TEREX | SCHAEFF

SERVICE-MANUAL

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In this Service Manual the individual components of the Schaeff construction machinery range as well as the functions and adjustments of the aggregates installed are described.

The hydraulic and electrical diagrams as well as cut-off views in connection with the operating manual and parts catalogue are to facilitate the repair and maintenance work.

We have purposely left out assembly and working steps as major repairs are normally carried out by experienced and qualified workshop personnel familiar with these type of repairs.

When carrying out a repair, safety and cleanliness at the workplace are essential. The use of excellent tools and the replacement of sealing parts at every repair should be self-evident.

Unless any special values are indicated, screw fittings are to be tightened using correct torque specifications.

This Service Manual is issued by the Customer Service Department of Messrs. Schaeff. It is to develop the after-sales service of Schaeff construction machinery together. The Service Bulletins we issue for your information can serve as a supplement.

This Manual is kept up-to-date through periodic supplements.

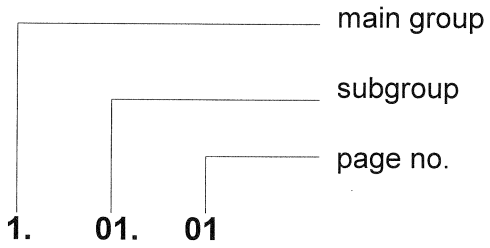
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The Service Manual is subdivided into main groups, subgroups and page numbers so that you can easily find special groups and pages.

This structuring will also facilitate the filing of revised versions and supplements within the framework of the technical alteration service.

E.g.



For the division of the main groups, please refer to the list of contents.
The subgroup division is done starting from the main group.
The page number follows the subgroup and main group number.

Please strictly follow the regulations for Accident Prevention valid in your country (see also 1.20).

The best safety measure to avoid accidents is to be careful when carrying out repairs. We therefore recommend to carefully study the corresponding information referring to the repair you intend to do.

Any maintenance and repair work on machines located in the field may only be performed when the work equipment is lowered to the ground, the engine is switched off, the machine is secured so that it cannot roll, and the hydraulic system is relieved.

If qualified personnel perform repair work in the workshop, the relevant Accident Prevention Regulations also apply.

Safety and Accident Prevention

1 Introductory remarks

Please read the operating instructions carefully before putting an earth-moving machine into operation and strictly follow the following remarks for a safe operation.

National safety regulations - e.g. the Accident Prevention Regulations, "Earth-Moving Machinery" (VBG 40) and "Vehicles" (VBG 12) in the Federal Republic of Germany - must also be complied with.

In addition to the operating instructions, legal regulations governing road traffic and road safety measures must also be observed. Such requirements could also apply in respect of handling hazardous goods or the wearing of personal safety equipment, for example.

Furthermore, safety laws governing work in particular locations (tunnels, adits, quarries, pontoons, contaminated areas, etc.) must likewise be observed.

2 Correct use

The earth-moving machine with normal shovel equipment is only to be used for work which is suitable for the machine's functions and its attachment.

Such work includes the digging, loading, displacing and dumping out of earth, stones or other materials and the loading of these materials onto lorries, conveyor belts or other means of transportation. The transport of the loading material, however, is mainly carried out by moving the earth-moving machine.

If special attachments, such as Uni-shovel, side dump shovel, sweeper, fork lift attachment etc. are mounted, special jobs can be done with the attachment.

Another or additional application, e.g. for transportation of passengers or using the lifting device as working platform etc. is not considered as correct use. The supplier is not liable for subsequent damage. The enduser himself bears the full risk.

It is part of the correct use to follow the operating and maintenance instructions and to carry out the maintenance as well as to follow the maintenance intervals.

3 General safety notes

It is important to refrain from any working methods which impair safety.

The earth-moving machine may only be used when it is in a safe, operational condition.

The manufacturer's operating instructions must be complied with for operation, maintenance, repair, assembly and transportation.

The plant operator must provide additional special safety instructions, wherever necessary, for specific local conditions.

The operating instructions and any information pertaining to safety must be carefully kept in the driver's cab.

The operating instructions and safety notes must be complete and fully readable.

Safety devices on earth-moving machines must not be deactivated or removed.

Protective work clothing must be worn during operation. Rings, scarves and unbuttoned jackets are to be avoided. Protective goggles, protective boots, helmets, gloves, reflecting jackets, ear-muffs, etc. may be required.

Before commencing work, information must be obtained on first aid and possible means of rescue (ambulance, fire brigade, helicopters).

A check must be carried out to ensure that the first aid box is at hand and that its contents comply with regulations.

Personnel must be aware of the location and method of operation of the fire extinguishers on the earth-moving machine as well as on-site fire-warning and fire-fighting equipment.

Loose parts such as tools or other accessories must be secured to the earth-moving machine.

Open doors, windows, covers, flaps, etc. must be secured so that they cannot slam shut.

4 Operation

Earth-moving machines may only be independently operated and serviced by people who

- are physically and mentally fit
- have been instructed in the operation or maintenance of the earth-moving machine and have demonstrated this ability to the plant operator
- can be expected to perform their allocated duties reliably

All these people must be of the legal minimum age.

They must be designated by the plant operator to operate or service the earth-moving machine.

Operating equipment (controls) may only be activated from the driver's seat.

The earth-moving machine may only be ascended and entered using the entrances and surfaces intended for this purpose.

The operator has to ensure that the cab, steps and other walked-on surfaces of the earth-moving machine are free of dirt, grease, oil, ice and snow.

5 Danger zone

•No one may enter the danger zone of earth-moving machines.

•The danger zone encompasses the area around the earth-moving machine in which people may be injured by movements of the earth-moving machine during operation, its working equipments and attachments, or by swinging out or falling loads, or by falling working equipment.

•The machine operator may only work with the earth-moving machine when the danger zone is free of personnel.

•The machine operator must give a warning signal to persons who may be in danger.

•The machine operator has to stop work with the earth-moving machine if anyone remains in the danger zone despite the warning.

•To ensure no danger of crushing, a sufficient safety distance (min. 500 mm) must be kept from solid objects, e.g. buildings, excavation slopes, scaffolding, other machines, etc.

If the above safety distance cannot be maintained, the area between solid objects and the working zone of the earth-moving machine must be blocked off.

•If conditions are such that the machine operator's view of the driving and working zone is restricted, he must be guided or the driving and working zone must be marked by a solid barricade.

The windows must be clean and free of ice.

Driving tracks must be designed so as to ensure smooth, safe operation, i.e. they must be sufficiently wide, on ground which has sufficient carrying capacity and as few slopes as possible.

Downhill tracks must be set out in such a way that loading machines can be braked safely.

6 Transport of passengers

Passengers must not be transported on the machine.

7 Stability

Earth-moving machines must be used, driven and operated in such a manner that their stability against overturning is ensured at all times.

The machine operator must drive at speeds which are suitable for local conditions.

The permitted payload of the earth-moving machine must not be exceeded.

Earth-moving machines must remain at a sufficient distance from the edges of quarries, pits, mounds and slopes to ensure there is no risk of falling.

Earth-moving machines must be secured so that they cannot roll or slip when in the vicinity of excavations, shafts, ditches, pits and slopes.

8 Travel operation

Before putting the earth-moving machine into operation, the driver's seat, mirrors and controls must be so adjusted as to ensure safe working.

The carrying capacity of bridges, cellar roofs, vaults, etc. must be verified before the earth-moving machine can drive over them.

The internal dimensions of constructions must be noted before entering underground passages, tunnels, etc.

On steep drops and uphill gradients, the load must be carried on the uphill side, if possible, in order to increase stability.

Before driving downhill, the appropriate gear for the terrain must be selected and the gear lever must not be moved during downhill travel (normal or crawler gear).

Earth-moving machines may only be driven on the open road when both the machine and the driver have the appropriate licence as required by the country in question.

Outside areas covered by general traffic regulations, e.g. on construction sites, traffic regulations should be applied in the proper manner. This should also apply with regard to drivers' licences.

9 Operation

The operator has to check the correct fastening of the attachments and / or lock of the quick exchange device daily before start of operation and after every attachment change. Move the attachment carefully at low height. Please ensure that nobody is in the danger zone during these checks.

The machine operator may only swing the working equipment over occupied drivers' seats, operator consoles and workplaces of other machines if these are protected by overhead guards (FOPS).

If a cab does not have the required protection, the driver of this vehicle must leave the driver's seat when the working equipment has to be slewed overhead.

The vehicles must be loaded in such a manner as to ensure that there is no overloading and no material can be lost during travel. The vehicle must be loaded from the lowest possible height.

At dumping points, earth-moving machines may only be operated when suitable measures have been taken to prevent rolling or falling.

10 Guides

Guides must be easily recognizable, e.g. by means of reflective clothing. They must remain within the machine operator's field of sight.

While guiding the machine, guides must not be given other jobs which may distract them from their task.

11 Danger of falling objects

Earth-moving machines may only be used where there is a danger of falling objects if the driver's seat and operator consoles have an overhead guard (FOPS). A front guard must be employed if there is a risk of materials breaking into the cab.

In front of walls e.g. of stacked materials, earth-moving machines must be positioned and operated in such a way that the driver's seat and entry to the driver's seat are not situated on the side facing the wall.

Demolition work may only be performed with earth-moving machines where there is no danger to personnel.

12 Working in the vicinity of underground power lines

Before commencing excavating work using earth-moving machines, it must be determined whether any underground power lines are present in the intended working zone which may present a danger to personnel.

If underground power lines are present, their exact position and course must be determined in consultation with the proprietor or operator of the lines, and the necessary safety precautions decided and implemented.

The course of power lines in the work area must be clearly marked, under supervision, before commencing any excavation work. If the position of lines cannot be determined, search ditches must be dug - manually, if needed.

If underground power lines are encountered unexpectedly or they or their protective covers are damaged, the machine operator must discontinue work immediately and notify the supervisor.

13 Working in the vicinity of overhead power lines

When the earth-moving machine is being used in the vicinity of overhead power lines and trolley wires, a safety distance which varies depending upon the nominal voltage of the overhead line must be maintained between the lines and the earth-moving machine and its working equipment, in order to prevent current overspill. This also applies to the distance between these lines and attached implements or loads.

The safety distances specified below must be complied with:

Nominal voltage	Safety distance in metres
- 1000 V	1.0 m
over 1 kV - 110 kV	3.0 m
over 110 kV - 220 kV	4.0 m
over 220 kV - 380 kV	5.0 m
nom. voltage unknown	5.0 m

In the observation of safety distances, all working movements of the earth-moving machine, e.g. positions of the boom, swinging ropes and the dimensions of attached loads must be taken into consideration. Uneven ground which would cause the earth-moving machine to be inclined and thus nearer to overhead lines must also be taken into account.

During work in windy conditions, both overhead lines and working equipment may swing out, thus reducing the safety distance.

If it is impossible to maintain sufficient distance from overhead power lines and trolley wires, the plant operator must consult with the proprietor or operator of the overhead lines to find other safety precautions to prevent current overspill. Such measures could be, e.g.

- Switching off the current
- Re-routing the overhead line
- Cabling, or
- Limiting the work zone of earth-moving machines.

14 Operation in closed rooms

If earth-moving machines are used in closed rooms, these areas must be sufficiently ventilated and special regulations observed.

15 Work stoppages

Before rest periods and at the end of the working day, the driver of the earth-moving machine must park the machine on ground with sufficient load capabilities and is as even as possible, and must secure it against movement.

Before rest periods and at the end of the working day, the driver must lower the working equipment onto the ground or secure it so that it cannot move about.

The driver must not leave the earth-moving machine if the working equipment has not been lowered to the ground or secured.

Earth-moving machines may only be parked in places where they do not present an obstacle, e.g. on the construction site or to plant traffic. Warning devices, e.g. triangles, warning cordons, flashing or hazard lights are to be used if necessary.

Before leaving the control console, the driver must bring all working equipment into home position and apply the brakes.

If the driver is leaving the earth-moving machine unattended, he must first turn off the drive motors and ensure that they cannot be started up by unauthorized persons (remove ignition key for example).

16 Crane operations

Crane operations are the hoisting, transporting and lowering of loads with the aid of a fixing device (rope, chain, etc.), whereby the assistance of personnel is required to attach and release the load.

Such work covers, for example, the lifting and lowering of pipes, heavy machine parts or containers with earth-moving machines.

Earth-moving machines may only be used for crane operations if the prescribed safety devices are present and in full working order. For earth-moving machines, these are:

- Safe fastening points for lifting device
- Table of carrying capacity
- Overload warning device*
- Hose rupture safety valve for boom cylinder*

*only in case of an admissible carrying capacity of more than 1000 kg

Loads must be attached in such a way that they cannot slip or fall out.

Personnel guiding the machine and attaching loads must always remain in the machine operator's field of sight.

The machine operator must carry loads as close to the ground as possible and prevent them from swinging.

Earth-moving machines may only travel with an attached load if the path of travel is fairly level.

When earth-moving machines are used for crane operations, personnel attaching loads may only approach the boom from the side and with the machine operator's permission. The machine operator may only give his permission if the earth-moving machine is standing still and the working equipment is not in motion.

Do not use fixing devices (ropes, chains) which are damaged or of inadequate dimensions. Protective gloves must always be worn when working with fixing devices.

17 Assembly, maintenance, repair

Earth-moving machines may only be assembled, converted or disassembled under the guidance of a suitable person designated by the plant operator and following the manufacturer's operating instructions.

After every change of attachment, the operator has to ensure the correct fastening and / or lock of the quick exchange device.

Work on braking, steering, hydraulic and electric systems of the earth-moving machine may only be carried out by expert personnel specially trained in these areas.

Stability must be ensured at all times during work on earth-moving machines.

The working equipment must be secured against movement by lowering them to the ground or equivalent measures, e.g. stays, trestles. When the engine is running, the insecured articulation area of loaders with articulated steering must not be entered.

When jacking up earth-moving machines, jacking devices must be positioned so that they cannot slip. Jacks must be positioned and applied absolutely straight, without tilting.

Raised earth-moving machines must be supported by suitable structures such as crosswise stacks of planks, square timbers or steel trusses.

Earth-moving machines which are raised with working equipment must be stabilized by a supporting structure immediately after lifting. Do not work under earth-moving machines which are only supported by the hydraulics.

The engine/motor must be turned off prior to all maintenance and repair work. These requirements may only be ignored in the case of maintenance or repair work which cannot be performed without the engine/ motor running.

Depressurize the hydraulic system when carrying out maintenance and repair jobs. To do this, lower the working equipment to the ground with the engine turned off and operate all hydraulic control levers until the hydraulic system is depressurized.

Before working on the electrics or when performing arc-welding on the machine, the connection to the battery must be interrupted.

When disconnecting the battery, first the negative pole then the positive pole must be disconnected. The battery must be re-connected in reverse order.

During repair work around the battery, the battery must be covered with insulating material; tools should never be placed on or near the battery.

Protective devices of moving machine parts may only be opened or removed when the drive has been switched off and cannot be switched on again by unauthorized persons. Protective devices are e.g. engine/motor covers, doors, protective grating, trim.

Upon completion of assembly, maintenance or repair work, all protective devices must once more be attached in the proper manner.

Load-bearing parts of earth-moving machines may only be welded following consultation with the manufacturer and in accordance with recognized welding principles.

Overhead guards (FOPS) must not be welded or drilled in any way which could impair their sturdiness.

Alterations, such as welding of the hydraulic system, may only be undertaken with the manufacturer's permission.

Before commencing work on the hydraulic system, the pilot pressure, back pressure and pressure inside the tank must be let off.

Lubricants cannot be taken internally and repeated skin contact should be avoided. There is no special danger to health if lubricants are used correctly. Please follow the safety recommendations issued by the mineral oil companies.

Only the hoses specified by the manufacturer may be used.

Hydraulic hoses must be routed and assembled by expert personnel.

Never smoke or handle open flames near or around the fuel tank and batteries.

18 Towing, loading, transportation

The towing of earth-moving machines may only be done with towing devices sufficiently dimensioned.

The fixing devices specified by the manufacturer must be employed.

For loading and transportation, earth-moving machines and all necessary auxiliary equipment must be secured against unwanted movement.

The travelling gear and track-laying gear of earth-moving machines must be sufficiently cleaned of mud, snow and ice to ensure that ramps can be driven up without risk of slipping.

When the earth-moving machine is transported on lorries, flat-bed trailers or by rail, it has to be carefully secured with wheel chocks and tie-downs at the fastening points.

Before setting off, the route to be taken must be examined to determine whether the roads are wide enough, entrances and passages under bridges are large enough and that roads and bridges have sufficient carrying capacity.

19 Monitoring and inspections

The machine must be thoroughly inspected by an authorized and trained person according to the safety regulations valid in your country:

- prior to the first commissioning and prior to re-commissioning after major changes
- at least once a year
- periodically according to the operating conditions and the conditions in the operator's company

The inspection report is to be put in writing and kept for future reference.

Furthermore, prior to each work shift, the machine operator must check the earth-moving machine according to the inspection chart.

Hydraulic hoses must be replaced as soon as the following damages are recognized:

- Damages to the outer layer which reach the intermediate layer
- Embrittled patches on the outer layer
- Deformations when under pressure or without pressure which differ from the original shape of the installed hose
- Leakages
- Damages to hose fittings or to the connection between the fitting and the hose

The coolant level must only be checked when it has cooled down; the cap must be turned carefully in order to bleed off excess pressure.

Prior to operations, the machine operator must check the function of the safety devices.

The machine operator must advise the supervisor immediately - and the person relieving him, should there be a change of operators - with regard to any shortcomings.

In the event of shortcomings which jeopardize the operating safety of the earth-moving machine, it must not be used until these have been eliminated.

20 Fire protection



A fire extinguisher has to be stored in the operator's cab. A fire extinguisher symbol has to be applied.

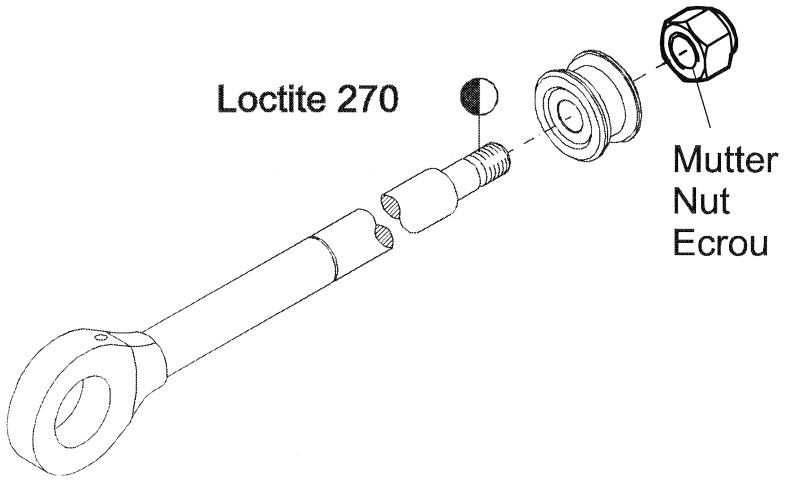
21 Emergency exit

The windscreen acts as an emergency exit. If a front guard is fitted or this exit can no longer be used for any other reason, an emergency hammer must be affixed at an easily accessible place inside the driver's cab.

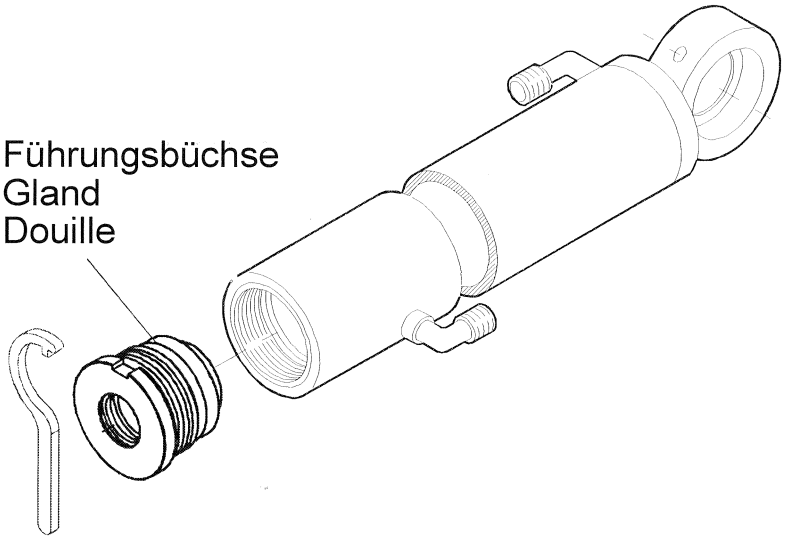
22 Other dangers

Failure of the hydraulics

If the hydraulic system fails due to a standstill of the diesel engine, a defectiveness of the hydraulic pump or a hydraulic oil leakage, only the **emergency** functions **„lower working equipment“** are possible.



Gewinde Kolbenmutter Thread of nut Filetage d'écrou	Anziehdrehmoment Nm Tightening torques Nm Couples de serrage Nm
M 18x2	200
M 20x2	260
M 22x2	410
M 24x2	450
M 27x2	810
M 30x2	1050
M 35x1,5	730
M 36x2	1075
M 36x3	1550
M 39x3	1700
M 40x1,5	730
M 42x2	1400
M 42x3	1850
M 48x3	2050
M 56x2	1600
M 60x2	1800
M 70x2	2500
M 80x2	2900
M 90x2	3200



Hydraulikzylinder ∅ Hydraulic cylinder ∅ Vérin hydraulique ∅	Gewinde - Führungsbüchse Thread - Bushing Filetage - Douille	Anziehdrehmomente Nm Tightening torques Nm Couples de serrage Nm
35/45	M50x2	200 - 230
50	M56x2	230 - 265
55	M60x2	250 - 290
63	M68x2	290 - 335
70	M75x2	330 - 380
70	M80x2	360 - 415
80	M85x2	390 - 450
90	M95x2	450 - 520
95	M100x2	480 - 550
100	M105x2	520 - 600
105	M110x2	550 - 635
110	M115x2	590 - 680
115	M120x2	630 - 725
125	M130x2	690 - 795

Pictograms

001 - 099 General control

100 - 119 Loader

120 - 139 Excavator

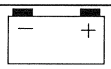
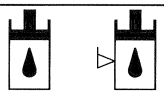
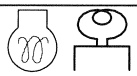
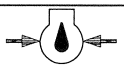
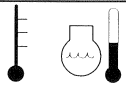
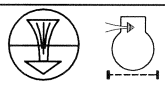
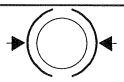
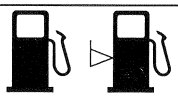
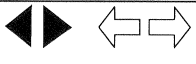
140 - 149 Backhoe excavator

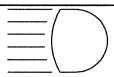
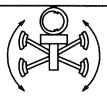
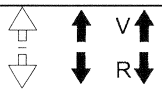
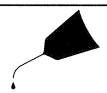
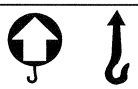
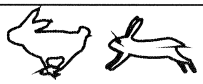
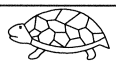
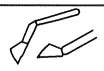
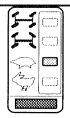
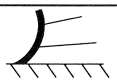
150 - 159 Universal-mounted excavator / loader

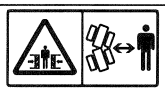
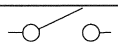
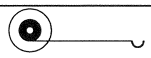
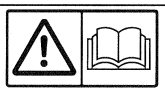
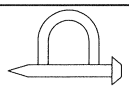
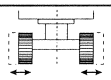
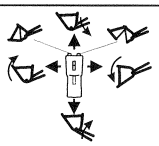
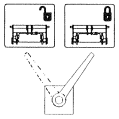
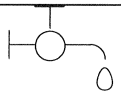
160 - 179 Walking excavator

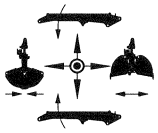
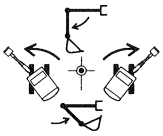
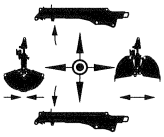
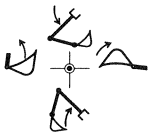
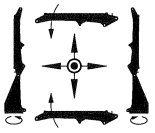
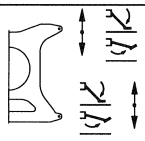
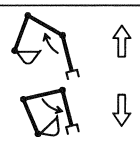
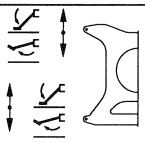
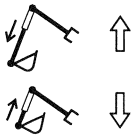
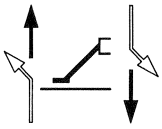
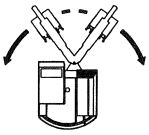
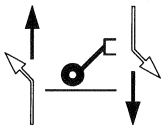
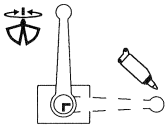
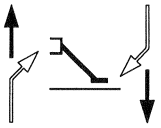
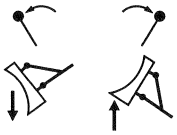
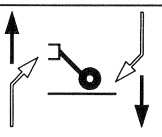
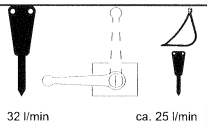
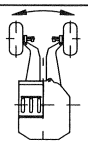
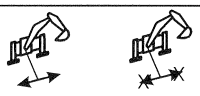
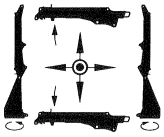
180 - 199 Tunnelling and mining machines / Rail-road excavator

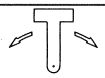
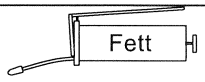
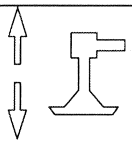
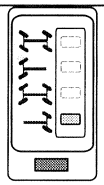
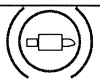
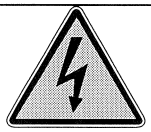
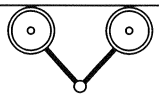
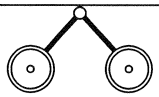
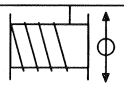
200 - Maintenance, safety, etc. in general

	Symbol	Description		Symbol	Description
001		Battery charge indicator	**012**		Hydraulic oil, hydraulic oil level
002		Pre-heat	**013**		Hydraulic oil temperature
003		Engine oil pressure	**014**		Hydraulic oil filter clogging indicator
004		Engine oil temperature	**015**		Horn
005		Engine oil level	**016**		Operational status, operating hours
006		Coolant temperature	**017**		Parking brake
007		Coolant level	**018**		Brake accumulator pressure
008		Air filter	**019**		Excavator brake
009		Fuel, fuel level	**020**		Service brake
010		Fan, Heater / ventilation	**021**		Hazard warning system
011		Windscreen wash/ wipe system	**022**		Direction indicator, left/right

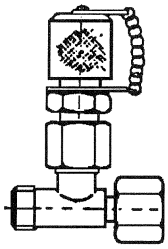
	Symbol	Description		Symbol	Description
023		Working floodlights	039		Speed control
024		Upper beam indicator	040		Oscillating axle lock
025		Direction of travel forward/reverse	041		Steering inversion
026		Rotating beacon	042		All-wheel steering crab / round steer
027		Light, lower beam	043		Rocker pedal for travel
028		Central grease system	044		Only shift when machine is at standstill
029		Lashing points	045		High gear
030		Overload warning device / Overload warning indicator	046		Cabin lift / lower
031		Suspension point for loading by crane	047		Steering control display
032		Travel speed, fast	048		First aid kit
033		Travel speed, slow	049		Fire extinguisher
034		Working hydraulics cut-off, excavator; loader / crane	050		Switch-over monitor for operating hours and time
035		Unlocked	051		Swing limitation, engine stop override
036		Locked	052		Switch for all-wheel steering
037		Float position	053		Interior lighting
038		Dozer blade	054		Reset hydraulic pulley block (crane)

	Symbol	Description		Symbol	Description
055		Quick movement hoisting winch	071		Danger of crushing
056		Cable uncoil limit switch	072		Danger of injury
057		Auxiliary winch	073		Observe notes in operating instructions
058		Magnet system	074		
059		Hydraulic rock breaker	075		Linde - no load automatics
060		Electric boom height limitation	076		Remote control
061		Undercarriage-adjustment	077		Warning - general
062		Switch-over swing speed, engine speed adjustment	078		Temperature - General
063		Free fall mode	079		
064		Grab rotation	080		
065		Bucket return positioning, lifting frame height limitation	100		Control by Joystick
066		Ride control system	101		
067		Bucket return positioning	102		Quick mount-hitch lock
068		Hydraulic oil level	103		
070		Safety distance, see item 202	104		Water pump for sweeper

	Symbol	Description		Symbol	Description
105		Warning lamp gearbox	151		Universal-mounted excavator/ loader (AL) controls ISO control system right
120		Control ISO control system-left Schaeff control system-right	152		Universal-mounted excavator/ loader (AL) controls Schaeff control system left
121		Control ISO control system right	153		Universal-mounted excavator/ loader (AL) controls Schaeff control system right
122		Control Schaeff control system left	154		Universal-mounted excavator/ loader (AL) controls Outrigger right
123		Control Intermediate boom (articulated boom type)	155		Universal-mounted excavator/ loader (AL) controls Outrigger left
124		Control telescopic stick in / out	160		Control Outrigger leg left
125		Control articulation „Knickmatik“	161		Control Wheel outrigger - left
126		Switch-over rock breaker / grapple	162		Control Outrigger leg right
127		Control dozer blade	163		Control Wheel outrigger - right
128		Switch-over (HR 12) Bucket - rocker breaker small / rock breaker big	164		Steering
140		Shifting of slide bearing	165		Wheel lock (HS 41)
150		Universal-mounted excavator/ loader (AL) controls ISO control left	166		Free wheel (HS 41 M)

	Symbol	Description		Symbol	Description
167		Outriggers spread	200		Grease gun
168		Outriggers lift / lower	201		Danger
169		Steering mode switch HS 41 MM	202		On the machine: caution, safety distance In the operating manual: warning
170		Outrigger left	203		Note
171		Outrigger right	204	R	Soot filter
180	D	Switch-over diesel drive	205		Particle filter
181		Switch-over electric drive			
182	START	Diesel engine ignition lock			
183		Pony truck IN			
184		Pony Truck OUT			
185	START E-Motor	Electric motor START			
186	Not-Aus E-Motor	Electric motor emergency OFF			
187		Cable drum (cable winch)			

Minimum basic equipment

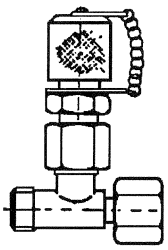


test port 8 L
part no. **5 066 234 200**

screwed fitting ELSD 8 L
part no. **1 919 060 351**

2 X

pilot pressure
"working hydraulics"
control pressure
"travel hydraulics"
etc.



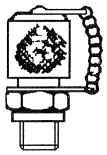
test port 10 L
part no. **5 066 234 230**

screwed fitting ELSD 10 L
part no. **1 919 060 352**

1 X

brake pressure

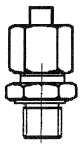
etc.



test port M 12x1,5
part no. **5 066 253 605**
seal ring 18x12x1,5
part no. **1 636 815 453**

2 X

control pressure
regulation start
housing pressure
"travel hydraulics"
etc.



nut 8 L
part no. **1 911 060 154**
plug
part no. **1 928 000 944**
screwed fitting G 8 L
part no. **1 915 000 418**

1 X

brake inching

etc.

Measuring hoses (Minimeß)

L = 2000mm part no. 5 066 253 600
L = 3200mm part no. 5 066 314 040
L = 6000mm part no. 5 066 314 070

L = 2500mm part no. 5 066 314 010
L = 5000mm part no. 5 066 314 055

Drift values in mm / minute

Machinery type		4 in 1 shovel		Lift cylinder	Tilt cylinder
SKS 611		---		3,0	5,5
SKS 633		---		3,0	5,5
SKS 634				**3,0**	**5,5**
SKS 661		---		3,5	5,5
SKL 823 (+Basic)		---		3,0	5,5
SKL 824				**3,0**	**5,5**
SKL 833 (+Basic)		---		3,0	5,5
SKL 834				**3,0**	**5,5**
SKL 843		---		3,5	6,0
SKL 844				**3,5**	**6,0**
SKL 853				**3,5**	**6,0**
SKL 863				**3,5**	**6,0**
SKL 871		---		2,0	3,0
SKL 873				3,5	3,0
SKL 873 SP				**3,5**	**3,0**
SKL 877		---		3,5	3,0
SCL 515		---		**3,0**	**5,5**

Machinery type	Boom cylinder	Intermediate boom cyl.	Dipperstick cylinder	Lift cylinder	Tilt cylinder
SMB 2041 M.	7,0		8,0	7,0	6,0
SMB 2041 GA	3,5	3,0	5,5	7.0	6,0
SKB 2000	5,5		5,5	3,5	3,0
HML 22 Mono	3,5		4,0		
HML 22 GA	3,0	2,5	4,0		
HML 23 GA	**3,0**	**3,0**	**4,0**		
HML 31 Mono	3,5		5,5		
HML 31 GA + Ci	3,5	2,5	5,5		
HML 32 Mono	**3,5**		**5,5**		
HML 32 GA + Ci	**3,5**	**2,5**	**5,5**		
HML 41 Mono	3,0		5,0		
HML 41 GA	3,0	2,5	5,0		
HML 42 GA	**3,0**	**2,5**	**5,0**		
HR 20 Mono	**3,0**		**3,0**		
HR 22 Mono	3,5		4,0		
HR 22 GA	3,0	2,5	4,0		
HR 31 Mono	3,5		5,5		
HR 31 GA	3,5	2,5	5,5		
HR 32 Mono	**3,5**		**5,5**		
HR 32 Ci	**3,5**	**2,5**	**5,5**		
HR 41 Mono	3,0		5,0		
HR 41 GA	3,0	2,5	5,0		
HR 42 Mono	**3,0**		**5,0**		

Machinery type	Boom cylinder		Dipperstick cylinder	Telescopic-stick in	
HS 41 M / MM	**3,0**		**4,0**	**7,0**	

Machinery type Engine / Control valve	Boom cylinder	Intermediate boom cyl.	Dipperstick cylinder	Lift cylinder	Tilt cylinder
HR 11 Mitsub./HV07	6,5		8,0		
HR 12 Mitsub./HV07	6,5		8,0		
HR 13 Mitsub./HV07	6,5		8,0		
HR 14 Mitsub./HV07	5,0		7,0		
HR 16 Mitsub./SM12	**4,0**		**8,0**		
HR 18 Mitsub./KVSE	**3,0**		**3,0**		
HR 11 Mitsub./SX10	**6,5**		**8,0**		
HR 12 Mitsub./SX10	**6,5**		**8,0**		
HR 13 Mitsub./SX10	**6,5**		**8,0**		
HR 14 Mitsub./SX12	**4,0**		**7,0**		

Test conditions:

1. Hydraulic oil temperature approx. 50 - 60 °C.
2. Fit test port with gauge on the cylinder.
3. Retract and extend cylinder several times and operate working equipment to its maximum reach until the gauge indicates a load pressure of 100 bar (if necessary charge with weight).
4. Measure piston rod length of cylinder
5. Measure piston rod length again after 5 minutes
6. The difference converted into 1 minute is the drift of the cylinder
7. The values indicated are valid for hydraulic oil 10 W 40 (viscosity at 50°C approx. 35 mm^2/s (cST))

There may be differences if hydraulic oil with a different specification is used.

SUBGROUP LIST

Technical Data

SKL 863	2.11
SKL 873 / SKL 200	2.13
SKL 824	2.22
SKL 834	2.24
SKL 844	2.26
SKL 854	2.27
SKL 160	2.28
SKL 260	2.30
SKS 634	2.37
HML 22	2.49
HML 23	2.49.50
HML 31	2.50
HML 32	2.51
HML 41	2.52
HML 42	2.53
HR 20	2.60
HR 32	2.65
HR 42	2.67
HR 11	2.73
HR 12	2.74
HR 13	2.75
HR 14	2.76
HR 16	2.78
HR 18	2.80
HR 1.5	2.90
HR 1.6	2.91
HR 2.0	2.92
HR 3.7	2.97

TEREX | SCHAEFF

DIESEL ENGINE

Manufacturer:		Perkins
Type: Standard / fast travel version:		1004-40T
Performance acc. to DIN 70020 (ECE-R 24):	kW/PS	74 / 100 at 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	4,000
High idle:	min^{-1}	2,350 $^{+70}$
Low idle:	min^{-1}	750 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	220
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Torque of cylinder head studs	Nm	110 (only in case of repair)
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	12 / 65
Starter:	V/kW/PS	12 / 2.8 / 3.8
Starting aid:		glow system
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm. H4 halogen headlamps

TRANSMISSION

Travel pump:	type	A 4 VG 90 DA with pressure cut-off
Displacement:	max. cm^3/rev.	90
Travel motor / fast travel version:	type	A 6 VM 160 DA 5 / A 6 VM 160 DA 5
Displacement / fast travel version:	max. cm^3/rev.	160 / 160

TRAVEL RANGE

Symbol „tortoise“	20 / 36 km/h - version:	km/h	0 - 6.5 / 0 - 6.0 and 0 - 19.0
Symbol „rabbit“	20 / 36 km/h - version:	km/h	0 - 20 / 0 - 12 and 0 -36

Cardan shaft rev. at **20 km/h - version**

			adjustment at nominal speed tortoise / rabbit
and standard tyres	405/80 R25:	min^{-1}	510 / 1,625
	17,5-25:	min^{-1}	510 / 1,600
	19,5-LR24:	min^{-1}	510 / 1,610
	16/70-24:	min^{-1}	510 / 1,820
	455/70 R24:	min^{-1}	510 / 1,670

Cardan shaft rev. at **36 km/h - version**

			adjustment at nominal speed tortoise / rabbit		
			1./2. gear	/	1./2. gear
and standard tyres	405/80 R25:	min^{-1}	510 / 970		1,540 / 2,935
	17,5-25:	min^{-1}	510 / 970		1,515 / 2,890
	19,5-LR24:	min^{-1}	510 / 970		1,525 / 2,910
	16/70-24:	min^{-1}	510 / 970		1,725 / 3,290
	455/70 R24::	min^{-1}	510 / 970		1,580 / 3,015

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	28^{+2}
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	2,100 at 220 bar HP
Start-up speed:	min^{-1}	$1{,}150^{\pm 50}$
Engine stalling (rabbit) - dynamic:	min^{-1}	$2{,}000^{\pm 50}$ at 240 bar HP
Brake inching beginning / end:	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	25

STEERING

Steering unit:	type	LAUCSD 400/130
Steering pump:	make	Brown
Displacement:	cm^3/rev:	41
Steering pressure (high idle):	bar	175
Priority valve:	type	LSPSD 3.325-1

WORKING HYDRAULICS

Working pump:	make	Commercial
Displacement:	cm^3/rev.	41
Control valve:	type	F 130 CF
Servo-controlled valve:	type	PRSV C01

PRESSURE AND SETTING VALUES — working

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift:	bar	300
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280
- shovel dump out:	bar	160
- additional control circuit:	bar	230 / 230
- pilot pressure (charge pressure):	bar	28^{+2}

WORKING CYCLES

Lifting frame lift:	s	5.8
Lifting frame lower:	s	4.1
Shovel dump in:	s	1.3 in upper position
Shovel dump out:	s	1.3 in upper position

AXLES

Front axle, standard / fast travel version with self-locking differential:	make/type	Clark-Hurth 112 / 56
Rear axle with self-locking differential:	make/type	Clark-Hurth 311 / 112 / 77
Rear axle - fast travel version with self-locking differential:	make/type	Clark-Hurth 353 / 112 / 550

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B resp. API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

		ltr.	
Engine oil - change:	approx.	9.5	engine oil
Hydraulic oil (tank and system) - first filling:	approx.	100.0	hydraulic oil
Hydraulic oil tank - change:	approx.	75.0	hydraulic oil
Fuel tank:	approx.	143.0	diesel
Front axle - central housing:	approx.	7.0	transmission oil
Front axle - wheel hub:	approx.	1.4	transmission oil, each
Rear axle - central housing:	approx.	9.0	transmission oil
Rear axle - gearbox:	approx.	1.5	transmission oil
Rear axle - wheel hub:	approx.	1.4	transmission oil, each
Service brake:	approx.	0.35	ATF oil
Cooling agent:	approx.	17.5	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1006-60 T
Performance acc. to DIN 70020:	kW/PS	100 / 136 at 2,200 min^{-1}
Construction:		6 cylinders in line
Cooling:		water
Injection:		direct injection
Spec. fuel consumption:	g/kWh	220
Capacity:	cm^3	5,980
High idle:	min^{-1}	2,350 $^{+50}$
Low idle:	min^{-1}	750 $^{+50}$
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Further data:		see engine instruction book

ELECTRIC SYSTEM

Voltage:	V	24
Battery:	V/Ah/A	2 x 12 / 105 / 450
Alternator:	V/A	24 / 55
Starter:	V/kW/PS	24 / 4.0 / 5.4
Starting aid:		glow system
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

TRANSMISSION

Travel pump:	type	A 4 VG 125 DA with pressure cut-off
Displacement:	max. cm^3/rev.	125
Travel motor:	type	A 6 VM 160 DA 6
Displacement:	max. cm^3/rev.	160

TRAVEL RANGE

4 pre-selectable travel ranges, electro-hydraulically operated:

SKL 873: 20 km/h - version		
Gearbox position 1, tortoise / rabbit:	km/h	0 to 7 / 0 to 15
Gearbox position 2, tortoise / rabbit:	km/h	0 to 10 / 0 to 20
SKL 873: 36 km/h - version		
Gearbox position 1, tortoise / rabbit:	km/h	0 to 7 / 0 to 16
Gearbox position 2, tortoise / rabbit:	km/h	0 to 16 / 0 to 36

Cardan shaft rev. at **20 km/h - version**

			adjustment at nominal speed tortoise / rabbit	
			1./2. gear	1./2. gear
and standard tyres	17.5-25:	min^{-1}	450 / 660	900 / 1,320
	20.5-25 Michelin:	min^{-1}	450 / 660	820 / 1,200
	20.5-25 GoodYear:	min^{-1}	450 / 660	800 / 1,170
	555/70 R25:	min^{-1}	450 / 660	840 / 1,230

Cardan shaft rev. at **36 km/h - version**

			adjustment at nominal speed tortoise / rabbit	
			1./2. gear	1./2. gear
and standard tyres	17.5-25:	min^{-1}	450 / 1,035	1,030 / 2,370
	20.5-25 Michelin:	min^{-1}	450 / 1,035	935 / 2,150
	20.5-25 GoodYear:	min^{-1}	450 / 1,035	915 / 2,100
	555/70 R25:	min^{-1}	450 / 1,035	960 / 2,210

Cardan shaft rev. at **40 km/h - version**			adjustment at nominal speed tortoise / rabbit 1./2. gear / 1./2. gear
and standard tyres	17.5-25:	min^{-1}	450 / 1,035 1,140 / 2,600
	20.5-25 Michelin:	min^{-1}	450 / 1,035 1,040 / 2,380
	20.5-25 GoodYear:	min^{-1}	450 / 1,035 1,015 / 2,330
	555/70 R25:	min^{-1}	450 / 1,035 1,065 / 2,450

PRESSURE AND SETTING VALUES, TRAVEL

Suction pressure:	max. bar	- 0.25
Charge pressure (high idle):	bar	32 $^{\pm 1}$
High pressure (safety valves):	bar	480
Pressure cut-off:	bar	440 $^{\pm 10}$
Case pressure:	max. bar	2.5
Regulation start (DA-motor):	bar	210 (motor can be stalled up to 2,100 $_{-50}$ min^{-1})
Start-up speed:	min^{-1}	1,150 $^{\pm 50}$
Engine stalling (tortoise):	min^{-1}	2,000 $^{+100}$ at full speed and 220 bar HP
Brake inching beginning / end:	bar	5 / 13

STEERING

Steering unit:	type	Rexroth LAGU 320/160-12/LD 240-175
Servo selector valve:	type	Rexroth 7730
Steering pump:	make	Brueninghaus (see working hydraulics)
Steering pressure:	bar	175

WORKING HYDRAULICS

Working and steering pump:	make	Brueninghaus/Rexroth
	type	A10 VO 71 DFR 1
Displacement:	cm^3/rev.	71
	ltr./min	156
Stand-by pressure (flow controller):	bar	30 $^{+2}$
Servo-controlled valve:	type	PRSV C01
Control valve:	type	Rexroth 3 M6-15

PRESSURE AND SETTING VALUES, WORKING

LS pressure relief valve:	bar	250
Line relief pressures:		
- lifting frame lift:	bar	280
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280
- shovel dump out:	bar	280
- additional control circuit:	bar	230 / 230

WORKING CYCLES

Lifting frame lift:	s	5.9
Lifting frame lower:	s	3.9
Shovel dump in:	s	2.7
Shovel dump out:	s	1.2

AXLES

Front axle:	make/type	Hurth 176/306 with self-locking diff.
Rear axle:	make/type	Hurth 360/176/54 with self-locking diff.
Lock value:		max. 45%
Front axle:	make/type	Hurth 176/306 with self-locking diff.
Rear axle - fast travel version:	make/type	Clark-Hurth 360/176/51 with self-locking differential

BRAKE SYSTEM

Service brake (four-wheel-brake):		hydraulic 2-circuit brake, oil-immersed disks of both axles
Parking brake (hydraulic hand brake valve):		spring-loaded brake acting on the disks of both axles
Additional brake:		hydrostatic by closed circuit of the transmission
Brake pump (accessory drive):	make	Rexroth
Brake pressure (service brake):	max. bar	60^{+6}
Accumulator charge valve:	make	Rexroth type LT 13
Cut-in / cut-off pressure:	bar	120 - 150
Sequence valve (pressure sequence valve):	bar	Δp 13 (e.g. 60 bar brake pressure means 60 bar at the inching valve and 47 bar at the brake)
Displacement:	cm^3/rev.	11
	ltr./min.	24
Opening pressure (parking brake):	bar	15
Setting value, parking brake:	bar	25

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B or API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	hydraulic oil

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil - change:	approx. 15.0	engine oil
Hydraulic oil (tank and system):	approx. 170.0	hydraulic oil
Hydraulic oil (change):	approx. 130.0	hydraulic oil
Fuel tank:	approx. 210.0	diesel
Front axle - central housing:	approx. 11.5	transmission oil
Front axle - wheel hub:	approx. 2.35	transmission oil, each
Rear axle - central housing:	approx. 10.5	transmission oil
Rear axle - reduction gearbox:	approx. 3.4	transmission oil
Rear axle - wheel hub:	approx. 2.35	transmission oil, each
Service brake:	connected to the hydraulic system	
Cooling agent:	approx. 46.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1006-60 T
Performance acc. to DIN 70020:	kW/PS	100 / 136 at 2,200 min^{-1}
Construction:		6 cylinders in line
Cooling:		water
Injection:		direct injection
Spec. fuel consumption:	g/kWh	220
Capacity:	cm^3	5,980
High idle:	min^{-1}	2,350 $^{+50}$
Low idle:	min^{-1}	750 $^{+50}$
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Further data:		see engine instruction book

ELECTRIC SYSTEM

Voltage:	V	24
Battery:	V/Ah/A	2 x 12 / 105 / 450
Alternator:	V/A	24 / 55
Starter:	V/kW/PS	24 / 4.0 / 5.4
Starting aid:		glow system
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

TRANSMISSION

Travel pump:	type	A 4 VG 125 DA with pressure cut-off
Displacement:	max. cm^3/rev.	125
Travel motor:	type	A 6 VM 160 DA 6
Displacement:	max. cm^3/rev.	160

TRAVEL RANGE

4 pre-selectable travel ranges, electro-hydraulically operated:

SKL 873: 20 km/h - version		
Gearbox position 1, tortoise / rabbit:	km/h	0 to 7 / 0 to 15
Gearbox position 2, tortoise / rabbit:	km/h	0 to 10 / 0 to 20
SKL 873: 40 km/h - version		
Gearbox position 1, tortoise / rabbit:	km/h	0 to 7 / 0 to 16
Gearbox position 2, tortoise / rabbit:	km/h	0 to 16 / 0 to 40

Cardan shaft rev. at **20 km/h - version**

tyres				adjustment at nominal speed tortoise / rabbit 1./2. gear	/	1./2. gear
standard:	20.5-25 12PR E91TL	Dunlop:	min^{-1}	450 / 660		820 / 1,200
option:	20.5 R25 XH TL	Michelin:	min^{-1}	450 / 660		800 / 1,170
	20.5-25 12PR SGLD/L-2	Good Year:	min^{-1}	450 / 660		800 / 1,170
	555/70 R25	Michelin:	min^{-1}	450 / 660		840 / 1,230
	20.5 R25 RL-2	Good Year:	min^{-1}	450 / 660		800 / 1,170

Cardan shaft rev. at **40 km/h - version**

tyres				adjustment at nominal speed tortoise / rabbit 1./2. gear	/	1./2. gear
standard:	20.5-25 12PR E91TL	Dunlop:	min^{-1}	450 / 1,035		1,040 / 2,380
option:	20.5 R25 XH TL	Michelin:	min^{-1}	450 / 1,035		1,015 / 2,330
	20.5-25 12PR SGLD/L-2	Good Year:	min^{-1}	450 / 1,035		1,015 / 2,330
	555/70 R25	Michelin:	min^{-1}	450 / 1,035		1,065 / 2,450
	20.5 R25 RL-2	Good Year:	min^{-1}	450 / 1,035		1,015 / 2,330

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	- 0.25
Charge pressure (high idle):	bar	32 $^{\pm 1}$
High pressure (safety valves):	bar	480
Pressure cut-off:	bar	440 $^{\pm 10}$
Case pressure:	max. bar	2.5
Regulation start (DA-motor):	bar	210 (motor can be stalled up to 2,100 $_{-50}$ min^{-1})
Start-up speed:	min^{-1}	1,150 $^{\pm 50}$
Engine stalling (tortoise):	min^{-1}	2,000 $^{-100}$ at full speed and 220 bar HP
Brake inching beginning / end:	bar	5 / 13

STEERING

Steering unit:	type	Rexroth LAGU 320/160-12/LD 240-175
Servo selector valve:	type	Rexroth 7730
Steering pump:	make	Brueninghaus (see working hydraulics)
Steering pressure:	bar	175

WORKING HYDRAULICS

Working and steering pump:	make	Brueninghaus/Rexroth
	type	A10 VO 71 DFR 1
Displacement:	cm³/rev.	71
	ltr./min	156
Stand-by pressure (flow controller):	bar	30 $^{+2}$
Servo-controlled valve:	type	PRSV C01
Control valve:	type	Rexroth 3 M6-15

PRESSURE AND SETTING VALUES — working

LS pressure relief valve:	bar	250
Line relief pressures:		
- lifting frame lift:	bar	280 $^{+10}$
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280 $^{+10}$
- shovel dump out:	bar	280 $^{+10}$
- additional control circuit:	bar	230 $^{+10}$ / 230 $^{+10}$

WORKING CYCLES

Lifting frame lift:	s	6.3
Lifting frame lower:	s	4.3
Shovel dump in:	s	1.3
Shovel dump out:	s	1.4

AXLES

Front axle with self-locking diff., 20 km/h - version:	make/type	DANA 176 / 348
Rear axle with self-locking diff., 20 km/h - version:	make/type	DANA 360 / 176 / 70
Lock value:	max. 45%	
Front axle with self-locking diff., 40 km/h - version:	make/type	DANA 176 / 348
Rear axle with self-locking diff., 40 km/h - version:	make/type	DANA 360 / 176 / 69

BRAKE SYSTEM

Service brake (four-wheel-brake):		hydraulic 2-circuit brake, oil-immersed disks of both axles
Parking brake (hydraulic hand brake valve):		spring-loaded brake acting on the disks of both axles
Additional brake:		hydrostatic by closed circuit of the transmission
Brake pump (accessory drive):	make	Rexroth
Brake pressure (service brake):	max. bar	60 $^{+6}$
Accumulator charge valve:	make	Rexroth type LT 13
Cut-in / cut-off pressure:	bar	120 - 150
Sequence valve (pressure sequence valve):	bar	Δp 13 (e.g. 60 bar brake pressure means 60 bar at the inching valve and 47 bar at the brake)
Displacement:	cm^3/rev.	11
	ltr./min.	24
Opening pressure (parking brake):	bar	15
Setting value, parking brake:	bar	25

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B or API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	hydraulic oil

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil - change:	approx. 15.0	engine oil
Hydraulic oil (tank and system):	approx. 170.0	hydraulic oil
Hydraulic oil (change):	approx. 130.0	hydraulic oil
Fuel tank:	approx. 210.0	diesel
Front axle - central housing:	approx. 11.5	transmission oil
Front axle - wheel hub:	approx. 2.35	transmission oil, each
Rear axle - central housing:	approx. 10.5	transmission oil
Rear axle - reduction gearbox:	approx. 3.4	transmission oil
Rear axle - wheel hub:	approx. 2.35	transmission oil, each
Service brake:	connected to the hydraulic system	
Cooling agent:	approx. 46.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1106C-E60TA
Performance acc. to DIN 70020:	kW/PS	106 / 144 at 2,200 min^{-1}
Construction:		6 cylinders in line
Cooling:		water
Injection:		direct injection
Spec. fuel consumption:	g/kWh	220
Capacity:	cm^3	6,000
High idle:	min^{-1}	2,350 $^{+50}$
Low idle:	min^{-1}	750 $^{+50}$
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Further data:		see engine instruction book

ELECTRIC SYSTEM

Voltage:	V	24
Battery:	V/Ah/A	2 x 12 / 105 / 760
Alternator:	V/A	24 / 80
Starter:	V/kW/PS	24 / 4.5 / 6.1
Starting aid:		glow system
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

TRANSMISSION

Travel pump:	type	A 4 VG 125 DA with pressure cut-off
Displacement:	max. cm^3/rev.	125
Travel motor:	type	A 6 VM 160 DA 6
Displacement:	max. cm^3/rev.	160

TRAVEL RANGE

4 pre-selectable travel ranges, electro-hydraulically operated:

SKL 873: 20 km/h - version		
Gearbox position 1, tortoise / rabbit:	km/h	0 to 7 / 0 to 15
Gearbox position 2, tortoise / rabbit:	km/h	0 to 10 / 0 to 20
SKL 873: 40 km/h - version		
Gearbox position 1, tortoise / rabbit:	km/h	0 to 7 / 0 to 16
Gearbox position 2, tortoise / rabbit:	km/h	0 to 16 / 0 to 40

Cardan shaft rev. at **20 km/h - version**

tyres				adjustment at nominal speed tortoise / rabbit 1./2. gear	/	1./2. gear
standard:	20.5-25 12PR SGLD/L-2	Good Year:	min^{-1}	450 / 660		800 / 1,170
option:	20.5 R25 XHA TL	Michelin:	min^{-1}	450 / 660		800 / 1,170
	20.5-25 12PR E91TL	Dunlop:	min^{-1}	450 / 660		820 / 1,200
	555/70 R25 XHF	Michelin:	min^{-1}	450 / 660		840 / 1,230
	20.5 R25 EM RL-2	Good Year:	min^{-1}	450 / 660		800 / 1,170

Cardan shaft rev. at **40 km/h - version**

tyres				adjustment at nominal speed tortoise / rabbit 1./2. gear	/	1./2. gear
standard:	20.5-25 12PR SGLD/L-2	Good Year:	min^{-1}	450 / 1,035		1,015 / 2,330
option:	20.5 R25 XHA TL	Michelin:	min^{-1}	450 / 1,035		1,015 / 2,330
	20.5-25 12PR E91TL	Dunlop:	min^{-1}	450 / 1,035		1,040 / 2,380
	555/70 R25 XHF	Michelin:	min^{-1}	450 / 1,035		1,065 / 2,450
	20.5 R25 EM RL-2	Good Year:	min^{-1}	450 / 1,035		1,015 / 2,330

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	- 0.25
Charge pressure (high idle):	bar	32 $^{\pm 1}$
High pressure (safety valves):	bar	480
Pressure cut-off:	bar	440 $^{\pm 10}$
Case pressure:	max. bar	2.5
Regulation start (DA-motor):	bar	220 (motor can be stalled up to 2,100 $_{-50}$ min^{-1})
Start-up speed:	min^{-1}	1,150 $^{\pm 50}$
Engine stalling (tortoise):	min^{-1}	2,000 $^{-100}$ at full speed and 220 bar HP
Brake inching beginning / end:	bar	5 / 13

STEERING

Steering unit:	type	Rexroth LAGU 320/160-12/LD 240-175
Servo selector valve:	type	Rexroth 7730
Steering pump:	make	Brueninghaus (see working hydraulics)
Steering pressure:	bar	205 $^{+10}/_{-5}$ (LS eff. 175 bar)
Supplementary steering (shift pressure)	bar	20 $^{\pm 2}$

WORKING HYDRAULICS

Working and steering pump:	make	Brueninghaus/Rexroth
	type	A10 VO 71 DFR 1
Displacement:	cm³/rev.	71
	ltr./min	156
Stand-by pressure (flow controller):	bar	32 $^{+2}$
Servo-controlled valve:	type	PRSV C01
Control valve:	type	Rexroth 3 M6-15

PRESSURE AND SETTING VALUES — working

LS pressure relief valve:	bar	250
Line relief pressures:		
- lifting frame lift:	bar	280 $^{+10}$
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280 $^{+10}$
- shovel dump out:	bar	280 $^{+10}$
- additional control circuit:	bar	230 $^{+10}$ / 230 $^{+10}$

WORKING CYCLES

Lifting frame lift:	s	6.3
Lifting frame lower:	s	4.3
Shovel dump in:	s	1.3
Shovel dump out:	s	1.4

AXLES

Front axle with self-locking diff., 20 km/h - version:	make/type	DANA 176 / 348
Rear axle with self-locking diff., 20 km/h - version:	make/type	DANA 360 / 176 / 70
Lock value:	max. 45%	
Front axle with self-locking diff., 40 km/h - version:	make/type	DANA 176 / 348
Rear axle with self-locking diff., 40 km/h - version:	make/type	DANA 360 / 176 / 69

BRAKE SYSTEM

Service brake (four-wheel-brake):		hydraulic 2-circuit brake, oil-immersed disks of both axles
Parking brake (hydraulic hand brake valve):		spring-loaded brake acting on the disks of both axles
Additional brake:		hydrostatic by closed circuit of the transmission
Brake pump (accessory drive):	make	Cassappa PLP 20.11.2
Displacement:	cm^3/rev.	11
	ltr./min.	24
Brake pressure (service brake):	max. bar	60 $^{+6}$
Accumulator charge valve:	make	Rexroth type LT 13
Cut-in / cut-off pressure:	bar	120 - 150
Sequence valve (pressure sequence valve):	bar	Δp 13 (e.g. 60 bar brake pressure means 60 bar at the inching valve and 47 bar at the brake)
Opening pressure (parking brake):	bar	15
Setting value, parking brake:	bar	25

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B or API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	hydraulic oil

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil - change:	approx. 15.0	engine oil (+ 2 x 0.5 l filter)
Hydraulic oil (tank and system):	approx. 170.0	hydraulic oil
Hydraulic oil (change):	approx. 130.0	hydraulic oil
Fuel tank:	approx. 210.0	diesel
Front axle - central housing:	approx. 11.5	transmission oil
Front axle - wheel hub:	approx. 2.35	transmission oil, each
Rear axle - central housing:	approx. 10.5	transmission oil
Rear axle - reduction gearbox:	approx. 3.4	transmission oil
Rear axle - wheel hub:	approx. 2.35	transmission oil, each
Service brake:	connected to the hydraulic system	
Cooling agent:	approx. 46.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Deutz
Type:		F4M 2011
Performance according to (ECE-R24/ISO1585/ISO9249):	kW/PS	37 / 50 at 2,300 min^{-1}
Construction:		4 cylinders in line
Cooling:		external oil cooling
Injection:		direct injection
Capacity:	cm^3	3,100
High idle:	min^{-1}	2,450 $^{+50}$
Low idle:	min^{-1}	850 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	216
Tappet clearance - inlet cold:	mm	0.30
Tappet clearance - outlet cold:	mm	0.50
Torque of cylinder head studs (only in case of repair):	Nm	30 / 80 / 160 Tightening angle 90°
Further data:		see engine instruction book or chapter 3

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 74 / 680 (EN)
Generator:	V/A	14 / 55
Starter:	V/kW/PS	12 / 2.3 / 3.1
Cold start aid:		heater plug
Lighting:		acc. to German motor vehicle construction and use regulation ("StVZO") and Euronorm. H4 halogen headlamp. Two working lights at the front.

TRANSMISSION

Travel pump:	type	A 4 VG 40 DA with pressure cut-off
Displacement:	max. cm^3/rev.	40
Travel motor 20/36 km/h version:	type	A 6 VM 55 DA 2
Displacement 20/36 km/h version:	max. cm^3/rev.	55

TRAVEL RANGE

Two/ four pre-selectable travel ranges, electro-hydraulically controlled:

SKL 824:	**20 km/h - version:**		
	tortoise / rabbit	km/h	0 to 7.0 / 0 to 20
SKL 824 S:	**36 km/h - version:**		
Gearbox position 1,	tortoise / rabbit:	km/h	0 to 6.5 / 0 to 18
Gearbox position 2,	tortoise / rabbit:	km/h	0 to 13 / 0 to 36

Cardan shaft rev. at **20 km/h - version**			adjustment at nominal speed tortoise / rabbit
and standard tyres	365/70 R18:	min^{-1}	650 / 1,985
	12,5-18:	min^{-1}	650 / 1,985
	335/80 R18:	min^{-1}	650 / 1,940

Cardan shaft rev. at **36 km/h - version**			adjustment at nominal speed tortoise / rabbit		
			1./2. gear	/	1./2. gear
and standard tyres	365/70 R18:	min^{-1}	630 / 1,290		1,750 / 3,565
	12,5-18:	min^{-1}	630 / 1,290		1,750 / 3,565
	335/80 R18:	min^{-1}	630 / 1,290		1,710 / 3.490

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	$30^{\pm 1}$
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	$2{,}200^{-50}$ at 240 bar HP
		(see setting instructions, chapter 5, measuring method 2)
Start-up speed:	min^{-1}	1,150
Engine stalling (rabbit) - dynamic:	min^{-1}	$2{,}100^{-100}$ at 260 bar HP
Brake inching beginning / end:	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	22

STEERING

Steering unit:	type	Danfoss OSPC 250 LS dyn.
Steering pump:	make	Cassappa
Displacement:	cm^3/rev:	17.8
Steering pressure (high idle):	bar	175
Priority valve:	type	Danfoss OLS 80 dyn.

WORKING HYDRAULICS

Working pump:	make	Cassappa
Displacement:	l/min.	41
Valve bank:	type	Parker P70
Servo-controlled valve:	type	Brown PRSV

PRESSURE AND SETTING VALUES — working

Main pressure relief valve (high idle):	max. bar	250	
Line relief pressures:			
- lifting frame lift:	bar	280	
- lifting frame lower:	bar	anti-cavitation	
- shovel dump in:	bar	280	
- shovel dump out:	bar	160	(up to s/n 824/0236)
	bar	125	(from s/n 824/0237, before 824/0234)
- additional control circuit:	bar	230 / 230	
- pilot pressure (charge pressure):	bar	$30^{\pm 1}$	

WORKING CYCLES

Lifting frame lift:	s	4.9
Lifting frame lower:	s	3.4
Shovel dump in:	s	---
Shovel dump out:	s	---

AXLES

Front axle with self-locking differential -	20 km/h-version:	make/type	ZF / AP – R – 715 // 4472 004 064
Rear axle with self-locking differential -	20 km/h-version:	make/type	ZF / AP – R – 715 // 4472 004 065
Front axle with self-locking differential -	36 km/h-version:	make/type	ZF / AP – R – 715 // 4472 004 064
Rear axle with self-locking differential -	36 km/h-version:	make/type	ZF / AP – R – 715 // 4472 004 067

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake, front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B or API-GL 5 resp., SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil with oil filter and oil cooler - change:	approx. 13.0	engine oil
Hydraulic oil (tank and system) - first filling:	approx. 49.0	hydraulic oil
Hydraulic oil tank (change):	approx. 40.0	hydraulic oil
Fuel tank:	approx. 75.0	diesel
Front axle - central housing:	approx. 3.5	transmission oil
Front axle - wheel hub:	approx. 0.3	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx. 4.0	transmission oil
Rear axle - wheel hub:	approx. 0.3	transmission oil, each
Service brake:	approx. 0.25	ATF oil

DIESEL ENGINE

Manufacturer:		Deutz
Type:		F4M 2011
Performance according to (ECE-R24/ISO1585/ISO9249):	kW/PS	44 / 60 at 2,400 min^{-1}
Construction:		4 cylinders in line
Cooling:		external oil cooling
Injection:		direct injection
Capacity:	cm^3	3,100
High idle:	min^{-1}	2,550 $^{+50}$
Low idle:	min^{-1}	850 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	218
Tappet clearance - inlet cold:	mm	0.30
Tappet clearance - outlet cold:	mm	0.50
Torque of cylinder head studs (only in case of repair):	Nm	30 / 80 / 160 Tightening angle 90°
Further data:		see engine instruction book or chapter 3

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 74 / 680 (EN)
Generator:	V/A	14 / 55
Starter:	V/kW/PS	12 / 2.3 / 3.1
Cold start aid:		heater plug
Lighting:		acc. to German motor vehicle construction and use regulation ("StVZO") and Euronorm. H4 halogen headlamp. Two working lights at the front.

TRANSMISSION

Travel pump:	type	A 4 VG 56 DA with pressure cut-off
Displacement:	max. cm^3/rev.	56
Travel motor 20/36 km/h version:	type	A 6 VM 80 DA 2
Displacement 20/36 km/h version:	max. cm^3/rev.	80

TRAVEL RANGE

Two/ four pre-selectable travel ranges, electro-hydraulically controlled:

SKL 834:	**20 km/h - version:**		
	tortoise / rabbit	km/h	0 to 7.0 / 0 to 20
SKL 834 S:	**36 km/h - version:**		
Gearbox position 1, tortoise / rabbit:		km/h	0 to 6.5 / 0 to 18
Gearbox position 2, tortoise / rabbit:		km/h	0 to 13 / 0 to 36

Cardan shaft rev. at **20 km/h - version**			adjustment at nominal speed tortoise / rabbit
and standard tyres	405/70 R18:	min^{-1}	650 / 1,880
	12,5-20:	min^{-1}	650 / 1,900
	335/80 R20:	min^{-1}	650 / 1,850

Cardan shaft rev. at **36 km/h - version**			adjustment at nominal speed tortoise / rabbit		
			1./2. gear	/	1./2. gear
and standard tyres	405/70 R18:	min^{-1}	635 / 1,300		1,660 / 3,390
	12,5-20:	min^{-1}	635 / 1,300		1,675 / 3,420
	335/80 R20:	min^{-1}	635 / 1,300		1,625 / 3,320

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	0.5 $^{\pm 0.1}$
Charge pressure (high idle):	bar	30 $^{\pm 1}$
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	2,300 $^{-50}$ at 180 bar
		(see setting instructions, chapter 5, measuring method 2)
Start-up speed:	min^{-1}	1,150
Engine stalling (rabbit) - dynamic:	min^{-1}	2,200 $^{-100}$ at 220 bar HP
Brake inching beginning / end:	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	22

STEERING

Steering unit:	type	Danfoss OSPC 250 LS dyn.
Steering pump:	make	Cassappa
Displacement:	cm^3/rev:	27
Steering pressure (high idle):	bar	175
Priority valve:	type	Danfoss OLS 80 dyn.

WORKING HYDRAULICS

Working pump:	make	Cassappa
Displacement:	l/min.	64
Valve bank:	type	Parker P 70
Servo-controlled valve:	type	Brown PRSV

PRESSURE AND SETTING VALUES — working

Main pressure relief valve (high idle):	max. bar	250	
Line relief pressures:			
- lifting frame lift:	bar	280	
- lifting frame lower:	bar	anti-cavitation	
- shovel dump in:	bar	280	
- shovel dump out:	bar	160	(up to s/n 834/0579)
	bar	125	(from s/n 834/0580, before /0522 to /0528; /0553 to /0561; /0576 to /0578)
- additional control circuit:	bar	230 / 230	
- pilot pressure (charge pressure):	bar	30 $^{\pm 1}$	

WORKING CYCLES

Lifting frame lift:	s	4.7
Lifting frame lower:	s	3.2
Shovel dump in:	s	---
Shovel dump out:	s	---

AXLES

Front axle with self-locking differential -	20 km/h-version:	make/type	ZF / AP – R – 715 // 4472 004 061
Rear axle with self-locking differential -	20 km/h-version:	make/type	ZF / AP – R – 715 // 4472 004 060
Front axle with self-locking differential -	36 km/h-version:	make/type	ZF / AP – R – 715 // 4472 004 061
Rear axle with self-locking differential -	36 km/h-version:	make/type	ZF / AP – R – 715 // 4472 004 066

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake, front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B or API-GL 5 resp., SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

		ltr.	
Engine oil with oil filter and oil cooler - change:	approx.	13.0	engine oil
Hydraulic oil (tank and system) - first filling:	approx.	55.0	hydraulic oil
Hydraulic oil tank (change):	approx.	46.0	hydraulic oil
Fuel tank:	approx.	75.0	diesel
Front axle - central housing:	approx.	4.0	transmission oil
Front axle - wheel hub:	approx.	0.3	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx.	4.5	transmission oil
Rear axle - wheel hub:	approx.	0.3	transmission oil, each
Service brake:	approx.	0.25	ATF oil

DIESEL ENGINE

Manufacturer:		Deutz
Type:		BF4M 2011 Turbo
Performance according to (ECE-R24/ISO1585/ISO9249):	kW/PS	54 / 73.5 at 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		external oil cooling
Injection:		direct injection, turbo charged
Capacity:	cm^3	3,100
High idle:	min^{-1}	2,350 $^{+50}$
Low idle:	min^{-1}	850 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	205
Tappet clearance - inlet cold:	mm	0.30
Tappet clearance - outlet cold:	mm	0.50
Torque of cylinder head studs (only in case of repair):	Nm	30 / 80 / 160 Tightening angle 90°
Further data:		see engine instruction book or chapter 3

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 74 / 680 (EN)
Generator:	V/A	14 / 55
Starter:	V/kW/PS	12 / 2.3 / 3.1
Cold start aid:		heater plug
Lighting:		acc. to German motor vehicle construction and use regulation ("StVZO") and Euronorm. H4 halogen headlamp. Two working lights at the front.

TRANSMISSION

Travel pump:	type	A 4 VG 56 DA with pressure cut-off
Displacement:	max. cm^3/rev.	56
Travel motor 20/36 km/h version:	type	A 6 VM 80 DA 5 / 63 W
Displacement 20/36 km/h version:	max. cm^3/rev.	80

TRAVEL RANGE

Two/ four pre-selectable travel ranges, electro-hydraulically controlled:

SKL 844:	**20 km/h - version:**		
	tortoise / rabbit	km/h	0 to 6.0 / 0 to 20
SKL 844 S:	**36 km/h - version:**		
Gearbox position 1, tortoise / rabbit:		km/h	0 to 6.0 / 0 to 18
Gearbox position 2, tortoise / rabbit:		km/h	0 to 12 / 0 to 36

Cardan shaft rev. at **20 km/h - version**			adjustment at nominal speed
tyres			tortoise / rabbit
standard:	405/70 R20:	min^{-1}	600 / 1,990
option:	14,5-20:	min^{-1}	600 / 2,005
	16/70-20:	min^{-1}	600 / 2,070
	375/75 R20:	min^{-1}	600 / 2,040

Cardan shaft rev. at **36 km/h - version**			adjustment at nominal speed		
			tortoise	/	rabbit
tyres			1./2. gear	/	1./2. gear
standard:	405/70 R20:	min^{-1}	580 / 1,190		1,750 / 3,570
option:	14,5-20:	min^{-1}	580 / 1,190		1,760 / 3,595
	16/70-20:	min^{-1}	580 / 1,190		1,800 / 3,700
	375/75 R20:	min-1	580 / 1,190		1,775 / 3,660

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	$30^{\pm 1}$
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	$2{,}100^{-50}$ at 250 bar
	(see setting instructions, chapter 5, measuring method 2)	
Start-up speed:	min^{-1}	1,150
Engine stalling (rabbit) - dynamic:	min^{-1}	$2{,}000^{-100}$ at 280 bar HP
Brake inching beginning / end:	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	22

STEERING

Steering unit:	type	LAGU 400/130-11/LD240-175M01
Steering pump:	make	Cassappa
Displacement:	cm^3/rev:	33
Steering pressure (high idle):	bar	175
Priority valve:	type	LPS 80R11/LD7-643/01

WORKING HYDRAULICS

Working pump:	make	WSP 20.14-045
Displacement:	l/min.	72
Valve bank:	type	Parker P 70
Servo-controlled valve:	type	Brown PRSV C01 S053 FO

PRESSURE AND SETTING VALUES — working

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift:	bar	280
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280
- shovel dump out:	bar	160 (up to s/n 844/0208) (from s/n 844/0209)
- additional control circuit:	bar	230 / 230
- pilot pressure (charge pressure):	bar	$30^{\pm 1}$

WORKING CYCLES

Lifting frame lift:	s	5.1
Lifting frame lower:	s	3.2
Shovel dump in:	s	---
Shovel dump out:	s	---

AXLES

Front axle	with self-locking differential -	20 km/h-version:	make/type	ZF / AP – R – 720 // 4472 025 009
Rear axle	with self-locking differential -	20 km/h-version:	make/type	ZF / AP – R – 720 // 4472 025 010
Front axle	with self-locking differential -	36 km/h-version:	make/type	ZF / AP – R – 720 // 4472 025 009
Rear axle	with self-locking differential -	36 km/h-version:	make/type	ZF / AP – R – 720 // 4472 025 011

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake, front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B or API-GL 5 resp., SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil with oil filter and oil cooler - change:	approx. 13.0	engine oil
Hydraulic oil (tank and system) - first filling:	approx. 88.0	hydraulic oil
Hydraulic oil tank (change):	approx. 62.0	hydraulic oil
Fuel tank:	approx. 102.0	diesel
Front axle - central housing:	approx. 4.0	transmission oil
Front axle - wheel hub:	approx. 0.3	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx. 4.5	transmission oil
Rear axle - wheel hub:	approx. 0.3	transmission oil, each
Service brake:	approx. 0.25	ATF oil

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1104 C - 44
Performance (ECE-R24/ISO1585/ISO9249):	kW/PS	61.5 / 84 bei 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		water cooling
Injection:		direct injection
Capacity:	cm^3	4,400
High idle:	min^{-1}	2,350 $^{+50}$
Low idle:	min^{-1}	750 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	211
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Engine oil pressure:	bar	3.0 (high idle, service temperature)
Torque of cylinder head studs (only in case of repair):	Nm	100 Tightening angle 225° (short) 270° (long) depending the length of the bolts.
Further data:		see engine instruction book or chapter 3

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 760 (EN)
Generator:	V/A	14 / 75
Starter:	V/kW/PS	12 / 3.0 / 4.1
Cold start aid:		4 Glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation ("StVZO") and Euronorm. H4 halogen headlamp. Two working lights at the front.

TRANSMISSION

Travel pump:		type	A 4 VG 71 DA with pressure cut-off
Displacement:		cm^3/rev.	max. 71
Travel motor	20/36 km/h version:	type	A 6 VM 107 DA 5 / 63 W
Displacement	20/36 km/h version:	cm^3/rev.	max. 107

TRAVEL RANGE

Two/ four pre-selectable travel ranges, electro-hydraulically controlled:

SKL 854:	**20 km/h - version:**				
	tortoise / rabbit	km/h	0 to 6.0	/	0 to 20
SKL 854 S:	**36 km/h - version:**				
Gearbox position 1,	tortoise / rabbit:	km/h	0 to 6.0	/	0 to 19
Gearbox position 2,	tortoise / rabbit:	km/h	0 to 11	/	0 to 36

Cardan shaft rev. at	**20 km/h - version**		adjustment at nominal speed		
tyres			tortoise / rabbit		
standard:	405/70 R20 Mitas:	min^{-1}	560 / 1,800		
option:	14,5-20 Dunlop:	min^{-1}	560 / 1,815		
	16/70-20 Dunlop:	min^{-1}	560 / 1,870		
	375/75 R20 Michelin:	min^{-1}	560 / 1,850		

Cardan shaft rev. at	**36 km/h - version**		adjustment at nominal speed		
			tortoise	/	rabbit
tyres			1./2. gear	/	1./2. gear
standard:	405/70 R20 Mitas:	min^{-1}	500 / 1,050		1,490 / 3,300
option:	14,5-20 Dunlop:	min^{-1}	500 / 1,050		1,500 / 3,300
	16/70-20 Dunlop:	min^{-1}	500 / 1,050		1,550 / 3,300
	375/75 R20 Michelin:	min^{-1}	500 / 1,050		1,530 / 3,300

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	$30^{\pm 1}$
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	$2{,}100^{-50}$ at 220 bar (see setting instructions, chapter 5, measuring method 2)
Start-up speed:	min^{-1}	1,150
Engine stalling (rabbit) - dynamic:	min^{-1}	$2{,}000^{-100}$ at 240 bar HP
Brake inching beginning / end:	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	22

STEERING

Steering unit:	type	LAGU 400/130-11/LD240-175M01
Steering pump:	make	Cassappa
Displacement:	cm^3/rev:	34.5
Steering pressure (high idle):	bar	175
Priority valve:	type	LPS 80R11/LD7-643/01

WORKING HYDRAULICS

Working pump:	make	KP 30.34DO-A8K9
Displacement:	l/min.	76
Valve bank:	type	Bucher HDM19WL/3
Servo-controlled valve:	type	Brown HPV1C01 F094 R0

PRESSURE AND SETTING VALUES — working

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift:	bar	280
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280
- shovel dump out:	bar	130
- additional control circuit:	bar	230 / 230
- pilot pressure (charge pressure):	bar	$30^{\pm 1}$

WORKING CYCLES

Lifting frame lift:	s	5.8
Lifting frame lower:	s	3.7
Shovel dump in:	s	1,3 in upper position
Shovel dump out:	s	1.5 in upper position

AXLES

Front axle	with self-locking differential -	20 km/h-version:	make/type	Dana - Hurth	112 / 213
Rear axle	with self-locking differential -	20 km/h-version:	make/type	Dana - Hurth	311 / 112 / 140
Front axle	with self-locking differential -	36 km/h-version:	make/type	Dana - Hurth	112 / 216
Rear axle	with self-locking differential -	36 km/h-version:	make/type	Dana - Hurth	357 / 112 / 248

BRAKE SYSTEM

Service brake	20km/h - Version:		hydraulically operated drum brake at the front axle
	36km/h - Version:		hydraulically operated drum brake at the front axle and oil-immersed disk brake at the rear axle
Parking brake:			drum brake at the front axle
Master cylinder:		make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see instruction book table
Transmission oil:	MIL-L 2105 B or API-GL 5 resp., SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil with oil filter - change:	approx. 9.5	engine oil
Hydraulic oil (tank and system) - first filling:	approx. 93.0	hydraulic oil
Hydraulic oil tank (change):	approx. 62.0	hydraulic oil
Fuel tank:	approx.110.0	diesel
Front axle - central housing:	approx. 7.8	transmission oil
Front axle - wheel hub:	approx. 0.85	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx. 9.3	transmission oil
Rear axle - wheel hub:	approx. 0.85	transmission oil, each
Service brake:	approx. 0.25	ATF oil
Cooling agent:	approx. 17.5	water with anti-corrosive and anti-freeze agent

TEREX | SCHAEFF

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1104 C – 44 Turbo
Performance (ECE-R24/ISO1585/ISO9249):	kW	74.5 at 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		water cooling
Injection:		direct injection
Capacity:	cm^3	4,400
Max. Torque:	Nm	412 at 1,400 min^{-1}
High idle:	min^{-1}	2,350 $^{+50}$
Low idle:	min^{-1}	750 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	215
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Engine oil pressure:	bar	3.0 (high idle, service temperature)
Torque of cylinder head studs (only in case of repair):	Nm	100 Tightening angle 225° (short) 270° (long) depending the length of the bolts.
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	24
Battery:	V/Ah/A	2 x 12 / 74 / 680 (EN)
Generator:	V/A	24 / 75
Starter:	V/kW/PS	24 / 4.5 / 6.1
Cold start aid:		4 Glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation ("StVZO") and Euronorm. H4 halogen headlamp. and two working lights at the front and rear.

TRANSMISSION

Travel pump:		type	A 4 VG 90 DA 2 D8 / 32R
Displacement:		cm^3/rev.	max. 90
Travel motor	20/40 km/h version:	type	A 6 VM 160 DA 3 / 63 W
Displacement	20/40 km/h version:	cm^3/rev.	max. 160

TRAVEL RANGE

Two / four pre-selectable travel ranges, electro-hydraulically controlled:

SKL 160:	**20 km/h - version:**				
	tortoise / rabbit	km/h	0 to 6.0	/	0 to 20
SKL 160 S:	**40 km/h - version:**				
Gearbox position 1,	tortoise / rabbit:	km/h	0 to 6.0	/	0 to 20
Gearbox position 2,	tortoise / rabbit:	km/h	0 to 12	/	0 to 40

Cardan shaft rev. at	**20 km/h - version**		adjustment at nominal speed
tyres			tortoise / rabbit
standard:	15,5 R25 GP-2B L-2:	min^{-1}	412 / 1,410
option:	17,5-25 TL12PR SGL:	min^{-1}	412 / 1,340
	16/70-24 SPT9 TL:	min^{-1}	412 / 1,575
	455/70 R24 SPT9 TL:	min^{-1}	412 / 1,445
	19,5 LR24 XM27 TL:	min^{-1}	412 / 1,395

Cardan shaft rev. at **40 km/h - version**			adjustment tortoise	/	rabbit
tyres			1./2. gear	/	1./2. gear
standard:	15,5 R25 GP-2B L-2:	min^{-1}	412 / 845		1,340 / 2,735
option:	17,5-25 TL12PR SGL:	min^{-1}	412 / 800		1,340 / 2,735
	16/70-24 SPT9 TL:	min^{-1}	412 / 945		1,340 / 3,060
	455/70 R24 SPT9 TL:	min^{-1}	412 / 865		1,340 / 2,810
	19,5 LR24 XM27 TL:	min^{-1}	412 / 835		1,340 / 2,710

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	$30^{\pm 1}$
High pressure (SV):	bar	490
Pressure cut-off:	bar	$460^{\pm 10}$
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	$2{,}100^{-50}$ at 220 bar HP
	(see setting instructions, chapter 5, measuring method 2)	
Start-up speed:	min^{-1}	$1{,}150^{\pm 50}$
Engine stalling (rabbit) - dynamic:	min^{-1}	$2{,}000^{-100}$ at 230 bar HP

STEERING

Steering unit:	type	LAGZ 420/100-21/LD240-175M01
Steering pump:	make	Brueninghaus A10VO45DFR1
Displacement:	cm^3/rev:	45
Steering pressure (high idle):	bar	175

WORKING HYDRAULICS

Working pump:	make	Brueninghaus A10VO45DFR1
Displacement:	l/min.	99
Stand-by pressure (flow controller):	bar	28^{+2}
Valve bank:	type	Rexroth 3M6-15
Servo-controlled valve:	type	Brown HPV1C01 F094 R0
Fan idle (oil cooler) temperature controlled:	min^{-1}	$2{,}100^{\pm 50}$

PRESSURE AND SETTING VALUES — working

LS-Pressure cut off valve:	bar	310 (at pressure gauge pump) (Δp eff. 280bar + Stand-by pressure)
Line relief pressures:		
- lifting frame lift:	bar	340
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	340
- shovel dump out:	bar	340
- additional control circuit:	bar	230 / 230
- pilot pressure (charge pressure):	bar	$30^{\pm 1}$

WORKING CYCLES

Lifting frame lift:	s	5.7
Lifting frame lower:	s	3.7
Shovel dump in:	s	2.0 in upper position
Shovel dump out:	s	1.4 in upper position

AXLES

Front axle	with self-locking differential -	20 km/h-version: make/type	Dana	176 / 379
Rear axle	with self-locking differential -	20 km/h-version: make/type	Dana	360 / 176 / 88
Front axle	with self-locking differential -	40 km/h-version: make/type	Dana	176 / 379
Rear axle	with self-locking differential -	40 km/h-version: make/type	Dana	360 / 176 / 88

BRAKE SYSTEM

Service brake (four-wheel-brake):		hydraulically operated 2 circuit brake oil-immersed disks at both axles
Parking brake (electr. switch):		spring-loaded brake acting on the disks of both axles
Additional brake:		hydrostatically by closed circuit of the transmission
Brake pump (accessory drive):	make	Cassappa PLP 20.11.2 DO-L9P1
Displacement:	cm^3/rev.	11
	ltr./min.	24
Brake pressure (service brake):	max. bar	30^{+5}
Accumulator charge valve:	make	Safim S6
Cut-in / cut-off pressure:	bar	120 - 150
Opening pressure (parking brake):	bar	15
Setting value, parking brake:	bar	30^{-5}

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see instruction book
Transmission oil:	MIL-L 2105 B or API-GL 5 resp., SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see operator instruction book

CAPACITIES

	ltr.	
Engine oil with oil filter and oilcooler - change:	approx. 9.5	engine oil
Hydraulic oil (tank and system) - first filling:	approx. 99.0	hydraulic oil
Hydraulic oil tank (change):	approx. 72.0	hydraulic oil
Fuel tank:	approx.140.0	diesel
Front axle - central housing:	approx. 13.5	transmission oil
Front axle - wheel hub:	approx. 1.7	transmission oil, each
Rear axle - central housing:	approx. 15.7	transmission oil
Rear axle - reduction gearbox:	approx. 3.4	transmission oil
Rear axle - wheel hub:	approx. 1.7	transmission oil, each
Service brake:	connected to the hydraulic system	
Cooling agent:	approx. 28.0	water with anti-corrosive and anti-freeze agent

TEREX | SCHAEFF

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1106 C – E60 TA Turbo with intercooler
Performance (ECE-R24/ISO1585/ISO9249):	kW	129 at 2,200 min^{-1}
Construction:		6 cylinders in line
Cooling:		water cooling
Injection:		direct injection
Capacity:	cm^3	6000
Max. Torque:	Nm	695 at 1,400 min^{-1}
High idle:	min^{-1}	2,350 $^{+50}$
Low idle:	min^{-1}	750 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	219
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Minimum engine oil pressure:	bar	1.9 (low idle, service temperature)
Minimum engine oil pressure:	bar	2.8 (high idle, service temperature)
Torque of cylinder head studs	Nm	110 (2 times!)
	°	150 (Tightening angle - short bolts)
	°	180 (Tightening angle - medium sized bolts)
	°	210 (Tightening angle - long bolts)
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	24
Battery:	V/Ah/A	2 x 12 / 110 / 850 (EN) 510 A (DIN)
Generator:	V/A	24 / 80
Starter:	V/kW	24 / 4.5
Cold start aid:		heater spiral and resistor
Lighting:		acc. to German motor vehicle construction and use regulation ("StVZO") and Euronorm. H4 halogen headlamp. Two working lights at the front and rear.

TRANSMISSION

Travel pump:		type	A 4 VG 140 DA 2 D2
Displacement:		cm^3/rev.	max. 140
Travel motor	16/40 km/h version:	type	A 6 VM 160 DA 3
Displacement	16/40 km/h version:	cm^3/rev.	max. 160

TRAVEL RANGE

Two/ four pre-selectable travel ranges, electro-hydraulically controlled:

SKL 260:	**16 km/h - version:**				
	tortoise / rabbit	km/h	0 to 6.0	/	0 to 16
SKL 260 S:	**40 km/h - version:**				
Gearbox 1.gear	tortoise / rabbit:	km/h	0 to 6.0	/	0 to 16
Gearbox 2.gear	tortoise / rabbit:	km/h	0 to 14	/	0 to 40

Cardan shaft rev. at **16 km/h - version** adjustment at nominal speed tortoise / rabbit

and standard tyres

20.5 R-25 EM	16 PR SGLD L-2:	min^{-1}	445 / 1,120
optional tires:	20.5 R 25 RL 2:	min^{-1}	445 / 1,120
	20.5 R 25 GP –2B:	min^{-1}	445 / 1,120
	20.5 R 25 XTLA TL:	min^{-1}	445 / 1,120
	20.5 R 25 XHA TL:	min^{-1}	445 / 1,120
	20.5 R 25 XLDD2A:	min^{-1}	445 / 1,100
	20.5 R 25 X Mine D2:	min^{-1}	445 / 1,090

Cardan shaft rev. at **40 km/h - version**		adjustment tortoise / rabbit 1./2. gear / 1./2. gear
standard tire:20.5 R-25 EM 16 PR SGLD L-2:	min^{-1}	445 / 1.290 — 1.020 / 2.950
optional tires:		
20.5 R 25 RL 2:	min^{-1}	445 / 1.290 — 1.020 / 2.950
20.5 R 25 GP-2B :	min^{-1}	445 / 1.290 — 1.020 / 2.950
20.5 R 25 XTLA TL:	min^{-1}	445 / 1.290 — 1.020 / 2.950
20.5 R 25 X HA TL:	min^{-1}	445 / 1.290 — 1.020 / 2.950
20.5 R 25 XLDD2A:	min^{-1}	445 / 1.290 — 1.020 / 2.950
20.5 R 25 X Mine D2:	min^{-1}	445 / 1.290 — 1.020 / 2.950

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	$30^{\pm 1}$
High pressure (SV):	bar	480
Pressure cut-off:	bar	$440^{\pm 10}$
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	$2{,}100^{-50}$ at 260 bar dynamic (see setting instructions, chapter 5, measuring method 2)
Start-up speed:	min^{-1}	$1{,}150^{\pm 50}$
Engine stalling (rabbit):	min^{-1}	$2{,}000^{-100}$ at 280 bar dynamic

STEERING

Steering unit:	type	LAGC 630 – 15/LD240-175M01
Steering pump:	make	Casappa LVP 75D-06
Displacement:	cm^3/rev:	45 (160 l/min)
Steering pressure (high idle):	bar	175
Savety valves at the orbitrol (l/r):	bar	240 / 240

WORKING HYDRAULICS

Working pump:	make	LAGC 630 – 15/LD240-175M01
Displacement:	cm^3/rev:	45 (160 l/min)
Stand-by pressure (flow controller):	bar	36^{+2}
Safety valve (pump):	bar	340^{+10}
Valve bank:	type	Rexroth 3M6-15
Servo-controlled valve:	type	Brown HPV1C01 F094 R0
Fan idle (oil cooler) temperature controlled:	min^{-1}	$1{,}800^{\pm 50}$

PRESSURE AND SETTING VALUES — working

LS-Pressure cut off valve:	bar	315^{-10} (at pressure gauge pump) (Δp eff. 280bar + Stand-by pressure)
Line relief pressures:		
- lifting frame lift:	bar	340
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	340
- shovel dump out:	bar	340
- additional control circuit:	bar	230 / 230
- pilot pressure (charge pressure):	bar	$30^{\pm 1}$

WORKING CYCLES

Lifting frame lift:	s	5.9
Lifting frame lower:	s	3.9
Shovel dump in:	s	1.7 in upper position
Shovel dump out:	s	1.2 in upper position

AXLES

Front axle	with self-locking differential -	16 km/h-version:	make/type	Dana	113 / 51
Rear axle	with self-locking differential -	16 km/h-version:	make/type	Dana	360 / 113 / 95 (second gear not disabled)
Front axle	with self-locking differential -	40 km/h-version:	make/type	Dana	113 / 51
Rear axle	with self-locking differential -	40 km/h-version:	make/type	Dana	360 / 113 / 95

BRAKE SYSTEM

Service brake (four-wheel-brake):		hydraulically operated 2 circuit brake oil-immersed disks at both axles
Parking brake (electr. switch):		spring-loaded brake acting on the disks of the rear axle
Additional brake:		hydrostatically by closed circuit of the transmission
Brake pump (accessory drive):	make	Cassappa PLP 20.11.2 DO-L9P1
Displacement:	cm^3/rev.	19
	ltr./min.	42
Brake pressure (service brake):	max. bar	45^{+5}
Accumulator charge valve:	make	Safim S6
Cut-in / cut-off pressure:	bar	120 - 150
Opening pressure (parking brake):	bar	15
Setting value, parking brake:	bar	30^{-3}

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see operators instruction book
Transmission oil:	MIL-L 2105 B or API-GL 5 resp., SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.
Brake medium:	hydraulic oil

MAINTENANCE PARTS

see operators instruction book

CAPACITIES

	ltr.	
Engine oil with oil filter and oil cooler - change:	approx. 15	engine oil
Hydraulic oil (tank and system) - first filling:	approx. 135	hydraulic oil
Hydraulic oil tank (change):	approx. 95	hydraulic oil
Fuel tank:	approx. 240	diesel
Front axle - central housing:	approx. 16.0	transmission oil
Front axle - wheel hub:	approx. 2.6	transmission oil, each
Rear axle - central housing:	approx. 16.0	transmission oil
Rear axle - reduction gearbox:	approx. 3.4	transmission oil
Rear axle - wheel hub:	approx. 2.6	transmission oil, each
Service brake:	connected to the hydraulic system	
Cooling agent:	approx. 41.0	water with anti-corrosive and anti-freeze agent

TEREX | SCHAEFF

DIESEL ENGINE

Manufacturer:		Deutz
Type:		F4M 2011
Performance according to (ECE-R24/ISO1585/ISO9249):	kW/PS	44 / 60 at 2,400 min^{-1}
Construction:		4 cylinders in line
Cooling:		external oil cooling
Injection:		direct injection
Capacity:	cm^3	3,100
High idle:	min^{-1}	2,550 $^{+50}$
Low idle:	min^{-1}	850 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	218
Tappet clearance - inlet cold:	mm	0.30
Tappet clearance - outlet cold:	mm	0.50
Torque of cylinder head studs (only in case of repair):	Nm	30 / 80 / 160 Tightening angle 90°
Further data:		see engine instruction book or chapter 3

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 74 / 680 (EN)
Generator:	V/A	14 / 55
Starter:	V/kW/PS	12 / 2.3 / 3.1
Cold start aid:		heater plug
Lighting:		acc. to German motor vehicle construction and use regulation ("StVZO") and Euronorm. H4 halogen headlamp. Two working lights at the front.

TRANSMISSION

Travel pump:		type	A 4 VG 56 DA with pressure cut-off
Displacement:		max. cm^3/rev.	56
Travel motor	20/36 km/h version:	type	A 6 VM 80 DA 2
Displacement	20/36 km/h version:	max. cm^3/rev.	80

TRAVEL RANGE

Two/ four pre-selectable travel ranges, electro-hydraulically controlled:

SKL 634:	**20 km/h - version:**		
	tortoise / rabbit	km/h	0 to 7.0 / 0 to 20
SKL 634 S:	**36 km/h - version:**		
Gearbox position 1, tortoise / rabbit:		km/h	0 to 6.5 / 0 to 18
Gearbox position 2, tortoise / rabbit:		km/h	0 to 13 / 0 to 36

Cardan shaft rev. at **20 km/h - version**			adjustment at nominal speed
tyres			tortoise / rabbit
standard:	12,5-20:	min^{-1}	650 / 2,100
option:	335/80 R20 SPT 9:	min^{-1}	650 / 2,050
	335/80 R20 XM 27TL:	min^{-1}	650 / 2,080

Cardan shaft rev. at **36 km/h - version**			adjustment at nominal speed		
			tortoise	/	rabbit
tyres			1./2. gear	/	1./2. gear
standard:	12,5-20:	min^{-1}	635 / 1,300		1.860 / 3,780
option:	335/80 R20 SPT 9:	min^{-1}	635 / 1,300		1.800 / 3,680
	335/80 R20 XM 27TL:	min^{-1}	635 / 1,300		1.840 / 3,750

PRESSURE AND SETTING VALUES

travel

Suction pressure:	max. bar	0.5 $^{\pm 0.1}$
Charge pressure (high idle):	bar	30 $^{\pm 1}$
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	2,300 $^{-50}$ at 180 bar
	(see setting instructions, chapter 5, measuring method 2)	
Start-up speed:	min^{-1}	1,150
Engine stalling (rabbit) - dynamic:	min^{-1}	2,200 $^{-100}$ at 220 bar HP
Brake inching beginning / end:	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	22

STEERING

Steering unit:	type	Danfoss OSPC 250 LS dyn.
Steering pump:	make	Cassappa
Displacement:	l/min	37
Steering pressure (high idle):	bar	175
Priority valve:	type	Danfoss OLS 80 dyn.

WORKING HYDRAULICS

Working pump:	make	Cassappa
Displacement:	l/min	65
	(= slewing 28 l/min and steering 37 l/min summation)	
Valve bank:	type	Parker P 70 CF
Servo-controlled valve:	type	Brown PRSV

PRESSURE AND SETTING VALUES

working (at high idle)

Main pressure relief valve I:		max. bar	250
Line relief pressures:			
- lifting frame lift:	(B2)	bar	280
- lifting frame lower:	(A2)	bar	anti-cavitation
- shovel dump in:	(B3)	bar	280
- shovel dump out:	(A3)	bar	160 (up to s/n 634/0136)
		bar	125 (from s/n 634/0137)
- additional control circuit:	(A1+Y9 / B1+Y8)	bar	230 / 230
Main pressure relief valve II:		max. bar	250
Line relief pressures:			
- slewing left:	(A1+Y31)	bar	230
- slewing right:	(B1+Y32)	bar	230
- pilot pressure (charge pressure):		bar	30 $^{\pm 1}$

WORKING CYCLES

Lifting frame lift:	s	4.7
Lifting frame lower:	s	3.3
Shovel dump in:	s	---
Shovel dump out:	s	---
Slewing right / left:	s	3.2 to each side

AXLES

Front axle:	with self-locking differential - 20 km/h-version:	make/type	ZF / AP – R – 720 // 4472 025 009
Rear axle:	with self-locking differential - 20 km/h-version:	make/type	ZF / AP – R – 720 // 4472 025 010
Front axle:	with self-locking differential - 36 km/h-version:	make/type	ZF / AP – R – 720 // 4472 025 009
Rear axle :	with self-locking differential - 36 km/h-version:	make/type	ZF / AP – R – 720 // 4472 025 011

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake, front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B or API-GL 5 resp., SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil with oil filter and oil cooler - change:	approx. 13.0	engine oil
Hydraulic oil (tank and system) - first filling:	approx. 55.0	hydraulic oil
Hydraulic oil tank (change):	approx. 46.0	hydraulic oil
Fuel tank:	approx. 75.0	diesel
Front axle - central housing:	approx. 4.0	transmission oil
Front axle - wheel hub:	approx. 0.3	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx. 4.5	transmission oil
Rear axle - wheel hub:	approx. 0.3	transmission oil, each
Service brake:	approx. 0.25	ATF oil

DIESEL ENGINE

Manufacturer:		Perkins
Type:		704 - 30
Performance acc. to DIN 70020:	kW/PS	44 / 60 at 2,300 min^{-1}
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	3,000
High idle:	min^{-1}	2,520 $^{+50}$
Low idle:	min^{-1}	800 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	215
Tappet clearance - inlet cold:	mm	0.35
Tappet clearance - exhaust cold:	mm	0.35
Torque cylinder head studs (in case of repair):	Nm	50 / 85
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 420
Generator:	V/Ah	14 / 65
Starter:	kW/PS	2.5 / 3.4
Starting aid:		4 glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronom

TRANSMISSION

Travel pump:	type	A 4 VG 40 DA with pressure cut-off
Displacement:	cm^3/rev.	0 to 40
Travel motor:	type	A 6 VM 55 DA
Displacment:	max. cm^3/rev.	55

TRAVEL RANGE

Symbol „tortoise“:		km/h	0 to 6
Symbol „rabbit“:		km/h	0 to 20
Cardan shaft rev. at **20 km/h**			adjustment at nominal speed tortoise / rabbit
with standard tyres:	365/70 R18:	min^{-1}	660 / 1.940
	8.25-20:	min^{-1}	660 / 1.950
	15.5/55 R18:	min^{-1}	660 / 2.125

PRESSURE AND SETTING VALUES

	travel	
Suction pressure:	bar	- 0.25
Charge pressure (high idle):	bar	30 $^{+2}$
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start (dynamic):	bar	290
Start-up speed:	min^{-1}	1,100 $^{\pm 50}$
Engine stalling (tortoise, dynamic):	min^{-1}	2,200 $^{\pm 50}$ at 260 $^{+10}$ bar HP

STEERING

Steering unit:	type	ZF-Hydraulik Nord LAGCSD 160 dyn.
Steering pump:	make	Commercial
Displacement:	cm^3/rev.	10 (≅ 28 $^{l}/_{min}$)
Steering pressure (high idle):	bar	120
Priority valve:	type	ZF-Hydraulik Nord LSPSD2 225

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 10 VO 045 DFLR
Displacement:	cm^3/rev.	0 to 45
Gear pumps:	type	Commercial
Flow rate:	cm^3/rev.	10 + 8 = 28 + 23 ltr.
LS-pressure relief valve:	bar	230 (valve bank 1)
LS-regulator (standby-pressure variable displacement pump)	bar	25
Servo-controlled valve (cross servo control stick):	type	VOAC PCL 401
Servo-controlled valve, linear lever (articulation):	type	VOAC PCL 402
Servo-controlled valve, linear lever (stabilizing):	type	VOAC PCL 402
Servo-controlled valve, pedal (breaker) - MONO boom / articulated boom:	type	Hamworthy
Servo-controlled valve, pedal - articulated boom / telescopic stick:	type	Rexroth 2TH6 RP20
Valve bank 1, MONO boom / articulated boom:	type	VOAC 4 L 90 LS / 5 L 90 LS
Valve bank 2:	type	VOAC 5 HV 07

PRESSURE AND SETTING VALUES	**working**	
LS pressure relief valve, valve bank 1:	bar	230
Main pressure relief valve 1 (L 90 LS), safety valve:	bar	260
Main pressure relief valve 2 (HV 07) (high idle):	bar	200
Line relief pressures (valve bank 1):		
- Boom:	bar	260 / 260
- Dipperstick:	bar	260 / 260
- Bucket:	bar	260 / 260
- Intermediate boom out / in:	bar	140 / 260
- Breaker - MONO boom / articulated boom (up to 131/0672):	bar	200
- Additional control circuit / breaker (from 131/0673):	bar	250 / 250
Line relief pressures (valve bank 2):		
- Slewing (valves at the slew motor):	bar	190 / 190 (high idle)
- Stabilizing:	bar	----
- Articulation:	bar	----
- Additional control circuit (up to 131/0672):	bar	250 - 250
Shut-off valve (up to serial no. 131/0542):	make	Buchholz
Shut-off valve (from serial no. 131/0543):	make	Bergin
Shut-off pressure (high idle):	bar	110
Pilot pressure (charge pressure) - high idle:	bar	30^{+2}

SLEW DRIVE

Slew gear: (up to S/N 131/0890 without /0856)	type	HD 2.3 (Hersfelder)
Slew gear: (from S/N 131/0891 including /0856)	type	PG252PR (SOM)
Slew motor:	type	A 2 FM 23
Slew pressure (valves at the slew motor):	bar	190 (high idle)

SLEW DRIVE

Slew gear:	type	HD 2.3
Slew motor:	type	A 2 FM 23
Slew pressure (valves at the slew motor):	bar	190 (high idle)

CYCLE TIMES - MONO / articulated boom / telescopic stick

Boom up / down	sec.	4.5 / 4.5
Dipperstick in / out	sec.	3.5 / 3.5
Intermediate boom up / down	sec.	3.5 / 3.5
Bucket in / out	sec.	2.6 / 2.0
Telescopic stick in / out	sec.	2.5 / 2.5

AXLES

Front axle:	make/type	Hurth 278 / 145
Rear axle:	make/type	Hurth 302 / 171 / 267

Axles - 4-wheel steering version:

Front axle:	make/type	Hurth 278 / 145
Rear axle (up to serial no. 121/0520):	make/type	Hurth 302 / 171 / 279
Rear axle (from serial no. 121/0521):	make/type	Hurth 302 / 171 / 325

BRAKES

Service brake:		oil-immersed multi-disk brake, front axle
Service brake (master cylinder):	make	ATE
Brake medium:		ATF - oil
Beginning/end of inching:	bar	5 - 13
Parking brake:		spring-loaded brake, front axle
Hand brake valve:	make	Wabco
Brake medium:		hydraulic oil
Pressure supply (charge pressure):	bar	30 $^{+2}$

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B / API-GL5 SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES:	**ltr.**		
Engine oil (change):	approx.	8.2	engine oil
Hydraulic oil (tank and system):	approx.	120.0	hydraulic oil
Hydraulic oil (change)	approx.	104.0	hydraulic oil
Fuel tank:	approx.	115.0	diesel
Steering front axle - central housing:	approx.	8.8	transmission oil
Rear axle - central housing:	approx.	6.5	transmission oil
Reduction gear:	approx.	1.5	transmission oil
Wheel hubs front axle:	approx.	0.6	transmission oil, each
Wheel hubs rear axle:	approx.	0.6	transmission oil, each
Slew gear:	approx.	1.6	Lifetime transmission oil
Service brake:	approx.	0.5	ATF-oil
Cooling agent:	approx.	13.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		KHD
Type:		F 4 M 2011
Performance according to DIN 70020:	kW/PS	44 / 60 at 2,400 min^{-1}
Cooling:		engine oil / air; external oil cooling
Injection:		direct injection
Capacity:	cm^3	3,100
High idle:	min^{-1}	2,550 $^{\pm 50}$
Low idle:	min^{-1}	850 $^{\pm 50}$
Spec. fuel consumption under full load:	g/kWh	235
Tappet clearance - inlet cold:	mm	0.30
Tappet clearance - outlet cold:	mm	0.50
Torque cylinder head studs:	Nm	30, 60, 160°
(only in case of repair):		Tightening angle 90°
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 760
Generator:	V/A	14 / 55
Starter:	kW/PS	2.3 / 3.1
Starting aid:		heater plug
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

TRANSMISSION

Travel pump:	type	A 4 VG 40 DA with pressure cut-off
Displacement:	cm^3/rev.	0 to 40
Travel motor:	type	A 6 VM 55 DA
Displacement:	max. cm^3/rev.	55
Servo-controlled valve, pedal:	type	Rexroth 2TH6 RP20

TRAVEL RANGE

	20 km/h version		
Symbol „tortoise“:		km/h	0 to 6
Symbol „rabbit“:		km/h	0 to 20
Cardan shaft rev.			adjustment at nominal speed tortoise / rabbit
with standard tyres:	365/70 R18:	min^{-1}	795 / 2,560
	8.25-20:	min^{-1}	735 / 2,370
	500/45-20:	min^{-1}	770 / 2,490
	30 km/h version		
Gearbox position 1, tortoise / rabbit:		km/h	0 to 6 / 0 to 11
Gearbox position 2, tortoise / rabbit:		km/h	0 to 17 / 0 to 30
Cardan shaft rev.			adjustment at nominal speed tortoise / rabbit
with standard tyres:	365/70 R18:	min^{-1}	855 / 3,560
	8.25-20:	min^{-1}	855 / 3,560
	500/45-20:	min^{-1}	855 / 3,560

PRESSURE AND SETTING VALUES	Travel	
Suction pressure:	bar	- 0.25
Charge pressure (high idle):	bar	30^{+2}
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start (dynamic):	bar	$290^{\pm 10}$
Start-up speed:	min^{-1}	$1{,}100^{+50}$ (50 bar HP)
Engine stalling (tortoise, dynamic):	min^{-1}	$2{,}300^{+50}/_{-100}$ at 260^{+10} bar HP

STEERING

Steering unit:	type	Rexroth LAGC SD 160
Steering pump:	make	Kayaba P3
Displacement:	cm^3/rev.	18 (≈ 43 l/min)
Steering pressure (high idle):	bar	120
Priority valve:	type	Rexroth LPS 80

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	Kayaba PSVD2-26E
Displacement:	cm^3/rev.	2 x 26 (≈ 2 x 62 l/min)
Gear pump: P3	type	Kayaba
Displacement:	cm^3/rev.	18 (≈ 43 l/min)
Main relief valve: P1 + P2	bar	245
Main relief valve: P3	bar	205
Servo-controlled valve (joystick) right / left:	type	Rexroth 4TH5 E70
Servo-controlled valve, linear lever (stabilizing):	type	Hydro – Control HC-RC11
Servo-controlled valve, pedal (intermediate boom / articulation)	type	Rexroth 2TH6 RP20
Valve bank:	type	Kayaba KVSE-72-9

PRESSURE AND SETTING VALUES	Working	
Valve bank - KVSE-72		
Main relief valve P1 + P2	bar	245
Line relief pressures:		
- Boom - articulated boom (raise / lower):	bar	280 / 280
- Dipperstick:	bar	280 / 280
- Bucket:	bar	280 / 280
- Intermediate boom - articulated boom / circular boom in / out:	bar	280 / 150
- Additional control circuit / breaker:	bar	280 / 280
Main relief valve P3	bar	205
Line relief pressures:		
- Slewing (valves at slew motor):	bar	205 / 205
- Articulation:	bar	---
- Stabilizing:	bar	---
Pilot pressure (charge pressure) - high idle:	bar	30^{+2}

SLEW DRIVE

Slew gear with slew motor:	type	Kayaba MSG-27P-23E-2
Slew pressure (valves at the slew motor):	bar	205 (high idle)

CYCLE TIMES

Articulated boom -	raise / lower:	sec.	4.5 / 4.5
Intermediate boom -	raise / lower:	sec.	4.1 / 3.2
Dipperstick -	in / out:	sec.	3.5 / 2.9
Bucket -	in / out:	sec.	2.6 / 2.1

AXLES

Front axle:	**20 km/h version**	make/type	Clark-Hurth	211 / 52
Rear axle:	**20 km/h version**	make/type	Clark-Hurth	315 / 111 / 61
Front axle:	**30 km/h version**	make/type	Clark-Hurth	211 / 52
Rear axle:	**30 km/h version**	make/type	Clark-Hurth	357 / 111 / 237

BRAKES

Brake pump:	make	Kayaba
Displacement:	cm^3/rev.	18
Brake shut-off valve:	make	Wabco 477
Switching range:	bar	120 - 150
Foot brake valve:	make	Wabco 467
Brake pressure:	bar	60^{+10}
Beginning/ end of inching:	bar	5 - 13
Parking brake:		spring-loaded brake in the front axle
Service brake:		oil-immersed multi-disk brake, front and rear axle

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. Lithium-saponified. NLGI grade 2 with EP additives

MAINTENANCE PARTS

see operating manual

CAPACITIES

		ltr.	
Engine oil (change):	approx.	13.0	engine oil
Hydraulic oil (tank and system):	approx.	180.0	hydraulic oil
Hydraulic oil (change):	approx.	110.0	hydraulic oil
Fuel tank:	approx.	150.0	diesel
Steering front axle - central housing:	approx.	4.0	transmission oil
Rear axle - central housing:	approx.	4.4	transmission oil
Reduction gear:	approx.	0.7	transmission oil
Wheel hubs front axle:	approx.	0.9	transmission oil, each
Wheel hubs rear axle:	approx.	0.9	transmission oil, each
Swing gear:	lubrication by circulation of the hydraulic oil		
Service brake:	connected to the hydraulic system		
Cooling agent:			engine oil

DIESEL ENGINE

Manufacturer:		KHD
Type:		BF 4 M 1012 E
Performance acc. to DIN 70020:	kW/PS	53 / 72 at 2,000 min^{-1}
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	3,200
High idle:	min^{-1}	2,150
Low idle:	min^{-1}	800
Spec. fuel consumption under full load:	g/kWh	208
Tappet clearance - inlet cold:	mm	$0.3^{+0.1}$
Tappet clearance - outlet cold:	mm	$0.5^{+0.1}$
Torque cylinder head studs:	Nm	30, 80, 90°
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	14 / 55
Starter:	kW/PS	3.1 / 4
Starting aid:		4 glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

TRANSMISSION

Travel pump:	type	A 4 VG 56 DA with pressure cut-off
Displacement:	cm^3/rev.	0 to 56
Travel motor:	type	A 6 VM 107 DA
Displacement:	max. cm^3/rev.	107
Pilot-operated valve, pedal:	type	Rexroth 2TH6 RP20 (from serial no. 032/5528)

TRAVEL RANGE

Symbol „tortoise“:		km/h	0 to 6
Symbol „rabbit“:		km/h	0 to 20 / 25
Cardan shaft rev. at **20 km/h**			adjustment at nominal speed tortoise / rabbit
with standard tyres:	8.25-20:	min^{-1}	560 / 1.850
	12.0-18:	min^{-1}	560 / 1.975
	15.5/55 R18:	min^{-1}	560 / 2.015
	365/70 R18:	min^{-1}	560 / 1.840
Cardan shaft rev. at **25 km/h**			adjustment at nominal speed tortoise / rabbit
with standard tyres:	8.25-20:	min^{-1}	560 / 2.320
	12.0-18:	min^{-1}	560 / 2.470
	15.5/55 R18:	min^{-1}	560 / 2.500
	365/70 R18:	min^{-1}	560 / 2.300

PRESSURE AND SETTING VALUES — travel

Suction pressure:	bar	- 0.25
Charge pressure (high idle):	bar	30 $^{+2}$
High pressure (SV):	bar	470
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start (dynamic):	bar	290 $^{\pm 10}$
Start-up speed:	min^{-1}	1,000 $^{+50}$ (50 bar HP)
Engine stalling (tortoise dynamic):	min^{-1}	1,900 $^{\pm 50}$ at 300 $^{+10}$ bar HP

STEERING

Steering unit:	type	ZF-Hydraulik Nord LAGCSD 200 dyn.
Steering pump:	make	Bosch
Displacement:	cm^3/rev.	14
Steering pressure (high idle):	bar	150
Priority valve:	type	ZF-Hydraulik Nord LSPSD2 225

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 10 VO 071 DFLR
Displacement:	cm^3/rev.	0 to 71
Gear pumps:	type	Bosch
Displacement:	cm^3/rev.	14+8+5
LS-pressure relief valve:	bar	250 (valve bank 1)
LS-regulator (stand-by pressure):	bar	25 at 2,150 min^{-1} (variable displacement pump)
Servo-controlled valve (cross servo control stick):	type	Rexroth 4TH6
Servo-controlled valve, linear lever (articulation):	type	VOAC PCL 402
Servo-controlled valve, linear lever (stabilizing):	type	VOAC PCL 402
Servo-controlled valve, pedal (breaker) - MONO boom:	type	Hamworthy
Servo-controlled valve, pedal - articulated boom / telescop. stick:	type	Rexroth 2TH6 RP20
Servo-controlled, pedal (breaker) - articulated boom:	type	Hamworthy
Valve bank 1, articulated boom / MONO boom:	type	5 SX 18 / 4 SX 18
Valve bank 2:	type	5 SM 12

PRESSURE AND SETTING VALUES — working

Main pressure relief valve 1 (SX 18):	bar	280 (SV) SV = safety valve
Main pressure relief valve 2 (5 SM 12) (high idle):	bar	220
Line relief pressures (valve bank 1):		
- Boom:	bar	280 / 280
- Dipperstick:	bar	280 / 280
- Bucket:	bar	280 / 280
- Intermediate boom extend / retract:	bar	150 / 280
- Breaker - MONO boom (up to 032/5527):	bar	280
- Breaker - articulated boom (up to 032/5527):	bar	180
- Additional control circuit / breaker (from 032/5528):	bar	250 / 250
Line relief pressures (valve bank 2):		
- Slewing (valves at the slew motor):	bar	190 / 190 (high idle)
- Stabilizing:	bar	----
- Articulation:	bar	----
- Additional control circuit (up to 032/5527):	bar	250 - 250
Shut-off valve (up to serial no. 032/5406):	make	Buchholz
Shut-off valve (from serial no. 032/5407):	make	Bergin
Shut-off pressure (high idle):	bar	110
Pilot pressure (charge pressure) - high idle:	bar	30 $^{+2}$

SLEW DRIVE

Slew gear:	type	HD 4
Slew motor:	type	A 2 FM 32
Slew pressure (valves at the slew motor):	bar	190 (high idle)

CYCLE TIMES

MONO boom, boom cylinder extend / retract:	sec.	4.8 / 4.5
Articulated boom, boom cylinder extend / retract:	sec.	4.5 / 4.5
Intermediate boom cylinder extend / retract:	sec.	4.0 / 3.0
Telescopic stick cylinder extend / retract:	sec.	2.5 / 2.0
Dipperstick cylinder extend / retract:	sec.	4.0 / 3.6
Bucket cylinder extend / retract :	sec.	2.6 / 2.0

AXLES

Front axle:	make/type	Hurth 311/279
Rear axle:	make/type	Hurth 172

BRAKES (up to serial no. 032/5557)

Brake pump:	make	Bosch
Displacement:	cm^3/rev.	5
Brake shut-off valve:	make	SAFIM
Switching range:	bar	110 - 150
Foot brake valve:	make	SAFIM type 56
Brake pressure:	bar	min. 40, max. 55
Brake inching pressure:	min. bar	20
Beginning/end of inching:	bar	5 - 13
Parking brake:		spring-loaded brake in the front axle
Service brake:		oil-immersed multi-disk brake, front axle

BRAKES (from serial no. 032/5558)

Brake pump:	make	Bosch
Displacement:	cm^3/rev	5
Brake shut-off valve:	make	Rexroth LT 06
Switching range:	bar	120 - 150
Foot brake valve:	make	Rexroth LT 05
Hand brake valve:	make	Rexroth LT 08
Brake pressure:	min. bar	60^{+10}
Brake inching pressure:	bar	60^{+10}
Beginning/end of inching:	bar	5 - 13
Parking brake:		spring-loaded brake in the front axle
Service brake:		oil-immersed multi-disk brake, front axle

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. With lithium.

MAINTENANCE PARTS see operation manual

CAPACITIES	**ltr.**		
Engine oil (first filling):	approx.	10.0	engine oil
Hydraulic oil (tank and system):	approx.	150.0	hydraulic oil
Hydraulic oil (change):	approx.	125.0	hydraulic oil
Fuel tank:	approx.	140.0	diesel
Steering front axle - central housing:	approx.	7.4	transmission oil
Rear axle - central housing:	approx.	7.0	transmission oil
Reduction gear:	approx.	1.5	transmission oil
Wheel hubs front axle:	approx.	0.5	transmission oil, each
Wheel hubs rear axle:	approx.	0.5	transmission oil, each
Slew gear:	approx.	1.2	transmission oil Lifetime
Service brake:	connected to the hydraulic system		
Cooling agent:	approx.	12.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		KHD
Type:		BF 4 M 1012 E
Performance according to DIN 70020:	kW/PS	53 / 72 at 2,000 min^{-1}
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	3,200
High idle:	min^{-1}	2,150
Low idle:	min^{-1}	800
Spec. fuel consumption under full load:	g/kWh	208
Tappet clearance - inlet cold:	mm	$0.3^{+0.1}$
Tappet clearance - outlet cold:	mm	$0.5^{+0.1}$
Torque cylinder head studs:	Nm	30, 80, 90°
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	14 / 55
Starter:	kW/PS	3.1 / 4
Starting aid:		4 glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

TRANSMISSION

Travel pump:	type	A 4 VG 56 DA with pressure cut-off
Displacement:	cm^3/rev.	0 to 56
Travel motor:	type	A 6 VM 107 DA
Displacement:	max. cm^3/rev.	107
Servo-controlled valve, pedal:	type	Rexroth 2TH6 RP20

TRAVEL RANGE

Symbol „tortoise“:		km/h	0 to 6
Symbol „rabbit“:		km/h	0 to 20 / 25
Cardan shaft rev. with **20 km/h version** (up to s/n: 3200/0313)			adjustment at nominal speed tortoise / rabbit
with standard tyres:	8.25-20:	min^{-1}	560 / 1,850
	12.0-18:	min^{-1}	560 / 1,975
	15.5/55 R18:	min^{-1}	560 / 2,015
	365/70 R18:	min^{-1}	560 / 1.840
Cardan shaft rev. with **25 km/h version** (up to s/n: 3200/0313)			adjustment at nominal speed tortoise / rabbit
with standard tyres:	8.25-20:	min^{-1}	560 / 2,320
	12.0-18:	min^{-1}	560 / 2,470
	15.5/55 R18:	min^{-1}	560 / 2,500
	365/70 R18:	min^{-1}	560 / 2,300

Cardan shaft from s/n 3200/0314 — **please see page 2.51.03 / 2.51.04**

Cardan shaft rev. with 36 km/h version — **please see page 2.51.03 / 2.51.04**

PRESSURE AND SETTING VALUES	Travel	
Suction pressure:	bar	- 0.25
Charge pressure (high idle):	bar	30^{+2}
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start (dynamic):	bar	$270^{\pm10}$
Start-up speed:	min^{-1}	$1{,}000^{+50}$ (50 bar HP)
Engine stalling (tortoise, dynamic):	min^{-1}	$1{,}900^{\pm50}$ at 280^{+10} bar HP

STEERING

Steering unit:	type	Rexroth LAGC 200-14/LD 200-140
Steering pump:	make	Bosch
Displacement:	cm^3/rev.	14
Steering pressure (high idle):	bar	140
Priority valve:	type	Rexroth LPS 40 R11

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 10 VO 071 DFLR
Displacement:	cm^3/rev.	0 to 71
Triple gear pumps:	type	Bosch
Displacement:	cm^3/rev.	14 + 8 + 5,5
LS-pressure relief valve:	bar	280 (valve bank 1)
LS-regulator (stand-by pressure):	bar	22 at 2,150 min^{-1} (variable displacement pump)
Servo-controlled valve (joystick) right / left:	type	Rexroth 4TH 6 N
Servo-controlled valve, linear lever (stabilizing):	type	Hydro – Control
MONO boom:		
Servo-controlled valve, pedal (articulation):	type	Rexroth 2TH 6 RP 20
With articulated boom and circular boom:		
Servo-controlled valve, pedal (intermediate boom / articulation)	type	Rexroth 2TH 6 RP 20
Valve bank 1, articulated boom and circular boom / MONO boom:	type	Rexroth 5 SX 14 / 4 SX 14
Valve bank 2:	type	Rexroth 4 SM 12

PRESSURE AND SETTING VALUES	Working	
Valve bank 1 - SX 14		
LS valve:	bar	280
Main relief valve:	bar	310
Line relief pressures:		
- Boom - articulated boom (raise / lower):	bar	300 / 300
- Boom - Mono boom (raise / lower):	bar	300 / 180
- Boom - circular boom (raise / lower):	bar	300 / 180
- Dipperstick:	bar	300 / 300
- Bucket:	bar	300 / 300
- Intermediate boom - articulated boom / circular boom in / out:	bar	300 / 150
- Additional control circuit / breaker:	bar	300 / 300

Valve bank 2 - SM 12

Main pressure relief valve 2 (high idle):	bar	230
Line relief pressures:		
- Slewing (valves at slew motor):	bar	100/250 / 100/250
- Articulation:	bar	----
- Stabilizing:	bar	----
- Option: front dozer blade:	bar	130 $^{+10}$ (Bosch safety valve in the undercarriage)

Cut-off valve:	make	Bergin
Cut-off pressure (high idle):	bar	110
Pilot pressure (charge pressure) - high idle:	bar	30 $^{+2}$

SLEW DRIVE

Slew gear (up to 3200/0124):	type	HD 4
Slew gear (from 3200/0125):	type	ZFP DR - 140
Slew motor:	type	A 2 FM 28
Slew pressure (valves at the slew motor):	bar	100 / 250

CYCLE TIMES

Mono boom -	raise / lower:	sec.	4.5 / 4.8
Articulated boom -	raise / lower:	sec.	4.5 / 4.5
Intermediate boom -	raise / lower:	sec.	4.0 / 3.0
Dipperstick -	in / out:	sec.	4.0 / 3.6
Bucket -	in / out:	sec.	2.6 / 2.0

AXLES

Front axle:	standard	(up to 3200/0313)	make/type	Clark-Hurth 311/279/105
Rear axle:	standard	(up to 3200/0313)	make/type	Clark-Hurth 172/482
Front axle:	standard	(from 3200/0314)	make/type	Clark-Hurth 311/212/99
Rear axle:	standard	(from 3200/0314)	make/type	Clark-Hurth 162/53

Options:

Front axle:	4 wheel steering	(from 3200/0288)	make/type	Clark-Hurth 311/212/110
Rear axle:	4 wheel steering	(from 3200/0288)	make/type	Clark-Hurth 212/348
Front axle:	HML32 S	(from 3200/0314)	make/type	Clark-Hurth 357/212/199
Rear axle:	HML32 S	(from 3200/0314)	make/type	Clark-Hurth 162/53

BRAKES

Brake pump:	make	Bosch
Displacement:	cm³/rev.	5.5
Brake shut-off valve:	make	Wabco
Switching range:	bar	120 - 150
Foot brake valve:	make	Wabco
Brake pressure:	bar	70 $^{+10}$ (up to s/n: 3200/0313)
	bar	40 $^{+10}$ (from s/n: 3200/0314)
Beginning/ end of inching:	bar	5 - 13
Parking brake:		spring-loaded brake in the front axle
Service brake:		oil-immersed multi-disk brake, front and rear axle

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. Lithium-saponified. NLGI grade 2 with EP additives

MAINTENANCE PARTS

see operating manual

CAPACITIES

	ltr.	
Engine oil (first filling):	approx. 10.0	engine oil
Hydraulic oil (tank and system):	approx. 190.0	hydraulic oil
Hydraulic oil (change):	approx. 125.0	hydraulic oil
Fuel tank:	approx. 190.0	diesel
Steering front axle - central housing:	approx. 7.4	transmission oil
Rear axle - central housing:	approx. 7.0	transmission oil
Reduction gear:	approx. 1.5	transmission oil
Wheel hubs front axle:	approx. 0.5	transmission oil, each
Wheel hubs rear axle:	approx. 0.5	transmission oil, each
Swing gear (up to 3200/0124):	approx. 1.2	transmission oil Lifetime
Swing gear (from 3200/0125):	lubrication by circulation of the hydraulic oil	
Service brake:	connected to the hydraulic system	
Cooling agent:	approx. 12.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		KHD
Type:		BF 4 M 2012 – Tier 2
Performance according to DIN 70020:	kW/hp	60 / 82 at 2,000 min^{-1}
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	4,040
High idle:	min^{-1}	2,150 $^{+50}$
Low idle:	min^{-1}	800 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	226
Tappet clearance - inlet cold:	mm	0.3 $^{+0.1}$
Tappet clearance - outlet cold:	mm	0.5 $^{+0.1}$
Engine oil pressure (low idle)	bar	0,8
Torque cylinder head studs:	Nm	40, 70 Tightening angle 180°
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 760(EN)
Generator:	V/A	14 / 95
Starter:	kW/PS	3.1 / 4
Starting aid:		air intake heater plate
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

TRANSMISSION

Travel pump:	type	A 4 VG 56 DA with pressure cut-off
Displacement:	cm^3/rev.	0 to 56
Travel motor:	type	A 6 VM 107 DA
Displacement:	max. cm^3/rev.	107
Servo-controlled valve, pedal:	type	Rexroth 2TH6 RP20

TRAVEL RANGE

HML 32:	**20/25 km/h - version**		
tortoise / rabbit:		km/h	0 to 6 / 0 to 20 or 25
HML 32:	**36 km/h - version**		
4 pre-selectable travel ranges, electro-hydraulically operated:			
Gearbox position 1,	tortoise / rabbit:	km/h	0 to 5 / 0 to 15
Gearbox position 2,	tortoise / rabbit:	km/h	0 to 11 / 0 to 36
Cardan shaft rev. at	**20 km/h - version**		adjustment at nominal speed tortoise / rabbit
with standard tyres:	8.25-20:	min^{-1}	395 / 1,480
option:	365/70-R18:	min^{-1}	395 / 1,475
	500/45-20:	min^{-1}	395 / 1,450
Cardan shaft rev. at	**25 km/h - version**		adjustment at nominal speed tortoise / rabbit
with standard tyres:	8.25-20:	min^{-1}	395 / 1,850
option:	365/70-R18:	min^{-1}	395 / 1,840
	500/45-20:	min^{-1}	395 / 1,810

Cardan shaft rev. at	**36 km/h - version**		adjustment at nominal speed Tortoise / rabbit 1^{st} / 2^{nd} gear / 1^{st} / 2^{nd} gear
with standard tyres:	8.25-20:	min^{-1}	350 / 850 / 1,105 / 2,660
option:	365/70-R18:	min^{-1}	350 / 850 / 1,100 / 2,650
	500/45-20:	min^{-1}	350 / 850 / 1,080 / 2,600

PRESSURE AND SETTING VALUES	**Travel**	
Suction pressure:	bar	- 0.25
Charge pressure (high idle):	bar	30^{+2}
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start (dynamic):	bar	$270^{\pm 10}$
Start-up speed:	min^{-1}	$1{,}100^{+50}$ (50 bar HP)
Engine stalling (tortoise, dynamic):	min^{-1}	$1{,}900^{+50}/_{-100}$ at 320^{+10} bar HP

STEERING

Steering unit:	type	Rexroth LAGC 200-14/LD 200-140
Steering pump:	make	Casappa
Displacement:	cm^3/rev.	16.6
Steering pressure (high idle):	bar	140
Priority valve:	type	Rexroth LPS 80 R11

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 10 VO 071 DFLR
Displacement:	cm^3/rev.	0 to 71
Triple gear pumps:	type	Casappa
Displacement:	cm^3/rev.	16.6 + 11.1
LS-pressure relief valve:	bar	280 (valve bank 1)
LS-regulator (stand-by pressure):	bar	22 at 2,150 min^{-1} (variable displacement pump)
Servo-controlled valve (joystick) right / left:	type	Rexroth 4TH6 N
Servo-controlled valve, linear lever (stabilizing):	type	Hydro - Control
MONO boom: Servo-controlled valve, pedal (articulation):	type	Rexroth 2TH6 RP20
With articulated boom and circular boom: Servo-controlled valve, pedal (intermediate boom / articulation)	type	Rexroth 2TH6 RP20
Valve bank 1, articulated boom and circular boom / MONO boom:	type	Rexroth 5 SX 14 / 4 SX 14
Valve bank 2:	type	Rexroth 4 SM 12

PRESSURE AND SETTING VALUES		Working	
Valve bank 1 - SX 14			
LS valve:		bar	280
Main relief valve:		bar	310
Line relief pressures:			
- Boom - articulated boom	(raise / lower):	bar	300 / 300
- Boom - Mono boom	(raise / lower):	bar	300 / 180
- Boom - circular boom	(raise / lower):	bar	300 / 180
- Dipperstick:		bar	300 / 300
- Bucket:		bar	300 / 300
- Intermediate boom - articulated boom / circular boom in / out:		bar	300 / 150
- Additional control circuit / breaker:		bar	300 / 300
Valve bank 2 - SM 12			
Main pressure relief valve 2 (high idle):		bar	230
Line relief pressures:			
- Slewing (valves at slew motor):		bar	100/250 / 100/250
- Articulation:		bar	----
- Stabilizing:		bar	----
- **Option:** front dozer blade:		bar	130 $^{+10}$ (Bosch safety valve in the undercarriage)
Cut-off valve:		make	Bergin
Cut-off pressure (high idle):		bar	110
Pilot pressure (charge pressure) - high idle:		bar	30 $^{+2}$
SLEW DRIVE			
Slew gear:		type	ZFP DR - 140
Slew motor:		type	A 2 FM 28
Slew pressure (valves at the slew motor):		bar	100 / 250
CYCLE TIMES			
Mono boom -	raise / lower:	sec.	4.5 / 4.8
Articulated boom -	raise / lower:	sec.	4.5 / 4.5
Intermediate boom -	raise / lower:	sec.	4.0 / 3.0
Dipperstick -	in / out:	sec.	4.0 / 3.6
Bucket -	in / out:	sec.	2.6 / 2.0
AXLES			
Front axle: standard and	(up to 3200/0444) /0448; /0449)	make/type	Clark-Hurth 311/212/99
Front axle: standard before	(from 3200/0450) /0445 - /0447)	make/type	Clark-Hurth 311/212/129
Rear axle: standard		make/type	Clark-Hurth 162/53
Options:			
Front axle: 4 wheel steering		make/type	Clark-Hurth 311/212/110
Rear axle: 4 wheel steering		make/type	Clark-Hurth 212/348
Front axle: HML32 S		make/type	Clark-Hurth 357/212/199
Rear axle: HML32 S		make/type	Clark-Hurth 162/53

BRAKES

Brake pump:	make	Casappa
Displacement:	cm^3/rev.	11.1
Brake shut-off valve:	make	Wabco
Switching range:	bar	120 - 150
Foot brake valve:	make	Wabco
Brake pressure:	bar	40^{+10}
Beginning/ end of inching:	bar	5 - 13
Parking brake:		spring-loaded brake in the front axle
Service brake:		oil-immersed multi-disk brake, front and rear axle

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation in the operating manual
Transmission oil:	MIL-L 2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. Lithium-saponified. NLGI grade 2 with EP additives

MAINTENANCE PARTS

see operating manual

CAPACITIES

	ltr.	
Engine oil (first filling):	approx. 10.0	engine oil
Hydraulic oil (tank and system):	approx. 190.0	hydraulic oil
Hydraulic oil (change):	approx. 125.0	hydraulic oil
Fuel tank:	approx. 190.0	diesel
Steering front axle - central housing:	approx. 7.4	transmission oil
Rear axle - central housing:	approx. 7.0	transmission oil
Reduction gear:	approx. 1.5	transmission oil
Wheel hubs front axle:	approx. 0.5	transmission oil, each
Wheel hubs rear axle:	approx. 0.5	transmission oil, each
Swing gear:	lubrication by circulation of the hydraulic oil	
Service brake:	connected to the hydraulic system	
Cooling agent:	approx. 12.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		KHD
Type:		BF 4 M 1012 E
Performance acc. to DIN 70020:	kW/PS	59 / 80 at 2,300 min^{-1}
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	3,200
High idle:	min^{-1}	2,450
Low idle:	min^{-1}	800
Spec. fuel consumption under full load:	g/kWh	208
Tappet clearance - inlet cold:	mm	$0.3^{+0.1}$
Tappet clearance - exhaust cold:	mm	$0.5^{+0.1}$
Torque cylinder head studs:	Nm	30, 80, 90°
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	14 / 55
Starter:	kW/PS	3.1 / 4
Starting aid:		4 glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

TRANSMISSION

Travel pump:	type	A 4 VG 71 DA with pressure cut-off
Displacement:	cm^3/rev.	0 to 71
Travel motor:	type	A 6 VM 160 DA
Displacement:	max. cm^3/rev.	160
Pilot-operated valve, pedal:	type	Rexroth 2TH6 RP20 (from serial no. 321/1290)

TRAVEL RANGE

Symbol „tortoise“:		km/h	0 to 6
Symbol „rabbit“:		km/h	0 to 20
Cardan shaft rev. at **20 km/h**			adjustment at nominal speed tortoise / rabbit
with standard tyres:	9.00-20:	min^{-1}	530 / 1.790
	16/70-20:	min^{-1}	530 / 1.740
	600/40-22,5TU:	min^{-1}	530 / 1.750

PRESSURE AND SETTING VALUES

	travel	
Suction pressure:	bar	- 0.25
Charge pressure (high idle):	bar	30
High pressure (SV):	bar	460^{+20}
Pressure cut-off:	bar	440
Case pressure at + 50° C:	max. bar	2.5
Regulation start (dynamic):	bar	$210^{\pm 10}$
Start-up speed:	min^{-1}	1,100
Engine stalling (tortoise dynamic):	min^{-1}	$2,200^{\pm 50}$ at 230^{+10} bar HP

STEERING

Steering unit (up to serial no. 321/1136):	type	OSPC 160 LS dyn.
Steering unit (from serial no. 321/1137):	type	ZF-LAGCSD 160
Steering pump:	make	Bosch
Displacement:	cm^3/rev.	14
Steering pressure (high idle):	bar	150
Priority valve (up to serial no. 321/1136):	type	OLS 40 dyn.
Priority valve (from serial no. 321/1137):	type	ZF-LSPSD 2.225-2

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 10 VO 100 DFSR
Displacement:	cm^3/rev.	0 to 100
Gear pumps:	type	Bosch
Displacement:	cm^3/rev.	14+8+5
LS-pressure relief valve:	bar	250 (valve bank 1)
LS-regulator (stand-by pressure):	bar	25 at 2,450 min^{-1} (variable displacement pump)
Servo-controlled valve (cross servo control stick):	type	Rexroth 4TH6
Servo-controlled valve, linear lever (articulation):	type	VOAC PCL 402
Servo-controlled valve, linear lever (stabilizing):	type	VOAC PCL 402
Servo-controlled valve, pedal - (telescopic stick / breaker) - MONO boom:	type	Hamworthy
Servo-controlled valve, pedal (breaker) - articulated boom:	type	Rexroth 2TH6
Valve bank 1:	type	5 SX 18
Valve bank 2:	type	5 SM 12

PRESSURE AND SETTING VALUES	**working**	
Main pressure relief valve 1 (SX 18):	bar	280 (SV)
Main pressure relief valve 2 (5 SM 12) (high idle):	bar	210
Line relief pressures (valve bank 1):		
- Boom:	bar	280 / 280
- Dipperstick:	bar	280 / 280
- Bucket:	bar	280 / 280
- Intermediate boom extend / retract:	bar	150 / 280
- Breaker (up to 321/1286):	bar	280
- Additional control circuit / breaker (from 321/1287):	bar	280 / 280
Line relief pressures (valve bank 2):		
- Slewing (valves at the slew motor):	bar	210 / 210 (high idle)
- Stabilizing:	bar	----
- Articulation:	bar	----
- Additional control circuit:	bar	250 - 250
Shut-off valve (up to serial no. 321/1262):	make	Buchholz
Shut-off valve (from serial no. 321/1263):	make	Bergin
Shut-off pressure (high idle):	bar	110
Pilot pressure (charge pressure) - high idle:	bar	30 $^{+2}$

SLEW DRIVE

Slew gear:	type	HD 4
Slew motor:	type	A 2 FM 28
Slew pressure (valves at the slew motor):	bar	210 (high idle)

AXLES

Front axle (up to serial no. 321/1244):	make/type	ZP APL-B 735
Rear axle (up to serial no. 321/1244):	make/type	ZP AP-B 735 + 14 VG 95
Front axle (from serial no. 321/1245):	make/type	Hurth 311/277/79
Rear axle (from serial no. 321/1245):	make/tpye	Hurth 172/437
Front axle (four-wheel steering):	make/type	Hurth 311/277/72
Rear axle (four-wheel steering):	make/type	Hurth 277/140

BRAKES (up to serial no. 321/1250)

Brake pump:	make	Bosch
Displacement:	cm^3/rev.	5
Brake shut-off valve:	make	SAFIM
Switching range:	bar	110 - 150
Foot brake valve:	make	SAFIM type 56
Brake pressure:	bar	40
Beginning / end of brake inching:	bar	5 - 13
Parking brake:	bar	spring-loaded brake at transfer gearbox
Service brake:	bar	oil-immersed multi-disk brake, front and rear axle

BRAKES (from serial no. 321/1251)

Brake pump:	make	Bosch
Displacement:	cm^3/rev.	5
Brake shut-off valve:	make	Rexroth
Switching range:	bar	120 - 150
Foot brake valve:	make	Rexroth
Brake pressure:	bar	60^{+10}
Beginning / end of brake inching:	bar	5 - 13
Parking brake:		springed-loaded brake in the front axle
Service brake:		oil-immersed multi-disk brake, front axle

CYCLE TIMES

MONO boom, boom cylinder extend / retract	sec.	5.0 / 5.0
Articulated boom, boom cylinder extend / retract	sec.	5.5./ 5.0
Intermediate boom cylinder extend / retract	sec.	4.5 / 3.5
Telescopic stick cylinder extend / retract	sec.	4.0 / 3.6
Dipperstick cylinder extend / retract	sec.	4.3 / 3.6
Bucket cylinder extend / retract	sec.	3.5 / 2.5

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. With lithium

MAINTENANCE PARTS

see operating manual

CAPACITIES

	ltr.	
Engine oil (first filling):	approx. 10.0	engine oil
Hydraulic oil (tank and system):	approx. 180.0	hydraulic oil
Hydraulic oil (change):	approx. 125.0	hydraulic oil
Fuel tank:	approx. 150.0	diesel
Steering front axle - central housing:	approx. 9.0	transmission oil
Rear axle - central housing and gearbox:	approx. 9.0	transmission oil
Wheel hubs front axle:	approx. 0.8	transmission oil, each
Wheel hubs rear axle:	approx. 0.8	transmission oil, each
Slew gear:	approx. 1.6	transmission oil Lifetime connected to the hydraulic system
Service brake:	approx. 12.0	water with anti-corrosive and anti-freeze agent
Cooling agent:		

DIESEL ENGINE

Manufacturer:		KHD
Type:		BF 4 M 2012
Performance acc. to DIN 70020:	kW/PS	67 / 91 at 2,000 min^{-1}
Cooling:		water/ water antifreeze mixture
Injection:		direct injection
Capacity:	cm^3	4,000
High idle:	min^{-1}	2,150 $^{+50}$
Low idle:	min^{-1}	800 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	208
Tappet clearance - inlet cold:	mm	0.3 $^{+0.1}$
Tappet clearance - exhaust cold:	mm	0.5 $^{+0.1}$
Torque cylinder head studs:	Nm	1st step: 40 2nd step: 70 Tightening angle: 180°
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 135 / 1000(EN)
Generator:	V/A	14 / 70
Starter:	kW/PS	3.1 / 4
Cold start aid:		heater plug
Lighting:		acc. to German motor vehicle construction and use regulation ("StVZO") and Euronorm

TRANSMISSION

Travel pump:		type	A 4 VG 90 DA 1 DT 8 with pressure cut-off
Displacement:		cm^3/rev.	0 to 90
Travel motor:		type	A 6 VM 140 DA 1
Displacement:	max.	cm^3/rev.	140
Pilot-operated valve, pedal:		type	Rexroth 2 TH 6 RP 20 (from serial no. 321/1290)

TRAVEL RANGE

Symbol „tortoise“:		km/h	0 to 6
Symbol „rabbit“:		km/h	0 to 20
Cardan shaft rev. at **20 km/h**			adjustment at nominal speed tortoise / rabbit
with standard tyres:	9.00-20 14PR:	min^{-1}	570 / 1,840
	600/40-22,5:	min^{-1}	570 / 1,795
Cardan shaft rev. at **25 km/h**			adjustment at nominal speed tortoise / rabbit
with standard tyres:	9.00-20 14PR:	min^{-1}	570 / 2,150
	600/40-22,5:	min^{-1}	570 / 2,065

PRESSURE AND SETTING VALUES — travel

Suction pressure:	bar	- 0.25
Charge pressure (high idle):	bar	30^{+2}
High pressure (SV):	bar	480
Pressure cut-off:	bar	460^{-10}
Case pressure at + 50° C:	max. bar	2.5
Regulation start (dynamic):	bar	$220^{\pm10}$
Start-up speed:	min^{-1}	$1{,}000^{+50}$ (50 bar HP)
Engine stalling (tortoise dynamic):	min^{-1}	$1{,}900^{\pm50}$ at 280^{+10} bar HP

STEERING

Steering unit:	type	Rexroth LAGC 160-14/LD 200-140/M01
Steering pump:	make	Casappa
Displacement:	cm^3/rev.	17
Steering pressure (high idle):	bar	$140^{\pm5}$
Priority valve:	type	Rexroth LPS 40 R11/LD7

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 10 VO 100 DFSR
Displacement:	cm^3/rev.	0 to 100
Gear pumps (triple):	type	Casappa
Displacement:	cm^3/rev.	17 + 11 + 5
LS-pressure relief valve:	bar	280 (valve bank 1)
LS-regulator (stand-by pressure):	bar	$22^{\pm1}$ at 2,150 min^{-1} (variable displacement pump)
Servo-controlled valve (joystick), right / left:	type	Rexroth 4TH6 NE-70-10
Servo-controlled valve, linear lever (stabilising):	type	Hydro-Control HC-RCB-01-A01
Servo-controlled valve, pedal (intermediate boom/articulation):	type	Rexroth 2TH6 RP 20
Valve bank 1, articulated boom:	type	Rexroth 5 SX 14
Valve bank 2:	type	Rexroth 4 SM 12

PRESSURE AND SETTING VALUES — working

Valve bank 1 (SX 14)

LS valve	bar	280
Main relief valve (high idle)	bar	310
Line relief pressures		
- Boom, articulated boom (up/down):	bar	300 / 300
- Stick:	bar	300 / 300
- Bucket:	bar	300 / 300
- Intermediate boom, articulated boom (in/out):	bar	300 / 150
- Additional control circuit / breaker:	bar	300 / 300

Valve bank 2 (SM 12)

Main pressure relief valve 2 (high idle)	bar	230
Line relief pressures		
- Swing (valves at swing motor):	bar	100/250 / 100/250
- Articulation:	bar	---/---
- Stabilizing:	bar	---/---
- **Option**: front dozer blade	bar	150^{+10} (Bosch safety valve in the undercarriage)

Shut-off valve	make	Knappheide
Shut-off valve (high idle):	bar	110 $^{\pm 5}$
Pilot pressure (charge pressure) – high idle:	bar	30 $^{+2}$

SWING DRIVE

Swing gear:	type	ZFP DR - 140
Swing motor:	type	A 2 FM 28
Swing pressure (valves at the swing motor):	bar	100 / 250

CYLE TIMES:

Articulated boom, boom	up / down:	s	4.7 / 4.0
Intermediate boom	up / down:	s	4.3 / 4.5
Stick	in / out:	s	5.2 / 4.7
Bucket	in / out:	s	3.1 / 2.6

AXLES

Front axle:	make/type	DANA 311 / 212 / 100
Rear axle:	make/type	DANA 162 / 54

BRAKES

Brake pump:	make	Cassappa
Displacement:	cm³/rev.	5
Brake shut-off valve:	make	Wabco
Switching range:	bar	120 – 150 $^{\pm 10}$
Foot brake valve:	make	Wabco
Brake pressure:	bar	40 $^{+5}$
Beginning / end of brake inching:	bar	5 - 13
Parking brake:		spring-loaded brake in the front axle
Service brake:	bar	oil-immersed multi-disk brake, front and rear axle

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil specification in the operating manual
Transmission oil:	SAE 80W 90LS / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825, lithium-saponified multi-purpose grease, K2K-30

MAINTENANCE PARTS	see operating manual	
CAPACITIES	**ltr.**	
Engine oil (first filling):	approx. 10.0	engine oil
Hydraulic oil (tank and system):	approx. 190.0	hydraulic oil
Hydraulic oil (change):	approx. 125.0	hydraulic oil
Fuel tank:	approx. 240.0	diesel
Steering front axle - central housing:	approx. 7.2	transmission oil
Steering front axle – gearbox:	approx. 0.9	transmission oil
Steering front axle – wheel hub:	approx. 0.9	transmission oil, each
Rear axle - central housing:	approx. 8.0	transmission oil
Rear axle – wheel hubs:	approx. 2.1	transmission oil, each
Swing gear:	Hydraulic oil, lubrication by circulation of the oil	
Service brake:	connected to the hydraulic system	
Cooling agent:	approx. 12.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		KHD
Type:		BF 4 M 2012 – Tier 2
Performance acc. to DIN 70020:	kW/PS	67 / 91 at 2,000 min^{-1}
Cooling:		water / antifreeze mixture
Injection:		direct injection
Capacity:	cm^3	4,040
High idle:	min^{-1}	2,150 $^{+50}$
Low idle:	min^{-1}	800 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	227
Tappet clearance - inlet cold:	mm	0.3 $^{+0.1}$
Tappet clearance - exhaust cold:	mm	0.5 $^{+0.1}$
Engine oil pressure (Low idle):	bar	0,8
Torque cylinder head studs:	Nm	1st step: 40 2nd step: 70 Tightening angle: 180°
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 135 / 1000 (EN)
Generator:	V/A	14 / 70
Starter:	kW/PS	3.1 / 4.2
Cold start aid:		air intake heater plate
Lighting:		acc. to German motor vehicle construction and use regulation ("StVZO") and Euronorm

TRANSMISSION

Travel pump:			type	A 4 VG 90 DA 1 DT 8 with pressure cut-off
Displacement:			cm^3/rev.	0 to 90
Travel motor	20/25	km/h version:	type	A 6 VM 140 DA 1
	36	km/h version:	type	A 6 VM 107 DA 1
Displacement:	20/25	km/h version:	cm^3/rev.	max. 140
	36	km/h version:	cm^3/rev.	max. 107
Pilot-operated valve, pedal:			type	Rexroth 2 TH 6 RP 20

TRAVEL RANGE

Symbol „tortoise":		km/h	0 to 6
Symbol „rabbit":		km/h	0 to 20
HML 42:	**20/25 km/h - version**		
tortoise / rabbit:		km/h	0 to 6 / 0 to 20 or 25
HML 42:	**36 km/h - version**		
4 pre-selectable travel ranges, electro-hydraulically operated:			
Gearbox position 1,	tortoise / rabbit:	km/h	0 to 7 / 0 to 16
Gearbox position 2,	tortoise / rabbit:	km/h	0 to 16 / 0 to 36
Cardan shaft rev. at	**20 km/h - version**		adjustment at nominal speed tortoise / rabbit
with standard tyres:	9.00-20 14PR:	min^{-1}	570 / 1,840
option:	600/40-22.5:	min^{-1}	570 / 1,795
	315/80 R 22.5	min^{-1}	570 / 1,780
Cardan shaft rev. at	**25 km/h - version**		adjustment at nominal speed tortoise / rabbit
with standard tyres:	9.00-20 14PR:	min^{-1}	570 / 2,150
option:	600/40-22,5:	min^{-1}	570 / 2,065
	315/80 R 22.5:	min^{-1}	570 / 2,050

Cardan shaft rev. at	**36 km/h - version**		adjustment at nominal speed Tortoise / rabbit 1st / 2nd gear / 1st / 2nd gear
with standard tyres:	9.00-20 14PR:	min^{-1}	510 / 1,180 / 1,440 / 3,300
option:	600/40-22,5:	min^{-1}	510 / 1,180 / 1,400 / 3,230
	315/80 R 22.5:	min^{-1}	510 / 1,180 / 1,395 / 3,200

PRESSURE AND SETTING VALUES	**travel**	
Suction pressure:	bar	- 0.25
Charge pressure (high idle):	bar	30^{+2}
High pressure (SV):	bar	480
Pressure cut-off:	bar	460^{-10}
Case pressure at + 50° C:	max. bar	2.5
Regulation start (dynamic):	bar	$220^{\pm10}$
Start-up speed:	min^{-1}	$1{,}000^{+50}$ (50 bar HP)
Engine stalling (tortoise dynamic):	min^{-1}	$1{,}900^{\pm50}$ at 230^{+10} bar HP

STEERING		
Steering unit:	type	Rexroth LAGC 160-14/LD 200-140/M01
Steering pump:	make	Cassapa
Displacement:	cm^3/rev.	16,6
Steering pressure (high idle):	bar	$140^{\pm5}$
Priority valve:	type	Rexroth LPS 40 R11/LD7

WORKING HYDRAULICS		
Working pump (variable displacement pump):	type	A 10 VO 100 DFSR
Displacement:	cm^3/rev.	0 to 100
Gear pumps (triple):	type	Cassapa
Displacement:	cm^3/rev.	16.6 + 11.1 + 4.8
LS-pressure relief valve:	bar	280 (valve bank 1)
LS-regulator (stand-by pressure):	bar	$22^{\pm1}$ at 2,150 min^{-1} (variable displacement pump)
Servo-controlled valve (joystick), right / left:	type	Rexroth 4TH6 NE-70-10
Servo-controlled valve, linear lever (stabilising):	type	Hydro-Control HC-RCB-01-A01
Servo-controlled valve, pedal (intermediate boom/articulation):	type	Rexroth 2TH6 RP 20
Valve bank 1, articulated boom:	type	Rexroth 5 SX 14
Valve bank 2:	type	Rexroth 4 SM 12

PRESSURE AND SETTING VALUES	**working**	
Valve bank 1 (SX 14)		
LS valve	bar	280
Main relief valve (high idle)	bar	310
Line relief pressures		
- Boom, articulated boom (up/down):	bar	300 / 300
- Stick:	bar	300 / 300
- Bucket:	bar	300 / 300
- Intermediate boom, articulated boom (in/out):	bar	300 / 150
- Additional control circuit / breaker:	bar	300 / 300
Valve bank 2 (SM 12)		
Main pressure relief valve 2 (high idle)	bar	230
Line relief pressures		
- Swing (valves at swing motor):	bar	100/250 / 100/250
- Articulation:	bar	---/---
- Stabilising:	bar	---/---
- **Option**: front dozer blade	bar	150^{+10} (Bosch safety valve in the undercarriage)

Shut-off valve	make	Knappheide
Shut-off valve (high idle):	bar	110 $^{\pm 5}$
Pilot pressure (charge pressure) – high idle:	bar	30 $^{+2}$

SWING DRIVE

Swing gear:	type	ZFP DR - 140
Swing motor:	type	A 2 FM 28
Swing pressure (valves at the swing motor):	bar	100 / 250

CYLE TIMES:

Articulated boom, boom	up / down:	s	4.7 / 4.0
Intermediate boom	up / down:	s	4.3 / 4.5
Stick	in / out:	s	4.4 / 4.2
Bucket	in / out:	s	3.1 / 2.3

AXLES

Front axle:	make/type	DANA 311 / 212 / 100
Rear axle:	make/type	DANA 162 / 54

Options:

Front axle 4-wheel steering:	make/type	DANA 311 / 212 / 118
Rear axle 4-wheel steering:	make/type	DANA 212 / 402
Front axle 36 km/h - version:	make/type	DANA 357 / 212 / 217
Rear axle 36 km/h - version:	make/type	DANA 162 / 54
Front axle 4-wheel steering+36 km/h-version:	make/type	DANA 357 / 212 / 217
Rear axle 4-wheel steering+36 km/h-version:	make/type	DANA 212 / 402

BRAKES

Brake pump:	make	Cassappa
Displacement:	cm³/rev.	4.8
Brake shut-off valve:	make	Wabco
Switching range:	bar	120 – 150 $^{\pm 10}$
Foot brake valve:	make	Wabco
Brake pressure:	bar	40 $^{+5}$
Beginning / end of brake inching:	bar	5 - 13
Parking brake:		spring-loaded brake in the front axle
Service brake:	bar	oil-immersed multi-disk brake, front and rear axle

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil specification in the operating manual
Transmission oil:	SAE 80W 90LS / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825, lithium-saponified multi-purpose grease, K2K-30

MAINTENANCE PARTS see operating manual

CAPACITIES	**ltr.**		
Engine oil (first filling):	approx.	10.0	engine oil
Hydraulic oil (tank and system):	approx.	190.0	hydraulic oil
Hydraulic oil (change):	approx.	125.0	hydraulic oil
Fuel tank:	approx.	240.0	diesel
Steering front axle - central housing:	approx.	7.2	transmission oil
Steering front axle – gearbox:	approx.	0.9	transmission oil
Steering front axle – wheel hub:	approx.	0.9	transmission oil, each
Rear axle - central housing:	approx.	8.0	transmission oil
Rear axle – wheel hubs:	approx.	2.1	transmission oil, each
Swing gear:			Hydraulic oil, lubrication by circulation of the oil
Service brake:			connected to the hydraulic system
Cooling agent:	approx.	12.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		S 4Q 2 - Y 163 KL
Output acc. to ISO 9249 (DIN 70020):	kW	37.9 / 51.5 at 2,400 min^{-1}
Construction:		4 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	2,505
High idle:	min^{-1}	2,570 $^{+30}/_{-20}$
Low idle:	min^{-1}	850 $^{\pm 20}$
Spec. fuel consumption (full load):	g/kWh	252
Fuel bleeding:		automatic
Tappet clearance - inlet / outlet:	mm	0.25 (cold)
Injection timing:	°	20 (before upper dead centre)
Tightening torque of cylinder head studs (in case of repair):	Nm	M 12 x 1.75 : 118 ± 5
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 50
Starter:	V/kW	12 / 2.0
Starting aid:		glow plugs, glow time controlled,
Lighting:		working headlamp H3, additional headlamp (optional)

TRANSMISSION

Travel motors with travel gear:	make / type	Kayaba MAG-33V-550 E
Travel speed:	km/h	0 to 3.0, 0 to 5.2

EXCAVATOR AND TRAVEL HYDRAULICS

Summation-controlled double variable displacement pump and 2 gear pumps:	make	Kayaba PSVD 2-26 E
Flow rate:	l/min.	62.4+62.4+43.2+8.4
Pilot pressure (high idle):	bar	30 (service temperature)
Control valve:	type	Kayaba KVSE 72-11
Joystick:	type	Rexroth 4TH 5
Pedal-operated valve (travel right/left, articulation, additional control circuit):	type	Rexroth 2TH 6
Pedal-operated valve (dozer blade)	type	Hydrocontrol HC-RCM-1S

SLEW DRIVE

Slew motor with gearbox:	make	Kayaba MSG-27P-23E-2
Slew pressure (valves at slew motor):	bar	205 (high idle) (service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve	P1 (high idle):	max. bar	245
	P2	max. bar	245
	P3	max. bar	205

LINE RELIEF PRESSURES

P1 (main pressure relief valve: 245 bar)		
- Travel right:	bar	-- / --
- Stick:	bar	280 / 280
- Articulation:	bar	anti-cavitation
- Additional control circuit: (slew bucket, grab rotation, rock breaker)	bar	210 / 210
P2 (main pressure relief valve: 245 bar)		
- Travel left:	bar	-- / --
- Boom lift / lower:	bar	280 / 180
- Bucket:	bar	280 / 280
P3 (main pressure relief valve: 205 bar)		
- Slewing (valves at the slew motor):	bar	205 / 205
- Dozer blade:	bar	-- / --

CYCLE TIMES

Boom up / down - to the ground (without damping)	sec.	3.0 / 2.7
Dipperstick cylinder extend / retract:	sec.	3.2 / 3.0
Bucket cylinder extend / retract:	sec.	2.5 / 2.0

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see **Schaeff** hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 95.0	diesel
Engine oil, engine and filter:	approx. 5.5 + 1.0	HD oil (change)
Hydraulic oil, tank and system:	approx. 108.0	hydraulic oil
Hydraulic oil tank:	approx. 75.0	hydraulic oil (change)
Travel gear:	approx. 0.9	transmission oil, each
Slew gear:	supply of hydraulic oil	
Cooling agent:	approx. 10.0	water with anti-corrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		KHD
Type:		BF 4 M 1012 E
Output acc. to DIN 70020:	kW/PS	53 / 72 at 2,000 min^{-1}
Cooling:		water
Injection:		direct injection, turbo charged
Capacity:	cm^3	3,200
High idle:	min^{-1}	2,150
Low idle:	min^{-1}	800
Spec. fuel consumption (full load):	g/kWh	208
Tappet clearance-inlet cold:	mm	$0.3^{+0,1}$
Tappet clearance-outlet cold:	mm	$0.5^{+0,1}$
Torque of cylinder head studs:	Nm	30, 80 , 90°
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	14 / 55
Starter:	kW/PS	3.1 / 4
Starting aid:		4 glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm.

TRANSMISSION

Travel gear:	make	Lohmann Stolterfoht GFT 9
2-stage variable displacement motor (integrated in the travel gear):	type	A 10 VE 45 HZ

TRAVEL RANGE:

Travel range I:	km/h	2.7
Travel range II:	km/h	5.2

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 10 VO 71 DFLR
Displacement:	cm^3/rev.	0 to 71
Gear pumps:	make	Cassapa
Displacement:	cm^3/rev.	14+14
LS-regulator (stand-by pressure variable displacement pump):	bar	25
Servo-controlled valve (cross servo control stick):	type	Rexroth 4TH6 N
Servo-controlled valve, pedal (travel):	type	Rexroth 2TH6
Servo-controlled valve, pedal (add.control circuit):	type	Rexroth 2TH6
Valve bank 1: Mono / circular boom:	type	6 SX 14 / 7 SX 14
Valve bank 2:	type	3 SM 12

PRESSURE AND SETTING VALUES	WORKING	
LS-pressure relief valve (6 SX 14):	bar	280 (valve bank 1)
Main pressure relief valve 1 (6 SX 14):	bar	300 (SV)
Main pressure relief valve 2 (3 SM 12) (high idle):	bar	230
Line relief pressures - valve bank 1 (SX 14):		
- MONO and circular boom:	bar	180 / 300
- Intermediate boom:	bar	180 / 300
- Dipperstick:	bar	300 / 300
- Bucket:	bar	300 / 300
- Breaker / additional control circuit:	bar	300 / 300
- Travel left / travel right:	bar	280 / 280 (in motor)
Line relief pressures - valve bank 2 (SM 12):		
- Slewing (valves at the slew motor):	bar	100/250 / 100/250
- Dozer blade:	bar	----
- Articulation:	bar	----
Shut-off valve:	make	Bergin
Shut-off pressure (high idle):	bar	110
Pressure reducing valve (pilot control):	make	Parker
Pilot pressure - high idle	bar	30 $^{\pm 5}$

SLEW DRIVE		
Slew gear (up to 330/0178):	type	HD 4
Slew gear (from 330/0179):	type	ZFP - DR 140
Slew motor:	type	A 2 FM 28
Slew pressure (valves at slew motor):	bar	100 / 250 (high idle)

LUBRICANTS	
Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.

MAINTENANCE PARTS	see operating manual

CAPACITIES	ltr.		
Engine oil (change):	approx.	10.0	engine oil
Hydraulic oil (tank and system):	approx.	140.0	hydraulic oil
Hydraulic oil (change):	approx.	120.0	hydraulic oil
Fuel tank:	approx.	130.0	diesel
Travel gear:	approx.	1.8	transmission oil, each
Slew gear:	approx.	1.6	transmission oil Lifetime
Cooling agent:	approx.	12.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Deutz
Type:		BF 4 M 2011 Turbo - TIER II
Output acc. to DIN 70020:	kW/PS	54 / 73.5 at 2,200 min^{-1}
Cooling:		external oil cooler
Injection:		direct injection, turbo charged
Capacity:	cm^3	3,100
Engine Torque	Nm	270 at 1,600 min^{-1}
High idle:	min^{-1}	2,350 $^{+50}$
Low idle:	min^{-1}	850 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	224
Tappet clearance-inlet cold:	mm	0.3 $^{+0,1}$
Tappet clearance-outlet cold:	mm	0.5 $^{+0,1}$
Compression ratio:	bar	22 – 27
Injection nozzle (opening pressure)	bar	210 $^{+8}$
Engine oil pressure:	bar	1.4 at 900 min^{-1} 2.2 at 1,800 min^{-1} 3.0 at high idle
Torque of cylinder head studs:	Nm	30 / 80 / 160
(only in case of repair):		Tightening angle 90°
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	14 / 55
Starter:	kW	2.3
Starting aid:		4 glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm.

TRANSMISSION

Travel gear:	make	Lohmann Stolterfoht GFT 9 T2
2-stage variable displacement motor (integrated in the travel gear):	type	A 10 VE 45 HZ

TRAVEL RANGE

Travel range I:	km/h	2.7
Travel range II:	km/h	5.2

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 10 VO 71 DFSR
Displacement:	cm^3/rev.	0 to 71
Gear pump:	make	Cassapa KP30.31 DO
Displacement:	cm^3/rev.	31
LS-regulator (stand-by pressure variable displacement pump):	bar	22 $^{\pm 1}$
Engine stalling (boom + dozer blade down in end position):	min^{-1}	2,000 $^{-100}$
Servo-controlled valve (cross servo control stick):	type	Rexroth 4TH5 E70
Servo-controlled valve, pedal (travel):	type	Rexroth 2TH6
Servo-controlled valve, pedal (add.control circuit):	type	Rexroth 2TH6
Valve bank 1: (Mono / circular boom)	type	6 SX 14 / 7 SX 14
Valve bank 2: (Standard / 2nd add. Circuit-Option)	type	3 SM 12 / 4 SM 12

PRESSURE AND SETTING VALUES	WORKING	
LS-pressure relief valve (6 SX 14):	bar	280 (valve bank 1)
Main pressure relief valve 1 (6 SX 14):	bar	310 (SV)
Main pressure relief valve 2 (3 SM 12) (high idle):	bar	230
Line relief pressures - valve bank 1 (SX 14):		
- MONO and circular boom:	bar	180 / 300
- Intermediate boom:	bar	180 / 300
- Dipperstick:	bar	300 / 300
- Bucket:	bar	300 / 300
- Breaker / additional control circuit:	bar	300 / 300
- Travel left / travel right:	bar	300 / 300 (valves in the travel motor)
Line relief pressures - valve bank 2 (SM 12):		
- Slewing (2 stage valves at the slew motor):	bar	100/250 / 100/250
- Dozer blade:	bar	----
- Articulation:	bar	----
Pilot pressure valve bank including the pressure reducing valve:	make	Hydac
Pilot pressure - high idle	bar	35^{+5}

SLEW DRIVE		
Slew gear:	type	ZFP - DR 140
Slew motor:	type	A 2 FM 28 / 61W
Slew pressure (2-stage valves at slew motor):	bar	100 / 250 (high idle)

LUBRICANTS	
Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.

MAINTENANCE PARTS	see operating manual

CAPACITIES	ltr.		
Engine oil (change):	approx.	10.0	engine oil
Hydraulic oil (tank and system):	approx.	140.0	hydraulic oil
Hydraulic oil (change):	approx.	110.0	hydraulic oil
Fuel tank:	approx.	130.0	diesel
Travel gear:	approx.	1.8	transmission oil, each
Slew gear:	Hydraulic oil, lubrication by circulation of the oil		

DIESEL ENGINE

Manufacturer:		KHD
Type:		BF 4 M 2012 E
Output acc. to DIN 70020:	kW/PS	69 / 94 bei 2,100 min^{-1}
Cooling:		water
Injection:		direct injection, turbo charged
Capacity:	cm^3	4,040
High idle:	min^{-1}	2,250
Low idle:	min^{-1}	800
Spec. fuel consumption (full load):	g/kWh	208
Tappet clearance-inlet cold:	mm	$0.3^{+0.1}$
Tappet clearance-outlet cold:	mm	$0.5^{+0.1}$
Torque of cylinder head studs:	Nm	40, 70 , 180°
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 135 / 600
Generator:	V/A	14 / 70
Starter:	kW/PS	3.1 / 4
Starting aid:		4 glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm.

TRANSMISSION

Travel gear:	make	Lohmann Stolterfoht GFT 17 T3
2-stage variable displacement motor (integrated in the travel gear):	type	A 10 VE 45 HZ
Parking and service brake:		oil immersed, spring loaded multi-disk brake in the travel gear

TRAVEL RANGE:

Travel range I:	km/h	2.5
Travel range II:	km/h	5.4

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 11 VO 75 LR3S
Displacement:	cm^3/rev.	0 to 75
Gear pumps:	make	Cassapa
Displacement:	cm^3/rev.	16,6+14,4
LS-regulator (stand-by pressure):	bar	22 at 2,250 min^{-1}
LS-pressure relief valve (SX 14):	bar	350 (valve bank 1)
Servo-controlled valve (cross servo control stick):	type	Rexroth 4TH5 E70
Servo-controlled valve, pedal (travel):	type	Rexroth 2TH6 RP20
Servo-controlled valve, pedal (articulation):	type	Rexroth 2TH6 RG06-10
Servo-controlled valve, pedal (dozer blade):	type	Rexroth 2TH6
Servo-controlled valve, pedal (add. control circuit):	type	Rexroth 2TH6 RP20
Control valve 1: (mono boom)	type	6 SX 14 (08 401 397)
Control valve 2:	type	3 SM 12 (08 401 195)

PRESSURE AND SETTING VALUES	WORKING	
LS-pressure relief valve (6 SX 14):	bar	350
Main pressure relief valve 1 (6 SX 14):	bar	370 (safety valve)
Main pressure relief valve 2 (3 SM 12):	bar	230
Line relief pressures - valve bank 1 (6SX 14):		
- MONO and circular boom:	bar	330 / 330
- Dipper stick:	bar	370 / 370
- Bucket:	bar	370 / 370
- Breaker / additional control circuit:	bar	300 / 300
- Travel left / travel right:	bar	360 / 360 (valves in the travel motor)
Line relief pressures - valve bank 2 (3SM 12):		
- Slewing (valves at the slew motor):	bar	150/250 /// 150/250
- Dozer blade:	bar	----
- Articulation:	bar	----
Shut-off valve:	make	Bergin
Shut-off pressure (high idle):	bar	110
Pressure reducing valve (pilot control):	make	Parker PRS-6 G
Pilot pressure - high idle	bar	35^{+2}

SLEW DRIVE		
Slew gear:	type	ZFP - DR 140
Slew motor:	type	A 2 FM 32/61W
Slew pressure (valves at slew motor):	bar	150 / 250 /// 150 / 250 (high idle)

LUBRICANTS	
Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.

MAINTENANCE PARTS	see operating manual

CAPACITIES	ltr.		
Engine oil (change):	approx.	10.0	engine oil
Hydraulic oil (tank and system):	approx.	180.0	hydraulic oil
Hydraulic oil (change):	approx.	110.0	hydraulic oil
Fuel tank:	approx.	150.0	diesel
Travel gear:	approx.	1.8	transmission oil, each
Cooling agent:	approx.	12.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Deutz
Type:		BF 4 M 2012 – TIER II
Output acc. to DIN 70020:	kW/PS	69 / 94 at 2,100 min^{-1}
Cooling:		water
Injection:		direct injection, turbo charged
Capacity:	cm^3	4,040
Engine torque	Nm	370 at 1,500 min^{-1}
High idle:	min^{-1}	2,250 $^{\pm 50}$
Low idle:	min^{-1}	800 $^{\pm 50}$
Spec. fuel consumption (full load):	g/kWh	231
Tappet clearance-inlet cold:	mm	0.3 $^{+0.1}$
Tappet clearance-outlet cold:	mm	0.5 $^{+0.1}$
Compression ratio:	bar	30 – 38
Injection nozzle (opening pressure)	bar	220
Engine oil pressure:	bar	0.8 at low idle, 120°C
Torque of cylinder head studs:	Nm	40, 70, Tightening angle 180°
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 135 / 1000(EN)
Generator:	V/A	14 / 70
Starter:	kW/PS	3.1 / 4
Starting aid:		air intake heater plate
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm.

TRANSMISSION

Travel gear:	make	Lohmann Stolterfoht GFT 17 T3
2-stage variable displacement motor (integrated in the travel gear):	type	A 10 VE 45 HZ
Parking and service brake:		oil immersed, spring loaded multi-disk brake in the travel gear

TRAVEL RANGE:

Travel range I:	km/h	2.5
Travel range II:	km/h	5.4

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 11 VO 75 LR3S
Displacement:	cm^3/rev.	0 to 75
Gear pumps:	make	Casappa
Displacement:	cm^3/rev.	16,6+14,4
LS-regulator (stand-by pressure):	bar	22 $^{\pm 1}$ at 2,250 min^{-1}
LS-pressure relief valve (SX 14):	bar	350 (valve bank 1)
Engine stalling	min^{-1}	2,000 $^{\pm 50}$
Servo-controlled valve (cross servo control stick):	type	Rexroth 4TH5 E70
Servo-controlled valve, pedal (articulation):	type	Rexroth 2TH6 RG06-10
Servo-controlled valve, pedal (dozer blade):	type	Rexroth 2TH6
Servo-controlled valve, pedal (travel):	type	Rexroth 2TH6 RP20
Servo-controlled valve, pedal (add. control circuit):	type	Rexroth 2TH6 RP20
Control valve 1: (mono boom)	type	6 SX 14 (08 401 397)
Control valve 2:	type	3 SM 12 (08 401 195)
Control valve 1: (articulated boom)	type	7 SX 14 (08 402 325)
Control valve 2: (with option 2nd control circuit)	type	4 SM 12 (08 401 495)

PRESSURE AND SETTING VALUES		WORKING	
Main pressure relief valve 1 (6 SX 14):		bar	380 (safety valve)
Main pressure relief valve 2 (3 SM 12):		bar	230
Line relief pressures - valve bank 1 (6/7 SX 14):			
- Boom	mono:	bar	370 / 330
	articulated:	bar	370 / 370
- Intermediate boom:		bar	370 / 150
- Dipper stick:		bar	370 / 370
- Bucket:		bar	370 / 370
- Breaker / additional control circuit:		bar	300 / 300
- Travel left / travel right:		bar	360 / 360 (valves in the travel motor)
Line relief pressures - valve bank 2 (3 SM 12):			
- Slewing (valves at the slew motor):		bar	150/250 /// 150/250
- Dozer blade:		bar	----
- Articulation:		bar	----
Shut-off valve:		make	Bergin
Shut-off pressure (high idle):		bar	110
Pressure reducing valve (pilot control):		make	Parker PRS-6 G
Pilot pressure - high idle		bar	35^{+2}

SLEW DRIVE		
Slew gear:	type	ZFP - DR 140
Slew motor:	type	A 2 FM 32/61W
Slew pressure (valves at slew motor):	bar	150 / 250 /// 150 / 250 (high idle)

LUBRICANTS	
Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.

MAINTENANCE PARTS	
	see operating manual

CAPACITIES		ltr.	
Engine oil (change):	approx.	10.0	engine oil
Hydraulic oil (tank and system):	approx.	180.0	hydraulic oil
Hydraulic oil (change):	approx.	110.0	hydraulic oil
Fuel tank:	approx.	150.0	diesel
Travel gear:	approx.	1.8	transmission oil, each
Cooling agent:	approx.	12.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		L 3 E - W 262 KL
Performance acc. to DIN 70020 + ECE-R24:	kW/PS	13.3 / 18 at 2,400 min^{-1}
Construction:		3 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	952
High idle:	min^{-1}	2,600 $^{+30}/_{-10}$
Low idle:	min^{-1}	1,020 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	247
Fuel bleeding:		automatic
Tappet clearance - inlet / exhaust:	mm	0.25 (cold)
Injection timing:	°	17 before upper dead centre
Torque of cylinder head studs:	Nm	M 10: 75 - 85 M 8: 20 - 30
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 40
Starter:	V/kW	12 / 1.7
Starting aid:		3 glow plugs, glow time controlled
Lighting:		working headlight H3

TRANSMISSION

Travel motors:	make/type	SOM MOR 15
Travel gears:	make/type	SOM PGR 132 N
Travel speed:	km/h	0 to 2.2

EXCAVATOR AND TRAVEL HYDRAULICS

Hydaulic pump:	make	JSB
Flow rate:	l/min	19.2+19.2+13.2
Pilot pressure (high idle):	bar	25 (service temperature)
Cut-off pressure (high idle):	bar	155 (service temperature)
Valve bank 1:	type	HV 07 VOAC
Valve bank 2:	type	HV 07 VOAC
Valve bank 3:	type	HV 07 VOAC
Cross servo control stick:	tpye	PCL 401
Pressure reducing valve:	make	Oil Control
Shut-off valve:	make	Bergin

SWING DRIVE

Swing motor with gearbox:	make	Dinamic Oil MGLR 200
Swing pressure (valves at swing motor):	bar	90 (high idle, service temperature)
(measured on pump):	bar	105^{+5} (high idle, service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve 1, 2, 3 (high idle):	max. bar	165, 165, 190

LINE RELIEF PRESSURES

Valve bank 1 (HV 07)		
- travel left:	bar	----
Valve bank 2 (HV 07)		
- articulation:	bar	----
- boom lift / lower:	bar	210 / 125
- bucket:	bar	210 / 210
- travel right:	bar	----
Valve bank 3 (HV 07)		
- slewing (valves at the slew motor):	bar	105^{+5} (high idle, service temperature, measured on pump P1)
- dozer blade:	bar	----
- dipperstick:	bar	210 / 210
- breaker / slew bucket / grab rotation:	bar	----

CYCLE TIMES

Boom up / down to the ground:	s	3.2 / 3.0
Dipperstick extend / retract:	s	2.0 / 2.6
Bucket extend / retract:	s	1.9 / 3.0

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 30.0	diesel
Engine oil, engine and filter:	approx. 3.4+ 0.2	HD-oil (change)
Hydraulic oil, tank and system:	approx. 35.0	hydraulic oil
Hydraulic oil tank:	approx. 25.0	hydraulic oil (change)
Travel gear:	approx. 0.3	transmission oil, each
Slew gear:	approx. 0.15	transmission oil
Cooling agent:	approx. 4.2	water with anticorrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		L 3 E - W 262 KL
Performance acc. to DIN 70020 + ECE-R24:	kW/PS	13.3 / 18 at 2,400 min^{-1}
Construction:		3 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	952
High idle:	min^{-1}	2,580 $^{+35}/_{-10}$
Low idle:	min^{-1}	1,020 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	247
Fuel bleeding:		automatic
Engine oil pressure:	bar	3.0 $^{\pm 0.3}$ at 1,000 min^{-1}
Tappet clearance - inlet / exhaust:	mm	0.25 (cold)
Injection timing:	°	17 before upper dead centre
Torque of cylinder head studs:	Nm	M 10: 75 - 85 M 8: 20 – 30
Electrical fuel pump:	bar	0.18
	l/min	0.37
Injection pressure:	bar	140
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 40
Starter:	V/kW	12 / 1.7
Starting aid:		3 glow plugs, glow time controlled
Lighting:		working headlight H3

TRANSMISSION

Travel motors:	make/type	SOM MOR 15
Travel gears:	make/type	SOM PGR 132 N
Travel speed:	km/h	0 to 2.7

EXCAVATOR AND TRAVEL HYDRAULICS

Hydaulic pump:	make	Haldex WP 09 A2
Flow rate:	l/min	33,6 + 19,2
Pilot pressure (high idle):	bar	28 (service temperature)
Valve bank:	type	Rexroth 9SX10
Cross servo control stick:	tpye	Rexroth 4TH 5
Servo control unit:	make	Hydac
Cut off valve:	make	Bergin
Cut off pressure (high idle):	bar	110 (service temperature)

SLEW DRIVE

Slew motor with gearbox:	make	Dinamic Oil VS 45 (up to s/n: 1100/0252)
Slew pressure (valves at slew motor):	bar	130 (high idle and service temperature, measured at pressure gauge P1)
Slew motor with gearbox:	make	SOM SD50+GWS200 (from s/n: 1100/0253)
Slew pressure (valves at slew motor):	bar	140 (high idle and service temperature, measured at pressure gauge P1)

PRESSURE AND SETTING VALUES

Main pressure relief valve (high idle):	max. bar	165

LINE RELIEF PRESSURES

- travel left (valves in the motor):	bar	----
- travel right (valves in the motor):	bar	----
- slewing (valves at the slew motor):	bar	130 (up to s/n: 1100/0252) 140 (from s/n: 1100/0253) (high idle and service temperature, measured at pressure gauge P1)
- dipperstick:	bar	210 / 210
- bucket:	bar	210 / 210
- boom lift / lower:	bar	210 / 160
- breaker / slew bucket / grab rotation:	bar	----
- articulation:	bar	anti cavitation
- dozer blade:	bar	----

CYCLE TIMES

Boom up / down to the ground:	s	3.2 / 3.0
Dipperstick extend / retract:	s	2.4 / 2.8
Bucket extend / retract:	s	1.9 / 2.8

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

		ltr.	
Fuel:	approx.	30.0	diesel
Engine oil, engine and filter:	approx.	3.4 + 0.2	HD-oil (change)
Hydraulic oil, tank and system:	approx.	35.0	hydraulic oil
Hydraulic oil tank:	approx.	25.0	hydraulic oil (change)
Travel gear:	approx.	0.3	transmission oil, each
Slew gear:	approx.	0.15	transmission oil
Cooling agent:	approx.	4.2	water with anticorrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		L 3 E
Output acc. to DIN 70020 and ECE-R24:	kW/PS	13.3 / 18 at 2,400 min^{-1}
Construction:		3 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	952
High idle:	min^{-1}	2,600 $^{+35}/_{-10}$
Low idle:	min^{-1}	1,020 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	247
Fuel bleeding:		automatic
Tappet clearance - inlet / outlet:	mm	0.25 (cold)
Injection timing:	°	17 (before upper dead centre)
Torque of cylinder head studs (in case of repair):	Nm	M 10: 75 - 85 M 8: 20 - 30
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 72
Generator:	V/A	12 / 40
Starter:	V/kW	12 / 1.6
Starting aid:		3 glow plugs, glow time controlled
Lighting:		working headlamp H3

TRANSMISSION

Travel motors:	make/type	SOM MOR 15
Travel gears:	make/type	SOM PGR 132 N
Travel speed:	km/h	0 to 2, option 0 to 3

EXCAVATOR AND TRAVEL HYDRAULICS

Hydaulic pump:	make	JSB
Displacement:	cm^3/rev.	8+8+5.5
Pilot pressure (high idle):	bar	25 (service temperature)
Shut-off pressure (high idle):	bar	155 (service temperature)
Valve bank 1:	type	HV 07 VOAC
Valve bank 2:	type	HV 07 VOAC
Valve bank 3:	type	HV 07 VOAC
Cross servo control stick:	type	PCL 401-1099
Pressure reducing valve:	make	HAWE
Shut-off valve (up to serial no. 355/5499):	make	Buchholz
Shut-off valve (from serial no. 355/5500):	make	Bergin

SLEW DRIVE

Slew motor with gearbox:	make	Dinamic Oil MGLR 200
Slew pressure (valves at slew motor):	bar	100 (high idle) (service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve 1, 2, 3:	max. bar	165, 165, 195	(high idle)

LINE RELIEF PRESSURES

Valve bank 1 (HV 07)		
- travel left:	bar	-----
Valve bank 2 (HV 07)		
- articulation:	bar	----
- boom lift / lower:	bar	210 / 125
- bucket:	bar	210 / 210
- travel right:	bar	----
Valve bank 3 (HV 07)		
- slewing (valves at the slew motor):	bar	100 (high idle)
- dozer blade:	bar	-----
- dipperstick:	bar	210 / 210
- breaker / slew bucket / grab rotation:	bar	-----

CYCLE TIMES

Boom up / down - to the ground	sec.	3.0 / 3.2
Dipperstick in / out:	sec.	2.0 / 2.6
Bucket in / out:	sec.	1.9 / 3.0

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 35.0	diesel
Engine oil, engine and filter:	approx. 3.4 + 0.2	HD-oil (change)
Hydraulic oil, tank and system:	approx. 38.0	hydraulic oil
Hydraulic oil tank:	approx. 28.0	hydraulic oil (change)
Travel gear:	approx. 0.3	transmission oil, each
Slew gear:	lubrication by circulation of the oil	
Cooling agent:	approx. 4.2	water with anti-corrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		L 3 E
Performance acc. to DIN 70020 + ECE-R24:	kW/PS	13.3 / 18 at 2,400 min^{-1}
Construction:		3 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	952
High idle:	min^{-1}	2,600 $^{+35}/_{-10}$
Low idle:	min^{-1}	1,020 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	247
Fuel bleeding:		automatic
Tappet clearance - inlet / exhaust:	mm	0.25 (cold)
Injection timing:	°	17 before upper dead centre
Torque of cylinder head studs:	Nm	M 10: 75 - 85 M 8: 20 - 30
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 40
Starter:	V/kW	12 / 1.6
Starting aid:		3 glow plugs, glow time controlled
Lighting:		working headlamp H3

TRANSMISSION

Travel motors:	make/type	SOM MOR 15
Travel gears:	make/type	SOM PGR 132 N
Travel speed:	km/h	0 to 2.2, option 0 to 3

EXCAVATOR AND TRAVEL HYDRAULICS

Hydaulic pump:	make	JSB
Flow rate:	l/min	19.2+19.2+13.2
Pilot pressure (high idle):	bar	25 (service temperature)
Shut-off pressure (high idle):	bar	155 (service temperature)
Valve bank 1:	type	HV 07 VOAC
Valve bank 2:	type	HV 07 VOAC
Valve bank 3:	type	HV 07 VOAC
Cross servo control stick:	type	PCL 401
Pressure reducing valve:	make	HAWE
Shut-off valve:	make	Bergin

SLEW DRIVE

Slew motor with gearbox:	make	Dinamic Oil MGLR 200
Slew pressure (valves at slew motor):	bar	100 (high idle) (service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve 1, 2, 3 (high idle):	max. bar	165, 165, 190

LINE RELIEF PRESSURES

Valve bank 1 (HV 07)		
- travel left:	bar	----
Valve bank 2 (HV 07)		
- articulation:	bar	----
- boom lift / lower:	bar	210 / 125
- bucket:	bar	210 / 210
- travel right:	bar	----
Valve bank 3 (HV 07)		
- slewing (valves at the slew motor):	bar	100 (high idle)
- dozer blade:	bar	----
- dipperstick:	bar	210 / 210
- breaker / slew bucket / grab rotation:	bar	----

CYCLE TIMES

Boom up / down to the ground:	s	3.0 / 3.2
Dipperstick extend / retract:	s	2.0 / 2.6
Bucket extend / retract:	s	1.9 / 3.0

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 30.0	diesel
Engine oil, engine and filter:	approx. 3.4+ 0.2	HD-oil (change)
Hydraulic oil, tank and system:	approx. 35.0	hydraulic oil
Hydraulic oil tank:	approx. 25.0	hydraulic oil (change)
Travel gear:	approx. 0.3	transmission oil, each
Slew gear:	approx. 0.15	transmission oil
Cooling agent:	approx. 4.2	water with anticorrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		L 3 E - W 262 KL
Performance acc. to DIN 70020 + ECE-R24:	kW/PS	13.3 / 18 at 2,400 min^{-1}
Construction:		3 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	952
High idle:	min^{-1}	2,580 $^{+35}/_{-10}$
Low idle:	min^{-1}	1,020 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	247
Fuel bleeding:		automatic
Tappet clearance - inlet / exhaust:	mm	0.25 (cold)
Engine oil pressure:	bar	3.0 $^{\pm 0.3}$ at 1,000 min^{-1}
Injection timing:	°	17 before upper dead centre
Torque of cylinder head studs:	Nm	M 10: 75 - 85
		M 8: 20 - 30
Electrical fuel pump:	bar	0.18
	l/min	0.37
Injection pressure:	bar	140
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 40
Starter:	V/kW	12 / 1.7
Starting aid:		3 glow plugs, glow time controlled
Lighting:		working headlight H3

TRANSMISSION

Travel motors:	make/type	SOM MOR 15
Travel gears:	make/type	SOM PGR 132 N
Travel speed:	km/h	0 to 2.7

EXCAVATOR AND TRAVEL HYDRAULICS

Hydaulic pump:	make	Haldex WP 09 A2
Flow rate:	l/min	33.6 + 19.2
Pilot pressure (high idle):	bar	28 (service temperature)
Valve bank:	type	Rexroth 9SX10
Cross servo control stick:	tpye	Rexroth 4TH 5
Servo control unit:	make	Hydac
Cut off valve:	make	Bergin
Cut off pressure (high idle):	bar	110 (service temperature)

SLEW DRIVE

Slew motor with gearbox:	make	Dinamic Oil VS 45 (up to s/n: 355/9309)
Slew pressure (valves at slew motor):	bar	130 (high idle and service temperature, measured at pressure gauge P1)
Slew motor with gearbox:	make	SOM SD50+GWS200 (from s/n: 355/9310)
Slew pressure (valves at slew motor):	bar	140 (high idle and service temperature, measured at pressure gauge P1)

PRESSURE AND SETTING VALUES

Main pressure relief valve (high idle):	max. bar	165

LINE RELIEF PRESSURES

- travel left (valves in the motor):	bar	----
- travel right (valves in the motor):	bar	----
- slewing (valves at the slew motor):	bar	130 (up to s/n: 355/9309) 140 (from s/n: 355/9310) (high idle and service temperature, measured at pressure gauge P1)
- dipperstick:	bar	210 / 210
- bucket:	bar	210 / 210
- boom lift / lower:	bar	210 / 160
- breaker / slew bucket / grab rotation:	bar	----
- articulation:	bar	anti cavitation
- dozer blade:	bar	----

CYCLE TIMES

Boom up / down to the ground:	s	3.2 / 3.0
Dipperstick extend / retract:	s	2.4 / 2.8
Bucket extend / retract:	s	1.9 / 2.8

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

		ltr.	
Fuel:	approx.	30.0	diesel
Engine oil, engine and filter:	approx.	3.4 + 0.2	HD-oil (change)
Hydraulic oil, tank and system:	approx.	35.0	hydraulic oil
Hydraulic oil tank:	approx.	25.0	hydraulic oil (change)
Travel gear:	approx.	0.3	transmission oil, each
Slew gear:	approx.	0.15	transmission oil
Cooling agent:	approx.	4.2	water with anticorrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		L 3 E
Performance acc. to DIN 70020 + ECE-R24:	kW/PS	13.3 / 18 at 2,400 min^{-1}
Construction:		3 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	952
High idle:	min^{-1}	2,600 $^{+35}/_{-10}$
Low idle:	min^{-1}	1,020 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	247
Fuel bleeding:		automatic
Tappet clearance - inlet / exhaust:	mm	0.25 (cold)
Injection timing:	°	17 before upper dead centre
Torque of cylinder head studs:	Nm	M 10: 75 - 85 M 8: 20 - 30
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 72
Generator:	V/A	12 / 40
Starter:	V/kW	12 / 1.7
Starting aid:		3 glow plugs, glow time controlled
Lighting:		working headlight HR3

TRANSMISSION

Travel motors:		make/type	SOM MOR
Travel gears:		make/type	SOM PGR 132 N
Travel speed	1st stage:	km/h	0 to 2.2
	2nd stage:	km/h	0 to 4.1

EXCAVATOR AND TRAVEL HYDRAULICS

Hydaulic pump:	make	Nachi PVD-OB
Flow rate:	l/min	21.6+21.6+15.4
Pilot pressure (high idle):	bar	25 (service temperature)
Valve bank 1, 2, 3:	type	HV 07 VOAC
Cross servo control stick (joystick):	tpye	PCL 401
Pressure reducing valve:	make	Oil Control

SWING DRIVE

Swing motor with gearbox:	make	Dinamic Oil MGLR 200 + VS 45-01 AA
Swing pressure (valves at swing motor):	bar	130_{-3} (high idle) (service temperature, measured at gauge port P3)

PRESSURE AND SETTING VALUES

Main pressure relief valve 1, 2, 3 (high idle):	max. bar	180, 180, 180

LINE RELIEF PRESSURES

Valve bank 1 (HV 07)		
- travel left (valves in travel motor):	bar	180 / 180
Valve bank 2 (HV 07)		
- articulation:	bar	anti-cavitation
- boom lift / lower:	bar	230 / 160
- bucket:	bar	210 / 210
- travel right (valves in travel motor):	bar	180 / 180
Valve bank 3 (HV 07)		
- swing (valves at the swing motor):	bar	130_{-3} (high idle, service temperature, measured at gauge port P3)
- dozer blade:	bar	----
- dipperstick:	bar	210 / 210
- breaker / swing bucket / grab rotation:	bar	----

CYCLE TIMES

Boom up / down - to the ground:	s	3.2 / 3.0
Dipperstick extend / retract:	s	2.0 / 2.6
Bucket extend / retract:	s	1.9 / 3.0

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. Lithium-saponified.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 30.0	diesel
Engine oil, engine and filter:	approx. 3.4 + 0.2	HD-oil (change)
Hydraulic oil, tank and system:	approx. 35.0	hydraulic oil
Hydraulic oil tank:	approx. 25.0	hydraulic oil (change)
Travel gear:	approx. 0.3	transmission oil, each
Swing gear:	approx. 0.15	transmission oil
Cooling agent:	approx. 4.2	water with anticorrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		L 3 E - W 262 KL
Performance acc. to DIN 70020 + ECE-R24:	kW/PS	13.3 / 18 at 2,400 min^{-1}
Construction:		3 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	952
High idle:	min^{-1}	2,580 $^{+35}/_{-10}$
Low idle:	min^{-1}	1,020 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	247
Fuel bleeding:		automatic
Tappet clearance - inlet / exhaust:	mm	0.25 (cold)
Engine oil pressure:	bar	3.0 $^{\pm 0.3}$ at 1,000 min^{-1}
Injection timing:	°	17 before upper dead centre
Torque of cylinder head studs:	Nm	M 10: 75 - 85
		M 8: 20 - 30
Electrical fuel pump:	bar	0.18
	l/min	0.37
Injection pressure:	bar	140
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 40
Starter:	V/kW	12 / 1.7
Starting aid:		3 glow plugs, glow time controlled
Lighting:		working headlight H3

TRANSMISSION

Travel motors:		make/type	SOM MOR 015
Travel gears:		make/type	SOM PGR 132 N
Travel speed:	tortoise	km/h	0 to 2.7
	rabbit	km/h	0 to 4.5

EXCAVATOR AND TRAVEL HYDRAULICS

Hydaulic pump:	make	Haldex WP 09 A2
Flow rate:	l/min	33.6 + 19.2
Pilot pressure (high idle):	bar	28 (service temperature)
Valve bank:	type	Rexroth 9SX10
Cross servo control stick:	tpye	Rexroth 4TH 5
Servo control unit:	make	Hydac
Cut off valve:	make	Bergin
Cut off pressure (high idle):	bar	125 (service temperature)

SLEW DRIVE

Slew motor with gearbox:	make	SOM RCG - 35
Slew pressure (valves at slew motor):	bar	155 (high idle and service temperature, measured at pressure gauge P1)

PRESSURE AND SETTING VALUES

Main pressure relief valve (high idle):	max. bar	180 $^{+5}$

LINE RELIEF PRESSURES

- travel left (valves in the motor):	bar	180 / 180	
- travel right (valves in the motor):	bar	180 / 180	
- slewing (valves at the slew motor):	bar	155	(high idle and service temperature, measured at pressure gauge P1)
- dipperstick:	bar	210 / 210	
- bucket:	bar	210 / 210	
- boom lift / lower:	bar	230 / 160	
- breaker / slew bucket / grab rotation:	bar	----	
- articulation:	bar	anti cavitation	
- dozer blade:	bar	----	

CYCLE TIMES

Boom up / down to the ground:	s	3.2 / 3.0
Dipperstick extend / retract:	s	2.4 / 2.8
Bucket extend / retract:	s	1.9 / 2.8

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

		ltr.	
Fuel:	approx.	30.0	diesel
Engine oil, engine and filter:	approx.	3.4 + 0.2	HD-oil (change)
Hydraulic oil, tank and system:	approx.	35.0	hydraulic oil
Hydraulic oil tank:	approx.	25.0	hydraulic oil (change)
Travel gear:	approx.	0.3	transmission oil, each
Slew gear:	approx.	0.15	transmission oil
Cooling agent:	approx.	4.2	water with anticorrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		S 4L-61 KL
Output acc. to DIN 70020 and ECE-R24:	kW/PS	20.5 / 28 at 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	1,500
High idle:	min^{-1}	2,450 $^{+20}/_{-30}$
Low idle:	min^{-1}	1,000 $^{\pm 25}$
Spec. fuel consumption (full load):	g/kWh	265
Fuel bleeding:		automatic
Tappet clearance - inlet / outlet:	mm	0.25 (cold)
Injection timing:	°	17 (before upper dead centre)
Torque of cylinder head studs (in case of repair):	Nm	M 10: 83 - 92
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 72
Generator:	V/A	12 / 50
Starter:	V/kW	12 / 2.0
Starting aid:		Glow plugs, glow time controlled,
Lighting:		working headlamps H3, additional headlamp (optional)

TRANSMISSION

Travel motors with travel gear:	make/type	Nachi PHV 300
Travel speed:	km/h	0 to 2.4; 0 to 4.3

EXCAVATOR AND TRAVEL HYDRAULICS

Pressure compensated summation controlled double variable displacement pump and 2 gear pumps:	make	Kayaba
Flow rate:	l/min.	38+38+27+8
Pilot pressure (high idle):	bar	30 (service temperature)
Valve bank 1:	type	HV 07 VOAC
Valve bank 2:	type	HV 07 VOAC
Valve bank 3:	type	HV 07 VOAC
Cross servo control stick:	type	PCL 401

SLEW DRIVE

Slew motor with gearbox:	make	SOM PG 161 PR
Slew pressure (valves at slew motor):	bar	200 (high idle) (service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve 1, 2, 3 (high idle):	max. bar	190, 190, 210

LINE RELIEF PRESSURES

Valve bank 1 (HV 07)			
- slewing (valves at the slew motor):	bar	200 / 200 (high idle, service temperature)	
- blade:	bar	---	
Valve bank 2 (HV 07)			
- travel left:	bar	--- / ---	(200 bar shock valves at the travel motor)
- bucket:	bar	175 / 175	
- boom lift / lower:	bar	210 / 125	(up to ser.no. 356/1704)
		210 / 140	(from ser.no. 356/1705)
		(and 356/1681; /1683; /1684; /1687; /1691; /1694; /1697 - /1703)	
Valve bank 3 (HV 07)			
- articulation:	bar	anti-cavitation	
- dipperstick:	bar	210 / 210	
- breaker / slew bucket / grab rotation:	bar	---	
- travel right:	bar	190 / 190	(200 bar shock valves at the travel motor)

CYCLE TIMES

Boom up / down - to the ground (without damping)	sec.	2.5 / 2.0
Dipperstick cylinder extend / retract:	sec.	3.3 / 2.5
Bucket cylinder extend / retract:	sec.	3.2 / 2.0

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 52.0	diesel
Engine oil, engine and filter:	approx. 7.7 + 0.5	HD-oil (change)
Hydraulic oil, tank and system:	approx. 85.0	hydraulic oil
Hydraulic oil tank:	approx. 72.0	hydraulic oil (change)
Travel gear:	approx. 0.6	transmission oil, each
Slew gear:	approx. 0.9	transmission oil
Cooling agent:	approx. 5.3	water with anti-corrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		S 4L - 262 KL
Output acc. to DIN 70020 and ECE-R24:	kW/PS	20.5 / 28 at 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	1,500
High idle:	min^{-1}	2,400 $^{+20}/_{-20}$
Low idle:	min^{-1}	1,000 $^{+50}/_{-25}$
Spec. fuel consumption (full load):	g/kWh	265
Fuel bleeding:		automatic
Tappet clearance - inlet / outlet:	mm	0.25 (cold)
Compression ratio:	bar	27 - 30
Injection timing:	°	17 (before upper dead centre)
Engine oil pressure:	bar	3.5 $^{\pm 0.5}$ (at high idle, service temperature)
Torque of cylinder head studs (in case of repair):	Nm	M 10 → 83 – 92
Injection pressure (valve opening pressure)	bar	140 $^{+5}$
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 50
Starter:	V/kW	12 / 2.0
Starting aid:		Glow plugs, glow time controlled,
Lighting:		working headlamps H3, additional headlamp (optional)

TRANSMISSION

Travel motors with travel gear:	make/type	SOM PGRF 402
Travel speed:	km/h	0 to 2.7; 0 to 4.6

EXCAVATOR AND TRAVEL HYDRAULICS

Hydraulic pump:	make	A 10 VO 45 DFR
Flow rate:	l/min	0 - 45
Pilot pressure (high idle):	bar	28 (service temperature)
Valve bank:	type	Rexroth 9 SX 12
Cross servo control stick:	type	Rexroth 4TH 6 N

SLEW DRIVE

(up to 356/3977)

Slew motor with gearbox:	make	SOM PG 161 PR
Slew pressure (valves at slew motor):	bar	200 (high idle; service temperature) (Δp at the slew motor 180bar)

(from 356/3978)

Slew motor with gearbox:	make	Kayaba MSG-27P-10E-19
Slew pressure (valves at slew motor):	bar	210 $^{+5}$ (high idle; service temperature) (Δp at the slew motor 180 $^{+5}$ bar)

PRESSURE AND SETTING VALUES

Main pressure relief valve (high idle):	max. bar	210	
Power regulator (G-regulator):	bar	20	(high idle, service temperature)
Stand-by regulator:	bar	21	(high idle, service temperature)
Δp (LS-Pressure)	bar	15,0	(high idle, service temperature)

LINE RELIEF PRESSURES

(up to 356/3977)			
- slewing (valves at the slew motor):	bar	200 / 200	(high idle, service temperature) (Δp at the slew motor 180bar)
(from 356/3978)			
- slewing (valves at the slew motor):	bar	210^{+5} / 210^{+5}	(high idle, service temperature) (Δp at the slew motor 180^{+5} bar)
- blade:	bar	---	
- travel left:	bar	--- / ---	(190 bar shock valves at the travel motor)
- travel right:	bar	--- / ---	(190 bar shock valves at the travel motor)
- bucket:	bar	175 / 175	
- boom lift / lower:	bar	230 / 160	
- articulation:	bar	anti-cavitation	
- dipperstick in/out:	bar	230 / 230	
- breaker / slew bucket / grab rotation:	bar	---	

CYCLE TIMES

Boom up / down - to the ground (without damping)	sec.	2.8 / 2.6
Dipperstick out / in:	sec.	2.5 / 3.3
Bucket out / in:	sec.	2.0 / 2.8

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see operation manual table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 52.0	diesel
Engine oil, engine and filter:	approx. 7.7 + 0.5	HD-oil (change)
Hydraulic oil, tank and system:	approx. 85.0	hydraulic oil
Hydraulic oil tank:	approx. 72.0	hydraulic oil (change)
Travel gear:	approx. 0.6	transmission oil, each
Slew gear:	lubrication by circulation of the hydraulic oil	
Cooling agent:	approx. 5.3	water with anti-corrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		S 4L-2-61 KL
Output acc. to DIN 70020 and ECE-R24:	kW/PS	26.5 / 36 at 2,400 min^{-1}
Construction:		4 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	1,758
High idle:	min^{-1}	2,600 $_{-50}$
Low idle:	min^{-1}	1,000 $^{\pm 25}$
Spec. fuel consumption (full load):	g/kWh	258
Fuel bleeding:		automatic
Tappet clearance - inlet / outlet:	mm	0.25 (cold)
Injection timing:	°	17 (before upper dead centre)
Torque of cylinder head studs (in case of repair):	Nm	M 10: 83 - 92
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 72
Generator:	V/A	12 / 50
Starter:	V/kW	12 / 2.0
Starting aid:		Glow plugs, glow time controlled,
Lighting:		working headlamp H3, additional headlamp (optional)

TRANSMISSION

Travel motors with travel gear:	make/type	Nachi PHV 300
Travel speed:	km/h	0 to 2.6, 0 to 4.5 (up to 358/1667) **0 to 2.4, 0 to 4.5 (from 358/1668,** and 358/1623, /1653-/1658, /1663, /1664, /1666)

EXCAVATOR AND TRAVEL HYDRAULICS

Pressure compensated summation controlled double variable displacement pump and 2 gear pumps:	make	Kayaba
Flow rate:	l/min.	46+46+28.5+8.5 (up to 358/1667) **43+43+28.5+8.5 (from 358/1668,** and 358/1623, /1653-/1658, /1663, /1664, /1666)
Pilot pressure (high idle):	bar	25 (service temperature)
Valve bank 1:	type	Rexroth SM 12
Valve bank 2:	type	Rexroth SM 12
Valve bank 3:	type	Rexroth SM 12
Cross servo control stick:	tpye	Rexroth 4TH6

SLEW DRIVE

Slew motor with gearbox:	make	SOM PG 161 PR
Slew pressure (valves at slew motor):	bar	200 (high idle) (service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve 1, 2, 3:	max. bar	210, 250, 250 (high idle)

LINE RELIEF PRESSURES

Valve bank 1 (SM 12)		
- slewing (valves at the slew motor):	bar	200 / 200 (high idle, service temperature)
- blade:	bar	---
Valve bank 2 (SM 12)		
- travel left:	bar	190 / 190 (200 bar shock valves at the travel motor)
- bucket:	bar	210 / 210
- boom lift / lower:	bar	280 / 140
Valve bank 3 (SM 12)		
- articulation:	bar	anti-cavitation
- dipperstick:	bar	280 / 280
- breaker / slew bucket / grab rotation:	bar	210 / 210
- travel right:	bar	190 / 190 (200 bar shock valves at the travel motor)

CYCLE TIMES

Boom up / down - to the ground (without damping)	sec.	2.0 / 1.6
Dipperstick cylinder extend / retract:	sec.	2.7 / 1.7
Bucket cylinder extend / retract:	sec.	2.4 / 1.9

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

		ltr.	
Fuel:	approx.	52.0	diesel
Engine oil, engine and filter:	approx.	7.7	+ 0.5 HD oil (change)
Hydraulic oil, tank and system:	approx.	85.0	hydraulic oil
Hydraulic oil tank:	approx.	72.0	hydraulic oil (change)
Travel gear:	approx.	0.6	transmission oil, each
Slew gear:	approx.	0.9	transmission oil
Cooling agent:	approx.	5.3	water with anti-corrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		S 4L 2 – Y 263 KL – Tier II
Output acc. to DIN 70020 and ECE-R24:	kW	23.8 at 2,100 min^{-1}
Construction:		4 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	1,758
Torque	Nm	105 at 1,500 min^{-1}
High idle:	min^{-1}	2,300 $^{-50}$
Low idle:	min^{-1}	1,000 $^{+25}$
Spec. fuel consumption (full load):	g/kWh	258
Fuel bleeding:		automatic
Tappet clearance - inlet / outlet:	mm	0.25 (cold)
Compression ratio:	bar	27 - 30
Injection timing:	°	17 (before upper dead centre)
Engine oil pressure:	bar	3.5 $^{\pm 0.5}$ (high idle, service temperature)
Torque of cylinder head studs (in case of repair):	Nm	M 10 → 83 to 92
Injection pressure	bar	140 $^{+5}$
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 50
Starter:	V/kW	12 / 2.0
Starting aid:		Glow plugs, glow time controlled,
Lighting:		working headlamp H3, additional headlamp (optional)

TRANSMISSION

Travel motors with travel gear:	make/type	SOM PGR 402
Travel speed:	km/h	0 to 2.7 / 0 to 4.6

EXCAVATOR AND TRAVEL HYDRAULICS

Variable displacement pump:	make	Rexroth
	type	A 10 VO 45 DFLR
Flow rate:	cm^3/rev.	0 – 45 (0 – 94.5 l/min)
Pilot pressure (high idle):	bar	28 (service temperature)
Valve bank:	type	Rexroth 9 SX 12
Cross servo control stick:	type	Rexroth 4TH6

SLEW DRIVE

(up to 358/4517)

Slew motor with gearbox:	make	SOM PG 162 PR
Slew pressure (valves at slew motor):	bar	215 (Δp = 185 between M1 and M2; high idle; service temperature)

(from 358/4518)

Slew motor with gearbox:	make	Kayaba MSG-27P-10E-18
Slew pressure (valves at slew motor):	bar	250 $^{+5}$ (Δp = 200^{+5} between M1 and M2; high idle; service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve:	max. bar	250 $^{+5}$	(high idle, service temperature)
Power regulator (G-regulator):	bar	20	(high idle, service temperature)
Stand-by regulator:	bar	21	(high idle, service temperature)
Δp (LS-Pressure)	bar	15,0	(high idle, service temperature)

LINE RELIEF PRESSURES

(up to 358/4517)			
- slewing (valves at the slew motor):	bar	215 / 215	(Δp = 185 bar between M1 and M2 high idle, service temperature)
(from 358/4518)			
- slewing (valves at the slew motor):	bar	250^{+5}/ 250^{+5}	(Δp = 200^{+5} bar between M1 and M2 high idle, service temperature)
- blade:	bar	---	
- travel left:	bar	---	(250 bar shock valves at the travel motor)
- travel left:	bar	---	(250 bar shock valves at the travel motor)
- bucket:	bar	210 / 210	
- boom lift / lower:	bar	280 / 160	
- articulation:	bar	anti-cavitation	
- dipper stick:	bar	280 / 280	
- breaker / slew bucket / grab rotation:	bar	210 / 210	

CYCLE TIMES

Boom up / down - to the ground (without damping)	sec.	2.8 / 2.7
Dipper stick cylinder extend / retract:	sec.	2.5 / 3.3
Bucket cylinder extend / retract:	sec.	2.4 / 2.8

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see operation manual
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 52.0	diesel
Engine oil, engine and filter:	approx. 7.7	+ 0.5 HD oil (change)
Hydraulic oil, tank and system:	approx. 85.0	hydraulic oil
Hydraulic oil tank:	approx. 72.0	hydraulic oil (change)
Travel gear:	approx. 0.6	transmission oil, each
Slew gear:	lubrication by circulation of the hydraulic oil	
Cooling agent:	approx. 5.3	water with anti-corrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		S 4Q 2-61 KL
Output acc. to ISO 9249 (DIN 70020):	kW	34.6 at 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	2,505
High idle:	min^{-1}	2,350 $^{+20}$
Low idle:	min^{-1}	850 $^{+20}$
Spec. fuel consumption (full load):	g/kWh	252
Fuel bleeding:		automatic
Tappet clearance - inlet / outlet:	mm	0.25 (cold)
Injection timing:	°	22 (before upper dead centre)
Tightening torque of cylinder head studs (in case of repair):	Nm	M 12 x 1.75 : 118 ± 5
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 72
Generator:	V/A	12 / 50
Starter:	V/kW	12 / 2.0
Starting aid:		glow plugs, glow time controlled,
Lighting:		working headlamp H3, additional headlamp (optional)

TRANSMISSION

Travel motors with travel gear:	make/type	Kayaba MAG-33V-550 E
Travel speed:	km/h	0 to 2.6, 0 to 5.2

EXCAVATOR AND TRAVEL HYDRAULICS

Summation-controlled double variable displacement pump and 2 gear pumps:	make	Kayaba PSVD 2-26 E
Flow rate:	l/min.	57+57+37+10
Pilot pressure (high idle):	bar	30 (service temperature)
Control valve:	type	Kayaba KVSE 70-10
Joystick:	type	Rexroth 4TH 5
Pedal-operated valve (travel right/left, dozer blade, articulation, additional control circuit):	type	Rexroth 2TH 6

SLEW DRIVE

Slew motor with gearbox:	make	Kayaba MSG-27 P-23
Slew pressure (valves at slew motor):	bar	205 (high idle) (service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve	P1 (high idle):	max. bar	245
	P2	max. bar	245
	P3	max. bar	205

LINE RELIEF PRESSURES

P1 (main pressure relief valve: 245 bar)		
- Travel right (valves at the slew motor):	bar	270 / 270
- Stick:	bar	280 / 280
- Articulation:	bar	anti-cavitation
- Additional control circuit: (slew bucket, grab rotation, rock breaker)	bar	210 / 210
P2 (main pressure relief valve: 245 bar)		
- Travel left (valves at the slew motor):	bar	270 / 270
- Boom lift / lower:	bar	280 / 140
- Bucket:	bar	280 / 280
P3 (main pressure relief valve: 205 bar)		
- Slewing (valves at the slew motor):	bar	205 / 205
- Dozer blade:	bar	----

CYCLE TIMES

Boom up / down - to the ground (without damping)	sec.	3.1 / 2.6
Dipperstick cylinder extend / retract:	sec.	3.8 / 3.4
Bucket cylinder extend / retract:	sec.	2.7 / 1.5

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see **Schaeff** hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

		ltr.	
Fuel:	approx.	60.0	diesel
Engine oil, engine and filter:	approx.	5.5 + 1.0	HD oil (change)
Hydraulic oil, tank and system:	approx.	102.0	hydraulic oil
Hydraulic oil tank:	approx.	72.0	hydraulic oil (change)
Travel gear:	approx.	0.9	transmission oil, each
Slew gear:	supply of hydraulic oil		
Cooling agent:	approx.	10.0	water with anti-corrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		S 4L 2 – Y 263 KL – TIER II
Output acc. to DIN 70020 and ECE-R24:	kW/PS	23.8 / 32.5 at 2,100 min^{-1}
Construction:		4 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	1,758
Torque	Nm	105 at 1,500 min^{-1}
High idle:	min^{-1}	2,300 $^{-50}$
Low idle:	min^{-1}	1,000 $^{+50}/_{-25}$
Spec. fuel consumption (full load):	g/kWh	258
Fuel bleeding:		automatic
Tappet clearance - inlet / outlet:	mm	0.25 (cold)
Compression ratio:	bar	27 - 30
Injection timing:	°	17 (before upper dead centre)
Engine oil pressure:	bar	3.5 $^{\pm 0.5}$ (high idle, service temperature)
Torque of cylinder head studs (in case of repair):	Nm	M 10 → 83 to 92
Injection pressure	bar	140 $^{+5}$
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 50
Starter:	V/kW	12 / 2.0
Starting aid:		Glow plugs, glow time controlled,
Lighting:		working headlamp H3, additional headlamp (optional)

TRANSMISSION

Travel motors with travel gear:	make/type	SOM PGR 402
Travel speed:	km/h	0 to 2.7 / 0 to 4.6

EXCAVATOR AND TRAVEL HYDRAULICS

Variable displacement pump:	make	Rexroth
	type	A 10 VO 45 DFLR
Flow rate:	cm^3/rev.	0 – 45 (0 – 94.5 l/min)
Pilot pressure (high idle):	bar	28 (service temperature)
Valve bank:	type	Rexroth 9 SX 12
Cross servo control stick:	type	Rexroth 4TH6

SLEW DRIVE

Slew motor with gearbox:	make	SOM PG 162 PR
Slew pressure (valves at slew motor):	bar	185 (Δp between M1 and M2; high idle; service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve:	max. bar	250 $^{+5}$	(high idle, service temperature)
Power regulator (G-regulator):	bar	20	(high idle, service temperature)
Stand-by regulator:	bar	21	(high idle, service temperature)
Δp (LS-Pressure)	bar	15,0	(high idle, service temperature)

LINE RELIEF PRESSURES

- slewing (valves at the slew motor):	bar	185 / 185	(Δp between M1 and M2 high idle, service temperature)
- blade:	bar	---	
- travel left:	bar	---	(250 bar shock valves at the travel motor)
- travel left:	bar	---	(250 bar shock valves at the travel motor)
- bucket:	bar	210 / 210	
- boom lift / lower:	bar	280 / 160	
- articulation:	bar	anti-cavitation	
- dipper stick:	bar	280 / 280	
- breaker / slew bucket / grab rotation:	bar	210 / 210	

CYCLE TIMES

Boom up / down - to the ground (without damping)	sec.	2.8 / 2.7
Dipper stick cylinder extend / retract:	sec.	2.5 / 3.3
Bucket cylinder extend / retract:	sec.	2.4 / 2.8

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see operation manual
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 52.0	diesel
Engine oil, engine and filter:	approx. 7.7	+ 0.5 HD oil (change)
Hydraulic oil, tank and system:	approx. 85.0	hydraulic oil
Hydraulic oil tank:	approx. 72.0	hydraulic oil (change)
Travel gear:	approx. 0.6	transmission oil, each
Slew gear:	lubrication by circulation of the hydraulic oil	
Cooling agent:	approx. 5.3	water with anti-corrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		S 4Q 2 - 262 KL
Output acc. to ISO 9249 (DIN 70020):	kW	34.6 at 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	2,505
High idle:	min^{-1}	2,350 $^{+20}$
Low idle:	min^{-1}	850 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	252
Compression ration	bar	26 - 30
Fuel bleeding:		automatic
Tappet clearance - inlet / outlet:	mm	0.25 (cold)
Injection timing:	°	20 (before upper dead centre)
Engine oil pressure:	bar	3.5 $^{\pm 0.5}$ (at high idle, service temperature)
Tightening torque of cylinder head studs (in case of repair):	Nm	M 12 x 1.75 → 118 $^{\pm 5}$
Injection pressure (valve opening pressure)	bar	120 $^{+10}$
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 50
Starter:	V/kW	12 / 2.0
Starting aid:		glow plugs, glow time controlled,
Lighting:		working headlamp H3, additional headlamp (optional)

TRANSMISSION

Travel motors with travel gear:	make/type	Kayaba MAG-33V-550 E
Travel speed:	km/h	0 to 2.6; 0 to 5.0

EXCAVATOR AND TRAVEL HYDRAULICS

Summation-controlled double variable displacement pump and 2 gear pumps:	make	Kayaba PSVD 2 - 26 E
Flow rate:	l/min.	57 + 57 + 37 + 10
Pilot pressure (high idle):	bar	30 (service temperature)
Control valve:	type	Kayaba KVSE 70-10
Joystick:	type	Rexroth 4TH 5
Pedal-operated valve (travel right/left, dozer blade, articulation, additional control circuit):	type	Rexroth 2TH 6

SLEW DRIVE

Slew motor with gearbox:	make	Kayaba MSG-27 P-23
Slew pressure (valves at slew motor):	bar	205 (high idle) (service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve	P1 (high idle):	max. bar	245
	P2	max. bar	245
	P3	max. bar	205

LINE RELIEF PRESSURES

P1 (main pressure relief valve: 245 bar)		
- Travel right (valves at the slew motor):	bar	270 / 270
- Stick:	bar	280 / 280
- Articulation:	bar	anti-cavitation
- Additional control circuit: (slew bucket, grab rotation, rock breaker)	bar	210 / 210
P2 (main pressure relief valve: 245 bar)		
- Travel left (valves at the slew motor):	bar	270 / 270
- Boom lift / lower:	bar	280 / 140
- Bucket:	bar	280 / 280
P3 (main pressure relief valve: 205 bar)		
- Slewing (valves at the slew motor):	bar	205 / 205
- Dozer blade:	bar	----

CYCLE TIMES

Boom up / down - to the ground (without damping)	sec.	3.1 / 2.6
Dipperstick extend / retract:	sec.	3.4 / 3.8
Bucket extend / retract:	sec.	1.5 / 2.7

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see operation manual
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 60.0	diesel
Engine oil, engine and filter:	approx. 5.5 + 1.0	HD oil (change)
Hydraulic oil, tank and system:	approx. 102.0	hydraulic oil
Hydraulic oil tank:	approx. 72.0	hydraulic oil (change)
Travel gear:	approx. 0.9	transmission oil, each
Slew gear:	lubrication by circulation of the hydraulic oil	
Cooling agent:	approx. 10.0	water with anti-corrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		L 3 E - W 262 KL
Performance acc. to DIN 70020 + ECE-R24:	kW	13.3 at 2,400 min^{-1}
Construction:		3 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	952
High idle:	min^{-1}	2.580 $^{+35}/_{-10}$
Low idle:	min^{-1}	1.020 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	247
Fuel bleeding:		automatic
Tappet clearance - inlet / exhaust:	mm	0.25 (cold)
Injection timing:	°	17 before upper dead centre
Torque of cylinder head studs:	Nm	M 10: 75 - 85 M 8: 20 – 30
Electric fuel pump:	bar	0,18
	l/min	0.37
Injection pressure (valve opening pressure):	bar	140
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 40
Starter:	V/kW	12 / 1.7
Starting aid:		3 glow plugs, glow time controlled
Lighting:		working headlight H3

TRANSMISSION

Travel motors:	make/type	SOM MOR 15
Travel gears:	make/type	SOM PGR 132 N
Travel speed:	km/h	0 to 2.7

EXCAVATOR AND TRAVEL HYDRAULICS

Hydaulic pump:	make	Haldex WP 09 A2
Flow rate:	l/min	33,6 + 19,2
Cut off valve:		pump integrated
Cut off pressure (high idle):	bar	110 $_{-5}$ (service temperature)
Pilot pressure (high idle):	bar	28 (service temperature)
Pressure reducing valve with accu	make	Hydac
Valve bank:	type	Rexroth 9 SX 10
Cross servo control stick:	type	Rexroth 4TH 6
Flow at additional circuit	l/min	at 100 bar → approx. 32 at 140 bar → approx. 26

SLEW DRIVE

Slew motor with gearbox:	make	SOM SD50 + GWS200
Slew pressure (valves at slew motor):	bar	140 (high idle and service temperature, measured at pressure port P1)

PRESSURE AND SETTING VALUES

Main pressure relief valve (high idle):	max. bar	165

LINE RELIEF PRESSURES

- travel left (valves in the motor):	bar	----
- travel right (valves in the motor):	bar	----
- slewing (valves at the slew motor):	bar	140 (high idle and service temperature, measured at pressure port P1)
- dipperstick:	bar	210 / 210
- bucket:	bar	210 / 210
- boom lift / lower:	bar	210 / 160
- breaker / slew bucket / grab rotation:	bar	----
- articulation:	bar	anti cavitation
- dozer blade:	bar	----

CYCLE TIMES

Boom up / down to the ground:	s	3.0 / 2.9
Dipperstick extend / retract:	s	2.6 / 2.9
Bucket extend / retract:	s	2.1 / 2.4
Slew speed (max.)	min^{-1}	10

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see operation manual
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

		ltr.	
Fuel:	approx.	30.0	diesel
Engine oil, engine and filter:	approx.	3.4 + 0.2	HD-oil (change)
Hydraulic oil, tank and system:	approx.	35.0	hydraulic oil
Hydraulic oil tank:	approx.	25.0	hydraulic oil (change)
Travel gear:	approx.	0.3	transmission oil, each
Slew gear:	approx.	0.07	transmission oil
Cooling agent:	approx.	4.2	water with anticorrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		L 3 E - W 262 KL
Performance acc. to DIN 70020 + ECE-R24:	kW	13.3 at 2,400 min^{-1}
Construction:		3 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	952
High idle:	min^{-1}	2.580 $^{+35}/_{-10}$
Low idle:	min^{-1}	1.020 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	247
Fuel bleeding:		automatic
Tappet clearance - inlet / exhaust:	mm	0.25 (cold)
Injection timing:	°	17 before upper dead centre
Torque of cylinder head studs:	Nm	M 10: 75 - 85 M 8: 20 – 30
Electric fuel pump	bar	0,18
	l/min	0,37
Injection pressure (valve opening pressure):	bar	140
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 40
Starter:	V/kW	12 / 1.7
Starting aid:		3 glow plugs, glow time controlled
Lighting:		working headlight H3

TRANSMISSION

Travel motors:	make/type	SOM MOR 15
Travel gears:	make/type	SOM PGR 132 N
Travel speed:	km/h	0 to 2.7

EXCAVATOR AND TRAVEL HYDRAULICS

Hydraulic pump:	make	Haldex WP 09 A2
Flow rate:	l/min	33,6 + 19,2
Cut off valve:		pump integrated
Cut off pressure (high idle):	bar	110 $_{-5}$ (service temperature)
Pilot pressure (high idle):	bar	28 (service temperature)
Pressure reducing valve with accu	make	Hydac
Valve bank:	type	Rexroth 9 SX 10
Cross servo control stick:	type	Rexroth 4TH 5
Flow at additional circuit	l/min	at 100 bar ➔ approx. 32 at 140 bar ➔ approx. 26

SLEW DRIVE

Slew motor with gearbox:	make	SOM SD50 + GWS200
Slew pressure (valves at slew motor):	bar	140 (high idle and service temperature, measured at pressure port P1)

PRESSURE AND SETTING VALUES

Main pressure relief valve (high idle):	max. bar	165

LINE RELIEF PRESSURES

- travel left (valves in the motor):	bar	----
- travel right (valves in the motor):	bar	----
- slewing (valves at the slew motor):	bar	140 (high idle and service temperature, measured at pressure port P1)
- dipperstick:	bar	210 / 210
- bucket:	bar	210 / 210
- boom lift / lower:	bar	210 / 160
- breaker / slew bucket / grab rotation:	bar	----
- articulation:	bar	anti cavitation
- dozer blade:	bar	----

CYCLE TIMES

Boom up / down to the ground:	s	3.0 / 2.9
Dipperstick extend / retract:	s	2.6 / 2.9
Bucket extend / retract:	s	2.1 / 2.4
Slew speed (max.)	min^{-1}	10

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see operation manual
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 30.0	diesel
Engine oil, engine and filter:	approx. 3.4 + 0.2	HD-oil (change)
Hydraulic oil, tank and system:	approx. 35.0	hydraulic oil
Hydraulic oil tank:	approx. 25.0	hydraulic oil (change)
Travel gear:	approx. 0.3	transmission oil, each
Slew gear:	approx. 0.07	transmission oil
Cooling agent:	approx. 4.2	water with anticorrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		L 3 E - W 262 KL
Performance acc. to DIN 70020 + ECE-R24:	kW	13.3 at 2,400 min^{-1}
Construction:		3 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	952
High idle:	min^{-1}	2.580 $^{+35}/_{-10}$
Low idle:	min^{-1}	1.020 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	247
Fuel bleeding:		automatic
Tappet clearance - inlet / exhaust:	mm	0.25 (cold)
Injection timing:	°	17 before upper dead centre
Torque of cylinder head studs:	Nm	M 10: 75 - 85 M 8: 20 – 30
Electric fuel pump	bar	0,18
	l/min	0,37
Injection pressure (valve opening pressure):	bar	140
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 40
Starter:	V/kW	12 / 1.7
Starting aid:		3 glow plugs, glow time controlled
Lighting:		working headlight H3

TRANSMISSION

Travel motors:		make/type	SOM MOR 15
Travel gears:		make/type	SOM PGR 132 N
Travel speed:	tortoise	km/h	0 to 2.7
	rabbit	km/h	0 to 4.5

EXCAVATOR AND TRAVEL HYDRAULICS

Hydraulic pump:	make	Haldex WP 09 A2
Flow rate:	l/min	33,6 + 19,2
Cut off valve:		pump integrated
Cut off pressure (high idle):	bar	125 $_{-5}$ (service temperature)
Pilot pressure (high idle):	bar	28 (service temperature)
Pressure reducing valve with accu	make	Hydac
Valve bank:	type	Rexroth 9 SX 10
Cross servo control stick:	type	Rexroth 4TH 5
Flow at additional circuit	l/min	at 100 bar → approx. 33 at 140 bar → approx. 30

SLEW DRIVE

Slew motor with gearbox:	make	SOM RCG-35
Slew pressure (valves at slew motor):	bar	155 (high idle and service temperature, measured **at pressure port P1**)

PRESSURE AND SETTING VALUES

Main pressure relief valve (high idle):	max. bar	180

LINE RELIEF PRESSURES

- travel left (valves in the motor):	bar	180 / 180
- travel right (valves in the motor):	bar	180 / 180
- slewing (valves at the slew motor):	bar	155 (high idle and service temperature, measured **at pressure port P1**)
- dipperstick:	bar	210 / 210
- bucket:	bar	210 / 210
- boom lift / lower:	bar	230 / 160
- breaker / slew bucket / grab rotation:	bar	----
- articulation:	bar	anti cavitation
- dozer blade:	bar	----

CYCLE TIMES

Boom up / down to the ground:	s	3.0 / 2.9
Dipperstick extend / retract:	s	2.6 / 2.9
Bucket extend / retract:	s	2.1 / 2.4
Slew speed (max.)	min^{-1}	10

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see operation manual
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 30.0	diesel
Engine oil, engine and filter:	approx. 3.4 + 0.2	HD-oil (change)
Hydraulic oil, tank and system:	approx. 35.0	hydraulic oil
Hydraulic oil tank:	approx. 25.0	hydraulic oil (change)
Travel gear:	approx. 0.3	transmission oil, each
Slew gear:	approx. 0.1	transmission oil
Cooling agent:	approx. 4.2	water with anticorrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

DIESEL ENGINE

Manufacturer:		Mitsubishi
Type:		S 4L 2 – Y 263 KL – TIER II
Output acc. to DIN 70020 and ECE-R24:	kW/PS	23.8 / 32.5 at 2,100 min^{-1}
Construction:		4 cylinders in line
Cooling:		water / anti-freeze agent
Capacity:	cm^3	1,758
Torque	Nm	105 at 1,500 min^{-1}
High idle:	min^{-1}	2,300 $^{-50}$
Low idle:	min^{-1}	1,000 $^{+50}/_{-25}$
Spec. fuel consumption (full load):	g/kWh	258
Fuel bleeding:		automatic
Tappet clearance - inlet / outlet:	mm	0.25 (cold)
Compression ratio:	bar	27 - 30
Injection timing:	°	17 (before upper dead centre)
Engine oil pressure:	bar	3.5 $^{\pm 0.5}$ (high idle, service temperature)
Torque of cylinder head studs (in case of repair):	Nm	M 10 → 83 to 92
Injection pressure	bar	140 $^{+5}$
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 74
Generator:	V/A	12 / 50
Starter:	V/kW	12 / 2.0
Starting aid:		Glow plugs, glow time controlled,
Lighting:		working headlamp H3, additional headlamp (optional)

TRANSMISSION

Travel motors with travel gear:		make/type	SOM PGR 402
Travel speed:	shift I	km/h	0 to 2.7
	shift II	km/h	0 to 4.6

EXCAVATOR AND TRAVEL HYDRAULICS

Variable displacement pump:	make	Rexroth
	type	A 10 VO 45 DFLR
Flow rate:	cm^3/min.	0 – 45 (0 - 94.5 l/min)
Pilot pressure (high idle):	bar	28 (service temperature)
Valve bank:	type	Rexroth 9 SX 12
Cross servo control stick:	type	Rexroth 4TH6

SLEW DRIVE

Slew motor with gearbox:	make	SOM PG 162 PR
Slew pressure (valves at slew motor):	bar	185 (Δp between M1 and M2; high idle; service temperature)

PRESSURE AND SETTING VALUES

Main pressure relief valve:	max. bar	250 $^{+5}$	(high idle, service temperature)
Power regulator (G-regulator):	bar	20.0	(high idle, service temperature)
Stand-by regulator:	bar	21.0	(high idle, service temperature)
Δp (LS-Pressure)	bar	15.0	(high idle, service temperature)

LINE RELIEF PRESSURES

- slewing (valves at the slew motor):	bar	185 / 185	(Δp between M1 and M2 high idle, service temperature)
- blade:	bar	---	
- travel left:	bar	---	(250 bar shock valves at the travel motor)
- travel left:	bar	---	(250 bar shock valves at the travel motor)
- bucket:	bar	210 / 210	
- boom lift / lower:	bar	280 / 160	
- articulation:	bar	anti-cavitation	
- dipper stick:	bar	280 / 280	
- breaker / slew bucket / grab rotation:	bar	210 / 210	

CYCLE TIMES

Boom up / down - to the ground (without damping)	sec.	2.5 / 2.7
Dipper stick cylinder extend / retract:	sec.	2.5 / 2.4
Bucket cylinder extend / retract:	sec.	2.4 / 2.1

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see operation manual
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 65.0	diesel
Engine oil, engine and filter:	approx. 7.7	+ 0.5 HD oil (change)
Hydraulic oil, tank and system:	approx. 72.0	hydraulic oil
Hydraulic oil tank:	approx. 54.0	hydraulic oil (change)
Travel gear:	approx. 0.6	transmission oil, each
Slew gear:	lubrication by circulation of the hydraulic oil	
Cooling agent:	approx. 5.3	water with anti-corrosive and anti-freeze agent

The values stated are approximate.
The level indicator is always decisive.

SUBGROUP LIST

DIESEL ENGINES

HML 31	/	HML 32	DEUTZ BF 4M 1012 E	3.100
HML 41	/	HR 31		
HR 32	/	HR 41		
HS 41	/	HS 41 M		
HS 41 MM				
HML 32	/	HML 42	DEUTZ BF 4M 2012 E	3.150
HR 42				
SKL 824	/	SKL 834	DEUTZ FL 2011 F	3.250
SKL 843	/	SKL 853	PERKINS 1004 / 1006	3.300
SKL 863	/	SKL 873		
HML 51 S	/	SKL 877		
SMB 2041				
HR11	/	HR 12	Mitsubishi L3E-61 KL	3.500
HR13				
HR 14	/	HR 16	Mitsubishi S4L - 61 KL	3.600
HR 18			Mitsubishi S4Q-2-61 KL	3.800

TEREX | SCHAEFF

DEUTZ Diesel Engines

are the product of many years of research and development. The resulting know-how, coupled with stringent quality standards, guarantee their long service life, high reliability and low fuel consumption.
It goes without saying that DEUTZ Diesel Engines meet the highest standards for environmental protection.

Service and Maintenance

Sound service and maintenance practices will ensure that the engine continues to meet your requirements.
Recommended service intervals must be observed and service and maintenance work carried out conscientiously.
Special care should be taken under abnormally demanding operating conditions.

DEUTZ SERVICE INTERNATIONAL GmbH

Please contact one of our authorized service representatives in the event of breakdowns or for spare parts inquiries. Our trained specialists will carry out repairs quickly and professionally, using only genuine spare parts. Genuine spare parts from DEUTZ SERVICE INTERNATIONAL GmbH are always manufactured to the highest technical standards.
A table of DEUTZ SERVICE INTERNATIONAL GmbH contact numbers is given at the end of this Operation Manual.

Beware of Running Engine

Shut the engine down before carrying out maintenance or repair work. Ensure that the engine cannot be accidentally started.
When the work is complete, be sure to refit any panels and guards that may have been removed.
Never fill the fuel tank while the engine is running.
Observe industrial safety regulations when running the engine in an enclosed space or underground.

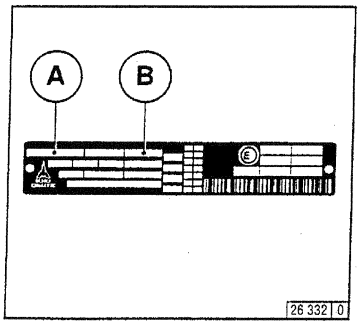
Safety

All safety instructions in this Manual are designated by the accompanying symbol. Please follow them carefully.
The attention of operating personnel should be drawn to these safety instructions.
General safety and accident prevention regulations laid down by law must also be observed.

Asbestos

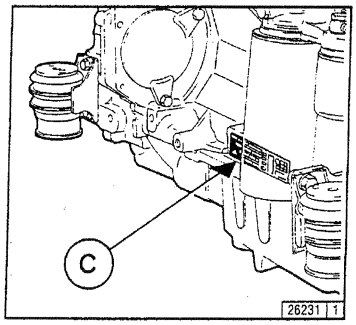
The gaskets used for this engine are asbestos-free. Please use suitable replacement parts when carrying out maintenance and repair work.

Rating Plate



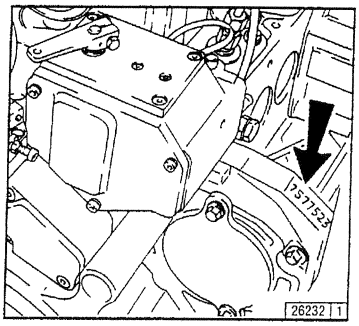
The model **A**, the engine serial number **B** and the performance data are stamped on the rating plate. The model and engine serial number must be given when ordering spare parts.

Rating Plate Location

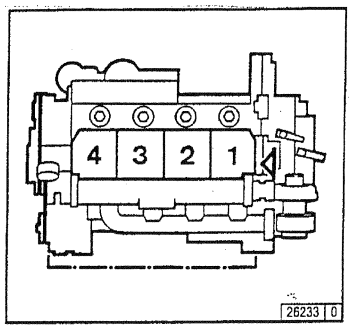


The rating plate **C** is attached to the crankcase.

Engine Serial Number



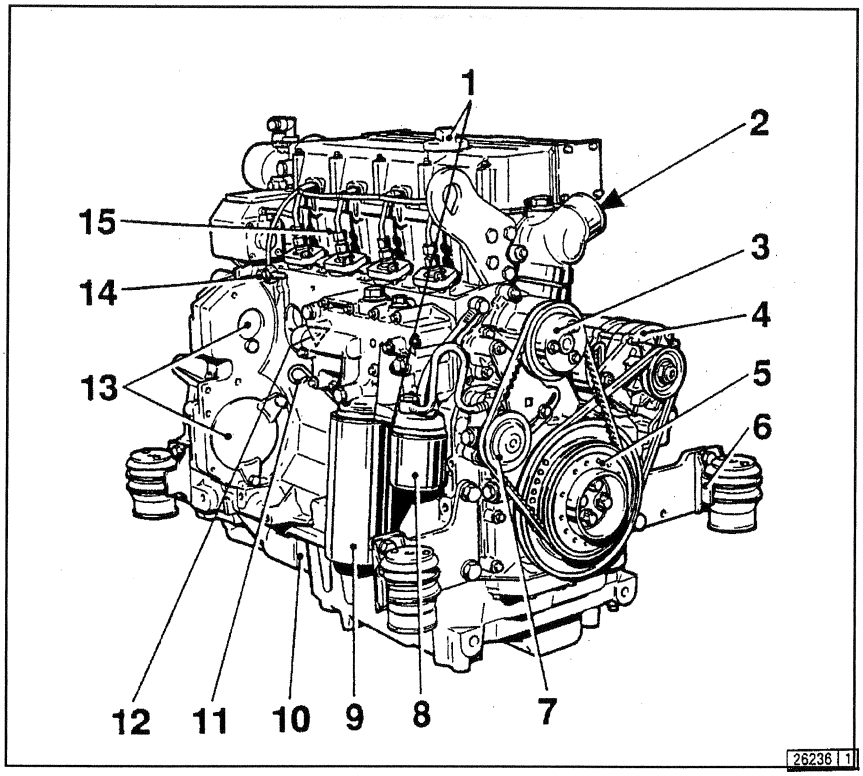
The engine serial number is also stamped on the crankcase itself **(arrow)**.



Cylinder Numbering

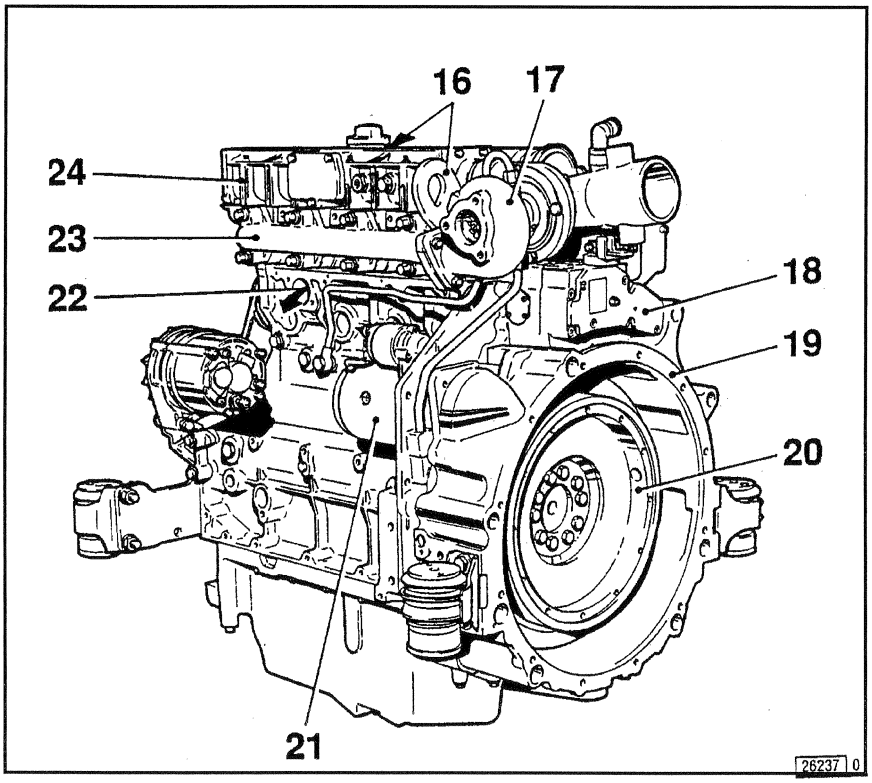
Cylinders are numbered consecutively, beginning at the flywheel end.

BF4M 1012 E



1 Oil filler (option: between filters)
2 Coolant inlet
3 Coolant pump
4 Alternator
5 Belt pulley
6 Engine mount
7 Fuel pump
8 Fuel filter
9 Lube oil filter
10 Oil pan
11 Dipstick
12 Lube oil cooler
13 Mounting facility for hydraulic pump
14 Back leak fuel pipe with pressure-regulating valve
15 Cylinder head

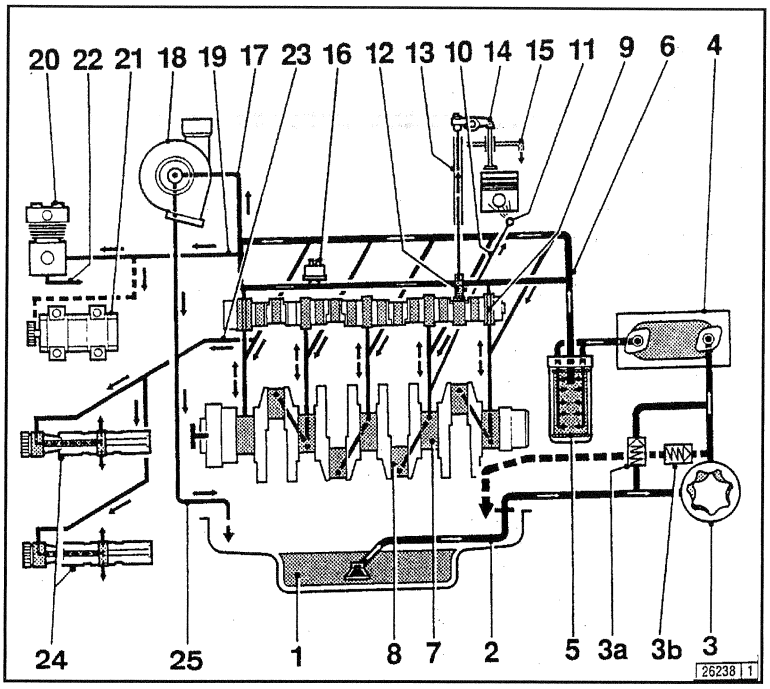
Service Side 1012 E



16 Lifting points
17 Exhaust turbocharger
18 Speed governor
19 SAE housing
20 Flywheel
21 Starter motor
22 Coolant outlet to heat exchanger
23 Exhaust manifold
24 Air intake manifold

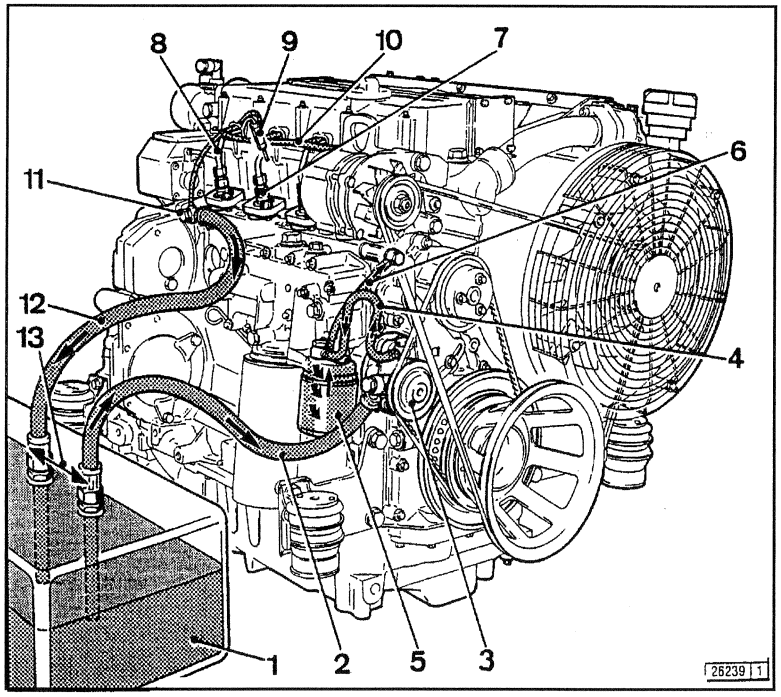
Starter Side 1012 E

BF4M 1012 E



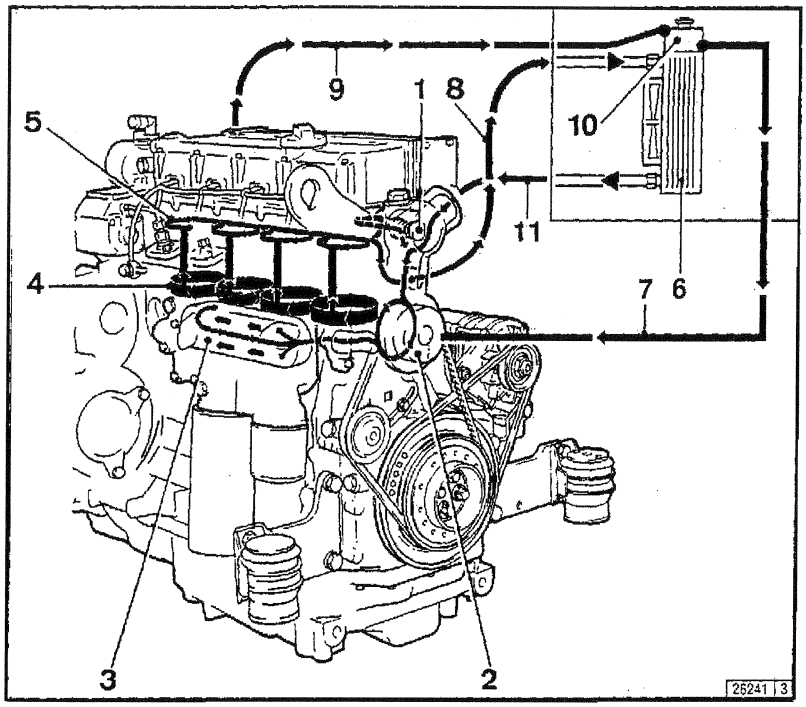
1 Oil pan
2 Air intake manifold
3 Lube oil pump
3a Back leak fuel valve
3b Pressure-relief valve
4 Lube oil cooler
5 Lube oil filter
6 Main oil gallery
7 Crankshaft bearing
8 Conrod bearing
9 Camshaft bearing
10 Line to spray nozzle
11 Spray nozzle for piston cooling
12 Tappet w/ control bore for pulse lubrication of rocker arms
13 Pushrod (designed for lube oil supply of rocker arms)
14 Rocker arm
15 Return line to oil pan
16 Oil sensor
17 Oil line to exhaust turbocharger
18 Exhaust turbocharger
19 Oil line to compressor or hydraulic pump
20 Compressor
21 Hydraulic pump
22 Return line to compressor or hydraulic pump
23 Line to mass balancing gear (2x)
24 Counterbalancing shafts
25 Exhaust turbocharger return to crankcase

Lube Oil Circuit Schematic
1012 / 1012 E



1 Fuel tank
2 Line to fuel pump
3 Fuel pump
4 Line to fuel filter
5 Fuel filter
6 Line to injection pumps
7 Injection pump
8 Line to injector
9 Injector
10 Back leak fuel pipe
11 Banjo bolt with pressure-regulating valve
12 Return line to fuel tank
13 Keep this spacing as wide as possible

Fuel System Schematic



1 Thermostat housing
2 Coolant pump
3 Lube oil cooler
4 Cylinder cooling
5 Cylinder head cooling
6 Heat exchanger
7 Vent connection for compensator reservoir-coolant pump
8 Line from engine to compensator reservoir
9 Vent connection from cylinder head to heat exchanger (compensator reservoir)
10 Compensator reservoir
11 Return line from compensator reservoir to thermostat housing

Cooling System Schematic 1012 E

Torque Wrench Settings

Location	Preload [Nm]			Torquing Load [Nm]				Total [Nm]	Remarks
	1st Stage	2nd Stage	3rd Stage	1st Stage	2nd Stage	3rd Stage	4th Stage		
Rocker cover								8,5	
Rocker arm setscrew								20 +2	
Mount, flywheel side								187	M 16 x 40 8.8 A4C
Mount, turbocharger side								187	M 16 x 40 8.8 A4C
Air intake manifold								8,5	
Exhaust manifold								21	
Oil drain plug								50	
Injector mounting								16	Torx
Injection line mounting								30	M 14x1.5
Oil pan (cast iron)								29	
Oil pan (sheet metal)								21	

Engine Specifications and Settings

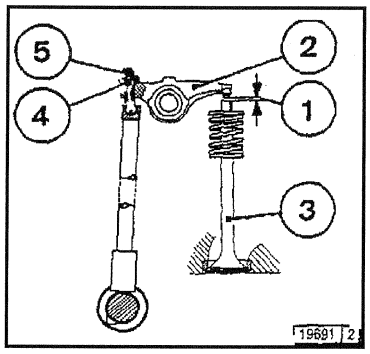
BF4M 1012E

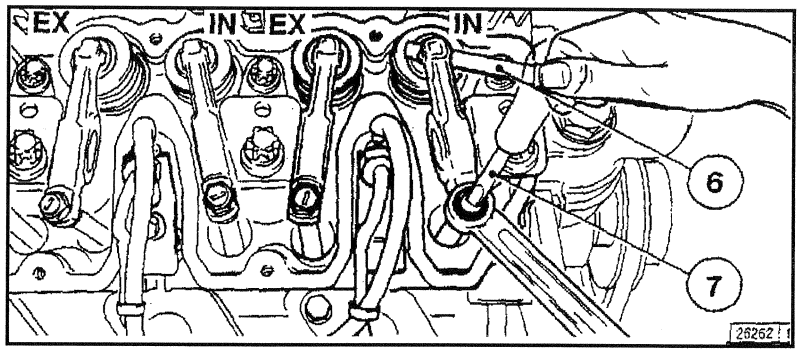
Model BFM 1012/E		BF4M 1012 BF4M 1012 E	BF4M 1012 C BF4M 1012 EC	BF6M 1012 BF6M 1012 E	BF6M 1012 C BF6M 1012 EC
Number of cylinders		4	4	6	6
Cylinder arrangement		vertical, in line			
Bore	[mm]	94			
Stroke	[mm]	115			
Total displacement	[cm³]	3192	3192	4788	4788
Compression ratio	[ε]	17,5			
Working cycle / Combustion system		4-stroke diesel with turbocharging and direkt injection			
Charge air cooler		w/o	w/	w/o	w/
Direction of rotation		counter clockwise			
Weight 1012/C incl. cooling system	[kg approx.]	Refer to head-office			
Weight 1012E/EC without cooling system as per DIN 70020-A	[kg approx.]	330	332	435	437
Engine power	[kW]	1)			
Speed	[rpm]	1)			
Valve clearance (cold engine)	[mm]	inlaete 0,3 +0.1 / exhaust 0,5 +0.1			
Injector opening pressure	[bar]	250 bar			
Start of delivery	[°crank angle bTDC]	1)			
Firing order		1-3-4-2	1-3-4-2	1-5-3-6-2-4	1-5-3-6-2-4
V-belt tension:		Tension / Retension 2)			
Alternator – Fan	[N]	400 / 250 ±50			
Fuel pump – Coolant pump	[N]	400 / 250 ±50			
Compressor	[N]	500 / 350 ±50			
Cooling system		Liquid cooled / Cooling system protection			
Coolant quantity (coolant capacity of engine only) 1012E/EC5)	[liters approx.]	5,6	5,6	7,3	7,3
1012/C with	[liters approx.]	9,3	10,0	12,2	13,6
Permissible continuous coolant temperature at engine outlet	[°C]	max. 110			
Temperature difference between Coolant inlet/outlet	[°C]	4 to 8			
Thermostat full open temperature	[°C]	83			
Coolant prewarming		95			
Coolant pump		4)			
Delivery pressure in	[bar]	1,2	1,3	1,2	1,2
Delivery rate in	[m³/h]	6,0	12,0	12,0	12,0
Power consumption in	[kW]	1,0	1,4	1,4	1,4
Lubrication		forced-feed lubrication			
SAE oil		15 W 40			
Oil temperature in oil pan	[°C]	max. 125			
Min. oil pressure with engine warm (120°C) and at low idle	[bar]	0,8			
Oil capacity (first fill-up) without filter	[liters approx.]	8,5 3)	8,5 3)	12,5 3)	12,5 3)
Oil capacity (first fill-up) with filter	[liters approx.]	10,0 3)	10,0 3)	14,0 3)	14,0 3)

1) Engine power, speed, start of delivery are stamped on engine rating plate (see also 2.1)
2) Retension 15 minutes after engine has run under load.
3) Approximate figures can vary depending on the design. **The upper marking on the dipstick is always the maximum.**
4) Only during winter (see 3.5.1)
5) Model 1012E with external cooling system, depending on cooling system design.

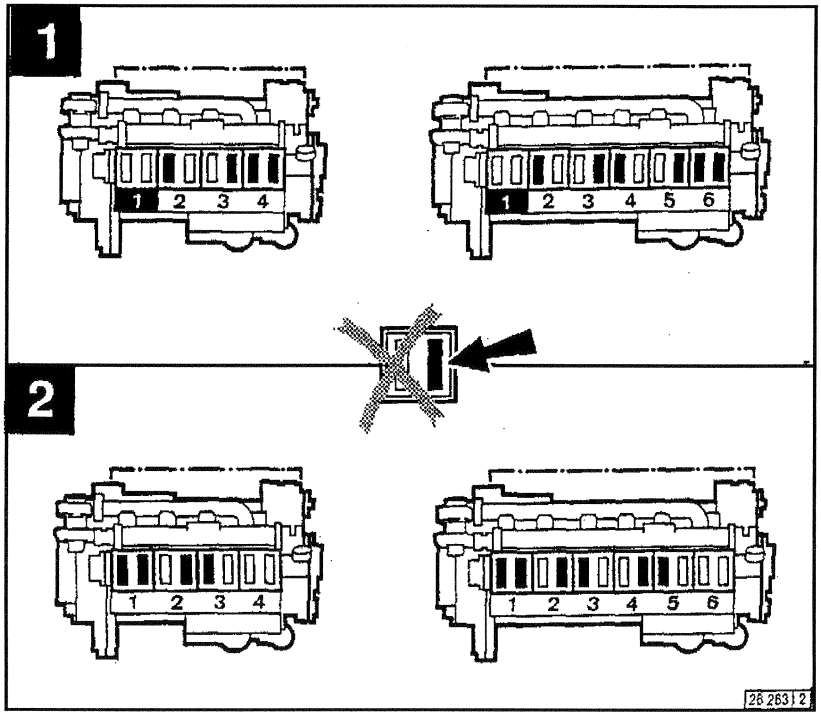
Checking / Adjusting Valve Clearances

BF4M 1012 E





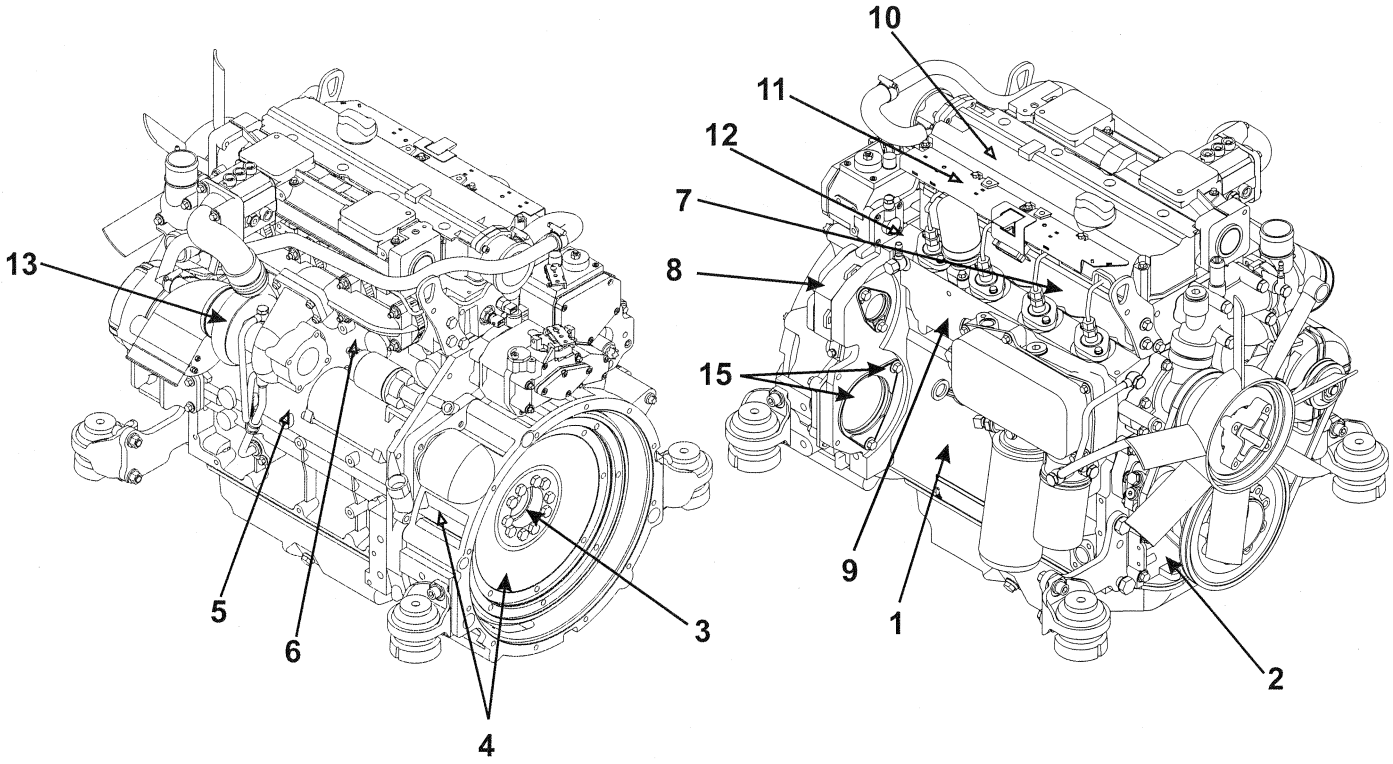
- Slacken off breather valve and swing to one side.
- Remove rocker cover.
- Position crankshaft as per schematic 6.6.1.1
- Before adjusting valve clearance, allow engine to cool down for at least 30 minutes. The oil temperature should be below 80°C / 176°F.
- Check valve clearance between rocker arm / tappet contact face 2 and valve stem 3 with feeler gauge 6 (there should be only slight resistance when feeler blade is inserted).
  For permissible valve clearance, see 9.1.
- Adjust valve clearance if necessary:
  - Release locknut 4.
  - Use screwdriver 7 to turn setscrew 5 so that the correct clearance is attained after locknut 4 has been tightened.
- Check and adjust valve clearance on all remaining cylinders.
- Replace rocker cover (use new gasket is needed).
- Swing breather valve back into position and secure.



- **Crankshaft Position 1:**
  Turn crankshaft until both valves in cylinder 1 overlap (exhaust valve about to close, inlet valve about to open). Adjust clearance of valves **marked in black** on schematic. Mark respective rocker arm with chalk to show that adjustment has been done.

- **Crankshaft Position 2:**
  Turn crankshaft one full revolution (360°).
  Adjust clearance of valves **marked in black** on schematic.

Valve Clearance Adjustment Schematic



Deutsch		Français	
Baugruppe	**Benennung**	**Groupe**	**Désignation**
1	Kurbelgehäuse	1	Bloc-moteur
2	Vorderer Deckel / Schmierölpumpe	2	Couvercle avant / pompe à huile de graissage
3	Kurbelwelle	3	Vilebrequin
4	Starterzahnkranz / Schwungrad	4	Couronne de démarreur / Volant
5	Pleuelstange	5	Bielle
6	Kolben	6	Piston
7	Zylinderkopf	7	Culasse
8	Räderkasten	8	Carter de distribution
9	Nockenwelle	9	Arbre à cames
10	Kipphebel	10	Support de culbuteur
11	Einspritzventil	11	Injecteur
12	Regelstange	12	Crémaillère
13	Luftpresser	13	Compresseur d'air
14	Massenausgleichswelle	14	Arbre à masses d'équilibrage
15	Hydraulikpumpenantrieb	15	Entraînement de pompe hydraulique
	Hydraulikpumpe mit Befestigungsflansch		Pompe hydraulique avec bride de fixation

English		Español	
Assembly Group	**Description**	**Grupo de construcción**	**Denominación**
1	Crankcase	1	Bloque motor
2	Front cover / Lube oil pump	2	Tapa delantera / Bomba de aceite lubricante
3	Crankshaft	3	Cigüeñal
4	Starter ring gear / flywheel	4	Corona del volante / Volante
5	Connecting rod	5	Biela
6	Piston	6	Pistón
7	Cylinder head	7	Culata
8	Timing case	8	Cárter de la distribución
9	Camshaft	9	Arbol de levas
10	Rocker arm bracket	10	Soporte de balancines
11	Injector	11	Inyector
12	Control rod	12	Cremallera
13	Air compressor	13	Compresor de aire
14	Mass balancing shaft	14	Eje equilibrador
15	Hydraulic pump drive	15	Accionamiento de bomba hidráulica
	Hydraulic pump with fastening flange		Bomba hidráulica con brida de fijación

Typ Model Type Tipo	**Deutz BF-4/6 M 2012**	**Motor Engine Moteur Motor**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Technische Daten Specification Data Caractéristicos techniques Datos téchnicos**		Blatt Page Feuille Página	**3.150.01**

Ventilspieleinstellschema
Schematic for valve clearance adjustment
Schéma de réglage des soupapes
Esquema para el ajuste del juego de válvulas

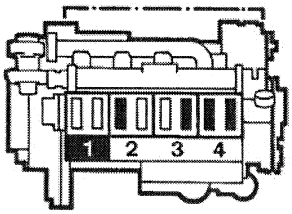
Kurbelwellenstellung **1**

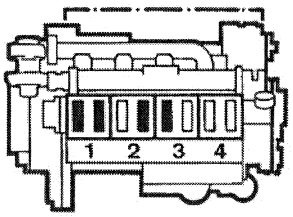
Motor bis zum Erreichen der Ventilüberschneidung am Zyl. Nr. 1 durchdrehen.

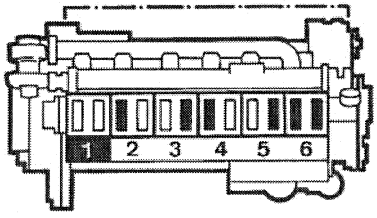
Kurbelwellenstellung **2**

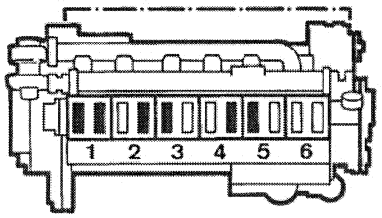
Motor um eine volle Umdrehung (360°) weiterdrehen.

nicht einstellbar — einstellbar









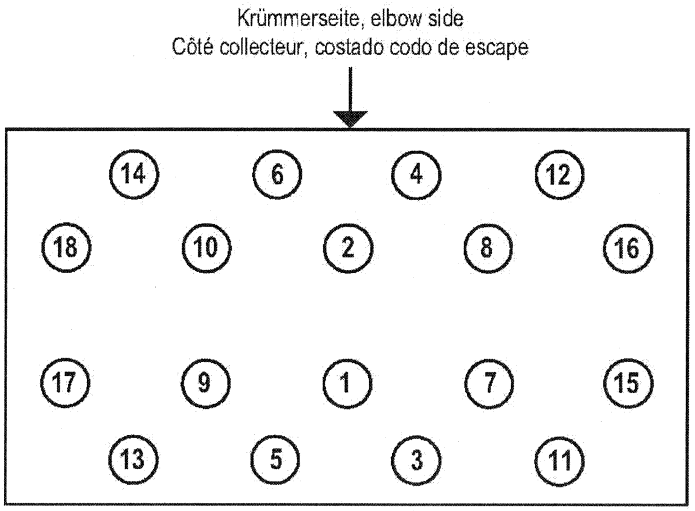
Typ Model Type Tipo	**Deutz** **BF-4/6 M 2012**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Ventileinstellschema** **Schematic for valve clearance adjustment** **Schéma de réglage des soupapes** **Esquema para el adjuste del juego de válvulas**		Blatt Page Feuille Página	**3.150.02**

English	Français	Español
Crankshaft position 1	**Position de vilebrequin** 1	**Posición del cigüeñal** 1
Turn engine until valves of cylinder No. 1 overlap.	Virer le moteur jusqu'à ce que les soupapes du cyl. n° 1 soient en balance.	Girar el cigüeñal hasta el cruce de las válvulas en el cilindro No. 1.
Not ready for adjustment.	non réglable	no ajustable
Crankshaft position 2:	**Position de vilebrequin 2**	**Posición del cigüeñal 2**
Turn engine further by one complete revolution (360°).	Virer encore le moteur d'un tour complet (360°).	Continuar girando el cigüeñal una vuelta entera (360°)
Ready for adjustment.	réglable	ajustable

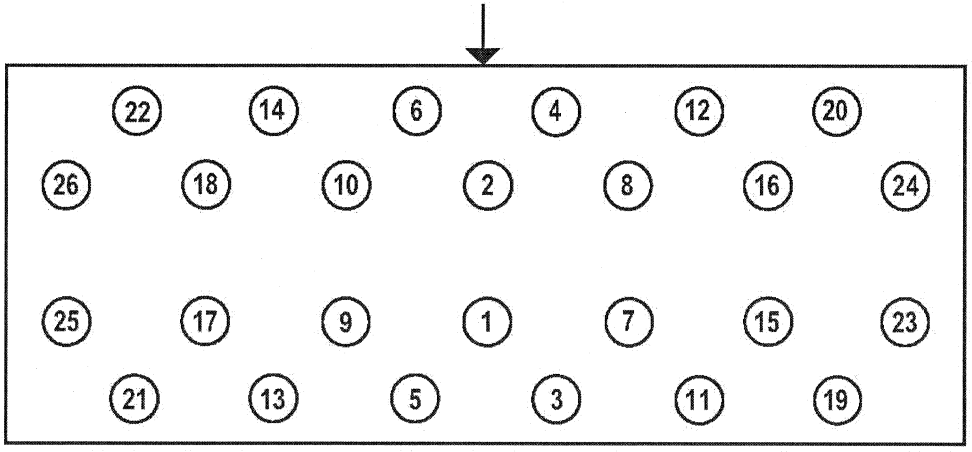
Typ Model Type Tipo	**Deutz** **BF-4/6 M 2012**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Ventileinstellschema** **Schematic for valve clearance adjustment** **Schéma de réglage des soupapes** **Esquema para el adjuste del juego de válvulas**		Blatt Page Feuille Página	**3.150.03**

Reihenfolge beim Anziehen der Zylinderkopfschrauben
Tightening order for cylinder head bolts
Ordre de serrage des boulons de culasse
Orden a seguir para el apriete de los tornillos de culata

4-Zylinder
4-cylinder
4 cylindres
4 cilindros



6-Zylinder
6-cylinder
6 cylindres
6 cilindros



Typ Model Type Tipo	**Deutz** **BF-4/6 M 2012**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Reihenfolge bei Anziehen der Zylinderkopfschraube** **Tightening order cylinder head bolt** **Ordre de serrage des boulons de culasse** **Orden a seguir para el apriete de los tornillos de culata**		Blatt Page Feuille Página	**3.150.04**

Technische Daten
Specification data
Caractéristiques techniques
Datos técnicos

Werkstatthandbuch BFM 2012

Deutsch	English	Français	Español
Motorgewicht nach DIN 70020 - A ca. kg	Engine weight acc. to DIN 70020 - A approx. kg	Poids du moteur selon DIN 70020 - A approx. kg	Peso del motor según DIN 70020-A aprox. kg
Gesamthubvolumen cm^3	Engine swept volume cm^3	Cylindrée totale cm^3	Cilindrada total cm^3
Bohrung mm	Bore mm	Alésage mm	Calibre mm
Hub mm	Stroke mm	Course mm	Carrera mm
Drehrichtung	Direction of rotation	Sens de rotation	Sentido de rotación
Nenndrehzahl max. 1/min	Rated speed rpm	Régime nominal maxi tr/mn	Régimen nominal máx. r/min
niedrigste Leerlaufdrehzahl 1/min	Minimum idling speed rpm	Ralenti extrême tr/mn	Régimen mín. en vacío r/min
Arbeitsweise	Working cycle	Principe de fonctionnement	Ciclo de trabajo

Werkstatthandbuch BFM 2012

BF4M 2012	BF4M 2012 C		BF6M 2012 C
ohne Kühlsystem w/ocooling system sans système de refroidissement sin sistema de refrigeración	ohne Kühlsystem w/ocooling system sans système de refroidissement sin sistema de refrigeración		ohne Kühlsystem w/ocooling system sans système de refroidissement sin sistema de refrigeración
380	380		495
4 040			6 060
101			
126			
Auf Schwungrad gesehen links When facing flywheel counter-clockwise Vu sur le volant, à gauche Mirándose sobre el volante, a izquierdas			
2500			
800			
Viertakt - Diesel Four-stroke diesel Diesel à 4 temps Diesel de 4 tiempos			

Technische Daten
Specification data
Caractéristiques techniques
Datos técnicos

Werkstatthandbuch BFM 2012

Deutsch	English	Français	Español
Verbrennungs-verfahren	Combustion principle	Principe de combustion	Sistema de combustión
Verdichtungs-verhältnis	Compression ratio	Taux de compression	Relación de compresión
Kompressionsdruck bar	Compression pressure bar	Compression bars	Presión de compresión bar
Zündfolge	Firing order	Ordre d'allumage	Orden de encendido
Abmessungen des Motors mit Anschlußgehäuse (normal)	Dimensions of engine with standard adapter housing	Dimensions du moteur avec carter d'adaption standard	Dimensiones del motor con cárter de adaptación (normal)
größte Länge mm	Max. length mm	Longueur HT mm	Longitud máx. mm
größte Breite mm	Max. width mm	Largeur HT mm	Ancho máx. mm
größte Höhe mm	Max. height mm	Hauteur HT mm	Altura máx. mm

BF4M 2012	BF4M 2012 C		BF6M 2012 C
Direkteinspritzung Direct injection Injection directe Inyección directa			
19			
30 - 38			
1 - 3 - 4 - 2		1 - 5 - 3 - 6 - 2 - 4	
910	921	1038	
643		628	
771	833	908	

Technische Daten
Specification data
Caractéristiques techniques
Datos técnicos

Werkstatthandbuch BFM 2012

Deutsch	English	Français	Español
Steuerzeiten ohne Stößel- und Ventilspiel	Valve timing without tappet and valve clearance	Calage de la distribution sans jeu de poussoirs et de soupapes	Cotas de reglaje sin juegos de válvulas y de empujadores
Einlass öffnet vor OT Grad	Inlet opens before TDC degrees	Admission ouvre avant PMH degrés	Admisión abre ante PMS grados
Einlass schließt nach UT Grad	Inlet closes after BDC degrees	Admission ferme après PMB degrés	Admisión cierra tras PMI grados
Auslass öffnet vor UT Grad	Exhaust opens before BDC degrees	Echappement ouvre avant PMB degrés	Escape abre ante PMI grados
Auslass schließt nach OT Grad	Exhaust closes after TDC degrees	Echappement ferme après PMH degrés	Escape cierra tras PMS grados
Absteuerventil bar	Pressurestat bar	Clapet régulateur final bars	Válvula reguladora final bar
Schmieröldruck in niedrigem Leerlauf Temperatur ca. 120 °C Öl SAE 15W/40 Minimum bar	Lube oil pressure at low idling Temperature approx. 120 °C oil SAE 15W/40 min. bar	Pression d'huile au ralenti mini température environ 120 °C huile SAE 15W/40 mini bar	Presión de aceite a marcha lenta en vacío, temperatura aprox. 120 °C aceite SAE 15W/40 mín. bar

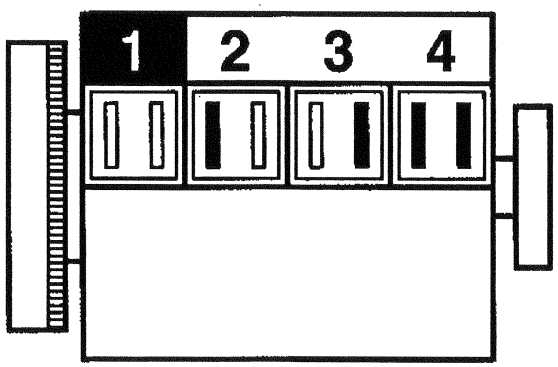
BF4M 2012	BF4M 2012 C		BF6M 2012 C
46			
56			
96			
50			
4 ± 0,4			
0,8			

Specification data	**3.250.01**
Schematic for valve clearance adjustment	**3.250.02**
Key to Symbols	**3.250.03**
Engine DEUTZ F-4M 2011 - overview	**3.250.04**
Valve clearance checking and adjusting	**3.250.05-3.250.06**
Compression pressure checking and adjusting	**3.250.07-3.250.08**
Injector checking and adjusting	**3.250.09-3.250.11**
Injector, repair of components	**3.250.12-3.250.14**

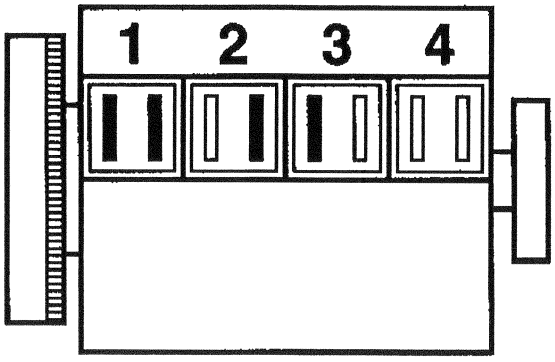
Deutsch	*English*	*Français*	*Español*
Technische Daten	**Specification data**	**Caractéristiques techniques**	**Datos técnicos**
F – 4M 2011 ohne Kühlsystem	**F – 4M 2011** Without cooling system	**F – 4M 2011** sans système de refroid	**F – 4M 2011** sin sistema de refrige
Motorgewicht ohne Starter, mit Generator ca. 248 kg	**Engine weight** without starter with generator approx. 248 kg	**Poids du moteur** sans démarreur avec génératrice approx. 248 kg	**Peso del motor** sin arrancador, con generador aprox. 248 kg
Gesamthubvolumen 3108 cm^3	**Engine swept volume** 3108 cm^3	**Cylindrée totale** 3108 cm^3	**Cilindradea total** 3108 cm^3
Bohrung 94mm	**Bore** 94mm	**Alésage** 94mm	**Calibre** 94mm
Hub 112mm	**Stroke** 112mm	**Course** 112mm	**Carrera** 112mm
Drehrichtung: Auf Schwungrad gesehen links	**Direction of rotation:** When facing flywheel counter-clockwise	**Sens de rotation:** Vu sur volant à gauche	**Sentido de giro:** Visto sobre el volante a izquierdas
Nenndrehzahl: max. 2800/min	**Rated speed:** max. 2800 rpm	**Régime nominal:** max.2800 tr/mn	**Régimen nominal:** máx. 2800 r/min
Niedrigste Leerlauf-drehzahl: 900/min	**Minimum idle speed:** 900 rpm	**Ralenti extrême:** 900 tr/mn	**Régimen min. en vacío:** 900 r/min
Arbeitsweise: Viertakt - Diesel	**Working cycle:** four-stroke diesel	**Principe de fonctionnement:** Diesel 4 temps	**Sistema de trabajo:** Diesel a 4 tiempos
Verbrennungsverfahren: Direkteinspritzung	**Combustion system:** Direct injection	**Principe de combustion:** Injection directe	**Sistema de compustión:** Inyección directa
Verdichtungsverhältnis: 19	**Compression ratio:** 19	**Taux de compression:** 19	**Relación de compresión:**19
Kompressionsdruck: 25-30 bar	**Compression pressure:** 25-30 bar	**Compression:** 25-30 bars	**Pressión de compresión:** 25-30 bar
Zündfolge: 1 – 3 – 4 - 2	**Firing order:** 1 – 3 – 4 - 2	**Ordre d'allumage:** 1 – 3 – 4 - 2	**Orden de encendido:** 1 – 3 – 4 - 2

Deutsch	*English*	*Français*	*Español*
Technische Daten	**Specification data**	**Caractéristiques techniques**	**Datos técnicos**
F – 4M 2011 ohne Kühlsystem	**F – 4M 2011** Without cooling system	**F – 4M 2011** sans système de refroid	**F – 4M 2011** sin sistema de refrige
Steuerzeiten ohne Stößel- und Ventilspiel	**Valve timing without valve clearance**	**Calage distribution sans jeux des poussoirs st soupapes**	**Cotas de reglaje sin juegos de válvula y de empujadores**
Einlaß öffnet 45 Grad vor OT	**Inlet opens** 45 degrees before TDC	**Admission ouvre** 45 degrés avant PMH	**Admisión abre** 45 drados a. PMS
Einlaß schließt 65 Grad nach UT	**Inlet closes** 65 degrees after BDC	**Admission ferme** 65 degrés après PMB	**Admisión cierra** 65 grados t. PMI
Auslaß öffnet 76 Grad vor UT	**Exhaust opens** 76 degrees before BDC	**Échappement ouvre** 76 degrés avant PMB	**Escape apre** 76 grados a. PMI
Auslaß schließt 44 Grad nach OT	**Exhaust closes** 44 degrees after TDC	**Échappement ferme** 44 degrés après PMH	**Escape cierra** 44 grados t. PMS
Mindestöldruck bei warmem Motor, Öltemperatur 110 °C Öl SAE 20/20 bei:	**Minimum oil pressure during warm motor, Oil temperature 110 °C Oil SAE 20/20 during:**	**Pression d'huile minimum sur moteur chaud, température d'huile 110 °C, huile SAE 20/20, à :**	**Presión min. de aceite a motor caliente, temperatura del aceite 110 °C, SAE 20/20, a:**
900/min (niederer Leerlauf) 1,4 bar	900 rpm (lower no-load) 1,4 bar	900 tr/mn (ralenti minimum)1,4 bars	900 r/min (régimen bajo en vacìo) 1,4 bar
1800/ min 2,2 bar	1800 rpm 2,2 bar	1800 tr/mn 2,2 bars	1800 r/min 2,2 bar
max. 2800/min 3,0 bar	max. 2800 rpm 3,0 bar	2800 tr/mn maxi 3,0 bars	máx. 2800 r/min 3,0 bar
Angaben für Motoren ohne Motoröl-Heizung	*Data related to motors without motor oil heating*	*Indications pour moteurs sans chauffage par huile moteur*	*Datos para motores sin calefacción por el aceite del motor*
Absteuerventil 7 bar	**Pressurestat** 7 bar	**Clapet de décharge** 7bar	**Válvula reguladora final** 7 bar

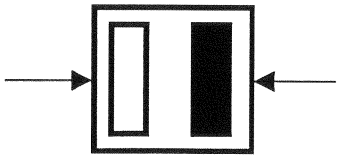
Deutsch	*English*	*Français*	*Español*
Ventilspieleinstell-schema	**Schematic for valve clearance adjustment**	**Schema de reglage des soupapes**	**Esquema para el ajuste de holgura de v81vulas**
Kurbelwellen-stellung **1** Motor bis zum Erreichen der Ventilüberschneidung am Zyl. Nr. 1 durchdrehen	**Crankshaft position** **1** Turn engine until valves of cylinder No.1 overlap	**Position de l'arbre à cames** **1** Virer le moteur jusqu'au chevau-chement des soupapes au cylindre 1	**Posición dei cigüeñal** **1** Gírese el motor, hasta que las válvulas del cilindro N° 1 coincidan en su posición momentánea



Kurbelwellen-stellung **2** Motor um eine volle Umdrehung (360°) weiterdrehen	**Crankshatt position** **2** Turn engine further by one complete revolution (360°).	**Position de l'arbre à cames** **2** Taurner le mateur d'un taur complet (360°)	**Posición dei cigüeñal** **2** Continuese girando el motor por una rotación completa (360°)



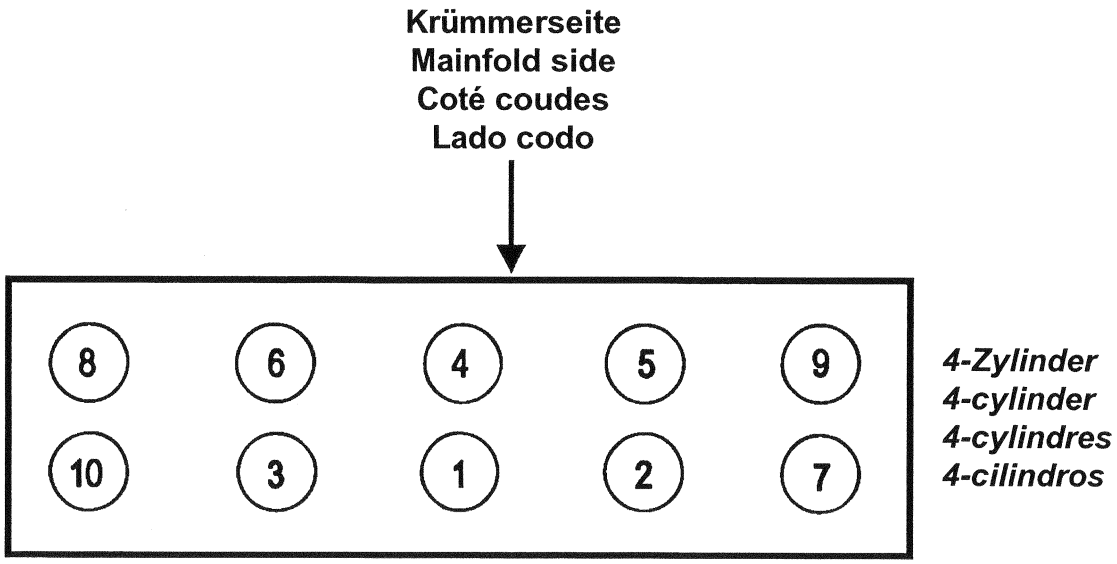
nicht einstellbar
not ready for adjustment
non réglable
no ajustable

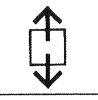


einstellbar
ready for adjustment
réglable
ajustable

Typ Model Type Tipo	**DEUTZ** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Technische Daten** **Specification data** **Caractéristiques techniques** **Datos técnicos**		Blatt Page Feuille Página	**3.250.02**

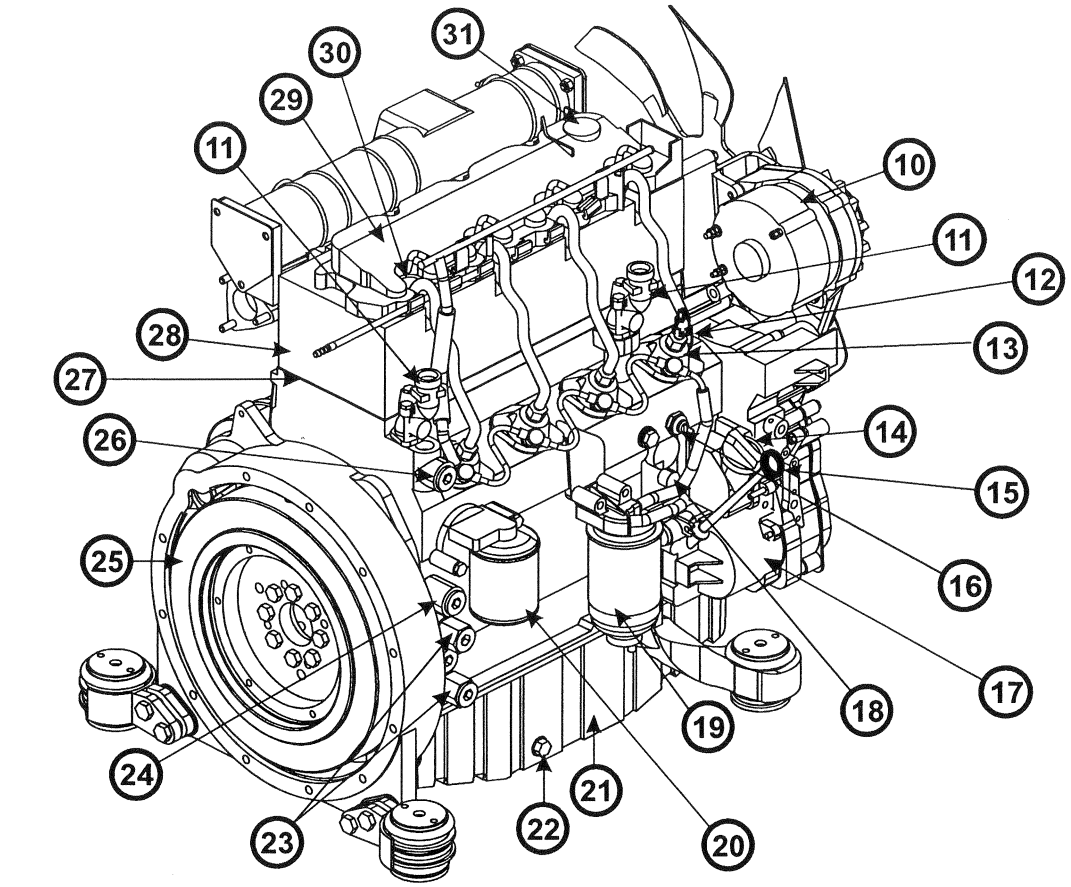
Reihenfolge beim Anziehen der Zylinderkopfschrauben
Tightening order for cylinder head bolts
Ordre à respecter lors du serrage d'approche et définitif des vis de cul.
Sucesión de los trabajos al apretar los tornillos de culata

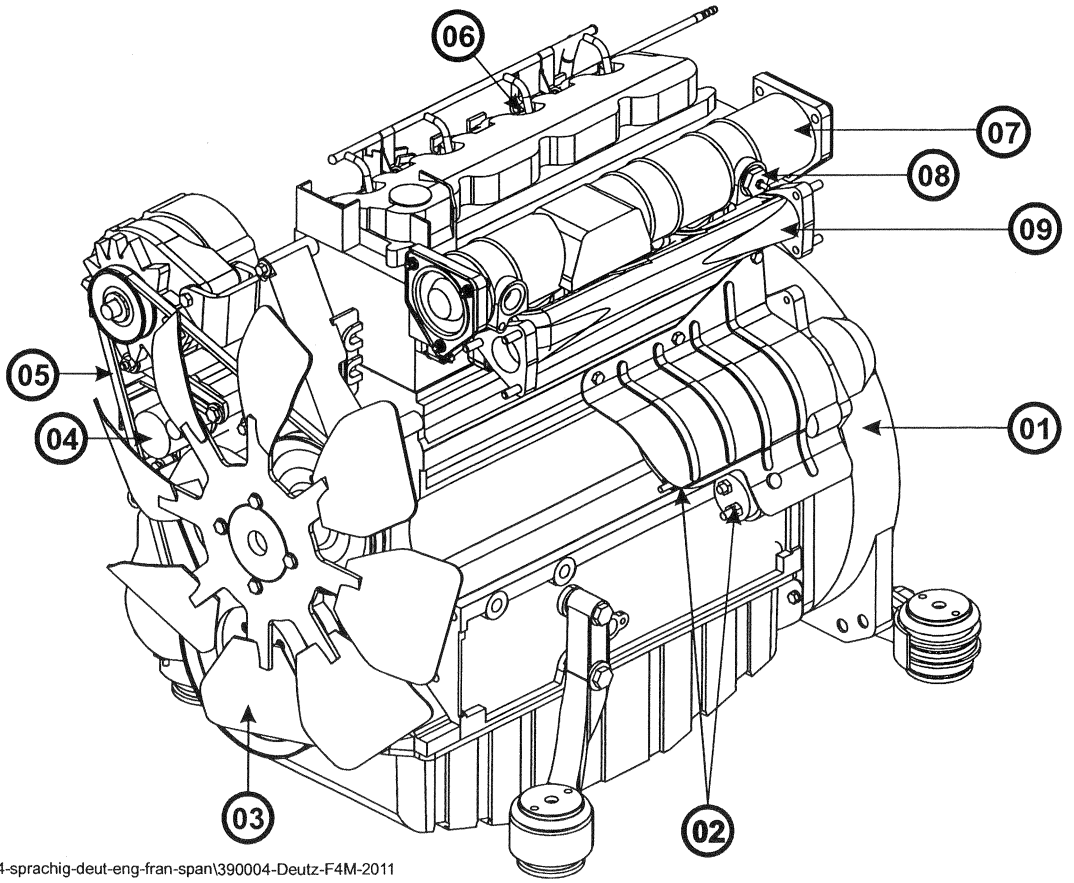


	Deutsch	*English*	*Français*	*Español*
	Bildzeichen-erklärung	**Key to Symbols**	**Explication des symboles**	**Leyenda de símbolos**
	**Zerlegen** von Baugruppen	**Disassembly** of assembly groups	**Déassemblage** d'ensemble constructifs	**Desarmer** grupos de constucción
	**Zusammenbauen** zu einer Baugruppe	**Reassembly** to form assembly group	**Assemblage** d'un ensemble constructif	**Ensamblar** un grupo de construcción
	**Abbauen – Ausbauen** behindernder Teile	**Remove** obstructing parts	**Démontage – Dépose** de pièces entravant l'accès	**Desmontar** elementos estorbantes
	**Einbauen – Anbauen** Teile, die beim Ab-/Ausbauen hinderten	**Reinstall – Remount** parts which had obstructed disassembly	**Remontage – repose** de pièces qui entravaient la dépose	**Remontar** elementos que habían estorbado en el desmontaje
	**Achtung, wichtiger Hinweis**	**Attention! Important notice!**	**Attention, remarque importante**	**Atención: Indicación importante**
	**Prüfen – Einstellen** z.B. Drehmomente, Maße, Drücke usw.	**Check – Adjust** e. g. torque dimensions, pressures, etc.	**Contrôler – régler** p. ex. couples, cotes, pressions etc.	**Verificar – ajustar** p. ej. pares motor, medidas, presiones, etc.
	**Spezialwerkzeug**	**Special tool**	**Outillage spécial**	**Herramienta especial**
	**Einbaurichtung beachten**	**Note direction of installation**	**Respecter le sens de montage**	**Dirección de montaje**
	**Kontrollieren – Prüfen** Sichtprüfung	**Visual inspection**	**Contrôle – Vérifier** contrôle visuel	**Inspección visual**
	**Bedingt wiederverwendbar** Bei Bedarf auswechseln	**Possibly still serviceable** renew if necessary	**Réutilisation conditionnelle** Remplacer le cas échéant	**Reutilizable en determinadas condiciones** Sustitur, si es necesario
	**Beim Zusammenbauen immer erneuern**	**Renew at each reassembly**	**Toujours remplacer au remontage**	**Renovar en cada montaje**
	**Entsichern – Sichern** z. B. Splint, Sicherungsbleche usw.	**Unlock – Lock** e. g. split pin, locking plate, etc.	**Débloquer – Arrêter** p. ex. goupille, tôle d'arrêt etc.	**Quitar – colocar elementos de seguridad** p. ej. pasador de aletas, chapa de seguridad, etc.
	**Sichern – Kleben** z. B. Dichtmittel flüssig	**Lock – Adhere** e. g. with liquid sealant	**Freiner – Coller** p. ex. produit d'étanchéité liquide	**Frenar – pegar** p. ej. utilizando pasta sellante

Typ Model Type Tipo	**DEUTZ** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Technische Daten** **Specification data** **Caractéristiques techniques** **Datos técnicos**		Blatt Page Feuille Página	**3.250.03**

	Deutsch	*English*	*Français*	*Español*
	Bildzeichen-erklärung	**Key to Symbols**	**Explication des symboles**	**Leyenda de símbolos**
	**Personenschäden verhüten** Hinweis auf Gefahrenstelle	**Guard against personal injury** Indication of hazard	**Prévention de dommages corporels** Signalisation de danger	**Prevención de daños personales** Aviso a puntos de peligro
	**Materialschaden verhüten** Teilbeschädigung	**Guard against material damage** Damage to parts	**Prévention de dommages matériels** Endommagement de pièces	**Prevención de daños materiales** Daños en partes o piezas
	**Unterbauen – Abstützen - Abfangen**	**Prop up - Support - Hold**	**Supporter – Étayer**	**colocar sobre caballeta – apoyar – sostener – retener**
	**Einölen**	**Oil**	**Huiler**	**Aceitar**
	**Einfetten**	**Grease**	**Graisser**	**Lubricar con grasa**
	**Markieren** vor dem Zerlegen, beachten beim Zusammenbauen	**Mark** before disassembly, observe marks when reassembly	**Repérer** avant désassemble, respecteur au réassemblage	**Marcar** antes de desarmar, observar la marcas al remontar
	**Wuchten,** ausgleichen von Unwuchten	**Balance** Eliminate any imbalance	**Equilibrer** éliminer le balourds	**Equilibar** Eliminar desequilibrios
	**Einfüllen – Auffüllen – Nachfüllen** z. B. Öl, Kühlwasser usw.	**Filling – Topping up – Refilling** e. g. oil, cooling water, etc.	**Remplir – Faire l'appoint** p. ex. huile, eau de refroidissement	**Llenar – reponer - rellenar** p. ej. aceite, agua de refrigeración, etc.
	**Ablassen** z. B. Öl, Kühlwasser usw.	**Drain off** e. g. oil, cooling water, etc.	**Vidange** p. ex. huile, eau de refroidissement	**Evacuar** p. ej. aceite, agua de refrigeración, etc.
	**Lösen** z. B. Lockern einer Spanneinrichtung	**Loosen – Release** e. g. loosening a clamping device	**Desserrer** p. ex. desserrer un dispositif de tension	**Soltar** p. ej. aflojar un dispositivo de sujeción
	**Spannen** z. B. Anziehen einer Spanneinrichtung	**Tighten – Clamp** e. g. tightening a clamping device	**Serrer** p. ex. serrer un dispositif de tension	**Fijar** p. ej. apretar un dispositivo de sujeción
	**Entlüften**	**Vent**	**Purge d'air**	**Purgar de aire**
	**Spanabhebende Bearbeitung**	**machining process**	**Usinage par enlèvement de copeaux**	**Mecanizado con arranque de virutas**

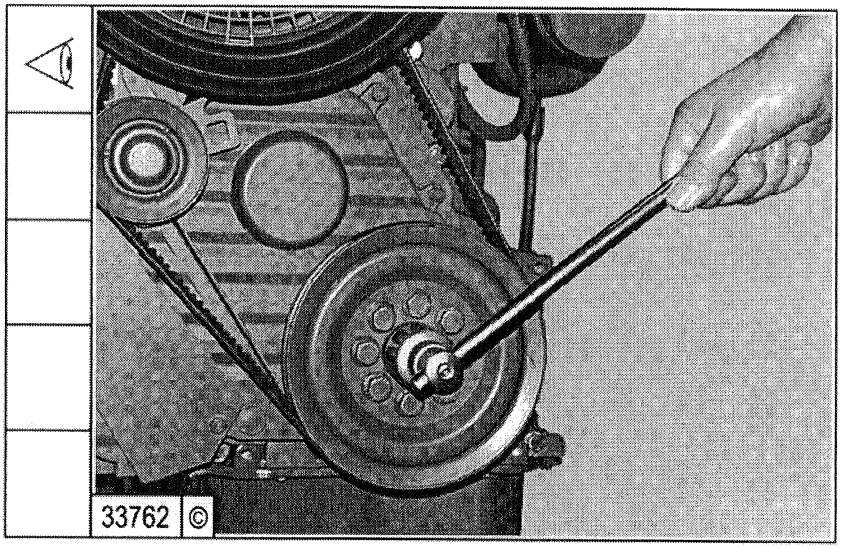


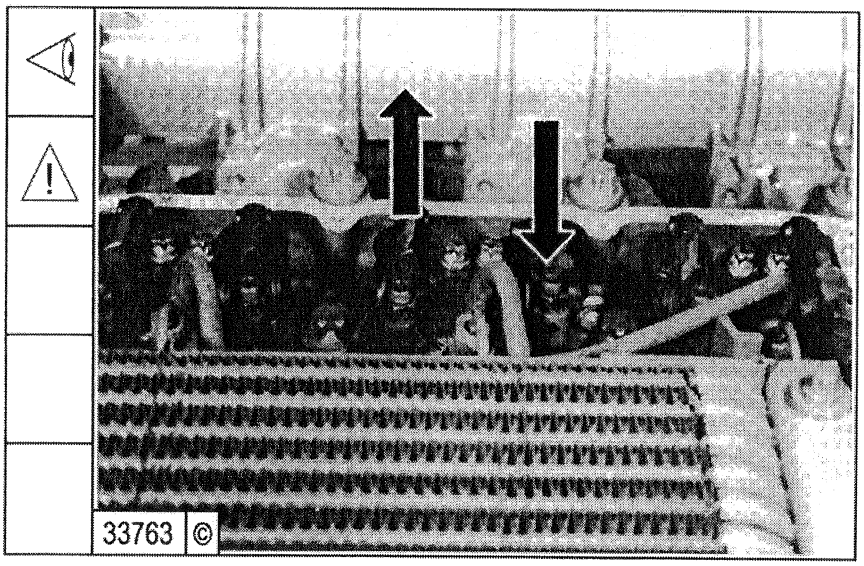


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Typ Model Type Tipo	**Deutz** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Technische Daten** **Specification data** **Caractéristiques techniques** **Datos técnicos**		Blatt Page Feuille Página	**3.250.04**

Pos. Item Rep. No.	*Deutsch*	*English*	*Français*	*Español*
01	Motor *DEUTZ F - 4M 2011*	Engine *DEUTZ F - 4M 2011*	Moteur *DEUTZ F - 4M 2011*	Motor *DEUTZ F - 4M 2011*
02	Starter	Starter	Démarreur	Arrancador
03	Lüfter	Fan	Ventilateur	Ventilador
04	Motorabstellung	Shutdown device	Arrêt du moteur	Parada del motor
05	Keilriemen	V-belt	Courroie trapézoïdale	Correa trapezoidal
06	Einspritzventile	Injectors	Injecteurs	Inyectóres
07	Luftansaugrohr	Air intake manifold	Collecteur d'admis. d'air	Colector de admisión
08	Glühwendelkerze	Glow plug	Bougie de réchauffage	Bujía de incandescente
09	Abgassammelrohr	Exhaust manifold	Collecteur d'échappement	Colector de escape
10	Generator	Alternator	Alternateur	Alternador
11	Ölkühleranschlüsse	Oil cooler connections	Raccords de refroidisseur d'huile	Racores para el refrigeradore de aceite
12	Öletmperaturgeber	Oil temperature regulator	Transmetteur de température d'huile	Transmisor de temperatura de aceite
13	Einspritzpumpen	Injection pumps	Pompes d'injection	Bombas de inyección
14	Verschlussdeckel für Öleinfüllung	Closure cover for oil filling	Bouchon de remplissage d'huile	Tapa en la boca de llendo de aceite
15	Ölmessstab	Oil dipstick	Jauge d'huile	Varilla medidora de nivel de aceite
16	Öldruckschalter	Oil pressure switch	Manocontact d'huile	Interruptor de presión de aceite
17	Schmierölpumpe	Lube oil pump	Pompe à huile	Bomba de aceite lubricante
18	Kraftstofförderpumpe	Fuel feed pump	Pompe d'alimentation en combustible	Bomba de alimentación de combustible
19	Kraftstofffilter	Fuel filter	Filtre à combustible	Filtro de combustible
20	Ölfilter	Oil filter	Filtre à huile	Filtro de aceite
21	Ölwanne	Oil pan	Carter d'huile	Cárter de aceite
22	Ölablasschraube	Oil drain plug	Bouchon de vidange d'huile	Tornillo de salida de aceite provisto
23	Öldruckventil mit Heizungsanschluß	Oil pressure control valve with heater connection	Soupape de régulation de pression d'huile avec branchem. de chauffage	Válvula reguladora de presión de aceite con conexión para calefacción
24	Öldruckventil	Oil pressure control valve	Soupape de régulation de pression d'huile	Válvula reguladora de presión de aceite
25	Starterkranz, Schwungrad	Starter ring gear, flywheel	Couronne de démarrage, volant	Corona del volante, volante
26	Thermostat	Thermostat	Thermostat	Termostato
27	Zylinderkopfdichtung	Cylinder head gasket	Joint de culasse	Juanta de culata
28	Zylinderkopf	Cylinder head	Culasse	Culata
29	Zylinderkopfhaube	Cylinder head cover	Cache-culbuteurs	Tapa de culata
30	Einspritzventile	Injectors	Injecteurs	Inyectores
31	Entlüftungsventil	Vent valve	Soupape de purge d'air	Válvula de ventilacón





Typ Model Type Tipo	**DEUTZ** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Ventilspiel - prüfen und einstellen** **Valve clearance - checking and adjusting** **Jeu des soupapes - contrôle et réglage** **Juego de válvulas - verificación y ajustes**		Blatt Page Feuille Página	**3.250.05**

Deutsch

Ventilspiel prüfen und einstellen

Die Standard-Ventilspieleinstellung ist möglich:

Am kalten- oder am warmen Motor nach einer Abkühlzeit von mindestens **0,5 h.**
Öltemperatur **80 °C**

Hinweis:
Bei jedem Zylinderkopf-Dichtungswechsel ist das Ventilspiel um 0,1 mm zu erhöhen.
*Nach **1000 Bh** ist das Standard-Ventilspiel einzustellen.*

Zylinderkopfhaube ist abgebaut

1. Motor durchdrehen bis zum Erreichen der Ventilüberschneidung, Zyl. Nr. 1.

Ventilspieleinstellschema siehe Technische Daten

Hinweis:
Ventilüberschneidung bedeutet:
Auslassventil ist noch nicht geschlossen, Einlassventil beginnt zu öffnen. Dabei sind beide Stoßstangen nicht drehbar.

English

Valve clearance checking and adjusting

The standard valve clearance can be adjusted:

with engine cold or warm after cooling down for at least **0.5 h**.
Oil temperature 80°C.

Note:
The valve clearance is to be increased by 0.1 mm at every cylinder head gasket renewal.
*After **1000 Bh** , the standard valve clearance is to be adjusted.*

Cylinder head cover has been removed.

1. Turn engine until valves of cylinder No.1 overlap.

For valve clearance adjustment schematic see Specification Data.

Note:
Valves overlapping means:
Exhaust valve about to close.
Inlet valve about to open.
Neither pushrod can be turned in this position.

Français

Jeu des soupapes contrôle et réglage

Un réglage standard du jeu des soupapes peut se faire:

sur moteur froid ou chaud après une durée de refroidissement d'au moins **0,5 h**.
Température d'huile **80 °C.**

Nota:
Après chaque remplacement de joint de culasse, le jeu des soupapes est a augmenter de 0, 1 mm.
Après 1000 h de marche, régler le jeu de soupape standard.

La cache-culbuteurs est déposé

1. Virer le moteur jusqu'à ce que les soupapes du cylindre n° 1 soient en bascule.

Schéma de réglage du jeu des soupapes, voir Caractéristiques techniques.

Nota:
Soupapes en bascule signifie: soupape d'échappement pas encore fermée, soupape d'admission commence à s'ouvrir. Les deux tiges de culbuteur ne se laissent pas tourner alors.

Español

Juego de válvulas verificación y ajustes

El juego estándar de válvulas se puede ajustar:

A motor frio o a motor caliente tras un período de enfriamiento de, por lo menos,
media hora **(0,5 h)**.
Temperatura dei aceite: **80 °C**

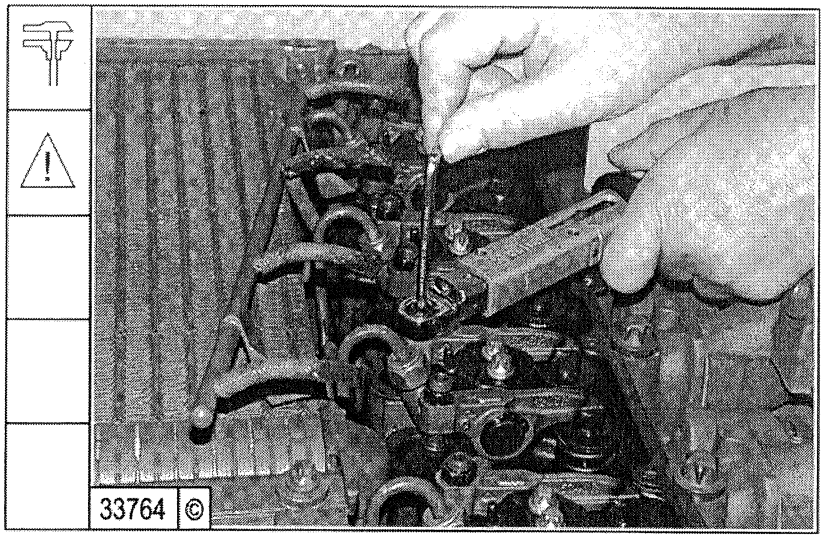
Nota:
Cada vez que se cambia la junta de culata, es necesario aumentar el juego de válvulas en 0,1 mm.
Tras **1000 horas** de funcionamiento hay que ajustar el juego estándar de válvulas.

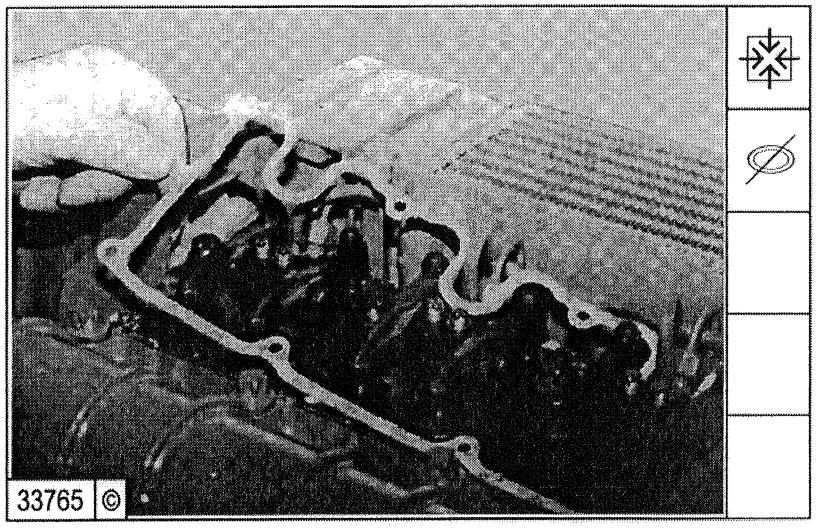
La tapa de culata está desmontada.

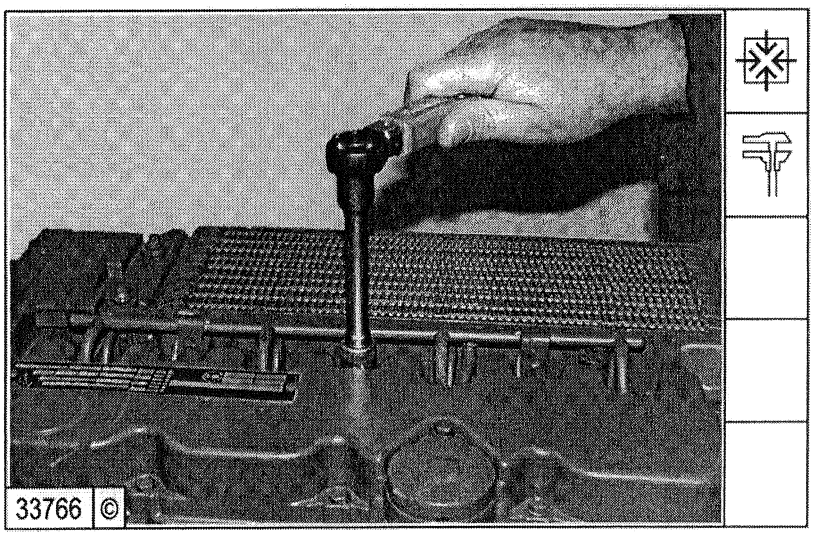
1. Girar el cigüeñal hasta que se crucen las válvulas en el cilindro No.1.

Para el esquema de ajuste del juego de válvulas, ver Datos técnicos.

Nota:
Por cruce de válvulas se entiende: La válvula de escape aún no está cerrada y la de admisión empieza a abrirse, sin que se puedan girar las dos varillas de empuje en esta posición.

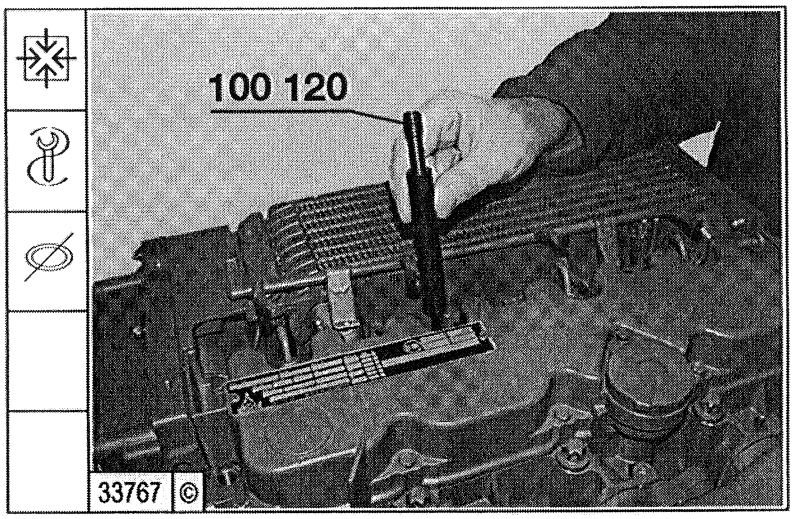


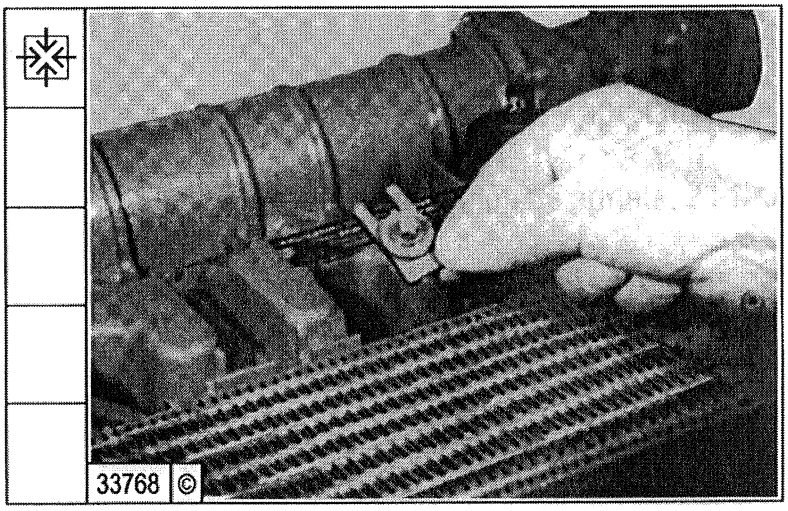


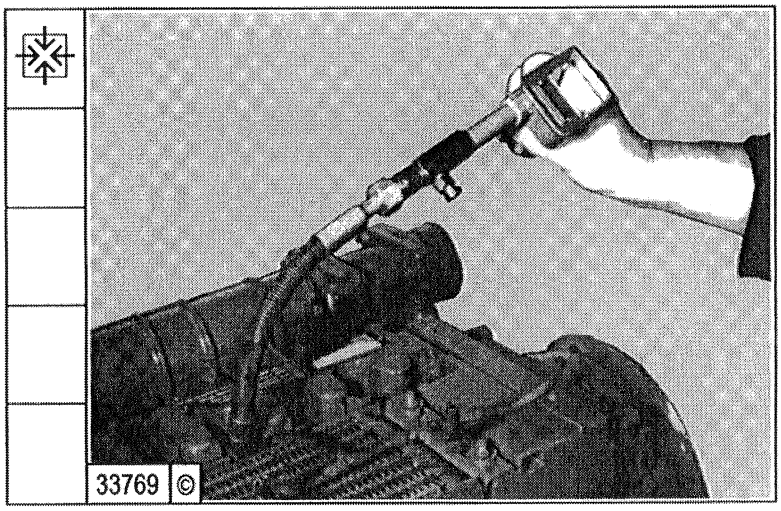


Typ Model Type Tipo	**DEUTZ** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Ventilspiel - prüfen und einstellen** **Valve clearance - checking and adjusting** **Jeu des soupapes - contrôle et réglage** **Juego de válvulas - verificación y ajustes**		Blatt Page Feuille Página	**3.250.06**

Deutsch	*English*	*Français*	*Español*
Ventilspiel prüfen und einstellen	**Valve clearance checking and adjusting**	**Jeu des soupapes contrôle et réglage**	**Juego de válvulas verificación y ajustes**
2. Ventilspieleinstellung am entsprechenden Zylinder mit Fühlerlehrenblatt einstellen	2. Adjust valve clearance on respective cylinder with feeler gauge.	2. Régler le jeu des soupapes du cylindre correspondant avec une jauge d'épaisseur.	2. Ajustar el juego de válvula en el cilindro correspondiente mediante la galga de espesores.
☞ ***Hinweis:*** *Ventilspiel Einlass:* ***0,3 mm*** *Ventilspiel Außlaß:* ***0,5 mm***	☞ ***Note:*** *Inlet valve clearance:* ***0.3 mm*** *Exhaust valve clearance:* ***0.5 mm***	☞ ***Nota:*** *Jeu de soupape Admission* ***0,3 mm*** *Jeu de soupape Échappement* ***0,5 mm***	☞ ***Nota:*** *Juego de válvula admisión:* ***0,3 mm*** *Juego de válvula escape:* ***0,5 mm***
3. Kontermutter festdrehen.	3. Tighten locknut.	3. Serrer le contre-écrou.	3. Apretar la contratuerca.
Anziehvorschrift: **20 ± 2 Nm**	Tightening specification: **20 ± 2 Nm**	Prescription de serrage: **20 ± 2 Nm**	Prescripción de apriete: 20 ± 2 Nm
Einstellung nochmals mit Fühlerlehrenblatt überprüfen.	Recheck the adjustment with feeler gauge.	Vérifier encore une fois le réglage avec la jauge d'épaisseur.	Verificar otra vez el ajuste efectuado, mediante la galga de espesores.
4. Dichtung aufsetzen.	4. Put gasket in place.	4. Mettre en place le joint.	4. Colocar la junta.
5. **Neue** Gummischläuche an Überströmleitung und Einspritzventile bis Anschlag aufschieben. Zylinderkopfhaube und Überströmleitung montieren. Schrauben festdrehen.	5. Insert **New** rubber tubes at the cross-over pipe and injection valves until the end stop. Mount the cylinder head cover and the cross-over pipe. Tighten bolts.	5. Emmancher des flexibles en caoutchouc **neufs** sur la rampe de décharge et les injecteurs jusqu'en butée. Monter le cache-culbuteurs et la rampe de décharge. Serrer les vis.	5. Colocar mangueras de goma **nuevas** sobre la tuberìa de rebose y los inyectores hasta el tope. Montar la tapa de culata y la tubería de rebose. Apretar los tornillos.
Anziehvorschrift: **8,5 Nm**	Tightening specification: **8.5 Nm**	Prescription de serrage: **8,5 Nm**	Prescripcion de apriete: **8,5 Nm**

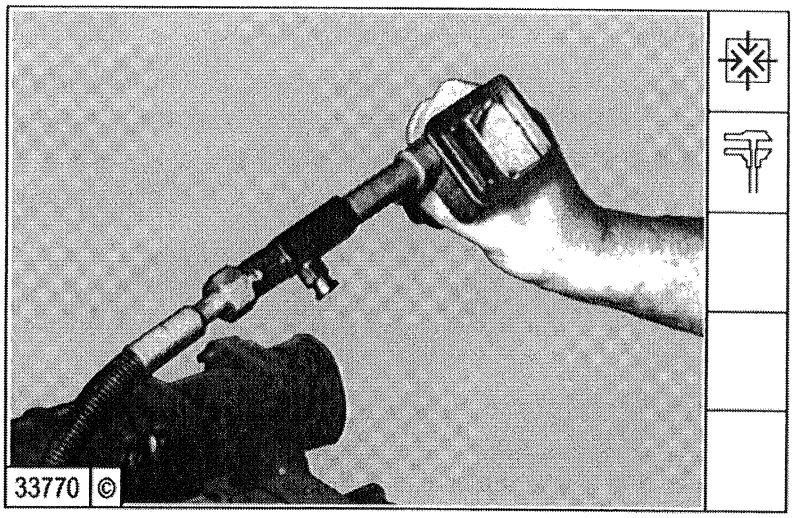


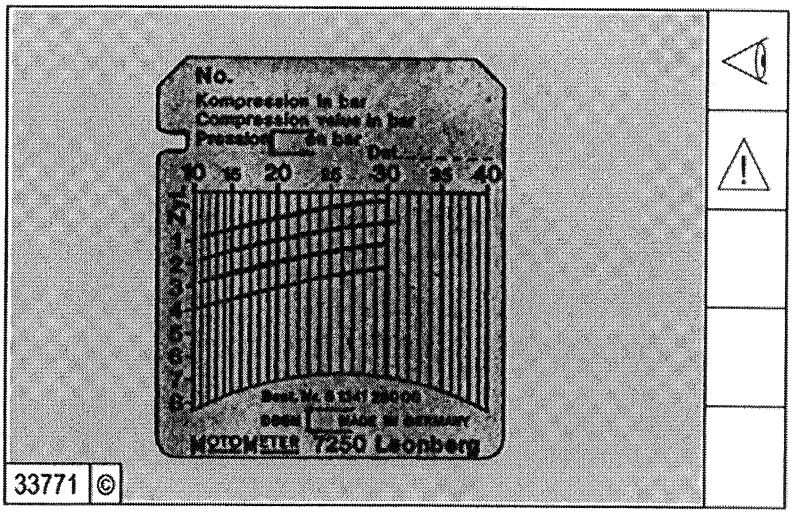




Typ Model Type Tipo	**DEUTZ** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Kompressionsdruck - prüfen und einstellen** **Compression pressure - checking and adjusting** **Pression de compression - controle et réglage** **Presión de comprsión - verificación y ajustes**		Blatt Page Feuille Página	**3.250.07**

Deutsch	*English*	*Français*	*Español*
Kompressionsdruck prüfen und einstellen	**Compression pressure checking and adjusting**	**Pression de compression contrôle et réglage**	**Presión de compresión verificación y ajustes**
Handelsübliche Werkzeuge: Kompressionsdruckprüfer Klauenschlüssel Torx-Werkzeugsatz	**Commercial tools required:** Compression tester Glaw key Torx tool kit	**Outillage standard:** Compressiomètre Clé à griffes Jeu d'outils Torx	**Herramientas comerciales:** Compresímetro Llave de garra Juego de herramientas Torx
Spezialwerkzeuge: Anschlussstück 100120	**Special tools required:** Connector 100120	**Outillage spécial:** Élément raccord 100120	**Herramientas especiales:** Pieza de ernpalme 100120
Einspritzventile sind ausgebaut, Ventilspiel ist kontrolliert.	**Injectors have been removed, valve clearance has been checked.**	**Les injecteurs sont déposés, le jeu des soupapes est contrôlé.**	**Los inyectores están desmontados, el juego de válvulas está verificado.**
1. Anschlussstück mit Spezialdichtung einsetzen.	1. Insert connector with new special seal.	1. Insérer l'élément raccord avec le joint spécial.	1. Introducir la pieza de empalme con una junta especial.
2. Spannpratze aufsetzen. Schraube festdrehen.	2. Fit clamping pad. Tighten bolt.	2. Mettre en place la patte de serrage. Serrer la vis..	2. Colocar la garra de sujeción. Apretar el tornillo.
3. Falls notwendig Adapter für Anschlussstück aufschrauben.	3. If necessary, screw on adapter for connector.	3. Si nécessaire, visser une pièce d'adaptation pour l'élément raccord	3. De ser necesario, enroscar el adaptador para la pieza de empalme.





Typ Model Type Tipo	**DEUTZ** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Kompressionsdruck - prüfen und einstellen** **Compression pressure - checking and adjusting** **Pression de compression - controle et réglage** **Presión de comprsión - verificación y ajustes**		Blatt Page Feuille Página	**3.250.08**

Deutsch

Kompressionsdruck prüfen und einstellen

4. Kompressions-druckprüfer anschließen. Motor mit Starter durchdrehen.

Kompressionsdruck:
25 - 30 bar

Der gemessene Kompressionsdruck ist abhängig von der Anlassdrehzahl während des Messvorganges und der Höhenlage des Motoraufstellortes.

Grenzwerte sind daher nicht genau festlegbar.

Empfohlen wird die Kompressionsdruckmessung nur als Vergleichsmessung aller Zylinder eines Motors untereinander anzusehen. Sind mehr als **15%** Abweichung ermittelt worden, sollte durch die Demontage der betroffenen Zylindereinheit die Ursache ermittelt werden.

Hinweis:
Einspritzventile mit neuer Spezialdichtung einsetzen und festdrehen.

Anziehvorschrift: ***21 Nm***

Einspritzleitungen anbauen und festdrehen.

Anziehvorschrift:
25 ± 2,5 Nm
***Neue** Gummischläuche an Überströmleitung und Einspritzventile bis Anschlag aufschieben. Überströmleitung anbauen.*

Anziehvorschrift: ***8,5 Nm***

English

Compression pressure
checking and adjusting

4. Connect compression tester. Turn engine with starter.

Compression pressure:
25 - 30 bar

The measured compression pressure is dependent on the starting speed during the measuring process and also on the altitude of the engine site.
Therefore it is difficult to specify precise limit values.
It is recommended to use the compression pressure measure-ment only for comparison of compression pressures of all cylinders in one engine. If a difference in pressure in excess of **15%** is determined, the cylinder unit concerned should be dismantled to establish the cause.

Note:
Fit injector with new special seal and tighten

Tightening specification:
21 Nm
Attach the injection pipes and fix them firmly.

Tightening specification:
25 ± 2.5 Nm
*Insert **New** rubber tubes at the cross-over pipe and injection valves until the end stop.*
Attach the cross-over pipe.

Tightening specification:
8,5 Nm

Français

Pression de compression contrôle et réglage

4. Brancher le compressiomètre. Virer le moteur à l'aide du démarreur.

Pression de compression:
25 à 30 bars

La pression de compression mesurée dépend de la vitesse de démarrage durant le relevé et de l'altitude du site d'installation du moteur.
Des valeurs limites précises ne peuvent donc pas être fixées.
Le relevé de la pression de compression doit uniquement être considéré comme relevé comparatif pour lensemble des cylindres d'un moteur. Si l'ecart relevé est supérieur à **15%**, il faut en déterminer la cause par démontage des unités de cylindre en question

Nota:
Remonter les injecteurs avec un joint spécial neuf et les serrer.
Prescription de serrage:
21 Nm
Remonter les tuyauteries d'injection et les serrer.

Prescription de serrage:
25 ± 2,5 Nm
*Emmancher des flexibles en caoutchouc **neufs** sur la rampe de décharge et les injecteurs jusqu'en butée. Monter la rampe de décharge.*

Prescription de serrage:
8,5 Nm

Español

Presión de compresión verificación y ajustes

4. Conectar el compresímetro. Girar el motor mediante el arrancador.

Presión de compresión:
25 - 30 bar

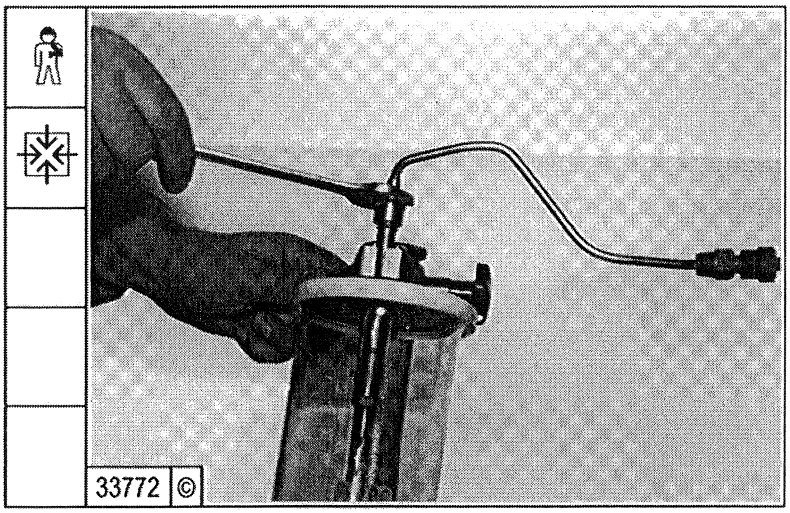
La presión de compresión medida depende de la velocidad de arranque al hacer la medición y de la altitud dellugar de instalación del motor.

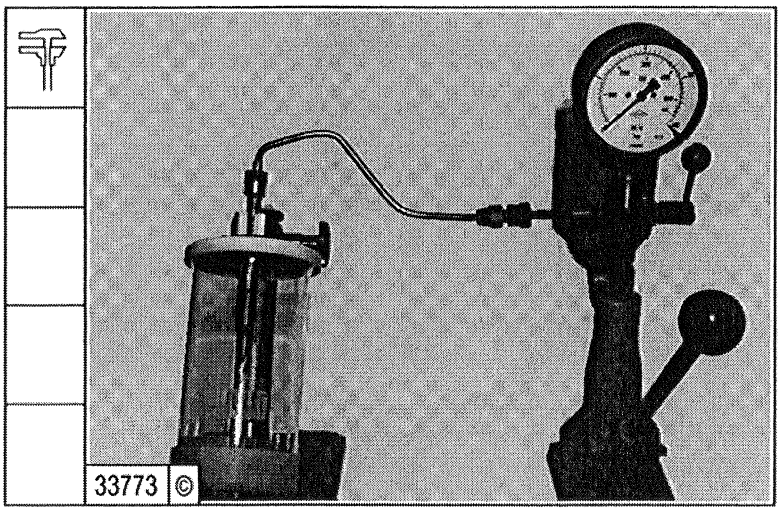
Por eso, no se pueden fijar valores límite exactos.
Se recomienda considerar la medición de la compresión tan sólo como una medición de comparación entre todos los cilindros de un motor. Si las diferencias son superiores al **15%,** es conveniente. buscar la causa desmontando la unidad de cilindro afectada.

Nota:
Introducir los inyectores con una junta especial nueva y apretar.
Prescripción de apriete:
21 Nm
Montar las tuberias de inyección y apretar.

Prescripción de apriete:
25 ± 2,5 Nm
*Colocar mangueras de goma **nuevas** sobre la tubería de rebose y los inyectores hasta el tope. Montar la tubería de rebose.*

Prescripción de apriete:
8,5 Nm:





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Benennung Description Dénomination Denominación	**Einspritzventil – prüfen und einstellen** **Injector – checking and adjusting** **Injecteur – contrôle et réglage** **Inyector – verificatión y ajustes**		Blatt Page Feuille Página	**3.250.09**

Deutsch

Einspritzventil prüfen und einstellen

Handelsübliche Werkzeuge:
Düsenprüfgerät
Lange Stecknuss SW 15

Spezialwerkzeug:
Halter für Einspritzventil 110 110

Hinweis:
Bei Arbeiten an der Einspritzausrüstung auf größte Sauberkeit achten. Zur Prüfung der Einspritzventile nur reines Prüföl nach ISO 4113 oder sauberen Dieselkraftstoff verwenden

Achtung!
Hände weg vom Düsenstrahl. Der Kraftstoff dringt tief in das Fleisch ein und kann zur Blutvergiftung führen.

1. Einspritzventil an das Düsenprüfgerät anbauen.

2. Prüfung des Öffnungsdruckes

Hebel des Düsenprüfgerätes bei zugeschaltetem Manometer langsam niederdrücken.
Der Druck bei dem der Zeiger stehe bleibt oder plötzlich abfällt, ist der Öffnungsdruck.

Öffnungsdruck für die Neueinstellung:
210 + 8 bar

English

Injector checking and adjusting

Commercial tools required:
Nozzle tester
Long socket a/flats 15

Special tool required:
Retainer for injector 110110

Note:
Utmost cleanliness must be ensured when working on the injection equipment. For testing the injector use only pure test oil to ISO 4113 or clean diesel fuel.

Caution
Beware of injection nozzle fuel jet. The! fuel penetrates deeply into the skin tissue and may cause blood poisoning.

1. Connect injector to nozzle tester.

2. Checking opening pressure

With pressure gauge switched on, slowly press down lever of nozzle tester. The pressure at which the gauge pointer stops or suddenly drops, is the opening pressure.

Opening pressure for initial setting:
210 + 8 bar

Français

Injecteur contrôle et réglage

Outillage standard:
Pompe d'essai des injecteurs
Douille longue de 15

Outillage spécial:
Dispositif de blocage d'injecteur 110110

Nota:
Lors de travaux sur le système d'injection, veiller a la plus grande propreté. Pour le contr61e des injecteurs, n'utiliser que du fuel d'essai pur selon IS0 4113 ou du gasoil propre.

Attention!
Tenir les mains hors du jet des injecteurs. Le combustible peut pénétrer profondément dans la chair et provoquer un empoisonnement du sang.

1. Monter l'injecteur sur la pompe d'essai des injecteurs.

2. Contr61e de la pression d'ouverture

Le manomètre étant branche, abaisser lentement le levier de la pompe d'essai. La pression a laquelle l'aiguille s'immobilise ou chute brusquement est la pression d'ouverture.

Pression d'ouverture pour un nouveau réglage:
210 + 8 bars

Español

Inyector verificación y ajustes

Herramientas comerciales:
Comprobador para inyectores
Llave de vaso largo de 15

Herramientas especiales:
Retenedor para inyector 110110

Nota:
Para cualquier trabajo a realizar en el equipo de inyección se observara la maxima limpieza. Para la comprobación de los inyectores se utilizará solamente aceite de prueba puro según IS0 4113 ó combustible diesel limpio.

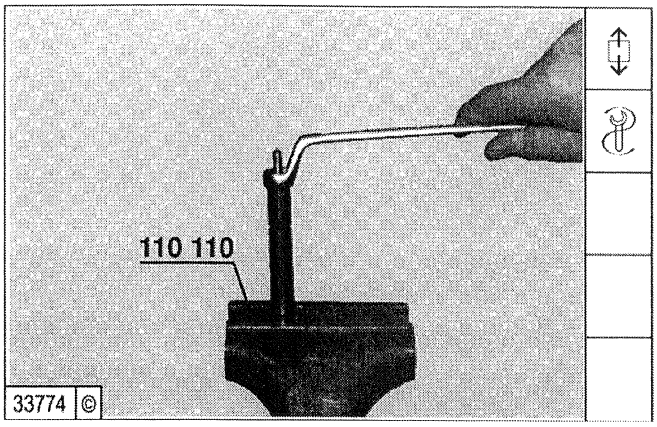
Atención:
No acercar nunca las manos al chorro del inyector, pues el combustible penetra profundamente en los tejidos y puede causar una intoxicación de la sangre.

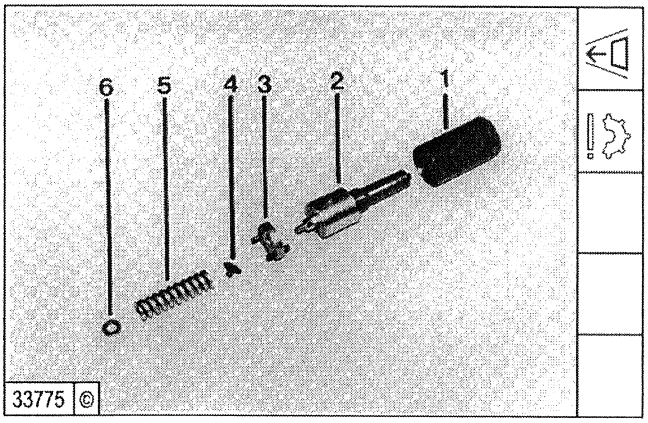
1. Montar el inyector en el comprobador.

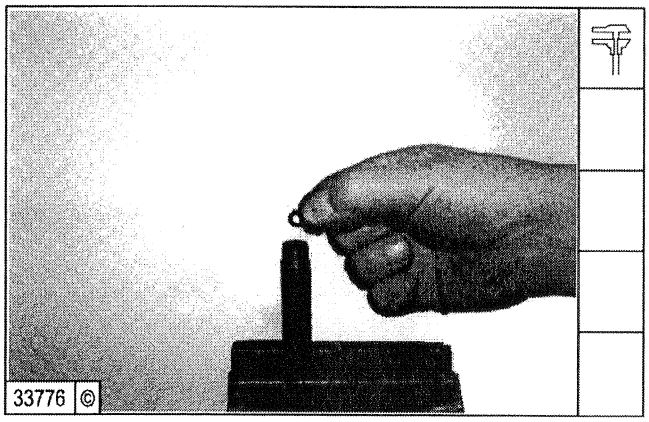
2. Comprobación de la presión de apertura

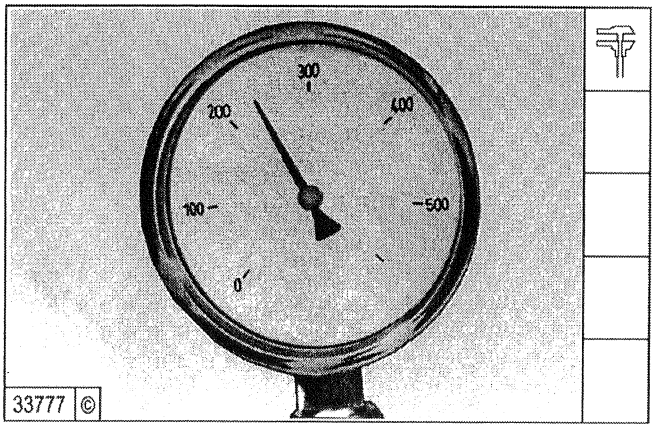
Con el manómetro conectado, tirar de la palanca del comprobador lentamente hacia abajo. La presión a la que la aguja se detenga o caiga bruscamente es la presión de apertura.

Presión de apertura para el nuevo ajuste:
210 + 8 bar









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Benennung Description Dénomination Denominación	**Einspritzventil – prüfen und einstellen** **Injector – checking and adjusting** **Injecteur – contrôle et réglage** **Inyector – verificatión y ajustes**		Blatt Page Feuille Página	**3.250.10**

Deutsch

Einspritzventil prüfen und einstellen

3. Einstellen des Öffnungsdruckes am Einspritzventil

Überwurfmutter abschrauben, alle Teile ausbauen.

Folge der Einzeldemontage

1. Überwurfmutter
2. Einspritzdüse
3. Zwischenstück
4. Druckbolzen
5. Druckfeder
6. Ausgleichscheibe

4. Durch Auswahl der erforderlichen Scheibe Druck einstellen. Stärkere Scheibe ergibt höheren Öffnungsdruck. Einspritzventil zusammenbauen. Überwurfmutter festdrehen.

Anziehvorschrift: **45 ± 5 Nm**

Einspritzventil auf dem Düsenprüfgerät erneut prüfen.

5. Prüfung auf Dichtheit

Düse und Düsenhalter abtrocknen mit Luft trockenblasen. Handhebel des Prüfgerätes langsam niederdrücken, bis **ca. 20 bar** unterhalb des vorher abgelesenen Öffnungsdruckes erreicht werden.

English

Injector checking and adjusting

3. Adjusting the opening pressure on the injector

Unscrew cap nut and remove all parts

Sequence of parts disassembly

1. Cap nut
2. Injection nozzle
3. Adapter
4. Thrust pin
5. Compression spring
6. Shims

4. Adjust pressure by selecting appropriate shim. A thicker shim increases the opening pressure. Reassemble injector. Tighten cap nut.

Tightening specification: **45 ± 5 Nm**

Recheck injector on nozzle tester.

5. Checking for tightness

Dry nozzle and nozzle holder -blow out with compressed air. Press down handlever of nozzle tester slowly until a pressure of about **20 bar** below the previous opening pressure reading is attained.

Français

Injecteur contrôle et réglage

3. Réglage de la pression d'ouverture sur l'injecteur

Dévisser l'écrou- raccord, démonter toutes les pièces.

Ordre de démontage des pièces

1) Écrou - raccord
2) Injecteur
3) Pièce intermédiaire
4) Poussoir
5) Ressort
6) Rondelles de réglage

4. Régler la pression en choisissant la rondelle adéquate. Une rondelle plus épaisse donne une pression d'ouverture plus élevée. Remonter l'injecteur. Serrer l'écrou - raccord.

Prescription de serrage: **45 ± 5 Nm**

Contr61er a nouveau l'injecteur sur la pompe d'essai

5. Contrôle d'étanchéité

Sécher l'injecteur et le porte-injecteur au jet d'air. Abaisser lentement le levier de la pompe d'essai jusqu'a env. **20 bars** au-dessous de la pression d'ouverture relevée précédemment.

Español

Inyector verificación y ajustes

3. Ajuste de la presión de apertura en el inyector

Desenroscar la tuerca de unión y desmontar todas las piezas

Secuencia del despiece

1. Tuerca de unión
2. Inyector o tobera
3. Pieza intermedia
4. Perno de presión
5. Resorte de presión
6. Arandelas de reglaje

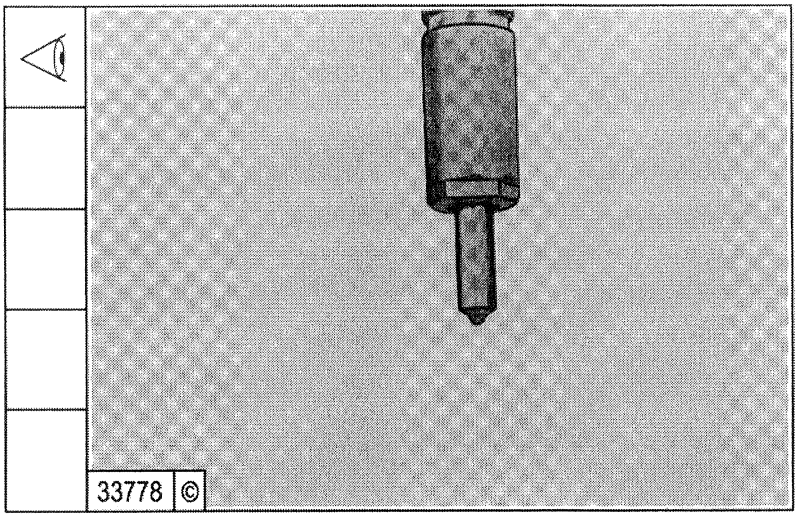
4. Ajustar la presión eligiendo la arandela adecuada. Una arandela más gruesa aumenta la presión de apertura. Ensamblar el inyector. Apretar la tuerca de unión.

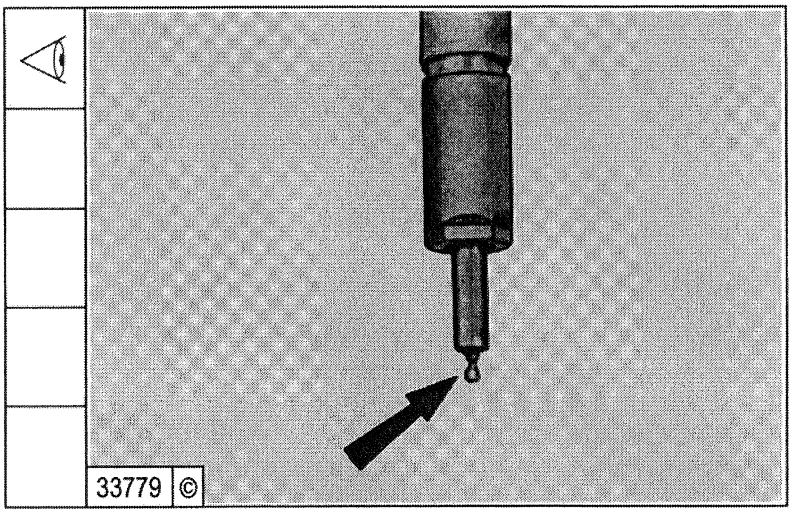
Prescripción de apriete: **45 ± 5 Nm**

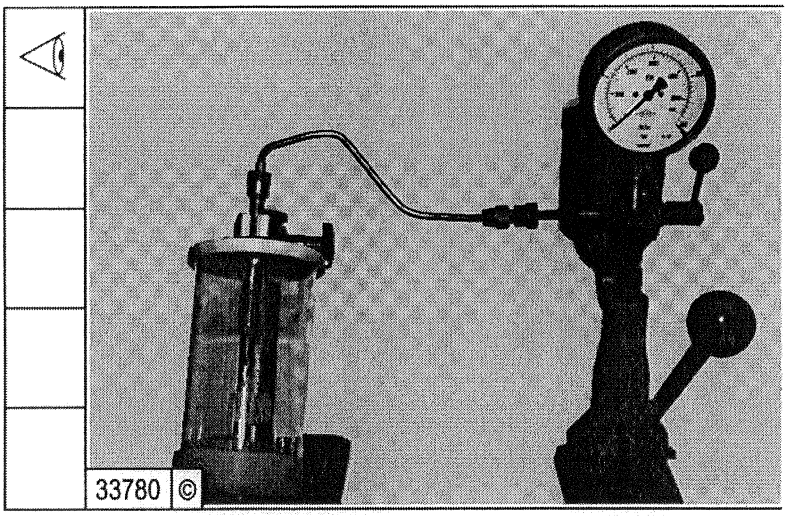
Comprobar el inyector de nuevo sobre el comprobador.

5. Comprobación de estanqueidad

Secar el inyector (tobera) y portainyector, soplándolos con aire comprimido. Tirar de la palanca del comprobador lentamente hacia abajo hasta que se alcance una presión en aprox. **20 bar** inferior a la de apertura leída anteriormente.

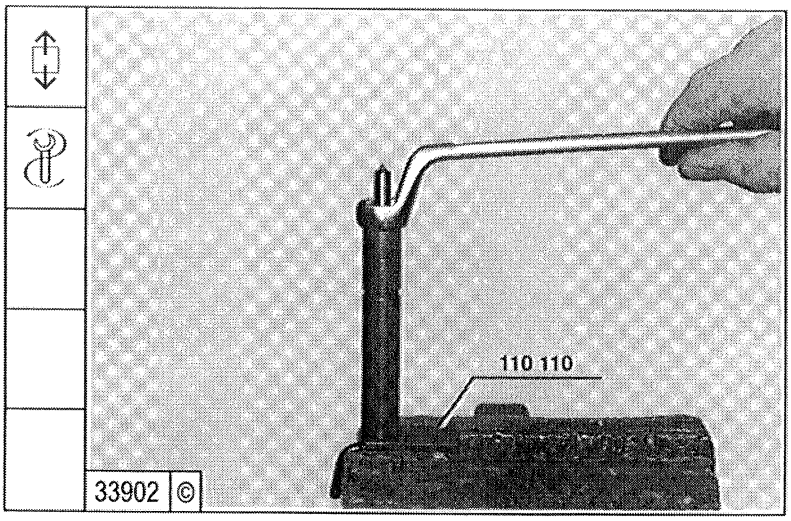


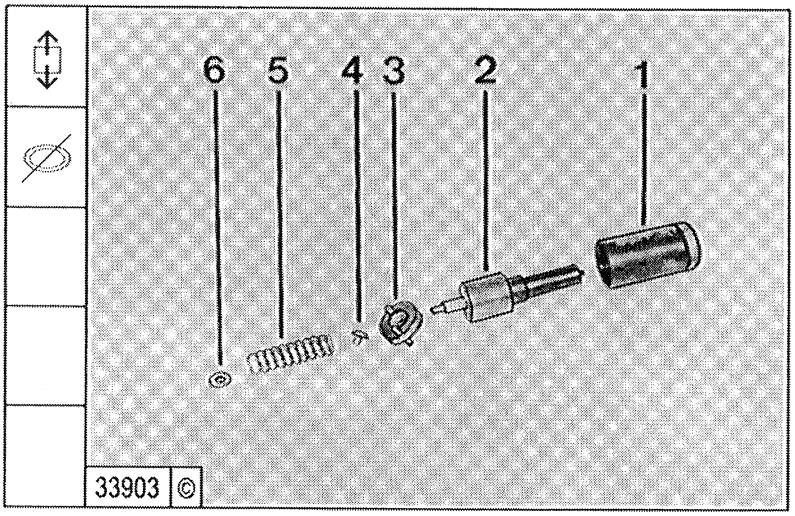


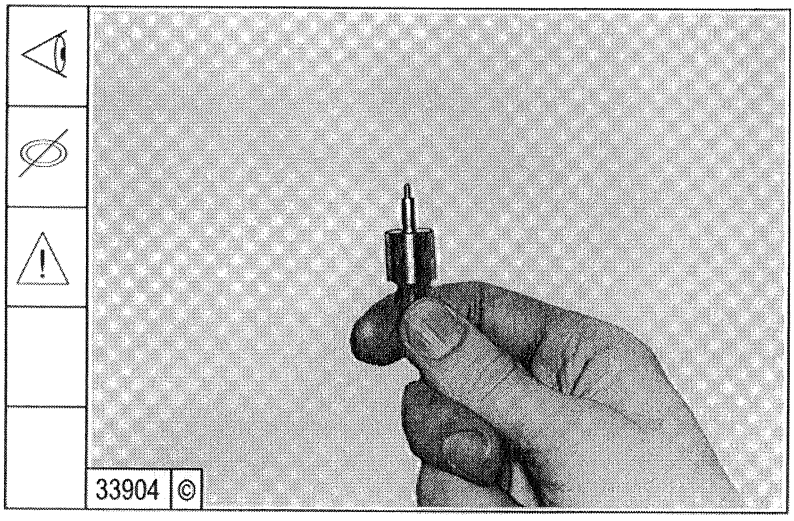


Typ Model Type Tipo	**DEUTZ** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Einspritzventil – prüfen und einstellen** **Injector – checking and adjusting** **Injecteur – contrôle et réglage** **Inyector – verificatión y ajustes**		Blatt Page Feuille Página	**3.250.11**

Deutsch	*English*	*Français*	*Español*
Einspritzventil prüfen und einstellen	**Injector checking and adjusting**	**Injecteur contrôle et réglage**	**Inyector verificación y ajustes**
6. Düse ist dicht, wenn innerhalb **10 Sekunden** kein Tropfen abfällt.	6. Nozzle is tight if there is no dripping within a period of **10 seconds**.	6. L'injecteur est étanche si aucune goutte ne s'écoule pendant **10 secondes**.	6. El inyector es estanco si, pasados **10 segundos**, no sale ni una gota.
7. Fällt ein Tropfen ab, ist das Einspritzventil zu zerlegen und die Undichtigkeit durch Reinigen zu beseitigen. Ist das nicht erfolgreich, muss die Einspritzdüse erneuert werden.	7. In case of a drip, the injector must be dismantled and cleaned to remedy the leak. If this does not cure the leak, the injector must be replaced.	7. Si l'injecteur goutte, il doit être démonte et la fuite éliminée par nettoyage. En cas d'échec, remplacer l'injecteur.	7. Si sale una gota, es necesario despiezar y limpiar el inyector para eliminar la falta de estanqueidad. Si esto no surte el efecto deseado, hay que sustituir el inyector por otro nuevo.
Nacharbeit ist nicht zulässig.	Reworking is not permissible.	Ne jamais rectifier l'injecteur.	No está permitido rectificar el inyector.
8. Schnarr- und Strahlprüfung	**8. Buzzing and spray pattern test**	**8. Contrôle du crissement et du jet**	**8. Comprobación del ronquido y la pulverización**
Manometer des Prüfgerätes abschalten.	Switch off pressure gauge of tester.	Débrancher le manomètre de la pompe d'essai.	Desconectar el manómetro del comprobador.
Die Schnarrprüfung ermöglicht eine hörbare Prüfung der Leichtgängigkeit der Düsennadel im Düsenkörper. Neue Einspritzventile haben gegenüber gebrauchten ein geändertes Schnarrverhalten. Durch Verschleiß im Nadelsitzbereich verschlechtert es sich. Schnarrt eine Einspritzdüse trotz Reinigung nicht, muss sie durch eine neue ersetzt werden.	The buzzing test permits an audible check of the ease of movement of the nozzle needle in the nozzle body. New injectors emit a different buzzing sound as compared to used injectors. It deteriorates due to wear in the needle seat area. If an injection nozzle does not buzz despite cleaning, it must be renewed.	Le contrôle du crissement est un contrôle acoustique du mouvement de l'aiguille dans le corps de l'injecteur. Les injecteurs neufs présentent un comportement de crissement différent par rapport aux injecteurs usages. Par suite de l'usure du logement d'aiguille, il se détériore. Si malgré nettoyage, un injecteur ne crisse plus, il doit être remplace par un injecteur neuf.	La comprobación del ronquido permite verificar audiblemente el fácil movimiento de la aguja dentro del cuerpo del inyector. Un inyector nuevo tiene un ronquido distinto del de un inyector usado. El ronquido disminuye con el desgaste en la zona de asiento de la aguja. Si un inyector deja de emitir el ronquido característico pese a su limpieza anterior, hay que sustituirlo por otro nuevo.
Ein gebrauchtes Einspritzventil muss bei schneller Hebeltätigkeit hörbar schnarren und dabei gut zerstäubt abspritzen. Das Strahlbild kann dabei gegenüber dem eines neuen Einspritzventils deutlich unterschiedlich sein.	A used injector should buzz clearly during rapid actuation of the handlever, while exhibiting a well atomized spray pattern. The spray pattern may differ noticeably from that of a new injector.	Un injecteur usage doit présenter un crissement audible lorsque le levier est actionne rapidement et bien pulvériser alors. La forme du jet peut alors être nettement différente de celle d'un injecteur neuf.	A rápido accionamiento de la palanca, un inyector usado debe roncar de forma audible y dar un chorro bien pulverizado, pudiendo variar la pulverización claramente de la de un inyector nuevo.







Typ Model Type Tipo	**DEUTZ** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Einspritzventil – Bauteile instand setzen** **Injector – repair of components** **Injecteur – mise en état des composants** **Inyector – repariоción de componentes**		Blatt Page Feuille Página	**3.250.12**

Deutsch

Einspritzventil
Bauteile instand setzen

Handelsübliches Werkzeug:

Lange Stecknuss SW 15

Spezialwerkzeug:

Halter für Einspritzventil 110 110

1. Überwurfmutter abschrauben.
2. Folge der Einzeldemontage
   1. Überwurfmutter
   2. Einspritzdüse
   3. Zwischenstück
   4. Druckbolzen
   5. Druckfeder
   6. Ausgleichscheibe

Sämtliche Teile in sauberem Dieselkraftstoff reinigen und mit Druckluft ausblasen.

3. Düsennadel und Düsenkörper sind zusammen geläppt und dürfen weder vertauscht noch einzeln ausgetauscht werden.
   Düsennadel nicht mit den Fingern berühren. Die Düsennadel muss bei senkrecht gehaltenem Düsenkörper durch ihr Eigengewicht langsam und ruckfrei auf ihren Sitz gleiten.

Hinweis:
Bei ruckweisem Abgleiten der Düsennadel die Einspritzdüse erneut in Dieselkraftstoff auswaschen, bei Bedarf erneuern. Neue Einspritzdüse ebenfalls in sauberem Dieselkraftstoff reinigen.

English

Injector
repair of components

Commercial tool required:

Long socket a/flats 15

Special tool required:

Retainer for injector 110 110

1. Unscrew cap nut.
2. Sequence of parts disassembly:
   1. Gap nut
   2. Injection nozzle
   3. Adapter
   4. Thrust pin
   5. Gompression spring
   6. Shim

Wash all parts in clean diesel fuel and blow out with compressed air.

3. Nozzle needle and nozzle body are lapped together and may neither be confused nor exchanged individually. Do not touch nozzle needles with your fingers. When nozzle body is held in upright position, nozzle needle should by its own weight slide down slowly and smoothly on

Note:
If nozzle needle does not slide down smoothly, wash injection nozzle again in diesel fuel. Renew, if necessary .New injection nozzle must likewise be washed in clean diesel fuel.

Français

Injecteur
mise en état des composants

Outillage standard:

Clé a douille longue de 15

Outillage spécial

Outil de maintien d'injecteur 110 110

1. Dévisser l'écrou - raccord.
2. Ordre de démontage
   1. Ecrou-raccord
   2. Injecteur
   3. Piece intermediaire
   4. Poussoir
   5. Ressort
   6. Rondelle de reglage

Nettoyer toutes les pièces dans du gasoil propre et les sécher au jet d'air comprime

3. Aiguille et corps d'injecteur sont rodes ensemble, ils ne doivent pas être intervertis ou remplaces séparément. Ne pas toucher l'aiguille d'injecteur avec les doigts. Le corps d'injecteur étant tenu en position verticale, l'aiguille doit tomber lentement et sans a-coups sur son siège par l'effet de son propre poids.

Nota:
Si l'aiguille descend par a-coups, nettoyer à nouveau l'injecteur dans du gasoil, le cas échéant, le remplacer. Nettoyer également l'injecteur neuf dans du gasoil propre.

Español

Inyector
repariocion de componentes

Herramienta comercial:

Llave de vaso largo de 15

Herramienta especial:

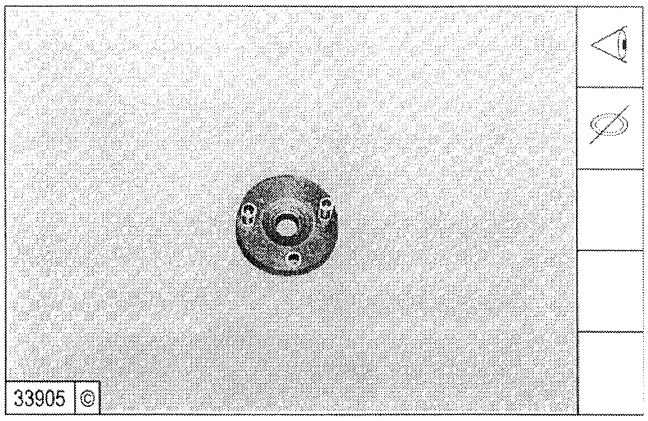
Retenedor de inyector 110 110

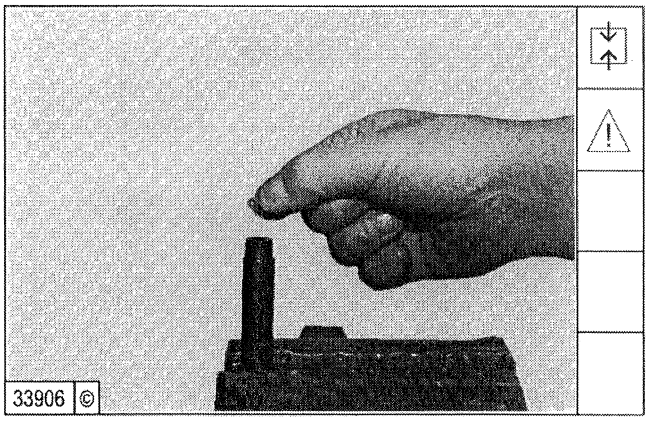
1. Desenroscar la tuerca de unión.
2. Secuencia dei despiece
   1. Tuerca de unión
   2. Inyector o tobera
   3. Pieza intermedia
   4. Perno de presión
   5. Resorte de presión
   6. Arandela de reglaje

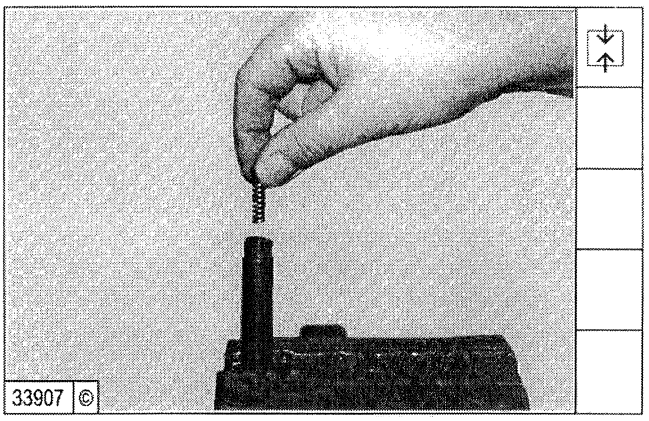
Limpiar todas las piezas en combustible diesellimpio y soplarlas con aire comprimido.

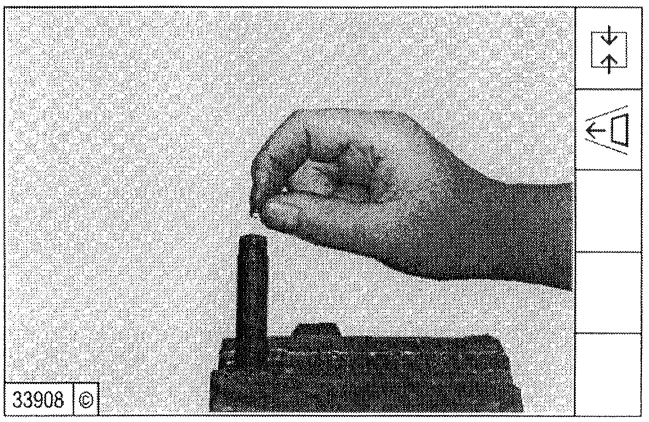
3. El cuerpo y la aguja del inyector son piezas perfectamente hermanadas por lapeado y, por tanto, no está permitido emparejarlas con otras o cambiarlas individualmente. No tocar la aguja con los dedos. Con el cuerpo del inyector en posición vertical, la aguja debe bajar por su peso propio lenta y progresivamente, deslizándose hasta alcanzar su posición final de asiento.

Nota:
Si el deslizamiento de la aguja no es progresivo, el inyector debe lavarse otra vez en combustible diesel o sustituirse por otro nuevo, segun el caso. Lavar el inyector nuevo igualmente en combustible diesel limpio.



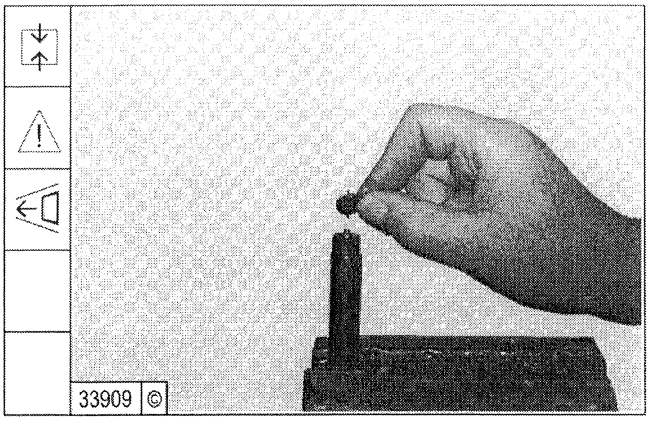


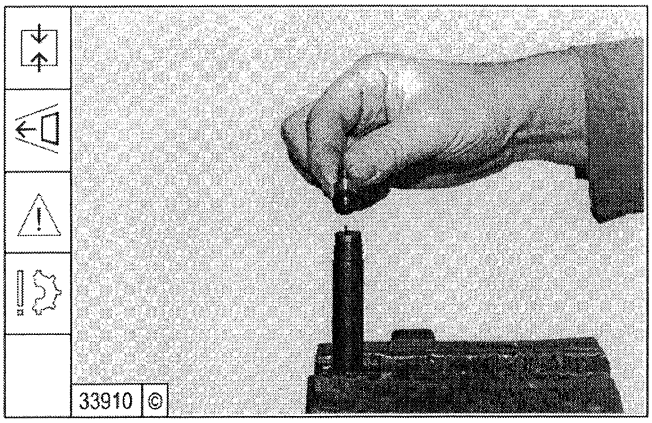


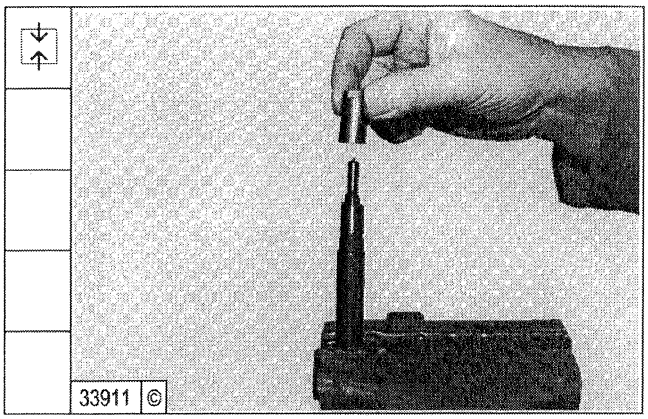


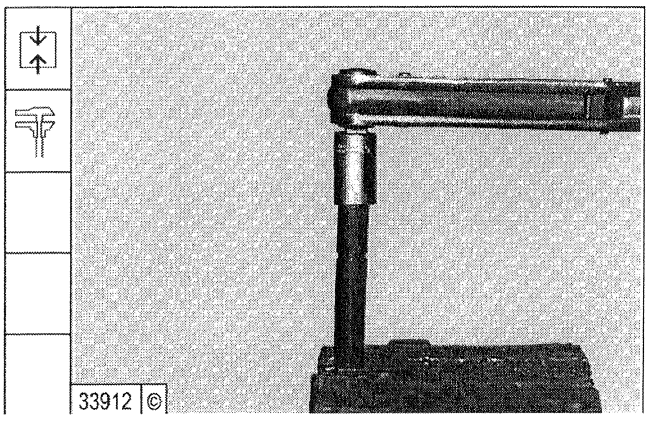
Typ Model Type Tipo	**DEUTZ** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Einspritzventil – Bauteile instand setzen** **Injector – repair of components** **Injecteur – mise en état des composants** **Inyector – repariоción de componentes**		Blatt Page Feuille Página	**3.250.13**

Deutsch	*English*	*Français*	*Español*
Einspritzventil **Bauteile instand setzen**	**Injector** **repair of components**	**Injecteur** **mise en état des composants**	**Inyector** **reparioción de componentes**
4. Sitzflächen des Zwischenstückes auf Verschleiß prüfen. Auf Vorhandensein der Zentrierstifte achten.	4. Check seating faces of adapter for wear. Make sure that centering pins are fitted.	4. Contrôler les surfaces de logement de la pièce intermédiaire quant a l'usure. Veiller à la présence des ergots de centrage.	4. Examinar las superficies de asiento de la pieza intermedia en cuanto a desgaste. Cuidar de que existan las espigas de centraje.
5. Ausgleichscheibe einsetzen.	5. Insert shim.	5. Insérer les rondelle de réglage.	5. Colocar las arandela de reglaje.
Hinweis: *Der Abspritzdruck ist von der Dicke der Ausgleich-scheibe abhängig.*	***Note:*** *The ejection pressure is dependent on the shim.*	***Nota:*** *La pression d'ouverture dépend des rondelle d'épaisseur.*	***Nota:*** *La presión de descarga depende de las arandela de reglaje.*
6. Druckfeder einsetzen.	6. Insert compression spring.	6. Insérer le ressort.	6. Introducir el resorte de presión.
7. Druckbolzen mit dem Zentrierbund zur Druck-feder weisend einsetzen	7. Insert thrust pin with centering collar facing towards compression spring.	7. Insérer le poussoir avec collet de centrage oriente vers le ressort.	7. Introducir el perno de presi6n con el collarfn de centraje indicando hacia el resorte de presión.



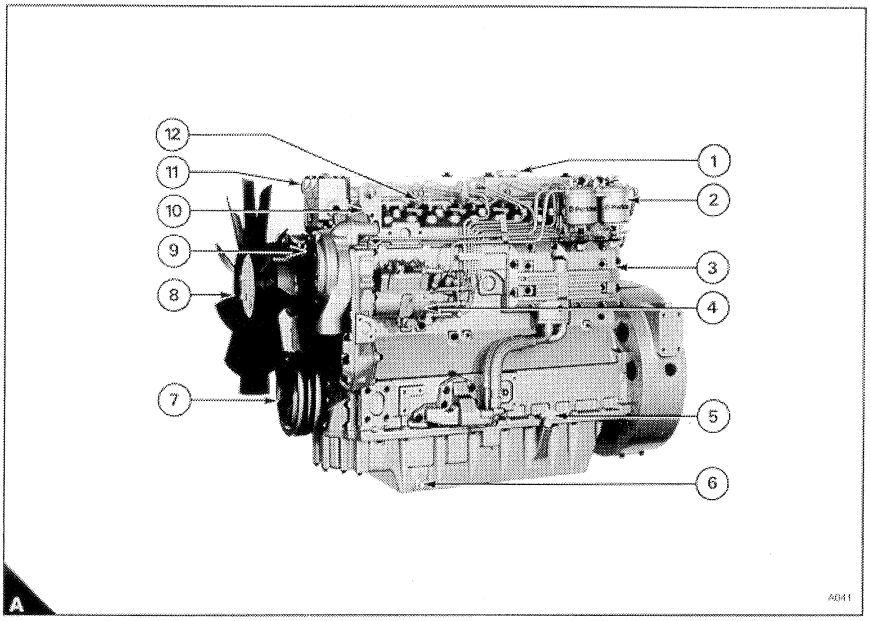






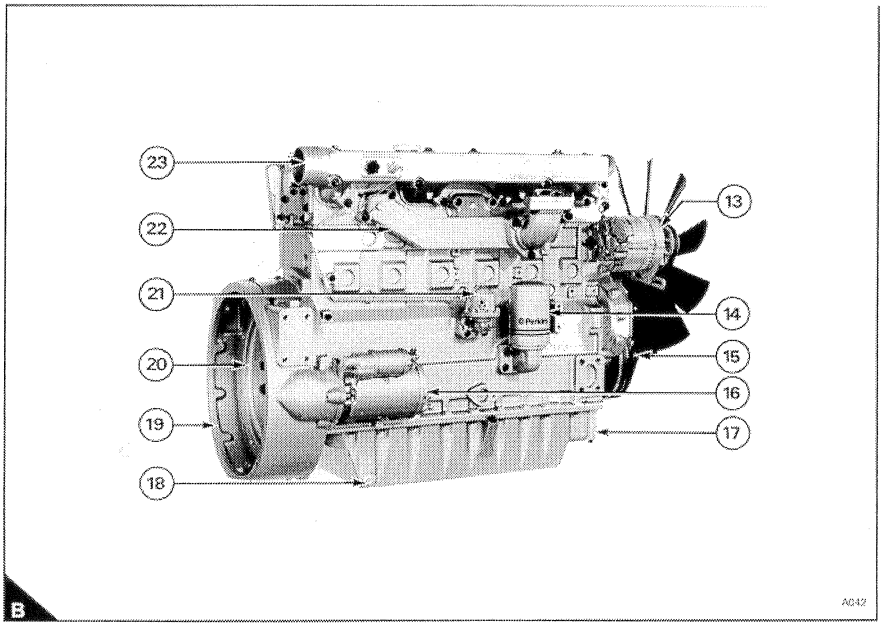
Typ Model Type Tipo	**DEUTZ** **F - 4M 2011**	**Motor** **Engine** **Moteur** **Motor**	Datum Edition Date Fecha	**06.2002**
Benennung Description Dénomination Denominación	**Einspritzventil – Bauteile instand setzen** **Injector – repair of components** **Injecteur – mise en état des composants** **Inyector – repariоción de componentes**		Blatt Page Feuille Página	**3.250.14**

Deutsch	*English*	*Français*	*Español*
Einspritzventil **Bauteile instand setzen**	**Injector** **repair of components**	**Injecteur** **mise en état des composants**	**Inyector** **repariоción de componentes**
8. Zwischenstück mit den Zentrierstiften in die Bohrungen des Düsenhalters einsetzen.	8. Insert adapter with centering pins into the bores of the nozzle holder.	8. Insérer la pièce intermediaire avec les ergots de centrage dans les alesages du porte-injecteur.	8. Introducir la pieza intermedia con las espigas de centraje en los taladros del portainyector.
Hinweis: *Die Ansenkung weist zum Druckbolzen.*	***Note:*** *The spot facing points to the thrust pin.*	***Nota:*** *Le Jamage doit etre oriente vers le poussoir.*	***Nota:*** *El rebaje debe indicar hacia el perno de presión.*
9. Einspritzdüse mit den Zentrierbohrungen auf die Zentrierstifte des Zwischenstückes aufsetzen.	9. Fit injection nozzle with center bores mating with the centering pins of the adapter.	9. Placer l'injecteur avec les alesages de centrage sur les ergots de centrage de la piece intermediaire.	9. Colocar el inyector con los taladros de centraje sobre las espigas de centraje de la pieza intermedia.
Hinweis: *Die Düsennadel darf nicht aus dem Düsenkörperfallen.*	***Note:*** *Take care that nozzle needle does not fallout of nozzle body.*	***Nota:*** *Ne pas laisser s'echapper l'aiguille du corps d'injecteur.*	***Nota:*** *La aguja no debe caer fuera del cuerpo del inyector.*
10. Überwurfmutter aufschrauben.	10. Screw on cap nut.	10. Visser l'ecrou – raccord.	10. Enroscar la tuerca de unión.
11. Überwurfmutter festdrehen.	11. Tighten cap nut.	11. Bioquer l'ecrou – raccord	11. Apretar la tuerca de unión.
Anziehvorschrift: **45 ± 5 Nm**	Tightening specification: **45 ± 5 Nm**	Prescription de serrage: **45 ± 5 Nm**	Prescripción de apriete: **45 ± 5 Nm**
***Einspritzventil prüfen und einstellen, siehe* Blatt** **3.250.09 – 3.250.11**	***For testing and adjusting injector look at page*** **3.250.09 – 3.250.11**	***Pour Je GOntröle et le calage de l'injecteur, voir feuille*** **3.250.09 – 3.250.11**	***Para la verificaci6n y el ajuste del inyector, ver página*** **3.250.09 – 3.250.11**



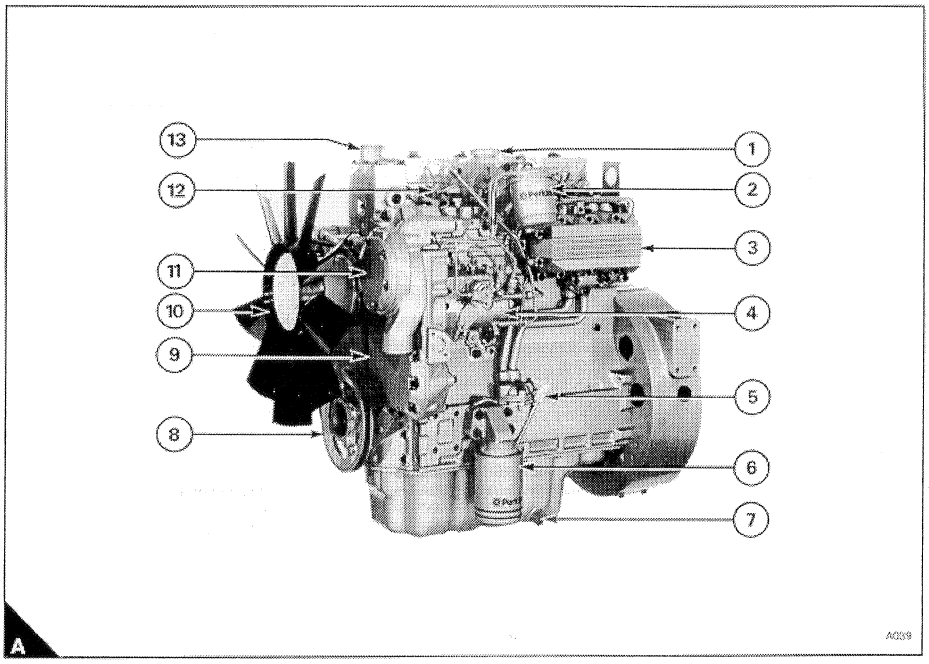
Front and left side view of YA engine (2.05/A)

1 Filler cap for lubricating oil
2 Fuel filter
3 Lubricating oil cooler
4 Fuel injection pump
5 Lubricating oil dipstick
6 Drain plug for lubricating oil
7 Crankshaft pulley
8 Fan
9 Water pump
10 Front lifting bracket
11 Water outlet
12 Atomiser



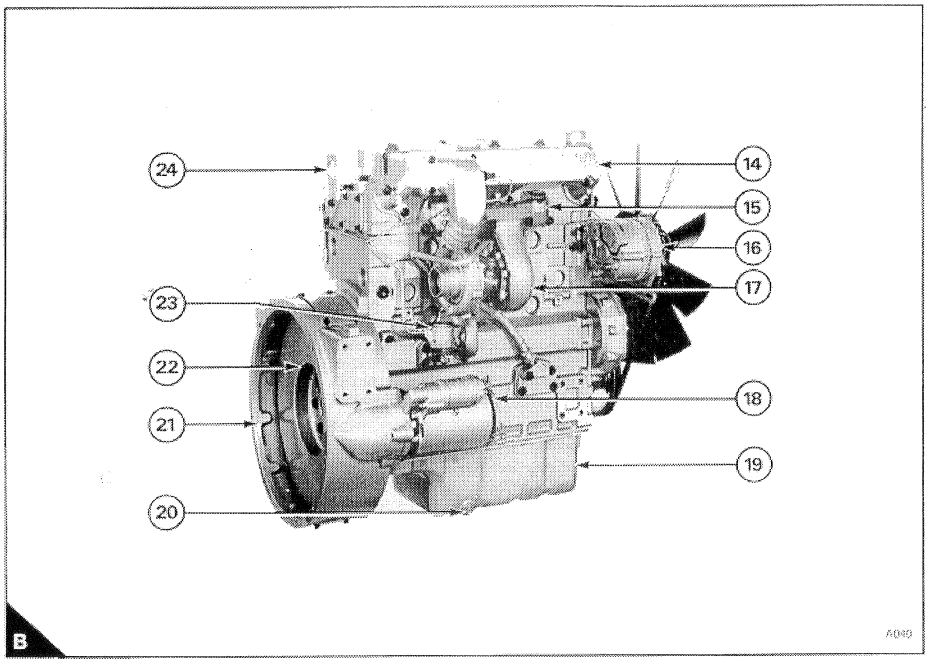
Rear and right side view of YA engine (2.05/B)

13 Alternator
14 Lubricating oil filter
15 Drive belts
16 Starter motor
17 Lubricating oil sump
18 Drain plug for lubricating oil
19 Flywheel housing
20 Flywheel
21 Fuel lift pump
22 Exhaust manifold
23 Induction manifold



Front and left side view of AB engine (2.03/A)

1 Filler cap for lubricating oil
2 Fuel filter
3 Lubricating oil cooler
4 Fuel injection pump
5 Lubricating oil dipstick
6 Lubricating oil filter
7 Drain plug for lubricating oil
8 Crankshaft pulley
9 Drive belt
10 Fan
11 Water pump
12 Atomiser
13 Water outlet



Rear and right side view of AB engine (2.03/B)

14 Induction manifold
15 Exhaust manifold
16 Alternator
17 Turbocharger
18 Starter motor
19 Lubricating oil sump
20 Drain plug for lubricating oil
21 Flywheel housing
22 Flywheel
23 Fuel lift pump
24 Rear lift bracket

How to renew an atomiser

Attention: Do not allow dirt to enter the fuel system. Before a connection is disconnected, clean thoroughly the area around the connection. After a component has been disconnected, fit a suitable cover to all open connections.

1 Remove the fuel leak-off pipe.

2 Remove the union nuts of the high-pressure pipe from the atomiser and from the fuel injection pump. Do not bend the pipe. If necessary, remove the pipe clamps.

3 Remove the atomiser flange setscrews and remove the flange (A1), the atomiser (A2) and its seat washer (A3). Remove the dust seal (A4) and the spacer (A5) and fit the spacer and a new dust seal onto the new atomiser.

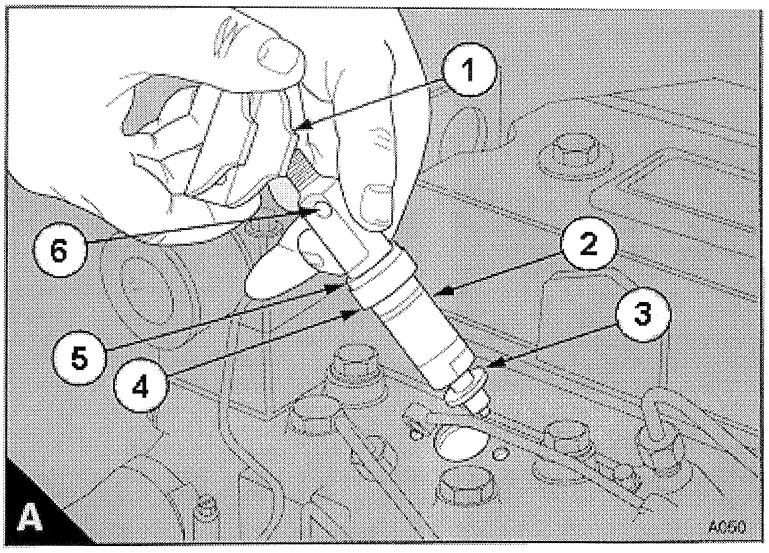
4 Put the new atomiser in position with its spacer, new dust seal and a new seat washer. Ensure that the fuel leak-off connection is not toward the engine. Fit the flange and engage the flange setscrews. Ensure that the atomiser is not tilted and tighten the flange setscrews evenly and gradually to 12 Nm (9 lbf ft) 1,2 kgf m.

Attention: Do not tighten the nuts of the high pressure pipes more than the recommended torque tension. If there is a leakage from the union nut,. ensure that the pipe is correctly aligned with the atomiser inlet. Do not tighten the atomiser union nut more, as this can cause a restriction at the end of the pipe. This can affect the fuel delivery.

5 Fit the high-pressure fuel pipe and tighten the union nuts to 22 Nm (16 lbf ft) 2,2 kgf m. If necessary, fit the pipe clamps.

6 Renew the aluminium washers and fit the leak-off pipe.

7 Operate the engine and check for leakage of fuel and air.



How to check the valve tip clearances

These are checked between the top of the valve stem and the rocker lever (A), with the engine hot or cold. The correct clearances are 0,20 mm (0.008 in) for inlet valves and
0.45 mm (0.018 in) for exhaust valves. The valve positions are shown at (B)

Attention: Number 1 cylinder is at the front of the engine.

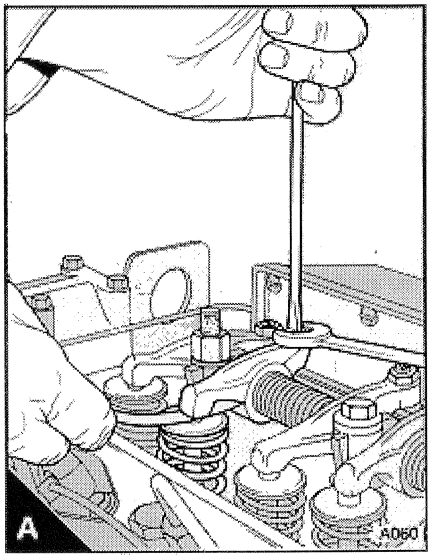
Four cylinder engines

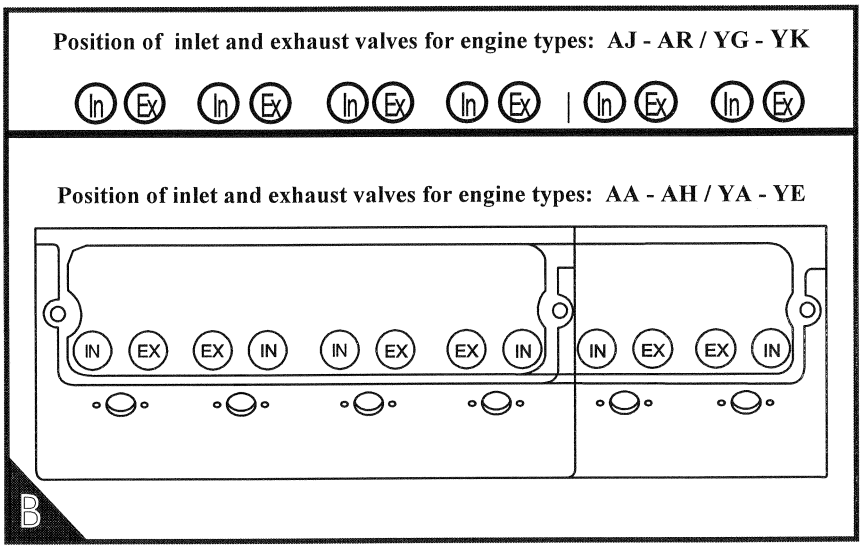
1 Turn the crankshaft in the normal direction of rotation until the inlet valve of number 4 cylinder has just opened and the exhaust valve of the same cylinder has not closed completely. Check the clearances of the valves of number 1 cylinder and adjust them, if it is necessary.

2 Set the valves of number 2 cylinder as indicated above for number 4 cylinder. Then check/adjust the clearances of the valves of number 3 cylinder.

3 Set the valves of number 1 cylinder. Then check/adjust the clearances of the valves of number 4 cylinder.

4 Set the valves of number 3 cylinder. Then check/adjust the clearances of the valves of number 2 cylinder.

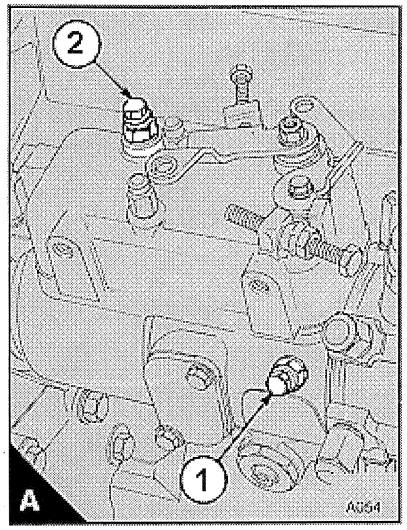


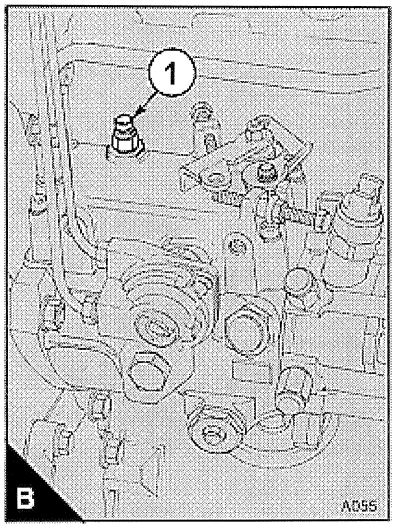


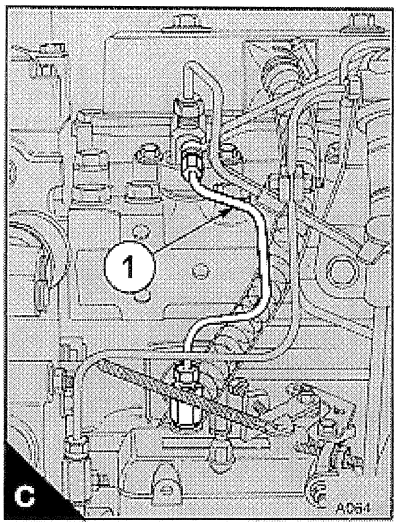
How to eliminate air from the fuel system

There are two methods to eliminate air from the fuel system according to the type of pump fitted:
The standard method is used where the fuel injection pump has vent screws (A and B).
The self-vent method is used where the fuel injection pump has a self-vent feature. These pumps have a vent pipe (C1) fitted between a connection in the top of the pump and the atomiser leak-off pipe. Vent screws are not fitted to these pumps.
If air enters the fuel system, it must be eliminated before the engine can be started.
Air can enter the system if:

- The fuel tank is drained during normal operation.
- The low-pressure fuel pipes are disconnected.
- A part of the low-pressure fuel system leaks during engine operation.

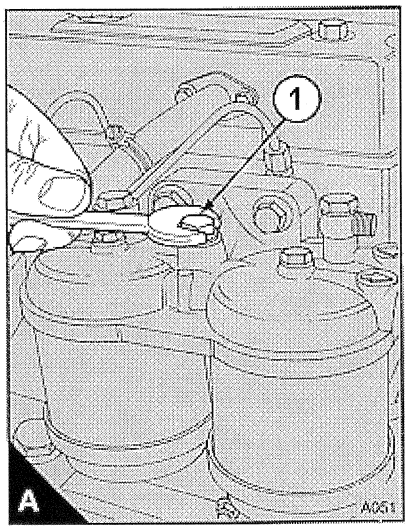




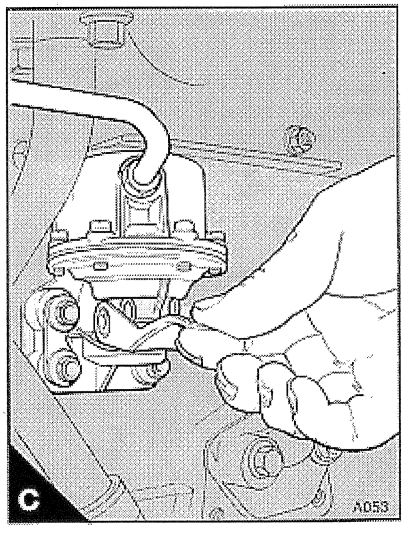


Standard method

1 Loosen the vent plug on the top of the twin element fuel filter. If a single element filter is used, loosen the banjo connection bolt which is fitted on the top of the filter.
2 Operate the priming lever on the fuel lift pump until fuel, free from air, comes from the filter vent point. Tighten the vent plug or the banjo connection bolt. If the drive cam of the fuel lift pump is at the point of maximum cam lift, it will not be possible to operate the priming lever. In this situation, the crankshaft must be turned one revolution.
3 Ensure that the manual stop control is in the "run" position. If an electrical stop control is used, turn the start key to the "R" position.
4 For engine codes AA, AC, YA and YC: Loosen the vent screw in the lock screw of the hydraulic head and the vent screw on the governor cover of the fuel injection pump.
For engine codes AB, AD, YB and YD: Loosen the vent screw on the governor cover of the fuel injection pump.
5 Operate the priming lever of the fuel lift pump until fuel, free from air, comes from the vent screw(s), Tighten the vent screw(s).



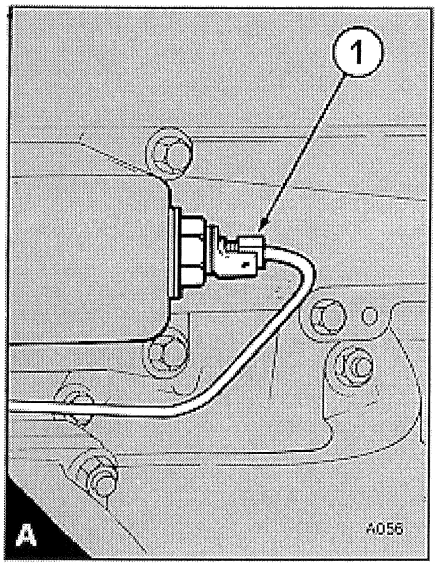


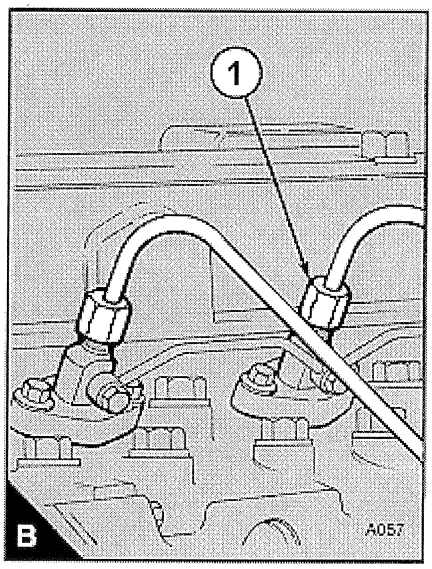


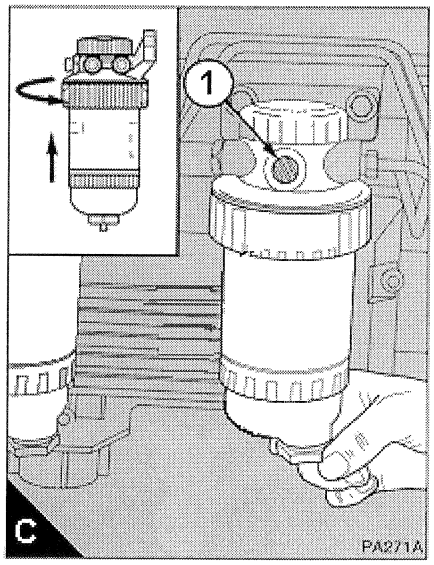
6 Loosen the union nut at the fuelled starting aid (if one is fitted) and operate the lift pump until fuel, free from air, comes from the connection. Tighten the union nut at the starting aid.

7 Loosen the union nut of the high-pressure pipes at two of the atomisers. Operate the starter motor until fuel, free from air, comes from the pipe connections. Tighten the high-pressure pipe connections.
Attention: Do not tighten the nuts of the high pressure pipes more than the recommended torque tension. If there is a leakage from the union nut, ensure that the pipe is correctly aligned with the atomiser inlet. Do not tighten the atomiser union nut more, as this can cause a restriction at the end of the pipe. This can affect the fuel delivery.

8 The motor is now ready to start. If the engine runs correctly for a short time and then stops or runs roughly, check for air in the fuel system. If there is air in the fuel system, there is probably a leckage in the low pressure system.







Self-vent method:

This method is used on the CAV and Stanadyne fuel injection pumps. Vent screws are not fitted to these pumps.
If the engine has been stopped by air in the fuel system:
Ensure that fuel has been added to the tank or that the leakage has been corrected.

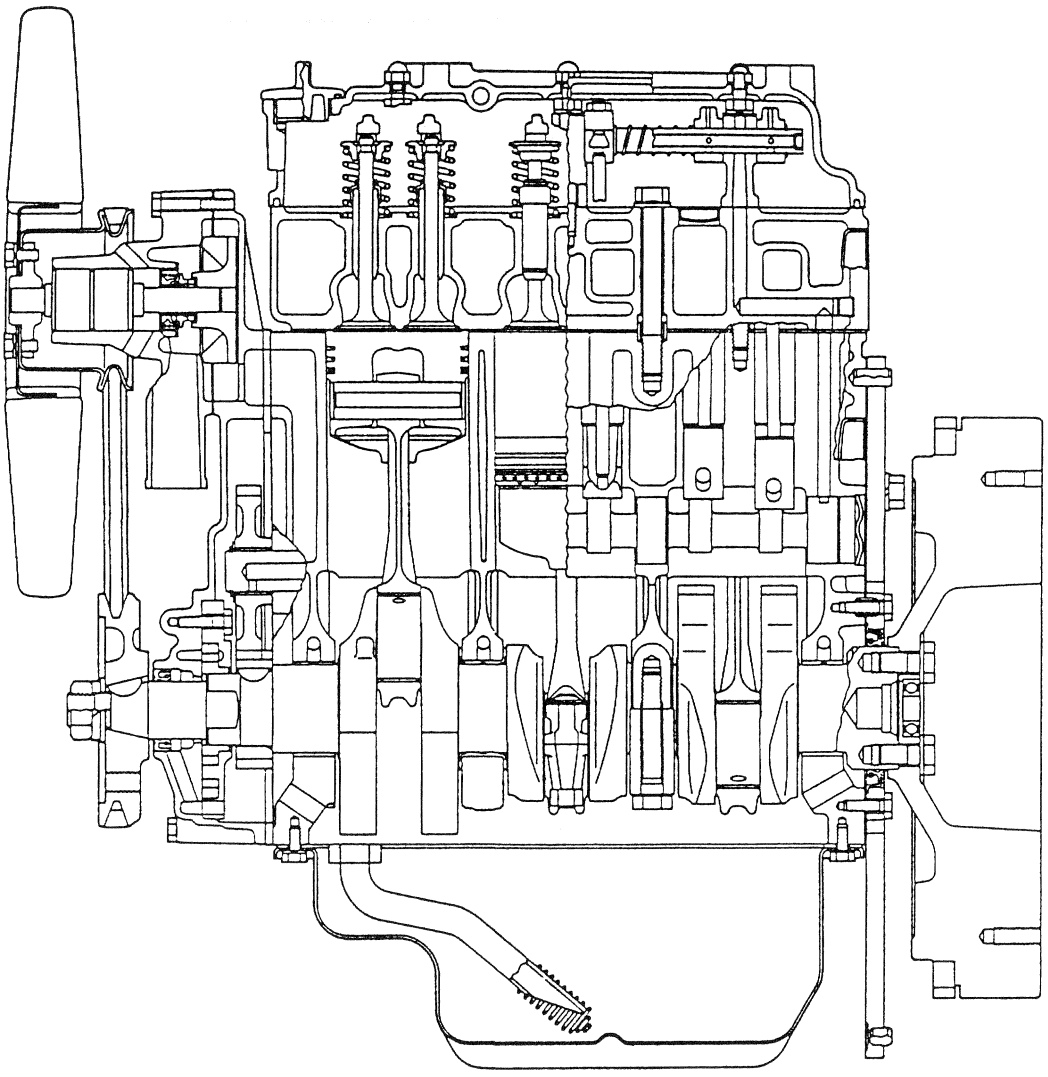
Attention: Although some fuel injection pumps will eliminate air automatically, use the procedure that follows to remove air from the fuel system to ensure that the battery will not discharge excessively:

1 Release the vent plug (A1) on the fuel filter head. Operate the priming lever of the fuel lift pump (C) until fuel, free of air, comes from the vent plug. Tighten the vent plug. If the drive cam of the fuel lift pump is at the point of maximum lift, it will not be possible to operate the priming lever. In this situation, the crankshaft must be turned one revolution.

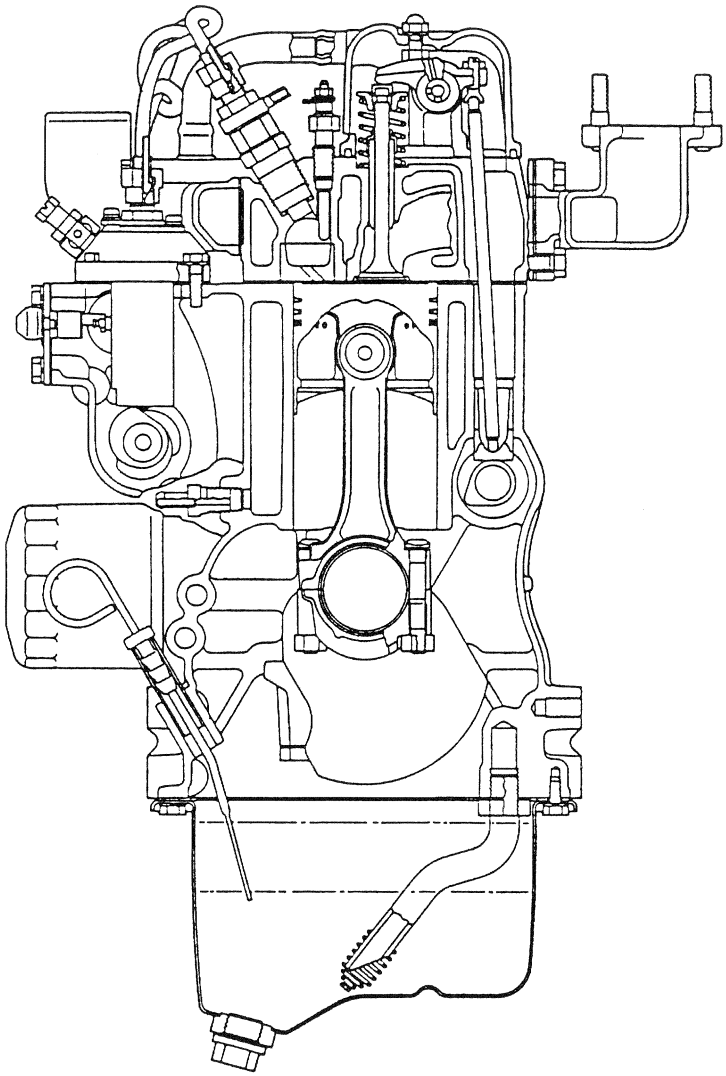
2 Loosen the high-pressure connections . (1B) at the atomisers. Ensure that the manual stop control, if one is fitted, is in the „run" position. Operate the starter motor until fuel, free of air, comes from the pipe connections. Tighten the connections to 22 Nm (2,2 kgf m).

Attention: Do not tighten the nuts of the high pressure pipes more than the recommended torque tension. If there is a leakage from the union nut, ensure that the pipe is correctly aligned with the atomiser inlet. Do not tighten the atomiser union nut more, as this can cause a restriction at the end of the pipe. This can affect the fuel delivery.

3 The engine is now ready to start. If the engine runs correctly for a short time and then stops or runs roughly, check for air in the fuel system. If there is air in the fuel system, there is probably a leakage in the low pressure system

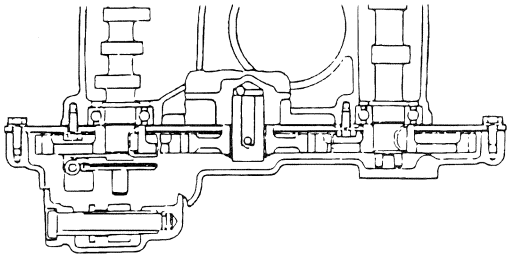


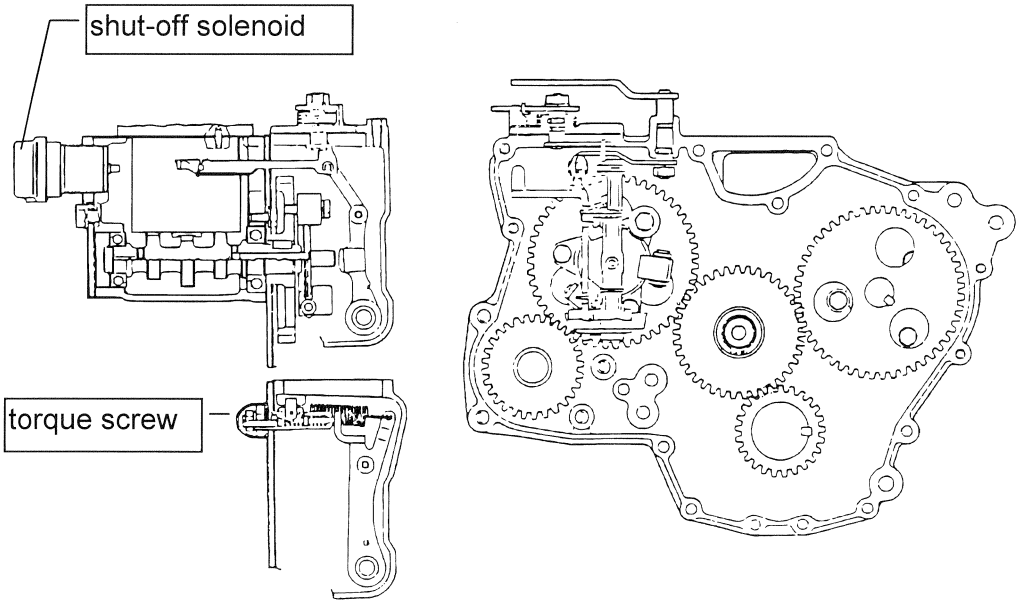
longitudinal section



cross section

HR 12



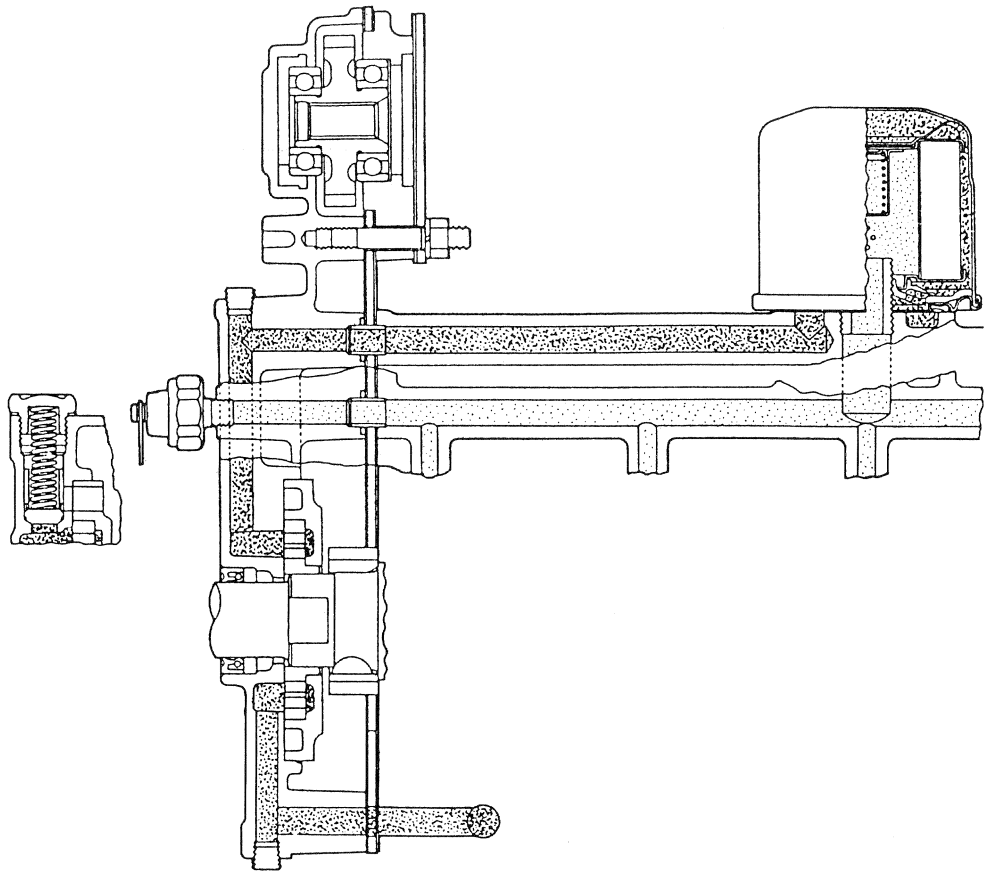


Basic adjustment of the torque screw (power setting of the engine)

Slacken counternut, turn out torque screw by 2 turns
Connect engine rpm gauge, start the engine, fully accelerate, 2,600 min^{-1}
Turn in screw until the engine decreases by 50 min^{-1}
Stop accelerating, engine must stop
Turn out torque screw by 2.8 turns again, so the correct engine power is set.

Cable colours, shut-off solenoid

Connector, wire harness:		Connector, solenoid:
brown	ground	blue
red	50 a	pink
blue/black	15/54	white



Oil circuit

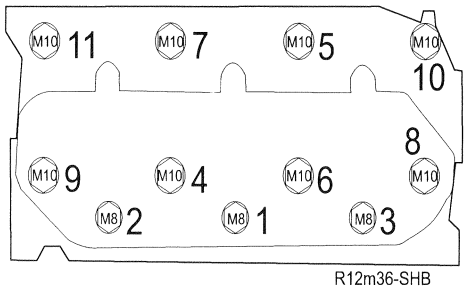
Technical Data

Valve clearance	cold	0.25	mm	inlet & exhaust
Injection nozzle pressure		140	bar	(+ 10 / - 0)
Compression pressure	new:	28	bar	lower limit 22
Injection timing		15°	v.OT*	up to 2000 min^{-1}
Injection timing		17°	v.OT*	more than 2000 till 3600 min^{-1}
Injection timing		19°	v.OT*	3600 min^{-1}

*v.OT = before top dead centre

Tightening torques

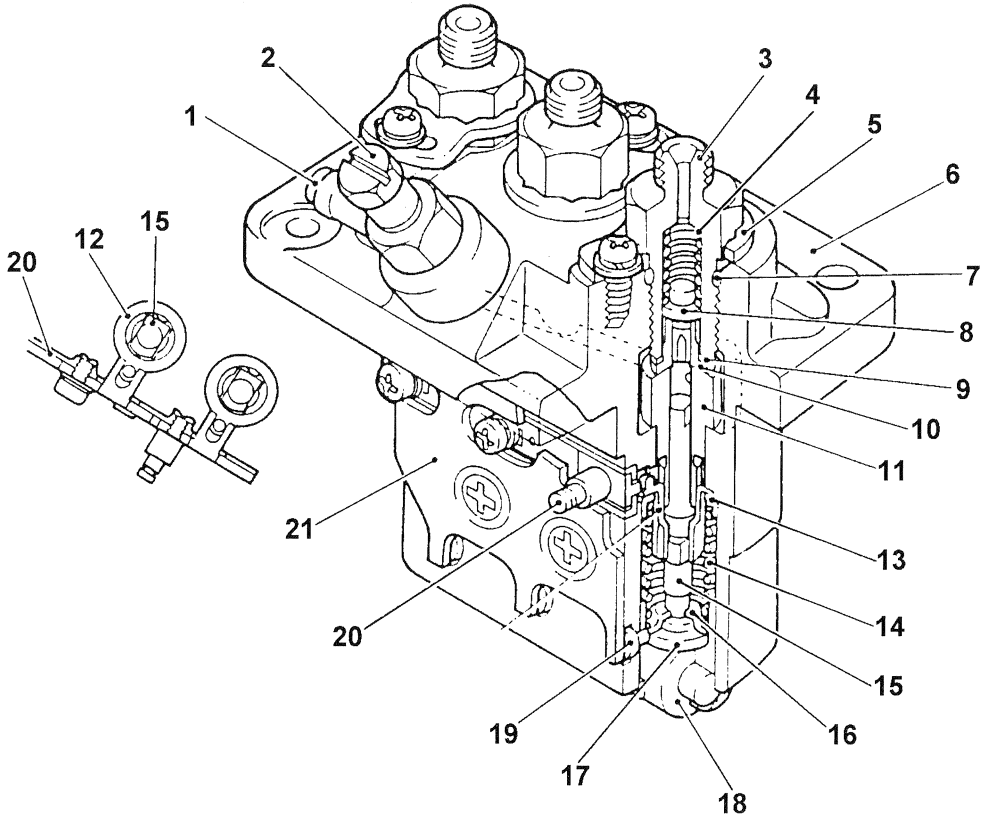
Crankshaft pulley	M 16	100 to 120 Nm
Main bearing cap	M 10	50 to 55 Nm
Connecting rod cap	M 8	32 to 35 Nm
Flywheel bolts	M 10	85 to 95 Nm
Nozzle holder	M 20	50 to 60 Nm
Glow plug	M 10	15 to 20 Nm
General bolts	M 6	7 Nm
General bolts	M 8	17 Nm
General bolts	M 10	35 Nm
General bolts	M 12	64 Nm



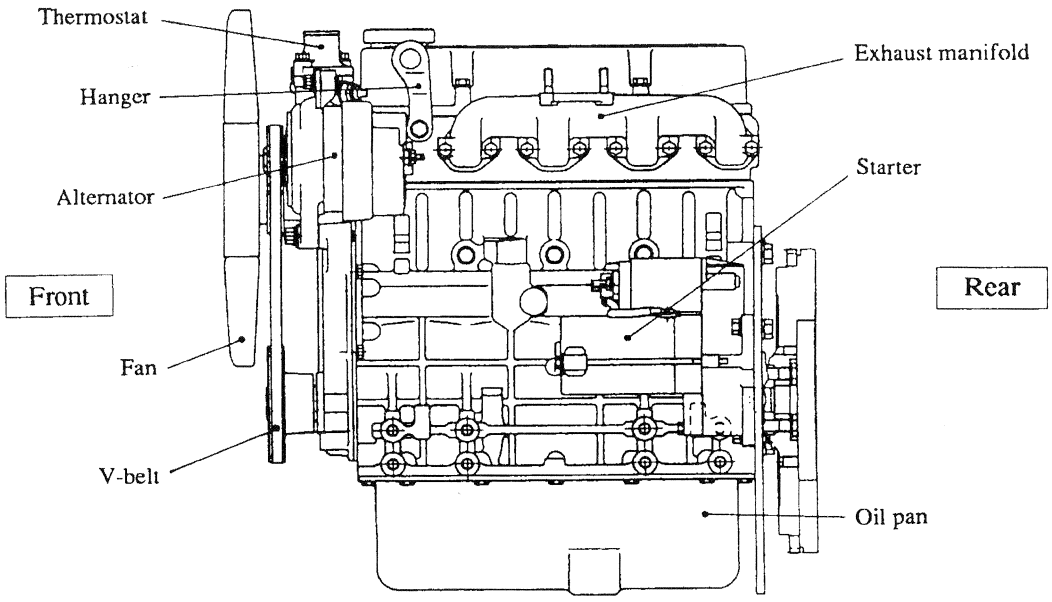
R12m36-SHB

cylinder head - tightening order

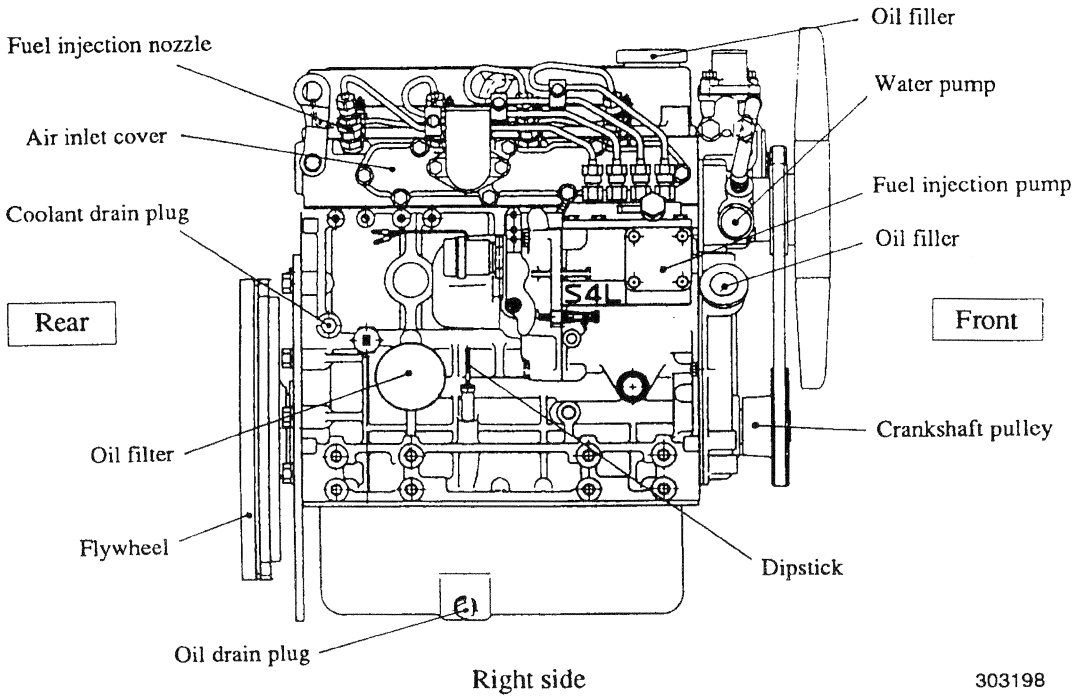
Cylinder head bolts	M 10	75 to 85 Nm
Cylinder head bolts	M 8	20 to 30 Nm



1	union collar	12	sleeve
2	air vent screw	13	upper seat
3	delivery valve holder	14	plunger spring
4	valve spring	15	plunger
5	holder stopper	16	lower seat
6	housing	17	adjusting shim
7	O - ring	18	tappet roller
8	delivery valve	19	pin
9	gasket	20	control rack
10	seat valve	21	stop wire bracket
11	plunger barrel		



Left side

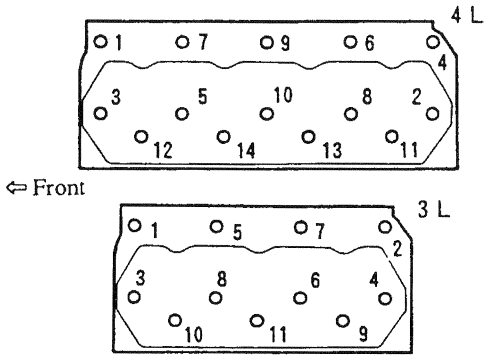


Right side

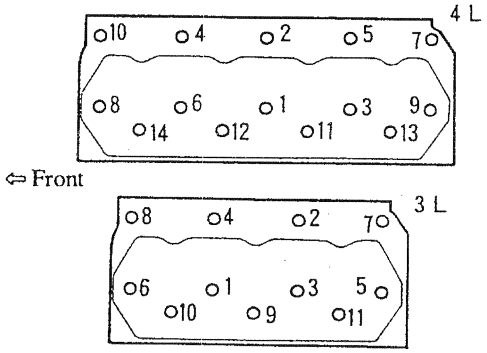
SCHAEFF	Typ/Model/Type **Mitsubishi S4L-2-61 KL**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Diesel engine**	Blatt/Page/Feuille **3.600.01**

CYLINDER HEAD

Loosening of the bolts - sequence -



Tightening of the bolts - sequence -



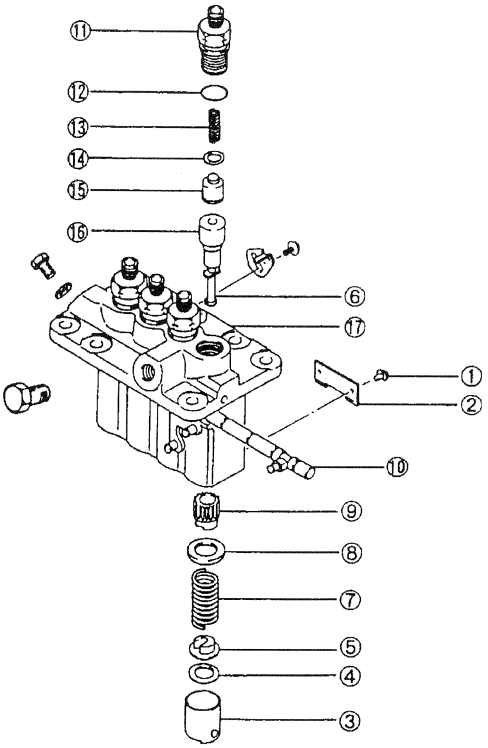
Tightening torque, cylinder head bolts: 88 ± 5 Nm

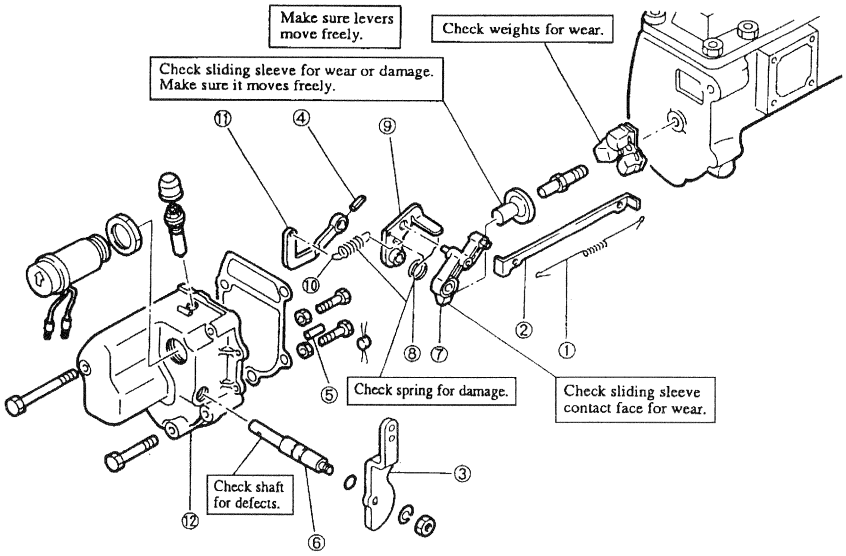
Technical Data

Valve clearance, cold	0.25	mm	inlet & exhaust
Injection pressure	140	bar	+ 5 bar
Compression pressure new	30	bar	lower limit: 27 bar
Injection timing	17°	before top dead centre	
Oil pressure, service temperature	3.5	bar	± 0.5 bar

Tightening torques: Bolts/nuts in general

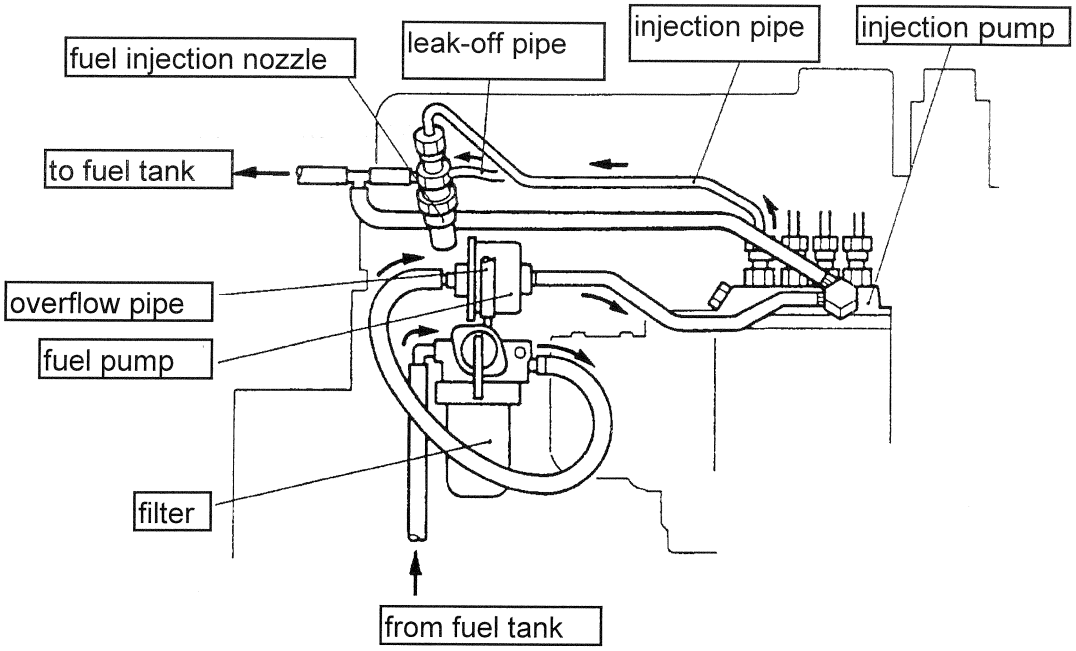
Thread	Quality class 4	Quality class 7
M 6	4 Nm	9 Nm
M 8	11 Nm	18 Nm
M 10	21 Nm	35 Nm
M 12	35 Nm	64 Nm
M14	60 Nm	93 Nm



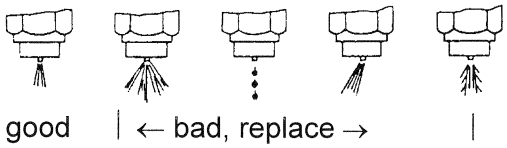


SCHAEFF	Typ/Model/Type **Mitsubishi S4L-2- 61 KL**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Diesel engine**	Blatt/Page/Feuille **3.600.02**

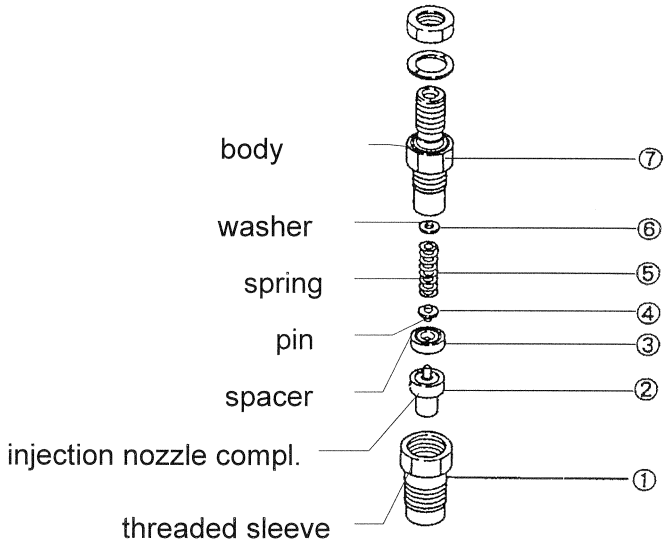
Fuel system



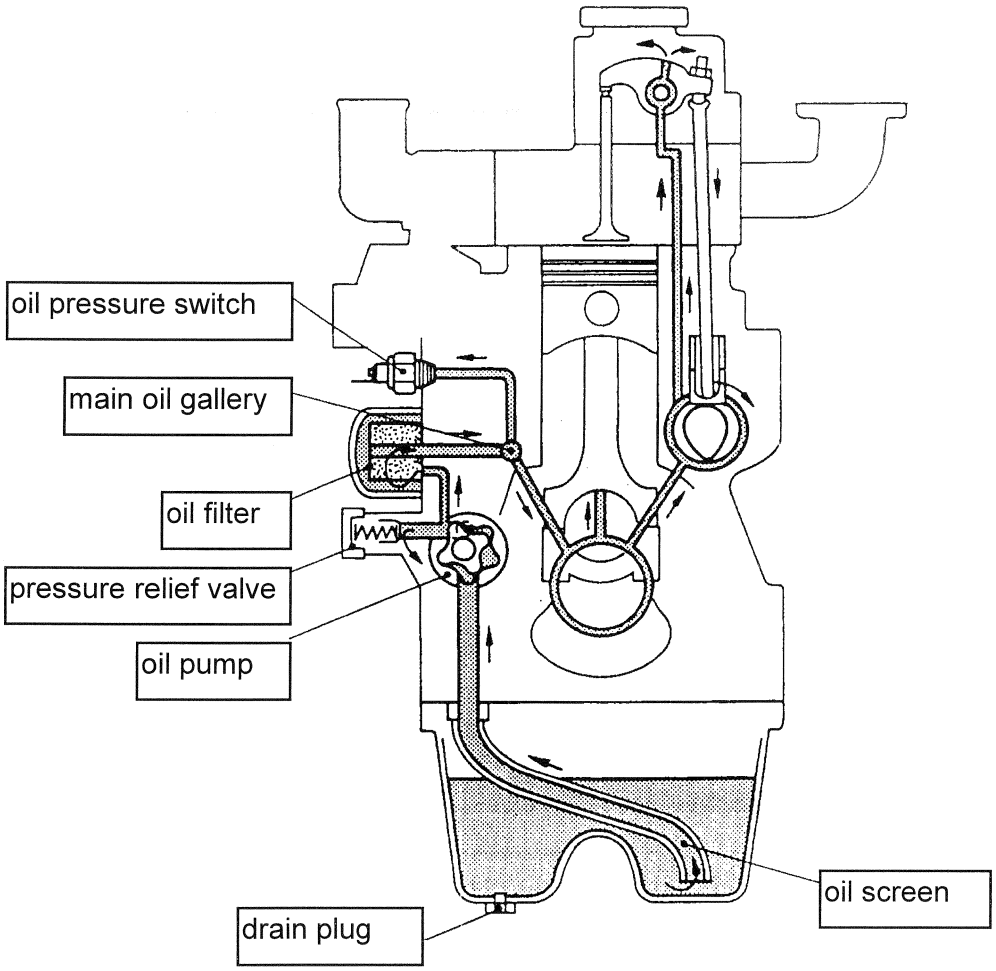
Injection nozzles - injection figures



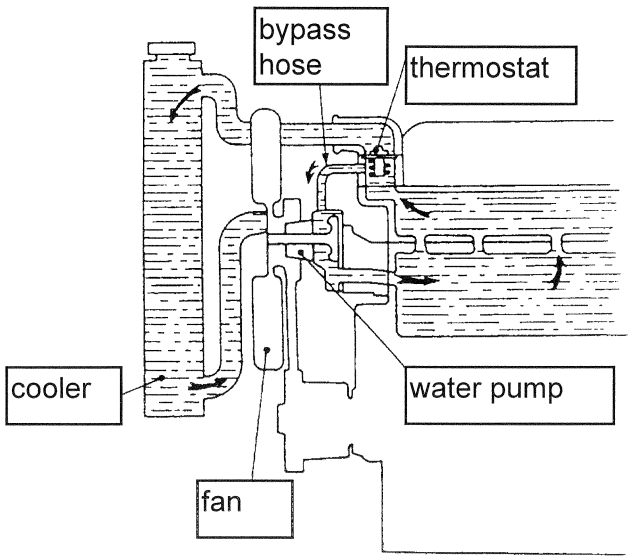
Injection nozzle

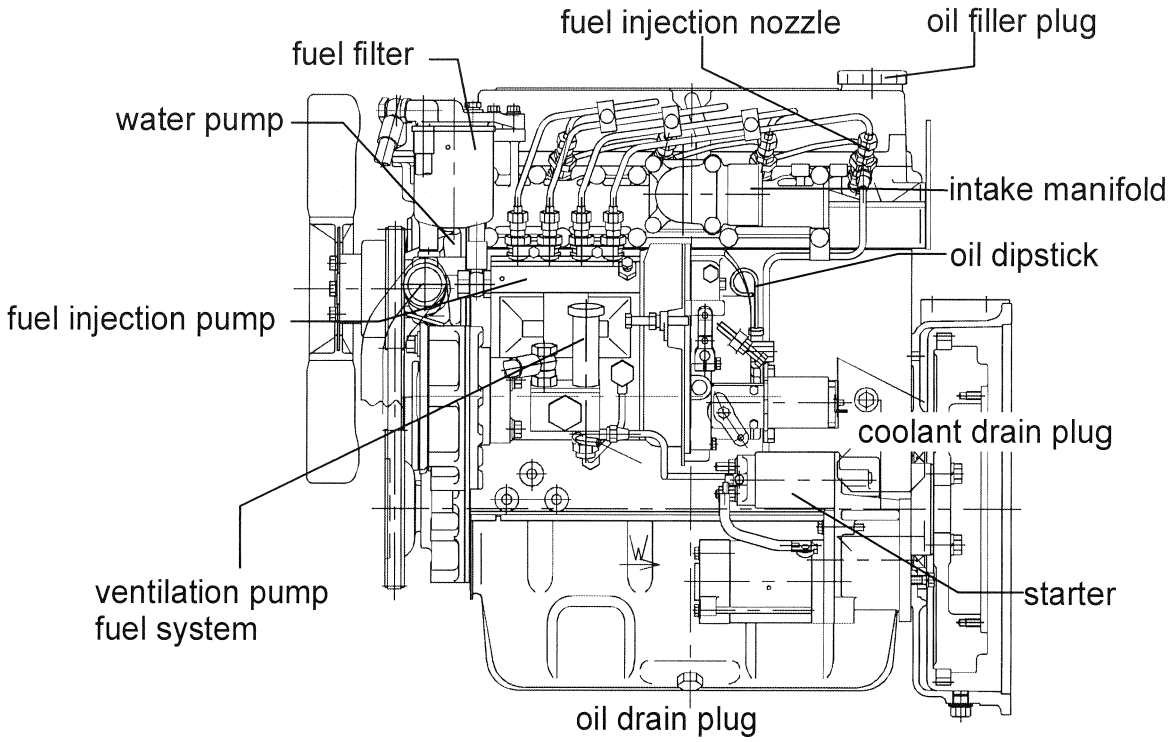


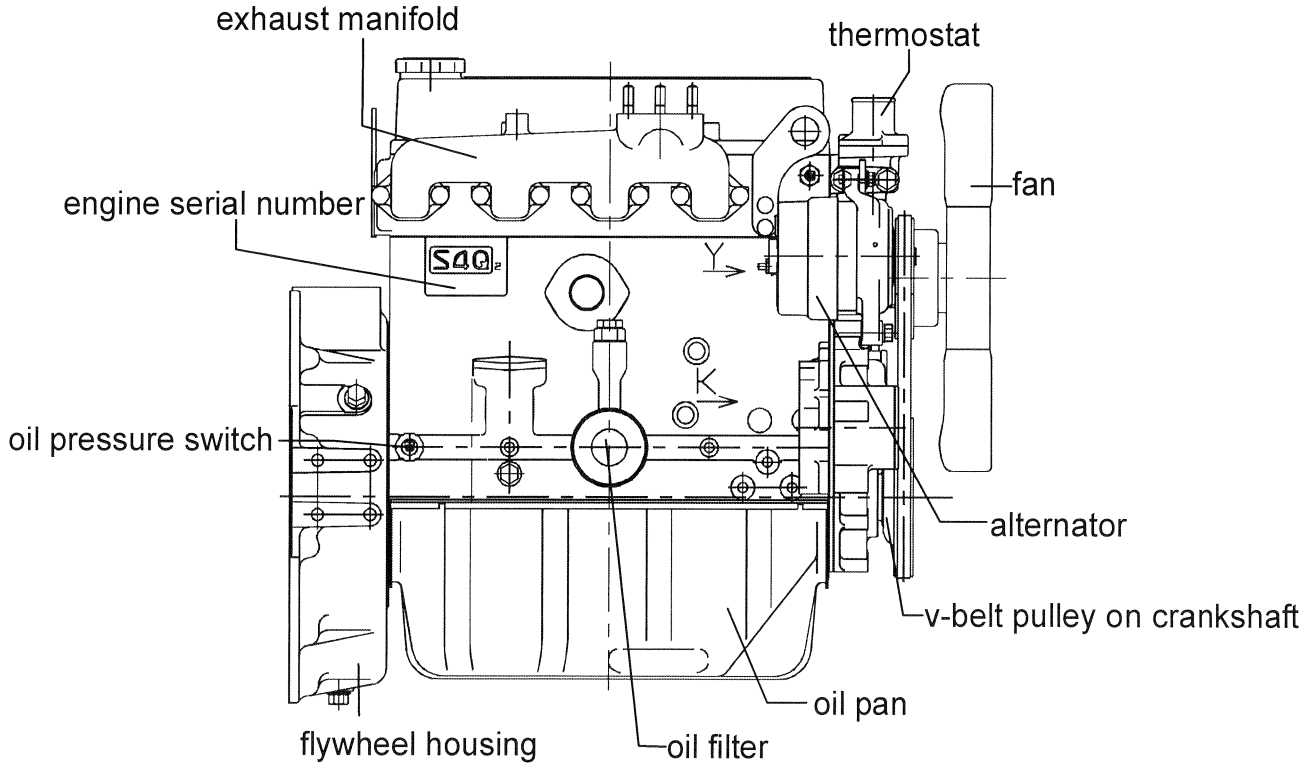
Oil circuit



Water circuit



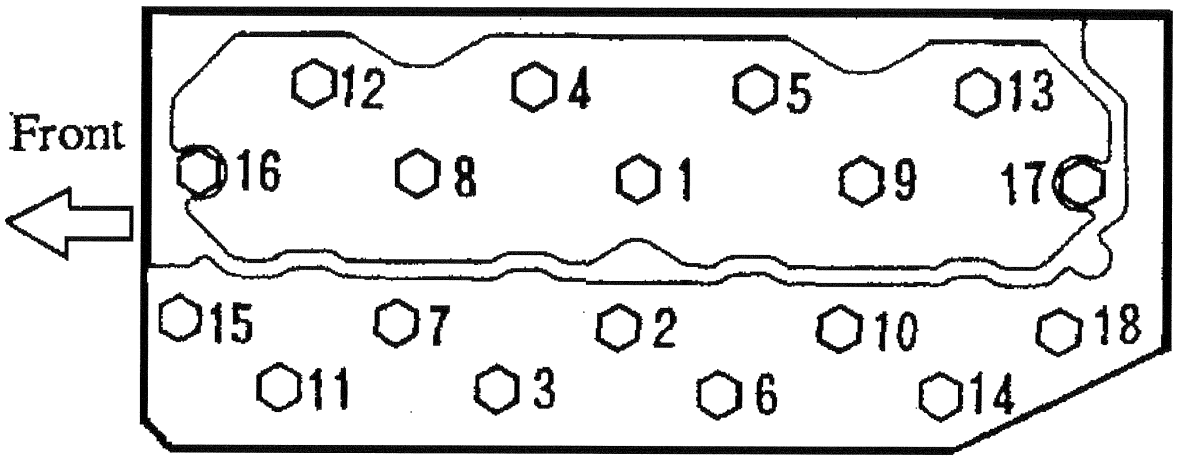




SCHAEFF	Typ/Model/Type **Mitsubishi S 4 Q - 2- 61 KL**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Diesel engine**	Blatt/Page/Feuille **3.800.01**

CYLINDER HEAD

Tightening order of bolts



Tightening torque of cylinder head studs: 118 ± 5 Nm

Technical Data

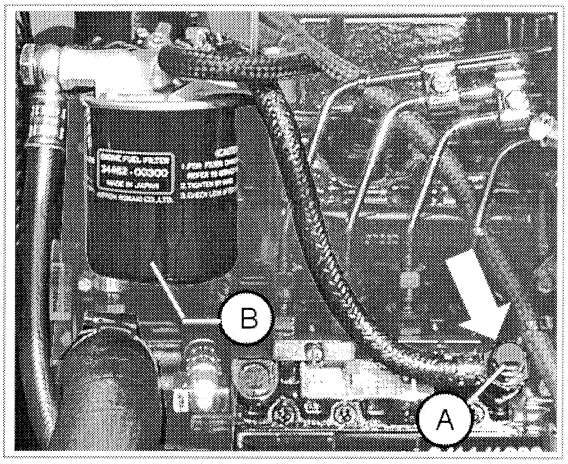
Tappet clearance	cold	0.25	mm	inlet & exhaust
Injection pressure		120	bar	+ 10 bar
Compression pressure	new	30	bar	Lower limit: 26 bar
Injection timing		22°	before top dead centre	
Oil pressure, service temperature		2 - 4	bar (under load)	± 0,5 bar

Tightening torques: bolts / nuts, general

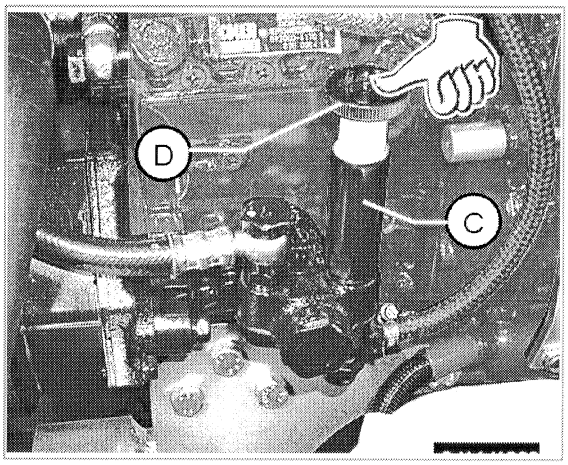
Thread	Quality class 4	Quality class 7
M 6	4 Nm	9 Nm
M 8	11 Nm	18 Nm
M 10	21 Nm	35 Nm
M 12	35 Nm	64 Nm
M 14	60 Nm	93 Nm

Fuel filter

- Slacken the ventilation plug **(A)** of the fuel filter **(B)** by means of an open end wrench.
- Put a clean cloth around the ventilation plug **(A)** to collect the escaping fuel, then operate the feed pump **(C)** as shown in the illustration.
- The ventilation plug **(A)** is to be closed when the fuel escapes from the ventilation without bubbles.



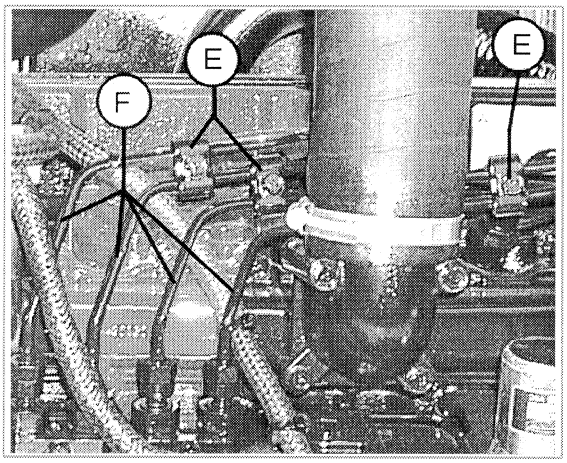
If the fuel pump valve is dirty and the fuel cannot be fed through the fuel filter, the ventilation plug as well as the feed line of the fuel filter are to be dismounted and cleaned with compressed air.



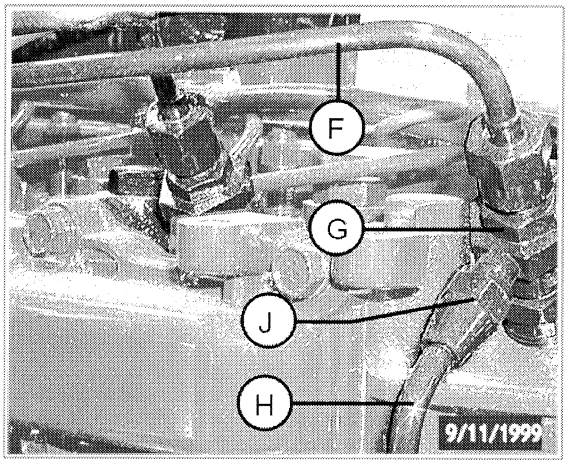
- To unlock the fuel pump cover **(D)**, turn it to the left.
- Operate the fuel feed pump **(C)** approximately 20 times, then turn the cover **(D)** to the right and lock.

Remove fuel lines

- Remove pipe clamp **(E)** from the injection lines **(F)**. Unscrew lines **(F)** at the injection pump and at the injection nozzles **(G)**.



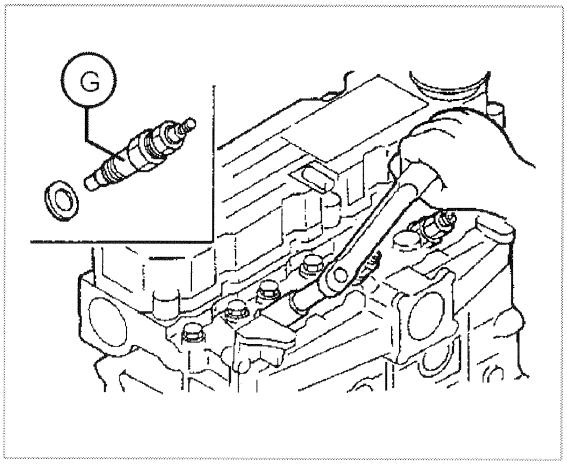
- Unscrew the drain oil lines **(H)** at the injection nozzles **(G)** by slackening the nuts **(J)**.



Mount protective caps to protect the fuel system against dirt or foreign particles at the pump and injection nozzles !

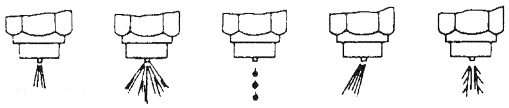
Removal of the injection nozzles

- Screw out the injection nozzles **(G)** of the engine by means of a socket wrench.

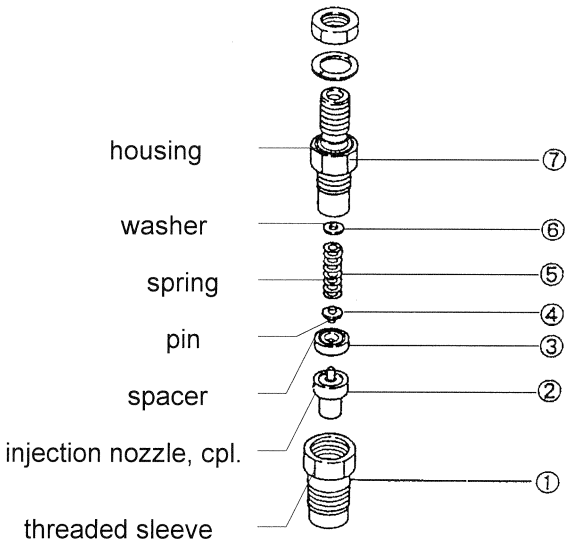


Remove the injection nozzle seals with a wire or a screwdriver and dispose of according to regulations.

Injection nozzles - injection figures

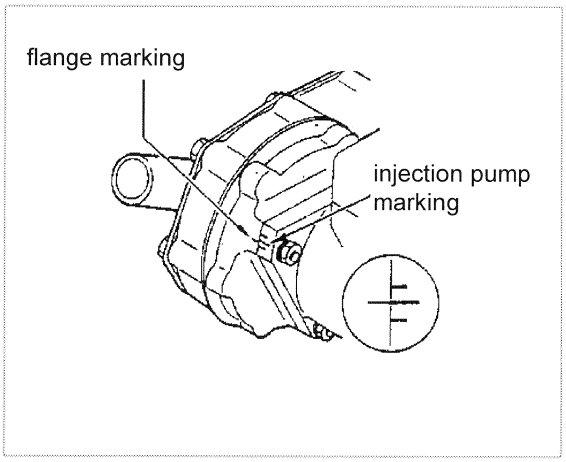


Injection nozzle



Removal of the injection pump

- Check the alignment of the marking on the injection pump with the marking on the flange.

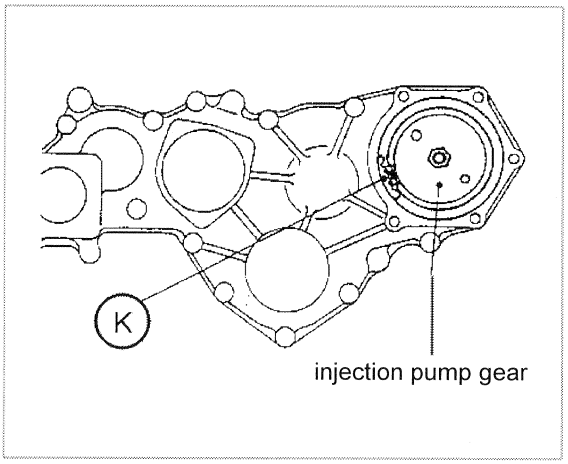


- Remove the front cover of the injection pump gear.

- Make markings **(K)** at the idler gear and injection pump gear.
- Slacken the bolts of the intermediate flange and remove the injection pump including the intermediate flange and gear.

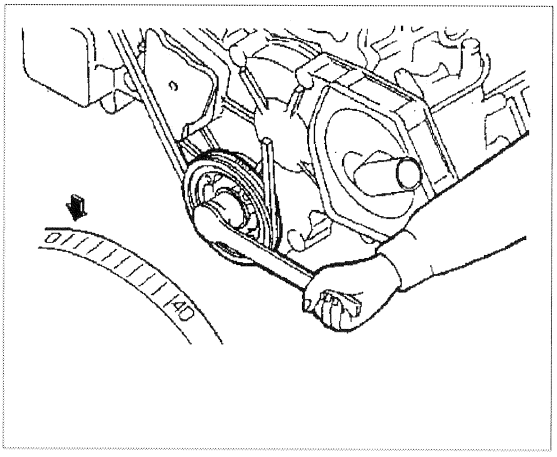
Make sure that the engine does not turn after the removal of the injection pump.

To remove the gear of the injection pump, slacken the nut of the gear prior to the removal of the pump.

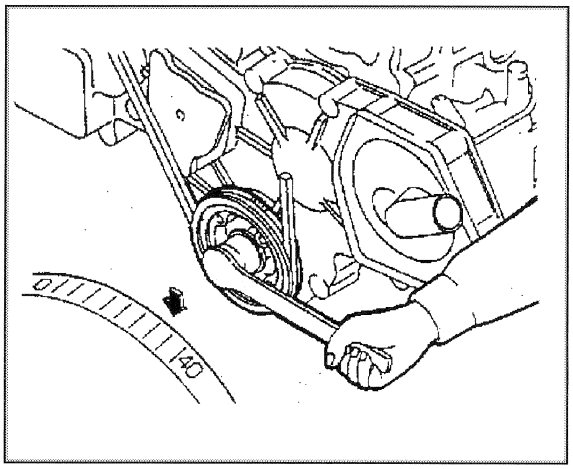


Check the injection timing

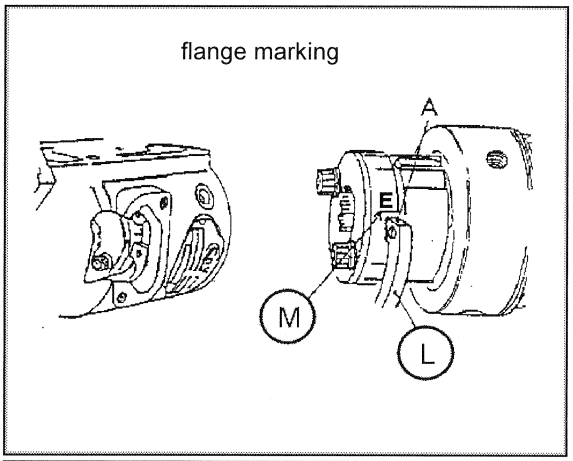
- Adjust the piston no. 1 to top dead centre.



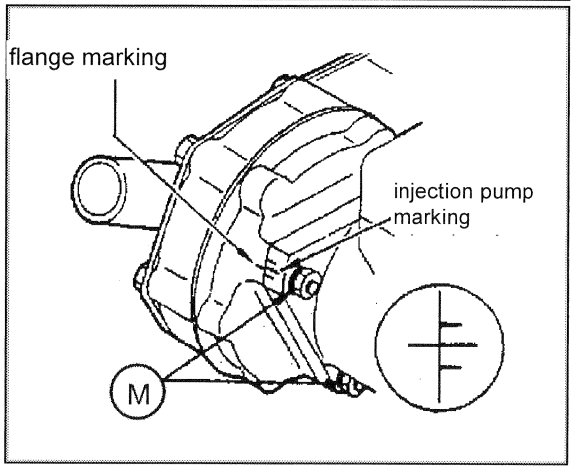
- Turn the crankshaft approximately 30° counter-clockwise, facing the engine front side (fan side). Then slowly turn clockwise up to 20° before top dead centre until the marking on the crankshaft V-belt pulley is in line with the one of the control housing.
- Remove the maintenance cover from the fuel injection pump.



- Make sure that the flat side „A“ of the circlip aligns with marking „E“ on the setting plate. If this is alright, the injection timing is adjusted correctly.

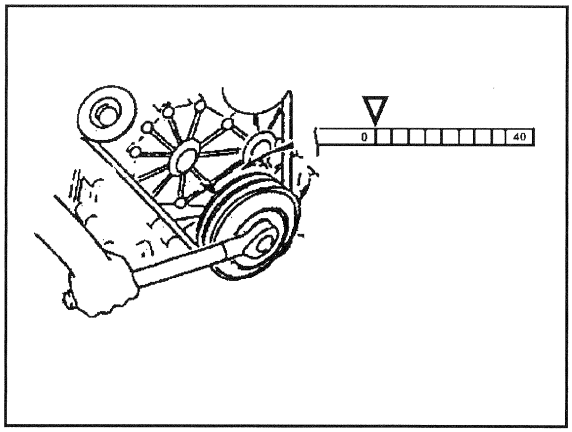


- If the flat side „A“ is not in alignment with line „E“, the nuts holding the injection pump are to be slackened and the pump is to be turned in such a manner that the markings align.
- Hold the injection pump in that position and tighten the nuts.



Engine control

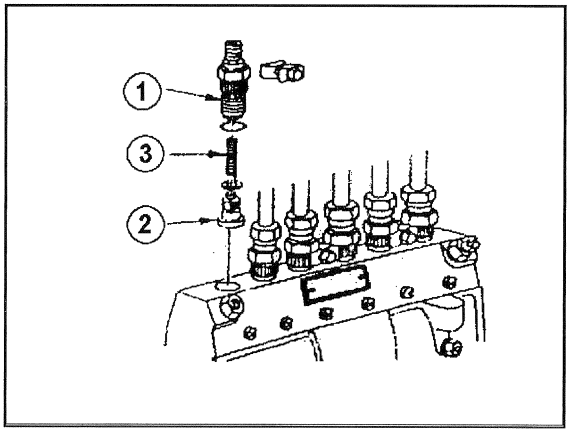
The setting data of the injection system depends on the performance, speed (rpm) and specification of the engine. For the correct data, please refer to the documentation of the engine manufacturer.



1) Adjustment of the first piston to top dead centre in compression stroke

a) Turn the crankshaft clockwise (with a view of the engine front side) until the „O“ at the crankshaft V-belt pulley is in line with the marking.

b) Press the inlet and outlet rocker at the first cylinder downward.
Tappets must be free.



2) Check of the injection timing

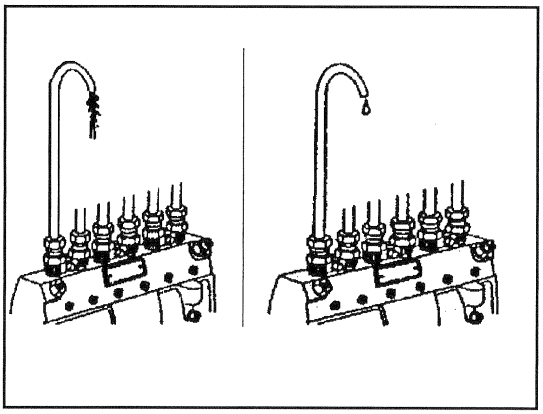
a) Remove the retainer ring of the valve holder for the first cylinder at the injection pump.

b) Dismount the valve holder (1) for the first cylinder. Remove the piston of the pressure valve (2) and the spring (3).

c) Re-mount the valve holder (1).

d) Mount the overflow pipe on the valve holder (1) for the first cylinder.

e) Turn the crankshaft until the piston of the first cylinder is 60° before top dead centre.



f) Turn the crankshaft in engine turning direction by operating the hand feed pump until the fuel flow from the overflow pipe stops.

g) Check injection timing (marking on the crankshaft V-belt pulley of the crankshaft).

3) Adjustment of the injection timing

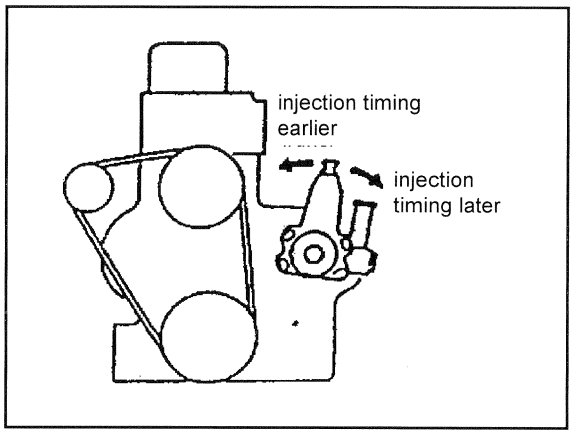
a) If the injection timing must be changed, turn the injection pump as shown in the illustration opposite.

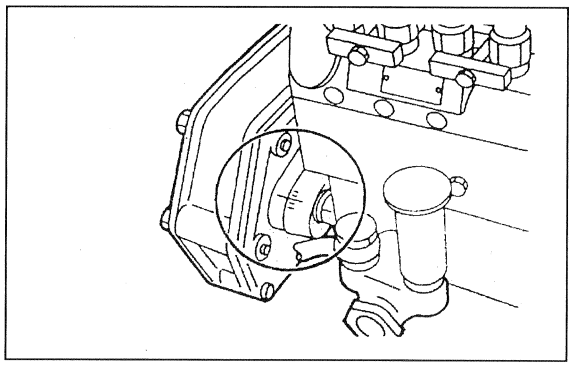
b) Only the setscrew for max. engine speed is sealed.

c) If this setting is checked and adjusted, please ensure that there is somebody near the engine to be able to operate the engine cut-off mechanically in case of engine overspeeding.

d) A marking unit at the injection pump flange changes the injection timing by 6° to the crankshaft angle.

For inspections and settings warm the engine up thoroughly until the coolant and engine oil temperatures are higher than 70°C (158° F).





Off-load min. speed (idle running speed) and max. speed setting

a) The off-load min. speed (idle running speed) as well as the max. speed of each engine are set on the test bench in the factory. The setscrew for max. speed is sealed. These settings are to be performed by an authorised workshop only.

b) After removing the leaden seals and adjusting the regulator, all visisble stops are to be sealed as though they would have been sealed by the factory.

c) It is decisive for the settlement of warranty claims whether the stop screw leaden seals are alright or not.

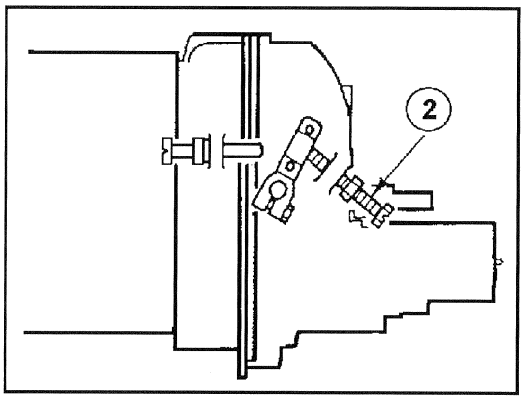
d) ***When this setting is checked and adjusted, please make sure that there is somebody near the engine in order to be able to stop engine mechanically in case of engine overspeeding.***

1) Engine start-up

a) Set speed adjusting lever to high idle running speed. Actuate starter.
b) The engine fires from a crankshaft speed of 150 min^{-1}. When the engine is running, the speed is to be held between 800 and 1,000 min^{-1}.
c) When the engine is running with constant speed, the speed adjusting lever is to be brought into idle running position.

2) Set off-load low idle running speed

a) Hold the speed adjusting lever in off-load min. speed position and set low idle running speed by means of the setscrew (2)

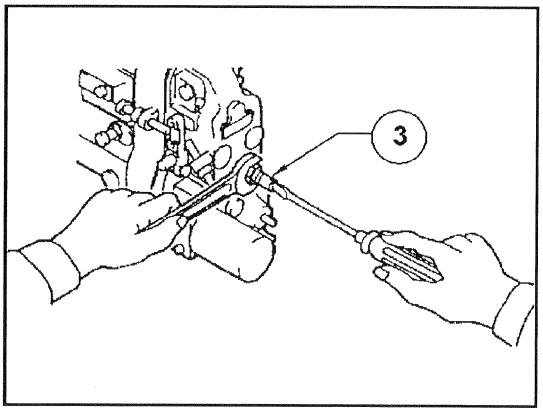


In case of a critical speed (speed resulting in bad engine vibrations due to torsional oscillations), a higher or lower speed range is to be chosen.

b) Engine speed increase:
Turn the setscrew of the low idle running speed clockwise.

To be performed by trained and qualified personnel only:

c) In case of speed variations (fluctuations of the engine), turn the setscrew (3) of the idle running speed spring clockwise to increase the spring preload.



An excessive spring preload results in engine overspeeding with the load decreasing. Make sure that this is prevented.

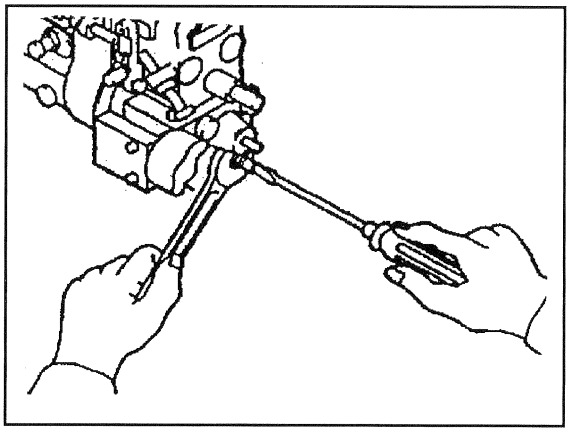
3) Set max. output (capacity)

To be performed by trained and qualified personnel only:

a) Bring speed adjusting lever into full load position and load engine with its indicated output.

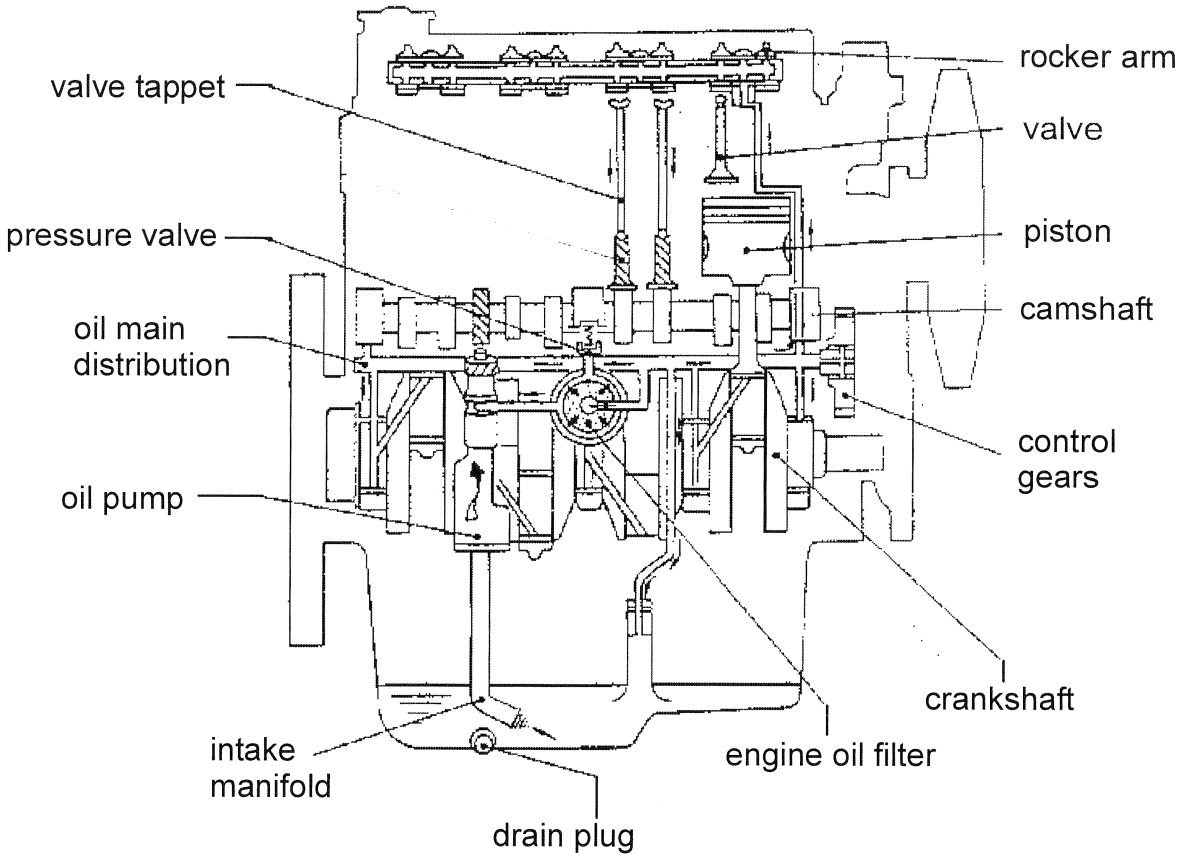
b) While the engine is running with constant speed, adjust the full load stop screw in such a manner that the engine achieves its indicated output.

c) If the full load stop screw is turned counter-clockwise, the capacity is reduced, and the engine speed is lowered.
If the full load stop screw is turned clockwise, the capacity is increased, and the exhaust gas values deteriorate.

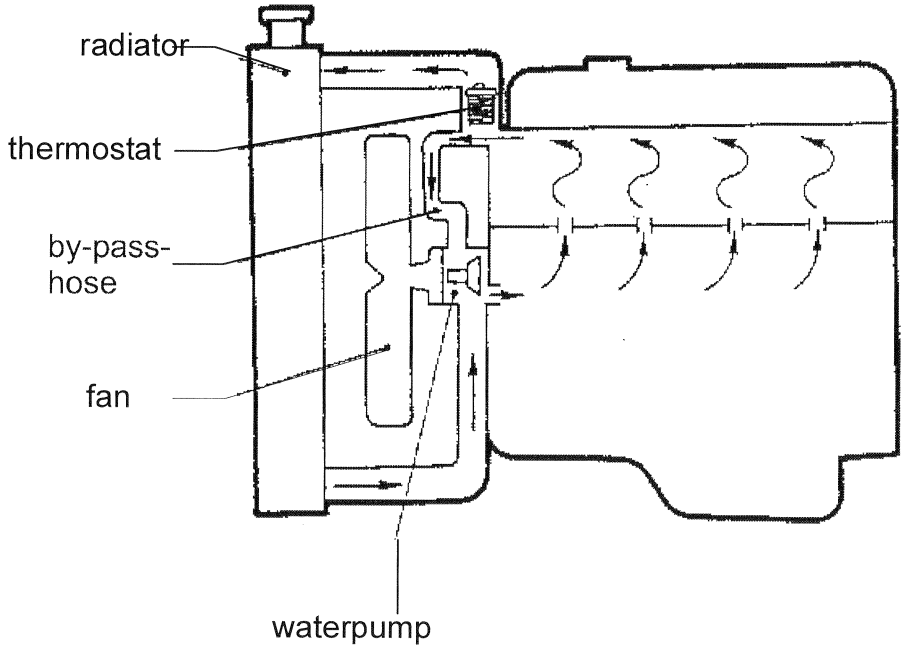


This setting can only be performed on the test bench as it is sealed by the factory.

Oil circuit



Water circuit



SCHAEFF	Typ/Model/Type **Mitsubishi S 4 Q - 2- 61 KL**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Diesel engine**	Blatt/Page/Feuille **3.800.07**

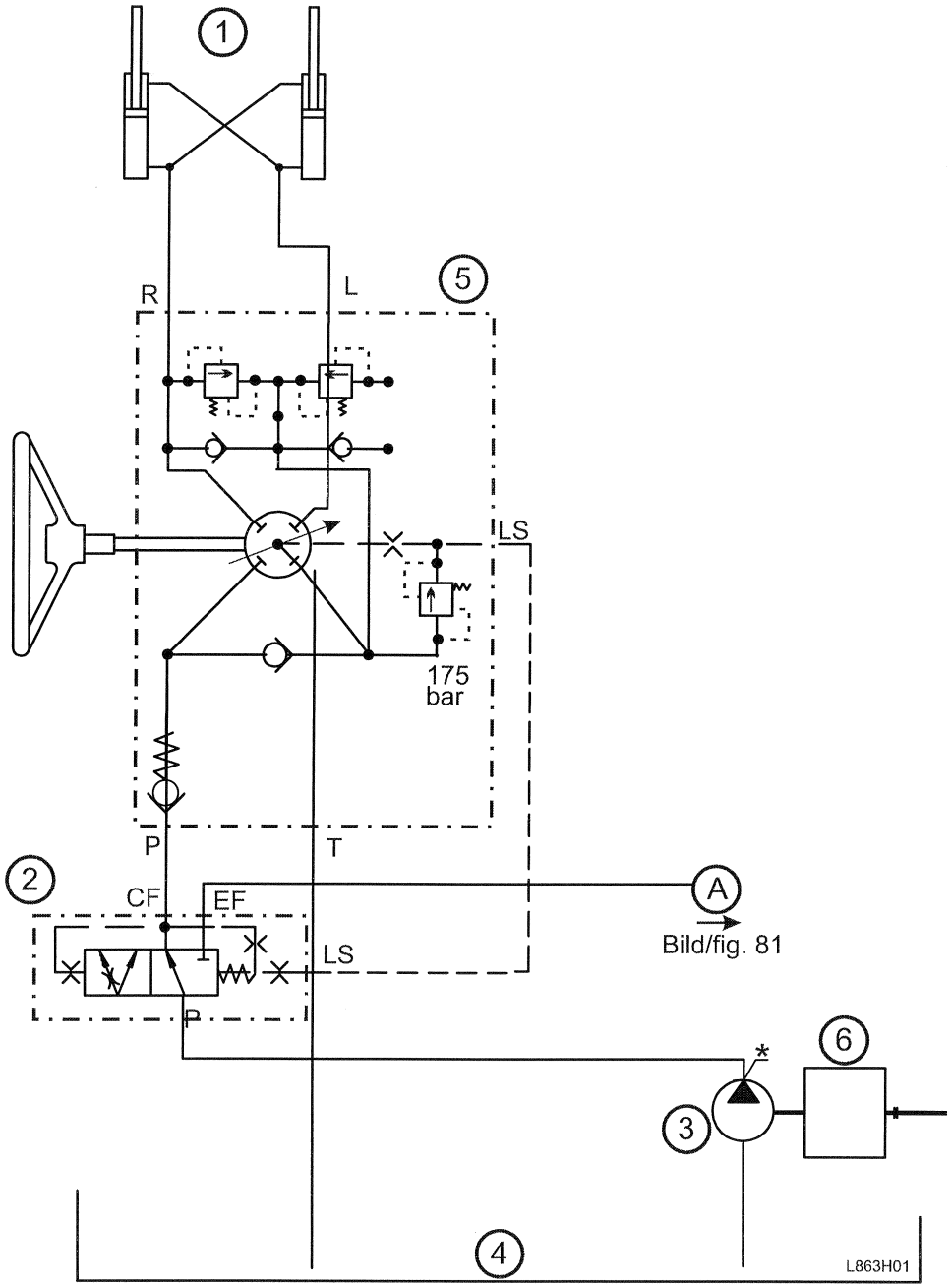
SUBGROUP LIST

Hydraulic system

Diagrams - schemes

SKL 863	4.11
SKL 873 / SKL 873 SP / SKL 200	4.13
SKL 824	4.22
SKL 834	4.24
SKL 844	4.26
SKL 854	4.27
SKL 160	4.28
SKL 260	4.30
SKS 634	4.37
HML 22	4.49
HML 23	4.49.50
HML 31	4.50
HML 32	4.51
HML 41	4.52
HML 42	4.53
HR 20	4.60
HR 32	4.65
HR 42	4.67
HR 11	4.73
HR 12	4.74
HR 13	4.75
HR 14	4.76
HR 16	4.78
HR 18	4.80
HR 1.5	4.90
HR 1.6	4.91
HR 2.0	4.92
HR 3.7	4.97

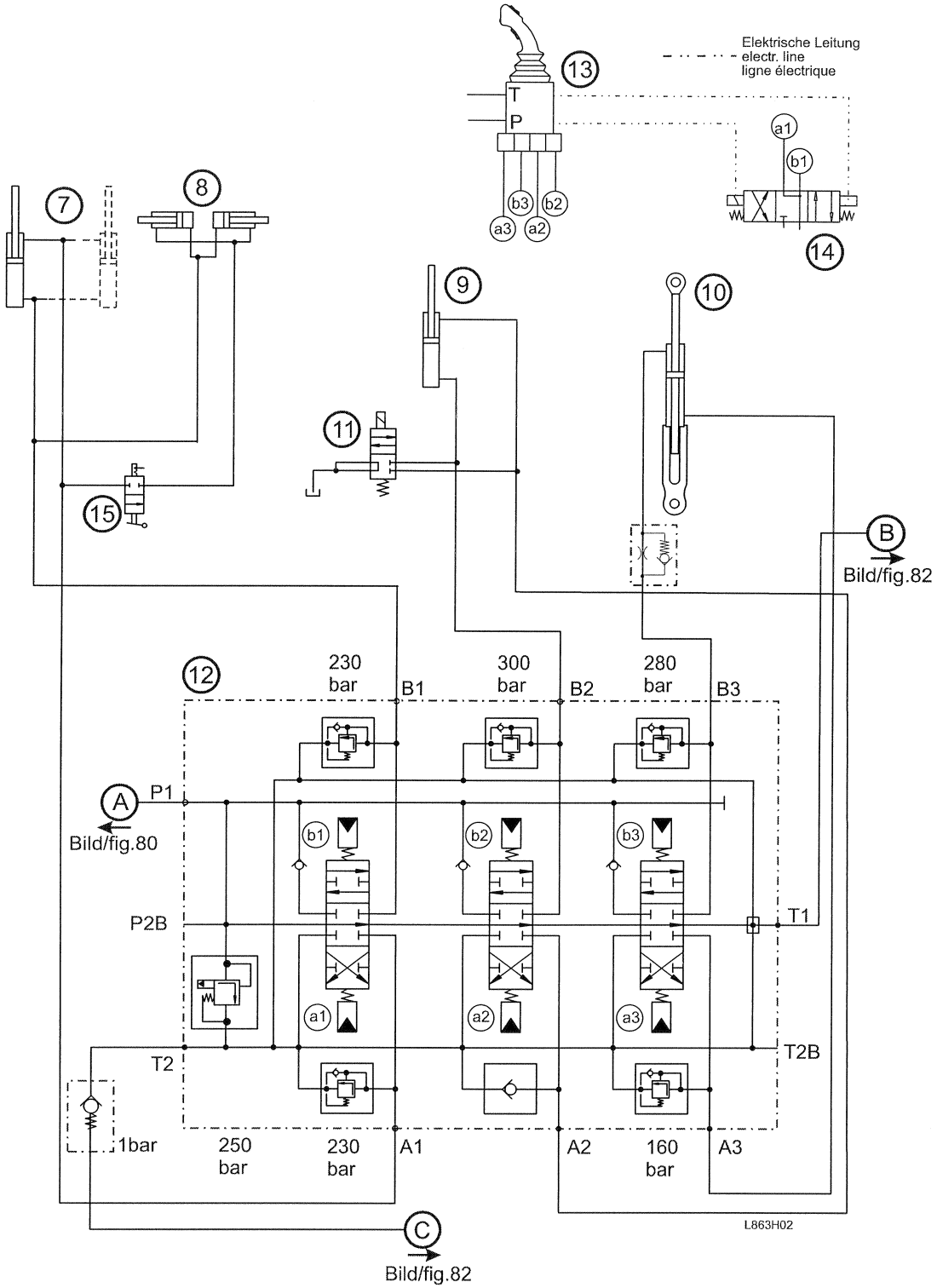
TEREX | SCHAEFF



1 Steering cylinder
2 Priority valve
3 Steering/loading pump
4 Hydraulic oil tank
5 Steering unit
6 Diesel engine

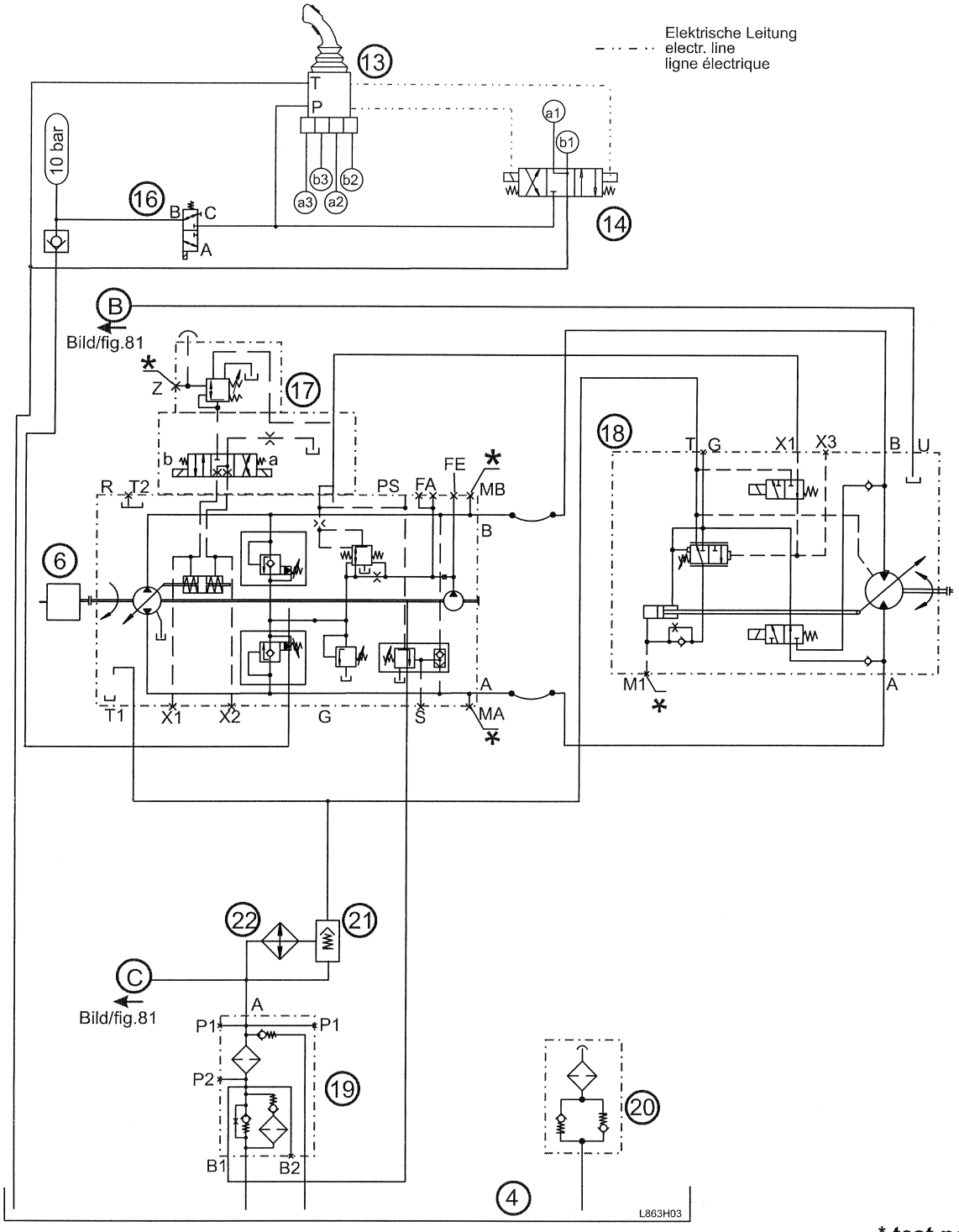
* test port

SCHAEFF	Typ/Model/Type **SKL 863**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, steering**	Blatt/Page/Feuille **4.11.01**



7 Hydr. cylinder - Multi-purpose bucket, etc.
8 Hydr. cylinder - Quick-mount hitch
9 Hydr. cylinder - Lifting frame
10 Hydr. cylinder - Tilt bucket
11 Float position
12 Control valve
13 Joystick
14 Additional control circuit
15 Ball valve

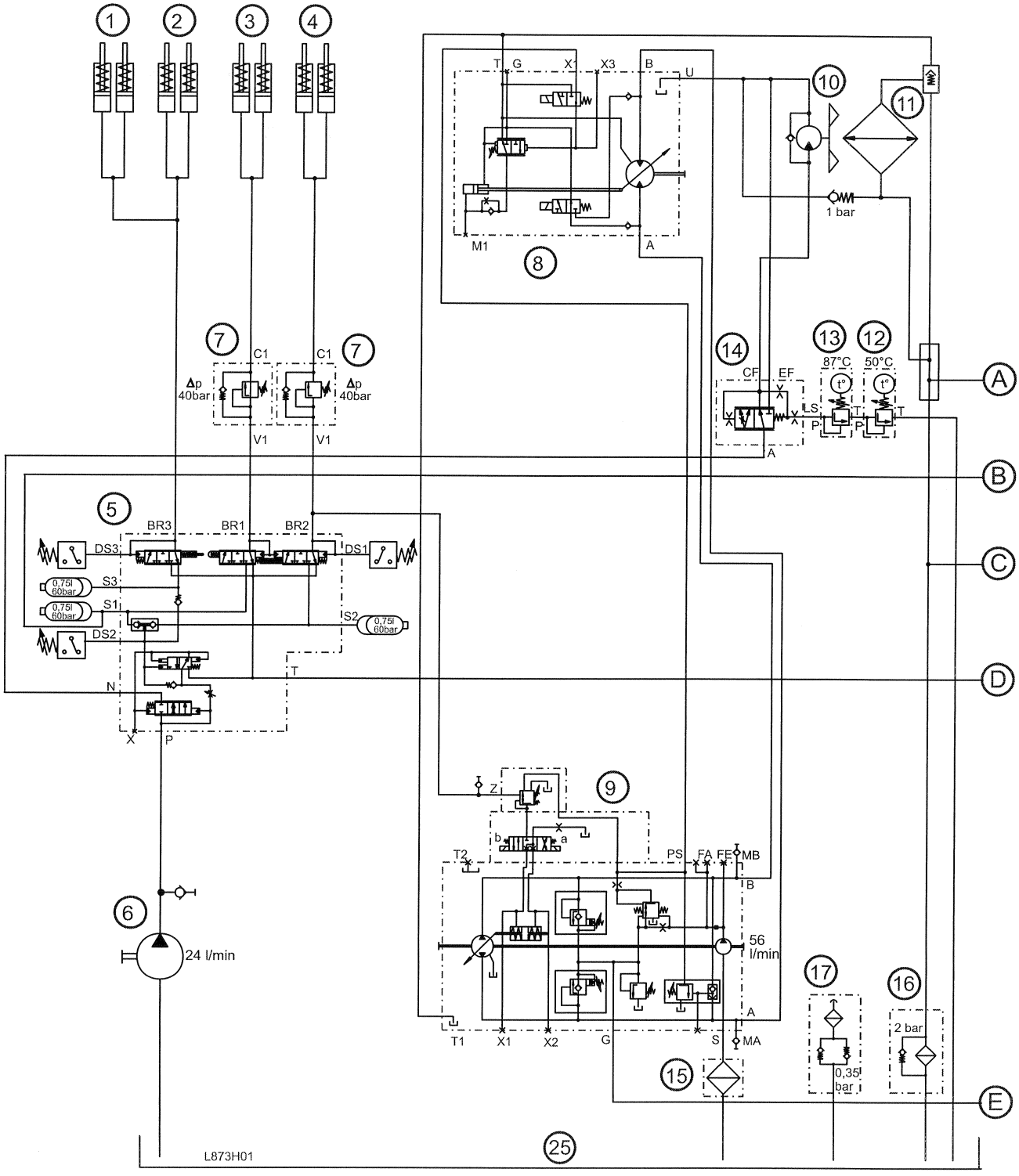
SCHAEFF	Typ/Model/Type **SKL 863**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, loading system**	Blatt/Page/Feuille **4.11.02**



*** test port**

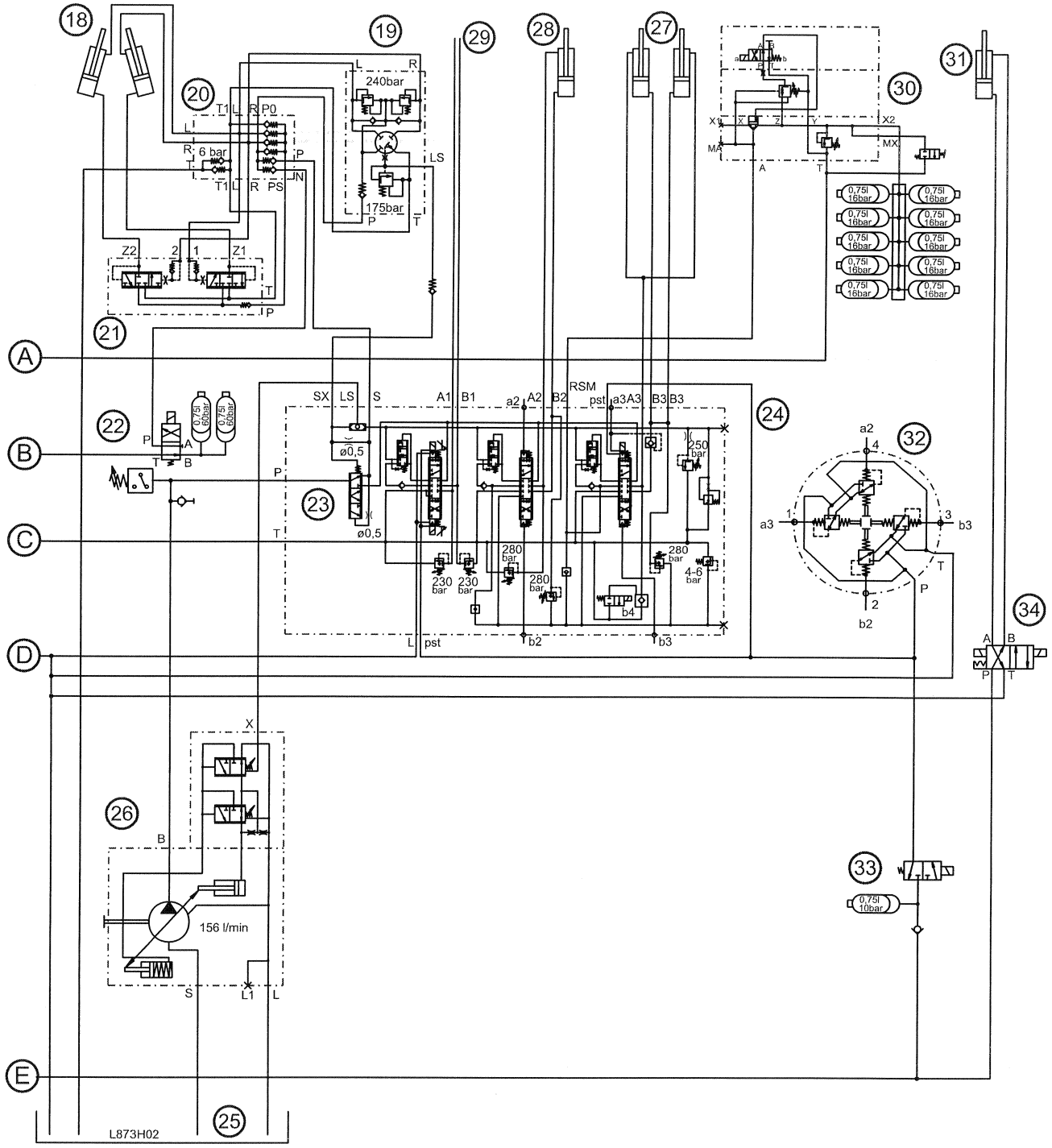
4	Hydraulic oil tank	17	Travel pump
6	Diesel engine	18	Travel motor
13	Joystick	19	Hydraulic oil combined filter
14	Additional control circuit	20	Ventilation filter
16	Cut-off valve - working hydraulics	21	Hydraulic oil temperature regulator
		22	Hydraulic oil cooler

SCHAEFF	Typ/Model/Type **SKL 863**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram - travelling, pilot control for loading system**	Blatt/Page/Feuille **4.11.03**



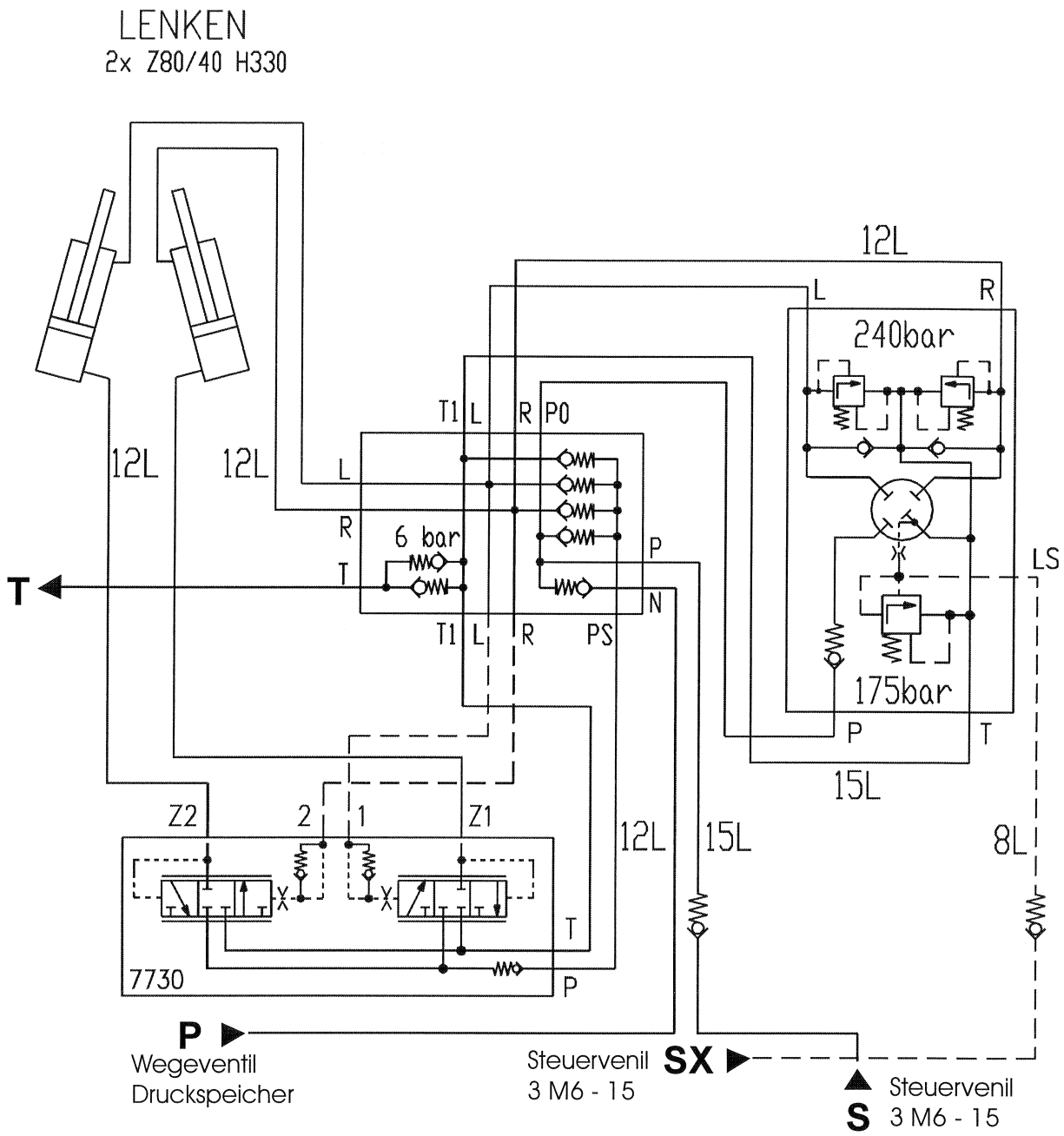
SCHAEFF	Typ/Model/Type **SKL 873 (from serial no. 873/0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, complete, part 1**	Blatt/Page/Feuille **4.13.01**

1	Parking brake, rear axle
2	Parking brake, front axle
3	Service brake, rear axle
4	Service brake, front axle
5	Brake control system
6	Gear pump on accessoy drive - brake, radiator drive
7	Valve
8	Travel motor
9	Travel pump
10	Fan motor
11	Hydraulic oil radiator
12	Hydraulic oil tank temperature sensor
13	Water radiator temperature sensor
14	Fan motor selector valve
15	Hydraulic oil, suction filter
16	Hydraulic oil, return filter
17	Ventilation filter
18	Steering cylinder
19	Steering orbitrol
20	Logic block
21	Servo control valve
22	Emergency steering
23	Priority valve (integrated in control valve)
24	Control valve
25	Hydraulic oil tank
26	Axial piston variable-capacity pump
27	Hydr. cylinder - lifting frame
28	Hydr. cylinder - bucket tilt
29	Additional control circuit
30	Ride control system (option)
31	2-gear transmission
32	Joystick
33	Working hydraulics cut-off valve
34	Selector valve



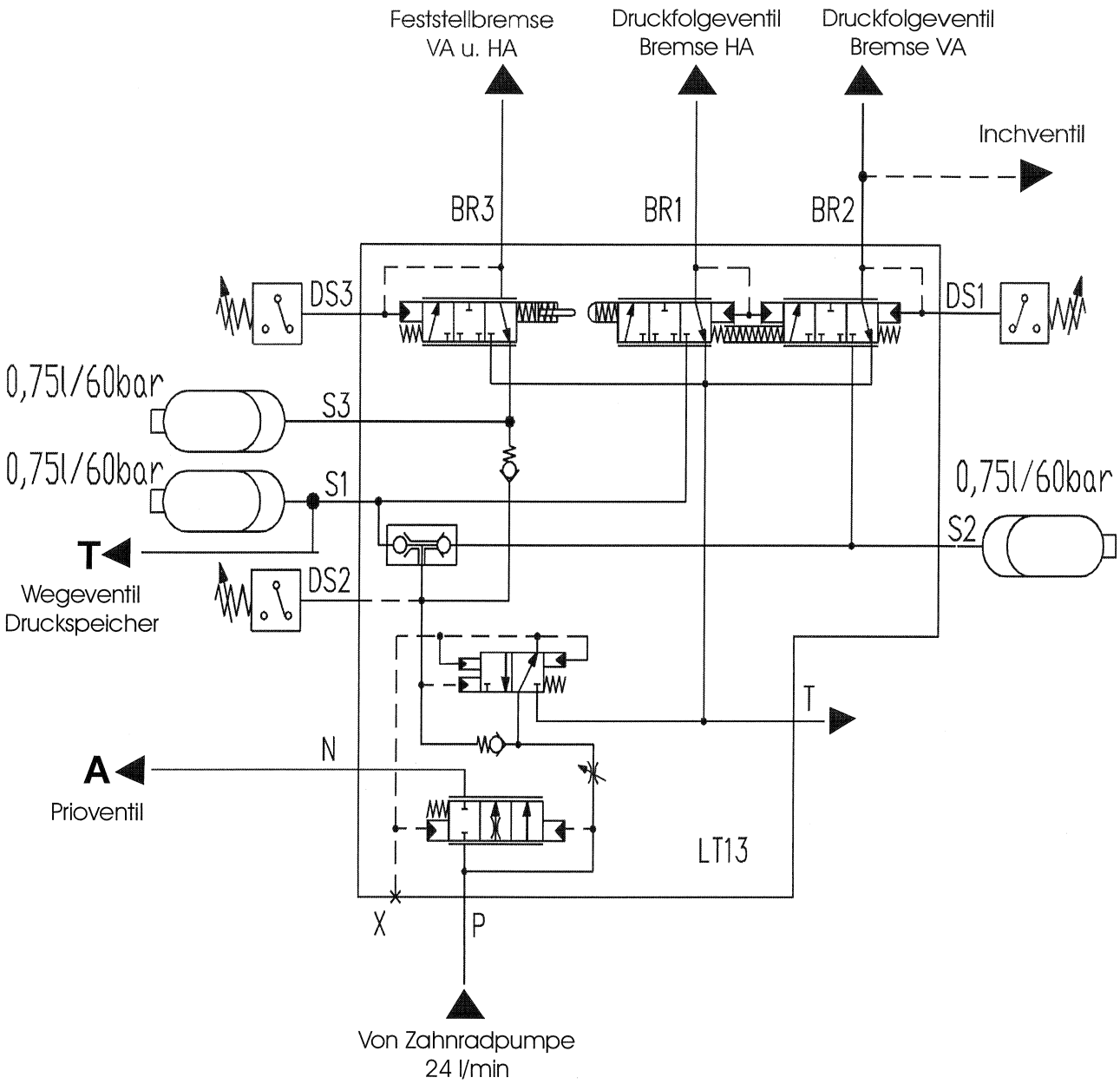
SCHAEFF	Typ/Model/Type **SKL 873 (from serial no. 873/0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, complete, part 2**	Blatt/Page/Feuille **4.13.02**

1	Parking brake, rear axle
2	Parking brake, front axle
3	Service brake, rear axle
4	Service brake, front axle
5	Brake control system
6	Gear pump on accessory drive, radiator drive
7	Valve
8	Travel motor
9	Travel pump
10	Fan motor
11	Hydraulic oil radiator
12	Hydraulic oil tank temperature sensor
13	Water radiator temperature sensor
14	Fan motor selector valve
15	Hydraulic oil, suction filter
16	Hydraulic oil, return filter
17	Ventilation filter
18	Steering cylinder
19	Steering orbitrol
20	Logic block
21	Servo control valve
22	Emergency steering
23	Priority valve (integrated in control valve)
24	Control valve
25	Hydraulic oil tank
26	Axial piston variable-capacity pump
27	Hydr. cylinder - lifting frame
28	Hydr. cylinder - bucket tilt
29	Additional control circuit
30	Ride control system (option)
31	2-gear transmission
32	Joystick
33	Working hydraulics cut-off valve
34	Selector valve



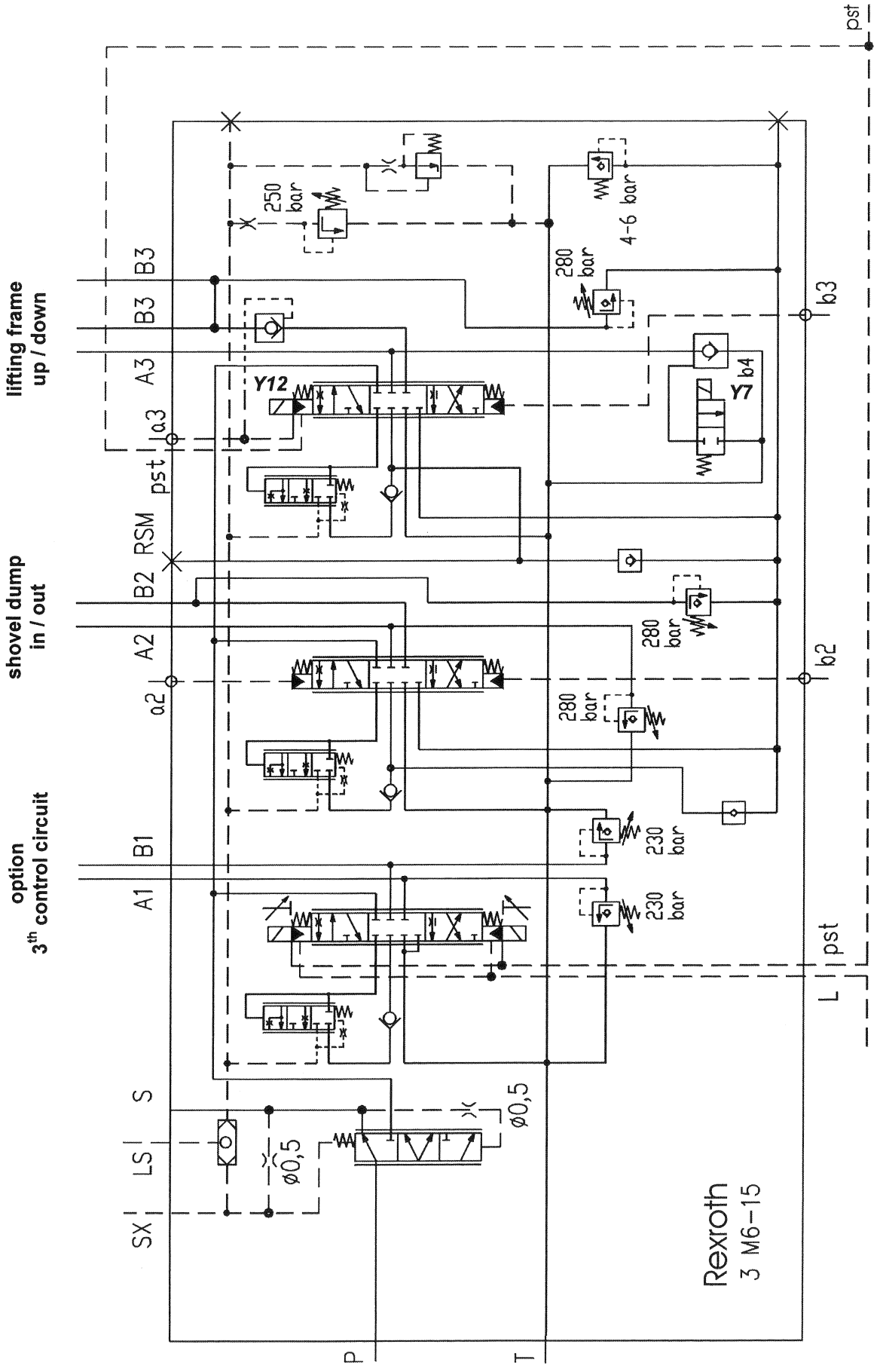
Lenken = steering
Steuerventil = control valve
Wegeventil = solenoid valve
Druckspeicher = pressure accumulator

SCHAEFF	Typ/Model/Type **SKL 873 (from serial no. 873/0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, steering**	Blatt/Page/Feuille **4.13.03**



Wegeventil = solenoid valve
Druckspeicher = pressure accumulator
Prioventil = priority valve
von Zahnradpumpe = from gear pump
Inchventil = inching valve
Druckfolgeventil = pressure sequence valve
Bremse VA = brake front axle
Bremse HA = brake rear axle
Feststellbremse VA und HA = parking brake front axle and rear axle

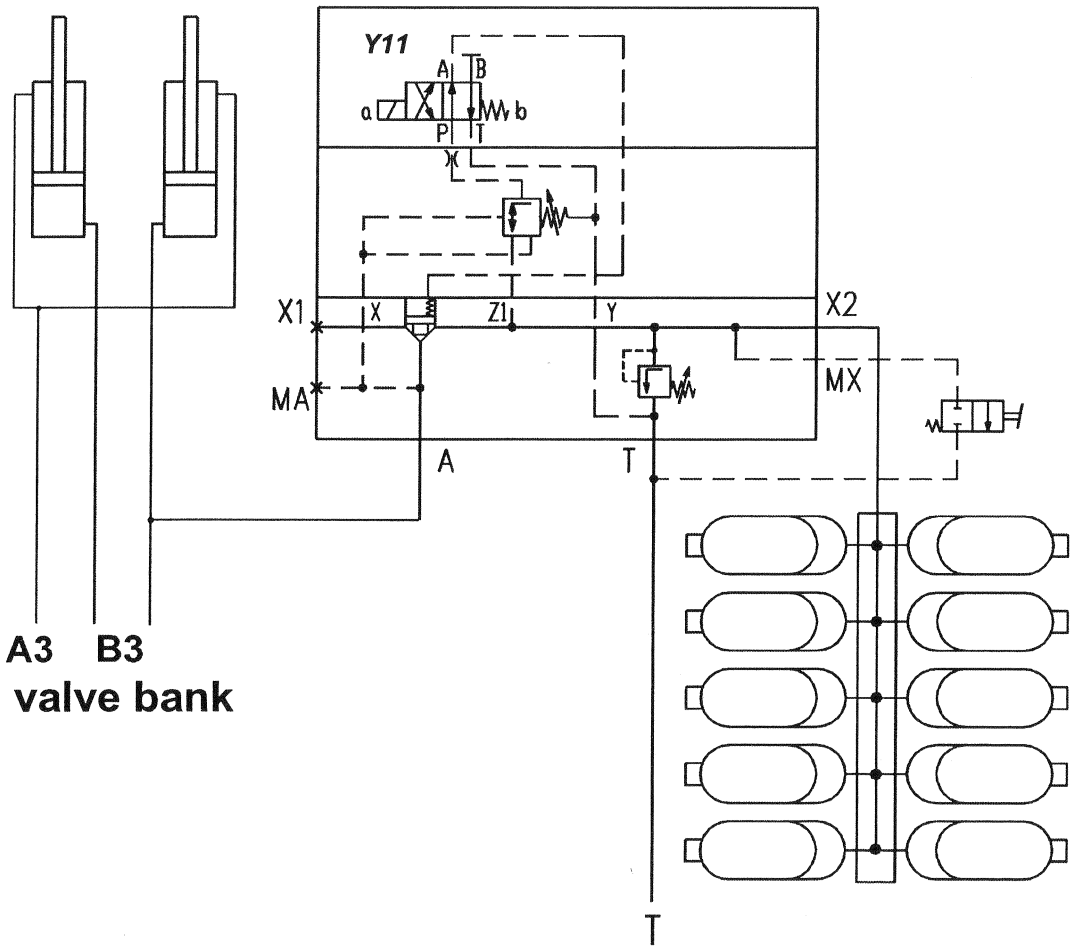
SCHAEFF	Typ/Model/Type **SKL 873 (from serial no. 873/0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, brake**	Blatt/Page/Feuille **4.13.04**



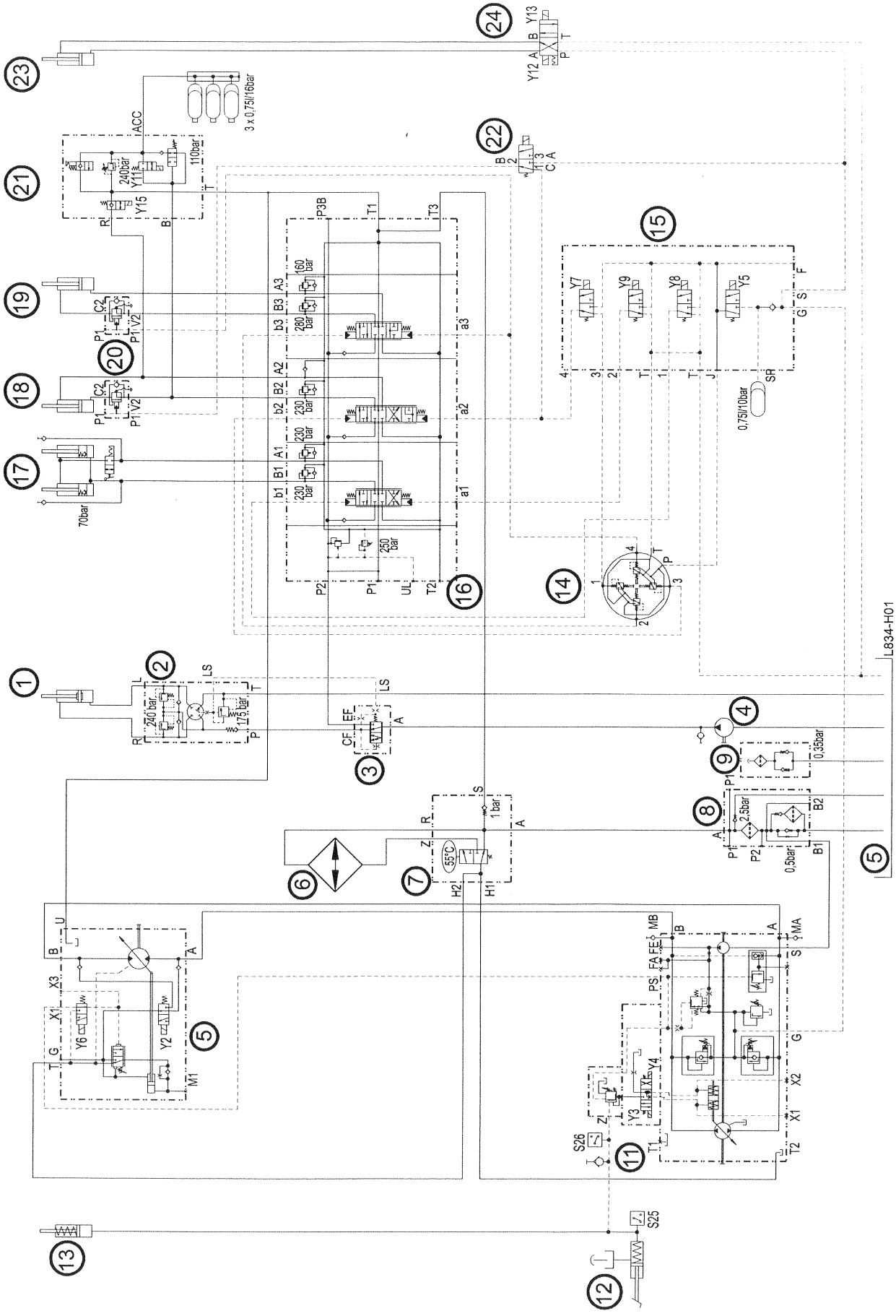
SCHAEFF	Typ/Model/Type **SKL 873 (from serial no. 873 / 0100)**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Hydraulic diagram, control valve**	Blatt/Page/Feuille **4.13.05**

option
ride control system

lifting
2x Z120/70 H670

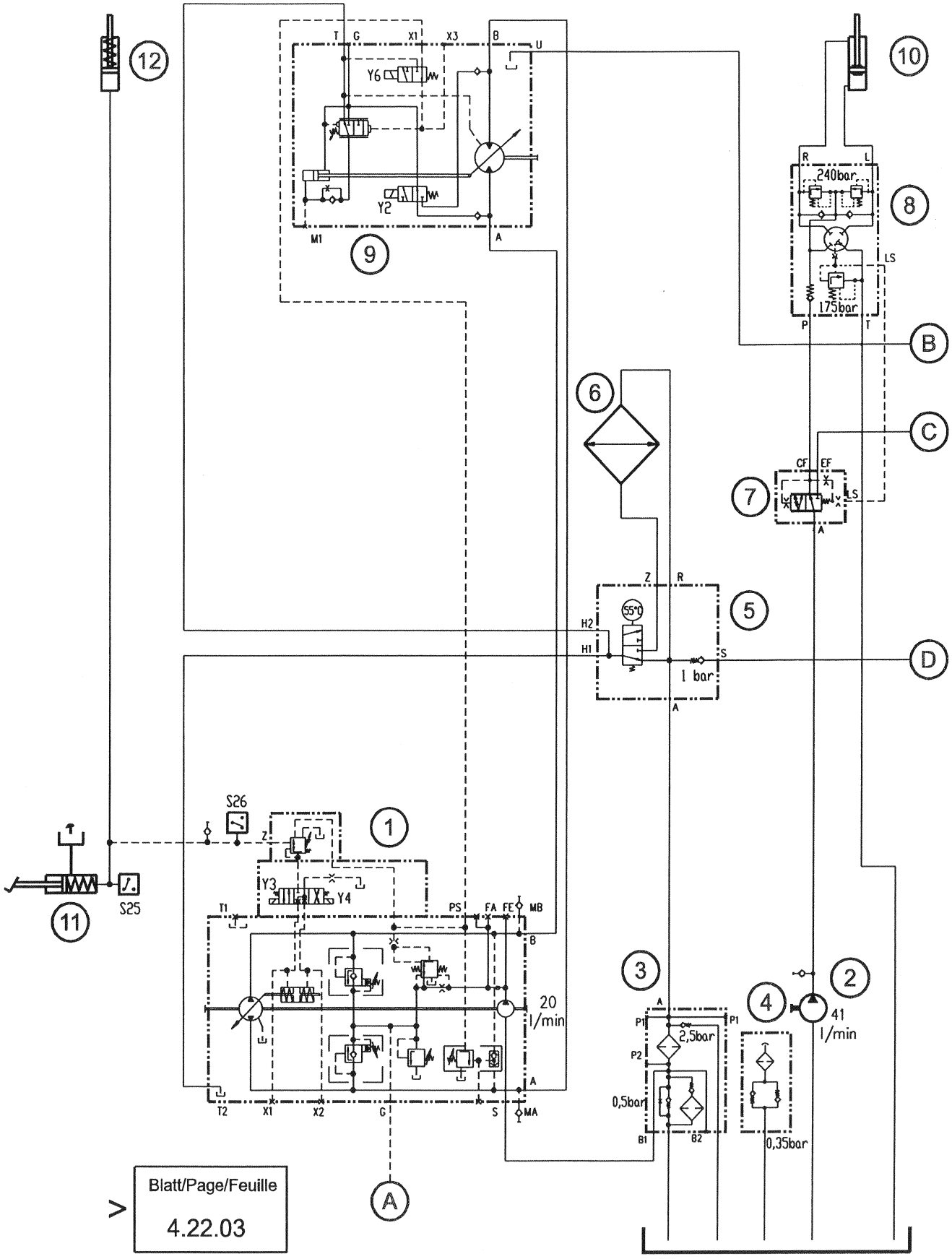


SCHAEFF	Typ/Model/Type **SKL 873 (from serial no. 873/0100)**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Hydraulic diagram, option ride control system**	Blatt/Page/Feuille **4.13.06**



SCHAEFF TEREX	Typ/Model/Type **SKL824 / SKL824 S**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.22.01**

1	Steering cylinder
2	Steering unit
3	Priority valve
4	Steering / loading pump
5	Hydraulic oil tank
6	Hydraulic oil radiator
7	Hydraulic oil temperature control
8	Hydraulic oil combined filter
9	Breather
10	Travel motor
11	Travel pump
12	Main brake cylinder
13	Brake, front axle
14	Loader control lever
15	Pilot control unit
16	Control valve
17	Additional control circuit connection; hydraulic quick-attach system
18	Hydraulic cylinder — lift frame
19	Hydraulic cylinder — bucket tilt
20	Load retaining valves
21	Vibration damping
22	Release valve (only if pos. 20 & 21 exist)
23	Transmission (high-speed version)
24	Valve

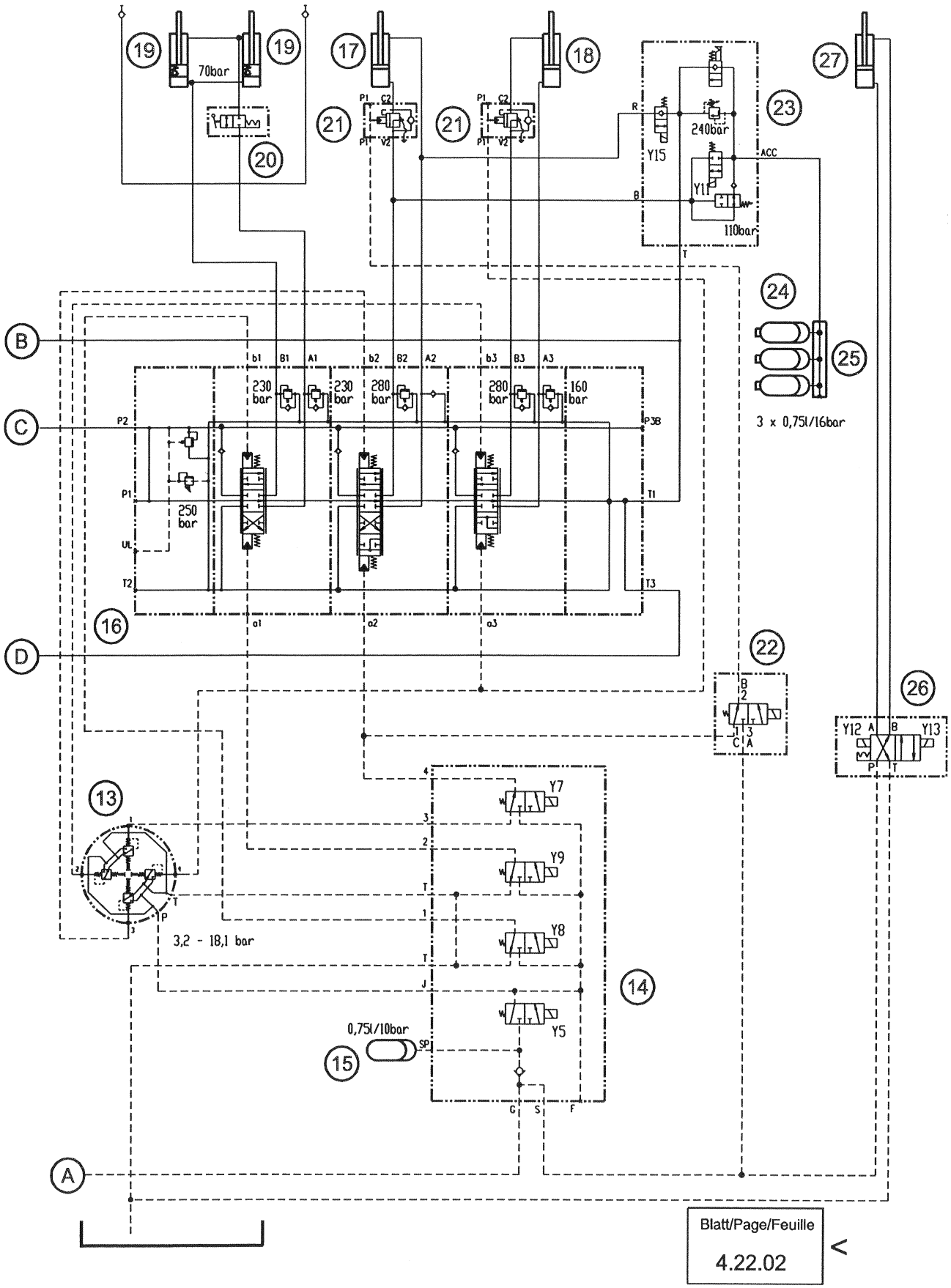


Blatt/Page/Feuille

4.22.03

SCHAEFF TEREX	Typ/Model/Type **SKL 824**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.22.02**

1	Verstellpumpe	Variable displacement pump	Pompe à débit variable
2	Zahnradpumpe	Gear pump	Pompe à engrenages
3	Rücklauffilter	Return filter	Filtre de retour
4	Belüftungsfilter	Vent filter	Filtre d'aération
5	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
6	Ölkühler	Oil cooler	Refroidisseur d'huile
7	Prioritätsventil	Priority valve	Valve prioritaire
8	Lenkaggregat	Steering unit	Esemble direction
9	Verstellmotor Fahren	Variable displacement motor - travel	Moteur à cylindrée variable - translation
10	Hydraulikzylinder Lenken	Hydraulic cylinder steering	Vérin hydraulique direction
11	Hauptbremszylinder	Master cylinder (brake)	Maître – cylindre (vérin)
12	Betriebsbremse (Vorderachse)	Service brake (front axle)	Frein de service (essieu AV)



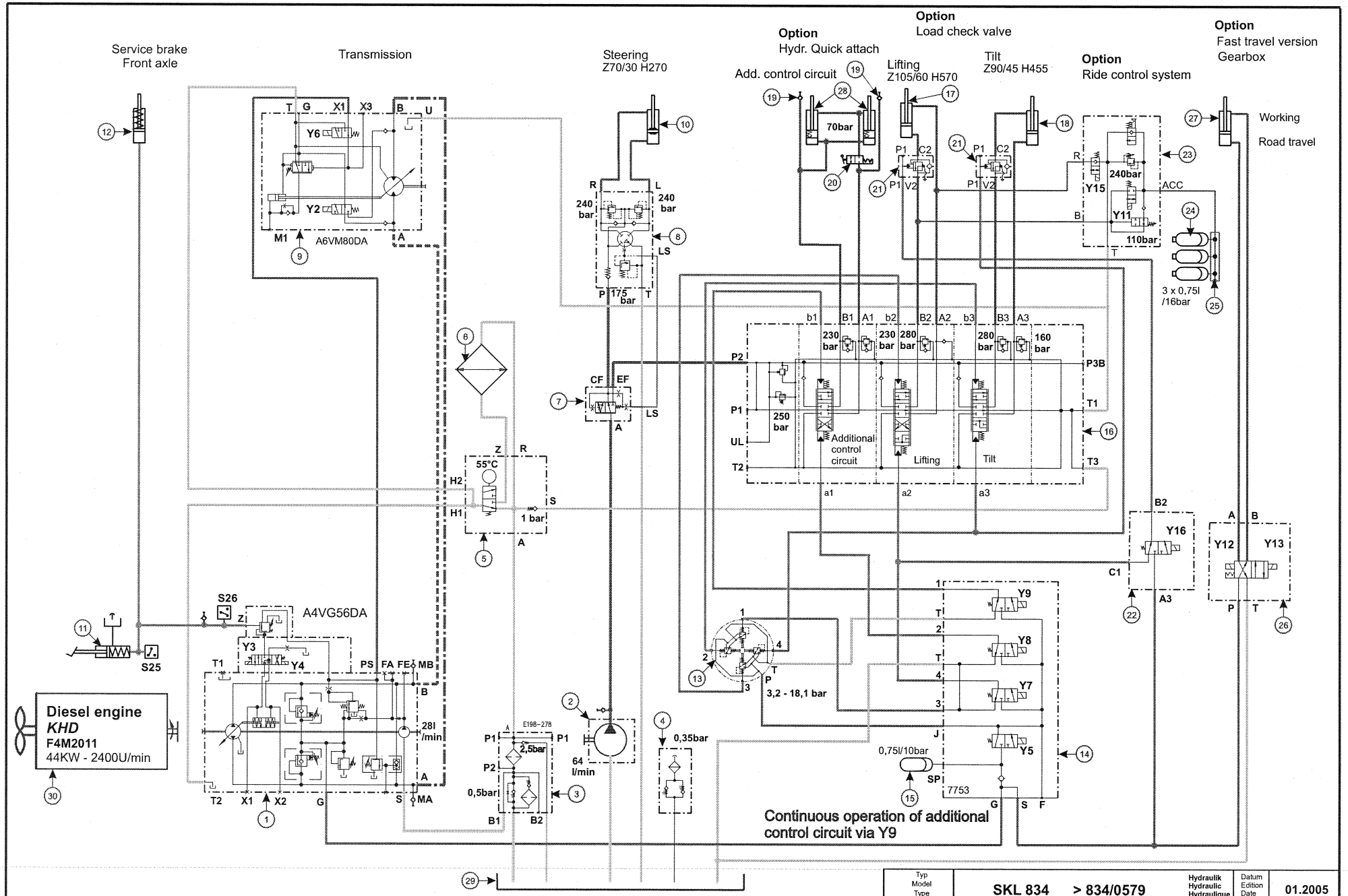
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4.22.02

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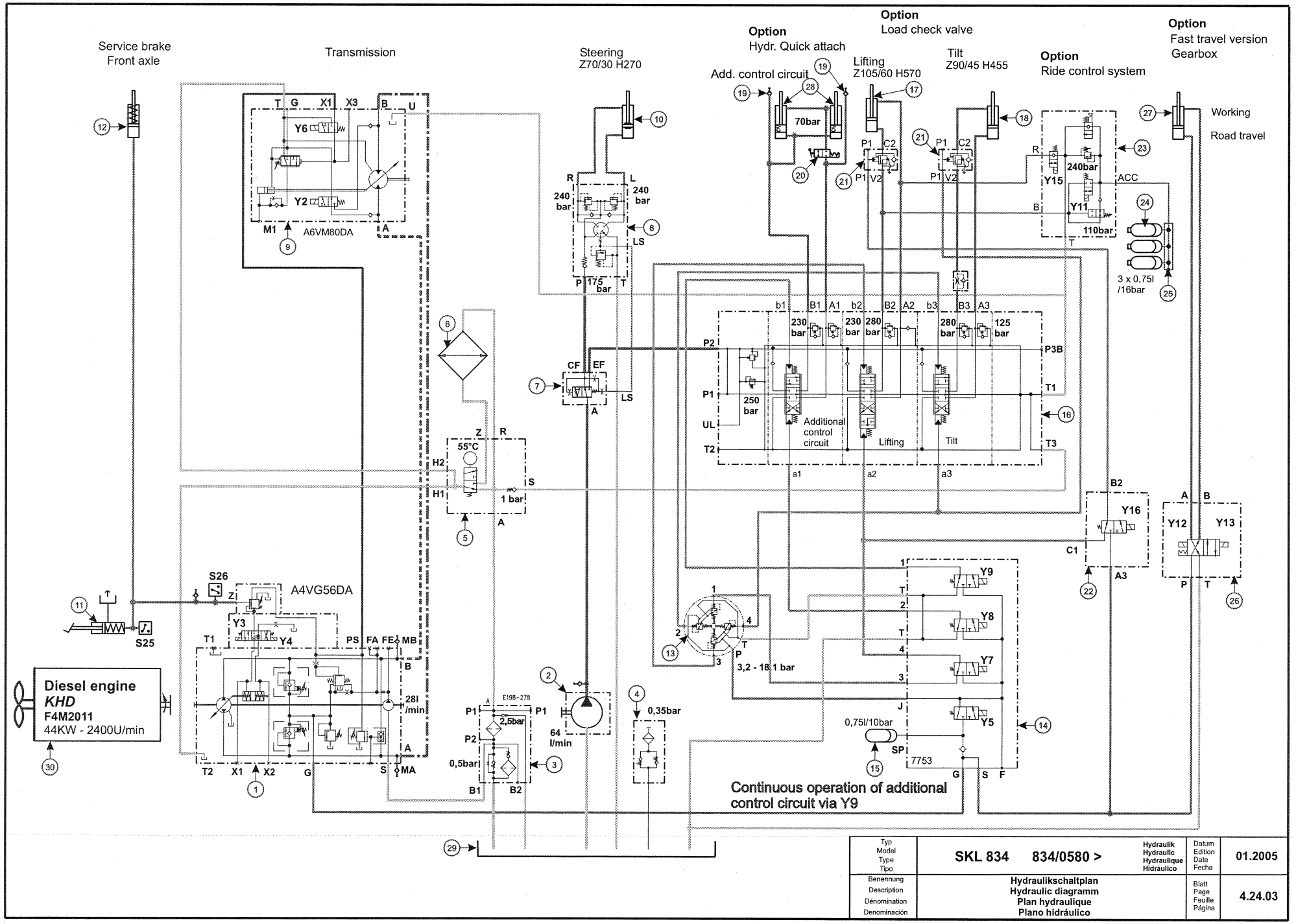
SCHAEFF TEREX	Typ/Model/Type	Datum/Edition/Date
	SKL 824	06.2002
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram	4.22.03

13	Vorsteuergerät	Pilot-operated valve	Distributeur à commande pilote
14	Vorsteuereinheit	Pilot-operated unit	Système pilote
15	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
16	Blocksteuergerät	Valve bank	Distributeur
17	Hydraulikzylinder - Hubrahmen	Hydraulic cylinder - lifting frame	Vérin hydraulique - bras de levage
18	Hydraulikzylinder - Schaufel kippen	Hydraulic cylinder - dump shovel	Vérin hydraulique - basculement godet
19	Zusatzsteuerkreis – (Schnellwechsel-aufhängung)	Additional control circuit (quick change suspension)	Circuit supplémentaire (suspension attache rapide)
20	Umschalthahn	Crossover	Robinet-inverseur
21	Lasthalteventil	Load check valve	Clapet de sécurité
22	3/2 Wegeventil	3/2 Control valve	Distributeur 3/2
23	Steuerblock	Control block	Bloc commande
24	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
25	Speicherblock	Accumulator bloc	Bloc accumulateur
26	3/2 Wegeventil (schnell / langsam)	3/2 Control valve (low / high speed)	Distributeur 3/2 (petite / grande vitesse)
27	Hydraulikzylinder - Schaltgetriebe	Hydraulic cylinder gearbox	Vérin hydraulique - boîte de vitesses


Service brake
Front axle
Transmission
Steering
Z70/30 H270
Option
Hydr. Quick attach
Add. control circuit
Lifting
Z105/60 H570
Option
Load check valve
Tilt
Z90/45 H455
Option
Ride control system
Option
Fast travel version
Gearbox
Working
Road travel
A6VM80DA
A4VG56DA
Diesel engine
KHD
F4M2011
44KW - 2400U/min
Additional control circuit
Lifting
Tilt
3,2 - 18,1 bar
Continuous operation of additional control circuit via Y9
SKL 834 > 834/0579
Hydraulikschaltplan
Hydraulic diagramm
Plan hydraulique
Plano hidráulico
01.2005
4.24.01

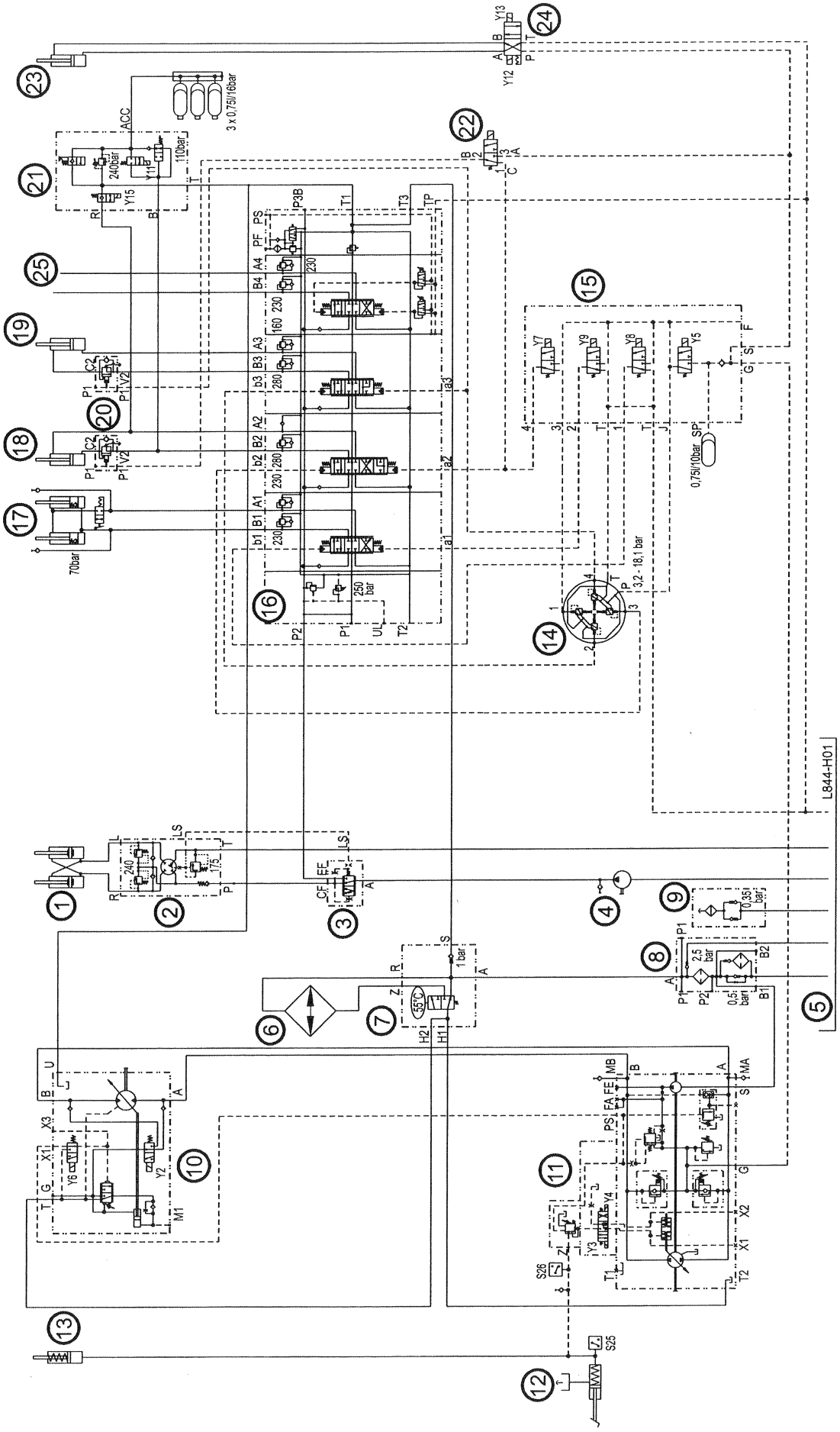
Pos. Item Rep. No.	Deutsch	English	Français
1	Verstellpumpe	Variable displacement pump	Pompe à débit variable
2	Zahnradpumpe	Gear pump	Pumpe à engrenage
3	Rücklauffilter, Saugfilter	Return filter, suction filter	Filtre de retour, filtre d'aspiration
4	Belüftungsfilter	Vent filter	Filtre d'aération
5	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
6	Ölkühler	Oil cooler	Refroidisseur d'huile
7	Prioritätsventil	Priority valve	Valve prioritaire
8	Lenkaggregat	Steering unit	Ensemble direction
9	Verstellmotor - Fahren	Variable displacement motor - travel	Moteur à cylindrée variable - translation
10	Hydraulikzylinder - Lenken	Hydraulic cylinder - steering	Vérin hydraulique - direction
11	Hauptbremszylinder	Master cylinder (brake)	Maître - cylindre (frein)
12	Betriebsbremse (Vorderachse)	Service brake (front axle)	Frein de service (essieu AV)
13	Vorsteuergerät	Joy stick	Distributeur à commande assistèe
14	Vorsteuereinheit	Pilot - operated unit	Système pilotage
15	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
16	Blocksteuergerät	Valve bank	Bloc distributeur
17	Hydraulikzylinder - Hubrahmen	Hydraulic cylinder - lifting frame	Vérin hydraulique - bras de levage
18	Hydraulikzylinder - Schaufel kippen	Hydraulic cylinder - dump shovel	Vérin hydraulique - basculement godet
19	Zusatzsteuerkreis	Additional control circuit	Circuit supplémentaire
20	Umschalthahn	Ball cock	Robinet - inverseur
21	Lasthalteventil	Load check valve	Clapet de sécurité
22	3/2 Wegeventil	3/2 Solenoid valve	electrovanne 3/2
23	Lastschwingungsdämpfventil	Ride control valve	bloc anti-tangage
24	Hydrospeicher (3x)	Hydraulic accumulator (3x)	Accumulateur hydraulique (3x)
25	Speicherblock	Accumulator bloc	Bloc d'accumulateurs
26	3/2 Wegeventil (schnell / langsam)	3/2 Solenoid valve (low / high speed)	Electrovanne 3/2 (petite / grande vitesse)
27	Hydraulikzylinder - Schaltgetriebe	Hydraulic cylinder - gearbox	Vérin hydraulique - boîte de vitesses
28	Schnellwechselaufhängung	Quick mount hitch suspension	Suspension attache rapide
29	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
30	Dieselmotor	Diesel engine	Moteur diesel

Typ Model Type Tipo	**SKL 834**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación		**Legende** **Legend** **Légende** **Leyenda**	Blatt Page Feuille Página	**4.24.02**


Service brake
Front axle
Transmission
Steering
Z70/30 H270
Option
Hydr. Quick attach
Add. control circuit
Option
Load check valve
Lifting
Z105/60 H570
Tilt
Z90/45 H455
Option
Ride control system
Option
Fast travel version
Gearbox
Working
Road travel
A6VM80DA
A4VG56DA
Diesel engine
KHD
F4M2011
44KW - 2400U/min
Additional control circuit
Lifting
Tilt
Continuous operation of additional control circuit via Y9
SKL 834
834/0580 >
Hydraulikschaltplan
Hydraulic diagramm
Plan hydraulique
Plano hidráulico
01.2005
4.24.03

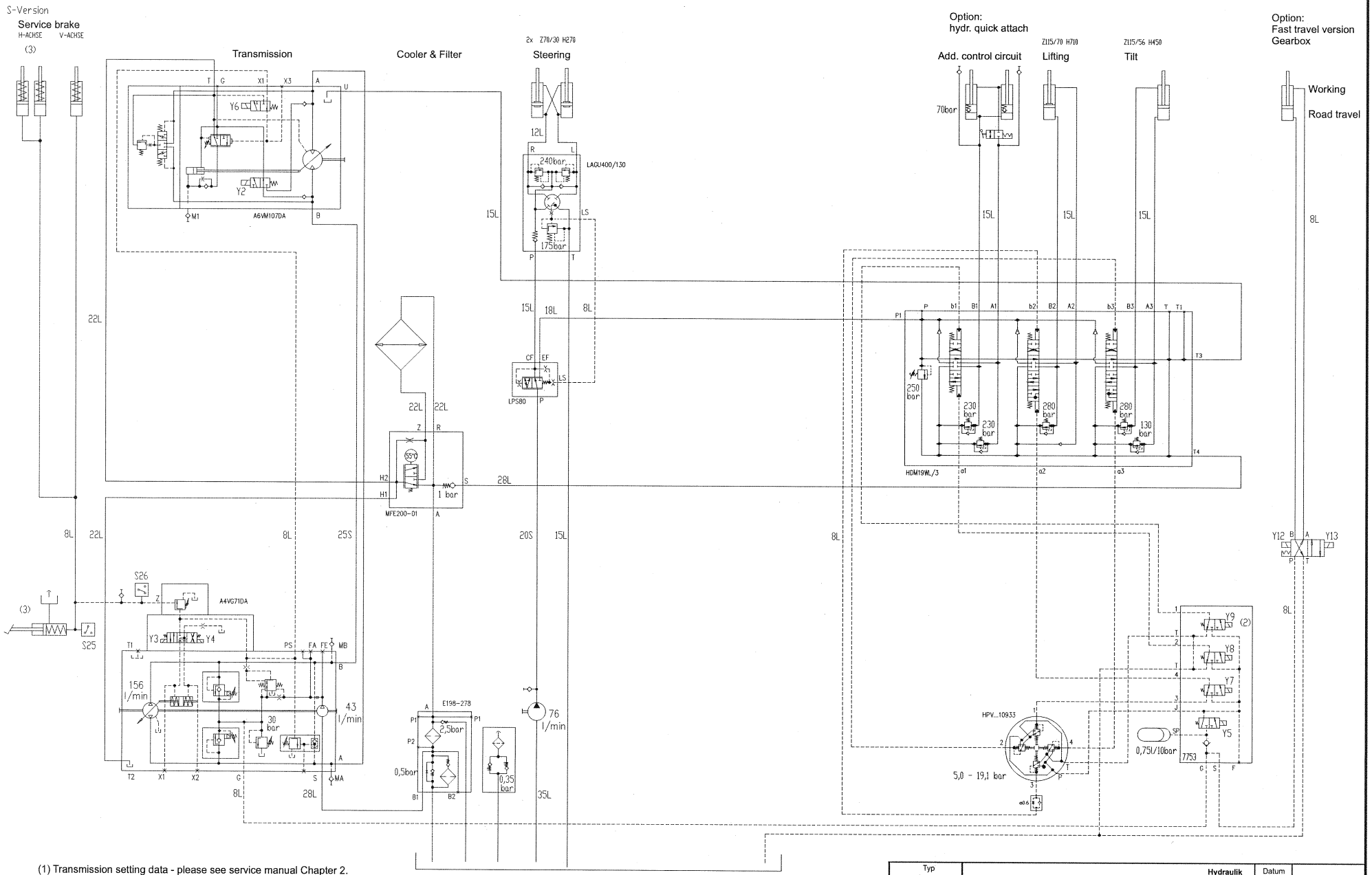
Pos. Item Rep. No.	Deutsch	English	Français
1	Verstellpumpe	Variable displacement pump	Pompe à débit variable
2	Zahnradpumpe	Gear pump	Pumpe à engrenage
3	Rücklauffilter, Saugfilter	Return filter, suction filter	Filtre de retour, filtre d'aspiration
4	Belüftungsfilter	Vent filter	Filtre d'aération
5	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
6	Ölkühler	Oil cooler	Refroidisseur d'huile
7	Prioritätsventil	Priority valve	Valve prioritaire
8	Lenkaggregat	Steering unit	Ensemble direction
9	Verstellmotor - Fahren	Variable displacement motor - travel	Moteur à cylindrée variable - translation
10	Hydraulikzylinder - Lenken	Hydraulic cylinder - steering	Vérin hydraulique - direction
11	Hauptbremszylinder	Master cylinder (brake)	Maître - cylindre (frein)
12	Betriebsbremse (Vorderachse)	Service brake (front axle)	Frein de service (essieu AV)
13	Vorsteuergerät	Joy stick	Distributeur à commande assistèe
14	Vorsteuereinheit	Pilot - operated unit	Système pilotage
15	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
16	Blocksteuergerät	Valve bank	Bloc distributeur
17	Hydraulikzylinder - Hubrahmen	Hydraulic cylinder - lifting frame	Vérin hydraulique - bras de levage
18	Hydraulikzylinder - Schaufel kippen	Hydraulic cylinder - dump shovel	Vérin hydraulique - basculement godet
19	Zusatzsteuerkreis	Additional control circuit	Circuit supplémentaire
20	Umschalthahn	Ball cock	Robinet - inverseur
21	Lasthalteventil	Load check valve	Clapet de sécurité
22	3/2 Wegeventil	3/2 Solenoid valve	electrovanne 3/2
23	Lastschwingungsdämpfventil	Ride control valve	bloc anti-tangage
24	Hydrospeicher (3x)	Hydraulic accumulator (3x)	Accumulateur hydraulique (3x)
25	Speicherblock	Accumulator bloc	Bloc d'accumulateurs
26	3/2 Wegeventil (schnell / langsam)	3/2 Solenoid valve (low / high speed)	Electrovanne 3/2 (petite / grande vitesse)
27	Hydraulikzylinder - Schaltgetriebe	Hydraulic cylinder - gearbox	Vérin hydraulique - boîte de vitesses
28	Schnellwechselaufhängung	Quick mount hitch suspension	Suspension attache rapide
29	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
30	Dieselmotor	Diesel engine	Moteur diesel

Typ Model Type Tipo	**SKL 834**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**		Blatt Page Feuille Página	**4.24.04**



SCHAEFF TEREX	Typ/Model/Type **SKL844 / SKL844 S**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.26.01**

1	Steering cylinders
2	Steering unit
3	Priority valve
4	Steering / charge pump
5	Hydraulic oil tank
6	Hydraulic oil cooler
7	Hydraulic oil temperature control
8	Hydraulic oil combined filter
9	Breather
10	Travel motor
11	Travel pump
12	Main brake cylinder
13	Brake, front axle
14	Loader control lever (right joystick – loading)
15	Pilot control unit
16	Control valve (triple as standard; quadruple as option)
17	Additional control circuit connection; hydraulic quick-attach system
18	Hydraulic cylinder — lift frame
19	Hydraulic cylinder — bucket tilt
20	Load retaining valves
21	Vibration damping
22	Release valve (only if pos. 20 & 21 exist)
23	Transmission (high-speed version)
24	Valve (high-speed version)
25	4th control circuit



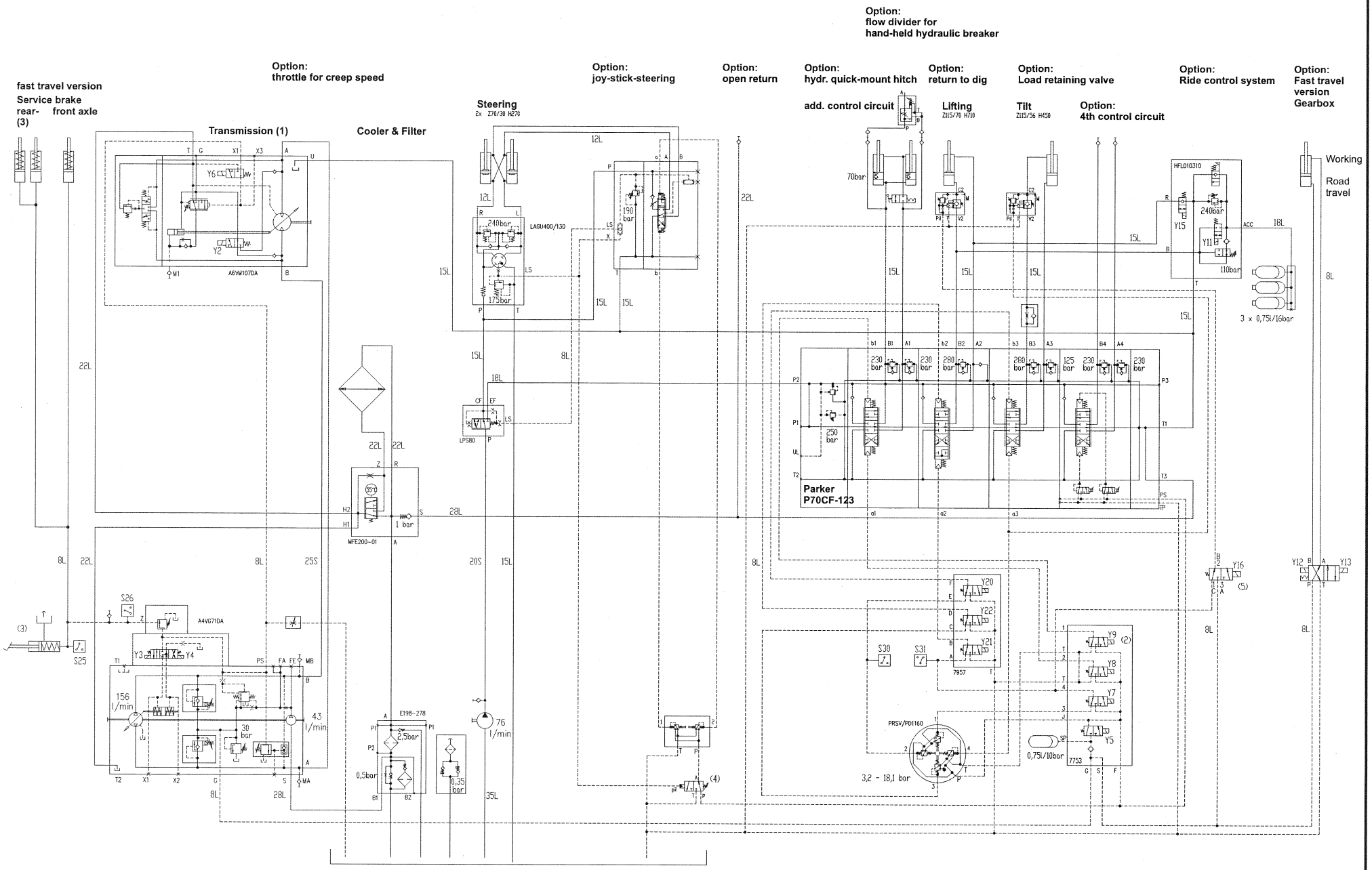
(1) Transmission setting data - please see service manual Chapter 2.

(2) Add. control circuit - continuous operation via Y9.

(3) Oil immersed disk brake in the rear axle at the SKL 854 fast travel version.

Typ Model Type Tipo	**SKL 854 854/0100 >**	**Hydraulik** **Hydraulic** **Hydraulique** **Hidráulico**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan** **Hydraulic diagramm** **Plan hydraulique** **Plano hidráulico**		Blatt Page Feuille Página	**4.27.01**

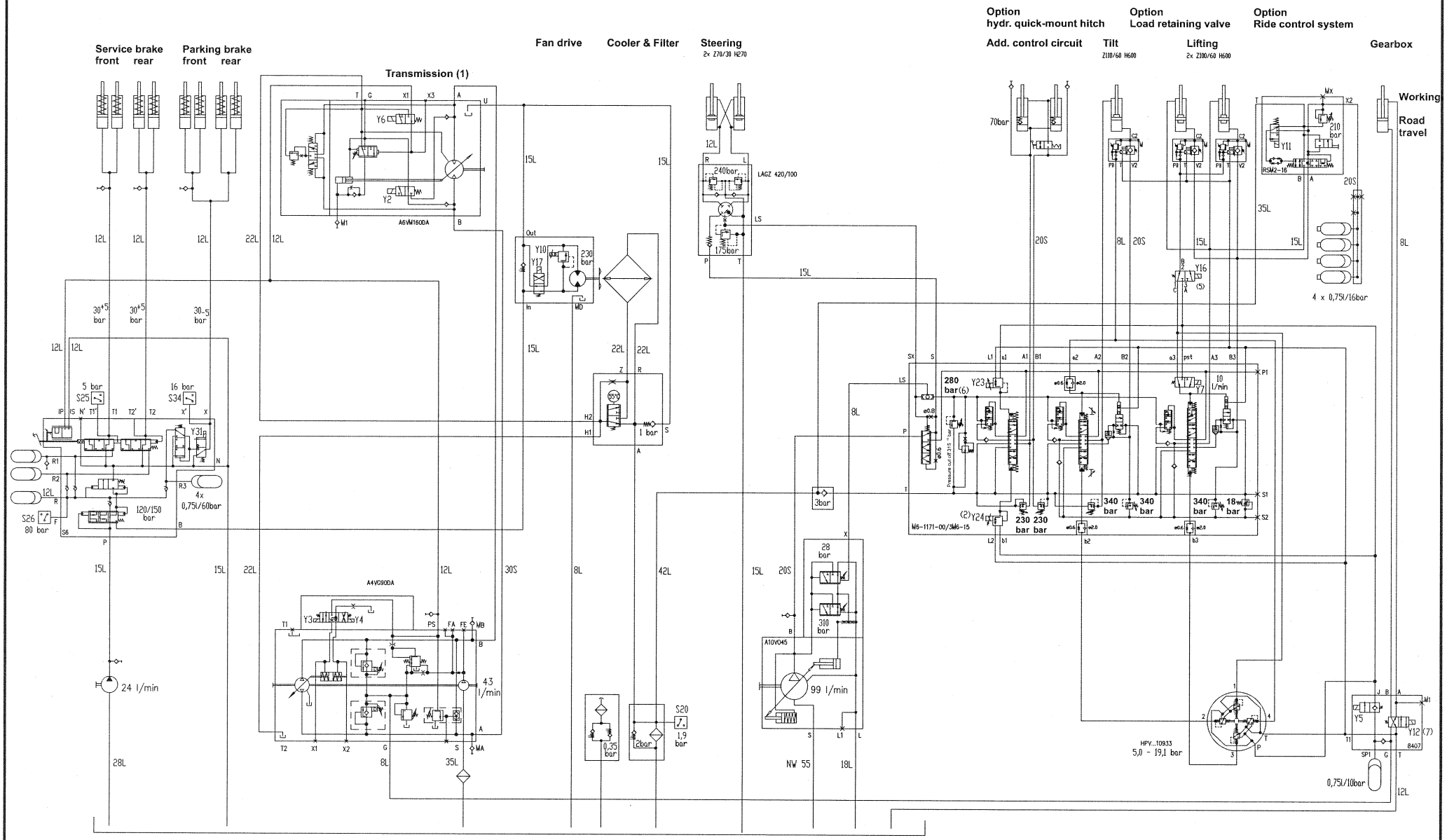
TEREX | SCHAEFF



(1) Transmission setting data please see service manual chapter 2.
(2) Add. control circuit - continuous operation via Y9.
(3) Oil immersed disk brake in the rear axle at the SKl854 fast travel version.
(4) Adjust this valve as follows: While operation the Joy stick steering and the steering wheel at the same time, the wheel should have the higher priority!
(5) Only necessarry when both, load retaining valves as well as the Ride control system is fitted at the machine.

Typ Model Type Tipo	**SKL 854**	**854/0100 >**	**Hydraulik** **Hydraulic** **Hydraulique** **Hidráulico**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan** **Hydraulic diagramm** **Plan hydraulique** **Plano hidráulico**	**Options !** The Parker P70 control valve is only used with the option 4th control circuit !		Blatt Page Feuille Página	**4.27.02**

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(1) Transmission setting data please see service manual chapter 2

(2) Add. control circuit - continuous operation via Y9

(5) Only necessarry when both, load retaining valves as well as the Ride control system is fitted at the machine.

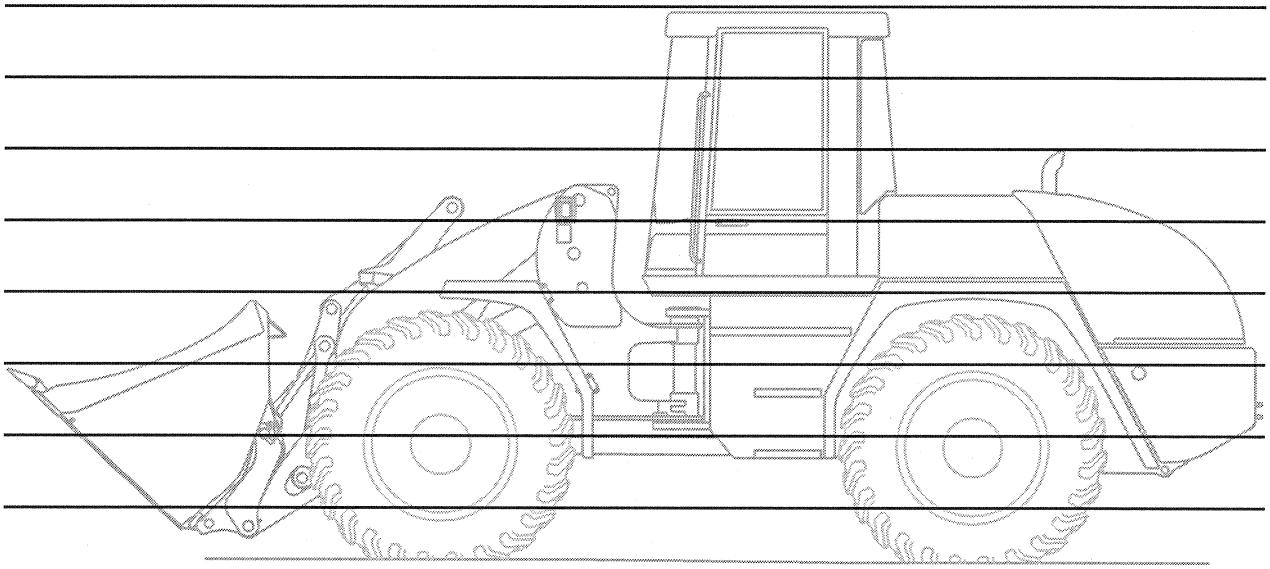
(6) Adjust LS-pressure cut off to 280bar at the working pump A10VO.

(7) With 20 km/h-Version is the switch of the solenoid Y12 not assigned!

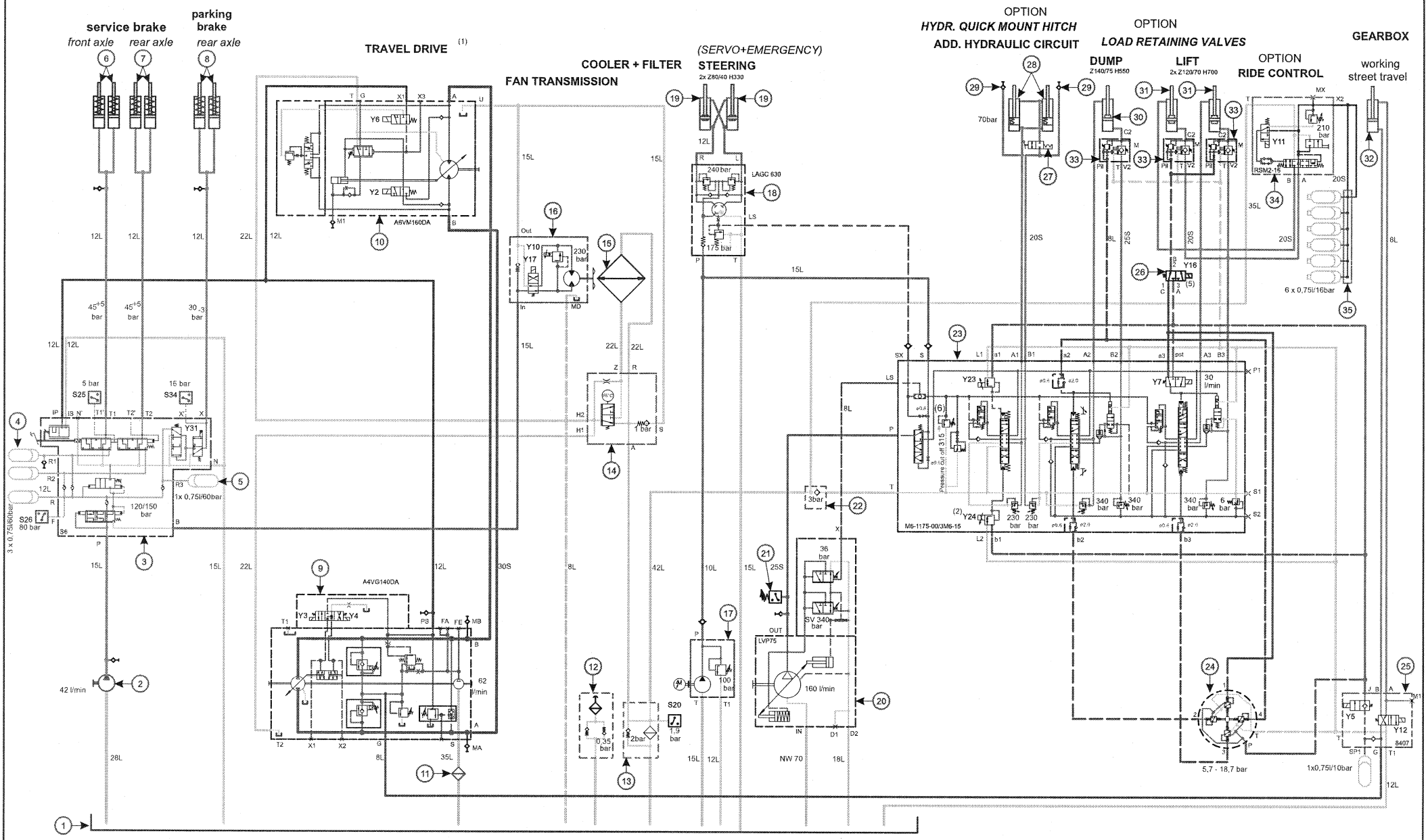
Typ Model Type Tipo	**SKL 160**	Hydraulik Hydraulic Hydraulique Hidráulico	ab Fz.-Id.-Nr. from s/n à partir n du s desde el numero	**160/0100**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan Hydraulic diagramm Plan hydraulique Plano hidráulico**				Blatt Page Feuille Página	**4.28.01**

TEREX | SCHAEFF

SKL260



Typ Model Type Tipo	**SKL 260**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**4.30.00**



(1) Fahrantrieb-Einstellwerte siehe Kapitel 2
(1) travel drive adjustment setting look at chapter 2
(1) Entraînement- valeurs de réglage voir chapitre 2

(2) Dauerbetrieb 3. Steuerkreis über Y9
(2) Additional circuit is permanent working by Y9
(2) Travail permanent circuit supplémentaire avec Y9

(5) nur erforderlich, wenn Lasthalteventile und Lastschwingungssystem gleichzeitig eingebaut sind
(5) only necessary when load control valves and ride control unit are installed together
(5) seulement nécessaire si des clapets anti- chute et anti- tangage sont montes en même temps.

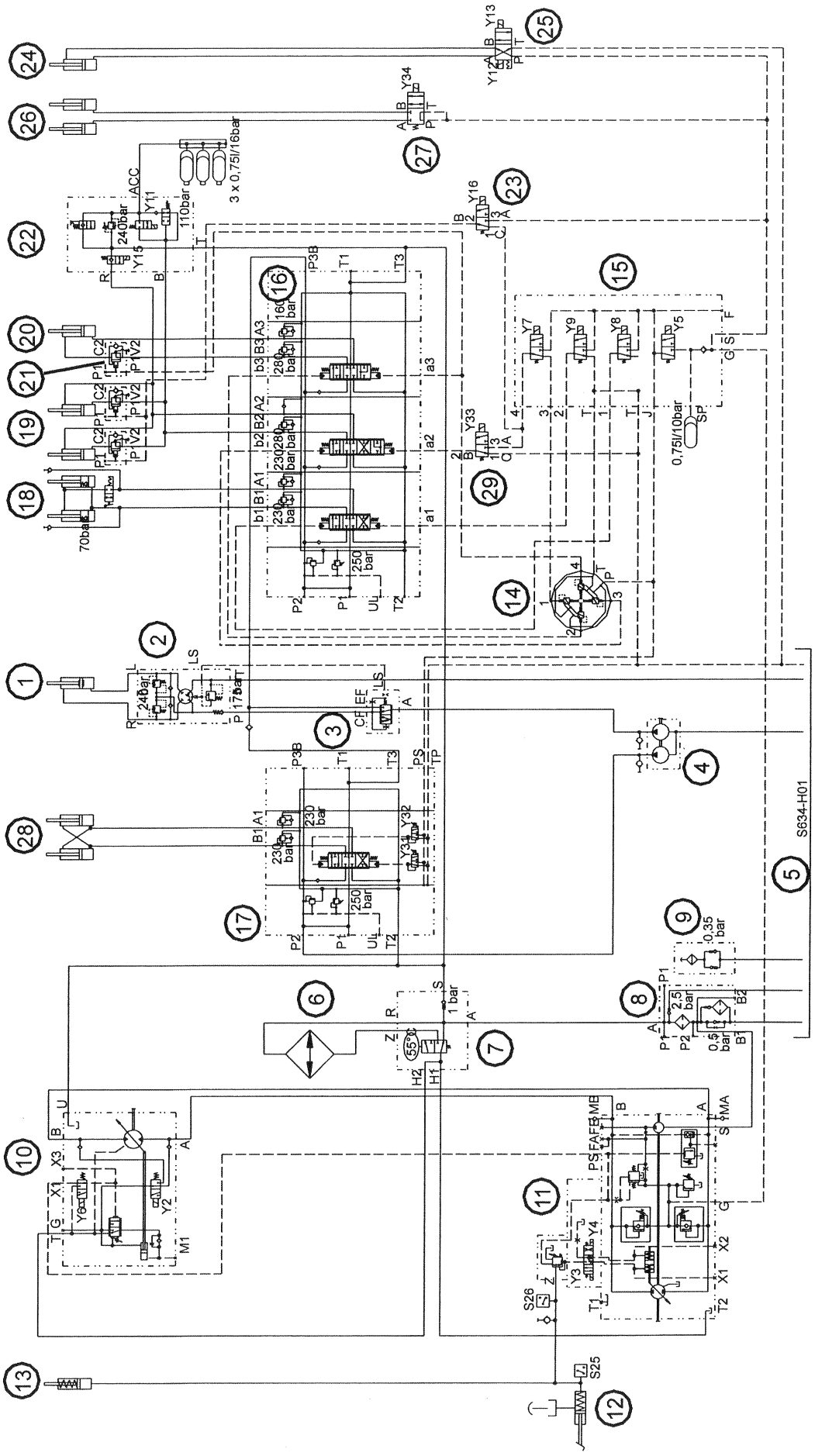
(6) LS-Druckabschneidung so einstellen, daß an der Meßstelle OUT an der Verstellpumpe (20) 315 $^{-10}$ bar wirken
(6) Adjust LS pressure- cut off in that manner to obtain 315 $^{-10}$ bar at pressure port OUT at the pump (20)
(6) Regler la coupure de pression LS de tel facon afin d´obtenir 315 $^{-10}$ bar à la prise de pression OUT de la pompe (20)

Typ Model Type Tipo	**SKL 260**	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no.	***0260/0100***	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan Hydraulic diagramm Plan hydraulique Plano hydráulico**	Blatt Page Feuille Página	***1/1***	Blatt Page Feuille Página	**4.30.01**

Pos. Item Rep. No.	DEUTSCH	ENGLISH	FRANÇAIS
1	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
2	Zahnradpumpe *(Bremse+Lüfter)*	Gear pump *(brake+fan)*	Pompe à engrenage *(frein+vent.)*
3	Fremdkraftbremsventil	Brake system	Système frein
4	Hydrospeicher (2x)*Betriebsbremse* *(1x) Schaltspeicher R*	Service brake accu (2x) (1x) charging accu R	Accus frein de service (2x) (1x) Remplissage accus R
5	Hydrospeicher (1x) *Feststellbremse R3*	Accu (1x) parking brake R3	Accu (1x) frein de stationnement R3
6	Betriebsbremse *(Vorderachse)*	Service brake*(front axle)*	Frein de service*(essieu AV)*
7	Betriebsbremse *(Hinterachse)*	Service brake*(rear axle)*	Frein de service*(essieu AR)*
8	Feststellbremse *(Hinterachse)*	Parking brake *(rear axle)*	Frein de stationnement *(essieu AR)*
9	Verstellpumpe *(Fahren)*	Variable displacement pump *(travel)*	Pompe à débit *variable (translation)*
10	Verstellmotor *(Fahren)*	Variable displacement motor *(travel)*	Moteur à cylindrée variable *(translation)*
11	Saugfilter	Suction filter	Filtre d'aspiration
12	Belüftungsfilter	Vent filter	Filtre d'aération
13	Rücklauffilter	Return filter	Filtre de retour
14	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
15	Ölkühler	Oil cooler	Refroidisseur d'huile
16	Umkehrlüftermotor *(Kühler) mit Steuerventil*	Reversible fan motor (cooler) with control unit	Ventilat. reversible *(refroidisseur)* *Avec distributeur*
17	Notlenkaggregat	Emergency steering unit	Groupe direction de secours
18	Lenkeinheit	Steering unit	Ensemble direction
19	Hydraulikzylinder *(Lenken)*	Hydraulic cylinder *(steering)*	Vérin hydraulique *(direction)*
20	Verstellpumpe *(Arbeiten)*	Variable displacement pump *(working)*	Pompe à débit *variable (travail)*
21	Druckschalter *(Notlenkung)*	Pressure switch *(emergency steering)*	Interrupteur de pressure *(direction de secours)*
22	Rücklaufsammler *(Arbeiten)*	Return line collector	Collecteur de retour
23	Blocksteuergerät	Valve bank	Bloc distributeur
24	Koordinatenhebel	Joy stick	Distributeur à commande assistée
25	Vorsteuereinheit mit Speicher Wegeventil **Y5** *Vorsteuerung ein/aus* Wegeventil **Y12** *Getriebeschaltung*	Pilot Control Unit with accumulator Solenoid **Y5** pilot pressure on/off Solenoid **Y12** gear shifting	Bloc pilotage et accu Elektrov. **Y5** pilotage marche/arrêt Elektrov.**Y12** changement de vitesses
26	3/2 Wegeventil ***Option*** *(Entriegelung Lasthalteventile)*	3/2 Solenoid valve ***option*** *(unlock load check valves)*	électrovanne 3/2 ***option*** *(déverrouillage clapets anti-chute)*
27	Umschalthahn ***Option*** *(Schnellwechsler)*	Ball cock ***option*** *(quick mount hitch)*	Robinet inverseur ***option*** *(attache rapide)*
28	Hydraulikzylinder *(Schnellwechsler)*	Hydraulic cylinders *(quick mount hitch)*	Vérins hydraulique *(attache rapide)*
29	Zusatzsteuerkreis ***Option*** *(Schnellwechsler)*	Additional control circuit ***option*** *(quick mount hitch)*	Circuit supplémentaire ***option*** *(attache rapide)*
30	Hydraulikzylinder *(Schaufel kippen)*	Hydraulic cylinder (dump shovel)	Vérin hydraulique *(basculement godet)*
31	Hydraulikzylinder *(Hubrahmen)*	Hydraulic cylinders *(lifting frame)*	Vérins hydraulique *(bras de vitesses)*
32	Hydraulikzylinder *(Schaltgetriebe)*	Hydraulic cylinder *(gearbox)*	Vérin hydraulique *(boîte de vitesses)*
33	Lasthalteventile ***Option***	Load check valves ***option***	Clapets anti-chute ***option***
34	Blocksteuergerät ***Option*** *(Lastschwingungsdämpfung)*	Valve bank ***option*** *(ride control)*	Bloc distributeur ***option*** *(anti-tangage)*
35	Speicherblock ***Option*** *(Lastschwingungsdämpfung)*	Accumulator bloc ***option*** *(ride control)*	Bloc d'accumulateurs ***option*** *(anti-tangage)*

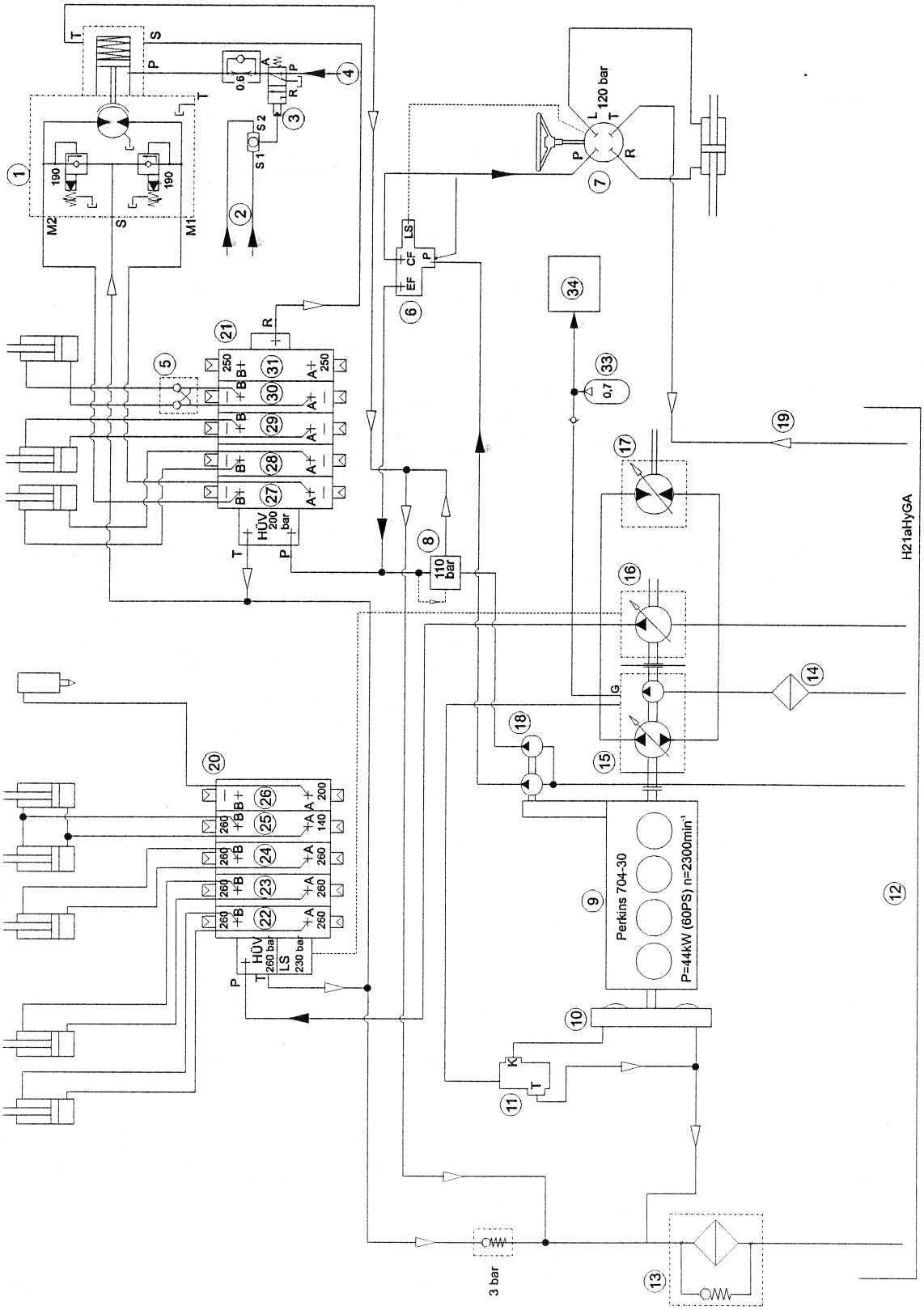
Typ Model Type Tipo	**SKL 260**	***ab Fz. Id. Nr.*** ***from s/n*** ***à partir du n/s*** ***desde el no.*** **0260/0100**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	***HYDRAULIKSCHALTPLAN*** ***HYDRAULIKDIAGRAM*** ***PLAN HYDRAULIQUE*** ***PLANO HYDRAULICO***	**LEGENDE** **LEGEND** **LEGENDE** **LAYENDA**	Blatt Page Feuille Página	**4.30.02**

TEREX | SCHAEFF



SCHAEFF TEREX	Typ/Model/Type **SKS 634 / SKS 634 S**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.37.01**

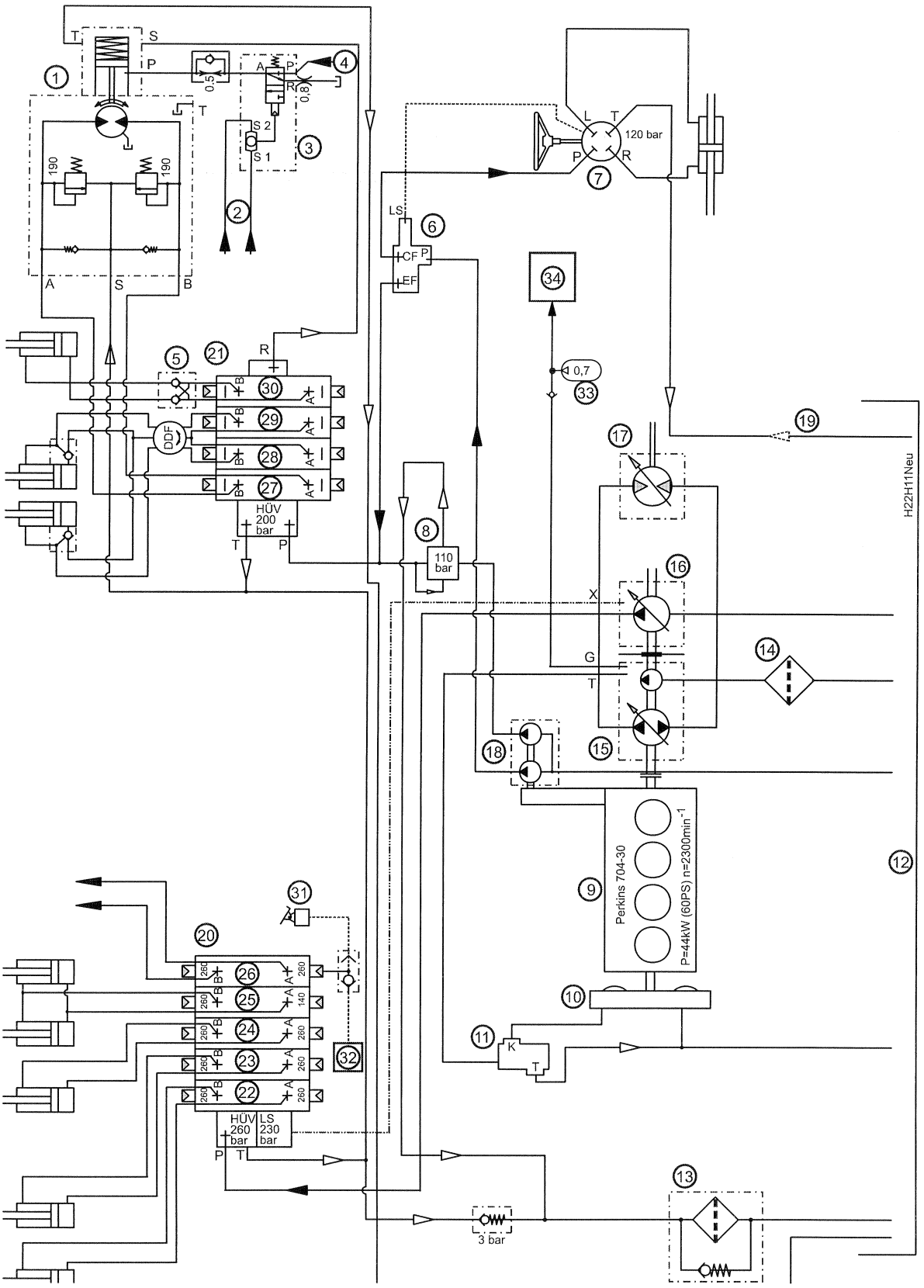
1	Steering cylinders
2	Steering unit
3	Priority valve
4	Steering / charge pump
5	Hydraulic oil tank
6	Hydraulic oil cooler
7	Hydraulic oil temperature control
8	Hydraulic oil combined filter
9	Breather
10	Travel motor
11	Travel pump
12	Main brake cylinder
13	Brake, front axle
14	Loader control lever
15	Pilot control unit
16	Control valve 1
17	Control valve 2 (slewing)
18	Additional control circuit connection; hydraulic quick-attach system
19	Hydraulic cylinder — lift frame
20	Hydraulic cylinder — bucket tilt
21	Option — Load retaining valves
22	Option — Vibration damping
23	Release valve (only if pos. 21 & 22 installed)
24	Transmission (high-speed version)
25	Valve
26	Hydraulic cylinder — oscillating axle
27	Valve
28	Hydraulic cylinder — slewing
29	Valve — Safety mechanism for lowering lift frame



SCHAEFF	Typ/Model/Type **HML 22 (serial no. 131/0512 - 131/0672)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (articulated boom)**	Blatt/Page/Feuille **4.49.01**

Hydraulic installation, articulated boom type

1	Slew drive
2	Pilot-operated valve „slew drive“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Shut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Intermediate boom
26	Breaker
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Additional control circuit
32	--
33	Accumulator - pilot pressure
34	Pilot control



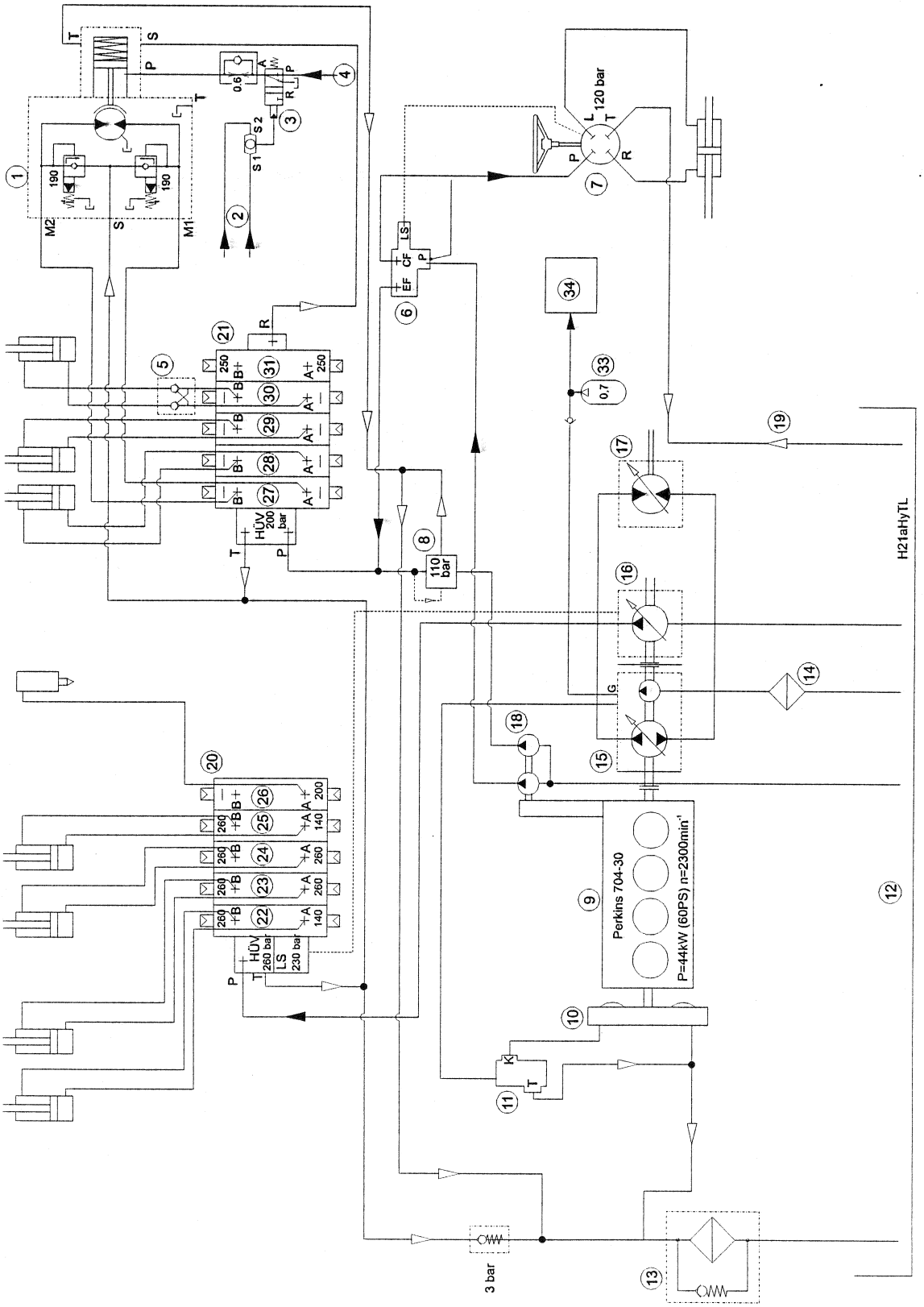
SCHAEFF	Typ/Model/Type **HML 22 (from serial no. 131/0673)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (articulated boom)**	Blatt/Page/Feuille **4.49.02**

Hydraulic installation, articulated boom type

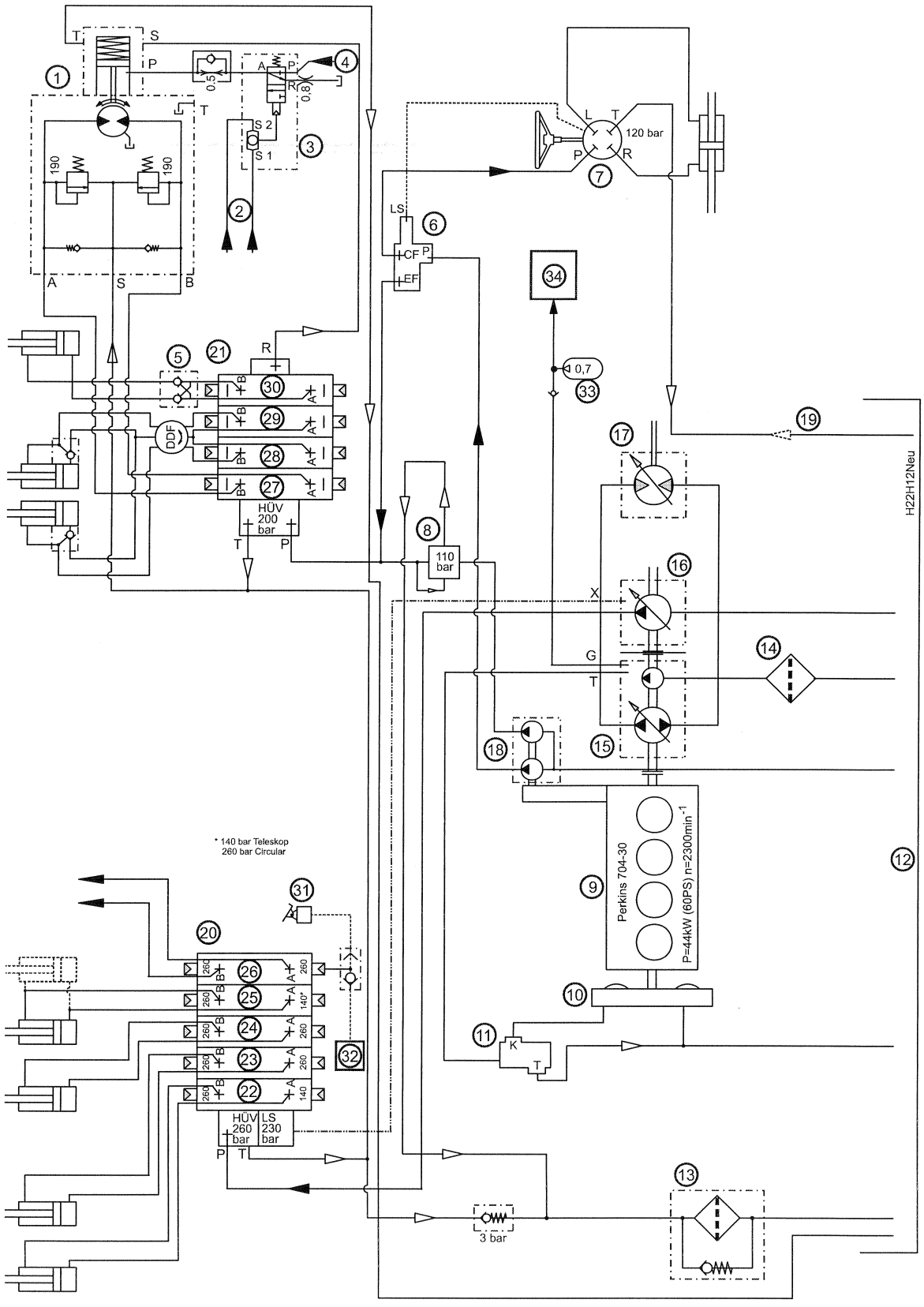
1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Intermediate boom
26	Breaker / additional control circuit
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Breaker pedal
32	4/3 way valve, additional control circuit
33	Accumulator - pilot pressure
34	Pilot control

Hydraulic installation, Mono boom, telescopic stick

1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Telescopic stick
26	Breaker
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Additional control circuit
32	----
33	Accumulator - pilot pressure
34	Pilot control



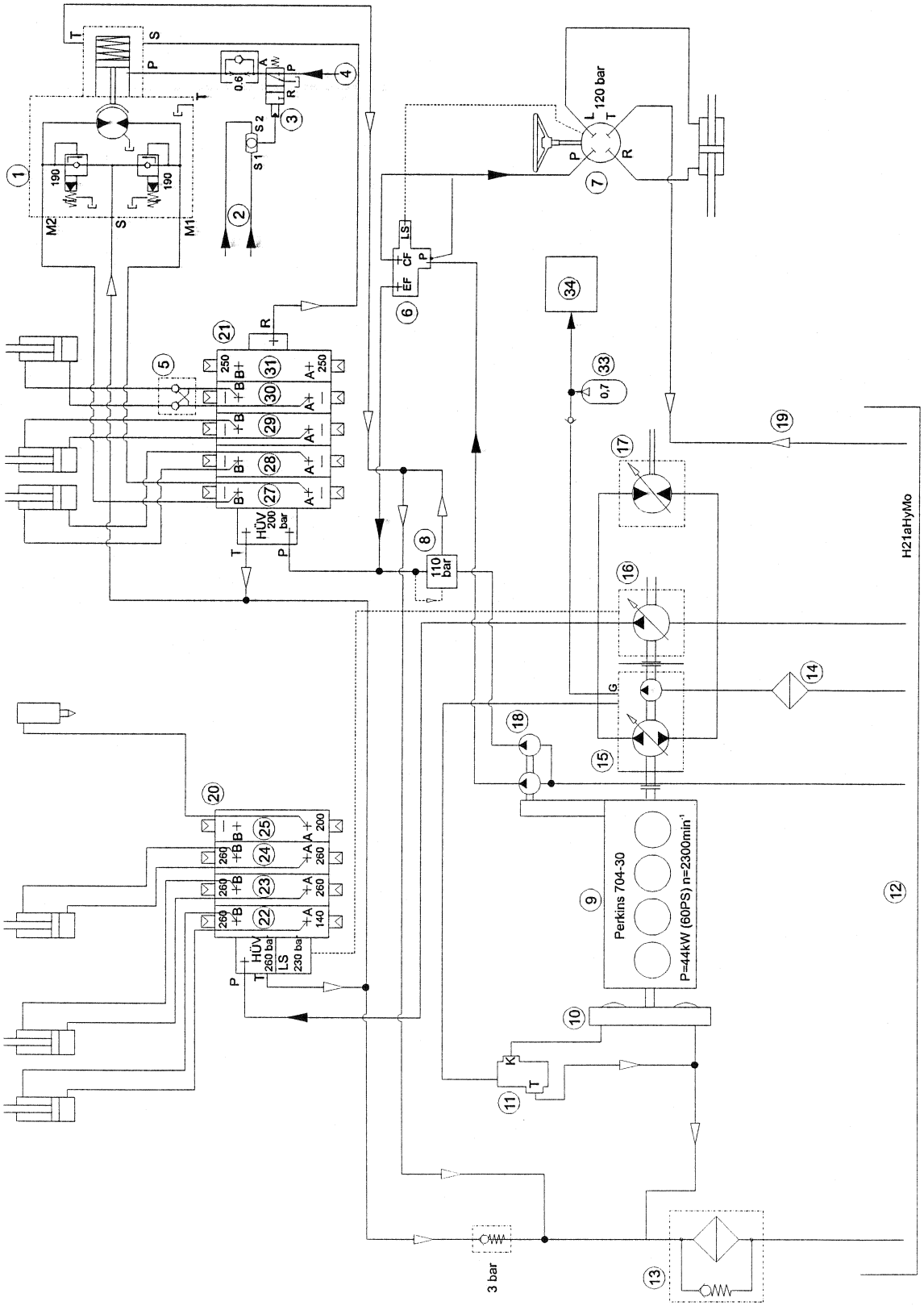
SCHAEFF	Typ/Model/Type **HML 22 (serial no. 131/0512 - 131/0672)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram** **(Mono boom - telescopic stick)**	Blatt/Page/Feuille **4.49.03**



SCHAEFF	Typ/Model/Type **HML 22 (from serial no. 131/0673)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (Mono boom with telescopic stick and circular boom)**	Blatt/Page/Feuille **4.49.04**

Hydraulic installation, Mono boom with telescopic stick and circular boom

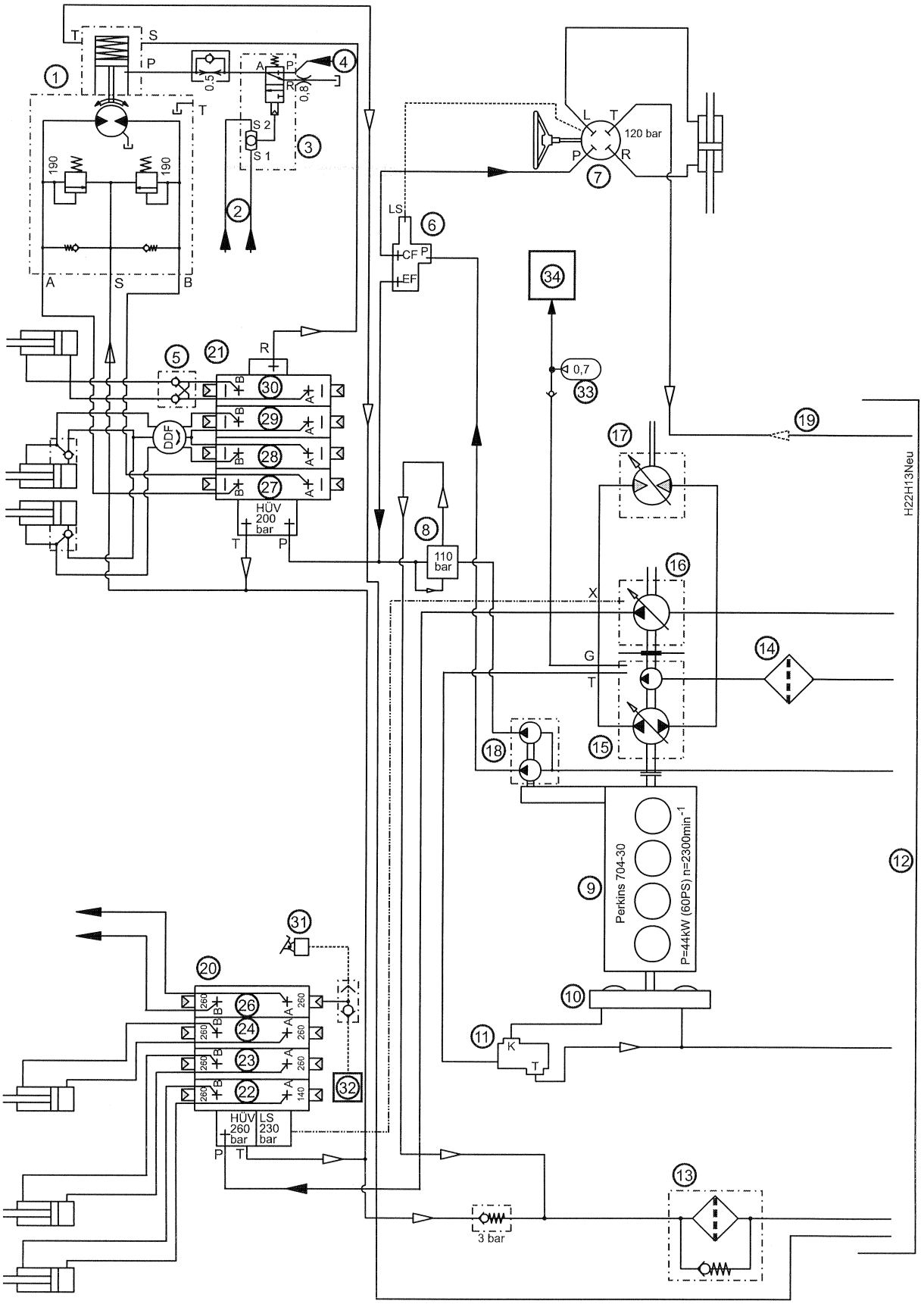
1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Telescopic stick / intermediate boom circular
26	Breaker / additional control circuit
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Breaker pedal
32	4/3 way valve, additional control circuit
33	Accumulator - pilot pressure
34	Pilot control



SCHAEFF	Typ/Model/Type **HML 22 (serial no. 131/0512 - 131/0672)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (Mono boom)**	Blatt/Page/Feuille **4.49.05**

Hydraulic installation, Mono boom

1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Breaker
26	-----
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Additional control circuit
32	-----
33	Accumulator - pilot pressure
34	Pilot control

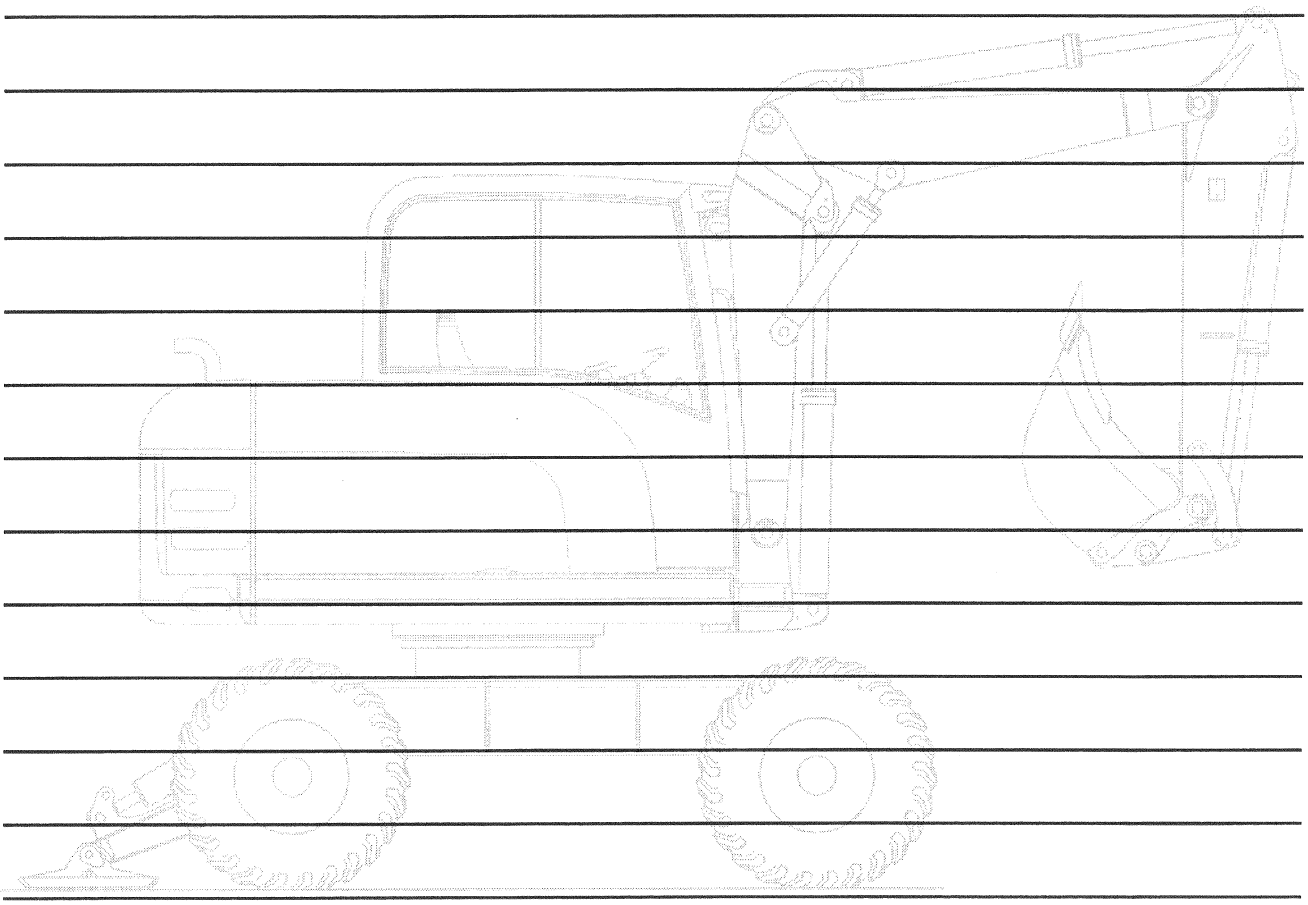


SCHAEFF	Typ/Model/Type **HML 22 (from serial no. 131/0673)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (Mono boom)**	Blatt/Page/Feuille **4.49.06**

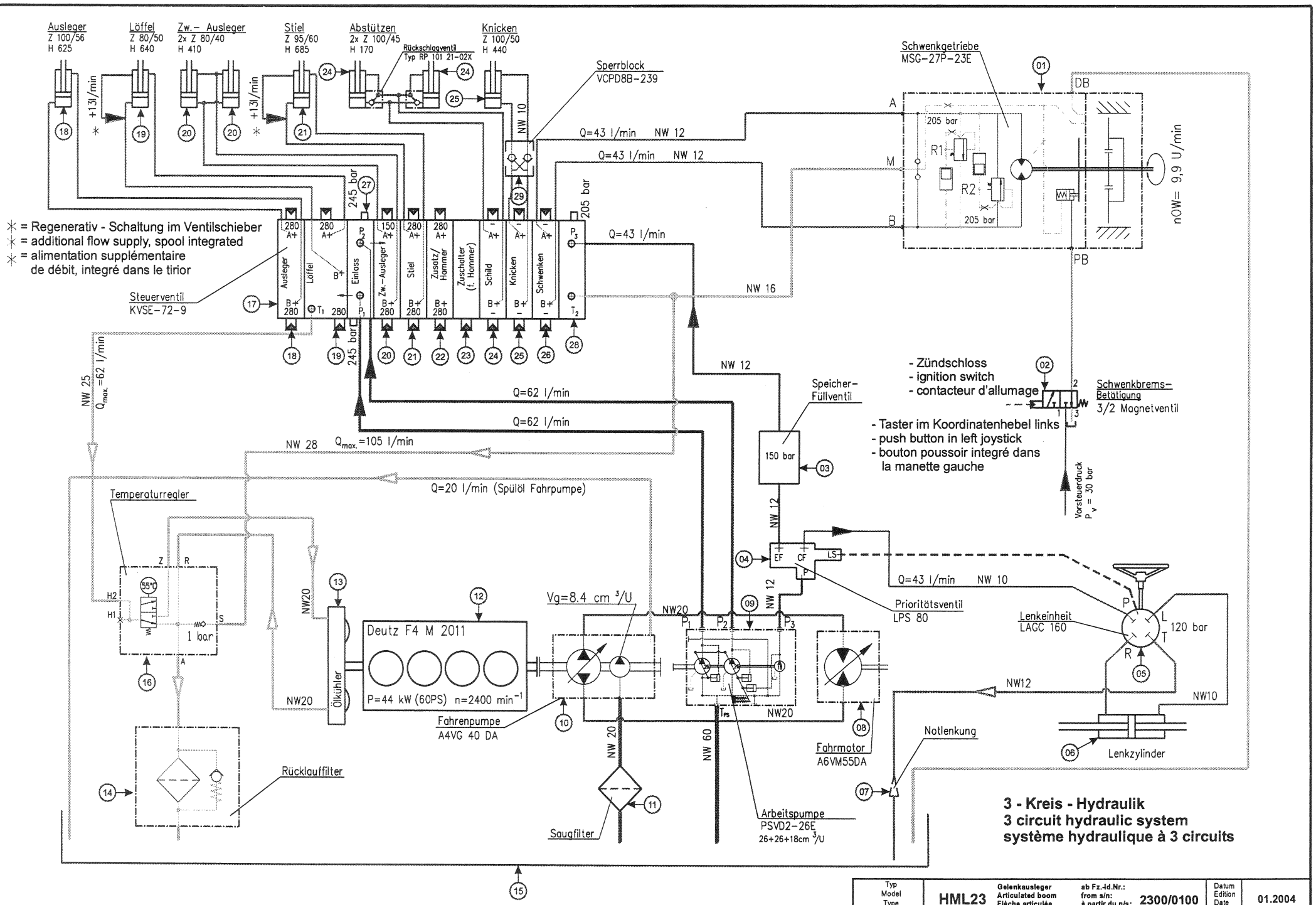
Hydraulic installation, Mono boom

1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
26	Breaker / additional control circuit
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Breaker pedal
32	4/3 way valve, additional control circuit
33	Accumulator - pilot pressure
34	Pilot control

HML 23



Typ Model Type Tipo	**HML 23**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**4.49.50**



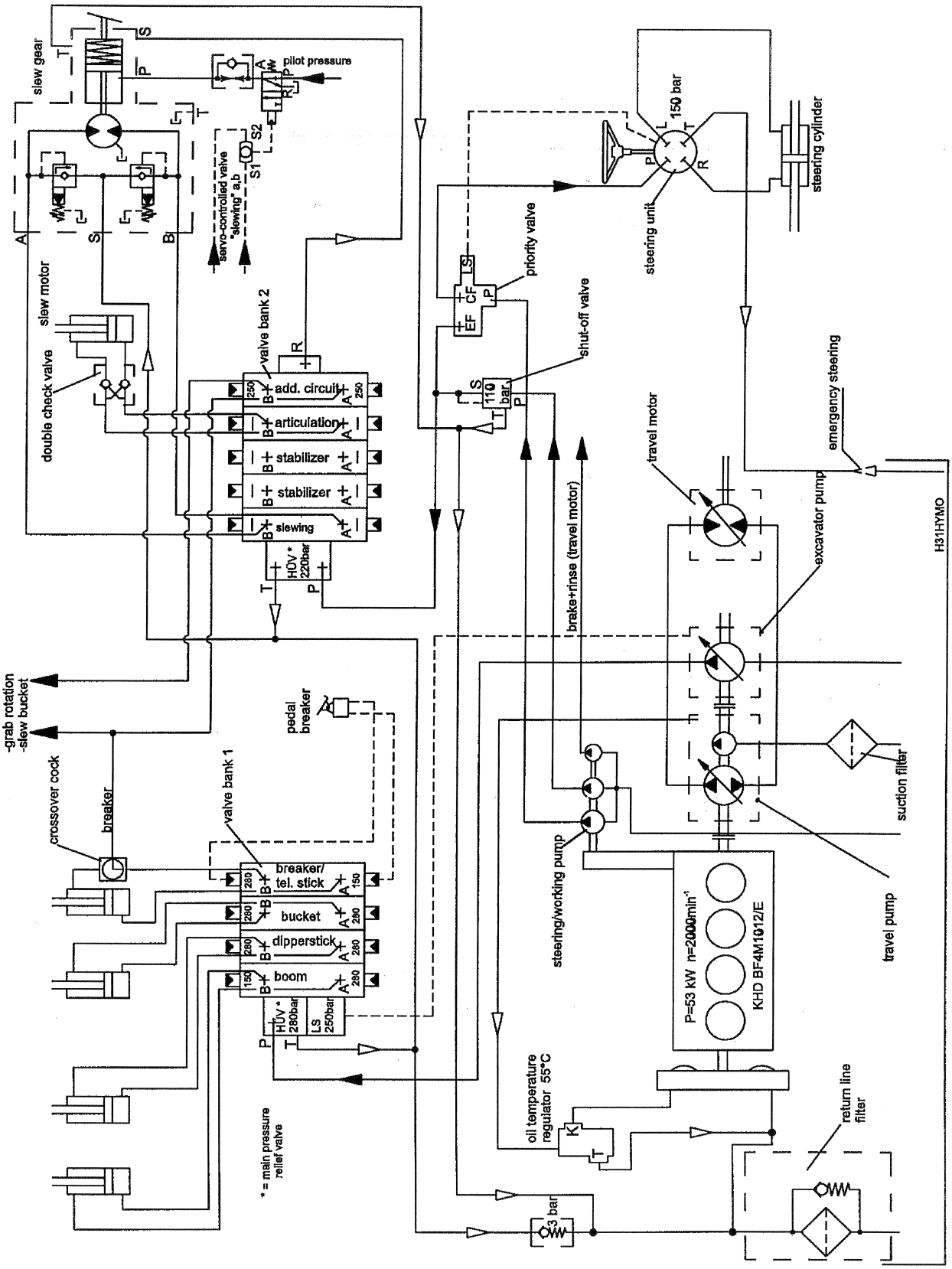
Typ Model Type Tipo	HML23	Gelenkausleger / Articulated boom / Flèche articulée / Pluma intermediara	ab Fz.-Id.Nr.: from s/n: à partir du n/s: desde el no.: 2300/0100	Datum Edition Date Fecha	01.2004
Benennung Description Dénomination Denominación	Hydraulikschema / Hydraulic diagram / Plan hydraulique / Plano hidráulico			Blatt Page Feuille Página	4.49.51

Pos. Item Rep. No.	Deutsch	English	Français
01	Drehwerkgetriebe + Hydromotor - *Drehantrieb*	Swing gear + hydraulic motor - *swing drive*	Reducteur d'orientation + moteur hydraulique - *entraînement d'orientation*
02	Wegeventil *Schwenkbremse - öffnen*	solenoid valve *swing brake - opening*	Electrovanne *frein de orientation - ouvert*
03	Speicherfüllventil - *Bremsanlage*	Accumulator charge valve - *brake system*	Valve de remplissage accu - système *de frein*
04	Prioritätsventil	Priority valve	Valve de priorité
05	Lenkeinheit	Steering unit	Unité de direction
06	Hydraulikzylinder– Lenken *Vorderachse*	Hydraulic cylinder - steering *front axle*	Vérin hydraulique - direction *essieu AR*
07	Notlenkung	Emergency steering	Direction de secours
08	Verstellmotor - Fahren	Variable displacement motor - travel	Moteur à cylindrée variable - translation
09	Verstellpumpe – Arbeiten	Variable displacement pump - working	Pompe à débit variable - équipement
10	Verstellpumpe – Fahren	Variable displacement pump - travel	Pompe à débit variable - translation
11	Saugfilter	Suction filter	Filtre d'aspiration
12	Dieselmotor	Diesel engine	Moteur diesel
13	Ölkühler	Oil cooler	Refroidisseur d'huile
14	Rücklauffilter	Return filter	Filtre de retour
15	Öltank	Oilt tank	Reservoir hydraulique
16	Hydrauliköltemperaturregler	Hydraulic oil temperature regulator	Régulateur de température d'huile hydraulique
17	Blocksteuergerät	Valve bank	Distributeur
18	Hydraulikzylinder – Ausleger	Hydraulic cylinder – boom	Vérin hydraulique – flèche
19	Hydraulikzylinder – Löffel	Hydraulic cylinder – bucket	Vérin hydraulique – godet
20	Hydraulikzylinder - Zwischenausleger	Hydraulic cylinder - intermediate boom	Vérin hydraulique – flèche intermédiaire
21	Hydraulikzylinder – Löffelstiel	Hydraulic cylinder – stick	Vérin hydraulique – balancier
22	Zusatzsteuerkreis / Hydraulikhammer	Additional control circuit / hydraulic hammer	Circuit supplémentaire / marteau hydraulique
23	Zuschaltbarer Steuerkreis für Hydraulikhammer	Hydraulic hammer overflow	Circuit supplémentaire pour marteau - grand debit
24	Hydraulikzylinder - Abstützen	Hydraulic cylinder – outrigger	Vérin hydraulique - stabilisateur
25	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - deport de flèche

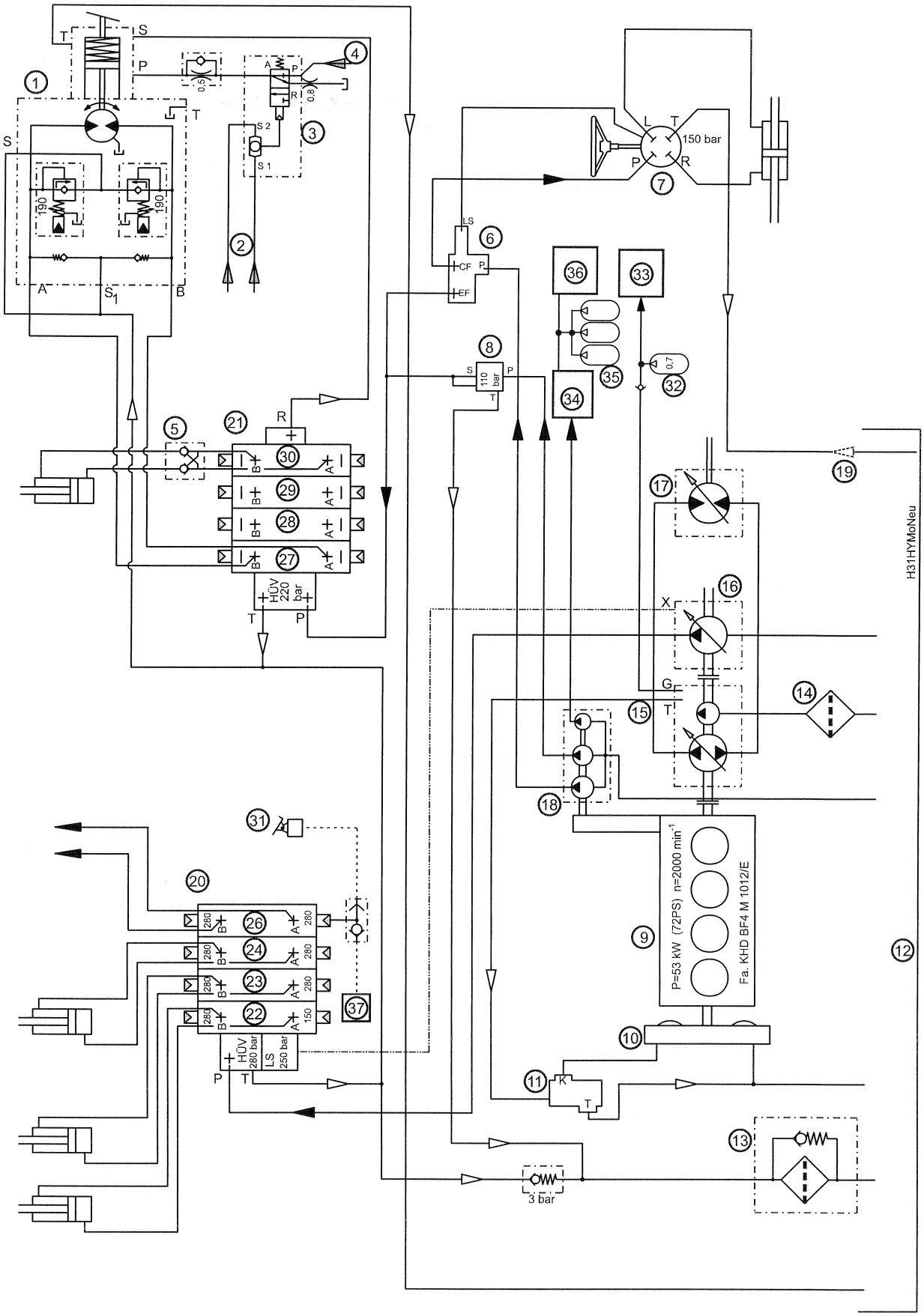
Typ Model Type Tipo	**HML 23**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**		Blatt Page Feuille Página	**4.49.52**

Pos. Item Rep. No.	Deutsch	English	Français
26	Steuerkreis - Schwenken	Swing - circuit	Circuit - orientation
27	Eingangselement **P3**	Inlet element **P3**	Elément d'entrée **P3**
28	Eingangselement **P1 + P2**	Inlet element **P1 + P2**	Elément d'entrée **P1 + P2**
29	Drosselrückschlagventil *entsperrbar*	Pilot controlled throttle check valve	Clapet anti-tetour avec ètrangleur piloté

Typ Model Type Tipo	**HML 23**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**		Blatt Page Feuille Página	**4.49.53**



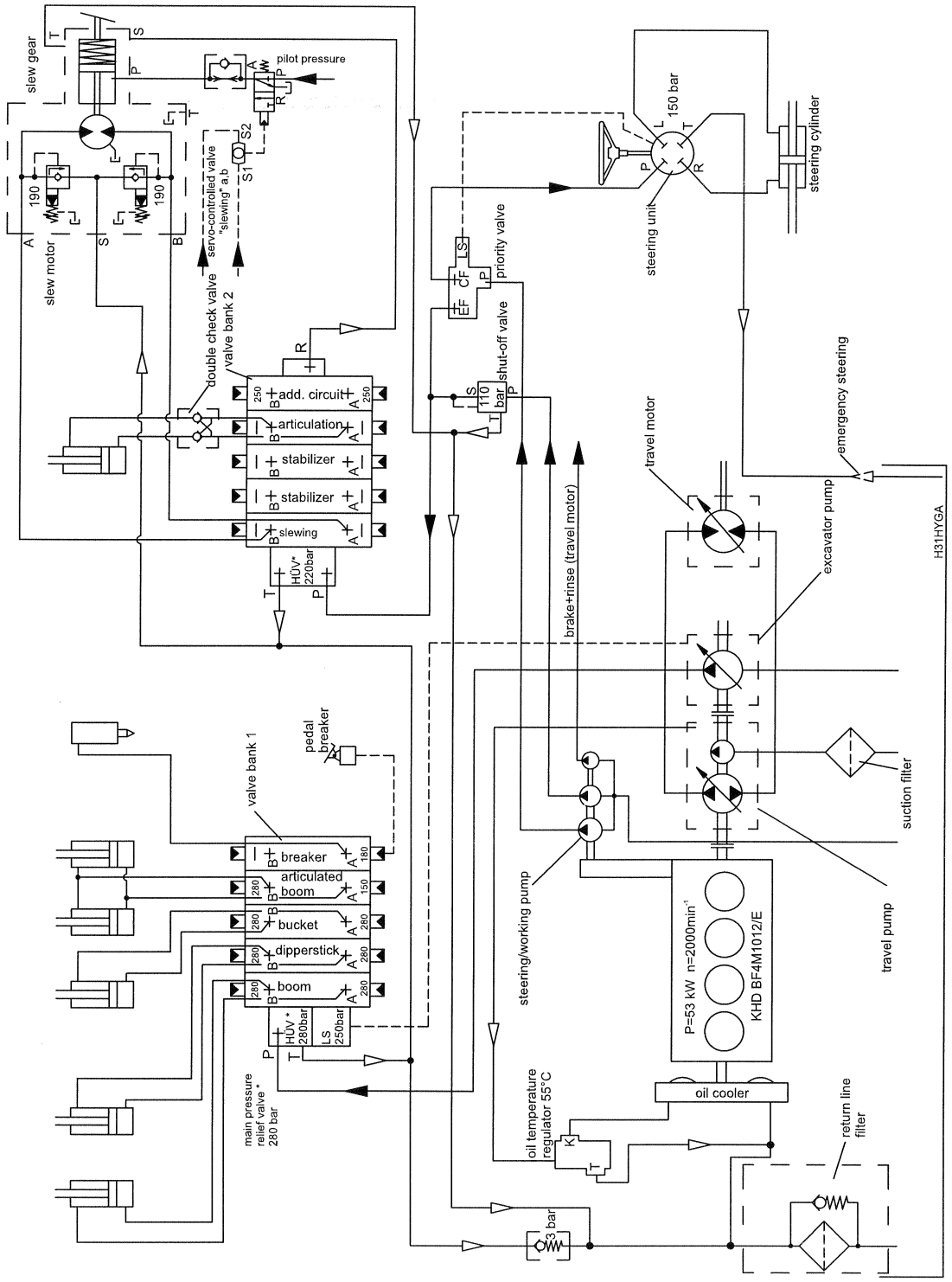
SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	HML 31 (serial no. 032/5100 - 032/5527)	01.2000
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram (MONO boom)	4.50.01



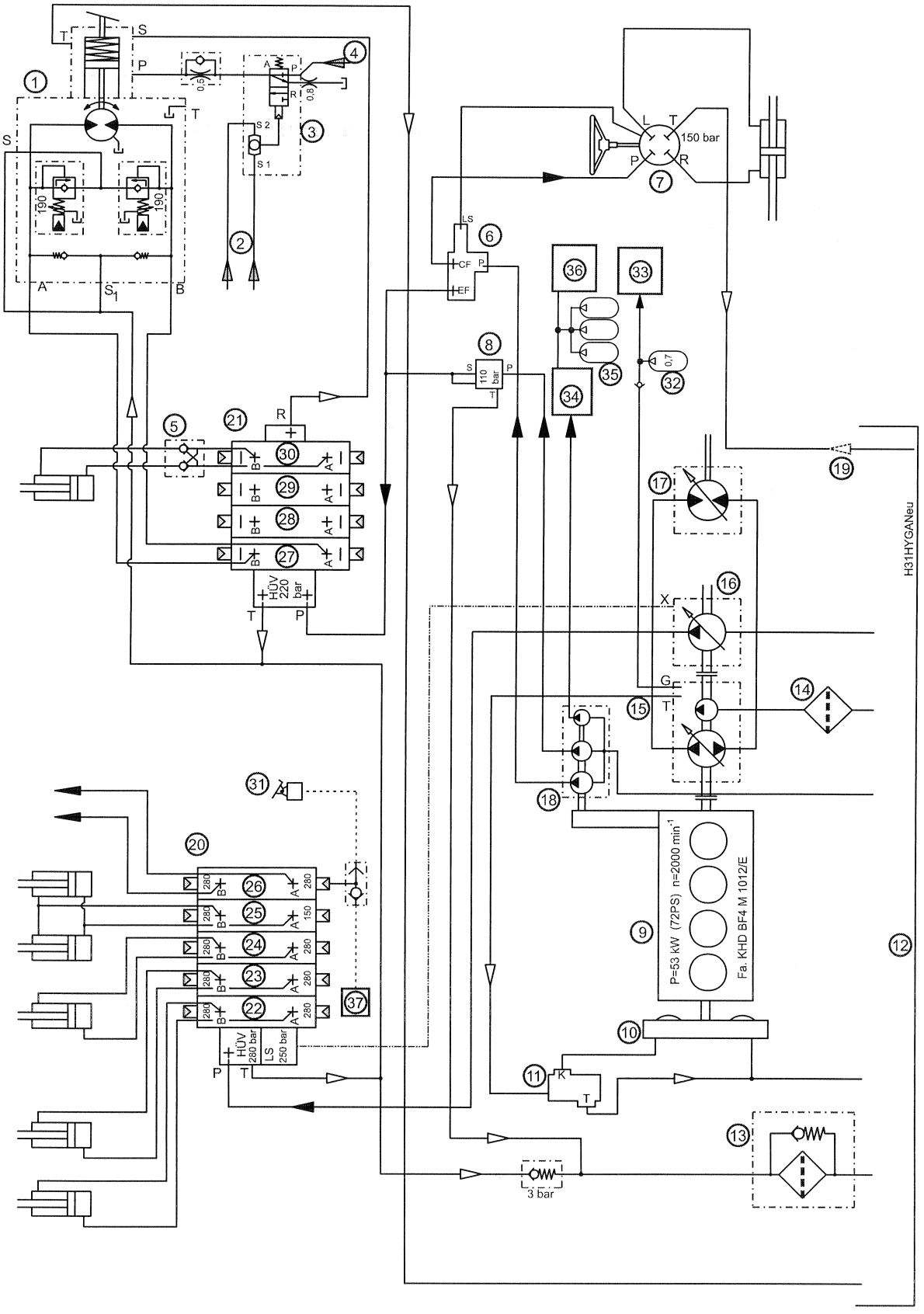
SCHAEFF	Typ/Model/Type **HML 31 (from serial no. 032/5528)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (Mono boom)**	Blatt/Page/Feuille **4.50.02**

Hydraulic installation, Mono boom

1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
26	Breaker / additional control circuit
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Breaker pedal
32	Accumulatator for pilot pressure
33	Pilot control
34	Accumulator charge valve for brake
35	Accumulator for brake
36	Brake system
37	4/3 way valve, additional control circuit



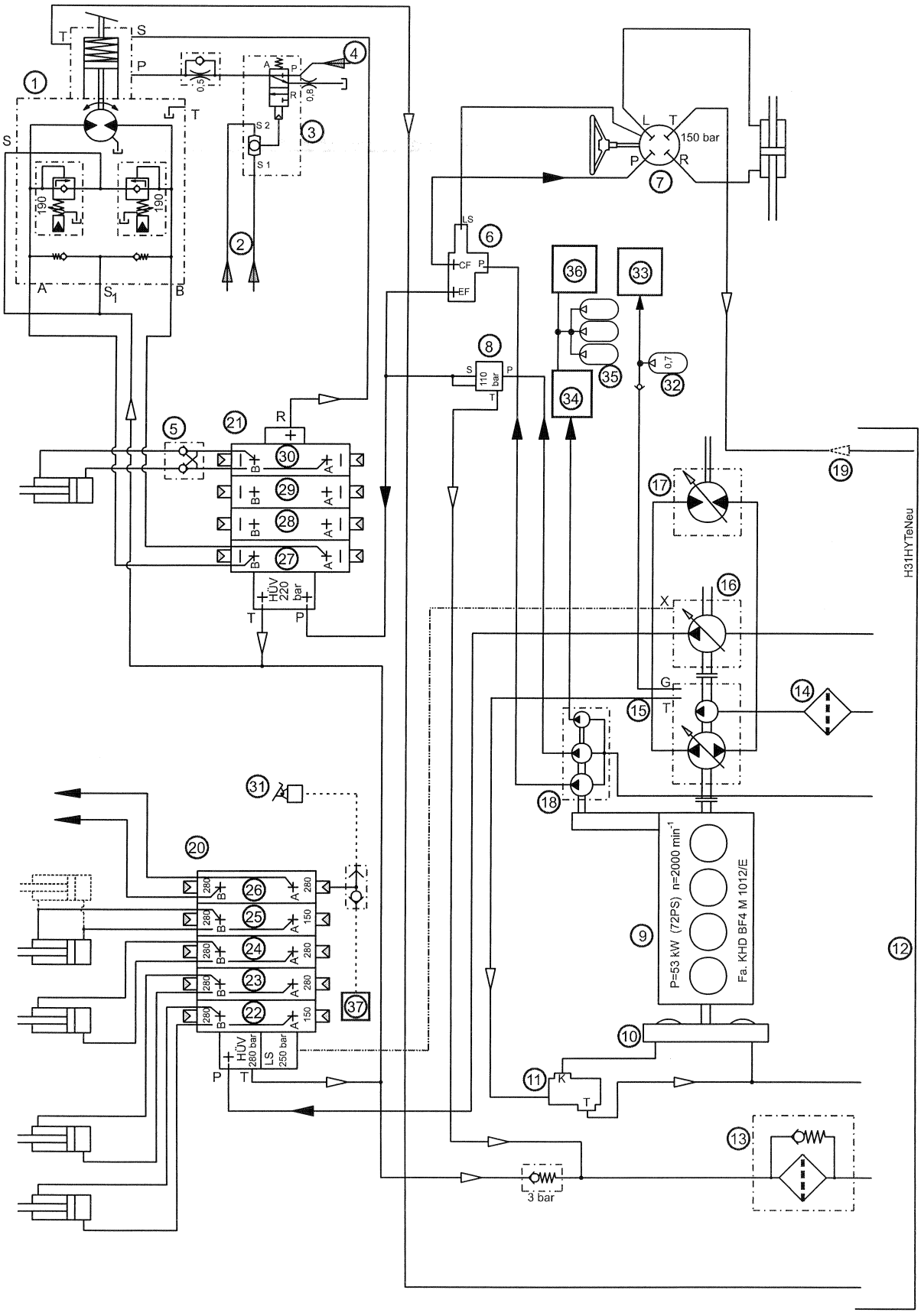
SCHAEFF	Typ/Model/Type **HML 31 (032/5100 - 032/5527)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (articulated boom)**	Blatt/Page/Feuille **4.50.03**



SCHAEFF	Typ/Model/Type **HML 31 (from serial no. 032/5528)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (articulated boom)**	Blatt/Page/Feuille **4.50.04**

Hydraulic installation, articulated boom type

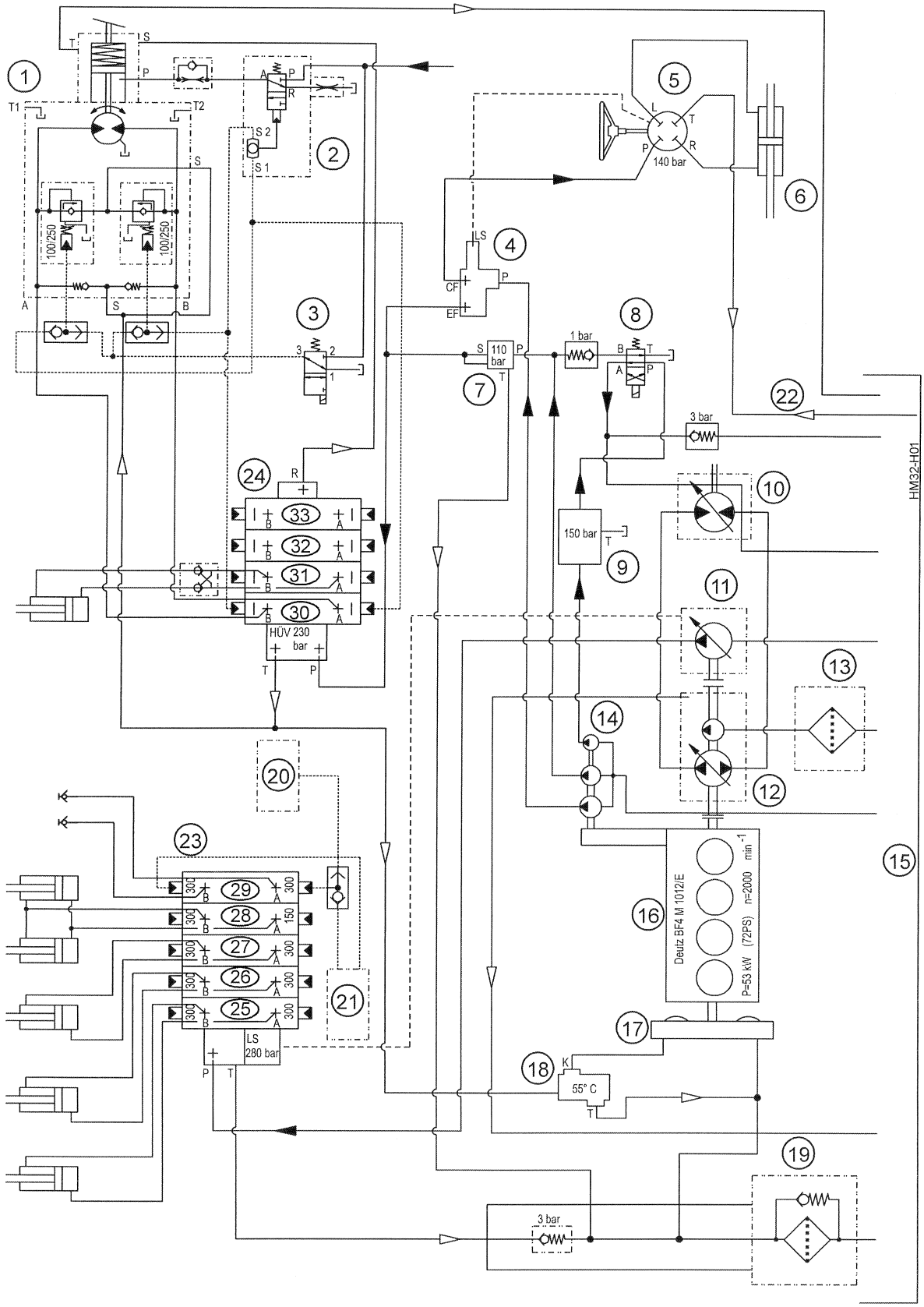
1	Slew drive
2	Pilot-operated valve „slew drive“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Intermediate boom
26	Breaker / additional control circuit
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Breaker pedal
32	Accumulator for pilot pressure
33	Pilot control
34	Accumulator charge valve for brake
35	Accumulator for brake
36	Brake system
37	4/3 way valve, additional control circuit



SCHAEFF	Typ/Model/Type **HML 31 (from serial no. 032/5528)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (Mono boom with telescopic stick and circular boom)**	Blatt/Page/Feuille **4.50.05**

Hydraulic installation, Mono boom with telescopic stick and circular boom

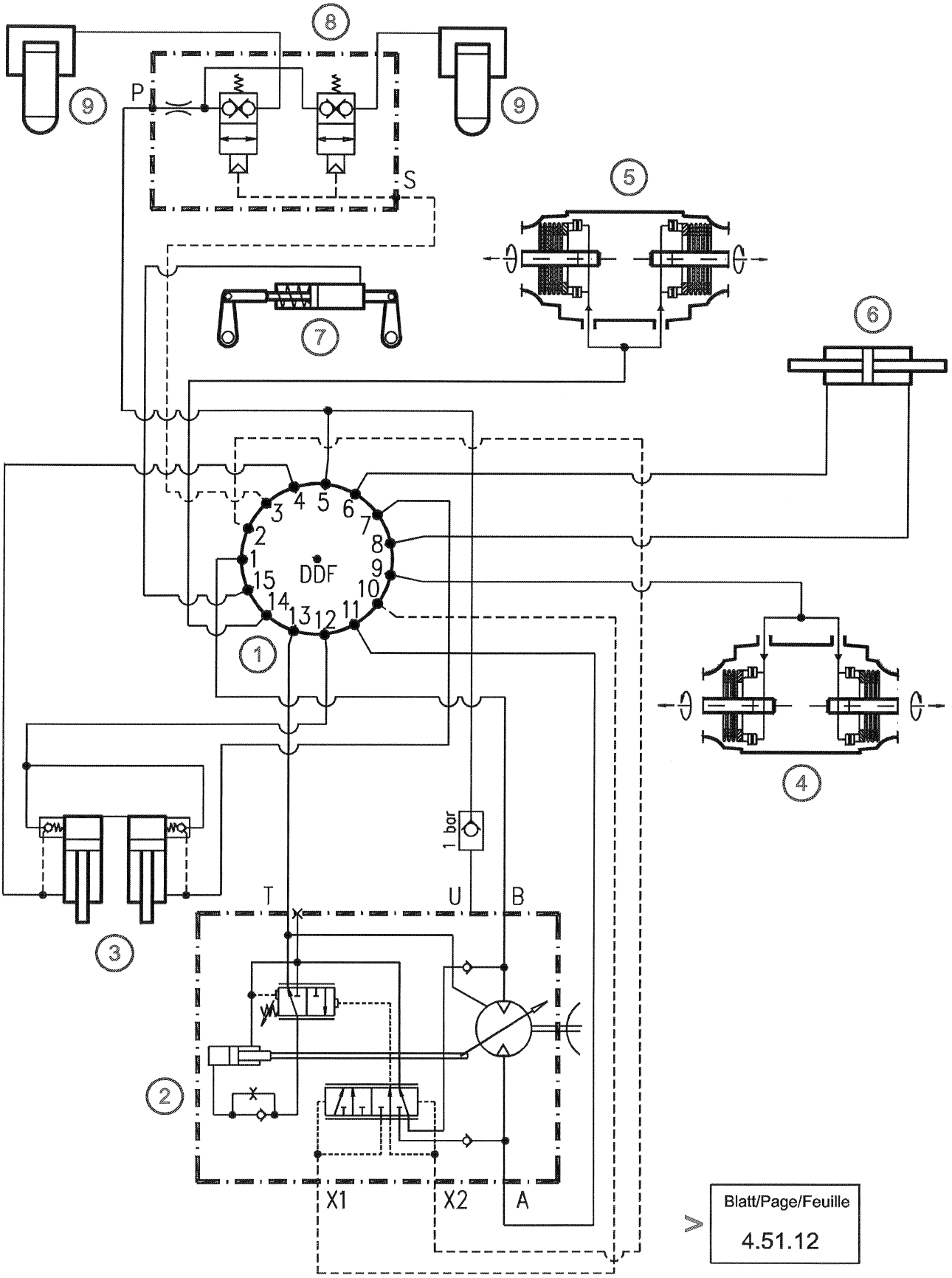
1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Telescopic stick / intermediate boom circular
26	Breaker / additional control circuit
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Breaker pedal
32	Accumulator for pilot pressure
33	Pilot control
34	Accumulator charge valve for brake
35	Accumulator for brake
36	Brake system
37	4/3 way valve, additional control circuit



SCHAEFF	Typ/Model/Type **HML 32**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (articulated boom)**	Blatt/Page/Feuille **4.51.01**

1	Swing drive
2	Valve for swing brake release
3	Starting aid (swing movement aid when machine on incline) (3/2 control valve)
4	Priority valve
5	Steering unit
6	Steering cylinder
7	Cut-off valve
8	Changeover swing / flushing (4/2 control valve)
9	Accumulator valve (brake system)
10	Travel motor
11	Variable capacity pump — excavating
12	Travel pump
13	Suction filter
14	Gear pump — steering, excavation, brake
15	Hydraulic oil tank
16	Diesel engine
17	Hydraulic oil cooler
18	Hydraulic oil temperature control
19	Return filter
20	Operation – Rock breaker (3/2 control valve)
21	Operation – Additional control circuit (4/3 control valve)
22	Emergency steering
23	Control valve 1
24	Control valve 2
25	Boom
26	Dipperstick
27	Bucket
28	Intermediate boom
29	Additional control circuit / Rock breaker
30	Swing
31	Articulation
32	Support
33	Support

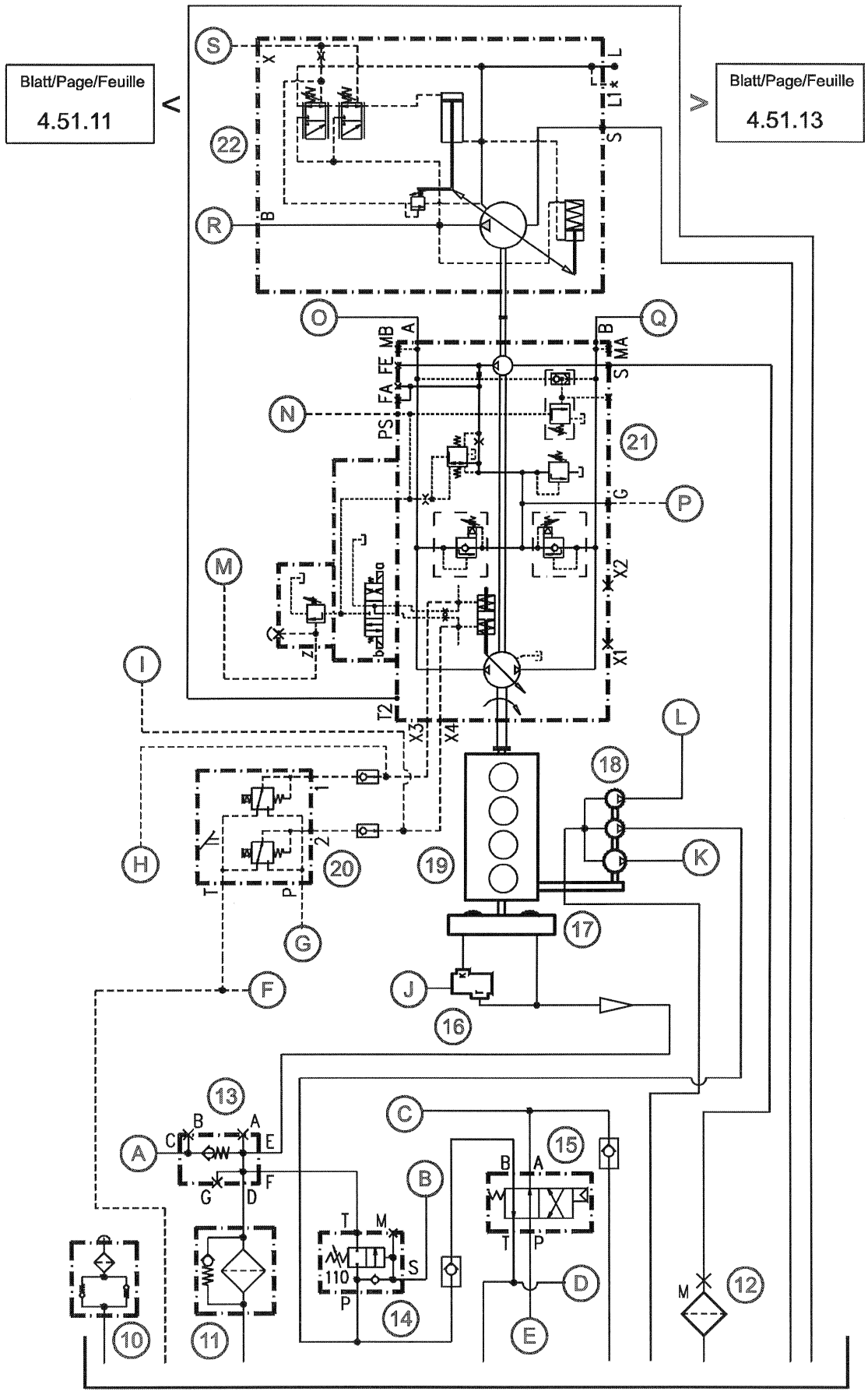
1	Drehdurchführung	Rotary transfer	Joint tournant
2	Verstellmotor - Fahren	Variable displacement motor - travel	Moteur à cylindrée variable - translation
3	Hydraulikzylinder – Abstützen	Hydraulic cylinder – outrigger	Vérin hydraulique - stabilisateur
4	Betriebsbremse - Kreis 2 (Hinterachse)	Service brake - circuit 2 (rear axle)	Frein de service - circuit 2 (essieu AR)
5	Betriebsbremse - Kreis 1 (Vorderachse)	Service brake - circuit 1 (front axle)	Frein de service - circuit 1 (essieu AV)
6	Hydraulikzylinder-Lenken	Hydraulic cylinder – steering	Vérin hydraulique - direction
7	Federspeicherzylinder - Feststellbremse	Spring loaded cylinder - parking brake	Cylindre à ressort accumulé - frein de stationnement
8	Wegeventil (Pendelachsverriegelung)	Control valve (oscillating axle lock)	Distributeur (verrouillage de l'essieu oscillant)
9	Hydraulikzylinder - Pendelachsverriegelung	Hydraulic cylinder – oscillating axle lock	Vérin hydraulique - verrouillage de l'essieu oscillant



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4.51.12

SCHAEFF	Typ/Model/Type **HML 32 articulated boom**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (undercarriage)**	Blatt/Page/Feuille **4.51.11**

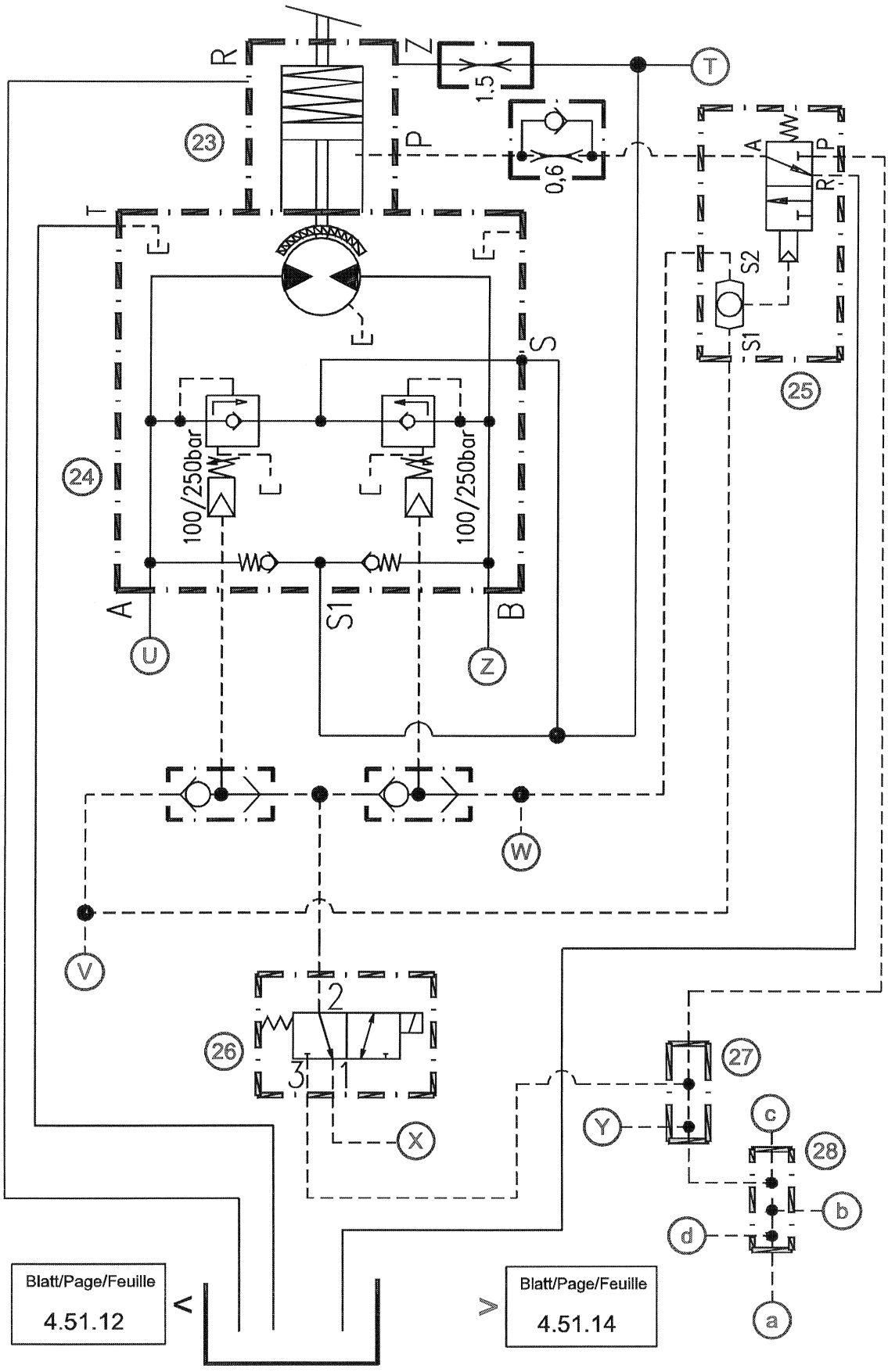
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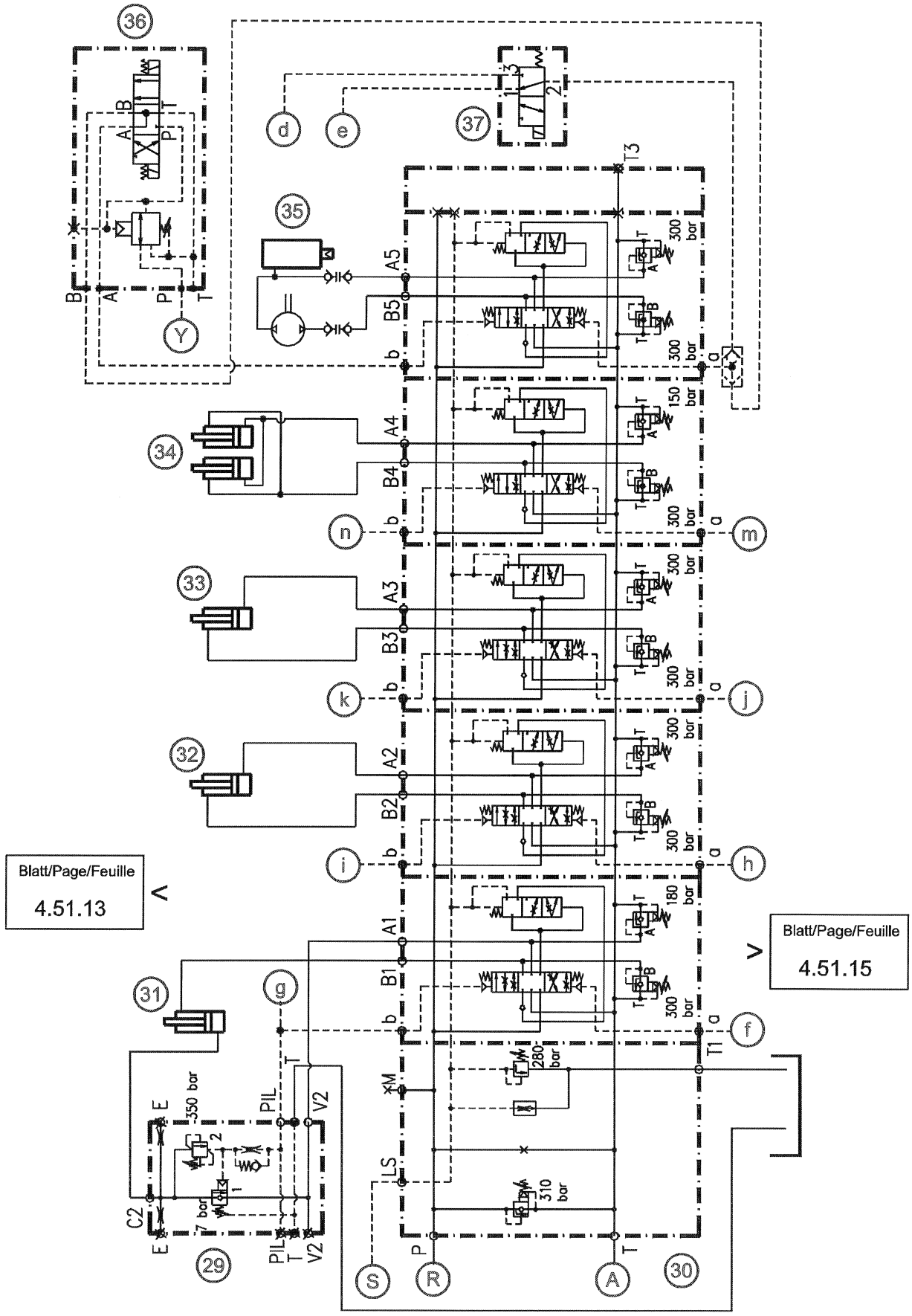
SCHAEFF	Typ/Model/Type **HML 32 articulated boom**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (oil flow)**	Blatt/Page/Feuille **4.51.12**

10	Belüftungsfilter	Vent filter	Filtre d'aération
11	Rücklauffilter	Return filter	Filtre de retour
12	Saugfilter	Suction filter	Filtre d'aspiration
13	Rücklaufsammler	Return line collector	Collecteur retour
14	Druckabschaltventil	Cut-off valve	Valve de coupure
15	Wegeventil	Control valve	Distributeur
16	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
17	Ölkühler	Oil cooler	Refroidisseur d'huile
18	Dreifachzahnradpumpe	Triple gear pump	Triple pompe à engrenages
19	Dieselmotor	Diesel engine	Moteur diesel
20	Vorsteuergerät – Fußpedal - (Fahren)	Pilot-operated valve – pedal (travel)	Distributeur à commande assistée - pédale (translation)
21	Verstellpumpe – Fahren	Variable displacement pump - travel	Pompe à débit variable - translation
22	Verstellpumpe – Arbeiten	Variable displacement pump - working	Pompe à débit variable - équipement



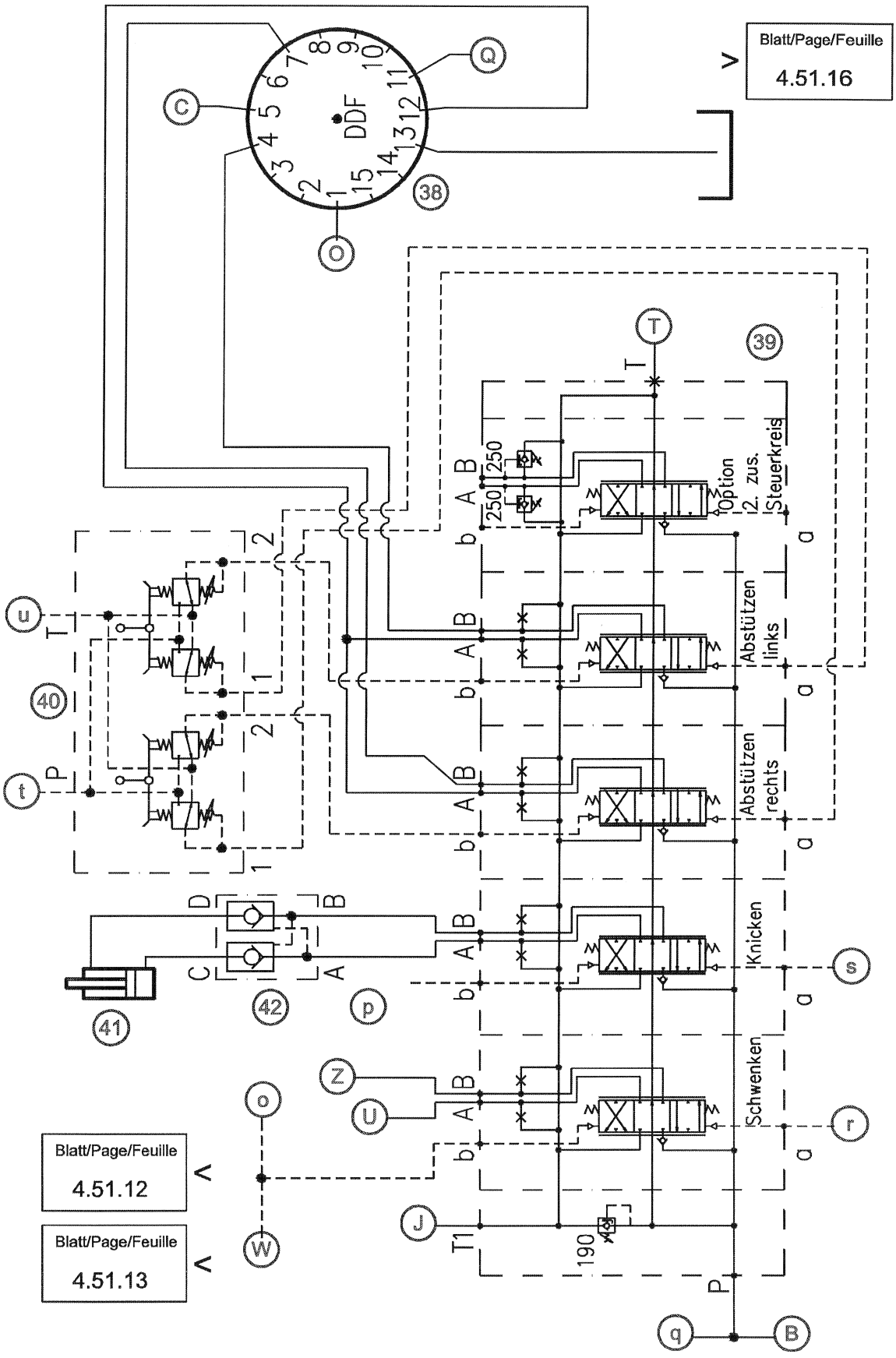
SCHAEFF	Typ/Model/Type **HML 32 articulated boom**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (swing)**	Blatt/Page/Feuille **4.51.13**

23	Drehwerkgetriebe (Drehantrieb)	Swing gear (swing drive)	Reducteur d'orientation (entraînement d'orientation)
24	Hydromotor (Drehantrieb)	Hydraulic motor (swing drive)	Moteur hydraulique (entraînement d'orientation)
25	Relaisventil	Relay valve	Clapet-relais
26	Wegeventil	Control valve	Distributeur
27	Sammler	Collector	Collecteur
28	Sammler	Collector	Collecteur



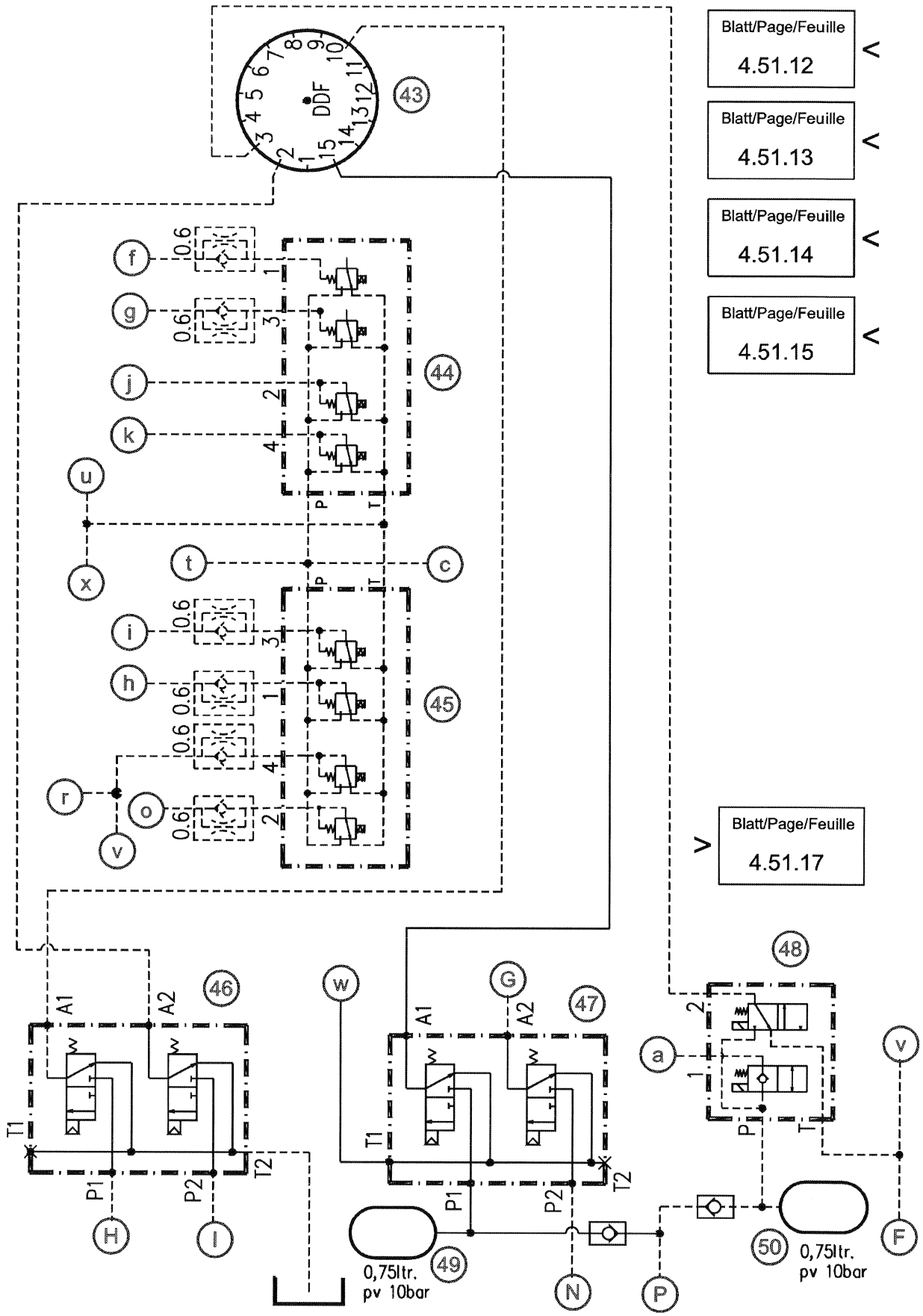
SCHAEFF	Typ/Model/Type **HML 32**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (working)**	Blatt/Page/Feuille **4.51.14**

29	Lasthalteventil	Load check valve	Clapet de sécurité
30	Blocksteuergerät 5SX14	Valve bank 5SX14	Bloc distributeur 5SX14
31	Hydraulikzylinder – Ausleger	Hydraulic cylinder – boom	Vérin hydraulique – flèche
32	Hydraulikzylinder – Löffelstiel	Hydraulic cylinder – stick	Vérin hydraulique – balancier
33	Hydraulikzylinder – Löffel	Hydraulic cylinder – bucket	Vérin hydraulique – godet
34	Hydraulikzylinder - Zwischenausleger	Hydraulic cylinder - intermediate boom	Vérin hydraulique – flèche intermédiaire
35	Zusatzsteuerkreis / Hydraulikhammer	Additional control circuit / hydraulic hammer	Circuit supplémentaire / marteau hydraulique
36	Wegeventil (Zusatzsteuerkreis)	Control valve (additional control circuit)	Distributeur (circuit supplémentaire)
37	Wegeventil (Hydraulikhammer)	Control valve (hydraulic hammer)	Distributeur (marteau hydraulique)



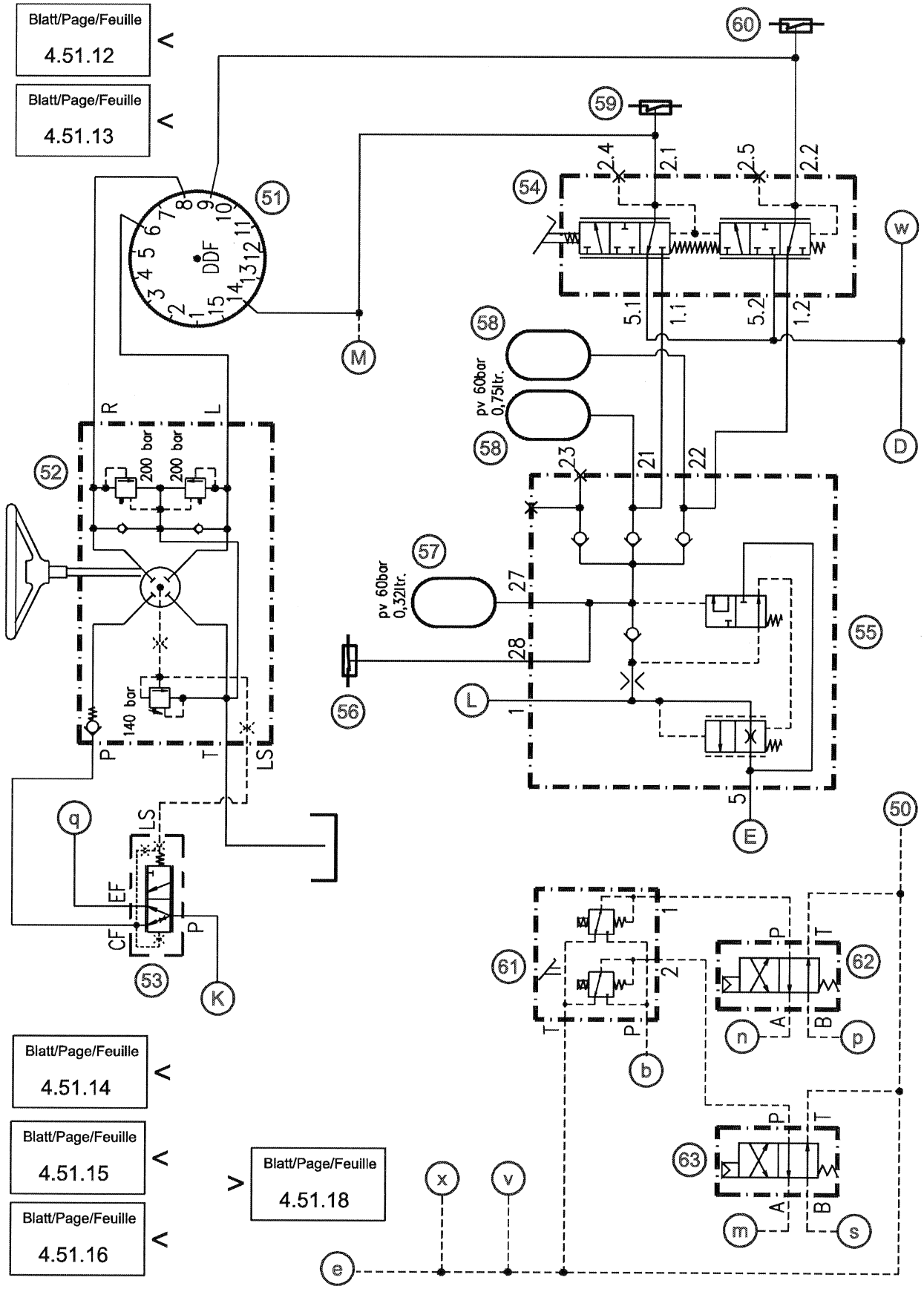
SCHAEFF	Typ/Model/Type **HML 32**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (articulation)**	Blatt/Page/Feuille **4.51.15**

38	Drehdurchführung (Drehantrieb)	Rotary transfer (swing drive)	Joint tournant (entraînement d'orientation)
39	Blocksteuergerät 4SM12	Valve bank 4SM12	Bloc distributeur 4SM12
40	Vorsteuergerät - Abstützen	Pilot-operated valve - outrigger	Distributeur à commande assistée - stabilisateur
41	Hydraulikzylinder - Knicken	Hydraulic cylinder – articulation	Vérin hydraulique - articulation
42	Doppelrückschlag-ventil - entsperrbar	Pilot controlled double check valve	Double clapet anti-retour piloté



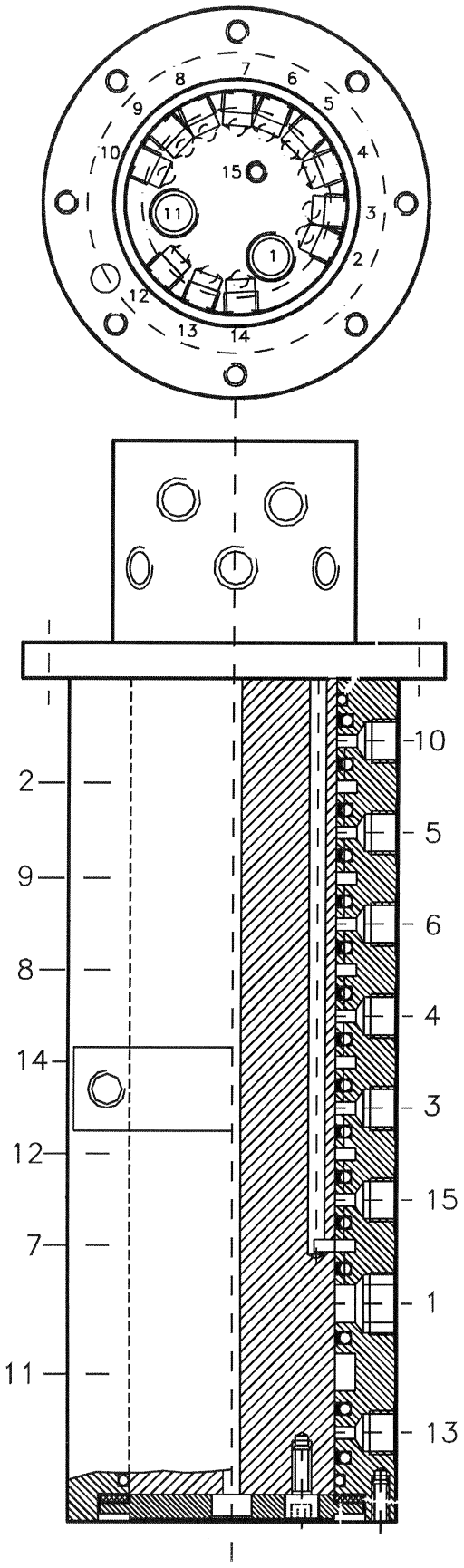
SCHAEFF	Typ/Model/Type **HML 32**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (pilot control)**	Blatt/Page/Feuille **4.51.16**

43	Drehdurchführung	Rotary transfer	Joint tournant
44	Vorsteuergerät (Löffel, Ausleger)	Pilot-operated valve (bucket, boom)	Distributeur à commande assistée (godet, flèche)
45	Vorsteuergerät (Schwenken, Löffelstiel)	Pilot-operated valve (swing, dipper)	Distributeur à commande assistée (orientation, balancier)
46	Wegeventil (Schnell /Langsam)	Control valve (low / high speed)	Distributeur (petite / grande vitesse)
47	Wegeventil (Feststellbremse)	Control valve (parking brake)	Distributeur (frein de stationnement)
48	Magnetventil	Solenoid valve	Electrovanne
49	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
50	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique



SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	HML 32	**01.2002**
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram (steering, brakes)	**4.51.17**

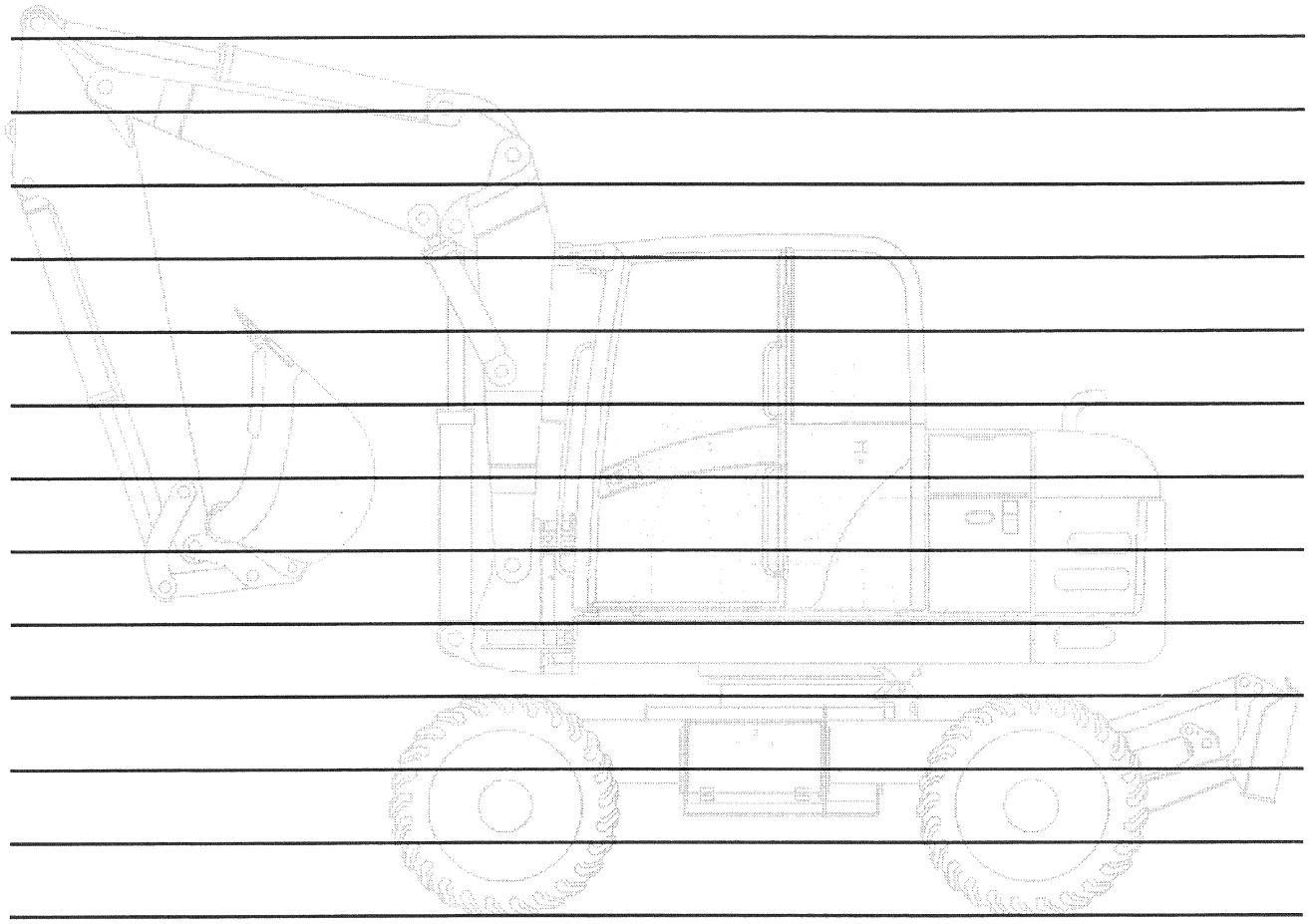
51	Drehdurchführung	Rotary transfer	Joint tournant
52	Lenkaggregat	Steering unit	Unité de direction
53	Prioritätsventil	Priority valve	Valve de priorité
54	Bremsventil (Fußpedal)	Counter balance valve (pedal)	Clapet de frein (pédale)
55	Druckabschaltventil	Shut-off valve	Valve de coupure
56	Druckschalter 85 bar (Öffner)	Pressure switch 85 bar (break contact)	Interrupteur de pression 85 bar (contact repos)
57	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
58	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
59	Druckschalter 5 bar (Schließer)	Pressure switch 5 bar (make contact)	Interrupteur de pression 5 bar (contacteur)
60	Druckschalter 40 bar (Schließer)	Pressure switch 40 bar (make contact)	Interrupteur de pression 40 bar (contacteur)
61	Vorsteuergerät (Knicken)	Pilot-operated valve (articulation)	Distributeur à commande assistée (articulation)
62	Wegeventil (Knicken)	Control valve (articulation)	Distributeur (articulation)
63	Wegeventil (Knicken)	Control valve (articulation)	Distributeur (articulation)



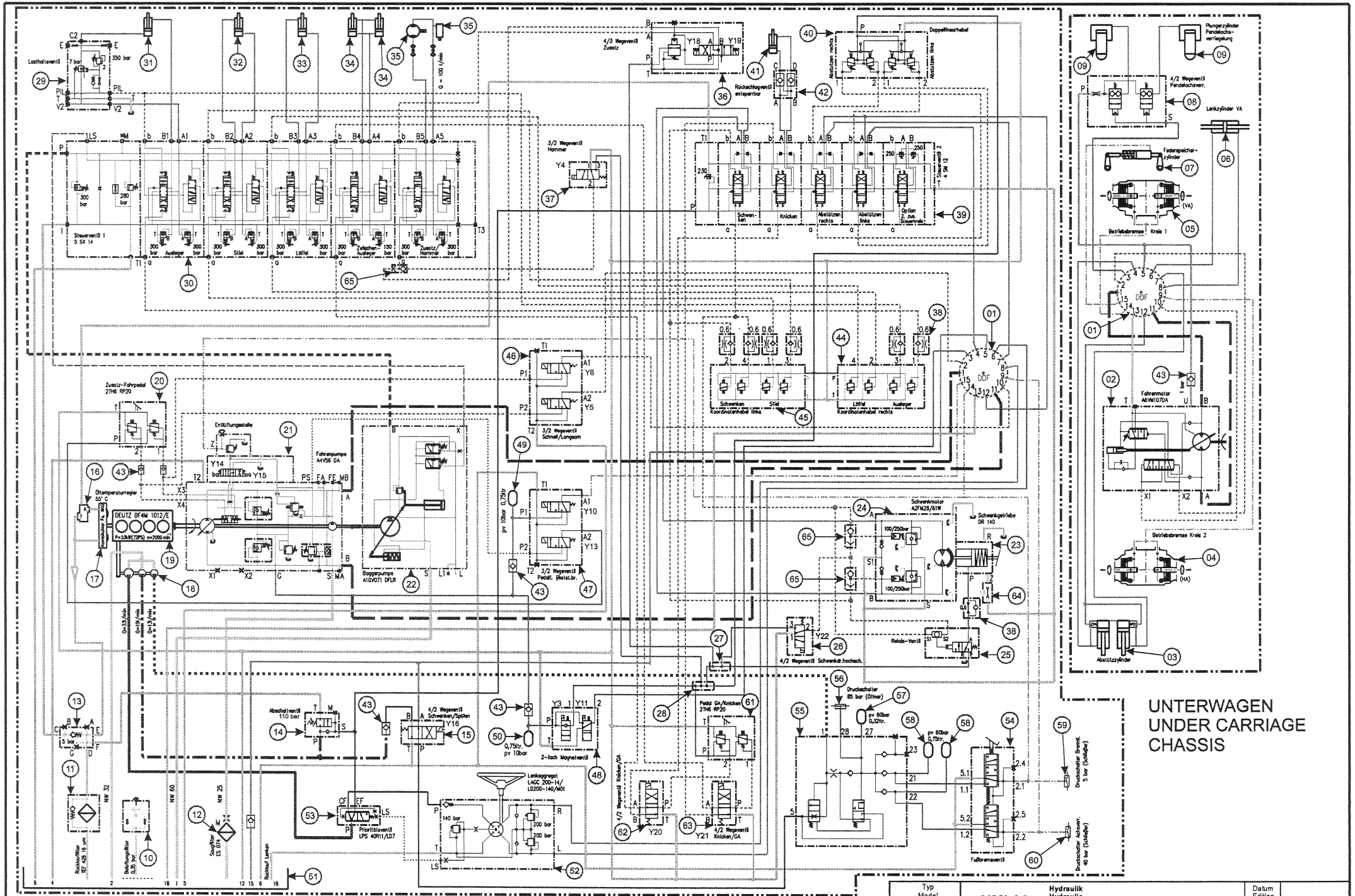
SCHAEFF	Typ/Model/Type **HML32 articulated boom**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulics (rotary transfer)**	Blatt/Page/Feuille **4.51.18**

	Belegungsplan: Drehdurchführung	Assignment diagram: rotary transfer	Schéma de répartition: joint tournant
1	Fahren	Travel	Translation
2	Schnell / Langsam (Wegeventil – A2)	Low / high speed (control valve – A2)	Petite / grande vitesse (distributeur – A2)
3	Pendelachsverriegelung	Oscillating axle lock	Verrouillage de l'essieu oscillant
4	Abstützen links (Zylinder ein)	Outrigger left (cylinder in)	Stabilisateur gauche (vérin rentrer)
5	Querspülung (Verstellmotor – Fahren)	Transverse drain (variable displacement motor – travel)	Drainage transversal (moteur à cylindrée variable – translation)
6	Lenken links	Steering left	Direction gauche
7	Abstützen rechts (Zylinder ein)	Outrigger right (cylinder in)	Stabilisateur droit (vérin rentrer)
8	Lenken rechts	Steering right	Direction droite
9	Betriebsbremse - Kreis 2 (Hinterachse)	Service brake - circuit 2 (rear axle)	Frein de service - circuit 2 (essieu AR)
10	Schnell / Langsam (Wegeventil – A1)	Low / high speed (control valve – A1)	Petite / grande vitesse (distributeur – A1)
11	Fahren	Travel	Translation
12	Abstützen links und rechts (Zylinder aus)	Outrigger left (cylinder out)	Stabilisateur gauche (vérin sortir)
13	Spülöl	Drain oil	Huile de drainage
14	Betriebsbremse - Kreis 1 (Vorderachse)	Service brake - circuit 1 (front axle)	Frein de service - circuit 1 (essieu AV)
15	Feststellbremse	Parking brake	Frein de stationnement

HML 32



Typ Model Type Tipo	**HML 32**	Datum Edition Date Fecha	**11.2003**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**4.51.20**



Typ Model Type Tipo	**HML32**	**Hydraulik** **Hydraulic** **Hydraulique** **Hidráulico**	Datum Edition Date Fecha: **01.2004**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan** **Hydraulic diagramm** **Plan hydraulique** **Plano hidráulico**		Blatt Page Feuille Página: **4.51.21**

Pos. Item Rep. No.	Deutsch	English	Français
01	Drehdurchführung	Rotary transfer	Joint tournant
02	Verstellmotor - Fahren	Variable displacement motor - travel	Moteur à cylindrée variable - translation
03	Hydraulikzylinder – Abstützen	Hydraulic cylinder – outrigger	Vérin hydraulique - stabilisateur
04	Betriebsbremse - Kreis 2 *Hinterachse*	Service brake - circuit 2 *rear axle*	Frein de service - circuit 2 *essieu AR*
05	Betriebsbremse - Kreis 1 *Vorderachse*	Service brake - circuit 1 *front axle*	Frein de service - circuit 1 *essieu AV*
06	Hydraulikzylinder– Lenken *Vorderachse*	Hydraulic cylinder - steering *front axle*	Vérin hydraulique - direction *essieu AR*
07	Federspeicherzylinder - Feststellbremse	Spring loaded cylinder - parking brake	Cylindre à ressort accumulé - frein de stationnement
08	Wegeventil *Pendelachsverriegelung*	Control valve *oscillating axle lock*	Distributeur *verrouillage de l'essieu oscillant*
09	Hydraulikzylinder - Pendelachsverriegelung	Hydraulic cylinder – oscillating axle lock	Vérin hydraulique - verrouillage de l'essieu oscillant
10	Belüftungsfilter	Vent filter	Filtre d'aération
11	Rücklauffilter	Return filter	Filtre de retour
12	Saugfilter	Suction filter	Filtre d'aspiration
13	Rücklaufsammler	Return line collector	Collecteur retour
14	Abschaltventil	Shut-off valve	Valve de coupure
15	Wegeventil **Y16** *schwenken / spülen*	solenoid valve **Y16** *flush / swing*	Electrovanne **Y16** purge / orientation
16	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
17	Ölkühler	Oil cooler	Refroidisseur d'huile
18	Dreifachzahnradpumpe	Triple gear pump	Triple pompe à engrenages
19	Dieselmotor	Diesel engine	Moteur diesel
20	Vorsteuergerät – Fußpedal *Fahren*	Pilot-operated valve – pedal *travel*	Distributeur à commande assistée - pédale *translation*
21	Verstellpumpe – Fahren	Variable displacement pump - travel	Pompe à débit variable - translation
22	Verstellpumpe – Arbeiten	Variable displacement pump - working	Pompe à débit variable - équipement
23	Drehwerkgetriebe (Drehantrieb)	Swing gear (swing drive)	Reducteur d'orientation (entraînement d'orientation)
24	Hydromotor (Drehantrieb)	Hydraulic motor (swing drive)	Moteur hydraulique (entraînement d'orientation)
25	Relaisventil *Schwenkbremse*	Relay valve *swing brake*	Clapet-relais *frein orientation*
26	Wegeventil **Y22** *Schwenkdruckhochschaltung*	Solenoid valve **Y22** *high torque swing*	electro-vanne **Y22** *élevation pression orientation*
27	Sammler	Collector	Collecteur
28	Sammler	Collector	Collecteur

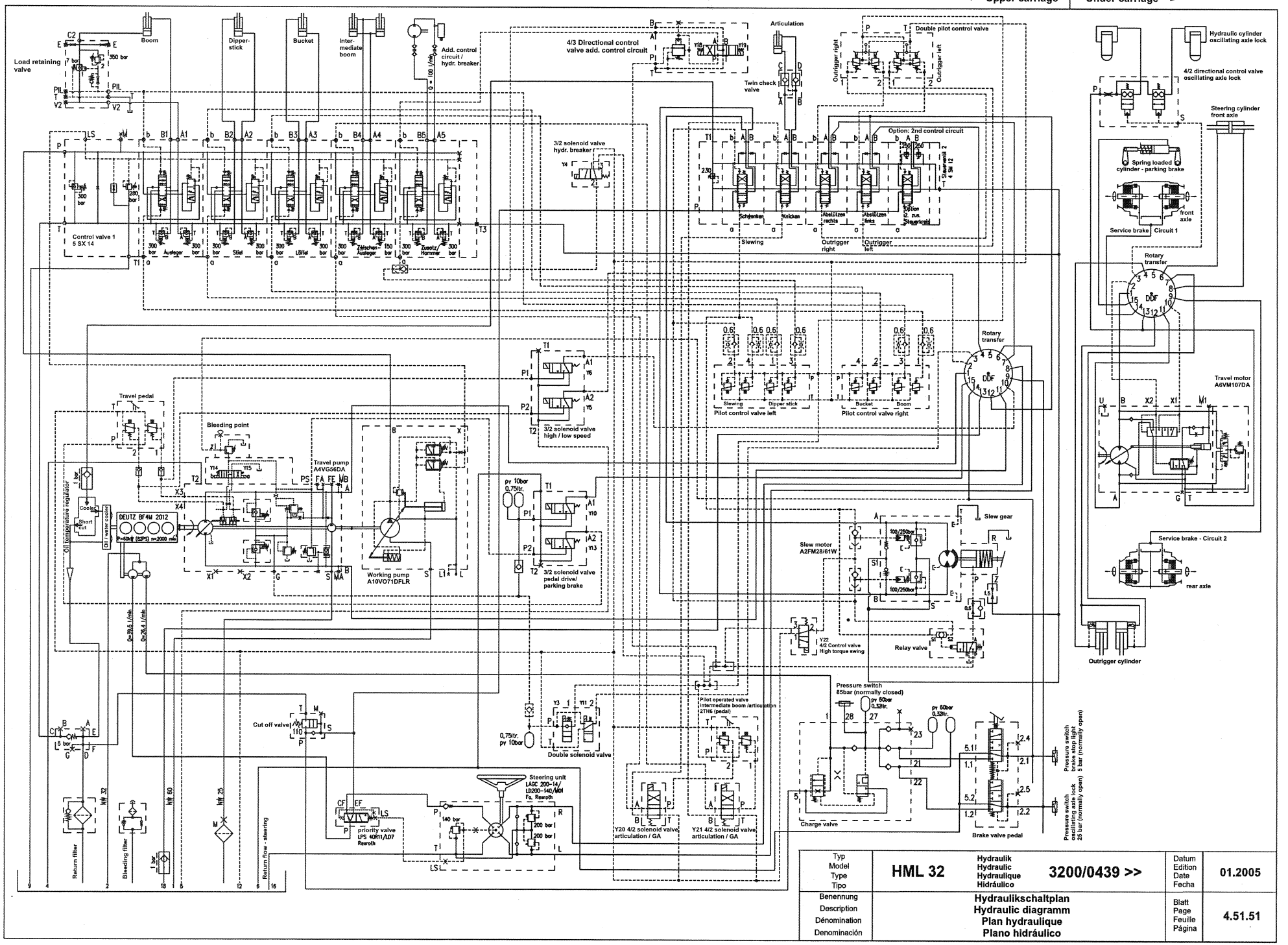
Typ Model Type Tipo	**HML 32**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**		Blatt Page Feuille Página	**4.51.22**

Pos. Item Rep. No.	Deutsch	English	Français
29	Lasthalteventil	Load holding valve	Clapet de sécurité
30	Blocksteuergerät 5SX14	Valve bank 5SX14	Bloc distributeur 5SX14
31	Hydraulikzylinder – Ausleger	Hydraulic cylinder – boom	Vérin hydraulique – flèche
32	Hydraulikzylinder – Löffelstiel	Hydraulic cylinder – stick	Vérin hydraulique – balancier
33	Hydraulikzylinder – Löffel	Hydraulic cylinder – bucket	Vérin hydraulique – godet
34	Hydraulikzylinder - Zwischenausleger	Hydraulic cylinder - intermediate boom	Vérin hydraulique – flèche intermédiaire
35	Zusatzsteuerkreis / Hydraulikhammer	Additional control circuit / hydraulic hammer	Circuit supplémentaire / marteau hydraulique
36	Wegeventil / Druckminder-ventil **Y18 / Y19** *Zusatzsteuerkreis*	Solenoid valve / pressure reducing valve **Y18 / Y19** *additional control circuit*	Electrovanne / diminueur de pression **Y18 / Y19** *circuit supplémentaire*
37	Wegeventil **Y4** *Hydraulikhammer*	Control valve **Y4** *hydraulic hammer*	Distributeur **Y4** *marteau hydraulique*
38	Drosselrückschlagventil	Throttle check-valve	Clapet anti-retour avec étrangleur
39	Blocksteuergerät 4SM12	Valve bank 4SM12	Distributeur 4SM12
40	Vorsteuergerät - Abstützen	Pilot-operated valve - outrigger	Distributeur à commande assistée - stabilisateur
41	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - deport de flèche
42	Doppelrückschlagventil *entsperrbar*	Pilot controlled double check valve	Double clapet anti-retour piloté
43	Rückschlagventil	Non-return valve	Clapet anti-retour
44	Vorsteuergerät *Löffel, Ausleger*	Pilot-operated valve *bucket, boom*	Distributeur à commande assistée *godet, flèche*
45	Vorsteuergerät *Schwenken, Löffelstiel*	Pilot-operated valve *swing, dipper*	Distributeur à commande assistée *orientation, balancier*
46	Wegeventil **Y5 / Y6** *Schnell / Langsam*	Control valve **Y5 / Y6** *low / high speed*	Electovanne **Y5 / Y6** *petite / grande vitesse*
47	Wegeventil **Y10 / Y13** *Feststellbremse / Pedalfahren*	Control valve **Y10 / Y13** *parking brake / pedal drive*	Distributeur **Y10 / Y13** *frein de stationnement / translation par pédale*
48	Zweifach-Magnetventil *-Vorsteuerung ein/aus* **Y3** *-Achsverriegelung* **Y11**	Double solenoid valve *-pilot pressure on/off* **Y3** *-oscillating axle lock* **Y11**	Double electrovanne *-pression pilotage marche/arrêt* **Y3** *-verrouillage pont oscillant* **Y11**
49	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
50	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
51	Öltank	Oilt tank	Reservoir hydraulique

Typ Model Type Tipo	**HML 32**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**		Blatt Page Feuille Página	**4.51.23**

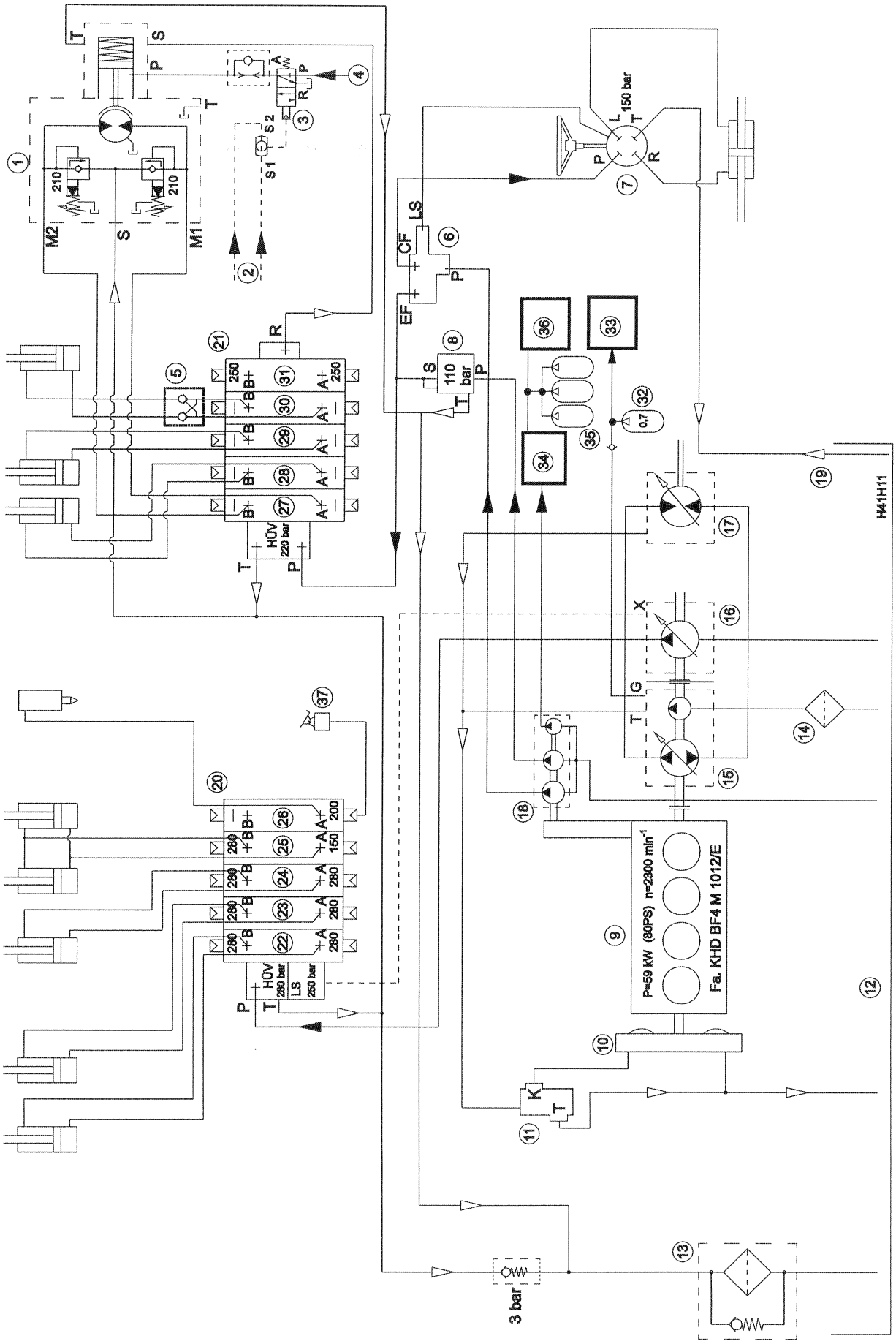
Pos. Item Rep. No.	Deutsch	English	Français
52	Lenkeinheit	Steering unit	Unité de direction
53	Prioritätsventil	Priority valve	Valve de priorité
54	Bremsventil *Fußpedal*	Brake valve *pedal*	Clapet de frein *pedale*
55	Druckabschaltventil	Shut-off valve	Valve de coupure
56	Druckschalter **85 bar** *Bremsspeicher*	Pressure switch **85 bar** *break accumulator*	Interrupteur de pression **85 bar** *accu frein*
57	Hydrospeicher	Hydraulic accumulator	Accu hydraulique
58	Hydrospeicher	Hydraulic accumulator	Accu hydraulique
59	Druckschalter **5 bar** *Bremslicht*	Pressure switch **5 bar** *brake stop light*	Interrupteur de pression **5 bar** *feu de stop*
60	Druckschalter **40 bar** *Achsverriegelung / automotives Fahren*	Pressure switch **40 bar** *axle lock / automotive drive*	Interrupteur de pression **40 bar** *verrouillage pont oscillant / translation automotive*
61	Vorsteuergerät *Knicken*	Pilot-operated valve articulation	Distributeur à commande assistée *articulation*
62	Wegeventil **Y20** *Knicken / **GA***	Solenoid valve **Y20** *articulation / **intermediate boom***	Electrovanne **Y20** *deport flèche **bras intermediaire***
63	Wegeventil **Y21** *Knicken / **GA***	Solenoid valve **Y20** *articulation / **intermediate boom***	Electrovanne **Y21** *deport flèche **bras intermediaire***
64	Drossel	Throttle	Etrangleur
65	Wechselventil	Shuttle valve	Selecteur

Typ Model Type Tipo	**HML 32**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**		Blatt Page Feuille Página	**4.51.24**



Typ Model Type Tipo	**HML 32**	**Hydraulik** **Hydraulic** **Hydraulique** **Hidráulico**	**3200/0439 >>**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan** **Hydraulic diagramm** **Plan hydraulique** **Plano hidráulico**			Blatt Page Feuille Página	**4.51.51**

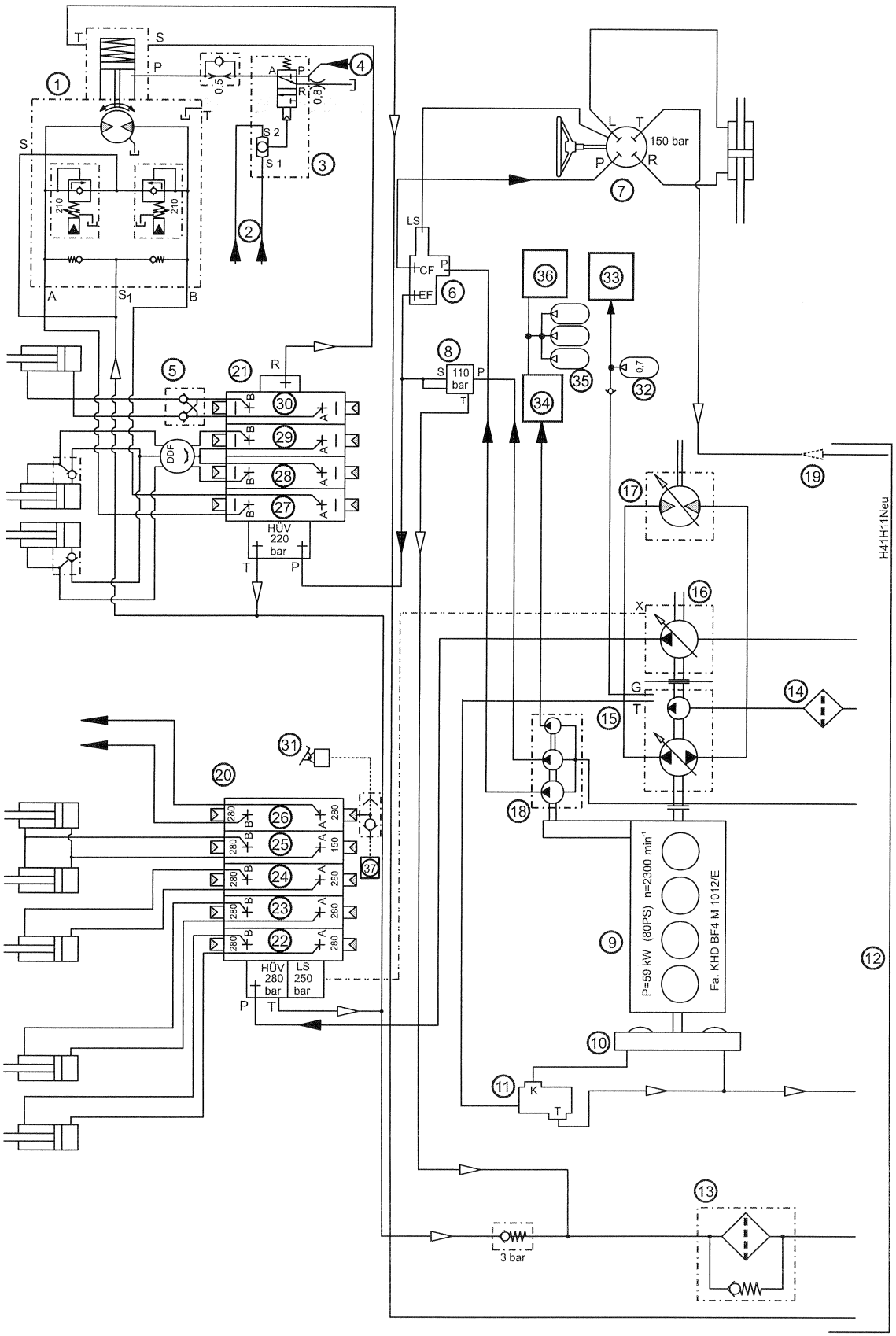
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SCHAEFF	Typ/Model/Type **HML 41 (serial no. 321/1099 - 321/1286)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.52.01**

Hydraulic installation

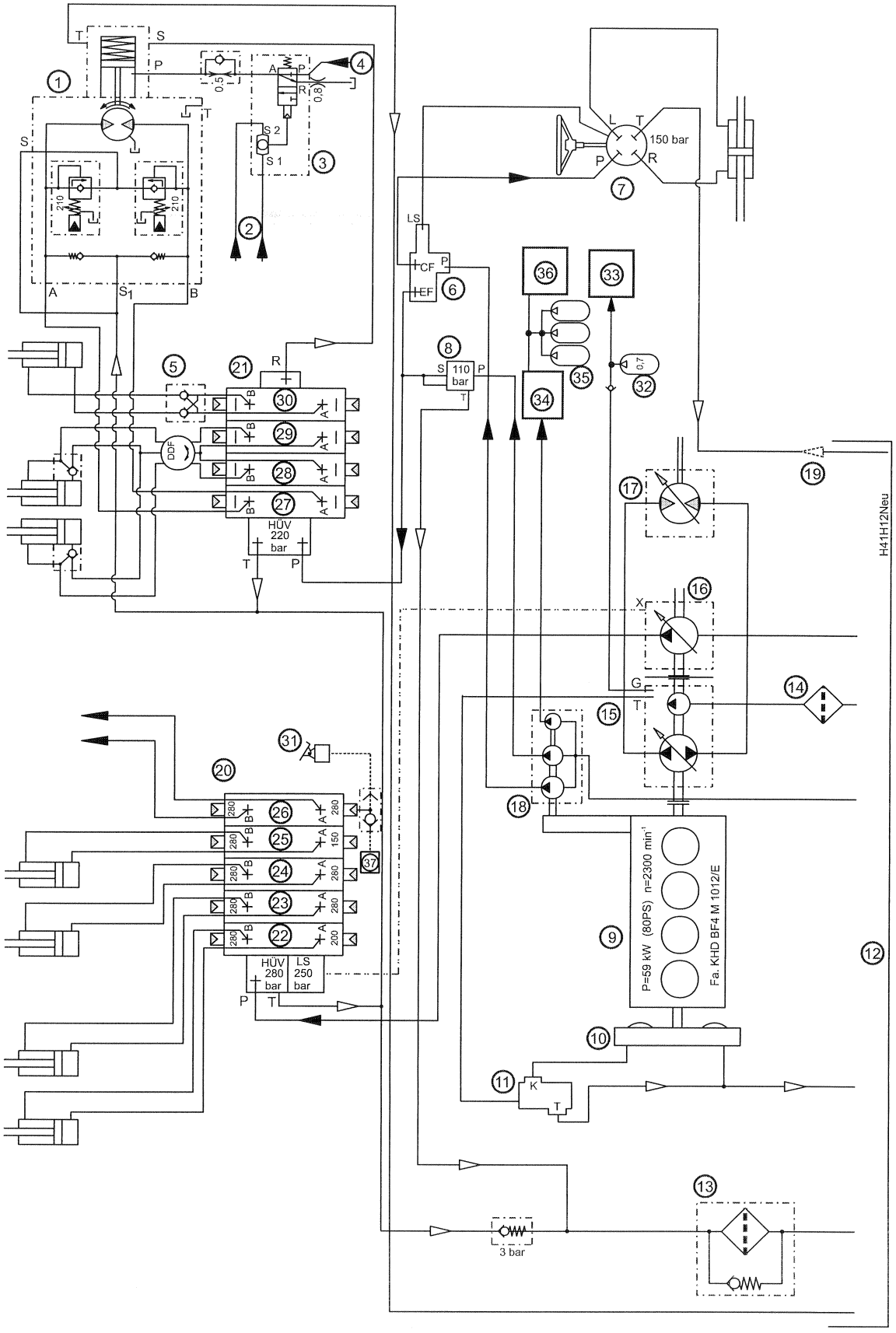
1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Intermediate boom
26	Breaker / additional control circuit
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Additional control circuit
32	Accumulator for pilot pressure
33	Pilot control
34	Accumulator charge valve for brake
35	Accumulator for brake
36	Brake system
37	Breaker pedal



SCHAEFF	Typ/Model/Type **HML 41 (from serial no. 321/1287)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (articulated boom)**	Blatt/Page/Feuille **4.52.02**

Hydraulic installation, articulated boom

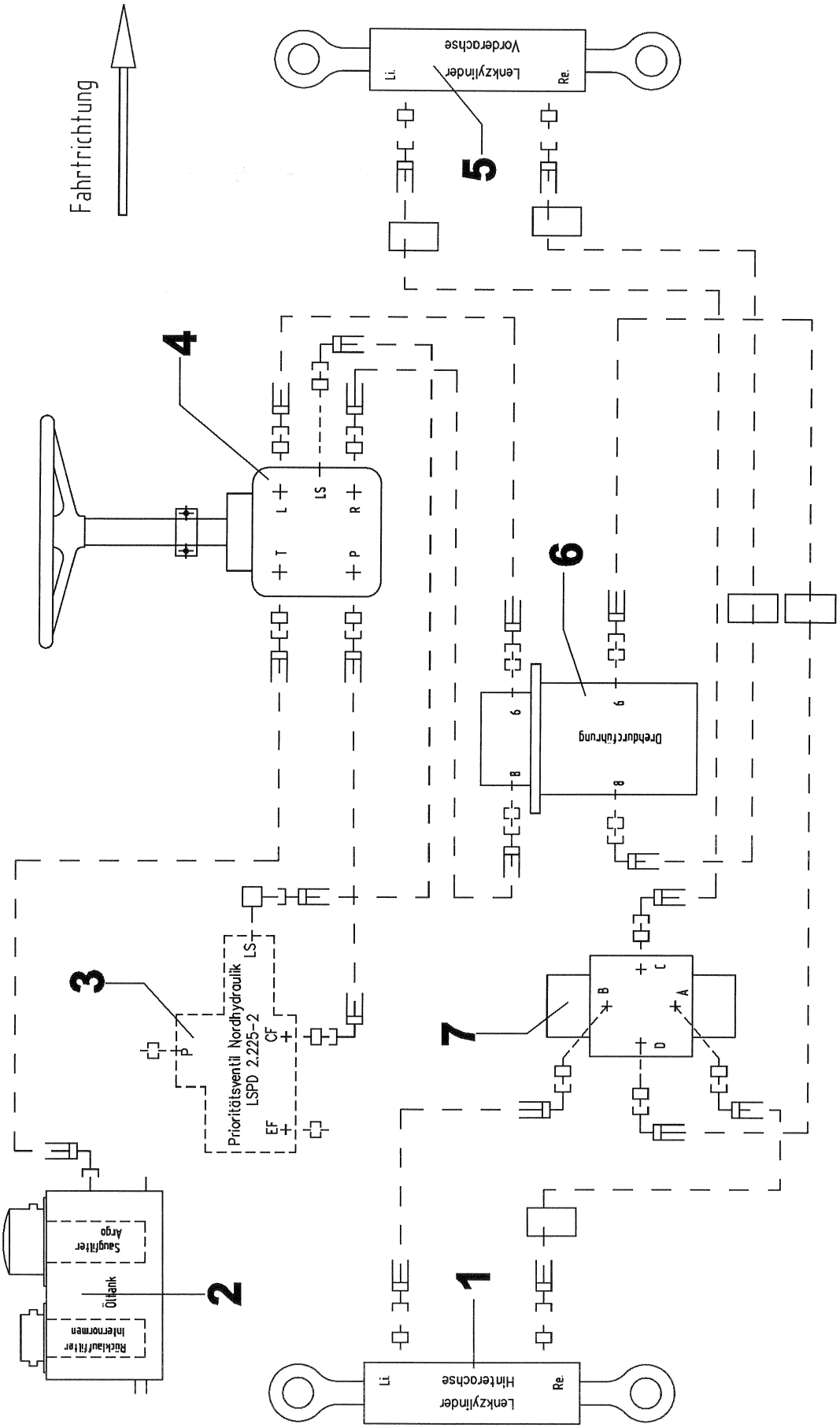
1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Intermediate boom
26	Breaker / additional control circuit
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Breaker pedal
32	Accumulator for pilot pressure
33	Pilot control
34	Accumulator charge valve for brake
35	Accumulator for brake
36	Brake system
37	4/3 way valve, additonal control circuit



SCHAEFF	Typ/Model/Type **HML 41 (from serial no. 321/1287)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, Mono boom**	Blatt/Page/Feuille **4.52.03**

Hydraulic installation, Mono boom

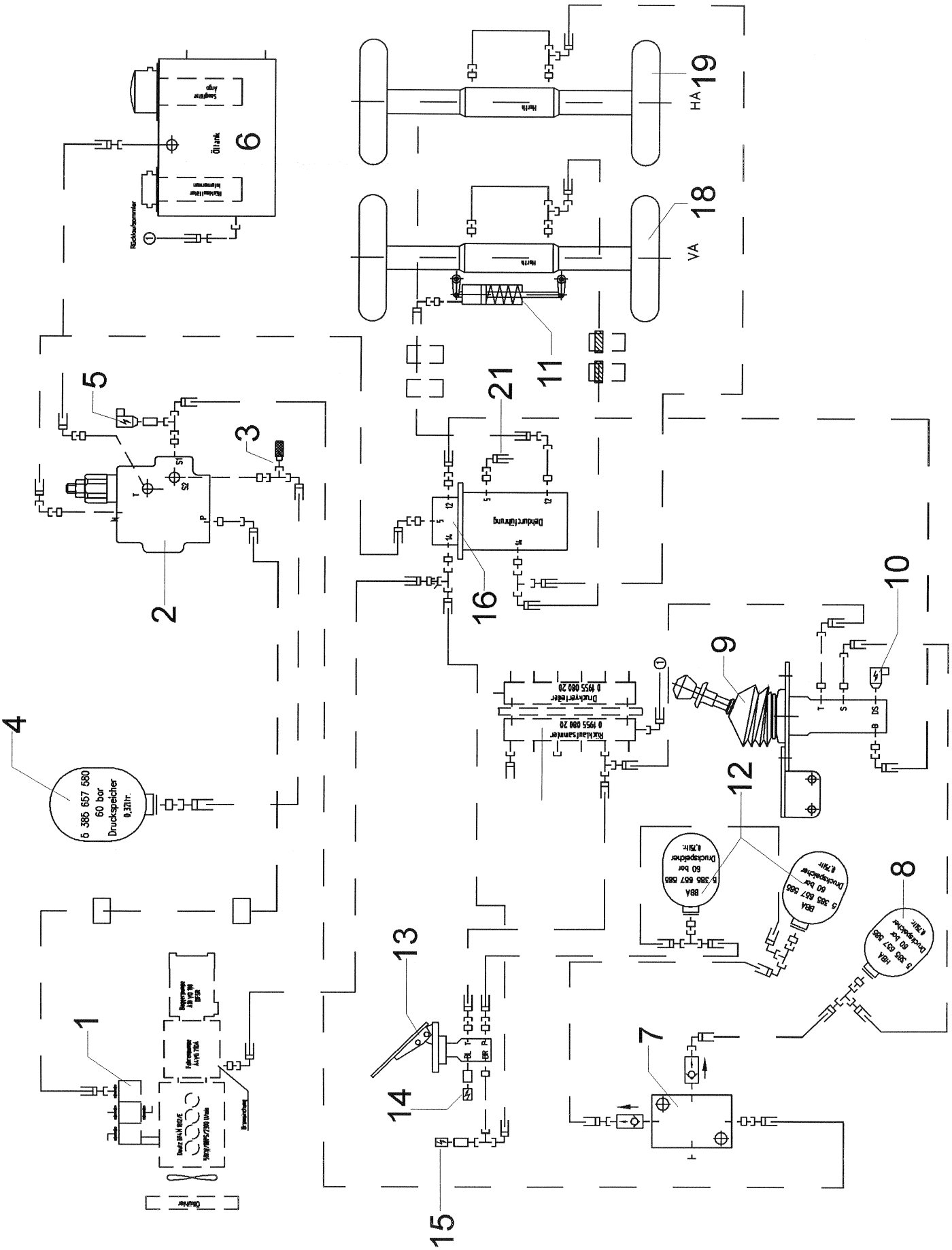
1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Priority valve
7	Steering unit
8	Cut-off valve
9	Diesel engine
10	Hydraulic oil cooler
11	Hydraulic oil temperature regulator
12	Hydraulic oil tank
13	Return line filter
14	Suction filter
15	Travel pump
16	Excavator - variable displacement pump
17	Travel motor
18	Excavator - gear pump
19	Emergency steering
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Telescopic dipperstick (option)
26	Breaker / additional control circuit
27	Slewing
28	Stabilizing
29	Stabilizing
30	Articulation
31	Breaker pedal
32	Accumulator for pilot pressure
33	Pilot control
34	Accumulator charge valve for brake
35	Accumulator for brake
36	Brake system
37	4/3 way valve, additonal control circuit



SCHAEFF	Typ/Model/Type **HML 41**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, 4-wheel-steering**	Blatt/Page/Feuille **4.52.04**

Hydraulic diagram, 4-wheel steering

1	Steering cylinder, rear axle
2	Hydraulic oil tank
3	Priority valve
4	Steering unit
5	Steering cylinder, front axle
6	Rotary transfer
7	Way valve, steering inversion

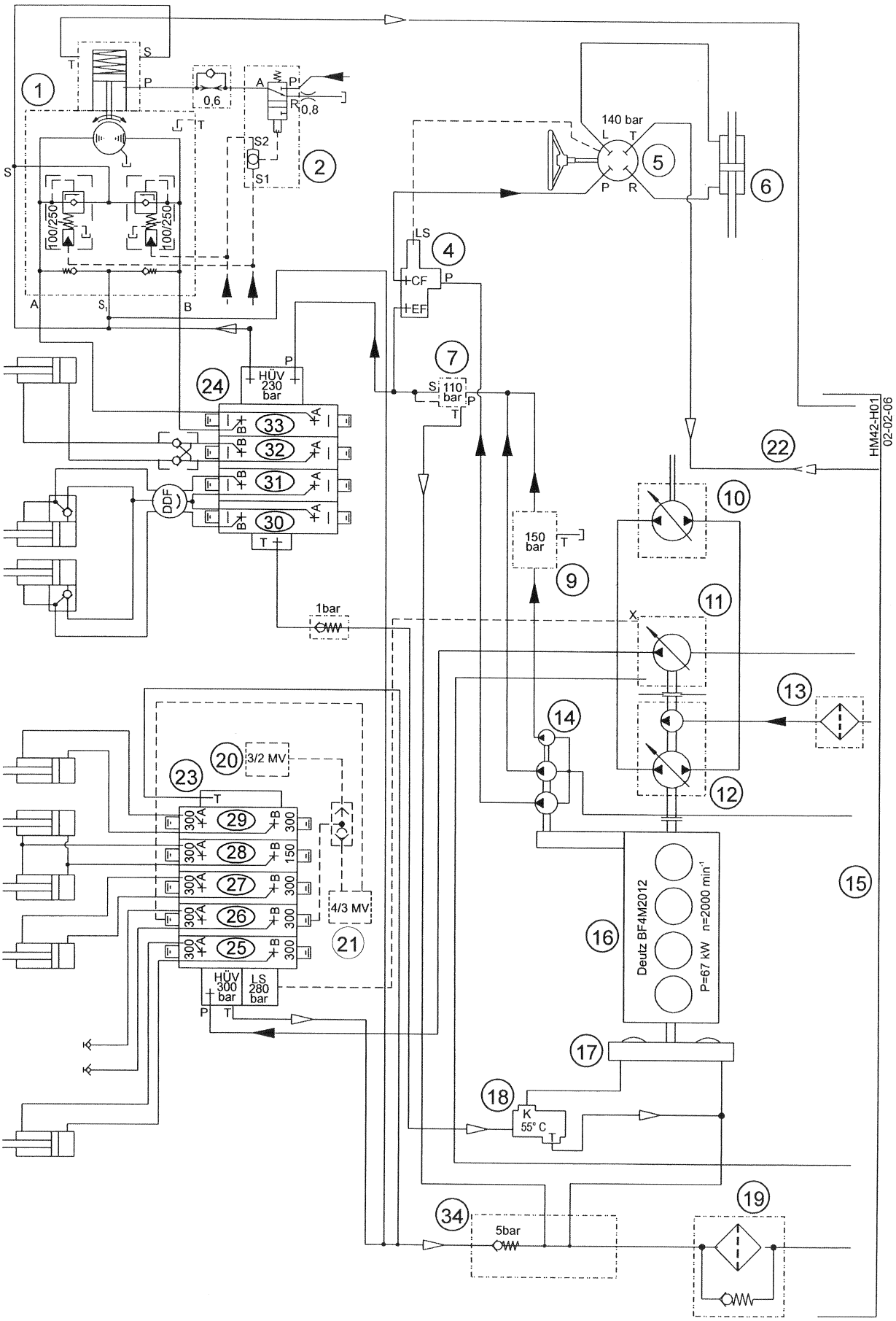


SCHAEFF	Typ/Model/Type **HML 41 (from serial no. 321/1251)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, brake**	Blatt/Page/Feuille **4.52.05**

HML 41

Legend - hydraulic diagram, brake

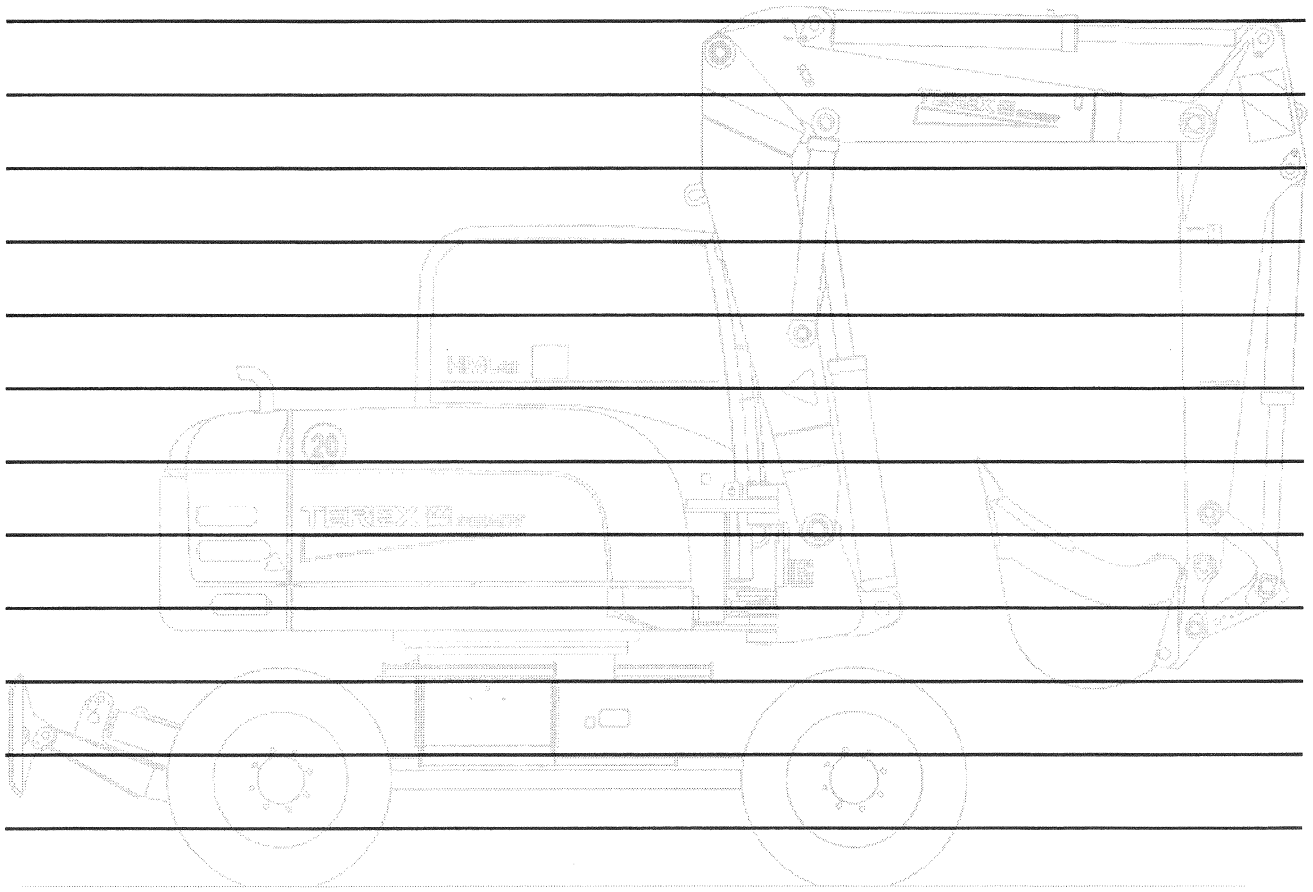
1	Brake pump
2	Accumulator charge valve (pump compartment)
3	Gauge port accumulator pressure
4	Pressure accumulator for accumulator charge valve (below cabin)
5	Pressure switch 85 bar for accumulator pressure
6	Hydraulic oil tank
7	Distributor block (below cabin)
8	Pressure accumulator for hand brake (below cabin)
9	Hand brake valve
10	Pressure switch 5 bar
11	Spring-loaded cylinder hand brake
12	Pressure accumulator for service brake and excavator brake (below cabin)
13	Foot brake valve
14	Brake light switch 5 bar
15	Pressure switch 50 bar oscillating axle lock
16	Rotary transfer
17	Brake inching valve travel pump
18	Front axle
19	Rear axle
20	Return line collector (below cabin)
21	Pressurized drain line, travel motor



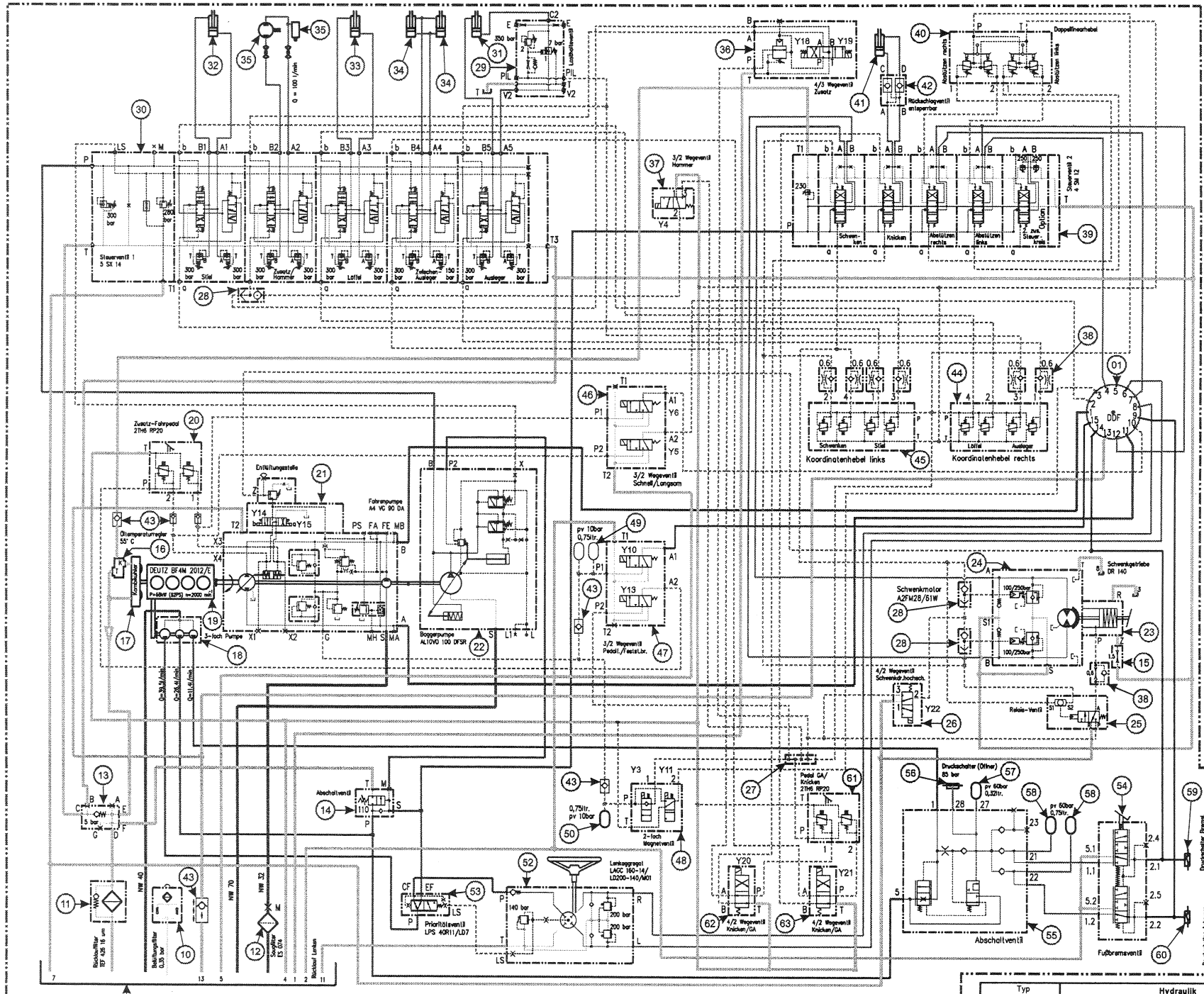
SCHAEFF TEREX	Typ/Model/Type	Datum/Edition/Date
	HML 42	**06.2002**
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram (articulated boom)	**4.53.01**

1 Swing drive
2 Valve for swing brake release
3 --
4 Priority valve
5 Steering unit
6 Steering cylinder
7 Cut-off valve
8 --
9 Accumulator valve (braking system)
10 Travel motor
11 Variable-capacity pump — excavation
12 Travel pump
13 Suction filter
14 Gear pump — steering, excavating, braking
15 Hydraulic oil tank
16 Diesel engine
17 Hydraulic oil radiator
18 Hydraulic oil temperature control
19 Return filter
20 Operation — Rock breaker (3/2 directional control valve)
21 Operation — Additional control circuit (4/3 directional control valve)
22 Emergency steering
23 Control valve 1
24 Control valve 2
25 Dipperstick
26 Additional control circuit / Rock breaker
27 Bucket
28 Intermediate boom
29 Boom
30 Stabilizer
31 Stabilizer
32 Articulation
33 Slewing
34 Return collector

HML 42



Typ Model Type Tipo	**HML 42**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**4.53.10**



Typ / Model / Type / Tipo	HML42	Hydraulik / Hydraulic / Hydraulique / Hidráulico	ab Fz.-Id.-Nr.: / from s/n: / à partir du n/s: / desde el no.: 4200/0100	Datum / Edition / Date / Fecha	01.2004
Benennung / Description / Dénomination / Denominación	Hydraulikschaltplan / Hydraulic diagramm / Plan hydraulique / Plano hidráulico			Blatt / Page / Feuille / Página	4.53.11

Pos. Item Rep. No.	Deutsch	English	Français
01	Drehdurchführung	Rotary transfer	Joint tournant
02	Verstellmotor - *Fahren*	Variable displacement motor - *travel*	Moteur à cylindrée variable - translation
03	Hydraulikzylinder – Abstützen	Hydraulic cylinder – outrigger	Vérin hydraulique - stabilisateur
04	Betriebsbremse - Kreis 2 *Hinterachse*	Service brake - circuit 2 *rear axle*	Frein de service - circuit 2 *essieu AR*
05	Betriebsbremse - Kreis 1 *Vorderachse*	Service brake - circuit 1 *front axle*	Frein de service - circuit 1 *essieu AV*
06	Hydraulikzylinder– Lenken *Vorderachse*	Hydraulic cylinder - steering *front axle*	Vérin hydraulique - direction *essieu AV*
07	Federspeicherzylinder - Feststellbremse	Spring loaded cylinder - parking brake	Cylindre à ressort accumulé - frein de stationnement
08	Wegeventil *Pendelachsverriegelung*	Control valve *oscillating axle lock*	Distributeur *verrouillage de l'essieu oscillant*
09	Hydraulikzylinder - Pendelachsverriegelung	Hydraulic cylinder – oscillating axle lock	Vérin hydraulique - verrouillage de l'essieu oscillant
10	Belüftungsfilter	Vent valve	Filtre d'aération
11	Rücklauffilter	Return filter	Filtre de retour
12	Saugfilter	Suction filter	Filtre d'aspiration
13	Rücklaufsammler **5bar**	Return line collector **5bar**	Collecteur de retour **5bar**
14	Abschaltventil	Shut-off valve	Valve de coupure
15	Drossel	Throttle	Etrangleur
16	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
17	Ölkühler	Oil cooler	Refroidisseur d'huile
18	Dreifachzahnradpumpe	Triple gear pump	Triple pompe à engrenages
19	Dieselmotor	Diesel engine	Moteur diesel
20	Vorsteuergerät – Fußpedal *Fahren*	Pilot-operated valve – pedal *travel*	Distributeur à commande assistée - pédale *translation*
21	Verstellpumpe – *Fahren*	Variable displacement pump - *travel*	Pompe à débit variable - translation
22	Verstellpumpe – *Arbeiten*	Variable displacement pump - *working*	Pompe à débit variable - *équipement*
23	Drehwerkgetriebe *Drehantrieb*	Swing gear *swing drive*	Reducteur d'orientation *entraînement d'orientation*
24	Hydromotor *Drehantrieb*	Hydraulic motor *swing drive*	Moteur hydraulique *entraînement d'orientation*
25	Relaisventil *Schwenkbremse*	Relay valve *swing brake*	Clapet-relais *frein d'orientation*
26	Wegeventil **Y22** *Schwenkdruckhochschaltung*	Solenoid valve **Y22** *high torque swing*	electro-vanne **Y22** *élevation pression d'orientation*
27	Sammler	Collector	Collecteur
28	Wechselventil	Shuttle valve	Selecteur

Typ Model Type Tipo	**HML 42**	**ab Fz.-Id.nr.. 4200 / 0100** **from s/n: 4200 / 0100** **à partir du n/s: 4200 / 0100** **desde el no.: 4200 / 0100**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha: **01.2004**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**			Blatt Page Feuille Página: **4.53.12**

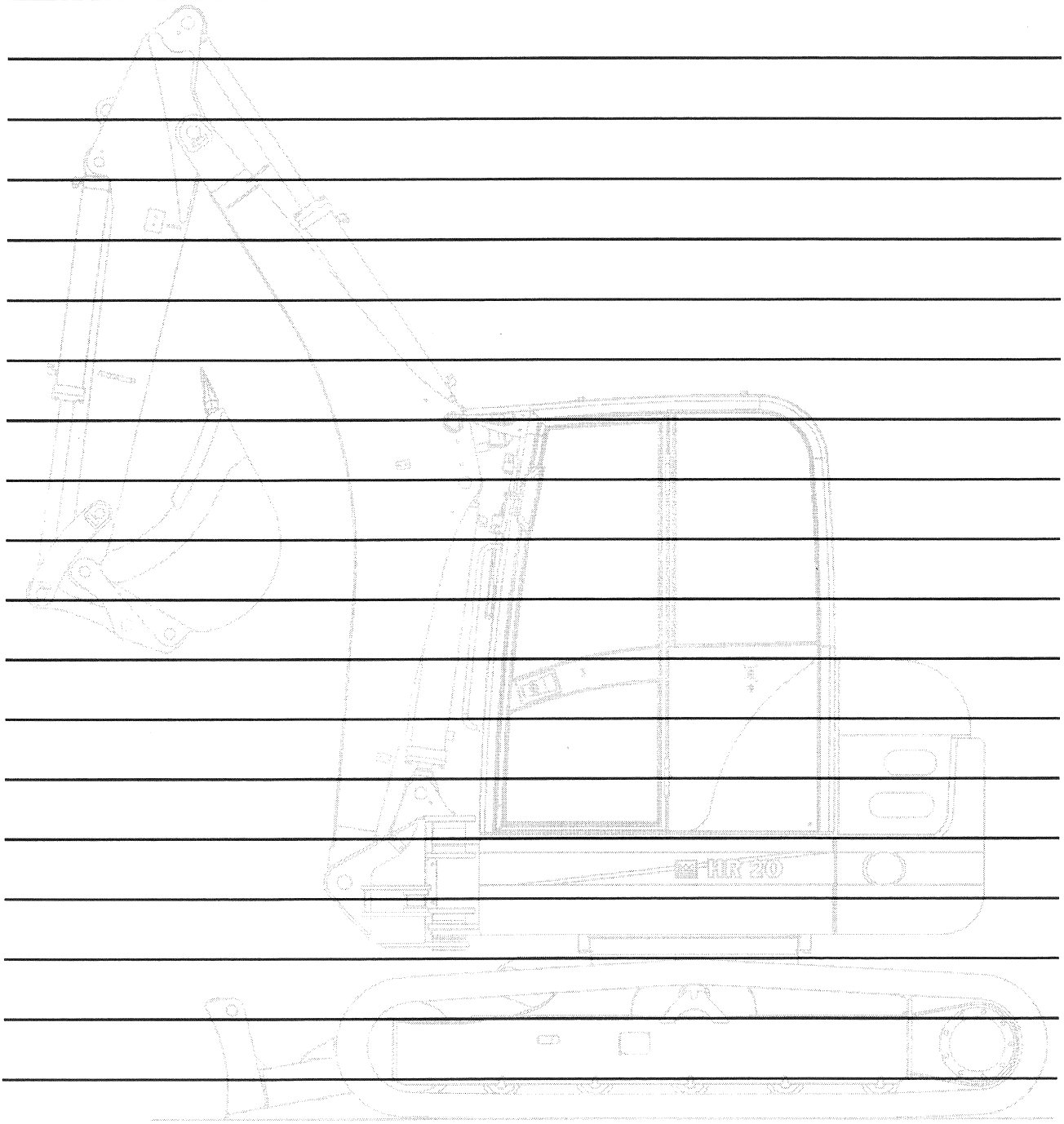
Pos. Item Rep. No.	Deutsch	English	Français
29	Lasthalteventil	Load holding valve	Clapet maintieu de charge
30	Blocksteuergerät 5SX14	Valve bank 5SX14	Distributeur 5SX14
31	Hydraulikzylinder – *Ausleger*	Hydraulic cylinder – *boom*	Vérin hydraulique – *flèche*
32	Hydraulikzylinder – *Löffelstiel*	Hydraulic cylinder – *stick*	Vérin hydraulique – *balancier*
33	Hydraulikzylinder – *Löffel*	Hydraulic cylinder – *bucket*	Vérin hydraulique – *godet*
34	Hydraulikzylinder - **Zwischenausleger**	Hydraulic cylinder - **intermediate boom**	Vérin hydraulique – *flèche intermédiaire*
35	Zusatzsteuerkreis / Hydraulikhammer	Additional control circuit / hydraulic hammer	Circuit supplémentaire / marteau hydraulique
36	Wegeventil / Druckminder-ventil **Y18 / Y19** *Zusatzsteuerkreis*	Solenoid valve / pressure reducing valve **Y18 / Y19** *additional control circuit*	Electrovanne / diminueur de pression **Y18 / Y19** *circuit supplémentaire*
37	Wegeventil **Y4** *Hydraulikhammer*	Control valve **Y4** *hydraulic hammer*	Distributeur **Y4** *marteau hydraulique*
38	Drosselrückschlagventil	Throttle check-valve	Clapet anti-retour avec étrangleur
39	Blocksteuergerät 4SM12	Valve bank 4SM12	Distributeur 4SM12
40	Vorsteuergerät - *Abstützen*	Pilot-operated valve - *outrigger*	Distributeur à commande assistée - *stabilisateur*
41	Hydraulikzylinder - *Knicken*	Hydraulic cylinder - *articulation*	Vérin hydraulique - *deport de flèche*
42	Doppelrückschlagventil *entsperrbar*	Pilot controlled double check valve	Double clapet anti-retour piloté
43	Rückschlagventil	Non-return valve	Clapet anti-retour
44	Vorsteuergerät *Löffel, Ausleger*	Pilot-operated valve *bucket, boom*	Distributeur à commande assistée *godet, flèche*
45	Vorsteuergerät *Schwenken, Löffelstiel*	Pilot-operated valve *swing, stick*	Distributeur à commande assistée *orientation, balancier*
46	Wegeventil **Y5 / Y6** *Schnell / Langsam*	Control valve **Y5 / Y6** *low / high speed*	Electovanne **Y5 / Y6** *petite / grande vitesse*
47	Wegeventil **Y10 / Y13** *Feststellbremse / Pedalfahren*	Control valve **Y10 / Y13** *parking brake / pedal drive*	Distributeur **Y10 / Y13** *frein de stationnement / translation par pédale*
48	Zweifach-Magnetventil *-Vorsteuerung ein/aus* **Y3** *-Achsverriegelung* **Y11**	Double solenoid valve *-pilot pressure on/off* **Y3** *-oscillating axle lock* **Y11**	Double electrovanne *-pression pilotage marche/arrêt* **Y3** *-verrouillage pont oscillant* **Y11**
49	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
50	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
51	Öltank	Oilt tank	Reservoir hydraulique

Typ Model Type Tipo	**HML 42**	**ab Fz.-Id.nr.. 4200 / 0100** **from s/n: 4200 / 0100** **à partir du n/s: 4200 / 0100** **desde el no.: 4200 / 0100**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha **01.2004**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**			Blatt Page Feuille Página **4.53.13**

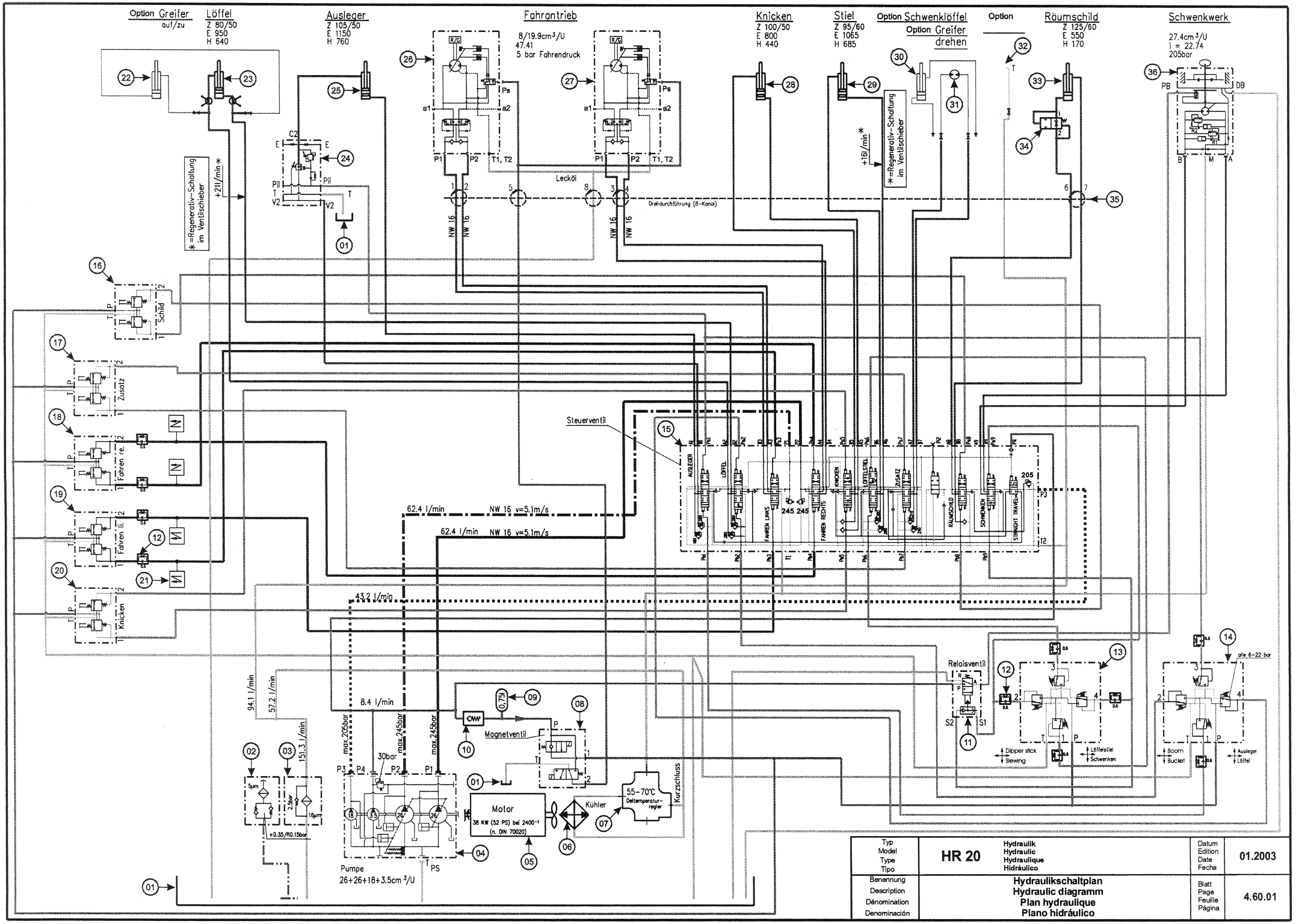
Pos. Item Rep. No.	Deutsch	English	Français
52	Lenkeinheit	Steering unit	Unité de direction
53	Prioritätsventil	Priority valve	Valve de priorité
54	Bremsventil *Fußpedal*	Brake valve *pedal*	Clapet de frein *pedale*
55	Druckabschaltventil	Shut-off valve	Valve de coupure
56	Druckschalter **85 bar** *Bremsspeicher*	Pressure switch **85 bar** *brake accumulator*	Interrupteur de pression **85 bar** *accu frein*
57	Hydrospeicher	Hydraulic accumulator	Accu hydraulique
58	Hydrospeicher	Hydraulic accumulator	Accu hydraulique
59	Druckschalter **5 bar** *Bremslicht*	Pressure switch **5 bar** *brake stop light*	Interrupteur de pression **5 bar** *feu de stop*
60	Druckschalter **40 bar** *Achsverriegelung / automotives Fahren*	Pressure switch **40 bar** *axle lock / automotive drive*	Interrupteur de pression **40 bar** *verrouillage pont oscillant / translation automotive*
61	Vorsteuergerät *Knicken* / **GA**	Pilot-operated valve *articulation* / ***intermediate boom***	Distributeur à commande assistée *articulation* / ***bras intermediaire***
62	Wegeventil **Y20** *Knicken* / ***GA***	Solenoid valve **Y20** *articulation* / ***intermediate boom***	Electrovanne **Y20** *deport flèche* / ***bras intermediaire***
63	Wegeventil **Y21** *Knicken* / ***GA***	Solenoid valve **Y21** *articulation* / ***intermediate boom***	Electrovanne **Y21** *deport flèche* / ***bras intermediaire***

Typ Model Type Tipo	**HML 42**	**ab Fz.-Id.nr.. 4200 / 0100** **from s/n: 4200 / 0100** **à partir du n/s: 4200 / 0100** **desde el no.: 4200 / 0100**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha **01.2004**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**			Blatt Page Feuille Página **4.53.14**

HR 20

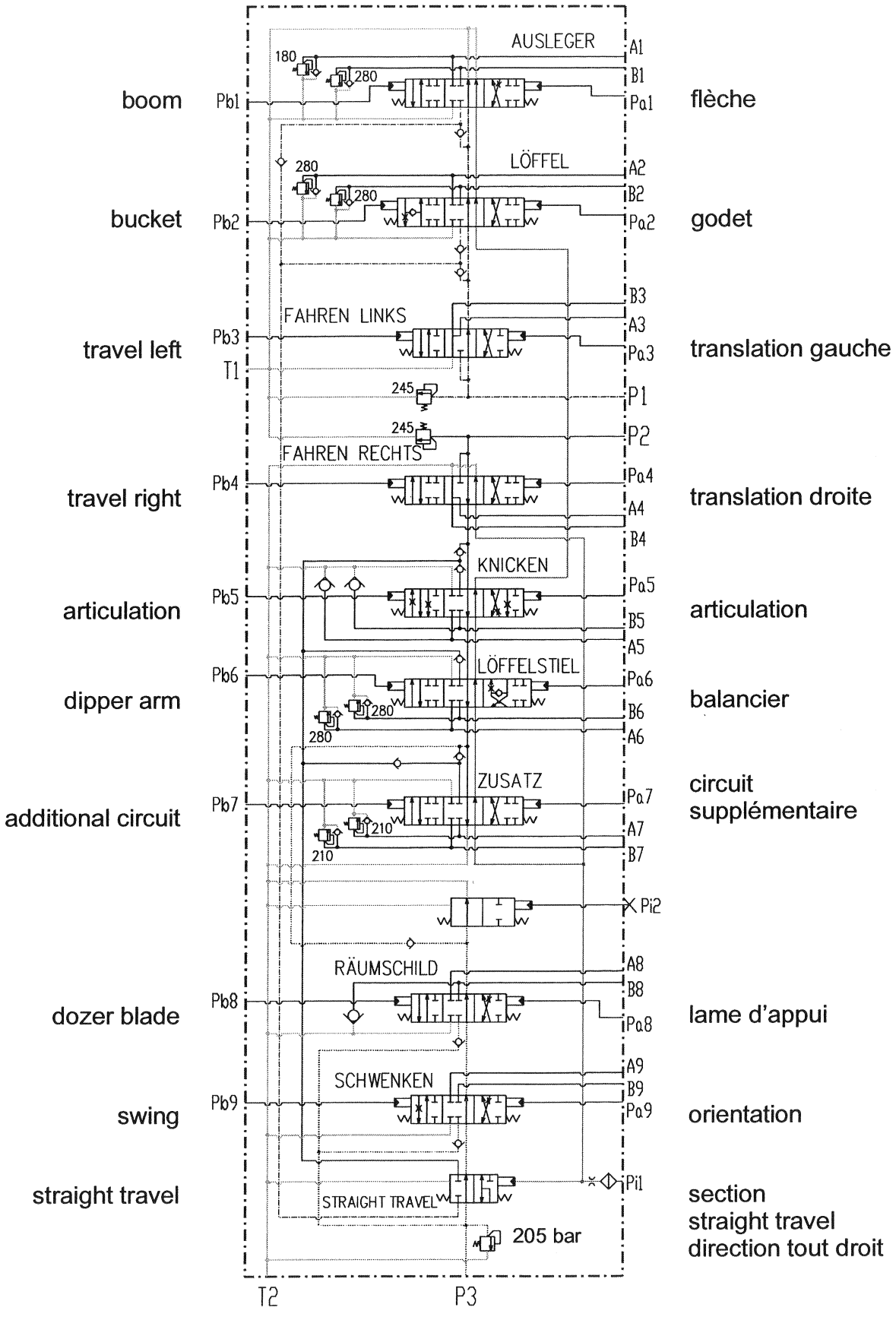


Typ Model Type Tipo	**HR 20**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**4.60.00**

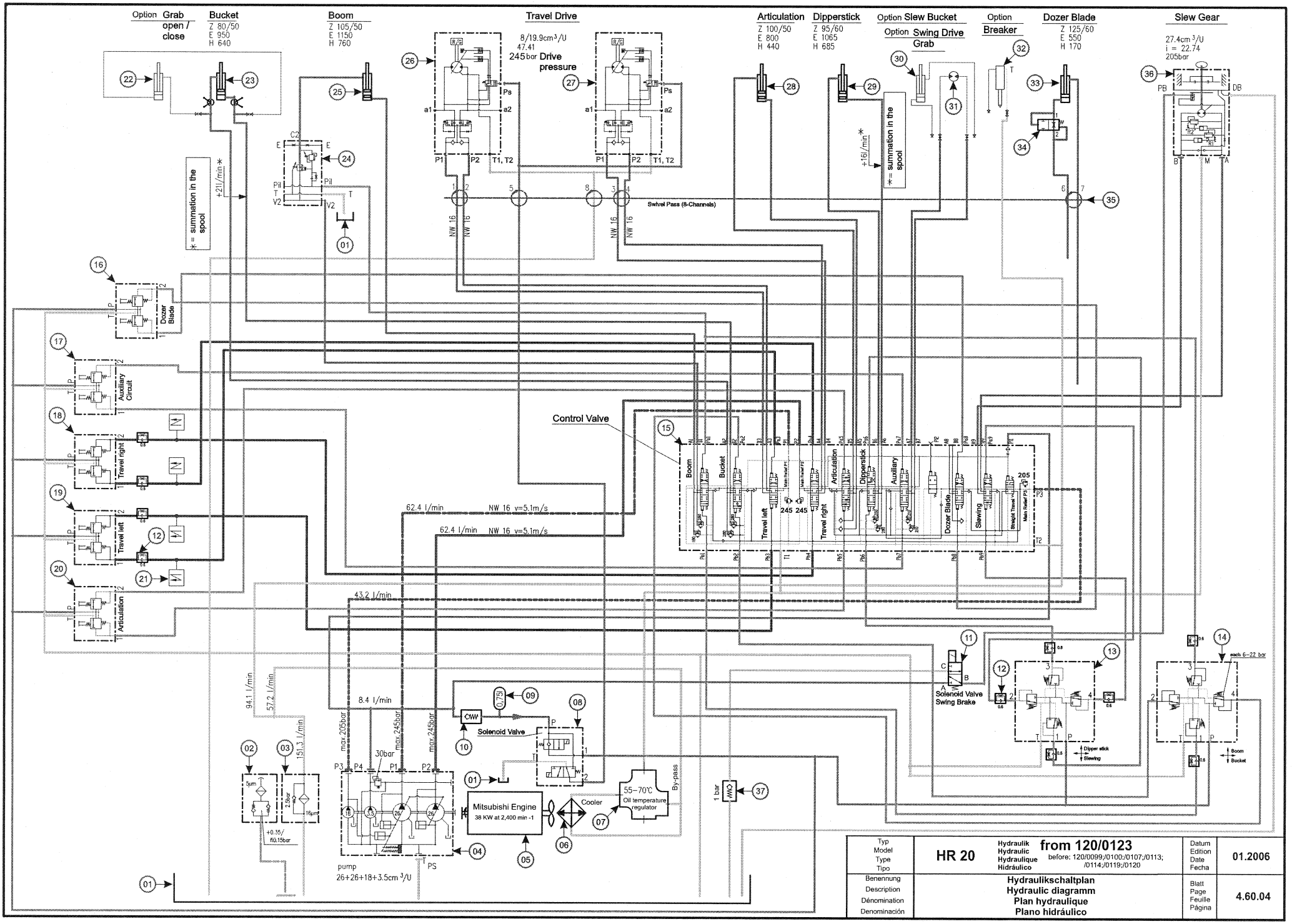

Option Greifer
auf/zu
Löffel
Z 80/50
E 950
H 640
Ausleger
Z 105/50
E 1150
H 760
Fahrantrieb
8/19.9cm³/U
47.41
5 bar Fahrendruck
Knicken
Z 100/50
E 800
H 440
Stiel
Z 95/60
E 1065
H 685
Option Schwenklöffel
Option Greifer
drehen
Option
Räumschild
Z 125/60
E 550
H 170
Schwenkwerk
27.4cm³/U
i = 22.74
205bar
*=Regenerativ-Schaltung im Ventilschieber
+2l l/min *
+16l/min *
Lecköl
Dreidurchführung (8-Konal)
NW 16
Schild
Zusatz
Fahren re.
Fahren li.
Knicken
Steuerventil
62.4 l/min NW 16 v=5.1m/s
62.4 l/min NW 16 v=5.1m/s
43.2 l/min
94.1 l/min
57.2 l/min
8.4 l/min
max.205bar
max.245bar
max.245bar
30bar
151.3 l/min
Magnetventil
0,75l
Motor
38 KW (52 PS) bei 2400-1
(n. DIN 70020)
Kühler
55-70°C
Oeltemperatur-regler
Kurzschluss
Pumpe
26+26+18+3.5cm³/U
Relaisventil
alle 6-22 bar
Dipper stick
Slewing
Löffelstiel
Schwenken
Boom
Bucket
Ausleger
Löffel
Typ
Model
Type
Tipo
HR 20
Hydraulik
Hydraulic
Hydraulique
Hidráulico
Datum
Edition
Date
Fecha
01.2003
Benennung
Description
Dénomination
Denominación
Hydraulikschaltplan
Hydraulic diagramm
Plan hydraulique
Plano hidráulico
Blatt
Page
Feuille
Página
4.60.01

Pos. Item Rep. No.	Deutsch	English	Français
01	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
02	Belüftungsfilter	Vent filter	Filtre d'aération
03	Rücklauffilter	Return filter	Filtre de retour
04	Verstellpumpe	Variable displacement pump	Pompe à débit variable
05	Dieselmotor	Diesel engine	Moteur diesel
06	Ölkühler	Oil cooler	Refroidisseur d'huile
07	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
08	Magnetventil (2-fach) 1= Vorsteuerung ein / aus 2= Fahren schnell / langsam	Solenoid valve (double-type) 1= Pilot control on / off 2= Travel high speed / low speed	Electrovanne (double) 1= Pilotage marche / arrêt 2= Translation grande vitesse / petite
09	Hydrospeicher **Pp**	Hydraulic accumulator **Pp**	Accumulateur hydraulique **Pp**
10	Rückschlagventil	Check valve	Clapet anti-retour
11	Relaisventil - Schwenkbremse	Relay valve - swing brake	Clapet-relais - frein d'orientation
12	Drosselrückschlagventil	Throttle check valve	Clapet anti-retour d'étranglement
13	Vorsteuergerät (links)	Pilot operated valve (left)	Distributeur à commande assistée (gauche)
14	Vorsteuergerät (rechts)	Pilot-operated valve (right)	Distributeur à commande assistée (droite)
15	Blocksteuergerät	Valve bank	Bloc distributeur
16	Vorsteuergerät (Räumschild)	Pilot-operated valve (dozer blade)	Distibuteur à commande assistée (lame)
17	Vorsteuergerät (Zusatzsteuerkreis)	Pilot-operated valve (additional control circuit)	Distributeur à commande assistée (circuit supplémentaire)
18	Vorsteuergerät (Fahren rechts)	Pilot-operated valve (travel right)	Distributeur à commande assistée (translation à droite)
19	Vorsteuergerät (Fahren links)	Pilot-operated valve (travel left)	Distributeur à commande assistée (translation à gauche)
20	Vorsteuergerät (Knicken)	Pilot-operated valve (articulation)	Distributeur à commande assistée (articulation)
21	Druckschalter	Pressure switch	Interrupteur de pression
22	Hydraulikzylinder - Greifer ***Option***	Hydraulic cylinder - grab ***Option***	Vérin hydr. - benne preneuse ***Option***
23	Hydraulikzylinder - Löffel	Hydraulic cylinder - bucket	Vérin hydraulique - godet
24	Lasthalteventil	Load check valve	Clapet de sécurite
25	Hydraulikzylinder - Ausleger	Hydraulic cylinder - boom	Vérin hydraulique - flèche
26	Fahrantrieb (links)	Travel drive (left)	Entraînement (gauche)
27	Fahrantrieb (rechts)	Travel drive (right)	Entraînement (droite)
28	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - articulation
29	Hydraulikzylinder - Löffelstiel	Hydraulic cylinder - dipper arm	Vérin hydraulique - balancier
30	Hydr.-Zylinder - Schwenklöffel	Hydr. cyl. - swing bucket	Vérin hydr. - godet orientable
31	Drehantrieb - Greifer ***Option***	Swing drive - grab ***Option***	Entraînement d'orientation - benne preneuse ***Option***
32	Hydraulikhammer ***Option***	Hydraulic hammer ***Option***	Marteau hydraulique ***Option***
33	Hydr.-Zylinder - Räumschild	Hydr. cylinder - dozer blade	Vérin hydr. - lame d'appui
34	Rohrbruchsicherung	Hose rupture valve	Clapet d'arrêt automatique
35	Drehdurchführung	Rotary transfer	Joint tournant
36	Schwenkantrieb	Swing drive	Entraînement d'orientation

Typ Model Type Tipo	**HR 20**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**		Blatt Page Feuille Página	**4.60.02**



Typ Model Type Tipo	**HR 20**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Blocksteuergerät** **Valve bank** **Bloc distributeur** **Válvula de control**		Blatt Page Feuille Página	**4.60.03**

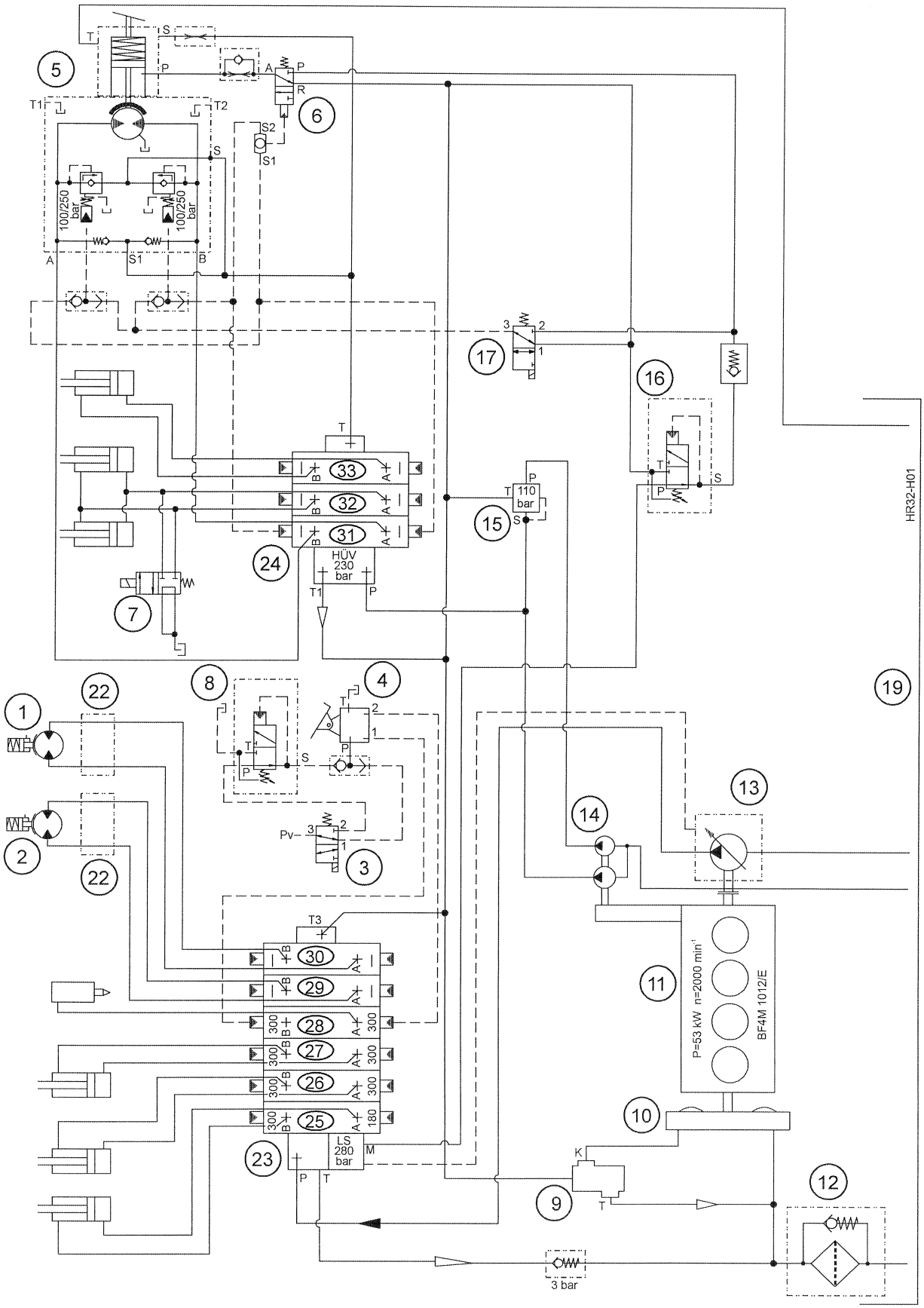


Typ / Model / Type / Tipo	HR 20	Hydraulik / Hydraulic / Hydraulique / Hidráulico: from 120/0123 before: 120/0099;/0100;/0107;/0113;/0114;/0119;/0120	Datum / Edition / Date / Fecha: 01.2006
Benennung / Description / Dénomination / Denominación	Hydraulikschaltplan Hydraulic diagramm Plan hydraulique Plano hidráulico		Blatt / Page / Feuille / Página: 4.60.04

Pos. Item Rep. No.	Deutsch	English	Français
01	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
02	Belüftungsfilter	Vent filter	Filtre d'aération
03	Rücklauffilter	Return filter	Filtre de retour
04	Verstellpumpe	Variable displacement pump	Pompe à débit variable
05	Dieselmotor	Diesel engine	Moteur diesel
06	Ölkühler	Oil cooler	Refroidisseur d'huile
07	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
08	Magnetventil (2-fach) 1= Vorsteuerung ein / aus 2= Fahren schnell / langsam	Solenoid valve (double-type) 1= Pilot control on / off 2= Travel high speed / low speed	Electrovanne (double) 1= Pilotage marche / arrêt 2= Translation grande vitesse / petite
09	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
10	Rückschlagventil	Check valve	Clapet anti-retour
11	Magnetventil - Schwenkbremse	Solenoid valve - swing brake	Electrovanne - frein d'orientation
12	Drosselrückschlagventil	Throttle check valve	Clapet anti-retour d'étranglement
13	Vorsteuergerät (links)	Pilot operated valve (left)	Distributeur à commande assistée (gauche)
14	Vorsteuergerät (rechts)	Pilot-operated valve (right)	Distributeur à commande assistée (droite)
15	Blocksteuergerät	Valve bank	Bloc distributeur
16	Vorsteuergerät (Räumschild)	Pilot-operated valve (dozer blade)	Distibuteur à commande assistée (lame)
17	Vorsteuergerät (Zusatzsteuerkreis)	Pilot-operated valve (additional control circuit)	Distributeur à commande assistée (circuit supplémentaire)
18	Vorsteuergerät (Fahren rechts)	Pilot-operated valve (travel right)	Distributeur à commande assistée (translation à droite)
19	Vorsteuergerät (Fahren links)	Pilot-operated valve (travel left)	Distributeur à commande assistée (translation à gauche)
20	Vorsteuergerät (Knicken)	Pilot-operated valve (articulation)	Distributeur à commande assistée (articulation)
21	Druckschalter	Pressure switch	Interrupteur de pression
22	Hydraulikzylinder - Greifer ***Option***	Hydraulic cylinder - grab ***Option***	Vérin hydr. - benne preneuse ***Option***
23	Hydraulikzylinder - Löffel	Hydraulic cylinder - bucket	Vérin hydraulique - godet
24	Lasthalteventil	Load check valve	Clapet de sécurite
25	Hydraulikzylinder - Ausleger	Hydraulic cylinder - boom	Vérin hydraulique - flèche
26	Fahrantrieb (links)	Travel drive (left)	Entraînement (gauche)
27	Fahrantrieb (rechts)	Travel drive (right)	Entraînement (droite)
28	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - articulation
29	Hydraulikzylinder - Löffelstiel	Hydraulic cylinder - dipper arm	Vérin hydraulique - balancier
30	Hydr.-Zylinder - Schwenklöffel	Hydr. cyl. - swing bucket	Vérin hydr. - godet orientable
31	Drehantrieb - Greifer ***Option***	Swing drive - grab ***Option***	Entraînement d'orientation - benne preneuse ***Option***
32	Hydraulikhammer ***Option***	Hydraulic hammer ***Option***	Marteau hydraulique ***Option***
33	Hydr.-Zylinder - Räumschild	Hydr. cylinder - dozer blade	Vérin hydr. - lame d'appui
34	Rohrbruchsicherung	Hose rupture valve	Clapet d'arrêt automatique
35	Drehdurchführung	Rotary transfer	Joint tournant
36	Schwenkantrieb	Swing drive	Entraînement d'orientation

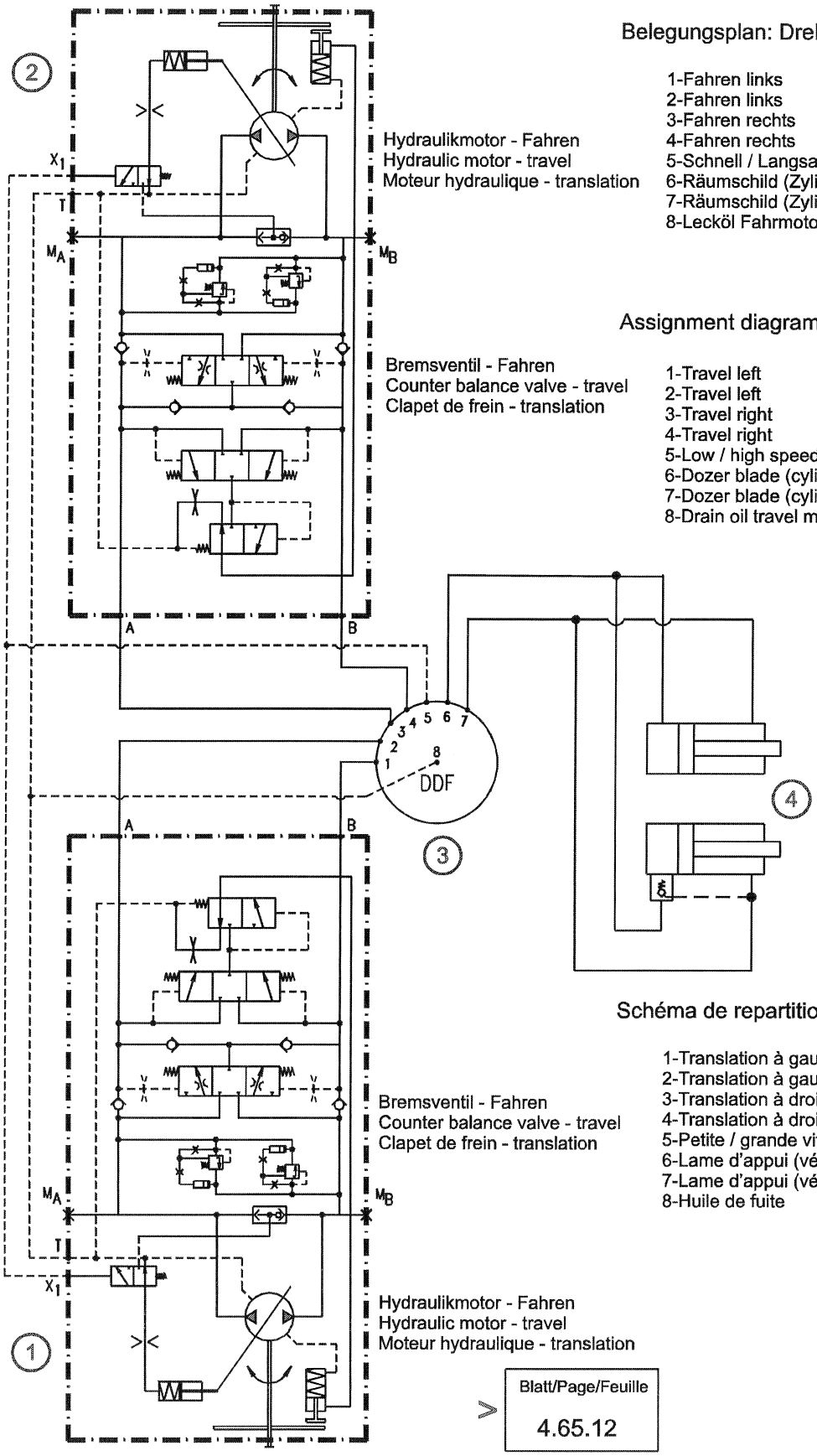
Typ Model Type Tipo	**HR 20**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**ab 120/0123** vorab: 120/0099;/0100;/0107;/0113; /0114;/0119;/0120	**Legende** **Legend** **Légende** **Leyenda**	Blatt Page Feuille Página	**4.60.05**

Hydraulic system



SCHAEFF	Typ/Model/Type **HR 32**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram - monobloc boom**	Blatt/Page/Feuille **4.65.01**

1	Travel motor, right
2	Travel motor, left
3	Change-over pilot control-rock breaker/additional control circuit
4	Pilot-operated valve - rock breaker/ additional control circuit
5	Swing drive
6	Valve "swing brake release"
7	Float position
8	Pressure relief valve (grab)
9	Hydraulic oil temperature regulator
10	Hydraulic oil radiator
11	Diesel engine
12	Return filter
13	Excavator variable capacity pump
14	Excavator gear pump
15	Cut-off valve
16	Pressure relief valve (pilot control)
17	4/2 directional control valve for additional swing brake
18	Pilot control
19	Hydraulic oil tank
22	Travel brake valve
23	Control valve 1
24	Control valve 2
25	Boom
26	Dipperstick
27	Bucket
28	Additional control circuit / Rock breaker
29	Travel, left
30	Travel, right
31	Swing
32	Dozer blade
33	Articulation



Belegungsplan: Drehdurchführung

1-Fahren links
2-Fahren links
3-Fahren rechts
4-Fahren rechts
5-Schnell / Langsam
6-Räumschild (Zylinder aus)
7-Räumschild (Zylinder ein)
8-Lecköl Fahrmotor

Assignment diagram: rotary transfer

1-Travel left
2-Travel left
3-Travel right
4-Travel right
5-Low / high speed
6-Dozer blade (cylinder out)
7-Dozer blade (cylinder in)
8-Drain oil travel motor

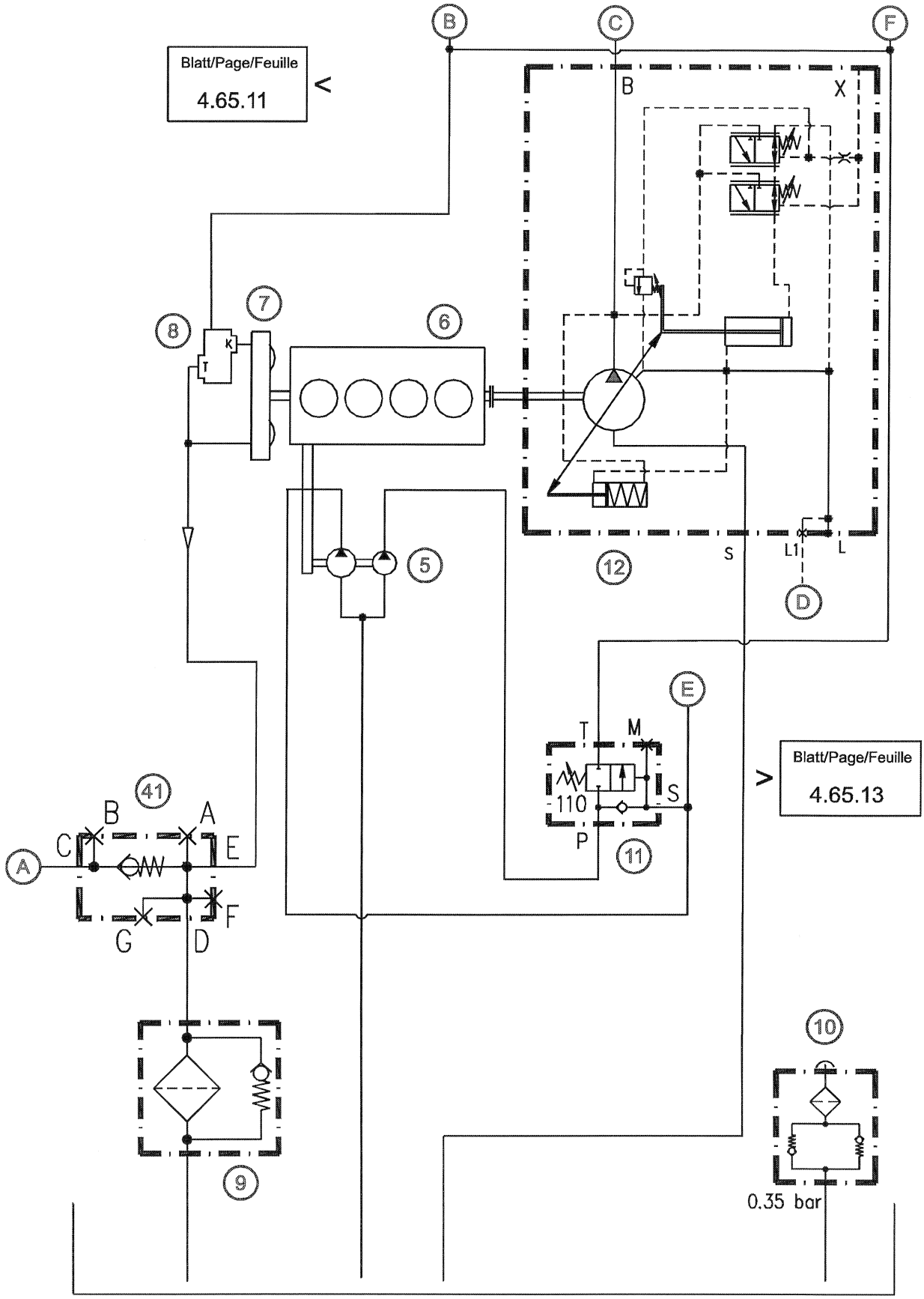
Schéma de repartition: joint tournant

1-Translation à gauche
2-Translation à gauche
3-Translation à droite
4-Translation à droite
5-Petite / grande vitesse
6-Lame d'appui (vérin sortir)
7-Lame d'appui (vérin rentrer)
8-Huile de fuite

> Blatt/Page/Feuille 4.65.12

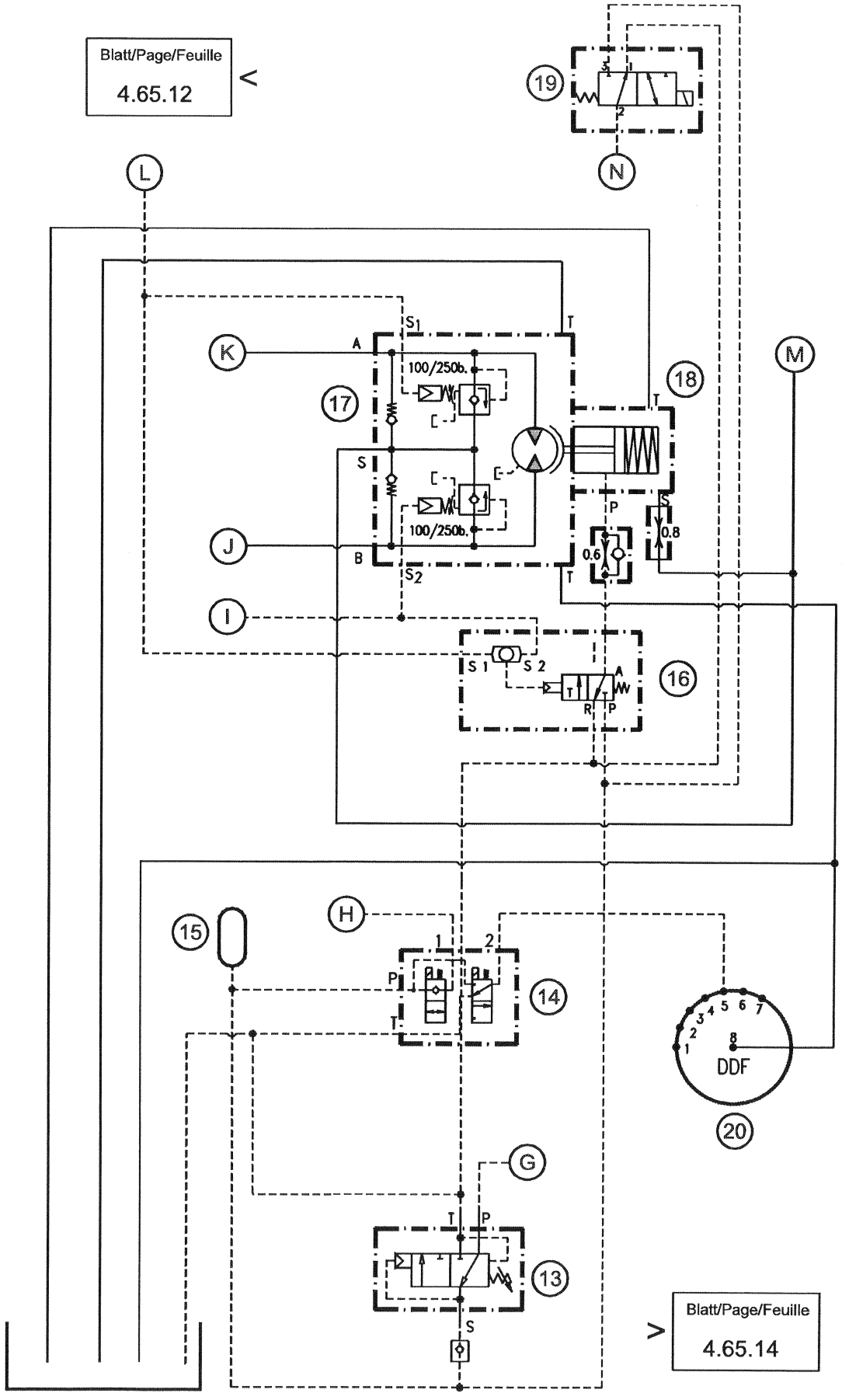
SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	HR 32 (up to serial no. 330/0178)	01.2002
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram (undercarriage)	4.65.11

1	Fahrantrieb links	Travel drive left	Entraînement à gauche
2	Fahrantrieb rechts	Travel drive right	Entraînement à droite
3	Drehdurchführung	Rotary transfer	Joint tournant
4	Hydraulikzylinder Abstützschild	Hydraulic cylinder dozer blade	Vérin hydraulique lame d'appui



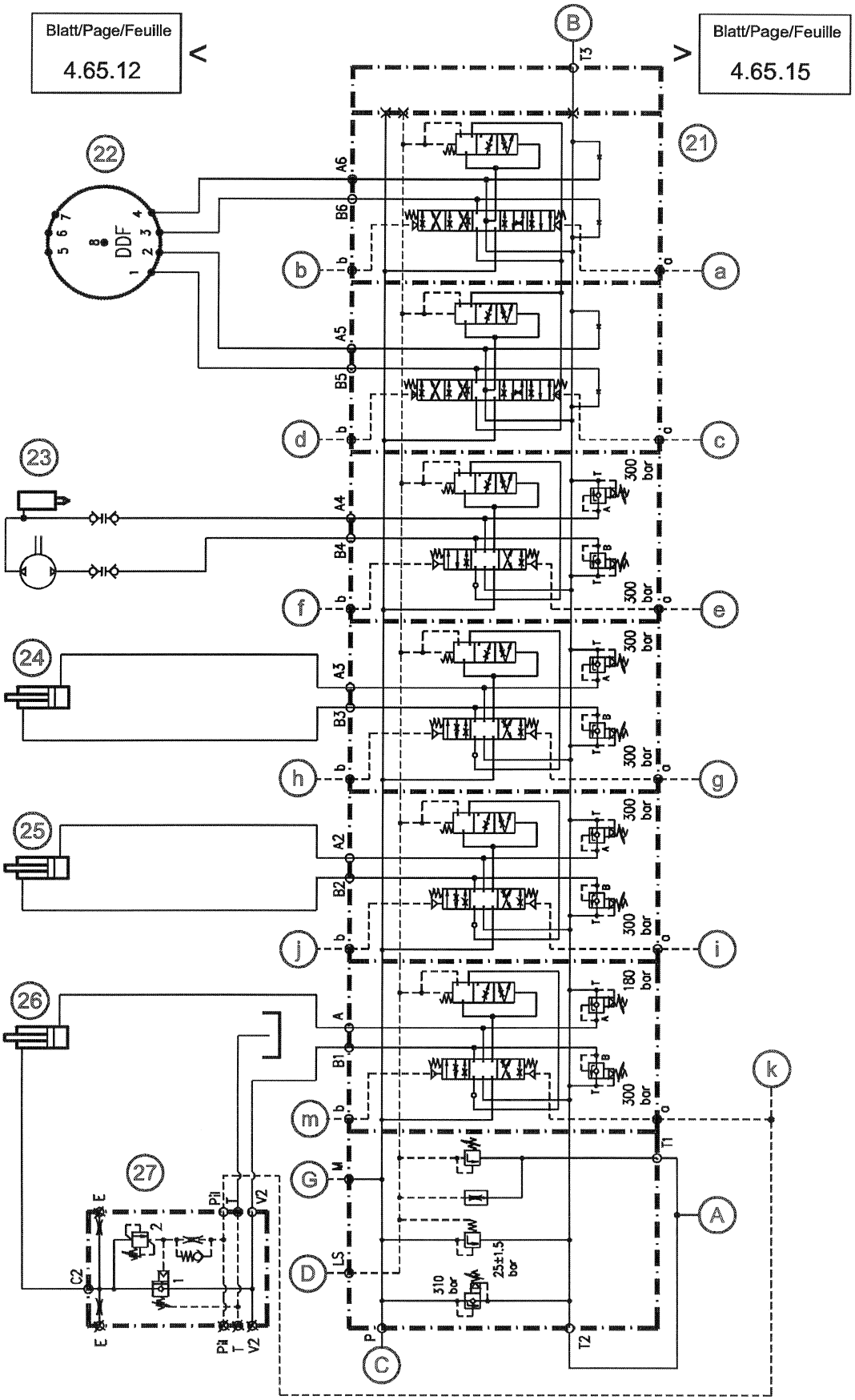
SCHAEFF	Typ/Model/Type **HR 32 (up to serial no. 330/0178)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (oil flow)**	Blatt/Page/Feuille **4.65.12**

5	Doppelzahnradpumpe	Double gear pump	Pompe tandem à engrenages
6	Dieselmotor	Diesel engine	Moteur diesel
7	Ölkühler	Oil cooler	Refroidisseur d'huile
8	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
9	Rücklauffilter	Return filter	Filtre de retour
10	Belüftungsfilter	Vent filter	Filtre d'aération
11	Druckabschaltventil	Cut-off valve	Valve de coupure
12	Verstellpumpe	Variable displacement pump	Pompe à débit variable
41	Rücklaufsammler	Return line collector	Collecteur retour



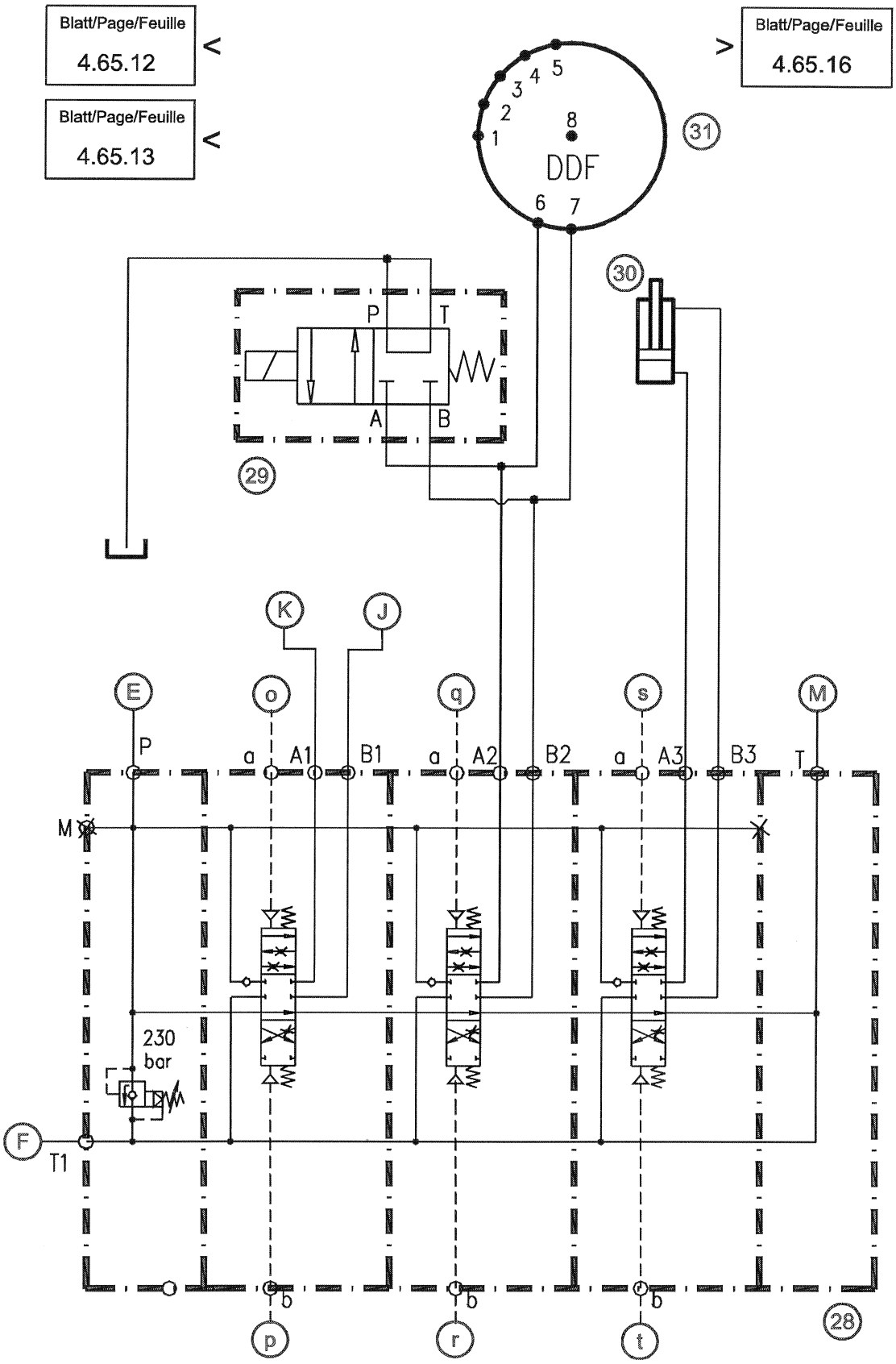
SCHAEFF TEREX	Typ/Model/Type **HR 32 (up to serial no. 330/0178)**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (swing)**	Blatt/Page/Feuille **4.65.13**

13	Druckminderventil	Pressure reducing valve	Soupape réductrice de pression
14	Magnetventil	Solenoid valve	Electrovanne
15	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
16	Relaisventil	Relay valve	Clapet-relais
17	Hydromotor (Drehantrieb)	Hydraulic motor (swing drive)	Moteur hydraulique (entraînement d'orientation)
18	Drehwerkgetriebe (Drehantrieb)	Swing gear (swing drive)	Réducteur d'orientation (entraînement d'orientation)
19	Wegeventil	Control valve	Distributeur
20	Drehdurchführung	Rotary transfer	Joint tournant



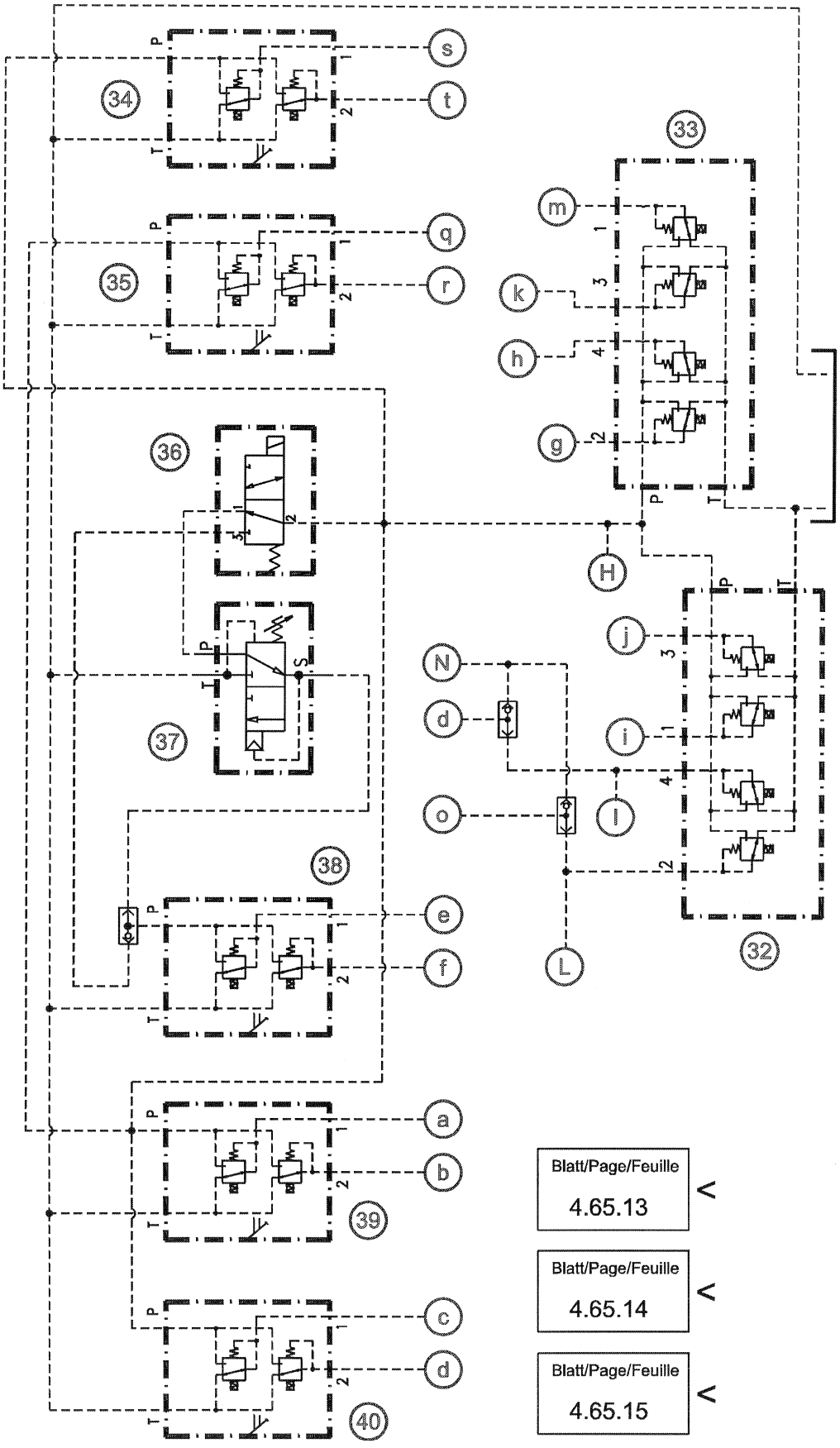
SCHAEFF	Typ/Model/Type **HR 32 (up to serial no. 330/0178)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (working)**	Blatt/Page/Feuille **4.65.14**

21	Blocksteuergerät 6SX14	Valve bank 6SX14	Bloc distributeur 6SX14
22	Drehdurchführung (Fahren)	Rotary transfer (travel)	Joint tournant (translation)
23	Zusatzsteuerkreis / Hydraulikhammer	Additional control circuit / hydraulic hammer	Circuit supplémentaire / marteau hydraulique
24	Hydraulikzylinder – Löffel	Hydraulic cylinder – bucket	Vérin hydraulique – godet
25	Hydraulikzylinder – Löffelstiel	Hydraulic cylinder – dipper	Vérin hydraulique – balancier
26	Hydraulikzylinder – Ausleger	Hydraulic cylinder – boom	Vérin hydraulique – flèche
27	Lasthalteventil	Load check valve	Clapet de sécurité



SCHAEFF	Typ/Model/Type **HR 32 (up to serial no. 330/0178)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (articulation)**	Blatt/Page/Feuille **4.65.15**

28	Blocksteuergerät 3SM12	Valve bank 3SM12	Bloc distributeur 3SM12
29	Wegeventil (Schwimmstellung)	Control valve (float position)	Distributeur (position flottante)
30	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - articulation
31	Drehdurchführung (Drehantrieb)	Rotary transfer (swing drive)	Joint tournant (entraînement d'orientation)



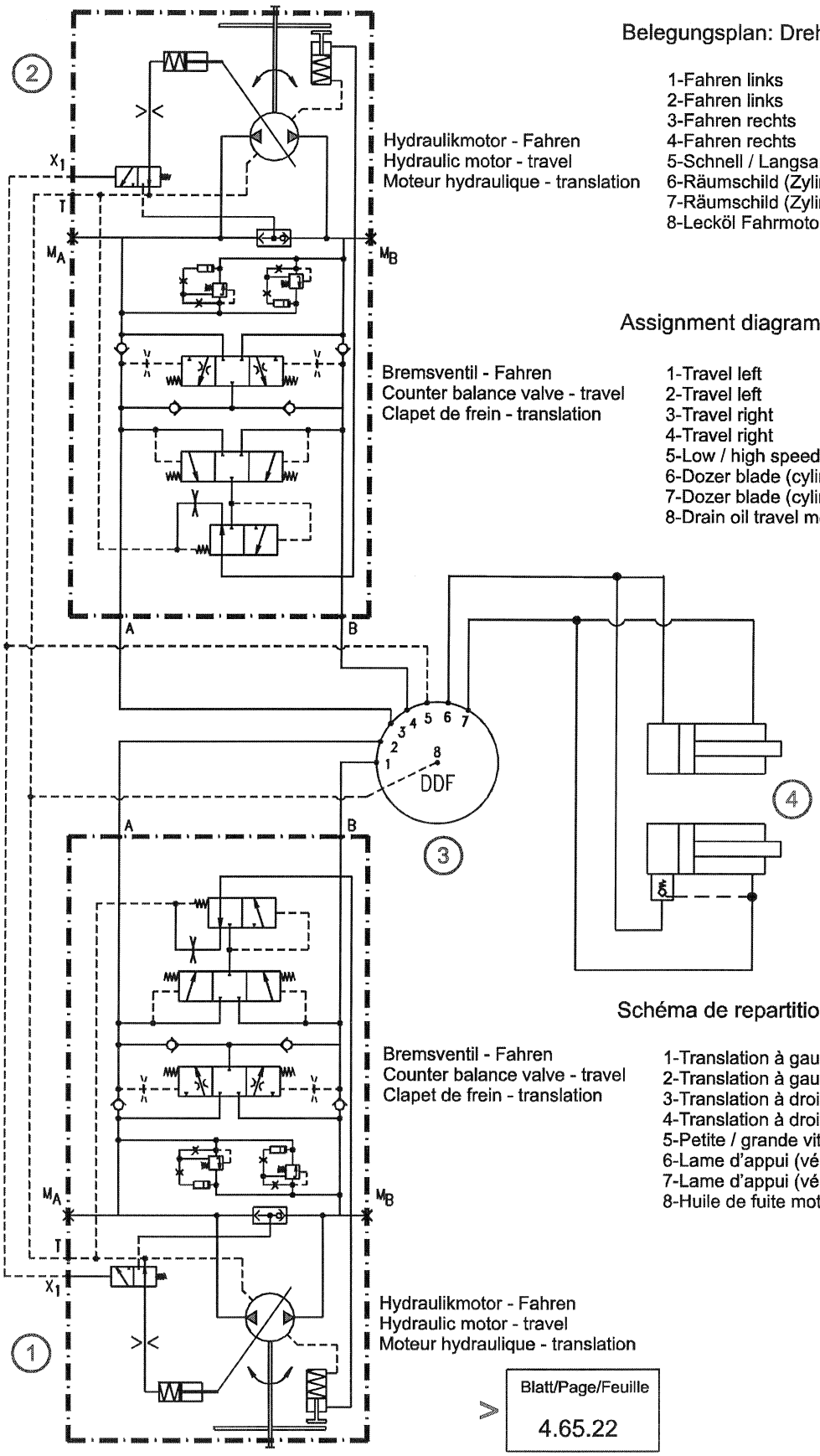
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4.65.15
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SCHAEFF	Typ/Model/Type **HR 32 (up to serial no. 330/0178)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (pilot control)**	Blatt/Page/Feuille **4.65.16**

32	Vorsteuergerät (Schwenken, Löffelstiel)	Pilot-operated valve (swing, dipper)	Distributeur à commande assistée (orientation, balancier)
33	Vorsteuergerät (Löffel, Ausleger)	Pilot-operated valve (bucket, boom)	Distributeur à commande assistée (godet, flèche)
34	Vorsteuergerät - Fußpedal (Knicken)	Pilot-operated valve – pedal (articulation)	Distributeur à commande assistée - pédale (articulation)
35	Vorsteuergerät - Fußpedal (Abstützschild)	Pilot-operated valve – pedal (dozer blade)	Distributeur à commande assistée - pédale (lame d'appui)
36	Wegeventil (Hydraulikhammer)	Control valve (hydraulic hammer)	Distributeur (marteau hydraulique)
37	Druckminderventil	Pressure reducing valve	Soupape réductrice de pression
38	Vorsteuergerät - Fußpedal (Zusatzsteuerkreis / Hydraulikhammer)	Pilot-operated valve – pedal (additional control circuit / hydraulic hammer)	Distributeur à commande assistée - pédale (circuit supplémentaire / marteau hydraulique)
39	Vorsteuergerät - Fußpedal (Fahren rechts)	Pilot-operated valve – pedal (travel right)	Distributeur à commande assistée - pédale (translation à droite)
40	Vorsteuergerät - Fußpedal (Fahren links)	Pilot-operated valve – pedal (travel left)	Distributeur à commande assistée - pédale (translation à gauche)



Hydraulikmotor - Fahren
Hydraulic motor - travel
Moteur hydraulique - translation

Bremsventil - Fahren
Counter balance valve - travel
Clapet de frein - translation

Bremsventil - Fahren
Counter balance valve - travel
Clapet de frein - translation

Hydraulikmotor - Fahren
Hydraulic motor - travel
Moteur hydraulique - translation

Belegungsplan: Drehdurchführung

1-Fahren links
2-Fahren links
3-Fahren rechts
4-Fahren rechts
5-Schnell / Langsam
6-Räumschild (Zylinder aus)
7-Räumschild (Zylinder ein)
8-Lecköl Fahrmotor

Assignment diagram: rotary transfer

1-Travel left
2-Travel left
3-Travel right
4-Travel right
5-Low / high speed
6-Dozer blade (cylinder out)
7-Dozer blade (cylinder in)
8-Drain oil travel motor

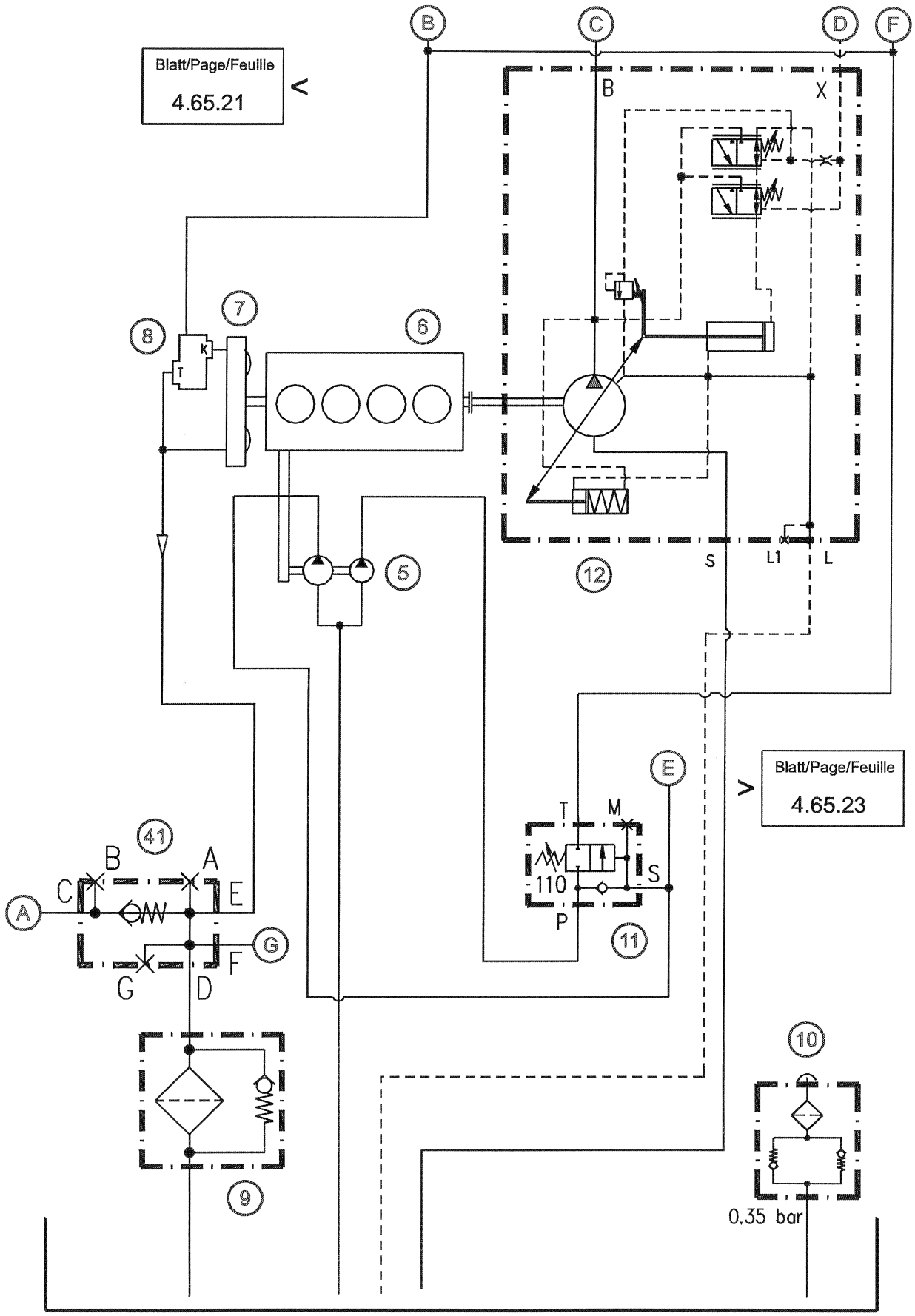
Schéma de repartition: joint tournant

1-Translation à gauche
2-Translation à gauche
3-Translation à droite
4-Translation à droite
5-Petite / grande vitesse
6-Lame d'appui (vérin sortir)
7-Lame d'appui (vérin rentrer)
8-Huile de fuite moteur translation

> Blatt/Page/Feuille 4.65.22

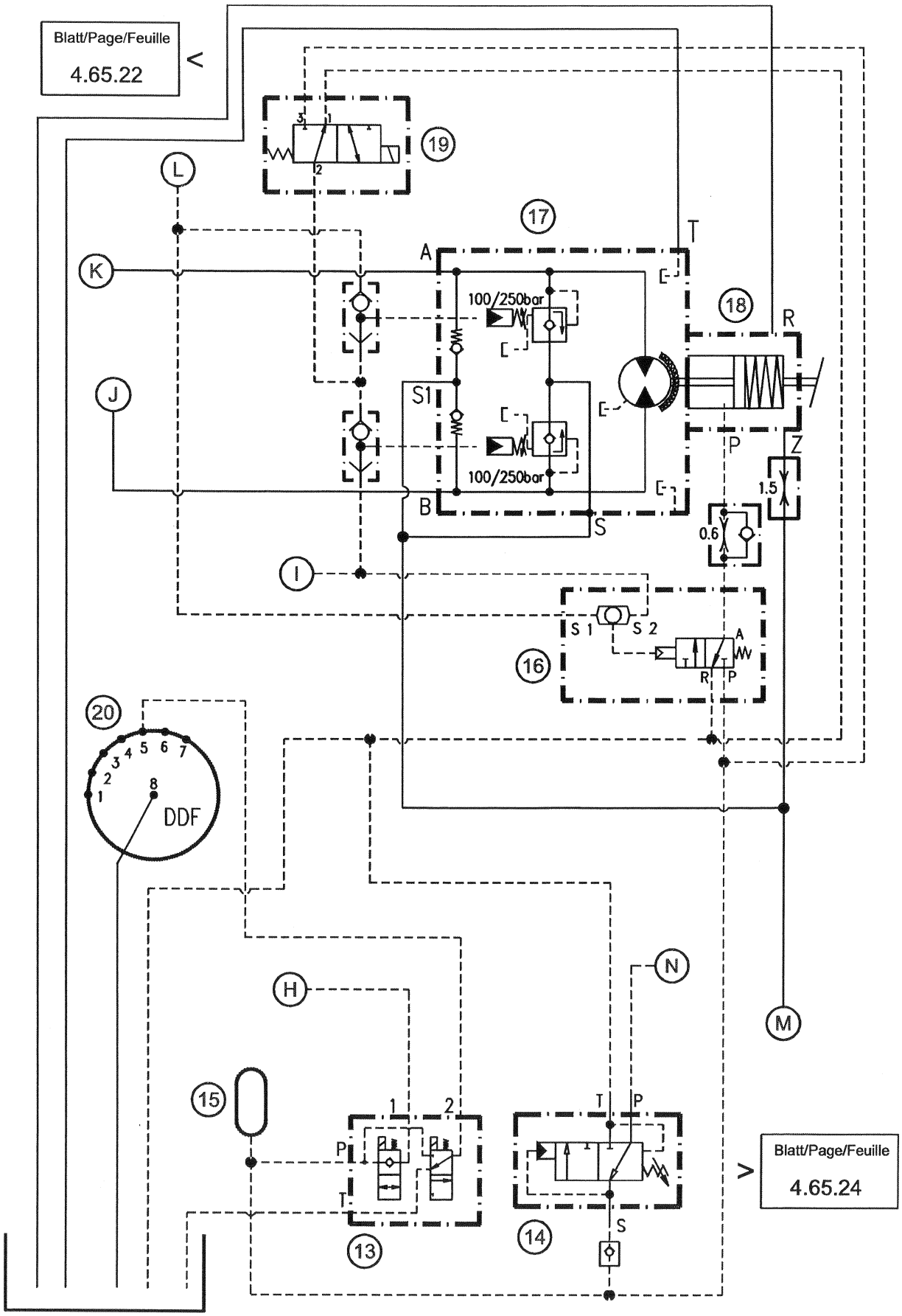
SCHAEFF	Typ/Model/Type **HR 32 (from serial no. 330/0179)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (undercarriage)**	Blatt/Page/Feuille **4.65.21**

1	Fahrantrieb links	Travel drive left	Entraînement à gauche
2	Fahrantrieb rechts	Travel drive right	Entraînement à droite
3	Drehdurchführung	Rotary transfer	Joint tournant
4	Hydraulikzylinder Abstützschild	Hydraulic cylinder dozer blade	Vérin hydraulique lame d'appui



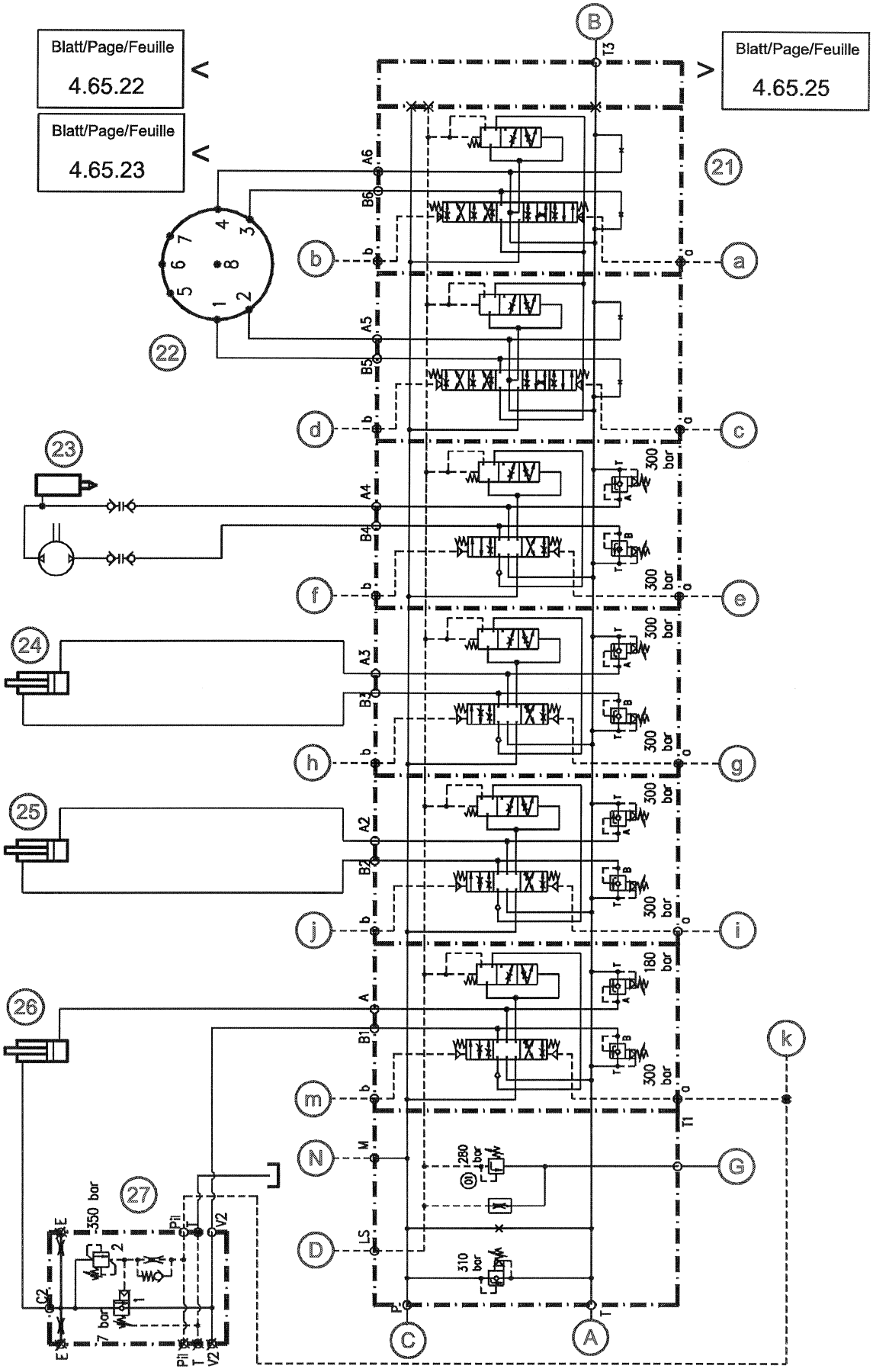
SCHAEFF	Typ/Model/Type **HR 32 (from serial no. 330/0179)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (oil flow)**	Blatt/Page/Feuille **4.65.22**

5	Doppelzahnradpumpe	Double gear pump	Pompe tandem à engrenages
6	Dieselmotor	Diesel engine	Moteur diesel
7	Ölkühler	Oil cooler	Refroidisseur d'huile
8	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
9	Rücklauffilter	Return filter	Filtre de retour
10	Belüftungsfilter	Vent filter	Filtre d'aération
11	Druckabschaltventil	Cut-off valve	Valve de coupure
12	Verstellpumpe	Variable displacement Pump	Pompe à débit variable
41	Rücklaufsammler	Return line collector	Collecteur retour



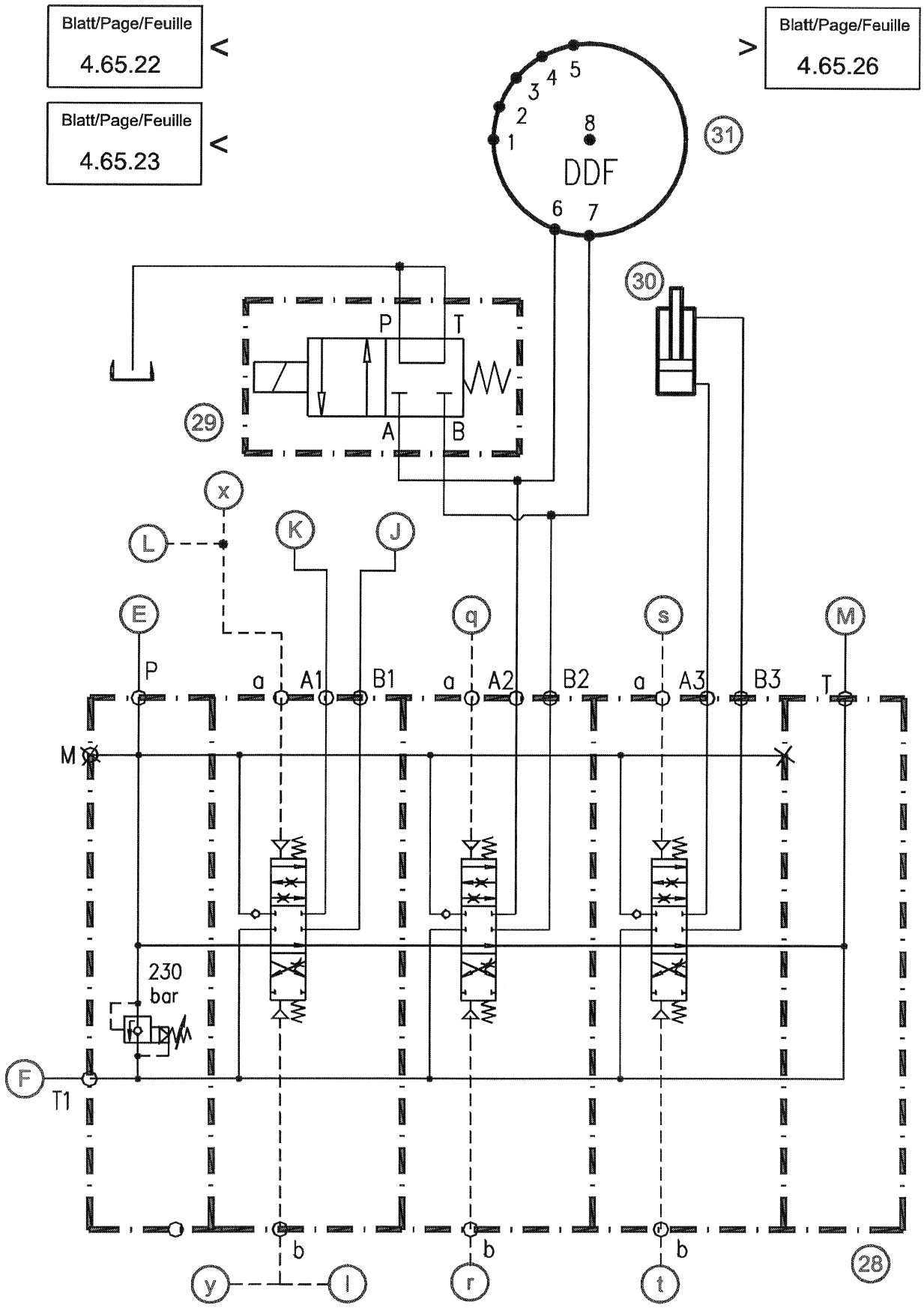
SCHAEFF TEREX	Typ/Model/Type **HR 32 (from serial no. 330/0179)**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (swing)**	Blatt/Page/Feuille **4.65.23**

13	Magnetventil	Solenoid valve	Electrovanne
14	Druckminderventil	Pressure reducing valve	Soupape réductrice de pression
15	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
16	Relaisventil	Relay valve	Clapet-relais
17	Hydromotor (Drehantrieb)	Hydraulic motor (swing drive)	Moteur hydraulique (entraînement d'orientation)
18	Drehwerkgetriebe (Drehantrieb)	Swing gear (swing drive)	Reducteur d'orientation (entraînement d'orientation)
19	Wegeventil	Control valve	Distributeur
20	Drehdurchführung	Rotary transfer	Joint tournant



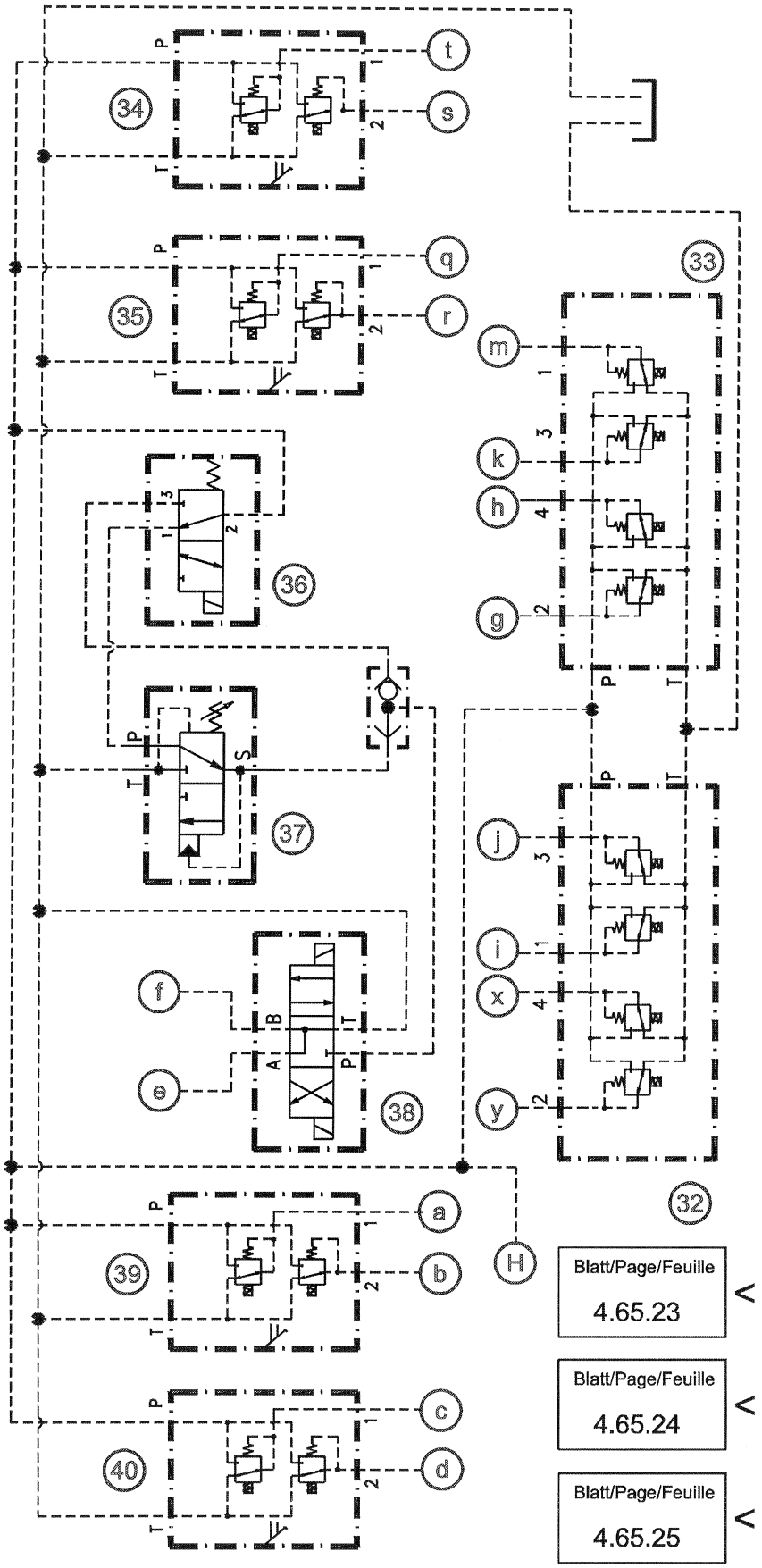
SCHAEFF	Typ/Model/Type **HR 32 (from serial no. 330/0179)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (working)**	Blatt/Page/Feuille **4.65.24**

21	Blocksteuergerät 6SX14	Valve bank 6SX14	Bloc distributeur 6SX14
22	Drehdurchführung (Fahren)	Rotary transfer (travel)	Joint tournant (translation)
23	Zusatzsteuerkreis / Hydraulikhammer	Additional control circuit / hydraulic hammer	Circuit supplémentaire / marteau hydraulique
24	Hydraulikzylinder – Löffel	Hydraulic cylinder – bucket	Vérin hydraulique – godet
25	Hydraulikzylinder – Löffelstiel	Hydraulic cylinder – dipper	Vérin hydraulique – balancier
26	Hydraulikzylinder – Ausleger	Hydraulic cylinder – boom	Vérin hydraulique – flèche
27	Lasthalteventil	Load check valve	Clapet de sécurité



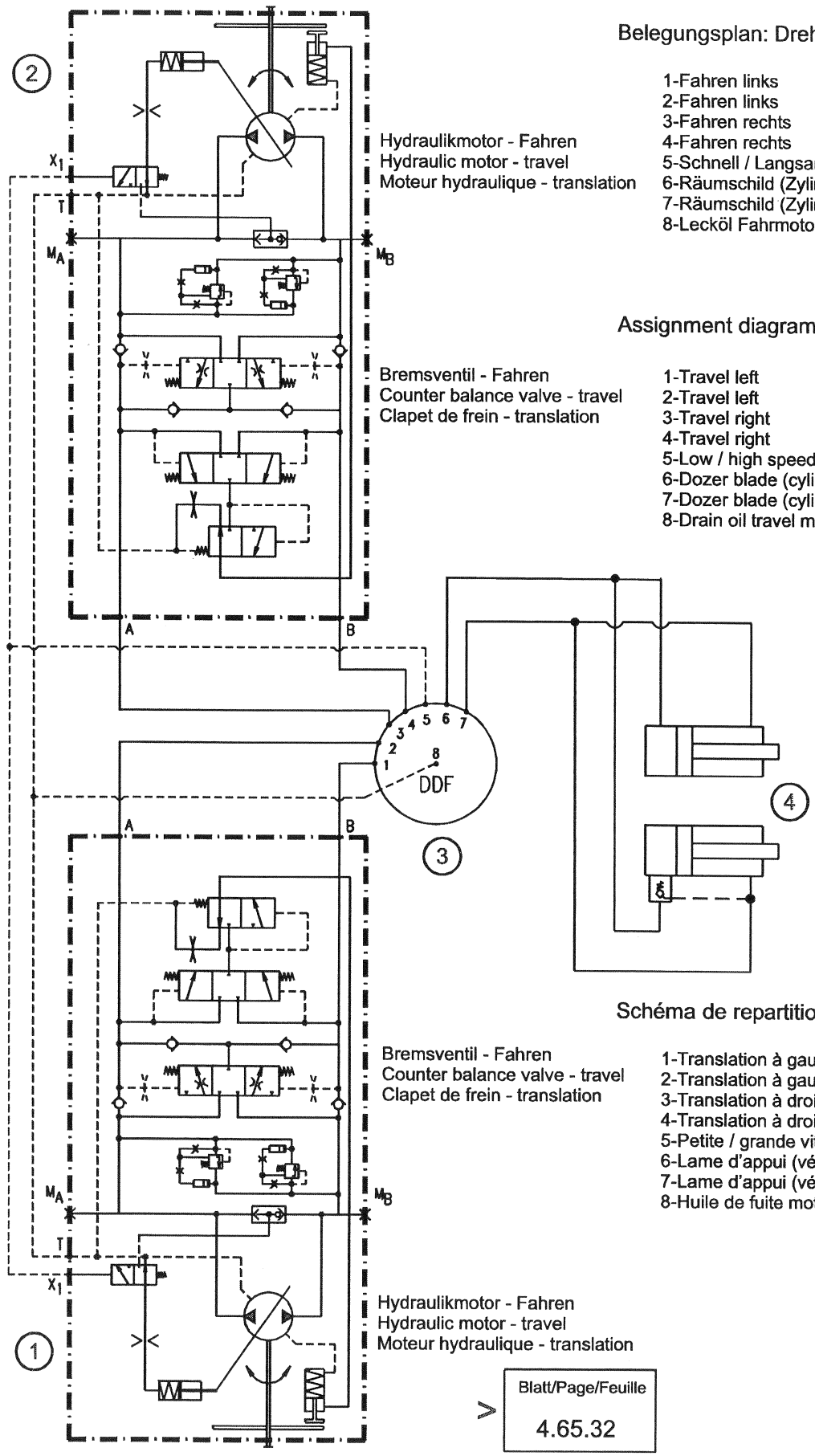
SCHAEFF	Typ/Model/Type **HR 32 (from serial no. 330/0179)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (articulation)**	Blatt/Page/Feuille **4.65.25**

28	Blocksteuergerät 3SM12	Valve bank 3SM12	Bloc distributeur 3SM12
29	Wegeventil (Schwimmstellung)	Control valve (float position)	Distributeur (position flottante)
30	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - articulation
31	Drehdurchführung (Drehantrieb)	Rotary transfer (swing drive)	Joint tournant (entraînement d'orientation)



SCHAEFF	Typ/Model/Type **HR 32 (from serial no. 330/0179)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (pilot control)**	Blatt/Page/Feuille **4.65.26**

32	Vorsteuergerät (Schwenken, Löffelstiel)	Pilot-operated valve (swing, dipper)	Distributeur à commande assistée (orientation, balancier)
33	Vorsteuergerät (Löffel, Ausleger)	Pilot-operated valve (bucket, boom)	Distributeur à commande assistée (godet, flèche)
34	Vorsteuergerät – Fußpedal (Knicken)	Pilot-operated valve – pedal (articulation)	Distributeur à commande assistée - pédale (articulation)
35	Vorsteuergerät – Fußpedal (Abstützschild)	Pilot-operated valve – pedal (dozer blade)	Distributeur à commande assistée - pédale (lame d'appui)
36	Wegeventil (Hydraulikhammer)	Control valve (hydraulic hammer)	Distributeur (marteau hydraulique)
37	Druckminderventil	Pressure reducing valve	Soupape réductrice de pression
38	Wegeventil (Zusatz-steuerkreis / Hydraulikhammer)	Control valve (additional control circuit / hydraulic hammer)	Distributeur (circuit supplémentaire / marteau hydraulique)
39	Vorsteuergerät – Fußpedal (Fahren rechts)	Pilot-operated valve – pedal (travel right)	Distributeur à commande assistée - pédale (translation à droite)
40	Vorsteuergerät – Fußpedal (Fahren links)	Pilot-operated valve – pedal (travel left)	Distributeur à commande assistée - pédale (translation à gauche)



Hydraulikmotor - Fahren
Hydraulic motor - travel
Moteur hydraulique - translation

Bremsventil - Fahren
Counter balance valve - travel
Clapet de frein - translation

Bremsventil - Fahren
Counter balance valve - travel
Clapet de frein - translation

Hydraulikmotor - Fahren
Hydraulic motor - travel
Moteur hydraulique - translation

Belegungsplan: Drehdurchführung

1-Fahren links
2-Fahren links
3-Fahren rechts
4-Fahren rechts
5-Schnell / Langsam
6-Räumschild (Zylinder aus)
7-Räumschild (Zylinder ein)
8-Lecköl Fahrmotor

Assignment diagram: rotary transfer

1-Travel left
2-Travel left
3-Travel right
4-Travel right
5-Low / high speed
6-Dozer blade (cylinder out)
7-Dozer blade (cylinder in)
8-Drain oil travel motor

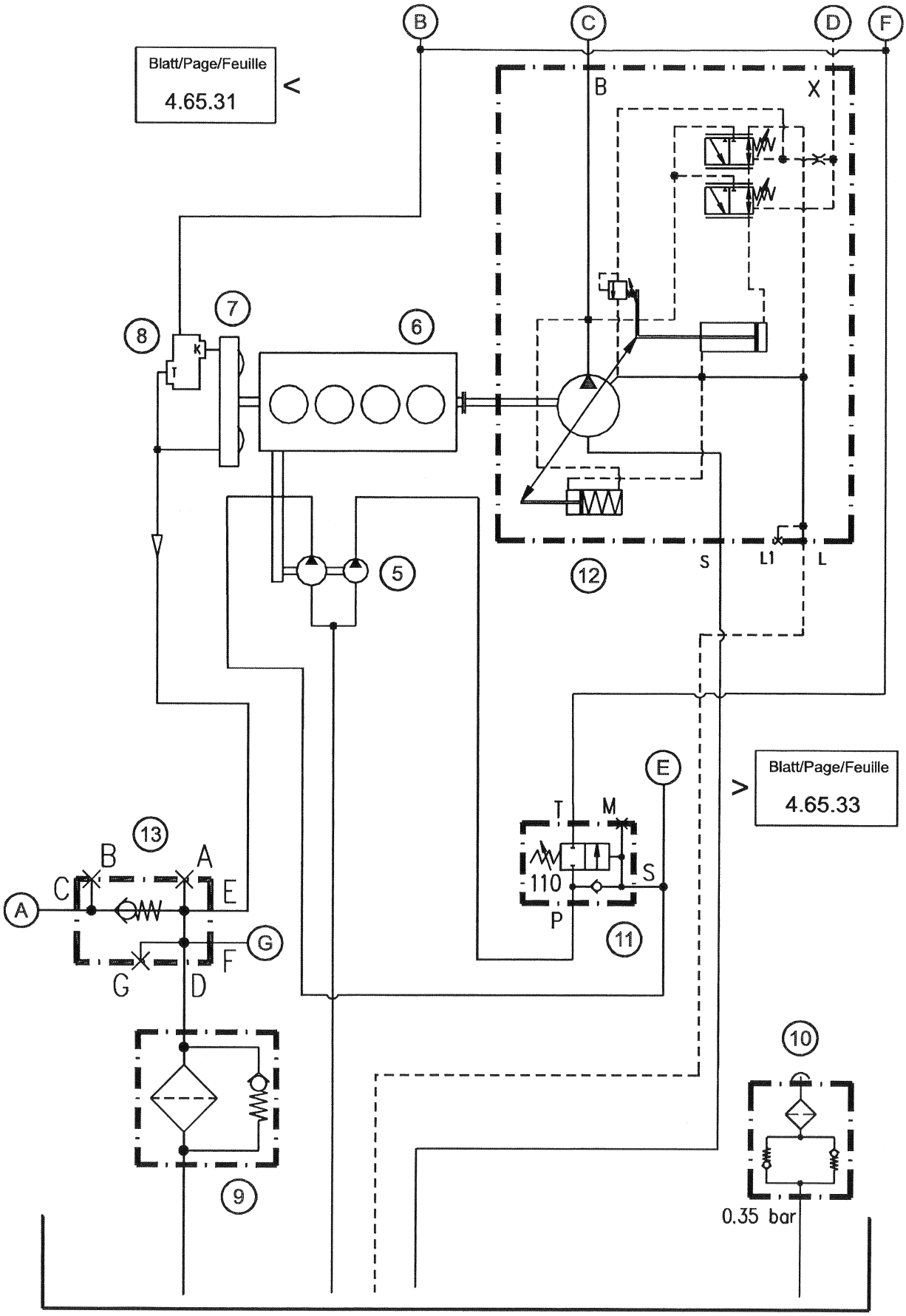
Schéma de repartition: joint tournant

1-Translation à gauche
2-Translation à gauche
3-Translation à droite
4-Translation à droite
5-Petite / grande vitesse
6-Lame d'appui (vérin sortir)
7-Lame d'appui (vérin rentrer)
8-Huile de fuite moteur translation

Blatt/Page/Feuille
4.65.32

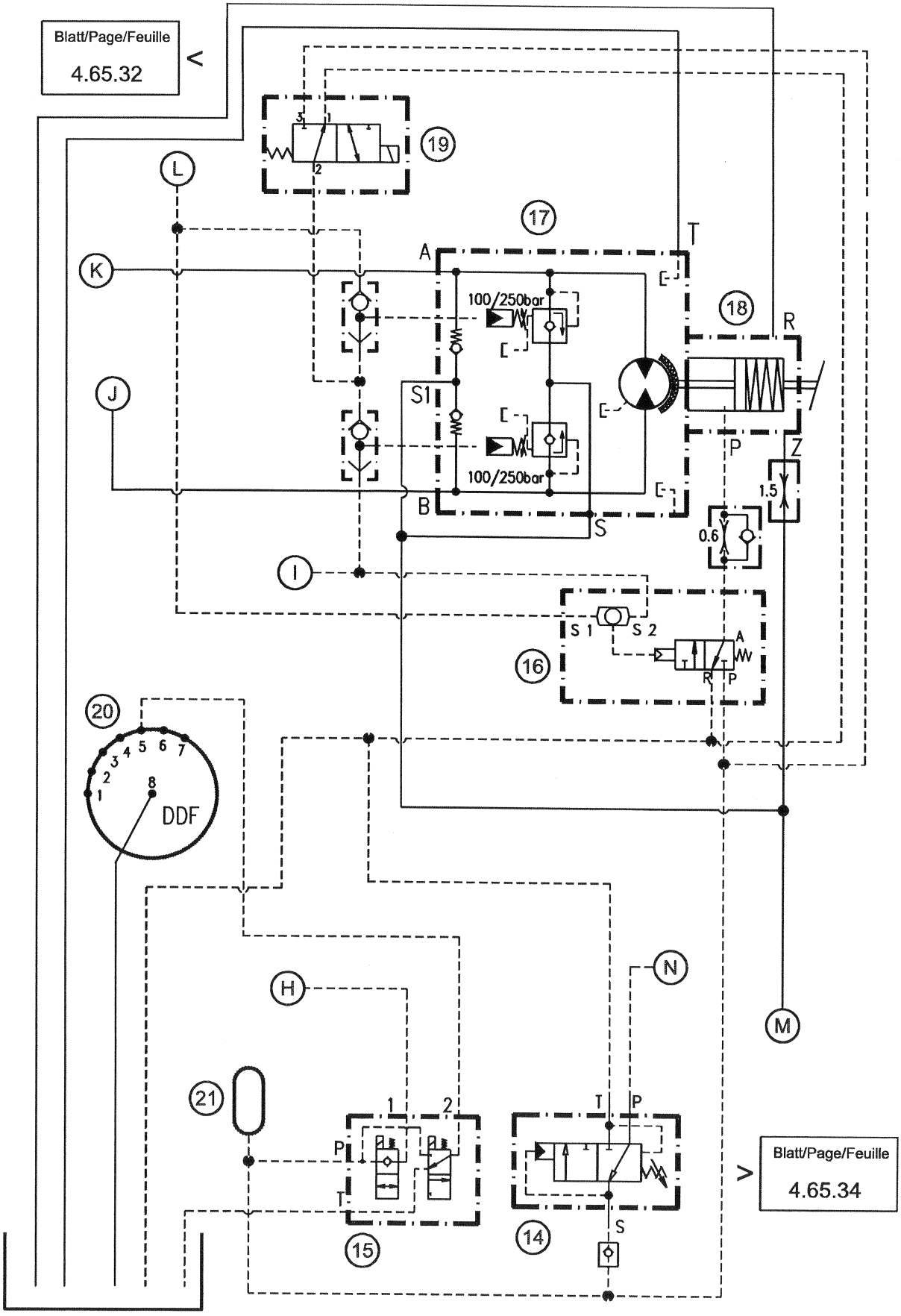
SCHAEFF TEREX	Typ/Model/Type **HR 32 Circular**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (undercarriage)**	Blatt/Page/Feuille **4.65.31**

1	Fahrantrieb links	Travel drive left	Entraînement à gauche
2	Fahrantrieb rechts	Travel drive right	Entraînement à droite
3	Drehdurchführung	Rotary transfer	Joint tournant
4	Hydraulikzylinder Abstützschild	Hydraulic cylinder dozer blade	Vérin hydraulique lame d'appui



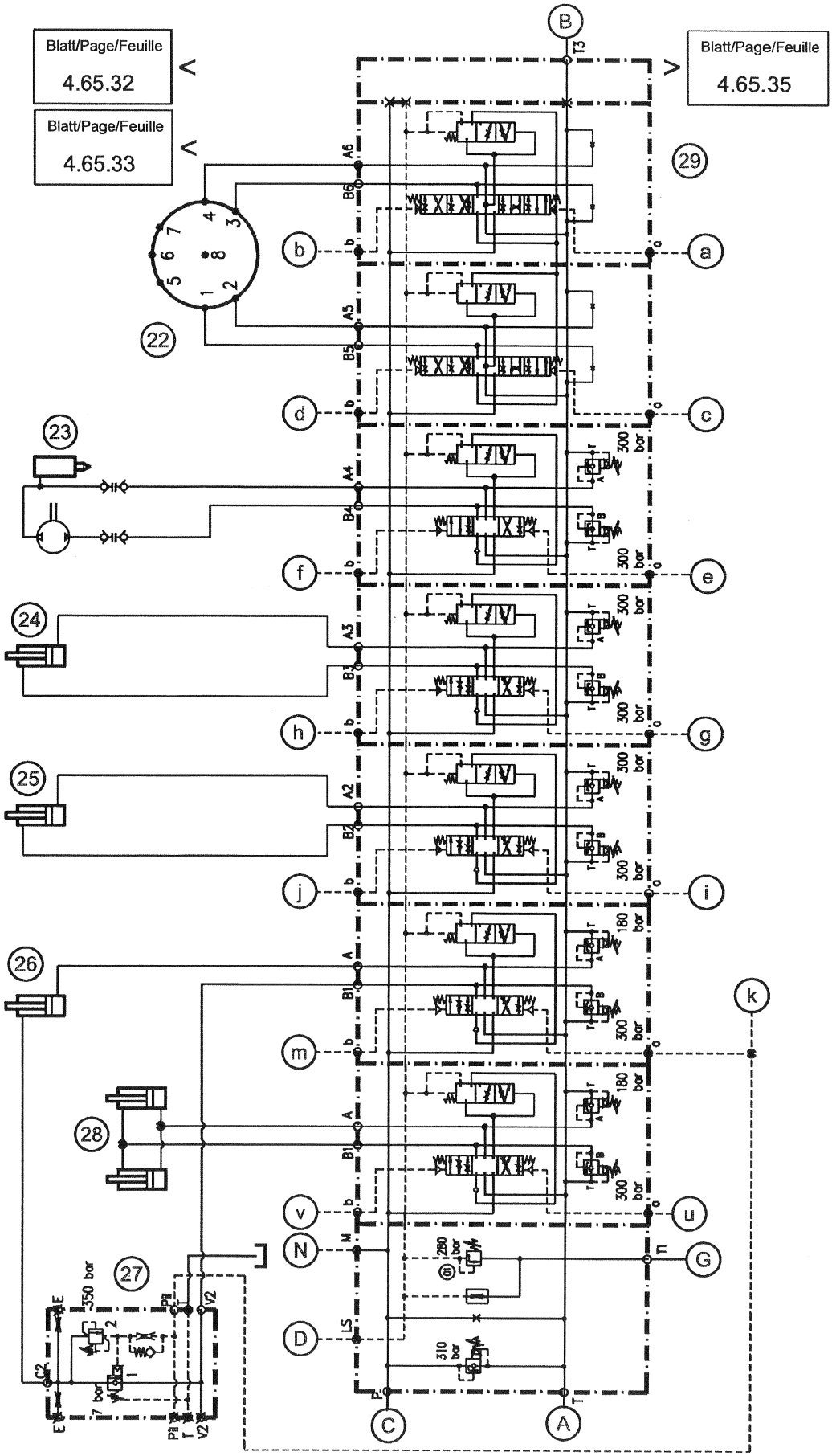
SCHAEFF TEREX	Typ/Model/Type **HR 32 Circular**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (circulation)**	Blatt/Page/Feuille **4.65.32**

5	Doppelzahnradpumpe	Double gear pump	Pompe tandem à engrenage
6	Dieselmotor	Diesel engine	Moteur diesel
7	Ölkühler	Oil cooler	Refroidisseur d'huile
8	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
9	Rücklauffilter	Return filter	Filtre de retour
10	Belüftungsfilter	Vent filter	Filtre d'aération
11	Druckabschaltventil	Shut-off valve	Valve de coupure
12	Verstellpumpe	Variable displacement pump	Pompe à débit variable
13	Rücklaufsammler	Return line collector	Collecteur retour



SCHAEFF TEREX	Typ/Model/Type **HR 32 Circular**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (swing)**	Blatt/Page/Feuille **4.65.33**

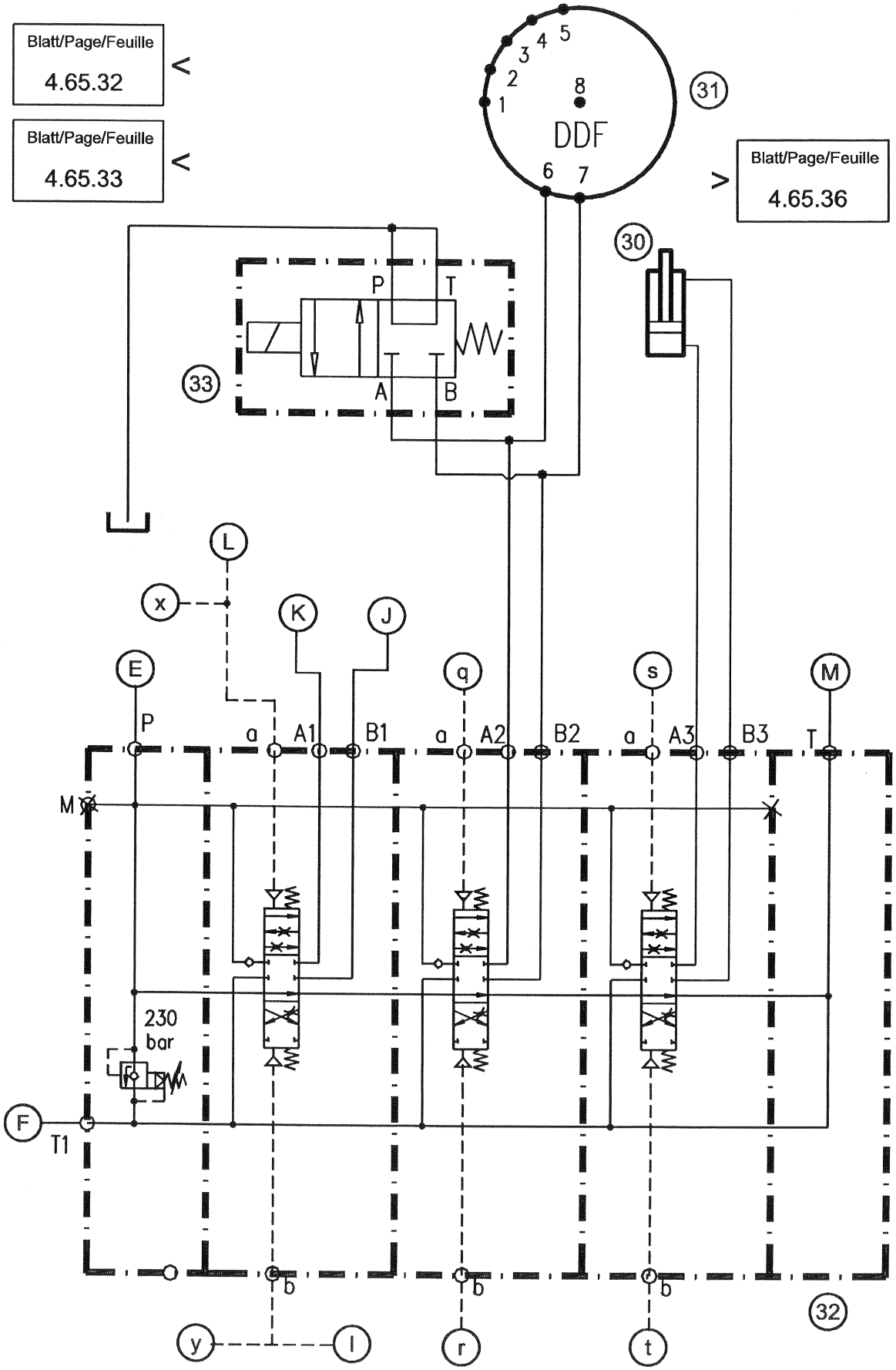
14	Druckminderventil	Pressure reducing valve	Soupape réductrice de pression
15	Magnetventil	Solenoid valve	Electrovanne
16	Relaisventil	Relay valve	Clapet-relais
17	Hydromotor (Drehantrieb)	Hydraulic motor (swing drive)	Moteur hydraulique (entraînement d'orientation)
18	Drehwerkgetriebe (Drehantrieb)	Swing gear (swing drive)	Reducteur d'orientation (entraînement d'orientation)
19	Wegeventil	Control valve	Distributeur
20	Drehdurchführung	Rotary transfer	Joint tournant
21	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique



SCHAEFF TEREX	Typ/Model/Type **HR 32 Circular**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (working)**	Blatt/Page/Feuille **4.65.34**

22	Drehdurchführung (Fahren)	Rotary transfer (travel)	Joint tournant (translation)
23	Zusatzsteuerkreis / Hydraulikhammer	Additional control circuit / hydraulic hammer	Circuit supplémentaire / marteau hydraulique
24	Hydraulikzylinder – Löffel	Hydraulic cylinder – bucket	Vérin hydraulique – godet
25	Hydraulikzylinder – Löffelstiel	Hydraulic cylinder – dipper	Vérin hydraulique – balancier
26	Hydraulikzylinder – Ausleger	Hydraulic cylinder – boom	Vérin hydraulique – flèche
27	Lasthalteventil	Load check valve	Clapet de sécurite
28	Hydraulikzylinder – Zwischenausleger	Hydraulic cylinder – intermediate boom	Vérin hydraulique – flèche intermédiaire
29	Blocksteuergerät 7SX14	Valve bank 7SX14	Bloc distributeur 7SX14

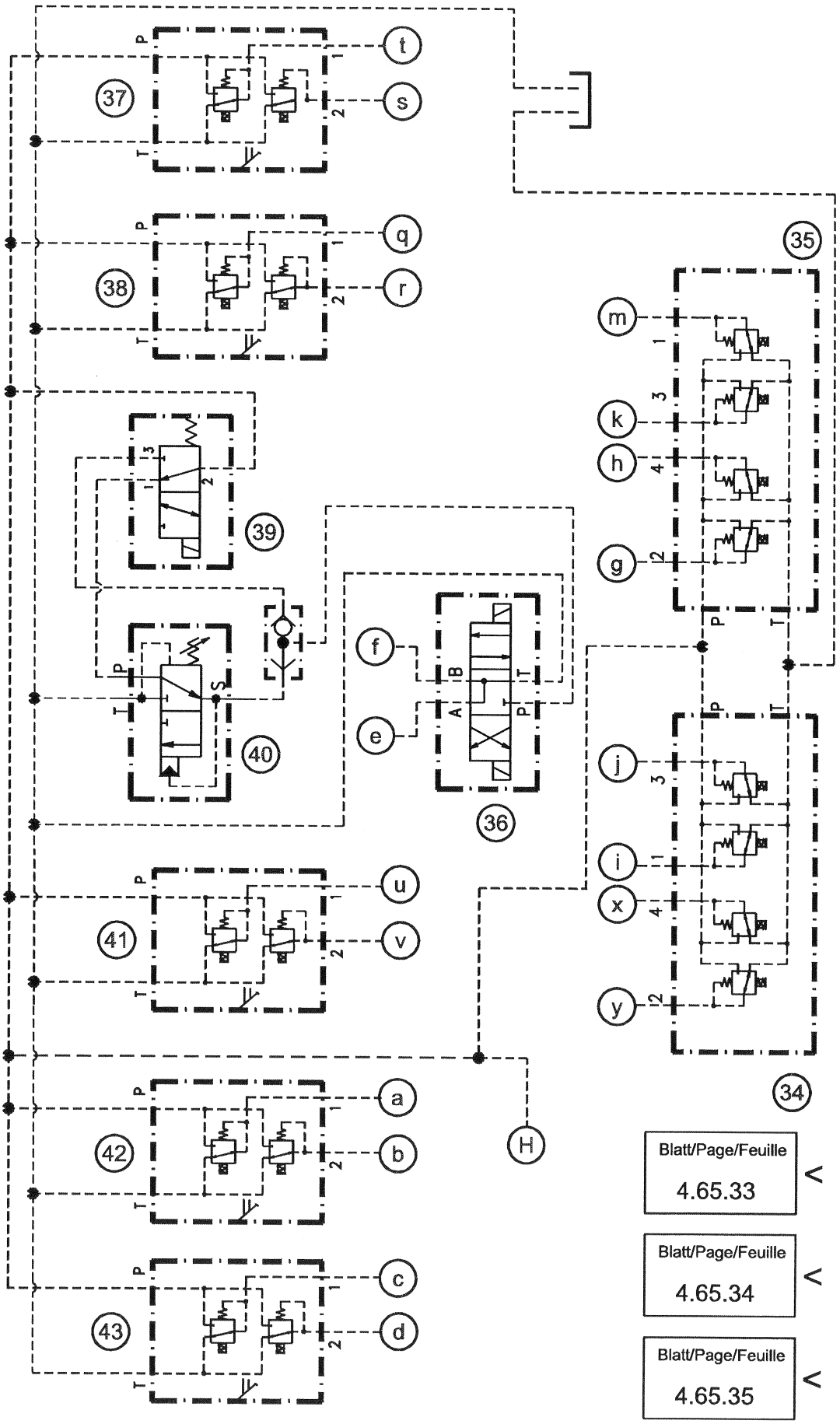
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4.65.36
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SCHAEFF TEREX	Typ/Model/Type **HR 32 Circular**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (articulation)**	Blatt/Page/Feuille **4.65.35**

30	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - articulation
31	Drehdurchführung (Drehantrieb)	Rotary transfer (swing drive)	Joint tournant (entraînement d'orientation)
32	Blocksteuergerät 3SM12	Valve bank 3SM12	Bloc distributeur 3SM12
33	Wegeventil (Schwimmstellung)	Control valve (float position)	Distributeur (position flottante)



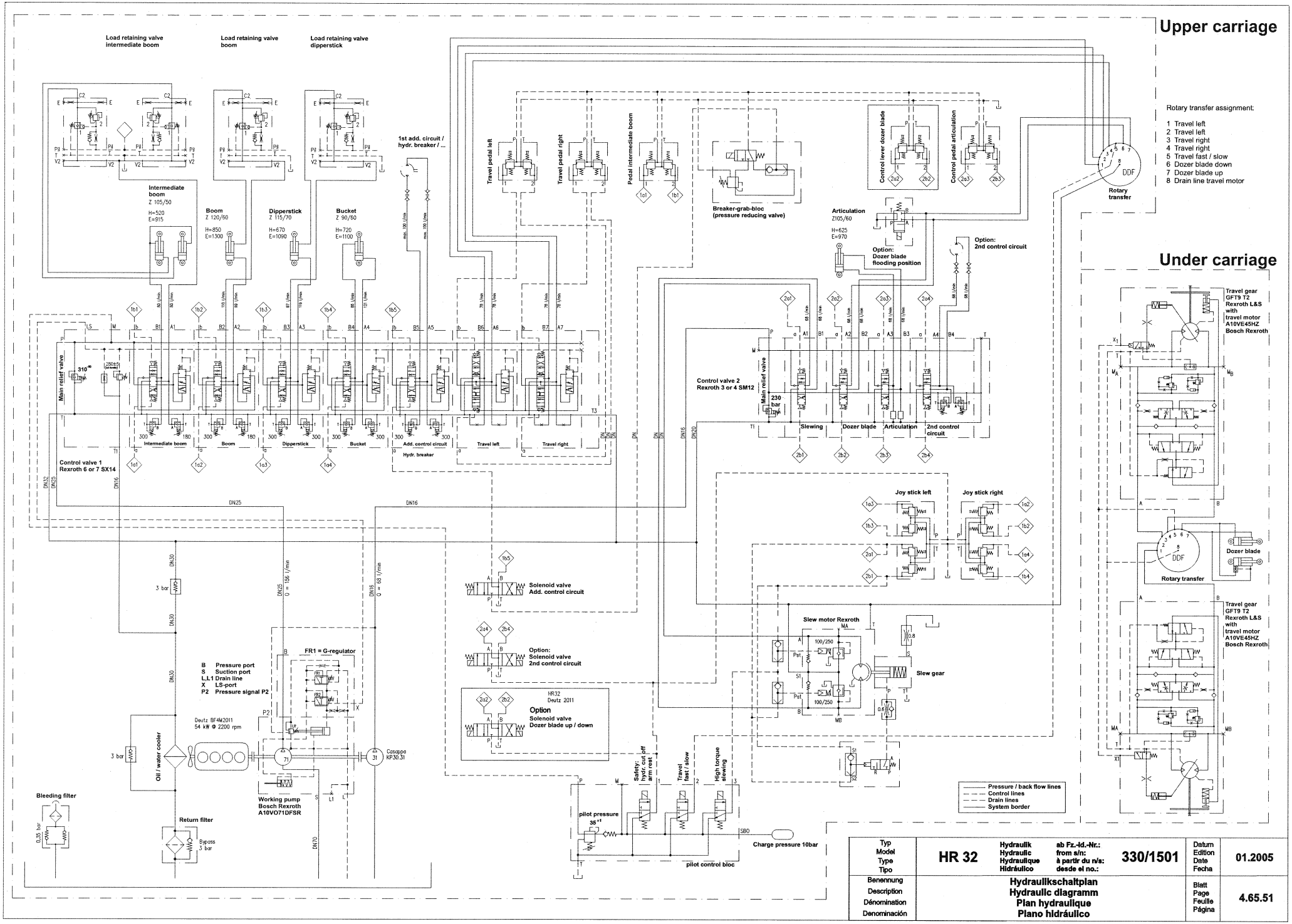
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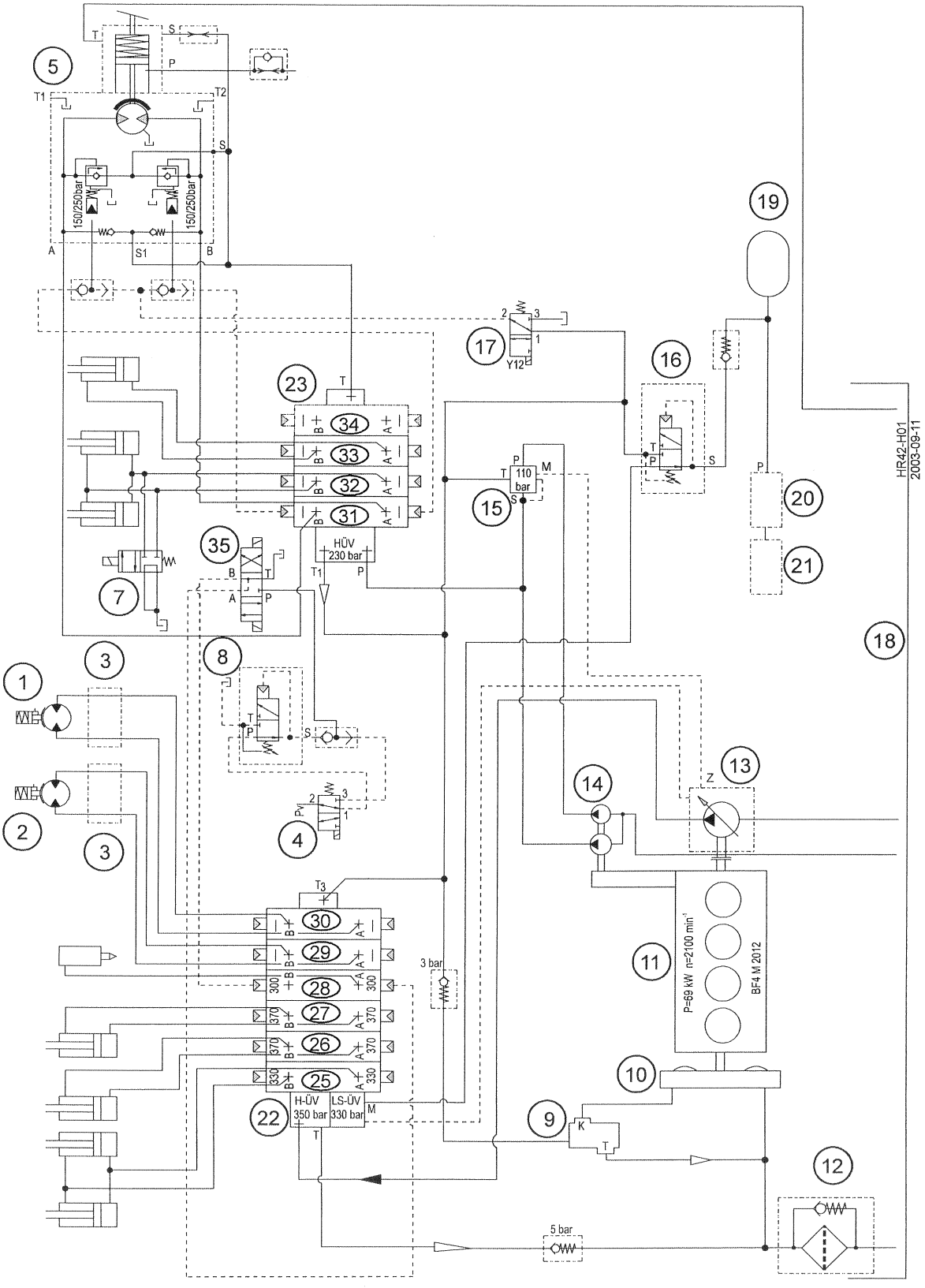
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	Benennung/Description/Dénomination: Hydraulic diagram (pilot control)	Blatt/Page/Feuille: 4.65.36

34	Vorsteuergerät (Schwenken, Löffelstiel)	Pilot-operated valve (swing, dipper)	Distributeur à commande assistée (orientation, balancier)
35	Vorsteuergerät (Löffel, Ausleger)	Pilot-operated valve (bucket, boom)	Distributeur à commande assistée (godet, flèche)
36	Wegeventil (Zusatzsteuerkreis / Hydraulikhammer)	Control valve (additional control circuit / hydraulic hammer)	Distributeur (circuit supplémentaire / marteau hydraulique)
37	Vorsteuergerät – Fußpedal (Knicken)	Pilot-operated valve – pedal (articulation)	Distributeur à commande assistée - pédale (articulation)
38	Vorsteuergerät – Fußpedal (Abstützschild)	Pilot-operated valve – pedal (dozer blade)	Distributeur à commande assistée - pédale (lame d'appui)
39	Wegeventil (Hydraulikhammer)	Control valve (hydraulic hammer)	Distributeur (marteau hydraulique)
40	Druckminderventil	Pressure reducing valve	Soupape réductrice de pression
41	Vorsteuergerät – Fußpedal (Zwischenausleger)	Pilot-operated valve – pedal (intermediate boom)	Distributeur à commande assistée - pédale (flèche intermédiaire)
42	Vorsteuergerät – Fußpedal (Fahren rechts)	Pilot-operated valve – pedal (travel right)	Distributeur à commande assistée - pédale (translation à droite)
43	Vorsteuergerät – Fußpedal (Fahren links)	Pilot-operated valve – pedal (travel left)	Distributeur à commande assistée - pédale (translation à gauche)



Typ / Model / Type / Tipo	HR 32	Hydraulik / Hydraulic / Hydraulique / Hidráulico	ab Fz.-Id.-Nr.: / from s/n: / à partir du n/s: / desde el no.:	330/1501	Datum / Edition / Date / Fecha	01.2005
Benennung / Description / Dénomination / Denominación	Hydraulikschaltplan / Hydraulic diagramm / Plan hydraulique / Plano hidráulico				Blatt / Page / Feuille / Página	4.65.51

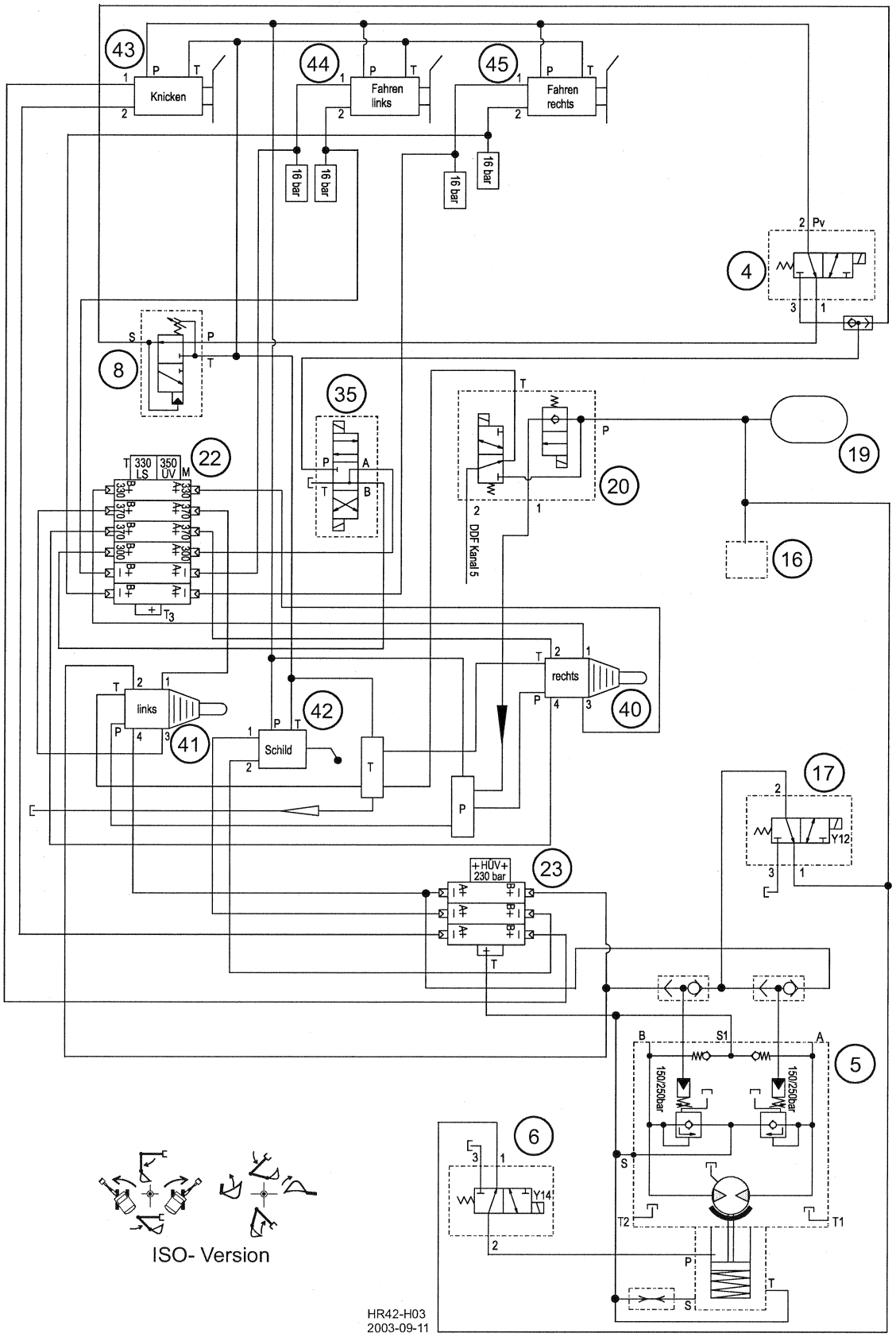
TEREX | SCHAEFF



Hydraulic installation including monobloc boom

TEREX SCHAEFF	Typ/Model/Type **HR 42 from ser.no.: 342/0100**	Datum/Edition/Date **01.2004**
	Benennung/Description/Dénomination **Hydraulic system**	Blatt/Page/Feuille **4.67.01**

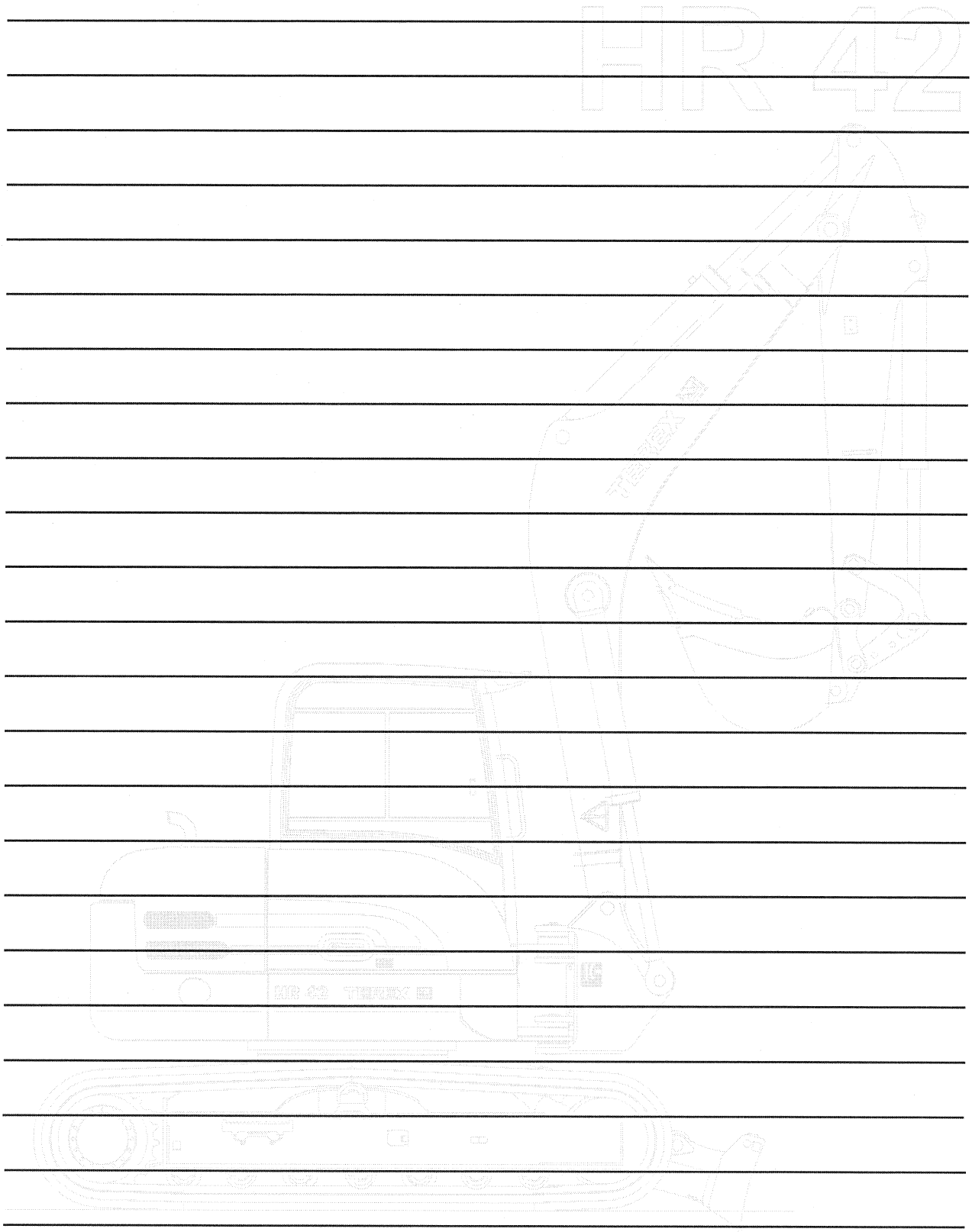
1	Travel motor, right
2	Travel motor, left
3	Brake valve
4	Additional control circuit change-over — rock breaker / grab
5	Swing drive
7	Float position
8	Pressure relief valve (grab)
9	Hydraulic oil temperature regulator
10	Hydraulic oil cooler
11	Diesel engine
12	Return filter
13	Excavator variable capacity pump
14	Excavator gear pump
15	Cut-off valve
16	Pressure relief valve (pilot control)
17	3/2 directional control valve – swing brake (pressure boost)
18	Hydraulic oil tank
19	Accumulator
20	Solenoid valve – armrest cut-off
21	Pilot control
22	Control valve 1
23	Control valve 2
24	--
25	Boom
26	Dipperstick
27	Bucket
28	Additional control circuit — Rock breaker / grab rotation
29	Travel, left
30	Travel, right
31	Slewing
32	Dozer blade
33	Articulation
34	Additional control circuit — special function
35	4/3 directional control valve — operation of additional control circuit



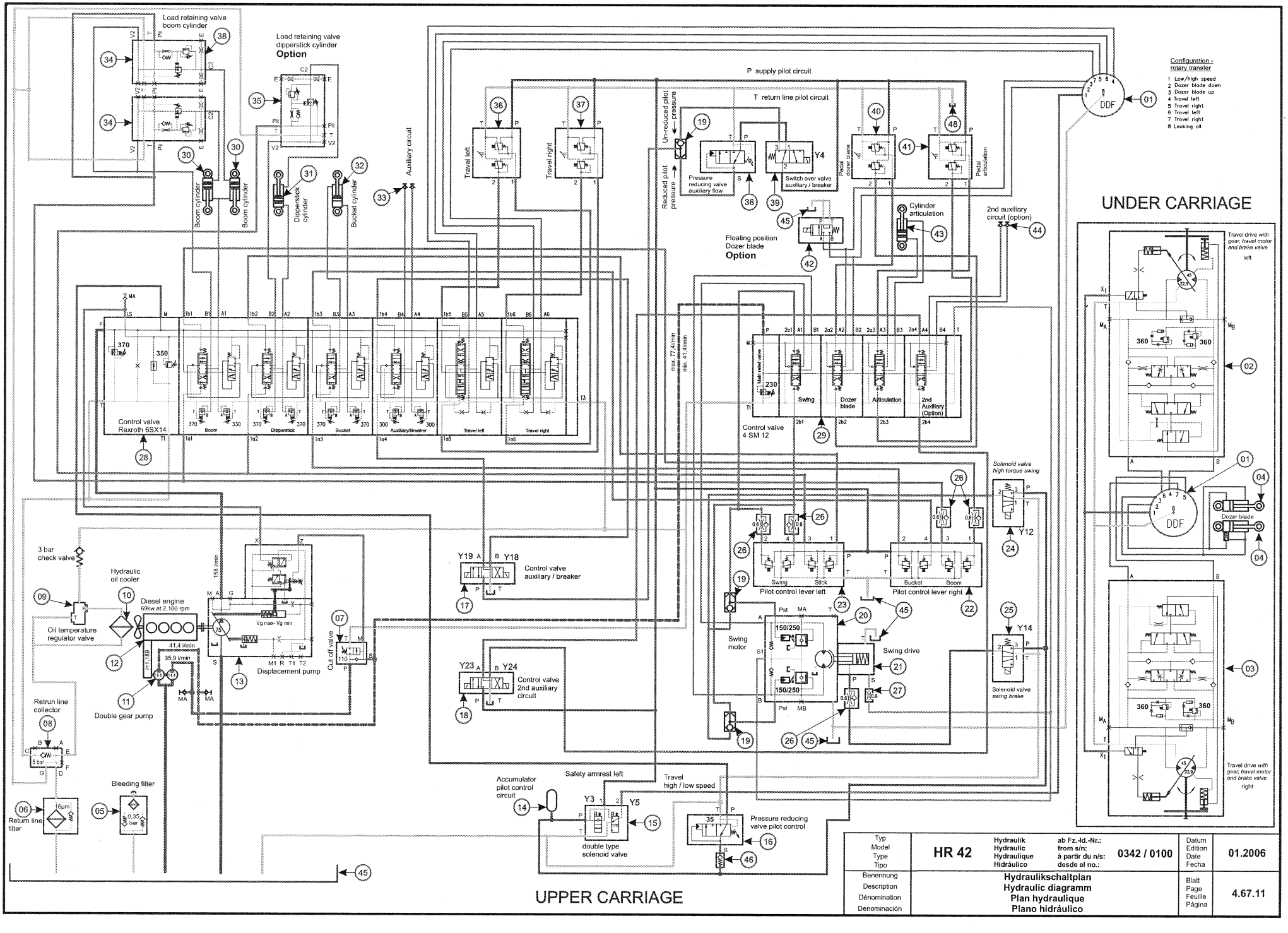
Hydraulic installation — pilot control

TEREX | SCHAEFF	Typ/Model/Type **HR 42 from ser.no.: 342/0100**	Datum/Edition/Date **01.2004**
	Benennung/Description/Dénomination **Hydraulic system**	Blatt/Page/Feuille **4.67.02**

4	*Change-over — rock breaker / grab*
5	*Swing drive*
6	3/2 directional control valve – holding brake for uppercarriage slewing motion
8	Pressure relief valve (grab)
16	Pressure relief valve
17	3/2 directional control valve – swing brake (pressure boost)
19	Accumulator
20	Solenoid valve – armrest cut-off
35	4/3 directional control valve — operation of additional control circuit
40	Pilot valve (joystick) right
41	Pilot valve (joystick) left
42	Pilot valve — dozer blade
43	Pilot valve — articulation
44	Pilot valve — travel, left
45	Pilot valve — travel, right



Typ Model Type Tipo	**HR 42**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Notizen** **Notes** **Notices** **Notas**	Blatt Page Feuille Página	**4.67.10**

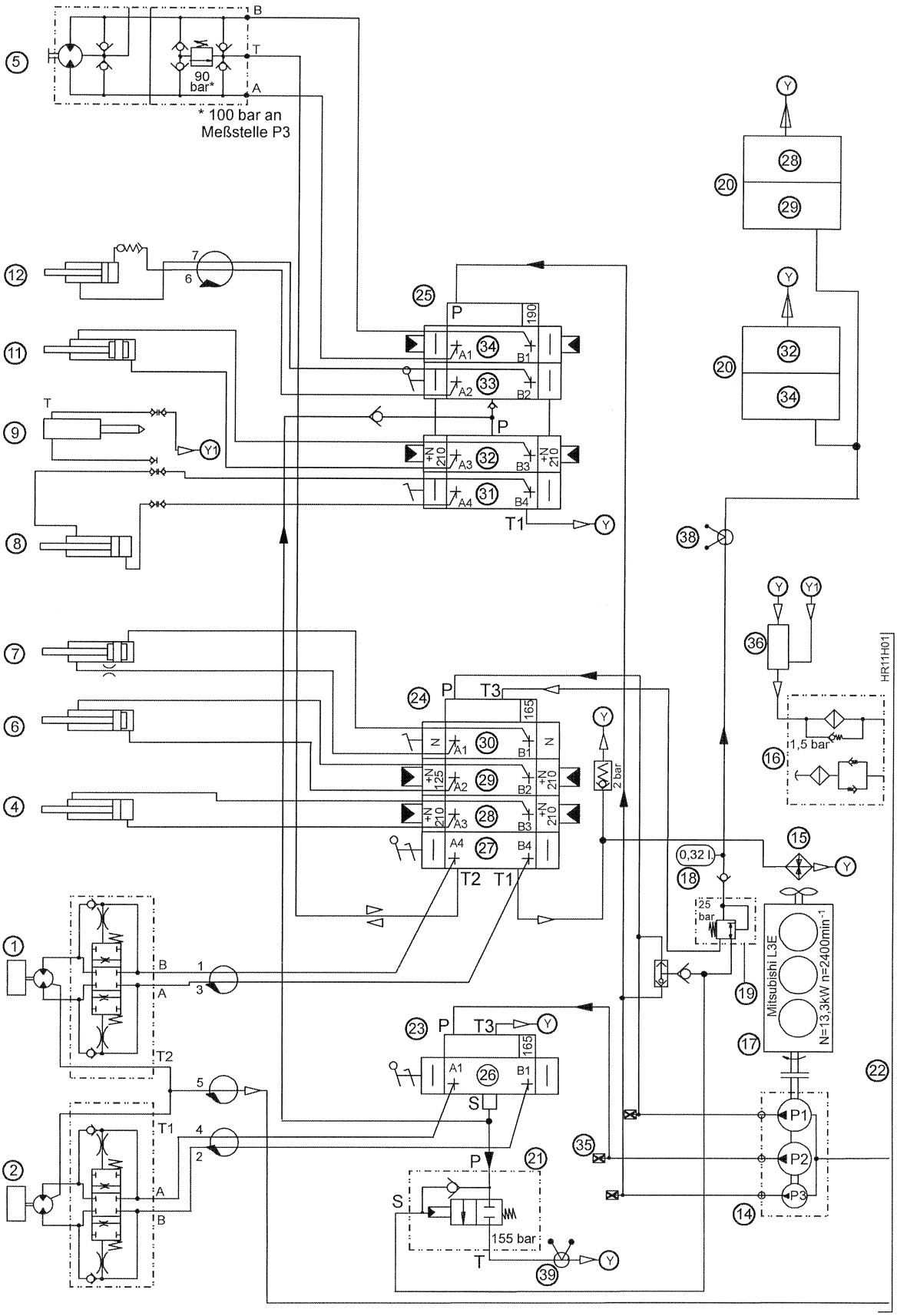

Load retaining valve boom cylinder
Load retaining valve dipperstick cylinder
Option
Auxiliary circuit
P supply pilot circuit
T return line pilot circuit
Un-reduced pilot pressure
Reduced pilot pressure
Travel left
Travel right
Pressure reducing valve auxiliary flow
Switch over valve auxiliary / breaker
Pedal dozer blade
Pedal articulation
Configuration - rotary transfer
1 Low/high speed
2 Dozer blade down
3 Dozer blade up
4 Travel left
5 Travel right
6 Travel left
7 Travel right
8 Leaking oil
DDF
Floating position Dozer blade
Option
Cylinder articulation
2nd auxiliary circuit (option)
Boom cylinder
Dipperstick cylinder
Bucket cylinder
Control valve Rexroth 6SX14
Boom
Dipperstick
Bucket
Auxiliary/Breaker
Travel left
Travel right
Control valve 4 SM 12
Main relief valve
Swing
Dozer blade
Articulation
2nd Auxiliary (Option)
max. 77,4l/min
min. 41,4l/min
UNDER CARRIAGE
Travel drive with gear, travel motor and brake valve left
Travel drive with gear, travel motor and brake valve right
Solenoid valve high torque swing
Solenoid valve swing brake
Pilot control lever left
Pilot control lever right
Swing
Stick
Bucket
Boom
Swing motor
Swing drive
Control valve auxiliary / breaker
Control valve 2nd auxiliary circuit
3 bar check valve
Hydraulic oil cooler
Diesel engine 69kw at 2.100 rpm
Oil temperature regulator valve
Displacement pump
Vg max- Vg min
158 l/min
41,4 l/min
35,9 l/min
Cut off valve
Double gear pump
Retrun line collector
Return line filter
Bleeding filter
Accumulator pilot control circuit
Safety armrest left
Travel high / low speed
double type solenoid valve
Pressure reducing valve pilot control
UPPER CARRIAGE
Typ
Model
Type
Tipo
HR 42
Hydraulik
Hydraulic
Hydraulique
Hidráulico
ab Fz.-Id.-Nr.:
from s/n:
à partir du n/s:
desde el no.:
0342 / 0100
Datum
Edition
Date
Fecha
01.2006
Benennung
Description
Dénomination
Denominación
Hydraulikschaltplan
Hydraulic diagramm
Plan hydraulique
Plano hidráulico
Blatt
Page
Feuille
Página
4.67.11

Pos. Item Rep. No.	Deutsch	English	Français
01	Drehdurchführung	Rotary transfer	Joint tournant
02	Fahrantrieb - links *mit Getriebe, Fahrmotor und Bremsventil*	Travel drive - *left* *with gear, travel motor and brake valve*	Entraînement - gauche *avec transmission,moteur translation et soupape de frein*
03	Fahrantrieb - rechts *mit Getriebe, Fahrmotor und Bremsventil*	Travel drive - *right* *with gear, travel motor and brake valve*	Entraînement - droite *avec transmission,moteur translation et soupape de frein*
04	Hydraulikzylinder - Abstützschild	Hydraulic cylinder - support blade	Vérin hydraulique - lame d'appui
05	Belüftungsfilter	Vent valve	Filtre d'aération
06	Rücklauffilter	Return filter	Filtre de retour
07	Abschaltventil	Shut-off valve	Valve de coupure
08	Rücklaufsammler **5bar**	Return line collector **5bar**	Collecteur de retour **5bar**
09	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
10	Ölkühler	Oil cooler	Refroidisseur d'huile
11	Doppelzahnradpumpe	Double gear pump	Pompe tandem à engrenage
12	Dieselmotor	Diesel engine	Moteur diesel
13	Verstellpumpe – *Arbeiten, Fahren*	Variable displacement pump - *working, travel*	Pompe à débit variable - *équipemen, translation*
14	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
15	Magnetventil (2-fach) *1= Vorsteuerung ein / aus* **Y3** *2= Fahren schnell / langsam* **Y5**	Solenoid valve (double-type) *1= Pilot control on / off* **Y3** *2= Travel high speed / low speed* **Y5**	Electrovanne (double) *1= Pilotage marche / arrêt* **Y3** *2= Translation grande vitesse / petite* **Y5**
16	Druckminderventil *Vorsteuerung*	Pressure reducing valve *pilot control*	Diminueur de pression *pilotage*
17	Wegeventil **Y18 / Y19** *Zusatzsteuerkreis / Hydraulikhammer*	Control valve **Y18 / Y19** *additional control circuit / hydraulic hammer*	Distributeur **Y18 / Y19** circuit supplémentaire / marteau hydraulique
18	Wegeventil **Y23 / Y24** *2.Zusatzsteuerkreis*	Control valve **Y23 / Y24** *2 nd additional control circuit*	Distributeur **Y23 / Y24** *2 me circuit supplémentaire*
19	Wechselventil	Shuttle valve	Selecteur
20	Hydromotor *Drehantrieb*	Hydraulic motor *swing drive*	Moteur hydraulique *entraînement d'orientation*
21	Drehwerkgetriebe *Drehantrieb*	Swing gear *swing drive*	Reducteur d'orientation *entraînement d'orientation*
22	Vorsteuergerät *Löffel, Ausleger*	Pilot-operated valve *bucket, boom*	Distributeur à commande assistée *godet, flèche*
23	Vorsteuergerät *Schwenken, Löffelstiel*	Pilot-operated valve *swing, stick*	Distributeur à commande assistée *orientation, balancier*
24	Wegeventil **Y12** *Schwenkdruckhochschaltung*	Solenoid valve **Y12** *high torque swing*	electro-vanne **Y12** *élevation pression d'orientation*

Typ Model Type Tipo	**HR 42**	**ab Fz.-Id.nr.. 0342 / 0100** **from s/n: 0342 / 0100** **à partir du n/s: 0342 / 0100** **desde el no.: 0342 / 0100**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**			Blatt Page Feuille Página	**4.67.12**

Pos. Item Rep. No.	Deutsch	English	Français
25	Wegeventil **Y14** *Schwenkbremse*	Solenoid valve **Y14** *swing brake*	electro-vanne **Y14** *frein d'orientation*
26	Drosselrückschlagventil	Throttle check-valve	Clapet anti-retour avec étrangleur
27	Drossel	Throttle	Étrangleur
28	Blocksteuergerät 6SX14	Valve bank 6SX14	Distributeur 6SX14
29	Blocksteuergerät 4SM12	Valve bank 4SM12	Distributeur 4SM12
30	Hydraulikzylinder – *Ausleger*	Hydraulic cylinder – *boom*	Vérin hydraulique – *flèche*
31	Hydraulikzylinder – *Löffelstiel*	Hydraulic cylinder – *stick*	Vérin hydraulique – *balancier*
32	Hydraulikzylinder – *Löffel*	Hydraulic cylinder – *bucket*	Vérin hydraulique – *godet*
33	Zusatzsteuerkreis / Hydraulikhammer	Additional control circuit / hydraulic hammer	Circuit supplémentaire / marteau hydraulique
34	Lasthalteventil	Load holding valve	Clapet maintieu de charge
35	Lasthalteventil **Option**	Load holding valve **Option**	Clapet maintieu de charge **Option**
36	Vorsteuergerät – Fußpedal *Fahren links*	Pilot-operated valve – pedal *travel left*	Distributeur à commande assistée - pédale *translation gauche*
37	Vorsteuergerät – Fußpedal *Fahren rechts*	Pilot-operated valve – pedal *travel right*	Distributeur à commande assistée - pédale *translation droite*
38	Druckminderventil - *Zusatzsteuerkreis / Hydraulikhammer*	Pressure reducing valve - *additional control circuit / hydraulic hammer*	Diminueur de pression - *circuit supplémentaire / marteau hydraulique*
39	Wegeventil **Y4** *Zusatzsteuerkreis / Hydraulikhammer*	Solenoid valve **Y4** *additional control circuit / hydraulic hammer*	Electro-vanne **Y4** *circuit supplémentaire / marteau hydraulique*
40	Vorsteuergerät - Fußpedal *Abstützschild*	Pilot-operated valve - pedal *support blade*	Distributeur à commande assistée - pédale *lame d'appui*
41	Vorsteuergerät - Fußpedal *Knicken*	Pilot-operated valve - pedal *articulation*	Distributeur à commande assistée - pédale *deport de flèche*
42	Wegeventil **Y11** Schwimmstellung *Abstützschild* **Option**	Control valve **Y11** flost position *support blade* **Option**	Distributeur **Y11** position du floteur - *lame d'appui* **Option**
43	Hydraulikzylinder - *Knicken*	Hydraulic cylinder - *articulation*	Vérin hydraulique - *deport de flèche*
44	*2.Zusatzsteuerkreis*	2 nd additional control circuit	2 me circuit supplémentaire
45	*Öltank*	Oil tank	Reservoir hydraulique
46	Rückschlagventil	Check-valve	Clapet anti-retour

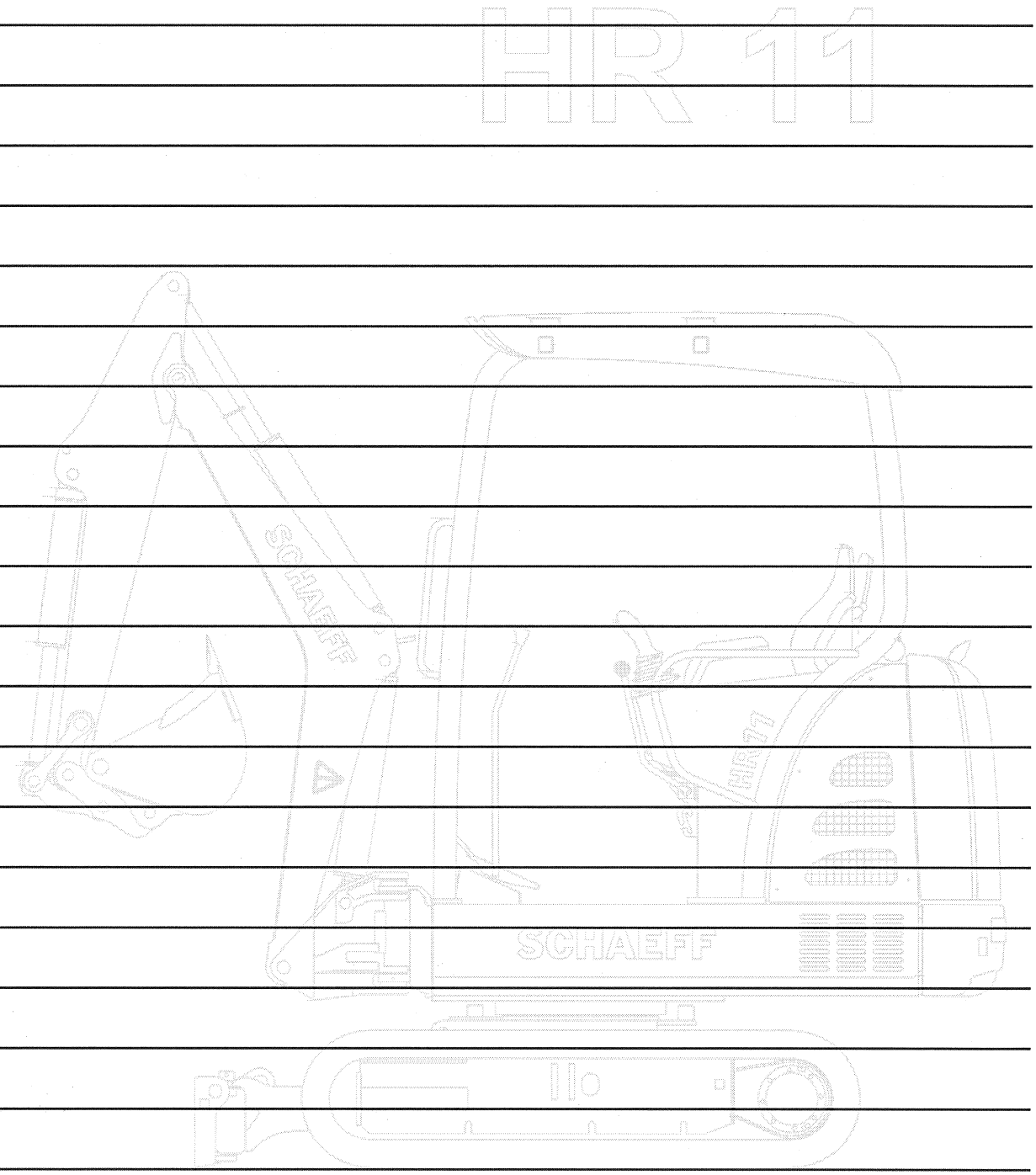
Typ Model Type Tipo	**HR 42**	**ab Fz.-Id.nr.. 0342 / 0100 from s/n: 0342 / 0100 à partir du n/s: 0342 / 0100 desde el no.: 0342 / 0100**	**HYDRAULIKSCHALTPLAN HYDRAULIC DIAGRAMM PLAN HYDRAULIQUE PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Legende Legend Légende Leyenda**			Blatt Page Feuille Página	**4.67.13**



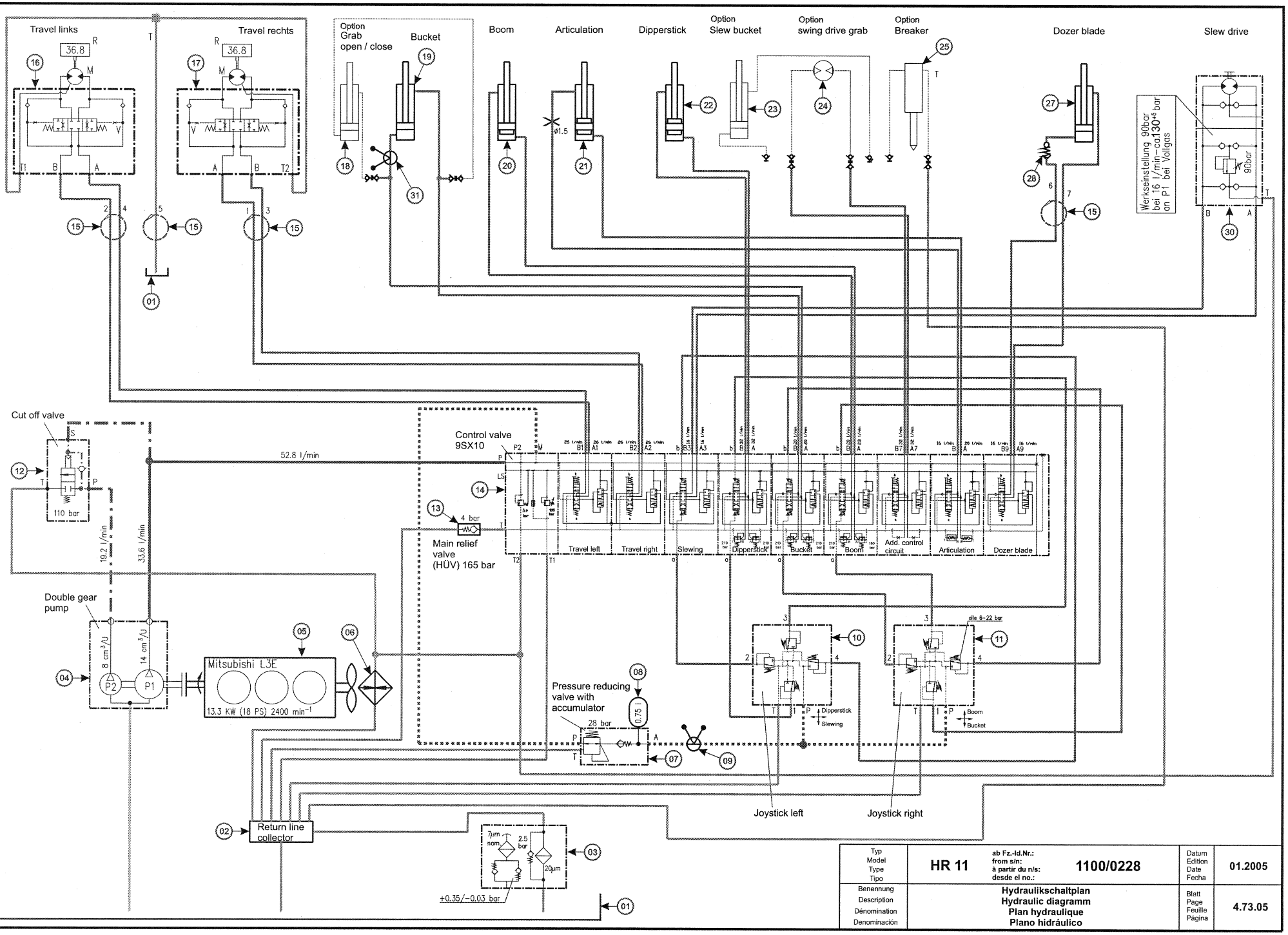
SCHAEFF	Typ /Model/Type **HR 11**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.73.01**

Explanation of hydraulic installation

1	Travel motor, right
2	Travel motor, left
4	Bucket cylinder
5	Swing drive
6	Boom cylinder
7	Articulated cylinder
8	Swing bucket (option)
9	Rock breaker (option)
11	Dipperstick cylinder
12	Dozer blade cylinder
14	Gear pump
15	Hydraulic oil radiator
16	Return filter / ventilation filter
17	Diesel engine
18	Pilot pressure accumulator
19	Pressure reducing valve for pilot control
20	Pilot control
21	Cut-off valve
22	Hydraulic oil tank
23	Control valve 1
24	Control valve 2
25	Control valve 3
26	Travel, left
27	Travel, right
28	Bucket
29	Boom
30	Articulation
31	Additional control circuit
32	Dipperstick
33	Dozer blade
34	Swing
35	Measuring point
36	Collector
38	Working hydraulics cut-off / exit barrier
39	Change-over — rock breaker (option)



Typ Model Type Tipo	**HR 11**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**4.73.04**



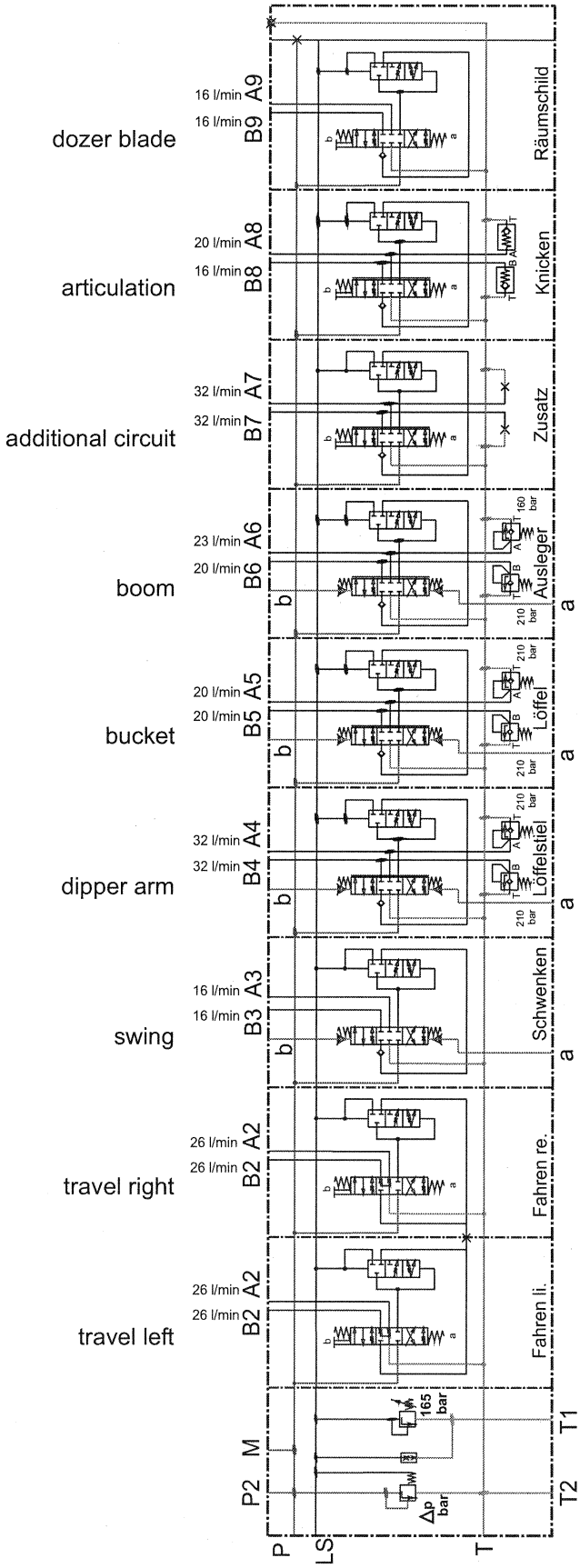
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Benennung Description Dénomination Denominación	Hydraulikschaltplan Hydraulic diagramm Plan hydraulique Plano hidráulico			Blatt Page Feuille Página	4.73.05

Pos. Item Rep. No.	Deutsch	English	Français
01	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
02	Rücklaufsammler	Return line collector	Collecteur retour
03	Rücklauffilter mit Belüftungsfilter	Return filter with Vent filter	Filtre de retour avec Filtre d'aération
04	Zahnradpumpe (2-fach)	Gear pump (double-type)	Pumpe à engrenage (double)
05	Dieselmotor	Diesel engine	Moteur diesel
06	Ölkühler	Oil cooler	Refroidisseur d'huile
07	Druckminderventil **Pp**	Pressure reducing valve **Pp**	Soupape réductrice de pression **Pp**
08	Hydrospeicher **Pp**	Hydraulic accumulator **Pp**	Accumulateur hydraulique **Pp**
09	Kugelhahn, *Ausstiegsschranke (sperren Arbeitshydraulik)*	Ball valve, *cut-off lever* (stop working hydraulic)	Robinet, *levier de sortie* (neutralisation hydr. de travail)
10	Vorsteuergerät (links)	Pilot operated valve (left)	Distributeur à commande assistèe (gauche)
11	Vorsteuergerät (rechts)	Pilot-operated valve (right)	Distributeur à commande assistèe (droite)
12	Abschaltventil	Relief valve	Valve de coupure
13	Ventil, *Rücklaufvorspannung*	Valve, *return pre-load*	Clapet, *prétension de retour*
14	Blocksteuergerät	Valve bank	Bloc distributeur
15	Drehdurchführung	Rotary transfer	Joint tournant
16	Fahrantrieb (links)	Travel drive (left)	Entraînement (gauche)
17	Fahrantrieb (rechts)	Travel drive (right)	Entraînement (droite)
18	Hydraulikzylinder - Greifer ***Option***	Hydraulic cylinder - grab ***Option***	Vérin hydr. - benne preneuse ***Option***
19	Hydraulikzylinder - Löffel	Hydraulic cylinder - bucket	Vérin hydraulique - godet
20	Hydraulikzylinder - Ausleger	Hydraulic cylinder - boom	Vérin hydraulique - flèche
21	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - articulation
22	Hydraulikzylinder - Löffelstiel	Hydraulic cylinder - dipper	Vérin hydraulique - balancier
23	Hydraulikzylinder - Schwenklöffel	Hydraulic cylinder - swinging bucket	Vérin hydraulique - godet orientable
24	Drehantrieb - Greifer ***Option***	Swing drive - grab ***Option***	Entraînement d'orientation - benne preneuse ***Option***
25	Hydraulikhammer ***Option***	Hydraulic hammer ***Option***	Marteau hydraulique ***Option***
26	Hydraulikzylinder - Spurweitenverstellung	Hydraulic cylinder - tread adjustment	Vérin hydraulique - d'réglage écartement
27	Hydr.-Zylinder - Räumschild	Hydr. cylinder - dozer blade	Vérin hydr. - lame d'appui
28	Rohrbruchsicherung	Hose rupture valve	Clapet d'arrêt automatique
29	Kugelhahn (Umschalten) *Räumschild / Spurweitenverstellung*	Ball valve (reverse) *dozer blade / tread adjustment*	Robinet (inversion) *lame d'appui / d'réglage`écartement*
30	Schwenkantrieb	Swing drive	Entraînement d'orientation

Typ Model Type Tipo	**HR 11**	**HYDRAULIKSCHALTPLAN HYDRAULIC DIAGRAMM PLAN HYDRAULIQUE PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación		**Legende Legend Légende Leyenda**	Blatt Page Feuille Página	**4.73.06**

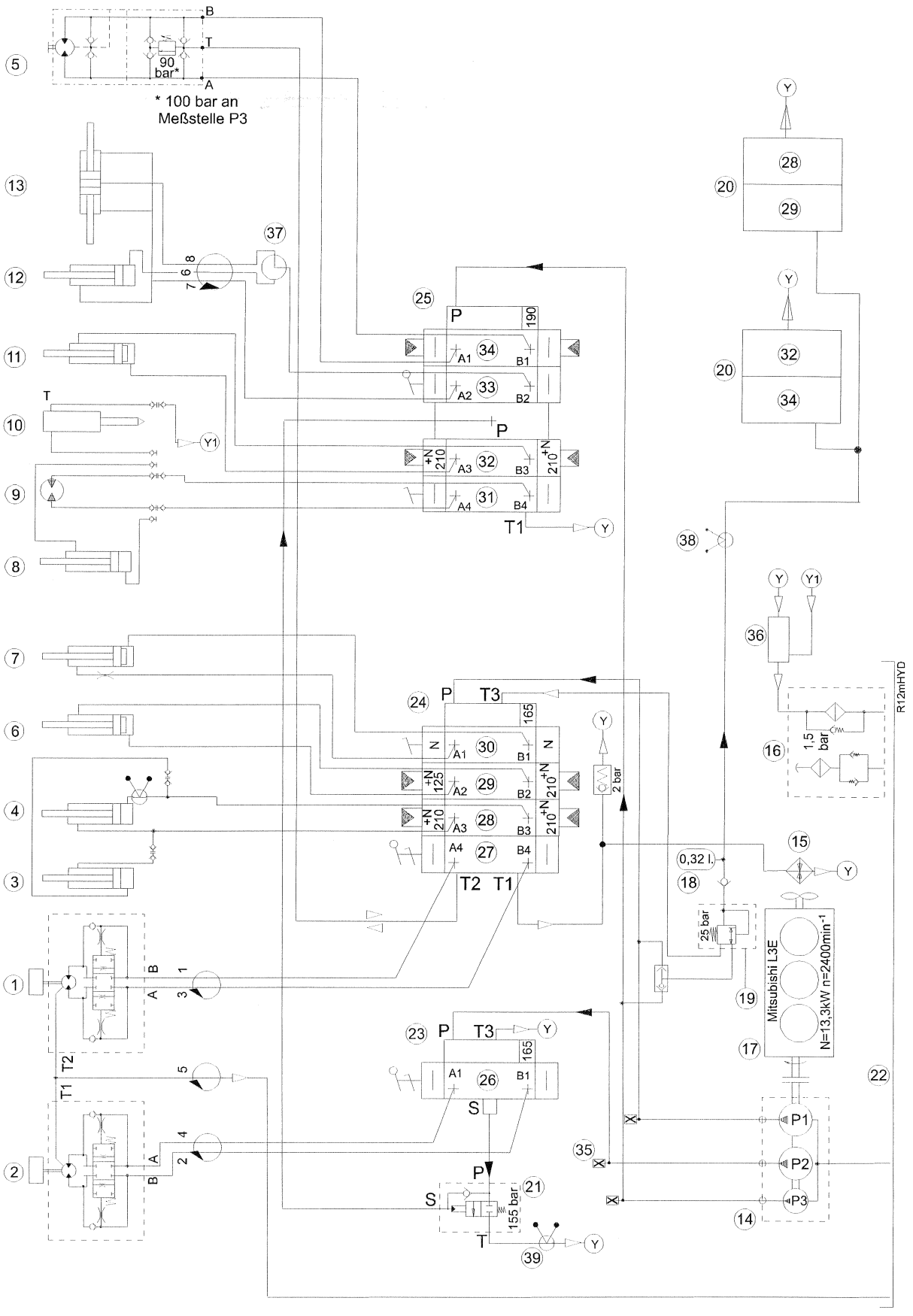
Blocksteuergerät
Control valve
Distributeur

5 606 661 865



HÜV: 165 bar

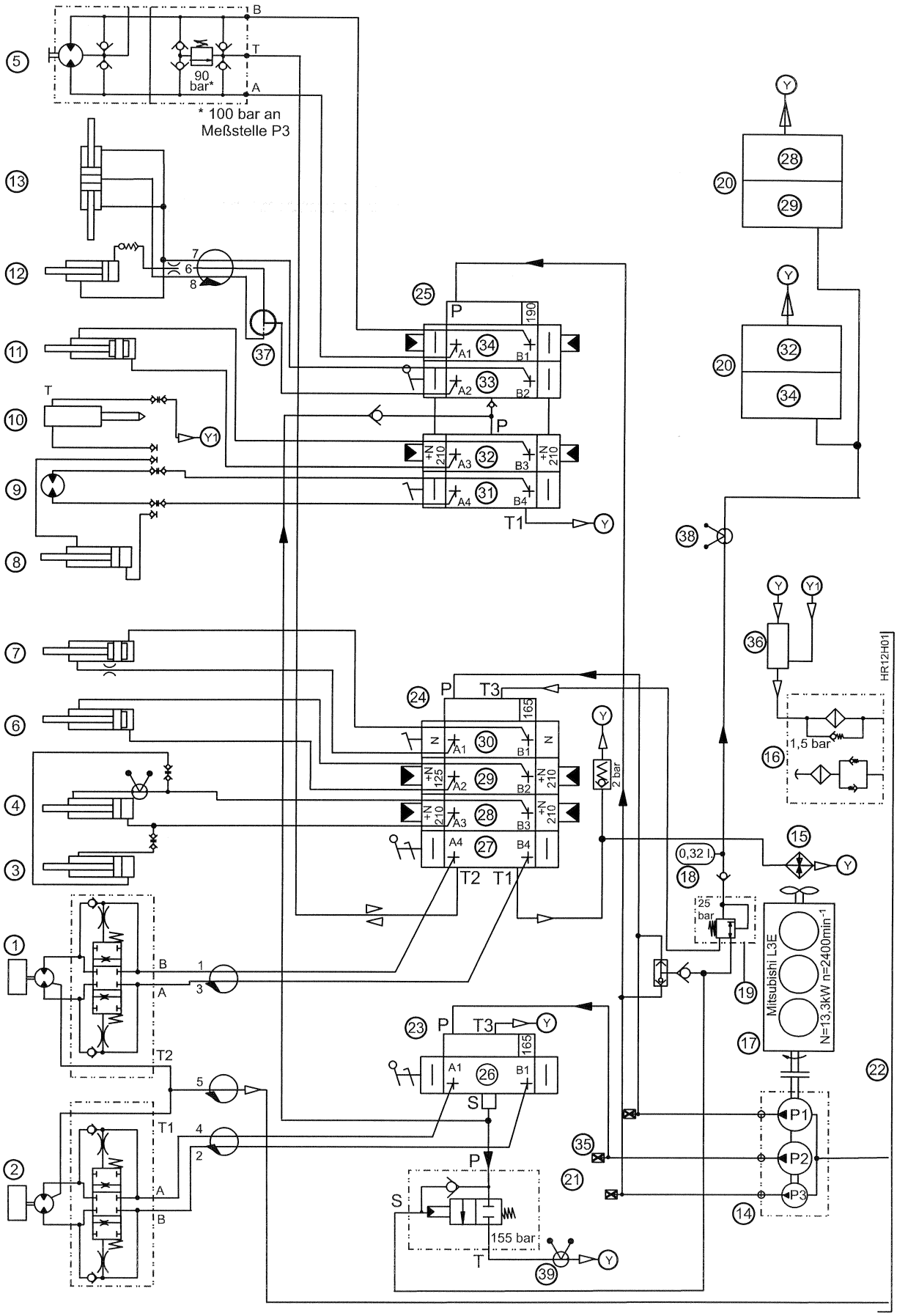
Typ Model Type Tipo	**HR 11**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Blocksteuergerät** **Valve bank** **Bloc distributeur** **Válvula de control**		Blatt Page Feuille Página	**4.73.07**



SCHAEFF	Typ/Model/Type **HR 12 (serial no. 355/4975 - 355/5586)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.74.01**

Explanation of hydraulic installation

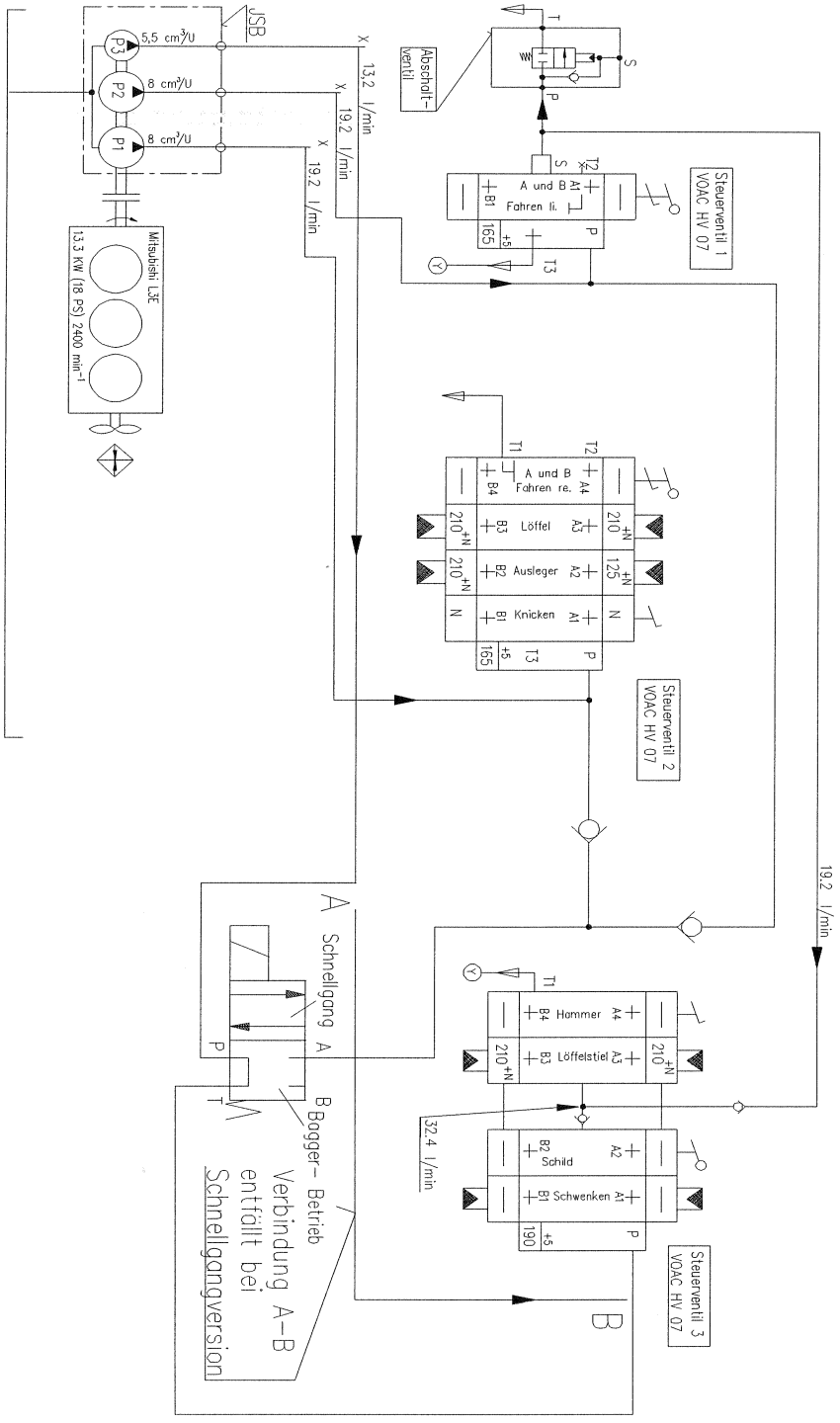
1	Travel motor, right
2	Travel motor, left
3	Grab cylinder
4	Bucket cylinder
5	Slew drive
6	Boom cylinder
7	Articulated cylinder
8	Slew bucket
9	Grab slew motor
10	Breaker
11	Dipperstick cylinder
12	Dozer blade cylinder
13	Tread width adjustment cylinder (option)
14	Gear pump
15	Hydraulic oil cooler
16	Return line filter / ventilation filter
17	Diesel engine
18	Pilot pressure accumulator
19	Pressure reducing valve for pilot control
20	Pilot control
21	Cut-off valve
22	Hydraulic oil tank
23	Valve bank 1
24	Valve bank 2
25	Valve bank 3
26	Travel, left
27	Travel, right
28	Bucket
29	Boom
30	Articulation
31	Additional control circuit
32	Dipperstick
33	Dozer blade / tread width adjustment
34	Slewing
35	Gauge port
36	Collector
37	Changeover - dozer blade / tread width adjustment
38	Cut-off - working hydraulics / exit barrier
39	Changeover - breaker (option)



SCHAEFF	Typ/Model/Type **HR 12 (from serial no. 355/5587)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.74.02**

Explanation of hydraulic installation

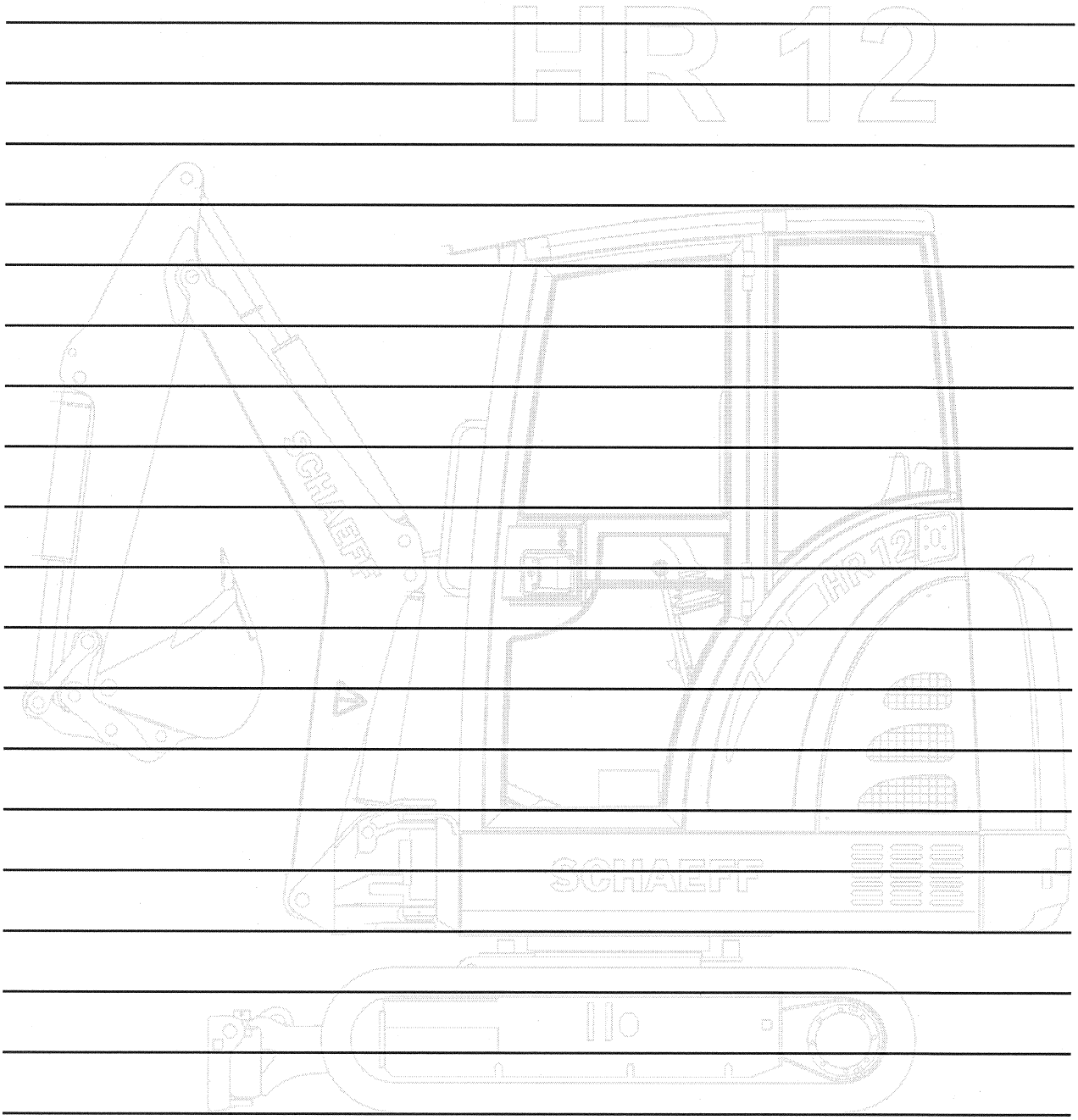
1	Travel motor, right
2	Travel motor, left
3	Grab cylinder
4	Bucket cylinder
5	Slew drive
6	Boom cylinder
7	Articulated cylinder
8	Slew bucket
9	Grab slew motor
10	Breaker
11	Dipperstick cylinder
12	Dozer blade cylinder
13	Tread width adjustment cylinder (optionally)
14	Gear pump
15	Hydraulic oil cooler
16	Return line filter / ventilation filter
17	Diesel engine
18	Pilot pressure accumulator
19	Pressure reducing valve for pilot control
20	Pilot control
21	Cut-off valve
22	Hydraulic oil tank
23	Valve bank 1
24	Valve bank 2
25	Valve bank 3
26	Travel, left
27	Travel, right
28	Bucket
29	Boom
30	Articulation
31	Additional control circuit
32	Dipperstick
33	Dozer blade / Tread width adjustment
34	Slewing
35	Gauge port
36	Collector
37	Changeover - dozer blade / tread width adjustment
38	Working hydraulics cut-off/ exit barrier
39	Changeover - rock breaker (optionally)



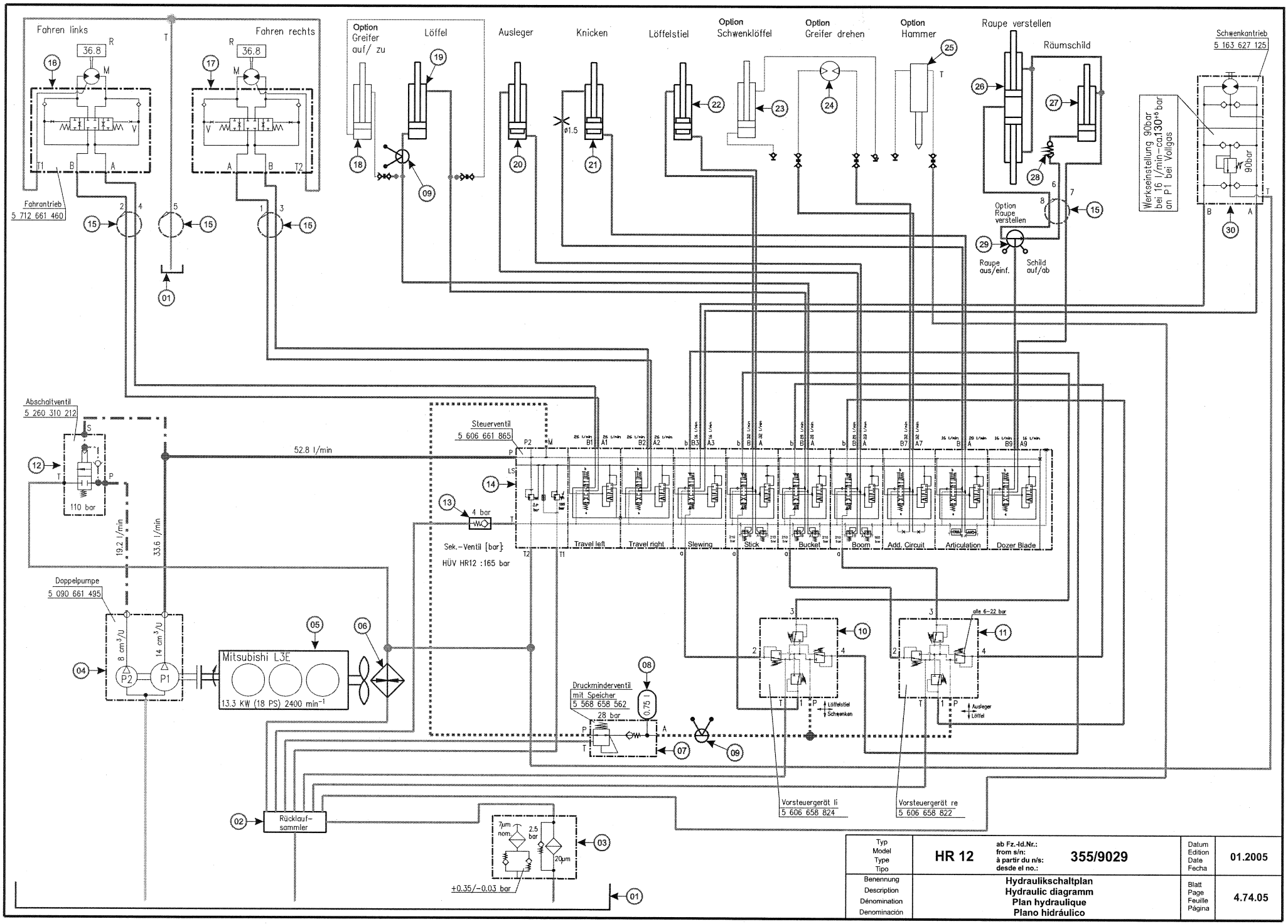
SCHAEFF	Typ/Model/Type **HR 12 (from serial no. 355/4975)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram - overdrive**	Blatt/Page/Feuille **4.74.03**

Legend to hydraulic diagram

A und B Fahren links	A and B travel left
A und B Fahren rechts	A and B travel right
Abschaltventil	cut-off valve
Ausleger	boom
Bagger-Betrieb	excavator operation
Hammer	breaker
Knicken	articulation
Löffel	bucket
Löffelstiel	dipperstick
Schild	blade
Schnellgang	overdrive
Schwenken	slewing
Steuerventil	valve bank
Verbindung A - B entfällt bei Schnellgangversion	no connection A - B for overdrive version



Typ Model Type Tipo	**HR 12**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**4.74.04**



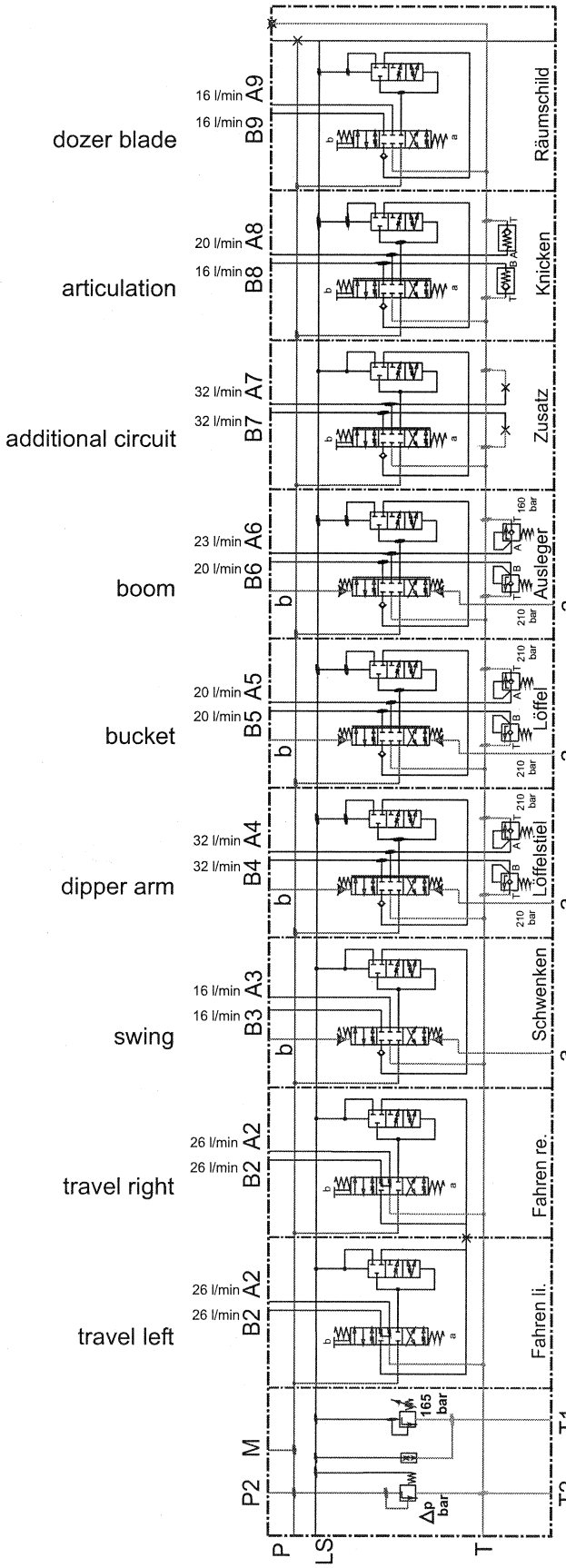
Typ / Model / Type / Tipo	HR 12	ab Fz.-Id.Nr.: / from s/n: / à partir du n/s: / desde el no.: 355/9029	Datum / Edition / Date / Fecha 01.2005
Benennung / Description / Dénomination / Denominación	Hydraulikschaltplan / Hydraulic diagramm / Plan hydraulique / Plano hidráulico		Blatt / Page / Feuille / Página 4.74.05

Pos. Item Rep. No.	Deutsch	English	Français
01	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
02	Rücklaufsammler	Return line collector	Collecteur retour
03	Rücklauffilter mit Belüftungsfilter	Return filter with Vent filter	Filtre de retour avec Filtre d'aération
04	Zahnradpumpe (2-fach)	Gear pump (double-type)	Pumpe à engrenage (double)
05	Dieselmotor	Diesel engine	Moteur diesel
06	Ölkühler	Oil cooler	Refroidisseur d'huile
07	Druckminderventil **Pp**	Pressure reducing valve **Pp**	Soupape réductrice de pression **Pp**
08	Hydrospeicher **Pp**	Hydraulic accumulator **Pp**	Accumulateur hydraulique **Pp**
09	Kugelhahn, *Ausstiegsschranke (sperren Arbeitshydraulik)*	Ball valve, *cut-off lever* (stop working hydraulic)	Robinet, *levier de sortie* (neutralisation hydr. de travail)
10	Vorsteuergerät (links)	Pilot operated valve (left)	Distributeur à commande assistèe (gauche)
11	Vorsteuergerät (rechts)	Pilot-operated valve (right)	Distributeur à commande assistèe (droite)
12	Abschaltventil	Relief valve	Valve de coupure
13	Ventil, *Rücklaufvorspannung*	Valve, *return pre-load*	Clapet, *prétension de retour*
14	Blocksteuergerät	Valve bank	Bloc distributeur
15	Drehdurchführung	Rotary transfer	Joint tournant
16	Fahrantrieb (links)	Travel drive (left)	Entraînement (gauche)
17	Fahrantrieb (rechts)	Travel drive (right)	Entraînement (droite)
18	Hydraulikzylinder - Greifer ***Option***	Hydraulic cylinder - grab ***Option***	Vérin hydr. - benne preneuse ***Option***
19	Hydraulikzylinder - Löffel	Hydraulic cylinder - bucket	Vérin hydraulique - godet
20	Hydraulikzylinder - Ausleger	Hydraulic cylinder - boom	Vérin hydraulique - flèche
21	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - articulation
22	Hydraulikzylinder - Löffelstiel	Hydraulic cylinder - dipper	Vérin hydraulique - balancier
23	Hydraulikzylinder - Schwenklöffel	Hydraulic cylinder - swinging bucket	Vérin hydraulique - godet orientable
24	Drehantrieb - Greifer ***Option***	Swing drive - grab ***Option***	Entraînement d'orientation - benne preneuse ***Option***
25	Hydraulikhammer ***Option***	Hydraulic hammer ***Option***	Marteau hydraulique ***Option***
26	Hydraulikzylinder - Spurweitenverstellung	Hydraulic cylinder - tread adjustment	Vérin hydraulique - d'réglage écartement
27	Hydr.-Zylinder - Räumschild	Hydr. cylinder - dozer blade	Vérin hydr. - lame d'appui
28	Rohrbruchsicherung	Hose rupture valve	Clapet d'arrêt automatique
29	Kugelhahn (Umschalten) *Räumschild / Spurweitenverstellung*	Ball valve (reverse) *dozer blade / tread adjustment*	Robinet (inversion) *lame d'appui / d'réglage`écartement*
30	Schwenkantrieb	Swing drive	Entraînement d'orientation

Typ Model Type Tipo	**HR 12**	**HYDRAULIKSCHALTPLAN HYDRAULIC DIAGRAMM PLAN HYDRAULIQUE PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación		**Legende Legend Légende Leyenda**	Blatt Page Feuille Página	**4.74.06**

Blocksteuergerät
Control valve
Distributeur

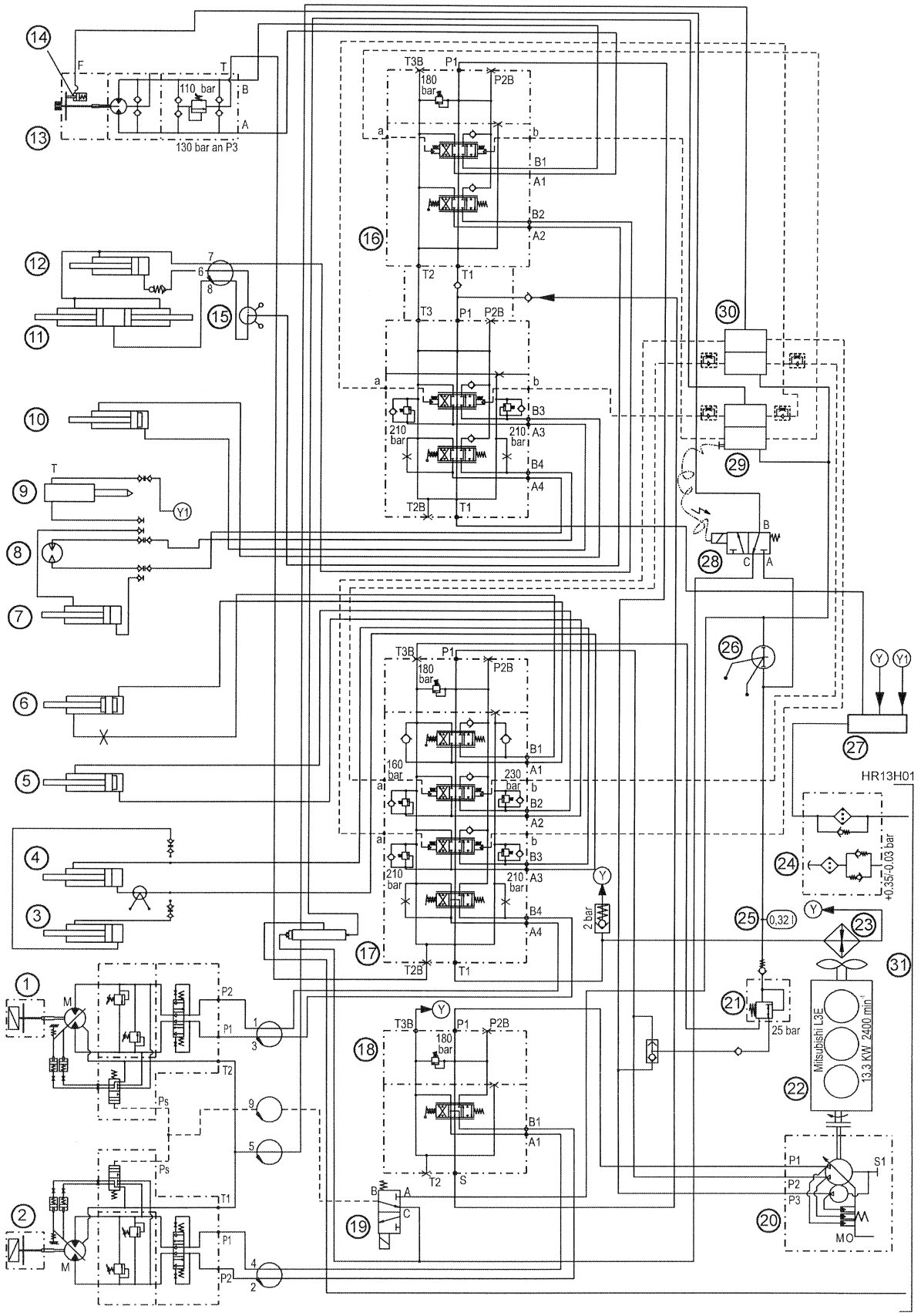
5 606 661 865



HÜV: 165 bar

Typ Model Type Tipo	**HR 12**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Blocksteuergerät** **Valve bank** **Bloc distributeur** **Válvula de control**		Blatt Page Feuille Página	**4.74.07**

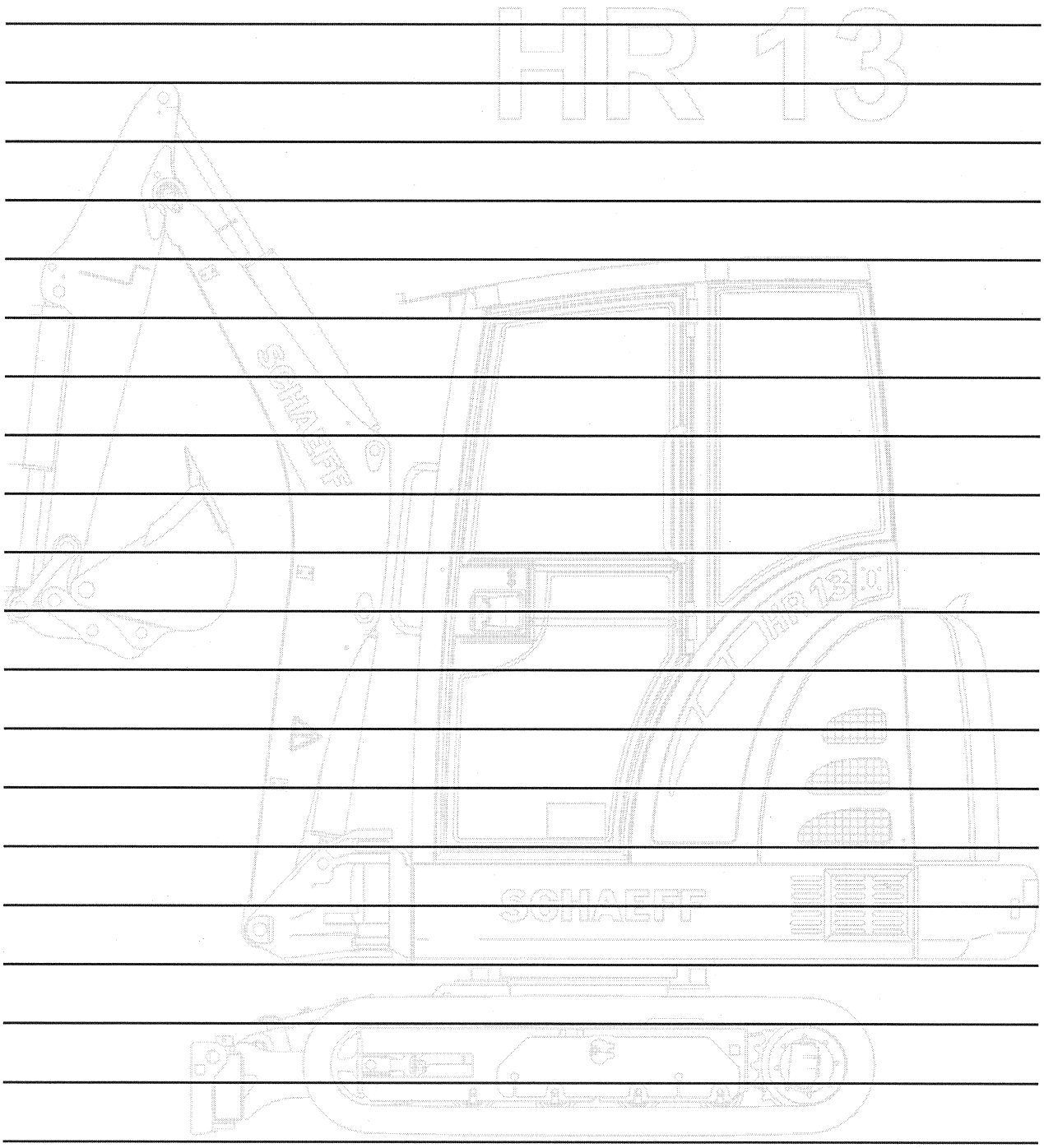
Hydraulic system



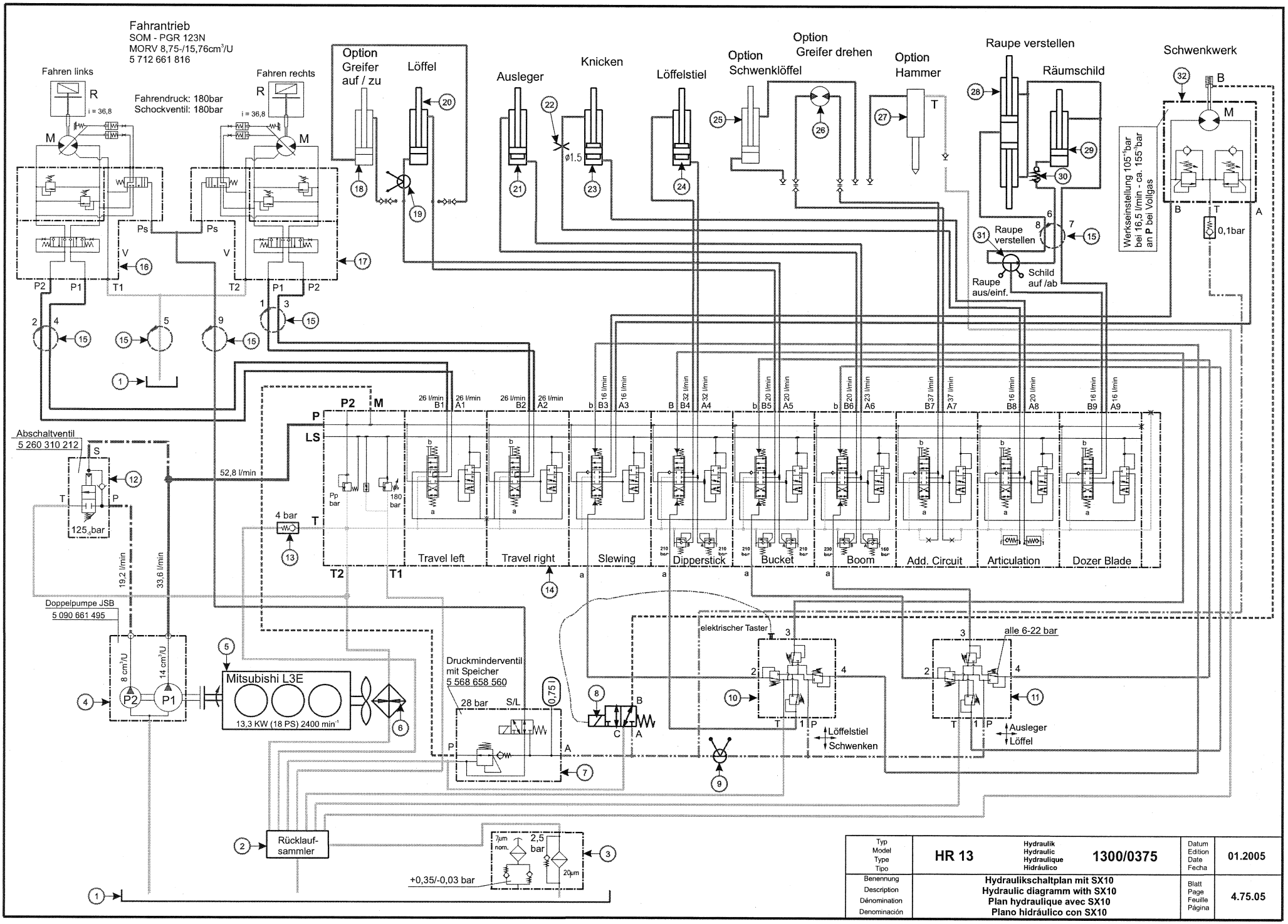
SCHAEFF	Typ/Model/Type **HR 13 (from serial no. 1300/0100)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.75.01**

Explanation of hydraulic installation

1 Travel motor, right
2 Travel motor, left
3 Grab cylinder
4 Bucket cylinder
5 Boom cylinder
6 Articulated cylinder
7 Swing bucket
8 Grab swivel motor
9 Rock breaker
10 Dipperstick cylinder
11 Track width adjusting cylinder
12 Dozer blade cylinder
14 Holding brake for swing motor
15 Change-over dozer blade — track width adjustment
16 Control valve 3
17 Control valve 2
18 Control valve 1
19 Fast / Slow
20 Dual variable displacement pump
21 Pressure relief valve for pilot control
22 Diesel engine
23 Hydraulic oil radiator
24 Return filter / Breather
25 Pilot pressure accumulator
26 Working hydraulics cut-off / Exit barrier
27 Collector
28 Valve — swing holding brake
29 Pilot valve 1
30 Pilot valve 2
31 Hydraulic oil tank



Typ Model Type Tipo	**HR 13**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**4.75.04**

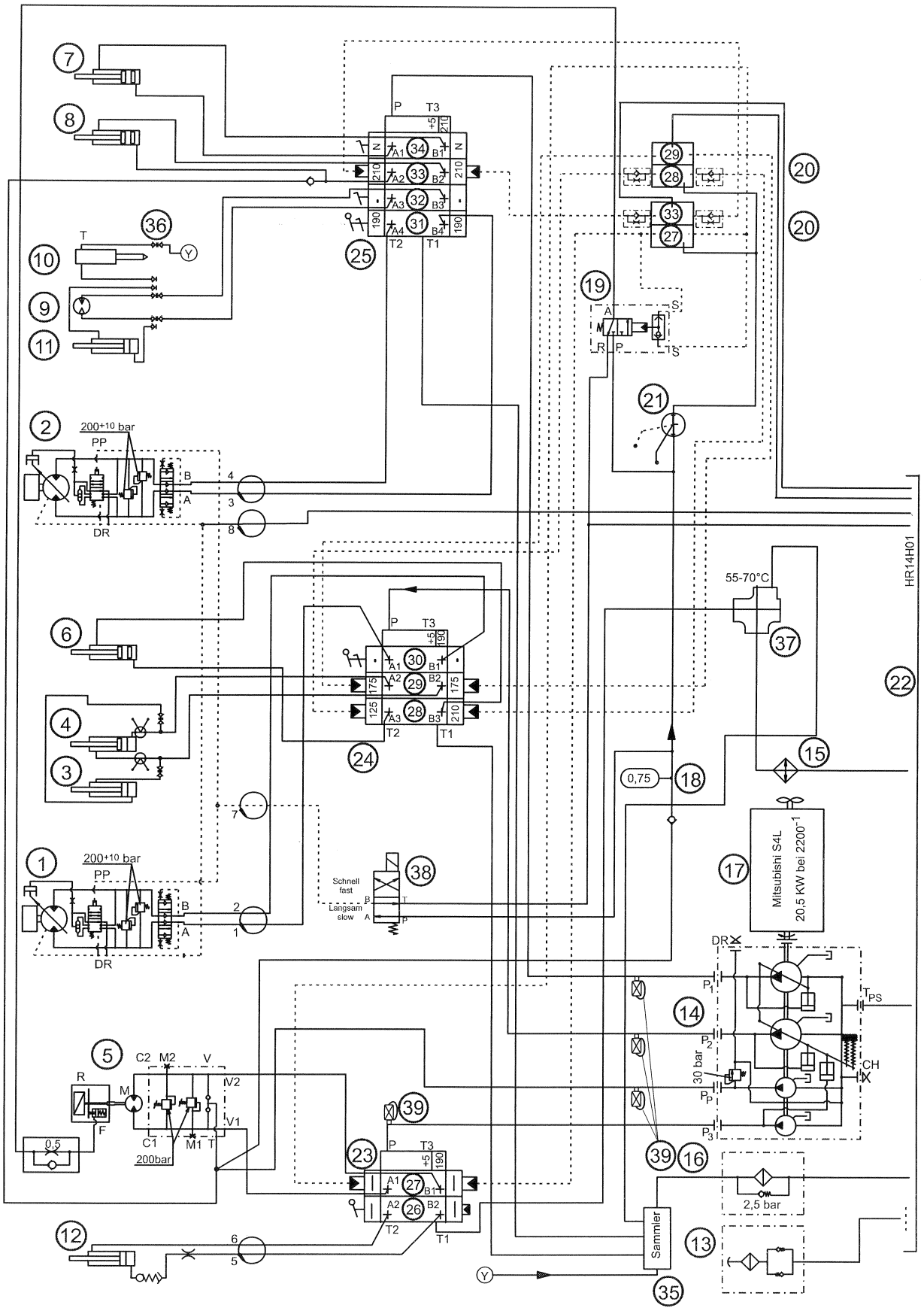


Typ Model Type Tipo	**HR 13**	Hydraulik Hydraulic Hydraulique Hidráulico	**1300/0375**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan mit SX10** **Hydraulic diagramm with SX10** **Plan hydraulique avec SX10** **Plano hidráulico con SX10**			Blatt Page Feuille Página	**4.75.05**

Pos. Item Rep. No.	Deutsch	English	Français
1	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
2	Rücklaufsammler	Return line collectorr	Collecteur retour
3	Rücklauffilter + Belüftungsfilter	Return filter + vent filter	Filtre de retour + filtre d'aération
4	Zahnradpumpe (2-fach)	Gear pump (double type)	Pumpe à engrenage (double)
5	Dieselmotor	Diesel engine	Moteur diesel
6	Ölkühler	Oil cooler	Refroidisseur d'huile
7	Druckminderventil mit Hydrospeicher (schnell/langsam)	Pressure reducing valve with hyd. accumulator (high/low speed)	Soupape réductrice de pression avec accumulateur hyd. (grande vitesse/petite)
8	Magnetventil (Schwenkbremse)	Solenoid valve (swing brake)	Electrovanne (frein d'orientation)
9	Kugelhahn, *Ausstiegsschranke (sperren Arbeitshydraulik)*	Ball valve, *cut-off lever* (stop working hydraulic)	Robinet, *levier de sortie* (neutralisation hydr. de travail)
10	Vorsteuergerät (links) *mit Taster für Schwenkbremse*	Pilot operated valve (left) *with button switch for swing brake*	Distributeur à commande assistée (gauche) *avec compas d'e´paisseur*
11	Vorsteuergerät (rechts)	Pilot-operated valve (right)	Distributeur à commande assistée (droite)
12	Abschaltventil	Relief valve	Valve de coupure
13	Rückschlag ventil	Check valve	Clapet anti-retour
14	Blocksteuergerät	Valve bank	Bloc distributeur
15	Drehdurchführung	Rotary transfer	Joint tournant
16	Fahrantrieb (links)	Travel drive (left)	Entraînement (gauche)
17	Fahrantrieb (rechts)	Travel drive (right)	Entraînement (droite)
18	Hydraulikzylinder - Greifer ***Option***	Hydraulic cylinder - grab ***Option***	Vérin hydr. - benne preneuse ***Option***
19	Kugelhahn *(sperren)*	Ball valve (stop)	Robinet (neutralisation)
20	Hydraulikzylinder - Löffel	Hydraulic cylinder - bucket	Vérin hydraulique - godet
21	Hydraulikzylinder - Ausleger	Hydraulic cylinder - boom	Vérin hydraulique - flèche
22	Blende	Orifice	Orifice
23	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - articulation
24	Hydraulikzylinder - Löffelstiel	Hydraulic cylinder - dipper arm	Vérin hydraulique - balancier
25	Hydraulikzylinder - Schwenklöffel *Option*	Hydraulic cylinder - swing bucket *Option*	Vérin hydraulique - godet orientable *Option*
26	Drehantrieb - Greifer ***Option***	Swing drive - grab ***Option***	Entraînement d'orientation - benne preneuse ***Option***
27	Hydraulikhammer ***Option***	Hydraulic hammer ***Option***	Marteau hydraulique ***Option***
28	Hydraulikzylinder - Spurweitenverstellung	Hydraulic cylinder - tread adjustment	Vérin hydraulique - d'réglage e´cartement
29	Hydr.-Zylinder - Räumschild	Hydr. cylinder - dozer blade	Vérin hydr. - lame d'appui
30	Rohrbruchsicherung	Hose rupture valve	Clapet d'arrêt automatique
31	Kugelhahn (Umschalten) *Räumschild / Spurweitenverstllung*	Ball valve (reversr) *dozer blade / tread adjustment*	Robinet (inversion) *lame d'appui / d'réglage d'écartement*
32	Schwenkantrieb	Swing drive	Entraînement d'orientation

Typ Model Type Tipo	**HR 13**	**HYDRAULIKSCHALTPLAN** **HYDRAULIC DIAGRAMM** **PLAN HYDRAULIQUE** **PLANO HIDRAULICO**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Legende** **Legend** **Légende** **Leyenda**		Blatt Page Feuille Página	**4.75.06**

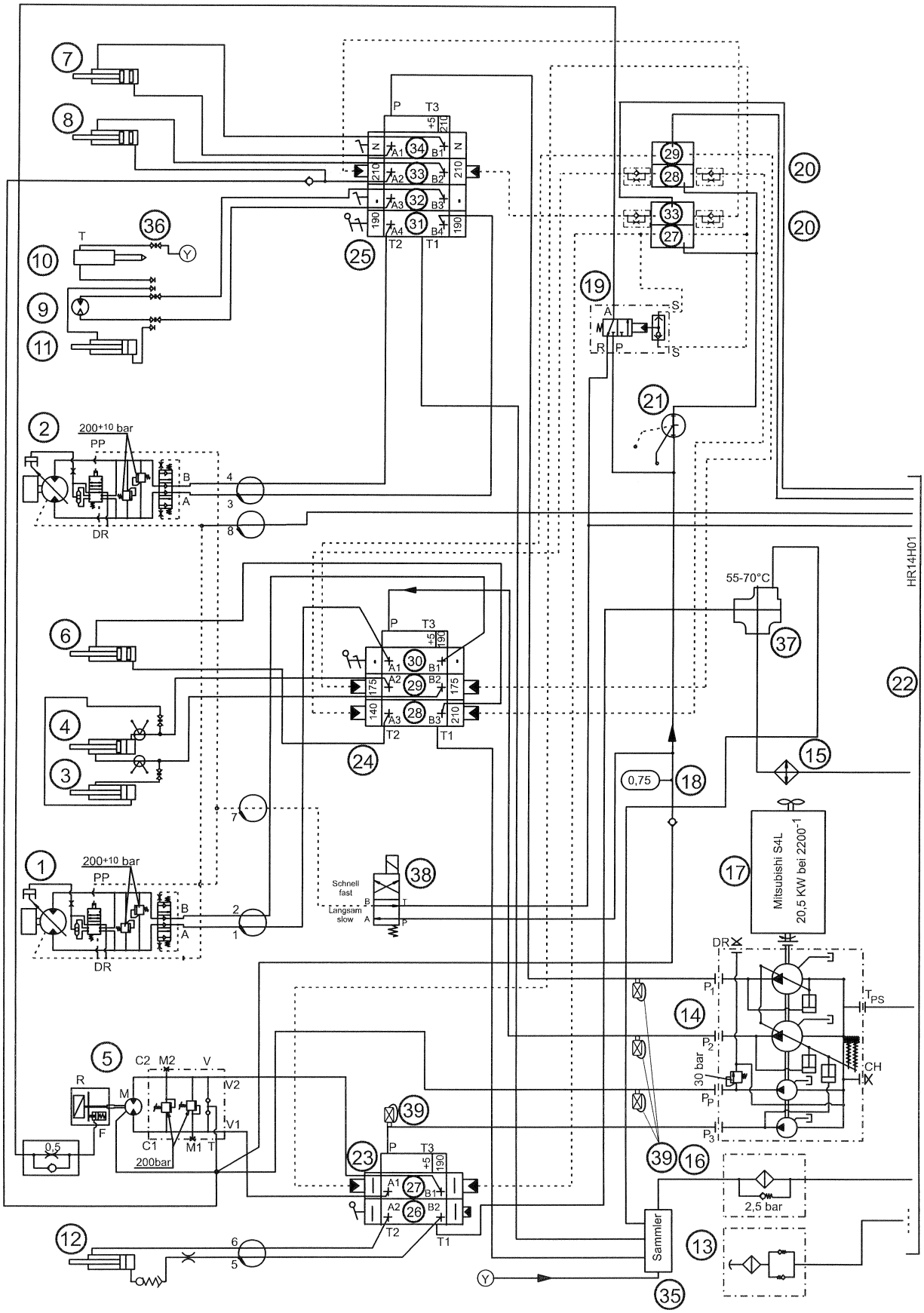
TEREX | SCHAEFF



SCHAEFF	Typ/Model/Type **HR 14 (356/1431 to 356/1660)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.76.01**

Explanation of hydraulic installation

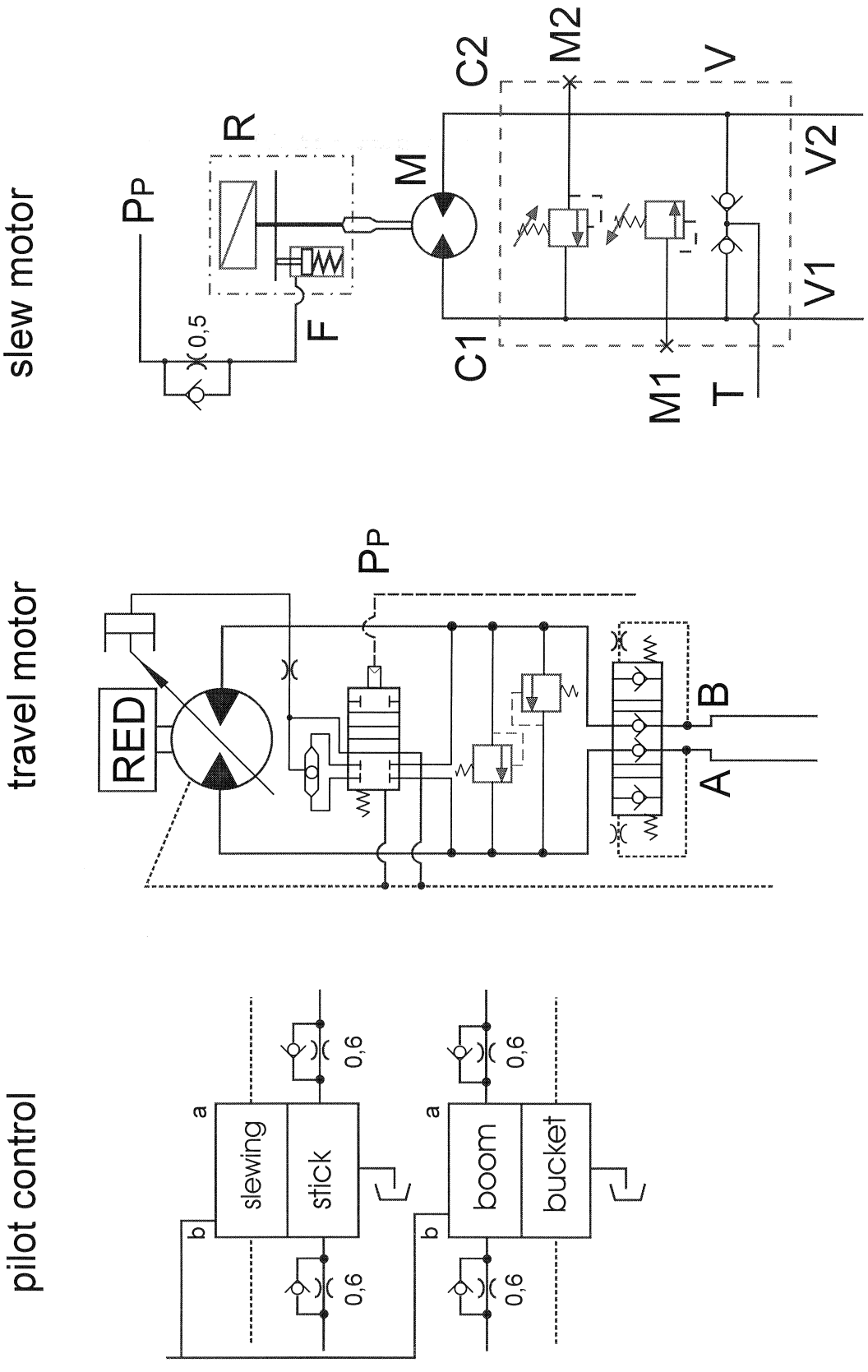
1	Travel motor, left
2	Travel motor, right
3	Grab cylinder
4	Bucket cylinder
5	Slew drive
6	Boom cylinder
7	Articulated cylinder
8	Dipperstick cylinder
9	Grab slew motor
10	Breaker
11	Slew bucket
12	Dozer blade cylinder
13	Ventilation filter
14	Gear pump
15	Hydraulic oil cooler
16	Return line filter
17	Diesel engine
18	Pilot pressure accumulator
19	Pressure reducing valve for pilot control
20	Pilot control
21	Cut-off valve - working hydraulics / exit barrier
22	Hydraulic oil tank
23	Valve bank 1
24	Valve bank 2
25	Valve bank 3
26	Dozer blade
27	Slewing
28	Boom
29	Bucket
30	Travel, left
31	Travel, right
32	Additional control circuit
33	Dipperstick
34	Articulation
35	Collector
36	Pressureless return
37	Thermostat valve
38	Valve fast/ slow
39	Gauge port



SCHAEFF	Typ/Model/Type **HR 14 (from serial no. 356/1661)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.76.02**

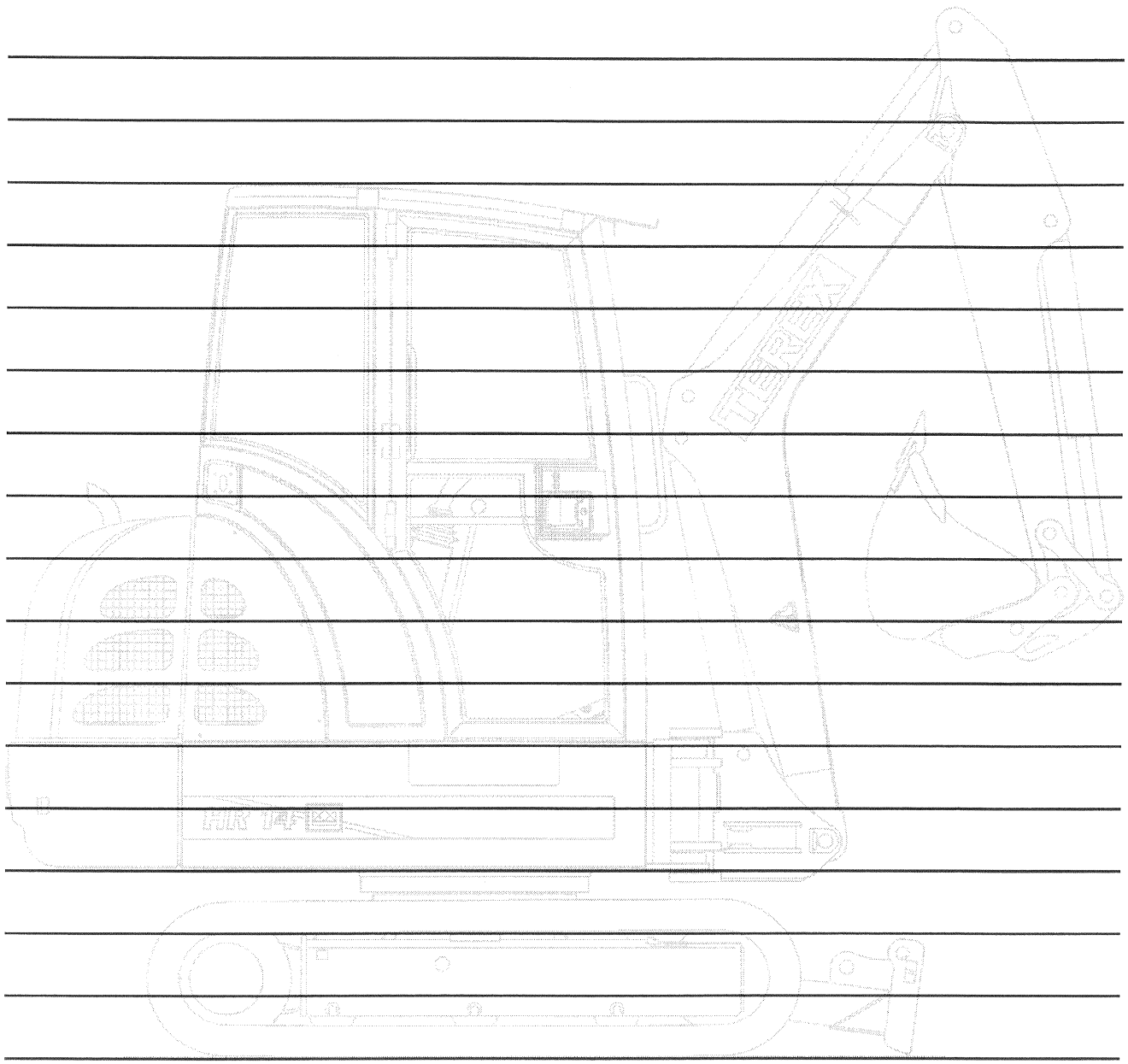
Explanation of hydraulic installation

1	Travel motor, left
2	Travel motor, right
3	Grab cylinder
4	Bucket cylinder
5	Slew drive
6	Boom cylinder
7	Articulated cylinder
8	Dipperstick cylinder
9	Grab slew motor
10	Breaker
11	Slew bucket
12	Dozer blade cylinder
13	Ventilation filter
14	Gear pump
15	Hydraulic oil cooler
16	Return line filter
17	Diesel engine
18	Pilot pressure accumulator
19	Pressure reducing valve for pilot control
20	Pilot control
21	Cut-off valve - working hydraulics / exit barrier
22	Hydraulic oil tank
23	Valve bank 1
24	Valve bank 2
25	Valve bank 3
26	Dozer blade
27	Slewing
28	Boom
29	Bucket
30	Travel, left
31	Travel, right
32	Additional control circuit
33	Dipperstick
34	Articulation
35	Collector
36	Pressureless return
37	Thermostat valve
38	Valve fast/ slow
39	Gauge port

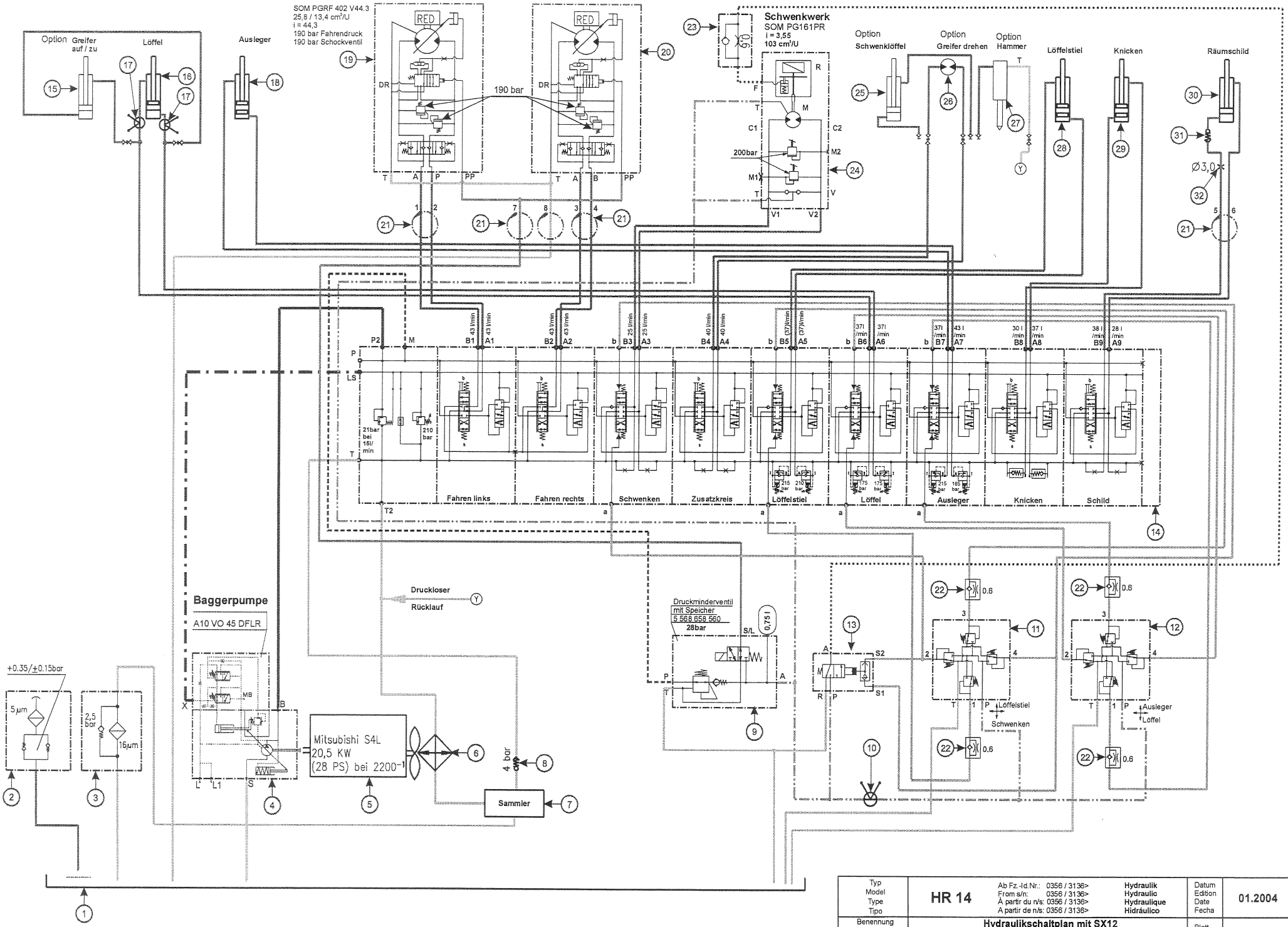


SCHAEFF	Typ/Model/Type **HR 14 (from serial no. 356/1661)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram pilot control, travel motor, slew motor**	Blatt/Page/Feuille **4.76.03**

HR 14



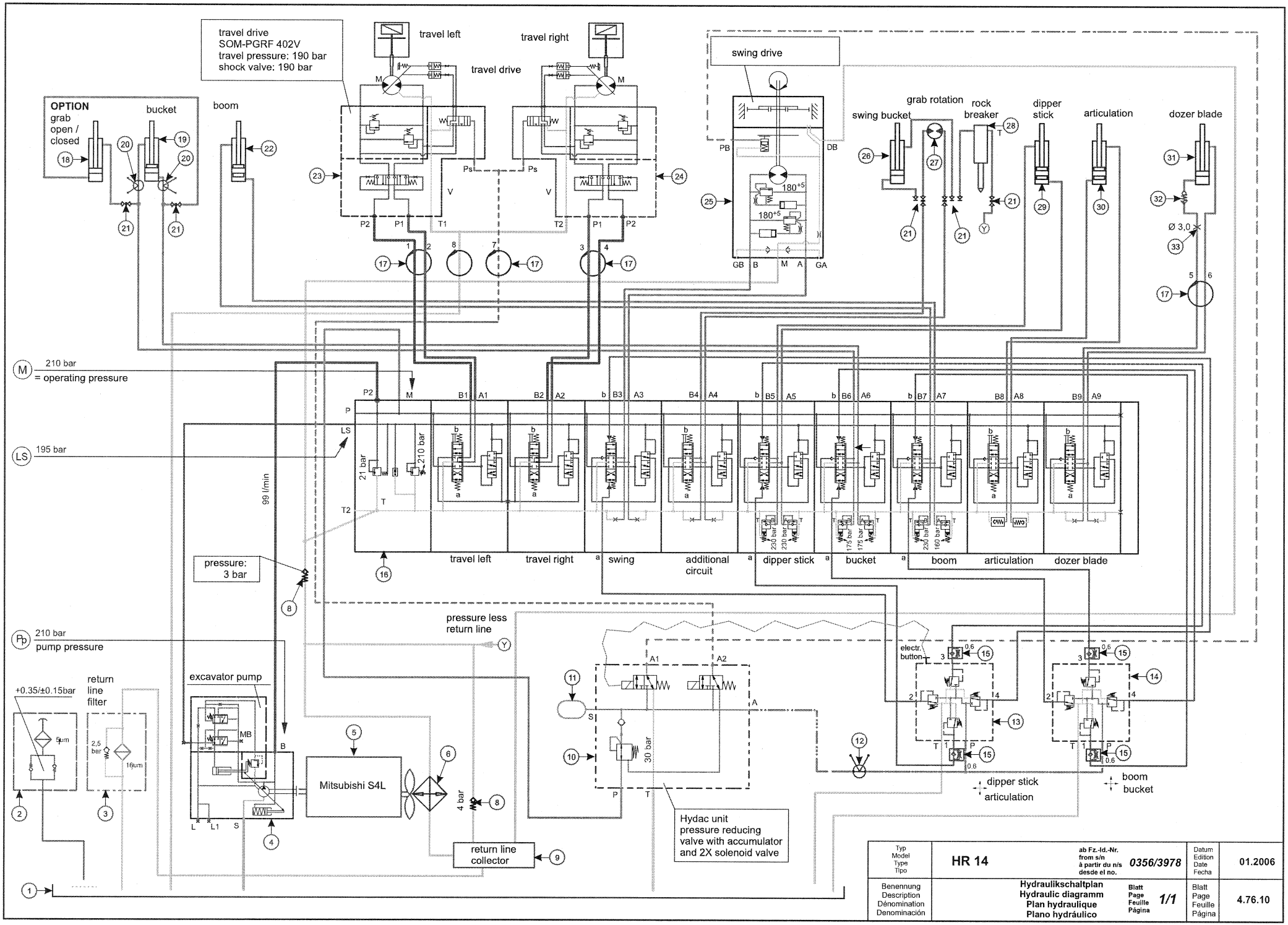
Typ Model Type Tipo	**HR 14**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**4.76.04**



Typ Model Type Tipo	**HR 14**	Ab Fz.-Id.Nr.: 0356 / 3136> From s/n: 0356 / 3136> À partir du n/s: 0356 / 3136> A partir de n/s: 0356 / 3136>	**Hydraulik** **Hydraulic** **Hydraulique** **Hidráulico**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan mit SX12** **Hydraulic diagramm with SX12** **Plan hydraulique avec SX12** **Plano hidráulico con SX12**			Blatt Page Feuille Página	**4.76.05**

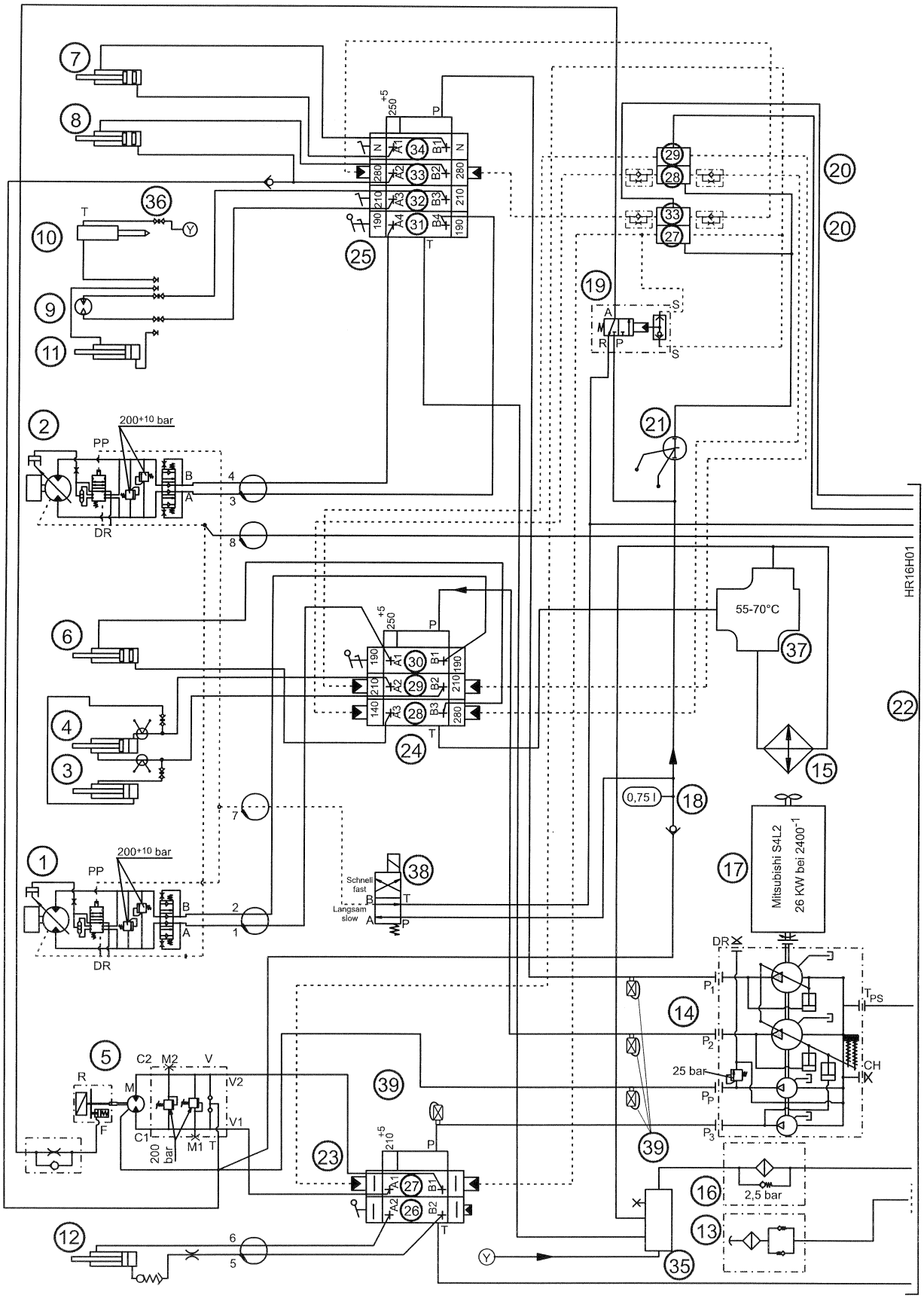
Pos. Item Rep. No.	Deutsch	English	Français
1	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
2	Belüftungsfilter	Vent filter	Filtre d'aération
3	Rücklauffilter	Return filter	Filtre de retour
4	Verstellpumpe	Variable displacement pump	Pompe à débit variable
5	Dieselmotor	Diesel engine	Moteur diesel
6	Ölkühler	Oil cooler	Refroidisseur d'huile
7	Rücklaufsammler	Return line collector	Collecteur de retour
8	Ventil, *Rücklaufvorspannung*	Valve, *return pre-load*	Clapet, *pressurisation de retour*
9	Druckminderventil mit Hydrospeicher (schnell/langsam)	Pressure reducing valve with hyd. accumulator (high/low speed)	Soupape réductrice de pression avec accumulateur hyd. (grande vitesse/petite)
10	Kugelhahn, *Ausstiegsschranke (sperren Arbeitshydraulik)*	Ball valve, *cut-off lever (stop working hydraulic)*	Robinet, *levier de securité (coupure pilotage)*
11	Vorsteuergerät (links)	Pilot operated valve (left)	Distributeur à commande assistée (gauche)
12	Vorsteuergerät (rechts)	Pilot-operated valve (right)	Distributeur à commande assistée (droite)
13	Relaisventil - Schwenkbremse	Relay valve - swing brake	Clapet-relais - frein d'orientation
14	Blocksteuergerät	Valve bank	Bloc distributeur
15	Hydraulikzylinder - Greifer ***Option***	Hydraulic cylinder - grab ***Option***	Vérin hydr. - benne preneuse ***Option***
16	Hydraulikzylinder - Löffel	Hydraulic cylinder - bucket	Vérin hydraulique - godet
17	Kugelhahn *(sperren)*	Ball valve *(stop)*	Robinet *(coupure)*
18	Hydraulikzylinder - Ausleger	Hydraulic cylinder - boom	Vérin hydraulique - flèche
19	Fahrantrieb *(links)*	Travel drive *(left)*	Translation *(gauche)*
20	Fahrantrieb *(rechts)*	Travel drive *(right)*	Translation *(droite)*
21	Drehdurchführung	Rotary transfer	Joint tournant
22	Drosselrückschlagventil	Throttle check valve	Clapet anti-retour d'étranglement
23	Drosselrückschlagventil	Throttle check valve	Clapet anti-retour d'étranglement
24	Schwenkantrieb	Swing drive	Entraînement d'orientation
25	Hydraulikzylinder - Schwenklöffel ***Option***	Hydraulic cylinder - swing bucket ***Option***	Vérin hydraulique - godet orientable ***Option***
26	Drehantrieb - Greifer ***Option***	Swing drive - grab ***Option***	Entraînement d'orientation - benne preneuse ***Option***
27	Hydraulikhammer ***Option***	Hydraulic hammer ***Option***	Marteau hydraulique ***Option***
28	Hydraulikzylinder - Löffelstiel	Hydraulic cylinder - dipper arm	Vérin hydraulique - balancier
29	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - déport laterale
30	Hydr.-Zylinder - Räumschild	Hydr. cylinder - dozer blade	Vérin hydr. - lame d'appui
31	Rohrbruchsicherung	Hose rupture valve	Clapet d'arrêt automatique
32	Blende	Orifice	Orifice

Typ / Model / Type / Tipo	HR 14	HYDRAULIKSCHALTPLAN HYDRAULIC DIAGRAMM PLAN HYDRAULIQUE PLANO HIDRAULICO	Datum / Edition / Date / Fecha	01.2004
Benennung Description Dénomination Denominación	Ab Fz.-Id.Nr.: 0356 / 3136> From s/n: 0356 / 3136> À partir du n/s: 0356 / 3136> A partir de n/s: 0356 / 3136>	**Legende** **Legend** **Légende** **Leyenda**	Blatt / Page / Feuille / Página	4.76.06



Typ Model Type Tipo	**HR 14**	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no.	*0356/3978*	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	**Hydraulikschaltplan** **Hydraulic diagramm** **Plan hydraulique** **Plano hydráulico**	Blatt Page Feuille Página	*1/1*	Blatt Page Feuille Página	4.76.10

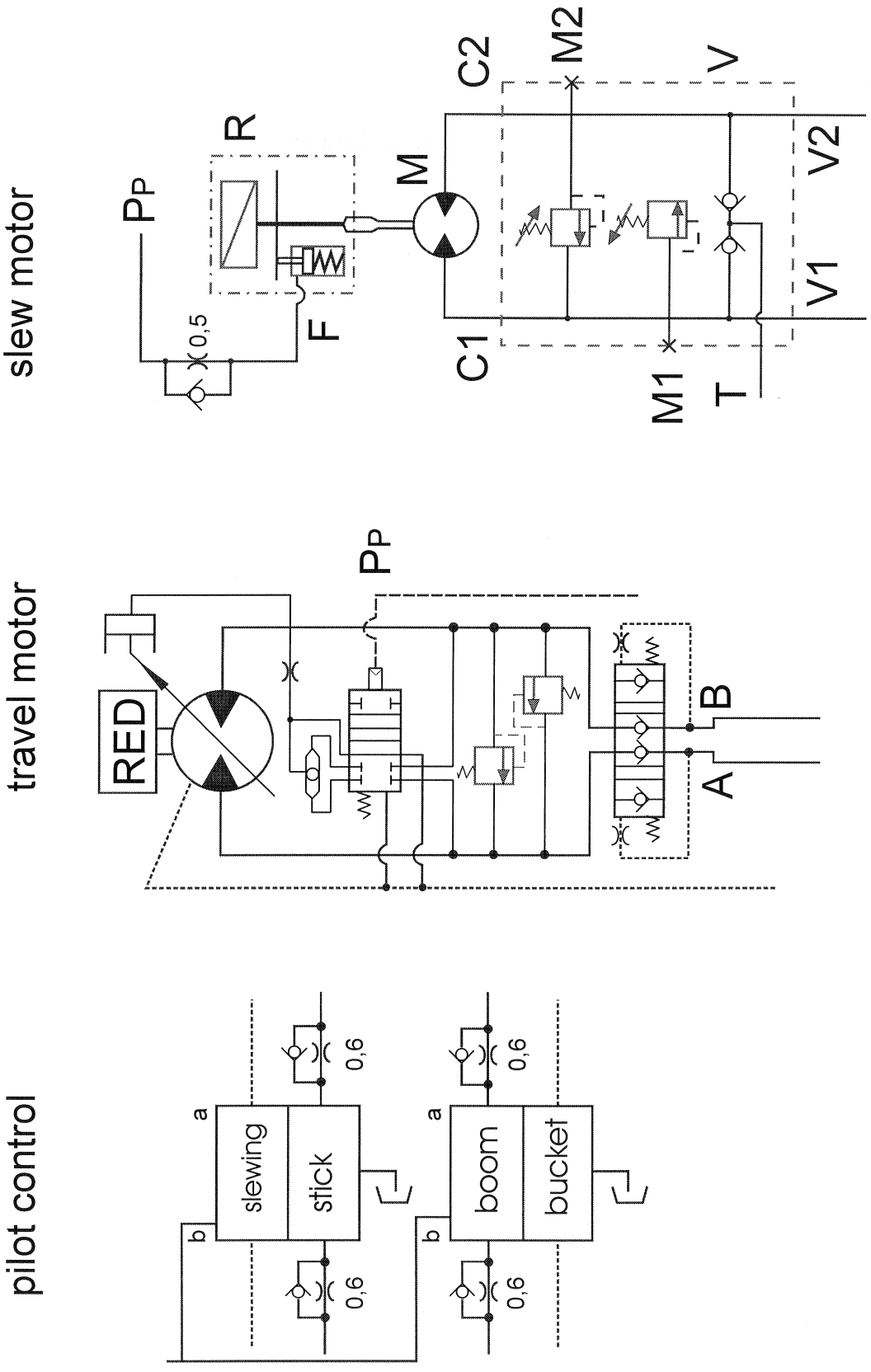
Pos. Item Rep. No.	DEUTSCH	ENGLISH	FRANÇAIS
1	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
2	Belüftungsfilter	Vent filter	Filtre d'aération
3	Rücklauffilter	Return filter	Filtre de retour
4	Verstellpumpe	Variable displacement pump	Pompe à débit variable
5	Dieselmotor	Diesel engine	Moteur diesel
6	Ölkühler	Oil cooler	Refroidisseur d'huile
7	Rücklaufsammler	Return line collector	Collecteur de retour
8	Ventil, *Rücklaufvorspannung*	Valve, *return pre-load*	Clapet, *pressurisation de retour*
9	Rücklaufsammler	Return line collector	Collecteur de retour
10	Druckminderventil mit Hydrospeicher *(schnell/langsam)* und 2x 3/2 Wegeventile	Pressure reducing valve with hydraulic accumulator *(high/low speed)* and 2x solenoid valve	Soupape réductrice de pression avec accumulateur hydraulique *(grande vitesse/petite)* et 2x électrovanne
11	Hydrospeicher	Hydraulic. accumulator	Accumulateur hydraulique
12	Kugelhahn, Ausstiegsschranke *(sperren Arbeitshydraulik)*	Ball valve, cut-off lever *(stop working hydraulic)*	Robinet, levier de sécurité *(coupure pilotage)*
13	Vorsteuergerät (links)	Pilot operated valve (left)	Distributeur à commande assistée (gauche)
14	Vorsteuergerät (rechts)	Pilot-operated valve (right)	Distributeur à commande assistée (droite)
15	Drosselrückschlagventil	Throttle check valve	Clapet anti-retour d'étranglement
16	Blocksteuergerät	Valve bank	Bloc distributeur
17	Drehdurchführung	Rotary transfer	Joint tournant
18	Hydraulikzylinder - Greifer **Option**	Hydraulic cylinder – grab **Option**	Vérin hydraulique - benne preneuse **Option**
19	Hydraulikzylinder - Löffel	Hydraulic cylinder - bucket	Vérin hydraulique - godet
20	Kugelhahn *(sperren)*	Ball valve *(stop)*	Robinet *(coupure)*
21	Hydraulikkupplung	Hydraulic coupling	Coupleur hydraulique
22	Hydraulikzylinder - Ausleger	Hydraulic cylinder - boom	Vérin hydraulique - flèche
23	Fahrantrieb (links)	Travel drive (left)	Translation (gauche)
24	Fahrantrieb (rechts)	Travel drive (right)	Translation (droite)
25	Schwenkantrieb	Swing drive	Entraînement d'orientation
26	Hydraulikzylinder - Schwenklöffel **Option**	Hydraulic cylinder - swing bucket **Option**	Vérin hydraulique - godet orientable **Option**
27	Drehantrieb - Greifer **Option**	Swing drive - grab **Option**	Entraînement d'orientation - benne preneuse **Option**
28	Hydraulikhammer **Option**	Hydraulic rock breaker **Option**	Marteau hydraulique **Option**
29	Hydraulikzylinder - Löffelstiel	Hydraulic cylinder - dipper arm	Vérin hydraulique - balancier
30	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - déport latérale
31	Hydraulikzylinder - Räumschild	Hydraulic cylinder - dozer blade	Vérin hydraulique - lame d'appui
32	Rohrbruchsicherung	Hose rupture valve	Clapet d'arrêt automatique
33	Blende	Orifice	Orifice



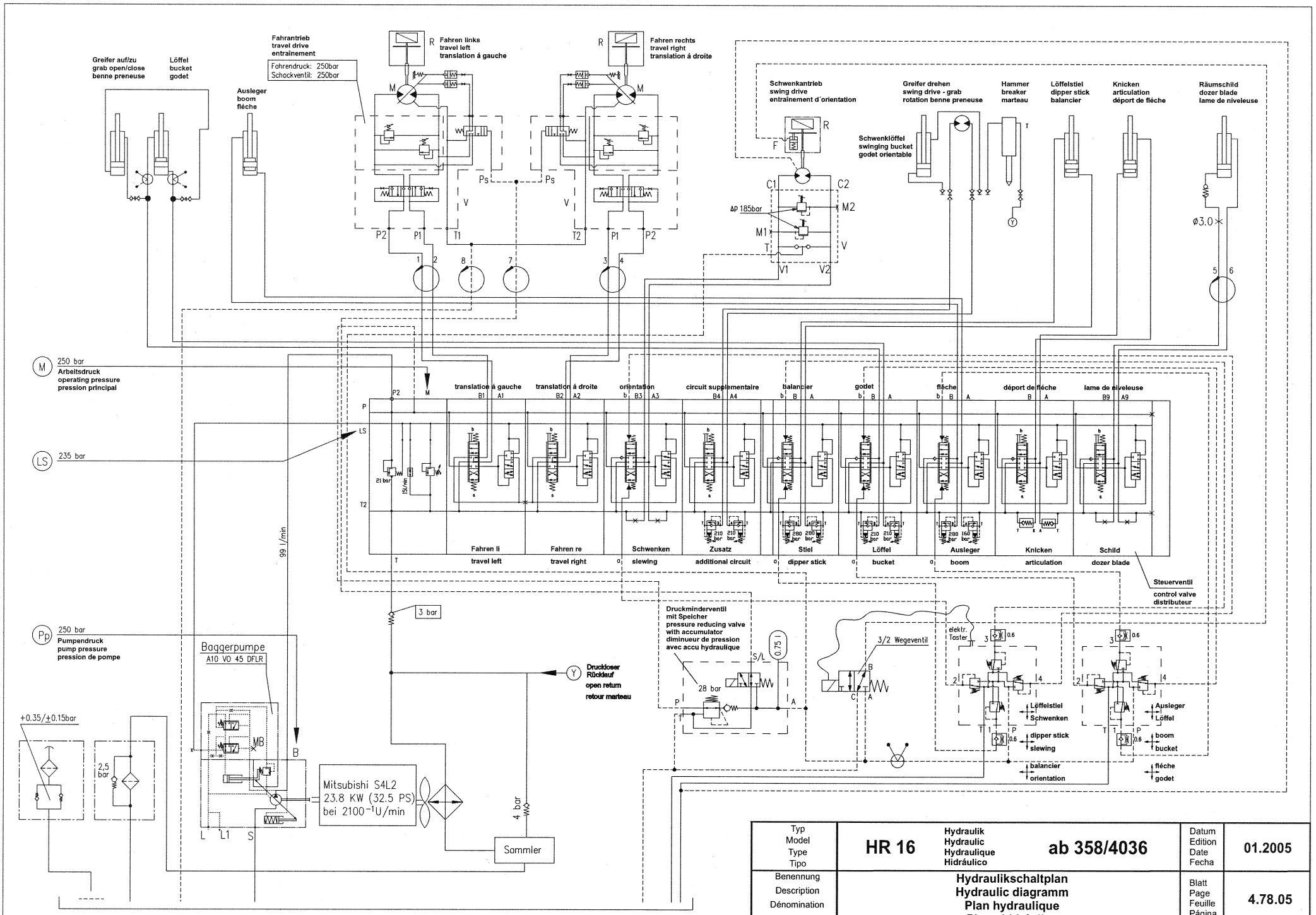
SCHAEFF	Typ/Model/Type **HR 16 (from serial no. 358/1398)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.78.01**

Explanation of hydraulic installation

1	Travel motor, left
2	Travel motor, right
3	Grab cylinder
4	Bucket cylinder
5	Slew drive
6	Boom cylinder
7	Articulated cylinder
8	Dipperstick cylinder
9	Grab slew motor
10	Breaker
11	Slew bucket
12	Dozer blade cylinder
13	Ventilation filter
14	Gear pump
15	Hydraulic oil cooler
16	Return line filter
17	Diesel engine
18	Pilot pressure accumulator
19	Pressure reducing valve for pilot control
20	Pilot control
21	Cut-off valve - working hydraulics / exit barrier
22	Hydraulic oil tank
23	Valve bank 1
24	Valve bank 2
25	Valve bank 3
26	Dozer blade
27	Slewing
28	Boom
29	Bucket
30	Travel, left
31	Travel, right
32	Additional control circuit
33	Dipperstick
34	Articulation
35	Collector
36	Pressureless return line
37	Thermostat valve
38	Valve fast/ slow
39	Gauge port

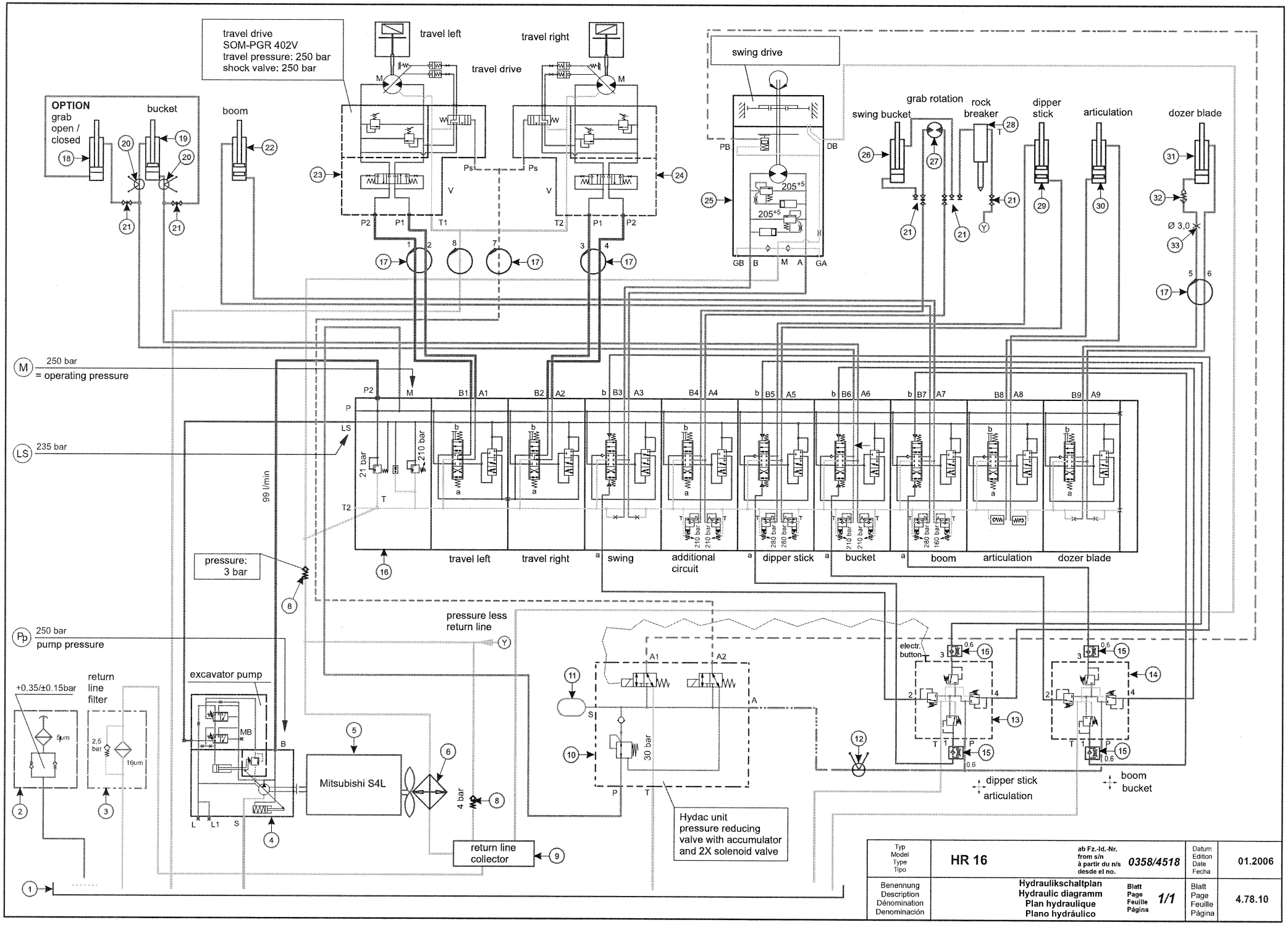


SCHAEFF	Typ/Model/Type **HR 16 (from serial no. 358/1398)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram pilot control, travel motor, slew motor**	Blatt/Page/Feuille **4.78.02**



Typ Model Type Tipo	**HR 16**	**Hydraulik** **Hydraulic** **Hydraulique** **Hidráulico**	**ab 358/4036**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan** **Hydraulic diagramm** **Plan hydraulique** **Plano hidráulico**			Blatt Page Feuille Página	**4.78.05**

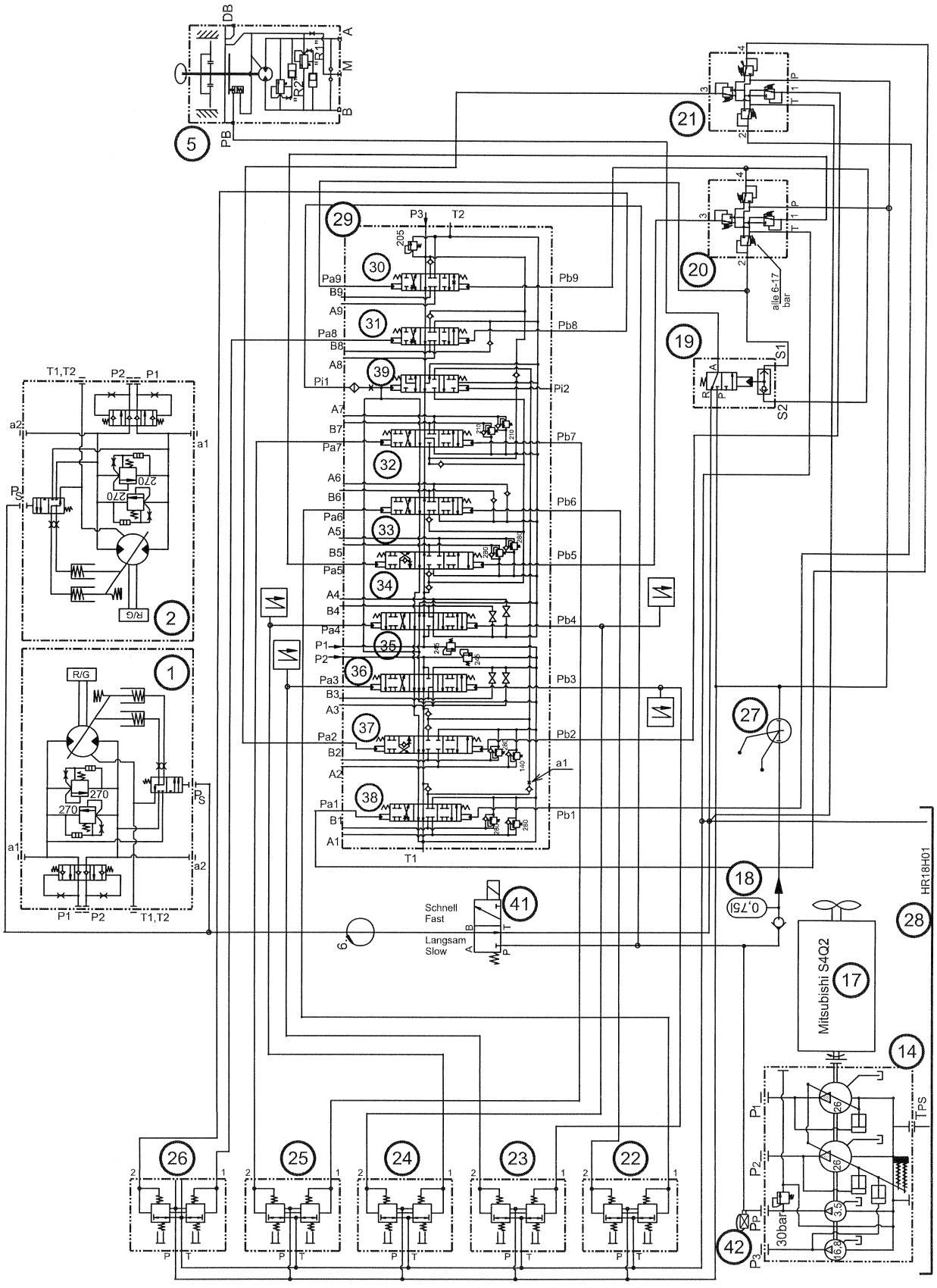
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Typ Model Type Tipo	**HR 16**	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no.	***0358/4518***	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan** **Hydraulic diagramm** **Plan hydraulique** **Plano hydráulico**	Blatt Page Feuille Página	***1/1***	Blatt Page Feuille Página	**4.78.10**

Pos. Item Rep. No.	DEUTSCH	ENGLISH	FRANÇAIS
1	Hydrauliköltank	Hydraulic oil tank	Réservoir hydraulique
2	Belüftungsfilter	Vent filter	Filtre d'aération
3	Rücklauffilter	Return filter	Filtre de retour
4	Verstellpumpe	Variable displacement pump	Pompe à débit variable
5	Dieselmotor	Diesel engine	Moteur diesel
6	Ölkühler	Oil cooler	Refroidisseur d'huile
7	Rücklaufsammler	Return line collector	Collecteur de retour
8	Ventil, *Rücklaufvorspannung*	Valve, *return pre-load*	Clapet, *pressurisation de retour*
9	Rücklaufsammler	Return line collector	Collecteur de retour
10	Druckminderventil mit Hydrospeicher *(schnell/langsam)* und 2x 3/2 Wegeventile	Pressure reducing valve with hydraulic accumulator *(high/low speed)* and 2x solenoid valve	Soupape réductrice de pression avec accumulateur hydraulique *(grande vitesse/petite)* et 2x électrovanne
11	Hydrospeicher	Hydraulic. accumulator	Accumulateur hydraulique
12	Kugelhahn, Ausstiegsschranke *(sperren Arbeitshydraulik)*	Ball valve, cut-off lever *(stop working hydraulic)*	Robinet, levier de sécurité *(coupure pilotage)*
13	Vorsteuergerät (links)	Pilot operated valve (left)	Distributeur à commande assistée (gauche)
14	Vorsteuergerät (rechts)	Pilot-operated valve (right)	Distributeur à commande assistée (droite)
15	Drosselrückschlagventil	Throttle check valve	Clapet anti-retour d'étranglement
16	Blocksteuergerät	Valve bank	Bloc distributeur
17	Drehdurchführung	Rotary transfer	Joint tournant
18	Hydraulikzylinder - Greifer **Option**	Hydraulic cylinder – grab **Option**	Vérin hydraulique - benne preneuse **Option**
19	Hydraulikzylinder - Löffel	Hydraulic cylinder - bucket	Vérin hydraulique - godet
20	Kugelhahn *(sperren)*	Ball valve *(stop)*	Robinet *(coupure)*
21	Hydraulikkupplung	Hydraulic coupling	Coupleur hydraulique
22	Hydraulikzylinder - Ausleger	Hydraulic cylinder - boom	Vérin hydraulique - flèche
23	Fahrantrieb (links)	Travel drive (left)	Translation (gauche)
24	Fahrantrieb (rechts)	Travel drive (right)	Translation (droite)
25	Schwenkantrieb	Swing drive	Entraînement d'orientation
26	Hydraulikzylinder - Schwenklöffel **Option**	Hydraulic cylinder - swing bucket **Option**	Vérin hydraulique - godet orientable **Option**
27	Drehantrieb - Greifer **Option**	Swing drive - grab **Option**	Entraînement d'orientation - benne preneuse **Option**
28	Hydraulikhammer **Option**	Hydraulic rock breaker **Option**	Marteau hydraulique **Option**
29	Hydraulikzylinder - Löffelstiel	Hydraulic cylinder - dipper arm	Vérin hydraulique - balancier
30	Hydraulikzylinder - Knicken	Hydraulic cylinder - articulation	Vérin hydraulique - déport latérale
31	Hydraulikzylinder - Räumschild	Hydraulic cylinder - dozer blade	Vérin hydraulique - lame d'appui
32	Rohrbruchsicherung	Hose rupture valve	Clapet d'arrêt automatique
33	Blende	Orifice	Orifice

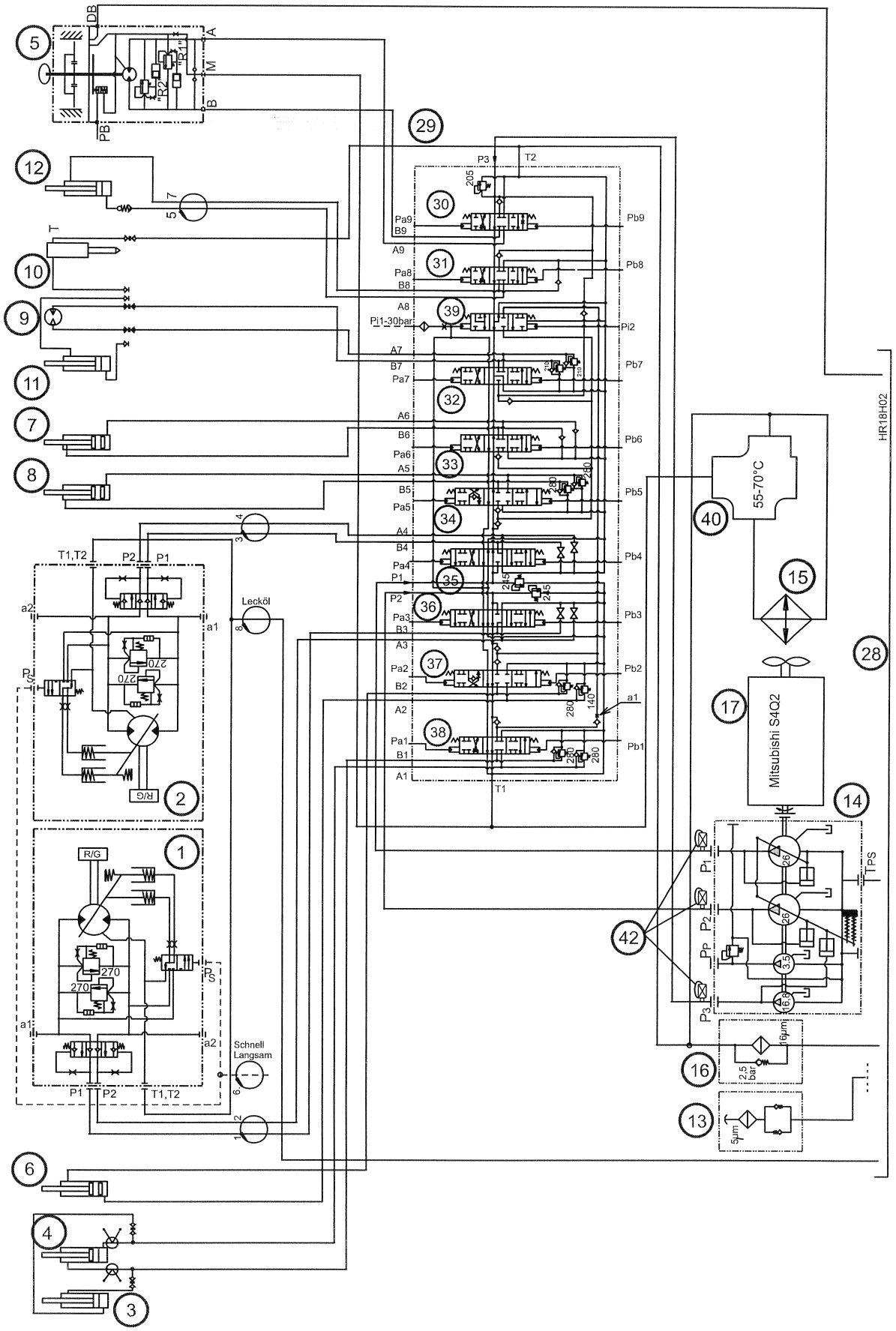
Typ Model Type Tipo	HR16	*ab Fz. Id. Nr. from s/n à partir du n/s desde el no.* 0358/4518	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	***HYDRAULIKSCHALTPLAN*** ***HYDRAULIKDIAGRAM*** ***PLAN HYDRAULIQUE*** ***PLANO HYDRAULICO***	**LEGENDE** **LEGEND** **LEGENDE** **LAYENDA**	Blatt Page Feuille Página	4.78.11



SCHAEFF	Typ/Model/Type **HR 18 (from serial no. 180/0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, pilot control**	Blatt/Page/Feuille **4.80.01**

Legend to hydraulic diagram

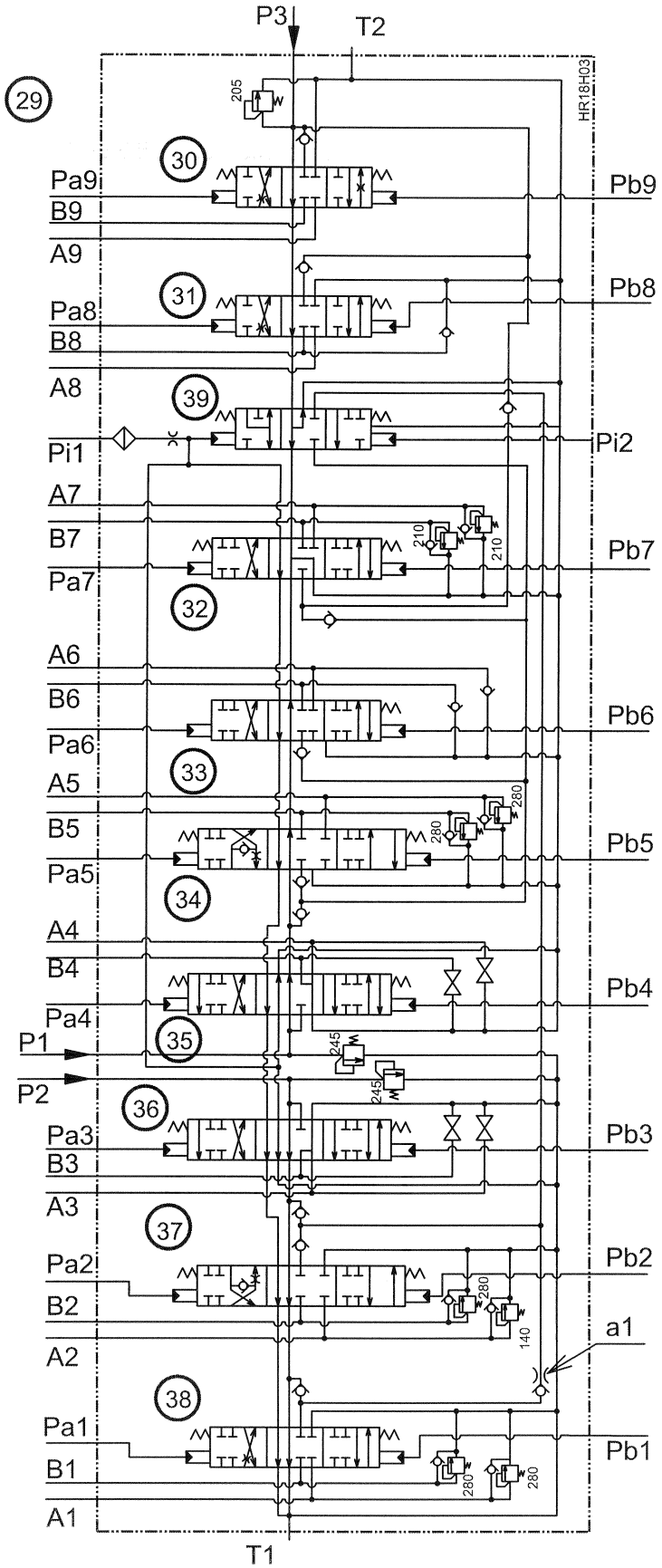
1	Travel motor, left
2	Travel motor, right
5	Slew drive
14	Hydraulic pump
17	Diesel engine
18	Pilot pressure accumulator
19	Relay valve for slew brake
20	Pilot-operated valve - slewing, dipperstick
21	Pilot-operated valve - boom, bucket
22	Pilot-operated valve - articulation
23	Pilot-operated valve - travel, left
24	Pilot-operated valve - travel, right
25	Pilot-operated valve - additional control circuit
26	Pilot-operated valve - dozer blade
27	Working hydraulics cut-off/ exit barrier
28	Hydraulic oil tank
29	Valve bank
30	Valve segment, slewing
31	Valve segment, dozer blade
32	Valve segment, additional control circuit
33	Valve segment, articulation
34	Valve segment, dipperstick
35	Valve segment, travel, right
36	Valve segment, travel, left
37	Valve segment, boom
38	Valve segment, bucket
39	Valve segment, travelling straight on
41	Selector valve, fast/ slow
42	Gauge port



SCHAEFF	Typ/Model/Type **HR 18 (from serial no. 180/0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, working/travelling**	Blatt/Page/Feuille **4.80.02**

Legend to hydraulic diagram

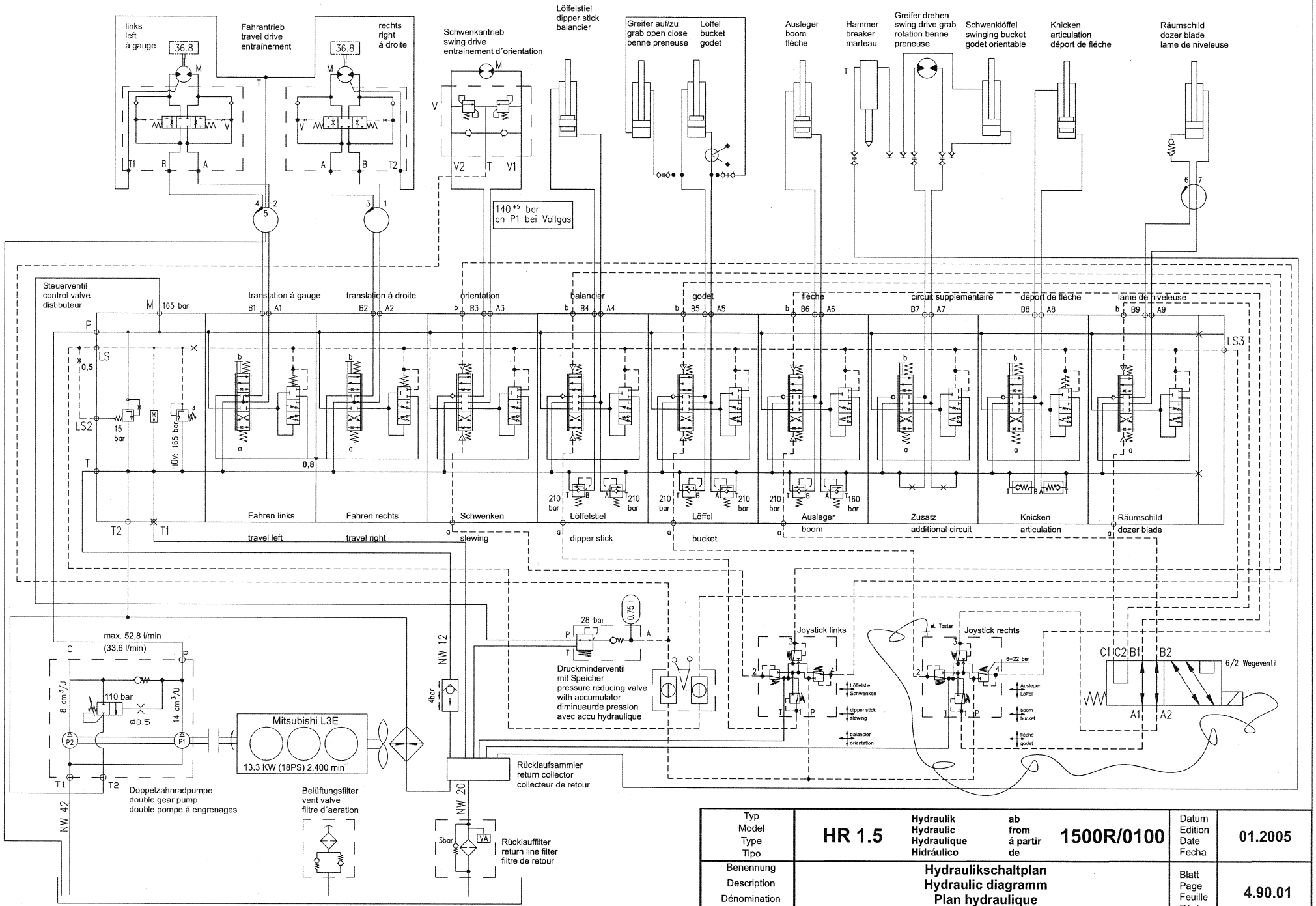
1	Travel motor, left
2	Travel motor, right
3	Grab cylinder
4	Bucket cylinder
5	Slew drive
6	Boom cylinder
7	Articulated cylinder
8	Dipperstick cylinder
9	Grab slew motor
10	Breaker
11	Slew bucket
12	Dozer blade cylinder
13	Ventilation filter
14	Hydraulic pump
15	Hydraulic oil cooler
16	Return line filter
17	Diesel engine
28	Hydraulic oil tank
29	Valve bank
30	Valve segment, slewing
31	Valve segment, dozer blade
32	Valve segment, additional control circuit
33	Valve segment, articulation
34	Valve segment, dipperstick
35	Valve segment, travel, right
36	Valve segment, travel, left
37	Valve segment, boom
38	Valve segment, bucket
39	Valve segment, travelling straight on
40	Thermostat valve
42	Gauge port



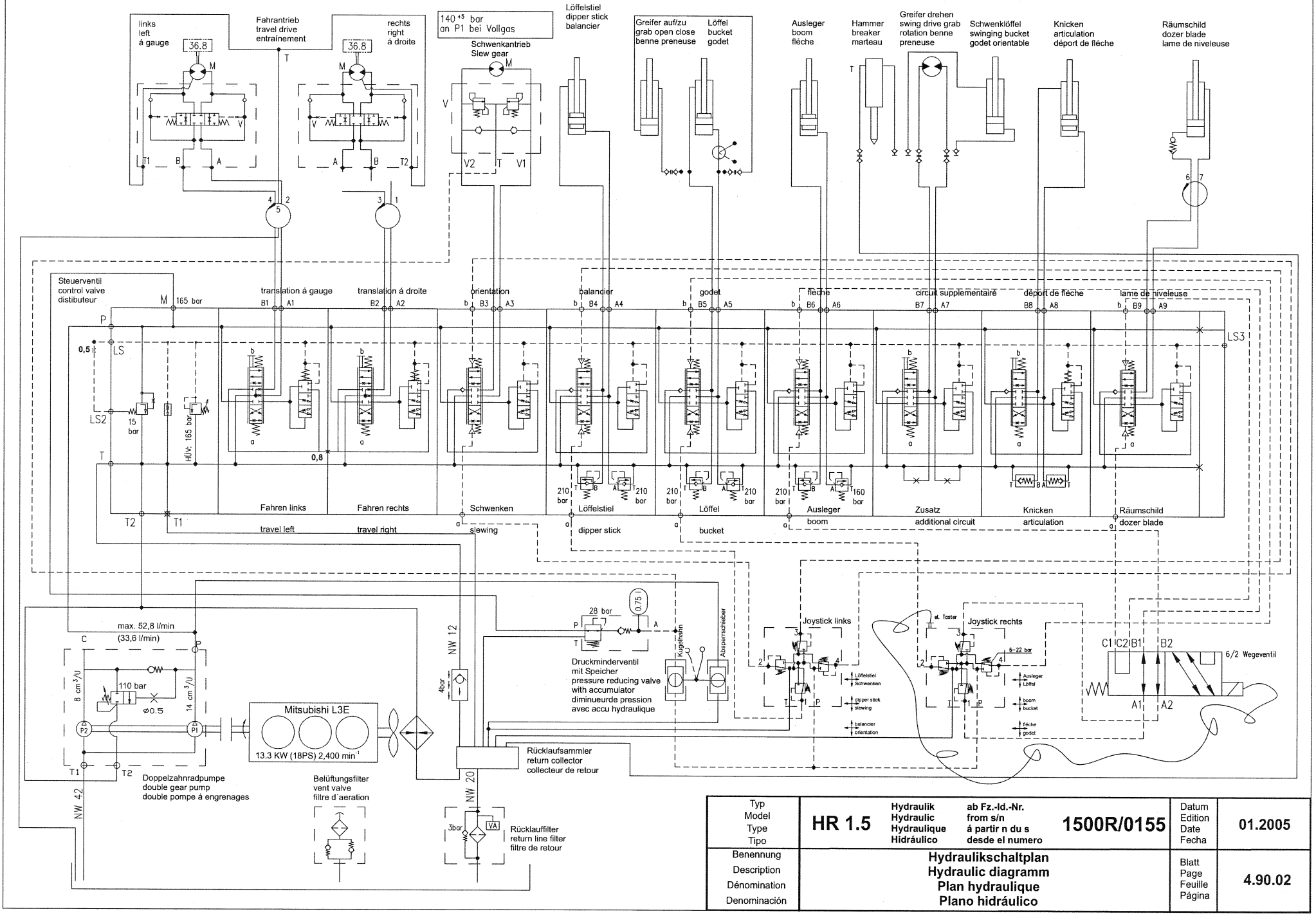
SCHAEFF	Typ/Model/Type **HR 18 (from serial no. 180/0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, valve bank**	Blatt/Page/Feuille **4.80.03**

29	Valve bank
30	Valve segment, slewing
31	Valve segment, dozer blade
32	Valve segment, additional control circuit
33	Valve segment, articulation
34	Valve segment, dipperstick
35	Valve segment, travel, right
36	Valve segment, travel, left
37	Valve segment, boom
38	Valve segment, bucket
39	Valve segment, travelling straight on

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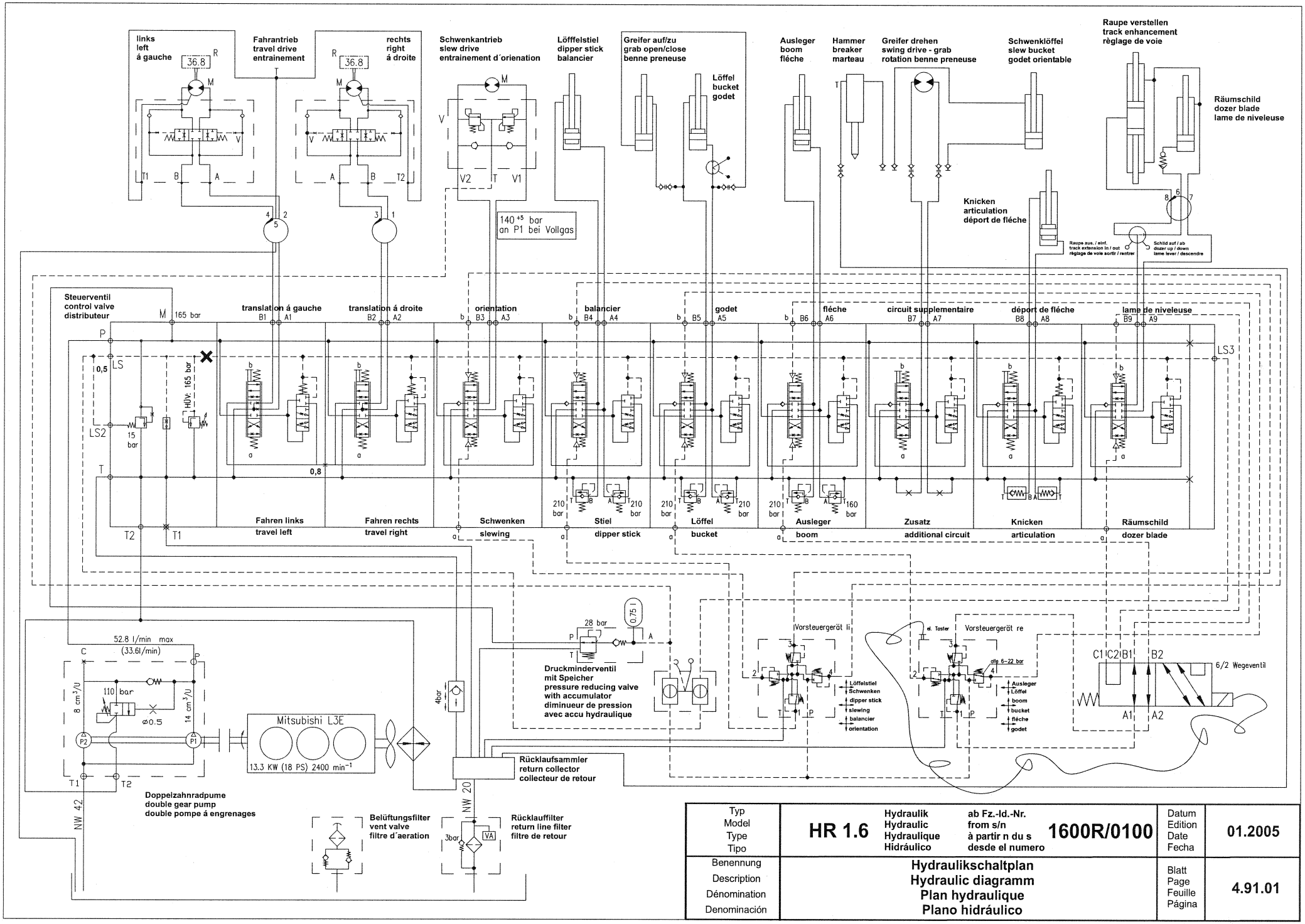


Typ Model Type Tipo	**HR 1.5**	**Hydraulik** **Hydraulic** **Hydraulique** **Hidráulico**	**ab** **from** **á partir de**	**1500R/0100**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan** **Hydraulic diagramm** **Plan hydraulique** **Plano hidráulico**				Blatt Page Feuille Página	**4.90.01**



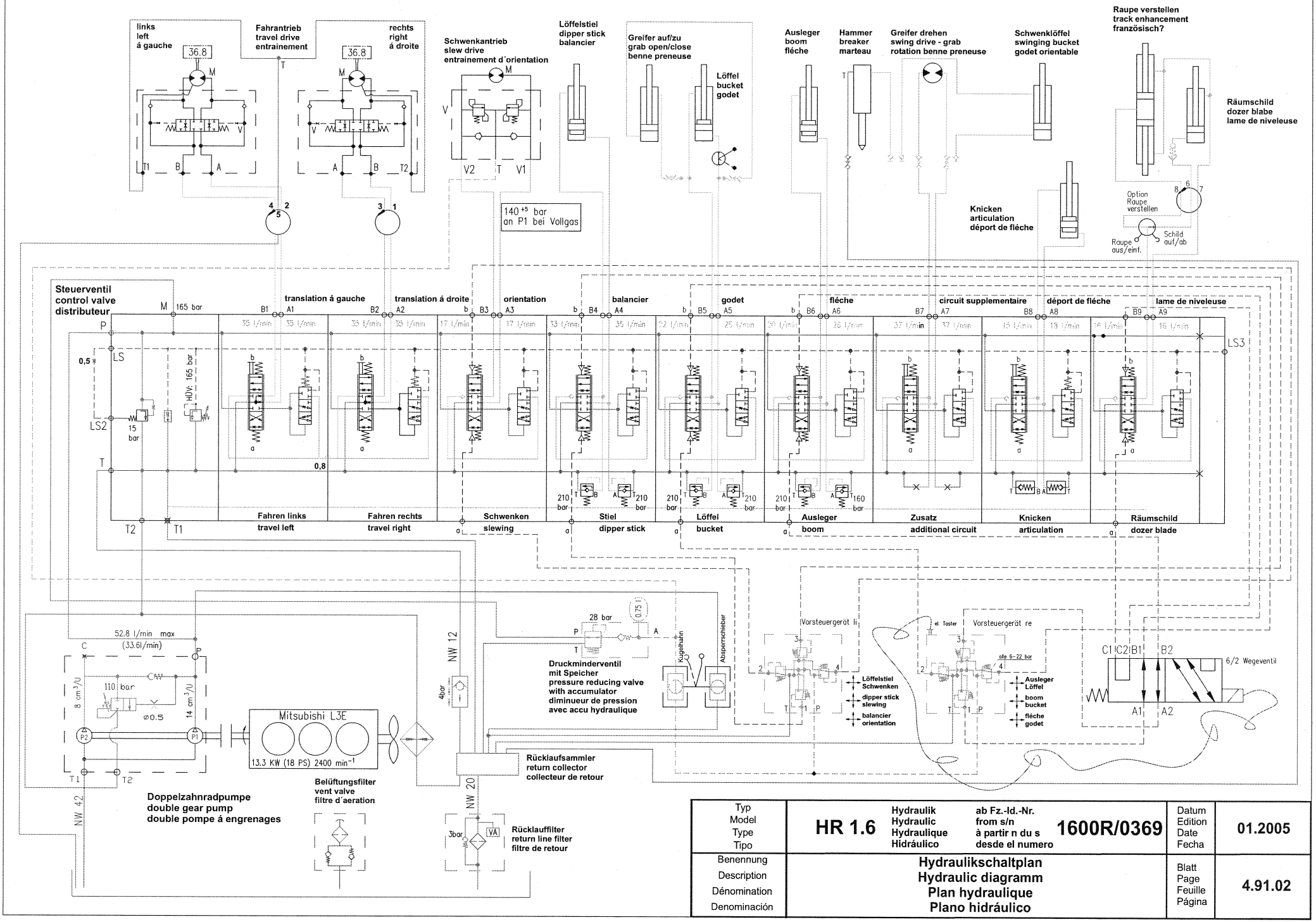
Typ Model Type Tipo	**HR 1.5**	**Hydraulik** **Hydraulic** **Hydraulique** **Hidráulico**	**ab Fz.-Id.-Nr.** **from s/n** **á partir n du s** **desde el numero**	**1500R/0155**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan** **Hydraulic diagramm** **Plan hydraulique** **Plano hidráulico**				Blatt Page Feuille Página	**4.90.02**

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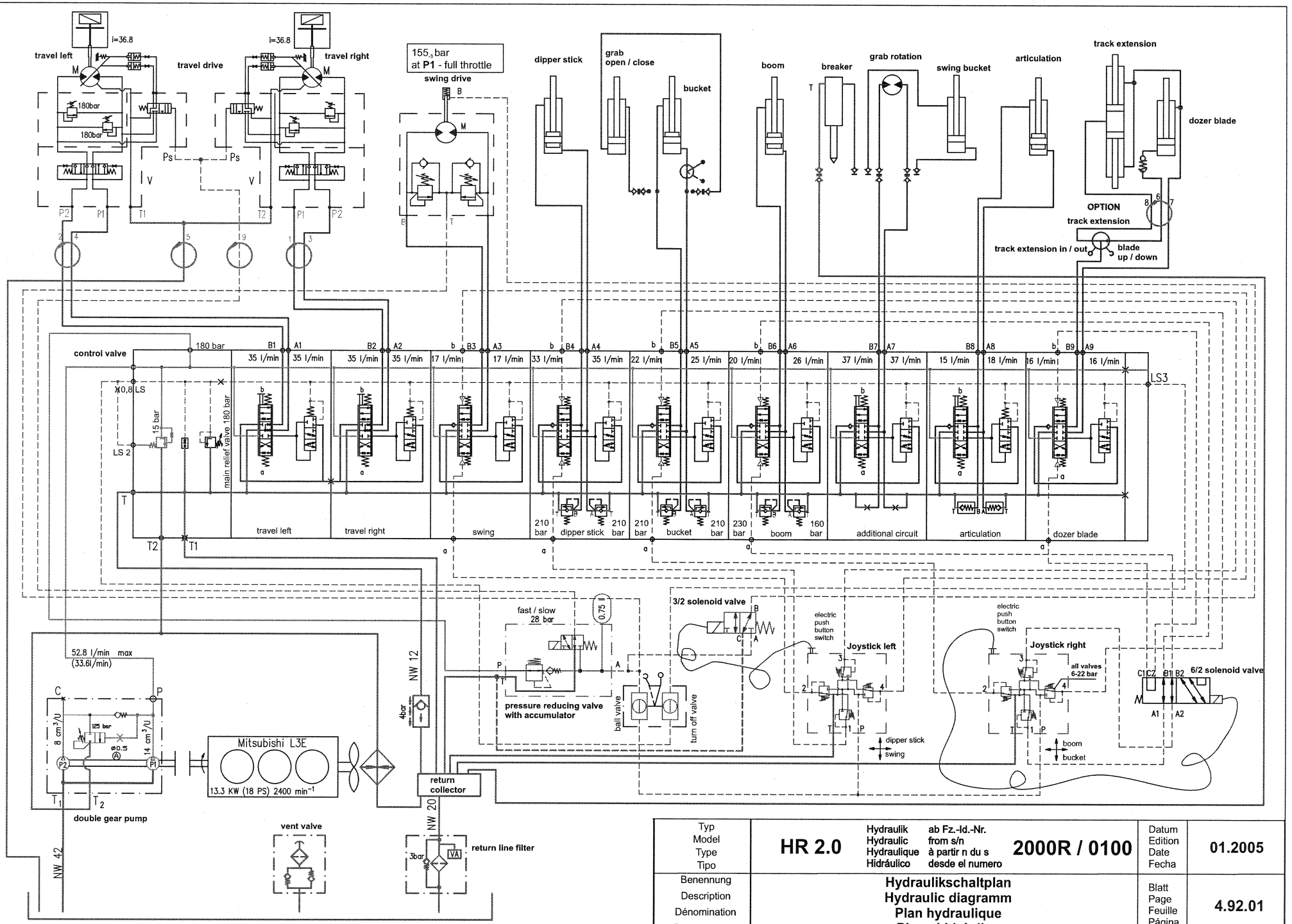
Typ Model Type Tipo	**HR 1.6**	Hydraulik Hydraulic Hydraulique Hidráulico	ab Fz.-Id.-Nr. from s/n à partir n du s desde el numero	**1600R/0100**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan Hydraulic diagramm Plan hydraulique Plano hidráulico**				Blatt Page Feuille Página	**4.91.01**

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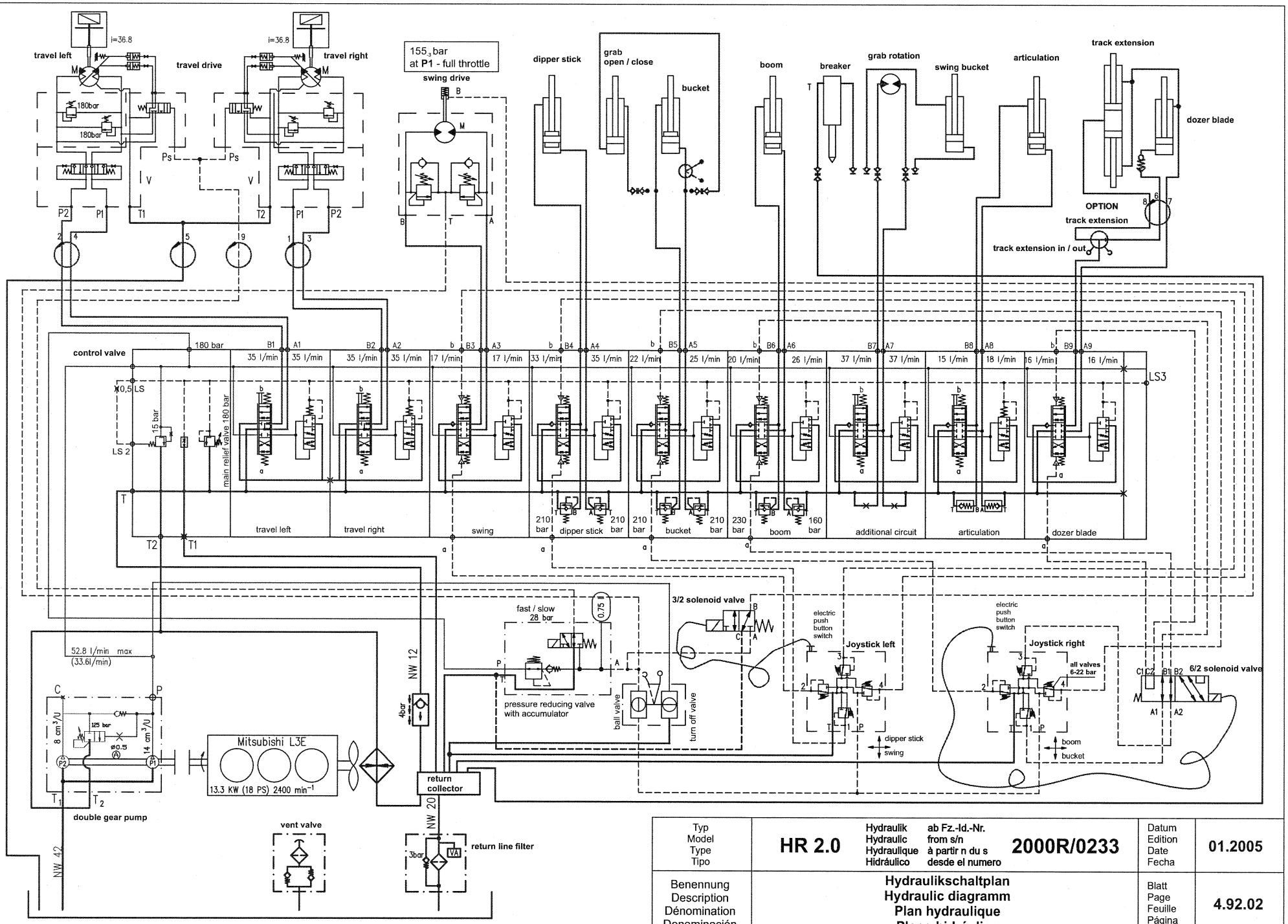
Typ Model Type Tipo	**HR 1.6**	Hydraulik Hydraulic Hydraulique Hidráulico	ab Fz.-Id.-Nr. from s/n à partir n du s desde el numero	**1600R/0369**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan Hydraulic diagramm Plan hydraulique Plano hidráulico**				Blatt Page Feuille Página	**4.91.02**

TEREX | SCHAEFF



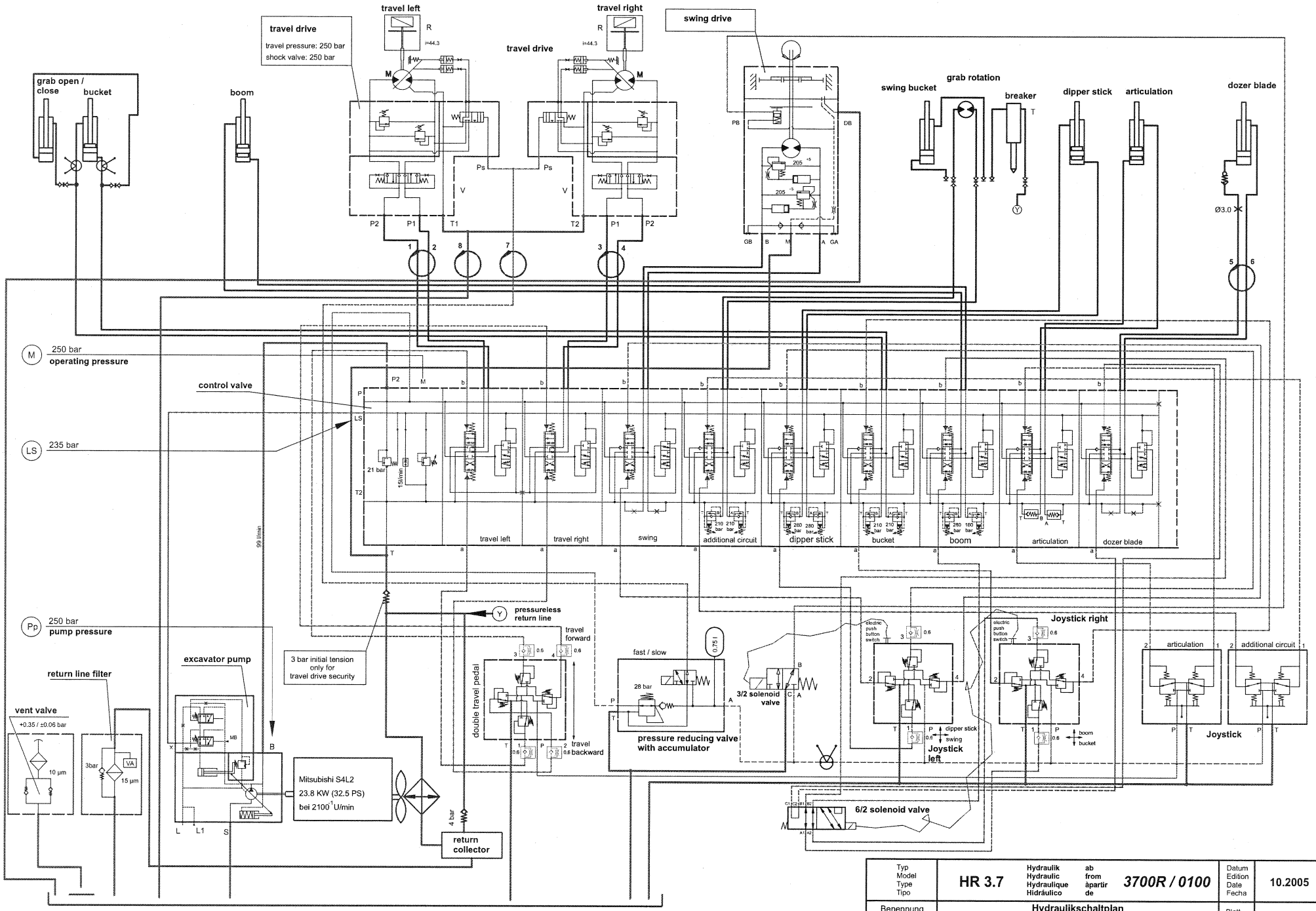
Typ Model Type Tipo	**HR 2.0**	Hydraulik Hydraulic Hydraulique Hidráulico	ab Fz.-Id.-Nr. from s/n à partir n du s desde el numero	**2000R / 0100**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan Hydraulic diagramm Plan hydraulique Plano hidráulico**				Blatt Page Feuille Página	**4.92.01**

TEREX | SCHAEFF



Typ Model Type Tipo	**HR 2.0**	Hydraulik Hydraulic Hydraulique Hidráulico	ab Fz.-Id.-Nr. from s/n à partir n du s desde el numero	**2000R/0233**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan Hydraulic diagramm Plan hydraulique Plano hidráulico**				Blatt Page Feuille Página	**4.92.02**

TEREX | SCHAEFF



Typ Model Type Tipo	**HR 3.7**	**Hydraulik** **Hydraulic** **Hydraulique** **Hidráulico**	**ab** **from** **àpartir** **de**	***3700R / 0100***	Datum Edition Date Fecha	**10.2005**
Benennung Description dénomination Denominación	**Hydraulikschaltplan** **Hydraulic diagramm** **Plan hydraulique** **Plano hidráulico**				Blatt Page Feuille Página	**4.97.01**

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SUBGROUP LIST

Setting instructions

HR 20	Working hydraulics	5.60
HR 22	Transmission	5.63
HR 31	Transmission	5.64
HR 41	Transmission	5.66
HR 13	Working pump	5.75
HR 14	Working pump	5.76
HR 16	Working pump	5.78
HR 18	Working pump	5.80
HML 31 HML 41	Travel hydraulics	5.100
SKL / SKS	Hydromatik pump data	5.200
SKL 873 / SKL 200	Working / travel hydraulics	5.213
SKL 824 / SKL 834 SKL 844 / SKL 854	Control valve Parker P70CF	5.224
SKL 160 / SKL 260	Displ. pump Casappa LVP75 Control valve Rexroth 3M6	5.230
HML/HR 32/42	Rexroth SX14 Control Valve	5.251
HML/HR 32/42	Rexroth SM12 Control Valve	5.253
HR 11/12/13	Rexroth SX10 Control Valve	5.274
HR 14/16	Rexroth SX12 Control Valve	5.276
SKL 823/ SKL 833 SKL 843/ SKL 853 SKL 863/ SKS 633	Travel hydraulics	5.300
SKL 823/ SKL 833 SKL 843/ SKL 853 SKL 863	Working hydraulics	5.400
HML 31 HML 41	Working hydraulics	5.500
HML 32	Working hydraulics	5.510
HML/HR/HS SMB	Basic adjustment of variable displacement pump A10 VO	5.520
HML 22 HR 22	Valve bank VOAC L90LS	5.530
HR 32	Working hydraulics	5.650
HR 42	Working hydraulics	5.670
HR 11/ HR 12 HR 13/ HR 14	Setting instructions valve bank VOAC HV 07	5.750

TEREX | SCHAEFF

The following checking and setting instructions contain information necessary to perform correct tests and settings. As with all maintenance and repair jobs, the regulations for accident prevention are binding.

For additional explanations or possible questions, please contact our Customer Service Department - Technical Service - by phone or fax.

First and foremost tests and settings of hydraulic units and components of particular importance are described. The order of the tests and settings should be observed, especially in case of trouble-shooting and new settings.

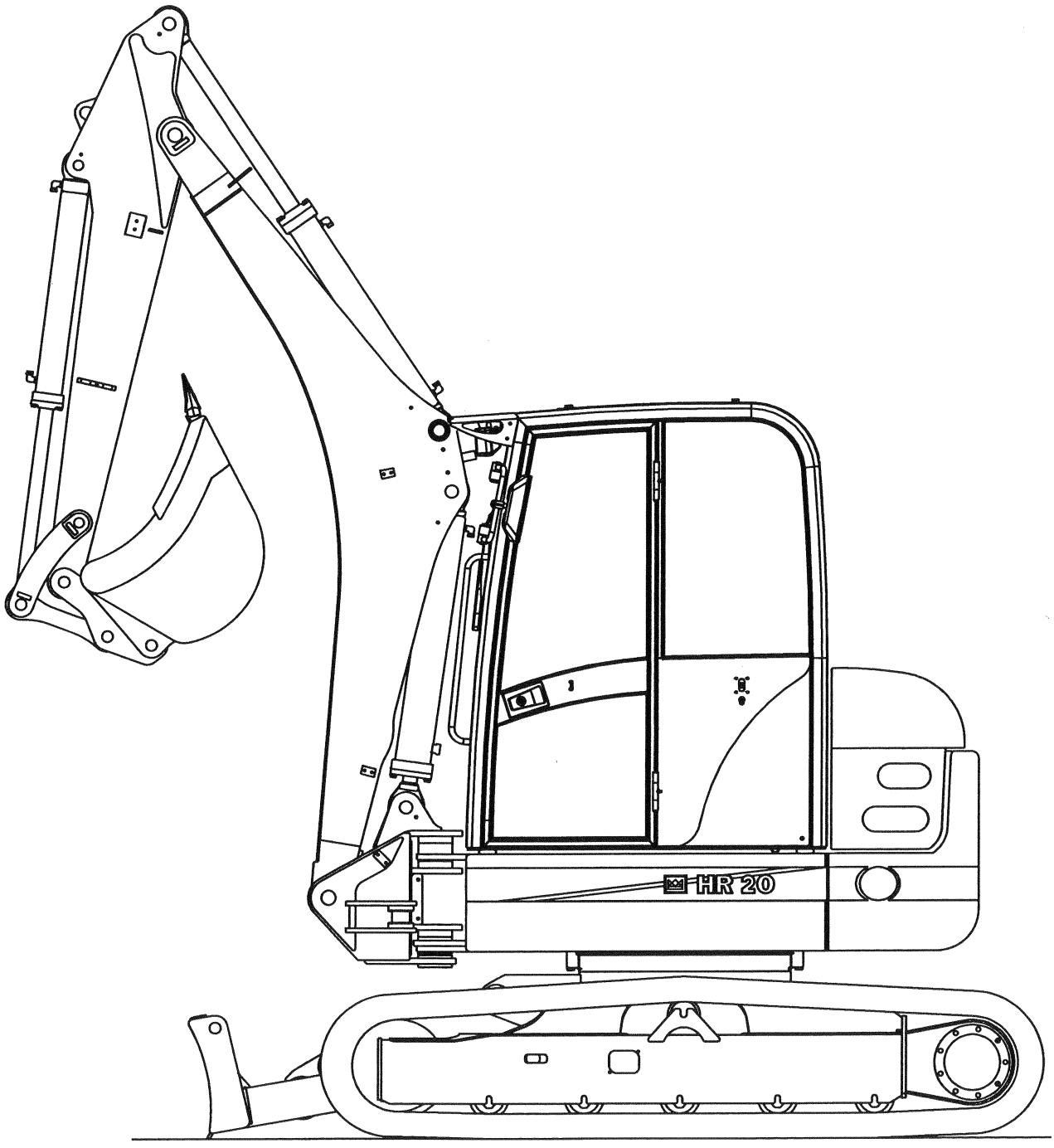
Attention: All tests and settings **have to be performed** at an oil temperature of 50 - 60° C.

Furthermore, the indicated engine speeds have to be observed carefully in order to guarantee the requested flow rates. Pay special attention when checking and setting high pressure valves, main pressure relief valves and line relief valves.

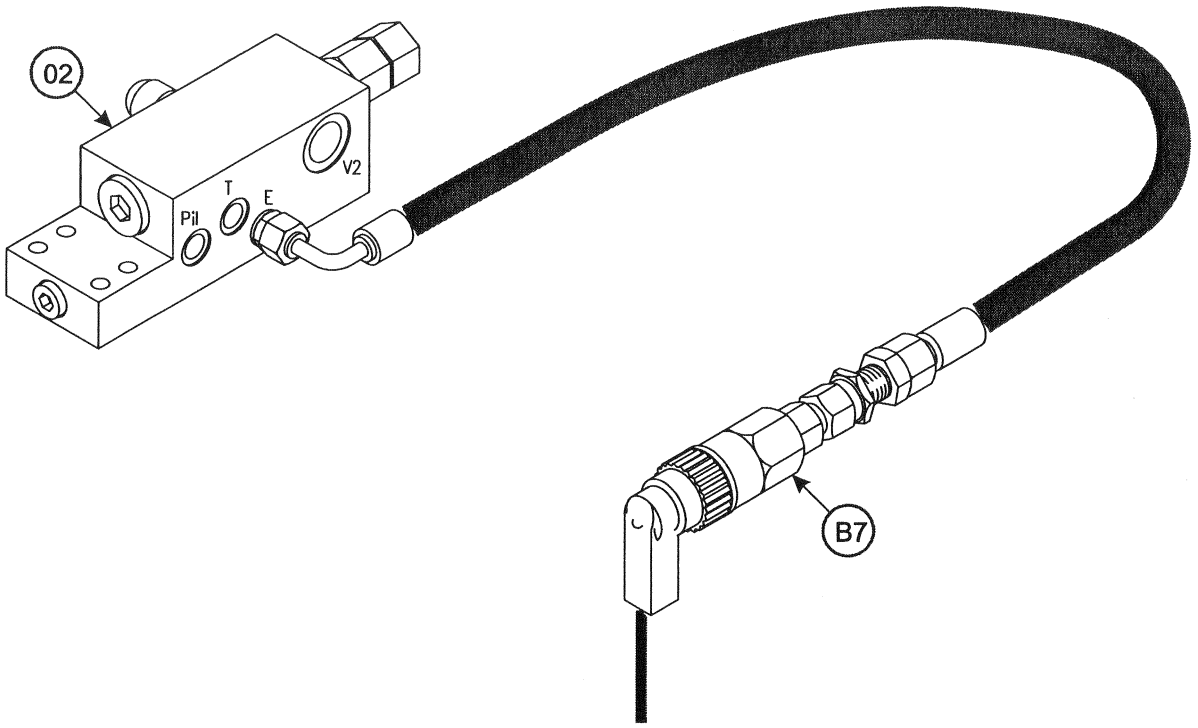
If any settings of aggregates or components have to be changed in order to perform other tests, the initial setting has to be reset after finishing these jobs. Only perform settings of line relief valves if they are adjusted lower than the pressure cut-off and / or the main pressure relief valve.

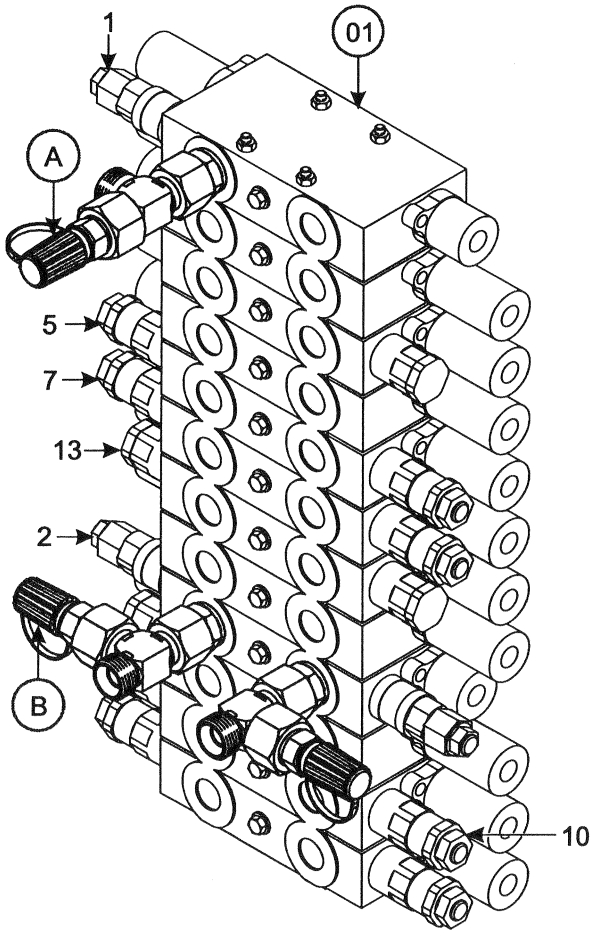
The test and setting instructions do not claim to be complete. The data given is not subject to the alteration service. Furthermore, we reserve the right to make improvements in the course of technical development without changing the test and setting instructions.

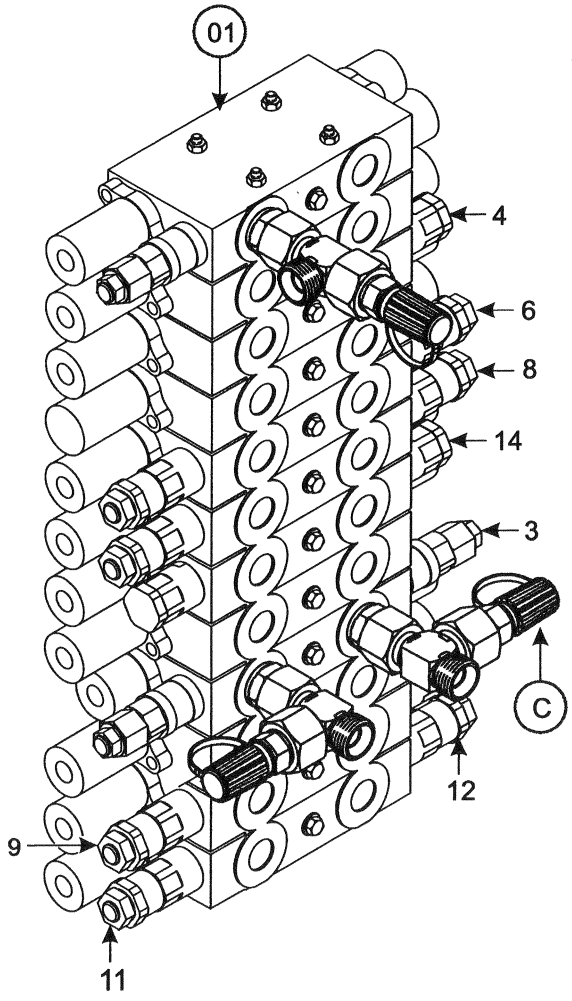
HR 20



Typ Model Type Tipo	**HR 20**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Instrucción de ajuste**	Blatt Page Feuille Página	**5.60.00**



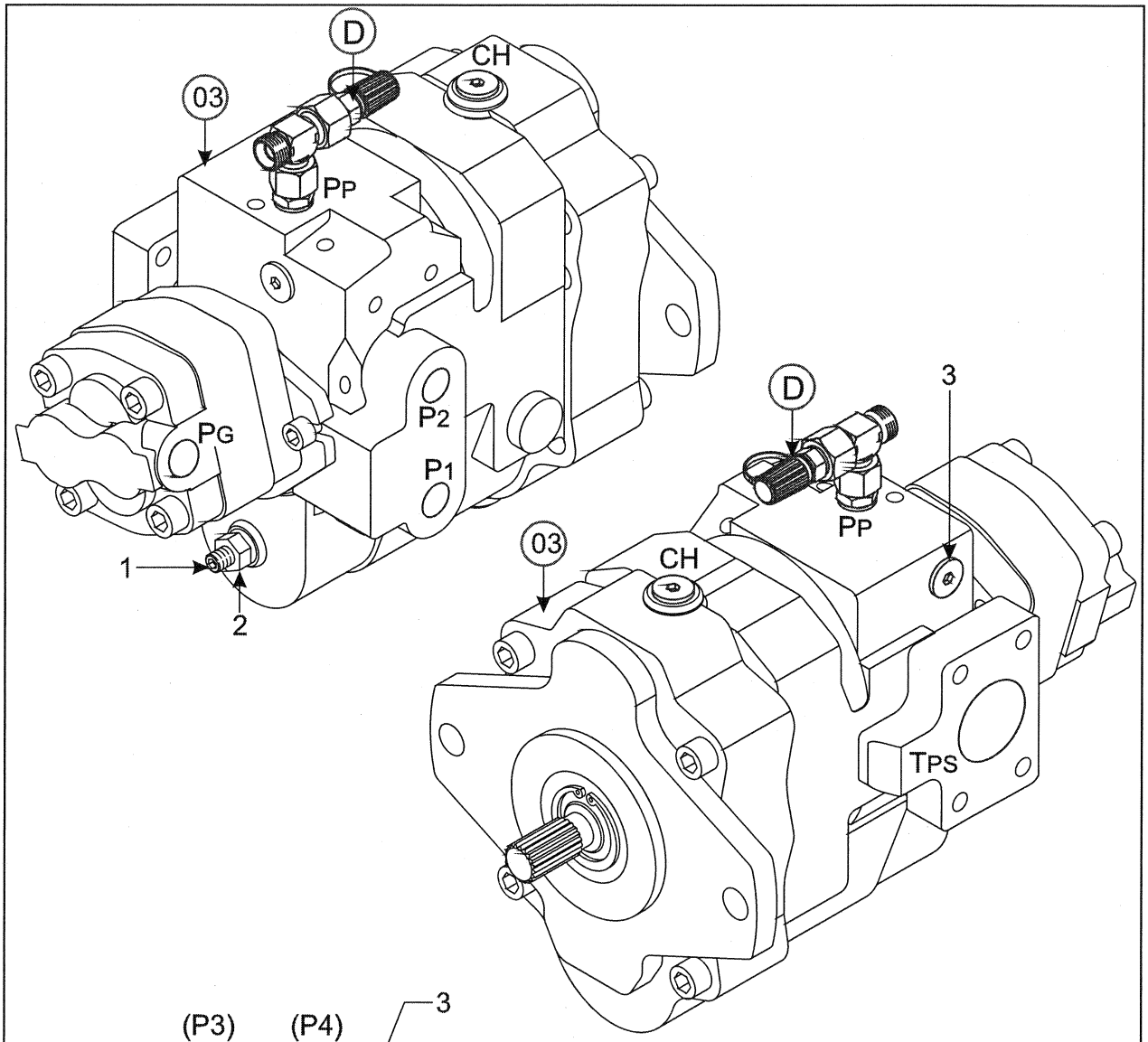


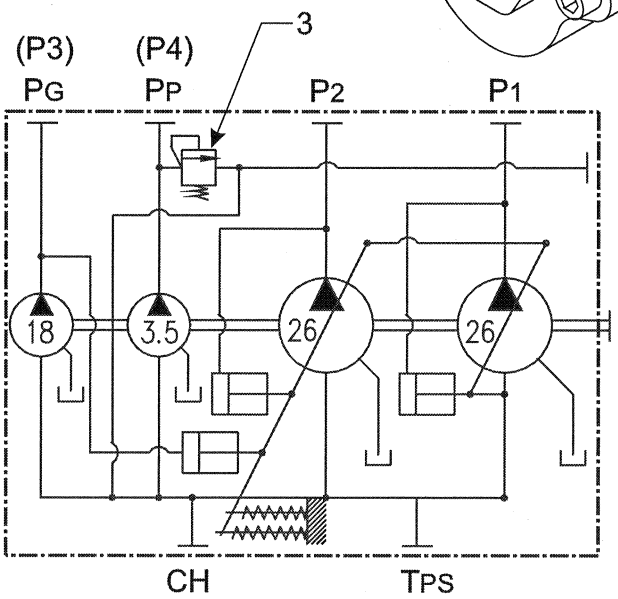


Typ Model Type Tipo	**HR 20**	**Blocksteuergerät - Lasthalteventil** **Valve bank - load check valve** **Bloc distributeur - clapet de sécurite** **Bloque de válvulas - válvula de seguridad**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Instrucción de regulación**		Blatt Page Feuille Página	**5.60.01**

Pos. Item Rep. No.	Deutsch	English	Français
(01)	**Blocksteuergerät** *KVSE-72-11*	**valve bank** *KVSE-72-11*	**bloc distributeur** *KVSE-72-11*
(02)	**Lasthalteventil**	**load check valve**	**clapet de sécurite**
(B7)	**Lastwarnsensor**	**load warning sensor**	**capteur avertiseur de charge**
(A)	**Messstelle für** **Arbeitspumpe P3** und *Einstellungen am Blocksteuergerät* (01)	**test port for** **working pump P3** and *settings at valve bank* (01)	**prise de pression pour** **pompe équipement P3** et *réglages côté distributeur* (01)
1	**Hauptüberdruckventil (HÜV)**	**main relief**	**limiteur de pression**
	für	*for*	*pour*
●	Schwenken	swing	orientation
●	Räumschild *mit Nachsaugventil* **(4)**	dozer blade *with anticavitation valve* **(4)**	lame d'appui *avec clapet anti-cavitation* **(4)**
(B)	**Messstelle für** **Arbeitspumpe P1** und *Einstellungen am Blocksteuergerät* (01)	**test port for** **working pump P1** and *settings at valve bank* (01)	**prise de pression pour** **pompe équipement P1** et *réglages côté distributeur* (01)
2	**Hauptüberdruckventil (HÜV)**	**main relief**	**limiteur de pression**
	für	*for*	*pour*
●	Fahren rechts	travel right	translation droite
●	Knicken *mit Nachsaugventilen* **(13+14)**	articulation *with anticavitation valves* **(13+14)**	articulation *avec clapets anti-cavitations* **(13+14)**
●	Löffelstiel *mit Sekundärventilen* **(7+8)**	dipper *with line relief valves* **(7+8)**	balancier *avec clapets secondaires* **(7+8)**
●	Zusatzsteuerkreis *mit Sekundärventilen* **(5+6)**	additional hydraulic circuit *with line relief valves* **(5+6)**	circuit supplémentaire *avec clapets secondaires* **(5+6)**
(C)	**Messstelle für** **Arbeitspumpe P2** und *Einstellungen am Blocksteuergerät* (01)	**test port for** **working pump P2** and *settings at valve bank* (01)	**prise de pression pour** **pompe équipement P2** et *réglages côté distributeur* (01)
3	**Hauptüberdruckventil (HÜV)**	**main relief**	**limiteur de pression**
●	Fahren links	travel left	translation gauche
●	Löffel *mit Sekundärventilen* **(9+10)**	bucket *with line relief valves* **(9+10)**	godet *avec clapets secondaires* **(9+10)**
●	Ausleger *mit Sekundärventilen* **(11+12)**	boom *with line relief valves* **(11+12)**	flèche *avec clapets secondaires* **(11+12)**

Typ Model Type Tipo	**HR 20**	**Blocksteuergerät - Lasthalteventil** **Valve bank - load check valve** **Bloc distributeur - clapet de sécurite** **Bloque de válvulas - válvula de seguridad**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Instrucción de regulación**		Blatt Page Feuille Página	**5.60.02**





Motor
Engine
Moteur
Motor

Typ Model Type Tipo	**HR 20**	**Arbeitspumpe** **Working pump** **Pompe équipement** **Bomba de trabajo**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Instrucción de regulación**		Blatt Page Feuille Página	**5.60.03**

Pos. Item Rep. No.	Deutsch	English	Français
(03)	**Arbeitspumpe** PSVD2-26E *26+26+18+3,5 cm³/U*	**working pump** PSVD2-26E *26+26+18+3,5 cm³/rev.*	**pompe équipement** PSVD2-26E *26+26+18+3,5 cm³/tour*
(D)	**Messstelle für** **Arbeitspumpe PP (P4)** und *Einstellungen am Vorsteuerdruck* **(3)**	**test port for** **working pump PP (P4)** and *settings at pilot pressure* **(3)**	**prise de pression pour** **pompe équipement PP (P4)** et *réglages côté pression pilotage* **(3)**
3	**Vorsteuerventil**	**pilot valve**	**clapet pilot**
P1	Arbeitspumpe *(Axialverstellkolbenpumpe)*	working pump *(plunger pump)*	pompe équipement *(pompe à débit variable)*
P2	Arbeitspumpe *(Axilaverstellkolbenpumpe)*	working pump *(plunger pump)*	pompe équipement *(pompe à débit variable)*
PG	Arbeitspumpe *(Zahnradpumpe **P3**)*	working pump *(gear pump **P3**)*	pompe équipement *(pompe à engrenages **P3**)*
PP	Vorsteuerpumpe	pilot pump	pompe pression pilotage
CH	Enlüftungsstopfen *(verschlossen)*	breather plug *(closed)*	bouchon d'aération *(bouche)*
TPS	Sauganschluss	suction port	pot d'aspiration

Deutsch

Die werkseitige Leistungseinstellung kann bei Bedarf wie folgt nach **Druck, Fördermenge** und **Drückungsdrehzahl** überprüft werden:

- Litermengenmessgerät am Pumpenausgang P2 installieren.
- 600 bar Manometer an Messstelle P2 anschließen.
- Maschine auf ca. 60°C Hydrauliköltemperatur warm fahren.
- Drehzahlmeßgerät anschließen, obere Leerlaufdrehzahl am Dieselmotor prüfen und ggf. einstellen.

HR 20: 2570 +30 / -20 min^{-1}

- Die Motordrückungsdrehzahl gemäß nachstehender Tabelle mit dem Steuerkreis "Löffelstiel aus" bei Vollgas in der Zylinderendlage überprüfen.

HR 20	bar	l/min	Motor-Drückungsdrehzahl
			bei HÜV - Druck 245 bar:
	245	41 - 42	2450 +30 / -20 min^{-1}

Bei zu starken Abweichungen der Litermenge bzw. der Drückungsdrehzahl Einstellschraube **(1)** nachjustieren.

Hierzu: Kontermutter (2) lösen und Einstellschraube (1) verstellen.

- Eindrehen nach rechts : Regelbeginn später (höhere Litermenge))
- Ausdrehen nach links : Regelbeginn früher (Litermenge niedriger)

Typ Model Type Tipo	**HR 20**	**Arbeitspumpe Working pump Pompe équipement Bomba de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung Setting instructions Instructions de réglage Instrucción de regulación**		Blatt Page Feuille Página	**5.60.04**

English

If necessary, the factory power setting can be checked for **pressure, flow rate** and **engine stall rpm:**

- Install flow meter (litre) at the pump outlet **P2**
- Connect 600 bar gauge to gauge port **P2**
- Operate the machine until it reaches a hydraulic oil temperature of approx. 60 ° C
- Connect tachometer, check and adjust if necessarry the max. idle running speed at the diesel engine.

HR 20: **2570 +30 / -20 min^{-1}**

- Check the engine stall rpm at full speed with the control circuit "dipper stick out" in the end position according to the following values:

HR 20	bar	l/min	**Engine stall rpm** at main pressure relief valve pressure of 245 bar: 2,450 +30 / -20 min $^{-1}$
	245	**41 - 42**	

In case the flow and / or the engine stall rpm differ too much, re-adjust the setscrew **(1)**.

- **To do this:** Slacken the counternut **(2)** and adjust the setscrew **(1)**

  - Turning to the right: Regulation start later (higher flow)
  - Turning to the left: Regulation start earlier (less flow)

Français

Si besoin est, les **pressions**, les **débits** et la **chute de régime** ajustés par l'usine peuvent être vérifiés:

- Installer un indicateur de débit sur la sortie de pompe **P2**.
- Monter un manomètre de 600 bar sur la prise de pression **P2**.
- Actionner le matériel jusqu'à ce qu'une température d'huile hydraulique d'env. 60 °C soit atteinte.
- Brancher un indicateur de nombre de tours, ajuster la marche à vide maxi. au moteur diesel et vérifier.

HR 20: **2570 +30 / -20 min^{-1}**

- Vérifier la chute de régime, moteur à plein régime, d'après le tableau ci dessous avec le circuit „balancier sorti", fin de course. -

HR 20	bar	l/min	**Chute de régime moteur** à une pression du limiteur de pression principal de 245 bar: 2.450 +30 / -20 min^{-1}
	245	**41 - 42**	

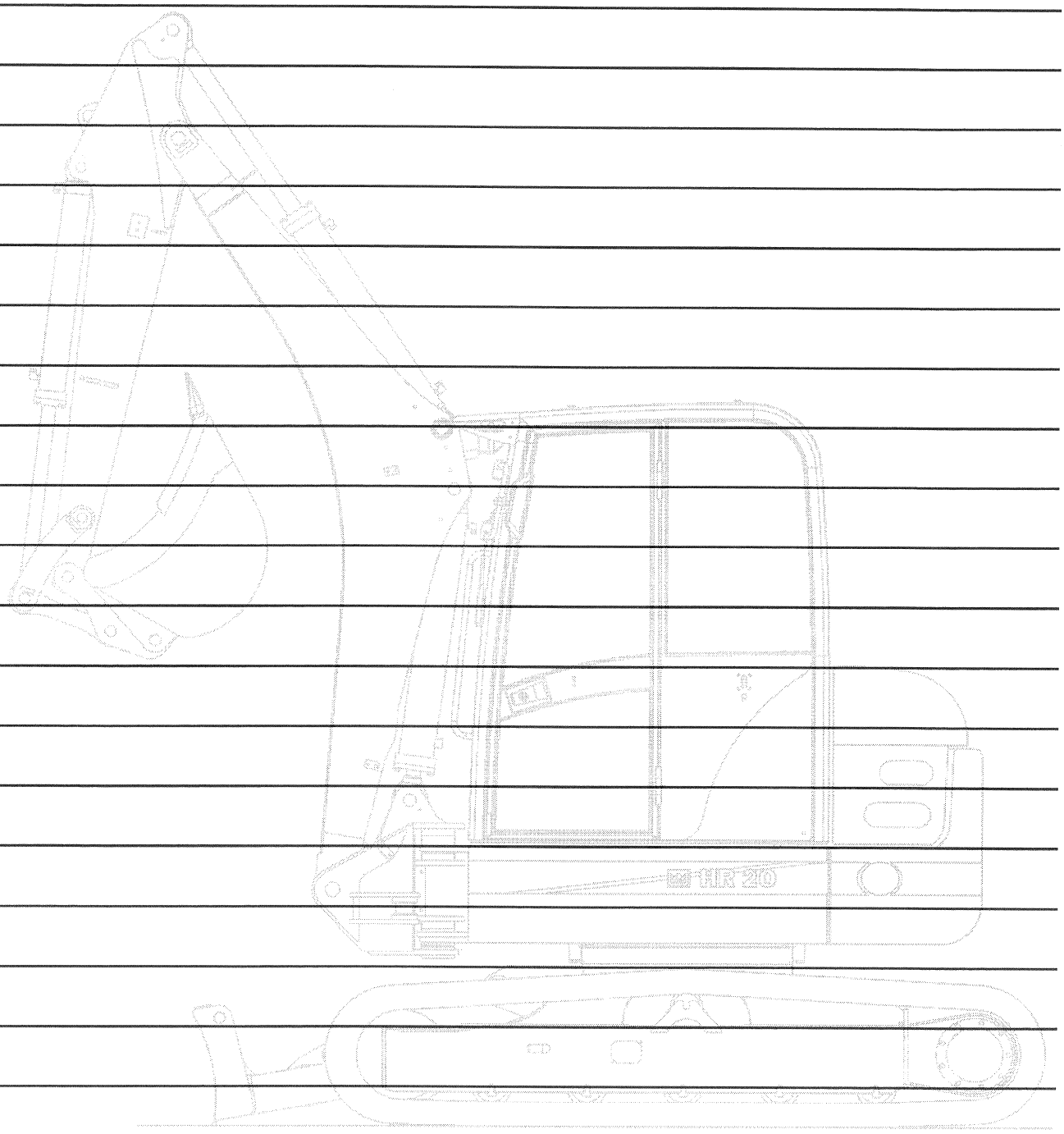
Rajuster la vis de réglage **(1)** en cas des différences excessives du débit et / ou de la chute de régime.

- **Pour faire cela:** Desserrer le contre-écrou **(2)** et ajuster la vis de réglage **(1).**

  - Resserer vers la droite: début de régulation plus tard (plus de débit)
  - Desserrer vers la gauche: début de régulation plus tôt (moins de débit)

Typ Model Type Tipo	**HR 20**	**Arbeitspumpe** **Working pump** **Pompe équipement** **Bomba de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Instrucción de regulación**		Blatt Page Feuille Página	**5.60.05**

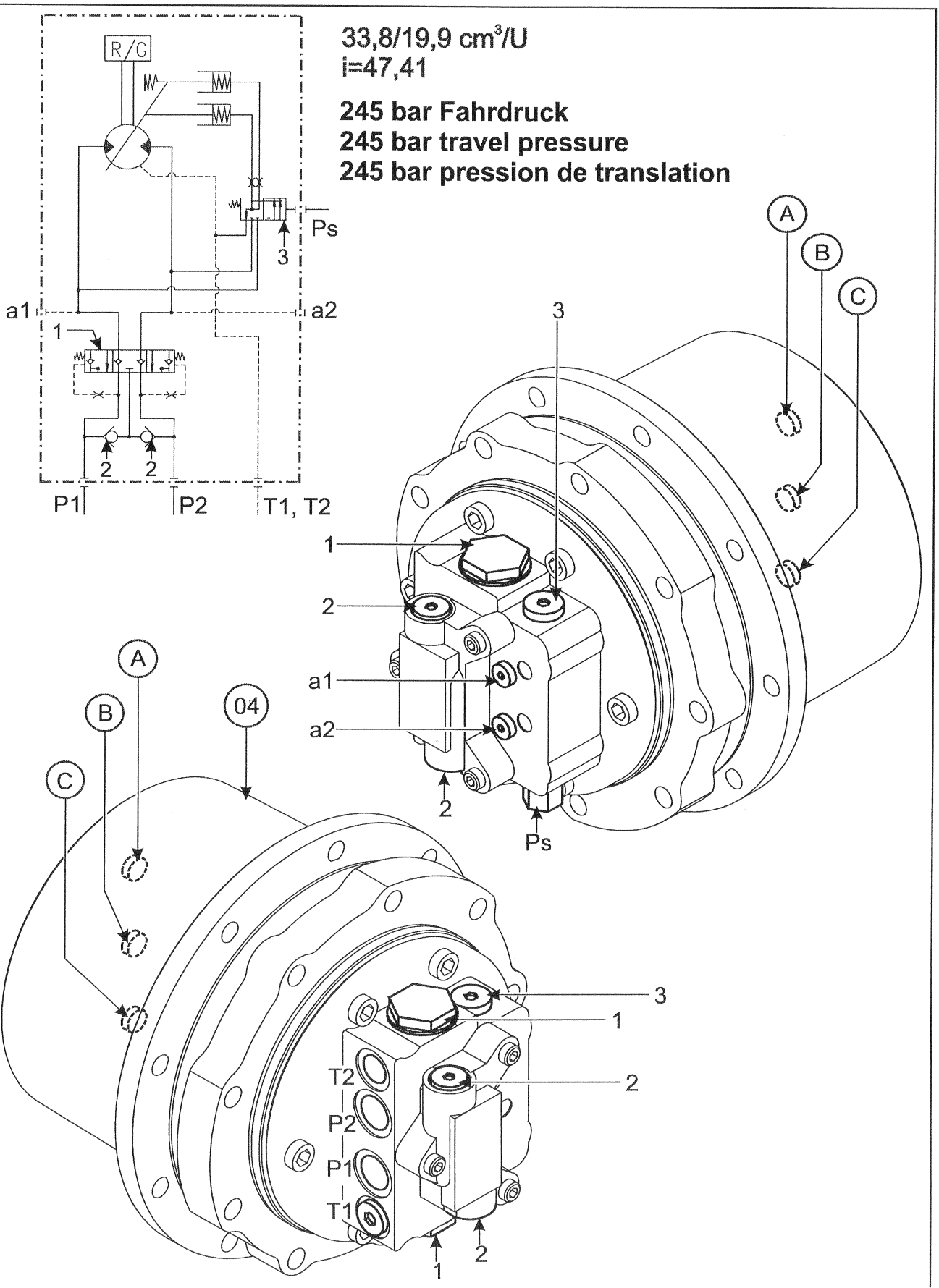
HR 20



Typ Model Type Tipo	**HR 20**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Notizen** **Notes** **Notices** **Notas**	Blatt Page Feuille Página	

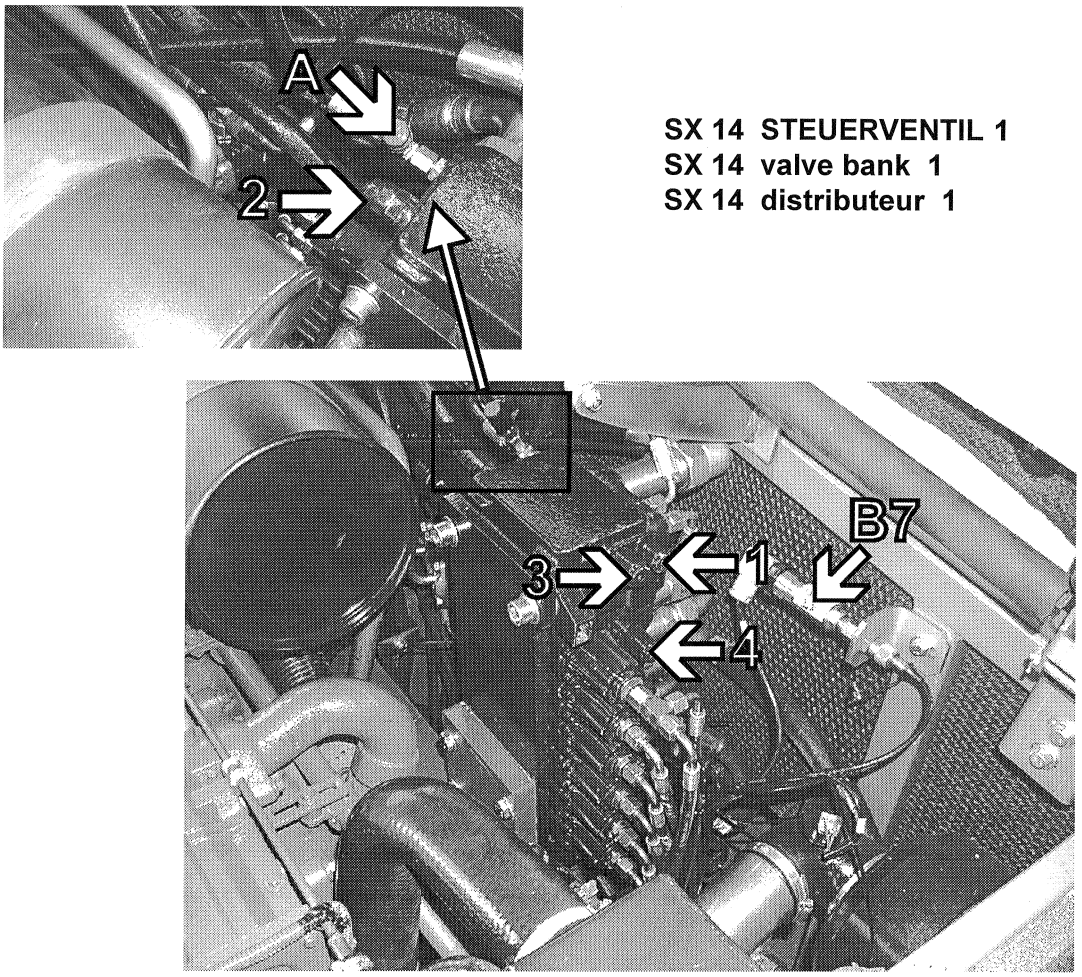
33,8/19,9 cm³/U
i=47,41

245 bar Fahrdruck
245 bar travel pressure
245 bar pression de translation



Typ Model Type Tipo	**HR 20**	**Fahrantrieb** **travel drive** **entraînement** **transmisión**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Instrucción de regulación**		Blatt Page Feuille Página	**5.60.06**

Pos. Item Rep. No.	Deutsch	English	Français
(04)	**Fahrantrieb**	**travel drive**	**entraînement**
P1	Druckanschluß *(Fahren)*	pressure connection *(travel)*	connexion de pression *(translation)*
P2	Druckanschluß *(Fahren)*	pressure connection *(travel)*	connexion de pression *(translation)*
T1	Verschlußschraube *(Lecköl)*	plug *(drain oil)*	bouchon *(huile de fuite)*
T2	Leckölanschluß	drain oil connection	connexion d'huile de fuite
Ps	Schaltdruckanschluß *(schnell / langsam)*	shift pressure connection *(low / high speed)*	connexion de commande de pression *(petite / grande vitesse)*
a1	Verschlußschraube *(Meßanschluß - Fahrdruck* **P2***)*	plug *(testport for travel pressure* **P2***)*	bouchon *(prise de pression pour pression de translation* **P2***)*
a2	Verschlußschraube *(Meßanschluß - Fahrdruck* **P1***)*	plug *(testport for travel pressure* **P1***)*	bouchon *(prise de pression pour pression de translation* **P1***)*
1	Verschlußschraube für Fahrbremsschieber	plug for counter balance spool	bouchon pour tiroir de frein de translation
2	Nachsaugventil (*Fahren* **P1, P2**)	anticavitation valve (*travel* **P1, P2**)	clapet anti-cavitation (*translation* **P1, P2**)
3	Verschlußschraube für Steuerkolben (schnell / langsam)	plug for spool *(low / high speed)*	bouchon pour tiroir *(petite / grande vitesse)*
(C)	Öleinfüllschraube	oil filling plug	bouchon de remplissage d'huile
(B)	Ölstandsschraube	oil-level check plug	bouchon de contrôle du niveau d'huile
(C)	Ölablaßschraube	oil-drain plug	bouchon de vidange d'huile



SX 14 STEUERVENTIL 1
SX 14 valve bank 1
SX 14 distributeur 1

A Messstelle für
Einstellungen am Steuerventil:
- LS – Druck (**1**)
- SV – Druck (**2**)
- Sekundärdrücke (**4**)

und
Messstelle für
Einstellungen an der Arbeitspumpe:
- Stand–by Druck
- Δp Druck

B7 Lastwarnsensor

1 LS-Druckbegrenzungsventil (einstellbar)
2 Sicherheitsventil (einstellbar)
3 LS-Stromregelventil (nicht einstellbar)
4 Sekundärventil(e) (einstellbar)

A test port for
settings at valve bank:
- LS – pressure (**1**)
- safety valve pressure (**2**)
- line relief pressures (**4**)

and
test port for
settings at working pump:
- stand–by pressure
- Δp pressure

B7 load warning sensor

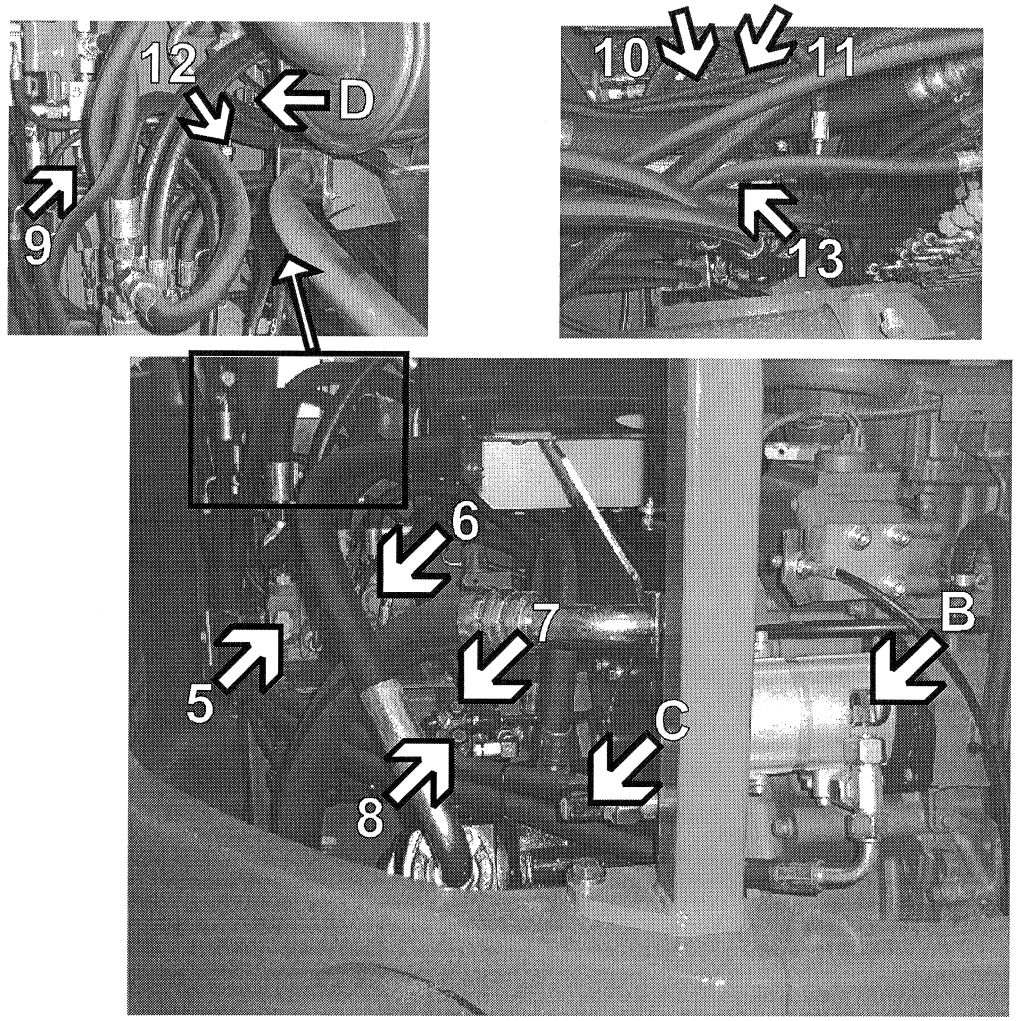
1 load sensing pressure valve (adjustable)
2 safety valve (adjustable)
3 LS – flow regulator valve (not adjustable)
4 line relief valve(s) (adjustable)

A prise de pression pour
réglages côté distributeur :
- pression d´atteinte (pression LS)(**1**)
- pression valve de sécurité (**2**)
- pressions secondaires (**4**)

et
prise de pression pour
réglages côté pompe équipement :
- pression d´atteinte (pression LS)
- pression Δp

B7 capteur avertisseur de charge

1 limiteur de pression LS (réglable)
2 clapet de sécurité (réglable)
3 régulateur de débit LS (non réglable)
4 clapet(s) secondaire(s) réglable(s)



B Messstelle für
Einstellungen am Steuerventil Nebenkreis u. Schwenkmotor:
- HÜV Steuerventil 2 (SM12) (**5**)
- Ventile am Schwenkmotor (**10** u. **11**)
- Räumschild (ohne Sekundärventile)
- Knicken (Nachsaugventile **6**)

C Messstelle für
- Abschaltdruck Ventil (**9**)

z.B. Räumschild auf Block, Vollgas, Druck langsam erhöhen

D Messstelle für
- Vorsteuerdruck (**12**)

B test port for
settings at valve bank secondary functions and swing motor:
- main relief at valve bank 2 (SM12) (**5**)
- line reliefs at slew motor (**10** and **11**)
- dozer blade (without line relief valves)
- articulation (anti-cavitation valves **6**)

C test port for
- cut –off pressure valve (**9**)

e.g. dozer blade in end stroke position, full throttle, slowly increase pressure

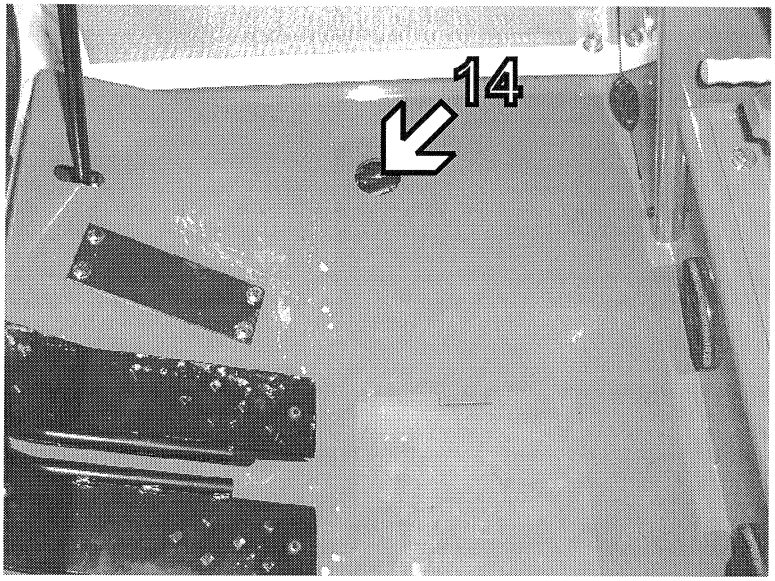
D test port for
- pilot pressure (**12**)

B prise de pression pour
réglages côté distributeur circuit hydr. secondaire et moteur d'orientation :
- limiteur de pression distributeur 2 (SM12) (**5**)
- clapets secondaires côté moteur d'orientation (**10** et **11**)
- lame (sans clapets secondaires)
- articulation (clapets anti-cavitation 6)

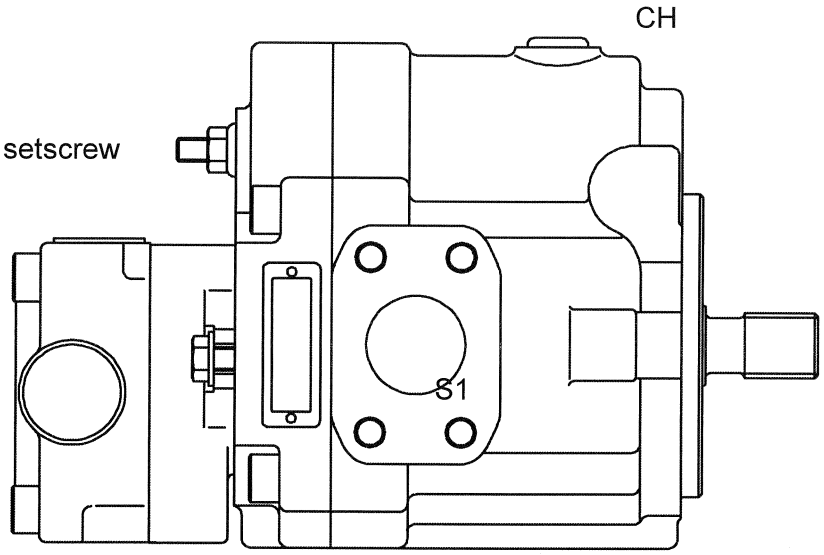
C prise de pression pour
- pression de coupure clapet (**9**)

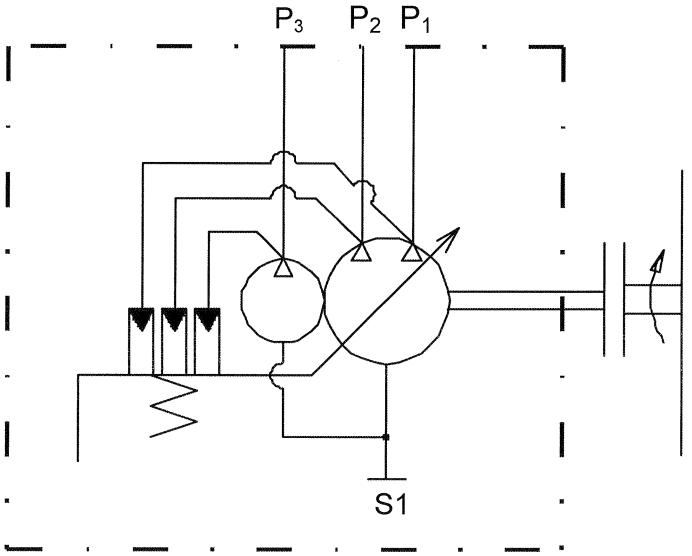
p.ex. lame en butée, pleins gaz, augmenter doucement la pression

D prise de pression pour
- pression de pilotage (**12**)



Einstellschraube am Druckminderventil (**14**).	Adjustment bolt at pressure reducing valve (**14**).	Vis de réglage côté soupape réductrice (**14**).
Vorsteuerdruck für Zusatzsteuer-kreis.	Pilot pressure for additional control circuit.	Pression pilotage pour circuit supplémentaire.
Einstellung der Geschwindigkeit (z.B. Greifer drehen)	Adjustment of flow (e.g. speed adjustment for clam shell rotation)	Réglage du débit (p.ex. réglage de la vitesse de rotation de la benne preneuse)





P_1	working pump	(piston pump)
P_2	working pump	(piston pump)
P_3	working pump	(gear pump)
CH	closed	(breather plug)
S1	suction port	

SCHAEFF	Typ/Model/Type **HR 13 (from serial no. 1300/0100)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram setting instructions - working pump**	Blatt/Page/Feuille **5.75.01**

Setting instructions working pump HR 13

If necessary, the factory **pressure, flow rate,** and **engine stall rpm** setting can be checked:

- Install flow meter (litre) at the pump outlet P2
- Connect 600 bar gauges to gauge port P1 and P2
- Operate the machine until it reaches a hydraulic oil temperature of approx. 50° C
- Connect tachometer, adjust and check max. idle running speed at the diesel engine.

HR 13: **2,600 $^{+35}/_{-10}$ min^{-1}**

- Check the regulation start as well as the engine stall rpm at full speed with the control circuit "boom" according to the following table:

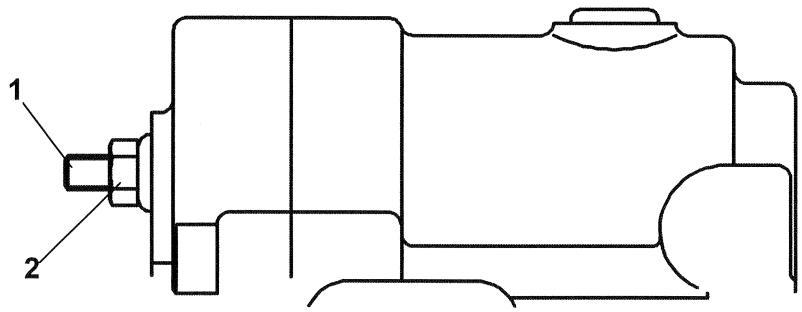
1) Extend stick and boom to final position, then throttle the pressure of the stick to 100 bar and hold (gauge P1)
2) Gradually throttle the boom pressure by means of the joystick (gauge P2).

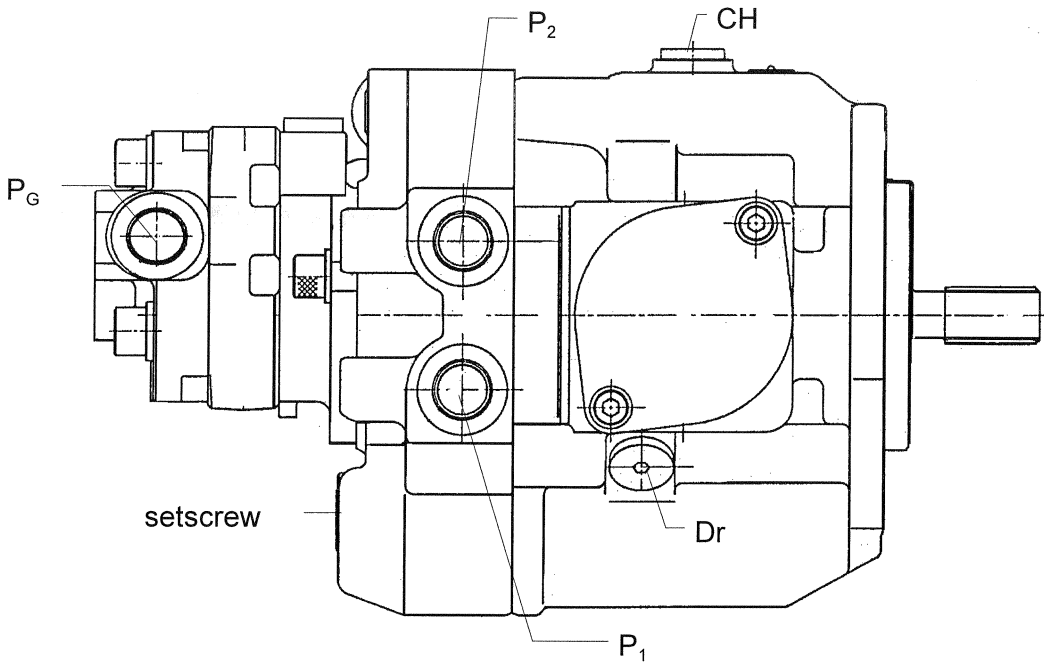
HR 13	bar	l/min ±1	Engine stall rpm
	90	20.0	Load one of the pumps to main relief pressure of 180 bar:
Regulation start at	**100**	**19.5**	
	110	19.0	2,450 $^{+20}$ min^{-1}

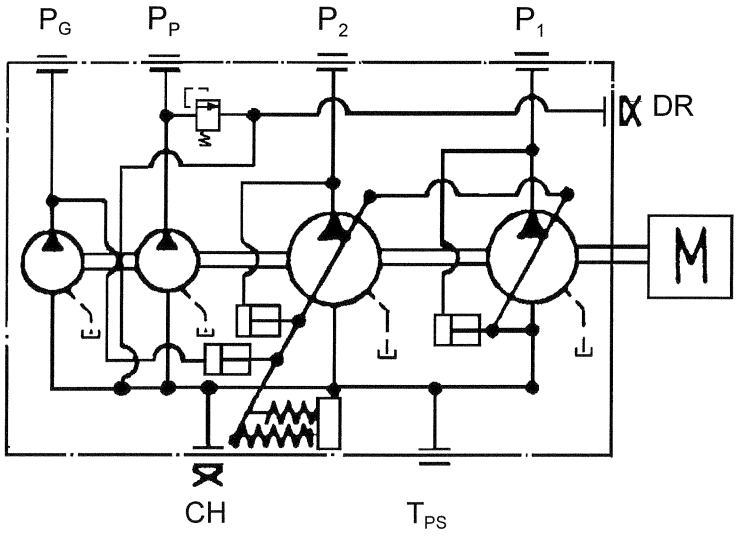
In case the regulation start and / or the engine stall rpm differ too much, re-adjust the setscrew **(1)**.

- **To do this:** Slacken the counternut (2) and adjust the setscrew (1)

  - Turning to the right: Regulation start later (more power)
  - Turning to the left: Regulation start earlier (less power)







P_1	working pump	(piston pump)
P_2	working pump	(piston pump)
P_P	pilot pump	
P_G	working pump	(gear pump P3)
DR	closed	
CH	closed	(breather plug)
T_{PS}	suction port	

SCHAEFF	Typ/Model/Type **HR 14 (from serial no. 356/1431)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram setting instructions - working pump**	Blatt/Page/Feuille **5.76.01**

Setting instructions working pump HR 14

If necessary, the factory power setting can be checked for **pressure, flow rate** and **engine stall rpm**:

- Install flow meter (litre) at the pump outlet P1
- Connect 600 bar gauge to gauge port P1
- Operate the machine until it reaches a hydraulic oil temperature of approx. 50° C
- Connect tachometer, adjust and check max. idle running speed at the diesel engine.

HR 14: **2,450 min^{-1}**

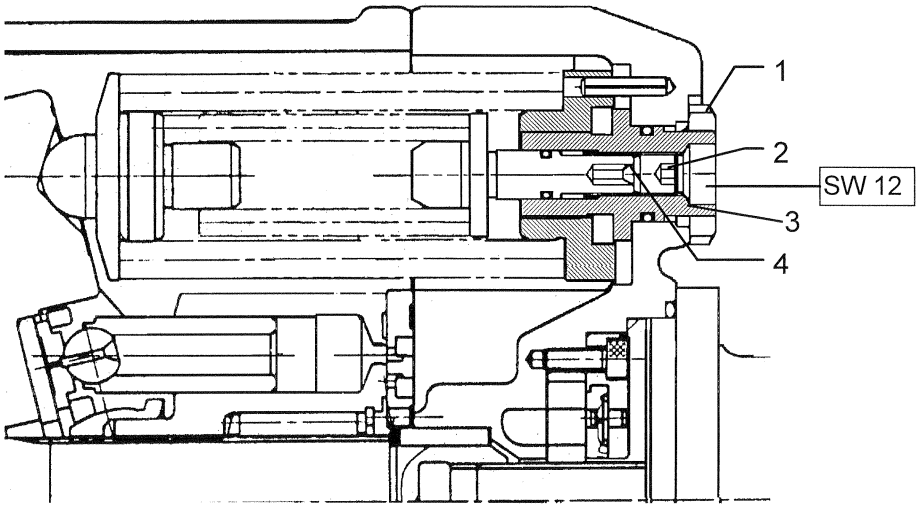
- Check the regulation start as well as the engine stall rpm at full speed with the control circuit "dipperstick" according to the following table:

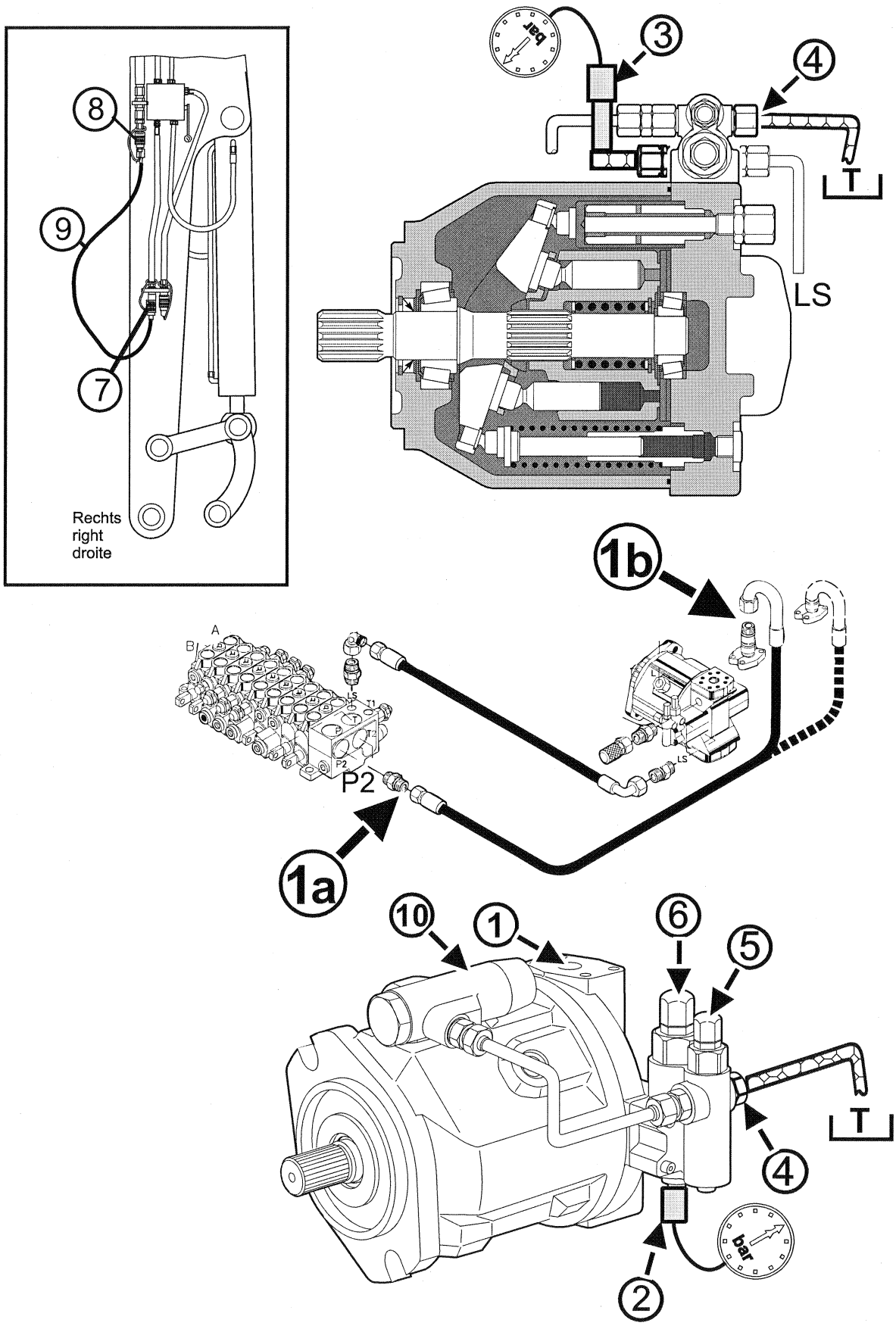
HR 14	bar	l/min ±1	Engine stall rpm
	180	37	at main pressure relief valve pressure of 210 bar: 2,300 ± 30 min^{-1}
Regulation start at	190	36	
	200	33	

In case the regulation start and / or the engine stall rpm differ too much, re-adjust the setscrew **(3)**.

- **To do this:** Remove hexagon socket plug **(2) SW 5** - secured with Loctite - that the hexagon socket screw key **SW12** can be inserted completely
- Slacken counter-ring **(1)**
- The setscrew **(4)** below, hexagon socket screw **SW 4**, is secured with Loctite and / or locked mechanically, **do not slacken !**
- Turn setscrew **(3)**, hexagon socket screw **SW12**, until the regulation start and the engine stall rpm correspond to the desired values.

  - Turning in - to the right: Regulation start earlier (less power)
  - Turning out - to the left: Regulation start later (more power)





TEREX | SCHAEFF	Typ/Model/Type **HR 14 from s/n.: 356/3136**	Datum/Edition/Date **01.2005**
	Benennung/Description/Dénomination **Setting instruction working pump A10VO45 DFLR**	Blatt/Page/Feuille **5.76.04**

TEREX | SCHAEFF

Mounting instructions

1 Hose situation of pump P towards valve bank port P2

1a **Up to s/n: 356/3434:**

Remove hose at valve bank port P2 (thread: S25).
Mount additional hose (part # 4.470.079.502) at valve bank and put a flow meter between this hose and the valve bank.

1b **From s/n: 356/3435:**
Remove hose at pump flange P (thread :S25)
Mount additional hose (part # 4.470.079.502) at pump flange and put a flow meter between flange and hose.

Needed parts for both situations:

2 x	elbow fitting	part # 1.924.060.256
2 x	hose	part # 4.470.079.502
1 x	fitting	part # 1.915.060.873

2 Gauge port for max. pump pressure (P) is factory mounted

3 Mount pressure gauge at LS-controller (stand by) opposite of LS-hose

Needed parts:

1 x	gauge port		part # 5.066.234.200
1 x	straight fitting	GES 8-PS 7/16-20 UNF	part # 1.939.000.815
1 x	elbow fitting		part # 1.924.000.571

4 Hose for tank discharge of the horse power valve (5).
Mount hose at horse power valve (5) at pump,remove vent valve and connect the other end of the hose to the vent valve port.

Needed parts:

1 x	straight fitting	GES 8-PS 7/16-20 UNF	part # 1.939.000.815
1 x	hose 8x1520 mm		part # 4.506.152.351

5 Horse power valve (Δp valve)

6 LS – regulator (stand-by)

7 Connect additional circuit (7) right hand side of dipperstick with pressureless returnline (8) by means of a hose (9)

Following parts are needed:

1 x	quick coupler plug male	part no. 5.000.253.100
1 x	quick coupler plug female	part no. 5.000.276.100
2 x	fitting	part no. 1.915.060.564
1 x	hose	part no. 4.262.110.363

10 Horsepower regulator (regulation start,regulation end)

Adjustment procedure

- Machine must have service temperature (approx 50 – 60 ° C)
- Mount gauges
- Check engine rpms, low and high idle and adjust if necessary

Adjustment of the regulators:

- Without tank discharge (4). Set LS-Controller(6) to a differencial pressure (Δp) between P and LS to approx.25 – 28 bar while additional circuit is activated (dynamic)

- Mount tank discharge (4) Set horse power valve (5) to 20 bar (no Δp) while additional circuit is activated

- Without tank discharge (4) Set LS-Controller (6) now to a differencial pressure (Δp) between P and LS to 15,3 bar while additional circuit is activated (dynamic)

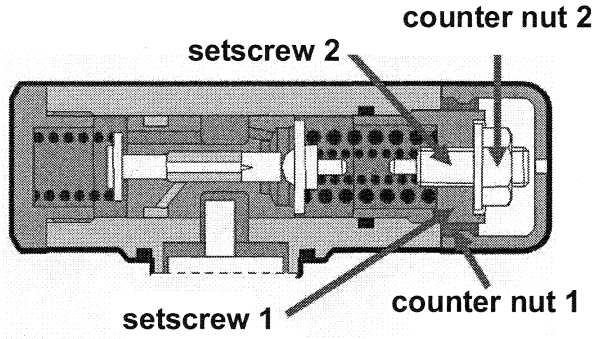
Checking of adjustment:

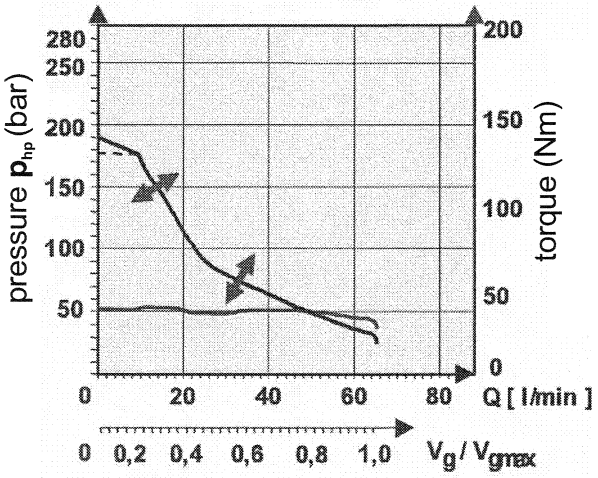
- Lift the machine, give full throttle and run the tracks in high speed (rabbit)
  Flow: 90 liters
  Pressure: 90 bar

In case of too much divergences ,adjustment of regulation start and end is possible at horse power control valve (6) according characteristic curve and chart.

A10V(S)O pressure, flow, power control

Adjust power control





Adjust the regulation start with the setscrew "1"

1. Loosen the counter nut "1"

2. Adjust the regulation start by turning the setscrew "1":
   Turning to the right - increase power
   Turning to the left - decrease power

3. Secure the setscrew "1" with the counter nut "1"

Adjust the regulation end with the setscrew "2":

4. Loosen the counter nut (13mm hexagon)

5. Adjust the regulation end by turning the setscrew "2" (4mm allen screw).
   Turning to the right - increase power
   Turning to the left - decrease power

6. Secure the setscrew "2" with the counter nut "2"

Requirement *for adjustment:*

Measuring of revolutions per minute and pressure
Flow rate measuring (flow meter)

A10V(S)O pressure, flow, power control

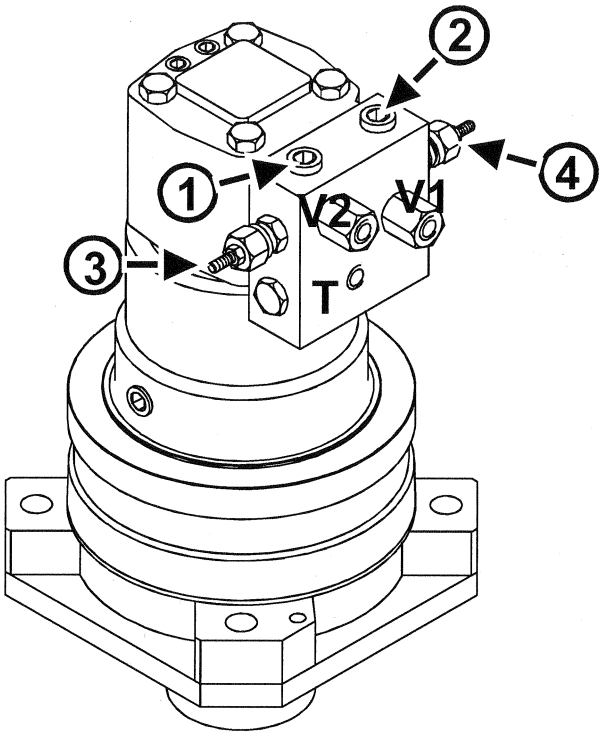
TEREX SCHAEFF

Mobile Hydraulics

power line for A10 VO 45 DFLR (t.o. 2429462 / serial-no.769491) mounted in HR14 from the Terex Schaeff company

X (flow)	Y (pressure)
0	205
20	203
30	202
35	198
40	180
50	150
60	131
70	118
80	102
90	90
95	80
100	0

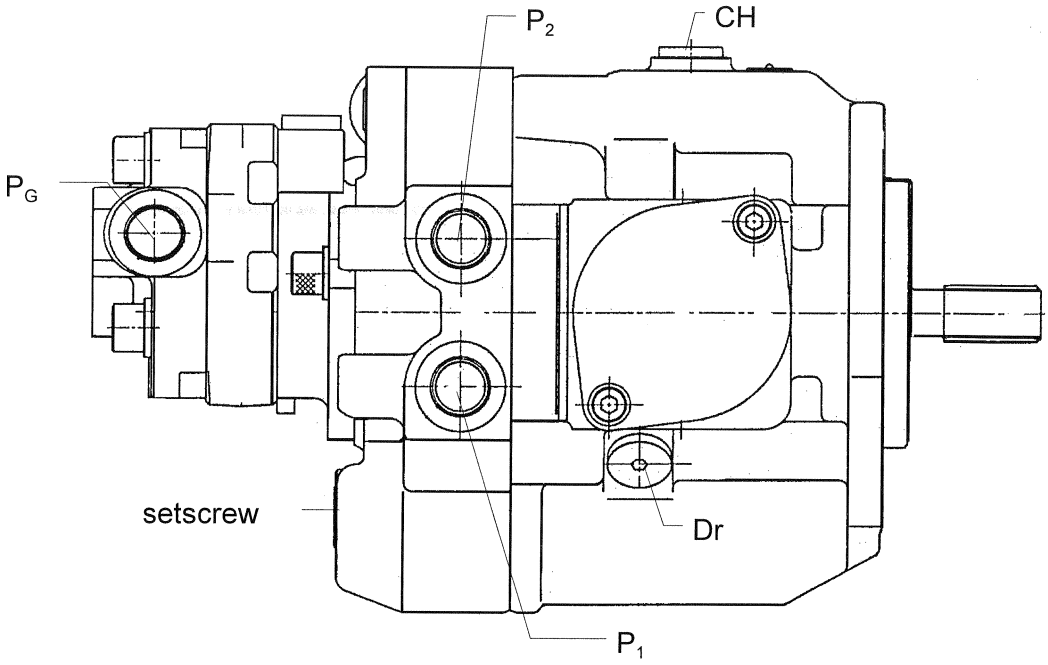
TEREX | SCHAEFF	Typ/Model/Type **HR 14 ab Fz.-Id.-Nr.: 356/3136**	Datum/Edition/Date **01.2005**
	Benennung / Description / Dénomination **Setting instruction working pump A10 VO45 DFLR**	Blatt/Page/Feuille **5.76.06**

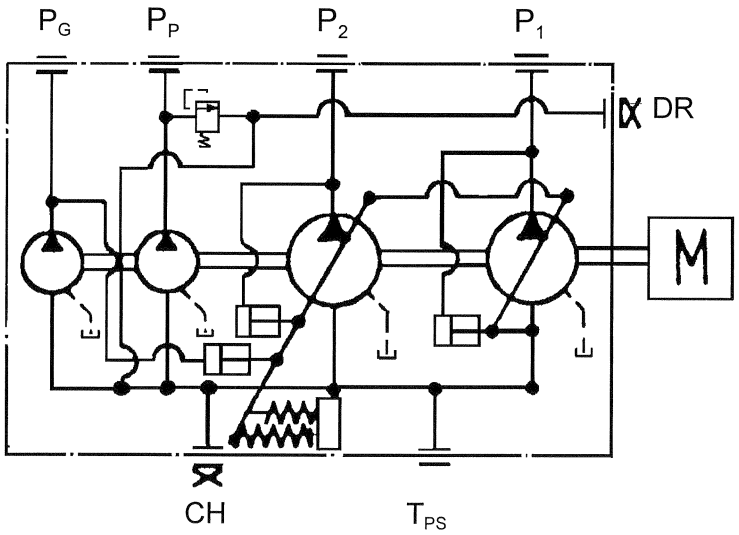


Adjustment procedure swing drive

- Machine must have service temperature (approx. 50-60°C)
- Remove floor plate in the cabin
- Release pilot pressure from accumulator, plug (1) and (2) are pressurized
- Remove plug (1) and (2) from valve bloc
- Mount gauge ports ¼ " into (1) and (2)
- Mount pressure gauge (digital version recommended) to (1) and (2)
- Swing left and right under full throttle against a fix obstacle and set the pressures at valve (3) and (4) each to a **Δp** between (1) and (2) of 180 bar
  (Example: (1) = 210 bar (2) = 30 bar = Δp 180 bar)

TEREX | SCHAEFF





P_1	working pump	(piston pump)
P_2	working pump	(piston pump)
P_P	pilot pump	
P_G	working pump	(gear pump P3)
DR	closed	
CH	closed	(breather plug)
T_{PS}	suction port	

SCHAEFF	Typ/Model/Type **HR 16 (from s/n. 358/1398 to s/n 358/1667)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram setting instructions - working pump**	Blatt/Page/Feuille **5.78.01**

Setting instructions working pump HR 16

If necessary, the factory power setting can be checked for **pressure, flow rate** and **engine stall rpm**:

- Install flow meter (litre) at the pump outlet P1
- Connect 600 bar gauge to gauge port P1
- Operate the machine until it reaches a hydraulic oil temperature of approx. 50° C
- Connect tachometer, adjust and check max. idle running speed at the diesel engine.

HR 16: **2,600 min^{-1}**

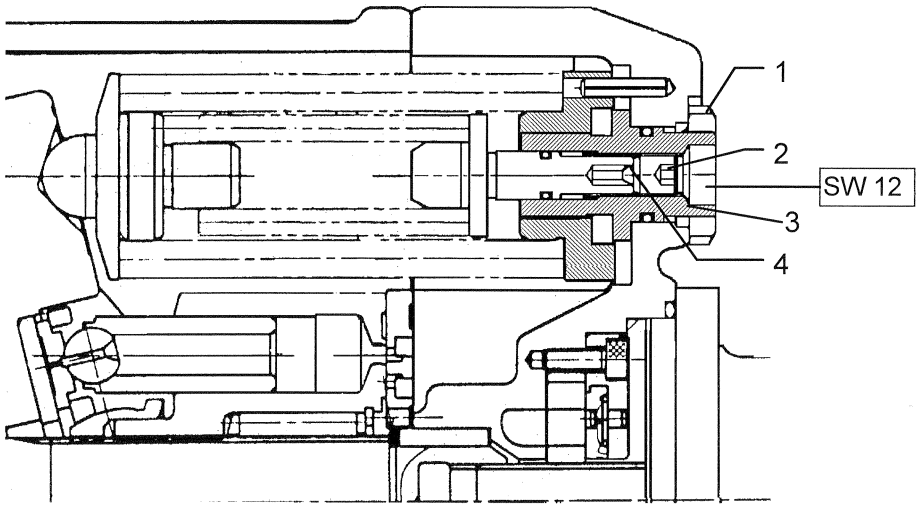
- Check the regulation start as well as the engine stall rpm at full speed with the control circuit "dipperstick" according to the following table:

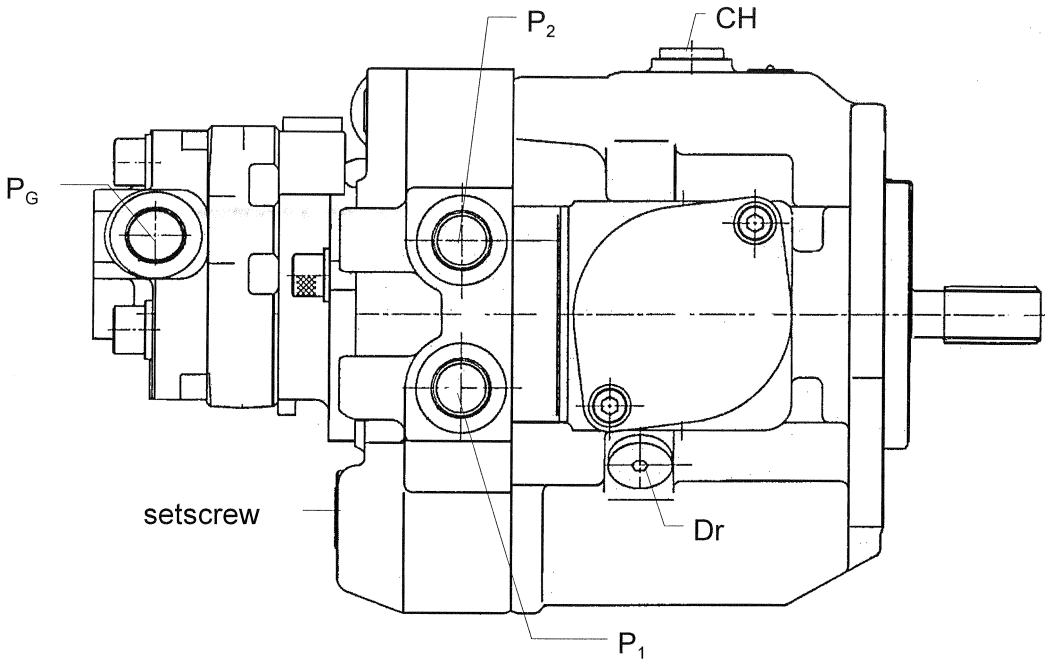
HR 16	bar	l/min ±1	**Engine stall rpm**
	180	46	at main pressure relief valve
Regulation start at	190	45	pressure of 250 bar:
	200	42	2,500 ± 30 min^{-1}

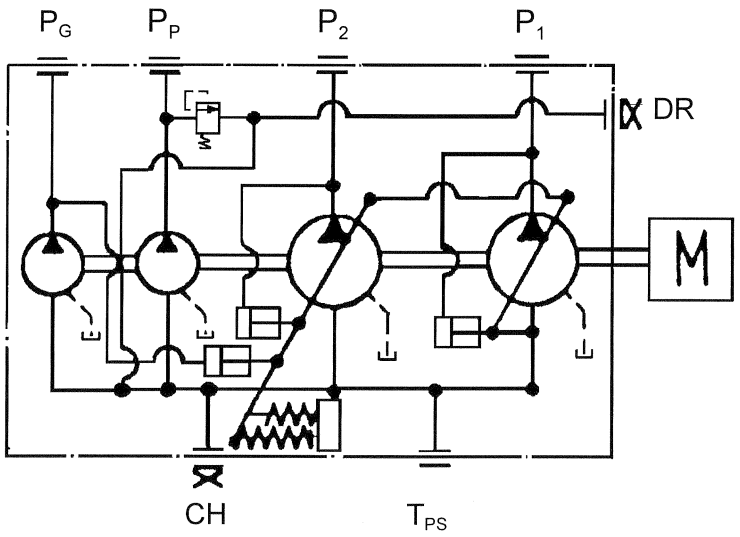
In case the regulation start and / or the engine stall rpm differ too much, re-adjust the setscrew **(3)**.

- **To do this:** Remove hexagon socket plug **(2) SW 5** - secured with Loctite - that the hexagon socket screw key **SW12** can be inserted completely
- Slacken counterring **(1)**
- The setscrew **(4)** below, hexagon socket screw **SW 4**, is secured with Loctite and / or locked mechanically, **do not slacken !**
- Turn setscrew **(3)**, hexagon socket screw **SW12**, until the regulation start and the engine stall rpm correspond to the desired values.

- Turning in - to the right: Regulation start earlier (less power)
- Turning out - to the left: Regulation start later (more power)







P_1	working pump	(piston pump)
P_2	working pump	(piston pump)
P_P	pilot pump	
P_G	working pump	(gear pump P3)
DR	closed	
CH	closed	(breather plug)
T_{PS}	suction port	

SCHAEFF	Typ/Model/Type **HR 16 (from serial no. 358/1668)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram setting instructions - working pump**	Blatt/Page/Feuille **5.78.02**

Setting instructions working pump HR 16

If necessary, the factory power setting can be checked for **pressure, flow rate** and **engine stall rpm**:

- Install flow meter (litre) at the pump outlet P1
- Connect 600 bar gauge to gauge port P1
- Operate the machine until it reaches a hydraulic oil temperature of approx. 50° C
- Connect tachometer, adjust and check max. idle running speed at the diesel engine.

HR 16: **2,600 min^{-1}**

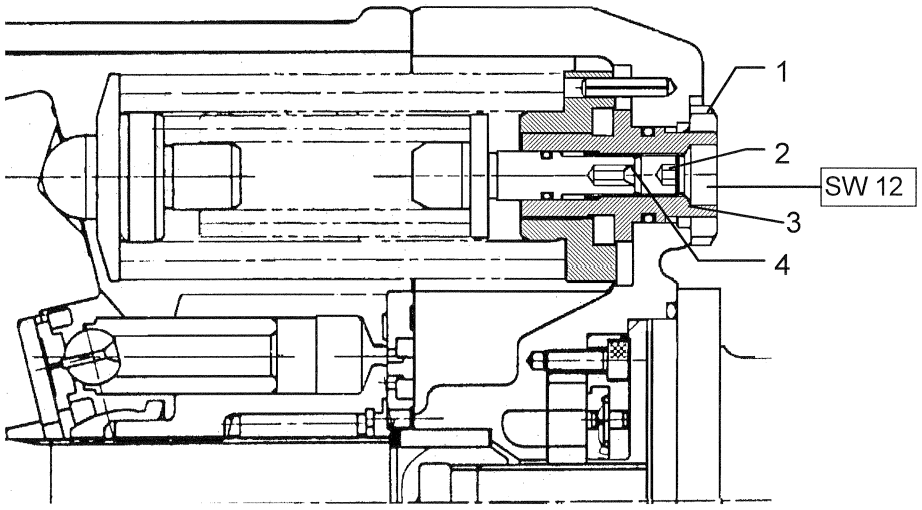
- Check the regulation start as well as the engine stall rpm at full speed with the control circuit "dipperstick" according to the following table:

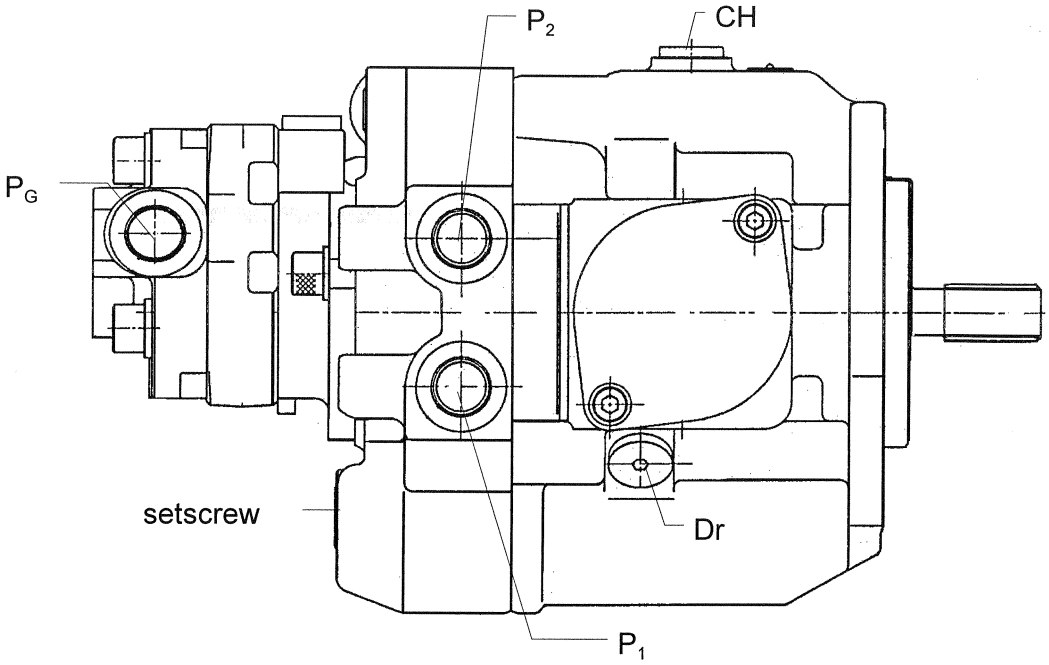
HR 16	bar	l/min ±1	**Engine stall rpm**
	180	43	at main pressure relief valve
Regulation start at	190	42	pressure of 250 bar:
	200	39	2,500 ± 30 min^{-1}

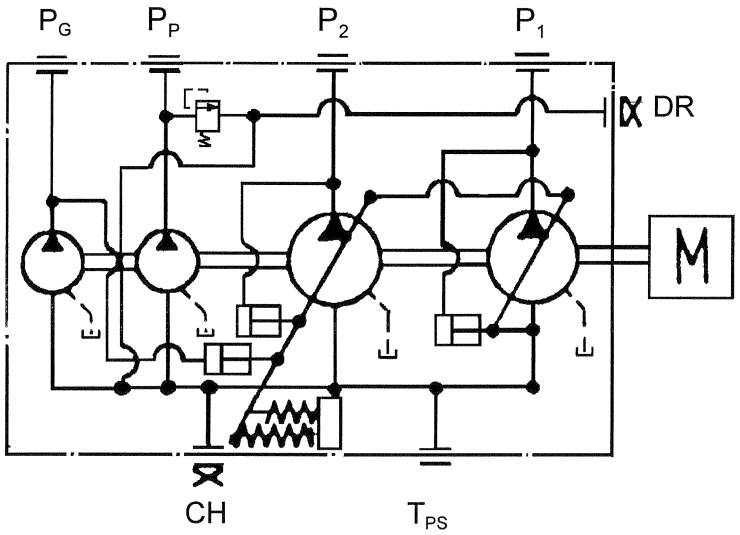
In case the regulation start and / or the engine stall rpm differ too much, re-adjust the setscrew **(3)**.

- **To do this:** Remove hexagon socket plug **(2) SW 5** - secured with Loctite - that the hexagon socket screw key **SW12** can be inserted completely
- Slacken counterring **(1)**
- The setscrew **(4)** below, hexagon socket screw **SW 4**, is secured with Loctite and / or locked mechanically, **do not slacken !**
- Turn setscrew **(3)**, hexagon socket screw **SW12**, until the regulation start and the engine stall rpm correspond to the desired values.

  - Turning in - to the right: Regulation start earlier (less power)
  - Turning out - to the left: Regulation start later (more power)







P_1	working pump	(piston pump)
P_2	working pump	(piston pump)
P_P	pilot pump	
P_G	working pump	(gear pump P3)
DR	closed	
CH	closed	(breather plug)
T_{PS}	suction port	

Setting instructions working pump HR 18

If necessary, the factory power setting can be checked for **pressure, flow rate** and **engine stall rpm**:

- Install flow meter (litre) at the pump outlet P2
- Connect 600 bar gauge to gauge port P2
- Operate the machine until it reaches a hydraulic oil temperature of approx. 50° C
- Connect tachometer, adjust and check max. idle running speed at the diesel engine.

HR 18: **2,350 +20 min^{-1}**

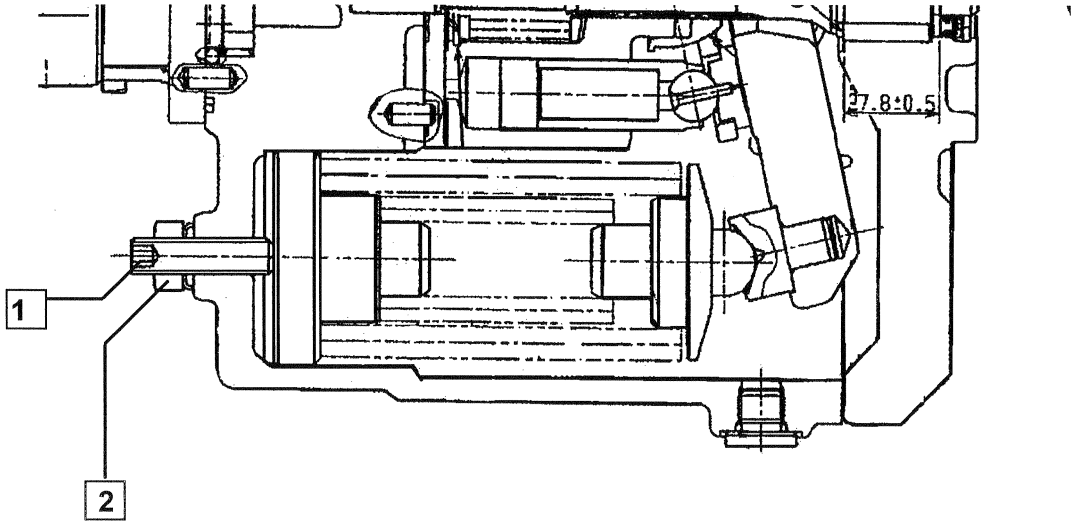
- Check the regulation start as well as the engine stall rpm at full speed with the control circuit "boom" according to the following table:

HR 18	bar	l/min ±1	Engine stall rpm
	220	55	at main pressure relief valve
Regulation start at	230	52	pressure of 245 bar:
	240	48	2,270 + 20 min^{-1}

In case the regulation start and / or the engine stall rpm differ too much, re-adjust the setscrew **(1)**.

- **To do this:** Slacken the counternut (2) and adjust the setscrew (1)

  - Turning to the right: Regulation start later (more power)
  - Turning to the left: Regulation start earlier (less power)



(See also description, hydraulic diagram and legend of the pages 6.85.01 and 6.85.02)

1. Connect gauge to test port at gear pump (8 cm³/rev.)

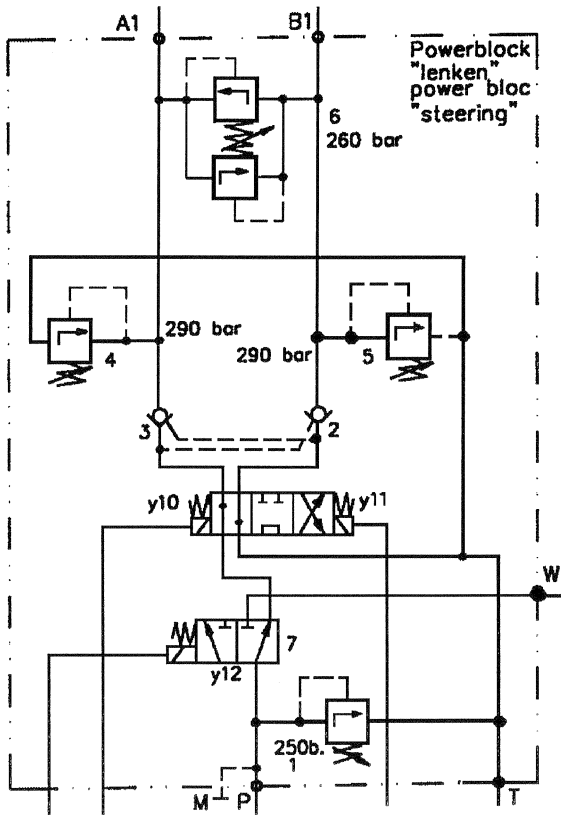
2. Turn in setscrews of line relief valves located in the steering block (punched no. **4, 5**) and cross-over valves (punched no. **6**) until mechanical stop.

3. Set main pressure relief valve (punched no. **1**) to more than 290 bar (operate steering until it reaches its mechanical stop).

4. Set line relief valves (punched no. **4, 5**) to 290 bar bar (operate steering until it reaches its mechanical stop on the right or on the left).

5. Set cross-over valves (punched no. **6**) to 260 bar (operate steering until it reaches its mechanical stop on the right or on the left).

6. Set the main pressure relief valve (punched no. **1**) back to 250 bar.



SCHAEFF	Typ/Model/Type **HS 41 M**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Steering valve (power block), setting instructions**	Blatt/Page/Feuille **5.85.01**

The diesel engine rpms have to be measured and - if necessary - adjusted prior to the check and / or adjustment of the transmission and working hydraulics.

1. Check and adjustment of the charge pressure (= pilot pressure of the working hydraulics)

- open the engine hood
- connect 60 bar - gauge to pressure port (M_A) or (M_B) of the travel pump
- attention, do not select any travel direction !
- set engine to high idle running speed
- read the value on the gauge. Desired value: see Technical Data
- if the desired value is not reached, screw the setscrew at the charge pressure relief valve of the travel pump (3) in or out resp.

  Screwing in: pressure increase
  Screwing out: pressure decrease

  Travel pumps without setscrew have to be adjusted via shims.

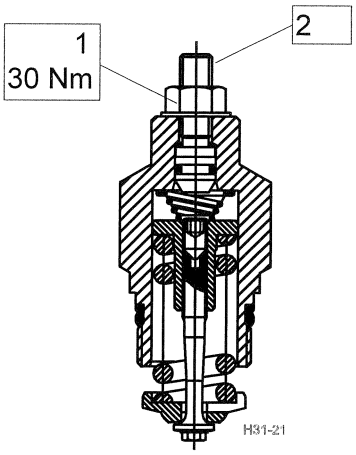
2. Check and replacement of the travel high pressure valves

(The travel high pressure valves are safety valves with towing function)

Note: It is only checked whether the travel high pressure valves are approx. 30 bar above the pressure cut-off

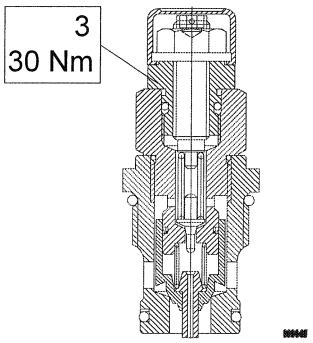
- connect 600 bar - gauge to gauge port (M_A) resp. (M_B) of the travel pump. Increase pressure cut-off (7) by approx. 30 - 40 bar
- set travel range selector switch to „rabbit“
- set travel direction lever to „forward“ or „reverse“ resp.
- drive the vehicle against a solid object
- fully accelerate
- read the value on the gauge. Desired value: approx. 460 bar

- both travel directions have to be checked
- if the reading is below the desired value, adjust the travel high pressure valves (4)
- re-adjust the pressure cut-off after this test, see point 3.



Towing function - HML 22 / HML 31:

- Slacken nut (1) at both high pressure relief valves and tighten screw (2) until it is flush with the nut (1). Tighten nut.
- Slacken nut (1) after towing and turn back screw (2) until stop. Re-tighten nut (1).



Towing function - HML 41:

- Slacken spring cartridge (3) at both high pressure relief valves by approx. 2 turns
- Retighten spring cartridge (3) after towing

3. Check and adjustment of the pressure cut-off (travel pump)

- connect 600 bar - gauge to gauge port (M_A) resp. (M_B) of the travel pump
- set travel range selector switch to „rabbit“
- start the engine
- set travel direction lever to „forward“ or „reverse“ resp.
- drive the vehicle against a solid object
- fully accelerate
- read the value on the gauge. Desired value: see Technical Data
- if the desired value is not reached, turn the setscrew (7) at the travel pump in or out resp.

  Screwing in: pressure increase
  Screwing out: pressure decrease

4. Check and adjustment of the start-up speed

- park machine on even ground
- connect engine rpm tachometer
- set travel range selector switch to „rabbit“
- start the engine
- set travel direction lever to „forward“
- slowly actuate accelerator pedal
- read the engine rpm when the machine is starting. Desired value: see Technical Data
- if the desired value is not reached, turn the setscrew at the regulator cartridge (1) in or out resp.

  Screwing in: machine starts later
  Screwing out: machine starts earlier

5. Check and adjustment of the engine stall rpm provided that the start-up speed is adjusted correctly

- remove brake inching hose (8) at travel pump and plug it. The connection at the pump can remain open.
- connect 600 bar - gauge to gauge port (M_A) or (M_B) resp. of the travel pump
- connect engine rpm tachometer
- start the engine
- jack up and secure the machine to allow free running of the wheels
- set travel range selector switch to „tortoise“ (travel motor must not regulate)
- set travel direction lever to „forward“ or „reverse“ resp.
- fully accelerate
- slowly actuate the foot brake pedal until the pressure value according to the Technical Data is reached. Read the engine rpm when the indicated pressure value is reached at the gauge port (M_A) or (M_B) . Desired value: see Technical Data
- If the desired value within the tolerance range is not reached, slight corrections can be made via the regulator cartridge and the start-up speed. In case the deviation is too high, the orifice in the regulator cartridge has to be replaced.

6. Check and adjustment of the regulation start at the travel motor

- remove brake inching hose (8) at the travel pump and plug it. The connection at the pump can remain open
- connect 600 bar - gauge to gauge port (M_A) or (M_B) of the travel pump
- connect 600 bar - gauge to gauge port (9) of the travel motor
- start the engine
- jack up and secure the machine in order to allow free running of the wheels
- set travel range selector switch to „rabbit"
- fully accelerate
- slowly operate the service brake. Both gauges increase. When the gauge (M_A - M_B) at the pump has reached the indicated regulation start value (see Technical Data), the gauge at the travel motor (9) has to decrease.
- if the desired value is not reached, screw the setscrew (10) at the travel motor in or out resp.

  Screwing in: Regulation start later
  Screwing out: Regulation start earlier

  Note: For the maximum use of the motor performance, the regulation start can vary from machine to machine. A deviation of ±10 bar is possible.

7. Check and adjustment of the inching

- connect 600 bar - gauge to gauge port (M_A) or (M_B) resp. of the travel pump
- jack up and secure the machine to allow free running of the wheels
- set travel range selector switch to „rabbit"
- set travel direction lever to „forward" resp. „reverse"
- fully accelerate
- slowly actuate the foot brake pedal
- watch the gauge: At approx. 200 bar travel high pressure, the pump has to inch, i.e. value of the gauge decreases, the wheels come to a standstill
- If the pump inches earlier or later, turn the setscrew (11) at the travel pump in or out resp.

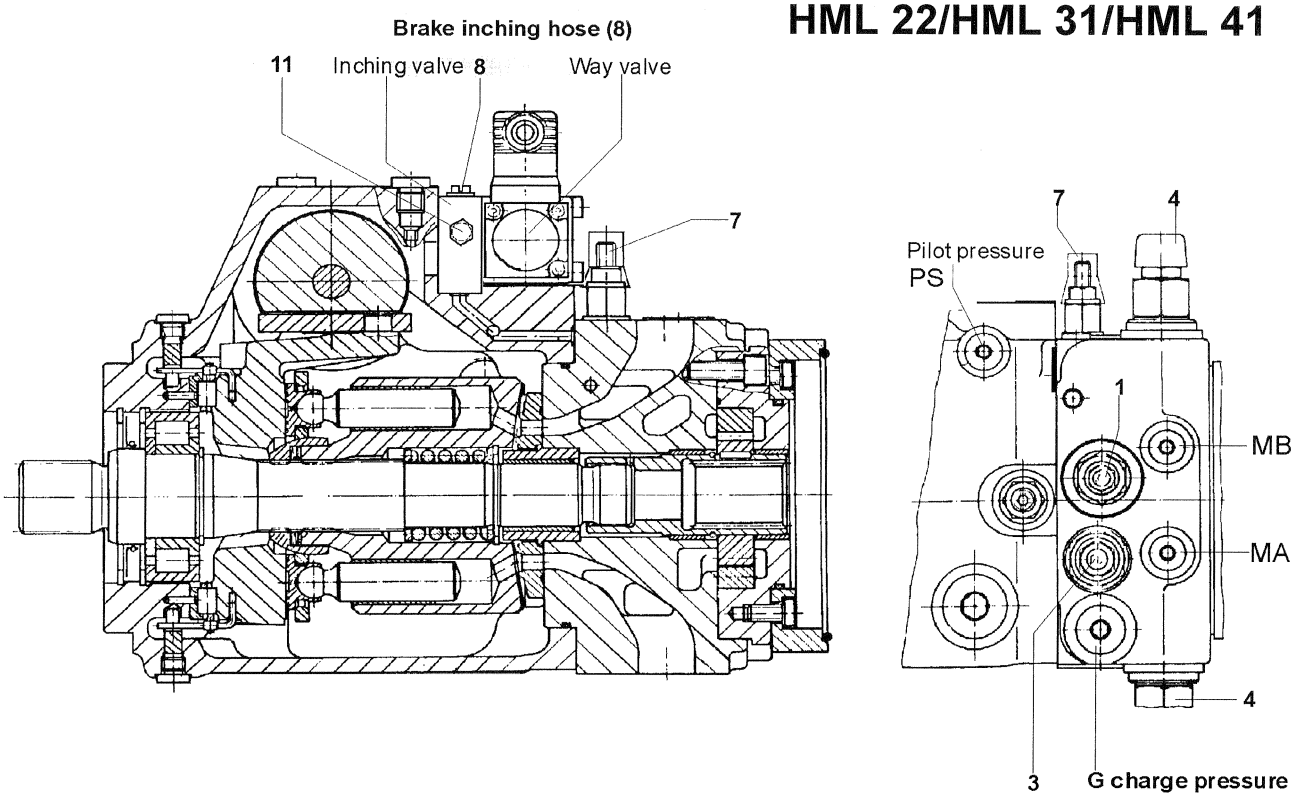
  Turning in: inching later
  Turning out: inching earlier

8. Check and adjustment of the travel pump neutral position

- connect gauge to the high pressure gauge port (M_A) or (M_B) of the travel pump
- set the engine to increased idle running speed
- watch the gauge. Both values have to be identical.
- if the values are different, the neutral position can be corrected via the setscrew (6) at the travel pump

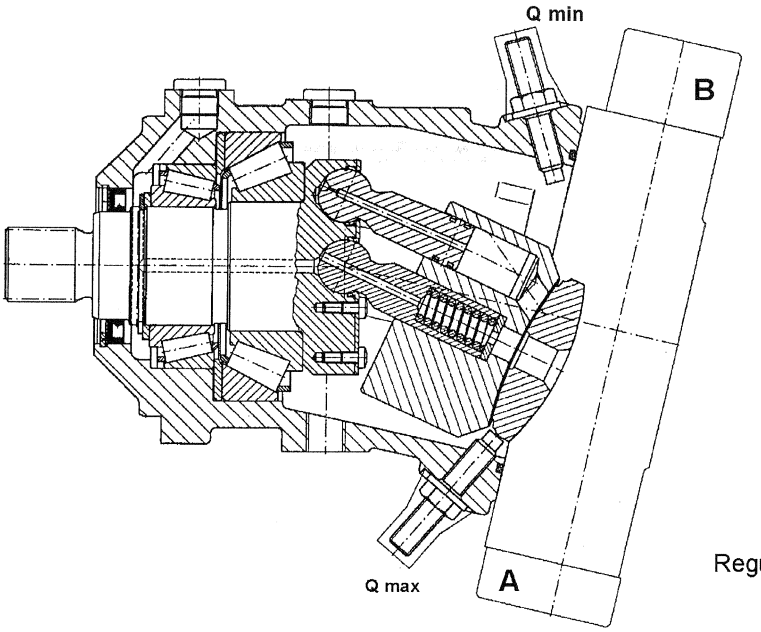
Travel pump A4VG...DA

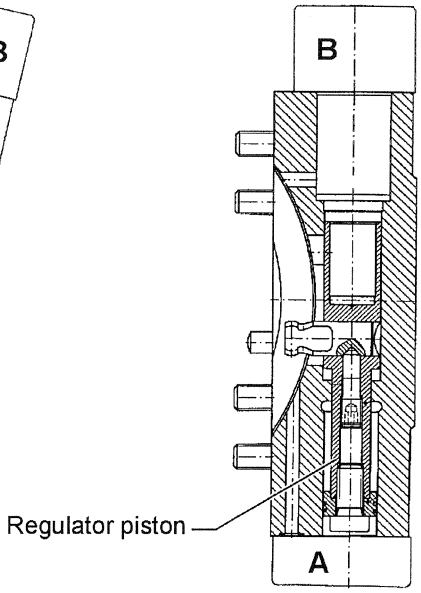
HML 22/HML 31/HML 41

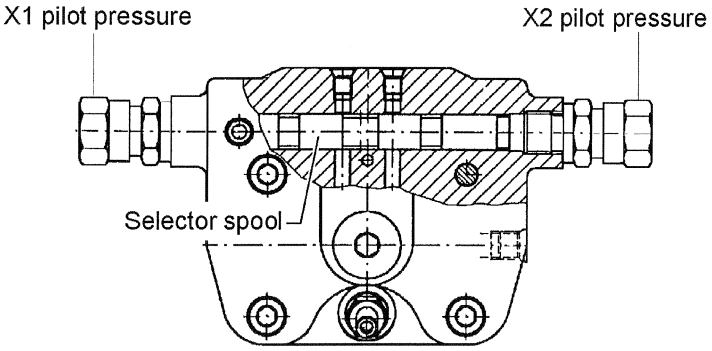


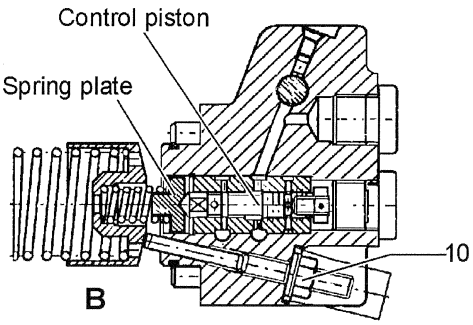
MA = high pressure gauge port
MB = high pressure gauge port
1 = setscrew, beginning of start-up
3 = charge pressure relief valve
4 = travel high pressure valves
6 = neutral position setscrew
7 = pressure cut-off
8 = brake inching hose
11 = inching setscrew

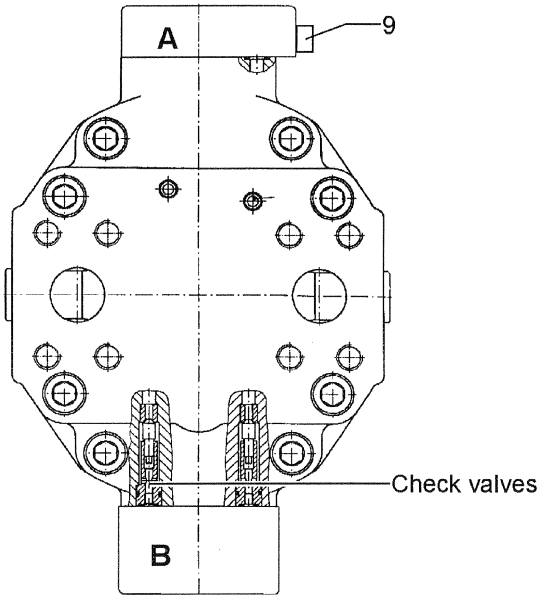
Travel motor A6VM....DA



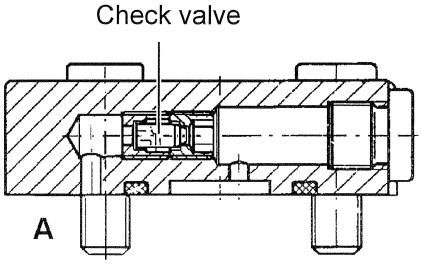








9 = gauge port regulation start
10 = setscrew regulation start



SCHAEFF	Typ/Model/Type **HML 31, HML41 / HML 41 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Setting instructions travel hydraulics**	Blatt/Page/Feuille **5.100.04**

TRAVEL PUMPS

Type	Pump description	DA - orifice regulator cartridge	Regulation start	Regulation end	X1 - X2 orifice	T- orifice
SKL 811 SKS 611	A4VG28DA 18/30R PZC	4.4 mm	50 bar 1400 min^{-1}	400 bar 2600 min^{-1}	1,0 mm	---
SKL 823 SKL 823 S	A4VG40DA 1D8/32R NZC	4.2 mm	50 bar 1150 min^{-1}	400 bar 1900 min^{-1}	---	0.8 mm
SKL 833 SKL 833 S	A4VG56DA 1D8/32R NZC	4.9 mm	50 bar 1150 min^{-1}	400 bar 1900 min^{-1}	---	1.0 mm
SKS 631	A4VG56DA 1D8/32R NZC	5.0 mm	50 bar 1150 min^{-1}	400 bar 1750 min^{-1}	---	---
SKL 843 SKL 843 S	A4VG56DA 1D8/32R NZC	4.6 mm	50 bar 1150 min^{-1}	400 bar 1750 min^{-1}	---	1.0 mm
SKL 841	A4VG56DA 1D8/32R NZC	4.6 mm	50 bar 1150 min^{-1}	400 bar 1600 min^{-1}	---	---
SKL 853 SKL 853 S	A4VG71DA 1D8/32R NZF	6.4 mm 5.6 mm	50 bar 1150 min^{-1}	400 bar 1700 min^{-1}	---	1.0 mm
SKL 851 B	A4VG71DA 1D8/32R NZF	6.4 mm	50 bar 1150 min^{-1}	400 bar 1700 min^{-1}	---	---
SKS 661 SKL 861B SKL 861B S	A4VG90DA 1D4/32R NZF	6.3 mm	50 bar 1150 min^{-1}	400 bar 1800 min^{-1}	---	---
SKL 863 SKL 863 S	A4VG90DA 1D8/32R NZF A4VG90DA 1D8/32R PZF	6.3 mm 6.3 mm	50 bar 1150 min^{-1}	400 bar 1800 min^{-1}	---	1.0 mm
SKL 871 SKL 871 S	A4VG90DA 2D4/32R PZF A4VG125DA 2D8/31R NZF	6.3 mm 7.1 mm	50 bar 1050 min^{-1} 1050 min^{-1}	400 bar 1500 min^{-1} 1800 min^{-1}	---	1.0 mm

Anziehdrehmomente Hydromatikpumpen /-motore
Tightening torques Hydromatikpumps /-motors

Anziehdrehmomente für Schaftschrauben (Metrisches ISO-Regelgewinde)

Die nebenstehenden Werte für Anziehdrehmomente gelten nur für Schaftschrauben mit metrischem ISO-Regelgewinde und Kopfauflagemaßen nach DIN 912, DIN 931 und DIN 933. Außerdem gelten diese Werte nur für leicht oder nicht geölte, unbehandelte Oberflächen, sowie nur bei Verwendung von Drehmoment- und Kraftbegrenzungsschlüsseln.

Gewinde größe	Festigkeitsklassen 8.8	10.9	12.9
	Anziehdrehmoment(Nm)		
M 3	1,1	1,6	1,9
M 4	2,9	4,1	4,9
M 5	6	8,5	10
M 6	10	14	17
M 8	25	36	41
M10	49	69	83
M12	86	120	145
M14	135	190	230
M16	210	295	355
M18	290	405	485
M 20	410	580	690
M 22	550	780	930
M 24	710	1000	1200
M 27	1050	1500	1800
M 30	1450	2000	2400

Tightening torques for shaft bolts (Metric ISO Standard Thread)

The values for tightening torques shown in the table are valid only for shaft bolts with metric ISO- standard threads and head support surface dimensions in accordance with DIN 912, DIN 931 and DIN 933. These values are also valid only for light or unoiled, untreated surface as well as for use only with torque-indicating wrenches and force limiting tools.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening Torque (lb.ft)		
M 3	0,8	1,2	1,4
M 4	2,1	3,0	3,6
M 5	4,4	6,3	7,4
M 6	7,4	10,3	12,5
M 8	18,4	25,8	30,2
M10	36,1	50,9	61,2
M12	63,4	88,4	106,9
M14	99,5	140,0	169,5
M16	154,8	217,4	261,6
M18	213,7	298,5	357,4
M 20	302,2	427,5	508,5
M 22	405,4	574,9	685,4
M 24	523,5	737,0	884,4
M 27	773,9	1105,5	1326,6
M 30	1068,7	1474,0	1768,8

Anziehdrehmomente für Verschlußschrauben VSTI (Metrisches Feingewinde)

Gewindegröße	Bezeichnung		Anziehdrehmoment(Nm)
M 8 x 1	VSTI 8 x 1	-ED/SA	= 5
M 10 x 1	VSTI 10 x1	-ED	= 10
M 12 x 1,5	VSTI 12 x 1,5	-ED	= 20
M 14 x 1,5	VSTI 14 x 1,5	-ED	= 30
M 16 x 1,5	VSTI 16 x 1,5	-ED/SA	= 30
M 18 x 1,5	VSTI 18 x 1,5	-ED/SA	= 40
M 20 x 1,5	VSTI 20 x 1,5	-ED/SA	= 50
M 22 x 1,5	VSTI 22 x 1,5	-ED	= 60
M 26 x 1,5	VSTI 16 x 1,5	-ED/SA	= 70
M 27 x 2	VSTI 27 x 2	-ED	= 90
M 30 x 1 ,5	VSTI 30 x 1,5	-ED/SA	= 100
M 33 x 2	VSTI 33 x 2	-ED/SA	= 120
M 42 x 2	VSTI 42 x 2	-ED/SA	= 200
M 48 x 2	VSTI 48 x 2	-ED	= 300

Tightening torques for locking screws VSTI (Metric ISO fine thread)

Thread size	Designation		Tightening torques (lb.ft)
M 8 x 1	VSTI 8 x 1	-ED/SA	= 4
M 10 x 1	VSTI 10 x1	-ED	= 7
M 12 x 1,5	VSTI 12 x 1,5	-ED	= 15
M 14 x 1,5	VSTI 14 x 1,5	-ED	= 22
M 16 x 1,5	VSTI 16 x 1,5	-ED/SA	= 22
M 18 x 1,5	VSTI 18 x 1,5	-ED/SA	= 29
M 20 x 1,5	VSTI 20 x 1,5	-ED/SA	= 37
M 22 x 1,5	VSTI 22 x 1,5	-ED	= 44
M 26 x 1,5	VSTI 16 x 1,5	-ED/SA	= 51
M 27 x 2	VSTI 27 x 2	-ED	= 66
M 30 x 1 ,5	VSTI 30 x 1,5	-ED/SA	= 74
M 33 x 2	VSTI 33 x 2	-ED/SA	= 88
M 42 x 2	VSTI 42 x 2	-ED/SA	= 147
M 48 x 2	VSTI 48 x 2	-ED	= 220

Anziehdrehmomente für Seal-Lock Bundmuttern (Metrisches ISO-Regelgewinde)

Die nebenstehenden Werte für Anziehdrehmomente gelten nur für Seal-Lock Bundmuttern der Festigkeitsklasse 8.8 mit metrischem ISO-Regelgewinde.

Gewinde größe	Festigkeitsklassen 8.8	10.9	12.9
	Anziehdrehmoment (Nm)		
M 6	10		
M 8	22		
M 10	40		
M 12	69		
M 14	110		
M 16	170		

Tightening torques for seal-lock nuts (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for seal-lock nuts of the strength class 8.8 and with metric ISO-standard thread.

Thread size	Strength classes 8.8	10.9	12.9
	Tightening torque (lb.ft)		
M 6	7,4		
M 8	16,2		
M 10	29,5		
M 12	50,9		
M 14	81,1		
M 16	125,3		

Anziehdrehmomente für Linsenschrauben mit Kreuzschlitz DIN 7985 (Metrisches ISO-Regelgewinde)

Die nebenstehenden Werte für Anziehdrehmomente gelten nur für Linsenschrauben mit Kreuzschlitz DIN 7985 der Festigkeitsklasse 8.8 mit metrischem ISO-Regelgewinde

Gewinde größe	Festigkeitsklassen 8.8	10.9	12.9
	Anziehdrehmoment(Nm)		
M 3	1,1		
M 4	2,9		
M 5	6		
M 6	10		
M 8	25		
M10	49		

Tightening torques for cross-slotted lens head screws DIN 7985 (Metric ISO- Standard Thread)

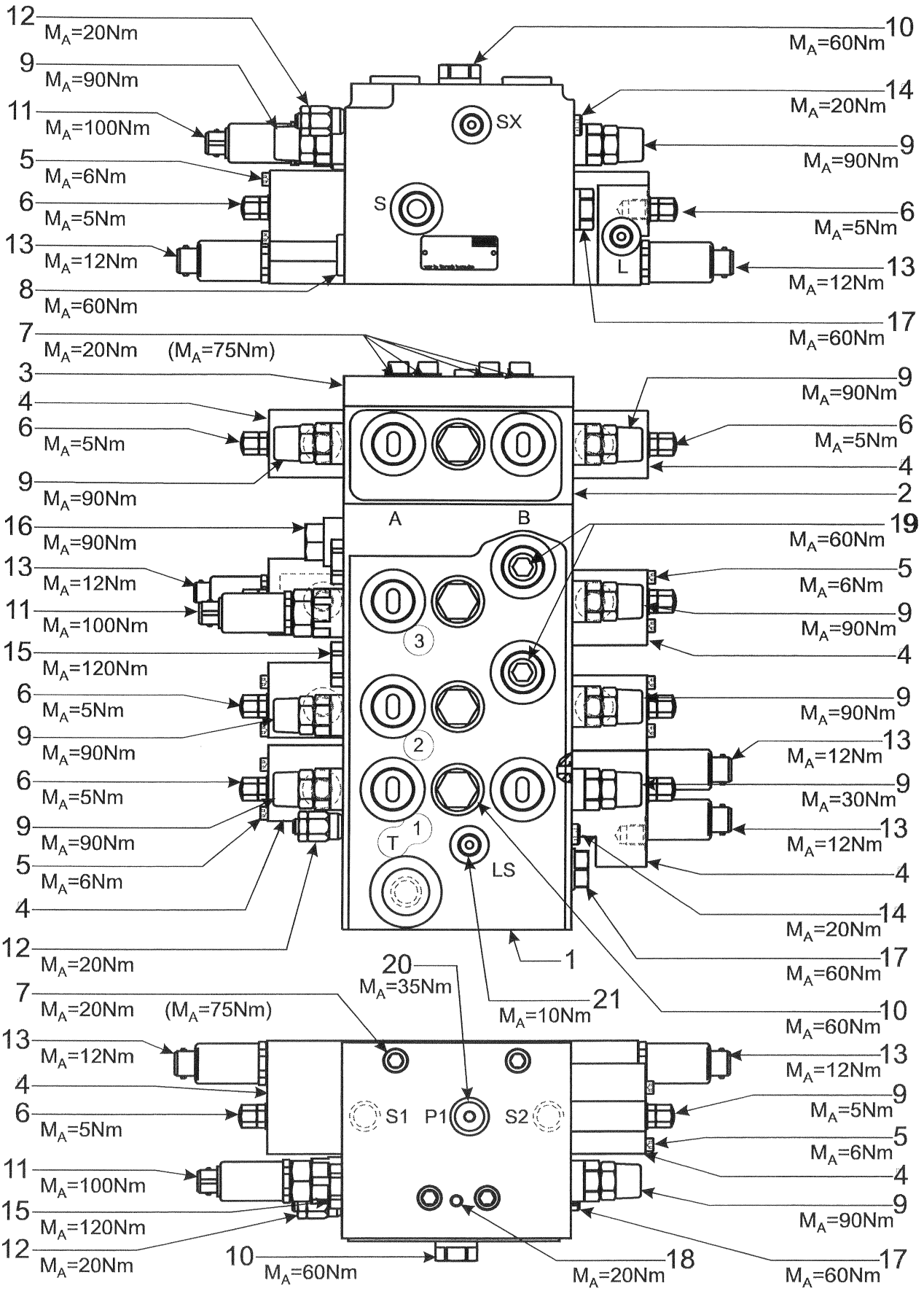
The values for tightening torques shown in the table are valid only for cross-slotted lens head screws DIN 7985 of the strength class 8.8 and with metric ISO-standard thread.

Thread size	Strength classes 8.8	10.9	12.9
	Tightening torques (lb.ft)		
M 3	0,8		
M 4	2,1		
M 5	4,4		
M 6	7,4		
M 8	18,4		
M10	36,1		

Typ / Model / Type / Tipo	General	Datum / Edition / Date / Fecha	01.2005
Benennung / Description / Dénomination / Denominación	Tightening torques Hydromatik	Blatt / Page / Feuille / Página	5.200.02

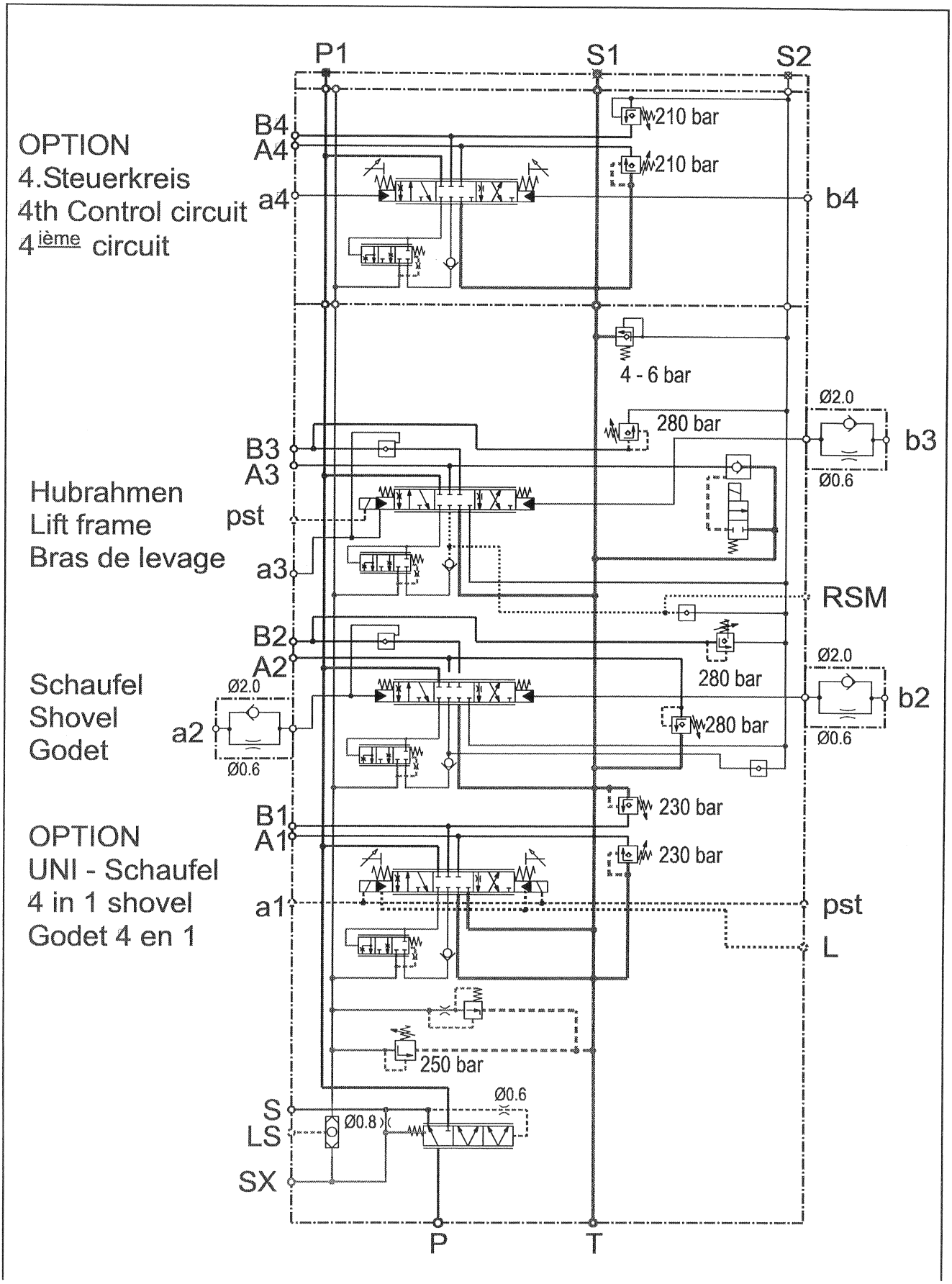
M6 - 15

Typ Model Type Tipo	**M6 - 15**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**5.213.00**



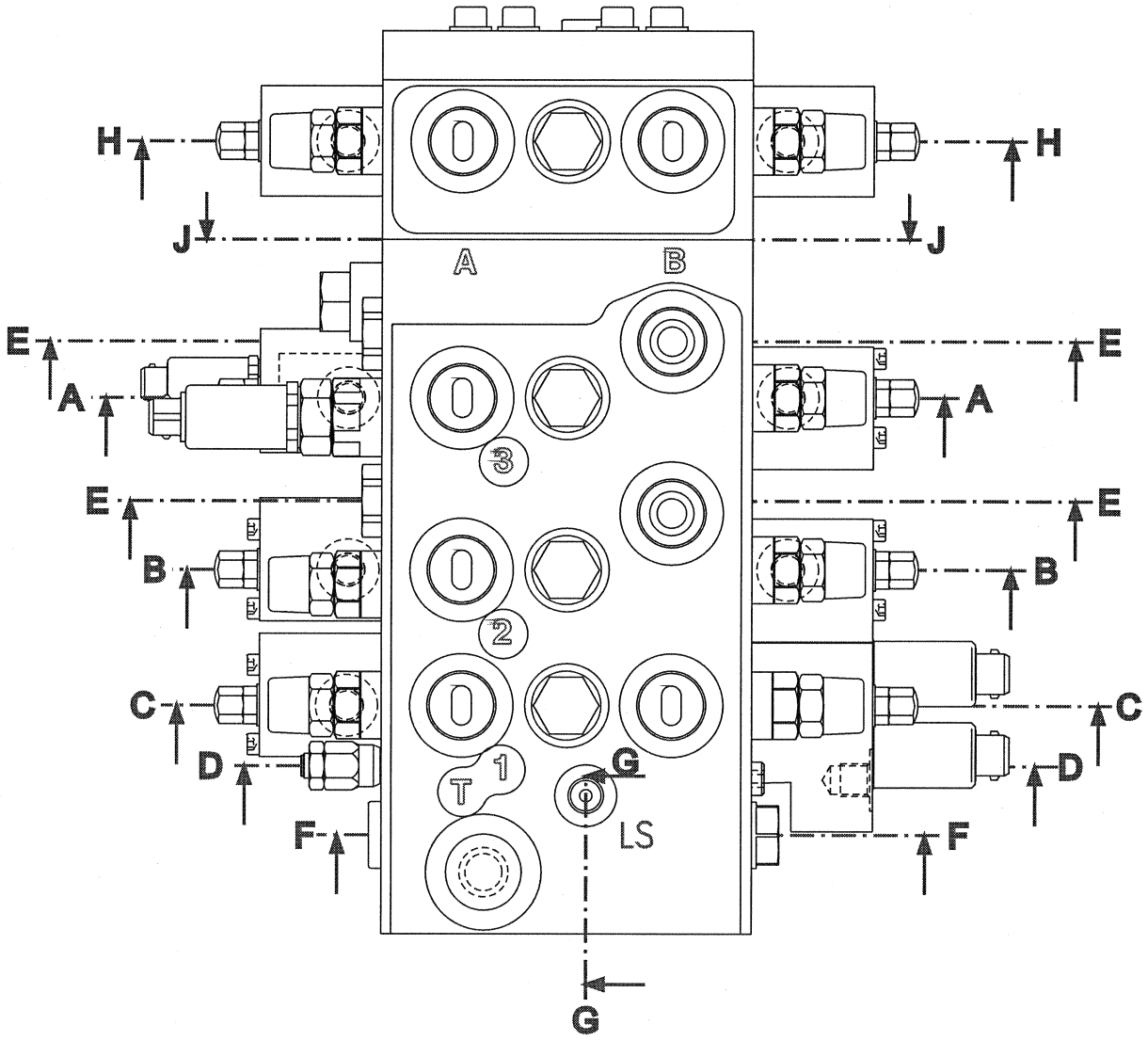
Typ Model Type Tipo	**SKL 873**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	**M6-15**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.213.01**

Pos. Item Rep. No.	Deutsch	English	Français
	BLOCKSTEUERGERAET	**VALVE BANK**	**DISTRIBUTEUR**
	4 M6-15	**4 M6-15**	**4 M6-15**
1	Steuerblock	Control block	Distributeur
2	Wegeventilelement	Directional valve element	Elément de distribution
3	Endelement	Final element	Elément finale
4	Deckel für hydraulische Betätigung mit Vorsteueranschluss	Cover for hydraulic operation with pilot operated connection	Capuchon pour commande hydraulique avec connexion à commande assistée
5	Schraube für Deckel	Screw for cover	Vis pour couvercle
6	Schieberwegbegrenzung	Spool stroke limitation	Limitation de course du tiroir
7	Zuganker	Tie rods	Tirants
8	Rückschlagventil	Check valve	Clapet anti-retour
9	Sekundärventil	Secondary pressure relief valve	Clapet secondaire
10	Verschlussschraube für Druckwaage	Plug for pressure compensator	Bouchon pour balance de pression
11	Schwimmstellungsventil	Floating position valve	Clapet position flottante
12	LS - Druckbegrenzungsventil	Load sensing pressure valve	Limiteur de pression LS
13	Druckminderventil	Pressure reducing valve	Soupape réductrice de pression
14	LS - Volumenstromregelventil	LS - flow regulator valve	Régulateur de débit LS
15	Sitzventil	Poppet valve	Soupappe
16	Vorspannventil	Initial tension valve	Soupape tension initiale
17	Verschlussschraube für Prioritätsschieber	Plug for priority spool	Bouchon pour tirior prioritaire
18	Verschlussschraube	Plug	Bouchon
19	Rückschlagventil (entsperrbar)	Check valve (unlock able)	Clapet anti-retour (antibloqage)
20	Verschlussschraube	Plug	Bouchon
21	Wechselventil	Shuttle valve	Soupape selecteur



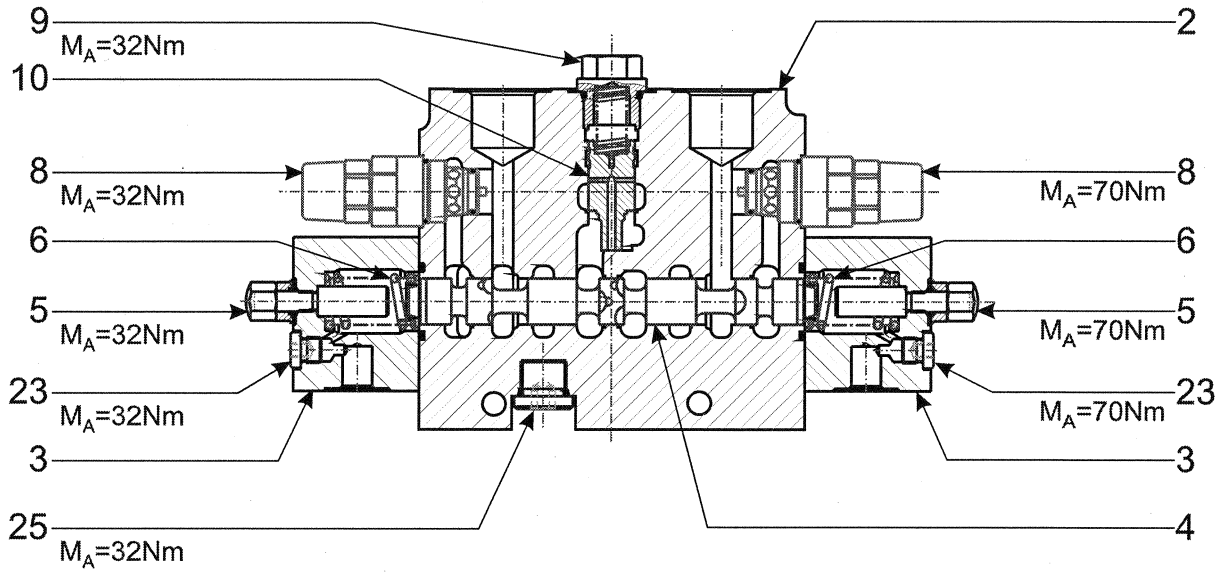
Typ Model Type Tipo	**SKL 873**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	**M6-15**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.213.03**

SCHNITTEBENEN **SURFACES OF CUT** **PLAN DE COUPES**

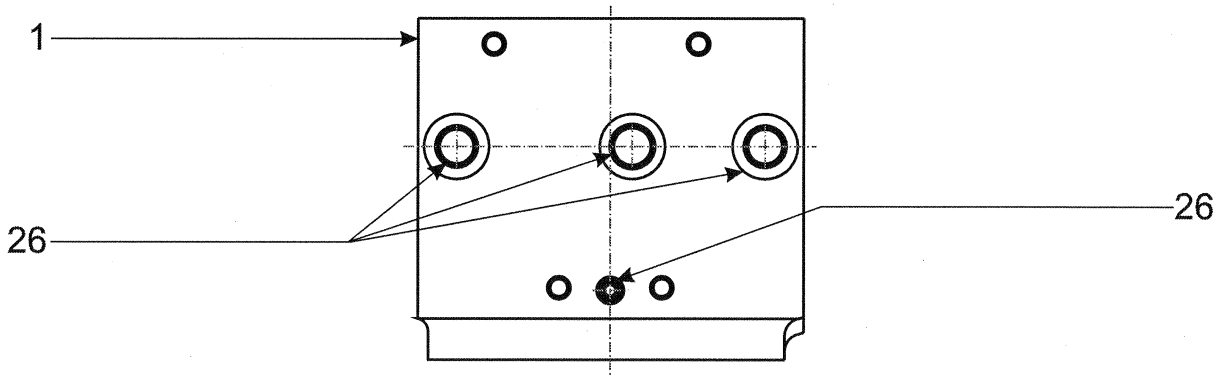


Typ Model Type Tipo	**SKL 873**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	**M6-15**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.213.04**

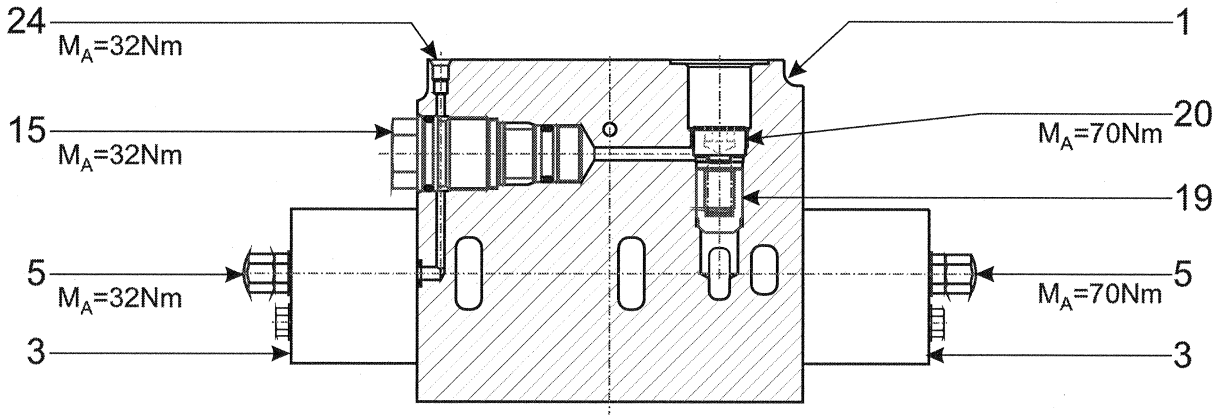
Option
H - H



J - J



E - E (2x)

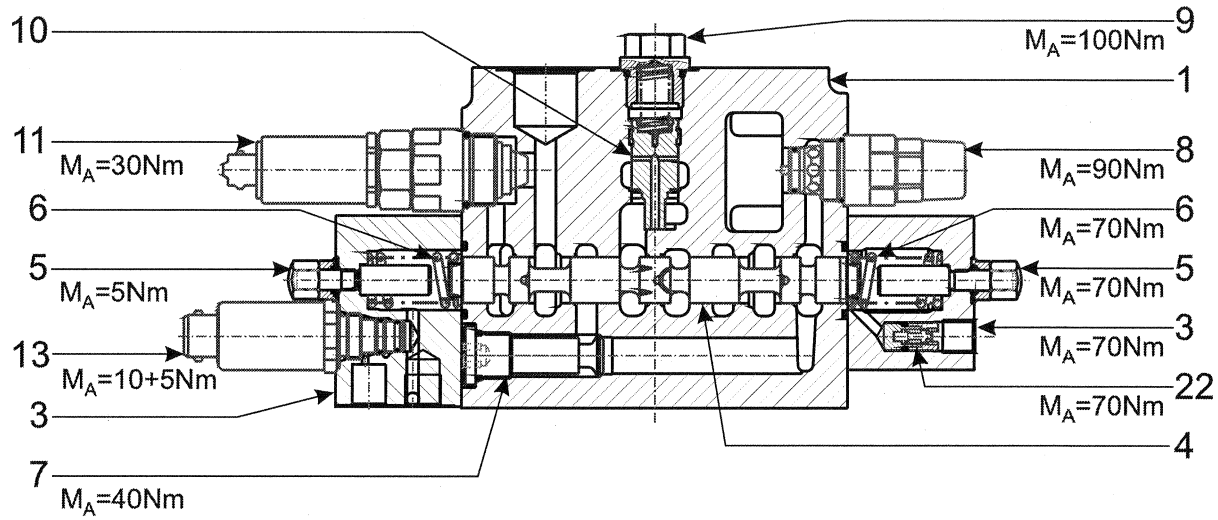


Typ Model Type Tipo	**SKL 873**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	**M6-15**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.213.05**

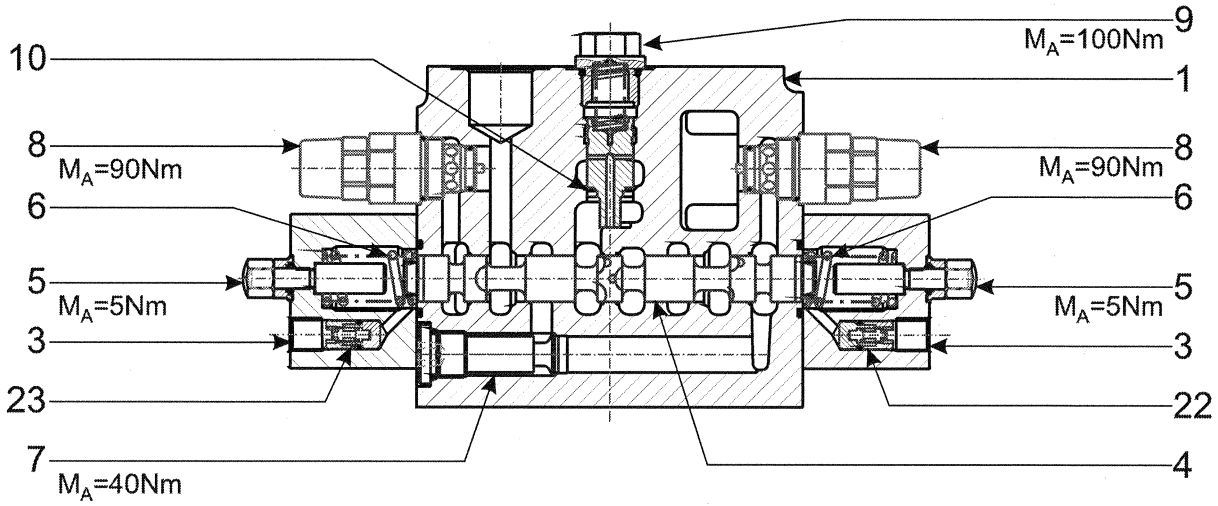
Pos. Item Rep. No.	Deutsch	English	Français
	BLOCKSTEUERGERAET	**VALVE BANK**	**DISTRIBUTEUR**
	4 M6-15	**4 M6-15**	**4 M6-15**
1	Steuerblock	Control block	Bloc distributeur
2	Wegeventilelement	Directional valve element	Elément de distribution
3	Deckel für hydraulische Betätigung mit Vorsteueranschluss	Cover for hydraulic operation with pilot operated connection	Capuchon pour commande hydraulique avec connexion à commande assistée
4	Steuerschieber	Main spool	Tiroir principale
5	Schieberwegbegrenzung	Spool stroke limitation	Limitation de course du tiroir
6	Rückstellfeder	Return spring	Ressort rappel
7	Rückschlagventil	Check valve	Clapet anti-retour
8	Sekundärventil	Secondary pressure relif valve	Clapet secondaire
9	Verschlussschraube	Plug	Bouchon
10	Druckwaage	Pressure compensator	Balance de pression
11	Schwimmstellungsventil	Floating position valve	Clapet position flottante
12	LS - Druckbegrenzungsventil	Load sensing pressure valve	Limiteur de pression LS
13	Druckminderventil	Pressure reducing valve	Soupape réductrice de pression
14	LS - Volumenstromregelventil	LS - flow regulator valve	Régulateur de débit LS
15	Sitzventil	Poppet valve	Soupappe
16	Verschlussschraube	Plug	Bouchon
17	Prioritätsschieber	Priority spool	Tirior prioritaire
18	Verschlussschraube	Plug	Bouchon
19	Rückschlagventil (entsperrbar)	Check valve (unlock able)	Clapet anti retour (antibloquage)
20	Duese	Nozzle	Injecteur
21	Wechselventil	Shuttle valve	Soupape selecteur
22	Drosselrückschlagventil	Throttle check-valve	Clapet anti-retour avec étrangleur
23	Verschlussschraube	Plug	Bouchon
24	Verschlussschraube	Plug	Bouchon
25	Verschlussschraube	Plug	Bouchon
26	O-Ring	O-ring	Joint torique

Typ Model Type Tipo	**SKL 873**	**Steuerventil** **Valve bank** **Distributeur** **Válvula** **M6-15**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.213.06**

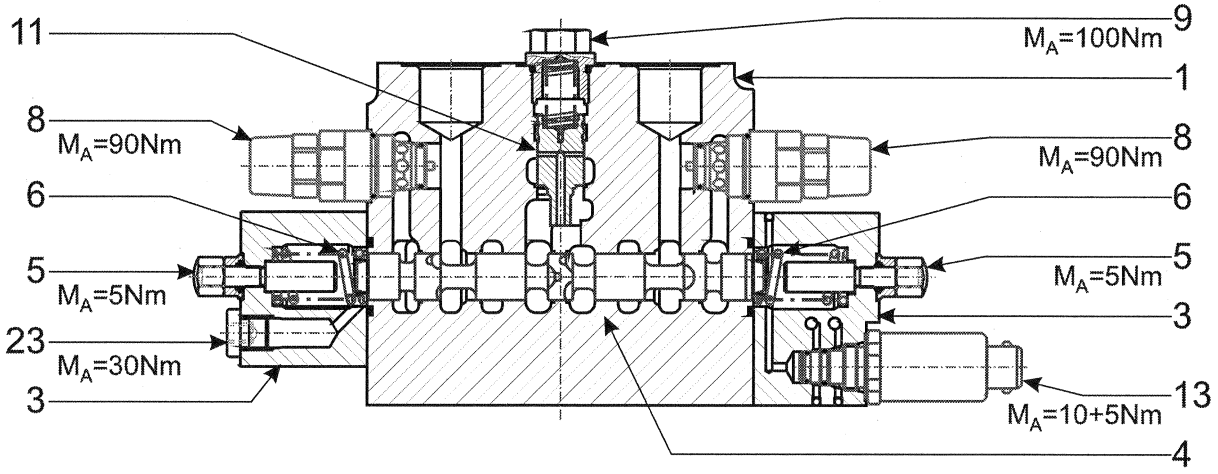
A - A



B - B



C - C

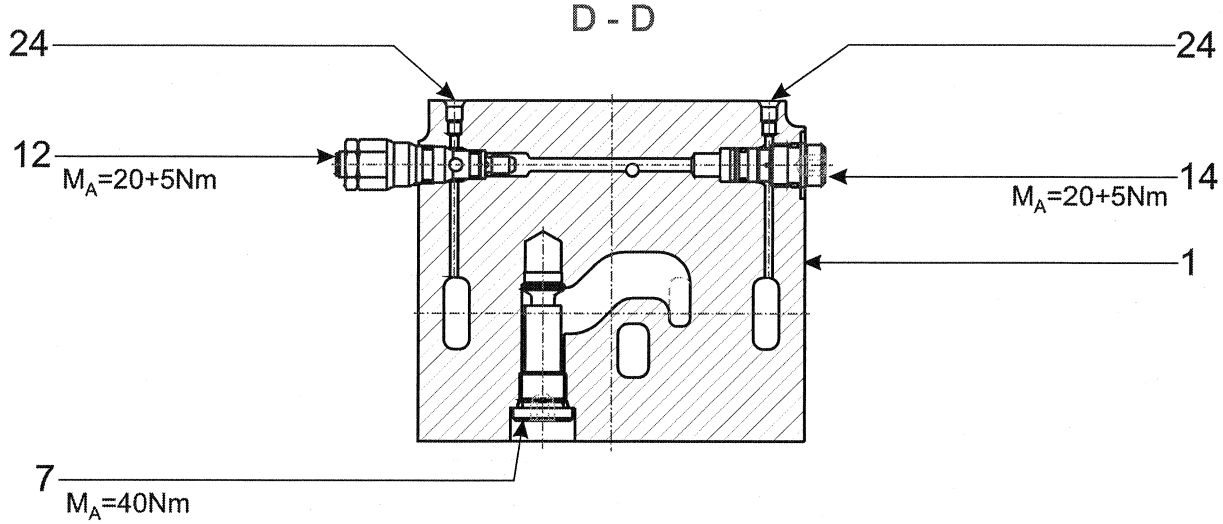


Typ Model Type Tipo	**SKL 873**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	**M6-15**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.213.07**

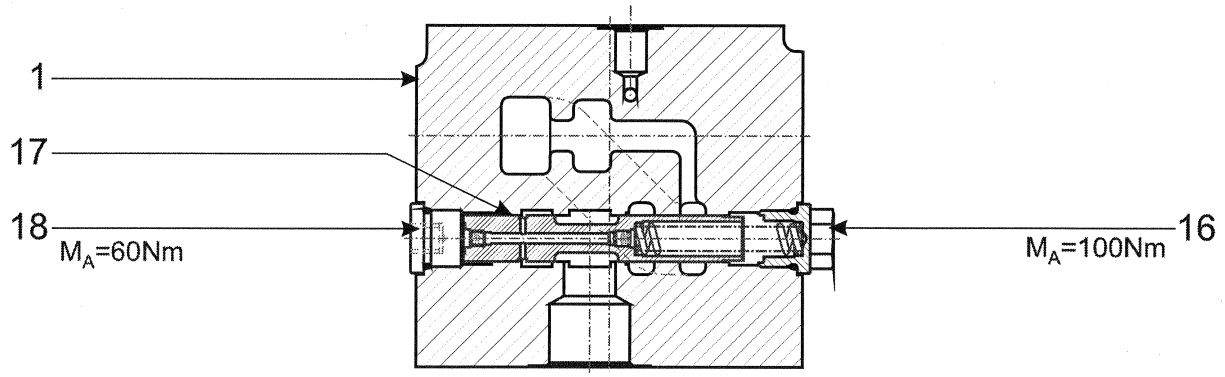
Pos. Item Rep. No.	Deutsch	English	Français
	BLOCKSTEUERGERAET	**VALVE BANK**	**DISTRIBUTEUR**
	4 M6-15	**4 M6-15**	**4 M6-15**
1	Steuerblock	Control block	Bloc distributeur
2	Wegeventilelement	Directional valve element	Elément de distribution
3	Deckel für hydraulische Betätigung mit Vorsteueranschluss	Cover for hydraulic operation with pilot operated connection	Capuchon pour commande hydraulique avec connexion à commande assisrée
4	Steuerschieber	Main spool	Tiroir principale
5	Schieberwegbegrenzung	Spool stroke limitation	Limitation de course du tiroir
6	Rückstellfeder	Return spring	Ressort rappel
7	Rückschlagventil	Check valve	Clapet anti-retour
8	Sekundärventil	Secondary pressure relif valve	Clapet secondaire
9	Verschlussschraube	Plug	Bouchon
10	Druckwaage	Pressure compensator	Balance de pression
11	Schwimmstellungsventil	Floating position valve	Clapet position flottante
12	LS - Druckbegrenzungsventil	Load sensing pressure valve	Limiteur de pression LS
13	Druckminderventil	Pressure reducing valve	Soupape réductrice de pression
14	LS - Volumenstromregelventil	LS - flow regulator valve	Régulateur de débit LS
15	Sitzventil	Poppet valve	Soupappe
16	Verschlussschraube	Plug	Bouchon
17	Prioritätsschieber	Priority spool	Tirior prioritaire
18	Verschlussschraube	Plug	Bouchon
19	Rückschlagventil (entsperrbar)	Check valve (unlock able)	Clapet anti retour (antibloquage)
20	Duese	Nozzle	Injecteur
21	Wechselventil	Shuttle valve	Soupape selecteur
22	Drosselrückschlagventil	Throttle check-valve	Clapet anti-retour avec étrangleur
23	Verschlussschraube	Plug	Bouchon
24	Verschlussschraube	Plug	Bouchon
25	Verschlussschraube	Plug	Bouchon
26	O-Ring	O-ring	Joint torique

Typ Model Type Tipo	**SKL 873**	**Steuerventil** **Valve bank** **Distributeur** **Válvula** **M6-15**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.213.08**

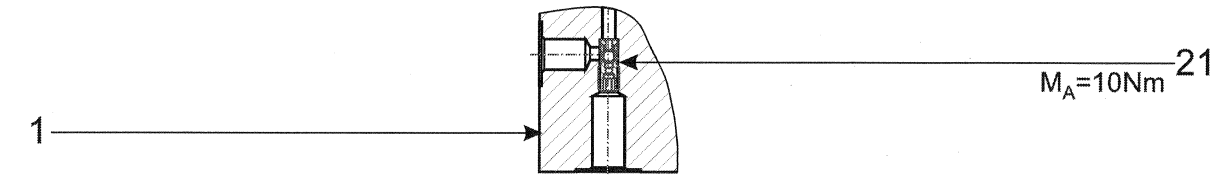
D - D



F - F



G - G

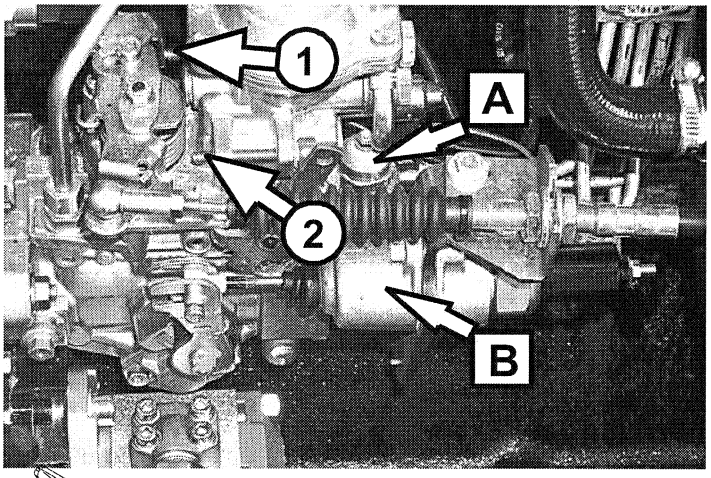


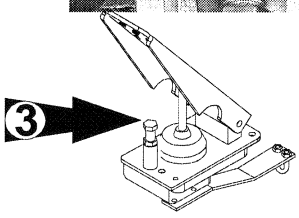
Typ Model Type Tipo	**SKL 873**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	**M6-15**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.213.09**

Pos. Item Rep. No.	Deutsch	English	Français
	BLOCKSTEUERGERAET	**VALVE BANK**	**DISTRIBUTEUR**
	4 M6-15	**4 M6-15**	**4 M6-15**
1	Steuerblock	Control block	Bloc distributeur
2	Wegeventilelement	Directional valve element	Elément de distribution
3	Deckel für hydraulische Betätigung mit Vorsteueranschluss	Cover for hydraulic operation with pilot operated connection	Capuchon pour commande hydraulique avec connexion à commande assistée
4	Steuerschieber	Main spool	Tiroir principale
5	Schieberwegbegrenzung	Spool stroke limitation	Limitation de course du tiroir
6	Rückstellfeder	Return spring	Ressort rappel
7	Rückschlagventil	Check valve	Clapet anti-retour
8	Sekundärventil	Secondary pressure relif valve	Clapet secondaire
9	Verschlussschraube	Plug	Bouchon
10	Druckwaage	Pressure compensator	Balance de pression
11	Schwimmstellungsventil	Floating position valve	Clapet position flottante
12	LS - Druckbegrenzungsventil	Load sensing pressure valve	Limiteur de pression LS
13	Druckminderventil	Pressure reducing valve	Soupape réductrice de pression
14	LS - Volumenstromregelventil	LS - flow regulator valve	Régulateur de débit LS
15	Sitzventil	Poppet valve	Soupappe
16	Verschlussschraube	Plug	Bouchon
17	Prioritätsschieber	Priority spool	Tirior prioritaire
18	Verschlussschraube	Plug	Bouchon
19	Rückschlagventil (entsperrbar)	Check valve (unlock able)	Clapet anti retour (antibloquage)
20	Duese	Nozzle	Injecteur
21	Wechselventil	Shuttle valve	Soupape selecteur
22	Drosselrückschlagventil	Throttle check-valve	Clapet anti-retour avec étrangleur
23	Verschlussschraube	Plug	Bouchon
24	Verschlussschraube	Plug	Bouchon
25	Verschlussschraube	Plug	Bouchon
26	O-Ring	O-ring	Joint torique

Typ Model Type Tipo	**SKL 873**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	**M6-15**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.213.10**

All checks and adjustments have to be carried out when the machine has reached service temperature





ENGINE RPM s: *

1- Limitation of low idle
2- Limitation of high idle
3- Mechanical stop under accelerator pedal

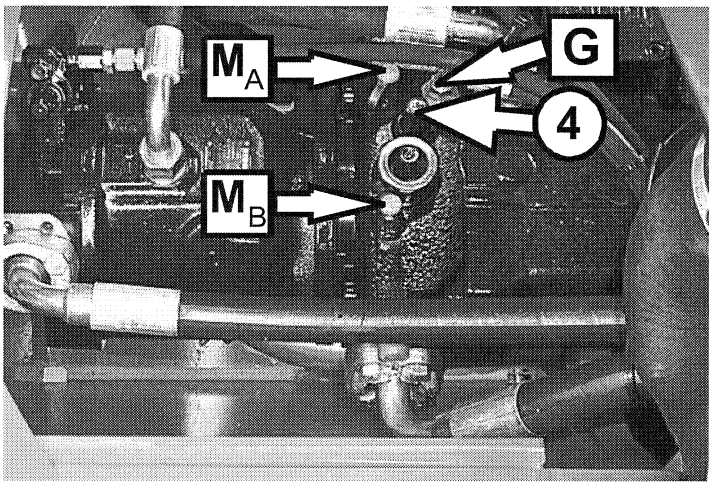
A- Engine shut-off solenoid
B- Cold start accelerating device

TRAVEL PUMP: Charge pressure *

Check : at high idle,
Put a 60 bar gauge at $\mathbf{M_A}$ or $\mathbf{M_B}$

Adjustment: at valve **4** (charge pressure) *

G = another test possibility for charge pressure and pilot pressure for working hydraulics.Mount test port here.



TRAVEL PUMP: Neutral position

Test: in low idle,put a 60 bar gauge at $\mathbf{M_A}$ and $\mathbf{M_B}$,
both pressures must be identical

Adjustment: set screw **5**

* Adjustment values: see chapter 2 technical data resp. chapter. 8 test certificate

TRAVEL PUMP: High pressure *
(Savety valves forward/ reverse)

Test: Turn pressure cut-off set screw **6** until mechanical stop (clockwise).
Put a 600 bar gauge at M_A resp.at M_B.
Drive machine against a solid object, the wheels must be locked.
Give full throttle. Read the pressures. *
Adjustment: safety valve **7** resp. **8** *

Following adjust the pressure cut-off valve **6**:
Put a 600 bar gauge at M_A resp.at M_B.
Drive machine against a solid object, the wheels must be locked.
Give full throttle. Read the pressures *

Adjustment: cut-off valve **6** *

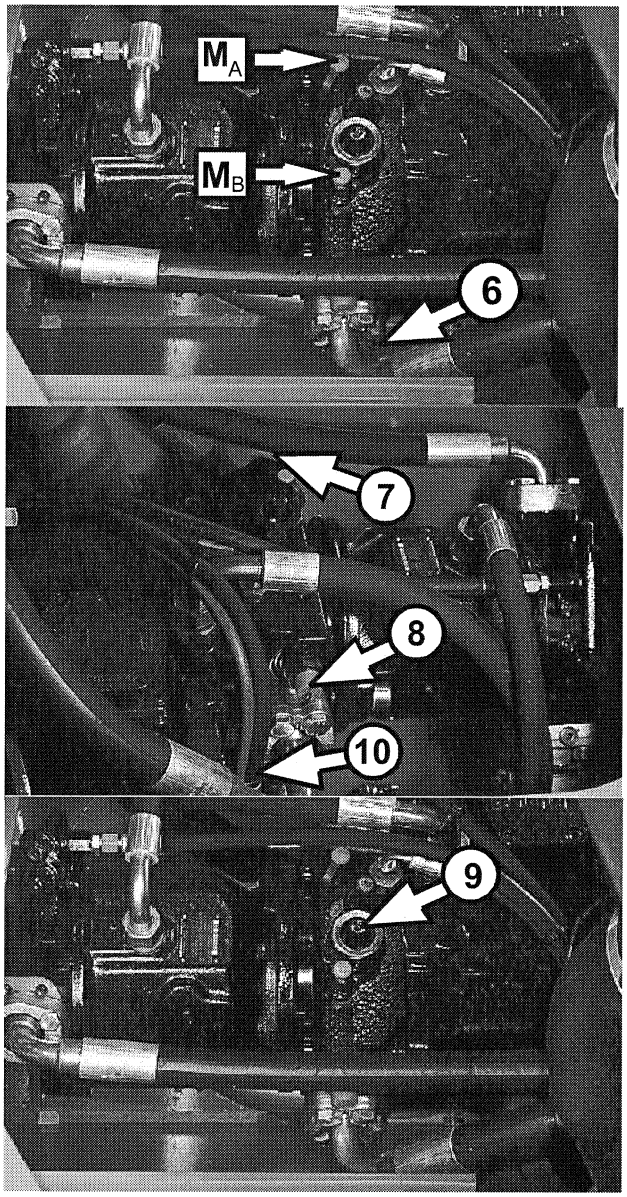
TRAVEL PUMP: Start-up speed *

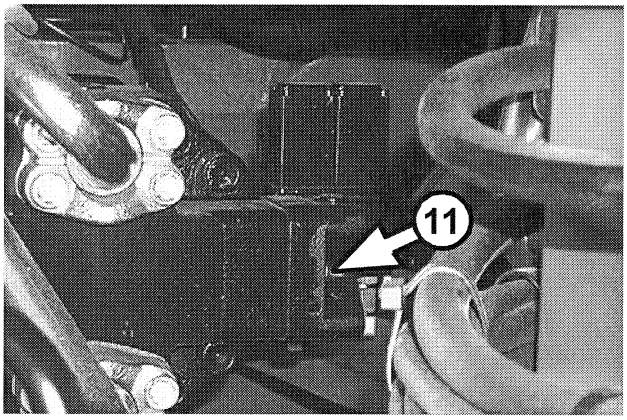
Test: place maschine on even ground , put an appropriate speedometer to the diesel engine.
Slowly press the accelerator pedal, then read the engine rpms when the machine starts moving.
Adjustment: set screw at valve **9**
(turning in = clockwise: starting later)

TRAVEL PUMP: Engine stallspeed *

Test: put an appropriate speedometer to the diesel engine.
Put a 600 bar gauge at M_A (travel forward).
Remove the brake inching hose **10** and plug.
Turn the regulation start set screw **11** one turn clockwise . The travel motor is not allowed to regulate.
Engage "rabbit" and give full throttle
Attention,respect the traffic !
Press the brake pedal until the pressure value is reached * , read the rpms *

Adjustment: Set screw at valve **9**
Respect start-up speed!
Turn the regulation start set screw **11** into initial position (anti-clockwise), mount brake inching hose again.

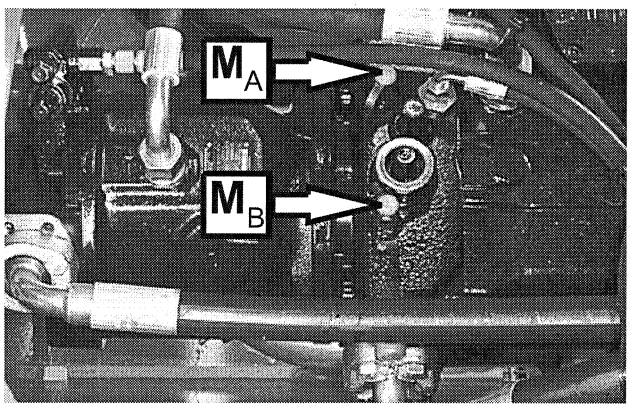




* Adjustment values:see chapter 2 technical data resp. chapter 8 test certificate

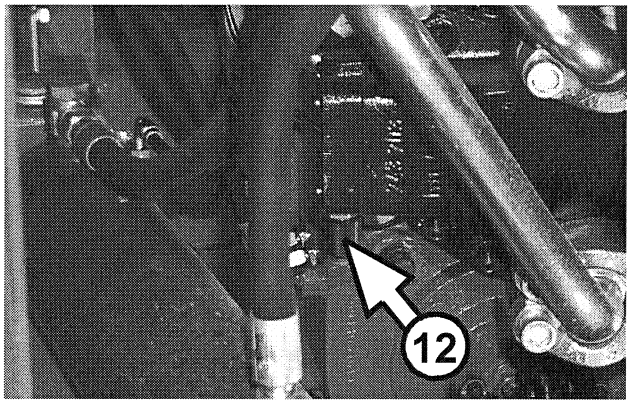
TRAVEL MOTOR: Regulation start

Test :put a 600 bar gauge at highpressure test port forward M_A.at the travel pump.
Put another 600 bar gauge at test port regulation start **12** of the travel motor.
Remove the brake inching hose **10** (see page 5.213.12) and plug. Place both gauges into the driver's cab,they have to be supervised during travel. Engage „rabbit" and give full throttle.



Attention, respect the traffic!

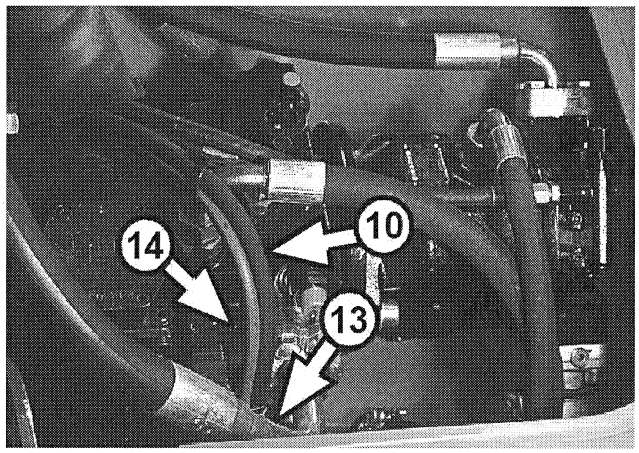
Apply the brake inching pedal slowly, the high pressure at both gauges will increase.
When the desired value * at the gauge at the test port M_A is reached, the regulation start pressure has to decrease.



Adjustment: regulation start set screw **11** (see 5.213.12) at travel motor
Mount brake inching hose (see 5.213.12) again.

TRAVEL PUMP: Brake inching valve

Test:Mount a 60 bar gauge at the brake inching valve test port **13.**
At a brake pressure of approx. 5 bar the speed of the machine must decrease.
Reaching a brake pressure of approx.13 bar, the machine has to come to a complete standstill.



Adjustment: Set screw at brake inching valve **14**

* Adjustment values: see chapter 2 technical data resp. chapter 8 test certificate

All checks and adjustments have to be carried out when the machine has reached service temperature

STEERING:
Test: Put a 600 bar gauge at test port **15** .
Start the engine, increased idle.
Turn the steering to mechanical stop
Read the pressure *

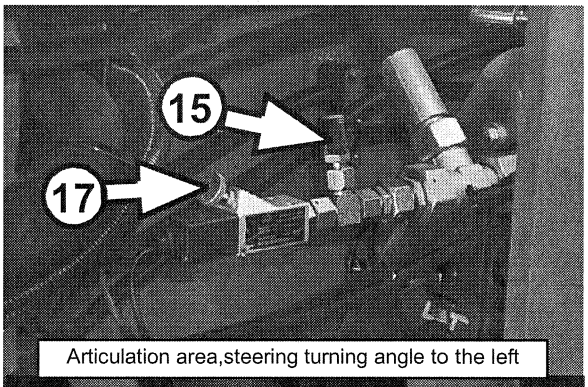
Adjustment: Remove plug **16** to access to the main relief valve underneath .

WORKING HYDRAULICS: LS-valve
Test: Put a 600 bar gauge at test port **15** .
Start the engine, increased idle.
Tilt the bucket in, resp. raise loader arm completely up to mechanical stop.
Read the pressure *
Adjustment: LS-valve **20** at control valve

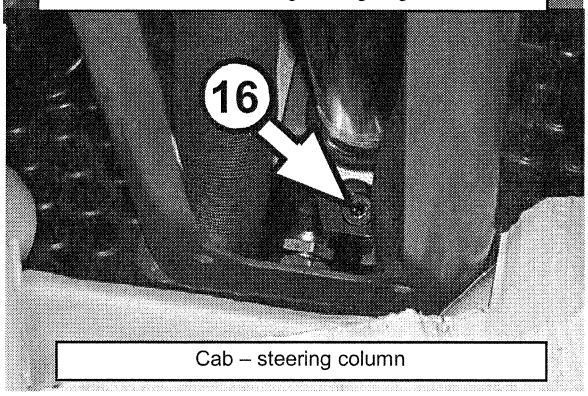
WORKING HYDRAULICS: Secundary relief valves
Test:Turn LS-valve set screw **20** ½ turn clockwise.
Operate all functions to its mechanical stops.
Read the pressures *
Adjustment: Secundary relief valves **21** at control valve.Reset LS-valve **20** .

WORKING HYDRAULICS: Variable displacement pump
Check stand-by pressure :
Put a 60 bar gauge at test port **15** .
Give full throttle, **do not operate any function,** read the pressures *
Adjustment: Regulator valve **18** at variable displacement pump.

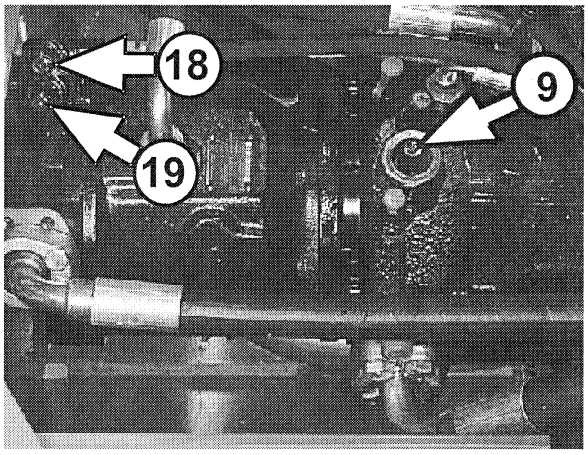
Check safety valve:
Put a 600 bar gauge at test port **15** .
Turn LS-valve set screw **20** ½ turn clockwise. Lower lifting frame until mechanical stop. Read the pressure *
Adjustment:. Regulator valve **18** at variable displacement pump.
Reset LS-valve **20.**

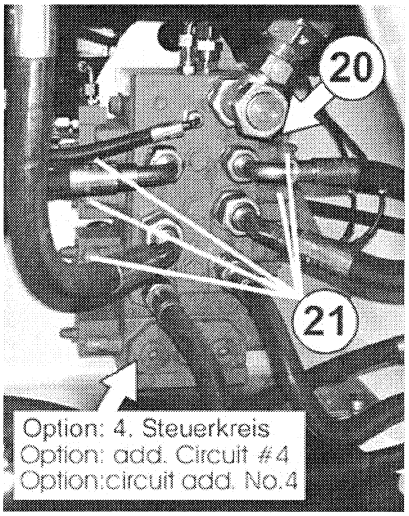


Articulation area,steering turning angle to the left



Cab – steering column





* Adjustment values: see chapter 2 technical data resp. chapter. 8 test certificate

TEREX | SCHAEFF	Typ/Model/Type **SKL 873 (from s/n.: 873/0274)**	Datum/Edition/Date **01.2006**
	Benennung/Description/Dénomination **Setting instruction** **Steering and working hydraulic**	Blatt/Page/Feuille **5.213.14**

TEREX | SCHAEFF

All checks and adjustments have to be carried out when the machine has reached service temperature

BRAKE HYDRAULIC:

Test : Put a 200 bar gauge at test port **13** (Travel pump – Inching valve).
Start the engine, increased idle.
Press the brake pedal down until mechanical stop is reached.
Read the pressure *

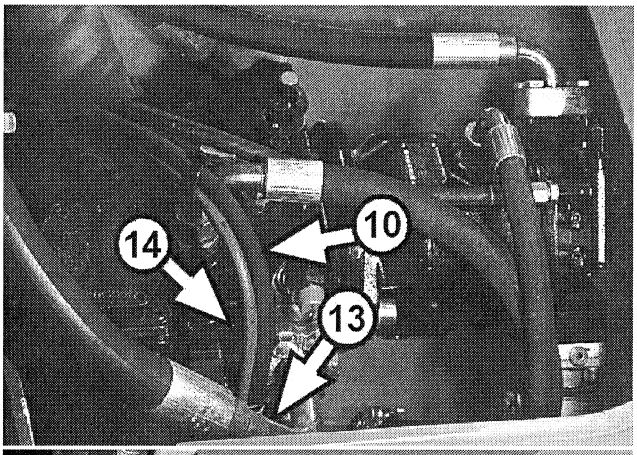
Adjustment : brake pedal rod **1** below cab floor.

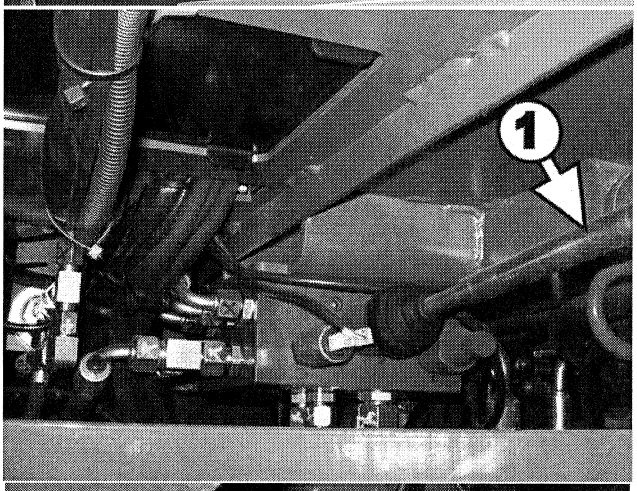
BRAKE HYDRAULIC:
Pressure differential valves

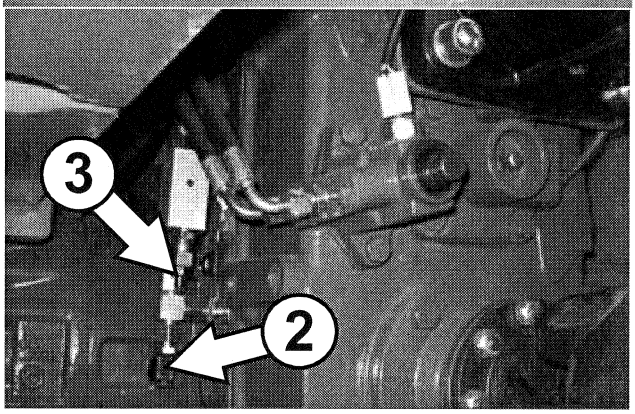
Test : Put a 60 bar gauge at test port **2** at the pressure differential valves of front and rear axle.
Start the engine, increased idle.
Press the brake pedal down until mechanical stop is reached.
Read the pressure *

Adjustment: Set screw **3** at pressure differential valves at both, front – and rear axle.

Adjust pressure differential valves at front and rear axles.



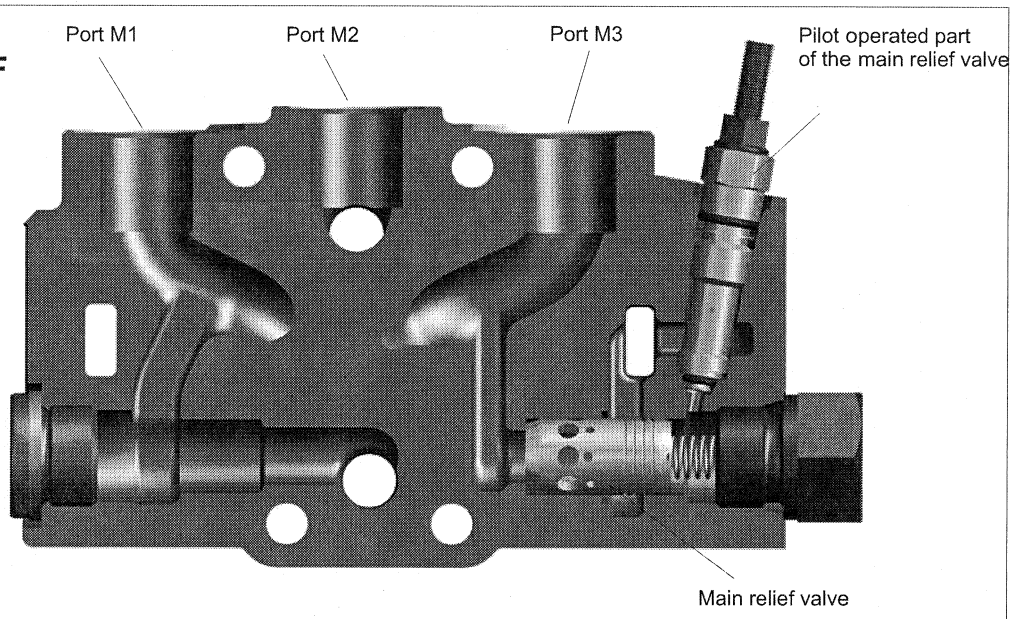


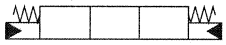


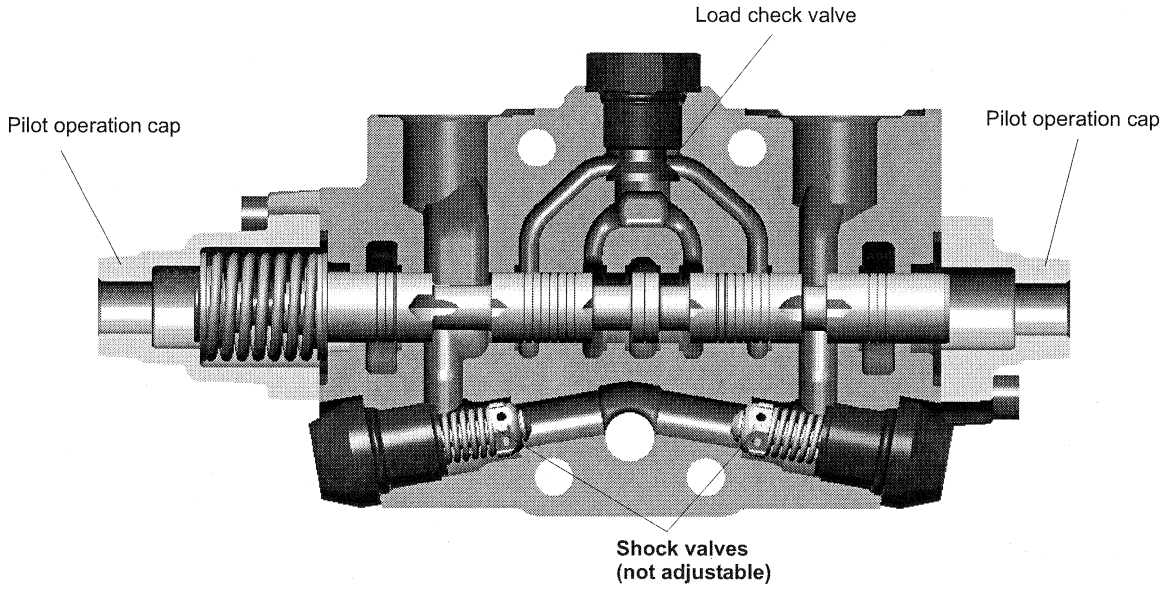
* **Adjustment values see chapter 2 technical data or chapter 8 test certificate**

TEREX | SCHAEFF

Control valve Parker P 70 CF Inlet section



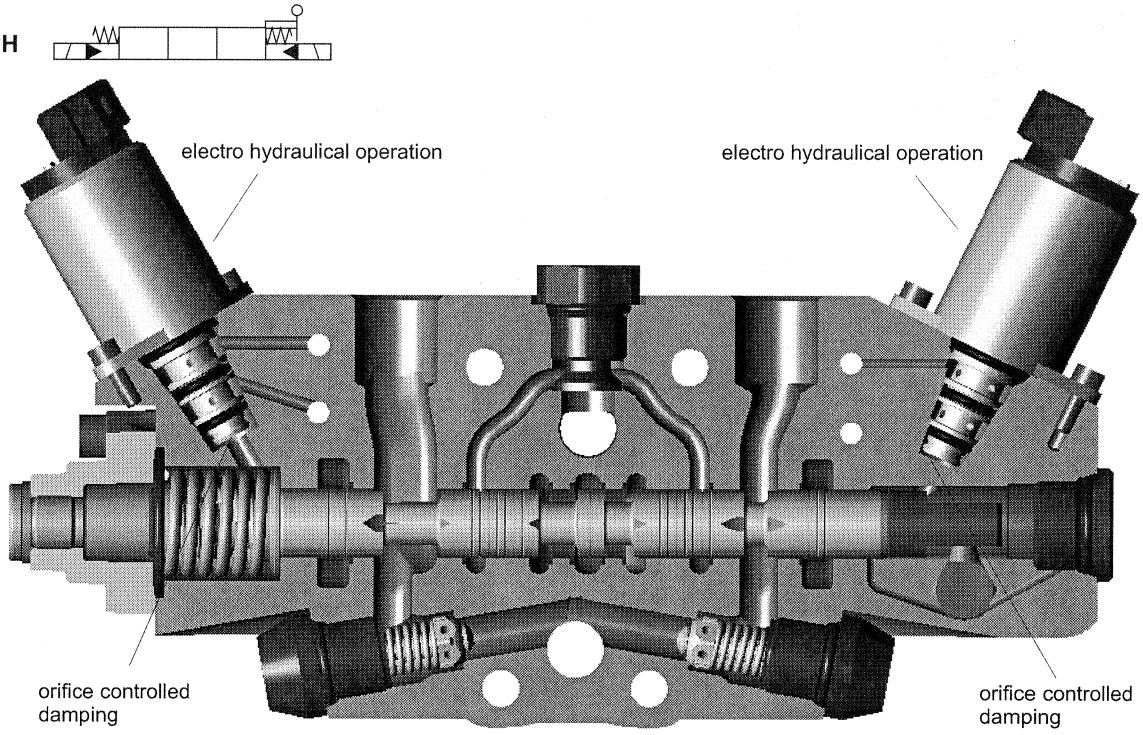
PC 



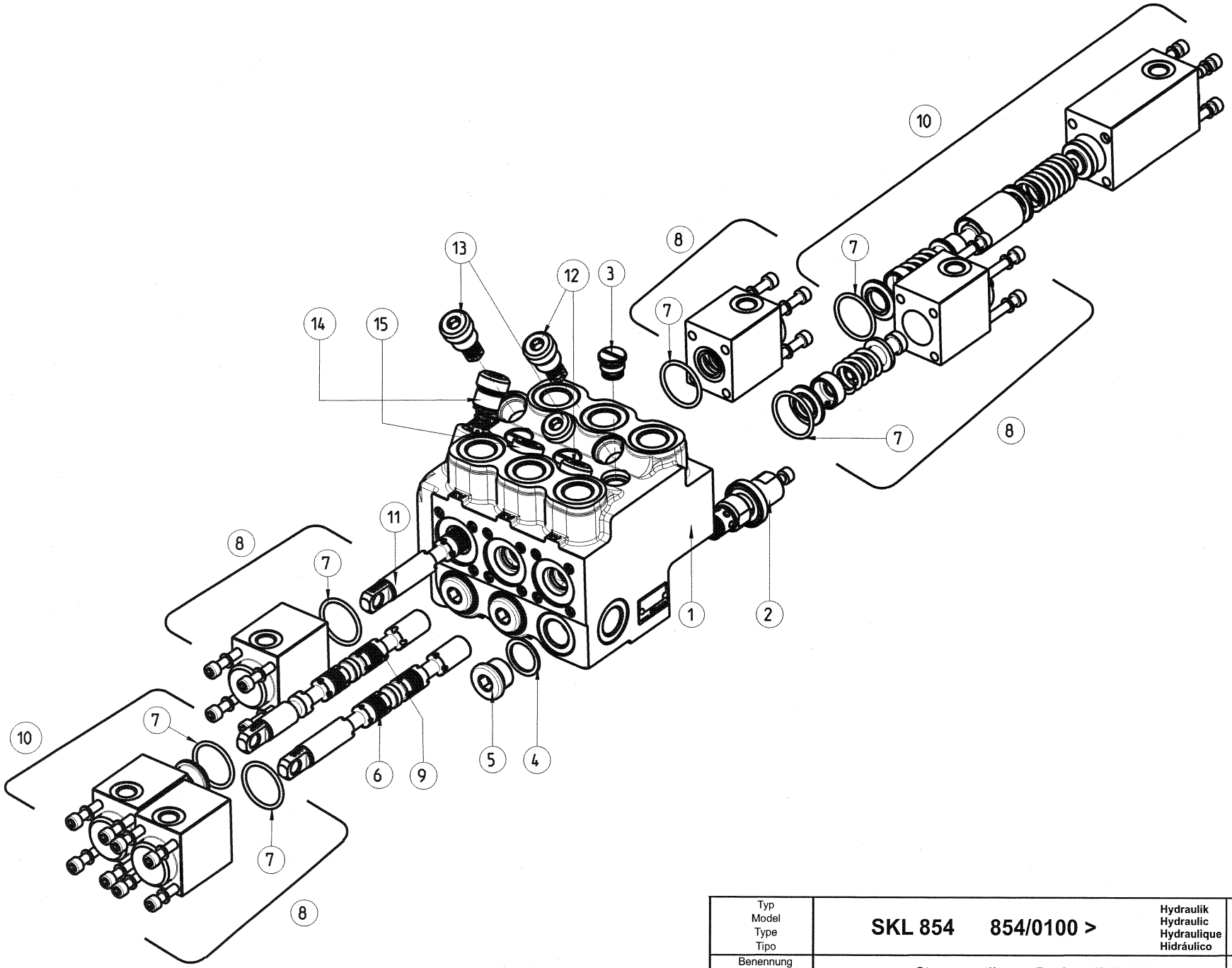
Pilot controlled hydr. proportional spool operation with closed rod ends

Typ Model Type Tipo	**SKL 824 834 844 und** **SKL 854 mit 2. Zusatzkreis**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Steuerventil Parker P 70 CF** **Valve bank Parker P 70 CF** **Distributeur Parker P 70 CF**		Blatt Page Feuille Página	**5.224.01**

ECH

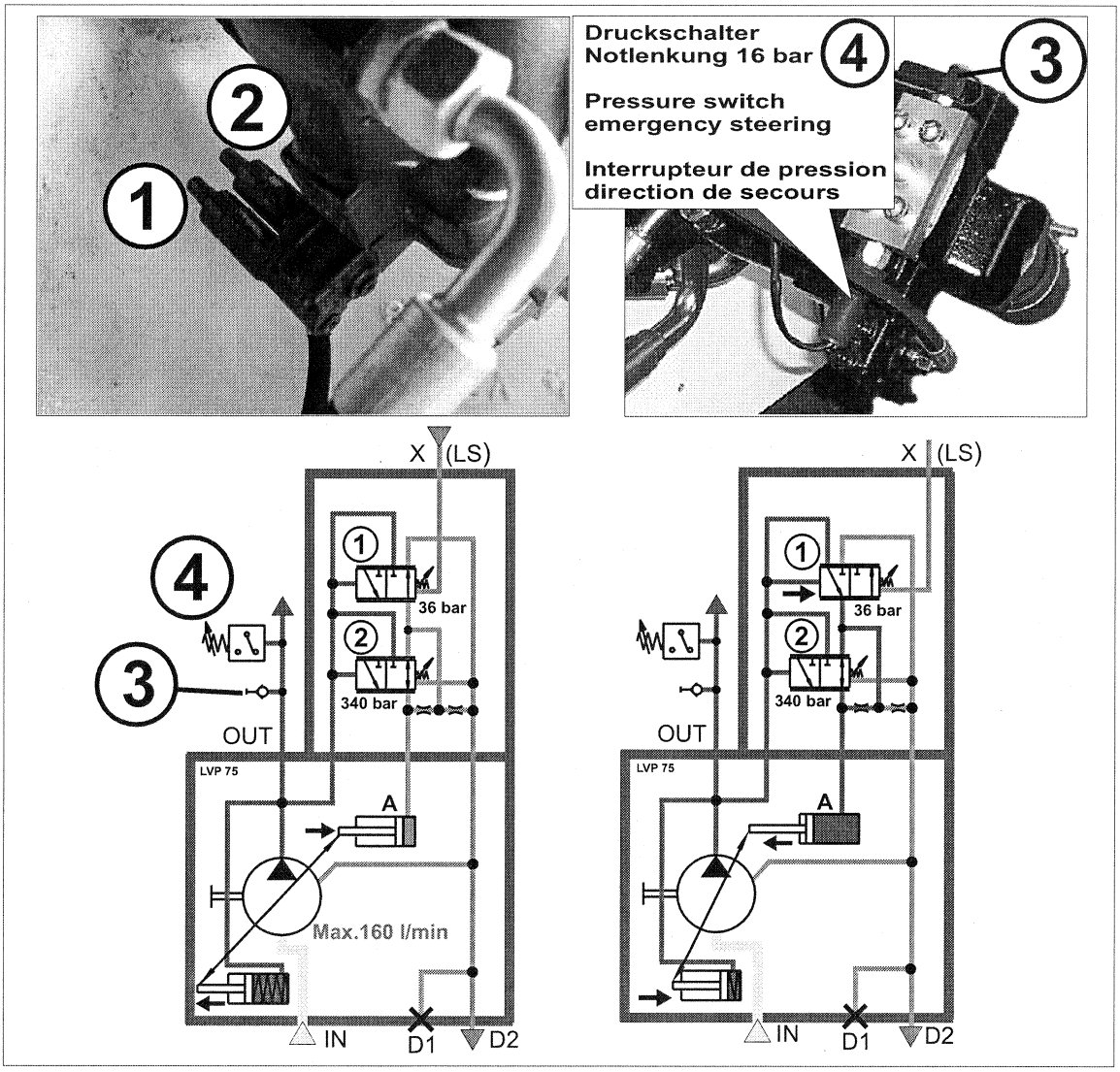


Pilot controlled electro- hydr. proportional spool operation with closed rod ends including the possibility of add. hydr. proportional spool operation.



Typ Model Type Tipo	**SKL 854** **854/0100 >** **Hydraulik Hydraulic Hydraulique Hidráulico**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Steuerventil** **Bucher HDM 19WL** **Control valve** **Distributeur**	Blatt Page Feuille Página	**5.227.01**

Ref.	Benennung	Description	Note	Q.ty
1	Steuerventil kpl.	Control valve HDM19WL/3 K302 ½"	COMPLEWTE WITH CHECK VALVE	1
2	Hauptüberdruckventil	Main relief valve VMP02 T.100-270 MAX VALVE		1
3	Lasthalte-Rückschlagventil	Check valve HDS10		3
4	Dichtscheibe	Washer (sealed) 21.3X27.5X1.50		3
5	Stopfen	Plug TCEI 1/2" G DIN908ST ZG		3
6	Steuerschieber (Zusatz)	Type Spool HDM19WL A5S		1
7	O - Ring	O-ring 3118 029.82X2.62 NBR90		6
8	Vorsteuerkappe kpl.	Pilot control cap (complete) HDM19WL POSIT. 50 HP		2
9	Steuerschieber (Hubrahmen)	Type Spool HDM19WL W5P		1
10	Vorsteuerkappe kpl. (Schwimmst.)	Pilot control cap (floating position) HDM19WL POSIT. 52 HP		1
11	Steuerschieber (Schaufel)	Type Spool HDM19WL R5RB		1
12	Sekundärventil (230 bar Zusatz)	Secondary (safety) valve 230 bar HDM19WL T.230		2
13	Sekundärventil (280 bar heben, einkippen)	Secondary valve 280 bar Lifting, shovel in HDM19WL T.280		2
14	Sekundärventil (130 bar auskippen)	Secondary valve 130 bar Dump out HDM19WL T.130		1
15	Nachsaugventil (Hubrahmen senken)	Anticavitation valve C/A-C/B HDM19WL		1



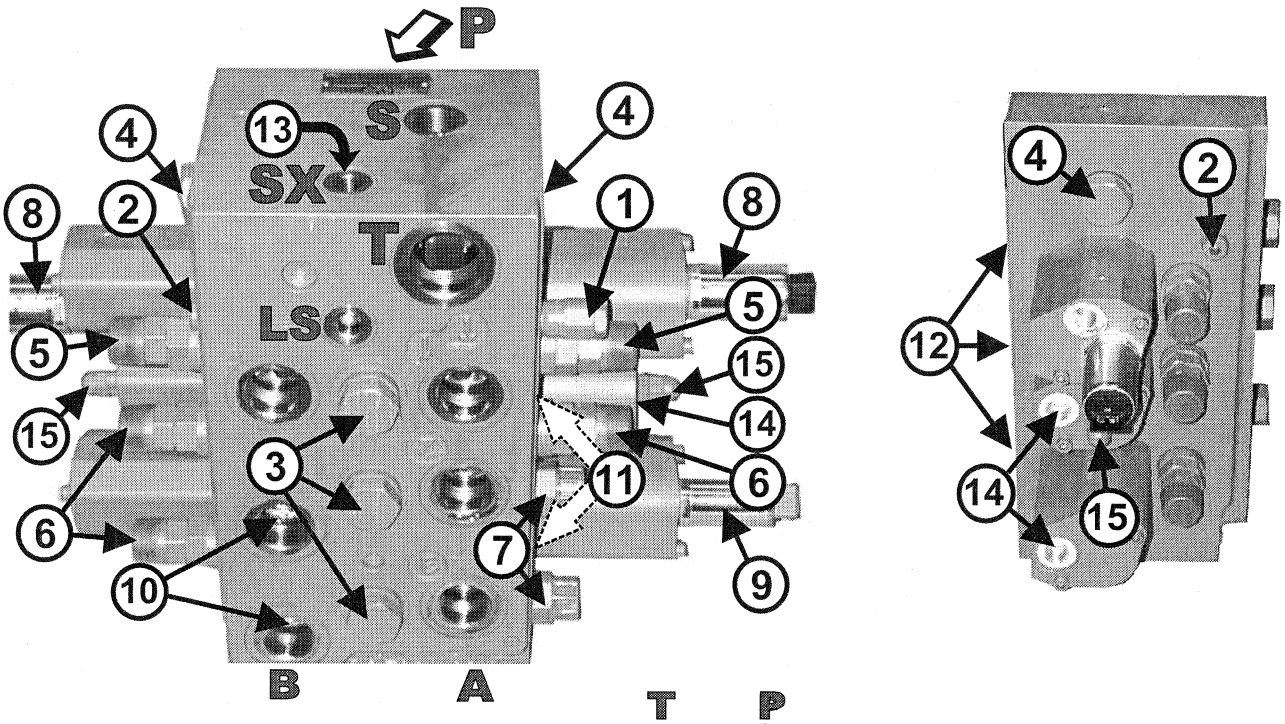
Steering and Working pump Casappa LVP 75:

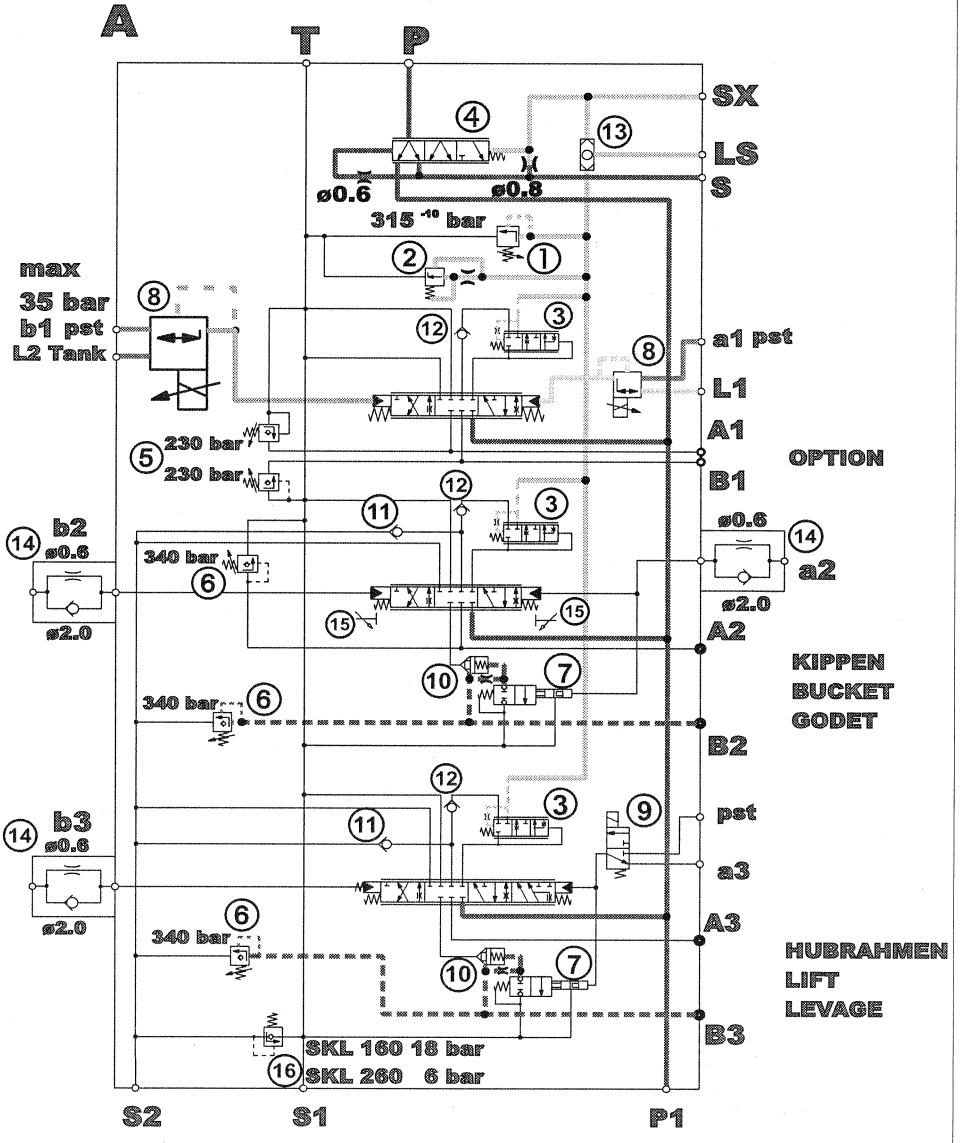
Diagram right: Diesel engine to be started, no function operated jet.
At stopped engine the displacement pump is at max. flow.
As soon as the engine is started, the power regulator **(1)** is pushed to the right hand side.
Then the actuation piston **(A)** is linked at the piston side to pressure port **(P)**. The pump destrokes to minimum flow, until the adjusted stand-by pressure of 36 bar is reached at the power regulator **(1)**. This pressure will be hold.
Diagram left: Steering or working function operated. The power regulator **(1)** is pushed to the left hand side because of the pressure signal coming via the X port (LS) to the spring chamber side of the power regulator **(1)**. Then, the piston side of the actuation piston is switched via port **(D2)** to tank, the displacement pump moves to maximum flow.

SETTING INSTRUCTION PUMP:

Bring machine to service temperature (50 - 60°C hydraulic oil - temp.)
Connect 60 bar pressure gauge to the **P** outlet **(3)** of the pump. Start up diesel engine, set engine to high idle. **DO NOT OPERATE ANY FUNCTION !!!** Check the pressure at the gauge, it should be at 36 bar! If not, please readjust the power regulator **(1)** at the pump. The second regulator **(2)** is the safety valve of the pump, set to 340 bar. Under normal conditions this safety valve is not in use. The working pressure is usually limited by the load sensing cut off valve at the control valve 3M6. To check safety valve regulator **(2)**, connect 600 bar pressure gauge to the **P** outlet **(3)** of the pump, then you'll have to set the LS cut off valve at the control valve to a higher pressure setting. Then actuate lifting frame down into its end stroke, check the pressure at the gauge port **(3).**

Typ Model Type Tipo	**SKL 260**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Description and setting instruction Displacement pump Casappa LVP 75**	Blatt Page Feuille Página	**5.230.01**





Alle Funktionen
All functions
Toutes fonctions
SKL 160 Q = 100 L/min
A3: Q = 10 L/min
SKL 260 Q = 160 L/min
A3: Q = 30 L/min

Typ Model Type Tipo	**SKL 160 - 260**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Steuerventil 3M6-15** **Valve bank 3M6-15** **Distributeur 3M6-15**	Blatt Page Feuille Página	**5.230.02**

Pos. Item Rep. No.	Deutsch	English	Français
	STEUERVENTIL	**VALVE BANK**	**DISTRIBUTEUR**
	3 M6-15	**3 M6-15**	**3 M6-15**
1	LS - Druckbegrenzungsventil 310 bar	Load sensing pressure valve 310 bar	Limiteur de pression LS 310 bar
2	LS - Volumenstromregelventil nicht einstellbar	LS - flow regulator valve not adjustable	Régulateur de débit LS non réglable
3	Sektionsdruckwaage	Pressure compensator	Balance de pression
4	Prioritätsschieber	Priority spool	Tiroir prioritaire
5	Sekundärventil 230 bar	Secondary pressure relief valve 230 bar	Clapet secondaire 230 bar
6	Sekundärventil 340 bar	Secondary pressure relief valve 340 bar	Clapet secondaire 340 bar
7	Sitzventil	Poppet valve	Valve à clapet
8	Druckminderventil proportional	Proportional pressure reducing valve	Réducteur de pression proportionnel
9	Schwimmstellungsventil	Floating position valve	Clapet position flottante
10	Rückschlagventil (entsperrbar)	Check valve (unlockable)	Clapet anti-retour (piloté)
11	Rückschlagventil, unter Vorsteuerkappe	Check valve, under pilot pressure cap	Clapet anti-retour, sous capuchon pression pilotage
12	Rückschlagventil	Check valve	Clapet anti-retour
13	Wechselventil	Shuttle valve	Soupape selecteur
14	Drosselrückschlagventil	Throttle check valve	Clapet anti-retour avec é etranglement
15	Schieberwegbegrenzung	Spool stroke limitation	Limitation de course du tiroir
16	Vorspannventil	Initial tension valve	Soupape précontrainte

Sekundärventile: Prüfen und Einstellen.

- 600 bar Manometer an Messpunkt 3 der Pumpe (siehe Blatt 5.230.01) anschliessen.
- Sicherheitsregler 2 der Pumpe, (siehe Blatt 5.230.01), über 340 bar einstellen.
- LS Druckbegrenzungsventil 1 am Steuerventil (siehe Blatt 5.230.02) über 340 bar einstellen.
- Alle Funktionen, ausser Hubrahmen senken, (ist ohne Sekundärventil), mit niedriger Motordrehzahl in Zylinderendlage fahren.
- Druck ablesen, gegebenenfalls nachstellen.
- Sicherheitsregler 2 und LS Druckbegrenzungsventil 1 wieder auf die angegebenen Werte zurückstellen.

Secondary pressure relief valve: Checks and adjustment.

- Connect a 600 bar gauge at test-port 3 at displacement pump (see page 5.230.01).
- Adjust safety controller 2 higher than 340 bar at displacement pump (see page 5.230.01).
- Adjust LS-pressure valve 1 higher than 340 bar at Control valve (see page 5.230.02)
- Actuate all functions, exept lowering loader frame (without secondary relief valve) with low engine rpms into hydr. cylinder end stroke position.
- Read the pressures, readjust if necessary.
- Readjust safety controller 2 and LS-pressure valve 1 to indicated values.

Clapets secondaires: Contrôle et réglage.

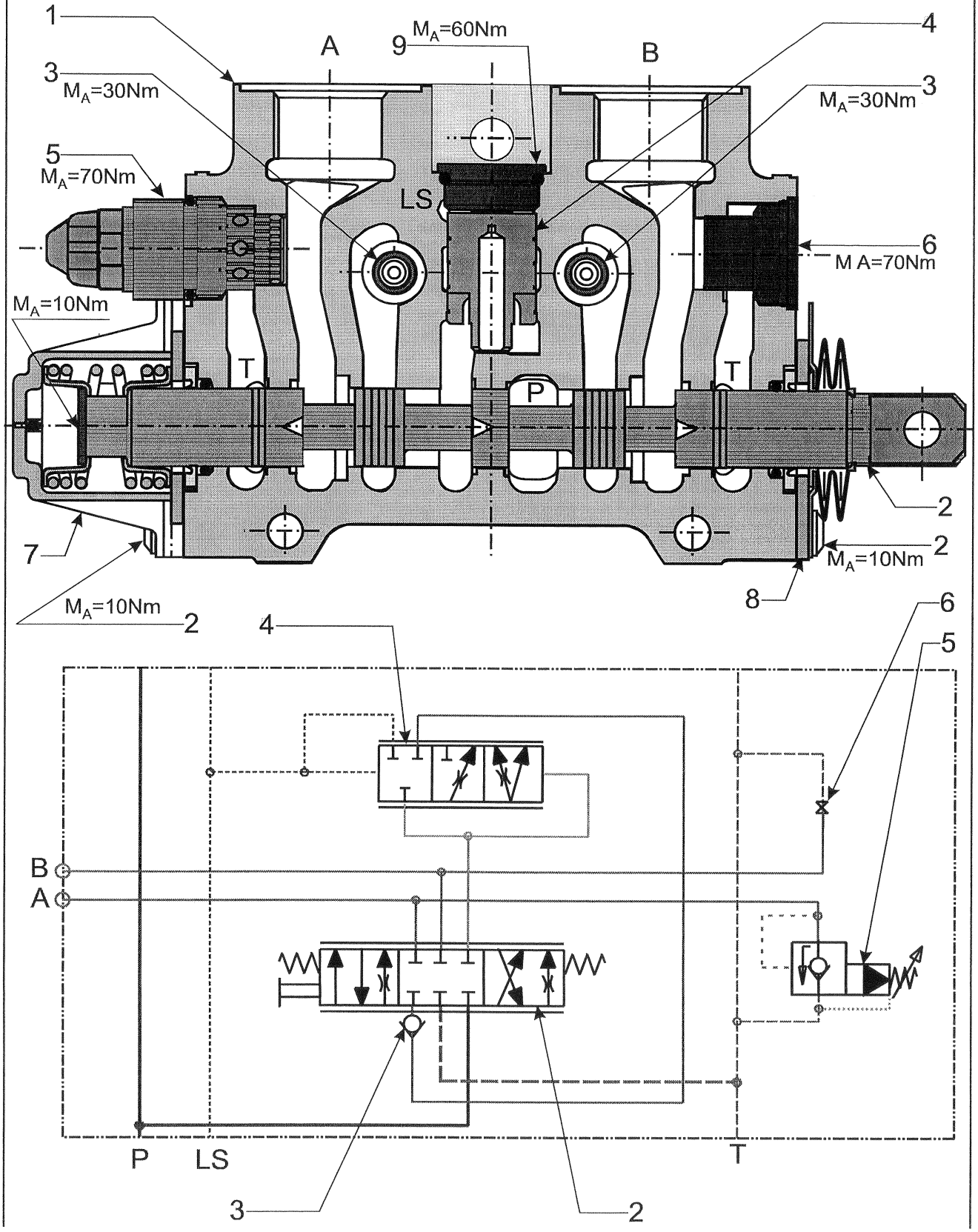
- Brancher un manomètre au prise de pression 3 ou pompe (voir page 5.230.01).
- Regler la pression du clapet de securité 2 ou pompe, (voir page 5.230.01) à une valeur supérieur à 340 bar.
- Regler la pression du limiteur de pression LS 1 ou distributeur,(voir page 5.230.02) à une valeur supérieur à 340 bar.
- Actionner toutes les fonctions de verins, sauf bras de levage abaisser, (sans clapet secondaire) á un régime moteur assez bas à fin de course. Relever les pressions et les reajuster si necessaire.
- Reajuster le clapet de securité 2 et le limiteur de pression LS 1 aux valeurs indiquées.

TEREX | SCHAEFF

SX 14

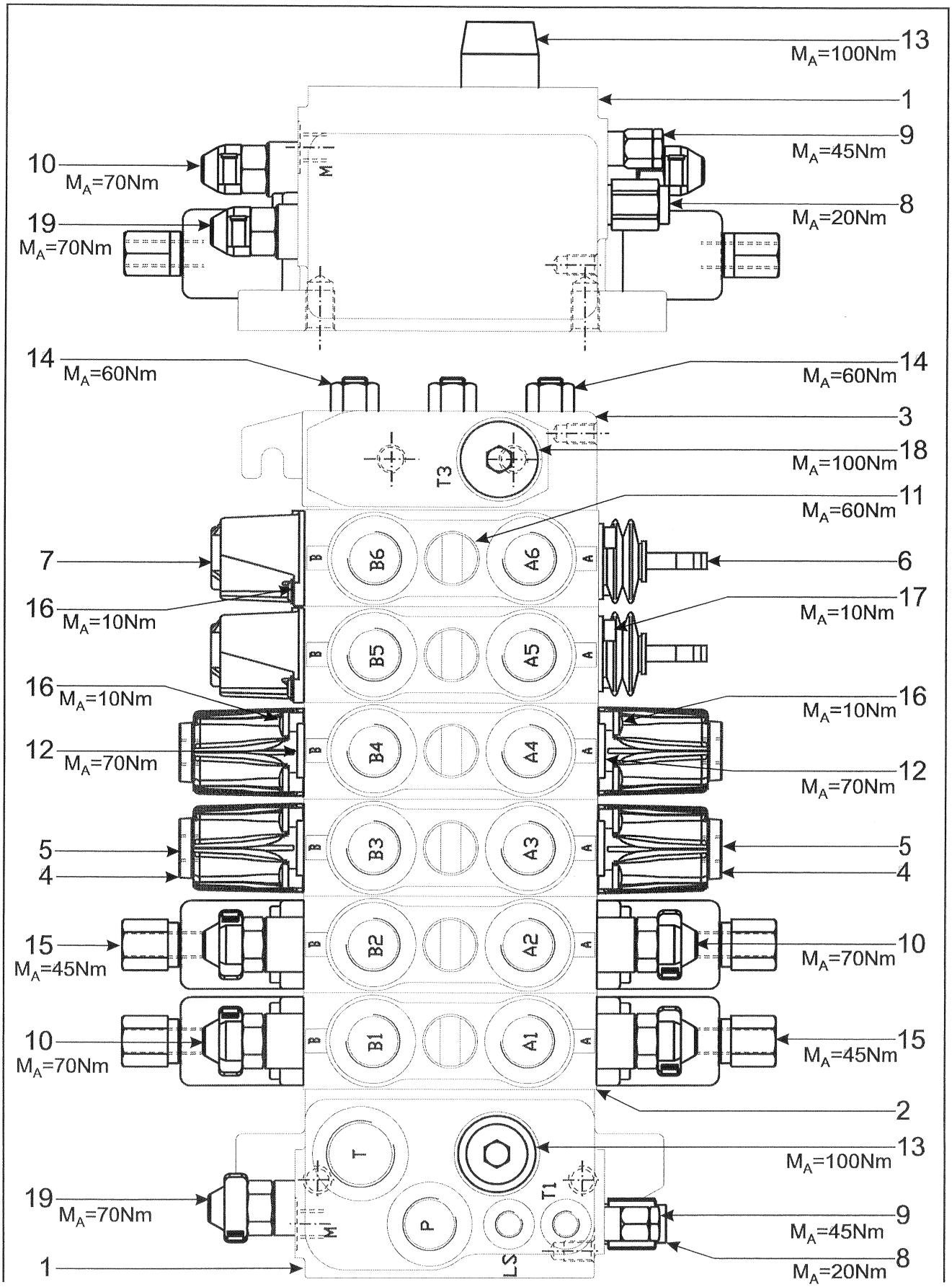
Typ Model Type Tipo	**SX 14**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**5.251.00**

Wegeventilelement — Directional valve element — Elément de distribution



Typ Model Type Tipo	**SX 14**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.251.01**

Pos. Item Rep. No.	Deutsch	English	Français
	Wegeventilelement	**Directional valve element**	**Elément de distribution**
1	Gehäuse	Housing	Corps
2	Steuerschieber mit Federrückstellung	Spool with spring return	Tiroir principal avec rappel ressort
3	Rückschlagventil	Check valve	Clapet anti-retour
4	Druckwaage	Pressure compensator	Balance de pression
5	Sekundärventil	Secondary relief valve	Clapet secondaire
6	Verschlußschraube	Plug	Bouchon
7	Deckel für Federrückstellung	Cover for spring spool return	Couvercle pour ressort tiroir
8	Platte	Plate	Plaque
9	Verschlussschraube für Druckwaage	Plug for pressure compensator	Bouchon pour balance de pression
10	Einschraubstück	Adapter	Raccord fileté
11	Schraube für Deckel	Screw for cover	Vis pour couvercle
12	Schraube für Platte	Screw for plate	Vis pour plaque

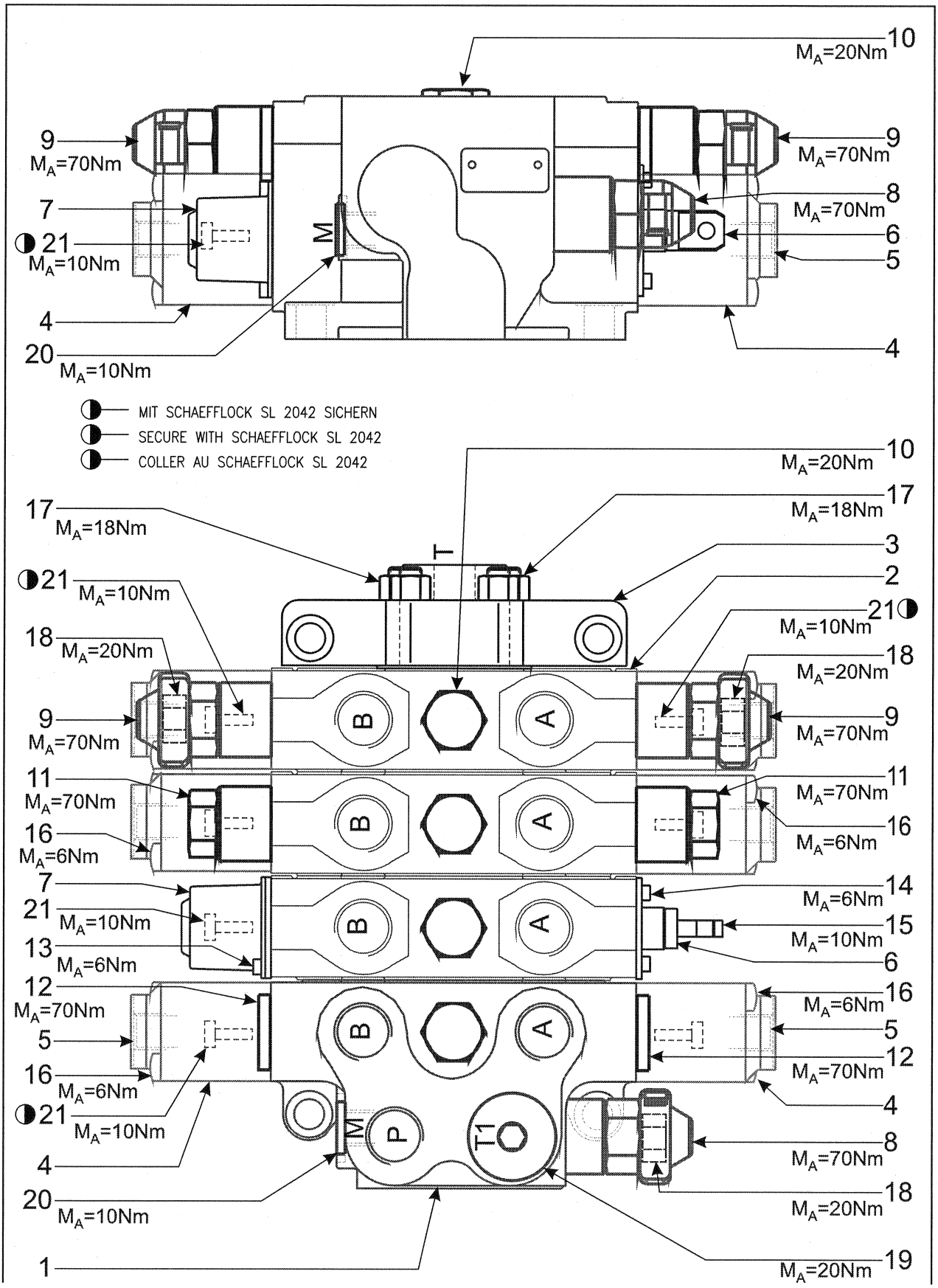


Typ Model Type Tipo	**SX 14**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.251.03**

Pos. Item Rep. No.	Deutsch	English	Français
	BLOCKSTEUERGERAET	**VALVE BANK**	**DISTRIBUTEUR**
	6 SX 14	**6 SX 14**	**6 SX 14**
1	Eingangselement	Inlet element	Elément d'entrée
2	Wegeventilelement	Directional valve element	Elément de distribution
3	Endelement	Final element	Elément finale
4	Deckel für hydraulische Betätigung	Cover for hydraulic operation	Capuchon pour commande hydraulique
5	Vorsteuranschluss (hydraulisch)	Pilot operated connection (hydraulic)	Connexion à commande assistée (hydraulique)
6	Mechanische Betätigung	Mechanical operation	Commande mécanique
7	Deckel für Federrückstellung	Cover for spring spool return	Couvercle pour ressort tiroir
8	LS - Volumenstromregelventil	LS - flow regulator valve	Régulateur de débit LS
9	LS - Druckbegrenzungsventil	Load sensing pressure valve	Limiteur de pression LS
10	Sekundärventil, *einstellbar*	Line relief valve, *adjustable*	Clapet secondaire, *réglable*
11	Verschlussschraube für Sektionsdruckwaage	Pressure compensator plug	Bouchon pour balance de pression
12	Verschlussschraube	Plug	Bouchon
13	Spülventil	Drain valve	Valve de purge
14	Zuganker	Tie rods	Tirants
15	Schieberwegbegrenzung	Spool stroke limitation	Limitation de course du tiroir
16	Schraube für Deckel	Screw for cover	Vis pour couvercle
17	Schraube für Platte	Screw for plate	Vis pour plaque
18	Verschlussschraube	Plug	Bouchon
19	Hauptüberdruckventil	Main relief valve	Limiteur pression principal

SM 12

Typ Model Type Tipo	**SM12**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**5.253.00**



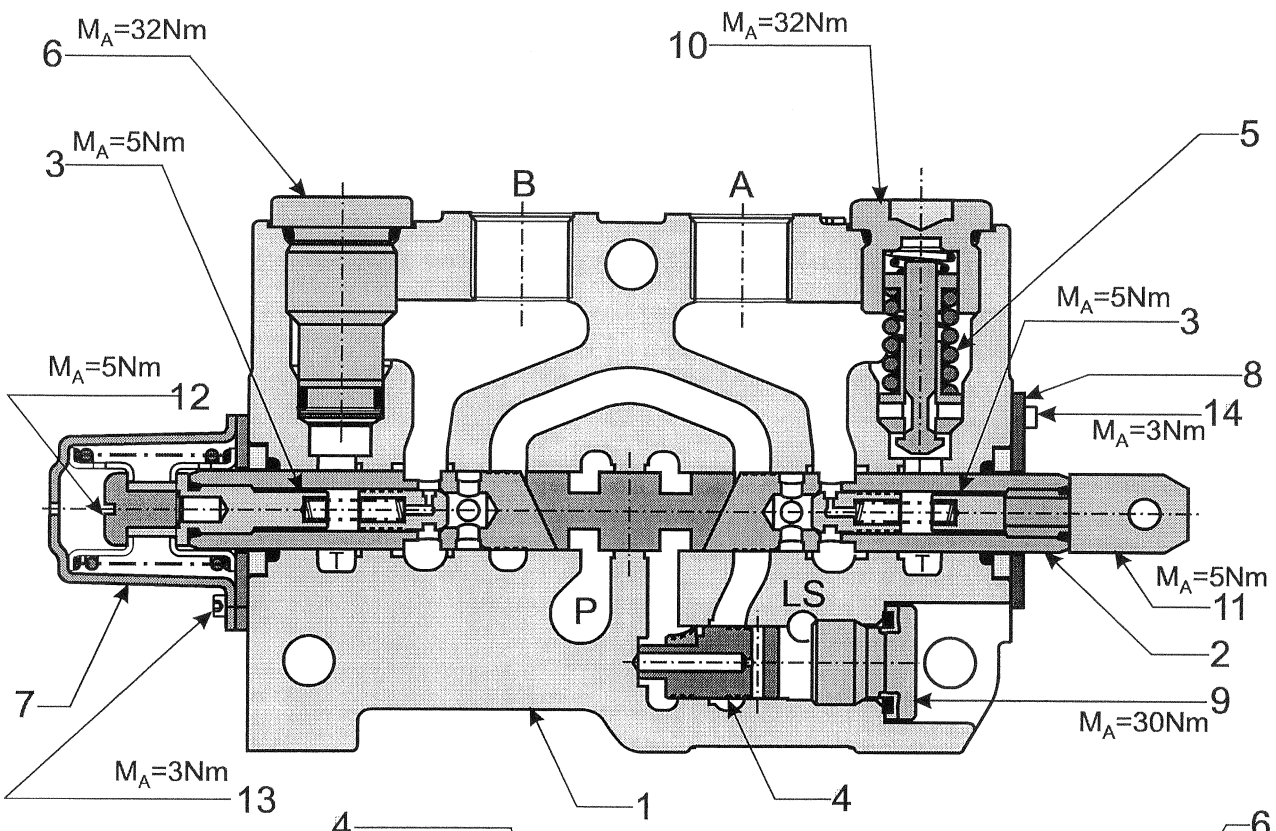
Typ Model Type Tipo	**SM 12**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.253.01**

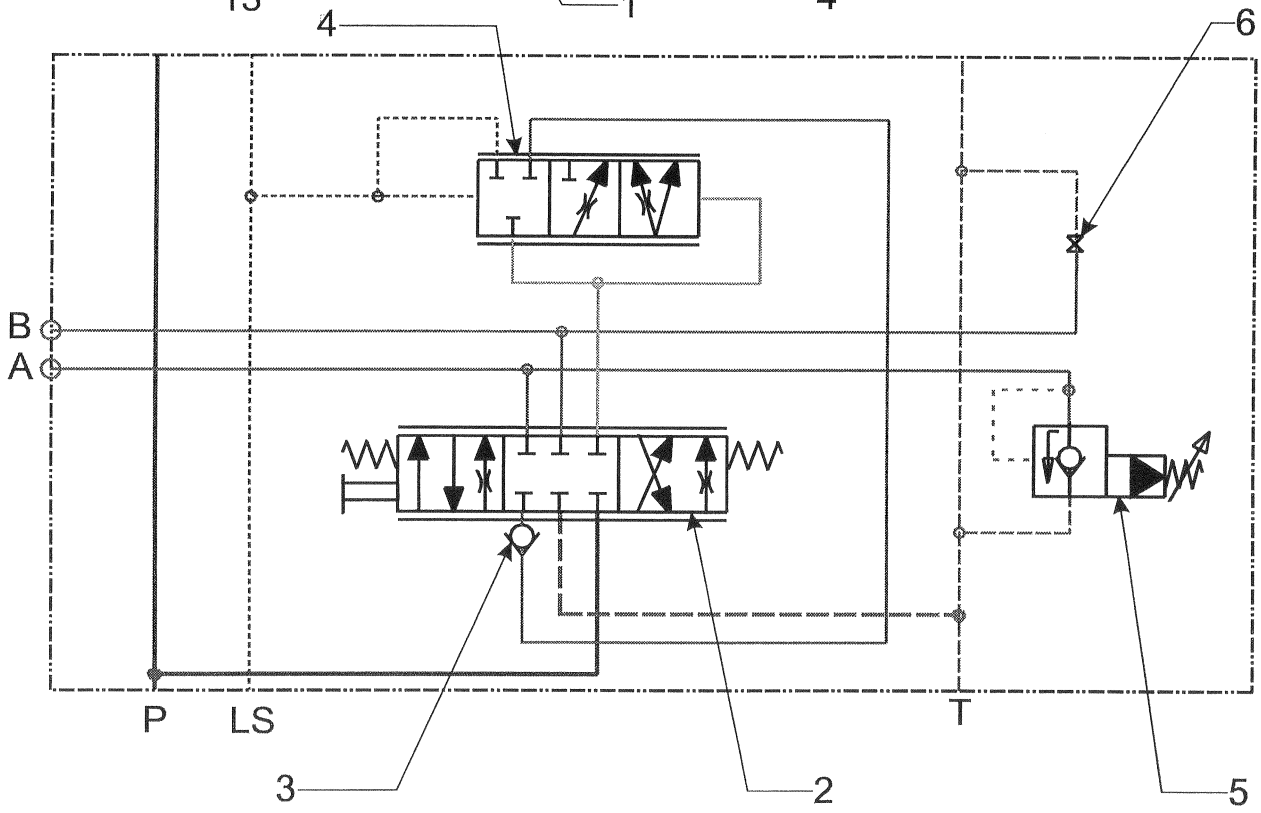
Pos. Item Rep. No.	Deutsch	English	Français
	BLOCKSTEUERGERAET	**VALVE BANK**	**DISTRIBUTEUR**
	4 SM 12	**4 SM 12**	**4 SM 12**
1	Eingangselement	Inlet element	Elément d'entrée
2	Wegeventilelement	Directional valve element	Elément de distribution
3	Endelement	Final element	Elément finale
4	Vorsteuerkappe	Cover for hydraulic operation	Capuchon pour commande hydraulique
5	Vorsteueranschluss (hydraulisch)	Pilot operated connection (hydraulic)	Connexion à commande assistée (hydraulique)
6	Mechanische Betätigung	Mechanical operation	Commande mécanique
7	Deckel für Federrückstellung	Cover for spring spool return	Couvercle pour ressort tiroir
8	Hauptüberdruckventil, einstellbar	Main relief valve, adjustable	Limiteur pression principal, réglable
9	Sekundärventil, *einstellbar*	Line relief valve, *adjustable*	Clapet secondaire, *réglable*
10	Verschlussschraube für Rückschlagventil	Plug for load retaining valve	Bouchon pour clapet anti retourr
11	Nachsaugventil	Anticavitation check valve	Clapet de gavage
12	Stopfen "Q"	Plug "Q"	Obturateur "Q"
13	Schraube für Deckel	Screw for cover	Vis pour couvercle
14	Schraube für Platte	Screw for plate	Vis pour plaque
15	Schieberzunge	Spool tongue	Embout à tenon
16	Schraube für Vorsteuerkappe	Screw for cover	Vis pour couvercle
17	Zuganker	Tie rods	Tirants
18	Kontermutter *Hauptüberdruckventil, Sekundärventil*	Counter nut *main relief valve, secondary relief valve*	Contre écrou *limiteur principal clapet secondaire*
19	Verschlussschraube	Plug	Bouchon
20	Verschlussschraube für Messanschluß "M"	Plug for test port "M"	Bouchon pour prise de pression "M"
21	Einschraubstück für Förderzentrierung Steuerschieber	Fitting for spool spring centering	Raccord fileté pour centrage du ressort de tirior

SX 10

Typ Model Type Tipo	**SX 10**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**5.274.00**

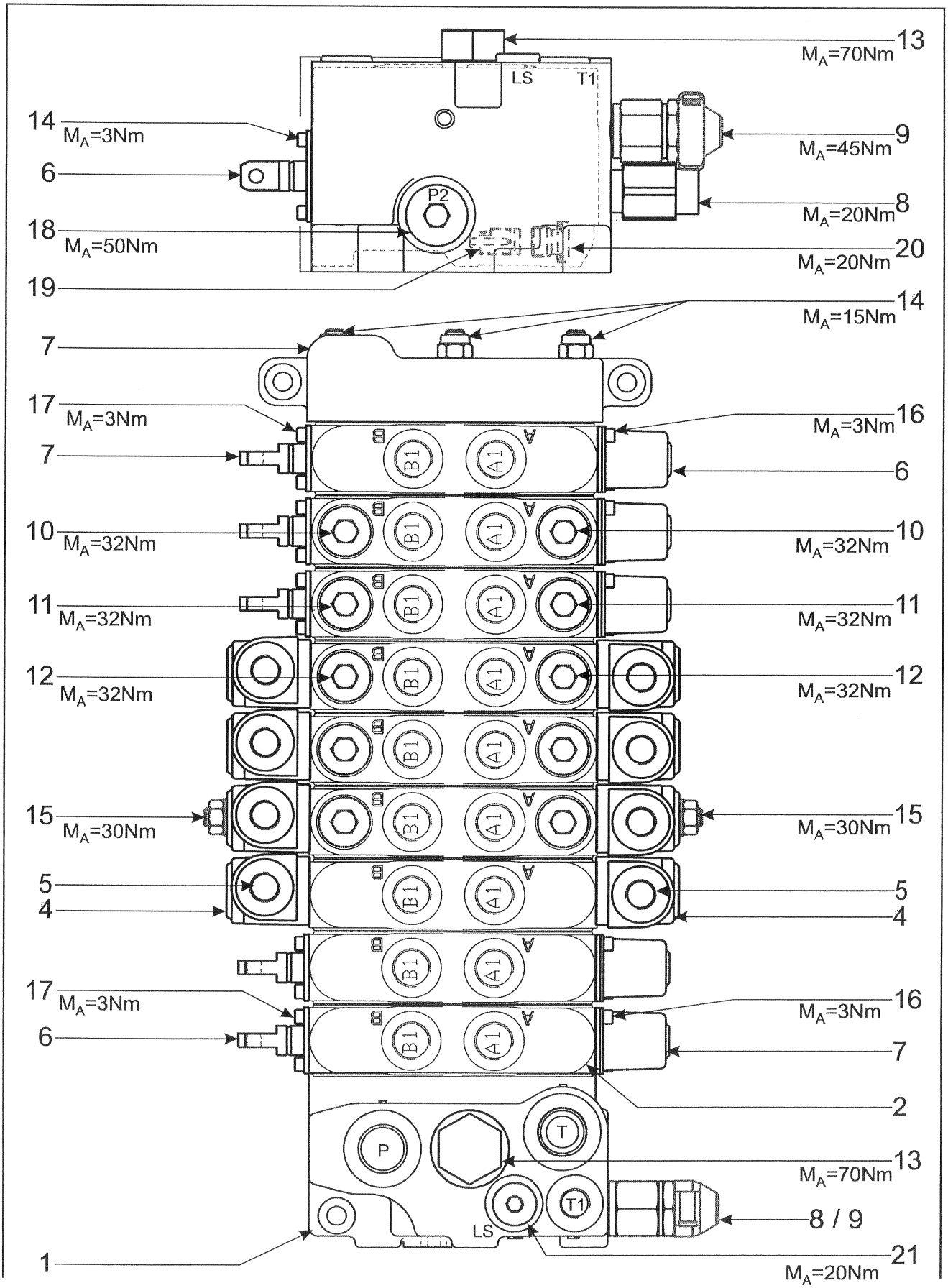
Wegeventilelement — Directional valve element — Elément de distribution





Typ Model Type Tipo	**SX 10**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.274.01**

Pos. Item Rep. No.	Deutsch	English	Français
	Wegeventilelement	**Directional valve element**	**Elément de distribution**
1	Gehäuse	Housing	Corps
2	Steuerschieber mit Federrückstellung	Spool with spring return	Tiroir principal avec rappel ressort
3	Rückschlagventil	Check valve	Clapet anti-retour
4	Druckwaage	Pressure compensator	Balance de pression
5	Sekundärventil	Secondary relief valve	Clapet secondaire
6	Verschlußschraube	Plug	Bouchon
7	Deckel für Kolbenrückstellung	Cover for spool return	Couvercle pour rappel tiroir
8	Platte	Plate	Plaque
9	Verschlussschraube für Druckwaage	Plug for pressure compensator	Bouchon pour balance de pression
10	Verschlussschraube für Sekundärventil	Plug for secondary relief valve	Bouchon pour clapet secondaire
11	Steuerschieberzunge	Spool tongue	Embbout à tenon de tirior principal
12	Zylinderschraube mit Schlitz	Slotted haed screw	Vis à tête fendue cylindrique
13	Schraube für Deckel	Screw for cover	Vis pour couvercle
14	Schraube für Platte	Screw for plate	Vis pour plaque



Typ Model Type Tipo	**SX 10**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.274.03**

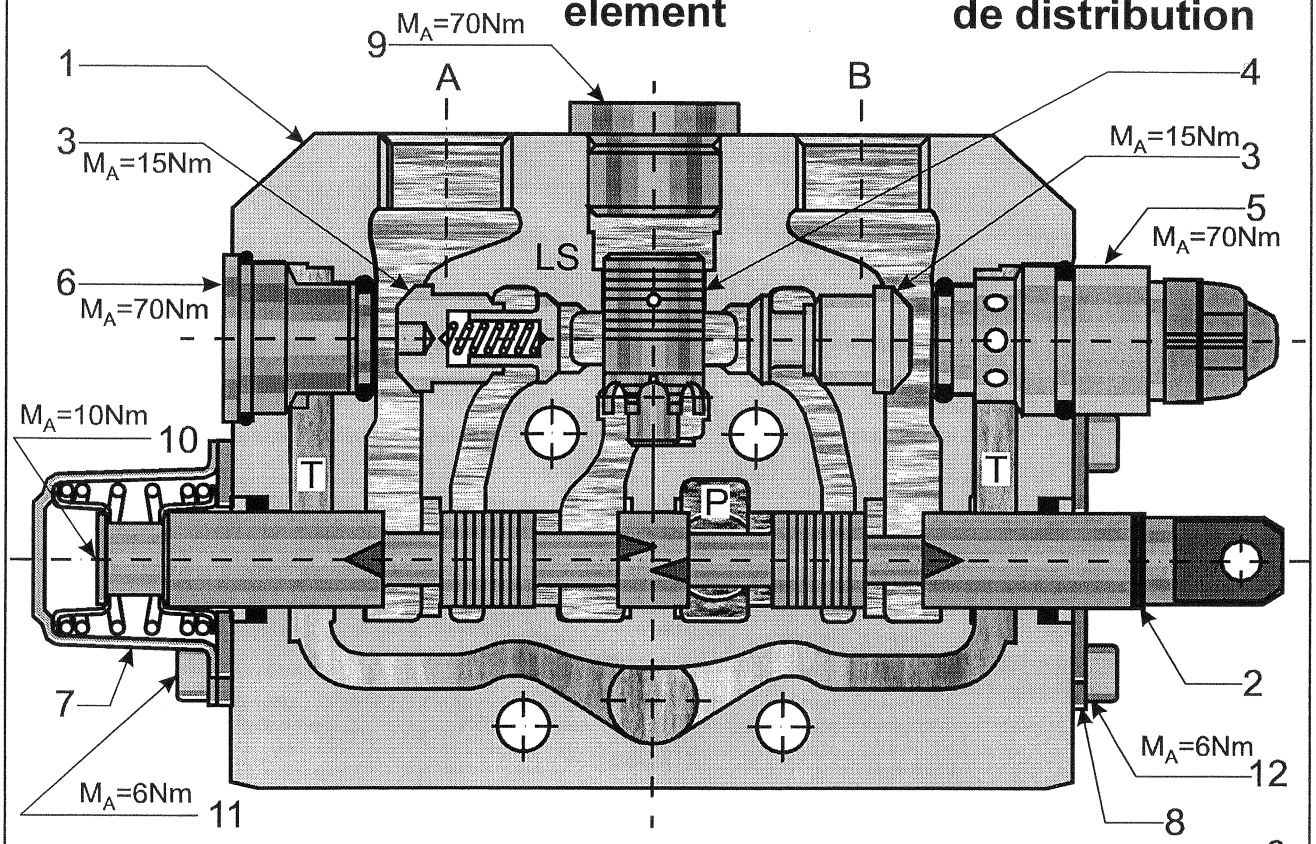
Pos. Item Rep. No.	Deutsch	English	Français
	BLOCKSTEUERGERAET	**VALVE BANK**	**DISTRIBUTEUR**
	9 SX 10	**9 SX 10**	**9 SX 10**
1	Eingangselement	Inlet element	Elément d'entrée
2	Wegeventilelement	Directional valve element	Elément de distribution
3	Endelement	Final element	Elément finale
4	Deckel für hydraulische Betätigung	Cover for hydraulic operation	Capuchon pour commande hydraulique
5	Vorsteuranschluss (hydraulisch)	Pilot operated connection (hydraulic)	Connexion à commande assistée (hydraulique)
6	Mechanische Betätigung	Mechanical operation	Commande mécanique
7	Deckel für Federrückstellung	Cover for spring spool return	Couvercle pour ressort tiroir
8	LS - Volumenstromregelventil	LS - flow regulator valve	Régulateur de débit LS
9	LS - Druckbegrenzungsventil	Load sensing pressure valve	Limiteur de pression LS
10	Verschlussschraube für Sekundärventil	Plug from secondary relief valve	Bouchon pour clapet secondaire
11	Verschlussschraube für Nachsaugventil	Plug for anti-cavitation check valve	Bouchon pour clapet realimentation
12	Verschlussschraube	Plug	Bouchon
13	Spülventil	Drain valve	Valve de purge
14	Zuganker	Tie rods	Tirants
15	Schieberwegbegrenzung	Spool stroke limitation	Limitation de course du tiroir
16	Schraube für Deckel	Screw for cover	Vis pour couvercle
17	Schraube für Platte	Screw for plate	Vis pour plaque
18	Verschlussschraube	Plug	Bouchon
19	Druckwaage	Pressure compensator	Balance de pression
20	Verschlussschraube für Druckwaage	Plug for pressure compensator	Bouchon pour balance de pression
21	Verschlussschraube	Plug	Bouchon

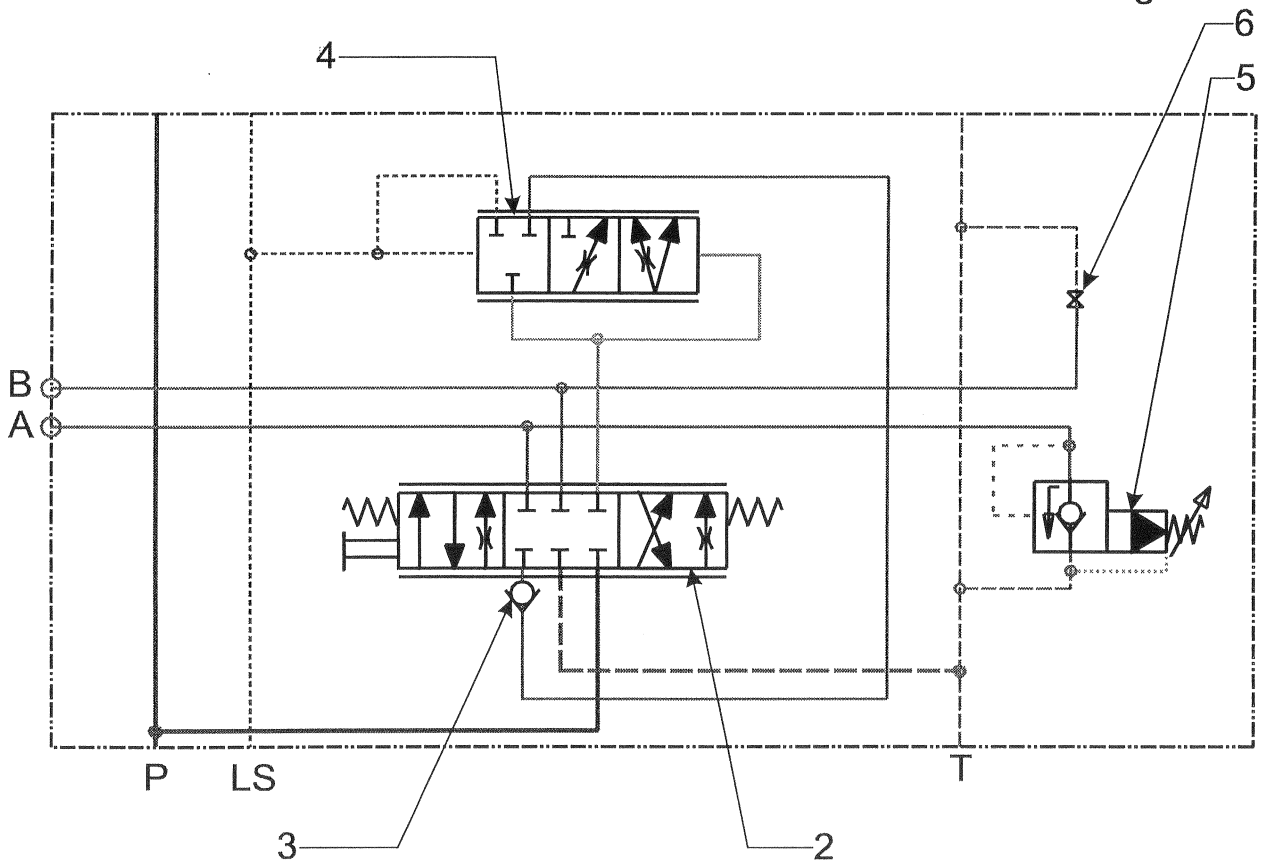
Typ Model Type Tipo	**SX 10**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.274.04**

SX 12

Typ Model Type Tipo	**SX 12**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**5.276.00**

Wegeventilelement — Directional valve element — Elément de distribution

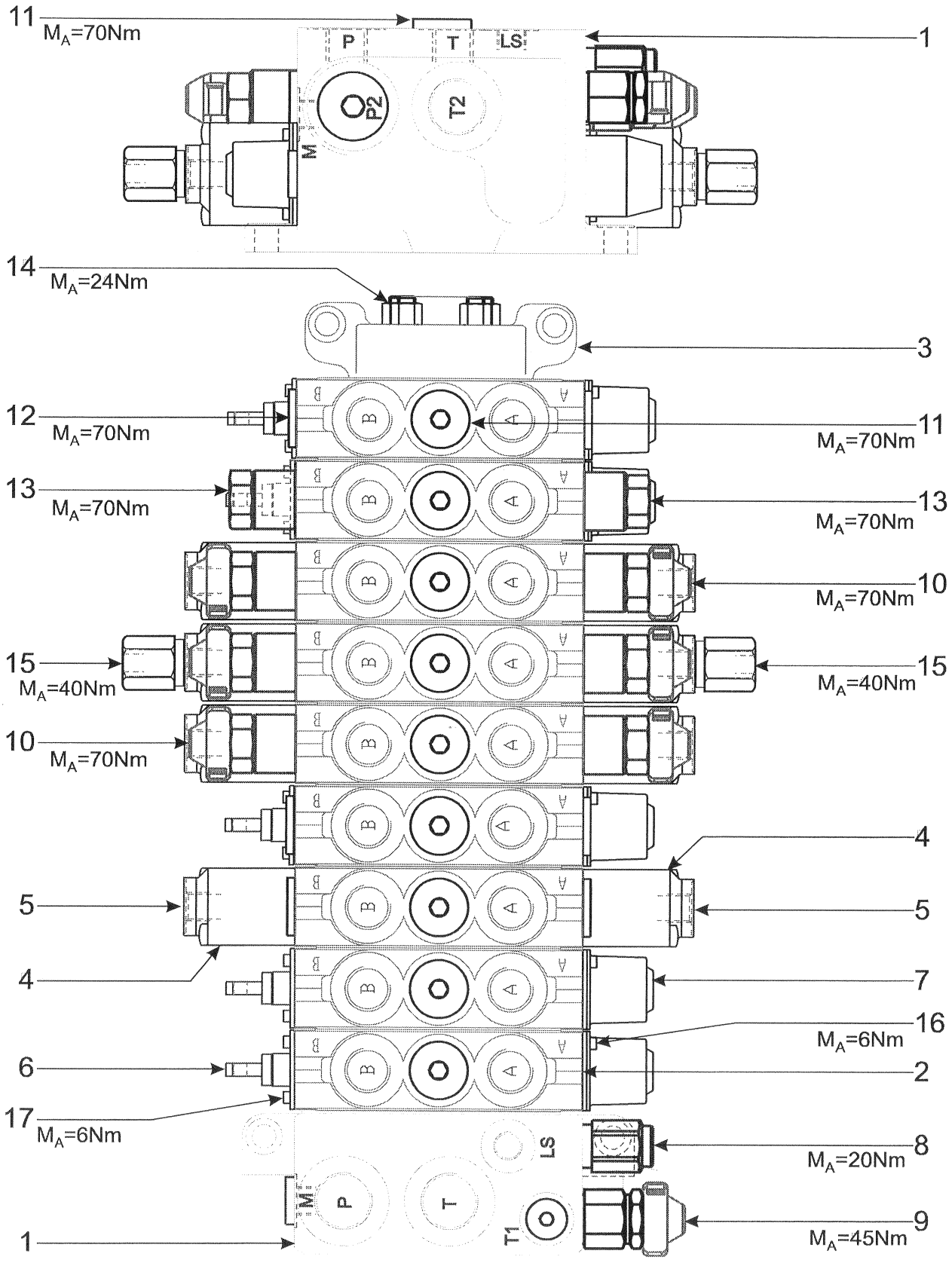




Typ Model Type Tipo	**SX 12**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.276.01**

Pos. Item Rep. No.	Deutsch	English	Français
	Wegeventilelement	**Directional valve element**	**Elément de distribution**
1	Gehäuse	Housing	Corps
2	Steuerschieber	Spool	Tiroir principal
3	Rückschlagventil	Check valve	Clapet anti-retour
4	Druckwaage	Pressure compensator	Balance de pression
5	Sekundärventil	Secondary relief valve	Clapet secondaire
6	Verschlußschraube	Plug	Bouchon
7	Deckel für Federrückstellung	Cover for spring spool return	Couvercle pour ressort tiroir
8	Platte	Plate	Plaque
9	Verschlussschraube für Druckwaage	Plug for pressure compensator	Bouchon pur balance de pression
10	Einschraubstück	Adapter	Raccord fileté
11	Schraube für Deckel	Screw for cover	Vis pour couvercle
12	Schraube für Platte	Screw for plate	Vis for plaque

Typ Model Type Tipo	**SX 12**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.276.02**



Typ Model Type Tipo	**SX 12**	**Steuerventil** **Valve bank** **Distributeur** **Válvula**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**		Blatt Page Feuille Página	**5.276.03**

Pos. Item Rep. No.	Deutsch	English	Français
	BLOCKSTEUERGERAET	**VALVE BANK**	**DISTRIBUTEUR**
	9 SX 12	**9 SX 12**	**9 SX 12**
1	Eingangselement	Inlet element	Elément d'entree
2	Wegeventilelement	Direction valve element	Elément de distribution
3	Endelement	Final element	Elément finale
4	Deckel für hydraulische Betätigung	Cover for hydraulic operation	Capuchon pour commande hydraulique
5	Vorsteuranschluss (hydraulisch)	Pilot operated connection (hydraulic)	Connexion à commande assistée (hydraulique)
6	Mechanische Betätigung	Mechanical operation	Commande mécanique
7	Deckel für Federrückstellung	Cover for spring spool return	Couvercle pour ressort tiroir
8	LS - Volumenstromregelventil	LS - flow regulator valve	Régulateur de débit LS
9	LS - Druckbegrenzungsventil	Load sensing pressure valve	Limiteur de pression LS
10	Sekundärventil, *einstellbar*	Line relief valve, *adjustable*	Clapet secondaire, *réglable*
11	Verschlussschraube für Sektionsdruckwaage	Pressure compensator plug	Bouchon pour balance de pression
12	Verschlussschraube für Rückschlagventil	Plug for load retaining valve	Bouchon pour clapet anti retourr
13	Nachsaugventil	Anticavitation valve	Clapet realimentation
14	Zuganker	Tie rods	Tirants
15	Schieberwegbegrenzung	Spool stroke limitation	Limitation de course du tiroir
16	Schraube für Deckel	Screw for cover	Vis pour couvercle
17	Schraube für Platte	Screw for plate	Vis pour plaque

1. Check and adjustment of the charge pressure

- connect 60 bar - gauge to high pressure port (M_A) or (M_B) of the travel pump
- attention, do not select any travel direction !
- read the value on the gauge. Desired value: see Technical Data
- if the desired value is not reached, screw out plug for the charge pressure valve (3) and correct the pressure by adding or removing shims.

2. Check and adjustment of the travel pump neutral position

- connect gauge to the high pressure port (M_A) and (M_B) of the travel pump
- set the engine to increased idle running speed
- watch the gauge. Both values have to be identical
- if the values are different, the neutral position can be corrected via the setscrew (6) at the travel pump

3. Check and adjustment of the start-up speed

- park machine on even ground
- connect engine rpm tachometer
- set travel range selector switch to „tortoise“
- set travel direction lever to „forward“ or „reverse“ resp.
- slowly actuate accelerator pedal
- read the engine rpm when the machine is starting. Desired value: see Technical Data
- if the desired value is not reached, turn the setscrew (1) at the regulator cartridge in or out resp.

  Screwing in: machine starts later
  Screwing out: machine starts earlier

4. Check and adjustment of the engine stall rpm

ATTENTION ! This check has to be carried on the road or in the field resp. (A slope would be favourable). **Beware of the road traffic !** If possible, carry out this check with 2 people.

- fill the bucket
- connect 600 bar - gauge to gauge port (M_A) forward of the travel pump
- connect engine rpm tachometer
- tighten the regulation start setscrew by 1 turn, travel motor must not regulate
- remove brake inching hose from the travel pump and plug
- set travel range selector switch to „rabbit"
- set travel direction lever to „forward"
- start up, fully accelerate
- operate the service brake when driving in order to obtain high pressure value, (see Technical Data). Read the engine rpm (see Technical Data) when this value is achieved.
- the adjustment can be corrected by turning the setscrew (1), regulator cartridge at the travel pump, in or out resp. (Attention: Start-up speed must be within the tolerance range)

  Turning in: Machine starts later
  Turning out: Machine starts earlier

  Afterwards reconnect the brake hose and deaerate the brake at the inching block.
  Adjust the regulation start as per the instructions, point 7.

5. Check and adjustment of the pressure cut-off

- connect 600 bar - gauge to gauge port (M_A) or (M_B) resp. of the travel pump
- set travel range selector switch to position „rabbit"
- set travel direction lever lever to „forward" or „reverse" resp.
- drive the vehicle against a solid object
- fully accelerate
- read the value on the gauge. Desired value: see Technical Data
- if the desired value is not reached, turn the setscrew (7) for the pressure cut-off in or out resp.

  Screwing in: pressure increase
  Screwing out: pressure decrease

6. Check and replacement of the travel high pressure valves

Note: It is only checked whether the travel high pressure valves are approx. 30 bar above the pressure cut-off

- connect 600 bar - gauge to gauge port (M_A) or (M_B) resp. of the travel pump
- increase pressure cut-off by approx. 30 - 40 bar
- set travel direction lever to „forward“ or „reverse“ resp.
- drive the vehicle against a solid object (wheels must lock up)
- fully accelerate
- read the value on the gauge. Desired value: 30 bar above the pressure cut-off
- if the desired value is not reached, remove the high pressure valve (4) or (5) resp. at the travel pump of the SKL 823 / SKL 833 / SKL 843 / SKS 633, adjust, re-install and check pressure, re-adjust if necessary.
  On the SKL 853 / SKL 863 adjust the high pressure valves - without removing them - via the setscrew.
- reset pressure cut-off to the desired value (see Technical Data)

7. Check and adjustment of the regulation start

Method 1: Test at slope

The high pressure is simulated by uphill travel. The regulation start will be achieved automatically at a corresponding gradient (dynamic measuring).

- connect 600 bar - gauge to gauge port (9) (regulation start) at the travel motor
- connect 600 bar - gauge to gauge port (M_A) = (high pressure forward) of the travel pump
- set travel range selector switch to „rabbit“
- set travel direction lever to „forward“
- start up, fully accelerate. **Attention: Beware of the road traffic** (if possible, carry out this check with 2 people)
- both gauges increase slowly. The gauge at the regulation start gauge port has to decrease after having reached the desired value (see Technical Data)
- if the gradient is not steep enough (high pressure too low), use the service brake, to do this, first remove the brake inching hose from the travel pump and plug.

- the adjustment can be corrected by turning in or out resp. the setscrew (10) at the travel motor

  Turning in: Regulation start later
  Turning out: Regulation start earlier

  Afterwards re-connect the brake hose and deaerate the brake at the inching block.

Method 2: Test on even ground

- interchange the pressure hoses charge pressure **(G)** and pilot pressure **(Pst)** at the travel pump, thus there is charge pressure at the travel motor regulation
- connect 600 bar - gauge to the travel pump **M**A = high pressure forward
- connect 60 bar - gauge to the travel pump **M**B = high pressure reverse (charge pressure in this case)
- connect 600 bar gauge to the travel motor, regulation start gauge port
- drive the machine forward against a solid object
- select fast travel range (rabbit)
- slowly accelerate
- watch all three gauges - if the gauge of the travel motor decreases, read the values on the other gauges and compare them with the following table (adjust the regulation start in case of excessive deviations)

SKL 823	**Charge pressure**	**Regulation start**
	30 bar	345 bar
	31 bar	355 bar
	32 bar	365 bar
	33 bar	370 bar

SKL 833 / SKS 633	**Charge pressure**	**Regulation start**
	28 bar	215 bar
	30 bar	240 bar
	32 bar	270 bar
	34 bar	300 bar

SKL 843	**Charge pressure**	**Regulation start**
	30 bar	300 bar
	31 bar	310 bar
	32 bar	320 bar
	33 bar	325 bar

SKL 853	**Charge pressure**	**Regulation start**
	26 bar	220 bar
	28 bar	250 bar
	30 bar	280 bar
	32 bar	300 bar

SKL 863	Charge pressure	Regulation start
	25 bar	220 bar
	26 bar	235 bar
	27 bar	250 bar
	28 bar	275 bar
	29 bar	285 bar

Tolerance range, regulation start: ± 10 bar

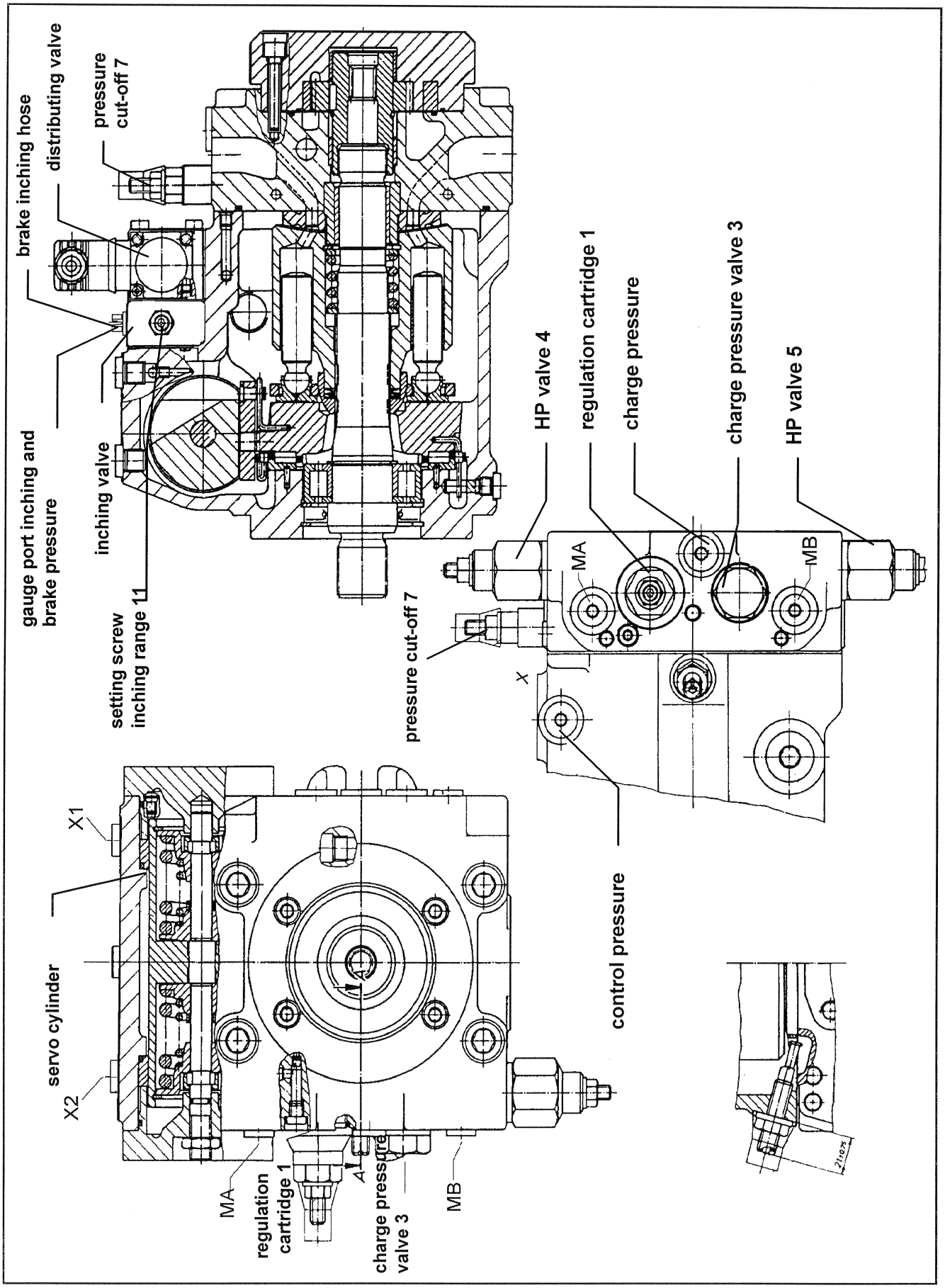
8. Check and adjustment of the inching

- open the engine bonnet
- connect 600 bar - gauge to the existing gauge port **M**A (high pressure forward) of the travel pump
- connect 60 bar - gauge to gauge port „brake pressure at the inching valve"
- drive the machine forward against a solid object so that the wheels lock up
- fully accelerate
- slowly actuate the foot brake pedal
- watch both gauges: At approx. 5 bar brake pressure the inching must begin, i.e. the 600 bar - gauge decreases. At approx. 13 bar brake pressure the inching must be finished, i.e. the 600 bar - gauge decreases to the charge pressure value
- the inching range can be changed or corrected resp. via the setscrew (11) at the inching valve

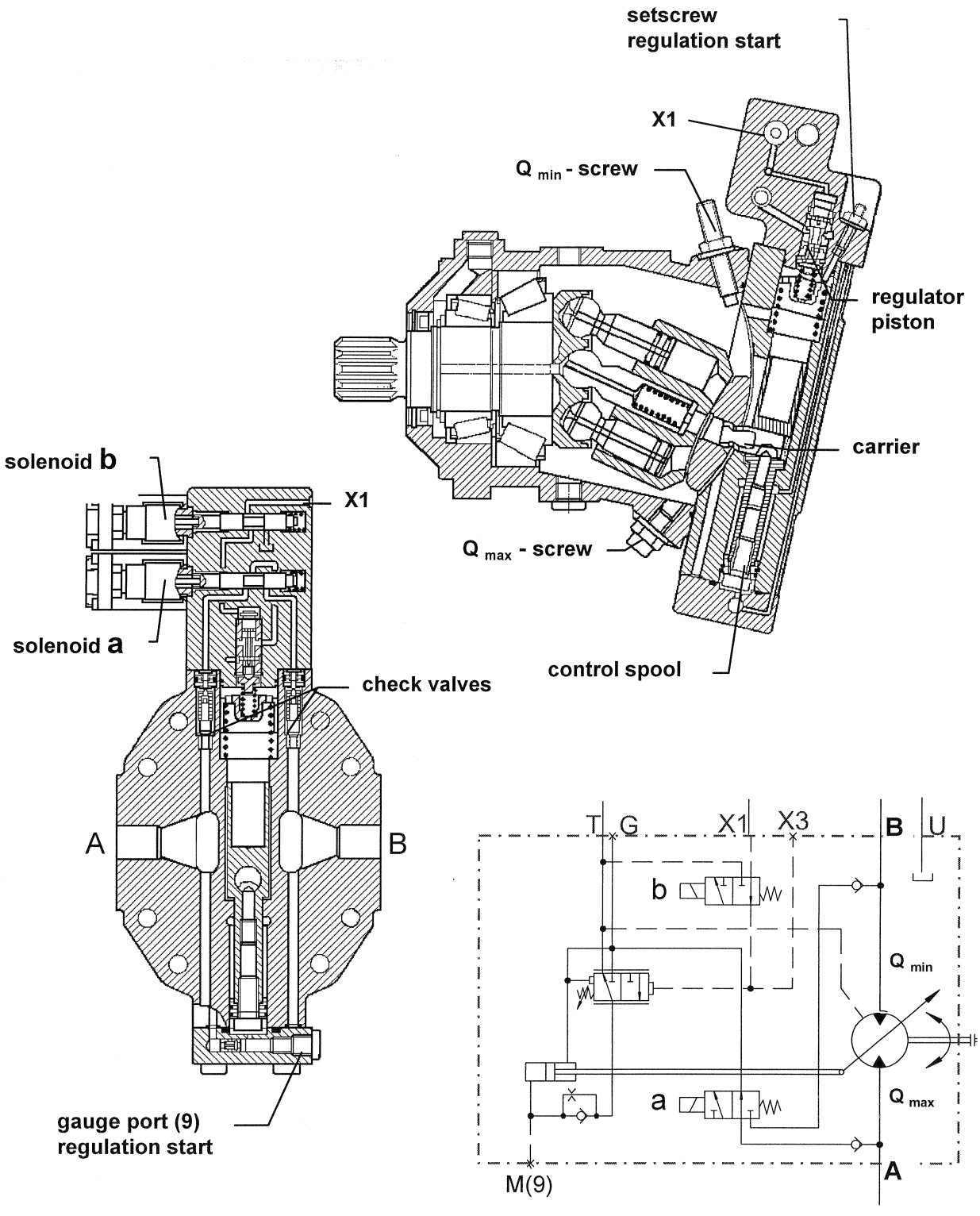
  Turning in: inching later
  Turning out: inching earlier

9. Check of pressure switch (hydrostatic brake)

- open the engine bonnet
- connect 60 bar - gauge to gauge port „brake pressure at the inching valve"
- connect a test lamp to the currentless cable of the brake pressure switch
- the test lamp has to light up at the brake pressure value (see Technical Data)
- if the pressure value does not correspond to the desired value, adjust the pressure switch or replace it resp.



SCHAEFF	Typ/Model/Type **SKL 823/833/843/853/863 SKS 633**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Travel pump**	Blatt/Page/Feuille **5.300.04**



SCHAEFF	Typ/Model/Type **SKL 823/833/843/853/863** **SKS 633**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Travel motor**	Blatt/Page/Feuille **5.300.05**

Description A 6 VM DA 5
with switching solenoids

Electrical travel direction valve und Q min - circuit

Travel range rabbit (road travel), forward

- Electrical switching solenoid (a) currentless in connection with travel direction switch

The high pressure side A is pressurized, so the high pressure can, on the one hand, act on the regulator piston (ring surface) via the check valve and the switching solenoid (a) and, on the other hand, on the control spool ring surface.

- Electrical switching solenoid (b) currentless in connection with quick / slow switch

Thus the corresponding speed-dependent control pressure can act on the big regulator piston surface. This effects that the travel motor is set to Q min (small swash plate angle) (rabbit) as with any other DA-regulation. When charged (increasing high pressure), the travel motor automatically regulates back to Q max (big swash plate angle) (tortoise) from the regulation start adjusted.

Travel range rabbit (road travel), reverse

- Switching solenoid (a) under current

The high pressure side B is pressurized. So the description given under travel range rabbit (road travel) forward applies.

Travel range tortoise (working), forward

- Switching solenoid (a) currentless

Functioning as described under travel range rabbit (road travel)

- Switching solenoid (b) under current

The control pressure is **not** switched on the big surface of the regulator piston, solenoid valve (b) is closed. The travel motor remains in Q max. position (big swash plate angle).

Hydrostatic brake

By releasing the accelerator pedal the travel speed is reduced. The hydrostatic transmission hereby acts as wear-resistant auxiliary brake.

Additional hydrostatic brake only acts in fast travel range (forward)

By actuating the foot brake pedal, from a special brake pressure both switching solenoids (a) and (b) at the travel motor are supplied with current via a brake pressure switch (see Technical Data). This effects that the travel motor is displaced from Q min to Q max.

This effects the following:
Switching solenoid (b) locks the control pressure x_1 to the regulator piston.
This one switches the big control spool surface to the tank.
As the high pressure relationship from A to B becomes inverted when the machine is slowed down (travel motor becomes the pump), the high pressure is transferred from side B to the ring surface of the control spool via the switching solenoid (a). Now the travel motor is in big swash plate angle position (Q max.) So the machine is additionally slowed down.

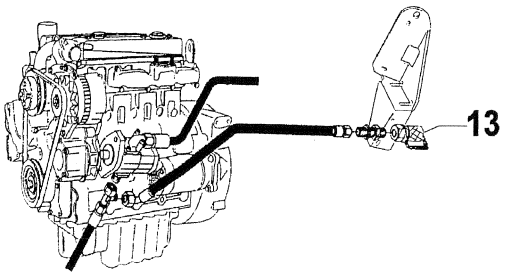
1. Check and replacement of the line relief valves

Note: It is checked whether the line relief valves are approx. 30 bar above the main pressure relief valve or whether the line relief valve "dumping out" is adjusted correctly.

- connect 600 bar - gauge to gauge port (13) of the working pump
- increase pressure of main pressure relief valve by approx. 40 bar
- set engine rpms to approx. 1,100 min^{-1}
- actuate all functions, one after the other, until mechanical stop

Charge the pump for a short time only to avoid pump damage

- watch the gauge: function "dumping out": Desired value: (see Technical Data). If the desired value is not reached or exceeded resp., the line relief valve cartridge has to be replaced.
  with all other functions it is checked whether the corresponding line relief valve is approx. 30 bar above the main pressure relief valve. If a value is too far beyond the tolerance, the corresponding valve cartridge has to be replaced.
- re-adjust main pressure relief valve to the desired value (see Technical Data)

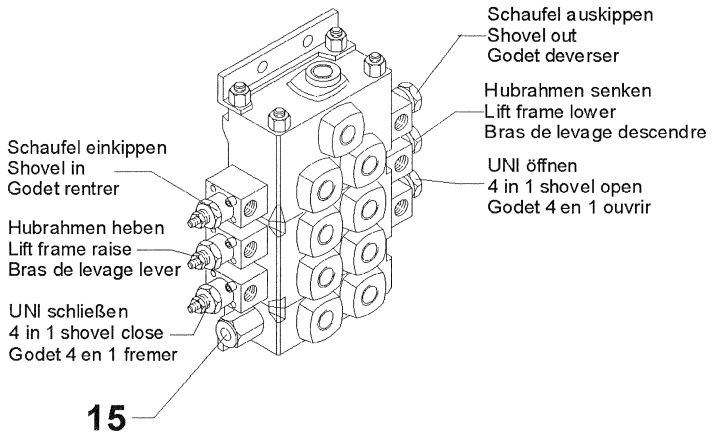


2. Check and adjustment of the main pressure relief valve

- connect 600 bar - gauge to gauge port (13) of the working pump
- fully accelerate
- actuate function "lifting frame, lift". Attention: Steering must not be actuated
- read the value on the gauge. Desired value: (main pressure relief valve): see Technical Data
- if the desired value is not reached, turn the setscrew (15) at the main pressure relief valve in or out resp.

Turning in: pressure increase

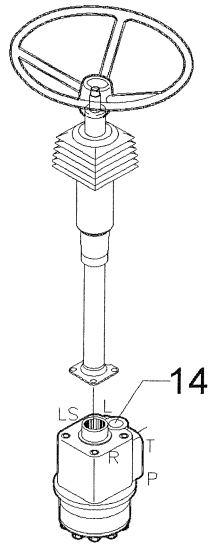
Turning out: pressure decrease



3. Check and adjustment of the steering pressure

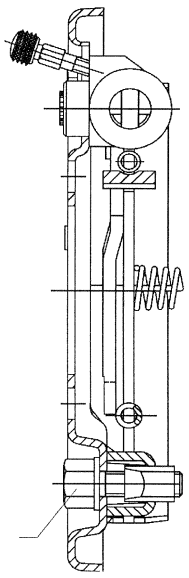
- connect 600 bar - gauge to gauge port (13) of the working pump
- fully accelerate
- actuate steering until stop
- read the value on the gauge. Desired value: see Technical Data
- if the desired value is not reached, adjust as described in the following:
- remove cap at the back of the steering console
- unscrew plug (14)
- screw the setscrew below in or out resp.

Screwing in: steering pressure increase
Screwing out: steering pressure decrease



4. Adjustment of the parking brake and service brake

- adjustment possibility between front axle and brake anchor plate of the brake drum at the setscrew SW 17
- turn in screw until the brake blocks, then slacken by 1 turn.
  An adjustment at the Bowden cable is not necessary.



1. Check and replacement of the line relief valves

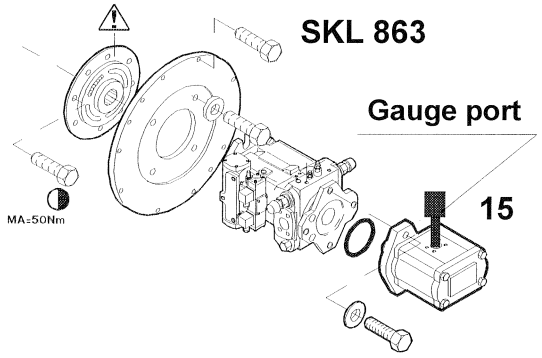
Note: It is checked whether the line relief valves are approx. 30 bar above the main pressure relief valve or whether the line relief valve "dumping out" is adjusted correctly.

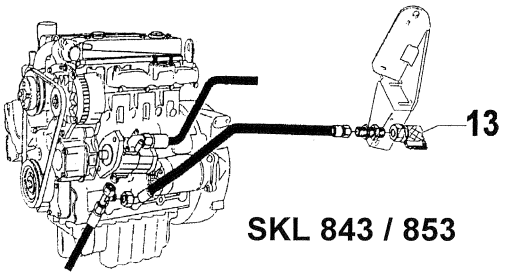
- connect 600 bar - gauge to gauge port (13) or (15) of the working pump
- increase pressure of main pressure relief valve by approx. 40 bar
- set engine rpms to approx. 1,100 min^{-1}
- actuate all functions, one after the other, until mechanical stop

Charge the pump for a short time only to avoid pump damage

- watch the gauge: function "dumping out": Desired value: (see Technical Data). If the desired value is not reached or exceeded resp., the line relief valve cartridge has to be replaced.
  With all other functions it is checked whether the corresponding line relief valve is approx. 30 bar above the main pressure relief valve. If a value is too far beyond the tolerance, the corresponding valve cartridge has to be replaced.

- re-adjust main pressure relief valve to the desired value (see Technical Data)



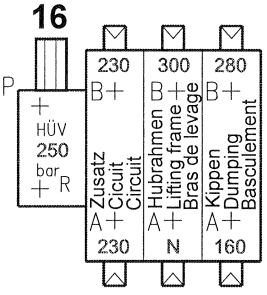


2. Check and adjustment of the main pressure relief valve

- connect 600 bar - gauge to gauge port (13) or (15) of the working pump
- fully accelerate
- actuate function "lifting frame, lift". Attention: Steering must not be actuated
- read the value on the gauge. Desired value: (main pressure relief valve): see Technical Data
- if the desired value is not reached, turn the setscrew (16) at the main pressure relief valve in or out resp.

Turning in: pressure increase

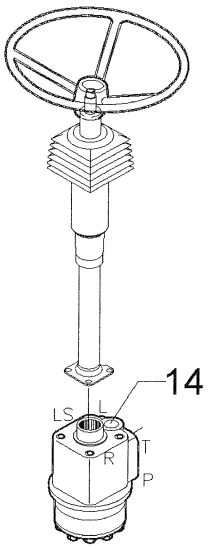
Turning out: pressure decrease



3. Check and adjustment of the steering pressure

- connect 600 bar - gauge to gauge port (13) or (15) of the working pump
- fully accelerate
- actuate steering until stop
- read the value on the gauge. Desired value: see Technical Data
- if the desired value is not reached, adjust as described in the following:
- remove cap at the back of the steering console
- unscrew plug (14)
- screw the setscrew below in or out resp.

Screwing in: steering pressure increase
Screwing out: steering pressure decrease



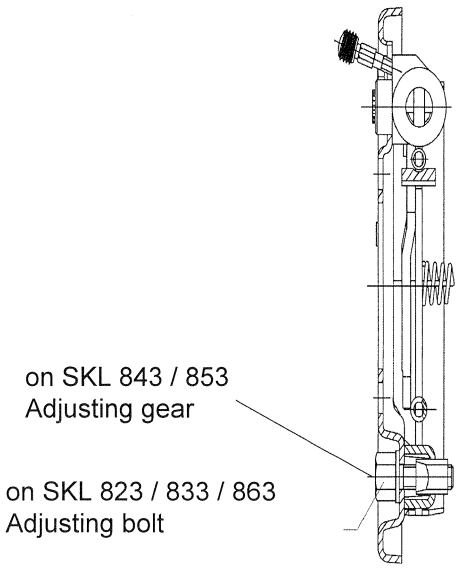
4. Adjustment of the parking brake and service brake

– adjustment possibility between front axle and brake anchor plate of the brake drum at the setscrew SW 17

– turn in screw until the brake blocks, then slacken by 1 turn.
An adjustment at the Bowden cable is not necessary.

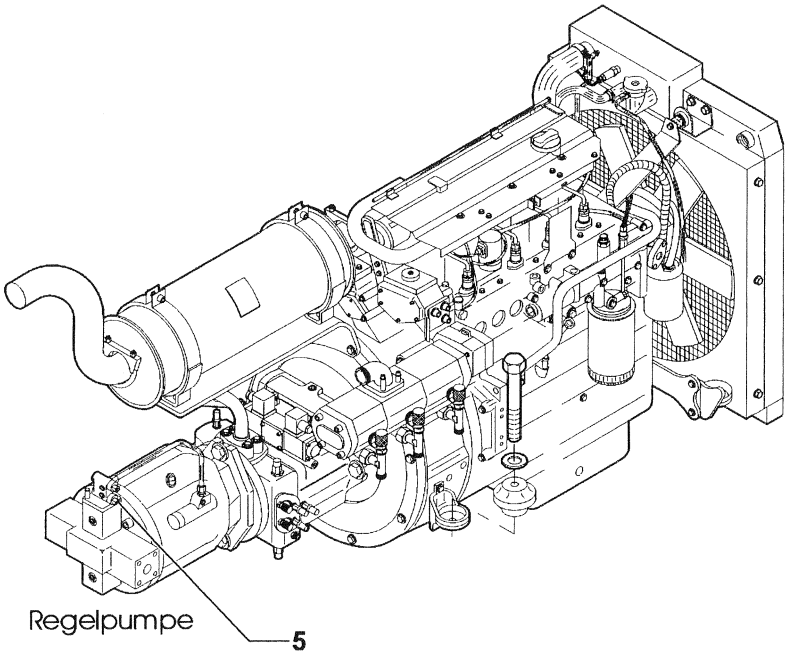
or

– turn adjusting gear by means of a screwdriver until the brake blocks, then release until the brake is free.



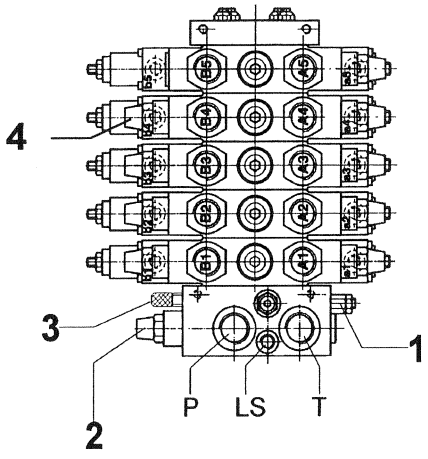
1. Check and adjustment of the stand-by pressure at the variable displacement pump

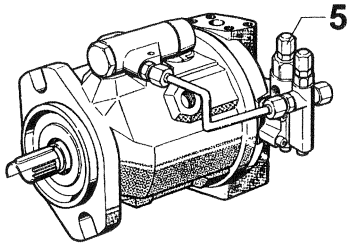
- Open the service ladder and valve bank compartment cover
- Connect 60 bar - gauge to gauge port (3) of the valve bank 1 (SX 18)
- Start the engine, fully accelerate
- Read the value on the gauge. Desired value: 25 bar
- If the desired value is not reached, turn the setscrew at the flow controller (5) of the variable displacment pump (see picture) in or out resp.
  Screwing in: pressure increase
  Screwing out: pressure decrease



Variable displacement pump

Valve bank 1 SX18





2. Check and adjustment of:

- Load-sensing (LS) valve 250 bar. Valve bank 1
- Line relief pressure and anti-cavitation valves (pressure values - see technical data)
- Primary pressure relief valve SV (=safety valve) 280 bar

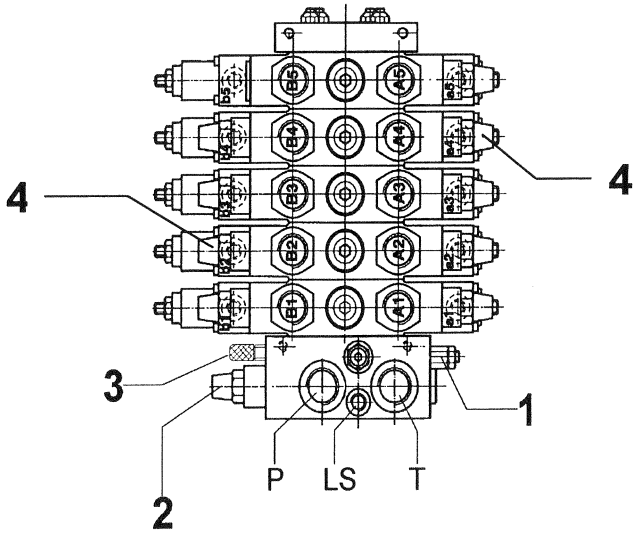
- LS valve 250 bar (1)

- Open service ladder and valve bank compartment cover
- Connect 600 bar - gauge to gauge port (3) of the valve bank 1 (SX 18), see also hydraulic diagram

– Line relief and anti-cavitation valves of valve bank 1

- Set load-sensing valve (1) and primary pressure relief valve (2) to more than 280 bar
- Adjust increased idle running speed
- Set all valve bank sections (A + B side), one after the other, to max. load
- Read pressure values on the gauge
- Desired values - see Technical Data and / or hydraulic diagram
- If the desired values are not reached, turn setscrews at the line relief valves (4) in or out resp.
  Screwing in: pressure increase
  Screwing out: pressure decrease
- Reset the primary pressure relief valve (2) to 280 bar first, then set the load-sensing valve (1) back to 250 bar

Valve bank 1 SX 18



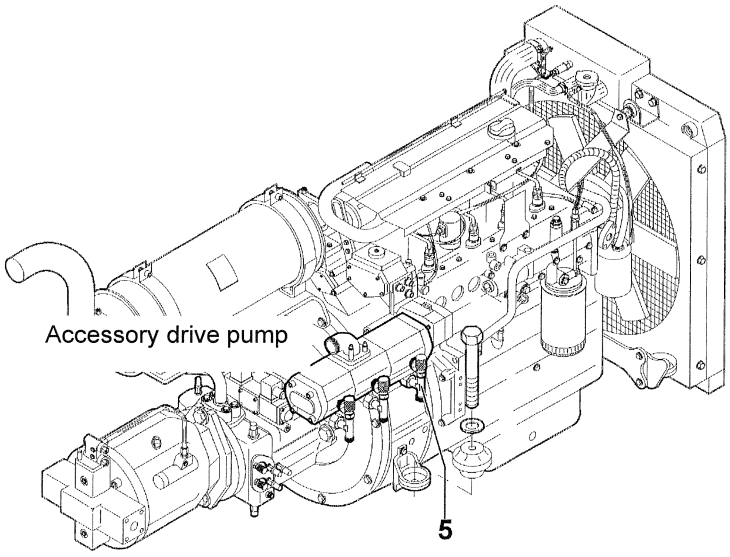
- Close the service ladder cover (otherwise there is no pilot control)
- Start the engine and fully accelerate
- Bring the hydraulic cylinders, e.g. „bucket“ to end stroke
- Read the value on the gauge. Desired value: 250 bar max.
- If the desired value is not reached, turn the setscrew at the load-sensing valve (1) in or out.
  Screwing in: pressure increase
  Screwing out: pressure decrease

– Primary pressure relief valve (SV = safety valve) 280 bar (2)

- Set load-sensing valve (1) to more than 280 bar (higher load of the Diesel engine)
- Read the value on the gauge. Desired value: max. 280 bar
- If the desired value is not reached, turn the setscrew at the primary relief valve (SV) (2) in or out.
- Then set the load-sensing valve (1) back to 250 bar

3. Check and adjustment of the positioning functions at valve bank 2 (SM 12)

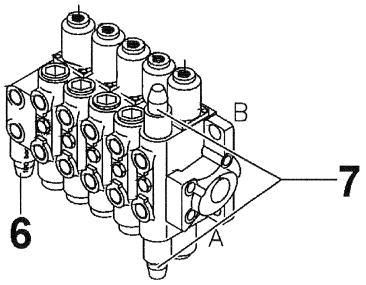
- Remove cover at the front between the driver's cab and the engine bonnet. Open the engine bonnet
- Connect 600 bar - gauge to gauge port (5) at the accessory drive pump I
- Start the engine and fully accelerate
- Bring the hydraulic cylinder, e.g. of function „stabilizing" to end stroke
- Read the value on the gauge
  Desired values:
  - HML 31: 220 bar
  - HML 41 / HML 41 S: 210 bar
- If the desired values are not reached, turn the setscrew at the valve bank 2 (SM 12), item (6), main pressure relief valve, in or out.
  Screwing in: pressure increase
  Screwing out: pressure decrease



4. Check and adjustment of the line relief valves at valve bank 2 (SM 12)
(Only the „additional control circuit" section is equipped with line relief valves)

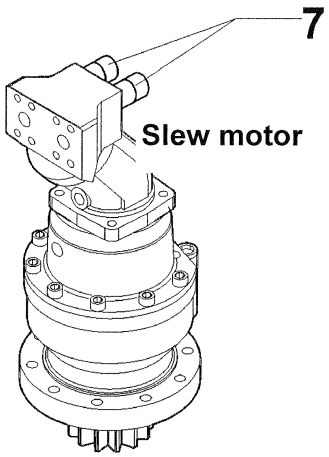
- Connect 600 bar - gauge to gauge port (5) of the accessory drive pumpe I (as described under 3.)
- Set main pressure relief valve item (6) at the valve bank (2) to more than 250 bar
- Start the engine: adjust low idle running speed
- Pressurize the section „addition control circuit" A + B for a short time (attention: longer load can result in pump damage)
- Read the value on the gauge. Desired value: 250 bar each
- If the desired values are not reached, turn the setscrew (7) out or in.
  Screwing out: pressure decrease
  Screwing in: pressure increase
- Finally set main pressure relief valve item (6) back to 220 bar (HML 31)
  210 bar (HML 41 / HML 41 S).

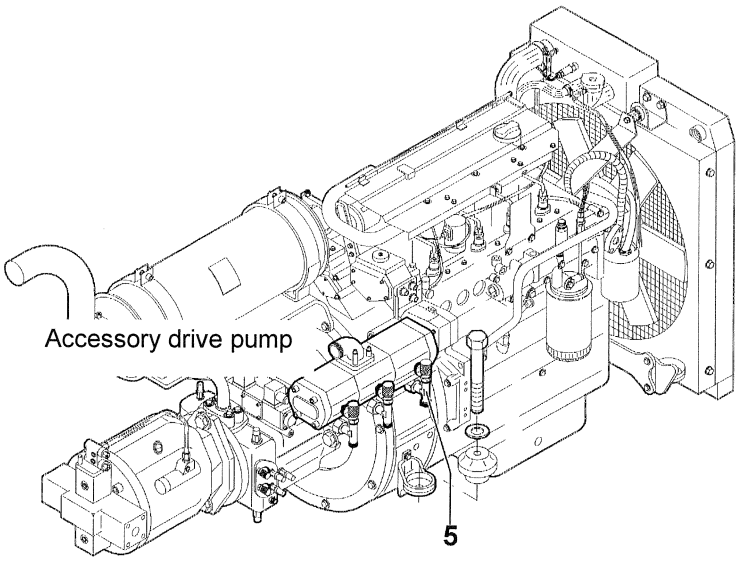
Valve bank 2 SM 12



5. Check and adjustment of the slew pressure

- Connect 600 bar - gauge to gauge port (5) of the accessory drive pump I
- Start the engine - fully accelerate
- Lock upper carriage with pin
- Pressurize the functions slewing left and right
- Read the value on the gauge
  Desired value: HML 31: 190 bar
  HML 41 / HML 41 S: 210 bar

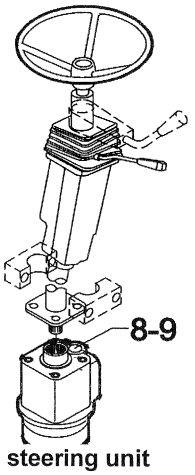




If the desired value is not reached, turn the setscrews, item (7), in or out.
Screwing in: pressure increase
Screwing out: pressure decrease

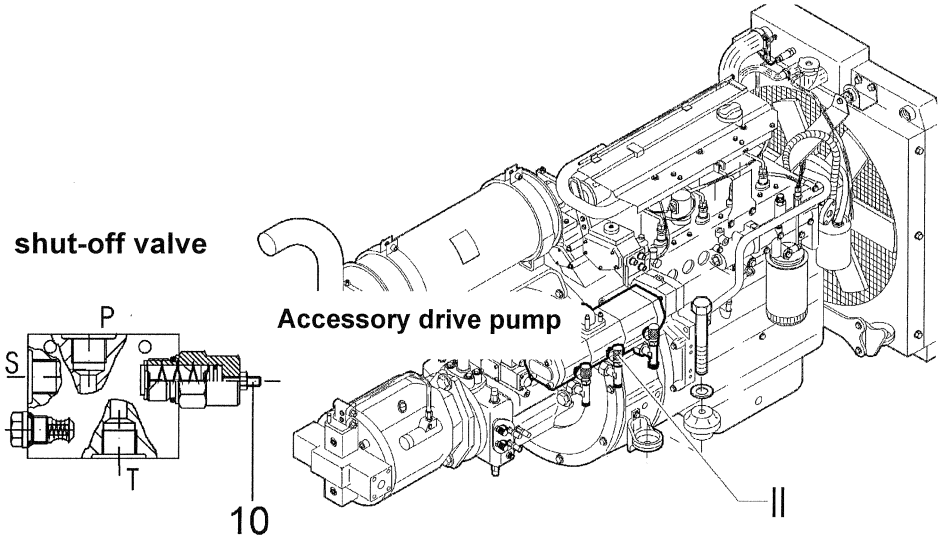
6. Check and adjustment of the steering

- Connect 600 bar - gauge to gauge port (5) of the accessory drive pump I
- Start the engine. Fully accelerate
- Move steering wheel until stop
- Read the value on the gauge. Desired value: max. 150 bar
- If the desired value is not reached, screw the setscrew item (8) under the plug (9) at the steering unit in or out
  Screwing in: pressure increase
  Screwing out: pressure decrease



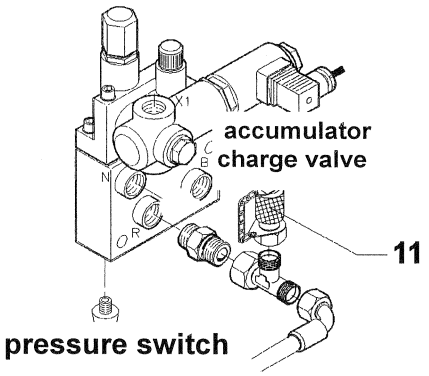
7. Check and adjustment of the cut-off valve

- Open the engine bonnet
- Connect 600 bar - gauge to the accessory drive pump II
- Slowly pressurize one section, e.g. „stabilizing“
- Watch the gauge, it has to increase to 110 bar and then drop again
- If the desired value is not reached or exceeded, turn the setscrew item (10) in or out
  Screwing in: pressure increase
  Screwing out: pressure decrease

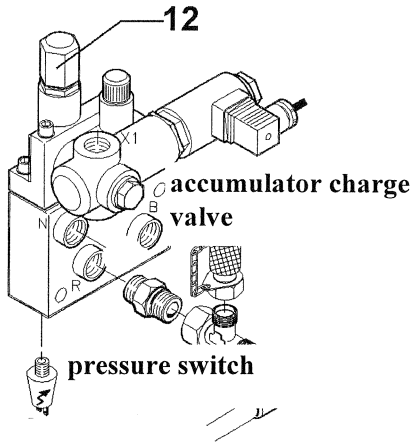


8. Check and adjustment of the brake accumulator charge valve and check of the brake pressure warning lamp

- Open the engine bonnet
- Connect 600 bar - gauge to gauge port accumulator charge valve item (11)
- Switch on ignition and empty the pressure accumulator by means of the foot brake pedal until the red brake pressure warning lamp lights up
- Read the value on the gauge
  Desired value: approx. 85 bar - this is the switching time of the pressure switch at the accumulator charge valve.
  If the desired value differs too much, replace the pressure switch.



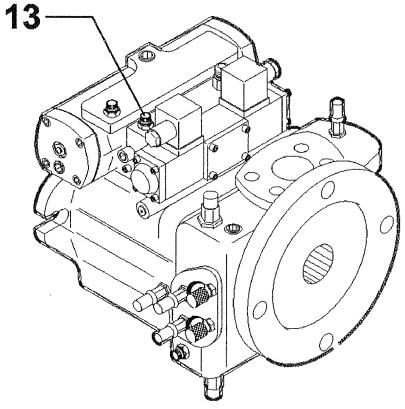
- Start the engine
- Watch the gauge, accumulators are charged, pressure increases.
  Desired value: approx. 150 bar
- Operate brake several times when the engine is running
- Pressure decreases slowly
- Watch the gauge: At approx. 110 bar the pressure has to increase again
- If the desired values differ too much, the accumulator charge valve can be re-adjusted via the setscrew (12)



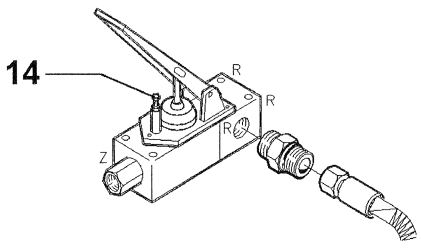
9. Check and adjustment of the brake pressure

- Remove brake inching hose at the travel pump (13), mount gauge port, (the connection at the travel pump can remain open)
- Connect 60 bar gauge to this gauge port
- Start the engine
- Actuate the foot brake until stop
- Read the value on the gauge. Desired value: max. 55 bar
- If the desired value is not reached, turn the screw (14) under the protection rubber at the pedal in or out
  Screwing in: pressure increase

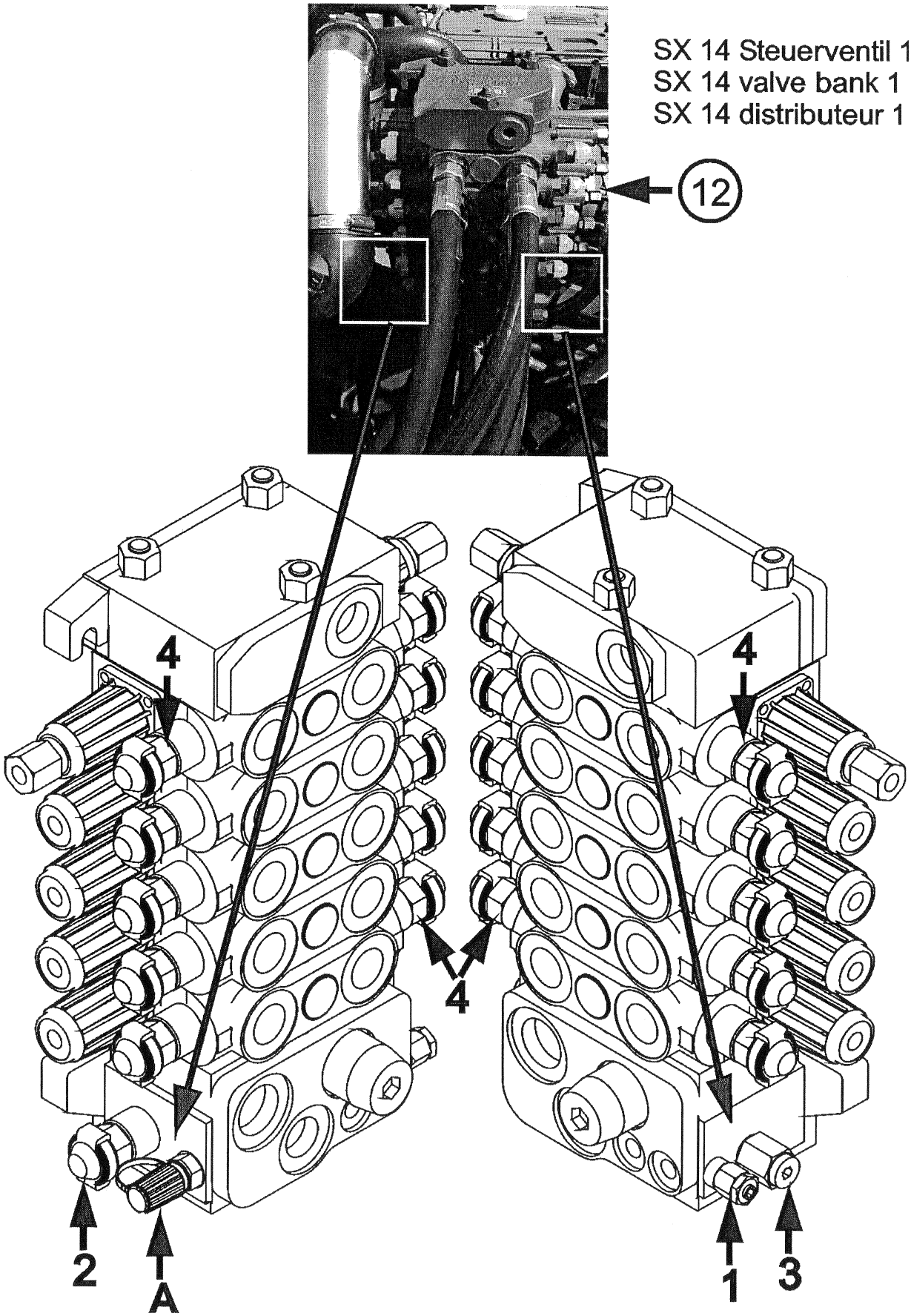
travel pump



foot brake pedal



SX 14 Steuerventil 1
SX 14 valve bank 1
SX 14 distributeur 1



SCHAEFF TEREX	Typ/Model/Type **HML 32**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Setting instructions (working hydraulics)**	Blatt/Page/Feuille **5.510.01**

(12) SX14 Steuerventil 1

A Messstelle für

Einstellungen am Steuerventil:

- LS Druck (**1**)
- SV Druck (**2**)
- Sekundärdrücke (**4**)

und

Messstelle für

Einstellungen an der Arbeitspumpe:

- Stand–by Druck
- Δp Druck

1 LS – Druckbegrenzungsventil *(einstellbar)*

2 Sicherheitsventil *(einstellbar)*

3 LS - Stromregelventil *(nicht einstellbar)*

4 Sekundärventil(e) *(einstellbar)*

(12) Siehe Blatt **6.51.01**

(12) SX14 valve bank 1

A test port for

settings at valve bank:

- LS pressure (**1**)
- safety valve pressure (**2**)
- line relief pressures (**4**)

and

test port for

settings at working pump:

- stand-by pressure
- Δp pressure

1 load sensing pressure relief valve *(adjustable)*

2 safety valve *(adjustable)*

3 LS – flow regulator valve *(not adjustable)*

4 line relief valve(s) *(adjustable)*

(12) see page **6.51.01**

(12) SX14 distributeur 1

A prise de pression pour

réglages côté distributeur:

- pression LS (**1**)
- pression valve de sécurité (**2**)
- pressions secondaires (**4**)

et

prise de pression pour

réglages côté pompe équipement:

- pression d'attente
- pression Δp

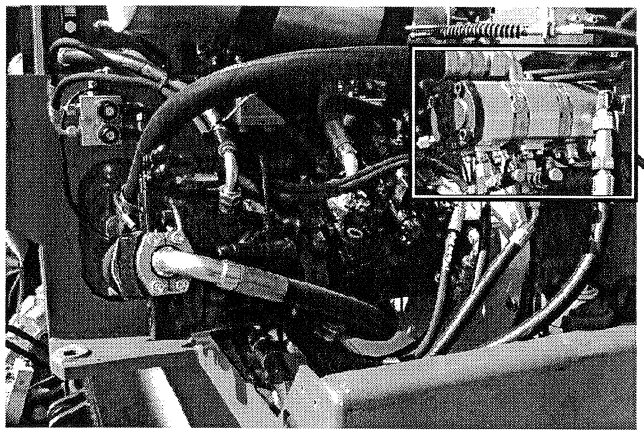
1 limiteur de pression LS (réglable)

2 valve de sécurité *(réglable)*

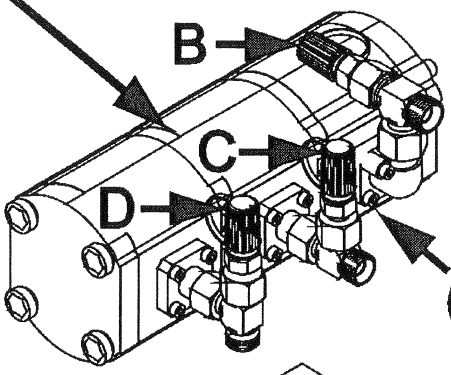
3 régulateur de débit LS *(non réglable)*

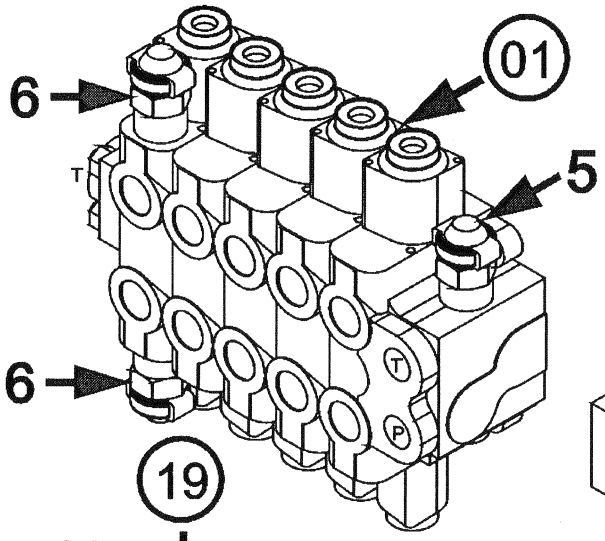
4 clapet(s) secondaire(s) *réglable(s)*

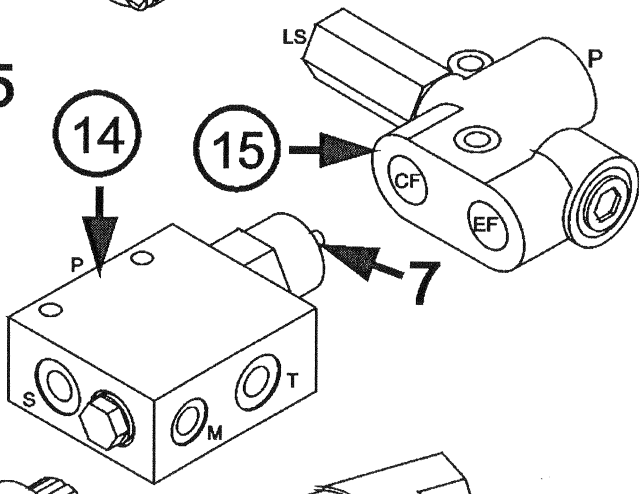
(12) voir page **6.51.01**

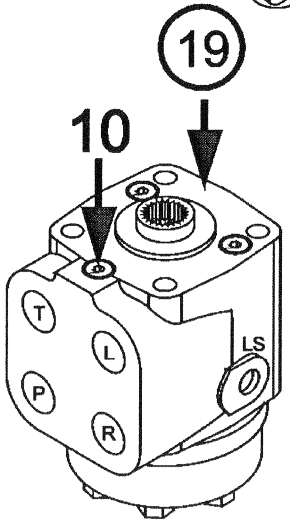


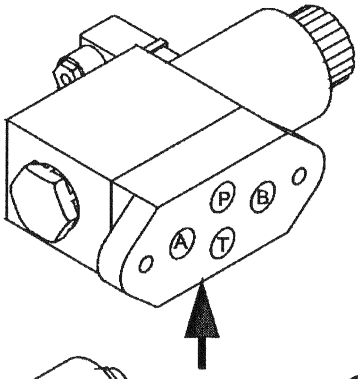
Dreifachzahnradpumpe
triple gear pump
triple pompe à engrenages

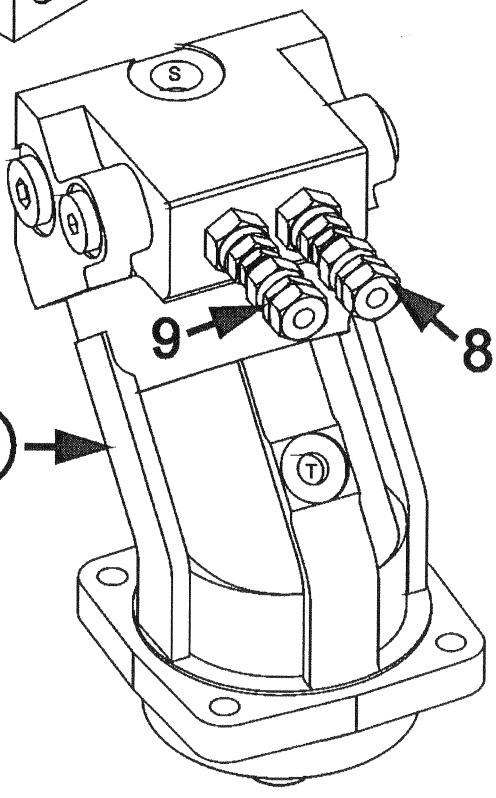


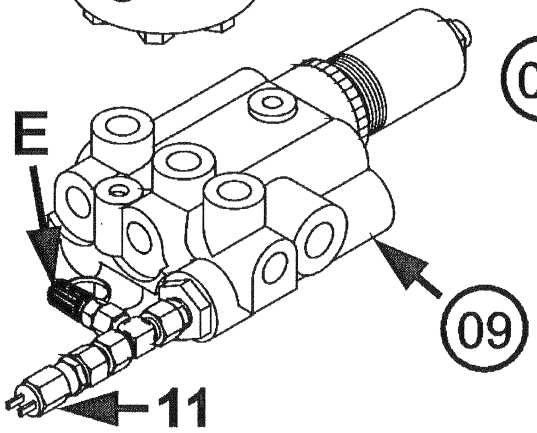












08

SCHAEFF TEREX	Typ/Model/Type **HML 32**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Setting instructions (working hydraulics)**	Blatt/Page/Feuille **5.510.02**

(21) **Dreifachzahnradpumpe**

(21) **triple gear pump**

(21) **triple pompe à engrenages**

B *Messstelle für*

Einstellungen am Steuerventil 2, Schwenkmotor, Lenkaggregat und (Nebenkreis)

(01) **Steuerventil 2 (SM12)**

Hauptüberdruckventil (**5**) für

- Schwenken
- Knicken
- Abstützen rechts
- Abstützen links
- Zweiter Zusatzsteuerkreis mit Sekundärventile (**6**) **Option** – *(Sortiergreifer, Schlegelmäher, Betonzange)*

(20) **Schwenkmotor**

- Ventile am Schwenkmotor (**8** und **9**)

(15) **Prioritätsventil**

(19) **Lenkaggregat**

- Druckbegrenzungsventil (**10**)

B *test port for*

settings at valve bank 2, swing motor, steering unit and (secondary functions)

(01) **valve bank 2 (SM12)**

main pressure relief valve (**5**) for

- swing
- articulation
- outrigger right
- outrigger left
- secondary add. control circuit with line relief valves (**6**) **option** – *(sorting grab, brush cutter, concrete crusher)*

(20) **swing motor**

- line relief valves at swing motor (**8** and **9**)

(15) **priority valve**

(19) **steering unit**

- pressure relief valve (**10**)

B *prise de pression pour*

réglages côté distributeur 2, moteur d'orientation, ensemble direction et (circuit secondaire)

(01) **distributeur 2 (SM12)**

limiteur de pression principal (**5**) pour

- orientation
- articulation
- stabilisateur droit
- stabilisateur gauche
- deuxième circuit supplémentaire avec clapets secondaires (**6**) **option** – *(grappin de triage, faucheuse à fléaux, broyeur de béton)*

(20) **moteur d'orientation**

- clapets secondaires côté moteur d'orientation (**8** et **9**)

(15) **valve prioritaire**

(19) **ensemble direction**

- limiteur de pression (**10**)

C *Messstelle für*

Einstellungen am Abschaltventil

(14) **Abschaltventil**

- Druckbegrenzungsventil (**7**)

(08) **4/2 Wegeventil mit Magnet - *y16*** (Spülen / Schwenken)

C *test port for*

settings at cut-off valve

(14) **cut-off valve**

- pressure relief valve (**7**)

(08) **4/2 solenoid valve - *y16*** (flush / swing)

C *prise de pression pour*

réglages côté valve de coupure

(14) **valve de coupure**

- limiteur de pression (**7**)

(08) **électrovanne 4/2 - *y16*** (purge / orientation)

D *Messstelle für*

(14) **Abschaltventil** - *bei geschlossener Baggerbremse*

D *test port for*

(14) **cut-off valve** - *with excavator brake applied*

D *prise de pression pour*

(14) **valve de coupure** - *frein de pelle serré*

E *Messstelle für*

(09) **Speicherfüllventil** (Bremse)

- Druckschalter – *S44* (**11**)

E *test port for*

(09) **accumulator charge valve** (brake)

- pressure switch – *S44* (**11**)

E *prise de pression pour*

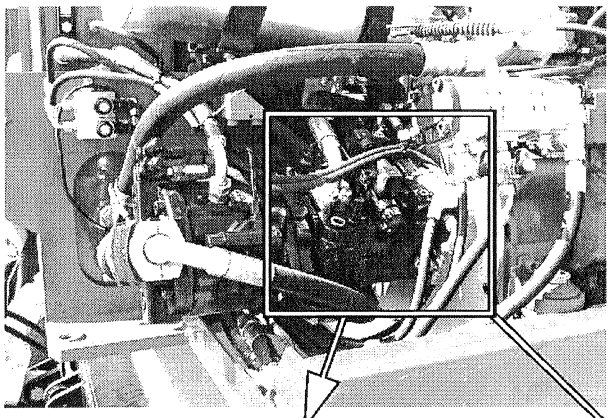
(09) **valve de remplissage accu** (frein)

- interrupteur à pression – *S44* (**11**)

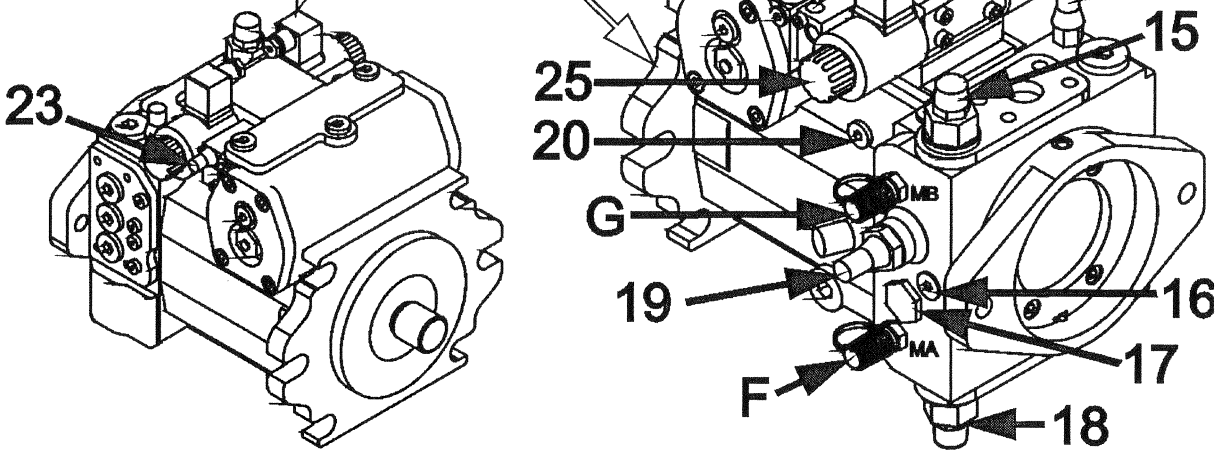
(01)(08)(09)(14)(15) Siehe Blatt **6.51.01**

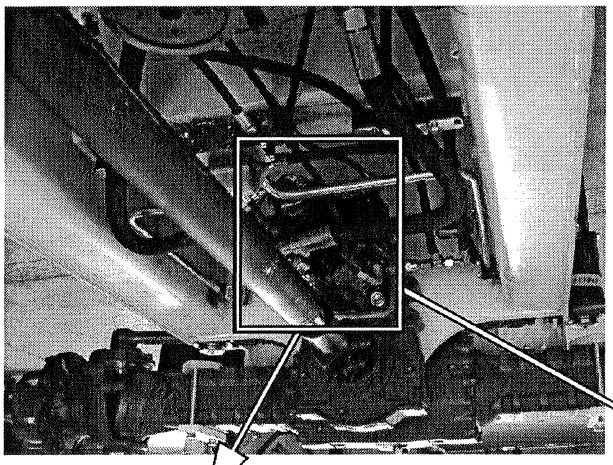
(01)(08)(09)(14)(15) see page **6.51.01**

(01)(08)(09)(14)(15) voir page **6.51.01**

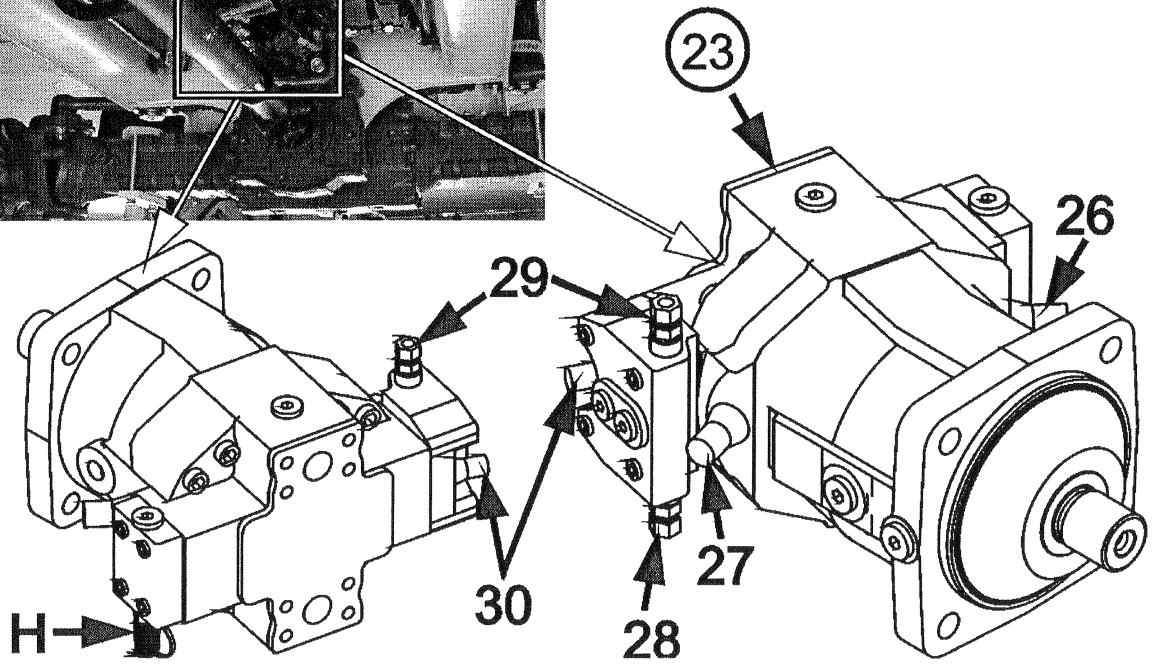


Verstellpumpe - Fahren
variable displacement pump - travel
pompe à débit variable - translation





Verstellmotor - Fahren
variable displacement motor - travel
moteur à cylindrée variable - translation



SCHAEFF TEREX	Typ/Model/Type **HML 32**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Setting instructions (working hydraulics)**	Blatt/Page/Feuille **5.510.03**

(22) **Verstellpumpe - Fahren**

(23) **Verstellmotor - Fahren**

F *Messstelle für*

Einstellungen an Verstellpumpe - Fahren und Verstellmotor – Fahren
(MA vorwärts)

G *Messstelle für*

Einstellungen an Verstellpumpe - Fahren und Verstellmotor – Fahren
(MB Fahren rückwärts)

- Anschluß - *Bremsinchung* **(12)**
- Anschluß ***„X1“*** *Stelldruck* **(13)**
- Ventil *Druckabschneidung* **(14)**
- Sicherheitsventil - *Fahren rückwärts* **(15)**
- Speisedruck ***„G“*** **(16)** – F*eststellbremse, Vorsteuerdruck, Pendelachsverrieglung*
- Speisedruckventil **(17)**
- Sicherheitsventil - *Fahren vorwärts* **(18)**
- Einstellschraube - *Regelventil* **(19)** *(Drückung – Anfahren)*
- Anschluß ***„Ps“*** - *Stelldruck* **(20)** *(Pedalfahren)*
- Anschluß ***„X2“*** - *Stelldruck* **(21)**
- Entlüftung **(22)**
- Einstellschraube **(23)** – *Bremsinchung*
- Elektromagnetventil ***„y15“*** - *Fahren rückwärts* **(24)**
- Elektromagnetventil ***„y14“*** *Fahren vorwärts* **(25)**

(22) **variable displacement pump – travel**

(23) **variable displacement motor – travel**

F *test port for*

settings at variable displacement pump – travel and variable displacement motor – travel
(MA travel forward)

G *test port for*

settings at variable displacement pump – travel and variable displacement motor – travel
(MB travel reverse)

- connection - *brake inching* **(12)**
- connection ***„X1“*** *control pressure* **(13)**
- Valve *pressure cut-off* **(14)**
- safety valve - *travel reverse* **(15)**
- charge pressure ***„G“*** **(16)** – *parking brake, pilot pressure, oscillating axle lock*
- charge pressure valve **(17)**
- safety valve - *travel forward* **(18)**
- setting screw – *regulator* **(19)** *(stall and start up speed)*
- Connection ***„Ps“*** - *control pressure* **(20)** *(pedal drive)*
- connection ***„X2“*** - *control pressure* **(21)**
- vent **(22)**
- setting screw **(23)** - *brake inching*
- solenoid valve ***„y15“*** – *travel reverse* **(24)**
- solenoid valve ***„y14“*** – *travel forward* **(25)**

(22) **pompe à débit variable – translation**

(23) **moteur à débit variable – translation**

F *prise de pression pour*

réglages côté pompe à débit variable – translation et moteur à cylindrée variable – translation
(MA marche AV)

G *prise de pression pour*

réglages côté pompe à débit variable – translation et moteur à cylindrée variable – translation
(MB marche AR)

- connexion - *inching frein* **(12)**
- connexion ***„X1“*** *pression de commande* **(13)**
- valve *coupure de pression* **(14)**
- valve de sécurité - *marche AR* **(15)**
- pression de gavage ***„G“*** **(16)** – *frein de stationnement, pression de pilotage, verrouillage essieu oscillant*
- valve de pression de gavage **(17)**
- valve de sécurité - *marche AV* **(18)**
- vis de réglage – *régulateur* **(19)** *(chute de régime – régime de démarrage)*
- connexion ***„Ps“*** - *pression de commande* **(20)** *(translation par pédale)*
- connexion ***„X2“*** - *pression de commande* **(21)**
- purge **(22)**
- vis de réglage **(23)** - *inching frein*
- électrovanne ***„y15“*** – marche *AR* **(24)**
- électrovanne ***„y14“*** – *marche AV* **(25)**

H *Messstelle für*

Einstellungen am Verstellmotor – Fahren
(Regelbeginn)

- Einstellschraube **(26)** - *Qmax*
- Einstellschraube **(27)** - *Qmin*
- Steuerdruckanschluß ***„X2“*** **(28)**
- Steuerdruckanschluß ***„X1“*** **(29)**
- Einstellschraube - *Regelbeginn* **(30)**

H *test port for*

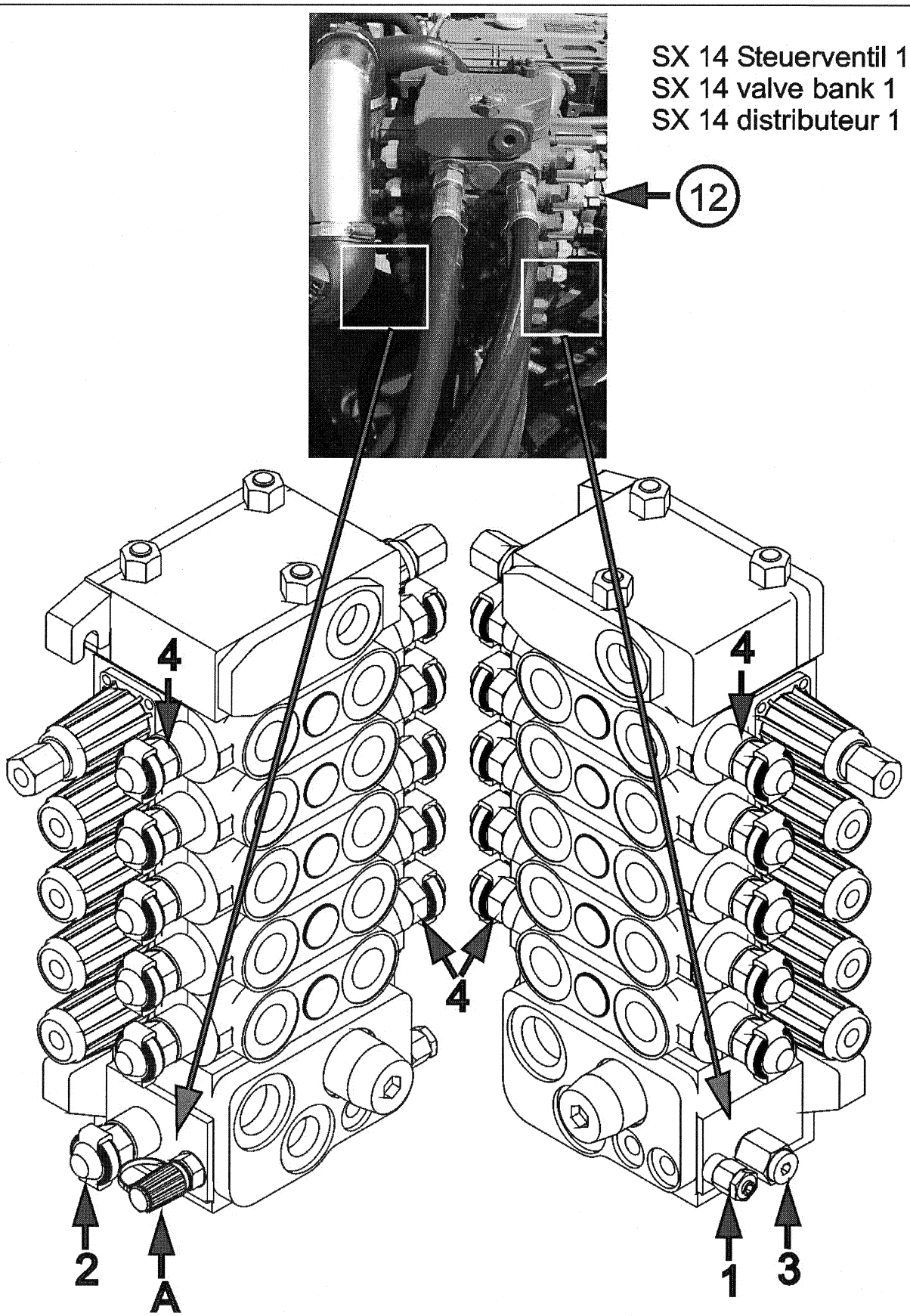
settings at variable displacement motor – travel
(regulation start)

- setting screw **(26)** - *Qmax*
- setting screw **(27)** - *Qmin*
- pilot pressure ***„X2“*** **(28)**
- pilot pressure ***„X1“*** **(29)**
- setting screw - *regulation start* **(30)**

H *prise de pression pour*

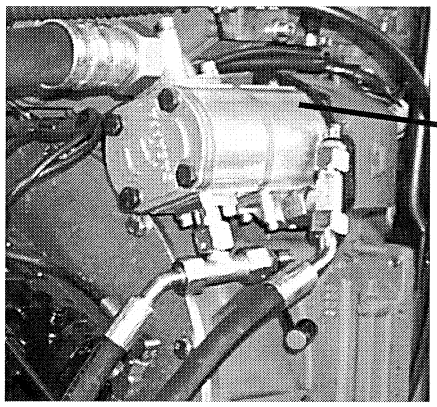
réglages côté moteur à débit variable – translation
(début de régulation)

- vis de réglage **(26)** - *Qmax*
- vis de réglage **(27)** - *Qmin*
- pression de pilotage ***„X2“*** **(28)**
- pression de pilotage ***„X1“*** **(29)**
- vis de réglage – *début de régulation* **(30)**

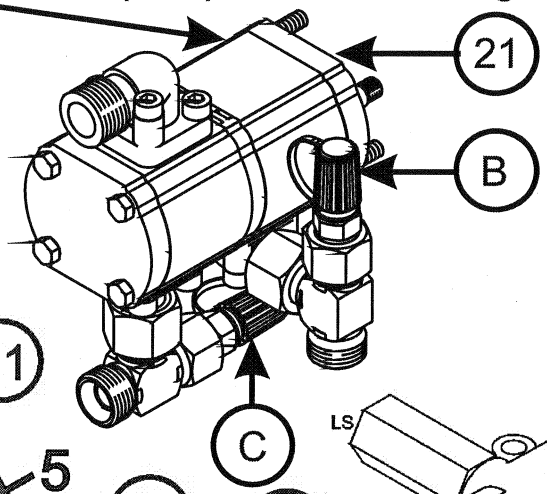


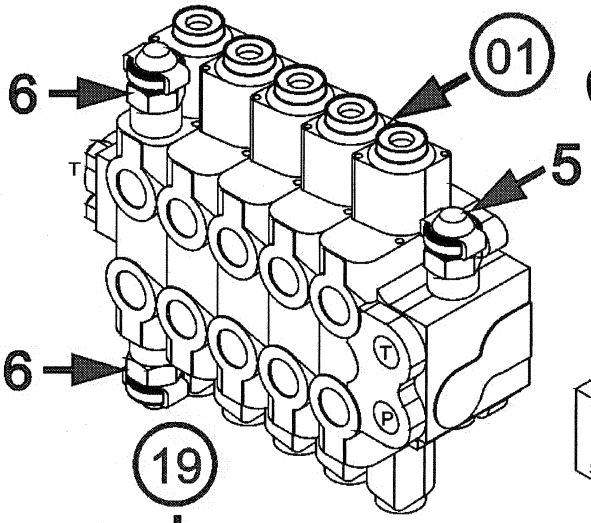
Typ Model Type Tipo	**HML 32**	**ab Fz.-Id.nr..** 3200 / 0439 **from s/n:** 3200 / 0439 **à partir du n/s:** 3200 / 0439 **desde el no.:** 3200 / 0439	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.510.11**

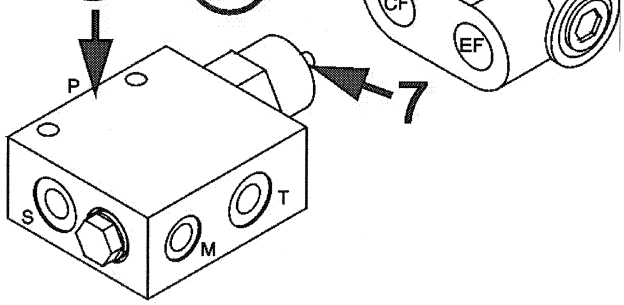
Pos. Item Rep. No.	Deutsch	English	Français
(12)	**SX14 Steuerventil 1**	**SX14 valve bank 1**	**12 SX14 distributeur 1**
A	**Messstelle für** *Einstellungen am Steuerventil:* • LS Druck (**1**) • SV Druck (**2**) • Sekundärdrücke (**4**) und **Messstelle für** *Einstellungen an der Arbeitspumpe:* • Stand–by Druck • Δp Druck	**test port for** *settings at valve bank:* • LS pressure (**1**) • safety valve pressure (**2**) • line relief pressures (**4**) and **test port for** *settings at working pump:* • stand-by pressure • Δp pressure	**prise de pression pour** *réglages côté distributeur:* • pression LS (**1**) • pression valve de sécurité (**2**) • pressions secondaires (**4**) et **prise de pression pour** *réglages côté pompe équipement:* • pression d'attente • pression Δp
1 2 3 4	LS – Druckbegrenzungsventil *(einstellbar)* Sicherheitsventil *(einstellbar)* LS - Stromregelventil *(nicht einstellbar)* Sekundärventil(e) *(einstellbar)*	load sensing pressure relief valve *(adjustable)* safety valve *(adjustable)* LS – flow regulator valve *(not adjustable)* line relief valve(s) *(adjustable)*	limiteur de pression LS (réglable) valve de sécurité *(réglable)* régulateur de débit LS *(non réglable)* clapet(s) secondaire(s) *réglable(s)*

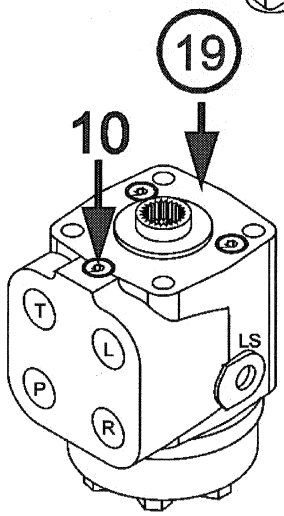


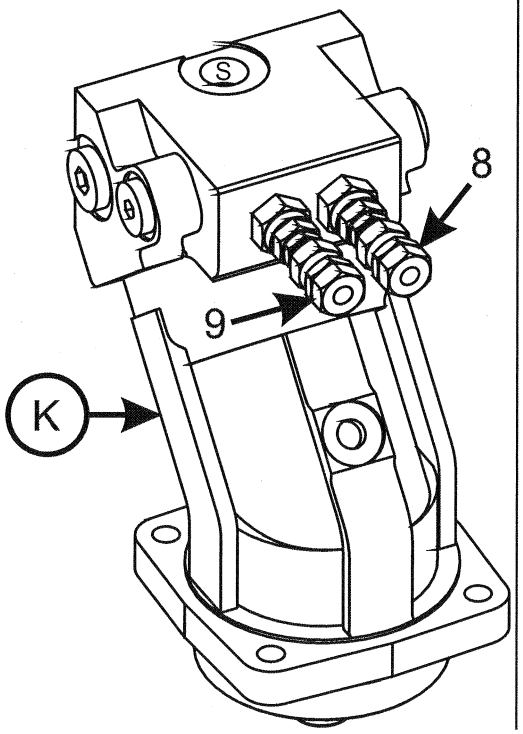
Doppelzahnradpumpe
double gear pump
pompe tandem à engrenages

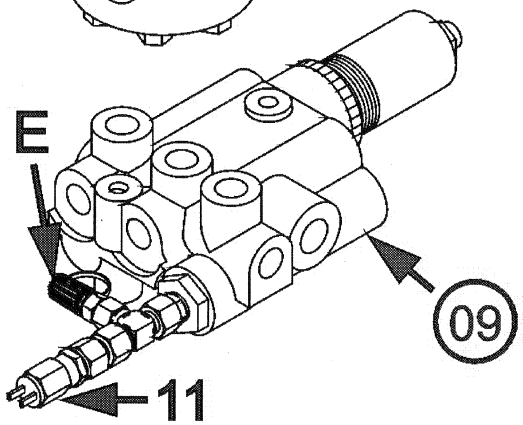






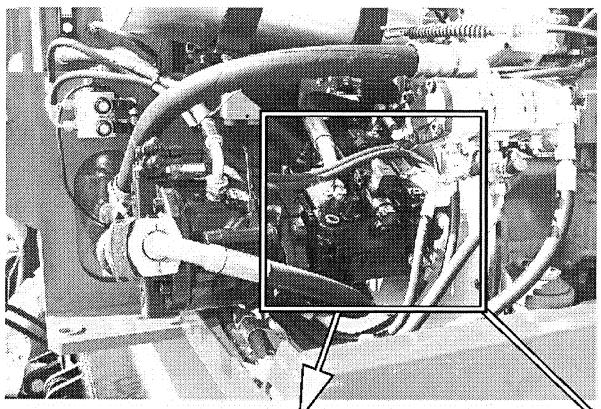




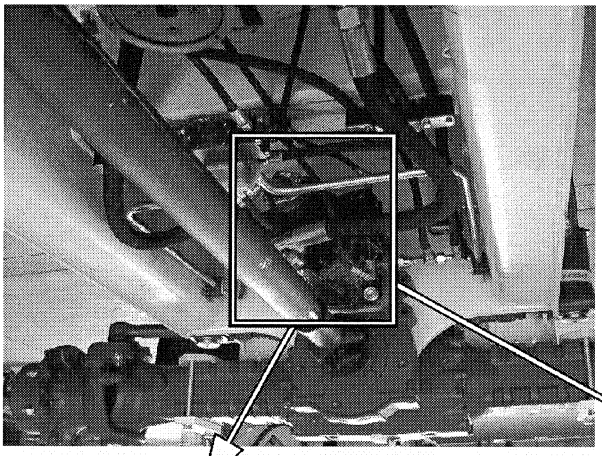


Typ Model Type Tipo	**HML 32**	**ab Fz.-Id.nr.. 3200 / 0439** **from s/n: 3200 / 0439** **à partir du n/s: 3200 / 0439** **desde el no.: 3200 / 0439**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.510.13**

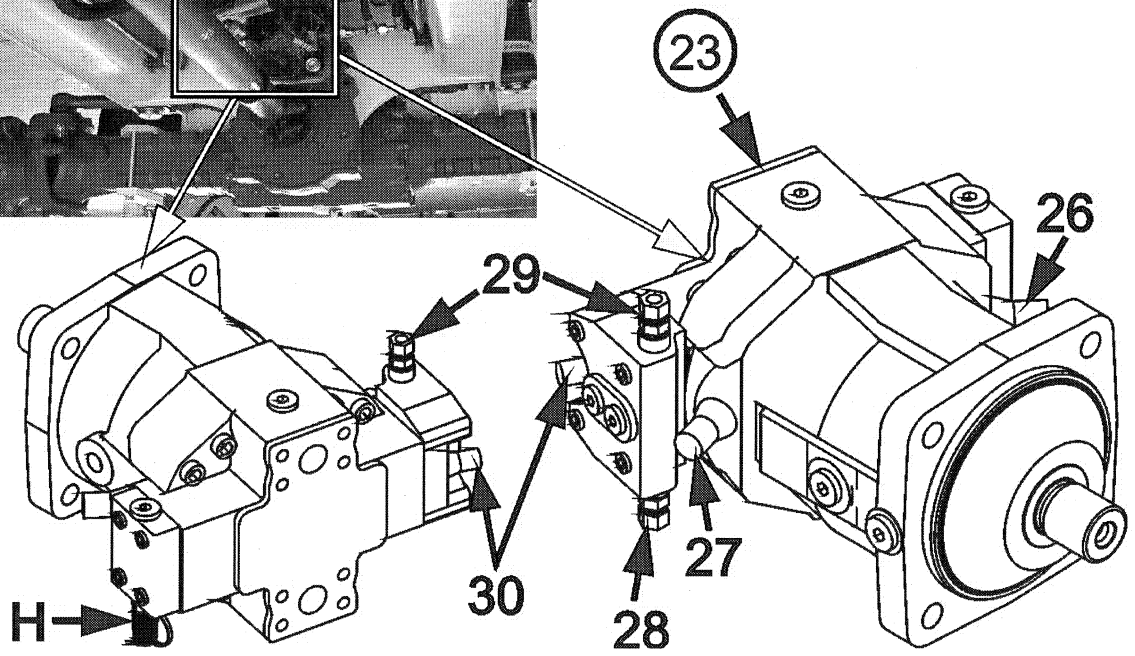
Pos. Item Rep. No.	Deutsch	English	Français
(21)	**Doppelzahnradpumpe**	**Double gear pump**	**Double pompe à engrenages**
B	***Messstelle für*** *Einstellungen am Steuerventil 2, Schwenkmotor, Lenkaggregat und (Nebenkreis)*	***test port for*** *settings at valve bank 2, swing motor, steering unit and (secondary functions)*	***prise de pression pour*** *réglages côté distributeur 2, moteur d'orientation, ensemble direction et (circuit secondaire)*
(01)	**Steuerventil 2 (SM12)**	**valve bank 2 (SM12)**	**distributeur 2 (SM12)**
	Hauptüberdruckventil (**5**) für	main pressure relief valve (5) for	limiteur de pression principal (**5**) pour
	• Schwenken • Knicken • Abstützen rechts • Abstützen links • Zweiter Zusatzsteuerkreis mit Sekundärventile (**6**) **Option** – *(Sortiergreifer, Schlegelmäher, Betonzange)*	• swing • articulation • outrigger right • outrigger left • secondary add. control circuit with line relief valves (**6**) **option** – *(sorting grab, brush cutter, concrete crusher)*	• orientation • articulation • stabilisateur droit • stabilisateur gauche • deuxième circuit supplémentaire avec clapets secondaires (**6**) **option** – *(grappin de triage, faucheuse à fléaux, broyeur de béton)*
(20)	**Schwenkmotor** • Ventile am Schwenkmotor (**8** und **9**)	**swing motor** • line relief valves at swing motor (**8** and **9**)	**moteur d'orientation** • clapets secondaires côté moteur d'orientation (**8** et **9**)
(15)	**Prioritätsventil**	**priority valve**	**valve prioritaire**
(19)	**Lenkaggregat** • Druckbegrenzungsventil (**10**)	**steering unit** • pressure relief valve (**10**)	**ensemble direction** • limiteur de pression (**10**)
C	***Messstelle für*** *Einstellungen am Abschaltventil*	***test port for*** *settings at cut-off valve*	***prise de pression pour*** *réglages côté valve de coupure*
(14)	**Abschaltventil** • Druckbegrenzungsventil (7)	**cut off valve** • pressure relief valve (7)	**valve de coupure** • limiteur de pression (7)
E	***Messstelle für***	***test port for***	***prise de pression pour***
(09)	**Speicherfüllventil** (Bremse) • Druckschalter – *S44* (**11**)	**accumulator charge valve** (brake) • pressure switch – *S44* (**11**)	**valve de remplissage accu** (frein) • interrupteur à pression – *S44* (**11**)



Verstellpumpe - Fahren
variable displacement pump - travel
pompe à débit variable - translation



Verstellmotor - Fahren
variable displacement motor - travel
moteur à cylindrée variable - translation



Typ Model Type Tipo	**HML 32**	**ab Fz.-Id.nr..** 3200 / 0439 **from s/n:** 3200 / 0439 **à partir du n/s:** 3200 / 0439 **desde el no.:** 3200 / 0439	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.510.15**

Pos. Item Rep. No.	Deutsch	English	Français
(22)	**Verstellpumpe - Fahren**	**variable displacement pump – travel**	**pompe à débit variable – translation**
(23)	**Verstellmotor - Fahren**	**variable displacement motor – travel**	**moteur à débit variable – translation**
F	***Messstelle für*** *Einstellungen an Verstellpumpe - Fahren und Verstellmotor – Fahren* ***(MA vorwärts)***	***test port for*** *settings at variable displacement pump – travel and variable displacement motor – travel* ***(MA travel forward)***	***prise de pression pour*** *réglages côté pompe à débit variable - translation et moteur à cylindrée variable – translation* ***(MA marche AV)***
G	***Messstelle für*** *Einstellungen an Verstellpumpe - Fahren und Verstellmotor – Fahren* ***(MB Fahren rückwärts)***	***test port for*** *settings at variable displacement pump – travel and variable displacement motor – travel* ***(MB travel reverse)***	***prise de pression pour*** *réglages côté pompe à débit variable - translation et moteur à cylindrée variable – translation* ***(MB marche AR)***
	• Anschluß - *Bremsinchung* **(12)**	• connection - *brake inching* **(12)**	• connexion - *inching frein* **(12)**
	• Anschluß ***„X1“*** *Stelldruck* **(13)**	• connection ***„X1“*** *control pressure* **(13)**	• connexion ***„X1“*** *pression de commande* **(13)**
	• Ventil *Druckabschneidung* **(14)**	• Valve *pressure cut-off* **(14)**	• valve *coupure de pression* **(14)**
	• Sicherheitsventil - *Fahren rückwärts* **(15)**	• safety valve - *travel reverse* **(15)**	• valve de sécurité - *marche AR* **(15)**
	• Speisedruck ***„G“*** **(16)** – *Feststellbremse, Vorsteuerdruck, Pendelachsverrieglung*	• charge pressure ***„G“*** **(16)** - *parking brake, pilot pressure, oscillating axle lock*	• pression de gavage ***„G“*** **(16)** - *frein de stationnement, pression de pilotage, verrouillage essieu oscillant*
	• Speisedruckventil **(17)**	• charge pressure valve **(17)**	• valve de pression de gavage **(17)**
	• Sicherheitsventil - *Fahren vorwärts* **(18)**	• safety valve - *travel forward* **(18)**	• valve de sécurité - *marche AV* **(18)**
	• Einstellschraube - *Regelventil* **(19)** *(Drückung – Anfahren)*	• setting screw – *regulator* **(19)** *(stall and start up speed)*	• vis de réglage – *régulateur* **(19)** *(chute de régime – régime de démarrage)*
	• Anschluß ***„Ps“*** - *Stelldruck* **(20)** *(Pedalfahren)*	• Connection ***„Ps“*** - *control pressure* **(20)** *(pedal drive)*	• connexion ***„Ps“*** - *pression de commande* **(20)** *(translation par pédale)*
	• Anschluß ***„X2“*** - *Stelldruck* **(21)**	• connection ***„X2“*** - *control pressure* **(21)**	• connexion ***„X2“*** - *pression de commande* **(21)**
	• Entlüftung **(22)**	• vent **(22)**	• purge **(22)**
	• Einstellschraube **(23)** – *Bremsinchung*	• setting screw **(23)** - *brake inching*	• vis de réglage **(23)** - *inching frein*
	• Elektromagnetventil ***„y15“*** - *Fahren rückwärts* **(24)**	• solenoid valve ***„y15“*** – *travel reverse* **(24)**	• électrovanne ***„y15“*** – marche *AR* **(24)**
	• Elektromagnetventil ***„y14“*** *Fahren vorwärts* **(25)**	• solenoid valve ***„y14“*** – *travel forward* **(25)**	• électrovanne ***„y14“*** – *marche AV* **(25)**

Typ Model Type Tipo	**HML 32**	**ab Fz.-Id.nr.. 3200 / 0439** **from s/n: 3200 / 0439** **à partir du n/s: 3200 / 0439** **desde el no.: 3200 / 0439**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.510.16**

Pos. Item Rep. No.	Deutsch	English	Français
H	***Messstelle für*** *Einstellungen am Verstellmotor - Fahren (Regelbeginn)* • Einstellschraube **(26)** - *Qmax* • Einstellschraube **(27)** - *Qmin* • Steuerdruckanschluß ***„X2“*** **(28)** • Steuerdruckanschluß ***„X1“*** **(29)** • Einstellschraube - *Regelbeginn* **(30)**	***test port for*** *settings at variable displacement motor – travel (regulation start)* • setting screw **(26)** - *Qmax* • setting screw **(27)** - *Qmin* • pilot pressure ***„X2“*** **(28)** • pilot pressure ***„X1“*** **(29)** • setting screw - *regulation start* **(30)**	***prise de pression pour*** *réglages côté moteur à débit variable – translation (début de régulation)* • vis de réglage **(26)** - *Qmax* • vis de réglage **(27)** - *Qmin* • pression de pilotage ***„X2“*** **(28)** • pression de pilotage ***„X1“*** **(29)** • vis de réglage – *début de régulation* **(30)**

Typ Model Type Tipo	**HML 32**	**ab Fz.-Id.nr..** 3200 / 0439 **from s/n:** 3200 / 0439 **à partir du n/s:** 3200 / 0439 **desde el no.:** 3200 / 0439	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Einstellanweisung** **Setting instructions** **Instructions de réglage** **Guía de ajuste**			Blatt Page Feuille Página	**5.510.17**

A.) *Adjustment of the Δ p - valve (power regulator)* ***(1)*** *at the Brueninghaus variable displacement pump*

- Connect 60 bar - gauge to pump high pressure port of valve bank 1 (working hydraulics)
- Turn in the setting screw at the load-sensing regulator **(2)** by one turn
- Dismount plug **(6)** opposite the pressure signal line **(5)** at the power regulator **(1).** Mount a screwed fitting GE 8 S 7/16-20 UNF (part no. 1 939 000 815) and a hose nominal width 8 mm (length: approx. 1.52m ⇒ part no. 4 506 152 351), put the latter into the hydraulic tank (ventilation filter hole). Prepare a receptacle for approx. 5 l drain oil for this check.
- Start the engine, set it to approx. 1,000 min^{-1} (rpm)
- Set a pressure of approx. 20 bar at the setting screw of the power regulator **(1)**
- Stop the engine, dismount the screwed fitting and hose. Slacken the setting screw at the load sensing regulator **(2)** by 1 turn. Check the stand-by pressure and re-adjust if necessary

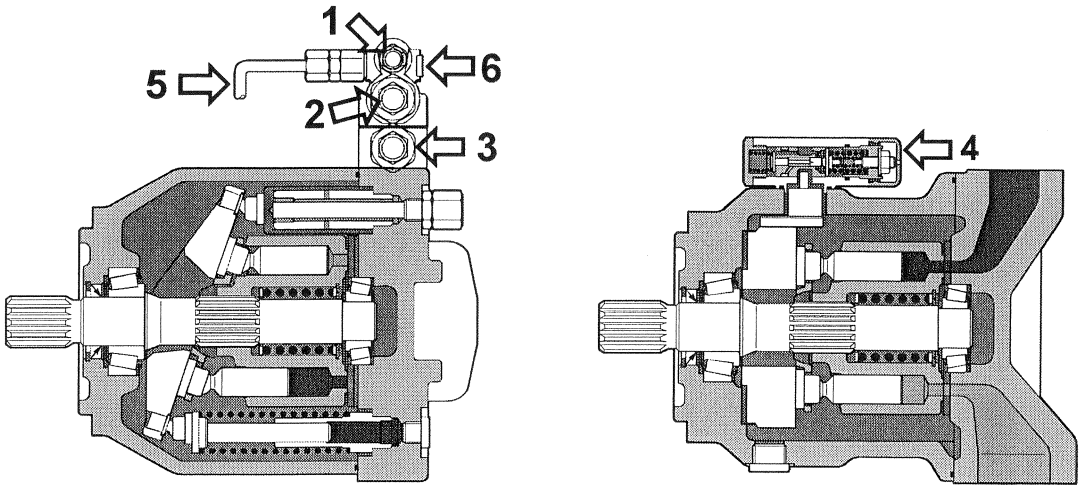
B.) *Adjustment of the load-sensing regulator* ***(2)***

- Connect 60 bar - gauge to the pressure port of valve bank 1
- Start the engine and set it to approx. 1,000 min^{-1} (rpm)
- Set the stand-by pressure at the setting screw of the load-sensing regulator **(2)** (see Technical Data)

C.) *Adjustment of the pressure regulator DFLR (pressure cut-off)* ***(3)***
(applies to SMB / HML 30 F only)

- Connect 600 bar - gauge to the gauge port of valve bank 1
- Start the engine, give full throttle
- Make any working movement (e.g. bucket) under full load (end stroke) and set the pressure regulator **(3)** to 250 bar
  If the main relief valve in valve bank 1 (working hydraulics) has to be checked or adjusted resp., raise the regulator valve **(3)** to well over 280 bar

D.) *The horse power control valve* ***(4)*** *is adjusted on the test bench*



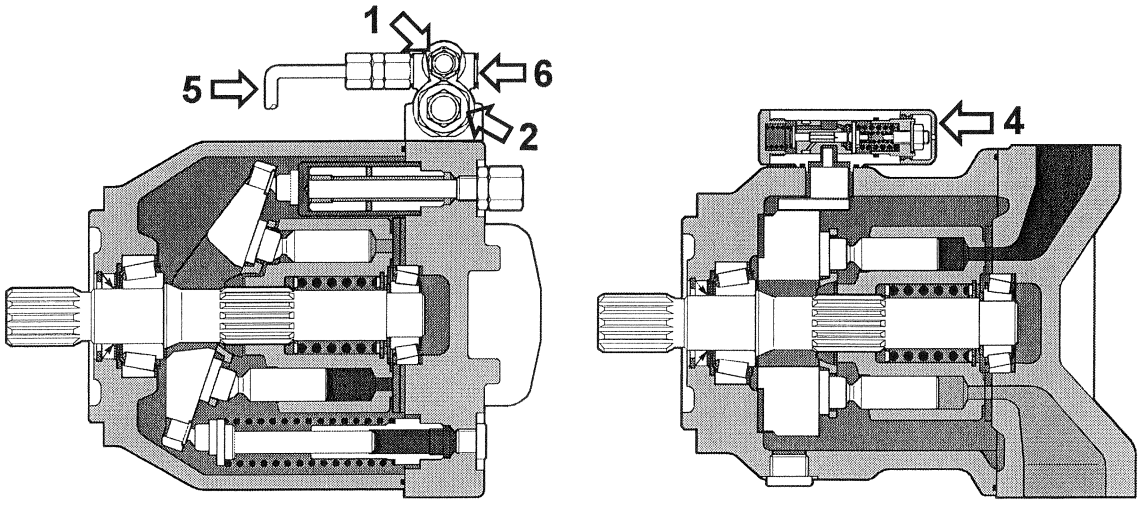
A.) *Adjustment of the Δ p - valve (power regulator)* ***(1)*** *at the Brueninghaus variable displacement pump*

- Connect 60 bar - gauge to pump high pressure port of valve bank 1 (working hydraulics)
- Turn in the setting screw at the load-sensing regulator **(2)** by one turn
- Dismount plug **(6)** opposite the pressure signal line **(5)** at the power regulator **(1).** Mount a screwed fitting GE 8 S 7/16-20 UNF (part no. 1 939 000 815) and a hose nominal width 8 mm (length: approx. 1.52m ⇒ part no. 4 506 152 351), put the latter into the hydraulic tank (ventilation filter hole). Prepare a receptacle for approx. 5 l drain oil for this check.
- Start the engine, set it to approx. 1,000 min^{-1} (rpm)
- Set a pressure of approx. 20 bar at the setting screw of the power regulator **(1)**
- Stop the engine, dismount the screwed fitting and hose. Slacken the setting screw at the load sensing regulator **(2)** by 1 turn. Check the stand-by pressure and re-adjust if necessary

B.) *Adjustment of the load-sensing regulator* ***(2)***

- Connect 60 bar - gauge to the gauge port of valve bank 1
- Start the engine and set it to approx. 1,000 min^{-1} (rpm)
  Set the stand-by pressure at the setting screw of the load-sensing regulator **(2)** (see Technical Data)

D.) *The horse power control valve* ***(4)*** *is adjusted on the test bench*



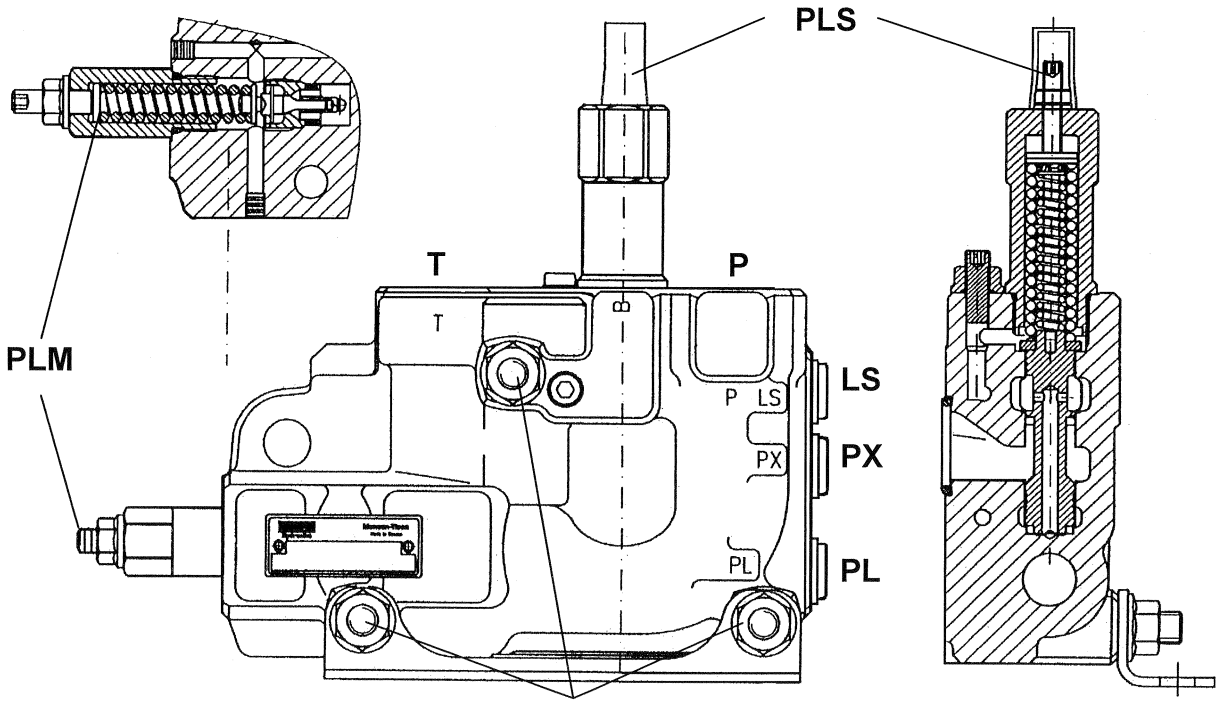
The PLS valve compensates pressure peaks, which can create a short change of the pressure difference, provided that the Δp of the pumpregulator is set by 5 to 8 bar lower than the Δp of the PLS valve.

Please note the following prior to the adjustment of the PLS - valve:

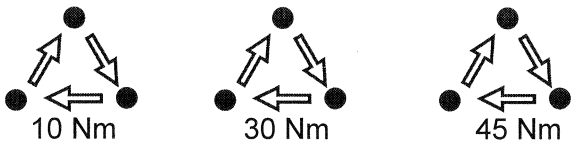
- Check the Δp - valve of the Brueninghaus variable displacement pump according to the setting instructions on page 5.520.01
- Mount a flow rate meter in the P line
- Mark the setscrew at the PLS valve

Adjustment of the PLS valve:

- Raise the Δp of the variable displacement pump by **5 - 8 bar** (Δp basic adjustment = 20 bar)
- The flow rate must be **0 ltr/min** (PLS valve closed).
  When a flow rate is measured, the spring of the PLS valve has to be preloaded until the flow rate meter indicates **0 ltr/min**.
  (One turn of the setscrew corresponds to approx. 2.5 bar)
- Now open the PLS valve until a value of **20 ltr/min** is indicated. Counterlock the setscrew.
- Re-adjust the Δp of the variable displacement pump to its original value.



Tightening torque = **MA,** in three stages



PLM valve = main pressure relief valve in connection with the PLS valve (see diagram)

Gauge ports	P at pressure cut-off (valve bank) LS at valve bank Accumulator charge pressure at brake block Travel brake pressure at brake block Gauge port no. 1 parking brake gear shifting Gauge port no. 2 pilot control Gauge port no. 3 steering Slew gear (Z - port)

Oil temperature 55 - 60° for all tests

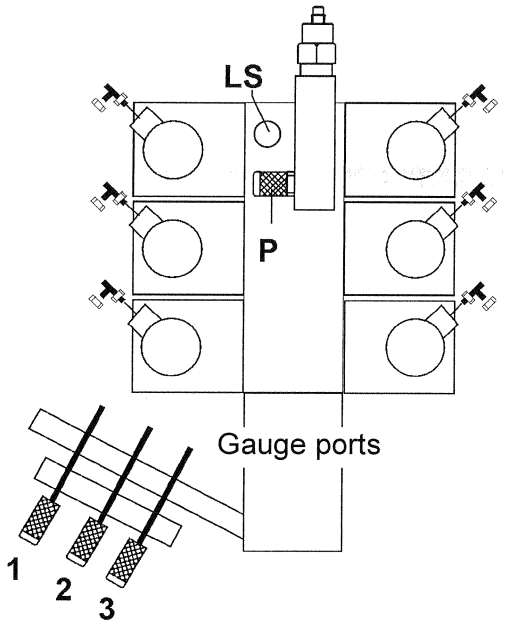
	Pressure	Gauge port
Pilot control	32 bar	gauge port no. 2
Stand-by pressure (diesel engine N max.)	28 - 45 bar	P pressure cut-off
LS consumer pressure	320 -5 bar	LS pressure cut-off
ΔP = difference P - LS	18 +1 bar	P + LS

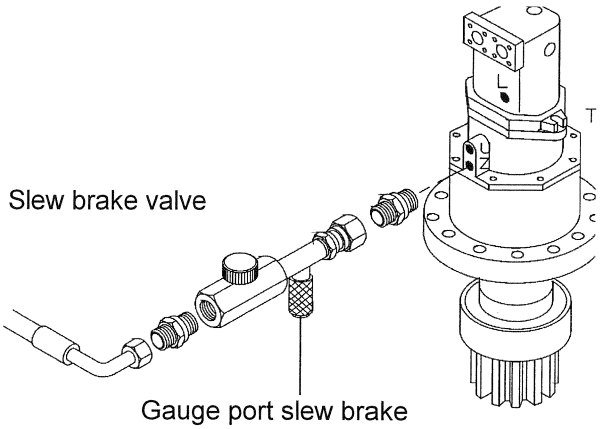
Measuring procedure: Jack up machine, diesel engine N max., travel range selector switch in position "rabbit"

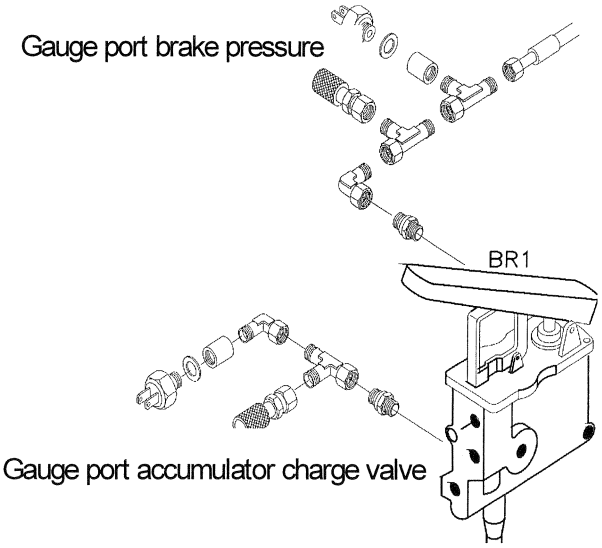
Check of line relief pressures: Turn in pressure cut-off by 1 turn

Lifting cylinder up + down	350 +20 bar LS
Stick cylinder out + in	350 +20 bar LS
Bucket cylinder out + in	350 +20 bar LS
Travel motor	420 bar LS

Turn back and readjust pressure cut-off	320 -5 bar	LS
Slewing primary	205 bar	LS
Slewing secondary	110 / 230 bar	LS
Slew brake	32 bar	slew gear (Z)
Steering	150 -5 bar	gauge port no. 3
Grab rotation	100 bar	gauge port no. 3
Parking brake - remaining pressure	11 bar	gauge port no. 1
Gear shifting	32 bar	gauge port no. 1
Charge pressure - service brake	120 / 150 bar	brake block
Brake pressure	60 bar	brake block
Cardan shaft rev.	1,560 +50 min^{-1}	
Engine rpm N min.	650 - 850 min^{-1}	
Engine rpm N max.	2,290 +40 min^{-1}	
Engine stalling N	2,200 min^{-1}	
Test procedure: Jack up machine diesel engine N max., travel range selector switch in position "rabbit", slow down with foot brake to	300 bar	LS

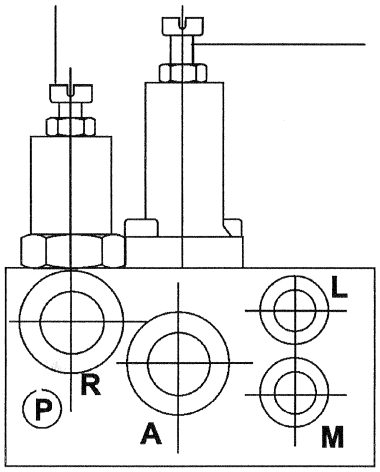






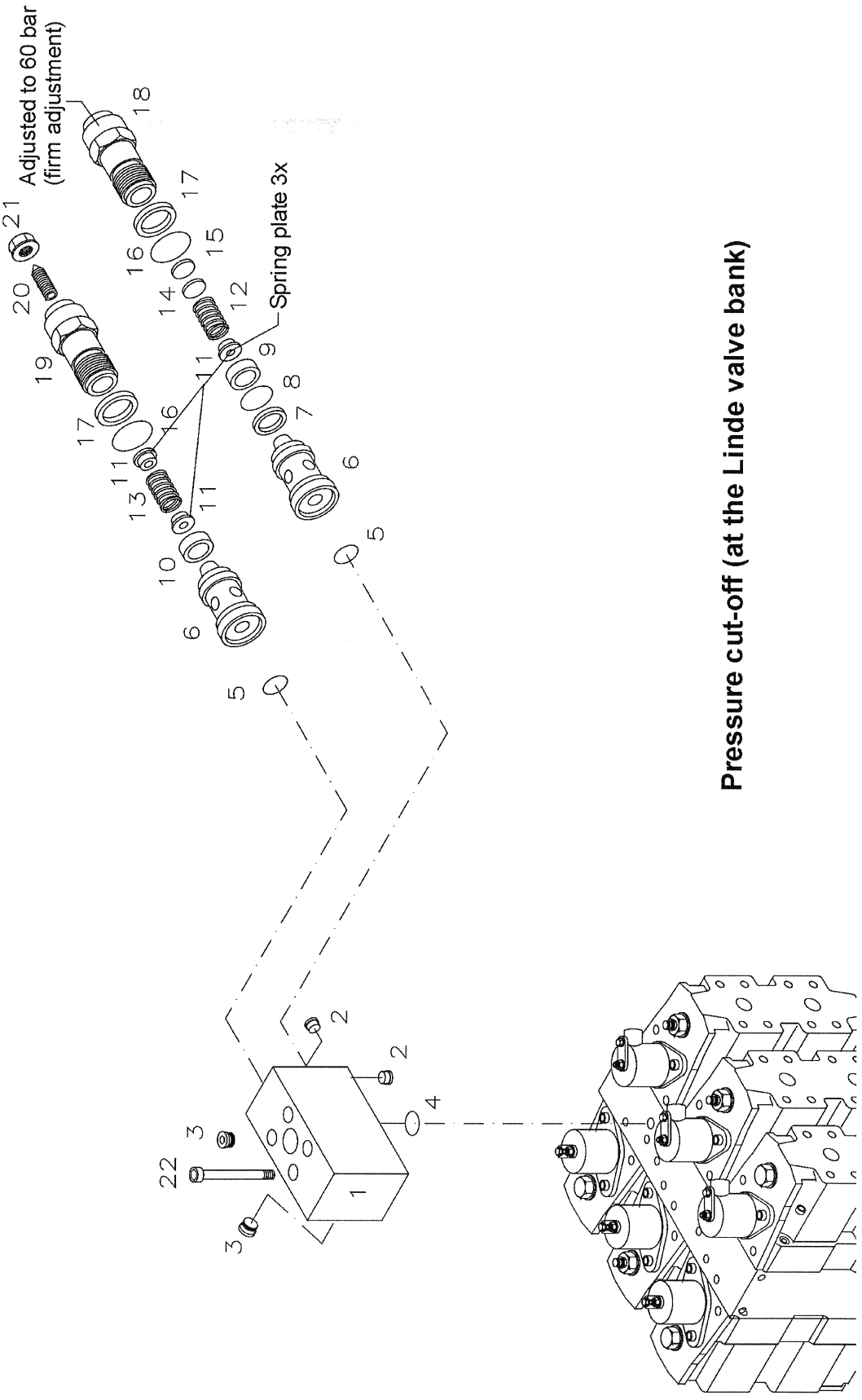
1. parking brake - gear shifting
2. pilot pressure
3. steering priority valve

40 bar pressure limitation / need not be adjusted



setscrew pressure reducing valve
pilot pressure: 32 bar

SCHAEFF	Typ/Model/Type **HML 51 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Setting values**	Blatt/Page/Feuille **5.540.02**



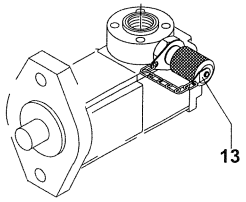
SCHAEFF	Typ/Model/Type **HML 51 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Setting values**	Blatt/Page/Feuille **5.540.03**

1. Check and replacement of the line relief valves

Note: It is checked if the line relief valves are approx. 30 bar above the main pressure relief valve or if the line relief valve „dumping out" is adjusted correctly resp.

- connect 600 bar - gauge to gauge port (13) of the working pump
- increase main pressure relief valve by approx. 40 bar
- set engine rpms to approx. 1,100 min^{-1}
- actuate all functions, one after the other, until mechanical stop
- watch the gauge: - function „dumping out": Desired value: see Technical Data. If the desired value is not reached or exceeded resp., the line relief valve cartridge has to be replaced

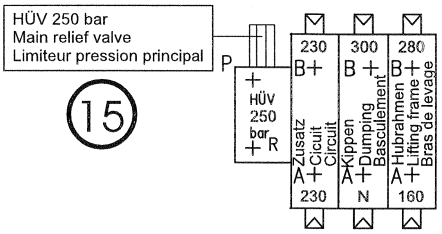
  - with all other functions it is checked whether the corresponding line relief valve is approx. 30 bar above the main pressure relief valve. If a value is too far beyond the tolerance, the corresponding valve cartridge has to be replaced
- reset main pressure relief valve to the desired value (see Technical Data)



2. Check and adjustment of the main pressure relief valve

- connect 600 bar - gauge to gauge port (13) of the working pump
- fully accelerate
- actuate function „lifting frame, lift". Attention: Steering must not be actuated
- read the value on the gauge. Desired value (main pressure relief valve): see Technical Data
- if the desired value is not reached, turn the setscrew (15) at the main pressure relief valve in or out resp.

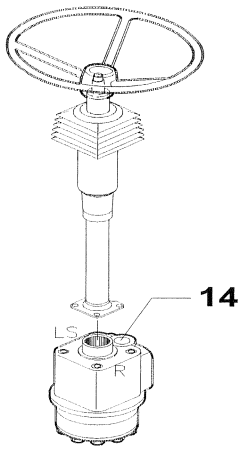
  Turning in: pressure increase
  Turning out: pressure decrease



3. Check and adjustment of the steering pressure

- connect 600 bar - gauge to gauge port (13) of the working pump
- fully accelerate
- actuate steering until stop
- read the value on the gauge. Desired value: see Technical Data
- if the desired value is not reached, carry out the adjustment as described in the following:
- remove cap at the rear of the steering console
- unscrew plug (14)
- screw the setscrew below in or out resp.

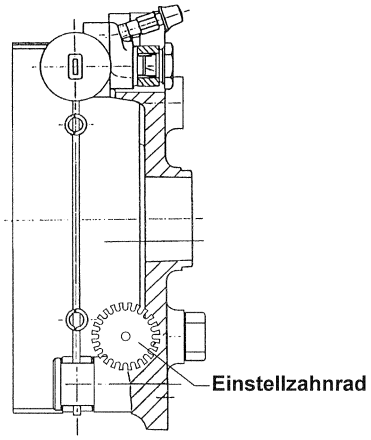
  Screwing in: steering pressure increase
  Screwing out: steering pressure decrease

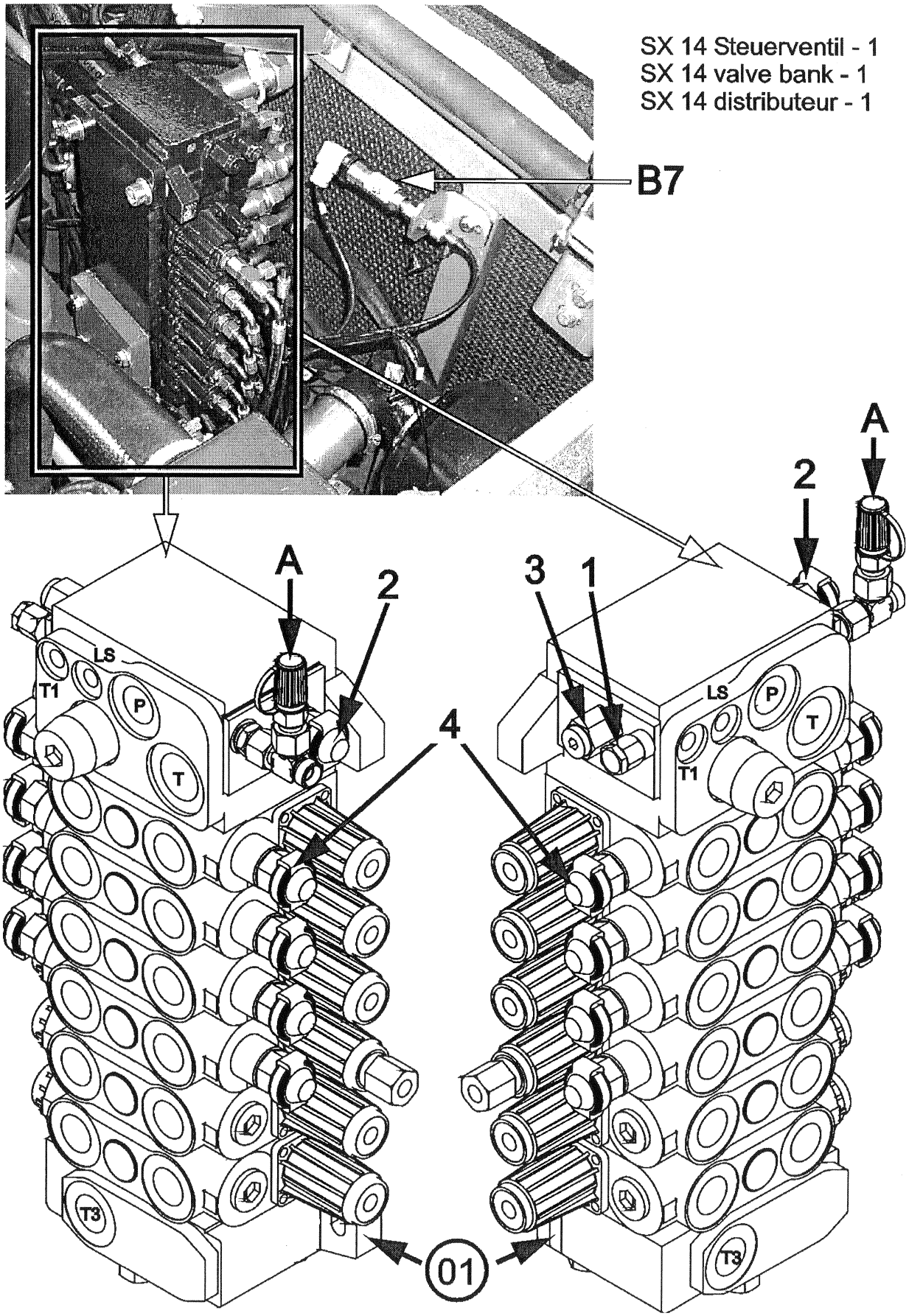


4. Adjustment of the parking brake and service brake

- adjustment possibility between the front axle and brake anchor plate of the brake drum at the setting gear
- adjust setting gear by means of a screwdriver until the brake blocks, then loosen until the wheels turn freely.
  An adjustment at the Bowden cable is not necessary.

Einstellzahnrad = setting gear





SCHAEFF TEREX	Typ/Model/Type **HR 32**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Setting instructions (working hydraulics)**	Blatt/Page/Feuille **5.650.01**

(01) SX 14 Steuerventil - 1

A ***Messstelle für***

Einstellungen am Steuerventil - 1

- LS – Druck **(1)**
- SV – Druck **(2)**
- Sekundärdrücke **(4)**

und

Messstelle für

Einstellungen an der Arbeitspumpe

- Stand-by Druck
- Δp Druck

B7 Lastwarnsensor

1 LS – Druckbegrenzungsventil *(einstellbar)*

2 Sicherheitsventil *(einstellbar)*

3 LS – Stromregelventil ***(nicht** einstellbar)*

4 Sekundärventil(e) *(einstellbar)*

(01) Siehe Blatt **6.65.01**

(01) SX 14 valve bank - 1

A ***test port for***

settings at valve bank - 1

- LS – pressure **(1)**
- safety valve pressure **(2)**
- line relief pressures **(4)**

and

test port for

settings at working pump

- stand-by pressure
- Δp pressure

B7 load warning sensor

1 load sensing pressure relief valve *(adjustable)*

2 safety valve *(adjustable)*

3 LS – flow regulator valve ***(not** adjustable)*

4 line relief valve(s) *(adjustable)*

(01) see page **6.65.01**

(01) SX 14 distributeur - 1

A ***prise de pression pour***

réglages côté distributeur - 1

- pression LS **(1)**
- pression valve de sécurité **(2)**
- pressions secondaires **(4)**

et

prise de pression pour

réglages côté pompe équipement

- pression d'attente
- pression Δp

B7 capteur avertisseur de charge

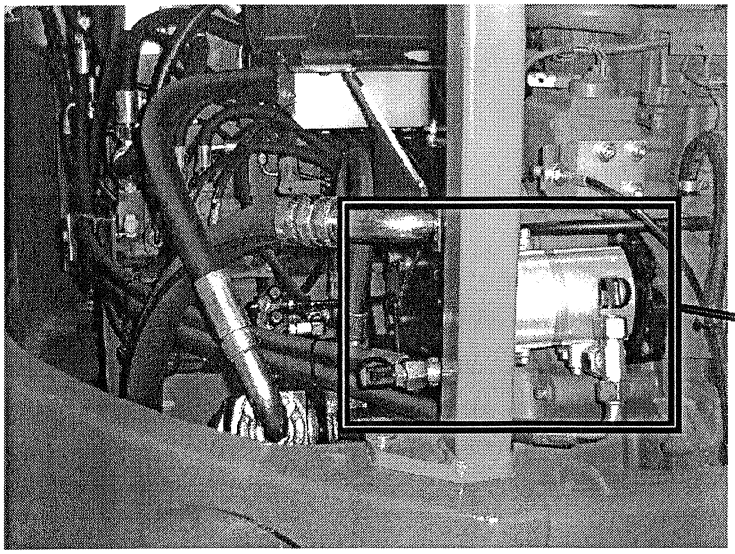
1 limiteur de pression LS *(réglable)*

2 valve de sécurité *(réglable)*

3 régulateur de débit LS ***(non** réglable)*

4 clapet(s) secondaire(s) *(réglable(s)*

(01) voir page **6.65.01**



Doppelzahnradpumpe
double gear pump
pompe tandem à engrenages

SCHAEFF TEREX	Typ/Model/Type **HR 32**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Setting instructions (working hydraulics)**	Blatt/Page/Feuille **5.650.02**

(21) **Doppelzahnradpumpe**

B *Messstelle für*

Einstellungen am Steuerventil 2, Nebenkreis und Schwenkmotor

(02) **Steuerventil 2 (SM12)**

Hauptüberdruckventil (**5**) für

- Schwenken *(ohne Sekundärventile)*
- Räumschild *(ohne Sekundärventile)*
- Knicken *(mit Nachsaugventilen* (**6**)*)*

(22) **Schwenkmotor**

- Ventile am Schwenkmotor (**7** und **8**)

C *Messstelle für*

Einstellungen am Abschaltventill

(03) **Abschaltventil**

- Einstellschraube (**9**)

z.b. Räumschild auf Block, Vollgas, Druck langsam erhöhen

D *Messstelle für*

Einstellungen am Druckminderventil

(06) **Druckminderventil** (Vorsteuerdruck)

- Einstellschraube (**10**)

(13) **Druckminderventil** (Vorsteuerdruck für Zusatzsteuerkreis)

- Einstellschraube (**11**)

z.b. Einstellung der Geschwindigkeit – Greifer drehen

(02) (03) (06) (13) Siehe Blatt **6.65.01**

(21) **double gear pump**

B *test port for*

settings at valve bank 2, secondary functions and swing motor

(02) **valve bank 2 (SM12)**

main pressure relief valve (**5**) for

- swing *(without line relief valves)*
- dozer blade *(without line relief valves)*
- articulation *(with anti-cavitation valves* (**6**)*)*

(22) **swing motor**

- line relief valves at swing motor (**7** and **8**)

C *test port for*

settings at cut-off valve

(03) **cut-off valve**

- setting screw (**9**)

e.g. dozer blade in end stroke position, full throttle, slowly increase pressure

D *test port for*

settings at pressure reducing valve

(06) **pressure reducing valve** (pilot pressure)

- setting screw (**10**)

(13) **pressure reducing valve** (pilot pressure for additional control circuit)

- Setting screw (**11**)

e.g. speed adjustment for clamshell grab rotation

(02) (03) (06) (13) see page **6.65.01**

(21) **pompe tandem à engrenages**

B *prise de pression pour*

réglages côté distributeur 2, circuit hydraulique secondaire et moteur d'orientation

(02) **Distributeur 2 (SM12)**

limiteur de pression principal (**5**) pour

- orientation *(sans clapets secondaires)*
- lame de remblayage *(sans clapets secondaires)*
- articulation *(avec clapets anti-cavitation* (**6**)*)*

(22) **moteur d'orientation**

- clapets secondaires côté moteur d'orientation (**7** et **8**)

C *prise de pression pour*

réglages côté valve de coupure

(03) **valve de coupure**

- vis de réglage (**9**)

p.ex. lame en butée, pleins gaz, augmenter doucement la pression

D *prise de pression pour*

réglages côté détendeur

(06) **détendeur** (pression de pilotage)

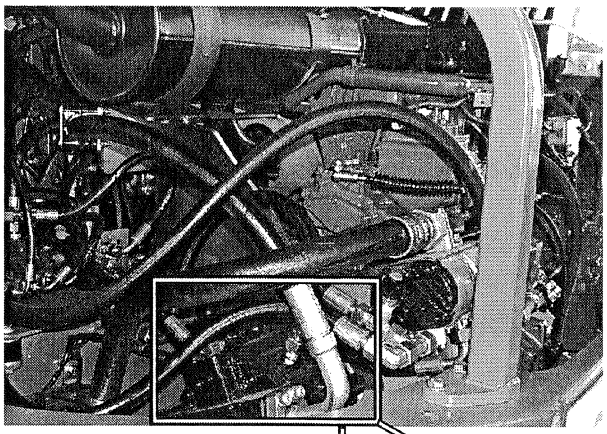
- vis de réglage (**10**)

(13) **détendeur** (pression de pilotage pour circuit supplémentaire)

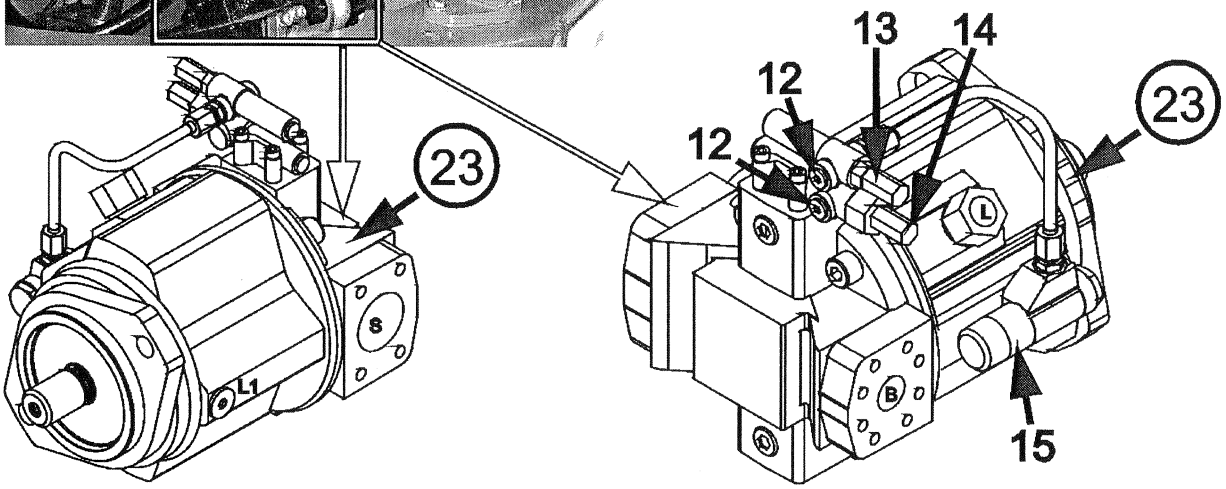
- vis de réglage (**11**)

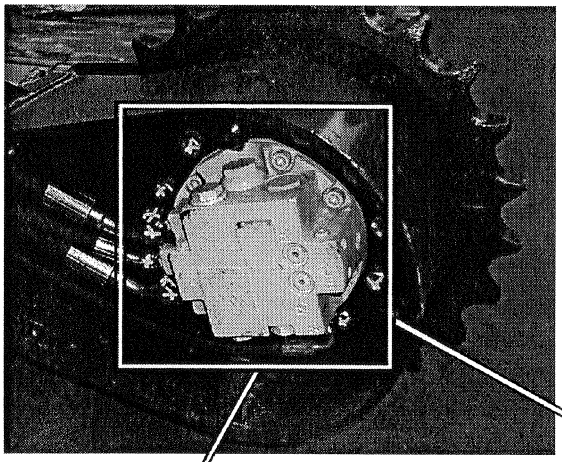
p.ex. réglage de la vitesse de rotation de la benne preneuse)

(02) (03) (06) (13) voir page **6.65.01**

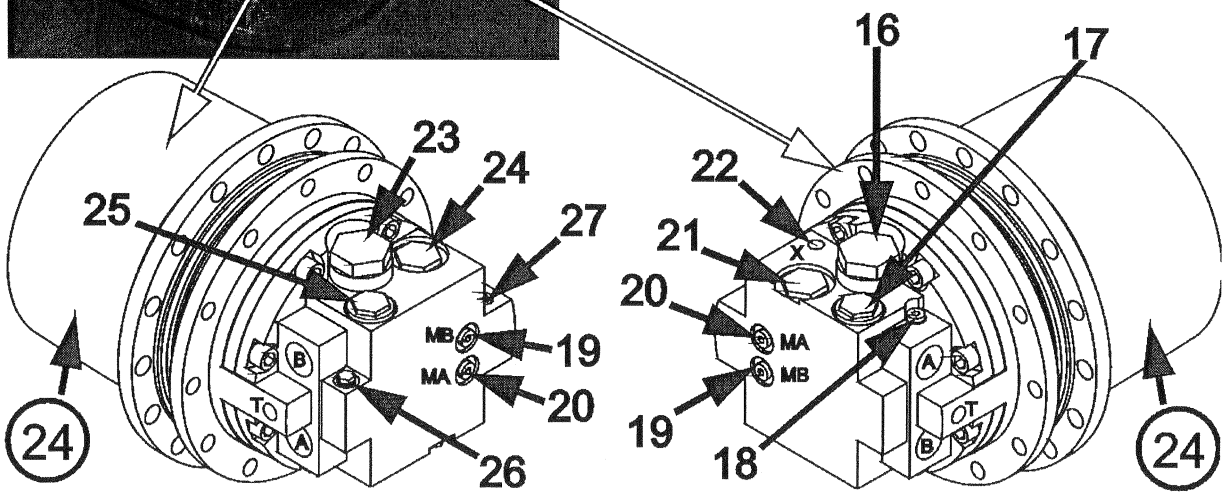


Verstellpumpe - Arbeiten
variable displacement pump - working
pompe à débit variable - équipement





Fahrantrieb
travel drive
entraînement



SCHAEFF TEREX	Typ/Model/Type **HR 32**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Instructions de réglage (pompe équipement, transmission)**	Blatt/Page/Feuille **5.650.03**

(23) Verstellpumpe - Arbeiten

- Verschlusschraube **(12)**
- Δp-Druckventil **(13)** *(Leistungsregler)*
- Load-Sensing-Regler **(14)** *(Stand-by Druck einstellen)*
- Leistungsventil **(15)** *(am Prüfstand einstellen)*

(23) variable displacement pump - working

- plug **(12)**
- Δ p-pressure valve **(13)** *(power regulator)*
- load sensing regulator **(14)** *(setting stand-by pressure)*
- power valve **(15)** *(setting at test bench)*

(23) pompe à débit variable - équipement

- bouchon **(12)**
- valve de pression-Δp **(13)** *(régulateur de puissance)*
- régulateur LS (load sensing) **(14)** *(réglage de la pression d'attente)*
- valve de puissance **(15)** *(réglage sur le banc d'essai)*

(24) Fahrantrieb

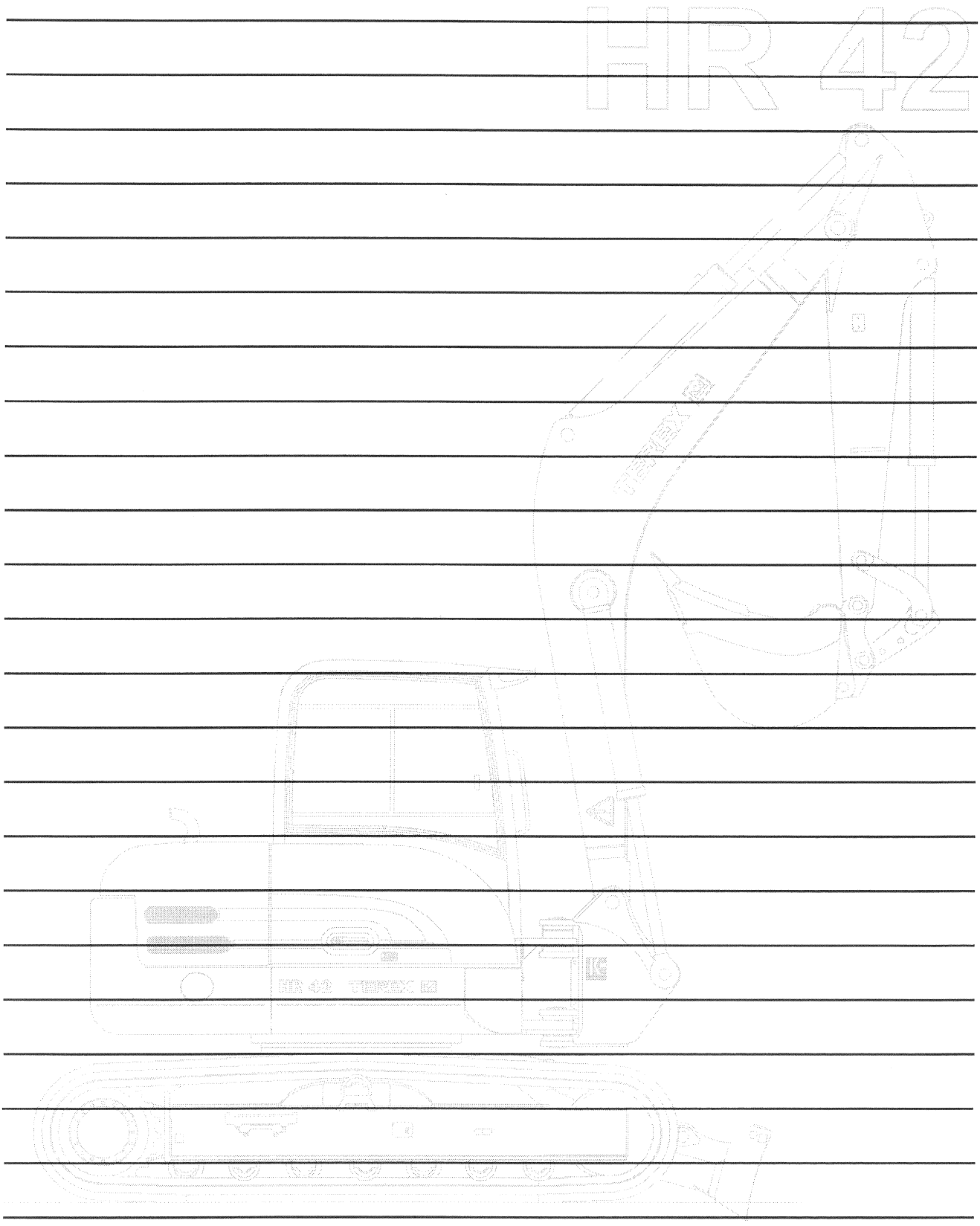
- Verschlusschraube **(16)** *(Bremskolben)*
- Rückschlagventil **(17)**
- Druckausgleichsventil **(18)**
- Verschlusschraube **(19)** *(Messanschluss „**MB**„)*
- Verschlusschraube **(20)** *(Messanschluss „**MA**„)*
- Sekundärventil mit Dämpfungskolben **(21)** *(280 bar)*
- Anschluss „**X**“ **(22)** *(Schaltdruck) schnell / langsam*
- Verschlusschraube **(23)** *(Bremskolben)*
- Sekundärventil mit Dämpfungskolben **(24)** *(280 bar)*
- Rückschlagventil **(25)**
- Druckregelventil **(26)**
- Wechselventil **(27)**

(24) travel drive

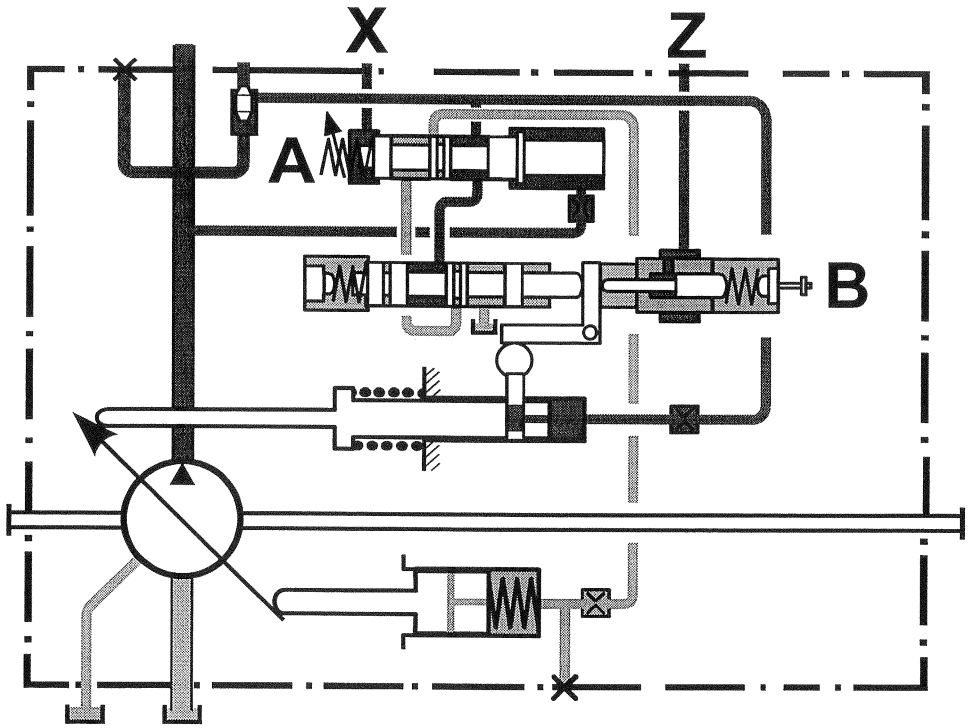
- plug **(16)** *(counter balance valve)*
- check valve **(17)**
- pressure balance valve **(18)**
- plug **(19)** *(test port „**MB**„)*
- plug **(20)** *test port „**MA**„)*
- line relief valve with cushion piston **(21)** *(280 bar)*
- connection „**X**“ **(22)** *(control pressure) fast / slow*
- plug **(23)** *(counter balance valve)*
- line relief valve with cushion piston **(24)** *(280 bar)*
- check valve **(25)**
- pressure control valve **(26)**
- shuttle valve **(27)**

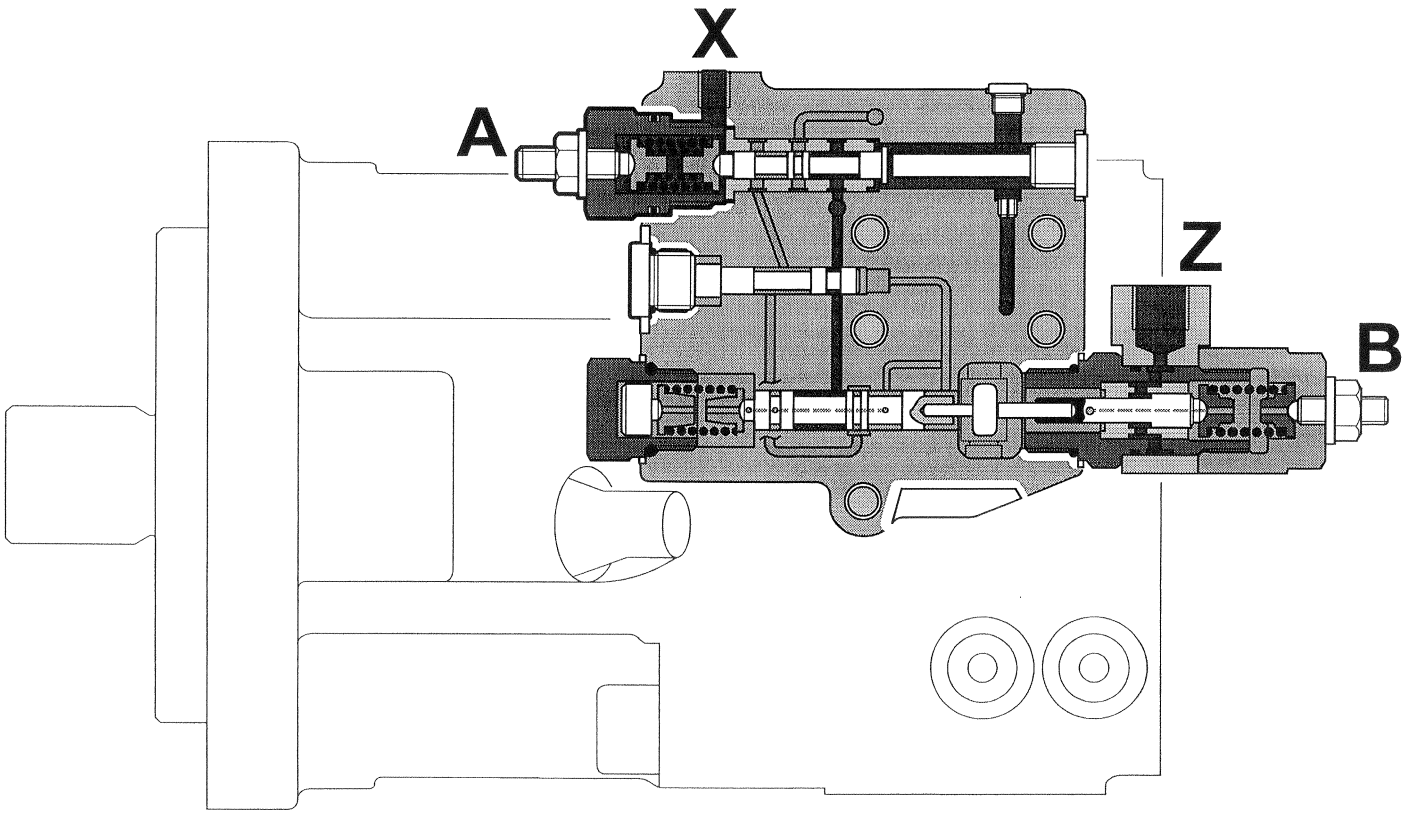
(24) entraînement

- bouchon **(16)** *(tiroir de freinage de translation)*
- clapet anti-retour **(17)**
- soupape compensatrice de pression **(18)**
- bouchon **(19)** *(prise de pression „**MB**„)*
- bouchon **(20)** *(prise de pression „**MA**„)*
- clapet secondaire avec piston d'amortissement **(21)** *(280 bar)*
- connexion „**X**“ **(22)** *(pression de commande) petite / grande*
- bouchon **(23)** *(tiroir de freinage de translation)*
- valve secondaire avec piston d'amortissement **(24)** *(280 bar)*
- clapet anti-retour **(25)**
- régulateur de pression **(26)**
- sélecteur **(27)**



Typ Model Type Tipo	**HR 42**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**5.670.00**





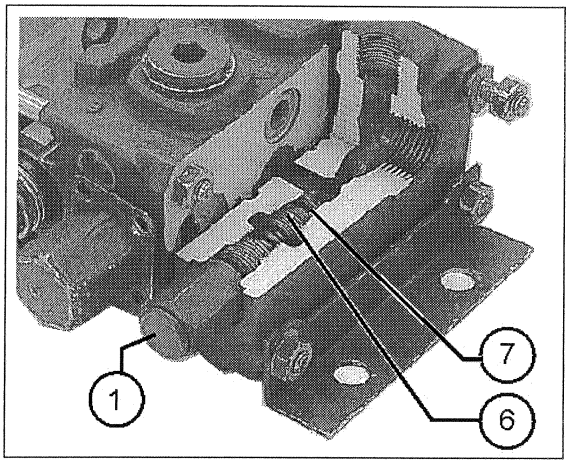
Typ Model Type Tipo	**HR 42** ab Fz.-Id.-Nr.: from s/n: á partir du n/s: **342/0100**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Einstellanweisung A11VO 75 LR3S** **Setting instructions** **Instructions de réglage**	Blatt Page Feuille Página	**5.670.01**

Pos. Item Rep. No.	Deutsch	English	Français
A	Einstellschraube **Stand by - Druck** (Messpunkt am Steuer-ventil 1). Bei Vollgas	Adjusting screw **stand by-pressure** (test port at control-valve 1) full throttle	Vis de réglage **pression d'attente (stand by)** (prise de pression au distributeur 1) plein gaz
B	Einstellschraube **Drückungs-drehzahl-Motor.** (Zusatz + Schild auf Block, bzw. Zwischenausleger aus + Schild auf Block).	Adjusting screw **engine stall** (add. cicuit and dozer blade at end stroke, resp. intermediate boom out and dozer blade at end stroke).	Vis de réglage **chute de regime** (circuit supplementaire et lame de niveleuse resp. flèche interédiaire et lame de niveleuse au fin de course).
X	Anschluss für LS-Leitung von Steuerventil 1	Port for LS - Line from control valve 1	Raccord conduite - LS du distributeur 1
Z	Anschluss für Summen-leistungsregelung von den Zahnradpumpen, Nebenantrieb	port for summation horse power control from gear pumps at auxilary drive	Raccord régulation de sommation de puissance des pompes à engrenages de l'entraînement latérale
	Einstellwerte siehe Technische Daten Kap.2	Setting values see technical datas, chapter 2	Valeurs de réglage voir caractéristiques techniques chapitre 2

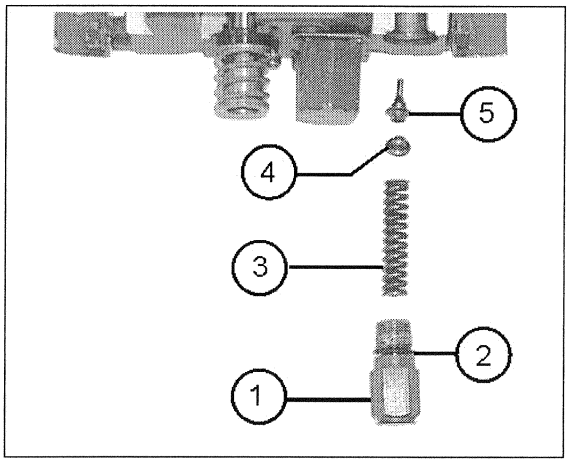
1 Spring sleeve
6 Valve seat
7 O-ring

Main pressure relief valve:
Adjustment

- Turn spring sleeve **(1)** until the requested pressure is achieved.
- The valve seat **(6)** can be screwed out.
- The O-ring **(7)** seals „**P**“ to „**T**“.

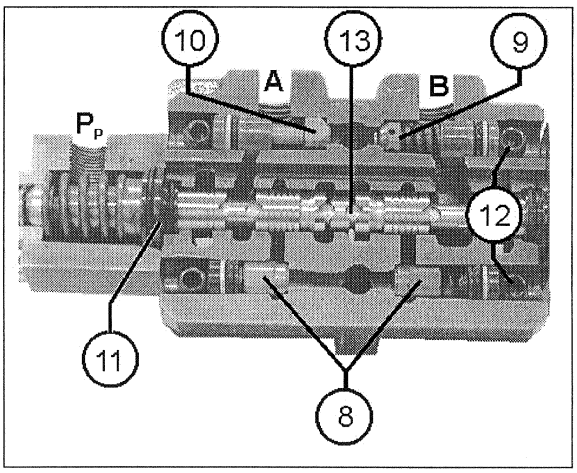


Main pressure relief valve:
1 Spring sleeve
2 O-ring
3 Pressure spring
4 Spring plate
5 Valve cone



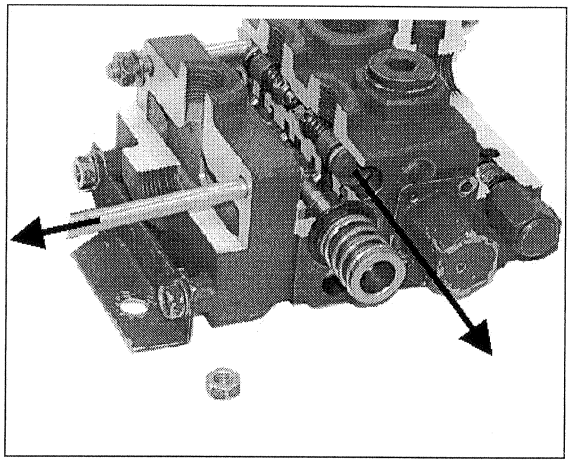
8 Load check valves
9 Line relief valve
10 Anti-cavitation valve
P_P Pilot pressure port
11 Sealing sleeve
12 Stud
A+B Consumer port
13 Control spool

The A + B sides must not be mixed up, asymetric control spool.



Replace line relief valve, anti-cavitation valve or Y plug resp.

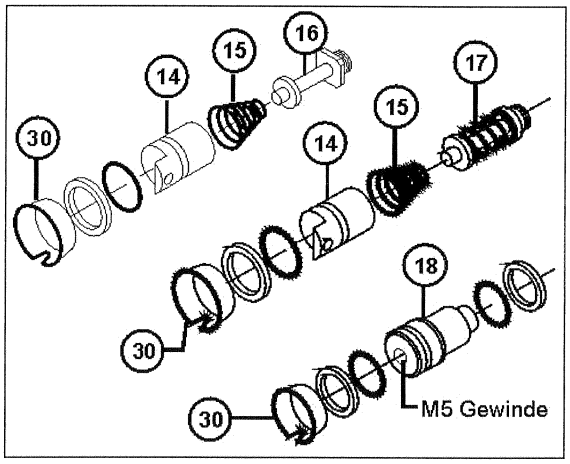
- Pull out stud (the stud locks the sleeve **(14)** and / or Y plug **(18)**
- Remove the pilot cap
- Remove the blind cap **(30)**
- Pull the sleeve **(14)** or Y plug **(18)** with a hook or screw M5 resp.
- Pull out the anti-cavitation spring and line relief valve or anti-cavitation valve resp. with a bar magnet
- Replace the seal parts, check the seal surfaces.



Assembly analogous.

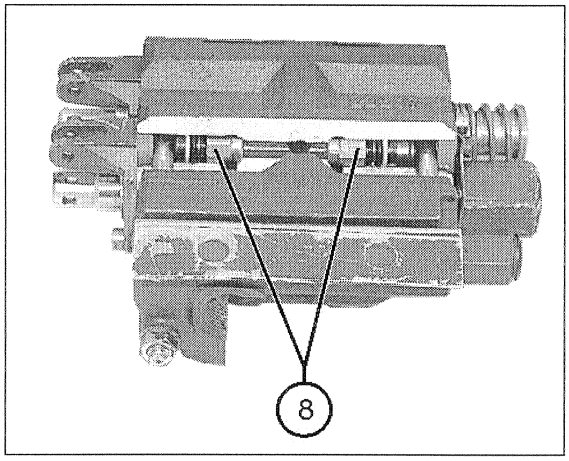
The relief line valve cannot be adjusted, it has to be replaced completely if need be.

If there is a surface at the sleeve **(14)**, it must be in horizontal position to the stud when it is assembled.



14 Sleeve with back-up ring and O-ring
15 Anti-cavitation spring
16 Anti-cavitation valve
17 Line relief valve
18 Y plug with back-up ring and O-ring

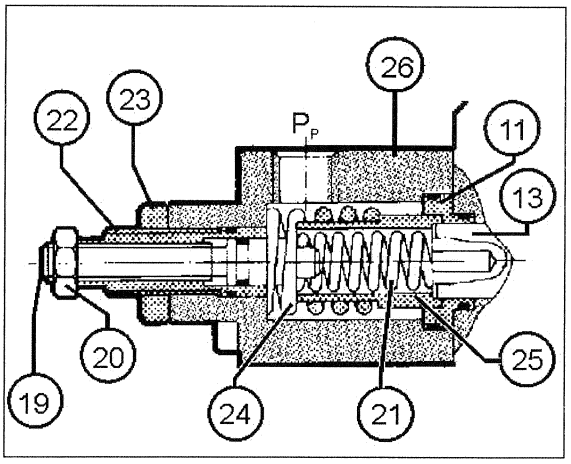
Replace load check valves **(8)**:
Proceed as described above - line relief valve.



Adjust neutral position of the control spool:
The neutral position can be adjusted by means of the setscrews **(19)**.
Both springs **(21)** must be adjusted in such a manner that the control spool to „**A**“ or „**B**“ opens at P_P=5.5 bar (pilot pressure).

The control spool stroke (oil flow) can be limited with the setscrews **(22)**. (It is completely open at all control spools).
To adjust a stroke limitation, proceed as follows:

- Slacken the counternuts **(20)** and **(23)** and secure the corresponding setscrews **(19)** and **(22)** to prevent turning.
- Hold the setscrew **(19)** and screw in the sleeve **(22)** until the oil flow requested is achieved.
- Tighen the counternuts **(20)** and **(23)**.

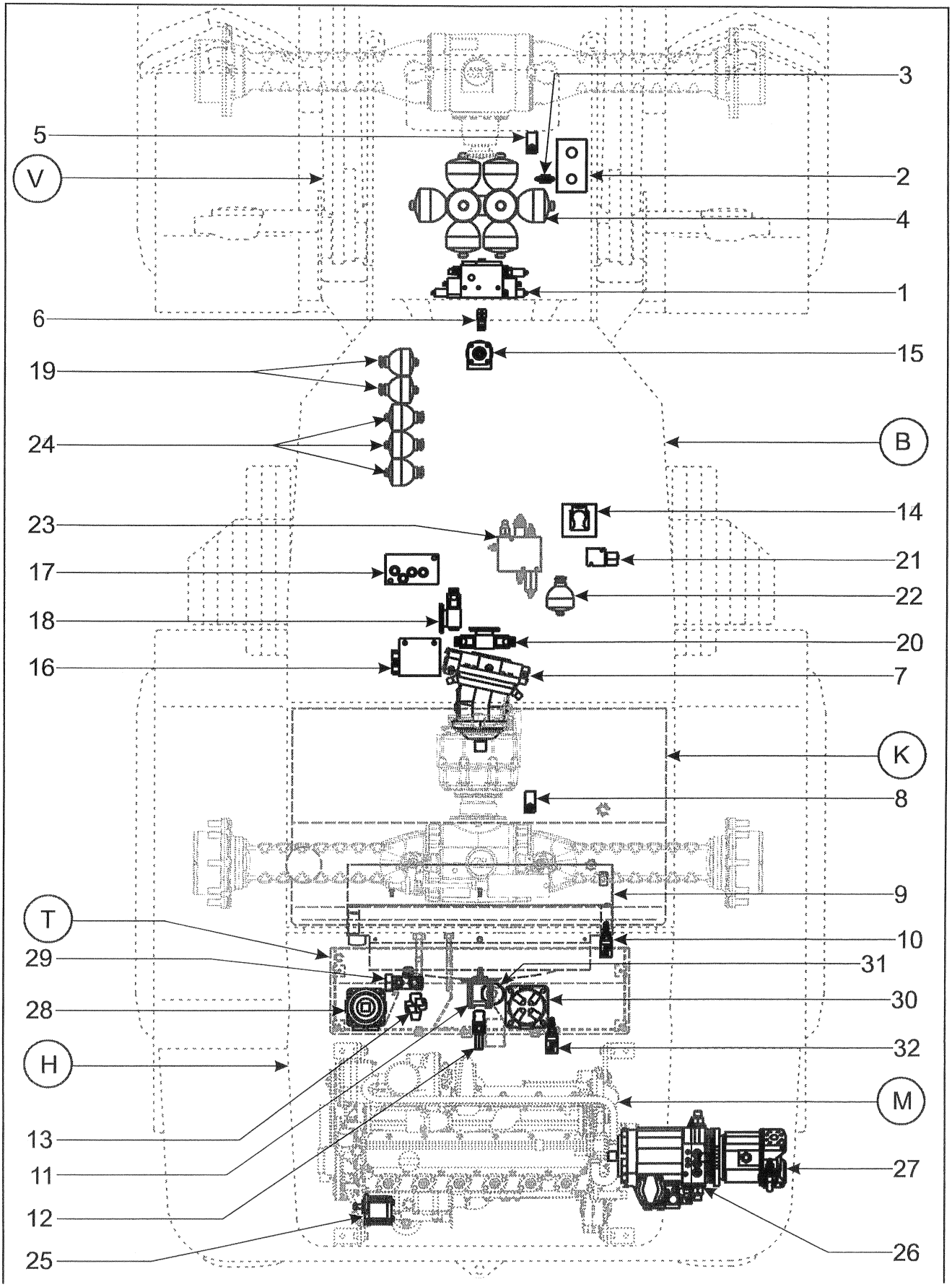


11	Seal sleeve
13	Control spool
19	Setscrew (control spool neutral position)
20	Counternut
21	Spring (neutral position)
22	Sleeve (control spool stroke limitation)
23	Counternut
24	Spring
25	Spring guiding sleeve
26	Pilot cap
P_P	Pilot pressure

SUBGROUP LIST
Functioning description

SKL 873	Location of hydraulic components	**6.13**
SKL 824	Location of hydraulic components	**6.22**
SKL 834	Location of hydraulic components	**6.24**
SKL 844	Location of hydraulic components	**6.26**
SKL 160	Rexroth control valve 3M6 and ride control system	**6.28**
SKS 634	Location of hydraulic components	**6.37**
HML 32	Location of hydraulic components	**6.51**
HML 42	Location of hydraulic components	**6.53**
HR 20	Location of hydraulic components	**6.60**
HR 32	Location of hydraulic components	**6.65**
HR 11	Location of hydraulic components	**6.73**
HR 12	Location of hydraulic components	**6.74**
HR 13	Location of hydraulic components	**6.75**
HR 14	Location of hydraulic components	**6.76**
HR 18	Kayaba control valve	**6.80**
Excavator gen.	Description, pilot-operated valve 4TH6 /4TH5	**6.100**
Excavator gen.	Description, pilot-operated valve PCL 401	**6.105**
Excavator gen.	Relay valve swing	**6.110**
HML 41/41S HR 41 HS 41/41M	Summation power control A10 VO DFSR with SX 18 valve bank	**6.200**
HML/HR	SX 14 valve bank	**6.210**
HML22/HR22	Slew pressure relief valve	**6.240**
HML 22/HR22	Valve bank VOAC L 90 LS	**6.250**
HML...S-Version	Gear shift function	**6.490**
SKL...S-Version	Ride control system, lifting frame	**6.500**
SKL, general	Suction filter function	**6.520**
HR, general	Travel motor, counter balance valve	**6.740**
HR/HML 32/42	Pilot operated 2-stage valves slewing	**6.850**
Excavator, gen.	Maintenance switch hydraulic oil return filter	**6.890**
HR 1.5 - 3.7	Display unit - mini excavators	**6.950**

TEREX | SCHAEFF



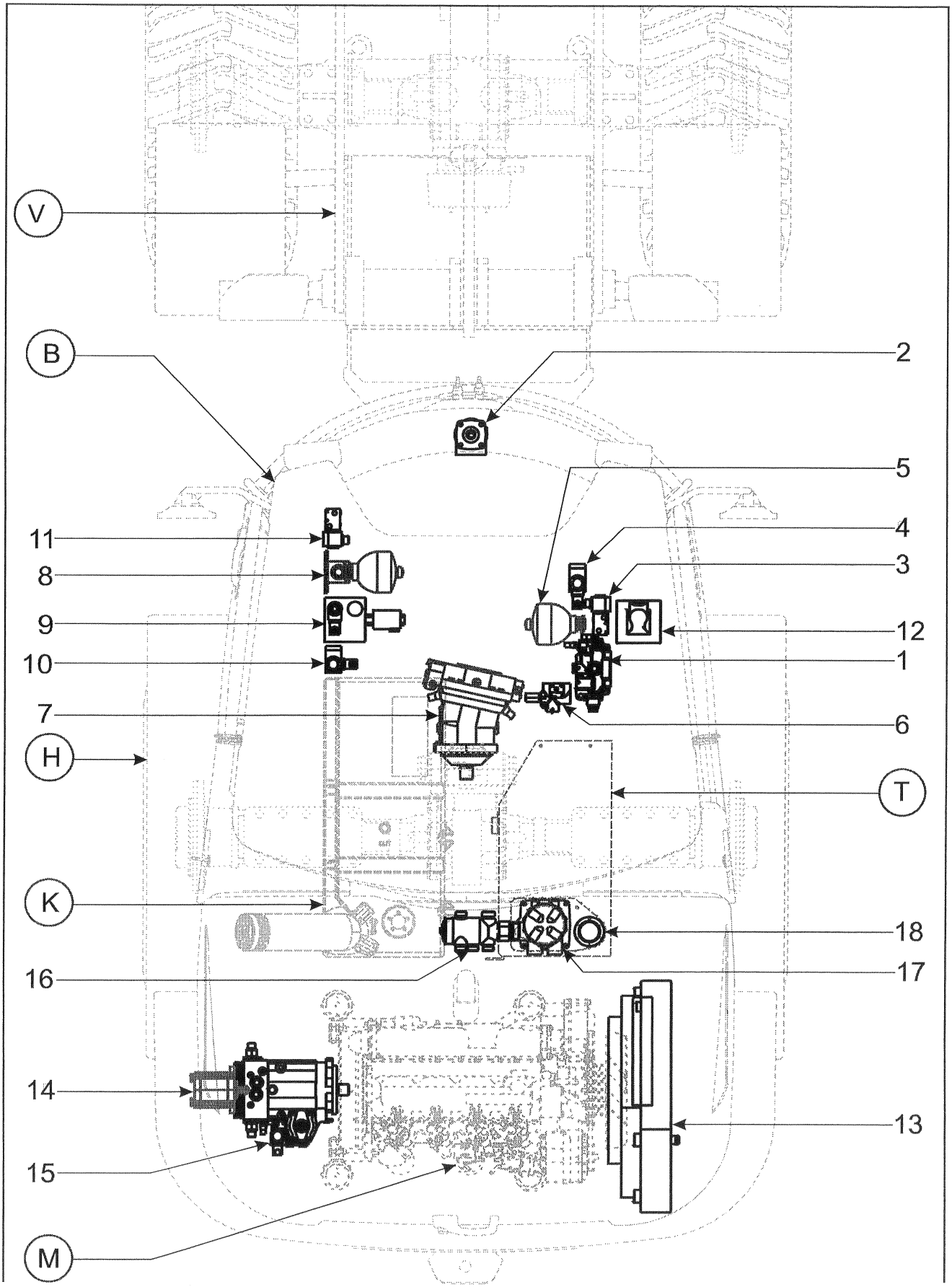
Typ Model Type Tipo	**SKL 873 SP**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.13.11**

Pos. Item Rep. No.	Deutsch	English	Français
(V)	**VORDERWAGEN**	**FRONT CHASSIS**	**CHÂSSIS AV**
1	Blocksteuergerät ***Y8, Y9***	Valve bank ***Y8, Y9***	Bloc distributeur ***Y8, Y9***
2	Stabilisierungsmodul ***Y11*** **OPTION** (Lastschwingungsdämpfung)	Stabilizing module ***Y11*** **OPTION** (ride control)	Module de stabilisation ***Y11*** **OPTION** (anti-tangage)
3	Kugelhahn **OPTION** **(Druckspeicherentlastung)**	Ball valve **OPTION** (acc. emergency release)	Robinet **OPTION** (detente de secours accumulateur)
4	Steuerplatte mit Hydrospeicher **OPTION** (Lastschwingungsdämpfung)	control plate with hydraulic accumulator **OPTION** (ride control)	Plaque de commande avec accumulateur hydr. **OPTION** **(anti-tangage)**
5	Druckfolgeventil (Betriebsbremse)	Preseure sepuence valve (service brake)	Clapet de sequence (frein de sevice)
6	Druckschalter ***Y13***	Pressure switch ***Y13***	Interrupteur de pression ***Y13***
(H)	**HINTERWAGEN**	**REAR CHASSIS**	**SCHÂSSIS AR**
7	Verstellmotor ***Y2, Y6*** (Fahren)	Variable displacement motor ***Y2, Y6*** (travel)	Moteur á cylindrée variable ***Y2, Y6*** (translation)
8	Druckfolgeventil (Betriebsbremse)	Pressure sequence valve (service brake)	Clapet de sequnce (frein de sevice)
9	Kombinierter Öl- Wasserkühler	Combi radiator cooler for oil and water	Refroidiseur combiné huile et eau
10	Thermostatventil 87°C (Kombikühler *Kühlwasser*)	Thermostatic valve 87°C (combi cooler *water*)	Régulateur de temperature *d'eau* (refroidisseur combiné)
11	Hydraulikmotor (Lüfter)	Hydraulic motor (fan)	Moteur hydraulique (ventilateur)
12	Prioritätsventil	Priority valve	Valve prioritaire
13	Öltemperaturregler	Oil temperature regulator	Régulateur de temp. d'huile
(B)	**BODENRAHMEN**	**FLOOR FRAME**	**CADRE DE PLANCHE**
14	Vorsteuergerät - *Joy-stick*	Pilot operated valve - *joy-stick*	Distributeur à commande assistée - *manipulateur*
15	Lenkeinheit	Steering unit	Unite de direction
16	Servo-Schaltventil	Servo valve	Valve à commande
17	Steuerblock	Valve bank	Block distributeur
18	4/2 Wegeventil ***Y5*** (Notlenkung)	4/2 Solenoid valve ***Y5*** (emergency steering)	Electrovanne 4/2 ***Y5*** (direction reserve)
19	Hydrospeicher (Notlenkung)	Hydraulic accumulatur (emergency steering)	Accumulateur hydraulique (Direction reserve)
20	4/2 Wegeventil ***Y10 , Y10*** (schnell / langsam)	4/2 Solenoid valve ***Y10, Y10*** (low / high speed)	Electrovanne 4/2 ***Y10, Y10*** (petite / grande vitesse)
21	3/2 Wegeventil (Abschaltung Arbeitshydraulik)	3/2 Solenoid valve (shut off working hydraulic)	Electrovanne 3/2 (coupure hydraulique de travail)

Typ Model Type Tipo	**SKL 873 SP**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.13.12**

Pos. Item Rep. No.	Deutsch	English	Français
22	Hydrospeicher (Abschaltung Arbeitshydraulik)	Hydraulic accumulator (shut off working hydraulik)	Accumulateur hydraulique (coupure hydraulique de travail)
23	Fremdkraftbremsventil	Brake valve	Soupape de frein
24	Hydrospeicher (Bremse)	Hydraulic accumulator (brake)	Accumulateur hydr. (frein)
(M)	**DIESELMOTOR**	**DIESEL ENGINE**	**MOTEUR DIESEL**
25	Zahnradpumpe	Gear pump	Pompe à engrenages
26	Verstellpumpe - Fahren ***Y3, Y4***	Variable displacement pump - trave ***Y3, Y4***	Pompe à débit variable - translation ***Y3, Y4***
27	Verstellpumpe - Arbeiten	Variable displacement pump - working	Pompe à débit variable - équipement
(T)	**HYDRAULIKÖLTANK**	**HYDRAULIC OIL TANK**	**RÉSERVOIR HYDRAULIQUE**
28	Rücklauffilter	Return filter	Filtre de retour
29	Rücklaufsammler	Return line collector	Collecteur de retour
30	Saugfilter	Suction filter	Filtre d'aspiration
31	Belüftungsfilter	Vent valve	Filtre d'aération
32	Thermostatventil 50°C (Hydrauliköltank)	Thermostaticl valve 50°C (hydraulic oil tank)	Régulateur de temp. d'huile 50°C (réservoir hydraulique)
(K)	**KRAFTSTOFFTANK**	**FUEL TANK**	**RESERVOIR DE CARBURANT**

Typ Model Type Tipo	**SKL 873 SP**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.13.13**



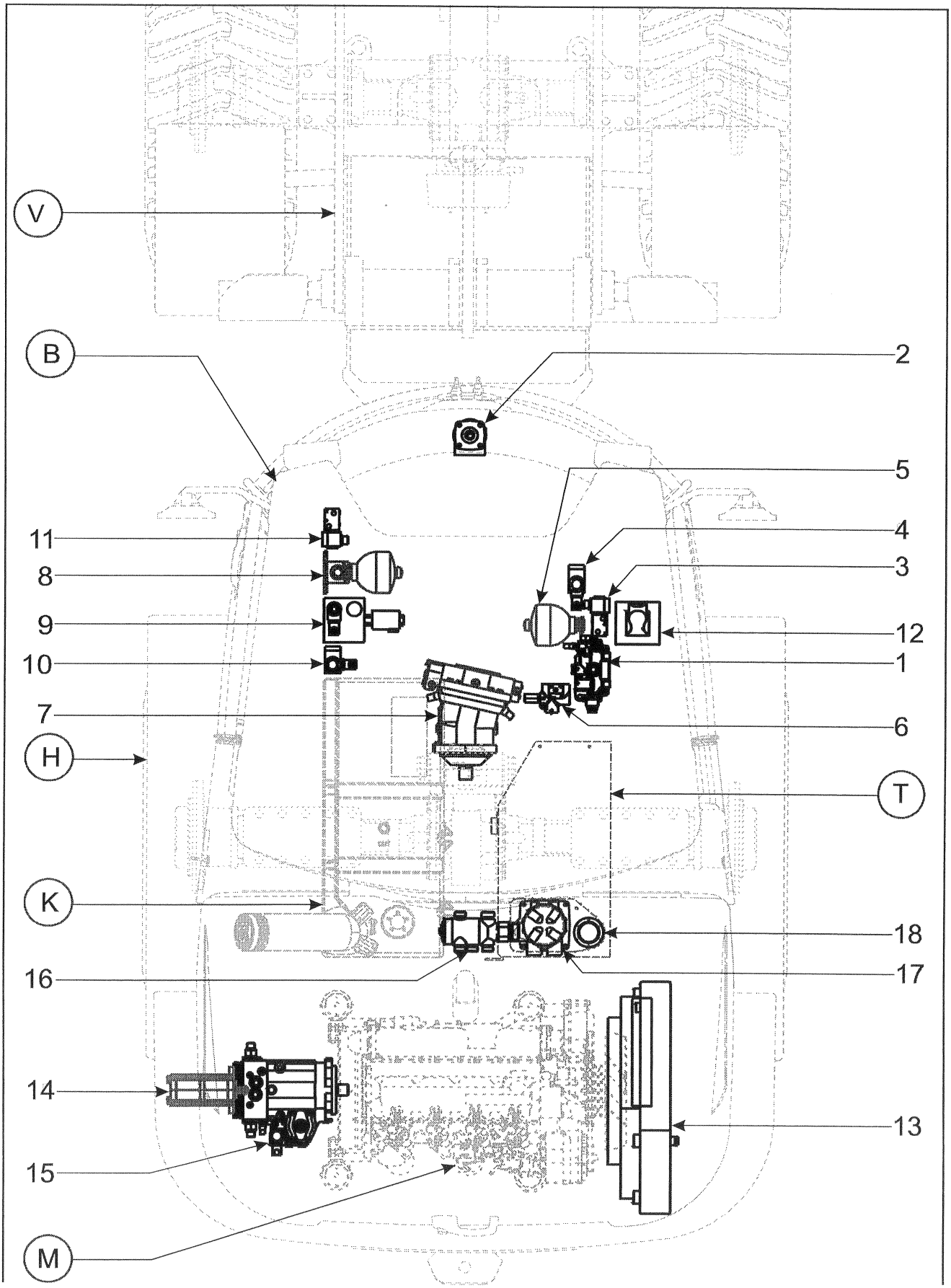
Typ Model Type Tipo	**SKL 824**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.22.11**

Pos. Item Rep. No.	Deutsch	English	Français
(V)	**VORDERWAGEN**	**FRONT CHASSIS**	**CHÂSSIS AV**
(H)	**HINTERWAGEN**	**REAR CHASSIS**	**CHÂSSIS AR**
1	Blocksteuergerät	Valve bank	Bloc distributeur
2	Lenkeinheit	Steering unit	Unite de direction
3	Vorsteuereinheit ***Y5,Y7,Y8,Y9***	Pilot-operated unit ***Y5,Y7,Y8,Y9***	Système pilotage ***Y5, Y7, Y8, Y9***
4	4/2 Wegeventil ***Y12, Y13*** (schnell / langsam)	4/2 Solenoid valve ***Y12,Y13*** (low / high speed)	Electrovanne 4/2 ***Y12,Y13*** (petite / grande vitesse)
5	Hydrospeicher (Arbeitshydraulik abschalten)	Hydraulic accumulator (Stop working hydraulic)	Accumulateur hydraulique (Neutralisation hydr. de travail)
6	Prioritätsventil (Lenken)	Priority valve (steering)	Valve prioritaire (direction)
7	Verstellmotor ***Y2,Y6*** (Fahren)	Variable displacement motor ***Y2,Y6*** (travel)	Moteur á cylindrée variable ***Y2,Y6*** (translation)
8	Speicherblock mit Hydrospeicher **OPTION** (Lastschwingungsdämpfung)	Accumulator bloc with hydr. accumulator **OPTION** (ride control)	Bloc d'accumulateurs avec accumulateur hydr. **OPTION** (anti-tangage)
9	Stabilisieungsmodul **OPTION** ***Y11,Y15***(Lastschwingungsd.)	Pilot bloc **OPTION** ***Y11, Y15*** (ride control)	Bloc de pilotage **OPTION** **Y11, Y15** (anti-tangage)
10	3/2 Wegeventil **OPTION** ***Y16*** (Lasthalteventil + Lastschwingungsdämpfung)	3/2 Solenoid valve **OPTION** ***Y16*** (load holding valve + ride control)	Electrovanne 3/2 **OPTION** ***Y16*** (lapet anti-chute + anti-tangage)
11	Steuerventil **OPTION** ***Y20,Y21, Y22*** (Schaufelrückstellung)	Valve bank **OPTION** ***Y20,Y21,Y22*** (return to dig))	Distributeur **OPTION** ***Y20,Y21,Y22*** (remise à niveau automatique)
(B)	**BODENRAHMEN**	**FLOOR FRAME**	**CADRE DE PLANCHER**
12	Vorsteuergerät - *Joy-stick*	Pilot operated valve - *joy-stick*	Distributeur à commande assistée - *manipulateur*
(M)	**DIESELMOTOR**	**DIESEL ENGINE**	**MOTEUR DIESEL**
13	Kombinierter Öl- Wasserkühler	Combi radiator cooler for oil and water	Refroidisseur combiné huile et eau
14	Zahnradpumpe (Lenken / Laden)	Gear pump (steering / working)	Pompe à engrenages (direction / travail)
15	Verstellpumpe (Fahren) ***Y3,Y4***	Variable displacement pump (travel) ***Y3,Y4***	Pompe à débit variable (translation) ***Y3,Y4***
(T)	**HYDRAULIKÖLTANK**	**HYDRAULIC OIL TANK**	**RÉSERVOIR HYDRAULIQUE**
16	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
17	Rücklauffilter	Return filter	Filtre de retour
18	Belüftungsfilter	Vent valver	Filtre d'aération
(K)	**KRAFTSTOFFTANK**	**FUEL TANK**	**RESERVOIR DE CARBURANT**

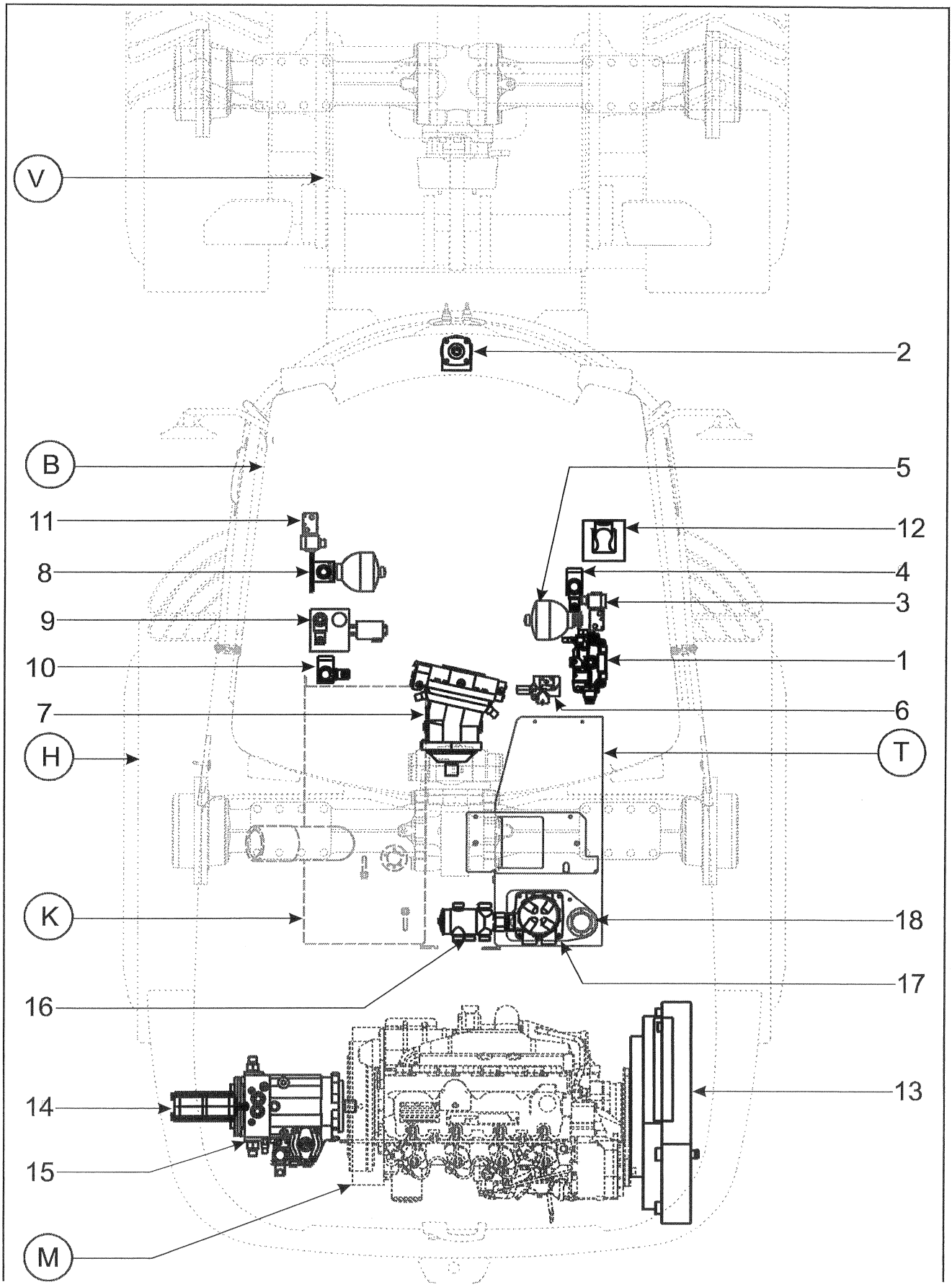
Typ Model Type Tipo	**SKL 824**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.22.12**

Pos. Item Rep. No.	Deutsch	English	Français
(V)	**VORDERWAGEN**	**FRONT CHASSIS**	**CHÂSSIS AV**
(H)	**HINTERWAGEN**	**REAR CHASSIS**	**CHÂSSIS AR**
1	Blocksteuergerät	Valve bank	Bloc distributeur
2	Lenkeinheit	Steering unit	Unite de direction
3	Vorsteuereinheit ***Y5,Y7,Y8,Y9***	Pilot-operated unit ***Y5,Y7,Y8,Y9***	Système pilotage ***Y5, Y7, Y8, Y9***
4	4/2 Wegeventil ***Y12, Y13*** (schnell / langsam)	4/2 Solenoid valve ***Y12,Y13*** (low / high speed)	Electrovanne 4/2 ***Y12,Y13*** (petite / grande vitesse)
5	Hydrospeicher (Arbeitshydraulik abschalten)	Hydraulic accumulator (Stop working hydraulic)	Accumulateur hydraulique (Neutralisation hydr. de travail)
6	Prioritätsventil (Lenken)	Priority valve (steering)	Valve prioritaire (direction)
7	Verstellmotor ***Y2,Y6*** (Fahren)	Variable displacement motor ***Y2,Y6*** (travel)	Moteur á cylindrée variable ***Y2,Y6*** (translation)
8	Speicherblock mit Hydrospeicher **OPTION** (Lastschwingungsdämpfung)	Accumulator bloc with hydr. accumulator **OPTION** (ride control)	Bloc d'accumulateurs avec accumulateur hydr. **OPTION** (anti-tangage)
9	Stabilisieungsmodul **OPTION** ***Y11,Y15***(Lastschwingungsd.)	Pilot bloc **OPTION** ***Y11, Y15*** (ride control)	Bloc de pilotage **OPTION** **Y11, Y15** (anti-tangage)
10	3/2 Wegeventil **OPTION** ***Y16*** (Lasthalteventil + Lastschwingungsdämpfung)	3/2 Solenoid valve **OPTION** ***Y16*** (load holding valve + ride control)	Electrovanne 3/2 **OPTION** ***Y16*** (lapet anti-chute + anti-tangage)
11	Steuerventil **OPTION** ***Y20,Y21, Y22*** (Schaufelrückstellung)	Valve bank **OPTION** ***Y20,Y21,Y22*** (return to dig))	Distributeur **OPTION** ***Y20,Y21,Y22*** (remise à niveau automatique)
(B)	**BODENRAHMEN**	**FLOOR FRAME**	**CADRE DE PLANCHER**
12	Vorsteuergerät - *Joy-stick*	Pilot operated valve - *joy-stick*	Distributeur à commande assistée - *manipulateur*
(M)	**DIESELMOTOR**	**DIESEL ENGINE**	**MOTEUR DIESEL**
13	Kombinierter Öl- Wasserkühler	Combi radiator cooler for oil and water	Refroidisseur combiné huile et eau
14	Zahnradpumpe (Lenken / Laden)	Gear pump (steering / working)	Pompe à engrenages (direction / travail)
15	Verstellpumpe (Fahren) ***Y3,Y4***	Variable displacement pump (travel) ***Y3,Y4***	Pompe à débit variable (translation) ***Y3,Y4***
(T)	**HYDRAULIKÖLTANK**	**HYDRAULIC OIL TANK**	**RÉSERVOIR HYDRAULIQUE**
16	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
17	Rücklauffilter	Return filter	Filtre de retour
18	Belüftungsfilter	Vent valver	Filtre d'aération
(K)	**KRAFTSTOFFTANK**	**FUEL TANK**	**RESERVOIR DE CARBURANT**

Typ Model Type Tipo	**SKL 834**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha **01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página **6.24.12**



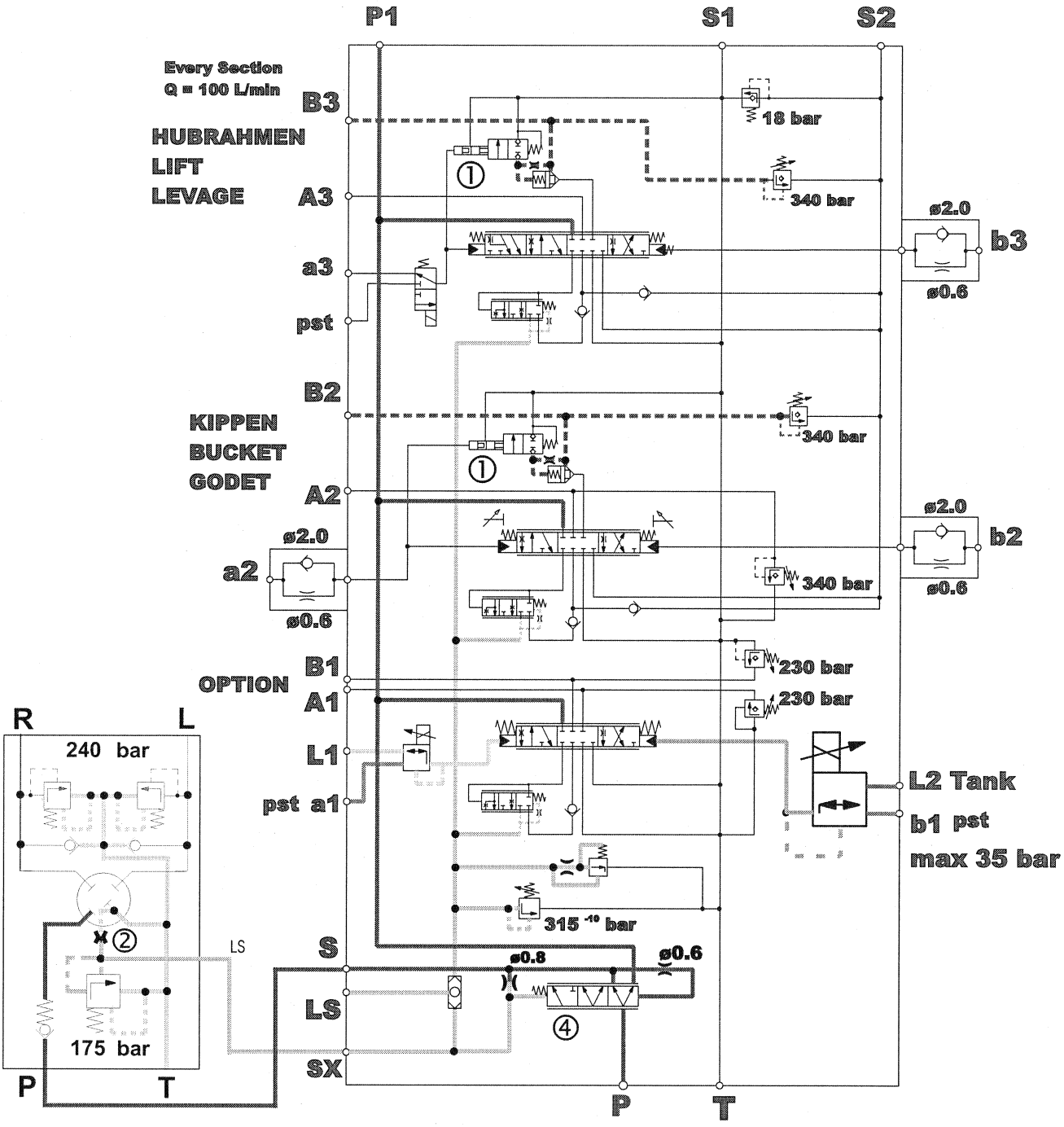
Typ Model Type Tipo	**SKL 834**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha **01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página **6.24.11**



Typ Model Type Tipo	**SKL 844**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.26.11**

Pos. Item Rep. No.	Deutsch	English	Français
(V)	**VORDERWAGEN**	**FRONT CHASSIS**	**CHÂSSIS AV**
(H)	**HINTERWAGEN**	**REAR CHASSIS**	**CHÂSSIS AR**
1	Blocksteuergerät	Valve bank	Bloc distributeur
2	Lenkeinheit	Steering unit	Unite de direction
3	Vorsteuereinheit ***Y5,Y7,Y8,Y9***	Pilot-operated unit ***Y5,Y7,Y8,Y9***	Système pilotage ***Y5, Y7, Y8, Y9***
4	4/2 Wegeventil ***Y12, Y13*** (schnell / langsam)	4/2 Solenoid valve ***Y12,Y13*** (low / high speed)	Electrovanne 4/2 ***Y12,Y13*** (petite / grande vitesse)
5	Hydrospeicher (Arbeitshydraulik abschalten)	Hydraulic accumulator (Stop working hydraulic)	Accumulateur hydraulique (Neutralisation hydr. de travail)
6	Prioritätsventil (Lenken)	Priority valve (steering)	Valve prioritaire (direction)
7	Verstellmotor ***Y2,Y6*** (Fahren)	Variable displacement motor ***Y2,Y6*** (travel)	Moteur á cylindrée variable ***Y2,Y6*** (translation)
8	Speicherblock mit Hydrospeicher **OPTION** (Lastschwingungsdämpfung)	Accumulator bloc with hydr. accumulator **OPTION** (ride control)	Bloc d'accumulateurs avec accumulateur hydr. **OPTION** (anti-tangage)
9	Stabilisieungsmodul **OPTION** ***Y11,Y15***(Lastschwingungsd.)	Pilot bloc **OPTION** ***Y11, Y15*** (ride control)	Bloc de pilotage **OPTION** **Y11, Y15** (anti-tangage)
10	3/2 Wegeventil **OPTION** ***Y16*** (Lasthalteventil + Lastschwingungsdämpfung)	3/2 Solenoid valve **OPTION** ***Y16*** (load holding valve + ride control)	Electrovanne 3/2 **OPTION** ***Y16*** (lapet anti-chute + anti-tangage)
11	Steuerventil **OPTION** ***Y20,Y21, Y22*** (Schaufelrückstellung)	Valve bank **OPTION** ***Y20,Y21,Y22*** (return to dig))	Distributeur **OPTION** ***Y20,Y21,Y22*** (remise à niveau automatique)
(B)	**BODENRAHMEN**	**FLOOR FRAME**	**CADRE DE PLANCHER**
12	Vorsteuergerät - *Joy-stick*	Pilot operated valve - *joy-stick*	Distributeur à commande assistée - *manipulateur*
(M)	**DIESELMOTOR**	**DIESEL ENGINE**	**MOTEUR DIESEL**
13	Kombinierter Öl- Wasserkühler	Combi radiator cooler for oil and water	Refroidisseur combiné huile et eau
14	Zahnradpumpe (Lenken / Laden)	Gear pump (steering / working)	Pompe à engrenages (direction / travail)
15	Verstellpumpe (Fahren) ***Y3,Y4***	Variable displacement pump (travel) ***Y3,Y4***	Pompe à débit variable (translation) ***Y3,Y4***
(T)	**HYDRAULIKÖLTANK**	**HYDRAULIC OIL TANK**	**RÉSERVOIR HYDRAULIQUE**
16	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
17	Rücklauffilter	Return filter	Filtre de retour
18	Belüftungsfilter	Vent valver	Filtre d'aération
(K)	**KRAFTSTOFFTANK**	**FUEL TANK**	**RESERVOIR DE CARBURANT**

Typ Model Type Tipo	**SKL 844**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.26.12**



Represented Situation:

Engine started, steering and working hydraulics not actuated, lifting frame raised, bucket tilt.

The priority spool **(4)** is pushed against the spring to the left. Stand-by pressure (28 bar) is present to the spools and the steering orbit **(via port S)**. The variable displacement pump supplies a minimal flow only. The LS-channnel is released via the orifice **(2)** in the steering orbit to tank.

The function lifting frame **(lower B3)** and bucket **(tilt B2)** are hydraulically supported at the low-leak-valves **(1)**. These valves prevent a creeping effect to the lowering and tilt of the bucket.

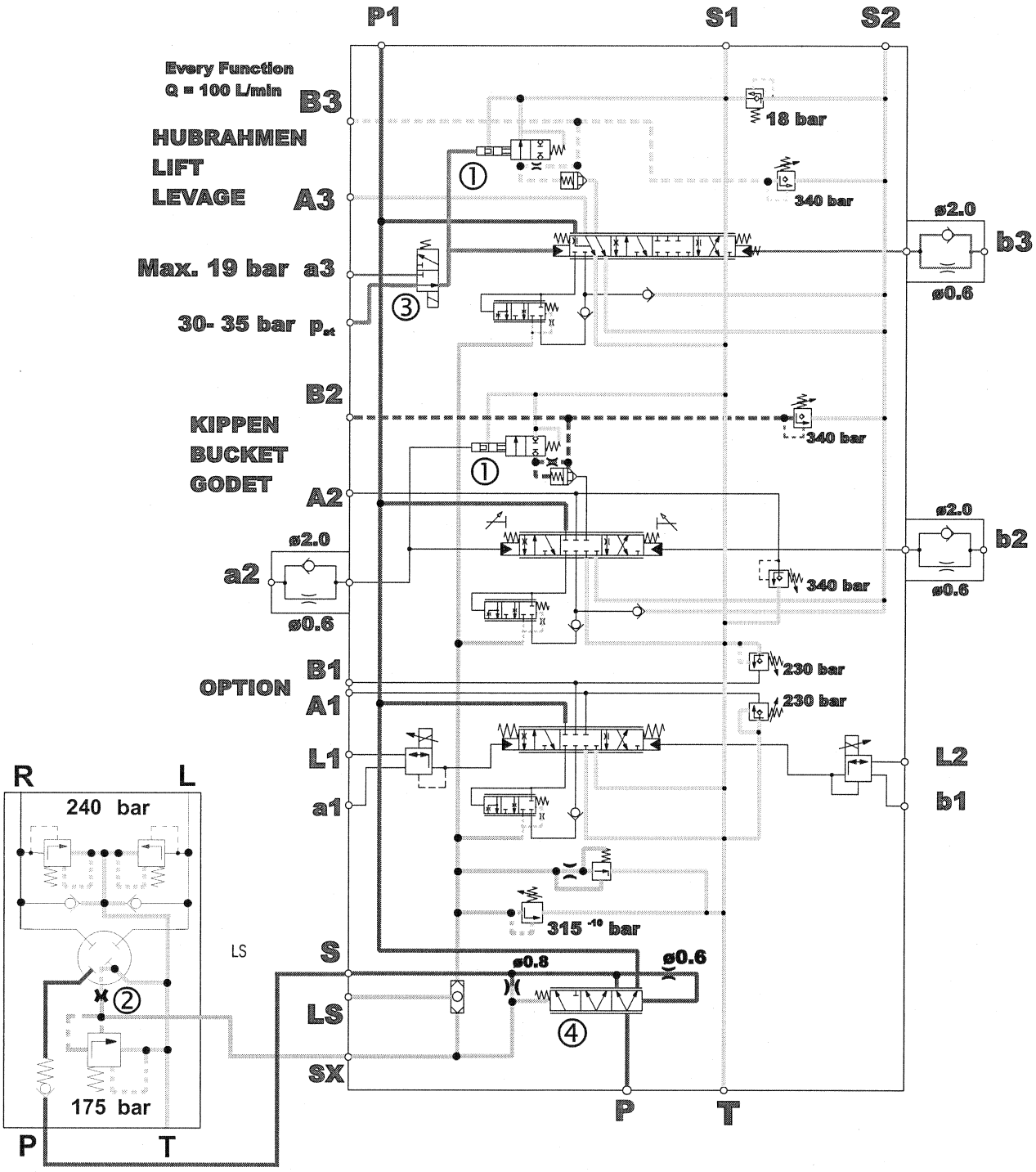
Additional circuit:

The flow adjustment of the additional circuit is proportional adjustable as standard (0 to 99 l/min).

The actuation is switched black/white, impluse or permanent mode.

Typ / Model / Type / Tipo	SKL 160	Hydraulik / Hydraulic / Hydraulique / Hidráulico — ab Fz.-Id.-Nr. / from s/n / à partir n du s / desde el numero: 160/0100	Datum / Edition / Date / Fecha	01.2006
Benennung / Description / Dénomination / Denominación	**Hydraulikschaltplan Steuerventil 3M6/15** **Hydraulic diagramm Control valve 3M6/15** **Plan hydraulique Distributeur 3M6/15** **Plano hidráulico**		Blatt / Page / Feuille / Página	6.28.05

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Situation II: floating position

Engine started, steering and working hydraulics not actuated, floating position activated.

The priority spool **(4)** is pushed against the spring to the left. Stand-by pressure (28 bar) is present to the spools and the steering orbit **(via port S)**. The variable displacement pump supplies a minimal flow only. The LS-channnel is released via the orifice **(2)** in the steering orbit to tank. Pilot pressure, (p_{st}= approx. 30-35 bar, charge pressure of the travel pump) is switched via the 3/2 solenoid valve **(3)** to the low-leak-valve **(1)** and to the spool (**a3**), this will bring it to the to the floating position. Via the opened low-leak-valve **(1)** and the spool, the lifting cylinder piston side (**B3**) is linked to tank.

The lifting cylinder rod side "lower" (**A3**) has got a link to tank via the spool. The shovel rests with its weight on the ground and is able to move without cavitation freely up and down.

Typ Model Type Tipo	**SKL 160**	Hydraulik Hydraulic Hydraulique Hidráulico	ab Fz.-Id.-Nr. from s/n à partir n du s desde el numero	**160/0100**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan Steuerventil 3M6/15** **Hydraulic diagramm Control valve 3M6/15** **Plan hydraulique Distributeur 3M6/15** **Plano hidráulico**				Blatt Page Feuille Página	**6.28.06**

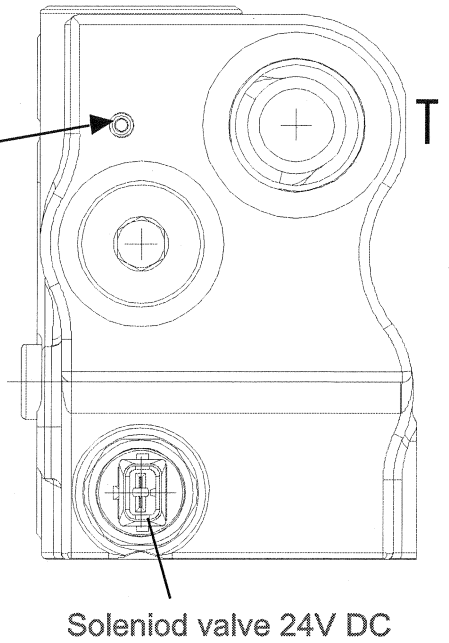
TEREX | SCHAEFF

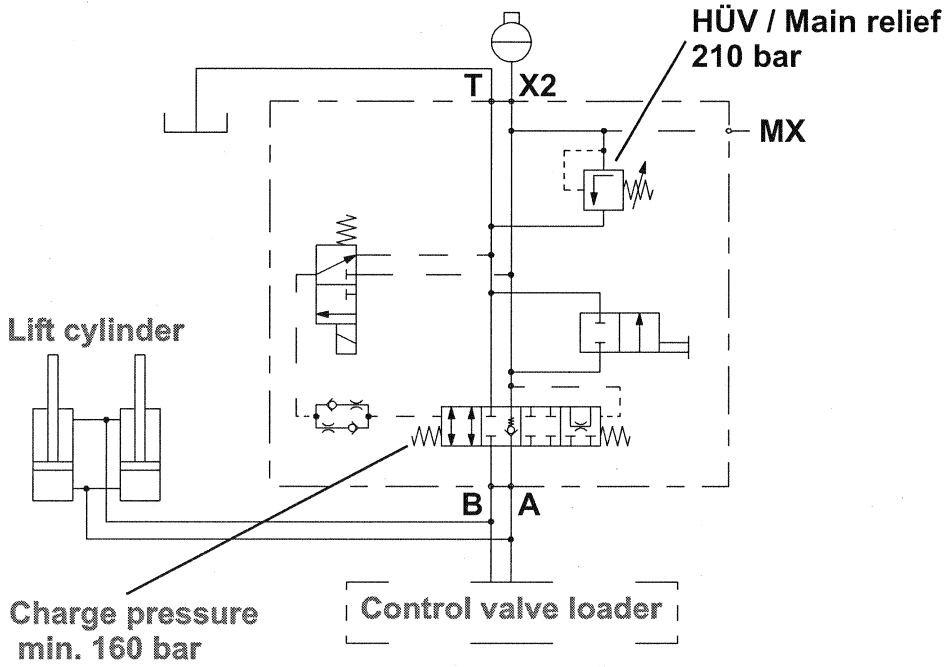
Pressure accumulator - discharge screw

Before carriing out repair jobs at the ride control system, ensure the pressure accumulators to be totally discharged.

To do this, dismount plug and screw out the valve coil (wrench size 3mm) approx. two revolutions (counter clockwise).

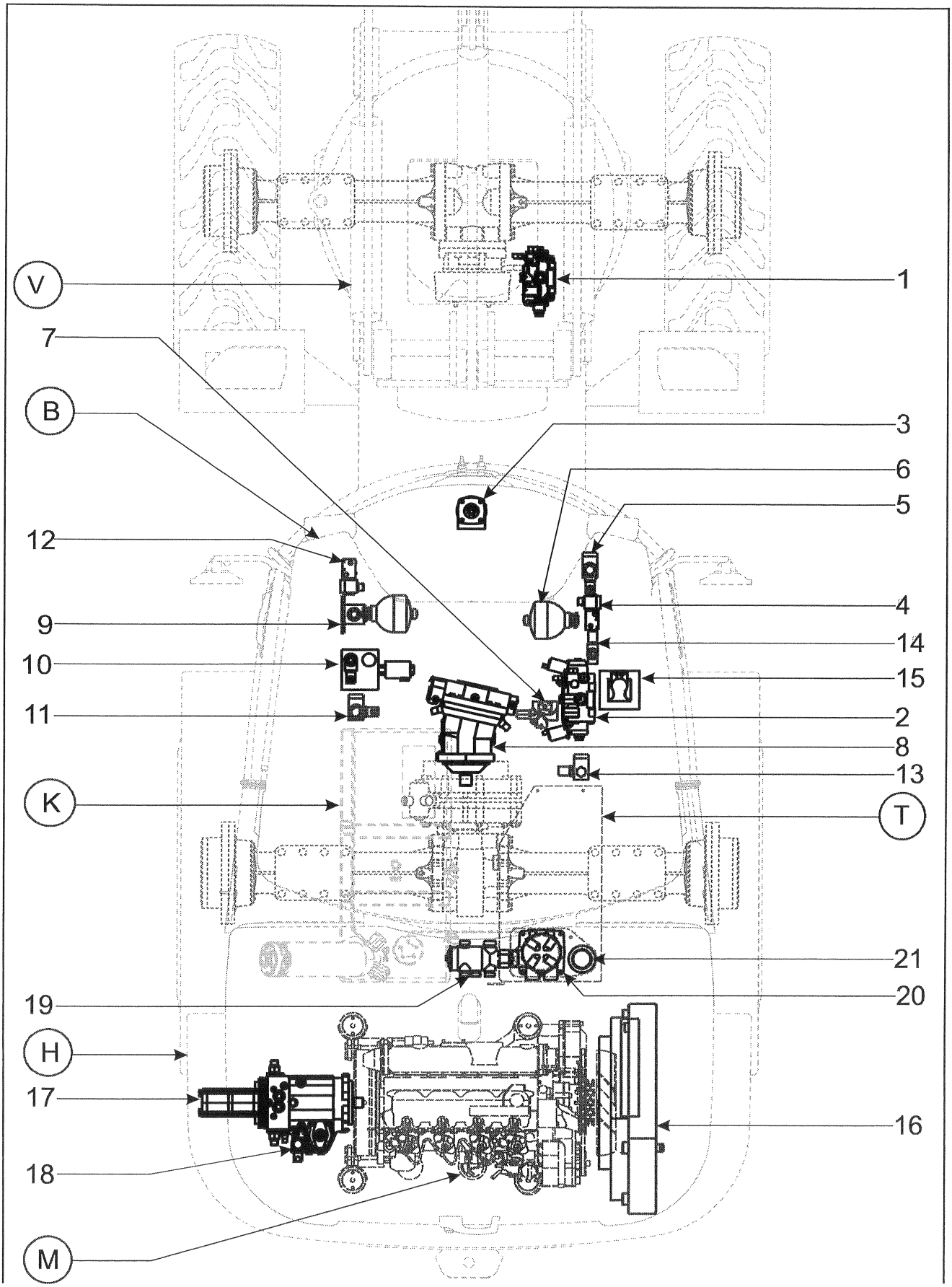
REMARK:
Tightening torque: valve coil = **3,5 Nm**
Tightening torque: plug = **7 Nm**





Typ Model Type Tipo	**SKL 160**	Hydraulik Hydraulic Hydraulique Hidráulico	ab Fz.-Id.-Nr. from s/n à partir n du s desde el numero	**160/0100**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Hydraulikschaltplan Lastschwingungsdaempfung** **Hydraulic diagramm Ride control system** **Plan hydraulique Amortissement d' oscillations** **Plano hidráulico**				Blatt Page Feuille Página	**6.28.07**

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Typ Model Type Tipo	**SKS 634**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.37.11**

Pos. Item Rep. No.	Deutsch	English	Français
(V)	**VORDERWAGEN**	**FRONT CHASSIS**	**CHÂSSIS AV**
1	Blocksteuergerät	Valve bank	Bloc distributeur
(H)	**HINTERWAGEN**	**REAR CHASSIS**	**CHÂSSIS AR**
2	Blocksteuergerät (Schwenken) ***Y31, Y32***	Valve bank (swing) ***Y32, Y32***	Bloc distributeur (orientation) ***Y31, Y32***
3	Lenkeinheit	Steering unit	Unite de direction
4	Vorsteuereinheit ***Y5,Y7,Y8,Y9***	Pilot-operated unit ***Y5,Y7,Y8,Y9***	Système pilotage ***Y5, Y7, Y8, Y9***
5	4/2 Wegeventil ***Y12, Y13*** (schnell / langsam)	4/2 Solenoid valve ***Y12,Y13*** (low / high speed)	Electrovanne 4/2 ***Y12,Y13*** (petite / grande vitesse)
6	Hydrospeicher (Arbeitshydraulik abschalten)	Hydraulic accumulator (Stop working hydraulic)	Accumulateur hydraulique (Neutralisation hydr. de travail)
7	Prioritätsventil (Lenken)	Priority valve (steering)	Valve prioritaire (direction)
8	Verstellmotor ***Y2,Y6*** (Fahren)	Variable displacement motor ***Y2,Y6*** (travel)	Moteur á cylindrée variable ***Y2,Y6*** (translation)
9	Speicherblock mit Hydrospeicher **OPTION** (Lastschwingungsdämpfung)	Accumulator bloc with hydr. accumulator **OPTION** (ride control)	Bloc d'accumulateurs avec accumulateur hydr. **OPTION** (anti-tangage)
10	Stabilisieungsmodul **OPTION** ***Y11,Y15***(Lastschwingungsd.)	Pilot bloc **OPTION** ***Y11, Y15*** (ride control)	Bloc de pilotage **OPTION** **Y11, Y15** (anti-tangage)
11	3/2 Wegeventil **OPTION** ***Y16*** (Lasthalteventil + Lastschwingungsdämpfung)	3/2 Solenoid valve **OPTION** ***Y16*** (load holding valve + ride control)	Electrovanne 3/2 **OPTION** ***Y16*** (lapet anti-chute + anti-tangage)
12	Steuerventil **OPTION** ***Y20,Y21, Y22*** (Schaufelrückstellung)	Valve bank **OPTION** ***Y20,Y21,Y22*** (return to dig))	Distributeur **OPTION** ***Y20,Y21,Y22*** (remise à niveau automatique)
13	4/2 Wegeventil ***Y34*** (Pendelachsverriegelung)	4/2 Solenoid valve ***Y34*** (oscillating axle locking)	Electrovanne 4/2 ***Y34*** (blocage d'essieu oscillant)
14	3/2 Wegeventil ***Y33*** (Sicherheit Hubrahmen senken)	3/2 Solenoid valve ***Y33*** (safety mechanism for lowering lift frame)	Electrovanne 3/2 ***Y33*** (securité bras de levage abaisser)
(B)	**BODENRAHMEN**	**FLOOR FRAME**	**CADRE DE PLANCHER**
15	Vorsteuergerät - *Joy-stick*	Pilot operated valve - *joy-stick*	Distributeur à commande assistée - *manipulateur*
(M)	**DIESELMOTOR**	**DIESEL ENGINE**	**MOTEUR DIESEL**
16	Kombinierter Öl- Wasserkühler	Combi radiator cooler for oil and water	Refroidisseur combiné huile et eau
17	Zahnradpumpe - *2-fach* (Lenken / Schwenken)	Gear pump - *double type* (steering / swing)	Pompe à engrenages - *double* (direction / orientationl)
18	Verstellpumpe (Fahren) ***Y3,Y4***	Variable displacement pump (travel) ***Y3,Y4***	Pompe à débit variable (translation) ***Y3,Y4***

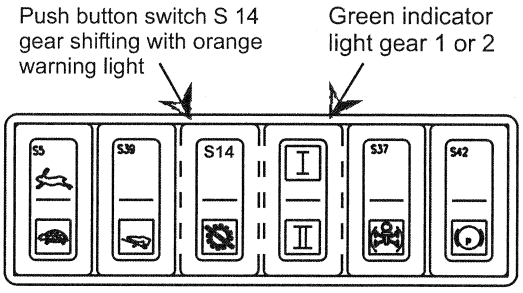
Typ Model Type Tipo	**SKS 634**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.37.12**

Pos. Item Rep. No.	Deutsch	English	Français
(T)	**HYDRAULIKÖLTANK**	**HYDRAULIC OIL TANK**	**RÉSERVOIR HYDRAULIQUE**
19	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
20	Rücklauffilter	Return filter	Filtre de retour
21	Belüftungsfilter	Vent valver	Filtre d'aération
(K)	**KRAFTSTOFFTANK**	**FUEL TANK**	**RESERVOIR DE CARBURANT**

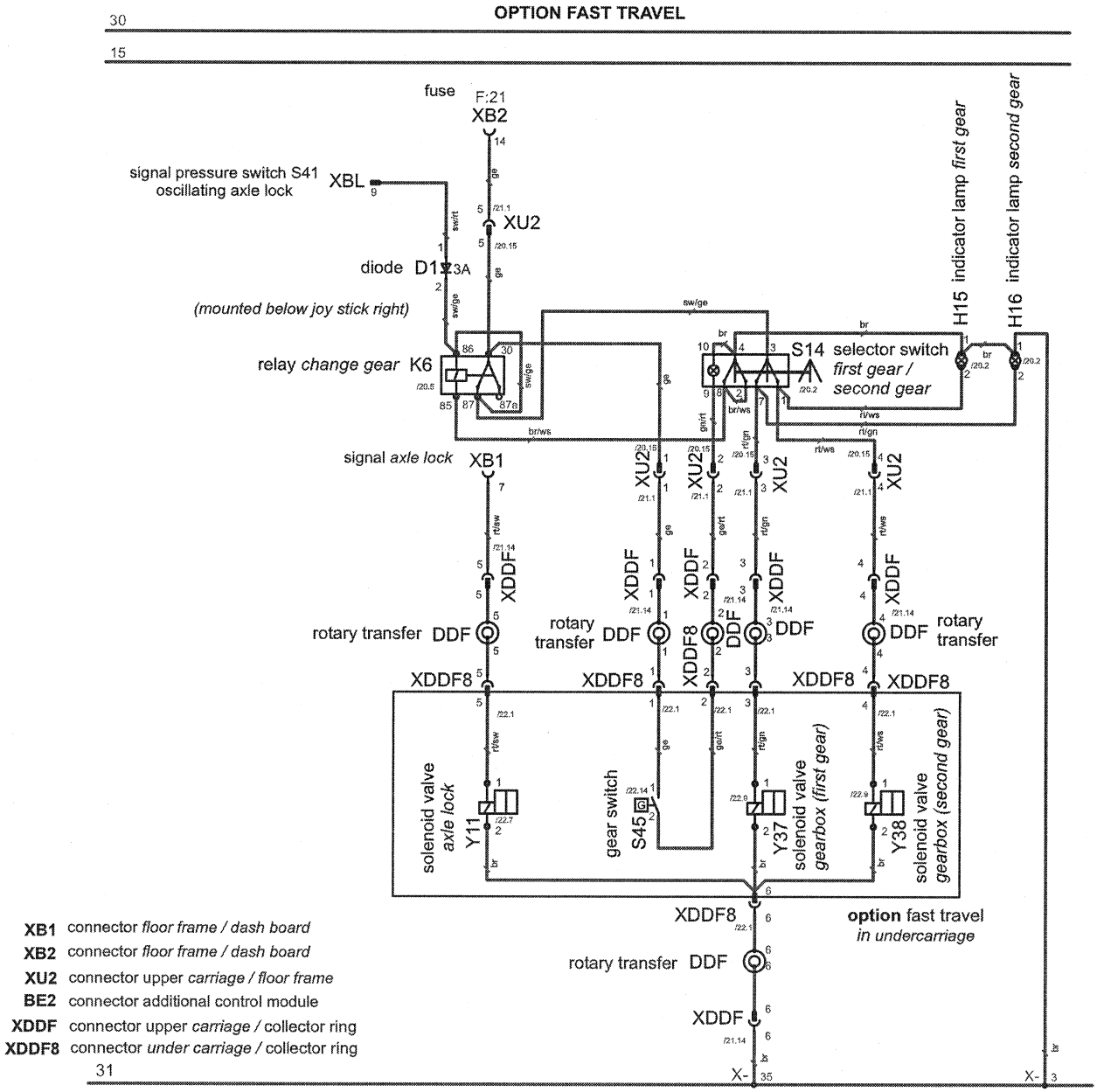
Typ Model Type Tipo	**SKS 634**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.37.13**

Function: Gear shifting “fast speed” version.

Use the brake until the machine come to a standstill.
Keep the brake pressed. The relay K6 is actuated by the pressure switch S 41 (25 bar) oscillating axle lock.
The desired gear range can now be selected by rocker switch S 14.
After having selected the gear, it has to be visually checked if the selection procedure has happened perfectly.
The green indicator lamps gear 1 or gear 2 are in “on” position when the selected gear is switched.
The orange indicator lamp in the rocker switch S 14 lights up - activated by the pressure switch S 45 at the gear shift cylinder - when the gears are not engaged. The switching procedure has to be done once more.



Switches behind the right joy stick

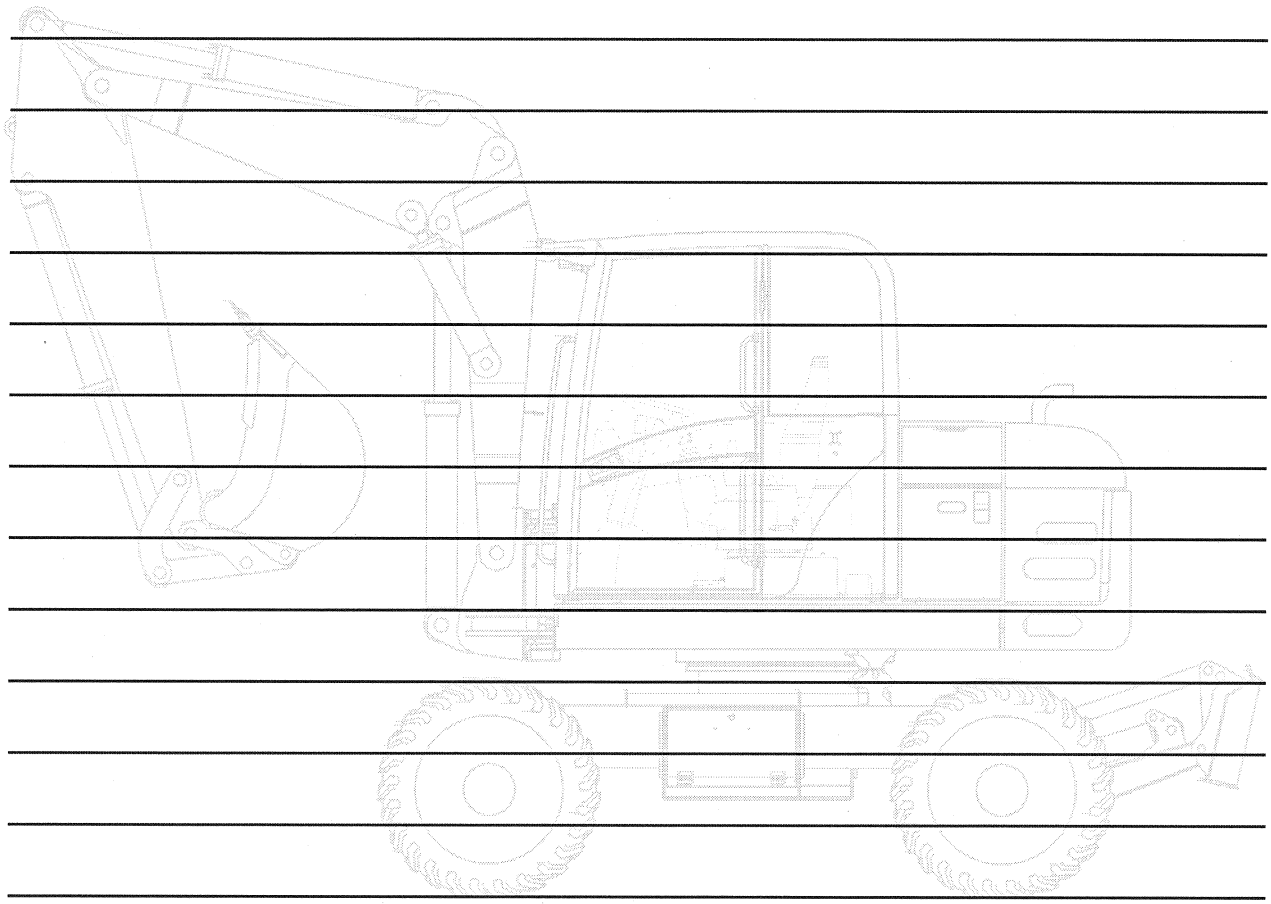


XB1 connector *floor frame / dash board*
XB2 connector *floor frame / dash board*
XU2 connector upper *carriage / floor frame*
BE2 connector additional control module
XDDF connector upper *carriage* / collector ring
XDDF8 connector *under carriage* / collector ring

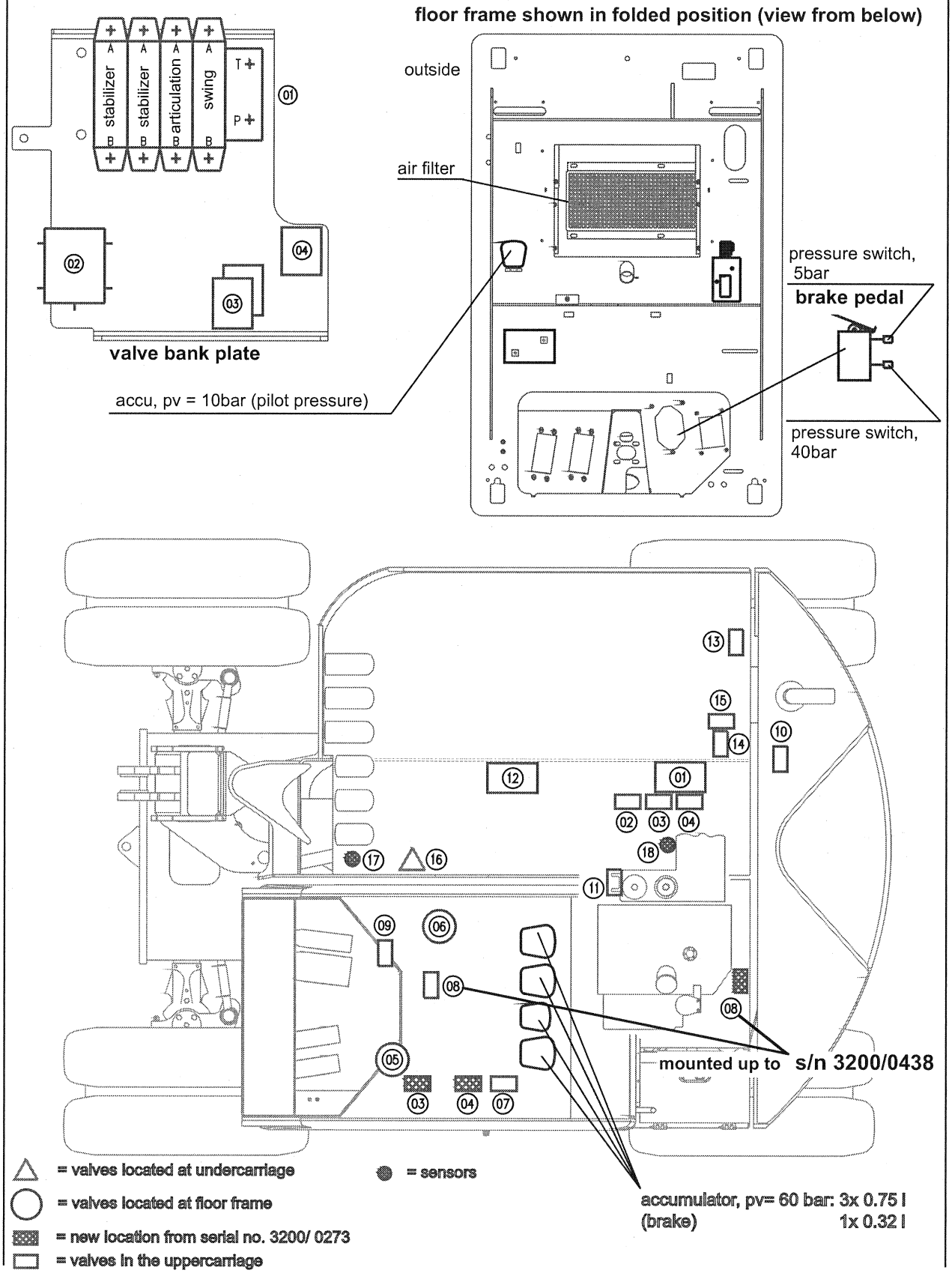
Typ Model Type	**HML 23- 32- 42**	**ab Fz.-Id.-Nr. from s/n à partir du n/s**	Datum Edition Date	**01.2006**
Benennung Description Dénomination	**Getriebeschaltung Funktion u. Stromlaufplan Gear shift function - wiring Changement de vitesses fonction et circuit électrique**		Blatt Page Feuille	**6.490.50**

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HML 32



Typ Model Type Tipo	**HML 32**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Notizen Notes Notices Notas**	Blatt Page Feuille Página	**6.51.00**

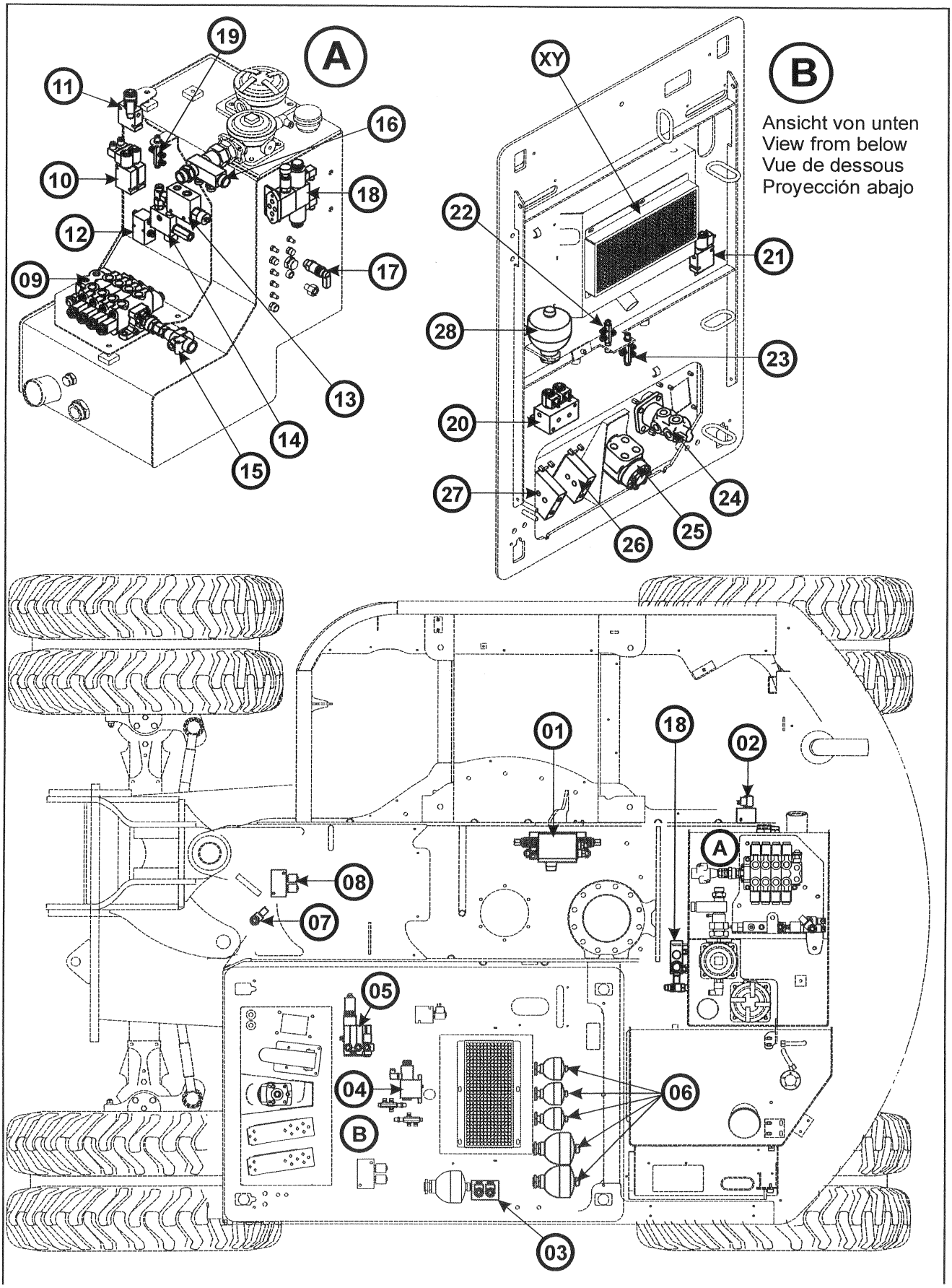


Typ Model Type Tipo	**HML 32**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Composants hydrauliques position de montage** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.51.01**

Pos. Item Rep. No.	Deutsch	English	Français
1	Steuerventil **4SM12** (an Mittelwand OW)	**valve bank 4SM12** (at partition wall uppercarriage)	**distributeur 4 SM 12** (sur cloison tourelle)
2	**Relaisventil** Schwenken (auf Ventilplatte)	**relay valve swing** (on valve bank plate)	**valve relais orientation** (sur plaque distributeur)
3	2x Ventil **GA/Knicken** ***Y20/Y21*** (auf Ventilplatte)	2 x solenoid **valve intermediate boom / articulation** ***Y20/Y21*** (on valve bank plate)	2 x électrovannes **flèche articulée / articulation** ***Y20/Y21*** (sur plaque distributeur)
4	Ventil Schwenken **Druckhochschaltung** ***Y22*** (auf Ventilplatte)	solenoid **valve high torque swing** ***Y22*** (on valve bank plate)	électrovanne **élevation pression orientation** ***Y22*** (sur plaque distributeur)
5	2-fach Magnetventil **abschalten Vorsteuerung / Achsverriegelung.** ***Y3/Y11***	double solenoid **valve pilot pressure cut-off / axle lock** ***Y3/Y11***	double électrovanne **coupure pression pilotage / verrouillage pont** ***Y3/Y11***
6	Ventil **Hammer** ***Y4*** (Bodenrahmen)	solenoid **valve breaker** ***Y4*** (floor frame)	électrovanne **marteau** ***Y6*** (cadre plancher)
7	3/2-Magnetventil **Pedalfahren/Feststellbremse** ***Y13/Y10*** (Oberwagen)	3/2 solenoid **valve pedal drive / parking brake** ***Y13/Y10*** (uppercarriage)	électrovanne 3/2 **translation par pédale/frein de stationnement** ***Y13/Y10*** (tourelle)
8	4/2-Magnetventil **Spülen / Schwenken** ***Y16*** (Oberwagen)	4/2 solenoid **valve flush / swing** ***Y16*** (uppercarriage)	électrovanne 4/2 **purge/orientation Y16** (tourelle)
9	**Speicherfüllventil** (Bremse) (Oberwgen) + Druckschalter 85 bar	**accumulator charge valve** (brake) (uppercarriage) + pressure switch 85 bar	**valve de remplissage accu** (frein) (tourelle) + interrupteur de pression 85 bar
10	2-fach Magnetventil **schnell/langsam** ***Y5/Y6*** (Trennwand Motorraum)	double solenoid valve **fast / slow** ***Y5/Y6*** (partition wall, engine compartment)	double électrovanne **petite / grande** ***Y5/Y6*** (cloison compartiment moteur)
11	4/3-Magnetventil **Zusatz** ***Y18/Y19*** (oben am Öltank)	4/3 solenoid valve **additional circuit** ***Y8/Y19*** (top of hydraulic oil tank)	électrovanne 4/3 **circuit supplémentaire** ***Y18/Y19*** (sur réservoir hydraulique)
12	Steuerventil **5SX14** (Ventilraum)	**valve bank 5 SX 14** (valve compartment)	**distributeur 5 SX 14** (compartiment distributeur)
13	**Öltemperaturregler** (unter Baggerpumpe)	**oil temperature regulator** (underneath the hydraulic pump)	**thermostat d'huile hydr.** (au-dessous de la pompe équipement)
14	**Abschaltventil** (Trennwand Motorraum)	**pressure cut-off valve** (partition wall, engine compartment)	**valve de coupure** (cloison compartiment moteur)
15	**Prioritätsventil** (Trennwand Motorraum)	**priority valve** (partition wall engine compartment)	**valve de priorité** (cloison compartiment moteur)
16	Ventil **Achsverriegelung** (Unterwagen)	**axle lock valve** (undercarriage)	**valve verrouillage pont** (châssis)

Typ Model Type Tipo	**HML 32**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Composants hydrauliques position de montage** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.51.02**

Pos. Item Rep. No.	Deutsch	English	Français
17	Lastwarnsensor	load indicator sensor	capteur indication de charge
18	Hydraulikölstandssensor	hydraulic oil level sensor	capteur niveau d'huile hydraulique



Typ Model Type Tipo	**HML 42**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.53.11**

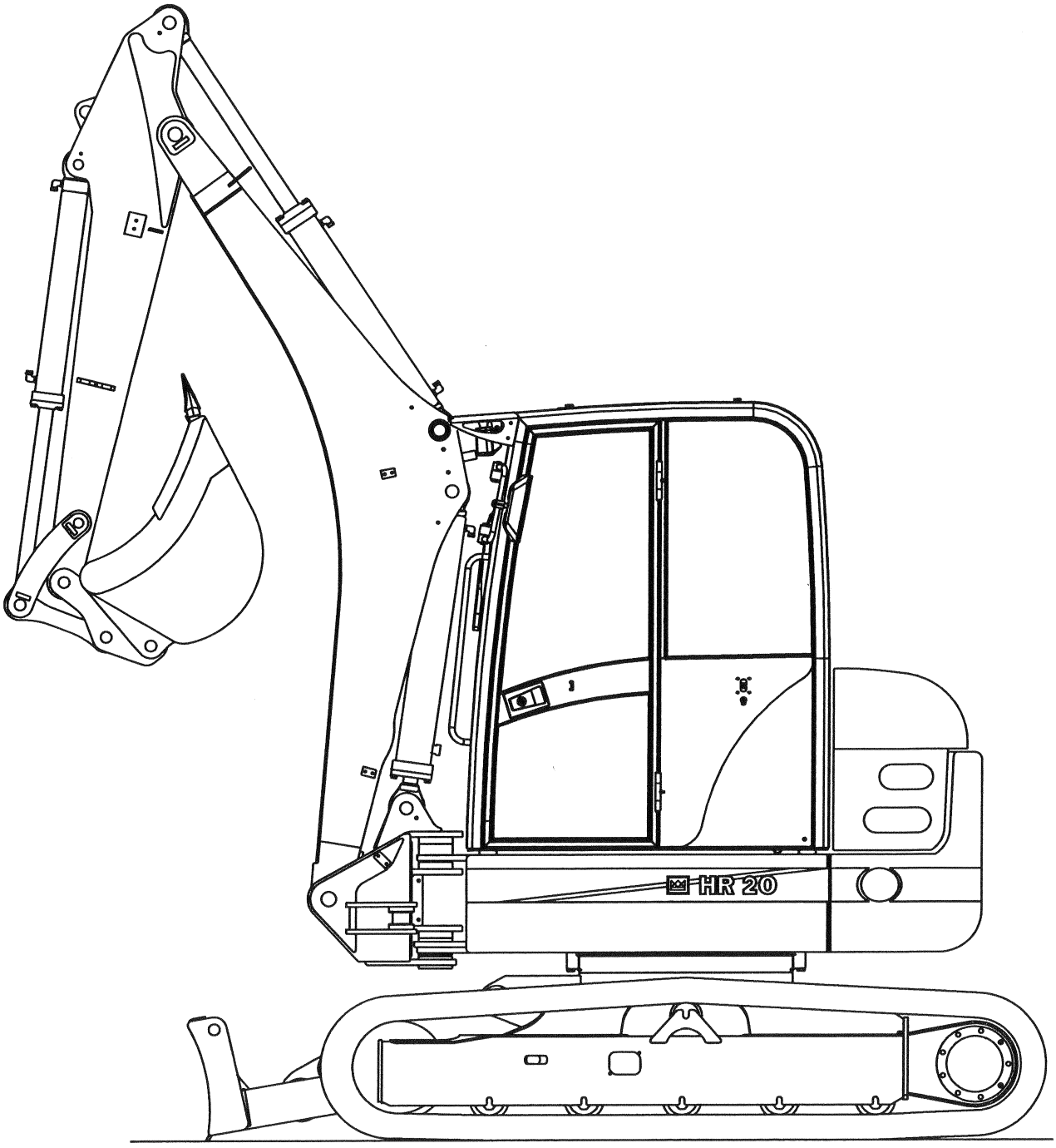
Pos. Item Rep. No.	Deutsch	English	Français
	OBERWAGEN	**UPPERCARRIAGE**	**TOURELLE**
01	***Steuerventil* 5SX14** (an Mittelwand Oberwagen)	***valve bank* 5SX14** (at partition wall uppercarriage)	***distributeur* 5SX14** (sur cloison tourelle)
02	***2-fach Magnetventil*** schnell/langsam **Y5/Y6** (Trennwand Motorraum)	***double solenoid valve*** **fast / slow Y5/Y6** (partition wall, engine compartment)	***double électrovanne*** **petite/grande Y5/Y6** (cloison compartiment moteur)
03	***3/2-Magnetventil*** Pedalfahren/Feststellbr. **Y13/Y10** (Oberwagen)	***3/2 solenoid valve* pedal drive / parking brake Y13/Y10** (uppercarriage)	***électrovanne 3/2* translation par pédale / frein de stationnement Y13/Y10** (tourelle)
04	***4/2-Magnetventil*** Spülen/Schwenken **Y16** (Oberwagen)	***4/2 solenoid valve*** flush / swing **Y16** (uppercarriage)	***électrovanne 4/2*** **purge/orientation Y16** (tourelle)
05	***Speicherfüllventil* + *Druckschalter*** 85 bar Bremse (Oberwagen)	***accumulator charge valve* + *pressure switch*** 85 bar brake (uppercarriage)	***valve de remplissage accu* + *interrupteur de pression*** 85 bar frein (tourelle)
06	***2x Druckspeicher*** 10 bar Feststellbremse, ***3x Druckspeicher*** 60 bar Speicherfüllventil (Oberwagen)	***2x accumulator*** 10 bar parking brake, ***3x accumulator*** 60bar accumulator charge valve (uppercarriage)	***2x accumulateur*** 10 bar frein de stationnement ***3x accumulateur*** 60 bar valve de remplissage (tourelle)
07	***Lastwarnsensor*** Ausleger (Oberwagen vorne oben)	***load indicator sensor*** boom (uppercarriage front up)	***capteur indication de charge*** **flèche** (tourelle)
	Unterwagen	**Undercarriage**	**Châssis**
08	***Ventil*** Achsverriegelung (Unterwagen)	***axle lock valve*** (undercarriage)	***valve*** verrouillage pont (châssis inférieure)
(K)	Ventilplatte, Öltank	Valve bank plate, oil tank	Plaque distributeur, réservoir hydraulique
09	***Steuerventil* 4SM12** (auf Ventilplatte)	***valve bank* 4SM12** (on valve bank plate)	***distributeur* 4SM12** (sur plaque distributeur)
10	2x ***4/2-Magnetventil*** GA/Knicken **Y20/Y21** (auf Ventilplatte)	***2x 4/2-solenoid valve*** **intermediate boom / articulation Y20/Y21** (on valve bank plate)	2x ***électrovannes 4/2*** **flèche articulée / articulation Y20/Y21** (sur plaque distributeur)
11	***3/2 Magnetventil*** Schwenken Druckhochschaltung **Y22** (auf Ventilplatte)	***3/2-solenoid valve*** **high torque swing Y22** (on valve bank plate)	***électrovanne 3/2*** élevation pression orientation **Y22** (sur plaque distributeur)
12	***Relaisventil*** Schwenken (auf Ventilplatte)	***relay valve* swing** (on valve bank plate)	***valve relais* orientation** (sur plaque distributeur)
13	***Abschaltventil*** (auf Ventilplatte)	***pressure cut-off valve*** (on valve bank plate)	***valve de coupure*** (sur plaque distributeur)

Typ Model Type Tipo	**HML 42**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha **01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página **6.53.12**

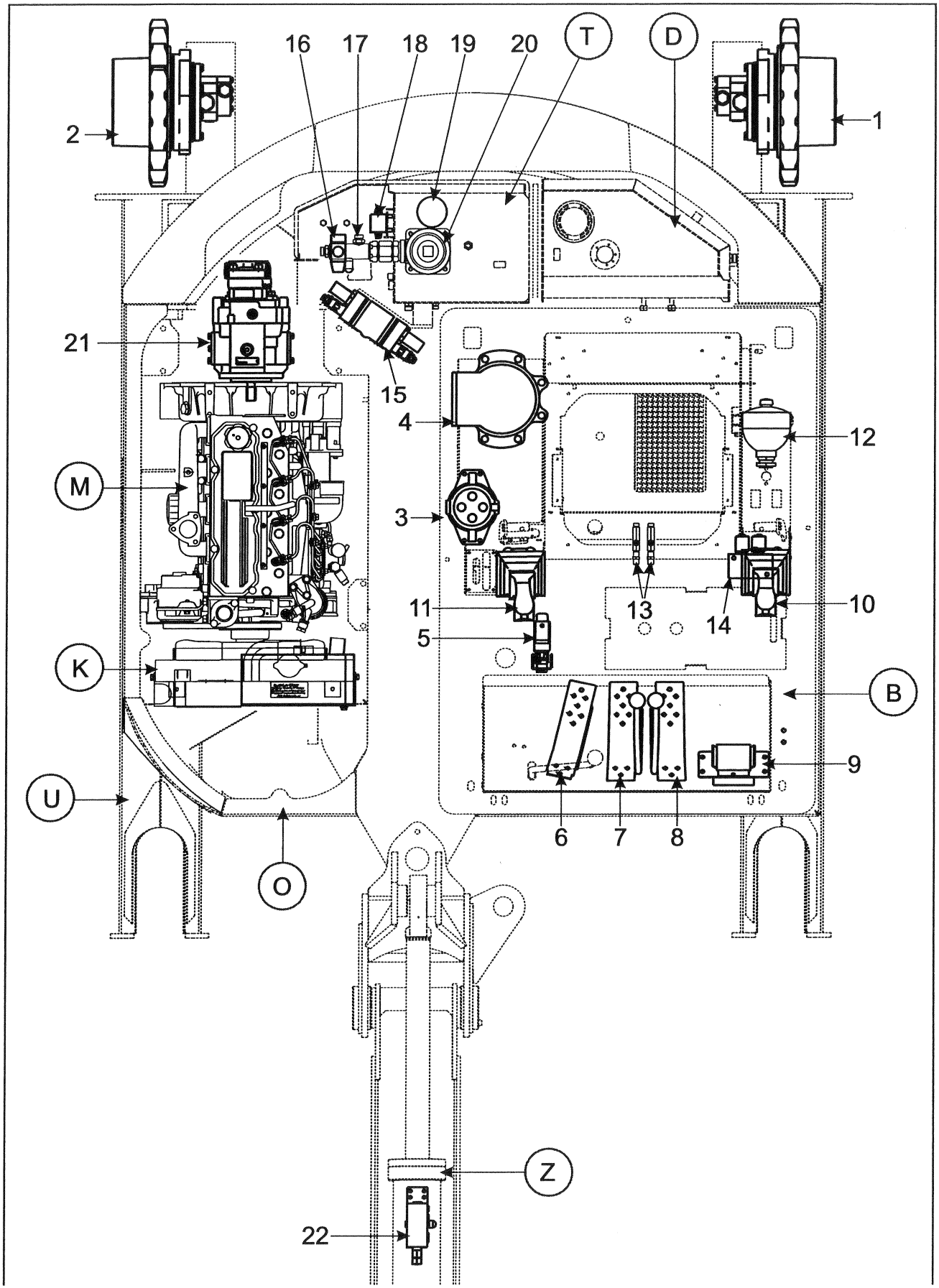
Pos. Item Rep. No.	Deutsch	English	Français
14	***Prioritätsventil*** (auf Ventilplatte)	***priority valve*** (on valve bank plate)	***valve de priorité*** (sur plaque distributeur)
15	***Öltemperaturregler*** (auf Ventilplatte)	***oil temperature regulator*** (on valve bank plate)	***thermostat d'huile hydraulique*** (sur plaque distributeur)
16	***Rücklaufsammler*** (oben am Öltank)	***Return line collector*** (on top at hydraulic oil tank)	***collecteur de retour*** (sur réservoir hydraulique)
17	***Sensor*** Hydraulikölstand (am Öltank)	***sensor*** hydraulic oil level (at hydraulic oil tank)	***capteur niveau*** **d'huile hydraulique** (sur réservoir hydraulique)
18	***4/3-Magnetventil*** *mit* ***Druckminderventil*** Zusatz **Y18/Y19** (oben am Öltank)	***4/3 solenoid valve*** *with* ***pressure reducing valve*** **additional circuit Y18/Y19** (top of hydraulic oil tank)	***électrovanne 4/3*** *avec* ***soupape réductrice de pression*** **circuit supplémentaire Y18/Y19** (sur réservoir hydraulique)
19	***Sammler*** Ölank (auf Ventilplatte)	***collector oil tank*** (on valve bank plate)	***collecteur*** réservoir hydraulique (sur plaque distributeur)
(B)	Bodenrahmen	Floor frame	Cadre plancher
20	***2-fach Magnetventil*** Abschaltung - Vorsteuerung / Achsverriegelung **Y3/Y11** (Bodenrahmen)	***double solenoid valve*** **pilot pressure cut-off / axle lock Y3/Y11** (floor frame)	double électrovanne **coupure pression pilotage/ verrouillage pont Y3/Y11** (cadre plancher)
21	***3/2-Magnetventil*** Hammer **Y4** (Bodenrahmen)	solenoid **valve breaker Y4** (floor frame)	***électrovanne 3/2*** **marteau Y4** (cadre plancher)
22	***Sammler*** Pumpe (Bodenrahmen)	***collector pump*** (floor frame)	***collecteur pompe*** (cadre plancher)
23	***Sammler*** Tank (Bodenrahmen)	***collector oil tank*** (floor frame)	***collecteur*** réservoir hydraulique (cadre plancher)
24	***Bremsventil*** Fußpedal (Bodenrahmen)	***counter balance valve*** pedal (floor frame)	***clapet de frein*** pédale (cadre plancher)
25	***Lenkeinheit*** (Bodenrahmen)	***steering unit*** (floor frame)	***ensemble direction*** (cadre plancher)
26	***Vorsteuergerät Pedal-Wippe*** Gelenkausleger Knicken (Bodenrahmen)	***pilot-operated pedal valve*** articulated boom - articulation (floor frame)	***distributeur à commande assistée pédale*** **flèche** articulée / deport de flèche (cadre plancher)
27	***Vorsteuergerät Pedal-Wippe*** Fahren (Bodenrahmen)	***pilot-operated pedal valve*** travel (floor frame)	***distributeur à commande assistée pédale*** translation (cadre plancher)
28	***Druckspeicher*** Vorsteuerung 10 bar (Bodenrahmen)	***pressure accumulator*** pilot control 10 bar (floor frame)	***collecteur*** commande assistée 10bar (cadre plancher)
XY	***Luftfilterelement*** Heizlüfter (Bodenrahmen)	***air filter element*** ventilator (floor frame)	***Cartouche filtre à air*** ventilateur (cadre plancher)

Typ Model Type Tipo	**HML 42**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.53.13**

HR 20



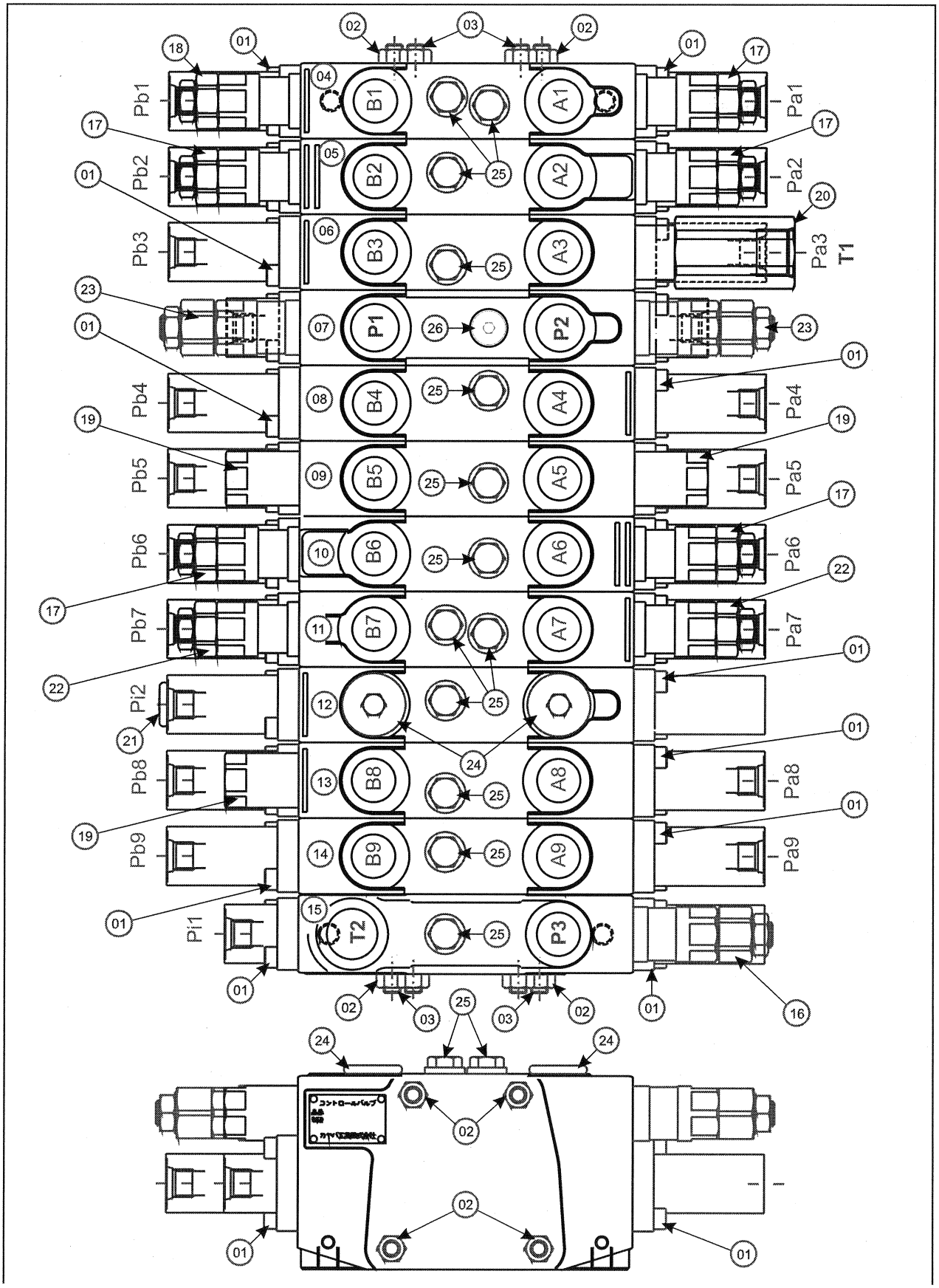
Typ Model Type Tipo	**HR 20**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Composants hydrauliques position de montage** **Posiciones de las válvulas hidráulicas**	Blatt Page Feuille Página	**6.60.00**



Typ Model Type Tipo	**HR 20**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Composants hydrauliques position de montage** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.60.01**

Pos. Item Rep. No.	Deutsch	English	Français
(U)	**UNTERWAGEN**	**UNTERCARRIAGE**	**CHÂSSIS**
1	Fahrantrieb (links)	Travel drive (left)	Entraînement (gauche)
2	Fahrantrieb (rechts)	Travel drive (right)	Entraînement (droite)
3	Drehdurchführung	Rotary transfer	Joint tournant
(O)	**OBERWAGEN**	**UPPERCARRIAGE**	**TOURELLE**
4	Schwenkantrieb	Swing drive	Entraînement d'orientation
(B)	**BODENRAHMEN**	**FLOOR FRAME**	**CADRE PLANCHER**
5	Vorsteuergerät (Räumschild)	Pilot-operated valve (dozer blade)	Distibuteur à commande assistée (lame)
6	Vorsteuergerät - *Fußpedal* (Zusatzsteuerkreis)	Pilot-operated valve - *pedal* (additional control circuit)	Distributeur à commande assistée - pédale(circuit supplémentaire)
7	Vorsteuergerät - *Fußpedal* (Fahren rechts)	Pilot-operated valve - *pedal* (travel right)	Distributeur à commande assistée - pédale (translation à droite)
8	Vorsteuergerät - *Fußpedal* (Fahren links)	Pilot-operated valve - *pedal* (travel left)	Distributeur à commande assistée - pédale (translation à gauche)
9	Vorsteuergerät - *Fußpedal* (Knicken)	Pilot-operated valve - *pedal* (articulation)	Distributeur à commande assistée - pédal (articulation)
10	Vorsteuergerät - *Joy-stick* (links)	Pilot operated valve - *joy-stick* (left)	Distributeur à commande assistée - *manipulateur* (gauche)
11	Vorsteuergerät - *Joy-stick* (rechts)	Pilot-operated valve - *joy-stick* (right)	Distributeur à commande assistée - *manipulateur* (droite)
12	Hydrospeicher **Pp**	Hydraulic accumulator **Pp**	Accumulateur hydraulique **Pp**
13	Sammler / Druckverteiler **Pp**	Collector / pressure distributor **Pp**	Collecteur / distributeur de pression **Pp**
14	Magnetventil (2-fach) 1= Vorsteuerung ein / aus 2= Fahren schnell / langsam	Solenoid valve (double-type) 1= Pilot control on / off 2= Travel high speed / low speed	Electrovanne (double) 1= Pilotage marche / arrêt 2= Translation grande vitesse / petite
(T)	**HYDRAULIKOELTANK**	**HYDRAULIC OIL TANK**	**RÉSERVOIR HYDRAULIQUE**
15	Blocksteuergerät	Valve bank	Bloc distributeur
16	Öltemperaturregler	Oil temperature regulator	Régulateur de température d'huile
17	Rücklaufsammler	Return line collector	Collecteur de retour
18	Relaisventil - Schwenkbremse	Relay valve - swing brake	Clapet-relais - frein d'orientation
19	Belüftungsfilter	Vent filter	Filtre d'aération
20	Rücklauffilter	Return filter	Filtre de retour
(M)	**DIESELMOTOR**	**DIESEL ENGINE**	**MOTEUR DIESEL**
21	Verstellpumpe	Variable displacement pump	Pompe à débit variable
(Z)	**HYDR.-ZYL. AUSLEGER**	**HYDR.-CYL. BOOM**	**VÉRIN HYDR. FLÈCHE**
22	Lasthalteventil	Load check valve	Clapet de sécurite
(D)	**KRAFTSTOFFTANK**	**FUEL TANK**	**RESERVOIR DE CARBURANT**
(K)	**OELKUEHLER**	**OIL COOLER**	**REFROIDISSEUR D'HUILE**

Typ Model Type Tipo	**HR 20**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha — **01.2003**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Composants hydrauliques position de montage** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página — **6.60.02**



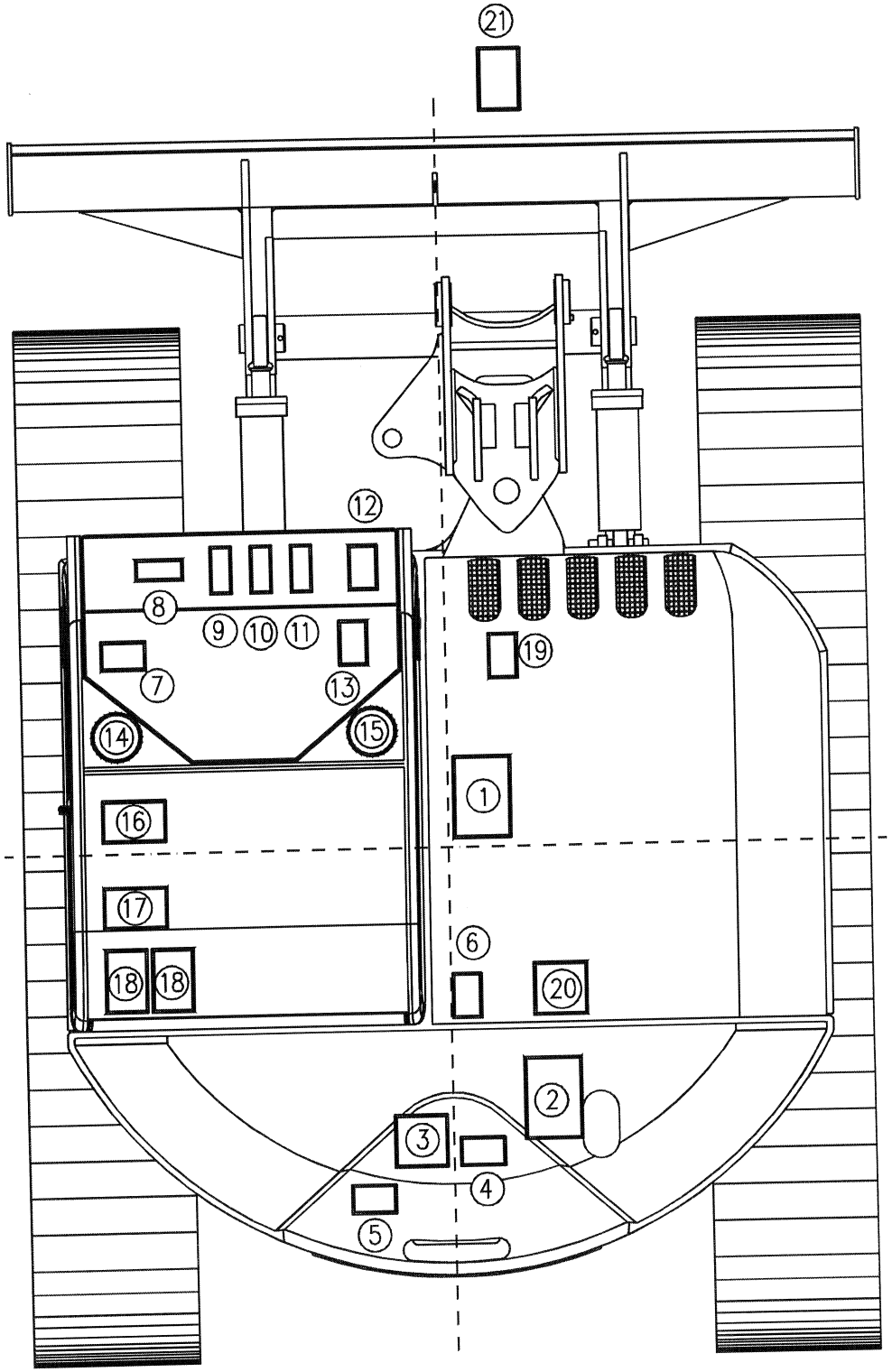
Typ Model Type Tipo	**HR 20**	**Blocksteuergerät** **Valve bank** **Distributeur** **Válvula de mando** **KAYABA KVSE-72-11**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Anziehdrehmomente** **Tightening torques** **Couples de serrage** **Pares de apriete**		Blatt Page Feuille Página	**6.60.03**

Pos. Item Rep. No.	Deutsch	English	Français
01	Schrauben für Ventilkappen **8,8-10,8 Nm**	Bolts for pilot caps **8.8-10.8 Nm**	Vis de fixation pour capouchons **8,8-10,8 Nm**
02	Muttern für Zuganker **26,5-29,4 Nm**	Nuts for tie rods **26.5-29.4 Nm**	Ecrous pour tirants d'ancrages **26,5-29,4 Nm**
03	Zuganker	Tie rods	Tirants d'ancrages
04	Ventilelement (Ausleger)	Valve element (boom)	Élément distribution (flèche)
05	Ventilelement (Löffel)	Valve element (bucket)	Élément distribution (godet)
06	Ventilelement (Fahren links)	Valve element (travle left)	Élément distrib. (translation gauche)
07	Ventilelement (Druckeingang)	Valve element (pressure inlet)	Élément distrib. (entrée pression)
08	Ventilelement (Fahren rechts)	Valve element (travel right)	Élément distrib. (translation droite)
09	Ventilelement (Knicken)	Valve element (articulation)	Élément distribution (articulation)
10	Ventilelement (Löffelstiel)	Valve element (dipper arm)	Élément distribution (balancier)
11	Ventilelement (Zusatzkreis)	Valve element (add. circuit)	Élément distribution (circuit suppl.)
12	Ventilelement (Hydr.-Hammer)	Valve element (hydr. hammer)	Élément distribution (marteau hydr.)
13	Ventilelement (Räumschild)	Valve element (dozer blade)	Élément distribution (lame d'appui)
14	Ventilelement (Schwenken)	Valve element (swing)	Élément distribution (orientation)
15	Ventilelement (Straight travel)	Ventilelement (straight travel)	Élément distribution (straight travel)
16	Hauptüberdruckventil ***205 bar*** **69-78 Nm**	Main relief valve ***205 bar*** **69-78 Nm**	Limiteur de press. principale ***205 bar*** **69-78 Nm**
17	Sekundärventil ***280 bar***	Line relief valve ***280 bar***	Clapet secondaire ***280 bar***
	69-78 Nm	**69-78 Nm**	**69-78 Nm**
18	Sekundärventil ***180 bar*** **69-78 Nm**	Line relief valve ***180 bar*** **69-78 Nm**	Clapet secondaire ***180 bar*** **69-78 Nm**
19	Nachsaugventil **69-78 Nm**	Anticavitation valve **69-78 Nm**	Clapet anti-cavitation **69-78 Nm**
20	Verschlußschraube **60 Nm**	Plug **60 Nm**	Bouchon **60 Nm**
21	Verschlußschraube **28 Nm**	Plug **28 Nm**	Bouchon **28 Nm**
22	Sekundärventil ***210 bar*** **69-78 Nm**	Line relief valve ***210 bar*** **69-78 Nm**	Clapet secondaire ***210 bar*** **69-78 Nm**
23	Hauptüberdruckventil ***245 bar*** **69-78 Nm**	Main relief valve ***245 bar*** **69-78 Nm**	Limiteur de press. principale ***245 bar*** **69-78 Nm**
24	Verschlußschr. **67,7-73,5 Nm**	Plug **67.7-73.5 Nm**	Bouchon **67,7-73,5 Nm**
25	Verschlußschraube für Rückschlagventile **31,4±1 Nm**	Plug for check valves **31.4±1 Nm**	Bouchon pour clapets de retenue **31,4±1 Nm**
26	Verschlußschr. **31,4±1 Nm**	Plug **31.4±1 Nm**	Bouchon **31,4±1 Nm**

Typ Model Type Tipo	**HR 20**	**Blocksteuergerät** **Valve bank** **Distributeur** **Válvula de mando**	**KAYABA KVSE-72-11**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Anziehdrehmomente** **Tightening torques** **Couples de serrage** **Pares de apriete**			Blatt Page Feuille Página	**6.60.04**

Note

valves 2-5 and 20 valve bank plate-mounted at top of fuel tank
valves 7-13 and 16 underneath floor frame
valves 17 and 18 underneath floor frame in the uppercarriage



SCHAEFF	Typ/Model/Type **HR 32**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Location of hydraulic components**	Blatt/Page/Feuille **6.65.01**

01 **valve bank 6 SX 14**

02 **valve bank 3 SM 12**

03 pressure **cut-off valve** 110 bar

04 3/2 way **relay valve swing**

05 3/2 solenoid **high torque swing Y12**

06 **pressure reducing valve pilot control** 35 bar

07 3/2 solenoid **selector valve breaker Y4**

08 pilot-operated **pedal articulation**

09 pilot-operated pressure **pedal travel left**

10 pilot-operated **pedal travel right**

11 pilot-operated **pedal intermediate boom**

12 pilot-operated **lever dozer**

13 **pressure reducing valve** additional control circuit (clamshell)

14 **joystick left**

15 **joystick right**

16 double solenoid **valve, working hydraulics cut-off Y3, fast/slow Y5**

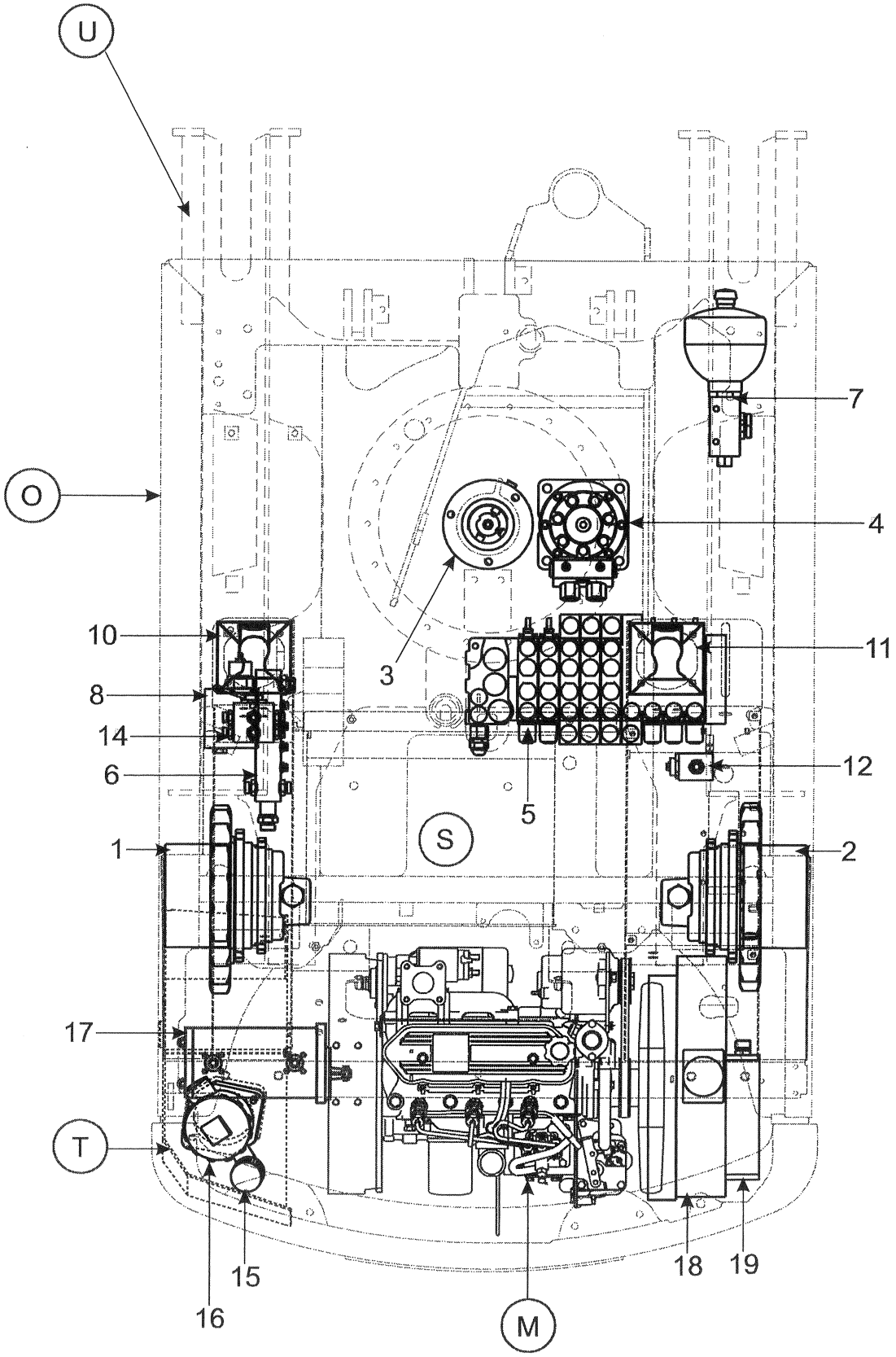
17 4/3 solenoid **operation additional control circuit/clamshell Y18 / Y19**

18 2 x 4/2 solenoid selector **valve ISO - John Deere (option) Y25 / Y26**

19 hydraulic oil **thermostat valve** (Wahler)

20 4/2 solenoid **valve floating position (option) Y11**

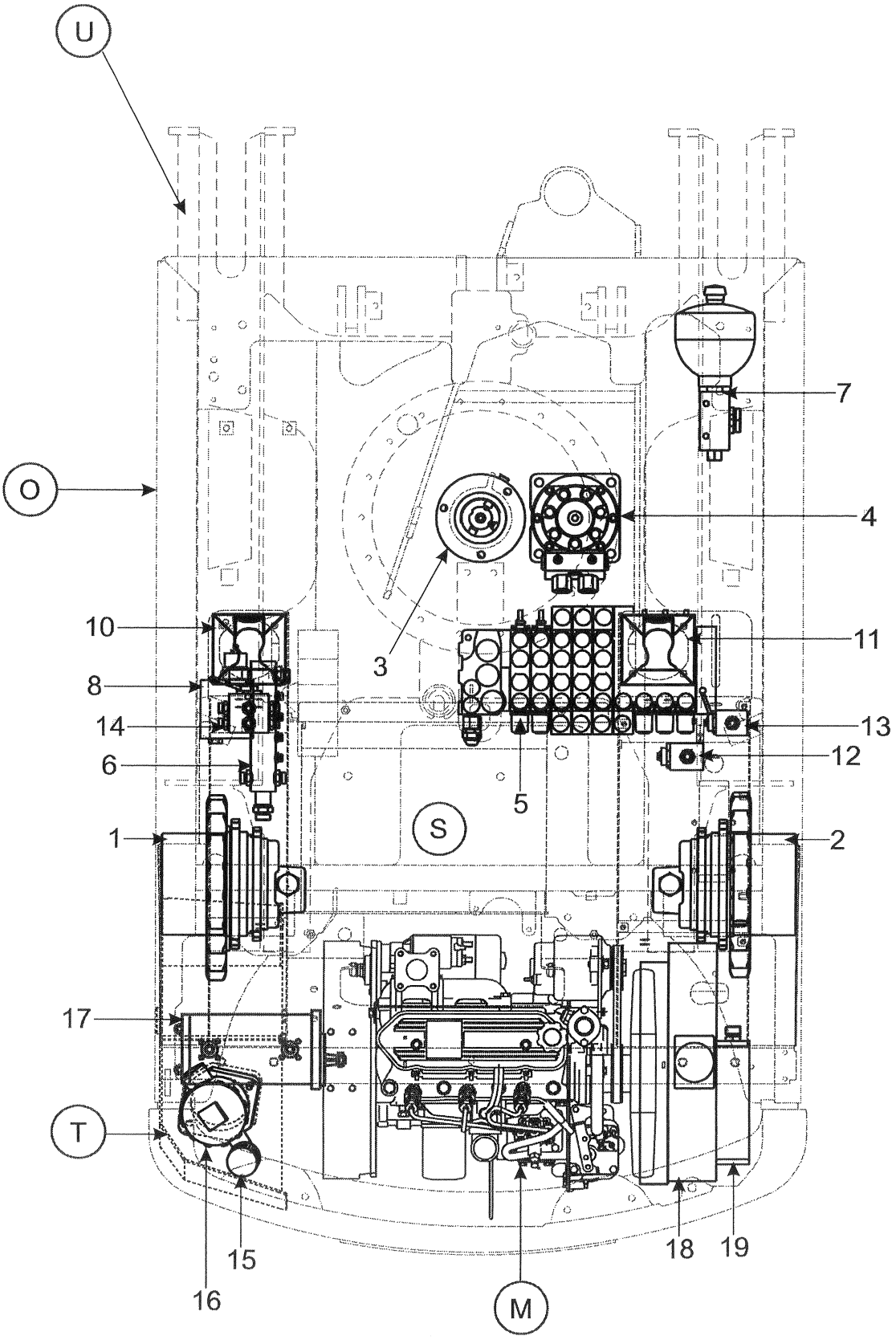
21 **load holding valve** boom



Typ Model Type Tipo	**HR 11**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.73.11**

Pos. Item Rep. No.	Deutsch	English	Français
(U)	**UNTERWAGEN**	**UNTERCARRIAGE**	**CHÂSSIS**
1	Fahrantrieb (links)	Travel drive (left)	Entraînement (gauche)
2	Fahrantrieb (rechts)	Travel drive (right)	Entraînement (droite)
3	Drehdurchführung	Rotary transfer	Joint tournant
(O)	**OBERWAGEN**	**UPPERCARRIAGE**	**TOURELLE**
4	Schwenkantrieb	Swing drive	Entraînement d'orientation
5	Blocksteuergerät	Valve bank	Bloc distributeur
6	Rücklaufsammler	Return line collector	Collecteur de retour
7	Druckminderventil mit Hydrospeicher **Pp**	Pressure reducing valve with hydraulic accumulator **Pp**	Soupape réduc. de pression avec accumulateur hydraulique **Pp**
8	Druckabschaltventil	Shutt-off valve	Valve de coupure
(S)	**SITZGESTELL KRAFTSTOFFTANK**	**SEAT CONSOLE FUEL TANK**	**CONSOLE DE SIÈGE RÉSERVOIR DE CARBURANT**
10	Vorsteuergerät - *Joy-stick* (links)	Pilot operated valve - *joy-stick* (left)	Distributeur à commande assistée - *manipulateur* (gauche)
11	Vorsteuergerät - *Joy-stick* (rechts)	Pilot-operated valve - *joy-stick* (right)	Distributeur à commande assistée - *manipulateur* (droite)
12	Kugelhahn, Ausstiegsschranke (Sperren Arbeitshydraulik)	Ball valve, cut-off lever (stop working hydraulic)	Robinet, levier de sortie (neutralisation hydr. de travail)
14	Kugelhahn, (Umschalten - ISO / SAE) **OPTION**	Ball valve, (reverse - ISO / SAE) **OPTION**	Robinet, inversion - ISO / SAE) **OPTION**
(T)	**HYDRAULIKOELTANK**	**HYDRAULIC OIL TANK**	**RÉSERVOIR HYDRAULIQUE**
15	Belüftungsfilter	Vent valve	Filtre d'aération
16	Rücklauffilter	Return filter	Filtre de retour
(M)	**DIESELMOTOR**	**DIESEL ENGINE**	**MOTEUR DIESEL**
17	Zahnradpumpe (2-fach)	Gear pump (double type)	Pompe à engrenage (double)
18	Motorölkühler	Engine oil cooler	Refroidisseur d'huile moteur
19	Hydraulikölkühler	Hydraulic oil cooler	Refroidisseur d'huile hydraulique

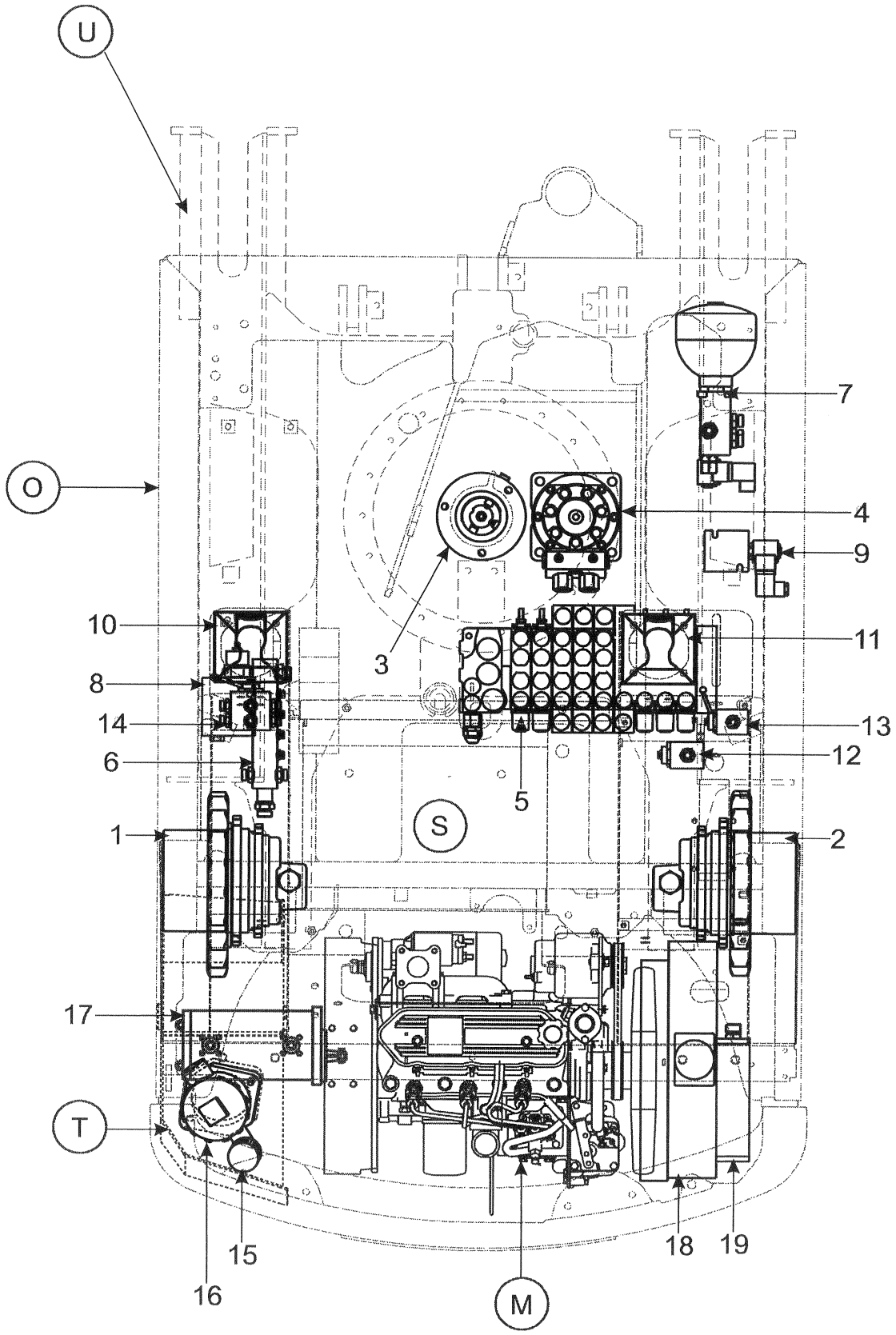
Typ Model Type Tipo	**HR 11**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.73.12**



Typ Model Type Tipo	**HR 12**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.74.11**

Pos. Item Rep. No.	Deutsch	English	Français
(U)	**UNTERWAGEN**	**UNTERCARRIAGE**	**CHÂSSIS**
1	Fahrantrieb (links)	Travel drive (left)	Entraînement (gauche)
2	Fahrantrieb (rechts)	Travel drive (right)	Entraînement (droite)
3	Drehdurchführung	Rotary transfer	Joint tournant
(O)	**OBERWAGEN**	**UPPERCARRIAGE**	**TOURELLE**
4	Schwenkantrieb	Swing drive	Entraînement d'orientation
5	Blocksteuergerät	Valve bank	Bloc distributeur
6	Rücklaufsammler	Return line collector	Collecteur de retour
7	Druckminderventil mit Hydrospeicher **Pp**	Pressure reducing valve with hydraulic accumulator **Pp**	Soupape réduc. de pression avec accumulateur hydraulique **Pp**
8	Druckabschaltventil	Shutt-off valve	Valve de coupure
(S)	**SITZGESTELL KRAFTSTOFFTANK**	**SEAT CONSOLE FUEL TANK**	**CONSOLE DE SIÈGE RÉSERVOIR DE CARBURANT**
10	Vorsteuergerät - *Joy-stick* (links)	Pilot operated valve - *joy-stick* (left)	Distributeur à commande assistée - *manipulateur* (gauche)
11	Vorsteuergerät - *Joy-stick* (rechts)	Pilot-operated valve - *joy-stick* (right)	Distributeur à commande assistée - *manipulateur* (droite)
12	Kugelhahn, Ausstiegsschranke (Sperren Arbeitshydraulik)	Ball valve, cut-off lever (stop working hydraulic)	Robinet, levier de sortie (neutralisation hydr. de travail)
13	Kugelhahn, (Umschalten - Räumschild / Spurweiten-verstellung) **OPTION**	Ball valve, (reverse - dozer blade / track adjustment) **OPTION**	Robinet, (inversion - lame d'appui/ réglage d'écarlement) **OPTION**
14	Kugelhahn, (Umschalten - ISO / SAE) **OPTION**	Ball valve, (reverse - ISO / SAE) **OPTION**	Robinet, (inversion - ISO / SAE) **OPTION**
(T)	**HYDRAULIKOELTANK**	**HYDRAULIC OIL TANK**	**RÉSERVOIR HYDRAULIQUE**
15	Belüftungsfilter	Vent valve	Filtre d'aération
16	Rücklauffilter	Return filter	Filtre de retour
(M)	**DIESELMOTOR**	**DIESEL ENGINE**	**MOTEUR DIESEL**
17	Zahnradpumpe (2-fach)	Gear pump (double type)	Pompe à engrenage (double)
18	Motorölkühler	Engine oil cooler	Refroidisseur d'huile moteur
19	Hydraulikölkühler	Hydraulic oil cooler	Refroidisseur d'huile hydraulique

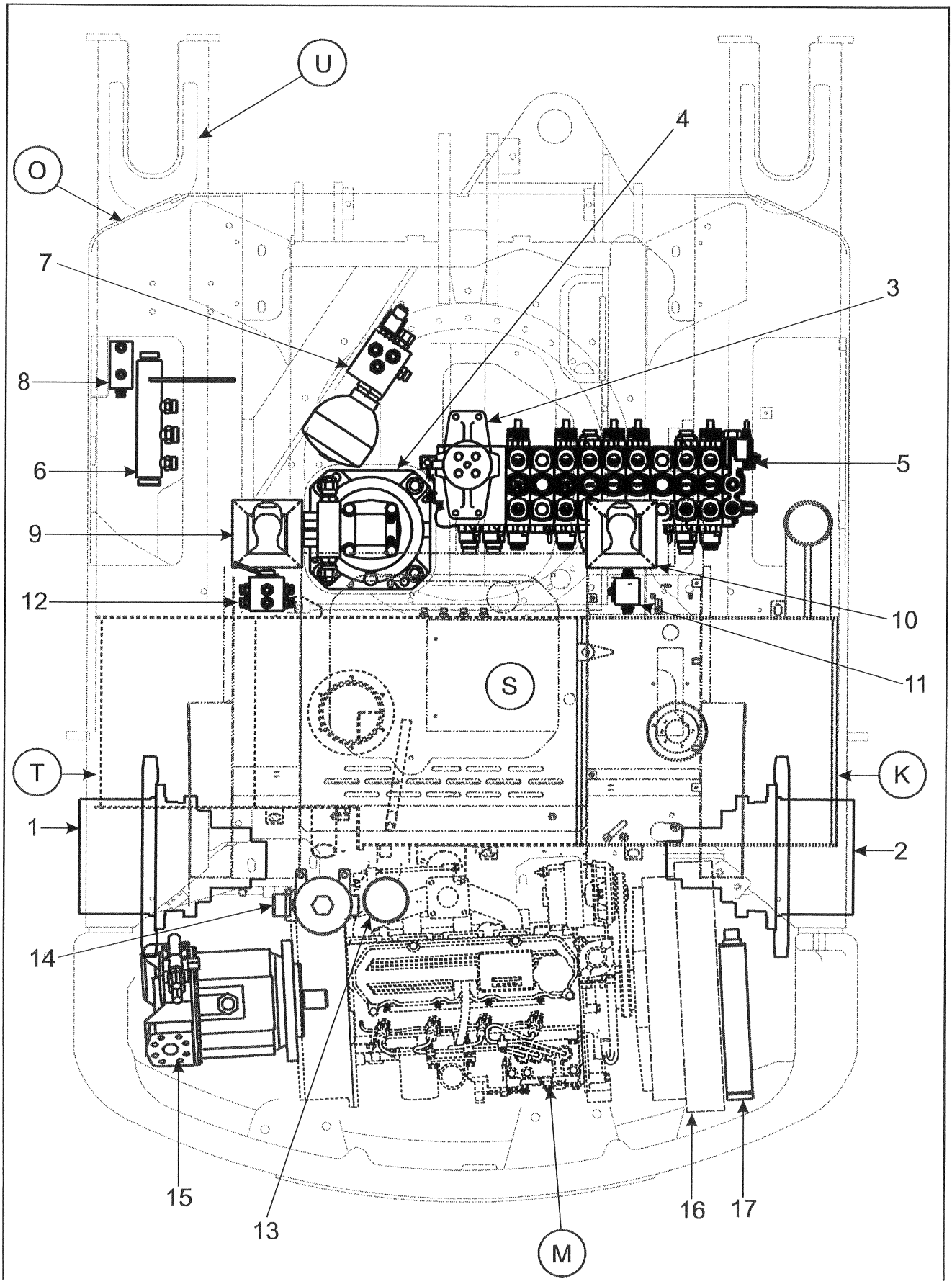
Typ Model Type Tipo	**HR 12**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.74.12**



Typ Model Type Tipo	**HR 13**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.75.11**

Pos. Item Rep. No.	Deutsch	English	Français
(U)	**UNTERWAGEN**	**UNTERCARRIAGE**	**CHÂSSIS**
1	Fahrantrieb (links)	Travel drive (left)	Entraînement (gauche)
2	Fahrantrieb (rechts)	Travel drive (right)	Entraînement (droite)
3	Drehdurchführung	Rotary transfer	Joint tournant
(O)	**OBERWAGEN**	**UPPERCARRIAGE**	**TOURELLE**
4	Schwenkantrieb	Swing drive	Entraînement d'orientation
5	Blocksteuergerät	Valve bank	Bloc distributeur
6	Rücklaufsammler	Return line collector	Collecteur de retour
7	Druckminderventil mit Hydrospeicher **Pp**	Pressure reducing valve with hydraulic accumulator **Pp**	Soupape réduc. de pression avec accumulateur hydraulique **Pp**
8	Druckabschaltventil	Shutt-off valve	Valve de coupure
9	Magnetventil (Schwenkbremse)	Solenoid valve (swing brake)	Electrovanne (frein d'orientation)
(S)	**SITZGESTELL KRAFTSTOFFTANK**	**SEAT CONSOLE FUEL TANK**	**CONSOLE DE SIÈGE RÉSERVOIR DE CARBURANT**
10	Vorsteuergerät - *Joy-stick* (links)	Pilot operated valve - *joy-stick* (left)	Distributeur à commande assistée - *manipulateur* (gauche)
11	Vorsteuergerät - *Joy-stick* (rechts)	Pilot-operated valve - *joy-stick* (right)	Distributeur à commande assistée - *manipulateur* (droite)
12	Kugelhahn, Ausstiegsschranke (Sperren Arbeitshydraulik)	Ball valve, cut-off lever (stop working hydraulic)	Robinet, levier de sortie (neutralisation hydr. de travail)
13	Kugelhahn, (Umschalten - Räumschild / Spurweiten-verstellung)	Ball valve, (reverse - dozer blade / track adjustment)	Robinet, (inversion - lame d'appui/ réglage d'écarlement)
14	Kugelhahn, (Umschalten - ISO / SAE) **OPTION**	Ball valve, (reverse - ISO / SAE) **OPTION**	Robinet, (inversion - ISO / SAE) **OPTION**
(T)	**HYDRAULIKÖLTANK**	**HYDRAULIC OIL TANK**	**RÉSERVOIR HYDRAULIQUE**
15	Belüftungsfilter	Vent valve	Filtre d'aération
16	Rücklauffilter	Return filter	Filtre de retour
(M)	**DIESELMOTOR**	**DIESEL ENGINE**	**MOTEUR DIESEL**
17	Zahnradpumpe (2-fach)	Gear pump (double type)	Pompe à engrenage (double)
18	Motorölkühler	Engine oil cooler	Refroidisseur d'huile moteur
19	Hydraulikölkühler	Hydraulic oil cooler	Refroidisseur d'huile hydraulique

Typ Model Type Tipo	**HR 13**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.75.12**



Typ Model Type Tipo	**HR 14**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.76.11**

Pos. Item Rep. No.	Deutsch	English	Français
(U)	**UNTERWAGEN**	**UNTERCARRIAGE**	**CHÂSSIS**
1	Fahrantrieb (links)	Travel drive (left)	Entraînement (gauche)
2	Fahrantrieb (rechts)	Travel drive (right)	Entraînement (droite)
3	Drehdurchführung	Rotary transfer	Joint tournant
(O)	**OBERWAGEN**	**UPPERCARRIAGE**	**TOURELLE**
4	Schwenkantrieb	Swing drive	Entraînement d'orientation
5	Blocksteuergerät	Valve bank	Bloc distributeur
6	Rücklaufsammler	Return line collector	Collecteur de retour
7	Druckminderventil mit Hydrospeicher **Pp**	Pressure reducing valve with hydraulic accumulator **Pp**	Soupape réduc. de pression avec accumulateur hydraulique **Pp**
8	Relaisventil - Schwenkbremse	Relay valve - swing brake	Clapet-relais - frein d'orientation
(S)	**SITZGESTELL**	**SEAT CONSOLE**	**CONSOLE DE SIÈGE**
9	Vorsteuergerät - *Joy-stick* (links)	Pilot operated valve - *joy-stick* (left)	Distributeur à commande assistée - *manipulateur* (gauche)
10	Vorsteuergerät - *Joy-stick* (rechts)	Pilot-operated valve - *joy-stick* (right)	Distributeur à commande assistée - *manipulateur* (droite)
11	Kugelhahn, Ausstiegsschranke (Sperren Arbeitshydraulik)	Ball valve, cut-off lever (stop working hydraulic)	Robinet, levier de sortie (neutralisation hydr. de travail)
12	Kugelhahn, (Umschalten - ISO / SAE) **OPTION**	Ball valve, (reverse - ISO / SAE) **OPTION**	Robinet, (inversion - ISO / SAE) **OPTION**
13	Belüftungsfilter	Vent valve	Filtre d'aération
14	Rücklauffilter	Return filter	Filtre de retour
(M)	**DIESELMOTOR**	**DIESEL ENGINE**	**MOTEUR DIESEL**
15	Verstellpumpe	Variable displacement pump	Pompe à débit variable
16	Motorölkühler	Engine oil cooler	Refroidisseur d'huile moteur
17	Hydraulikölkühler	Hydraulic oil cooler	Refroidisseur d'huile hydraulique
(T)	**HYDRAULIKÖLTANK**	**HYDRAULIC OIL TANK**	**RÉSERVOIR HYDRAULIQUE**
(K)	**KRAFTSTOFFTANK**	**FUEL TANK**	**RÉSERVOIR DE CARBURANT**

Typ Model Type Tipo	**HR 14**	**Arbeitshydraulik** **Working hydraulik** **Hydraulique équipement** **Hidráulico de trabajo**	Datum Edition Date Fecha	**01.2004**
Benennung Description Dénomination Denominación	**Ventileinbauübersicht** **Location of hydraulic components** **Position de montage des composants hydrauliques** **Posiciones de las válvulas hidráulicas**		Blatt Page Feuille Página	**6.76.12**

Valve bank, consisting of:

- 10 sections
- Sandwich design
- 3 pump inlets P1, P2, P3
- 3 main pressure relief valves with setscrew
- Line relief valves with setscrews
- 2 tank ports

Pressure supply P1:

- Main pressure relief valve: 245 bar
- 35 Travel right: without line relief valves
- 34 Dipperstick: 280/280 bar
  Anti-cavitation "dipperstick in": spool-integrated
- Articulation: anti-cavitation on both sides

Pressure supply P2:

- Main pressure relief valve: 245 bar
- 36 Travel left: without line relief valves
- 37 Boom: down 140 bar / up 280 bar
  Anti-cavitation "boom down": spool-integrated
- 38 Bucket: 280/280 bar

Pressure supply P3:

- Main pressure relief valve: 205 bar
- 30 Slewing: Line relief valves in the slew motor
- 31 Blade: without line relief valves
- 39 "Straight travel"
- 32 Additional control circuit: 210/210 bar

Function "Straight Travel"

Neutral position of all control spools:

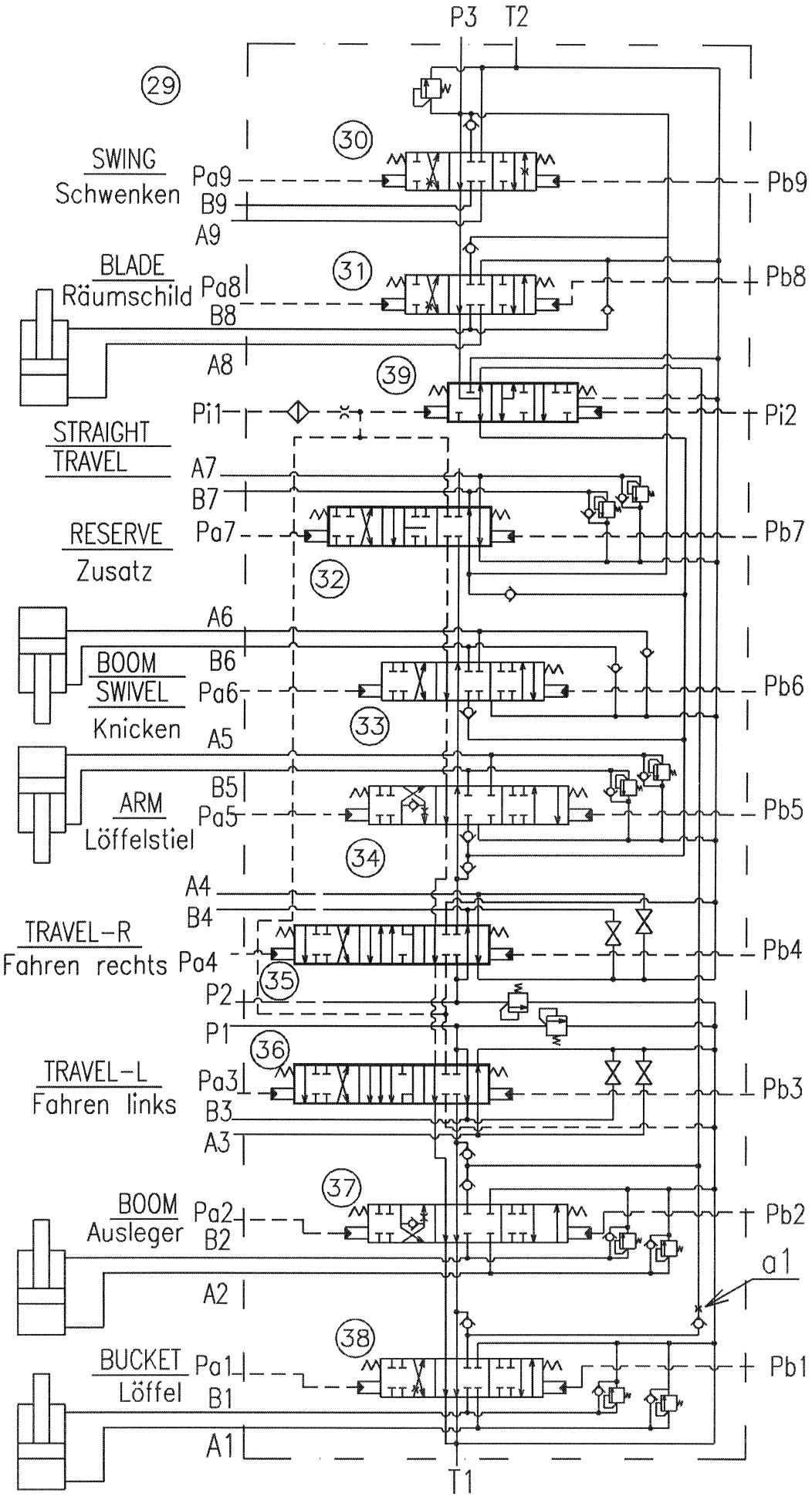
Both pilot pressure channels are switched to the tank at the spool "straight travel" behind the orifice 0.4 mm.
The 3 pumps feed all working and setting functions described before.

Both travel spools are operated:

If both travel spools are operated, one pilot pressure channel at the travel spools behind the orifice 0.4 mm will be switched to stop. If any other function is operated during travelling (e.g. additional control circuit), the second pilot pressure channel will also be switched to stop. By this pilot pressure accumulation, the spool "straight travel" moves and opens the feed line from pump P3 to the remaining consumers.
The straight travel will not be influenced by the operation of another function (straight travel).

Function orifice a1 (Ø 3.1):

If the functions travel, boom, bucket are operated at the same time, the boom always has priority.


P3
T2
29
30
SWING
Schwenken
Pa9
B9
A9
Pb9
BLADE
Räumschild
31
Pa8
B8
A8
Pb8
39
Pi1
Pi2
STRAIGHT
TRAVEL
A7
B7
RESERVE
Zusatz
Pa7
Pb7
32
A6
BOOM
SWIVEL
Knicken
B6
Pa6
Pb6
33
A5
ARM
Löffelstiel
B5
Pa5
Pb5
34
A4
B4
TRAVEL-R
Fahren rechts
Pa4
Pb4
35
P2
P1
36
TRAVEL-L
Fahren links
Pa3
Pb3
B3
A3
37
BOOM
Ausleger
Pa2
B2
Pb2
a1
A2
38
BUCKET
Löffel
Pa1
B1
Pb1
A1
T1

Functional description

Hydraulic pilot-operated valves of the type 4 TH 6 work on the basis of directional control pressure reducing valves.

These valves mainly consist of the control stick (5), 4 pressure reducing valves and the housing (10).

Each pressure reducing valve consists of a control spool (6), a regulator spring (7), a return spring (8) and a tappet (9).

When the joystick is not operated, it is held in neutral position by the return spring (8). The ports (1, 2 , 3, 4) are connected with the tank port (T) by the bore (11).

When operating the control stick (5), the tappet (9) exerts pressure on the return spring (8) and the regulator spring (7).

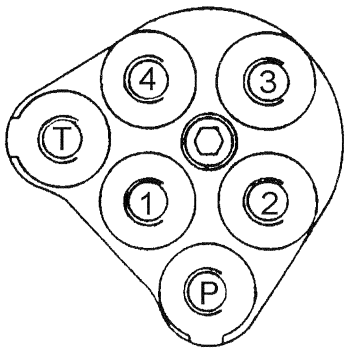
The regulator spring (7) moves the control spool (6) downwards at first, then closes the connection between the corresponding port and the tank port T.

At the same time the corresponding port is connected to the port P via the bore (11).

The regulation procedure starts as soon as the regulator spool (6) finds its balance between the force of the regulator spring (7) and the force resulting from the hydraulic pressure in the corresponding port (1, 2, 3 or 4).

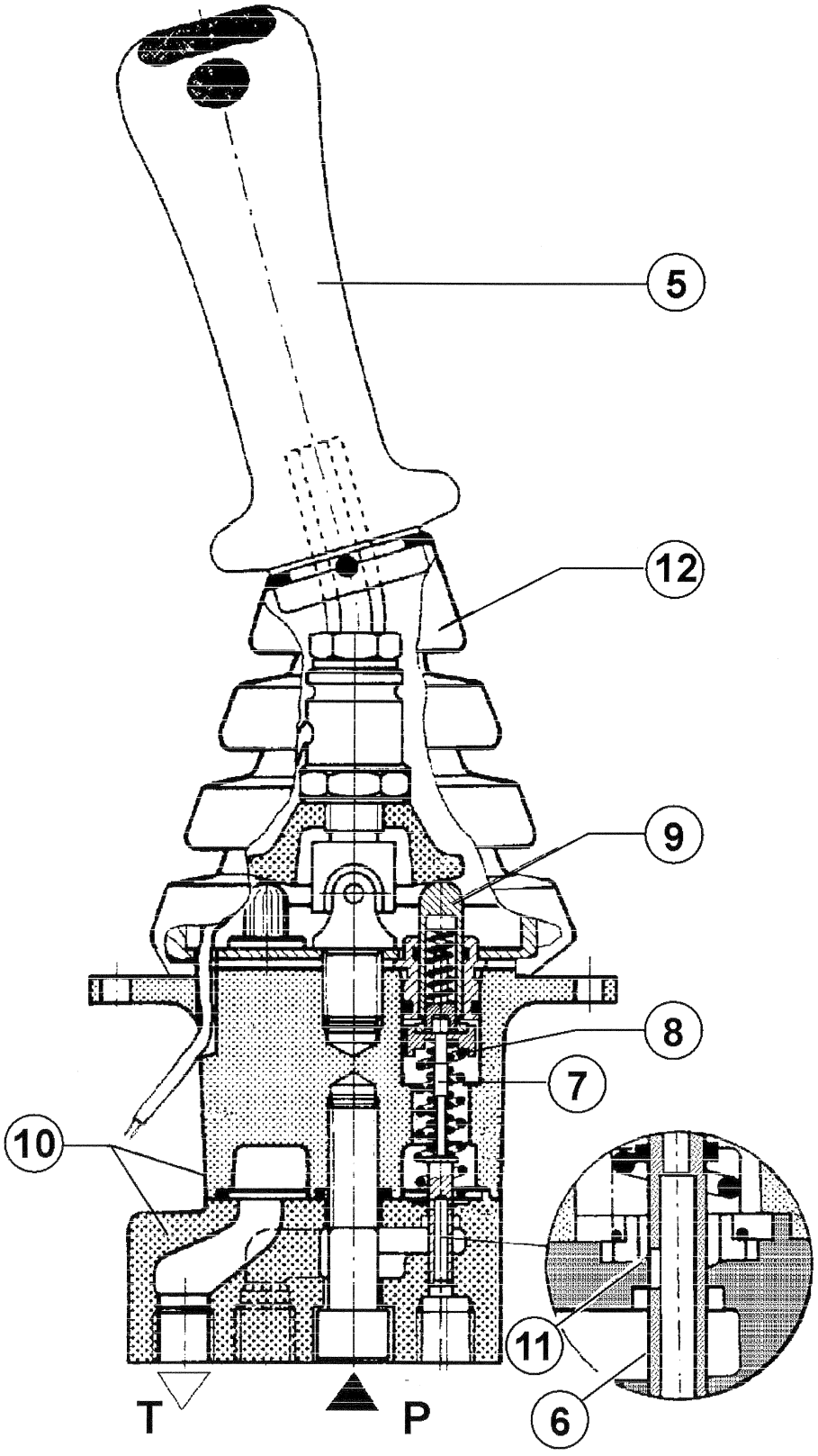
Due to the combined effect of the control spool (6) and the regulator spring (7), the pressure in the corresponding ports is proportional to the stroke of the tappet (9) and consequently to the position of the joystick (5).

This pressure regulation, dependent upon the position of the joystick and the characteristics of the regulator spring allows a proportional hydraulic control of all kinds of control valve banks and control valves for hydraulic pumps and motors.



A rubber collar (12) protects the mechanical parts of the housing against contamination. So these pilot-operated valves are also suitable for unfavourable operating conditions.

Pilot-operated valve type 4 TH 6



Functional description

Hydraulic pilot-operated valves of the type 4 TH 5 work on the basis of directional control pressure reducing valves.

These valves mainly consist of the control stick (5), 4 pressure reducing valves and the housing (10).

Each pressure reducing valve consists of a control spool (6), a regulator spring (7), a return spring (8) and a tappet (9).

When the joystick is not operated, it is held in neutral position by the return spring (8). The ports (1, 2 , 3, 4) are connected with the tank port (T) by the bore (11).

When operating the control stick (5), the tappet (9) exerts pressure on the return spring (8) and the regulator spring (7).

The regulator spring (7) moves the control spool (6) downwards at first, then closes the connection between the corresponding port and the tank port T.

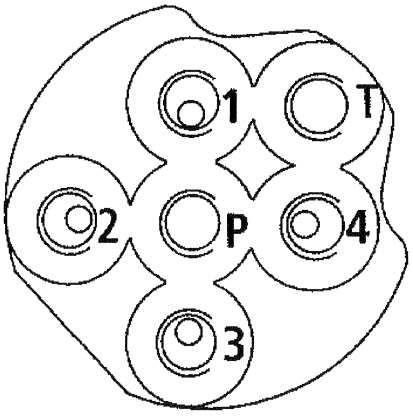
At the same time the corresponding port is connected to the port P via the bore (11).

The regulation procedure starts as soon as the regulator spool (6) finds its balance between the force of the regulator spring (7) and the force resulting from the hydraulic pressure in the corresponding port (1, 2, 3 or 4).

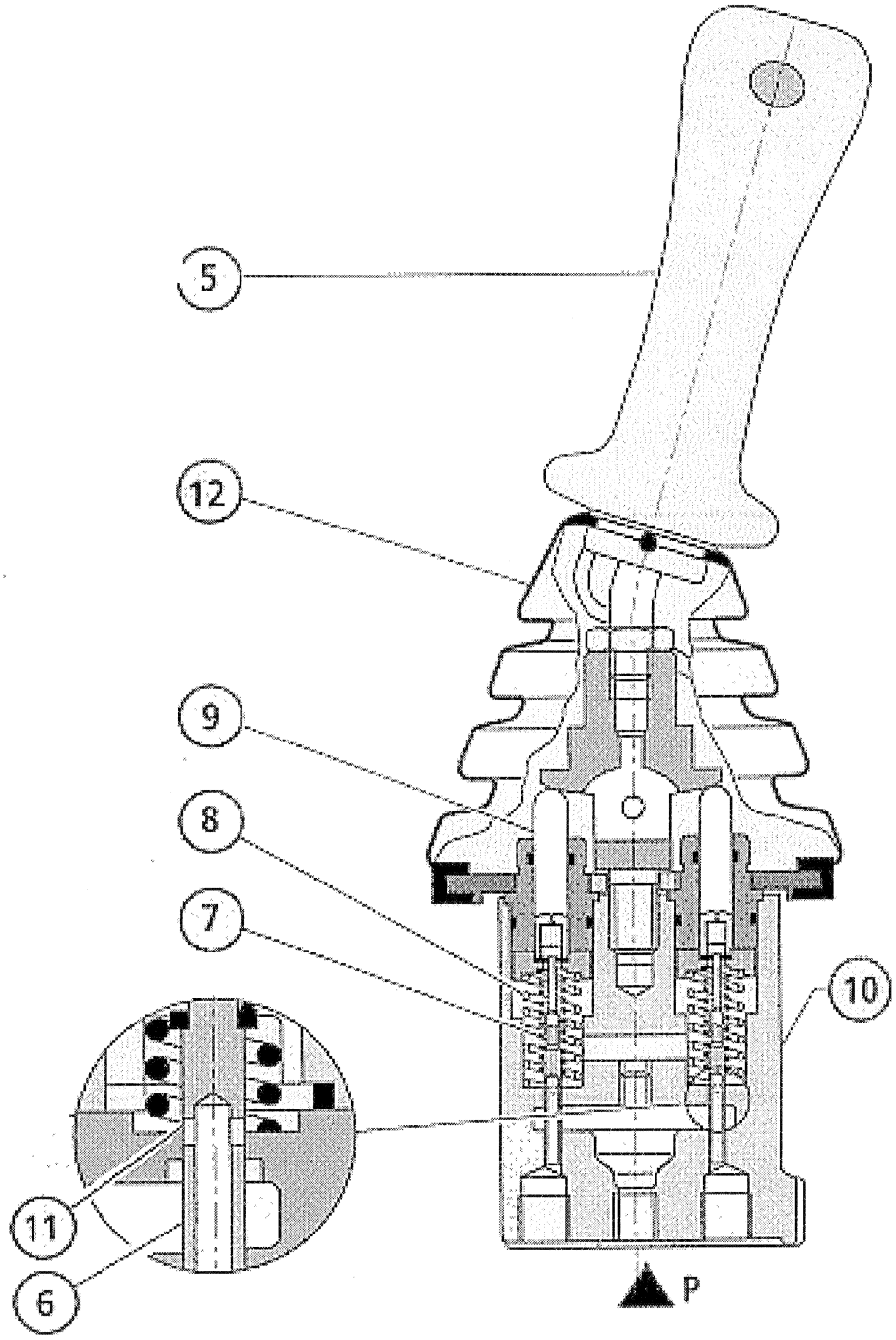
Due to the combined effect of the control spool (6) and the regulator spring (7), the pressure in the corresponding ports is proportional to the stroke of the tappet (9) and consequently to the position of the joystick (5).

This pressure regulation, dependent upon the position of the joystick and the characteristics of the regulator spring allows a proportional hydraulic control of all kinds of control valve banks and control valves for hydraulic pumps and motors.

A rubber collar (12) protects the mechanical parts of the housing against contamination. So these pilot-operated valves are also suitable for unfavourable operating conditions.



Pilot-operated valve type 4 TH 5



Functional description

Hydraulic pilot-operated valves of the type PCL 401 work on the basis of directional control pressure reducing valves.

These valves mainly consist of the control stick (5), 4 pressure reducing valves and the housing (10).

Each pressure reducing valve consists of a control spool (6), a regulator spring (7), a return spring (8) and a tappet (9).

When the joystick is not operated, it is held in neutral position by the return spring (8).

The ports (1, 2 , 3, 4) are connected with the tank port (T) by the bore (11).

When the control stick (5) is operated, the tappet (9) exerts pressure on the return spring (8) and the regulator spring (7).

The regulator spring (7) moves the control spool (6) downwards at first, then closes the connection between the corresponding port and the tank port T.

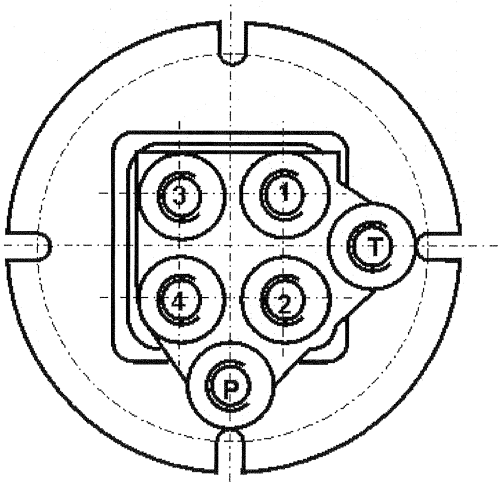
At the same time the corresponding port is connected to the port P via the bore (11).

The regulation procedure starts as soon as the regulator spool (6) finds its balance between the force of the regulator spring (7) and the force resulting from the hydraulic pressure in the corresponding port (1, 2, 3 or 4).

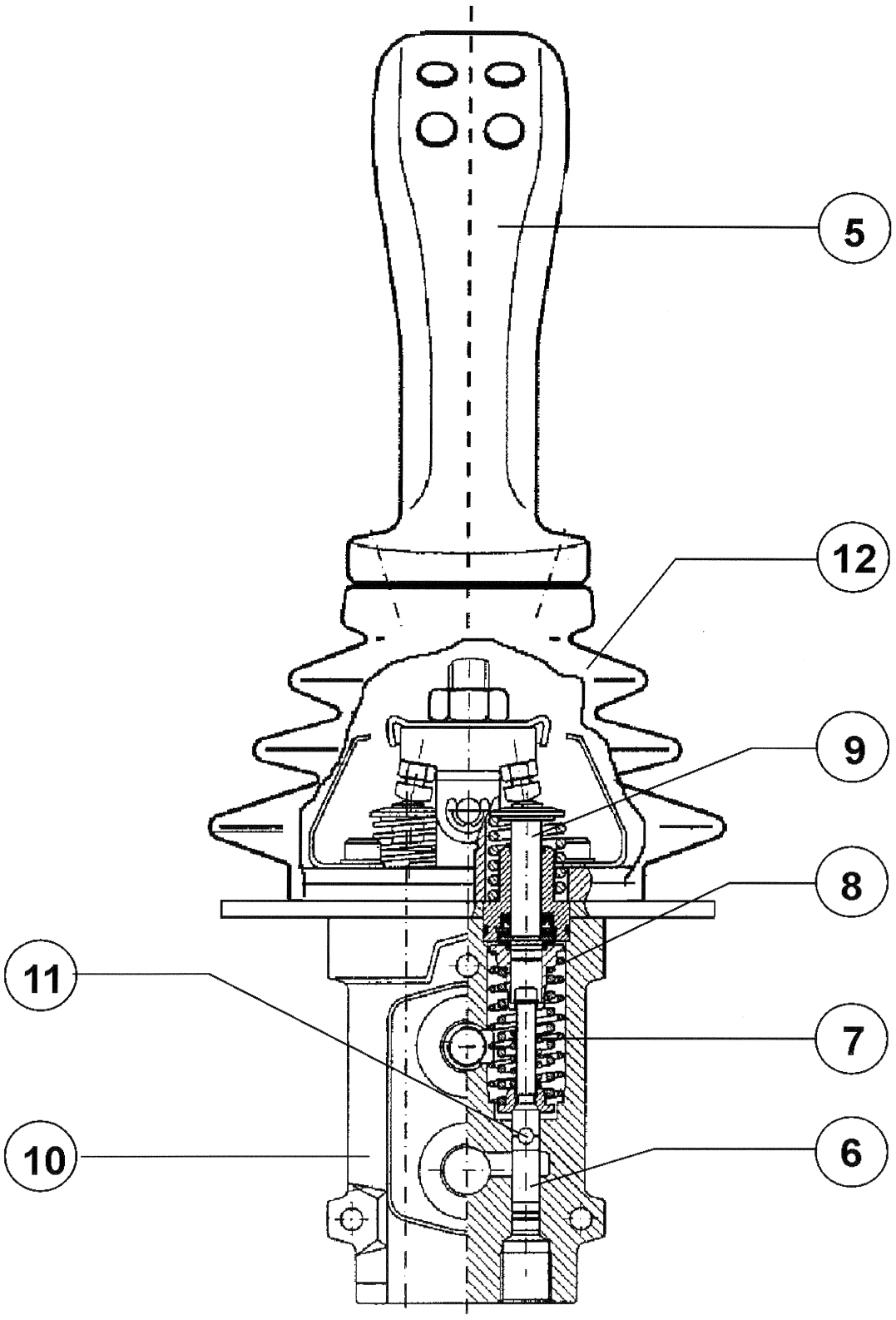
Due to the combined effect of the control spool (6) and the regulator spring (7), the pressure in the corresponding ports is proportional to the stroke of the tappet (9) and consequently to the position of the joystick (5).

This pressure regulation, dependent upon the position of the joystick and the characteristics of the regulator spring allows a proportional hydraulic control of all kinds of control valve banks and control valves for hydraulic pumps and motors.

A rubber collar (12) protects the mechanical parts of the housing against contamination. So these pilot-operated valves are also suitable for unfavourable operating conditions.

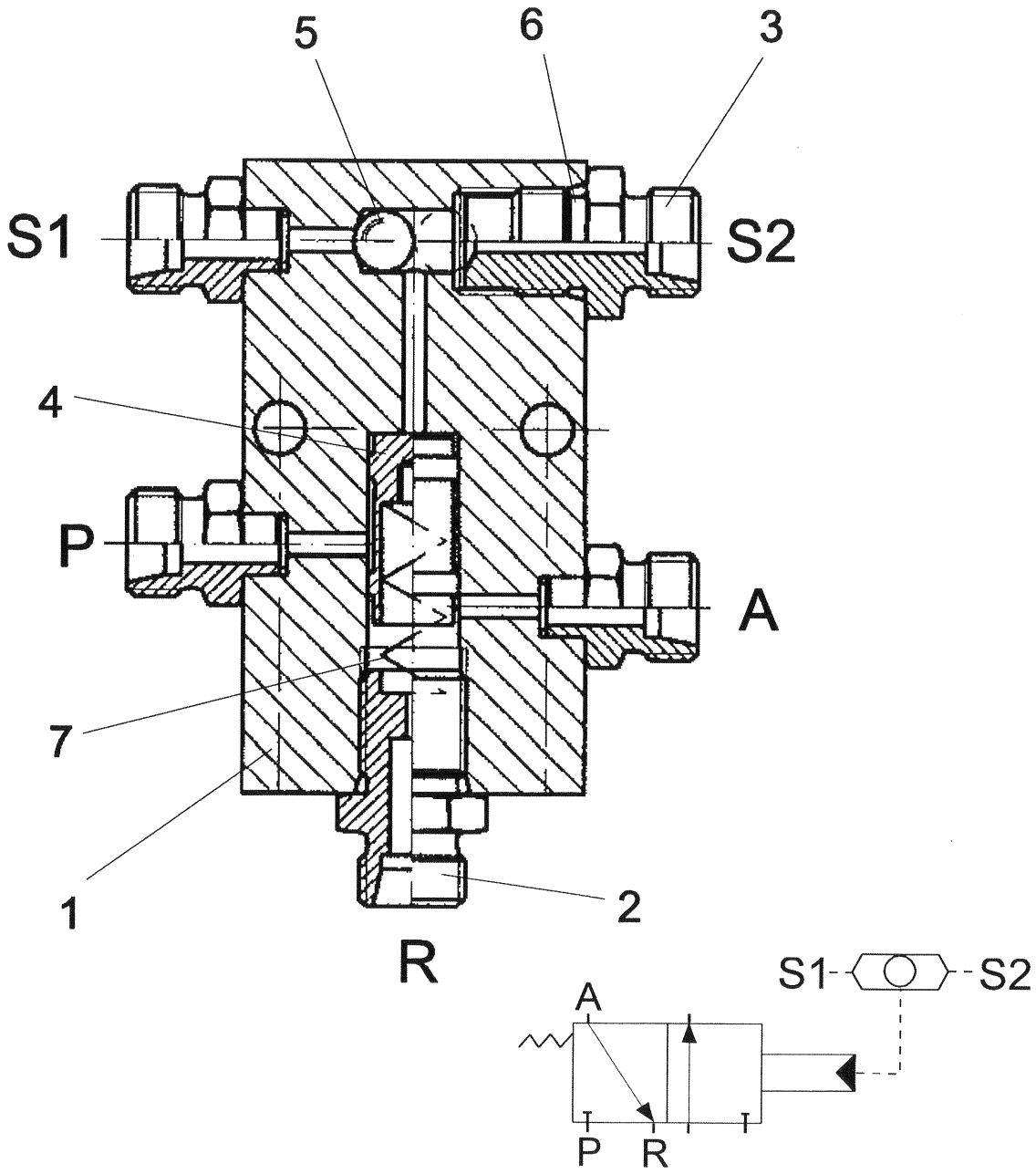


Pilot-operated valve type PCL 401



6.105.01/02.2001

Relay valve - slewing



1 relay valve
2 screwed socket
3 screwed socket
4 valve tappet
5 ball 8mm
6 O-ring
7 pressure spring

S1, **P** and **A** are soldered connections

SCHAEFF TEREX	Typ/Model/Type **Excavator, general**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Relay valve - swing**	Blatt/Page/Feuille **6.110.01**

The summation power control (DFSR) is based on the flow-controller (FR) (11) with an additional control valve (0) (horse power control valve). This valve is a specially designed pressure relief valve.

It consists of two springs (9), an eccentric (8) connected to the pump swash plate (7) and is equipped with two pressure ports (13, 14).

Both springs are destined to approach a hyperbolic characteristic curve. One spring is pre-loaded, the other one has clearance, both can be adjusted but only at test bench.

The eccentric loads or releases the springs depending on the pump swash plate position.

A pressure outlet connects the valve to the FR (flow controller) and to the pump's pressure line via the restrictor (2). The other pressure outlet (14) gives the opportunity to put load on the pre-loaded spring.

Function:

For a better understanding, it is easier to proceed in two steps:

1.) Pressure port X2 is released

The DFSR-system now works as an ordinary DFLR-control. The DFSR-controller is connected to the FR (flow-controller) (3, 4, 5, 10, 12) and via a restrictor (2) to the pump's pressure line. The pump is set to maximum displacement. The DFSR-controller is closed.

As soon as the max. pressure of the DFSR-controller is reached, the valve opens and the oil flow is led through line (13) via the control edge (1) into the pump's housing. Due to the restrictor (2) the pressure of the FR-controller (12), which the DFSR-controller is linked to, drops. The activated FR-controller swivels the pump to smallest displacement.

The eccenctric on the one hand closes the DFSR-controller and on the other hand loads the springs of the DFSR-controller (either one or both springs, this depends on the swash plate position). So, the max. pressure at the DFSR-controller is increased, i.e. with smaller displacement the pump can run at higher pressure. The springs of the DFSR-controller are chosen and adjusted in a such a manner that the hydraulic power outlet ($P \sim \Delta p \times Q$) remains nearly constant.

2.) Pressure port X2 is pressurized

Now the controller works as a summation power controller (DFSR). The preload of the spring is partially compensated depending on the pressure existing and on the relevant area of the piston of the DFSR-controller (1) loaded with pressure.

Compared to case 1, when pressure port X2 is not pressurized, the power control starts operating at relatively low pump pressure.

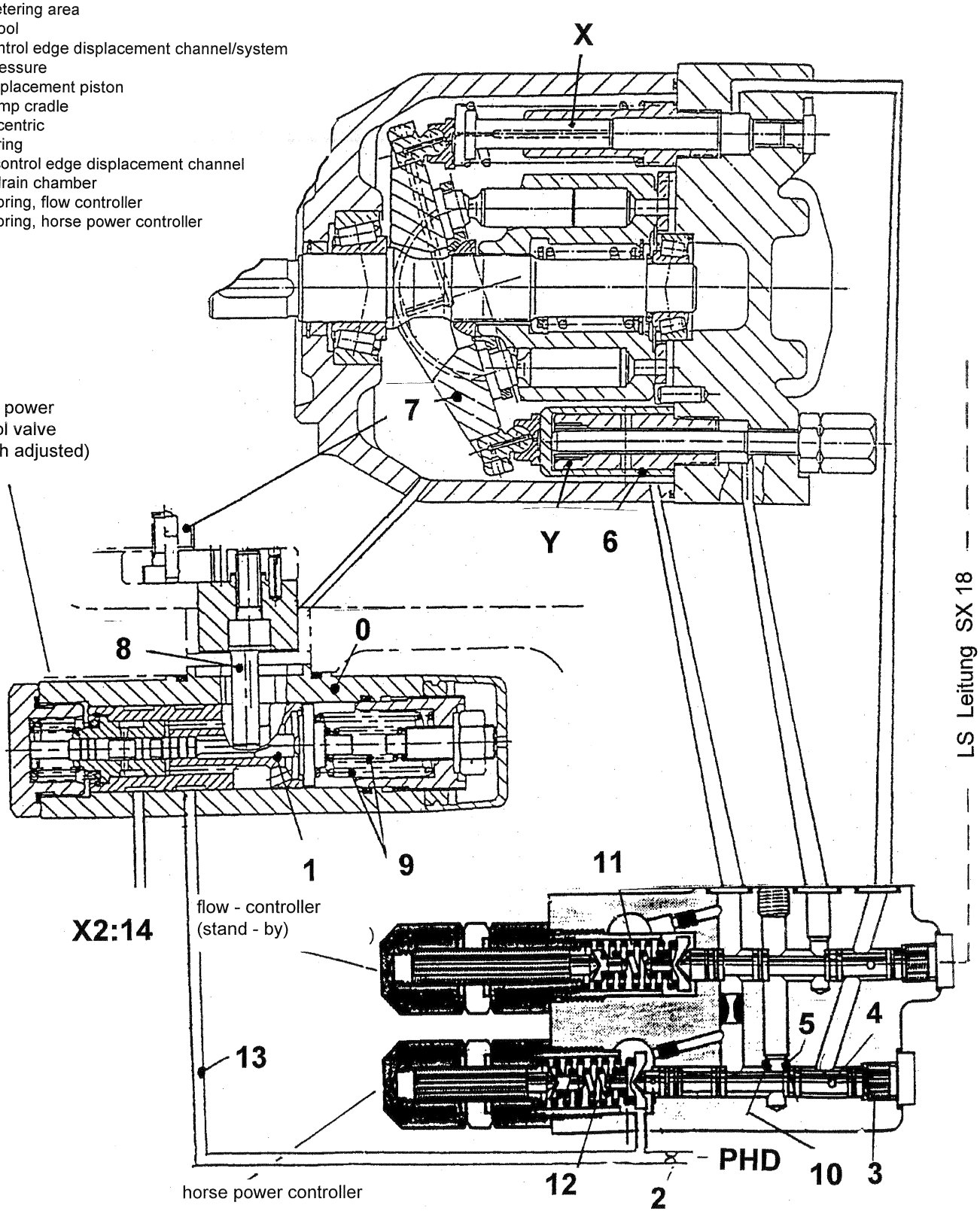
In other words, the power preset can be changed by simply pressurizing pressure port X2.

Otherwise, the DFSR-controller functions as described in 1.)

Adjustment:

- The stand-by pressure adjustment is effected at the FR (flow controller) (11) - see Technical Data
- Test port: At valve bank 1 (SX 18)
- Machine warmed up
- Full throttle
- Do not actuate the valve bank working functions

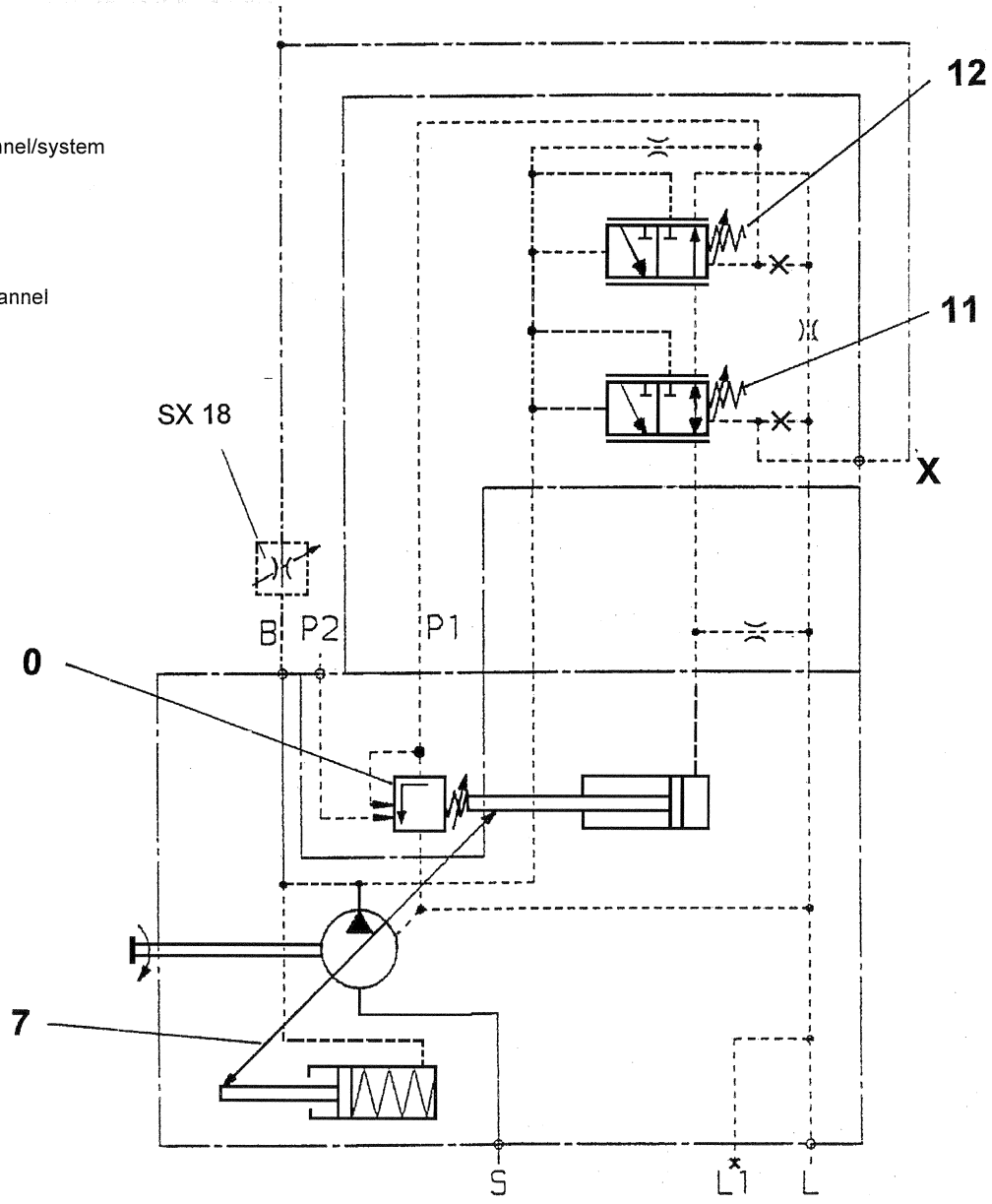
0 =horse power control valve
1 =control edge - tank
2 =restrictor
3 =metering area
4 =spool
5 =control edge displacement channel/system pressure
6 =displacement piston
7 =pump cradle
8 =eccentric
9 =spring
10 = control edge displacement channel drain chamber
11 =spring, flow controller
12 =spring, horse power controller



SCHAEFF	Typ/Model/Type **HML 41 - HS 41 / 41 M**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Summation power control A10 VO-DFSR**	Blatt/Page/Feuille **6.200.02**

A 10 V - DFSR
Hydraulikschaltplan

0 =horse power control valve
1 =control edge - tank
2 =restrictor
3 =metering area
4 =spool
5 =control edge displacement channel/system pressure
6 =displacement piston
7 =pump cradle
8 =eccentric
9 =spring
10 = control edge displacement channel drain chamber
11 =spring, flow controller
12 =spring, horse power controller



Description of function

- When the machine not running, the pump is set to max. swash plate angle
- When the machine is started, the pump is in Q_{min} - displacement

I. No load operation „idle running position"

The hydraulic pump feeds in two directions:

A. To the valve bank „SX 18". The flow stops at the final plate of the valve bank. Due to this, the load sensing (LS) line does not get any load signal to the flow controller (spring loaded side).

B. The oil flow opens the flow controller (11), this allows the flow passing through the pressure regulator to the servo piston (Y).

Result:

Now both pump servo pistons have the same pressurization, the only difference is the piston area, i.e.:

The servo piston (Y) has a larger pressure area compared to the servo piston (X) which has additional spring load. This effects that the swash plate swings back to nearly „zero" flow. The servo piston (Y) feeds the oil at the end stroke point through a small traverse hole into the pump case (drain).

Note:

When the pump is in neutral position, there is only an oil flow of about 3.5 l/min at a stand-by pressure of 25 bar at full throttle.

Checking: At the SX 18 - valve bank inlet section there is a gauge port to check the „stand-by" pressure. Adjustment possibilty at the LS-controller (flow controller).

II. Valve bank is operated „half working load"

When the SX 18 - valve bank spool (single or multiple) is operated, a load pressure (LS) signal is sent through a spool-integrated restriction via a shuttle check valve to the load sensing flow controller (spring loaded side).

Result:

The flow controller closes and the servo piston (Y) has connection to the drain line. Restrictions allow smooth positioning movements. The pressure decreases at the control piston (Y), at control piston (X) the pressure increases → hydraulic pump feeds to the consumer !

Up to a pressurization of approx. 100 bar, the variable displacement pump is in max. swash plate angle. The horse power control regulator and horse power control valve are not working.

Note:

Only the highest load sensing pressure in the SX 18 - valve 1 is signalled to the pump.

III. Valve bank is operated - „stronger working load"

As soon as the system pressure (working pressure) is exceeding the middle value, the horse power control regulator acts as well (in connection with the horse power control valve), i.e. in front of the horse power control regulator restrictor, there is a different pressurization on the horse power control regulator due to Δ p.

Result:

The horse power control regulator opens dependently upon the pressure increase and pressure is fed again to the servo piston (Y) = **reduction of pump swash plate angle.**

At the same time the horse power control valve is pre-loaded with pressure by means of a connection line coming from the horse power control regulator (spring loaded side). The double spring in the horse power control valve is influenced by an eccentric connection (swash plate / horse power control valve piston). Both springs are set independently of each other at the test bench so that the most favourable power curve is reached together with the horse power control regulator. At a high power load rate the horse power control valve opens to the tank and the horse power control regulator „switches" the systems pressure to the servo piston (Y).

Result: The variable displacement pump moves back considerably =
smallest pump swash plate angle at high working pressure

The working pressure can increase further until the pressure has reached for example 250 bar, at this moment the load-sensing main relief valve in the SX 18 - valve bank is in action. The pump swings back to minimum swash plate angle.

Test and pressure setting:

At the SX 18 - valve bank inlet there is a gauge port for testing the pressure. Adjustment possibility at the LS-pressure relief valve (setting screw) at full pressure load.

Note:

Any adjustment of the horse power control regulator resp. horse power control valve is only possible at a test bench. Do not remove the horse power valve: The power curve changes in case of eccentric damage. The stand-by pressure (= 25 bar) is set at the flow controller while the machine is warm, at full throttle, valve banks not operated.

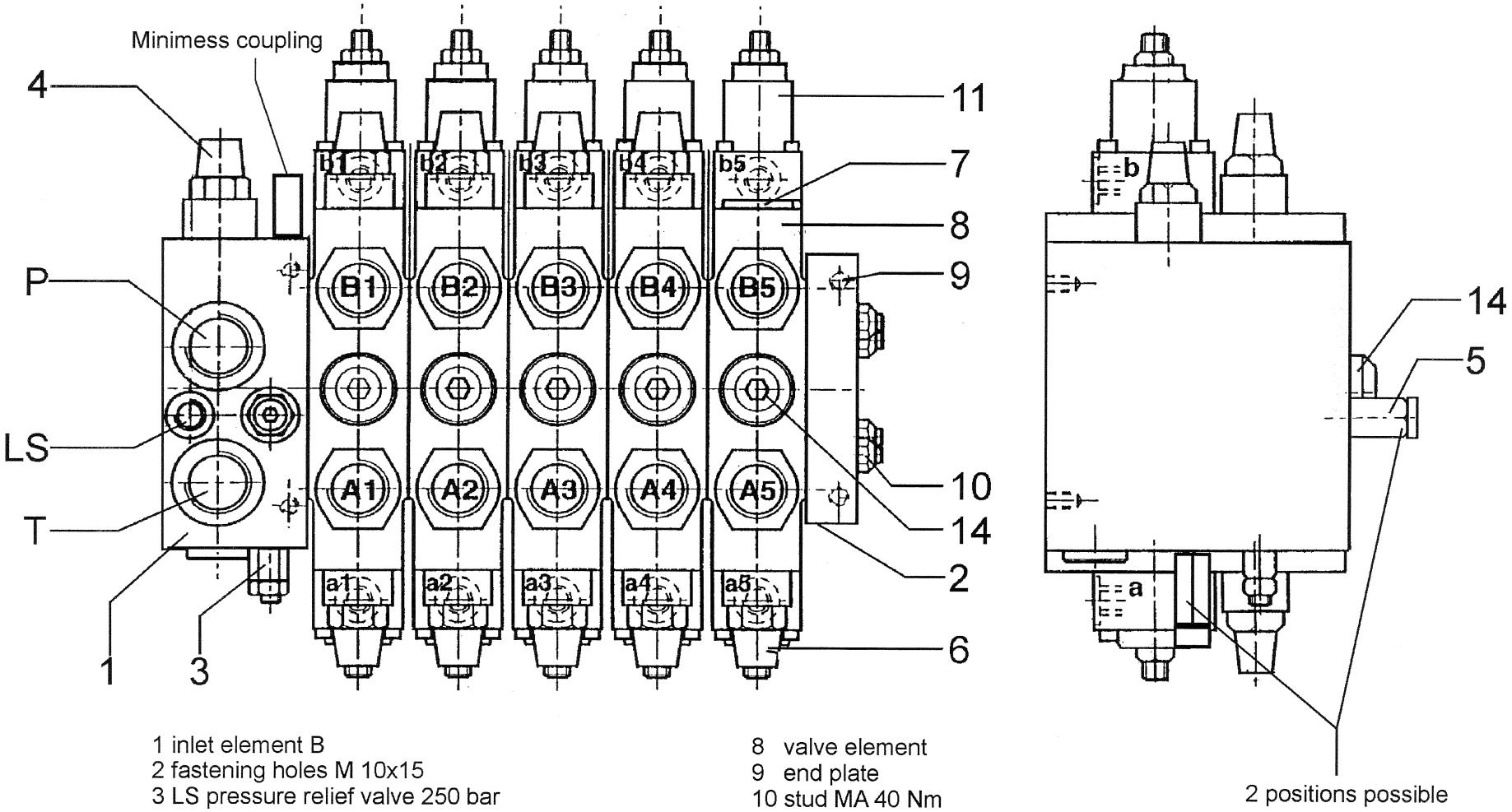
SCHAEFF

Typ/Model/Type
Valve bank SX 18

Benennung/Description/Dénomination
View

Datum/Edition/Date
01.2000

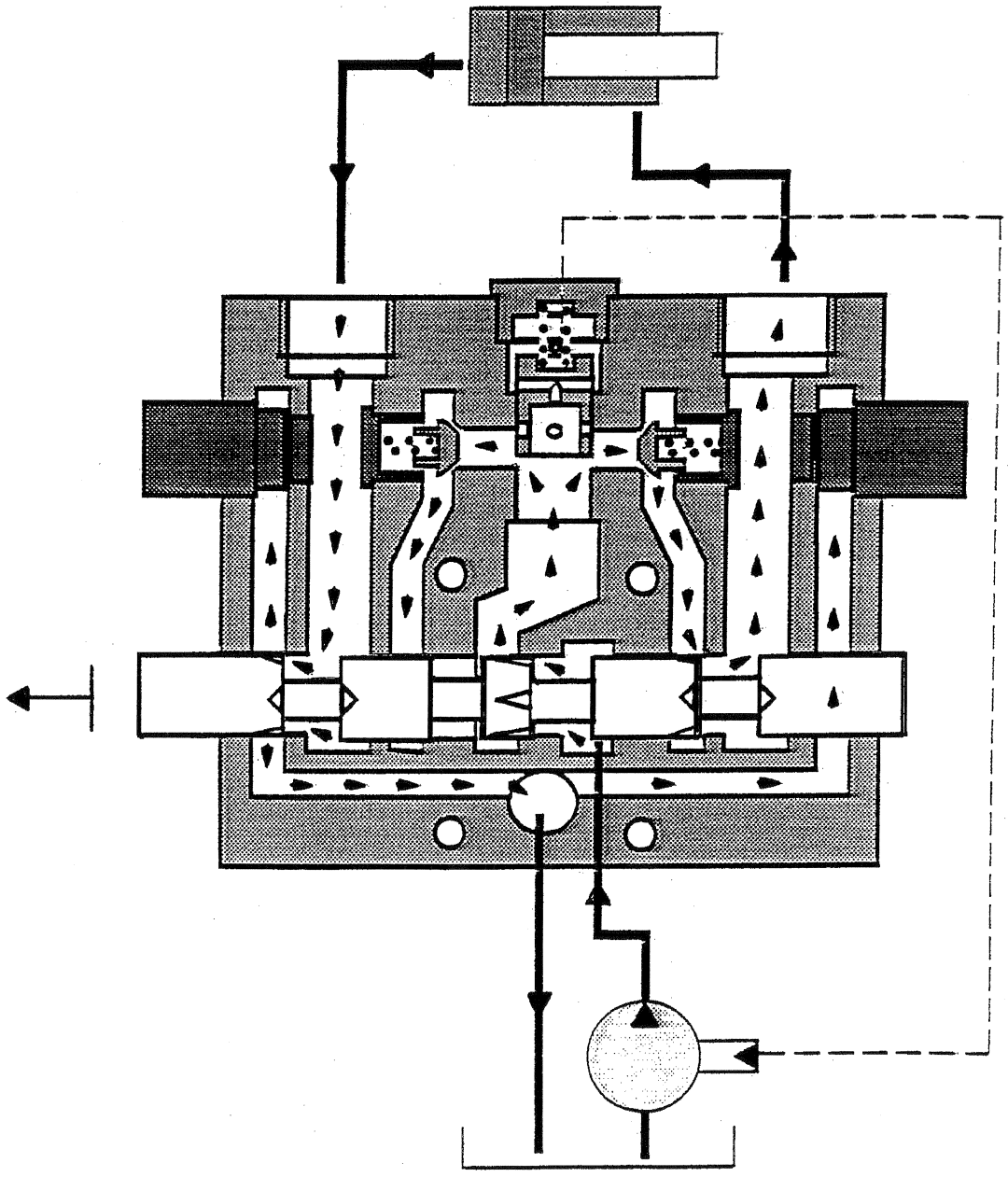
Blatt/Page/Feuille
6.200.04

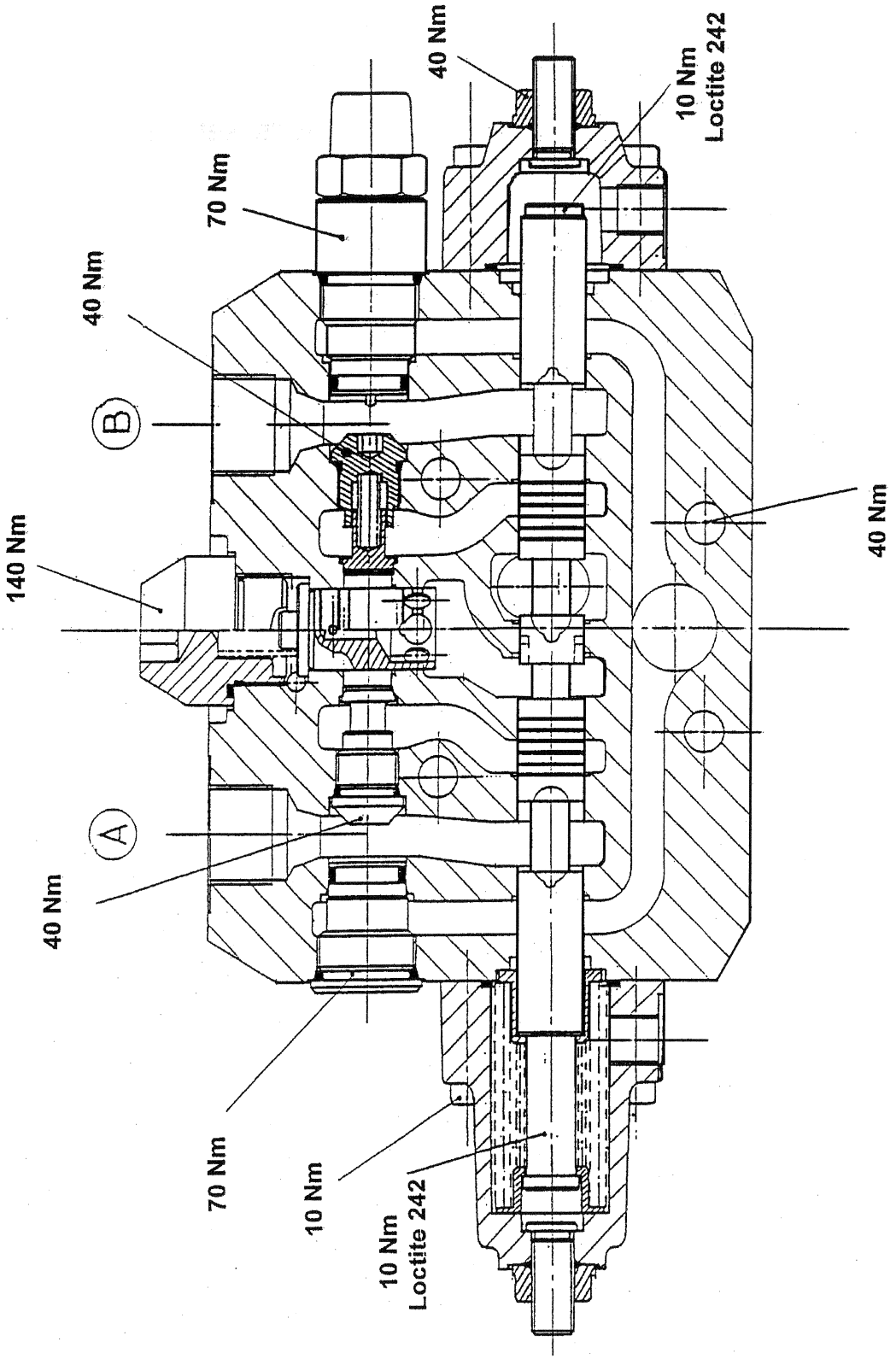


1 inlet element B
2 fastening holes M 10x15
3 LS pressure relief valve 250 bar
4 primary pressure relief valve 280 bar
5 LS flow regulator valve
6 line relief valve, pilot-operated
7 plug
8 valve element
9 end plate
10 stud MA 40 Nm
11 hydraulic operation with stroke limitation on ports A and B
14 pressure compensator plug MA 140 Nm

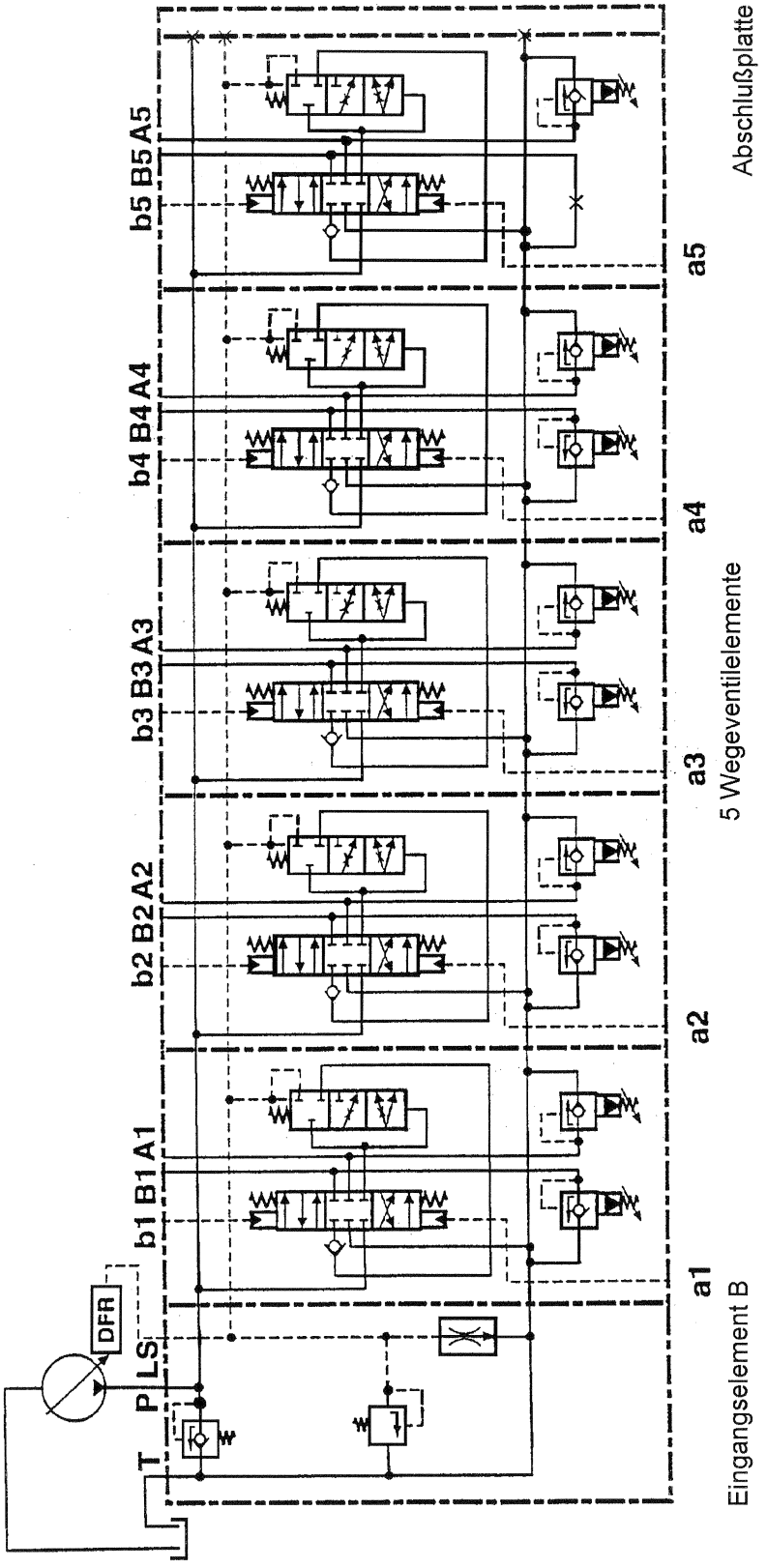
Rexroth valve bank SX 18

Control spool operated

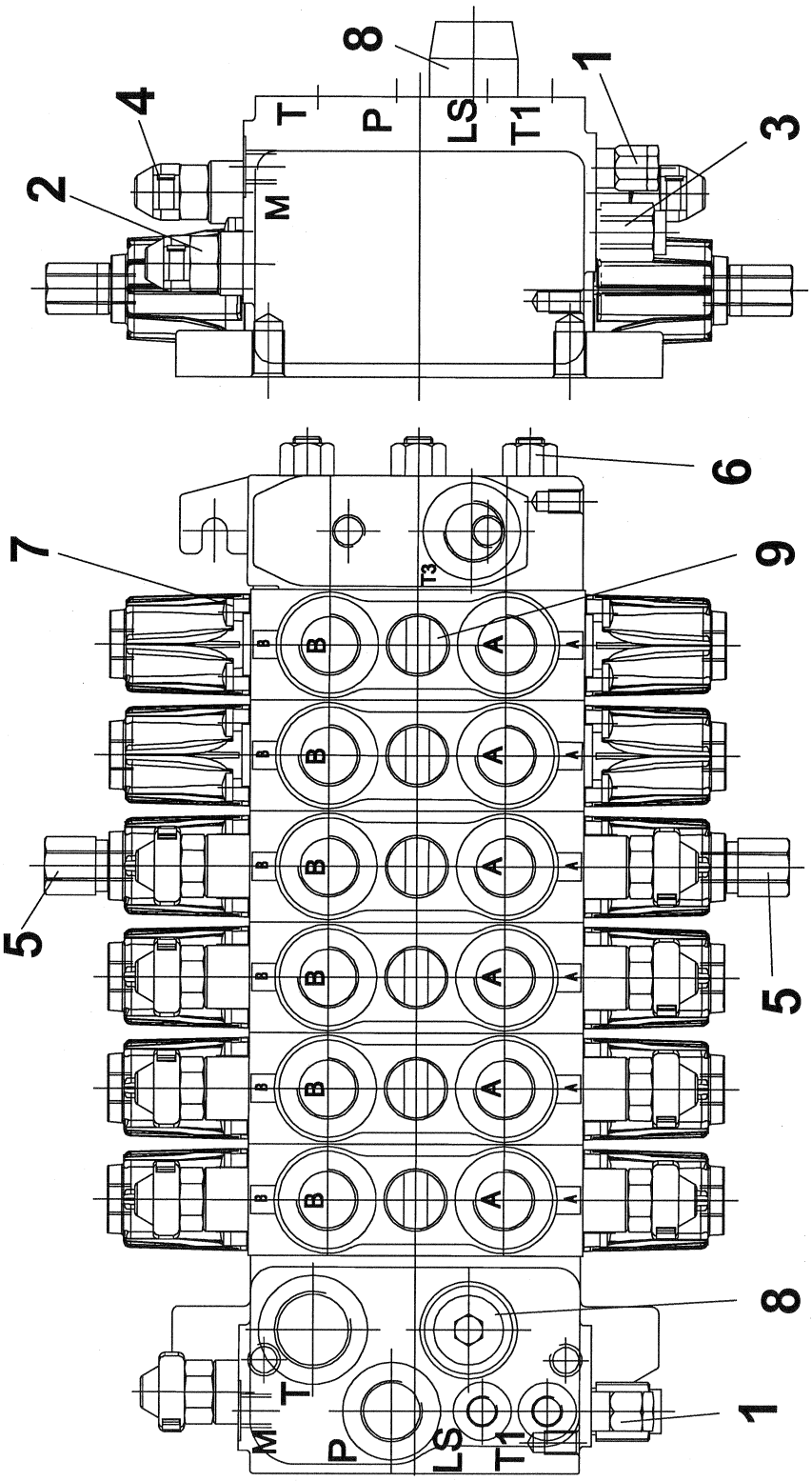




SCHAEFF	Typ/Model/Type **Valve bank SX 18**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Tightening torques**	Blatt/Page/Feuille **6.200.05**

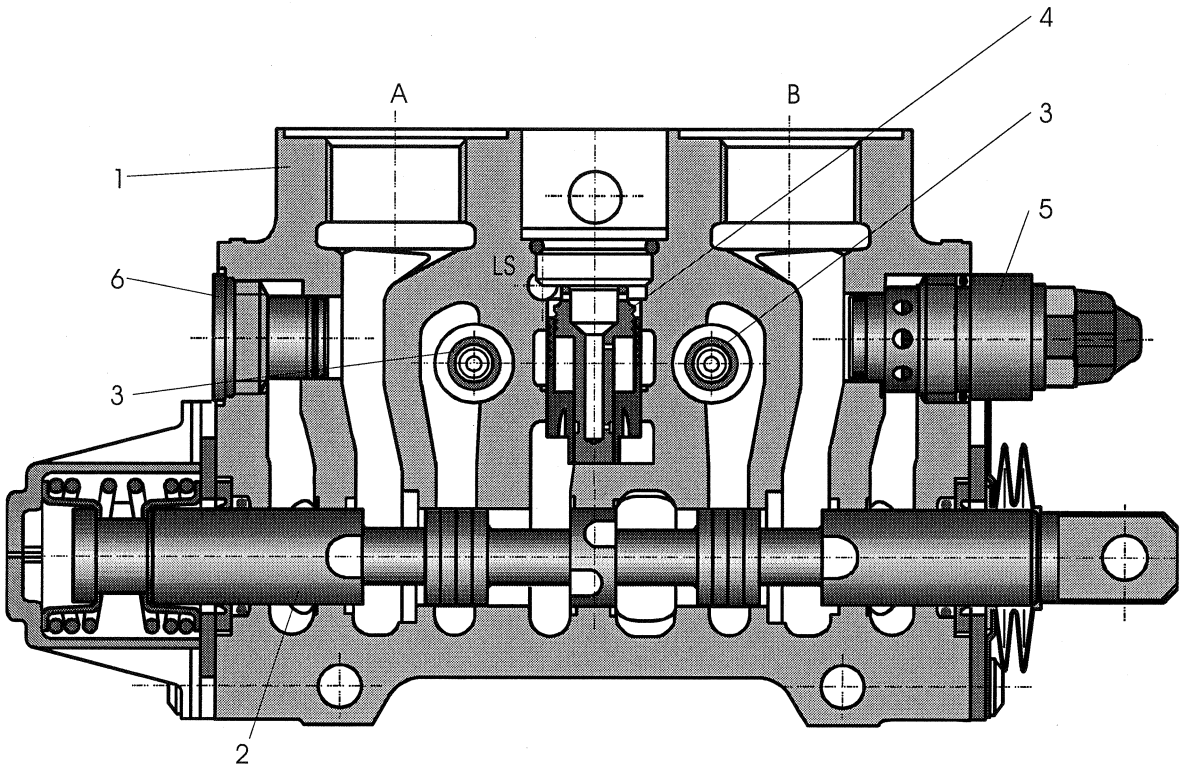


SCHAEFF	Typ/Model/Type **Valve bank SX 18**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **6.200.06**



TEREX | SCHAEFF	Typ/Model/Type **Valve bank SX 14**	Datum/Edition/Date **01.2005**
	Benennung/Description/Dénomination **Tightening torques**	Blatt/Page/Feuille **6.210.01**

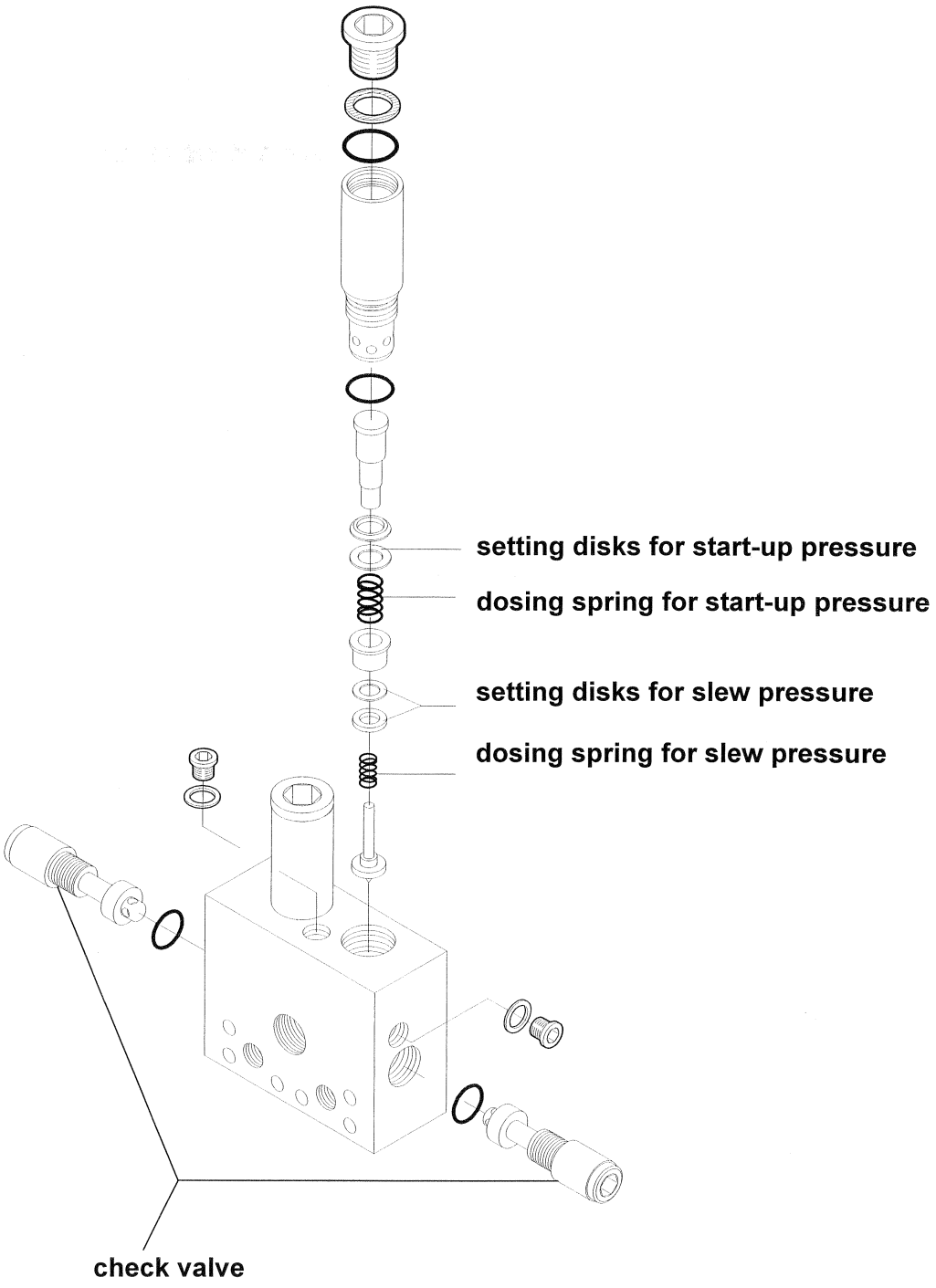
1 LS-Ventil M_A=45Nm	**1** LS-valve torque=45Nm	**1** limiteur LS couple de serrage=45Nm
2 Sicherheitsventil M_A=70Nm	**2** safety valve torque=70Nm	**2** limiteur de securité couple de serrage=70Nm
3 LS-Stromregelventil M_A=20Nm	**3** LS-flow regulator valve torque=20Nm	**3** régulateur de débit LS couple de serrage=20Nm
4 Sekundärventile M_A=70Nm	**4** line relief valves torque=70Nm	**4** clapets secondaires couple de serrage=70Nm
5 Schieberweg-begrenzung M_A=40Nm	**5** spool stroke limitation torque=40Nm	**5** limitation de course du tiroir couple de serrage=40Nm
6 Zuganker M12 M_A=60Nm	**6** tie rods M12 torque=60Nm	**6** tirants M12 couple de serrage=60Nm
7 Schrauben für Vorsteuerkappe M_A=10Nm	**7** screws for hydraulic control housing torque=10Nm	**7** vis de fixation du boîtier de la commande hydraulique. couple de serrage=10Nm
8 Druckwaage Eingangssektion M_A=100Nm	**8** pressure compensator inlet section torque=100Nm	**8** balance de pression entrée couple de serrage=100Nm
9 Druckwaagenstopfen M_A=60Nm	**9** pressure compensator plug torque=60Nm	**9** balance de pression bouchon couple de serrage=60Nm



1 Gehäuse	**1** housing	**1** boîtier
2 Steuerschieber	**2** spool	**2** tiroir
3 Rückschlagventile M_A = 30Nm	**3** check valves torque = 30Nm	**3** clapets maintien de charge Couple de serrage = 30Nm
4 Druckwaage	**4** pressure compensator	**4** balance de pression
5 Sekundärventil	**5** line relief valve	**5** clapet secondaire
6 Verschlussstopfen	**6** plug	**6** bouchon

TEREX | SCHAEFF	Typ/Model/Type **Valve bank SX14**	Datum/Edition/Date **01.2005**
	Benennung/Description/Dénomination **Sectional view (principle)**	Blatt/Page/Feuille **6.210.02**

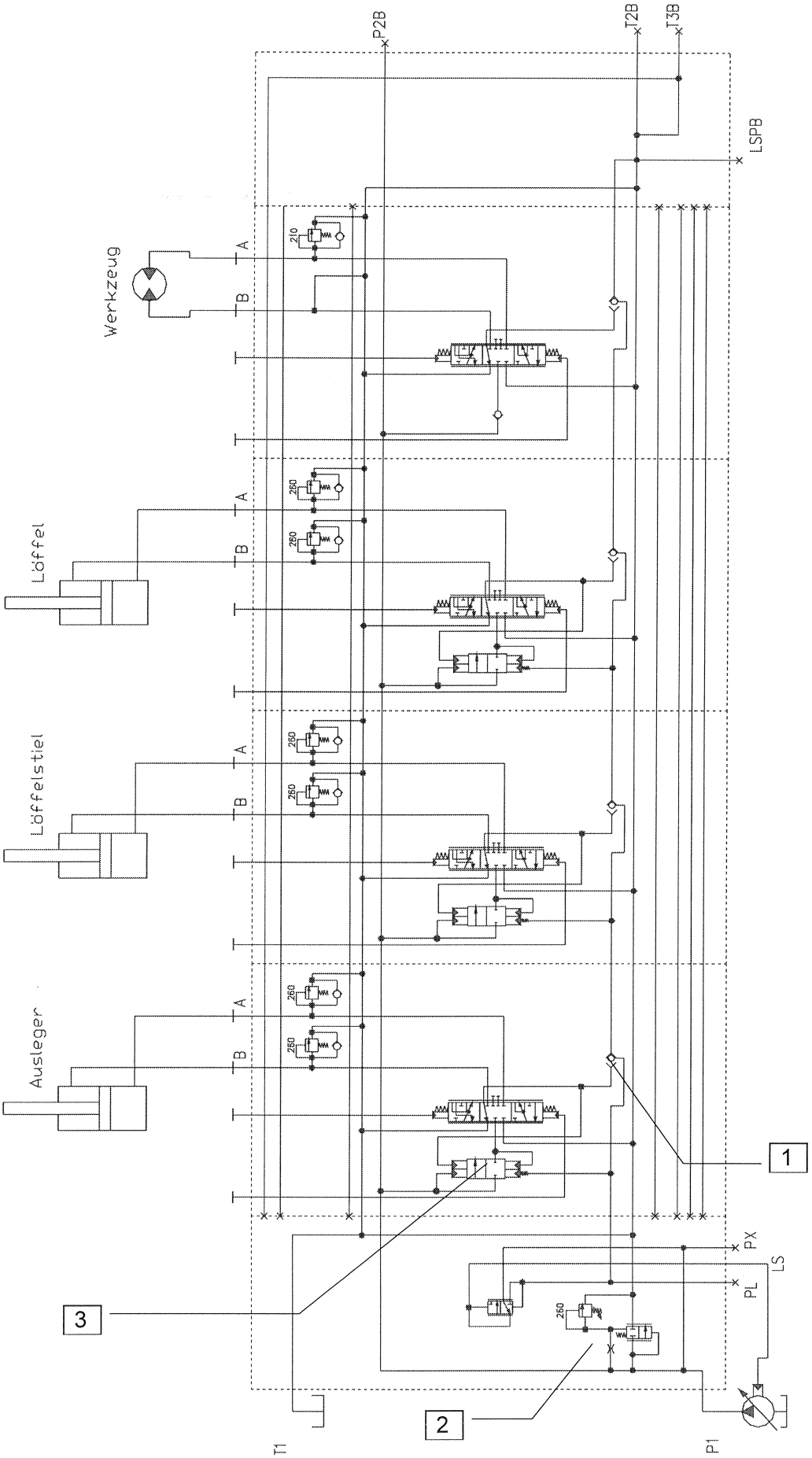
TEREX | SCHAEFF



damped slew pressure relief valve

VOAC (Super - Choke - Less)

SCHAEFF	Typ/Model/Type **HML 22 / HR 22**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Slew pressure relief valve**	Blatt/Page/Feuille **6.240.01**



Werkzeug = equipment, Löffel = bucket, Löffelstiel = dipperstick, Ausleger = boom

SCHAEFF	Typ/Model/Type **VOAC L 90 LS**	Datum/Edition/Date **01.2001**
	Benennung/Description/Dénomination **Hydraulic diagram, valve bank**	Blatt/Page/Feuille **6.250.01**

The L 90 LS is a load sensing directional control valve in sectional design with pressure compensation.

The oil flow of the variable displacement pump is led to the directional control valve via P1.

The oil flow to the consumer and to the tank is blocked if all spools are in neutral position.

All spools in the valve are fed with oil in parallel.

By the actuation of a spool, the load pressure is signalled to the pump via the shuttle valves ①.

The position of the shuttle valves guarantees that the max. load pressure is signalled to the variable displacement pump.

The max. load pressure is limited and adjusted by the pressure relief valve ②.

The pressure balances ③ situated in each section guarantee that the corresponding consumer moves independently of the pressure changes in the system.

Furthermore, the pressure balance prevents the stop of any consumer if a consumer requires more oil than the pump can supply (Δp gets smaller).

All line relief and anti-cavitation valves are easily accessible and can be changed or replaced without problems.

position neutre
neutral position
Neutrale Position

pression, haute
pressure, high
Druck-Hoch

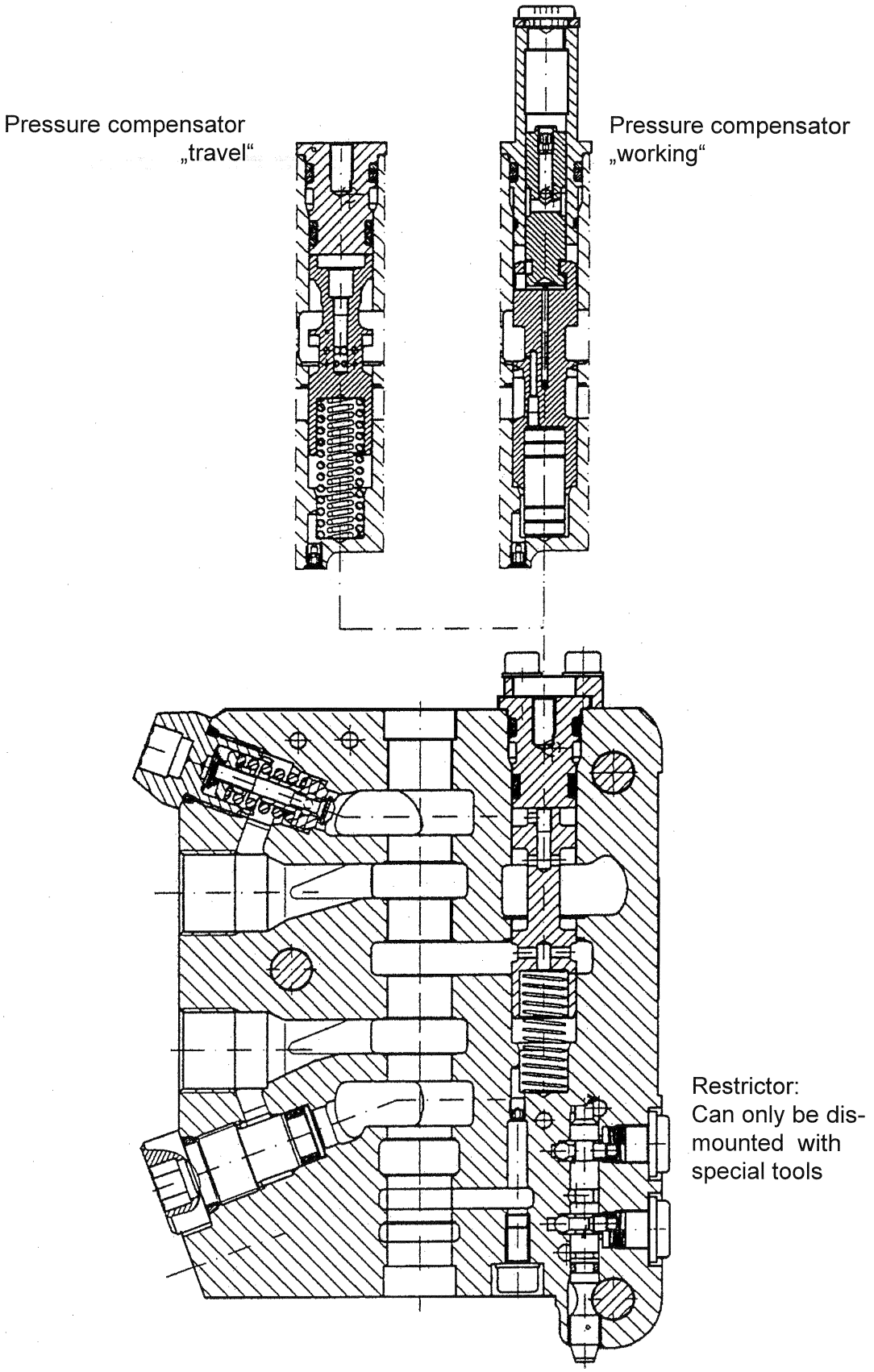
pression pompe
pump pressure
Pumpen-Druck

raccords, équipement
connexions, working
Arbeitsanschlüsse
(Verbraucher)
(consommateurs)

tank pressure
pression réservoir
Tank-Druck

pression,basse
pressure, low
Druck-Niedrig

SCHAEFF	Typ/Model/Type **VOAC L 90 LS**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Control valve segment - principle**	Blatt/Page/Feuille **6.250.03**


Pressure compensator
„travel“
Pressure compensator
„working“
Restrictor:
Can only be dis-
mounted with
special tools

This system cushions the swinging movements of the loader which occur during driving. This system works with empty and full loader bucket.

This results in the following advantages:

- high transport speed
- stable manoeuvrability
- shorter braking distance
- higher comfort for the driver
- high handling rate

The ride control system can be switched on or off by a rocker switch located in the dashboard. A sensor in the rear axle measures the speed.

The signal is transmitted to the speedometer and the threshold switch. Independently of the travel speed "rabbit" or "tortoise", from the speed of 6 km/h the threshold switch switches on the ride control system via a solenoid valve located in the stabilizing module.

Peak pressures, which can be created when working with the loading equipment, cannot reach the accumulator system when the speed is below 6 km/h, thus the accumulators are not strained unnecessarily. In addition, the lifting frame would be unstable.

Switching position:

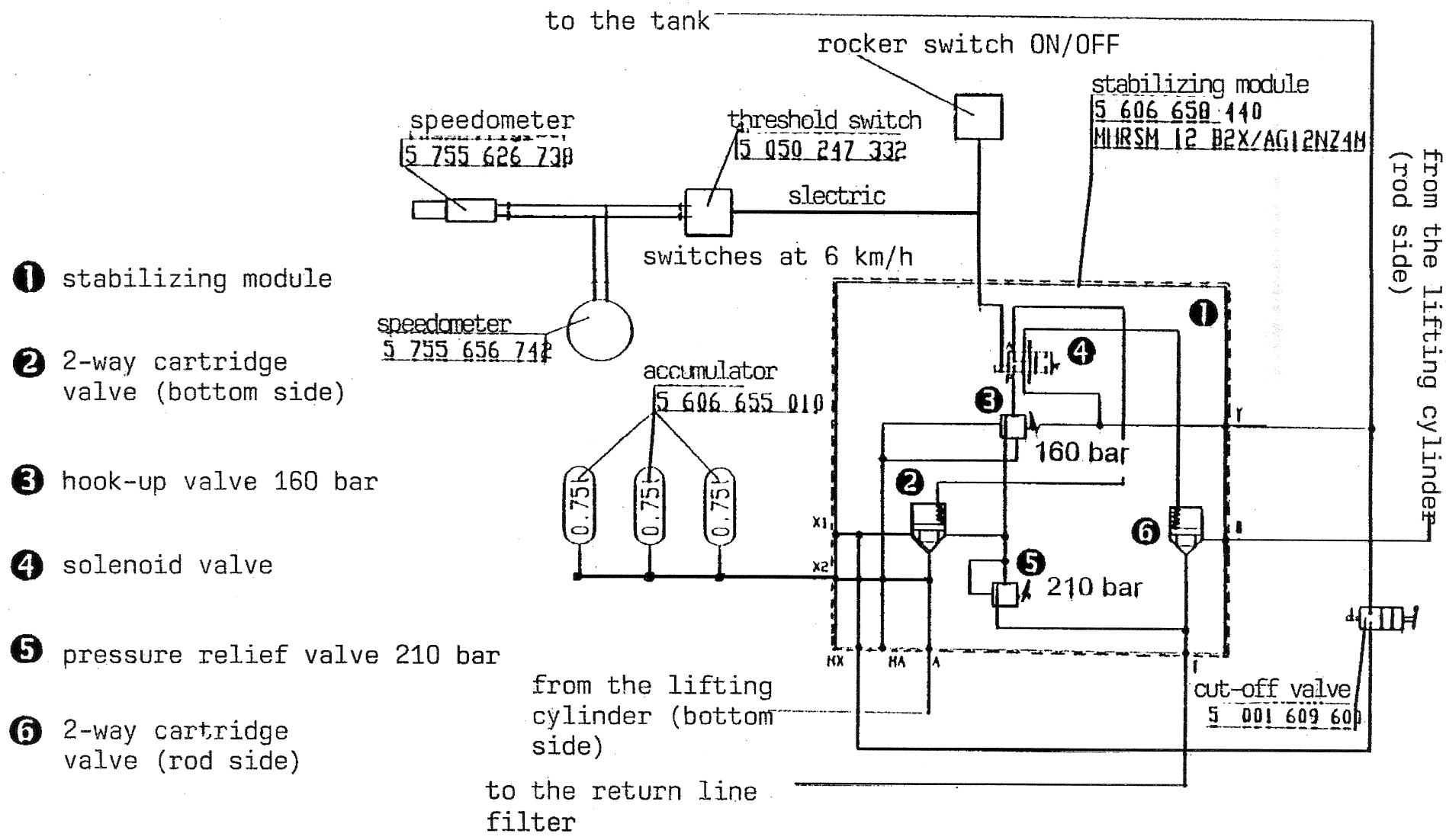
The ride control system is switched on.

When the travel speed of 6 km/h is reached, the threshold switch transmits an electric signal to the solenoid valve (4). The oil, which was „locked in" on the spring-loaded side of the 2-way cartridge valve (2) and (6) before, now has return connection to the tank.

By the relief of the valve (2), there is a connection between lifting cylinder (bottom side) and accumulators. At the lifting cylinder (rod side) the oil flows to the return line filter via the 2-way cartridge valve (6). So the lifting cylinder can oscillate cavitation-free.

Attention:

There is a ball valve installed between accumulator and 2-way cartridge valve (2) in order to depressurize the accumulators when repairs have to be performed at the system.


❶ stabilizing module
❷ 2-way cartridge valve (bottom side)
❸ hook-up valve 160 bar
❹ solenoid valve
❺ pressure relief valve 210 bar
❻ 2-way cartridge valve (rod side)
to the tank
rocker switch ON/OFF
stabilizing module
5 606 650 140
MHRSM 12 B2X/AG12NZ4M
speedometer
5 755 626 730
threshold switch
5 050 247 332
slectric
switches at 6 km/h
speedometer
5 755 656 742
accumulator
5 606 655 010
0.75l
0.75l
0.75l
160 bar
210 bar
X1
X2
HX
HA
A
T
from the lifting cylinder (bottom side)
to the return line filter
from the lifting cylinder (rod side)
cut-off valve
5 001 609 600

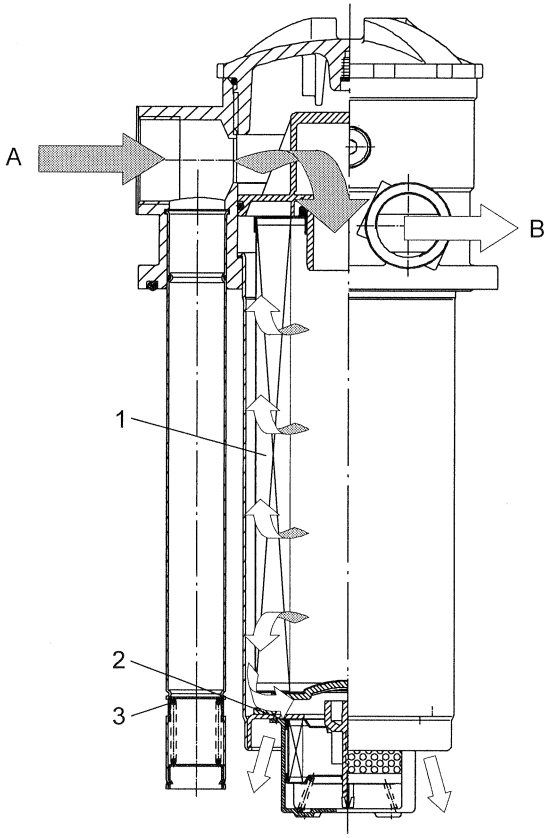
Suction filter function:
A 100% filtration of the suction flow guarantees that the boost pump is not contaminated.

Return filter function:
By means of the full flow filtration in the system return, any contamination remaining in the system after the assembly or repair or getting into the system from outside, is completely filtered.

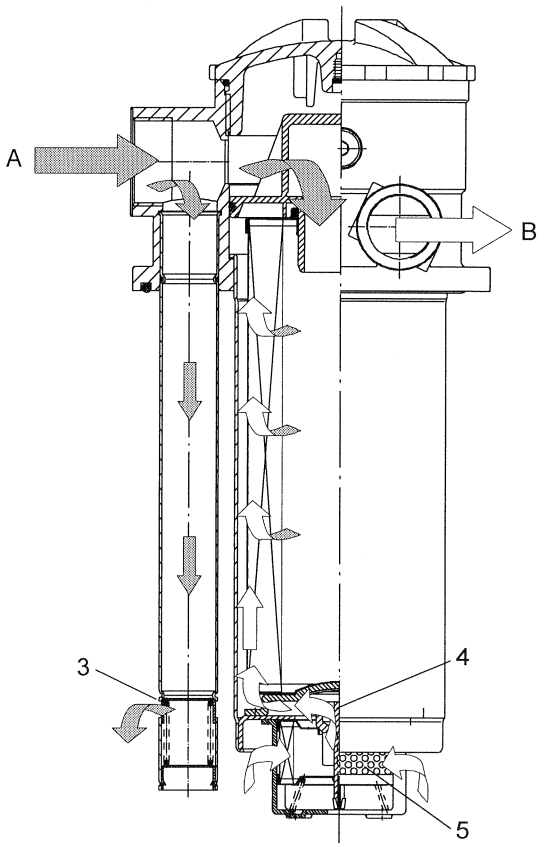
Functioning:
The hydraulic oil coming from the system return (A) passes the filter element (1). The volume the boost pump of the hydrostatic transmission (B) needs is supplied by a pressure valve (2) pressurised up to 0.5 bar. The surplus oil between the return flow and suction flow is fed into the tank in filtered condition.
The pressurisation of 0.5 bar in the suction line reduces the cavitation risk in the boost pump thus allowing excellent cold start characteristics.
An integrated pressure relief valve (3) prevents an inadmissibly high back pressure in the return line. There is no direct connection between the system return (A) and the suction port of the boost pump (B) (no bypass) as this valve leads directly to the tank.
The anti-cavitation valve (4) with the sieve (5) of the filter fineness of 125µm guarantees the supplies of the boost pump in case of a brief oil shortage (drain / cold start).

There is no oil shortage with normal operation.

normal operation



anti-cavitation operation



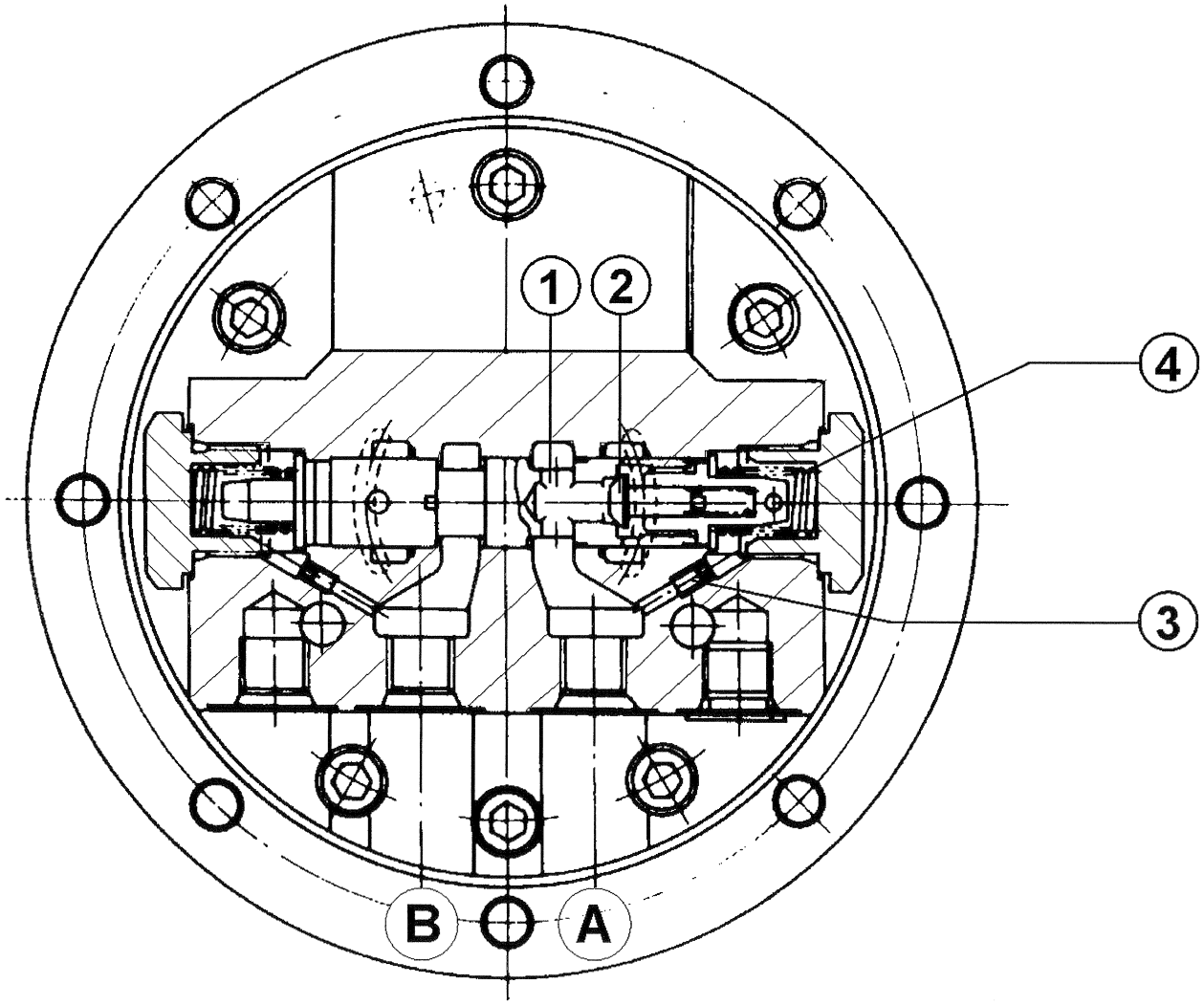
SCHAEFF	Typ/Model/Type **SKL, general**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Suction - return filter**	Blatt/Page/Feuille **6.520.01**

Start-up:
Pressurization of **A**:

The hydraulic oil flows through the cross hole (**1**) in the groove of the spool to the check valve (**2**) and via the control slots through the valve plate to the travel motor pistons.
The return line is still blocked. The pressure is fed into the spring compartment (**4**) via the orifice (**3**), the spool moves to the left and releases the return line **B**.
The travel motor turns, the machine travels.

Brakes (downhill):

The pressure side relieves during downhill travel as the travel motor, driven by the machine's own weight, turns into a pump.
By this pressure drop in the spring compartment (**4**) the spool moves towards neutral position.
The return line **B** is blocked until pressure is again built up on the feed side **A**.
The spool levels out in this position and keeps the travel speed constant.
Analogous in reverse travel.



SCHAEFF	Typ/Model/Type **HR - general**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Travel motor - travel brake spool**	Blatt/Page/Feuille **6.740.01**

Slew motor - pressure limitation

Valve type: **Pilot-operated pressure relief valve with pressure hook-up**

This valve effects a smoother braking of the slew procedure

- **Description of function**
- **Setting instructions**

HS41 / HS41M / HS41MM :

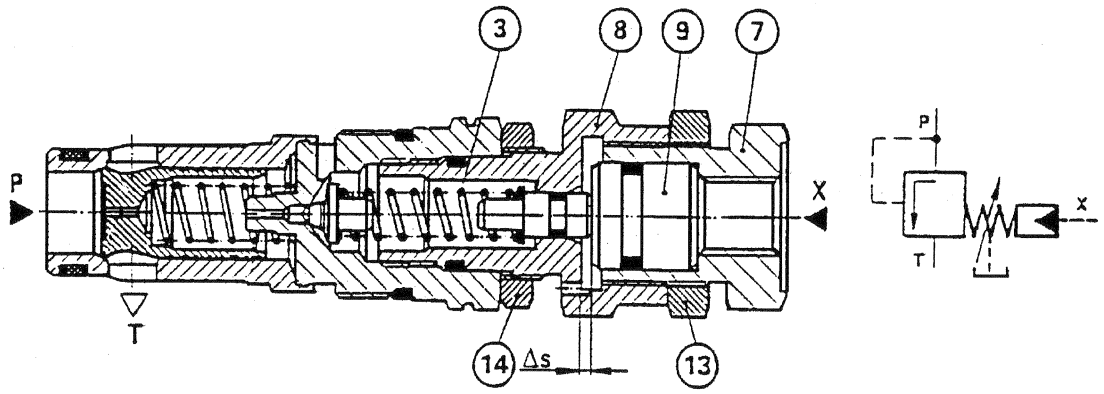
The spring (3) is pre-loaded by an external pressurization of the piston (9) with pilot pressure (P_{st} max. 30 bar) via the port x.

The value of the spring pre-load is determined by the piston stroke Δs.

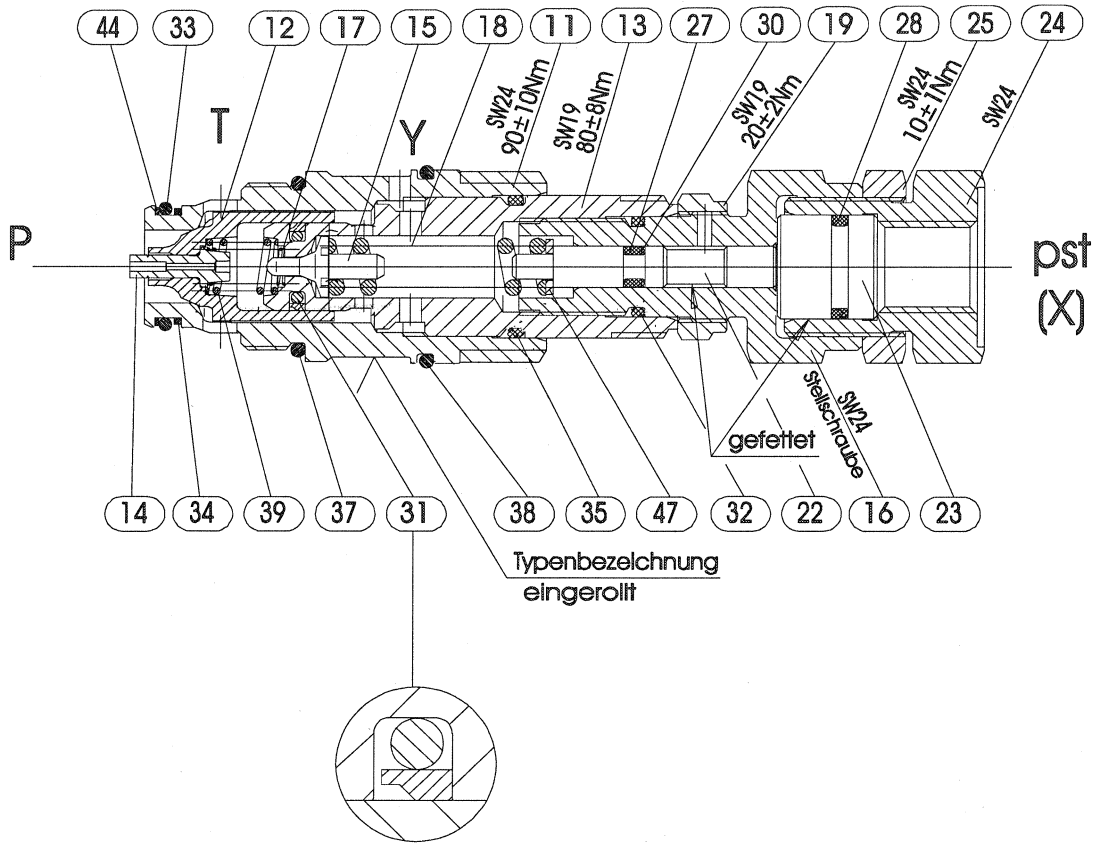
The hook-up pressure increase Δp is adjusted to (**280 bar – HS 41**) and (**250 bar – HR / HML32**). The adjustment has to be effected by the setting screw (7) and the counter nut (13). 1 turn corresponds to 150 bar.

Adjustment of the main pressure and hook-up pressure:

- Connect gauge to pump test port (I) of the double pump at the accessory drive
- Adjust main pressure relief valve at valve bank (II) to more than 280 bar - see diagram
- Disconnect pilot control line from the main pressure relief valve and plug
- Adjust max. engine rpm
- Loosen counter nut (13) and turn pressure setting screw (7) clockwise until stop. Tighten counter nut (13).
- Loosen counter nut (14) and set pressure setting screw (8) to (**280 bar – HS 41**) and (**250 bar – HR / HML32**) (pressure stage 2) by simultaneously operating the slew function. Tighten counter nut (14). Re-check pressure.
- Screwing in: Pressure increase
  Screwing out: Pressure decrease
- Operate slew function again until stop and set main pressure to (**190 bar - HS 41**) and (**100 bar – HR / HML 32**) by turning the setting screw (7) counter-clockwise. To do this, loosen counter nut (13) first, retighten afterwards. Re-check pressure setting.
- Re-connect the pilot control line



TEREX | SCHAEFF	Typ/Model/Type **HS / HML / HR**	Datum/Edition/Date **01.2005**
	Benennung/Description/Dénomination **Pilot-operated pressure relief valve**	Blatt/Page/Feuille **6.850.07**



HR32 / HML32 / HR42 / HML42 :

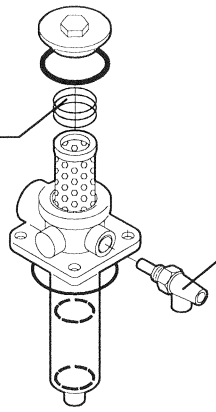
The spring (47) is pre-loaded by an external pressurization of the piston (23) with pilot pressure (P_{st} max. 30 bar) via the port x.
The value of the spring pre-load is determined by the piston stroke (23).
The hook-up pressure increase Δp is adjusted to **250 bar**. The adjustment has to be effected by the setting screw (24) and the counter nut (25). 1 turn corresponds to 150 bar.

Adjustment of the main pressure and hook-up pressure:

- Connect gauge to pump test port (I) of the double pump at the accessory drive
- Adjust main pressure relief valve at valve bank (II) to more than 250 bar
- Disconnect pilot control line from the main pressure relief valve and plug them
- Adjust max. engine rpm
- Loosen counter nut (25) and turn pressure setting screw (24) clockwise until stop. Tighten counter nut (25).
- Loosen counter nut (19) and set pressure setting screw (13) to **250 bar** (pressure stage 2) by simultaneously operating the slew function. Tighten counter nut (19). Re-check pressure.
- Screwing in: Pressure increase
  Screwing out: Pressure decrease
- Operate slew function again until stop and set main pressure to (**100 bar - HR/HML32, HML42**) and (**150 bar – HR42**) by turning the setting screw (24) counter-clockwise. To do this, loosen counter nut (25) first, retighten afterwards. Re-check pressure setting.
- Re-connect the pilot control line

filter unit, part no.:
5.003.659.255

filter by-pass
opens at
2.5 bar



installed in :
HR 11 **HR 12**
HR 13

maintenance switch
part no. 5.380.660.831.
Pressure setting:
1.9 $_{-0.2}$ bar

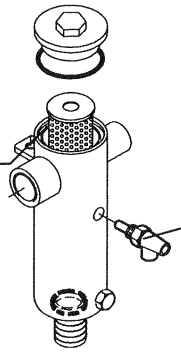
filter unit part no.:
5.380.660.842

installed in :
HR 14 **HR 16**

filter unit part no.:
5.380.660.841

installed in :
HR 18

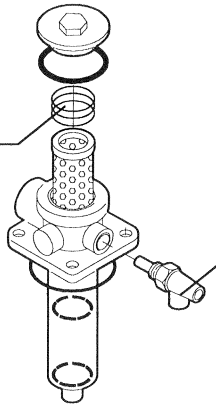
filter by-pass
opens at
2.5 bar



maintenance switch
part no. 5.380.660.831.
Pressure setting:
1.9 $_{-0.2}$ bar

filter unit part no.:
5.380.660.829

filter by-pass
opens at
2.5 bar



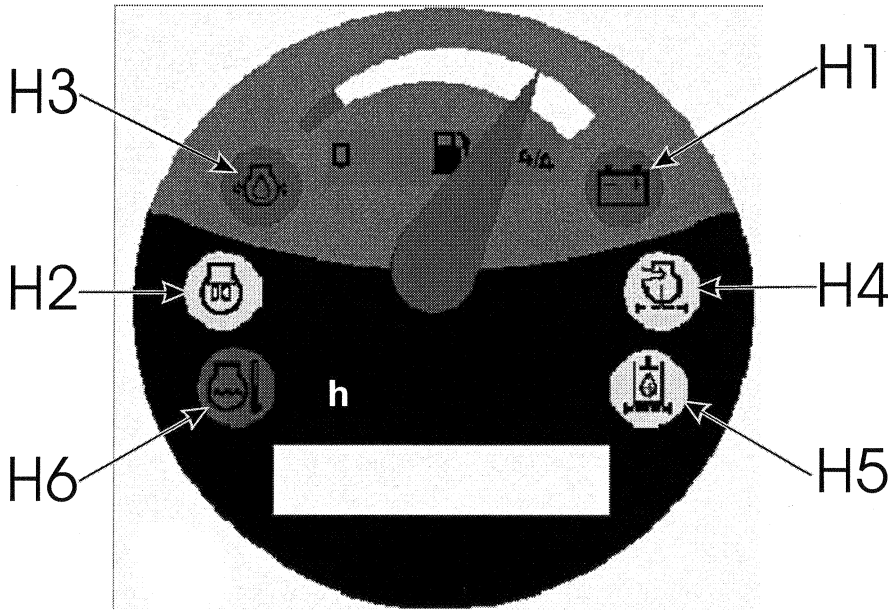
installed in: **HS 41** **SMB 2041**
HR 22 **HR 31** **HR 32**
HR 41 **HML 22** **HML 31**
HML32 **HML 41** **HML 42**

maintenance switch
part no. 5.380.660.831.
Pressure setting:
1.9 $_{-0.2}$ bar

Note: The filter clogging warning lamp can light up briefly
as long as the hydraulic oil is cold

Indicator Unit

HR 1.5 HR 1.6
HR 2.0 HR 3.7



1. Mechanic

- Instrument with 80mm port diameter
- Fuel gauge, hour meter, 6 indicator lights,

2. Indicator lights

• H1	Charge control	red	switched to negative		
• H2	pre-heating control	yellow	switched to positive		
• H3	Engine oil pressure	red	switched to negative	buzzer	
• H4	Air filter clog control	yellow	switched to negative	buzzer	
• H5	Hydraulic filter control	yellow	switched to negative	buzzer	delayed
• H6	Coolant temperaturered		switched to negative	buzzer	

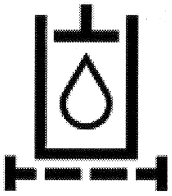
3. Check- control

- Indicator lights up for a period of 2 seconds
- Hour meter - all indicator light segments in line are active
- All 6 indicator lights are active
- Buzzer is active

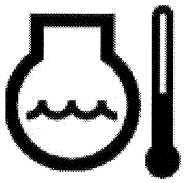
4. Pictograms



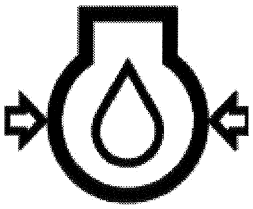
air filter control



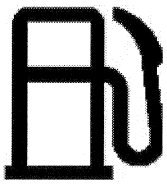
hydraulic oil filter clog control



coolant temperature



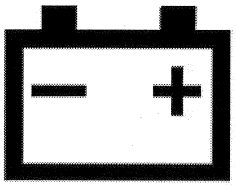
engine oil pressure



fuel gauge



pre-heating control



charge control

5. Buzzer

- Soldered at strip conductor and riveted
- Volume 92 dB/m intermittent
- Diode wiring on the circuit board
- Input signals to activate the buzzer are the input signals from “H3”, “H4”,”H5” und “H6”
- Activation of buzzer when engine is turned on (charge control off), 1 second time-delay, time delay at active input “H5” there is a time delay of 5 minutes; then 3 minutes intermittent buzzer; follow that there is a 5 minute interval.
- Buzzer connected at power supply “+Ub” for more volume.

6. Fuel gauge

- Type with "SMH" step motor
- Luminous indicator - glass clear red, white designed
- Code capable of 6 different fuel gauges
- Code entered by using a 4 DIP- Switch
- Indicator needle operates smoothly
- Dial face and needle lit via 6 LED's (yellow or red) when power supply "off", the needle is in the left-most position

Fuel gauge indicator:		***fuel sender parts.no.***
HR 1.5/1.6/2.0/14/16	empty : 60,5 Ohm full : 2,0 Ohm	....**5.755.586.655**....
HR 18	empty : 62,0 Ohm full : 2,5 Ohm	....**5.755.628.620**....
HR 3.7	empty : 77,7 Ohm full : 1,1 Ohm	....**5.755.628.653**....

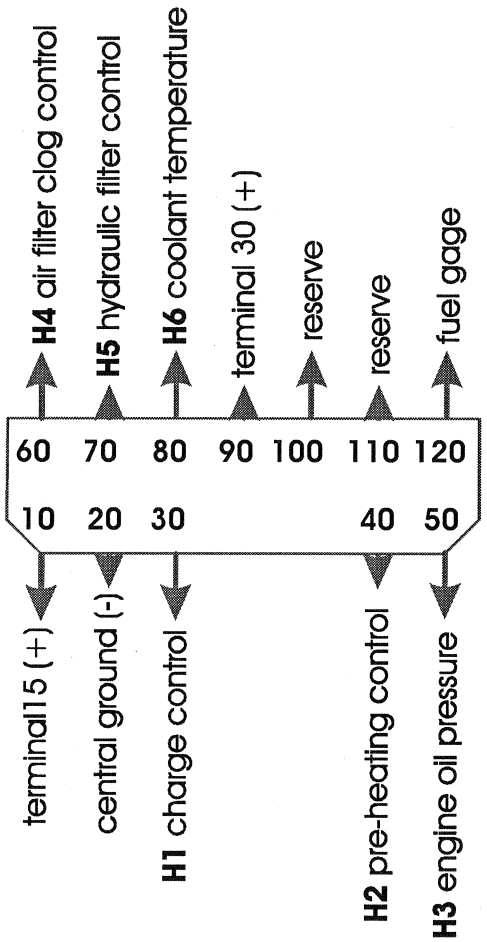
0	0	0	0	
0	0	1	0	
0	1	0	0	
1	**2**	**3**	**4**	**DIP-switch**

7. Hour meter

- Display in LED – 7 segments per digit design
- Green light digit display
- Display with 6 digits
- 5 segments per digit after decimal point
- One line display for total operating hours
- Hours are counted on the meter when certain conditions are satisfied (terminal 15) "on" and charge control "off".
- Accuracy tolerance of +/- 0.1% completes area.

8. Main connector

- 12 terminal connector
- Resting on the PC-board, soldered
- Including securing latch and reverse battery protection



terminal layout of the plug on the back of the dial

9. Electric specification

- Power supply (Ub): 8V to 16V
- Reserve battery protection for the power supply connections

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SERVICE-MANUAL

List of Contents

SKL 863	**SKL 873**
SKL 824	**SKL 834**
SKL 844	**SKL 854**
SKL 160	**SKL 260**
SKS 634	
HML 22	**HML 23**
HML 31	**HML 32**
HML 41	**HML 42**
HR 20	**HR 32**
HR 42	
HR 11	**HR 12**
HR 13	**HR 14**
HR 16	**HR 18**
HR 1.5	**HR 1.6**
HR 2.0	**HR 3.7**

1 General
2 Technical Data
3 Diesel Engine
4 Hydraulic System
5 Setting Instructions
6 Functioning Description
7 Electrical System
8 Maintenance
9 Operation
10 Options
11 Repair Instructions
12 Service-Bulletins

01.2006
folder 2 of 3

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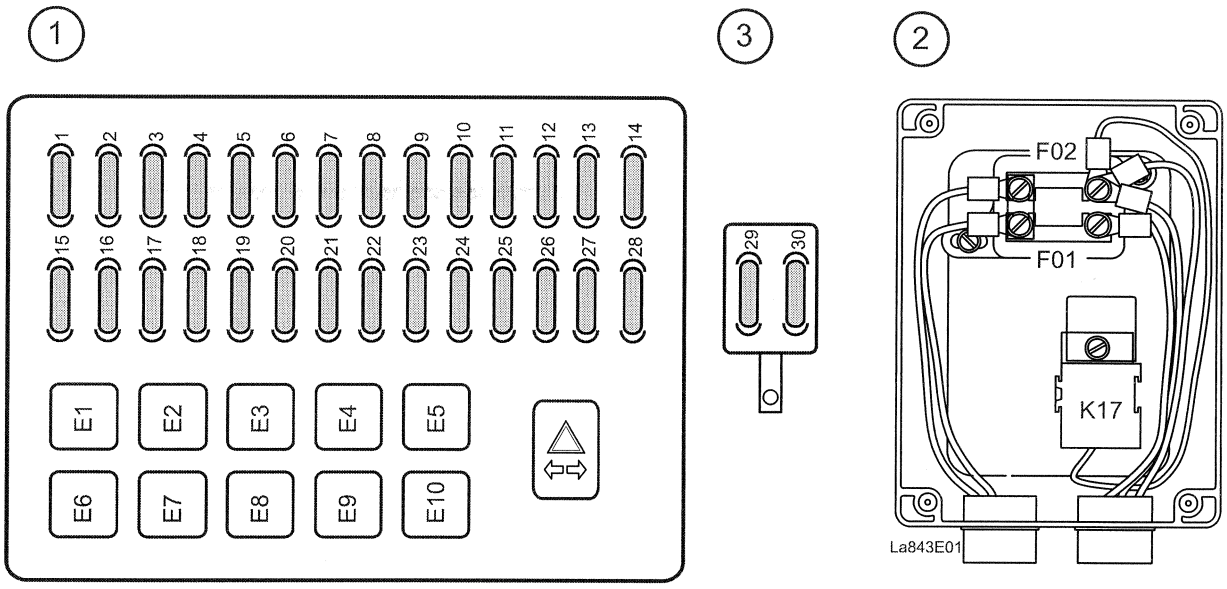
SUBGROUP LIST

Electrical system

Fuse assignment diagrams / wiring diagrams

SKL 863	7.11
SKL 873	7.13
SKL 824	7.22
SKL 834	7.24
SKL 844	7.26
SKL 854	7.27
SKL 160	7.28
SKL 260	7.30
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HML 22	7.49
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HML 41	7.52
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HR 20	7.60
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HR 1.6	7.91
HR 2.0	7.92
HR 3.7	7.97
Electrical system, general	7.100

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1 = fuse and relay box.....seat console, bottom right

2 = starter box .....engine compartment dividing wall - tank, right

3 = fuse box .....behind fuse and relay box (pos. 1)

Location	Relay	Function
E 1	--	not assigned
E 2	K 2	Starting safety
E 3	K 3	Travel, reverse
E 4	K 4	Travel, forward
E 5	K 5	Float position
E 6	K 6	Additional valve
E 7	K 7	Additional valve
E 8	K 8	Brake inching
E 9	K 9	Working floodlights, front
E 10	K 10	Working floodlights, rear
⇕▷	K 11	Flasher transmitter
	K 17	Start-up
	K 18	Pre-heating time control (engine compartment dividing wall - near generator)

Fuse and diode assignment

Position	Ampere	Assigned to	Position	Ampere	Assigned to
F 1	10	Hazard warning switch Immobilizer	F 15	10	Hazard warning switch Immobilizer
F 2	15	Working hydraulics cut-off	F 16	10	Rotating beacon Cab light
F 3	15	Travel - quick/ slow Hydrostatic brake	F 17	15	Socket Radio
F 4	15	Parking brake relay	F 18	15	Lower beam
F 5	10	Signal horn	F 19	15	Upper beam
F 6	10	Brake light	F 20	10	Side marker light, left Front working floodlight relay
F 7	15	Heater fan	F 21	10	Instruments' illumination Rear working floodlight relay Side marker light, right
F 8	15	Front wiper	F 22	20	Engine shut-off
F 9	15	Rear wiper	F 23 D 5	Diode 3A	Back-Alarm
F 10	10	Instruments	F 24 D 4	Diode 3A	Hydrostatic brake
F 11	15	Float position relay	F 25 D 3	Diode 3A	Connection fast / slow Hydrostatic brake
F 12	10	Radio	F 26 D 1	Diode 3A	Starting safety
F 13	10	Additional control circuit	F 27 D 2	Diode 3A	Starting safety
F 14 D 6	Diode 3A	Three-phase alternator	F 28 D 7	Diode 3A	Engine shut-off diode

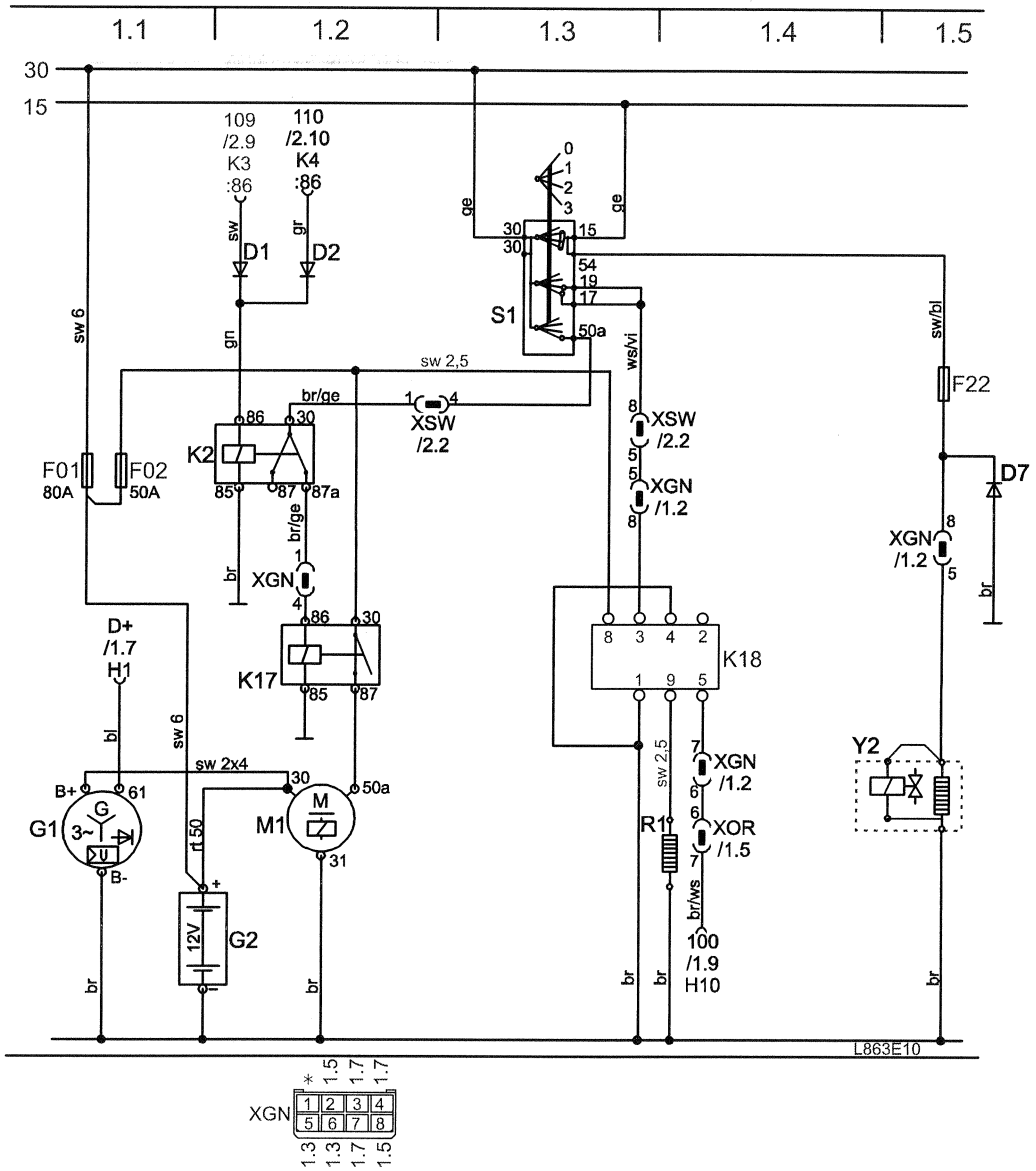
F 29*	15	Working floodlight, front	F 30*	15	Working floodlight, rear
F 01	80	Pre-heat/ starter switch	F 02	50	Starter

* These fuses are located behind the fuse and relay carrier. They have to be unscrewed for access.

Cable and plug colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

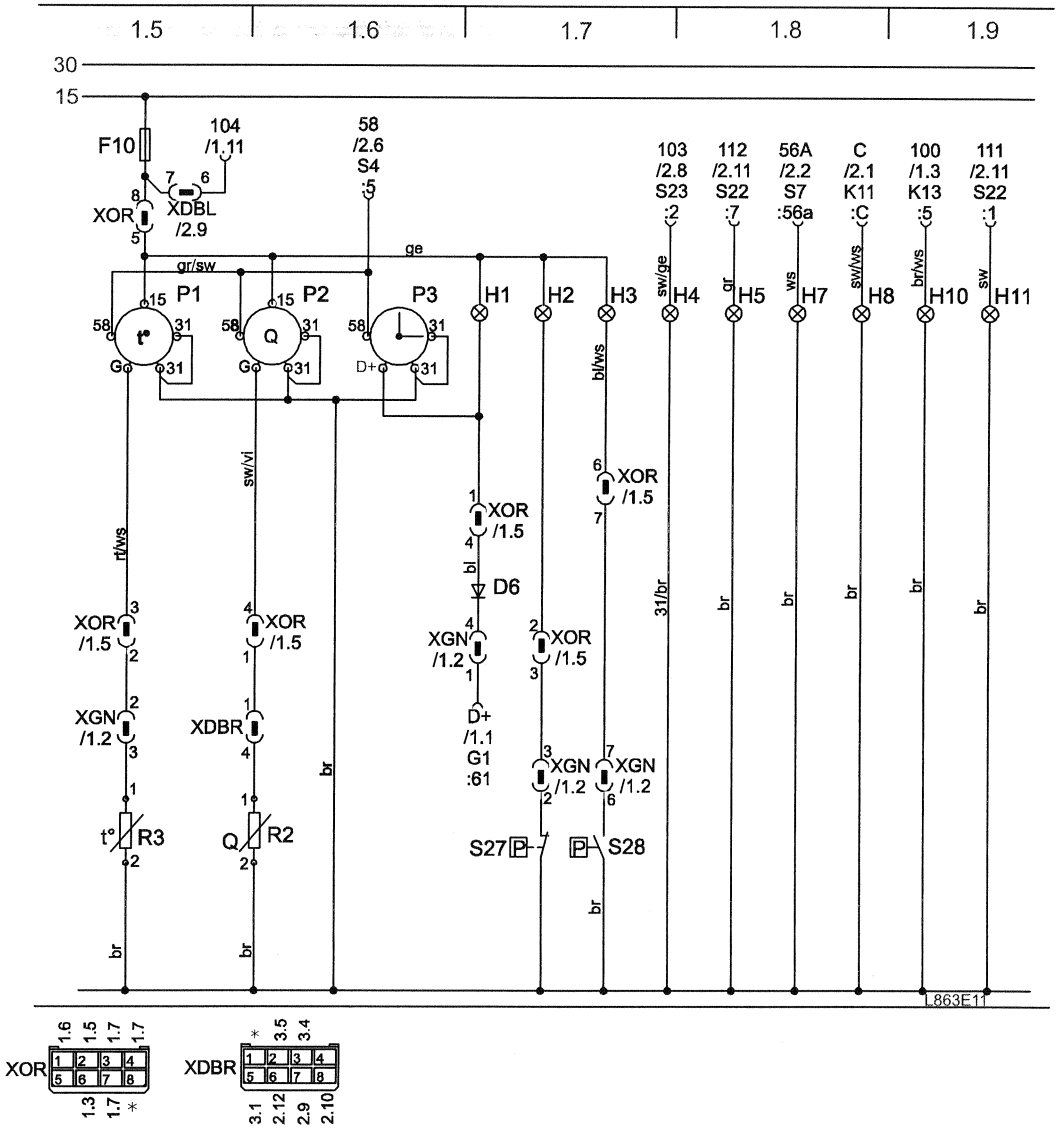
Start-up, pre-heat system



Path	Designation	Device	Path	Designation	Device
		Start-up, pre-heat system			
1.1	G1	Generator	1.2	D1	Diode
1.1	G2	Battery 12V	1.2	D2	Diode
1.2	M1	Starter	1.3	S1	Pre-heat/ starter switch
1.2	K2	Starting relay (starting safeguard)	1.4	K18	Pre-heat time control unit
1.2	K17	Starting relay (starting aid)	1.4	Y2	Cut-off
1.1	F01	Flat-type fuse 80A	1.4	R1	Glow plugs
1.1	F02	Flat-type fuse 50A	1.4	F22	Cut-off fuse
			1.5	D7	Diode

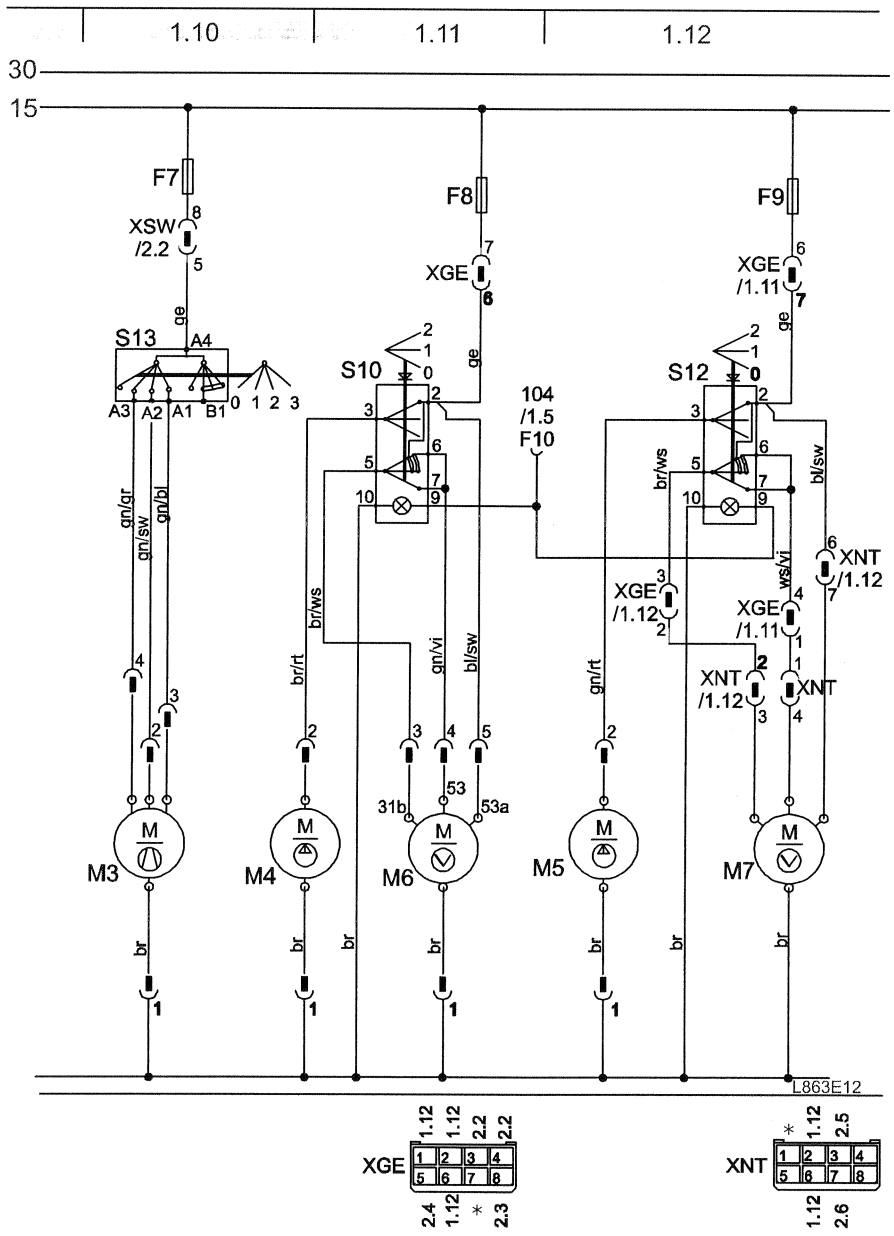
SCHAEFF	Typ/Model/Type **SKL 863**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.11.02**

Instruments, indicating units



Path	Desig-nation	Device	Path	Desig-nation	Device
		Instruments, indicating units			
1.5	P1	Temperature indicator	1.7	H4	Parking brake indicator lamp
1.6	P2	Fuel gauge	1.8	H5	Travel - forward
1.6	P3	Operating hour meter	1.9	H11	Travel - reverse
1.5	R3	Coolant temperature sensor	1.8	H7	Upper beam indicator lamp
1.6	R2	Fuel gauge transmitter	1.8	H8	Flashlight turn signal
1.5	F10	Fuse	1.9	H10	Pre-heat indicator lamp
1.7	H1	Battery charge indicator lamp	1.7	D6	Diode
1.7	H2	Engine oil pressure indicator lamp	1.7	S27	Engine oil pressure switch
1.7	H3	Air filter clogging indicator lamp	1.7	S28	Air filter clogging switch

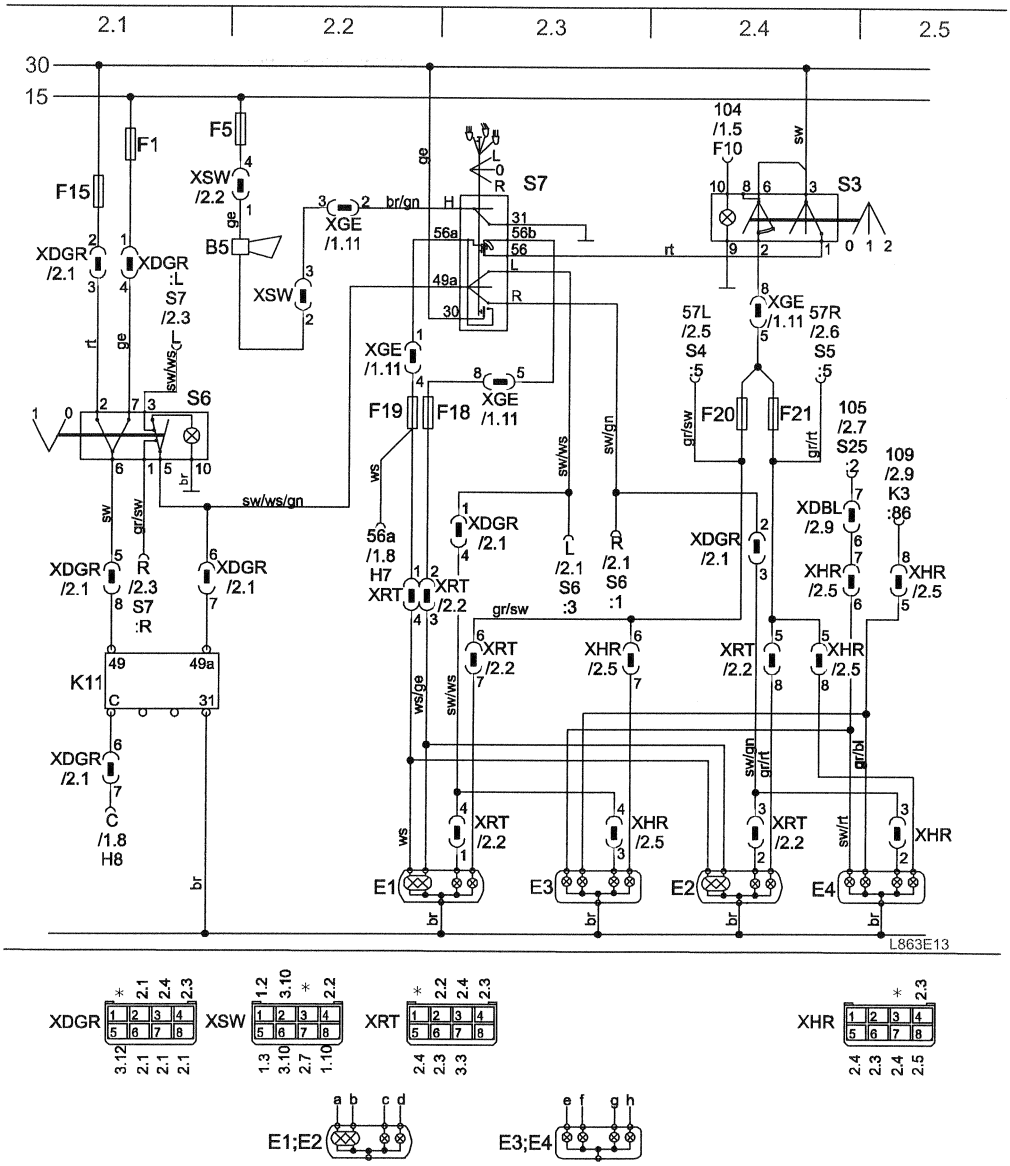
Heater fan	Wash/ wipe system



Path	Desig-nation	Device	Path	Desig-nation	Device
		Heater fan	1.11	S10	Front wash/ wipe switch
1.10	F7	Fuse	1.12	S12	Rear wash/ wipe switch
1.10	S13	Heater fan switch	1.10	M4	Front washer pump
1.10	M3	Heater fan	1.11	M6	Front wipe motor
		Wash/ wipe system	1.12	M5	Rear washer pump
1.11	F8	Fuse	1.12	M7	Rear wipe motor
1.12	F9	Fuse			

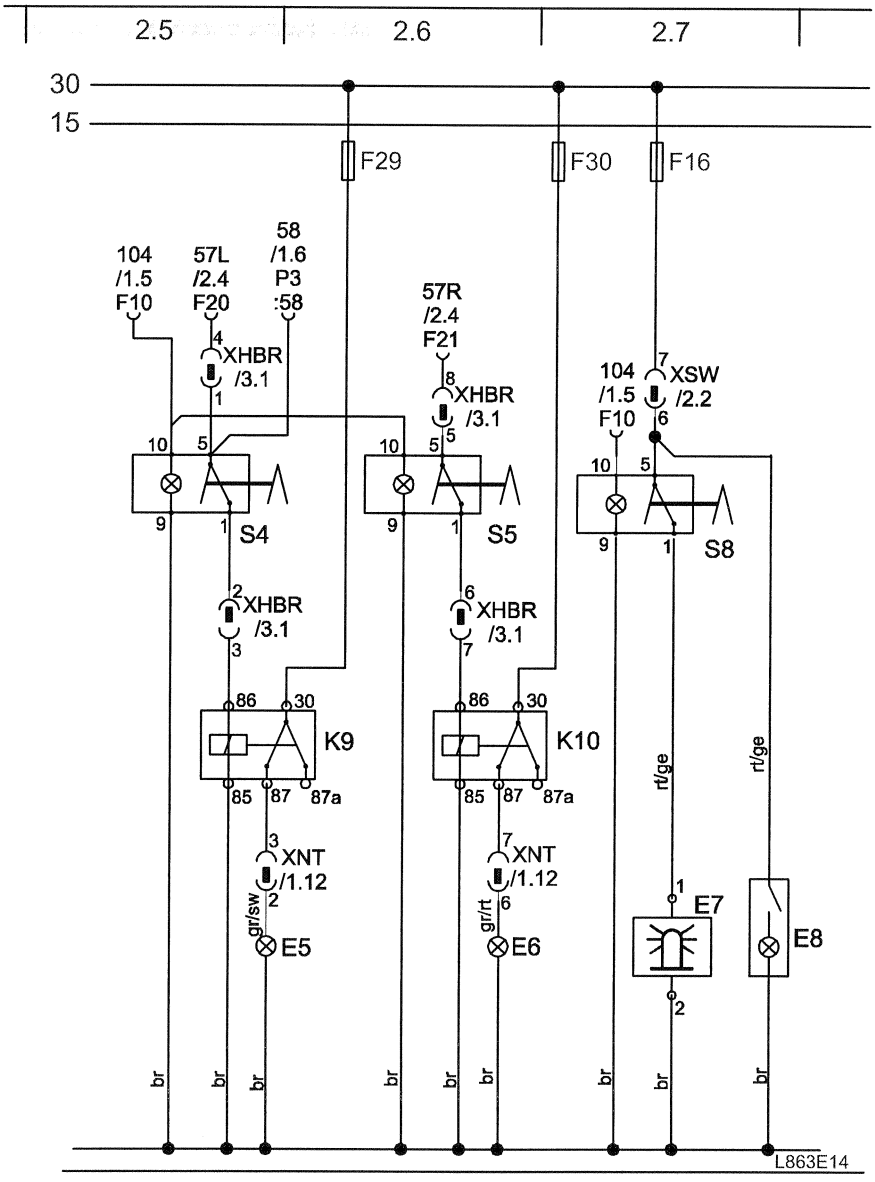
SCHAEFF	Typ/Model/Type **SKL 863**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.11.03**

Lighting and signalling system



a = Upper beam
b = Lower beam
c = Turning indicator
d = Side marker light
e = Brake light
f = Reversing headlight
g = Turning indicator
h = Side marker light

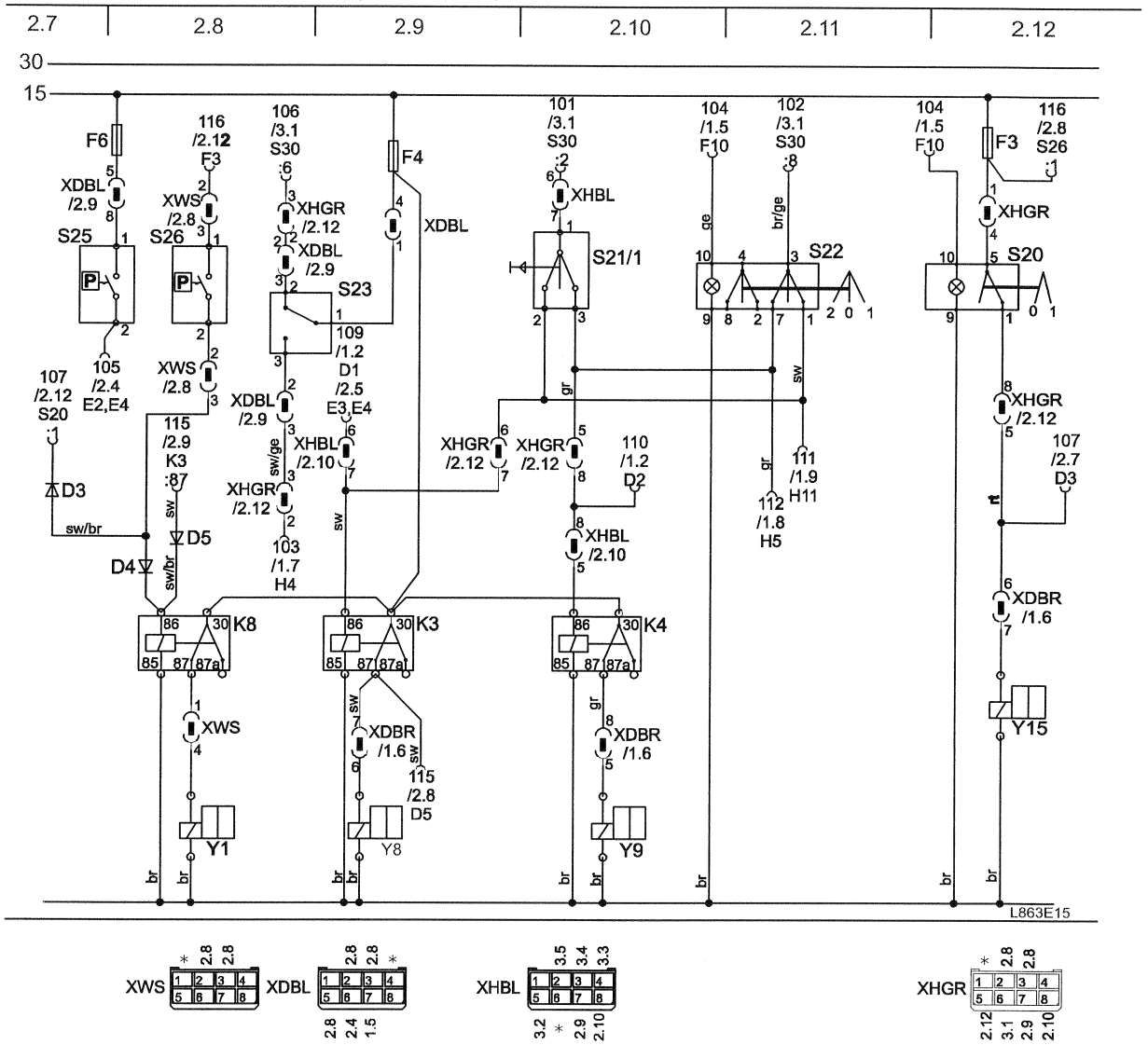
Path	Designation	Device	Path	Designation	Device
		Lighting and signalling system	2.2	F18	Fuse
2.1	F15	Fuse	2.4	F20	Fuse
2.1	F1	Fuse	2.4	F21	Fuse
2.2	F5	Fuse	2.1	K11	Flashlight turn signal relay
2.2	B5	Horn	2.2	E1	Left-hand headlights
2.1	S6	Hazard warning switch	2.4	E2	Right-hand headlights
2.3	S7	Steering column switch	2.3	E3	Left-hand back light
2.4	S3	Light switch	2.5	E4	Right-hand back light
2.2	F19	Fuse			



Path	Designation	Device
		Lighting and signalling system
2.5	S4	Front working floodlights
2.5	K 9	Front working floodlights
2.5	E5	Front working floodlights
2.6	F29	Fuse
2.6	S5	Rear working floodlights

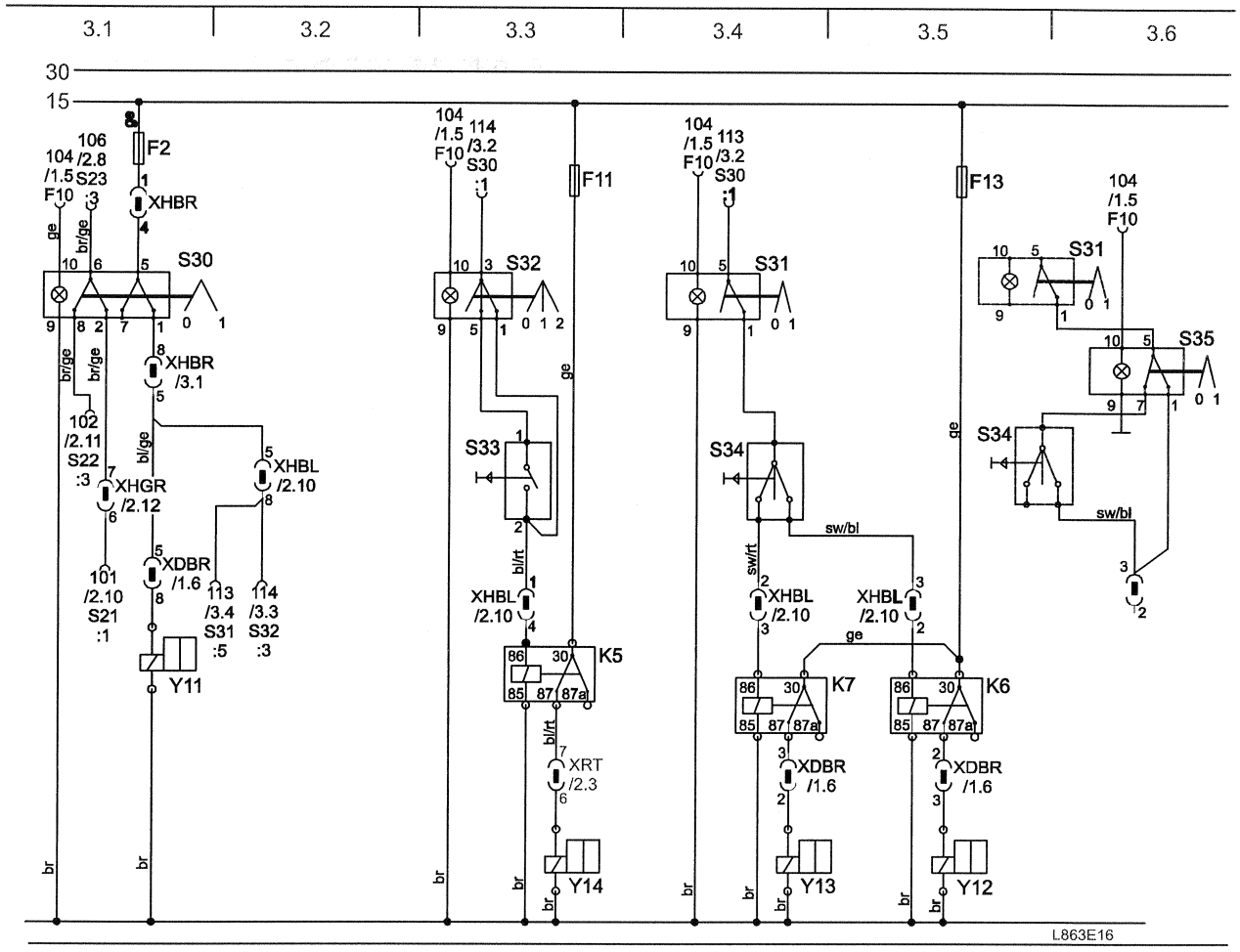
Path	Designation	Device
2.6	K 10	Rear working floodlights
2.6	E6	Rear working floodlights
2.8	F 30	Fuse
2.7	F16	Fuse
2.7	S8	Rotating beacon
2.7	E7	Rotating beacon
2.7	E8	Cab lighting

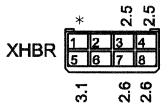
Travel, brakes



Path	Designation	Device	Path	Designation	Device
		Travel, brakes	2.7	D3	Diode
2.8	F6	Fuse	2.8	D4	Diode
2.9	F4	Fuse	2.8	D5	Diode
2.12	F3	Fuse	2.8	K8	Hydrostatic brake
2.8	S25	Brake light switch	2.9	K3	Travel, reverse
2.8	S26	Hydrostatic brake	2.10	K4	Travel, forwards
2.8	S23	Parking brake switch	2.8	Y1	Direction-of-travel recognition
2.10	S21/1	Co-ordinate lever	2.9	Y8	Valve for travel, reverse
2.11	S22	Travel, forward -reverse	2.10	Y9	Valve for travel, forward
2.12	S20	Travel, fast - slow	2.12	Y15	Valve for travel, fast - slow

Working hydraulics	Float position	Additional control circuit	Option

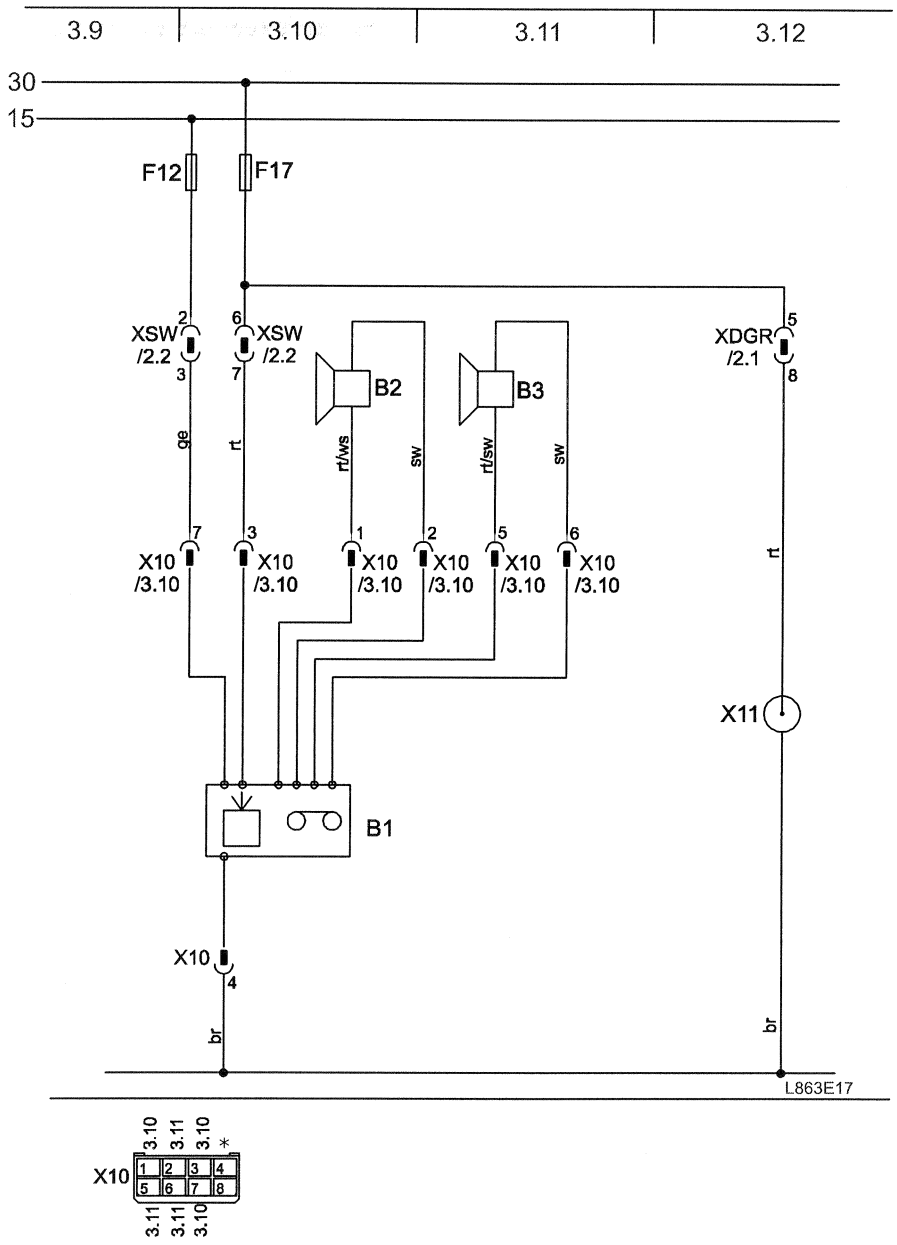




Path	Designation	Device
		Working hydraulics
3.1	F2	Fuse
3.1	S30	Working hydraulics cut-off
3.1	Y11	Working hydraulics valve
		Float position
3.3	F11	Fuse
3.2	S32	Float position
3.3	S33	Co-ordinate lever for float position
3.3	K5	Float position relay
3.3	Y14	Float position valve

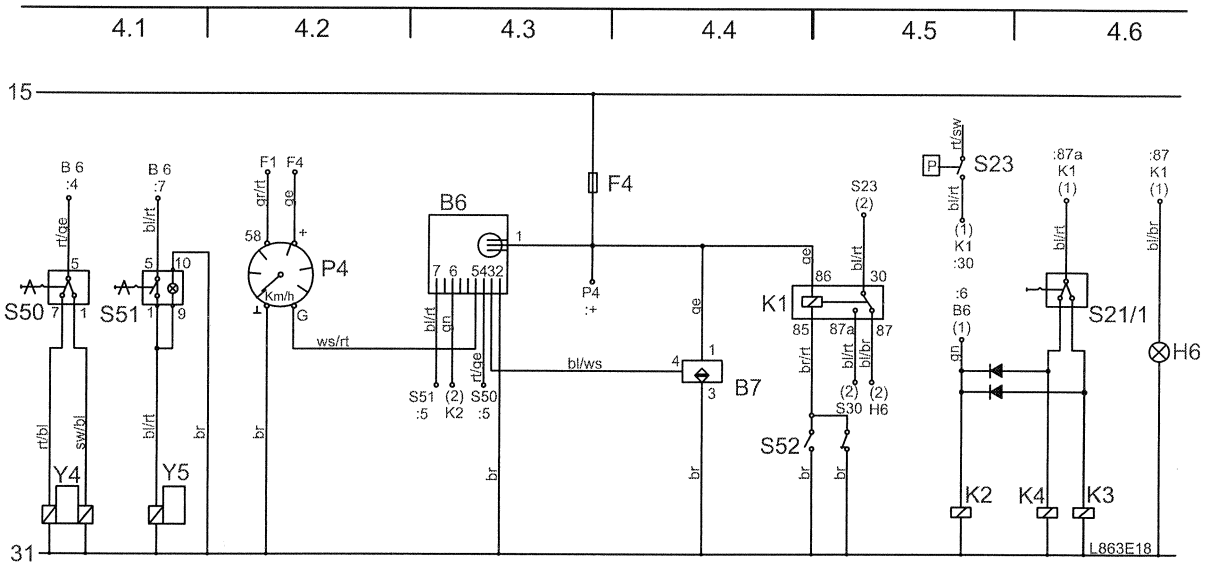
Path	Designation	Device
		Additional control circuit
3.5	F13	Fuse
3.4	S34	Co-ordinate lever for 3rd control circuit
3.4	S31	3rd control circuit cut-off
3.4	K7	Additional control circuit valve
3.5	K6	Additional control circuit valve
3.4	Y13	Additional control circuit valve
3.5	Y12	Additional control circuit valve
		Option
3.6	S35	3rd control circuit continuous operation

Radio, socket

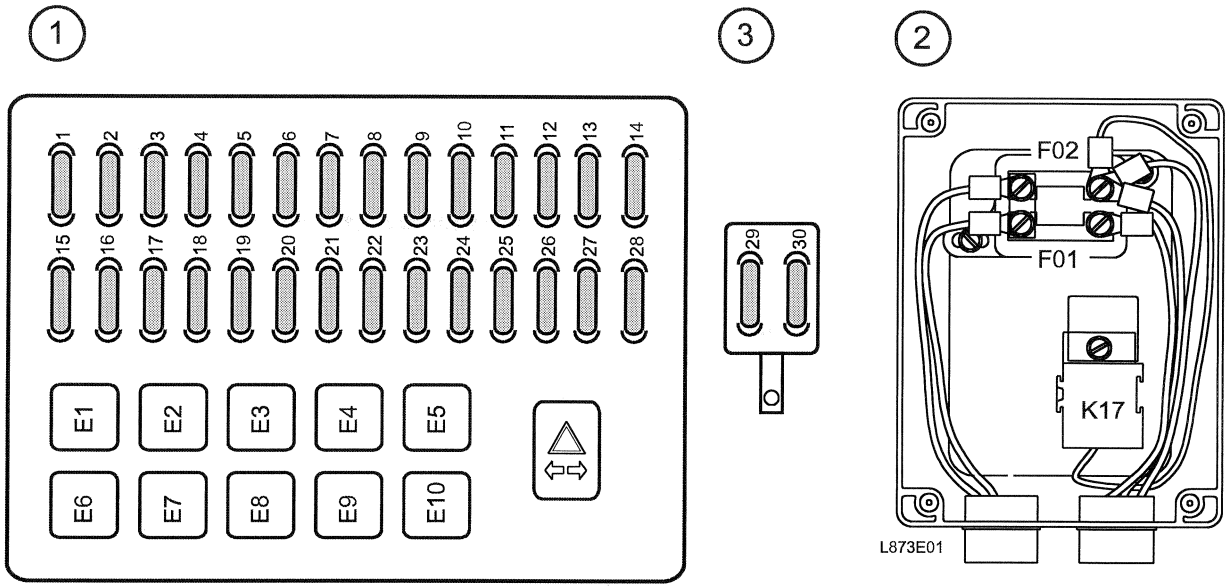


Path	Desig-nation	Device	Path	Desig-nation	Device
		Radio, socket			
3.10	F12	Fuse			
3.10	F17	Fuse			
3.10	B2	Loudspeaker			
3.11	B3	Loudspeaker			
3.10	B1	Radio			
3.12	X11	Socket			
3.10	X10	Radio socket (AMP)			

Fast travel version - Installation of a speedometer



Path	Desig-nation	Device	Path	Desig-nation	Device
		Fast travel version			
4.1	S 50	Switch for 1st / 2nd gear	4.5	K 1	Travel lock
4.1	Y 4	Relay for 1st / 2nd gear	4.5	S 52	Gear switch
4.1	S 51	Lifting frame damping	4.5	S 23	Parking brake pressure switch
4.1	Y 5	Relay for lifting frame	4.6	S 21/1	Switch for co-ordinate lever
4.2	P 4	Speedometer	4.5	K 2	Starting safety
4.3	B 6	Control unit	4.6	K 4	Travel, forward
4.3	F 4	Fuse	4.6	K 3	Travel, reverse
4.4	B 7	Speedometer sensor	4.6	H 6	Gear shifting display



1 = fuse and relay box.....seat console, bottom right

2 = starter box .....engine compartment dividing wall - tank, right

3 = fuse box .....behind fuse and relay box (pos. 1)

Location	Relay	Function
E 1	K 1	Starting safety
E 2	K 2	Parking brake; travel
E 3	K 3	Travel - reverse
E 4	K 4	Travel - forward
E 5	K 5	Brake light
E 6	K 6	Low idle
E 7	K 7	Flasher transmitter
E 8		not assigned
E 9	K 9	Working floodlight, front
E 10	K 10	Working floodlight, rear
		not assigned
	K 17	Start-up
	K18	Pre-heating time control (engine compartment dividing wall - near generator

Fuse and diode assignment

Position	Ampere	assigned to	Position	Ampere	assigned to
F 1	10	Flasher Immobilizer	F 15	15	Engine shut off
F 2	10	Travel - quick / slow	F 16	10	Heater fan
F 3	10	Working hydraulics Float; add. control circuit	F 17	10	Front wiper
F 4	10	Dashboard illumination D+	F 18	10	Rear wiper
F 5	10	Signal horn	F 19		Option
F 6	10	Brake light	D 7 (F 20)	Diode 3A	Blocking diode
F 7		Option	D 8 (F 21)	Diode 3A	Blocking diode
F 8	10	Working floodlight front	D 9 (F 22)	Diode 3A	Blocking diode
F 9	10	Working floodlight rear	F 23	10	Side marker light left
F 10	10	Hazard warning switch Immobilizer	F 24	10	Side marker light right
F 11	10	Rotation beacon Cab light	D 6 (F 25)	Diode 3A	Blocking diode D+
F 12	10	Socket	D 1 (F 26)	Diode 3A	Starting safety
F 13	10	Low beam	D 2 (F 27)	Diode 3A	Starting safety
F 14	10	High beam	D 3 (F 28)	Diode 3A	Engine cut off diode

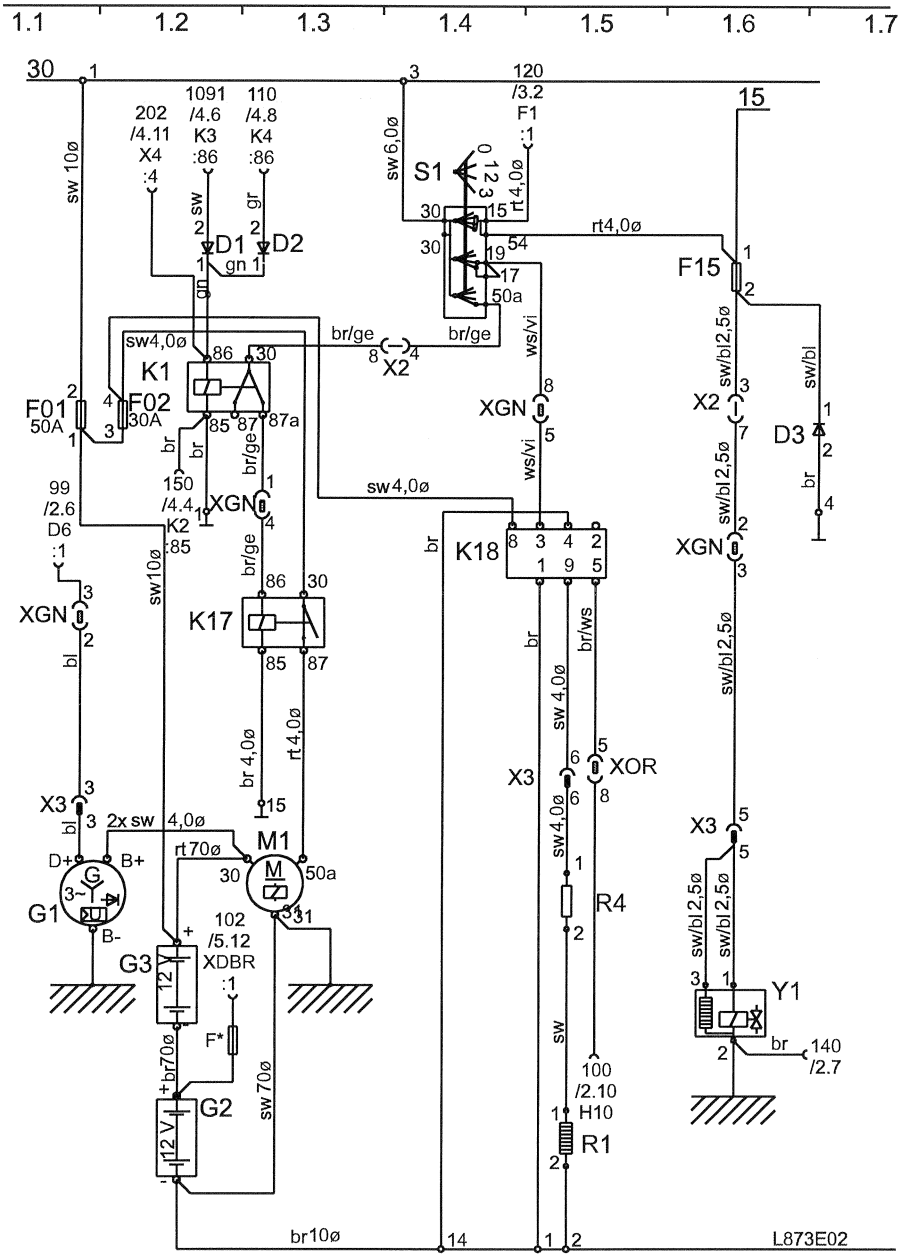
F 01	50	Pre-heat / starter switch	F 02	30	Starter
F *	10	Radio (cable fuse - near battery)			

D 10 (F 29)	Diode 3A	Float position	D 11 (F 30)	Diode 3A	Float position

Cable and plug colours

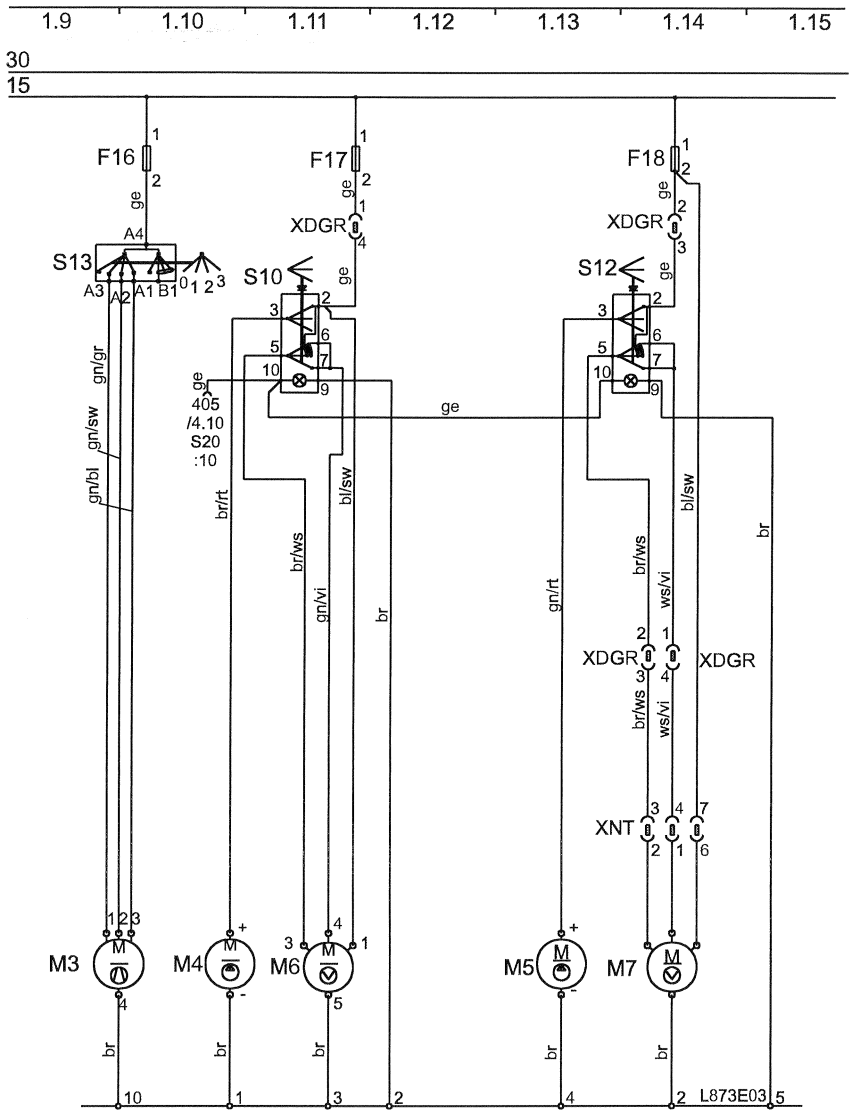
bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Start-up, pre-heat system



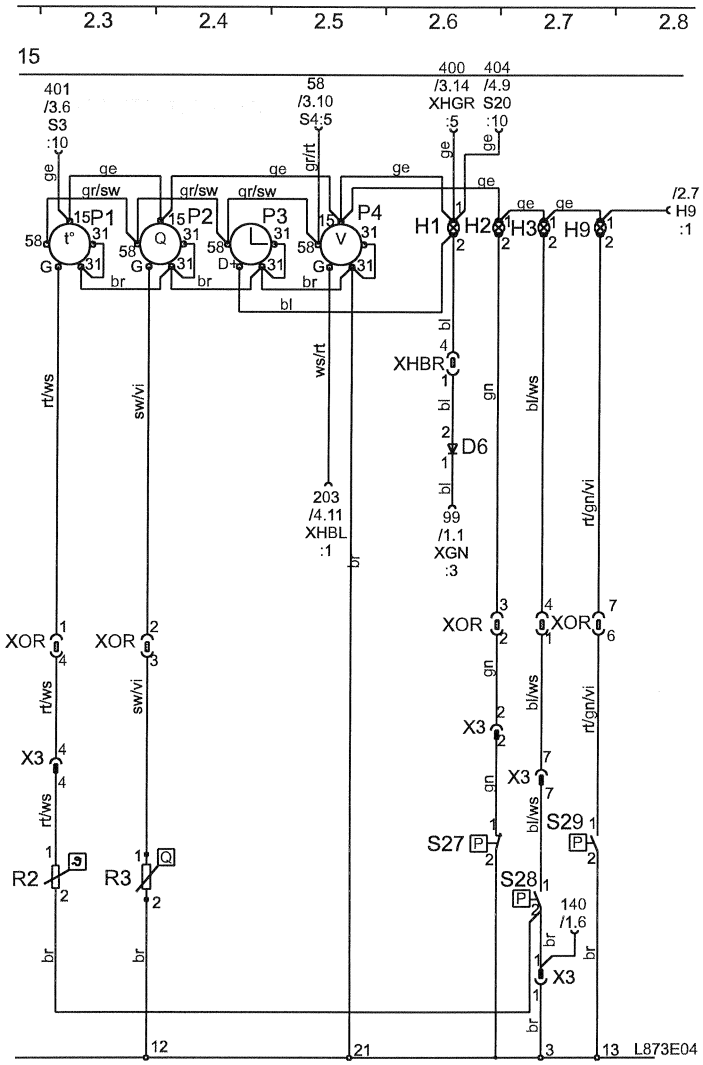
Path	Designation	Device	Path	Designation	Device
		Start-up, pre-heat system	1.2	G2	Battery 12V
1.1	F01	Flat-type fuse 50A	1.2	G3	Battery 12V
1.1	F02	Flat-type fuse 30A	1.4	S1	Pre-heat / starter switch
1.2	D1	Blocking diode	1.5	K18	Pre-heat time control unit
1.3	D2	Blocking diode	1.5	R1	Flame-type glow plug
1.2	K1	Start relay (starting safeguard)	1.6	F15	Fuse
1.3	K17	Start relay (starting aid)	1.7	D3	Blocking diode
1.1	G1	Generator	1.6	Y1	Cut-off
1.3	M1	Starter			

Heater fan	Wash / wipe system



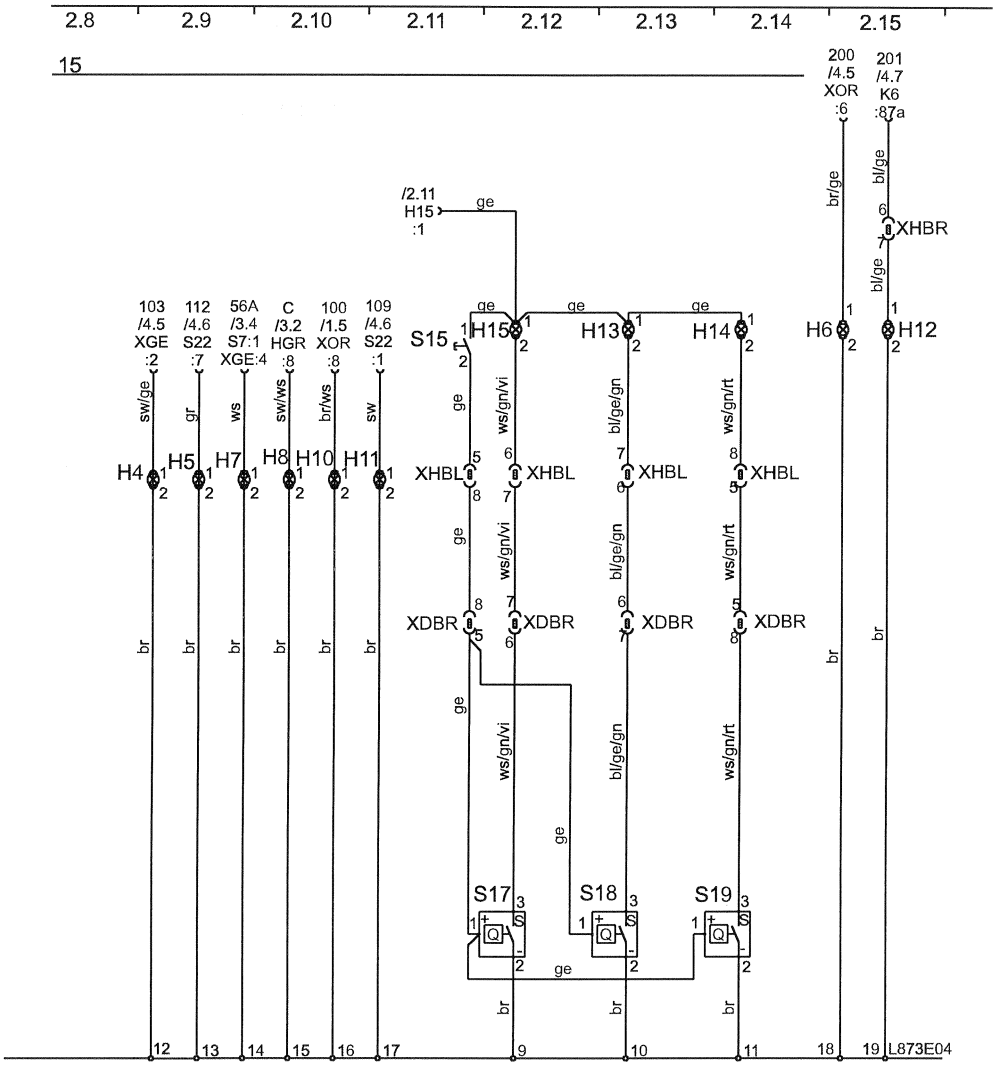
Path	Desig-nation	Device	Path	Desig-nation	Device
		Heater fan			***Rear wash / wipe system***
1.10	F16	Fuse	1.14	F18	Fuse
1.10	S13	Heater fan switch	1.14	S12	Rear wash / wipe switch
1.10	M3	Heater fan	1.13	M5	Rear washer pump
		Front wash / wipe system	1.14	M7	Rear wipe motor
1.12	F17	Fuse			
1.11	S10	Front wash / wipe switch			
1.11	M4	Front washer pump			
1.11	M6	Front wipe motor			

Instruments, Indicating units



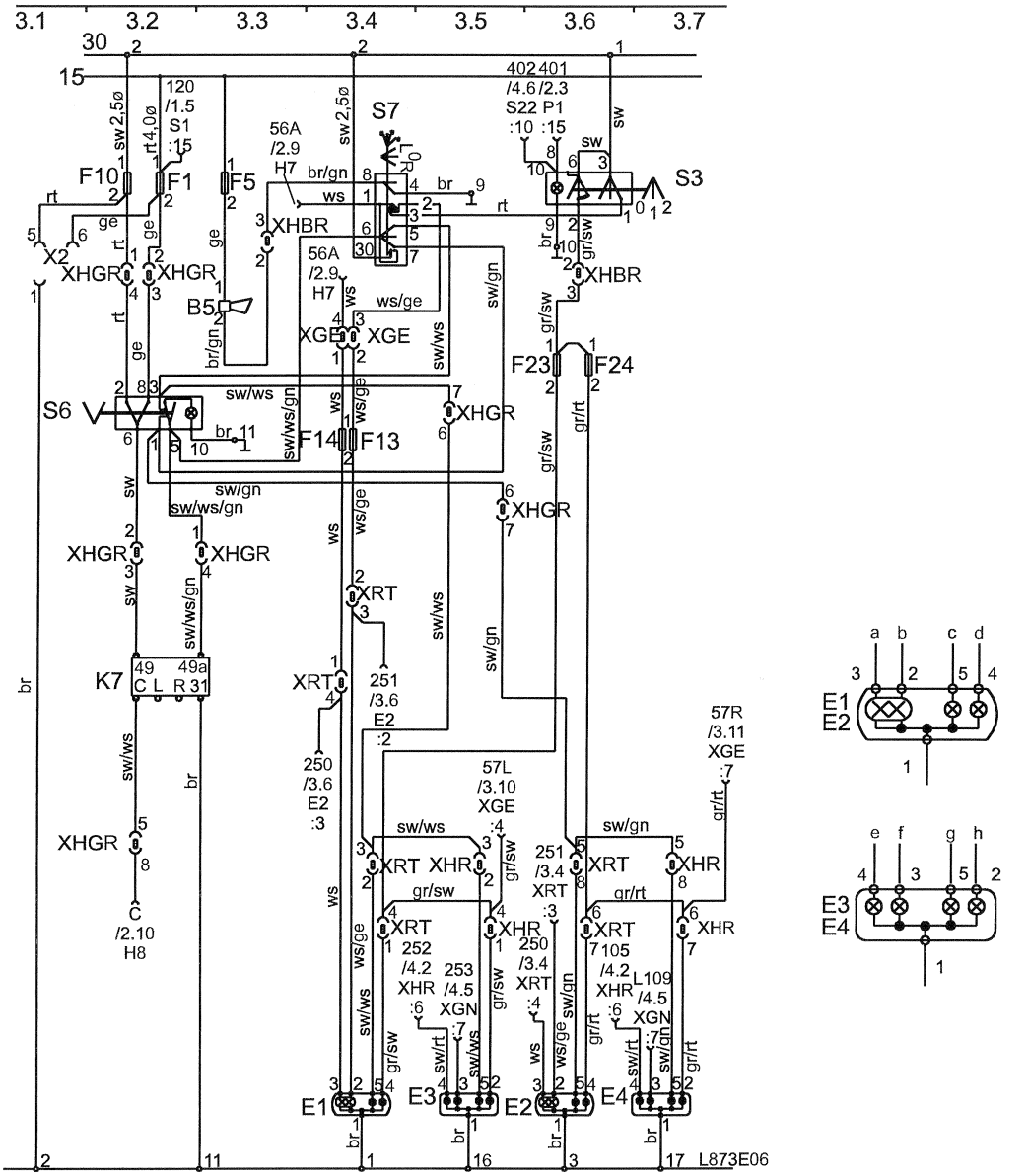
Path	Desig-nation	Device	Path	Desig-nation	Device
		Indicating units			***Indicating units***
2.3	P1	Temperature indicator	2.6	H1	Battery charge indicator lamp
2.3	R2	Coolant temperature sensor	2.6	D6	Blocking diode
2.4	P2	Fuel gauge	2.7	H2	Engine oil pressure indicator
2.4	R3	Fuel gauge transmitter	2.7	S27	Engine oil pressure switch
2.4	P3	Operating hour meter	2.7	H3	Air filter clogging indicator lamp
2.5	P4	Speedometer			
			2.7	S28	Air filter clogging switch
			2.8	H9	Indicator lamp hydraulic oil filter
			2.8	S29	Service unit hydraulic

Indicator instruments, indicator lamps / check instruments



Path	Designation	Device	Path	Designation	Device
		Indicator lamps and - transmitter			
2.9	H4	Parking brake indicator lamp	2.12	S17	Engine oil level gauge
2.9	H5	Travel - forward	2.13	H13	Coolant level gauge / indicator
2.10	H7	Upper beam indicator lamp	2.13	S18	Coolant level gauge
2.10	H8	Flasher	2.14	H14	Hydraulic oil level gauge / indicator
2.10	H10	Pre-heat indicator lamp	2.14	S19	Hydraulic oil level gauge
2.11	H11	Travel - reverse	2.15	H6	Spring loaded accumulator brake / indicator
2.12	H15	Engine oil level gauge / indicator			
2.12	S15	Check button	2.15	H12	Gear shifting, neutral position indicator lamp

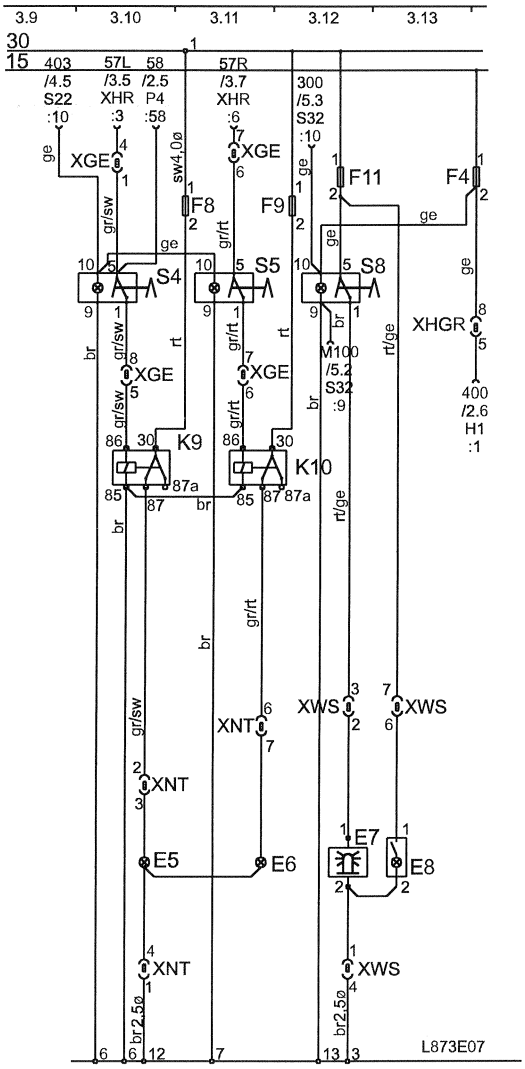
Lighting and signalling system



a = Upper beam
b = Lower beam
c = Turning indicator
d = Side marker light
e = Brake light
f = Reversing headlight
g = Turning indicator
h = Side marker light

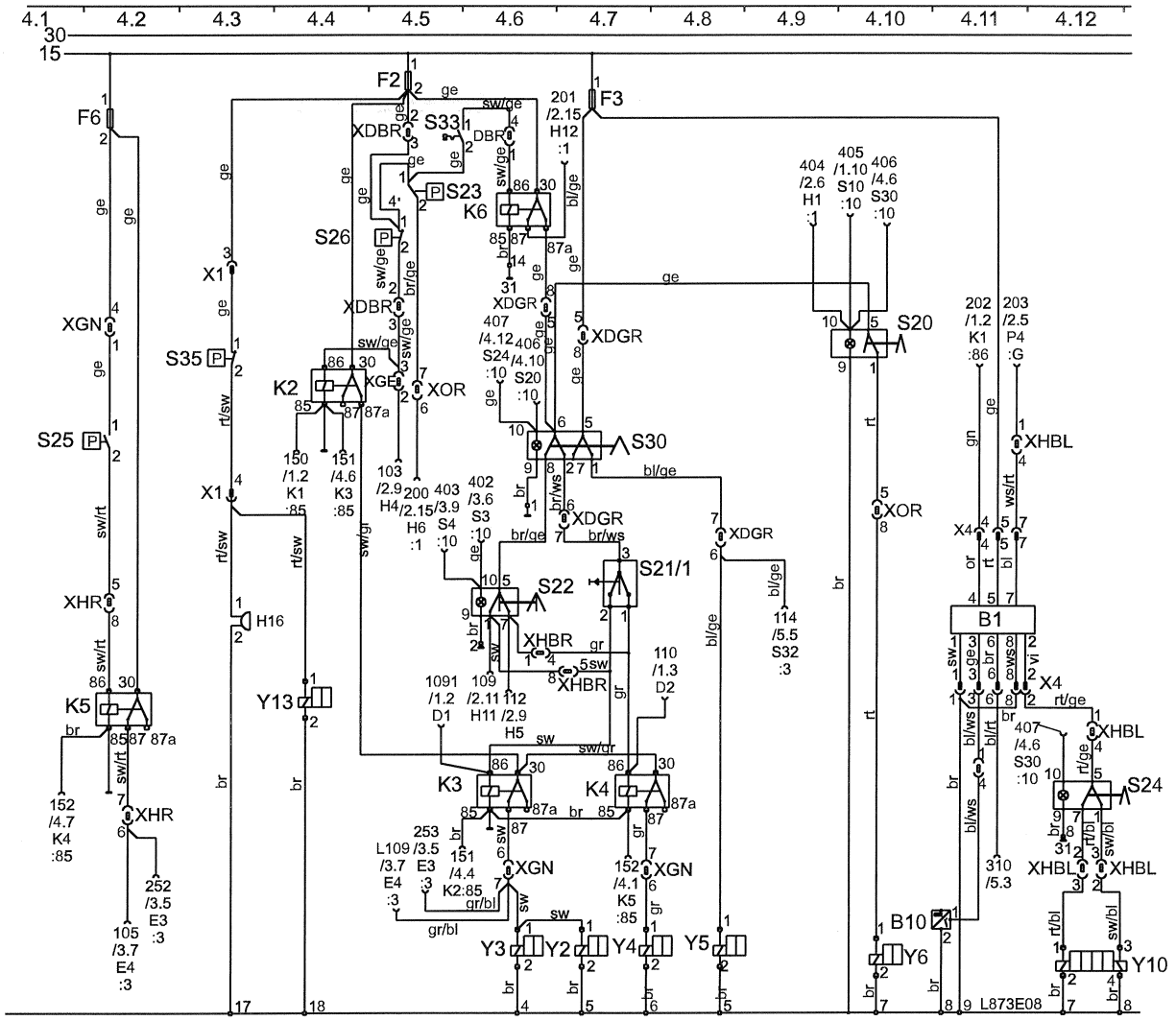
Path	Desig-nation	Device	Path	Desig-nation	Device
		Lighting and signalling system	3.4	F13	Fuse
			3.4	F14	Fuse
3.2	F10	Fuse	3.5	E1	Headlight left
3.2	F1	Fuse	3.5	E3	Rear light left
3.2	S6	Hazard warning switch	3.6	S3	Light switch
3.2	K7	Flashlight turning signal relay	3.6	F23	Fuse
3.3	F5	Fuse	3.6	F24	Fuse
3.3	B5	Horn	3.6	E2	Headlight right
3.4	S7	Steering column switch	3.7	E4	Rear light right

Working headlamp, Rotating beacon



Path	Desig-nation	Device	Path	Desig-nation	Device
		Working headlamp, Rotating beacon	3.11	K 10	Rear working light relay
			3.11	E6	Rear working light
3.10	S4	Headlight switch	3.12	F11	Fuse
3.10	F8	Fuse	3.12	S8	Rotating beacon switch
3.10	K 9	Headlight relay	3.12	E7	Rotating beacon
3.10	E5	Headlight	3.13	E8	Cab lighting
3.11	S5	Rear working light switch	3.14	F4	Fuse dash light
3.12	F9	Fuse			

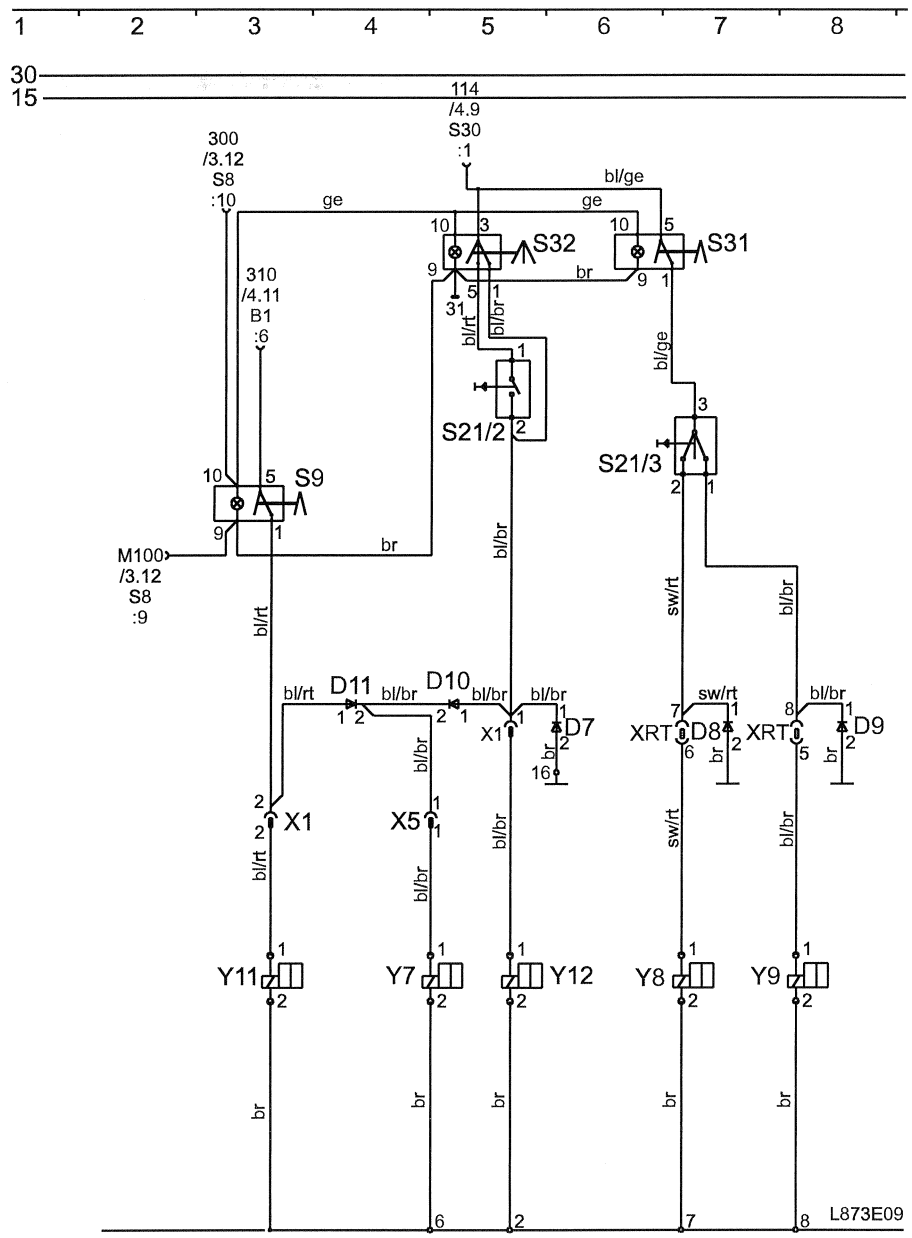
Brakes, travel, working hydraulic



Path	Desig-nation	Device
		Brakes, travel, working hydraulic
4.2	F6	Fuse
4.2	S25	Brake light switch
4.2	K5	Brake light relay
4.3	S35	Steering / switch
4.3	H16	Warning buzzer
4.4	Y13	Valve for steering
4.5	F2	Fuse
4.5	S23	Accumulator pressure
4.5	S26	Parking brake switch
4.4	K2	Parking brake / travel relay
4.6	S33	Gear box switch
4.6	K6	Gear shifting, neutral position relay
4.7	F3	Fuse

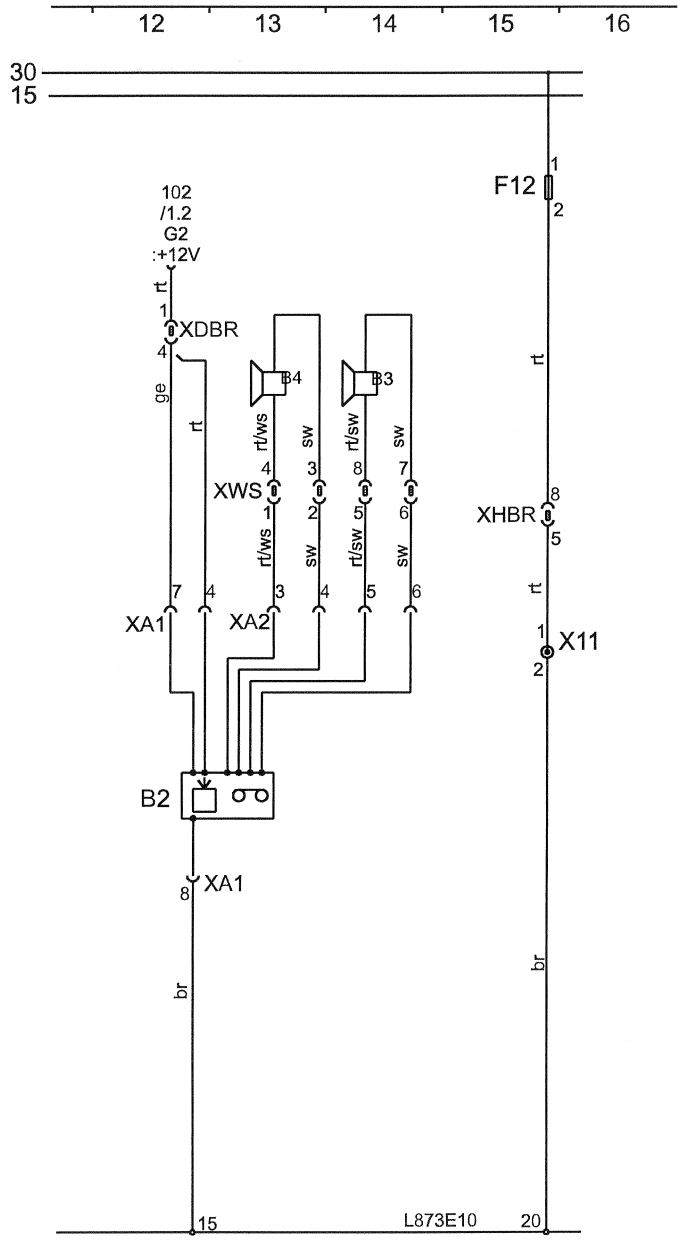
Path	Desig-nation	Device
4.7	S30	Working hydraulic cut-off
4.6	S22	Travel / forward - reverse
4.7	S21/1	Co-ordinate lever
4.6	K3	Travel reverse relay
4.7	K4	Travel forward relay
4.6	Y3	Valve for travel, reverse
4.7	Y2	Direction-of-travel recognition
4.7	Y4	Valve for travel, forward
4.8	Y5	Valve for working hydraulic
4.10	S20	Travel / fast - slow
4.10	Y6	Valve for travel, fast - slow
4.11	B1	Control unit
4.11	B10	Tacho transmitter
4.12	S24	Selector switch 1./2. Speed
4.12	Y10	Valve gearbox

Float position, Option

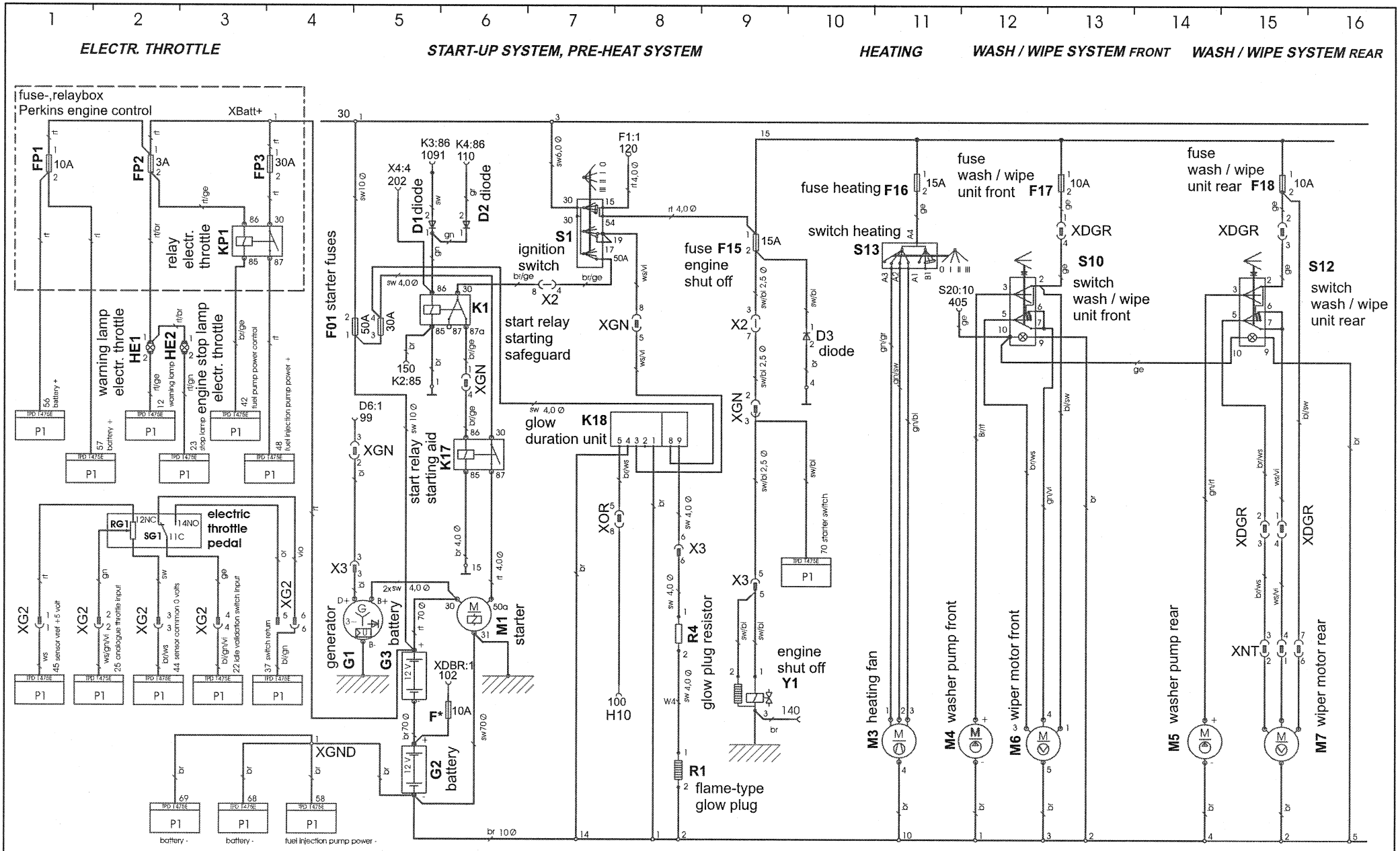


Path	Desig-nation	Device	Path	Desig-nation	Device
		Float position, Option	5.5	Y7	Valve for Float position
5.3	S9	Cut off lifting frame damping	5.5	Y12	Valve for Float position
5.4	D11	Blocking diode	5.7	S31	Switch / option
5.5	D10	Blocking diode	5.7	S21/3	Co-ordinate lever
5.3	Y11	Valve lifting frame damping	5.7	D8	Blocking diode
5.5	S32	Float position switch	5.8	D9	Blocking diode
5.5	S21/2	Co-ordinate lever	5.7	Y8	Valve - Option 1
5.5	D7	Blocking diode	5.8	Y9	Valve - Option 2

Radio, socket



Path	Desig-nation	Device	Path	Desig-nation	Device
		Radio, socket			
5.12	B2	Radio	5.15	F12	Fuse
5.13	B4	Loudspeaker left	5.15	X11	Socket
5.14	B3	Loudspeaker right			

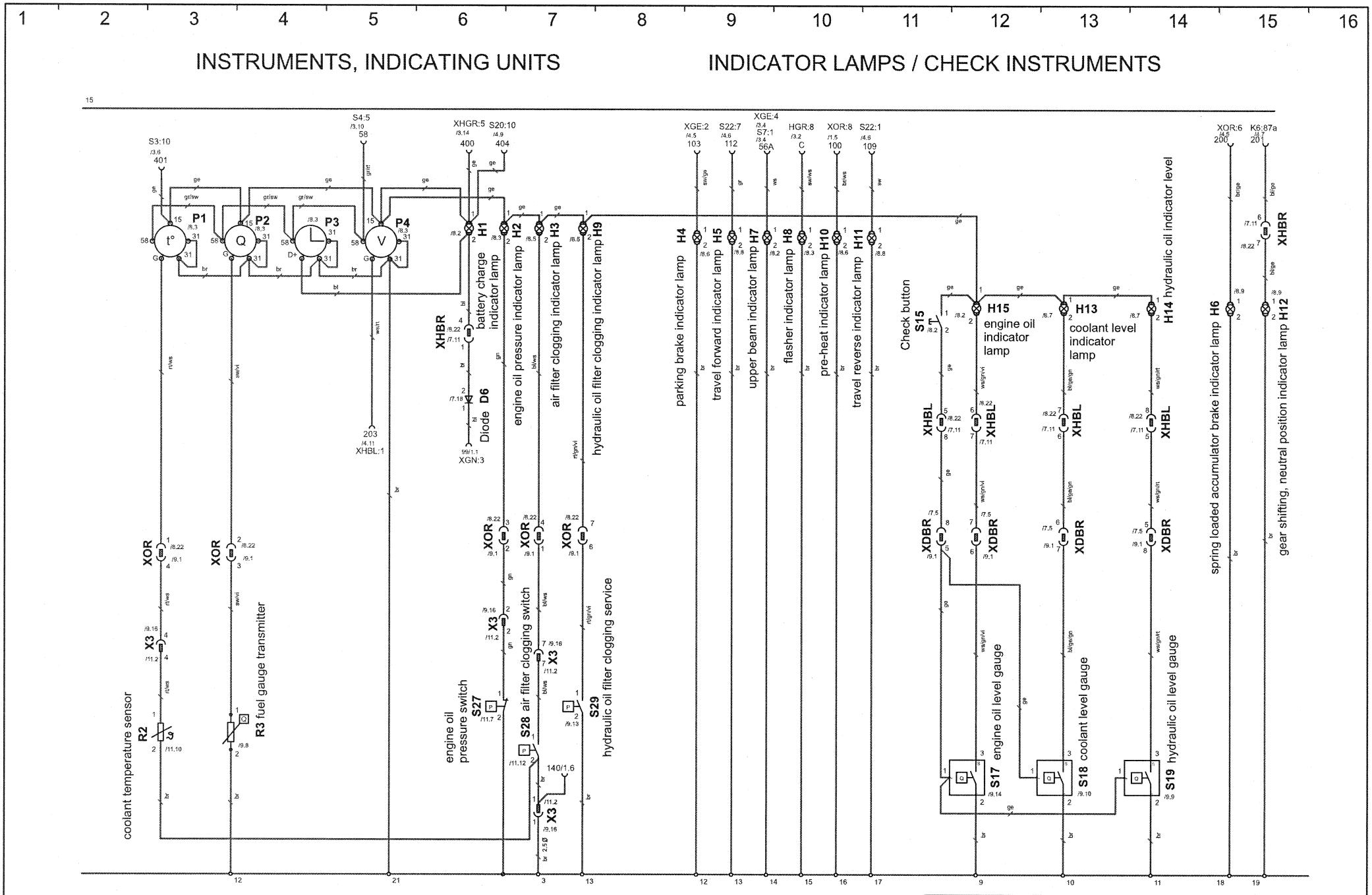


FP1	fuse 10A	power supply Perkins engine
FP2	fuse 3A	ignition switch input
FP3	fuse 30A	power supply fuel injection pump
RG1	throttle demand sensor	
SG1	idle validation switch	

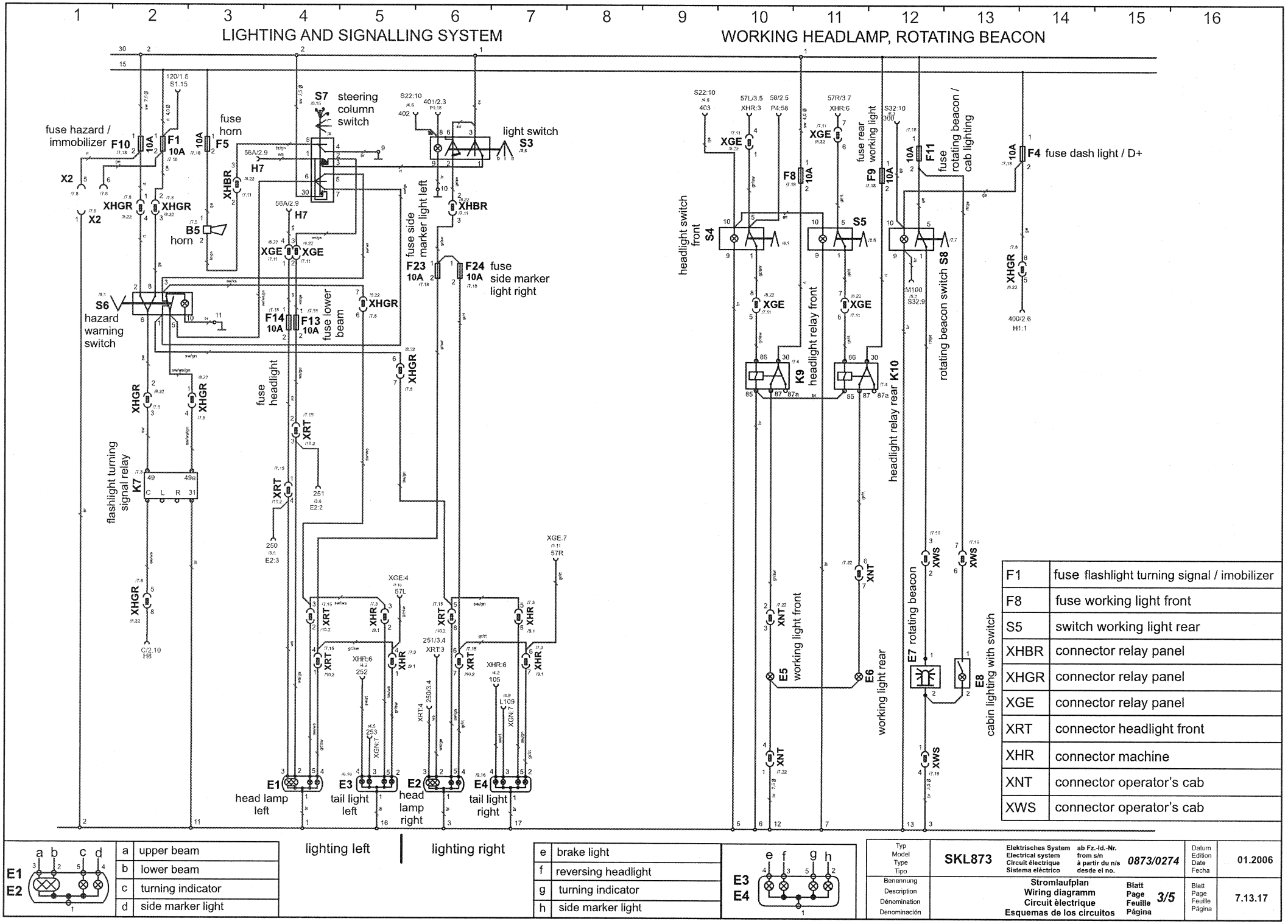
F*	fuse 10A
P1	machine interface connector
XGND	central ground point
XG2	connector electr. throttle
XGN	connector relay panel

X2	connector
X3	connector engine
XOR	connector machine
XDGR	connector relay panel
XNT	connector

Typ / Model / Type / Tipo	SKL873	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0873/0274	Datum / Edition / Date / Fecha	01.2006
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos		Blatt / Page / Feuille / Página 1/5	Blatt / Page / Feuille / Página	7.13.15



P1	temperatur indicator (coolant)	P4	speedometer	XOR	connector machine	Typ / Model / Type / Tipo	SKL873	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0873/0274	Datum / Edition / Date / Fecha 01.2006
P2	fuel gauge	X3	connector engine	XDBR	connector relay panel	Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 2/5	Blatt / Page / Feuille / Página 7.13.16
P3	operating hour meter	XHBR	connector relay panel	XHBL	connector relay panel				



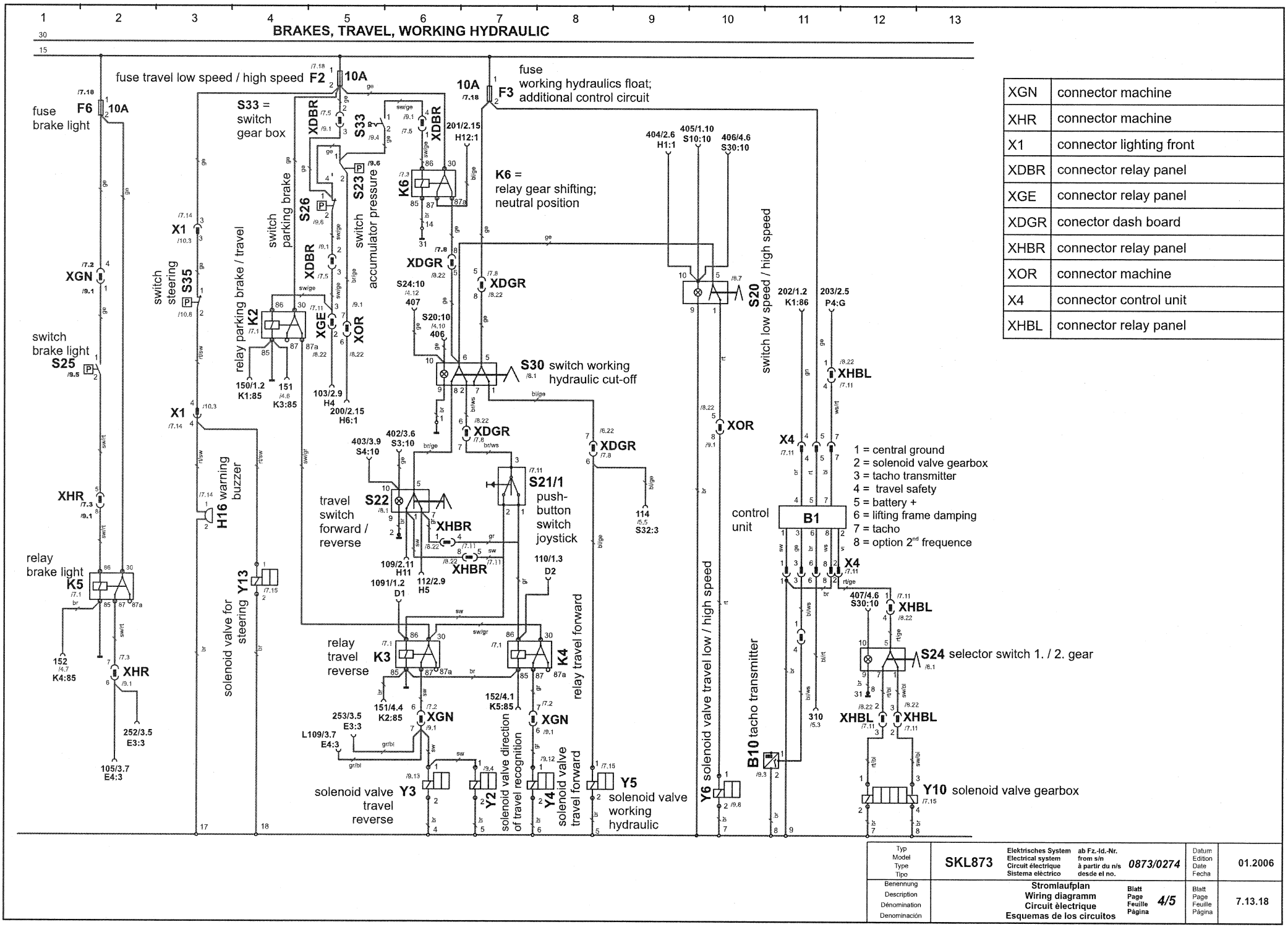
F1	fuse flashlight turning signal / imobilizer
F8	fuse working light front
S5	switch working light rear
XHBR	connector relay panel
XHGR	connector relay panel
XGE	connector relay panel
XRT	connector headlight front
XHR	connector machine
XNT	connector operator's cab
XWS	connector operator's cab

a	upper beam
b	lower beam
c	turning indicator
d	side marker light

e	brake light
f	reversing headlight
g	turning indicator
h	side marker light

Typ Model Type Tipo	SKL873	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 0873/0274	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 3/5		Blatt Page Feuille Página	7.13.17

BRAKES, TRAVEL, WORKING HYDRAULIC

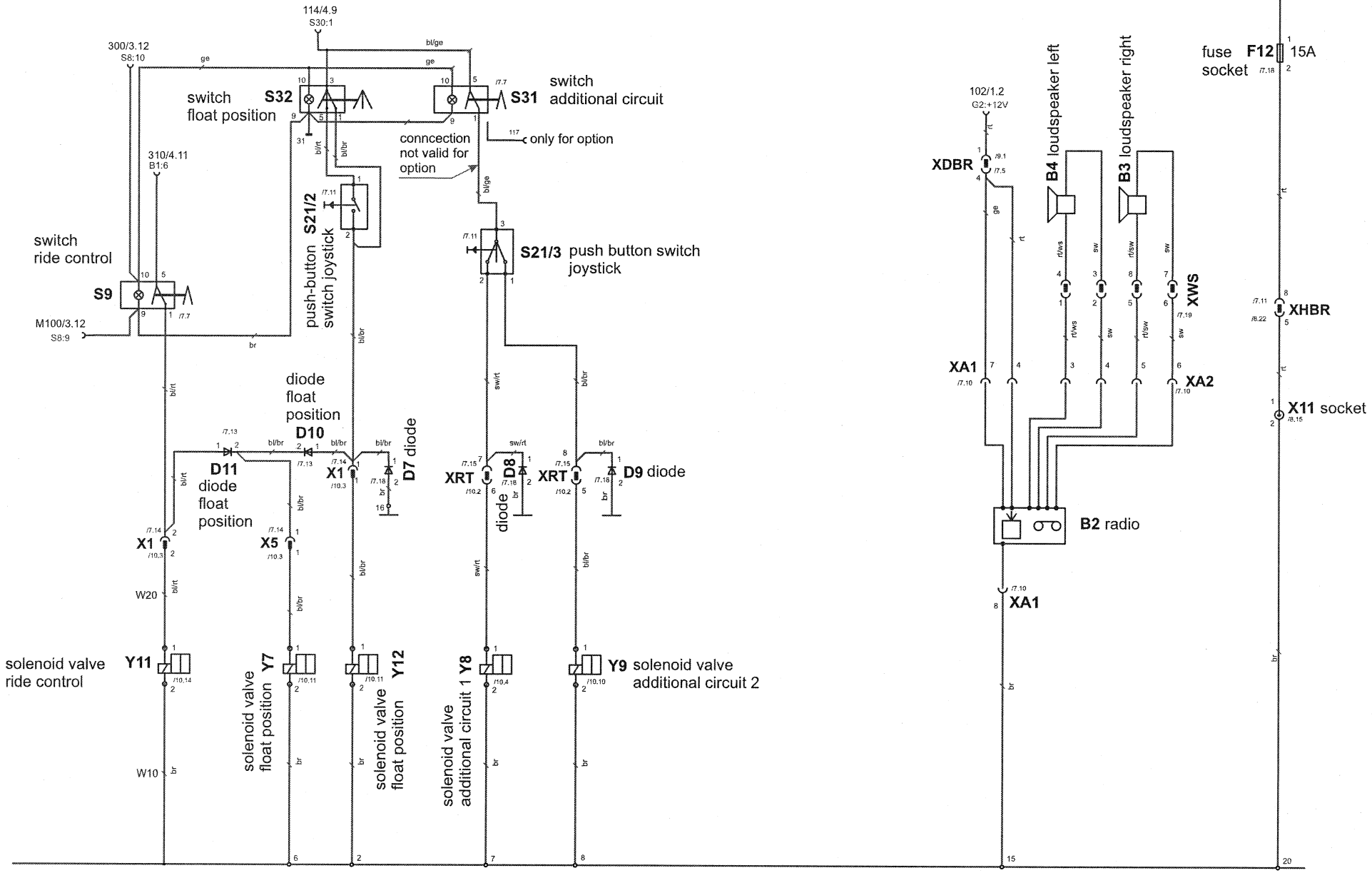


XGN	connector machine
XHR	connector machine
X1	connector lighting front
XDBR	connector relay panel
XGE	connector relay panel
XDGR	conector dash board
XHBR	connector relay panel
XOR	connector machine
X4	connector control unit
XHBL	connector relay panel

Typ / Model / Type / Tipo	SKL873	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0873/0274	Datum / Edition / Date / Fecha	01.2006
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos		Blatt / Page / Feuille / Página 4/5	Blatt / Page / Feuille / Página	7.13.18

RIDE CONTROL, FLOAT POSITION, ADDITIONAL CIRCUIT

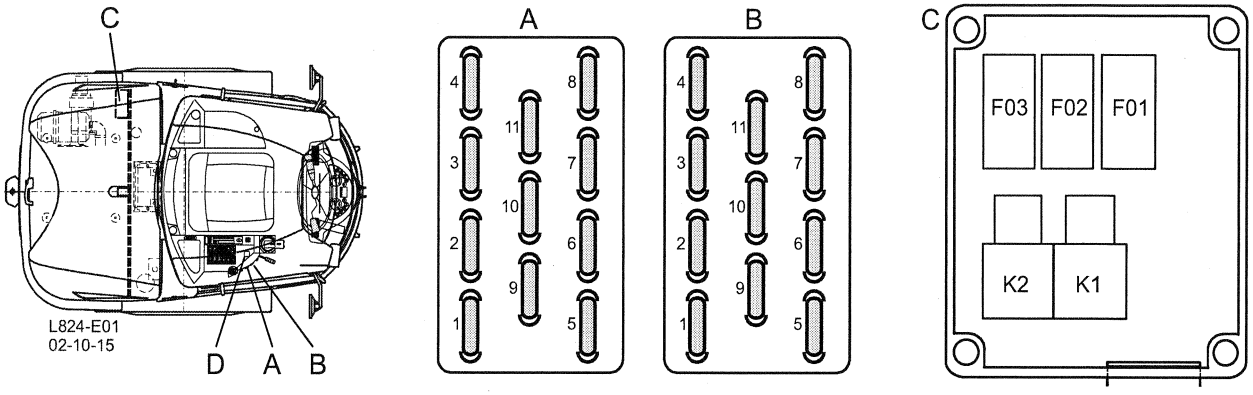
RADIO, SOCKET



X1	connector lighting front	XA1	connector radio	XDBR	connector machine	Typ / Model / Type / Tipo	SKL873	Elektrisches System / Electrical system / Circuit électrique / Sistema elèctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0873/0274	Datum / Edition / Date / Fecha 01.2006
X5	connector relay panel	XA2	connector radio	XWS	connector operator's cab	Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / Circuit èlectrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 5/5	Blatt / Page / Feuille / Página 7.13.19
XRT	connector relay panel	XHBR	connector dash board						

TEREX | SCHAEFF

Fuse box — Assignment diagram



D = K3 (turn-signal flasher relay) below instrument panel

A			B		
Position	**Ampere**	**assigned to**	**Position**	**Ampere**	**assigned to**
F 1	15	Heater fan	F 1	15	Working floodlight, front
F 2	15	Wash/wipe, front	F 2	15	Working floodlight, rear
F 3	15	Wash/wipe, rear	F 3	10	Turn signal
F 4	10	Rotating beacon; interior light	F 4	10	Hazard warning switch
F 5	15	Travel, forward/reverse	F 5	15	Socket; radio
F 6	10	Reserve	F 6	15	Reserve
F 7	10	Reserve	F 7	10	Horn
F 8	10	E-module inputs	F 8	10	High beam
F 9	10	Instruments	F 9	10	Low beam
F 10	10	Radio	F 10	10	Side marker light, left
F 11	15	Reserve	F 11	10	Side marker light, right

C / D					
F 01	50	Series fuse	K 1		Start relay
F 02	80	Starting system	K 2		Pre-heat relay
F 03	30	Control module power supply	K 3		Turn-signal flasher relay

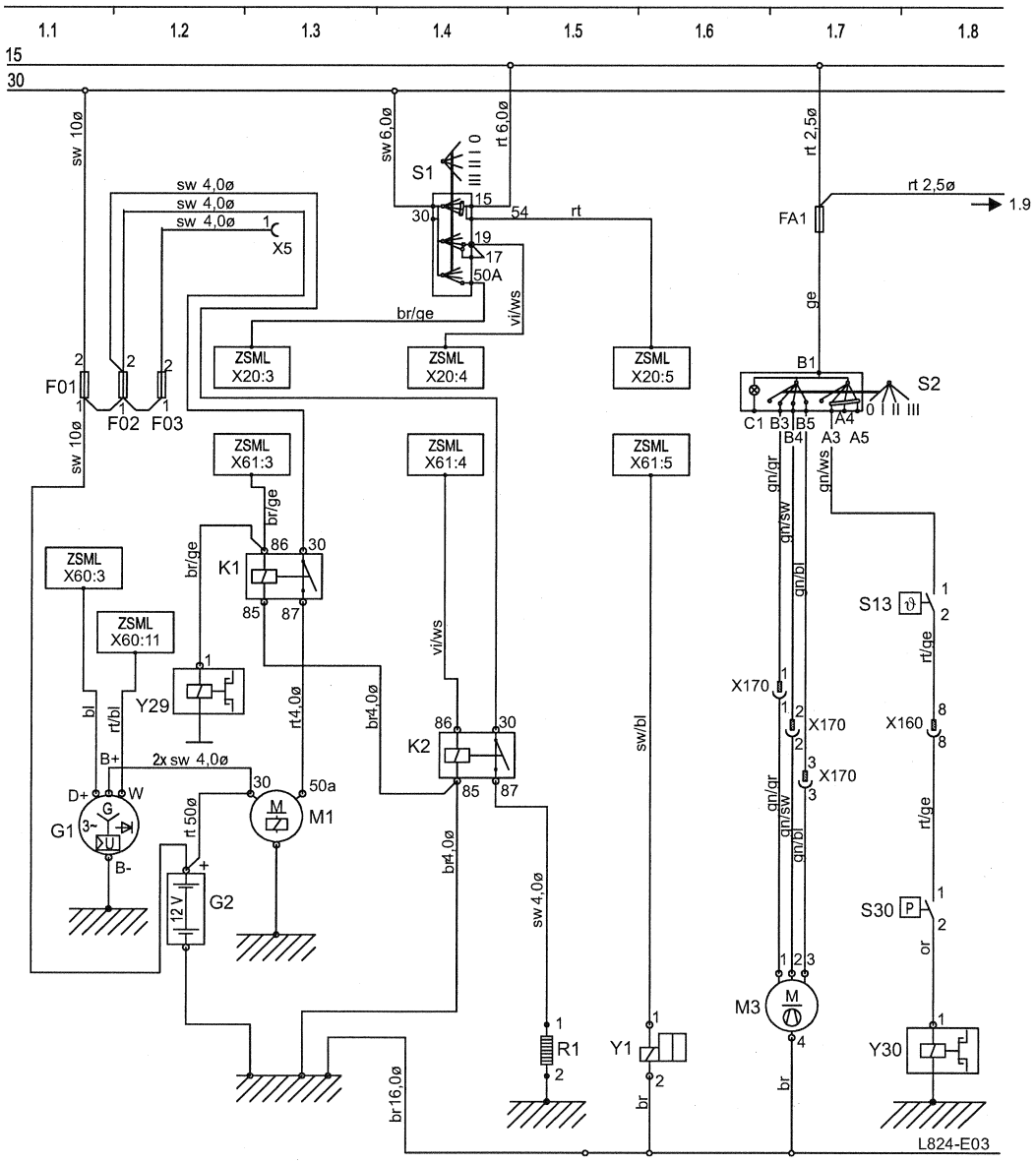
Colors of fuses

10 A	red	15 A	blue	30 A	Rose	50 A	red	80 A	white

Cable and plug colors

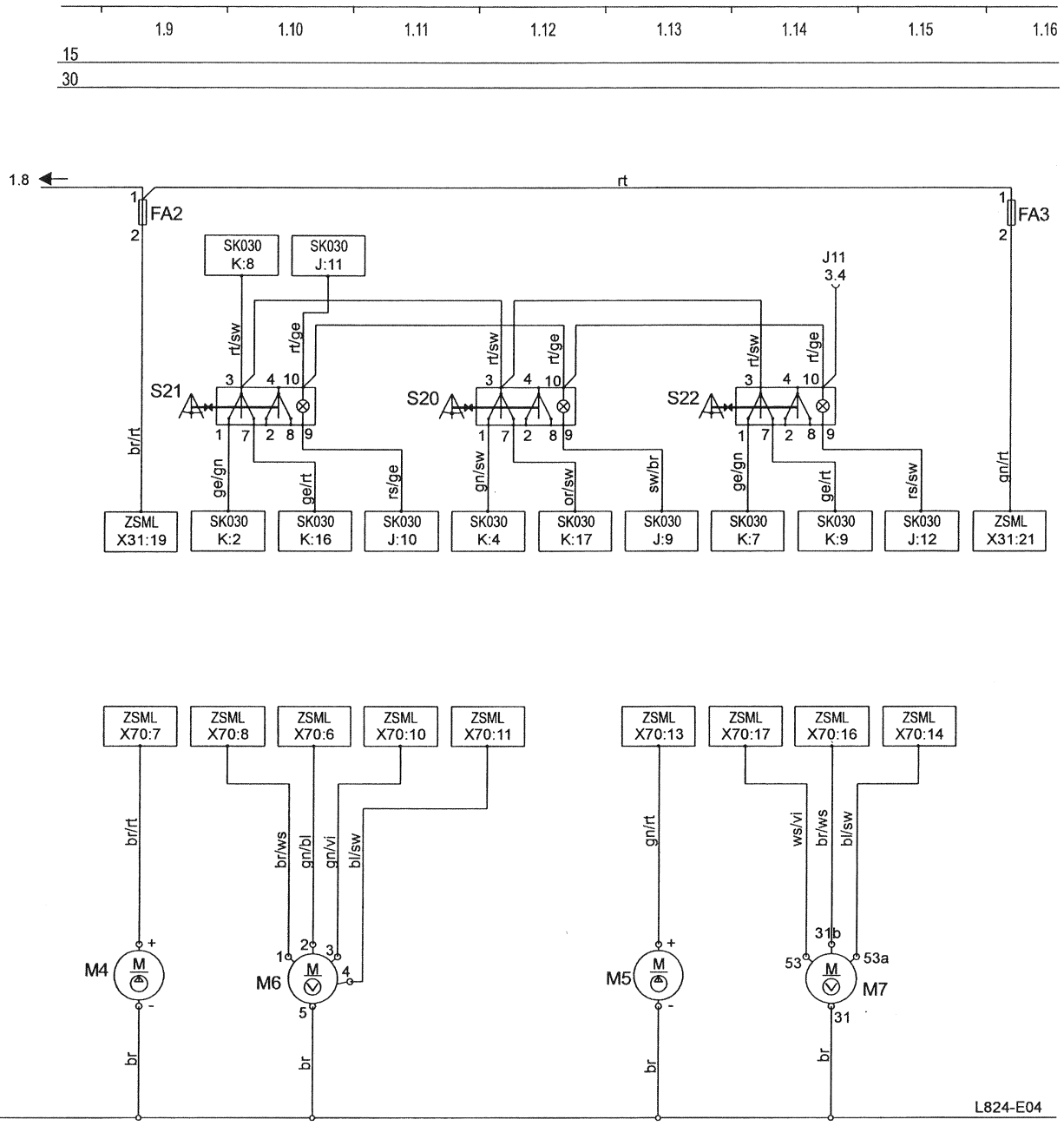
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bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Start-up	Pre-heat	Shut-off	Heating	Air conditioning



Path	Designation	Device	Path	Designation	Device
	ZSML	Central control module	1.4	K2	Start relay (starting safeguard)
1.1	F01	Flat-type fuse	1.5	R1	Glow plugs
1.1	G1	Generator	1.5	Y1	Engine shutdown
1.1	F02	Flat-type fuse	1.7	FA1	Fuse
1.2	F03	Flat-type fuse	1.7	S2	Heater switch
1.2	Y29	Cold start enhancement	1.7	M3	Heating
1.2	G2	Battery 12 V	1.8	S13	Air conditioning temperat. switch
1.3	K1	Start relay (starting aid)	1.8	S30	Air conditioning pressure switch
1.3	M1	Starter	1.8	Y30	Air conditioning relay
1.4	S1	Pre-heat/ starter switch			

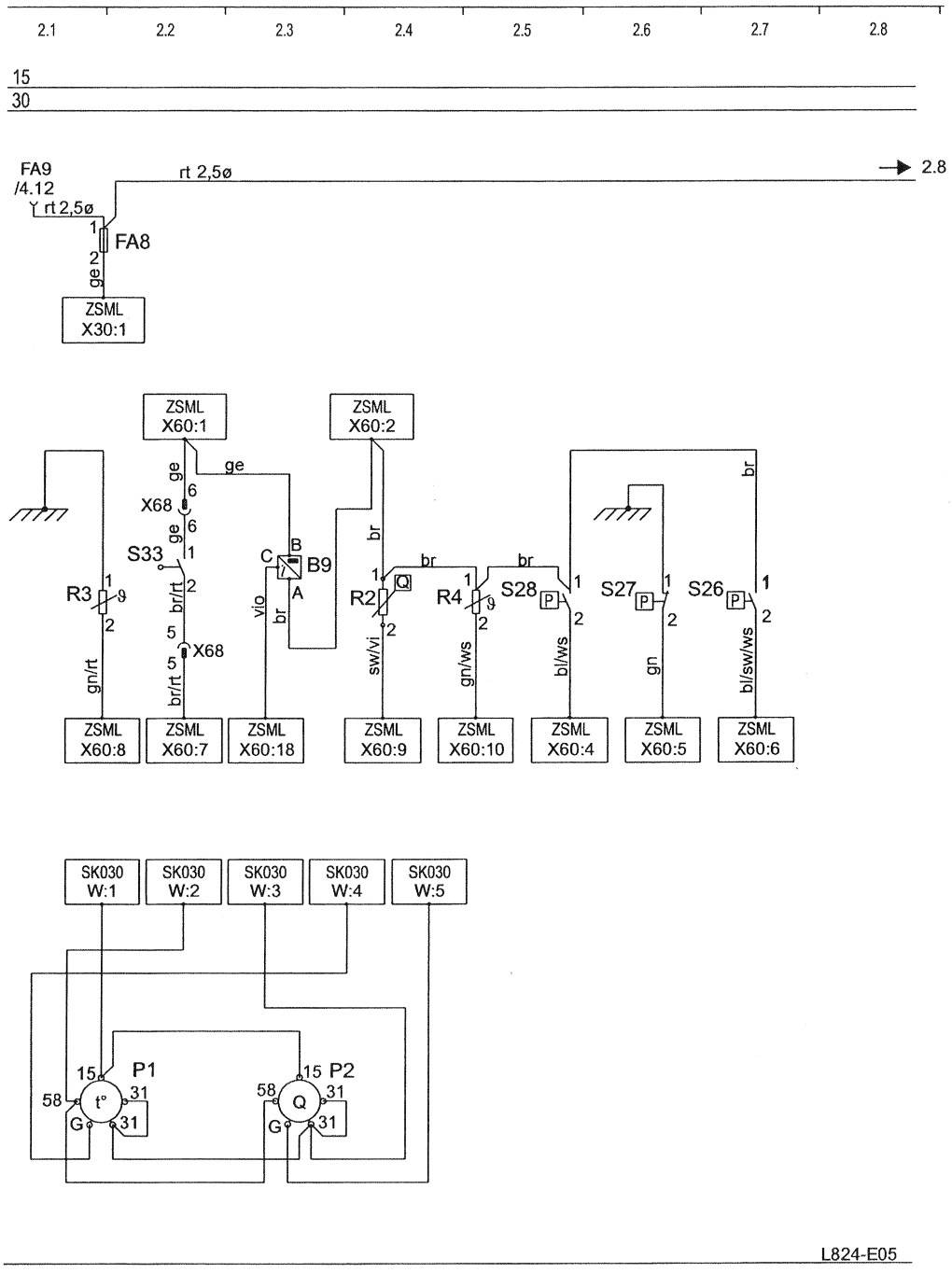
Wash/wipe system, front	Wash/wipe system, rear



Path	Designation	Device	Path	Designation	Device
	ZSML	Central control module	1.11	S20	Washer switch front/rear
	SK030	Instrument panel	1.13	M5	Washer pump rear
1.9	FA2	Fuse	1.14	S22	Wiper switch rear
1.9	M4	Washer pump front	1.14	M7	Wiper rear
1.10	S21	Wiper switch front	1.16	FA3	Fuse
1.10	M6	Wiper front			

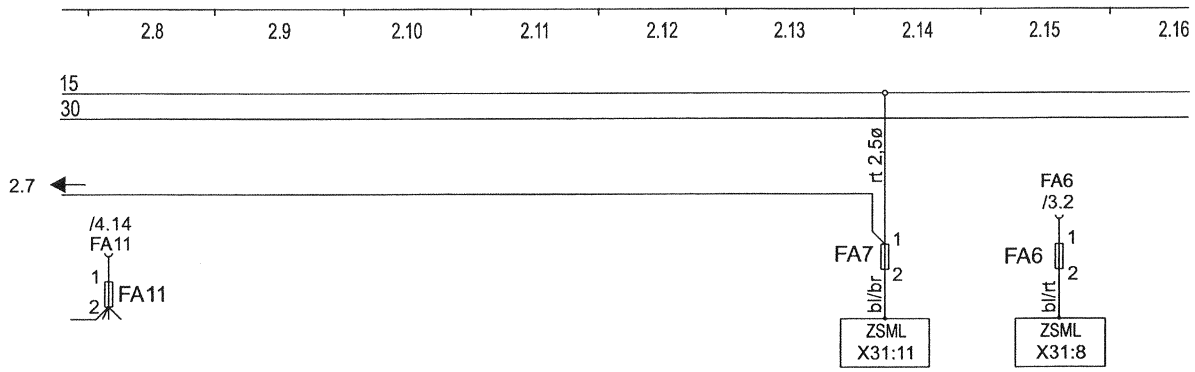
SCHAEFF TEREX	Typ/Model/Type	Datum/Edition/Date
	SKL 824	**01.2003**
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Wiring diagram	**7.22.02**

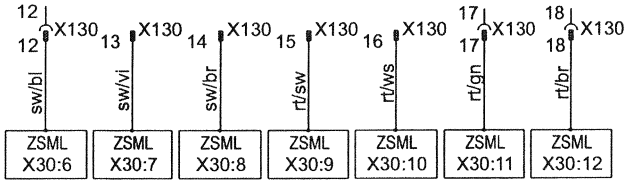
Monitoring

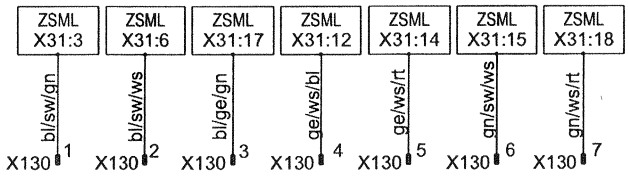


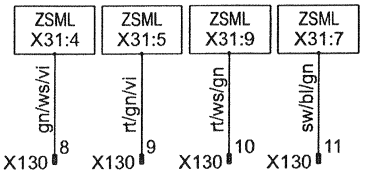
Path	Designation	Device	Path	Designation	Device
2.1	FA8	Fuse	2.4	R2	Tank sensor
2.1	R3	Engine temperature sensor	2.5	R4	Hydraulic oil temperature sensor
2.2	P1	Engine temperature indicator	2.5	S28	Air filter maintenance switch
2.2	S33	Transmission position	2.6	S27	Oil pressure switch
2.3	B9	Speed	2.7	S26	Hydrostatic brake switch
2.3	P2	Fuel tank indicator			

Monitoring





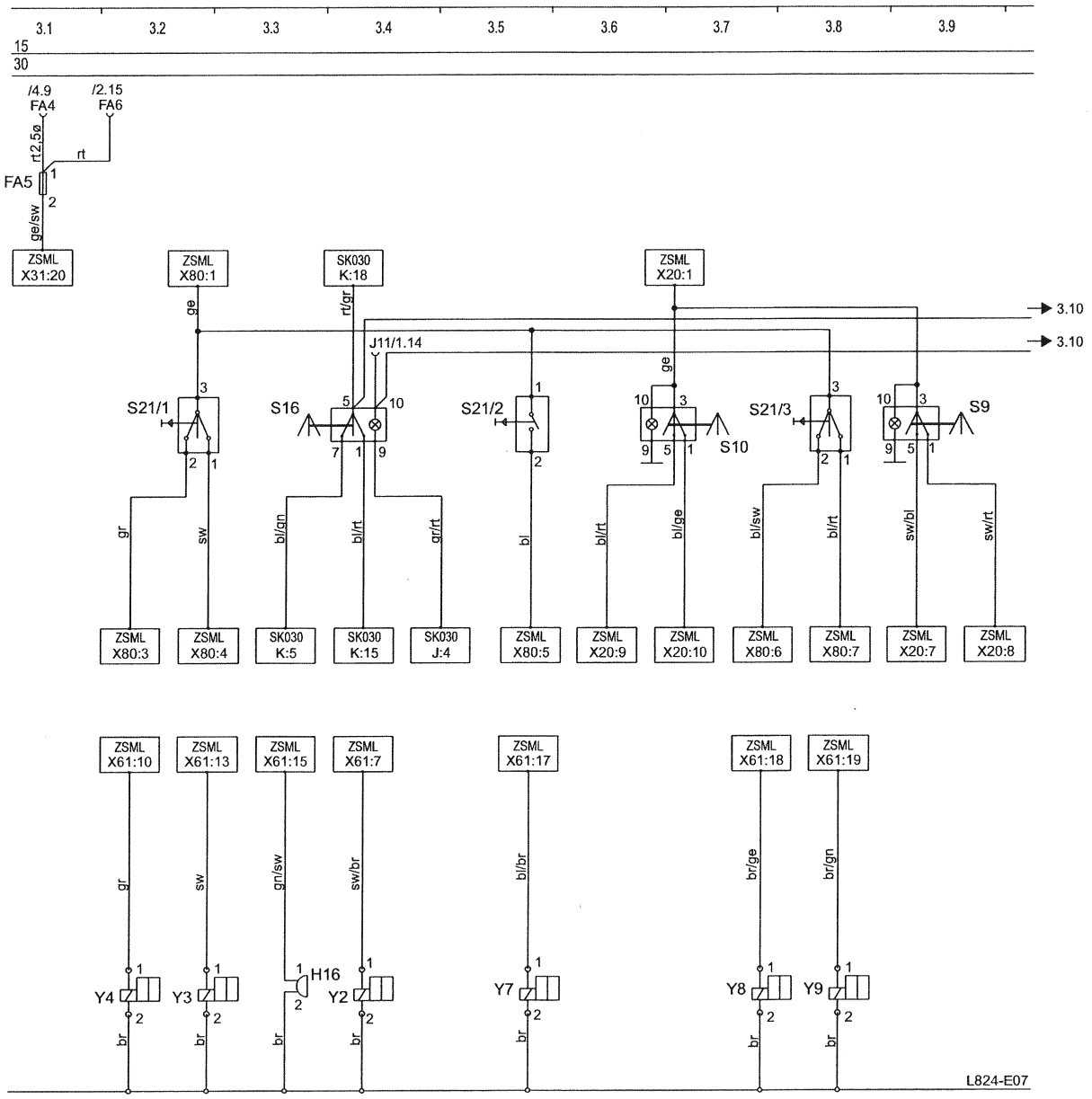




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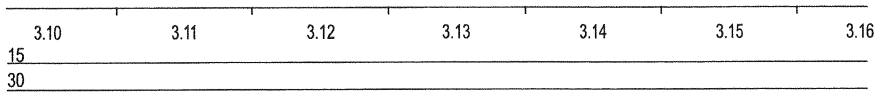
Path	Designation	Device	Path	Designation	Device
2.8	FA11	Reserve fuse	2.15	FA6	Reserve fuse
2.14	FA7	Reserve fuse			

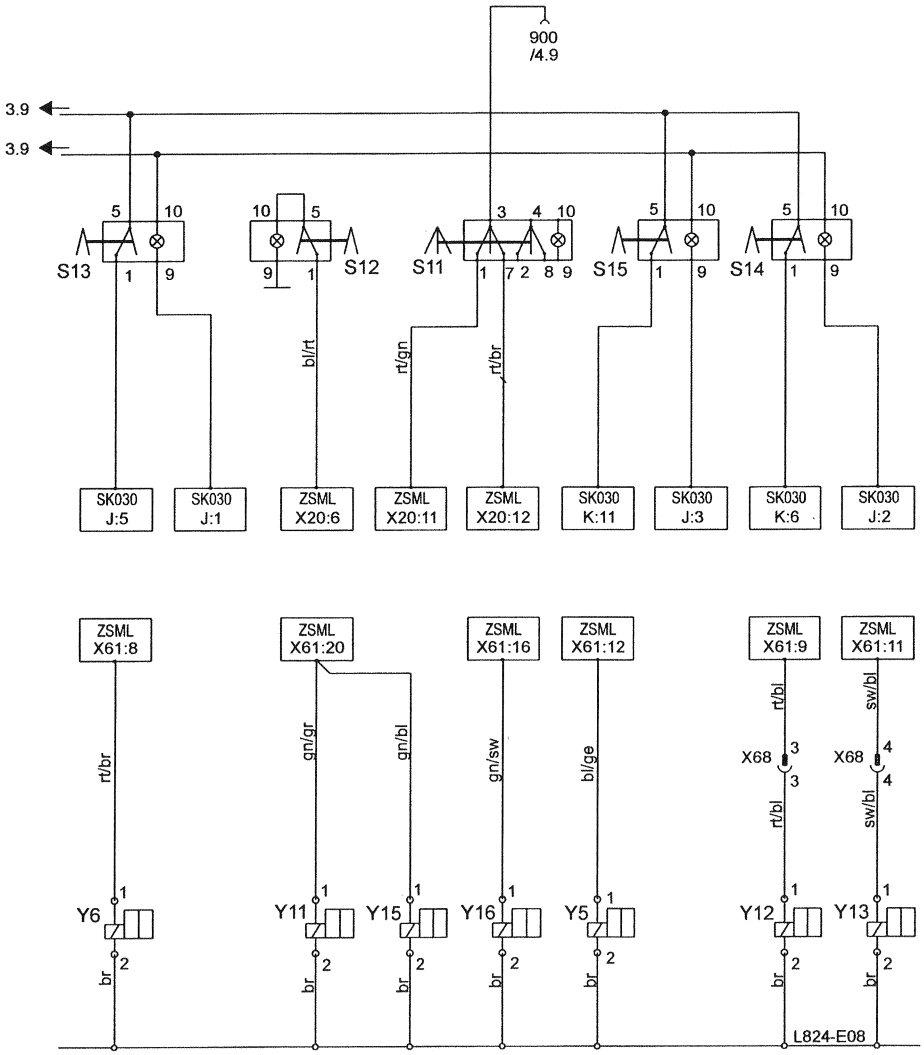
"Travel" fuse	Travel	Float position	Additional control circuit



Path	Designation	Device	Path	Designation	Device
3.1	FA5	Fuse	3.5	S21/2	Float position switch
3.2	Y4	Travel, forward	3.5	Y7	Float position
3.2	S21/1	Switch for travel, forward/reverse	3.7	S10	Float position switch
3.3	Y3	Travel, reverse	3.8	Y8	Additional control circuit 1
3.3	H16	Travel motion alarm	3.8	S21/3	Additional control circuit switch
3.4	S16	Switch for travel, forward/reverse	3.8	Y9	Additional control circuit 2
3.4	Y2	Travel direction recognition	3.9	S9	Additional control circuit

Travel speed	Ride control system	4th control circuit	Working hydraulics	Transmission

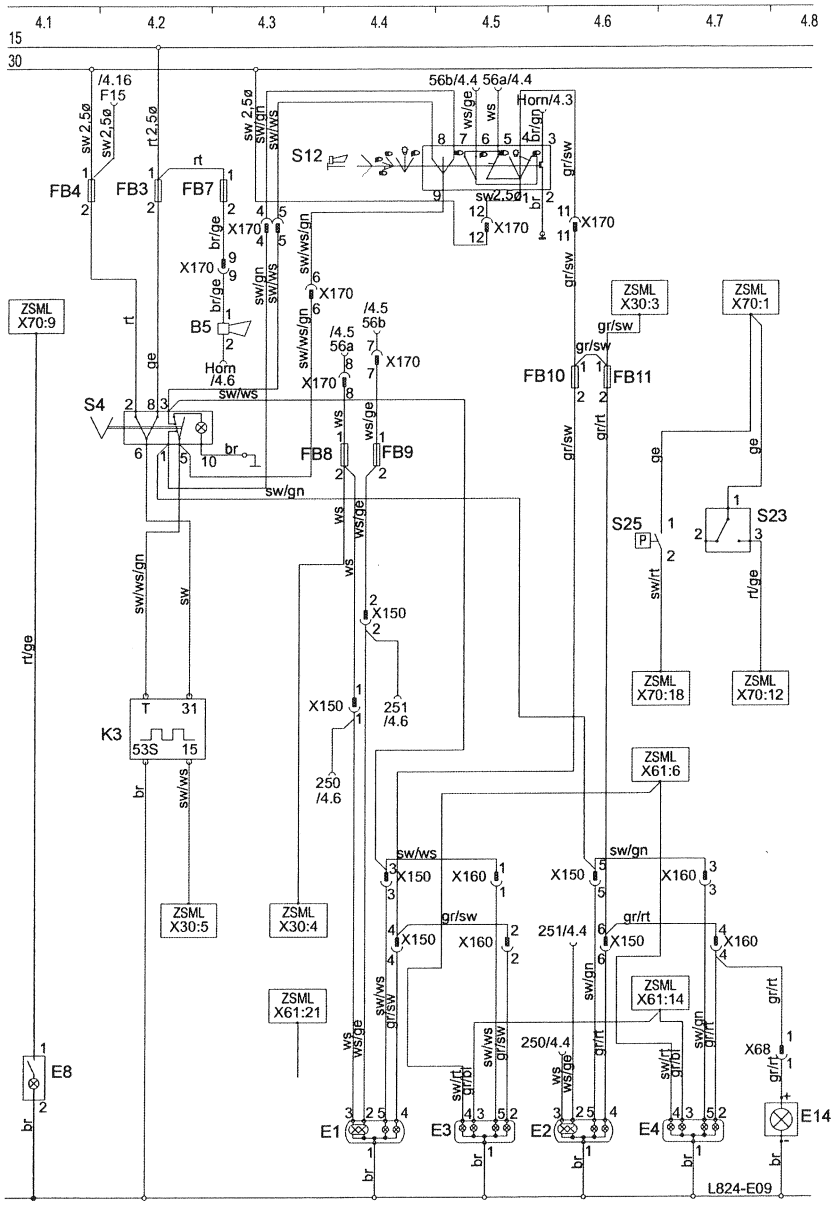




Path	Designation	Device	Path	Designation	Device
3.10	S13	Travel, SLOW	3.13	S11	4th control circuit
3.10	Y6	Travel, SLOW	3.14	Y5	Working hydraulics
3.12	S12	Ride control system switch	3.14	S15	Working hydraulics
3.12	Y11	Ride control system 1	3.15	S14	Transmission
3.12	Y15	Ride control system 2	3.15	Y12	Transmission 1
3.13	Y16	Ride control system 3	3.16	Y13	Transmission 2

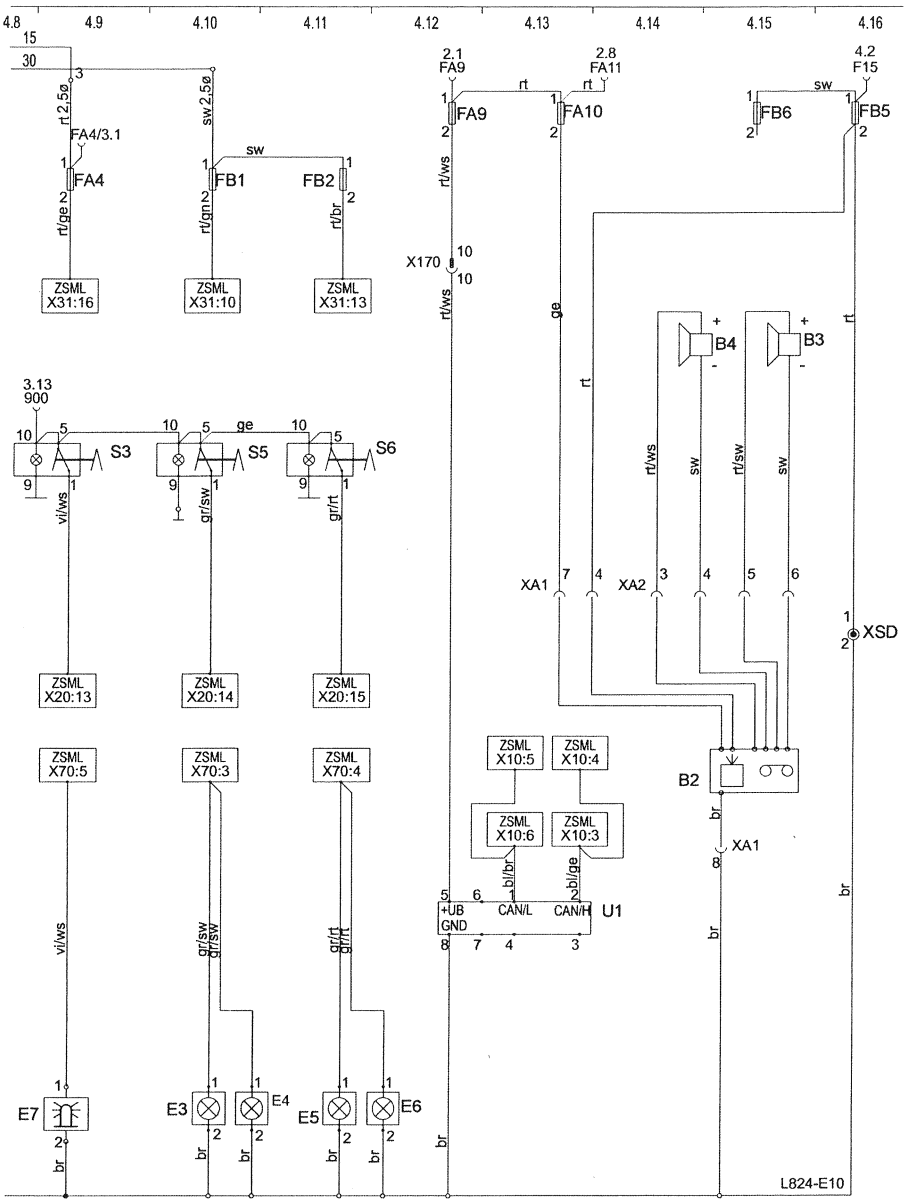
SCHAEFF TEREX	Typ/Model/Type **SKL 824**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.22.04**

Lighting and signaling



Path	Designation	Device	Path	Designation	Device
4.1	E8	Interior light	4.4	E1	Lighting front left
4.1	FB4	Fuse	4.5	S12	Light switch
4.2	FB3	Fuse	4.5	E3	Lighting rear left
4.2	S4	Direction indicator switch, hazard warning switch	4.6	FB10	Fuse
4.2	K3	Flasher transmitter	4.6	FB11	Fuse
4.3	FB7	Fuse	4.6	E2	Lighting front right
4.3	B5	Horn	4.6	S25	Brake light switch
4.4	FB8	Fuse	4.7	E4	Lighting rear right
4.4	FB9	Fuse	4.7	S23	Hand brake switch
			4.8	E14	License-plate illumination

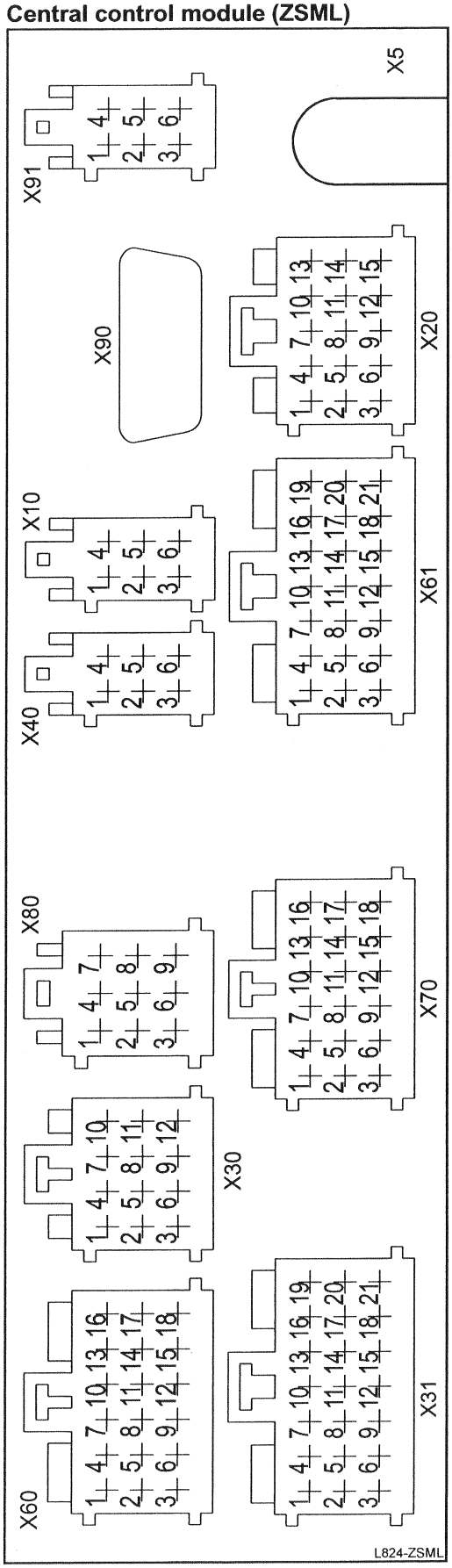
Rotating beacon	Working floodlights	Instrument panel	Radio	Socket



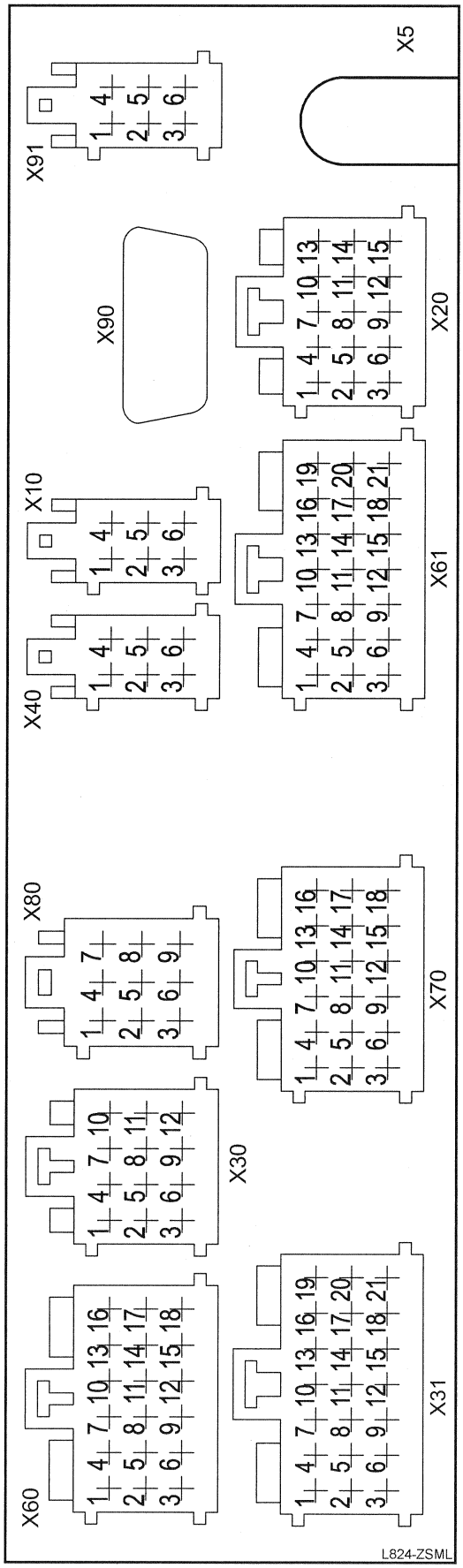
Path	Designation	Device	Path	Designation	Device
4.9	FA4	Fuse	4.12	E6	Working floodlight rear
4.9	S3	Rotating beacon switch	4.12	FA9	Fuse
4.9	E7	Rotating beacon	4.13	U1	Instrument panel
4.10	FB1	Fuse	4.13	FA10	Fuse
4.10	S5	Working floodlight front	4.15	B4	Loudspeaker
4.10	E3	Working floodlight front	4.15	B2	Radio
4.11	E4	Working floodlight front	4.15	FB6	Fuse
4.11	FB2	Fuse	4.15	B3	Loudspeaker
4.11	S6	Working floodlight rear	4.16	FB5	Fuse
4.11	E5	Working floodlight rear	4.16	XSD	Socket

SCHAEFF TEREX	Typ/Model/Type **SKL 824**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.22.05**

Central control module (ZSML)

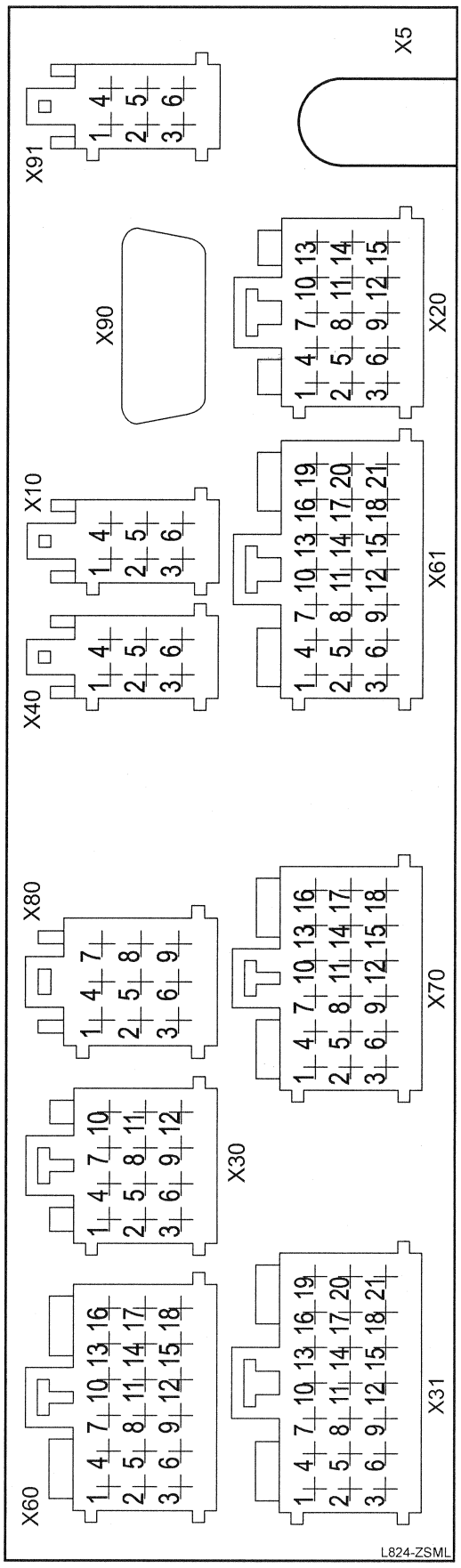


X60	***Signal inputs "engine monitoring"***
1	Power supply Terminal 15 output
2	Central mass Terminal 31
3	Charge control generator D+
4	Air filter maintenance switch signal
5	Oil pressure switch signal
6	Hydrostatic brake pressure switch signal
7	Transmission switch signal
8	Tank sensor signal
9	Engine temperature sensor signal
10	Hydraulic oil temperature sensor signal
11	Speed signal generator "W" signal
12	--
13	--
13	--
15	--
16	--
17	--
18	Speedometer signal sensor
X30	***Signal inputs "Lighting"***
1	Power supply Terminal 15 output
2	--
3	Parking light Terminal 15 input
4	High beam signal
5	Direction indicator control signal
6	Reserve -
7	Reserve +
8	Reserve +
9	Reference voltage
10	Reserve - Analog
11	Reserve - Analog
12	Reserve - Analog
X80	***Coordinate lever***
1	Power supply Terminal 15 output
2	Central mass Terminal 31
3	Travel forward signal
4	Travel reverse signal
5	Float position signal
6	Additional control circuit signal
7	Additional control circuit signal
8	Reserve - Analog
9	Reserve - Analog

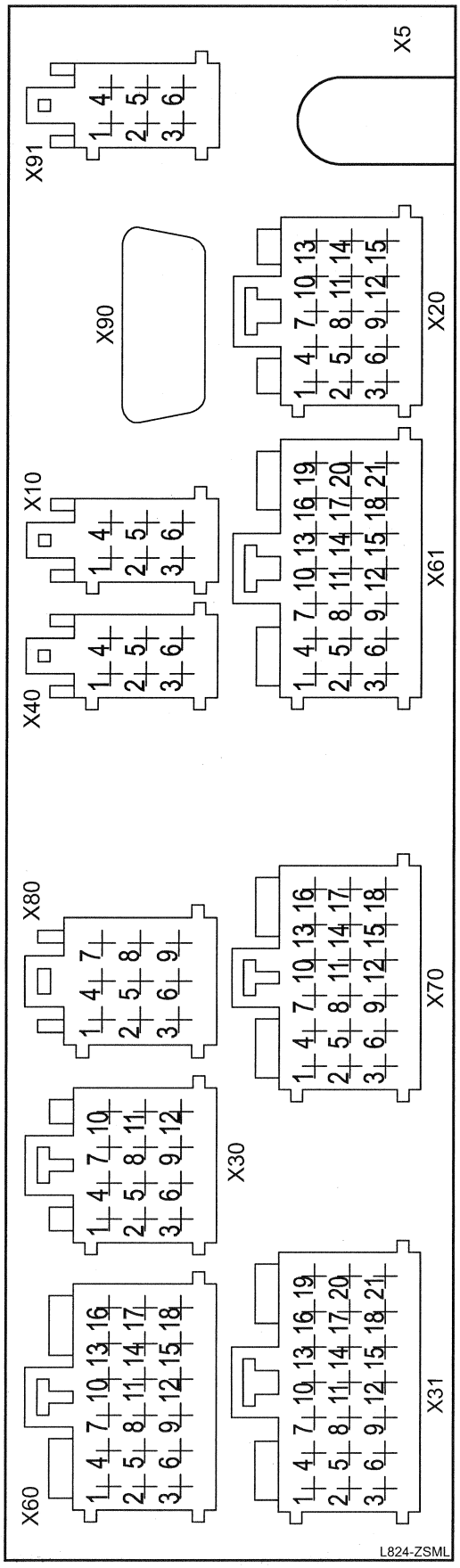


X40	***CAN-BUS (Option)***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	CAN/HI
4	R1
5	R2
6	CAN/LO
X10	***Control panel***
1	--
2	Central ground Terminal 31
3	CAN/HI
4	--
5	--
6	CAN/LO
X90	***Programming connection***
X91	***Immobilizer (Option)***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	***TXD***
4	RXD
5	CTS
6	RTS

TEREX | SCHAEFF	Typ/Model/Type **SKL 824**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.22.06**



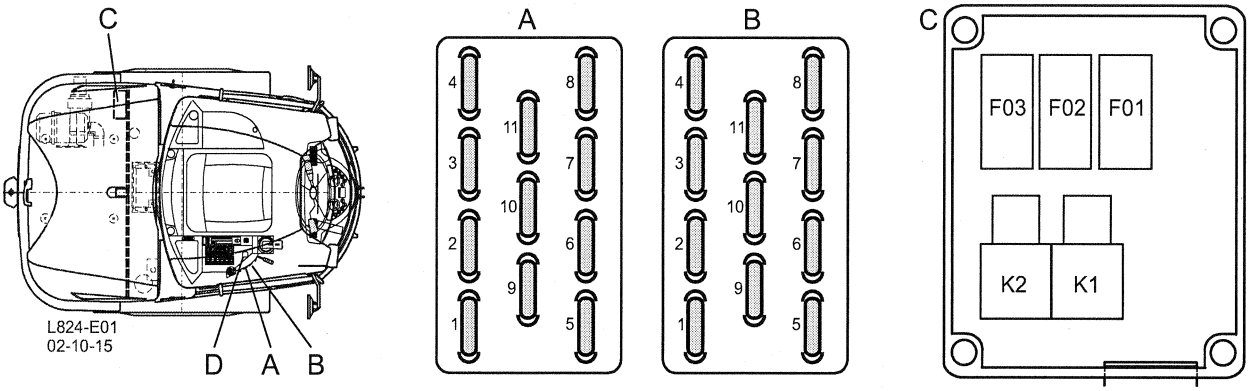
X31	Module power supply, working floodlights, rotating beacon, wiper
1	--
2	--
3	Reserve digital output
4	Relay K11:87a N.C. contact output
5	Relay K11:87 N.O. contact output
6	Reserve digital output
7	Relay K12:87 N.O. contact output
8	Relay K12 power supply Terminal 15 input
9	Relay K12:87a N.C. contact Output
10	Power supply Terminal 15 input working floodlight front
11	Relay K11 power supply Terminal 15 input
12	PWM output (Option 2nd auxiliary circuit)
13	Power supply Terminal 15 input working floodlight rear
14	PWM output (Option 2nd auxiliary circuit)
15	Reserve PWM output
16	Power supply Terminal 30 input rotating beacon
17	Reserve Digital output
18	Reserve PWM output
19	Power supply Terminal 15 input wash/ wipe rear
20	Power supply Terminal 15 input travel
21	Power supply Terminal 15 input wash/ wipe rear
X70	**Working floodlights , Wipers**
1	Brake light switch Terminal 15 output
2	--
3	Working floodlight front output
4	Working floodlight rear output
5	Rotating beacon output
6	Wiper Terminal 53b 2nd setting output
7	Washer pump front output
8	Wiper Terminal 31b output
9	Interior lamp Terminal 30 output
10	Wiper Terminal 53 output
11	Wiper Terminal 53a output
12	Hand brake switch signal input
13	Washer pump rear output
14	Rear wiper Terminal 53a output
15	--
16	Rear wiper Terminal 31b output
17	Rear wiper Terminal output
18	Brake light switch signal input



X61	*X61* new from 824/0213	*Rear carriage*
1	1	--
2	2	--
3	3	Starting Terminal 50a output
4	4	Pre-heat output
5	5	Engine shutdown output
6	6	Brake light output
7	7	Travel, direction recognition output
8	8	Travel, FAST-SLOW output
9	9	Transmission 1 output
10	21	Travel forward output
11	11	Transmission 2 output
12	12	Working hydraulics output
13	16	Travel reverse output
14	15	Back-up lamp output
15	10	Travel motion alarm output
16	14	Ride control system 3 output
17	17	Float position output
18	18	Additional control circuit output
19	19	Additional control circuit output
20	20	Ride control system 1,2 output
21	13	Fog lamp Output
X20		***Panel, right***
1		Power supply Terminal 15 output
2		--
3		Starting Terminal 50a signal
4		Pre-heat signal
5		Engine shutdown signal
6		Ride control system signal
7		Additional control circuit signal
8		Additional control circuit signal
9		Float position 1 signal
10		Float position 2 signal
11		4th control circuit signal
12		4th control circuit signal
13		Rotating beacon signal
14		Working floodlight front signal
15		Working floodlight rear Signal
X5		***Power supply***

TEREX | SCHAEFF

Fuse box — Assignment diagram



D = K3 (turn-signal flasher relay) below instrument panel

A			B		
Position	**Ampere**	**assigned to**	**Position**	**Ampere**	**assigned to**
F 1	15	Heater fan	F 1	15	Working floodlight, front
F 2	15	Wash/wipe, front	F 2	15	Working floodlight, rear
F 3	15	Wash/wipe, rear	F 3	10	Turn signal
F 4	10	Rotating beacon; interior light	F 4	10	Hazard warning switch
F 5	15	Travel, forward/reverse	F 5	15	Socket; radio
F 6	10	Reserve	F 6	15	Reserve
F 7	10	Reserve	F 7	10	Horn
F 8	10	E-module inputs	F 8	10	High beam
F 9	10	Instruments	F 9	10	Low beam
F 10	10	Radio	F 10	10	Side marker light, left
F 11	15	Reserve	F 11	10	Side marker light, right

C / D					
F 01	50	Series fuse	K 1		Start relay
F 02	80	Starting system	K 2		Pre-heat relay
F 03	30	Control module power supply	K 3		Turn-signal flasher relay

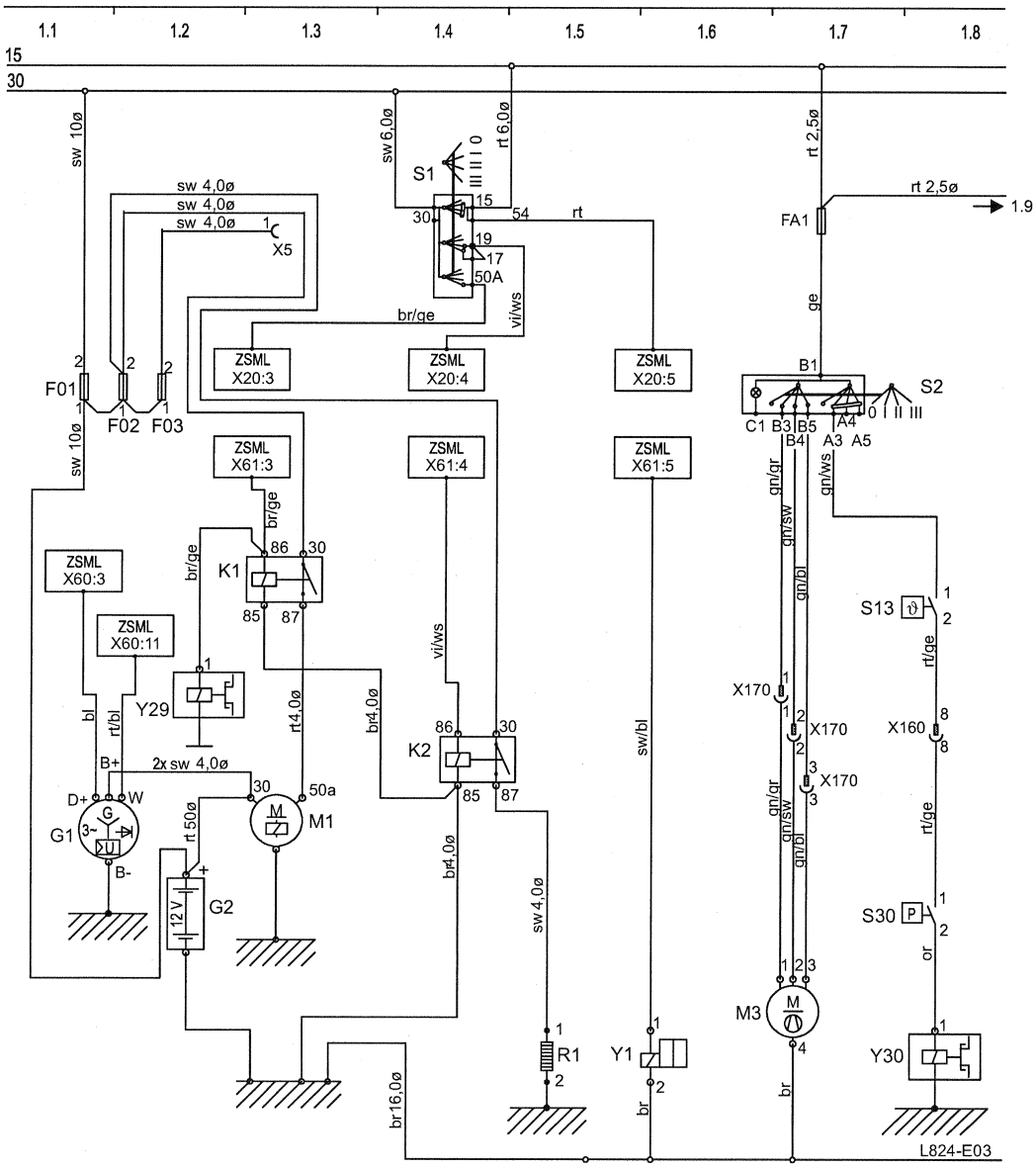
Colors of fuses

10 A	red	15 A	blue	30 A	Rose	50 A	red	80 A	white

Cable and plug colors

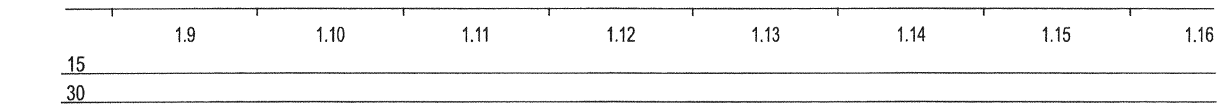
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bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

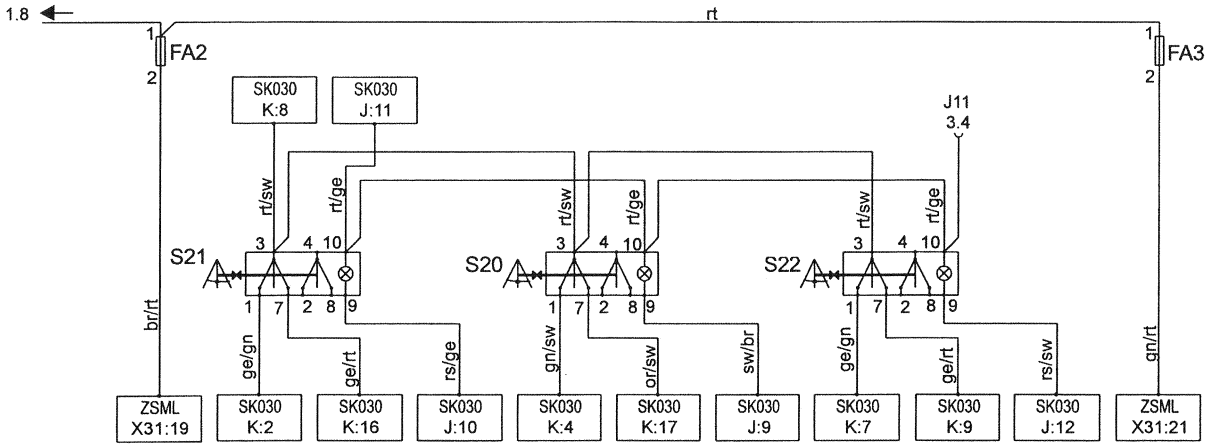
Start-up	Pre-heat	Shut-off	Heating	Air conditioning

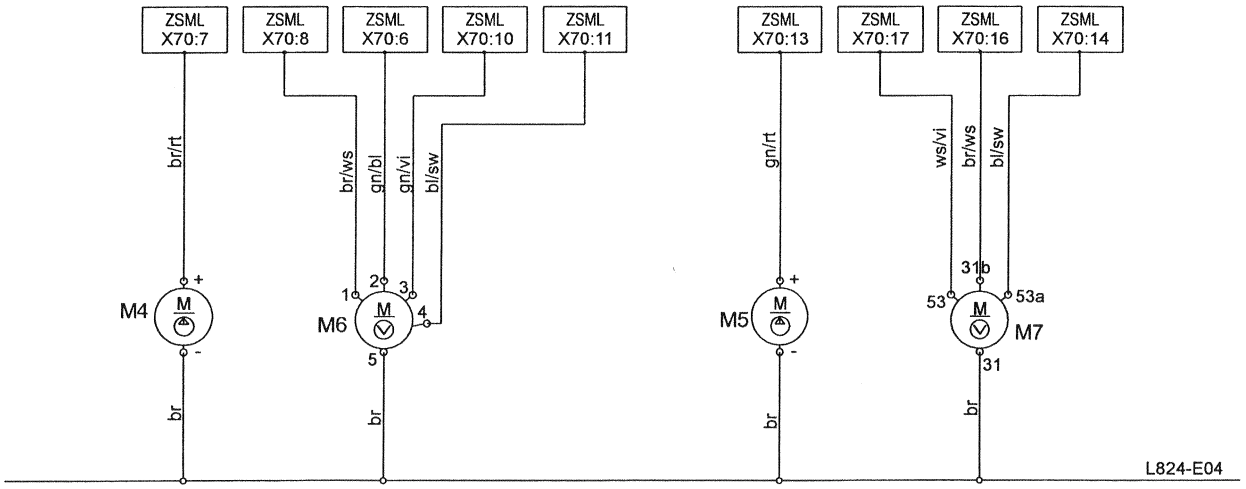


Path	Designation	Device	Path	Designation	Device
	ZSML	Central control module	1.4	K2	Start relay (starting safeguard)
1.1	F01	Flat-type fuse	1.5	R1	Glow plugs
1.1	G1	Generator	1.5	Y1	Engine shutdown
1.1	F02	Flat-type fuse	1.7	FA1	Fuse
1.2	F03	Flat-type fuse	1.7	S2	Heater switch
1.2	Y29	Cold start enhancement	1.7	M3	Heating
1.2	G2	Battery 12 V	1.8	S13	Air conditioning temperat. switch
1.3	K1	Start relay (starting aid)	1.8	S30	Air conditioning pressure switch
1.3	M1	Starter	1.8	Y30	Air conditioning relay
1.4	S1	Pre-heat/ starter switch			

Wash/wipe system, front	Wash/wipe system, rear



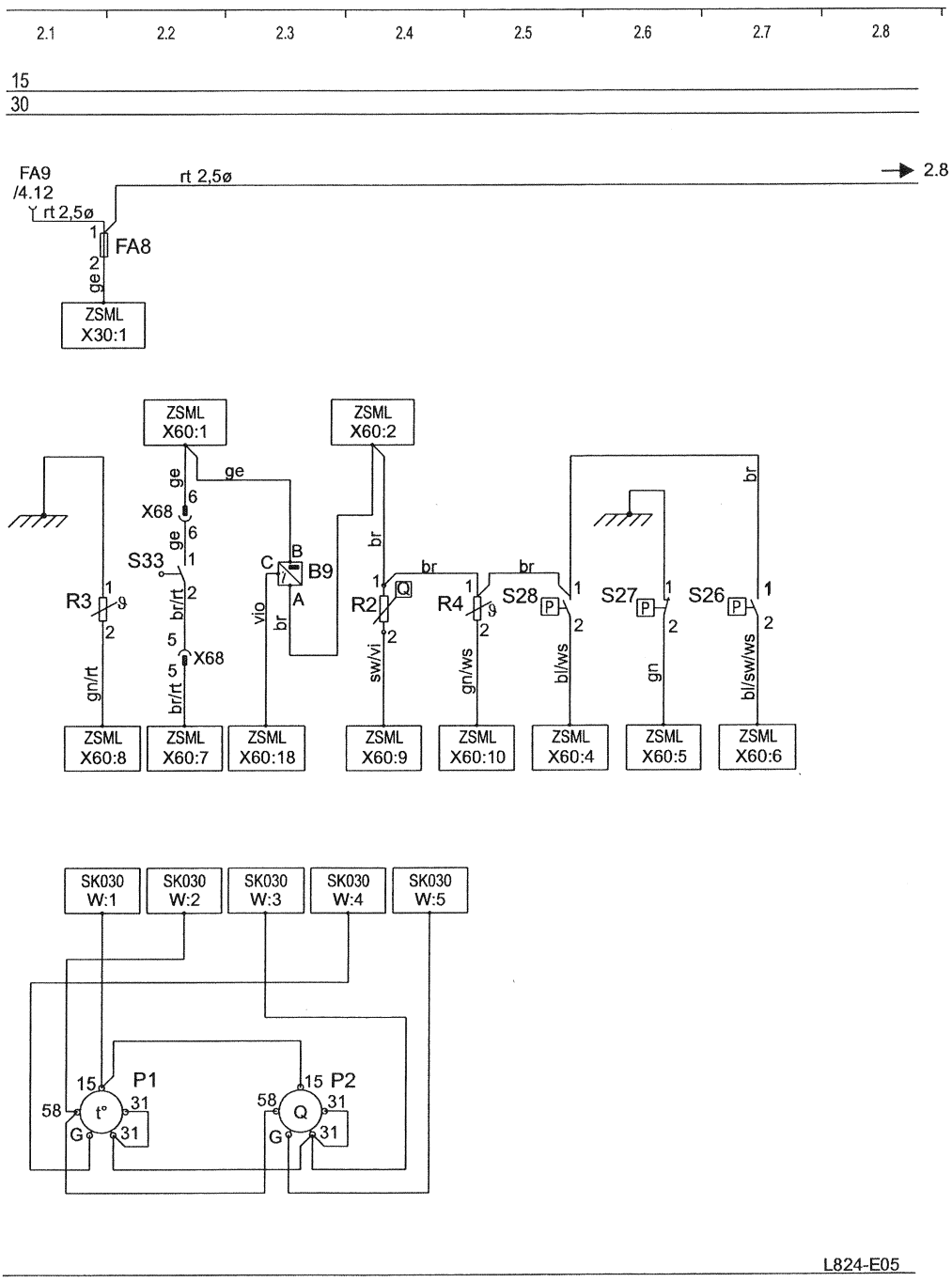




Path	Designation	Device	Path	Designation	Device
	ZSML	Central control module	1.11	S20	Washer switch front/rear
	SK030	Instrument panel	1.13	M5	Washer pump rear
1.9	FA2	Fuse	1.14	S22	Wiper switch rear
1.9	M4	Washer pump front	1.14	M7	Wiper rear
1.10	S21	Wiper switch front	1.16	FA3	Fuse
1.10	M6	Wiper front			

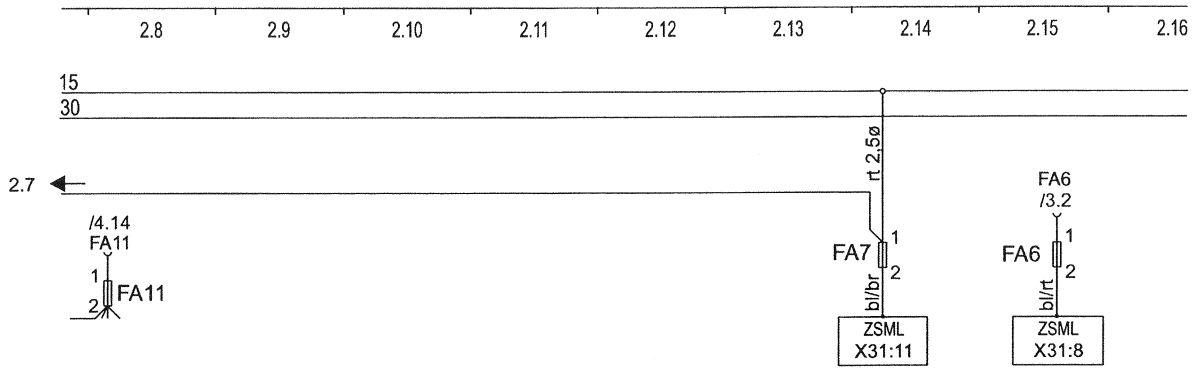
SCHAEFF TEREX	Typ/Model/Type	Datum/Edition/Date
	SKL 834	**01.2003**
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Wiring diagram	**7.24.02**

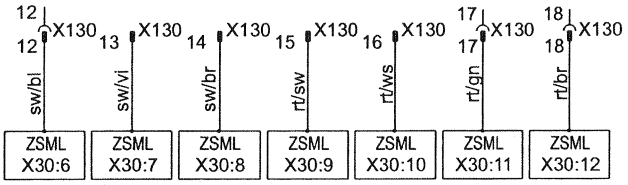
Monitoring

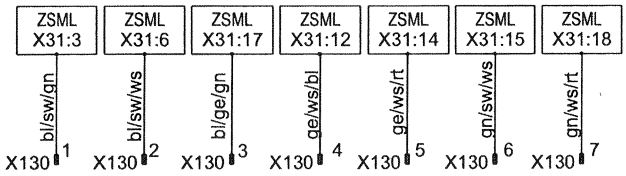


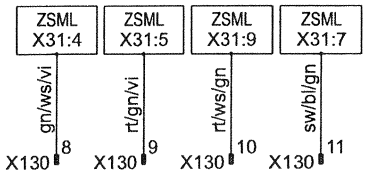
Path	Designation	Device	Path	Designation	Device
2.1	FA8	Fuse	2.4	R2	Tank sensor
2.1	R3	Engine temperature sensor	2.5	R4	Hydraulic oil temperature sensor
2.2	P1	Engine temperature indicator	2.5	S28	Air filter maintenance switch
2.2	S33	Transmission position	2.6	S27	Oil pressure switch
2.3	B9	Speed	2.7	S26	Hydrostatic brake switch
2.3	P2	Fuel tank indicator			

Monitoring





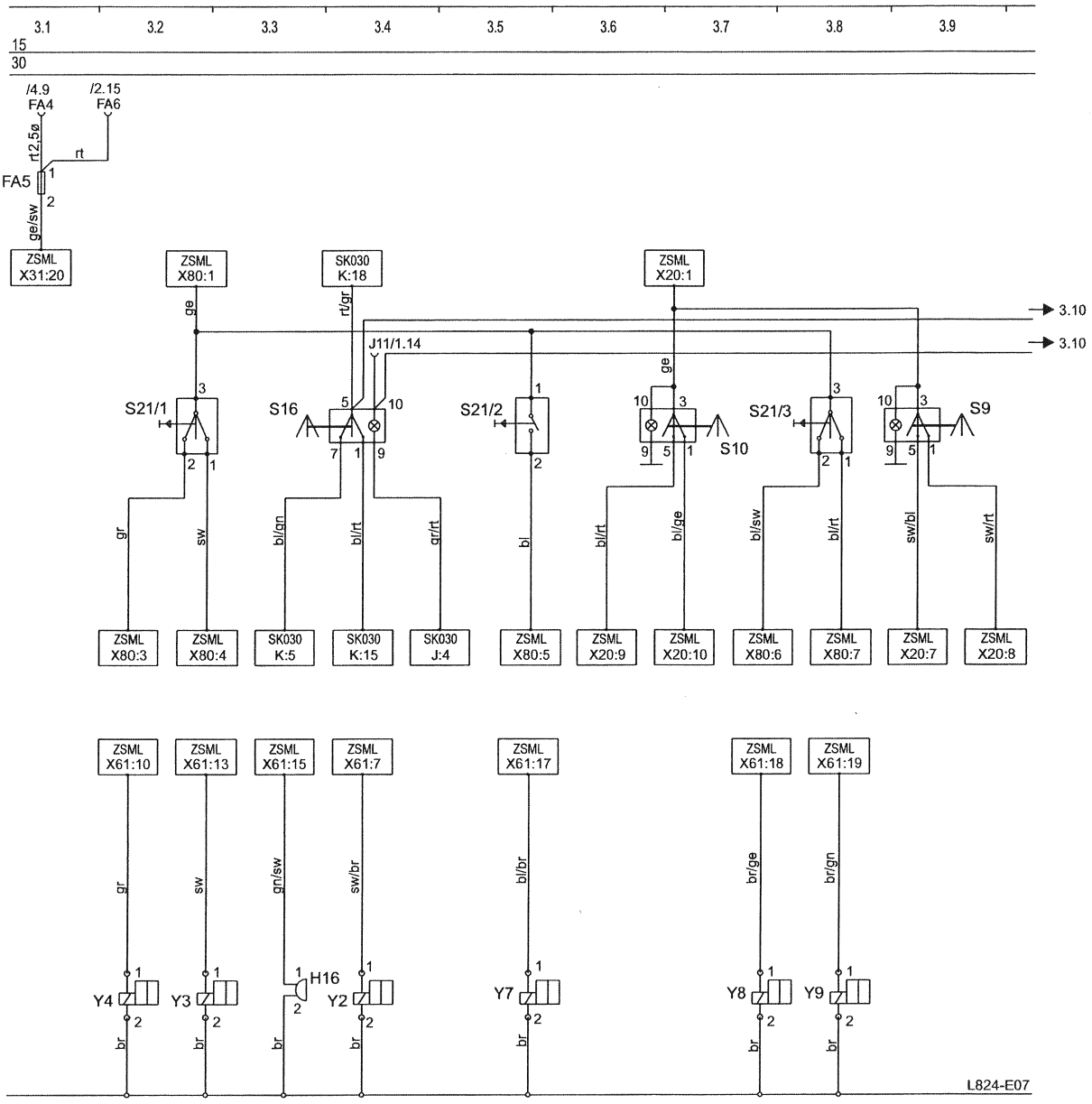




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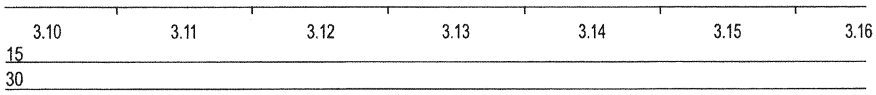
Path	Designation	Device	Path	Designation	Device
2.8	FA11	Reserve fuse	2.15	FA6	Reserve fuse
2.14	FA7	Reserve fuse			

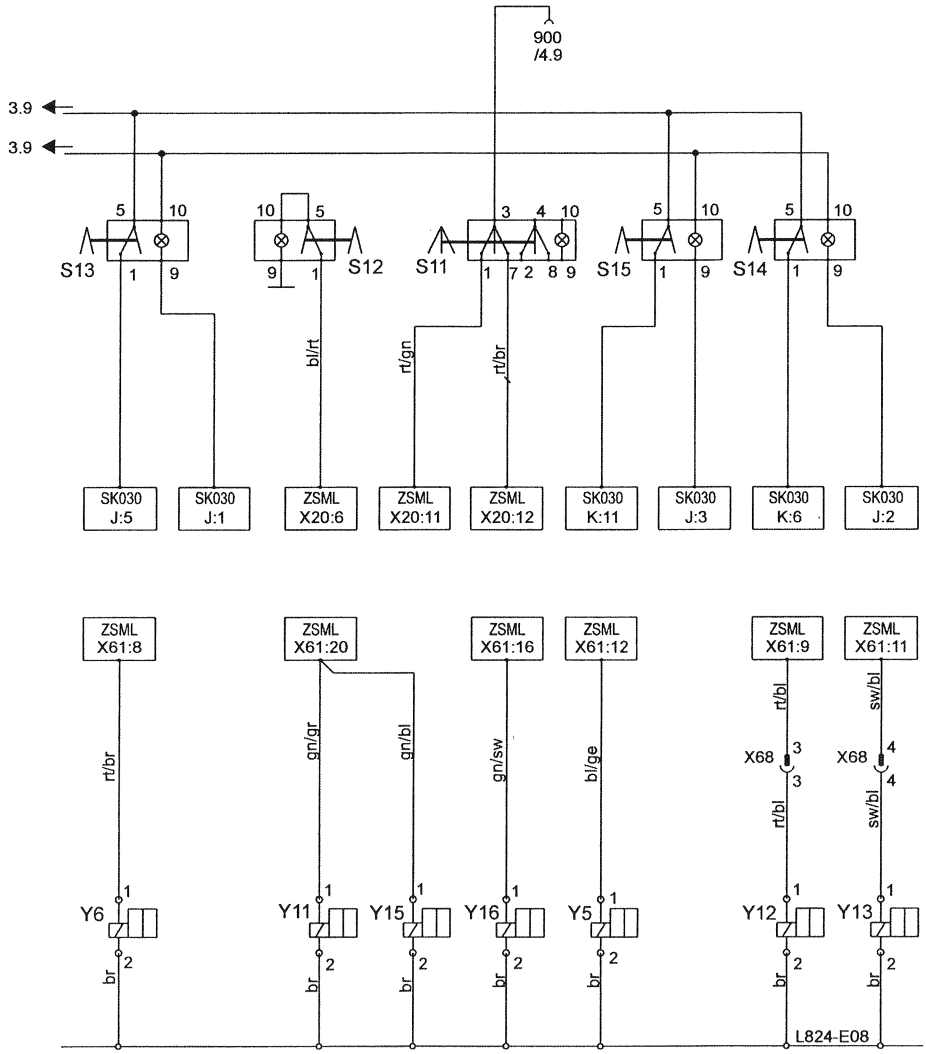
"Travel" fuse	Travel	Float position	Additional control circuit



Path	Designation	Device	Path	Designation	Device
3.1	FA5	Fuse	3.5	S21/2	Float position switch
3.2	Y4	Travel, forward	3.5	Y7	Float position
3.2	S21/1	Switch for travel, forward/reverse	3.7	S10	Float position switch
3.3	Y3	Travel, reverse	3.8	Y8	Additional control circuit 1
3.3	H16	Travel motion alarm	3.8	S21/3	Additional control circuit switch
3.4	S16	Switch for travel, forward/reverse	3.8	Y9	Additional control circuit 2
3.4	Y2	Travel direction recognition	3.9	S9	Additional control circuit

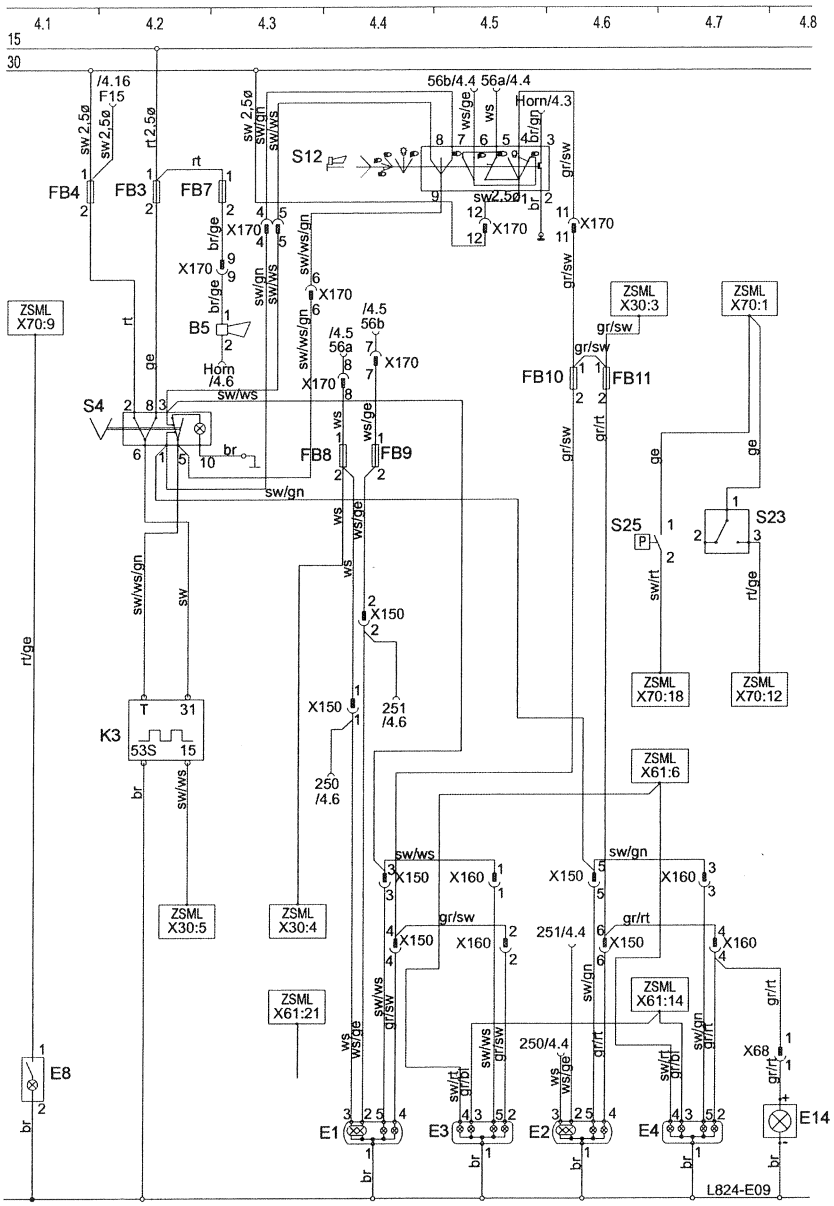
Travel speed	Ride control system	4th control circuit	Working hydraulics	Transmission





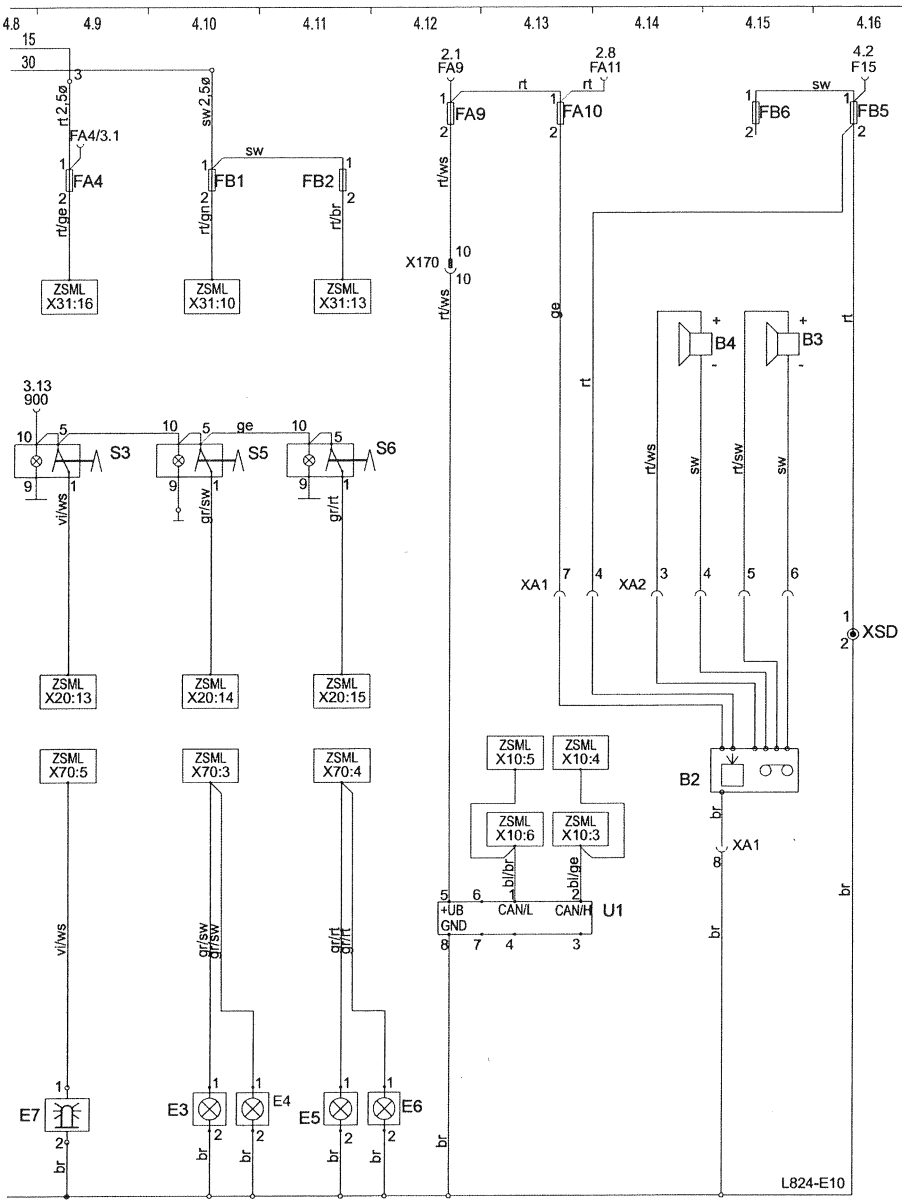
Path	Designation	Device	Path	Designation	Device
3.10	S13	Travel, SLOW	3.13	S11	4th control circuit
3.10	Y6	Travel, SLOW	3.14	Y5	Working hydraulics
3.12	S12	Ride control system switch	3.14	S15	Working hydraulics
3.12	Y11	Ride control system 1	3.15	S14	Transmission
3.12	Y15	Ride control system 2	3.15	Y12	Transmission 1
3.13	Y16	Ride control system 3	3.16	Y13	Transmission 2

Lighting and signaling



Path	Designation	Device	Path	Designation	Device
4.1	E8	Interior light	4.4	E1	Lighting front left
4.1	FB4	Fuse	4.5	S12	Light switch
4.2	FB3	Fuse	4.5	E3	Lighting rear left
4.2	S4	Direction indicator switch, hazard warning switch	4.6	FB10	Fuse
4.2	K3	Flasher transmitter	4.6	FB11	Fuse
4.3	FB7	Fuse	4.6	E2	Lighting front right
4.3	B5	Horn	4.6	S25	Brake light switch
4.4	FB8	Fuse	4.7	E4	Lighting rear right
4.4	FB9	Fuse	4.7	S23	Hand brake switch
			4.8	E14	License-plate illumination

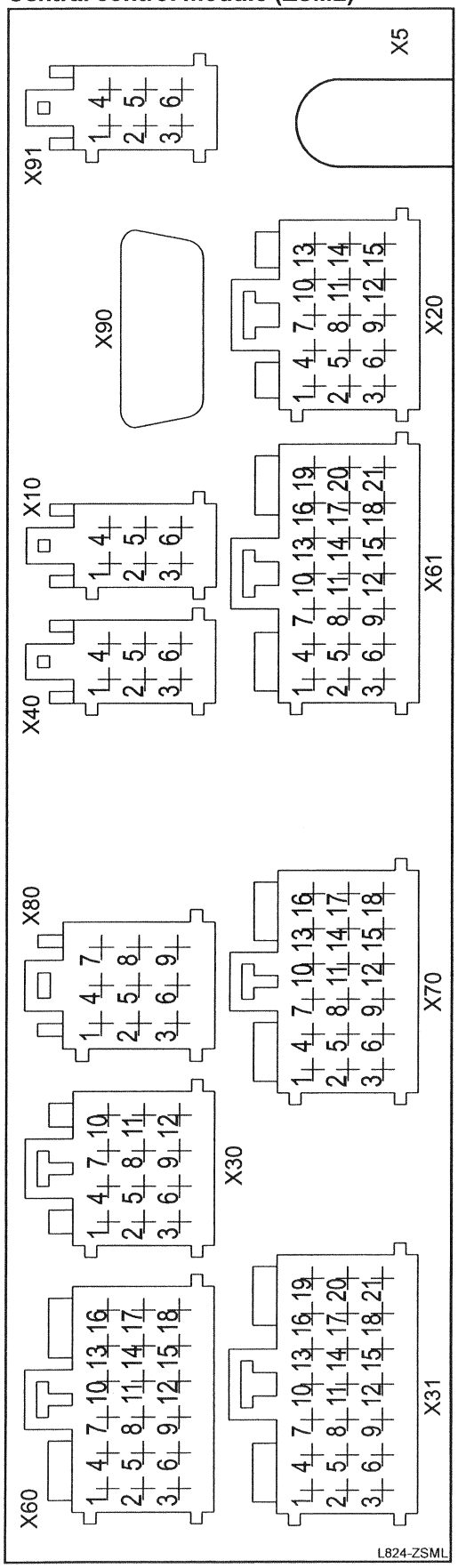
Rotating beacon	Working floodlights	Instrument panel	Radio	Socket



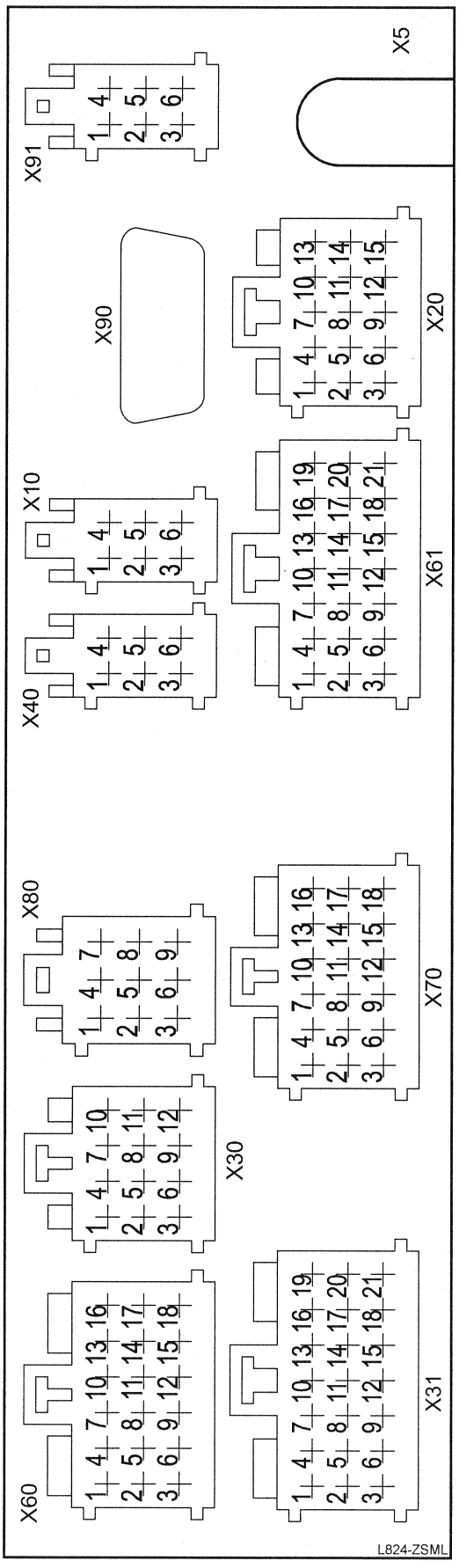
Path	Designation	Device	Path	Designation	Device
4.9	FA4	Fuse	4.12	E6	Working floodlight rear
4.9	S3	Rotating beacon switch	4.12	FA9	Fuse
4.9	E7	Rotating beacon	4.13	U1	Instrument panel
4.10	FB1	Fuse	4.13	FA10	Fuse
4.10	S5	Working floodlight front	4.15	B4	Loudspeaker
4.10	E3	Working floodlight front	4.15	B2	Radio
4.11	E4	Working floodlight front	4.15	FB6	Fuse
4.11	FB2	Fuse	4.15	B3	Loudspeaker
4.11	S6	Working floodlight rear	4.16	FB5	Fuse
4.11	E5	Working floodlight rear	4.16	XSD	Socket

SCHAEFF TEREX	Typ/Model/Type **SKL 834**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.24.05**

Central control module (ZSML)

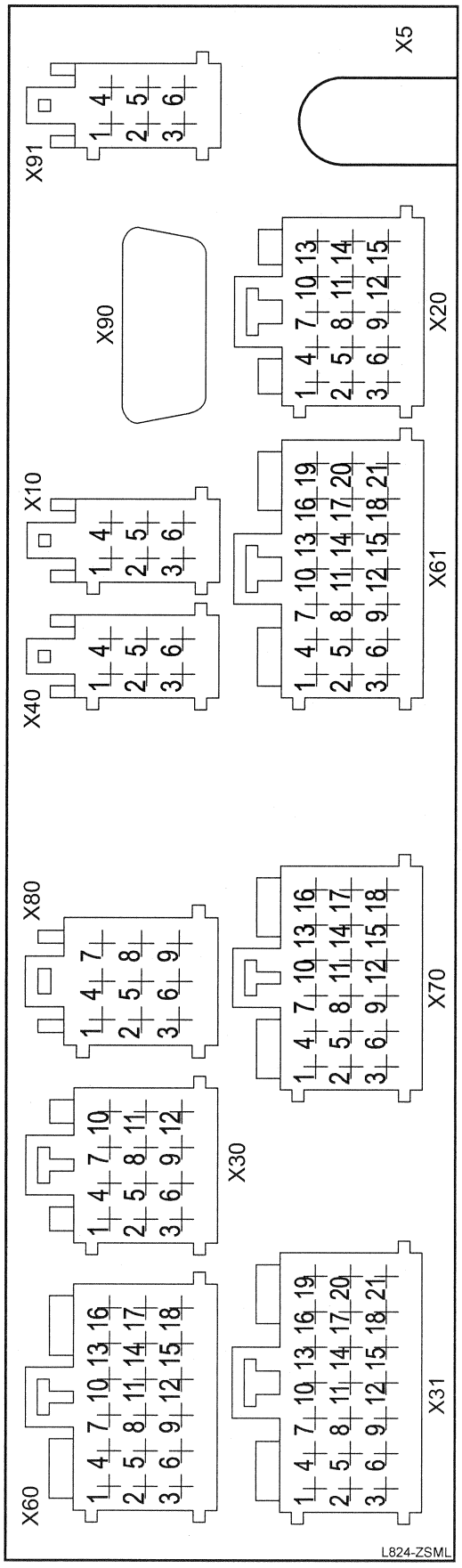


X60	***Signal inputs "engine monitoring"***
1	Power supply Terminal 15 output
2	Central mass Terminal 31
3	Charge control generator D+
4	Air filter maintenance switch signal
5	Oil pressure switch signal
6	Hydrostatic brake pressure switch signal
7	Transmission switch signal
8	Tank sensor signal
9	Engine temperature sensor signal
10	Hydraulic oil temperature sensor signal
11	Speed signal generator "W" signal
12	--
13	--
13	--
15	--
16	--
17	--
18	Speedometer signal sensor
X30	***Signal inputs "Lighting"***
1	Power supply Terminal 15 output
2	--
3	Parking light Terminal 15 input
4	High beam signal
5	Direction indicator control signal
6	Reserve -
7	Reserve +
8	Reserve +
9	Reference voltage
10	Reserve - Analog
11	Reserve - Analog
12	Reserve - Analog
X80	***Coordinate lever***
1	Power supply Terminal 15 output
2	Central mass Terminal 31
3	Travel forward signal
4	Travel reverse signal
5	Float position signal
6	Additional control circuit signal
7	Additional control circuit signal
8	Reserve - Analog
9	Reserve - Analog

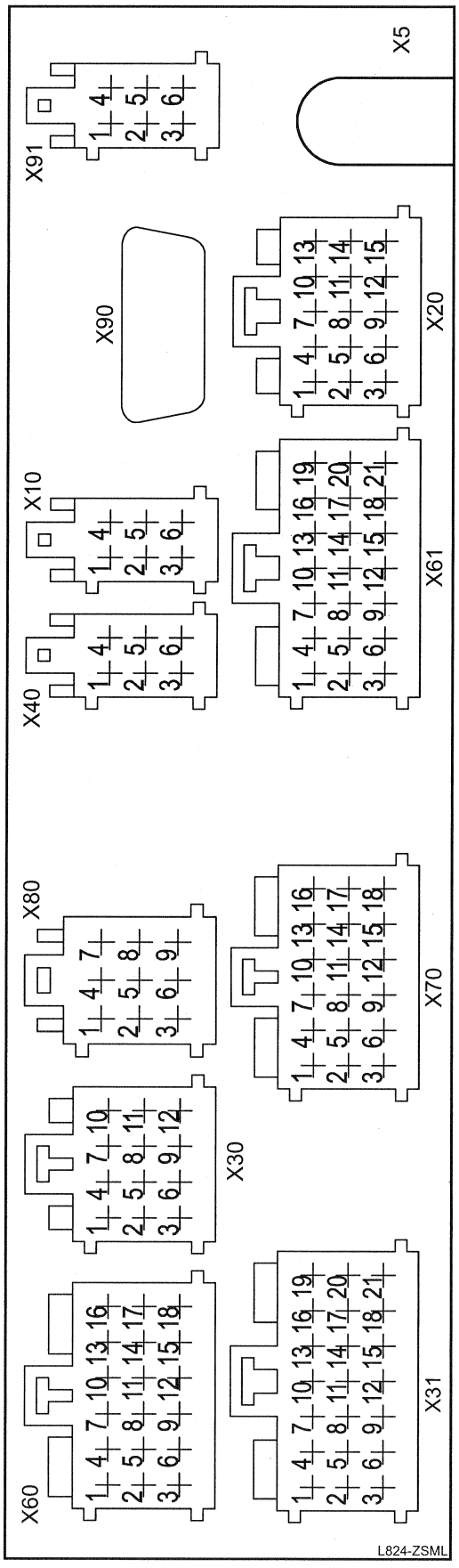


X40	***CAN-BUS (Option)***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	CAN/HI
4	R1
5	R2
6	CAN/LO
X10	***Control panel***
1	--
2	Central ground Terminal 31
3	CAN/HI
4	--
5	--
6	CAN/LO
X90	***Programming connection***
X91	***Immobilizer (Option)***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	***TXD***
4	RXD
5	CTS
6	RTS

TEREX | SCHAEFF	Typ/Model/Type **SKL 834**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.24.06**



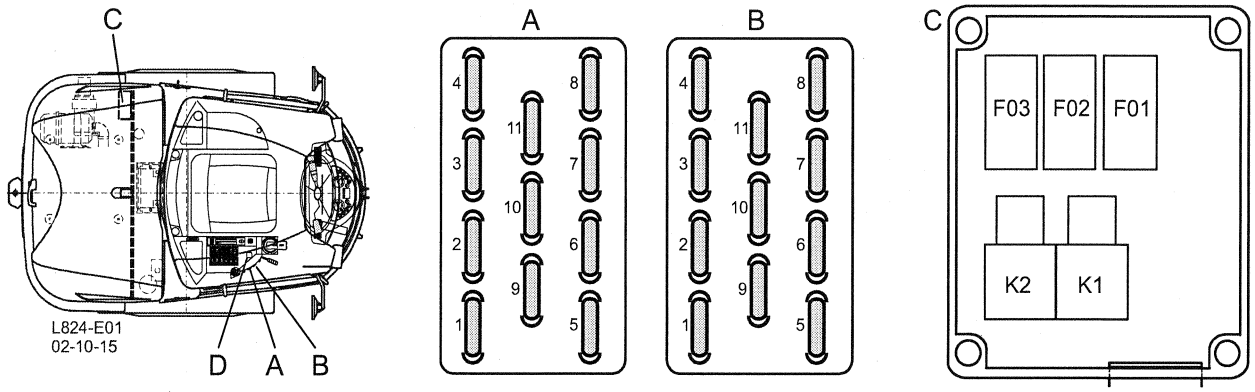
X31	Module power supply, working floodlights, rotating beacon, wiper
1	--
2	-
3	Reserve digital output
4	Relay K11:87a N.C. contact output
5	Relay K11:87 N.O. contact output
6	Reserve digital output
7	Relay K12:87 N.O. contact output
8	Relay K12 power supply Terminal 15 input
9	Relay K12:87a N.C. contact Output
10	Power supply Terminal 15 input working floodlight front
11	Relay K11 power supply Terminal 15 input
12	PWM output (Option 2nd auxiliary circuit)
13	Power supply Terminal 15 input working floodlight rear
14	PWM output (Option 2nd auxiliary circuit)
15	Reserve PWM output
16	Power supply Terminal 30 input rotating beacon
17	Reserve Digital output
18	Reserve PWM output
19	Power supply Terminal 15 input wash/ wipe rear
20	Power supply Terminal 15 input travel
21	Power supply Terminal 15 input wash/ wipe rear
X70	**Working floodlights , Wipers**
1	Brake light switch Terminal 15 output
2	--
3	Working floodlight front output
4	Working floodlight rear output
5	Rotating beacon output
6	Wiper Terminal 53b 2nd setting output
7	Washer pump front output
8	Wiper Terminal 31b output
9	Interior lamp Terminal 30 output
10	Wiper Terminal 53 output
11	Wiper Terminal 53a output
12	Hand brake switch signal input
13	Washer pump rear output
14	Rear wiper Terminal 53a output
15	--
16	Rear wiper Terminal 31b output
17	Rear wiper Terminal output
18	Brake light switch signal input



X61	*X61* new from 834/0503	*Rear carriage*
1	1	--
2	2	--
3	3	Starting Terminal 50a output
4	4	Pre-heat output
5	5	Engine shutdown output
6	6	Brake light output
7	7	Travel, direction recognition output
8	8	Travel, FAST-SLOW output
9	9	Transmission 1 output
10	21	Travel forward output
11	11	Transmission 2 output
12	12	Working hydraulics output
13	16	Travel reverse output
14	15	Back-up lamp output
15	10	Travel motion alarm output
16	14	Ride control system 3 output
17	17	Float position output
18	18	Additional control circuit output
19	19	Additional control circuit output
20	20	Ride control system 1,2 output
21	13	Fog lamp Output
X20		***Panel, right***
1		Power supply Terminal 15 output
2		--
3		Starting Terminal 50a signal
4		Pre-heat signal
5		Engine shutdown signal
6		Ride control system signal
7		Additional control circuit signal
8		Additional control circuit signal
9		Float position 1 signal
10		Float position 2 signal
11		4^{th} control circuit signal
12		4^{th} control circuit signal
13		Rotating beacon signal
14		Working floodlight front signal
15		Working floodlight rear Signal
X5		***Power supply***

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Fuse box — Assignment diagram



D = K3 (turn-signal flasher relay) below instrument panel

A			B		
Position	**Ampere**	**assigned to**	**Position**	**Ampere**	**assigned to**
F 1	15	Heater fan	F 1	15	Working floodlight, front
F 2	15	Wash/wipe, front	F 2	15	Working floodlight, rear
F 3	15	Wash/wipe, rear	F 3	10	Turn signal
F 4	10	Rotating beacon; interior light	F 4	10	Hazard warning switch
F 5	15	Travel, forward/reverse	F 5	15	Socket; radio
F 6	10	Reserve	F 6	15	Reserve
F 7	10	Reserve	F 7	10	Horn
F 8	10	E-module inputs	F 8	10	High beam
F 9	10	Instruments	F 9	10	Low beam
F 10	10	Radio	F 10	10	Side marker light, left
F 11	15	Reserve	F 11	10	Side marker light, right

C / D					
F 01	50	Series fuse	K 1		Start relay
F 02	80	Starting system	K 2		Pre-heat relay
F 03	30	Control module power supply	K 3		Turn-signal flasher relay

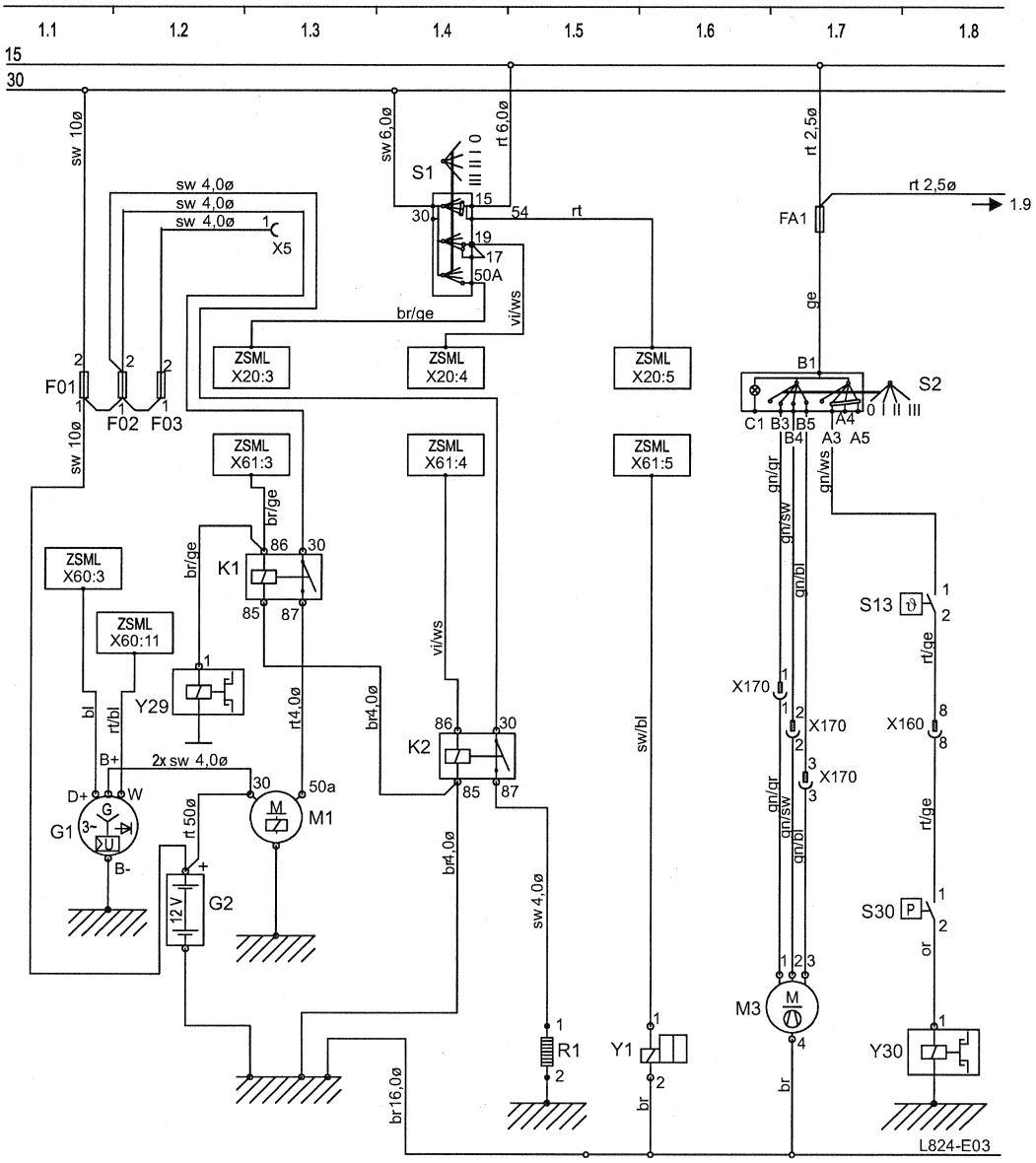
Colors of fuses

10 A	red	15 A	blue	30 A	Rose	50 A	red	80 A	white

Cable and plug colors

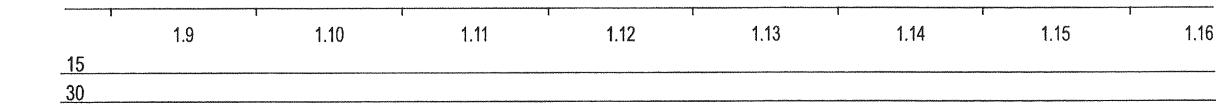
bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

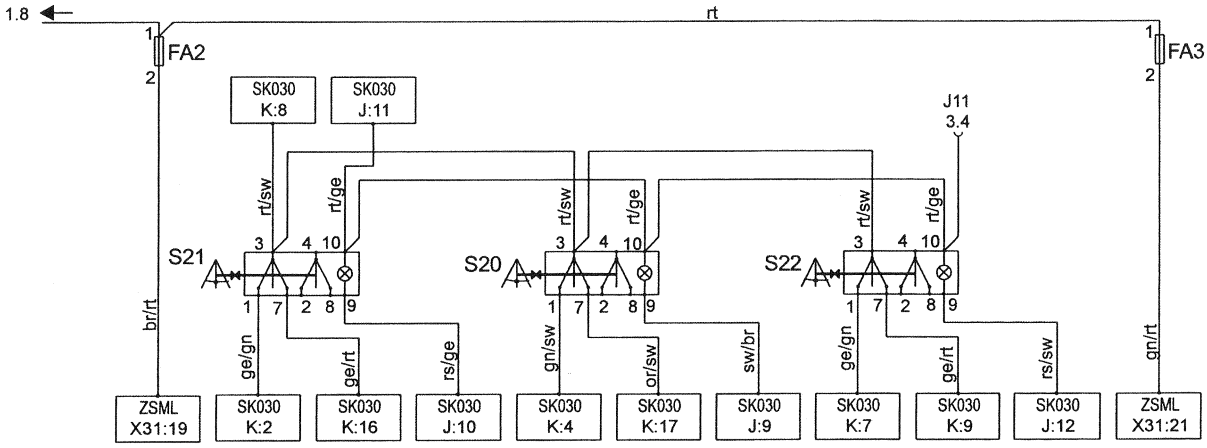
Start-up	Pre-heat	Shut-off	Heating	Air conditioning

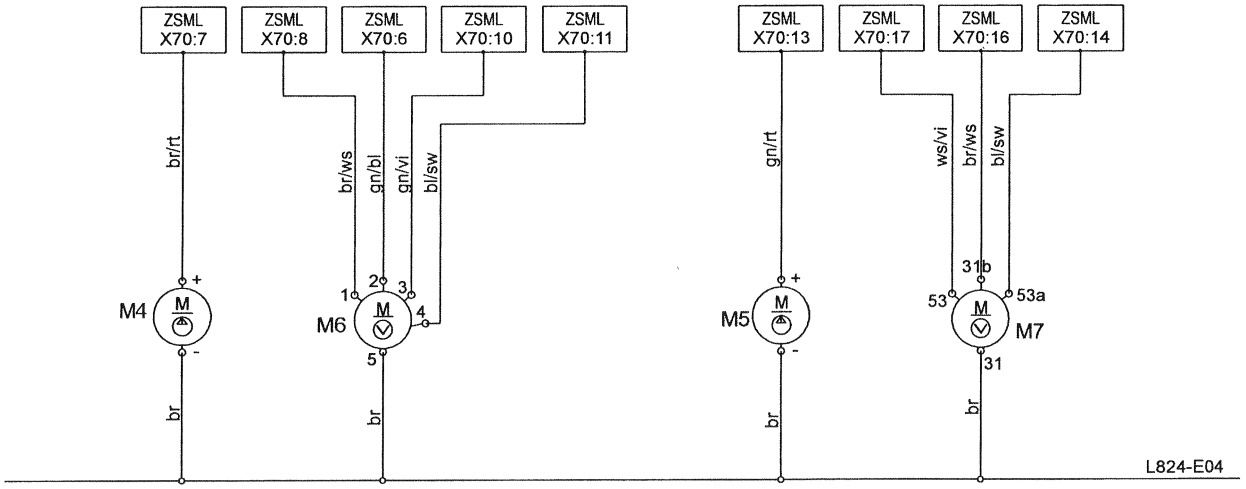


Path	Designation	Device	Path	Designation	Device
	ZSML	Central control module	1.4	K2	Start relay (starting safeguard)
1.1	F01	Flat-type fuse	1.5	R1	Glow plugs
1.1	G1	Generator	1.5	Y1	Engine shutdown
1.1	F02	Flat-type fuse	1.7	FA1	Fuse
1.2	F03	Flat-type fuse	1.7	S2	Heater switch
1.2	Y29	Cold start enhancement	1.7	M3	Heating
1.2	G2	Battery 12 V	1.8	S13	Air conditioning temperat. switch
1.3	K1	Start relay (starting aid)	1.8	S30	Air conditioning pressure switch
1.3	M1	Starter	1.8	Y30	Air conditioning relay
1.4	S1	Pre-heat/ starter switch			

Wash/wipe system, front	Wash/wipe system, rear



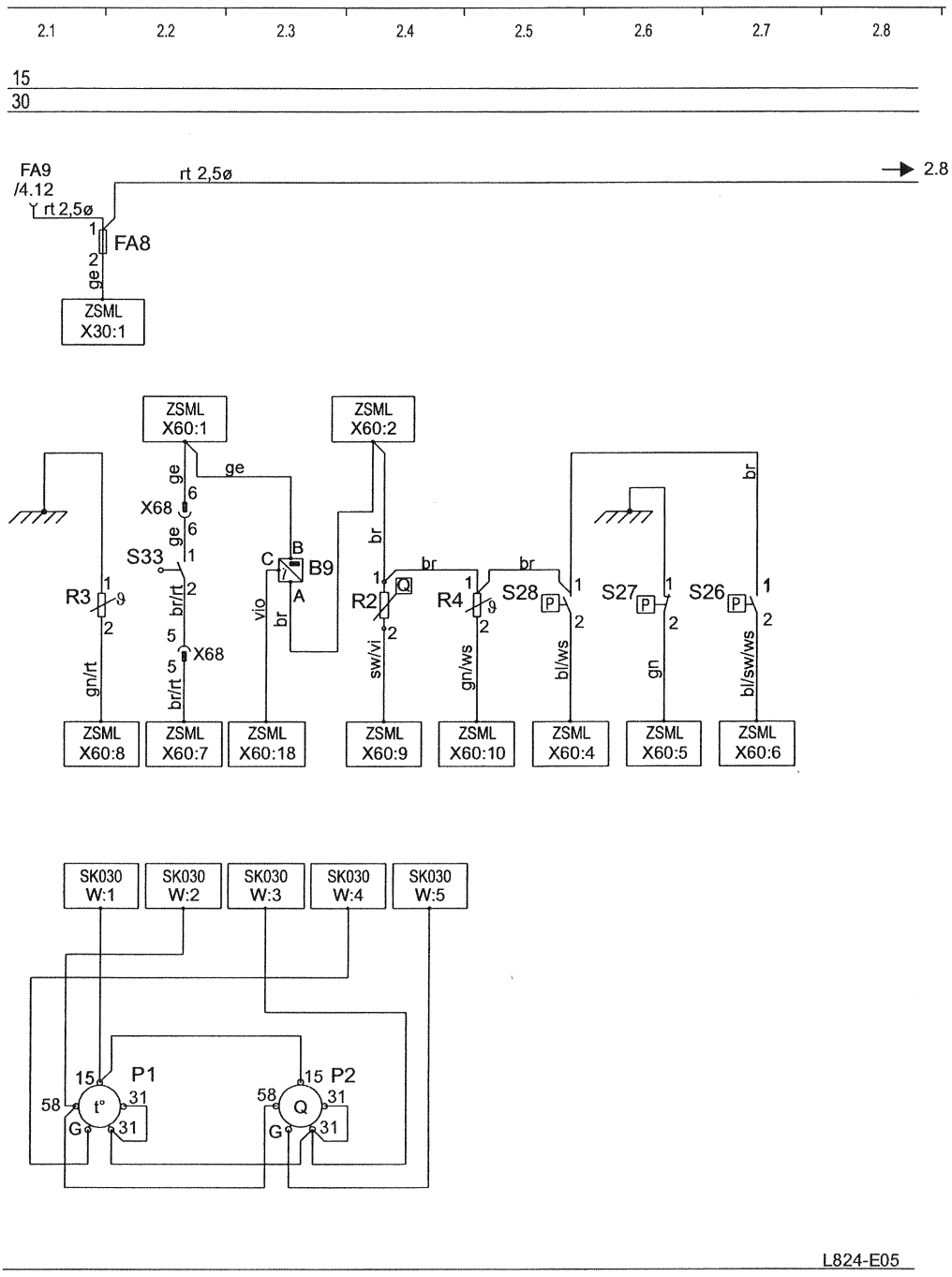




Path	Designation	Device	Path	Designation	Device
	ZSML	Central control module	1.11	S20	Washer switch front/rear
	SK030	Instrument panel	1.13	M5	Washer pump rear
1.9	FA2	Fuse	1.14	S22	Wiper switch rear
1.9	M4	Washer pump front	1.14	M7	Wiper rear
1.10	S21	Wiper switch front	1.16	FA3	Fuse
1.10	M6	Wiper front			

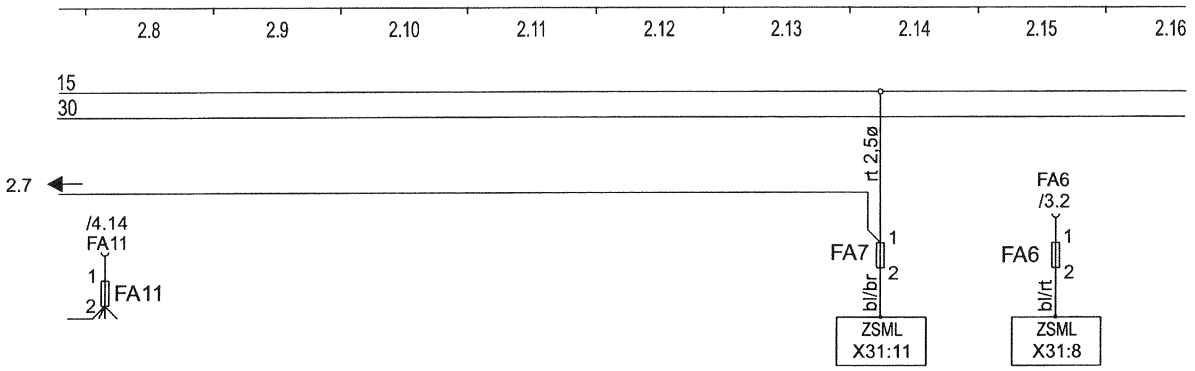
SCHAEFF TEREX	Typ/Model/Type	Datum/Edition/Date
	SKL 844	**01.2003**
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Wiring diagram	**7.26.02**

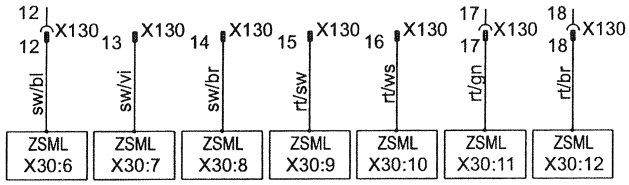
Monitoring

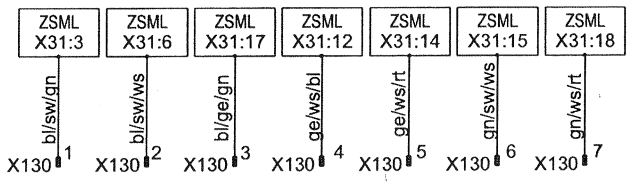


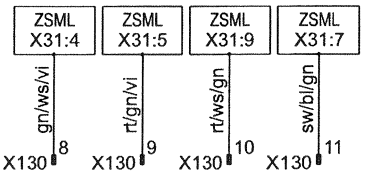
Path	Designation	Device	Path	Designation	Device
2.1	FA8	Fuse	2.4	R2	Tank sensor
2.1	R3	Engine temperature sensor	2.5	R4	Hydraulic oil temperature sensor
2.2	P1	Engine temperature indicator	2.5	S28	Air filter maintenance switch
2.2	S33	Transmission position	2.6	S27	Oil pressure switch
2.3	B9	Speed	2.7	S26	Hydrostatic brake switch
2.3	P2	Fuel tank indicator			

Monitoring





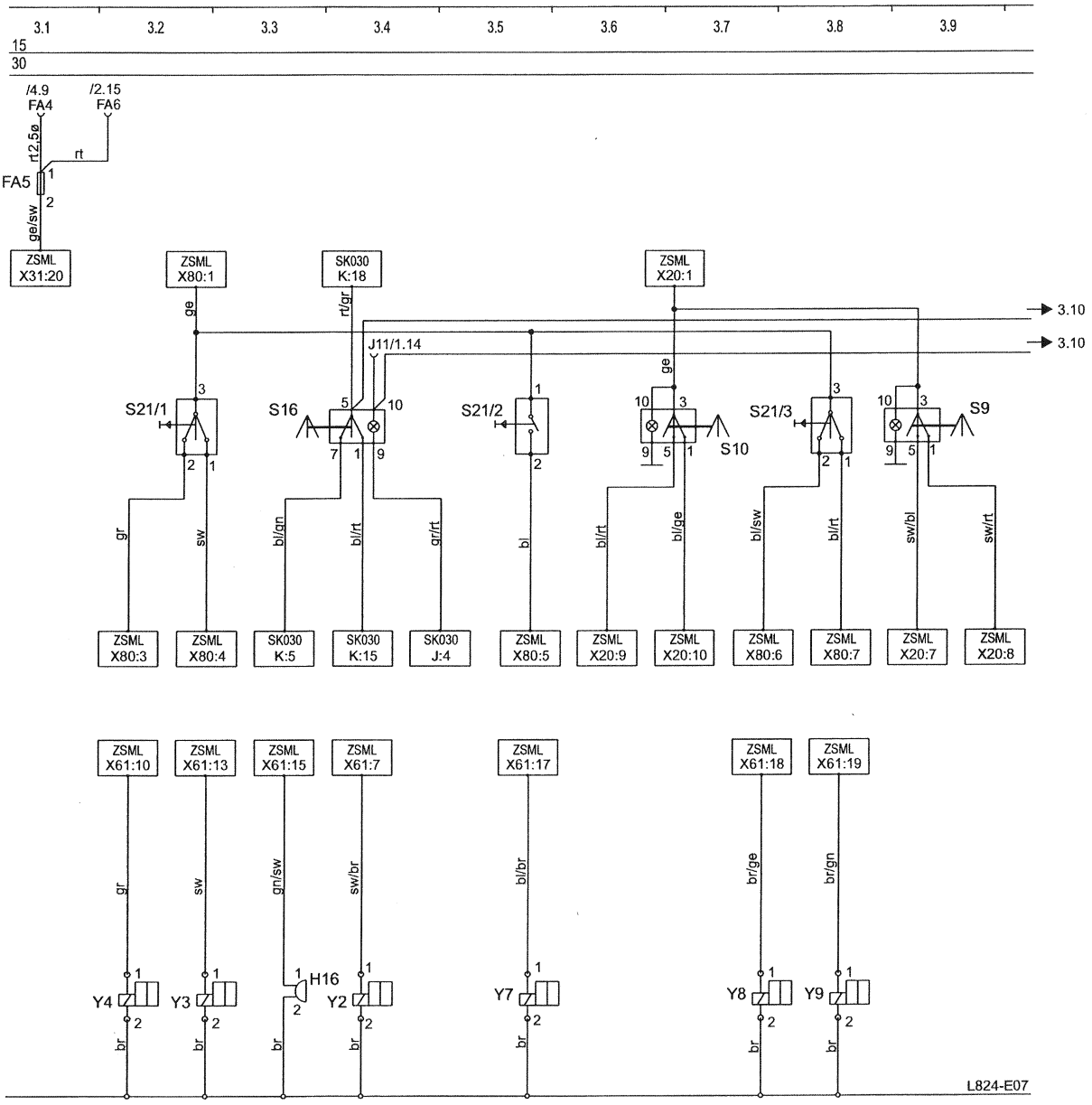




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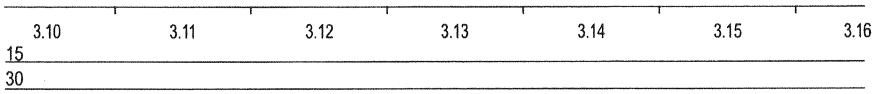
Path	Designation	Device	Path	Designation	Device
2.8	FA11	Reserve fuse	2.15	FA6	Reserve fuse
2.14	FA7	Reserve fuse			

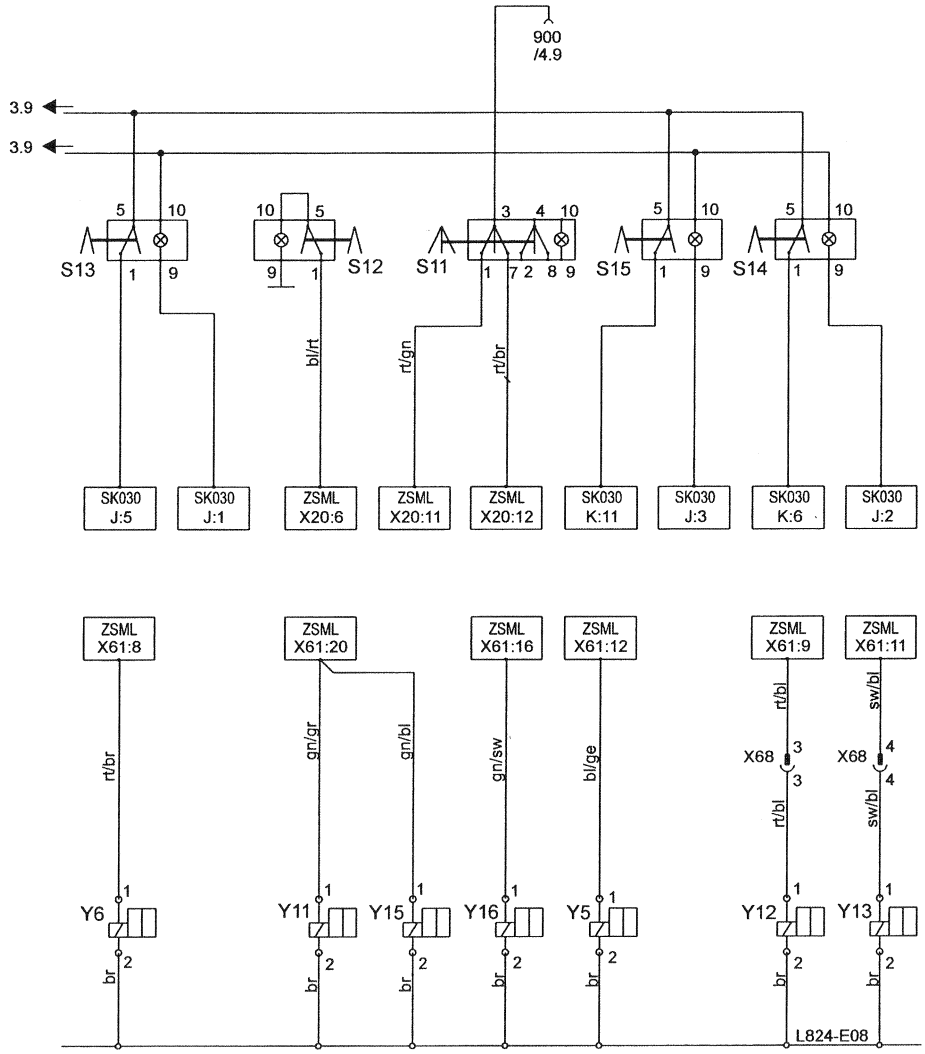
"Travel" fuse	Travel	Float position	Additional control circuit



Path	Designation	Device	Path	Designation	Device
3.1	FA5	Fuse	3.5	S21/2	Float position switch
3.2	Y4	Travel, forward	3.5	Y7	Float position
3.2	S21/1	Switch for travel, forward/reverse	3.7	S10	Float position switch
3.3	Y3	Travel, reverse	3.8	Y8	Additional control circuit 1
3.3	H16	Travel motion alarm	3.8	S21/3	Additional control circuit switch
3.4	S16	Switch for travel, forward/reverse	3.8	Y9	Additional control circuit 2
3.4	Y2	Travel direction recognition	3.9	S9	Additional control circuit

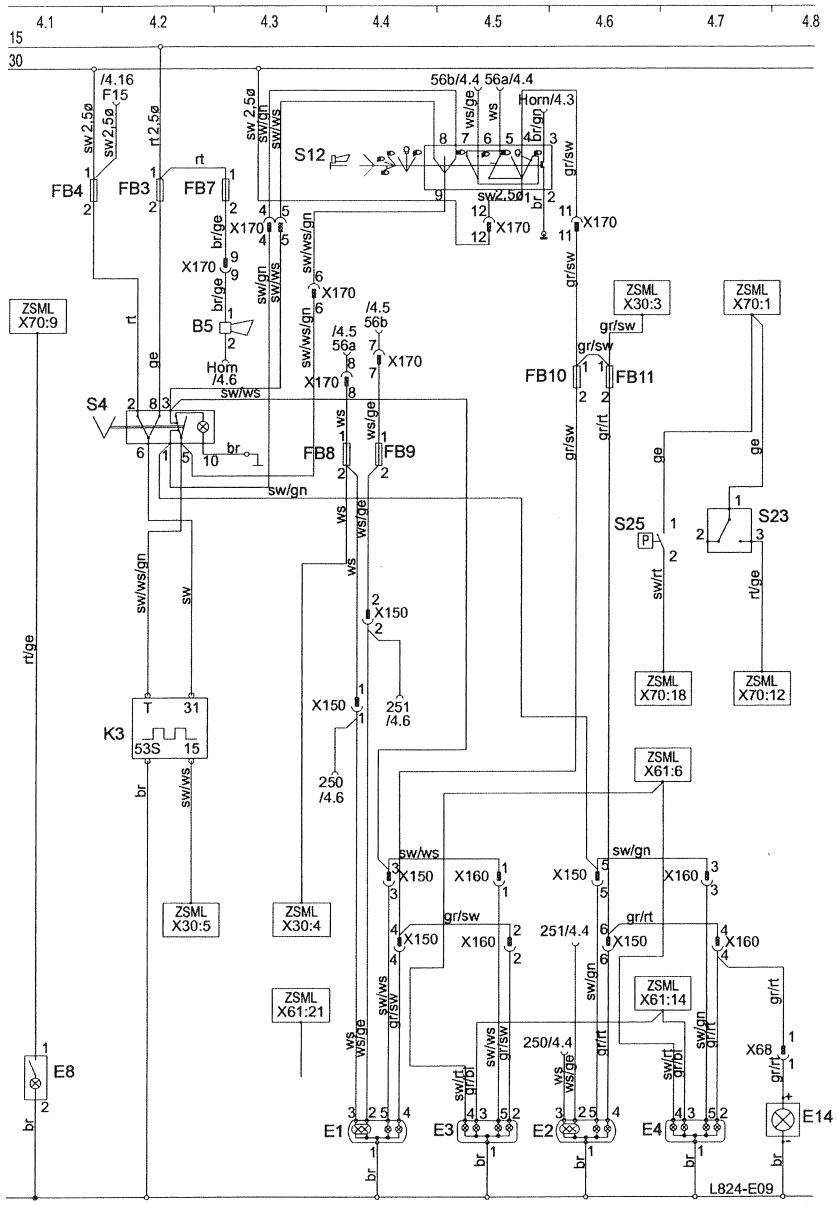
Travel speed	Ride control system	4th control circuit	Working hydraulics	Transmission





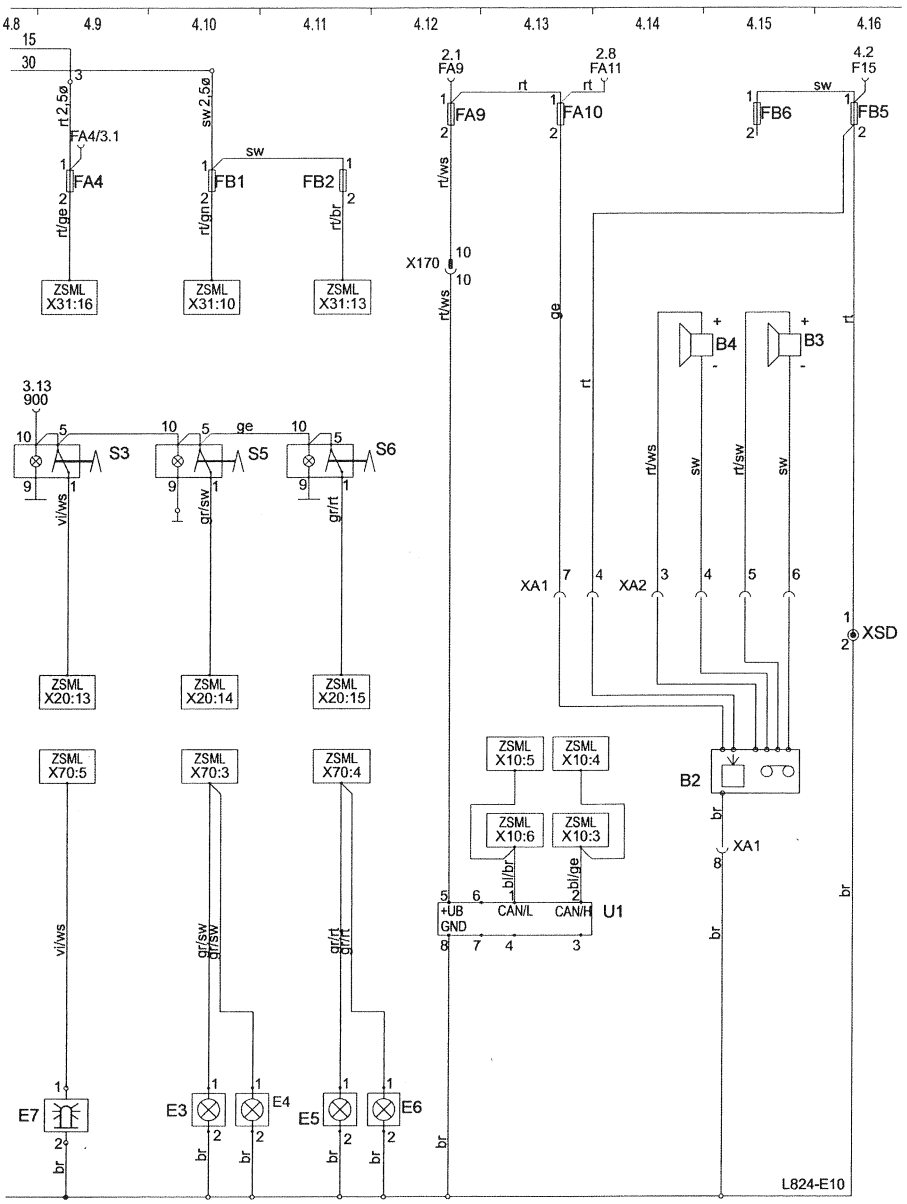
Path	Designation	Device	Path	Designation	Device
3.10	S13	Travel, SLOW	3.13	S11	4th control circuit
3.10	Y6	Travel, SLOW	3.14	Y5	Working hydraulics
3.12	S12	Ride control system switch	3.14	S15	Working hydraulics
3.12	Y11	Ride control system 1	3.15	S14	Transmission
3.12	Y15	Ride control system 2	3.15	Y12	Transmission 1
3.13	Y16	Ride control system 3	3.16	Y13	Transmission 2

Lighting and signaling



Path	Designation	Device	Path	Designation	Device
4.1	E8	Interior light	4.4	E1	Lighting front left
4.1	FB4	Fuse	4.5	S12	Light switch
4.2	FB3	Fuse	4.5	E3	Lighting rear left
4.2	S4	Direction indicator switch, hazard warning switch	4.6	FB10	Fuse
4.2	K3	Flasher transmitter	4.6	FB11	Fuse
4.3	FB7	Fuse	4.6	E2	Lighting front right
4.3	B5	Horn	4.6	S25	Brake light switch
4.4	FB8	Fuse	4.7	E4	Lighting rear right
4.4	FB9	Fuse	4.7	S23	Hand brake switch
			4.8	E14	License-plate illumination

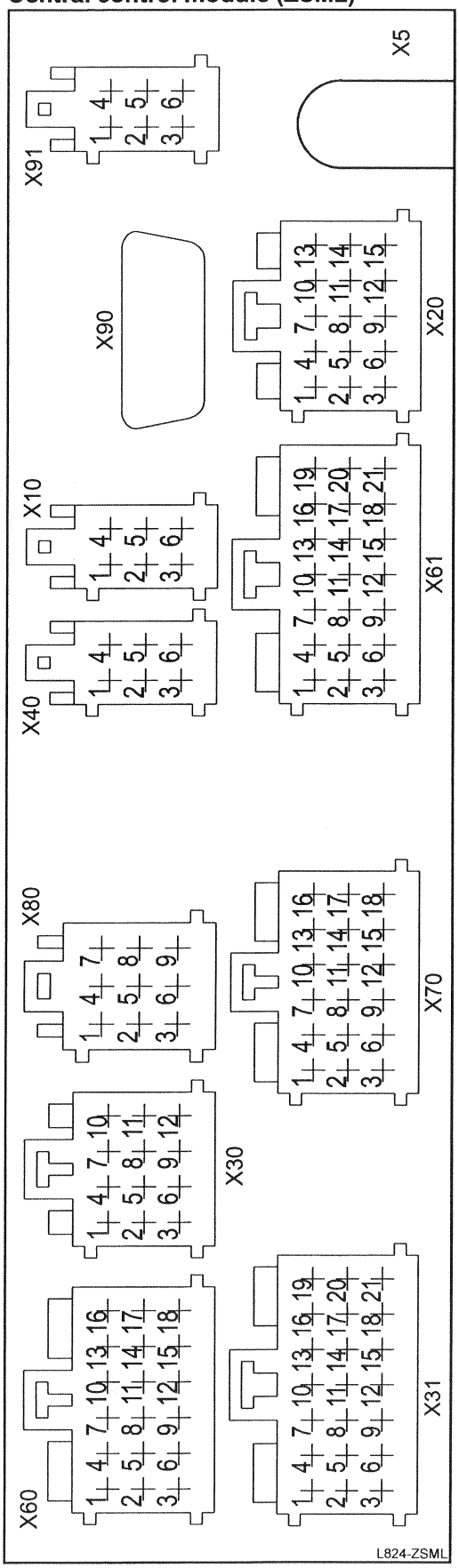
Rotating beacon	Working floodlights	Instrument panel	Radio	Socket



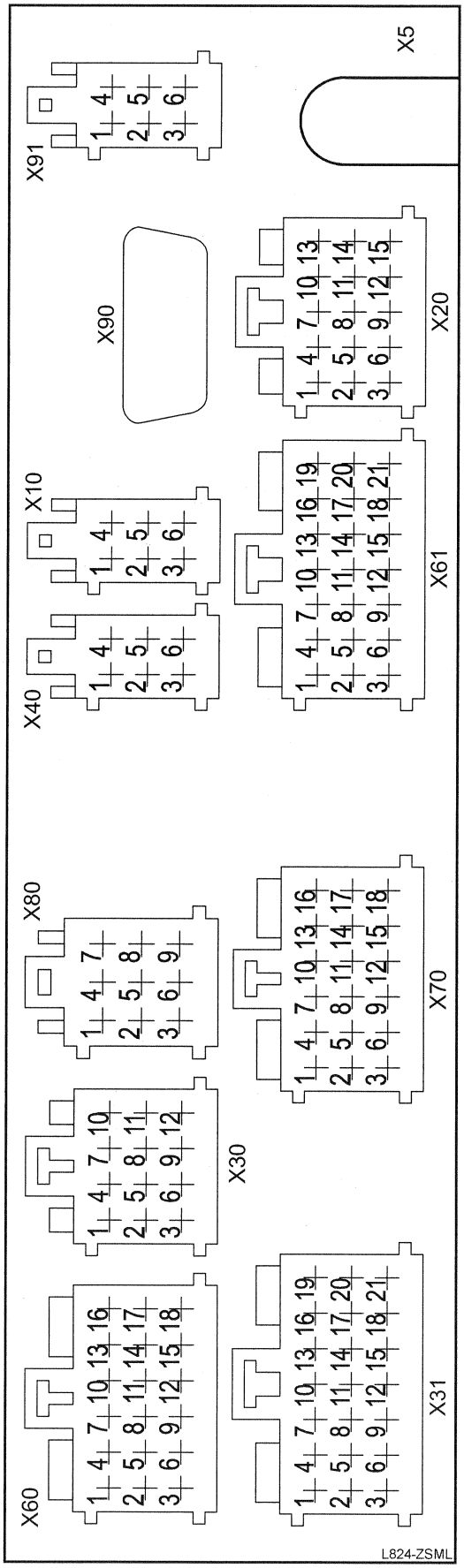
Path	Designation	Device	Path	Designation	Device
4.9	FA4	Fuse	4.12	E6	Working floodlight rear
4.9	S3	Rotating beacon switch	4.12	FA9	Fuse
4.9	E7	Rotating beacon	4.13	U1	Instrument panel
4.10	FB1	Fuse	4.13	FA10	Fuse
4.10	S5	Working floodlight front	4.15	B4	Loudspeaker
4.10	E3	Working floodlight front	4.15	B2	Radio
4.11	E4	Working floodlight front	4.15	FB6	Fuse
4.11	FB2	Fuse	4.15	B3	Loudspeaker
4.11	S6	Working floodlight rear	4.16	FB5	Fuse
4.11	E5	Working floodlight rear	4.16	XSD	Socket

SCHAEFF TEREX	Typ/Model/Type **SKL 844**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.26.05**

Central control module (ZSML)

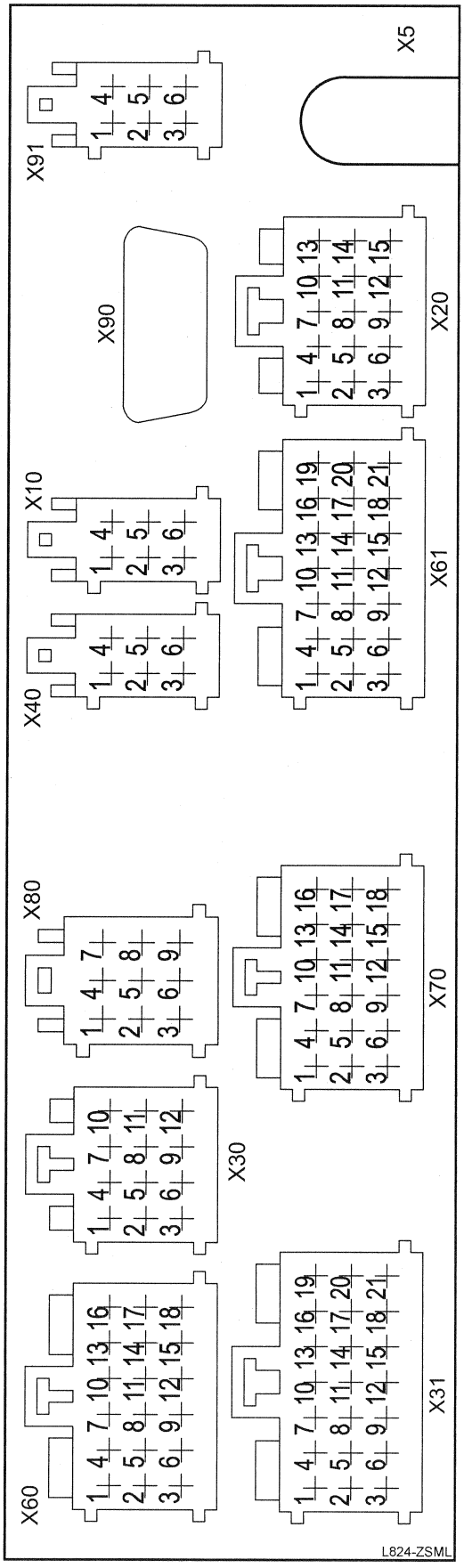


X60	***Signal inputs "engine monitoring"***
1	Power supply Terminal 15 output
2	Central mass Terminal 31
3	Charge control generator D+
4	Air filter maintenance switch signal
5	Oil pressure switch signal
6	Hydrostatic brake pressure switch signal
7	Transmission switch signal
8	Tank sensor signal
9	Engine temperature sensor signal
10	Hydraulic oil temperature sensor signal
11	Speed signal generator "W" signal
12	--
13	--
13	--
15	--
16	--
17	--
18	Speedometer signal sensor
X30	***Signal inputs "Lighting"***
1	Power supply Terminal 15 output
2	--
3	Parking light Terminal. 15 input
4	High beam signal
5	Direction indicator control signal
6	Reserve -
7	Reserve +
8	Reserve +
9	Reference voltage
10	Reserve - Analog
11	Reserve - Analog
12	Reserve - Analog
X80	***Coordinate lever***
1	Power supply Terminal 15 output
2	Central mass Terminal 31
3	Travel forward signal
4	Travel reverse signal
5	Float position signal
6	Additional control circuit signal
7	Additional control circuit signal
8	Reserve - Analog
9	Reserve - Analog

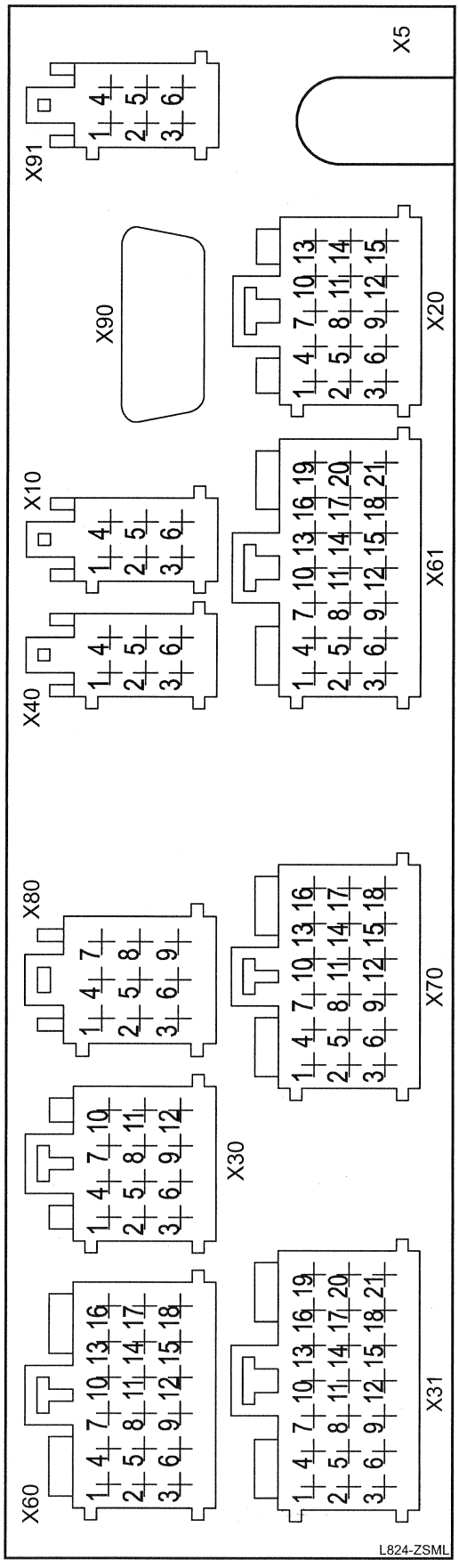


X40	***CAN-BUS (Option)***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	CAN/HI
4	R1
5	R2
6	CAN/LO
X10	***Control panel***
1	--
2	Central ground Terminal 31
3	CAN/HI
4	--
5	--
6	CAN/LO
X90	***Programming connection***
X91	***Immobilizer (Option)***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	***TXD***
4	RXD
5	CTS
6	RTS

TEREX | SCHAEFF	Typ/Model/Type **SKL 844**	Datum/Edition/Date **01.2003**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.26.06**

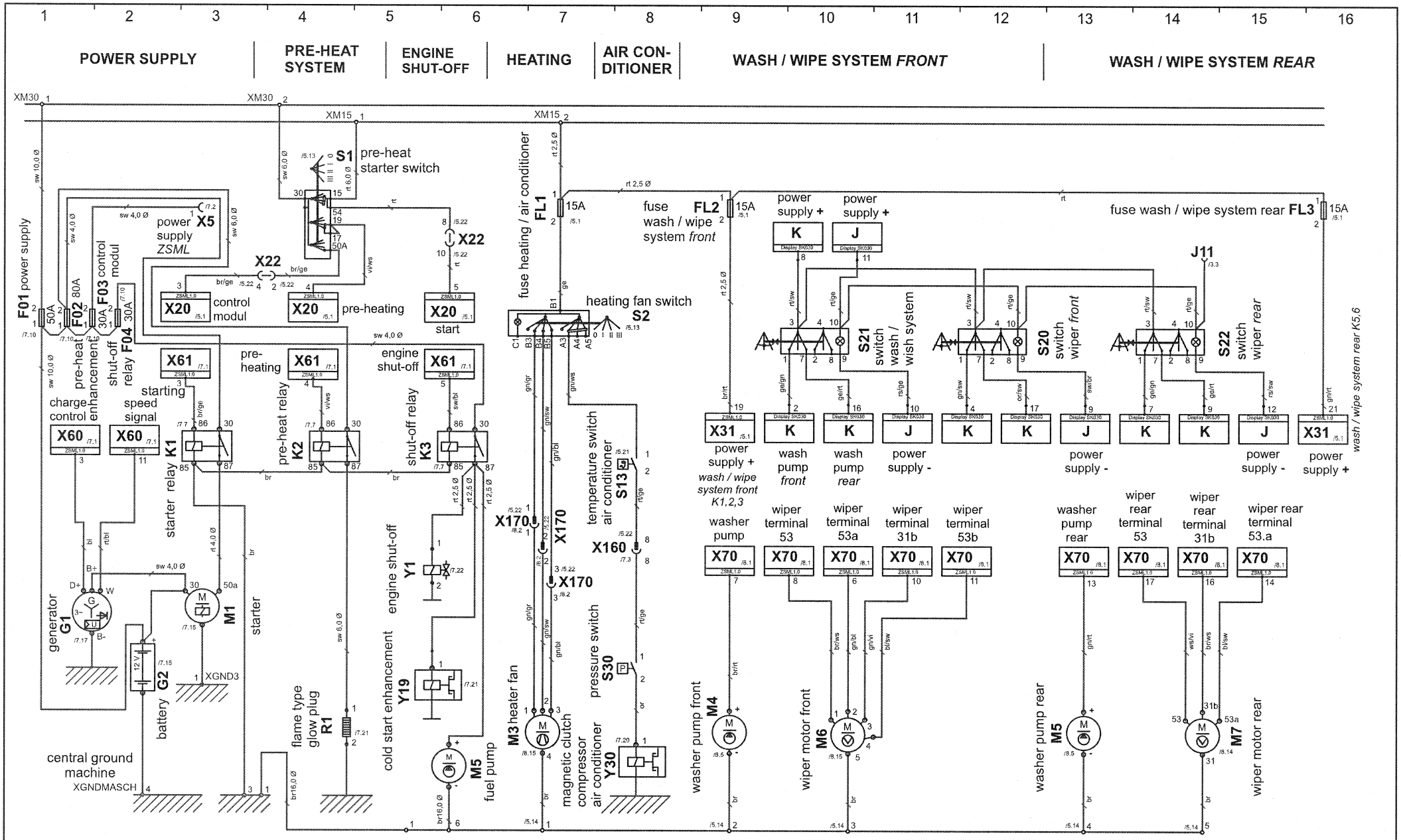


X31	Module power supply, working floodlights, rotating beacon, wiper
1	--
2	-
3	Reserve digital output
4	Relay K11:87a N.C. contact output
5	Relay K11:87 N.O. contact output
6	Reserve digital output
7	Relay K12:87 N.O. contact output
8	Relay K12 power supply Terminal 15 input
9	Relay K12:87a N.C. contact Output
10	Power supply Terminal 15 input working floodlight front
11	Relay K11 power supply Terminal 15 input
12	PWM output (Option 2nd auxiliary circuit)
13	Power supply Terminal 15 input working floodlight rear
14	PWM output (Option 2nd auxiliary circuit)
15	Reserve PWM output
16	Power supply Terminal 30 input rotating beacon
17	Reserve Digital output
18	Reserve PWM output
19	Power supply Terminal 15 input wash/ wipe rear
20	Power supply Terminal 15 input travel
21	Power supply Terminal 15 input wash/ wipe rear
X70	**Working floodlights , Wipers**
1	Brake light switch Terminal 15 output
2	--
3	Working floodlight front output
4	Working floodlight rear output
5	Rotating beacon output
6	Wiper Terminal 53b 2nd setting output
7	Washer pump front output
8	Wiper Terminal 31b output
9	Interior lamp Terminal 30 output
10	Wiper Terminal 53 output
11	Wiper Terminal 53a output
12	Hand brake switch signal input
13	Washer pump rear output
14	Rear wiper Terminal 53a output
15	--
16	Rear wiper Terminal 31b output
17	Rear wiper Terminal output
18	Brake light switch signal input



X61	*X61* new from 844/0183	*Rear carriage*
1	1	--
2	2	--
3	3	Starting Terminal 50a output
4	4	Pre-heat output
5	5	Engine shutdown output
6	6	Brake light output
7	7	Travel, direction recognition output
8	8	Travel, FAST-SLOW output
9	9	Transmission 1 output
10	21	Travel forward output
11	11	Transmission 2 output
12	12	Working hydraulics output
13	16	Travel reverse output
14	15	Back-up lamp output
15	10	Travel motion alarm output
16	14	Ride control system 3 output
17	17	Float position output
18	18	Additional control circuit output
19	19	Additional control circuit output
20	20	Ride control system 1,2 output
21	13	Fog lamp Output
X20		***Panel, right***
1		Power supply Terminal 15 output
2		--
3		Starting Terminal 50a signal
4		Pre-heat signal
5		Engine shutdown signal
6		Ride control system signal
7		Additional control circuit signal
8		Additional control circuit signal
9		Float position 1 signal
10		Float position 2 signal
11		4^{th} control circuit signal
12		4^{th} control circuit signal
13		Rotating beacon signal
14		Working floodlight front signal
15		Working floodlight rear Signal
X5		***Power supply***

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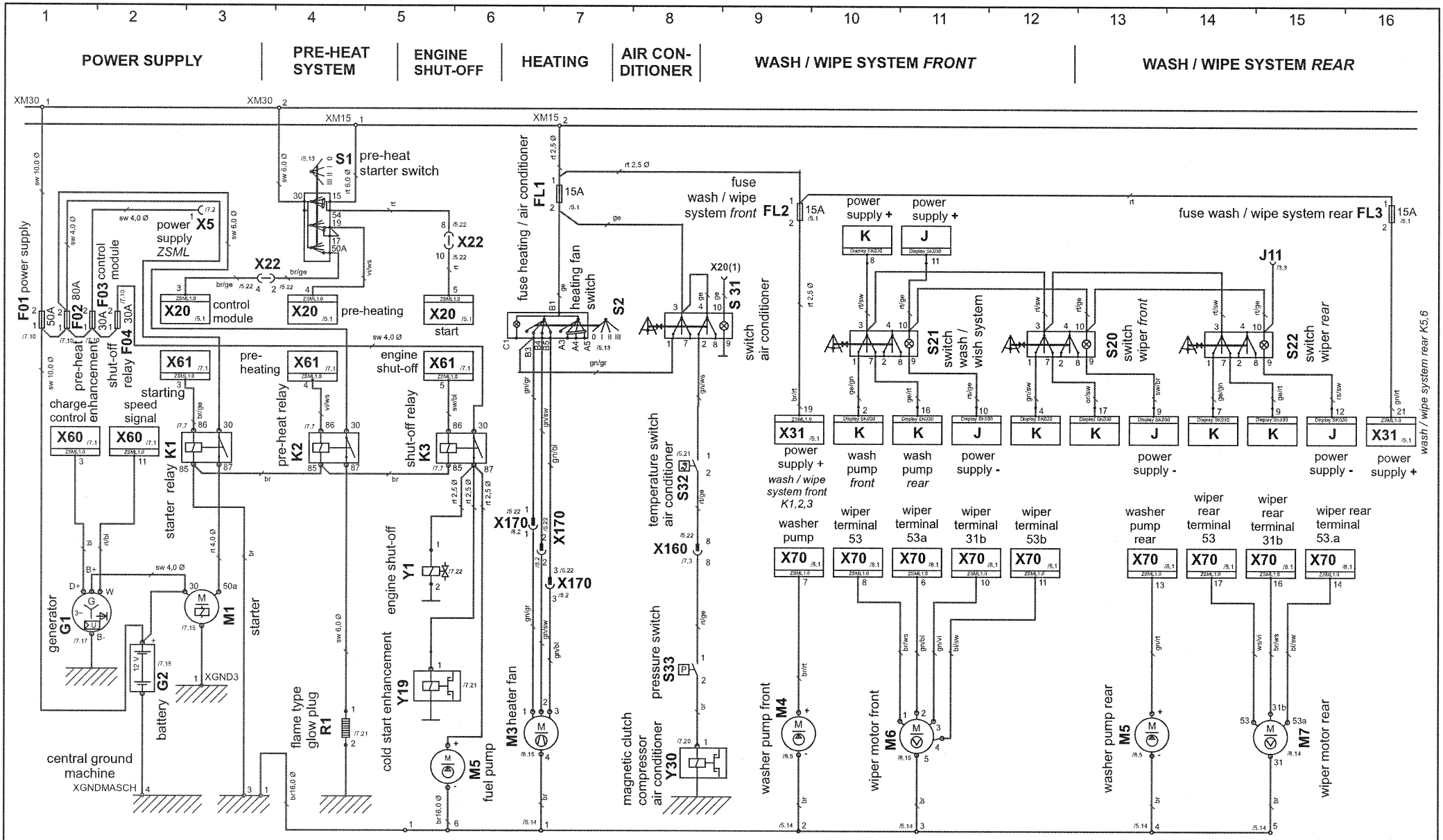


X5	connector central control module
X20	connector central control module
X31	connector central control module

X60	connector central control module
X61	connector central control module
X70	connector central control module
X160	connector switch console

X170	connector operator's cab / floor frame
K	connector display
J	connector display
F01-F04	input fuses (starterbox)

Typ / Model / Type / Tipo	SKL854	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	bis Fz.-Id.-Nr. up to s/n jusqu'au n/s a el no.	0854/0136	Datum / Edition / Date / Fecha 01.2006
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos		Blatt / Page / Feuille / Página 1/4		Blatt / Page / Feuille / Página 7.27.11.1

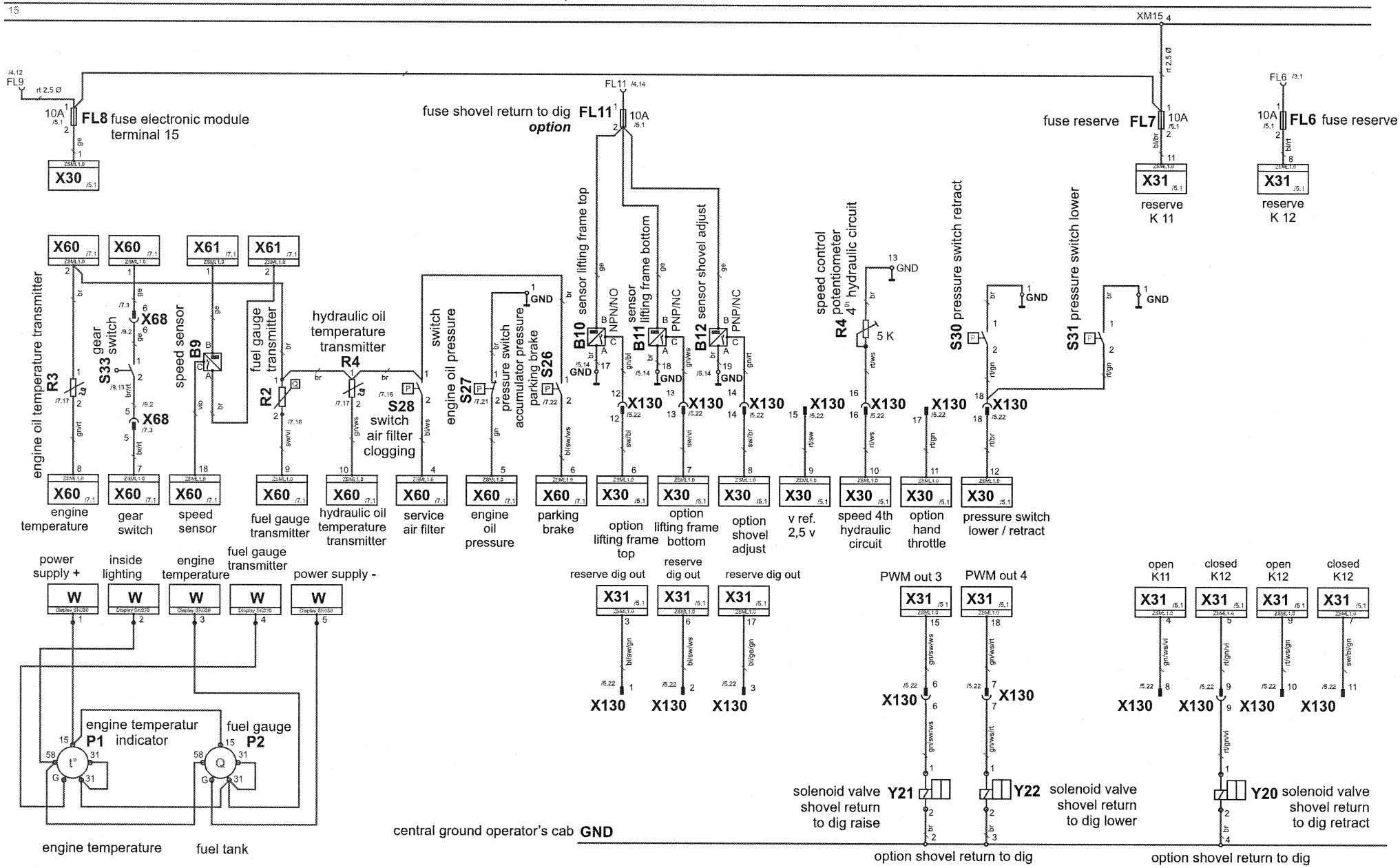


X5	connector central control module
X20	connector central control module
X31	connector central control module

X60	connector central control module
X61	connector central control module
X70	connector central control module
X160	connector switch console

X170	connector operator's cab / floor frame
K	connector display
J	connector display
F01-F04	input fuses (starter box)

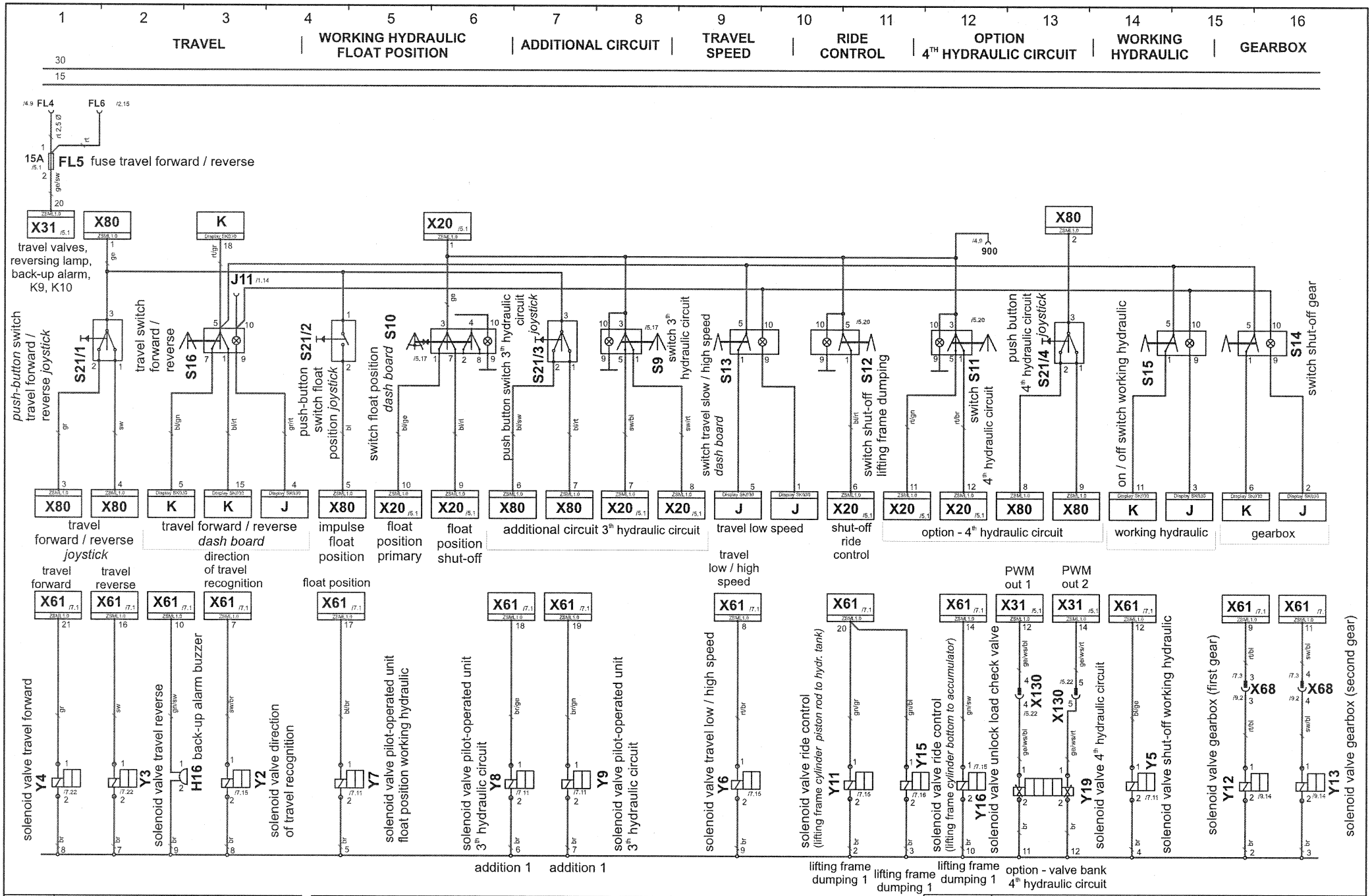
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Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos		Blatt Page Feuille Página	1/4	Blatt Page Feuille Página 7.27.11.2



X30	connector central control module
X31	connector central control module
X60	connector central control module
X61	connector central control module

X130	connector switch console / rear chassis
W	connector display

Typ Model Type Tipo	SKL854	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0854/0100	Datum Edition Date Fecha 01.2006
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 2/4	Blatt Page Feuille Página 7.27.12

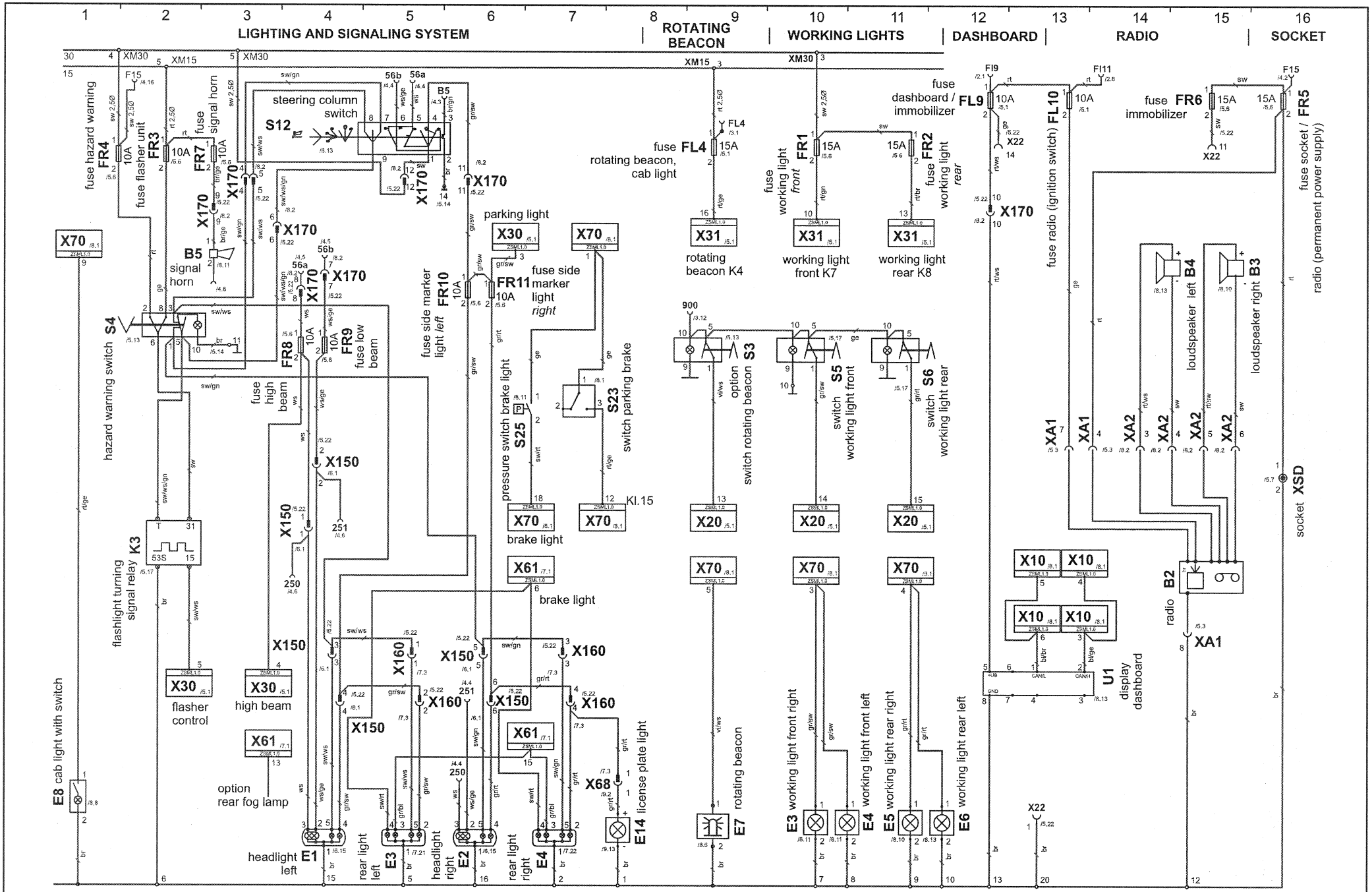


X20	connector central control module
X31	connector central control module
X61	connector central control module

X80	connector central control module
X61	connector central control module
X130	connector switch console / shovel return to dig
X68	connector fast travel version / rear chassis

K	connector display
J	connector display

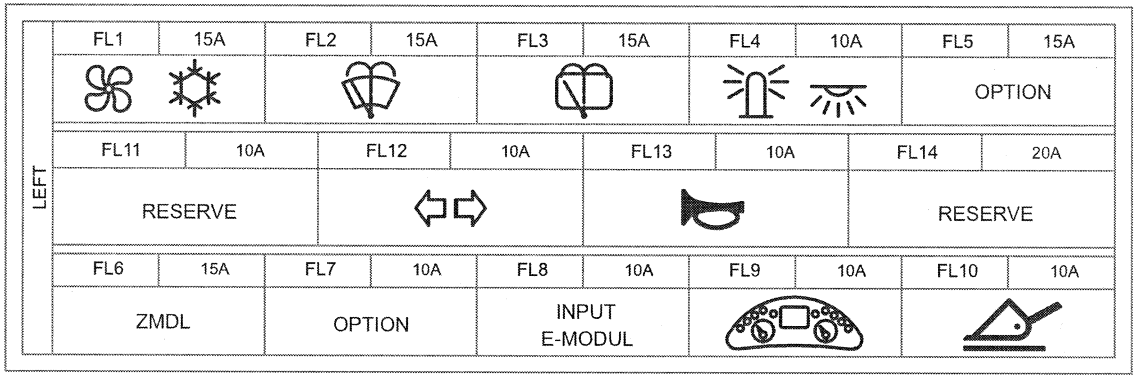
Typ Model Type Tipo	SKL854	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no.	0854/0100	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos		Blatt Page Feuille Página	3/4	Blatt Page Feuille Página	7.27.13

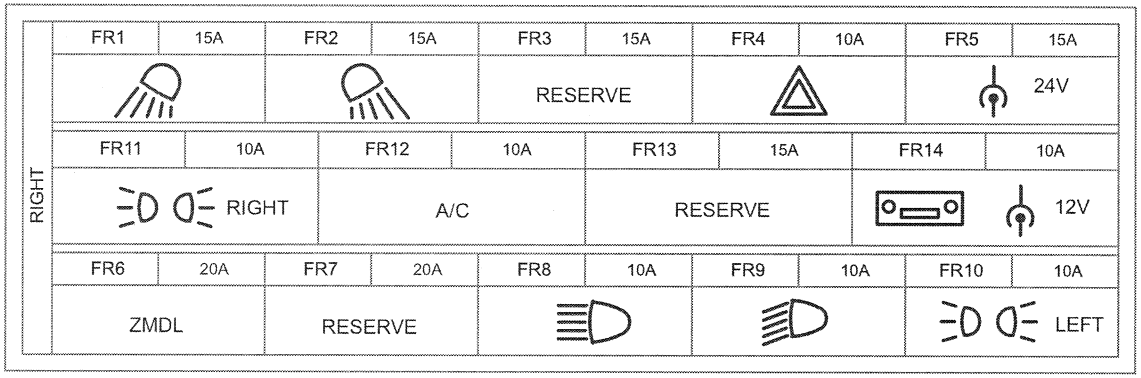

LIGHTING AND SIGNALING SYSTEM
ROTATING BEACON
WORKING LIGHTS
DASHBOARD
RADIO
SOCKET
fuse hazard warning FR4
fuse flasher unit FR3
fuse signal horn FR7
steering column switch S12
B5 signal horn
hazard warning switch S4
fuse high beam FR8
fuse low beam FR9
fuse side marker light left FR10
fuse side marker light right FR11
parking light
pressure switch brake light S25
switch parking brake S23
brake light
flashlight turning signal relay K3
flasher control
high beam
option rear fog lamp
headlight left E1
rear light left E3
headlight right E2
rear light right E4
E8 cab light with switch
E14 license plate light
fuse FL4 rotating beacon, cab light
rotating beacon K4
option switch rotating beacon S3
E7 rotating beacon
fuse working light front FR1
working light front K7
switch working light front S5
E3 working light front right
E4 working light front left
fuse working light rear FR2
working light rear K8
switch working light rear S6
E5 working light rear right
E6 working light rear left
fuse dashboard / immobilizer FL9
fuse radio (ignition switch) FL10
fuse immobilizer FR6
fuse socket / radio (permanent power supply) FR5
loudspeaker left B4
loudspeaker right B3
radio B2
display dashboard U1
socket XSD
X10 connector central control module
X20 connector central control module
X30 connector central control module
X31 connector central control module
X61 connector central control module
X68 connector fast travel version
X70 connector central control module
X150 connector switch console / front chassis
X160 connector operator's cab / floor frame
X170 connector operator's cab / switch console
XA1 connector radio connection
XA2 connector loudspeaker connection
SKL854
Elektrisches System / Electrical system / Circuit électrique / Sistema elèctrico
ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0854/0100
Stromlaufplan / Wiring diagramm / Circuit èlectrique / Esquemas de los circuitos
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Datum / Edition / Date / Fecha 01.2006
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FL1	**15A**	HEATER/AIR CONDITIONER
FL2	**15A**	WASH/WIPE FRONT
FL3	**15A**	WASH/WIPE REAR
FL4	**10A**	ROTATING BEACON/INTERIOR LIGHT
FL5	**15A**	POWER SUPPLY K9/K10
FL6	**15A**	ADDITIONAL CONTROL MODULE (TERMINAL 15)
FL7	**10A**	POWER SUPPLY K11/K12
FL8	**10A**	CENTRAL CONTROL MODUL ENTRIES
FL9	**10A**	DASHBOARD
FL10	**10A**	RESERVE (TERMINAL 15)
FL11	**10A**	RESERVE (TERMINAL 15)
FL12	**10A**	FLASHER (TERMINAL 15)
FL13	**10A**	HORN (TERMINAL 15)
FL14	**20A**	RESERVE (TERMINAL 15)



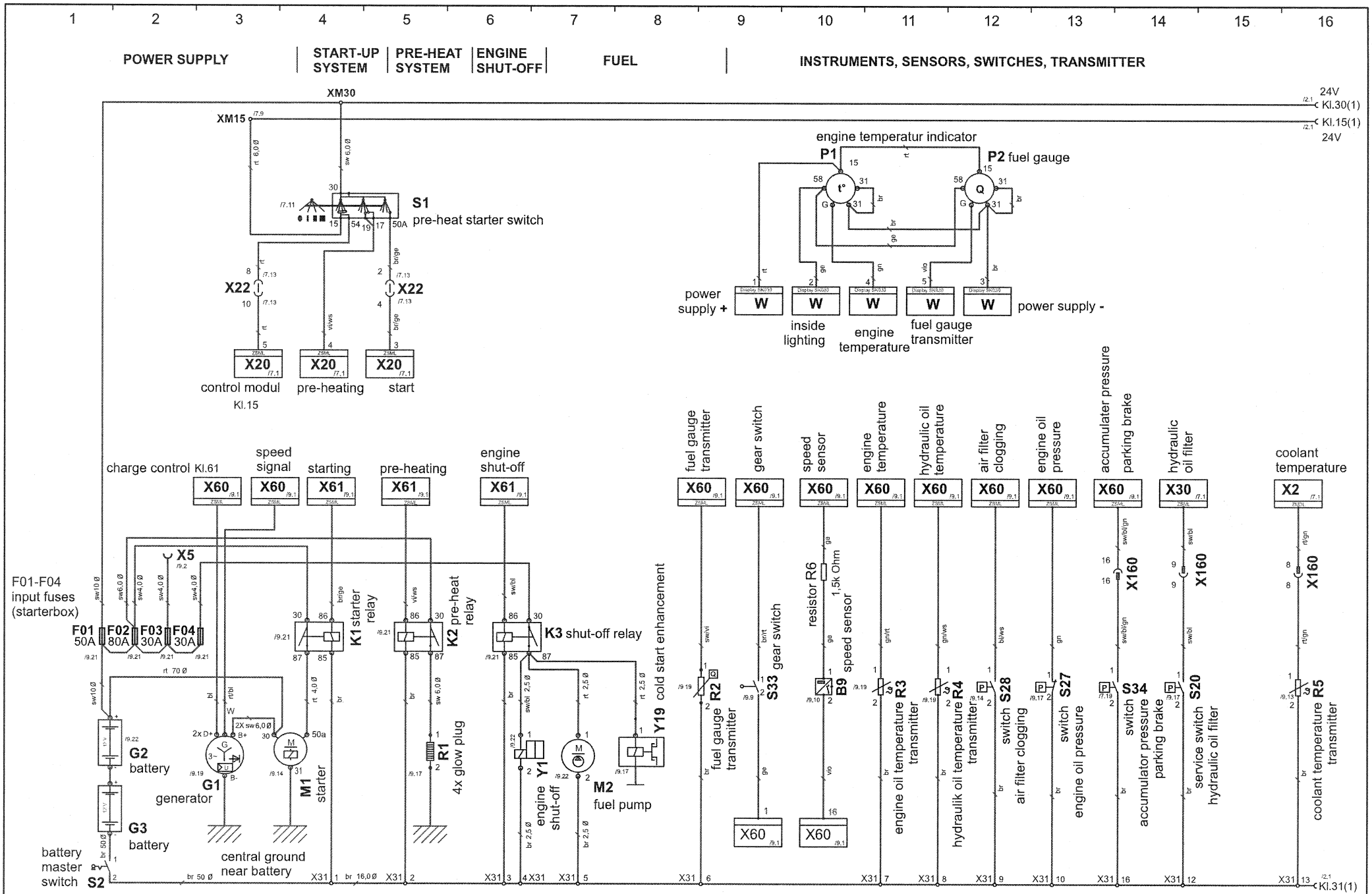






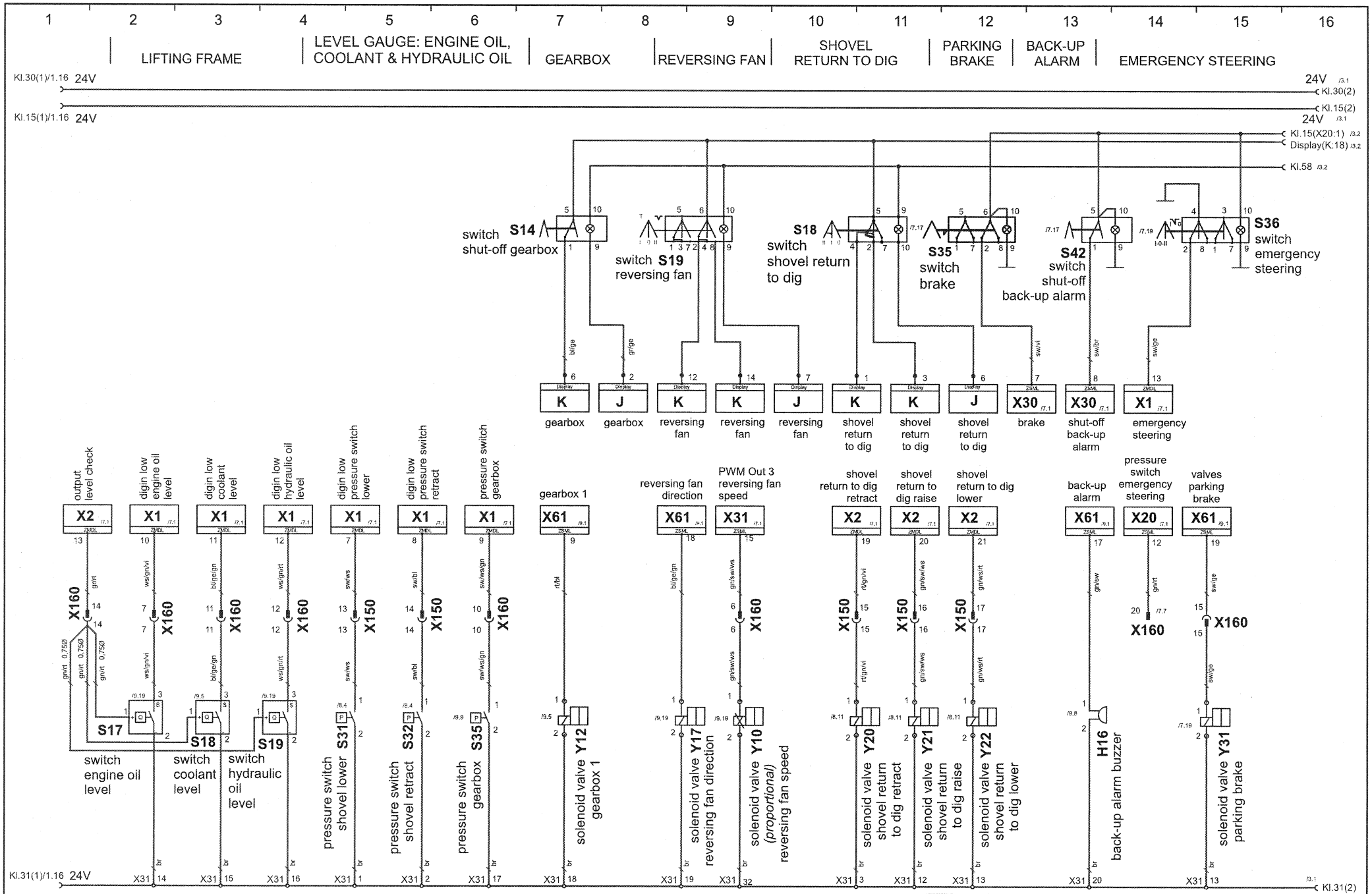
FR1	**15A**	WORKING FLOODLIGHT FRONT (TERMINAL 30)
FR2	**15A**	WORKING FLOODLIGHT REAR (TERMINAL 30)
FR3	**15A**	RESERVE (TERMINAL 30)
FR4	**10A**	HAZARD WARNING SWITCH (TERMINAL30)
FR5	**15A**	SOCKET 24VOLT (TERMINAL 30)
FR6	**20A**	ADDITIONAL CONTROL MODULE (TERMINAL 30)
FR7	**20A**	RESERVE (TERMINAL 30)
FR8	**10A**	HIGH BEAM
FR9	**10A**	LOW BEAM
FR10	**10A**	SIDE MARKER LAMP LEFT
FR11	**10A**	SIDE MARKER LAMP RIGHT (TERMINAL 30)
FR12	**10A**	AIR CONDITIONER (TERMINAL 30)
FR13	**15A**	RESERVE (TERMINAL 30)
FR14	**10A**	RADIO 12VOLT (TERMINAL 30)

Typ / Model / Type / Tipo	**SKL160** Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. *0160/0100*	Datum / Edition / Date / Fecha	01.2006
Benennung / Description / Dénomination / Denominación	**Sicherungs- und Belegungsplanfplan / Assignment diagramm / Schéma de réparation / Esquemas de la caja**	Blatt / Page / Feuille / Página	7.28.10



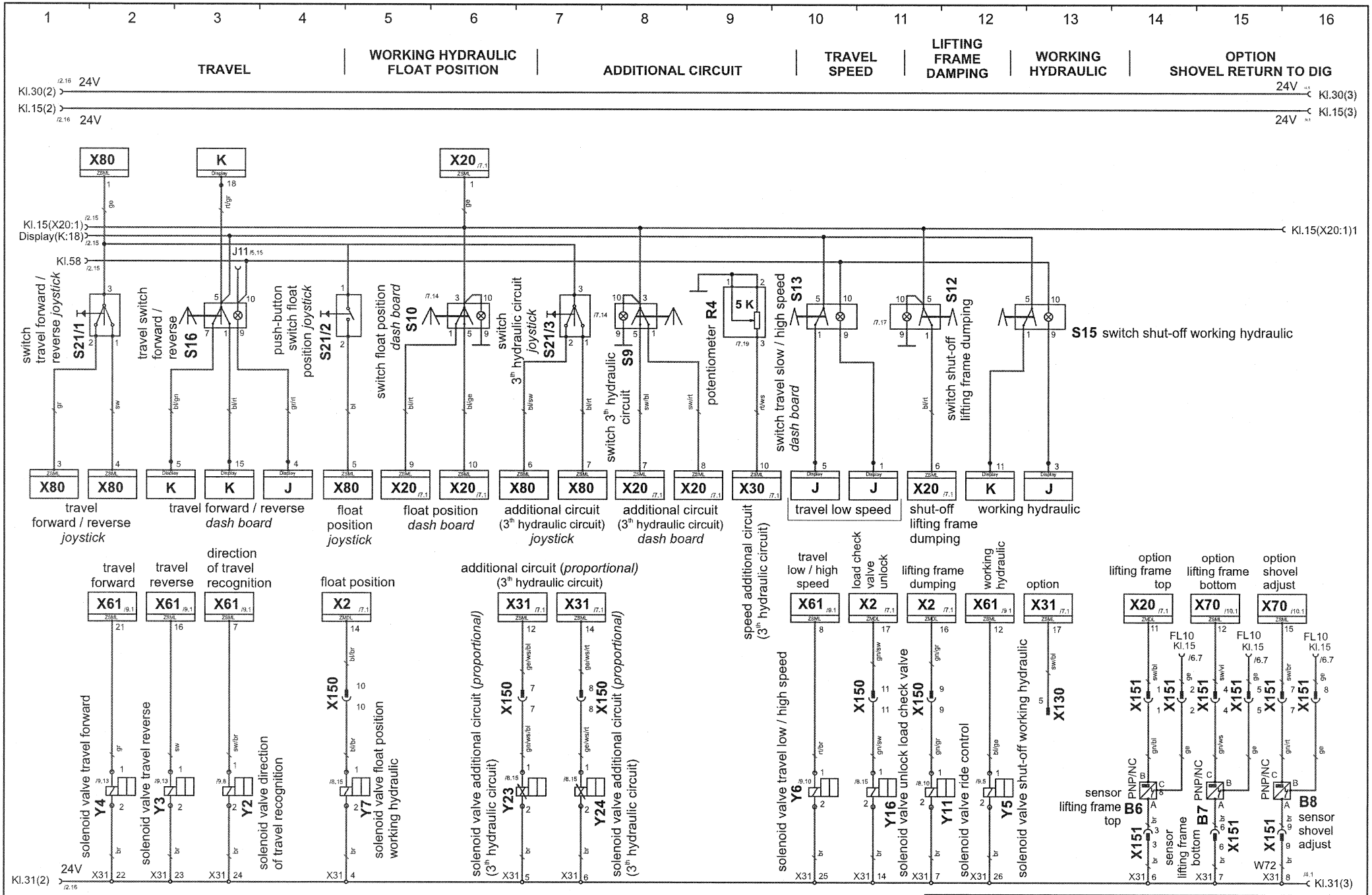
X2	connector additional control module			X61	connector central control module
X5	connector central control module	X30	connector central control module	X160	connector switch console
X20	connector central control module	X60	connector central control module	W	connector display

Typ Model Type Tipo	SKL160	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 0160/0100	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página	1/6	Blatt Page Feuille Página	7.28.11



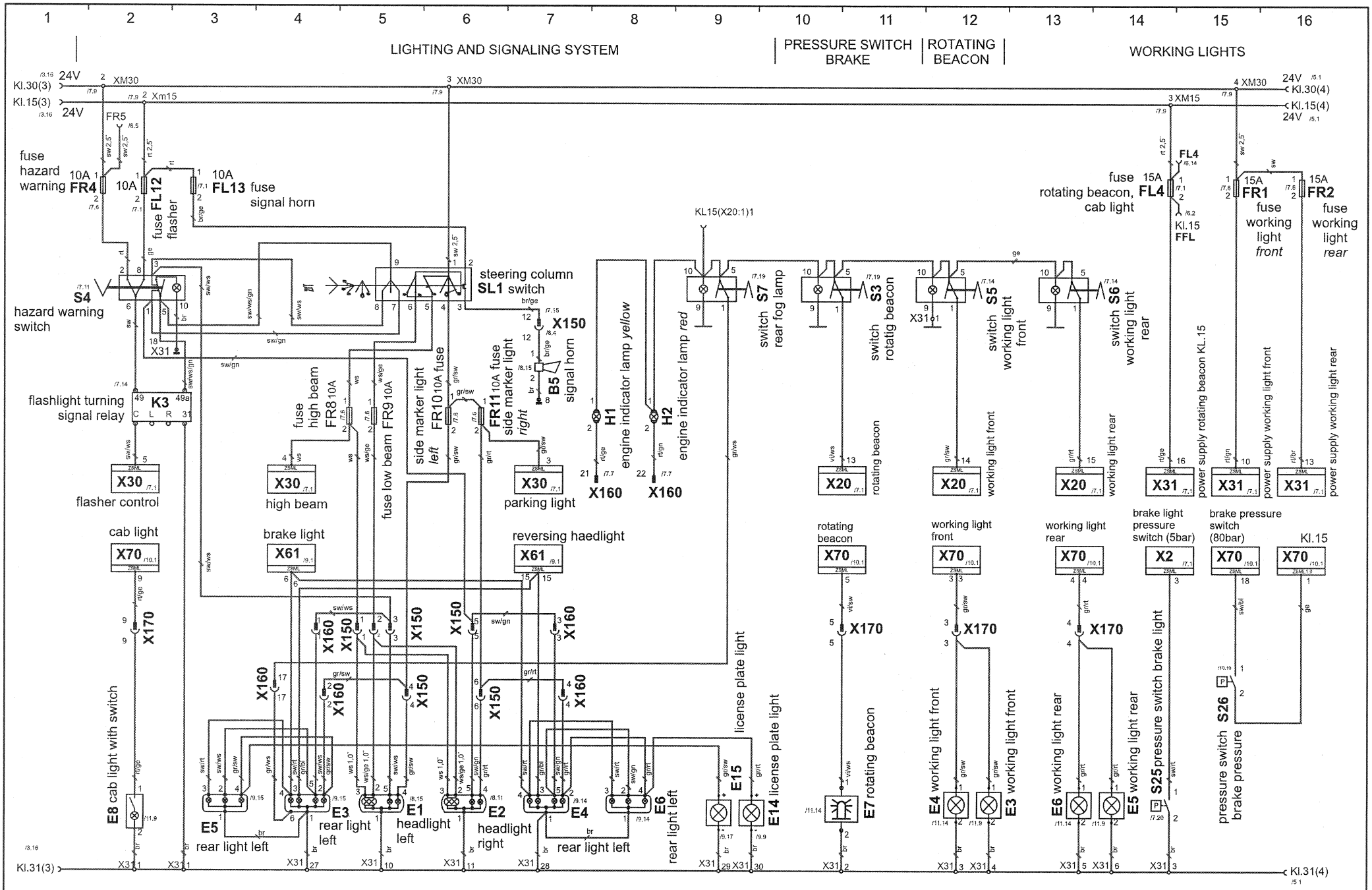
X1	connector additional control module	X30	connector switch console	X150	connector switch console
X2	connector additional control module	X31	connector switch console	X160	connector switch console
X20	connector central control module	X61	connector switch console	J & K	connector display

Typ / Model / Type / Tipo	SKL160	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no.	0160/0100	Datum / Edition / Date / Fecha	01.2006
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página	2/6	Blatt / Page / Feuille / Página	7.28.12



X2	connector additional control modul	X61	connector central control modul	X150	connector switch console
X20	connector central control modul	X70	connector central control modul	X151	connector shovel return to dig *operator's cab*
X30	connector central control modul	X80	connector central control modul	J	connector display
X31	connector central control modul	X130	connector switch console	K	connector display

Typ / Model / Type / Tipo	SKL160	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0160/0100	Datum / Edition / Date / Fecha 01.2006
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 3/6	Blatt / Page / Feuille / Página 7.28.13

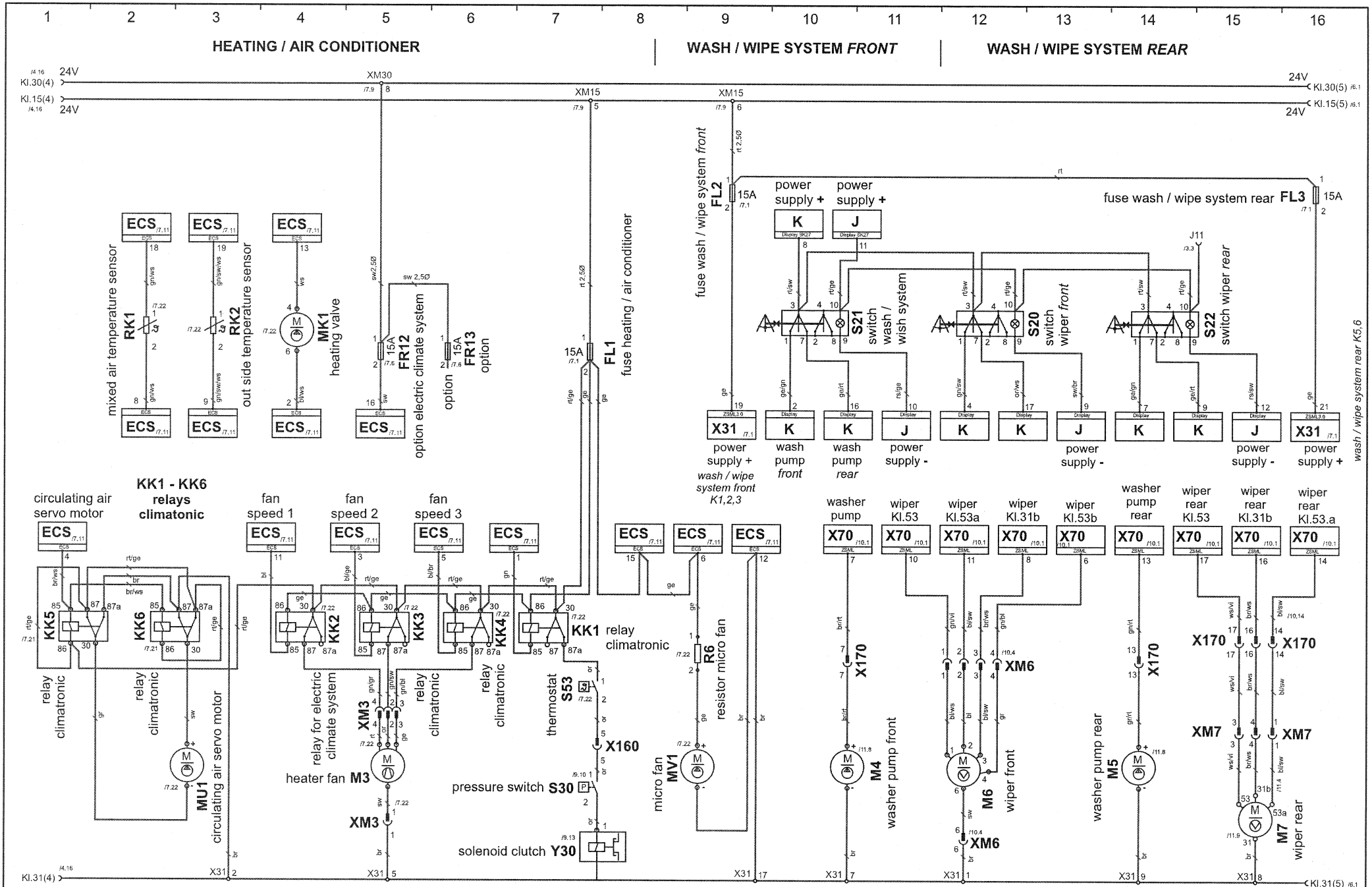


X2	connector additional control modul
X20	connector central control modul
X30	connector central control modul
X31	connector central control modul

X61	connector central control modul
X70	connector central control modul
X150	connector front chassis
X160	connector rear chassis

X170	connector operator's cab

Typ / Model / Type / Tipo	SKL160	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0160/0100	Datum / Edition / Date / Fecha 01.2006
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 4/6	Blatt / Page / Feuille / Página 7.28.14

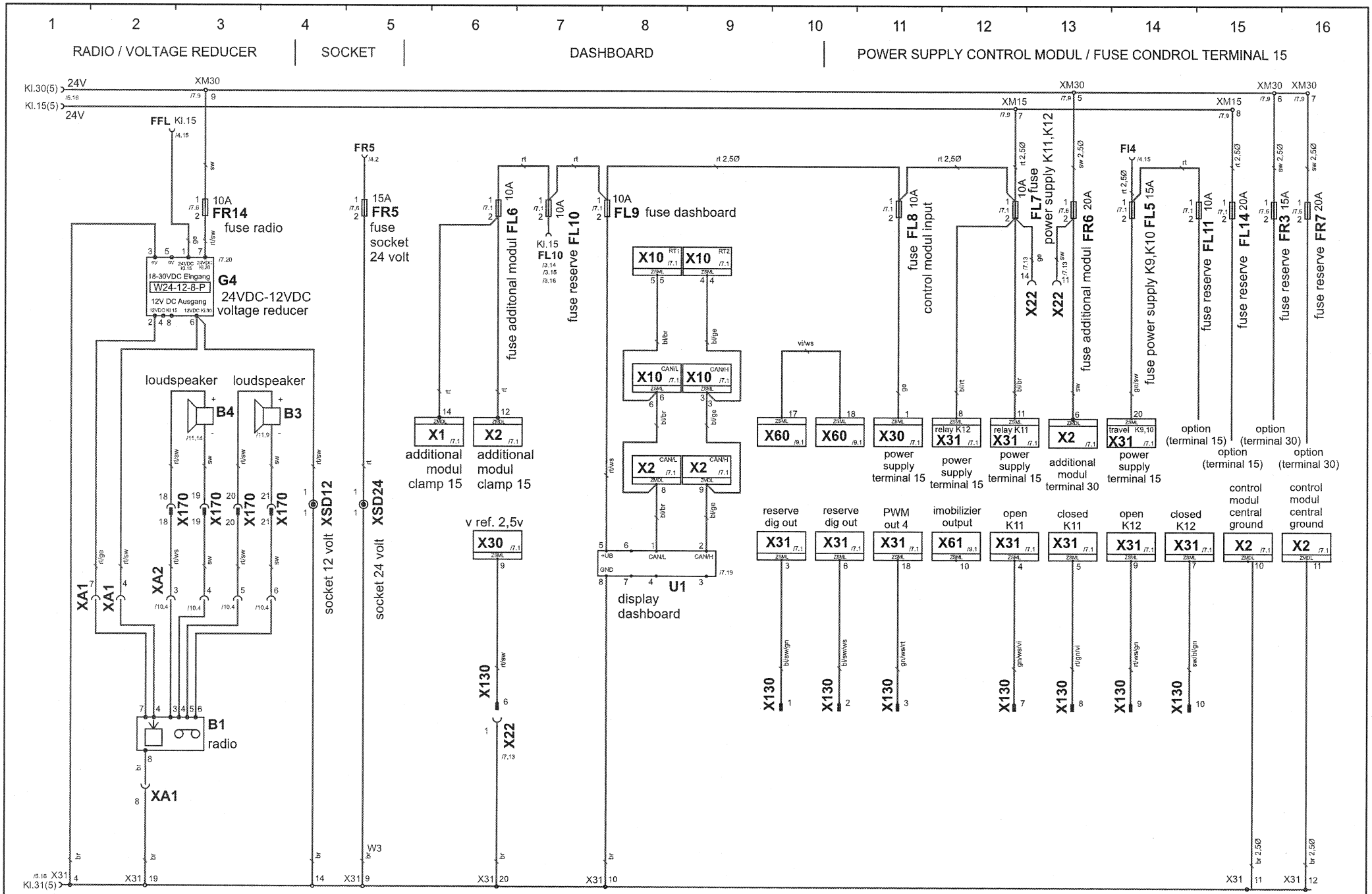


X31	connector central control modul
X70	connector central control modul
X160	connector rear chassis
X170	connector operator's cab

XM3	connector fan
XM6	connector wiper motor front
ECS	connector climatronic
J	connector display

K	connector display
XM6	connector wiper motor rear

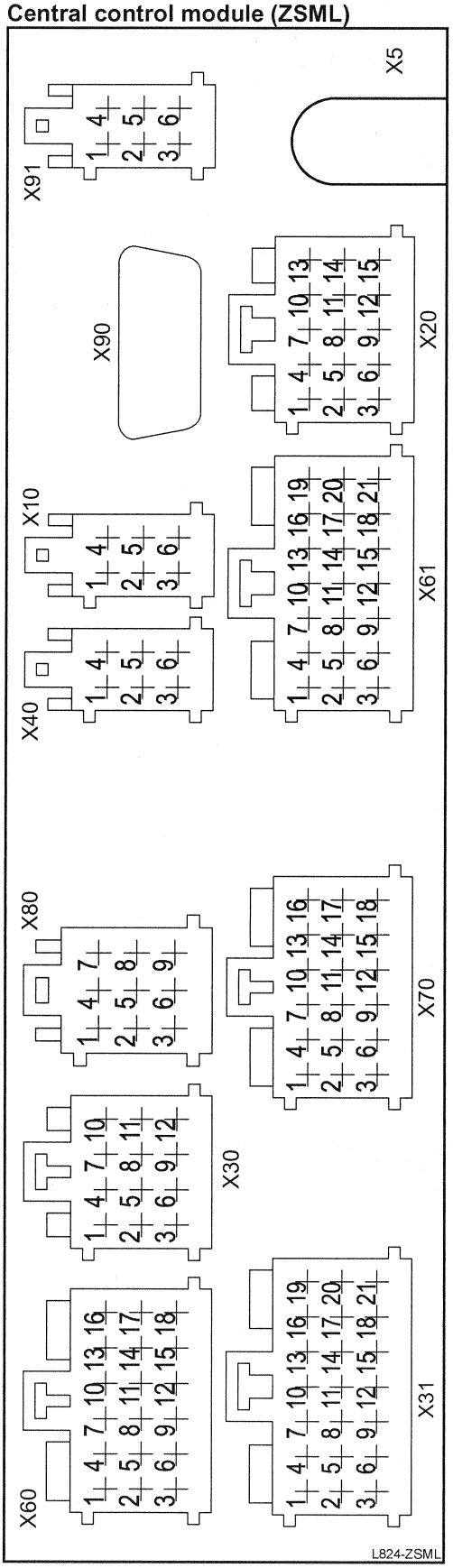
Typ Model Type Tipo	SKL160	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no.	0160/0100	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos		Blatt Page Feuille Página	5/6	Blatt Page Feuille Página	7.28.15



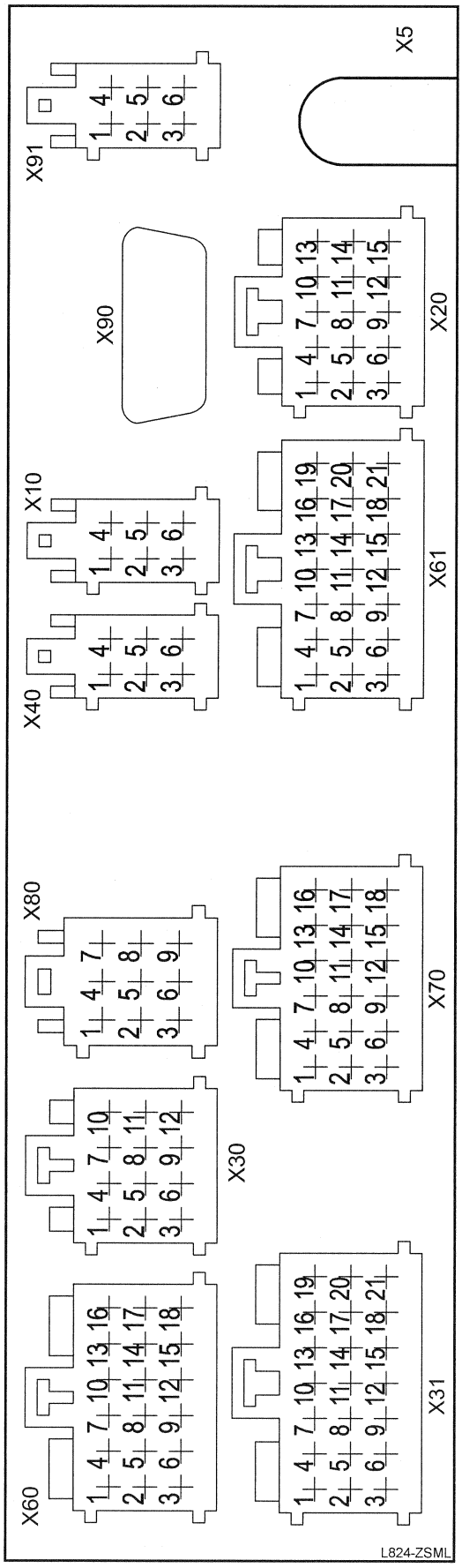
X1	connector additional control modul	X30	connector central control modul	X130	connector switch console	Typ / Model / Type / Tipo	SKL160	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0160/0100	Datum / Edition / Date / Fecha	01.2006
X2	connector additional control modul	X31	connector central control modul	X170	connector operator's cab / floor frame						
X10	connector central control modul	X60	connector central control modul	XA1	connector radio connection	Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / Circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página	6/6	Blatt / Page / Feuille / Página	7.28.16
		X61	connector central control modul	XA2	connector radio / floor frame						

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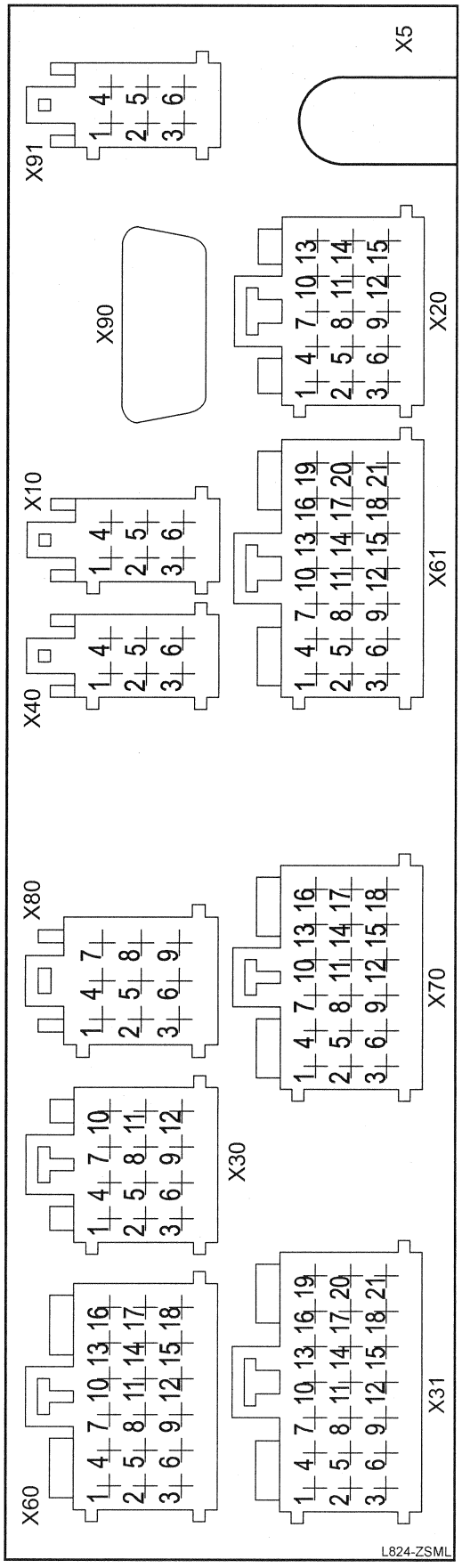
Central control module (ZSML)



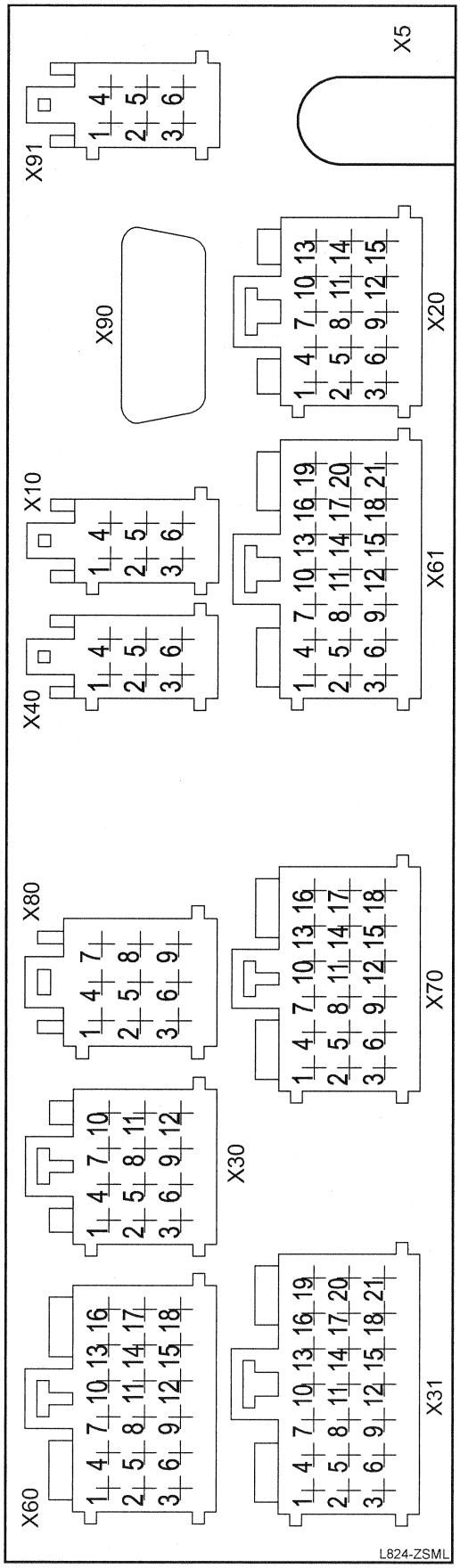
X60	***Signal inputs "engine monitoring"***
1	Transmission switch signal
2	--
3	Charge signal generator D+
4	Air filter maintenance switch signal
5	Oil pressure switch signal
6	Accumulator pressure parking brake
7	Transmission switch signal
8	Engine temperature sensor signal
9	Fuel gauge sensor signal
10	Hydraulic oil temperature sensor signal
11	Idle signal generator "W" signal
12	--
13	--
14	--
15	Speedometer signal sensor
16	Speedometer sensor output
17	link to terminal 18
18	link to terminal 17
X30	***Signal inputs "Lighting"***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	Parking light Terminal 15 input
4	High beam signal
5	Direction indicator control signal
6	Hydraulic oil filter clogging (signal)
7	Parking brake (signal)
8	shut off back-up alarm
9	Reference voltage 2.5V
10	Analog input speed 3rd control circuit
11	Spare - Analog
12	Spare - Analog
X80	***Coordinate lever***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	Travel forward signal
4	Travel reverse signal
5	Float position signal
6	Additional control circuit signal
7	Additional control circuit signal
8	Spare - Analog
9	Spare - Analog



X40	***CAN-BUS (Option)***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	CAN/HI
4	R1
5	R2
6	CAN/LO
X10	***Control panel***
1	--
2	Central ground Terminal 31
3	CAN/HI
4	--
5	--
6	CAN/LO
X90	***Programming connection***
X91	***Immobilizer (Option)***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	***TXD***
4	RXD
5	CTS
6	RTS



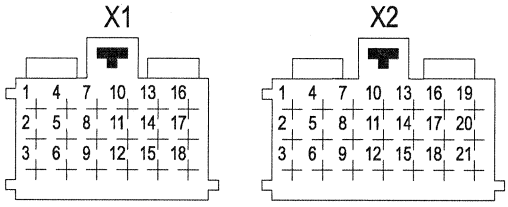
X31	Module power supply, working floodlights, rotating beacon, wiper
1	--
2	-
3	Spare digital output
4	Relay K11:87a N.C. contact output
5	Relay K11:87 N.O. contact output
6	Spare digital output
7	Relay K12:87 N.O. contact output
8	Relay K12 power supply Terminal 15 input
9	Relay K12:87a N.C. contact Output
10	Power supply Terminal 30 input working floodlight front
11	Relay K11 power supply Terminal 15 input
12	3rd control circuit (PWM output)
13	Power supply Terminal 30 input working floodlight rear
14	3rd control circuit (PWM output)
15	Reversing fan speed PWM output
16	Power supply Terminal 15 input rotating beacon
17	Spare Digital output
18	Spare PWM output
19	Power supply Terminal 15 input wash/ wipe rear
20	Power supply Terminal 15 input travel
21	Power supply Terminal 15 input wash/ wipe rear
X70	**Working floodlights , Wipers**
1	Power supply brake pressure switch
2	--
3	Working floodlight front output
4	Working floodlight rear output
5	Rotating beacon output
6	Wiper Terminal 53b 2nd setting output
7	Washer pump front output
8	Wiper Terminal 31b output
9	Interior lamp Terminal 30 output
10	Wiper Terminal 53 output
11	Wiper Terminal 53a output
12	RTD lifting frame lower position (signal)
13	Washer pump rear output
14	Rear wiper Terminal 53a output
15	RTD shovel position (signal)
16	Rear wiper Terminal 31b output
17	Rear wiper Terminal output
18	Brake light switch 100bar signal input



X61	***Rear carriage***
1	--
2	--
3	Starting Terminal 50a output
4	Pre-heating output
5	Engine shutdown output
6	Brake light output
7	Travel, direction recognition output
8	Travel, FAST-SLOW output
9	Transmission 1 output
10	Option Immobilizer
11	--
12	Working hydraulics output
13	--
14	--
15	Back-up lamp output
16	Travel reverse output
17	Back-up alarm output
18	Reversing fan output
19	Solenoid valve parking brake output
20	--
21	Travel forward output
X20	***Panel, right***
1	Power supply Terminal 15 output
2	--
3	Start-up Terminal 50a signal
4	Pre-heat signal
5	Power supply control unit Terminal 15
6	Ride control system signal
7	Additional control circuit signal
8	Additional control circuit signal
9	Float position 1 signal
10	Float position 2 signal
11	RTD lifting frame high position (signal)
12	Pressure switch emergency steering
13	Rotating beacon signal
14	Working floodlight front signal
15	Working floodlight rear Signal
X5	***Power supply***

Additional Control Unit ZMDL



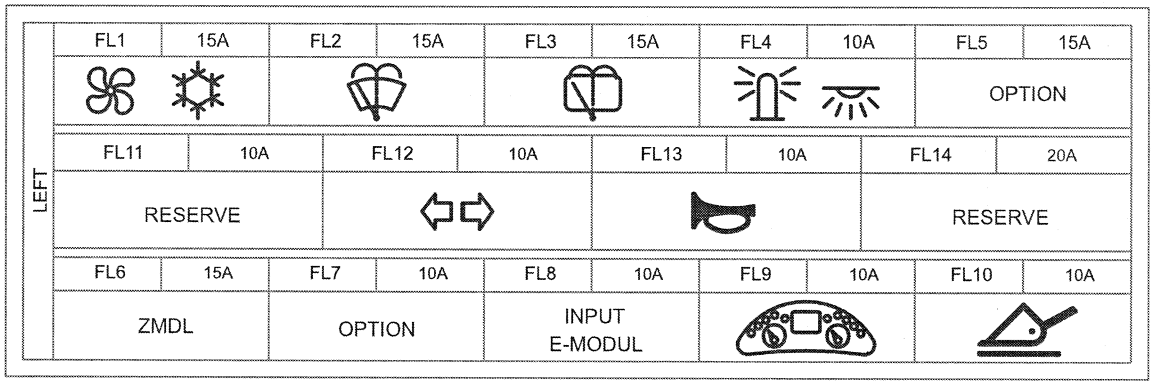


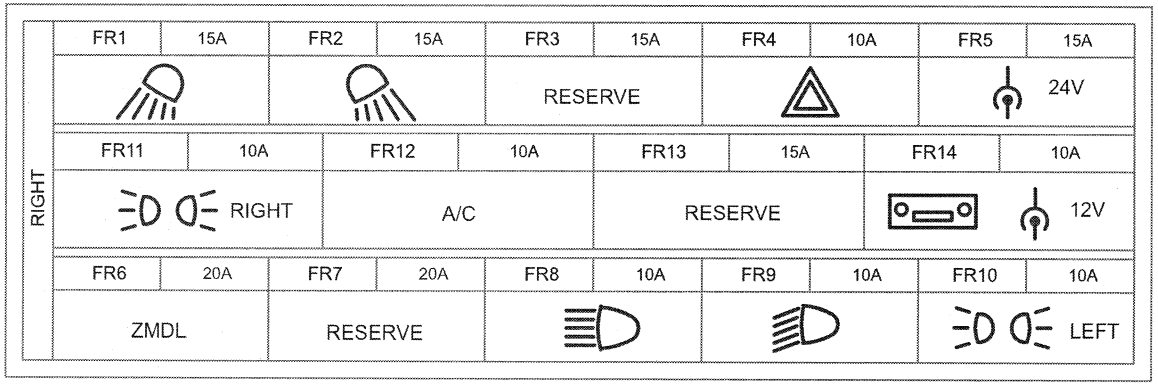
X1	***plug***
1	
2	
3	
4	
5	
6	
7	digin low pressure switch lower
8	digin low pressure switch retract
9	pressure switch gear shift (signal)
10	digin low engine oil level
11	digin low coolant level
12	digin low hydraulic oil level
13	emergency steering (signal)
14	power supply control unit terminal 15
15	--
16	--
17	--
18	--
X2	***plug***
1	--
2	--
3	brake light pressure switch 5 bar
4	coolant temperature
5	--
6	power supply control unit terminal 30
7	--
8	CAN-Bus-link ZSML X10 CAN/L
9	CAN-Bus-link ZSML X10 CAN/L
10	central ground
11	central ground
12	power supply control unit terminal 15
13	level check output
14	float position output
15	--
16	solenoid valve ride control
17	solenoid valve unlock load check valve
18	--
19	RTD retract output
20	RTD lifting frame high position (cut off output)
21	RTD lower output
X90	***plug***

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FL1	**15A**	HEATER/AIR CONDITIONER
FL2	**15A**	WASH/WIPE FRONT
FL3	**15A**	WASH/WIPE REAR
FL4	**10A**	ROTATING BEACON/INTERIOR LIGHT
FL5	**15A**	POWER SUPPLY K9/K10
FL6	**15A**	ADDITIONAL CONTROL MODULE (TERMINAL 15)
FL7	**10A**	POWER SUPPLY K11/K12
FL8	**10A**	CENTRAL CONTROL MODUL INPUT SIGNALS
FL9	**10A**	DASHBOARD
FL10	**10A**	SHOVEL RETURN TO DIG
FL11	**10A**	RESERVE (TERMINAL 15)
FL12	**10A**	FLASHER (TERMINAL 15)
FL13	**10A**	HORN (TERMINAL 15)
FL14	**20A**	RESERVE (TERMINAL 15)



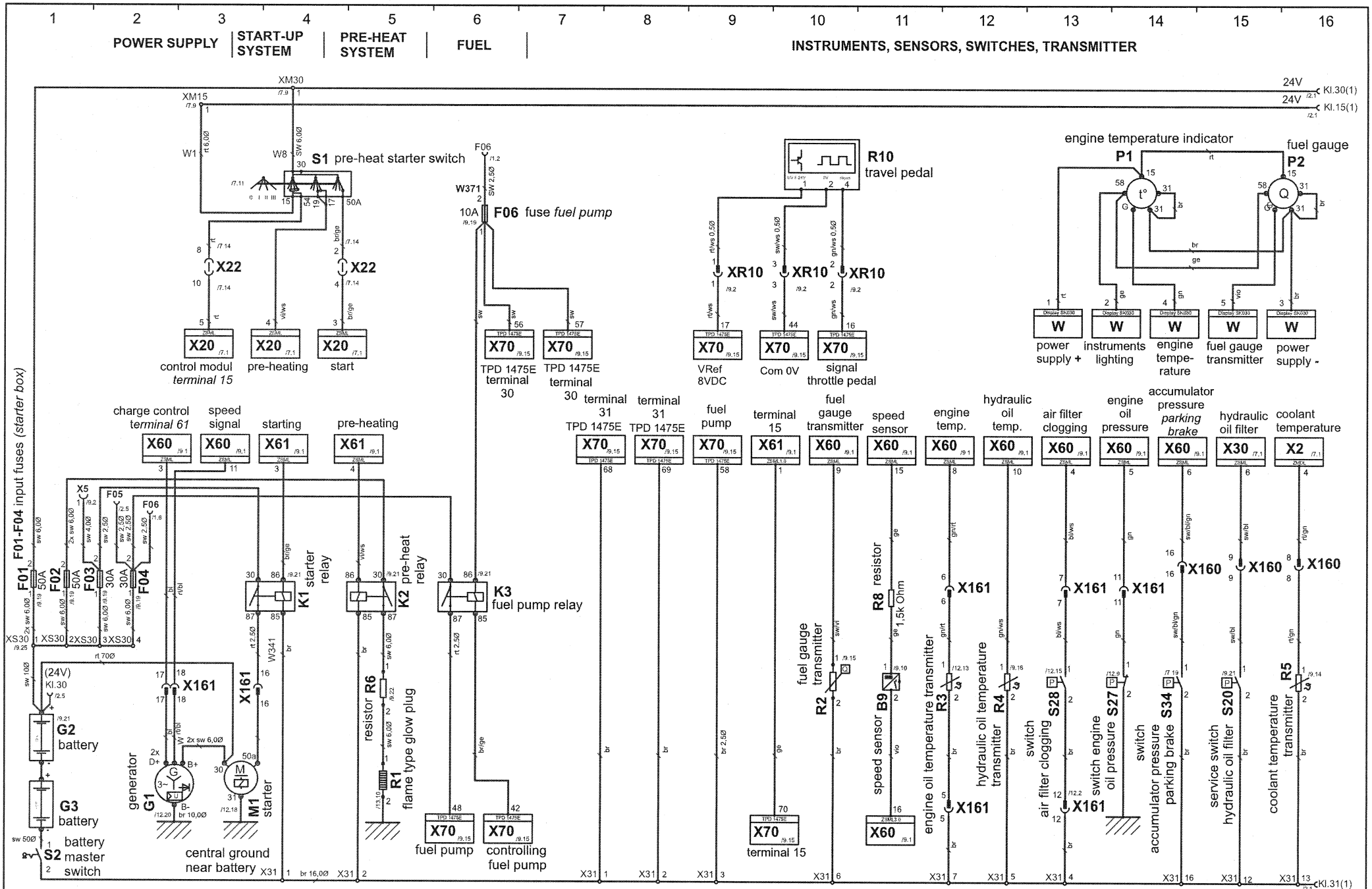






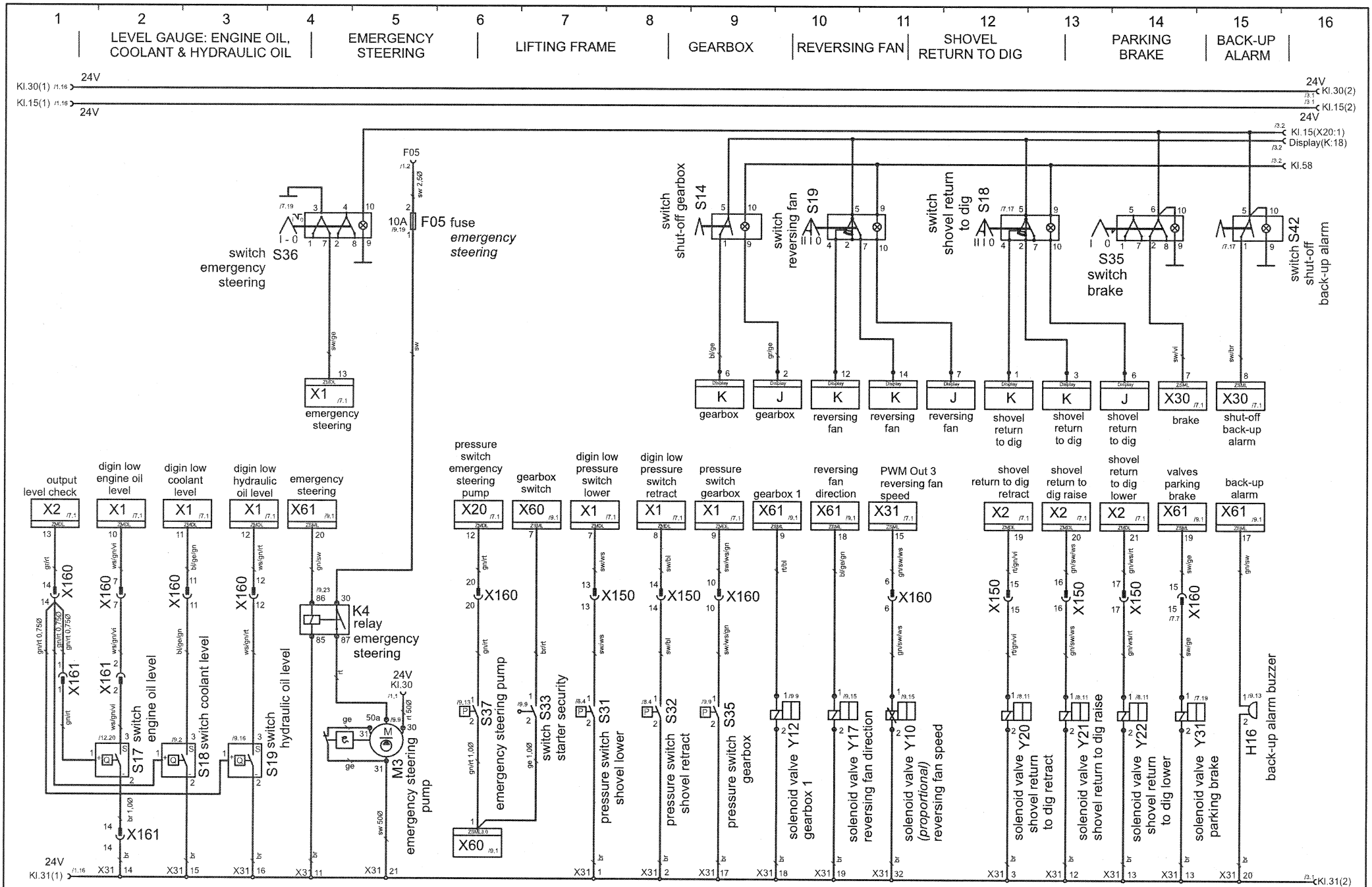
FR1	**15A**	WORKING FLOODLIGHT FRONT (TERMINAL 30)
FR2	**15A**	WORKING FLOODLIGHT REAR (TERMINAL 30)
FR3	**15A**	RESERVE (TERMINAL 30)
FR4	**10A**	HAZARD WARNING SWITCH (TERMINAL30)
FR5	**15A**	SOCKET 24VOLT (TERMINAL 30)
FR6	**20A**	ADDITIONAL CONTROL MODULE (TERMINAL 30)
FR7	**20A**	RESERVE (TERMINAL 30)
FR8	**10A**	HIGH BEAM
FR9	**10A**	LOW BEAM
FR10	**10A**	SIDE MARKER LAMP LEFT
FR11	**10A**	SIDE MARKER LAMP RIGHT (TERMINAL 30)
FR12	**10A**	AIR CONDITIONER (TERMINAL 30)
FR13	**15A**	RESERVE (TERMINAL 30)
FR14	**10A**	RADIO 12VOLT (TERMINAL 30)

Typ / Model / Type / Tipo	**SKL260** Elektrisches System / Electrical system / Circuit électrique / Sistema elèctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. *0260/0100*	Datum / Edition / Date / Fecha	01.2006
Benennung / Description / Dénomination / Denominación	**Sicherungs- und Belegungsplanfplan** **Assignment diagramm** **Schéma de réparation** **Esquemas de la caja**	Blatt / Page / Feuille / Página	7.30.00



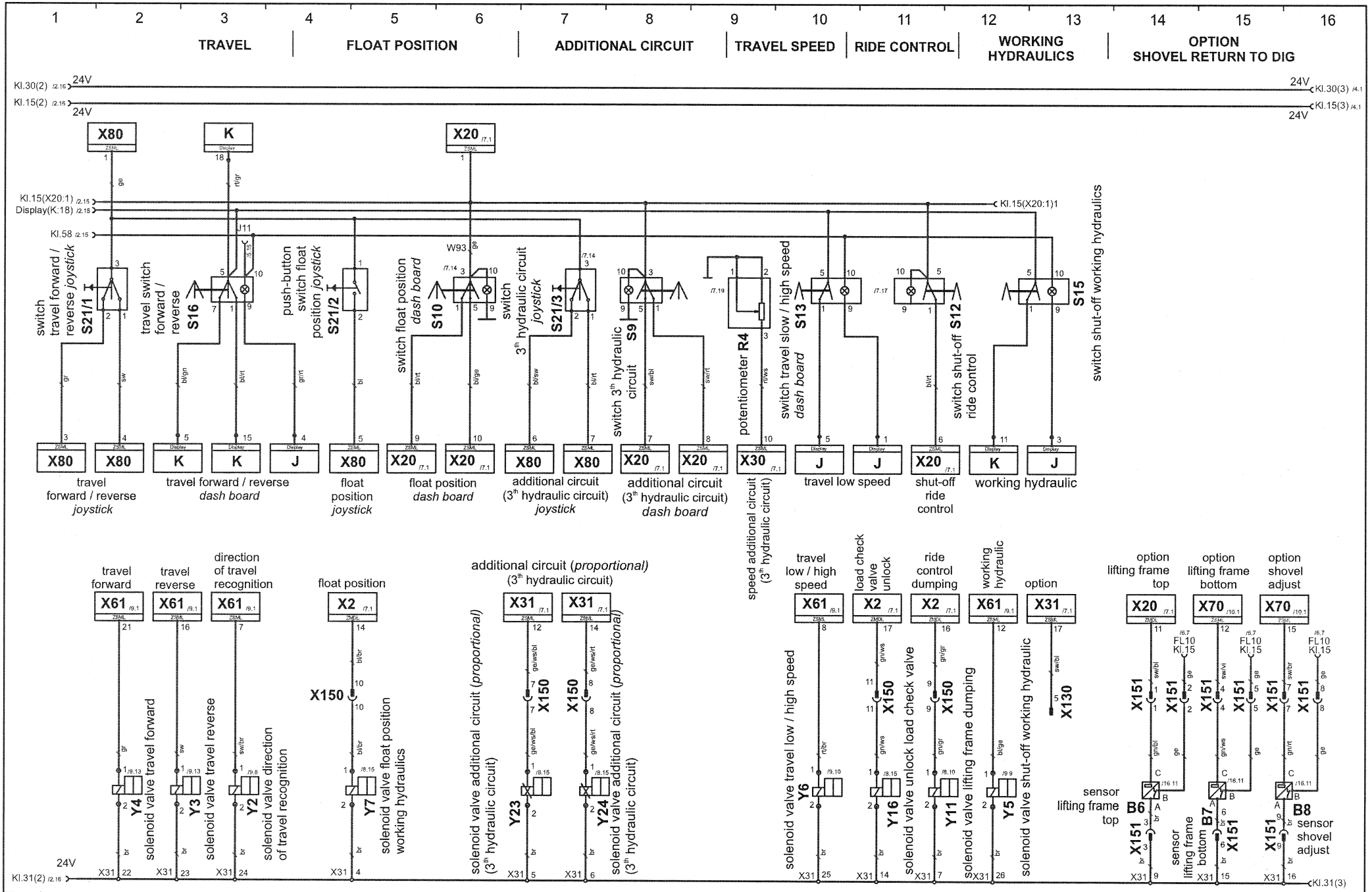
X2	connector *additional control modul*	X61	connector *central control modul*	XR10	connector *travel pedal / rear chassis*
X20	connector *central control modul*	X70	connector *central control modul*	W	connector *display*
X30	connector *central control modul*	X160	connector *switch console / rear chassis*		
X60	connector *central control modul*	X161	connector *switch console / rear chassis*		

Typ Model Type Tipo	SKL260	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0260/0100	Datum Edition Date Fecha 01.2006
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 1/6	Blatt Page Feuille Página 7.30.01



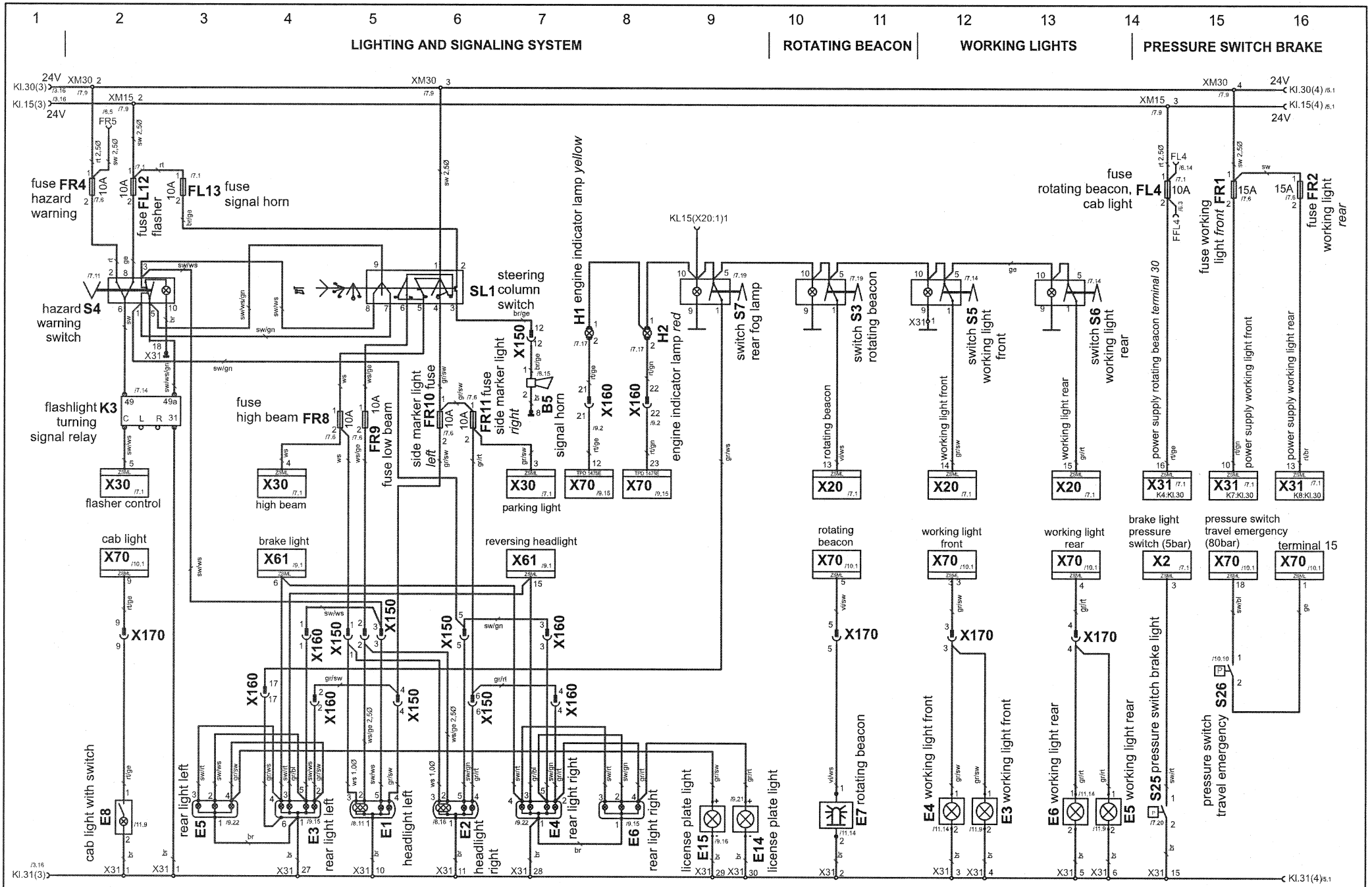
X1	connector additional control module	**X30**	connector switch console	**X150**	connector switch console / front chassis
X2	connector additional control module	**X31**	connector switch console	**X160**	connector switch console / rear chassis
X20	connector central control module	**X61**	connector switch console	**J & K**	connector display

Typ Model Type Tipo	**SKL260**	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no.	***0260/0100***	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos**	Blatt Page Feuille Página	**2/6**	Blatt Page Feuille Página	**7.30.02**



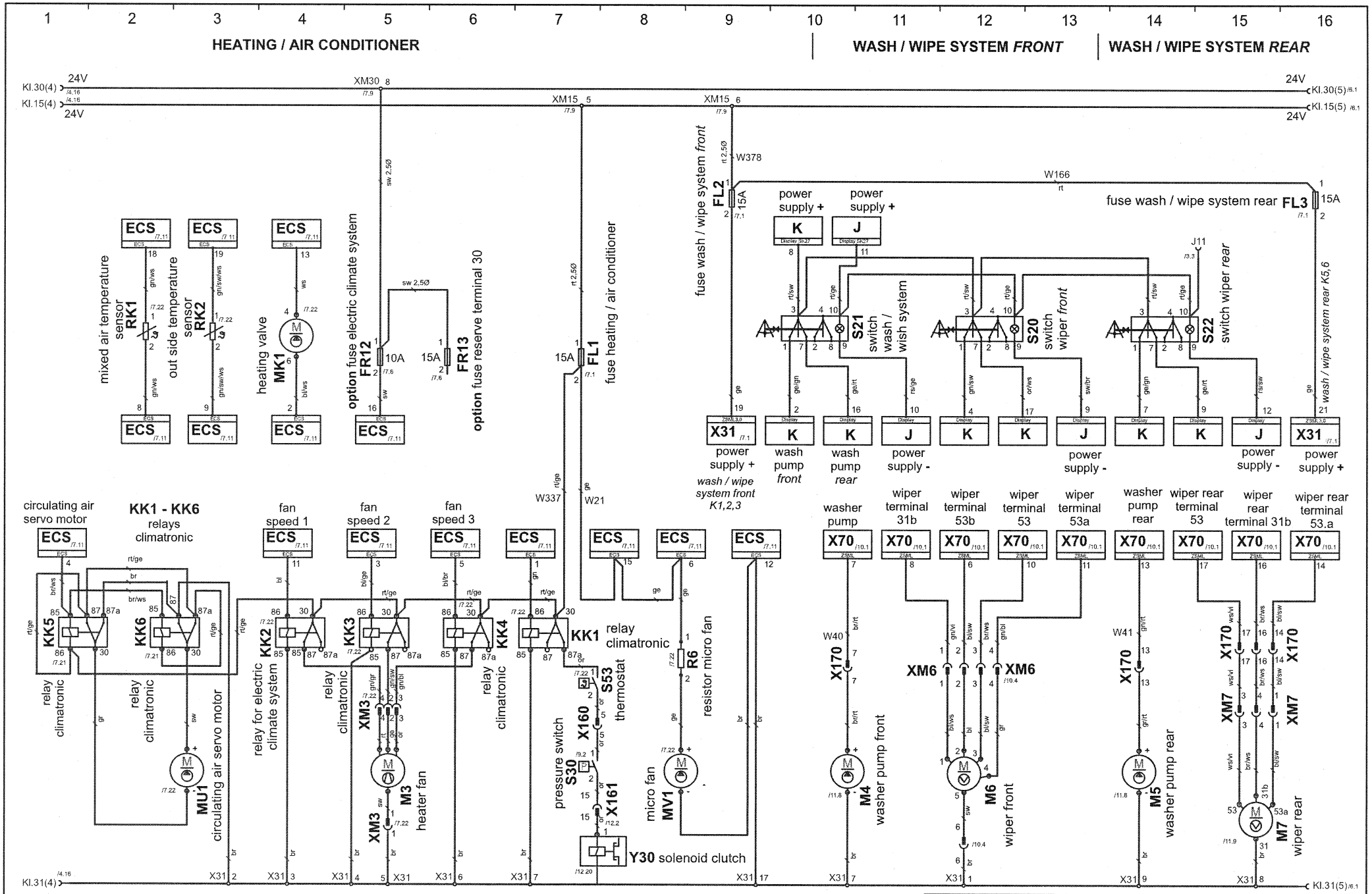
X2	connector additional control modul	X61	connector central control modul	X150	connector switch console / rear chassis
X20	connector central control modul	X70	connector central control modul	X151	connector shovel return to dig *operator's cab / lifting frame*
X30	connector central control modul	X80	connector central control modul	K&J	connector display
X31	connector central control modul	X130	connector switch console		

Typ Model Type Tipo	SKL260	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no.	0260/0100	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm circuit électrique Esquemas de los circuitos		Blatt Page Feuille Página	3/6	Blatt Page Feuille Página	7.30.03



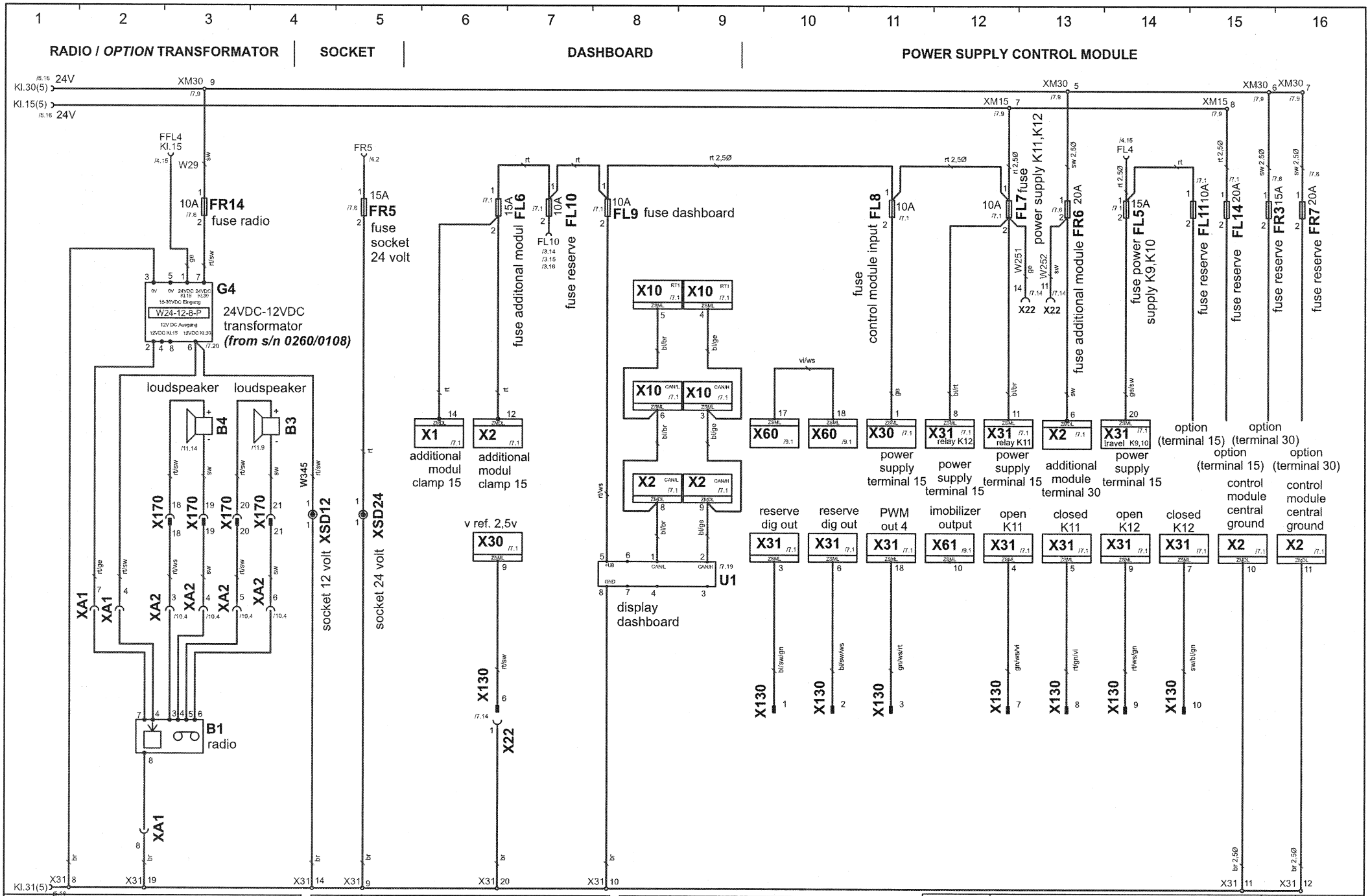
X2	connector additional control modul	X61	connector central control modul	X170	connector operator's cab / floor frame
X20	connector central control modul	X70	connector central control modul		
X30	connector central control modul	X150	connector front chassis / switch console		
X31	connector central control modul	X160	connector rear chassis / switch console		

Typ / Model / Type / Tipo	SKL260	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0260/0100	Datum / Edition / Date / Fecha	01.2006
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 4/6		Blatt / Page / Feuille / Página	7.30.04



X31	connector central control modul	XM3	connector fan	K	connector display
X70	connector central control modul	XM6	connector wiper motor front	XM7	connector wiper motor rear
X160	connector rear chassis	ECS	connector climatronic		
X170	connector operator's cab	J	connector display		

Typ / Model / Type / Tipo	SKL260	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0260/0100	Datum / Edition / Date / Fecha	01.2006
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 5/6		Blatt / Page / Feuille / Página	7.30.05

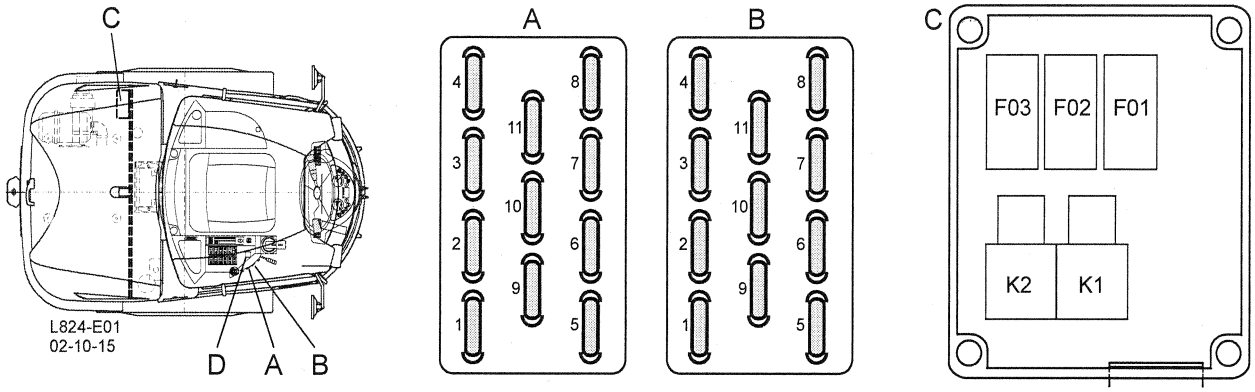


X1	connector additional control modul	X30	connector central control modul	X130	connector switch console	Typ / Model / Type / Tipo	SKL260
X2	connector additional control modul	X31	connector central control modul	X170	connector operator's cab / floor frame	Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos
X10	connector central control modul	X60	connector central control modul	XA1	connector radio connection	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0260/0100
		X61	connector central control modul	XA2	connector radio / floor frame	Blatt / Page / Feuille / Página	6/6

Datum / Edition / Date / Fecha	01.2006
Blatt / Page / Feuille / Página	7.30.06

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Fuse box — Assignment diagram



D = K3 (turn-signal flasher relay) below switch board

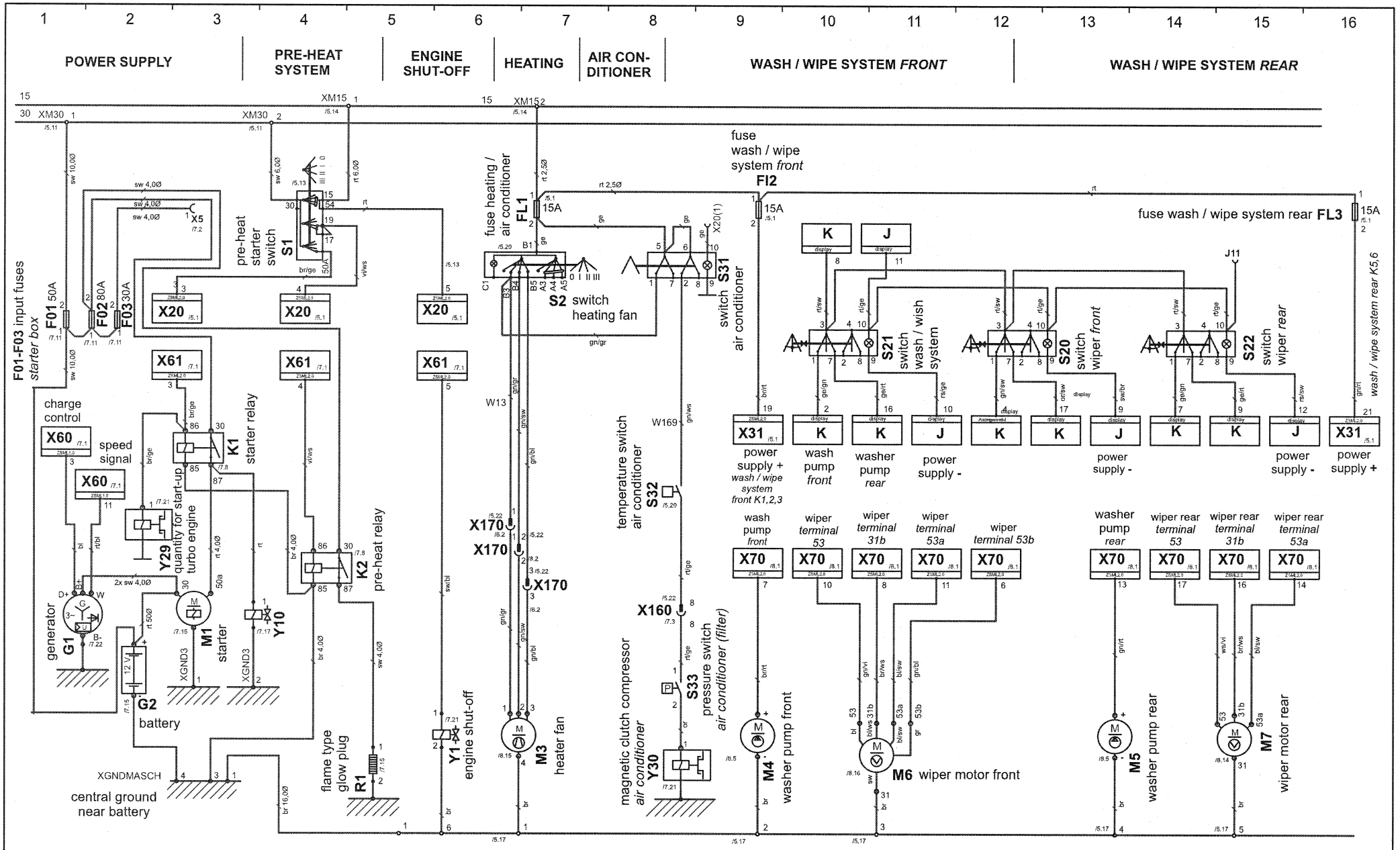
A			B		
Position	**Ampere**	**assigned to**	**Position**	**Ampere**	**assigned to**
F 1	15	Heater fan	F 1	15	Working floodlight, front
F 2	15	Wash/wipe, front	F 2	15	Working floodlight, rear
F 3	15	Wash/wipe, rear	F 3	10	Turn indicator
F 4	10	Rotating beacon; interior light	F 4	10	Hazard warning switch
F 5	15	Travel, forward/reverse	F 5	15	Socket; radio
F 6	10	Reserve	F 6	15	Reserve
F 7	10	swing axle lock	F 7	10	Horn
F 8	10	E-module inputs	F 8	10	High beam
F 9	10	Instruments	F 9	15	Low beam
F 10	10	Radio	F 10	10	Side marker light, left
F 11	10	Proximity switches	F 11	10	Side marker light, right
C / D					
F 01	50	Series fuse	K 1		Start relay
F 02	80	Starting system	K 2		Pre-heat relay
F 03	30	Control module power supply	K 3		Turn-indicator flasher relay

Colors of fuses

10 A	red	15 A	blue	30 A	Rose	50 A	red	80 A	white

Cable and plug colors

bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		



X20	connector central control module
X31	connector central control module
X60	connector central control module
X61	connector central control module

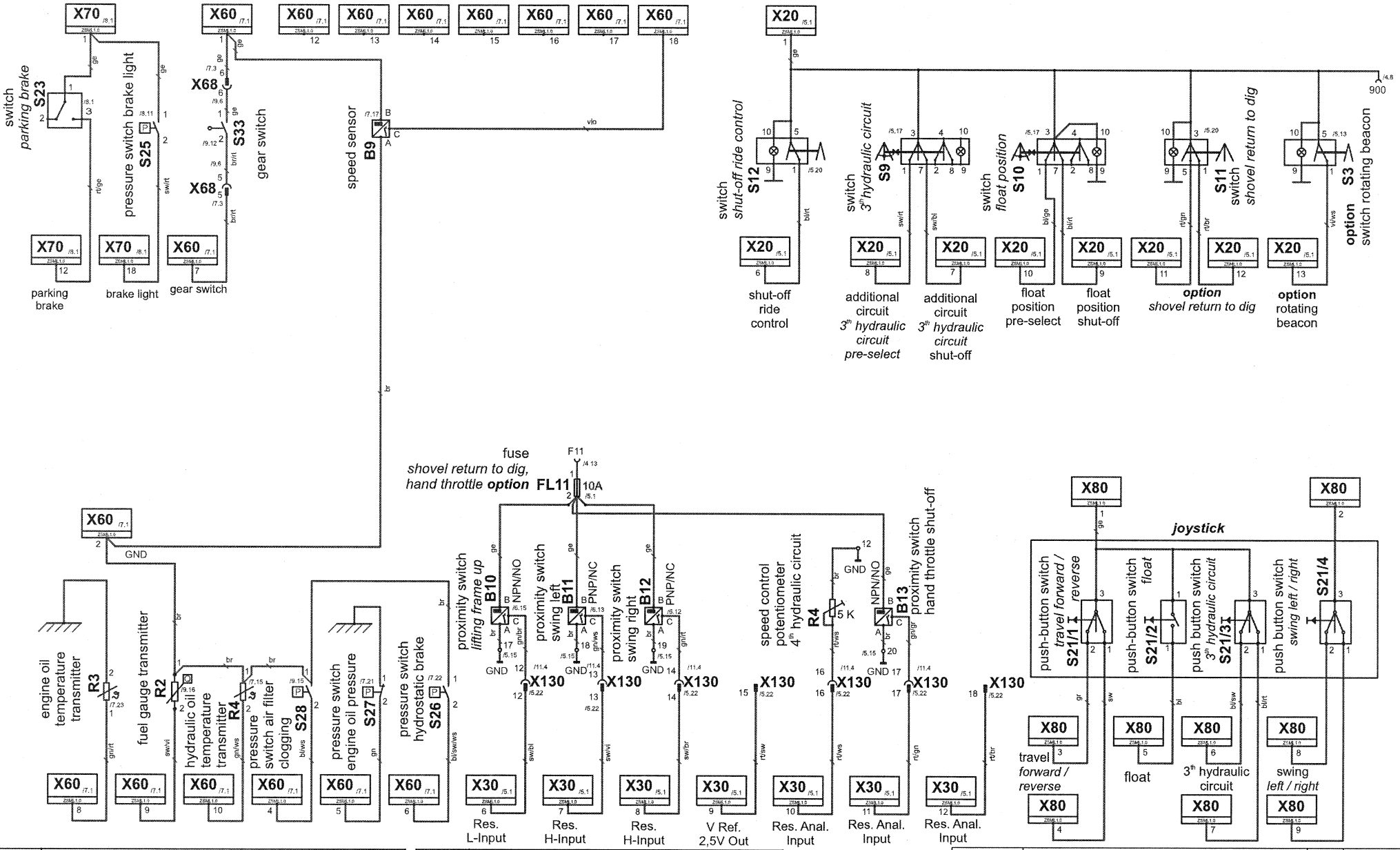
X70	connector central control module
X160	connector switch console
X170	connector operator's cab / floor frame
K	connector display

J	connector display
XMOT	connector rear chassis / engine
F01-F03	input fuses (starter box)

Typ Model Type Tipo	SKS 634	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 0634/0100	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 1/4		Blatt Page Feuille Página	7.37.01

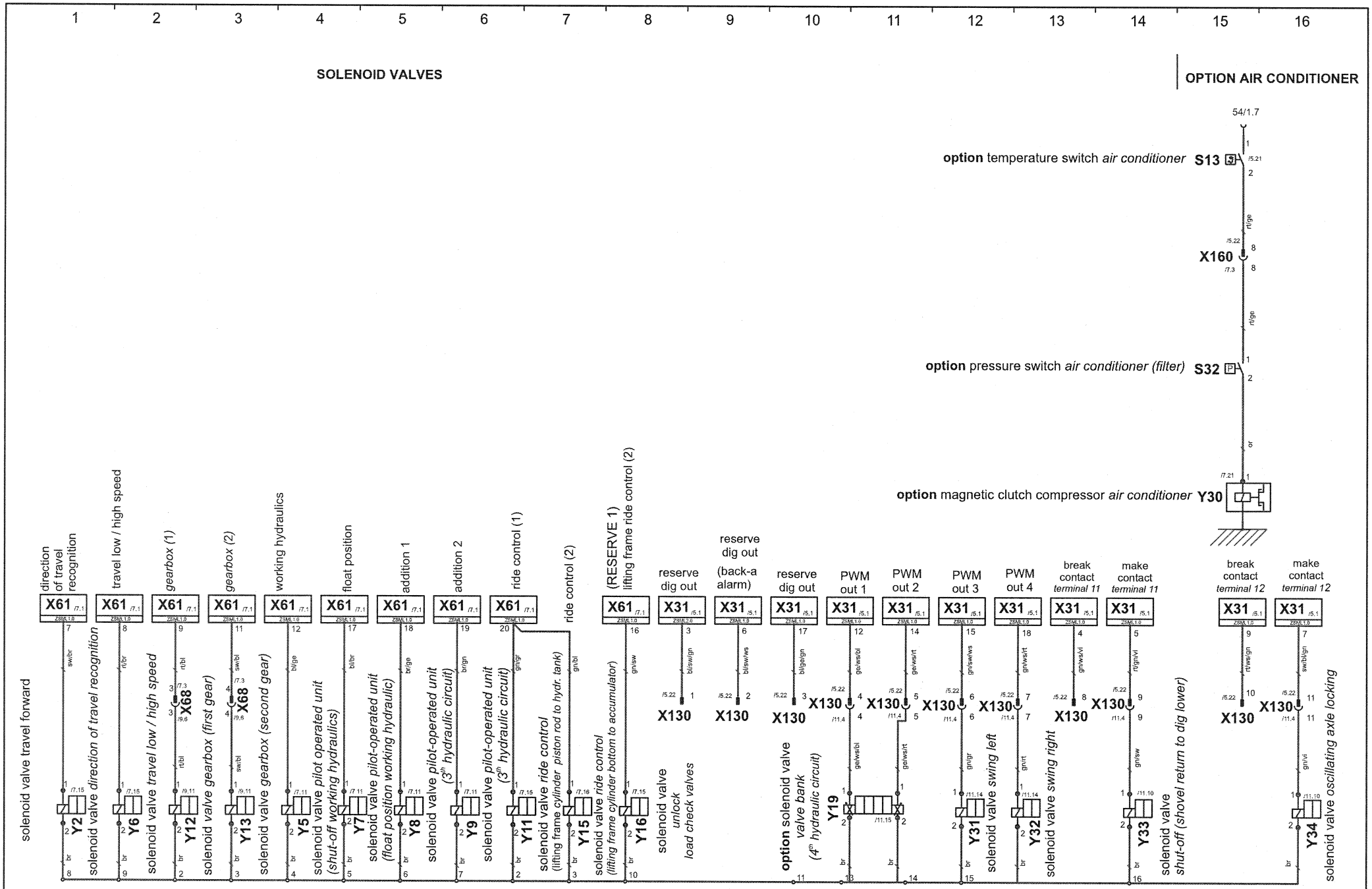
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

INSTRUMENTS, SENSORS, SWITCHES, TRANSMITTER



X20	connector central control module	X130	connector switch console / front chassis
X30	connector central control module		
X60	connector central control module		
X68	connector switch console / rear chassis		

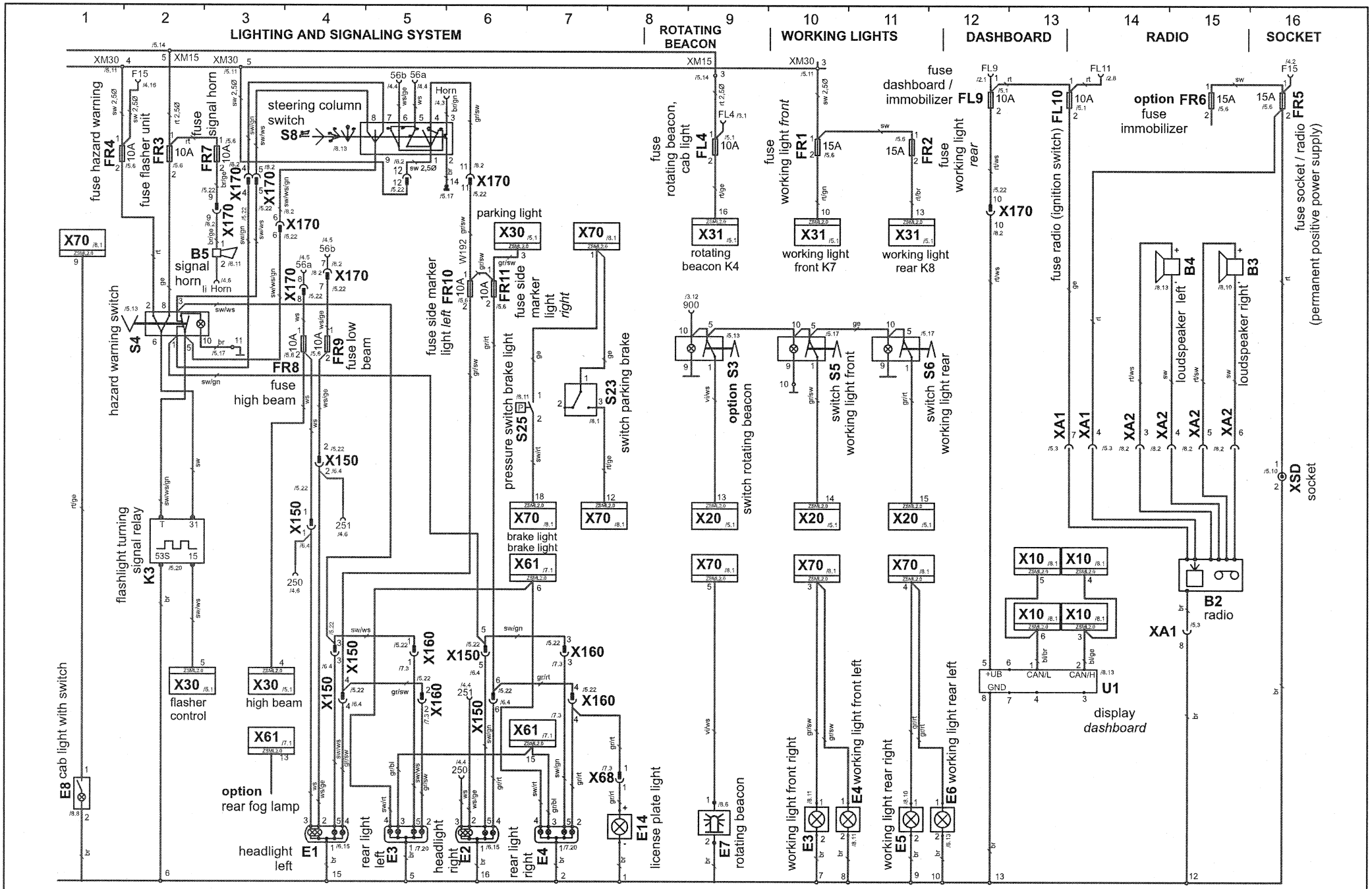
Typ Modell Type Tipo	SKS 634	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 0634/0100	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos		Blatt Page Feuille Página 2/4	Blatt Page Feuille Página	7.37.02



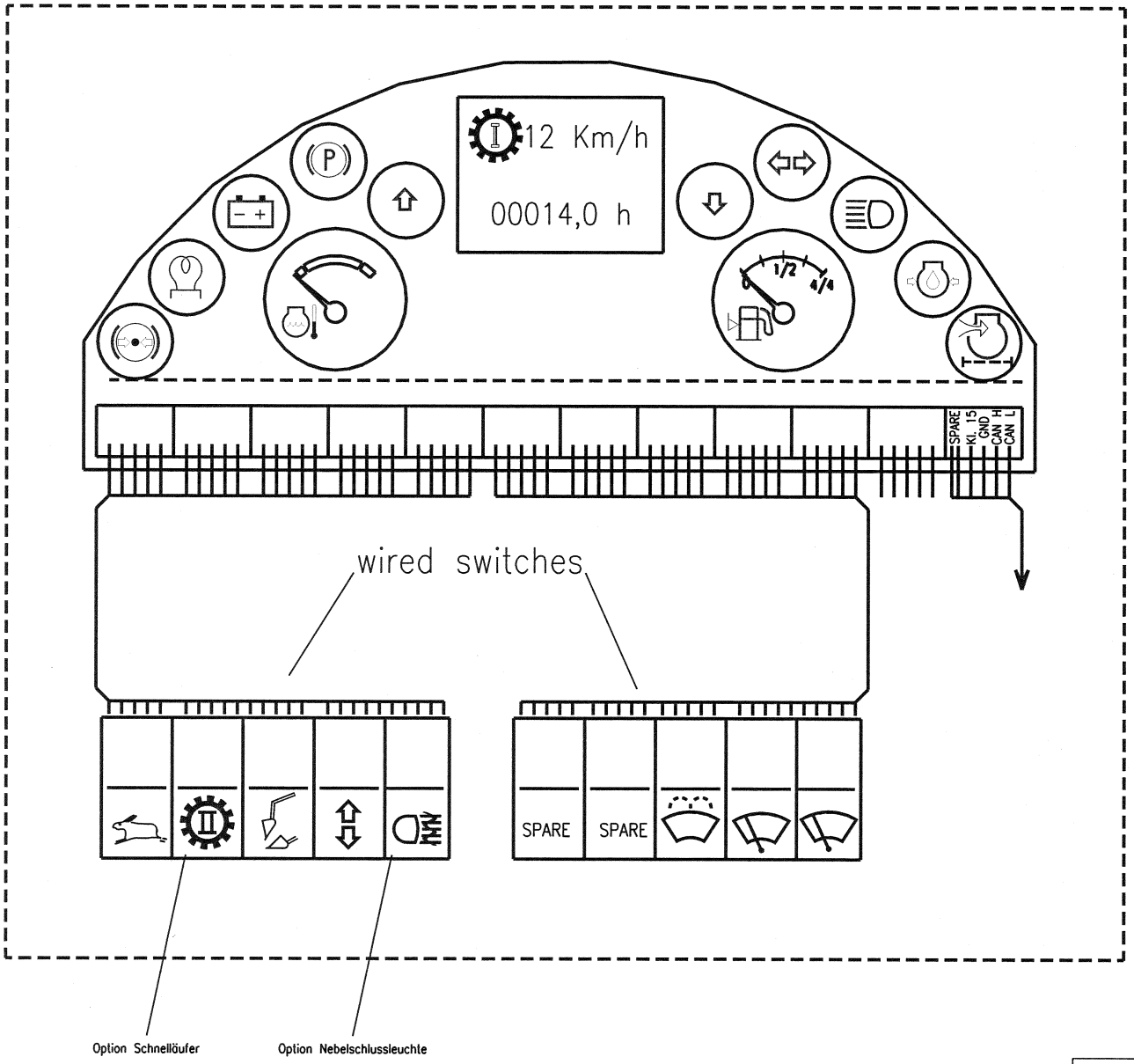
X31	connector central control module
X61	connector central control module

X68	connector 2-stage gearbox / rear chassis
X130	connector switch console / front chassis
X160	connector switch console / rear chassis

Typ Modell Type Tipo	SKS 634	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0634/0100	Datum Edition Date Fecha 01.2006
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 3/4	Blatt Page Feuille Página 7.37.03



X10	connector central control module	X61	connector central control module	X160	connector switch console / rear chassis	Typ / Modell / Type / Tipo	SKS 634
X20	connector central control module	X68	connector fast travel version	X170	connector operator's cab / switch console	Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos
X30	connector central control module	X70	connector central control module	XA1	connector radio connection	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 0634/0100
X31	connector central control module	X150	connector switch console / front chassis	XA2	connector loudspeaker connection	Blatt / Page / Feuille / Página	4/4
						Datum / Edition / Date / Fecha	01.2006
						Blatt / Page / Feuille / Página	7.37.04



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00014,0 h

12 Km/h

00014,0 h

21 Km/h

00014,0 h

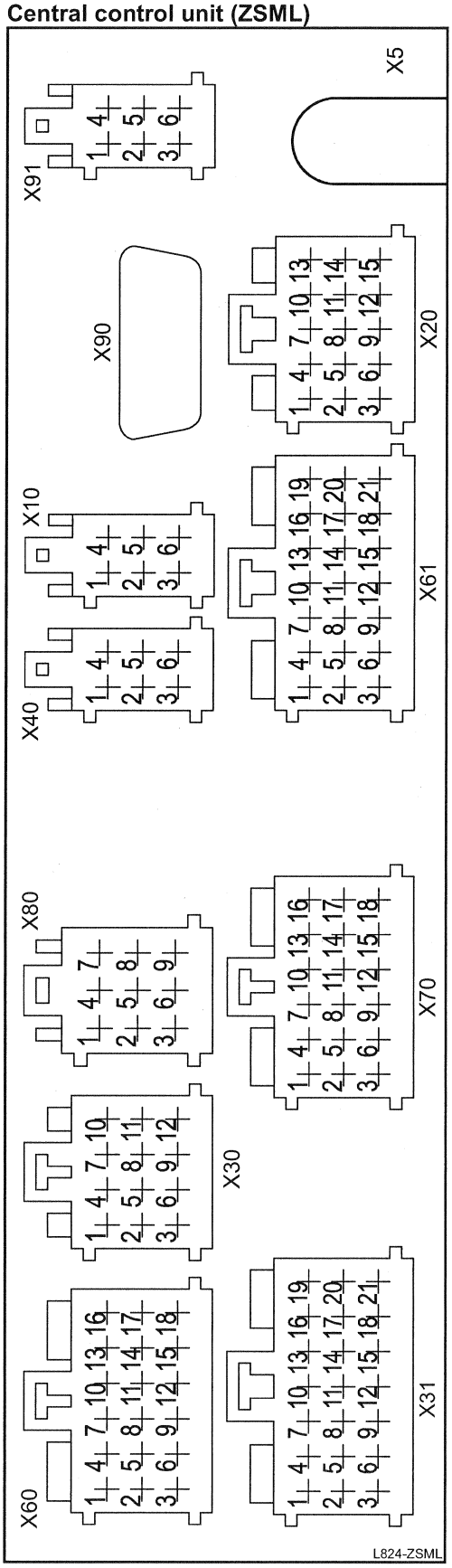
00 Km/h

00014,0 h

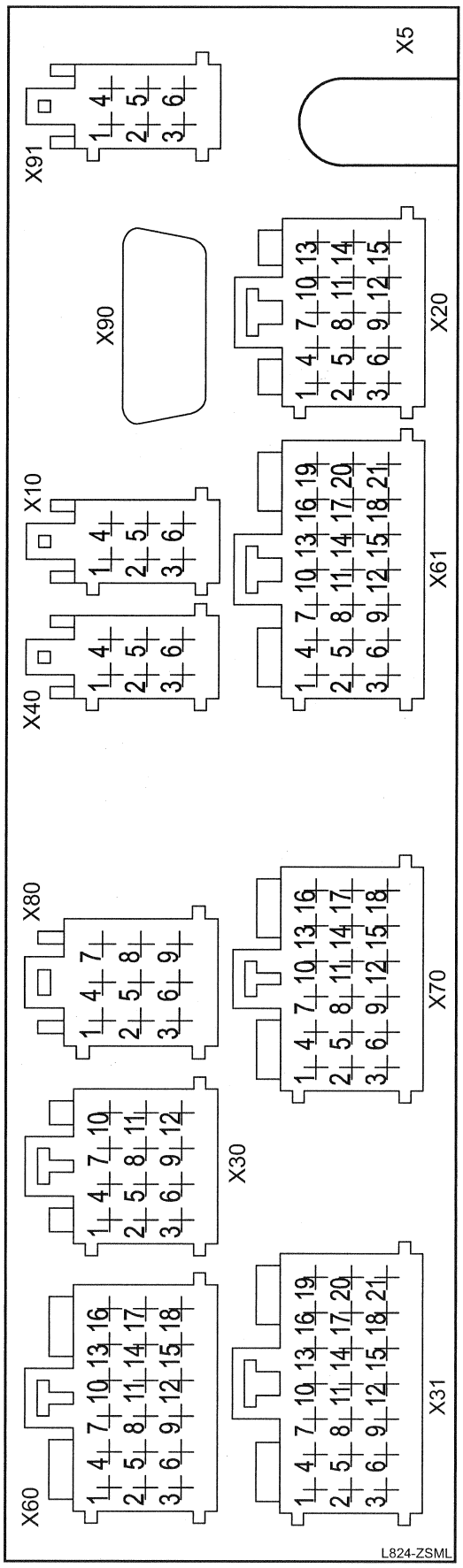
12 Km/h

Typ Model Type Tipo	SKS 634	Elektrisches System Electrical system Circuit électrique Sistema elèctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no.	634/0100	Datum Edition Date Fecha	01.2005
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos				Blatt Page Feuille Página	7.37.05

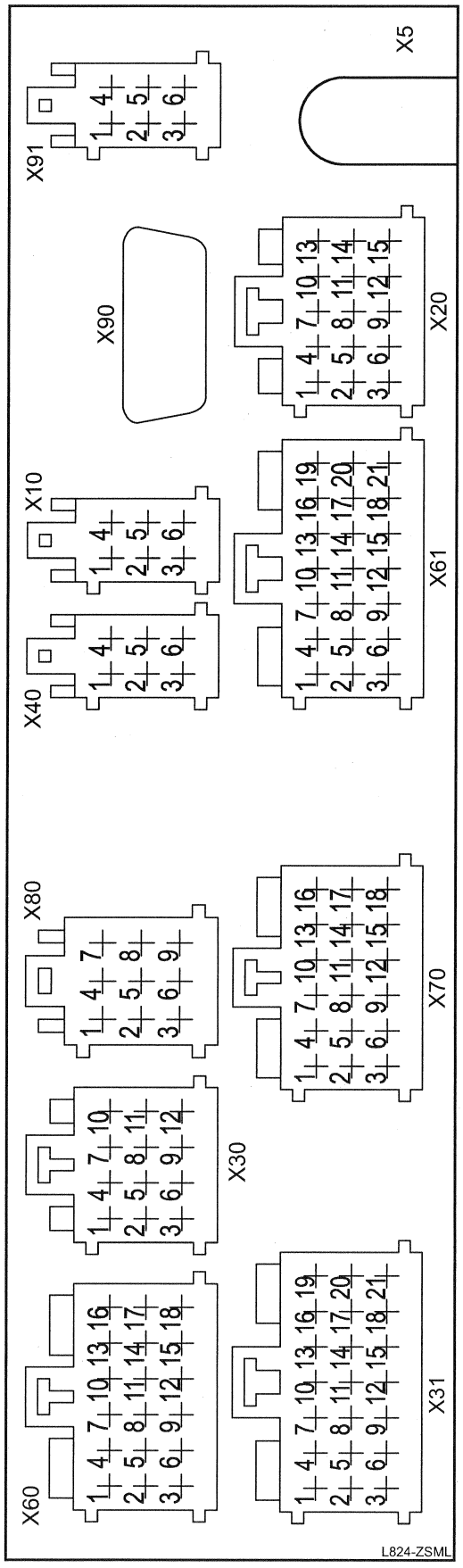
Central control unit (ZSML)



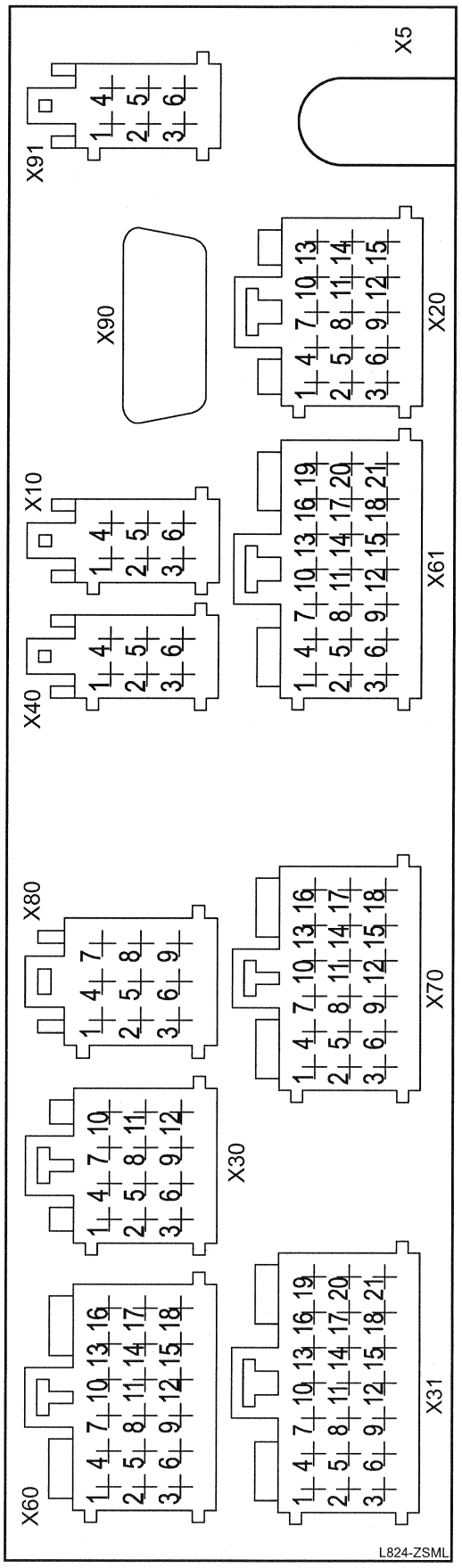
X60	***Signal inputs "engine monitoring"***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	Charge control generator D+
4	Air filter maintenance switch signal
5	Oil pressure switch signal
6	Hydrostatic brake pressure switch signal
7	Transmission switch signal
8	Engine temperature sensor signal
9	Tank sensor signal
10	Hydraulic oil temperature sensor signal
11	Speed signal generator "W" signal
12	--
13	--
13	--
15	--
16	--
17	--
18	Speedometer signal sensor
X30	***Signal inputs "Lighting"***
1	Power supply Terminal 15 output
2	--
3	Parking light Terminal 15 input
4	High beam signal
5	Direction indicator control signal
6	Lifting frame high
7	Slew left
8	Slew right
9	Reference voltage 2.5V
10	Spare - Analog
11	Option
12	Spare - Analog
X80	***Coordinate lever***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	Travel forward signal
4	Travel reverse signal
5	Float position signal
6	Additional control circuit signal
7	Additional control circuit signal
8	Slew left signal
9	Slew right signal



X40	***CAN-BUS (Option)***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	CAN/HI
4	R1
5	R2
6	CAN/LO
X10	***Control panel***
1	--
2	Central ground Terminal 31
3	CAN/HI
4	--
5	--
6	CAN/LO
X90	***Programming connection***
X91	***Immobilizer (Option)***
1	Power supply Terminal 15 output
2	Central ground Terminal 31
3	***TXD***
4	RXD
5	CTS
6	RTS



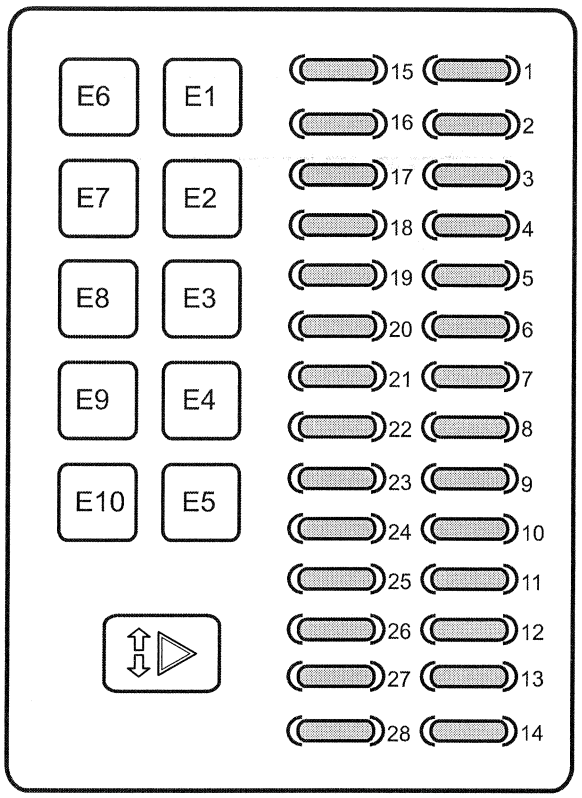
X31	Control unit power supply, working floodlights, rotating beacon, wiper
1	--
2	-
3	Spare digital output
4	Relay K11:87a N.C. contact output
5	Cut off lifting frame lower
6	Spare digital output
7	Swing axle lock
8	Relay K12 power supply Terminal 15 input
9	Relay K12:87a N.C. contact Output
10	Power supply Terminal 15 input working floodlight front
11	Relay K11 power supply Terminal 15 input
12	Option 4th control circuit proportional regulated output signal 1
13	Power supply Terminal 15 input working floodlight rear
14	Option 4th control circuit proportional regulated output signal 2
15	Slew left (PWM) output
16	Power supply Terminal 30 input rotating beacon
17	Spare Digital output
18	Slew right (PWM) output
19	Power supply Terminal 15 input wash/ wipe rear
20	Power supply Terminal 15 input travel
21	Power supply Terminal 15 input wash/ wipe rear
X70	***Working floodlights , Wipers***
1	Brake light switch Terminal 15 output
2	--
3	Working floodlight front output
4	Working floodlight rear output
5	Rotating beacon output
6	Wiper Terminal 53b 2nd setting output
7	Washer pump front output
8	Front wiper Terminal 31b output
9	Interior lamp Terminal 30 output
10	Front wiper Terminal 53 output
11	Front wiper Terminal 53a output
12	Parking brake switch signal input
13	Rear washer pump output
14	Rear wiper Terminal 53a output
15	--
16	Rear wiper Terminal 31b output
17	Rear wiper Terminal output
18	Brake light switch signal input



X61	*X61* new from 634/0118	*Rear carriage*
1	1	--
2	2	--
3	3	Starting Terminal 50a output
4	4	Pre-heat output
5	5	Engine shutdown output
6	6	Brake light output
7	7	Travel, direction recognition output
8	8	Travel, FAST-SLOW output
9	9	Transmission 1 output
10	21	Travel forward output
11	11	Transmission 2 output
12	12	Working hydraulics output
13	16	Travel reverse output
14	15	Back-up lamp output
15	10	Travel motion alarm output
16	14	Ride control system 3 output
17	17	Float position output
18	18	Additional control circuit output
19	19	Additional control circuit output
20	20	Ride control system 1,2 output
21	13	Fog lamp Output
X20		***Panel, right***
1		Power supply Terminal 15 output
2		--
3		Starting Terminal 50a signal
4		Pre-heat signal
5		Engine shutdown signal
6		Ride control system signal
7		Additional control circuit signal
8		Additional control circuit signal
9		Float position 1 signal
10		Float position 2 signal
11		Option return to dig signal 1
12		Option return to dig signal 2
13		Rotating beacon signal
14		Working floodlight front signal
15		Working floodlight rear Signal
X5		***Power supply***

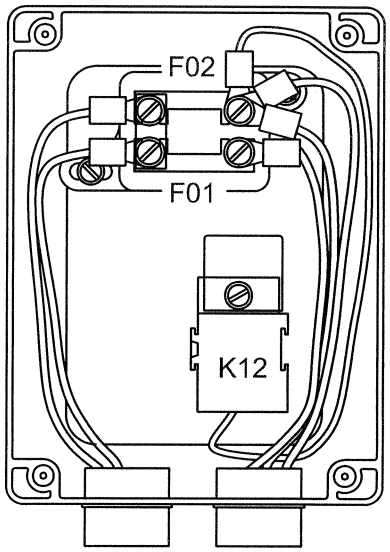
-

1



H22E01

2



1 = fuse and relay box: armrest right rear

2 = starter box: engine compartment bulkhead

Item	Relay	Function
⇕▷	K 0	flasher transmitter
E 1	K 1	working floodlights
E 2	K 2	starting safety
E 3	K 3	axle lock
E 4	K 4	parking brake
E 5	K 5	safeguard - entry steps
E 6	K 6	safeguard - entry step pilot control
E 7	K 7	parking brake
E 8	K 8	pedal - travel
E 9	-	not used
E 10	-	not used
	K 11	pre-heating time control unit (engine compartment bulkhead - near generator)
	K 12	start-up

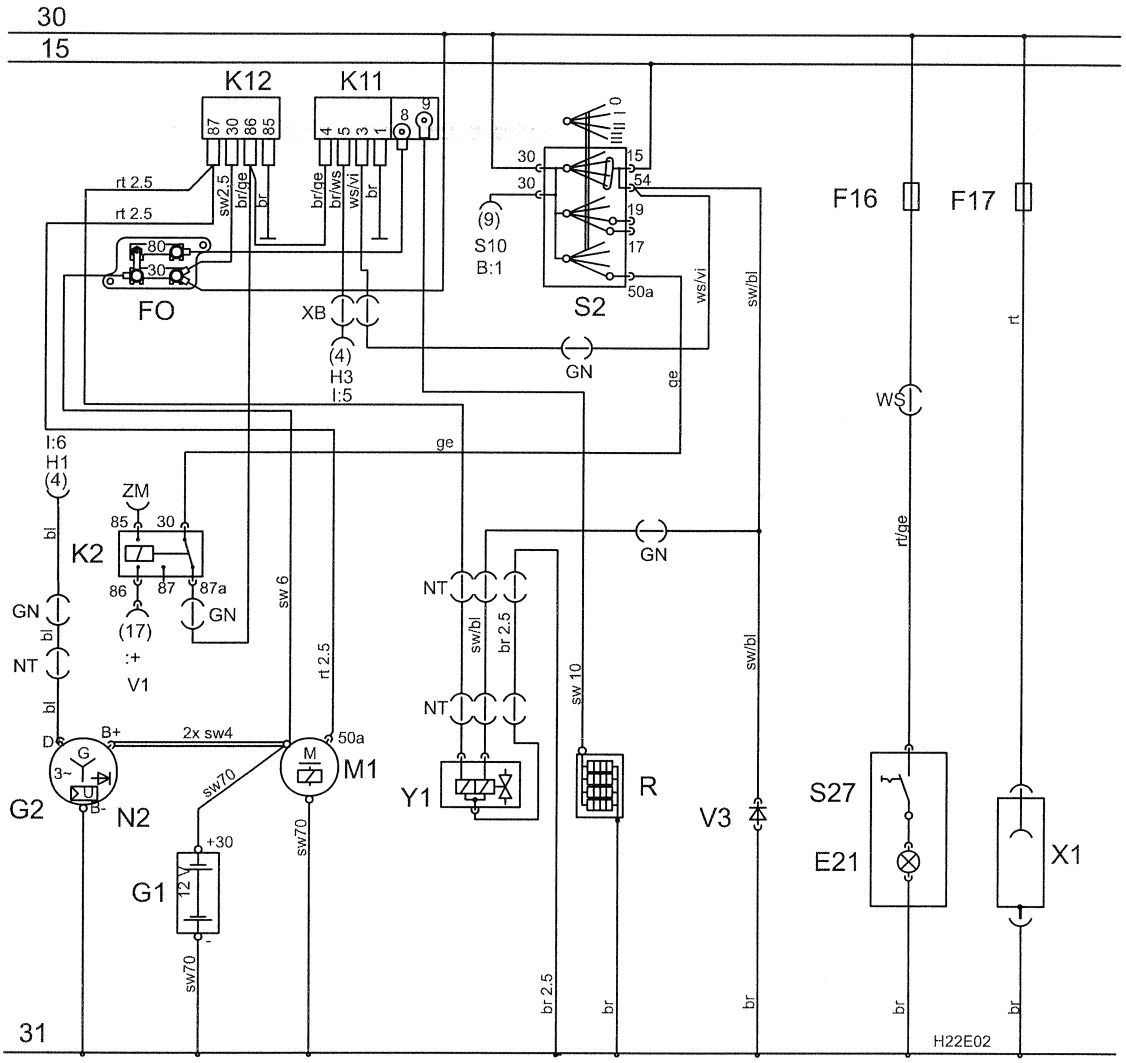
SCHAEFF	Typ/Model/Type **HML 22 (from serial no. 131/0512)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Fuse and relay box, assignment diagram**	Blatt/Page/Feuille **7.49.01**

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Wiper switch	F 15	10	Hazard warning switch Check module Immobilizer
F 2	10	Working hydraulics cut-off	F 16	10	Rotating beacon Internal light
F 3	10	Fast/ slow	F 17	20	Socket, radio
F 4	10	Parking brake relay Travel	F 18	15	Lower beam
F 5	10	Front dozer blade	F 19	15	Upper beam Upper beam indicator lamp
F 6	10	Horn, headlamp flasher	F 20	10	Left side marker lamp Front/rear working floodlights
F 7	15	Heater fan	F 21	10	Right side marker lamp
F 8	10	Oscillating axle lock	F 22	10	Rear working floodlight
F 9	10	Level sensor power supply, shut-off overload warning device	F 23	10	Front working floodlight
F 10	10	Excavator brake; brake light parking brake, overload warning device proximity switch	F 24		---
F 11	10	Entry step proximity switch Steering proximity switch	F 25	10	Diesel cut-off valve
F 12	10	Rock breaker Radio	F 26	20	Electrical tank refueling pump
F 13	10	Check module Power supply check module	F 27		--
F 14		--	F 28	Diode 3A	Electrical engine cut-off Immobilizer
F 01	80	Pre-heat/ starter switch	F 02	50	Start-up

Cable and plug colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

1. Power supply	2. Pre-heater starting system	3. Interior light, socket

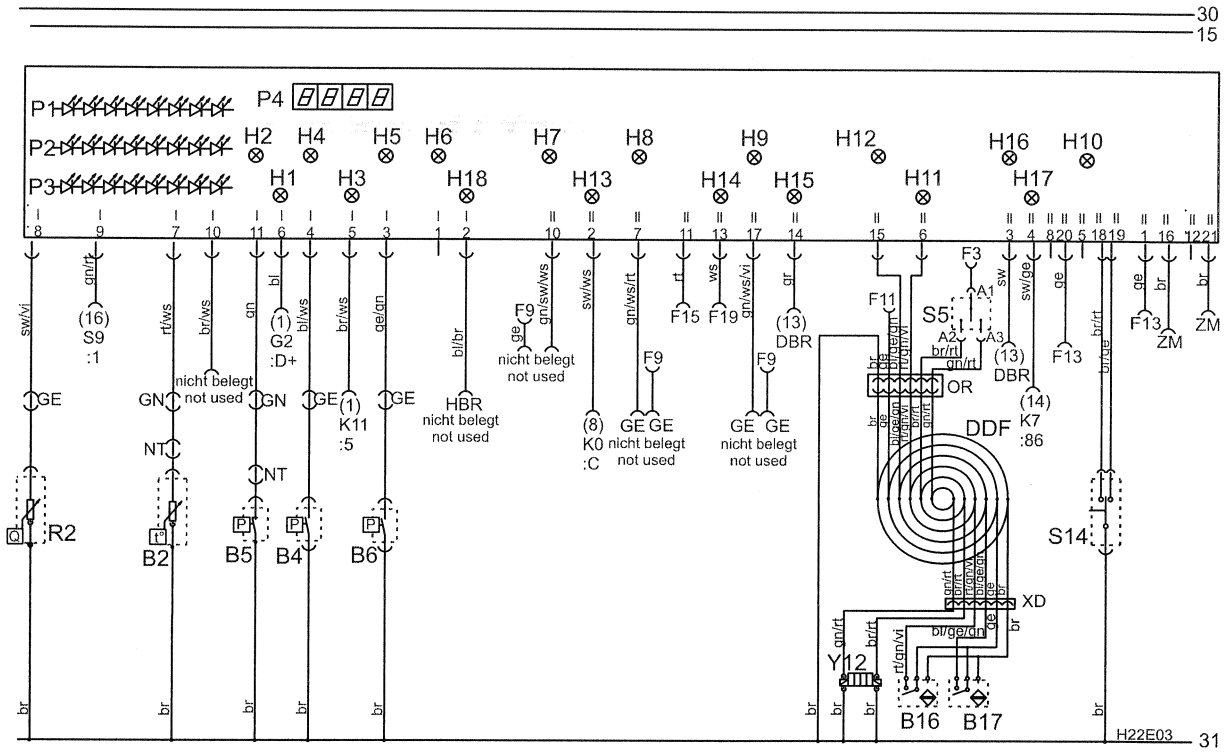


Section Qty.	Desig-nation	Device
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	N2	Generator regulator
2	FO	Blade-type fuses 30/80A
2		***Pre-heater starting system***
1	S2	Pre-heat/ starter switch
1	V3	Blocking diode
1	K2	Starting safeguard relay
1	K12	Starting relay 12V 70A

Section Qty.	Desig-nation	Device
1	M1	Starter motor (starter)
1	Y1	Electrical engine cut-off
1	K11	Pre-heating time control unit
1	R	Glow plugs
3		***Interior light***
1	F16	Fuse
1	S27	Interior light switch
1	E21	Interior light
1	F17	Fuse
1	X1	Socket

SCHAEFF	Typ/Model/Type **HML 22 (from serial no. 131/0512)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.49.02**

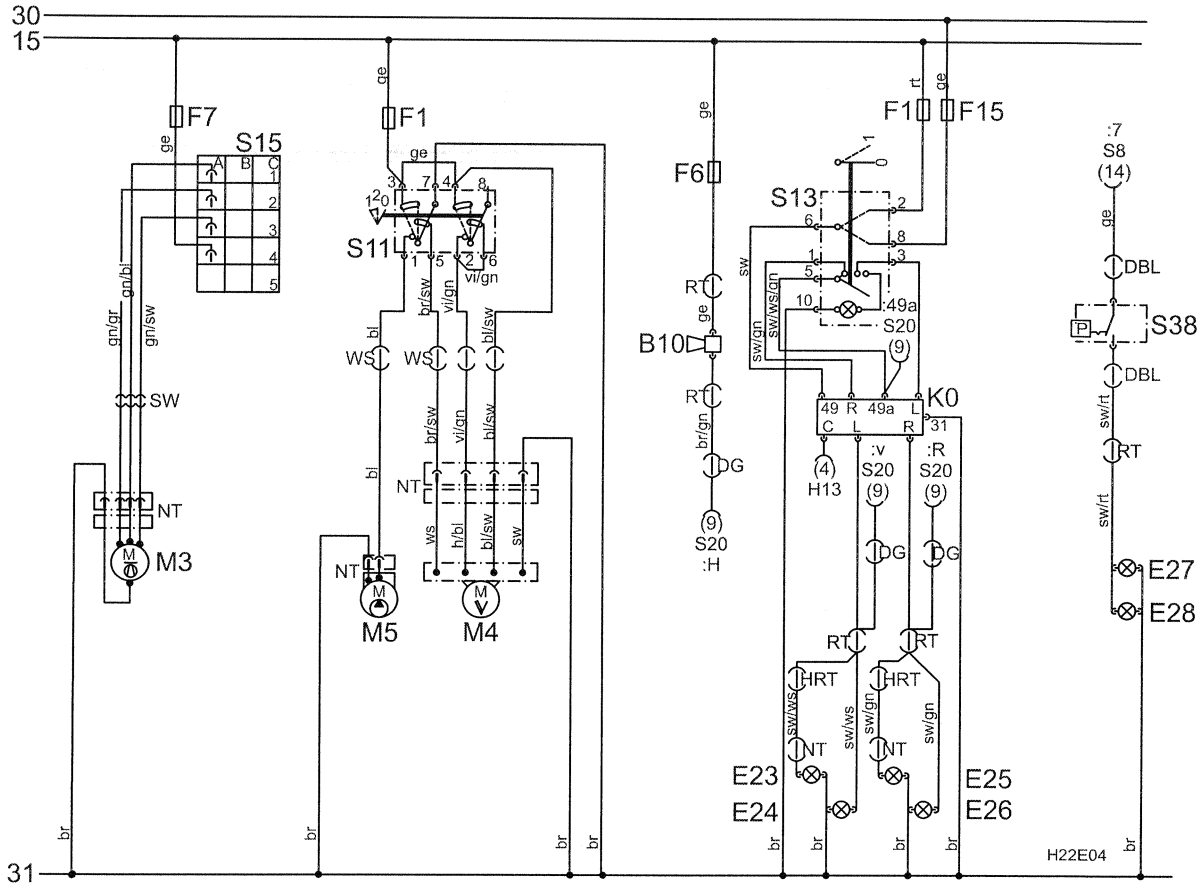
4. Display units



Section Qty.	Desig-nation	Device
4		***Display units***
1	P1	Fuel gauge
1	R2	Fuel gauge sensor
1	P2	Engine coolant
1	P3	Overload warning device
1	B2	Coolant temperature sensor
1	P4	Operating hour meter, trip recorder, watch
1	H2	Engine oil pressure lamp
1	B5	Engine oil pressure switch
1	H1	Battery charge indicator lamp
1	H4	Air filter indicator
1	B4	Air filter clogging
1	H3	Pre-heating indicator
1	H5	Hydraulic filter clogging indicator
1	B6	Hydraulic filter clogging sensor
1	H6	unassigned
1	H18	unassigned
1	H7	unassigned

Section Qty.	Desig-nation	Device
1	H13	Direction indicator
1	H8	unassigned
1	H14	Upper beam indicator
1	H9	unassigned
1	H15	Travel, forward
1	H11	Front axle steering lock
1	H12	Rear axle steering lock
1	DDF	Rotary transmission
1	B16	Sensor for front axle steering lock
1	B17	Sensor for rear axle steering lock
1	S5	Multi-function switch
1	Y12	4-wheel steering valve
1	H16	Travel in reverse
1	H17	Parking brake
1	H10	unassigned
1	S14	Display change-over

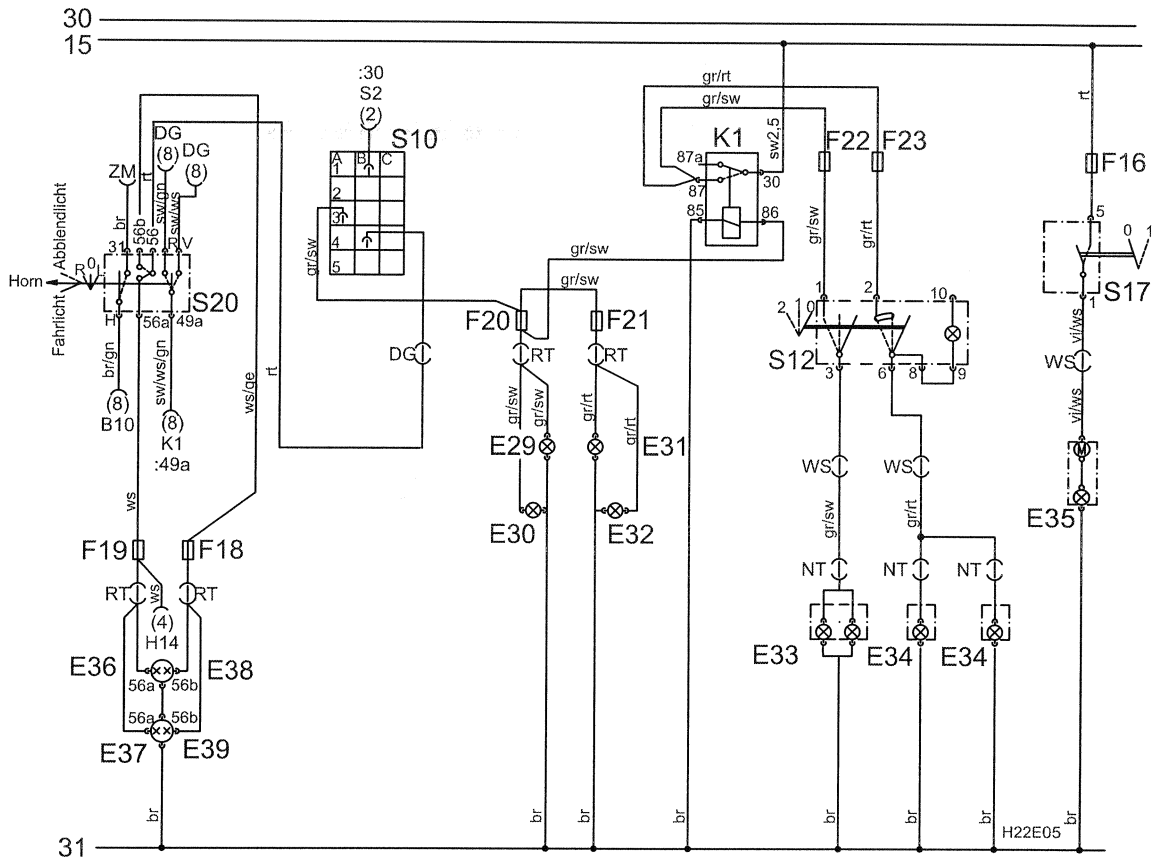
6. Heater fan	7. Wash/ wipe system	8. Signaling system



Section Qty	Desig-nation	Device
6		***Heater fan***
1	F7	Fuse
1	S15	Switch for heater fan
1	M3	Heater fan
7		***Wash/wipe system***
1	F1	Fuse
1	S11	Wiper switch
1	M4	Wiper motor
1	M5	Washer pump

Section Qty.	Desig-nation	Device
8		***Signaling system***
1	F6	Fuse
1	B10	Horn
1	F1	Fuse
1	F15	Fuse
1	S13	Hazard warning switch
1	K0	Directional indicator
1	E23	Flashlight turn signal, front left
1	E24	Flashlight turn signal, rear left
1	E25	Flashlight turn signal, front right
1	E26	Flashlight turn signal, rear right
1	S38	Brake lamp switch
1	E27	Brake lamp, left
1	E28	Brake lamp, right

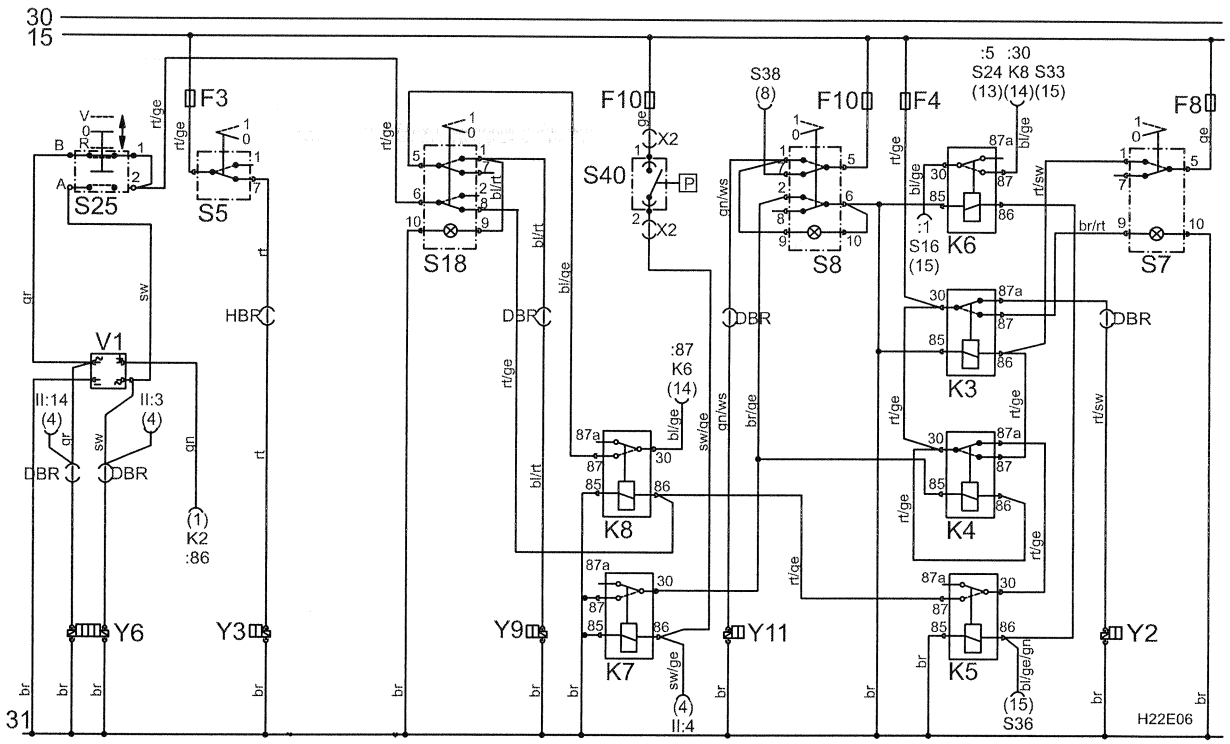
9. Lighting system	10. Working floodlights, rotating beacon



Section Qty	Desig-nation	Device
9		**Lighting system**
1	S20	Turning indicator switch
1	F19	Fuse
1	E36	Upper beam, left
1	E37	Upper beam, right
1	F18	Fuse
1	E38	Lower beam, left
1	E39	Lower beam, right
1	S10	Light switch
1	F20	Fuse
1	E29	Side marker light, front, left
1	E30	Side marker light, rear, left
1	F21	Fuse
1	E31	Side marker light, front, right
1	E32	Side marker light, rear, right

Section Qty.	Desig-nation	Device
10		**Working floodlights**
1	K 1	Working floodlight relay, front/ rear
1	F22	Fuse
1	F23	Fuse
1	S12	Working floodlight switch
1	E33	Working floodlight, rear
1	E34	Working floodlight, front
1	F16	Fuse
1	S17	Switch for rotating beacon
1	E 35	Rotating beacon

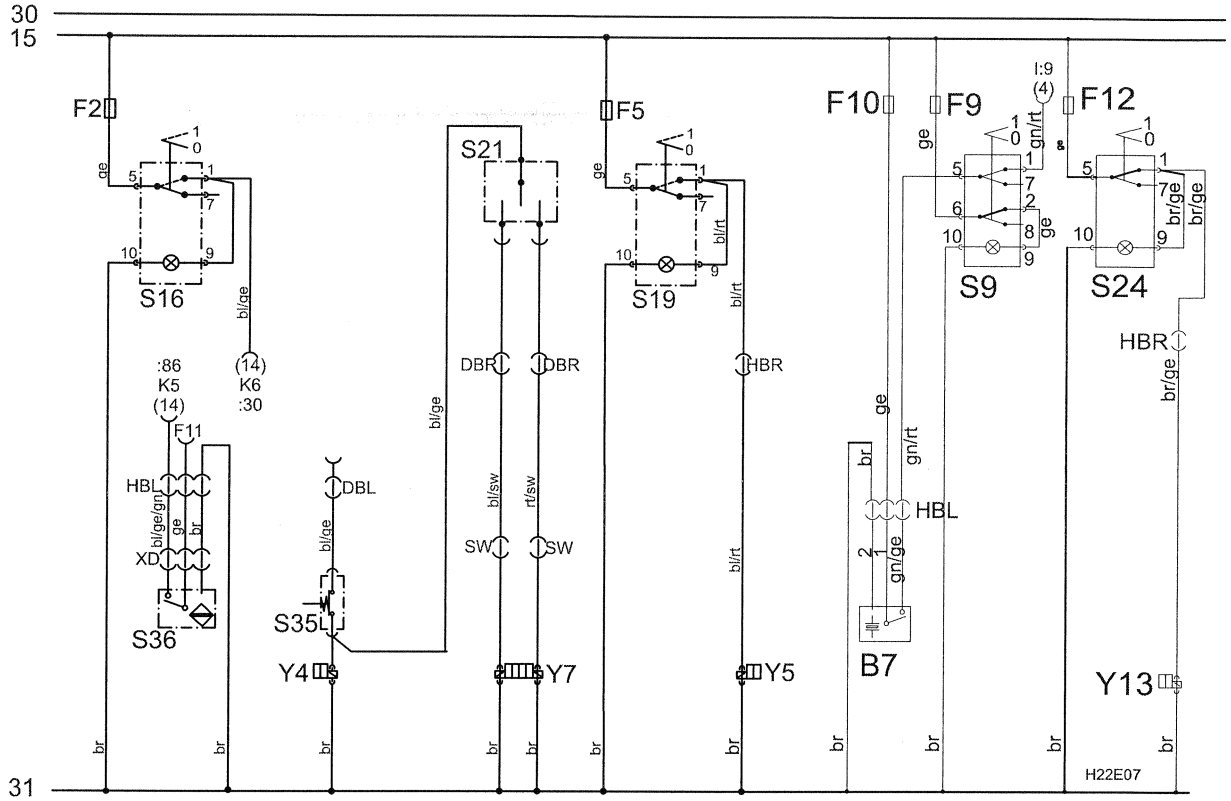
13. Travel	14. Brake



Section Qty	Desig-nation	Device
13		***Travel***
1	V1	Bridge-connected rectifier
1	Y6	Valve for travel, forward/ reverse
1	S25	Switch for forward/ reverse travel
1	S5	Fast/ slow switch
1	Y3	Fast/ slow valve
1	F3	Fuse
1	S18	Switch for accelerator pedal
1	Y9	Valve for accelerator pedal
14		***Brake***
1	F10	Fuse
1	S40	Parking brake push-button
1	K 7	Parking brake relay

Section Qty.	Desig-nation	Device
1	K8	Relay for accelerator pedal
1	S8	Excavator brake switch
1	Y11	Excavator brake valve
1	F4	Fuse
1	K6	Relay for entry steps safety device
1	K3	Relay for oscillating axle lock
1	K 4	Parking brake relay
1	K 5	Relay for travel safety
1	Y2	Valve for oscillating axle lock
1	F8	Fuse
1	S7	Switch for oscillating axle lock

15. Working hydraulics cut-off	16. Options

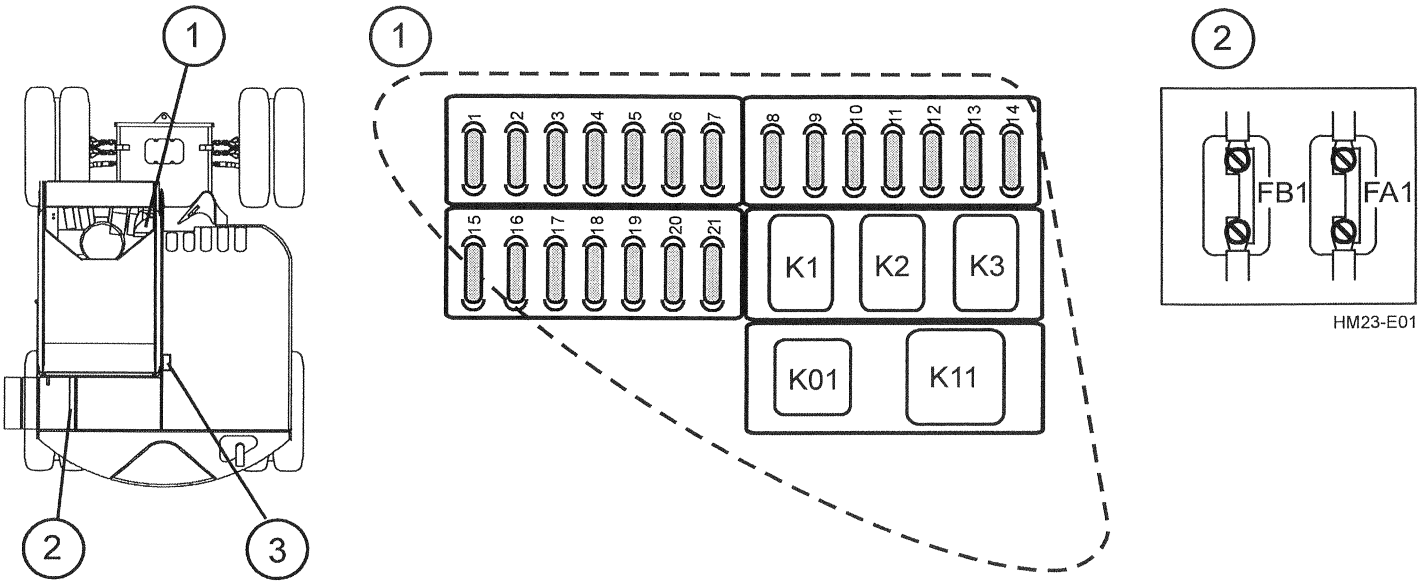


Section Qty	Desig-nation	Device
15		***Working hydraulics cut-off***
1	F2	Fuse
1	S16	Switch for working hydraulics cut-off
1	S36	Switch for entry steps safety device
1	S35	Armrest switch
1	Y4	Working hydraulics valve

Section Qty.	Desig-nation	Device
16		***Options***
1	S21	Switch for coordinate lever, right
1	Y7	Valve for e.g. turning the grab
1	F5	Fuse
1	S19	Front dozer blade switch
1	Y5	Front dozer blade valve
1	F10	Fuse
1	F9	Fuse
1	B7	Overload warning pressure sensor
1	S9	Overload warning cut-off
1	F12	Fuse
1	S24	Switch for rock breaker
1	Y13	Valve for rock breaker

Electrical system

Fuse and relay box - Assignment diagram



1 = Instrument panel 2 = Service ladder 3 = Starter box in engine compartment

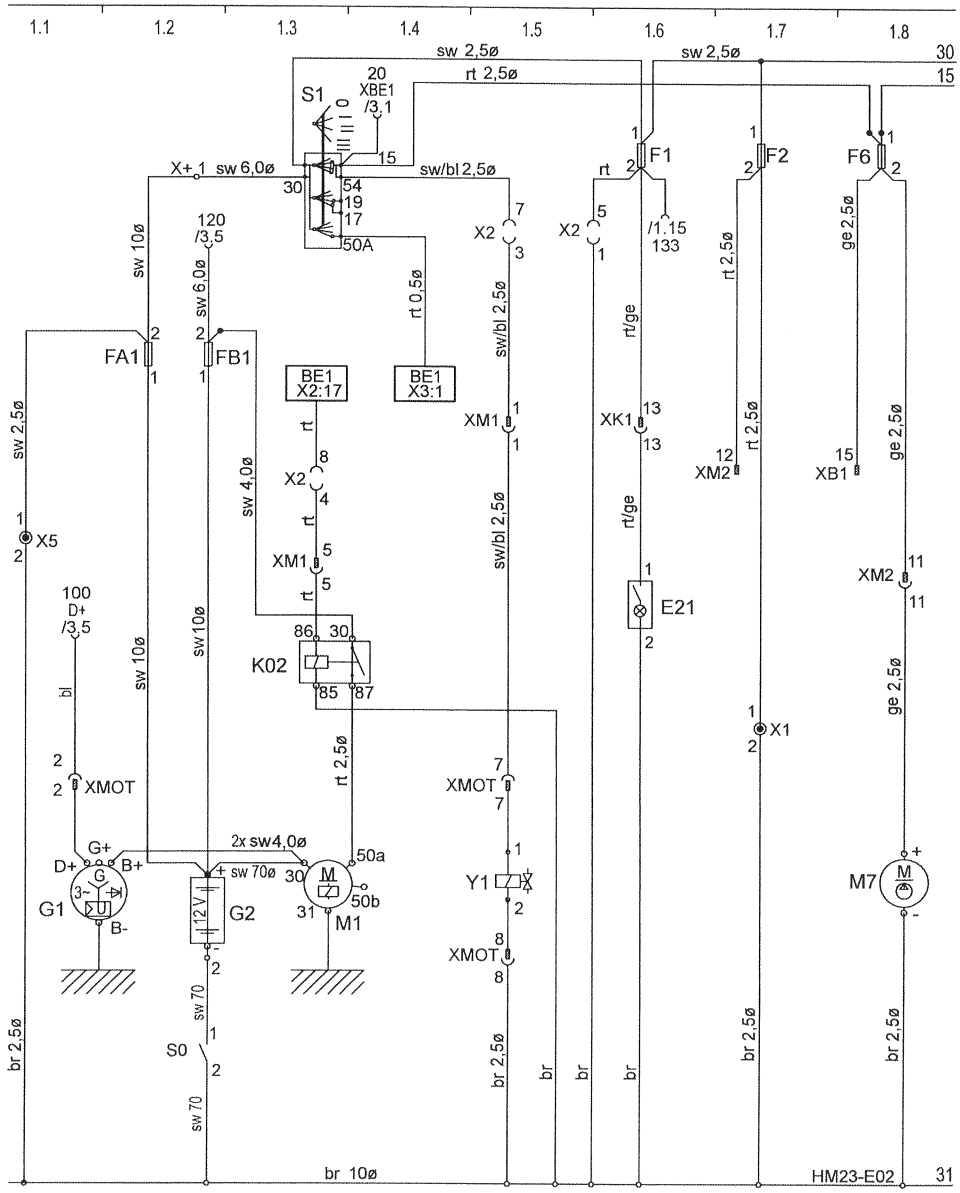
Fuses		
Location	**Ampere**	**assigned with**
F1	10	Interior light, radio, immobilizer
F2	20	Socket, additional heating (option)
F3	10	Hazard lamp, headlamp flasher, rotating beacon
F4	15	Working floodlight, front
F5	15	Working floodlight, rear
F6	15	Refueling pump, electrical seat heating (option)
F7	10	Horn, switch lighting, immobilizer
F8	15	Heater fan
F9	10	Wiper and washer system, radio
F10	5	Hydr. oil level, overload warning, rock breaker, additional control circuit
F11	5	Travel, parking brake, brake light switch
F12	5	Working hydraulics
F13	10	Brake light
F14	10	Hazard lamp
F15	15	High beam

Fuses		
Location	**Ampere**	**assigned with**
F16	15	Low beam
F17	10	Side marker lamp, left
F18	10	Side marker lamp, right
F19	10	Additional module
F20	10	All-wheel steering (option)
F21	10	(Option)
FA1	40	Main fuse
FB1	50	Pre-heating

Colors of fuses			
5A	brown	10A	red
15A	blue	20A	yellow

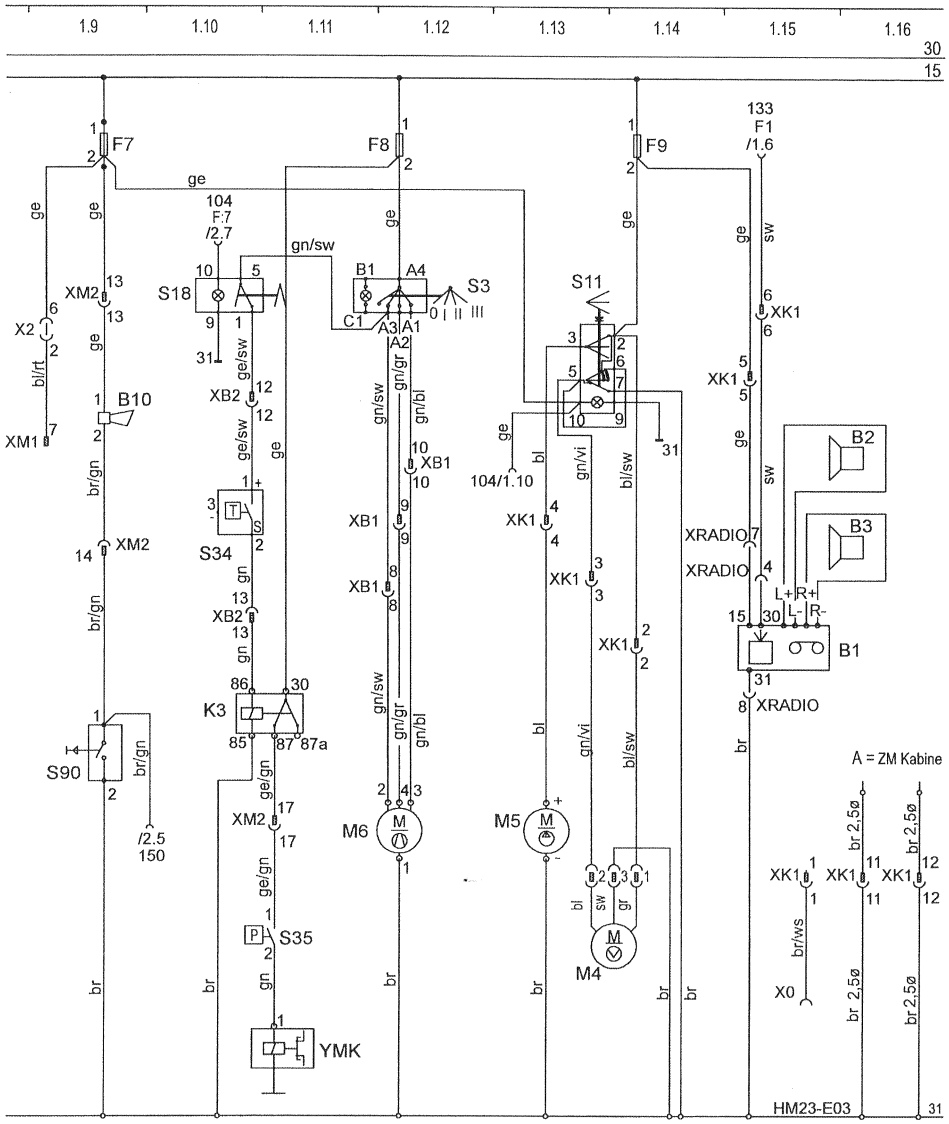
Relays	
Position	**Function**
K 01	Pre-heating relay
K 02	Start-up relay (in starter box)
K 1	Working floodlight, front
K 2	Working floodlight, rear
K 3	not assigned (air conditioning — option)
K11	Directional indicator

Power supply	Start-up system	Shut-off	Interior light, socket	Refueling pump



Path	Code	Device	Path	Code	Device
		Power supply			***Shut-off***
1.1	X5	Service ladder socket	1.5	Y1	Shut-off valve
1.2	G1	Generator			
1.2	FA 1	Fuse			***Interior light, socket***
1.2	FB 1	Fuse	1.6	F1	Fuse
1.2	G2	Battery	1.6	E21	Interior light
1.2	SO	Battery disconnect switch	1.7	F2	Fuse
		Start-up system	1.7	X1	Instrument panel socket
1.3	S1	Glow plug and starter switch			
1.3	M1	Starter			***Refueling pump***
1.3	K02	Start-up relay	1.8	F6	Fuse
			1.8	M7	Refueling pump

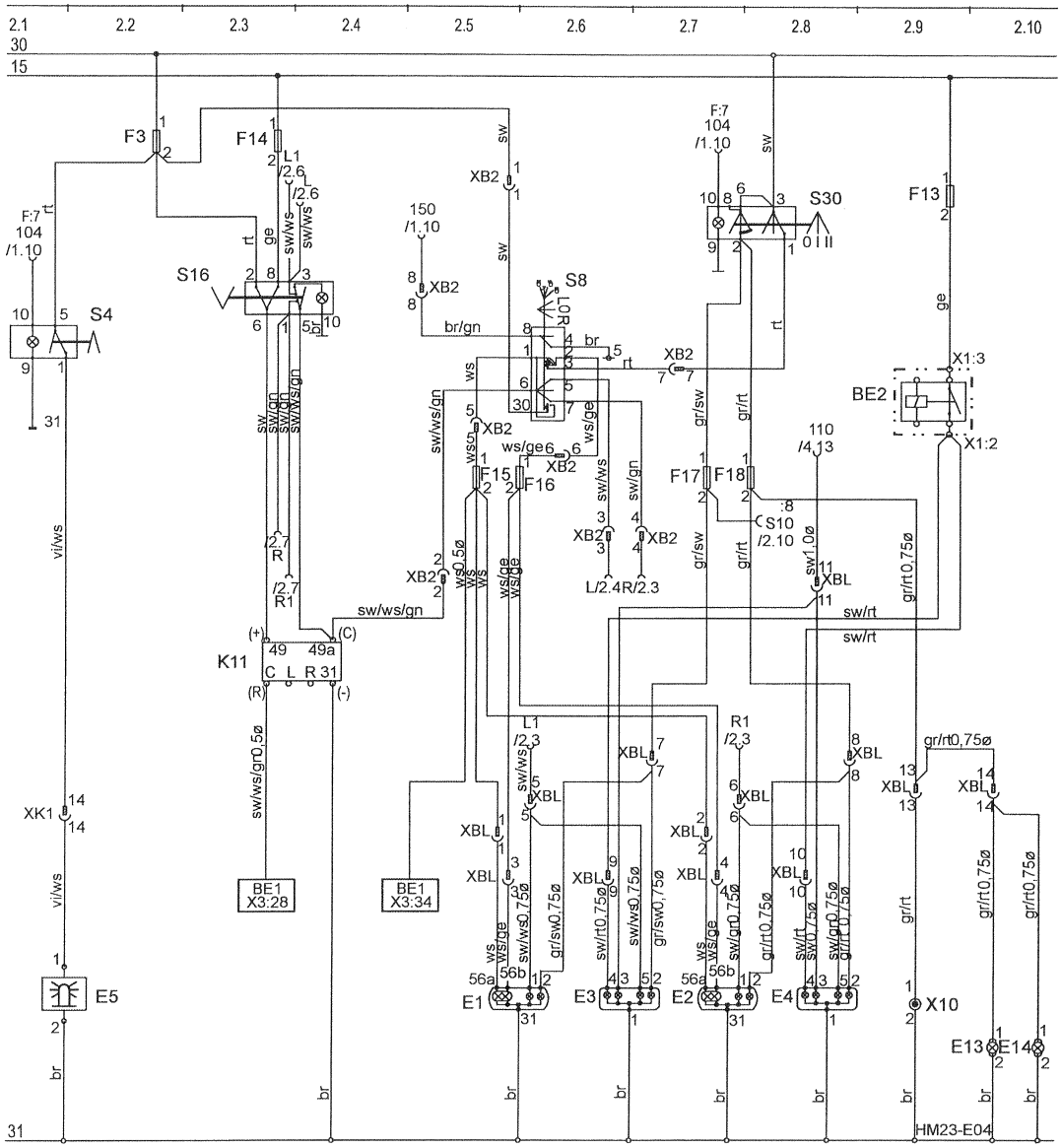
Horn	Heater fan, air conditioning	Wiper and washer system	Radio



Path	Code	Device	Path	Code	Device
		Horn			***Wiper and washer system***
1.9	F7	Fuse	1.13	M5	Washer pump
1.9	B10	Horn	1.13	S11	Wipe/wash switch
1.9	S90	Coordinate lever horn button	1.13	F9	Fuse
		Heater fan, air conditioning	1.13	M4	Wiper motor
1.10	S18	Air conditioning switch			***Radio***
1.10	S34	Air conditioning temperature switch	1.15	B1	Radio
1.10	K3	Relay	1.16	B2	Loudspeaker
1.10	S35	Air conditioning pressure switch	1.16	B3	Loudspeaker
1.10	YMK	Compress. magnetic coupling			
1.11	F8	Fuse	1.16	A	Central mass, cab
1.12	S3	Heater fan switch			

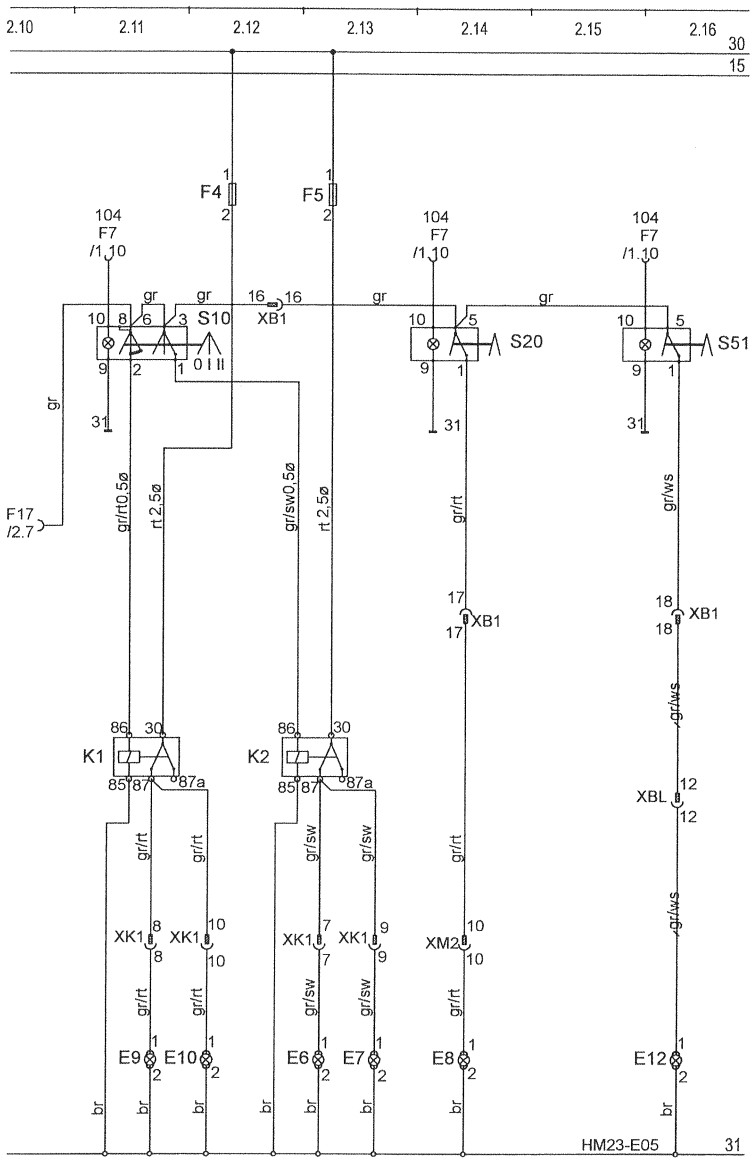
TEREX SCHAEFF	Typ/Model/Type **HML 23 from s/n.: 2300/0100**	Datum/Edition/Date **01.2004**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.49.51**

Rotating beacon	Lighting system



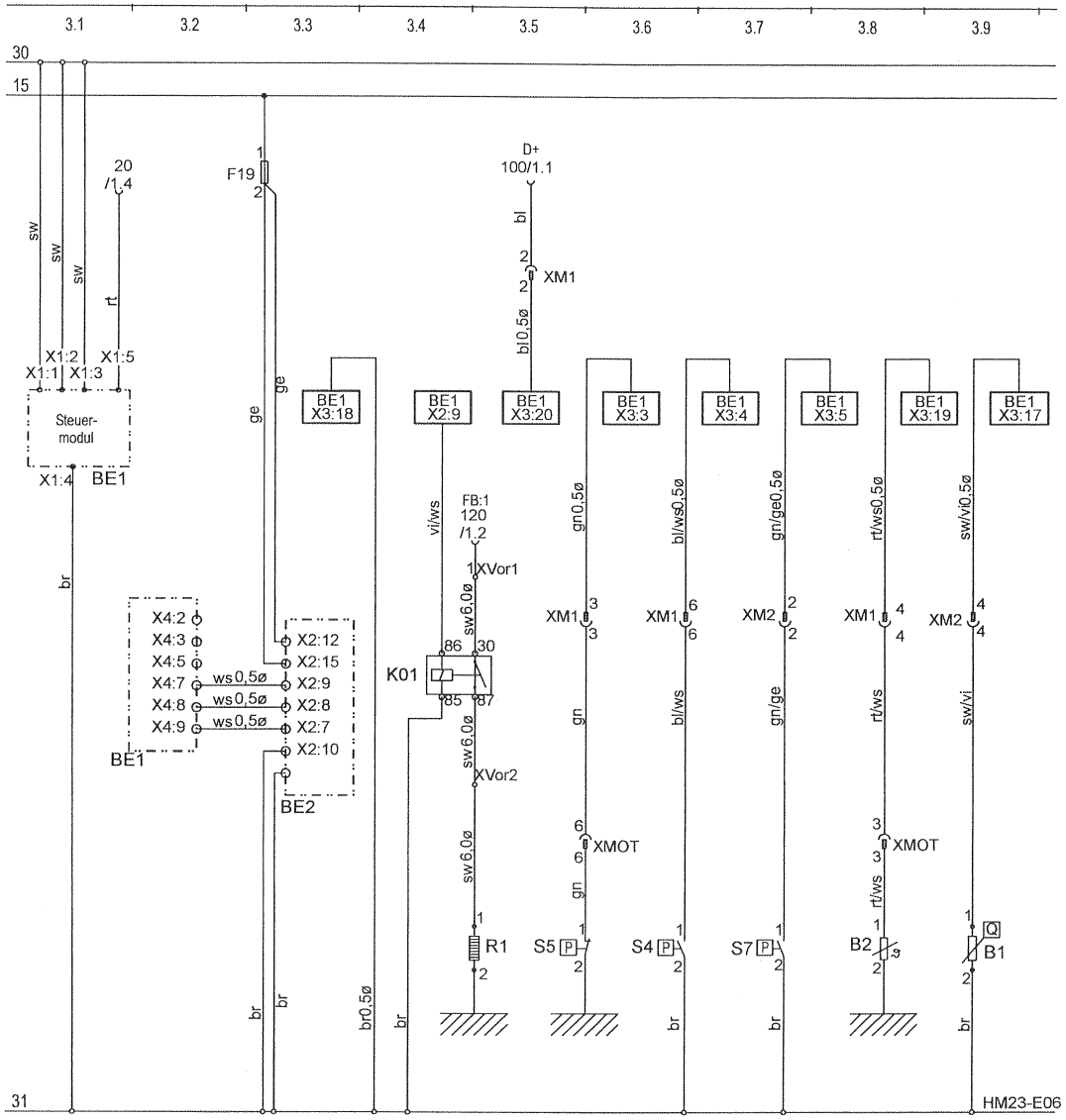
Path	Code	Device	Path	Code	Device
		Rotating beacon	2.5	E1	Headlamp, left
2.1	S4	Rotating beacon switch	2.6	E3	Tail lamp, left
2.2	E5	Rotating beacon	2.7	E2	Headlamp, right
2.2	F3	Fuse	2.7	F17	Fuse
		Lighting system	2.8	S30	Light switch
2.3	F14	Fuse	2.8	F18	Fuse
2.3	S16	Hazard warning switch	2.8	E4	Tail lamp, right
2.3	K11	Directional indicator	2.9	F13	Fuse
2.5	F15	Fuse	2.9	BE2	Additional module
2.5	F16	Fuse	2.9	X10	Side marker lamp socket
2.6	S8	Steering column switch	2.10	E13	License-plate illumination
			2.10	E14	License-plate illumination

Working floodlights	Rear fog lamp



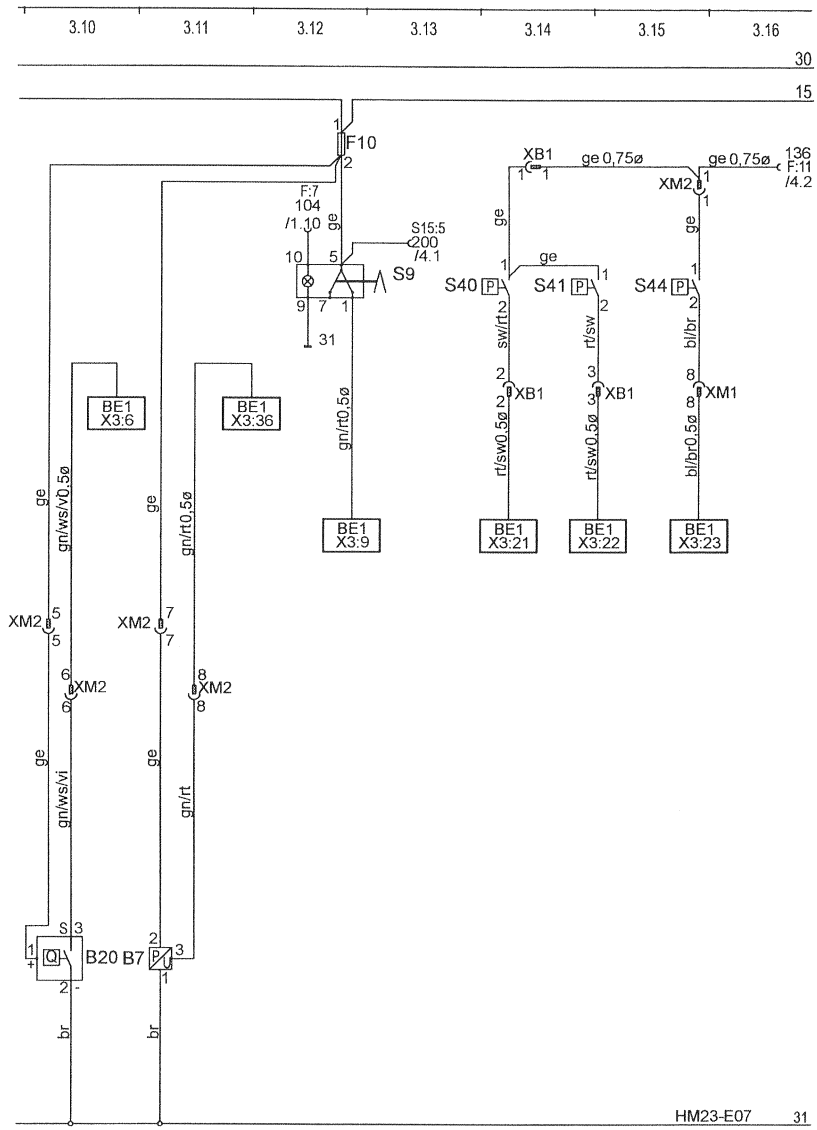
Path	Code	Device	Path	Code	Device
		Working floodlights	2.13	E7	Working floodlight, rear
2.10	S10	Switch for working floodlights, front & rear	2.14	S20	Switch for boom-mounted working floodlight
2.11	K1	Relay for front floodlight	2.14	E8	Boom-mounted working floodlight
2.11	E9	Working floodlight, front			***Rear fog lamp***
2.12	E10	Working floodlight, front	2.16	S51	Rear fog lamp switch
2.12	F4	Fuse	2.16	E12	Rear fog lamp
2.13	F5	Fuse			
2.13	K2	Relay for rear floodlight			
2.13	E6	Working floodlight, rear			

Control module	Pre-heat system	Instruments, warning devices



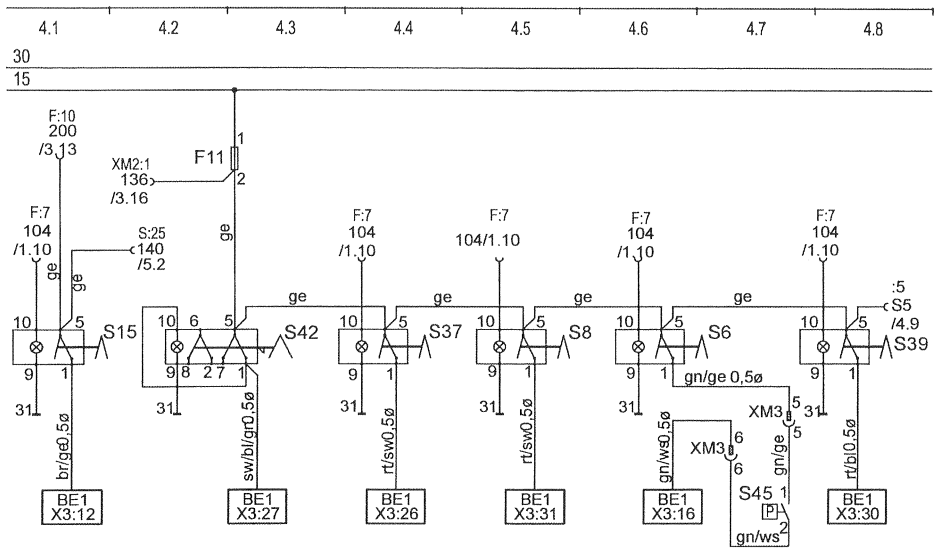
Path	Code	Device	Path	Code	Device
		Control module			**Instruments, warning devices**
3.1	BE1	Control module	3.5	S5	Oil pressure switch
3.3	F19	Fuse	3.6	S4	Air filter maintenance
3.3	BE2	Additional module	3.7	S7	Hydraulic oil filter maintenance
		Pre-heating	3.8	B2	Coolant temperature
3.4	K01	Pre-heat relay	3.9	B1	Fuel-level sensor
3.4	R1	Glow plugs			

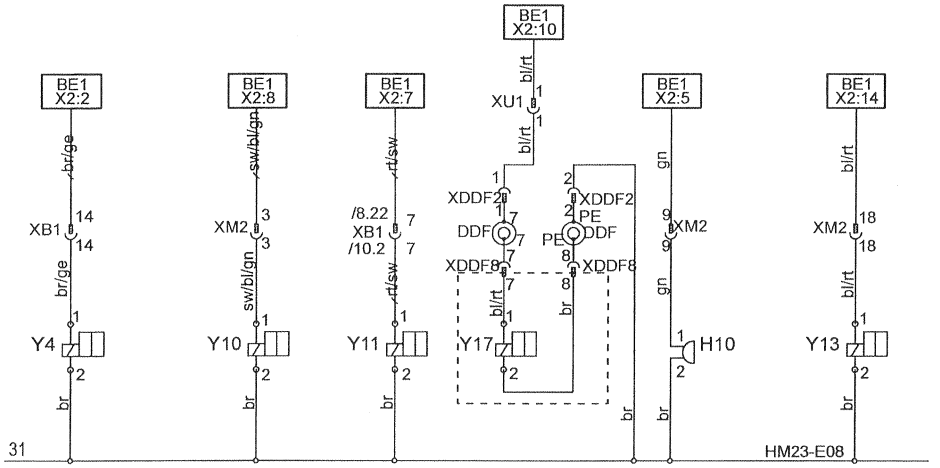
Instruments, warning devices	Overload warning device	Hydraulic functions



Path	Code	Device	Path	Code	Device
		Instruments, warning devices			***Hydraulic functions***
3.10	B20	Hydraulic oil level	3.14	S40	Brake light pressure switch
		Overload warning device	3.15	S41	Axle lock pressure switch
3.11	B7	Overload warning signal sensor	3.15	S44	Accumulator pressure
3.12	F10	Fuse			
3.12	S9	Overload warning switch			

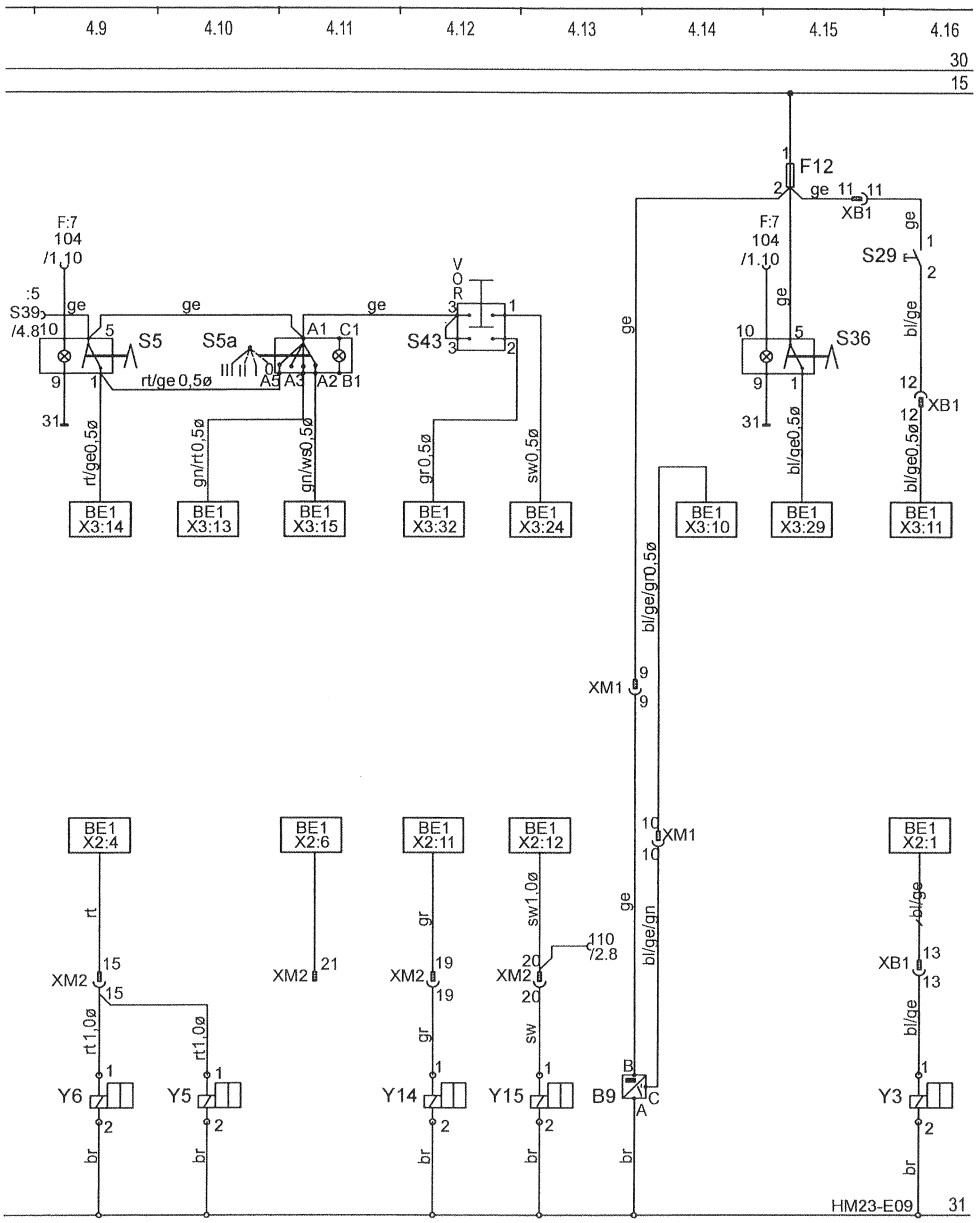
Hydraulic functions	Travel drive





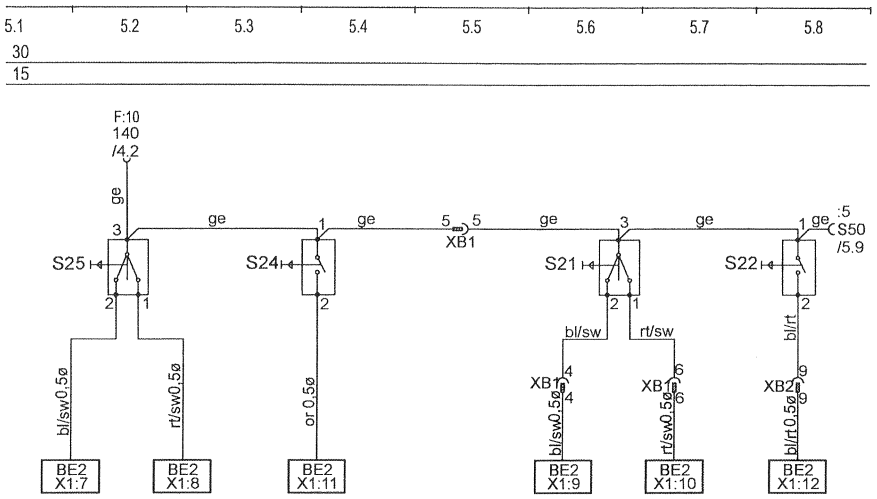
Path	Code	Device	Path	Code	Device
		Hydraulic functions	4.5	DDF	Swivel joint
4.1	S15	Rock breaker switch	4.5	Y17	Front dozer blade valve
4.1	Y4	Rock breaker valve	4.6	S6	Travel motion alarm switch
4.2	F11	Fuse	4.6	H10	Travel motion alarm horn
4.2	S42	Parking brake switch	4.7	S45	Travel motion alarm pressure switch
4.3	Y10	Parking brake valve	4.8	S39	Accelerator pedal switch
4.4	S37	Axle lock switch	4.8	Y13	Accelerator pedal valve
4.4	Y11	Axle lock valve			
4.5	S8	Front dozer blade switch			

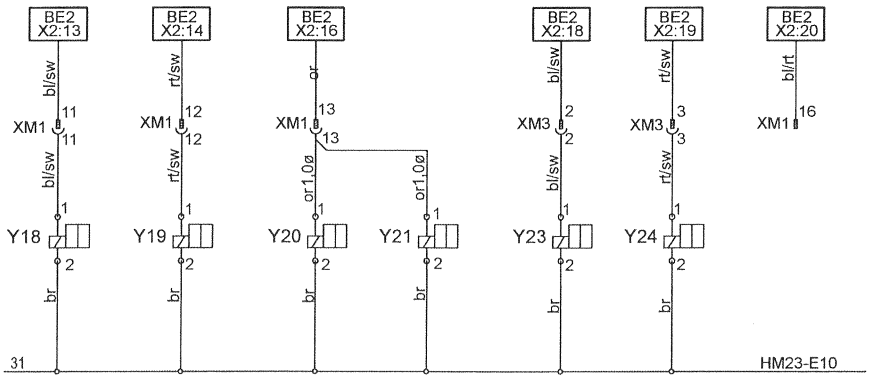
Travel drive	Working hydraulics cut-off



Path	Code	Device	Path	Code	Device
		Travel drive			***Working hydraulics cut-off***
4.9	S5	Switch FAST-SLOW	4.14	B9	Service ladder proximity switch
4.9	Y6	"FAST" valve	4.15	F12	Fuse
4.11	S5a	All-wheel steering switch	4.15	S36	Working hydraulics cut-off
4.10	Y5	"FAST" valve	4.16	S29	Armrest switch
4.12	Y14	Valve for travel, forward	4.16	Y3	Working hydraulics valve
4.12	S43	"Forward/Reverse" switch			
4.13	Y15	Valve for travel, forward			

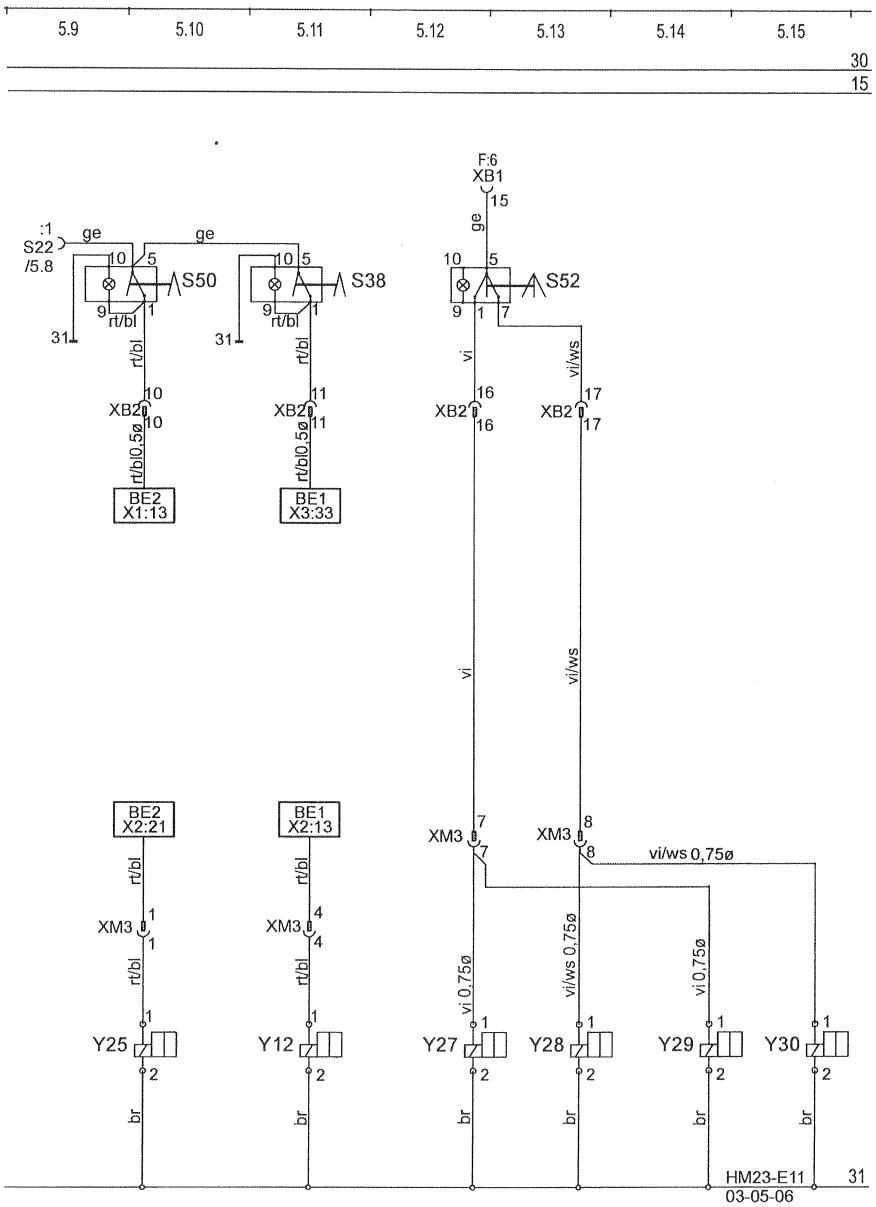
Coordinate lever, right	Coordinate lever, left





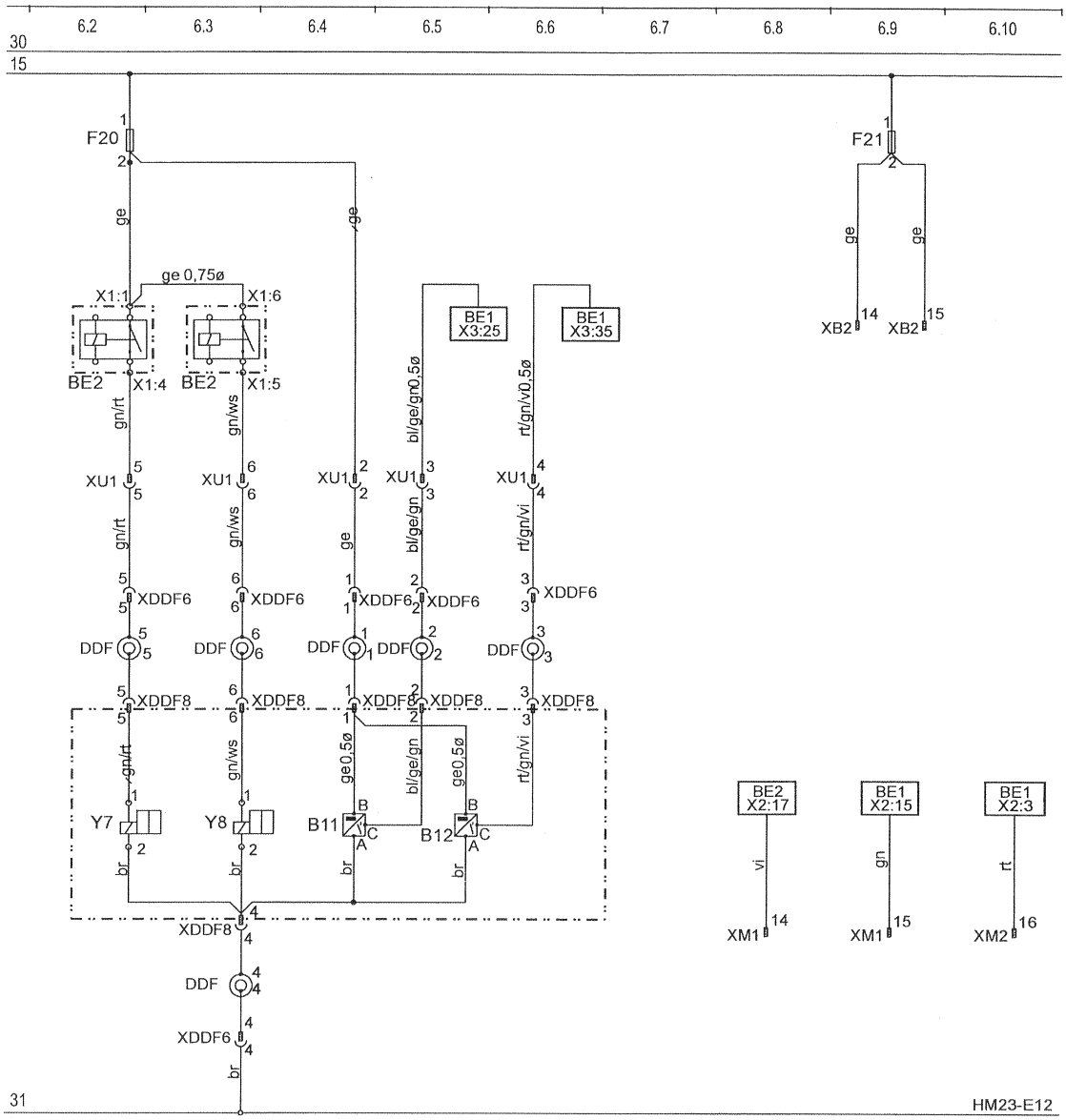
Path	Code	Device	Path	Code	Device
		Coordinate lever, right			***Coordinate lever, left***
5.2	S25	Push-button for additional control circuit 1	5.6	S21	Push-button for additional control circuit 2
5.1	Y18	Valve for additional control circuit 1	5.6	Y23	Valve for additional control circuit 2
5.2	Y19	Valve for additional control circuit 1	5.7	Y24	Valve for additional control circuit 2
5.4	S24	Articulation changeover switch	5.8	S22	Swing pressure boost
5.4	Y20	Valve for articulation			
5.5	Y21	Valve for articulation			

Armrest, left	Individual pads for machine support



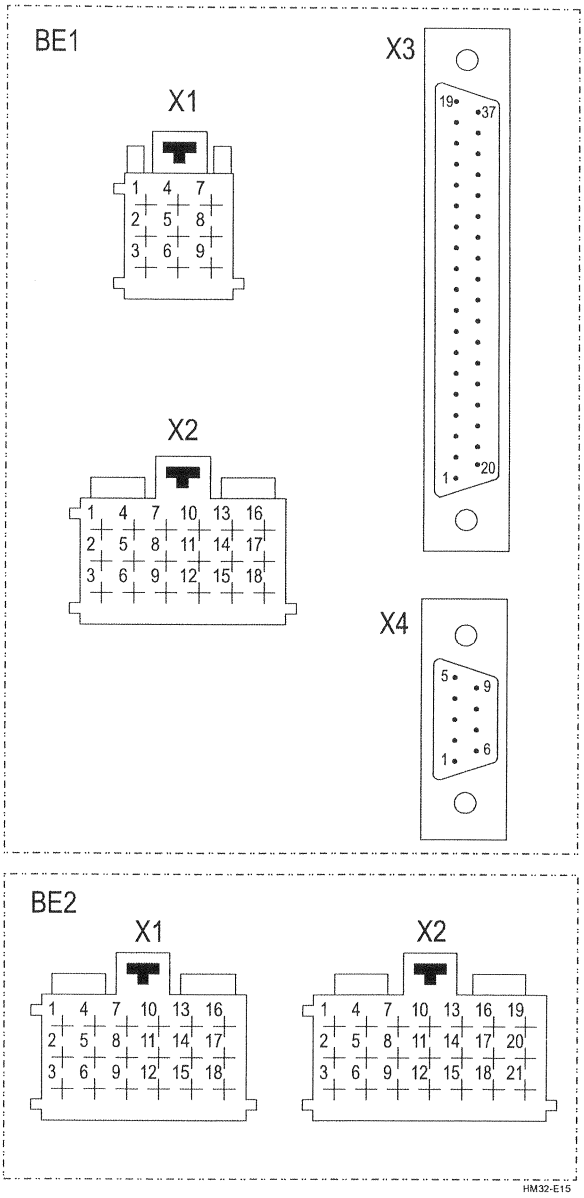
Path	Code	Device	Path	Code	Device
		Armrest, left			***Individual pads for machine support***
5.9	S50	Bucket changeover switch	5.12	S52	Switch for support
5.10	Y25	Bucket changeover valve	5.12	Y27	Support, left
5.11	S38	Steering changeover switch	5.13	Y28	Support, left
5.11	Y12	Steering changeover valve	5.15	Y29	Support, right
			5.15	Y30	Support, right

All-wheel steering of undercarriage	Option



Path	Code	Device	Path	Code	Device
		All-wheel steering of undercarriage	6.4	B11	Front axle proximity switch
6.2	F20	Fuse	6.5	B12	Rear axle proximity switch
6.2	BE2	Additional module			**Option**
6.2	DDF	Swivel joint	6.9	F21	Fuse
6.2	Y7	Valve "round"/"crab" (steering)			
6.3	Y8	Valve "round"/"crab" (steering)			

Control module BE1

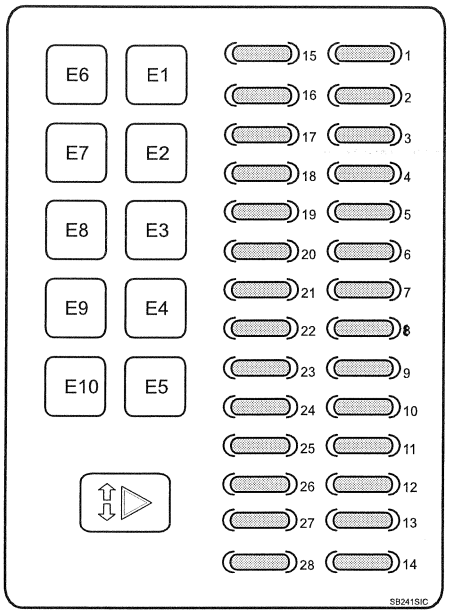


X1	***Power supply***
1	Power supply Terminal 30
2	Power supply Terminal 30
3	Power supply Terminal 30
4	Central mass
5	Power supply Terminal 15
6	--
7	--
8	--
9	--
X2	***Signal outputs***
1	Working hydraulics
2	Rock breaker
3	--
4	FAST
5	Travel motion alarm
6	--
7	Axle lock
8	Parking brake
9	Pre-heating
10	Front dozer blade
11	Travel, forward
12	Travel, reverse
13	Steering changeover
14	Accelerator pedal
15	--
16	--
17	Start-up solenoid switch Terminal 50A
18	--
X3	***Signal inputs***
1	Start-up ignition lock Terminal 50A
2	--
3	Oil pressure switch
4	Air filter clogging
5	Hydraulic oil filter clogging
6	Hydraulic oil float switch
7	--
8	--
9	Overload warning switch
10	Service ladder proximity switch
11	Armrest switch

12	Rock breaker switch
13	All-wheel steering "crab"
14	FAST–SLOW switch
15	All-wheel steering, "round"
16	Travel motion alarm switch
17	Fuel-level sensor
18	Central mass
19	Coolant temperature
20	Charge control
21	Brake light signal
22	Axle lock signal
23	Accumulator pressure signal
24	Switch for travel, reverse
25	Front axle steering angle signal
26	Axle lock switch
27	Parking brake switch
28	Direction indicator lamp signal
29	Working hydraulics switch
30	Accelerator pedal switch
31	Front dozer blade switch
32	Switch for travel, forward
33	Steering changeover switch
34	High beam signal
35	Rear axle steering angle signal
36	Overload warning signal
37	--
X4	***Interface***
1	--
2	--
3	--
4	--
5	--
6	--
7	Connection additional module X2:9
8	Connection additional module X2:8
9	Connection additional module X2:7

Additional module BE2

X1	***Plug***
1	--
2	--
3	Power supply Terminal 15
4	--
5	--
6	--
7	Additional control circuit 1 push-button
8	Additional control circuit 1 push-button
9	Additional control circuit 2 push-button
10	Additional control circuit 2 push-button
11	Articulation changeover push-button
12	--
13	Bucket changeover switch (option)
14	--
15	--
16	--
17	--
18	--
X2	***Plug***
1	--
2	--
3	--
4	--
5	--
6	--
7	Connection control module X4:9
8	Connection control module X4:8
9	Connection control module X4:7
10	Central mass
11	Central mass
12	Power supply Terminal 15
13	Valve additional control circuit 1
14	Valve additional control circuit 1
15	Power supply Terminal 15
16	Valve for articulation
17	--
18	Valve for additional control circuit 2
19	Valve for additional control circuit 2
20	--
21	Bucket changeover (option)



Location	Relay	Function
	K 0	Flasher transmitter
E 1	K 1	Working headlamp
E 2	K 2	Starting safeguard
E 3	K 3	Axle lock
E 4	K 4	Parking brake
E 5	K 5	Safety - service ladder
E 6	K 6	Safety - service ladder - pilot control
E 7	K 7	Parking brake
E 8	K 8	Drive pedal
E 9	-	unassigned
E 10	-	unassigned

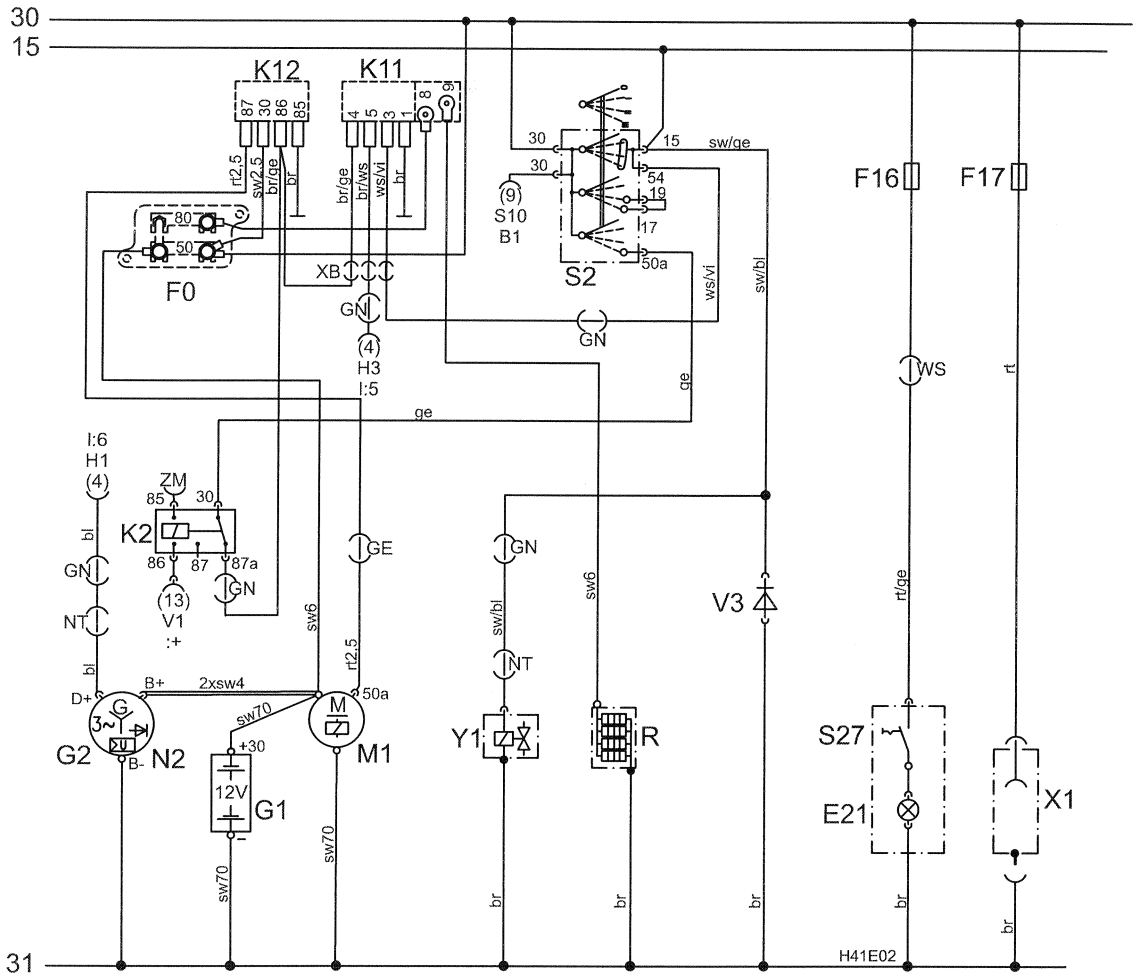
Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Wiper switch	F 15	10	Hazard warning switch Check module Immobilizer
F 2	10	Working hydraulics cut-off	F 16	10	Rotating beacon Internal light
F 3	10	Quick/ slow	F 17	20	Socket Radio
F 4	10	Parking brake relay Driving	F 18	15	Lower beam
F 5	10	Front dozer blade	F 19	15	Upper beam Upper beam indicator light
F 6	10	Horn Headlamp flasher	F 20	10	Left sidelight Front/rear work. headlamp
F 7	15	Heater fan	F 21	10	Right sidelight
F 8	10	Oscillating axle lock	F 22	10	Rear working headlamp
F 9	10	Level sensor power supply Cut-off load warning device	F 23	10	Front working headlamp
F 10	10	Excavator brake, brake light Parking brake, transmitter load warning	F 24		--
F 11	10	Service ladder proximity switch Steering proximity switch	F 25	10	Cut-off valve diesel
F 12	10	Breaker Radio	F 26	20	Electrical refuelling pump
F 13	10	Check module Power supply check module	F 27		--
F 14	10	--	F 28	Diode 3A	Electrical engine cut-off Immobilizer

Cable and connector colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

SCHAEFF	Typ/Model/Type **HML 31 (from serial no. 032/5100)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Fuse and relay box assignment diagram**	Blatt/Page/Feuille **7.50.01**

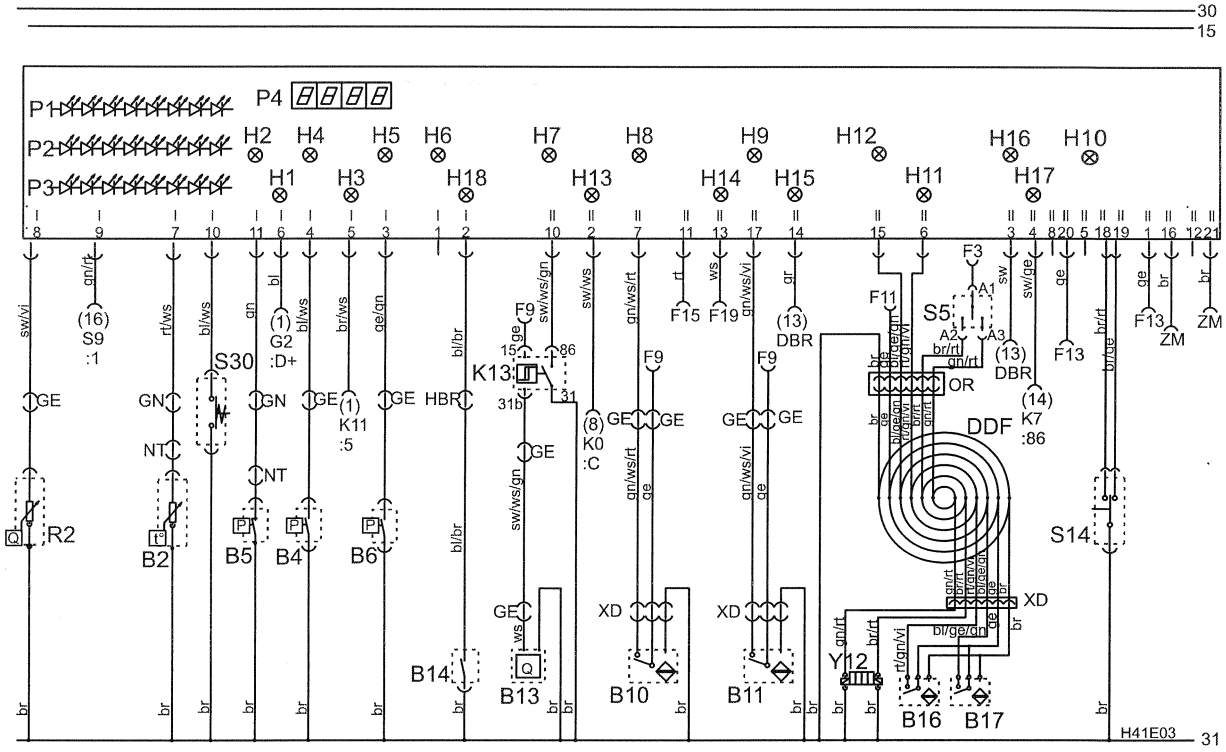
1. Power supply	2. Pre-heater starting system	3. Internal light, socket



Section Qty.	Desig-nation	Device
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	N2	Generator regulator
2	FO	Blade-type fuses 50/80A
2		***Pre-heater starting system***
1	S2	Glow plug/starter switch
1	V3	Blocking diode BY 251
1	K2	Starting safeguard
1	K12	Starting relay 12V 70A

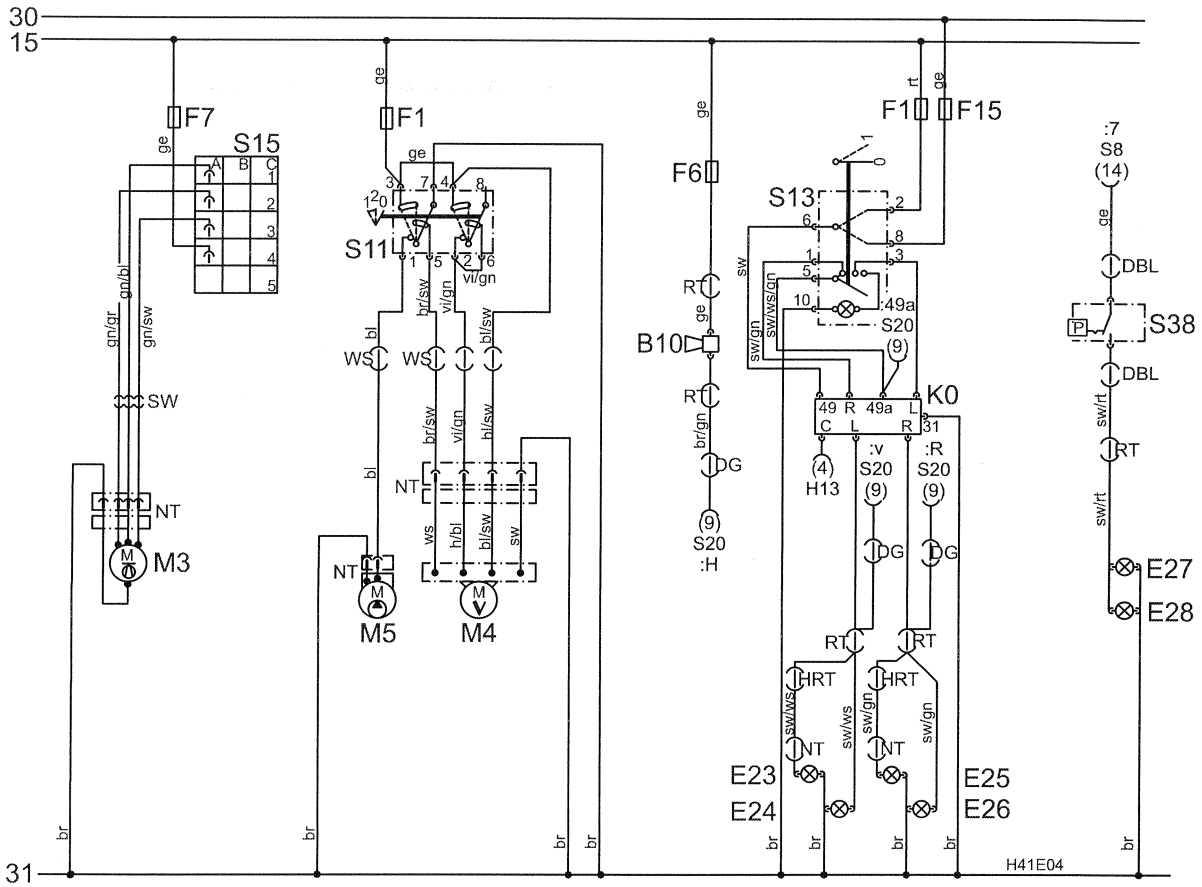
Section Qty.	Desig-nation	Device
1	M1	Starter motor
1	Y1	Electr. engine cut-off
1	K11	Pre-heating time control unit
1	R	Glow plugs
3		***Internal light***
1	F16	Fuse
1	S27	Internal light switch
1	E21	Internal light
1	F17	Fuse
1	X1	Socket

4. Display units



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
4		***Display units***	1	H7	Engine oil level
1	P1	Fuel gauge	1	K13	Engine oil relay
1	R2	Fuel gauge sensor	1	B13	Transmitter, engine oil level
1	P2	Engine coolant	1	H13	Direction indicator
1	P3	Overload warning device	1	H8	Coolant level
1	B2	Coolant temperature sensor	1	B10	Transmitter, coolant level
1	S30	Check button	1	H14	Upper beam indicator
1	P4	Operating hour meter, trip recorder, watch	1	H9	Hydraulic oil level
1	H2	Engine oil pressure lamp	1	B11	Transmitter, hydraulic oil level
1	B5	Engine oil pressure switch	1	H15	Drive forward
1	H1	Battery charge indicator lamp	1	H11	Steering lock, front axle
1	H4	Air filter indicator	1	DDF	Rotary transfer
60 601	B4	Transmitter, air filter clogging	1	B16	Transmitter, steering lock front axle
1	H3	Pre-heating indicator	1	H12	Steering lock, rear axle
1	H5	Hydraulic filter clogging indicator	2	B17	Transmitter, steering lock, rear axle
1	B6	Transmitter, hydr. filter clogging	1	S5	Multi-functional switch
1	H6	unassigned	1	Y12	4-wheel steering valve
1	H18	Accumulator pressure, brake	1	H16	Drive in reverse
1	B14	Transmitter, accumulator press.	1	H17	Parking brake
			2	H10	unassigned
			1	S14	Changeover display

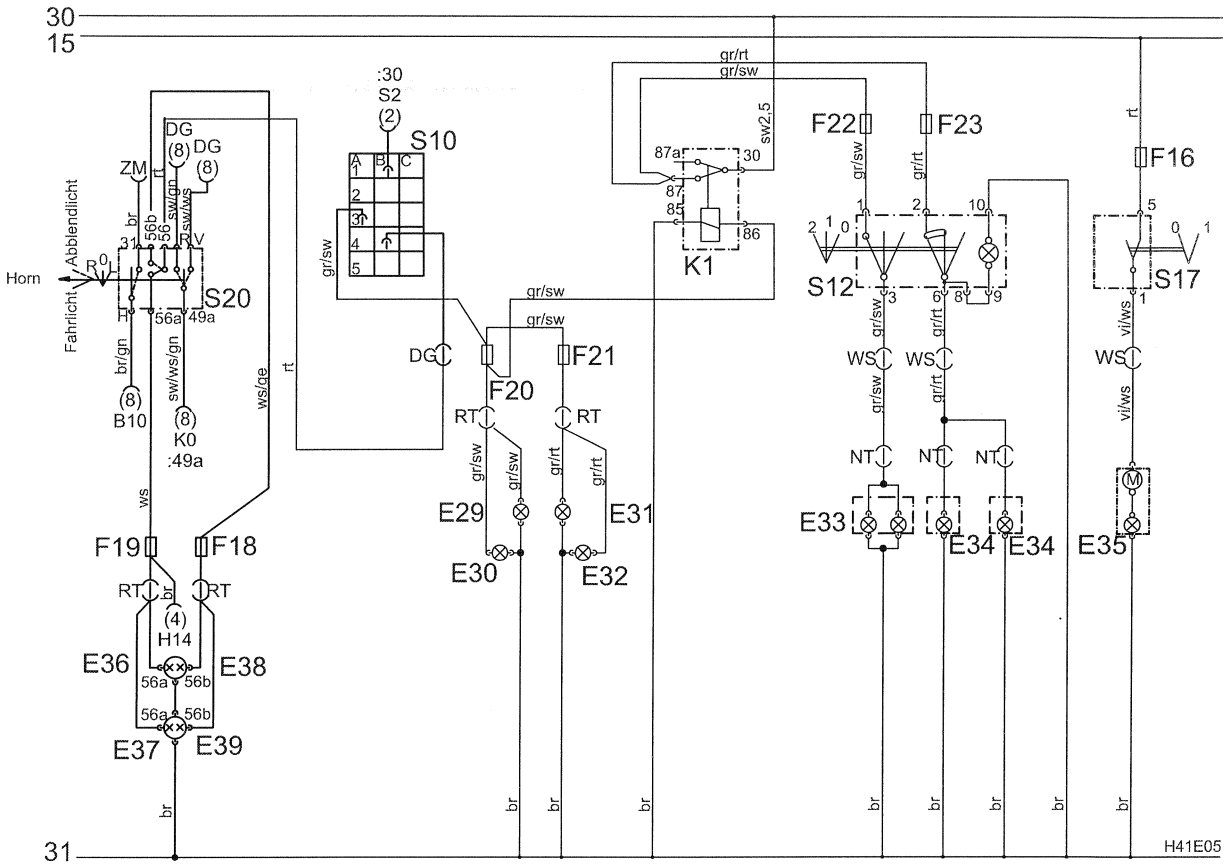
6. Heater fan	7. Wash/wipe system	8. Signaling system



Section Qty.	Desig-nation	Device
6		***Heater fan***
1	F7	Fuse
1	S15	Switch for heater fan
1	M3	Heater fan
7		***Wash/wipe system***
1	F1	Fuse
1	S11	Wiper switch
1	M4	Wiper motor
1	M5	Washer pump

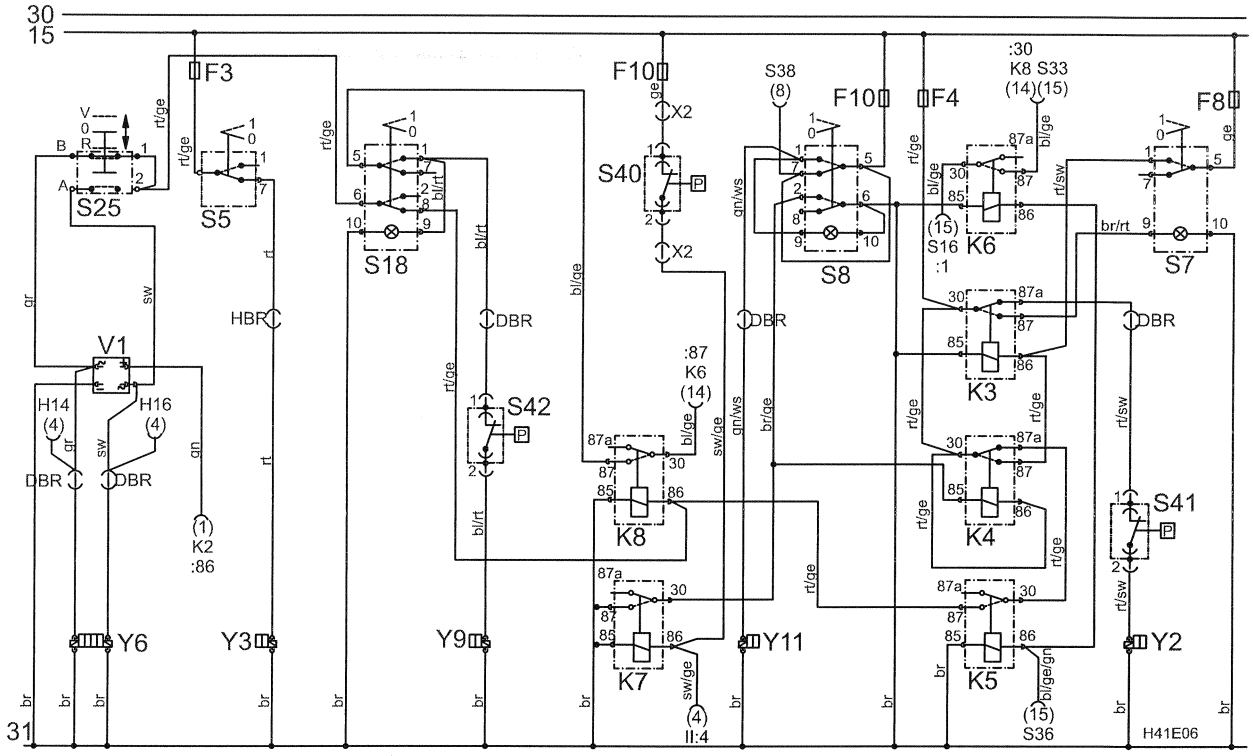
Section Qty.	Desig-nation	Device
8		***Signaling system***
1	F6	Fuse
1	B10	Signal horn
1	F1	Fuse
1	F15	Fuse
1	S13	Hazard warning switch
1	K0	Turning indicator transmitter
1	E23	Turning indicator, front left
1	E24	Turning indicator, rear left
1	E25	Turning indicator, front right
1	E26	Turning indicator, rear right
1	S38	Brake light switch
1	E27	Brake light, left
1	E28	Brake light, right

9. Lighting system	10. Working headlamps, revolving roof lamp



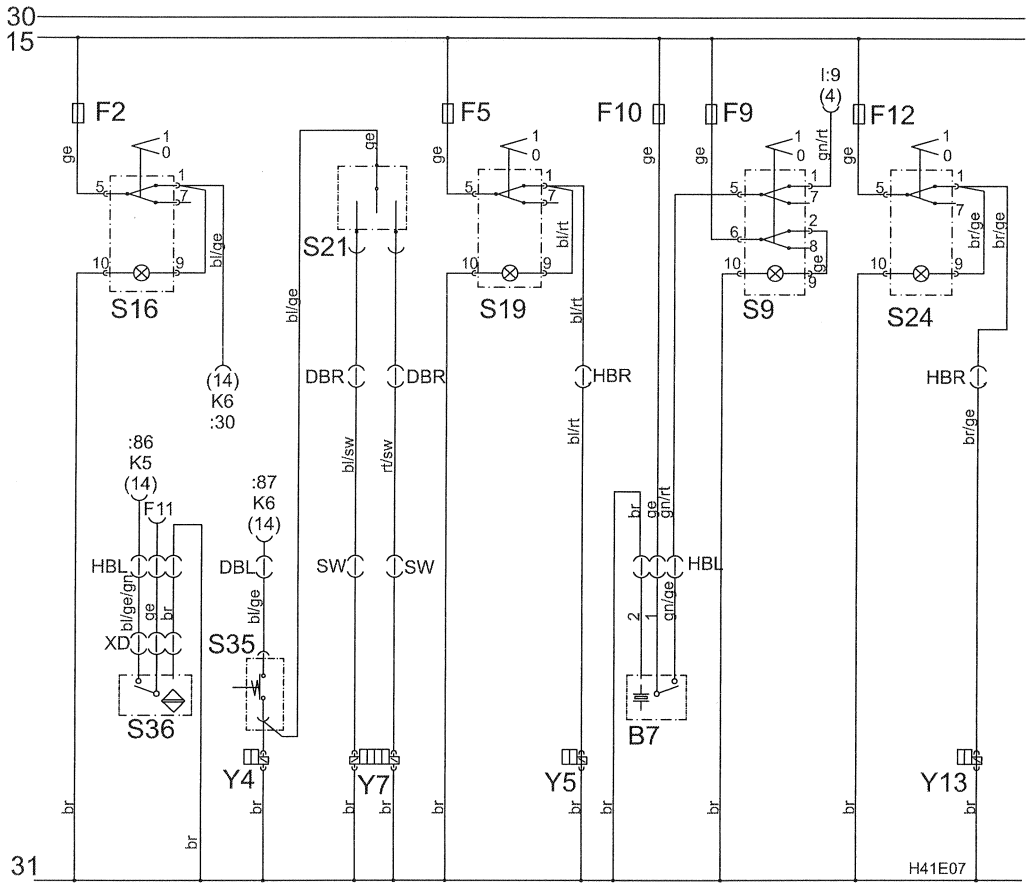
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
9		***Lighting system***	***10***		***Working headlamps***
1	S20	Turning indicator switch	1	K1	Working headlamp relay
1	F19	Fuse	1	F22	Fuse
1	E36	Upper beam, left	1	F23	Fuse
1	E37	Upper beam, right	1	S12	Working headlamp switch
1	F18	Fuse	1	E33	Rear working headlamp
1	E38	Lower beam, left	2	E34	Front working headlamp
1	E39	Lower beam, right	1	F16	Fuse
1	S10	Light switch	1	S17	Revolving roof lamp switch
1	F20	Fuse	1	E35	Revolving roof lamp
1	E29	Sidelight, front left			
1	E30	Sidelight, rear left			
1	F21	Fuse			
1	E31	Sidelight, front right			
1	E32	Sidelight, rear right			

13. Driving	14. Brake



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
13		***Driving***			
1	V1	Bridge-connected rectifier	1	F10	Fuse
1	Y6	Valve: Drive forward/backward	1	S8	Excavator brake switch
1	S25	Switch: Drive forward/backward	1	Y11	Excavator brake valve
1	F3	Fuse	1	F4	Fuse
1	S5	Fast/slow switch	1	K6	Relay for safety device, service ladder
1	Y3	Fast/slow valve	1	K3	Oscillating axle lock relay
1	S18	Drive pedal switch	1	K4	Parking brake relay
1	S42	Brake pressure switch	1	K5	Relay for safety device, driving
1	Y9	Drive pedal valve	1	F8	Fuse
			1	S7	Oscillating axle lock switch
14		***Brake***	1	S41	Excavator brake switch
1	K8	Drive pedal relay	1	Y2	Oscillating axle lock valve
1	K 7	Parking brake relay	1	F8	Fuse
1	F10	Fuse			
1	S40	Parking brake pressure switch			

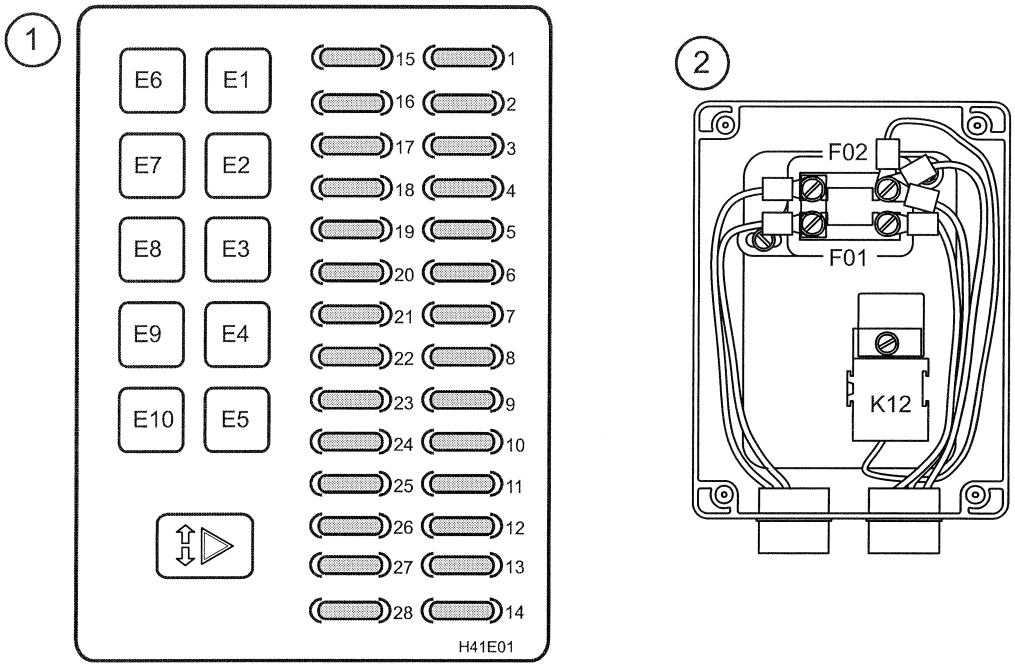
15. Working hydraulics cut-off	16. Options



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
15		***Working hydraulics cut-off***	1	F5	Fuse
1	F2	Fuse	1	S19	Front dozer blade switch
1	S16	Switch for working hydr. cut-off	1	Y5	Front dozer blade valve
1	S36	Switch for safety device, service ladder	1	F10	Fuse
1	S35	Armrest switch	1	B7	Pressure sensor load warning
1	Y4	Working hydraulics valve	1	F9	Fuse
			1	S9	Load warning cut-off
16		***Options***	1	F12	Fuse
1	S21	Switch for coordinate lever, right	1	S24	Rock breaker switch
1	Y7	Valve: e.g. turn grab	1	Y13	Rock breaker valve

Electrical system

Fuse and relay box - Assignment diagram



1 = Fuse and relay box armrest, rear right
2 = Starter box engine compartment dividing wall

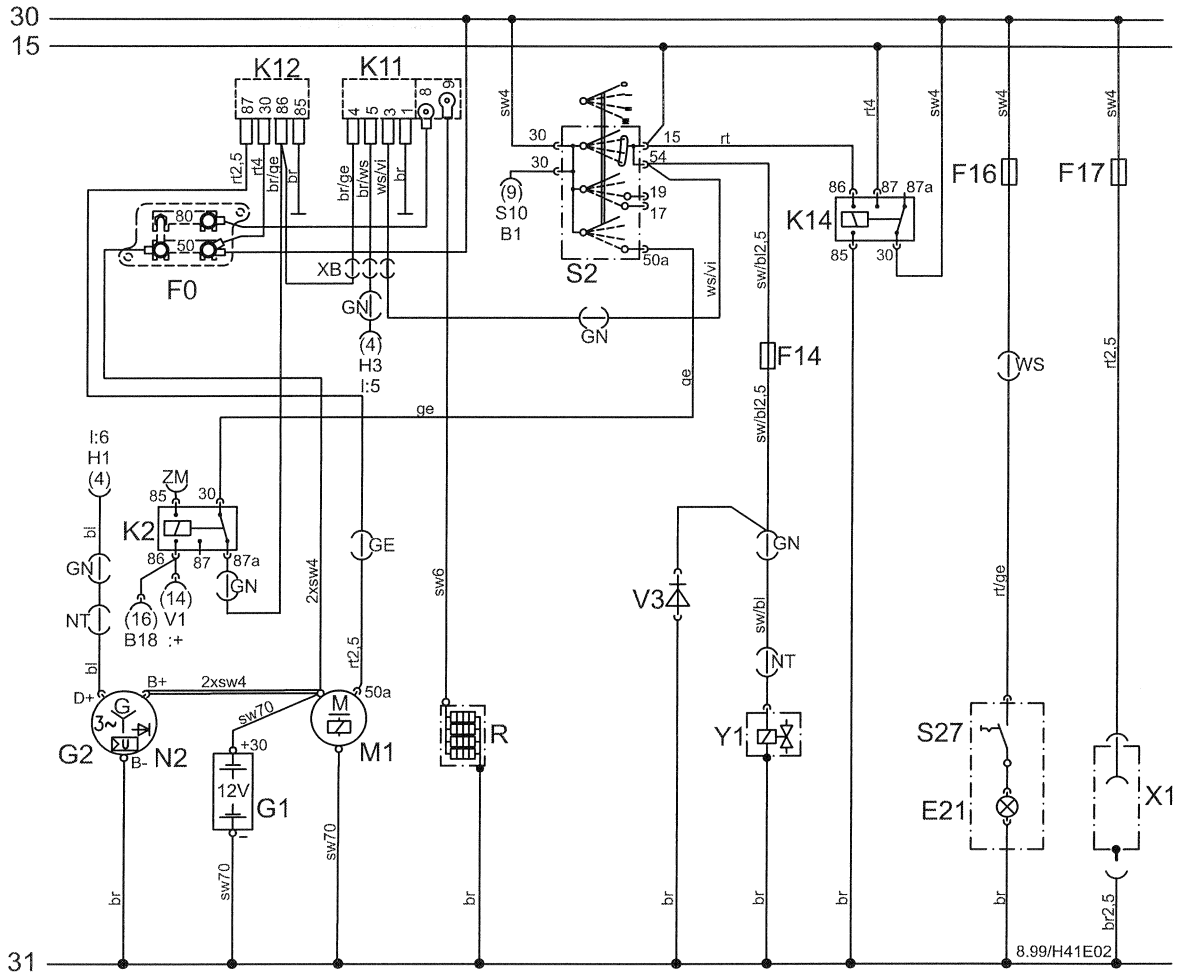
Location	Relay	Function
⇕▷	K 0	Directional indicator
E 1	K 1	Working floodlights, front/ rear
E 2	K 2	Start-up safeguard
E 3	K 3	Axle lock
E 4	K 4	Parking brake, travel shutdown
E 5	K 5	Safety device for entry steps, working hydraulics cut-off
E 6	K 6	Pedal for driving
E 7	-	not assigned
E 8	-	not assigned
E 9	-	not assigned
E 10	-	not assigned
	K 11	Pre-heating time control (engine compartment dividing wall - near generator)
	K 12	Start-up
	K 13	Control electronics for engine oil level (below instrument panel)
	K 14	Relief relay for pre-heat/ starter switch (below instrument panel)

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Wiper switch	F 15	10	Hazard warning switch Check module Immobilizer
F 2	10	Working hydraulics cut-off	F 16	10	Rotating beacon Interior light
F 3	10	Fast/ slow	F 17	20	Socket Radio
F 4	10	Parking brake relay Travel	F 18	15	Lower beam
F 5	10	Front dozer blade	F 19	15	Upper beam Upper beam indicator lamp
F 6	10	Horn Headlamp flasher	F 20	10	Side marker lamp, left Working floodlight, front/ rear
F 7	15	Heater fan	F 21	10	Side marker lamp, right
F 8	10	Oscillating axle lock	F 22	15	Rear working floodlight
F 9	10	Level sensor power supply Overload warning device cut-off	F 23	15	Front working floodlight
F 10	10	Excavator brake, brake light Parking brake, overload warning transmitter	F 24	15	--
F 11	10	Service ladder proximity switch Steering proximity switch	F 25	15	Diesel cut-off valve
F 12	10	Rock breaker Radio	F 26	15	Electrical tank refueling pump
F 13	10	Check module Power supply check module	F 27	15	--
F 14	20	Engine shut-off	F 28	Diode 3A	Electrical motor cut-off Immobilizer
F 01	80	Pre-heat/ starter switch	F 02	50	Start-up

Cable and plug colors

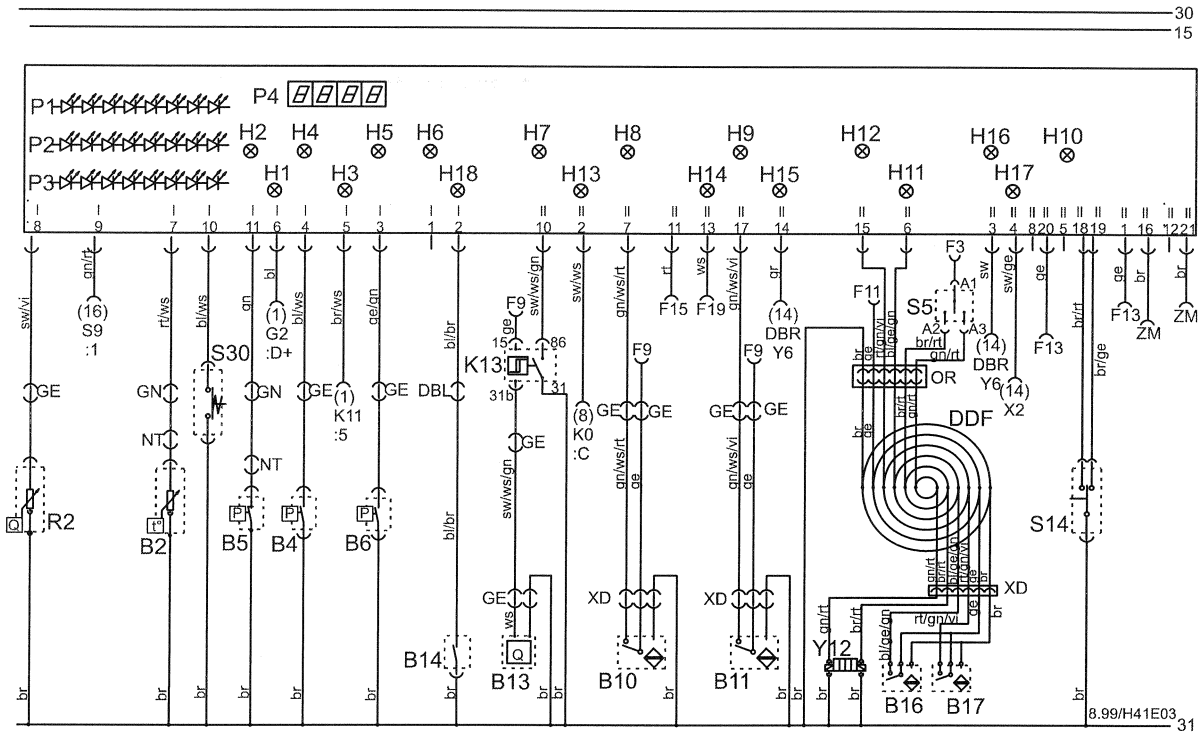
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bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

1. Power supply	2. Pre-heat/ start-up system	3. Interior light, socket



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
1		***Power supply***	1	K12	Starting relay 12 V 70 A
1	G1	Battery	1	M1	Starter motor (starter)
1	G2	Generator	1	K11	Pre-heating time control unit
1	N2	Generator regulator	1	R	Glow plugs
2	FO	Flat-type fuses, 50/80A	1	K14	Relief relay
2		***Pre-heat/ start-up system***	***3***		***Interior light, socket***
1	S2	Pre-heat/ starter switch	1	F16	Fuse
1	F14	Fuse	1	S27	Interior light switch
1	V3	Blocking diode BY 251	1	E21	Interior light
1	Y2	Electrical motor cut-off	1	F17	Fuse
1	K2	Starting safeguard relay	1	X1	Socket

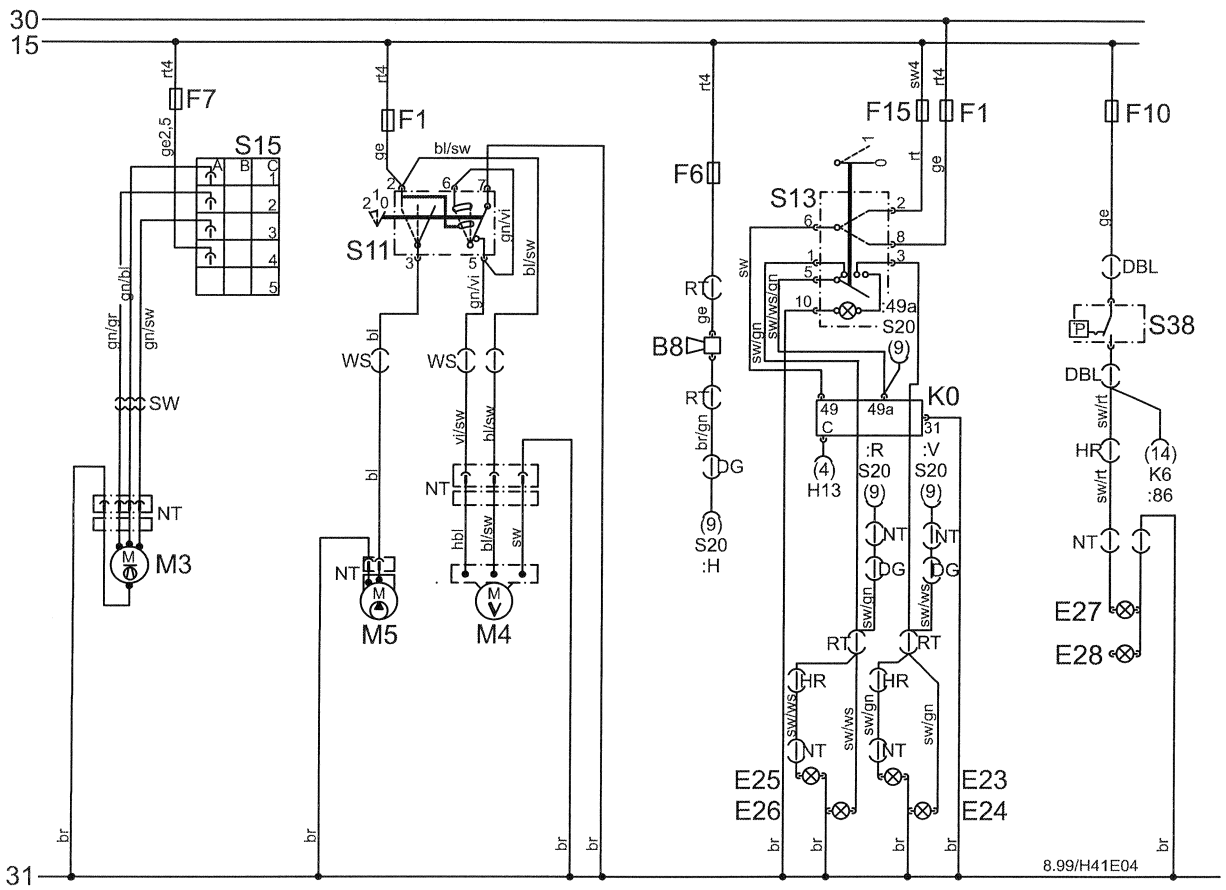
4. Display units



Section Qty.	Desig-nation	Device
4		***Display units***
1	P1	Fuel gauge
1	R2	Fuel gauge sensor
1	P2	Engine coolant
1	P3	Overload warning device
1	B2	Coolant temperature sensor
1	S30	Check button
1	P4	Elapsed hour meter, trip record.
1	H2	Engine oil pressure lamp
1	B5	Engine oil pressure switch
1	H1	Battery charge indicator lamp
1	H4	Air filter indicator
1	B4	Air filter clogging sensor
1	H3	Pre-heating control
1	H5	Hydr. filter clogging indicator
1	B6	Hydr. filter clogging sensor
1	H6	not assigned
1	H18	Brake accumulator pressure
1	B14	Accumulator pressure sensor

Section Qty.	Desig-nation	Device
1	H7	Engine oil level
1	K13	Engine oil relay
1	B13	Engine oil level sensor
1	H13	Direction indicator
1	H8	Coolant level
1	B10	Coolant level sensor
1	H14	Upper beam indicator
1	H9	Hydraulic oil level
1	B11	Hydraulic oil level sensor
1	H15	Travel, forward
1	H11	Front axle steering lock
1	DDF	Rotary transmission
1	B16	Front axle steering lock sensor
1	H12	Rear axle steering lock
1	B17	Rear axle steering lock sensor
1	S5	Multi-function switch
1	Y12	All-wheel drive valve
1	H16	Travel, in reverse
1	H17	Parking brake
1	H10	not assigned
1	S14	Display changeover switch

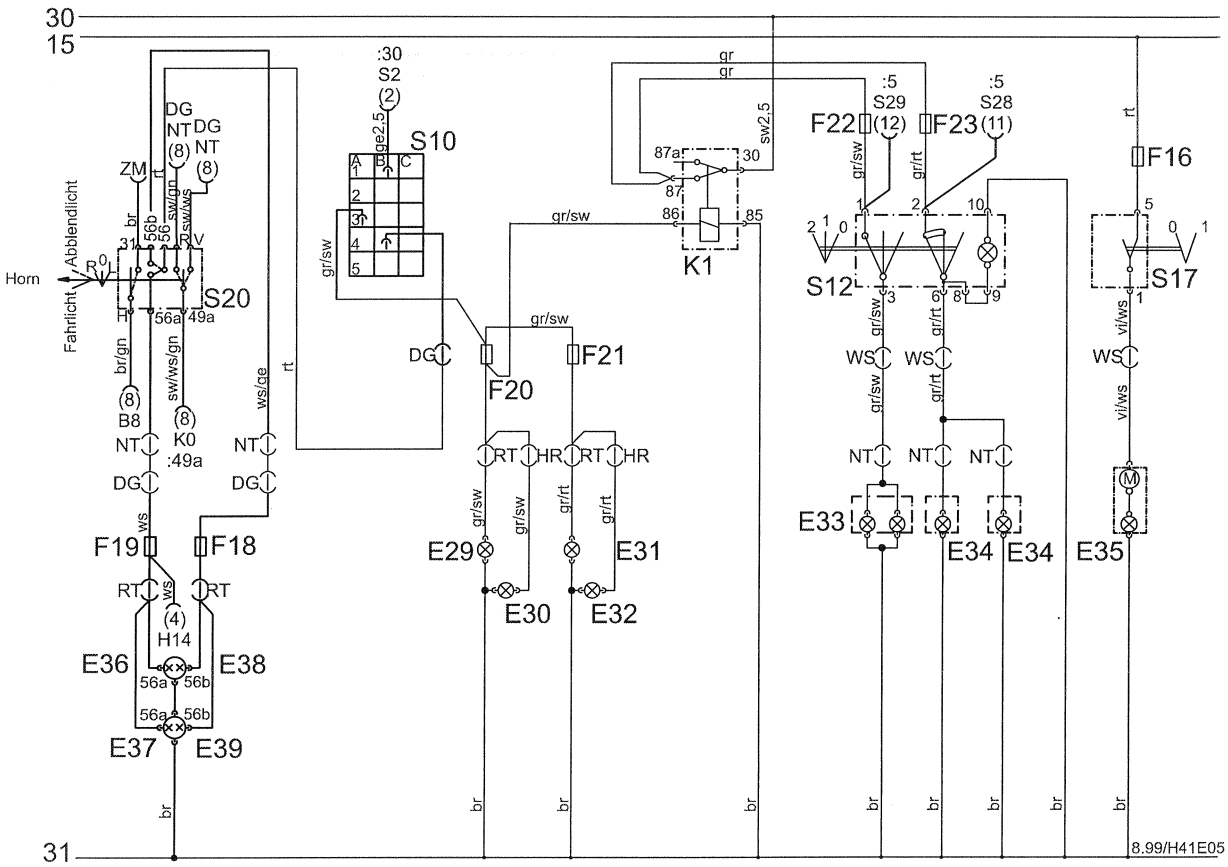
6. Heater fan	7. Wash/wipe system	8. Signaling system



Section Qty.	Desig-nation	Device
6		***Heater fan***
1	F7	Fuse
1	S15	Switch for heater fan
1	M3	Heater fan
7		***Wash/wipe system***
1	F1	Fuse
1	S11	Wiper switch
1	M4	Wiper motor
1	M5	Washer pump

Section Qty.	Desig-nation	Device
8		***Signaling system***
1	F6	Fuse
1	B8	Horn
1	F1	Fuse
1	F15	Fuse
1	S13	Hazard warning switch
1	K0	Directional indicator
1	E23	Turning indicator, front left
1	E24	Turning indicator, rear left
1	E25	Turning indicator, front right
1	E26	Turning indicator, rear right
1	F10	Fuse
1	S38	Stop light switch
1	E27	Left stop light
1	E28	Right stop light

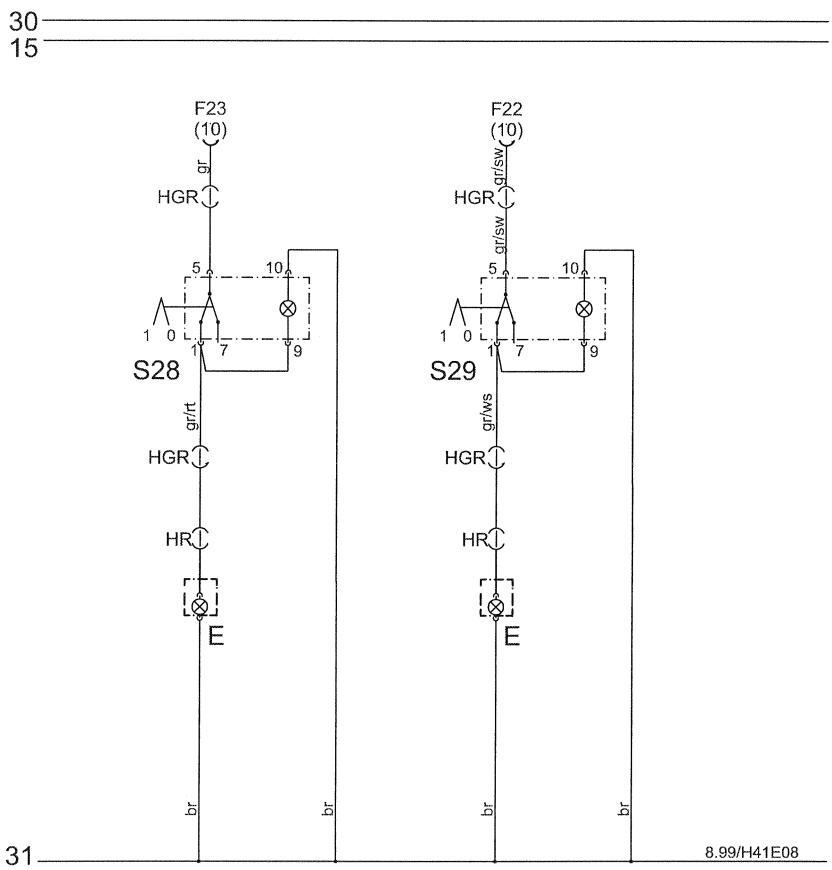
9. Lighting system	10. Working floodlights, rotating beacon



Section Qty.	Desig-nation	Device
9		***Lighting system***
1	S20	Turning indicator switch
1	F19	Fuse
1	E36	Upper beam, left
1	E37	Upper beam, right
1	F18	Fuse
1	E38	Lower beam, left
1	E39	Lower beam, right
1	S10	Light switch
1	F20	Fuse
1	E29	Side marker lamp, front left
1	E30	Side marker lamp, rear left
1	F21	Fuse
1	E31	Side marker lamp, front right
1	E32	Side marker lamp, rear right

Section Qty.	Desig-nation	Device
10		***Working floodlights***
1	K1	Working floodlights relay
1	F22	Fuse
1	F23	Fuse
1	S12	Working floodlights switch
1	E33	Working floodlight, rear
2	E34	Working floodlight, front
1	F16	Fuse
1	S17	Rotating beacon switch
1	E 35	Rotating beacon

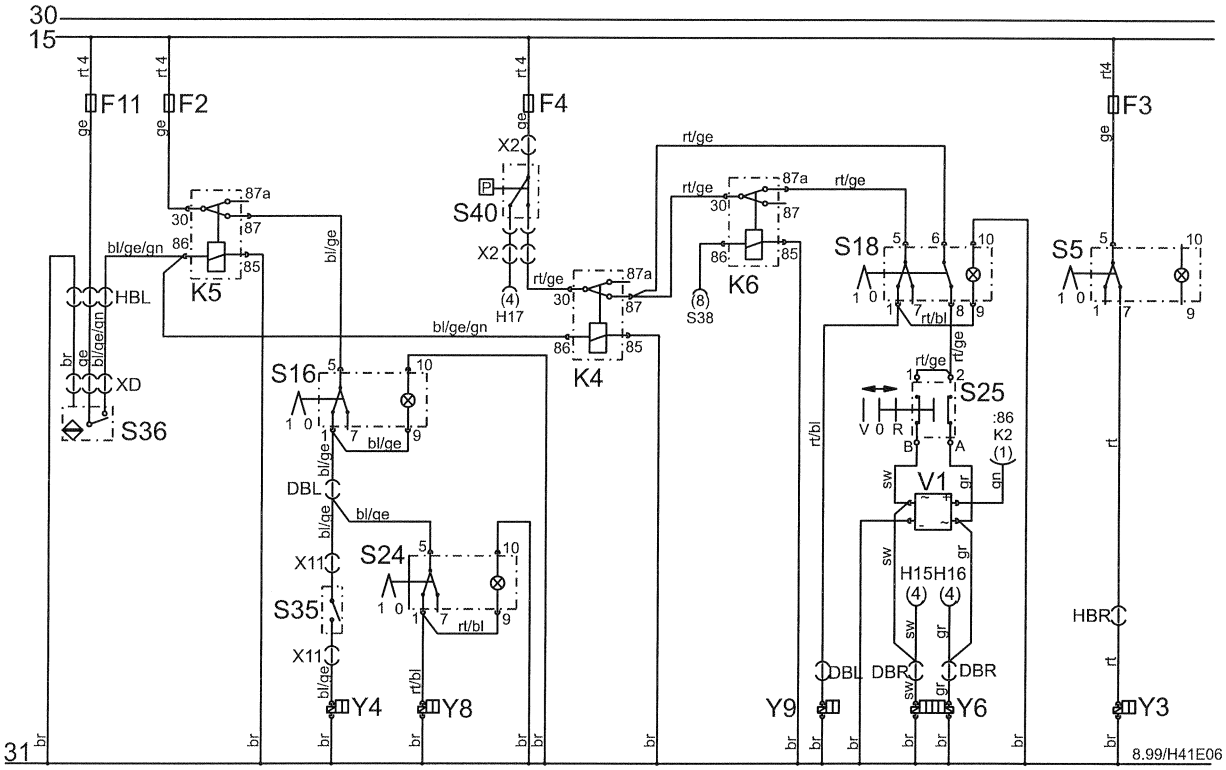
11. Boom-mounted working floodlight	12. Rear fog light



Section Qty.	Desig-nation	Device
11		***Boom-mounted working floodlight***
1	F23	Fuse
1	S28	Switch, working floodlight
1	E	Working floodlight

Section Qty.	Desig-nation	Device
12		***Rear fog light***
1	F22	Fuse
1	S29	Switch, rear fog light
1	E	Fog light

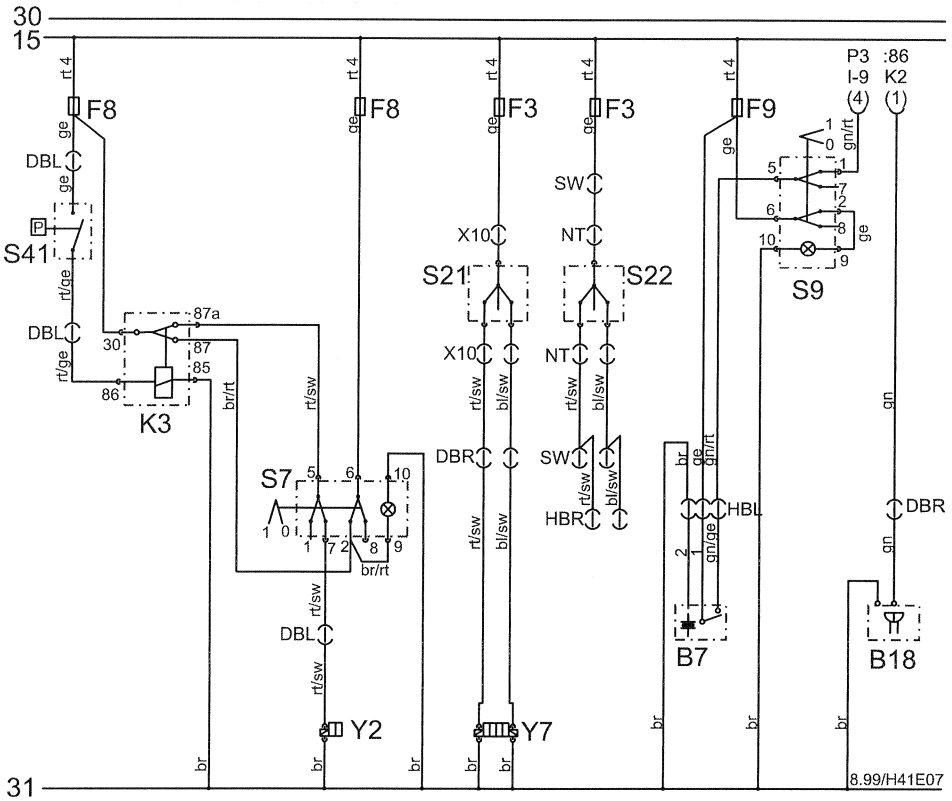
13. Working hydraulics cut-off	14. Travel



Section Qty.	Desig-nation	Device
13		***Working hydraulics cut-off***
1	F11	Fuse
1	XD	Plug connection
1	S36	Proximity switch for entry steps
1	F2	Fuse
1	K5	Relay for entry steps safety device
1	S16	Working hydraulics switch
1	X11	Plug connection
1	S35	Armrest switch
1	Y4	Valve for working hydraulics
1	S24	Switch for steering
1	Y8	Valve for steering

Section Qty.	Desig-nation	Device
14		***Travel***
1	F4	Fuse
1	X2	Plug connection
1	S40	Parking brake pressure switch
1	K4	Travel relay
1	K6	Relay for rocker pedal
1	S18	Switch for rocker pedal
1	Y9	Valve for rocker pedal
1	S25	Switch for travel, forward/ in reverse
1	V1	Bridge-connected rectifier
1	Y6	Valve for travel
1	F3	Fuse
1	S5	Fast/ Slow switch
1	Y3	Fast/ Slow valve

15. Oscillating axle lock	16. Options

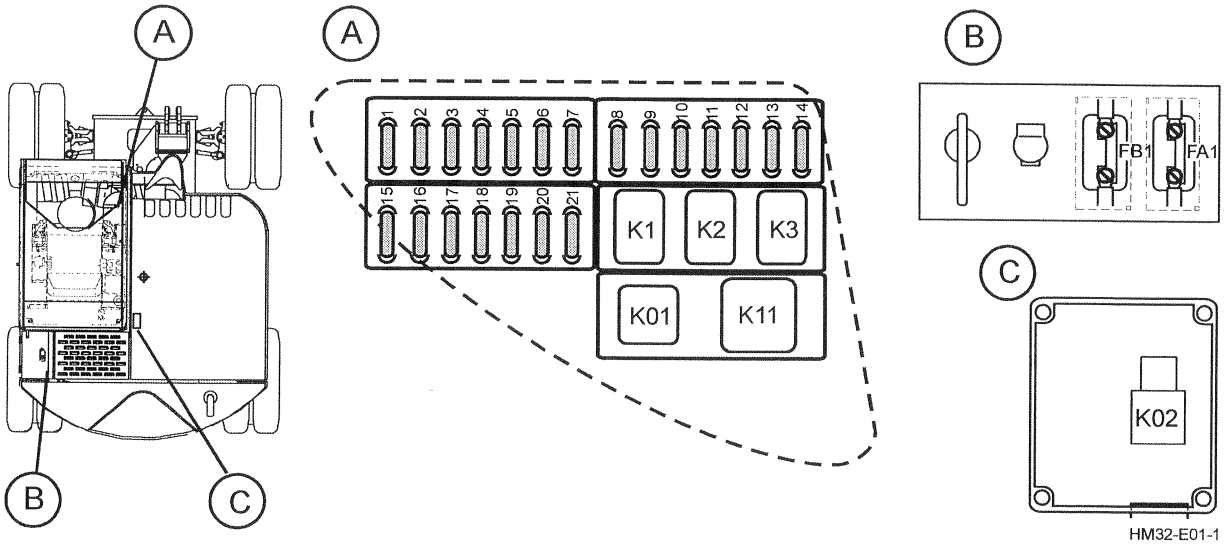


Section Qty.	Desig-nation	Device
15		***Oscillating axle lock***
1	F8	Fuse
1	S41	Pressure switch
1	K3	Relay for oscillating axle lock
1	F8	Fuse
1	S7	Switch for oscillating axle lock
1	Y2	Valve for oscillating axle lock

Section Qty.	Desig-nation	Device
16		***Options***
1	F3	Fuse
1	X10	Plug connection
1	S21	Switch in coordinate lever, right
1	Y7	Valve: e.g. grab rotation
1	F3	Fuse
1	S22	Switch in coordinate lever, left (not assigned)
1	F9	Fuse
1	S9	Overload warning cut-off
1	B7	Overload warning pressure sensor
1	B18	Warning buzzer
1		

Electrical system

Fuse and relay box - Assignment diagram



1 = Instrument panel 2 = Service ladder 3 = Starter box

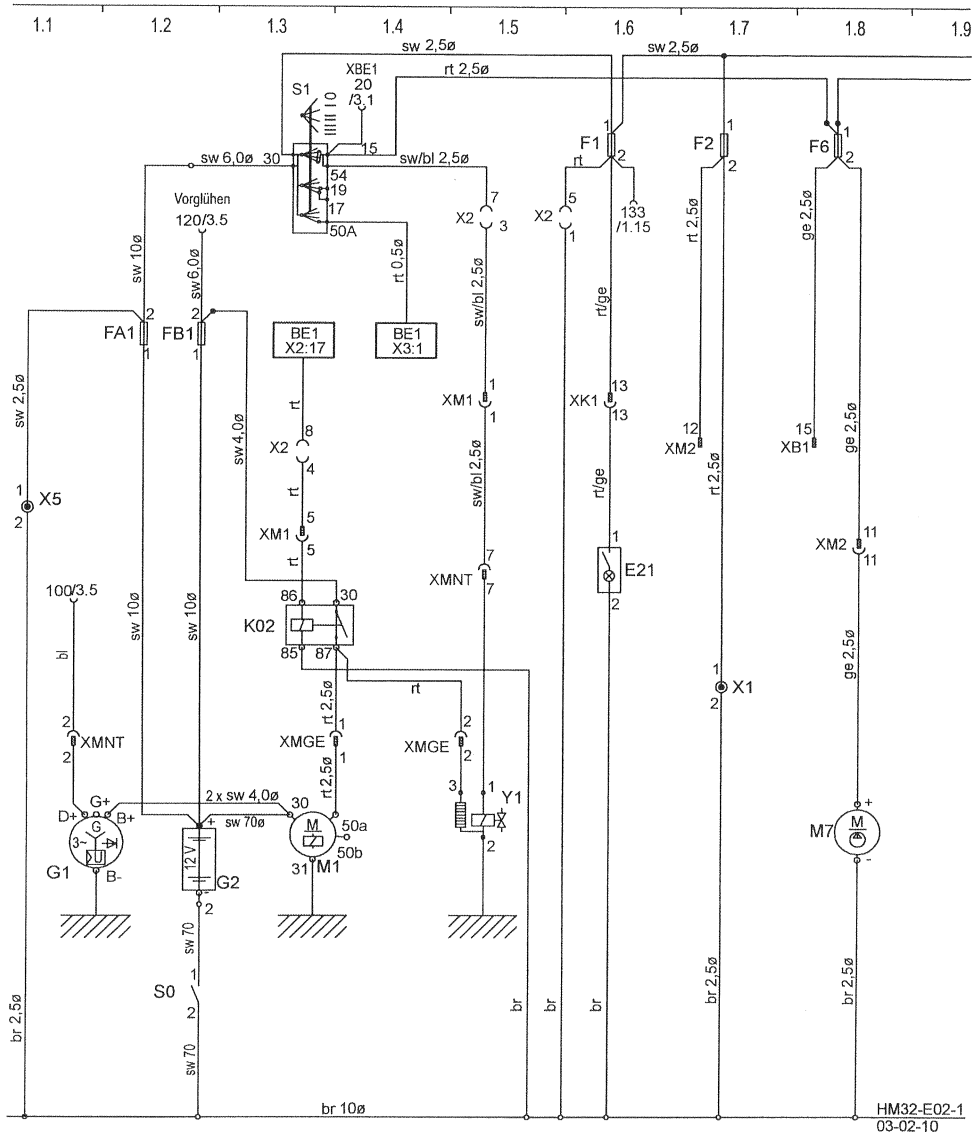
Fuses		
Position	**Ampere**	**assigned to**
F 1	10	Interior lamp, radio, immobilizer
F 2	20	Socket, additional heating (option)
F 3	10	Hazard flasher, headlamp flasher, rotating beacon
F 4	15	Working floodlight, front
F 5	15	Working floodlight, rear
F 6	15	Fuel-filling pump, electrical seat heating (option)
F 7	10	Horn, switch lighting, immobilizer
F 8	15	Heater fan
F 9	10	Wish-wash system, radio
F 10	5	Hydraulic oil level, overload warning, rock breaker, additional control circuit
F11	5	Travel, parking brake, brake light switch
F12	5	Working hydraulics
F13	10	Brake light
F14	10	Hazard flasher
F 15	15	High beam
F 16	15	Low beam

Fuses		
Position	**Ampere**	**assigned to**
F17	10	Side marker lamp, left
F18	10	Side marker lamp, right
F19	10	Additional module
F20	10	All-wheel steering
F21	10	--
FA1	40	Main fuse
FB1	60	Pre-heating

Colors of fuses			
5A	brown	10A	red
15A	blue	20A	yellow

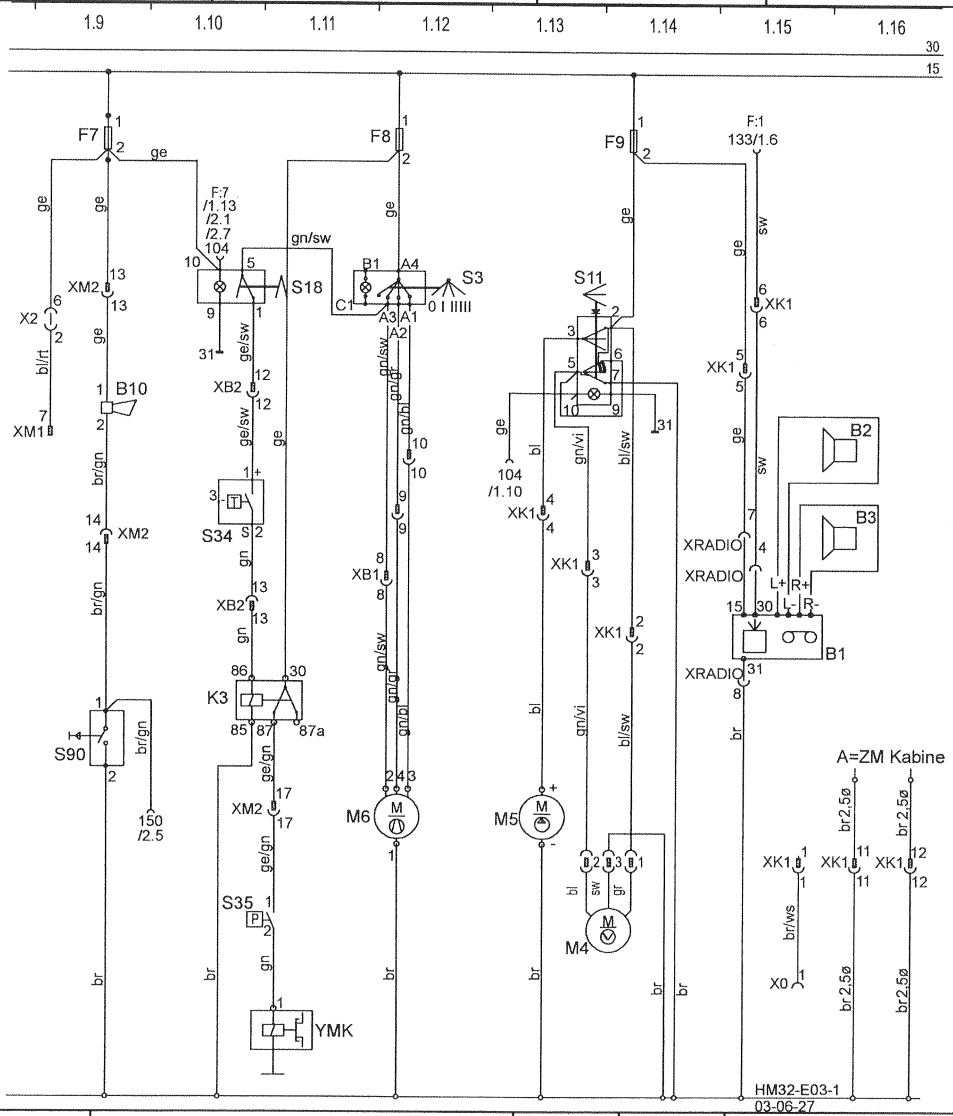
Relays	
Position	**Function**
K 01	Pre-heating relay
K 02	Start-up relay
K 1	Working floodlight, front
K 2	Working floodlight, rear
K 3	not assigned (air conditioning — option)
K11	Turn-signal flasher

Power supply	Start-up system	Shut-off	Interior lamp, socket	Fuel-filling pump



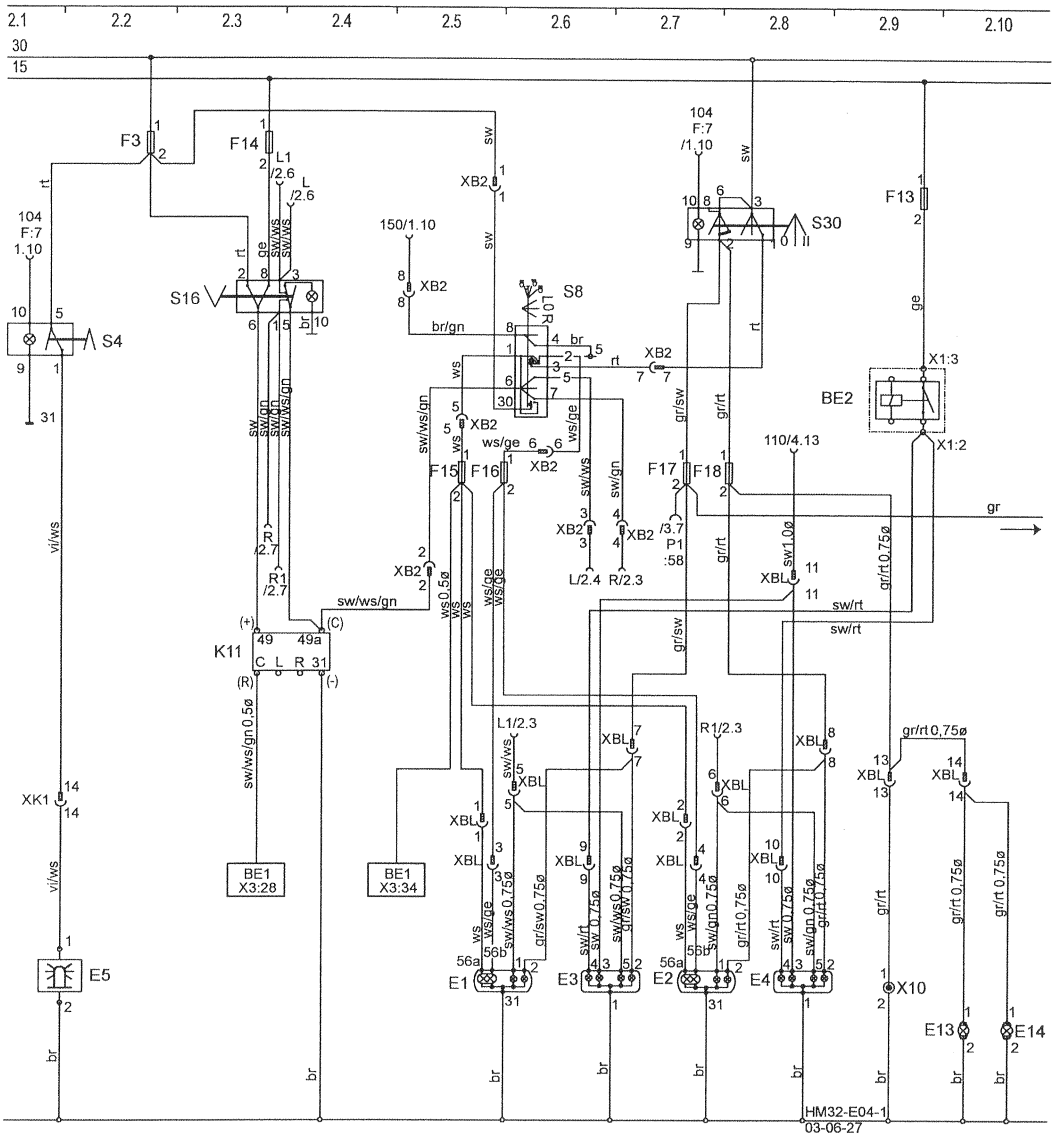
Path	Code	Device	Path	Code	Device
		Power supply			***Shut-off***
1.1	X5	Service ladder socket	1.5	Y1	Shut-off
1.2	G1	Generator			***Interior lamp, socket***
1.2	FA 1	Fuse	1.6	F1	Fuse
1.2	FB 1	Fuse	1.6	E21	Interior lamp
1.2	G2	Battery	1.7	F2	Fuse
1.2	SO	Battery disconnect switch	1.7	X1	Instrument panel socket
		Start-up system			
1.3	S1	Glow plug and starter switch			***Fuel-filling pump***
1.3	M1	Starter	1.8	F6	Fuse
1.3	K02	Start-up relay	1.8	M7	Fuel-filling pump

Horn	Heater fan, air conditioning	Wish-wash system	Radio



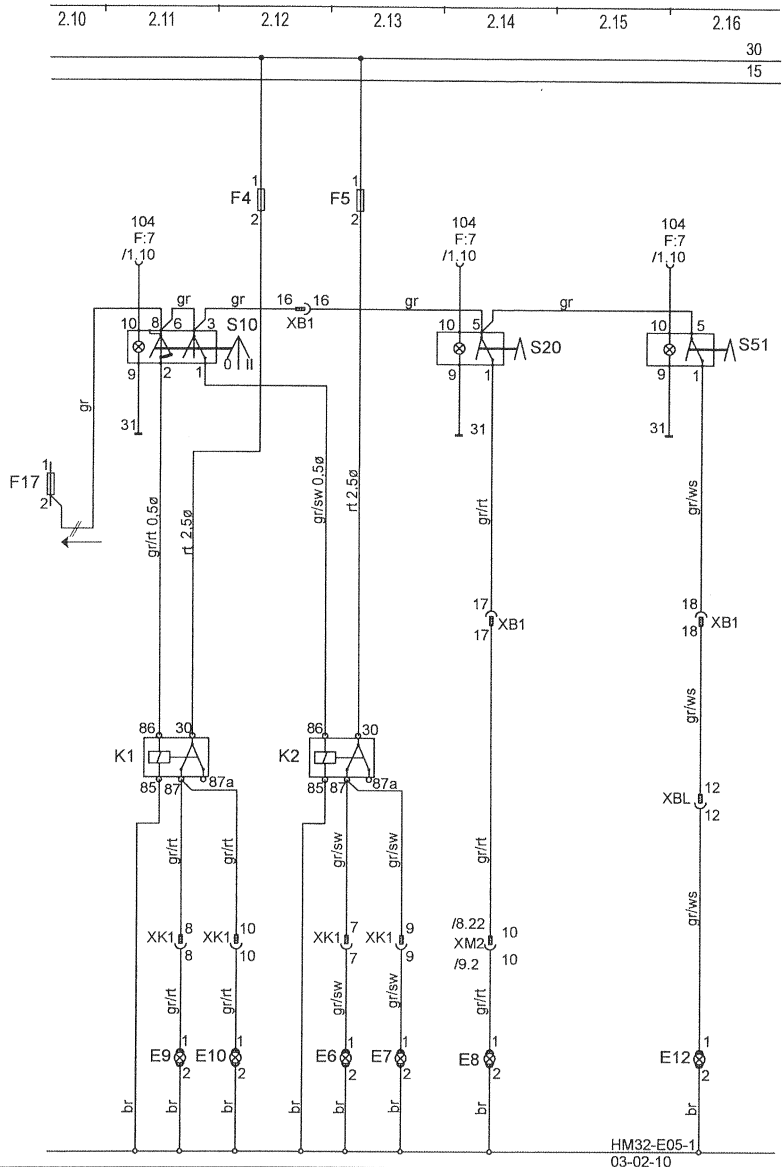
Path	Code	Device	Path	Code	Device
		Horn			***Wish-wash system***
1.9	F7	Fuse	1.13	M5	Washer pump
1.9	B10	Horn	1.13	S11	Wish-wash switch
1.9	S90	Coordinate lever horn button	1.13	F9	Fuse
		Heater fan, air conditioning	1.13	M4	Wiper motor
1.10	S18	Air conditioning switch			
1.10	S34	Air condit. temperature switch			***Radio***
1.10	K3	Relay	1.15	B1	Radio
1.10	S35	Air conditioning pressur.switch	1.16	B2	Loudspeaker
1.10	YMK	Compress. magnetic coupling	1.16	B3	Loudspeaker
1.11	F8	Fuse			
1.12	S3	Heater fan switch	1.16	A	Central mass, cab
1.12	M6	Heater fan			

Rotating beacon	Lighting system



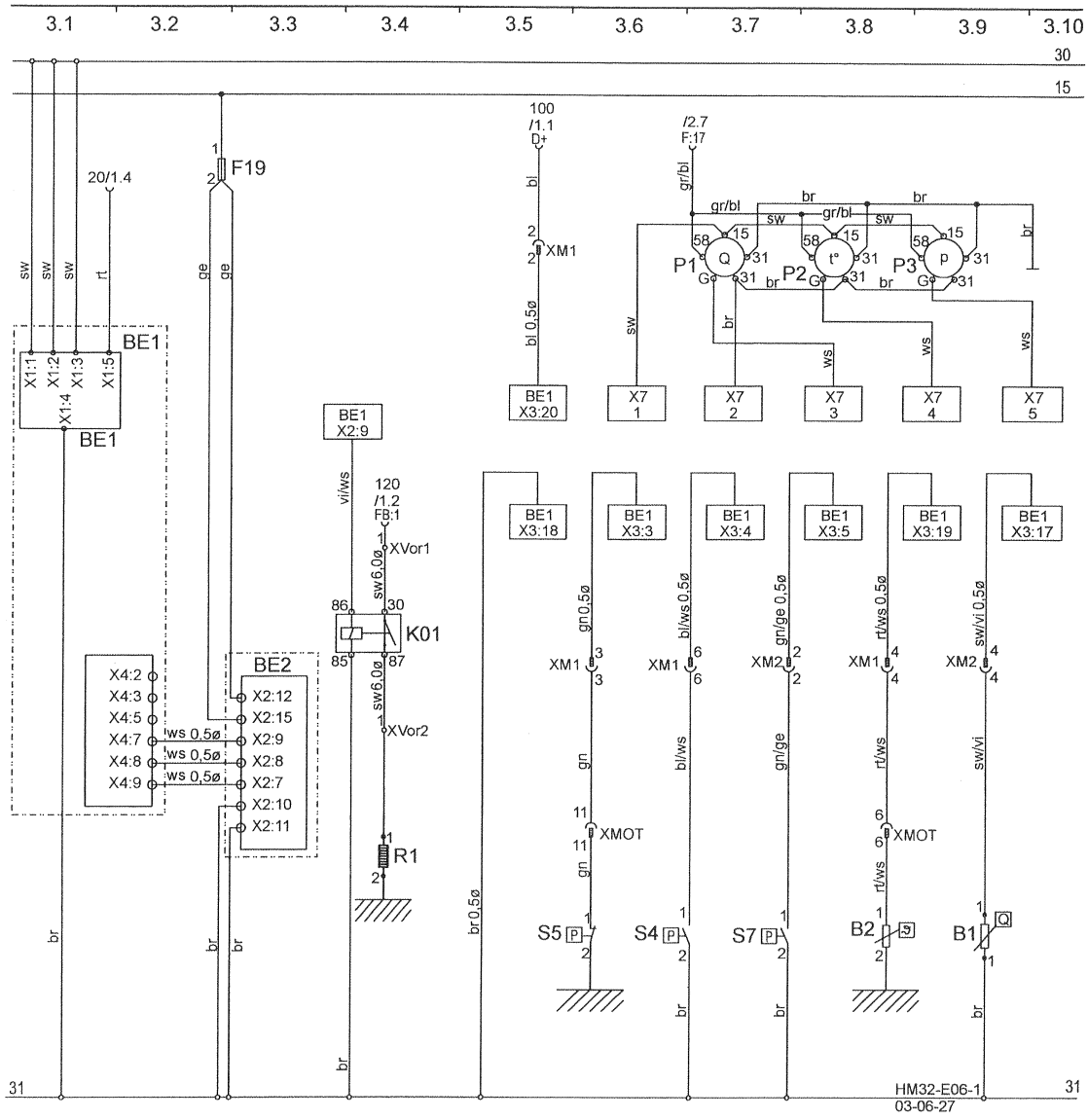
Path	Code	Device	Path	Code	Device
		Rotating beacon	2.5	E1	Headlamp, left
2.1	S4	Rotating beacon switch	2.6	E3	Tail lamp, left
2.2	E3	Rotating beacon	2.7	E2	Headlamp, right
2.2	F3	Fuse	2.7	F17	Fuse
		Lighting system	2.8	S30	Light switch
2.3	F14	Fuse	2.8	F18	Fuse
2.3	S16	Hazard warning switch	2.8	E4	Tail lamp, right
2.3	K11	Directional indicator	2.9	F13	Fuse
2.5	F15	Fuse	2.9	BE2	Additional module
2.5	F16	Fuse	2.9	X10	Side marker lamp socket
2.6	S8	Steering-column switch	2.10	E13	License-plate illumination
			2.10	E14	License-plate illumination

Working floodlights	Rear fog lamp



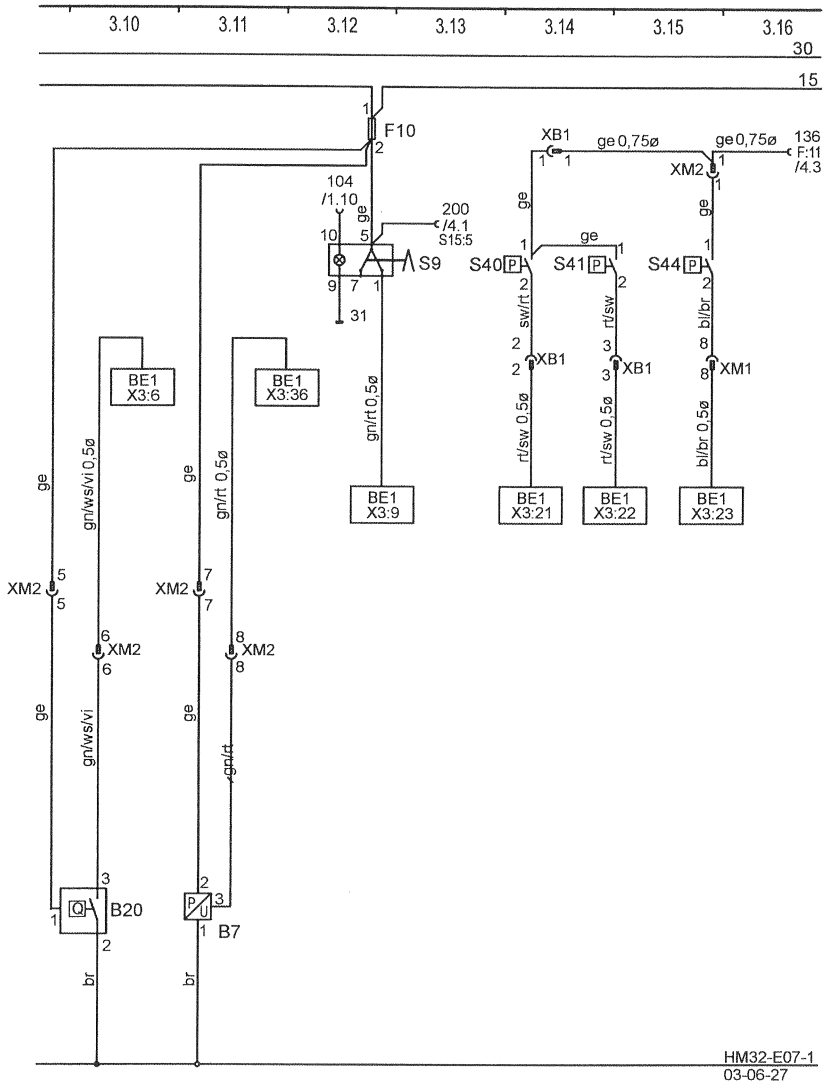
Path	Code	Device	Path	Code	Device
		Working floodlights	2.13	E7	Working floodlight, rear
2.10	S10	Switch for working floodlights, front and rear	2.14	S20	Switch for boom-mounted working floodlight
2.11	K1	Headlamp relay, front	2.14	E8	Boom-mounted working floodlight
2.11	E9	Working floodlight, front			
2.12	E10	Working floodlight, front			***Rear fog lamp***
2.12	F4	Fuse	2.16	S51	Rear fog lamp switch
2.13	F5	Fuse	2.16	E12	Rear fog lamp
2.13	K2	Headlamp relay, rear			
2.14	E6	Working floodlight, rear			

Control module	Pre-heat system	Instruments, warning devices



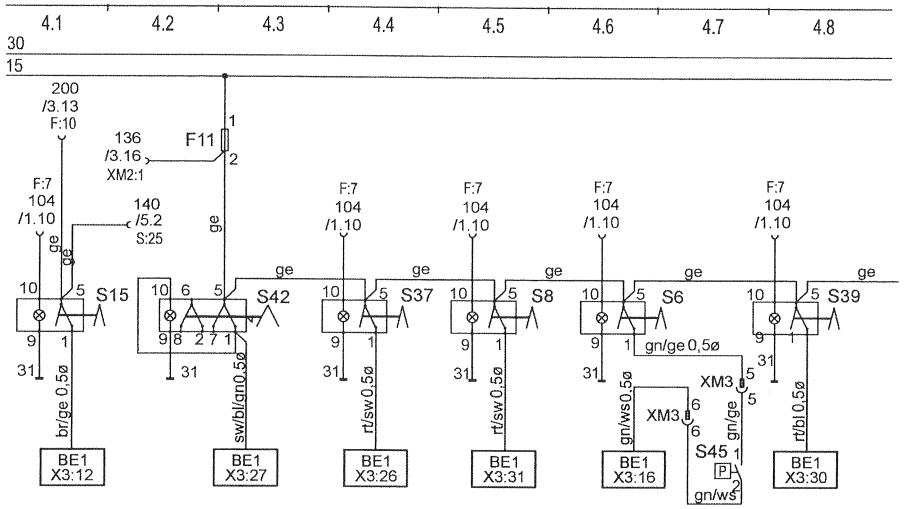
Path	Code	Device	Path	Code	Device
		Control module			***Instruments, warning devices***
3.1	BE1	Control module	3.5	S5	Oil pressure switch
3.3	F19	Fuse	3.6	S4	Air filter maintenance
3.3	BE2	Additional module	3.7	S7	Hydraulic oil filter
		Pre-heating	3.8	B2	Coolant temperature
3.4	K01	Pre-heat relay	3.9	B1	Tank sensor
3.4	R1	Glow plugs			

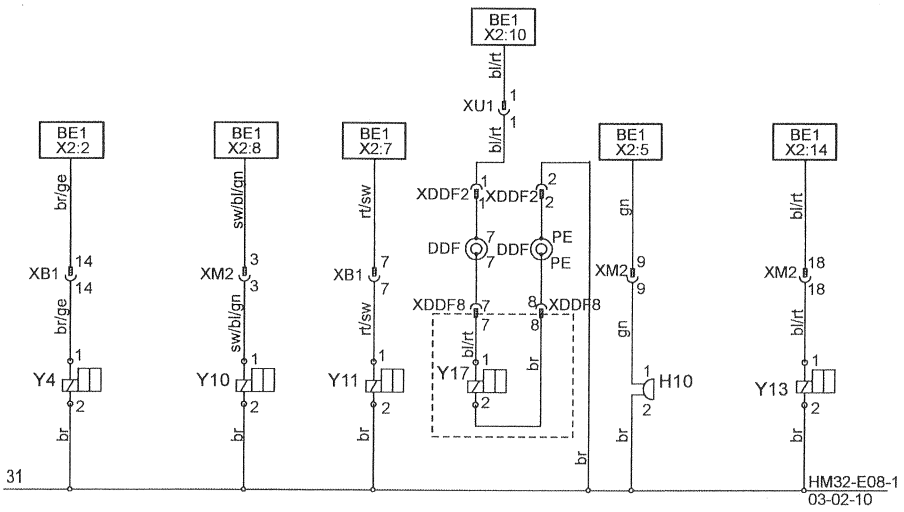
Instruments, warning devices	Overload warning device	Hydraulic functions



Path	Code	Device	Path	Code	Device
		Instruments, warning devices			***Hydraulic functions***
3.10	B20	Hydraulic oil level	3.14	S40	Brake lights pressure switch
		Overload warning device	3.14	S41	Axle lock pressure switch
3.11	B7	Overload warning signal sensor	3.15	S44	Accumulator pressure
3.12	F10	Fuse			
3.12	S9	Overload warning device switch			

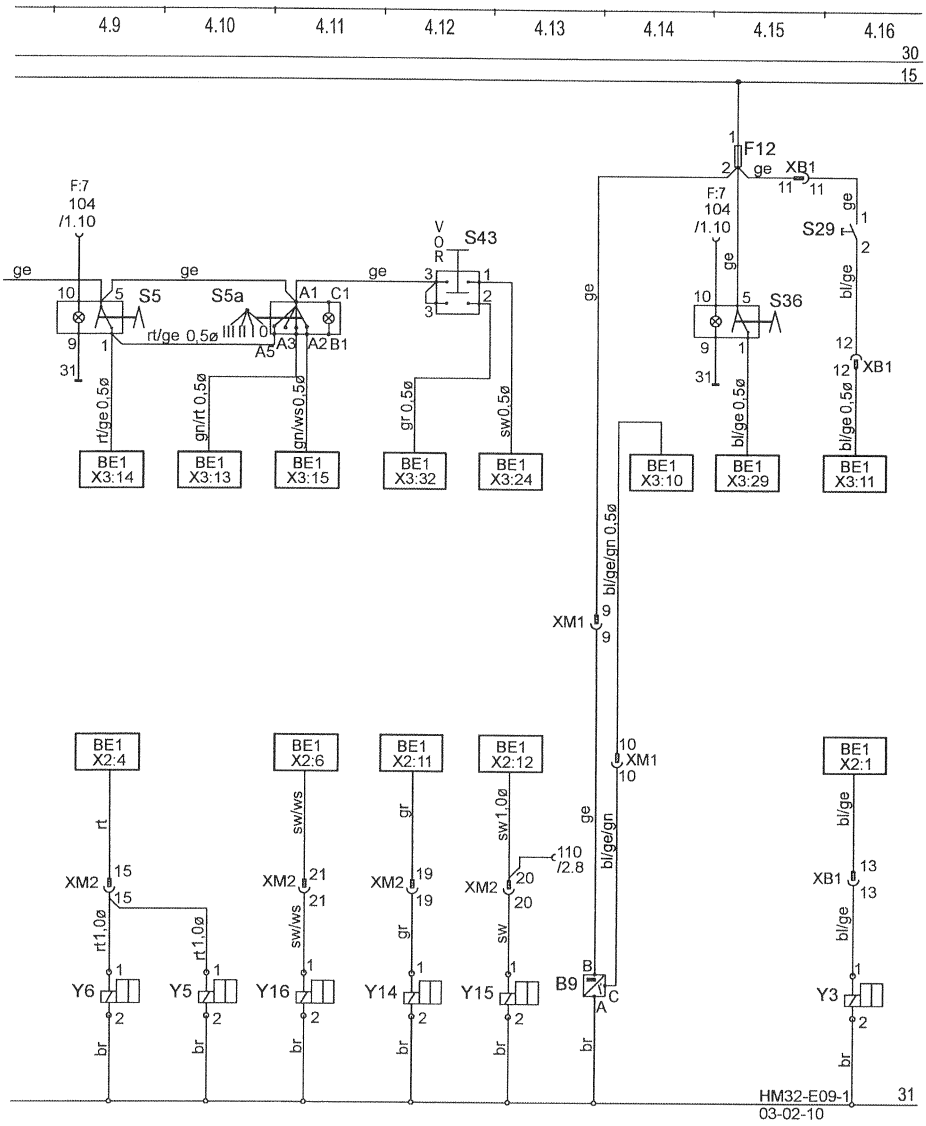
Hydraulic functions	Travel drive





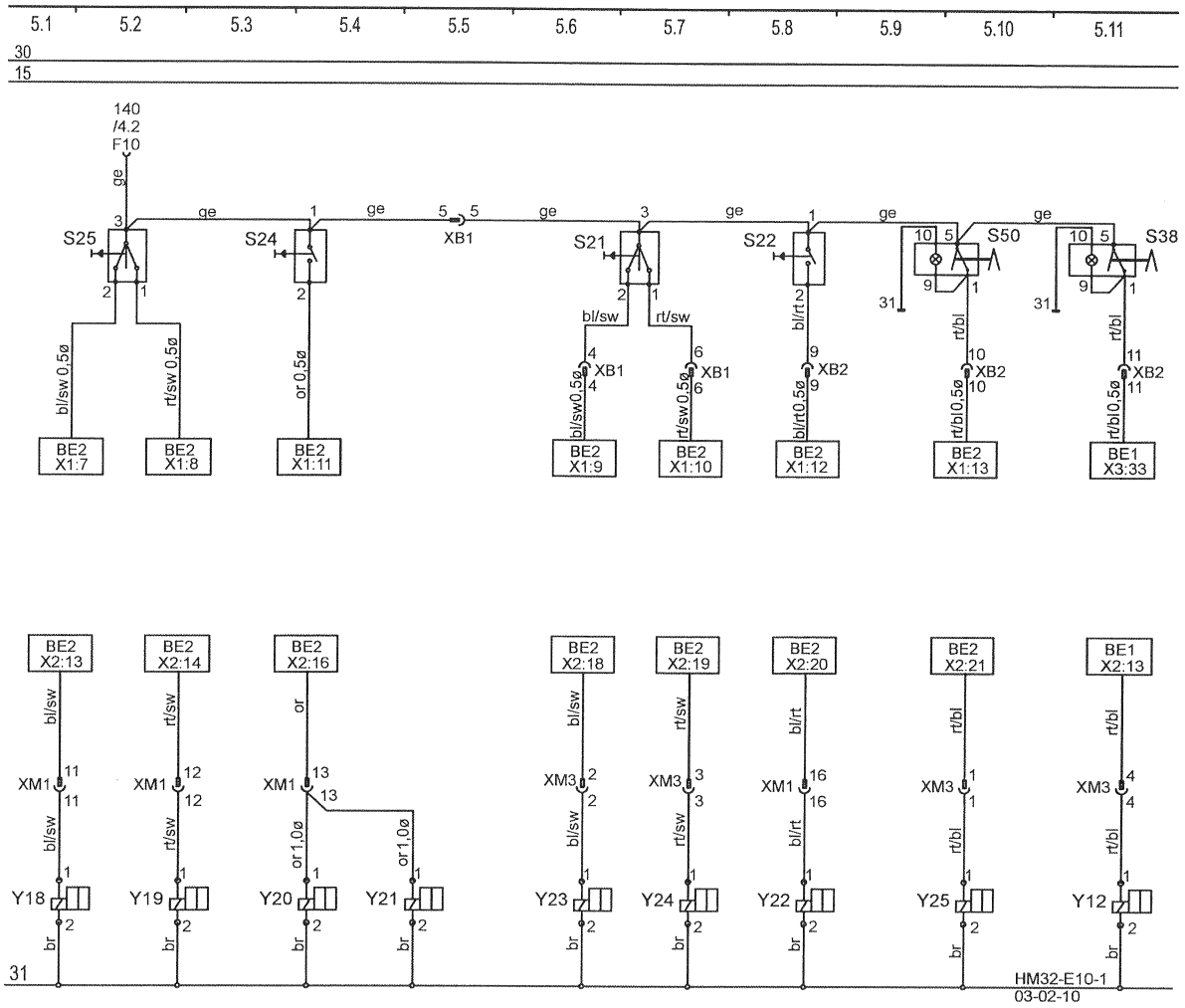
Path	Code	Device	Path	Code	Device
		Hydraulic functions	4.5	S8	Front dozer blade switch
4.1	S15	Rock breaker switch	4.5	Y17	Front dozer blade valve
4.1	Y4	Rock breaker valve	4.5	DDF	Rotary transmission
4.3	F11	Fuse	4.6	S6	Travel motion alarm switch
4.3	S42	Parking brake switch	4.7	S45	Travel motion alarm pressure switch
4.3	Y10	Parking brake valve	4.7	H10	Travel motion alarm horn
4.4	S37	Axle lock switch	4.8	S39	Switch for travel by pedal
4.4	Y11	Axle lock valve	4.8	Y13	Valve for travel by pedal

Travel drive	Working hydraulics cut-off



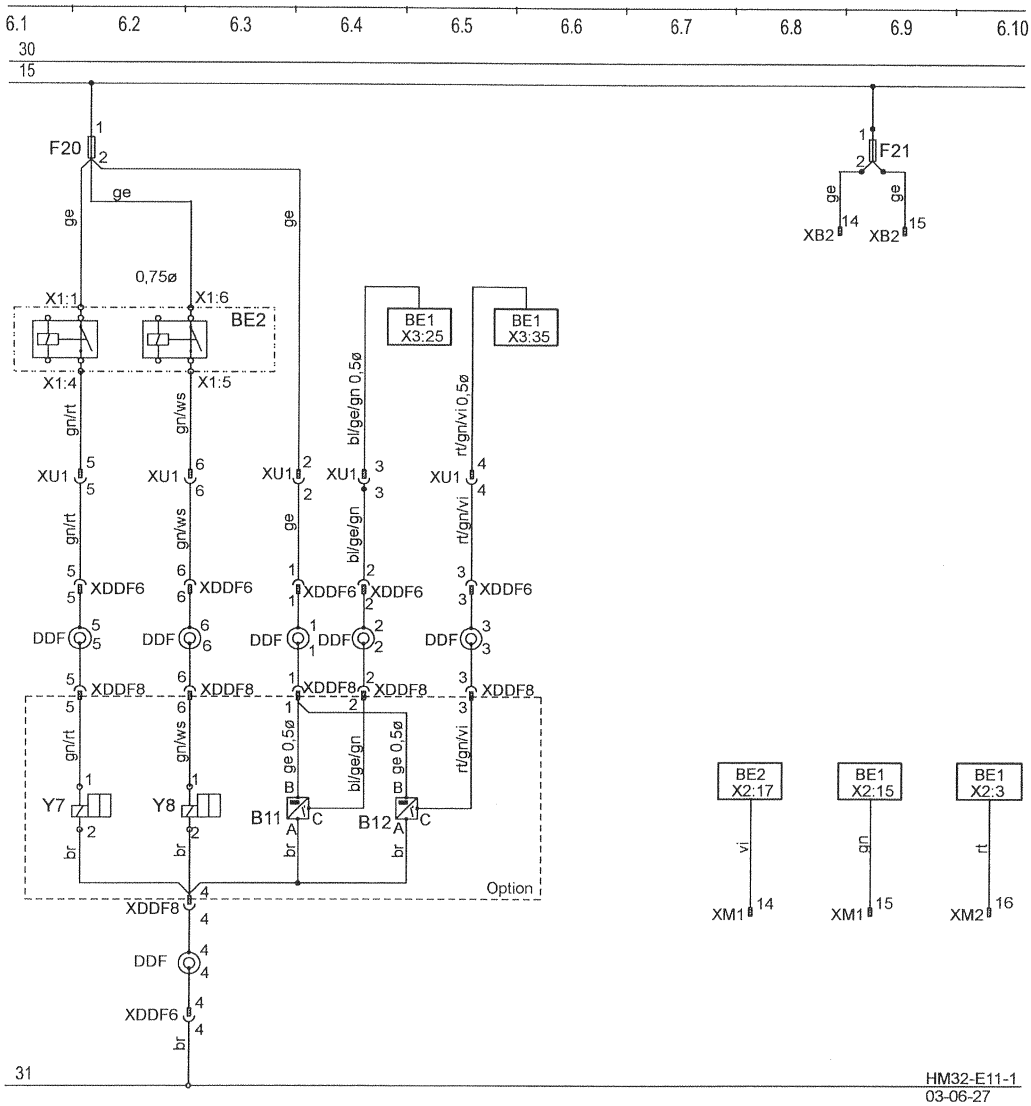
Path	Code	Device	Path	Code	Device
		Travel motion alarm			***Working hydraulics cut-off***
4.9	Y6	Valve "FAST"	4.13	B9	Service ladder proximity switch
4.9	S5	Switch "FAST/SLOW"	4.15	F12	Fuse
4.10	Y5	Valve "FAST"	4.15	S36	Working hydraulics cut-off
4.11	S5a	Switch "All-wheel steering"	4.16	S29	Armrest switch
4.11	Y16	Valve "Flushing"	4.16	Y3	Working hydraulics valve
4.12	Y14	Valve "Travel, forward"			
4.12	S43	"Forward/Reverse" switch			
4.13	Y15	Valve "Travel, forward"			

Coordinate lever, right	Coordinate lever, left	Armrest, left



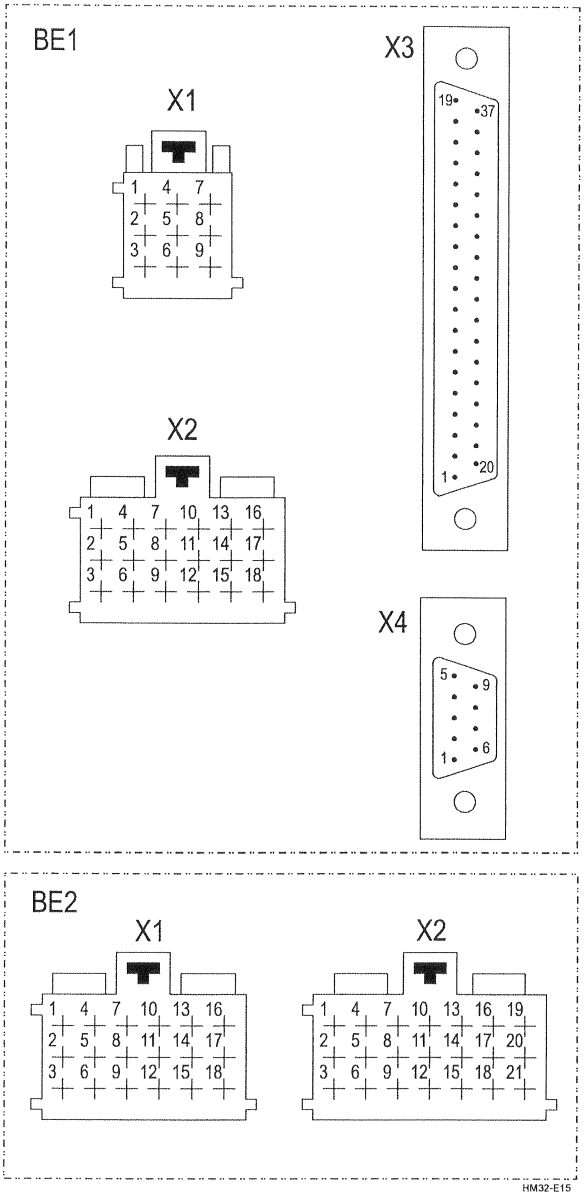
Path	Code	Device	Path	Code	Device
		Coordinate lever, right			***Coordinate lever, left***
5.1	Y18	Valve, additional control circuit 1	5.6	Y23	Valve, additional control circuit 2
5.2	S25	Push-button, additional control circuit 1	5.7	S21	Push-button, additional control circuit 2
5.2	Y19	Valve, addit. control circuit 1	5.7	Y24	Valve, addit. control circuit 2
5.4	S24	Changeover switch, articulat.	5.8	S22	Swing pressure boost
5.4	Y20	Valve, articulation	5.8	Y22	Swing pressure valve
5.5	Y21	Valve, articulation			***Armrest, left***
			5.10	S50	Switch, bucket control changeover
			5.10	Y25	Valve, bucket control changeover
			5.11	S38	Switch, steering changeover
			5.11	Y12	Valve, steering changeover

Steering	Option



Path	Code	Device	Path	Code	Device
		Steering	6.3	Y8	Valve "Round/Crab"
6.1	F20	Fuse	6.4	B11	Proximity switch for front axle steering angle
6.1	BE2	Additional module	6.5	B12	Proximity switch for rear axle steering angle
6.1	Y7	Valve "Round/Crab"			***Option***
6.2	DDF	Rotary transmission	6.9	F21	Fuse

Control module



Control module **BE1**

X1	***Power supply***
1	Power supply Terminal 30
2	Power supply Terminal 30
3	Power supply Terminal 30
4	Central mass
5	Power supply Terminal 15
6	--
7	--
8	--
9	--
X2	***Signal outputs***
1	Working hydraulics
2	Rock breaker
3	--
4	FAST – SLOW
5	Travel motion alarm
6	Flushing
7	Axle lock
8	Parking brake
9	Pre-heating
10	Front dozer blade
11	Travel, forward
12	Travel, reverse
13	Steering changeover
14	Accelerator pedal
15	--
16	--
17	Start-up magnetic switch Terminal 50A
18	--
X3	***Signal inputs***
1	Start-up ignition lock Terminal 50A
2	--
3	Oil pressure switch
4	Air filter clogging
5	Hydraulic oil filter clogging
6	Hydraulic oil float switch
7	--
8	--
9	Overload warning switch
10	Service ladder proximity switch
11	Armrest switch

12	Rock breaker switch
13	All-wheel steering "Crab"
14	Fast – Slow switch
15	All-wheel steering "Round"
16	Travel motion alarm switch
17	Tank sensor
18	Central mass
19	Coolant temperature
20	Charge control
21	Brake light signal
22	Axle lock signal
23	Accumulator pressure signal
24	Switch for travel, reverse
25	Front axle steering angle signal
26	Axle lock switch
27	Parking brake switch
28	Direction indicator lamps signal
29	Working hydraulics switch
30	Accelerator pedal switch
31	Front dozer blade switch
32	Switch for travel, forward
33	Steering changeover switch
34	High beam signal
35	Rear axle steering angle signal
36	Overload warning signal
37	--
X4	***Interface***
1	--
2	--
3	--
4	--
5	--
6	--
7	Connection additional module X2:9
8	Connection additional module X2:8
9	Connection additional module X2:7

Additional module BE2

X1	***Plug***
1	Power supply Terminal 15
2	Brake lights
3	Power supply Terminal 15
4	Valve for all-wheel steering
5	Valve for all-wheel steering
6	Power supply Terminal 15
7	Additional control circuit 1 push-button
8	Additional control circuit 1 push-button
9	Additional control circuit 2 push-button
10	Additional control circuit 2 push-button
11	Articulation changeover push-button
12	Swing pressure boost push-button
13	Bucket changeover (option) switch
14	--
15	--
16	--
17	--
18	--
X2	***Plug***
1	--
2	--
3	--
4	--
5	--
6	--
7	Connection control module X4:9
8	Connection control module X4:8
9	Connection control module X4:7
10	Central mass
11	Central mass
12	Power supply Terminal 15
13	Valve additional control circuit 1
14	Valve additional control circuit 1
15	Power supply Terminal 15
16	Valve for articulation
17	--
18	Valve for additional control circuit 2
19	Valve for additional control circuit 2
20	Swing pressure boost
21	Bucket changeover (option)

All voltages are measured between ground and the corresponding test point !!
Unless otherwise advised, the ignition has to be switched on !!

Charge indicator

generator D+	wire harness machine engine plug XMNT:2	wire harness machine disconnect XM1:2	input plug control module X3:20	warning lamp
blue	blue	blue	blue	
12V	12V	12V	12V	OFF

only with running engine

Oil pressure indicator

oil pressure switch S5	wire harness machine engine plug XMNT:6	wire harness machine disconnect XM1:3	input plug control module X3:3	warning lamp
green	green	green	green	
0V	0V	0V	0V	ON

Air filter indicator

maintenance switch air filter S4	wire harness machine disconnect XM1:6	input plug control module X3:4	warning lamp
blue / white	blue / white	blue / white	
0V	0V	0V	ON

Hydraulic oil filter indicator

maintenance switch hydraulic oil filter S7	wire harness machine disconnect XM2:2	input plug control module X3:5	warning lamp
green / yellow	green / yellow	green / yellow	
0V	0V	0V	ON

Hydraulic oil level

oil level transmitter B20	wire harness machine disconnect XM2:6	input plug control module X3:6	warning lamp
green / white / violet	green / white / violet	green / white / violet	
0V	0V	0V	ON

Accumulator charge pressure indicator

pressure switch S44	wire harness machine disconnect XM1:8	input plug control module X3:23	warning lamp
blue / brown	blue / brown	blue / brown	
12V	12V	12V	ON

Flasher indicator

flasher relay K11:C	input plug control module X3:28	warning lamp
black / white / green	black / white / green	
12V	12V	ON

All voltages are measured between ground and the corresponding test point !!
Unless otherwise advised, the ignition has to be switched on !!

High beam indicator

steering column switch S8:1	wire harness floor frame disconnect XB2:5	fuse F15:2	input plug control module X3:34	warning lamp
white	white	white	white	
12V	12V	12V	12V	ON

Starting safety

switch forward S43:2	input plug control module X3:32	switch reverse S43:1	input plug control module X3:24	pre-heat/ starter switch S1:50a	control module X3:1
grey	grey	black	black	red	red
0V	0V	0V	0V	12V	12V

only when key is in start position

output plug control module X2:17	wire harness machine disconnect XM1:5	starter box: relay K02:86	starter box: fuse F02:2	starter box: relay K02:30	starter box: relay K02:87	wire harness machine engine plug XMGE:1
red	red	red	red	red	red	red
12V	12V	12V	12V	12V	12V	12V

Fast/ slow

switch S5:1	input plug control module X3:14	output plug control module X2:4	wire harness machine disconnect XM2:15	valve Y6:1	output plug control module X2:3	wire harness machine disconnect XM2:16	valve Y5:1
red / yellow	red / yellow	red	red	red	red	red	red
12V	12V	12V	12V	12V	12V	12V	12V

Sensitive travel

switch S39:1	input plug control module X3:30	wire harness floor frame: armrest switch S29:2	wire harness floor frame disconnect XB1:12	input plug control module X3:11
red / blue	red / blue	blue / yellow	blue / yellow	blue / yellow
12V	12V	12V	12V	12V

output plug control module X2:14	wire harness machine disconnect XM2:18	valve Y13:1
blue / red	blue / red	blue / red
12V	12V	12V

Travel forward

switch forward S43:2	input plug control module X3:32	switch reverse S43:1	input plug control module X3:24	switch parking brake S42:1	input plug control module X3:27	wire harness machine pressure switch axle lock S41:2	wire harness floor frame disconnect XB1:3	input plug control module X3:22
grey	grey	black	black	black / blue / green	black / blue / green	red / black	red / black	red / black
12V	12V	0V	0V	0V	0V	0V	0V	0V

switch sensitive travel S39:1	input plug control module X3:30	wire harness floor frame: armrest switch S29:2	wire harness floor frame disconnect XB1:12	input plug control module X3:11	wire harness machine: proximity switch stairs B9:C	wire harness machine disconnect XM1:10	input plug control module X3:10
red / blue	red / blue	blue / yellow	blue / yellow	blue / yellow	blue / yellow / green	blue / yellow / green	blue / yellow / green
0V	0V	12V	12V	12V	12V	12V	12V

output plug control module X2:11	wire harness machine disconnect XM2:19	valve Y14:1	warning lamp
grey	grey	grey	
12V	12V	12V	ON

All voltages are measured between ground and the corresponding test point !!
Unless otherwise advised, the ignition has to be switched on !!

Travel reverse

switch forward S43:2	input plug control module X3:32	switch reverse S43:1	input plug control module X3:24	switch parking brake S42:1	input plug control module X3:27	wire harness machine pressure switch axle lock S41:2	wire harness floor frame disconnect XB1:3	input plug control module X3:22
grey	grey	black	black	black / blue / green	black / blue / green	red / black	red / black	red / black
0V	0V	12V	12V	0V	0V	0V	0V	0V

switch sensitive travel S39:1	input plug control module X3:30	wire harness floor frame: armrest switch S29:2	wire harness floor frame disconnect XB1:12	input plug control module X3:11	wire harness machine: proximity switch stairs B9:C	wire harness machine disconnect XM1:10	input plug control module X3:10
red / blue	red / blue	blue / yellow	blue / yellow	blue / yellow	blue / yellow / green	blue / yellow / green	blue / yellow / green
0V	0V	12V	12V	12V	12V	12V	12V

output plug control module X2:12	wire harness machine disconnect XM2:20	valve Y15:1	warning lamp
black	black	black	
12V	12V	12V	ON

Flushing

wire harness machine pressure switch axle lock S41:2	wire harness floor frame disconnect XB1:3	input plug control module X3:22
red / black	red / black	red / black
12V	12V	12V

output plug control module X2:6	wire harness machine disconnect XM2:21	valve Y16:1
black / white	black / white	black / white
12V	12V	12V

Parking brake

switch S42:1	input plug control module X3:27	output plug control module X2:8	wire harness machine disconnect XM2:3	valve Y10:1	warning lamp
black / blue / green	black / blue / green	black / blue / green	black / blue / green	black / blue / green	
12V	12V	0V	0V	0V	ON

Stop light

wire harness floor frame pressure switch stop light S40:2	wire harness floor frame disconnect XB1:2	input plug control module X3:21
black / red	black / red	black / red
12V	12V	12V

when pressure switch excavator brake is actuated
switches off stop light automatically after approx. 1 minute

add. module plug X1:2	wire harness floor frame disconnect XBL:9	plug left-hand rear light pin 4	wire harness floor frame disconnect XBL:10	plug right-hand rear light pin 4
black / red	black / red	black / red	black / red	black / red
12V	12V	12V	12V	12V

All voltages are measured between ground and the corresponding test point !!
Unless otherwise advised, the ignition has to be switched on !!

Steering inversion

switch steering inversion S38:1	input plug control module X3:33
red / blue	red / blue
12V	12V

output plug control module X2:13	additional wire harness XU1:1	valve Y12:1
red / blue	red / blue	red / blue
12V	12V	12V

Oscillating axle lock

wire harness floor frame pressure switch excavator brake S41:2	wire harness floor frame disconnect XB1:3	input plug control module X3:22
red / black	red / black	red / black
12V	12V	12V

switch oscillating axle lock S37:1	input plug control module X3:26
red / black	red / black
12V	12V

output plug control module X2:7	wire harness floor frame disconnect XB1:7	valve Y11:1
red / black	red / black	red / black
0V	0V	0V

output plug control module X2:7	wire harness floor frame disconnect XB1:7	valve Y11:1
red / black	red / black	red / black
0V	0V	0V

Working hydraulics

switch working hydraulics S36:1	input plug control module X3:29	wire harness floor frame: armrest switch S29:2	wire harness floor frame disconnect XB1:12	input plug control module X3:11	wire harness machine: proximity switch stairs B9:C	wire harness machine disconnect XM1:10	input plug control module X3:10
blue / yellow	blue / yellow	blue / yellow	blue / yellow	blue / yellow	blue / yellow / green	blue / yellow / green	blue / yellow / green
12V	12V	12V	12V	12V	12V	12V	12V

output plug control module X2:1	wire harness floor frame disconnect XB1:13	valve Y3:1
blue / yellow	blue / yellow	blue / yellow
12V	12V	12V

Front dozer blade

switch front dozer blade S8:1	input plug control module X3:31
red / black	red / black
12V	12V

output plug control module X2:10	wire harness machine disconnect XM2:22	valve Y17:1
blue / red	blue / red	blue / red
12V	12V	12V

All voltages are measured between ground and the corresponding test point !!
Unless otherwise advised, the ignition has to be switched on !!

Breaker

switch breaker operation S15:1	input plug control module X3:12	pushbutton right-hand joystick S25:2	input plug additional module X1:7
brown / yellow	brown / yellow	blue / black	blue / black
12V	12V	12V	12V

output plug additional module X2:2	wire harness floor frame disconnect XB1:14	valve Y4:1
brown / yellow	brown / yellow	brown / yellow
12V	12V	12V

switch breaker operation S15:1	input plug control module X3:12	pushbutton right-hand joystick S25:1	input plug additional module X1:8
brown / yellow	brown / yellow	red / black	red / black
12V	12V	12V	12V

output plug additional module X2:2	wire harness floor frame disconnect XB1:14	valve Y4:1
brown / yellow	brown / yellow	brown / yellow
12V	12V	12V

Swing brake

pushbutton left-hand joystick S22:2	wire harness floor frame disconnect XB2:9	input plug additional module X1:12	output plug additional module X2:20	wire harness machine disconnect XM1:16	valve Y22:1
blue / red	blue / red	blue / red	blue / red	blue / red	blue / red
12V	12V	12V	12V	12V	12V

Articulation

pushbutton right-hand joystick S24:2	input plug add. module X1:11	output plug add. module X2:16	wire harness machine disconnect XM1:13	valve Y20:1	output plug add. module X2:17	wire harness machine disconnect XM1:14	valve Y21:1	
orange	orange	orange	orange	orange	violet	violet	violet	
12V	12V	12V	12V	12V	12V	12V	12V	

Additional control circuit I

switch breaker operation S15:1	input plug control module X3:12	pushbutton right-hand joystick S25:2	input plug add. module X1:7
brown / yellow	brown / yellow	blue / black	blue / black
0V	0V	12V	12V

output plug add. module X2:13	wire harness machine disconnect XM1:11	valve Y18:1
blue / black	blue / black	blue / black
12V	12V	12V

switch breaker operation S15:1	input plug control module X3:12	pushbutton right-hand joystick S25:1	input plug add. module X1:8
brown / yellow	brown / yellow	red / black	red / black
0V	0V	12V	12V

output plug add. module X2:14	wire harness machine disconnect XM1:12	valve Y19:1
red / black	red / black	red / black
12V	12V	12V

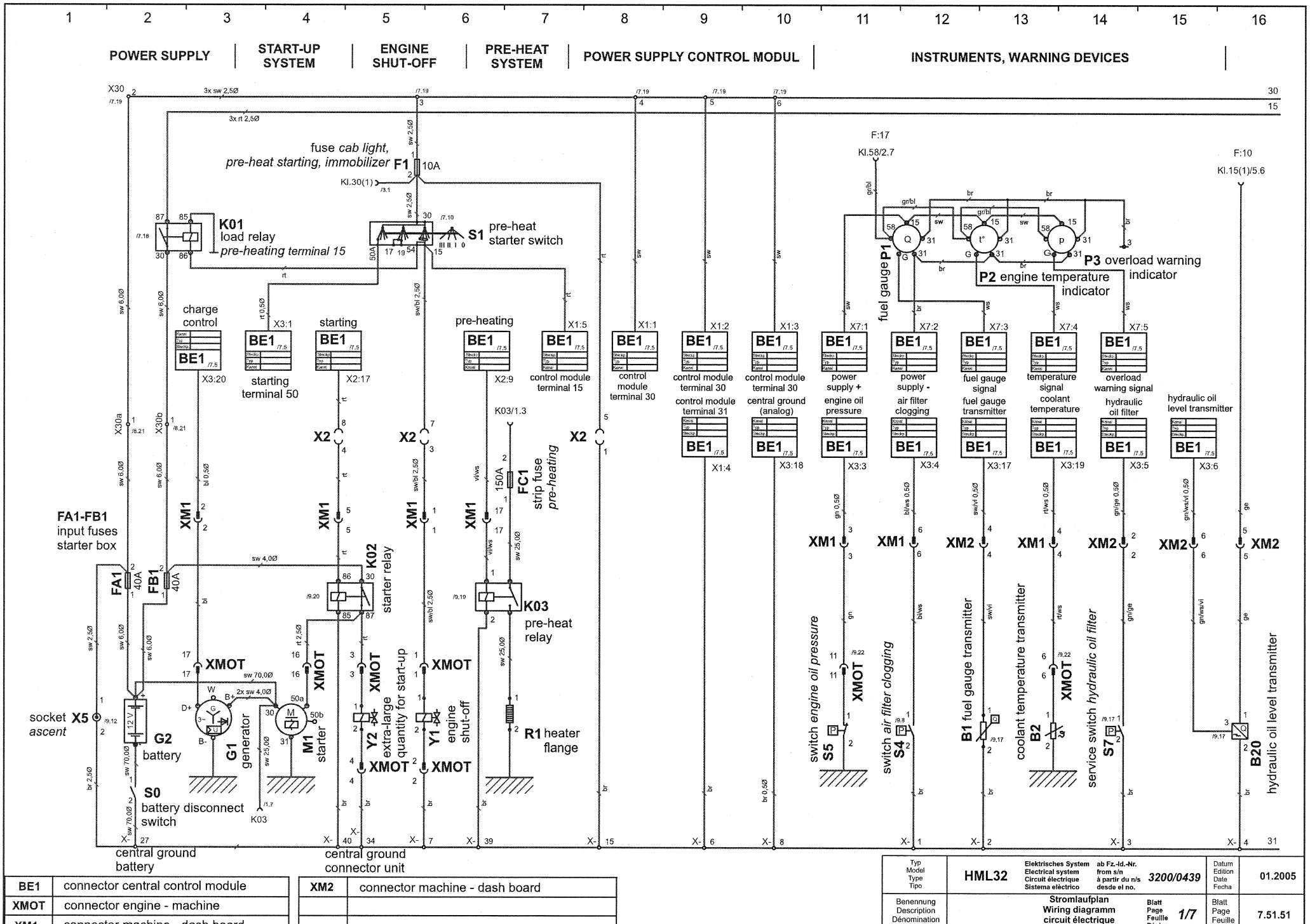
Additional control circuit II

pushbutton left-hand joystick S21:2	wire harness floor frame disconnect XB1:4	input plug add. module X1:9
blue / black	blue / black	blue / black
12V	12V	12V

output plug add. module X2:18	wire harness machine disconnect XM3:2	valve Y23:1
blue / black	blue / black	blue / black
12V	12V	12V

pushbutton left-hand joystick S21:1	wire harness floor frame disconnect XB1:6	input plug add. module X1:10
red / black	red / black	red / black
12V	12V	12V

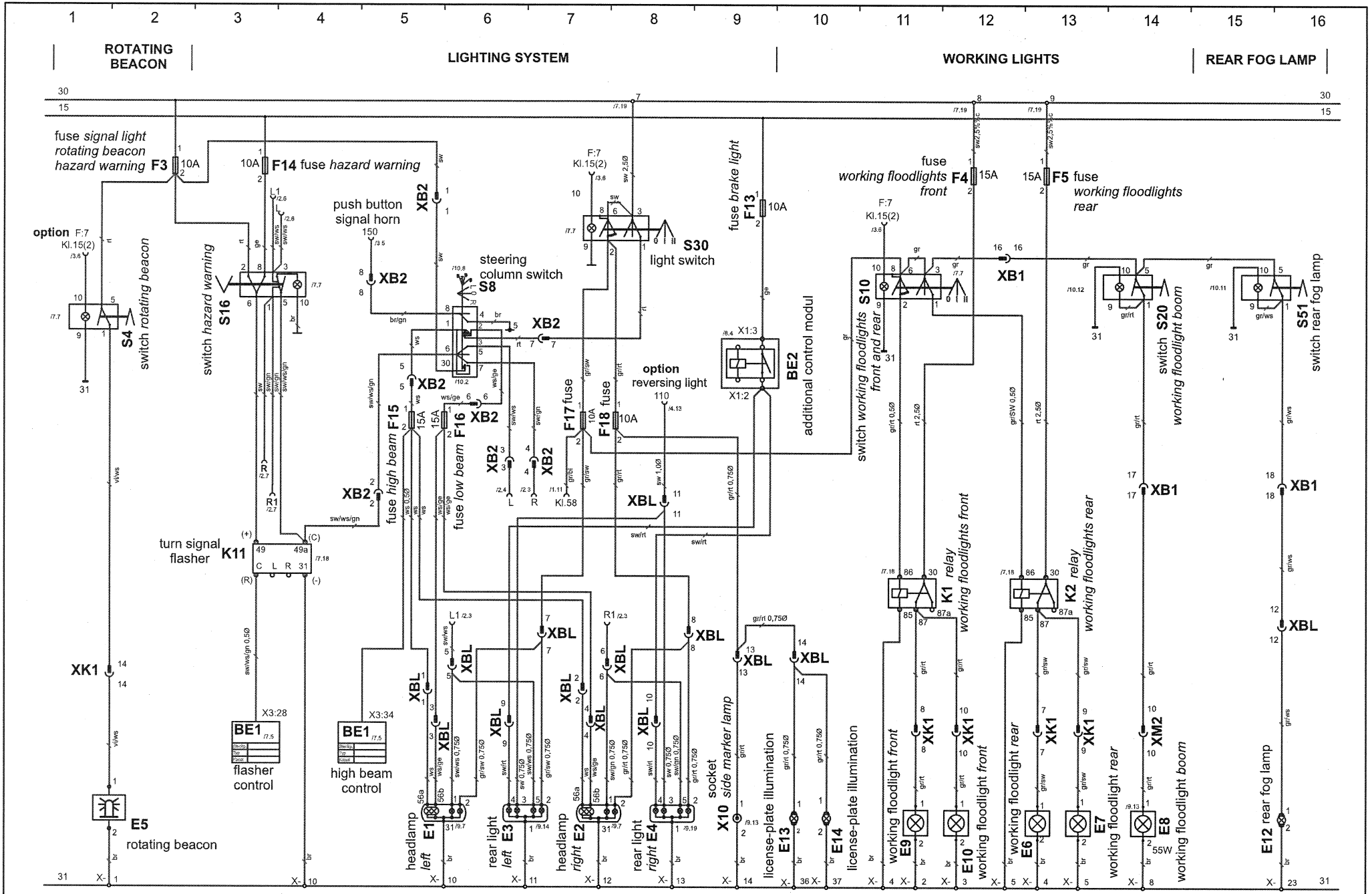
output plug add. module X2:19	wire harness machine disconnect XM3:3	valve Y24:1
red / black	red / black	red / black
12V	12V	12V



BE1	connector central control module
XMOT	connector engine - machine
XM1	connector machine - dash board

XM2	connector machine - dash board

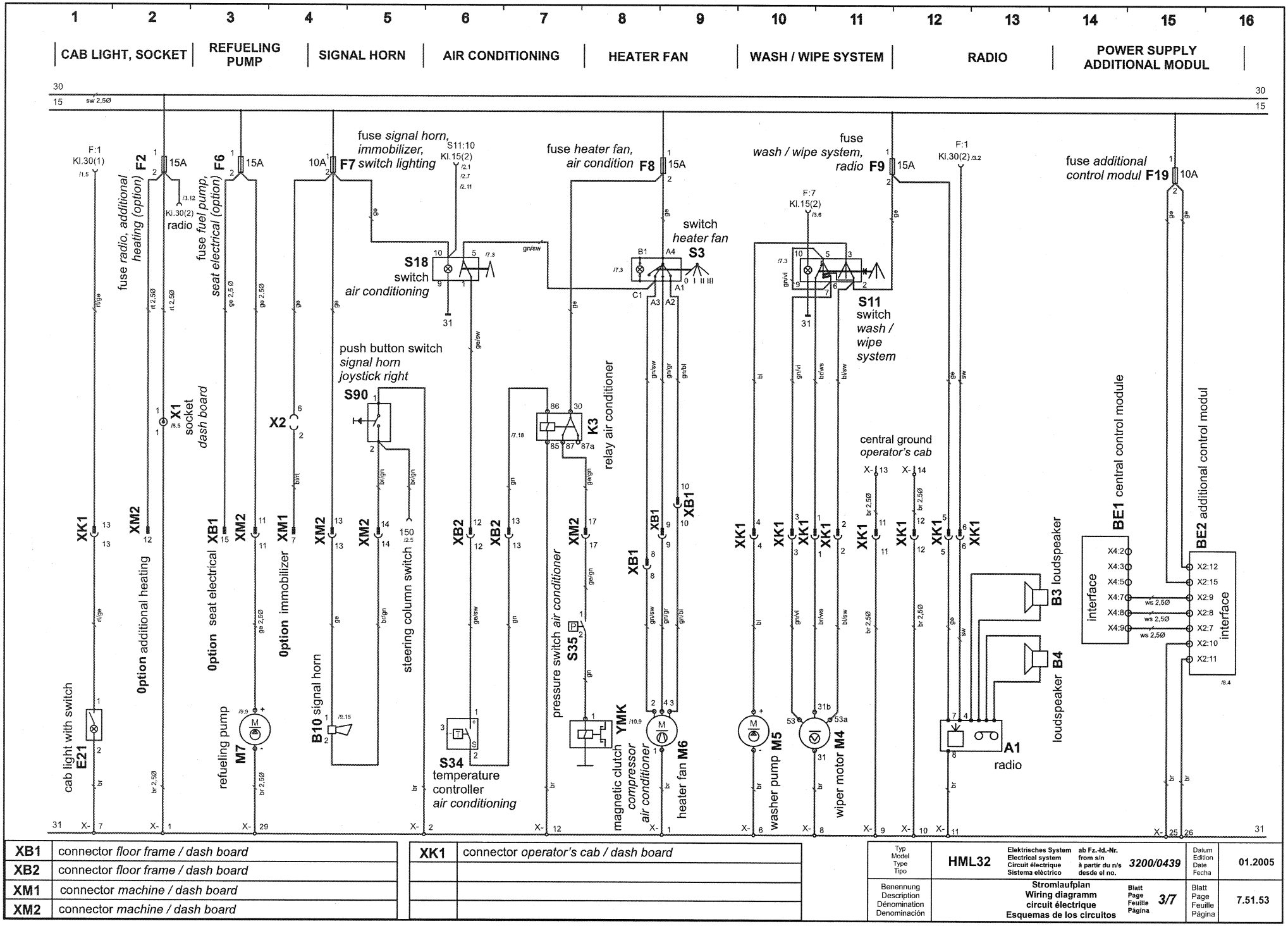
Typ Model Type Tipo	HML32	Elektrisches System / Electrical system / Circuit électrique / Sistema elèctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 3200/0439	Datum Edition Date Fecha	01.2005
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm circuit électrique Esquemas de los circuitos	Blatt Page Feuille Página 1/7		Blatt Page Feuille Página	7.51.51



F17	fuse *side marker light left, instruments lighting*
F18	fuse *side marker right*
XB1	connector *floor frame / dash board*
XB2	connector *floor frame / dash board*

XBL	connector *machine / dash board*
XK1	connector *operator's cab / dash board*
XM2	connector *machine / dash board*
BE1	connector *central control module*

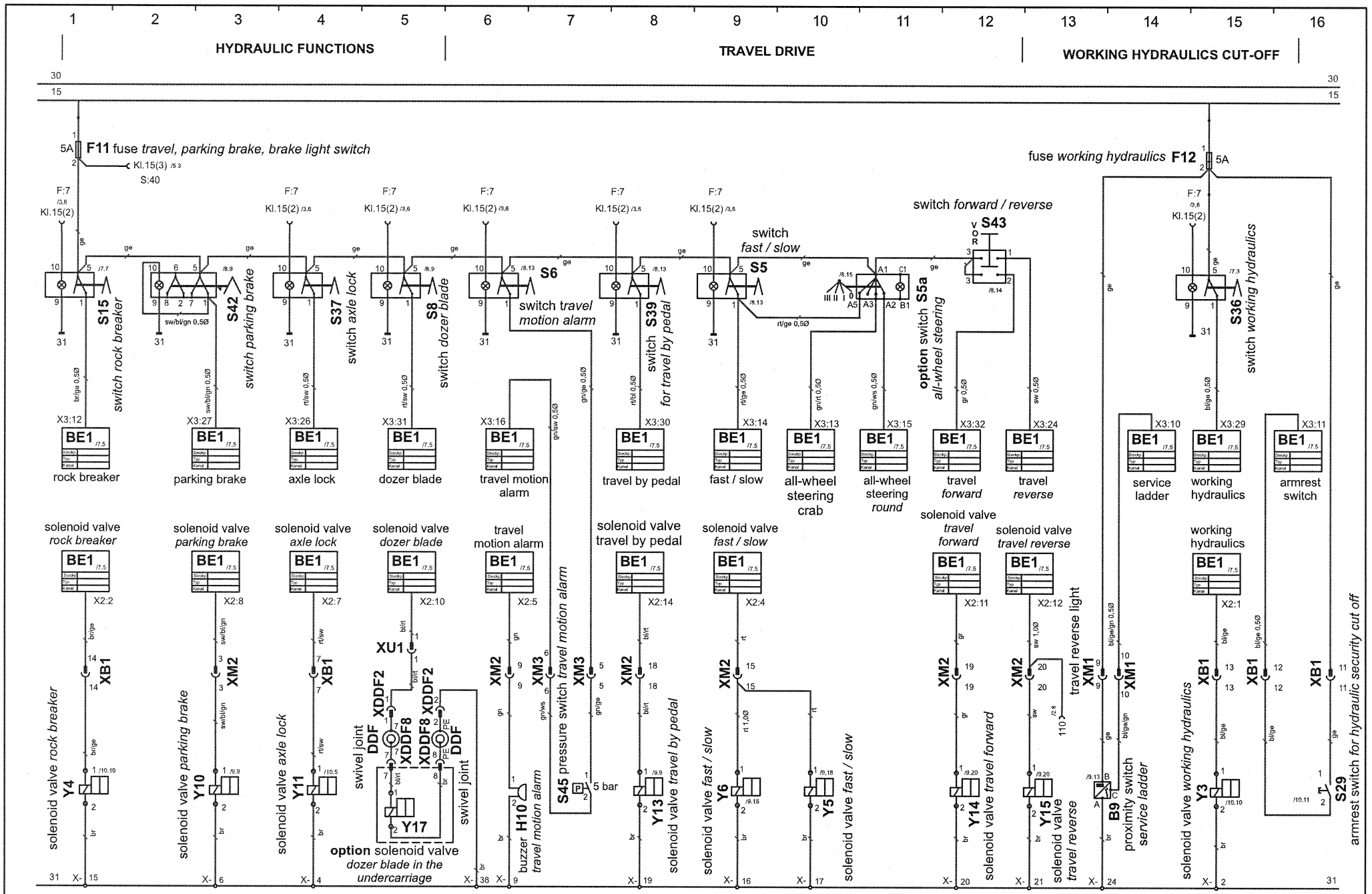
Typ Model Type Tipo	HML32	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 3200/0439	Datum Edition Date Fecha 01.2005
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 2/7	Blatt Page Feuille Página 7.51.52



XB1	connector *floor frame / dash board*
XB2	connector *floor frame / dash board*
XM1	connector *machine / dash board*
XM2	connector *machine / dash board*

XK1	connector *operator's cab / dash board*

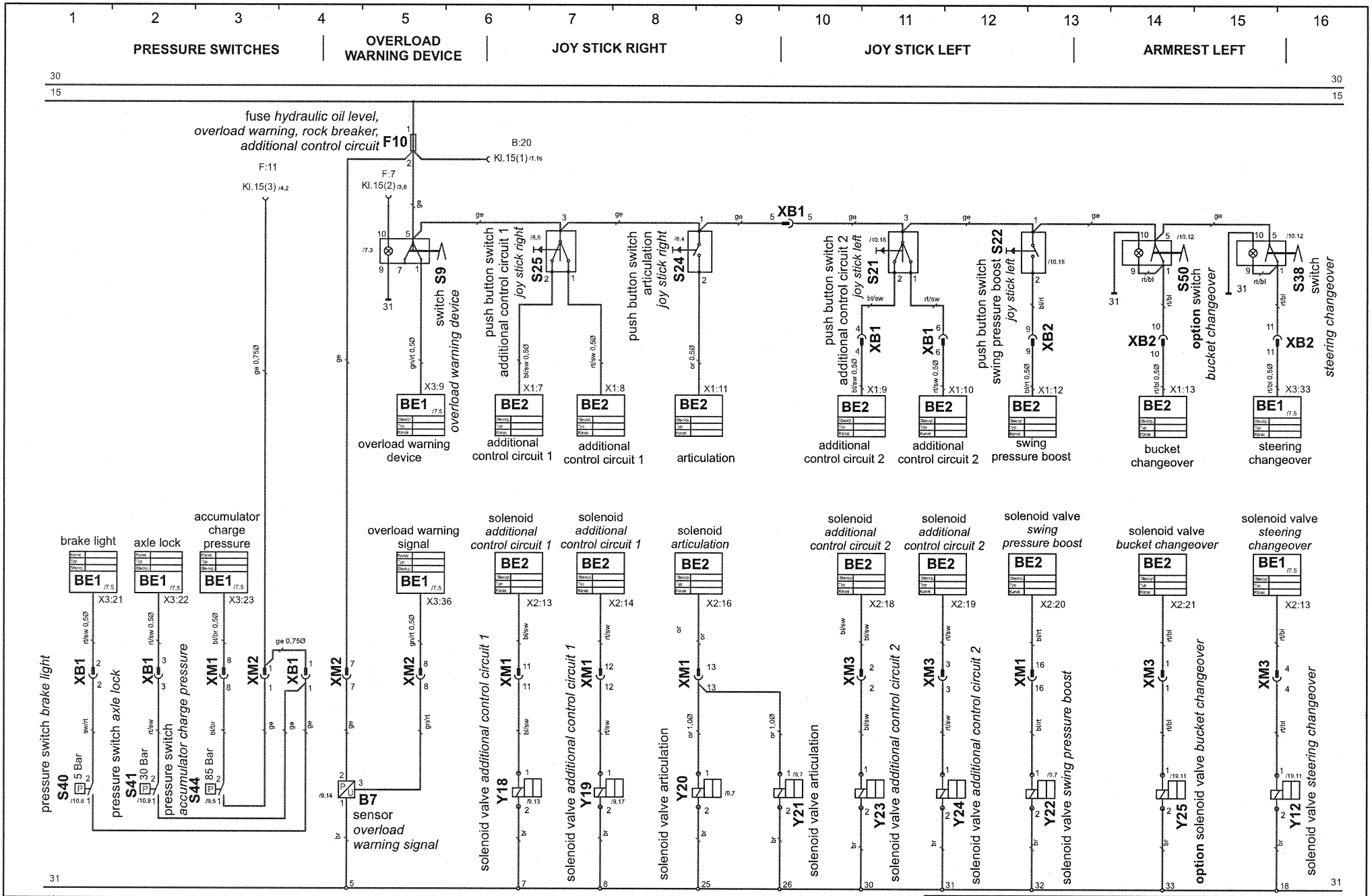
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Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 3/7	Blatt Page Feuille Página 7.51.53



XB1	connector *floor frame / dash board*
XM1	connector *machine / dash board*
XM2	connector *machine / dash board*
XM3	connector *machine / dash board*

XU1	connector under carriage / *dash board*
XDDF2	connector *machine* / collector ring
XDDF8	connector *machine* / collector ring
BE1	connector central control module

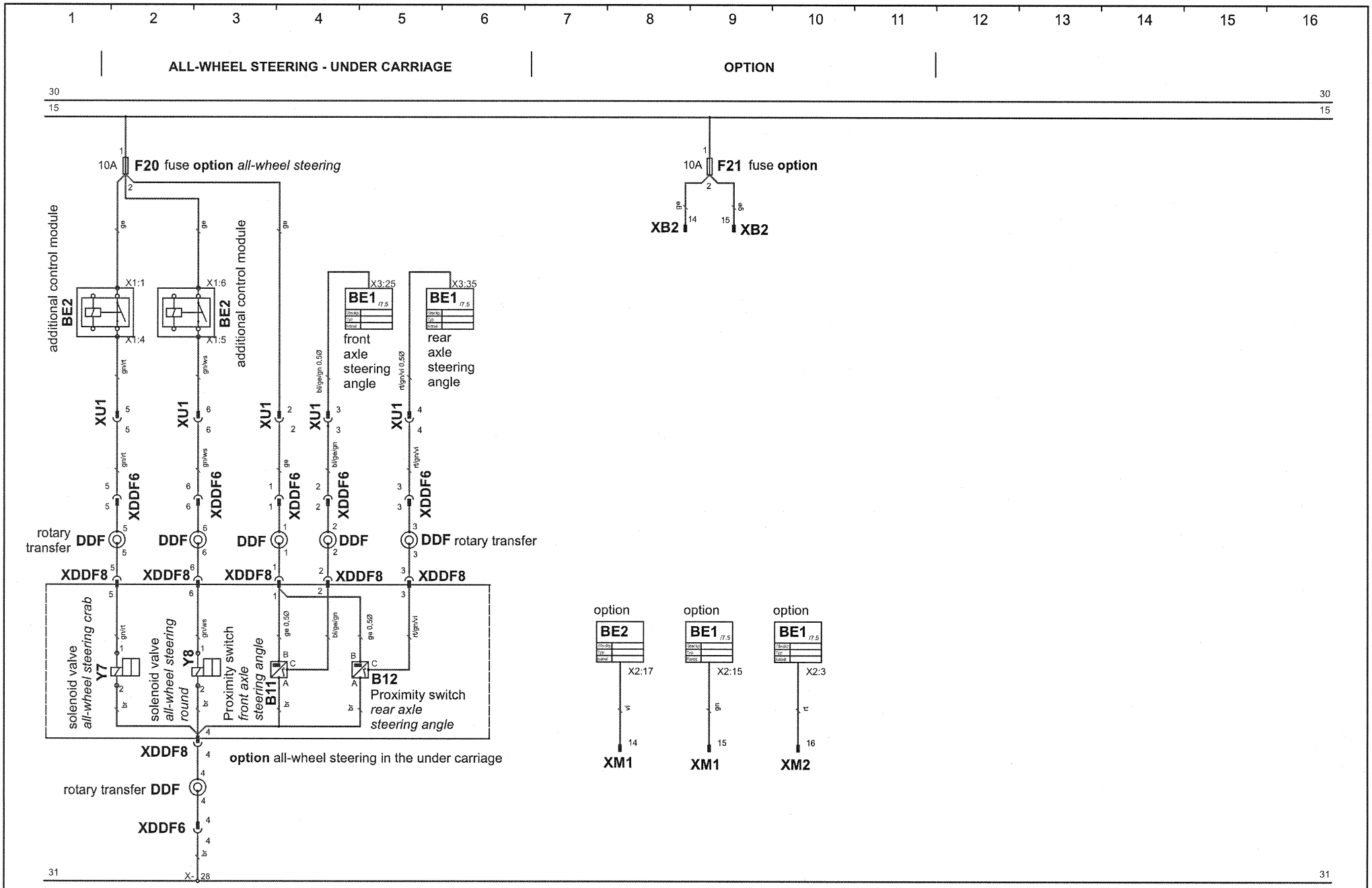
Typ Model Type Tipo	HML32	Elektrisches System Electrical system Circuit électrique Sistema elèctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no.	3200/0439	Datum Edition Date Fecha 01.2005
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm circuit électrique Esquemas de los circuitos		Blatt Page Feuille Página 4/7		Blatt Page Feuille Página 7.51.54



XM1	connector *machine / dash board*
XM2	connector *machine / dash board*
XM3	connector *machine / dash board*
XB1	connector *floor frame / dash board*

XB2	connector *floor frame / dash board*
BE1	connector central control module
BE2	connector additional control module

Typ / Model / Type / Tipo	HML32	Elektrisches System / Electrical system / Circuit électrique / Sistema elèctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 3200/0439	Datum / Edition / Date / Fecha 01.2005
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 5/7	Blatt / Page / Feuille / Página 7.51.55



XM1	connector *machine / dash board*
XM2	connector *machine / dash board*
XB2	connector *floor frame / dash board*
BE1	connector central control module

BE2	connector additional control module
XU1	connector machine / *dash board*
XDDF6	connector upper carriage / collector ring
XDDF8	connector *under carriage* / collector ring

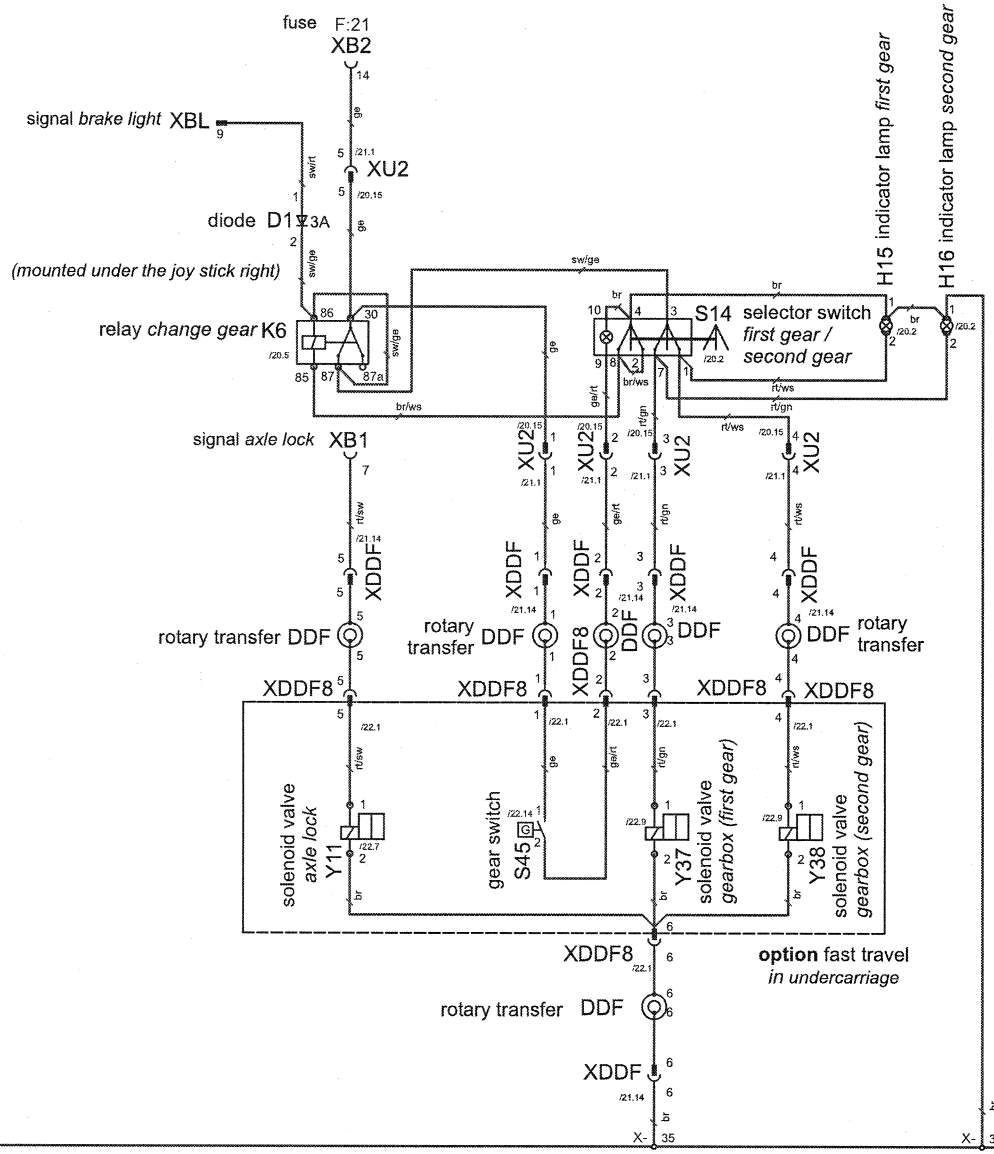
Typ / Model / Type / Tipo	HML32	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 3200/0439	Datum / Edition / Date / Fecha 01.2005
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 6/7	Blatt / Page / Feuille / Página 7.51.56

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

OPTION FAST TRAVEL

30

15



31

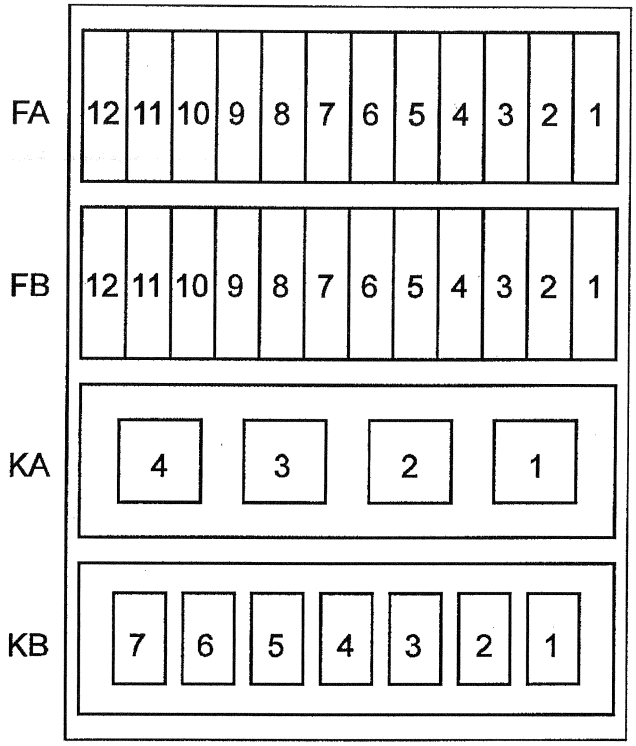
XB1	connector *floor frame / dash board*
XB2	connector *floor frame / dash board*
XU2	connector upper *carriage / floor frame*
BE2	connector additional control module

XDDF	connector upper *carriage* / collector ring
XDDF8	connector *under carriage* / collector ring

Typ Model Type Tipo	HML32	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 3200/0439	Datum Edition Date Fecha	01.2005
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 7/7		Blatt Page Feuille Página	7.51.57

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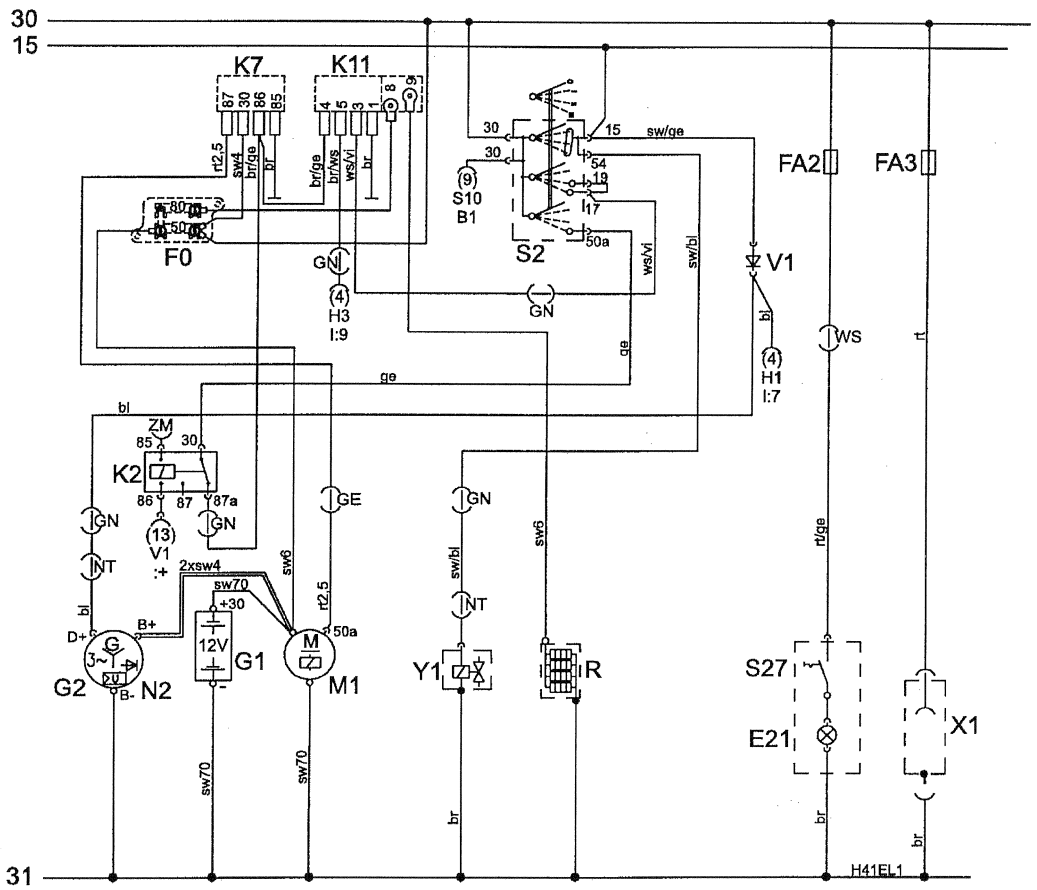
Fuse and relay box - assignment



Position	Ampere	Assigned with	Positio	Ampere	Assigned with
FA 1	10	Warning light switch Monitoring module	FB 1	10	Warning light switch Wiper switch
FA 2	10	Cab light	FB 2	10	Lock working hydraulics Control lamps for instruments
FA 3	10	Socket	FB 3	10	Fast-slow
FA 4	10	Rotating beacon	FB 4	10	Relay-parking brake
FA 5	10	Side marker light left Working floodlight	FB 5	10	Front dozer blade
FA 6	10	Side marker light right	FB 6	10	Horn, headlamp flasher Stop light
FA 7	15	Low beam	FB 7	15	Heating ventilation
FA 8	15	High beam High beam- Control lamp	FB 8	10	Oscillating axle lock Coordinate switch left
FA 9			FB 9	10	Current supply Level transmitter
FA 10			FB 10	10	Parking brake Coordinate switch right
FA 11	20		FB 11	10	Excavator brake
FA 12	15		FB 12	10	Radio

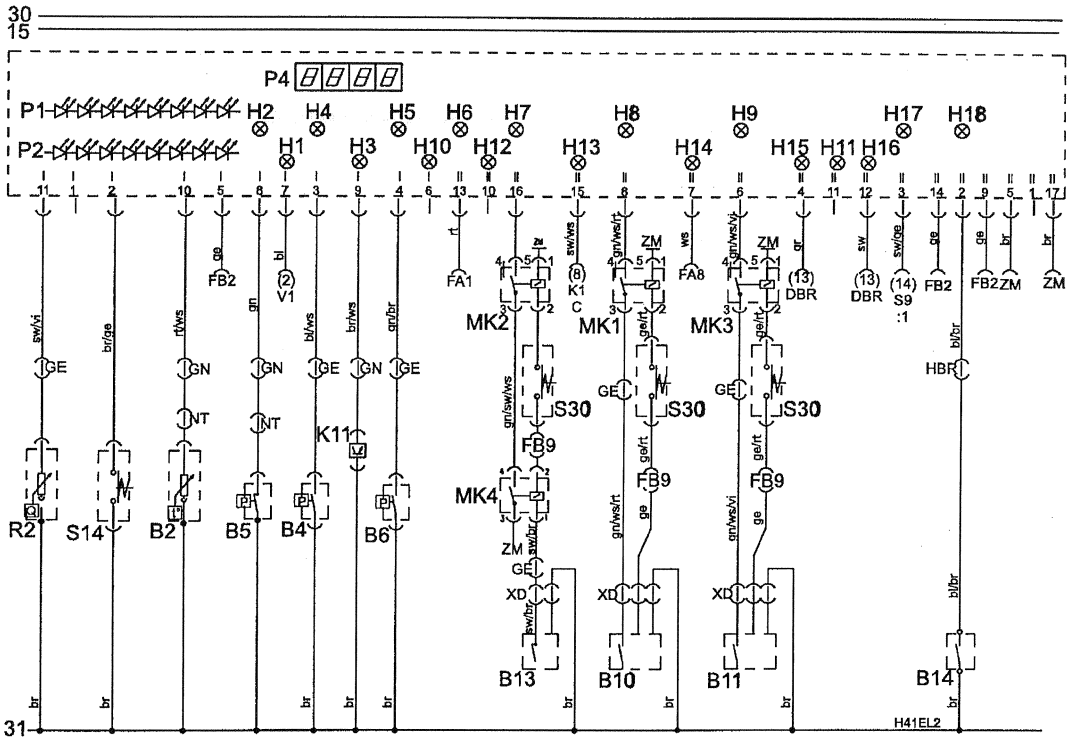
KA 1	Flasher transmitter	KB 1	Level-hydraulic oil
KA 2	Start safety	KB 2	Level-Engine oil
KA 3	Axle lock	KB 3	Level-Cooling water
KA 4	Parking brake	KB 4	
		KB 5	
		KB 6	
		KB 7	

1. Current supply	2. Pre-glow start-up system	3. Cab light, socket



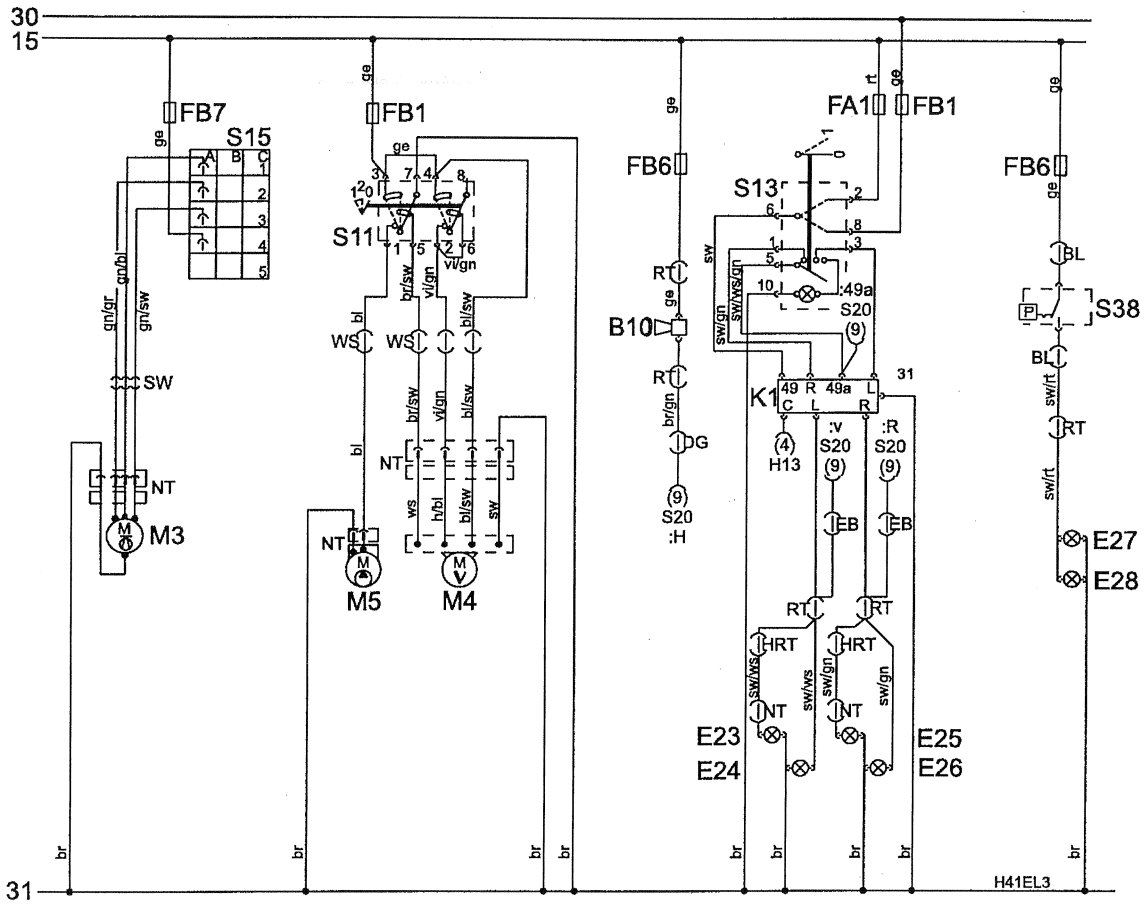
Section Qty.	Code	Unit	Section Qty.	Code	Unit
1		***Current supply***	1	GN	Plug connection
1	G1	Battery	1	NT	Plug connection
1	G2	Generator	1	Y1	Electric engine shut-off
1	N2	Generator regulator	1	GN	Plug connection
1	NT	Plug connection	1	K11	Pre-glow time control unit
1	GN	Plug connection	1	R	Pencil-type glow plugs
2	FO	Blade-type fuse			
			3		***Cab light***
2		***Pre-glow start-up system***	1	FA2	Fuse
1	S2	Glow-start switch	1	WS	Plug connection
1	V1	Blocking diode	1	S27	Cab light switch
1	K2	Relay - Start-up safety	1	E21	Cab light
1	K7	Starting relay	1	FA3	Fuse
1	GE	Plug connection	1	X1	Socket
1	M1	Start-up engine (starter)			

4. Indicators



Section Qty.	Code	Unit	Code	Unit
4		***Indicators***	S30	Check button
1	P1	Fuel gauge	FB9	Fuse
1	GE	Plug connection	MK4	Micro-Relay
1	R2	Fuel gauge-transmitter	GE	Plug connection
1	S14	Change-over-Display	XD	Plug connection
1	P2	Engine cooling water	B13	Level transmitter engine oil
1	GN	Plug connection	H13	Travel direction indicactor
1	NT	Plug connection	H8	Engine oil cooling water level
1	B2	Temp. sensor cooling water	MK1	Micro-Relay
1	P4	Working hour meter, daily hours	GE	Plug connection
1	H2	Engine oil pressure	XD	Plug connection
1	GN	Plug connection	B10	Level transmitter cooling water
1	NT	Plug connection	S30	Check button level
1	B5	Engine oil pressure switch	FB9	Fuse
1	H1	Charge control lamp	H14	High beam control
1	H4	Air filter control	H9	Level hydr. oil
1	GE	Plug connection	MK3	Micro-Relay
1	B4	Air filter contamination	GE	Plug connection
1	H3	Pre-glow control	XD	Plug connection
1	GN	Plug connection	B11	Level transmitter hydr. oil
1	K11	Pre-glow time control unit	S30	Check button level
1	H5	Hydr. filter contamin. indicator	FB9	Fuse
1	GE	Plug connection	H15	Forward - reverse
1	B6	Hydr. filter contamination	H11	Blank
1	H12	Blank	H16	Travel reverse
1	H6	Blank	H17	Parking brake
1	H10	Blank	H18	Accumulator pressure
1	H7	Level engine oil	HBR	Plug connection
1	MK2	Micro-Relay	B14	Transmitter - accumulator press.

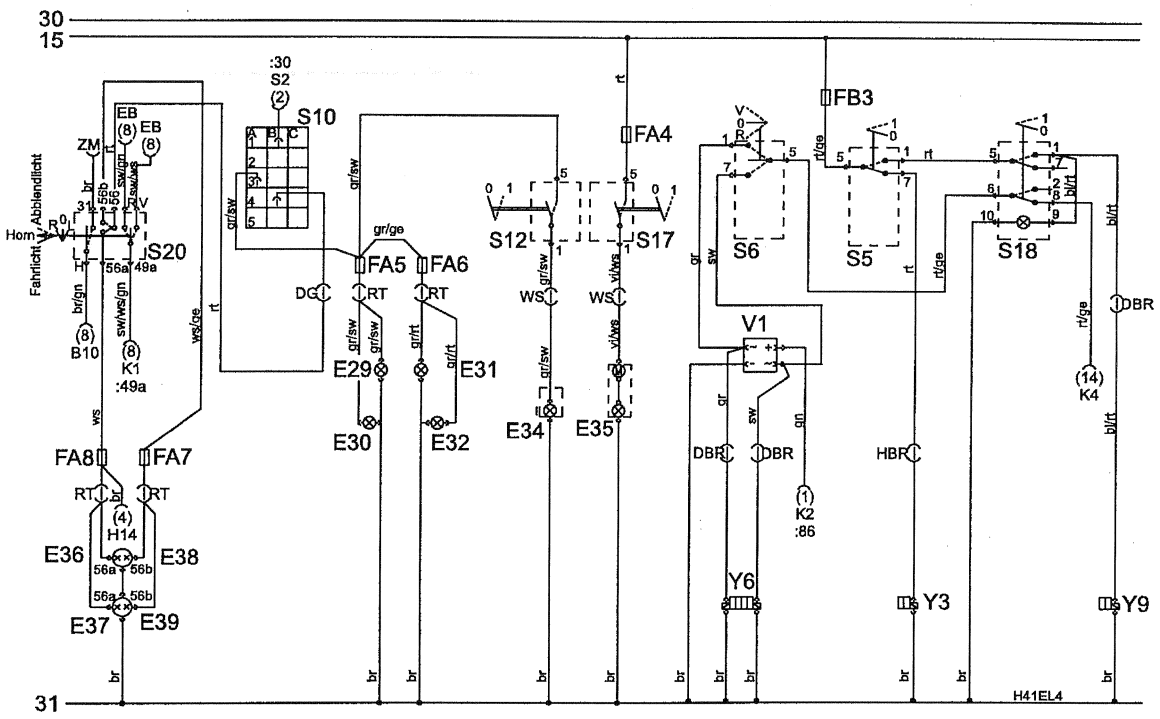
6. Heating ventilation	7. Wiper and washer system	8. Signal system



Section Qty.	Code	Unit	Section Qty.	Code	Unit
6		***Heating ventilation***	1	DG	Plug connection
1	FB:7	Fuse	1	FA:1	Fuse
1	S15	Switch, Heating ventilation	1	FB:1	Fuse
1	SW	Plug connection	1	S13	Warning light switch
1	NT	Plug connection	1	K1	Flasher transmitter
1	M3	Heating ventilation	1	EB	Plug connection
			2	RT	Plug connection
7		***Wiper and washer system***	2	HRT	Plug connection
1	FB:1	Sicherung	2	NT	Plug connection
1	S11	Wiper switch	1	E23	Flasher front left
4	WS	Plug connection	1	E24	Flasher rear left
1	NT	Plug connection	1	E25	Flasher front right
1	M4	aper motor	1	E26	Flasher rear right
1	M5	Washer pump	1	FB:6	Fuse
			1	BL	Plug connection
8		***Signal system***	1	S38	Stop light switch
1	FB:6	Fuse	1	BL	Plug connection
1	RT	Plug connection	1	RT	Plug connection
1	B10	Signal horn	1	E27	Stop light left
1	RT	Plug connection	1	E28	Stop light right

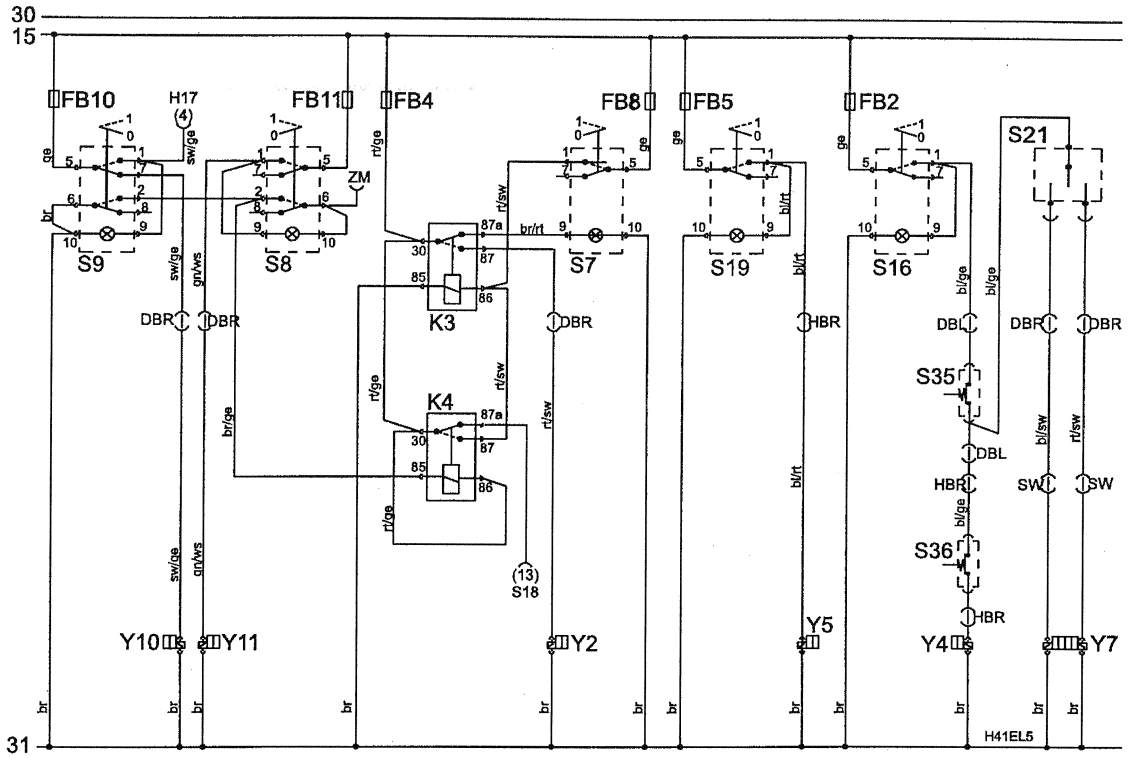
SCHAEFF	Typ/Model/Type **HML 41 (up to serial no. 321/1171)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.52.03**

9. Lighting system	10. Working floodlights, rotating beacon	13. Travel

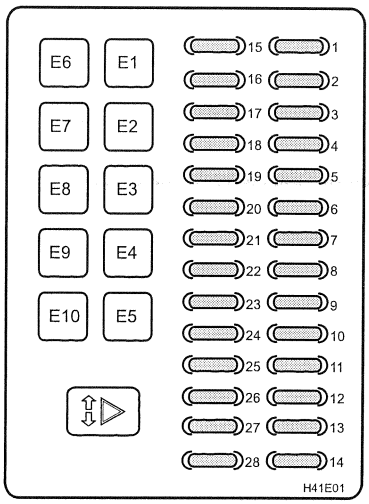


Section Qty.	Code	Unit	Section Qty.	Code	Unit
9		**Light system**	***10***		***Working floodlights***
1	S20	Flasher switch	1	FA:5	Fuse
1	FA:8	Fuse	1	S12	Switch working floodlights
1	RT	Plug connection	1	WS	Plug connection
1	E36	High beam left	1	E34	Working floodlights
1	E37	High beam right	1	FA:4	Fuse
1	FA:7	Fuse	1	S17	Switch rotating beacon
1	RT	Plug connection	1	WS	Plug connection
1	E38	Low beam left	1	E 35	Rotating beacon
1	E39	Low beam right			
1	S10	Light switch	***13***		***Travel***
1	DG	Plug connection	1	S6	Switch travel forward - reverse
1	FA:5	Fuse	1	V1	Bridge rectifier
1	RT	Plug connection	2	DBR	Plug connection
1	E29	Side marker light left front	1	Y6	Valve travel forward - reverse
1	E30	Side marker light left rear	1	FB:3	Fuse
1	FA:6	Fuse	1	SS	Switch Fast - Slow
1	RT	Plug connection	1	HBR	Plug connection
1	E31	Side marker light right front	1	Y3	Valve Fast - Slow
1	E32	Side marker light right rear	1	S18	Switch pedal travel
			1	DBR	Plug connection
			1	Y9	Valve Pedal travel

14. Brake	15. Options (installation units)



Section Qty.	Code	Unit	Section Qty.	Code	Unit
14		***Brake***	***15***		***Options (install. units)***
1	FB:10	Fuse	1	FB:5	Fuse
1	S9	Switch Parking brake	1	S19	Switch: front dozer blade
1	DBR	Plug connection	1	Y3	Valve : front dozer blade
1	Y10	Valve Parking brake	1	FB:2	Fuse
1	FB11	Fuse	1	S16	Switch: Lock work. hydraulics
1	S8	Switch Excavator brake	1	DBL	Plug connection
1	DBR	Plug connection	1	S35	Armrest switch
1	Y11	Valve Excavator brake	1	DBL	Plug connection
1	FB4	Fuse	1	HBR	Plug connection
1	K3	Relay: oscillating axle lock	1	S36	Switch: Safety ascent
1	K4	Relay: Parking brake	1	HBR	Plug connection
1	DBR	Plug connection	1	Y4	Valve: working hydraulics
1	Y2	Valve oscillating axle lock	1	S21	Switch: Coordinate lever right
1	FB:8	Fuse	2	DBR	Plug connection
1	S7	Switch I. Oscillating axle lock	2	SW	Plug connection
			1	Y7	Valve: e.g. turning of grab



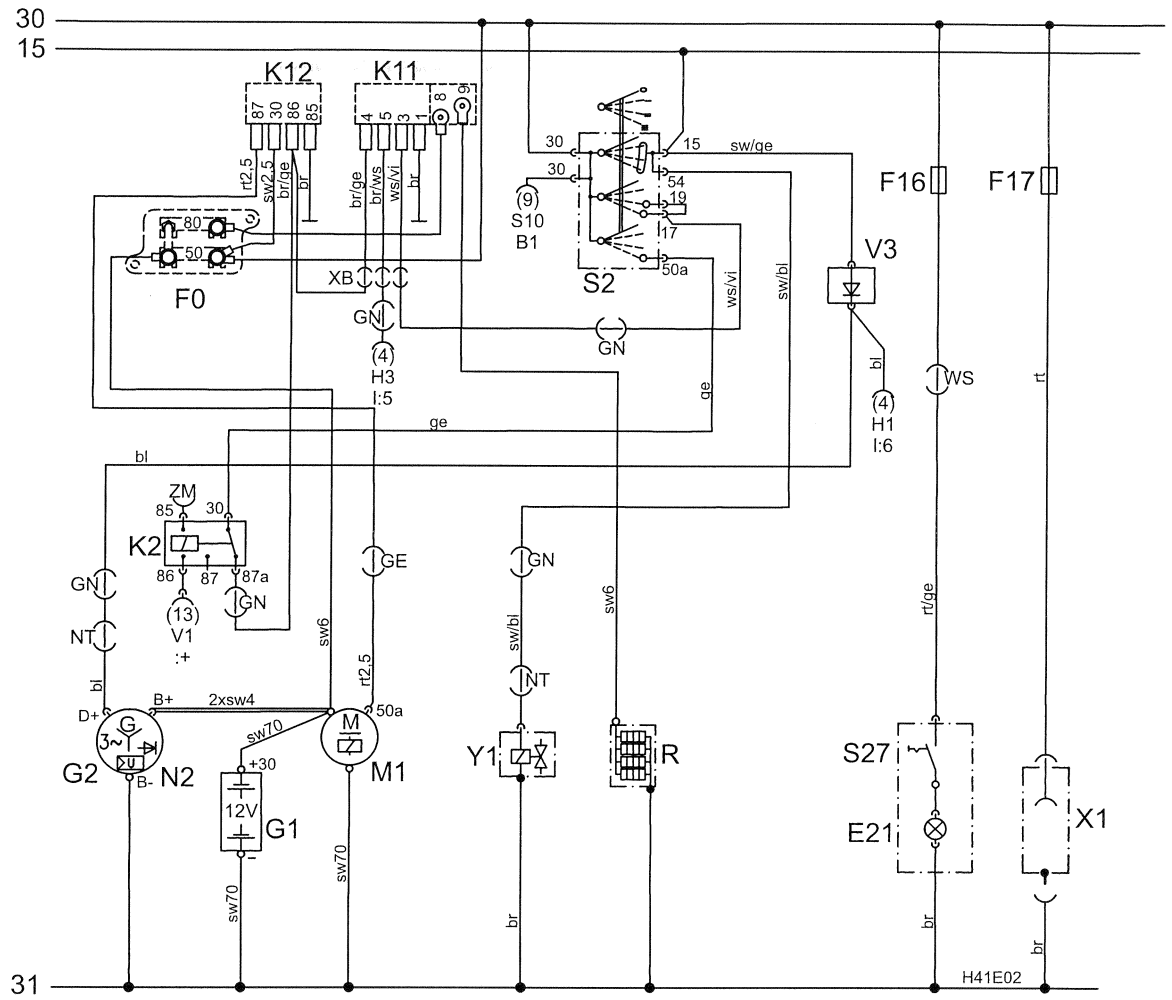
Location	Relay	Function
	K 0	Flasher transmitter
E 1	K 1	Working floodlight
E 2	K 2	Starting safety
E 3	K 3	Axle lock
E 4	K 4	Parking brake
E 5	K 5	Safety-service ladder
E 6	K 6	Safety-service ladder-pilot control
E 7	K 7	Parking brake
E 8	K 8	Pedal - travel
E 9	-	unassigned
E 10	-	unassigned

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Wiper switch	F 15	10	Hazard warning switch Check module Immoblizer
F 2	10	Working hydraulics cut-off	F 16	10	Rotating beacon Interior light
F 3	10	Fast/ slow	F 17	20	Socket Radio
F 4	10	Parking brake relay Driving	F 18	15	Lower beam
F 5	10	Front dozer blade	F 19	15	Upper beam Upper beam indicator lamp
F 6	10	Horn, headlamp flasher	F 20	10	Left side marker lamp Front/ rear working floodlights
F 7	15	Heater fan	F 21	10	Right side marker lamp
F 8	10	Oscillating axle lock	F 22	10	Rear working floodlight
F 9	10	Level sensor power supply Overload warning device cut-off	F 23	10	Front working floodlight
F 10	10	Excavator brake; brake light Parking brake, overload warning sensor	F 24		---
F 11	10	Service ladder proximity switch Steering proximity switch	F 25	10	Diesel cut-off valve
F 12	10	Rock breaker Radio	F 26	20	Electrical tank refuelling pump
F 13	10	Check module Power supply check module	F 27		--
F 14		--	F 28	Diode 3A	Electrical engine cut-off Immobilizer

Cable and plug colours

bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

1. Power supply	2. Pre-heater starting system	3. Interior light, socket

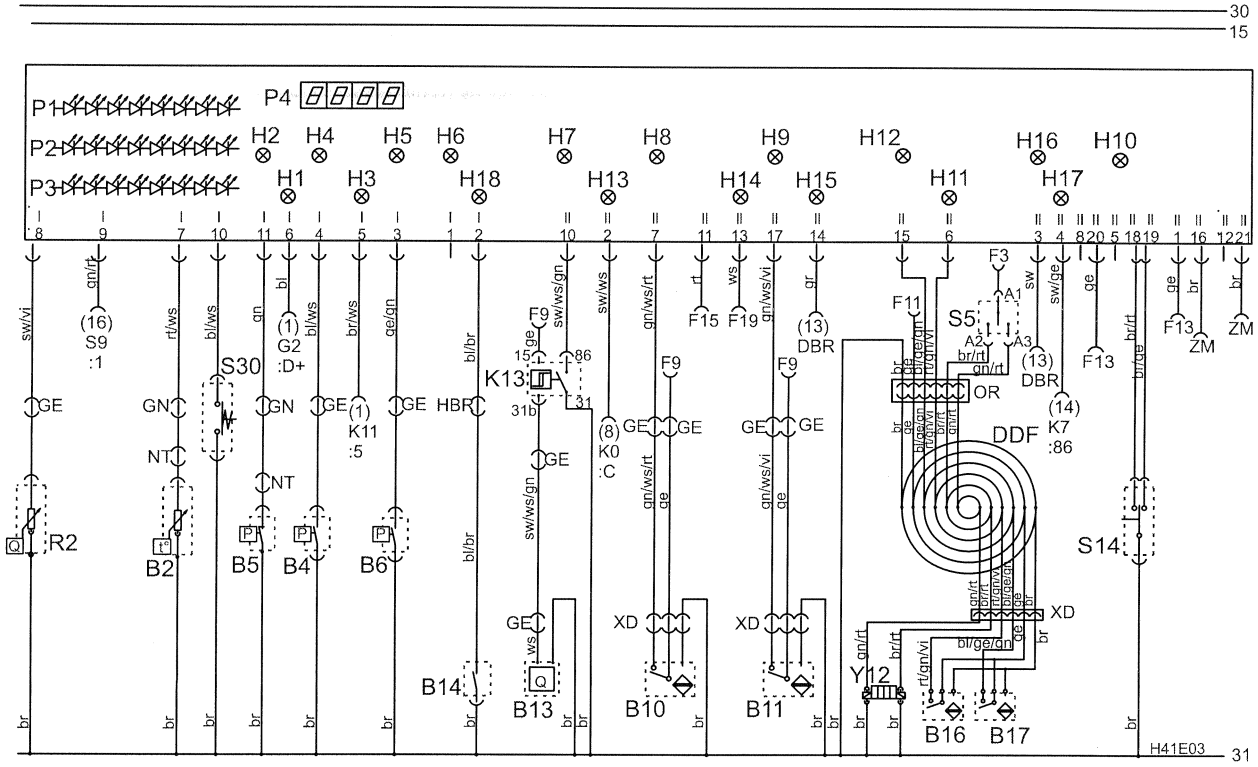


Section Qty.	Desig-nation	Device
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	N2	Generator regulator
2	FO	Blade-type fuses 50/80A
2		***Pre-heater starting system***
1	S2	Pre-heat/ starter switch
1	V3	Blocking diode BY 251
1	K2	Starting safeguard relay
1	K12	Starting relay 12V 70A

Section Qty.	Desig-nation	Device
1	M1	Starter motor (starter)
1	Y1	Electrical engine cut-off
1	K11	Pre-heating time control unit
1	R	Glow plugs
3		***Interior light***
1	F16	Fuse
1	S27	Interior light switch
1	E21	Interior light
1	F17	Fuse
1	X1	Socket

SCHAEFF	Typ/Model/Type **HML 41 (from serial no. 321/1172)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.52.06**

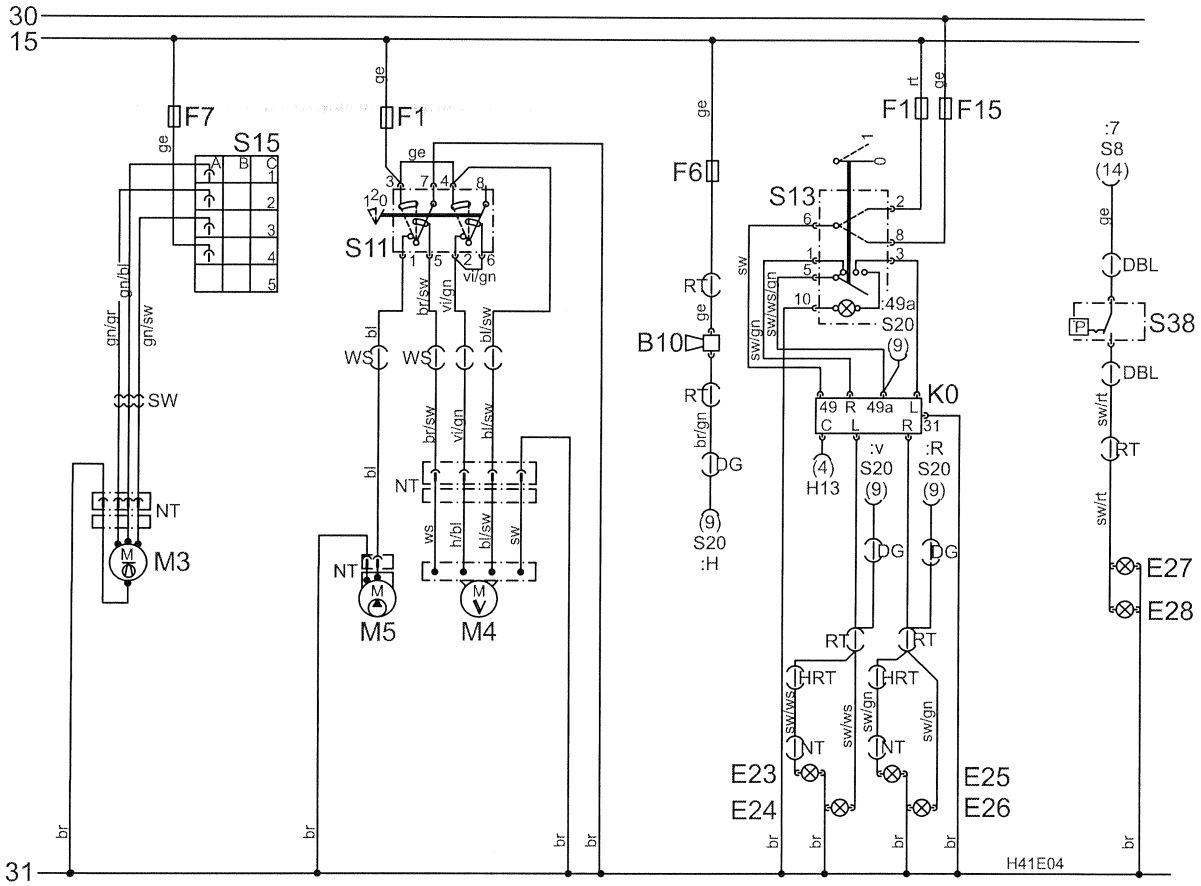
4. Display units



Section Qty.	Desig-nation	Device
4		***Display units***
1	P1	Fuel gauge
1	R2	Fuel gauge sensor
1	P2	Engine coolant
1	P3	Overload warning device
1	B2	Coolant temperature sensor
1	S30	Check button
1	P4	Operating hour meter, trip recorder, watch
1	H2	Engine oil pressure lamp
1	B5	Engine oil pressure switch
1	H1	Battery charge indicator lamp
1	H4	Air filter indicator
1	B4	Air filter clogging sensor
1	H3	Pre-heating indicator
1	H5	Hydraulic filter clogging indicator
1	B6	Hydraulic filter clogging sensor
1	H6	unassigned
1	H18	Brake accumulator pressure
1	B14	Accumulator pressure sensor

Section Qty.	Desig-nation	Device
1	H7	Engine oil level
1	K13	Engine oil relay
1	B13	Engine oil level sensor
1	H13	Direction indicator
1	H8	Coolant level
1	B10	Coolant level sensor
1	H14	Upper beam indicator
1	H9	Hydraulic oil level
1	B11	Hydraulic oil level sensor
1	H15	Travel, forward
1	H11	Steering lock of front axle
1	DDF	Rotary transmission
1	B16	Sensor, steering lock, front axle
1	H12	Steering lock, rear axle
1	B17	Sensor, steering lock, rear axle
1	S5	Multi-function switch
1	Y12	Four-wheel steering valve
1	H16	Travel, in reverse
1	H17	Parking brake
1	H10	unassigned
1	S14	Display of changeover switch

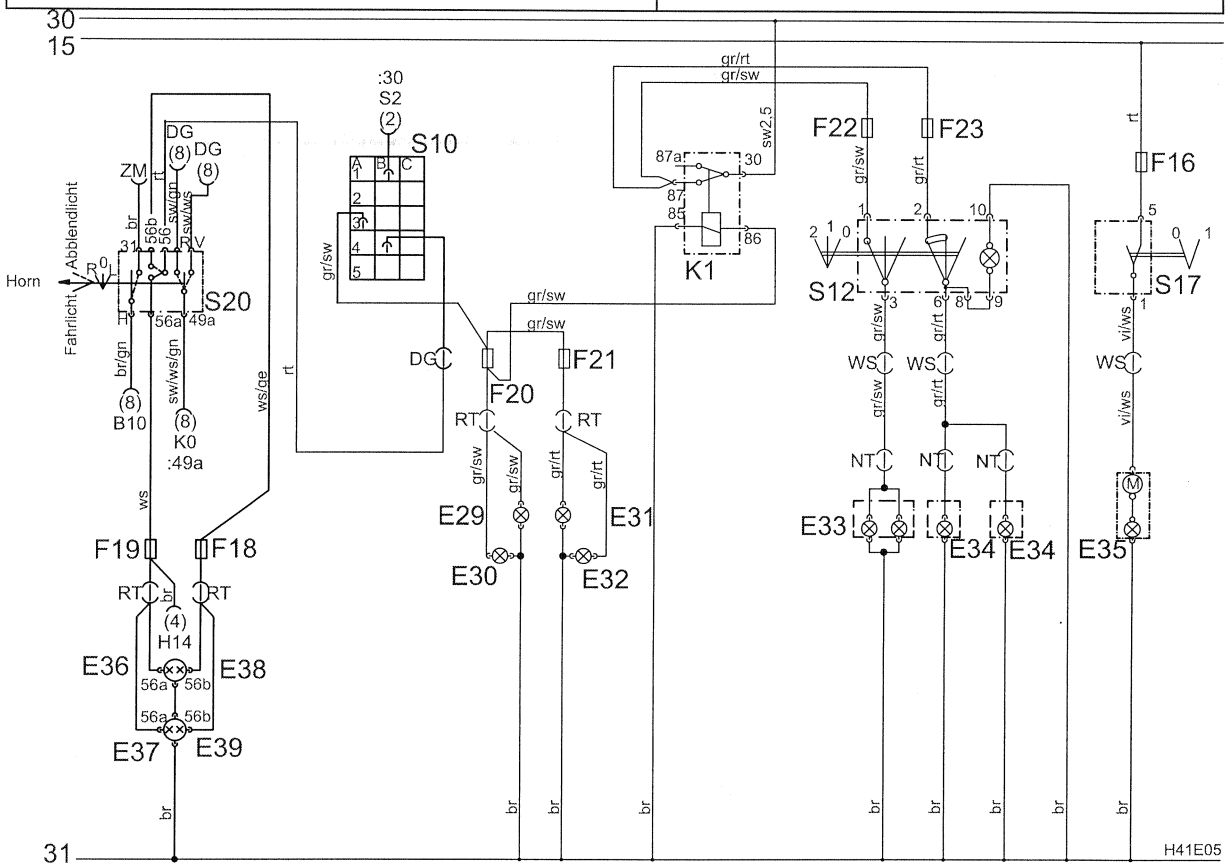
6. Heater fan	7. Wash/ wipe system	8. Signaling system



Section Qty	Desig-nation	Device
6		***Heater fan***
1	F7	Fuse
1	S15	Switch for heater fan
1	M3	Heater fan
7		***Wash/wipe system***
1	F1	Fuse
1	S11	Wiper switch
1	M4	Wiper motor
1	M5	Washer pump

Section Qty.	Desig-nation	Device
8		***Signaling system***
1	F6	Fuse
1	B10	Horn
1	F1	Fuse
1	F15	Fuse
1	S13	Hazard warning switch
1	K0	Turning indicator transmitter
1	E23	Turning indicator, front left
1	E24	Turning indicator, rear left
1	E25	Turning indicator, front right
1	E26	Turning indicator, rear right
1	S38	Brake lamp switch
1	E27	Brake lamp, left
1	E28	Brake lamp, right

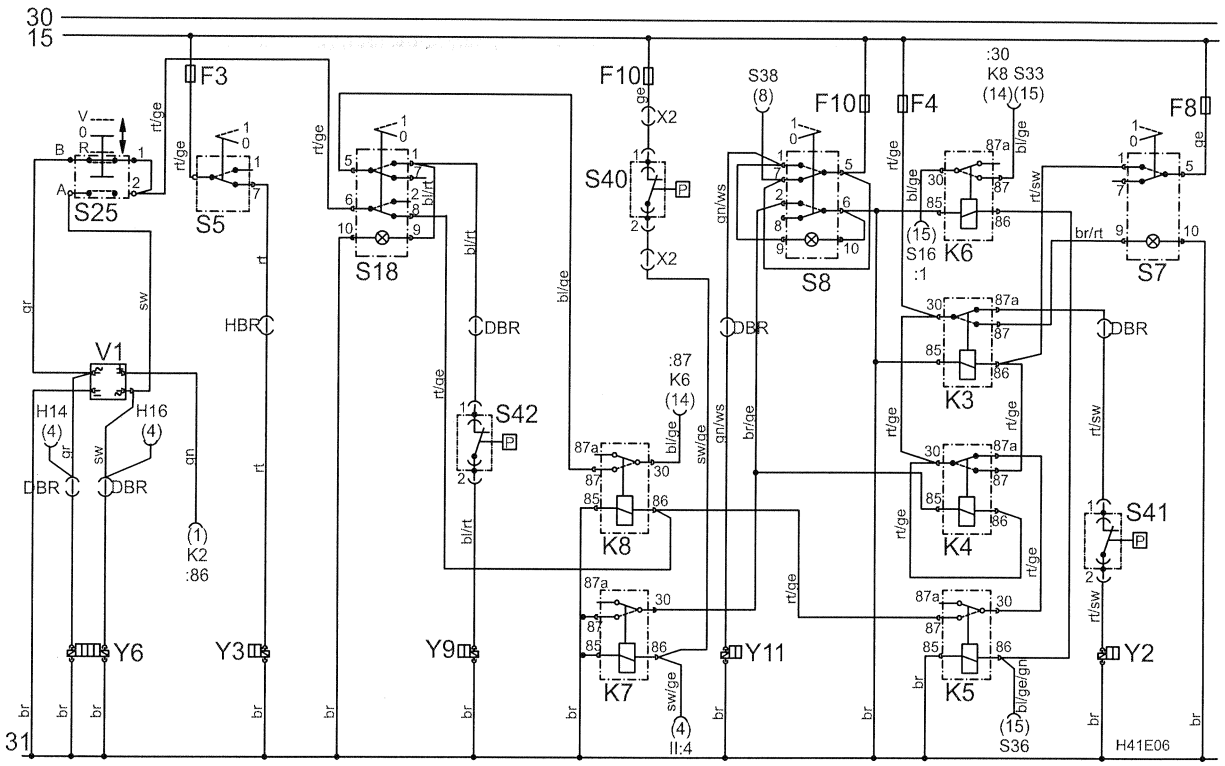
9. Lighting system	10. Working floodlights, rotating beacon



Section Qty.	Desig-nation	Device
9		***Lighting system***
1	S20	Turning indicator switch
1	F19	Fuse
1	E36	Upper beam, left
1	E37	Upper beam, right
1	F18	Fuse
1	E38	Lower beam, left
1	E39	Lower beam, right
1	S10	Light switch
1	F20	Fuse
1	E29	Side marker lamp, front left
1	E30	Side marker lamp, rear left
1	F21	Fuse
1	E31	Side marker lamp, front right
1	E32	Side marker lamp, rear right

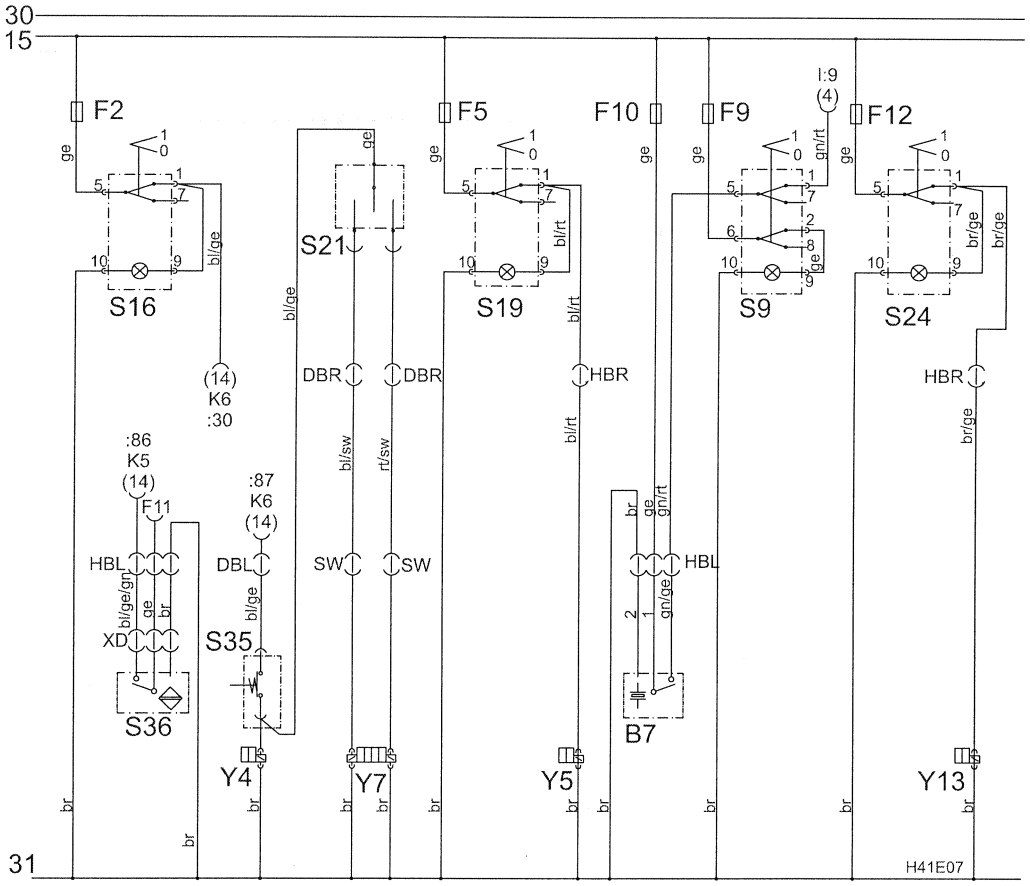
Section Qty.	Desig-nation	Device
10		***Working floodlights***
1	K1	Working floodlight relay
1	F22	Fuse
1	F23	Fuse
1	S12	Switch for working floodlight(s)
1	E33	Working floodlight, rear
2	E34	Working floodlight, front
1	F16	Fuse
1	S17	Switch for rotating beacon
1	E 35	Rotating beacon

13. Travel	14. Brake



Section Qty.	Desig-nation	Device	Section Qty	Desig-nation	Device
13		***Travel***	1	F10	Fuse
1	V1	Bridge-connected rectifier	1	S8	Excavator brake switch
1	Y6	Valve for travel, forward/ in reverse	1	Y11	Excavator brake valve
1	S25	Switch for travel, forward/ in reverse	1	F4	Fuse
1	F3	Fuse	1	K6	Relay for safety device, service ladder
1	S5	Fast/ Slow switch	1	K3	Oscillating axle lock relay
1	Y3	Fast/ Slow valve	1	K 4	Parking brake relay
1	S18	Drive pedal switch	1	K 5	Relay for safety device, travel
1	S42	Brake pressure switch	1	F8	Fuse
1	Y9	Drive pedal valve	1	S7	Oscillating axle lock switch
			1	S41	Excavator brake switch
14		***Brake***	1	Y2	Oscillating axle lock valve
1	K8	Drive pedal relay	1	F8	Fuse
1	K 7	Parking brake relay			
1	F10	Fuse			
1	S40	Parking brake pressure switch			

15. Working hydraulics cut-off	16. Options

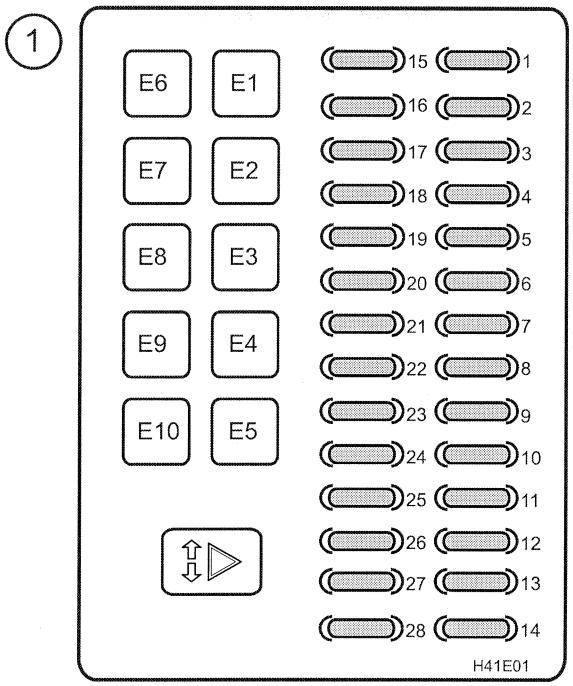


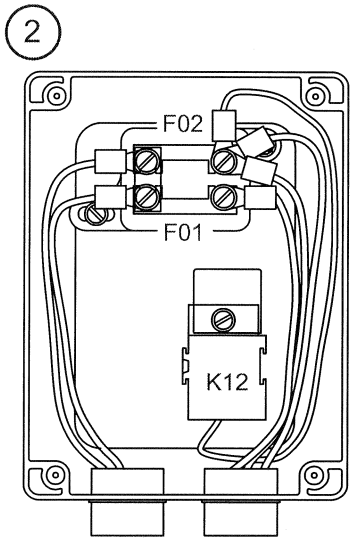
Section Qty.	Desig-nation	Device
15		***Working hydraulics cut-off***
1	F2	Fuse
1	S16	Switch for working hydr. cut-off
1	S36	Switch for safety device, service ladder
1	S35	Armrest switch
1	Y4	Working hydraulics valve
16		***Options***
1	S21	Switch for coordinate lever, right
1	Y7	Valve: e.g. turn grab

Section Qty.	Desig-nation	Device
1	F5	Fuse
1	S19	Front dozer blade switch
1	Y5	Front dozer blade valve
1	F10	Fuse
1	B7	Overload warning pressure sensor
1	F9	Fuse
1	S9	Overload warning cut-off
1	F12	Fuse
1	S24	Rock breaker switch
1	Y13	Rock breaker valve

Electrical system

Fuse and relay box - Assignment diagram





1 = Fuse and relay box armrest, rear right

2 = Starter box engine compartment dividing wall

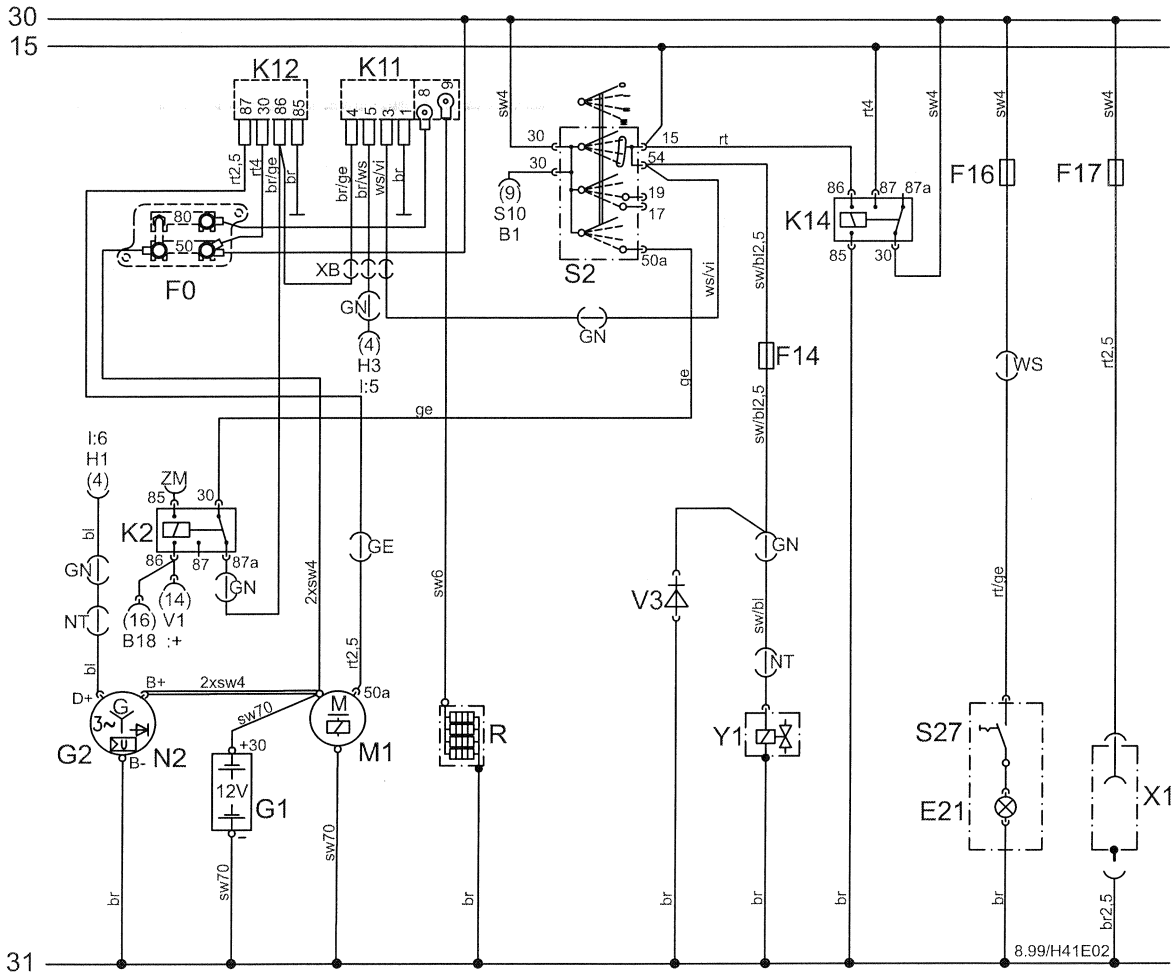
Location	Relay	Function
⇕▷	K 0	Directional indicator
E 1	K 1	Working floodlights, front/ rear
E 2	K 2	Start-up safeguard
E 3	K 3	Axle lock
E 4	K 4	Parking brake, travel cut-off
E 5	K 5	Safety device for entry steps, working hydraulics cut-off
E 6	K 6	Pedal for driving
E 7	-	not assigned
E 8	-	not assigned
E 9	-	not assigned
E 10	-	not assigned
	K 11	Pre-heating time control (engine compartment dividing wall - near generator)
	K 12	Start-up
	K 13	Control electronics for engine oil level (below instrument panel)
	K 14	Relief relay for pre-heat/ starter switch (below instrument panel)

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Wiper switch	F 15	10	Hazard warning switch Check module Immoblizer
F 2	10	Working hydraulics cut-off	F 16	10	Rotating beacon Interior light
#F 3	10	Fast/ slow	F 17	20	Socket Radio
F 4	10	Parking brake relay Driving	F 18	15	Lower beam
F 5	10	Front dozer blade	F 19	15	Upper beam Upper beam indicator lamp
F 6	10	Horn, headlamp flasher	F 20	10	Left side marker lamp Front/ rear working floodlights
F 7	15	Heater fan	F 21	10	Right side marker lamp
F 8	10	Oscillating axle lock	F 22	15	Rear working floodlight
F 9	10	Level sensor power supply Overload warning device cut-off	F 23	15	Front working floodlight
F 10	10	Excavator brake; brake light Parking brake, overload warning sensor	F 24	15	--
F 11	10	Service ladder proximity switch Steering proximity switch	F 25	15	Diesel cut-off valve
F 12	10	Rock breaker Radio	F 26	15	Electrical tank refueling pump
F 13	10	Check module Power supply check module	F 27	15	--
F 14	20	Engine shut-off	F 28	Diode 3A	Electrical motor cut-off Immobilizer
F 01	80	Pre-heat/ starter switch	F 02	50	Start-up

Cable and plug colors

bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

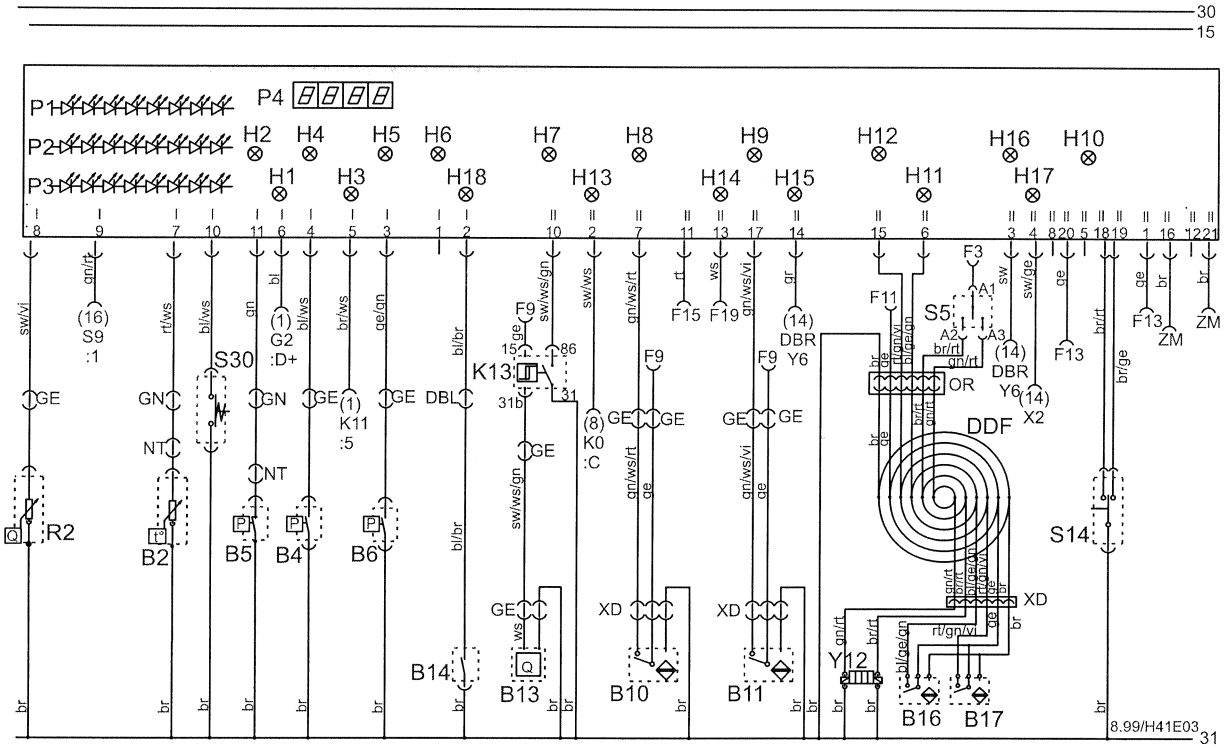
1. Power supply	2. Pre-heat/ start-up system	3. Interior light, socket



Section Qty.	Desig-nation	Device
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	N2	Generator regulator
2	FO	Flat-type fuses, 50/80A
2		***Pre-heat/ start-up system***
1	S2	Pre-heat/ starter switch
1	F14	Fuse
1	V3	Blocking diode BY 251
1	Y1	Electrical motor cut-off
1	K2	Starting safeguard relay

Section Qty.	Desig-nation	Device
1	K12	Starting relay 12 V 70 A
1	M1	Starter motor (starter)
1	K11	Pre-heating time control unit
1	R	Glow plugs
1	K14	Relief relay
3		***Interior light, socket***
1	F16	Fuse
1	S27	Interior light switch
1	E21	Interior light
1	F17	Fuse
1	X1	Socket

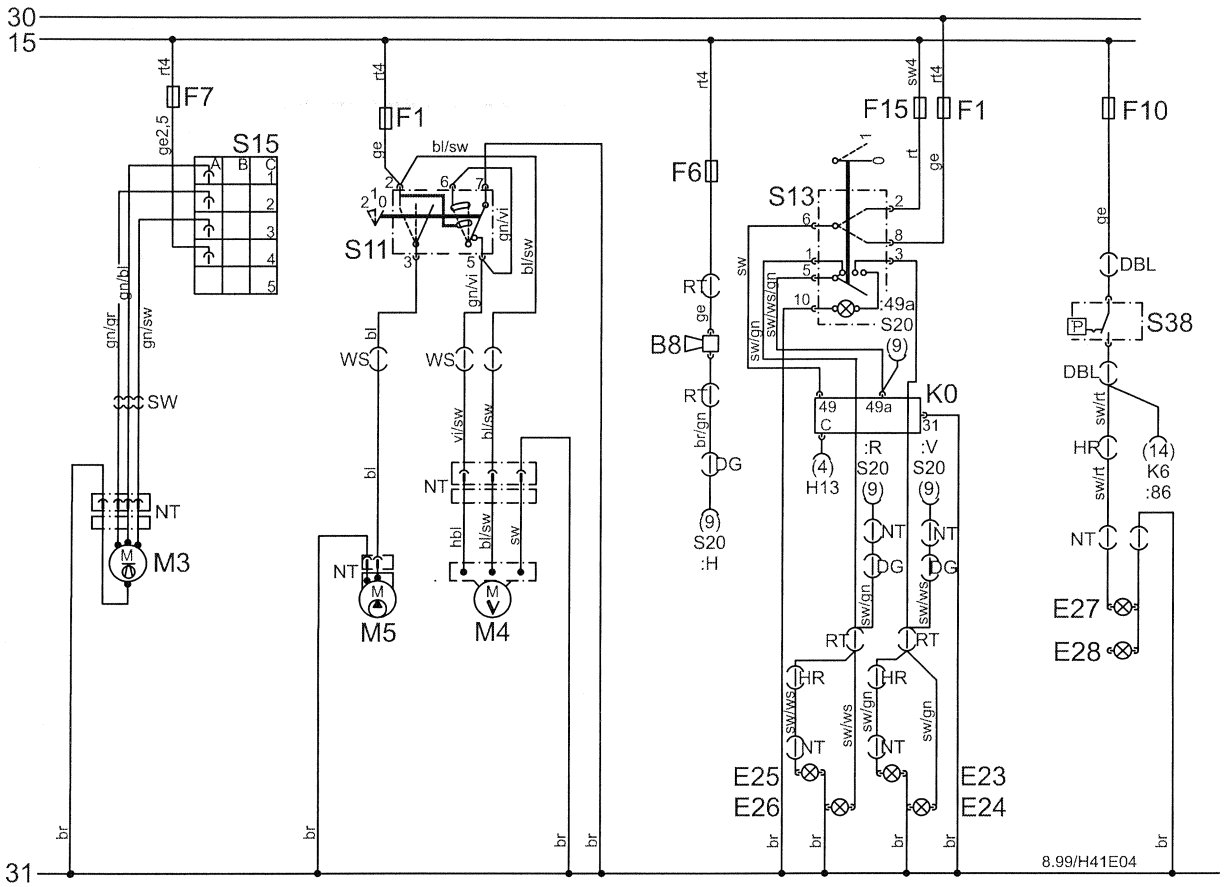
4. Display units



Section Qty.	Desig-nation	Device
4		***Display units***
1	P1	Fuel gauge
1	R2	Fuel gauge sensor
1	P2	Engine coolant
1	P3	Overload warning device
1	B2	Coolant temperature sensor
1	S30	Check button
1	P4	Operating hour meter, trip recorder
1	H2	Engine oil pressure lamp
1	B5	Engine oil pressure switch
1	H1	Battery charge indicator lamp
1	H4	Air filter indicator
1	B4	Air filter clogging sensor
1	H3	Pre-heating indicator
1	H5	Hydraulic filter clogging indicator
1	B6	Hydraulic filter clogging sensor
1	H6	unassigned
1	H18	Brake accumulator pressure
1	B14	Accumulator pressure sensor

Section Qty.	Desig-nation	Device
1	H7	Engine oil level
1	K13	Engine oil relay
1	B13	Engine oil level sensor
1	H13	Direction indicator
1	H8	Coolant level
1	B10	Coolant level sensor
1	H14	Upper beam indicator
1	H9	Hydraulic oil level
1	B11	Hydraulic oil level sensor
1	H15	Travel, forward
1	H11	Neutral position of front axle
1	DDF	Rotary transmission
1	B16	Sensor for neutral position of front axle
1	H12	Neutral position of rear axle
1	B17	Sensor for neutral position of rear axle
1	S5	Multi-function switch
1	Y2	Four-wheel steering valve
1	H16	Travel, in reverse
1	H17	Parking brake
1	H10	unassigned
1	S14	Display of changeover switch

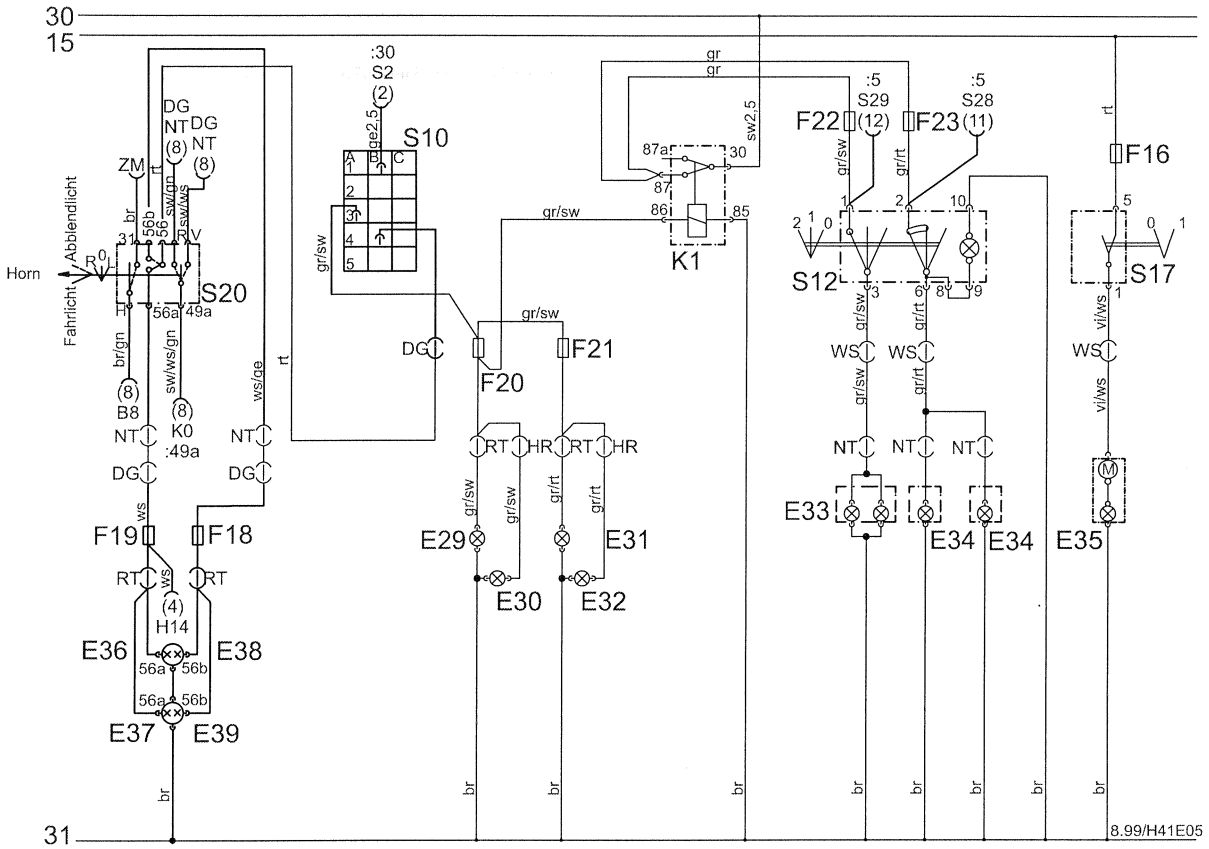
6. Heater fan	7. Wash/ wipe system	8. Signaling system



Section Qty	Desig-nation	Device
6		***Heater fan***
1	F7	Fuse
1	S15	Switch for heater fan
1	M3	Heater fan
7		***Wash/wipe system***
1	F1	Fuse
1	S11	Wiper switch
1	M4	Wiper motor
1	M5	Washer pump

Section Qty.	Desig-nation	Device
8		***Signaling system***
1	F6	Fuse
1	B8	Horn
1	F1	Fuse
1	F15	Fuse
1	S13	Hazard warning switch
1	K0	Directional indicator
1	E23	Turning indicator, front left
1	E24	Turning indicator, rear left
1	E25	Turning indicator, front right
1	E26	Turning indicator, rear right
1	F10	Fuse
1	S38	Stop light switch
1	E27	Left stop light
1	E28	Right stop light

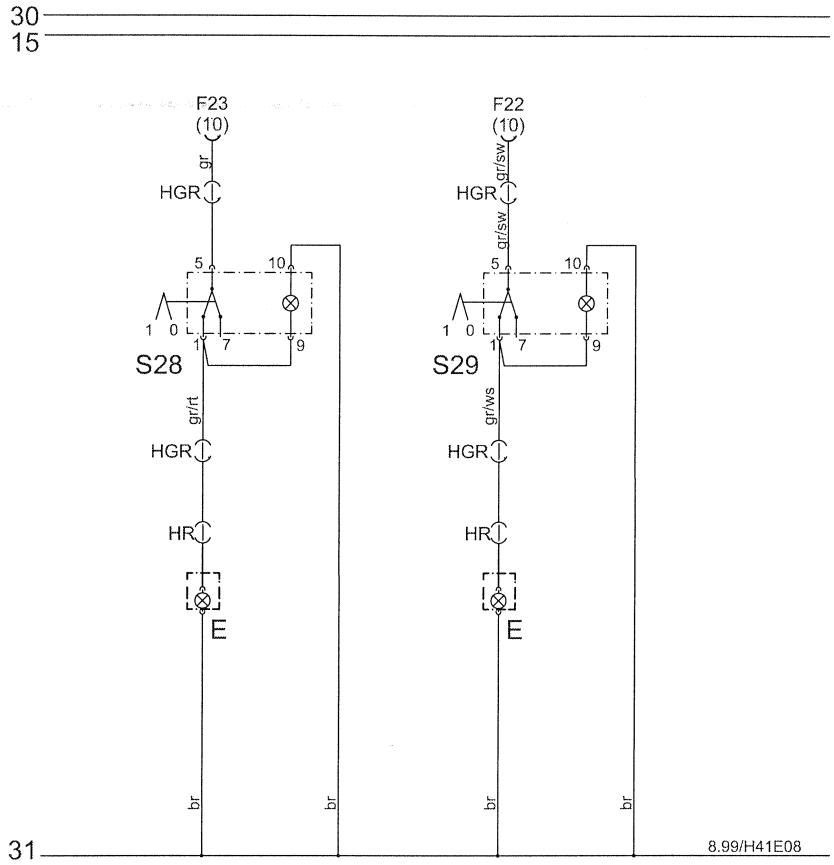
9. Lighting system	10. Working floodlights, rotating beacon



Section Qty.	Desig-nation	Device
9		***Lighting system***
1	S20	Turning indicator switch
1	F19	Fuse
1	E36	Upper beam, left
1	E37	Upper beam, right
1	F18	Fuse
1	E38	Lower beam, left
1	E39	Lower beam, right
1	S10	Light switch
1	F20	Fuse
1	E29	Side marker lamp, front left
1	E30	Side marker lamp, rear left
1	F21	Fuse
1	E31	Side marker lamp, front right
1	E32	Side marker lamp, rear right

Section Qty.	Desig-nation	Device
10		***Working floodlights***
1	K1	Working floodlights relay
1	F22	Fuse
1	F23	Fuse
1	S12	Working floodlights switch
1	E33	Working floodlight, rear
2	E34	Working floodlight, front
1	F16	Fuse
1	S17	Rotating beacon switch
1	E 35	Rotating beacon

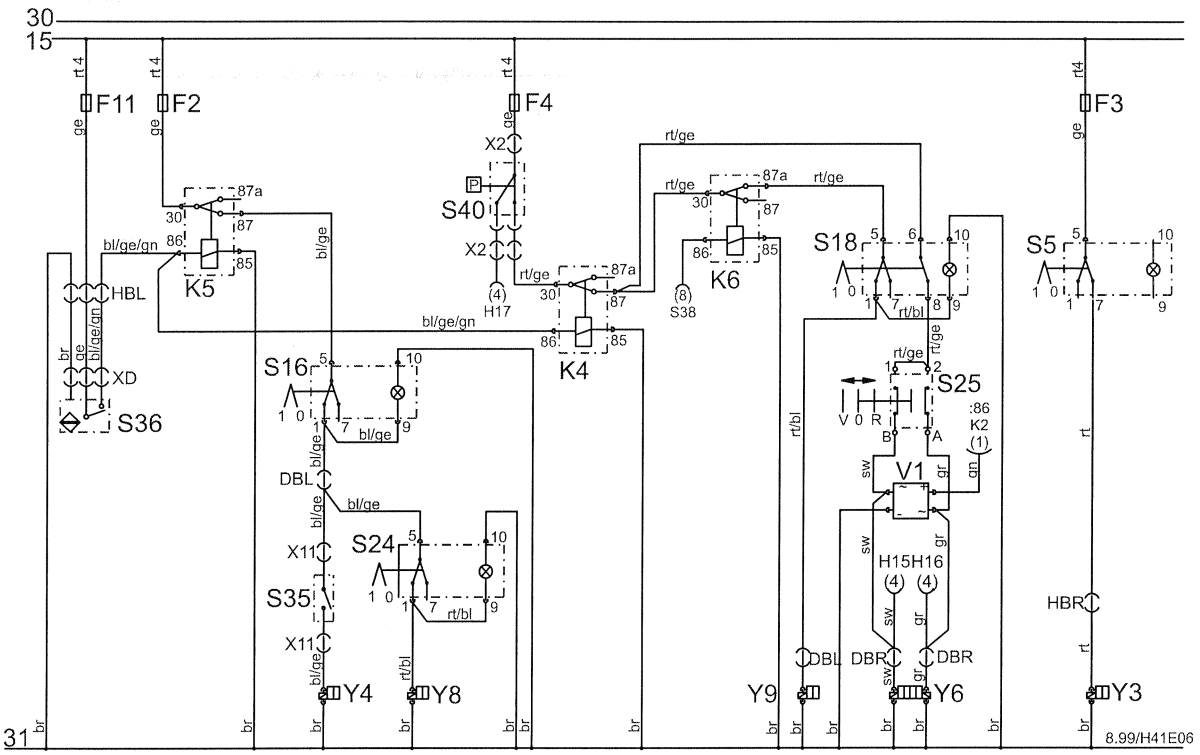
11. Boom-mounted working floodlight	12. Rear fog light



Section Qty.	Desig-nation	Device
11		***Boom-mounted working floodlight***
1	F23	Fuse
1	S28	Switch, working floodlight
1	E	Working floodlight

Section Qty.	Desig-nation	Device
12		***Rear fog light***
1	F22	Fuse
1	S29	Switch, rear fog light
1	E	Fog light

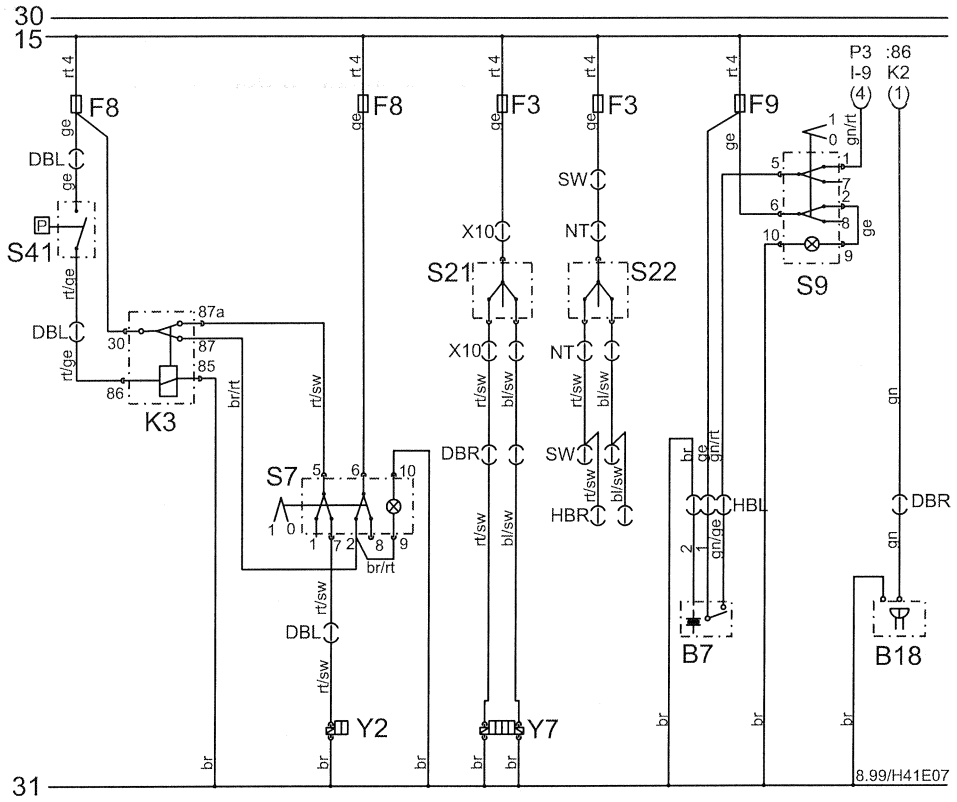
13. Working hydraulics cut-off	14. Travel



Section Qty.	Desig-nation	Device
13		***Working hydraulics cut-off***
1	F11	Fuse
1	XD	Plug connection
1	S36	Proximity switch for entry steps
1	F2	Fuse
1	K5	Relay for entry steps safety device
1	S16	Working hydraulics switch
1	X11	Plug connection
1	S35	Armrest switch
1	Y4	Valve for working hydraulics
1	S24	Switch for steering
1	Y8	Valve for steering

Section Qty.	Desig-nation	Device
14		***Travel***
1	F4	Fuse
1	X2	Plug connection
1	S40	Parking brake pressure switch
1	K4	Travel relay
1	K6	Relay for rocker pedal
1	S18	Switch for rocker pedal
1	Y9	Valve for rocker pedal
1	S25	Switch for travel, forward/ in reverse
1	V1	Bridge-connected rectifier
1	Y6	Valve for travel
1	F3	Fuse
1	S5	Fast/ Slow switch
1	Y3	Fast/ Slow valve

15. Oscillating axle lock	16. Options

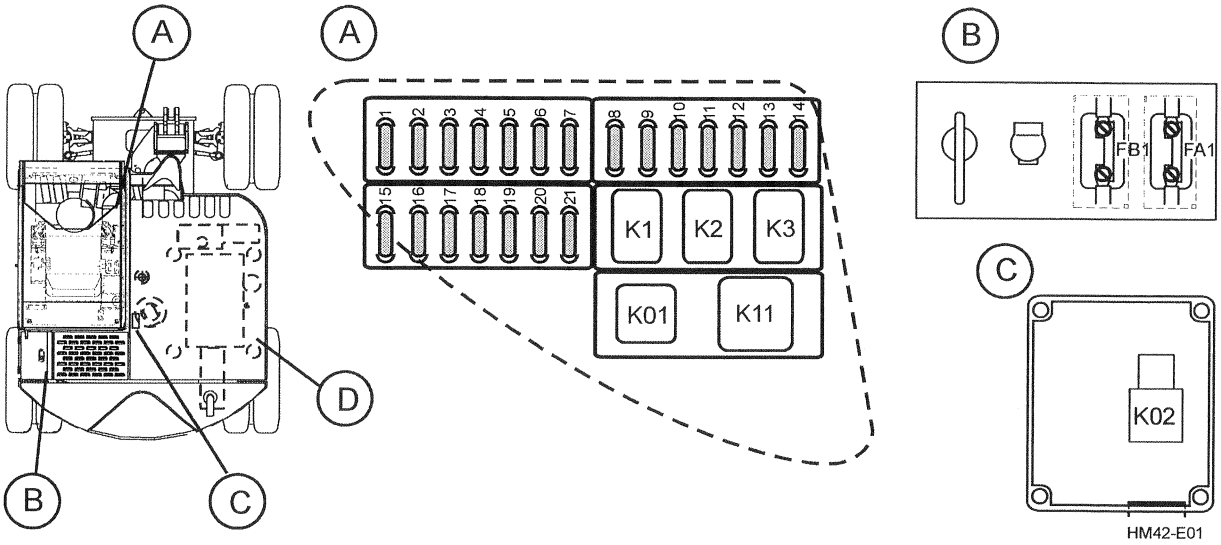


Section Qty.	Desig-nation	Device
15		***Oscillating axle lock***
1	F8	Fuse
1	S41	Pressure switch
1	K3	Relay for oscillating axle lock
1	F8	Fuse
1	S7	Switch for oscillating axle lock
1	Y2	Valve for oscillating axle lock

Section Qty.	Desig-nation	Device
16		***Options***
1	F3	Fuse
1	X10	Plug connection
1	S21	Switch in coordinate lever, right
1	Y7	Valve: e.g. grab rotation
1	F3	Fuse
1	S22	Switch in coordinate lever, left (not assigned)
1	F9	Fuse
1	S9	Overload warning cut-off
1	B7	Overload warning pressure sensor
1	B18	Warning buzzer
1		

Electrical system

Fuse and relay box — Assignment diagram



A = Instrument panel B = Service ladder C = Starter box D = Power Relay K03

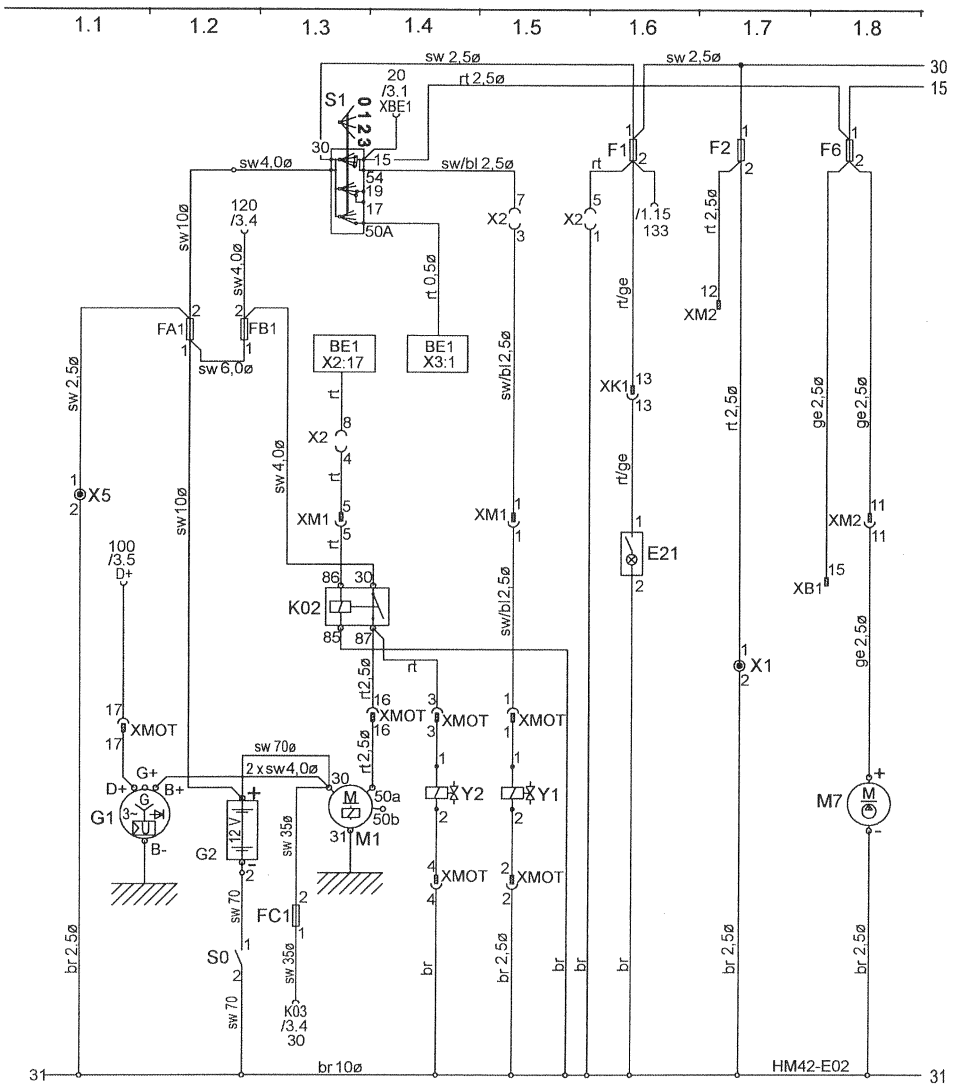
Fuses		
Position	**Amps**	**assigned to**
F 1	10	Interior light, radio, immobilizer
F 2	20	Socket, additional heating (option)
F 3	10	Hazard lamp, headlamp flasher, rotating beacon
F 4	15	Working floodlight, front
F 5	15	Working floodlight, rear
F 6	15	Fuel-filling pump, electrical seat heating (option)
F 7	10	Horn, switch lighting, immobilizer
F 8	15	Heater fan, air conditioning
F 9	10	Wish-wash system, radio
F 10	5	Hydr. oil level, overload warning, rock breaker, additional control circuit
F11	5	Travel, parking brake, brake light switch
F12	5	Working hydraulics
F13	10	Brake light
F14	10	Hazard lamp
F 15	15	High beam
F 16	15	Low beam

Fuses		
Position	**Amps**	**assigned to**
F17	10	Side marker lamp, left
F18	10	Side marker lamp, right
F19	10	Additional module
F20	10	All-wheel steering (option)
F21	10	Option
FA1	50	Main fuse
FB1	40	Pre-heating
FC1	175	Heating flange (K03)

Colors of fuses			
5 A	brown	10 A	red
15 A	blue	20 A	yellow

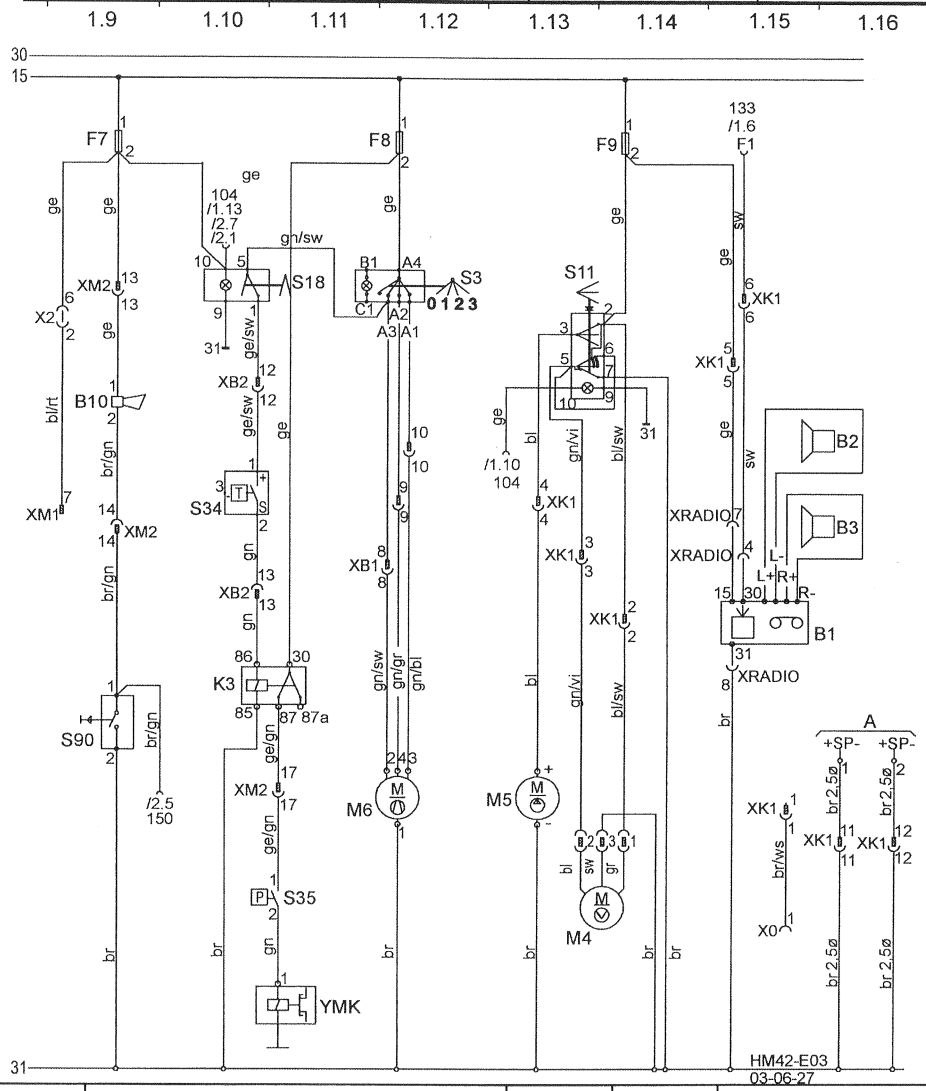
Relays	
Position	**Function**
K 01	Pre-heating relay
K 02	Start-up relay
K 03	Power relay
K 1	Working floodlight, front
K 2	Working floodlight, rear
K 3	not assigned (air cond. → option)
K11	Directional indicator

Power supply	Start-up system	Shut-off	Interior light, socket	Fuel-filling pump



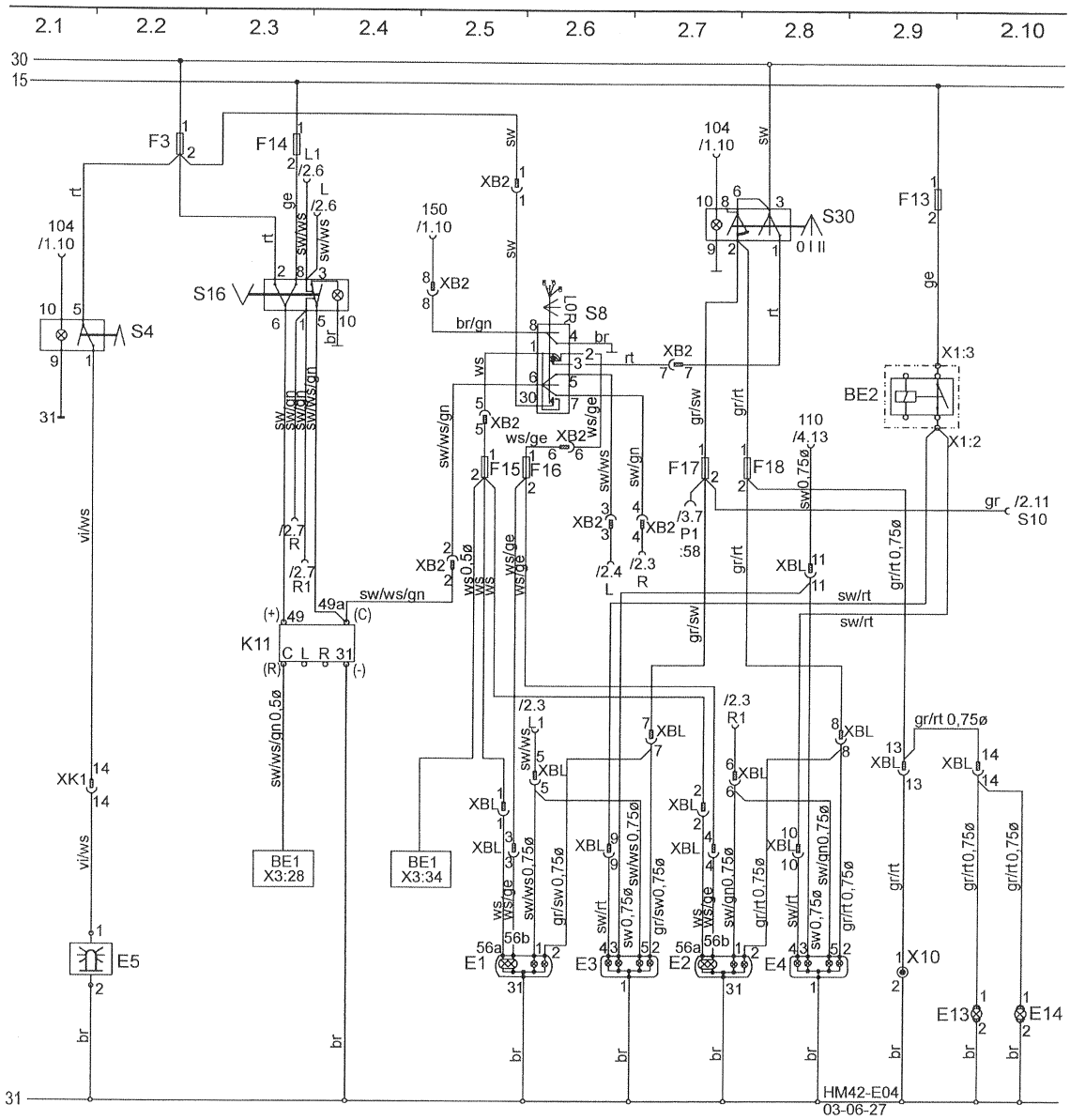
Path	Code	Device	Path	Code	Device
		Power supply			***Shut-off***
1.1	X5	Service ladder socket	1.4	Y2	Extra-large quantity for start-up
1.2	G1	Generator	1.5	Y1	Shut-off
1.2	FA 1	Fuse			***Interior light, socket***
1.2	FB 1	Fuse	1.6	F1	Fuse
1.2	G2	Battery	1.6	E21	Interior light
1.2	SO	Battery disconnect switch	1.7	F2	Fuse
		Start-up system	1.7	X1	Instrument panel socket
1.3	FC1	Fuse (heating flange)			
1.3	S1	Pre-heat starter switch			***Fuel-filling pump***
1.3	M1	Starter	1.8	F6	Fuse
1.3	K02	Start-up relay	1.8	M7	Fuel-filling pump

Horn	Heater fan, air conditioning	Wish-wash system	Radio



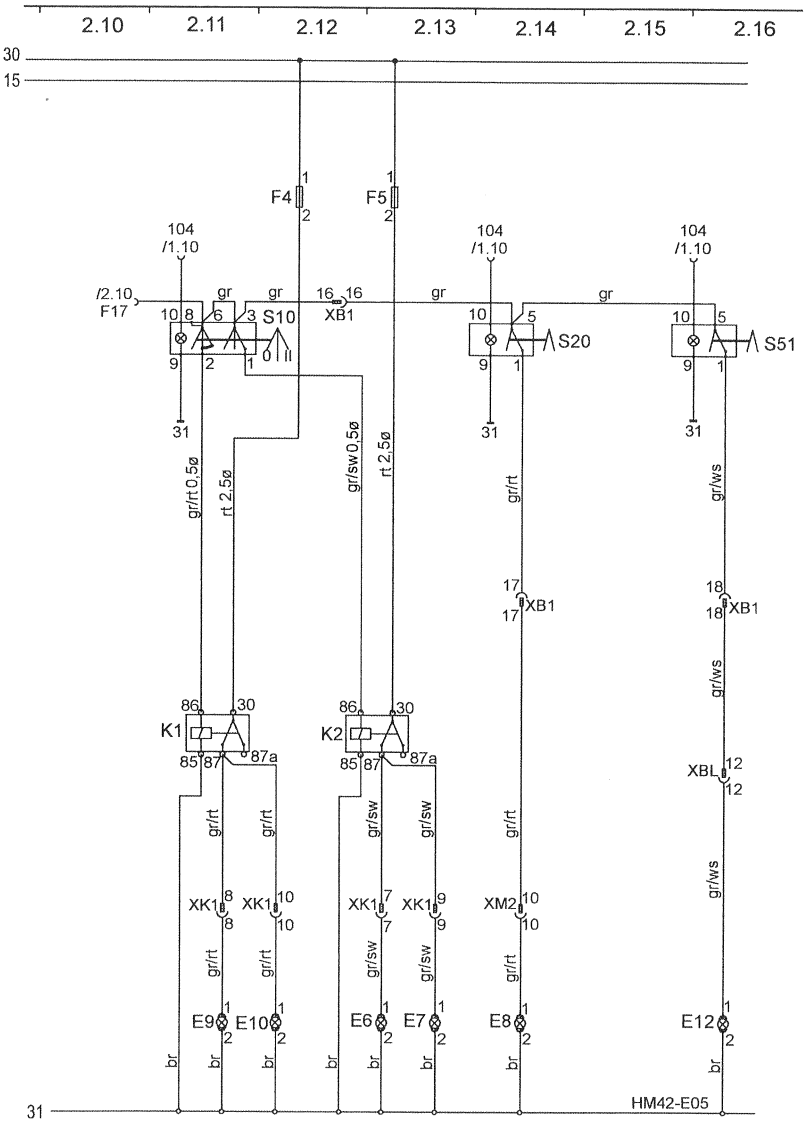
Path	Code	Device	Path	Code	Device
		Horn			***Wish-wash system***
1.9	F7	Fuse	1.13	M5	Washer pump
1.9	B10	Horn	1.13	S11	Wish-wash switch
1.9	S90	Coordinate lever horn button	1.13	F9	Fuse
		Heater fan, air conditioning	1.13	M4	Wiper motor
1.10	S18	Air conditioning switch			***Radio***
1.10	S34	Air conditioning temperature switch	1.15	B1	Radio
1.10	K3	Relay	1.16	B2	Loudspeaker
1.10	S35	Air conditioning pressure switch	1.16	B3	Loudspeaker
1.10	YMK	Compressor magnetic coupling			
1.11	F8	Fuse	1.16	A	Central mass, cab
1.12	S3	Heater fan switch			
1.12	M6	Heater fan			

Rotating beacon	Lighting system



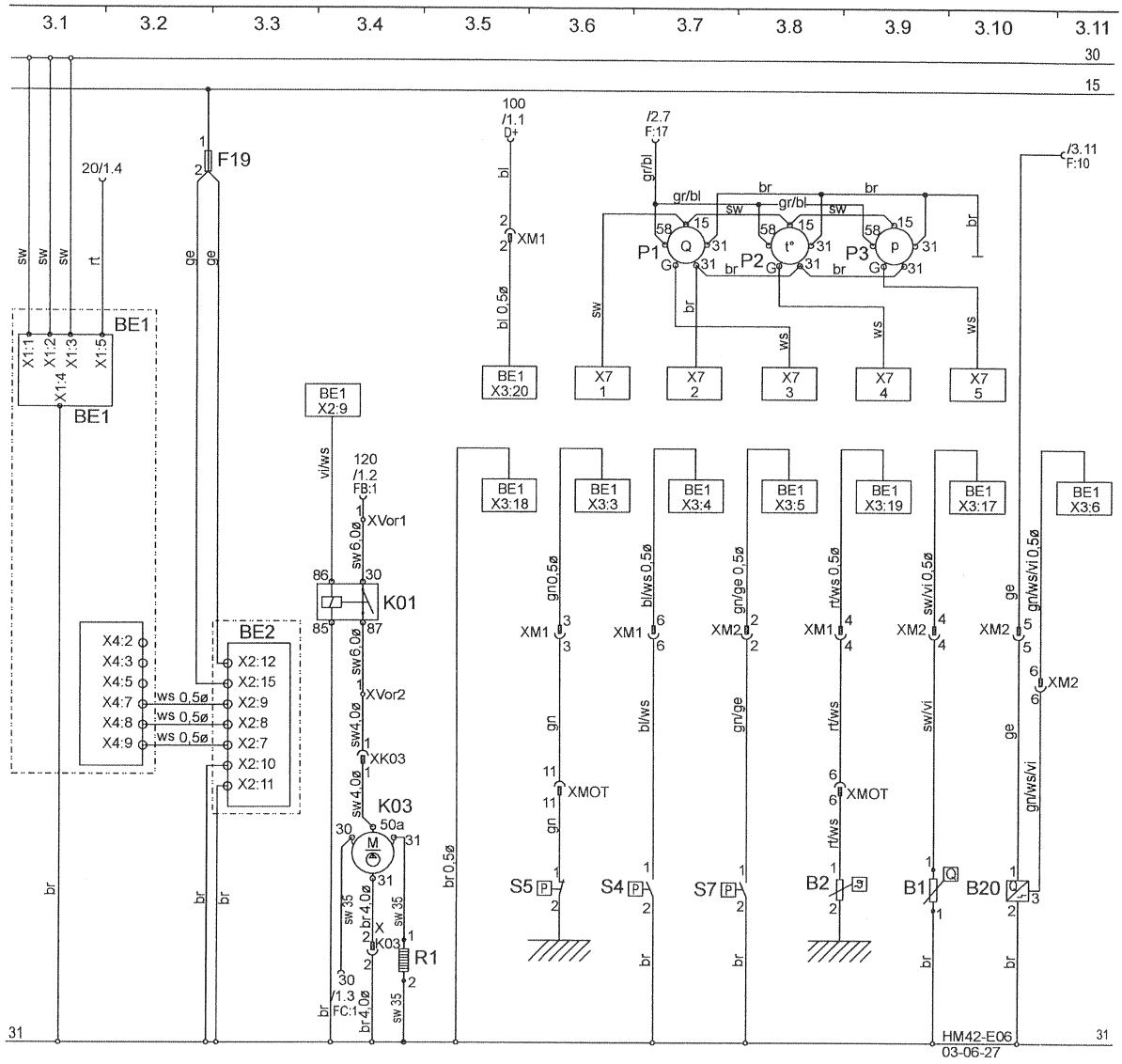
Path	Code	Device	Path	Code	Device
		Rotating beacon	2.6	E3	Rear light, left
2.1	S4	Rotating beacon switch	2.8	S30	Light switch
2.2	E5	Rotating beacon	2.7	E2	Headlamp, right
2.2	F3	Fuse	2.7	F17	Fuse
		Lighting system	2.8	F18	Fuse
2.3	F14	Fuse	2.8	E4	Rear light, right
2.3	S16	Hazard warning switch	2.9	F13	Fuse
2.3	K11	Directional indicator	2.9	BE2	Additional module
2.6	S8	Steering column switch	2.9	X10	Side marker lamp socket
2.5	F15	Fuse	2.10	E13	License-plate illumination
2.6	F16	Fuse	2.10	E14	License-plate illumination
2.5	E1	Headlamp, left			

Working floodlights	Rear fog lamp



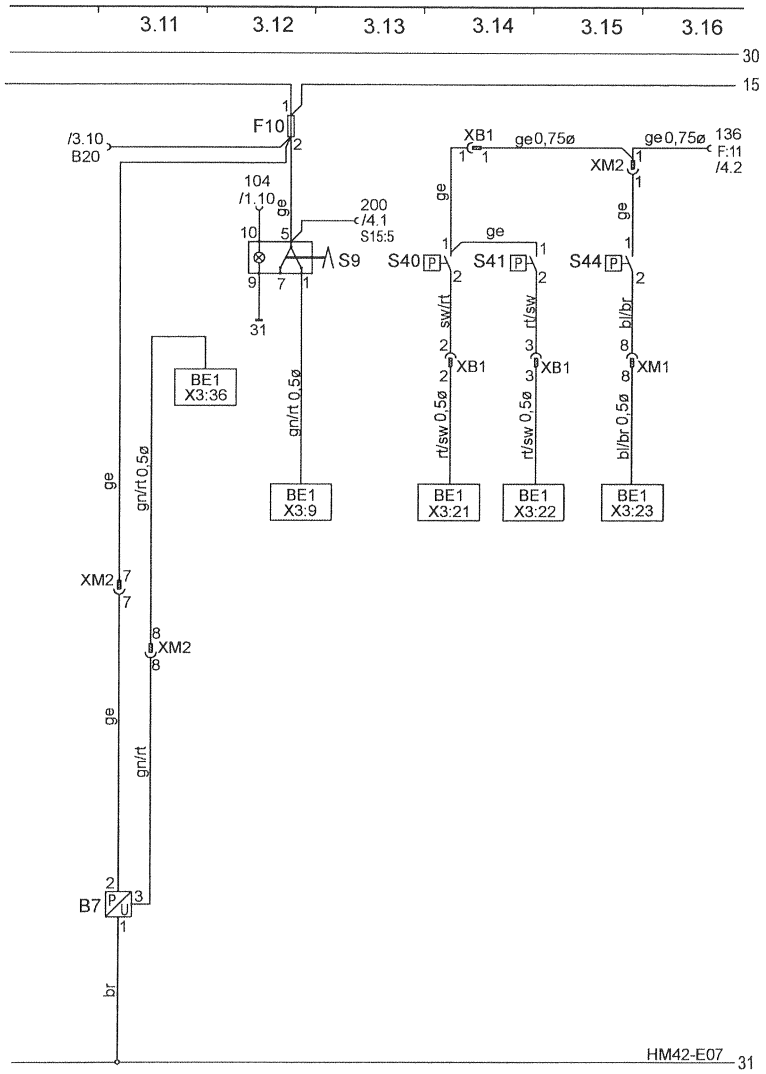
Path	Code	Device	Path	Code	Device
		Working floodlights	2.12	E6	Working floodlight, rear
2.7	F17	Fuse	2.13	E7	Working floodlight, rear
2.10	S10	Switch for working floodlights, front & rear	2.14	S20	Switch for boom-mounted working floodlight
2.11	K1	Floodlight relay, front	2.14	E8	Boom-mounted working floodlight
2.11	E9	Working floodlight, front			
2.11	E10	Working floodlight, front			***Rear fog lamp***
2.11	F4	Fuse	2.16	S51	Rear fog lamp switch
2.12	F5	Fuse	2.16	E12	Rear fog lamp
2.12	K2	Floodlight relay, rear			

Control module	Pre-heat system	Instruments, warning devices



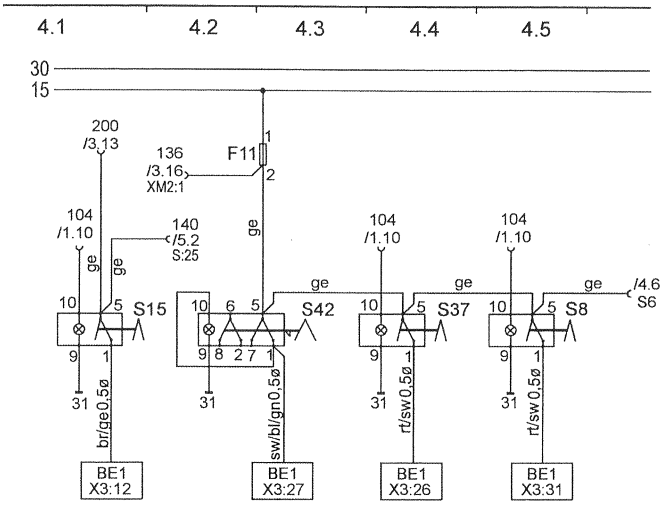
Path	Code	Device	Path	Code	Device
		Control module			***Instruments, warning devices***
3.1	BE1	Control module	3.5	S5	Oil pressure switch
3.3	F19	Fuse	3.6	S4	Air filter maintenance
3.3	BE2	Additional module	3.7	P1	Fuel gauge
		Pre-heating	3.7	S7	Hydraulic oil filter
3.4	K01	Pre-heat relay	3.8	P2	Temperature indicator
3.4	K03	Power relay	3.8	B2	Coolant temperature
3.4	R1	Glow plugs	3.9	P3	Overload warning device
			3.9	B1	Tank sensor
			3.10	B20	Hydraulic oil level
			2.12	F10	Fuse

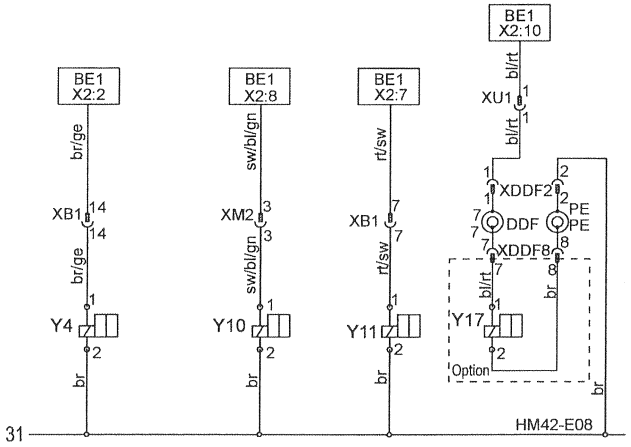
Overload warning device	Hydraulic functions



Path	Code	Device	Path	Code	Device
		Overload warning device			***Hydraulic functions***
3.11	B7	Overload warning signal sensor	3.14	S40	Brake light pressure switch
3.12	F10	Fuse	3.14	S41	Axle lock pressure switch
3.12	S9	Overload warning switch	3.15	S44	Accumulator pressure

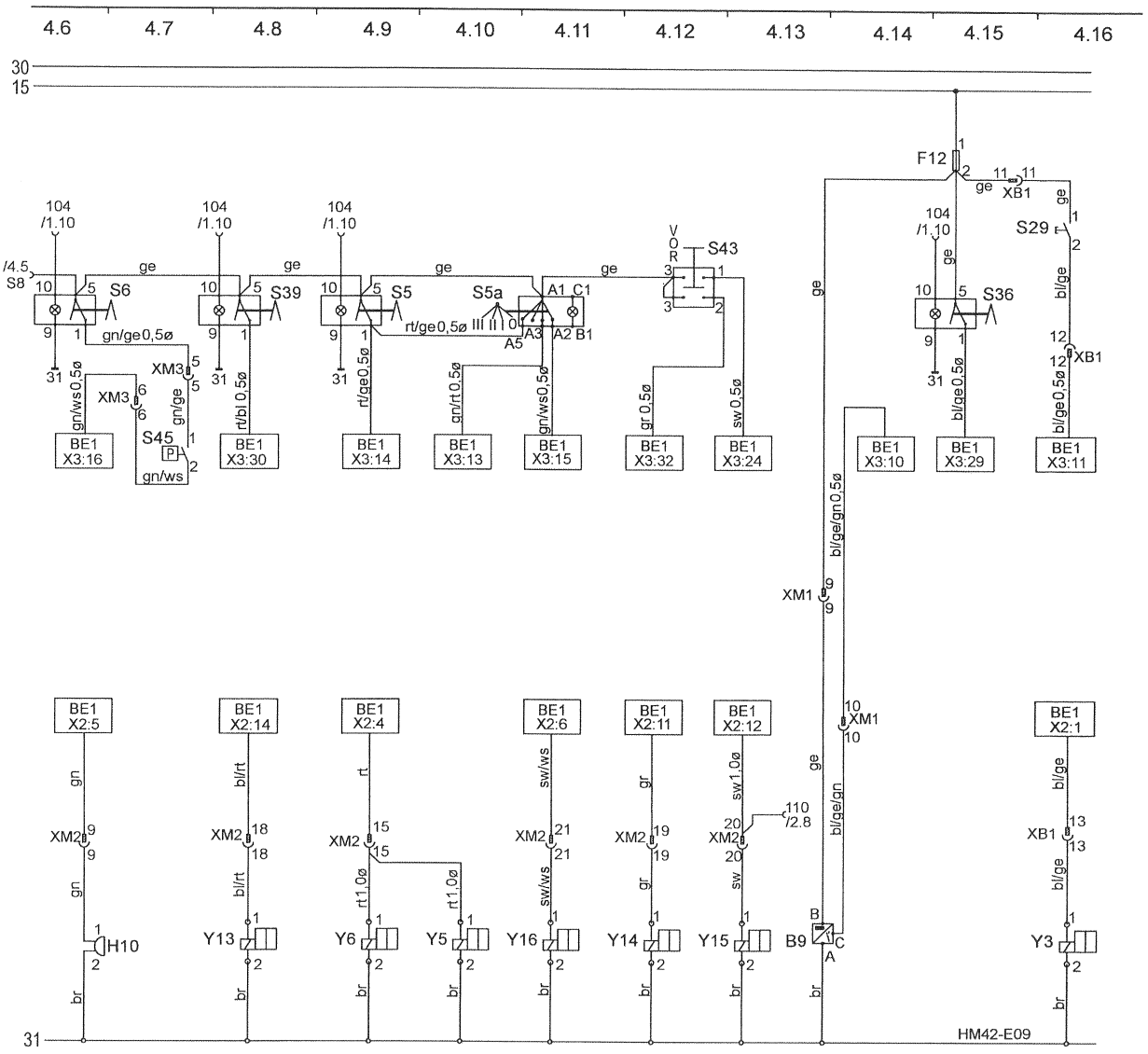
Hydraulic functions





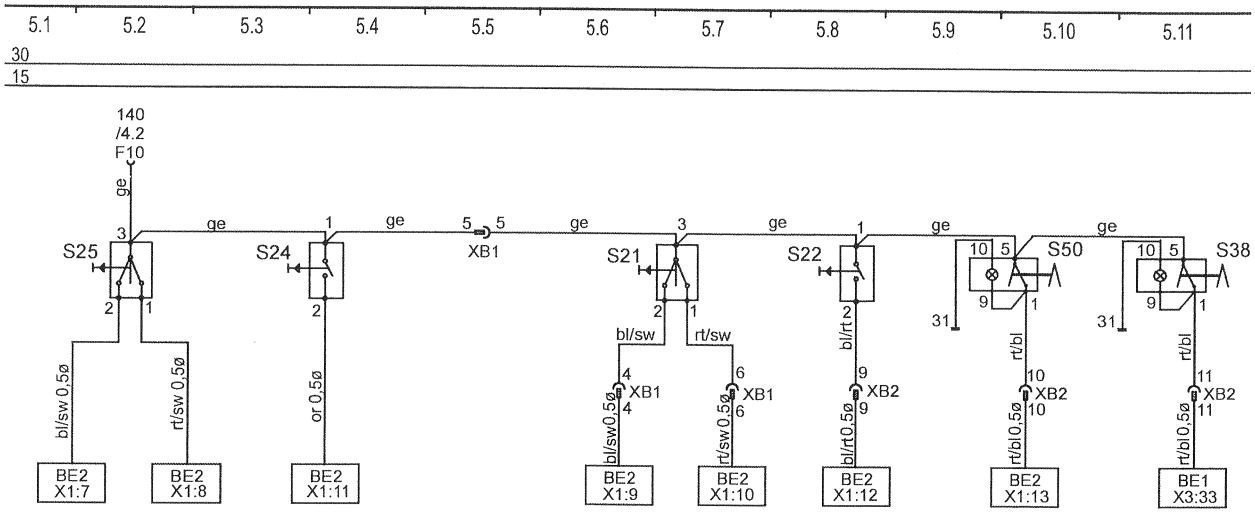
Path	Code	Device	Path	Code	Device
		Hydraulic functions	4.4	S37	Axle lock switch
4.1	S15	Rock breaker switch	4.4	Y11	Axle lock valve
4.1	Y4	Rock breaker valve	4.5	S8	Front dozer blade switch
4.2	F11	Fuse	4.5	Y17	Front dozer blade valve
4.2	S42	Parking brake switch			
4.2	Y10	Parking brake valve		DDF	Rotary joint

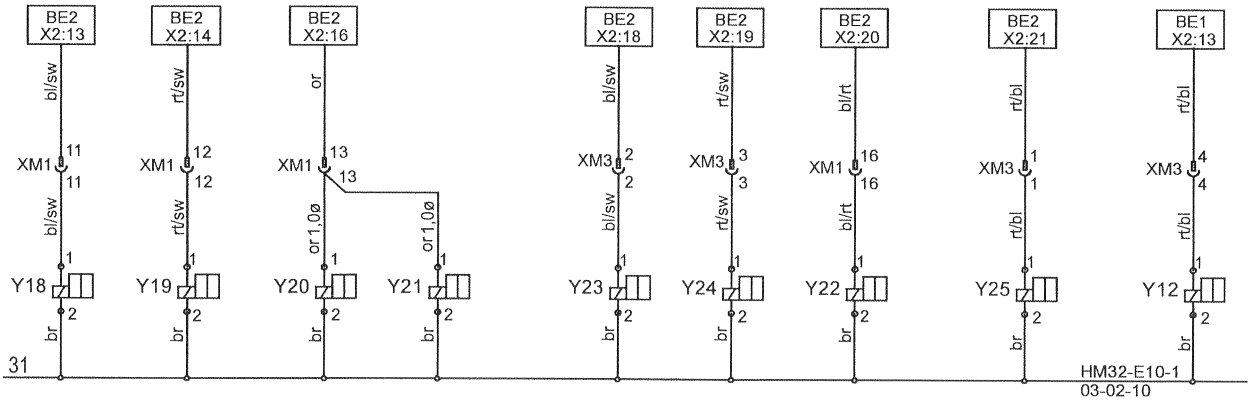
Travel drive	Working hydraulics cut-off



Path	Code	Device	Path	Code	Device
		Travel drive	4.12	Y14	Valve for travel, forward
4.6	S6	Travel motion alarm switch	4.12	S43	"Forward/Reverse" switch
4.6	H10	Travel motion alarm horn	4.13	Y15	Valve for travel, reverse
4.7	S45	Travel motion alarm pressure switch	4.11	Y16	Valve for flushing (travel motor)
4.8	S39	Accelerator pedal switch			***Working hydraulics cut-off***
4.8	Y13	Accelerator pedal valve	4.13	B9	Service ladder proximity switch
4.9	S5	"FAST/SLOW" switch	4.15	F12	Fuse
4.9	Y6	"FAST" valve	4.15	S36	Working hydraulics cut-off
4.10	Y5	"FAST" valve	4.16	S29	Armrest switch
4.11	S5a	All-wheel steering switch	4.16	Y3	Working hydraulics valve

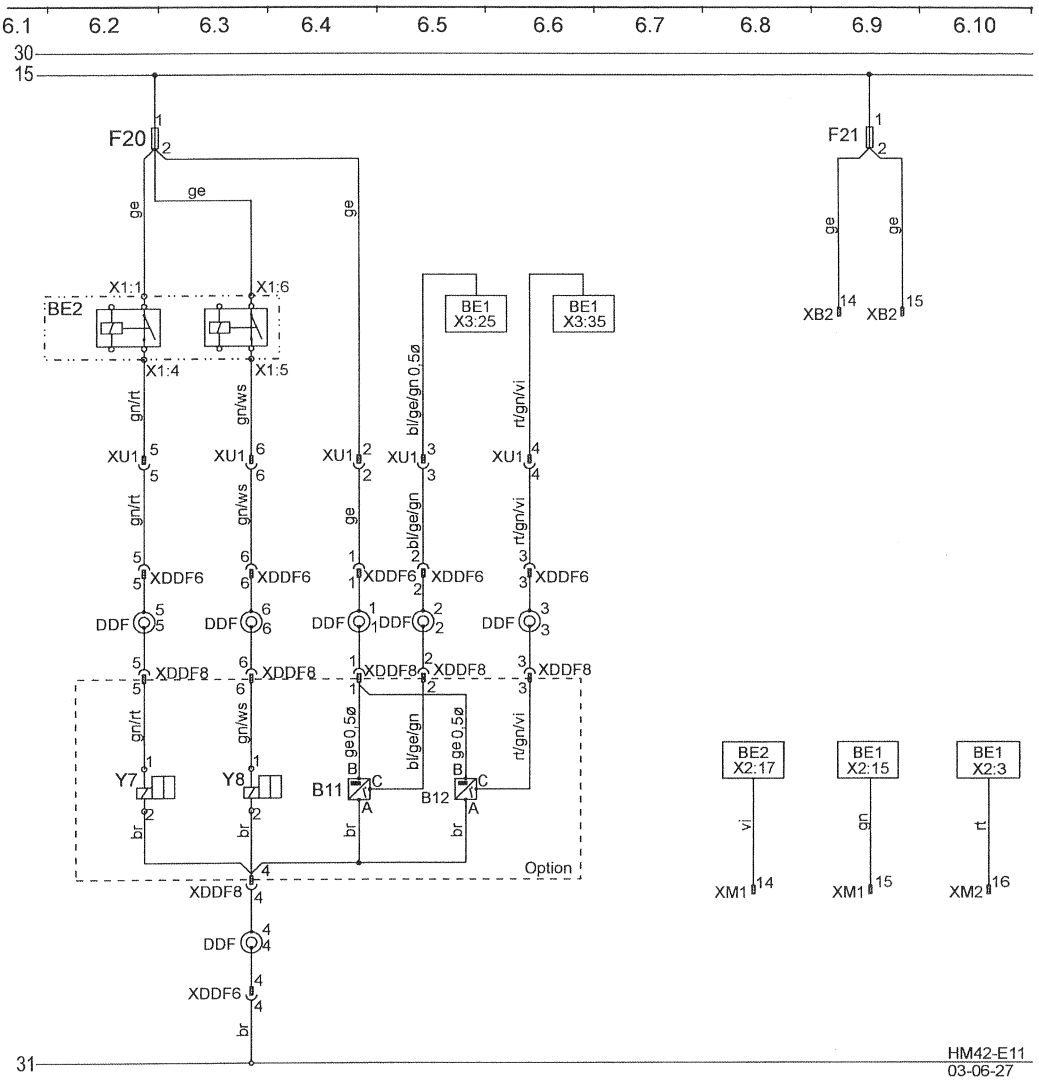
Coordinate lever, right	Coordinate lever, left	Armrest, left





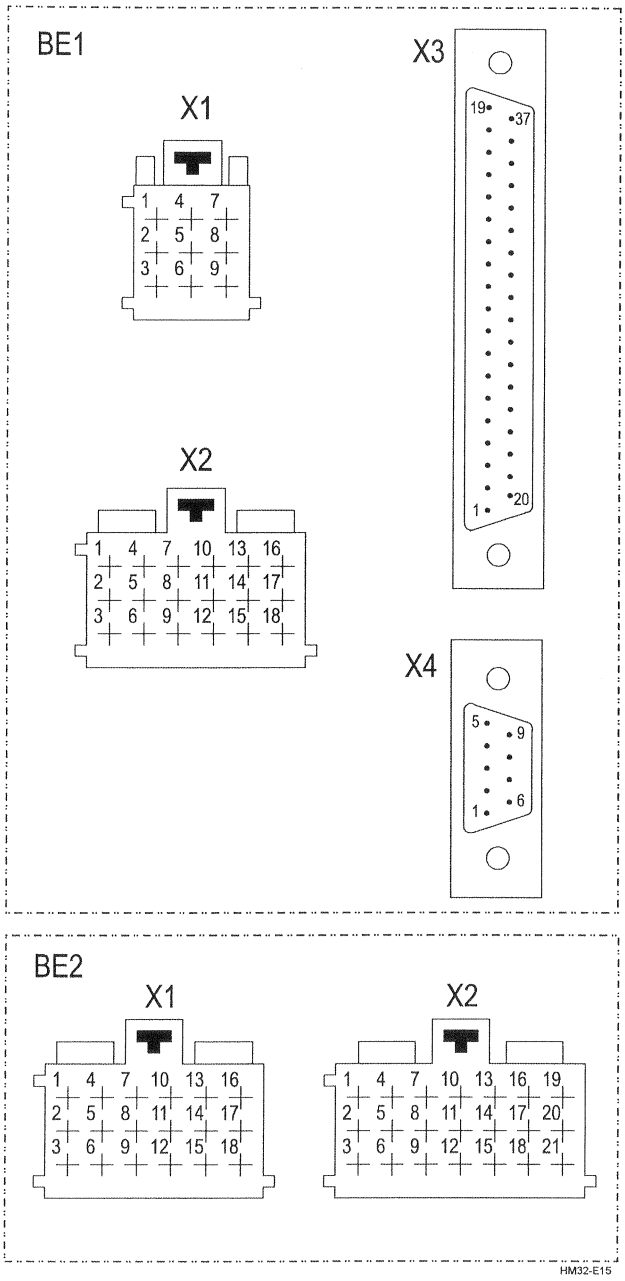
Path	Code	Device	Path	Code	Device
		Coordinate lever, right			***Coordinate lever, left***
5.2	S25	Push-button for additional control circuit 1	5.6	S21	Push-button for additional control circuit 2
5.1	Y18	Valve for additional control circuit 1	5.6	Y23	Valve for additional control circuit 2
5.2	Y19	Valve for additional control circuit 1	5.7	Y24	Valve for additional control circuit 2
5.4	S24	Articulation changeover switch	5.8	S22	Swing pressure boost
5.4	Y20	Valve for articulation	5.8	Y22	Swing pressure valve
5.5	Y21	Valve for articulation			Armrest, left
			5.10	S50	Switch for option
			5.10	Y25	Valve for option
			5.11	S38	Steering changeover switch
			5.11	Y12	Steering changeover valve

Steering	Option



Path	Code	Device	Path	Code	Device
		Steering			
6.2	F20	Fuse	6.4	B11	Front axle proximity switch, steering angle
6.2	BE2	Additional module	6.5	B12	Rear axle proximity switch, steering angle
6.2	Y7	Valve round/crab (steering)	6.9	F21	Fuse (option)
6.3	Y8	Valve round/crab (steering)		DDF	Rotary joint

Control module



X1	***Power supply***
1	Power supply Terminal 30
2	Power supply Terminal 30
3	Power supply Terminal 30
4	Central mass
5	Power supply Terminal 15
6	--
7	--
8	--
9	--
X2	***Signal outputs***
1	Working hydraulics
2	Rock breaker
3	FAST – SLOW
4	FAST – SLOW
5	Travel motion alarm
6	Flushing
7	Axle lock
8	Parking brake
9	Pre-heating
10	Front dozer blade
11	Travel, forward
12	Travel, reverse
13	Steering changeover
14	Accelerator pedal
15	Option
16	--
17	Start-up magnetic switch terminal 50A
18	--
X3	***Signal inputs***
1	Start-up ignition lock terminal 50A
2	--
3	Oil pressure switch
4	Air filter clogging
5	Hydraulic oil filter clogging
6	Hydraulic oil float switch
7	--
8	--
9	Overload warning switch
10	Service ladder proximity switch
11	Armrest switch

12	Rock breaker switch
13	--
14	FAST – SLOW switch
15	--
16	Travel motion alarm switch
17	Tank sensor
18	Central mass
19	Coolant temperature
20	Charge control
21	Brake light signal
22	Axle lock signal
23	Accumulator pressure signal
24	Switch for travel, reverse
25	Front axle steering angle signal
26	Axle lock switch
27	Parking brake switch
28	Direction indicator lamp signal
29	Working hydraulics switch
30	Accelerator pedal switch
31	Front dozer blade switch
32	Switch for travel, forward
33	Steering changeover switch
34	High beam signal
35	Rear axle steering angle signal
36	Overload warning signal
37	--
X4	***Interface***
1	--
2	--
3	--
4	--
5	--
6	--
7	Connection additional module X2:9
8	Connection additional module X2:8
9	Connection additional module X2:7

Additional module BE2

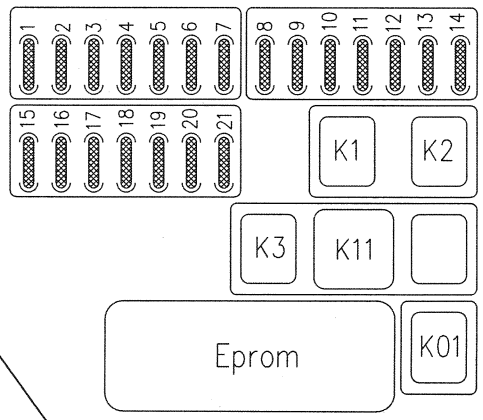
X1	***Plug***
1	--
2	Brake lights
3	Power supply Terminal 15
4	--
5	--
6	--
7	Additional control circuit 1 push-button
8	Additional control circuit 1 push-button
9	Additional control circuit 2 push-button
10	Additional control circuit 2 push-button
11	Articulation changeover push-button
12	Swing pressure boost push-button
13	Bucket changeover switch (option)
14	--
15	--
16	--
17	--
18	--
X2	***Plug***
1	--
2	--
3	--
4	--
5	--
6	--
7	Connection control module X4:9
8	Connection control module X4:8
9	Connection control module X4:7
10	Central mass
11	Central mass
12	Power supply Terminal 15
13	Valve additional control circuit 1
14	Valve additional control circuit 1
15	Power supply Terminal 15
16	Valve for articulation
17	Valve for articulation
18	Valve for additional control circuit 2
19	Valve for additional control circuit 2
20	Swing pressure boost
21	Bucket changeover (option)

Sicherungen (Fuses)

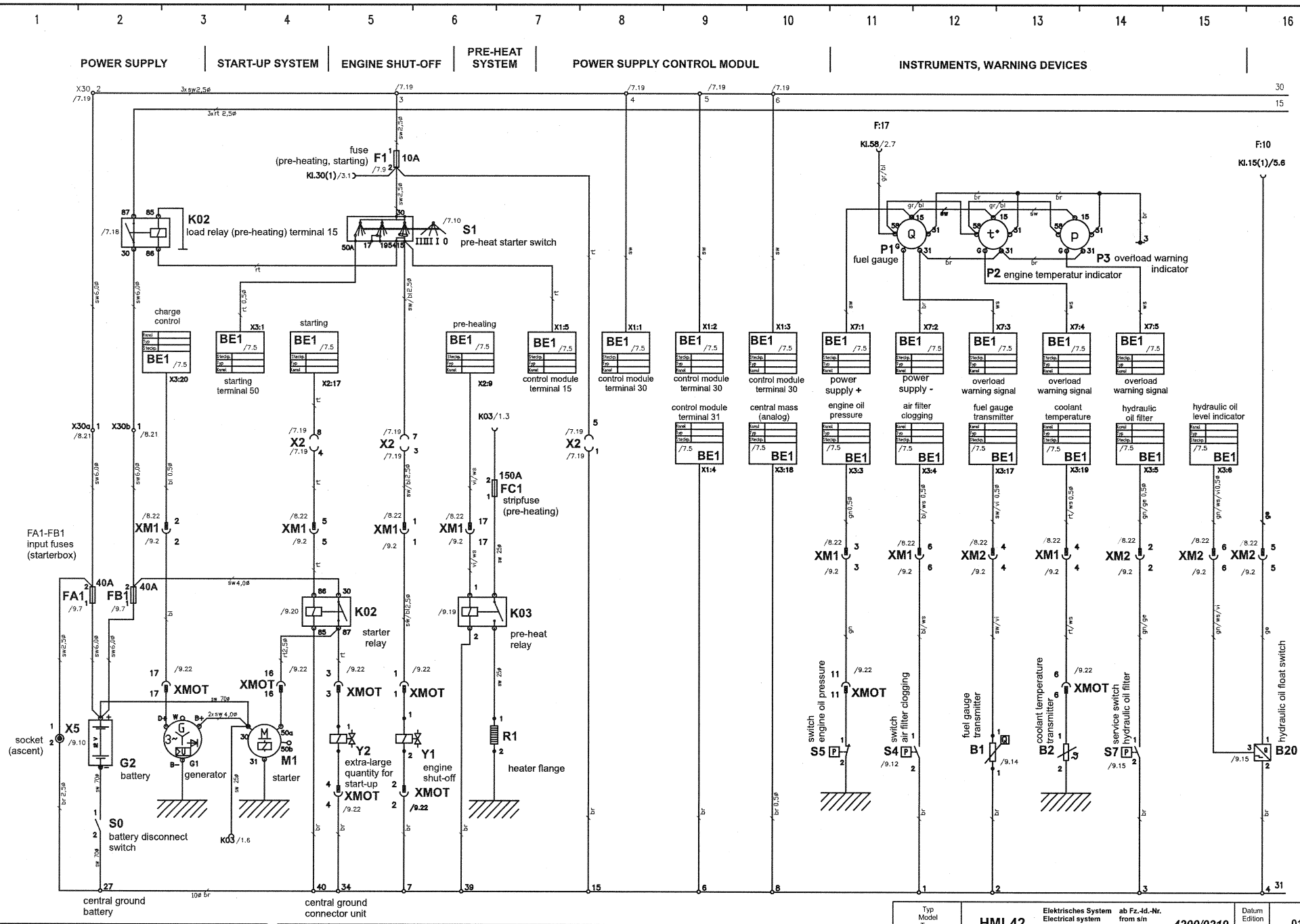
Pos. (item)	Amp. (Amp.)	belegt mit (assigned to)
F1	10	Glühstart Innenleuchte, Wegfahrsperre (glow plug and starter switch, interior light, immobilizer)
F2	15	Steckdose, Radio Zusatzheizung (Option) (socket, radio, additional heating–option)
F3	10	Warnblinker, Lichthupe, Rundumleuchte (hazard flasher, headlamp flasher, rotating beacon)
F4	15	Arbeitsscheinwerf. vo. (working floodlight, front)
F5	15	Arbeitsscheinwerf. hi. (working floodlight, rear)
F6	15	Betankungspumpe, elektr. Sitz (Option) (fuel–filling pump, electrical seat heating–option)
F7	10	Horn, Wegfahrsperre, Schalterbeleuchtung (horn, immobilizer, switch lighting)
F8	15	Heizgebläse (heater fan)
F9	15	Wisch–Waschanlage, Radio (wish–wash system, radio)
F10	5	Hydr. Ölniveau, Lastwarn Hammer, Zusatz (hydraulic oil level, overload warning, rock breaker, additional control circuit)
F11	5	Fahren, Feststellbremse Bremslichtschalter (travel, parking brake, brake light switch)
F12	5	Arbeitshydraulik (working hydraulics)
F13	10	Bremslicht (brake light)
F14	10	Warnblinker (hazard flasher)
F15	15	Fernlicht (high beam)
F16	15	Abblendlicht (low beam)
F17	10	Begrenzungslicht li., Instrumenten–beleuchtung (side marker lamp, left, instruments lighting)
F18	10	Begrenzungslicht re. (side marker lamp, right)
F19	10	Zusatzmodul (additional module)
F20	10	Allradlenkung (all–wheel steering)
F21	10	frei (not assigned)

Relais (relays)

Pos. (item.)	Funktion (function)
K01	Relais Kl 15 (relay term. 15)
K1	Arbeitsscheinwerfer vo. (working floodlight, front)
K2	Arbeitsscheinwerfer hi. (working floodlight, rear)
K3	frei (Klimaanlage–Option) (not assigned – air conditioning–option)
K11	Blinkgeber (directional indicator)



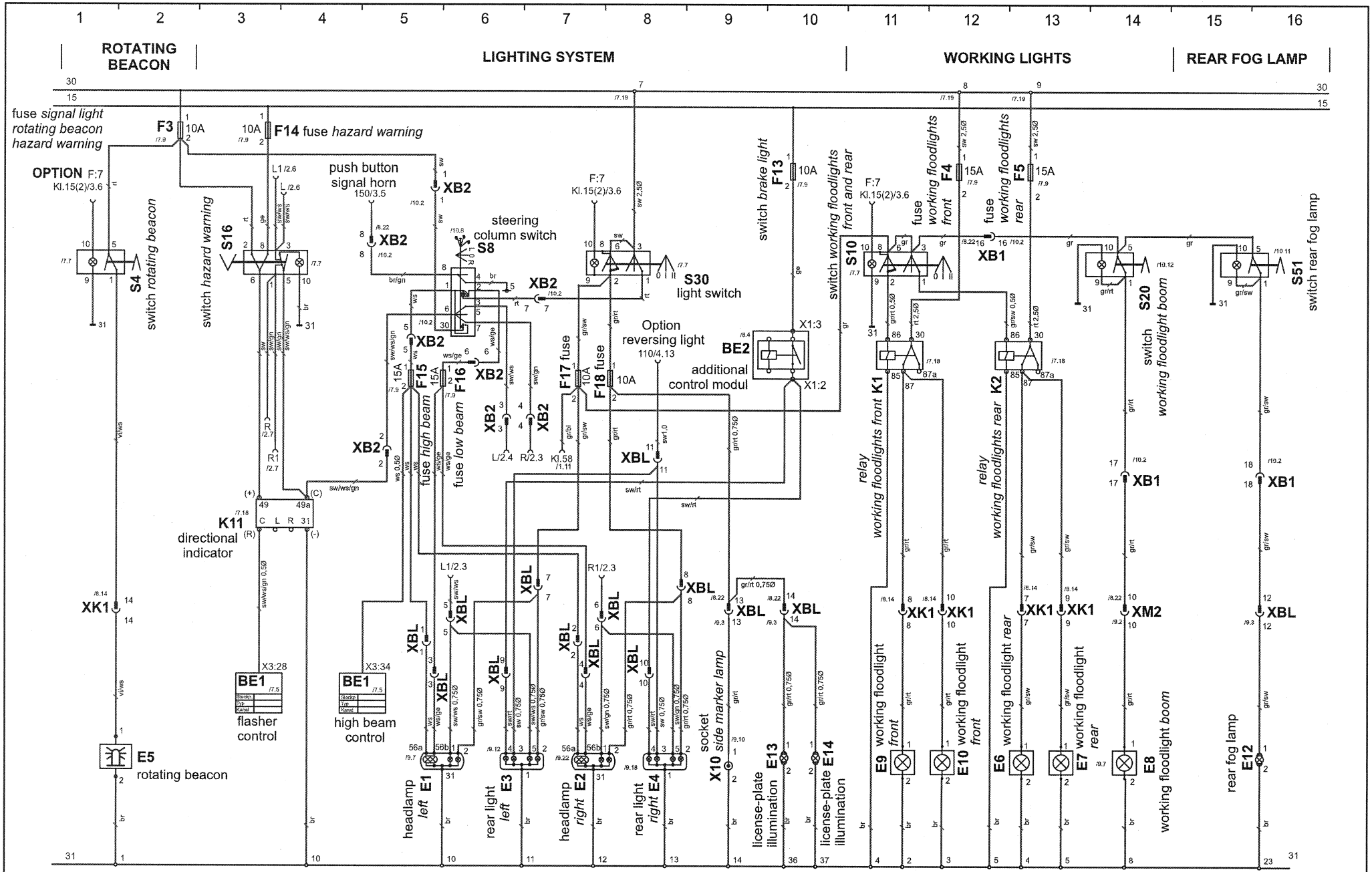
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Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.53.50**



BE1	connector central control module
XMOT	connector engine - machine
XM1	connector machine - dash board

XM2	connector machine - dash board

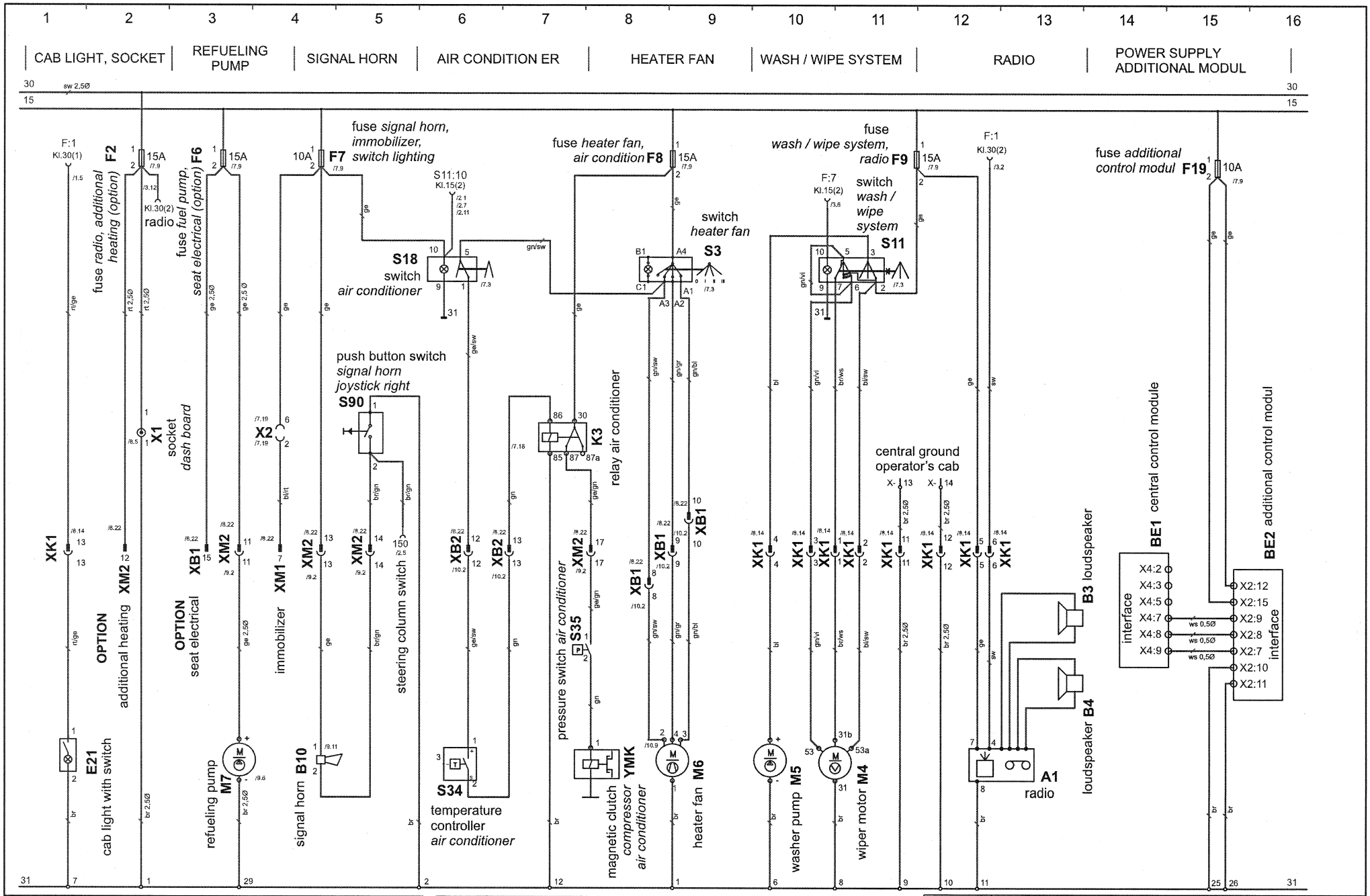
Typ Model Type Tipo	HML42	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 4200/0219	Datum Edition Date Fecha 01.2005
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 6/1	Blatt Page Feuille Página 7.53.51



F17	fuse *side marker light left, instruments lighting*
F18	fuse *side marker right*
XB1	connector *floor frame / dash board*
XB2	connector *floor frame / dash board*

XBL	connector *machine / dash board*
XK1	connector *operator's cab / dash board*
XM2	connector *machine / dash board*
BE1	connector *central control module*

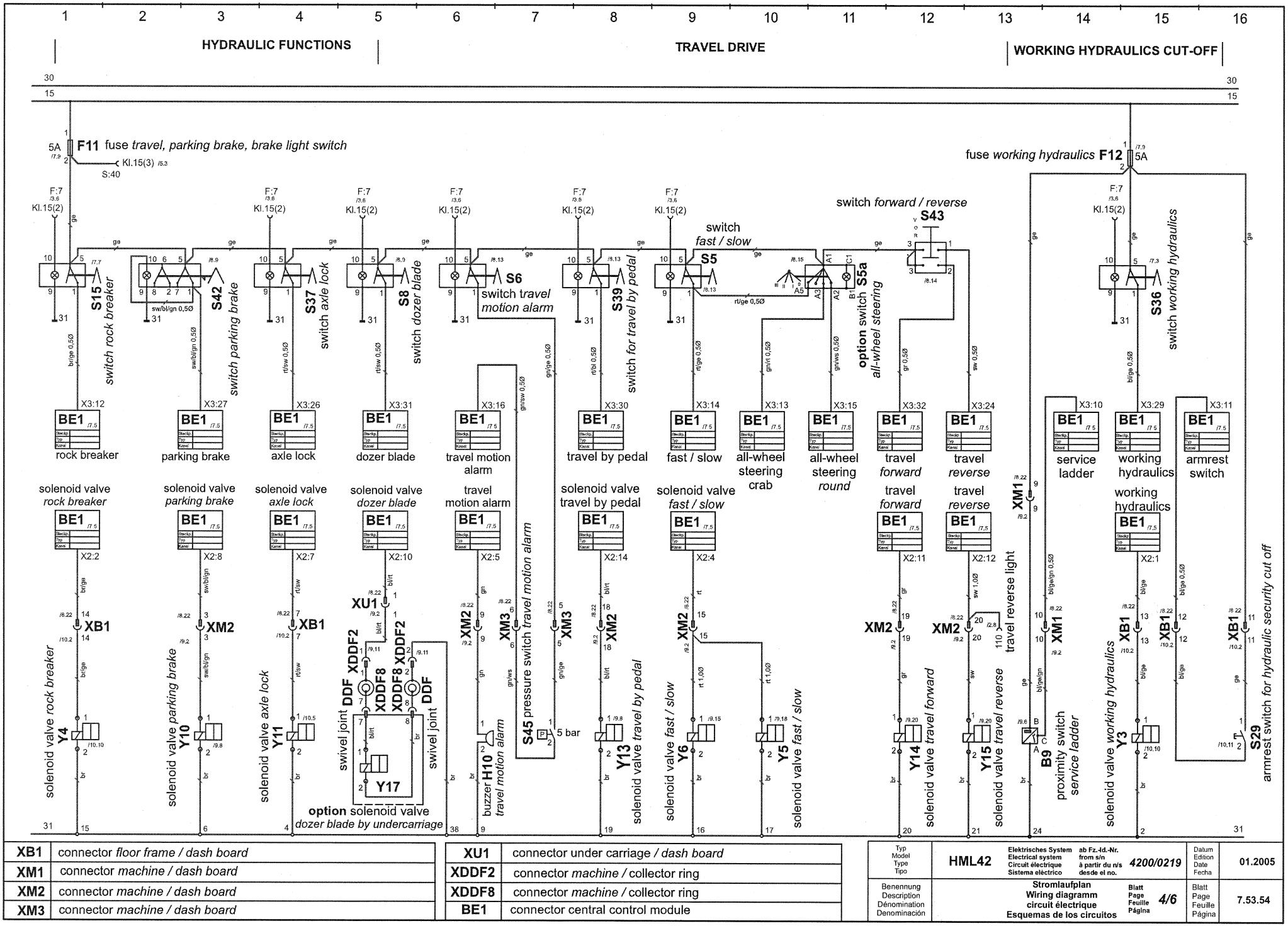
Typ / Model / Type / Tipo	HML42	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 4200/0219	Datum / Edition / Date / Fecha 01.2005
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 6/2	Blatt / Page / Feuille / Página 7.53.52



XB1	connector *floor frame / dash board*
XB2	connector *floor frame / dash board*
XM1	connector *machine / dash board*
XM2	connector *machine / dash board*

XK1	connector *operator's cab / dash board*

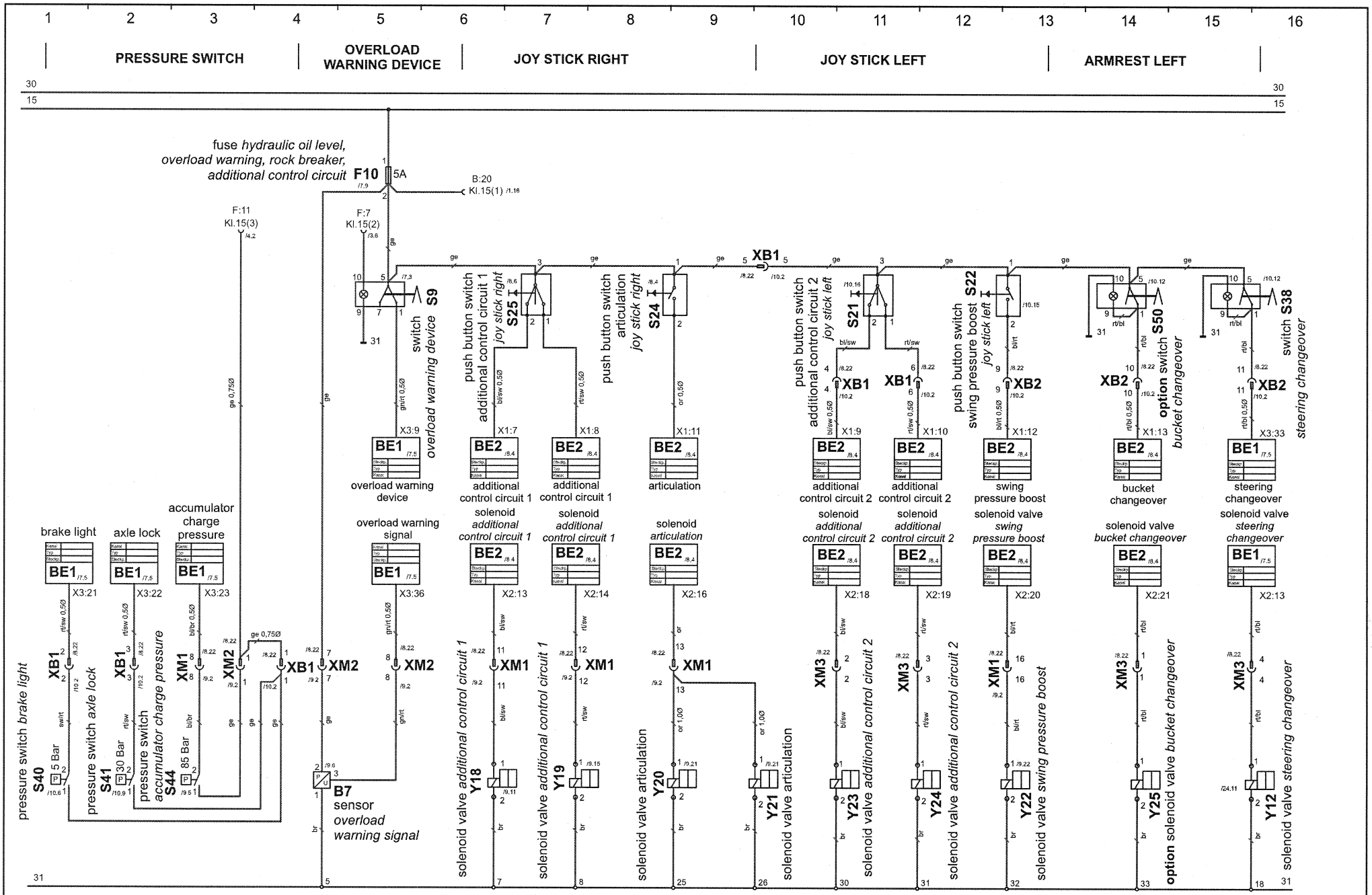
Typ Model Type Tipo	HML42	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 4200/0219	Datum Edition Date Fecha: 01.2005
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm circuit électrique Esquemas de los circuitos		Blatt Page Feuille Página: 7.53.53



XB1	connector *floor frame / dash board*
XM1	connector *machine / dash board*
XM2	connector *machine / dash board*
XM3	connector *machine / dash board*

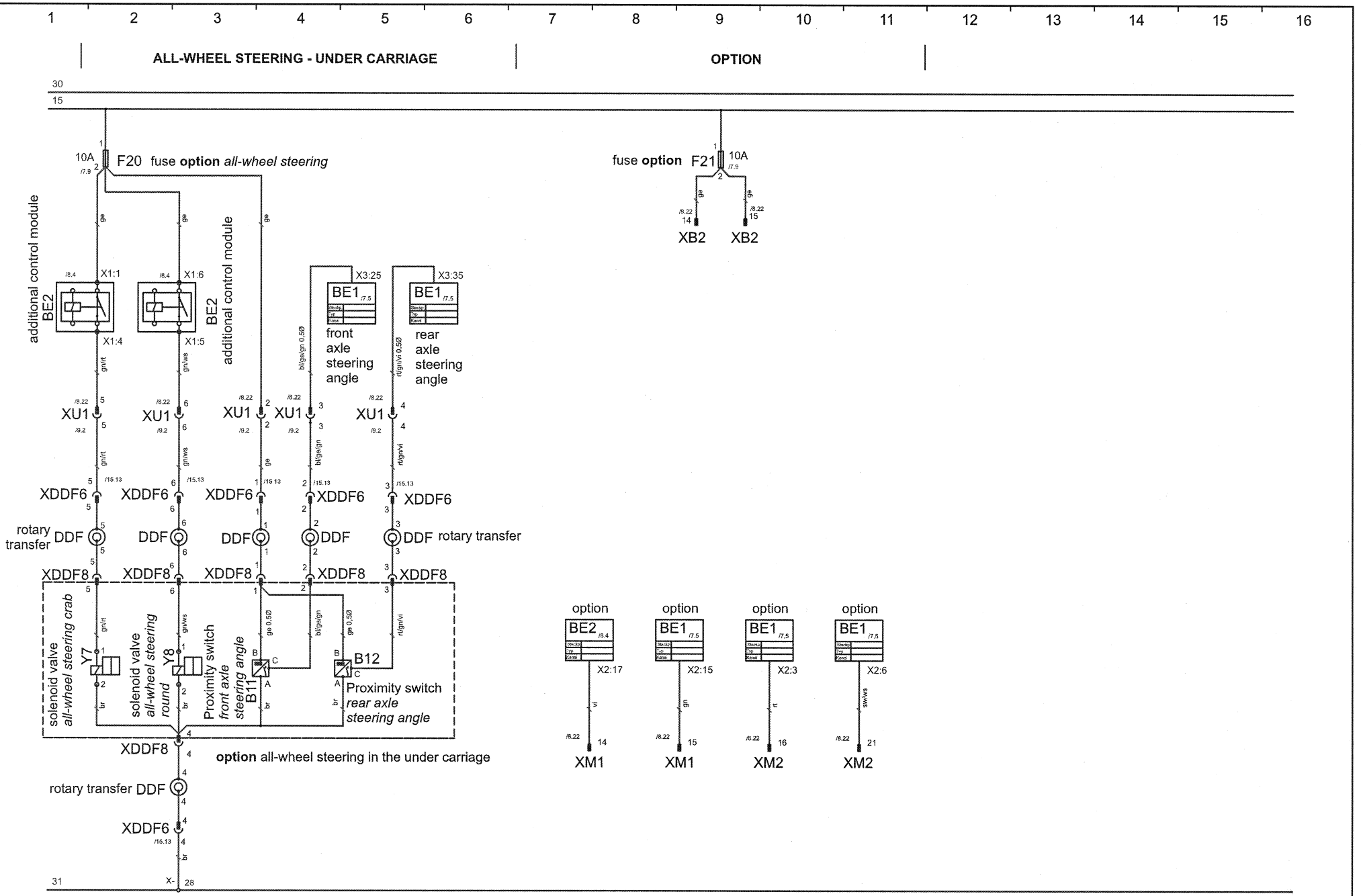
XU1	connector under carriage / *dash board*
XDDF2	connector *machine* / collector ring
XDDF8	connector *machine* / collector ring
BE1	connector central control module

Typ / Model / Type / Tipo	HML42	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 4200/0219	Datum / Edition / Date / Fecha 01.2005
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 4/6	Blatt / Page / Feuille / Página 7.53.54



XM1	connector *machine / dash board*
XM2	connector *machine / dash board*
XM3	connector *machine / dash board*
XB1	connector *floor frame / dash board*
XB2	connector *floor frame / dash board*
BE1	connector central control module
BE2	connector additional control module

Typ Model Type Tipo	HML42	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 4200/0219	Datum Edition Date Fecha 01.2005
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 5/6	Blatt Page Feuille Página 7.53.55



XM1	connector *machine / dash board*
XM2	connector *machine / dash board*
XB2	connector *floor frame / dash board*
BE1	connector *central control module*

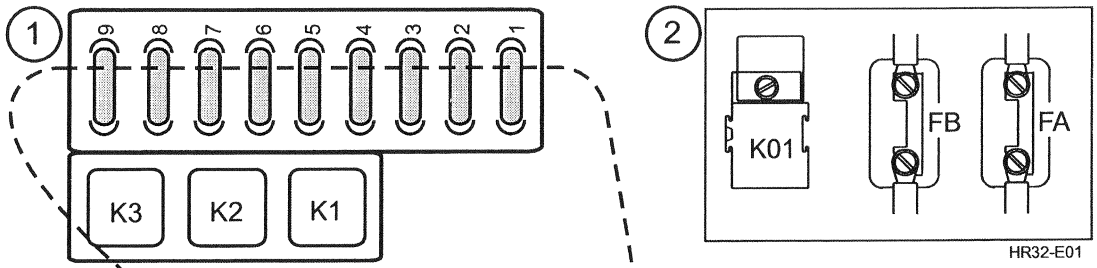
BE2	connector *additional control module*
XU1	connector *under carriage / dash board*
XDDF6	connector *under carriage* / collector ring
XDDF8	connector *machine* / collector ring

Typ Model Type Tipo	**HML42**	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. **4200/0219**	Datum Edition Date Fecha **01.2005**
Benennung Description Dénomination Denominación	**Stromlaufplan** **Wiring diagramm** **circuit électrique** **Esquemas de los circuitos**	Blatt / Page / Feuille / Página **6/6**	Blatt Page Feuille Página **7.53.56**

TEREX | SCHAEFF

Electrical system

Fuse and relay box - Assignment diagram



1 = Instrument panel 2 = next to battery

Fuses			Relay	
Item	**Ampere**	**Assigned to**	**Position**	***Function***
F 1	15	Interior light, radio, immobilizer, rotating beacon	K 01	Pre-heat relay
F 2	20	Socket, refueling pump, additional heating (option)		
F 3	15	Working floodlight, front	K 1	Working floodlight, front
F 4	15	Working floodlight, rear	K 2	Working floodlight, rear
F 5	10	Horn, switch light, immobilizer	K 3	not assigned
F 6	15	Heater fan		
F 7	10	Wish/wash system		
F 8	5	Control module signal input		
F 9	-	Additional heating (option) Seat with electrical heating (option) Working floodlight(s) (option)		
FA	30	Main fuse		
FB	60	Pre-heating		

Fuse colors

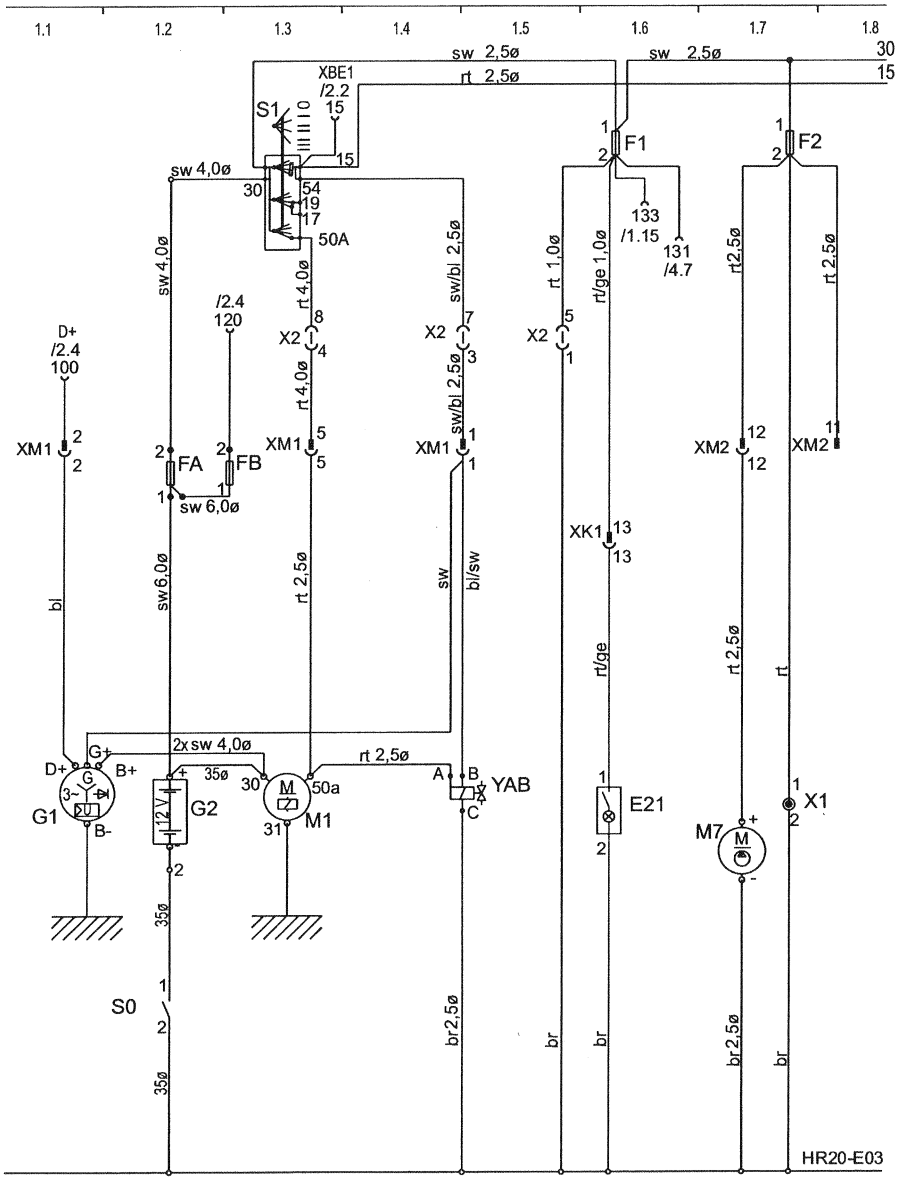
5 A	yellow-brown	10 A	red	15 A	blue	20A	yellow

Cable and plug colors

bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Typ Model Type Tipo	**HR 20**	**Elektrisches System** **Electrical System** **Circuit électrique** **Sistema eléctricor**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación		**Belegungsplan** **Asignment diagram** **Schéma de répartition** **Esquema de la caja**	Blatt Page Feuille Página	**7.60.01**

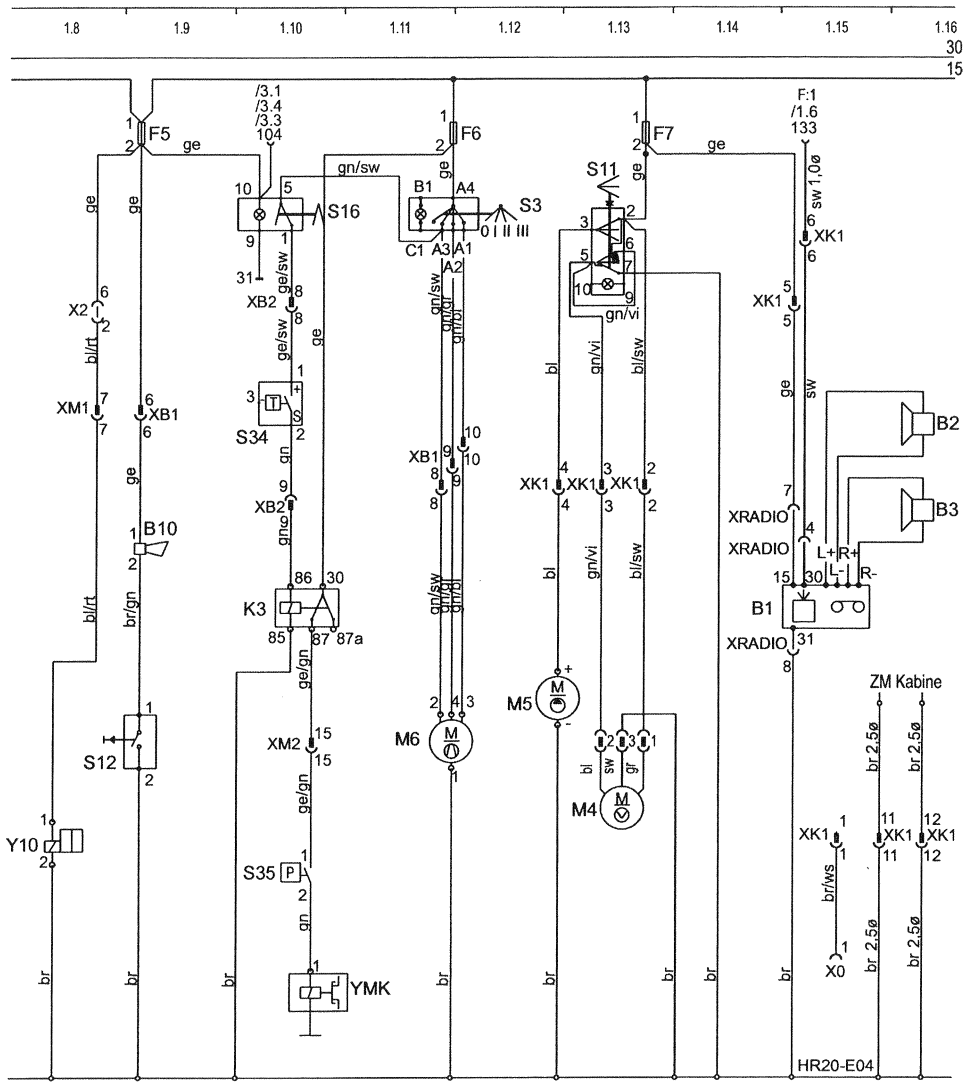
Power supply	Start-up system	Shut-off	Interior light	Socket, refueling pump



Path	Desig-nation	Device	Path	Desig-nation	Device
		Power supply			***Shut-off***
1.1	G1	Generator	1.4	Y1	Shut-off
1.2	FA	Fuse			***Interior light***
1.2	FB	Fuse	1.6	F1	Fuse
1.2	G2	Battery	1.6	E21	Interior light
1.2	SO	Battery disconnect switch			***Socket, refueling pump***
		Start-up system	1.7	F2	Fuse
1.3	S1	Pre-heat/ starter switch	1.7	M7	Refueling pump
1.3	M1	Starter	1.8	X1	Socket

Typ Model Type Tipo	**HR 20**	**Elektrisches System** **Electrical System** **Circuit électrique** **Sistema eléctricor**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación		**Stromlaufplan** **Wiring diagram** **Circuit électrique** **Esquemas de los circuitos**	Blatt Page Feuille Página	**7.60.02**

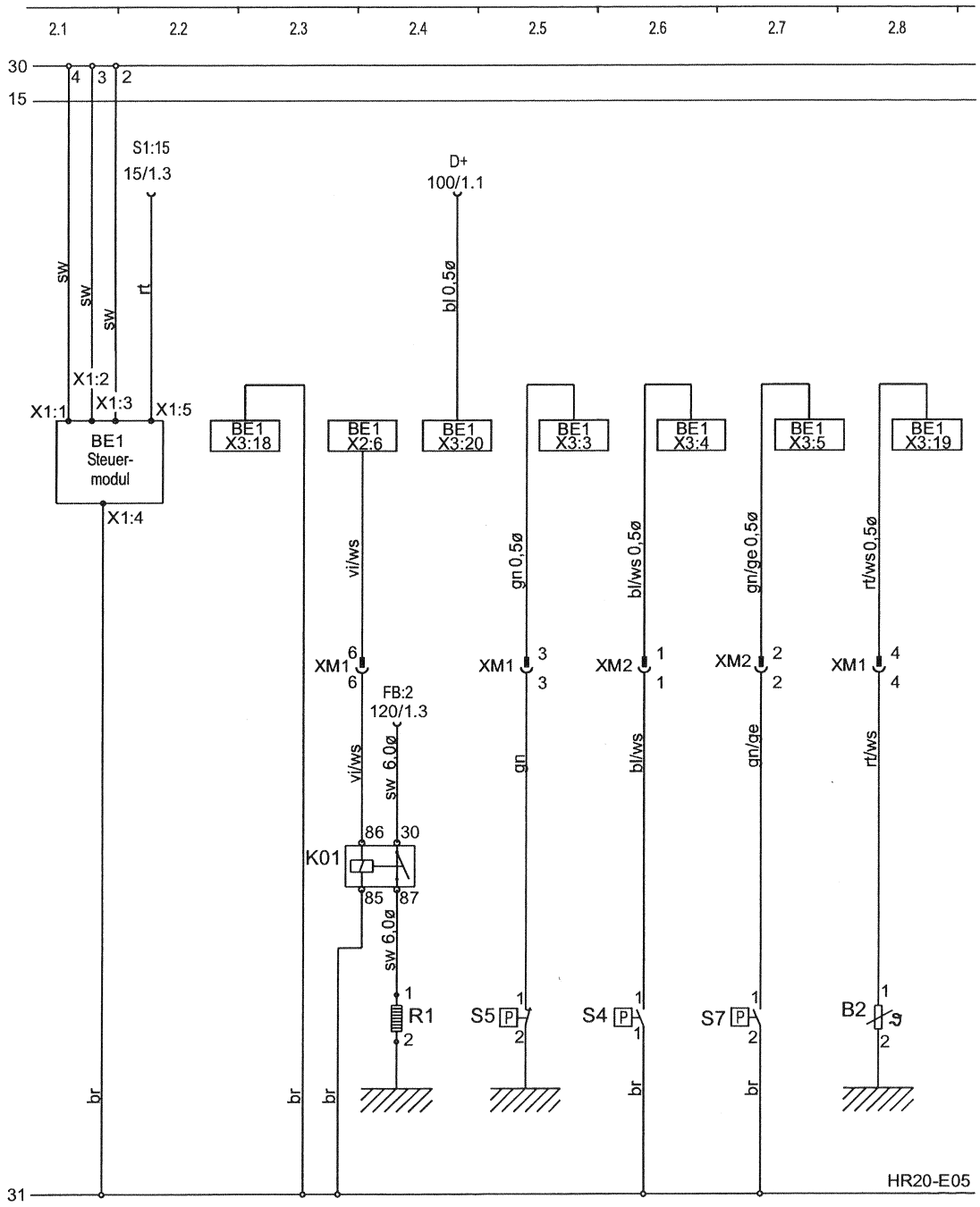
Horn	Heater fan / air conditioner	Wash/ wipe system	Radio



Path	Desig-nation	Device	Path	Desig-nation	Device
		Horn	1.11	M6	Heater fan
1.8	F5	Fuse	1.11	S3	Heater fan switch
1.8	B10	Horn			***Wash/ wipe system***
1.8	S12	Horn button	1.12	M5	Washer pump
1.8	Y10	Solenoid valve, immobilizer	1.13	S11	Wash/ wipe switch
		Heater fan/ air conditioning	1.13	F7	Fuse
1.9	S16	Air conditioning switch	1.13	M4	Wiper motor
1.10	K3	Relay			***Radio***
1.10	S34	Air condition. pressure switch	1.15	B1	Radio
1.10	YMK	Compressor magnetic coupling	1.16	B2	Loudspeaker
1.10	S35	Air conditioning temperature switch	1.16	B3	Loudspeaker
1.11	F6	Fuse	1.16	ZM	Central mass, cab

Typ Model Type Tipo	**HR 20**	**Elektrisches System** **Electrical System** **Circuit électrique** **Sistema eléctricor**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación		**Stromlaufplan** **Wiring diagram** **Circuit électrique** **Esquemas de los circuitos**	Blatt Page Feuille Página	**7.60.03**

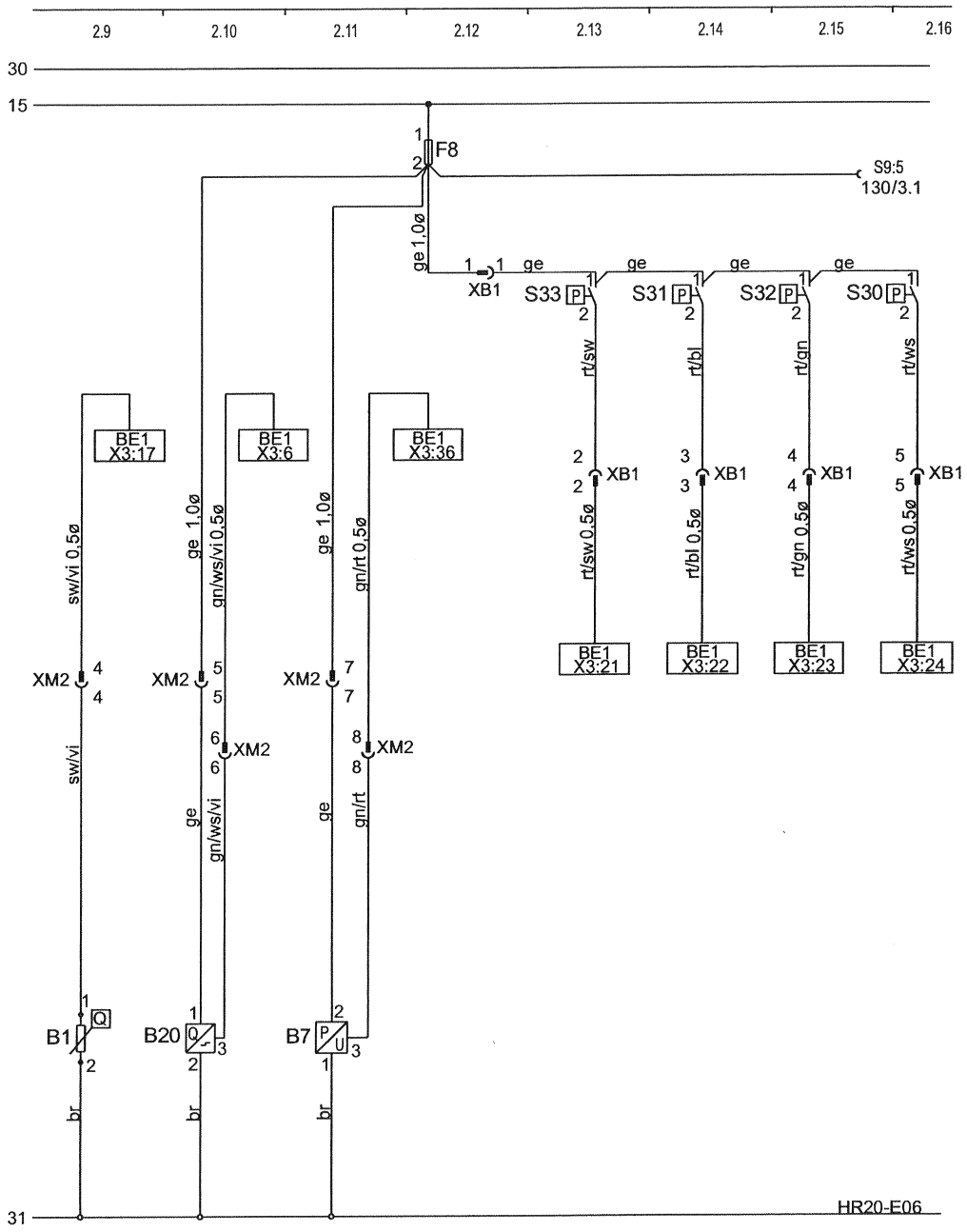
Check module	Pre-heating	Instruments, monitors



Path	Desig-nation	Device	Path	Desig-nation	Device
		Check module			***Instruments, monitors***
2.1	BE1	Control module	2.4	S5	Oil pressure switch
		Pre-heating	2.5	S4	Maintenance, air filter
2.3	K01	Pre-heat relay	2.6	S7	Hydraulic oil filter
2.3	R1	Glow plugs	2.7	B2	Coolant temperature

Typ Model Type Tipo	**HR 20**	**Elektrisches System** **Electrical System** **Circuit électrique** **Sistema eléctricor**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Stromlaufplan** **Wiring diagram** **Circuit électrique** **Esquemas de los circuitos**		Blatt Page Feuille Página	**7.60.04**

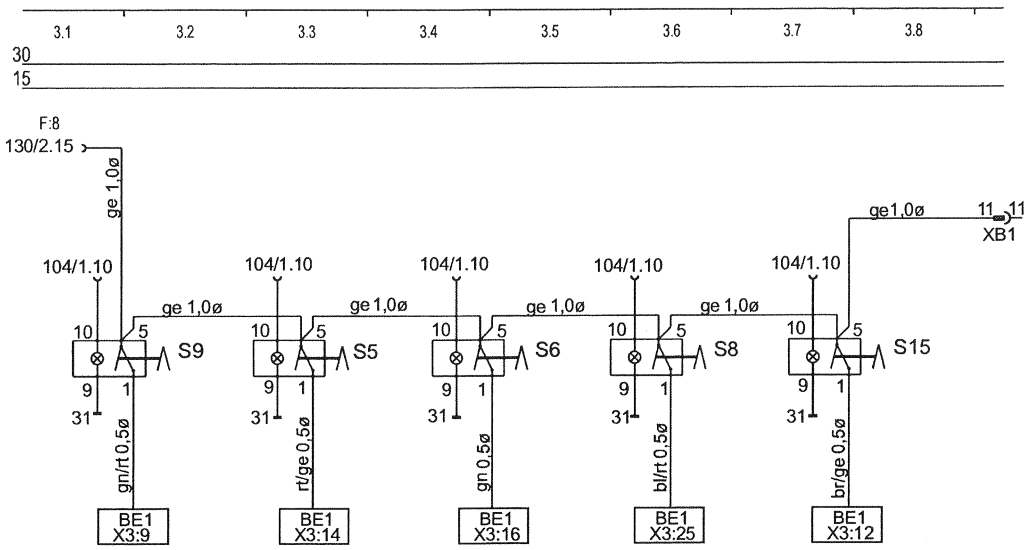
Instruments, monitors	Load warning sensor	Pressure switch, "Travel"

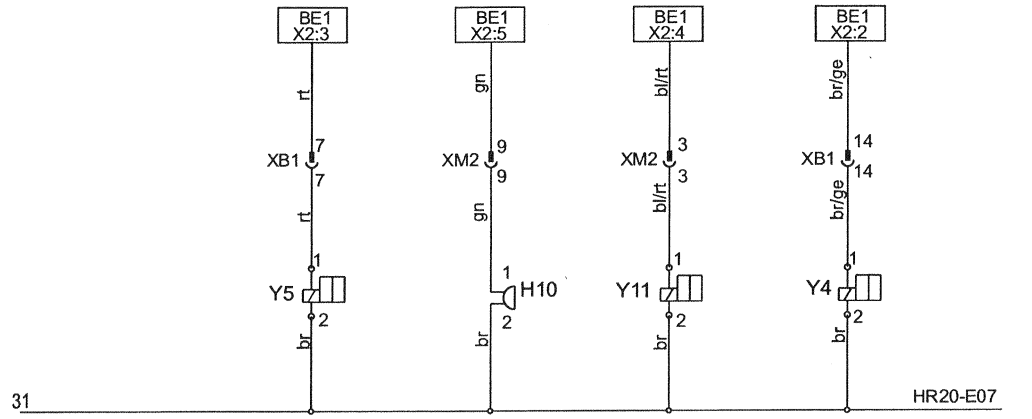


Path	Desig-nation	Device	Path	Desig-nation	Device
		Load warning sensor			***Pressure switch, "Travel"***
2.8	B1	Tank sensor	2.13	S33	Pressure switch forward/left
2.9	B20	Hydr. oil level	2.14	S31	Pressure switch reverse/left
2.11	B7	Load warning signal	2.15	S32	Pressure switch forward/right
2.12	F8	Fuse	2.16	S30	Pressure switch reverse/right

Typ Model Type Tipo	**HR 20**	**Elektrisches System** **Electrical System** **Circuit électrique** **Sistema eléctricor**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Stromlaufplan** **Wiring diagram** **Circuit électrique** **Esquemas de los circuitos**		Blatt Page Feuille Página	**7.60.05**

Load warning device	Travel	Float position, rock breaker

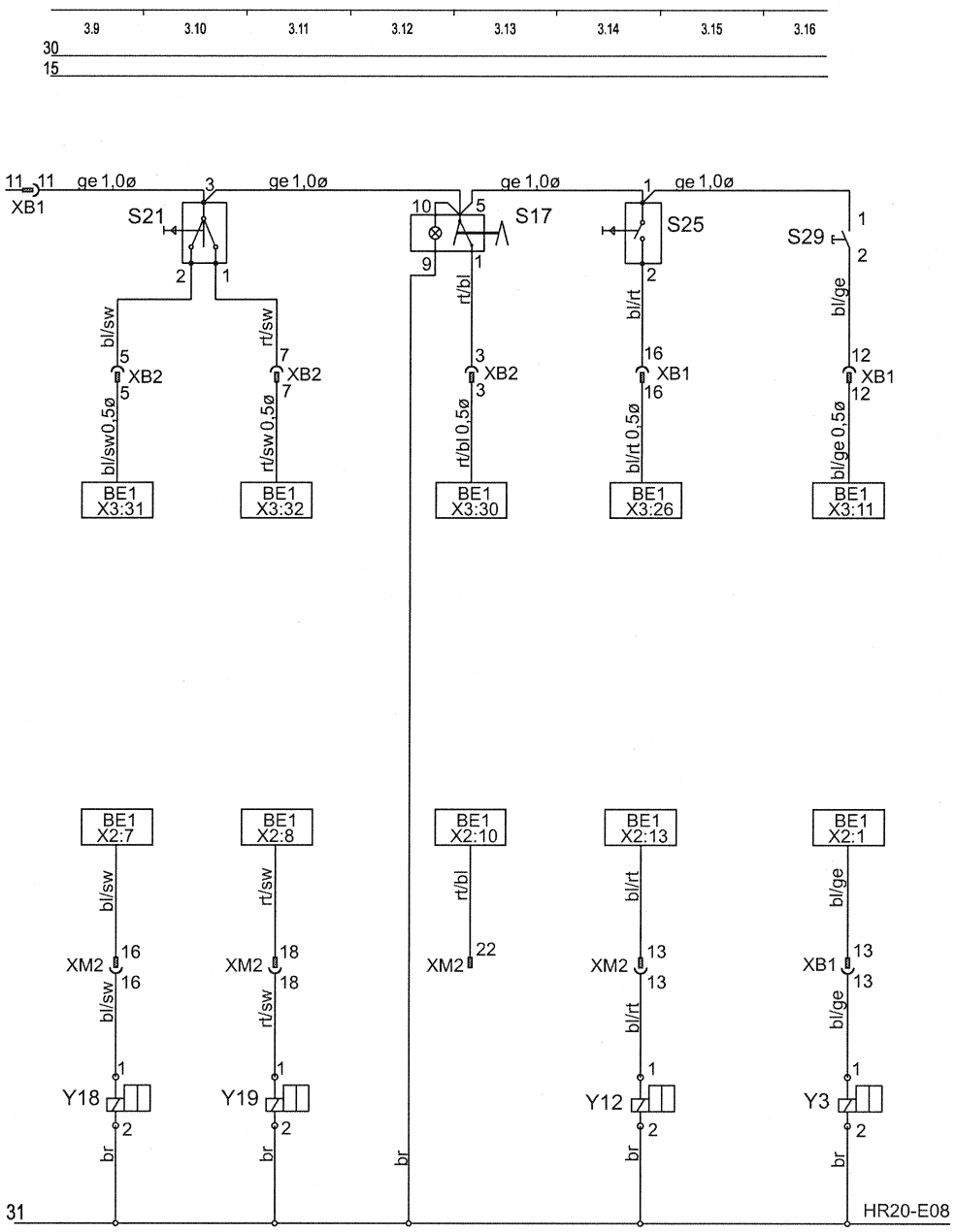




Path	Designation	Device	Path	Designation	Device
		Load warning device			**Float position, breaker**
3.2	S9	Shut-off - load warning device	3.6	S8	Float position
		Travel	3.6	Y11	Float position valve
3.3	S5	FAST-SLOW	3.7	S15	Rock breaker
3.3	Y5	Valve, fast	3.7	Y4	Rock breaker valve
3.4	S6	Travel motion alarm			
3.4	H10	Travel motion alarm			

Typ / Model / Type / Tipo	**HR 20**	**Elektrisches System / Electrical System / Circuit électrique / Sistema eléctricor**	Datum / Edition / Date / Fecha	**01.2003**
Benennung / Description / Dénomination / Denominación		**Stromlaufplan / Wiring diagram / Circuit électrique / Esquemas de los circuitos**	Blatt / Page / Feuille / Página	**7.60.06**

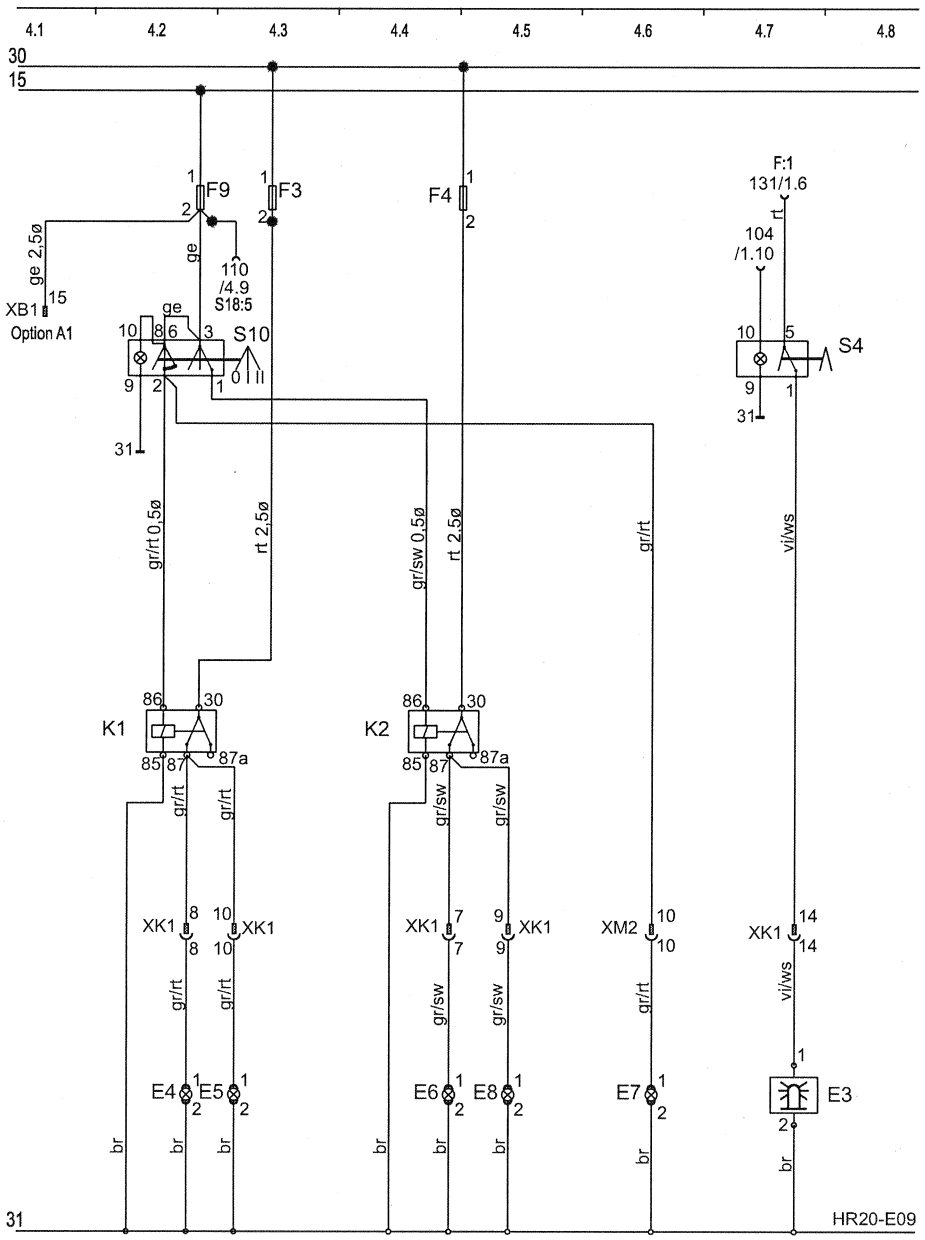
Joystick, right	Option	Swing brake	Working hydraulics



Path	Designation	Device	Path	Designation	Device
		Joystick, right			***Swing brake***
3.10	S21	Push-button — additional control circuit	3.14	S25	Swing brake
3.10	Y18	Valve — additional control circuit	3.14	Y12	Valve — swing brake
3.10	Y19	Valve — additional control circuit			***Working hydraulics***
		Option	3.15	S29	Armrest switch
3.12	S17	Option	3.15	Y3	Working hydraulics

Typ Model Type Tipo	**HR 20**	**Elektrisches System** **Electrical System** **Circuit électrique** **Sistema eléctricor**	Datum Edition Date Fecha	**07.2004**
Benennung Description Dénomination Denominación	**Stromlaufplan** **Wiring diagram** **Circuit électrique** **Esquemas de los circuitos**		Blatt Page Feuille Página	**7.60.07**

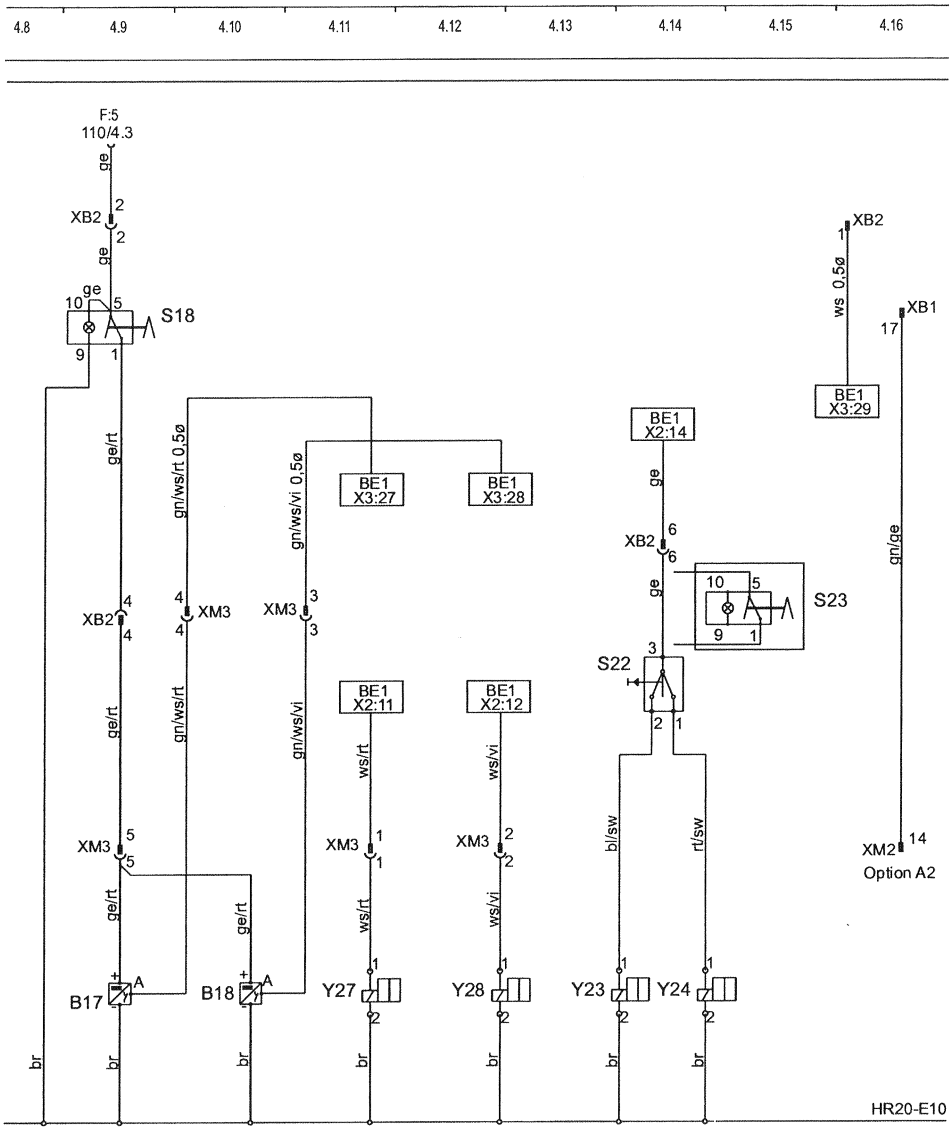
Working floodlights	Rotating beacon



Path	Desig-nation	Device	Path	Desig-nation	Device
		Working floodlights	4.4	F4	Fuse
4.1	A1	Air-cushioned seat (option)	4.4	K2	Relay
4.2	F9	Fuse	4.4	E6	Working floodlight rear
4.2	S10	Working floodlights	4.5	E8	Working floodlight rear
4.2	K1	Relay	4.6	E7	Boom-mounted work. floodlight
4.2	E4	Working floodlight front	4.7	S4	Rotating beacon switch
4.3	F3	Fuse	4.7	E3	Rotating beacon
4.3	E5	Working floodlight front			

Typ Model Type Tipo	**HR 20**	**Elektrisches System** **Electrical System** **Circuit électrique** **Sistema eléctricor**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación		**Stromlaufplan** **Wiring diagram** **Circuit électrique** **Esquemas de los circuitos**	Blatt Page Feuille Página	**7.60.08**

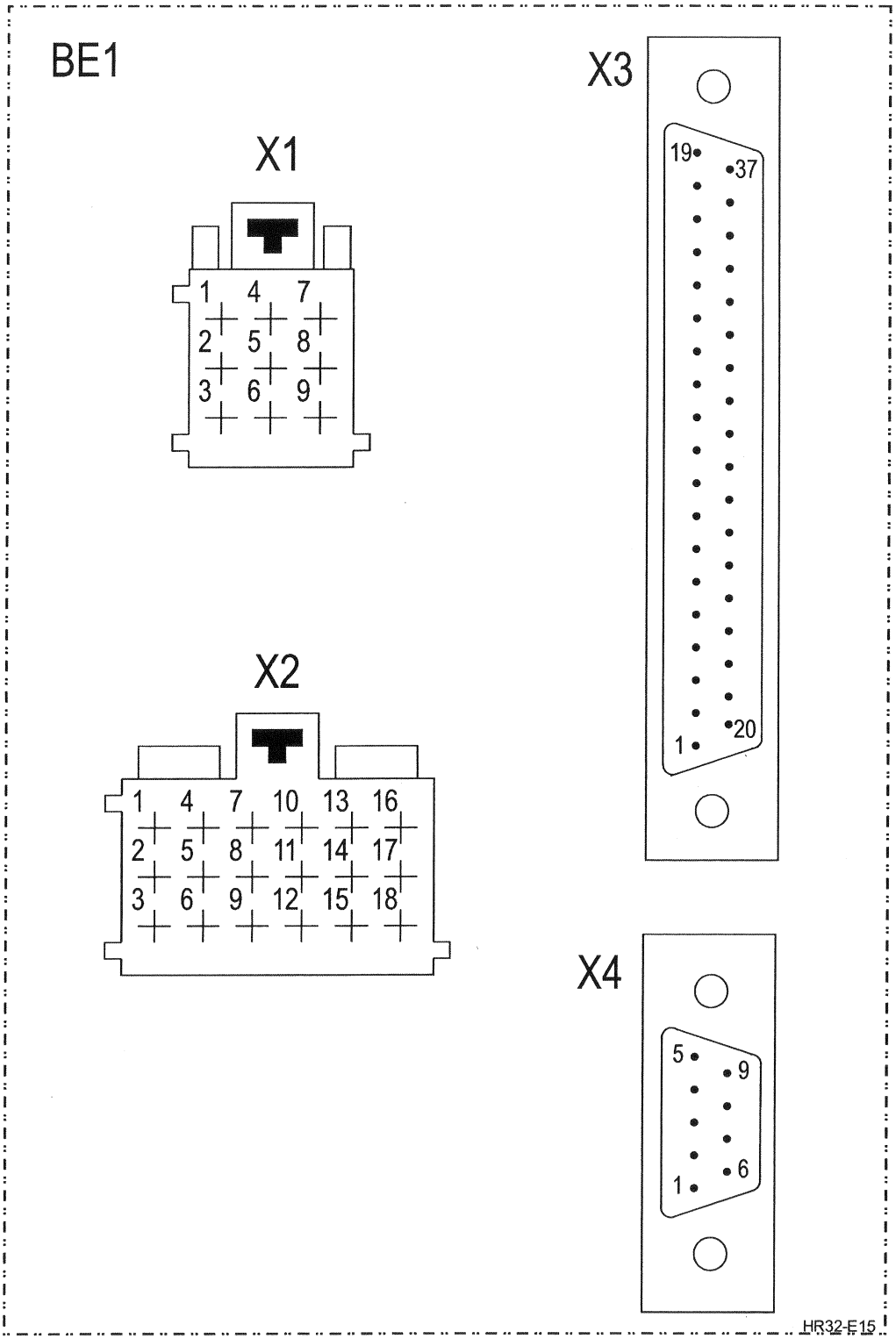
"Circular" boom — restriction of reach	Joystick, left	Option



Path	Designation	Device	Path	Designation	Device
		Restriction of reach for "Circular" boom			***Joystick, left***
4.9	B17	Boom proximity switch	4.14	S22	Push-button — additional control circuit II
4.9	S18	Switch — restriction of reach	4.14	Y23	Solenoid valve — additional control circuit II
4.10	B18	Intermediate boom proximity switch	4.14	Y24	Solenoid valve — additional control circuit II
4.12	Y27	Boom solenoid valve	4.15	S23	Cut-off switch — additional control circuit II - option
4.13	Y28	Intermed. boom solenoid valve			***Option***
			4.16	--	Cable link ISO/SAE
			4.16	X3:29	Reserve

Typ Model Type Tipo	**HR 20**	**Elektrisches System** **Electrical System** **Circuit électrique** **Sistema eléctricor**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación		**Stromlaufplan** **Wiring diagram** **Circuit électrique** **Esquemas de los circuitos**	Blatt Page Feuille Página	**7.60.09**

Check module



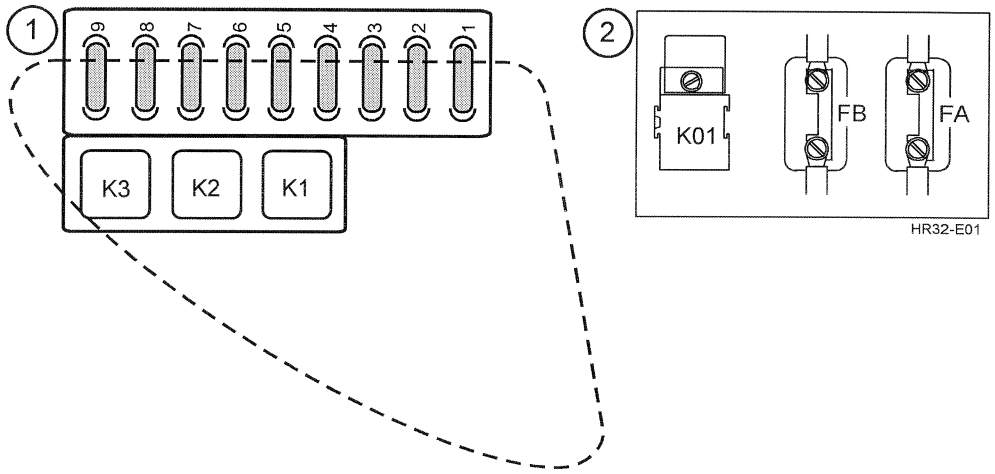
Typ Model Type Tipo	**HR 20**	**Elektrisches System** **Electrical System** **Circuit électrique** **Sistema eléctricor**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación		**Kontrollmodul** **Control module** **Module de surveilance** **Módulo de control**	Blatt Page Feuille Página	**7.60.10**

X1	Power supply
1	Power supply Ter minal 30
2	Power supply Terminal 30
3	Power supply Terminal 30
4	Central mass
5	Power supply Terminal 15
6	--
7	--
8	--
9	--
X2	**Signal outputs**
1	Working hydraulics
2	Rock breaker
3	FAST-SLOW
4	Float position
5	Travel motion alarm
6	Pre-heat
7	Valve — additional control circuit
8	Valve — additional control circuit
9	--
10	Option
11	Boom cut-off
12	Intermediate boom cut-off
13	High torque swing drive
14	Valve — additional control circuit 2
15	--
16	--
17	--
18	--
X3	**Signal inputs**
1	--
2	--
3	Oil pressure switch
4	Air filter clogging
5	Hydraulic oil filter clogging
6	Hydraulic oil level switch
7	--
8	--
9	Overload warning switch
10	--

11	Armrest switch
12	Rock breaker switch
13	--
14	FAST-SLOW switch
15	--
16	Travel motion alarm switch
17	Tank sensor
18	Central mass
19	Coolant temperature
20	Charge control
21	Pressure switch "Travel" forward left
22	Pressure switch "Travel" reverse left
23	Pressure switch "Travel" forward right
24	Pressure switch "Travel" reverse right
25	Float position switch
26	High torque swing drive
27	Boom proximity switch
28	Intermediate boom proximity switch
29	Option
30	Option
31	Additional control circuit — push-button
32	Additional control circuit — push-button
33	--
34	--
35	--
36	Overload warning signal
37	--
X4	**Interface**
1	--
2	--
3	--
4	--
5	--
6	--
7	--
8	--
9	--

Electrical system

Fuse and relay box — Assignment plan



1 = Instrument panel 2 = next to battery

Fuses			Relay	
Item	**Ampere**	**Assigned to**	**Position**	*Function*
F 1	15	Interior light, radio, immobilizer, rotating beacon	K 01	Pre-heat relay
F 2	20	Socket, refueling pump, additional heating (option)		
F 3	15	Working floodlight, front	K 1	Working floodlight, front
F 4	15	Working floodlight, rear	K 2	Working floodlight, rear
F 5	10	Horn, switch light, immobilizer	K 3	not assigned
F 6	15	Heater fan		
F 7	10	Wish/wash system		
F 8	5	Control module signal input		
F 9	-	Additional heating (option) Seat with electrical heating (option) Working floodlight(s) (option)		
FA	30	Main fuse		
FB	60	Pre-heating		

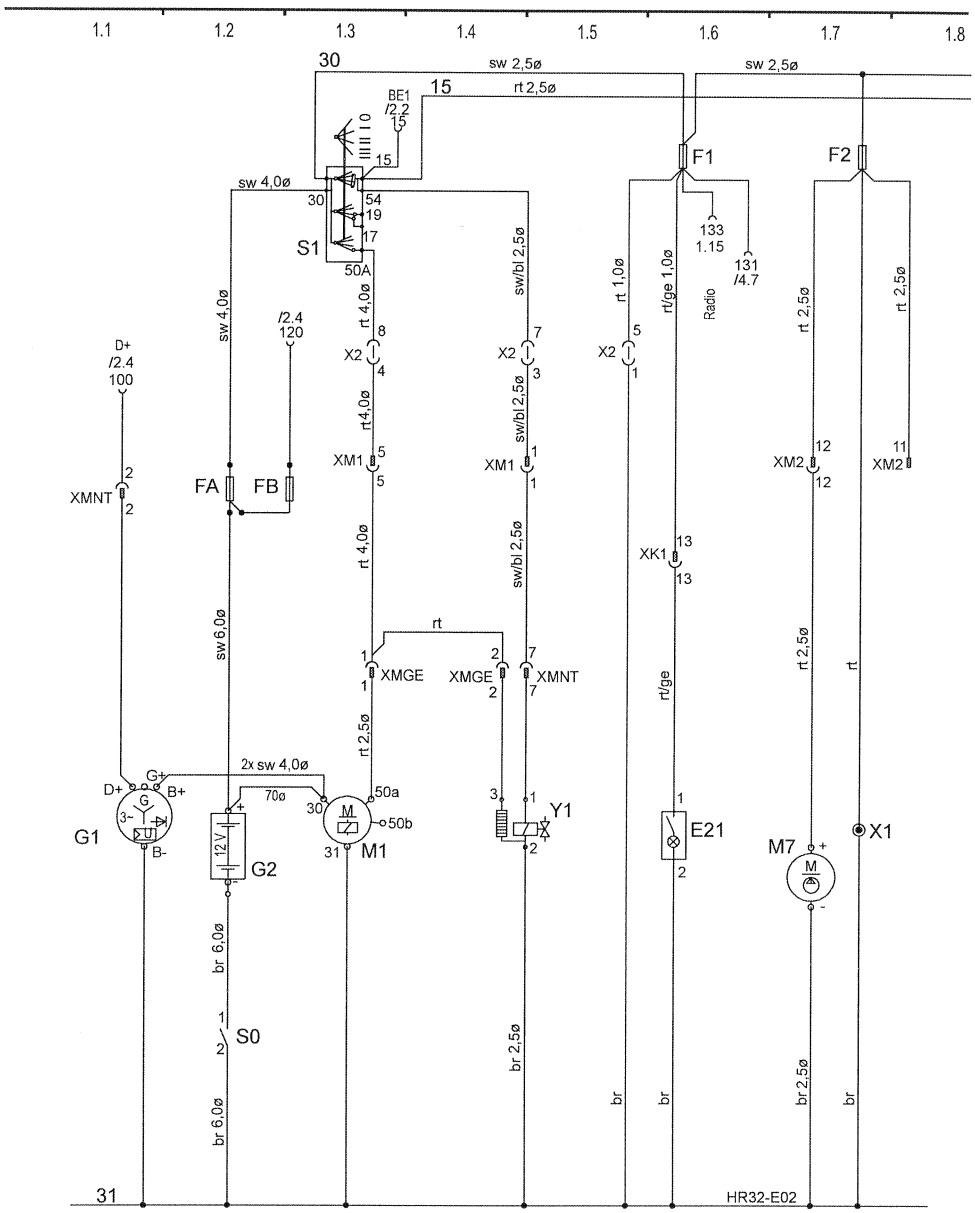
Fuse colors

5 A	yellow-brown	10 A	red	15 A	blue	20A	yellow

Cable colors

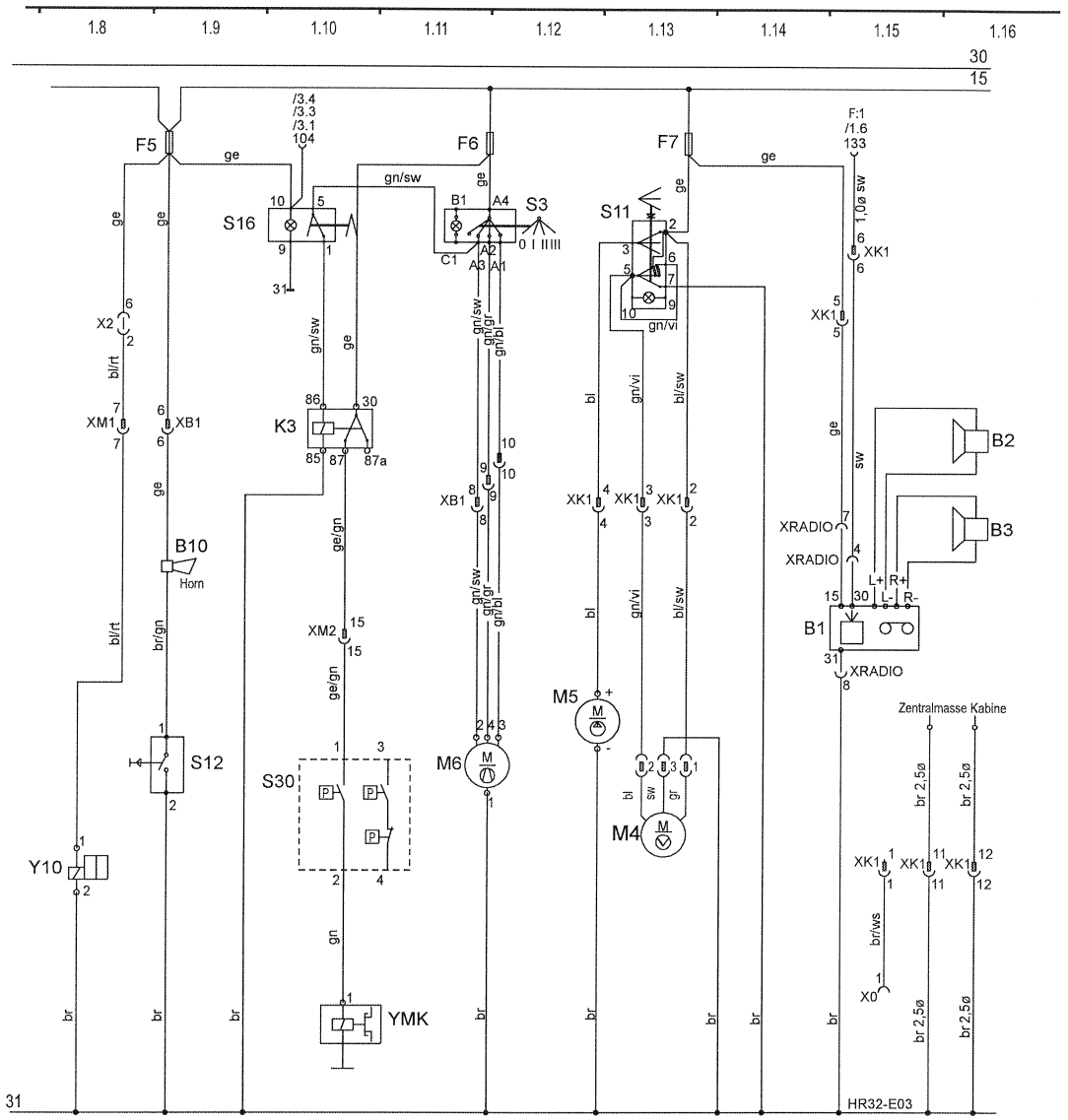
bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Power supply	Start-up system	Shut-off	Interior light	Socket, refueling pump



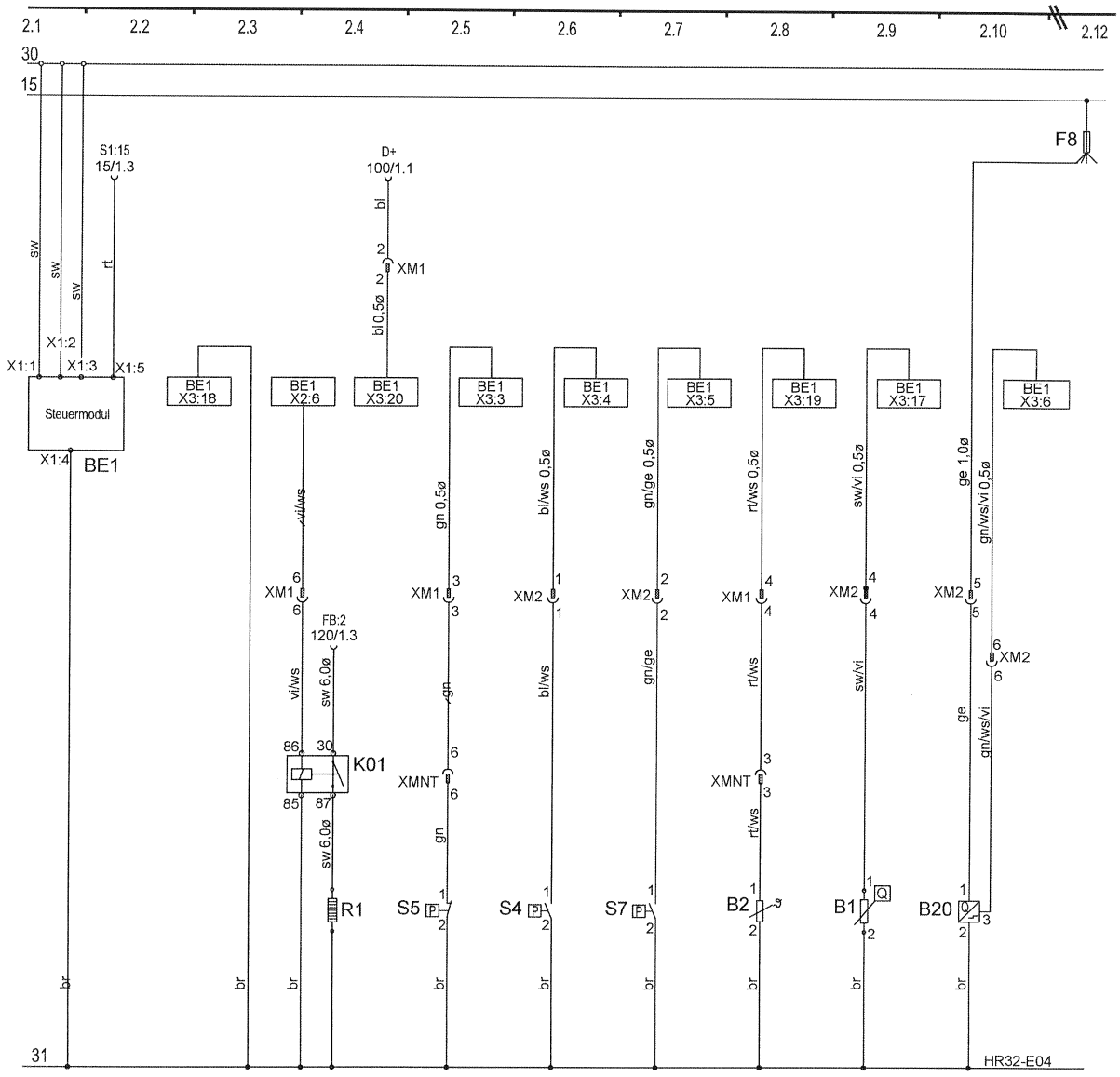
Path	Desig-nation	Device	Path	Desig-nation	Device
		Power supply			***Shut-off***
1.1	G1	Generator	1.4	Y1	Shut-off
1.2	FA	Fuse			***Interior light***
1.2	FB	Fuse	1.6	F1	Fuse
1.2	G2	Battery	1.6	E21	Interior light
1.2	SO	Battery disconnecting switch			***Socket, refueling pump***
		Start-up system	1.7	F2	Fuse
1.3	S1	Pre-heat/ starter switch	1.7	M7	Refueling pump
1.3	M1	Starter	1.8	X1	Socket

Horn	Heater fan / air conditioner	Wash/ wipe system	Radio



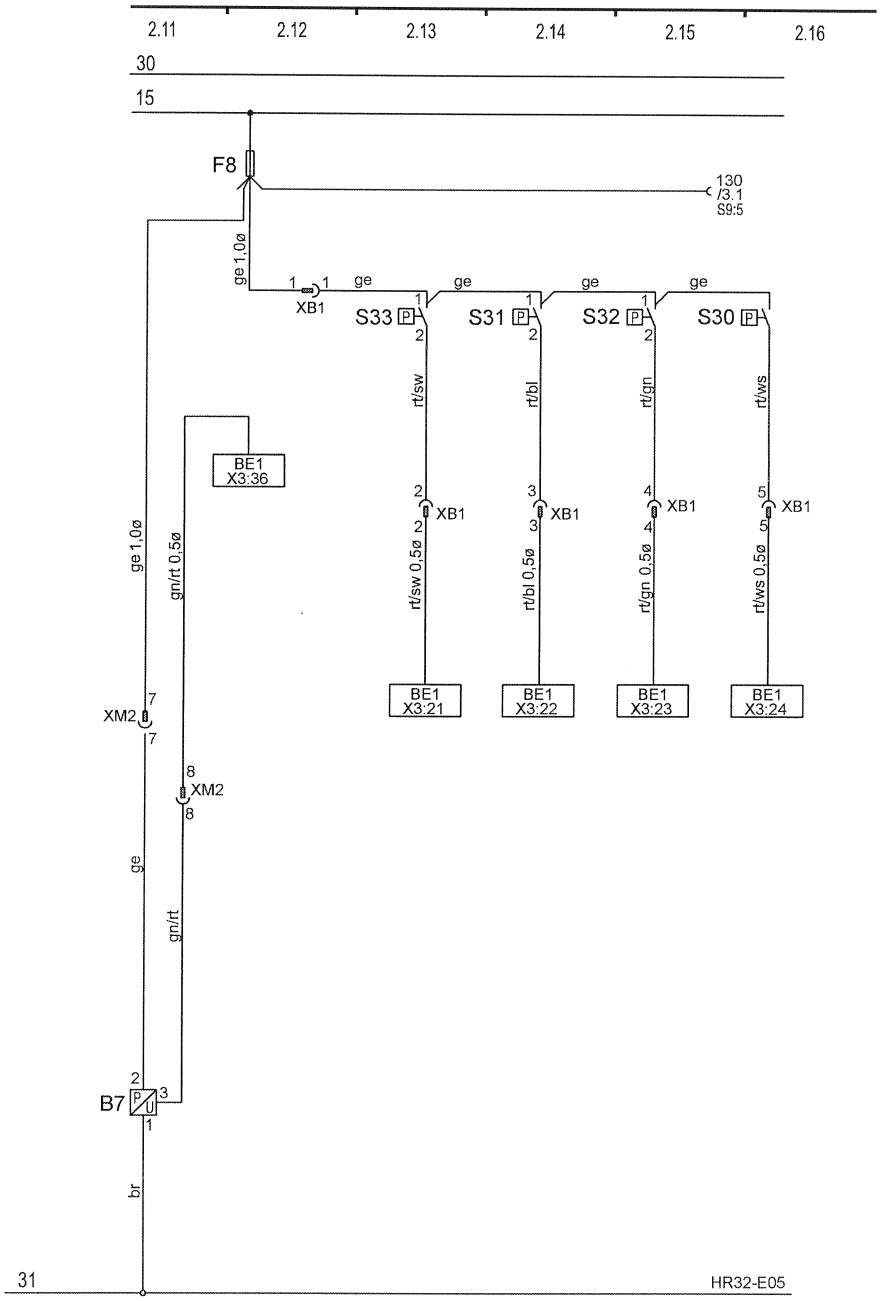
Path	Desig-nation	Device	Path	Desig-nation	Device
		Horn	1.11	M6	Heater fan
1.8	F5	Fuse	1.11	S3	Heater fan switch
1.8	B10	Horn			***Wash/ wipe system***
1.8	S12	Fuse, horn button	1.12	M5	Washer pump
1.8	Y10	Solenoid valve, immobilizer	1.13	S11	Wash/ wipe switch
		Heater fan/ air conditioner	1.13	F7	Fuse
1.9	S16	Air conditioner switch	1.13	M4	Wiper motor
1.10	K3	Relay			***Radio***
1.10	S30	Pressure switch air conditioner	1.15	B1	Radio
1.10	YMK	Magnetic coupling compressor	1.16	B2	Loudspeaker
1.11	F6	Fuse	1.16	B3	Loudspeaker

Check module	Pre-heat	Display units



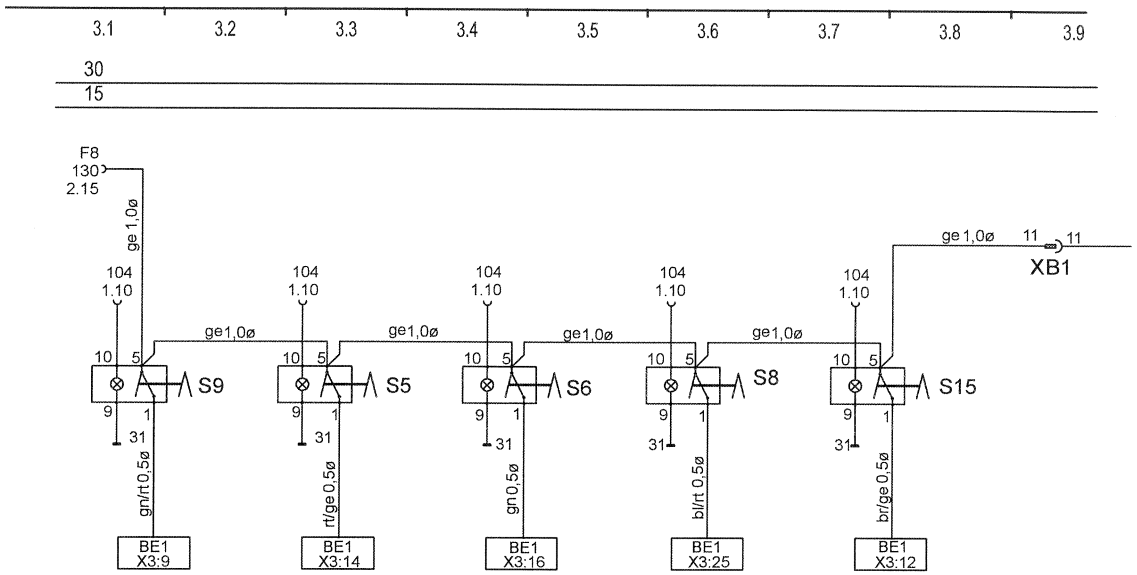
Path	Desig-nation	Device	Path	Desig-nation	Device
		Check module			***Display units***
2.1	BE1	Control module	2.4	S5	Oil pressure switch
		Pre-heat	2.5	S4	Maintenance, air filter
2.3	K01	Pre-heat relay	2.6	S7	Hydraulic oil filter
2.3	R1	Glow plugs	2.7	B2	Coolant temperature
			2.8	B1	Fuel gauge transmitter
			2.9	B20	Hydraulic oil level
			2.12	F8	Fuse

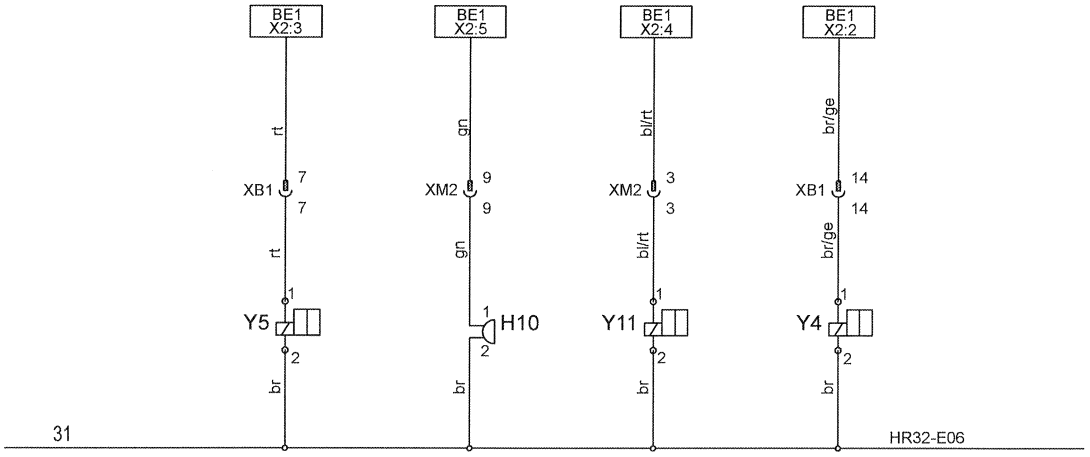
Load warning sensor	Pressure switch travel



Path	Desig-nation	Device	Path	Desig-nation	Device
		Load warning sensor			***Pressure switch travel***
2.11	F8	Fuse	2.13	S33	Pressure switch forward/left
2.11	B7	Load warning signal	2.14	S31	Pressure switch reverse/left
			2.15	S32	Pressure switch forward/right
			2.16	S30	Pressure switch reverse/right

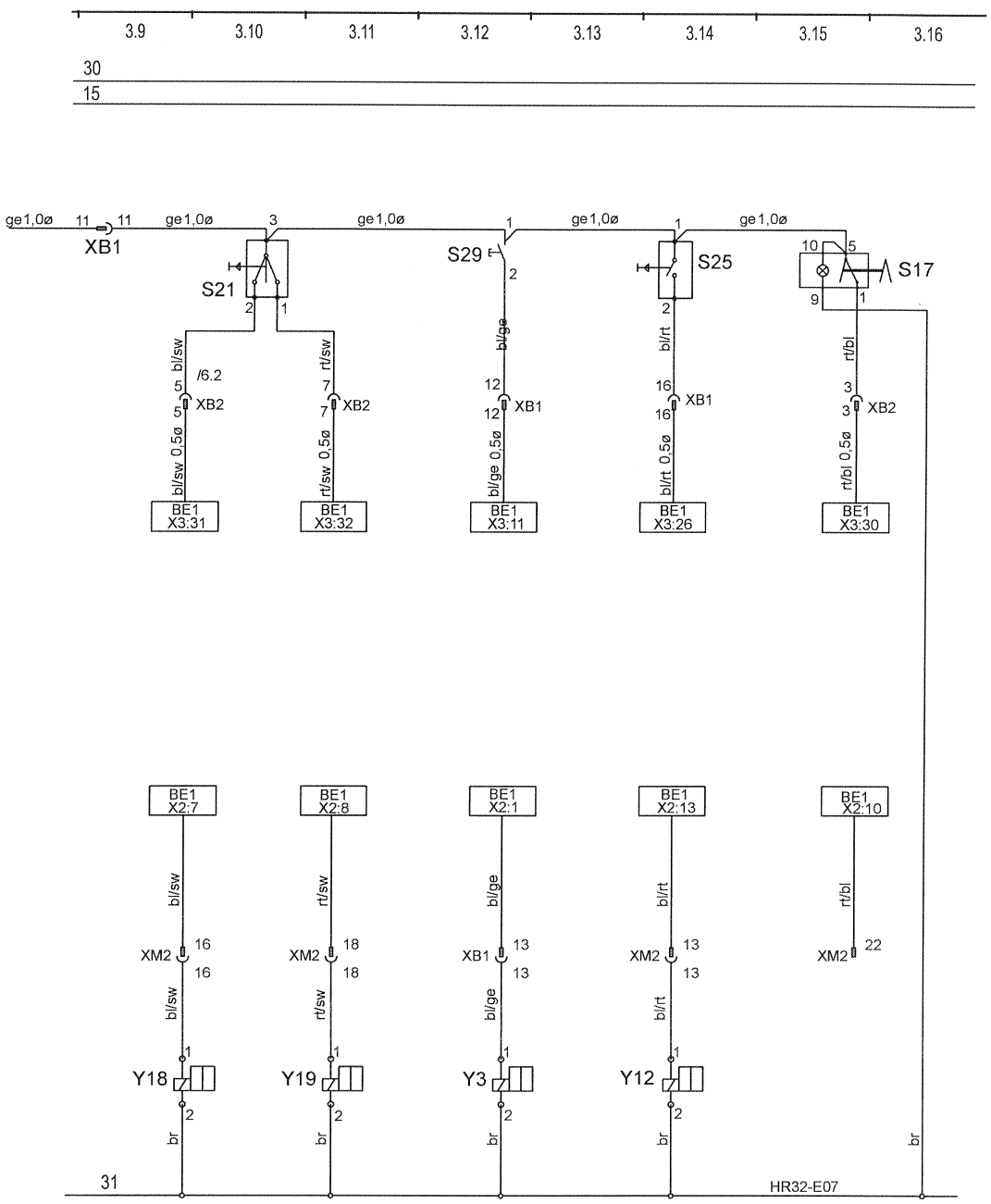
Load warning device	Travel	Float position, breaker





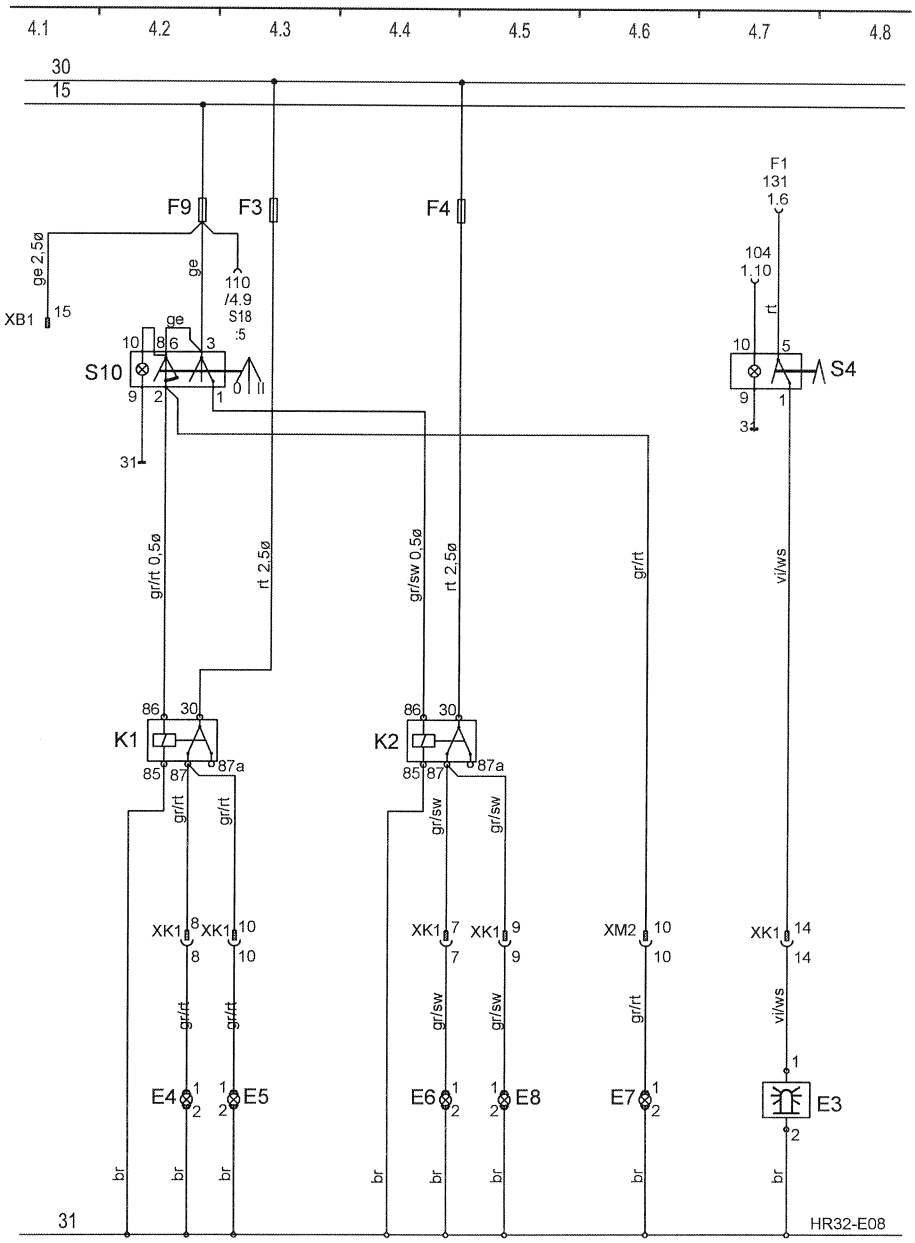
Path	Designation	Device	Path	Designation	Device
		Load warning device			**Float position, breaker**
3.2	S9	Shut-off - load warning device	3.6	S8	Float position
		Travel	3.6	Y11	Valve float position
3.3	S5	Fast/ slow	3.7	S15	Breaker
3.3	Y5	Valve, fast	3.7	Y4	Valve breaker
3.4	S6	Travel alarm			
3.4	H10	Travel alarm			

Joystick right	Working hydraulics	High torque swing drive	Option



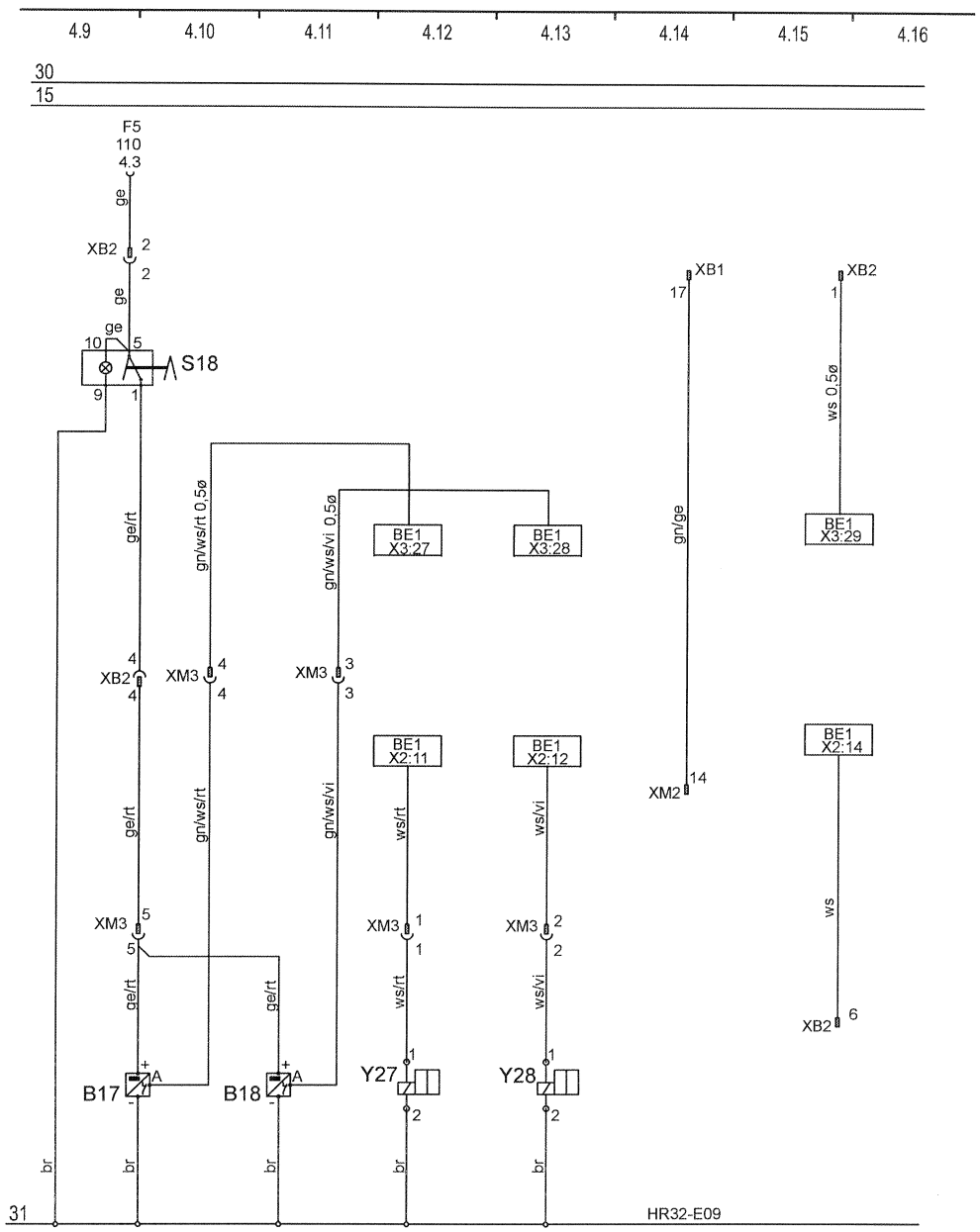
Path	Desig-nation	Device	Path	Desig-nation	Device
		Joystick			***High torque swing drive***
3.10	S21	Pushbutton additional control circuit	3.14	S25	High torque swing drive
3.10	Y18	Valve additional control circuit	3.14	Y12	Valve high torque swing drive
3.10	Y19	Valve additional control circuit			***Option***
		Working hydraulics	3.16	S17	Option
3.12	S29	Armrest switch			
3.12	Y3	Working hydraulics			

Working floodlights	Rotating beacon



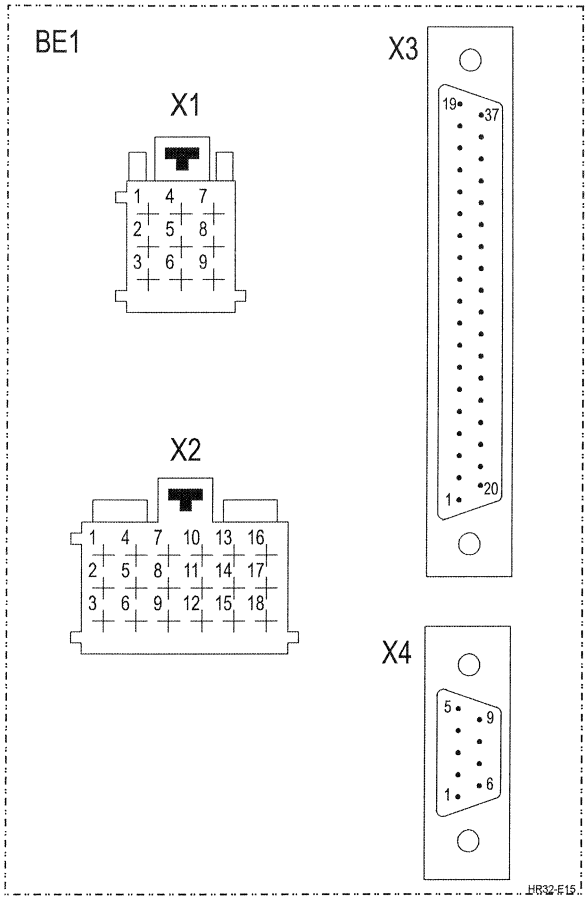
Path	Designation	Device	Path	Designation	Device
		Working floodlights	4.4	K2	Relay
4.2	F9	Fuse	4.4	E6	Working floodlight rear
4.2	S10	Working floodlights	4.5	E8	Working floodlight rear
4.2	K1	Relay	4.6	E7	Boom-mounted work. floodlight
4.2	E4	Working floodlight front	4.7	S4	Switch rotating beacon
4.3	F3	Fuse	4.7	E3	Rotating beacon
4.3	E5	Working floodlight front			
4.4	F4	Fuse			

Reach limitation "Circular" boom	Option



Path	Designation	Device	Path	Designation	Device
		Reach limitation "Circular" boom			***Option***
4.9	B17	Proximity switch boom	4.14	--	Cable link ISO/John Deere
4.10	S18	Switch reach limitation	4.15	--	Reserve
4.11	B18	Proximity switch intermediate boom			
4.12	Y27	Solenoid valve boom			
4.13	Y28	Solenoid valve intermediate boom			

Control module



X1	Power supply
1	Power supply terminal 30
2	Power supply terminal 30
3	Power supply terminal 30
4	Ground
5	Power supply terminal 15
6	--
7	--
8	--
9	--

X2	Signal outlets
1	Working hydraulics
2	Breaker
3	Quick – slow
4	Float position
5	Back-up alarm
6	Pre-glow
7	Valve additional control circuit
8	Valve additional control circuit
9	--
10	Option
11	Boom cut-off
12	Intermediate boom cut-off
13	High torque swing drive
14	Valve additional control circuit 2
15	--
16	--
17	--
18	--

X3	Signal inlets
1	--
2	--
3	Oil pressure switch
4	Air filter contamination
5	Hydraulic oil filter contamination
6	Hydraulic oil level switch
7	--
8	--
9	Load warning switch
10	--
11	Armrest switch
12	Breaker switch
13	--
14	Quick – slow switch
15	--
16	Back-up alarm switch
17	Tank transmitter
18	Ground
19	Coolant temperature
20	Load control
21	Pressure switch travel forward left
22	Pressure switch travel reverse left
23	Pressure switch travel forward right
24	Pressure switch travel reverse right
25	Float position switch
26	High torque swing drive
27	Proximity switch boom
28	Proximity switch intermediate boom
29	Option
30	Option
31	Additional control circuit – pushbutton
32	Additional control circuit – pushbutton
33	--
34	--
35	--
36	Load warning signal
37	--

X4	Interface	Unassigned !!!

Charge indicator

generator D+	wire harness machine engine plug XMNT:2	wire harness machine disconnect XM1:2	input plug control module X3:20	warning lamp
blue	blue	blue	blue	
12V	12V	12V	12V	OFF

only with running engine

Oil pressure indicator

oil pressure switch S5	wire harness machine engine plug XMNT:6	wire harness machine disconnect XM1:3	input plug control module X3:3	warning lamp
green	green	green	green	
0V	0V	0V	0V	ON

Air filter indicator

maintenance switch air filter S4	wire harness machine disconnect XM2:1	input plug control module X3:4	warning lamp
blue / white	blue / white	blue / white	
0V	0V	0V	ON

Hydraulic oil filter indicator

maintenance switch hydraulic oil filter S7	wire harness machine disconnect XM2:2	input plug control module X3:5	warning lamp
green / yellow	green / yellow	green / yellow	
0V	0V	0V	ON

Hydraulic oil level

oil level transmitter B20	wire harness machine disconnect XM2:6	input plug control module X3:6	warning lamp
green / white / violet	green / white / violet	green / white / violet	
0V	0V	0V	ON

Working hydraulics

wire harness floor frame: armrest switch S29:2	wire harness floor frame disconnect XB1:12	input plug control module X3:11
blue / yellow	blue / yellow	blue / yellow
12V	12V	12V

All voltages are measured between ground and the corresponding test point!!
Unless otherwise indicated, the ignition has to be switched on !!

output plug control module X2:1	wire harness floor frame disconnect XB1:13	valve Y3:1
blue / yellow	blue / yellow	blue / yellow
12V	12V	12V

Breaker

switch breaker operation S15:1	input plug control module X3:12
brown / yellow	brown / yellow
12V	12V

output plug add. module X2:2	wire harness floor frame disconnect XB1:14	valveY4:1
brown / yellow	brown / yellow	brown / yellow
12V	12V	12V

Fast travel

switch S5:1	input plug control module X3:14	pressure switch front left S33:2	wire harness floor frame disconnect XB1:2	input plug control module X3:21	pressure switch front right S32:2	wire harness floor frame disconnect XB1:4	input plug control module X3:23
red / yellow	red / yellow	red / black	red / black	red / black	red / green	red / green	red / green
12V	12V	12V	12V	12V	12V	12V	12V

output plug control module X2:3	wire harness floor frame disconnect XB1:7	valveY5:1
red	red	red
12V	12V	12V

switch S5:1	input plug control module X3:14	pressure switch rear left S31:2	wire harness floor frame disconnect XB1:2	input plug control module X3:22	pressure switch rear right S30:2	wire harness floor frame disconnect XB1:4	input plug control module X3:24
red / yellow	red / yellow	red / blue	red / blue	red / blue	red / white	red / white	red / white
12V	12V	12V	12V	12V	12V	12V	12V

output plug control module X2:3	wire harness floor frame disconnect XB1:7	valveY5:1
red	red	red
12V	12V	12V

Float position

switch float position S8:1	input plug control module X3:25
blue / red	blue / red
12V	12V

output plug control module X2:4	wire harness machine disconnect XM2:3	valveY11:1
blue / red	blue / red	blue / red
12V	12V	12V

Swing brake

pushbutton left-hand joystick S25:2	wire harness floor frame disconnect XB1:16	input plug control module X3:26
blue / red	blue / red	blue / red
12V	12V	12V

output plug control module X2:13	wire harness machine disconnect XM2:13	valveY12:1
blue / red	blue / red	blue / red
12V	12V	12V

Additional control circuit I

pushbutton right-hand joystick S21:2	wire harness floor frame disconnect XB2:5	input plug control module X3:31	switch breaker operation S15:1	input plug control module X3:12	pushbutton right-hand joystick S21:1	wire harness floor frame disconnect XB2:7	input plug control module X3:32
blue / black	blue / black	blue / black	brown / yellow	brown / yellow	red / black	red / black	red / black
12V	12V	12V	0V	0V	12V	12V	12V

output plug control module X2:7	wire harness machine disconnect XM2:16	valveY18:1	output plug control module X2:8	wire harness machine disconnect XM2:18	valveY19:1
blue / black	blue / black	blue / black	red / black	red / black	red / black
12V	12V	12V	12V	12V	12V

Additional control circuit II

output plug control module X2:14	wire harness floor frame disconnect XB2:6	pushbutton left-hand joystick S22:3	pushbutton left-hand joystick S22:2	output plug control module X2:14	wire harness floor frame disconnect XB2:6	pushbutton left-hand joystick S22:3	pushbutton left-hand joystick S22:1
yellow	yellow	yellow	blue / black	yellow	yellow	yellow	red / black
12V	12V	12V	12V	12V	12V	12V	12V

valveY23:1
blue / black
12V

valveY24:1
red / black
12V

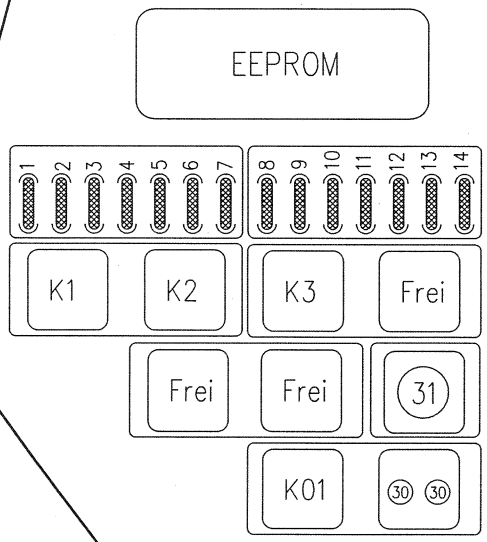
All voltages are measured between ground and the corresponding test point!!
Unless otherwise indicated, the ignition has to be switched on !!

Sicherungen (Fuses)

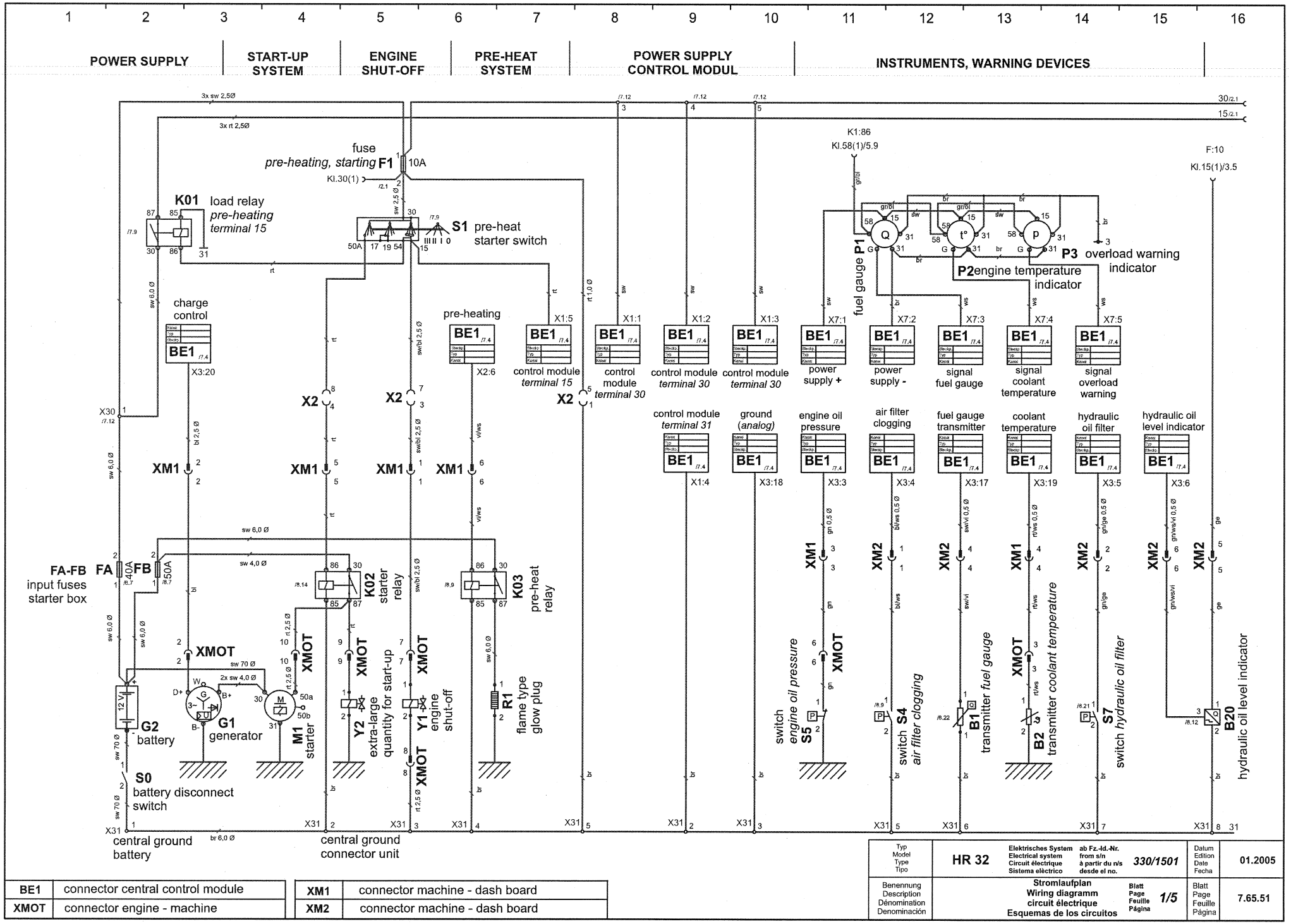
Name	Amp.	belegt mit (assigned to)
F1	10	Glühstartschalter Innenleuchte Wegfahrsperre (ignition start switch interior light immobilizer)
F2	15	Steckdose, Radio Kl.30 Option Zusatzheizung (socket, radio, option additional heating)
F3	10	Rundumleuchte (rotating beacon)
F4	15	Arbeitsscheinwerf. vorne (working floodlight, front)
F5	15	Arbeitsscheinwerf. hi. (working floodlight, rear)
F6	15	Betankungspumpe, Option elektr. Sitz (refuelling pump, option electrical seat)
F7	10	Horn, Schalterbeleucht.,Wegfahrsperre (horn, panel light, immobilizer)
F8	15	Heizgebläse Klimaanlage (heater fan A/C system
F9	15	Wisch–Waschanlage Radio Kl.15 (wish/wash system radio cl.15)
F10	5	Hydr.–Ölniveau, Lastwarn Hydraulikfunktionen (hydraulic oil level, overload warning hydraulic functions)
F11	5	Druckschalter Fahren (pressure switch travelling)
F12	5	Arbeitshydraulik (hydraulic main system)
F13	5	Koordinatenhebel li. / re. (joy–stick left / right)
F14	10	Option: Reichweitenbegrenz. (option: range limitation)

Relais (relays)

	Funktion (function)
K1	Arbeitsscheinwerfer vo. (working floodlight, front)
K2	Arbeitsscheinwerfer hi. (working floodlight, rear)
K3	nicht belegt (not assigned)



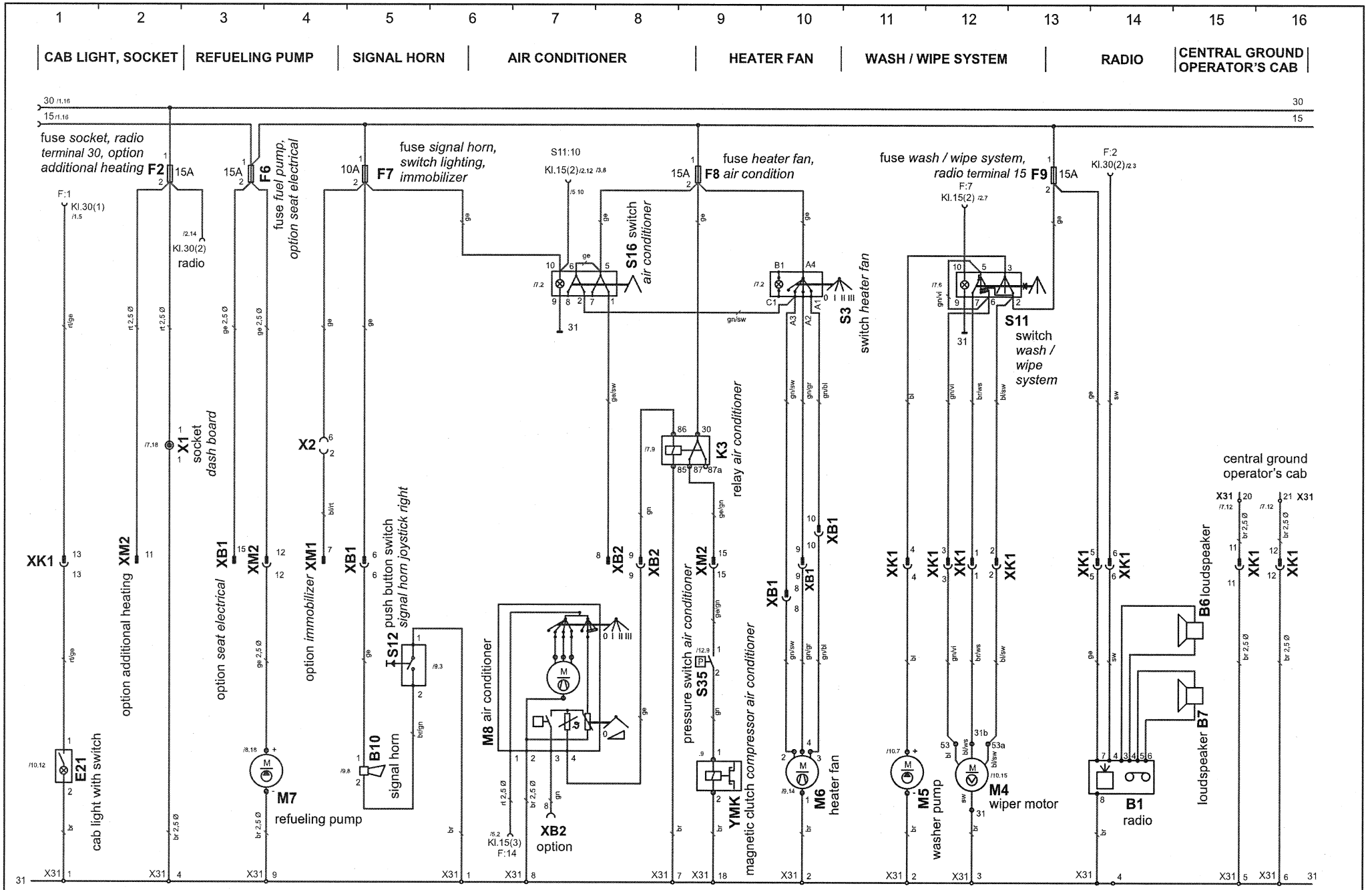
Typ Model Type Tipo	**HR 32**	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	ab Fz.-Id.-Nr. from a/n à partir du n/s desde el no.	***330/1501***	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Sicherungs- und Belegungsplanplan Assignment diagramm Schéma de réparation Esquemas de la caja**				Blatt Page Feuille Página	**7.65.50**



BE1	connector central control module
XMOT	connector engine - machine

XM1	connector machine - dash board
XM2	connector machine - dash board

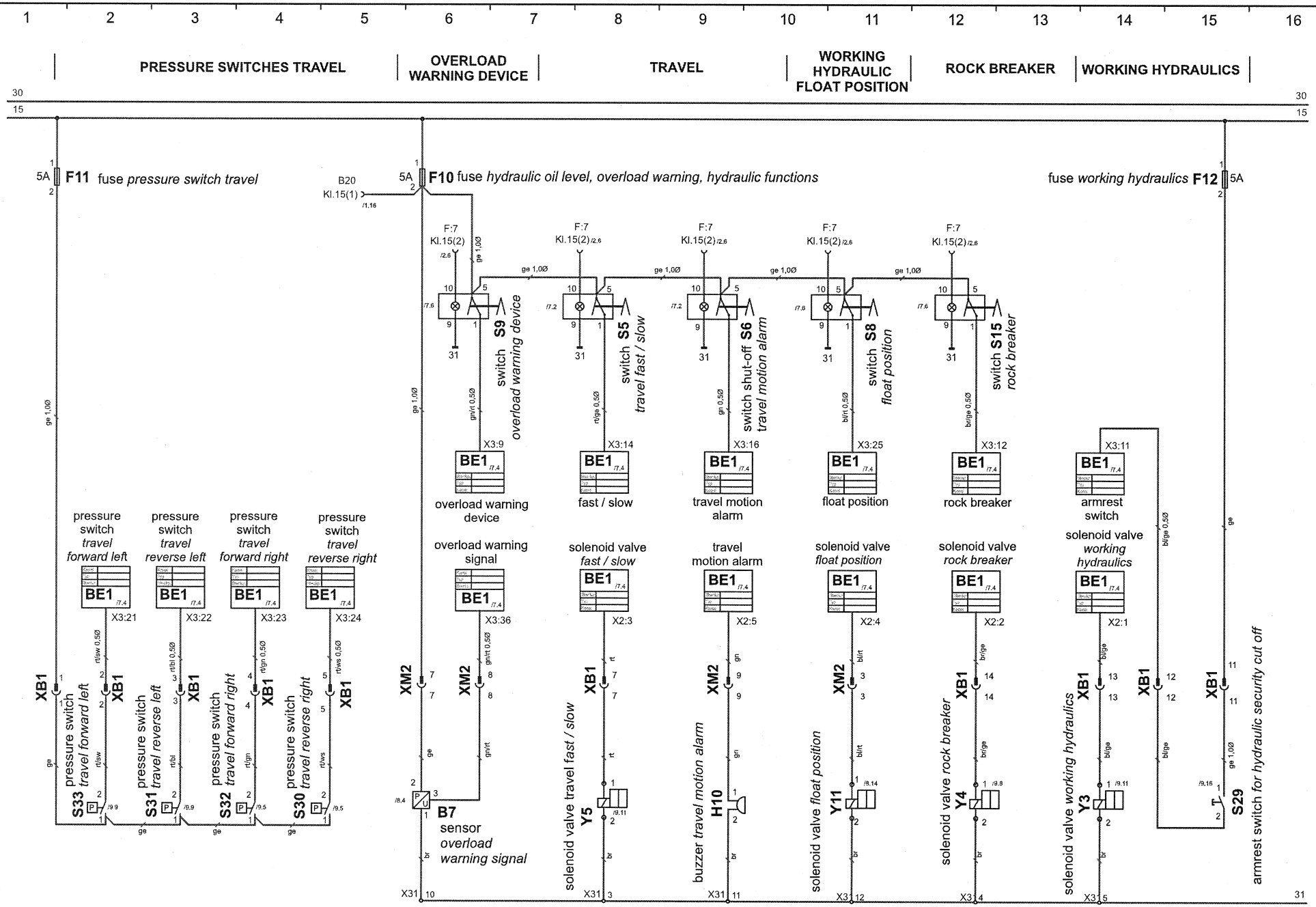
Typ Model Type Tipo	HR 32	Elektrisches System / Electrical system / Circuit électrique / Sistema elèctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 330/1501	Datum Edition Date Fecha	01.2005
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm circuit électrique Esquemas de los circuitos	Blatt Page Feuille Página 1/5		Blatt Page Feuille Página	7.65.51



XB1	connector *floor frame / dash board*
XB2	connector *floor frame / dash board*
XM1	connector *machine / dash board*
XM2	connector *machine / dash board*

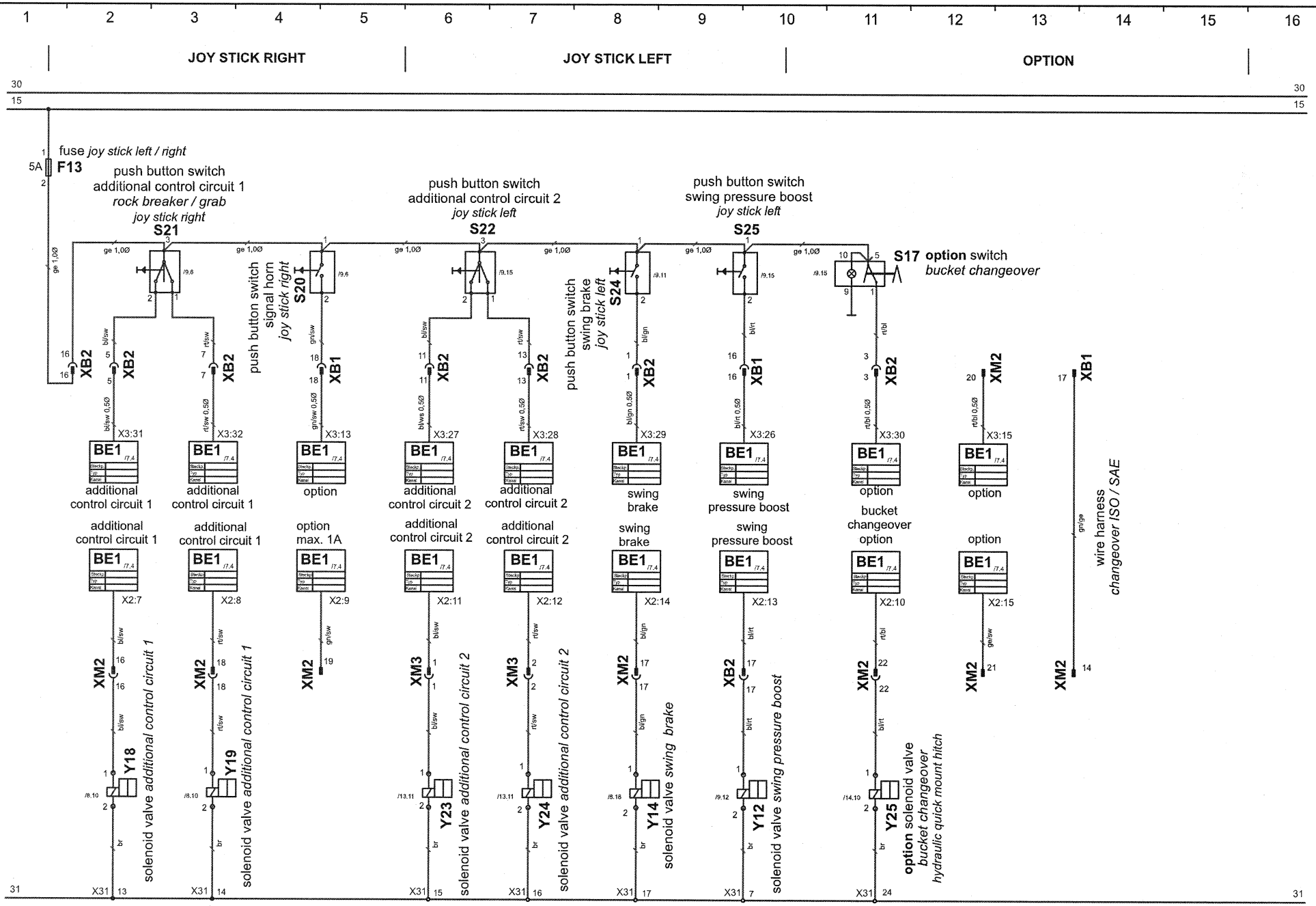
XK1	connector *operator's cab / dash board*

Typ / Model / Type / Tipo	HR 32	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 330/1501	Datum / Edition / Date / Fecha 01.2005
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 2/5	Blatt / Page / Feuille / Página 7.65.52



XB1	connector *floor frame / dash board*
XM1	connector *machine / dash board*
BE1	connector central control module

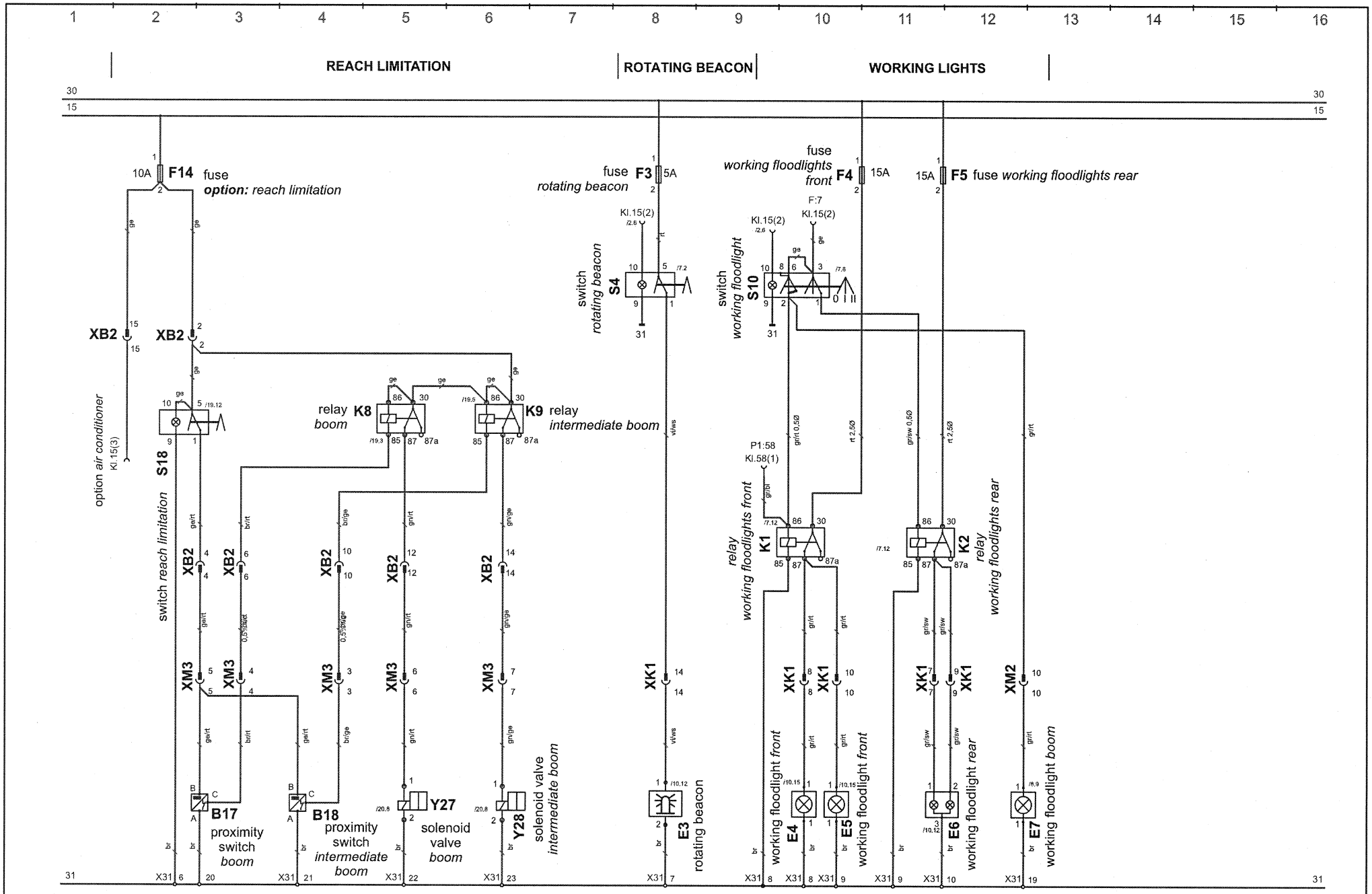
Typ Model Type Tipo	HR 32	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 330/1501	Datum Edition Date Fecha 01.2005
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 3/5	Blatt Page Feuille Página 7.65.53



XM2	connector *machine / dash board*
XM3	connector *machine / dash board*
XB1	connector *floor frame / dash board*
XB2	connector *floor frame / dash board*

BE1	connector *central control module*

Typ / Model / Type / Tipo	HR 32	Elektrisches System / Electrical system / Circuit électrique / Sistema elèctrico	ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 330/1501	Datum / Edition / Date / Fecha	01.2005
Benennung / Description / Dénomination / Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt / Page / Feuille / Página 4/5		Blatt / Page / Feuille / Página	7.65.54

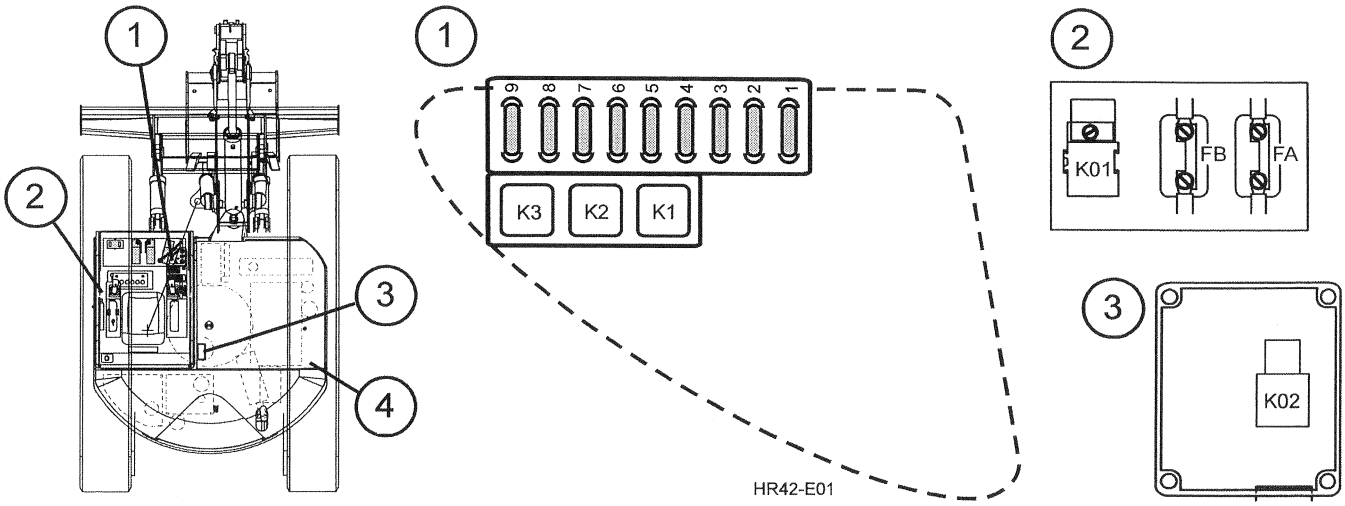


XB2	connector *floor frame / dash board*
XM2	connector *machine / dash board*
XM3	connector *machine / dash board*
XK1	connector *operator's cab / dash board*

Typ Model Type Tipo	HR 32	Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. 330/1501	Datum Edition Date Fecha 01.2005
Benennung Description Dénomination Denominación	Stromlaufplan / Wiring diagramm / circuit électrique / Esquemas de los circuitos	Blatt Page Feuille Página 5/5	Blatt Page Feuille Página 7.65.55

Electrical system

Fuse and relay box — Assignment plan



A = Instrument panel B = Battery compartment C = Starter box in engine compartment D = Power relay K03

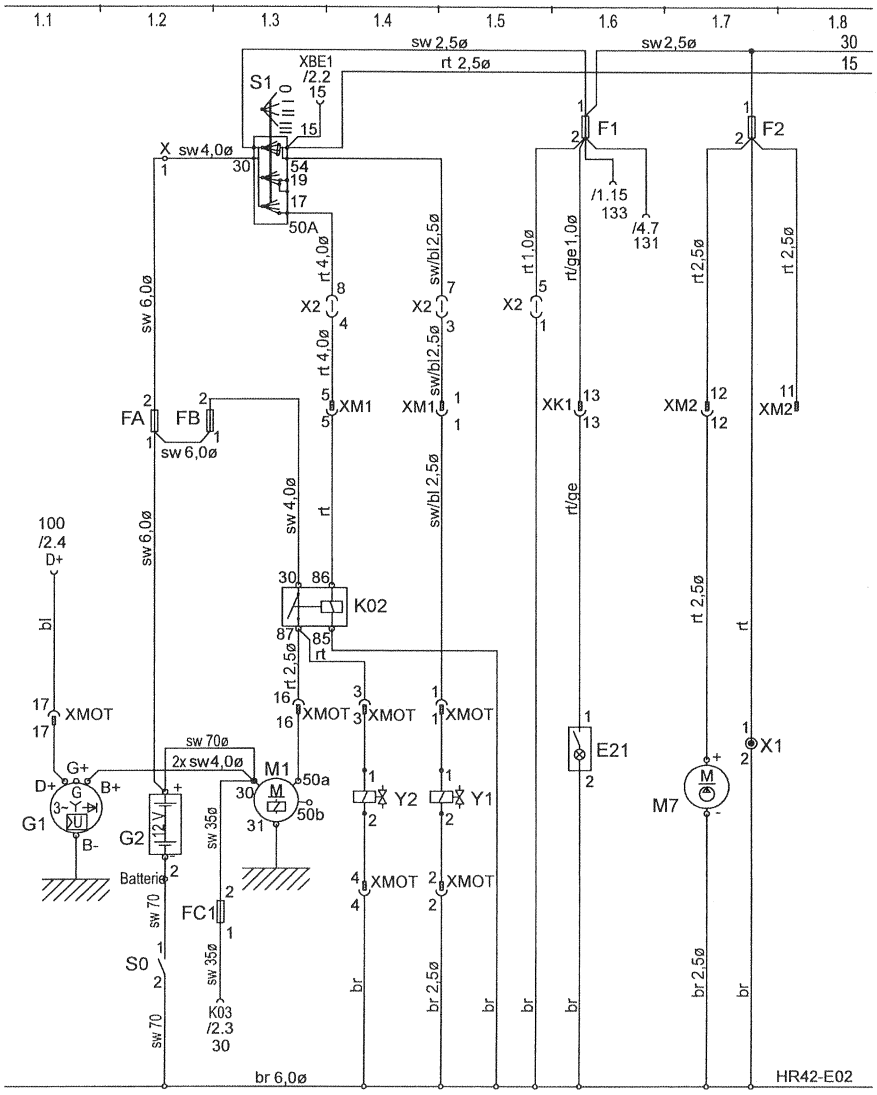
Fuses		
Item	**Ampere**	**Assigned to**
F 1	15	Interior light, radio, immobilizer, rotating beacon
F 2	20	Socket, refueling pump, optional additional heating
F 3	15	Working floodlight, front
F 4	15	Working floodlight, rear
F 5	10	Horn, switch illumination, immobilizer
F 6	15	Heater fan
F 7	15	Wish/wash system
F 8	5	Control module signal input
F 9	15	Additional heating (option) Seat with electrical heating (option) Working floodlight(s) (option)

Fuse colors			
5A	brown	10A	red
15A	blue	20A	yellow

Fuses		
Item	**Ampere**	**Assigned to**
FA	40	Main fuse
FB	40	Start-up, pre-heating
FC	150	Heater flange (K03)

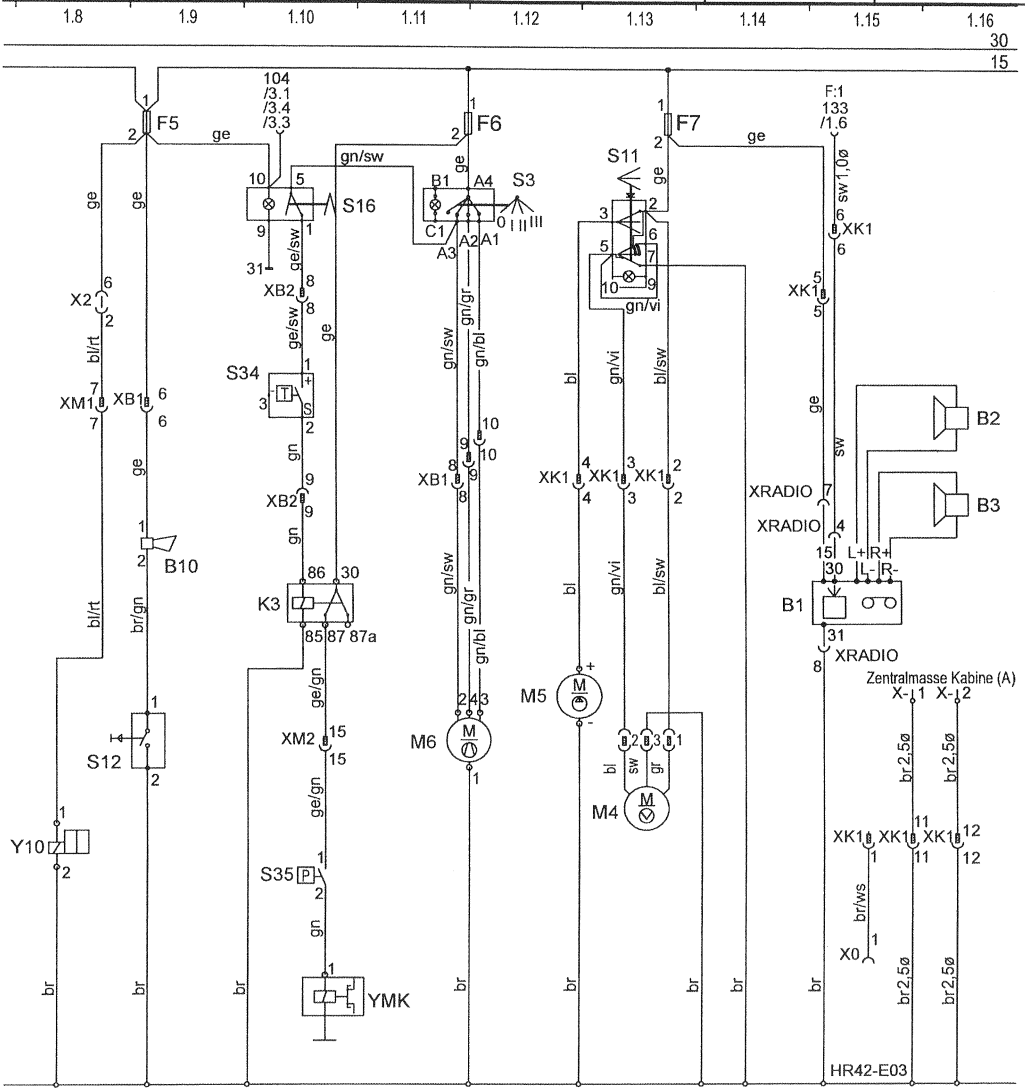
Relays	
Position	**Function**
K 02	Starting relay
K 03	Heater flange power relay
K 1	Working floodlight, front
K 2	Working floodlight, rear
K 3	not assigned (optional air conditioning)

Power supply	Start-up system	Shut-off	Interior light	Refueling pump, socket



Path	Desig-nation	Device	Path	Desig-nation	Device
		Power supply			***Shut-off***
1.1	G1	Generator	1.5	Y1	Shut-off
1.2	FA	Fuse			***Interior light***
1.2	FB	Fuse	1.6	F1	Fuse
1.2	G2	Battery	1.6	E21	Interior light
1.2	S0	Battery disconnecting switch			***Refueling pump, socket***
		Start-up system	1.7	F2	Fuse
1.3	FC	Fuse	1.7	M7	Refueling pump
1.3	S1	Glow plug and starter switch	1.7	X1	Socket
1.3	M1	Starter			
1.3	K02	Start-up relay			
1.4	Y2	Excess fuel for starting			

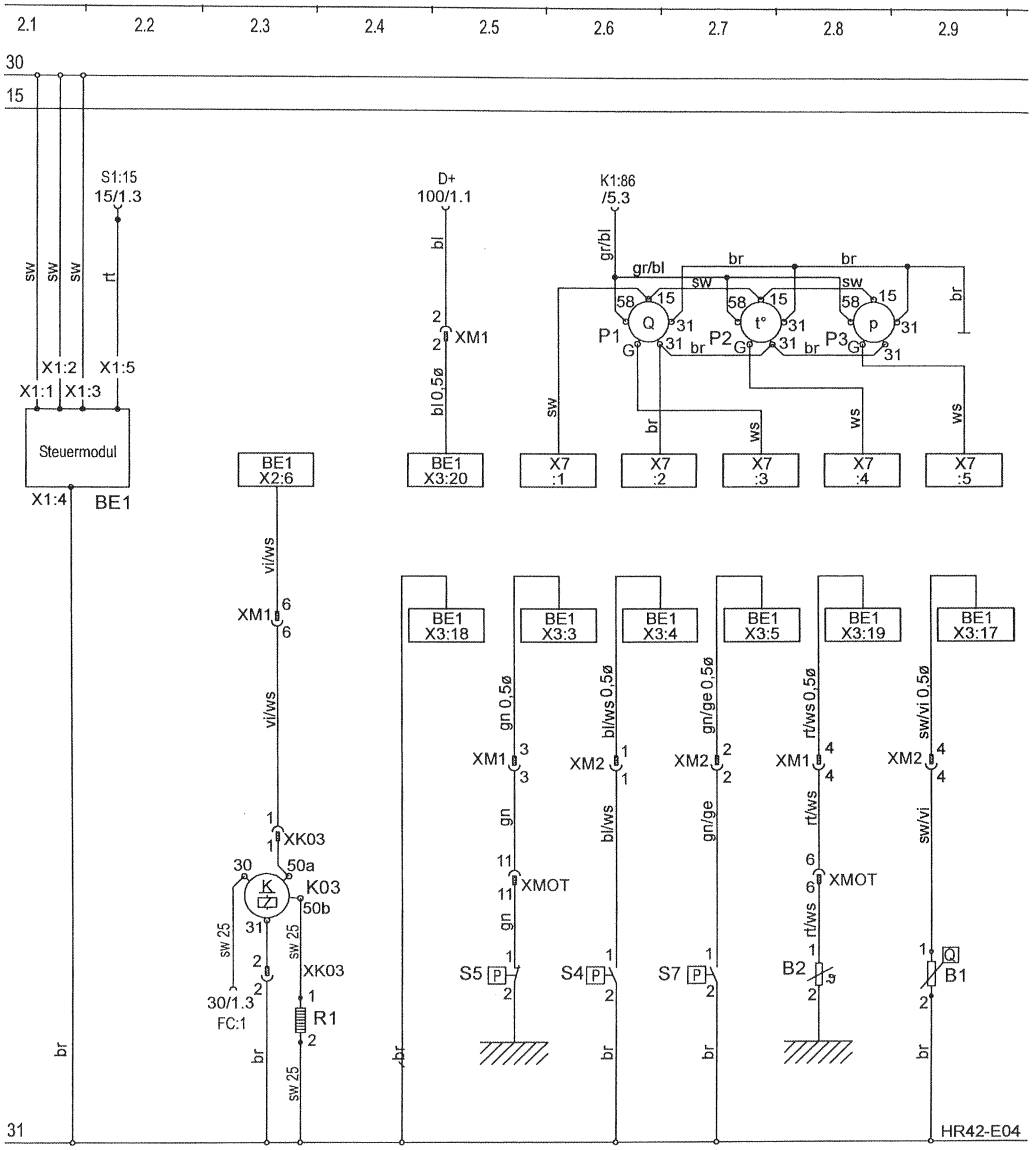
Horn	Air conditioning	Heater fan	Wash/ wipe system	Radio



Path	Designation	Device	Path	Designation	Device
		Horn			***Heater fan***
1.8	Y10	Solenoid valve, immobilizer	1.11	F6	Fuse
1.9	F5	Fuse	1.11	S3	Heater fan switch
1.9	B10	Horn	1.11	M6	Heater fan
1.9	S12	Horn button			***Wash/ wipe system***
		Air conditioning	1.13	S11	Wash/ wipe switch
1.10	S16	Air conditioning switch	1.13	M5	Washer pump
3	K3	Relay	1.13	F7	Fuse
3	S34	Air condition. temperature switch	1.13	M4	Wiper motor
1.10	S35	Air condition. pressure switch			***Radio***
1.10	YMK	Compressor magnet.coupling	1.15	B1	Radio
			1.16	B2	Loudspeaker
			1.16	B3	Loudspeaker

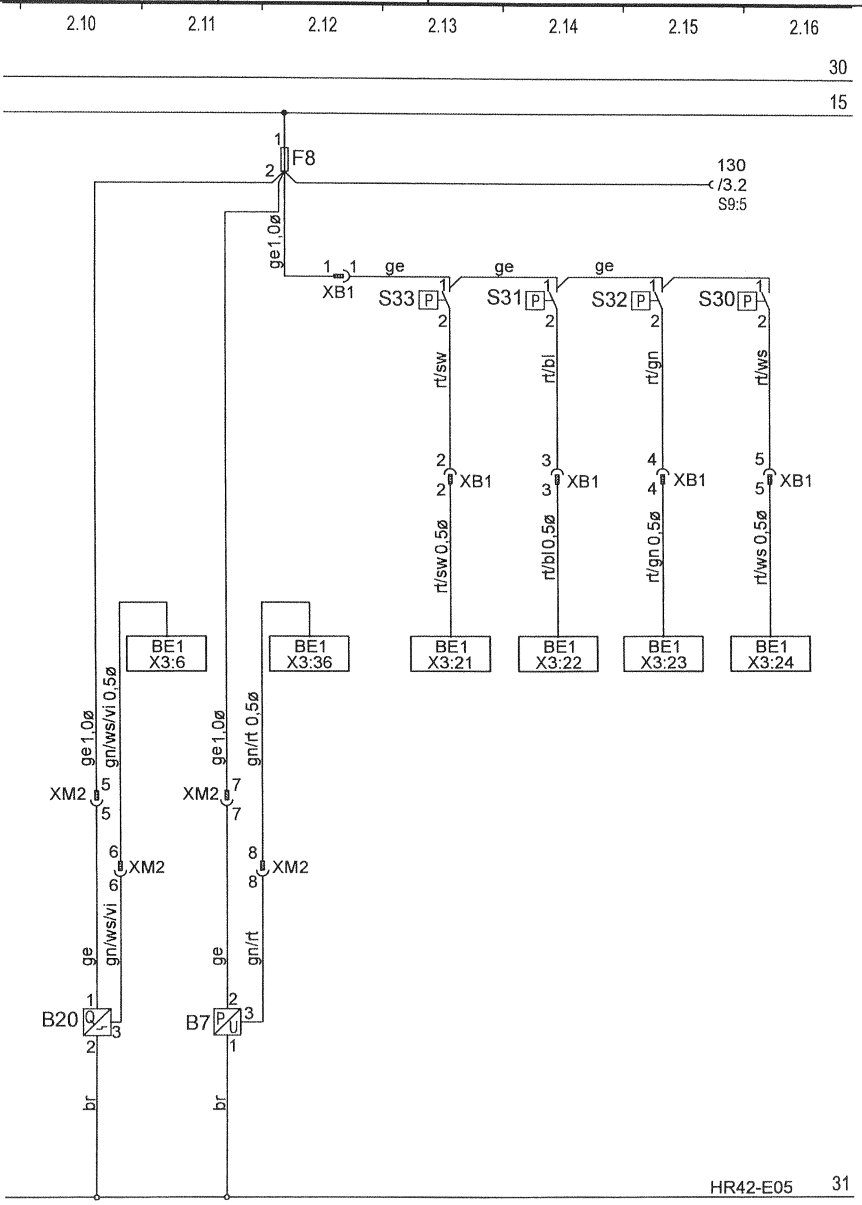
TEREX SCHAEFF	Typ/Model/Type **HR42 from s/n.: 342/0100**	Datum/Edition/Date **01.2004**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.67.02**

Check module	Pre-heating	Instruments, warning equipment



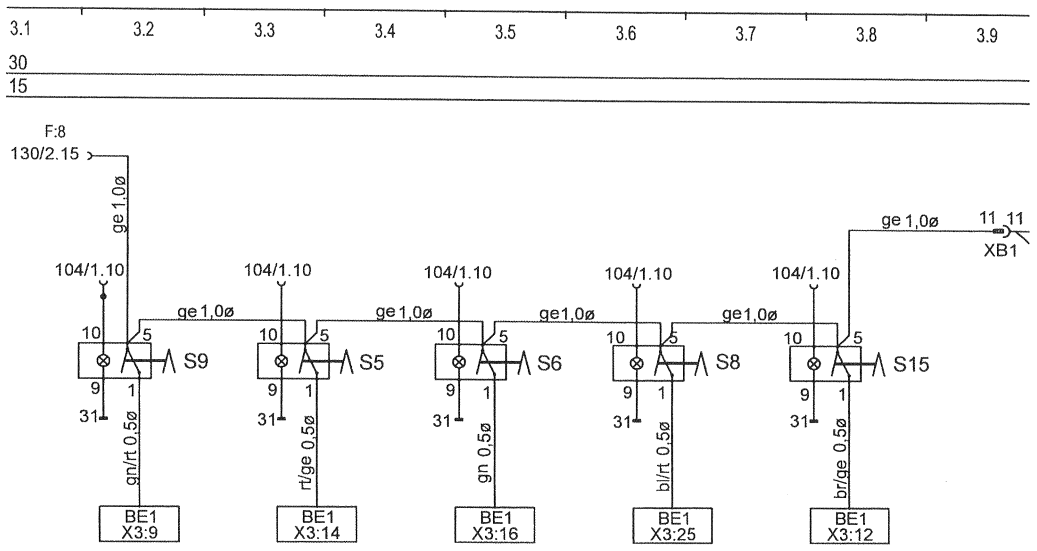
Path	Desig-nation	Device	Path	Desig-nation	Device
		Check module			***Instruments, warning equipment***
2.1	BE1	Control module	2.5	S5	Oil pressure switch
		Pre-heating	2.6	S4	Air filter servicing
2.3	K03	Power relay	2.6	P1	Fuel-level indicator
2.3	R1	Heater flange	2.7	S7	Hydraulic oil filter
			2.7	P2	Coolant temperature indicator
			2.8	B2	Coolant temperature
			2.8	P3	Overload warning device
			2.9	B1	Fuel-level sensor

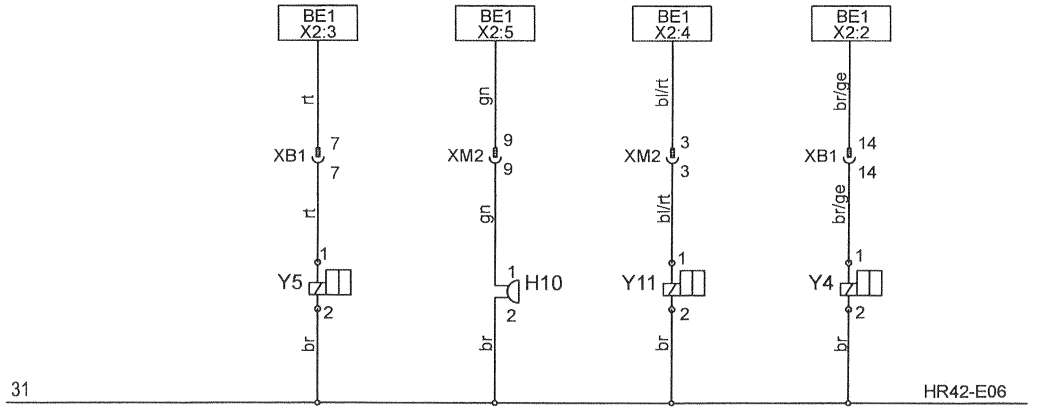
Hydraulic oil level	Load warning sensor	"Travel" pressure switch



Path	Desig-nation	Device	Path	Desig-nation	Device
		Hydraulic oil level			***"Travel" pressure switch***
2.10	B20	Hydraulic oil level	2.13	S33	Pressure switch forward/left
		Load warning sensor	2.14	S31	Pressure switch reverse/left
2.11	B7	Load warning signal	2.15	S32	Pressure switch forward/right
2.12	F8	Fuse	2.16	S30	Pressure switch reverse/right

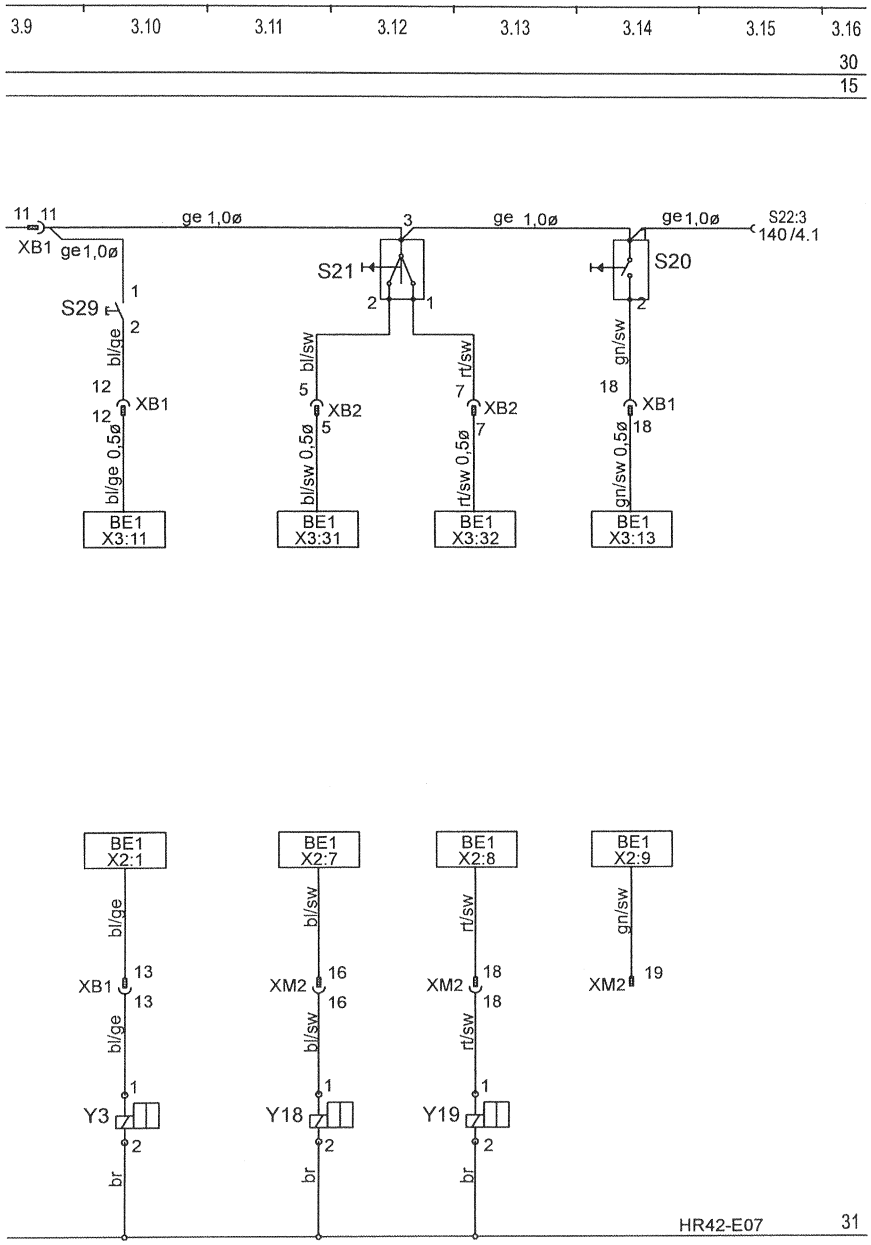
Load warning device	Travel	Float position	Rock breaker





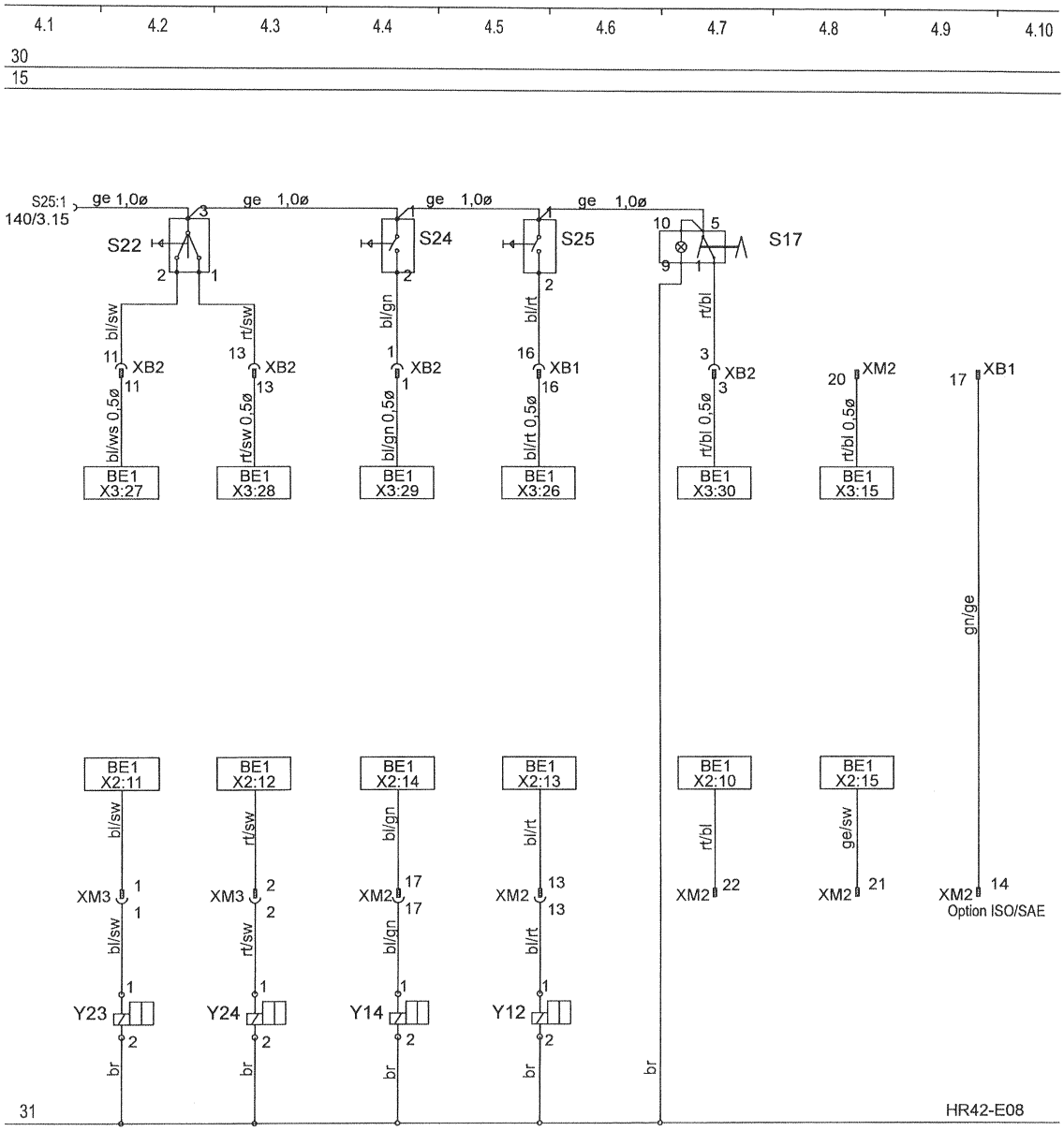
Path	Desig-nation	Device	Path	Desig-nation	Device
		Load warning device			***Float position***
3.2	S9	Shut-off - load warning device	3.6	S8	Float position
		Travel	3.6	Y11	Float position valve
3.3	S5	FAST-SLOW			***Rock breaker***
3.4	Y5	Valve, fast	3.8	S15	Rock breaker
3.5	S6	Travel motion alarm	3.8	Y4	Rock breaker valve
3.5	H10	Travel motion alarm			

Working hydraulics	Joystick, right



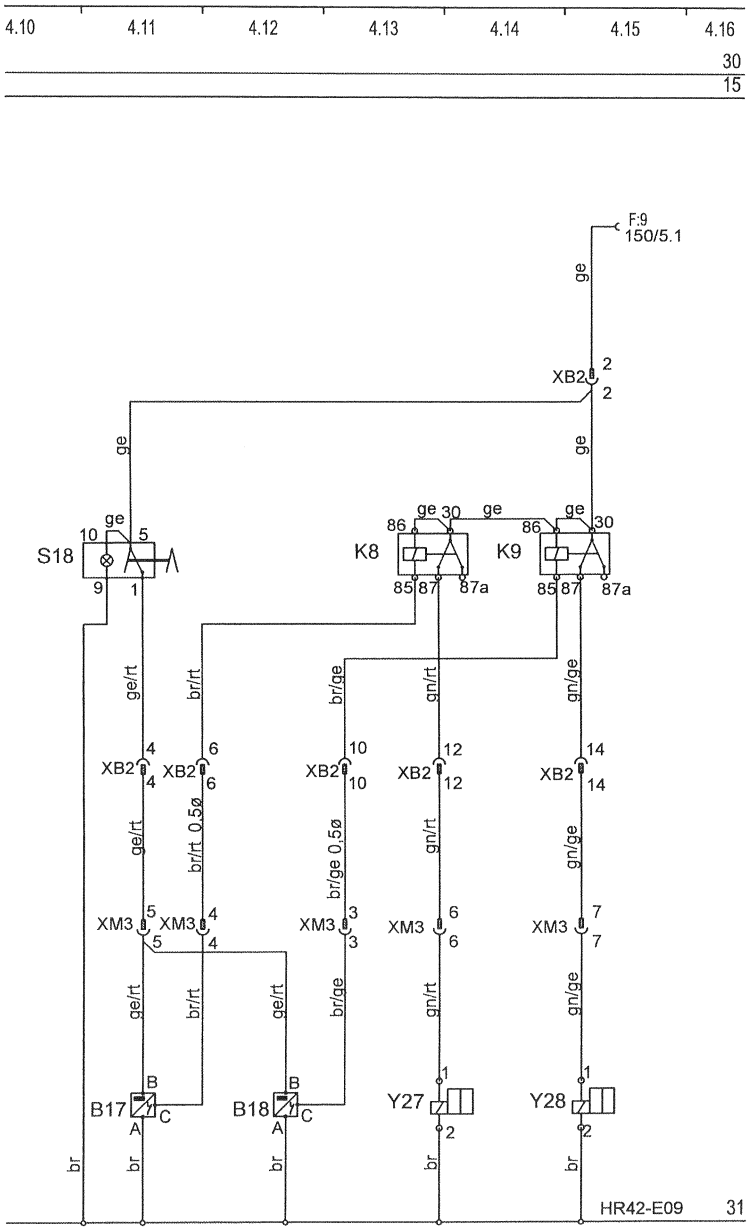
Path	Desig-nation	Device	Path	Desig-nation	Device
		Working hydraulics			***Joystick, right***
3.10	S29	Armrest switch	3.11	Y18	Valve, additional control circuit 1
3.10	Y3	Working hydraulics	3.12	S21	Push-button, additional control circuit 1
			3.13	Y19	Valve, additional control circuit 1
			3.14	S20	Option

Joystick, left	Option



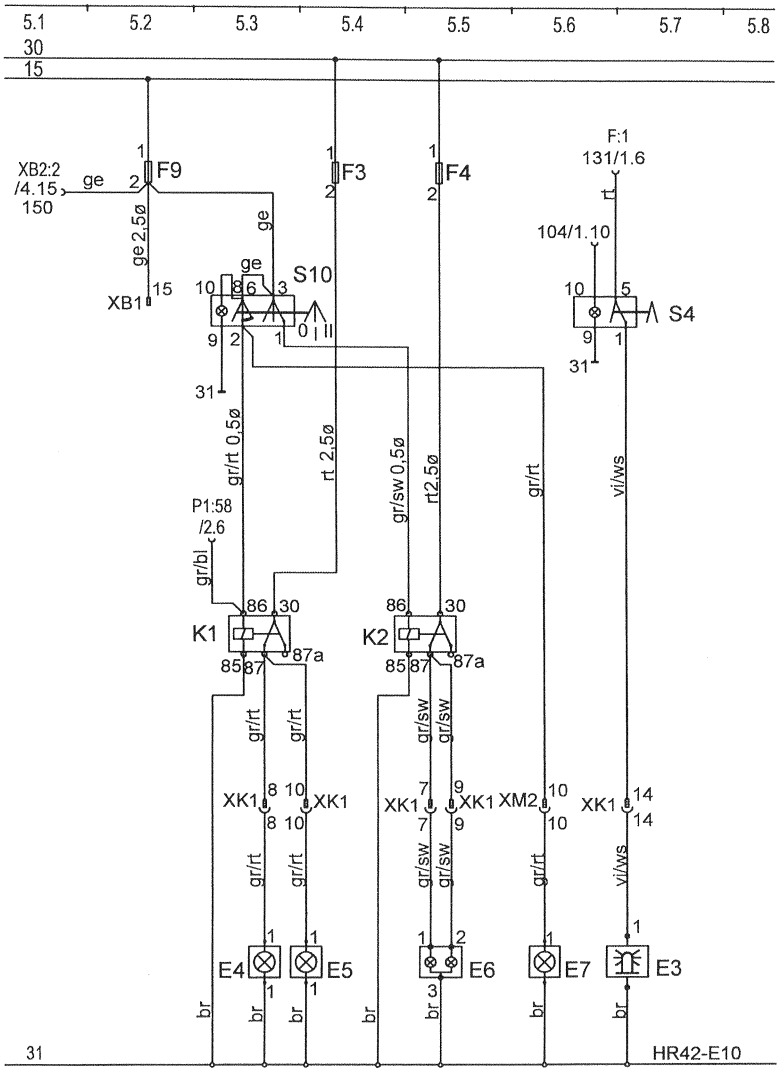
Path	Desig-nation	Device	Path	Desig-nation	Device
		Joystick, left			***Option***
4.2	Y23	Valve, additional control circuit 2	4.7	S17	Switch for option
4.2	S22	Push-button, additional control circuit 2	4.9	--	Cable link ISO/SAE
4.3	Y24	Valve, additional control circuit 2			
4.4	S24	Push-button – swing brake			
4.4	Y14	Valve – swing brake			
4.6	S25	Push-button - high torque swing drive			
4.6	Y12	Valve - high torque swing drive			

Restriction of reach



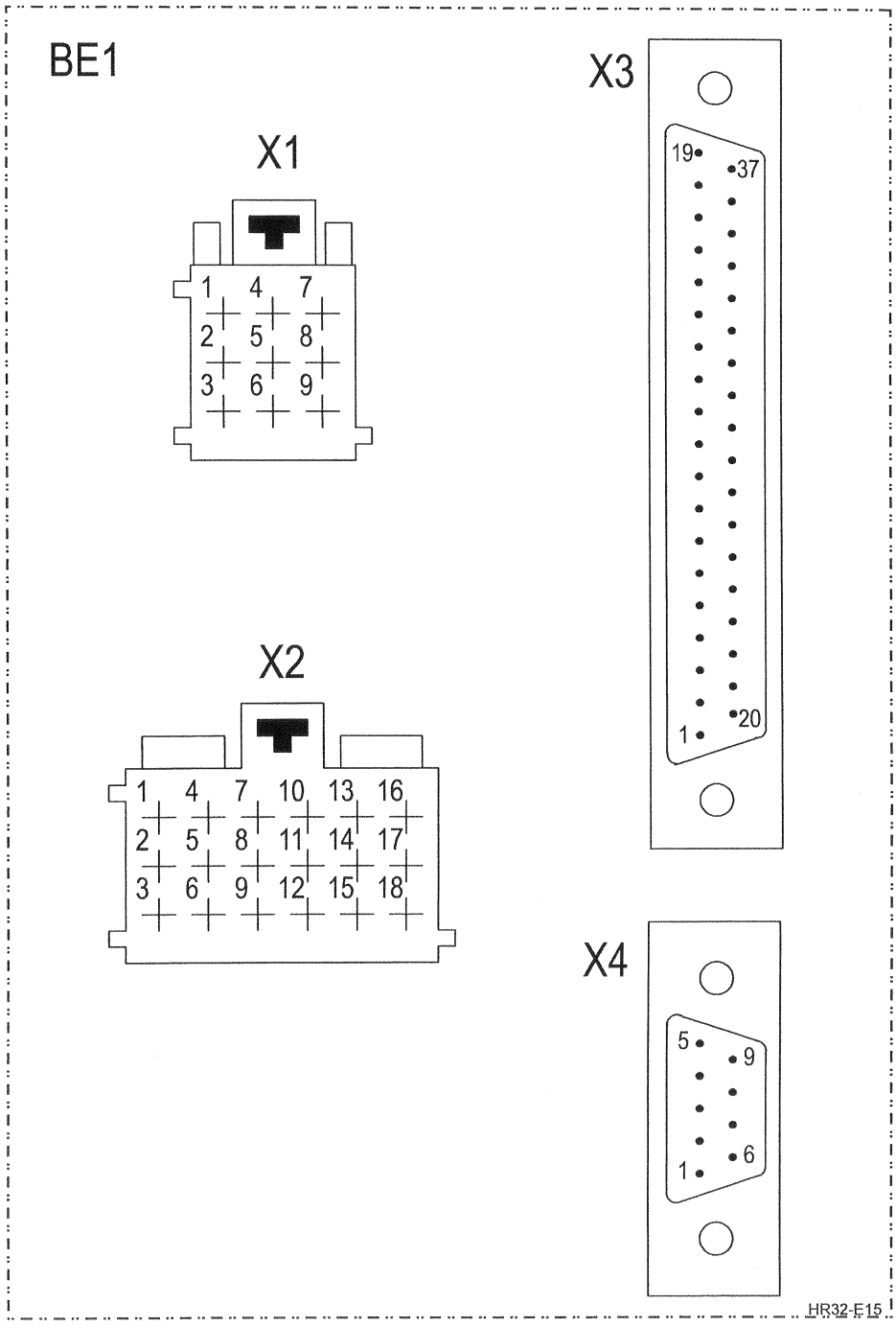
Path	Desig-nation	Device	Path	Desig-nation	Device
		Restriction of reach			
4.11	S18	Switch - restriction of reach			
4.11	B17	Boom proximity switch			
4.12	B18	Intermediate boom proximity switch			
4.14	K8	Boom relay			
4.14	Y27	Boom solenoid valve			
4.19	K9	Intermediate boom relay			
4.15	Y28	Intermediate boom solenoid valve			

Working floodlights	Rotating beacon



Path	Desig-nation	Device	Path	Desig-nation	Device
		Working floodlights	5.5	F4	Fuse
5.2	F9	Fuse	5.5	K2	Relay
5.3	S10	Working floodlight	5.5	E6	Working floodlight rear
5.3	K1	Relay	5.6	E7	Boom-mounted working floodlight
5.3	E4	Working floodlight front			***Rotating beacon***
5.4	E5	Working floodlight front	5.7	S4	Switch for rotating beacon
5.4	F3	Fuse	5.7	E3	Rotating beacon

Check module



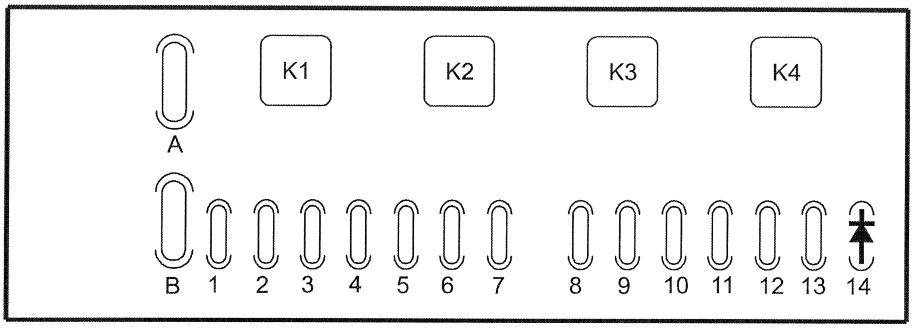
TEREX SCHAEFF	Typ/Model/Type **HR42 from s/n.: 342/0100**	Datum/Edition/Date **01.2004**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.67.06**

Check module BE1

X1	***Power supply***
1	Power supply Terminal 30
2	Power supply Terminal 30
3	Power supply Terminal 30
4	Central mass
5	Power supply Terminal 15
6	--
7	--
8	--
9	--
X2	***Signal outputs***
1	Working hydraulics
2	Rock breaker
3	FAST - SLOW
4	Float position
5	Travel motion alarm
6	Pre-heating
7	Additional control circuit — valve
8	Additional control circuit — valve
9	Option
10	Option
11	Additional control circuit 2 — valve
12	Additional control circuit 2 — valve
13	High torque swing drive
14	Swing brake valve
15	--
16	--
17	--
18	--
X3	***Signal inputs***
1	--
2	--
3	Oil pressure switch
4	Air filter clogging
5	Hydraulic oil filter clogging
6	Hydraulic oil level switch
7	--
8	--
9	Overload warning switch

10	--
11	Armrest switch
12	Rock breaker switch
13	Option
14	FAST – SLOW switch
15	--
16	Travel motion alarm switch
17	Fuel-level sensor
18	Central mass
19	Coolant temperature
20	Battery charge indicator
21	Pressure switch "travel", forward, left
22	Pressure switch, "travel", reverse, left
23	Pressure switch, "travel", forward, right
24	Pressure switch, "travel", reverse, right
25	Float position switch
26	High torque swing drive
27	Additional control circuit 2 – push-button
28	Additional control circuit 2 – push-button
29	Swing brake switch
30	Switch for option
31	Additional control circuit – push-button
32	Additional control circuit – push-button
33	--
34	--
35	--
36	Overload warning signal
37	--
X4	***Interface***
1	--
2	--
3	--
4	--
5	--
6	--
7	--
8	--
9	--

Electrical system



HR12E01

Fuse and relay box - Assignment diagram

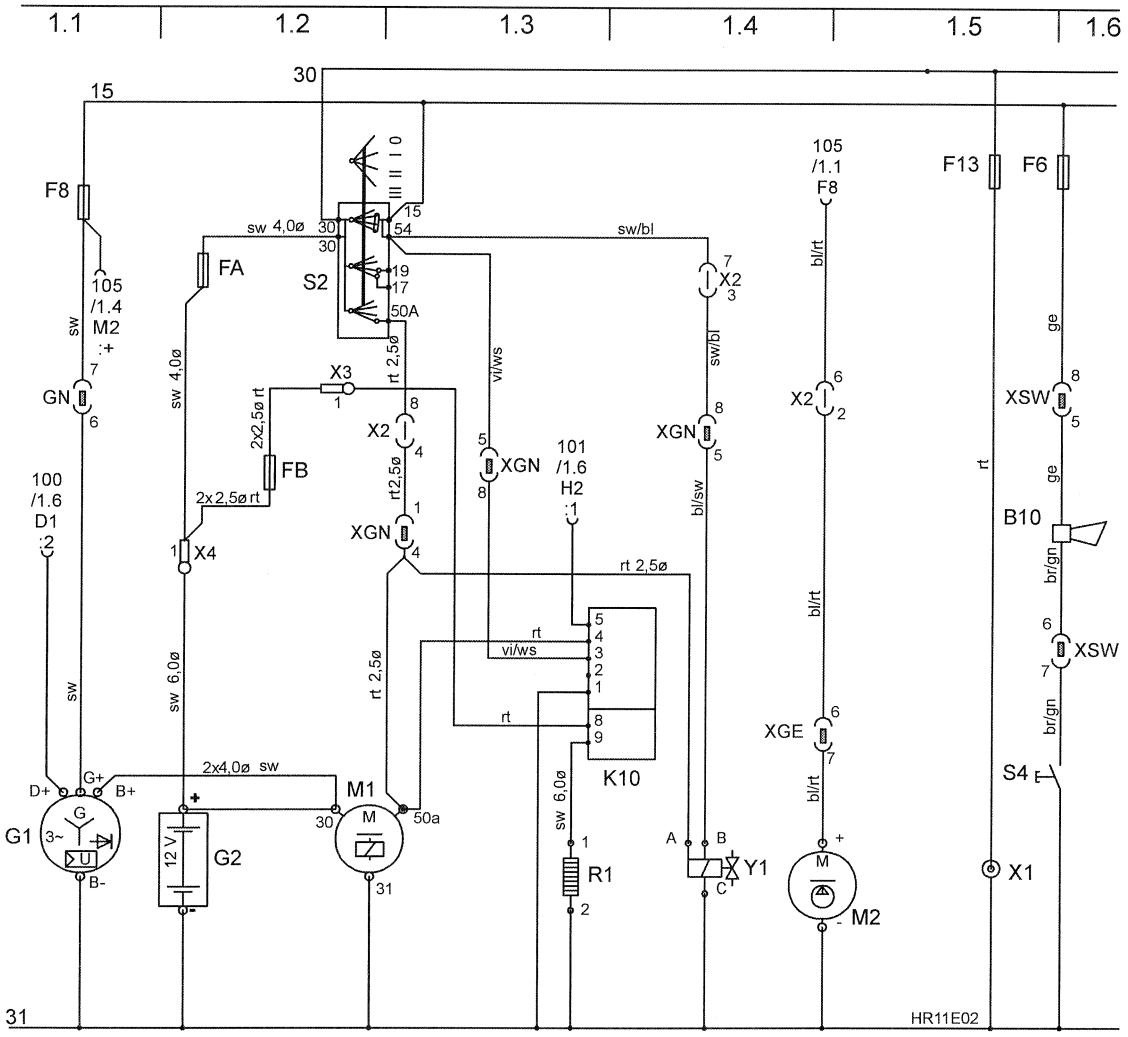
Item	Fuse	Assigned to
FA	30 A	Main fuse
FB	60 A	Fuse for pre-heater system
F1	--	not assigned
F2	10A	Instruments, indicator lamps
F3	10A	Working floodlight, front
F4	10A	Working floodlight, rear (option)
F5	--	not assigned
F6	10A	Horn
F7	--	not assigned
F8	10°	Fuel pump/ generator
F9	--	not assigned
F10	--	not assigned
F11	--	not assigned
F12	10A	Rotating beacon (option)
F13	20A	Socket
F14	Diode 3A	Blocking diode for generator

K1	Buzzer cut-off	K2	not assigned
K3	not assigned	K4	Diode block
K10	Pre-heating time control unit — rear right-hand side, engine compartment dividing wall		

Cable and plug colors

bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

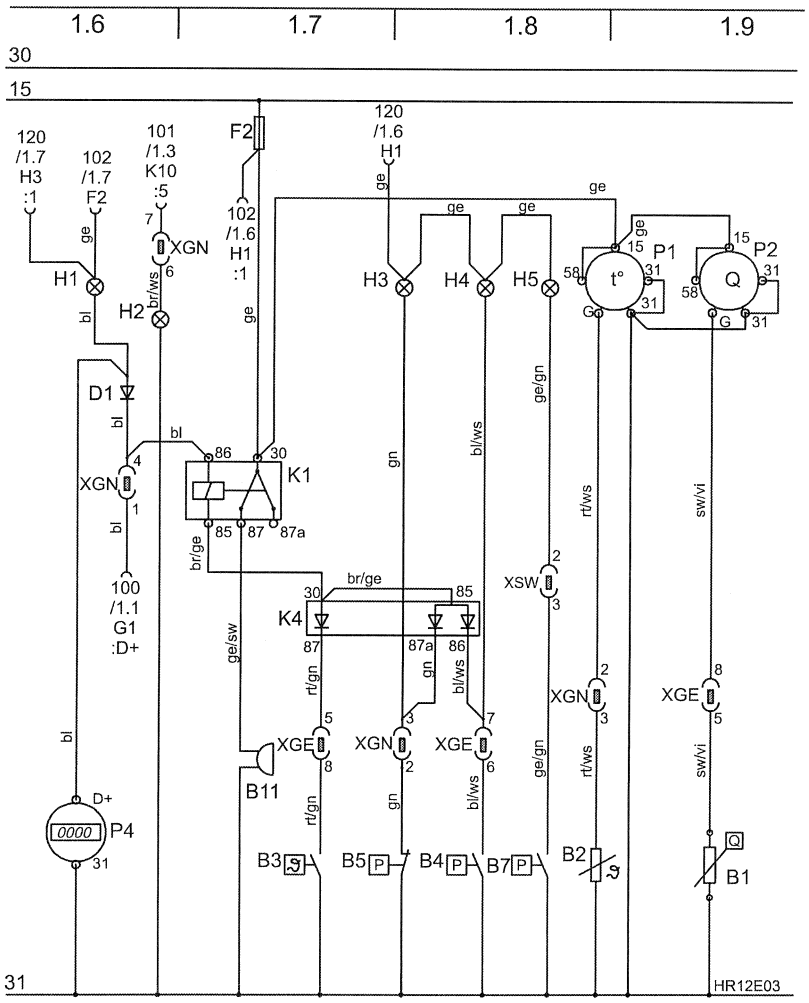
1 Power supply	2 Pre-heat / start-up system	3 Engine shut-off, fuel pump	4 Socket, horn



Electric circuit diagram 1

Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
1		***Power supply***	***3***		***Engine shut-off, fuel pump***
1.1	G1	Generator	1.4	Y1	Engine shut-off
1.2	G2	Battery	1.4	M2	Fuel pump
2		***Pre-heat / start-up system***	***4***		***Socket, horn***
1.2	S2	Pre-heat/ starter switch	1.5	F13	Socket fuse
1.2	FA	Main fuse	1.5	X1	Socket
1.2	FB	Fuse, pre-heat system	1.6	S4	Horn button
1.3	K10	Pre-heating time control unit	1.6	B10	Horn
1.3	R1	Glow plugs			
1.2	M1	Starter			

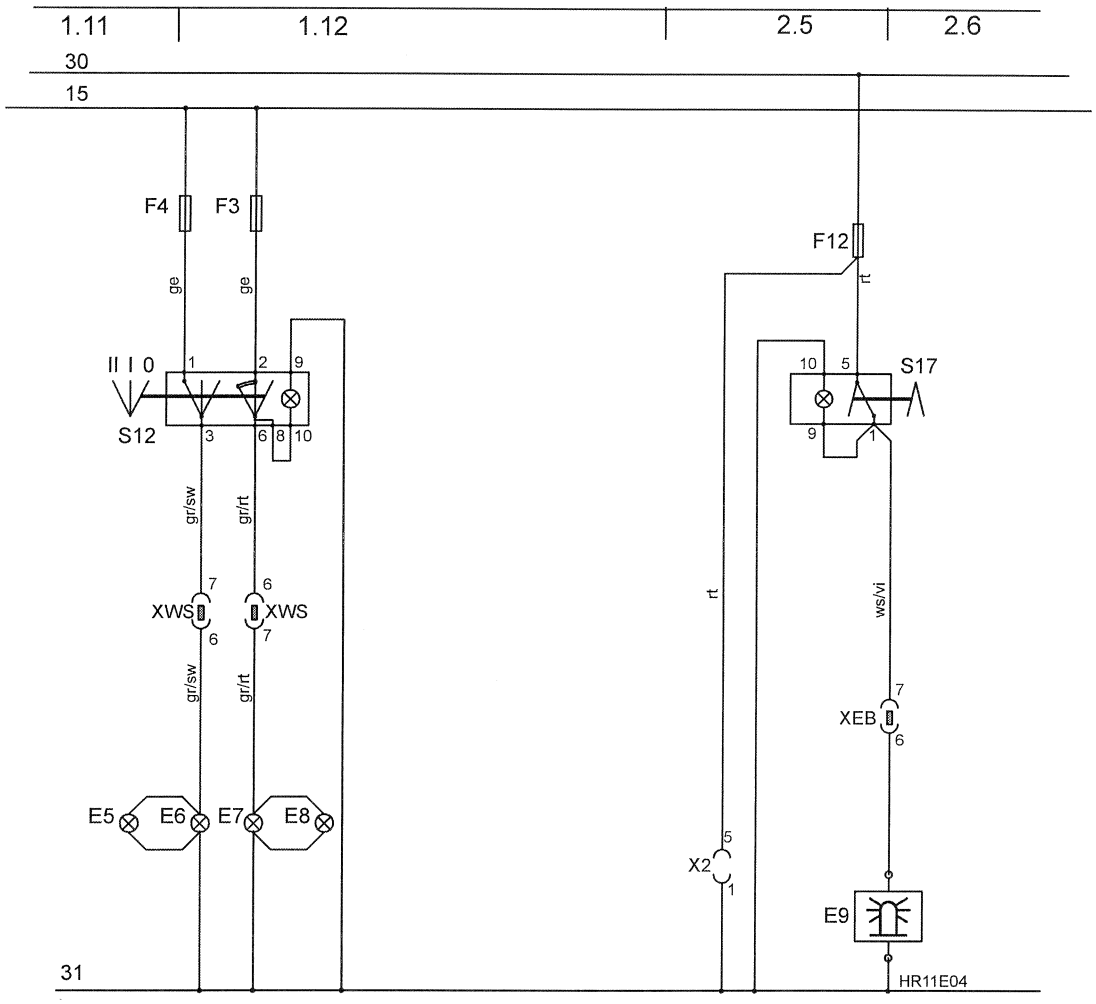
5 Instruments, warning equipment



Electric circuit diagram 2

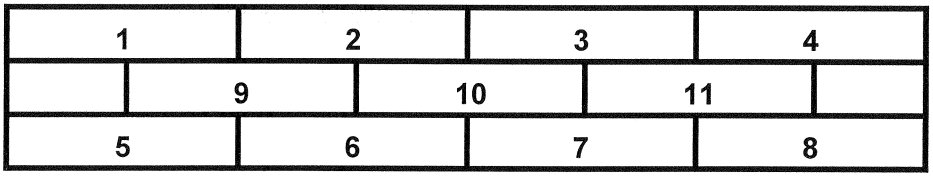
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
5		***Instruments, Warning equipment***			
1.6	H1	Battery charge indicator	1.8	H4	Air filter indicator
1.6	D1	Blocking diode for generator	1.8	B4	Air filter maintenance switch
1.6	P4	Operating hour meter	1.8	H5	Hydraulic oil filter clogging indicator
1.7	F2	Instruments, indicator lamps	1.8	B7	Hydraulic oil filter clogging
1.6	H2	Pre-heating monitor	1.8	K4	Diode block
1.7	K1	Warning buzzer cut-off	1.8	P1	Temperature indicator
1.7	B11	Warning buzzer	1.8	B2	Temperature sensor
1.7	B3	Temperature warning contact	1.9	P2	Fuel gauge
1.8	H3	Oil pressure indicator	1.8	B1	Tank sensor
1.8	B5	Oil pressure switch			

7 Working floodlight	9 Rotating beacon



Electric circuit diagram 3

Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
7		***Working floodlights***	***9***		***Rotating beacon***
1.11	S12	Switch for working floodlights	2.5	F12	Rotating beacon
1.12	E7	Working floodlight, front	2.5	S17	Switch for rotating beacon
1.12	E8	Working floodlight, front	2.6	E9	Rotating beacon
1.11	E5	Working floodlight, rear (option)			
1.11	E6	Working floodlight, rear (option)			



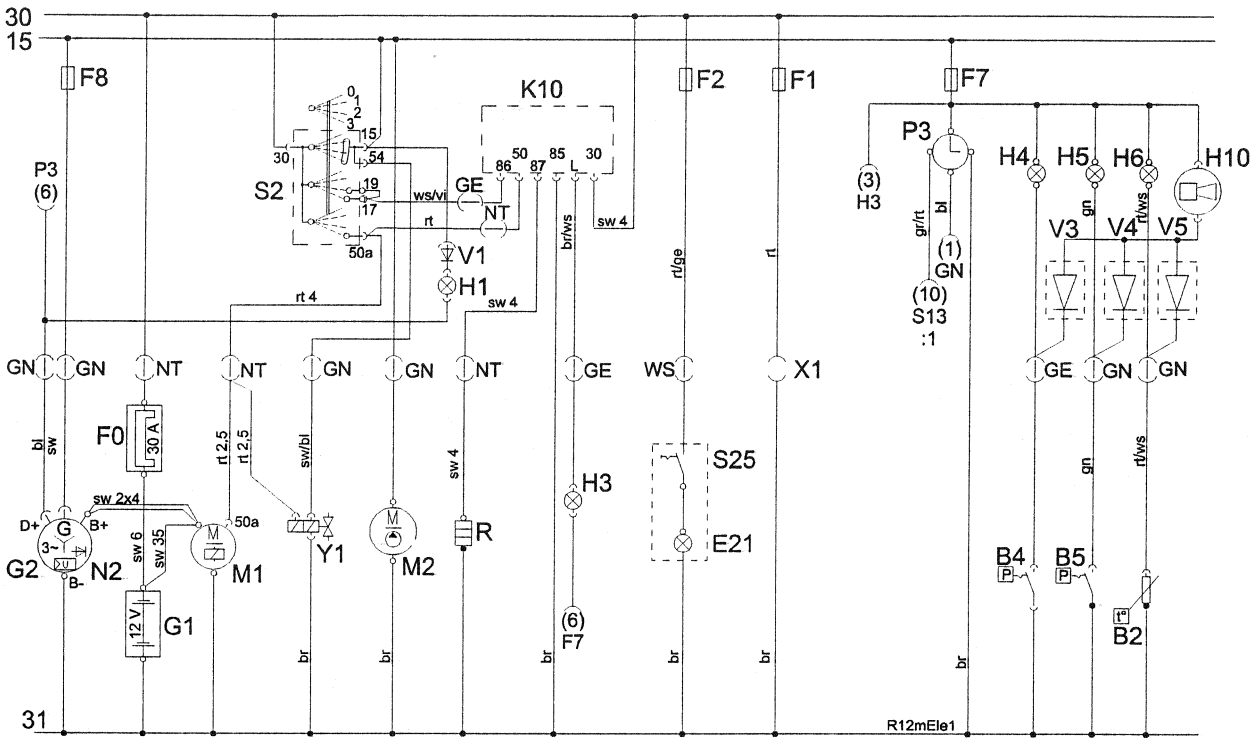
Item	Amps	Assigned to
1	10 A	Socket
2	10 A	Cab lamp / radio
3	10 A	Working floodlights
4	10 A	Heater fan
5	10 A	Signal horn
6	10 A	Windscreen wiper
7	10 A	Indicator lamps and instruments
8	10 A	Not assigned
9	10 A	Quick-slow (option)
10	10 A	Fuel pump
11	10 A	Not assigned

Spare bulbs/fuses	Type	Spare part number
Indicator elements	12 V 1.2 W	5 755 659 355
Cab lamp	12 V 5 W	1 814 000 101
Switch	12 V 1.2 W	1 813 000 021
Fuse	10 A	5 050 650 264

Cable and connector colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	bright red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

1. Power supply	2. Start-up system	3. Pre-heater system	5. Cab light, clock, radio, socket	6. Indicating units

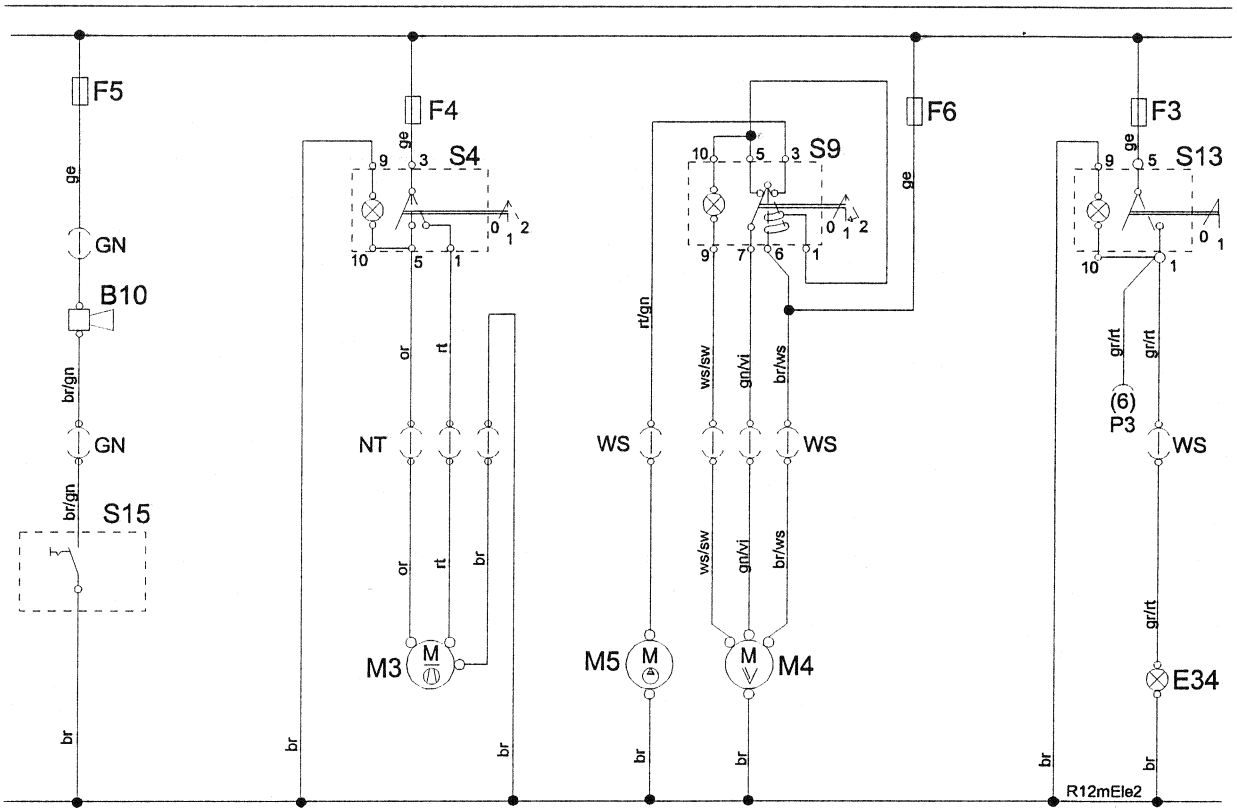


Section Qty.	Desig-nation	Device
1		***Power supply***
1	F8	Fuse
1	G2	Generator
1	N2	Generator regulator
1	G1	Battery
1	FO	Flat-type fuse
2		***Start-up system***
1	S2	Pre-heat/ starter switch
1	V1	Blocking diode BY 251
1	H1	Indicator lamp, generator
1	M1	Starter motor (starter)
1	Y1	Engine shut-off
1	M2	Fuel pump
3		***Pre-heater system***
3	R	Glow plugs
1	K10	Pre-heating time relay
1	H3	Indicator lamp, pre-heating monitor

Section Qty.	Desig-nation	Device
5		***Cab light***
1	F2	Fuse
1	S25	Switch, cab light
1	E21	Cab light
1	F1	Fuse
1	X1	Socket
6		***Indicating units***
1	F7	Fuse
1	P3	Operating hour meter
1	H4	Indicator lamp, air filter clogging
1	B4	Switch, air filter clogging
1	H5	Indicator lamp, engine oil pressure
1	B5	Engine oil pressure switch
1	H6	Indicator lamp, coolant temperature
1	B2	Temperature switch, coolant
1	H10	Acoustic buzzer
	V 3-5	Diode - plug

SCHAEFF	Typ/Model/Type **HR 12 (from serial no. 355/4975 - 355/5586)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.74.02**

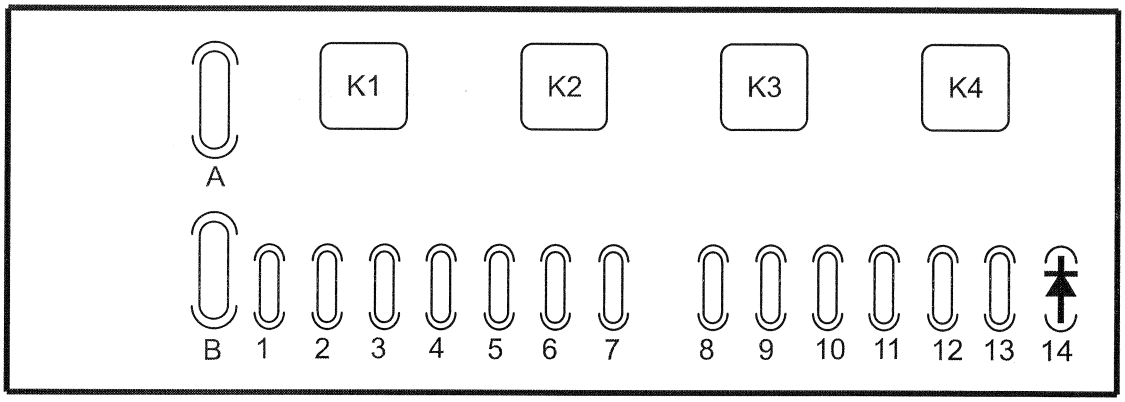
7. Horn	8. Heater fan	9. Wash/ wipe system	10. Work floodlights



Section Qty.	Desig-nation	Device
7		***Signal horn***
1	F5	Fuse
1	B10	Signal horn
1	S15	Horn button
8		***Heater fan***
1	F4	Fuse
1	S4	Switch, heater fan
1	M3	Heater fan motor

Section Qty.	Desig-nation	Device
9		***Wash/ wipe system***
1	F6	Fuse
1	S9	Switch, wash/ wipe system
1	M4	Wiper motor
1	M5	Washer pump
10		***Work floodlights***
1	F3	Fuse
1	S13	Switch, work floodlights
1	E34	Work floodlights

Fuse and relay box - Assignment diagram



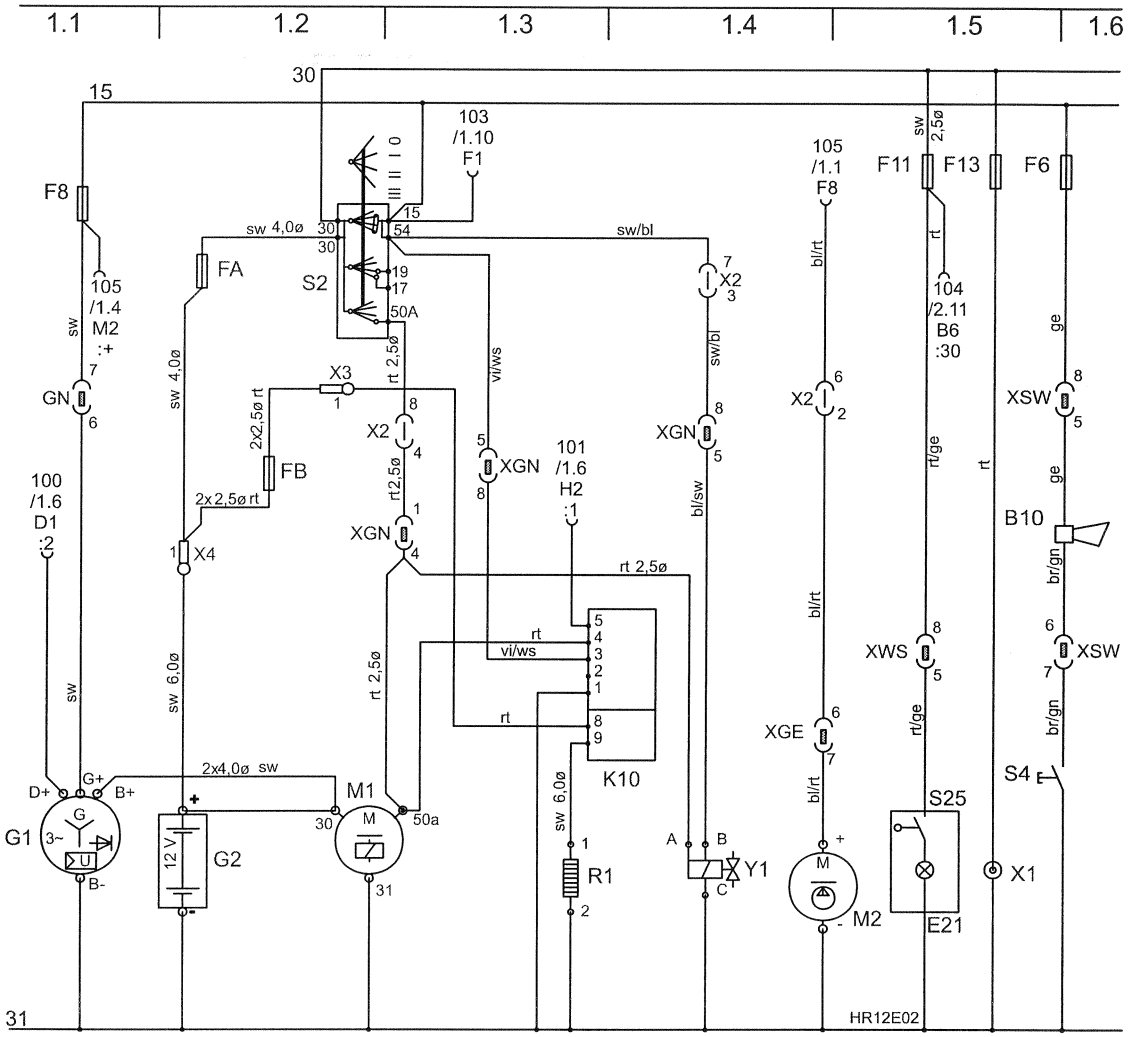
HR12E01

Item	Fuse	Assigned to
FA	30 A	Main fuse
FB	60 A	Fuse for pre-heater system
F1	15A	Windscreen wiper
F2	10A	Instruments, indicator lamps
F3	10A	Working floodlights, front
F4	10A	Working floodlights, rear
F5	10A	Travel, fast/ slow
F6	10A	Horn
F7	15A	Heater fan
F8	10A	Fuel pump / generator
F9	10A	Radio
F10		Option
F11	10A	Cab light, radio
F12	10A	Rotating beacon
F13	20A	Socket
F14	Diode 3A	Diode for generator

Cable and plug colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

1 Power supply	2 Start-up & pre-heat system	3 Engine shut-off, fuel pump	4 Internal light, socket, horn

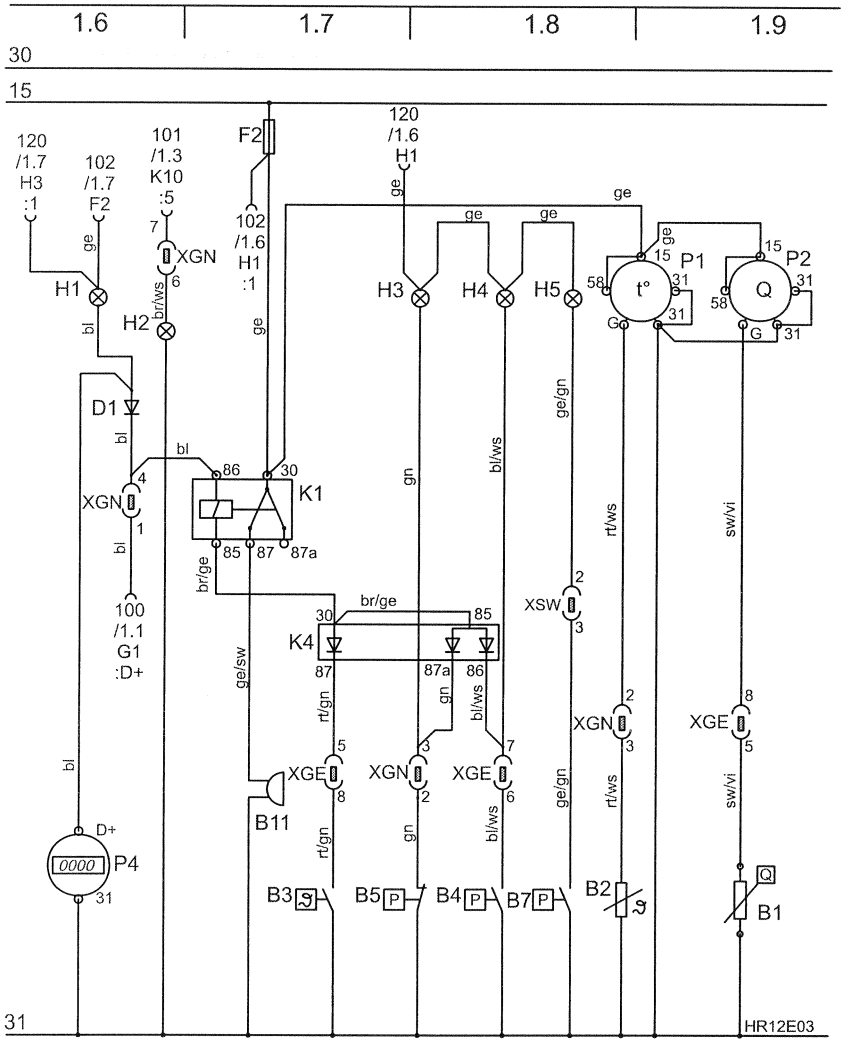


Section Qty.	Desig-nation	Device
1		***Power supply***
1.1	G1	Generator
1.2	G2	Battery
1.1	N2	Fuel pump, generator
2		***Start-up, pre-heat system***
1.2	S2	Pre-heat/ starter switch
1.2	FA	Main fuse
1.2	FB	Fuse, pre-heat system
1.3	K10	Pre-heating time control unit
1.3	R1	Glow plugs
1.2	M1	Starter

Section Qty.	Desig-nation	Device
3		***Engine shut-off, fuel pump***
1.4	Y1	Engine shut-off
1.4	M2	Fuel pump
4		***Internal light, socket, horn***
1.5	F11	Internal light, radio
1.5	E21, S25	Internal light
1.5	F13	Fuse, socket
1.5	X1	Socket
1.6	S4	Horn button
1.6	B10	Horn

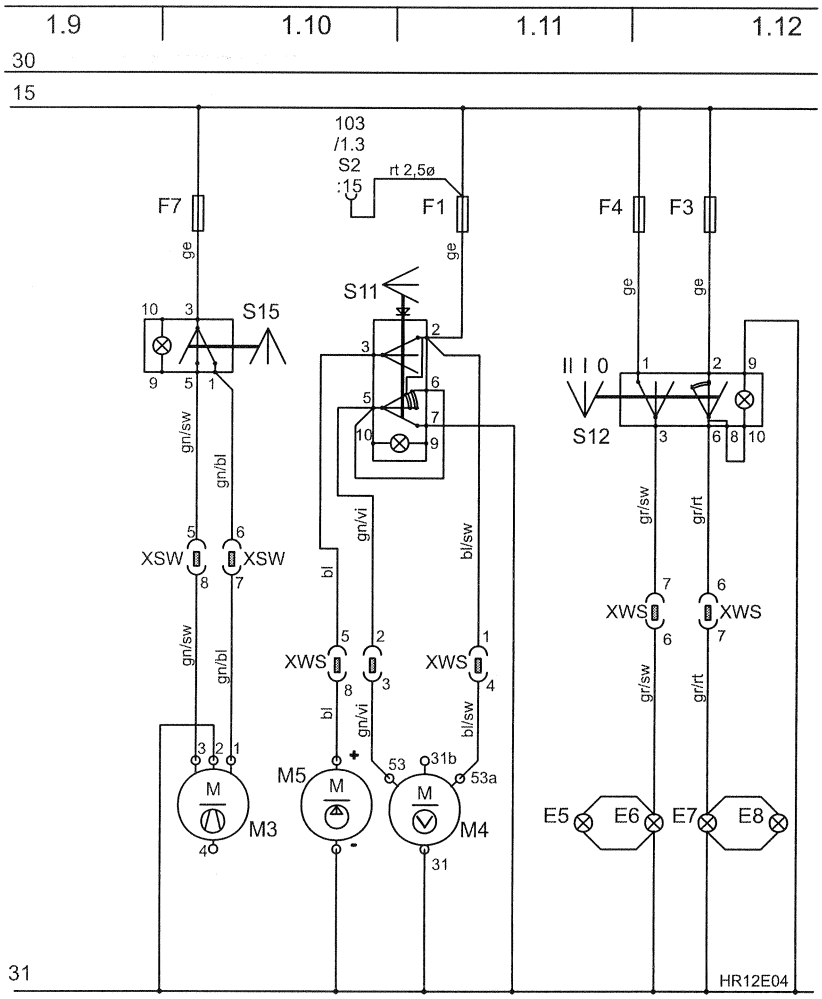
SCHAEFF	Typ/Model/Type **HR 12 (from serial no. 355/5587)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.74.04**

5 Instruments, warning device



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
5		***Instruments, Warning device***			
1.6	H1	Battery charge indicator	1.8	H4	Air filter indicator
1.6	D1	Diode for generator	1.8	B4	Air filter maintenance switch
1.6	P4	Operating hour meter	1.8	H5	Hydraulic oil filter clogging indicator
1.7	F2	Instruments, indicator lamps	1.8	B7	Hydraulic oil filter clogging
1.6	H2	Pre-heating monitor	1.8	K4	Diode block
1.7	K1	Warning buzzer cut-off	1.8	P1	Temperature indicator
1.7	B11	Warning buzzer	1.8	B2	Temperature sensor
1.7	B3	Temperature warning contact	1.9	P2	Fuel gauge
1.8	H3	Oil pressure indicator	1.8	B1	Tank sensor
1.8	B5	Oil pressure switch			

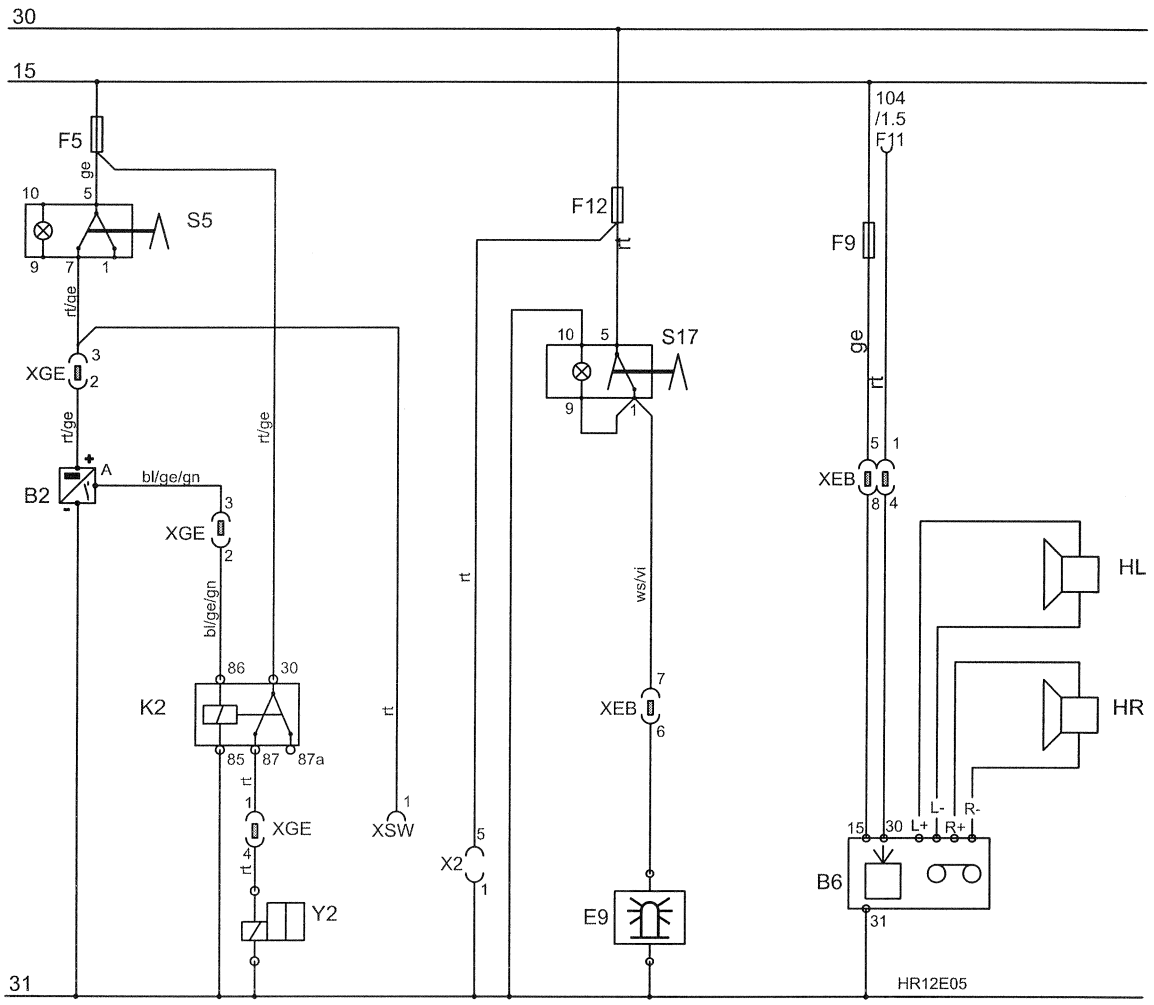
6 Heater fan, wash/ wipe system	7 Working floodlights



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
6		***Heater fan, wash/ wipe system***	***7***		***Working floodlights***
1.10	S15	Fan switch	1.11	S12	Switch for working floodlights
1.10	M3	Heater fan	1.11	E5	Working floodlight, rear
1.10	S11	Wash/ wipe switch	1.11	E6	Working floodlight, rear
1.10	M5	Washer pump	1.12	E7	Working floodlight, front
1.11	M4	Wiper motor	1.12	E8	Working floodlight, front

8 Travel, fast/ slow	9 Rotating beacon	10 Radio installation

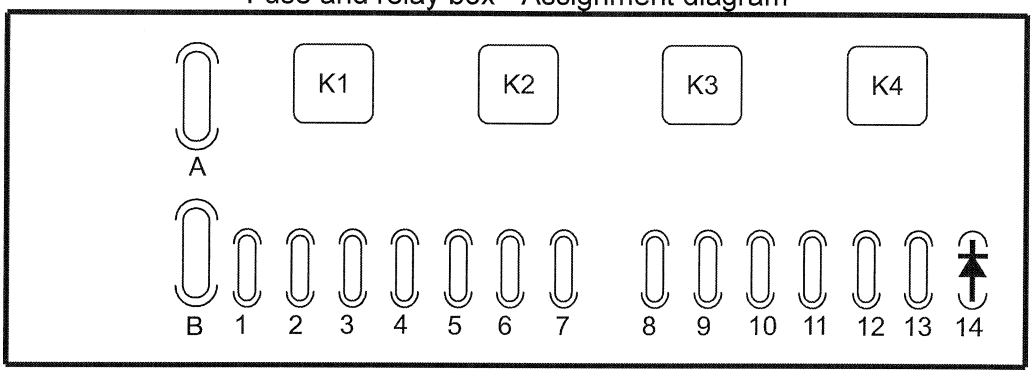
2.1	2.2	2.5	2.6	2.11	2.12



Section Qty.	Desig-nation	Device
8		***Travel, fast/ slow***
2.1	F5	Travel, fast/ slow
2.1	B2	Proximity switch for hand lever
2.1	S5	Selection switch, fast/ slow
2.2	K2	Relay, fast/ slow
2.2	Y2	Valve, fast/ slow
9		***Rotating beacon***
2.5	F12	Rotating beacon
2.5	S17	Switch for rotating beacon
2.6	E9	Rotating beacon

Section Qty.	Desig-nation	Device
10		***Radio installation***
2.11	F9	Radio Cl. 15
2.11	B6	Radio
2.12	HL	Loudspeaker, left
2.12	HR	Loudspeaker, right

Fuse and relay box - Assignment diagram



HR12E01

Item	Fuse	Assigned to
FA	30 A	Main fuse
FB	60 A	Fuse for pre-heater system
F1	15A	Windshield wiper
F2	10A	Instruments, indicator lamps
F3	10A	Working floodlight, front
F4	10A	Working floodlight, rear (option)
F5	10A	Tracking fast/slow
F6	10A	Horn
F7	15A	Heater fan
F8	10A	Fuel pump/ generator
F9	10A	Radio (option)
F10	--	not assigned
F11	10A	Interior light, radio
F12	10A	Rotating beacon (option)
F13	20A	Socket
F14 (D1)	Diode 3A	Generator blocking diode

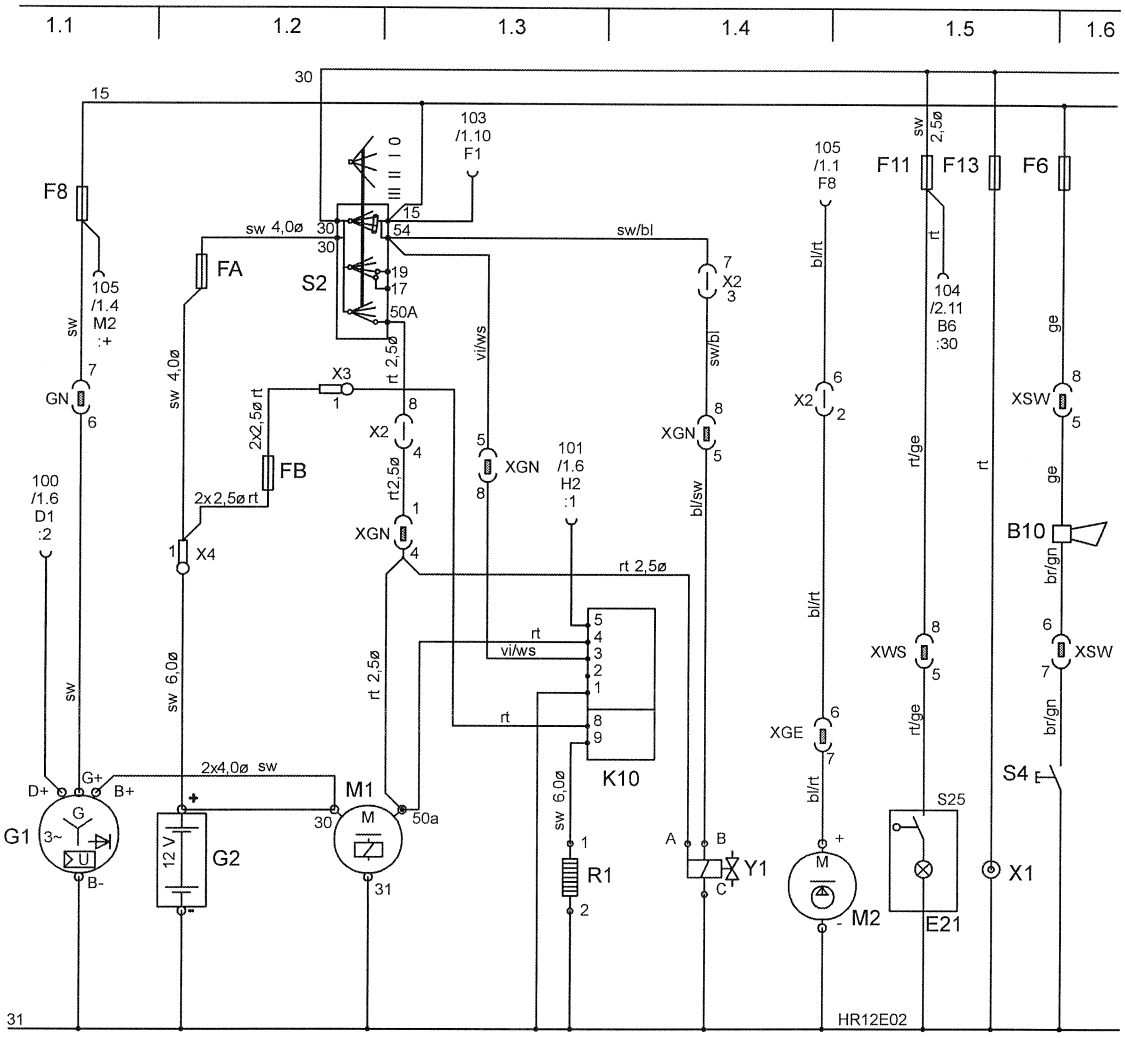
K1	Buzzer cut-off	K2	Tracking fast/slow
K3	not assigned	K4	Diode block
K10	Pre-heating relay — rear right-hand side, engine compartment dividing wall		

Cable and plug colors

bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Notizen	Notes	Notices	Appunti	Apuntes

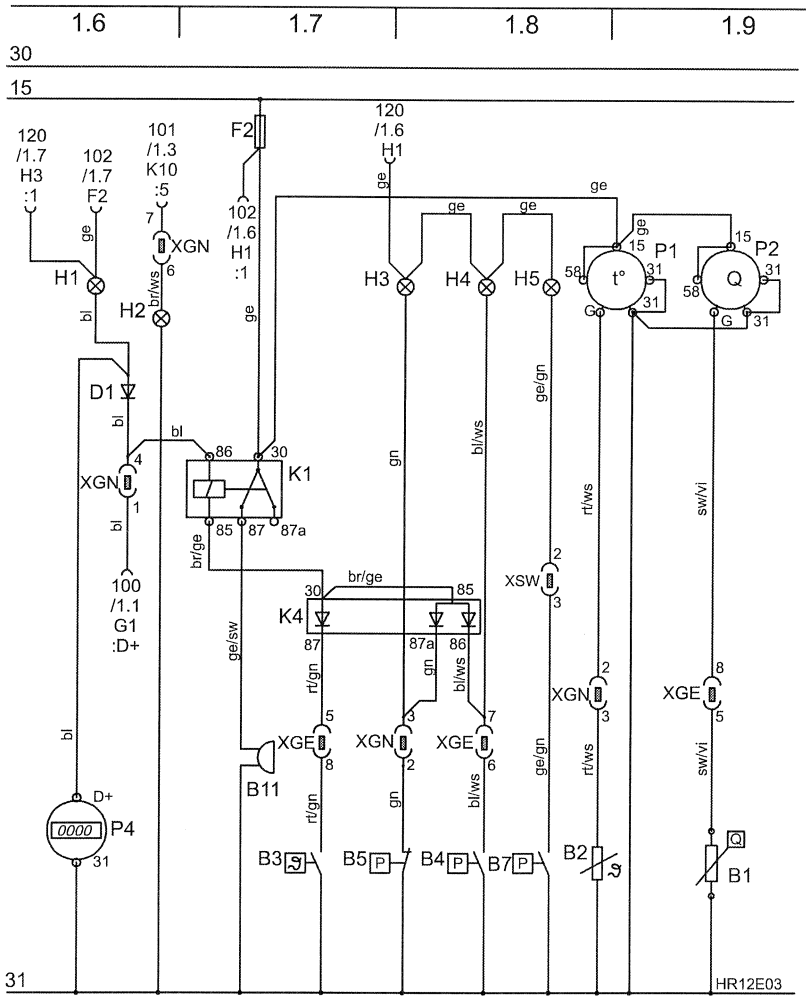
Power supply	Pre-heat / start-up system	Engine shut-off, fuel pump	Interior light, socket, horn



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
		Power supply			***Engine shut-off, fuel pump***
1.1	F8	Fuse	1.4	Y1	Engine shut-off valve
1.1	G1	Generator	1.4	M2	Fuel pump
1.2	G2	Battery			
					Interior light, socket, horn
		Pre-heat / start-up system	1.5	F11	Interior light, radio
1.2	S2	Pre-heat/ starter switch	1.5	E21	Interior light
1.2	M1	Starter	1.5	S25	Interior light
1.2	FA	Main fuse	1.5	F13	Socket fuse
1.2	FB	Fuse, pre-heat system	1.5	X1	Socket
1.3	K10	Pre-heating relay	1.6	F6	Fuse
1.3	R1	Glow plugs	1.6	S4	Horn button
			1.6	B10	Horn

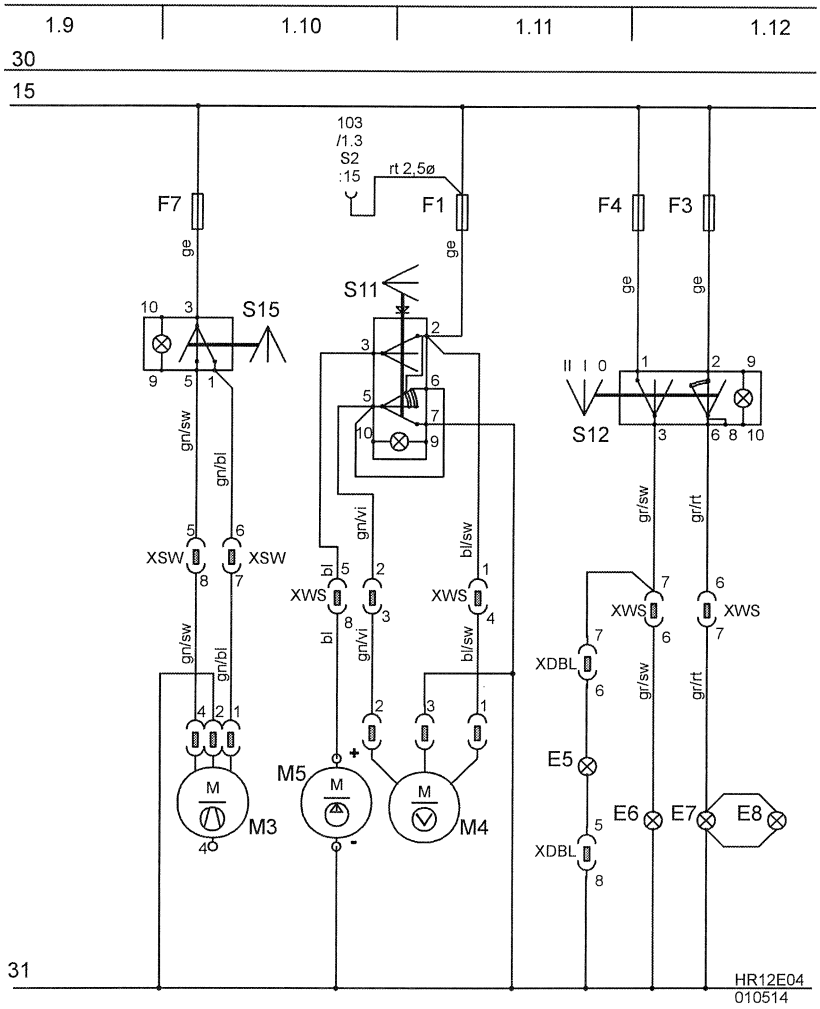
SCHAEFF	Typ/Model/Type **HR 13 (from serial no. 1300/0100)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.75.02**

Instruments, warning devices



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
		Instruments, warning devices			
1.6	H1	Battery charge indicator	1.8	B5	Oil pressure switch
1.6	D1	Generator blocking diode	1.8	H4	Air filter monitor
1.6	P4	Operating hour meter	1.8	B4	Air filter maintenance switch
1.6	H2	Pre-heating monitor	1.8	H5	Hydraulic oil filter clogging monitor
1.7	F2	Instruments, indicator lamps	1.8	B7	Hydraulic oil filter clogging
1.7	K1	Warning buzzer cut-off relay	1.8	P1	Temperature indicator
1.7	B11	Warning buzzer	1.8	B2	Temperature sensor
1.7	K4	Diode block relay	1.9	P2	Fuel gauge
1.7	B3	Temperature warning contact	1.9	B1	Tank sensor
1.8	H3	Oil pressure monitor			

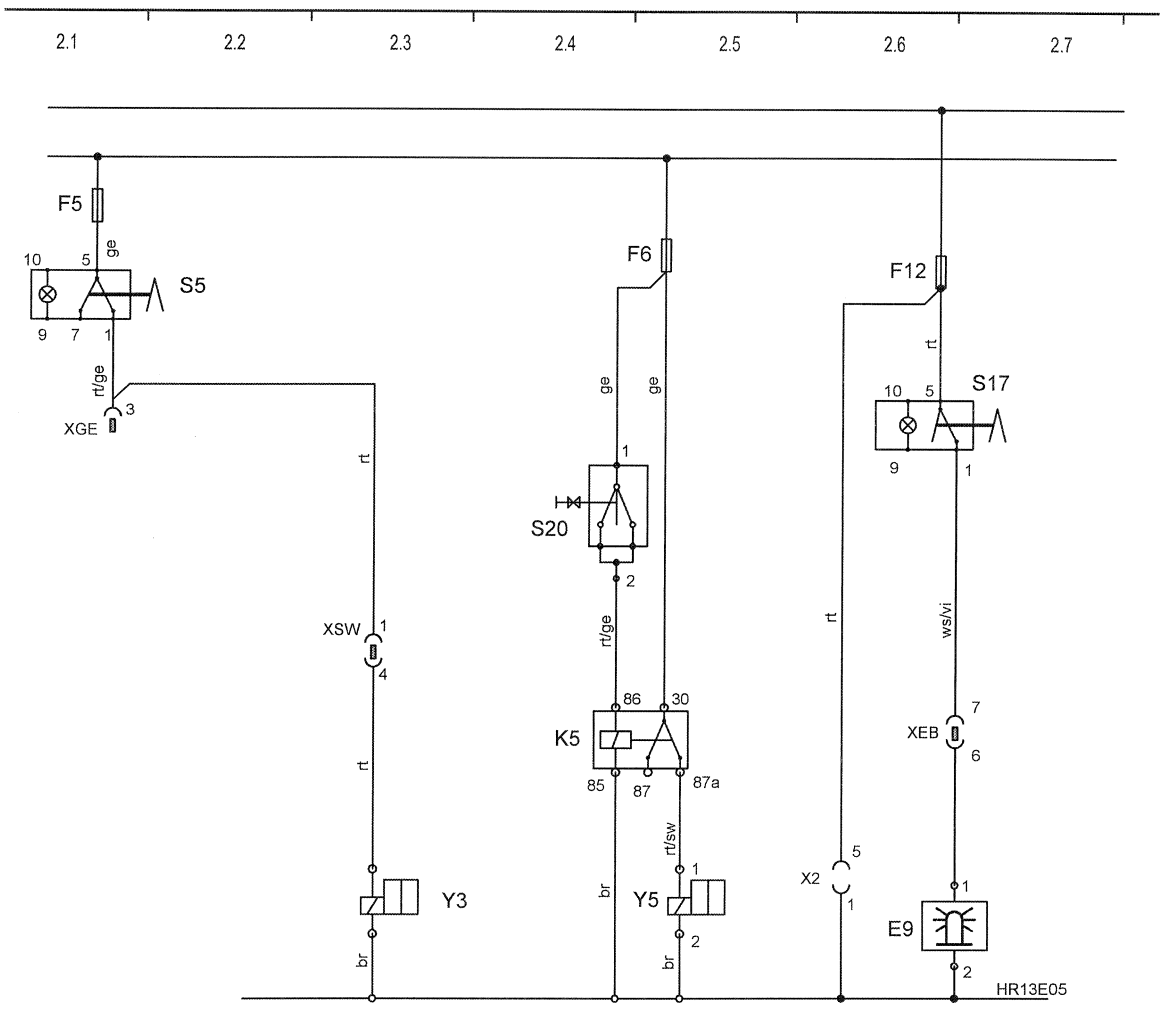
Heater fan, wash/ wipe system	Working floodlights



Section Qty.	Desig-nation	Device
		Heater fan, wash/ wipe system
1.9	F7	Fuse
1.10	S15	Fan switch
1.10	M3	Heater fan
1.11	F1	Fuse
1.10	S11	Wash/ wipe switch
1.10	M5	Washer pump
1.11	M4	Wiper motor

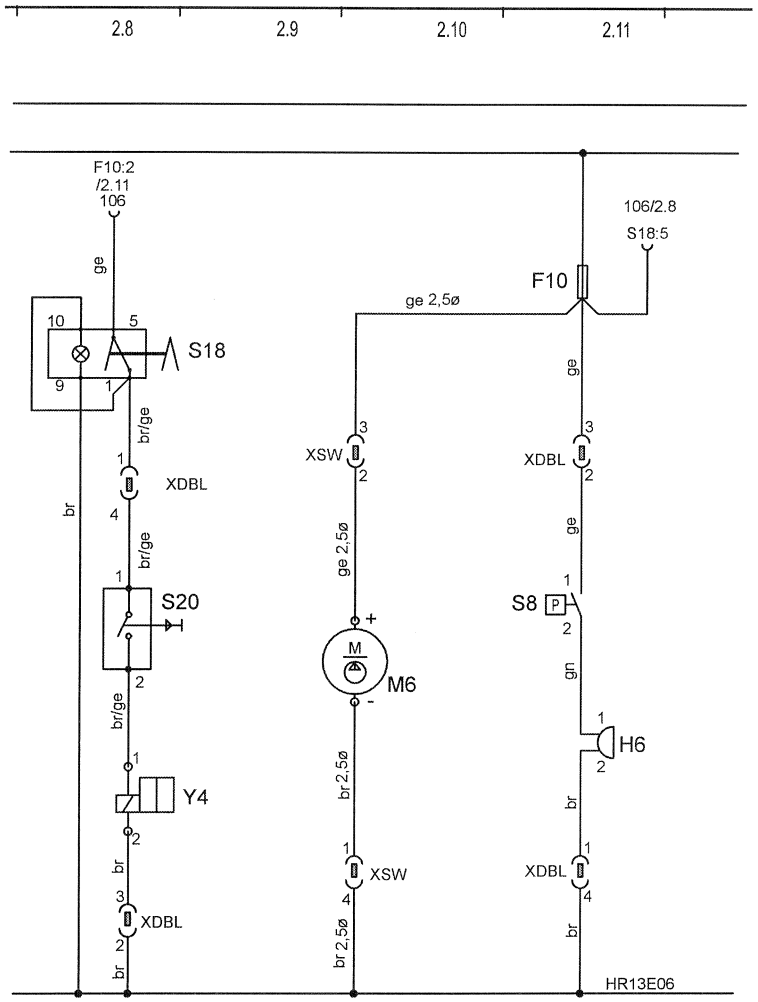
Section Qty.	Desig-nation	Device
		Working floodlights
1.11	F4	Fuse
1.12	F3	Fuse
1.11	S12	Switch for working floodlights
1.11	E5	Working floodlight, rear
1.11	E6	Working floodlight, rear
1.12	E7	Working floodlight, front
1.12	E8	Working floodlight, front

Tracking, fast/ slow	Swing brake	Rotating beacon



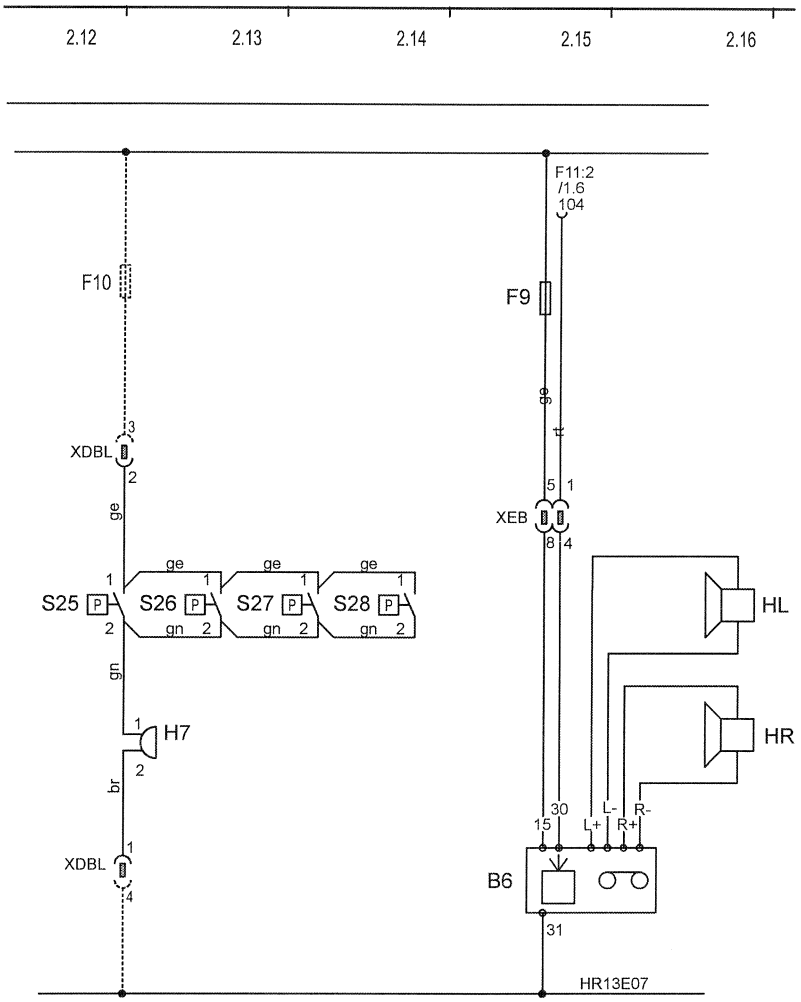
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
		Travel, fast/ slow			***Rotating beacon***
2.1	F5	Fuse	2.6	F12	Fuse
2.1	S5	Selection switch, fast/ slow	2.6	S17	Switch for rotating beacon
2.2	Y3	Valve, fast/ slow	2.6	E9	Rotating beacon
		Swing brake			
2.4	F6	Fuse			
2.4	S20	Button, control lever, left			
2.4	K5	Swing brake relay			
2.4	Y5	Swing brake valve			

Rock breaker control	Refueling pump	Back-up alarm



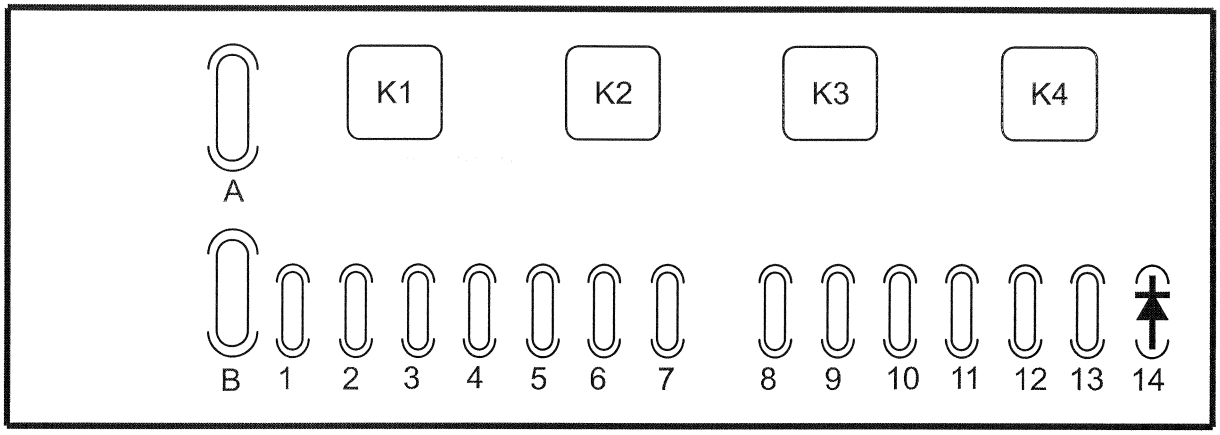
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
		Rock breaker control			***Back-up alarm***
2.8	S18	Rock breaker switch	2.11	F10	Fuse
2.8	S20	Coordinate lever	2.11	S8	Pressure switch
2.8	Y4	Rock breaker valve	2.11	H6	Warning buzzer
		Refueling pump			
2.10	M6	Refueling pump			

Travel motion alarm	Radio installation



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
		Travel motion alarm			***Radio installation***
2.13	S25	Pressure switch	2.15	F9	Fuse
2.13	S26	Pressure switch	2.15	B6	Radio
2.14	S27	Pressure switch	2.16	HL	Loudspeaker, left
2.14	S28	Pressure switch	2.16	HR	Loudspeaker, right
2.14	H7	Buzzer			

Fuse and relay box - Assignment diagram



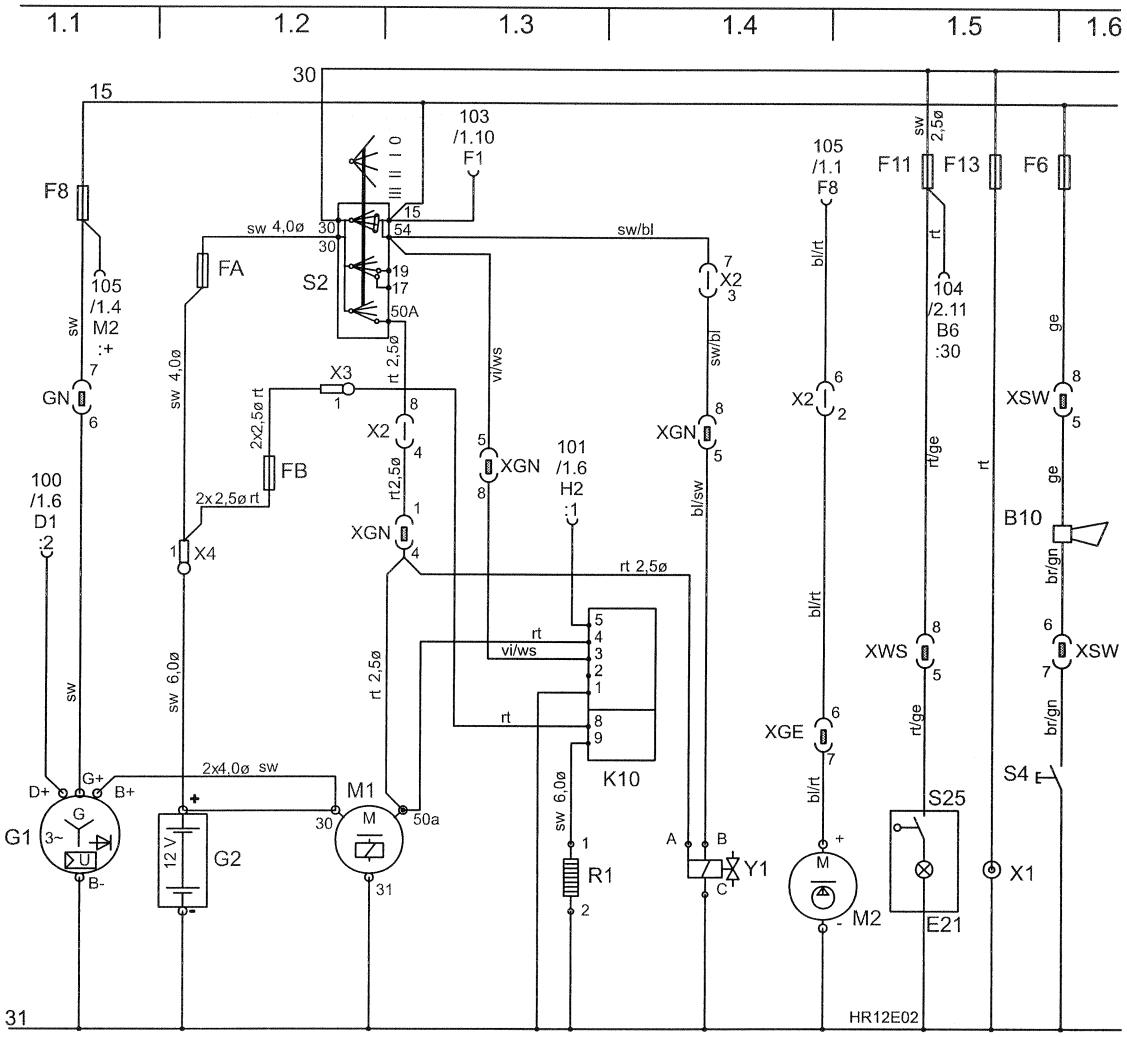
HR12E01

Item	Fuse	Assigned to
FA	30 A	Main fuse
FB	60 A	Fuse for pre-heater system
F1	15A	Windscreen wiper
F2	10A	Instruments, indicator lamps
F3	10A	Working floodlights, front
F4	10A	Working floodlights, rear
F5	10A	Travel, fast/ slow
F6	10A	Horn
F7	15A	Heater fan
F8	10A	Fuel pump/ generator
F9	10A	Radio
F10		Option
F11	10A	Internal light, radio
F12	10A	Rotating beacon
F13	20A	Socket
F14	Diode 3A	Blocking diode for generator

Cable and plug colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

1 Power supply	2 Start-up & pre-heat system	3 Engine shut-off, fuel pump	4 Internal light, socket, horn

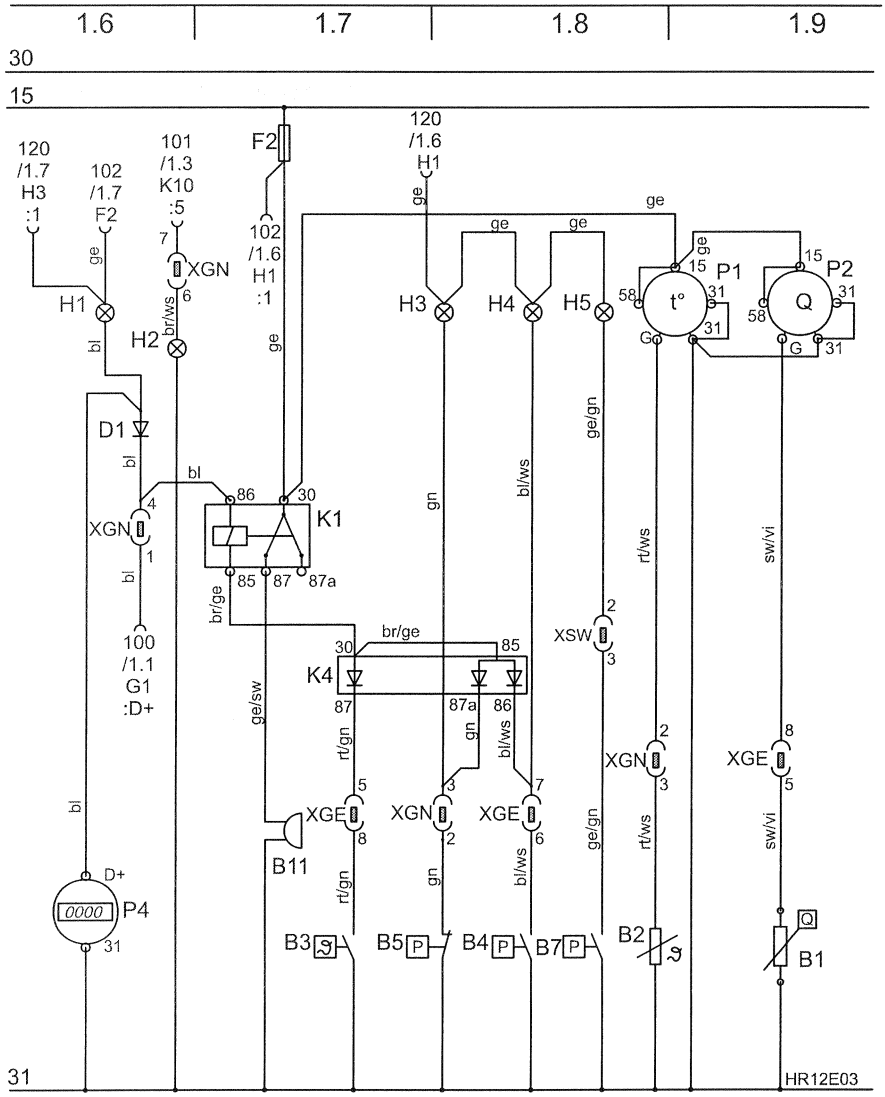


Section Qty.	Desig-nation	Device
1		***Power supply***
1.1	G1	Generator
1.2	G2	Battery
1.1	N2	Fuel pump, generator
2		***Start-up, pre-heat system***
1.2	S2	Pre-heat/ starter switch
1.2	FA	Main fuse
1.2	FB	Fuse, pre-heat system
1.3	K10	Pre-heating time control unit
1.3	R1	Glow plugs
1.2	M1	Starter

Section Qty.	Desig-nation	Device
3		***Engine shut-off, fuel pump***
1.4	Y1	Engine shut-off
1.4	M2	Fuel pump
4		***Internal light, socket, horn***
1.5	F11	Internal light, radio
1.5	E21, S25	Internal light
1.5	F13	Fuse, socket
1.5	X1	Socket
1.6	S4	Horn button
1.6	B10	Horn

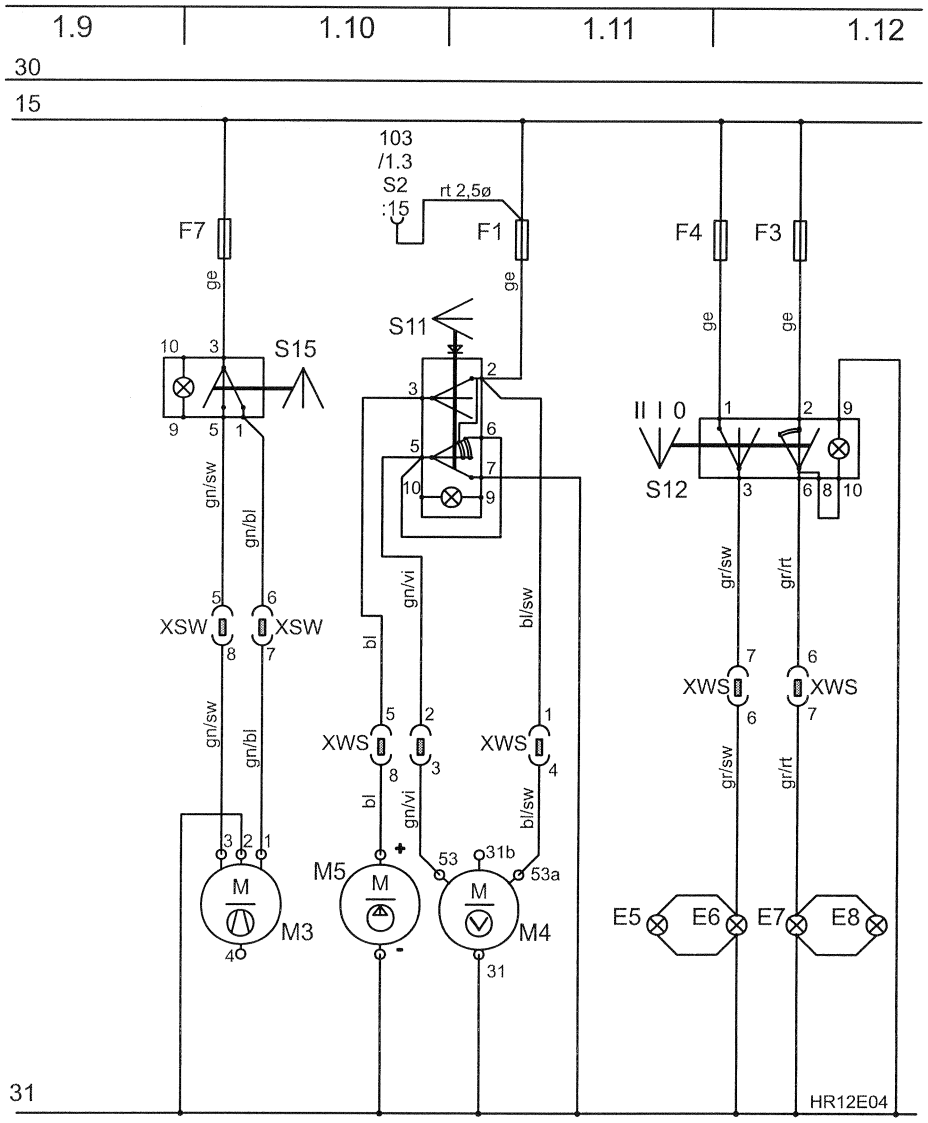
SCHAEFF	Typ/Model/Type **HR 14 (from serial no. 356/1431)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.76.02**

5 Instruments, warning device



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
5		***Instruments, warning device***			
1.6	H1	Battery charge indicator	1.8	H4	Air filter indicator
1.6	D1	Diode for generator	1.8	B4	Air filter maintenance switch
1.6	P4	Operating hour meter	1.8	H5	Hydraulic oil filter clogging indicator
1.7	F2	Instruments, indicator lamps	1.8	B7	Hydraulic oil filter clogging
1.6	H2	Pre-heating monitor	1.8	K4	Diode block
1.7	K1	Warning buzzer cut-off	1.8	P1	Temperature indicator
1.7	B11	Warning buzzer	1.8	B2	Temperature sensor
1.7	B3	Temperature warning contact	1.9	P2	Fuel gauge
1.8	H3	Oil pressure indicator	1.8	B1	Tank sensor
1.8	B5	Oil pressure switch			

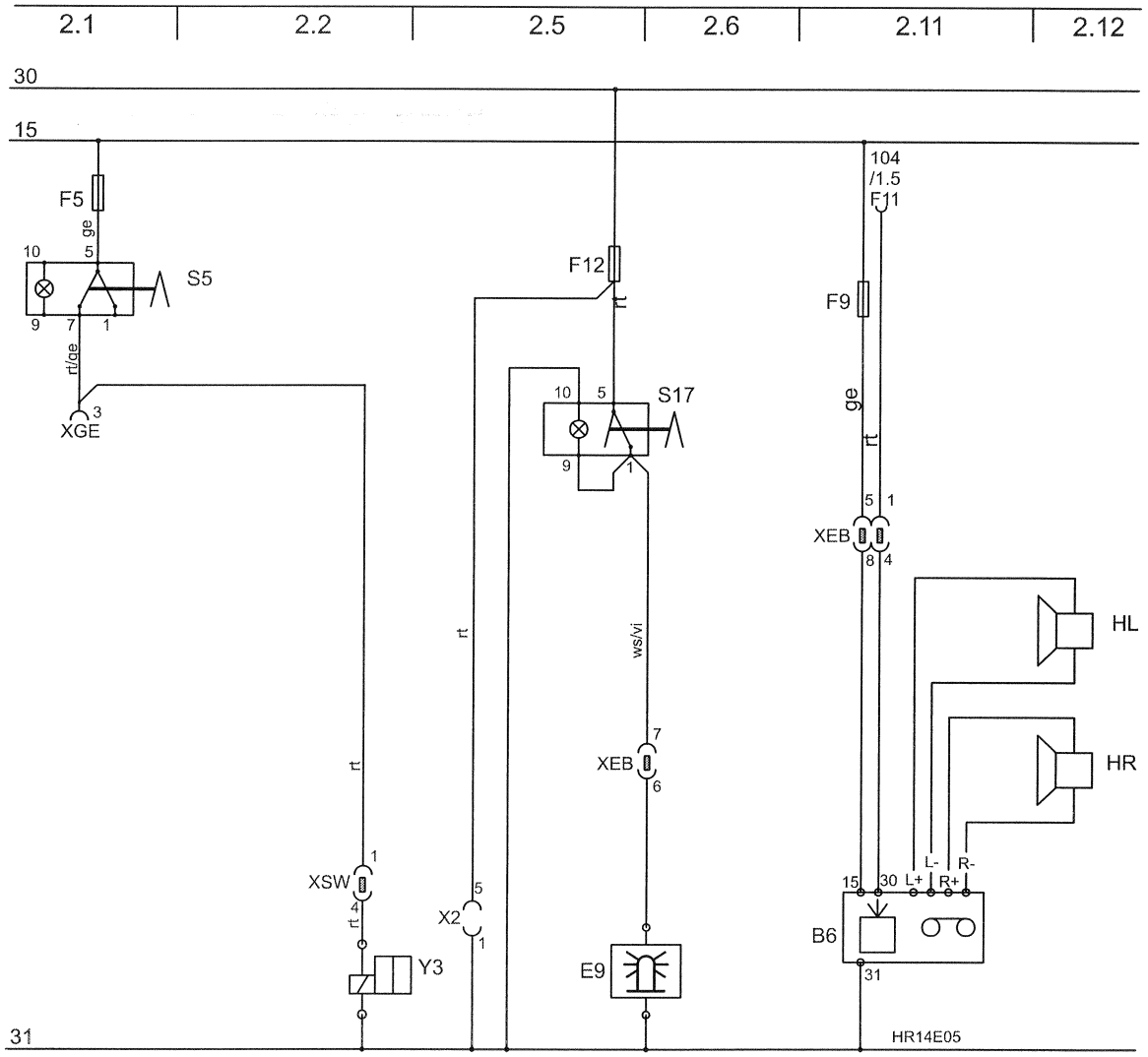
6 Heater fan, wash/ wipe system	7 Working floodlights



Section Qty.	Desig-nation	Device
6		***Heater fan, wash/ wipe system***
1.10	S15	Fan switch
1.10	M3	Heater fan
1.10	S11	Wash/ wipe switch
1.10	M5	Washer pump
1.11	M4	Wiper pump

Section Qty.	Desig-nation	Device
7		***Working floodlights***
1.11	S12	Switch for working floodlights
1.11	E5	Working floodlight, rear
1.11	E6	Working floodlight, rear
1.12	E7	Working floodlight, front
1.12	E8	Working floodlight, front

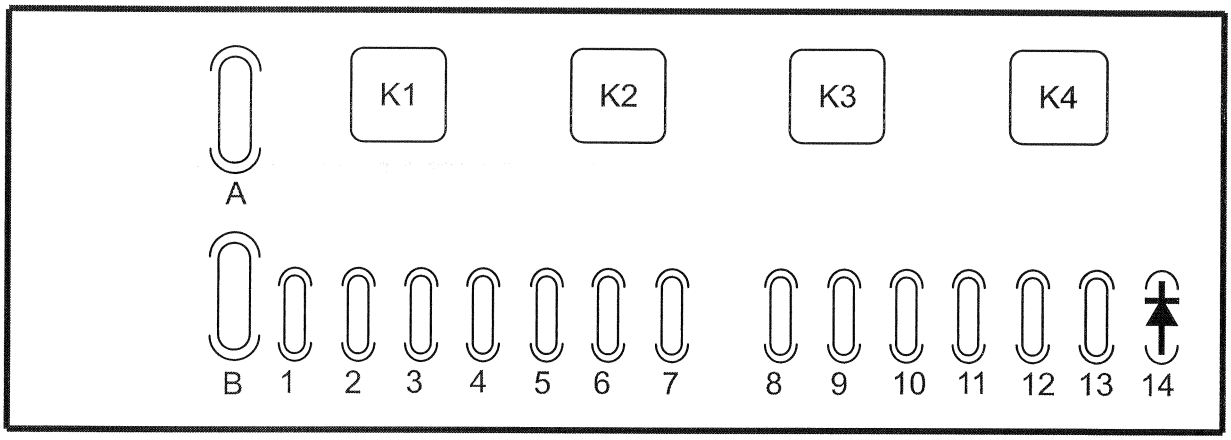
8 Travel, fast/ slow	9 Rotating beacon	10 Radio installation



Section Qty.	Desig-nation	Device
8		***Travel, fast/ slow***
2.1	F5	Travel, fast/ slow
2.1	S5	Selection switch, fast/ slow
2.2	Y3	Valve, fast/ slow
9		***Rotating beacon***
2.5	F12	Rotating beacon
2.5	S17	Switch for rotating beacon
2.6	H9	Rotating beacon

Section Qty.	Desig-nation	Device
10		***Radio installation***
2.11	F9	Radio Cl. 15
2.11	B6	Radio
2.12	HL	Loudspeaker, left
2.12	HR	Loudspeaker, right

Fuse and relay box - Assignment diagram



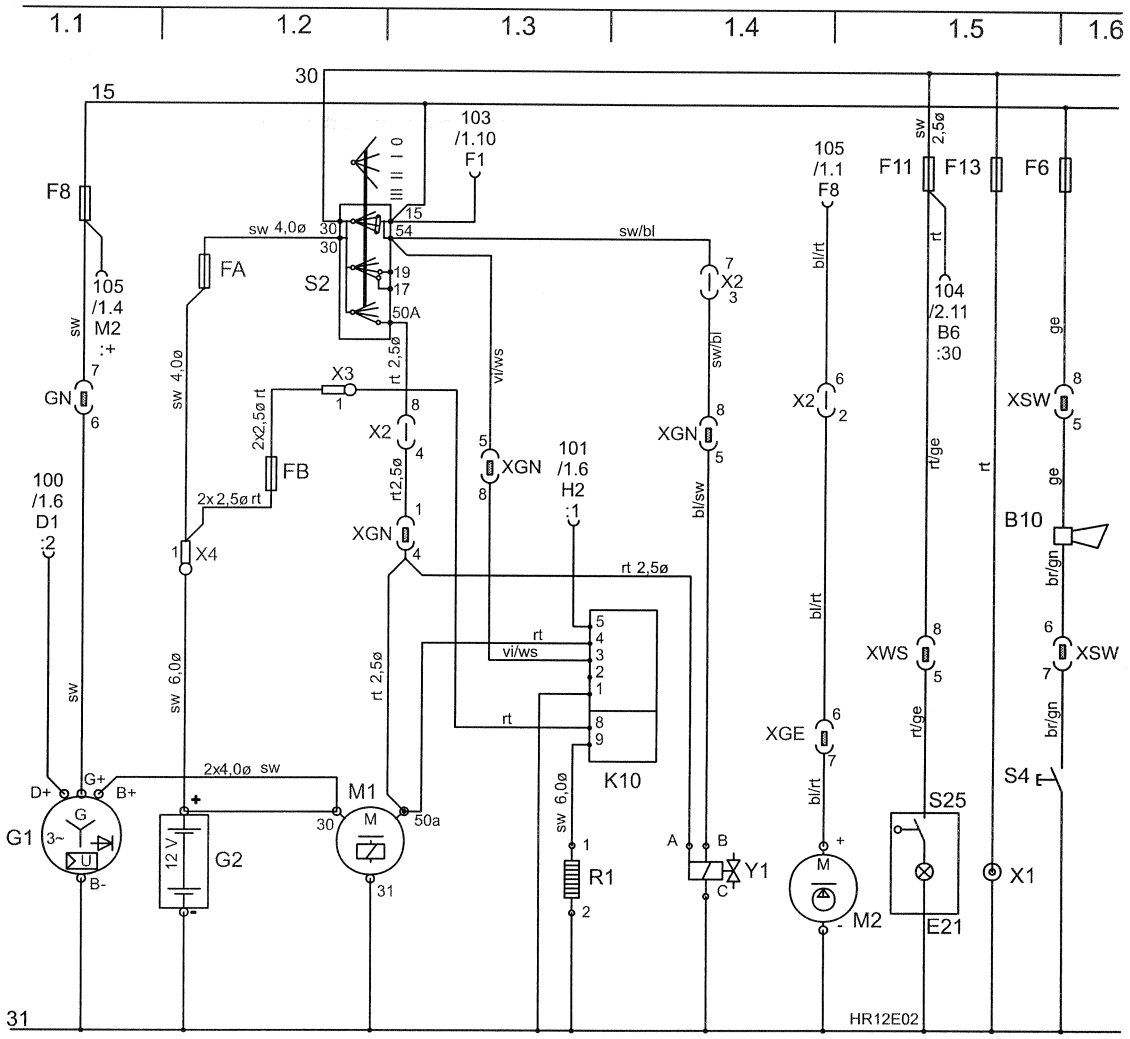
HR12E01

Item	Fuse	Assigned to
FA	30 A	Main fuse
FB	60 A	Fuse for pre-heater system
F1	15A	Windscreen wiper
F2	10A	Instruments, indicator lamps
F3	10A	Working floodlights, front
F4	10A	Working floodlights, rear
F5	10A	Travel, fast/ slow
F6	10A	Horn
F7	15A	Heater fan
F8	10A	Fuel pump/ generator
F9	10A	Radio
F10		Option
F11	10A	Internal light, radio
F12	10A	Rotating beacon
F13	20A	Socket
F14	Diode 3A	Blocking diode for generator

Cable and plug colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

1 Power supply	2 Start-up & pre-heat system	3 Engine shut-off, fuel pump	4 Internal light, socket, horn

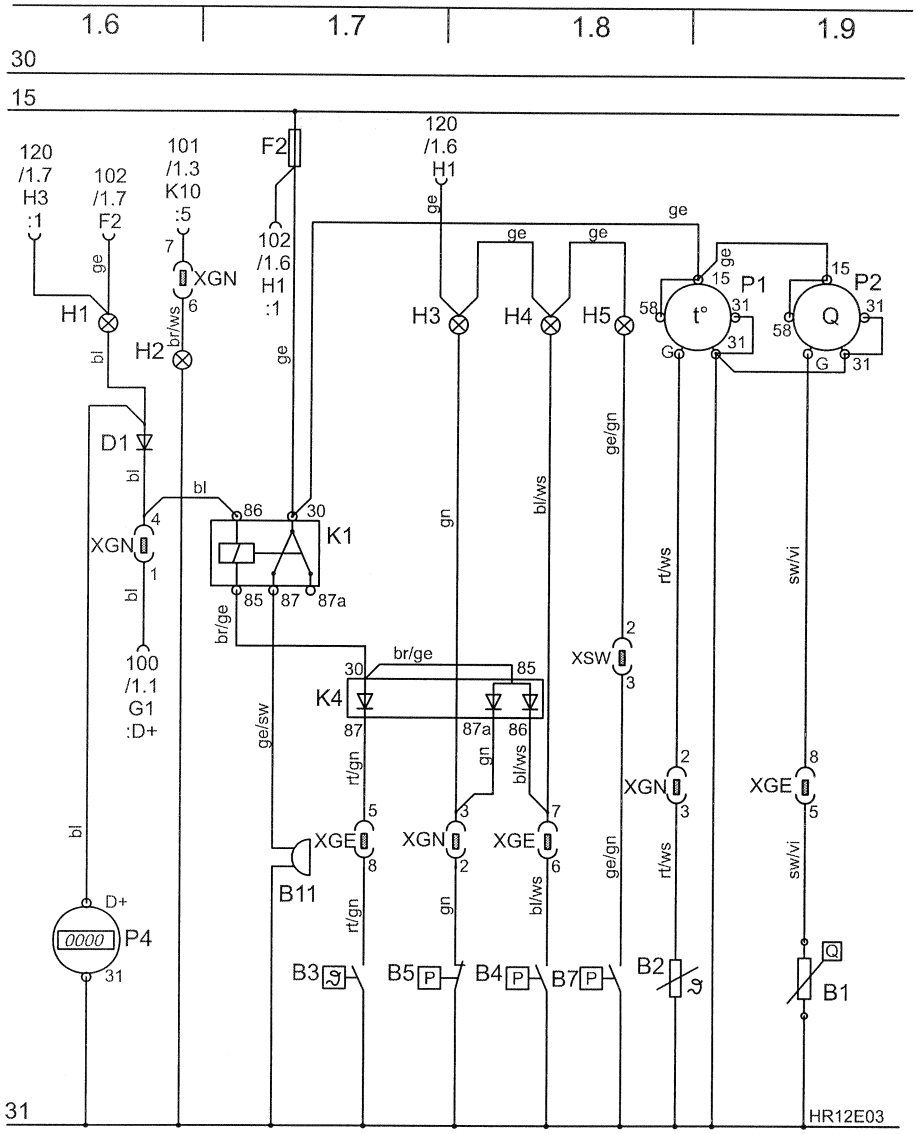


Section Qty.	Desig-nation	Device
1		***Power supply***
1.1	G1	Generator
1.2	G2	Battery
1.1	N2	Fuel pump. generator
2		***Start-up, pre-heat system***
1.2	S2	Pre-heat/ starter switch
1.2	FA	Main fuse
1.2	FB	Fuse, pre-heat system
1.3	K10	Pre-heating time control unit
1.3	R1	Glow plugs
1.2	M1	Starter

Section Qty.	Desig-nation	Device
3		***Engine shut-off, fuel pump***
1.4	Y1	Engine shut-off
1.4	M2	Fuel pump
4		***Internal light, socket, horn***
1.5	F11	Internal light, radio
1.5	E21. S25	Internal light
1.5	F13	Fuse, socket
1.5	X1	Socket
1.6	S4	Horn button
1.6	B10	Horn

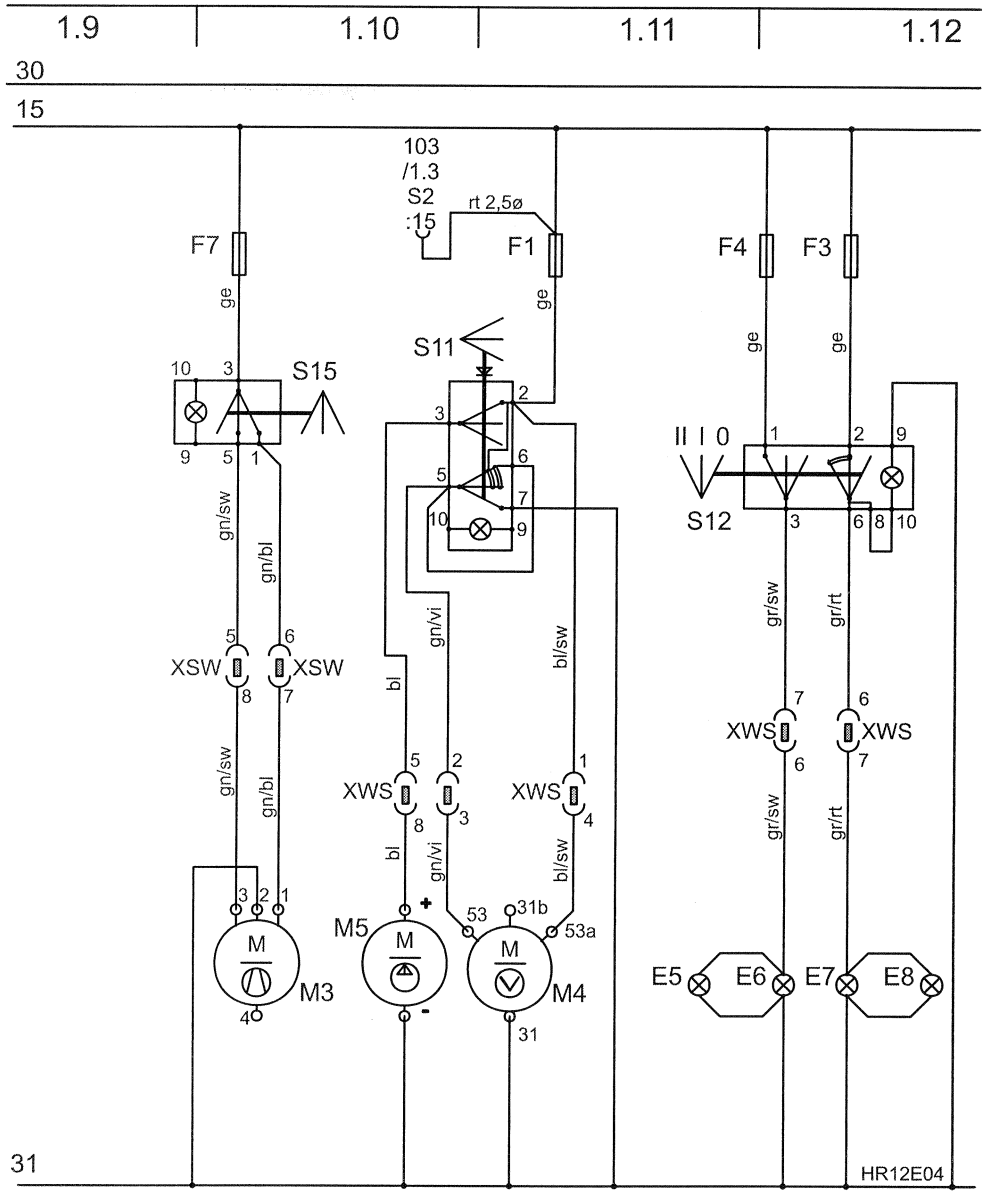
SCHAEFF	Typ/Model/Type **HR 16 (from serial no. 358/1398)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.78.02**

5 Instruments, warning device



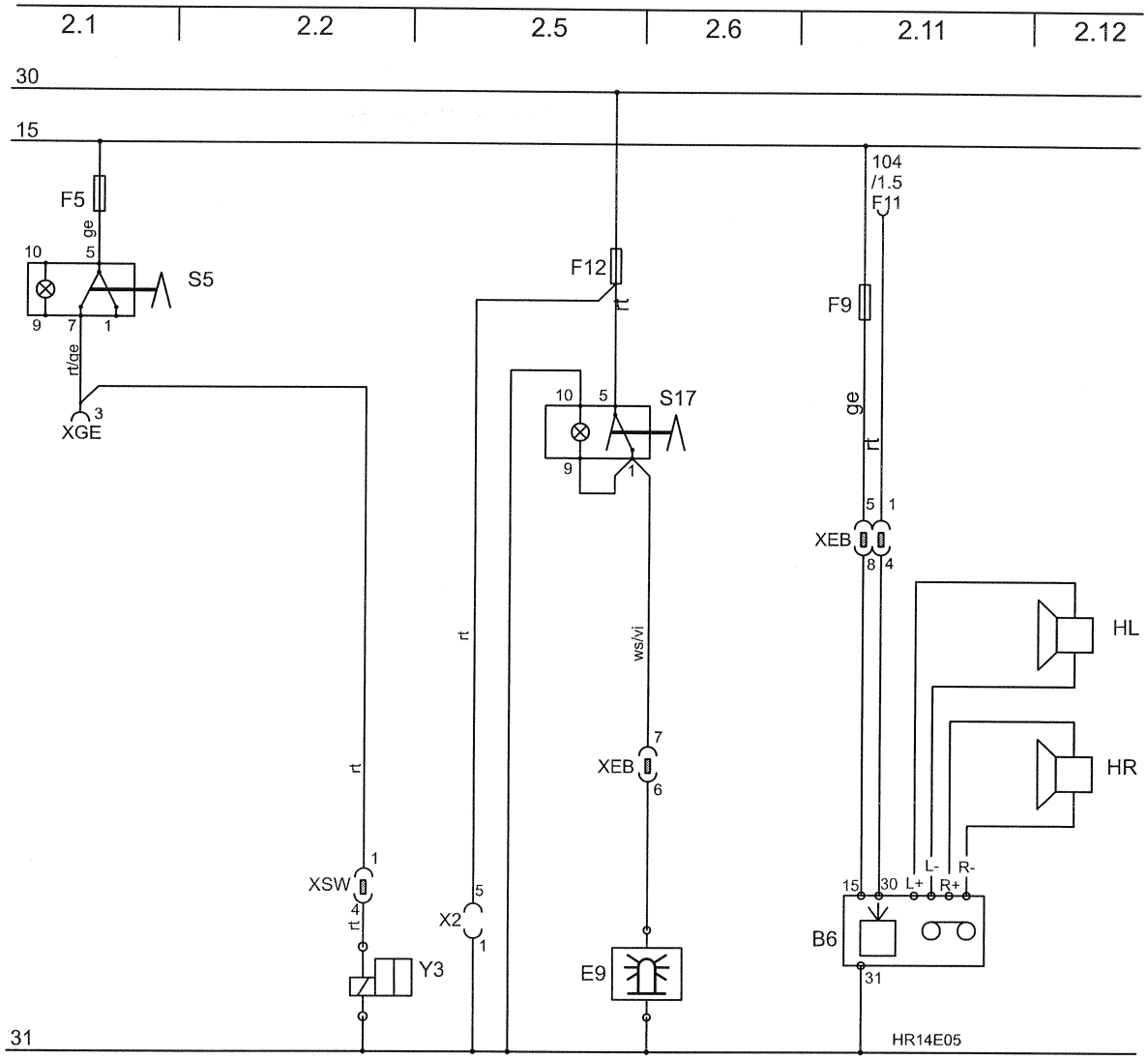
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
5		***Instruments, Warning device***			
1.6	H1	Battery charge indicator	1.8	H4	Air filter indicator
1.6	D1	Blocking diode for generator	1.8	B4	Air filter maintenance switch
1.6	P4	Operating hour meter	1.8	H5	Hydraulic oil filter clogging indicator
1.7	F2	Instruments, indicator lamps	1.8	B7	Hydraulic oil filter clogging
1.6	H2	Pre-heating monitor	1.8	K4	Diode block
1.7	K1	Warning buzzer cut-off	1.8	P1	Temperature indicator
1.7	B11	Warning buzzer	1.8	B2	Temperature sensor
1.7	B3	Temperature warning contact	1.9	P2	Fuel gauge
1.8	H3	Oil pressure indicator	1.8	B1	Tank sensor
1.8	B5	Oil pressure switch			

6 Heater fan, wash/ wipe system	7 Working floodlights



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
6		***Heater fan, wash/ wipe system***	***7***		***Working floodlights***
1.10	S15	Fan switch	1.11	S12	Switch for working floodlights
1.10	M3	Heater fan	1.11	E5	Working floodlight, rear
1.10	S11	Wash/ wipe switch	1.11	E6	Working floodlight, rear
1.10	M5	Washer pump	1.12	E7	Working floodlight, front
1.11	M4	Wiper motor	1.12	E8	Working floodlight, front

8 Travel, fast/ slow	9 Rotating beacon	10 Radio installation

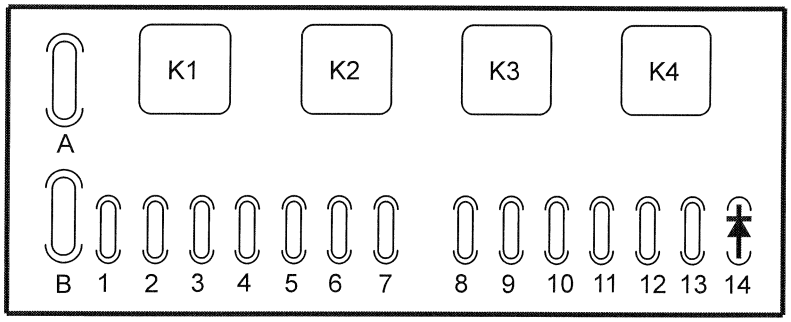


Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
8		***Travel, fast/ slow***	***10***		***Radio installation***
2.1	F5	Travel, fast/ slow	2.11	F9	Radio Cl. 15
2.1	S5	Selection switch, fast/ slow	2.11	B6	Radio
2.2	Y3	Valve, fast/ slow	2.12	HL	Loudspeaker, left
			2.12	HR	Loudspeaker, right
9		***Rotating beacon***			
2.5	F12	Rotating beacon			
2.5	S17	Switch for rotating beacon			
2.6	E9	Rotating beacon			

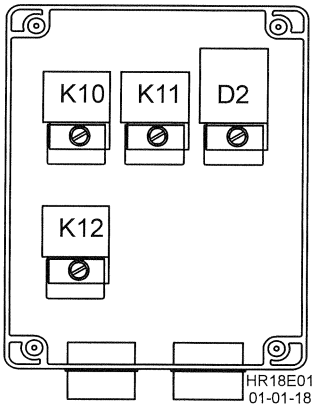
Electrical system

Fuse and relay box - assignment diagram

(1)



(2)



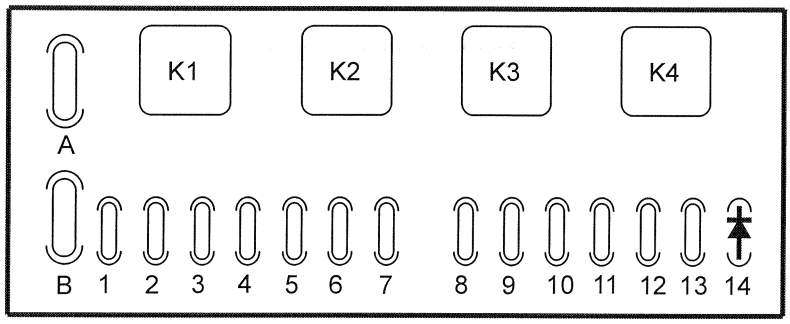
1 = Fuse and relay box.....Dashboard

2 = Relay box .....Upper carriage front left

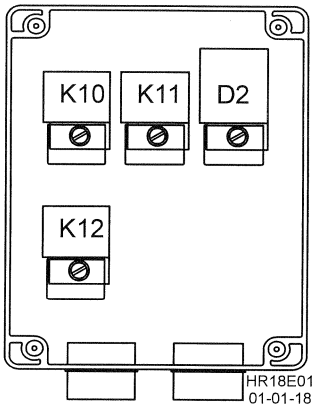
including additional equipment

Item	Ampere	Assigned to
FA	30 A	Main fuse
FB	60 A	Fuse for pre-heater system
F1	15A	Windscreen wiper
F2	10A	Instruments, indicator lamps
F3	10A	Working floodlight, front
F4	10A	Working floodlight, rear, boom-mounted working floodlight
F5	10A	Travel, fast/ slow
F6	10A	Horn
F7	15A	Heater fan
F8	10A	Generator
F9	10A	Radio
F10	10A	Travel alarm
F11	10A	Interior lighting, radio
F12	10A	Rotating beacon, immobilizer
F13	20A	Socket
F14	Diode 3A	Blocking diode for generator

1



2

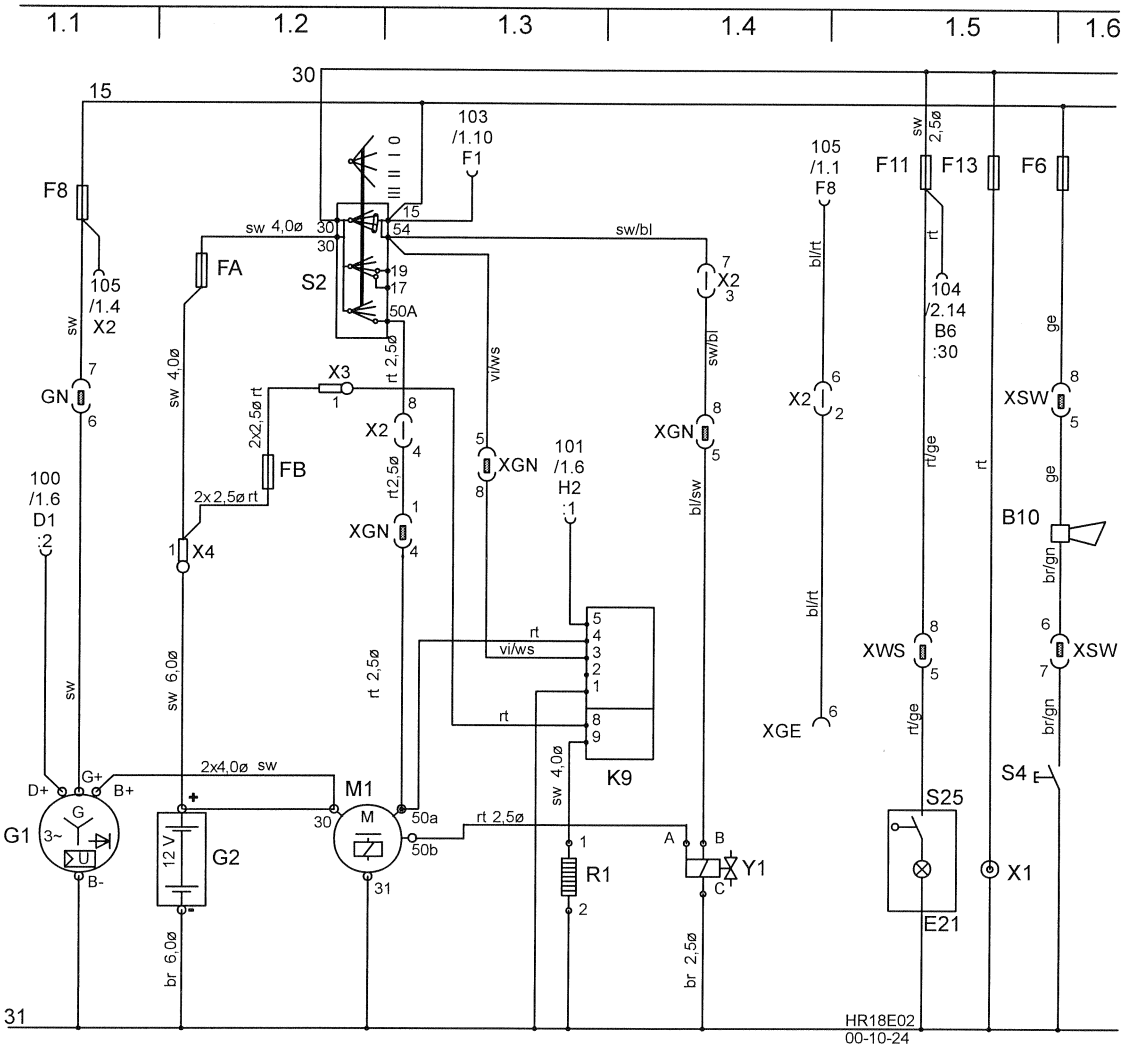


K 1	Cut-off warning buzzer
K 2	Option
K 3	Option
K 4	Diode block warning buzzer
K 9	Pre-heating time control relay - at engine dividing wall, right
K 10	Travel alarm - travel forward
K 11	Travel alarm - travel reverse
K12	Travel alarm - travel
D 2	Diode block travel alarm

Cable and plug colours (X...)

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Power supply	Pre-heat/ start-up system	Engine shut-off	Interior lighting, socket, horn

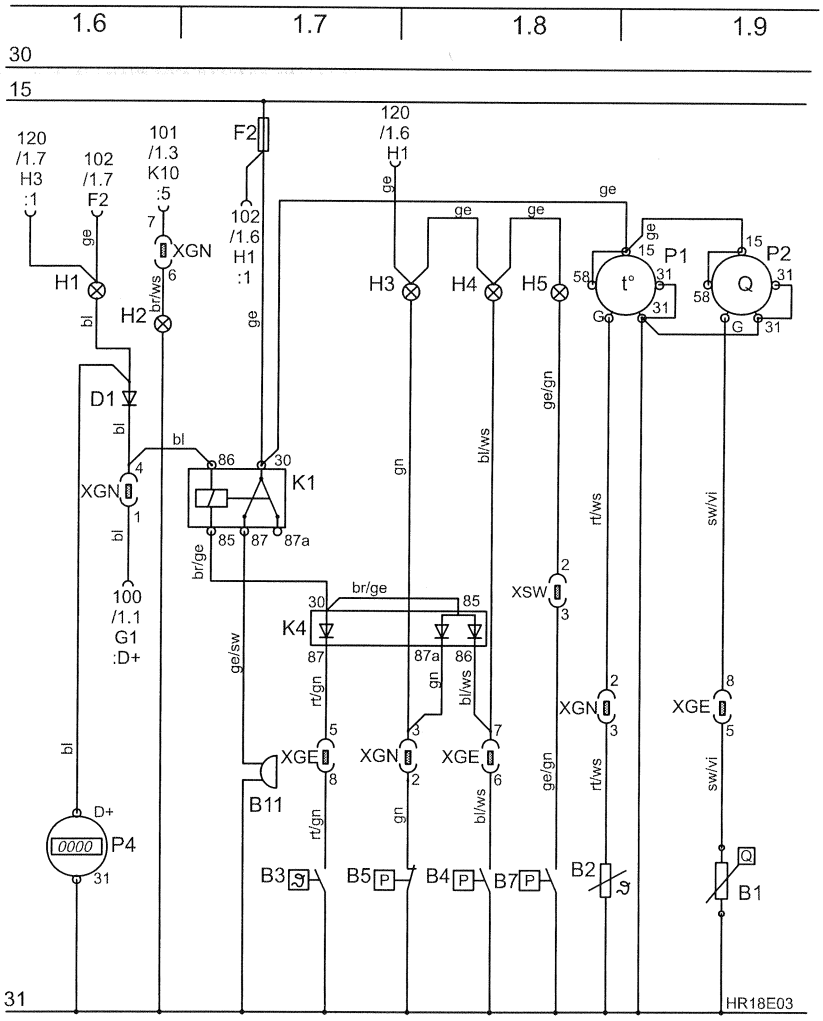


Section	Desig-nation	Device
		Power supply
1.1	G1	Generator
1.2	G2	Battery
1.1	F8	Fuse
		Pre-heat/ start-up system
1.2	S2	Pre-heat/ starter switch
1.2	FA	Main fuse
1.2	FB	Fuse, pre-heat system
1.3	K9	Pre-heating time control unit
1.3	R1	Glow plugs
1.2	M1	Starter

Section	Desig-nation	Device
		Engine shut-off
1.4	Y1	Engine shut-off
		Interior lighting, socket, horn
1.5	F11	Interior lighting, radio
1.5	E21	Interior lighting
1.5	S25	Interior lighting switch
1.5	F13	Socket fuse
1.5	X1	Socket
1.6	F6	Fuse
1.6	B10	Horn
1.6	S4	Horn button

SCHAEFF	Typ/Model/Type **HR 18 (from serial no. 180/0100)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.80.02**

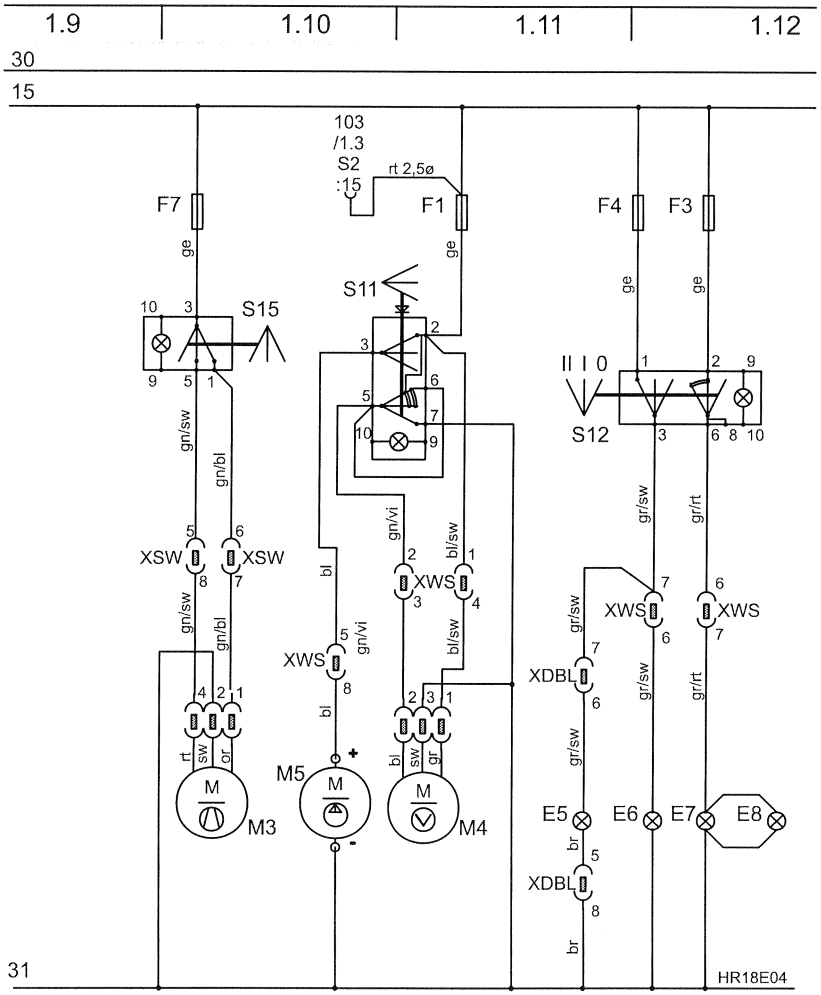
Instruments, warning device



Section	Desig-nation	Device
		Instruments, warning device
1.6	H1	Charge indicator
1.6	D1	Blocking diode for generator
1.6	P4	Operating hour meter
1.6	H2	Pre-heating monitor
1.7	F2	Instruments, indicator lamps
1.7	K1	Warning buzzer cut-off
1.7	K4	Diode block
1.7	B11	Warning buzzer
1.7	B3	Coolant temperature warning contact

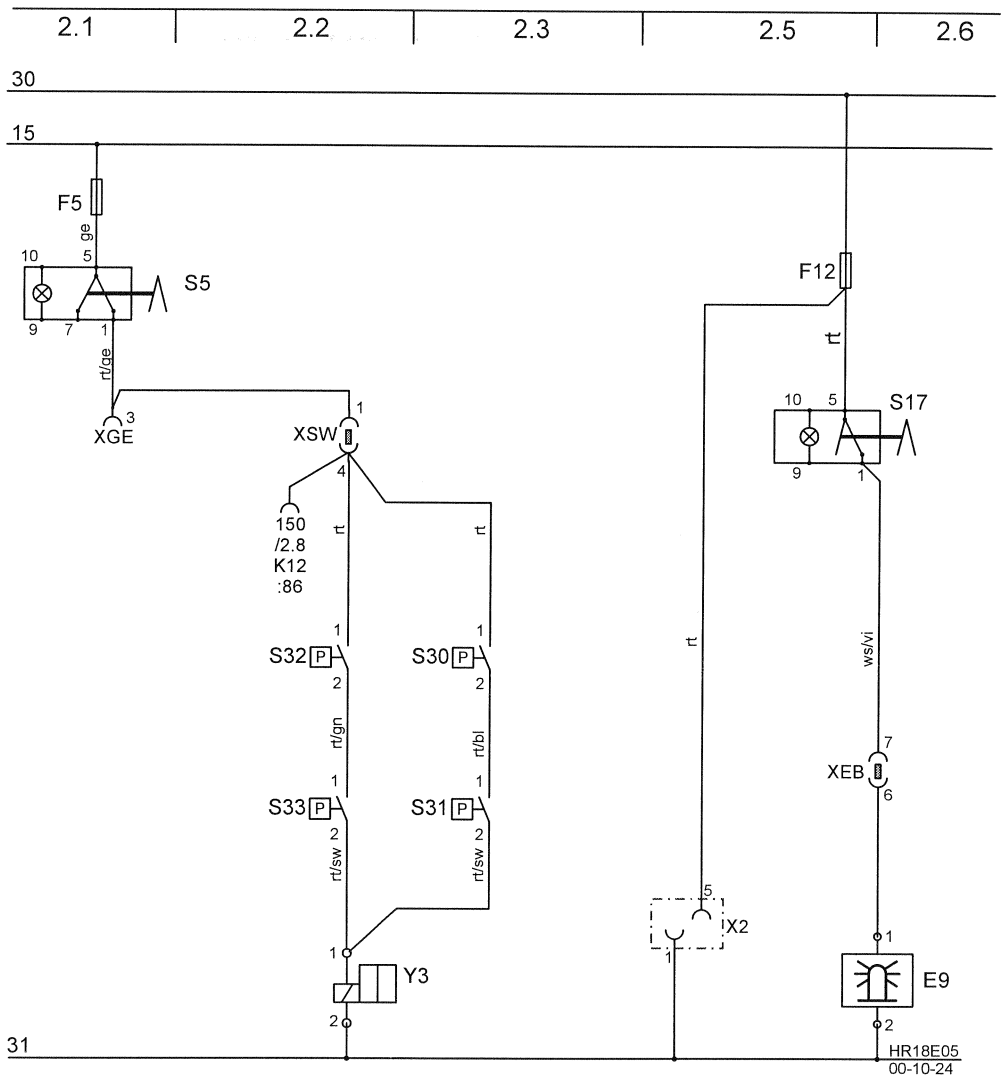
Section	Desig-nation	Device
1.8	H3	Oil pressure checking
1.8	B5	Oil pressure switch
1.8	H4	Air filter indicator
1.8	B4	Air filter maintenance switch
1.8	H5	Hydraulic oil filter clogging checking
1.8	B7	Hydraulic oil filter clogging
1.8	P1	Coolant temperature indicator
1.8	B2	Coolant temperature sensor
1.9	P2	Tank gauge
1.9	B1	Tank level sensor

Heater fan, wash/ wipe system	Working floodlights



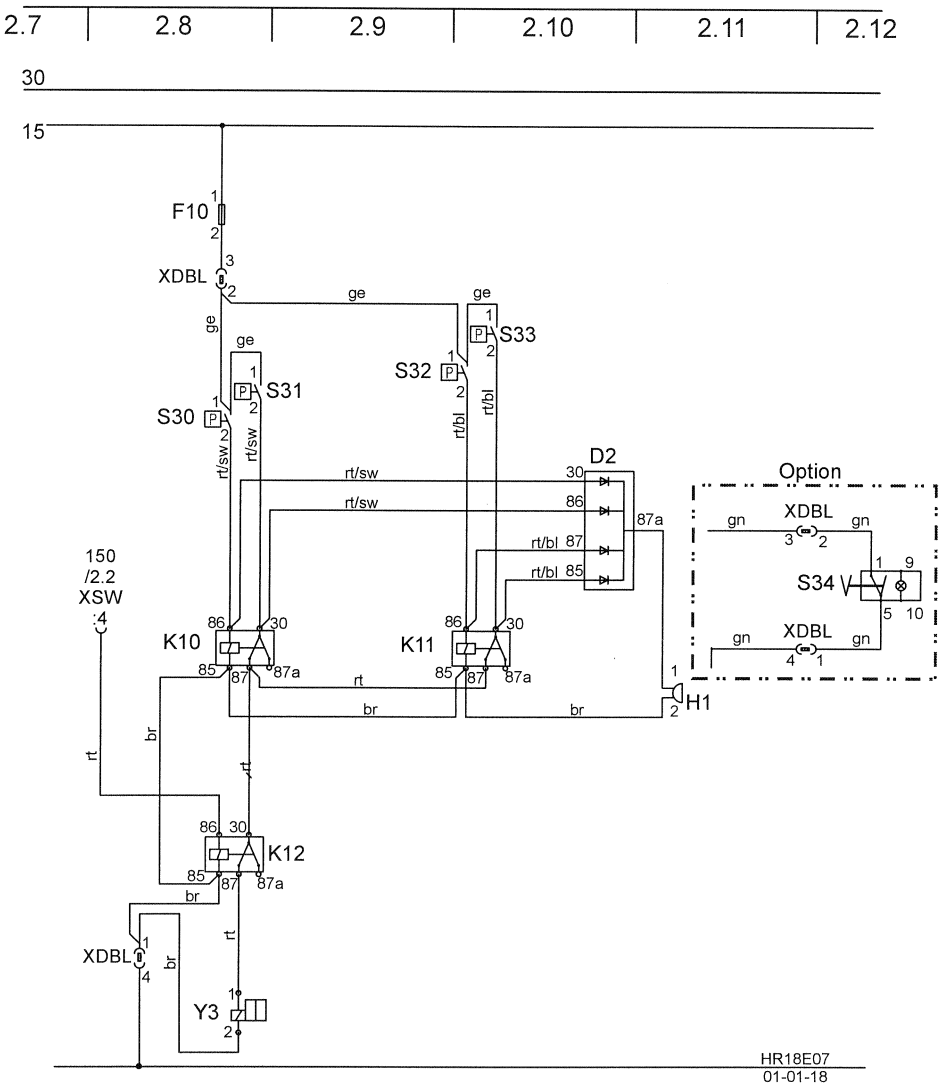
Section	Desig-nation	Device	Section	Desig-nation	Device
		Heater fan, wash/ wipe system			***Working floodlights***
1.10	F7	Fuse	1.12	F4	Fuse
1.10	S15	Fan switch	1.12	F3	Fuse
1.10	M3	Heater fan	1.11	S12	Switch for working floodlights
1.11	F1	Fuse	1.11	E5	Working floodlight, boom
1.10	S11	Wash/ wipe switch	1.11	E6	Working floodlight, rear
1.10	M5	Washer pump	1.12	E7	Working floodlight, front
1.11	M4	Wiper motor	1.12	E8	Working floodlight, front

Travel, fast/ slow	Rotating beacon



Section	Desig-nation	Device	Section	Desig-nation	Device
		Travel, fast/ slow			***Rotating beacon***
2.1	F5	Travel, fast/ slow	2.5	F12	Fuse
2.1	S5	Selection switch, fast/ slow	2.5	S17	Switch for rotating beacon
2.2	S32	Pressure switch, reverse/ left	2.6	E9	Rotating beacon
2.2	S33	Pressure switch, reverse/ right	2.5	X2	Immobilizer
2.3	S30	Pressure switch, forward/ left			
2.3	S31	Pressure switch, forward/ right			
2.2	Y3	Valve, fast/ slow			

Travel alarm (option)

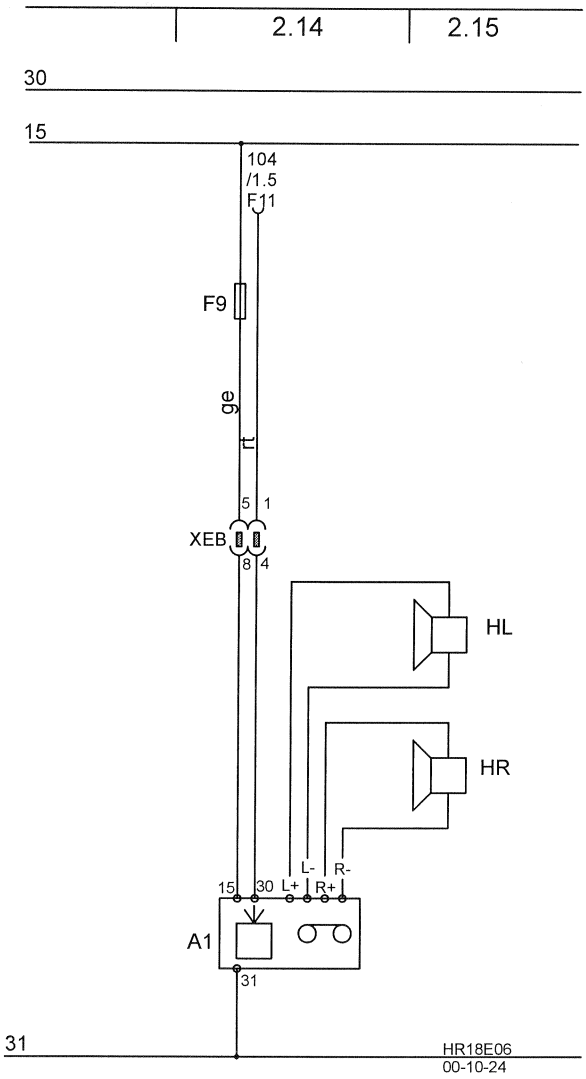


Section	Desig-nation	Device
		Reversing alarm
2.8	F10	Fuse
2.8	S30	Pressure switch, forward/ left
2.8	S31	Pressure switch, forward/ right
2.8	K10	Relay travel forward
2.8	K12	Relay travel
2.8	Y3	Valve quick/ slow

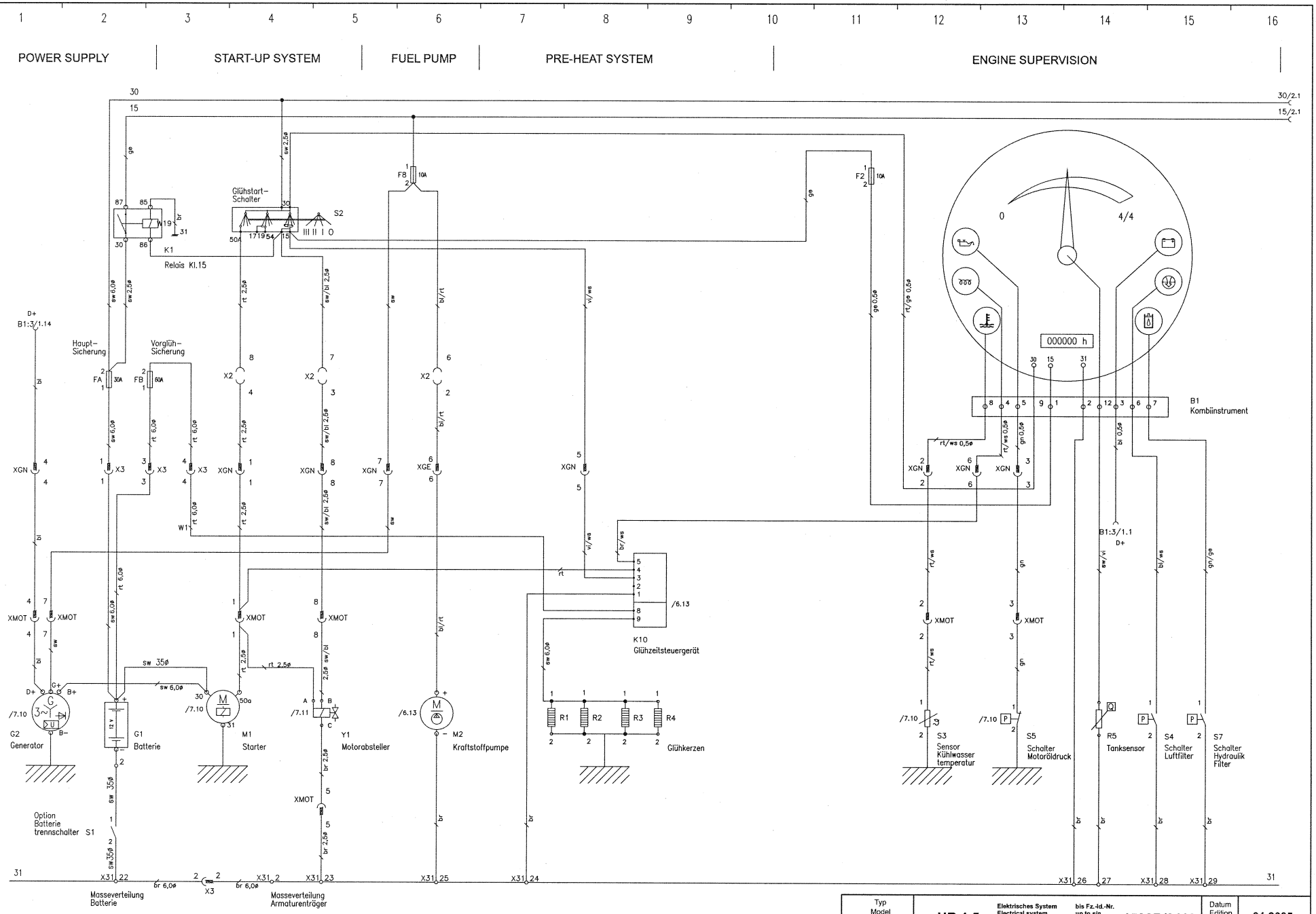
Section	Desig-nation	Device
		Rotating beacon
2.10	S32	Pressure switch reverse/ left
2.10	S33	Pressure switch reverse/ right
2.10	K11	Relay travel reverse
2.10	D2	Diode block
2.11	H1	Buzzer back-up alarm
2.12	S34	Cut-off travel alarm (option)

SCHAEFF	Typ/Model/Type **HR 18 (from serial no. 180/0100)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.80.04**

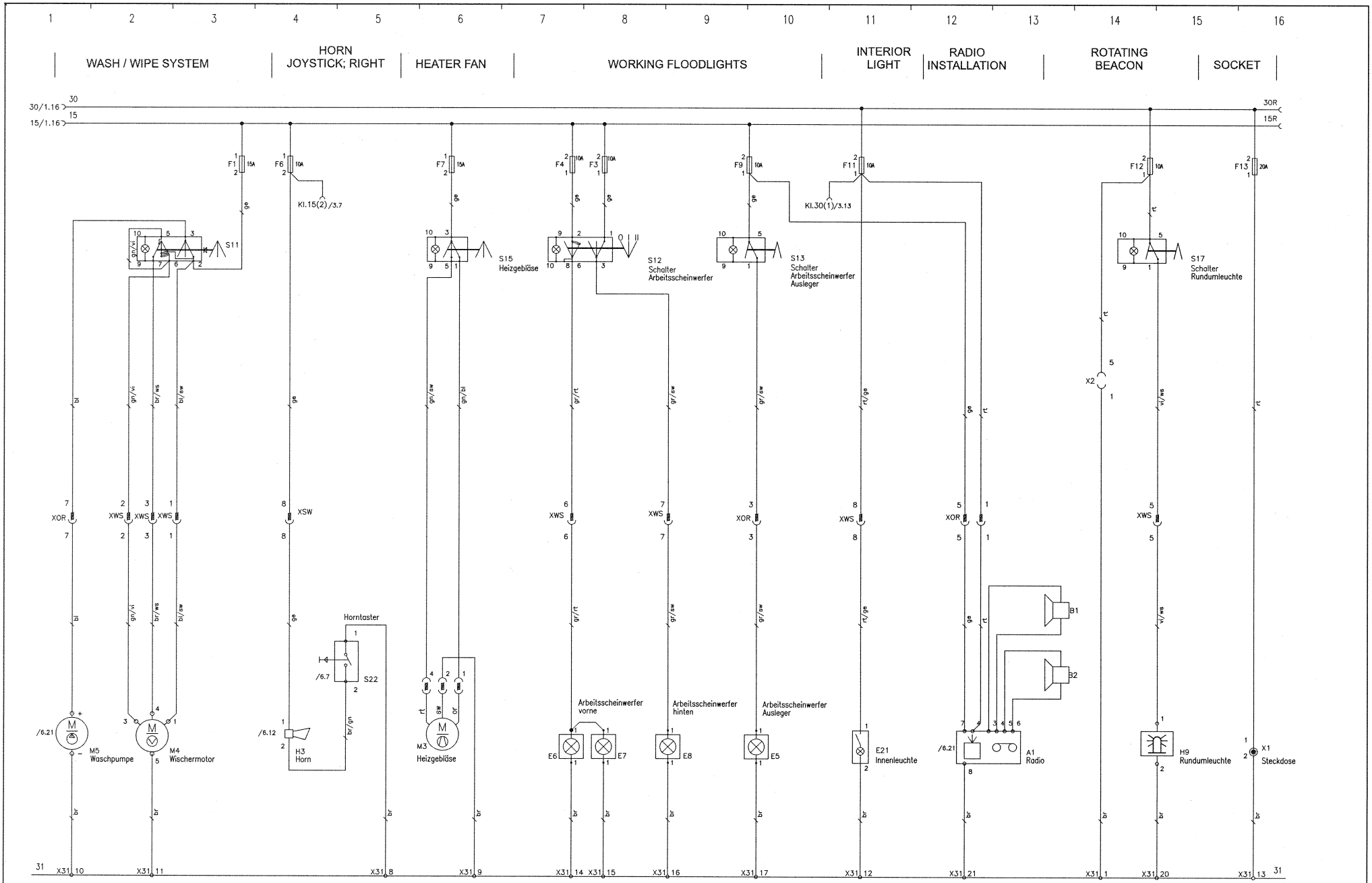
Radio



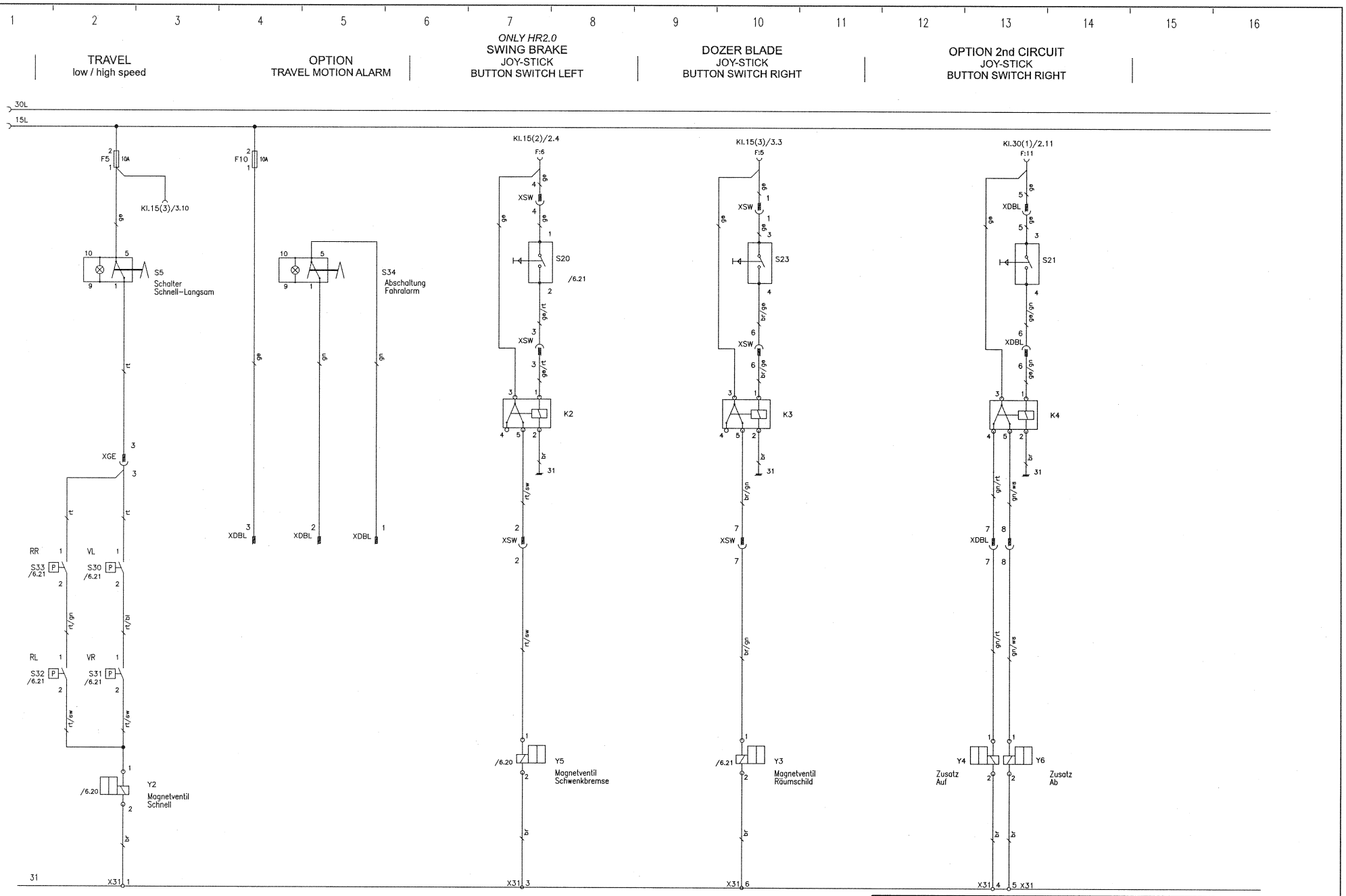
Section	Desig-nation	Device	Section	Desig-nation	Device
		Radio installation			
2.11	F9	Fuse			
2.11	A1	Radio			
2.12	HL	Loudspeaker left			
2.12	HR	Loudspeaker right			



Typ Model Type Tipo	**HR 1.5**	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	bis Fz.-Id.-Nr. up to s/n jusqu'au n/s al numero	**1500R/0119**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.90.01**

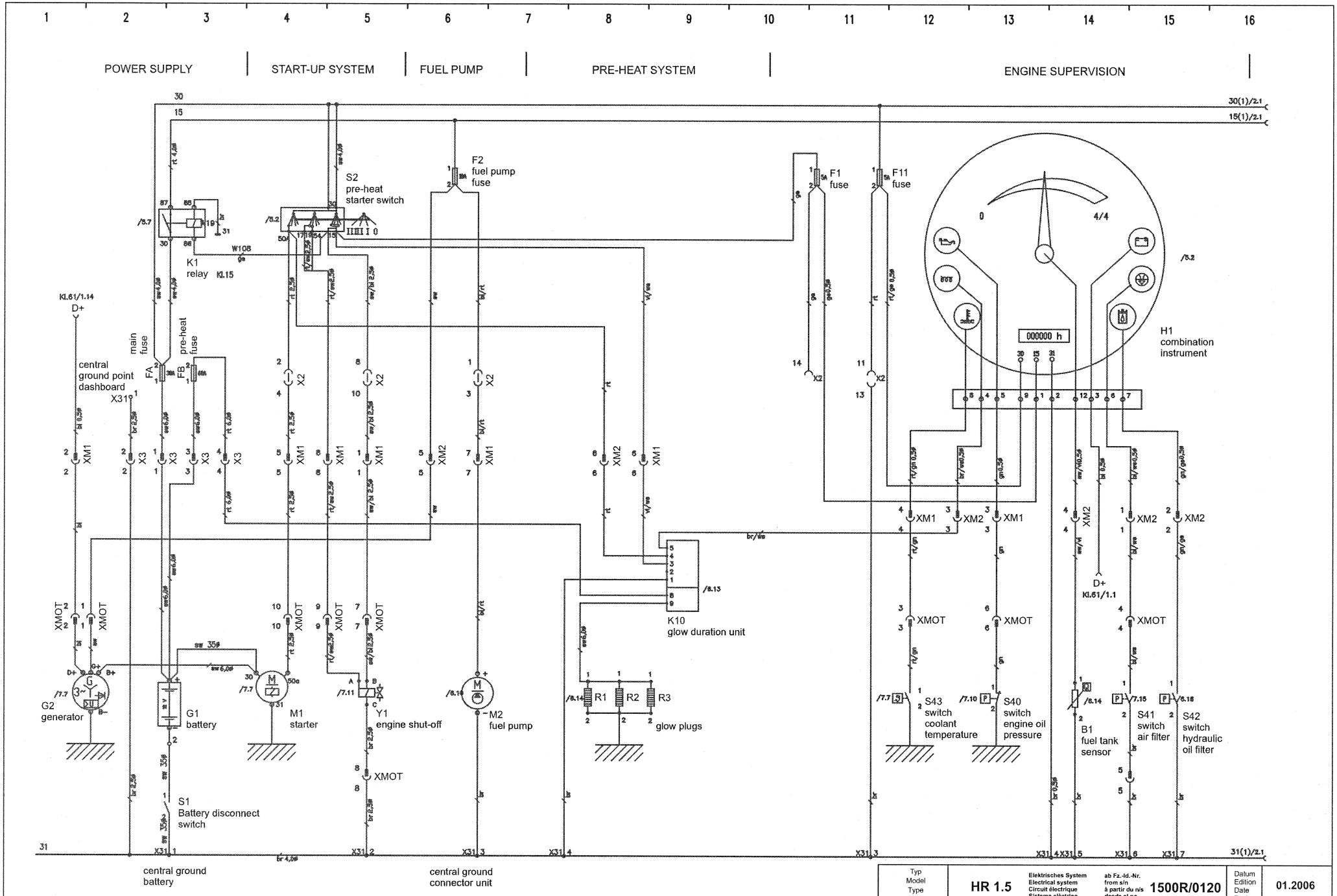


Typ Model Type Tipo	**HR 1.5**	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	bis Fz.-Id.-Nr. up to s/n jusqu'au n/s al numero	**1500R/0119**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.90.02**

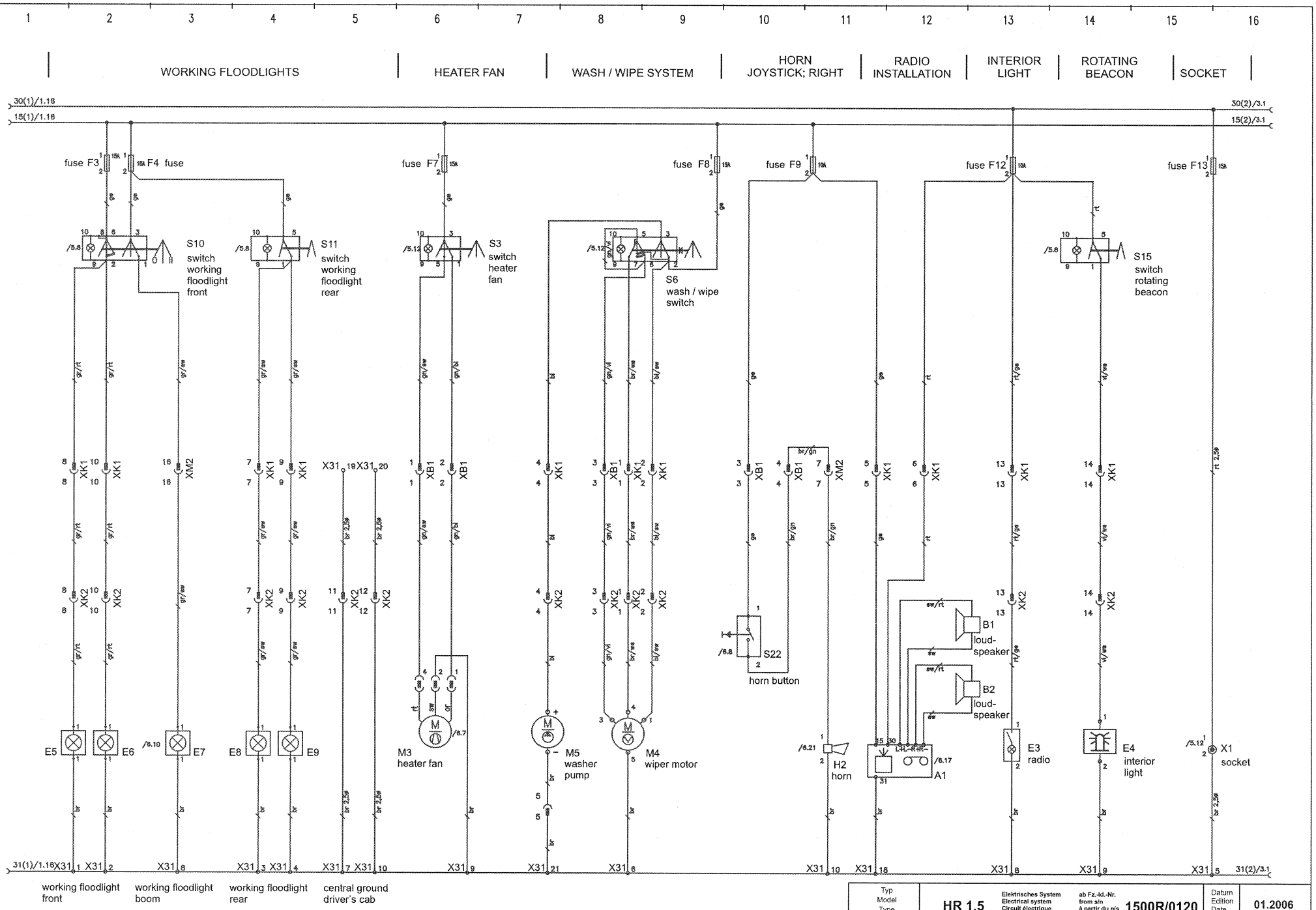


Typ Model Type Tipo	**HR 1.5** Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — bis Fz.-Id.-Nr. / up to s/n / jusqu'au n/s / al numero **1500R/0119**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Stromlaufplan** **Wiring diagramm** **Circuit électrique** **Esquemas de los circuitos**	Blatt Page Feuille Página	**7.90.03**

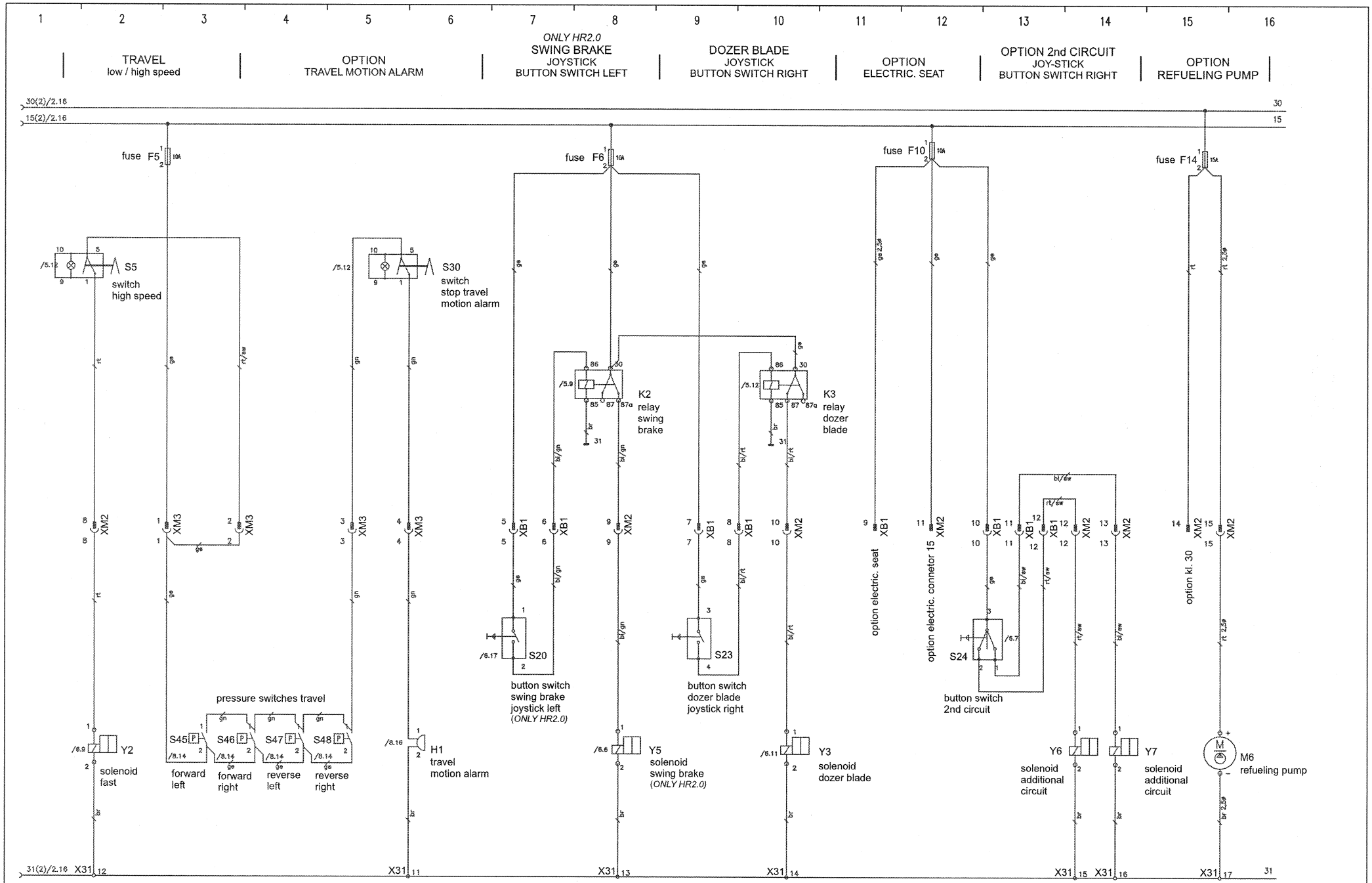
TEREX | SCHAEFF



Typ Model Type Tipo	HR 1.5	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 1500R/0120	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos			Blatt Page Feuille Página	7.90.11

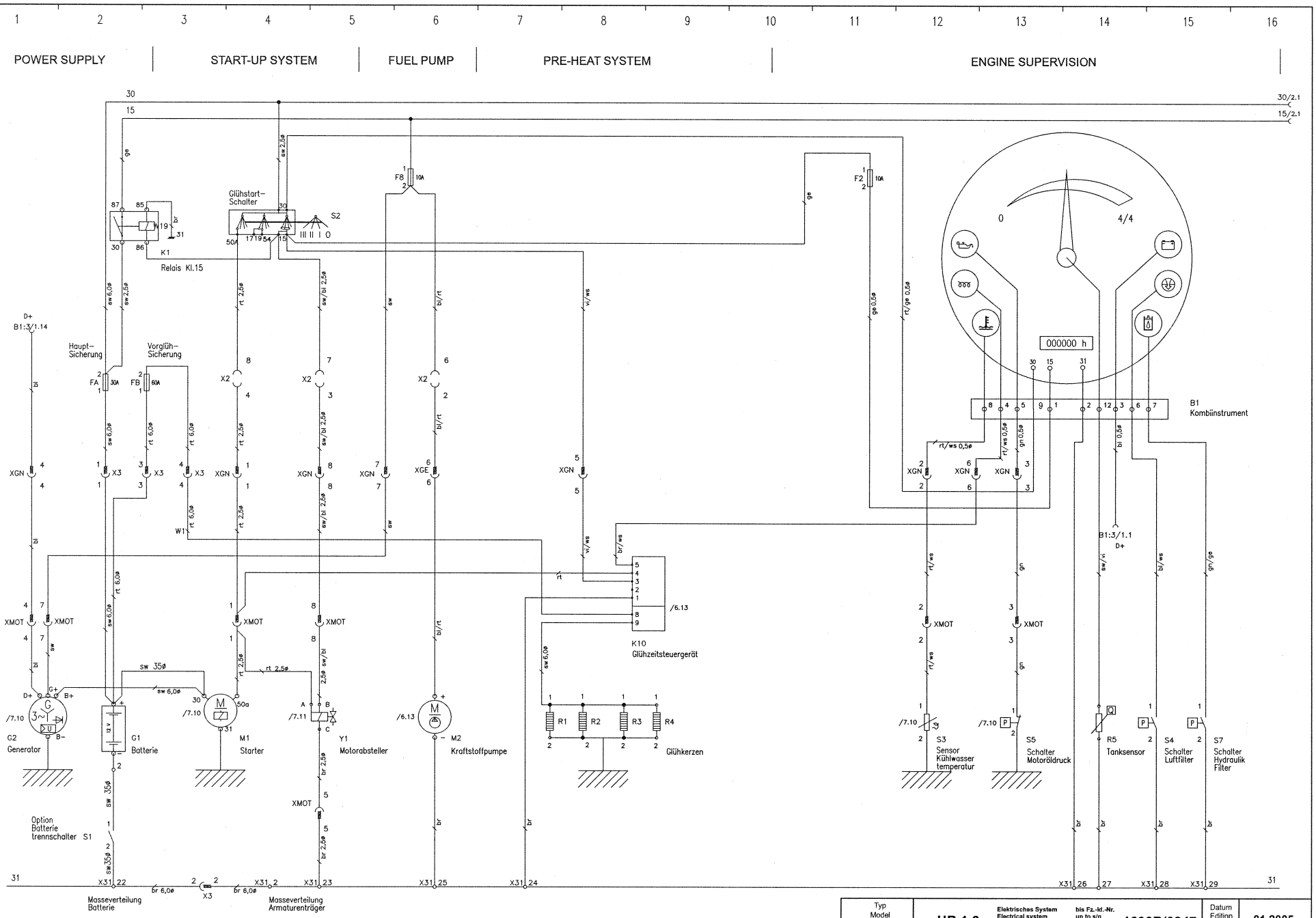


Typ Model Type Tipo	HR 1.5	Elektrisches System Electrical system Circuit électrique Sistema elèctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 1500R/0120	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos			Blatt Page Feuille Página	7.90.12

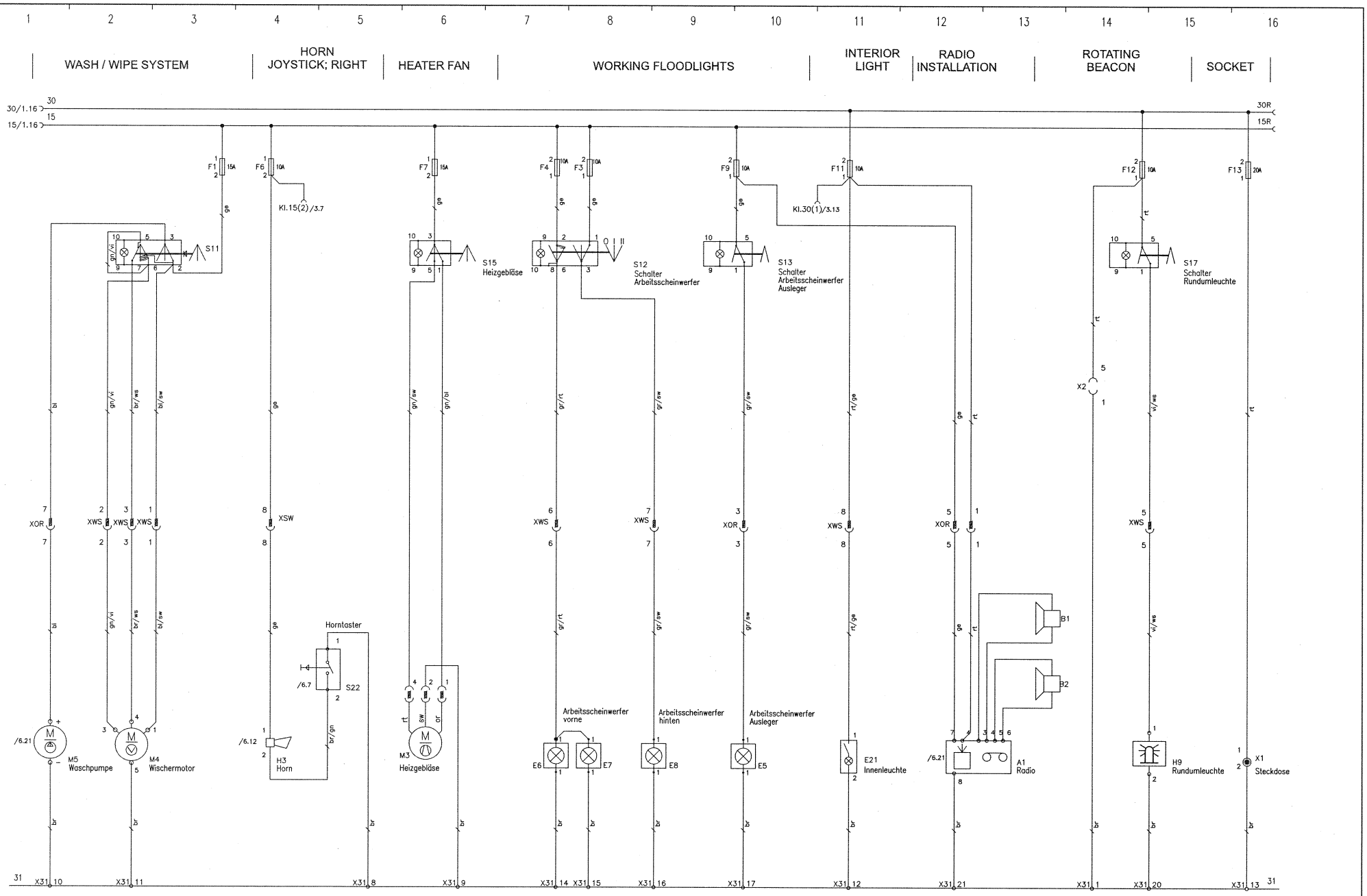


Typ Model Type Tipo	**HR 1.5** Elektrisches System / Electrical system / Circuit électrique / Sistema eléctrico — ab Fz.-Id.-Nr. / from s/n / à partir du n/s / desde el no. **1500R/0120**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Stromlaufplan** **Wiring diagramm** **Circuit électrique** **Esquemas de los circuitos**	Blatt Page Feuille Página	**7.90.13**

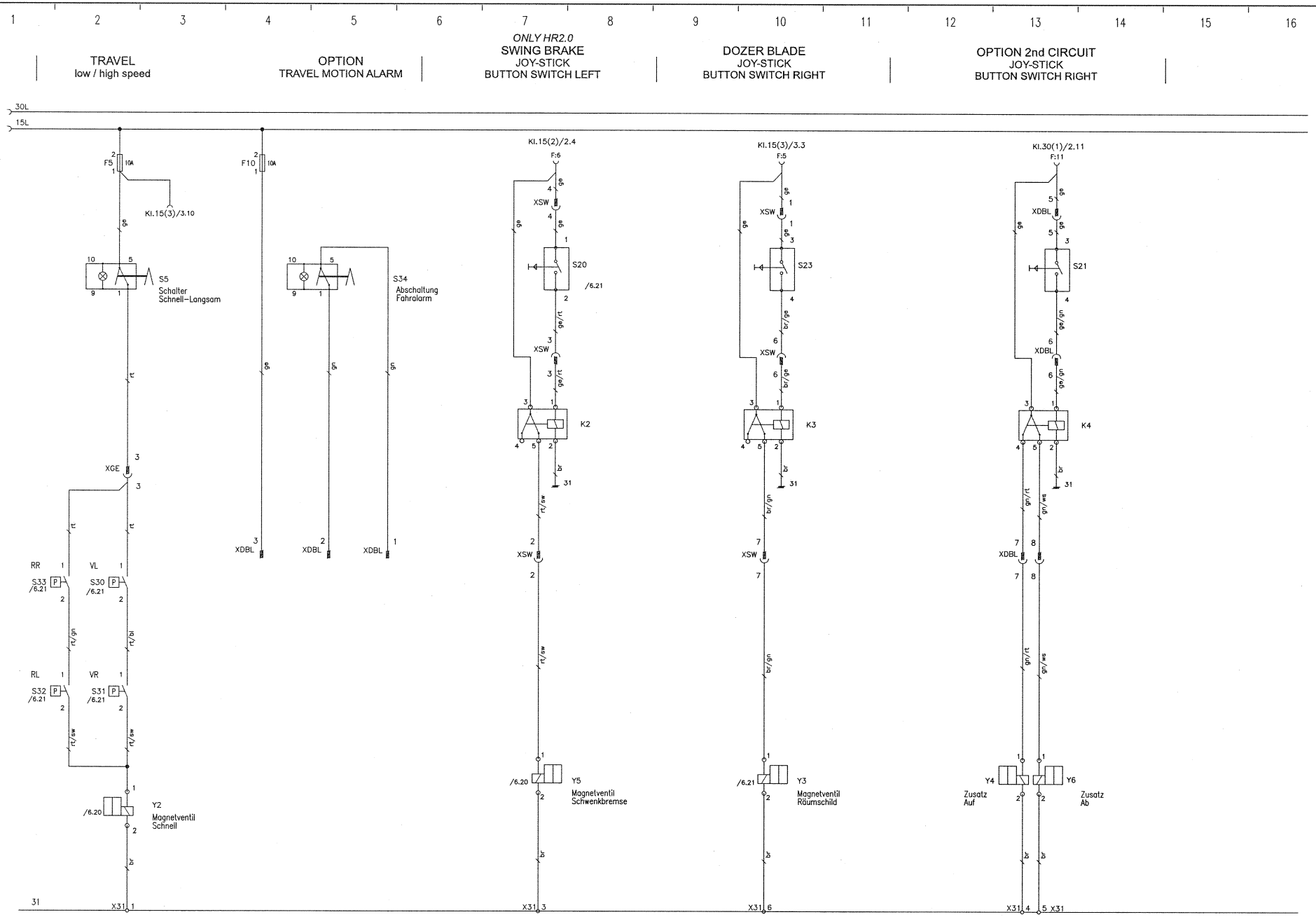
TEREX | SCHAEFF



Typ Model Type Tipo	**HR 1.6**	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	bis Fz.-Kl.-Nr. up to s/n jusqu'au n/s al numero	**1600R/0247**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.91.01**



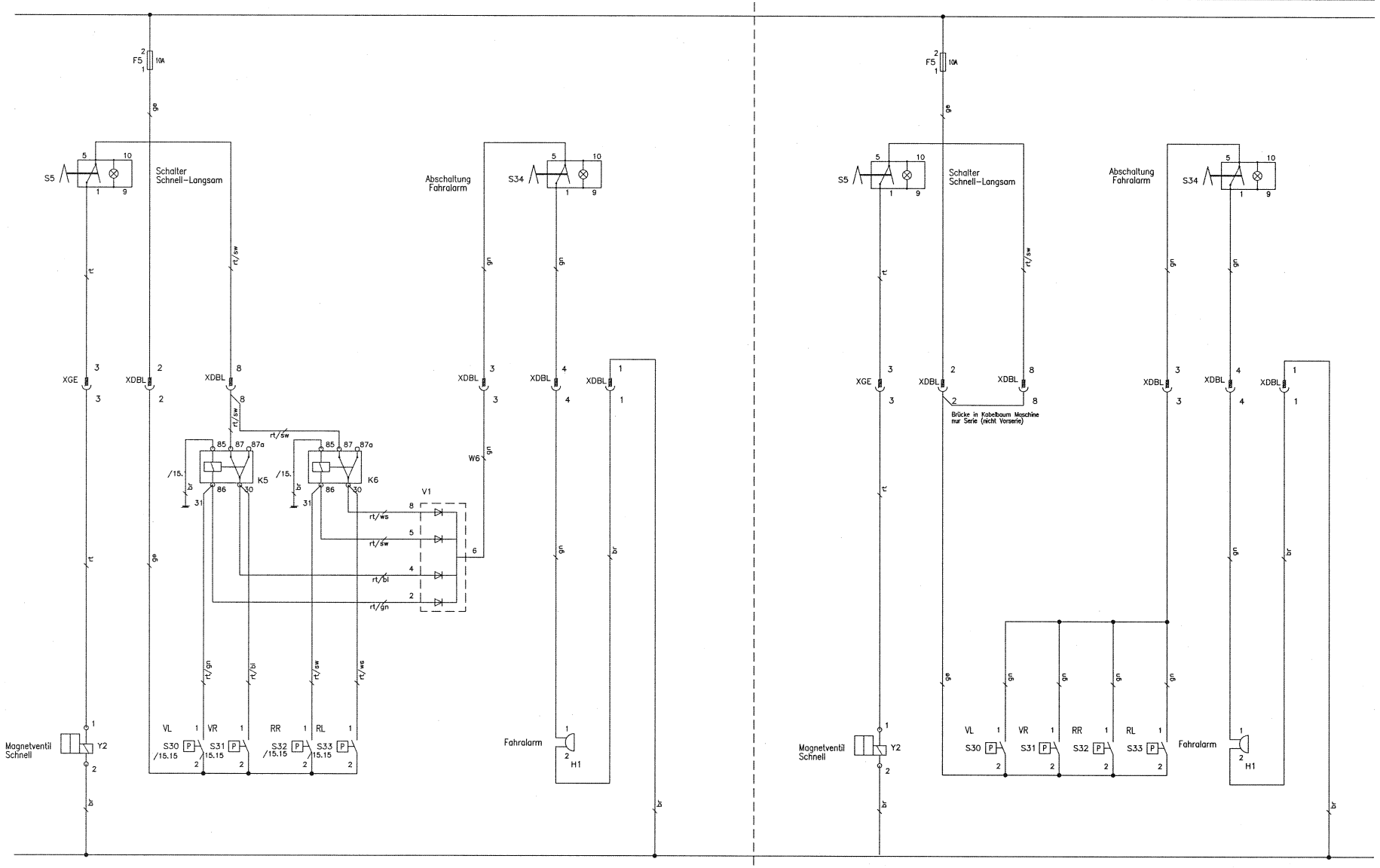
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Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.91.02**



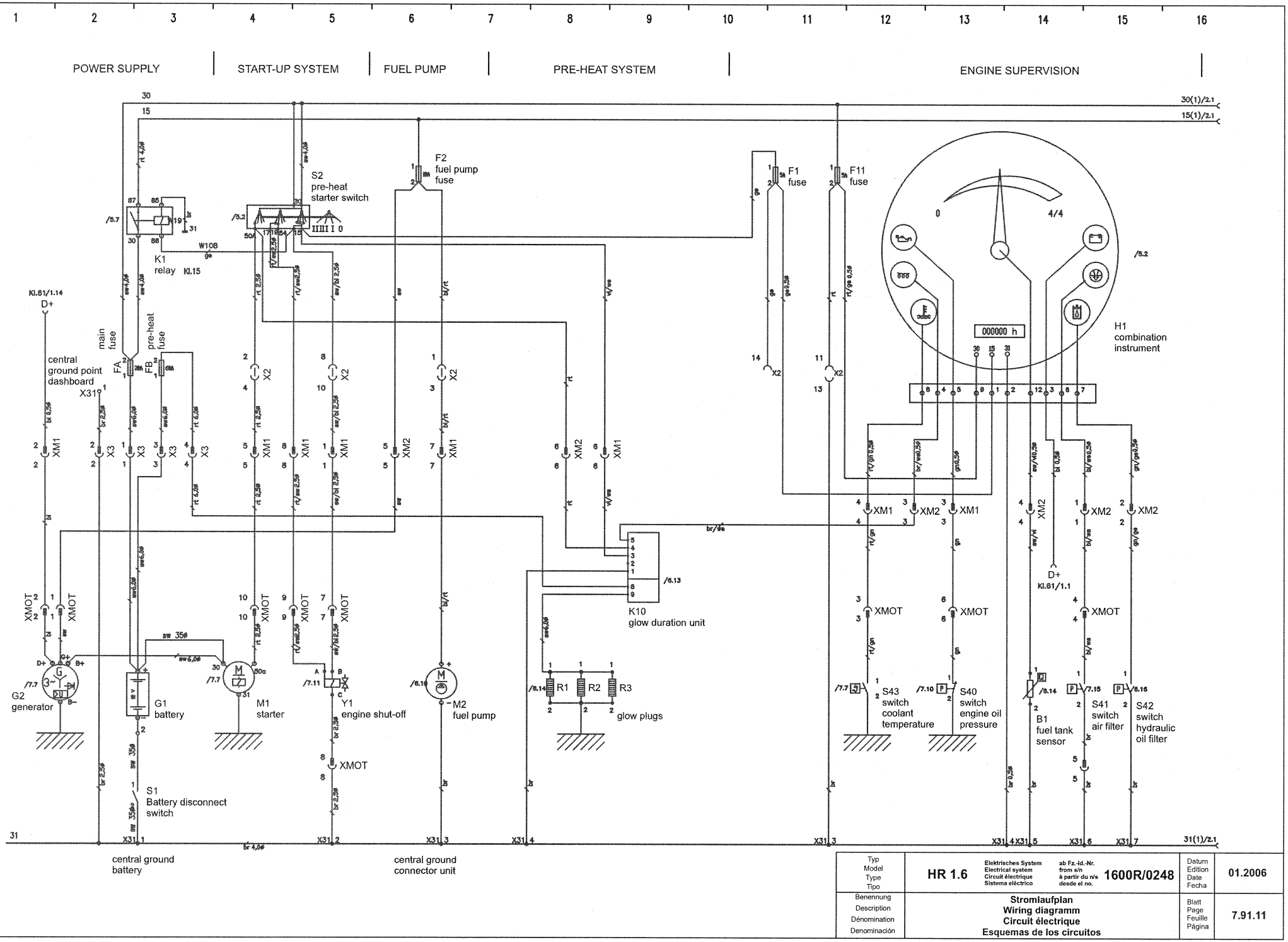
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Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**			Blatt Page Feuille Página **7.91.03**

HR 3.7 OPTION travel motion alarm

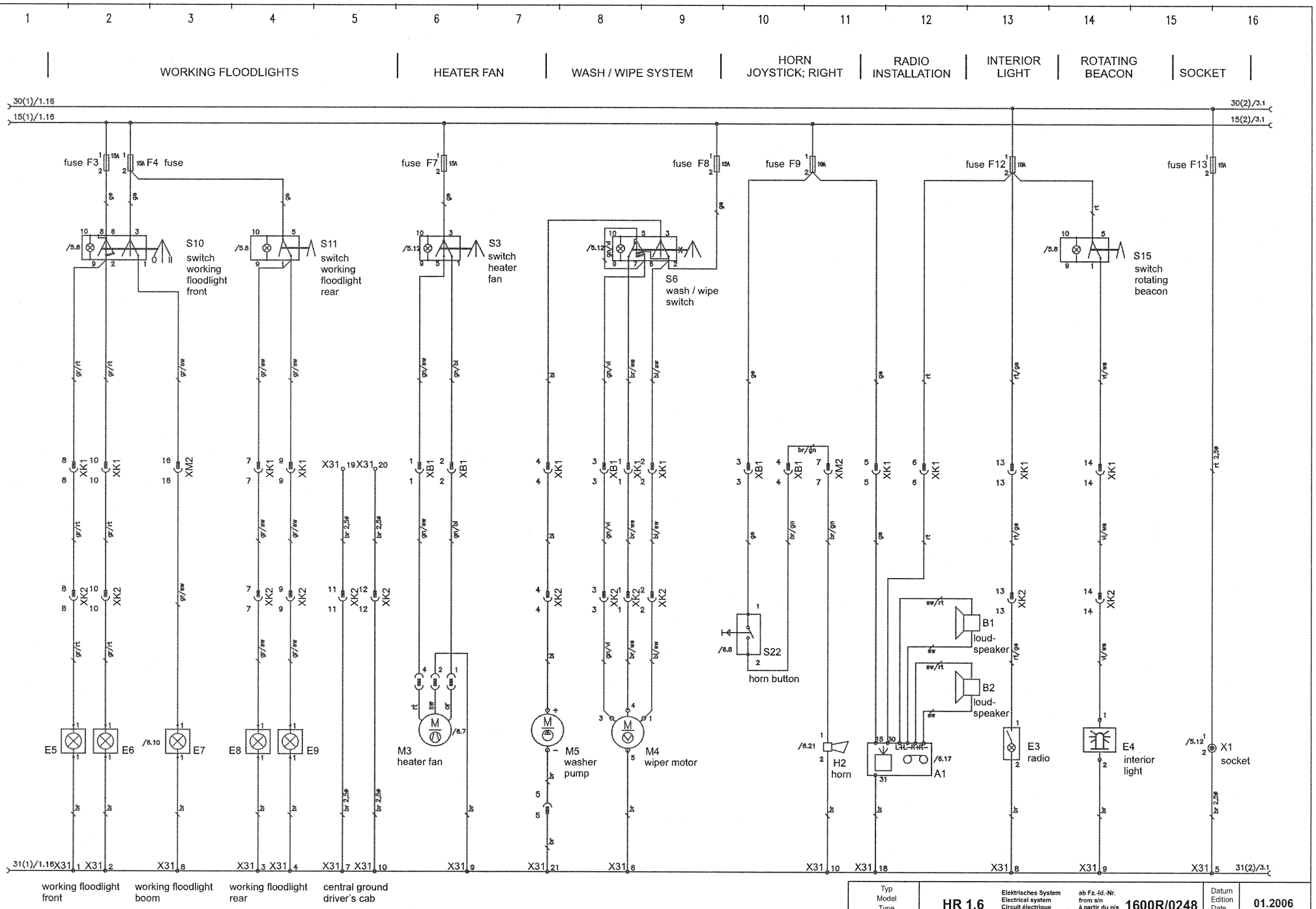
HR 1.6 / HR 2.0 OPTION travel motion alarm



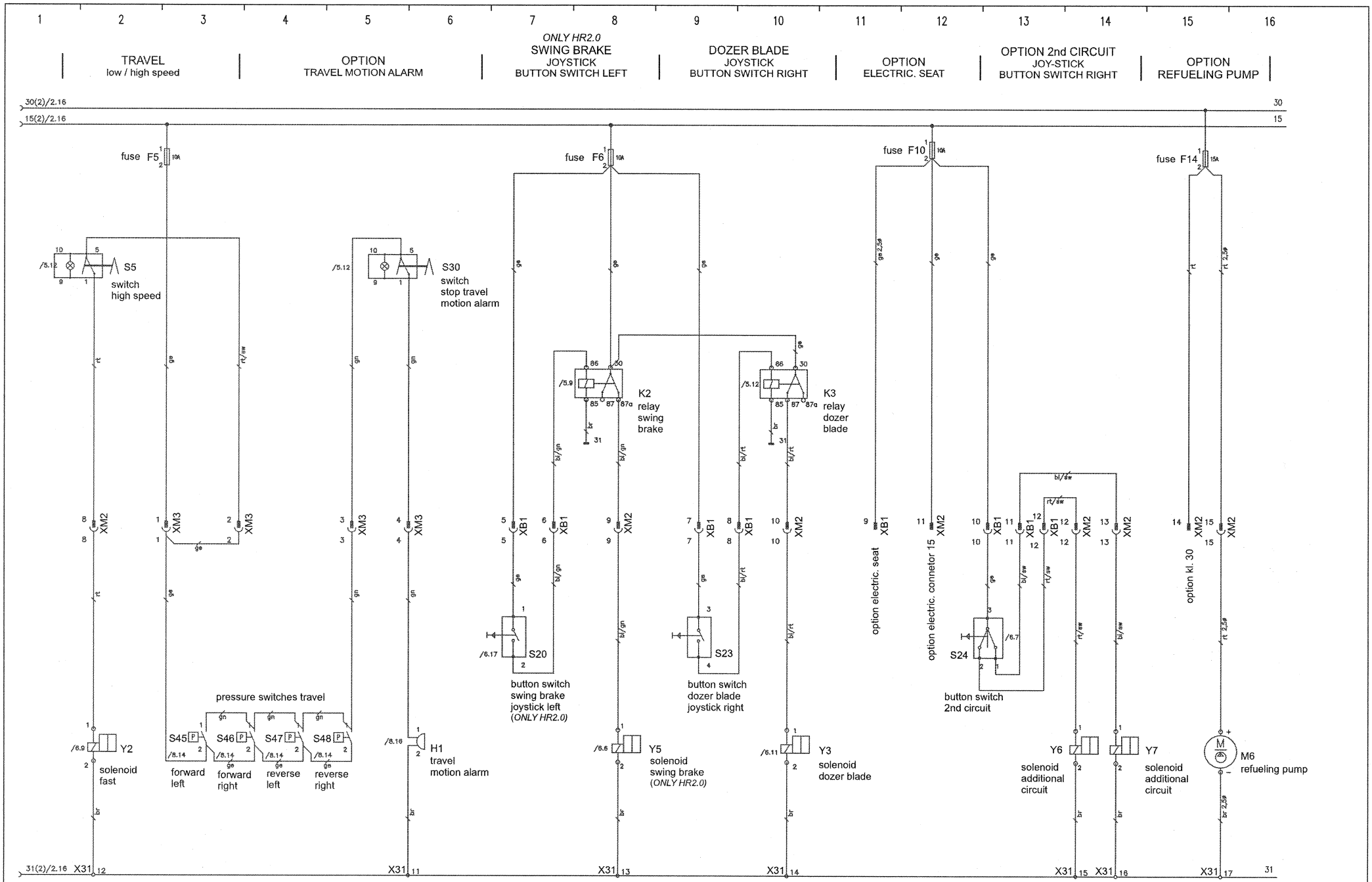
Typ Model Type Tipo	**HR 1.6**	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	bis Fz.-Id.-Nr. up to s/n jusqu'au n/s al numero	**1600R/0247**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.91.04**



Typ Model Type Tipo	**HR 1.6**	Elektrisches System Electrical system Circuit électrique Sistema elèctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. **1600R/0248**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Stromlaufplan** **Wiring diagramm** **Circuit électrique** **Esquemas de los circuitos**			Blatt Page Feuille Página	**7.91.11**

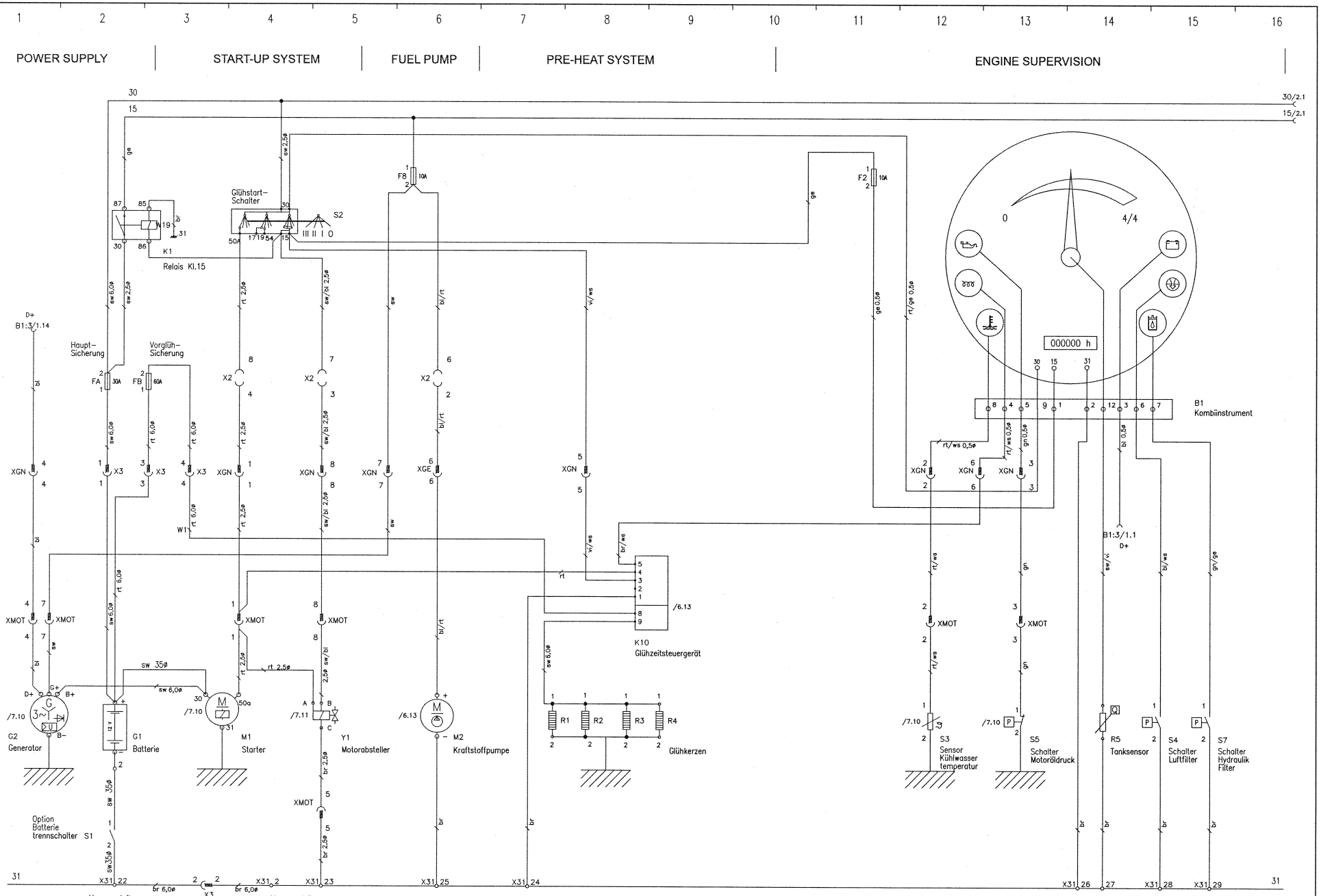


Typ Model Type Tipo	HR 1.6	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 1600R/0248	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos			Blatt Page Feuille Página	7.91.12

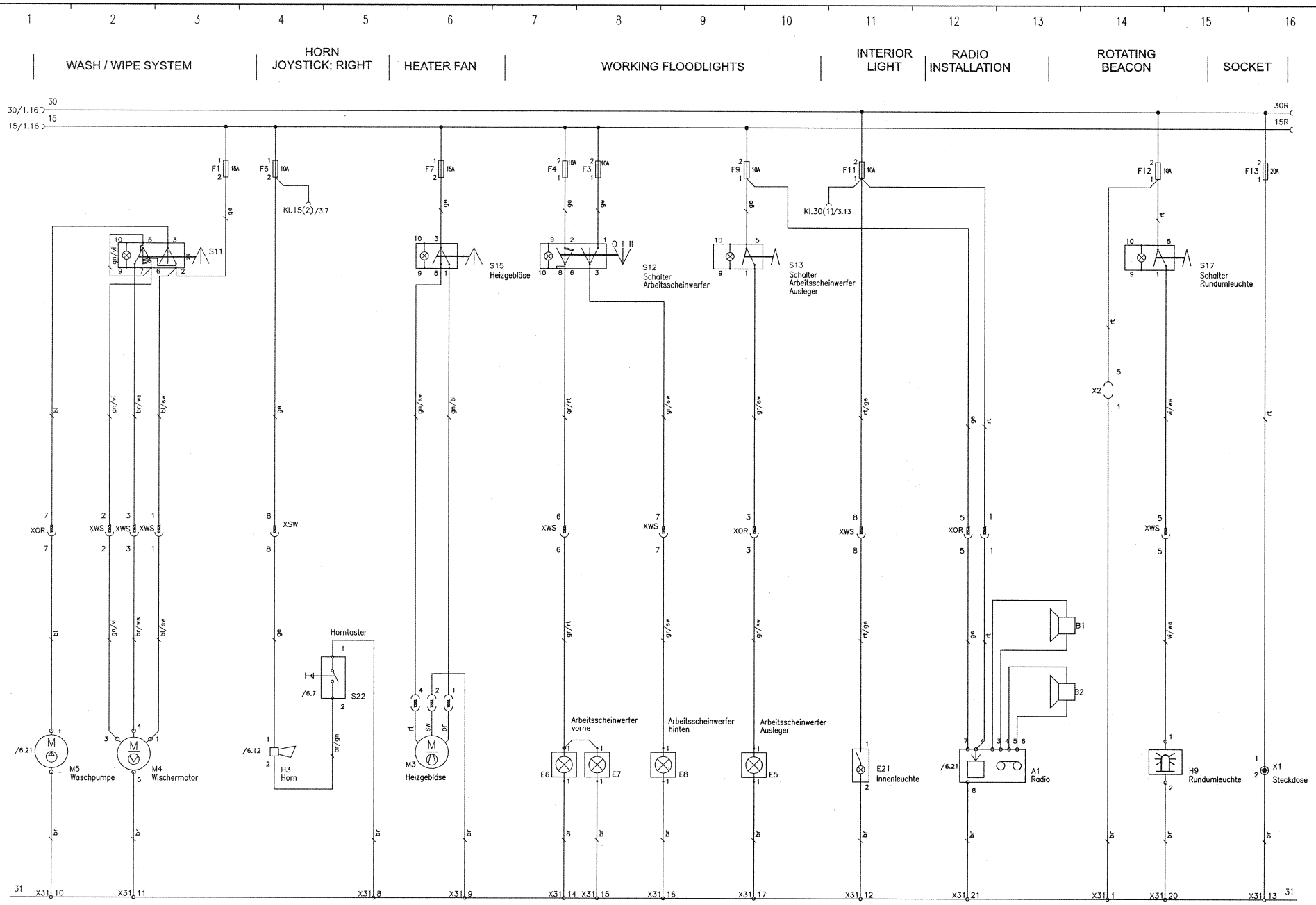


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Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos			Blatt Page Feuille Página	7.91.13

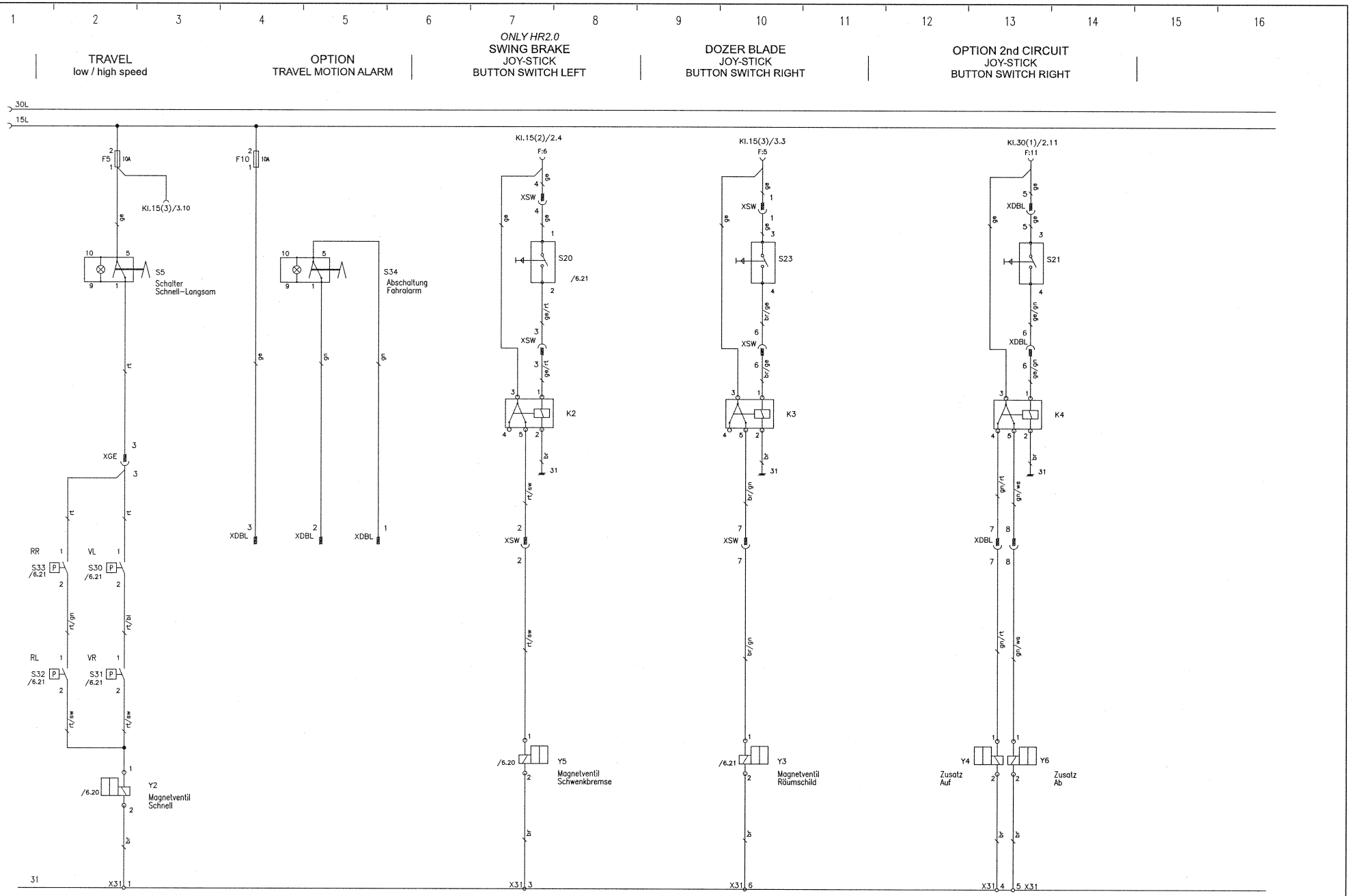
TEREX | SCHAEFF



Typ Model Type Tipo	**HR 2.0**	Elektrisches System Electrical system Circuit électrique Sistema elèctrico	bis Fz.-Id.-Nr. up to s/n jusqu'au n/s al numero	**2000R/0169**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.92.01**



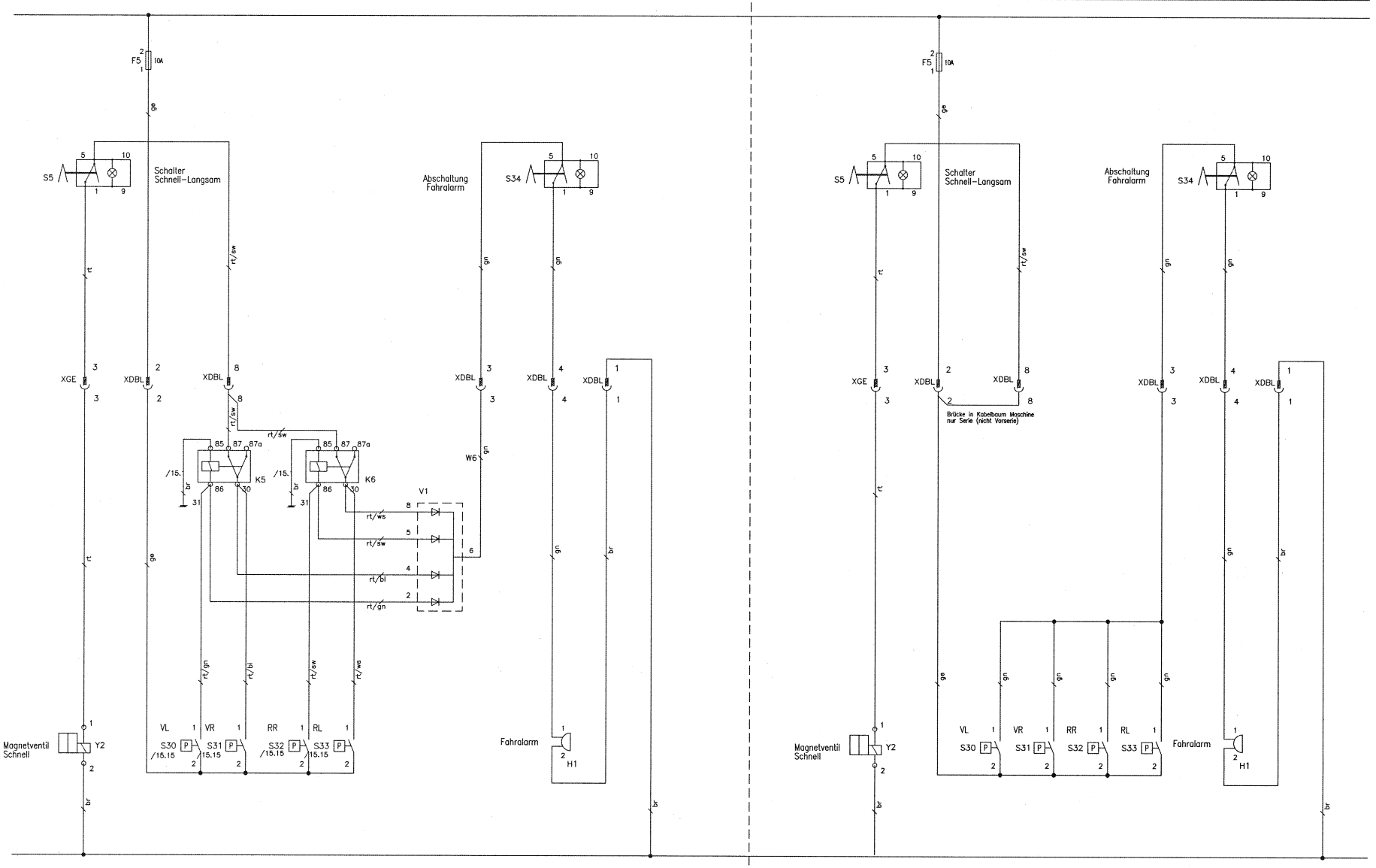
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Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos				Blatt Page Feuille Página	7.92.02



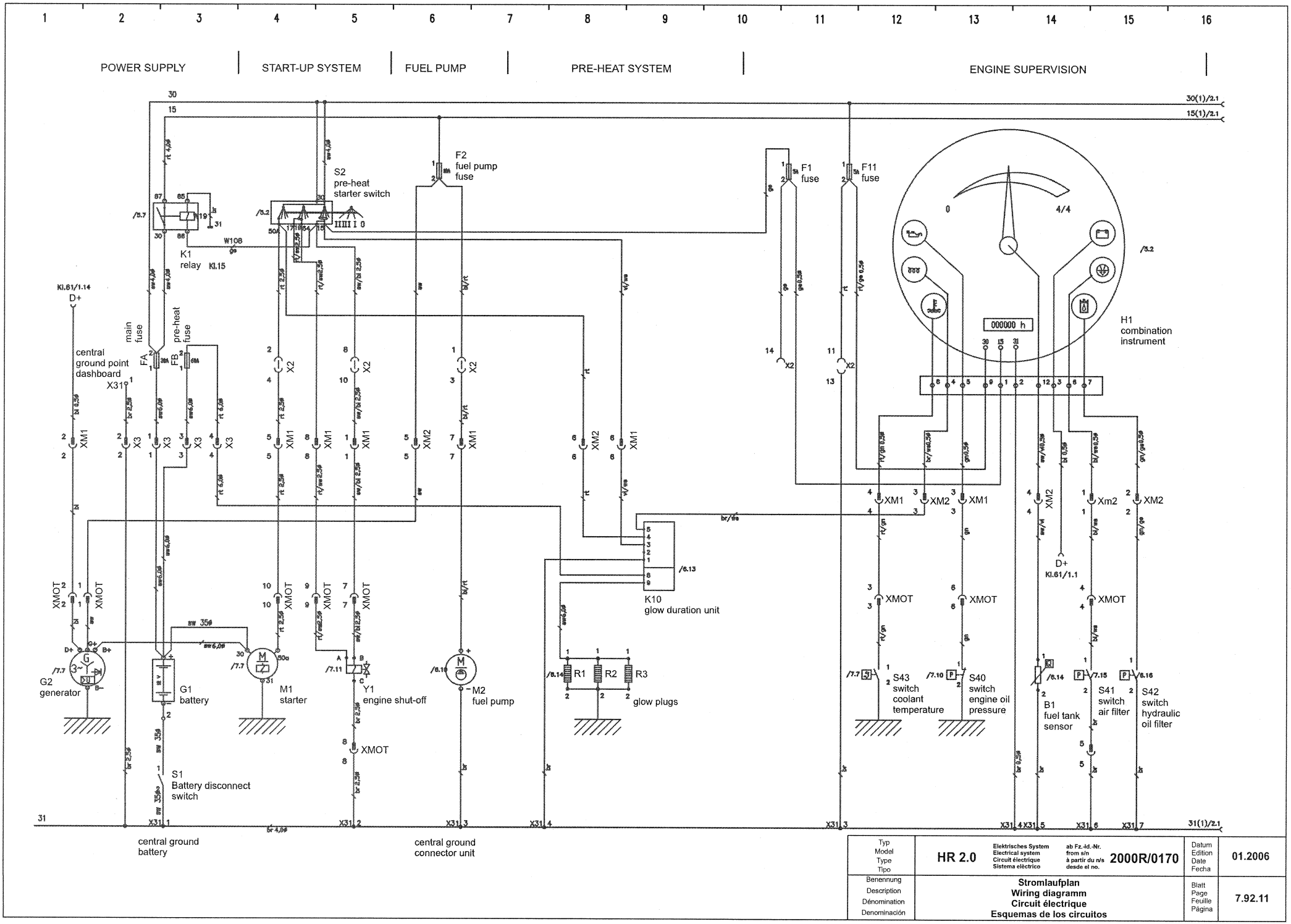
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Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**		Blatt Page Feuille Página **7.92.03**

HR 3.7 OPTION travel motion alarm

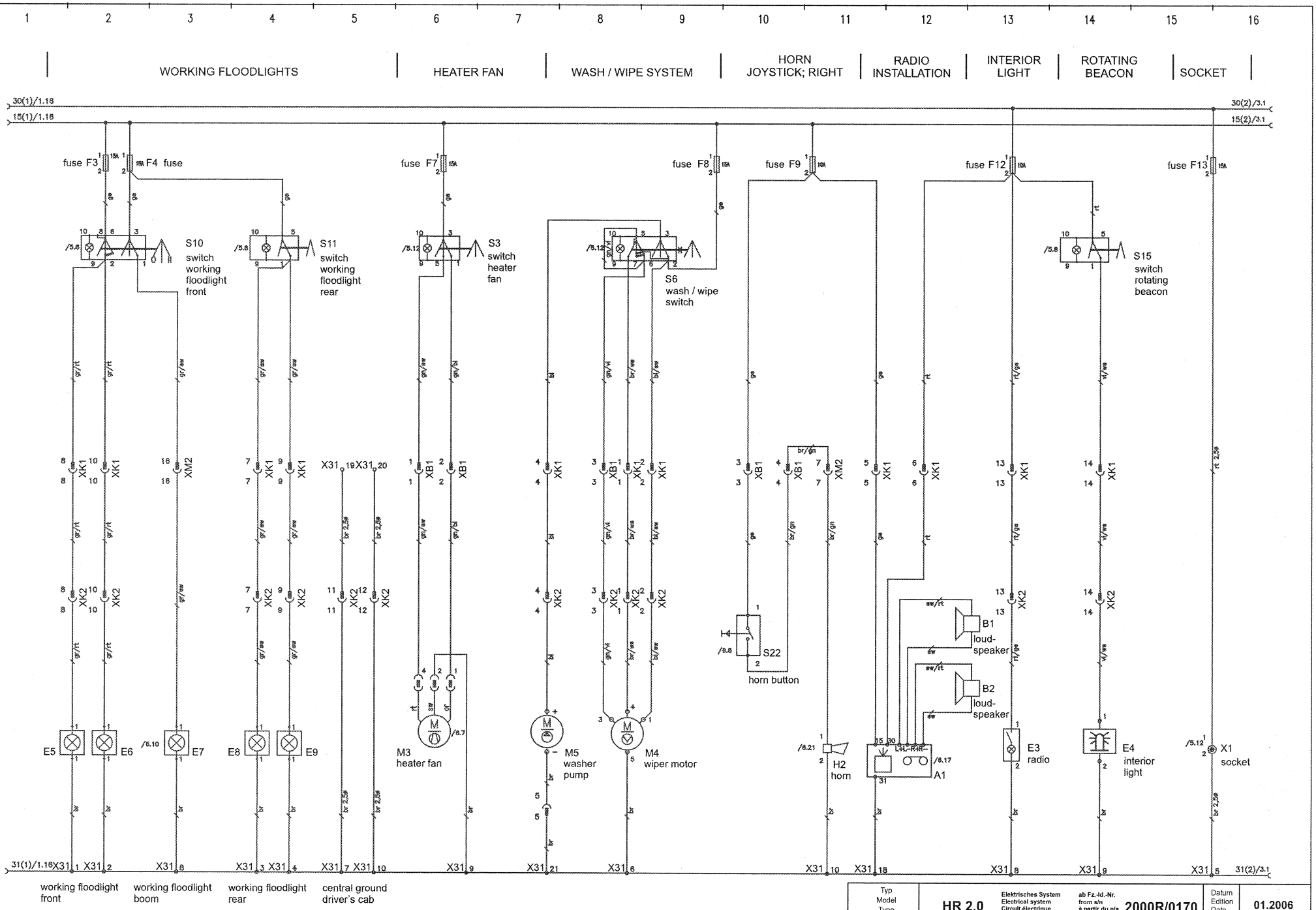
HR 1.6 / HR 2.0 OPTION travel motion alarm



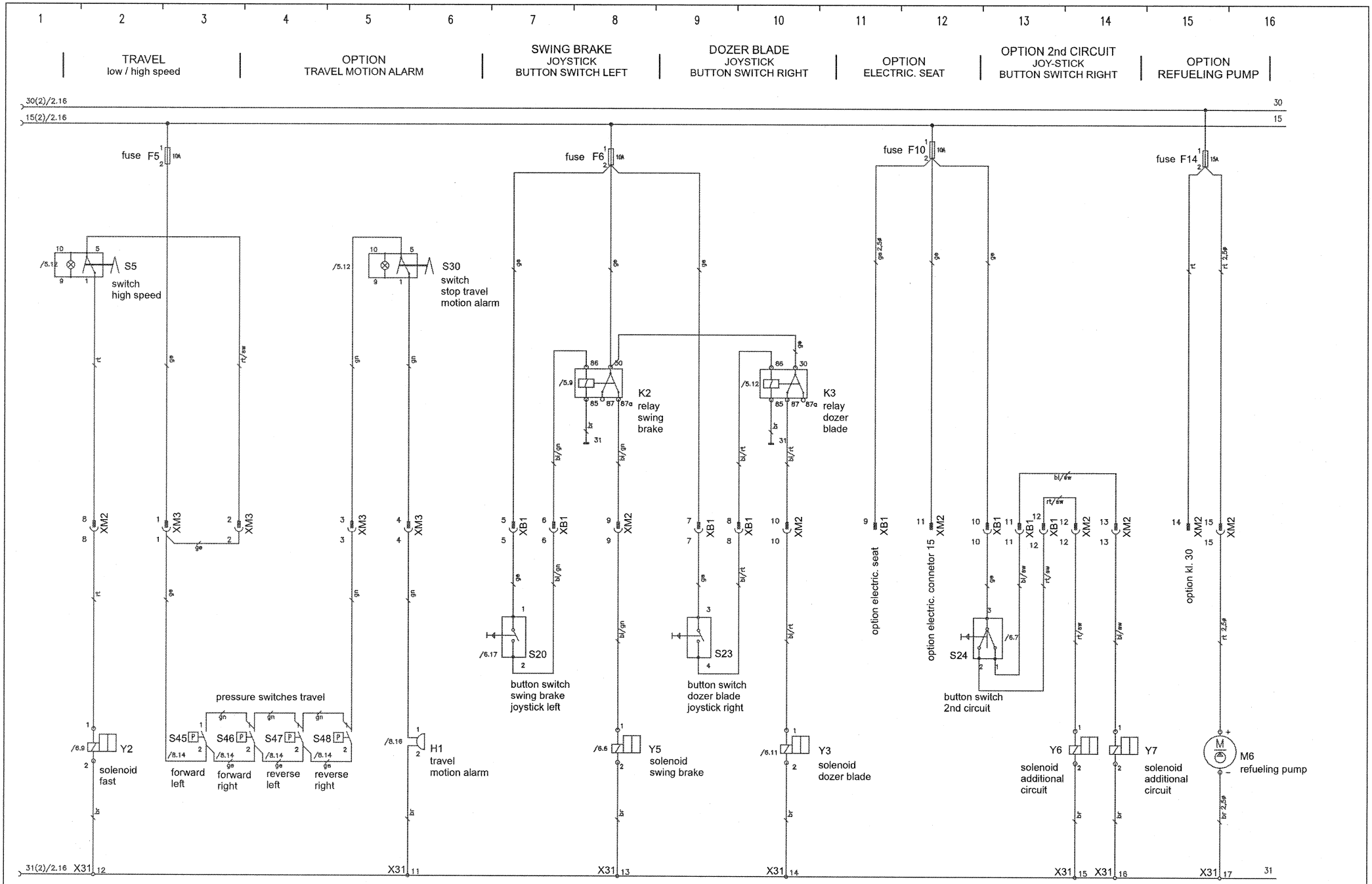
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Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.92.04**



Typ Model Type Tipo	**HR 2.0**	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. **2000R/0170**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**			Blatt Page Feuille Página	**7.92.11**

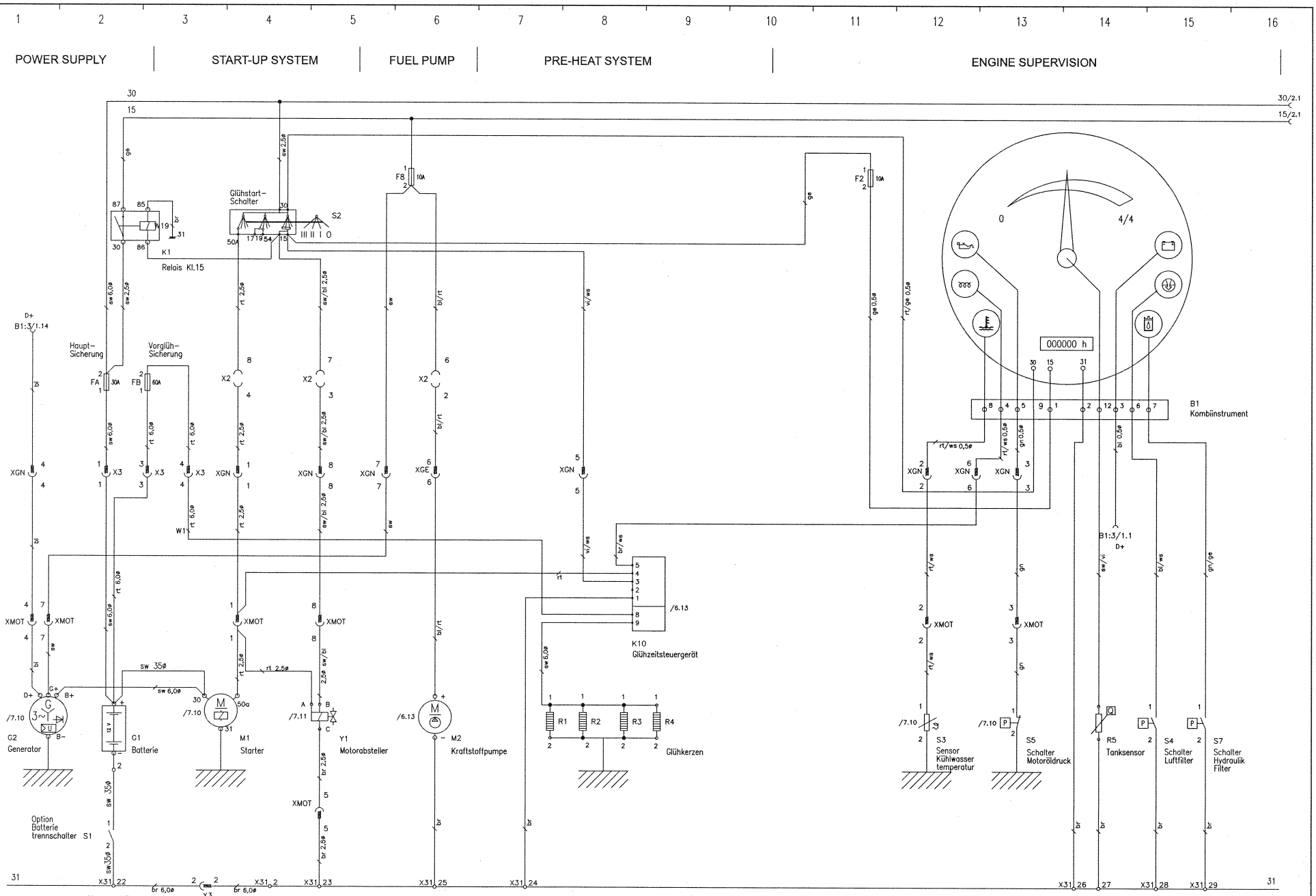


Typ Model Type Tipo	HR 2.0	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 2000R/0170	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos			Blatt Page Feuille Página	7.92.12

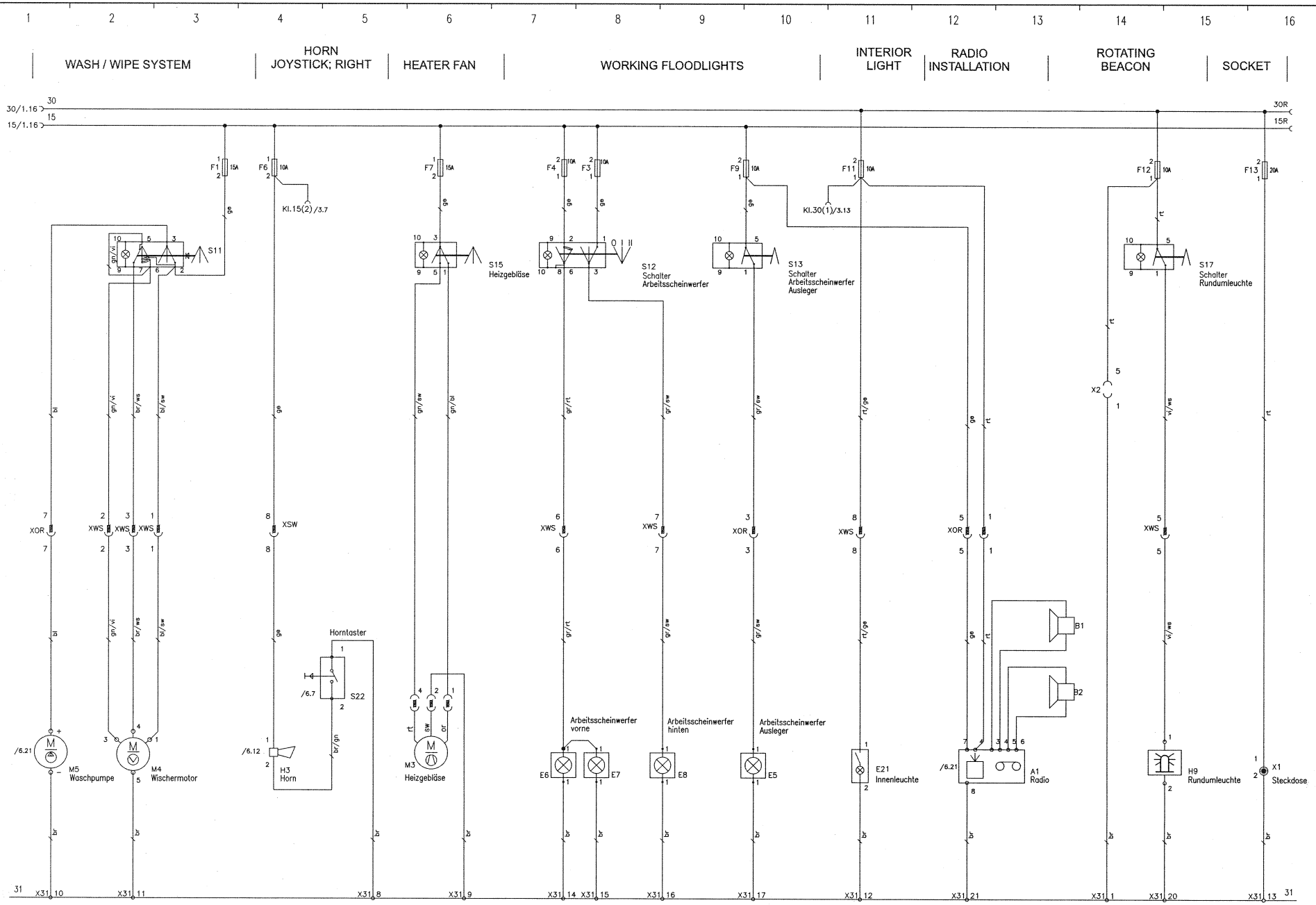


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Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos			Blatt Page Feuille Página	7.92.13

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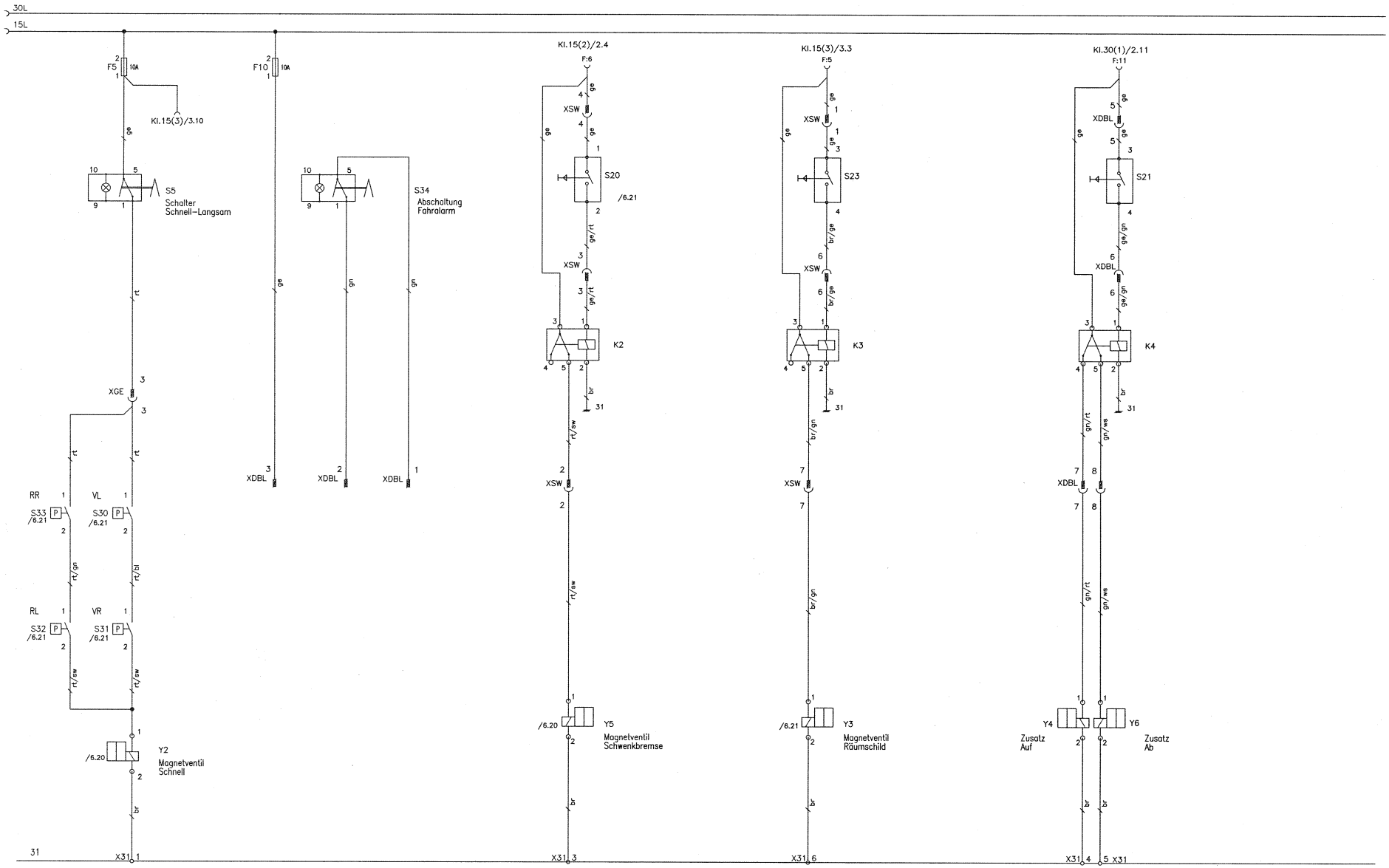
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Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.97.01**



Typ Model Type Tipo	**HR 3.7**	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	bis Fz.-Id.-Nr. up to s/n jusqu'au n/s al numero	**37000R/0186**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.97.02**

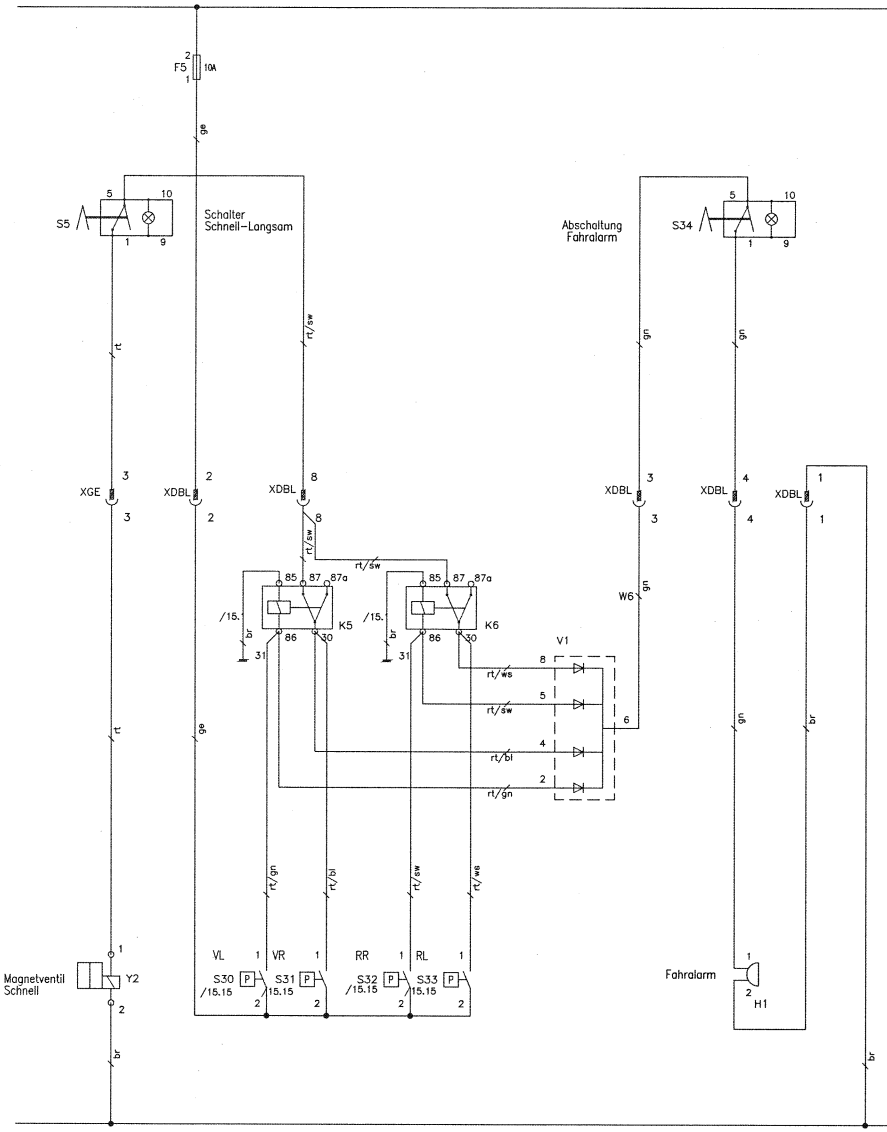
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

TRAVEL low / high speed	OPTION TRAVEL MOTION ALARM	*ONLY HR2.0* SWING BRAKE JOY-STICK BUTTON SWITCH LEFT	DOZER BLADE JOY-STICK BUTTON SWITCH RIGHT	OPTION 2nd CIRCUIT JOY-STICK BUTTON SWITCH RIGHT

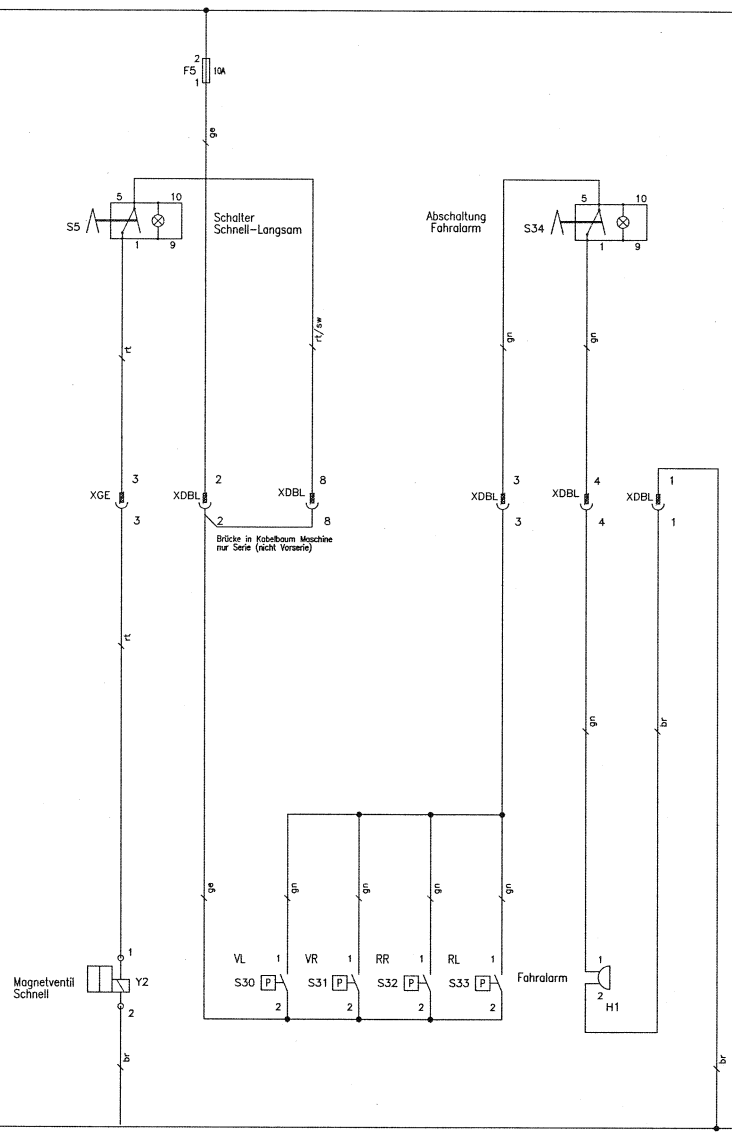


Typ Model Type Tipo	**HR 3.7**	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	bis Fz.-Id.-Nr. up to s/n jusqu'au n/s al numero	**3700R/0186**	Datum Edition Date Fecha	**01.2005**
Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.97.03**

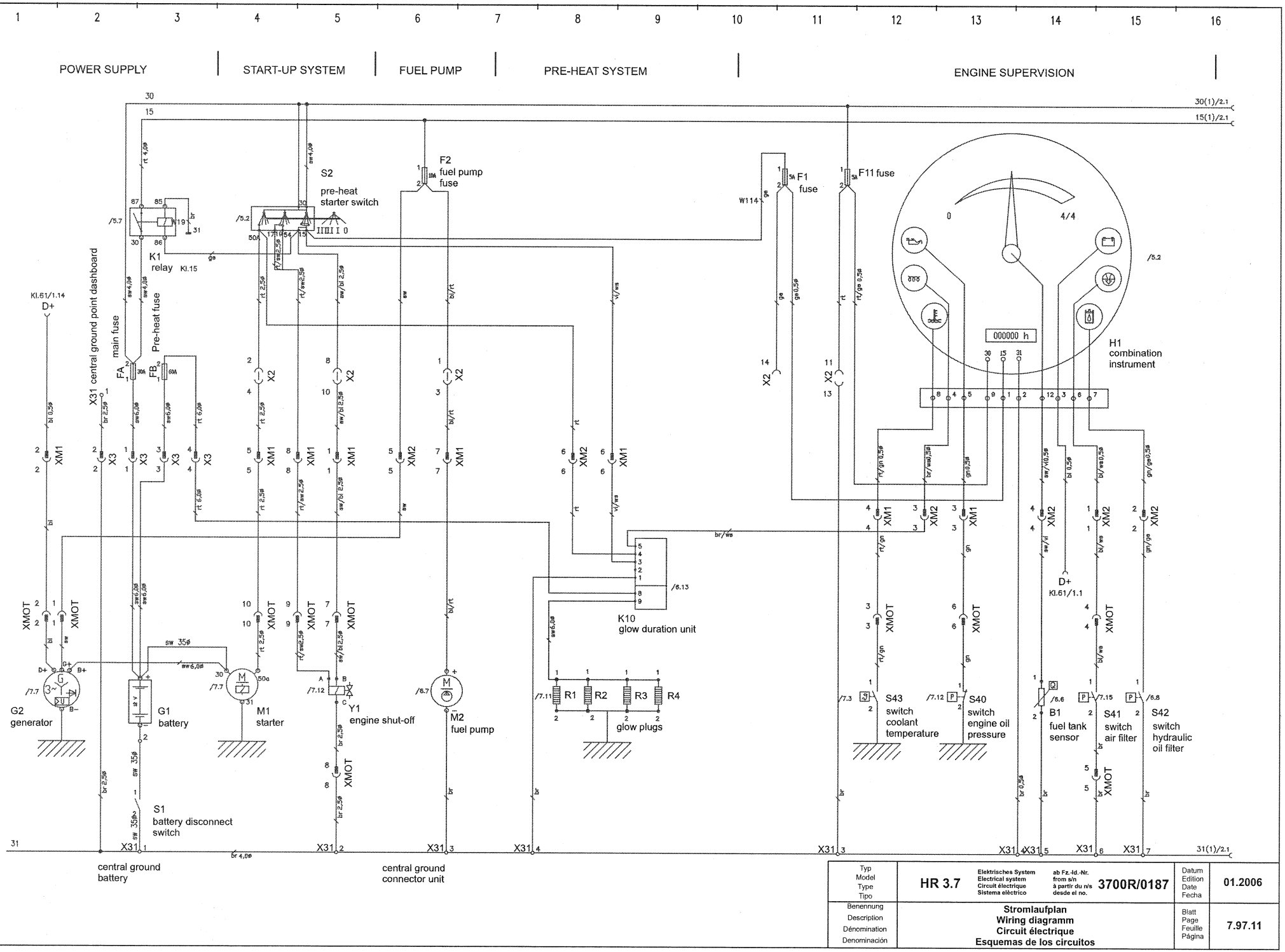
HR 3.7 OPTION travel motion alarm



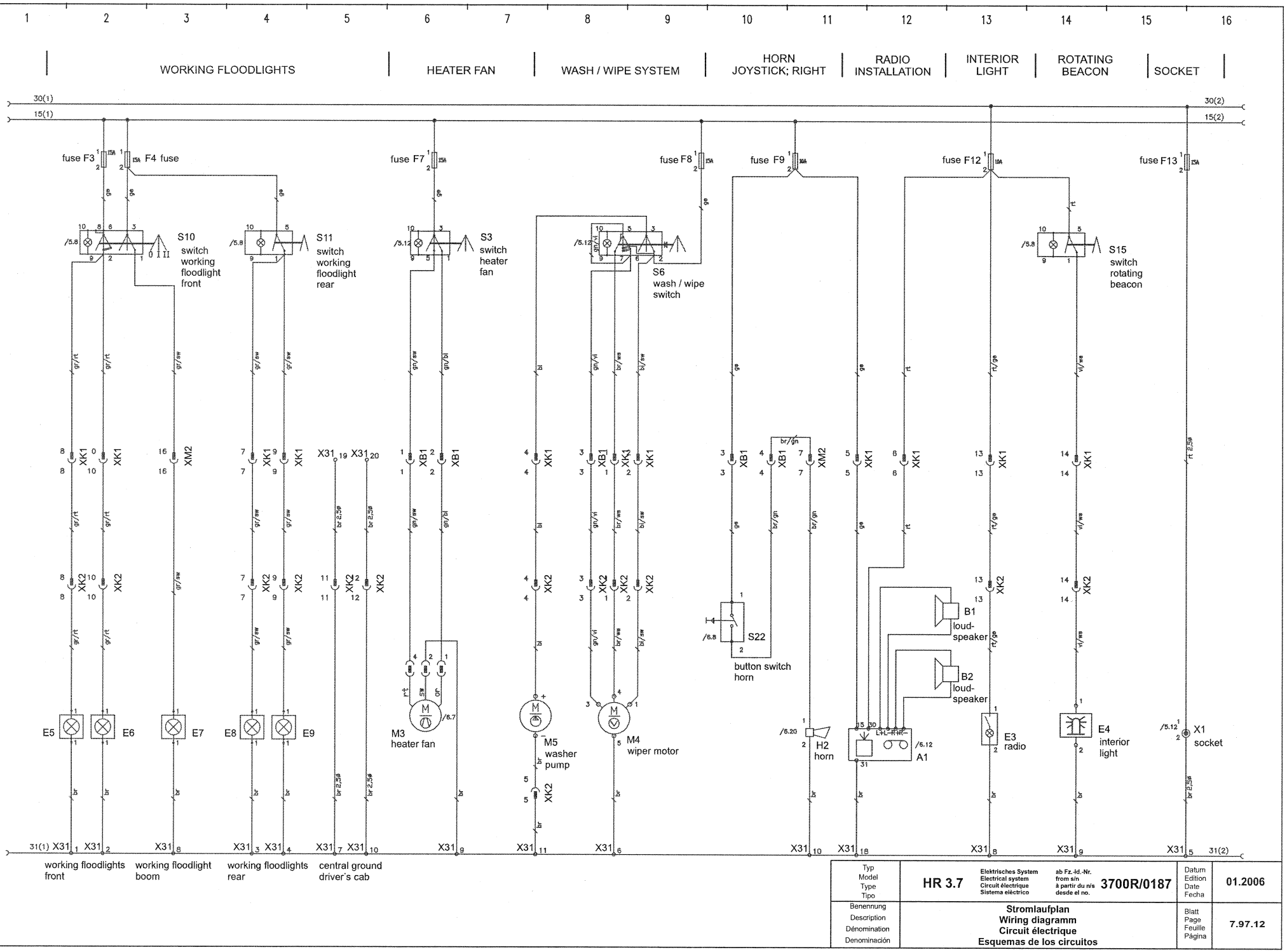
HR 1.6 / HR 2.0 OPTION travel motion alarm



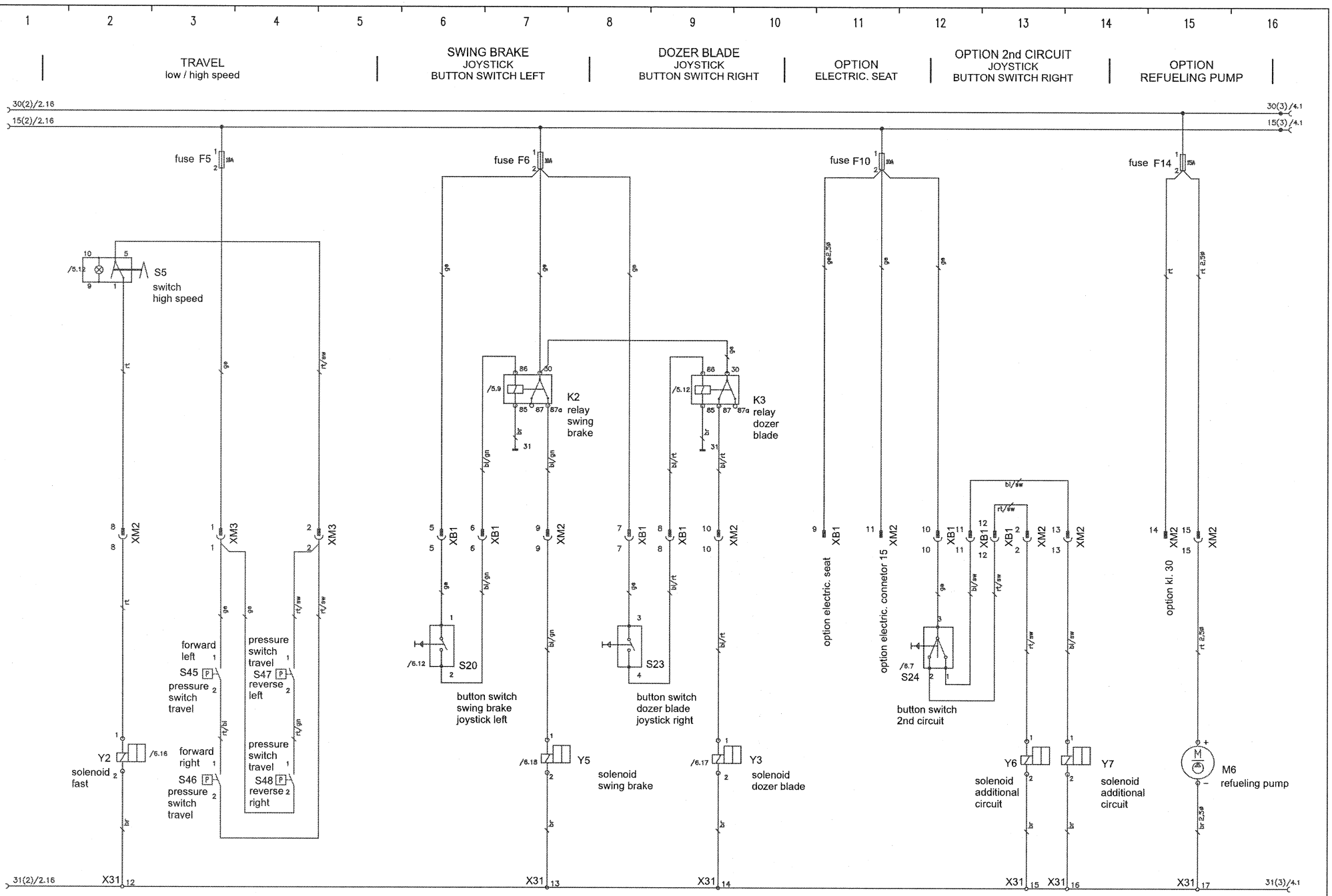
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Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**				Blatt Page Feuille Página	**7.97.04**



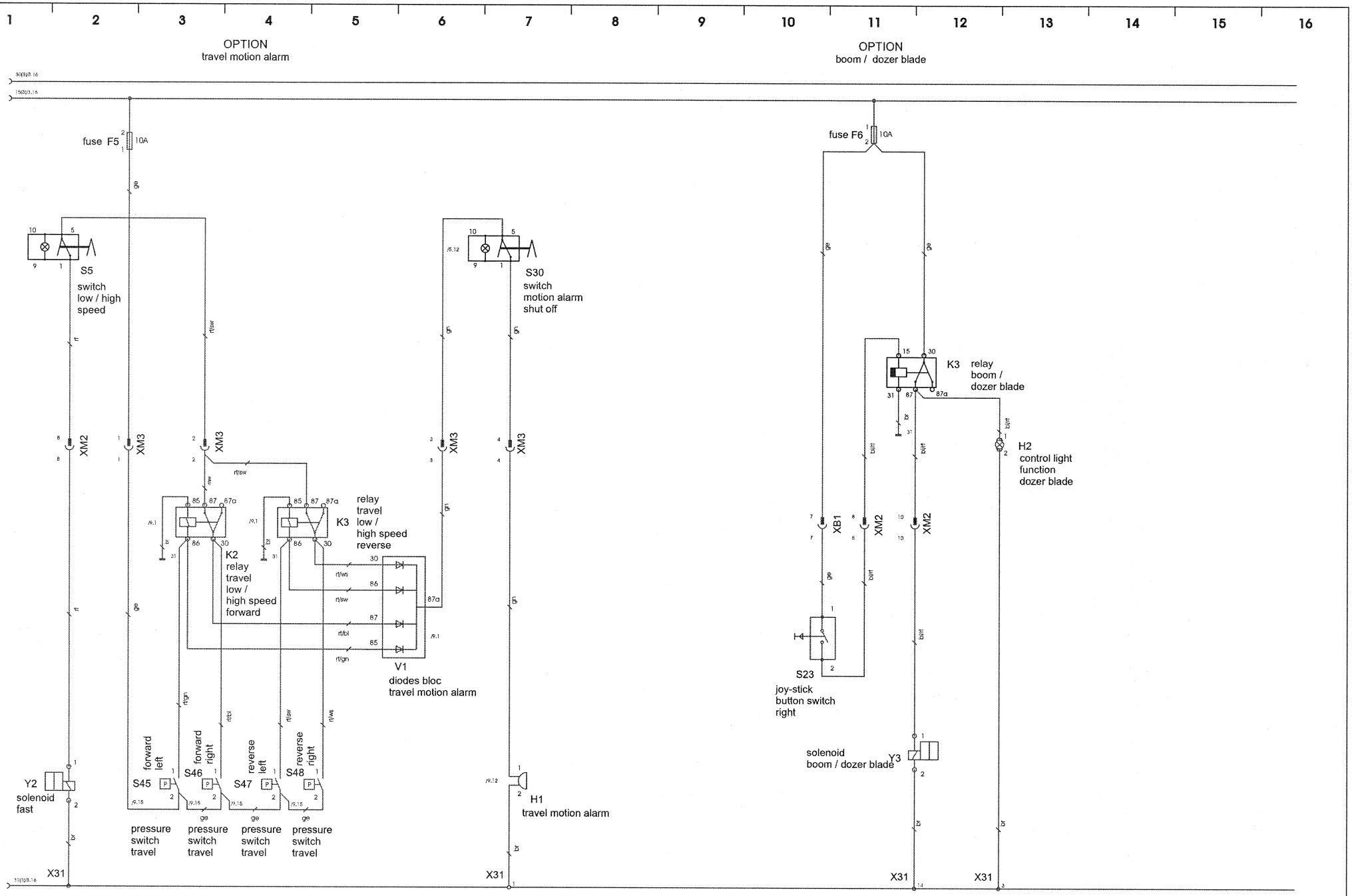
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Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos				Blatt Page Feuille Página	7.97.11



Typ Model Type Tipo	HR 3.7	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. 3700R/0187	Datum Edition Date Fecha	01.2006
Benennung Description Dénomination Denominación	Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos			Blatt Page Feuille Página	7.97.12



Typ Model Type Tipo	**HR 3.7**	Elektrisches System Electrical system Circuit électrique Sistema elèctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. **3700R/0187**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**			Blatt Page Feuille Página	**7.97.13**



Typ Model Type Tipo	**HR 3.7**	Elektrisches System Electrical system Circuit électrique Sistema eléctrico	ab Fz.-Id.-Nr. from s/n à partir du n/s desde el no. **3700R/0187**	Datum Edition Date Fecha	**01.2006**
Benennung Description Dénomination Denominación	**Stromlaufplan Wiring diagramm Circuit électrique Esquemas de los circuitos**			Blatt Page Feuille Página	**7.97.14**

Cable colours	Terminal	Significance	Nominal cross sections (mm^2) 0.75	1.5	2.5	4.0	6.0
black	30/49	Battery, positive, reverse, flasher	x	x	x	x	x
red	15	Glow starter, positive		x	x	x	
brown	31	Ground, negative	x	x	x	x	
blue	D+/61	Generator, working hour meter	x	x	x		
white	56a	High beam	x	x	x		
yellow	15	Switched positive output	x	x	x		
green		Oil pressure - engine	x	x	x		
grey		Switch forward - rectifier	x	x	x		
beige		Board check system		x			
black / red	54	Brake lights, stop light switch		x			
black / blue		Additional valve		x			
black / white	L	Flasher left, flasher check, terminal C		x			
black / green	R	Flasher right		x			
black / yellow		Parking brake - charge indicator light		x			
black / white / green	49a	Flasher switch		x			
black / grey	C2	Flasher indicator light		x			
black / violet	G	Fuel level gauge		x			
black / brown		Warning buzzer		x			
red / black		Axle lock		x			
red / white		Temperature indicator		x			
red / yellow		Hand brake switch - cabin lamp		x			
red / blue		Steering inversion		x			
red / green		4-wheel steering - crab		x			
red / brown		4-wheel steering - round		x			
brown / red		Hydr.oil cooler / transmitter / engine		x			
brown / white	17/31b	Warning lamp pre-glow / wiper motor		x			
brown / yellow		V-belt check, valve-breaker		x			
brown / green		Horn		x			
blue / red		Hydraulic pressure		x			
blue / brown		Diesel fuel heat., charge press. (fuel)		x			
blue / white		Air filter check		x			
blue / yellow		Armrest switch - pilot control		x			
blue / black		Electr. engine shut-off, wiper motor		x			
white / yellow	56b	Low beam		x			
white / grey	3	Light switch		x			
yellow / black		Heater fan switch - motor		x			
yellow / green		Hydr. filter clogging indicator		x			
green / red		Engine oil temperature light (Deutz)		x			
green / white		Hydraulic oil temperature		x			
green / violet		Windscreen wiper		x			
green / grey		Heater fan		x			
green / blue		Heater fan		x			
green / black		Heater fan		x			
grey / black		Side marker lamp left		x			
grey / red		Side marker lamp right, panel lamps / working floodlights		x			
violet / white		Rotating beacon		x			
green / white / red		Cooling water level		x			
green / black / white		Engine oil level		x			
green / white / violet		Hydraulic oil level		x			
orange		Slew limitation		x			
blue / green		Wiper switch		x			
blue / yellow / green (1,5)		Steering lock angle rear		x			
red / green / violet		Steering lock angle front		x			

In case of a bad battery charge, the functioning of the battery has to be checked prior to the generator replacement !

- Check tightness of eye connections at the generator **B+** = battery+ and **D+** = dynamo+, retighten if need be

- Check ground connection of **generator** to **engine** and **engine** to **chassis**

Simple test method:

- With volt meter with diesel engine turned off:
  from battery positive pole to generator housing

  The volt meter must indicate the voltage of the battery.

- With volt meter with running diesel engine:
  from ground cable to generator housing

  The volt meter must indicate nearly nothing.

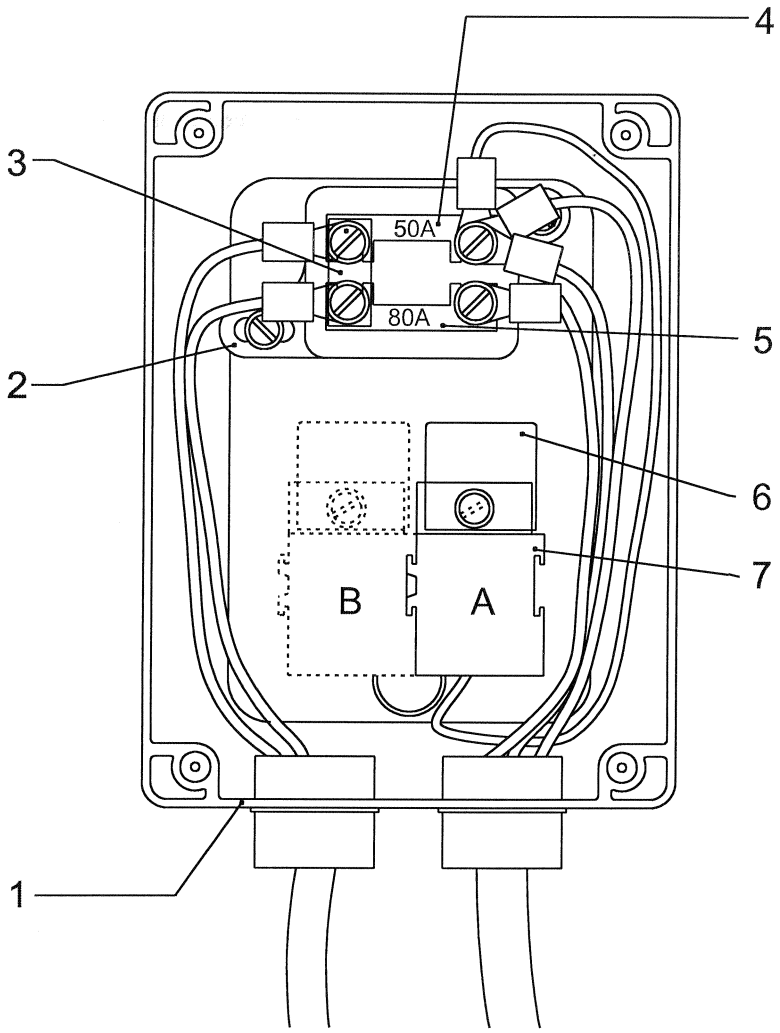
⇒ **In case of voltage drop, clean ground connection surfaces, ensure good contact.**

- Checking of the charge performance of the generator

- connect volt meter to the battery
- start the diesel engine
- voltage after approximately 5 minutes: **13.5 - 14.5 Volt**

⇒ **If one or several consumers (e.g. headlamps, windscreen wipers etc.) are switched on, the voltage must not drop below 13 V.**

Note: Also check the diodes in the fuse box.



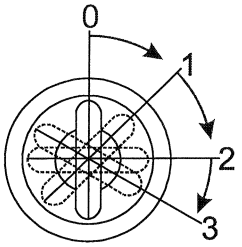
1	Cable distributor box	part no. 5 208 640 150
2	Blade-type fuse carrier	part no. 5 756 656 510
3	Bridge for blade-type fuse	part no. 6 179 007 110
4	Strip fuse 50 A	part no. 5 050 165 815
5	Strip fuse 80 A	part no. 5 050 165 880
	Strip fuse 30 A	part no. 5 050 165 810 (SMB 2041)
6	Relay 12V 70A	part no. 5 050 247 810
7	Relay base	part no. 5 050 247 815

A Starting relay for HML / SMB 2041 / HS / HR (except for mini-excavators)
(Please note: The glow duration unit for automatic pre-glow of the HML / HS / HR, including mini-excavators, is located in the engine compartment)

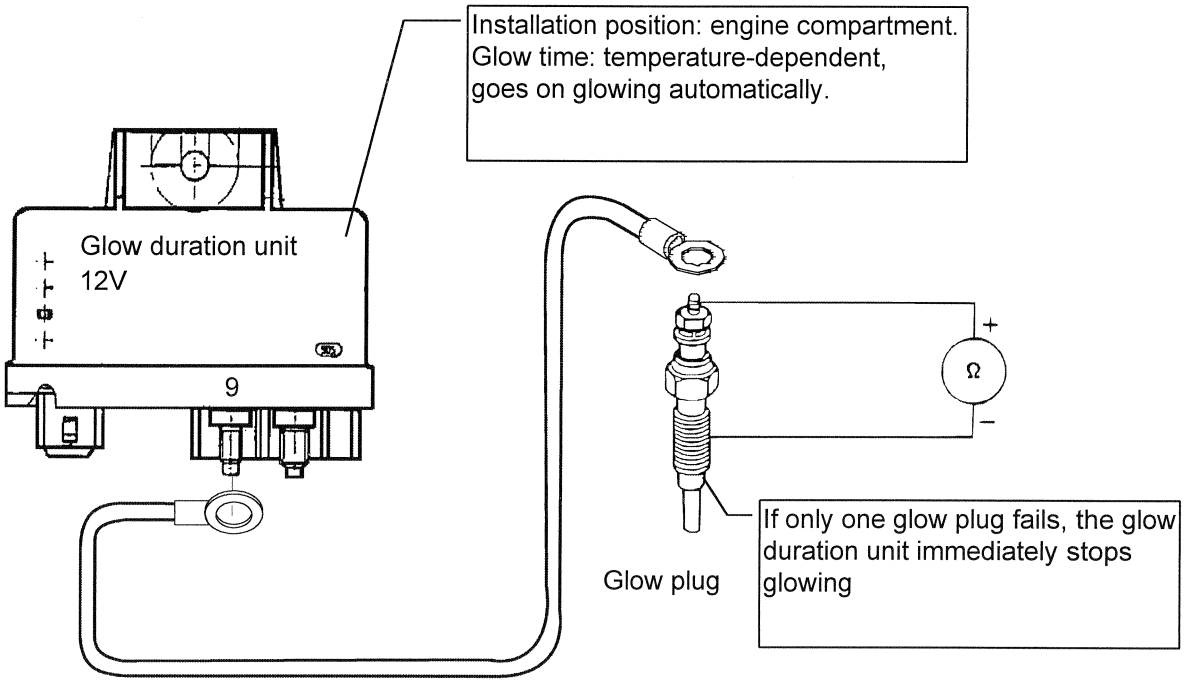
B Additional pre-glow relay for manual pre-glow only on SMB 2041

Type A: **Automatic pre-glow via ignition lock with glow duration unit and glow plugs**

Installed in: **HML 22 / 31 / 41** **HR 22 / 31 / 41** **HS 41** **HR 12 / 14 / 16 / 18**
SKL 823 / 833 **SKS 633**



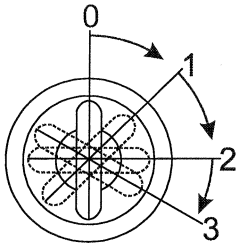
Ignition lock positions, engine start-up:
Ignition key is turned to position **1**
Warning lamps „charge control", „engine oil pressure" and „pre-glow" light up (pre-glow starts simultaneously).
Turn the ignition key to position **3** after the pre-glow monitoring has extinguished, the engine starts up (position **2** is skipped).



Trouble shooting: In case of problems with the pre-glow system, the glow plugs have to be checked prior to the replacement of the glow duration unit.
If the glow plugs do not have an electrical passage at the test and / or present a high ohmic resistance, the glow plugs have to be replaced.

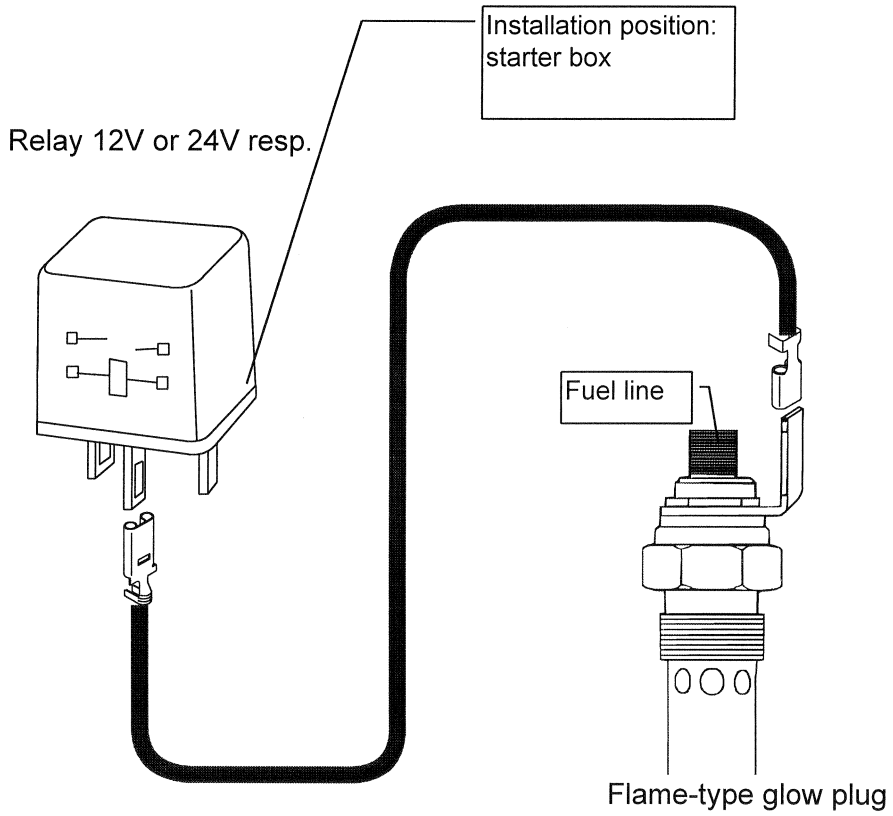
Type B: **Manual pre-glow via ignition lock with relay and flame-type glow plug, without glow duration unit**

Installed in:
SKL 843 (up to serial no. 843/0244)
SKL 853 (up to serial no. 853/0199)
SKL 871 / 873 / 877 (relay 24V and resistance for flame-type glow plug)
SKS 661
SMB 2041



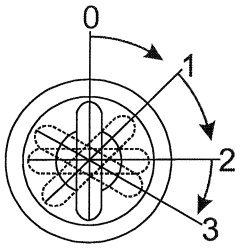
Ignition lock positions, engine start-up:
Turn ignition key to position **2**,
warning lamp „pre-glow" lights up, (pre-glow starts simultaneously), keep the ignition key in that position for approx. 15 sec. Then turn to position **3**, engine starts up.

Attention, no time relay, warning lamp does not extinguish automatically !
Too long pre-glowing may result in damage at the flame-type glow plug !

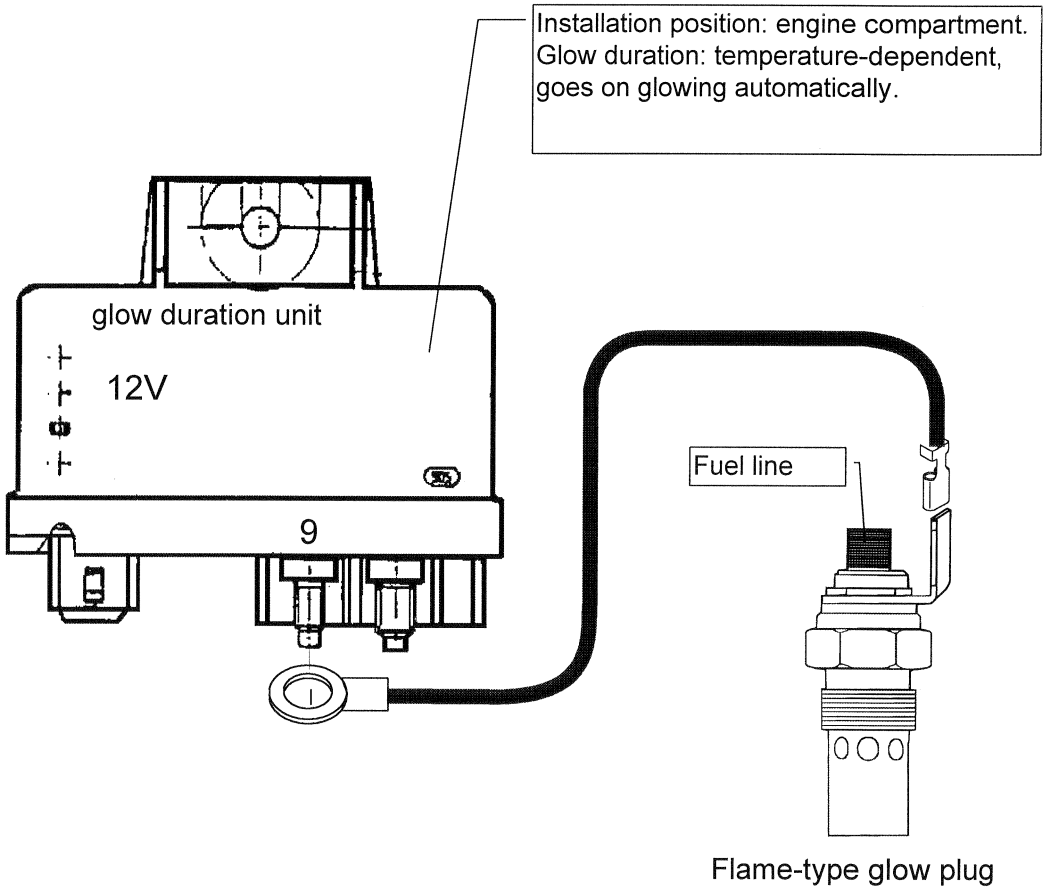


Type C: **Manual pre-glow via ignition lock with glow duration unit and flame-type glow plug**

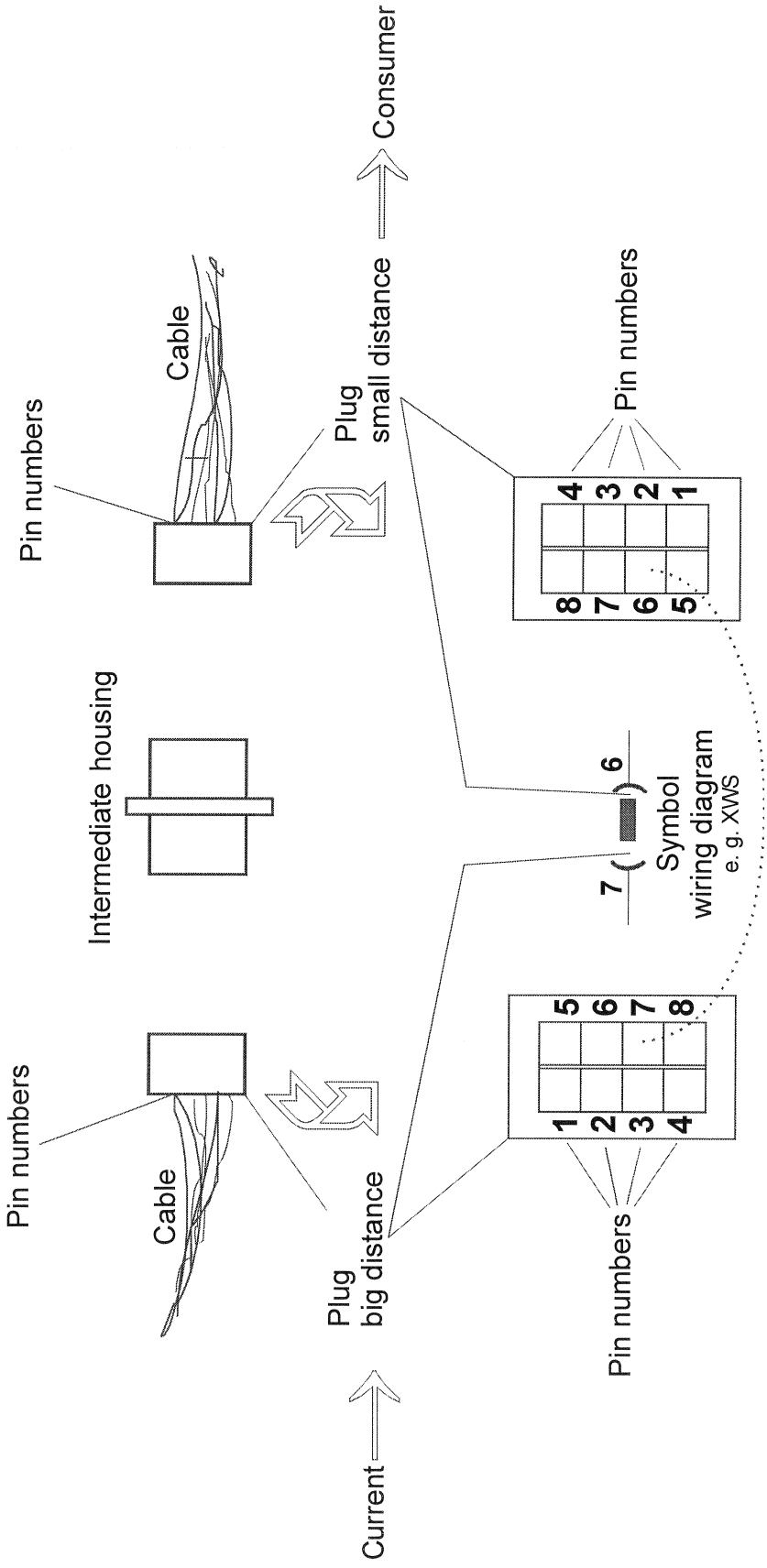
Installed in:
SKL 843 (from serial no. 843/0245)
SKL 853 (from serial no. 853/0200)
SKL 863



Ignition lock positions, engine start-up:
Turn ignition key to position **2,**
warning lamp „pre-glow" lights up, (pre-glow starts simultaneously).
Turn the ignition key to position **3** after the pre-glow monitoring has extinguished, engine starts up



Flame-type glow plug



SCHAEFF	Typ/Model/Type **Electrical system - general**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Plug connections**	Blatt/Page/Feuille **7.100.06**

Gewinde nicht bündig
Nennschaltabstand max. = 8 mm

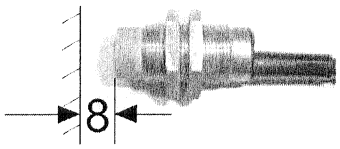
Thread not even
nominal switching distance max. = 8 mm

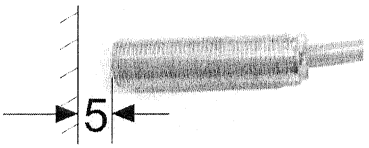
Filetage pas à fleur
distance de commutation nominale max. = 8 mm

Gewinde bündig
Nennschaltabstand max. = 5 mm

Thread even
nominal switching distance max. = 5 mm

Filetage à fleur
distance de commutation nom. max. = 5 mm

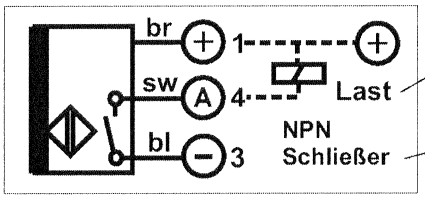




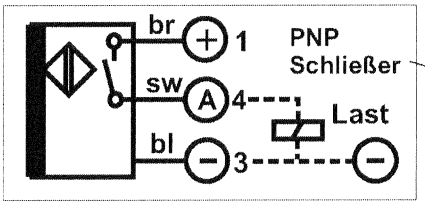
Anschlusskabel: 3 x 0,5 mm²
Connecting cable
Câble de raccordement

br - braun/ brown/ brun = Plus/ positive/ positif
bl - blau/ blue/ bleu = Masse/ ground/ masse
sw - schwarz/ black/ noir = Signal/ signal/ signal

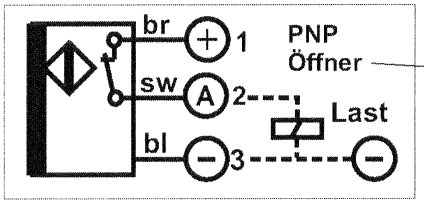
 # 5 350 639 017



 # 5 350 639 018



 # 5 350 639 019



Typ Model Type Tipo	Elektrisches System Electrical system Circuit électrique Sistema elèctrico	Datum Edition Date Fecha	01.2005
Benennung Description Dénomination Denominación	**Näherungsschalter** **Proximity switch** **Interrupteur de proximité**	Blatt Page Feuille Página	7.100.07

TEREX | SCHAEFF

SUBGROUP LIST

Maintenance
Inspection plans and test certificates

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SKL 834	8.24
SKL 844	8.26
SKL 854	8.27
SKL 160	8.28
SKL 260	8.30
SKS 634	8.37
HML 22	8.49
HML 23	8.49.50
HML 31	8.50
HML 32	8.51
HML 41	8.52
HML 42	8.53
HR 20	8.62
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HR 3.7	8.97

TEREX | SCHAEFF

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
	Perform work with machine at operating temperature	100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter		X	X	X	X	X	X		X
6	Clean fuel pump and screen	O	O	O	O	O	O	O		O
7	Check air intake	O	O	O	O	O	O	O		
8	Change air filter - main cartridge	**acc. to service indicator**								X
9	Change air filter - safety cartridge **1)**	**as required**								
10	Clean cooling fins of combined hydraulic oil/ water radiator. In case of high exposure to dust, shorten the cleaning intervals.	O	O	O	O	O	O	O		
11	Check antifreeze level in coolant									O
12	Change coolant **1)**	**as required**								
13	Check V-belt tension	O	O	O	O	O	O	O		
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
15	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
16	Check valve lash of engine and adjust if necessary	O		O		O		O		O
17	Check condition of engine breather and clean **1)**					O				
18	Check acid level and connections of battery	O	O	O	O	O	O	O		
19	Clean dust filter for cab ventilation or replace	O	O	X	O	X	O	X		X
20	Check condition of tyres, tyre pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
21	Check secure fastening of axles and cardan shaft	O	O	O	O	O	O	O		
22	Check bearing bushes and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
23	Check bushes and bolts of the articulation and the articulated steering and replace if necessary.	O	O	O	O	O	O	O		
24	Check that door catches function perfectly, replace if necessary	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
	Perform work with machine at operating temperature	100	500	1000	1500	2000	2500	3000		
25	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
26	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation	O	O	O	O	O	O	O		
28	Check or change hydraulic oil 2)	O	O	X	O	X	O	X		X
29	Replace insert of hydraulic oil filter	X	X	X	X	X	X	X	X	
30	Replace ventilation filter			X		X		X		X
31	Rear axle differential - oil check or oil change	O	X	O	X	O	X	O		X
32	Front axle differential - oil check or oil change	O	X	O	X	O	X	O		X
33	Gear: oil check or oil change	O	X	O	X	O	X	O		X
34	Wheel hubs of front/ rear axles: oil check or oil change	O	X	O	X	O	X	O		X
35	Check function of brakes and replace brake oil	O	O	O	O	X	O	O		X
36	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
37	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
38	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
39	Test run and test work	O	O	O	O	O	O	O		
40	Initial inspection cards and return to Schaeff	O	O	O						

2) **Extension of hydraulic oil change interval -**
Hydraulic oil change according to oil sample analysis and lab report. Oil sample intervals as specified by test lab.

SKL 863, serial no. 863/.....

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2350^{+70}						
Engine, low idle running speed	min^{-1}	750^{+50}						
Charge pressure, pilot pressure	bar	28^{+5}						high idle running speed
Start-up speed	min^{-1}	1150 ±50						
Engine stalling	min^{-1}	2000 ±50						full throttle, 240 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	220						dynamic at 2100 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	25						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	300	---					
Tilting	bar	160	280					
Add. control circuit	bar	230	230					
Steering	bar	175	175					full throttle

Inspection plan
To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter		X	X	X	X	X	X		X
6	Clean fuel pump and screen		O	O	O	O	O	O		O
7	Check air intake	O	O	O	O	O	O	O		
8	Change air filter - main cartridge	**acc. to service indicator**								X
9	Change air filter - safety cartridge **1)**	**as required**								
10	Clean cooling fins of combined hydraulic oil/ water radiator. ⚠ In case of high exposure to dust, shorten the cleaning intervals.	O	O	O	O	O	O	O		
11	Check antifreeze level in coolant									O
12	Change coolant **1)**	**as required**								
13	Check V-belt tension	O	O	O	O	O	O	O		
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
15	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
16	Check valve lash of engine and adjust if necessary	O		O		O		O		O
17	Check condition of engine breather system and clean **1)**					O				
18	Check acid level and connections of batteries	O	O	O	O	O	O	O		
19	Clean dust filter for cab ventilation or replace	O	O	X	O	X	O	X		X
20	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
21	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
22	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
23	Check bushings and bolts of the pivot point and the articulated steering and replace if necessary.	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
24	Check that door catches function perfectly, replace if necessary	O	O	O	O	O	O	O		
25	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
26	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.	O	O	O	O	O	O	O		
28	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
29	Replace insert of hydraulic oil suction filter	X	X	X	X	X	X	X	X	
30	Replace insert of hydraulic oil return filter	X	**according to service indicator**							X
31	Replace ventilation filter			X		X		X		X
32	Check function of brakes and brake disc play	O	O	O	O	O	O	O		
33	Bleed brake	O	O	O	O	O	O	O		
34	Front axle differential - oil check or oil change	O	X	O	X	O	X	O		X
35	Rear axle differential - oil check or oil change	O	X	O	X	O	X	O		X
36	Transmission: oil check or oil change	O	X	O	X	O	X	O		X
37	Wheel hubs of front/ rear axles: oil check or oil change	O	X	O	X	O	X	O		X
38	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
39	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
40	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
41	Test run and test work	O	O	O	O	O	O	O		
42	Initial inspection cards and return to **Schaeff**	O	O	O						

2) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample intervals as specified by test lab.

SKL 873, serial no. 873/.....

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2350^{+70}						
Engine, low idle running speed	min^{-1}	750^{+50}						
Charge pressure, pilot pressure	bar	32^{+1}						high idle running speed
Start-up speed	min^{-1}	1150 ±50						
Engine stalling	min^{-1}	2000^{+100}						full throttle, 220 bar HP, rabbit, dyn.
Pressure cut-off	bar	440^{+10}						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	210						dynamic at 2100 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	280	280					
Add. control circuit	bar	230	230					
Steering	bar	175	175					full throttle

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, Maintenance* X = *Replace*		Operating hours				2x min.	1x min.	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil			X [2]			X	
3	Change engine oil filter			X			X	
4	Drain water from fuel tank	O	O			O		
5	Change fuel filter			X			X	
6	Clean fuel pump and screen filter			O				
7	Check air intake	O	O					
8	Change air filter - main cartridge	**to service indicator**					X	
9	Change air filter - safety cartridge	**as required** [1]						
10	Clean cooling fins of hydraulic oil radiator. ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
11	Clean cooling fins of engine oil radiator ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
12	Check V-belt tension	O		O				
13	Check engine mounts and pump attachments	O	O					
14	Check engine speed adjustment, top-end and low idle speed	O	O					
15	Check valve lash of engine and adjust if necessary			O				
16	Check injection valves				O			
17	Check fuel leak oil pipe and replace if necessary			O	X[1]			
18	Replace toothed belt [3]							
19	Check crankcase breather in valve cover				O			
20	Check acid level and battery connections	O	O					
21	Check condition of tires, tire pressure and tightness of wheel nuts	O	O					
22	Check secure fastening of axles and propeller shaft	O	O					
23	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
24	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O					

O = *Checking, Maintenance* X = *Replace*		Operating hours				2x min.	1x min.	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
25	Check that door catches function perfectly, and replace if necessary	O	O					
26	Clean or replace the dust filter for cab ventilation	O		X			X	
27	Check electrical indicating and warning elements, and lighting system	O	O					
28	Check smooth running of operator controls and adjust if necessary	O	O					
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O					
30	Check or change hydraulic oil	O	O	X [2)]			X	
31	Replace insert of hydraulic oil return suction filter	X	X			X		
32	Replace breather			X			X	
33	Check function of brakes and replace brake oil	O	O		X		X	
34	Bleed brake	O	O					
35	Rear axle differential with transmission / option: transmission: oil check or oil change	X	O	X [2)]			X	
36	Front axle differential - oil check or oil change	X	O	X [2)]			X	
37	Wheel hubs of front and rear axles: oil check or oil change	X	O	X [2)]			X	
38	Grease machine according to overview of lubricating points	O	O					
39	Check function, condition and completeness of safety equipment	O	O					
40	Hydraulic function check with pressure function test	O	O					
41	Test run and test work	O	O					
42	Initial inspection cards and return to **SCHAEFF-TEREX**	O	O [4)]					

1) at least every 2 years

2) Extension of oil change intervals according to **SCHAEFF-TEREX** oil sample analysis and lab report.

3) Every 5 years or 5,000 operating hours respectively

4) within warranty

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	$2{,}450^{+50}$						
Engine, low idle running speed	min^{-1}	850^{+50}						
Charge pressure, pilot pressure	bar	30^{+5}						high idle running speed
Start-up speed	min^{-1}	1,150						
Engine stalling	min^{-1}	2,100						full throttle, 260 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	240						dynamic at 2200 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	22						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	160	280					
Add. control circuit	bar	230	230					
Steering	bar	175	175					

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, Maintenance* **X = *Replace***		**Operating hours**				2x min.	1x min.	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil			X [2)]			X	
3	Change engine oil filter			X			X	
4	Drain water from fuel tank	O	O			O		
5	Change fuel filter			X			X	
6	Clean fuel pump and screen filter			O				
7	Check air intake	O	O					
8	Change air filter - main cartridge	**to service indicator**					X	
9	Change air filter - safety cartridge	**as required [1)]**						
10	Clean cooling fins of hydraulic oil radiator. ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
11	Clean cooling fins of engine oil radiator ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
12	Check V-belt tension	O		O				
13	Check engine mounts and pump attachments	O	O					
14	Check engine speed adjustment, top-end and low idle speed	O	O					
15	Check valve lash of engine and adjust if necessary			O				
16	Check injection valves				O			
17	Check fuel leak oil pipe and replace if necessary			O	X [1)]			
18	Replace toothed belt [3)]							
19	Check crankcase breather in valve cover				O			
20	Check acid level and battery connections	O	O					
21	Check condition of tires, tire pressure and tightness of wheel nuts	O	O					
22	Check secure fastening of axles and propeller shaft	O	O					
23	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
24	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O					

O = *Checking, Maintenance* X = *Replace*		Operating hours				2x min.	1x min.	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
25	Check that door catches function perfectly, and replace if necessary	O	O					
26	Clean or replace the dust filter for cab ventilation	O		X			X	
27	Check electrical indicating and warning elements, and lighting system	O	O					
28	Check smooth running of operator controls and adjust if necessary	O	O					
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O					
30	Check or change hydraulic oil	O	O	X 2)			X	
31	Replace insert of hydraulic oil return suction filter	X	X			X		
32	Replace breather			X			X	
33	Check function of brakes and replace brake oil	O	O		X		X	
34	Bleed brake	O	O					
35	Rear axle differential with transmission / option: transmission: oil check or oil change	X	O	X 2)			X	
36	Front axle differential - oil check or oil change	X	O	X 2)			X	
37	Wheel hubs of front and rear axles: oil check or oil change	X	O	X 2)			X	
38	Grease machine according to overview of lubricating points	O	O					
39	Check function, condition and completeness of safety equipment	O	O					
40	Hydraulic function check with pressure function test	O	O					
41	Test run and test work	O	O					
42	Initial inspection cards and return to **SCHAEFF**	O	O 4)					

1) at least every 2 years

2) Extension of oil change intervals according to **SCHAEFF-TEREX** oil sample analysis and lab report.

3) Every 5 years or 5,000 operating hours respectively

4) within warranty

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	$2{,}550^{+50}$						
Engine, low idle running speed	min^{-1}	850^{+50}						
Charge pressure, pilot pressure	bar	30^{+5}						high idle running speed
Start-up speed	min^{-1}	1,150						
Engine stalling	min^{-1}	2,200						full throttle, 220 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	180						dynamic at 2,300 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	22						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	160	280					
Add. control circuit	bar	230	230					
Steering	bar	175	175					

Inspection plan

To be carried out by trained specialist dealer personnel

		Operating hours					
O = *Checking, Maintenance* X = *Replace*		after 100	every 500	every 1000	every 2000	2x min. jearly	1x min. jearly
Perform work with machine at operating temperature							
1	Check whether machine-specific instruction book is in the machine	O	O				
2	Change engine oil		X [2)]				X
3	Change engine oil filter		X				X
4	Drain water from fuel tank	O	O			O	
5	Change fuel filter			X			X
6	Clean fuel pump and screen filter			O			
7	Check air intake	O	O				
8	Change air filter - main cartridge	to service indicator					X
9	Change air filter - safety cartridge	as required [1)]					
10	Clean cooling fins of hydraulic oil cooler (combined cooler). ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O	
11	Clean cooling fins of engine oil cooling system (comb. cooler). ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O	
12	Check V-belt tension	O		O			
13	Check engine mounts and pump attachments	O	O				
14	Check engine speed adjustment, top-end and low idle speed	O	O				
15	Check valve lash of engine and adjust if necessary			O			
16	Check injection valves				O		
17	Check fuel leak oil pipe and replace if necessary			O	X [1)]		
18	Replace toothed belt [3)]						
19	Check crankcase breather in valve cover				O		
20	Check acid level and battery connections	O	O				
21	Check condition of tires, tire pressure and tightness of wheel nuts	O	O				
22	Check secure fastening of axles and propeller shaft	O	O				
23	Check bearing bushings and bolts of work equipment and replace if necessary	O	O				
24	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O				
25	Check that door catches function perfectly, and replace if necessary	O	O				
26	Clean or replace the dust filter for cab ventilation	O		X			X
27	Check electrical indicating and warning elements, and lighting system	O	O				
28	Check smooth running of operator controls and adjust if necessary	O	O				

Inspection plan

To be carried out by trained specialist dealer personnel

		Operating hours					
O = *Checking, Maintenance* X = *Replace* Perform work with machine at operating temperature		after 100	every 500	every 1000	every 2000	2x min. jearly	1x min. jearly
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.	O	O				
30	Check or change hydraulic oil	O	O	X [2)]			X
31	Replace insert of hydraulic oil return suction filter	X	X			X	
32	Replace breather			X			X
33	Check function of brakes and replace brake oil	O	O		X		X
34	Bleed brake	O	O				
35	Rear axle differential with transmission / option: transmission: oil check or oil change	X	O	X [2)]			X
36	Front axle differential - oil check or oil change	X	O	X [2)]			X
37	Wheel hubs of front and rear axles: oil check or oil change	X	O	X [2)]			X
38	Grease machine according to overview of lubricating points	O	O				
39	Check function, condition and completeness of safety equipment	O	O				
40	Hydraulic function check with pressure function test	O	O				
41	Test run and test work	O	O				
42	Initial inspection cards and return to manufacture	O	O [4)]				

1) at least every 2 years

2) Extension of oil change intervals according to oil sample analysis and lab report.

3) Every 5 years or 5,000 operating hours respectively

4) within warranty

SKL 844 **from serial no. 844/0100**

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2,350 $^{+50}$						
Engine, low idle running speed	min^{-1}	850 $^{+50}$						
Charge pressure, pilot pressure	bar	30 $^{\pm 1}$						high idle running speed
Start-up speed	min^{-1}	1,150						
Engine stalling	min^{-1}	2,000 $^{-100}$						full throttle, 280 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	250						dynamic at 2,100 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	22						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	160	280					
Add. control circuit	bar	230	230					
Steering	bar	175	175					

Inspection plan

Work to be carried out by trained specialist dealer personnel.

O = Checking, maintenance X = Replace Perform work with machine at operating temperature		Operating hours				min. 2 x annually	min. 1 x annually
		after 100	every 500	every 1000	every 2000		
1	Check whether machine-specific instruction book is in the machine.	O	O				
2	Change engine oil.		X				X
3	Change engine oil filter.		X				X
4	Drain water from fuel tank.	O	O			O	
5	Change fuel filter.		X				X
6	Check the air intake.	O	O				
7	Replace the air filter main cartridge.	according to the service indicator					X
8	Replace the air filter safety cartridge.	as required [1]					
9	Clean cooling fins on the hydraulic oil cooler. ***Machine damage*** *due to strong accumulation of dust.* • *Shorten the cleaning intervals.*	O	O			O	
10	Clean cooling fins of water cooler (combined cooler). ***Machine damage*** *due to strong accumulation of dust.* • *Shorten the cleaning intervals.*	O	O			O	
11	Check antifreeze level in coolant.						O
12	Change coolant.	as required [1]					
13	Check V-belt tension.	O	O				
14	Check engine mounts and pump attachments.	O	O				
15	Check engine speed adjustment, upper and lower idling speeds.	O	O				
16	Check valve lash of engine and adjust if necessary.			O			O
17	Check injection valves.			O			
18	Check crankcase breather in valve cover.				O		
19	Check acid level and battery connections.	O	O				
20	Check condition of tires, tire pressure and tightness of wheel nuts.	O	O				
21	Check fastening of axles and propeller shaft.	O	O				
22	Check bearing bushings and bolts of work equipment and replace if necessary.	O	O				
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O				

O = Checking, maintenance X = Replace Perform work with machine at operating temperature		Operating hours				min. 2 x	min. 1 x
		after 100	every 500	every 1000	every 2000	annu-ally	annu-ally
24	Check that door catches function perfectly, and replace if necessary.	O O					
25	Clean or replace the dust filter for cab ventilation.	O		X			X
26	Check electrical indicating and warning elements and lighting equipment.	O O					
27	Check smooth running of operator controls and adjust if necessary.	O O					
28	Check for leaks in all pipes, hoses, control valves, hydraulic pumps, cylinders, etc. ***Attention*** *The screw-in couplings must be locked when tightening hose and line connections to prevent rotation.*	O O					
29	Check or change hydraulic oil.	O	O	X [2]			X
30	Replace insert of hydraulic oil return suction filter.	X	X			X	
31	Replace breather.			X			X
32	Check function of brakes, replace brake oil.	O	O		X		X
33	Bleed brake.	O	O				
34	Differential – rear axle with transmission / Option: manual transmission: oil check or oil change resp.	X X	O	X			
35	Differential – front axle oil: check or oil change resp.	X	O	X			X
36	Wheel hubs of front and rear axles: oil check or oil change.	X	O	X			X
37	Grease machine according to overview of lubricating points.	O	O				
38	Check function, condition and completeness of safety devices.	O	O				
39	Hydraulic function check with pressure function test.	O	O				
40	Test run and test work.	O	O				
41	Initial inspection card and return to manufacturer.	O	O [3]				

[1] *At least once every two years.*

[2] *Extension of oil change intervals after an oil analysis and laboratory report*

[3] *Within the warranty period.*

TEREX | SCHAEFF

SKL 854 **from serial no. 854/0100**

	Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading							
Engine, high idle running speed min^{-1}	2,350 $^{+50}$						
Engine, low idle running speed min^{-1}	750 $^{+50}$						
Charge pressure, pilot pressure bar	30 $^{\pm 1}$						high idle running speed
Start-up speed min^{-1}	1,150						
Engine stalling min^{-1}	2,000 $^{-100}$						full throttle, 240 bar HP, rabbit, dyn.
Pressure cut-off bar	450						
High pressure (SV) bar	480						
Regulation start DA-motor bar	220						dynamic at 2,100^{-50} min^{-1}
Cardan shaft rev. min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching bar	5 - 13						
Pressure switch, hydrostatic brake bar	22						
Main pressure relief valve bar	250						full throttle, 50° - 60° C
Line relief pressures	**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders							
Lifting frame bar	280	---					
Tilt bar	130	280					
Add. control circuit bar	230	230					
Steering bar	175	175					

SKL 160 **from serial no. 160/0100**

	Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading							
Engine, high idle running speed min^{-1}	2,350 $^{+50}$						
Engine, low idle running speed min^{-1}	750 $^{+50}$						
Charge pressure, pilot pressure bar	30 $^{\pm 1}$						high idle running speed
Start-up speed min^{-1}	1,150						
Engine stalling min^{-1}	2,000 $^{-100}$						full throttle, 230 bar HP, rabbit, dyn.
Pressure cut-off bar	460 $^{\pm 10}$						
High pressure (SV) bar	490						
Regulation start DA-motor bar	220						dynamic at 2,100^{-50} min^{-1}
Cardan shaft rev. min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching bar	5 - 13						
Pressure switch brake warning beginning at bar	80						enough for at least 3 brake controls
Stand-by pressure bar	28 $^{+2}$						full throttle
Main pressure relief valve bar	310						full throttle, 50° - 60° C
Line relief pressures	**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders							
Lifting frame bar	340	---					
Tilt bar	340	340					
Add. control circuit bar	230	230					
Steering bar	175	175					

TEREX | SCHAEFF

SKL 260 from serial no. 260/0100

	Desired value	Actual value	Adjusted	Remark
Engine, transmission, brake, steering, loading				
Engine, high idle running speed min^{-1}	2,350 $^{+50}$			
Engine, low idle running speed min^{-1}	750 $^{+50}$			
Charge pressure, pilot pressure bar	30 $^{\pm 1}$			high idle running speed
Start-up speed min^{-1}	1,150 $^{\pm 50}$			
Engine stalling min^{-1}	2,000 $^{-100}$			full throttle, 280 bar HP, rabbit, dyn.
Pressure cut-off bar	440 $^{\pm 10}$			
High pressure (SV) bar	480			
Regulation start DA-motor bar	260			dynamic at 2,100 $^{-50}$ min^{-1}
Cardan shaft rev. min^{-1}	see Techn. Data Chapter 2			
Beginning / end of inching bar	5 - 13			
Pressure switch brake warning beginning at bar	80			enough for at least 3 brake controls
Stand-by pressure bar	36 $^{+2}$			full throttle
Main pressure relief valve bar	315 $_{-10}$			full throttle, 50° - 60° C

Line relief pressures	**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders							
Lifting frame bar	340	---					
Tilt bar	340	340					
Add. control circuit bar	230	230					
Steering bar	175	175					

TEREX | SCHAEFF

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, Maintenance* X = *Replace*		Operating hours				2x min.	1x min.	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil			X			X	
3	Change engine oil filter			X			X	
4	Drain water from fuel tank	O	O			O		
5	Change fuel filter			X			X	
6	Clean fuel pump and screen filter			O				
7	Check air intake	O	O					
8	Change air filter - main cartridge	**to service indicator**					X	
9	Change air filter - safety cartridge	**as required** [1]						
10	Clean cooling fins of hydraulic oil cooler ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
11	Clean cooling fins of engine oil cooling system ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
12	Check V-belt tension	O		O				
13	Check engine mounts and pump attachments	O	O					
14	Check engine speed adjustment, top-end and low idle speed	O	O					
15	Check valve lash of engine and adjust if necessary			O				
16	Check injection valves				O			
17	Check fuel leak oil pipe and replace if necessary			O	X[1]			
18	Replace toothed belt [3]							
19	Check crankcase breather in valve cover				O			
20	Check acid level and battery connections	O	O					
21	Check condition of tires, tire pressure and tightness of wheel nuts	O	O					
22	Check secure fastening of axles and propeller shaft	O	O					
23	Check that ring gear attachment screws are securely fastened	O	O					

1) at least every 2 years

3) Every 5 years or 5,000 operating hours respectively

O = *Checking, Maintenance* X = *Replace* **Perform work with machine at operating temperature**		**Operating hours**				2x min. yearly	1x min. yearly	
		after 100	every 500	every 1,000	every 2,000			
24	Check function of axle lock and vent cylinders	O	O					
25	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
26	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O					
27	Check that door catches function perfectly, and replace if necessary	O	O					
28	Clean or replace the dust filter for cab ventilation	O		X			X	
29	Check electrical indicating and warning elements, and lighting system	O	O					
30	Check smooth running of operator controls and adjust if necessary	O	O					
31	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O					
32	Check or change hydraulic oil	O	O	X [2)]			X	
33	Replace insert of hydraulic oil return suction filter	X	X			X		
34	Replace breather			X			X	
35	Check function of brakes and replace brake oil	O	O		X		X	
36	Bleed brake	O	O					
37	Rear axle differential with transmission / option: transmission: oil check or oil change	X	O	X [2)]			X	
38	Front axle differential - oil check or oil change	X	O	X [2)]			X	
39	Wheel hubs of front and rear axles: oil check or oil change	X	O	X [2)]			X	
40	Grease machine according to overview of lubricating points	O	O					
41	Check function, condition and completeness of safety equipment	O	O					
42	Hydraulic function check with pressure function test	O	O					
43	Test run and test work	O	O					
44	Initial inspection cards and return to **SCHAEFF-TEREX**	O	O [4)]					

1) at least every 2 years

2) Extension of oil change intervals according to **SCHAEFF-TEREX** oil sample analysis and lab report.

3) Every 5 years or 5,000 operating hours respectively

4) within warranty

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2,550 $^{+50}$						
Engine, low idle running speed	min^{-1}	850 $^{+50}$						
Charge pressure, pilot pressure	bar	30 $^{+5}$						high idle running speed
Start-up speed	min^{-1}	1,150 $^{\pm 50}$						
Engine stalling	min^{-1}	2,200 $^{-100}$						full throttle, 220 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	180						dynamic at 2,300 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	22						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	160	280					
Add. control circuit	bar	230	230					
Slewing	bar	230	230					
Steering	bar	175	175					full throttle

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000	year-ly	year-ly
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter		X	X	X	X	X	X		X
6	Check air intake	O	O	O	O	O	O	O		
7	Change air filter main cartridge	**acc. to service indicator**								X
8	Change air filter safety cartridge **1)**	**as required**								
9	Clean cooling fins of combined hydraulic oil/ water radiator. *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
10	Check antifreeze level in coolant									O
11	Change coolant **1)**	**as required**								
12	Check V-belt tension	O	O	O	O	O	O	O		
13	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
14	Check engine speed adjustment, top-end and bottom end idle speed	O	O	O	O	O	O	O		
15	Check tightness of exhaust system	O	O	O	O	O	O	O		
16	Check valve lash of engine and adjust if necessary			O		O		O		
17	Check injection nozzles			O		O		O		
18	Replace engine breather assembly in valve cover **1)**					X				
19	Check acid level and battery connections	O	O	O	O	O	O	O		
20	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
21	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
22	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
23	Check that door catches, locks, hinges, pneumatic springs, etc. are in good condition and function perfectly, and replace if necessary	O	O	O	O	O	O	O		
24	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000	year-ly	year-ly
25	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
26	Check function of hydraulic axle lock and vent plunger cylinders	O	O	O	O	O	O	O		
27	Check function of steering	O	O	O	O	O	O	O		
28	Check condition and function of outrigger equipment	O	O	O	O	O	O	O		
29	Check hose-rupture safety valves of outrigger equipment	O	O	O	O	O	O	O		
30	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
31	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
32	Replace insert of hydraulic oil suction filter	X	X	X	X	X	X	X	X	
33	Replace insert of hydraulic oil return filter	X	**acc. to service indicator**							X
34	Replace ventilation filter			X		X		X		X
35	Check function of brakes and play of brake discs	O	O	O	O	O	O	O		
36	Check brake oil or replace	O	O	X	O	X	O	X		X
37	Differential of rear axle - oil check or oil change	O	X	O	X	O	X	O		X
38	Differential of front axle - oil check or oil change	O	X	O	X	O	X	O		X
39	Reduction gear - oil check or oil change	O	X	O	X	O	X	O		X
40	Wheel hubs of front and rear axles - oil check or oil change	O	X	O	X	O	X	O		X
41	Swing gear - oil check	O	O	O	O	O	O	O		
42	Check that ring gear attachment screws are securely fastened	O	O	O	O	O	O	O		
43	Check that swing-drive attachment (hydraulic motor and transmission) is securely fastened	O	O	O	O	O	O	O		
44	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
45	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
46	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
47	Test run and test work	O	O	O	O	O	O	O		
48	Initial inspection cards and return to **Schaeff**	O	O	O						

2) Extension of hydraulic oil change interval

Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HML 22, serial no. 131/....

		Desired values		Actual values		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2520 ±50						
Engine, low idle running speed	min^{-1}	800 +50						
Charge pressure	bar	30 ±2						high idle
Start-up speed	min^{-1}	1100 +50						
Engine stalling tortoise, dynamic	min^{-1}	2100 ±50						at 210^{+10} bar HP
High pressure valves	bar	480 +20						
High pressure	bar	450						pressure cut-off
Regulation start	bar	290						dynamic
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Steering left / right	bar	120						
Pilot pressure	bar	28 - 32						charge pressure, high idle
LS-pressure relief valve	bar	230						valve bank 1 full throttle
Stand-by pressure	bar	25						LS-regulator
Main pressure relief valve 1	bar	260						valve bank 1 full throttle
Main pressure relief valve 2	bar	200						valve bank 2 full throttle
Cut-off valve	bar	110						full throttle
Slewing right / left	bar	190						full throttle
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Articulated boom	bar	260	260					
Mono boom	bar	140	260					
Dipperstick	bar	260	260					
Bucket	bar	260	260					
Stabilizing	bar	---	---					
Articulation	bar	---	---					
Intermediate boom/ telescopic stick	bar	140	260					
Add. control circuit	bar	250	250					
Breaker	bar	210						

Inspection plan

To be carried out by trained dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours				min 2x	min 1x	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil			X			X	
3	Change engine oil filter			X			X	
4	Drain fuel tank	O	O			O		
5	Replace fuel filter			X			X	
6	Clean fuel pump and screen filter			O				
7	Check air intake	O	O					
8	Change air filter main cartridge	**to service indicator**					X	
9	Change air filter safety cartridge	**as required** [1]						
10	Clean cooling fins of engine oil cooler ⚠ *The cleaning intervals should be shor tened if there is high exposure to dust.*	O	O			O		
11	Clean cooling fins of hydraulic oil cooler ⚠ *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O			O		
12	Check V-belt tension	O		O				
13	Check engine suspension and pump attachments	O	O					
14	Check engine speed adjustment, top-end and low idle speed	O	O					
15	Check valve lash of engine and adjust if necessary			O				
16	Check injection valves				O			
17	Check or replace fuel-leakage pipe			O	X[1]			
18	Replace toothed belt [3]							
19	Check crankcase breather in valve cover				O			
20	Check acid level and battery connections	O	O					
21	Replace cab ventilation dust filter		X				X	
22	Check condition of tires, tire pressure and tightness of wheel nuts	O	O					
23	Check secure fastening of axles and propeller shaft	O	O					
24	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
25	Check that door catches are in perfect condition and replace if necessary	O	O					
26	Check electrical indicating and warning elements, and lighting system	O	O					

O = *Checking, maintenance* X = *Replacement*		Operating hours				min 2x	min 1x	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
27	Check smooth running of operator controls and adjust if necessary	O	O					
28	Check function of hydraulic axle lock and vent plunger cylinders	O	O					
29	Check function of steering	O	O					
30	Check function and condition of outriggers and dozer blade	O	O					
31	Check line rupture valves of outriggers and dozer blade	O	O					
32	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and line connections, the screw-in couplings must be locked to prevent rotation.*	O	O					
33	Check or change hydraulic oil	O	O	X [2]				
34	Replace insert of hydraulic oil return filter	X	**in compliance with service indicator**				X	
35	Replace insert of hydraulic oil suction filter	X	X			X		
36	Replace breather			X			X	
37	Check function of brakes and play of brake discs	O	O					
38	Differential of rear axle - oil check or oil change	X	O	X			X	
39	Differential of front axle - oil check or oil change	X	O	X			X	
40	Transfer gear - oil check or oil change	X	O	X			X	
41	Wheel hubs of front and rear axles - oil check or oil change	X	O	X			X	
42	Check that ring gear attachment screws are securely fastened	O	O					
43	Check that swing-drive attachment (hydraulic motor and transmission) is securely fastened	O	O					
44	Grease machine in compliance with overview of lubricating points	O	O					
45	Check function, condition and completeness of safety equipment	O	O					
46	Hydr. function check with pressure function test	O	O					
47	Test run and test work	O	O					
48	Initial inspection cards and return to manufacturer	O	O [4]					

1. at least every 2 years
2. Extension of oil change intervals in compliance with oil sample analysis and lab report.
3. every 5 years or 5,000 operating hours respectively
4. within warranty

HML23 s/n: 2300/.....

		Desired values	Actual values	Adjusted	Remarks
Engine, transmission, steering, working					
Engine, high idle running speed	min^{-1}	2,520 $^{+50}$			
Engine, low idle running speed	min^{-1}	800 $^{+50}$			
Charge pressure	bar	30 $^{+2}$			high idle
Start-up speed	min^{-1}	1,100 $^{\pm 50}$			at 50 bar HP
Engine stalling tortoise, dynamic	min-1	2,300 $^{+50}/_{-100}$			at 210^{+10} bar HP
High pressure valves	bar	480			
High pressure	bar	450			pressure cut-off
Regulation start	bar	290 $^{\pm 10}$			dynamic
Cardan shaft rev.	min^{-1}	see Technical Data Chapter 2			
Beginning / end of inching	bar	5 - 13			
Brake accumulator pressure	bar	120 - 150			
Brake pressure	bar	60 $^{+10}$			
Steering left / right	bar	120			
Pilot pressure	bar	30 $^{+2}$			charge pressure, high idle
Main pressure relief valve P1 + P2	bar	245 $^{+5}$			full throttle
Main pressure relief valve P3	bar	205 $^{+5}$			full throttle
Slewing right / left	bar	205			valves at the slew motor

Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Articulated boom	bar	280	280					
Dipperstick	bar	280	280					
Bucket	bar	280	280					
Intermediate boom	bar	150	280					
Add. control circuit	bar	280	280					
Articulation	bar	---	---					
Stabilizing	bar	---	---					

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year -ly	min 1x year- ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter	X	X	X	X	X	X	X		X
6	Change fuel pre-filter		X	X	X	X	X	X		X
7	Check air intake	O	O	O	O	O	O	O		
8	Change air filter main cartridge	**acc. to service indicator**								X
9	Change air filter safety cartridge **1)**	**as required**								
10	Clean cooling fins of combined hydraulic oil/water radiator. ☞ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
11	Check antifreeze level in coolant									O
12	Change coolant **1)**	**as required**								
13	Check V-belt tension	O	O	O	O	O	O	O		
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
15	Check engine speed adjustment, top-end and bottom end idle speed	O	O	O	O	O	O	O		
16	Check tightness of exhaust system	O	O	O	O	O	O	O		
17	Check acid level and battery connections	O	O	O	O	O	O	O		
18	Check valve lash of engine and adjust if necessary	O			O			O		O
19	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
20	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
21	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
22	Check that door catches, locks, hinges, pneumatic springs, etc. are in good condition and function perfectly, and replace if necessary	O	O	O	O	O	O	O		
23	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
24	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
25	Check function of hydraulic axle lock and vent plunger cylinders	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
26	Check function of steering	O	O	O	O	O	O	O		
27	Check condition and function of outriggers	O	O	O	O	O	O	O		
28	Check cable-break protection of outriggers	O	O	O	O	O	O	O		
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
30	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
31	Replace insert of hydraulic oil suction filter	X	X	X	X	X	X	X	X	
32	Replace insert of hydraulic oil return filter	X	**acc. to service indicator**							X
33	Replace ventilation filter			X		X		X		X
34	Check function of brakes and play of discs	O	O	O	O	O	O	O		
35	Differential of rear axle - oil check or oil change	O	X	O	X	O	X	O		X
36	Differential of front axle - oil check or oil change	O	X	O	X	O	X	O		X
37	Transfer box - oil check or oil change	O	X	O	X	O	X	O		X
38	Wheel hubs of front and rear axles - oil check or oil change	O	X	O	X	O	X	O		X
39	Swing gear - oil check	O	O	O	O	O	O	O		
40	Check that ring gear attachment screws are securely fastened	O	O	O	O	O	O	O		
41	Check that swing-gear attachment (hydraulic motor and transmission) is securely fastened	O	O	O	O	O	O	O		
42	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
43	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
44	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
45	Test run and test work	O	O	O	O	O	O	O		
46	Initial inspection cards and return to **Schaeff**	O	O	O						

2) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2150 $^{\pm 50}$						
Engine, low idle running speed	min^{-1}	800						
Charge pressure	bar	30 $^{+2}$						high idle running speed
Start-up speed	min^{-1}	1000 $^{+50}$						
Engine stalling tortoise, dynamic	min^{-1}	1800 $^{+150}$						at 295 bar HP, tortoise
Pressure cut-off	bar	450						
High pressure (SV)	bar	470						
Regulation start	bar	290 $^{\pm 10}$						dynamic
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Brake accumulator pressure	bar	110 - 150						
Brake pressure	bar	40 - 55						
Steering left / right	bar	150						
Stand-by pressure	bar	25						at 2150 min^{-1}
Pressure cut-off	bar	250						full throttle
Pilot pressure / charge pressure	bar	30 $^{+2}$						high idle running speed
Main pressure relief valve 1 (SX 18)	bar	280						(SV)
Main pressure relief valve 2 (5SM12)	bar	220						full throttle
Cut-off valve	bar	110						
Slewing right / left	bar	190						
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Articulated boom	bar	280	280					
Articul. boom circul.	bar	150	280					
Mono boom	bar	150	280					
Dipperstick	bar	280	280					
Bucket	bar	280	280					
Intermediate boom	bar	150	280					
Telescopic stick	bar	150	280					
Add. control circuit	bar	250	250					
Articulation	bar	---	---					
Stabilizing	bar	---	---					
Breaker	bar	280	280					(Mono boom)
Breaker	bar	180	180					(articulated boom)

Inspection plan

To be carried out by trained dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours				min 2x	min 1x	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil		X [2)]				X	
3	Change engine oil filter		X				X	
4	Drain fuel tank	O	O			O		
5	Replace fuel filter		X				X	
6	Replace fuel pre-filter		X				X	
7	Check air intake	O	O					
8	Change air filter main cartridge	**to service indicator**					X	
9	Change air filter safety cartridge	**as required [1)]**						
10	Clean cooling fins of combined hydraulic oil/ water radiator. ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
11	Check antifreeze level in coolant						O	
12	Change coolant	**as required [1)]**						
13	Check V-belt tension	O	O					
14	Check engine mounts and pump attachments	O	O					
15	Check engine speed adjustment, top-end and low idle speed	O	O					
16	Check valve lash of engine and adjust if necessary			O				
17	Check acid level and battery connections	O	O					
18	Replace cab ventilation dust filter		X				X	
19	Check condition of tires, tire pressure and tightness of wheel nuts	O	O					
20	Check secure fastening of axles and propeller shaft	O	O					
21	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
22	Check that door catches are in perfect condition and replace if necessary	O	O					
23	Check electrical indicating and warning elements, and lighting system	O	O					
24	Check smooth running of operator controls and adjust if necessary	O	O					
25	Check function of hydraulic axle lock and vent plunger cylinders	O	O					

O = *Checking, maintenance* X = *Replacement*		Operating hours				min 2x yearly	min 1x yearly	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000			
26	Check function of steering	O	O					
27	Check condition and function of support equipment	O	O					
28	Check hose-rupture safety valves of support equipment	O	O					
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O					
30	Check or change hydraulic oil	O	O	X [2]				
31	Replace insert of hydraulic oil return filter	X	**according to service indicator**				X	
32	Replace insert of hydraulic oil suction filter	X	X			X		
33	Replace ventilation filter			X			X	
34	Check function of brakes and play of brake discs	O	O					
35	Differential of rear axle - oil check or oil change			X			X	
36	Differential of front axle - oil check or oil change			X			X	
37	Transfer gear - oil check or oil change			X			X	
38	Wheel hubs of front and rear axles - oil check or oil change			X			X	
39	Swing gear - oil check	O	O					
40	Check that ring gear attachment screws are securely fastened	O	O					
41	Check that swing-drive attachment (hydraulic motor and transmission) is securely fastened	O	O					
42	Grease machine according to overview of lubricating points	O	O					
43	Check function, condition and completeness of safety equipment	O	O					
44	Hydraulic function check with pressure function test	O	O					
45	Test run and test work	O	O					
46	Initial inspection cards and return to **SCHAEFF**	O	O [3]					

1. at least every 2 years
2. extension of oil change interval according to **SCHAEFF** oil sample analysis and lab report.
3. within warranty

HML 32, serial no. 3200/....

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2150 $^{\pm 50}$						
Engine, low idle running speed	min^{-1}	800						
Charge pressure	bar	30 $^{+2}$						high idle running speed
Start-up speed	min^{-1}	1000 $^{+50}$						at 50 bar HP
Engine stalling tortoise, dynamic	min^{-1}	1900 $^{\pm 50}$						at 290 bar HP, tortoise
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start	bar	270 $^{\pm 10}$						dynamic
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Brake accumulator pressure	bar	120 - 150						
Brake pressure	bar	70 $^{\pm 10}$						
Steering left / right	bar	140						
Pilot pressure / charge pressure	bar	30 $^{+2}$						high idle
Stand-by pressure	bar	22 $^{\pm 1}$						high idle
Pressure cut-off (SX 14)	bar	280						high idle
Main pressure relief valve 1 (SX 14)	bar	300						(SV = safety valve)
Main pressure relief valve 2 (SM12)	bar	230						high idle
Cut-off valve	bar	110						high idle
Swing	bar	100/250						2 stage valves
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Articulated boom	bar	300	300					
Mono/ circular boom	bar	180	300					
Dipperstick	bar	300	300					
Bucket	bar	300	300					
Intermediate boom	bar	150	300					
Add. control circuit	bar	300	300					
Articulation	bar	---	---					
Stabilizing	bar	---	---					

Inspection plan

To be carried out by trained dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours				min 2x yearly	min 1x yearly	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000			
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil		X				X	
3	Change engine oil filter		X				X	
4	Drain fuel tank	O	O			O		
5	Replace fuel filter		X				X	
6	Replace fuel pre-filter		X				X	
7	Check air intake	O	O					
8	Change air filter main cartridge	**according to service indicator**					X	
9	Change air filter safety cartridge	**as required** [1)]						
10	Clean cooling fins of combined hydraulic oil/ water radiator. *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
11	Check antifreeze level in coolant						O	
12	Change coolant	**as required** [1)]						
13	Check V-belt tension	O	O					
14	Check engine mounts and pump attachments	O	O					
15	Check engine speed adjustment, top-end and low idle speed	O	O					
16	Check valve lash of engine and adjust if necessary			O				
17	Check acid level and battery connections	O	O					
18	Replace cab ventilation dust filter		X				X	
19	Check condition of tires, tire pressure and tightness of wheel nuts	O	O					
20	Check secure fastening of axles and propeller shaft	O	O					
21	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
22	Check that door catches are in perfect condition and replace if necessary	O	O					
23	Check electrical indicating and warning elements, and lighting system	O	O					
24	Check smooth running of operator controls and adjust if necessary	O	O					
25	Check function of hydraulic axle lock and vent plunger cylinders	O	O					

O = *Checking, maintenance* X = *Replacement*		Operating hours				min 2x	min 1x	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
26	Check function of steering	O	O					
27	Check condition and function of support equipment	O	O					
28	Check hose-rupture safety valves of support equipment	O	O					
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O					
30	Check or change hydraulic oil	O	O	X [2]				
31	Replace insert of hydraulic oil return filter	X	**according to service indicator**				X	
32	Replace insert of hydraulic oil suction filter	X	X			X		
33	Replace ventilation filter			X			X	
34	Check function of brakes and play of brake discs	O	O					
35	Differential of rear axle - oil check or oil change	X		X			X	
36	Differential of front axle - oil check or oil change	X		X			X	
37	Transfer gear - oil check or oil change	X		X			X	
38	Wheel hubs of front and rear axles - oil check or oil change	X		X			X	
39	Check that ring gear attachment screws are securely fastened	O	O					
40	Check that swing-drive attachment (hydraulic motor and transmission) is securely fastened	O	O					
41	Grease machine according to overview of lubricating points	O	O					
42	Check function, condition and completeness of safety equipment	O	O					
43	Hydraulic function check with pressure function test	O	O					
44	Test run and test work	O	O					
45	Initial inspection cards and return to manufacturer	O	O [3]					

1. at least every 2 years

2. extension of oil change interval according to oil sample analysis and lab report.

3. within warranty

HML 32, serial no. 3200 / 0439

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2,150 $^{+50}$						
Engine, low idle running speed	min^{-1}	800 $^{+50}$						
Charge pressure	bar	30 $^{+2}$						high idle running speed
Start-up speed	min^{-1}	1,100 $^{\pm 50}$						
Engine stalling tortoise, dynamic	min^{-1}	1,900 $^{\pm 50}$						at 320 bar HP
Pressure cut-off	bar	460 $^{-10}$						
High pressure (SV)	bar	480						
Regulation start	bar	270 $^{\pm 10}$						dynamic
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Brake accumulator pressure	bar	120 - 150						
Brake pressure	bar	40 $^{+10}$						
Steering left / right	bar	140 $^{\pm 5}$						
Pilot pressure / charge pressure	bar	30 $^{+2}$						high idle
Stand-by pressure	bar	22						high idle
Pressure cut-off (SX 14)	bar	280						full throttle
Main pressure relief valve 1 (SX 14)	bar	310 $^{-10}$						(SV = safety valve)
Main pressure relief valve 2 (SM12)	bar	230						
Cut-off valve	bar	110 $^{\pm 5}$						
Swing	bar	100/250						2 stage valves
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Articulated boom	bar	300	300					
Mono/ circular boom	bar	180	300					
Dipperstick	bar	300	300					
Bucket	bar	300	300					
Intermediate boom	bar	150	300					
Telescopic stick	bar	---	---					
Add. control circuit	bar	300	300					
Boom off-set	bar	---	---					
Stabilizing	bar	---	---					
Add.dozer blade option	bar	130						Push dozer down

TEREX | SCHAEFF

Inspection plan

To be carried out by trained specialist dealer personnel

	O = *Checking, maintenance* X = *Replacement*	Operating hours							min 2x year -ly	min 1x year- ly
	Perform work with machine at operating temperature	100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter	X		X		X		X		X
6	Fuel pre-filter **1)**	X				X				
7	Check air intake	O	O	O	O	O	O	O		
8	Change air filter main cartridge	**acc. to service indicator**								X
9	Change air filter safety cartridge **1)**	**as required**								
10	Clean cooling fins of combined hydraulic oil/ water radiator. *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
11	Check antifreeze level in coolant									O
12	Change coolant **1)**	**as required**								
13	Check V-belt tension	O	O	O	O	O	O	O		
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
15	Check engine speed adjustment, top-end and bottom end idle speed	O	O	O	O	O	O	O		
16	Check tightness of exhaust system	O	O	O	O	O	O	O		
17	Check valve lash of engine and adjust if necessary	O			O			O		O
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
20	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
21	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
22	Check that door catches, locks, hinges, pneumatic springs, etc. are in good condition and function perfectly, and replace if necessary	O	O	O	O	O	O	O		
23	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
24	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
25	Check function of hydraulic axle lock and vent plunger cylinders	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
26	Check function of steering	O	O	O	O	O	O	O		
27	Check condition and function of support equipment	O	O	O	O	O	O	O		
28	Check hose-rupture safety valves of support equipment	O	O	O	O	O	O	O		
29	Check and adjust the clearances on the telescopic dipperstick	O	O	O	O	O	O	O		
30	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O	O	O	O	O	O		
31	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
32	Replace insert of hydraulic oil suction filter	X	X	X	X	X	X	X	X	
33	Replace insert of hydraulic oil return filter	X	**acc. to service indicator**							X
34	Replace ventilation filter			X		X		X		X
35	Check function of brakes and play of brake discs	O	O	O	O	O	O	O		
36	Bleed the brake	O	O	O	O	O	O	O		
37	Differential of rear axle - oil check or oil change	O	X	O	X	O	X	O		X
38	Differential of front axle - oil check or oil change	O	X	O	X	O	X	O		X
39	Transmission on front axle - oil check or oil change	O	X	O	X	O	X	O		X
40	Wheel hubs of front and rear axles - oil check or oil change	O	X	O	X	O	X	O		X
41	Swing gear - oil check	O	O	O	O	O	O	O		
42	Check that ring gear attachment screws are securely fastened	O	O	O	O	O	O	O		
43	Check that swing-gear attachment (hydraulic motor and transmission) is securely fastened	O	O	O	O	O	O	O		
44	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
45	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
46	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
47	Test run and test work	O	O	O	O	O	O	O		
48	Initial inspection cards and return to **Schaeff**	O	O	O						

2) Extension of hydraulic oil change interval

Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HML 41, serial no. 321/....

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2450						
Engine, low idle running speed	min^{-1}	800						
Charge pressure	bar	30 $^{+2}$						high idle running speed
Start-up speed	min^{-1}	1100						
Engine stalling tortoise, dynamic	min^{-1}	2000 $^{+100}$						at 230 bar HP
Pressure cut-off	bar	440						
High pressure (SV)	bar	460 $^{+20}$						
Regulation start	bar	210 $^{\pm 10}$						dynamic
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
End of inching	bar	20						
Brake accumulator pressure	bar	110 - 150						
Brake pressure	bar	40						
Steering left / right	bar	150						
Stand-by pressure	bar	25						at 2450 min^{-1}
Pressure cut-off	bar	250						full throttle
Pilot pressure / charge pressure	bar	30 $^{+2}$						high idle running speed
Main pressure relief valve 1 (SX 18)	bar	280						(SV)
Main pressure relief valve 2 (5SM12)	bar	210						full throttle
Cut-off valve	bar	110						
Slewing right / left	bar	210						
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	280	280					
Dipperstick	bar	280	280					
Bucket	bar	280	280					
Intermediate boom	bar	150	280					
Telescopic stick	bar	150	280					
Add. control circuit	bar	250	250					
Articulation	bar	---	---					
Stabilizing	bar	---	---					
Breaker	bar	280	280					

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min 2x yearly	min 1x yearly	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000			
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil		X [2]				X	
3	Change engine oil filter		X				X	
4	Drain fuel tank	O	O			O		
5	Replace fuel filter			X			X	
6	Replace fuel pre-filter			X			X	
7	Check air intake	O	O					
8	Change air filter main cartridge	**to service indicator**					X	
9	Change air filter safety cartridge	**as required [1]**						
10	Clean cooling fins of combined hydraulic oil/ water radiator. ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
11	Check antifreeze level in coolant						O	
12	Change coolant	**as required [1]**						
13	Check V-belt tension	O	O					
14	Check engine mounts and pump attachments	O	O					
15	Check engine speed adjustment, top-end and low idle speed	O	O					
16	Check valve lash of engine and adjust if necessary			O				
17	Check acid level and battery connections	O	O					
18	Replace cab ventilation dust filter		X				X	
19	Check condition of tires, tire pressure and tightness of wheel nuts	O	O					
20	Check secure fastening of axles and propeller shaft	O	O					
21	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
22	Check that door catches are in perfect condition and replace if necessary	O	O					
23	Check electrical indicating and warning elements, and lighting system	O	O					
24	Check smooth running of operator controls and adjust if necessary	O	O					
25	Check function of hydraulic axle lock and vent plunger cylinders	O	O					

O = *Checking, maintenance* X = *Replacement*		Operating hours				min 2x yearly	min 1x yearly	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000			
26	Check function of steering	O	O					
27	Check condition and function of support equipment	O	O					
28	Check line rupture valves of support equipment	O	O					
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and line connections, the screw-in couplings must be locked to prevent rotation.*	O	O					
30	Check or change hydraulic oil	O	O	X [2)]				
31	Replace insert of hydraulic oil return filter	X	**according to service indicator**				X	
32	Replace insert of hydraulic oil suction filter	X	X			X		
33	Replace breather			X			X	
34	Check function of brakes and play of brake discs	O	O					
35	Differential of rear axle - oil check or oil change			X			X	
36	Differential of front axle - oil check or oil change			X			X	
37	Transfer gear - oil check or oil change			X			X	
38	Wheel hubs of front and rear axles - oil check or oil change			X			X	
39	Check that ring gear attachment screws are securely fastened	O	O					
40	Check that swing-drive attachment (hydraulic motor and transmission) is securely fastened	O	O					
41	Grease machine according to overview of lubricating points	O	O					
42	Check function, condition and completeness of safety equipment	O	O					
43	Hydraulic function check with pressure function test	O	O					
44	Test run and test work	O	O					
45	Initial inspection cards and return to **SCHAEFF**	O	O [3)]					

1. at least every 2 years

2. Extension of oil change interval according to **SCHAEFF-TEREX** oil sample analysis and lab report.

3. within warranty

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2150 $^{\pm 50}$						
Engine, low idle running speed	min^{-1}	800						
Charge pressure	bar	30 $^{+2}$						high idle running speed
Start-up speed	min^{-1}	1000 $^{+50}$						at 50 bar HP
Engine stalling tortoise, dynamic	min^{-1}	1900 $^{\pm 50}$						at 280 bar HP, tortoise
Pressure cut-off	bar	460						
High pressure (SV)	bar	480						
Regulation start	bar	220 $^{\pm 10}$						dynamic
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Brake accumulator pressure	bar	120 - 150						
Brake pressure	bar	40 $^{+5}$						
Steering left / right	bar	140 $^{\pm 5}$						
Pilot pressure / charge pressure	bar	30 $^{+2}$						high idle
Stand-by pressure	bar	22 $^{\pm 1}$						2,150 min^{-1}
Pressure cut-off (SX 14)	bar	280						high idle
Main pressure relief valve 1 (SX 14)	bar	300						(SV = safety valve)
Main pressure relief valve 2 (SM12)	bar	230						high idle
Cut-off valve	bar	110						high idle
Swing	bar	100/250						2 stage valves
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Articulated boom	bar	300	300					
Dipperstick	bar	300	300					
Bucket	bar	300	300					
Intermediate boom	bar	150	300					
Add. control circuit	bar	300	300					
Articulation	bar	---	---					
Stabilising	bar	---	---					

Inspection plan

To be carried out by trained dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours				min 2x	min 1x	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil		X				X	
3	Change engine oil filter		X				X	
4	Drain fuel tank	O	O			O		
5	Replace fuel filter			X			X	
6	Replace fuel pre-filter			X			X	
7	Check air intake	O	O					
8	Change air filter main cartridge	**according to service indicator**					X	
9	Change air filter safety cartridge	**as required** [1)]						
10	Clean cooling fins of combined hydraulic oil/ water radiator. *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
11	Check antifreeze level in coolant						O	
12	Change coolant	**as required** [1)]						
13	Check V-belt tension	O	O					
14	Check engine mounts and pump attachments	O	O					
15	Check engine speed adjustment, top-end and low idle speed	O	O					
16	Check valve lash of engine and adjust if necessary			O				
17	Check acid level and battery connections	O	O					
18	Replace cab ventilation dust filter		X				X	
19	Check condition of tires, tire pressure and tightness of wheel nuts	O	O					
20	Check secure fastening of axles and propeller shaft	O	O					
21	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
22	Check that door catches are in perfect condition and replace if necessary	O	O					
23	Check electrical indicating and warning elements, and lighting system	O	O					
24	Check smooth running of operator controls and adjust if necessary	O	O					
25	Check function of hydraulic axle lock and vent plunger cylinders	O	O					

O = *Checking, maintenance* X = *Replacement*		Operating hours				min 2x	min 1x	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000	yearly	yearly	
26	Check function of steering	O	O					
27	Check condition and function of support equipment	O	O					
28	Check hose-rupture safety valves of support equipment	O	O					
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O					
30	Check or change hydraulic oil	O	O	X [2)]				
31	Replace insert of hydraulic oil return filter	X	**according to service indicator**				X	
32	Replace insert of hydraulic oil suction filter	X	X			X		
33	Replace ventilation filter			X			X	
34	Check function of brakes and play of brake discs	O	O					
35	Differential of rear axle - oil check or oil change	X		X			X	
36	Differential of front axle - oil check or oil change	X		X			X	
37	Transfer gear - oil check or oil change	X		X			X	
38	Wheel hubs of front and rear axles - oil check or oil change	X		X			X	
39	Check that ring gear attachment screws are securely fastened	O	O					
40	Check that swing-drive attachment (hydraulic motor and transmission) is securely fastened	O	O					
41	Grease machine according to overview of lubricating points	O	O					
42	Check function, condition and completeness of safety equipment	O	O					
43	Hydraulic function check with pressure function test	O	O					
44	Test run and test work	O	O					
45	Initial inspection cards and return to manufacturer	O	O [3)]					

1. at least every 2 years

2. extension of oil change interval according to oil sample analysis and lab report.

3. within warranty

HML 42 from s/n: 4200/0219

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2,150 $^{+50}$						
Engine, low idle running speed	min^{-1}	800 $^{+50}$						
Charge pressure	bar	30 $^{+2}$						high idle running speed
Start-up speed	min^{-1}	1,000 $^{+50}$						at 50 bar HP
Engine stalling tortoise, dynamic	min^{-1}	1,900 $^{\pm50}$						at 230 $^{+10}$ bar HP, tortoise
Pressure cut-off	bar	460 $^{-10}$						
High pressure (SV)	bar	480						
Regulation start	bar	220 $^{\pm10}$						dynamic
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
End of inching	bar	20						
Brake accumulator pressure	bar	120 - 150						
Brake pressure	bar	40 $^{\pm10}$						
Steering left / right	bar	140 $^{\pm5}$						
Pilot pressure / charge pressure	bar	30 $^{+2}$						high idle
Stand-by pressure	bar	22 $^{\pm1}$						2,150 min^{-1}
Pressure cut-off (SX 14)	bar	280						high idle
Main pressure relief valve 1 (SX 14)	bar	300 $^{+10}$						(SV = safety valve)
Main pressure relief valve 2 (SM12)	bar	230						high idle
Cut-off valve	bar	110						high idle
Swing	bar	100/250						2 stage valves
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Articulated boom	bar	300	300					
Dipperstick	bar	300	300					
Bucket	bar	300	300					
Intermediate boom	bar	150	300					
Add. control circuit	bar	300	300					
Articulation	bar	---	---					
Stabilising	bar	---	---					

TEREX | SCHAEFF

Inspection plan

To be carried out by trained dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1,200			
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil	X	X [2]			X		
3	Change engine oil filter	X	X			X		
4	Drain fuel tank	O	O			O		
5	Change fuel filter	X		X			X	
6	Clean fuel pre-filter	O	O					
7	Check air intake	O	O					
8	Change air filter - main cartridge	**in compliance with service indicator**					X	
9	Change air filter - safety cartridge	**as required** [1]						
10	Clean cooling fins of combined hydraulic oil-water cooler ⚠ *The cleaning intervals should be shortened if there is high exposure to dust*	O	O			O		
11	Check antifreeze level in coolant						O	
12	Change coolant	**as required** [1]						
13	Check V-belt tension	O	O					
14	Check engine mounts and pump attachments	O	O					
15	Check engine speed adjustment, top-end and low-idle idle speed	O	O					
16	Check valve lash of engine and adjust if necessary	O		O			O	
17	Check injection nozzles [2]			O				
18	Check injection pump [2]			O				
19	Check acid level and battery connections	O	O					
20	Check condition of rubber crawler chains	O	O					
21	Check condition and fastening of grouser plates on the undercarriage steel crawlers	O	O					
22	Check secure fastening of sprocket, crawler gear units and hydraulic motor	O	O					
23	Check smooth running of bottom and top rollers	O	O					
24	Check bearing bushings and bolts of work equipment and re-adjust "free of clearance"	O	O					

1. at least every 2 years
2. by trained personnel
3. Extension of oil change interval in compliance with oil sample analysis and lab report.
4. within warranty

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1,200			
25	Check dust filter for cab ventilation			X			X	
26	Check that door catches function perfectly, and replace if necessary	O	O					
27	Check electrical indicating and warning elements, and lighting system	O	O					
28	Check smooth running of operator controls	O	O					
29	Visual inspection of all steel components and other components for material cracks, deformation, wear, other damage	O	O					
30	Check condition and function of dozer blade	O	O					
31	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. When tightening hose and line connections, the screw-in couplings must be locked to prevent rotation.	O	O					
32	Check or change hydraulic oil	O	O		X [3]		X	
33	Replace hydraulic oil return filter insert	X	**in compl. with service indicat.**				X	
34	Replace breather for hydraulic oil tank				X		X	
35	Crawler gear units: Check or replace oil	X	O		X		X	
36	Check that ring gear attachment screws are securely fastened	O	O					
37	Check that swing gear unit is securely fastened (hydraulic motor and transmission)	O	O					
38	Grease machine in compliance with overview of lubricating points	O	O					
39	Check function, condition and completeness of safety equipment	O	O					
40	Hydraulic function check with pressure function test	O	O					
41	Test run and test work	O	O					
42	Initial inspection card and return to manufacturer	O	O [4]					

1. at least every 2 years
2. by trained personnel
3. Extension of oil change interval in compliance with oil sample analysis and lab report.
4. within warranty

HR 20 **from serial no. 120/....**

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2,350 $^{+20}/_{-30}$						
Engine, low idle running speed	min^{-1}	850 $^{\pm 20}$						
Pilot pressure	bar	30 $^{+1}$						high idle
Main pressure relief valve (P1)	bar	245						high idle running speed
Main pressure relief valve (P2)	bar	245						high idle running speed
Main pressure relief valve (P3)	bar	205						high idle running speed
Slewing right / left	bar	205						
Valves at slew motor	bar	205						
Travel left/right, main pressure relief valve	bar	245	245					
Valves at travel motor	bar	---	---					
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	180	280					
Dipperstick	bar	280	280					
Bucket	bar	280	280					
Articulation	bar	*	*					* = anti-cavitation
Dozer blade	bar	----	----					
Breaker, slew bucket, grab rotation	bar	210	210					

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000			
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil		X [2)]				X	
3	Change engine oil filter		X				X	
4	Drain fuel tank	O	O			O		
5	Change fuel filter		X				X	
6	Change fuel pre-filter		X				X	
7	Check air intake	O	O					
8	Change air filter - main cartridge	**according to service indicator**					X	
9	Change air filter - safety cartridge	**as required** [1)]						
10	Clean cooling fins of the combined hydraulic oil-water radiator *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O			O		
11	Check antifreeze level in coolant						O	
12	Change coolant	**as required** [1)]						
13	Check V-belt tension	O	O					
14	Check engine mounts and pump attachments	O	O					
15	Check engine speed adjustment, top-end and low idle speed	O	O					
16	Check valve lash of engine and adjust if necessary			O				
17	Check acid level and battery connections	O	O					
18	Check dust filter for cab ventilation		X				X	
19	Check condition and secure fastening of steel crawler chain track shoes	O	O					
20	Check secure fastening of sprocket, crawler gear units and hydraulic motor	O	O					
21	Check smooth running of bottom and top rollers	O	O					
22	Check function of parking brake	O	O					
23	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
24	Check that door catches function perfectly, and replace if necessary	O	O					

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000			
25	Check electrical indicating and warning elements, and lighting system	O	O					
26	Check smooth running of operator controls and adjust if necessary	O	O					
27	Check condition and function of dozer blade	O	O					
28	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. When tightening hose and line connections, the screw-in couplings must be locked to prevent rotation.	O	O					
29	Check or change hydraulic oil	O	O	X [2)]				
30	Replace hydraulic oil return filter insert	X	**according to service indicator**					
31	Replace ventilation filter			X			X	
32	Crawler gear units: Check or replace oil	X	O	X			X	
33	Swing gear: oil check	O	O					
34	Check that ring gear attachment screws are securely fastened	O	O					
35	Check that swing gear attachment (hydraulic motor and transmission) is securely fastened	O	O					
36	Grease machine according to overview of lubricating points	O	O					
37	Check function, condition and completeness of safety equipment	O	O					
38	Hydraulic function check with pressure function test	O	O					
39	Test run and test work	O	O					
40	Initial inspection card and return to **SCHAEFF**	O	O [3)]	O [3)]				

1. at least every 2 years

2. Extension of oil change interval according to **SCHAEFF** oil sample analysis and lab report. For further information see operators' manual

3. within warranty

HR 32, serial no. 330/....

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2150 $^{\pm 50}$						
Engine, low idle running speed	min^{-1}	800						
Pilot pressure	bar	35 $^{+5}$						
LS pressure relief valve (SX 14)	bar	280						high idle valve bank 1
Stand-by pressure	bar	22 $^{+1}$						high idle
Main pressure relief valve 1 (SX 18)	bar	300						high idle valve bank 1
Main pressure relief valve 2 (5 SM 12)	bar	230						high idle valve bank 2
Shut-off valve	bar	110 $^{\pm 5}$						
Swing right / left	bar	100 / 250						2-stage valves
Line relief pressures,		**out**	**In**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom (mono/circular boom)	bar	150	300					
Intermediate boom (circular boom)	bar	150	300					
Dipperstick	bar	300	300					
Bucket	bar	300	300					
Add. control circuit	bar	300	300					
Travel right	bar	280 $^{+10}$	280 $^{+10}$					Valves in travel motor
Travel left	bar	280 $^{+10}$	280 $^{+10}$					Valves in travel motor
Articulation	bar	----	----					
Dozer blade	bar	----	----					

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly
Perform work with machine at operating temperature		after 100	every 500	every 1000	every 2000		
1	Check whether machine-specific instruction book is in the machine	O	O				
2	Change engine oil		X				X
3	Change engine oil filter		X				X
4	Drain fuel tank and fuel filter	O	O			O	
5	Change fuel filter		X				X
6	Change fuel pre-filter		X				X
7	Check air intake	O	O				
8	Change air filter - main cartridge	**according to service indicator**					X
9	Change air filter - safety cartridge	**as required** [1)]					
10	Clean cooling fins of combined hydraulic oil-engine oil cooler ⚠ *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O			O	
11	--						
12	--						
13	Check V-belt tension	O	O				
14	Check engine mounts and pump attachments	O	O				
15	Check engine speed adjustment, top-end and low idle speed	O	O				
16	Check valve lash of engine and adjust if necessary			O			
17	Check acid level and battery connections	O	O				
18	Check dust filter for cab ventilation		X				X
19	Check condition and secure fastening of steel crawler chain track shoes	O	O				
20	Check secure fastening of sprocket, crawler gear units and hydraulic motor	O	O				
21	Check smooth running of bottom and top rollers	O	O				
22	Check function of parking brake	O	O				
23	Check bearing bushings and bolts of work equipment and replace if necessary	O	O				
24	Check that door catches function perfectly, and replace if necessary	O	O				

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly
Perform work with machine at operating temperature		after 100	every 500	every 1000	every 2000		
25	Check electrical indicating and warning elements, and lighting system	O	O				
26	Check smooth running of operator controls and adjust if necessary	O	O				
27	Check condition and function of dozer blade	O	O				
28	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. ☞ *When tightening hose and line connections, the screw-in couplings must be locked to prevent rotation.*	O	O				
29	Check or change hydraulic oil	O	O	X [2)]			
30	Replace hydraulic oil return filter insert	X	**according to service indicator**				
31	Replace breather			X			X
32	Crawler gear units: Check or replace oil	X	O	X			X
33	--						
34	Check that ring gear attachment screws are securely fastened	O	O				
35	Check that swing gear attachment (hydraulic motor and transmission) is securely fastened	O	O				
36	Grease machine according to overview of lubricating points	O	O				
37	Check function, condition and completeness of safety equipment	O	O				
38	Hydraulic function check with pressure function test	O	O				
39	Test run and test work	O	O				
40	Initial inspection card and return to manufacturer	O	O [3)]				

1. at least every 2 years
2. Extension of oil change interval according to oil sample analysis and lab report. For further information
3. within warranty

HR 32 from serial no. 330/1501

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2.350 $^{+150}$						
Engine, low idle running speed	min^{-1}	850 $^{+100}$						
Pilot pressure / charge pressure	bar	35 $^{\pm1}$						
Main pressure relief valve 1 (SX 14)	bar	280 $^{\pm5}$						high idle valve bank 1
Stand-by pressure	bar	22 $^{+1}$						high idle
Main pressure relief valve 1 (SX 14)	bar	310 $^{-10}$						high idle valve bank 1
Main pressure relief valve 2 (SM12)	bar	230 $^{\pm5}$						high idle valve bank 2
Swing right / left	bar	100 / 250						2-stage valves
Line relief pressures,		**out**	**In**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom (mono / circular boom)	bar	180	300					
Intermediate boom /circular)	bar	180	300					
Dipper stick	bar	300	300					
Bucket	bar	300	300					
Add. control circuit	bar	300	300					
Travel right	bar	$300^{\pm10}$	$300^{\pm10}$					Valves in travel motor
Travel left	bar	$300^{\pm10}$	$300^{\pm10}$					Valves in travel motor
Articulation	bar	----	----					
Dozer blade	bar	----	----					

TEREX | SCHAEFF

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000			
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil		X				X	
3	Change engine oil filter		X				X	
4	Drain fuel tank	O	O			O		
5	Change fuel filter			X			X	
6	Change fuel pre-filter			X				
7	Check air intake	O	O					
8	Change air filter - main cartridge	**according to service indicator**					X	
9	Change air filter - safety cartridge	**as required** [1]						
10	Clean cooling fins of the combined hydraulic oil-water cooler *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O			O		
11	Check antifreeze level in coolant						O	
12	Change coolant	**as required** [1]						
13	Check V-belt tension	O	O					
14	Check engine mounts and pump attachments	O	O					
15	Check engine speed adjustment, top-end and low idle speed	O	O					
16	Check valve lash of engine and adjust if necessary			O				
17	Check acid level and battery connections	O	O					
18	Check dust filter for cab ventilation		X				X	
19	Check condition and secure fastening of steel crawler chain track shoes	O	O					
20	Check secure fastening of sprocket, crawler gear units and hydraulic motor	O	O					
21	Check smooth running of bottom and top rollers	O	O					
22	Check function of parking brake	O	O					
23	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
24	Check that door catches function perfectly, and replace if necessary	O	O					

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 500	every 1,000	every 2,000			
25	Check electrical indicating and warning elements, and lighting system	O	O					
26	Check smooth running of operator controls and adjust if necessary	O	O					
27	Check condition and function of dozer blade	O	O					
28	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. When tightening hose and line connections, the screw-in couplings must be locked to prevent rotation.	O	O					
29	Check or change hydraulic oil	O	O	X [2)]				
30	Replace hydraulic oil return filter insert	X	**according to service indicator**					
31	Replace breather			X			X	
32	Crawler gear units: Check or replace oil	X	O	X			X	
33	Check that ring gear attachment screws are securely fastened	O	O					
34	Check that swing gear attachment (hydraulic motor and transmission) is securely fastened	O	O					
35	Grease machine according to overview of lubricating points	O	O					
36	Check function, condition and completeness of safety equipment	O	O					
37	Hydraulic function check with pressure function test	O	O					
38	Test run and test work	O	O					
39	Initial inspection card and return to manufacturer	O	O [3)]					

1. at least every 2 years
2. Extension of oil change intervals according to oil sample analysis and lab report.
3. within warranty

HR 42, serial no. 342/....

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2,250 $^{\pm 50}$						
Engine, low idle running speed	min^{-1}	800 $^{+50}$						
Pilot pressure	bar	35 $^{+1}$						
LS pressure relief valve (SX 14)	bar	350 $^{+5}$						high idle valve bank 1
Stand-by pressure	bar	22 $^{\pm 1}$						high idle
Main pressure relief valve 1 (SX 14)	bar	370 $^{+5}$						high idle valve bank 1
Main pressure relief valve 2 (5 SM 12)	bar	230 $^{+5}$						high idle valve bank 2
Shut-off valve	bar	110 $^{\pm 5}$						
Swing right / left	bar	150-250 $^{\pm 10}$ / 150-250 $^{\pm 10}$						2-stage valves
Circulation pressure Gear pump P1	bar	18						high idle
Circulation pressure Gear pump P2	bar	19						high idle
Line relief pressures,		**out**	**In**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom (mono boom)	bar	330	330					
Dipperstick	bar	370	370					
Bucket	bar	370	370					
Add. control circuit	bar	300	300					
		forward	backward					
Travel right	bar	360 $^{\pm 5}$	360 $^{\pm 5}$					Valves in travel motor
Travel left	bar	360 $^{\pm 5}$	360 $^{\pm 5}$					Valves in travel motor
Articulation	bar	----	----					
Dozer blade	bar	----	----					

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1,200			
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil	X	X [2)]			X		
3	Change engine oil filter	X	X			X		
4	Drain water from fuel tank	O	O			O		
5	Change fuel filter	X		X			X	
6	Check air intake	O	O					
7	Change air filter - main cartridge	**according to service indicator**					X	
8	Change air filter - safety cartridge	**as required** [1)]						
9	Clean cooling fins of hydraulic oil radiator. *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O			O		
10	Clean cooling fins of water radiator. *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O			O		
11	Check antifreeze level in coolant						O	
12	Change coolant	**as required** [1)]						
13	Check V-belt tension	O	O					
14	Check engine mounts and pump attachments	O	O					
15	Check engine speed adjustment, top-end and bottom-end idle speed	O	O					
16	Check valve lash of engine and adjust if necessary	O		O			O	
17	Check injection nozzles			O				
18	Check injection pump			O				
19	Check acid level and battery connections	O	O					
20	Check condition of crawler chains	O	O					
21	Check secure fastening of sprocket, crawler gear units and hydraulic motor	O	O					
22	Check smooth running of bottom and top rollers	O	O					
23	Check bearing bushings and bolts of work equipment and re-adjust "free of clearance"	O	O					

1. at least every 2 years

2. Extension of oil change interval according to **SCHAEFF** oil sample analysis and lab report.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1,200			
24	Check electrical indicating and warning elements, and lighting system	O	O					
25	Check smooth running of operator controls and adjust if necessary	O	O					
26	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O					
27	Check or change hydraulic oil	O	O		X [2)]		X	
28	Replace hydraulic oil return filter insert	X		X			X	
29	Replace breather				X		X	
30	Crawler gear units: Check or replace oil	X	O		X [2)]		X	
31	Check that swing gear unit is securely fastened	O	O				O	
32	Swing gear: oil check	O	O					
33	Check that ring gear attachment screws are securely fastened	O		O			O	
34	Grease machine according to overview of lubricating points	O	O					
35	Check function, condition and completeness of safety equipment	O	O					
36	Function of brake valves	O	O					
37	Hydraulic function check with pressure function test	O	O					
38	Test run and test work	O	O					
39	Initial inspection card and return to **SCHAEFF**	O	O [3)]					

3. within warranty

HR 11, from serial no. 1100/0100

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2600						
Engine, low idle running speed	min^{-1}	1020 $^{+50}$						
Pilot pressure	bar	25						
Main pressure relief valve 1 (HV 07)	bar	165						high idle running speed
Main pressure relief valve 2 (HV 07)	bar	165						high idle running speed
Main pressure relief valve 3 (HV 07)	bar	190						high idle running speed
Cut-off valve	bar	155						
Swing right / left	bar	100						valves in the slew motor
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	125	210					
Dipperstick	bar	210	210					
Bucket	bar	210	210					
Travel right	bar	----	----					
Travel left	bar	----	----					
Articulation	bar	----	----					
Dozer blade	bar	----	----					

HR 11 **from s/n.: 1100/0228**

	Desired value	Actual value	Adjusted	Remarks
Engine, travel hydraulics, working hydraulics				
Engine, high idle running speed min^{-1}	2,600 $^{+35}/_{-10}$			
Engine, low idle running speed min^{-1}	1,020 $^{+50}$			
Pilot pressure bar	28 $^{+1}$			
Main pressure relief valve (9 SX10) bar	165			high idle
Cut off valve bar	110			
Slewing up to s/n.: 1100/0252 right / left bar	130 $^{+5}$			Valves at the slew motor Dinamic Oil
Slewing from s/n.: 1100/0253 right / left bar	140 $^{+5}$			Valves at the slew motor Comer / SOM

Line relief pressures

hydraulic cylinders	**out**	**in**	**out**	**in**	**out**	**in**	
Boom bar	160	210					
Dipperstick bar	210	210					
Bucket bar	210	210					
Travel right bar	----	----					
Travel left bar	----	----					
Articulation bar	----	----					
Dozer blade bar	----	----					

Inspection plan

To be carried out by dealer's trained Service Personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	300	600	900	1200	1500	1800	year-ly	year-ly
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X	X	
3	Change engine oil filter	X	X	X	X	X	X	X	X	
4	Drain fuel tank	O	O	O	O	O	O	O		
5	Replace fuel filter	X		X		X		X	X	
6	Clean fuel pre-filter	O	O	O	O	O	O	O		
7	Check air intake	O	O	O	O	O	O	O		
8	Replace air filter main cartridge	**acc. to service indicator**								X
9	Replace air filter safety cartridge **1)**	**as required**								
10	Clean cooling fins of the hydraulic oil radiator *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
11	Clean cooling fins of the water radiator. *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
12	Check antifreeze level in coolant									O
13	Change coolant **1)**	**as required**								
14	Check V-belt tension	O	O	O	O	O	O	O		
15	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
16	Check engine speed adjustment, high and low idle speed	O	O	O	O	O	O	O		
17	Check tightness of exhaust system	O	O	O	O	O	O	O		
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Check valve lash of engine and adjust if necessary	O		O		O		O		O
20	Check injection nozzles **2)**			O		O		O		O
21	Check injection pump **2)**			O		O		O		
22	Check condition of crawlers	O	O	O	O	O	O	O		
23	Crawler drive - check secure fastening of sprocket, travel gears and hydraulic motor.	O	O	O	O	O	O	O		
24	Check smooth running of idlers and carrier rollers	O	O	O	O	O	O	O		
25	Check function of travel brake valves	O	O	O	O	O	O	O		
26	Check bearing bushes and bolts of work equipment and adjust them "free from play"	O	O	O	O	O	O	O		

1) at least every 2 years
2) by trained personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	300	600	900	1200	1500	1800	year-ly	year-ly
27	Check that door catches function perfectly, replace if necessary	O	O	O	O	O	O	O		
28	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
29	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
30	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. ⚠ *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
31	Check or change hydraulic oil **3)**	O	O	O	X	O	O	X		X
32	Replace insert of hydraulic oil return filter	X		X		X		X	X	
33	Replace ventilation filter	X				X				X
34	Travel gear: Check or replace oil	X	O	O	O	X	O	O		X
35	Check that swing gear unit is securely fastened	O	O	O	O	O	O	O	O	
36	Swing gear oil check	O	O	O	O	O	O	O		
37	Check that ring gear attachment screws are securely fastened	O		O		O		O	O	
38	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
39	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
40	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
41	Test run and test work	O	O	O	O	O	O	O		
42	Initial inspection cards and return to **Messrs. Schaeff**.	O	O	O	O					

3) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HR 12 Mitsubishi engine, serial no. 355/4975 - /5586

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2600						
Engine, low idle running speed	min^{-1}	1020						
Pilot pressure	bar	25						
Main pressure relief valve 1 (HV 07)	bar	165						high idle running speed
Main pressure relief valve 2 (HV 07)	bar	165						high idle running speed
Main pressure relief valve 3 (HV 07)	bar	190						high idle running speed
Cut-off valve	bar	155						
Slewing right / left	bar	100						valves in the slew motor
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	125	210					
Dipperstick	bar	210	210					
Bucket	bar	210	210					
Travel right	bar	----	----					
Travel left	bar	----	----					
Articulation	bar	----	----					
Dozer blade	bar	----	----					

Inspection plan
To be carried out by dealer's trained Service Personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	300	600	900	1200	1500	1800	year-ly	year-ly
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X	X	
3	Change engine oil filter	X	X	X	X	X	X	X	X	
4	Drain fuel tank	O	O	O	O	O	O	O		
5	Replace fuel filter	X		X		X		X	X	
6	Clean fuel pre-filter	O	O	O	O	O	O	O		
7	Check air intake	O	O	O	O	O	O	O		
8	Replace air filter main cartridge	**acc. to service indicator**								X
9	Replace air filter safety cartridge **1)**	**as required**								
10	Clean cooling fins of the hydraulic oil radiator. ⚠ *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
11	Clean cooling fins of the water radiator. ⚠ *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
12	Check antifreeze level in coolant									O
13	Change coolant **1)**	**as required**								
14	Check V-belt tension	O	O	O	O	O	O	O		
15	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
16	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
17	Check tightness of exhaust system	O	O	O	O	O	O	O		
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Check valve lash of engine and adjust if necessary	O		O		O		O		O
20	Check injection nozzles **2)**			O		O		O		O
21	Check injection pump **2)**			O		O		O		
22	Check condition of crawlers	O	O	O	O	O	O	O		
23	Crawler drive - check secure fastening of sprocket, travel gears and hydraulic motor	O	O	O	O	O	O	O		
24	Check smooth running of idlers and carrier rollers	O	O	O	O	O	O	O		
25	Check function of travel brake valves	O	O	O	O	O	O	O		
26	Check bearing bushes and bolts of work equipment and adjust them "free from play"	O	O	O	O	O	O	O		

1) at least every 2 years
2) by trained personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	300	600	900	1200	1500	1800	year-ly	year-ly
27	Check that door catches function perfectly, replace if necessary	O	O	O	O	O	O	O		
28	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
29	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
30	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. ⚠ *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
31	Check or change hydraulic oil **3)**	O	O	O	X	O	O	X		X
32	Replace insert of hydraulic oil return filter	X		X		X		X	X	
33	Replace ventilation filter	X				X				X
34	Travel gear: Check or replace oil	X	O	O	O	X	O	O		X
35	Check that swing gear unit is securely fastened	O	O	O	O	O	O	O	O	
36	Swing gear oil check	O	O	O	O	O	O	O		
37	Check that ring gear attachment screws are securely fastened	O		O		O		O	O	
38	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
39	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
40	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
41	Test run and test work	O	O	O	O	O	O	O		
42	Initial inspection cards and return to **Messrs. Schaeff**.	O	O	O	O					

3) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HR 12 Mitsubishi engine, from serial no. 355/5587

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2600						
Engine, low idle running speed	min^{-1}	1020 +50						
Pilot pressure	bar	25						
Main pressure relief valve 1 (HV 07)	bar	165						high idle running speed
Main pressure relief valve 2 (HV 07)	bar	165						high idle running speed
Main pressure relief valve 3 (HV 07)	bar	190						high idle running speed
Cut-off valve	bar	155						
Slewing right / left	bar	100						valves in the slew motor
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	125	210					
Dipperstick	bar	210	210					
Bucket	bar	210	210					
Travel right	bar	----	----					
Travel left	bar	----	----					
Articulation	bar	----	----					
Dozer blade	bar	----	----					

HR 12 **from s/n.: 355/9029**

	Desired value	Actual value	Adjusted	Remarks
Engine, travel hydraulics, working hydraulics				
Engine, high idle running speed min^{-1}	2,600 $^{+35}/_{-10}$			
Engine, low idle running speed min^{-1}	1,020 $^{+50}$			
Pilot pressure bar	28 $^{+1}$			
Main pressure relief valve (9 SX10) bar	165			high idle
Cut off valve bar	110			
Slewing up to s/n.: 355/9309 right / left bar	130 $^{+5}$			Valves at the slew motor Dinamic Oil
Slewing from s/n.: 355/9310 right / left bar	140 $^{+5}$			Valves at the slew motor Comer / SOM

Line relief pressures

hydraulic cylinders	**out**	**in**	**out**	**in**	**out**	**in**	
Boom bar	160	210					
Dipperstick bar	210	210					
Bucket bar	210	210					
Travel right bar	----	----					
Travel left bar	----	----					
Articulation bar	----	----					
Dozer blade bar	----	----					

Inspection plan

To be carried out by trained dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1,200			
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil	X	X [2)]			X		
3	Change engine oil filter	X	X			X		
4	Drain water from fuel tank	O	O			O		
5	Change fuel filter	X		X			X	
6	Check air intake	O	O					
7	Change air filter - main cartridge	**according to service indicator**					X	
8	Change air filter - safety cartridge	**as required** [1)]						
9	Clean cooling fins of hydraulic oil radiator *The cleaning intervals should be shortened if there is high exposure to dust*	O	O			O		
10	Clean cooling fins of water radiator *The cleaning intervals should be shortened if there is high exposure to dust*	O	O			O		
11	Check antifreeze level in coolant						O	
12	Change coolant	**as required** [1)]						
13	Check V-belt tension	O	O					
14	Check engine mounts and pump attachments	O	O					
15	Check engine speed adjustment, top-end and low-idle idle speed	O	O					
16	Check valve lash of engine and adjust if necessary	O		O			O	
17	Check injection nozzles			O				
18	Check injection pump			O				
19	Check acid level and battery connections	O	O					
20	Check condition of crawler chains	O	O					
21	Check secure fastening of sprocket, crawler gear units and hydraulic motor	O	O					
22	Check smooth running of bottom and top rollers	O	O					
23	Check bearing bushings and bolts of work equipment and re-adjust "free of clearance"	O	O					

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1,200			
24	Check electrical indicating and warning elements, and lighting system	O	O					
25	Check smooth running of operator controls and adjust if necessary	O	O					
26	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O					
27	Check or change hydraulic oil	O	O		X [2]		X	
28	Replace hydraulic oil return filter insert	X	**according to service indicator**				X	
29	Replace breather				X		X	
30	Crawler gear units: Check or replace oil	X	O		X [2]		X	
31	Check that swing gear unit is securely fastened	O	O				O	
32	Check that ring gear attachment screws are securely fastened	O		O			O	
33	Grease machine according to overview of lubricating points	O	O					
34	Check function, condition and completeness of safety equipment	O	O					
35	Function of brake valves	O	O					
36	Hydraulic function check with pressure function test	O	O					
37	Test run and test work	O	O					
38	Initial inspection card and return to **SCHAEFF**	O	O [3]					

1. at least every 2 years
2. extension of oil change interval according to **SCHAEFF** oil sample analysis and lab report.
3. within warranty

HR 13, from serial no. 1300/0100

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle	min^{-1}	2600						
Engine, low idle	min^{-1}	1020 $^{+50}$						
Pilot pressure	bar	25						
Main pressure relief valve 1 (HV 07)	bar	180						high idle running speed
Main pressure relief valve 2 (HV 07)	bar	180						high idle running speed
Main pressure relief valve 3 (HV 07)	bar	180						high idle running speed
Cut-off valve	bar	---						
Swing right/left	bar	110						valves at the slew motor
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	160	230					
Dipperstick	bar	210	210					
Bucket	bar	210	210					
Travel, right	bar	---	---					
Travel, left	bar	---	---					
Articulation	bar	---	---					
Dozer blade	bar	---	---					

	Desired value	Actual value	Adjusted	Remarks
Engine, travel hydraulics, working hydraulics				
Engine, high idle running speed min^{-1}	2,580 $^{+35}/_{-10}$			
Engine, low idle running speed min^{-1}	1,020 $^{+50}$			
Pilot pressure bar	28 $^{+1}$			
Main pressure relief valve (9 SX10) bar	180 $^{+5}$			high idle
Cut off valve bar	125 $^{-5}$			
Slewing right / left bar	155 $^{+5}$			Valves at the slew motor / gauge at P1

Line relief pressures

hydraulic cylinders	**out**	**in**	**out**	**in**	**out**	**in**	
Boom bar	160	230					
Dipperstick bar	210	210					
Bucket bar	210	210					
Travel right bar	180	180					
Travel left bar	180	180					
Articulation bar	----	----					
Dozer blade bar	----	----					

Inspection plan

To be carried out by dealer's trained Service Personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	300	600	900	1200	1500	1800	year-ly	year-ly
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X	X	
3	Change engine oil filter	X	X	X	X	X	X	X	X	
4	Drain fuel tank	O	O	O	O	O	O	O		
5	Replace fuel filter	X		X		X		X	X	
6	Clean fuel pre-filter	O	O	O	O	O	O	O		
7	Check air intake	O	O	O	O	O	O	O		
8	Replace air filter main cartridge	**acc. to service indicator**								X
9	Replace air filter safety cartridge **1)**	**as required**								
10	Clean cooling fins of the hydraulic oil radiator. ⚠ *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
11	Clean cooling fins of the water radiator. ⚠ *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
12	Check antifreeze level in coolant									O
13	Change coolant **1)**	**as required**								
14	Check V-belt tension	O	O	O	O	O	O	O		
15	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
16	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
17	Check tightness of exhaust system	O	O	O	O	O	O	O		
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Check valve lash of engine and adjust if necessary	O		O		O		O		O
20	Check injection nozzles **2)**			O		O		O		O
21	Check injection pump **2)**			O		O		O		
22	Check condition of crawler chains	O	O	O	O	O	O	O		
23	Crawler chain drive - check secure fastening of sprocket, crawler gear unit and hydraulic motor.	O	O	O	O	O	O	O		
24	Check smooth running of idlers and carrier rollers.	O	O	O	O	O	O	O		
25	Check function of travel brake valves	O	O	O	O	O	O	O		
26	Check bearing bushes and bolts of work equipment and adjust them "free from play"	O	O	O	O	O	O	O		

1) at least every 2 years
2) by trained personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	300	600	900	1200	1500	1800	year-ly	year-ly
27	Check that door catches function perfectly, replace if necessary	O	O	O	O	O	O	O		
28	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
29	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
30	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
31	Check or change hydraulic oil **3)**	O	O	O	X	O	O	X		X
32	Replace insert of hydraulic oil return filter	X		X		X		X	X	
33	Replace ventilation filter	X				X				X
34	Crawler gear unit: Check or replace oil.	X	O	O	O	X	O	O		X
35	Check that swing gear unit is securely fastened.	O	O	O	O	O	O	O	O	
36	Swing gear oil check	O	O	O	O	O	O	O		
37	Check that ring gear attachment screws are securely fastened.	O		O		O		O	O	
38	Grease machine according to overview of lubricating points.	O	O	O	O	O	O	O		
39	Check function, condition and completeness of safety equipment.	O	O	O	O	O	O	O		
40	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
41	Test run and test work	O	O	O	O	O	O	O		
42	Initial inspection cards and return to **Messrs. Schaeff**.	O	O	O	O					

3) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HR 14 Mitsubishi engine, serial no. 356/....

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle	min^{-1}	2450						
Engine, low idle	min^{-1}	1000						
Pilot pressure	bar	30						high idle running speed
Main pressure relief valve 1 (HV 07)	bar	190						high idle running speed
Main pressure relief valve 2 (HV 07)	bar	190						high idle running speed
Main pressure relief valve 3 (HV 07)	bar	210						high idle running speed
Slewing right/left	bar	200						valves at the slew motor
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	125	210					**up to s/n. 356/1704**
	bar	140	210					**from s/n. 356/1705** (and 356/1681, /1683, /1684, /1687, /1691, /1694, /1697 - /1703)
Dipperstick	bar	210	210					
Bucket	bar	175	175					
Articulation	bar	*	*					* = anti-cavitation
Dozer blade	bar	----	----					
Breaker, slew bucket, grab rotation	bar	----	----					
Travel, right	bar	200	200					valves at the slew motor
Travel, left	bar	200	200					valves at the slew motor

	Desired value	Actual value	Adjusted	Remarks
Engine, travel hydraulics, working hydraulics				
Engine, high idle running speed min^{-1}	2,450 $^{+35}/_{-10}$			
Engine, low idle running speed min^{-1}	1,000 $^{\pm 25}$			
Pilot pressure bar	28 $^{+1}$			
Main pressure relief valve (9 SX12) bar	210 $^{+5}$			high idle
Slewing right / left bar	200 $^{+5}$			Valves at the slew motor

Line relief pressures

hydraulic cylinders	**out**	**in**	**out**	**in**	**out**	**in**	
Boom bar	160	215					
Dipperstick bar	210	215					
Bucket bar	175	175					
Travel right bar	190	190					Shock valves at the
Travel left bar	190	190					travel motor
Articulation bar	----	----					
Dozer blade bar	----	----					

To be carried out by dealer's trained Service Personnel

O = *Checking. maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	300	600	900	1200	1500	1800	year-ly	year-ly
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X	X	
3	Change engine oil filter	X	X	X	X	X	X	X	X	
4	Drain fuel tank	O	O	O	O	O	O	O		
5	Replace fuel filter	X		X		X		X	X	
6	Clean fuel pre-filter	O	O	O	O	O	O	O		
7	Check air intake	O	O	O	O	O	O	O		
8	Replace air filter main cartridge	**acc. to service indicator**								X
9	Replace air filter safety cartridge **1)**	**as required**								
10	Clean cooling fins of the hydraulic oil radiator. ⚠ *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
11	Clean cooling fins of the water radiator. ⚠ *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
12	Check antifreeze level in coolant									O
13	Change coolant **1)**	**as required**								
14	Check V-belt tension	O	O	O	O	O	O	O		
15	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
16	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
17	Check tightness of exhaust system	O	O	O	O	O	O	O		
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Check valve lash of engine and adjust if necessary	O		O		O		O		O
20	Check injection nozzles **2)**			O		O		O		O
21	Check injection pump **2)**			O		O		O		
22	Check condition of crawler chains	O	O	O	O	O	O	O		
23	Crawler drive - check secure fastening of sprocket, travel gears and hydraulic motor.	O	O	O	O	O	O	O		
24	Check smooth running of lower rollers and carrier rollers.	O	O	O	O	O	O	O		
25	Check function of travel brake valves	O	O	O	O	O	O	O		
26	Check bearing bushes and bolts of work equipment and adjust them so that they are "free from play"	O	O	O	O	O	O	O		

1) at least every 2 years
2) by trained personnel

O = *Checking. maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	300	600	900	1200	1500	1800	year-ly	year-ly
27	Check that door catches function perfectly, replace if necessary	O	O	O	O	O	O	O		
28	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
29	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
30	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. ⚠ *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O	O	O	O	O	O		
31	Check or change hydraulic oil **3)**	O	O	O	X	O	O	X		X
32	Replace insert of hydraulic oil return line filter	X		X		X		X	X	
33	Replace ventilation filter	X				X				X
34	Crawler gear unit: Check or replace oil.	X	O	O	O	X	O	O		X
35	Check that swing gear unit is securely fastened.	O	O	O	O	O	O	O	O	
36	Swing gear oil check	O	O	O	O	O	O	O		
37	Check that ring gear attachment screws are securely fastened.	O		O		O		O	O	
38	Grease machine according to overview of lubricating points.	O	O	O	O	O	O	O		
39	Check function, condition and completeness of safety equipment.	O	O	O	O	O	O	O		
40	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
41	Test run and test work	O	O	O	O	O	O	O		
42	Initial inspection cards and return to **Messrs. Schaeff**.	O	O	O	O					

3) **Extension of hydraulic oil change interval**
Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HR 16 Mitsubishi engine, serial no. 358/....

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2600						
Engine, low idle running speed	min^{-1}	1020						
Pilot pressure	bar	25						high idle running speed
Main pressure relief valve 1 (SM 12)	bar	210						high idle running speed
Main pressure relief valve 2 (SM 12)	bar	250						high idle running speed
Main pressure relief valve 3 (SM 12)	bar	250						high idle running speed
Slewing right/left	bar	200						valves at the slew motor
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	140	280					
Dipperstick	bar	280	280					
Bucket	bar	210	210					
Articulation	bar	*	*					* = anti-cavitation
Dozer blade	bar	----	----					
Breaker, slew bucket, grab rotation	bar	210	210					
Travel, right	bar	200 190	200 190					valves at the travel motor, valve bank
Travel, left	bar	200 190	200 190					valves at the travel motor, valve bank

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x	min. 1x
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1200	yearly	yearly
1	Checking whether operating manual for the machine is kept in the machine.	O	O				
2	Changing the engine oil.	X	X			X	
3	Changing the engine oil filter.	X	X			X	
4	Draining water from the fuel tank.	O	O			O	
5	Changing the fuel filter.	X		X			X
6	Checking the air intake.	O	O				
7	Replacing the air filter – main cartridge.	**according to the service indicator**					X
8	Replacing the air filter – safety cartridge.	**as required** [1)]					
9	Cleaning cooling fins on the hydraulic oil cooler. ***Machine damage*** *Due to strong accumulation of dust.* • Shorten the cleaning intervals.	O	O			O	
10	Cleaning cooling fins on the radiator. ***Machine damage*** *Due to strong accumulation of dust.* • Shorten the cleaning intervals.	O	O			O	
11	Check level of antifreeze in the coolant.						O
12	Changing the coolant.	**as required** [1)]					
13	Checking the V-belt tension.	O	O				
14	Checking engine mount and pump attachments.	O	O				
15	Checking engine speed adjustment, upper and lower idling speeds.	O	O				
16	Checking valve play on the engine and adjusting if necessary.	O		O			O
17	Checking injection nozzles.			O			
18	Checking the injection pump.			O			
19	Checking acid level and battery connections.	O	O				
20	Checking conditions of the crawler chains.	O	O				
21	Checking secure fastening of chain drive, crawler gear units and hydraulic motor.	O	O				
22	Checking for smooth running of bottom and top rollers.	O	O				
23	Checking bearing bushings and bolts on operating equipment an adjust to make “play-free”	O	O				

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x	min. 1x
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1200	yearly	yearly
24	Checking electrical indicating and warning elements and the lighting equipment.	O	O				
25	Checking operating elements for smooth movement and adjusting as required.	O	O				
26	Checking for leaks in all pipes, hoses, control valves hydraulic pumps, cylinders, etc.. ***Note*** *The screw-in couplings must be locked when tightening hose and line connections to prevent rotation.*	O	O				
27	Checking or changing the hydraulic oil.	O	O		X [2]		X
28	Replacing the hydraulic oil return filter insert.	X	**according to the service indicator**				X
29	Replacing the breather.				X		X
30	Checking or replacing oil on crawler gear units.	X	O		X		X
31	Checking the swiveling gear unit securely fastened.	O	O				O
32	Checking that the ring gear attachment screws are securely fastened.	O		O			O
33	Greasing the machine in accordance with the overview of lubrications points.	O	O				
34	Checking the function, condition and completeness of safety devices.	O	O				
35	Checking the function of service brake valves.	O	O				
36	A hydraulic function check with pressure function test.	O	O				
37	Test run and test operation.	O	O				
38	Signing the inspection card and returning it to the manufacturer.	O	O [3]				

1) At least once every two years.

2) Extension of the oil change intervals after an oil analysis and laboratory report

3) Within the warranty period

HR 16 from serial no. 358/4036

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2,300 $^{-50}$						
Engine, low idle running speed	min^{-1}	1,000 $^{\pm 25}$						
G-regulator	bar	20.0						high idle
Stand-by pressure	bar	21.0						high idle
Δp (LS-pressure)	bar	15.0						high idle
Pilot pressure / charge pressure	bar	28 $^{\pm 1}$						high idle
Main pressure relief valve (SX12)	bar	250 $^{+5}$						high idle
Swing right / left Δp between M1-M2	bar	185						Valves at the swing motor
Line relief pressures,		**out**	**In**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	160	280					
Dipper stick	bar	280	280					
Bucket	bar	210	210					
Articulation	bar	---	---					anti-cavitations
Dozer blade	bar	---	---					
Rock breaker, swing bucket, grab rotation	bar	210	210					
Travel right	bar	250	250					Shock valves at the travel motor
Travel left	bar	250	250					Shock valves at the travel motor

TEREX | SCHAEFF

Inspection plan

To be carried out by dealer's trained Service Personnel

O = *Checking. maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	300	600	900	1200	1500	1800	year-ly	year-ly
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X	X	
3	Change engine oil filter	X	X	X	X	X	X	X	X	
4	Drain fuel tank	O	O	O	O	O	O	O		
5	Replace fuel filter	X		X		X		X	X	
6	Clean fuel pre-filter	O	O	O	O	O	O	O		
7	Check air intake	O	O	O	O	O	O	O		
8	Replace air filter main cartridge	**acc. to service indicator**								X
9	Replace air filter safety cartridge **1)**	**as required**								
10	Clean cooling fins of combined hydraulic oil / water radiator. ⚠ *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
11	Check antifreeze level in coolant									O
12	Change coolant **1)**	**as required**								
13	Check V-belt tension	O	O	O	O	O	O	O		
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
15	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
16	Check tightness of exhaust system	O	O	O	O	O	O	O		
17	Check acid level and battery connections	O	O	O	O	O	O	O		
18	Check valve lash of engine and adjust if necessary			O		O		O		O
19	Check injection nozzles **2)**			O		O		O		O
20	Check condition of crawler chains	O	O	O	O	O	O	O		
21	Crawler drive - check secure fastening of sprocket, crawler gear unit and hydraulic motor	O	O	O	O	O	O	O		
22	Check smooth running of lower rollers and carrier rollers	O	O	O	O	O	O	O		
23	Check function of brake valves	O	O	O	O	O	O	O		
24	Check bearing bushes and bolts of work equipment and adjust them so that they are "free from play"	O	O	O	O	O	O	O		
25	Check wear of door catches and their function, replace if necessary	O	O	O	O	O	O	O		

1) at least every 2 years
2) by trained personnel

O = *Checking. maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	300	600	900	1200	1500	1800	year-ly	year-ly
26	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. ⚠ *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O	O	O	O	O	O		
28	Check or change hydraulic oil **3)**	O	O	O	X	O	O	X		X
29	Replace insert of hydraulic oil return line filter	X		X		X		X	X	
30	Replace ventilation filter	X				X				X
31	Crawler gear unit: Check or replace oil.	X	O	O	O	X	O	O		X
32	Check that swing gear unit is securely fastened.	O	O	O	O	O	O	O	O	
33	Check that ring gear attachment screws are securely fastened.	O	O	O	O	O	O	O	O	
34	Grease machine according to overview of lubricating points.	O		O		O		O		
35	Check function, condition and completeness of safety equipment.	O	O	O	O	O	O	O		
36	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
37	Test run and test work	O	O	O	O	O	O	O		
38	Initial inspection cards and return to **Messrs. Schaeff**.	O	O	O	O					

3) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

Test certificate HR 18 Mitsubishi engine, serial no. 180/....

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2350						
Engine, low idle running speed	min^{-1}	850						
Pilot pressure	bar	30						high idle
Main pressure relief valve (P1)	bar	245						high idle running speed
Main pressure relief valve (P2)	bar	245						high idle running speed
Main pressure relief valve (P3)	bar	205						high idle running speed
Slewing right / left Valves at slew motor	bar bar	205 205						
Travel left/right, main pressure relief valve Valves at travel motor	bar bar	245 270	245 270					
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	140	280					
Dipperstick	bar	280	280					
Bucket	bar	280	280					
Articulation	bar	*	*					* = anti-cavitation
Dozer blade	bar	----	----					
Breaker, slew bucket, grab rotation	bar	210	210					

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x	min. 1x
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1200	yearly	yearly
1	Checking whether operating manual for the machine is kept in the machine.	O	O				
2	Changing the engine oil.	X	X			X	
3	Changing the engine oil filter.	X	X			X	
4	Draining water from the fuel tank.	O	O			O	
5	Changing the fuel filter.	X		X			X
6	Checking the air intake.	O	O				
7	Replacing the air filter – main cartridge.	**according to the service indicator**					X
8	Replacing the air filter – safety cartridge.	**as required** [1)]					
9	Cleaning cooling fins on the hydraulic oil cooler. ***Machine damage*** *Due to strong accumulation of dust.* • Shorten the cleaning intervals.	O	O			O	
10	Cleaning cooling fins on the radiator. ***Machine damage*** *Due to strong accumulation of dust.* • Shorten the cleaning intervals.	O	O			O	
11	Check level of antifreeze in the coolant.						O
12	Changing the coolant.	**as required** [1)]					
13	Checking the V-belt tension.	O	O				
14	Checking engine mount and pump attachments.	O	O				
15	Checking engine speed adjustment, upper and lower idling speeds.	O	O				
16	Checking valve play on the engine and adjusting if necessary.	O		O			O
17	Checking injection nozzles.			O			
18	Checking the injection pump.			O			
19	Checking acid level and battery connections.	O	O				
20	Checking conditions of the crawler chains.	O	O				
21	Checking secure fastening of chain drive, crawler gear units and hydraulic motor.	O	O				
22	Checking for smooth running of bottom and top rollers.	O	O				
23	Checking bearing bushings and bolts on operating equipment an adjust to make “play-free”	O	O				

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x	min. 1x
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1200	yearly	yearly
24	Checking electrical indicating and warning elements and the lighting equipment.	O	O				
25	Checking operating elements for smooth movement and adjusting as required.	O	O				
26	Checking for leaks in all pipes, hoses, control valves hydraulic pumps, cylinders, etc.. ***Note*** *The screw-in couplings must be locked when tightening hose and line connections to prevent rotation.*	O	O				
27	Checking or changing the hydraulic oil.	O	O		X [2]		X
28	Replacing the hydraulic oil return filter insert.	X	**according to the service indicator**				X
29	Replacing the breather.				X		X
30	Checking or replacing oil on crawler gear units.	X	O		X		X
31	Checking the swiveling gear unit securely fastened.	O	O				O
32	Checking that the ring gear attachment screws are securely fastened.	O		O			O
33	Greasing the machine in accordance with the overview of lubrications points.	O	O				
34	Checking the function, condition and completeness of safety devices.	O	O				
35	Checking the function of service brake valves.	O	O				
36	A hydraulic function check with pressure function test.	O	O				
37	Test run and test operation.	O	O				
38	Signing the inspection card and returning it to the manufacturer.	O	O [3]				

1) At least once every two years.

2) Extension of the oil change intervals after an oil analysis and laboratory report

3) Within the warranty period

HR 1.5 from serial no. 1500R/0100

	Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working							
Engine, high idle running speed min^{-1}	2,580 $^{+35}/_{-10}$						
Engine, low idle running speed min^{-1}	1,020 $^{+50}$						
Δp (between P und LS) bar	15						high idle
Pilot pressure bar	28 $^{\pm 1}$						high idle
Main pressure relief valve (SX10) bar	165 $^{+5}$						high idle
Swing right / left At test point P1 bar	140 $^{+5}$						Valves at the swing motor
Line relief pressures, hydraulic cylinders	**out**	**In**	**out**	**in**	**out**	**in**	
Boom bar	160	210					
Dipper stick bar	210	210					
Bucket bar	210	210					
Articulation bar	---	---					anti-cavitations
Dozer blade bar	---	---					
Rock breaker, swing bucket, grab rotation bar	---	---					
Travel right bar	---	---					Shock valves at the travel motor
Travel left bar	---	---					Shock valves at the travel motor

TEREX | SCHAEFF

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x	min. 1x
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1200	yearly	yearly
1	Checking whether operating manual for the machine is kept in the machine.	O	O				
2	Changing the engine oil.	X	X			X	
3	Changing the engine oil filter.	X	X			X	
4	Draining water from the fuel tank.	O	O			O	
5	Changing the fuel filter.	X		X			X
6	Checking the air intake.	O	O				
7	Replacing the air filter – main cartridge.	**according to the service indicator**					X
8	Replacing the air filter – safety cartridge.	**as required** [1]					
9	Cleaning cooling fins on the hydraulic oil cooler. ***Machine damage*** *Due to strong accumulation of dust.* • Shorten the cleaning intervals.	O	O			O	
10	Cleaning cooling fins on the radiator. ***Machine damage*** *Due to strong accumulation of dust.* • Shorten the cleaning intervals.	O	O			O	
11	Check level of antifreeze in the coolant.						O
12	Changing the coolant.	**as required** [1]					
13	Checking the V-belt tension.	O	O				
14	Checking engine mount and pump attachments.	O	O				
15	Checking engine speed adjustment, upper and lower idling speeds.	O	O				
16	Checking valve play on the engine and adjusting if necessary.	O		O			O
17	Checking injection nozzles.			O			
18	Checking the injection pump.			O			
19	Checking acid level and battery connections.	O	O				
20	Checking conditions of the crawler chains.	O	O				
21	Checking secure fastening of chain drive, crawler gear units and hydraulic motor.	O	O				
22	Checking for smooth running of bottom and top rollers.	O	O				
23	Checking bearing bushings and bolts on operating equipment an adjust to make “play-free”	O	O				

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x	min. 1x
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1200	yearly	yearly
24	Checking electrical indicating and warning elements and the lighting equipment.	O	O				
25	Checking operating elements for smooth movement and adjusting as required.	O	O				
26	Checking for leaks in all pipes, hoses, control valves hydraulic pumps, cylinders, etc.. ***Note*** *The screw-in couplings must be locked when tightening hose and line connections to prevent rotation.*	O	O				
27	Checking or changing the hydraulic oil.	O	O		X [2]		X
28	Replacing the hydraulic oil return filter insert.	X	**according to the service indicator**				X
29	Replacing the breather.				X		X
30	Checking or replacing oil on crawler gear units.	X	O		X		X
31	Checking the swiveling gear unit securely fastened.	O	O				O
32	Checking that the ring gear attachment screws are securely fastened.	O		O			O
33	Greasing the machine in accordance with the overview of lubrications points.	O	O				
34	Checking the function, condition and completeness of safety devices.	O	O				
35	Checking the function of service brake valves.	O	O				
36	A hydraulic function check with pressure function test.	O	O				
37	Test run and test operation.	O	O				
38	Signing the inspection card and returning it to the manufacturer.	O	O [3]				

1) At least once every two years.

2) Extension of the oil change intervals after an oil analysis and laboratory report

3) Within the warranty period

HR 1.6 from serial no. 1600R/0100

	Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working							
Engine, high idle running speed min^{-1}	2,580 $^{+35}/_{-10}$						
Engine, low idle running speed min^{-1}	1,020 $^{+50}$						
Δp (between P und LS) bar	15						high idle
Pilot pressure bar	28 $^{\pm 1}$						high idle
Main pressure relief valve (SX10) bar	165 $^{+5}$						high idle
Shut-off valve bar	110 $^{+5}$						
Swing right / left at test point P1 bar	140 $^{+5}$						Valves at the swing motor
Line relief pressures,	**out**	**In**	**out**	**in**	**out**	**in**	
hydraulic cylinders							
Boom bar	160	210					
Dipper stick bar	210	210					
Bucket bar	210	210					
Articulation bar	---	---					anti-cavitations
Dozer blade bar	---	---					
Rock breaker, swing bucket, grab rotation bar	---	---					
Travel right bar	---	---					Shock valves at the travel motor
Travel left bar	---	---					Shock valves at the travel motor

TEREX | SCHAEFF

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x	min. 1x
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1200	yearly	yearly
1	Checking whether operating manual for the machine is kept in the machine.	O	O				
2	Changing the engine oil.	X	X			X	
3	Changing the engine oil filter.	X	X			X	
4	Draining water from the fuel tank.	O	O			O	
5	Changing the fuel filter.	X		X			X
6	Checking the air intake.	O	O				
7	Replacing the air filter – main cartridge.	**according to the service indicator**					X
8	Replacing the air filter – safety cartridge.	**as required** [1)]					
9	Cleaning cooling fins on the hydraulic oil cooler. ***Machine damage*** *Due to strong accumulation of dust.* • Shorten the cleaning intervals.	O	O			O	
10	Cleaning cooling fins on the radiator. ***Machine damage*** *Due to strong accumulation of dust.* • Shorten the cleaning intervals.	O	O			O	
11	Check level of antifreeze in the coolant.						O
12	Changing the coolant.	**as required** [1)]					
13	Checking the V-belt tension.	O	O				
14	Checking engine mount and pump attachments.	O	O				
15	Checking engine speed adjustment, upper and lower idling speeds.	O	O				
16	Checking valve play on the engine and adjusting if necessary.	O		O			O
17	Checking injection nozzles.			O			
18	Checking the injection pump.			O			
19	Checking acid level and battery connections.	O	O				
20	Checking conditions of the crawler chains.	O	O				
21	Checking secure fastening of chain drive, crawler gear units and hydraulic motor.	O	O				
22	Checking for smooth running of bottom and top rollers.	O	O				
23	Checking bearing bushings and bolts on operating equipment an adjust to make “play-free”	O	O				

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x	min. 1x
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1200	yearly	yearly
24	Checking electrical indicating and warning elements and the lighting equipment.	O	O				
25	Checking operating elements for smooth movement and adjusting as required.	O	O				
26	Checking for leaks in all pipes, hoses, control valves hydraulic pumps, cylinders, etc.. ***Note*** *The screw-in couplings must be locked when tightening hose and line connections to prevent rotation.*	O	O				
27	Checking or changing the hydraulic oil.	O	O		X [2]		X
28	Replacing the hydraulic oil return filter insert.	X	**according to the service indicator**				X
29	Replacing the breather.				X		X
30	Checking or replacing oil on crawler gear units.	X	O		X		X
31	Checking the swiveling gear unit securely fastened.	O	O				O
32	Checking that the ring gear attachment screws are securely fastened.	O		O			O
33	Greasing the machine in accordance with the overview of lubrications points.	O	O				
34	Checking the function, condition and completeness of safety devices.	O	O				
35	Checking the function of service brake valves.	O	O				
36	A hydraulic function check with pressure function test.	O	O				
37	Test run and test operation.	O	O				
38	Signing the inspection card and returning it to the manufacturer.	O	O [3]				

1) At least once every two years.

2) Extension of the oil change intervals after an oil analysis and laboratory report

3) Within the warranty period

HR 2.0 from serial no. 2000R/0100

	Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working							
Engine, high idle running speed min^{-1}	2,580 $^{+35}/_{-10}$						
Engine, low idle running speed min^{-1}	1,020 $^{+50}$						
Δp (between P und LS) bar	15						high idle
Pilot pressure bar	28 $^{\pm 1}$						high idle
Main pressure relief valve (SX10) bar	180 $^{+5}$						high idle
Shut-off valve bar	125 $^{+5}$						
Swing right / left at test point P1 bar	155 $^{+5}$						Valves at the swing motor
Line relief pressures,	**out**	**In**	**out**	**in**	**out**	**in**	
hydraulic cylinders							
Boom bar	160	230					
Dipper stick bar	210	210					
Bucket bar	210	210					
Articulation bar	---	---					anti-cavitations
Dozer blade bar	---	---					
Rock breaker, swing bucket, grab rotation bar	---	---					
Travel right bar	---	---					Shock valves at the travel motor
Travel left bar	---	---					Shock valves at the travel motor

TEREX | SCHAEFF

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x	min. 1x
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1200	yearly	yearly
1	Checking whether operating manual for the machine is kept in the machine.	O	O				
2	Changing the engine oil.	X	X			X	
3	Changing the engine oil filter.	X	X			X	
4	Draining water from the fuel tank.	O	O			O	
5	Changing the fuel filter.	X		X			X
6	Checking the air intake.	O	O				
7	Replacing the air filter – main cartridge.	**according to the service indicator**					X
8	Replacing the air filter – safety cartridge.	**as required** [1)]					
9	Cleaning cooling fins on the hydraulic oil cooler. ***Machine damage*** *Due to strong accumulation of dust.* • Shorten the cleaning intervals.	O	O			O	
10	Cleaning cooling fins on the radiator. ***Machine damage*** *Due to strong accumulation of dust.* • Shorten the cleaning intervals.	O	O			O	
11	Check level of antifreeze in the coolant.						O
12	Changing the coolant.	**as required** [1)]					
13	Checking the V-belt tension.	O	O				
14	Checking engine mount and pump attachments.	O	O				
15	Checking engine speed adjustment, upper and lower idling speeds.	O	O				
16	Checking valve play on the engine and adjusting if necessary.	O		O			O
17	Checking injection nozzles.			O			
18	Checking the injection pump.			O			
19	Checking acid level and battery connections.	O	O				
20	Checking conditions of the crawler chains.	O	O				
21	Checking secure fastening of chain drive, crawler gear units and hydraulic motor.	O	O				
22	Checking for smooth running of bottom and top rollers.	O	O				
23	Checking bearing bushings and bolts on operating equipment an adjust to make “play-free”	O	O				

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x	min. 1x
Perform work with machine at operating temperature		after 100	every 300	every 600	every 1200	yearly	yearly
24	Checking electrical indicating and warning elements and the lighting equipment.	O	O				
25	Checking operating elements for smooth movement and adjusting as required.	O	O				
26	Checking for leaks in all pipes, hoses, control valves hydraulic pumps, cylinders, etc.. ***Note*** *The screw-in couplings must be locked when tightening hose and line connections to prevent rotation.*	O	O				
27	Checking or changing the hydraulic oil.	O	O		X [2]		X
28	Replacing the hydraulic oil return filter insert.	X	**according to the service indicator**				X
29	Replacing the breather.				X		X
30	Checking or replacing oil on crawler gear units.	X	O		X		X
31	Checking the swiveling gear unit securely fastened.	O	O				O
32	Checking that the ring gear attachment screws are securely fastened.	O		O			O
33	Greasing the machine in accordance with the overview of lubrications points.	O	O				
34	Checking the function, condition and completeness of safety devices.	O	O				
35	Checking the function of service brake valves.	O	O				
36	A hydraulic function check with pressure function test.	O	O				
37	Test run and test operation.	O	O				
38	Signing the inspection card and returning it to the manufacturer.	O	O [3]				

1) At least once every two years.

2) Extension of the oil change intervals after an oil analysis and laboratory report

3) Within the warranty period

HR 3.7 from serial no. 3700R/0100

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2,300 $^{-50}$						
Engine, low idle running speed	min^{-1}	1,000 $^{\pm 25}$						
G-regulator	bar	20.0						high idle
Stand-by pressure	bar	21.0						high idle
Δp (LS-pressure)	bar	15.0						high idle
Pilot pressure / charge pressure	bar	28 $^{\pm 1}$						high idle
Main pressure relief valve (SX12)	bar	250 $^{+5}$						high idle
Swing right / left Δp between M1-M2	bar	185						Valves at the swing motor
Line relief pressures,		**out**	**In**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	160	280					
Dipper stick	bar	280	280					
Bucket	bar	210	210					
Articulation	bar	---	---					anti-cavitations
Dozer blade	bar	---	---					
Rock breaker, swing bucket, grab rotation	bar	210	210					
Travel right	bar	250	250					Shock valves at the travel motor
Travel left	bar	250	250					Shock valves at the travel motor

TEREX | SCHAEFF

SUBGROUP LIST

Operation

Work before putting into operation	**9.002**
SKL 863	**9.11**
SKL 873	**9.13**
SKL 824	**9.22**
SKL 834	**9.24**
SKL 844	**9.26**
SKL 854	**9.27**
SKS 634	**9.37**
HML 22	**9.49**
HML 23	**9.49.50**
HML 31	**9.50**
HML 32	**9.51**
HML 41	**9.52**
HML 42	**9.53**
HR 20	**9.60**
HR 32	**9.65**
HR 42	**9.67**
HR 11	**9.73**
HR 12	**9.74**
HR 13	**9.75**
HR 14	**9.76**
HR 16	**9.78**
HR 18	**9.80**
HR 1.5	**9.90**
HR 1.6	**9.91**
HR 2.0	**9.92**
HR 3.7	**9.97**

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Work before putting into operation

! Note

All checking work must be carried out **prior to starting the engine** with the machine standing on level ground and cooled down.
The levels of engine oil, coolant and hydraulic oil can be read on the check display.

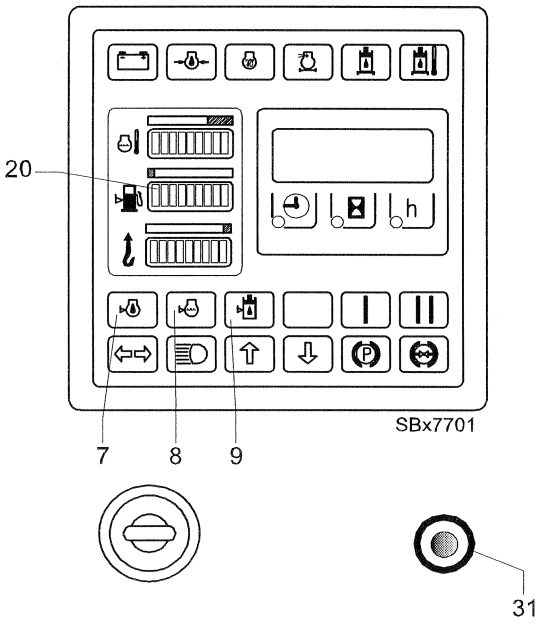
! Note

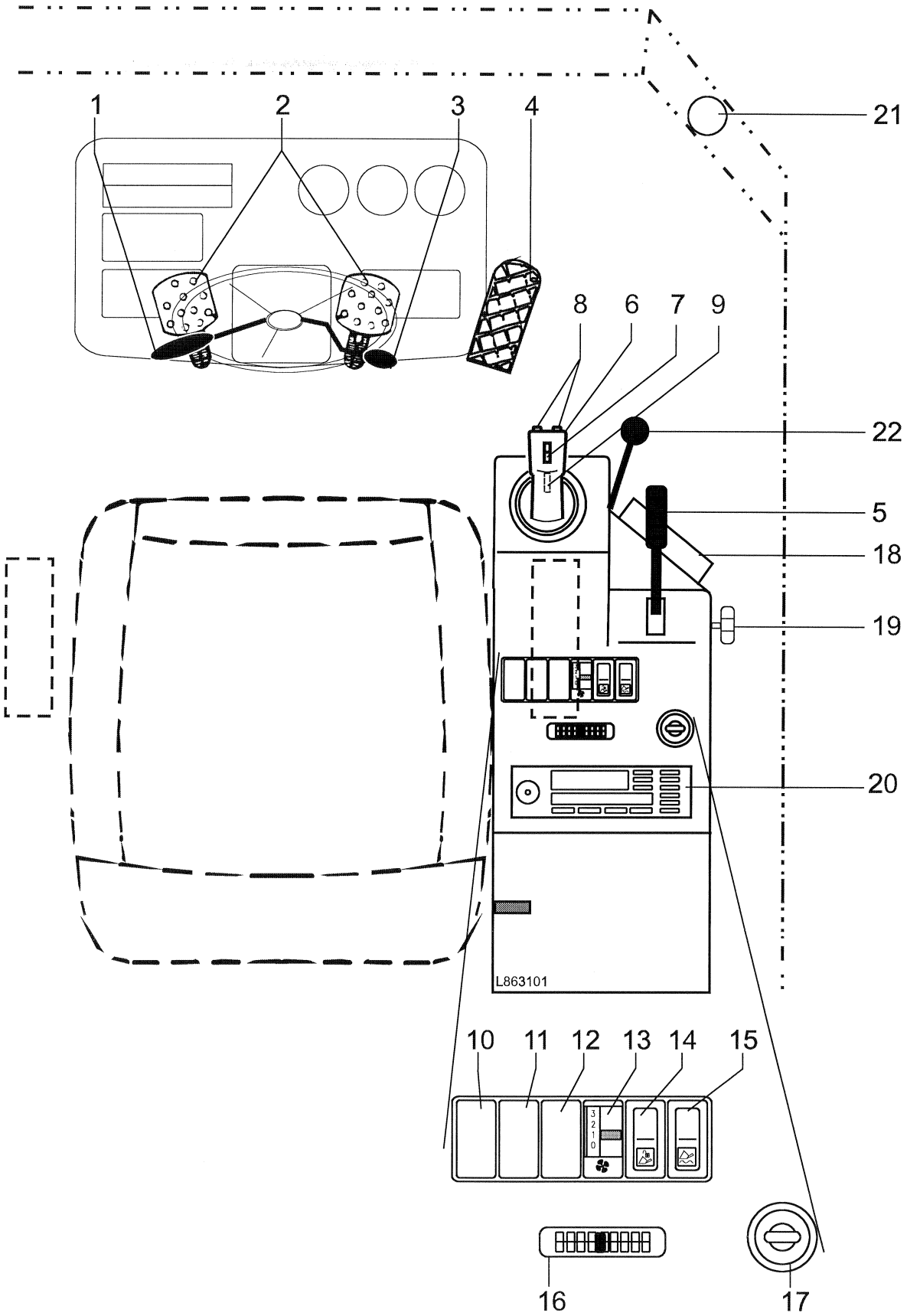
When the diesel engine is running, the level indicator is without function.

Checking:

- Switch on ignition and wait for approx. 10 seconds (display establishes internal working order)
- Press the check button (7/31) for approx. 3 seconds
  ⇒ the indicator lamps
  - engine oil level (7/7)
  - coolant level (7/8)
  - hydraulic oil level (7/9)

  should light up.
- Release the check button.
- When the level indicators are correct, the indicator lamps go down.
- If there is not enough fluid, the corresponding level indicator lamp flashes and an audible signal can be heard.
- Top up the missing fluid.



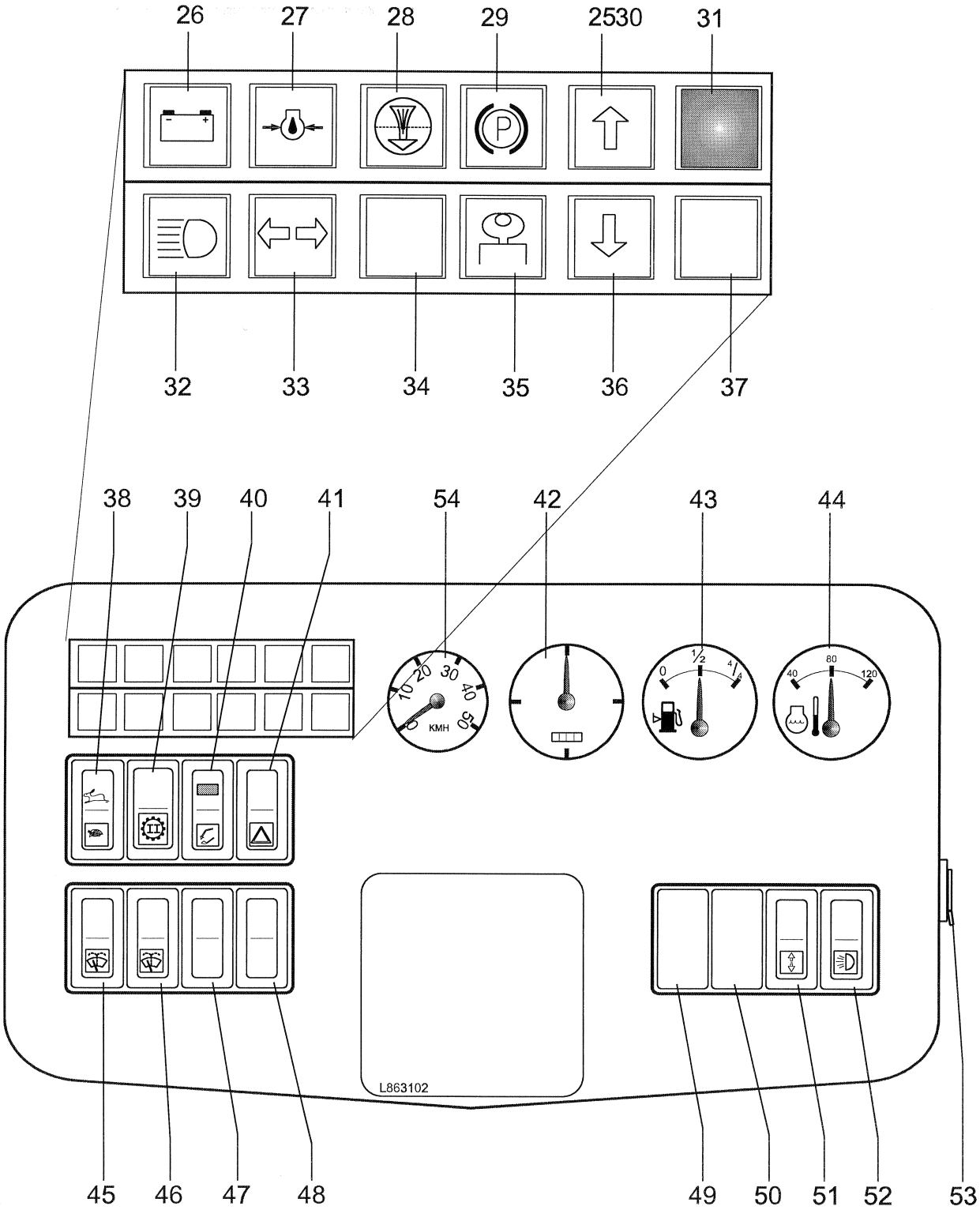


SCHAEFF	Typ/Model/Type **SKL 863**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.11.01**

	Description
1	Direction indicator - signal horn - low/ high beam switch (steering column switch)
2	Double brake inching pedal
3	Steering wheel - tilt adjustment
4	Accelerator pedal
5	Parking brake
6	Actuating lever for loading equipment
7	Travel direction selector switch (without function when working hydraulics are switched off)
8	Actuation - additional control circuit
9	Actuation of impulse mode - float position
10	not assigned *
11	not assigned *
12	not assigned *
13	Fan switch
14	Cut-off switch for actuation of additional control circuit (pos. 8)
15	Selection switch for float position - OFF/impulse-/continuous operation mode
16	Slider control - heating
17	Pre-heat/ starter switch
18	Fuse and relay box
19	Shift lever for fan - fresh air/ re-circulating air
20	Radio
21	Washer tank
22	4th control circuit

*e.g. for accessories such as ride control system, bucket re-positioning etc.

Operating and display elements



SCHAEFF	Typ/Model/Type **SKL 863**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.11.02**

Description

26 Battery charge indicator
27 Engine oil pressure indicator
28 Air filter clogging indicator
29 Parking brake indicator lamp
30 Travel forward
31 Indicator lamp - switch gear (only fast travel version)

*When the **switch gear indicator lamp** lights up, the shift gear is in an intermediate position. **The machine is not ready to drive!** This can be remedied by brief steering movements in such a manner that the shift gear is engaged.*

32 High beam
33 Flashlight turn signal
34 not assigned *
35 Pre-heat indicator
36 Travel in reverse
37 not assigned *
38 Travel range switch - fast/ slow
39 Change-over switch for high-speed gear

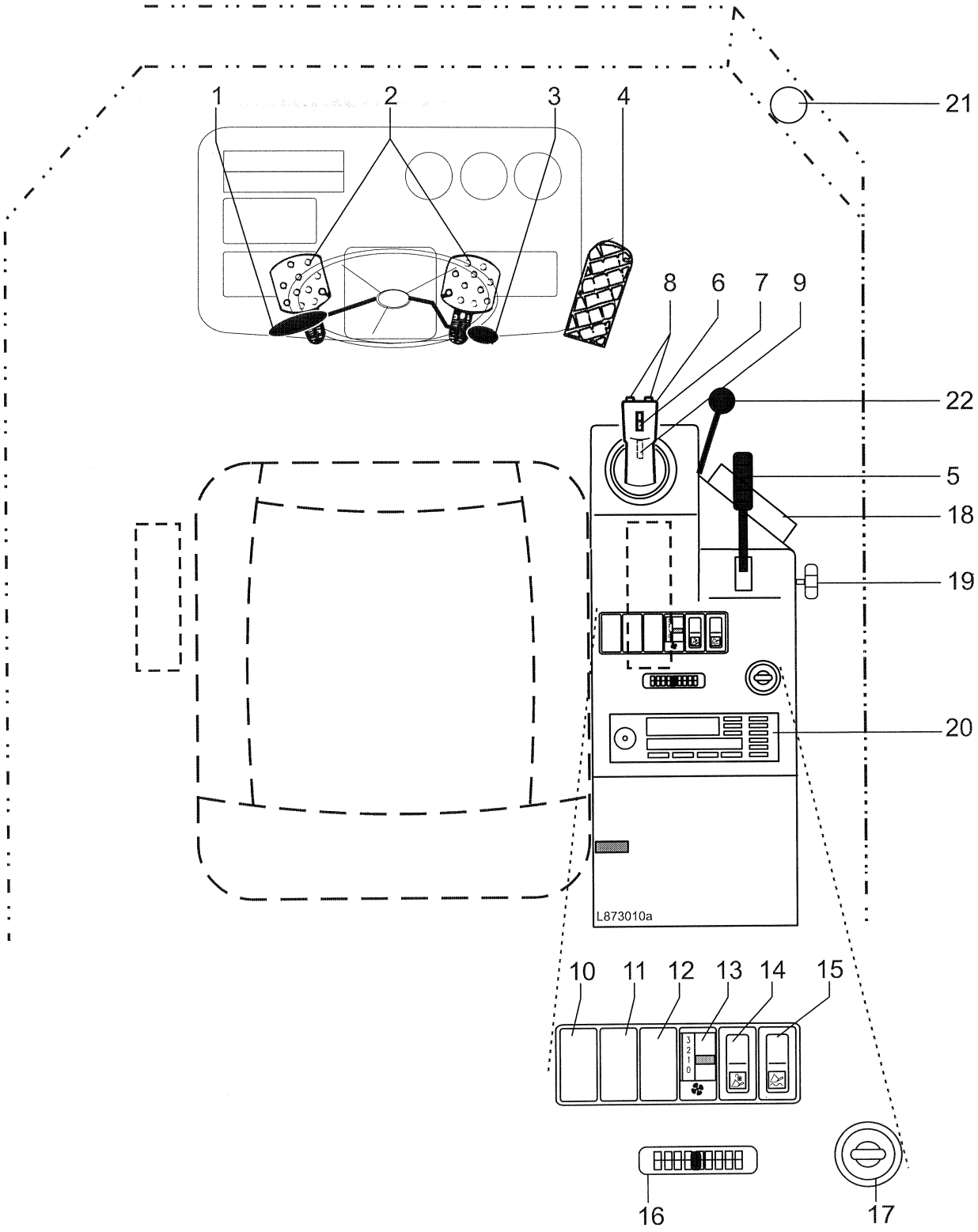
Only press the button when machine is at standstill!

40 Multi-function switch with locking function for work equipment cut-off and setting of travel direction selector switch from pos. 07 to pos. 51

Only press the button when machine is at standstill!

41 Hazard warning switch
42 Operating hour meter
43 Fuel gauge
44 Coolant temperature indicator
45 Switch for windscreen wiper, front, wash/ wipe function
46 Switch for windscreen wiper, rear, wash/ wipe function
47 not assigned *
48 not assigned *
49 not assigned *
50 not assigned *
51 Travel direction selection - Function only when working hydraulics are switched off
52 Light switch
53 Socket
54 Speedometer (only fast travel version)

* e.g. for accessories such as rotating beacon, water pump for sweeper, additional floodlights, etc.

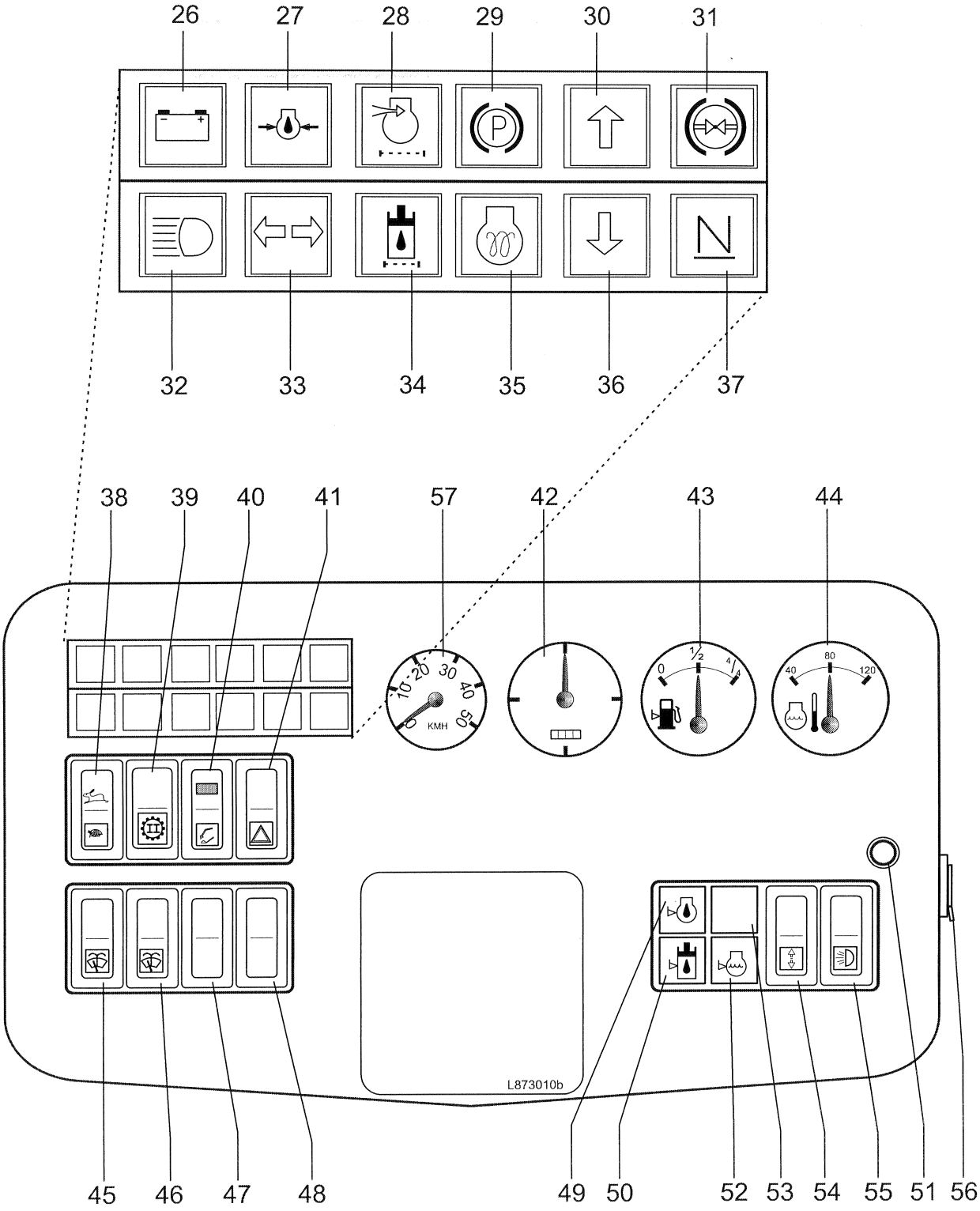


SCHAEFF	Typ/Model/Type **SKL 873**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.13.01**

1 Direction indicator - signal horn - low/ high beam switch (steering column switch)
2 Dual brake inching pedal
3 Steering wheel - tilt adjustment
4 Accelerator pedal
5 Parking brake
6 Joystick (operating lever) for loading equipment
7 Travel direction selection switch (without function when working hydraulics are switched off)
8 Actuation - additional control circuit
9 Actuation of impulse mode - float position
10 not assigned *
11 not assigned *
12 not assigned *
13 Fan switch
14 Cut-off switch for actuation of additional control circuit (pos. 8)
15 Pre-selection switch for float position - OFF/Impulse/continuous operation
16 Slider control - Heating
17 Pre-heat/ starter switch
18 Fuse and relay box
19 Shift lever for fan - fresh air/ circulating air
20 Radio
21 Washer tank
22 4th control circuit

*e.g. for accessories such as ride control system, bucket re-positioning, etc.

Operator controls and display elements



26 Battery charge indicator
27 Engine oil pressure indicator lamp
28 Air filter clogging indicator
29 Parking brake indicator lamp
30 Travel, forward
31 Brake accumulator pressure indicator lamp
32 High beam
33 Direction indicator
34 Hydraulic oil return filter clogging indicator
35 Pre-heat indicator
36 Travel in reverse
37 Transmission indicator lamp



*When the **transmission indicator lamp** lights up, the transmission is in an intermediate position. **The machine is not ready to drive!** This can be remedied by brief steering movements in such a way that the transmission engages.*

38 Driving range switch - fast/ slow
39 Change-over switch - mechanical transmission range



Only press the button when machine is at standstill!

40 Multi-function switch with lock for work equipment cut-off and change-over of direction-of-travel pre-selection switch from pos. 07 to pos. 46

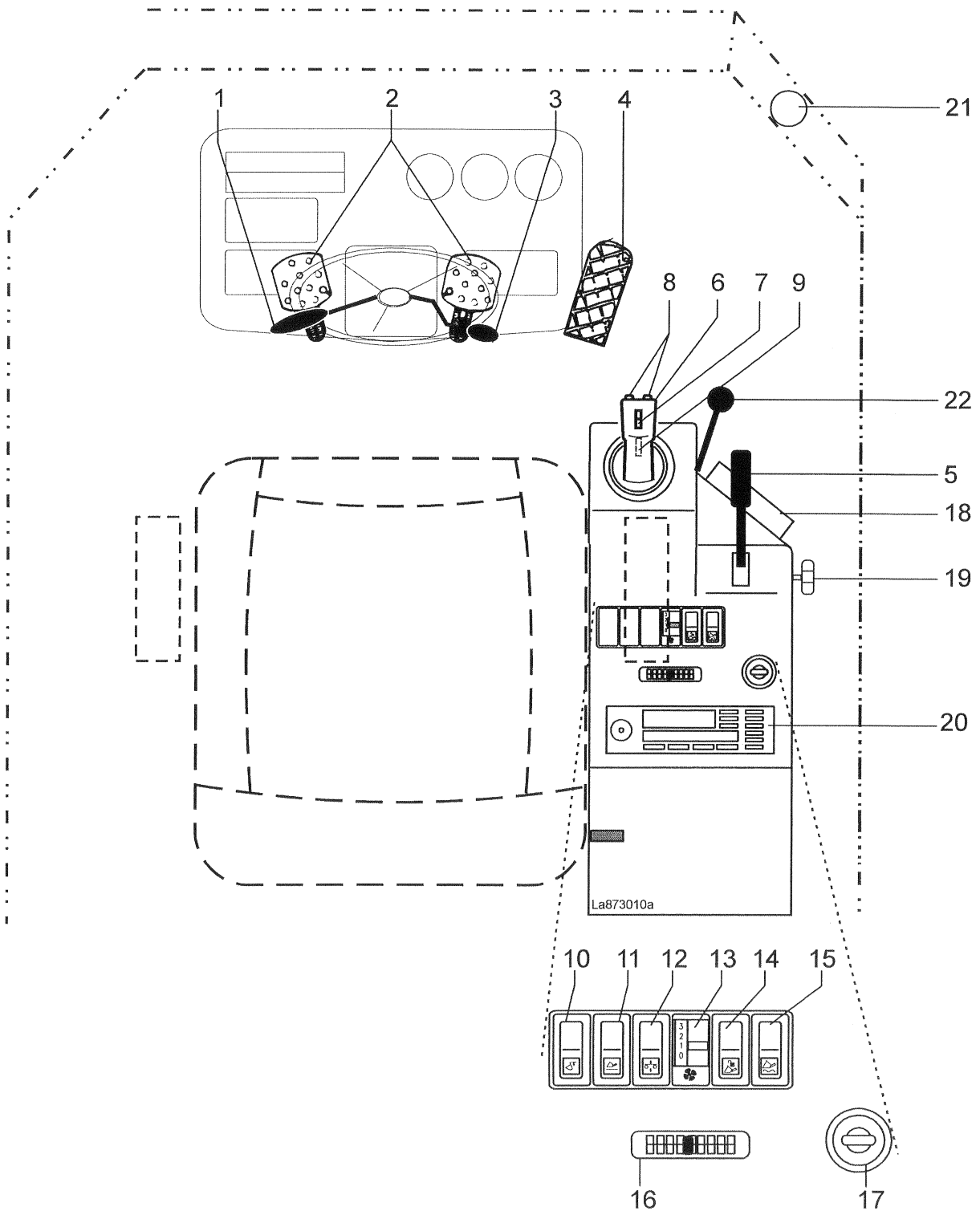


Only press the button when machine is at standstill!

41 Hazard warning switch
42 Operating hour meter
43 Fuel gauge
44 Coolant temperature indicator
45 Switch for windshield wiper, front, wash/ wipe function
46 Switch for windshield wiper, rear, wash/ wipe function
47 not assigned *
48 not assigned *
49 Filling level indicator for engine oil
50 Filling level indicator for hydraulic oil
51 Check button
52 Filling level indicator for coolant *
53 not assigned
54 Travel direction pre-selection - Function only activated when working hydraulics are switched off
55 Light switch
56 Socket
57 Speedometer (only high-speed version)

* e.g. for accessories such as rotating beacon, additional floodlight(s), etc.

Operator controls and display elements



1 Direction indicator — horn — low/high beam (steering column mounted switch)

2 Dual brake inching pedal

3 Tilt adjustment of steering wheel

4 Accelerator pedal

5 Parking brake

6 Joystick (control lever) — loader installation

7 Direction-of-travel pre-selection
(without function if working hydraulics are disabled)

8 Actuation of additional control circuit

9 Impulse mode — float position

10 Option — lift frame height limitation

11 Option — bucket return

12 Option — Ride control system

13 Fan switch

14 OFF switch for actuation of additional control circuit (Pos. 8)

15 Pre-selection switch for float position - OFF/Impulse-/Continuous operation

16 Heater control

17 Pre-heat/ starter switch

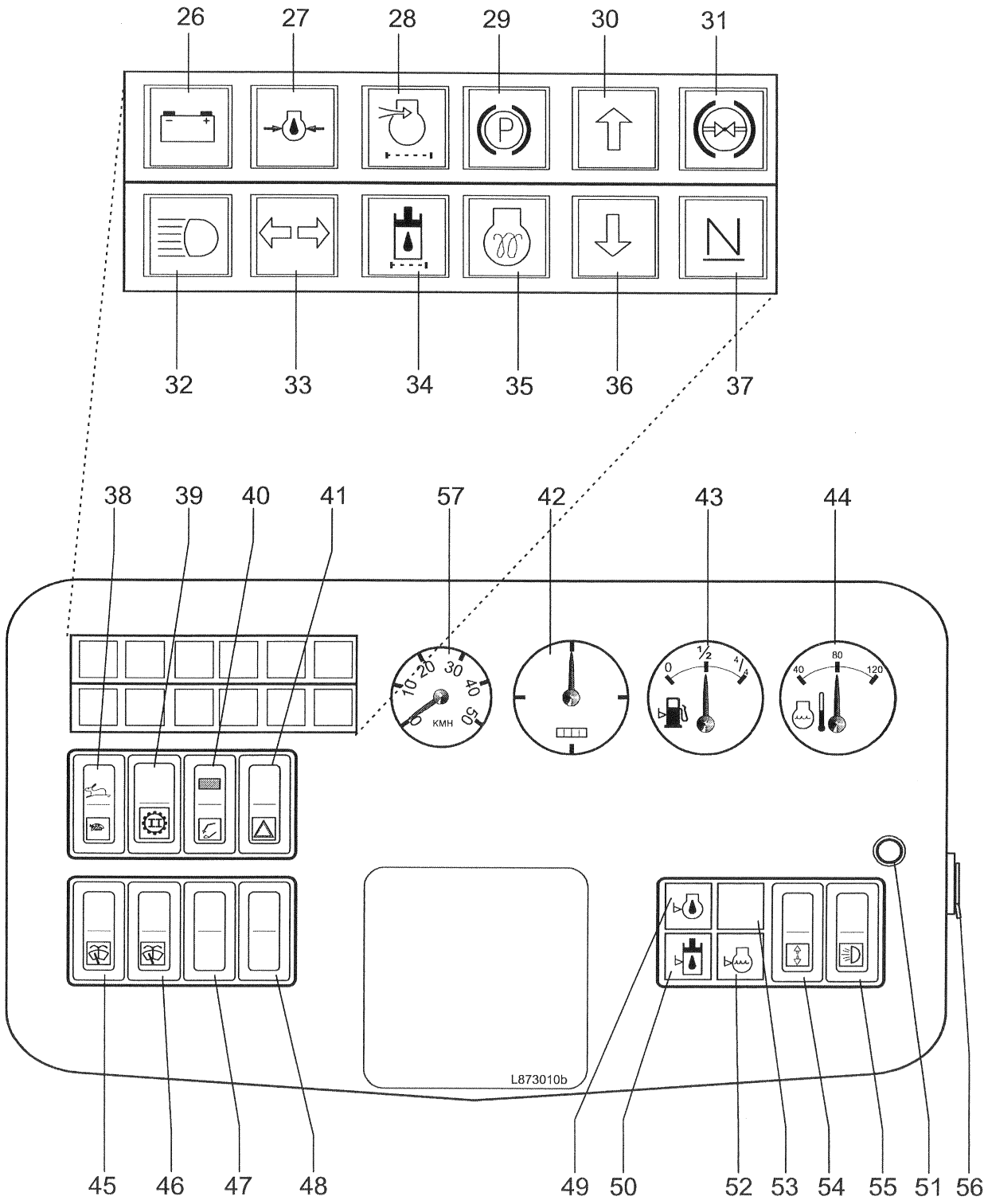
18 Fuse and relay box

19 Fan: fresh air/ re-circulating air

20 Option — Radio

21 Washer tank

22 Option — 4th control circuit



TEREX SCHAEFF	Typ/Model/Type **SKL 873 SP** **from s/n.: 873/0171 up to 873/0273**	Datum/Edition/Date **01.2004**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.13.04**

26 Battery charge indicator
27 Engine oil pressure indicator lamp
28 Air filter clogging indicator
29 Parking brake indicator lamp
30 orward
31 Brake accumulator pressure indicator lamp
32 Upper beam
33 Direction indicator
34 Hydraulic oil return filter clogging indicator
35 Pre-heat indicator
36 Travel in reverse
37 Transmission indicator lamp



*When the **transmission indicator lamp** lights up, the transmission is in an intermediate position. **The machine is not ready to drive!** This can be remedied by brief steering movements in such a way that the transmission engages.*

38 Travel speed switch FAST/SLOW
39 Change-over switch - mechanical transmission range



Only press the button when machine is at standstill!

40 Multi-function switch with lock for work equipment cut-off and change-over of direction-of-travel pre-selection switch from Pos. 07 to Pos. 46

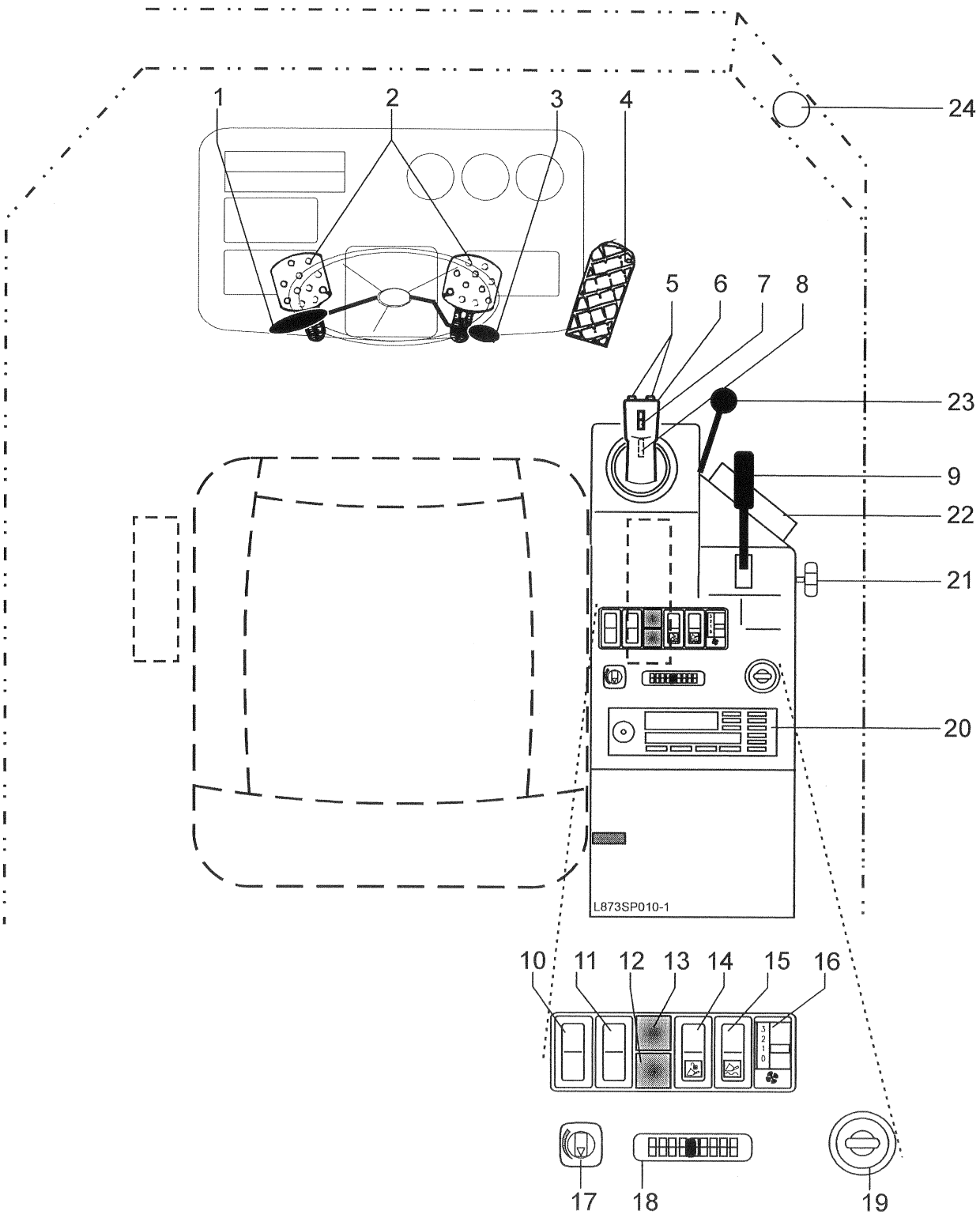


Only press the button when machine is at standstill!

41 Hazard warning switch
42 Operating hour meter
43 Fuel gauge
44 Coolant temperature indicator
45 Switch for windshield wiper, front, wash/ wipe function
46 Switch for windshield wiper, rear, wash/ wipe function
47 not assigned *
48 not assigned *
49 Filling level indicator for engine oil
50 Filling level indicator for hydraulic oil
51 Check button
52 Filling level indicator for coolant
53 not assigned
54 Direction-of-travel pre-selection — Function only activated when working hydraulics are disabled
55 Light switch
56 Socket
57 Speedometer (only high-speed version)

* e.g. for accessories such as rotating beacon, additional floodlight(s), etc.

Operator controls and display elements



TEREX SCHAEFF	Typ/Model/Type **SKL 873 SP** **from s/n.: 873/0274**	Datum/Edition/Date **01.2004**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.13.05**

1 Direction indicator — horn — low/high beam (steering column mounted switch)

2 Dual brake inching pedal

3 Tilt adjustment of steering wheel

4 Accelerator pedal

5 Actuation of additional control circuit

6 Joystick (control lever) — loader installation

7 Direction-of-travel pre-selection (without function if working hydraulics are switched off)

8 Impulse mode — float position

9 Parking brake

10 not assigned *

11 not assigned *

12 Red — Engine monitoring indicator lamp

13 Yellow — Engine monitoring indicator lamp

14 OFF switch for actuation of additional control circuit (Pos. 8)

15 Pre-selection switch for float position - OFF/Impulse-/Continuous operation

16 Fan switch

17 Option — Air conditioning

18 Heater control

19 Glow plug and starter switch

20 Option — Radio

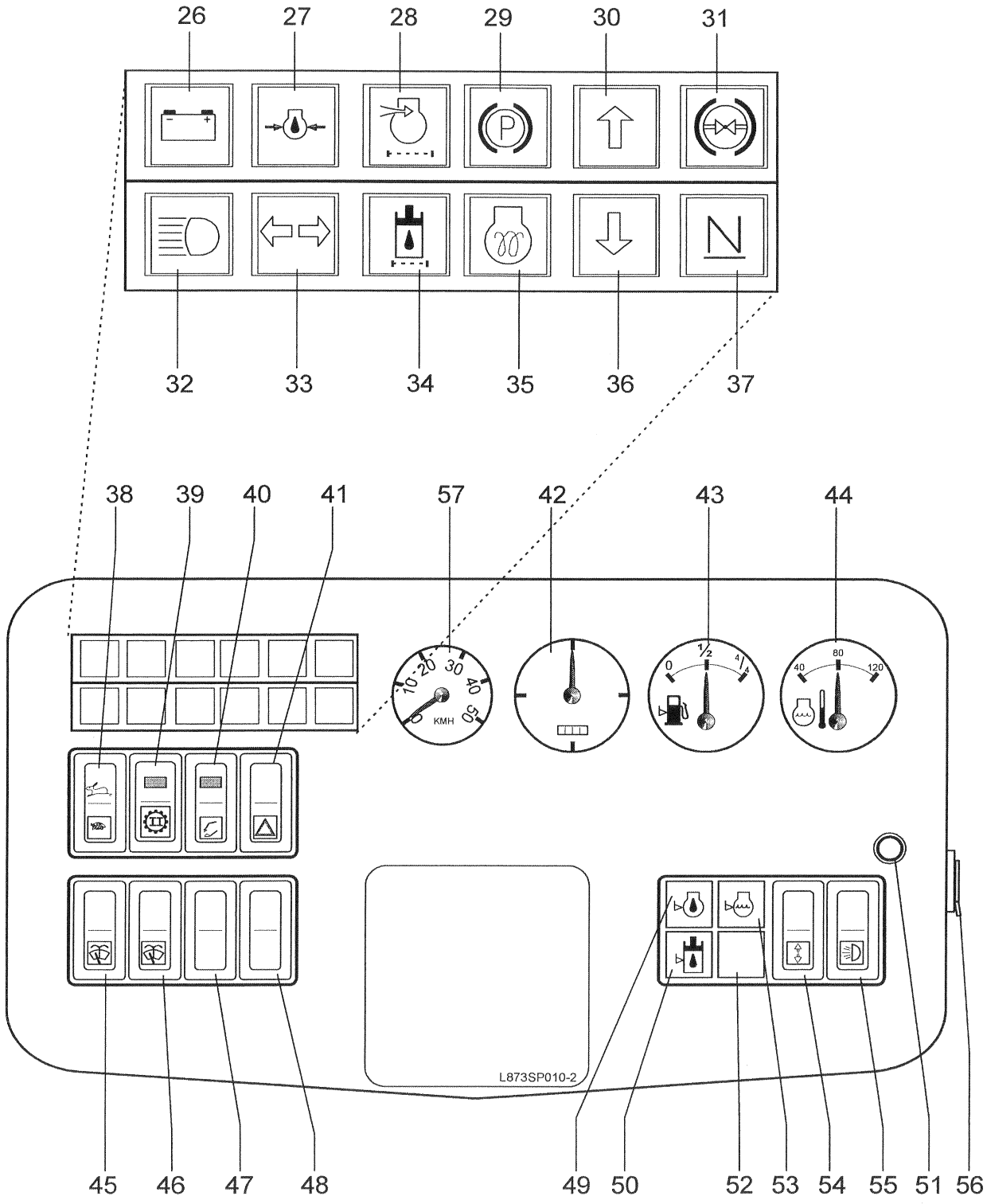
21 Fan: fresh air/ re-circulating air

22 Fuse and relay holder

23 Option — 4th control circuit

24 Washer fluid storage tank

*
for functions such as bucket return, load vibration-damping, etc.



TEREX SCHAEFF	Typ/Model/Type **SKL 873 SP** **from s/n.: 873/0274**	Datum/Edition/Date **01.2004**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.13.06**

26 Red — Battery charge indicator
27 Red — Engine oil pressure indicator lamp
28 Red — Air filter clogging indicator
29 Red — Parking brake indicator lamp
30 Green — Travel, forward
31 Red — Brake accumulator pressure indicator lamp
32 Blue — High beam
33 Green — Direction indicator
34 Red — Hydraulic oil return filter clogging indicator
35 Yellow — Pre-heat indicator
36 Green — Travel in reverse
37 Red — Manual transmission indicator lamp



*If the **manual transmission indicator lamp** lights up, it is in an intermediate position. **The machine is not ready for operation!** This can be remedied by brief steering movements to be performed until the transmission engages.*

38 Travel speed switch FAST/SLOW
39 Change-over switch with stop - mechanical driving position



Only press the button when machine is at standstill!

40 Multi-function switch with lock for work equipment cut-off and change-over of direction-of-travel pre-selection switches from Pos. 07 to Pos. 46



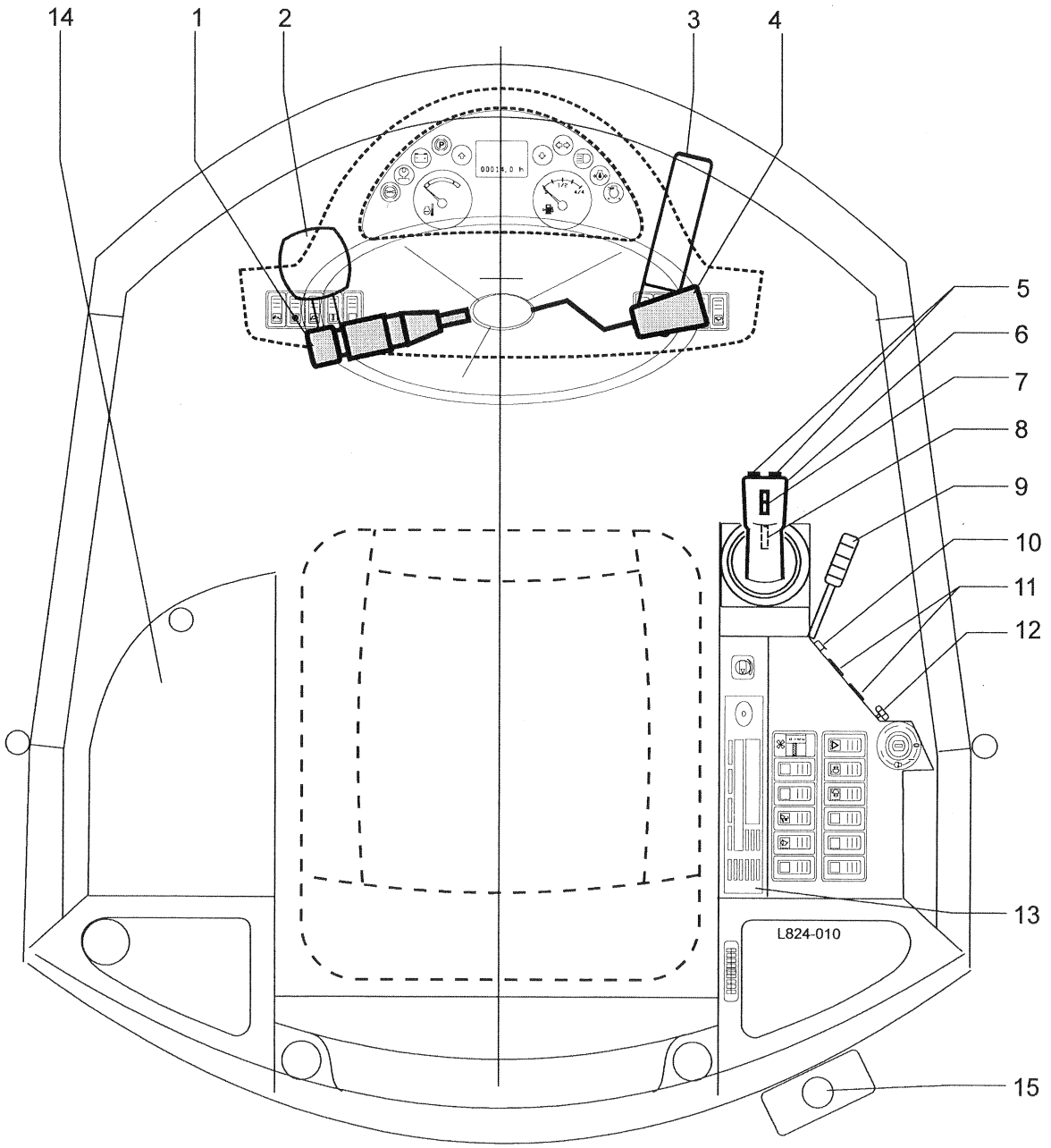
Only press the button when machine is at standstill!

41 Hazard warning switch
42 Operating hour meter
43 Fuel gauge
44 Coolant temperature indicator
45 Switch for windshield wiper, front, Wash-wipe function
46 Switch for windshield wiper, rear, Wash-wipe function
47 not assigned *
48 not assigned *
49 Red — Filling level indicator for engine oil
50 Red — Filling level indicator for hydraulic oil
51 Check button
52 not assigned
53 Red — Coolant level indicator
54 Direction-of-travel pre-selection — Function only activated when working hydraulics are switched off
55 Light switch
56 Socket
57 Speedometer (only high-speed version)

* e.g. for accessories such as rotating beacon, additional floodlight(s), etc.

Operator controls and display elements

The following list includes non-standard equipment !



1 Direction indicator — horn — low/high beam (steering column mounted switch)

2 Brake inching pedal

3 Accelerator pedal

4 Tilt adjustment of steering wheel (option: height adjustment)

5 Actuation of additional control circuit

6 Control lever — loader installation

7 Direction-of-travel pre-selection (without function if working hydraulics are disabled)

8 Impulse mode — float position

9 Parking brake

10 Socket

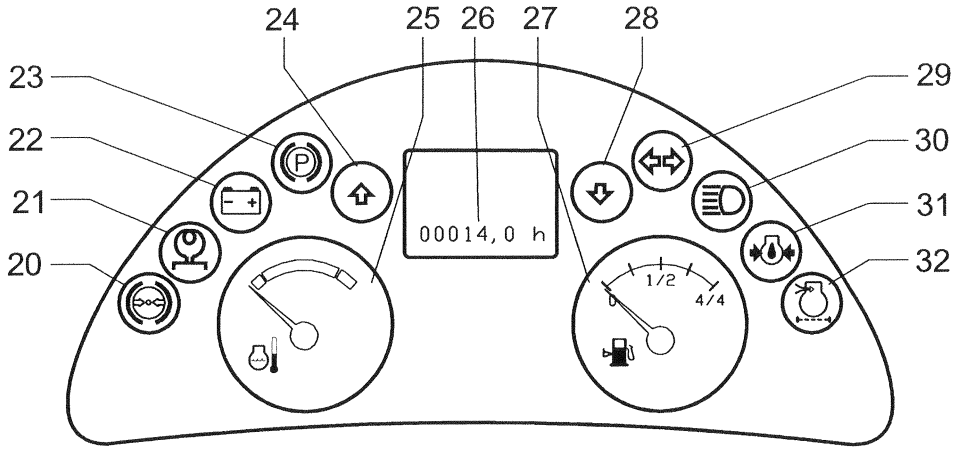
11 Fuse carrier

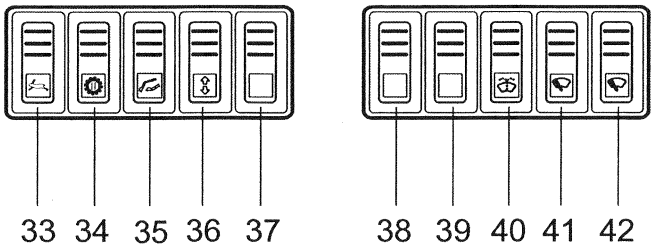
12 Fan: fresh air/ re-circulating air

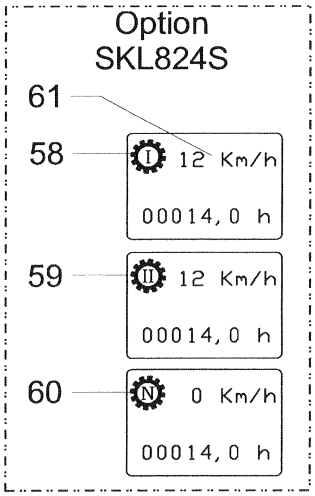
13 Radio

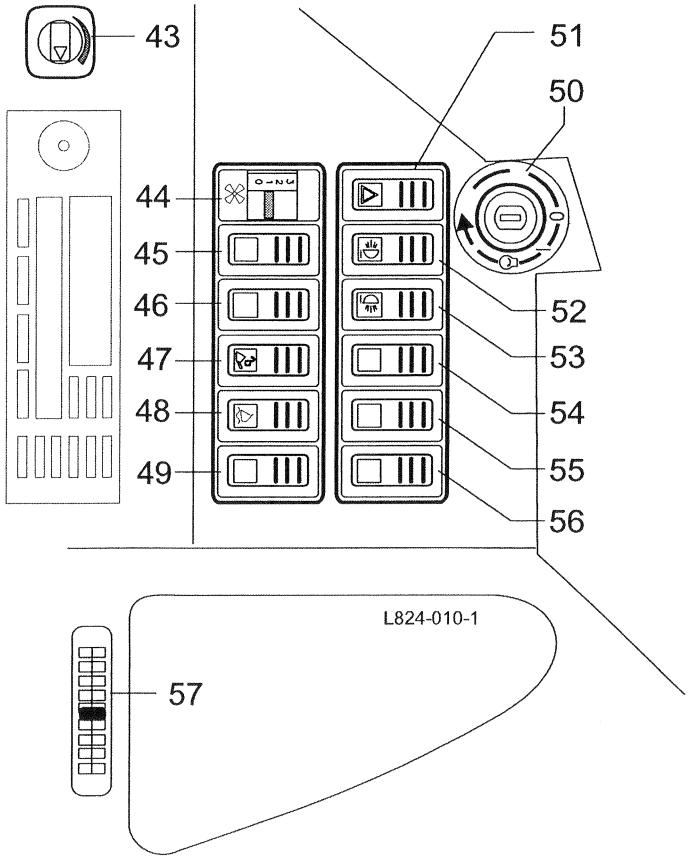
14 Control rod for mechanical quick-attach system

15 Washer tank


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Option
SKL824S
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12 Km/h
00014,0 h
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12 Km/h
00014,0 h
60
0 Km/h
00014,0 h


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L824-010-1
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20 not assigned *
21 YELLOW — pre-heating monitor
22 RED — battery charge indicator
23 RED — parking brake
24 GREEN — travel direction, forward
25 Coolant temperature
26 Operating hour meter
27 Fuel gauge
28 GREEN — travel direction, reverse
29 GREEN — direction indicator
30 BLUE — high beam
31 RED — engine oil pressure
32 YELLOW — air filter indicator
33 Travel speed — fast/slow
34 Change-over switch for high gear



Only press when machine is at standstill!

35 Multi-function switch with lock for work equipment cut-off and change-over of the direction-of-travel pre-selection switches from pos. 07 to pos. 36



Only press when machine is at standstill!

36 Pre-selection of travel direction — Function only active if working hydraulics are disabled
37 not assigned *
38 not assigned *
39 not assigned *
40 Windshield wash function front/rear
41 Windshield wiper, front
42 Windshield wiper, rear
43 Switch for air conditioning and temperature control
44 Fan switch – heater
45 not assigned *
46 not assigned *
47 Pre-selection switch for actuation of additional control circuit (Pos. 5)
48 Pre-selection switch for float position — OFF/Impulse/Continuous mode
49 not assigned *
50 Pre-heat/starter switch
51 Hazard warning switch
52 Working floodlight, front
53 Working floodlight, rear
54 not assigned *
55 not assigned *
56 not assigned *
57 Heater control
58 Monitor — transmission indicator range I
59 Monitor — transmission indicator range II
60 Monitor — transmission indicator range — disabled

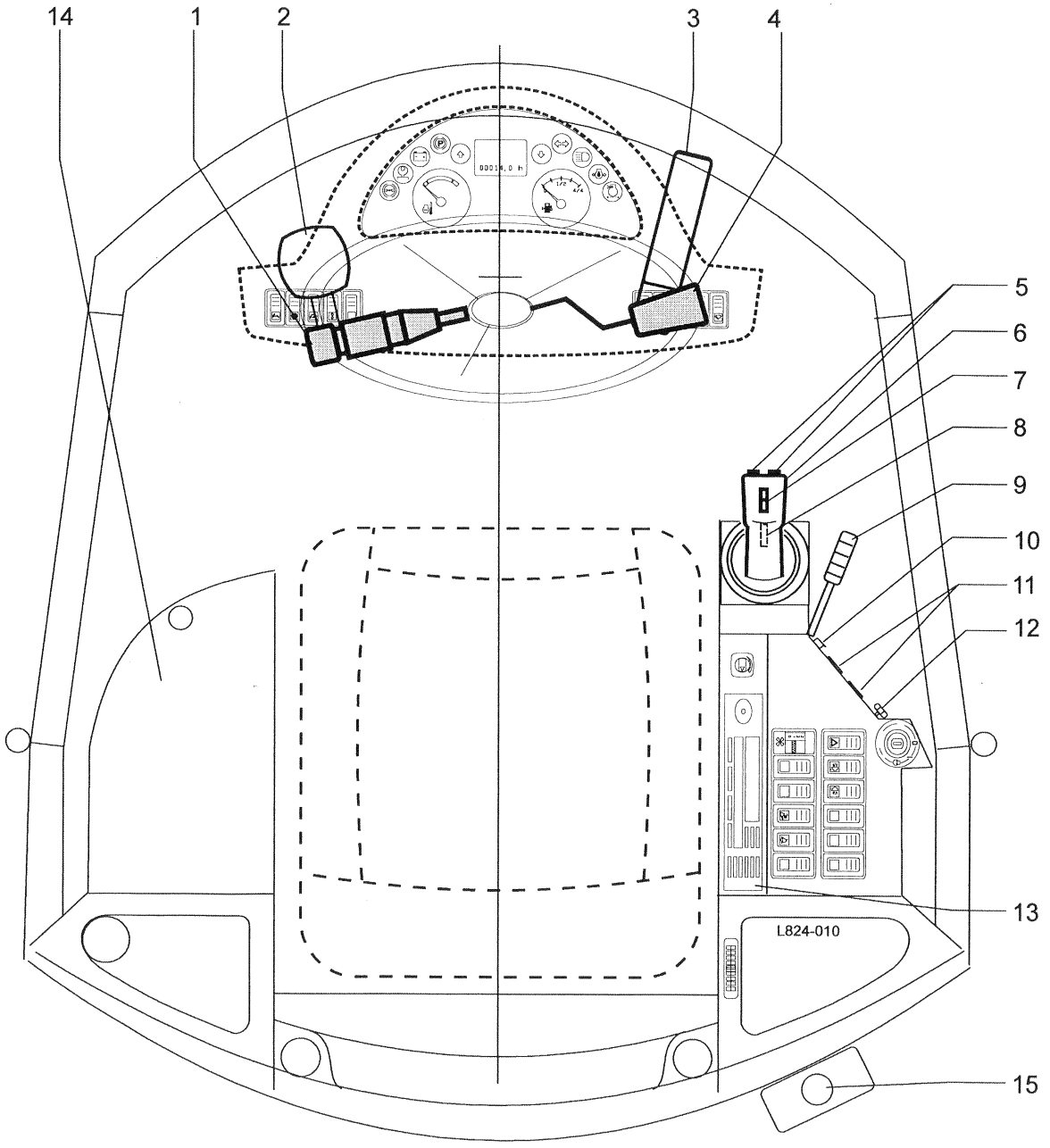


If this symbol comes up, the transmission is in an intermediate position. ***The machine is not ready to start!*** *This can be remedied by performing brief steering movements until the transmission engages.*

61 Speed indicator

Operator controls and display elements

The following list includes non-standard equipment !



1 Direction indicator — horn — low/high beam (steering column mounted switch)

2 Brake inching pedal

3 Accelerator pedal

4 Tilt adjustment of steering wheel (option: height adjustment)

5 Actuation of additional control circuit

6 Control lever — loader installation

7 Direction-of-travel pre-selection (without function if working hydraulics are disabled)

8 Impulse mode — float position

9 Parking brake

10 Socket

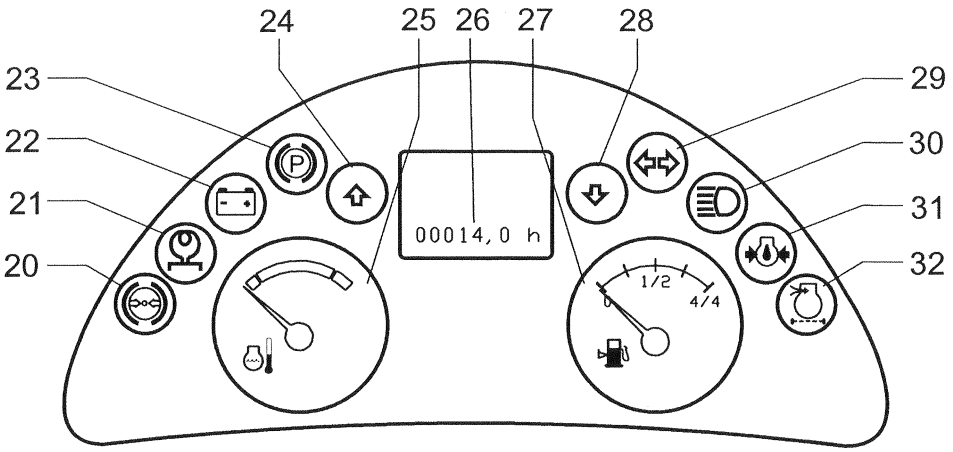
11 Fuse carrier

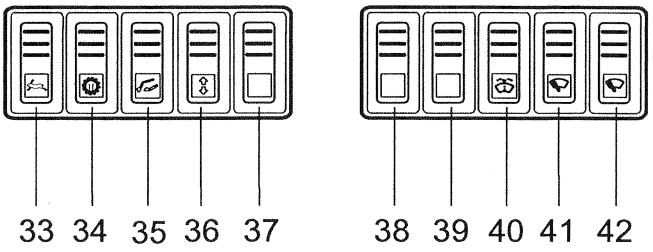
12 Fan: fresh air/ re-circulating air

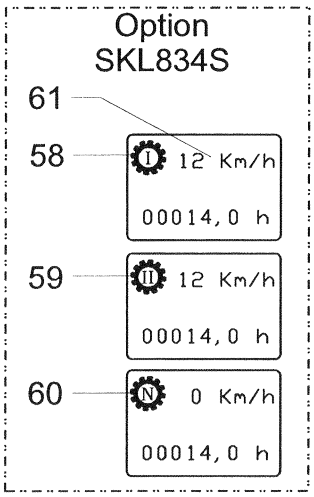
13 Radio

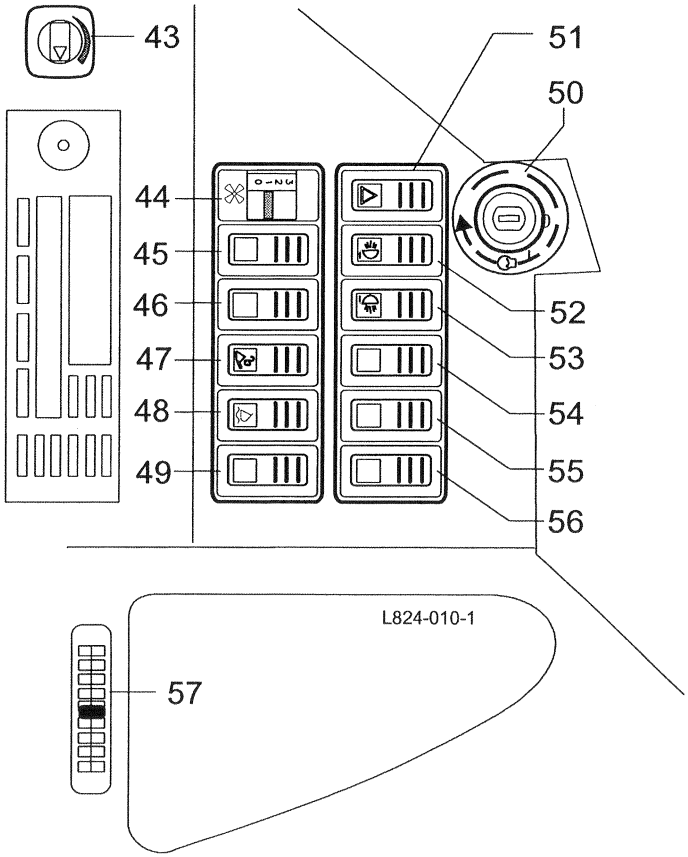
14 Control rod for mechanical quick-attach system

15 Washer tank


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Option
SKL834S
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12 Km/h
00014,0 h
59
12 Km/h
00014,0 h
60
0 Km/h
00014,0 h


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L824-010-1
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20 not assigned *
21 YELLOW — pre-heating monitor
22 RED — battery charge indicator
23 RED — parking brake
24 GREEN — travel direction, forward
25 Coolant temperature
26 Operating hour meter
27 Fuel gauge
28 GREEN — travel direction, reverse
29 GREEN — direction indicator
30 BLUE — high beam
31 RED — engine oil pressure
32 YELLOW — air filter indicator
33 Travel speed — fast/slow
34 Change-over switch for high gear



Only press when machine is at standstill!

35 Multi-function switch with lock for work equipment cut-off and change-over of the direction-of-travel pre-selection switches from pos. 07 to pos. 36



Only press when machine is at standstill!

36 Pre-selection of travel direction — Function only active if working hydraulics are disabled
37 not assigned *
38 not assigned *
39 not assigned *
40 Windshield wash function front/rear
41 Windshield wiper, front
42 Windshield wiper, rear
43 Switch for air conditioning and temperature control
44 Fan switch – heater
45 not assigned *
46 not assigned *
47 Pre-selection switch for actuation of additional control circuit (Pos. 5)
48 Pre-selection switch for float position — OFF/Impulse/Continuous mode
49 not assigned *
50 Pre-heat/starter switch
51 Hazard warning switch
52 Working floodlight, front
53 Working floodlight, rear
54 not assigned *
55 not assigned *
56 not assigned *
57 Heater control
58 Monitor — transmission indicator range I
59 Monitor — transmission indicator range II
60 Monitor — transmission indicator range — disabled

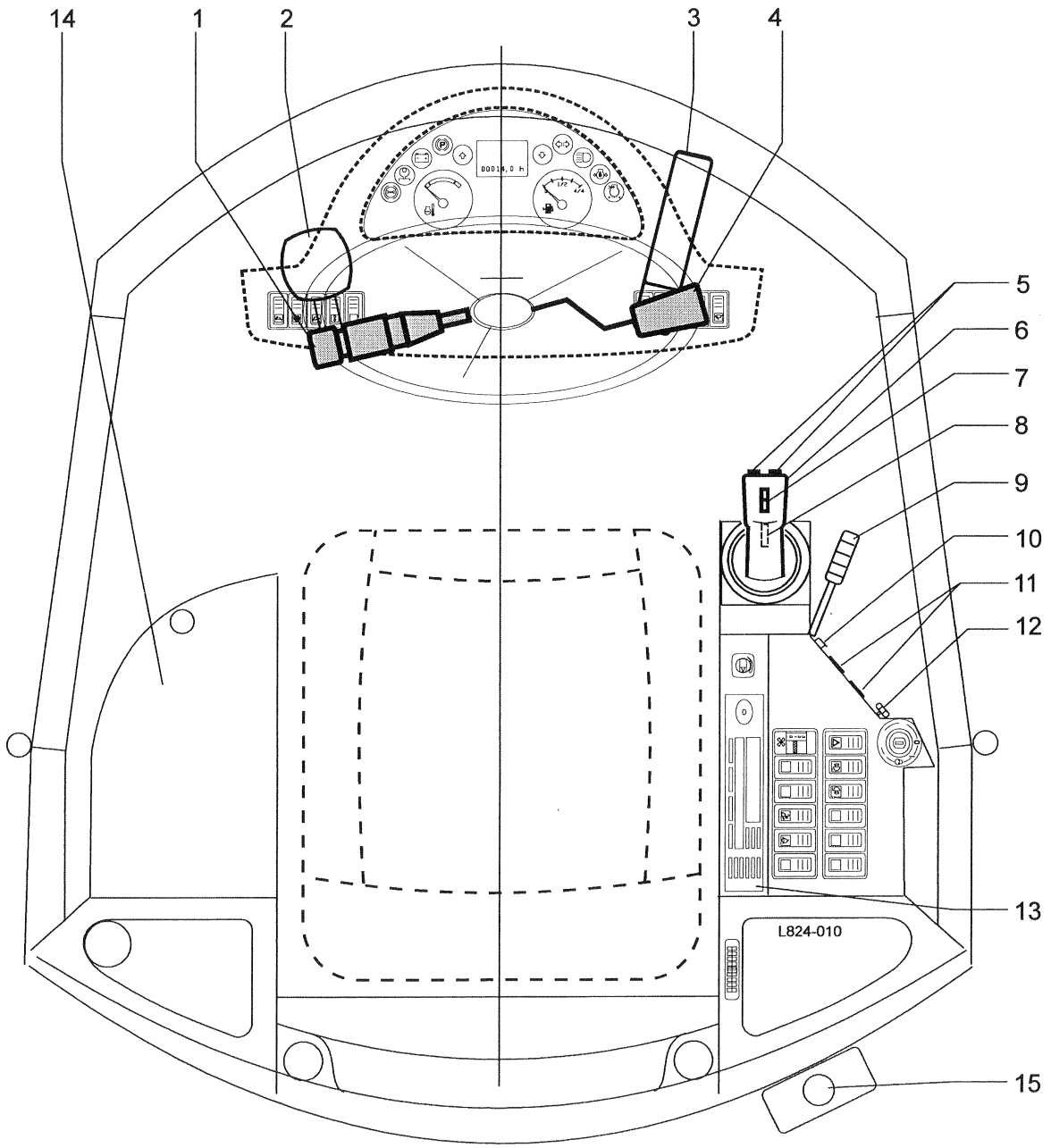


If this symbol comes up, the transmission is in an intermediate position. ***The machine is not ready to start!*** *This can be remedied by performing brief steering movements until the transmission engages.*

61 Speed indicator

Operator controls and display elements

The following list includes non-standard equipment !



1 Direction indicator — horn — low/high beam (steering column mounted switch)

2 Brake inching pedal

3 Accelerator pedal

4 Tilt adjustment of steering wheel (option: height adjustment)

5 Actuation of additional control circuit

6 Control lever — loader installation

7 Direction-of-travel pre-selection (without function if working hydraulics are disabled)

8 Impulse mode — float position

9 Parking brake

10 Socket

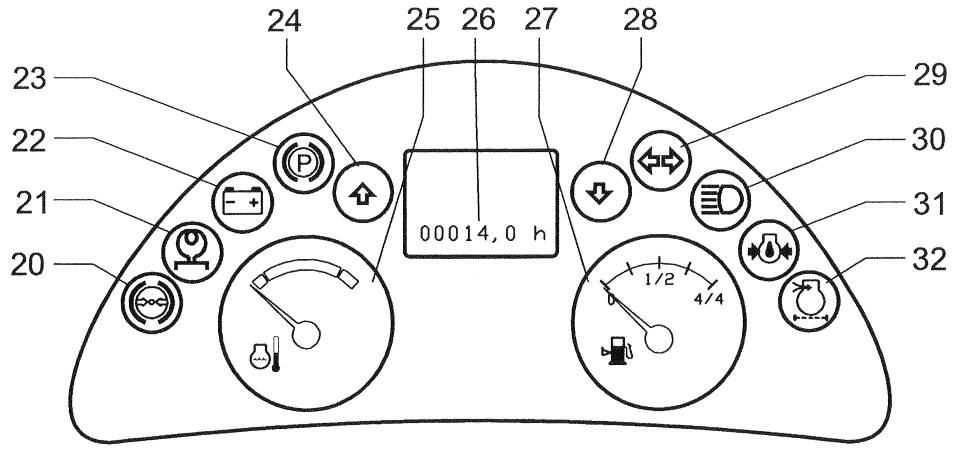
11 Fuse carrier

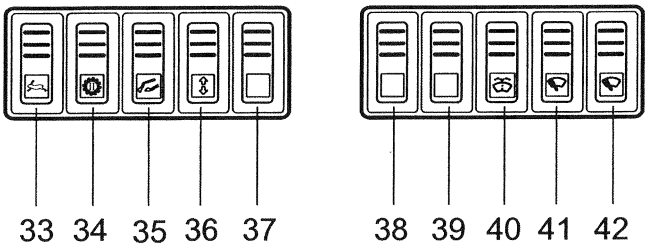
12 Fan: fresh air/ re-circulating air

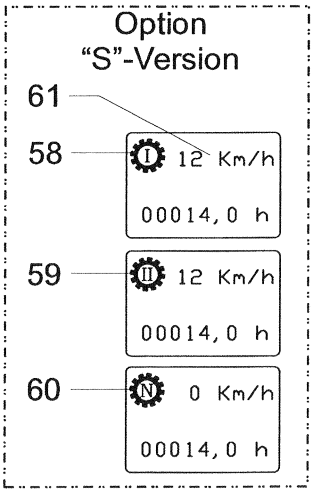
13 Radio

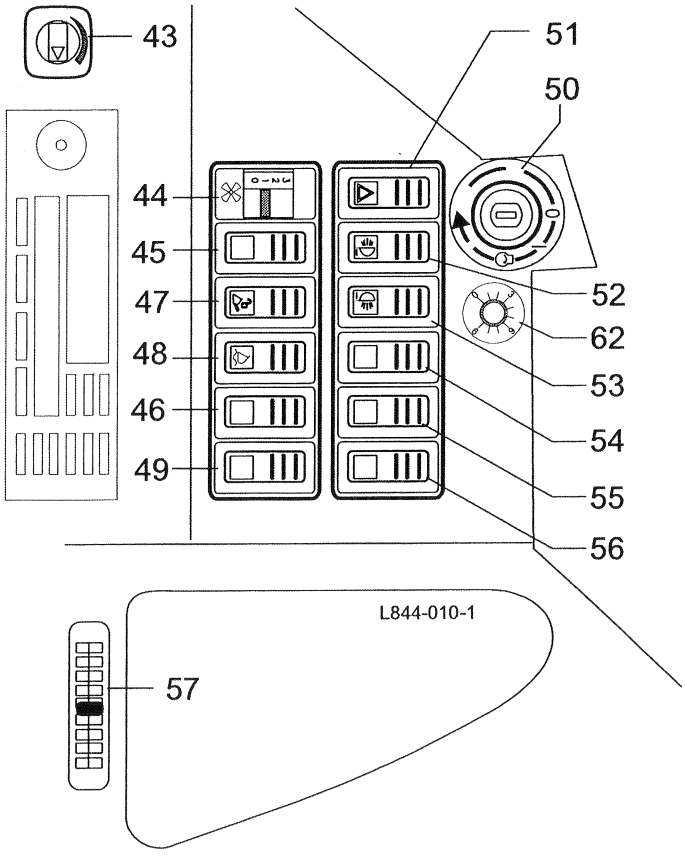
14 Control rod for mechanical quick-attach system

15 Washer tank









Instrument panel

20 not assigned *

21 YELLOW — pre-heating monitor

22 RED — battery charge indicator

23 RED — parking brake

24 GREEN — travel direction, forward

25 Coolant temperature

26 Operating hour meter

27 Fuel gauge

28 GREEN — travel direction, reverse

29 GREEN — direction indicator

30 BLUE — high beam

31 RED — engine oil pressure

32 YELLOW — air filter indicator

33 Travel speed — fast/slow

34 Change-over switch for high gear



Only press when machine is at standstill!

35 Multi-function switch with lock for work equipment cut-off and change-over of the direction-of-travel pre-selection switches from pos. 07 to pos. 36



Only press when machine is at standstill!

36 Pre-selection of travel direction — Function only active if working hydraulics are disabled

37 not assigned *

38 not assigned *

39 not assigned *

40 Windshield wash function front/rear

41 Windshield wiper, front

42 Windshield wiper, rear

43 Switch for air conditioning and temperature control

44 Fan switch – heater

45 not assigned *

46 not assigned *

47 Pre-selection switch for actuation of additional control circuit (Pos. 5)

48 Pre-selection switch for float position — OFF/Impulse/Continuous mode

49 not assigned *

50 Pre-heat/starter switch

51 Hazard warning switch

52 Working floodlight, front

53 Working floodlight, rear

54 not assigned *

55 not assigned *

56 Option — 4th control circuit

57 Heater control

58 Monitor — transmission indicator range I

59 Monitor — transmission indicator range II

60 Monitor — transmission indicator range — disabled



If this symbol comes up, the transmission is in an intermediate position. ***The machine is not ready to start!*** *This can be remedied by performing brief steering movements until the transmission engages.*

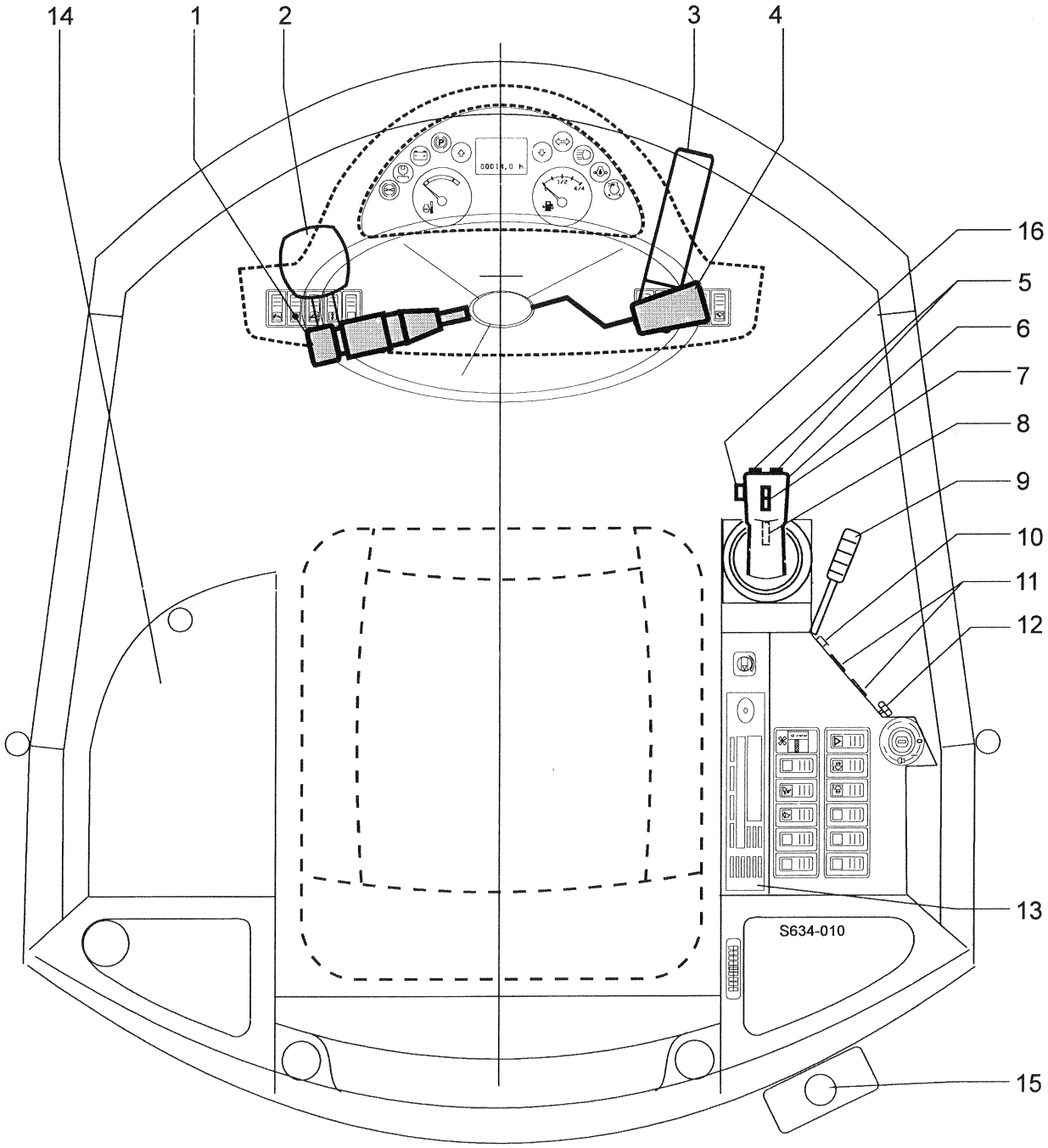
61 Speed indicator

62 Option — Flow setting for 4th control circuit, e.g. sweeper rotating speed

* for non-standard equipment

Operator controls and display elements

The following list includes non-standard equipment !



Operator controls

1 Direction indicator — horn — low/high beam (steering column mounted switch)

2 Brake inching pedal

3 Accelerator pedal

4 Tilt adjustment of steering wheel (option: height adjustment)

5 Actuation of additional control circuit

6 Control lever — loader installation

7 Direction-of-travel pre-selection (without function if working hydraulics are disabled)

8 Impulse mode — float position

9 Parking brake

10 Socket

11 Fuse carrier

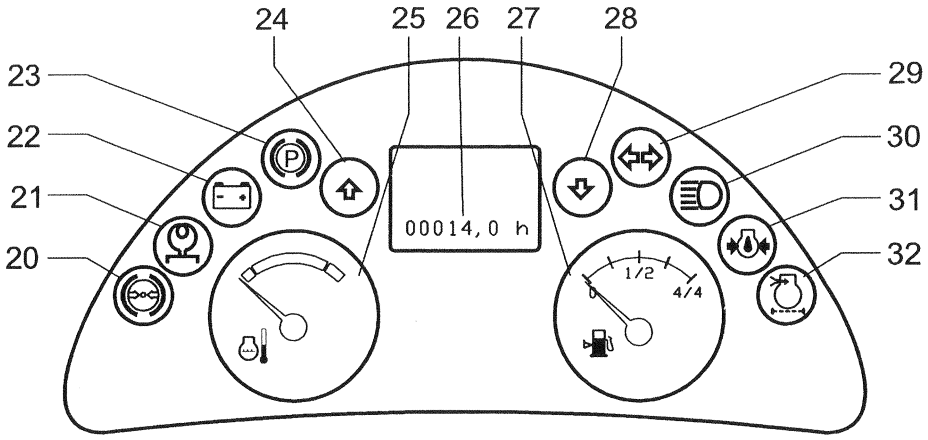
12 Fan: fresh air/ re-circulating air

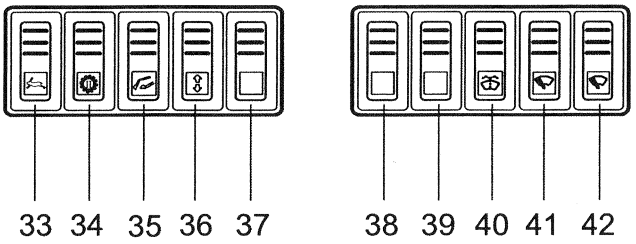
13 Radio

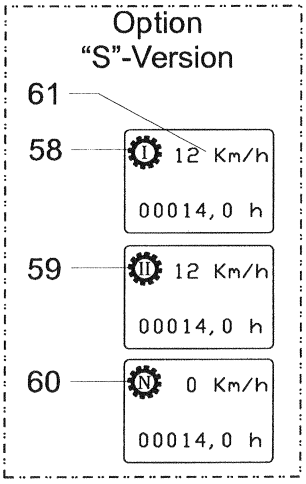
14 Control rod for mechanical quick-attach system

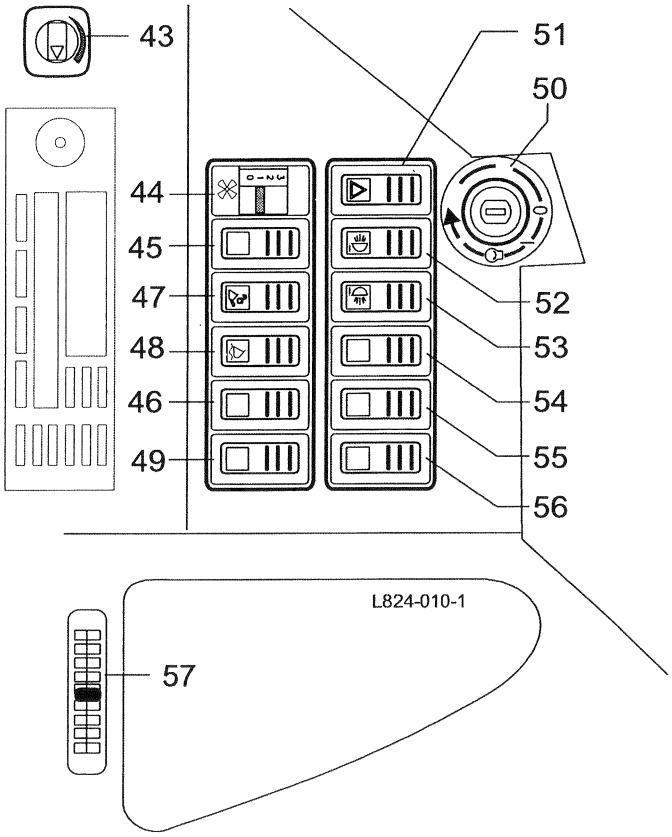
15 Washer tank

16 Loader installation slewing function









Instrument panel

20 not assigned

21 YELLOW — pre-heating monitor

22 RED — battery charge indicator

23 RED — parking brake

24 GREEN — travel direction, forward

25 Coolant temperature

26 Operating hour meter

27 Fuel gauge

28 GREEN — travel direction, reverse

29 GREEN — direction indicator

30 BLUE — high beam

31 RED — engine oil pressure

32 YELLOW — air filter indicator

33 Travel speed — fast/slow

34 "S"-version only — Change-over switch for high gear



Only press when machine is at standstill!

35 Multi-function switch with lock for work equipment cut-off and change-over of the direction-of-travel pre-selection switches from pos. 07 to pos. 36



Only press when machine is at standstill!

36 Pre-selection of travel direction — Function only active if working hydraulics are disabled

37 not assigned *

38 not assigned *

39 not assigned *

40 Windshield wash function front/rear

41 Windshield wiper, front

42 Windshield wiper, rear

43 Option — Switch for air conditioning and temperature control

44 Fan switch – heater

45 not assigned *

46 not assigned *

47 Pre-selection switch for actuation of additional control circuit (Pos. 5)

48 Pre-selection switch for float position — OFF/Impulse/Continuous mode

49 not assigned *

50 Pre-heat/starter switch

51 Hazard warning switch

52 Working floodlight, front

53 Working floodlight, rear

54 not assigned *

55 not assigned *

56 not assigned *

57 Heater control

58 Monitor — transmission indicator range I

59 Monitor — transmission indicator range II

60 Monitor — transmission indicator range — disabled

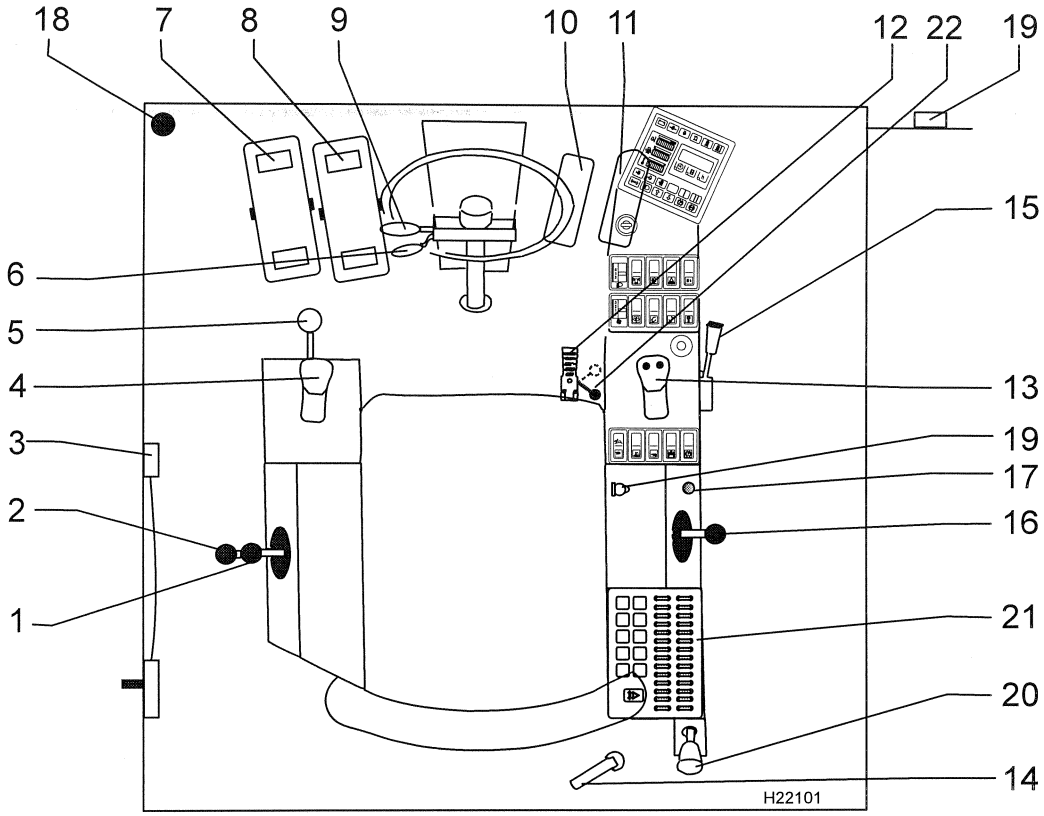


If this symbol comes up, the transmission is in an intermediate position. ***The machine is not ready to start!*** *This can be remedied by performing brief steering movements until the transmission engages.*

61 Speed indicator

* for non-standard equipment

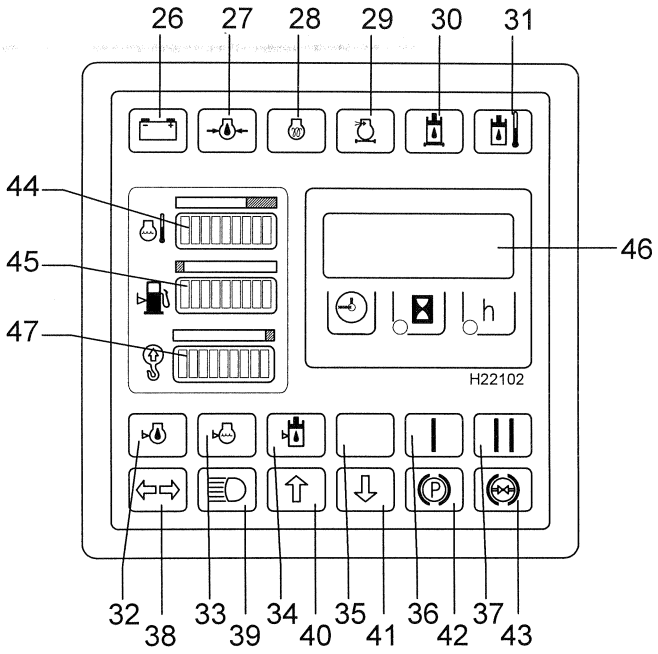
This picture contains non-standard equipment !

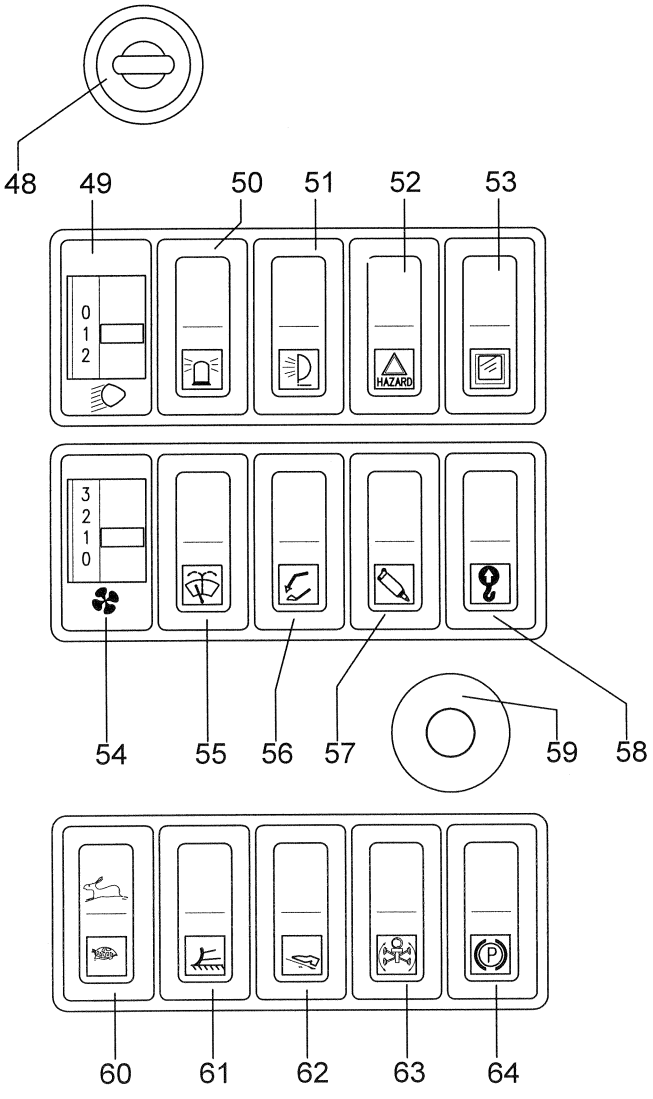


1	Actuating lever for right-hand stabilizer
2	Actuating lever for left-hand stabilizer / front dozer blade
1-2	Rear blade
3	Door release
4	Actuating lever for excavator equipment
5	Cut-off for working hydraulics (raise control panel)
6	Steering column adjustment
7	Sensitive travel
8	Actuation of intermediate boom or retract/ extend telescope
9	Direction indicator switch/ horn
10	Service brake
11	Accelerator pedal
12	Rock breaker operation
13	Actuating lever for excavator equipment
14	Uppercarriage locking bolt
15	Manual throttle
16	Actuating lever for articulation
17	Off switch for hot water for heating
18	Control rod for quick-mount hitch
19	Socket
20	Parking brake
21	Fuse and relay box
22	Locking mechanism for rock breaker operations

Dashboard

This picture contains non-standard equipment !



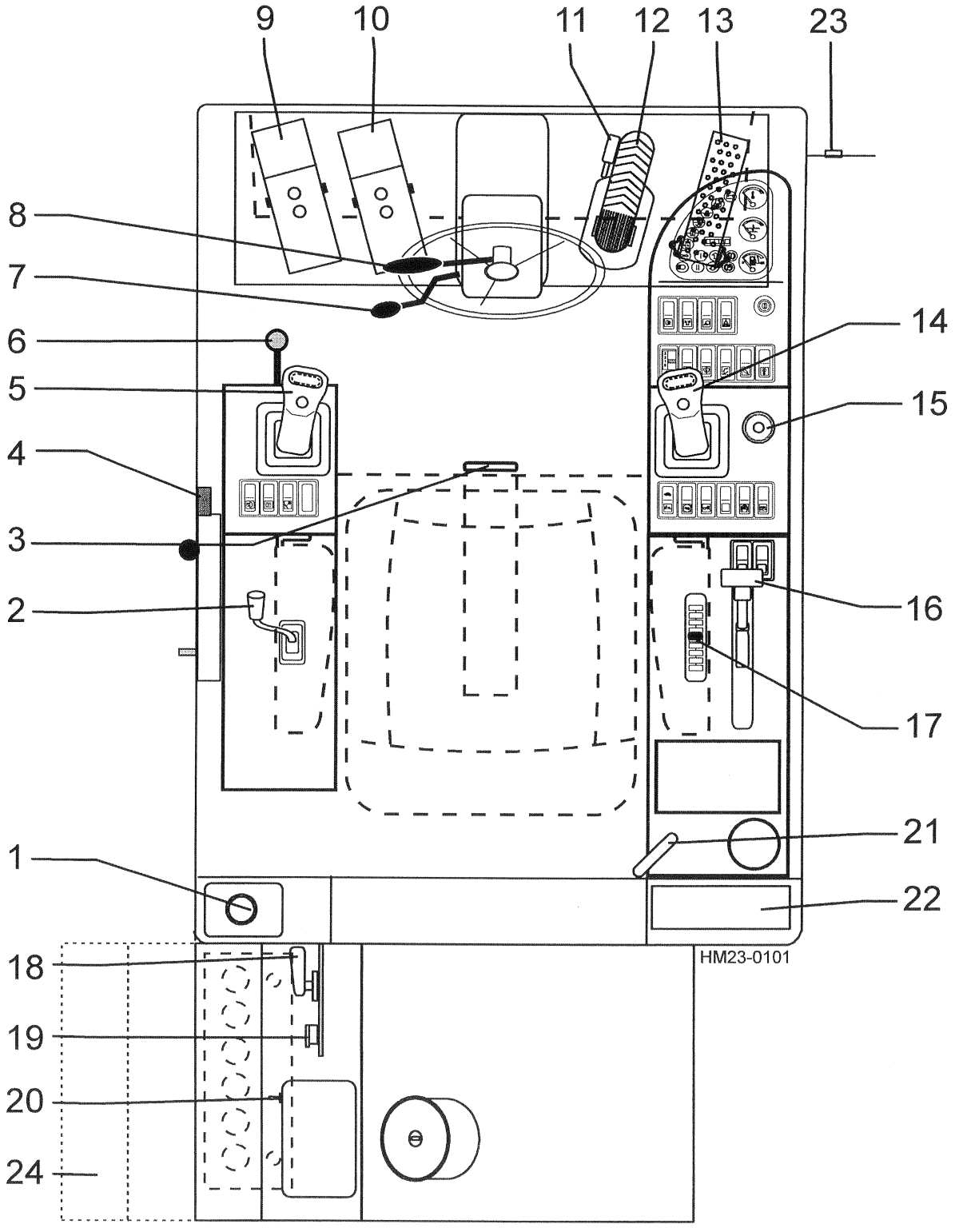


Description of instrument panel

26	Battery charge indicator lamp
27	Engine oil pressure
28	Pre-heating monitor
29	Air filter service indicator
30	Hydraulic oil filter clogging indicator
31	Blank
32	Blank
33	Blank
34	Blank
35	Blank
36	Blank
37	Blank
38	Direction-of-travel indicator
39	Upper beam indicator lamp
40	Travel, forward
41	Travel, in reverse
42	Parking brake indicator lamp
43	Blank
44	Coolant temperature
45	Fuel gauge
46	Clock / Operating hour meter / Trip recorder
47	Overload warning device
48	Pre-heat/ starter switch
49	Light switch
50	Rotating beacon
51	Working floodlight
52	Hazard warning switch
53	Rocker switch up: Change display (item 46) Rocker switch down: Set clock Reset trip recorder (press for at least 15 sec.)
54	Heater fan switch
55	Windshield wiper and wash/wipe system
56	Cut-off for working hydraulics
57	Changeover switch for rock breaker / grab slewing
58	Cut-off for overload warning device
59	Travel: Fast/Slow
60	Fast-Slow
61	Change-over switch for front dozer blade / left-hand stabilizer
62	Sensitive travel
63	Oscillating axle lock
64	Excavator brake

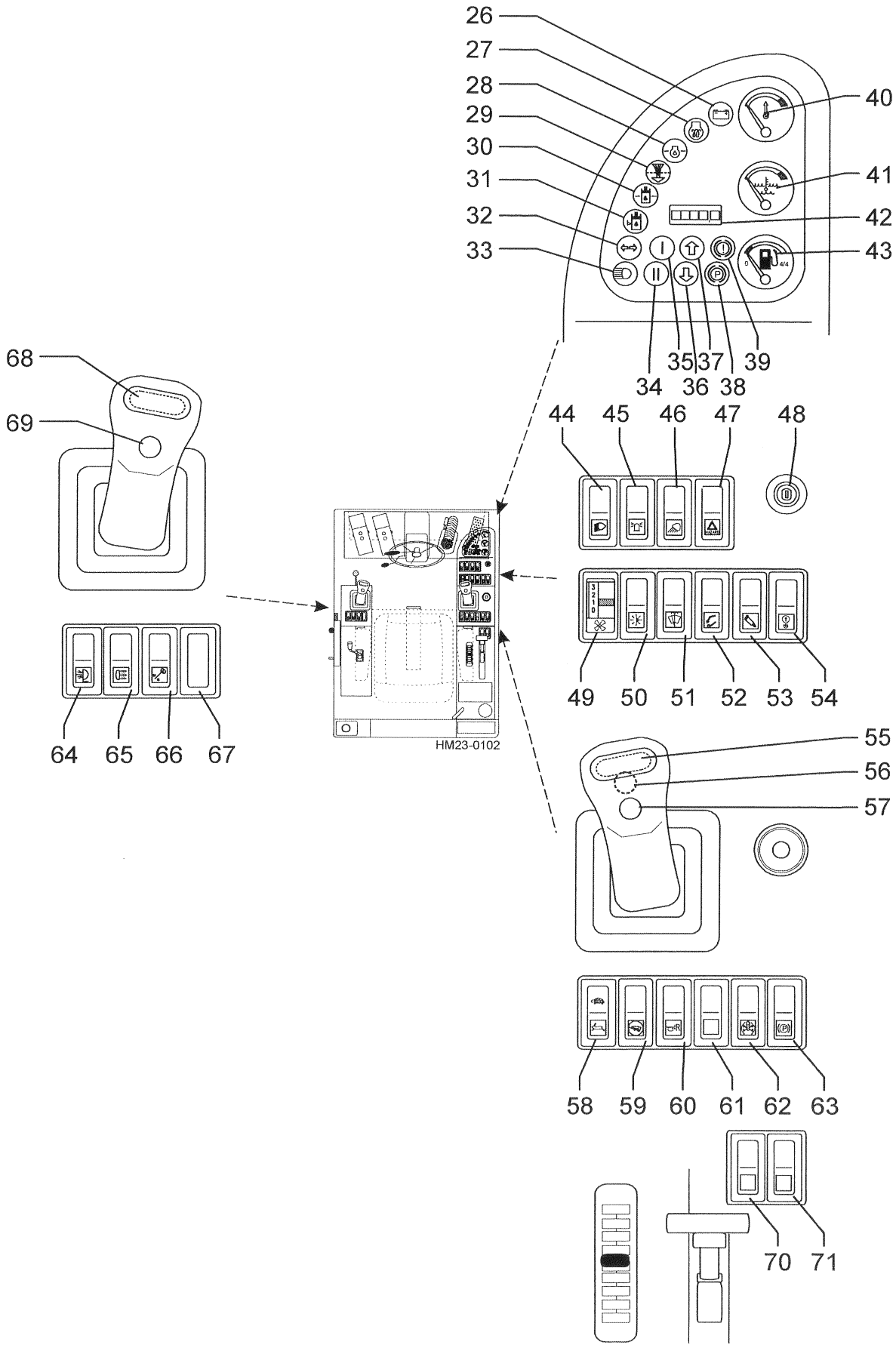
Operator controls

This picture contains non-standard equipment!



TEREX SCHAEFF	Typ/Model/Type **HML23 from s/n.: 2300/0100**	Datum/Edition/Date **01.2004**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.49.50**

1	Windshield washer fluid tank
2	Control lever — stabilizer/ support blade front / rear
3	Changeover fresh air — re-circulating air
4	Door release
5	Control lever — excavator installation
6	Working hydraulics cut-off (raise panel)
7	Steering column — tilt and height adjustment
8	Direction-indicator switch
9	Sensitive travel
10	Operation — intermediate boom / articulation
11	Excavator brake release
12	Service brake / excavator brake
13	Accelerator pedal
14	Control lever — excavator installation
15	Travel direction pre-selector — forward / neutral / reverse
16	Engine speed control (manual throttle)
17	Heater temperature control
18	Battery main switch
19	Socket
20	Refueling pump (option)
21	Superstructure locking bolt
22	Radio
23	Socket
24	Service ladder (cover)


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HM23-0102
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26 RED — battery charge indicator lamp

27 YELLOW — pre-heating monitor

28 RED — engine oil pressure

29 YELLOW — air filter indicator

30 RED — hydraulic oil return filter clogging indicator

31 RED — hydraulic oil level

32 GREEN — direction indicator

33 BLUE — high beam

34 GREEN — not assigned

35 GREEN — not assigned

36 GREEN — travel direction, reverse

37 GREEN — travel direction, forward

38 RED — parking brake

39 RED — brake accumulator pressure indicator

40 Overload warning device

41 Coolant temperature

42 Operating hour meter

43 Fuel gauge

44 Light switch

45 Rotating beacon

46 Working floodlights

47 Hazard warning switch

48 Glow plug and starter switch

49 Heater fan switch

50 Air conditioning

51 Windshield wiper - wash/wipe system

52 Working hydraulics cut-off

53 Rock breaker / additional control circuit

54 Overload warning device ON/OFF

55 Rocker switch — Operation of additional control circuit I; e.g. grab rotation, rock breaker

56 Horn button

57 Button — intermediate boom / articulation change-over

58 FAST — SLOW

59 Sensitive travel

60 Travel motion alarm cut-off

61 not assigned

62 Oscillating axle lock

63 Parking brake

64 Boom-mounted working floodlight

65 Rear fog lamp

66 Steering change-over

67 not assigned

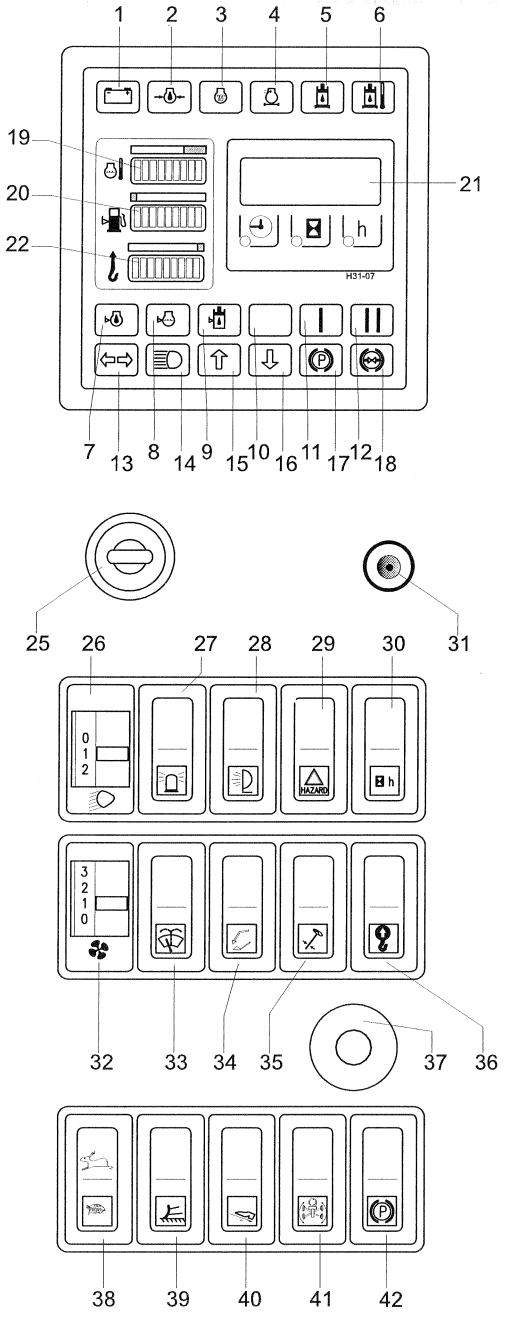
68 Rock breaker — Operation of additional control circuit II

69 Push-button — Slewing holding brake

70 Change-over switch — front dozer blade / stabilizers

71 Change-over switch right-hand / left-hand stabilizer

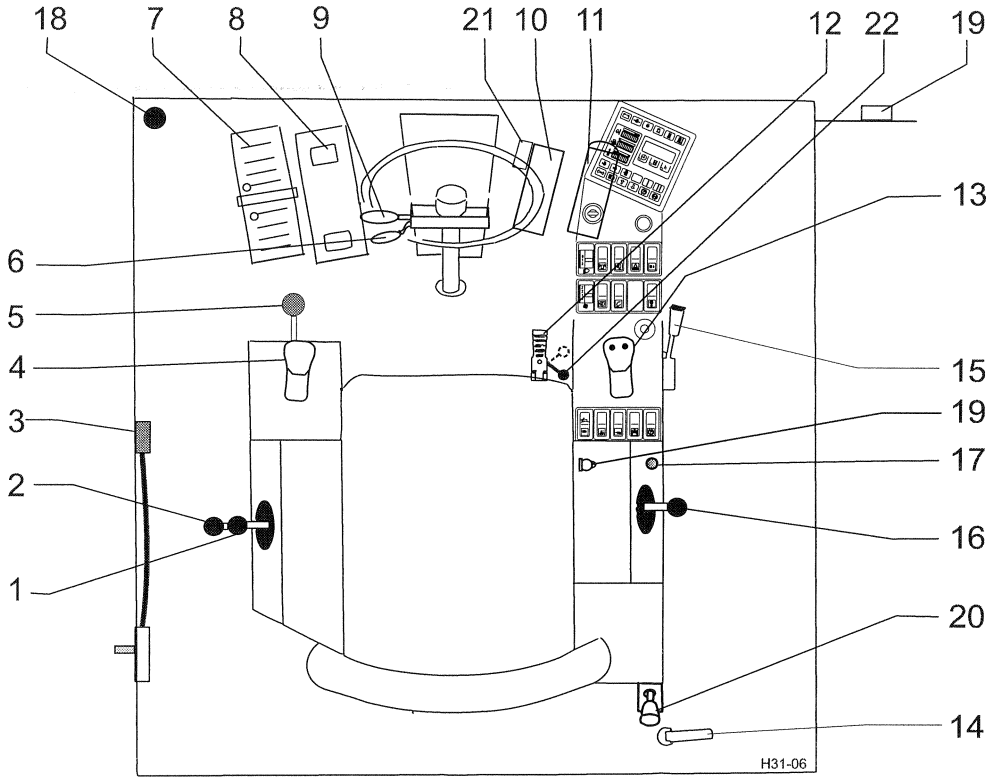
This picture contains special equipment!



1 Battery charge indicator lamp
2 Engine oil pressure
3 Pre-heating monitor
4 Air filter service indicator
5 Hydr. oil filter clogging indicator
6 Hydr. oil temperature
7 Engine oil level
8 Coolant level
9 Hydraulic oil level
10 Blank
11 Blank
12 Blank
13 Travel direction indicator
14 High beam indicator lamp
15 Travel forwards
16 Travel in reverse
17 Parking brake lamp
18 Accumulator pressure indicator lamp
19 Coolant temperature
20 Fuel gauge
21 Operating hour meter/trip recorder/clock
22 Overload warning device

25 Pre-heat/ starter switch
26 Light switch
27 Rotating beacon
28 Working headlights
29 Hazard warning switch
30 Rocker switch up: Change display (item 21)
Rocker switch down: Set clock
Reset trip recorder (press for at least 15 sec.)
31 Check button
32 Heater fan switch
33 Windscreen wiper and wash/wipe system
34 Working hydraulics cut-off
35 Blank
36 Cut-off overload warning device
37 Travel: forwards/reverse
38 Fast/Slow
39 Front dozer blade
40 Sensitive travel
41 Oscillating axle lock
42 Excavator brake (serial no. >032/5557)

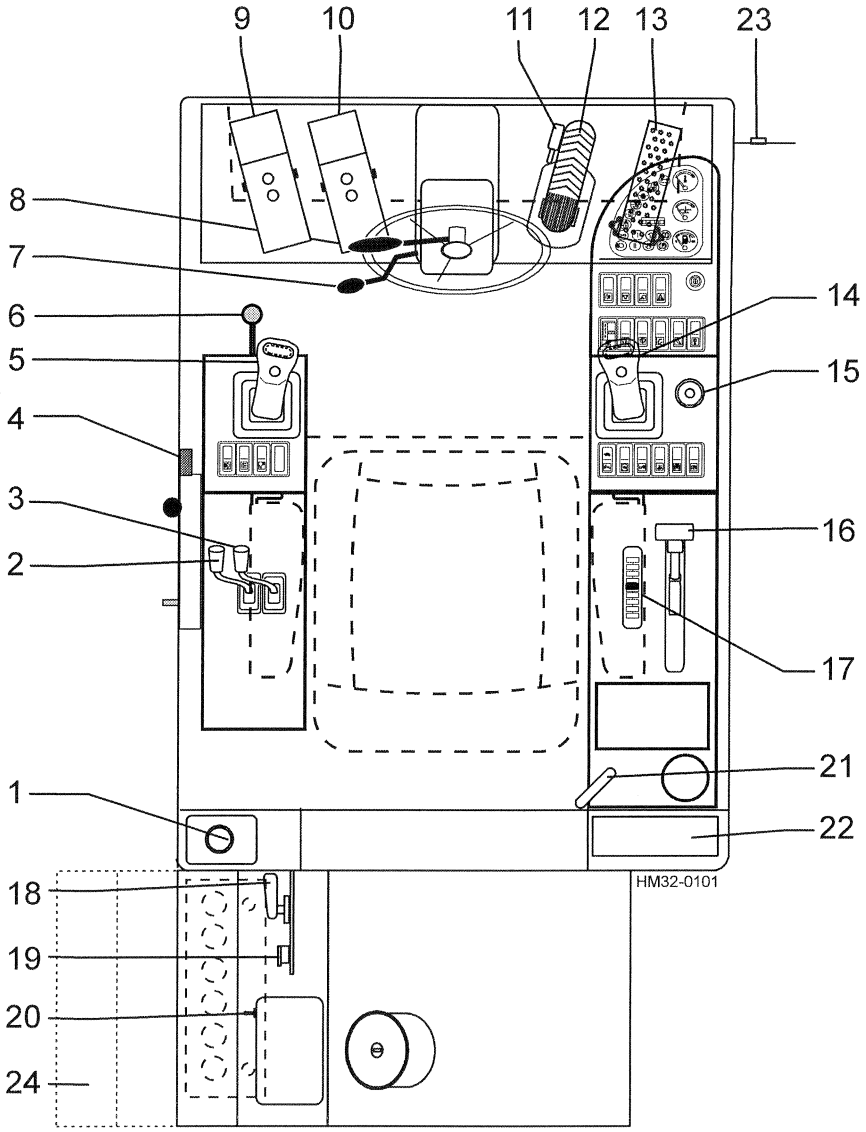
This pictures contains optional equipment !



1	Actuating lever for right-hand stabilizer
2	Actuating lever for left-hand stabilizer / front dozer blade
1-2	Rear blade
3	Door release
4	Actuating lever for excavator equipment
5	Cut-off for working hydraulics (raise control panel)
6	Steering column adjustment
7	Sensitive travel
8	Actuation of intermediate boom or retract/extend telescope
9	Turning indicator switch/horn
10	Service brake
11	Accelerator pedal
12	Hammer operation
13	Actuating lever for excavator equipment
14	Uppercarriage locking bolt
15	Manual throttle
16	Actuating lever - articulation
17	Off switch for hot water for heating
18	Actuating rod for quick-mount hitch
19	Socket
20	Parking brake
21	Release for excavator brake (serial no. 032/5558>)
22	Hammer operation lock (serial no. 032/5558>)

Operator controls

This picture contains non-standard equipment!



Description of instrument panel

1 Windshield washer tank

2 Stabilizer, left

3 Stabilizer, right

4 Door release

5 Control lever — excavator installation

6 Working hydraulics cut-off (raise panel)

7 Steering column — tilt and height adjustment

8 Turning indicator

9 Sensitive travel

10 Monobloc: operation of articulation

"TPA"/"CI": operation of intermediate boom / articulation

11 Excavator brake release

12 Service brake / excavator brake

13 Accelerator pedal

14 Control lever — excavator installation

15 Travel direction pre-selector — forward / neutral / reverse

16 Engine speed control (manual throttle)

17 Heater temperature control

18 Battery main switch

19 Socket

20 Refueling pump (option)

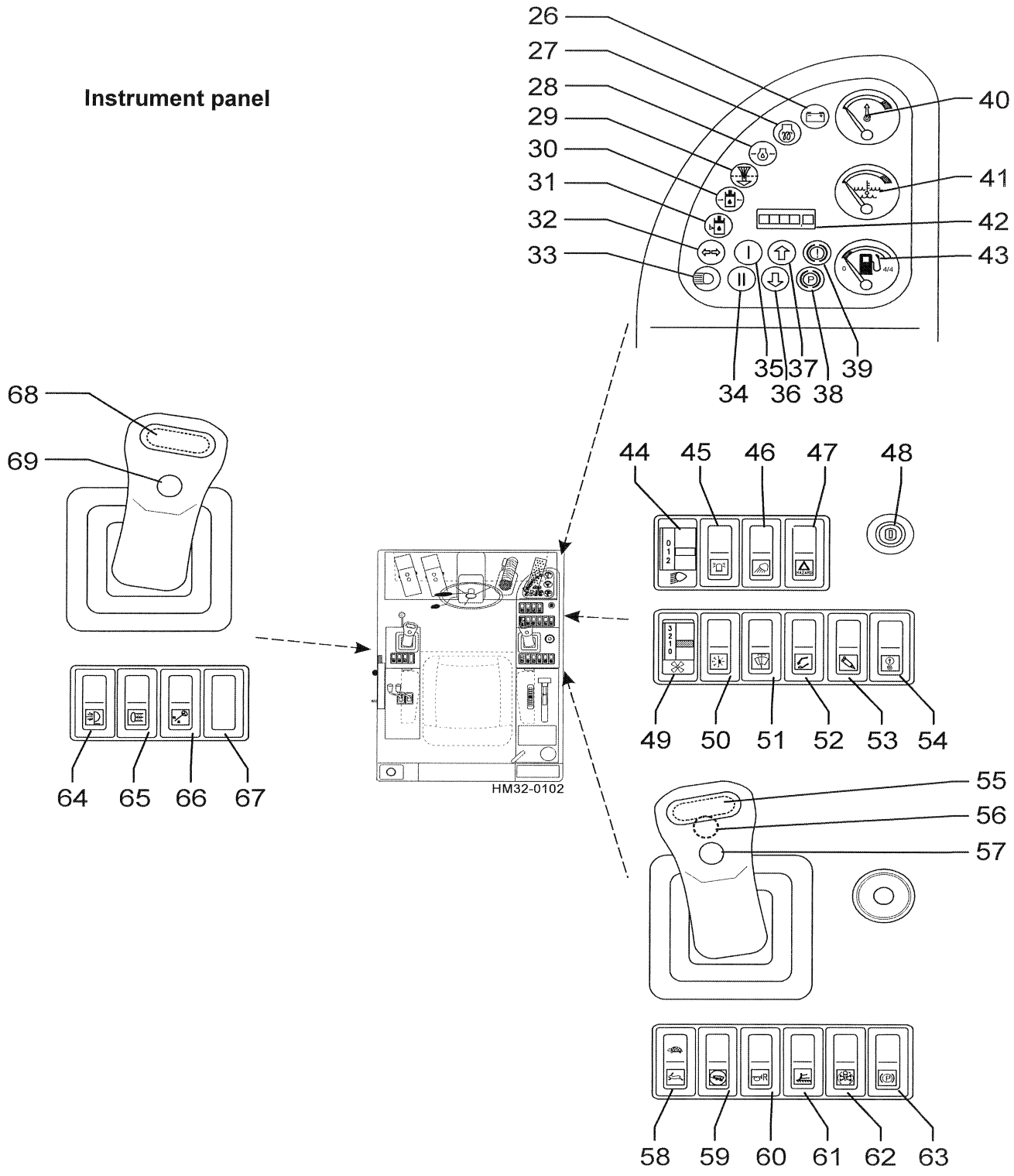
21 Uppercarriage slewing lock

22 Radio

23 Socket

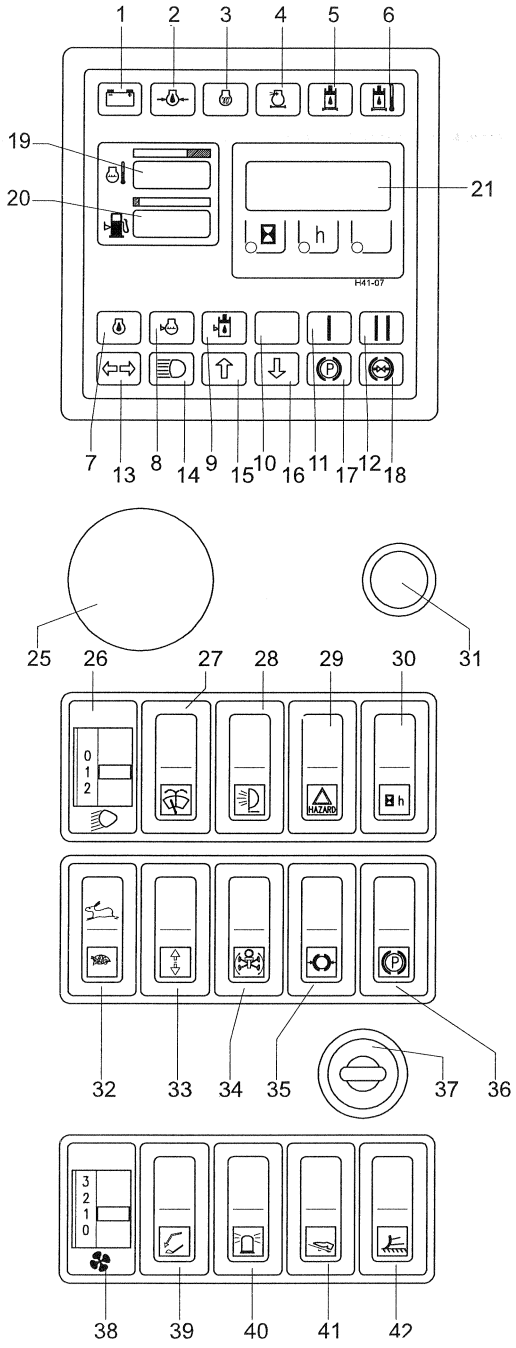
24 Service ladder (cover)

Instrument panel



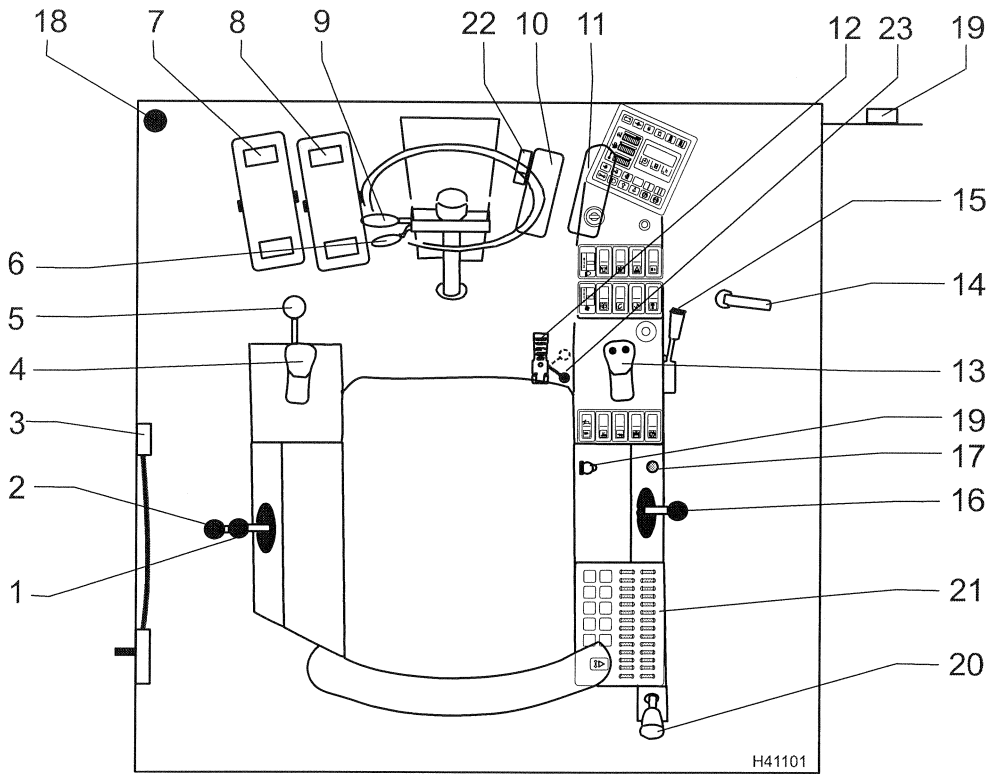
Description of instrument panel

26	RED — battery charge indicator lamp
27	YELLOW — pre-heating monitor
28	RED — engine oil pressure
29	YELLOW — air filter indicator
30	RED — hydraulic oil return filter clogging indicator
31	RED — hydraulic oil level
32	GREEN — turn signals
33	BLUE — high beam
34	GREEN — not assigned
35	GREEN — not assigned
36	GREEN — travel direction, reverse
37	GREEN — travel direction, forward
38	RED — parking brake
39	RED — brake accumulator pressure indicator
40	Overload warning device
41	Coolant temperature
42	Operating hour meter
43	Fuel gauge
44	Light switch
45	Rotating beacon
46	Working floodlight
47	Hazard warning switch
48	Pre-heat/ starter switch
49	Heater fan switch
50	Air conditioning
51	Windshield wiper - wash/wipe system
52	Working hydraulics cut-off
53	Rock breaker / additional control circuit
54	Overload warning device ON/OFF
55	Operation of additional control circuit I
56	Horn
57	Button — change-over intermediate boom / articulation
58	Fast — slow
59	Sensitive travel
60	Travel motion alarm cut-off
61	Front dozer blade
62	Oscillating axle lock
63	Parking brake
64	Boom-mounted working floodlight
65	Fog light
66	Steering change-over
67	not assigned
68	Operation of additional control circuit II
69	Hydrostatic additional swing brake



1 Battery charge indicator lamp
2 Engine oil pressure
3 Pre-heating monitor
4 Air filter service indicator
5 Hydr. oil filter clogging indicator
6 Hydr. oil temperature
7 Engine oil level
8 Coolant level
9 Hydraulic oil level
10 Blank
11 Blank
12 Blank
13 Travel direction indicator
14 High beam indicator lamp
15 Travel forwards
16 Travel in reverse
17 Parking brake lamp
18 Accumulator pressure indicator lamp
19 Coolant temperature
20 Fuel gauge
21 Working hour meter/ trip recorder

25 Overload warning device
26 Light switch
27 Windscreen wiper and wash/wipe system
28 Working headlights
29 Hazard warning switch
30 Change-over: display operating hours trip recorder (item 21)
Reset trip recorder - change-over (press for at least 15 sec.)
31 Check button
32 Fast/ slow
33 Travel: forward/reverse
34 Oscillating axle lock
35 Excavator brake
36 Parking brake
37 Pre-heat/ starter switch
38 Heater fan switch
39 Cut-off for working hydraulics
40 Rotating beacon
41 Sensitive travel
42 Changeover switch dozer blade / stabilizer left

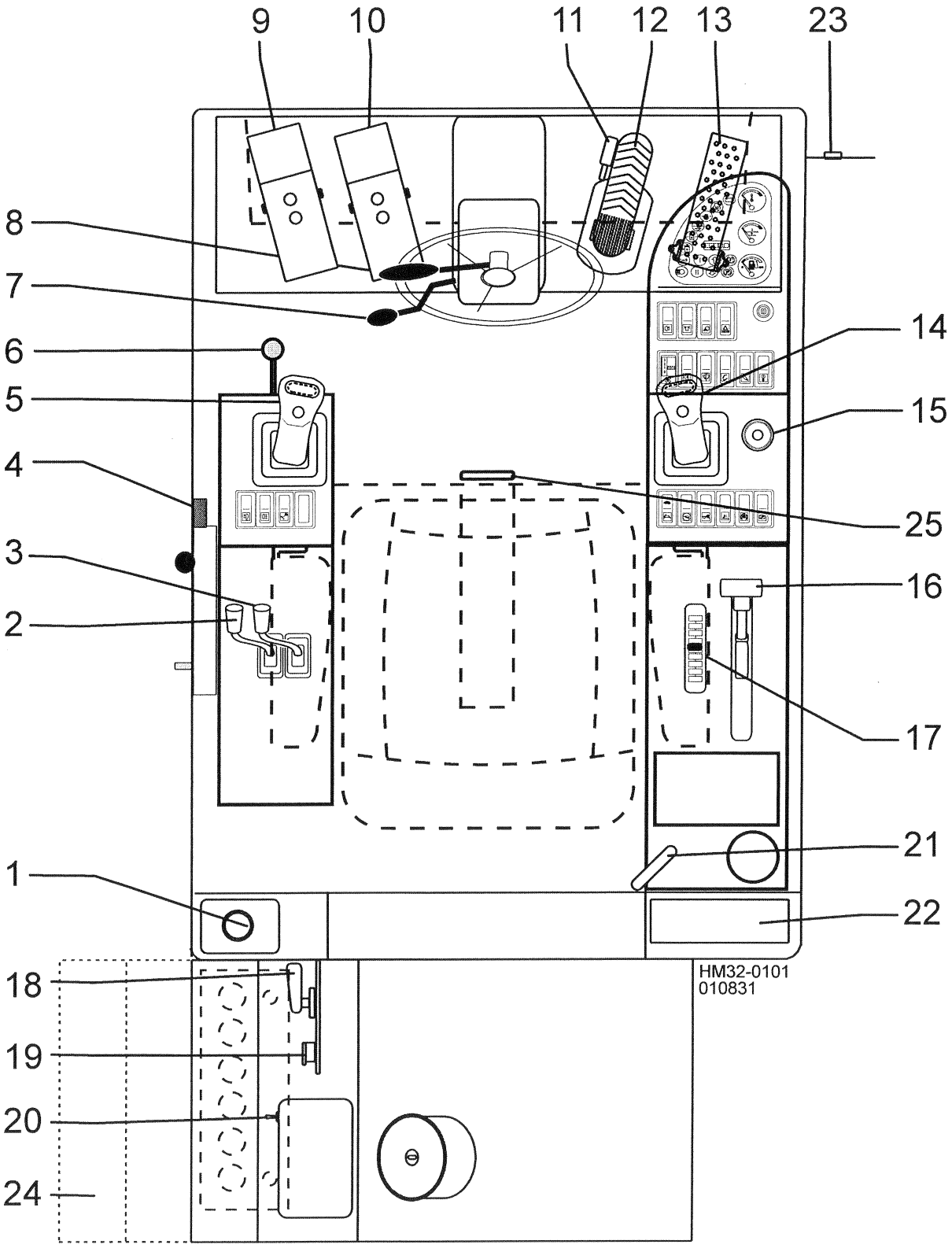


This picture contains optional equipment !

1 Actuating lever for right-hand stabilizer
2 Actuating lever for left-hand stabilizer / front dozer blade
1-2 Rear blade
3 Door release
4 Actuating lever for excavator equipment
5 Cut-off for working hydraulics (raise control panel)
6 Steering column adjustment
7 Sensitive travel
8 Actuation of intermediate boom or retract/extend telescope
9 Turning indicator switch/horn
10 Service brake
11 Accelerator pedal
12 Hammer operation
13 Actuating lever for excavator equipment
14 Uppercarriage locking bolt
15 Manual throttle
16 Articulation actuating lever
17 Off switch for hot water for heating
18 Actuating rod for quick-mount hitch
19 Socket
20 Parking brake
21 Fuse and relay box
22 Release for excavator brake (from serial no. 321/1251>)
23 Hammer operation lock

Operator controls

This picture contains non-standard equipment!



SCHAEFF TEREX	Typ/Model/Type **HML 42**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.53.01**

Description of cab

1 Windshield washer tank

2 Stabilizer, left

3 Stabilizer, right

4 Door release

5 Control lever — excavator installation

6 Working hydraulics cut-off (raise panel)

7 Steering column — tilt and height adjustment

8 Turning indicator

9 Sensitive travel

10 Monobloc: operation of articulation

"TPA"/"CI": operation of intermediate boom / articulation

11 Excavator brake release

12 Service brake / excavator brake

13 Accelerator pedal

14 Control lever — excavator installation

15 Travel direction pre-selector — forward / neutral / reverse

16 Engine speed control (manual throttle)

17 Heater temperature control

18 Battery main switch

19 Socket

20 Refueling pump (option)

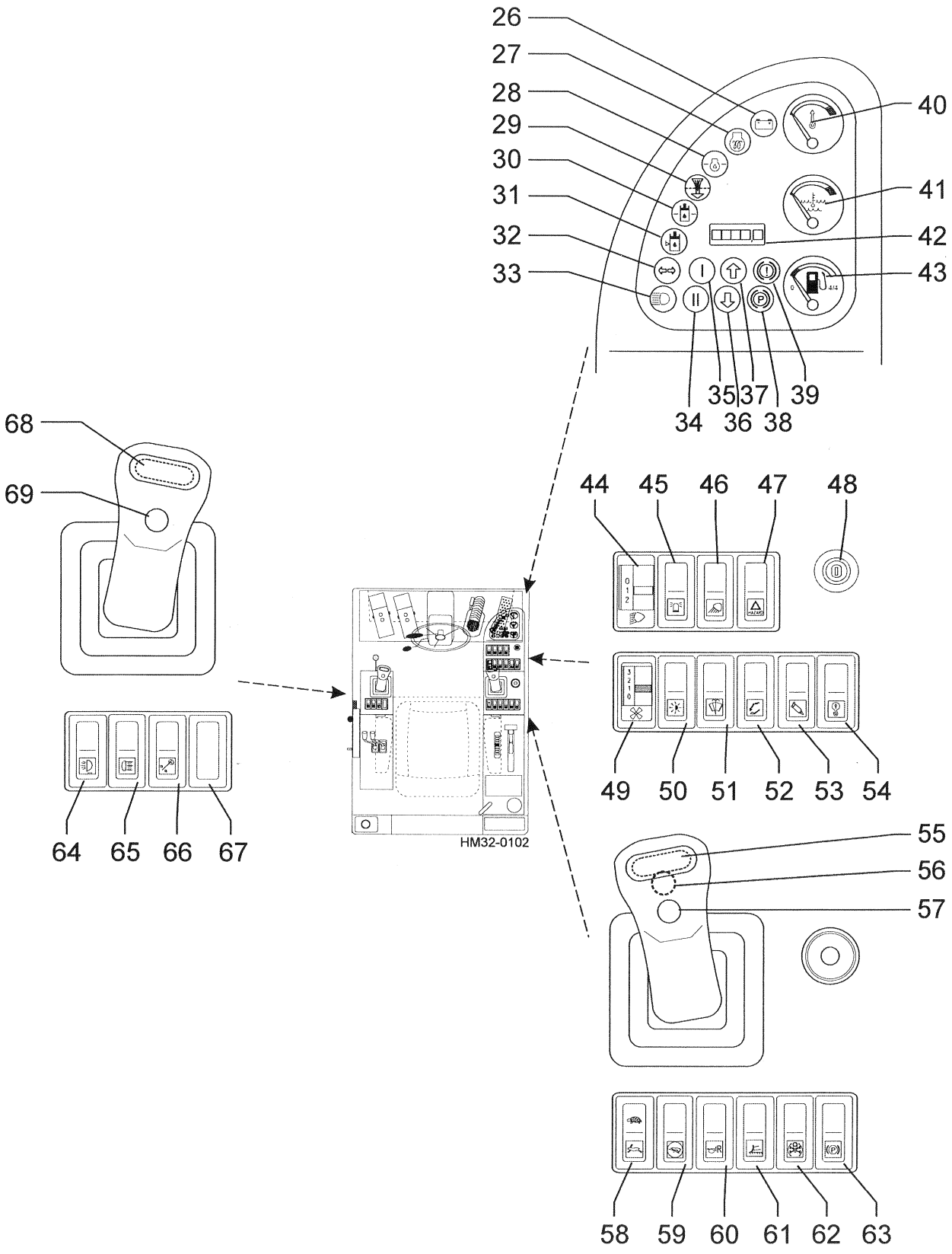
21 Superstructure slewing lock

22 Radio

23 Socket

24 Service ladder (cover)

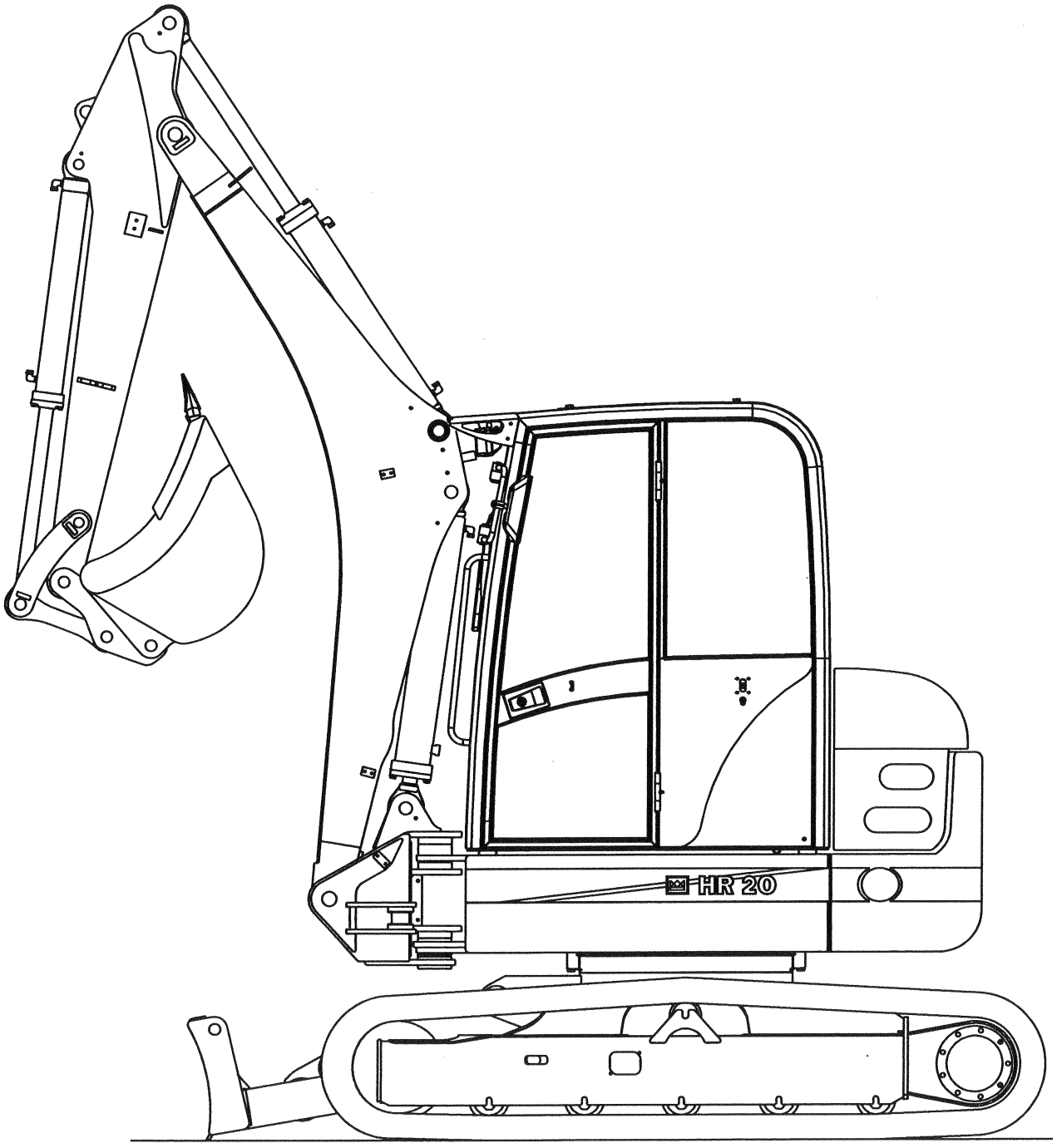
25 Choice fresh air — recirculating air


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HM32-0102

Description of instrument panel

26 RED — battery charge indicator lamp
27 YELLOW — pre-heating monitor
28 RED — engine oil pressure
29 YELLOW — air filter indicator
30 RED — hydraulic oil return filter clogging indicator
31 RED — hydraulic oil level
32 GREEN — turn signals
33 BLUE — high beam
34 GREEN — not assigned
35 GREEN — not assigned
36 GREEN — travel direction, reverse
37 GREEN — travel direction, forward
38 RED — parking brake
39 RED — brake accumulator pressure indicator
40 Overload warning device
41 Coolant temperature
42 Operating hour meter
43 Fuel gauge
44 Light switch
45 Rotating beacon
46 Working floodlights
47 Hazard warning switch
48 Pre-heat/ starter switch
49 Heater fan switch
50 Air conditioning
51 Windshield wiper - wash/wipe system
52 Working hydraulics cut-off
53 Rock breaker / additional control circuit
54 Overload warning device ON/OFF
55 Operation of additional control circuit I; e.g. grab rotation, rock breaker
56 Horn
57 Button — change-over intermediate boom / articulation
58 Fast — slow
59 Sensitive travel
60 Travel motion alarm cut-off
61 Front dozer blade
62 Oscillating axle lock
63 Parking brake
64 Boom-mounted working floodlight
65 Rear fog lamp
66 Steering change-over
67 not assigned
68 Operation of additional control circuit II
69 Hydrostatic additional swing brake

HR 20

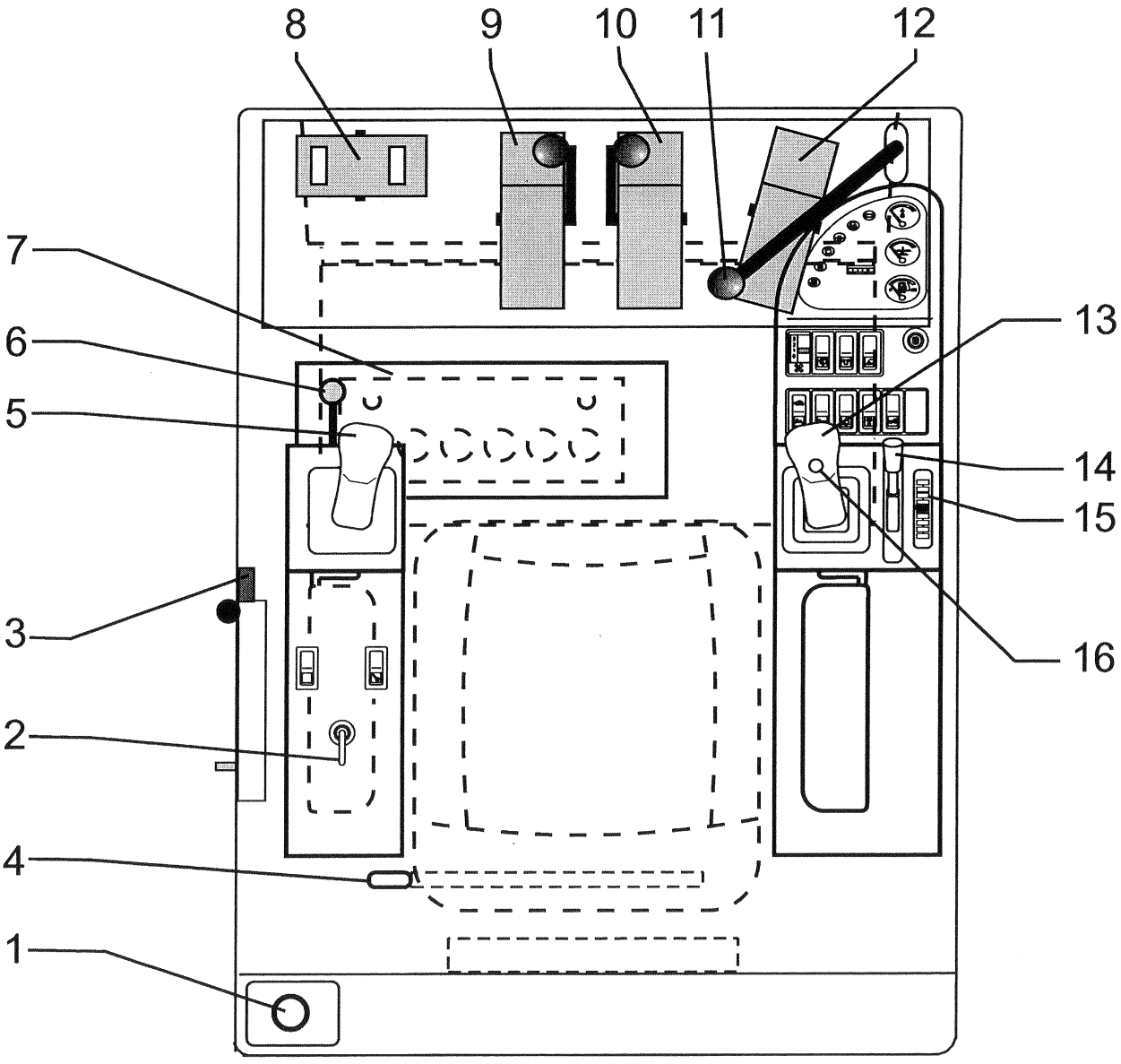


Typ Model Type Tipo	**HR 20** **Bedienung** **Operation** **Maniement** **Manejo**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Bedienelemente** **Operator controls** **Indicateurs et éléments de commande** **Elementos de manejar**	Blatt Page Feuille Página	**9.60.00**

Die nachfolgende Aufstellung beinhaltet Sonderausstattungen.

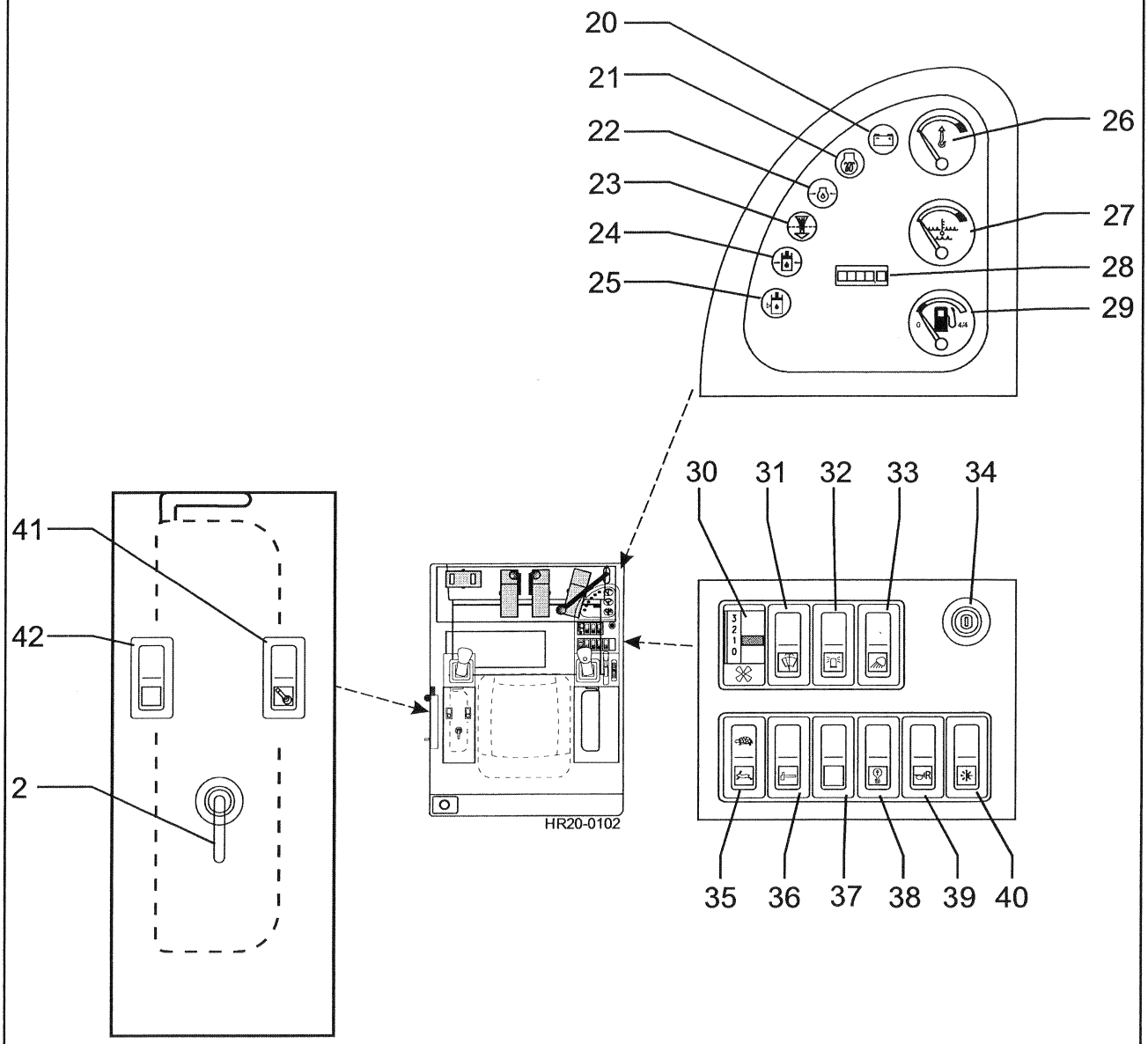
This picture contains non-standard equipment!

Ce schéma comporte des exécutions hors-série!



Pos. Item Rep. No.	Deutsch	English	Français
	Bedienelemente	**Operator controls**	Indicateurs et éléments de commande
1	Behälter Scheibenwaschwasser	Window washer tank	Réservoir d'eau de lavage pour la lave-glace
2	Batterie - Hauptschalter	Battery main switch	Interrupteur principale - battrie
3	Türentriegelung	Door release	Déverrouillage de portière
4	Umschalter Frischluft/Umluft	Selector switch fresh air / circulating air	Inverseur air frais / air pulsé
5	Betätigungshebel - Baggereinrichtung	Joy stick for digging equipment	Manette de commande équipement pelle
6	Abschalter für Arbeitshydraulik (Anheben der Konsole)	Cut-off for working hydraulics (raise control panel)	Interrupteur équipement hydraulique (soulever l'accoudoir)
7	Wartungsdeckel Batterie	Battery service cover	Couvercle d'entretien batterie
8	Betätigung - Knicken	Actuation of articulation	Commande - articulation
9	Fahrwerk links	Crawler unit, left	Chenille gauche
10	Fahrwerk rechts	Crawler unit, right	Chenille droite
11	Betätigungshebel - Räumschild	Actuating lever for dozer blade	Manette de commande - lame de remblayage
12	Zusatzsteuerkreis - Greifer / Hammer	Additional control circuit - grab / rock breaker	Circuit supplémentaire - benne preneuse / marteau
13	Betätigungshebel - Baggereinrichtung	Joy stick for digging equipment	Manette de commande - équipement pelle
14	Motordrehzahlverstellung (Handgas)	Engine speed (manual throttle)	Manette d'accélérateur
15	Temperaturregelung Heizung	Temperature control, heating	Régulateur de température du chauffage
16	Signalhorn	Horn	Klaxon

Armaturenkonsole

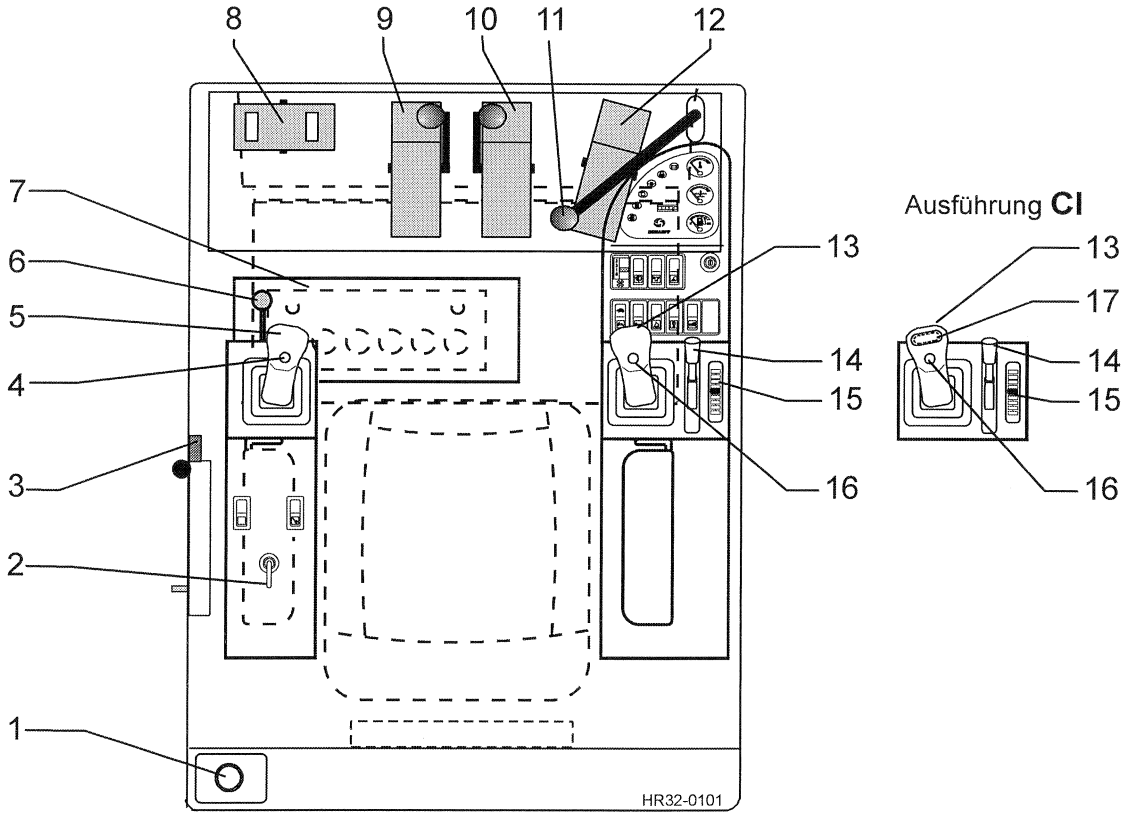


Typ Model Type Tipo	**HR 20**	**Bedienung** **Operation** **Maniement** **Manejo**	Datum Edition Date Fecha	**01.2003**
Benennung Description Dénomination Denominación	**Armaturenkonsole** **Instrument panel** **Console de commande** **Consola de mando**		Blatt Page Feuille Página	**9.60.03**

Pos. Item Rep. No.	Deutsch	English	Français
	Beschreibung - Armaturenkonsole	**Description - Instrument panel**	**Descriptif - console de commande**
2	Batteriehauptschalter	Battery main switch	Interrupteur principale de batterie
20	Ladekontrolllampe	Battery charge indicator	Témoin de charge
21	Vorglühüberwachung	Pre-heating monitor	Témoin de préchauffage
22	Motoröldruck	Engine oil pressure	Pression d'huile moteur
23	Luftfilterkontrolle	Air filter indicator	Contrôle d'entretien du filtre à air
24	Hydraulikölfilter - Verschmutzungsanzeige	Hydraulic oil filter - clogging indicator	Témoin colmatage du filtre d'huile hydraulique
25	nicht belegt	not assigned	non utilisé
26	Lastwarneinrichtungsanzeige	Overload warning device	Avertisseur de charge
27	Kühlmitteltemperatur	Coolant temperature	Température réfrigérant
28	Betriebsstundenzähler	Operating hour meter	Compteur d'heures de service
29	Kraftstoffvorratsanzeige	Fuel indicator	Témoin de carburant
30	Gebläseschalter - Heizung	Heater fan switch	Commutateur ventilation - chauffage
31	Scheibenwischer - Wisch-/Waschanlage	Windshield wash/ wipe system	Essuie - glace / lave - glace
32	Rundum - Warnleuchte	Rotating beacon	Gyrophare
33	Arbeitsscheinwerfer	Working floodlight	Phare de travail
34	Glühstartschalter	Pre-heat / starter switch	Interrupteur de préchauffage et démarrage
35	Schnell - Langsam	high speed / low speed	Grande vitesse / petite
36	Umschalter - Greifer / Hammer	Switch - grab / rock breaker	Commutateur - benne preneuse / marteau
37	nicht belegt	not assigned	non utilisé
38	Abschalter - Lastwarneinrichtung (akustisch)	Switch - overload warning device	Interrupteur - avertisseur de charge
39	Abschalter - Fahralarm	Switch - travel motion alarm	Interrupteur - avertisseur de translation
40	Option - Klimaanlage	Option - Air conditioning	Option - climatisation
41	Option - Umschaltung ISO-Steuerung - SAE-Steuerung	Option - Changeover from ISO control to SAE control	Option - commutation commande ISO / commande John Deere
42	nicht belegt	not assigned	non utilisé

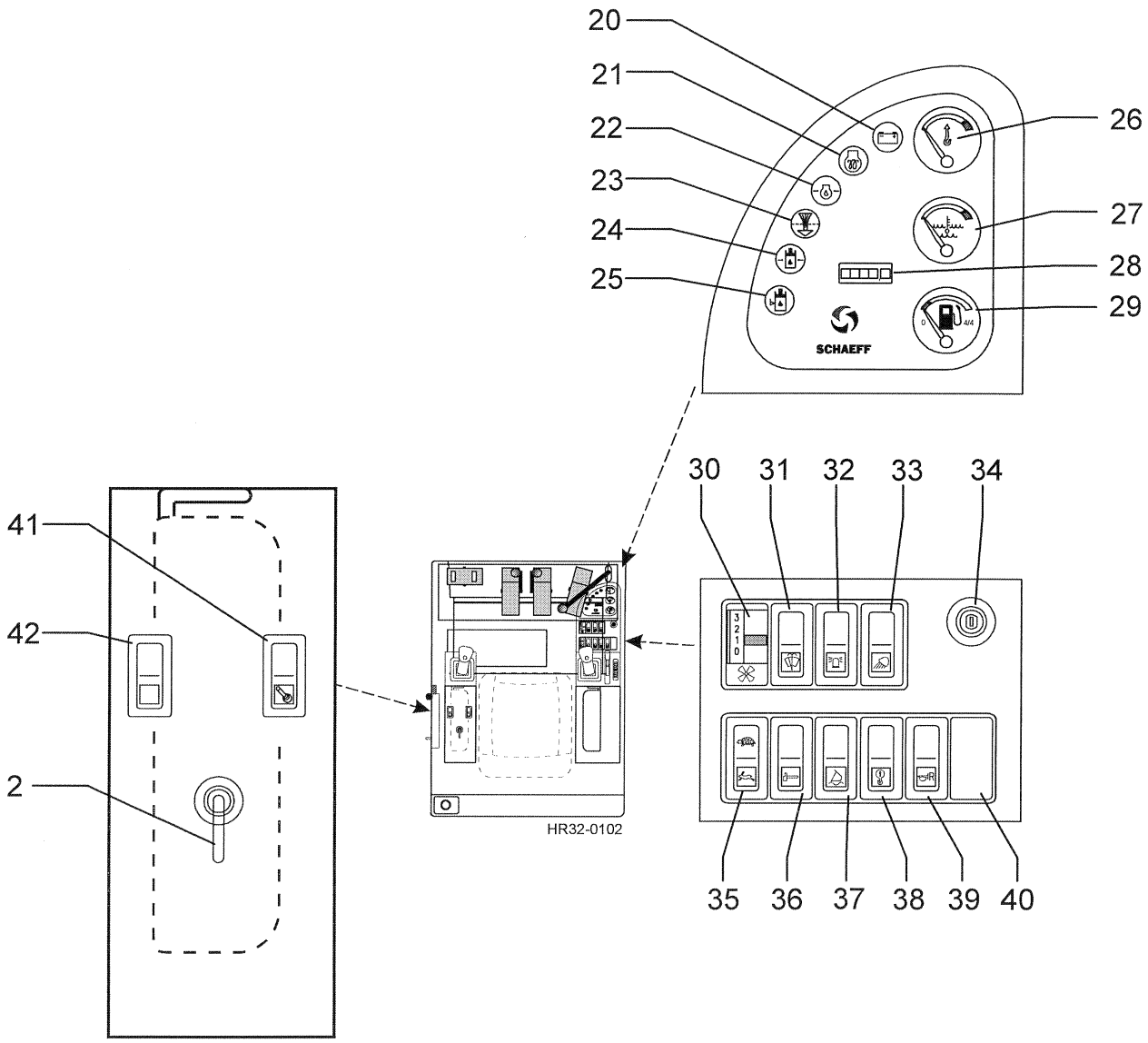
Operator controls

This picture contains non-standard equipment!



1 Window washer tank
2 Battery main switch
3 Door release
4 Hydrostatic additional swing brake
5 Actuating lever for excavator installation
6 Cut-off for working hydraulics (raise control panel)
7 Battery service cover
8 Actuation of articulation
9 Crawler unit, left
10 Crawler unit, right
11 Actuating lever for dozer blade
12 Additional control circuit — grab/ rock breaker
with "Circular" boom fitted: intermediate boom
13 Actuating lever for excavator installation
14 Engine speed (manual throttle)
15 Temperature control, heating
16 Horn
17 **with "Circular" boom fitted**: Additional control circuit — grab/ rock breaker

Instrument panel



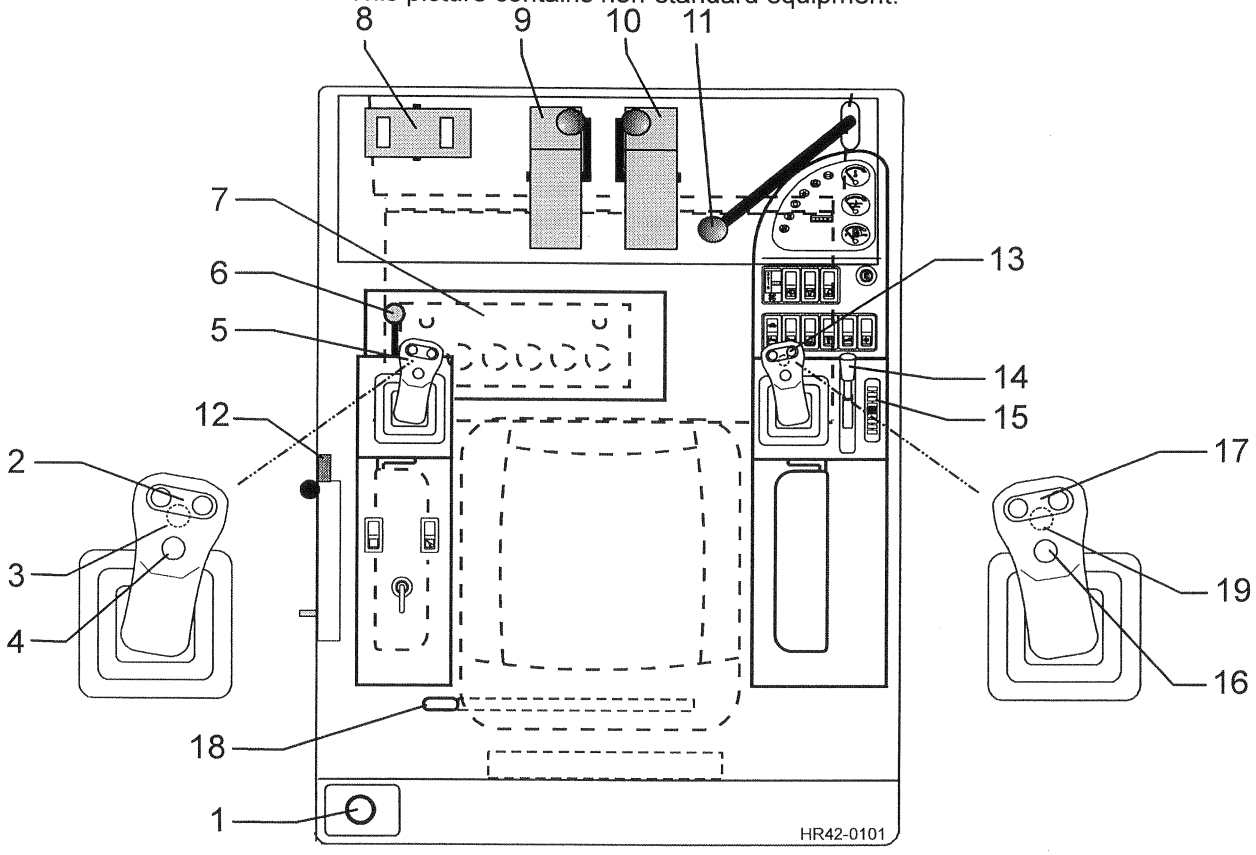
Instrument panel

Description — Instrument panel

2	Battery main switch
20	Battery charge indicator
21	Pre-heating monitor
22	Engine oil pressure
23	Air filter indicator
24	Hydraulic oil filter - clogging indicator
25	Hydraulic oil level
26	Overload warning device
27	Coolant temperature
28	Operating hour meter
29	Fuel gauge
30	Heater fan switch
31	Windshield wash/ wipe system
32	Rotating beacon
33	Working floodlight
34	Pre-heat/ starter switch
35	Fast - slow
36	Rock breaker
37	Dozer blade float position
38	Overload warning device cut-off
39	Travel motion alarm OFF switch
40	not assigned
41	Changeover from ISO control to John Deere control (option)
42	not assigned

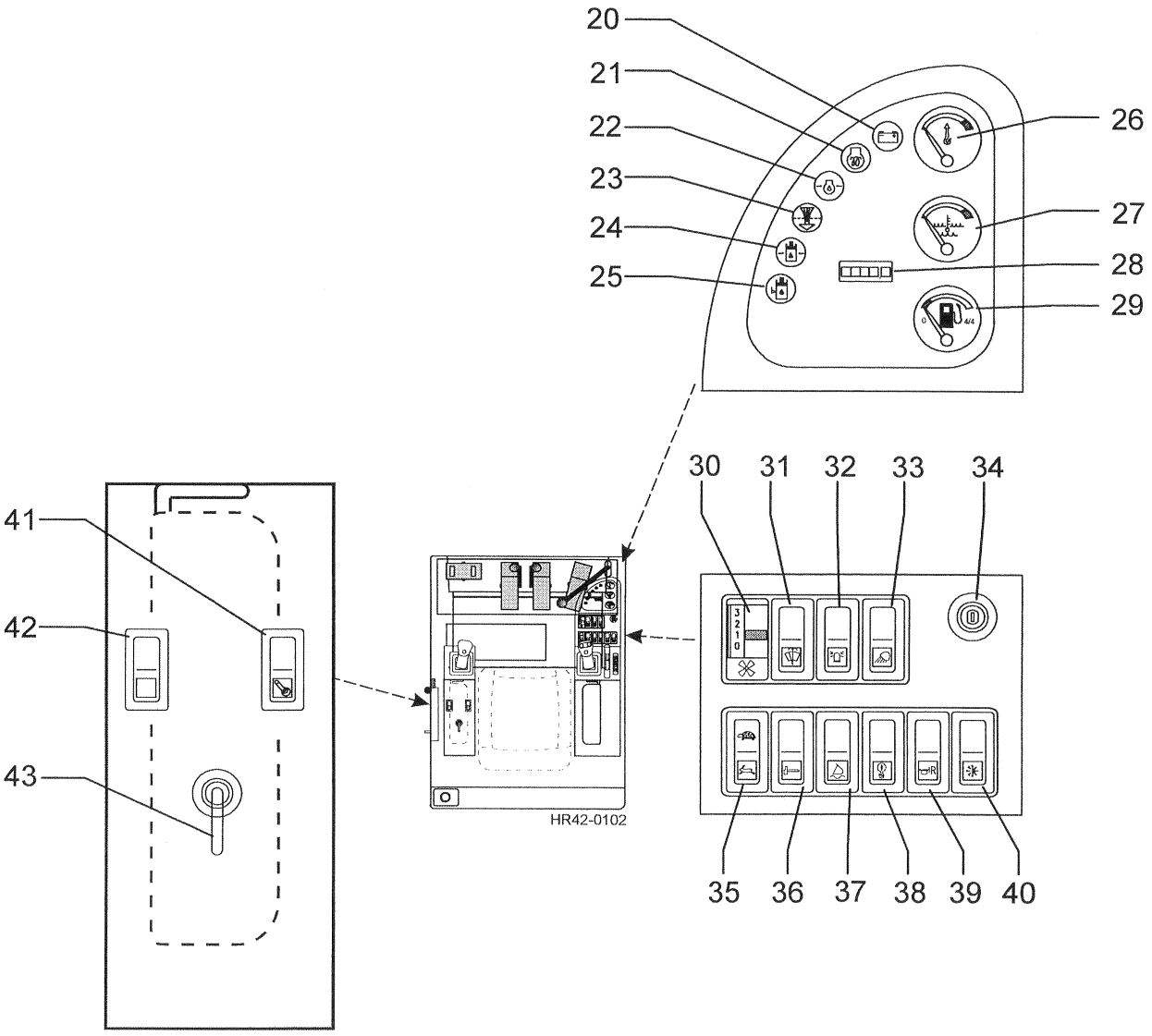
Operator controls

This picture contains non-standard equipment!



1	Window washer tank
2	Rocker switch - Additional control circuit — special function
3	Push-button – Holding brake for uppercarriage slewing motion
4	Push-button – Swing brake
5	Actuating lever for excavator installation
6	Cut-off for working hydraulics (raise control panel)
7	Battery service cover
8	Actuation of articulation
9	Crawler unit, left
10	Crawler unit, right
11	Actuating lever — dozer blade
12	Door release
13	Actuating lever — excavator installation
14	Engine speed adjustment (manual throttle)
15	Temperature control, heating
16	Push-button – Horn
17	Rocker switch - Additional control circuit — grab/ rock breaker
18	Choice fresh air / circulating air
19	Push-button – not assigned

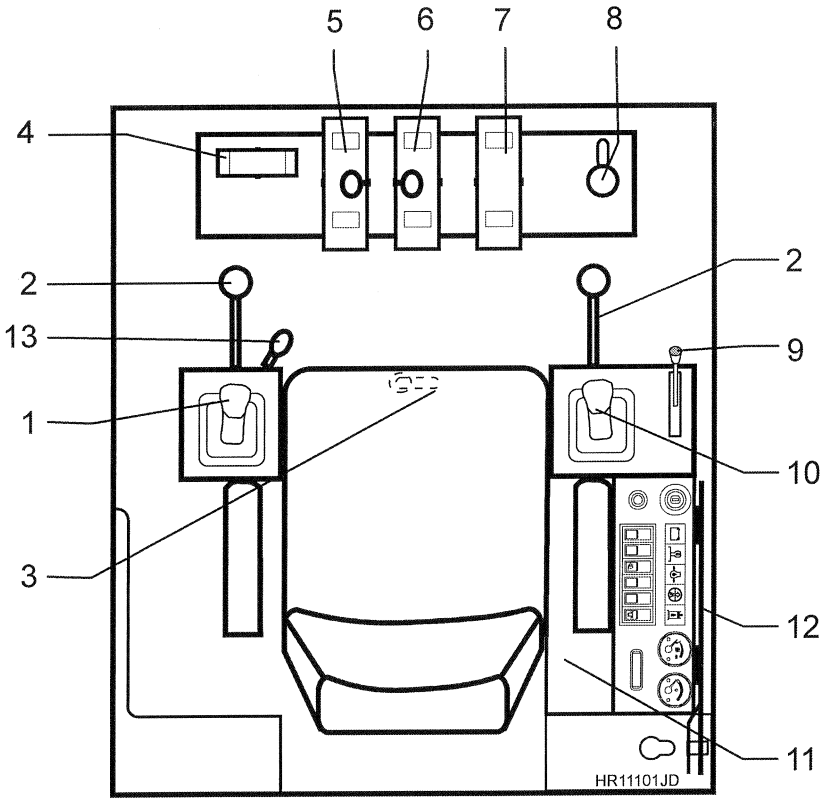
Instrument panel



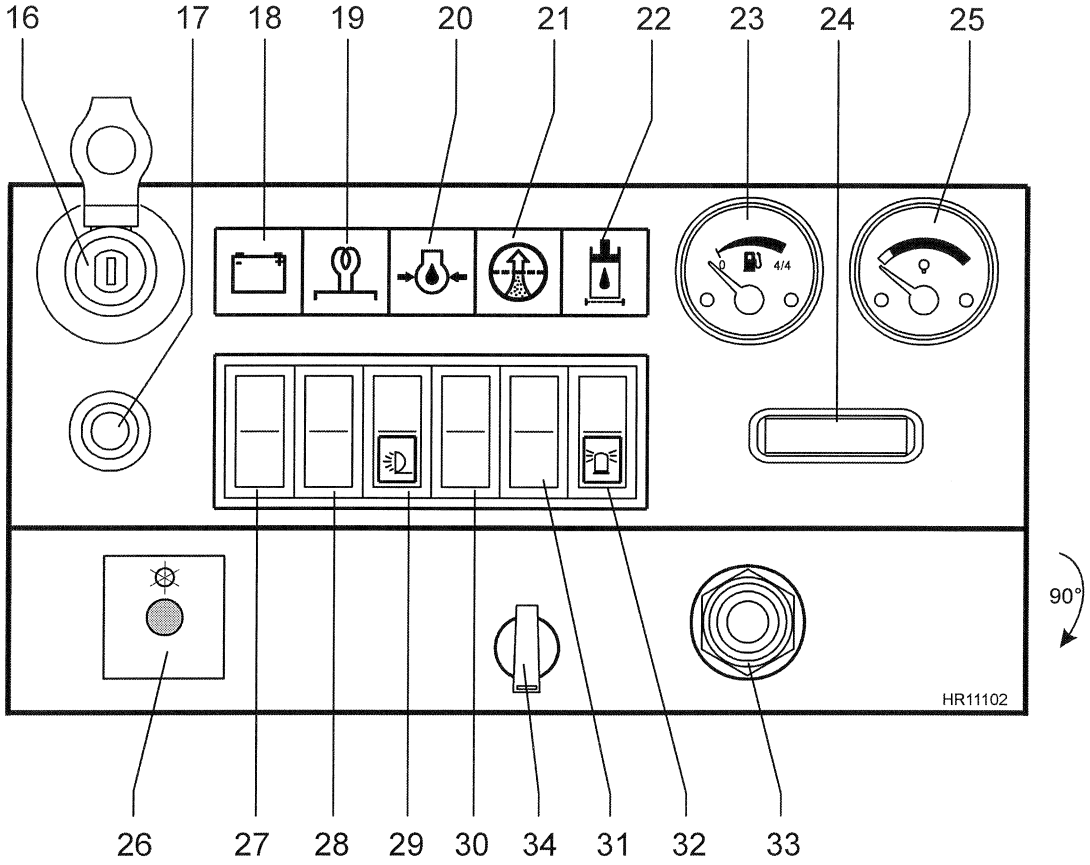
Instrument panel

	Description — Instrument panel
20	Battery charge indicator
21	Pre-heating monitor
22	Engine oil pressure
23	Air filter indicator
24	Hydraulic oil filter clogging indicator
25	Hydraulic oil level
26	Overload warning device
27	Coolant temperature
28	Operating hour meter
29	Fuel gauge
30	Heater fan switch
31	Windshield wash/ wipe system
32	Rotating beacon
33	Working floodlight
34	Glow-plug and starter switch
35	FAST - SLOW
36	Rock breaker
37	Dozer blade float position
38	Overload warning device OFF switch
39	Travel motion alarm OFF switch
40	Option — Air conditioning
41	Option — Changeover ISO-SAE control
42	not assigned
43	Battery disconnect switch

Display elements and operator controls

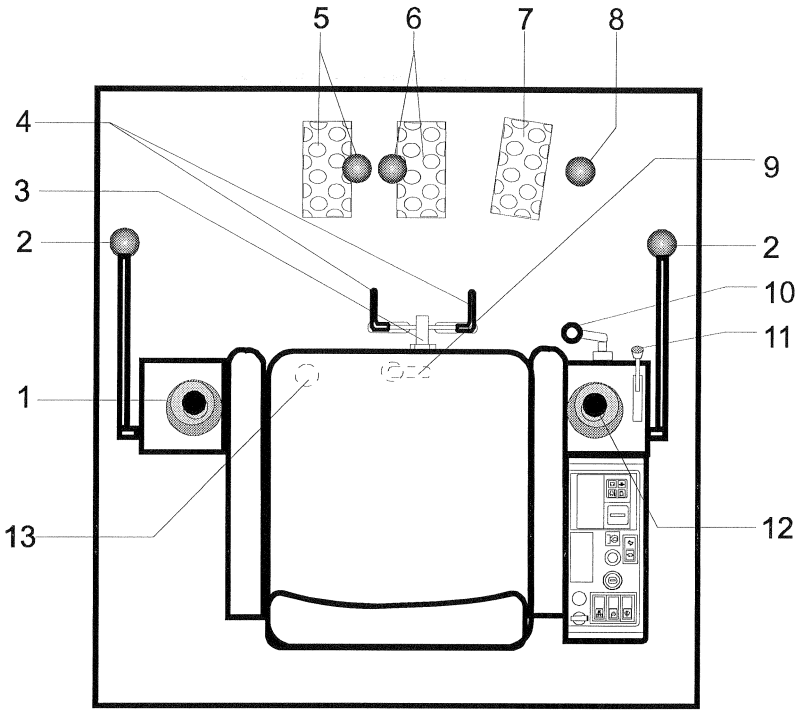


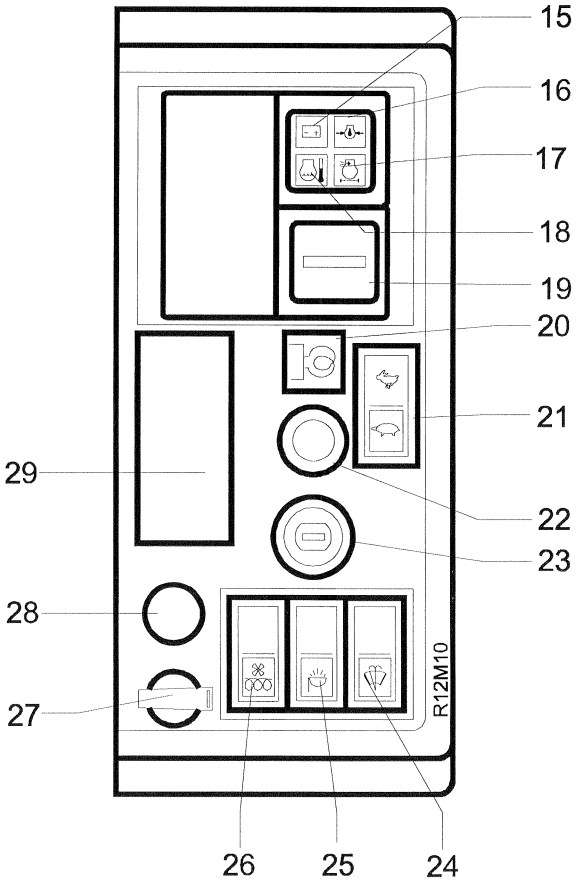
1	Actuation of excavator installation
2	Working hydraulics cut-off / Exit barrier
3	Uppercarriage locking bolt
4	Actuation of articulation
5	Crawler unit, left
6	Crawler unit, right
7	**Option:** additional control circuit — rock breaker, etc.
8	Actuation of dozer blade
9	Manual throttle
10	Actuation of excavator installation
11	Fuse and relay box
12	Vandal guard
13	**Option:** changeover "ISO" control — "JD" control



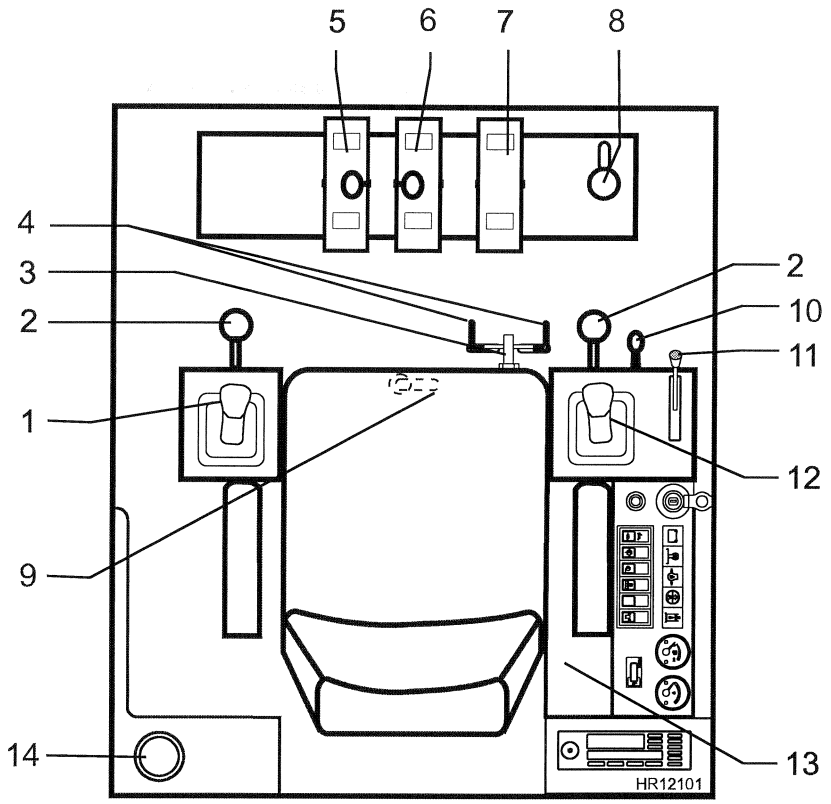
16 Pre-heat/ starter switch (ignition lock)
17 Horn button
18 Red - Battery charge indicator
19 Orange - Pre-heating monitor
20 Red - Engine oil pressure indicator
21 Orange - Air filter clogging indicator
22 **Option:** hydraulic oil filter clogging indicator
23 Fuel gauge
24 Operating hour meter
25 Coolant temperature
26 **Option:** immobilizer
27 --
28 --
29 Working floodlight
30 --
31 --
32 **Option:** rotating warning beacon
33 Warning buzzer
34 Socket

Display and operating elements





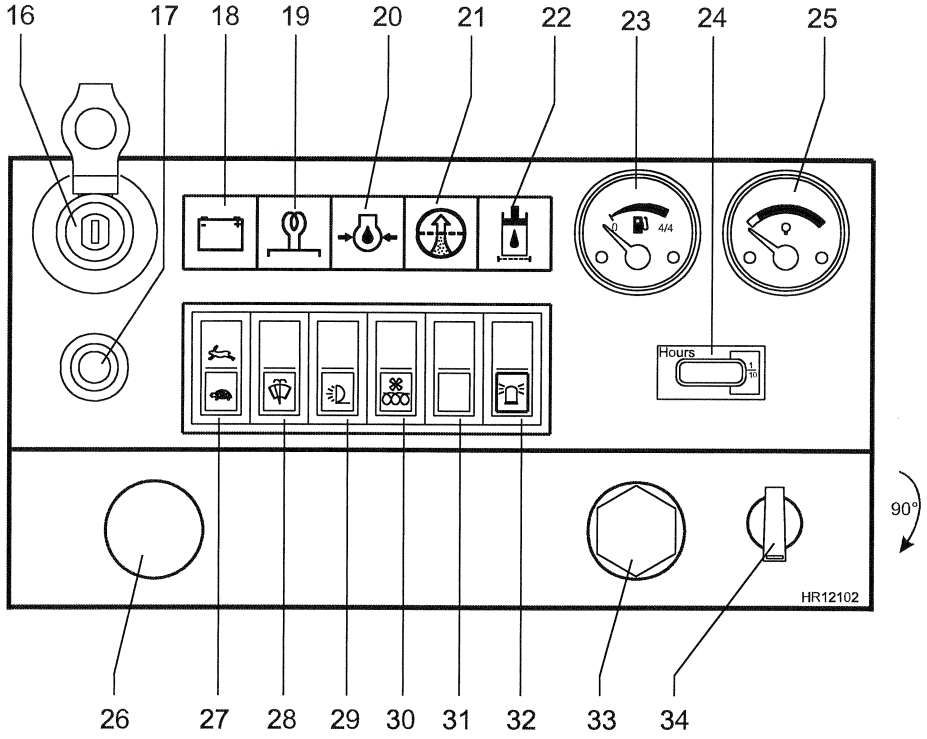
SCHAEFF	Typ/Model/Type **HR 12 (serial no. 355/4975 - 355/5586)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.74.01**



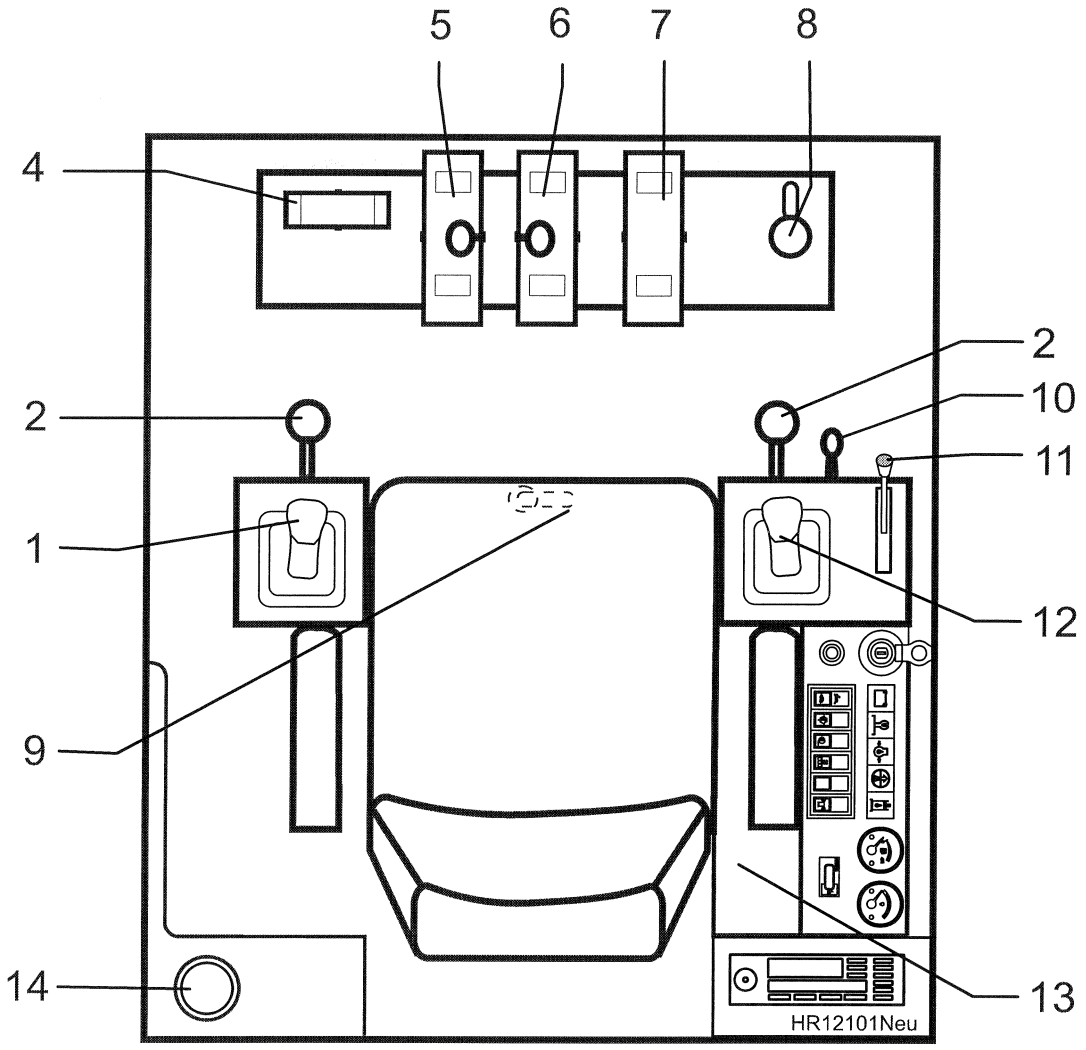
1	Actuation of excavator equipment
2	Cut-off - working hydraulics/ exit barrier
3	Articulation lock
4	Actuation of articulation
5	Crawler-type undercarriage, left
6	Crawler-type undercarriage, right
7	Additional control circuit - grab rotation, rock breaker, etc.
8	Actuation of dozer blade/ tread width adjustment
9	Uppercarriage locking bolt
10	Shift lever for dozer blade/ tread width adjustment (option)
11	Manual throttle
12	Actuation of excavator equipment
13	Fuse and relay box
14	Windscreen washer tank

Description

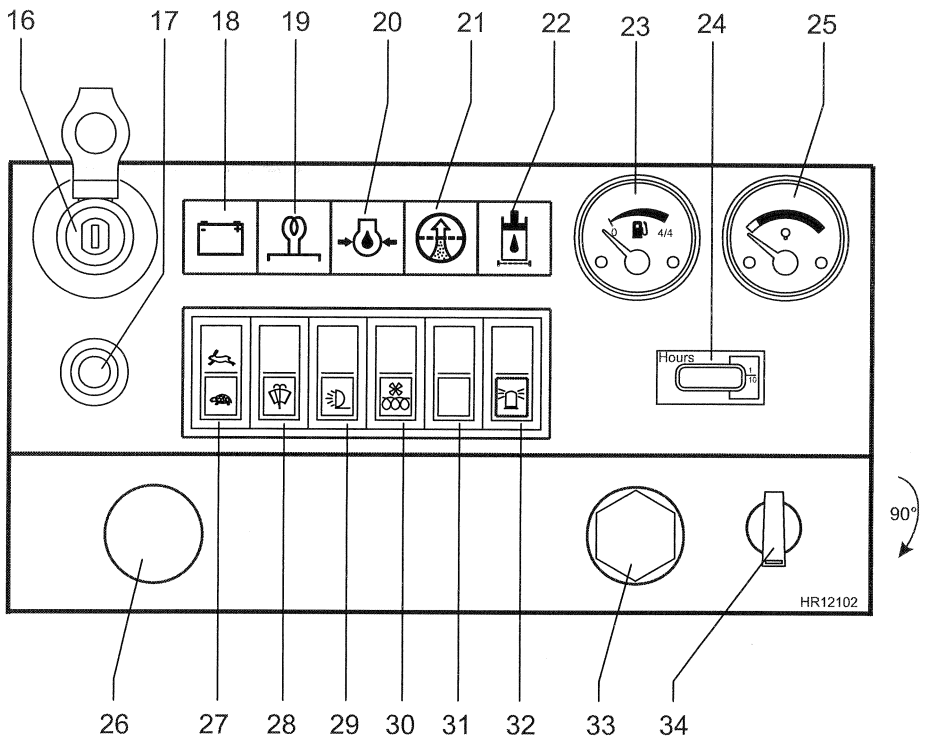
1	Operation - excavator equipment
2	Shut-off - working hydraulics / exit barrier
3	Lock - articulation
4	Operation - articulation
5	Crawler-type undercarriage, left
6	Crawler-type undercarriage, right
7	Additional control circuit - grab rotation, breaker, etc.
8	Operation - dozer blade / tread width adjustment
9	Uppercarriage - locking pin
10	Switch-over - dozer blade / tread width adjustment (option)
11	Manual throttle
12	Operation - excavator equipment
13	Fuel level gauge
14	---
15	Red - battery charge control
16	Red - engine oil control
17	Red - air filter clogging indicator
18	Red - cooling water temperature - warning lamp
19	Operating hour meter
20	Orange - pre-glow monitoring
21	Quick/ slow (option)
22	Signal horn - pushbutton
23	Pre-heat/ starter switch (ignition lock)
24	Windscreen wiper, wiper/ washer system
25	Working headlamps
26	Heating / ventilation
27	Socket
28	not assigned
29	Fuse box



16	Pre-heat/ starter switch (ignition lock)
17	Horn button
18	Red - battery charge indicator
19	Orange - pre-heating monitor
20	Red - engine oil pressure indicator
21	Red - air filter clogging indicator
22	Hydraulic oil filter clogging indicator (option)
23	Fuel gauge
24	Operating hour meter
25	Coolant temperature
26	Immobilizer (option)
27	Fast/ slow (option)
28	Windscreen wiper wash/ wipe system
29	Work floodlights
30	Heater / ventilation
31	Blank
32	Rotating warning beacon (option)
33	Warning buzzer
34	Socket

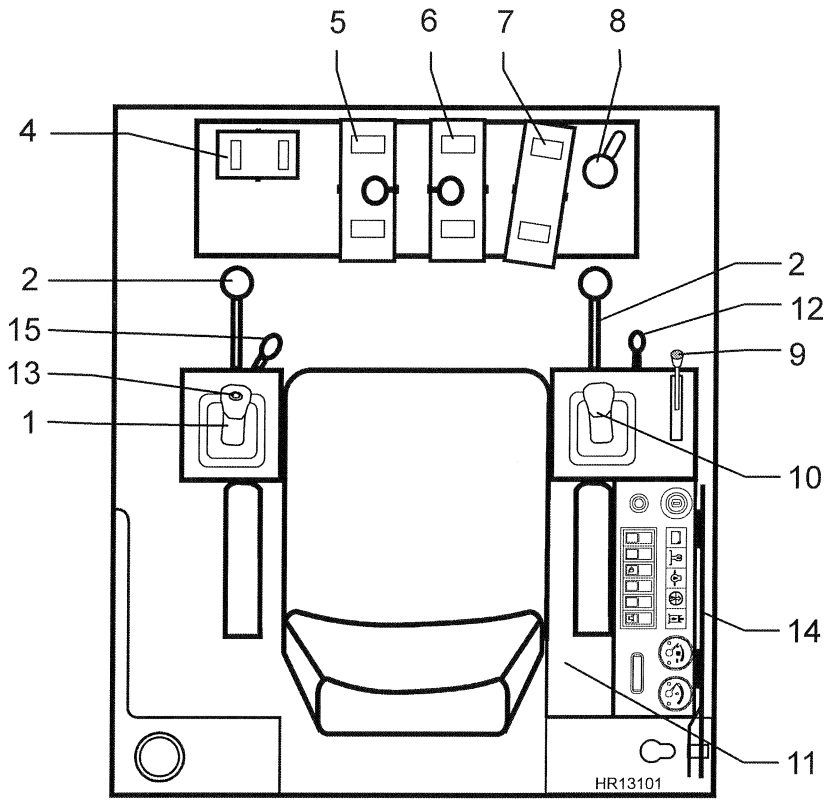


1	Actuation of excavator equipment
2	Cut-off - working hydraulics/ exit barrier
3	--
4	Actuation of articulation
5	Crawler-type undercarriage, left
6	Crawler-type undercarriage, right
7	Additional control circuit - grab rotation, rock breaker, etc.
8	Actuation of dozer blade/ tread width adjustment
9	Upper carriage locking bolt
10	Shift lever for dozer blade/ tread width adjustment (option)
11	Manual throttle
12	Actuation of excavator equipment
13	Fuse and relay box
14	Windscreen washer tank

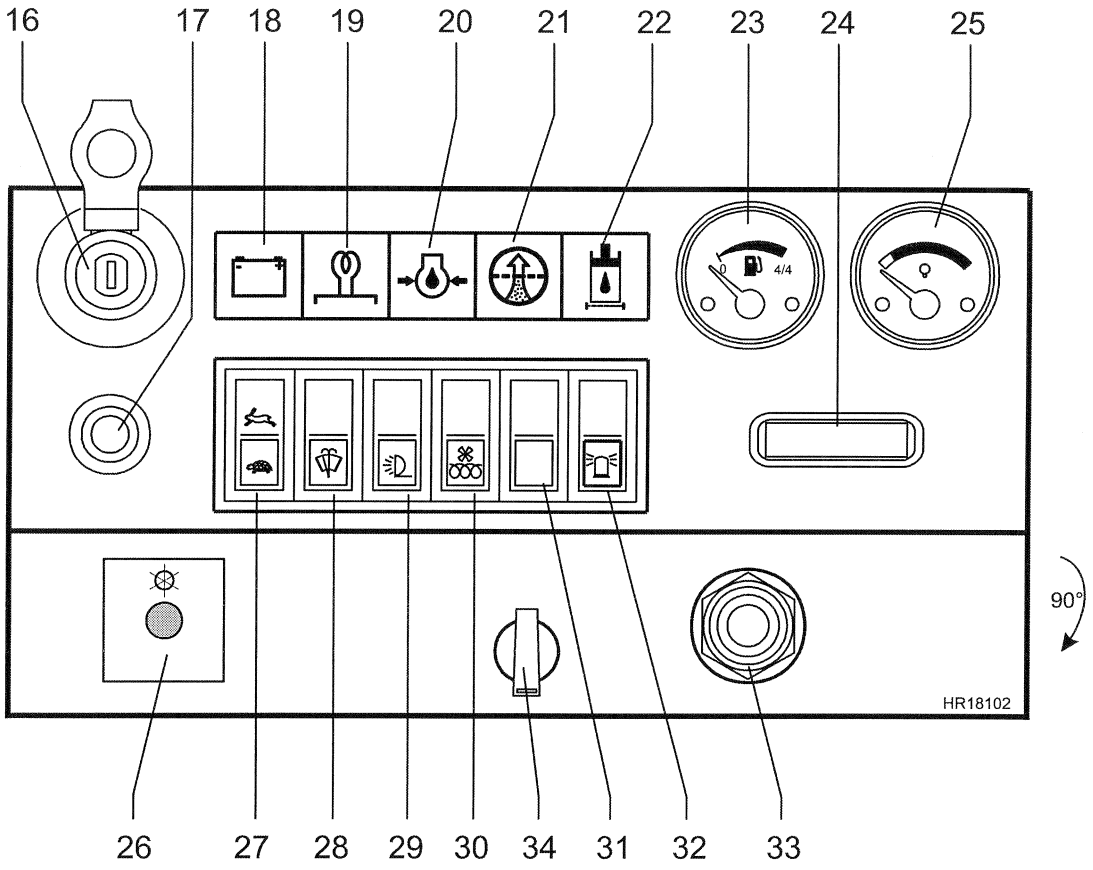


16	Pre-heat/ starter switch (ignition lock)
17	Horn button
18	Red - battery charge indicator
19	Orange - pre-heating monitor
20	Red - engine oil pressure indicator
21	Red - air filter clogging indicator
22	Hydraulic oil filter clogging indicator (option)
23	Fuel gauge
24	Operating hour meter
25	Coolant temperature
26	Immobilizer (option)
27	Fast/ slow (option)
28	Windscreen wiper wash/ wipe system
29	Work floodlights
30	Heater / ventilation
31	Blank
32	Rotating warning beacon (option)
33	Warning buzzer
34	Socket

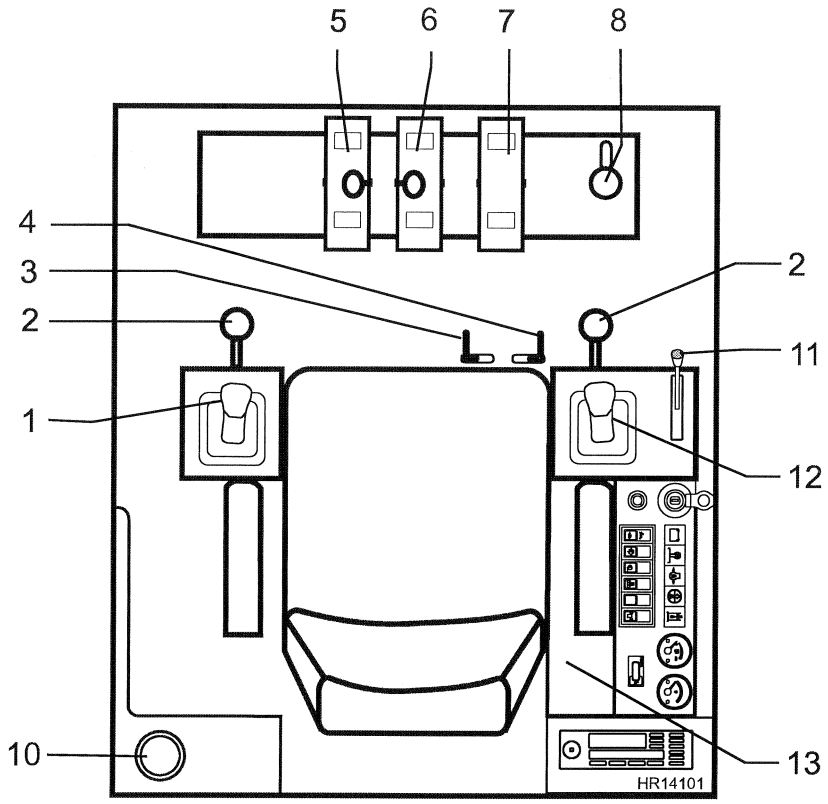
Display elements and operator controls



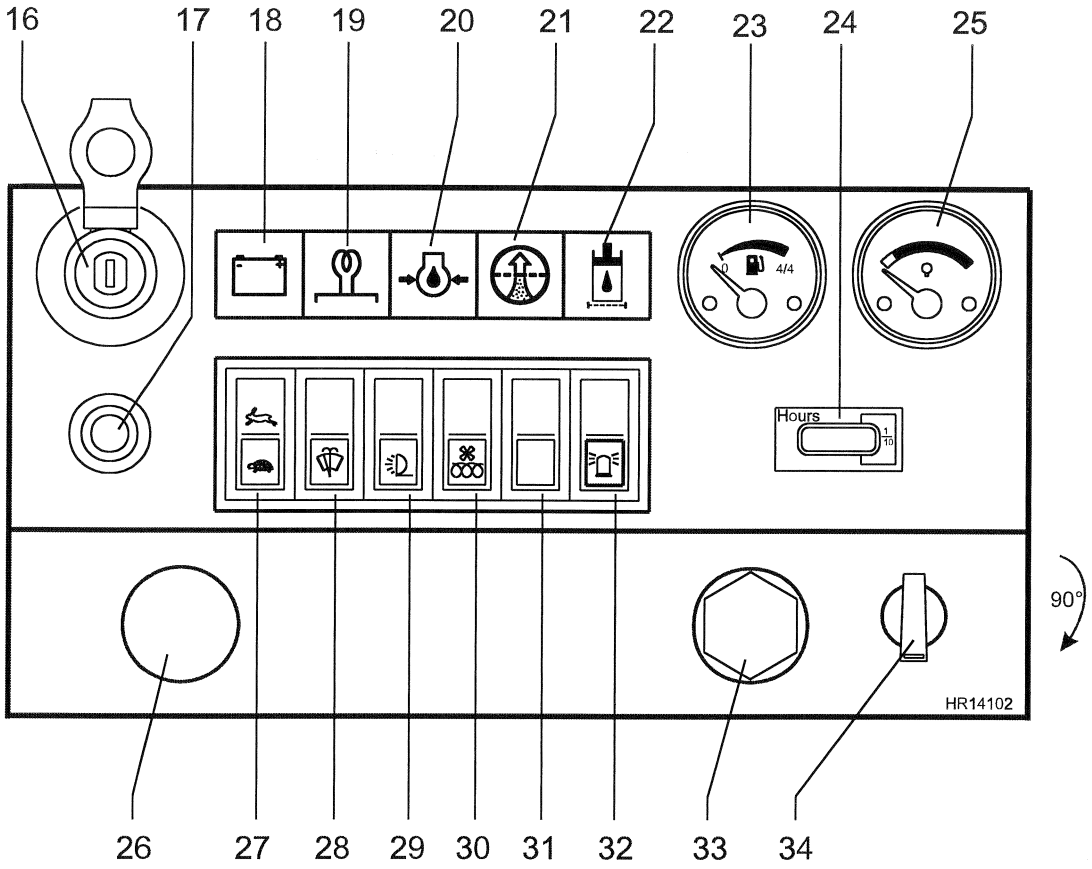
1	Actuation of excavator installation
2	Working hydraulics cut-off / Exit barrier
3	--
4	Actuation of articulation
5	Crawler unit, left
6	Crawler unit, right
7	**Option:** Additional control circuit — rock breaker, etc.
8	Actuation of dozer blade
9	Manual throttle
10	Actuation of excavator installation
11	Fuse and relay box
12	Change-over lever for dozer blade / track width adjustment
13	Holding brake — slewing
14	**Option:** Vandal guard (canopy only)
15	**Option:** Change-over "ISO" control — "JD" control



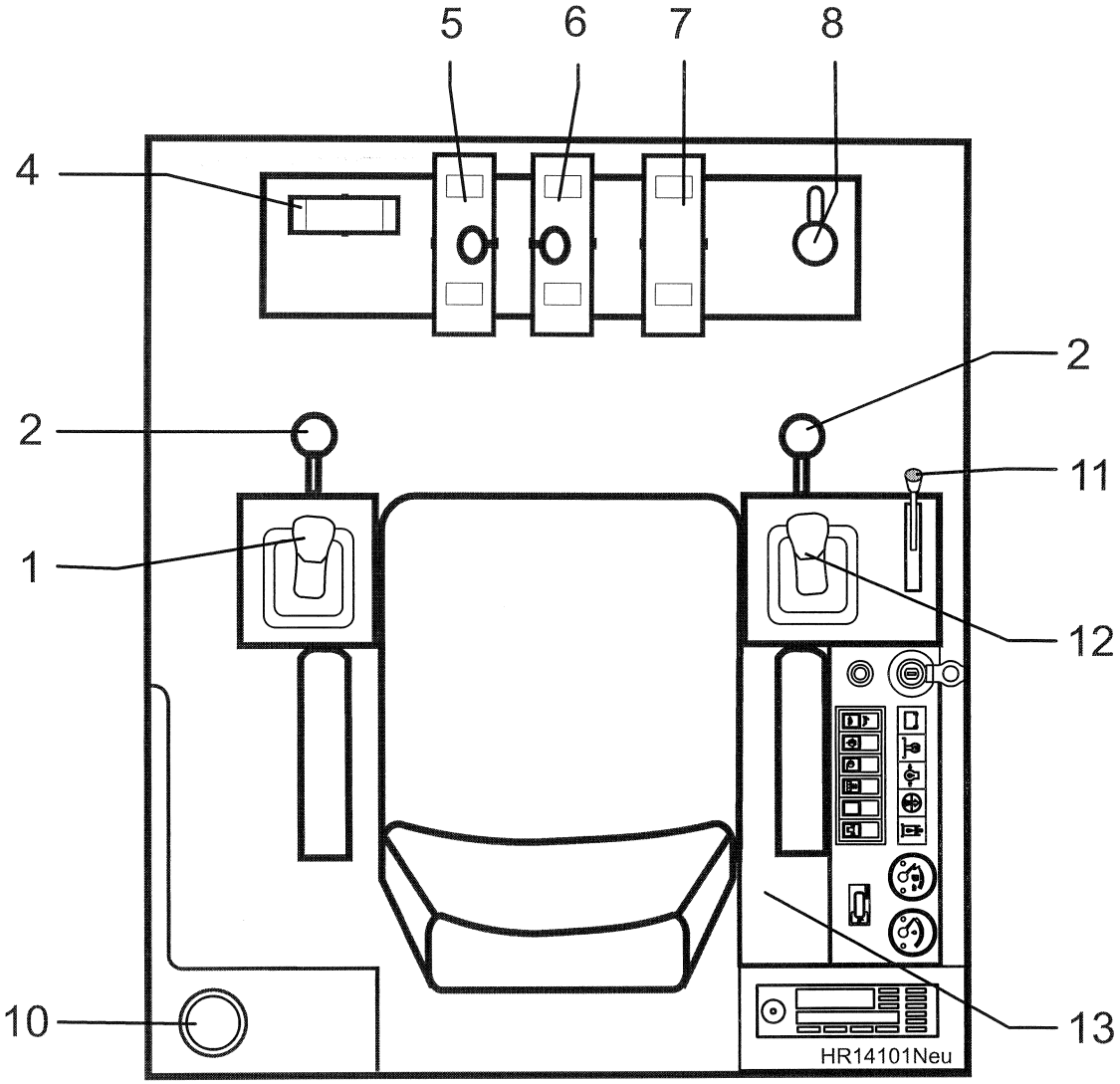
16	Pre-heat/ starter switch (ignition lock)
17	Horn button
18	Red - Battery charge indicator
19	Orange - Pre-heating monitor
20	Red - Engine oil pressure indicator
21	Orange - Air filter clogging indicator
22	Hydraulic oil filter clogging indicator
23	Fuel gauge
24	Operating hour meter
25	Coolant temperature
26	**Option**: immobilizer
27	Fast / Slow
28	Windshield wiping and washing system
29	Working floodlight
30	Heating / Ventilation
31	Blank
32	Rotating warning beacon
33	Warning buzzer
34	Socket



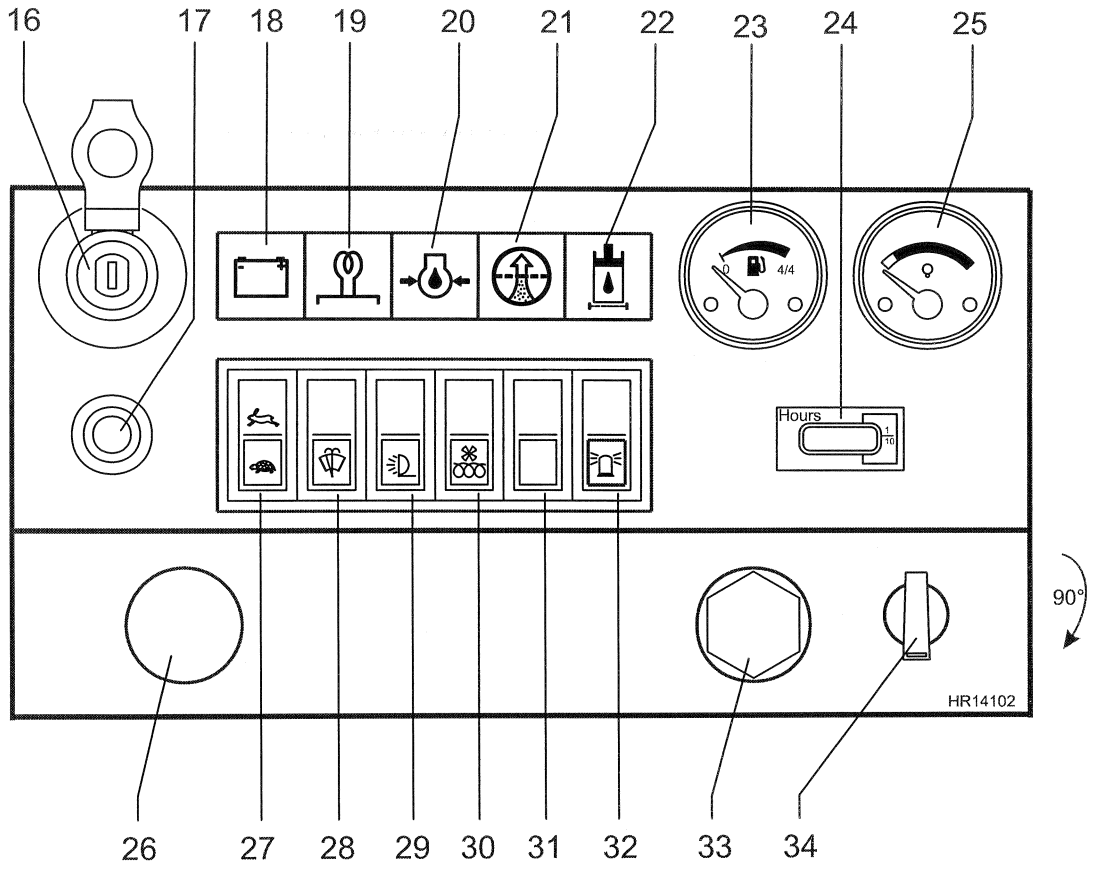
1	Actuation of excavator equipment
2	Cut-off - working hydraulics/ exit barrier
3	Actuation of articulation, left
4	Actuation of articulation, right
5	Crawler-type undercarriage, left
6	Crawler-type undercarriage, right
7	Additional control circuit - grab rotation, rock breaker, etc.
8	Actuation of dozer blade
9	---
10	Windscreen washer tank
11	Manual throttle
12	Actuation of excavator equipment
13	Fuse and relay box



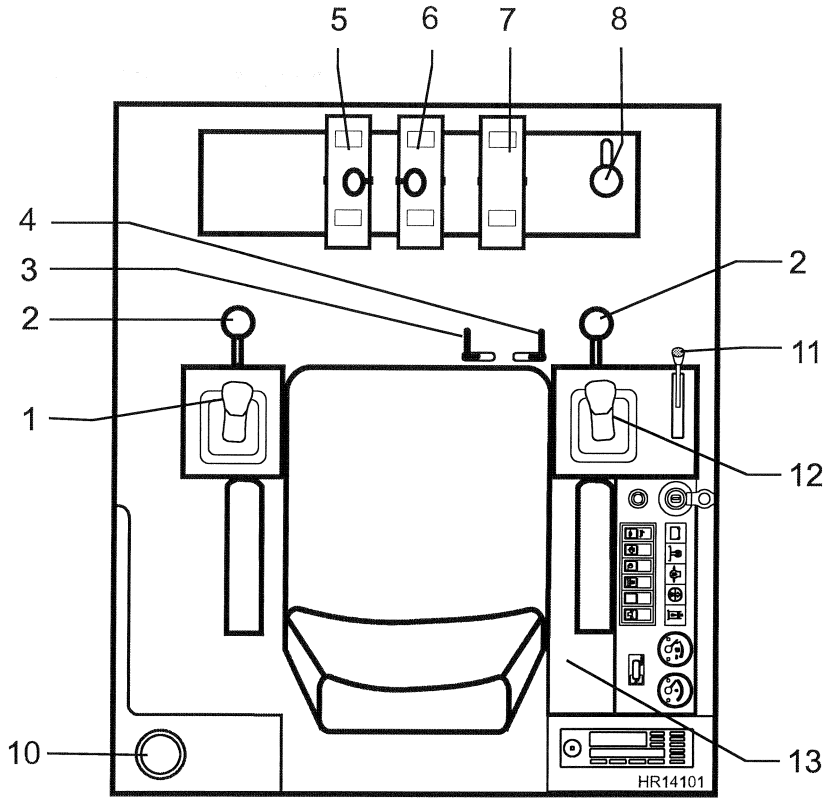
16	Pre-heat/ starter switch (ignition lock)
17	Horn button
18	Red - battery charge indicator
19	Orange - pre-heating monitor
20	Red - engine oil pressure indicator
21	Red - air filter clogging indicator
22	Hydraulic oil filter clogging indicator
23	Fuel level gauge
24	Operating hour meter
25	Coolant temperature
26	Immobilizer (option)
27	Fast/ slow
28	Windscreen wash/ wipe system
29	Working floodlights
30	Heater / fan
31	Blank
32	Rotating warning beacon (option)
33	Warning buzzer
34	Socket



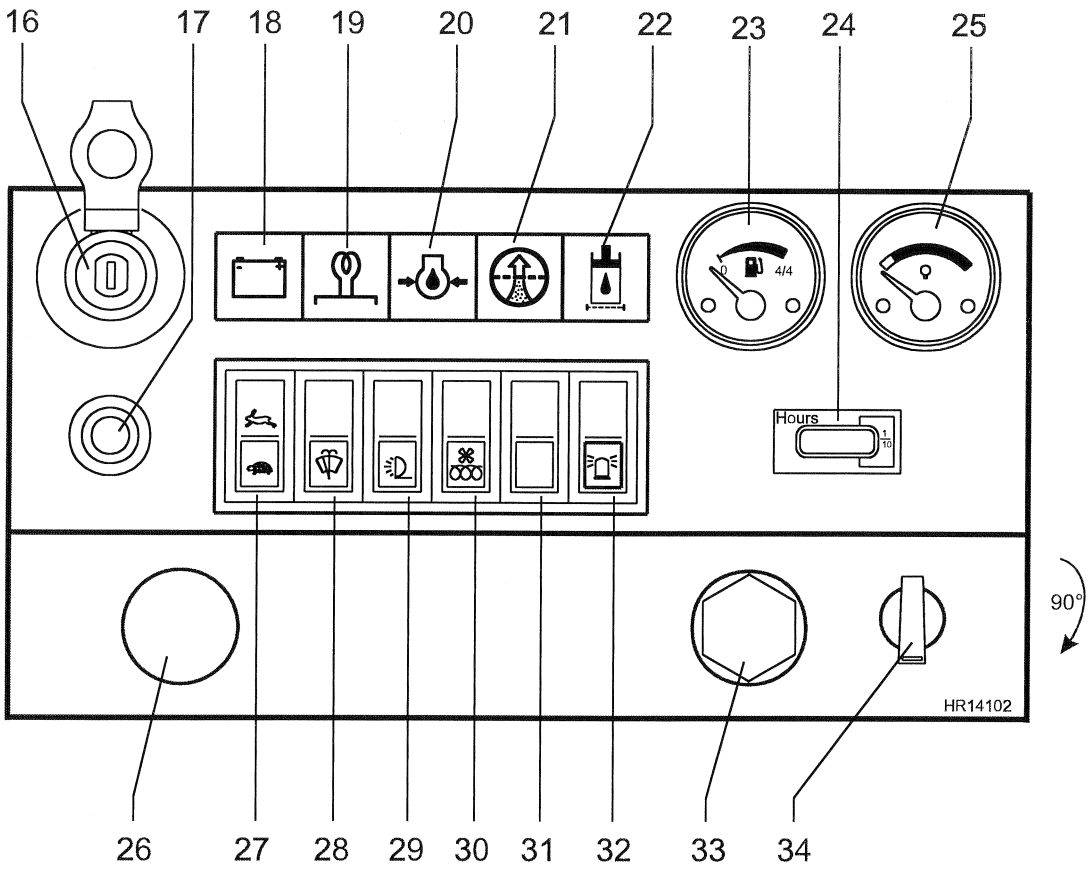
1	Actuation of excavator equipment
2	Cut-off - working hydraulics/ exit barrier
3	---
4	Actuation of articulation
5	Crawler-type undercarriage, left
6	Crawler-type undercarriage, right
7	Additional control circuit - grab rotation, rock breaker, etc.
8	Actuation of dozer blade
9	---
10	Windscreen washer tank
11	Manual throttle
12	Actuation of excavator equipment
13	Fuse and relay box



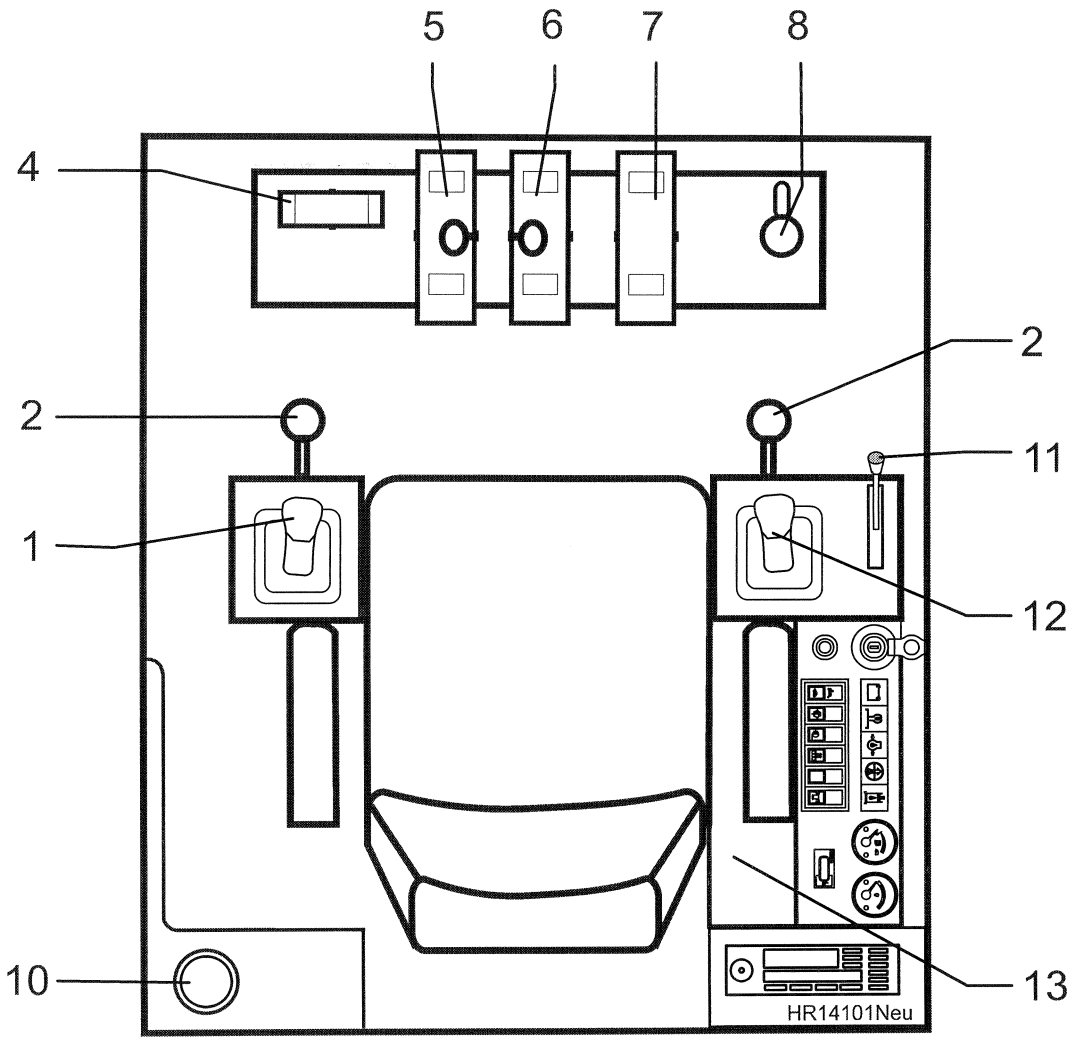
16	Pre-heat/ starter switch (ignition lock)
17	Horn button
18	Red - battery charge indicator
19	Orange - pre-heating monitor
20	Red - engine oil pressure indicator
21	Red - air filter clogging indicator
22	Hydraulic oil filter clogging indicator
23	Fuel level gauge
24	Operating hour meter
25	Coolant temperature
26	Immobilizer (option)
27	Fast/ slow
28	Windscreen wash/ wipe system
29	Working floodlights
30	Heater / fan
31	Blank
32	Rotating warning beacon (option)
33	Warning buzzer
34	Socket



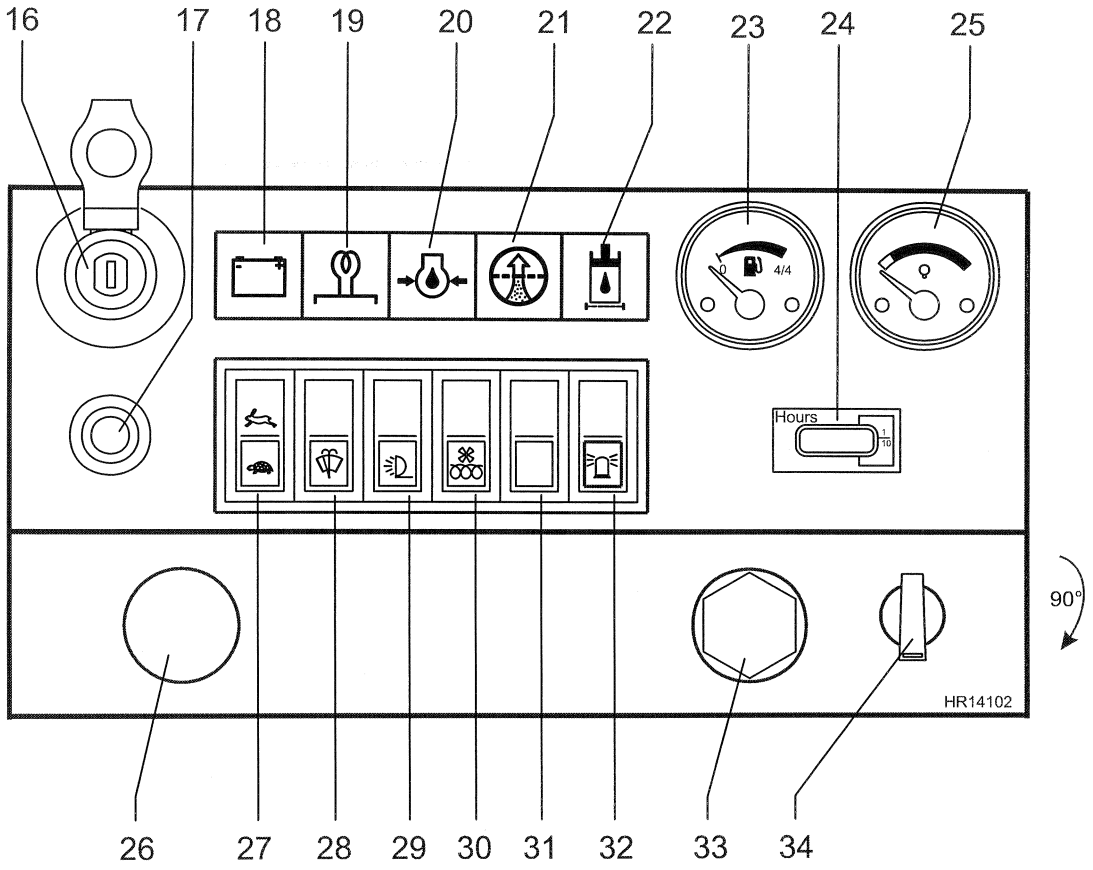
1	Actuation of excavator equipment
2	Cut-off - working hydraulics/ exit barrier
3	Actuation of left-hand articulation
4	Actuation of right-hand articulation
5	Crawler-type undercarriage, left
6	Crawler-type undercarriage, right
7	Additional control circuit - grab rotation. rock breaker, etc.
8	Actuation of dozer blade
9	---
10	Washer tank for windscreen
11	Manual throttle
12	Actuation of excavator equipment
13	Fuse and relay box



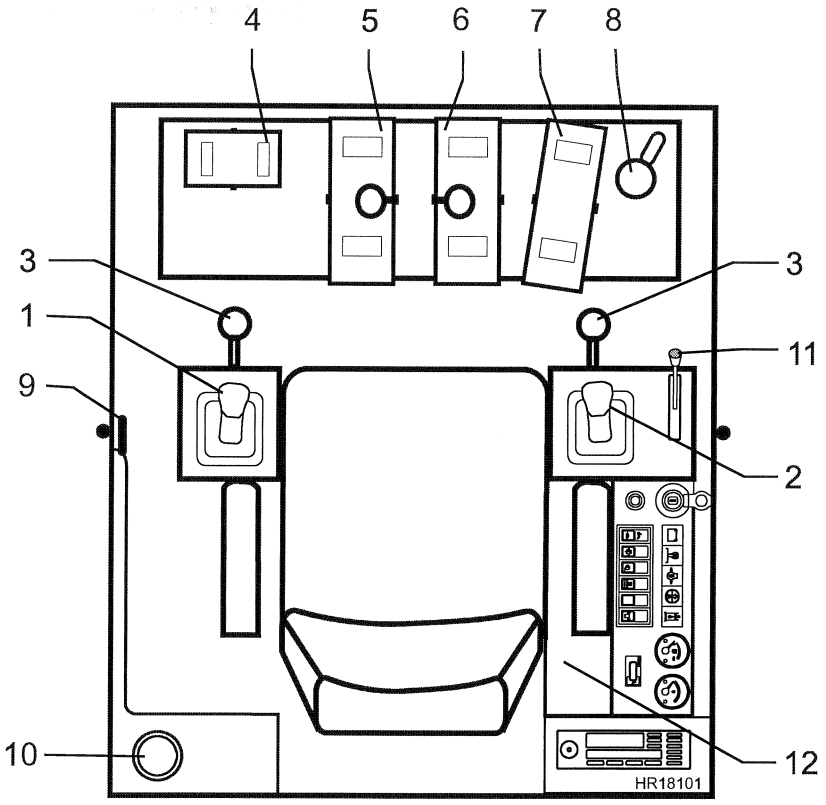
16	Pre-heat/ starter switch (ignition lock)
17	Horn button
18	Red - battery charge indicator
19	Orange - pre-heating monitor
20	Red - engine oil pressure indicator
21	Red - air filter clogging indicator
22	Hydraulic oil filter clogging indicator
23	Fuel gauge
24	Operating hour meter
25	Coolant temperature
26	Immobilizer (option)
27	Fast/ slow
28	Windscreen wash/ wipe system
29	Work floodlights
30	Heater / ventilation
31	Blank
32	Rotating warning beacon (option)
33	Warning buzzer
34	Socket



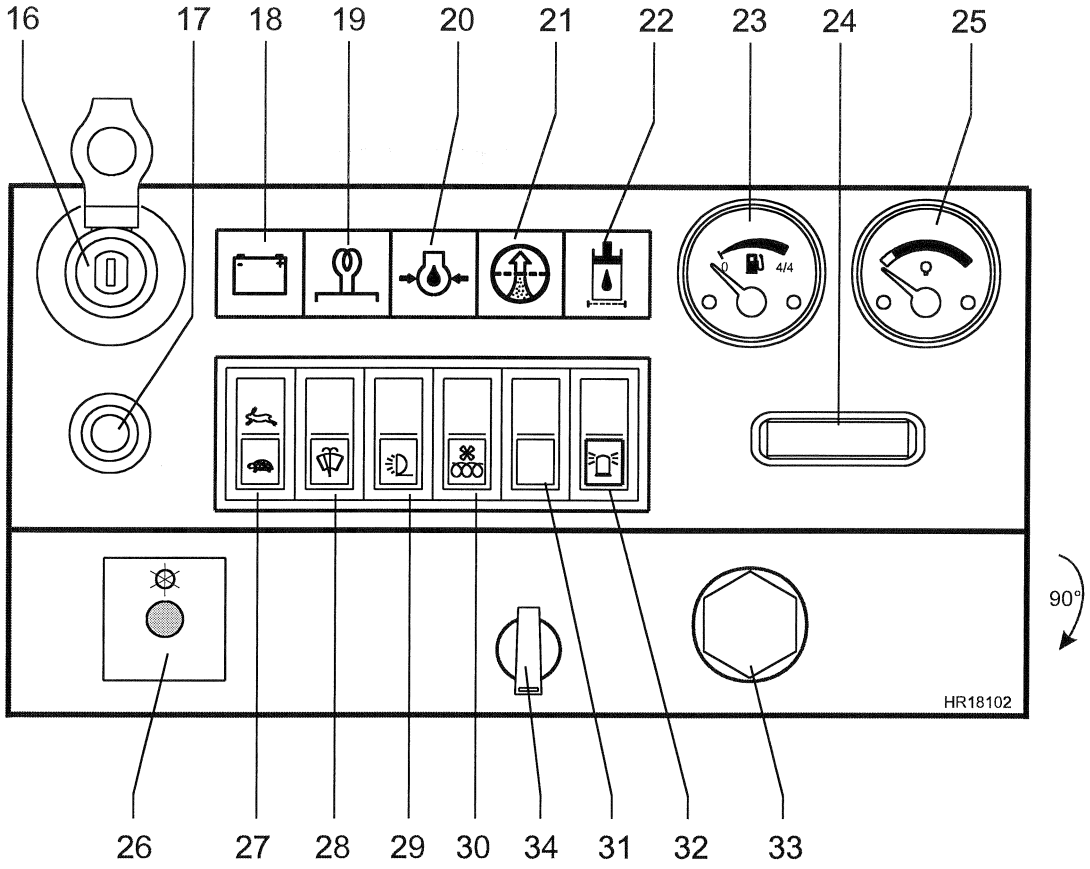
1	Actuation of excavator equipment
2	Cut-off - working hydraulics/ exit barrier
3	---
4	Actuation articulation
5	Crawler-type undercarriage, left
6	Crawler-type undercarriage, right
7	Additional control circuit - grab rotation, rock breaker, etc.
8	Actuation of dozer blade
9	---
10	Washer tank for windscreen
11	Manual throttle
12	Actuation of excavator equipment
13	Fuse and relay box



16	Pre-heat/ starter switch (ignition lock)
17	Horn button
18	Red - battery charge indicator
19	Orange - pre-heating monitor
20	Red - engine oil pressure indicator
21	Red - air filter clogging indicator
22	Hydraulic oil filter clogging indicator
23	Fuel gauge
24	Operating hour meter
25	Coolant temperature
26	Immobilizer (option)
27	Fast/ slow
28	Windscreen wash/ wipe system
29	Work floodlights
30	Heater / ventilation
31	Blank
32	Rotating warning beacon (option)
33	Warning buzzer
34	Socket



1	Actuation of excavator equipment
2	Actuation of excavator equipment
3	Working hydraulics cut-off lever (exit barrier)
4	Actuation of articulation
5	Crawler unit, left
6	Crawler unit, right
7	Additional control circuit - grab rotation, rock breaker, etc.
8	Actuation of dozer blade
9	Door release
10	Washer tank for windscreen wiper
11	Manual throttle
12	Fuse and relay box

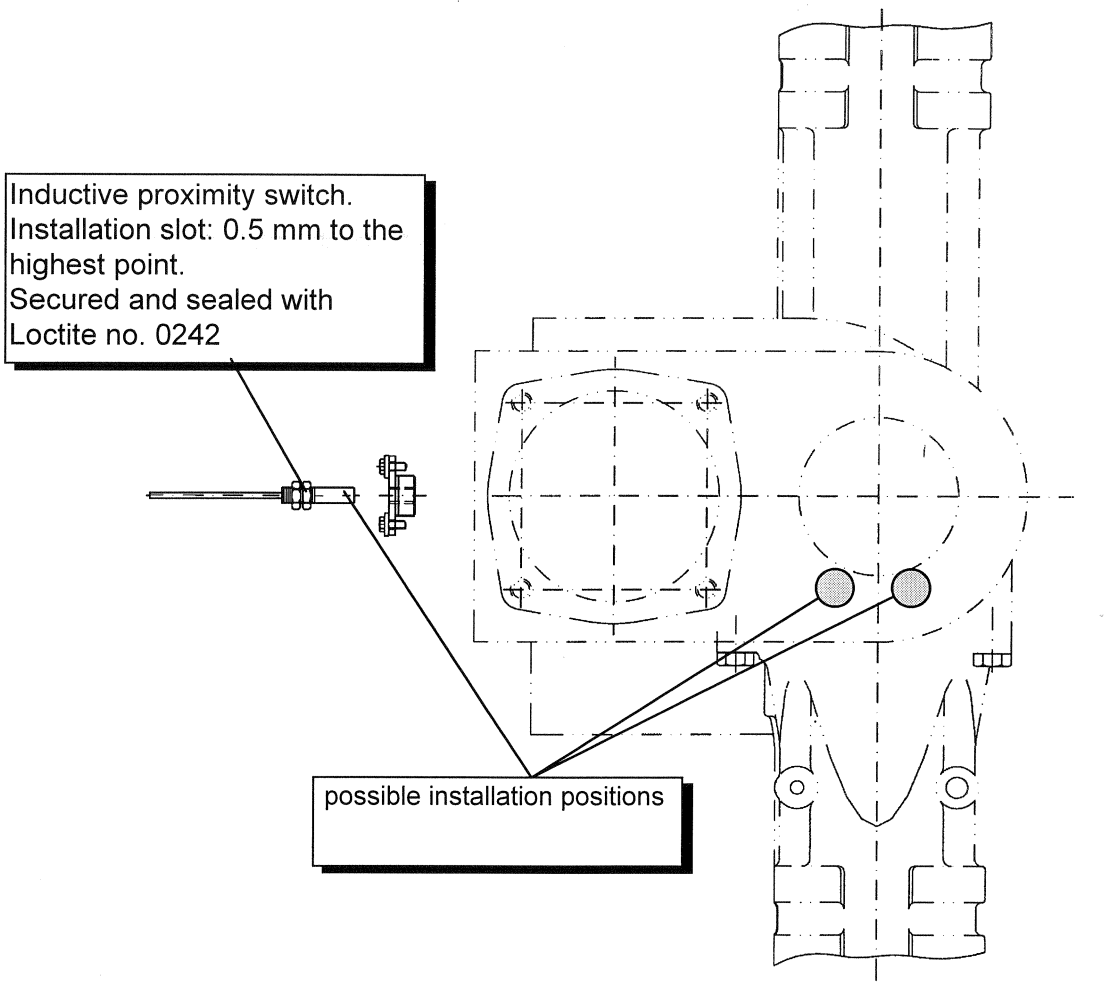


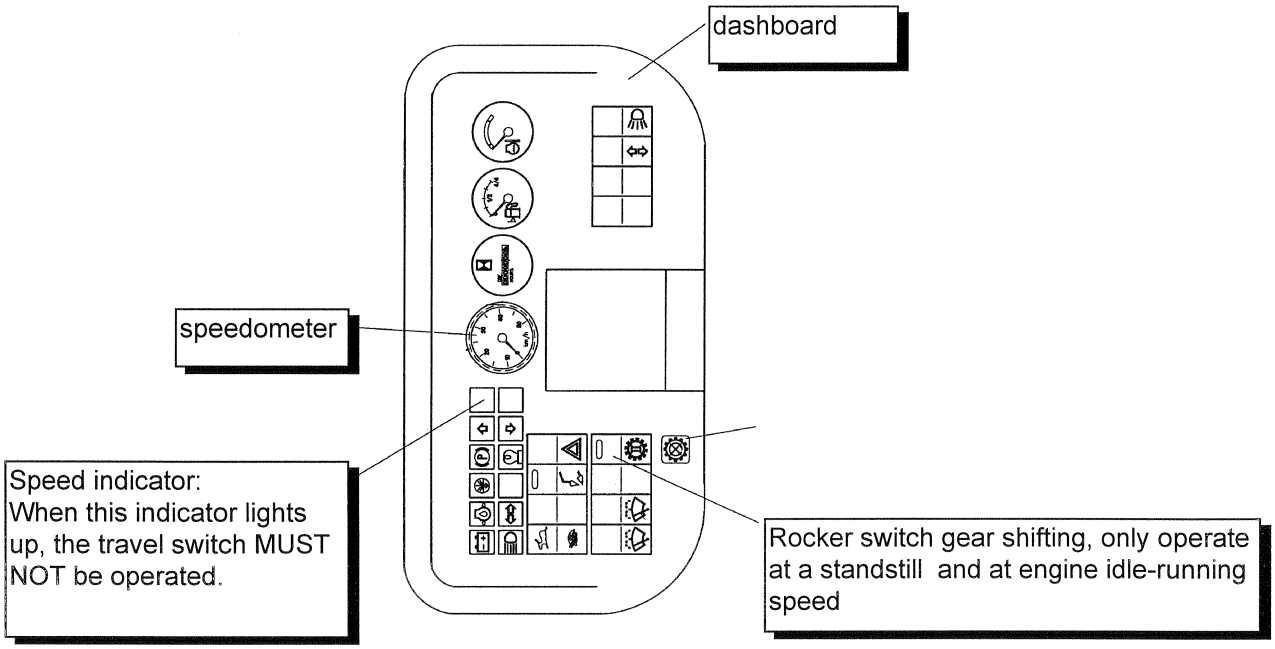
16	Pre-heat/ starter switch (ignition lock)
17	Horn button
18	Red - battery charge indicator
19	Orange - pre-heating monitor
20	Red - engine oil pressure indicator
21	Yellow - air filter clogging indicator
22	Hydraulic oil filter clogging indicator
23	Fuel gauge
24	Operating hour meter
25	Coolant temperature
26	Immobilizer (option)
27	Fast/ slow
28	Windscreen wash/ wipe system
29	Working floodlight(s)
30	Heater / ventilation
31	Blank
32	Rotating warning beacon (option)
33	Warning buzzer
34	Socket

SUBGROUP LIST

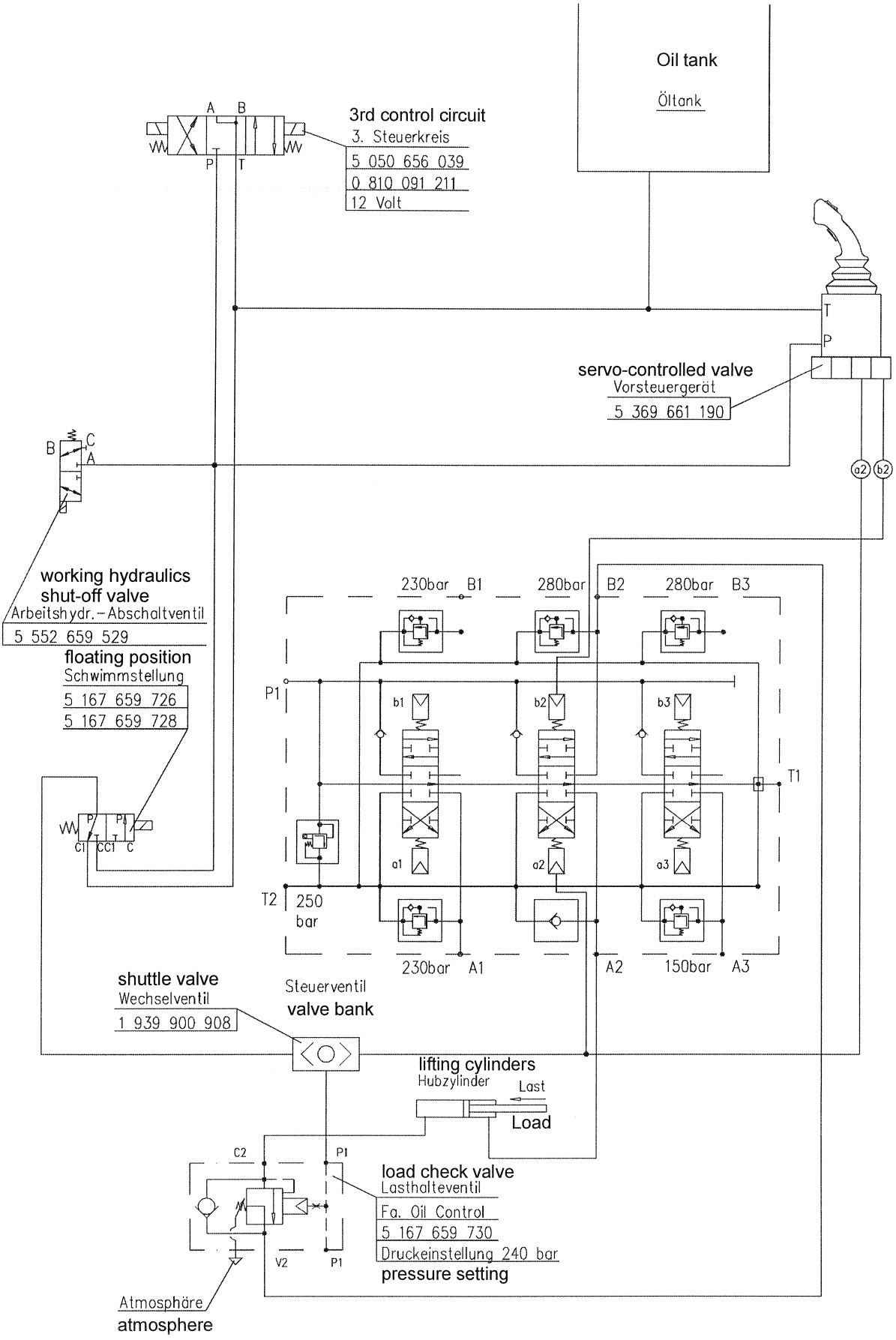
Options

SKL / SKS	Fast travel version	10.020
SKL / SKS	Load check valves	10.040
HML 31 HML 41 SMB 2041	Load warning device	10.050
SCHAEFF	Hydraulic breakers	10.100
SCHAEFF	Hydraulic grabs	10.200

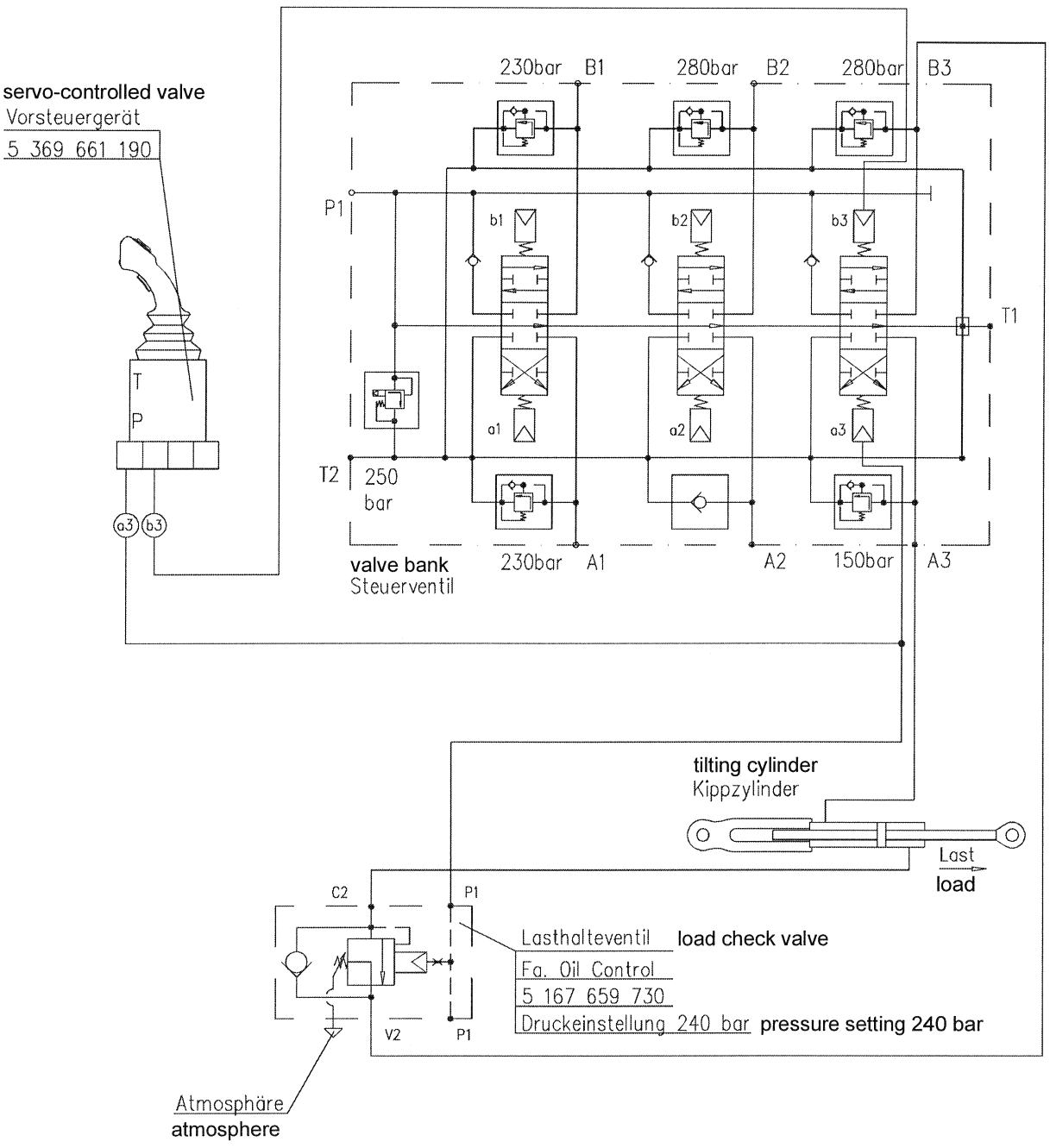




SCHAEFF	Typ/Model/Type **SKL / SKS**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Fast travel version - 36 km/h**	Blatt/Page/Feuille **10.020.01**



SCHAEFF	Typ/Model/Type **SKL / SKS**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Load check valve, lifting cylinder**	Blatt/Page/Feuille **10.040.01**



SCHAEFF	Typ/Model/Type **SKL / SKS**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Load check valve, tilting cylinder**	Blatt/Page/Feuille **10.040.02**

Einstellung des Überwachungs-Moduls

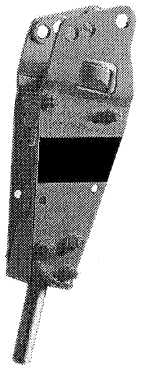
Gerät	Grab-einrichtung	Einstellwert [bar]	Schalter-Kombination Überwachungsmodul	
			Schalter	Position
HML 31	Mono	140	4	Ein (on)
	GA		5	Aus (off)
HML 41	Mono	140	4	Ein (on)
			5	Aus (off)
	GA	120	4	Aus (off)
			5	Aus (off)
SMB	Mono	160	4	Aus (off)
			5	Ein (on)

SCHAEFF	Typ/Model/Type **HML 22, HML 31, HML 41, SMB 2041** **HR 22, HR 31, HR 41**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Load warning device** **MONO / articulated boom**	Blatt/Page/Feuille **10.050.01**

Legend to load warning device MONO / articulated boom

Cu-Dichtring	copper seal
Druckaufnehmer	pressure sensor
Einstellung des Überwachungsmoduls	setting of control module
Einstellwert (bar)	set value (bar)
Fahrtrichtung	travel direction
GA	articulated boom
Gerät	type
Grabeinrichtung	equipment
HBL	connector, light blue
Hochdruckschlauch	hydraulic hose
Lastwarn br	load warning, brown
Lastwarn ge	load warning, yellow
Lastwarn gn/rt	load warning, green / red
Manometeranschluß für Schottwand	fitting for gauge
Meßstutzen	fitting
Mono	MONO boom
Position	switching position
Schalter	switch
Schalterkombination Überwachungsmodul	switch configuration
Scheibe	shim
Steuerventil	valve bank
Stopfen	plug
Stopfen entfernt	plug removed
Überwachsmodul Rückseite	control module rear
Ventilhalter	valve bank support
Winkel	angle plate
zum Ausleger Zyl.	to the boom cylinder

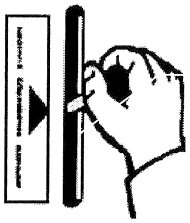
SCHAEFF HYDRAULIC BREAKERS



SH 50

- **High back-pressure acceptable**
  Hydraulic mounting variety
- **Hydraulic return stroke dampening**
  Protection of the digging unit, higher comfort for the operator
- **Slim shape**
  Indispensable for digging ditches and demolition jobs
- **Selection of two speeds**
  SH50/SH70 Manual selection of the function: High striking frequency or high striking energy
- **Excellent performance / weight ratio**
  Schaeff hydraulic breakers weigh less with the same performance thus allowing the attachment to a machine one smaller in size
- **Protection against blank strikes**
  Increases the lifetime of the breaker and reduces the maintenance costs
- **Progressive start**
  Facilitates the positioning of the tool, protects the breaker if it is not fully applied
- **Maintenance-free gas accumulator**
  Guarantees a high availability, refilling at the job-site not necessary
- **Underwater application without problems**
  All types pre-equipped
- **Connection for central automatic grease supply**
  Optimum grease supply for chisel bushing and tool. All types pre-equipped
- **Sound-absorbing version - optional**
  A rubber cover and metal case considerably reduce the noise.
  The sound-absorption can be installed later

1



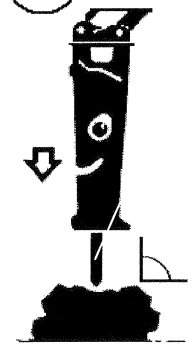
After having determined or marked resp. the maximum position of the throttle lever, do not change it during the whole application

2

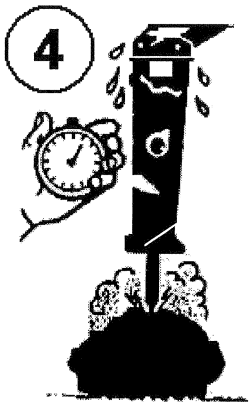


Avoid any violent boom movements of the excavator as long as the breaker works and the chisel penetrates the rock.

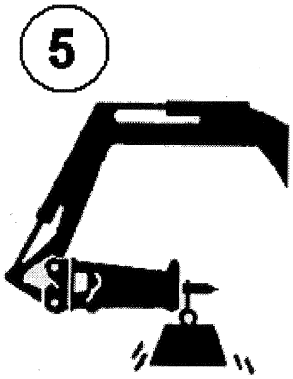
3



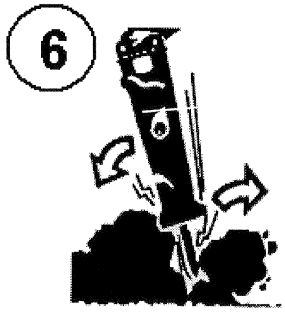
Always keep the correct working direction with the breaker, i.e. always remain perpendicular to the surface of the material to be broken.



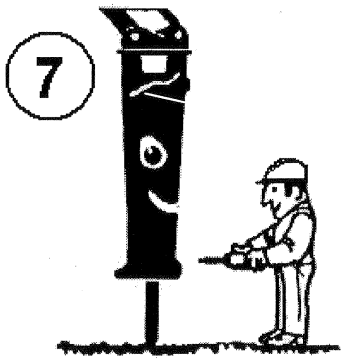
If the rock is particularly hard and tough, never hold the breaker in the same position for more than 15 seconds but change its position from time to time.



Never use the chisel as a lever or as a load-hook, especially when the breaker works.

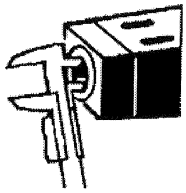


Never let the breaker strike freely but always put it on the material to be broken. Do not switch on the breaker before doing this.



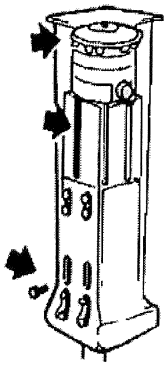
Lubricate the chisel insert end with a graphitic grease every second working hour. If a lubrication system is installed, ensure that it is refilled before starting work.

8



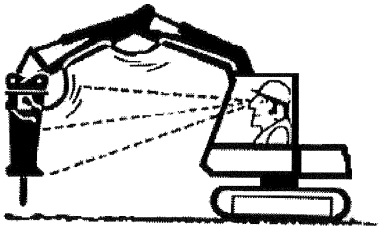
Replace the chisel bushing as soon as it has reached its maximium wear limit.

9



Immediately turn off the breaker if one of the tie rods is loose or broken.

10



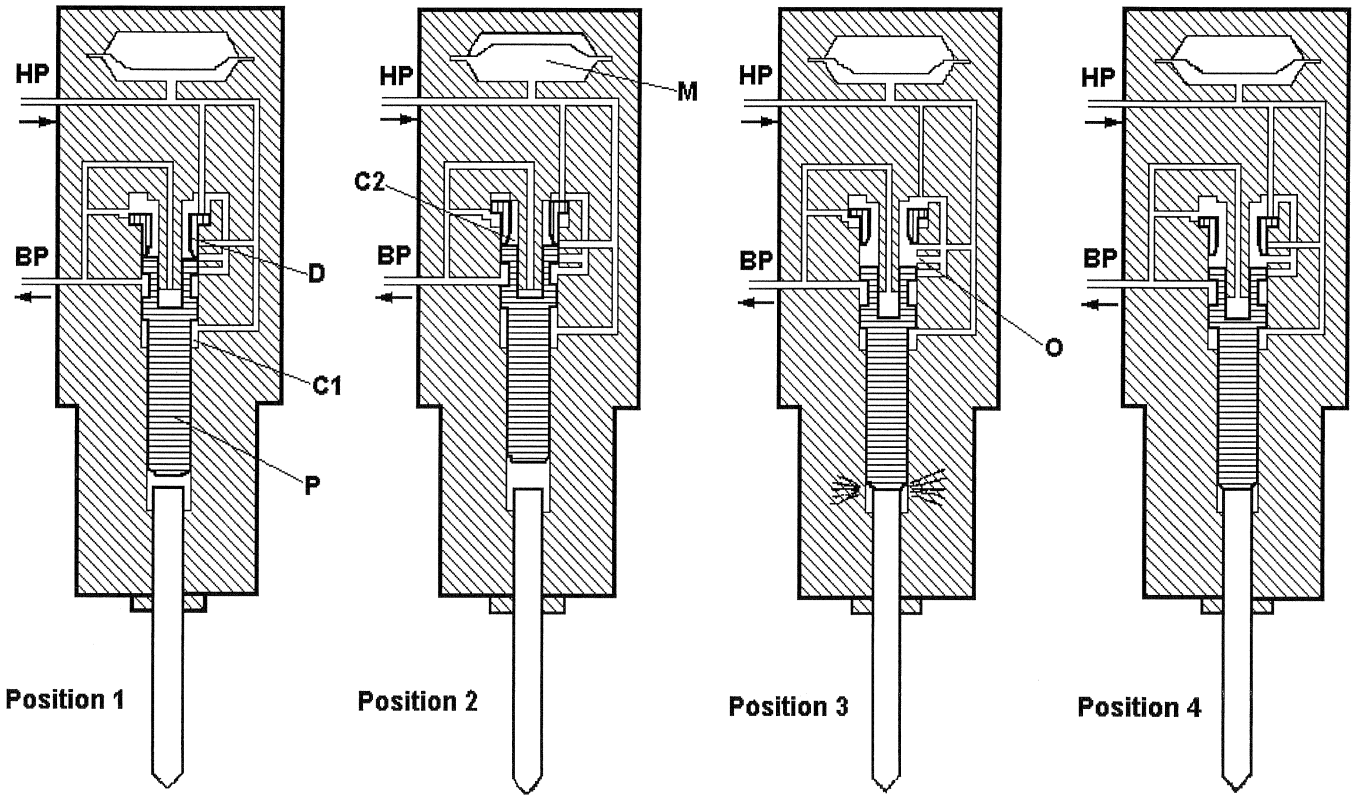
Immediately turn off the breaker if the pressure hoses leading to the breaker hammer or vibrate badly.

Pos. 1
Hydraulic oil (HP) pushes the piston (P) upward via the chamber (C1).

Pos. 2
During this upward movement the piston (P) pushes the control valve (D) upward until stop.
At this moment the pressure increases in the chamber (C2) which is filled via a notch between the piston (P) and the control valve (D).
At the same time the membrane (M) is lifted and the nitrogen of the accumulator is compressed.

Pos. 3
The force applied on the upper part of the piston (P) increases in comparison to the lower part of the piston. This results in an accelerated downward movement, the oil quantity which also required in this case is supplied by the pressure accumulator.
In the course of this downward movement the piston (P) opens the channel (O) leading to a downward movement of the control valve (D). The piston (P) meets the chisel on its long way down.

Pos. 4
On its way the control valve (D) interrupts the filling of the chamber (C2).
Thus a connection with the return line (BP) is created.



Breaker type		SH 50	SH 70	SH 85	SH 95 D	SH 140 (previous denomination: SH 130)
suitable for **machinery type**		HR 12	HR 14	HR 16 HR 18	HR 22 HML 22 SMB 2041	HR 31 HR 32 HR 41 HML 31 HML 32 HML 41 HS 41
Machinery weight	(t)	0.8-2.5	1.0-3.5	2.5-7.0	2.5-8.0	4.0-12.0
Breaker operating weight	(kg)	106	140	195	245	370
Height with standard chisel	(mm)	1060	1093	1448	1565	1700
Breaker width max.	(mm)	196	210	290	387	452
Chisel diameter	(mm)	50	50	62	62	74
Oil quantity required, min./max.	(l/min)	18/32	20/50	40/67	55/85	70/110
Striking rate, depending upon oil quantity, min./max.	(min^{-1})	635/1450	640/2000	740/1085	1040/1440	1090/1500
Breaker operating pressure max.	(bar)	140	155	120	140	145
Admissible counter pressure max.	(bar)	32	32	30	30	22
Protection against idle running		yes	yes	yes	yes	yes

Wrench sizes

Breaker type	SH 50	SH 70	SH 85/95HD	SH 140
Connection thread (HP) pressure, (BP) return line	1/2" NPT	1/2" NPT	1/2" NPT	3/4" NPT
Wrench size of the housing bolts and nuts	1 5/16"= 33 mm (1)	1 5/16"= 33 mm (1)	1 5/16"= 33 mm (1)	1 1/2"= 38 mm (1)
Wrench size of the nuts for tie rods	26 mm (1)	26 mm (1)	29 mm (1)	38 mm (1)
Fastenting screws pressure accumulator	special wrench	special wrench 3/8" (2)	3/8" , 1/2" (2)	5/8" , 1/2" (2)

(1) = ring / fork wrench (or nut)
(2) = Allen key nut

Special tools

- Filling device for lateral pressure accumulator — no.: E. 59832
- Extractor for SH 50 / 70 — no.: E. 84513
- Extractor for SH 85 / 95HD — no.: E. 92725
- Extractor for SH 140 — no.: E. 88684

Pressure settings Schaeff breakers

Prior to each first commissioning of a hydraulic breaker **always** measure the

operating pressure and
oil quantity

of the excavator in the corresponding hydraulic control circuit (see Technical Data excavator).

If the recommended oil quantity is exceeded:

Correction via speed reduction or installation of a flow divider

Too low operating pressure at the excavator:

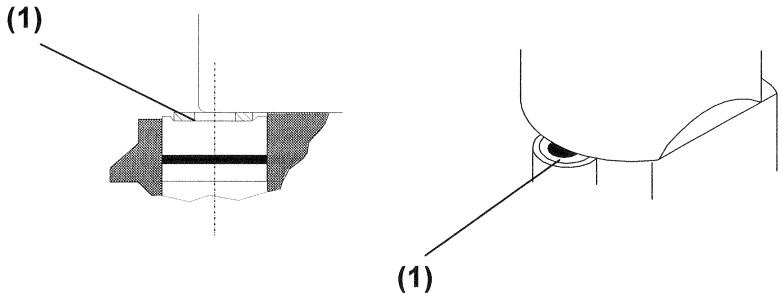
Increase the operating pressure according to the Technical Data or adjust the breaker operating pressure accordingly.

- **In general the opening pressure of the excavator pressure relief valve („ÜV") must be at least 20 bar above the breaker operating pressure.**

Breaker operating pressure adjustment:

Schaeff breaker SH 50 / SH 70

The breaker pressure can be reduced by approx. 20 bar by removing the shim (1).
Remove the shim with a screwdriver.

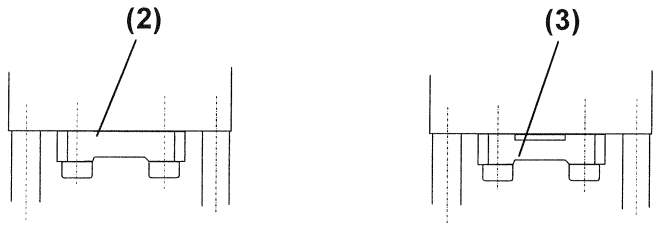


Schaeff breaker SH 85 / SH 95HD

Adjustment by turning the pressure setting flange accordingly.

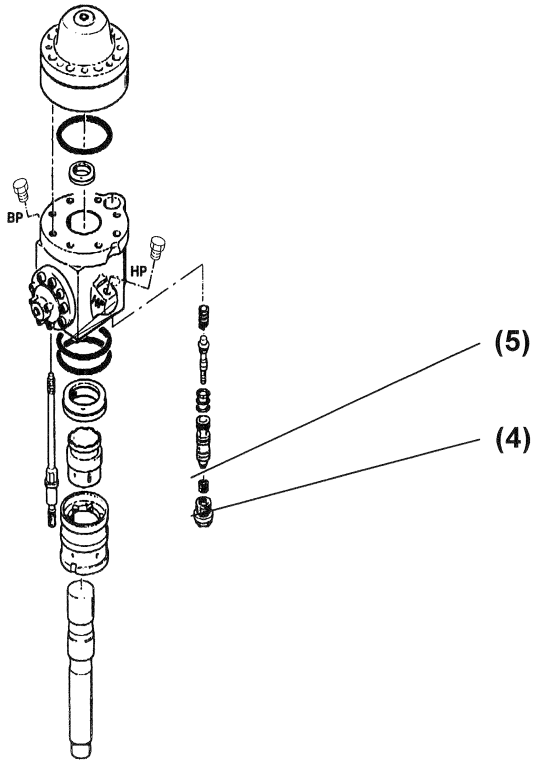
Position **2:** full operating pressure

Position **3:** operating pressure reduced by approx. 20 bar



Schaeff breaker SH 130

Dismount the valve closing plug **(4)** under the control head and adjust the operating pressure by adding or removing shims **(5)**.



Explanation:

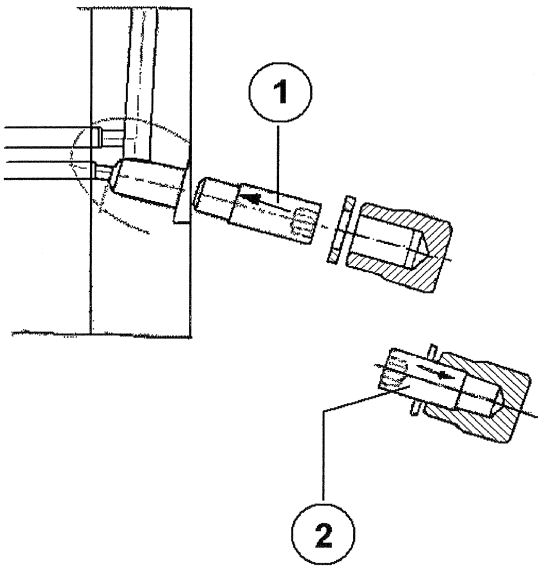
In order to break hard rock, a high striking energy instead of a high striking frequency is needed.

This change to the so-called position „frequency" or „energy" can be effected fast and simply.

Depending upon the mounting position of the hexagon socket insert 1/4" at the breaker head, the piston stroke is changed.

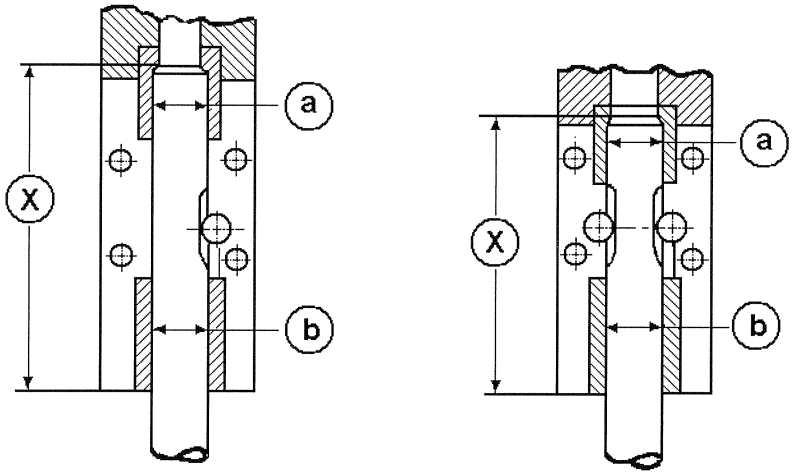
Long stroke ⇒ energy (1)

Short stroke ⇒ frequency (2)



♦ Long stroke	Striking energy	Striking figure	Operating pressure
SH 50	225 J	1130 min^{-1}	140 bar
SH 70	280 J	1600 min^{-1}	155 bar
♦ **Short stroke**			
SH 50	170 J	1450 min^{-1}	140 bar
SH 70	215 J	2000 min^{-1}	155 bar

SH 50 / 70 **SH 85 / 95HD / 140**

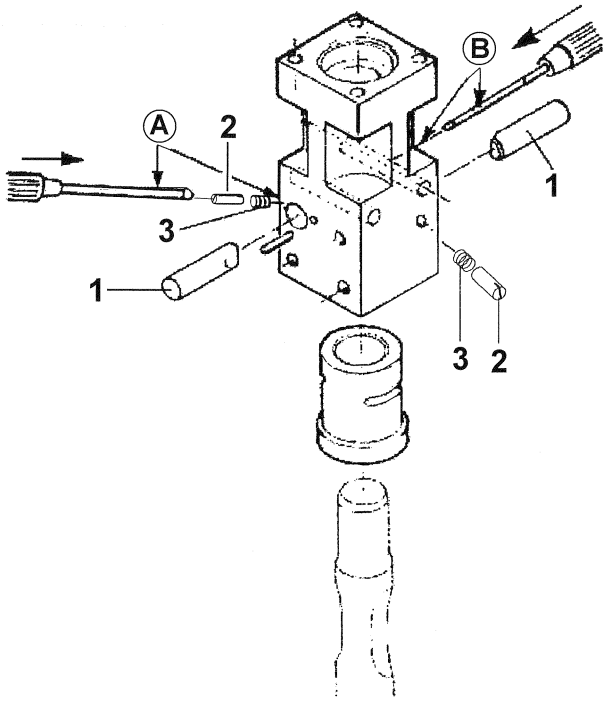


Wear measurements

SH 50	**SH 70**	**SH 85/95HD**	**SH 140**
a 53.0 mm	a 53.0 mm	a 65.0 mm	a 77.0 mm
b 54.0 mm	b 54.0 mm	b 66.0 mm	b 78.0 mm
x 186.0 mm	x 237.0 mm	x 254.0 mm	x 344.0 mm

In order to determine all values, the chisel has to be removed (see overleaf).

Measurement -a-: Determine with inside calipers
Measurement -b-: Determine with feeler gauge or inside calipers
Measurement -x-: Insert chisel into the breaker, mark at the housing, pull out the chisel - the measurement from the side pushed in till the marking



Chisel, assembly and disassembly

♦ **Disassembly**

Push the bar **(2)** and its spring **(3)** - in drilled hole **(A)** - inside and hold by means of a screwdriver or pin punch.
Now strike the retainer lock **(1)** through the drilled hole **(B)** with a longer pin.

∇ Valid for **SH 50 / 70**
As for the **SH 85 / 95HD / 140**, this procedure has to be repeated as there are two retainer locks (see picture).
The chisel can now be pulled out.

♦ **Assembly**

Insert the chisel into the breaker so that the flat sparings are in line with the retainer lock drilled holes.
Insert the (or both resp.) retainer lock(s) **(1)** until stop, the two other bars **(2)** engage automatically.
The insert end of the chisel has to be lubricated with graphite grease prior to the assembly.

Hydraulic flow at the additional circuit mini exavator

(at hammer connectors/additional circuit available flow)

HR11	**1100/0100 up to 1100/0227** 30.5 l/min at 100 bar 18.5 l/min at 180 bar	**1100/0228 >>>** 26.5 l/min at 100 bar 23.5 l/min at 140 bar ab 1100/ 0264 31.0 l/min at 100 bar 29.0 l/min at 130 bar	**HR1.5**	31.0 l/min at 100 bar 29.0 l/min at 130 bar
HR12	**355/5558 up to 355/9028** 30.5 l/min at 100 bar 18.5 l/min at 180 bar	**355/9029 >>>** 26.5 l/min at 100 bar 23.5 l/min at 140 bar ab 355/ 9483 31.0 l/min at 100 bar 29.0 l/min at 130 bar	**HR1.6**	31.0 l/min at 100 bar 29.0 l/min at 130 bar
HR13	**1300/0100 up to 1300/0374** 32.0 l/min at 100 bar 19.5 l/min at 180 bar	**1300/0375 >>>** 31.0 l/min at 100 bar 29.0 l/min at 140 bar	**HR2.0**	31.0 l/min at 100 bar 29.0 l/min at 140 bar
HR14	**356/1431 up to 356/3135** 36.0 l/min at 100 bar 33.0 l/min at 140 bar 30.0 l/min at 200 bar	**356/3136 >>>** 37.5 l/min at 100 bar 36.0 l/min at 140 bar 33.0 l/min at 180 bar		
HR16	**358/1398 up to 358/4035** 42.5 l/min at 100 bar 41.0 l/min at 140 bar 34.0 l/min at 200 bar	**358/4036 >>>** 48.5 l/min at 100 bar 47.5 l/min at 140 bar 42.0 l/min at 200 bar	**HR3.7**	48.5 l/min at 100 bar 47.5 l/min at 140 bar 42.0 l/min at 200 bar
HR18		**180/0100 >>>** 55.5 l/min at 100 bar 54.0 l/min at 140 bar 40.0 l/min at 200 bar		
HR20		**120/0100 >>>** 61.0 l/min at 100 bar 59.5 l/min at 140 bar 40.0 l/min at 200 bar		

The flow rates can differ a little bit, caused by various factors,
e.g. different idles, wear in the hydraulic pump, a.s.o.)

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Grab type:	Mounted on machinery type:	Max. pressure of grab:	Grab closing: Line relief valves in grab cylinder (in bar)	Grab rotation: Line relief valves in in grab rotation motor (left - right in bar)
GL 1 200 bar Version	**HR 11**	165	line relief valves in valve bank of machine	150-150
GL 1 200 bar Version	**HR 12**	165	line relief valves in valve bank of machine	150-150
GL 1 200 bar Version	**HR 14**	190	line relief valves in valve bank of machine	150-150
GL 1 260 bar Version	**HR 16**	210	line relief valves in valve bank of machine	150-150
GL 1 260 bar Version	**HR 18**	245	line relief valves in valve bank of machine	150-150
GM 2	**HML 22** **HR 22**	230	215	150-150
GM 2	**SMB 2041**	230	215	150-150
GS 3	**HML 31** **HR 31**	250	line relief valves in valve bank of machine	150-150
GS 3	**HR 32**	250	line relief valves in valve bank of machine	150-150
GS 3	**HML 41** **HR 41**	250	line relief valves in valve bank of machine	150-150
GS 3	**HS 41** **HS 41 M / MM**	250	line relief valves in valve bank of machine	150-150

Orifices: GL 1 / GM 2 integrated in rotation motor Ø approx. 1.4 mm

Orifices: GS 3 Ø approx. 1.6 mm

SUBGROUP LIST

Repair instructions

HR / SKL	Overview Assembly Tool	11.001.01
HML 32	Tilt cabin	11.51.01
HR 32	Tilt cabin	11.65.01-02
HR 12	Sealing of cylinders	11.74.01-03
HR 14	Sealing of cylinders	11.76.01-04
HR 16	Sealing of cylinders	11.78.01-04
HR 18	Sealing of cylinders	11.80.01-03
HR 18	Pump removal	11.80.20
HR 18	Pump disassembly	11.80.21-26
HR 18	Pump assembly	11.80.30-37
HR 18	Travel gear removal	11.80.50
SKL 823	Clark-Hurth axle	11.150.01-09
HR 12, 14	Pilot-operated valve PCL 401	11.210.01
HR 16	Pilot-operated valve TH6	11.230.01
HR 18	Pilot-operated valve TH5	11.250.01-02
HR 12,14,16, 18	Glue kit, cabin window panes	11.300.01

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Overview of assembly tools for pistons with piston rings HR11 / HR12 / HR13 / HR14 / HR16 / HR18

Cylinder function	Cylinder number	Piston ϕ / Rod ϕ	Machine Type	Assembly Tool Number
Boom / Dipperstick	6 5005 400 00 6 5005 405 00 6 5005 410 00	70/35	HR11/12/13	6 9500 300 02
Dipperstick	6 5004 265 00	63/35	HR11/12	6 9500 300 01
Bucket	6 5004 811 00	63/40	HR11/12/13	6 9500 300 01
Dozer blade	6 5004 065 00	63/30	HR11/12/13	none

Cylinder function	Cylinder number	Piston ϕ / Rod ϕ	Machine Type	Assembly Tool Number
Boom	6 5006 375 00	80/40	HR14	6 9500 300 03
Dipperstick	6 5005 695 00	70/40	HR14	6 9500 300 02
Bucket	6 5005 835 00	70/35	HR14	6 9500 300 02
Articulation	6 5006 430 00	80/40	HR14/HR16	6 9500 300 03
Dozer blade	6 5007 297 00	90/40	HR14/HR16	none

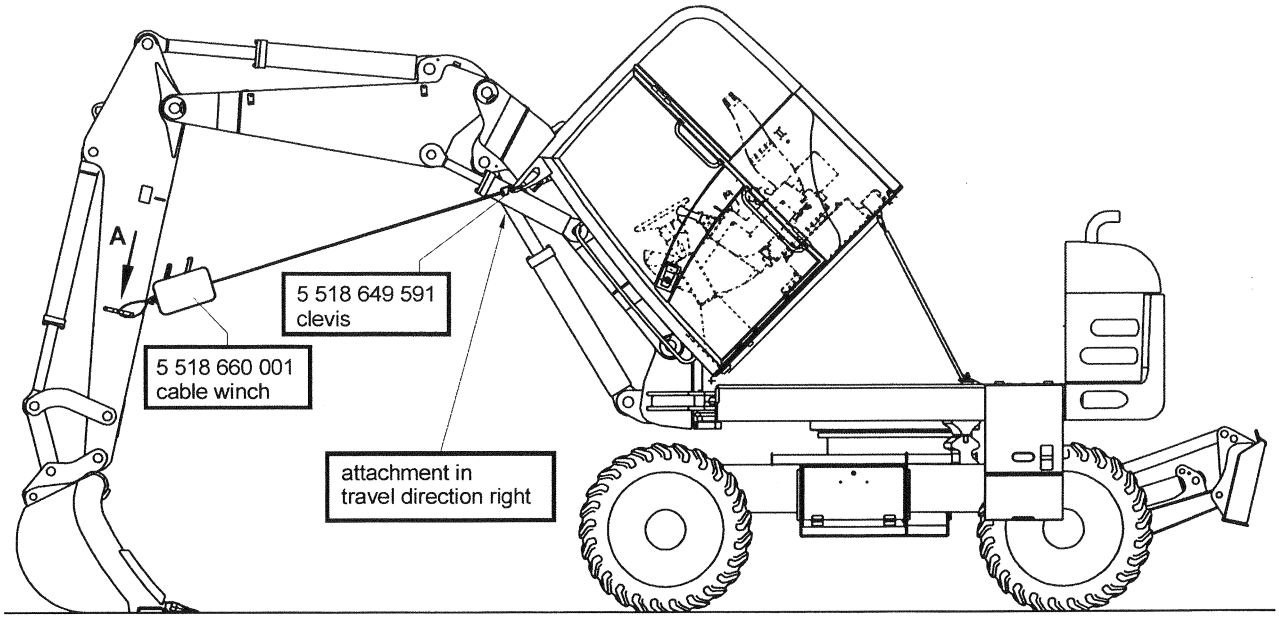
Cylinder function	Cylinder number	Piston ϕ / Rod ϕ	Machine Type	Assembly Tool Number
Boom	6 5007 545 00	90/45	HR16	6 9500 300 04
Dipperstick	6 5005 845 00	70/45	HR16	6 9500 300 02
Bucket	6 5005 855 00	70/35	HR16	6 9500 300 02

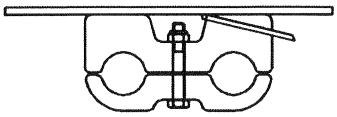
Cylinder function	Cylinder number	Piston ϕ / Rod ϕ	Machine Type	Assembly Tool Number
Boom	6 5009 200 00	100/50	HR18	6 9500 300 05
Dipperstick	6 5007 870 00	90/55	HR18	6 9500 300 04
Bucket	6 5005 860 00	70/45	HR18	6 9500 300 02
Articulation	6 5007 870 00	90/55	HR18	6 9500 300 04
Dozer blade new	6 5011 470 00	110/50	HR18	none
Dozer blade old	6 5009 100 00	100/45	HR18	none

Assembly Tools for Cylinders with double end rod – mounting of the steady bush

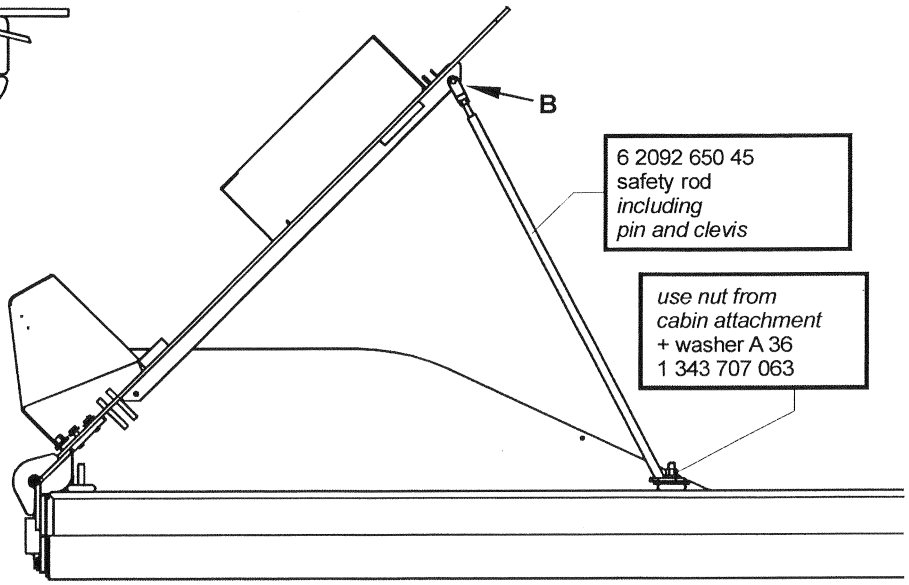
Cylinder function	Cylinder number	Piston ϕ / Rod ϕ	Machine Type	Assembly Tool Number
Tilt cylinder	6 5011 420 00 6 5011 450 00 6 5011 455 00	110/56	SKL 851 B SKL 853	6 9500 300 06
	6 5011 290 00	110/56	SKL 851 B	6 9500 300 06
	6 5011 390 00	100/56	SKS 661	6 9500 300 06
	6 5013 850 00	125/70	SKL 861 B	6 9500 300 07
	6 5013 940 00	125/70	SKL 861 B	6 9500 300 07
	6 5015 460 00	130/70	SKL 861 B	6 9500 300 07
	6 5015 450 00	130/70	SKL 863	6 9500 300 07
	6 5014 565 00	140/70	SKL871	6 9500 300 07

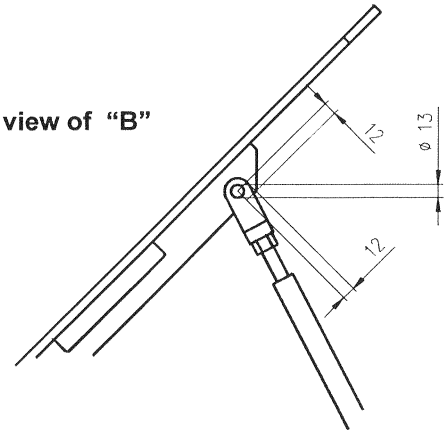
Tilt cabine
Kit-No. 6.209.265.000





view of "A"

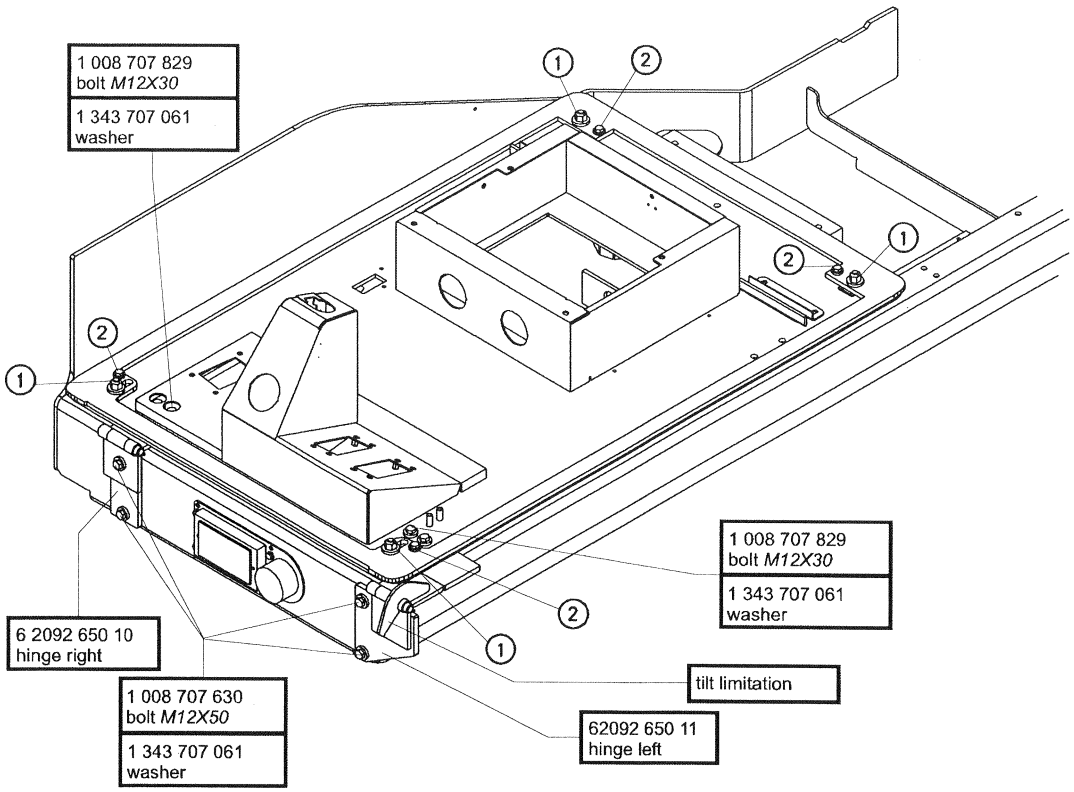




view of "B"

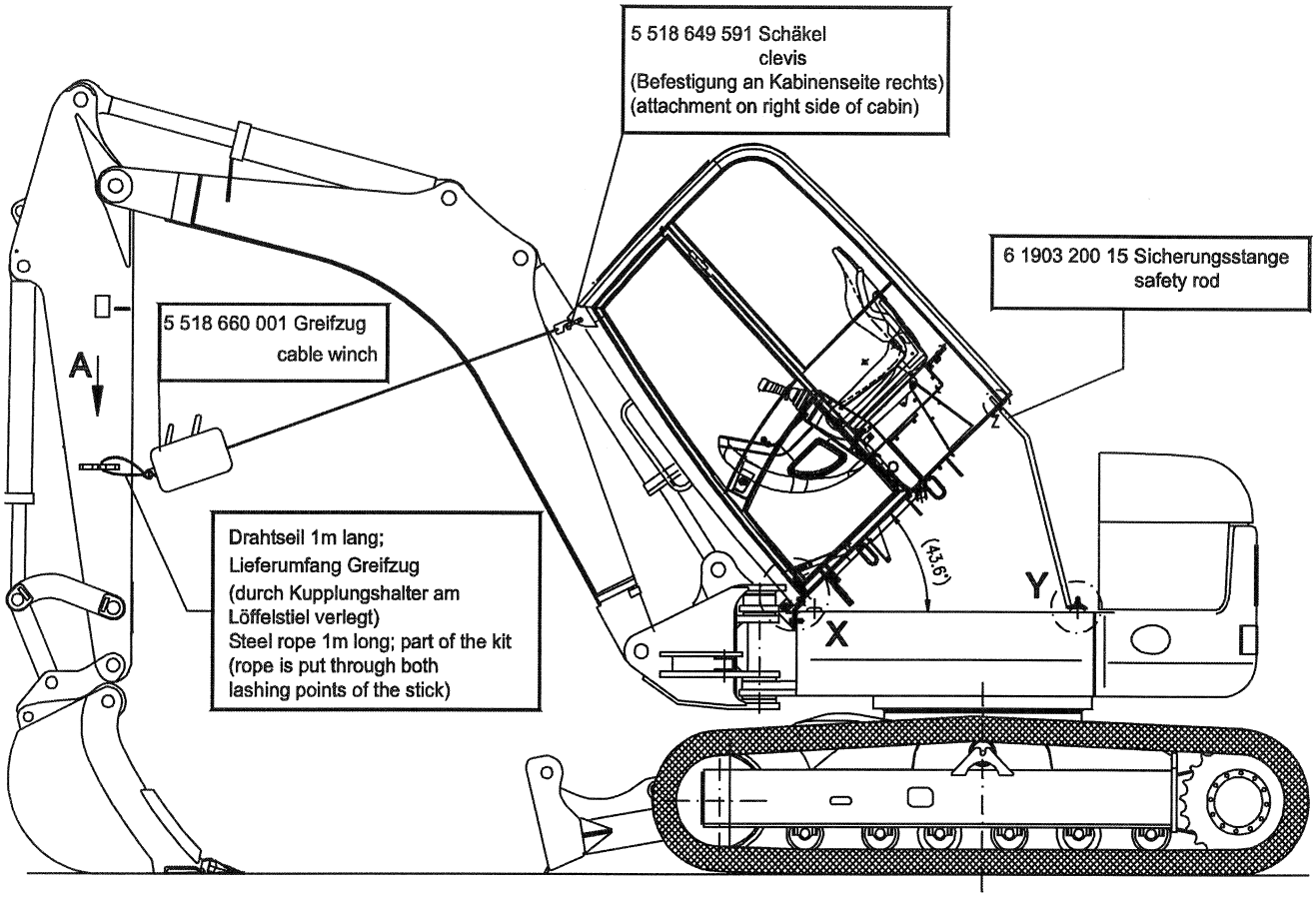
rework
drilled hole Ø 13mm

SCHAEFF TEREX	Typ/Model/Type **HML 32**	Datum/Edition/Date **06.2002**
	Benennung/Description/Dénomination **Tilt cabin**	Blatt/Page/Feuille **11.51.01**

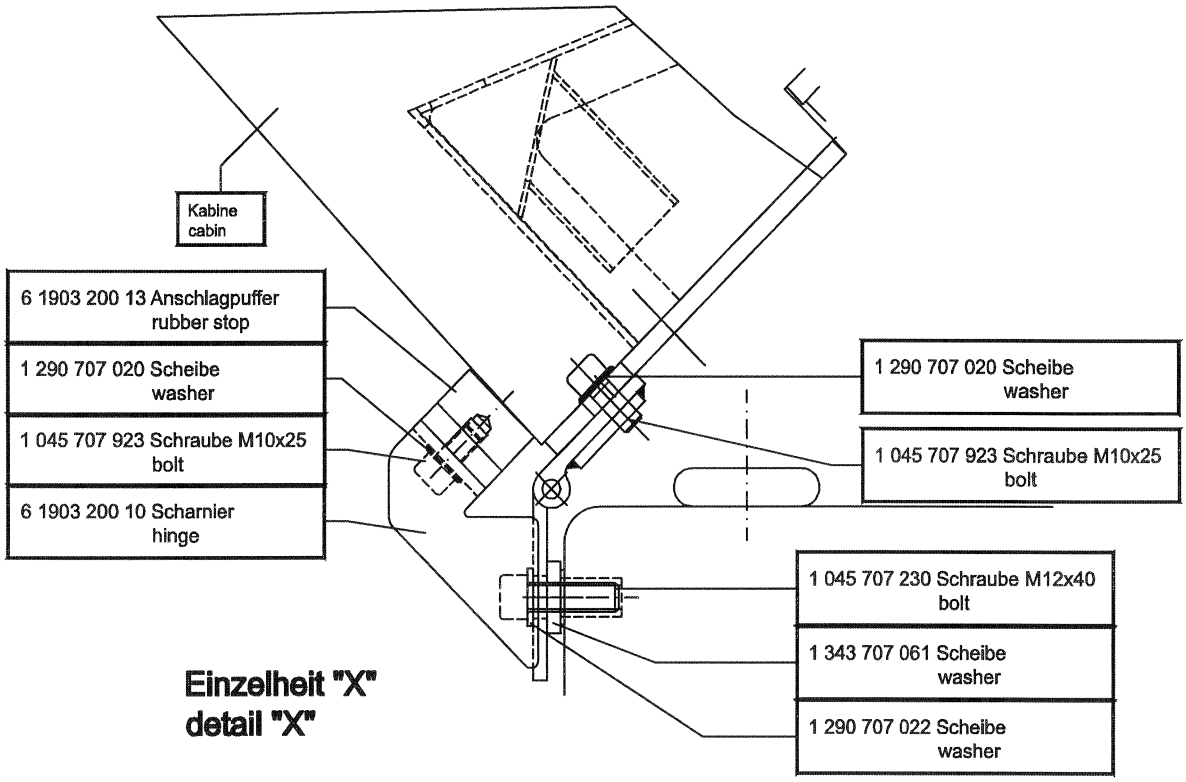


Instructions for tilting the cabin: *(it will take you approx. 30 min to execute points 1 - 14)*

1) Before starting, completely read the mounting instructions.
2) Set the working equipment parallel to the cabin. Lower the boom, turn off the engine and relieve the hydraulics. (Fasten or remove from the cabin all objects which could fall to the front when the cabin is tilted).
3) Fasten the hinges 6 2092 650 10 + 11 at the upper carriage and floor frame.
Attention ! 50mm bolts for fastening on the upper carriage ! The hinge 6 2092 650 11 must have the tilt limitation **otherwise the cabin must not be tilted !** (see sketch)
4) Check whether the bolts item 2 are available **and** tightened.
5) Remove all 4 nuts and washers ***item 1***
Attention! Do not remove ***item 2*** as they connect the cabin with the floor frame !!
6) Fasten the clevis on the right-hand support (in travel direction) of the canopy and attach the cable winch (see sketch)
7) Fasten the other rope (1 m long) on the coupling support of the stick. The steel rope loops point to the machine (see sketch).
8) Shut the cabin door and open the rear flap.
9) Carefully lift the cabin by approx. 20 cm by means of the cable winch.
10) Check whether the fastening hole for the safety bar is available at the floor frame otherwise rework (see sketch) **Attention!** Secure cabin during rework !
11) If the fastening hole for the safety bar is available, the cabin has to be tilted until the tilt limitation touches the hinge 6 2092 650 11.
12) Mount the safety bar (see sketch). **Attention!** ***DANGER!*** **Do not work underneath the cabin as long as the safety rod is not mounted**
13) Secure the safety rod both at the top and at the bottom with a nut and washer and/or pin (see sketch).
14) Release the cable winch but do not remove it.
15) Do not put lateral load on the safety rod while working underneath the cabin.
16) The cabin is lowered in reverse order. The locks which prevent turning on the cabin bearings must possibly be realigned.

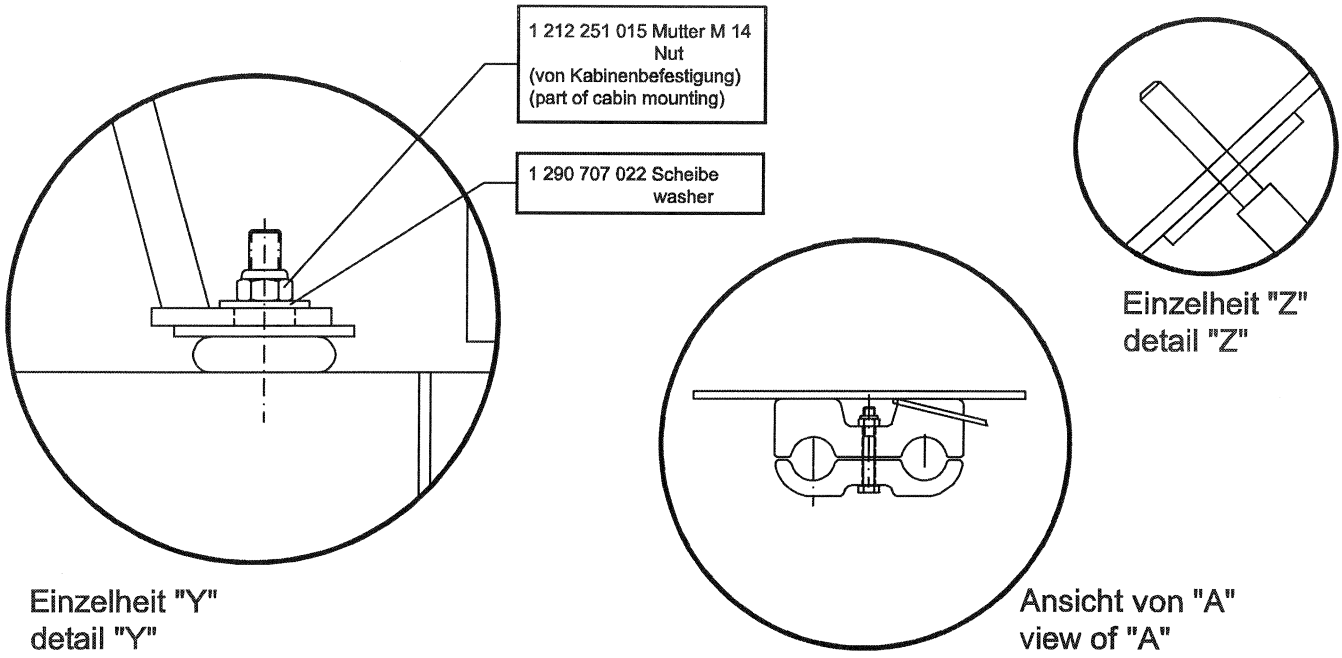


Arbeitseinrichtung parallel zu Raupenfahrwerk (nicht geknickt)
Working equipment parallel to the tracks (not articulated)

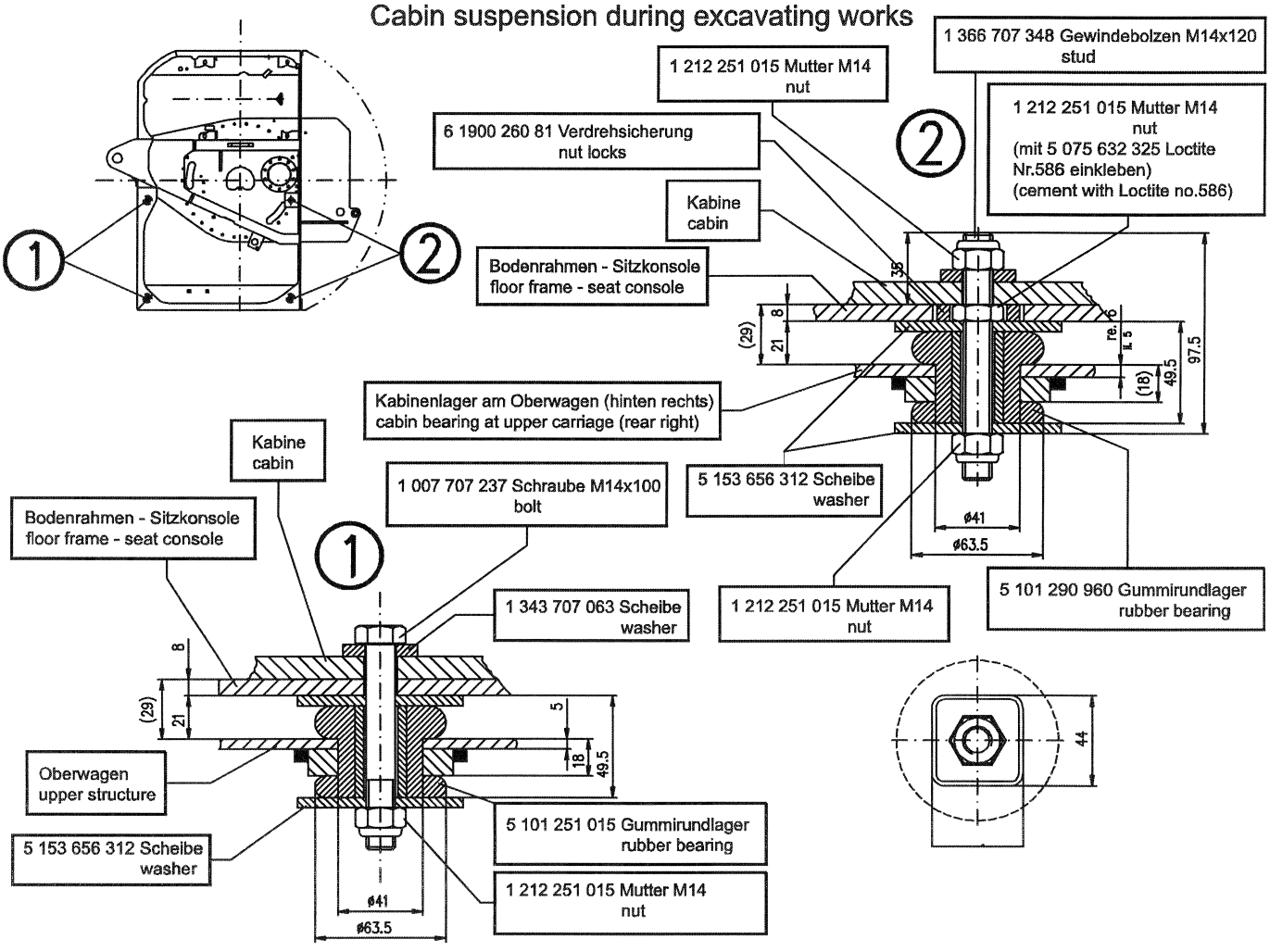


Einzelheit "X"
detail "X"

SCHAEFF	Typ/Model/Type **HR 32**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Kabine kippen / Tilt cabin**	Blatt/Page/Feuille **11.65.01**



Kabinenlagerung bei Baggerbetrieb
Cabin suspension during excavating works

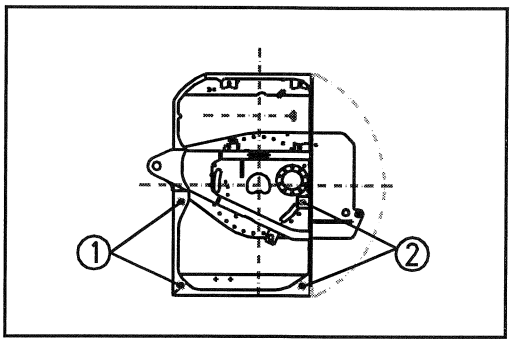


Instructions for tilting the cabin

Please use the parts kit no. 6 190 320 000

Due to danger of accident, please respect these mounting instructions !!!

►►► please read them carefully !



1.) Mount 2x hinge 6 1903 200 10 to the upper carriage and the floor frame.

Bolt 2x rubber stop 6 1903 200 13 on the hinges.

2.) Remove the cover at the bottom of the upper carriage.

3.) Remove the stowage box and right armrest

4.) Remove 2x cabin fastening bolt M14 (item 2)

Remove 2x hexagon bolt M14x100 and nut M14 (item 1)

5.) Put 1m steel rope through the lashing points situated on both sides of the dipperstick. The steel rope loops point to the machine.

6.) Fasten a clevis on the right-hand support of the canopy

7.) Attach the cable winch (attach the hook at the cable winch housing to the steel rope loops on the dipperstick and attach the hook at the steel rope of the cable winch to the clevis)

8.) Lift the cabin by means of the cable winch until the rubber stops reach the cabin. Now the safety rod 6 1903 200 15 can be mounted. (Installation at the external cabin bearing)

!! Danger !!

Do not work underneath the tilted cabin as long as the safety rod has not been mounted.

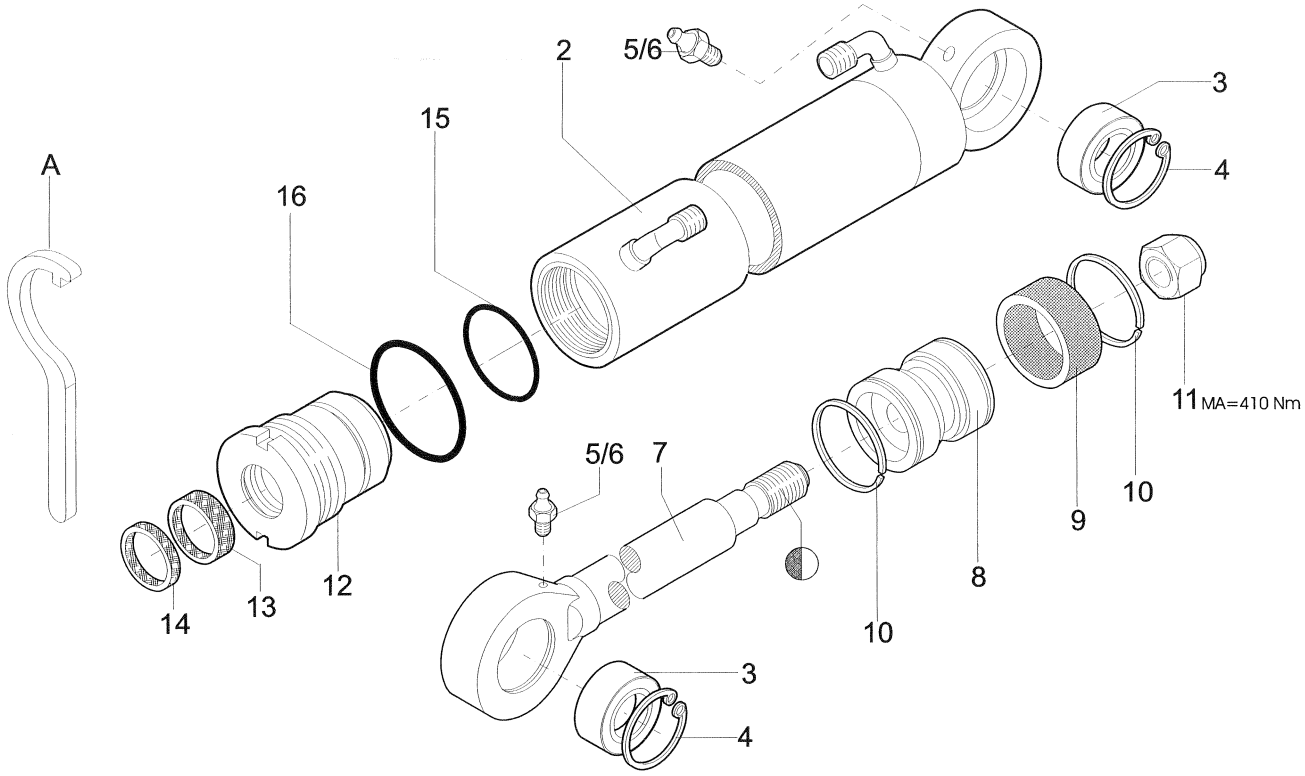
Do not put lateral load on the safety rod while working under the cabin.

9.) Release the cable winch **but do not remove it**.

The cabin is lowered in reverse order.

The locks 6 1900 260 81 which prevent turning on the cabin bearings must possibly be realigned !

HR 12
Dipperstick cylinder
articulated cylinder



(both cylinder sides with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 12 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 11 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 8 with seal item 9
- remove the bushing item 12 from the piston rod

- check the segment type S, item 10

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 11 onto the piston rod with Loctite 270.
  Tightening torque of nut: 410 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

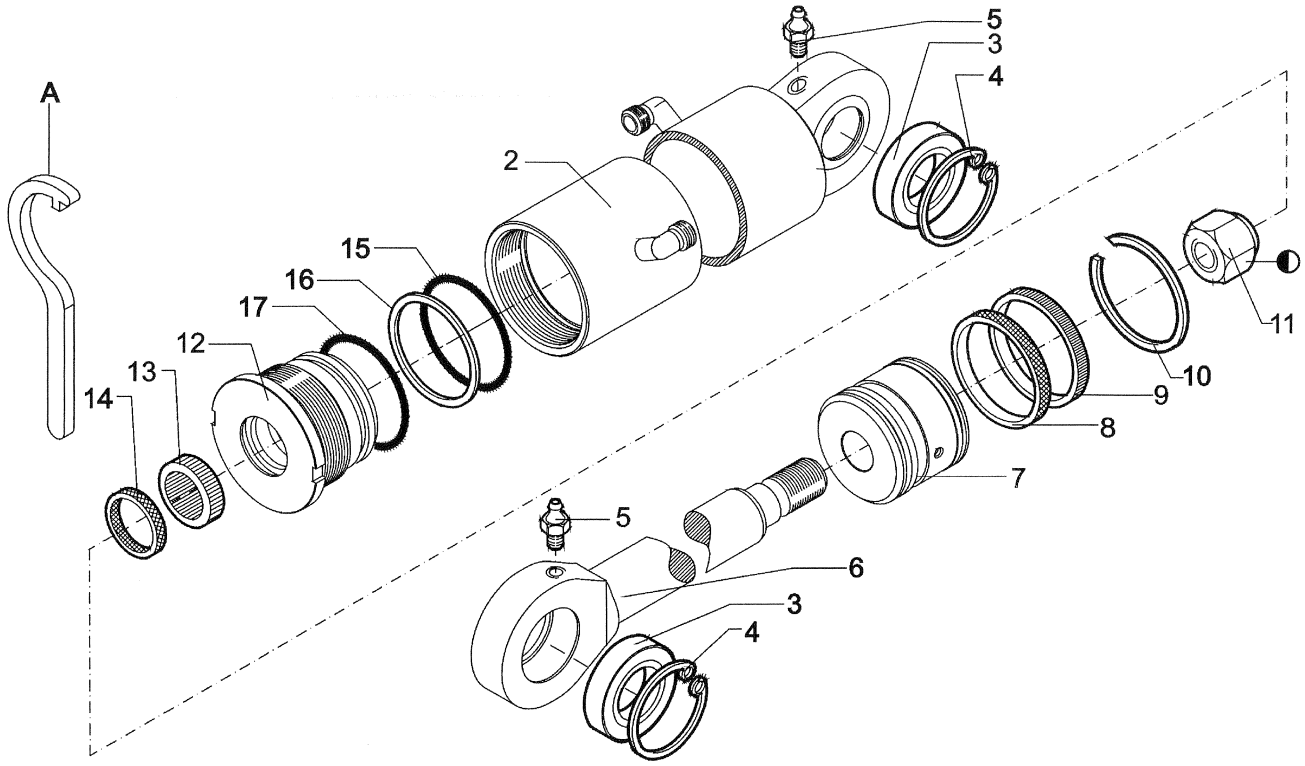
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 12
Boom cylinder



(one cylinder side with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 12 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 11 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 12 from the piston rod
- replace all seals

- check the segment type S item 10

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

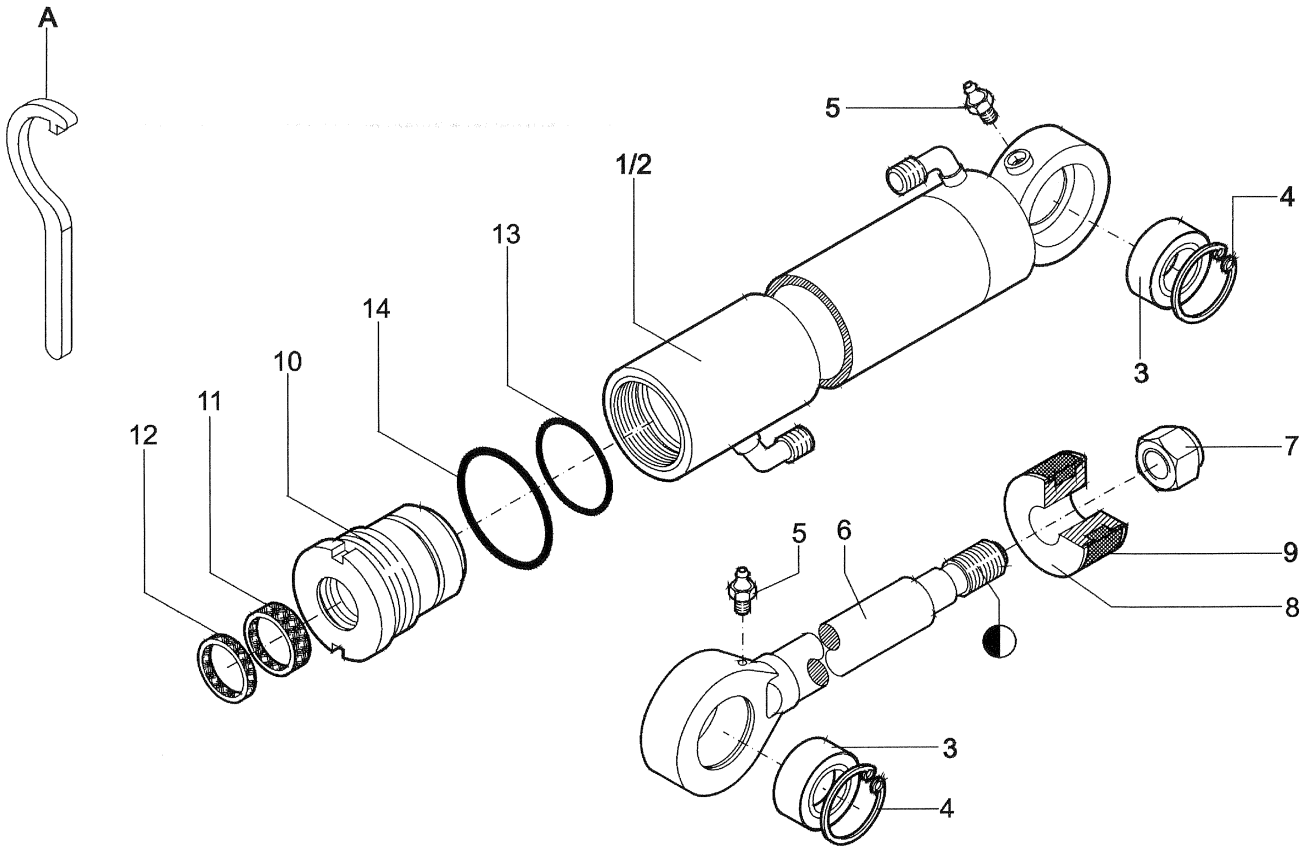
- clean the piston rod thread (free from grease)

- secure the new nut (free from grease) item 11 with Loctite 270

Tightening torque of nut: 450 Nm

- insert the piston rod into the cylinder barrel

HR 12
Bucket cylinder



(without end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 7 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 8 with seal item 9
- remove the bushing item 10 from the piston rod

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 7 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 410 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

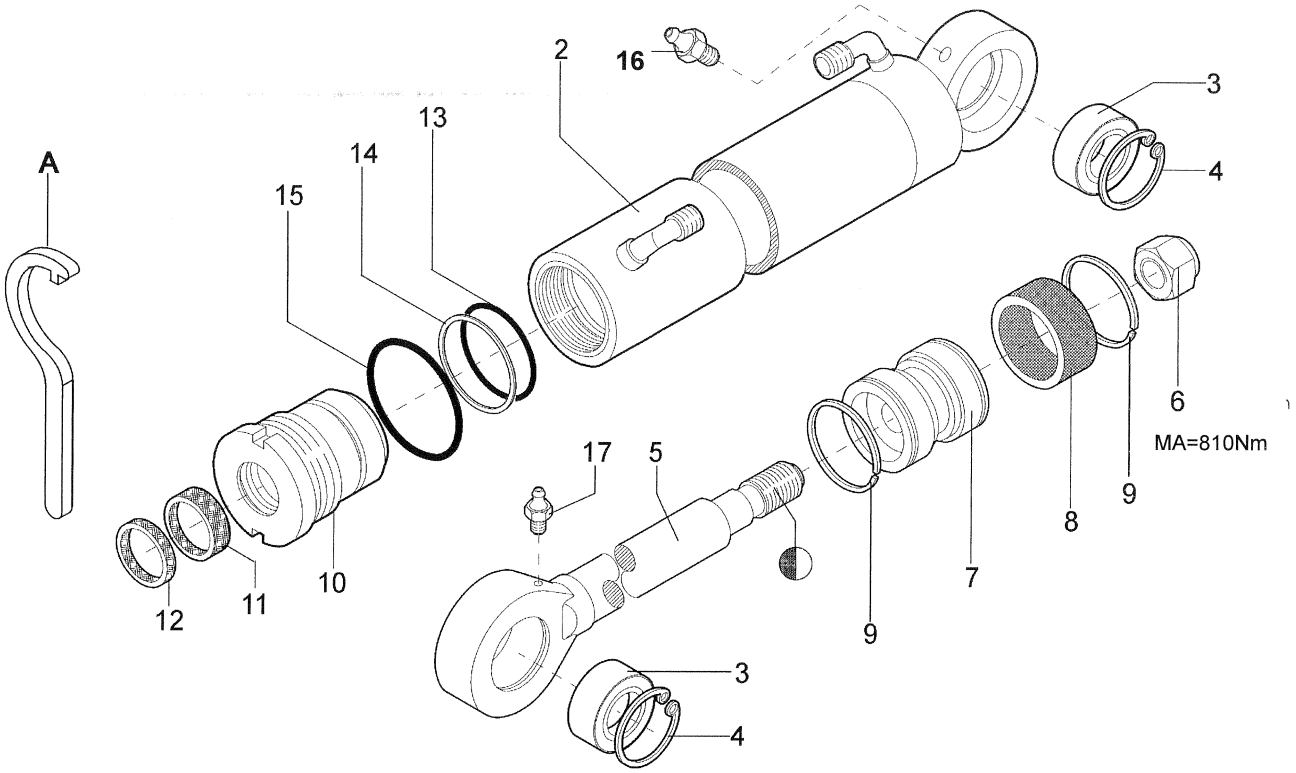
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 14
Boom cylinder



(both cylinder sides with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 10 from the piston rod

- check the segment type S item 9

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces at the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 810 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

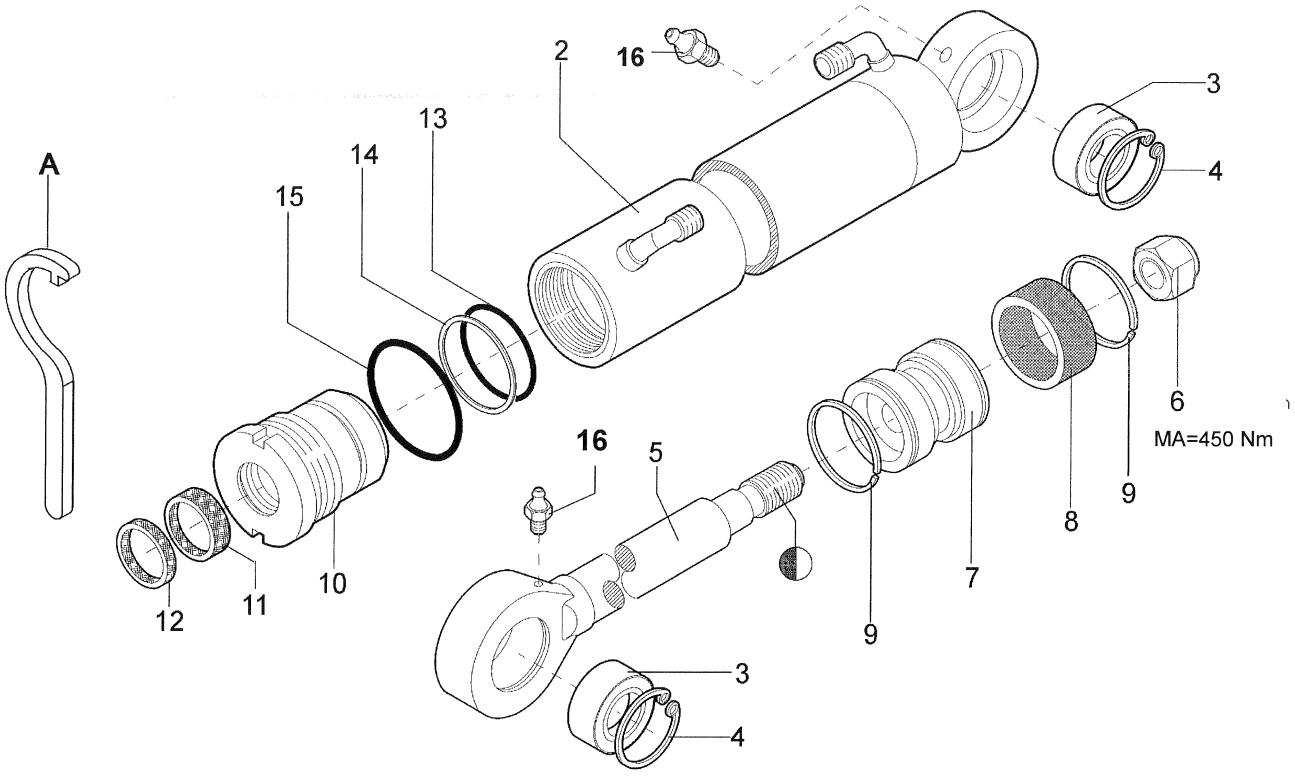
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 14
Dipperstick cylinder



(both cylinder sides with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 10 from the piston rod

- check the segment type S, item 9

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces at the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 450 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

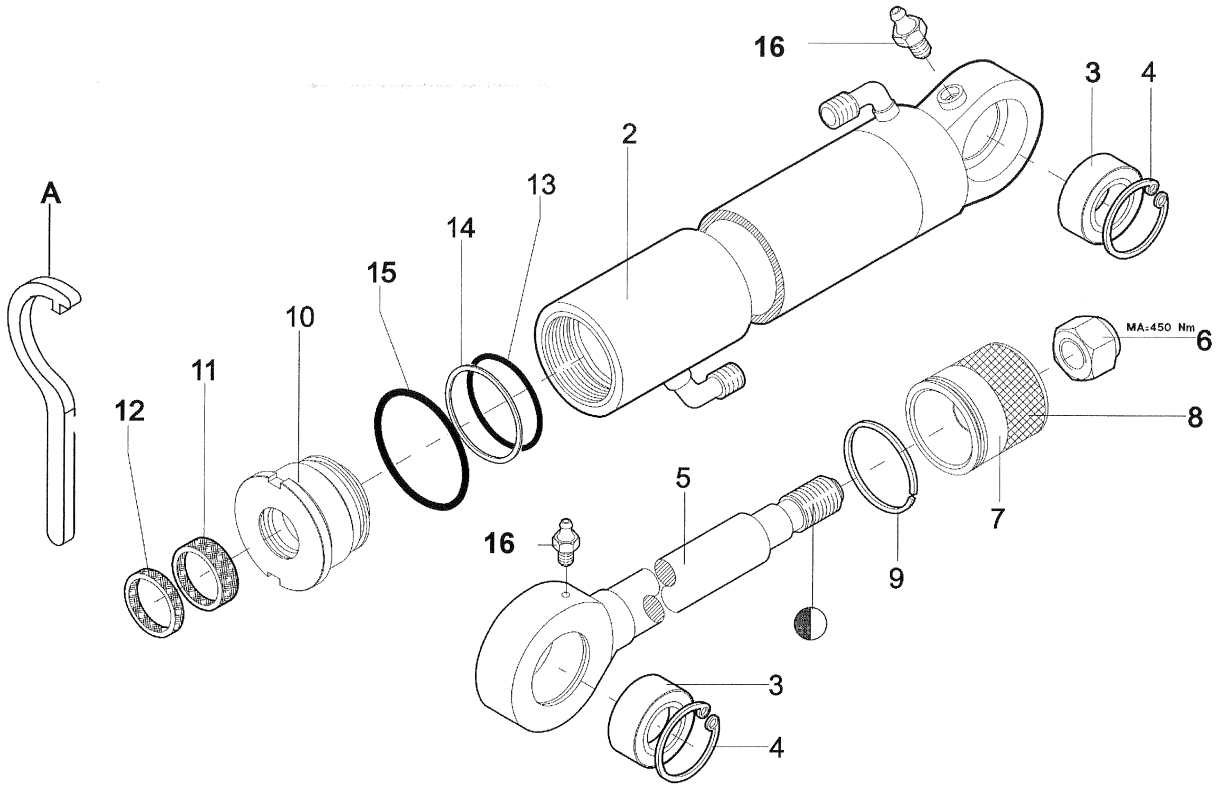
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 14
Bucket cylinder



(one cylinder side with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 10 from the piston rod

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces at the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 450 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

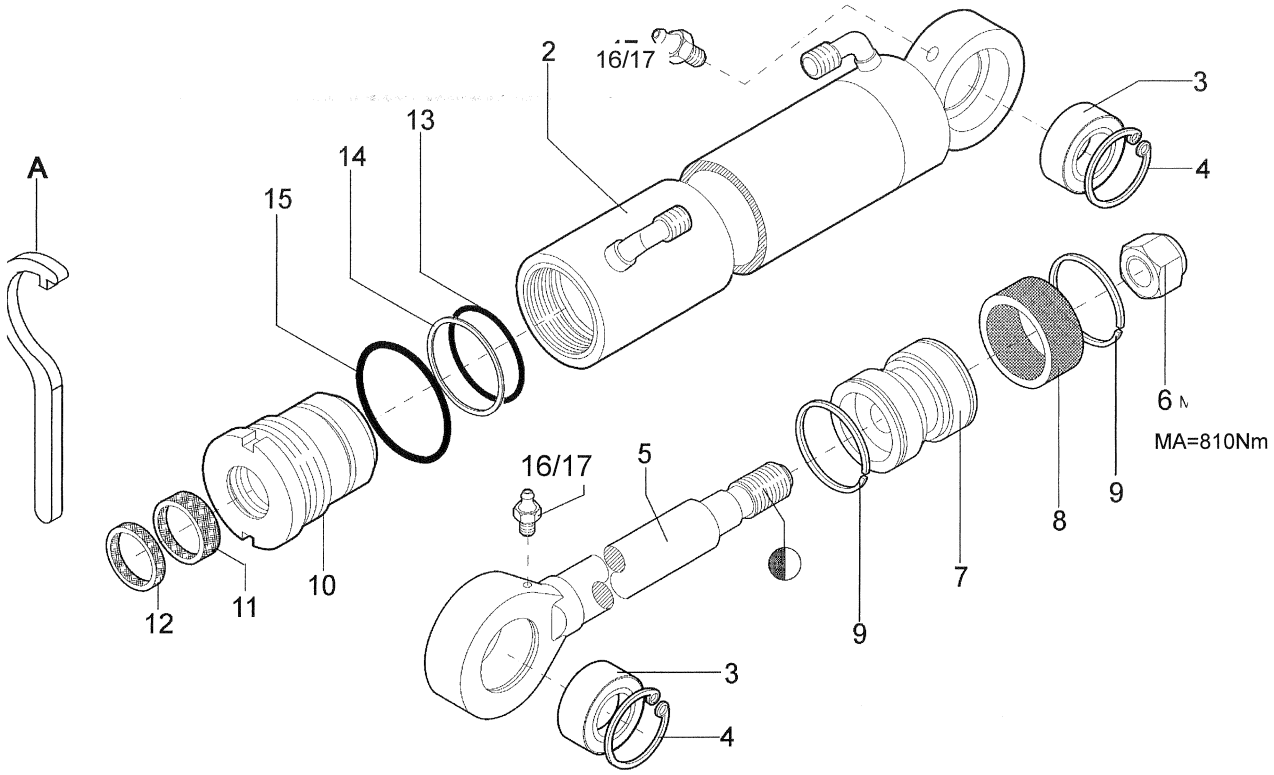
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 14
Articulated cylinder



(both cylinder sides with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 10 from the piston rod

- check the segment type S, item 9

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 810 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

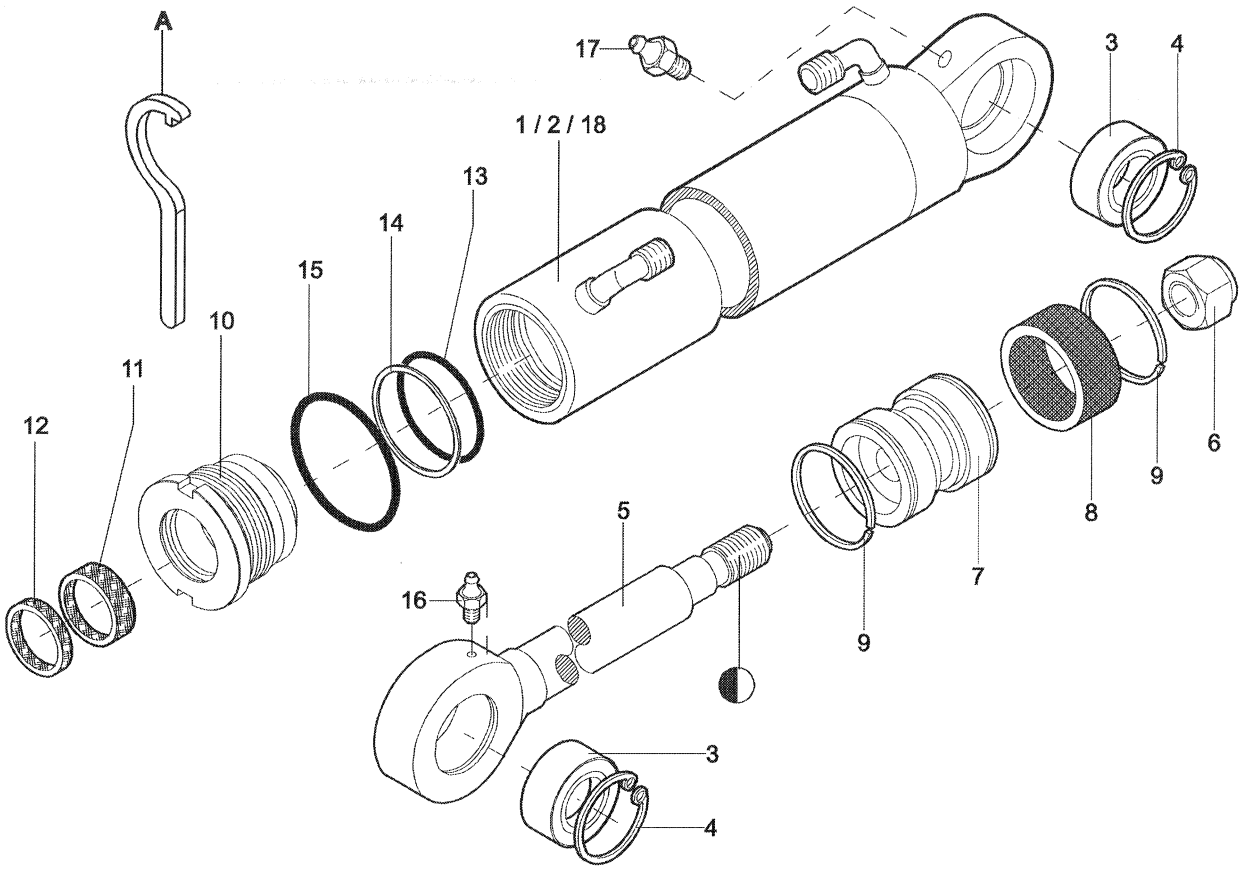
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 16
Dipperstick cylinder



(both cylinder sides with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 10 from the piston rod

- check the segment type S, item 9

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 450 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

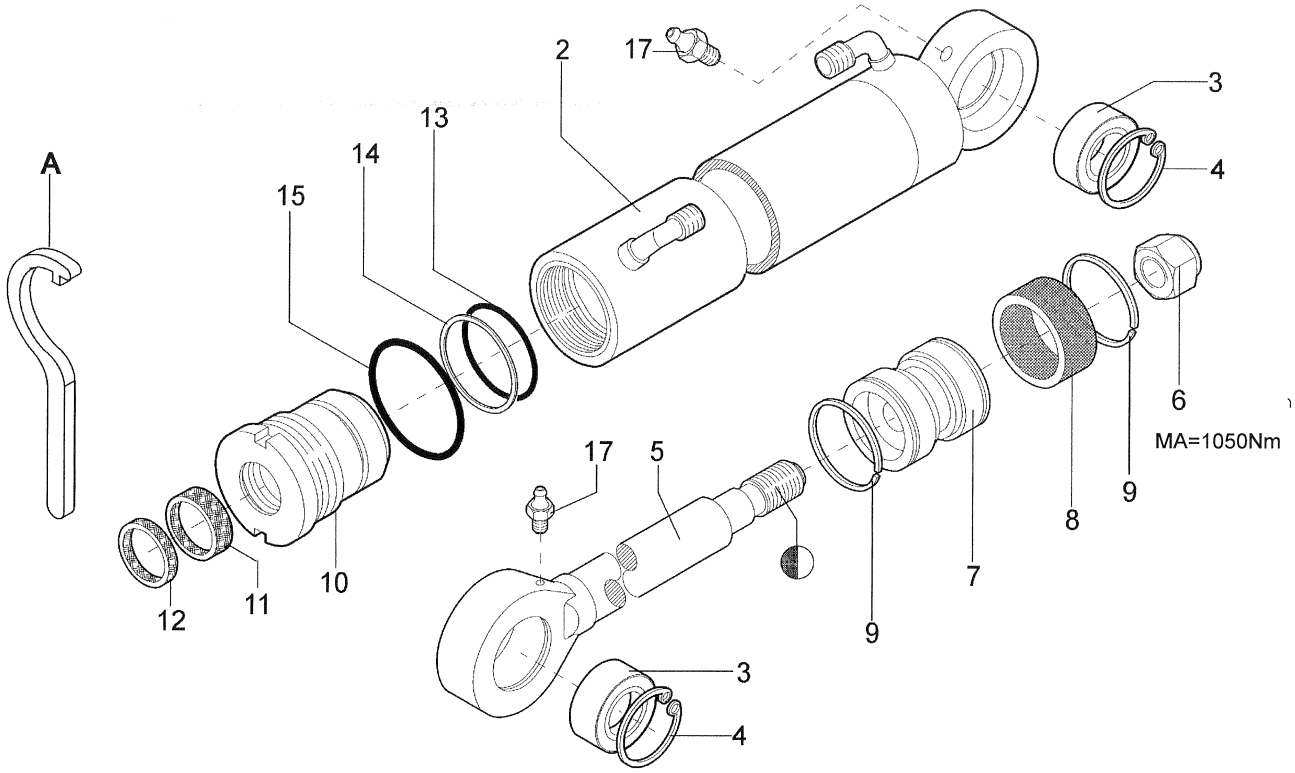
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 16
Boom cylinder



(both cylinder sides with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 10 from the piston rod

- check the segment type S item 9

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 1050 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

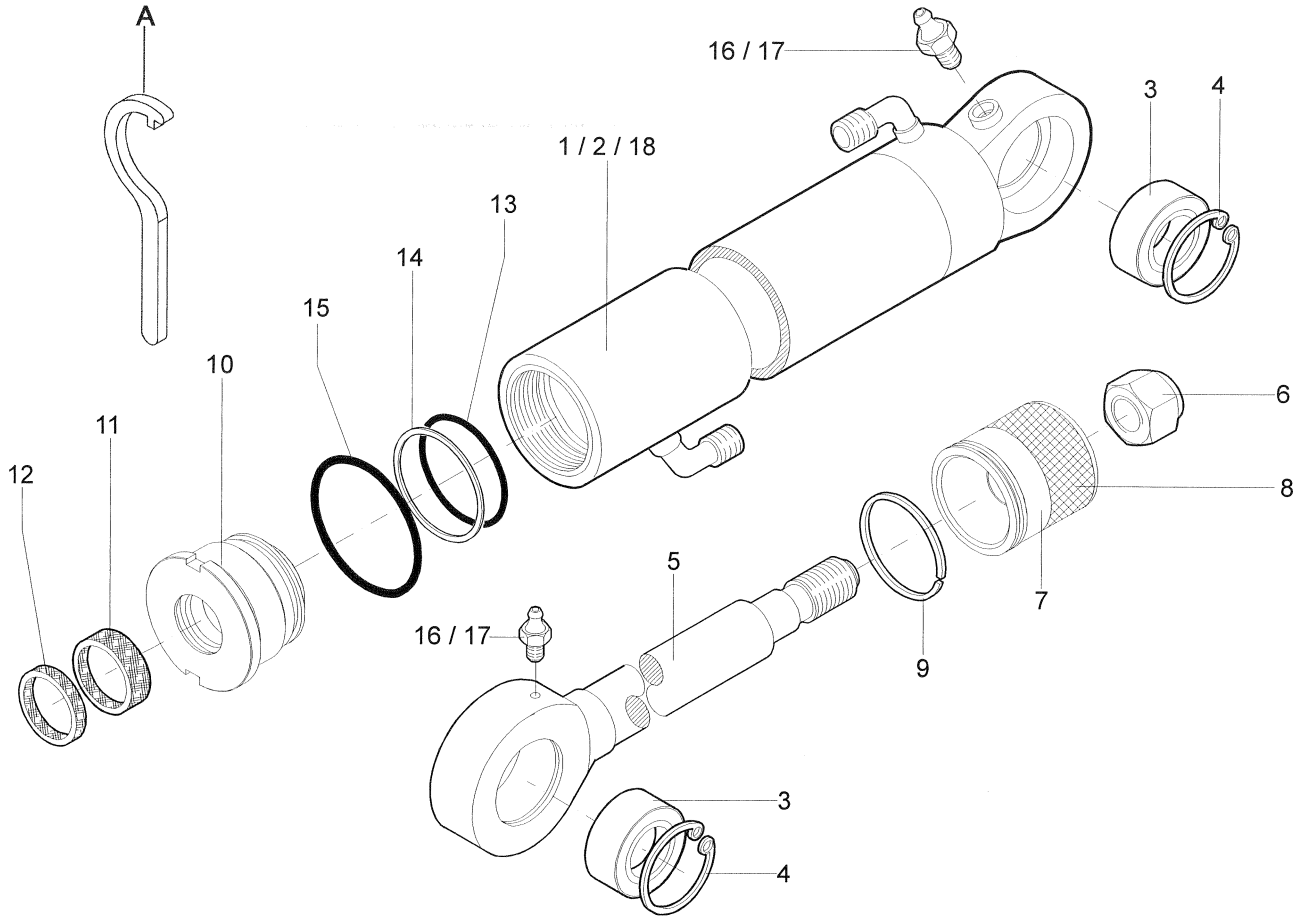
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 16
Bucket cylinder



(one cylinder side with end stroke dampening)

- dismount the hydraulic cylinder

- plug the hoses

- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position

- put an oil collecting receptacle underneath

- unscrew the bushing item 10 by means of a hook wrench item A

- pull the piston rod assembly with piston and bushing out of the cylinder barrel

- clamp the piston rod eye in a suitable vice in horizontal position

- stabilize the piston rod at the piston by means of a square timber

- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)

- extract the piston item 7 with seal item 8

- remove the bushing item 10 from the piston rod

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 450 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

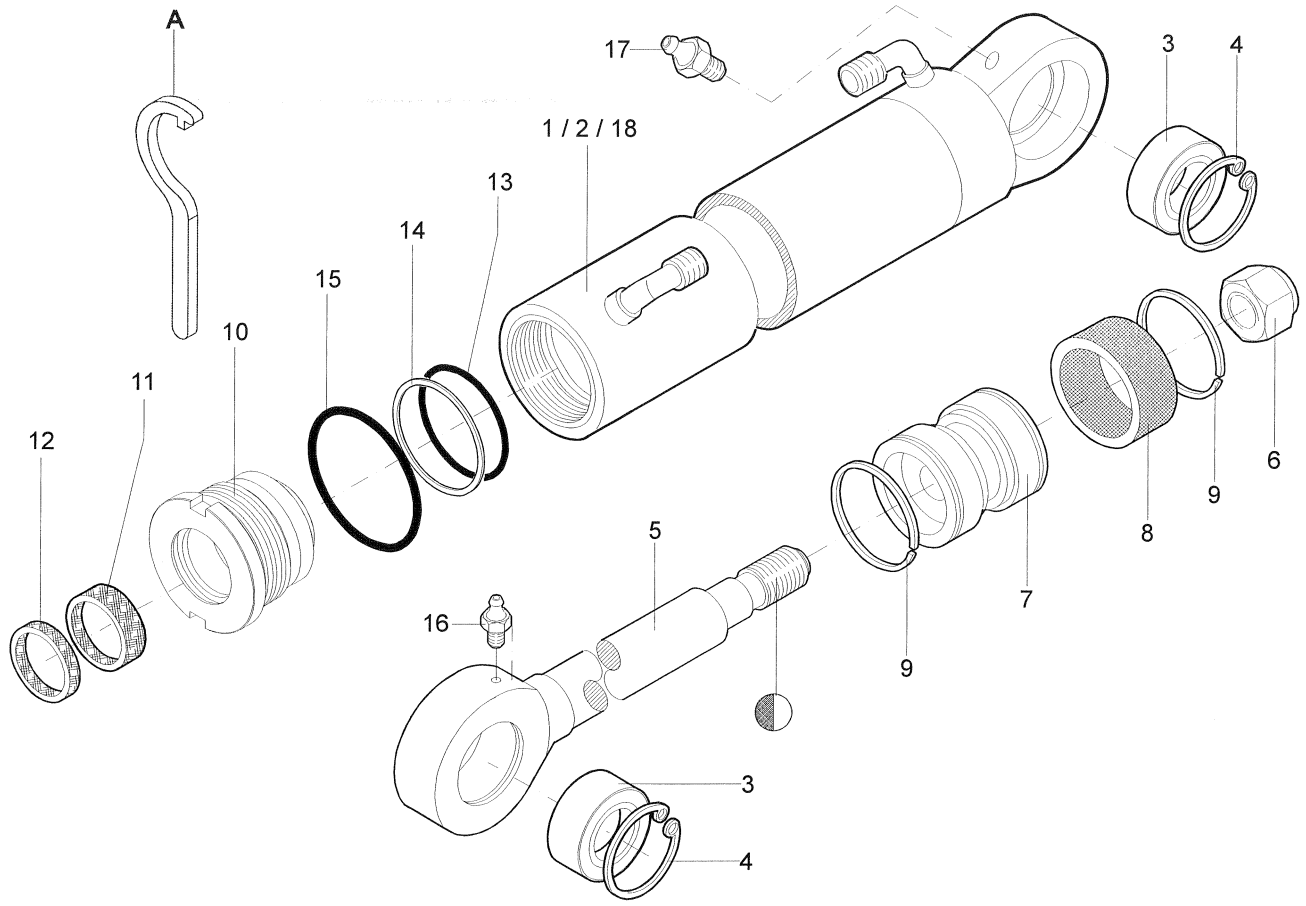
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 16
Articulated cylinder



(both cylinder sides with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 10 from the piston rod

- check the segment type S, item 9

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 810 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

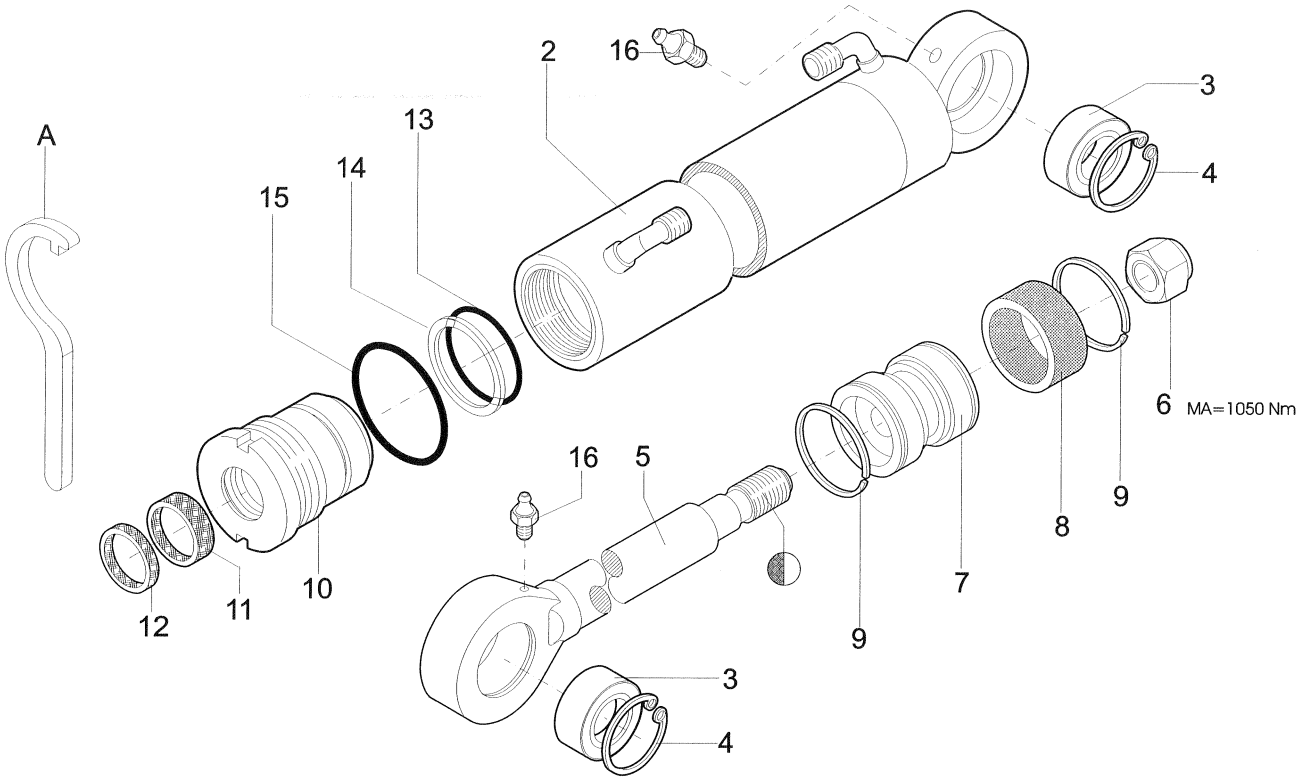
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 18
Dipperstick cylinder/Articulated cylinder



(both cylinder sides with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 10 from the piston rod

- check the segment type S, item 9

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 1050 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

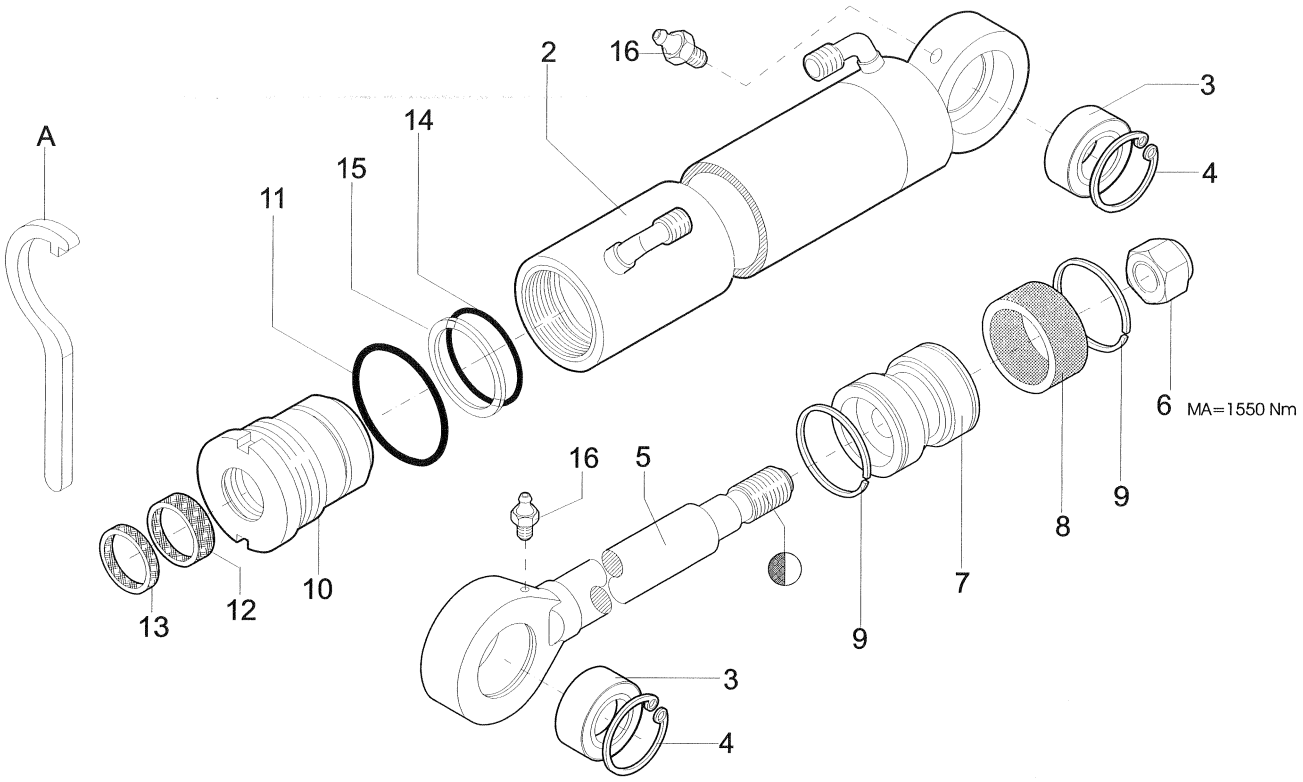
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 18
Boom cylinder



(both cylinder sides with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 10 from the piston rod

- check the segment type S item 9

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod, secure with Loctite 270.
  Tightening torque of nut: 1550 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

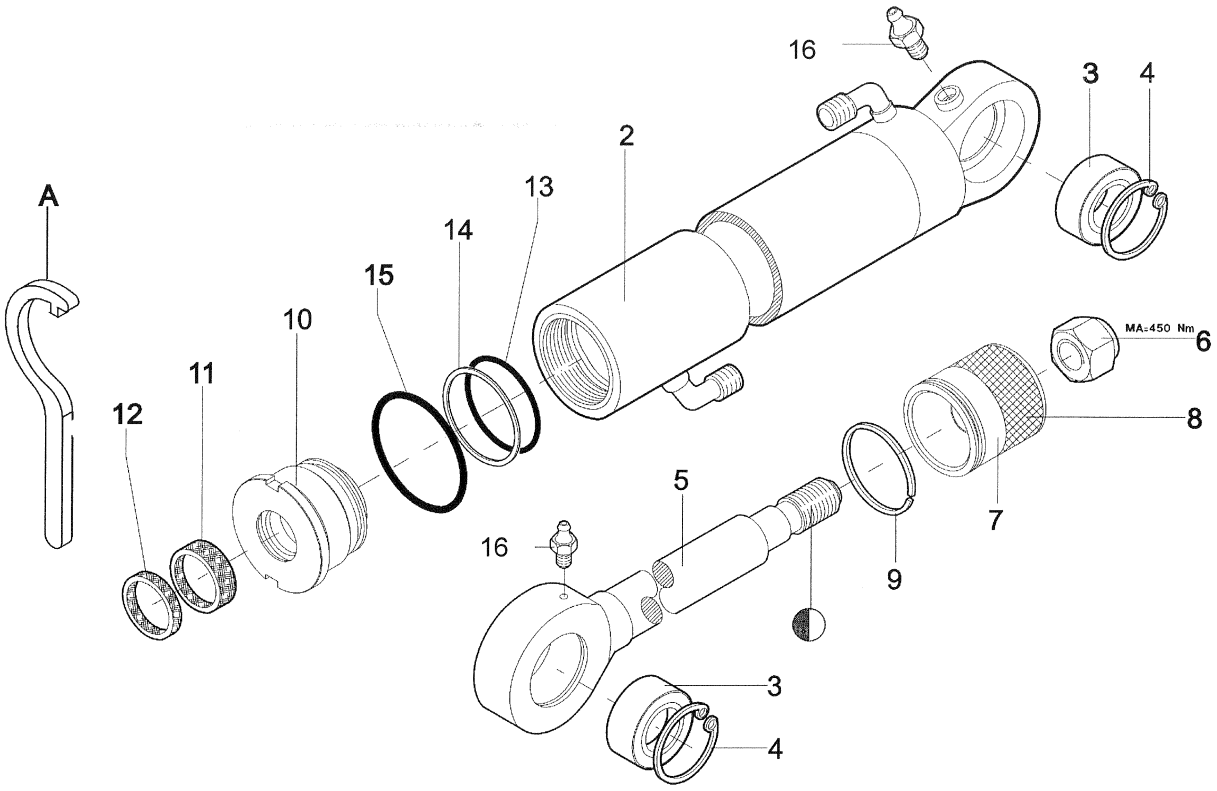
- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

HR 18
Bucket cylinder



(one cylinder side with end stroke dampening)

- dismount the hydraulic cylinder
- plug the hoses
- clamp the dismounted hydraulic cylinder in a suitable vice in horizontal position
- put an oil collecting receptacle underneath
- unscrew the bushing item 10 by means of a hook wrench item A
- pull the piston rod assembly with piston and bushing out of the cylinder barrel
- clamp the piston rod eye in a suitable vice in horizontal position
- stabilize the piston rod at the piston by means of a square timber
- slacken the nut item 6 (nut is secured with Loctite, warm up to 200° C if necessary)
- extract the piston item 7 with seal item 8
- remove the bushing item 10 from the piston rod

- check the piston rod for damage, replace if necessary

- check both bearings, item 3, for wear and tear, replace if necessary

- remove the old seals

Attention:
- do not damage the seal surfaces of the bushing and piston when removing the old seals

- replace all seals and rub with oil

Carry out the assembly in reverse order

- clean the piston rod thread (free from grease)

- screw the new nut (free from grease) item 6 onto the piston rod with Loctite 270.
  Tightening torque of nut: 450 Nm

- check the inside of the cylinder barrel for scratches, damage, bulges, etc.

- insert the piston rod into the cylinder barrel

- grease the thread of the bushing

- screw the bushing in the cylinder barrel
  Tightening torque: see chapter 1

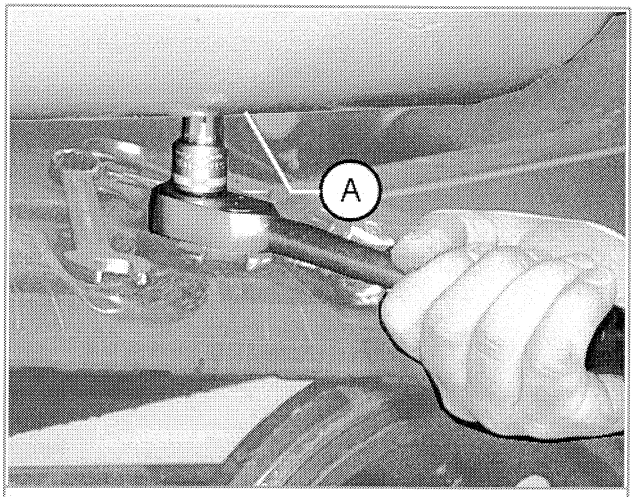
- mount the cylinder, connect it and move it carefully and slowly to end stroke (on both sides)

Remove the variable displacement pump

Park the machine in a safe place:

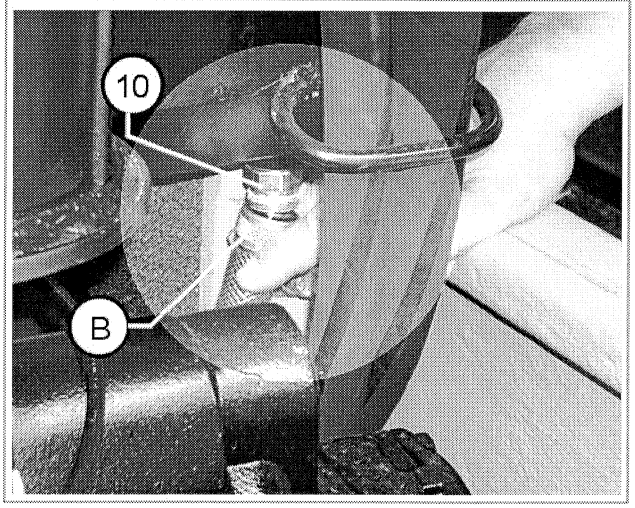
- Observe the safety and accident prevention regulations of the operating manual
- Leaking agents such as fuels, hydraulic oil, engine oil or coolant are harmful to the environment
- Prepare receptacles which are big enough to collect the corresponding quantities
- Collect fluids drained off to reuse them or dispose of them according to the regulations
- Plug the ports, lines and hoses

- Unscrew the cover **(A)** below the engine.

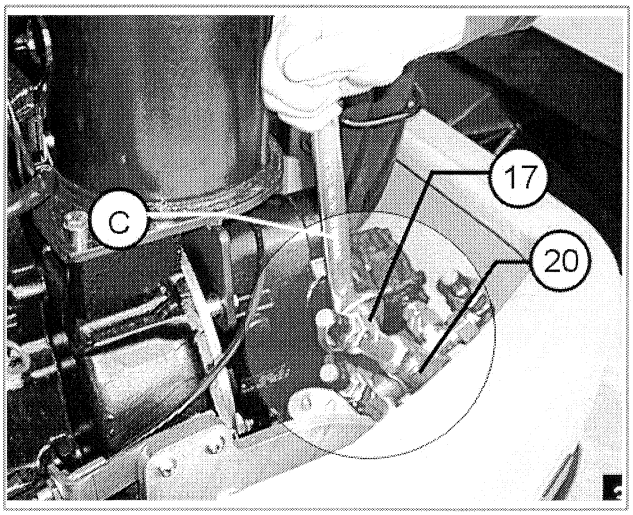


Drain hydraulic oil:

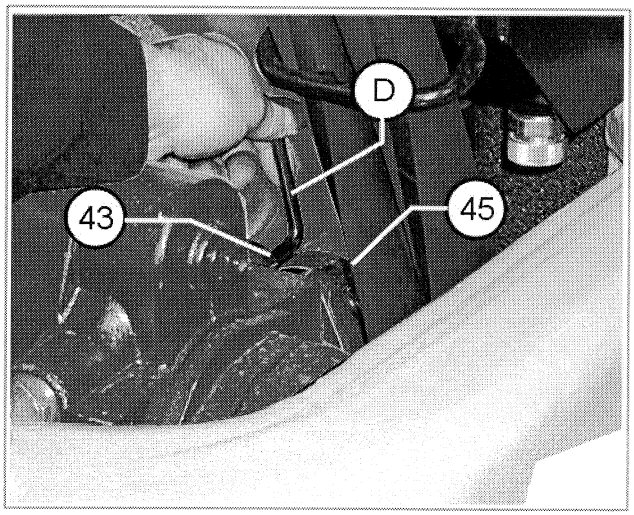
- Connect the drain hose **(B)** at the drain valve **(10)** mounted at the oil tank
- Collect the oil in the receptacle.



- Unscrew the fittings **(17)** and the pressure hoses **(20)** together from the pump (fork wrench **(C)** SW 32)
- Collect the oil
- Plug the hoses and pump with blind plugs



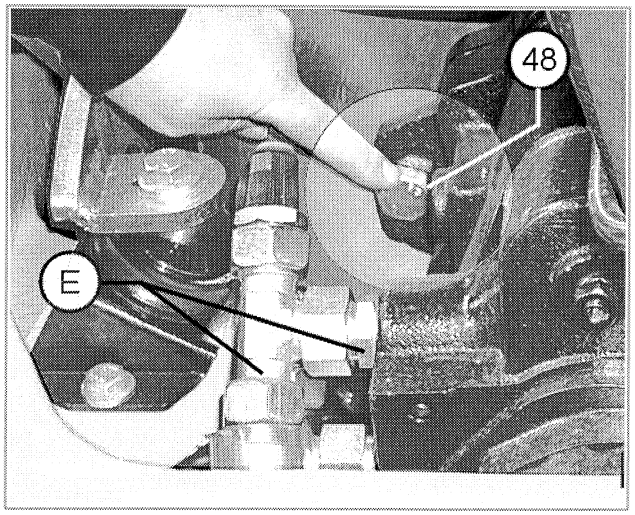
- Unscrew the bolts **(43)** at the suction flange with a hexagon socket screw key **(D)** SW10
- Remove the suction hose **(45)**
- Collect the oil
- Plug the hoses and pump with blind plugs



- Slacken the pump fastening bolts (48) (SW24).

Be careful when removing the pump !

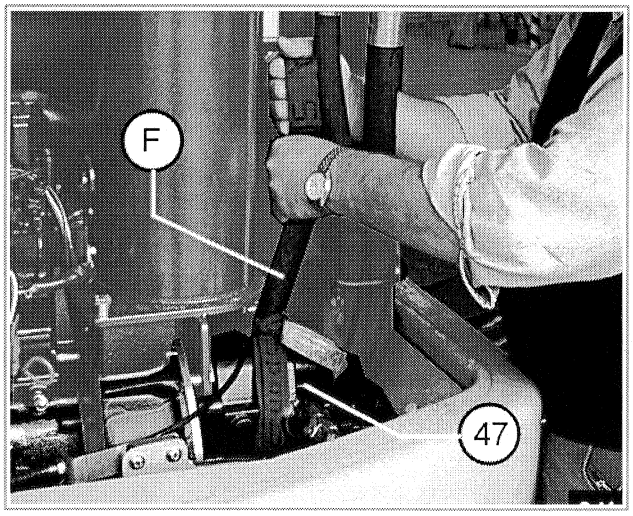
- Secure the pump fastening bolts (48) with Loctite 242, tightening torque MA = 220 Nm.



- Pull the pump out of the flange by means of a shoulder strap **(F)** and lift it out obliquely
- When replacing the pump, reuse the screwed fitting **(E)** of the old pump
- For the repair of the pump, please refer to pages 11.80.21 to 11.80.25
- Assembly analogous.

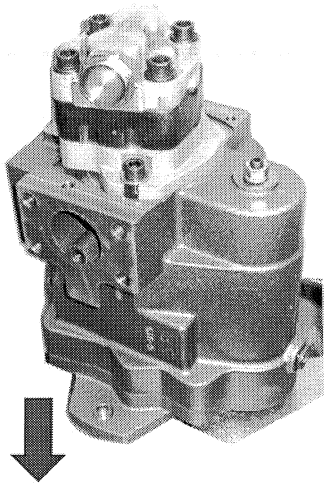
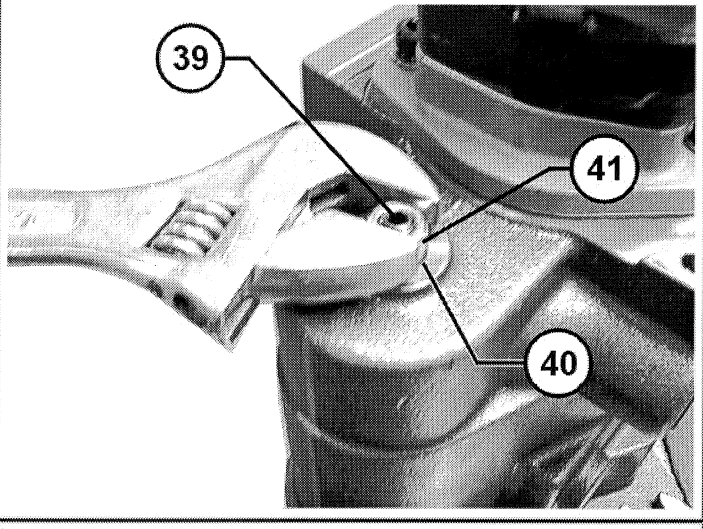
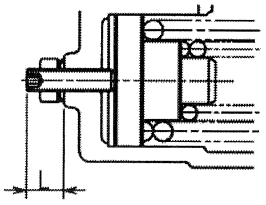
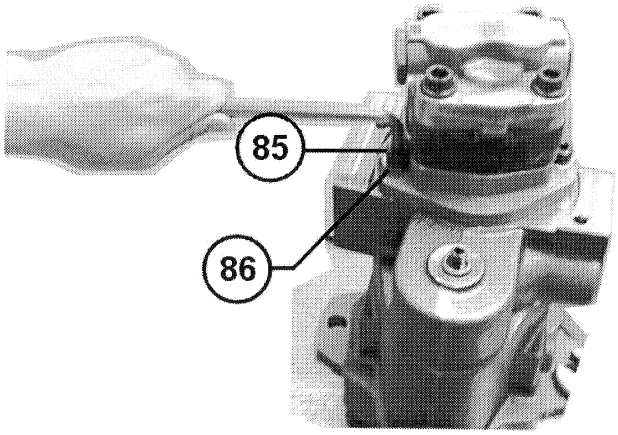
Attention !

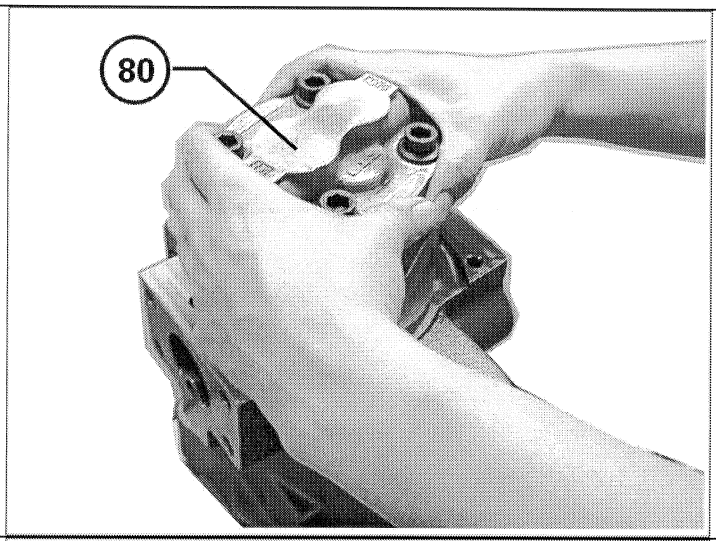
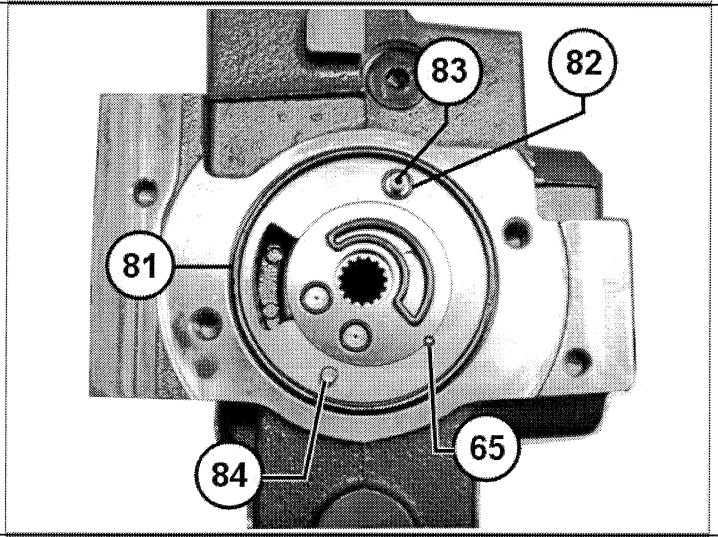
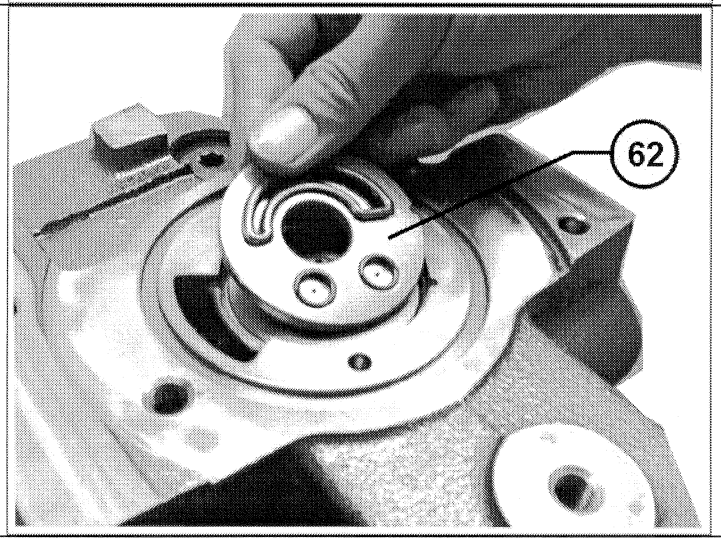
It is imperative to clean the tank, flush the hydraulic system and replace the filter element after a pump damage.

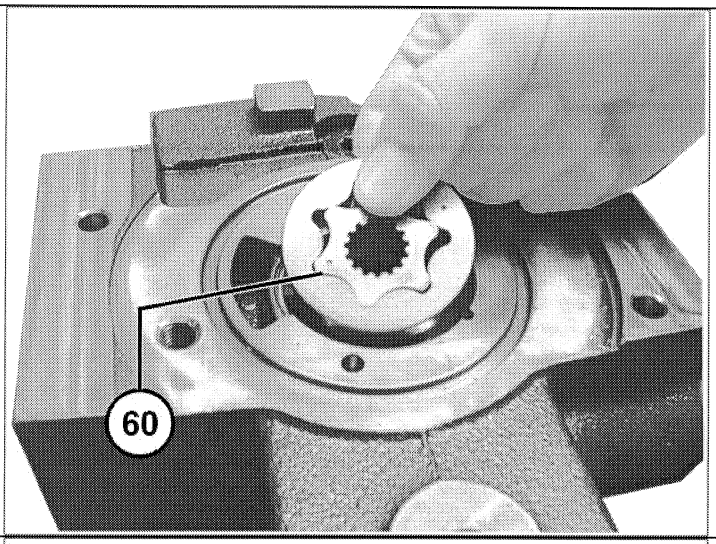
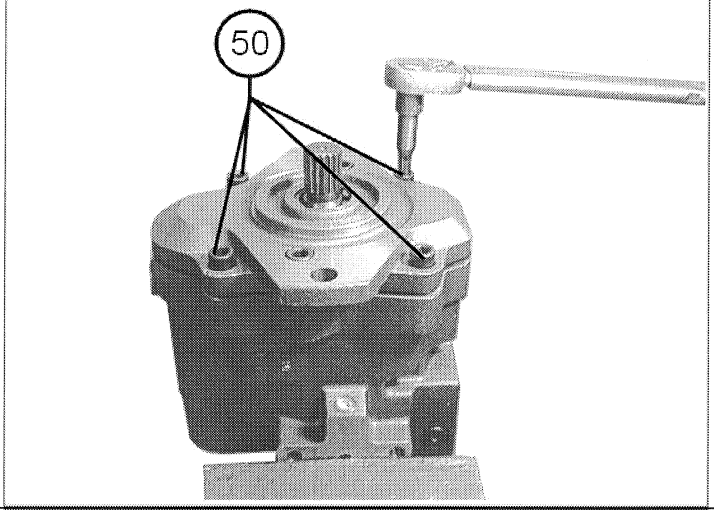
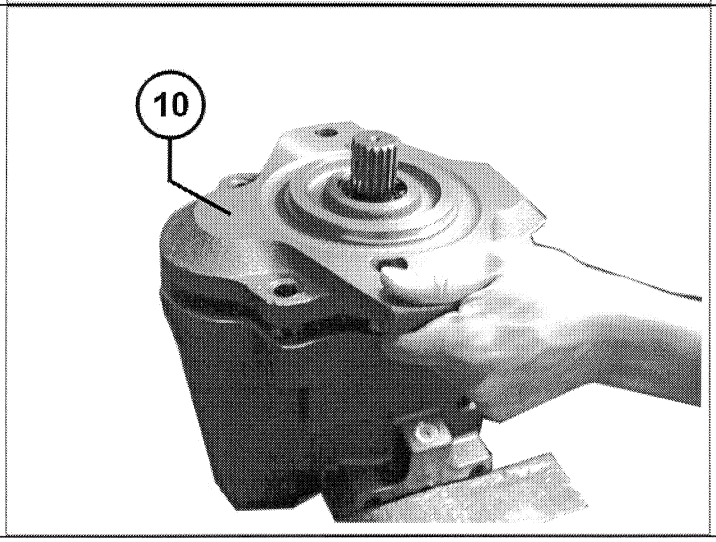


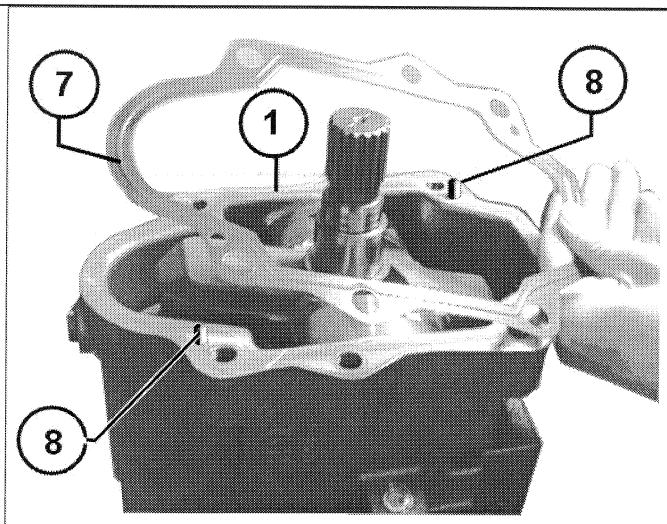
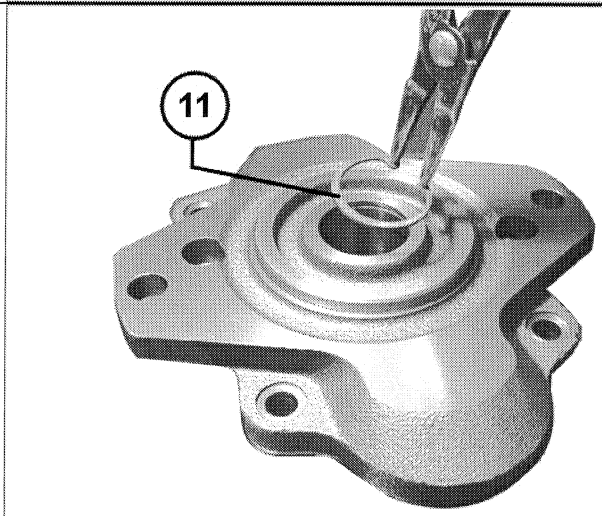
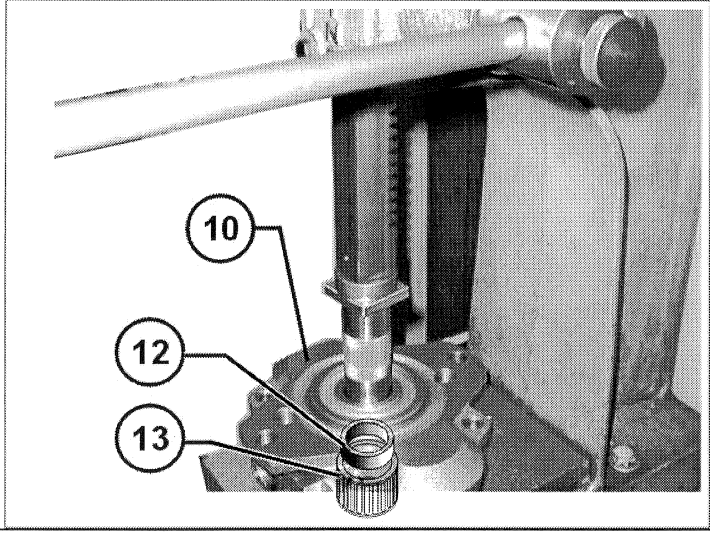
	PROCEDURE	NOTE
	Clean the pump compartment carefully. Dismount the pressure and suction hoses. Drain the oil of the pump and tank. Plug all ports. Remove the pump. Clean the pump carefully before disassembly.	After draining the oil, the plugs should be closed tight in order to prevent oil leakage and oil contamination

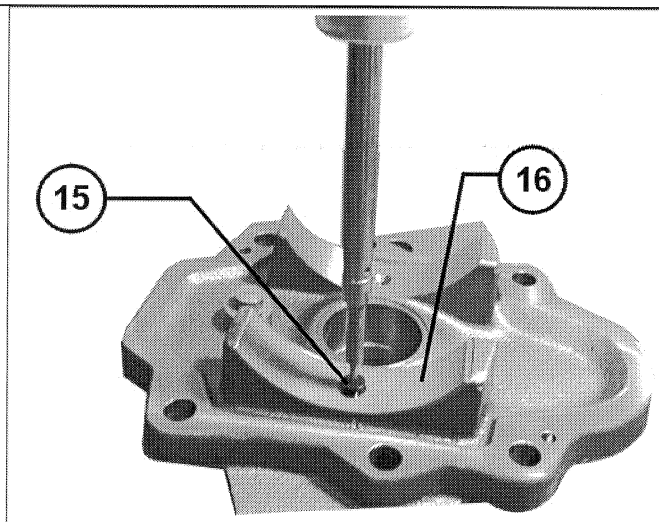
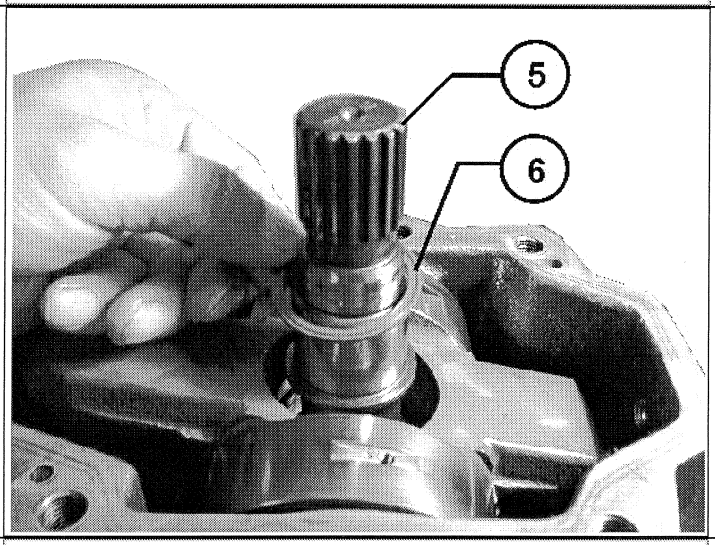
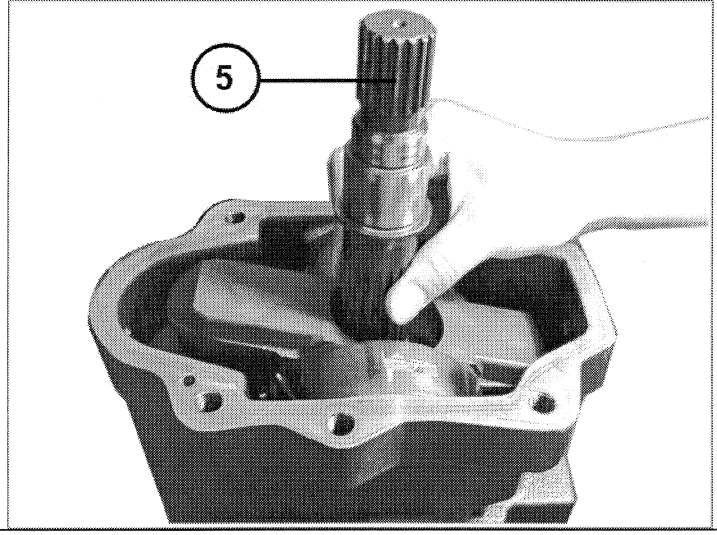
Pump disassembly

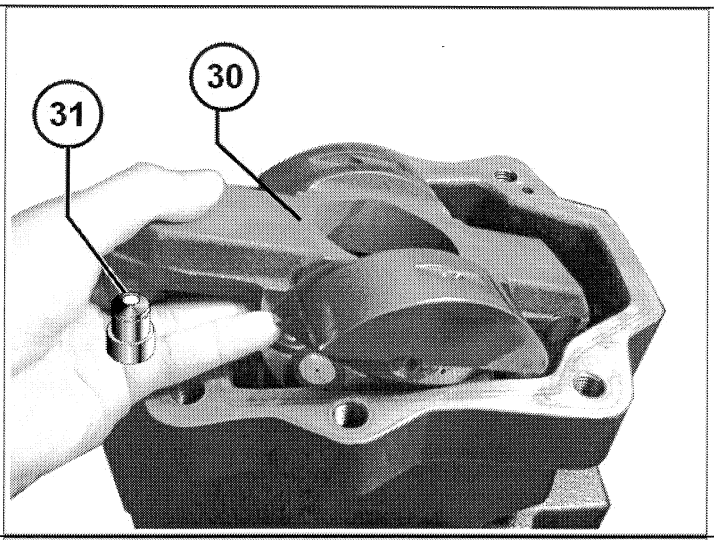
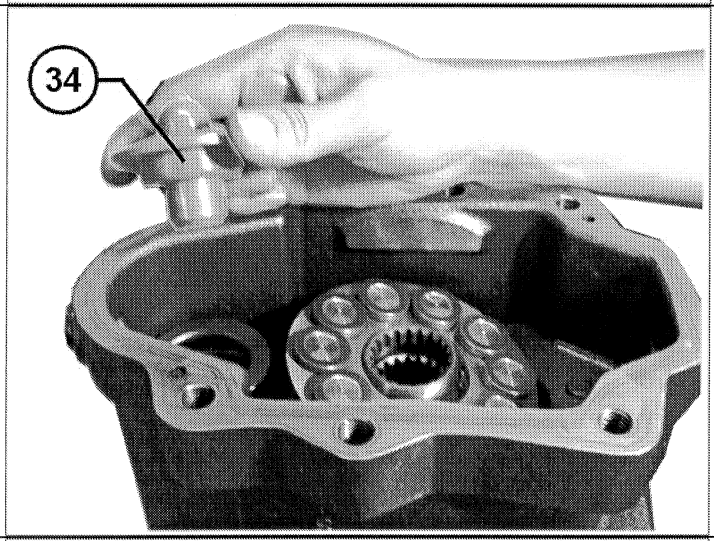
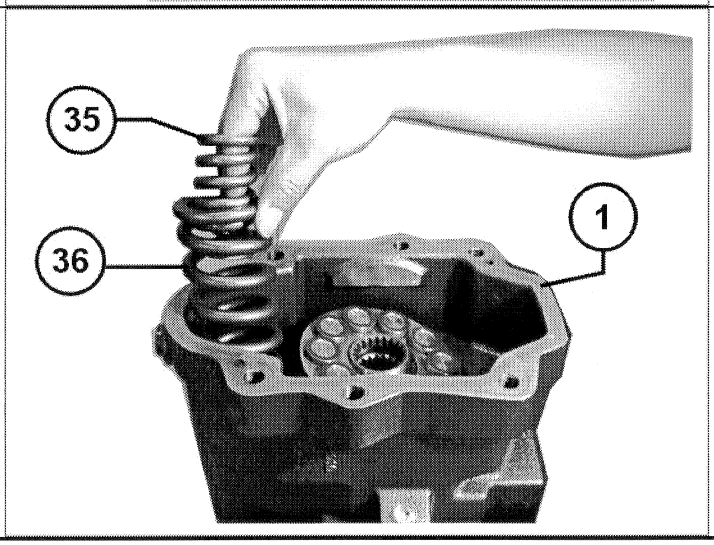
	PICTURE	PROCEDURE
		Clamp the pump with the shaft pointing downward.
		Dismount the setscrew **(39)**, nut **(41)** and seal washer **(40)**. ***BE CAREFUL*** Measure the height **„L“** before removing the setscrew. 
		Dismount the bolts **(85)** and washers **(86)**.

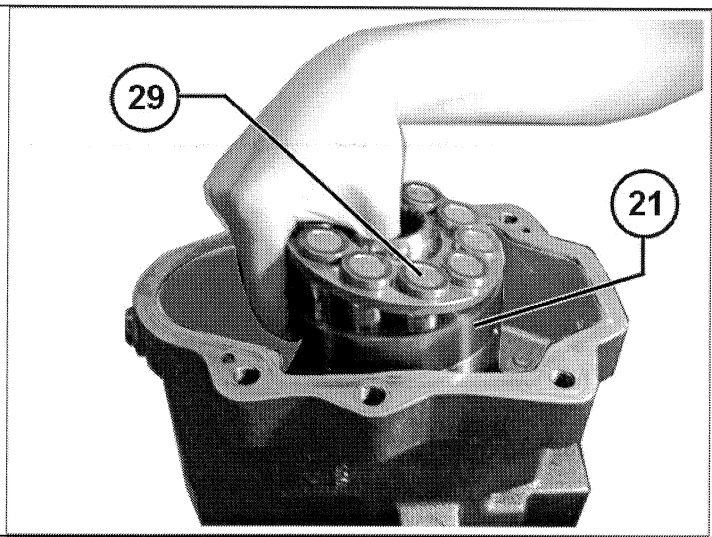
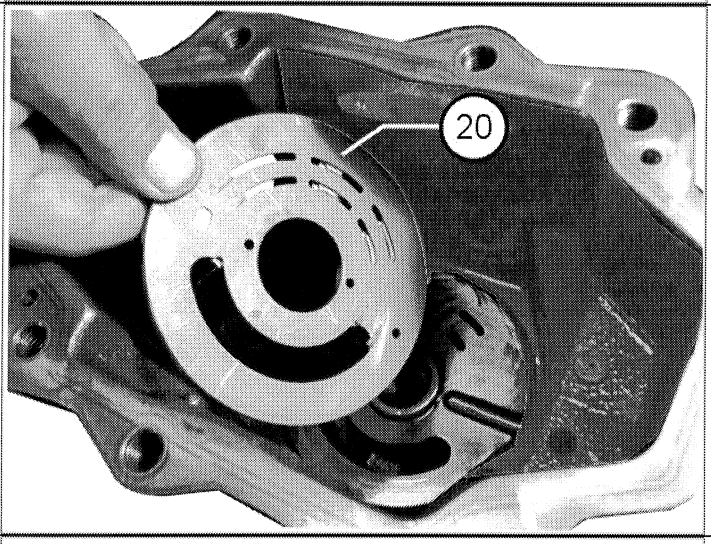
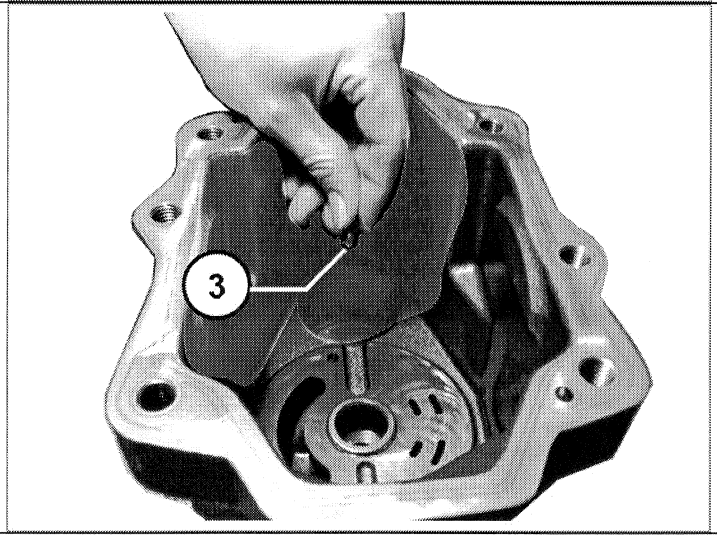
	PICTURE	PROCEDURE
		Pull out the gear pump **(80)**.
		Remove the steel ball **(65)**, O-rings **(81),(82)** and pins **(83)** and **(84)**
		Remove the control plate **(62)**.

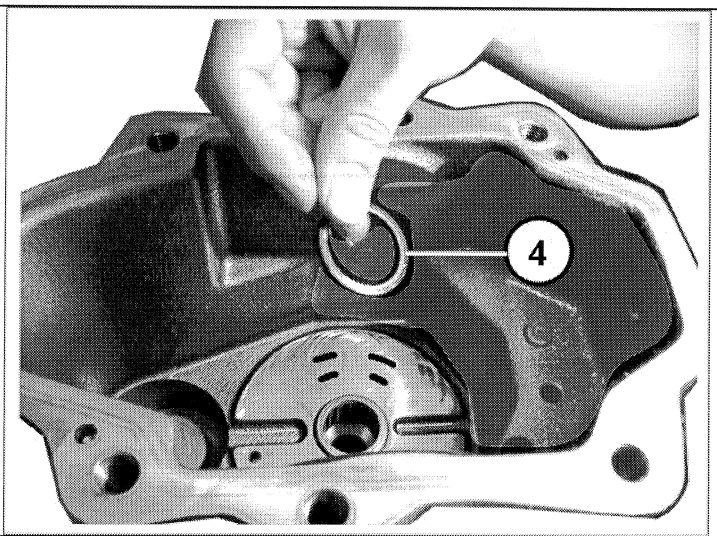
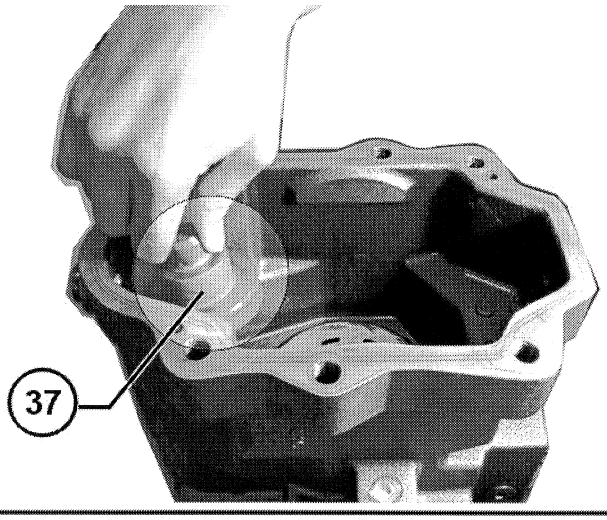
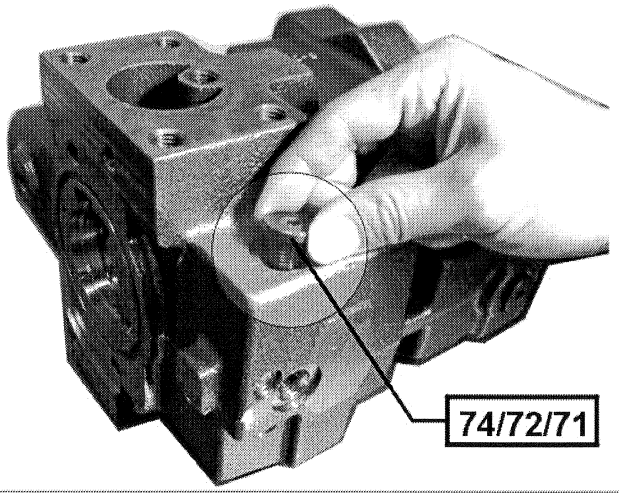
	PICTURE	PROCEDURE
		Remove the rotor assembly **(60)**.
		Fasten the pump with the pump shaft pointing upward. Unscrew the 6 bolts **(50)**. ***BE CAREFUL*** The flange plate is under pressure (spring pressure).
		Remove the flange **(10)**. ***BE CAREFUL*** Do not catch your fingers and hands between the flange and housing.

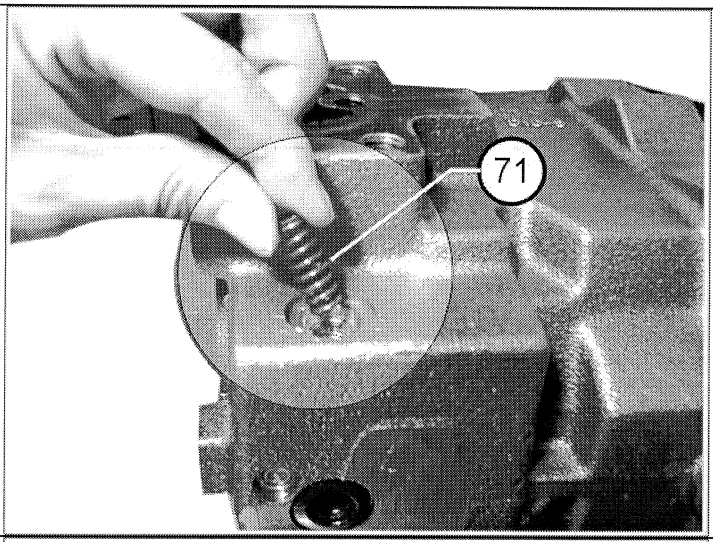
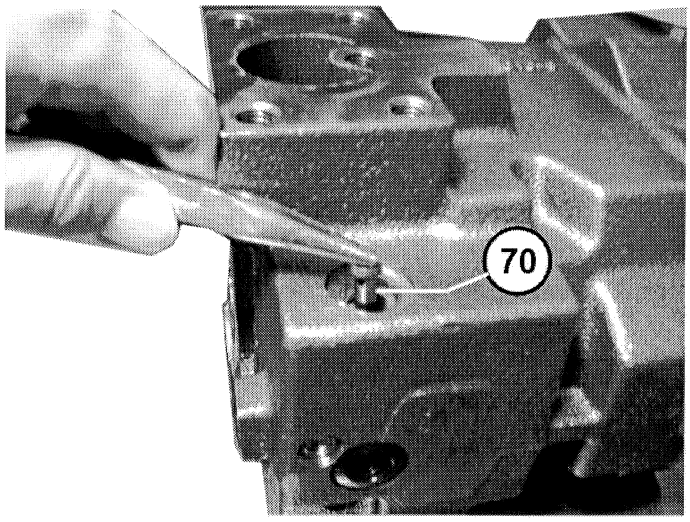
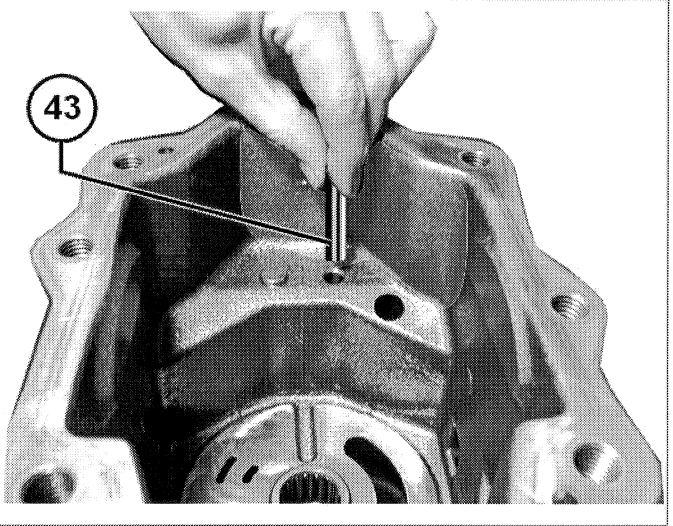
	PICTURE	PROCEDURE
		Remove the gasket **(7)** and pins **(8)** from the housing **(1)** ***BE CAREFUL*** The gasket can cause injuries on your fingers or hands.
		Take out the snap ring **(11)** ***BE CAREFUL*** The snap ring can jump out.
		Press the seal ring **(12)** as well as the needle bearing **(13)** out of the flange **(10)** by means of a hand press

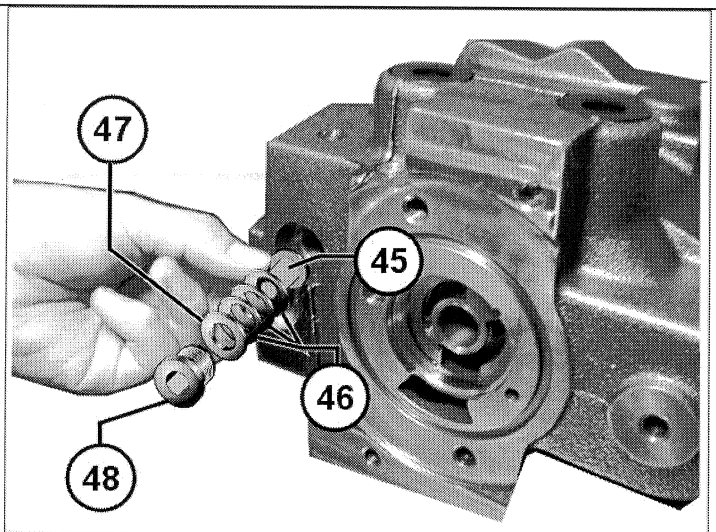
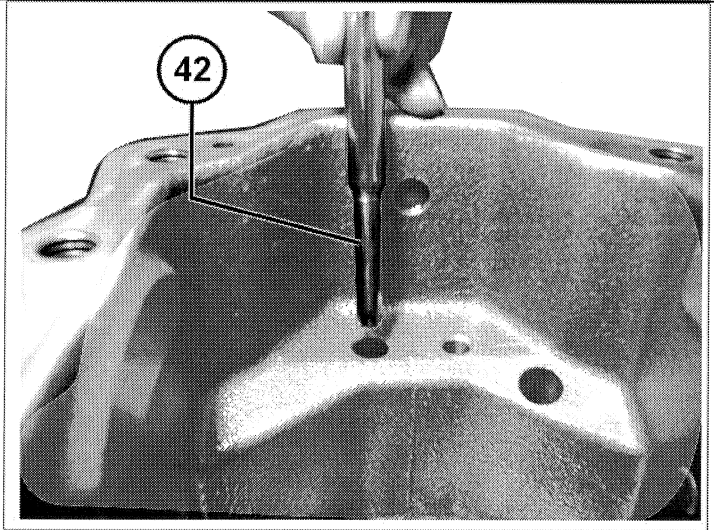
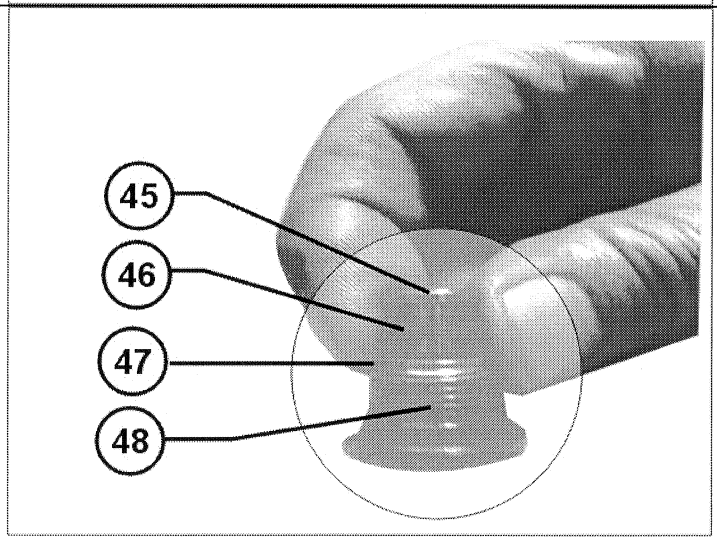
	PICTURE	PROCEDURE
		Unscrew the bolts **(15)** and remove the bearing shells **(16)**.
		Remove the thrust washer **(6)** from the shaft **(5)**.
		Extract the shaft **(5)**.

	PICTURE	PROCEDURE
		Remove the swashplate **(30)** and holder **(31)**. ***BE CAREFUL*** Handle with care to make sure that the holder **(31)** does not drop.
		Pull out the spring seat **(34)**.
		Remove the inner **(35)** and outer spring **(36)** from the housing **(1)**.

	PICTURE	PROCEDURE
		Carefully take out the cylinder block assembly **(21) / (29)**.
		Remove the valve plate **(20)**.
		Remove the pin **(3)**.

	PICTURE	PROCEDURE
		Take out the thrust washer **(4)**.
		Pull out the lower spring seat **(37)**.
		Remove the plug **(74)** from the relief valve. Pay attention to the shims at the rear of the plug. ***BE CAREFUL*** Spring **(71)** can jump out.

	PICTURE	PROCEDURE
		Take out the spring **(71)**.
		Take out the valve cone **(70)**.
		Remove the control pin **(43)**.

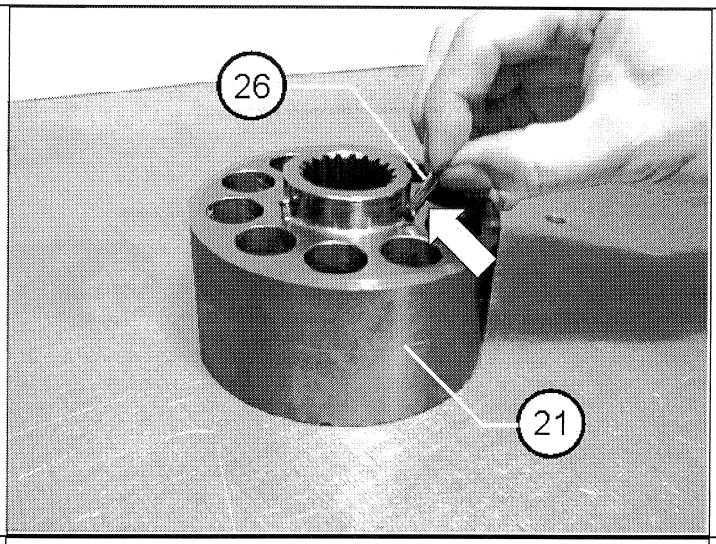
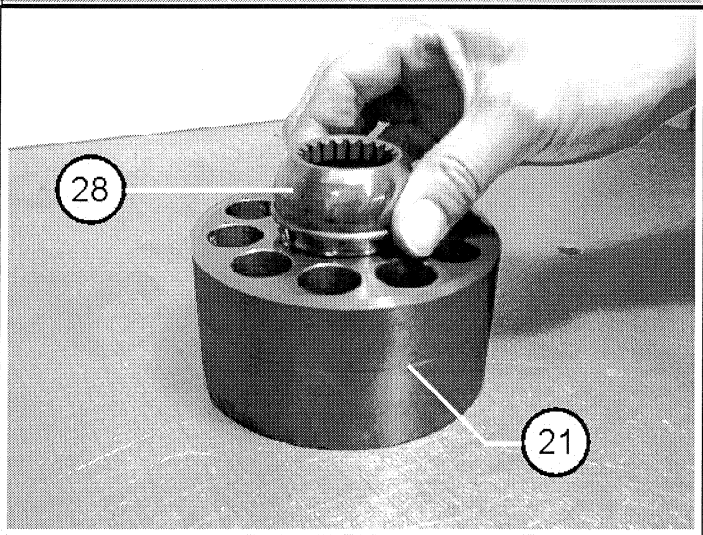
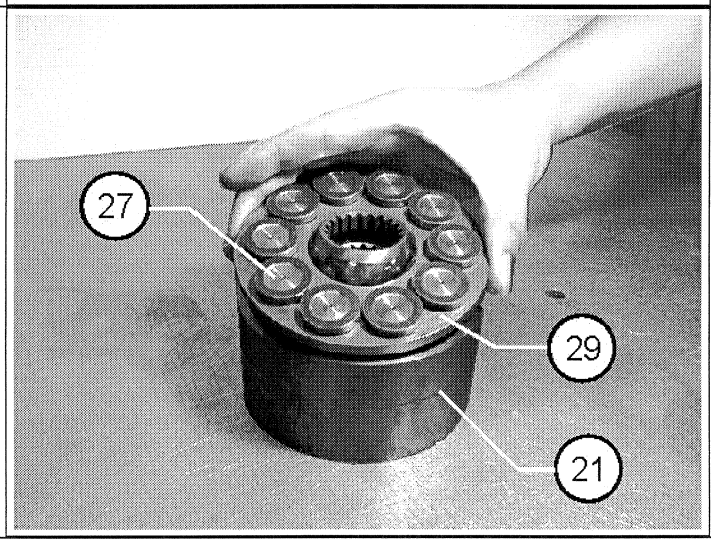
	PICTURE	PROCEDURE
		Unscrew the plug **(48)**, pay attention to the stopper **(45)**, the disk springs **(46)** and the washers **(47)**.
		Remove the control pin **(42)**.
		Remove the stopper **(45)**, the disk springs **(46)** and the washers **(47)** from the plug **(48)**.

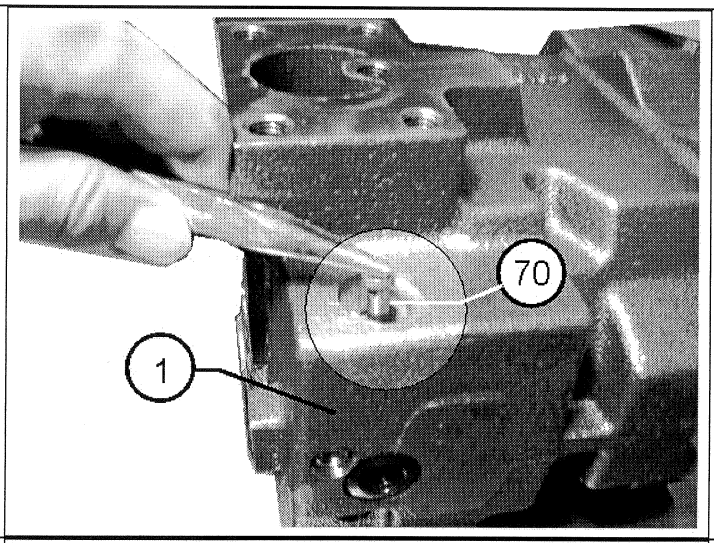
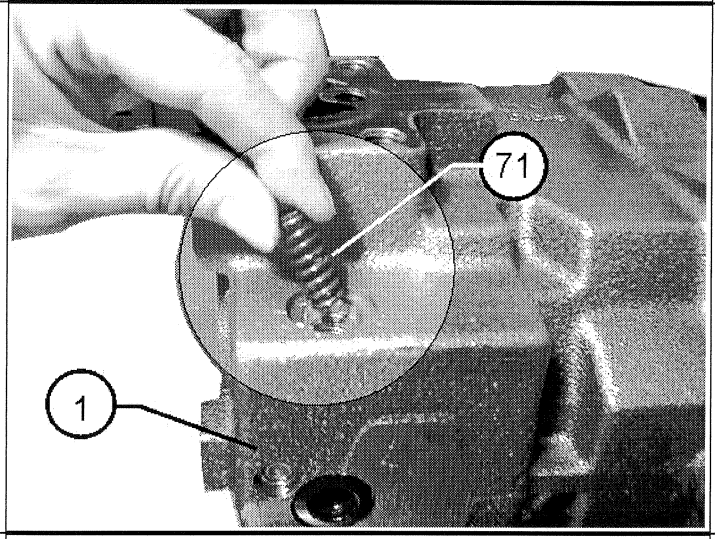
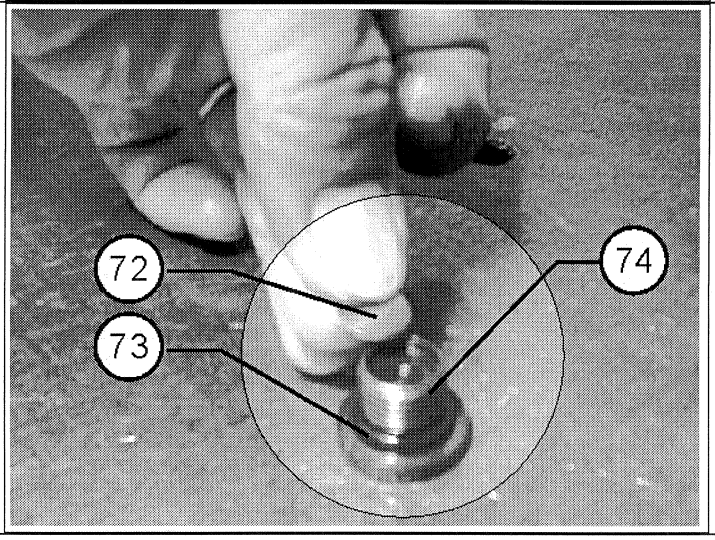
Assembly

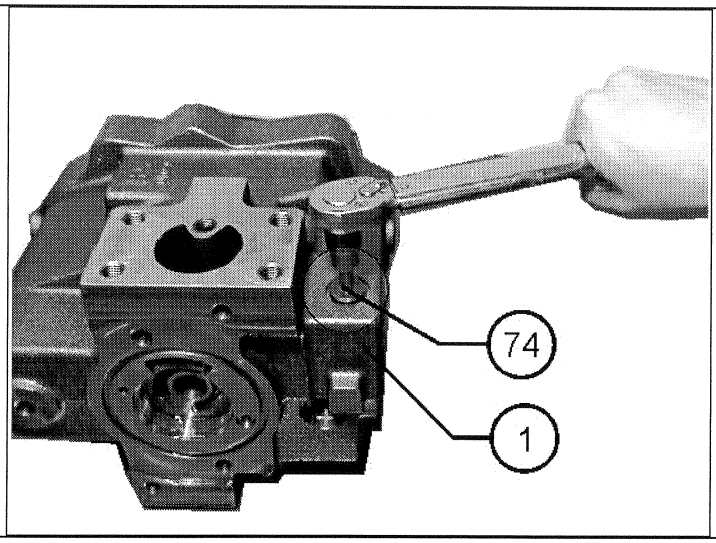
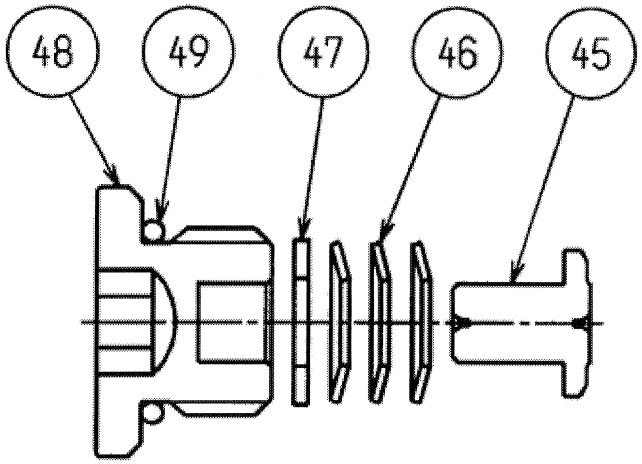
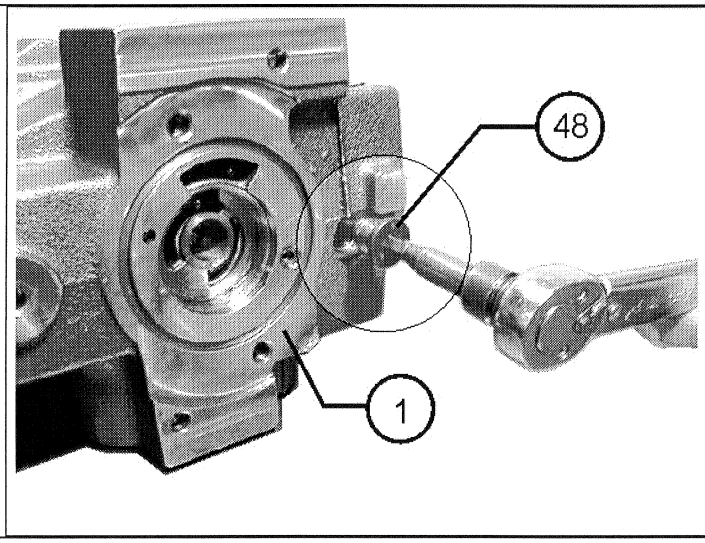
Precautionary measures prior to the assembly

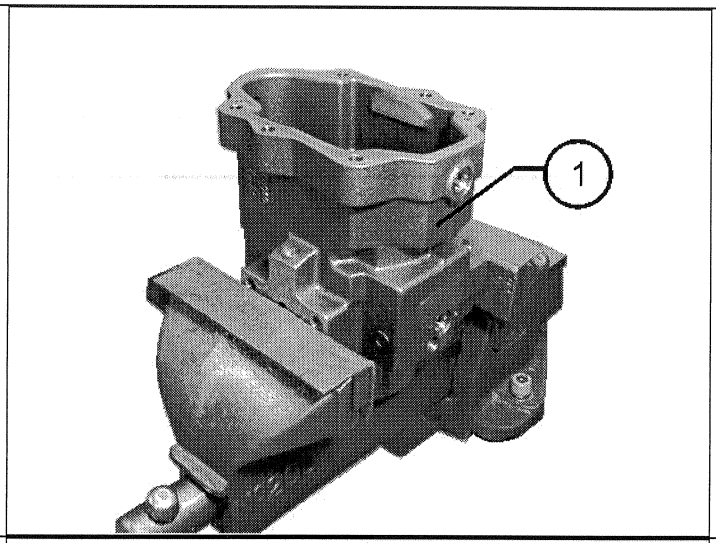
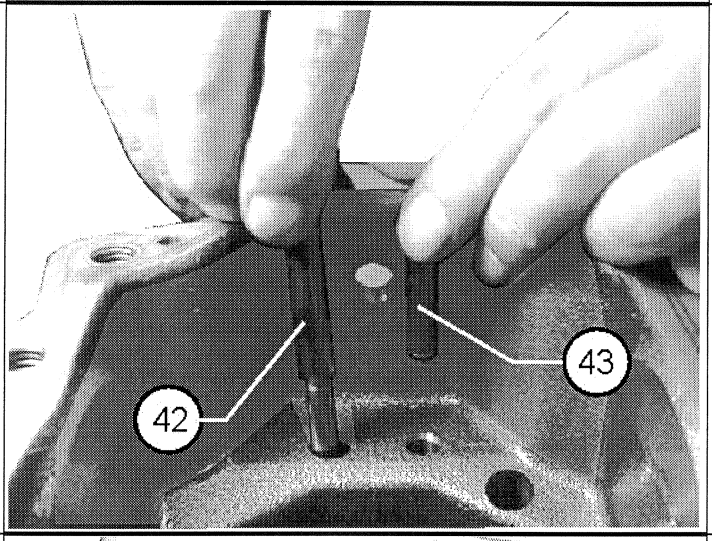
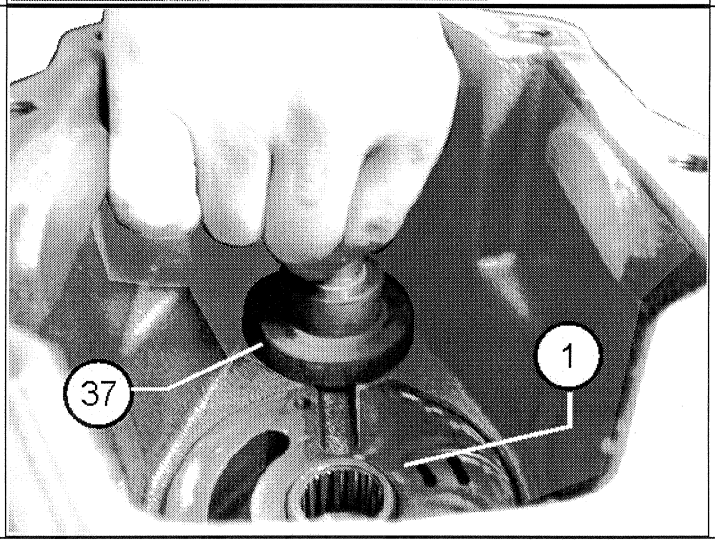
	PROCEDURE	NOTE
	Clean all parts The parts must not be damaged. Replace the seals and O-rings by new ones. Tighten the bolts, etc. with the correct torque.	Lubricate all oil seals and O-rings (especially the oil seal lip area).

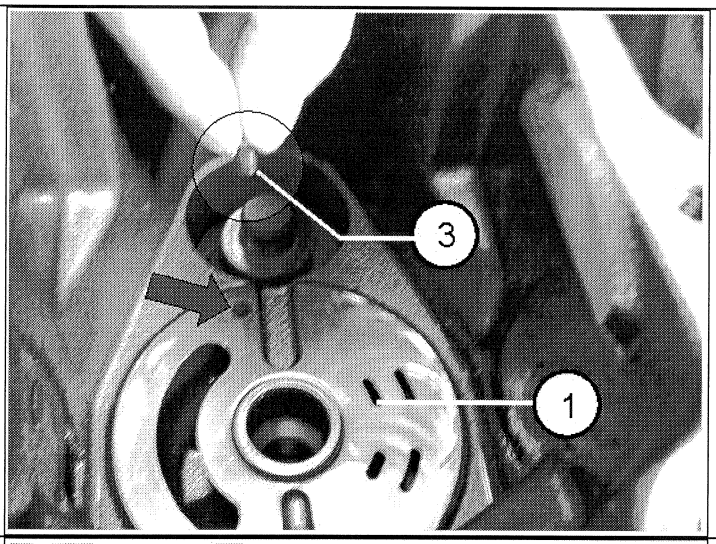
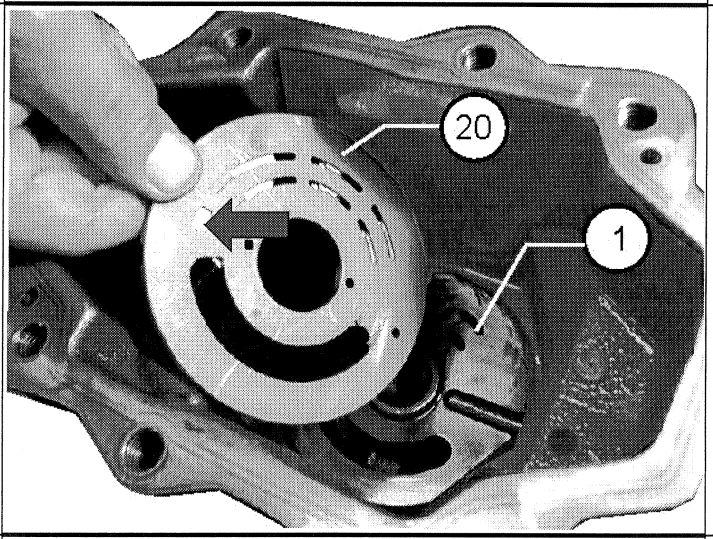
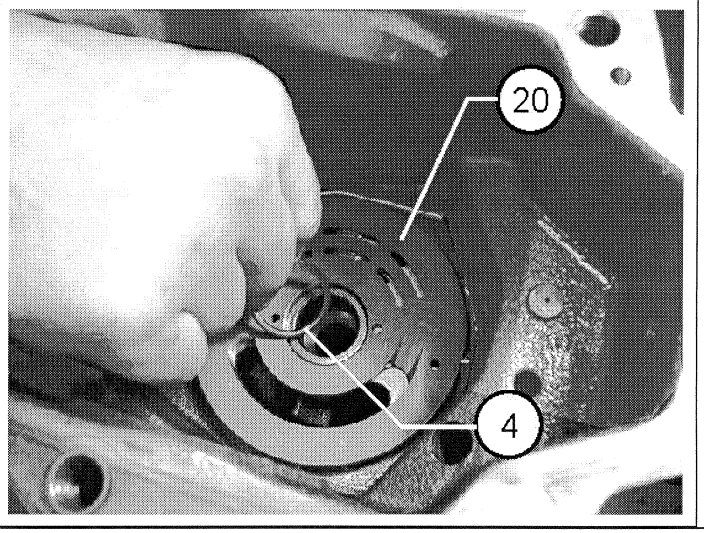
Assembly

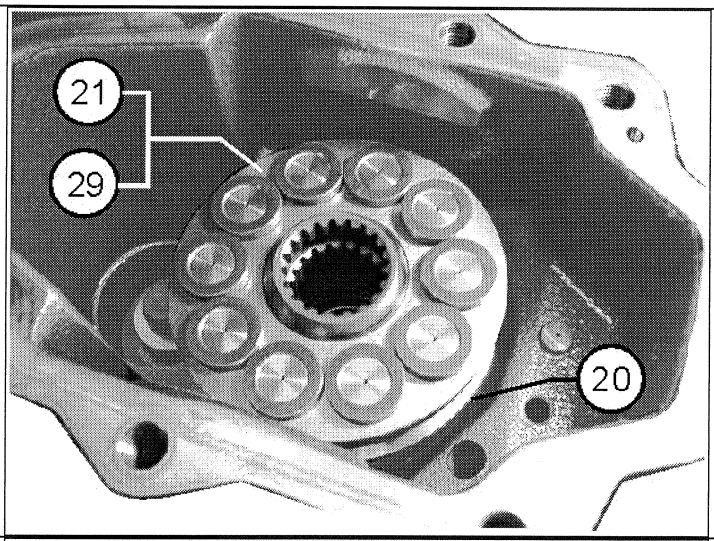
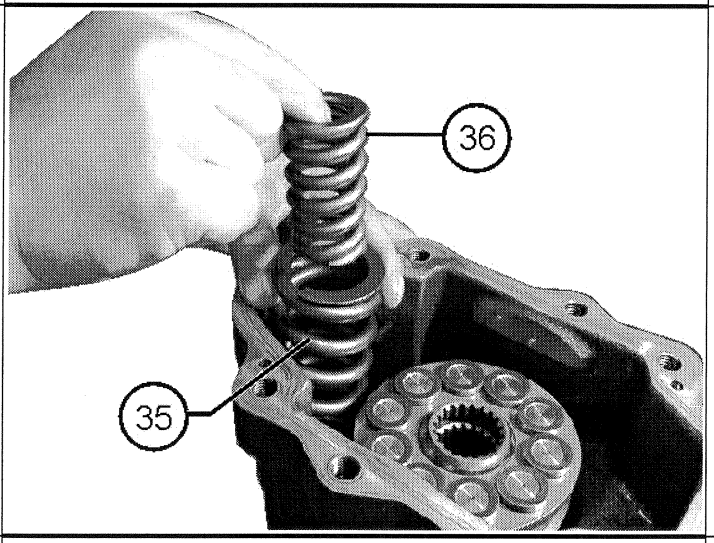
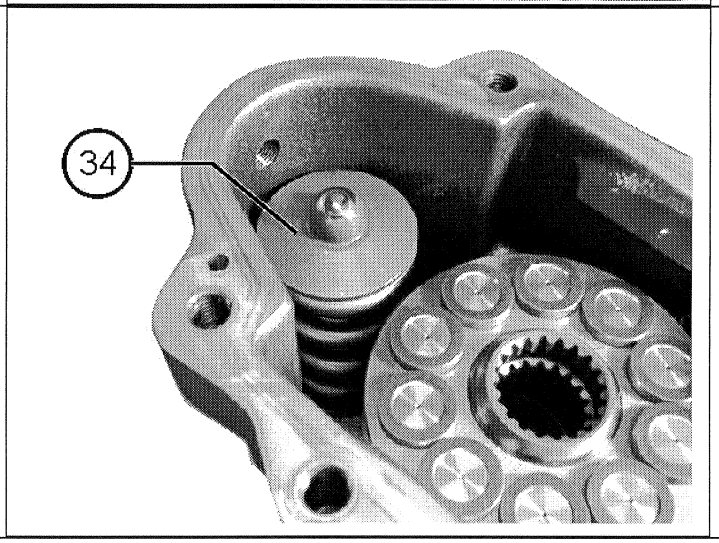
	PICTURE	PROCEDURE
		Apply grease on the three pins **(26)** and put them into the cylinder block **(21)**.
		Put the retainer holder **(28)** on the cylinder block **(21)**.
		***CAUTION*** *Do not use a hammer !* Put the piston **(27)** into the retainer holder **(29)** and install this assembly in the cylinder block **(21)**.

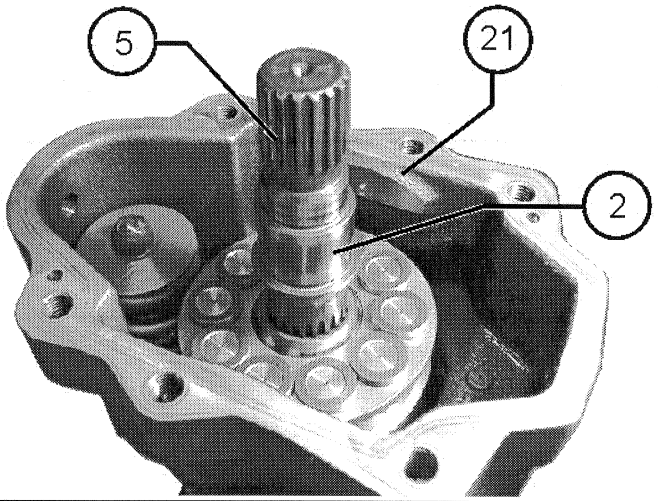
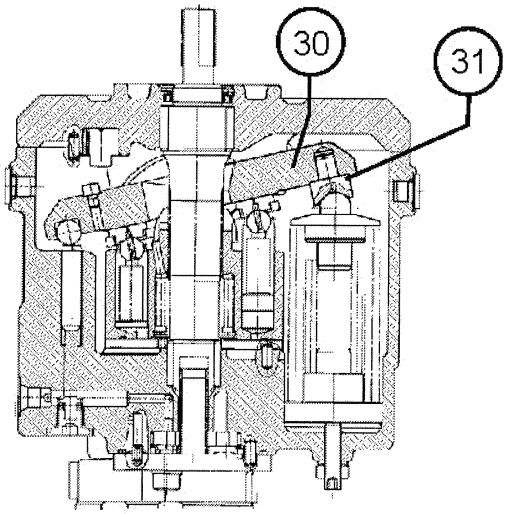
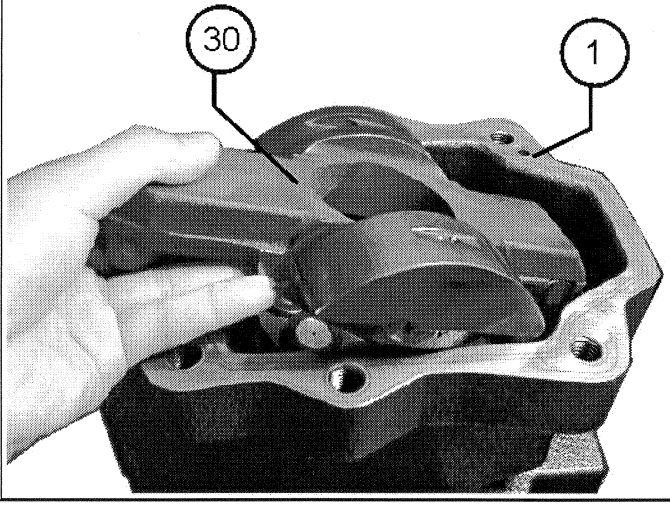
	PICTURE	PROCEDURE
		Mount the valve cone **(70)** in the housing **(1)**.
		Insert the spring **(71)** into the housing **(1)**.
		Mount the O-ring **(73)** on the plug **(74)**. Put the shim **(72)** with grease into the plug **(74)**.

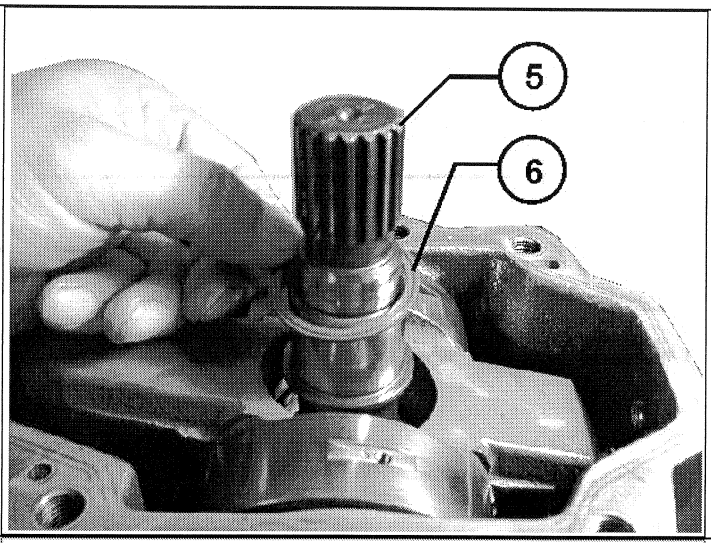
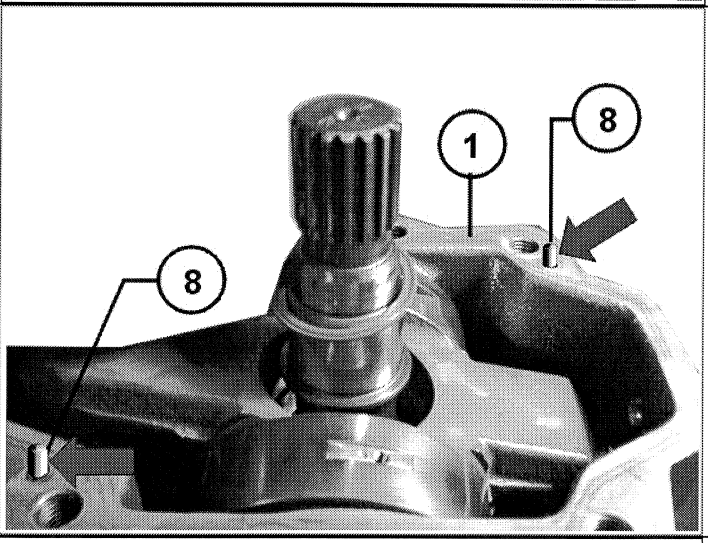
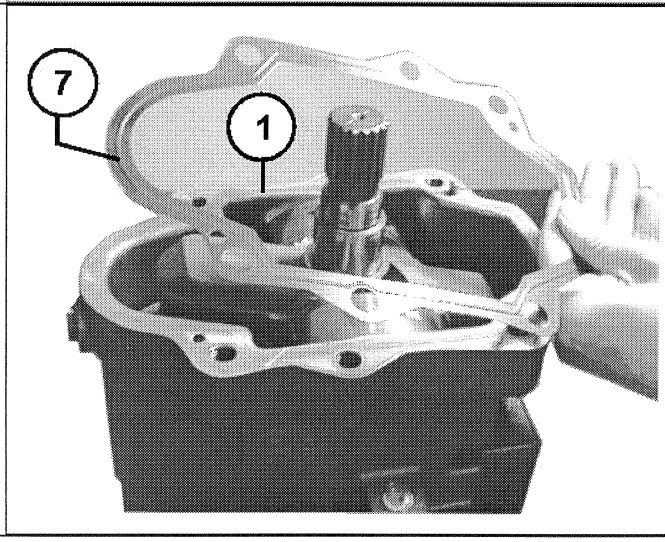
	PICTURE	PROCEDURE
		Screw the plug **(74)** into the housing **(1)**. Tightening torque: 29.4 Nm
		Mount the O-ring **(49)**, the washer **(47)**, the disk springs **(46)** and the stopper **(45)** in the plug **(48)**. ***CAUTION*** Consider the installation direction of the disk springs.
		Screw the plug **(48)** into the housing **(1)**. Tightening torque: 57.0 Nm

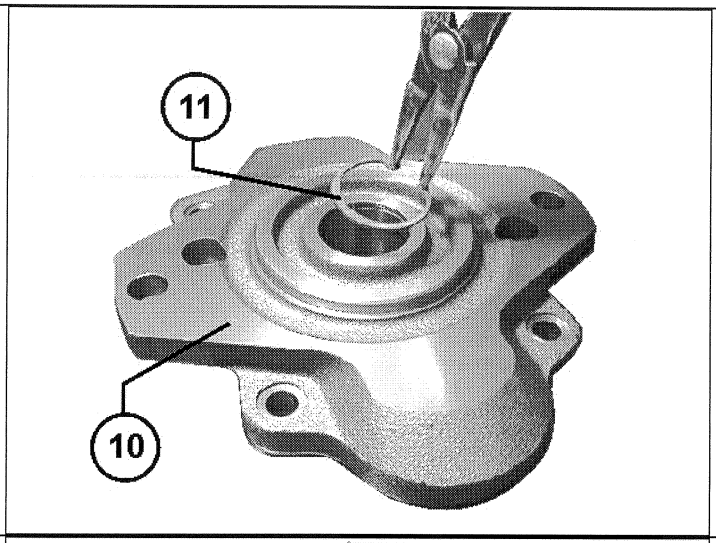
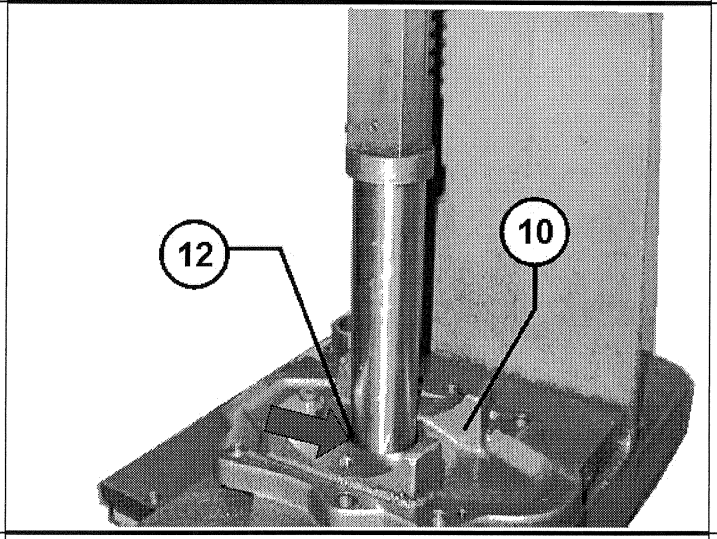
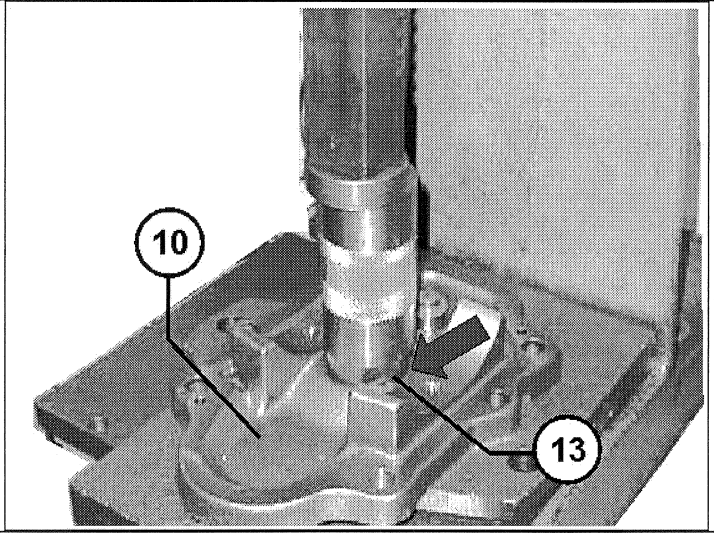
	PICTURE	PROCEDURE
		Clamp the housing **(1)** in a vice with protection pads. ***CAUTION*** Be careful that the suction port is not damaged by the vice.
		Put the control pins **(42)** and **(43)** into the housing.
		Mount the spring seat **(37)** in the housing **(1)**.

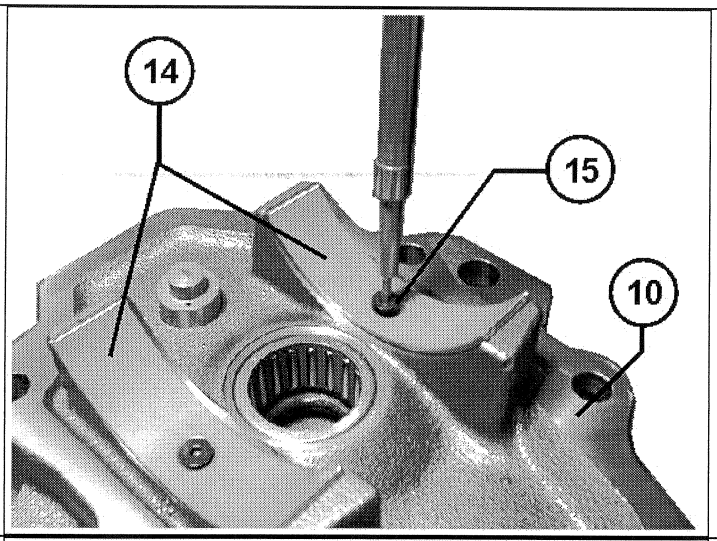
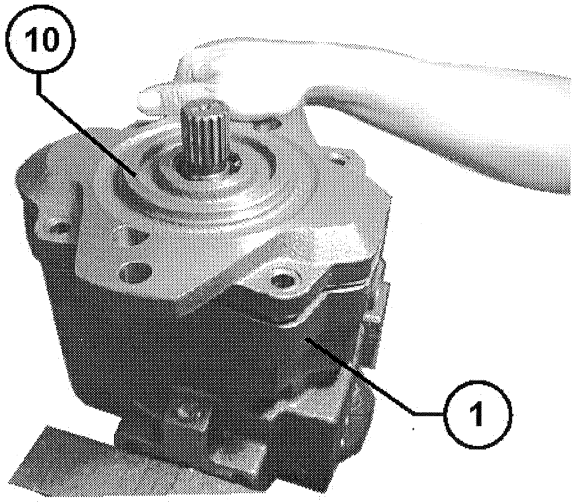
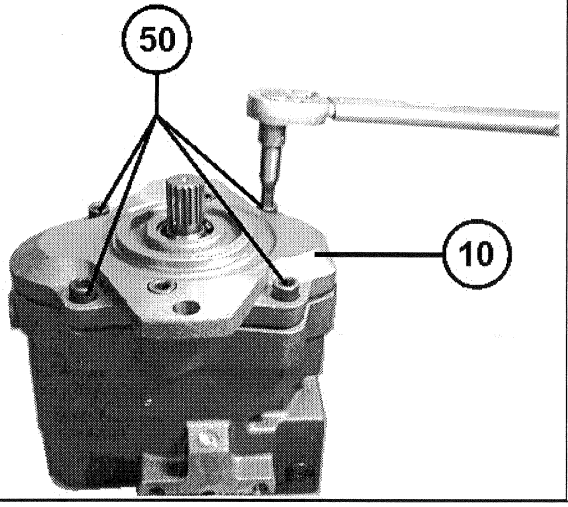
	PICTURE	PROCEDURE
		Put the pin **(3)** into the housing **(1)**, see arrow.
		Put the valve plate **(20)** into the housing **(1)**. The copper alloy must point upward. The pin **(3)** must engage (see arrow).
		Put the thrust washer **(4)** into the valve plate **(20)**.

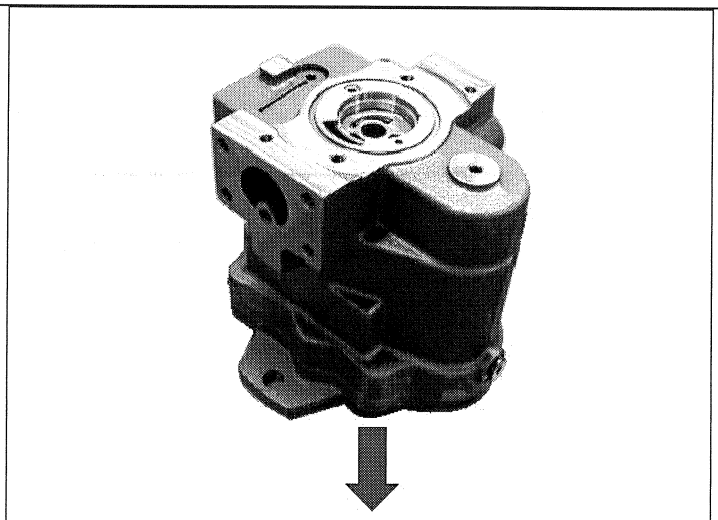
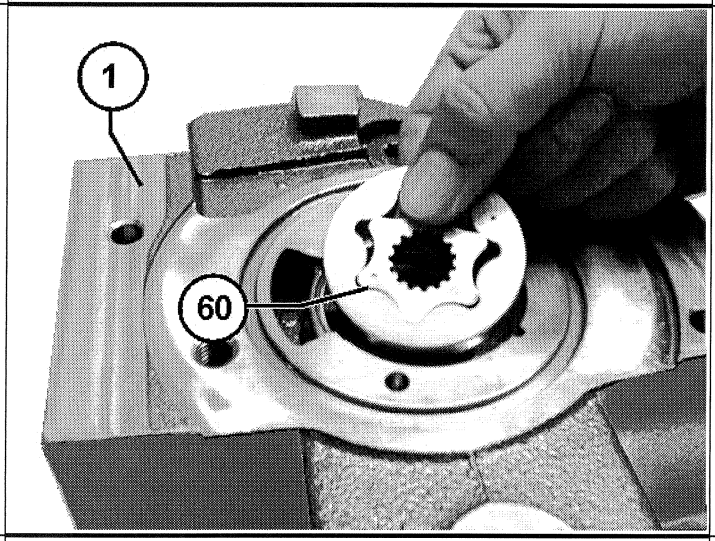
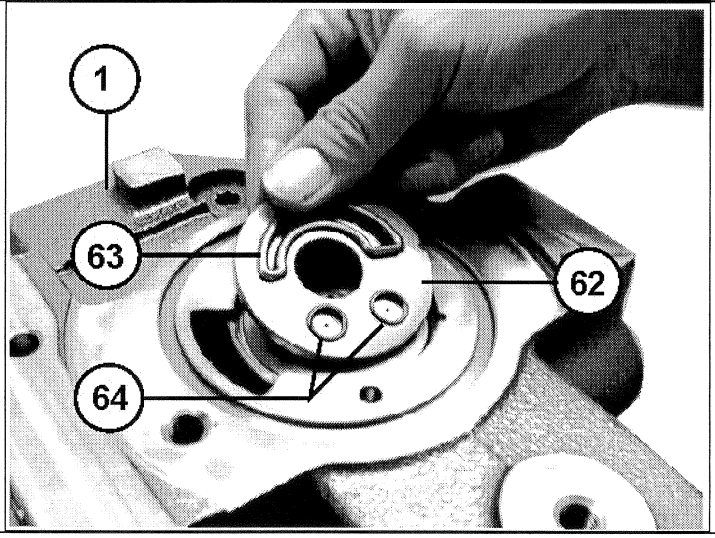
	PICTURE	PROCEDURE
		Put the cylinder block assembly **(21)** and **(29)** on the valve plate **(20)** rubbed with oil. ***CAUTION*** Be careful that the valve plate and rotor assembly are not damaged.
		Mount both springs **(35)** and **(36)**. ***CAUTION*** Be careful that the valve plate and rotor assembly are not damaged.
		Insert the spring seat **(34)**.

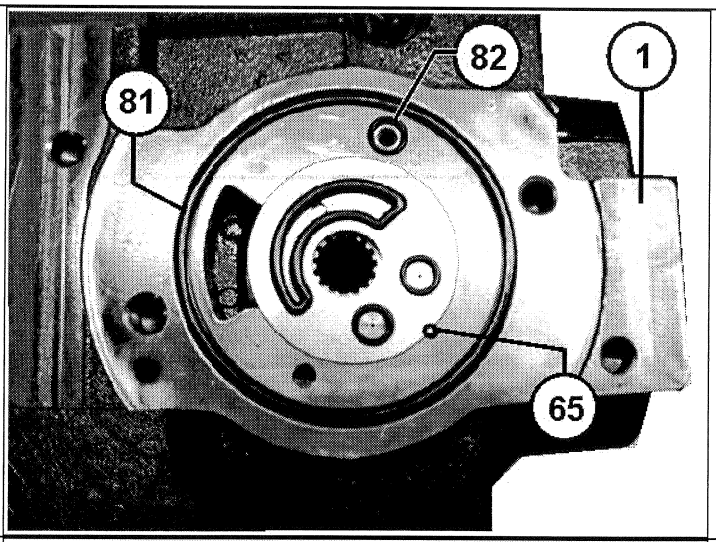
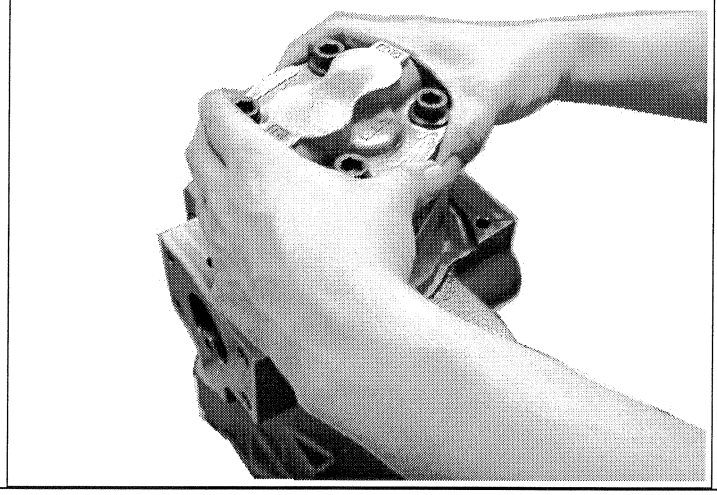
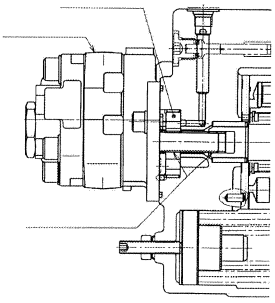
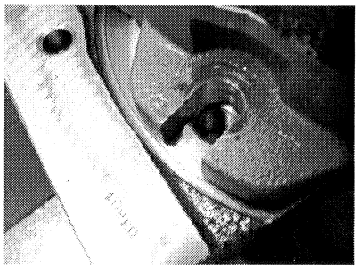
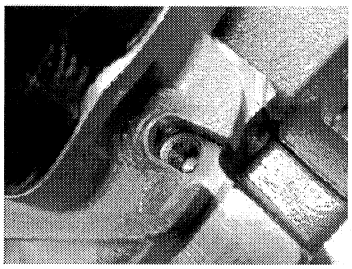
	PICTURE	PROCEDURE
		Mount the shaft **(5)** in such a manner that the grooves in the cylinder block **(21)** and the needle bearing **(2)** match. ***CAUTION*** Be careful that the swashplate, valve group and rotor assembly are not damaged.
		Apply grease on the holder **(31)** and mount it in the swashplate **(30)**.
		Put the swashplate **(30)** into the housing **(1)**. ***CAUTION*** Be careful that the swashplate and rotor assembly are not damaged. Handle with care that the holder does not drop **(31)**.

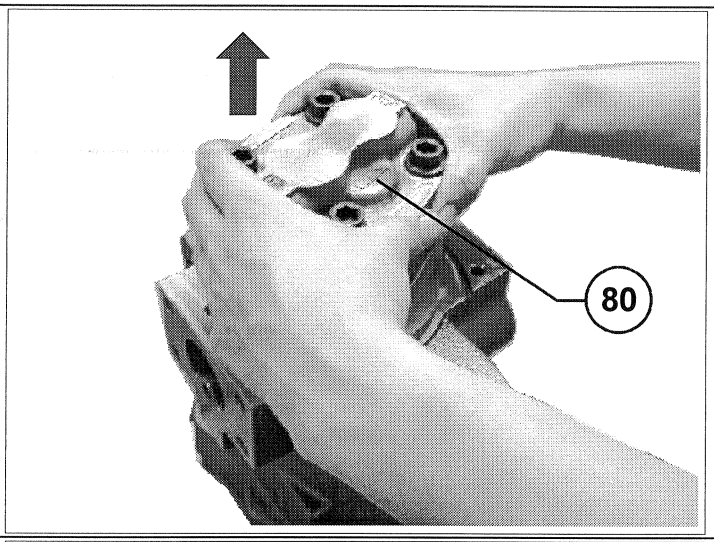
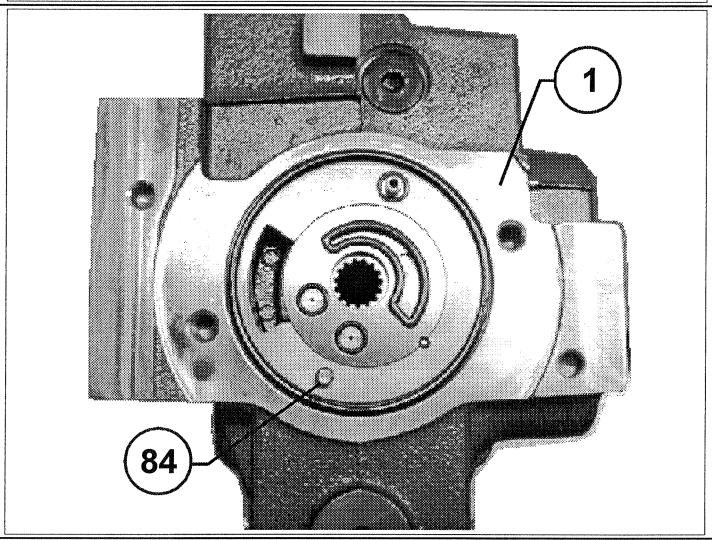
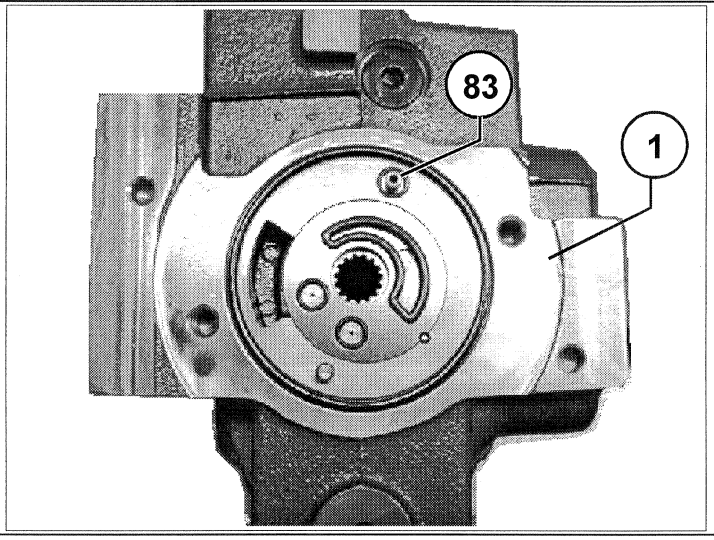
	PICTURE	PROCEDURE
		Put the thrust washer **(6)** on the shaft **(5)**.
		Insert the pins **(8)** into the housing **(1)**.
		Put the gasket on **(7)** on the housing **(1)**. ***CAUTION*** The gasket can cause injuries on your fingers or hands.

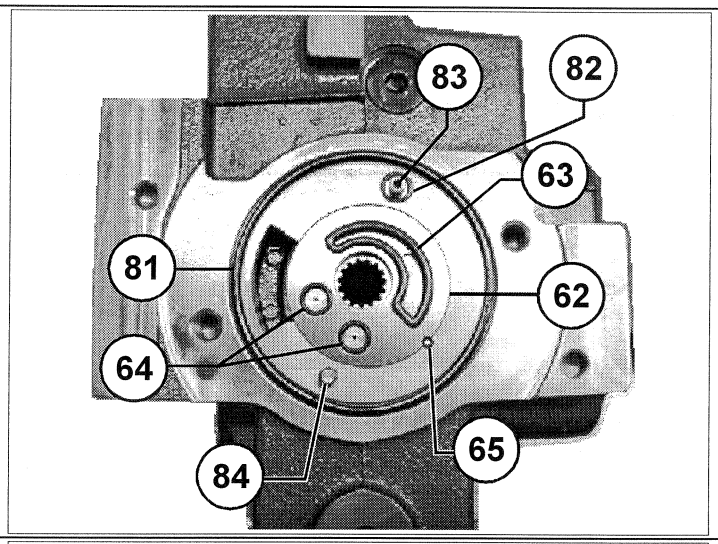
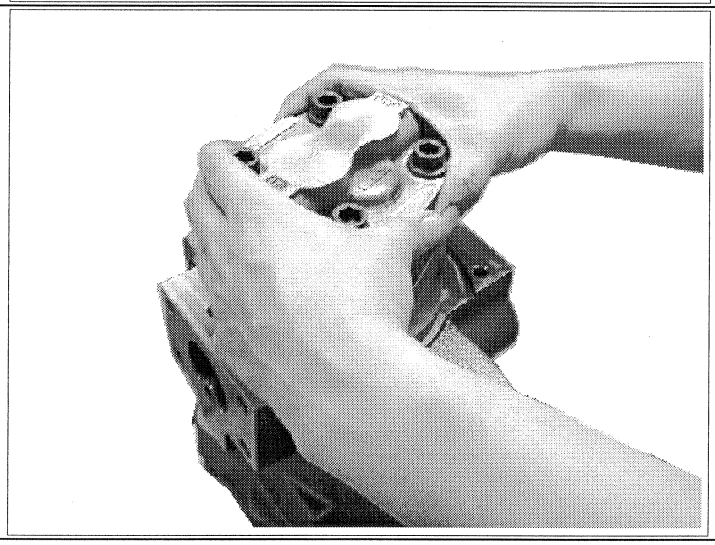
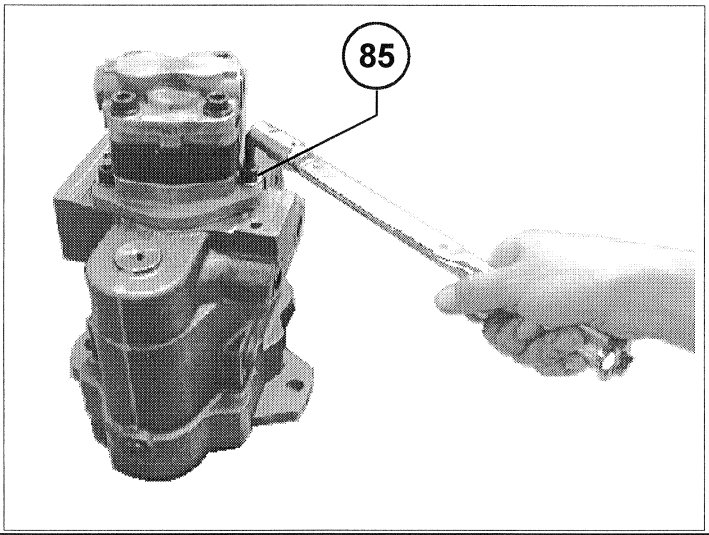
	PICTURE	PROCEDURE
		Mount the snap ring **(11)** in the flange **(10)**. ***CAUTION*** The snap ring can jump out.
		Press the shaft seal ring **(12)** into the flange **(10)** from the inside by using an appropriate tool.
		Press the needle bearing **(13)** carefully into the flange **(10)**. ***CAUTION*** The type description at the bearing should point to the front. The pressing height measure can be found in the following.

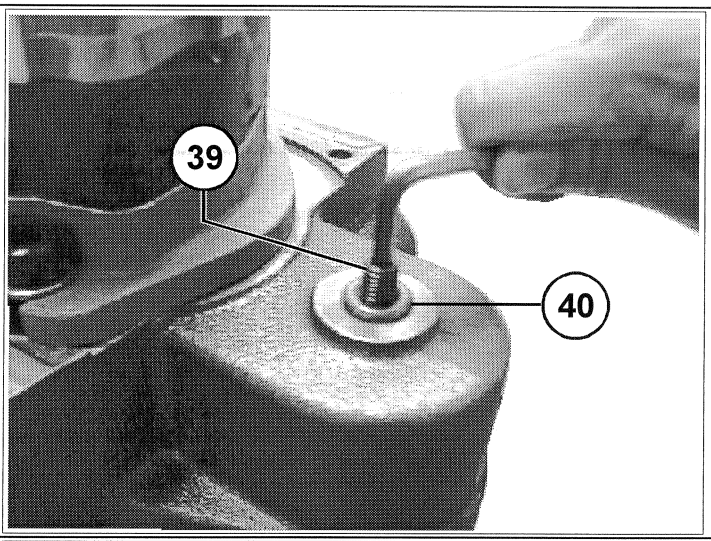
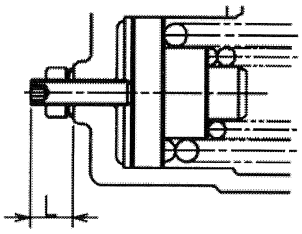
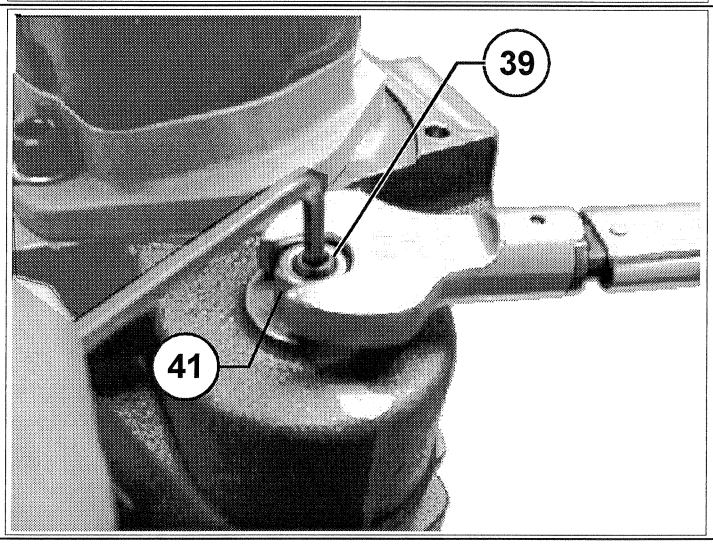
	PICTURE	PROCEDURE
		Fix the flange **(10)**. Fasten the bearing shells **(14)** with the two bolts **(15)**. Tightening torque: 5.9 Nm
		Mount the flange **(10)** on the housing **(1)**. The shaft **(5)**, needle bearing **(13)** and pin **(8)** must match. ***CAUTION*** Do not catch your fingers or hands between the flange and housing.
		Fasten the flange **(10)** with six bolts **(50)**. Tightening torque: 106.9 Nm ***CAUTION*** (Tighten crosswise)

	PICTURE	PROCEDURE
		Clamp the pump with the shaft pointing downward.
		Put the rotor assembly **(60)** into the housing **(1)**.
		Mount the O-rings **(63)** and **(64)** in the plate **(62)**, put the plate **(62)** into the housing **(1)**.

	PICTURE	PROCEDURE
		Put the steel ball **(65)** and the O-rings **(81)** and **(82)** on the housing **(1)**. ***CAUTION*** The steel ball can fall out.
		Fix the gear pump temporarily and adapt it to the internal spline of the rotor assembly and the shaft of the piston pump. 
	 	Rotate the gear pump housing until the threaded hole and flange hole are in alignment.

	PICTURE	PROCEDURE
		Pull out the gear pump **(80)** carefully. ***CAUTION*** Pay attention that the plate and steel ball do not get loose when pulling out the gear pump.
		Insert the pin **(84)** into the housing **(1)**. ***NOTE*** The pin **(84)** is hardened.
		Insert the pin **(83)** into the housing **(1)**. ***NOTE*** The pin **(83)** is hollow. ***CAUTION*** The pins must not be mixed up.

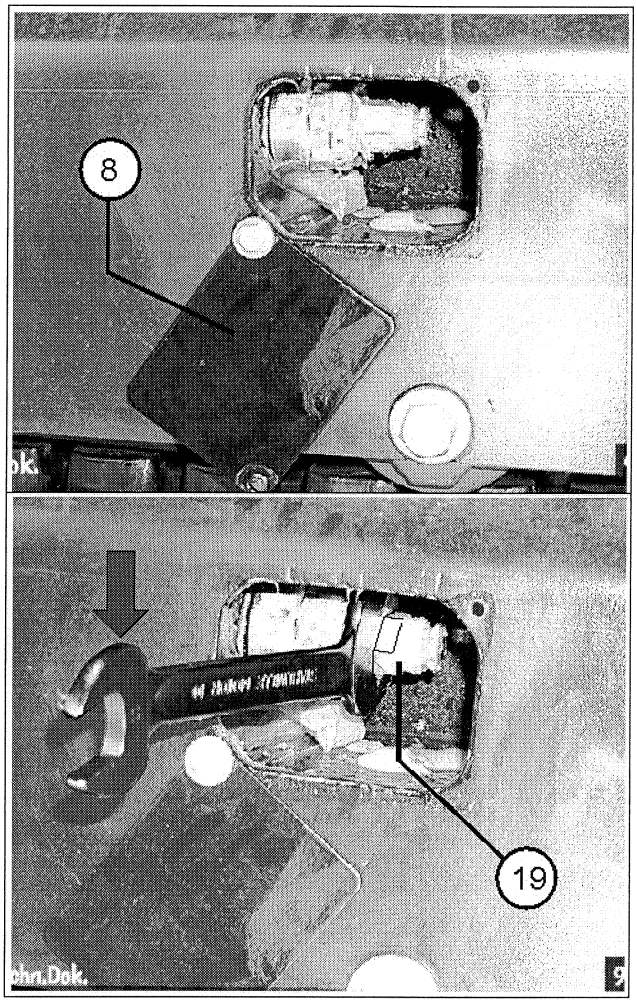
	PICTURE	PROCEDURE
		Check the surface for cleanliness. Make sure that the following parts are installed: a) O-rings **(63/64) (81/82)** b) Plate **(62)** c) Steel ball **(65)** d) Pins **(83/84)**
		Position the gear pump on the housing. ***ATTENTION*** Do not use a hammer !
		Fasten the gear pump with two bolts **(85)**. Tightening torque: 44.1 Nm

	PICTURE	PROCEDURE
		Mount the setscrew **(39)**, tighten it to same height as before the disassembly **(L)**. 
		Mount the sealing washer **(40)** and tighten the nut **(41)**. Tightening torque: 15.7 Nm ***CAUTION*** Hold the setscrew **(39)** with a wrench while tightening the nut **(41)**.

Remove the travel gear

Park the machine in a safe place:

- Observe the safety and accident prevention regulations of the operating manual.
- Leaking agents such as fuel, hydraulic oil, engine oil or coolants are harmful to the environment.
- Prepare receptacles which are big enough to collect the corresponding quantities
- Collect fluids drained off to reuse them or dispose of them according to the regulations
- Plug the ports, lines and hoses.

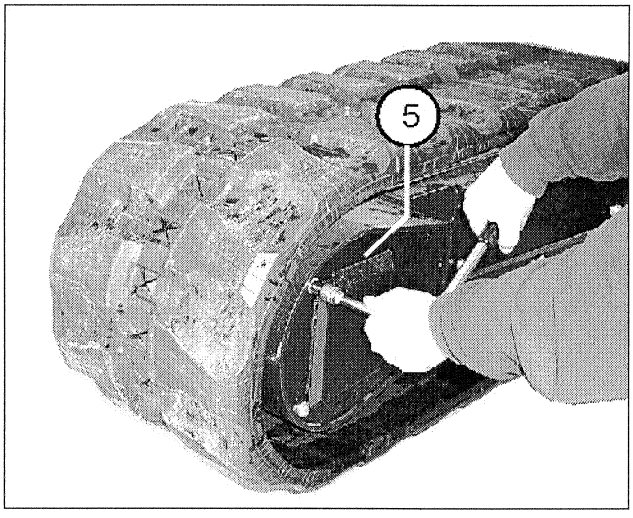


Release the crawler track

- Unscrew the cover **(8)** of the undercarriage (SW 13).

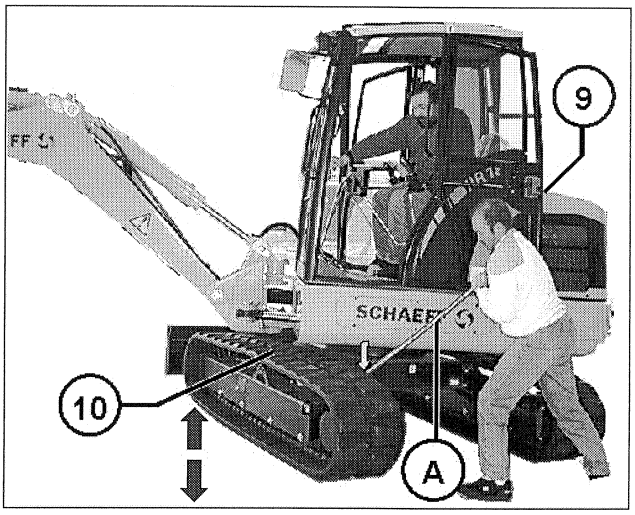
- Loosen and unscrew the track tensioning valve **(19)** until grease escapes at the thread of the track tensioning valve.
- The track is released when there is no longer grease escaping at the track tensioning valve **(19)**
- Remove the grease from the undercarriage and dispose of it according to the regulations.

- Unscrew the cover **(5)** above the travel motor (SW 13).



Dismount

- Slew the uppercarriage at right angles to the excavator direction.
- Lift the corresponding crawler carriage by means of the boom (jack up and secure the undercarriage).
- Dismount the released track from inside by means of a mounting bar **(A)** with the help of another person. Let the track fall off extremely ***carefully*** and ***slowly***.



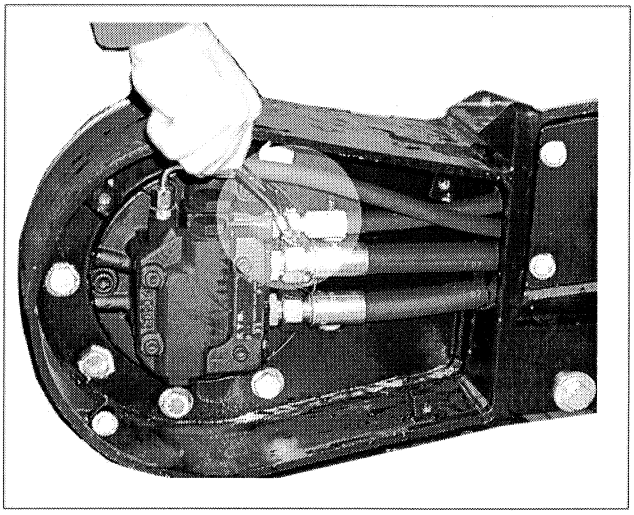
Attention !

– Danger of accident !

- Pull the rubber track **(10)** aside.

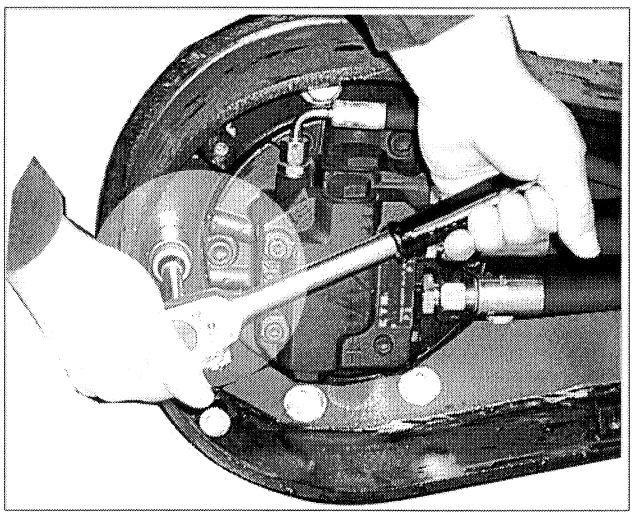
Dismount the hoses

- Turn the engine off
- Unscrew the ventilation filter **(9)** of the hydraulic tank (the tank is thus de-pressurized)
- Release the hydraulic system by operating the control elements several times.
- (Connect a vacuum pump at the ventilation filter thread to prevent that the hydraulic oil from the tank continues to flow out of the unplugged hoses).
- Mark the hoses before removing them.
- Unscrew the hoses.
- Plug the open hoses as well the motor ports with clean blind plugs.



Dismount travel gear assembly with motor

- Remove the fastening bolts.
- Assembly of a new or replacement gear with motor analogous.



- Should foreign particles (dirt, abrasion, etc.) be found in the hydraulic system, clean it or flush it. Replace the filter and top up new oil.

EINFÜHRUNG

Leistung und Lebensdauer der Antriebselemente sind nicht nur von regelmässiger und ordnungsgemässer Wartung, sondern auch vom rechtzeitigen Eingreifen bei auftretenden Störungen oder Pannen abhängig.
Bei der Erstellung dieses Handbuches sind wir von einer vollständigen Überholung der Triebachse ausgegangen.
Es versteht sich, dass der Mechaniker selbst von Fall zu Fall den notwendigen Arbeitsgang wählt.
Dieses Handbuch ermöglicht während der Reparatur sicher und gezielt vorzugehen. Photos und Skizzen zeigen deutlich wie die Eingriffe vorzunehmen sind.
Nachstehend sind alle Informationen und Hinweise aufgeführt um den sachgemässen Aus- und Einbau der einzelnen Bestandteile sowie deren Überprüfung und eine korrekte Montage vornehmen zu können.

WICHTIG: Bei allen Vorgängen ist es empfehlenswert geeignete Werkzeuge wie Stützen oder Werkbänke, Kunststoff oder Kupferhammer, Abziehvorrichtungen und spezifische Schlüssel zu benützen um die Arbeit zu erleichtern und zu beschleunigen, sowie um bearbeitete Flächen zu schützen und, nicht zuletzt, zur Sicherheit des Monteurs. Vor dem Ausbau die Triebachse gründlich reinigen, Verkrustungen und Fettanhäufungen entfernen, dann das Schmieröl ablassen.

VORAUSSETZUNG

Alle ausgebauten Antriebselemente müssen gründlich mit geeigneten Mitteln gereinigt, repariert bzw. ersetzt werden, wenn Beschädigungen wie Verschleißerscheinungen, Anrisse oder Freß-spuren festgestellt werden. Die Gleitelemente wie Lager, Nadelkäfige, Anlaufscheiben, die Zahnräder, das Kegel- u. Tellerradpaar, die Wellen, die Dichtelemente wie O-Ringe, die Wellendichtringe welche den Abnützungen besonders ausgesetzt sind, müssen ausführlichst überprüft werden.

Wir empfehlen die Dichtelemente bei jeder Reparatur oder Revision zu ersetzen.
Dichtringe sind vor der Montage einzufetten.
Kegel- und Tellerrad müssen gemeinsam ersetzt werden. Beim Zusammenbau sind die vorge-schriebenen Werte für Spiele und Vorspannungen einzuhalten.

WARTUNG- UND REPARATUR

Um unseren Kunden die Reparatur von Getrieben und- Triebachsen zu erleichtern, haben wir diese Wartungs-und Reparaturanleitung verfasst. Die Zeichnungen der zur Reparatur erforderlichen, spezifischen Werkzeuge können über uns bezogen werden.

INTRODUCTION

The efficiency and continued operation of mechanical units depend on constant and correct maintenance and also on efficient repair work should there be break-down or malfunctioning.
The instructions in this manual have been made out based on a complete overhaul of the unit. However the mechanic must decide whether or not it is necessary to dismantle the individual components when only localised repair work is needed.
The manual provides a quick and sure guide which, with the use of photographs and diagrams illustrating the various phases of the operations, allows accurate work to take place.
Therefore all the information needed for correct disassembly, the relative checks and assembly of each individual component, have been written down.

IMPORTANT: Throughout the phases of repair or maintenance work it is advisable to use purpose-built equipment such as: trestles, or supporting benches, plastic or copper hammers, the appropriate levers, extractors and specific spanners or wrenches, so that the work is facilitated and the working surfaces and the operators themselves are safeguarded.
Before going on to disassemble the parts it would be opportune to thoroughly clean the unit, to remove any encrusted or accumulated greases and then to completely remove the oil through the oil draining plugs.

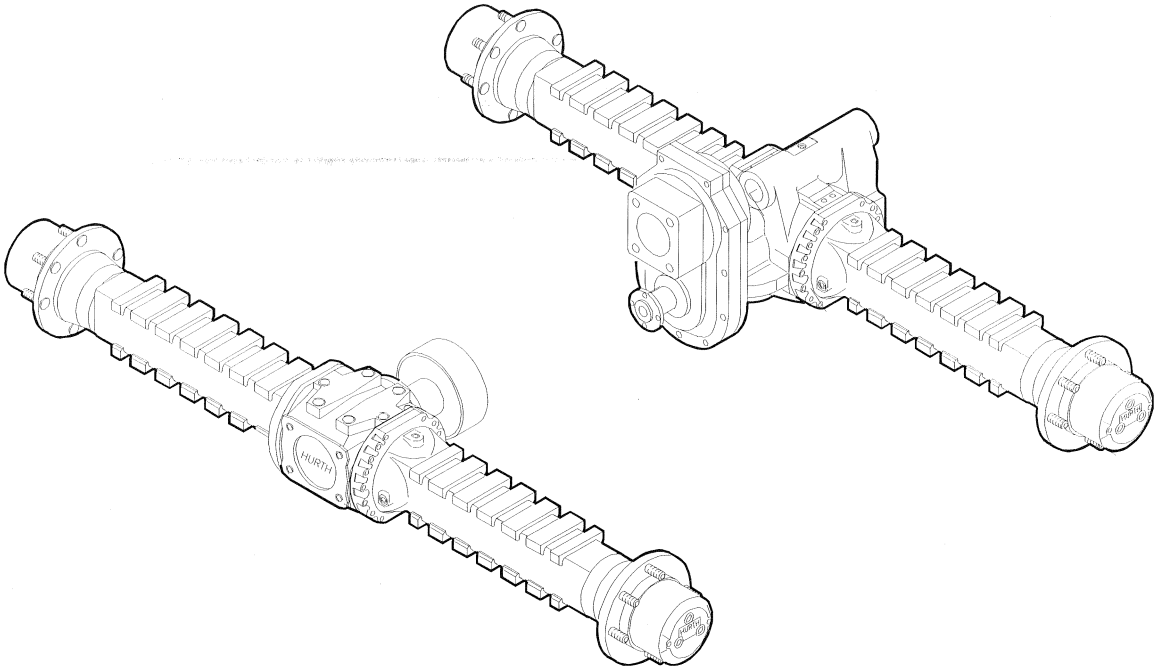
INTRODUCTORY STATEMENT

All the disassembled mechanical units should be thoroughly cleaned with appropriate products and then restored or replaced should damage, wear, cracking, or seizing have occurred. In particular, thoroughly check the state of all the moving parts (bearings, gears, crown wheel and pinion, shafts) and sealing parts (O-rings, oil shield) which are subject to major stress and wear.

In any case it is advisable to replace the seals every time a component is overhauled or repaired. In assembly phase the sealing rings must be lubricated on the sealing edge. In case of the crown wheel and pinion, replacement of one necessitates the replacement of the other.
In assembly phase the prescribed pre-loading and backlash of the parts must be maintained.

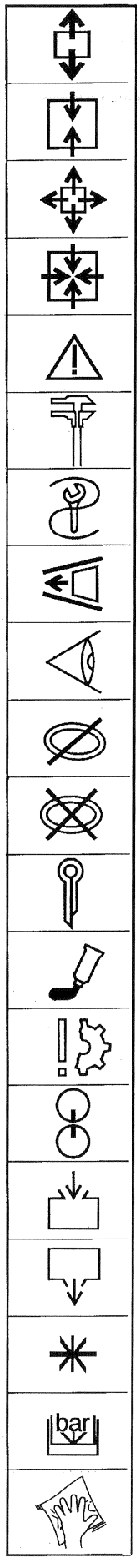
MAINTENANCE AND REPAIR

We have compiled these instructions for maintenance and repair in order to facilitate any such work on the differential unit and gear change unit.
Drawings necessary in order to carry out maintenance and repair work can be bought directly from us.



INHALT	Contents	SEITE / PAGE
Symbole	Symbols	11.150.02
Radnabe	Wheel hub	11.150.03
Radnabe an Achskoerper	Wheel hub onto axle housing	11.150.03
Planetengetriebe	Epycicloidal reduction	11.150.04
Kegelritzellagerung	Bevel pinion support	11.150.04
Kegelritzellagerung	Bevel pinion support	11.150.05
Kegelritzellagerung	Bevel pinion support	11.150.05
Einstellung des Kegel und Telleradpaares	Adjustments of bevel gear set	11.150.06
Einstellung des Kegelrollenlagers/ differentials	Adjustment of taper roller bearings / differentials	11.150.06
Einstellung des Kegelrollenlagers/ Differentials	Adjustment of taper roller bearings / differentials	11.150.07
Ausbau des Differentials aus der Achse	Disassembling of the differential from the axle	11.150.07
Einbau des Differentials	Assembling of the differential	11.150.08
Selbstsperrdifferential	Self locking differential	11.150.08
Selbstsperrdifferential	Self locking differential	11.150.09

Symbole / Symbols



Zerlegen von Baugruppen
Disassembly of assembly groups
Démontage des sous-groupes

Zusammenbauen von Baugruppen
Assembly of assembly groups
Montage des sous-groupes

Abbauen - Ausbauen
Remove abstruction parts
Demontage des pieces encombrante

Einbauen - Anbauen
Reinstall-remount parts which had obstructed disassembly
Montage des pieces encombrantes

Achtung, wichtiger Hinweis
Attention! Important notice
Attention! Indication importante

Prüfen - Einstellen z. B. Momente, Maße, Drucke usw.
Check - adjust e.g.torque, dimensions, pressures etc.
Controler, regler p.e.couples, côtes, pressions etc.

T = Spezialwerkzeug P = Seite
T = Special tool P = Page
T = Outils speciaux P = Page

Einbaurichtung beachten
Note direction of installation
Respecter direction de montage

Kontrollieren - Prüfen
Visual inspection
Controler, examiner, contrôle visuel

Bedingt wiederverwendbar
Possibly still serviceable, renew if necessary
Eventuellement a utiliser à nouveau

Beim Zusammenbau immer erneuern
Renew at each reassembly
Remplacer avec chaque montage

Entsichern - Sichern
Unlock - lock e.g. split pin, locking plate, etc.
Enlever - mettre la securite

Sichern-Kleben (flüssige Dichtung)
Lock - adhere (liquid sealant)
Mettre la securite, coller (mastic liquide)

Materialschaden verhüten
Guard against material damage, damage to parts
Eviter dommages au materiaux, dommages au pieces

Vor dem Ausbau markieren (für den Zusammenbau)
Mark before disassembly, observe marks when reassembl.
Marquer avant le demontage (pour le montage)

Einfüllen - Auffüllen - Nachfüllen (Öl-Schmiermittel)
Filling - topping up - refilling e.g. oil, cooling water, etc.
Charger - remplir (huile - lubrifiant)

Öl, bzw. Schmiermittel/Ablassen
Drain off oil, lubricant
Vidanger, lubrifiant

Spannen
Tighten - clam e.g; tightening a clamping device
Tendre

Leitung unter Druck setzen
Apply pressure into hydraulic circuit
Inserer pression dans le circuit hydraulique

Reiningen
Clean
Nettoyer

AUS- UND EINBAU :

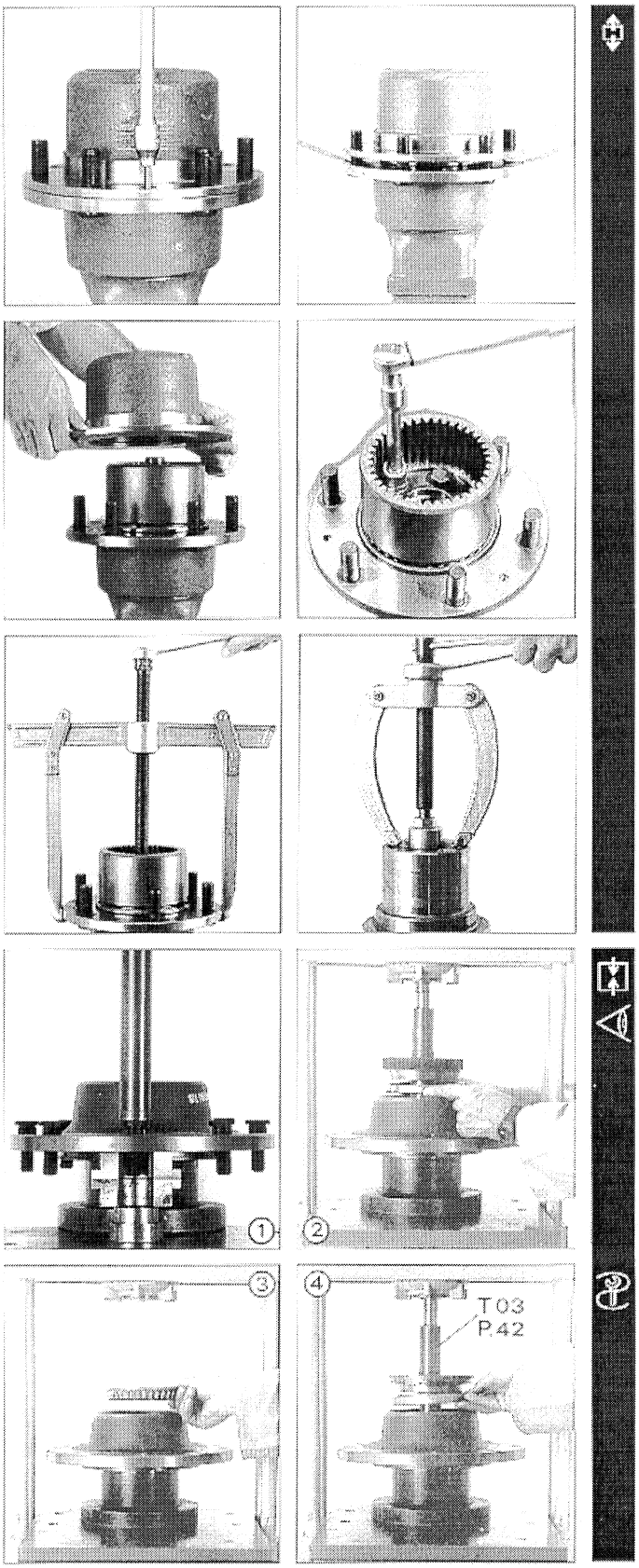
RADNABE, WELLENDICHTRING UND ZENTRIERRING AUSBAUEN.

DISASSEMBLING AND ASSEMBLING

DISASSEMBLING OF WHEEL HUB, SEAL AND CENTRE RING

DEMONTAGE ET MONTAGE

DEMONTAGE MOYEU DE ROUE, JOINT D'ETANCHEITE ET BAGUE DE CENTRAGE



RADNABE ZUSAMMENBAUEN :

1. RADBOLZEN EINPRESSEN
2. AUSSENRINGE DER KEGELROLLEN-LAGER EINPRESSEN
3. LAGER EINSETZEN
4. WELLENDICHTRING MONTIEREN.

ASSEMBLING OF WHEEL HUB:

1. FITTING OF WHEEL STUDS
2. INSTALLATION OF OUTER RACES OF TAPER ROLLER BEARINGS
3. ASSEMBLING OF BEARINGS
4. FITTING OF SEAL

MONTAGE MOYEU DE ROUE:

1. PLANTAGE GOUJONS
2. PLANTAGE BAGUES EXTERNES ROULEMENTS CONIQUES
3. MONTAGE DE ROULEMENT
4. PLANTAGE JOINT D'ETANCHEITE

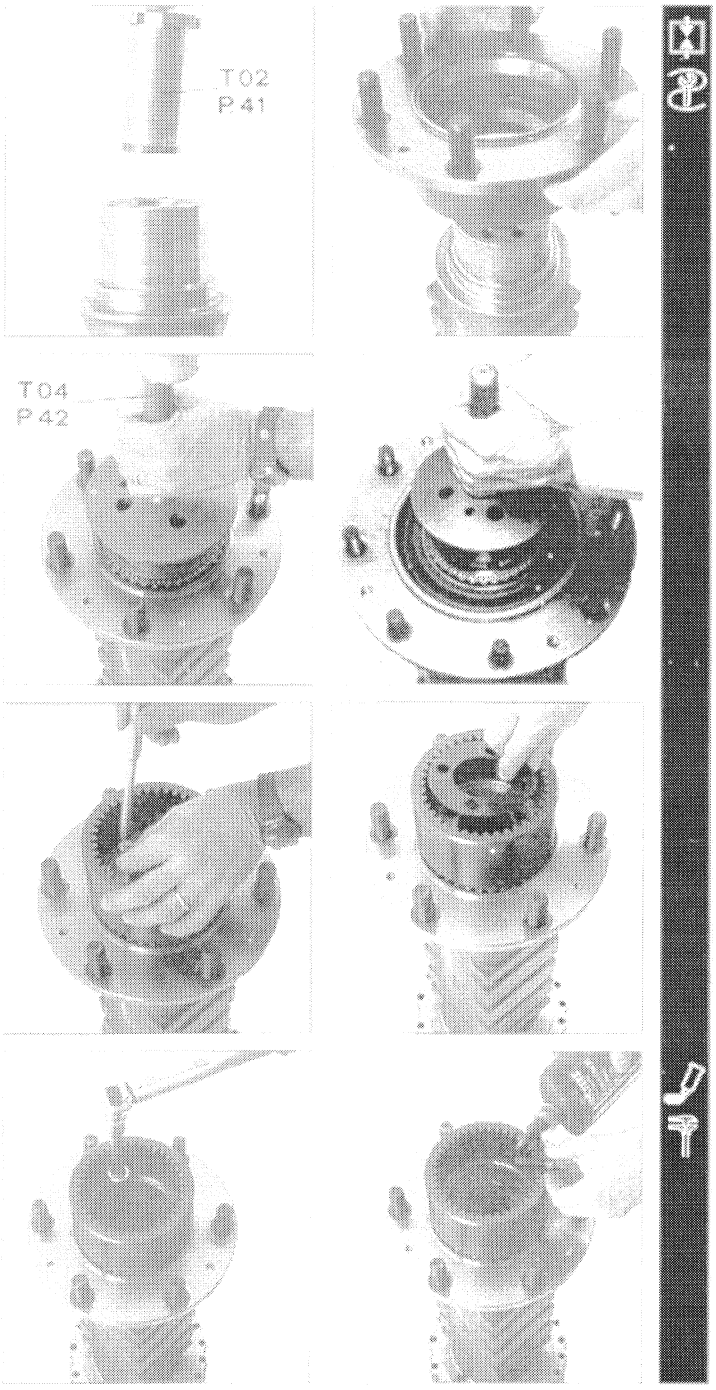
SCHAEFF	Typ/Model/Type **SKL 823 / 823 Basic**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Radnabe / Wheel hub**	Blatt/Page/Feuille **11.150.03**

RADNABE AN ACHSKOERPER
WHEEL HUB ONTO AXLE HOUSING
MOYEU DE ROUE SUR BRAS

ZUSAMMENBAU DER RADNABE, DES WELLENDICHTRINGES UND DES ZENTRIERRINGES.

ASSEMBLING OF WHEEL HUB, SEAL AND CENTRE RING.

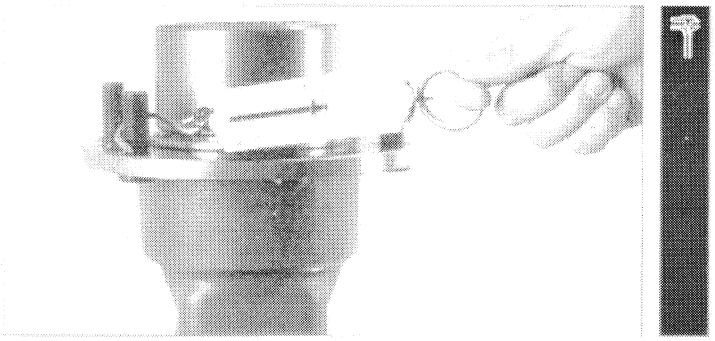
ASSEMBLAGE MOYEU DE ROUE, JOINT D'ETANCHEITE ET BAGUE DE CENTRAGE.



DREHMOMENT NEUER LAGER MIT WELLENDICHTRING: 7 BIS 20 Nm.

TORQUE OF NEW BEARINGS WITH SEAL: FROM 7 TO 20 Nm

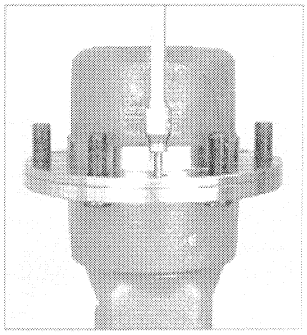
COUPLE DE ROTATION DES ROULEMENTS NOUVEAUX AVEC LE JOINT D'ETANCHEITE: DE 7 A 20 Nm.

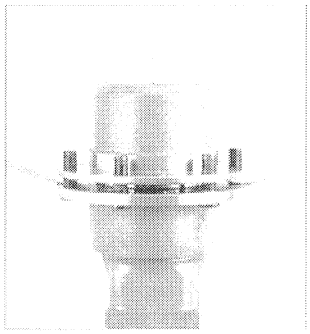


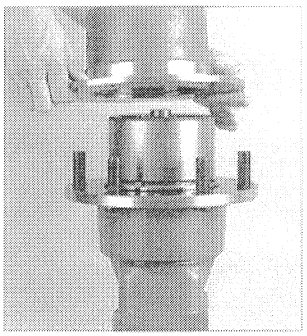
AUSBAU DES PLANETENTRÄGERS.

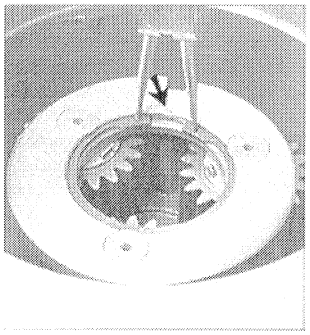
DISASSEMBLING OF PLANET CARRIER.

DEMONTAGE SUPPORT PORTE SATELLITES





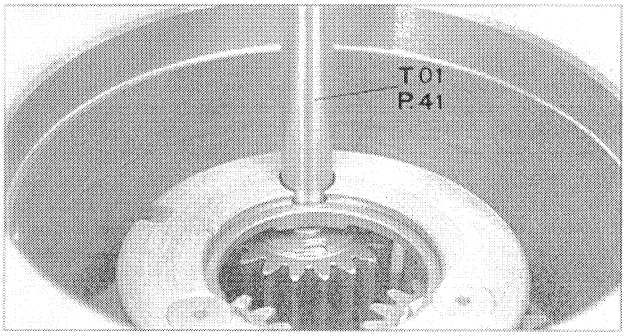


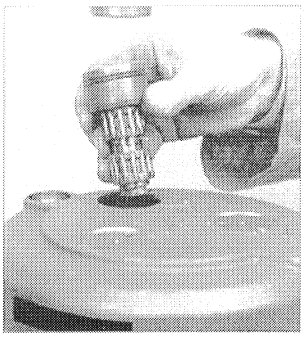


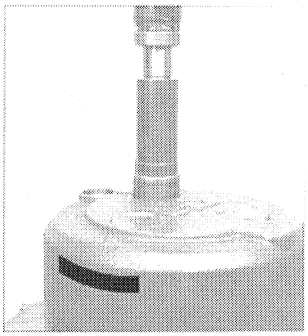
EINBAU DES PLANETENTRAEGERS. ANLAUFSCHEIBE MIT BOHRUNG DES PLANETENRADES UND BOHRUNG IM PLANETENTRAEGER FLUCHTEN LASSEN.

ASSEMBLING OF PLANET CARRIER. ALIGN TRUST WASHER WITH HOLES OF PLANET GEAR AND PLANET CARRIER.

MONTAGE SUPPORT PORTE SATELLITES. ALIGNER LA RONDELLE AVEC LE TROU DU SATELLITE AU TROU DU SUPPORT PORTE SATELLITE.



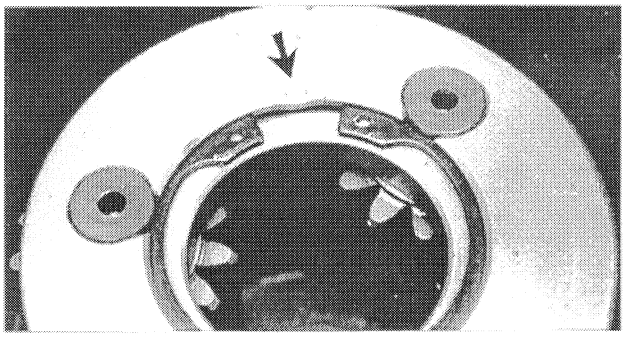




NACH DEM EINBAU DES SICHERUNGS-RINGES ANSTAUCHEN.

TO PUNCH AFTER ASSEMBLING OF THE CIRLIP.

APRES LE MONTAGE DU CIRCLIP CHANFREINER.

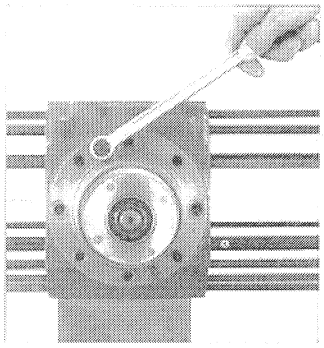


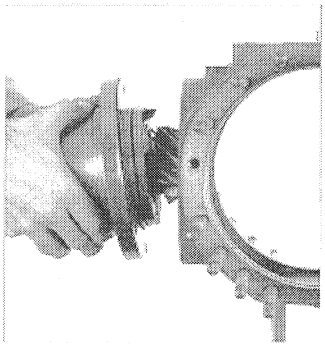
KEGELRITZELLAGERUNG
BEVEL PINION SUPPORT
SUPPORT DU PIGNON CONIQUE

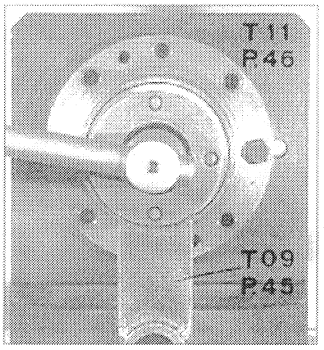
AUSBAU DER KEGELRITZELLAGERUNG.

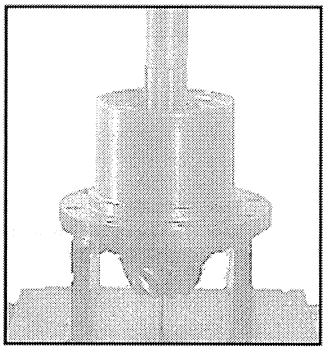
DISASSEMBLING OF BEVEL PINION SUPPORT

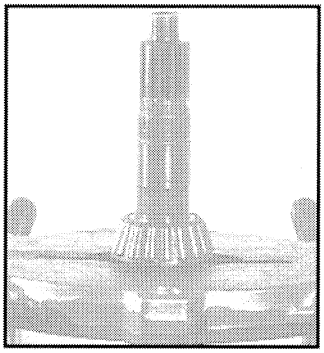
DEMONTAGE SUPPORT PIGNON CONIQUE

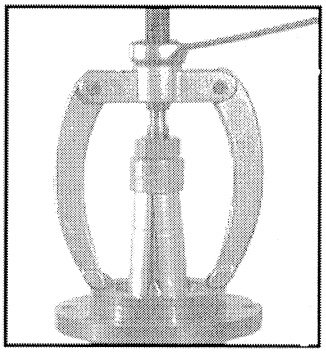








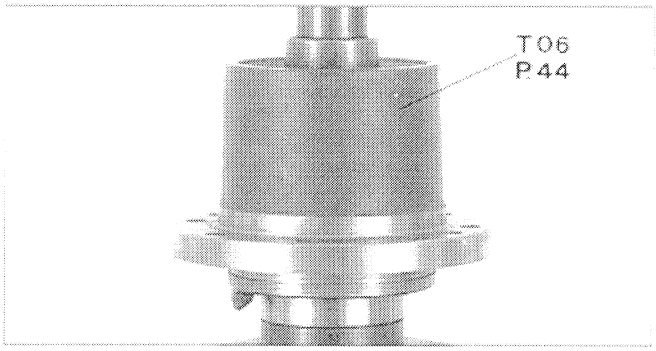




EINBAU DER AEUSSEREN LAGERRINGE DER KEGELROLLENLAGER.

ASSEMBLING OF EXTERNAL RACES OF TAPER ROLLER BEARINGS.

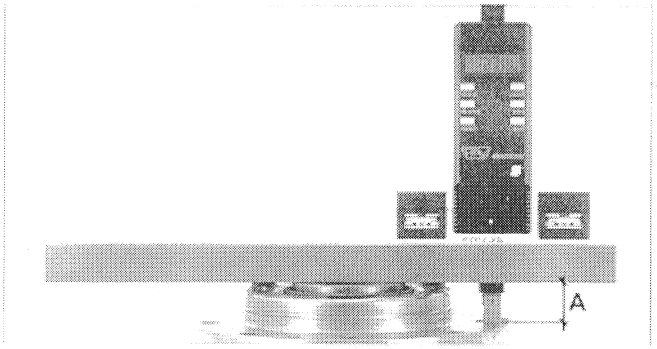
MONTAGE BAGUE EXTERNE DES ROULEMENTS A ROULEAUX CONIQUES



UEBERPRUEFUNG DES MASSES `A" DES DECKELS.

CONTROL OF DIMENSION „A“ OF COVER.

CONTROLE COTE „A“ DU COUVERCLE.



ERMITTLUNG DES PASS-SCHEIBEN-PACKETES S1 FUER DIE VORSPANNUNG DER KEGELROLLENLAGER S1 = B - C + X
X = HINZUZUFUEGENDER WERT UM DIE KORREKTE VORSPANNUNG DER KEGELROLLENLAGER ZU ERREICHEN.
X= 0,07⇳ 0,09

DETERMINATION OF SHIM PACK S1 FOR THE PRELOAD OF THE TAPER ROLLER BEARINGS S1=B - C+X

X = VALUE TO ADD IN ORDER TO OBTAIN THE CORRECT PRELOAD OF THE TAPER ROLLER BEARINGS.

DETERMINATION DES CALES S1 POUR LA PRECHARGE DES ROULEMENTS A ROULEAUX CONIQUES S1 = B - C + X

X = VALEUR A AJOUTER POUR OBTENIR LA PRECHARGE CORRECTE DES ROULEMENTS A ROULEAUX CONIQUES

EINBAU DER KEGELRITZELLAGERUNG UND DES WELLENDICHTRINGES.

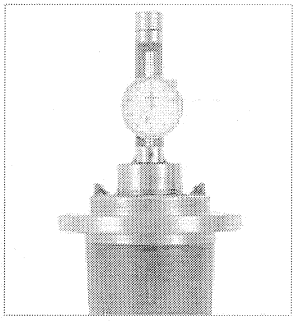
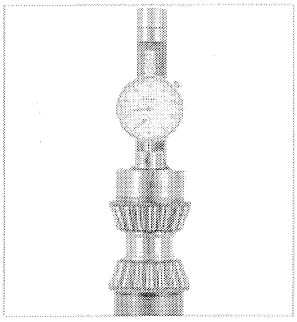
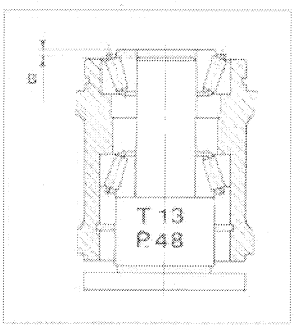
ASSEMBLING OF BEVEL PINION SUPPORT AND SEAL.

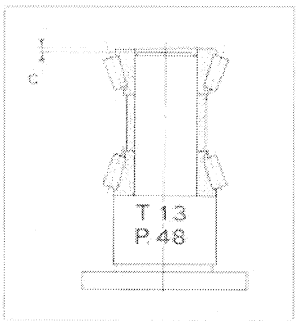
MONTAGE SUPPORT PIGNON CONIQUE ET JOINT D'ETANCHEITE.

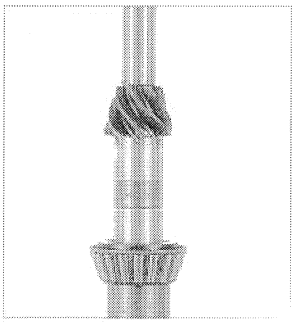
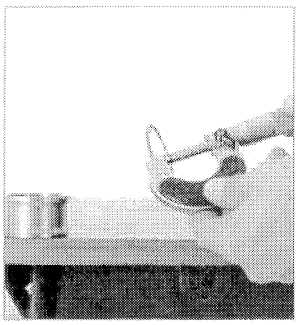
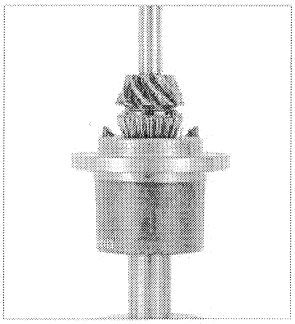
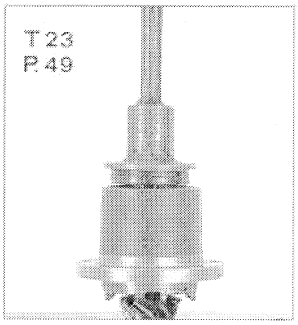
WELLENMUTTER ANZIEHEN UND DREHMOMENT UEBERPRUEFEN.

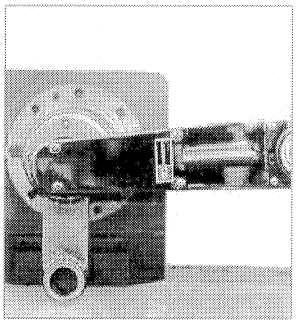
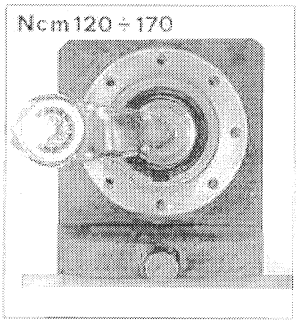
RING NUT TIGHTEN AND TORQUE CHECKING.

SERRAGE ECROU ET CONTROLE DU COUPLE DE ROTATION.



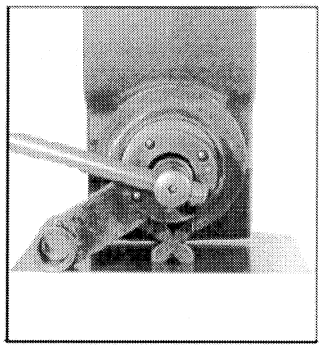
SCHAEFF	Typ/Model/Type **SKL 823 / 823 Basic**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Kegelritzellagerung / Bevel pinion support**	Blatt/Page/Feuille **11.150.05**

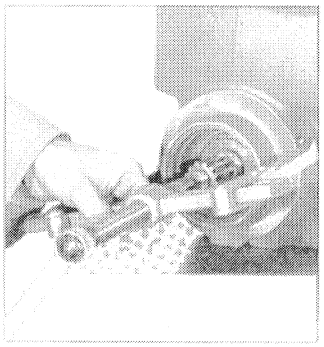
KEGELRITZELLAGERUNG
BEVEL PINION SUPPORT
SUPPORT DU PIGNON CONIQUE

AUSBAU DER KEGELRITZELLAGERUNG.

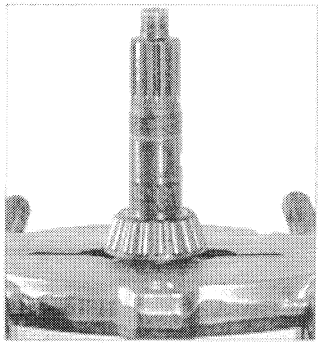
DISASSEMBLING OF BEVEL PINION SUPPORT.

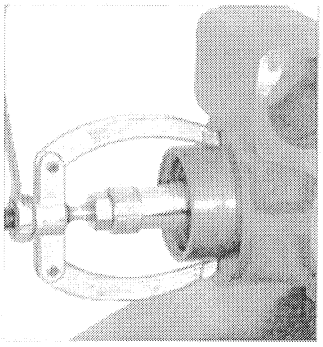
DEMONTAGE SUPPORTATION CONIQUE.



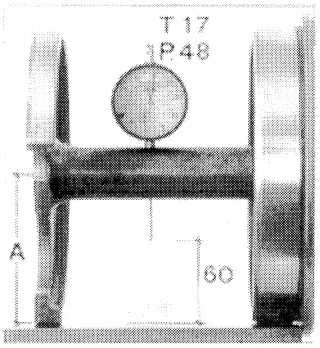


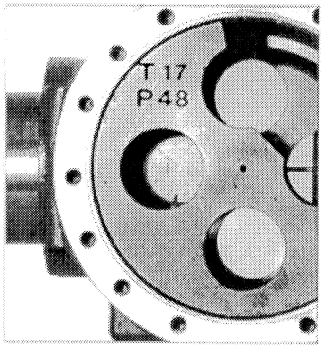
ERMITTLUNG DES PASSSCHEIBENPACKETES S2 FUER DIE EINSTELLUNG DER KEGELRITZELLAGERUNG. AUSSENRINGE OHNE PASSSCHEIBEN EINSETZEN. NACHDEM DAS MESSINSTRUMENT AUF NULL EINGESTELLT IST, DAS WERKZEUG EINSETZEN UND MESSEN. DAS MASS S2 ERGIBT SICH AUS DER DIFFERENZ. AUSSENRING AUSBAUEN, PASSSCHEIBEN EINSETZEN UND AUSSENRING ENTGUELTIG EINBAUEN.



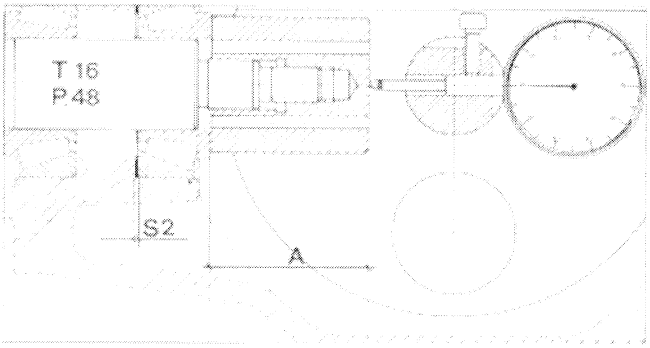


DETERMINATION OF SHIM PACK S2 FOR ADJUSTEMENT OF BEVEL PINION POSITION. ASSEMBLING OF OUTER RACES WITHOUT SHIMS. INSERT TOOL AND VERIFY AFTER HAVING SET TO ZERO THE GAUGE ON A SURFACE PLATE. THE DIFFERENCE IS S2. REMOVE OUTER RACE OF TAPER ROLLER BEARING, INSERT SHIMS AND REASSEMBLE THE OUTER RACE DEFINITIVELY.





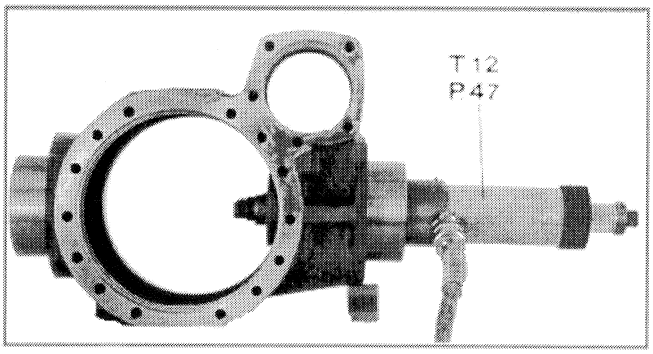
DETERMINATION S2 POUR LE POSITIONNEMENT DU PIGNON CONIQUE. MONTER LES CRAPAUDINE EXTERNE SANS CALES. INSERER L'OUTIL ET VERIFIER APRES AVOIR MIS A ZERO LE COMPARATEUR SUR UN MARBRE DE CONTROLE. LA DIFFERENCE RELEVEE CORRESPOND A S2. DEMONTER LA CRAPAUDINE EXTERNE DU ROULEMENT CONIQUE, INSERER LE PAQUET DES CALES ET REMONTER LA CRAPAUDINE DEFINITIVEMENT.



MONTAGE DER AUSSENRINGE DER KEGELROLLENLAGER.

ASSEMBLING OF OUTER RACES OF TAPER ROLLER BEARINGS.

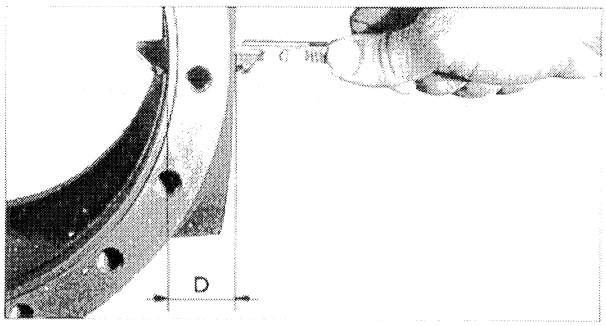
MONTAGE BAGUE EXTERNE ROULEMENTS A ROULEAUX CONIQUES.

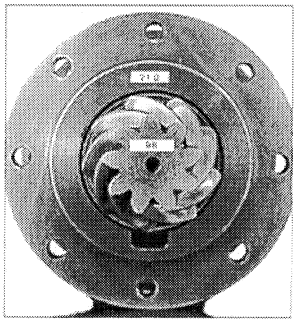


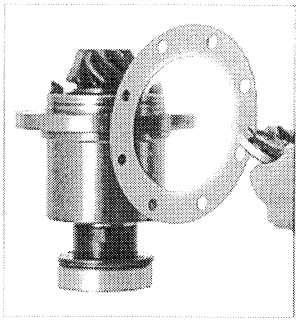
ERMITTLUNG DES PASS-SCHEIBENPAKETES S2 FUER DIE EINSTELLUNG DER KEGELRITZELLAGERUNG S2 = (I + A) - (D + r)

DETERMINATION OF SHIM PACK S2 FOR ADJUSTEMENT OF BEVEL PINION POSITION:
S2 = (I+A) - (D + r)

DETERMINATION DES CALES S2 POUR LE POSITIONNEMENT DU PIGNON CONIQUE:
S2 = (I+A) - (D + r)



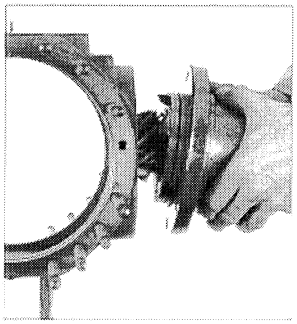


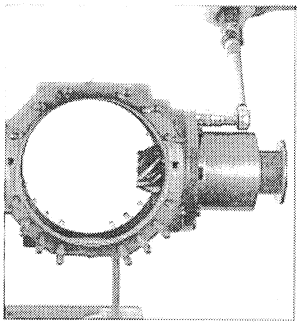


EINBAU DER KEGELRITZELLAGERUNG MIT PASS-SCHEIBENPAKET S2.

ASSEMBLING OF BEVEL PINION SUPPORT WITH SHIM PACK S2.

ASSEMBLAGE SUPPORT PIGNON CONIQUE AVEC CALES S2.

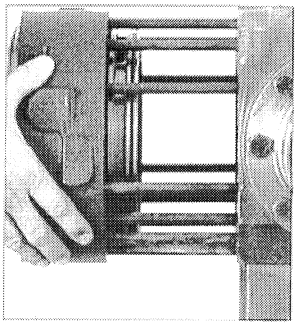


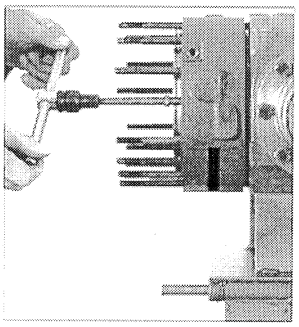


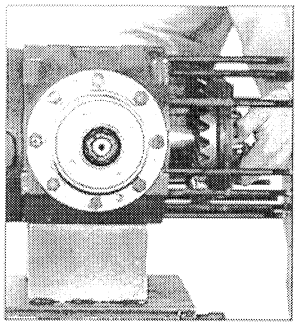
EINBAU DES ACHSMITTENGEHAEUSES.
ACHTUNG: DICHTFLAECHEN DER O-RINGE BEIM EINBAU DES DIFFERENTIALS IN DAS ACHSMITTENGEHAEUSE NICHT BESCHAEDIGEN.

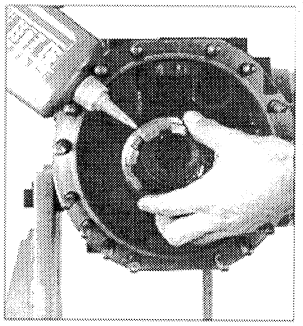
ASSEMBLING OF CENTRAL AXEL HOUSING.
NOTE: BE CAREFUL NOT TO DAMAGE THE TIGHT SURFACES OF THE O-RINGS WHILE INTRODUCING THE DIFFERENTIAL CASE INTO THE CENTRAL AXLE HOUSING.

ASSEMBLAGE CORPS CENTRAL.
NOTE: FAIRE ATTENTION DE NE PAS ENDOMMAGER LES ZONES D'ETANCHEITE DES JOINTS TORIQUES PENDANT LE MONTAGE DU DIFFERENTIEL DANS LE CARTER CENTRAL.









EINSTELLUNG DES KEGELROLLENLAGERS/ DIFFERENTIALS

ADJUSTEMENTS OF TAPER ROLLER BEARINGS /DIFFERENTIALS

ROULEMENTS A ROULEAUX CONIQUES DU DIFFERENTIEL

MUTTERN ANZIEHEN BIS FLANKENSPIEL ZWISCHEN DEN ZAEHNEN VON KEGEL- UND TELLERRADPAAR CA. 0,15-0,18 MM BETRAEGT. LAGER NICHT VORSPANNEN.
AM KEGELRITZEL DAS DREHMOMENT DER RITZEL- UND DIFFERENTIALLAGERUNG MESSEN. AM TELLERRAD GEGENUEBERLIEGENDE MUTTER ANZIEHEN BIS EIN 35-45 Ncm HOEHERES MOMENT AM KEGELRITZEL GEMESSEN WIRD.

SCREW IN THE ADJUSTING NUTS TO OBTAIN APPROX. 0,15-0,18MM BACKLASH BETWEEN THE TEETH OF THE BEVEL GEAR SET, WITHOUT PRELOADING THE TAPER ROLLER BEARINGS.
CHECK THE ROTATING TORQUE OF PINION AND DIFFERENTIAL. TIGHTEN NUT ON OPPOSITE SITE TO THE CROWN WHEEL TO OBTAIN A 35-45Ncm HIGHER ROTATING TORQUE ON THE PINION.

VISSER LES ECROUS JUSQU'A OBTENIR UN JEU DE 0,15-0,18 ENTRE LES DENTS DU COUPLE CONIQUE SANS PRECHARGER LES ROULEMENTS DU DIFFERENTIEL. RELEVER LA COUPLE DE ROTATION DU PIGNON ET DU DIFFERENTIEL ET SERRER L'ECROU DU COTE OPPOSE DE LA COURONNE JOUSQU'A L'AUGMENTATION DU COUPLE DU PIGNON DE 35-45 Ncm

BEIDE MUTTERN KENNZEICHNEN. ZUR KORREKTUR DES FLANKENSPIELS DES KEGEL- UND TELLERRADES AUSSCHLIESSLICH DIE BEIDEN MUTTERN VERSTELLEN. BEI ZU KLEINEM SPIEL MUTTER AUF DER TELLERRADSEITE LOESEN UND DIE GEGENUEBERLIEGENDE ENTSPRECHEND NACHSTELLEN. BEI ZU GROSSEM SPIEL IN UMGEKEHRTER WEISE VERFAHREN.

MARK BOTH RING NUTS. TO ADJUST THE BACKLASH MOVE RING NUTS ONLY. LO0SE THE ONE ON BEVEL CROWN WHEEL SIDE AND TIGHTEN THE OPPOSITE ONE FOR THE EQUAL MEASURE IF THE BACKLASH IS TOO LOW; VICEVERSA IF THE BACKLASH IS TOO HIGH.

TRACER UN SIGNE DE REFERENCE SUR LES DEUX ECROUS. POUR LA CORRECTION DU JEU ENTRE LES DENTS DU COUPLE CONIQUE AGIR EXCLUSIVEMENT SUR LES ECROUS, SERRER OU DESERRER EN EGALE MESURE POUR NE PAS VARIER LA PRECHARGE.

SICHERUNGSBLECHE IN DER GEEIGNETESTEN POSITION ANBRINGEN UND ANSTAUCHEN.

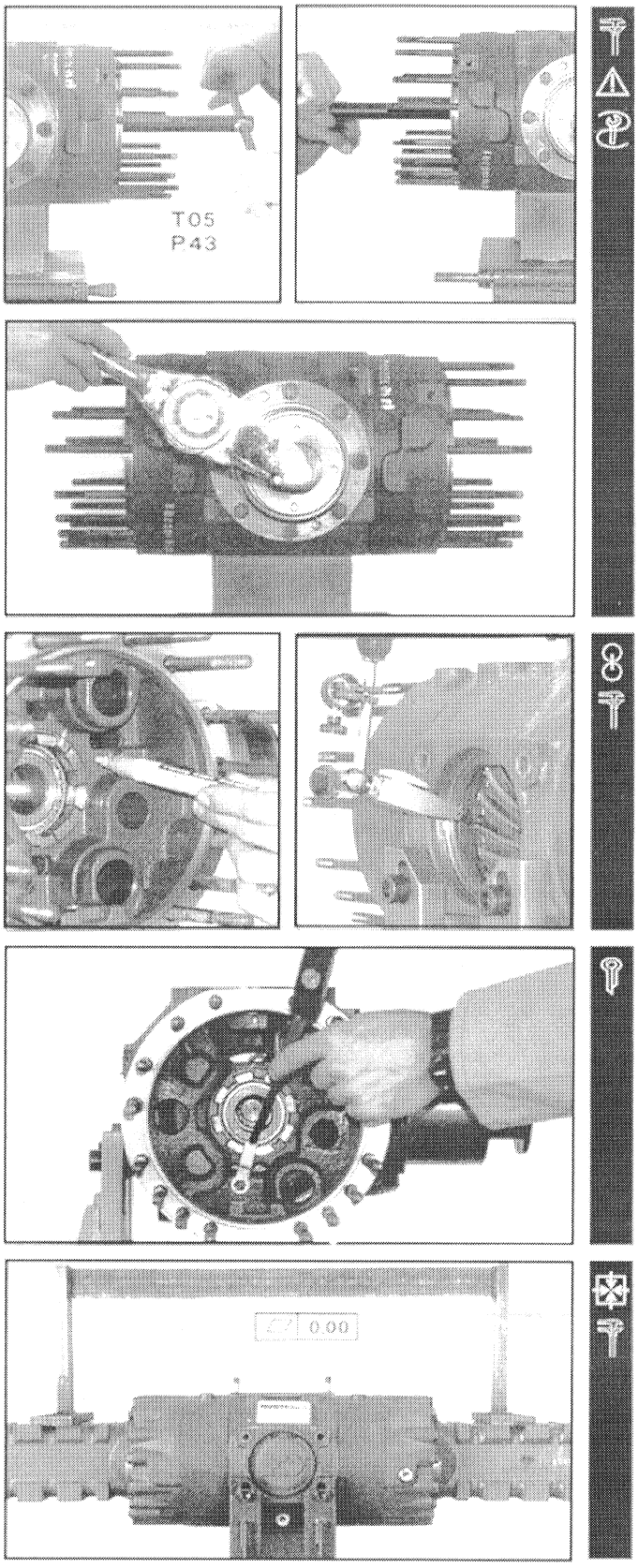
FIT SECURITY SHEETS IN THE BEST POSITION AND PUNCH IT.

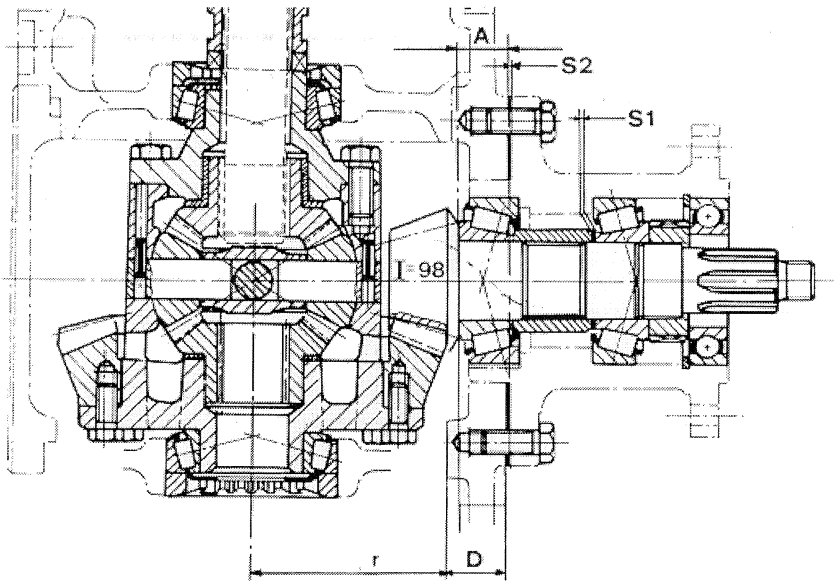
MONTER LES PLAQUETTES DE SECURITE DANS LA POSITION PLUS JUSTE ET CHANFREINER.

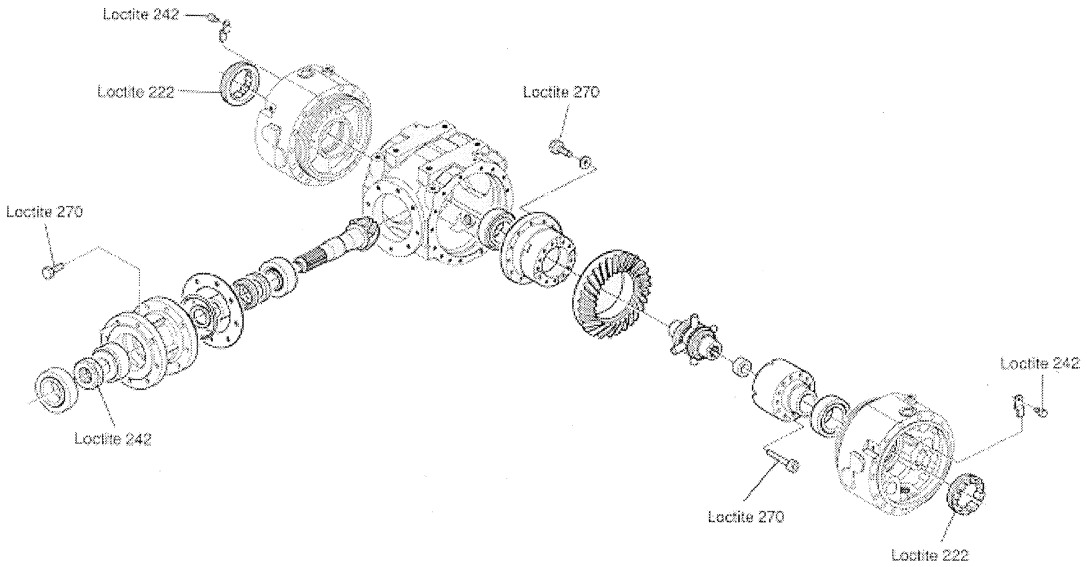
ACHSE ZUSAMMENBAUEN UND PLANPARALELLITAET DER ACHSKOERPER UEBERPRUEFEN

ASSEMBLE THE AXLE AND CHECK PARALLELISM BETWEEN AXLE HOUSING

ASSEMBLER LE PONT ET VERIFIER LA PLANEITE ENTRE LES CARTERS.





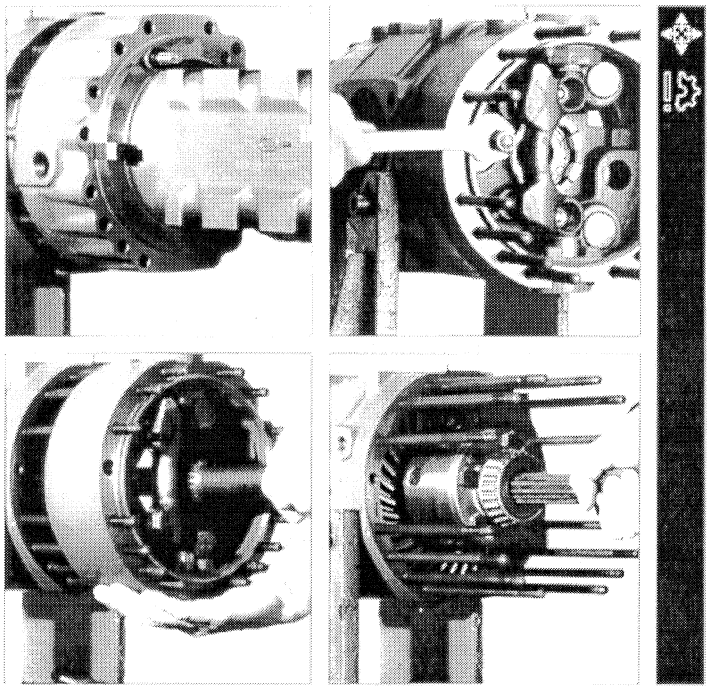


SCHAEFF	Typ/Model/Type **SKL 823 / 823 Basic**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Einstellung des Kegelrollenlagers/ Differentials** **Adjustment of taper roller bearings /differentials**	Blatt/Page/Feuille **11.150.07**

AUSBAU DES DIFFERENTIALS AUS DER ACHSE.

DISASSEMBLING OF THE DIFFERENTIAL FROM THE AXLE.

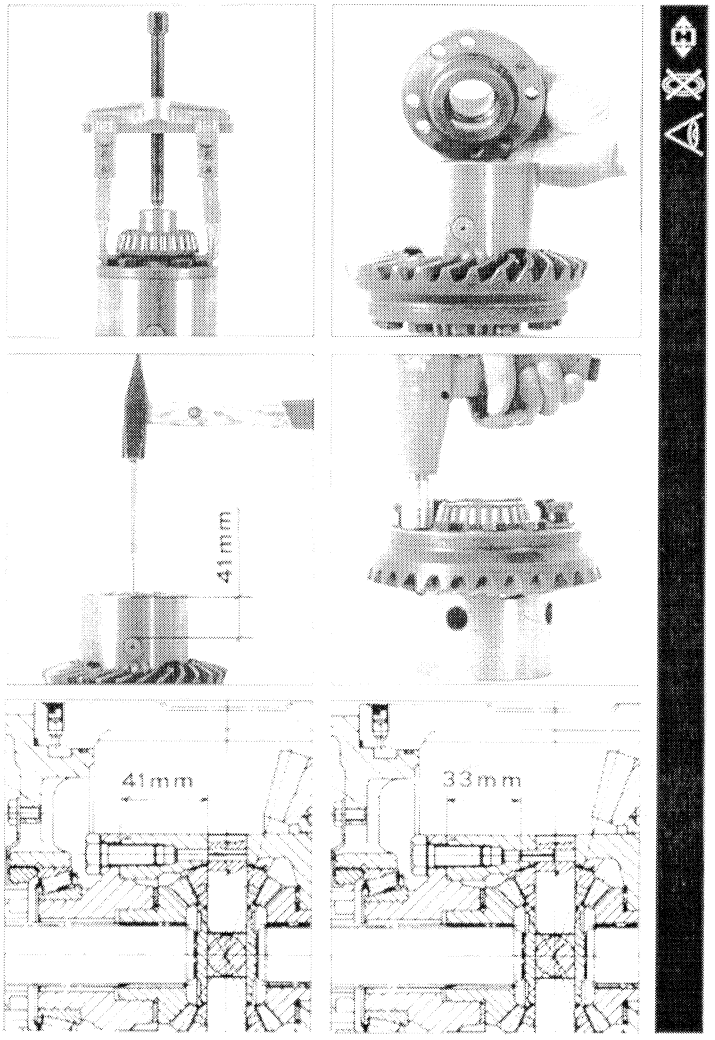
DEMONTAGE DIFFERENTIEL DU PONT.



ACHTUNG: BEFESTIGUNGSSCHRAUBEN DES TELLERRADES VOR JEDEM EINBAU ERNEUERN.

NOTE: REPLACE THE FITTING BOLTS OF THE CROWN WHEEL EVERY TIME THAT THEY HAVE TO BE REMOVED.

NOTE: REMPLACER LES VIS DE FIXATION DE LA COURONNE CONIQUE CHAQUE FOIS QUE L'ON DOIT LES DEMONTER.

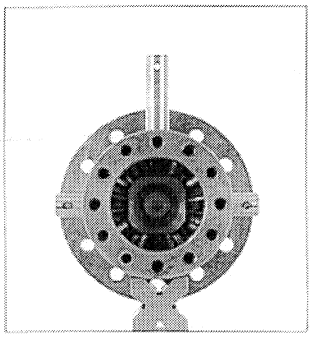


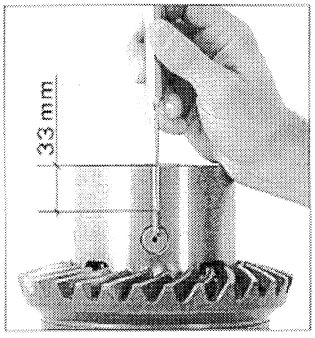
Einbau des Differentials
Assembling of the differential
Montage differentiel

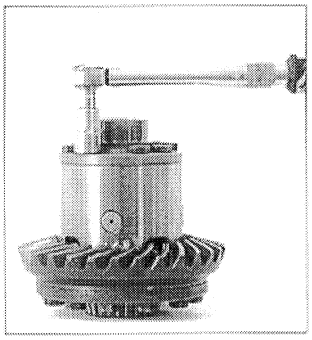
ACHTUNG: ALLE SCHRAUBEN MIT DREHMOMENTSCHLUESSEL ANZIEHEN
SCHRAUBE M 1O x 1,25 x 25-10K
DREHMOMENT Nm 73-76
SCHRAUBE M 1O x 25-10K
DREHMOMENT Nm 69-72

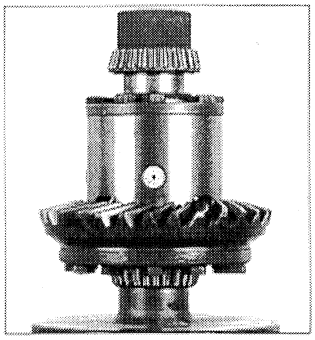
NOTE: TIGHTEN ALL BOLTS WITH TORQUE WRENCH
BOLT M 10X1,25X25-10K
TORQUE Nm 73-76
BOLT M 10X25-10K
TORQUE Nm 69-72

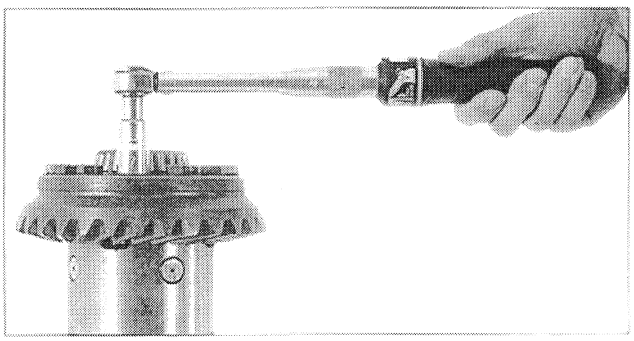
NOTE: SERRER TOUTES LES VIS AVEC LA CLEF DYNMAOMETRIQUE
VIS M 10X1,25X25-10K
COUPLE Nm 73-76
VIS 10X25-10K
COUPLE Nm 69-72

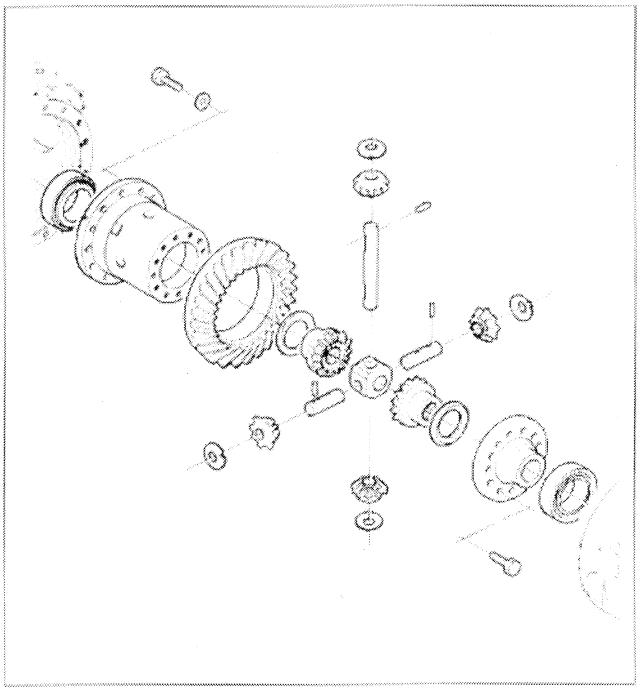












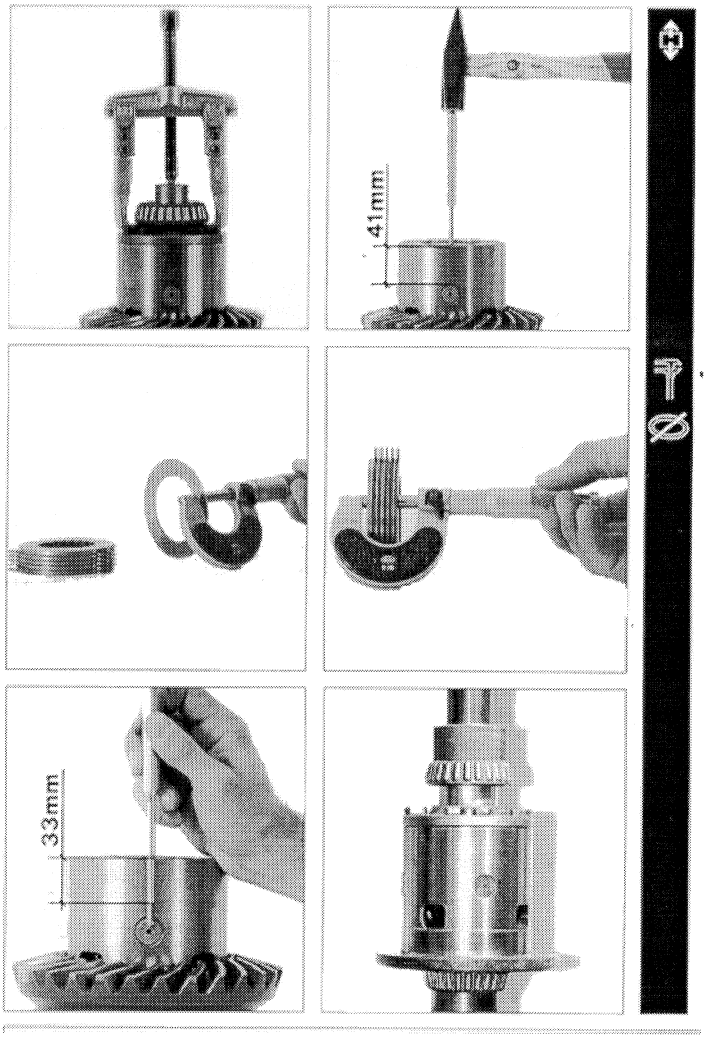
SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	SKL 823 / 823 Basic	**02.2001**
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Einbau des Differentials **Assembling of the differential**	**11.150.08**

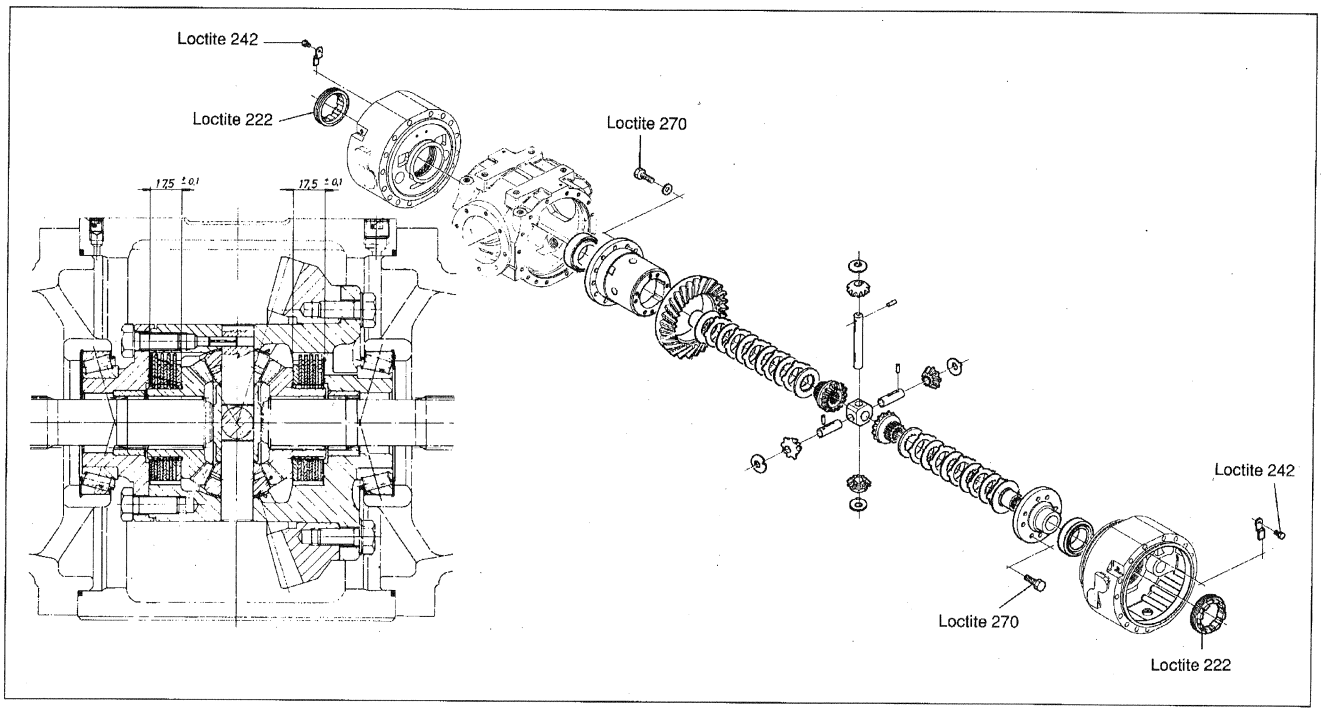
SELBSTSPERRDIFFERENTIAL
SELF LOCKING DIFFERENTIAL

UEBERPRUEFUNG DES SCHEIBEN-PAKETES ZUR ERMITTLUNG DER PASS-SCHEIBEN.
DIE GESAMTSTAERKE DES SCHEIBEN-PAKETES MIT EVENTUELLEN PASS-SCHEIBEN MUSS 17,5 mm ± 0,1 mm BETRAGEN.

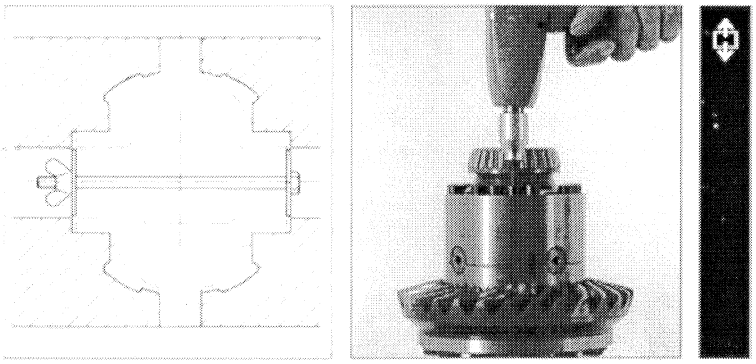
CHECK THE DISC PACK TO DETERMINE THE SHIMS.
THE TOTAL THICKNESS OF THE DISC PACK WITH EVENTUAL SHIMS MUST BE 17,5 ± 0,1mm.

CONTROLE DU PAQUET DES DISQUES POUR DETERMINER LA COTE DES CALES.
L'ENSEMBLE DU PAQUET DES DISQUES AVEC LES CALES DOITETRE DE 17,5± 0,1mm.



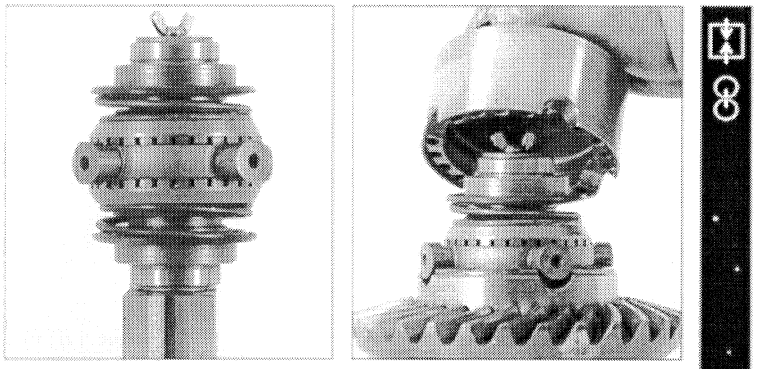


AUSBAU
DISASSEMBLY
DEMONTAGE



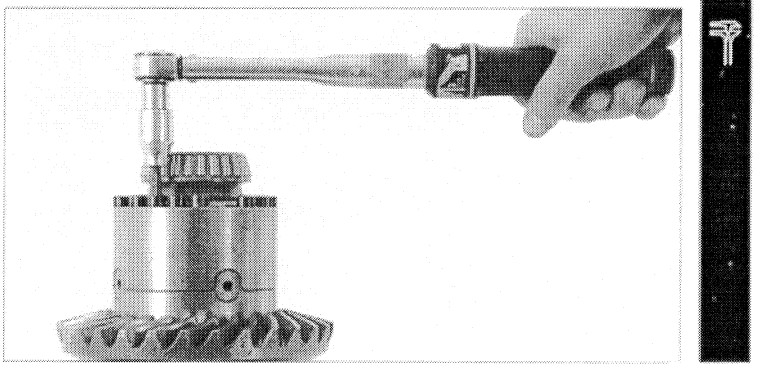
EINBAU

ACHTUNG: PAARUNGSNUMMERN AUF DEN GEHAEUSEHAELFTEN BEACHTEN.
BEFESTIGUNGSSCHRAUBEN DER GEHAEUSEHAELFTEN ANZIEHEN UND MONTIERSCHRAUBE ENTFERNEN. SCHRAUBE M8x65-10K
DREHMOMENT Nm 35-37.



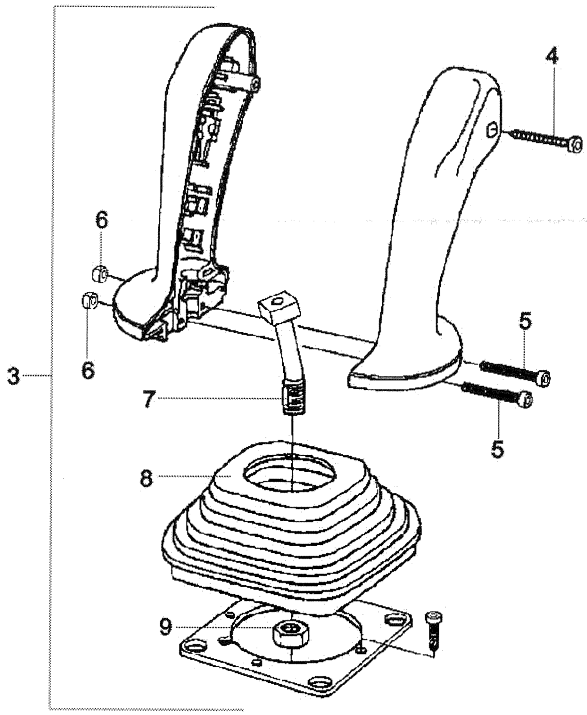
ASSEMBLY

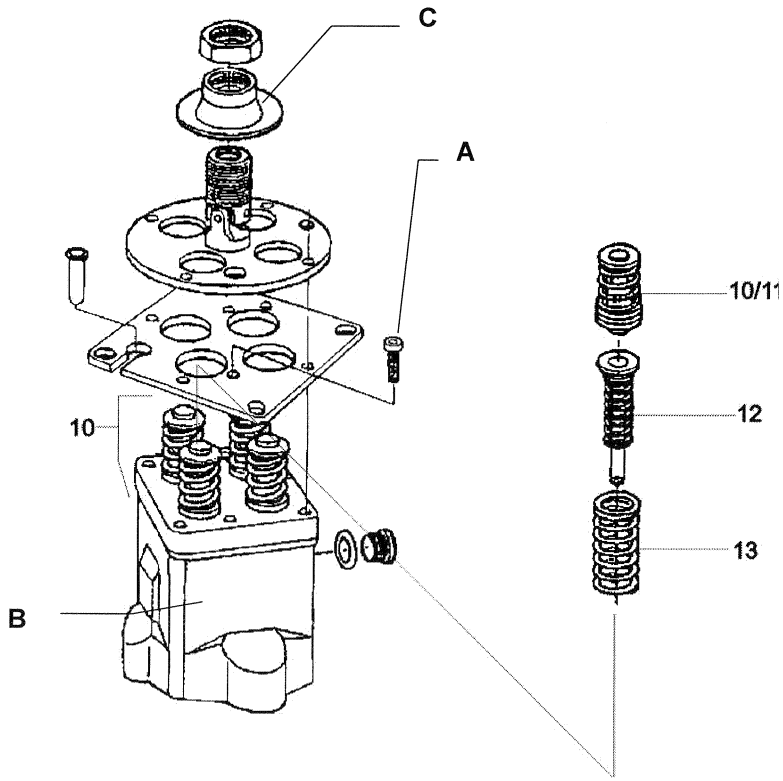
NOTE: OBSERVE PAIRING NUMBER ON SEMI-CASES. TIGHTEN THE FIXING BOLTS OF THE SEMI-CASES AND REMOVE MOUNTING BOLT.
BOLT M8x65-10K
TORQUE Nm 35-37.



MONTAGE

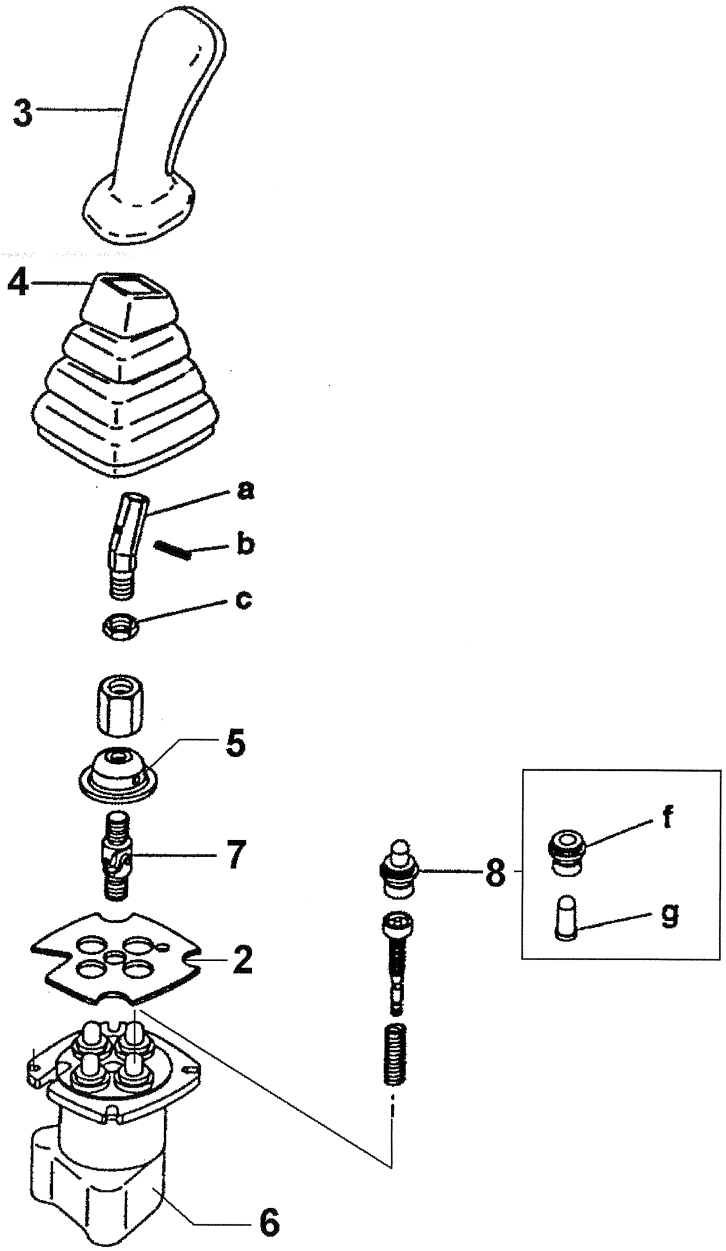
NOTE: FAIRE ATTENTION AUX NUMEROS D'ACCOUPLEMENT MARQUES SUR LES DEMIS-CARTER DIFFERENTIEL. ENLEVER LA VIS DE PRE-ASSEMBLAGE APRES AVOIR SERRE LES VIS DE FERMETURE DES DEMIS-CARTERS.
VIS M8x65-10K
COUPLE DE SERRAGE Nm 35-37.





Sealing of the joystick (oil leakage below the bellow)

- Let escape the excess pressure of the hydraulic tank (open the ventilation filter)
- Mount a vacuum pump instead of the ventilation filter, create a vacuum.
- Turn up the bellow **8** at the pilot-operated valve.
- Screw out the 4 hexagon socket screws item **A**, remove the complete lever with retaining plates.
- Pull the leaking tappet set **10** out of the housing.
- Check the seat surface in the housing **B** for scratches, damage, etc.
- Press in the new tappet set **10**.
- Remaining assembly analogous. (The lever must nearly be free from play, if need be, readjust pressure disk **C**).

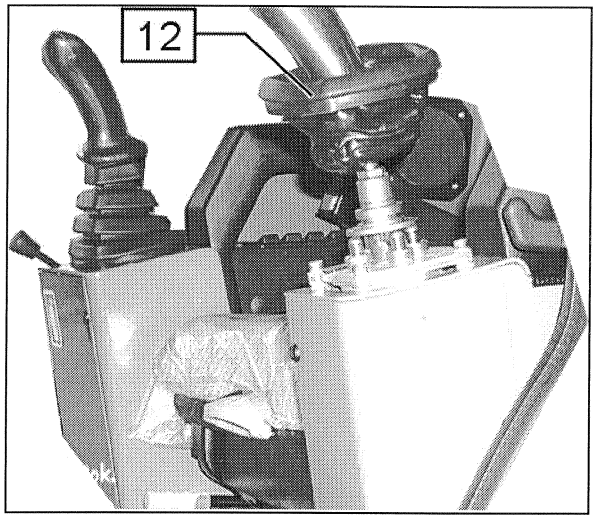


Sealing of the joystick (oil leakage below the bellow)

- Let escape the excess pressure of the hydraulic oil tank (open the ventilation filter)
- Connect a vacuum pump instead of the ventilation filter, create vacuum
- Turn up the bellow **4** at the pilot-operated valve
- Unscrew the handle **3** together with the cardan joint **7** and the remaining parts
- Pull the leaking tappet set **8** out of the housing
- Check the seat surface in the housing **6** for scratches, damage, etc
- Press in the new tappet set **8**
- Remaining assembly analogous (lever must nearly be free from play, if need be, readjust pressure disk **5**.

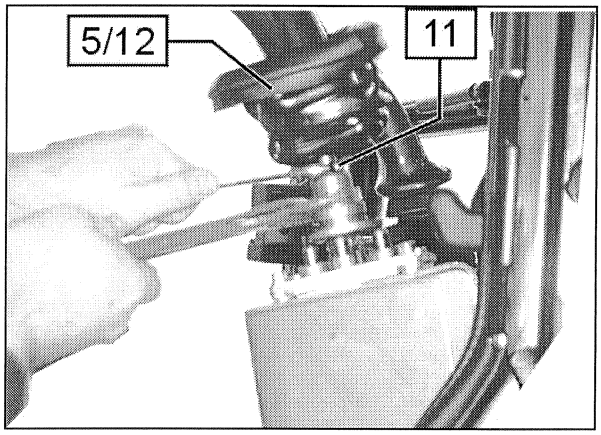
Sealing of the joystick (oil leakage below the bellow)

- Let escape the excess pressure of the hydraulic oil tank (open the ventilation filter)
- Connect a vacuum pump instead of the ventilation filter, create a vacuum
- For the work to be carried out now, e.g. replacement of hydraulic lines, all ports have to be plugged. Do not interrupt the vacuum pump operation

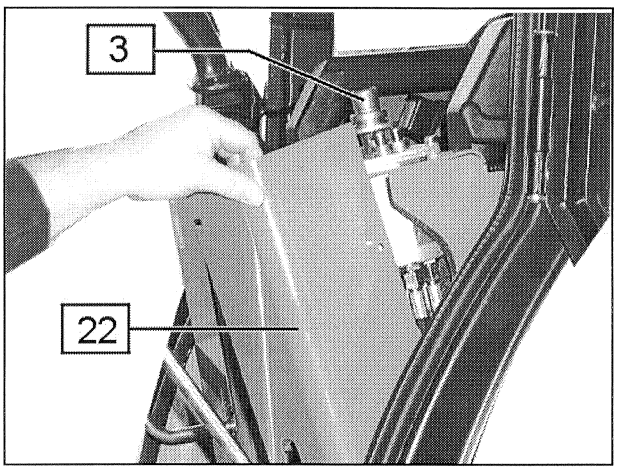


- Turn up the bellow **(12)** at the pilot-operated valve

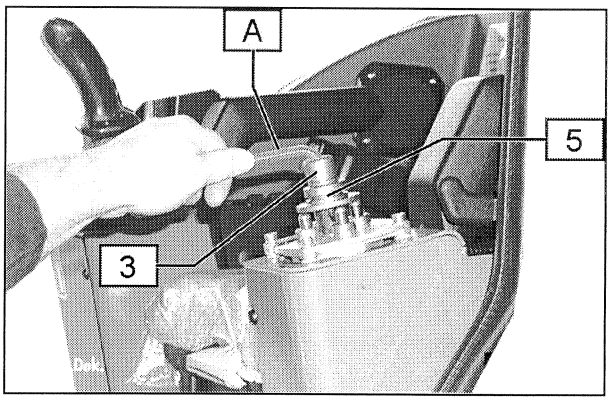
- Slacken the nut **(11)** with fork wrench 19 mm
- Unscrew the handle **(5)** together with the bellow **(12)**



- Before slackening the cardan joint **(3)**, unscrew the cover **(22)** from the seat console



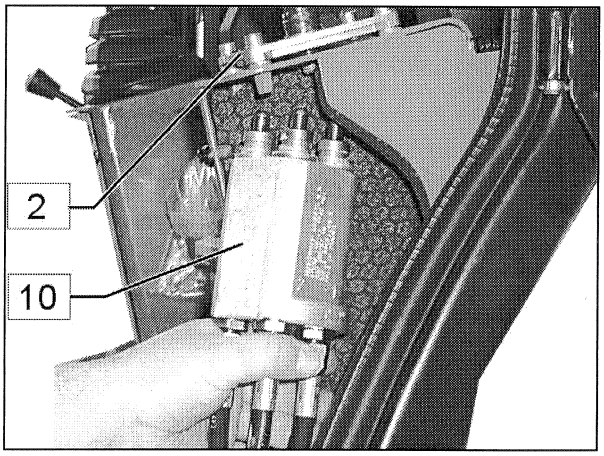
- Unscrew the cardan joint **(3)** by means of a hexagon socket screw key **(A)** 8 mm



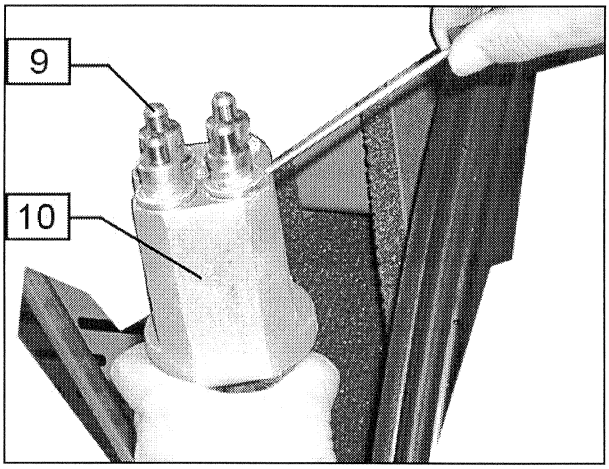
Attention !

- Hold the housing as, otherwise, it will drop

- Pull the housing **(10)** out of the retaining plate **(2)**

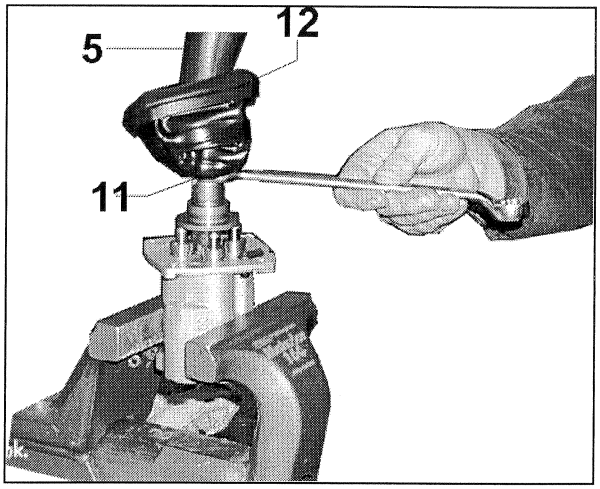


- Pull the leaking tappet set **(9)** out of the housing
- Check the seat surface in the housing **(10)** for scratches, damage, etc.
- Press in the new tappet set **(9)**
- Remaining assembly analogous (lever must nearly be free from play), if need be, readjust pressure disk **(5)**
- Pay attention to the colour marking when tightening the nut **(11)** !

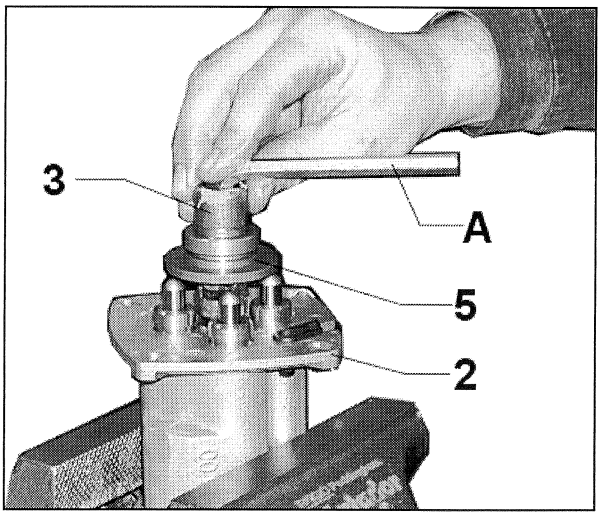


Sealing of the joystick (oil leakage below the bellow)

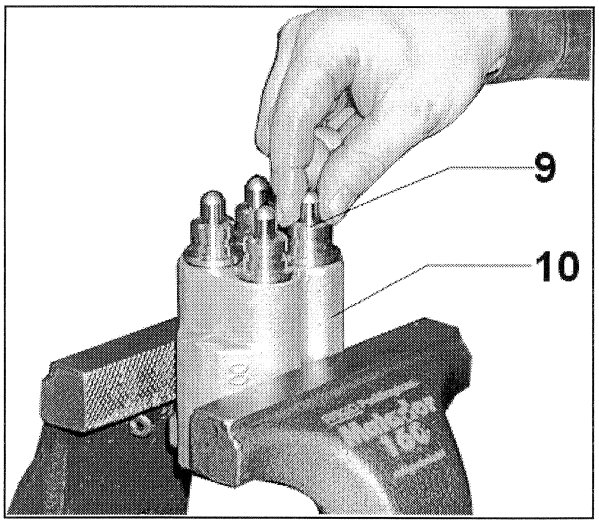
- Let escape the excess pressure of the hydraulic oil tank (open the ventilation filter).
- Connect a vacuum pump instead of the ventilation filter, create a vacuum.
- Turn up the bellow **(12)** at the pilot-operated valve.
- Slacken the nut **(11)** with a 19 mm fork wrench.
- Unscrew the handle **(5)** together with the bellow **(12)**.



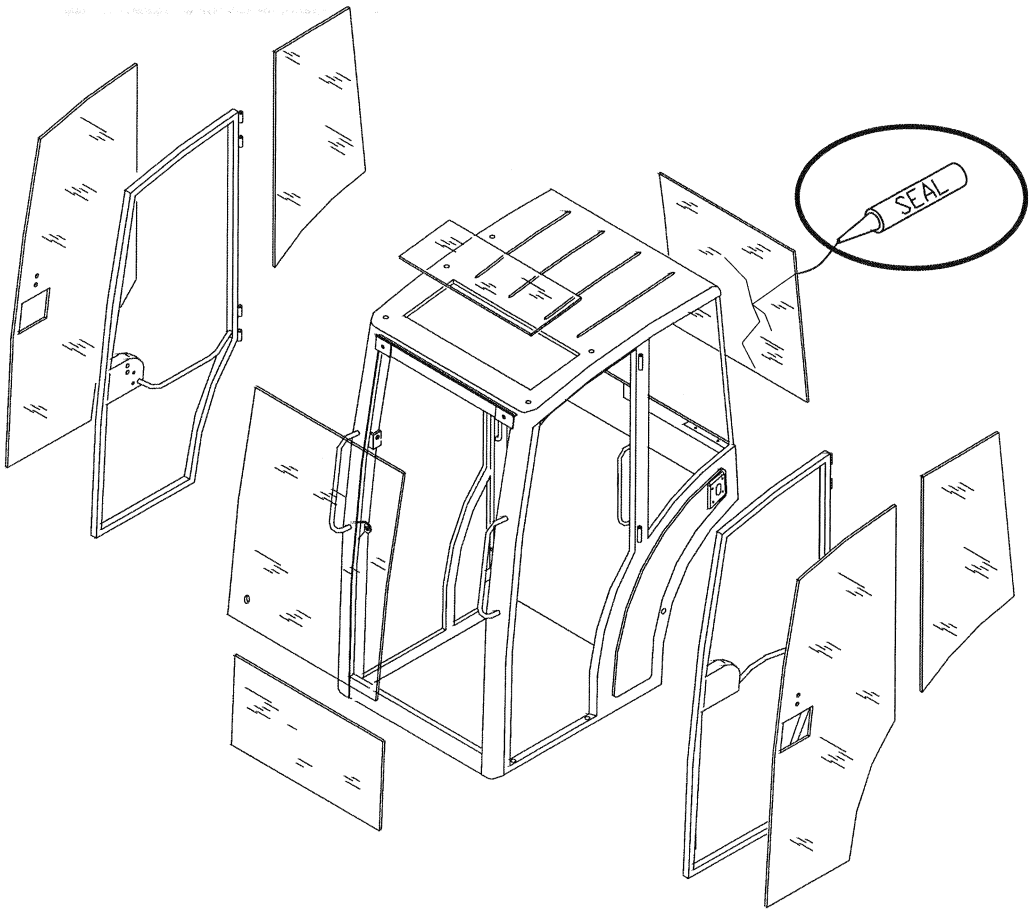
- Unscrew the cardan shaft **(3)** by means of an 8 mm hexagon socket screw key **(A)**.
- Remove the shims and the holding plate **(2)**.



- Pull the leaking tappet set **(9)** out of the housing.
- Check the seat surface in the housing **(10)** for scratches, damage, etc.
- Press in the new tappet set **(9)**.
- Remaining assembly analogous (lever must be nearly free from play, if need be, readjust pressure disk **(5)**).
- Pay attention to the colour marking when tightening the nut **(11) !**



Driver's cab with cemented window panes



If need be, the **repair kit part no. 5.075.632.517** is available.
It also contains the repair instructions (please also refer to our Service Information no. 11/98 of 15.07.98).

"BETASEAL" window pane glue kit part no. 5 075 632 517

1. Remove the broken glass pane by means of the cutting wire enclosed.

2. Trim the remaining PUR material back to a thickness of 1 - 2 mm by using a well-sharpened knife.

3. Clean / activate the cut surfaces with "BETAWIPE 4001" (blue cap) and let dry for 2 - 3 minutes.

4. Apply "BETAWIPE VP 04604" (yellow cap) on the glue surfaces of the glass pane by means of a (clean) cloth and rub dry.

5. Shake "BETAPRIME 5100" (green cap) well before use for approx. 1 minute. Then rapidly apply "BETAPRIME 5100" on the glue surface of the pane by means of the applicator and let dry for 15 minutes.

6. Tear off the rear steel cap of the glue cartridge and remove the enclosed "Silicagel" bag.

7. Evenly apply the glue "BETASEAL" or "BETAMATE" on the glue surfaces of the cabin by means of the enclosed nozzle.

8. Position the pane immediately with an appropriate glass transport handle and press into place with an appropriate webbing.

Drying times and safety regulations:
Please respect the instructions of the glue manufacturer.

TEREX | SCHAEFF

SERVICE-MANUAL

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SKL 843	SKL 853	2	Technical Data
SKL 877		3	Diesel Engine
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SCL 515	SKS 633	5	Setting Instructions
		6	Functioning Description
SKB 2000	SMB 2041	7	Electrical System
		8	Maintenance
HML 21	HML 51 S	9	Operation
		10	
HR 21	HR 22	11	
HR 31	HR 41	12	
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TEREX | SCHAEFF

SUBGROUP LIST

Technical Data

SKL 823	2.03
SKL 823 Basic	2.04
SKL 833	2.05
SKL 833 Basic	2.06
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HS 41M	2.85
HS 41MM	2.86

TEREX | SCHAEFF

DIESEL ENGINE

Manufacturer:		Perkins	
Type:		704-30	
Performance acc. to ISO 9249 (ECE-R 24):	kW/PS	37.0/50 at 2,300 min^{-1}	(up to 823/0717)
Performance acc. to ISO 9249 (ECE-R 24):	kW/PS	37.0/50 at 2,400 min^{-1}	(from 823/0718)
Construction:		4 cylinders in line	
Cooling:		water	
Injection:		direct injection	
Capacity:	cm^3	3,000	
High idle:	min^{-1}	2,520 $^{+50}$	(up to 823/0717)
High idle:	min^{-1}	2,600 $^{+50}$	(from 823/0718)
Low idle:	min^{-1}	800 $^{+50}$	
Spec. fuel consumption under full load:	g/kWh	215	
Tappet clearance - inlet cold:	mm	0.35	
Tappet clearance - outlet cold:	mm	0.35	
Torque of cylinder head studs (only in case of repair):	Nm	50 / 85	
Further data:		see engine instruction book	

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	12 / 65
Starter:	V/kW(PS)	12 / 2.5 (3.4)
Starting aid:		glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm H4 halogen headlamps

TRANSMISSION

Travel pump:	type	A 4 VG 40 DA with pressure cut-off
Displacement:	max. cm^3/rev	40
Travel motor / fast travel version:	type	A 6 VM 55 DA 2 / A 6 VM 80 DA 5
Displacement / fast travel version:	max. cm^3/rev.	55 / 80

TRAVEL RANGE (up to serial no. 823/0717)

Symbol „tortoise" / fast travel version :	km/h	0 - 6.5 / 0 - 6.5
Symbol „rabbit" / fast travel version:	km/h	0 - 20 / 0 - 30

Cardan shaft rev. with **20 - km/h version**			adjustment at nominal speed tortoise / rabbit
with standard tyres:	365/70 R18:	min^{-1}	585 / 1,760
	12,5-18:	min^{-1}	585 / 1,760
	335/80 R18:	min^{-1}	585 / 1,720
Cardan shaft rev. with **30 km/h - fast travel version**			adjustment at nominal speed tortoise / rabbit
with standard tyres:	365/70 R18:	min^{-1}	450 / 2,050
	12,5-18:	min^{-1}	450 / 2,050
	335/80 R18:	min^{-1}	450 / 1,995

(from serial no. 823/0718)

Cardan shaft rev. with **20 km/h version**			adjustment at nominal speed tortoise / rabbit
with standard tyres	365/70 R18:	min^{-1}	610 / 1,760
	12,5-18:	min^{-1}	610 / 1,760
	335/80 R18:	min^{-1}	610 / 1,720

Cardan shaft rev. with **30 km/h - fast travel version**			adjustment at nominal speed tortoise / rabbit
with standard tyres	365/70 R18:	min^{-1}	470 / 2,050
	12,5-18:	min^{-1}	470 / 2,050
	335/80 R18:	min^{-1}	470 / 1,995

PRESSURE AND SETTING VALUES **travel**

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	30^{+5}
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	2,100 at 280 bar
	(see also setting instructions, chapter 5, measuring method 2)	
Start-up speed:	min^{-1}	1,150
Engine stalling (rabbit) - dynamic:	min^{-1}	2,100 at 280 bar HP (up to 823/0717)
Engine stalling (rabbit) - dynamic:	min^{-1}	2,200 at 280 bar HP (from 823/0718)
Brake inching beginning / end:	bar	5 -13
Pressure switch (hydrostatic brake):	bar	22

STEERING

Steering unit (serial no. 823/0100 - /0104):	type	ZF-Hydraulik Nord LAGCSD 250
Steering unit (from serial no. 823/0105):	type	Danfoss OSPC 250 LS dyn.
Steering pump:	make	Commercial
Displacement:	cm^3/rev.	13
Steering pressure (high idle):	bar	175
Priority valve (serial no. 823/0100 - /0104):	type	ZF-Hydraulik Nord LSPSD 3.125-2
Priority valve (from serial no. 823/0105):	type	Danfoss OLS 80 dyn.

WORKING HYDRAULICS

Working pump:	make	Commercial
Displacement:	cm^3/rev.	13
Valve bank:	type	VOAC HV 07
Servo-controlled valve:	type	Brown PRSV

PRESSURE AND SETTING VALUES **working**

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift:	bar	280
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280
- shovel dump out:	bar	150
- additional control circuit:	bar	230 / 230
- pilot pressure (charge pressure):	bar	30^{+5}

WORKING CYCLES

Lifting frame lift:	s	5.2
Lifting frame lower:	s	3.6
Shovel dump in:	s	1.1 in upper position
Shovel dump out:	s	1.1 in upper position

AXLES

Front axle with **s**elf-**l**ocking **d**ifferential:	make/type	Clark-Hurth 171 / 288
Rear axle with SLD:	make/type	Clark-Hurth 302 / 171 / 297
Front axle with SLD - fast travel version:	make/type	Clark-Hurth 171 / 287
Rear axle with SLD - fast travel version:	make/type	Clark-Hurth 302 / 171 / 256

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake, front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydr. oil recommendation table
Transmission oil:	MIL-L 2105 B resp. API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

please see instruction book

CAPACITIES

	ltr.	
Engine oil with oil filter (change):	approx. 8.2	engine oil
Hydraulic oil (tank and system) first filling:	approx. 61.0	hydraulic oil
Hydraulic oil tank (change):	approx. 46.0	hydraulic oil
Fuel tank:	approx. 72.0	diesel
Front axle - central housing:	approx. 6.5	transmission oil
Front axle - wheel hub:	approx. 0.35	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx. 8.0	transmission oil
Rear axle - wheel hub:	approx. 0.35	transmission oil, each
Service brake:	approx. 0.25	ATF oil
Cooling agent:	approx. 13.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Perkins
Type:		704-30
Performance acc. to ISO 9249 (ECE-R 24):	kW/PS	37.0 / 50 at 2,400 min^{-1}
Construction:		4 cylinders in line
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	3,000
High idle:	min^{-1}	2,600 $^{+50}$
Low idle:	min^{-1}	800 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	215
Tappet clearance - inlet cold:	mm	0.35
Tappet clearance - outlet cold:	mm	0.35
Torque of cylinder head studs (only in case of repair):	Nm	50 / 85
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 72 / 420
Generator:	V/A	12 / 65
Starter:	V/kW(PS)	12 / 2.5 (3.4)
Starting aid:		glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm H4 halogen headlamps

TRANSMISSION

Travel pump:		type	A 10 VG 45 DA 1 D8
Displacement:		max. cm^3/rev	45
Travel motor	20 km/h:	type	A 6 VM 55 DA 2X
Displacement	20 km/h:	max. cm^3/rev.	55

TRAVEL RANGE

Symbol „tortoise“	20 km/h:	km/h	0 - 6.5
Symbol „rabbit“	20 km/h:	km/h	0 - 20

Cardan shaft rev. with **20 km/h**			adjustment at nominal speed tortoise / rabbit
with standard tyres:	10,5 - 18 MPT:	min^{-1}	690 / 1,950
	15,5/55 R18 Dunlop:	min^{-1}	585 / 1,960

PRESSURE AND SETTING VALUES — Travel

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	$30^{\pm 1}$
High pressure (SV):	bar	420^{+10}
Pressure cut-off:	bar	390^{+10}
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	2,250 at 280 bar HP
	(see also setting instructions, chapter 5, measuring method 2)	
Start-up speed:	min^{-1}	$1{,}150^{\pm 50}$
Engine stalling (rabbit) - dynamic:	min^{-1}	$2{,}200^{-100}$ at 210 bar HP
Brake inching beginning / end:	bar	5 -13
Pressure switch (hydrostatic brake):	bar	22

STEERING

Steering unit (from serial no. 823/0105):	type	Danfoss OSPC 250 LS 150
Steering pump:	make	Bosch
Displacement:	cm^3/rev.	14
Steering pressure (high idle):	bar	$175^{+10}/_{-5}$
Priority valve (from serial no. 823/0105):	type	Danfoss OLSB 80

WORKING HYDRAULICS

Working pump:	make	Bosch
Displacement:	cm^3/rev.	14
Valve bank:	type	VOAC HV 07
		mech. controlled

PRESSURE AND SETTING VALUES — Working

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift:	bar	280
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280
- shovel dump out:	bar	140
- additional control circuit:	bar	- / -
- pilot pressure (charge pressure):	bar	---

WORKING CYCLES

Lifting frame lift:	s	4.9
Lifting frame lower:	s	3.4
Shovel dump in:	s	1.1 in upper position
Shovel dump out:	s	1.4 in upper position

AXLES

Front axle with self-locking differential:	make/type	Clark-Hurth 171 / 288
Rear axle:	make/type	Clark-Hurth 302 / 171 / 340

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake, front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydr. oil recommendation table
Transmission oil:	MIL-L 2105 B resp. API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

please see instruction book

CAPACITIES

	ltr.	
Engine oil with oil filter (change):	approx. 8.2	engine oil
Hydraulic oil (tank and system) first filling:	approx. 61.0	hydraulic oil
Hydraulic oil tank (change):	approx. 46.0	hydraulic oil
Fuel tank:	approx. 72.0	diesel
Front axle - central housing:	approx. 6.5	transmission oil
Front axle - wheel hub:	approx. 0.35	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx. 8.0	transmission oil
Rear axle - wheel hub:	approx. 0.35	transmission oil, each
Service brake:	approx. 0.25	ATF oil
Cooling agent:	approx. 13.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Perkins
Type:		704-30
Performance acc. to DIN 70020 (ECE-R 24):	kW/PS	44 / 60 at 2,300 min^{-1}
Construction:		4 cylinders in line
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	3,000
High idle:	min^{-1}	2,520 $^{+50}$
Low idle:	min^{-1}	800 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	215
Tappet clearance - inlet cold:	mm	0.35
Tappet clearance - outlet cold:	mm	0.35
Torque of cylinder head studs (only in case of repair):	Nm	50 / 85
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	12 / 65
Starter:	V/kW/PS	12 / 2.5 / 3.4
Starting aid:		glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm. H4 halogen headlamps

TRANSMISSION

Travel pump:	type	A 4 VG 56 DA with pressure cut-off
Displacement:	max. cm^3/rev.	56
Travel motor / 20 km/h - version:	type	A 6 VM 80 DA 5
Travel motor / 30 km/h - version:	type	A 6 VM 107 DA 5
Travel motor / 36 km/h - version:	type	A 6 VM 80 DA 5
Displacement / 20 km/h - version:	max. cm^3/rev.	80
Displacement / 30 km/h - version:	max. cm^3/rev.	107
Displacement / 36 km/h - version:	max. cm^3/rev.	80

TRAVEL RANGE

Symbol „tortoise" - 20/30/36km/h-version:		km/h	0 bis 6,5 / 0 bis 6,5 / 0 bis 6,5
Symbol „rabbit" - 20/30/36km/h-version:		km/h	0 bis 20 / 0 bis 30 / 0 bis 36
Cardan shaft rev. at **20 km/h - version**			adjustment at nominal speed tortoise / rabbit
and standard tyres	405/70 R18:	min^{-1}	615 / 1,890
	12,5-20:	min^{-1}	615 / 1,910
	335/80 R18:	min^{-1}	615 / 1,950
Cardan shaft rev. at **30 km/h - version up to ser.no.: 833/1930**			adjustment at nominal speed tortoise / rabbit
and standard tyres	405/70 R18:	min^{-1}	625 / 2,525
	12,5-20 :	min^{-1}	625 / 2,550
	335/80 R18:	min^{-1}	625 / 2,605
Cardan shaft rev. at **36 km/h - version from ser.no.: 833/1931**			adjustment at nominal speed tortoise 1./2. gear / rabbit 1./2. gear
and standard tyres	405/70 R18:	min^{-1}	610 / 1,230 / 1,690 / 3,370
	12,5-20:	min^{-1}	610 / 1,230 / 1,710 / 3,400
	335/80 R18:	min^{-1}	610 / 1,230 / 1,740 / 3,475

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	30^{+5}
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	2,200 at 210 bar (see setting instructions, chapter 5, measuring method 2)
Start-up speed:	min^{-1}	1,150
Engine stalling (rabbit) - dynamic:	min^{-1}	2,100 at 220 bar HP
Brake inching beginning / end:	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	22

STEERING

Steering unit (serial no. 833/0100 - /0104):	type	ZF-Hydraulik Nord LAGCSD 250
Steering unit (from serial no. 833/0105):	type	Danfoss OSPC 250 LS dyn.
Steering pump:	make	Commercial
Displacement:	cm^3/rev:	21
Steering pressure (high idle):	bar	175
Priority valve (serial no. 833/0100 - /0104):	type	ZF-Hydraulik Nord LSPSD 3.125-2
Priority valve (from serial no. 833/0105):	type	Danfoss OLS 80 dyn.

WORKING HYDRAULICS

Working pump:	make	Commercial
Displacement:	cm^3/rev.	21
Valve bank:	type	VOAC HV 07
Servo-controlled valve:	type	Brown PRSV

PRESSURE AND SETTING VALUES — working

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift:	bar	280
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280
- shovel dump out:	bar	150
- additional control circuit:	bar	230 / 230
- pilot pressure (charge pressure):	bar	30^{+5}

WORKING CYCLES

Lifting frame lift:	s	5.0
Lifting frame lower:	s	3.4
Shovel dump in:	s	1.1 in upper position
Shovel dump out:	s	1.1 in upper position

AXLES

Front axle with self-locking differential -	20 km/h-version:	make/type	ZF 4472 030 068	
Rear axle with self-locking differential -	20 km/h-version:	make/type	ZF 4472 030 069	(up to ser. no 833/1698)
Rear axle with self-locking differential -	20 km/h-version:	make/type	ZF 4472 030 120	(from ser. no 833/1699 before 833/1673 to /1679)
Front axle with self-locking differential -	30 km/h-version:	make/type	ZF 4472 030 068	(up to ser. no 833/1930)
Rear axle with self-locking differential -	30 km/h-version:	make/type	ZF 4472 030 070	(up to ser. no 833/1930)
Front axle with self-locking differential -	36 km/h-version:	make/type	ZF 4472 030 085	(from ser. no 833/1931)
Rear axle with self-locking differential -	36 km/h-version:	make/type	ZF 4472 030 116	(from ser. no 833/1931)

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake, front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B resp. API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil - first filling:	approx. 9.5	engine oil
Hydraulic oil (tank and system) first filling:	approx. 67.0	hydraulic oil
Hydraulic oil tank (change):	approx. 51.0	hydraulic oil
Fuel tank:	approx. 72.0	diesel
Front axle - central housing:	approx. 7.5	transmission oil
Front axle - wheel hub:	approx. 0.7	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx. 8.0	transmission oil
Rear axle - wheel hub:	approx. 0.7	transmission oil, each
Service brake:	approx. 0.25	ATF oil
Cooling agent:	approx. 13.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Perkins
Type:		704-30
Performance acc. to DIN 70020 (ECE-R 24):	kW/PS	44 / 60 at 2,300 min^{-1}
Construction:		4 cylinders in line
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	3,000
High idle:	min^{-1}	2,520 $^{+50}$
Low idle:	min^{-1}	800 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	215
Tappet clearance - inlet cold:	mm	0.35
Tappet clearance - outlet cold:	mm	0.35
Torque of cylinder head studs (only in case of repair):	Nm	50 / 85
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 72 / 420
Generator:	V/A	12 / 65
Starter:	V/kW/PS	12 / 2.5 / 3.4
Starting aid:		glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm. H4 halogen headlamps

TRANSMISSION

Travel pump:		type	A 4 VG 56 DA 1D8
Displacement:		max. cm^3/rev.	56
Travel motor	20 km/h:	type	A 6 VM 80 DA 5/63
Displacement	20 km/h:	max. cm^3/rev.	80

TRAVEL RANGE

Symbol „tortoise“ -	20 km/h:	km/h	0 bis 6,5
Symbol „rabbit“ -	20 km/h:	km/h	0 bis 20
Cardan shaft rev. at	**20 km/h**		adjustment at nominal speed tortoise / rabbit
and standard tyres	12,5-18 MPT Dunlop:	min^{-1}	625 / 2,050
	365/70 R18 SPT9 Dunlop:	min^{-1}	625 / 2,030
	405/70 R18:	min^{-1}	625 / 1,925

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	30^{+5}
High pressure (SV):	bar	480^{+10}
Pressure cut-off:	bar	450^{+10}
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	2,200 at 210 bar HP
	(see setting instructions, chapter 5, measuring method 2)	
Start-up speed:	min^{-1}	1,150
Engine stalling (rabbit) - dynamic:	min^{-1}	2,100 at 220 bar HP
Brake inching beginning / end:	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	22

STEERING

Steering unit:	type	Danfoss OSPC 250 LS 150
Steering pump:	make	Commercial
Displacement:	cm^3/rev:	21
Steering pressure (high idle):	bar	$175\ ^{+10}/_{-5}$
Priority valve:	type	Danfoss OLSB 80

WORKING HYDRAULICS

Working pump:	make	Commercial
Displacement:	cm^3/rev.	21
Valve bank:	type	VOAC HV 07 mech. operated
Servo-controlled valve:	type	---

PRESSURE AND SETTING VALUES — working

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift:	bar	280
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280
- shovel dump out:	bar	140
- additional control circuit:	bar	- / -
- pilot pressure (charge pressure):	bar	---

WORKING CYCLES

Lifting frame lift:	s	5.0
Lifting frame lower:	s	3.4
Shovel dump in:	s	1.1 in upper position
Shovel dump out:	s	1.4 in upper position

AXLES

Front axle with self-locking differential -	20 km/h:	make/type	ZF / AP - R725 4472 030 068
Rear axle without self-locking differential -	20 km/h:	make/type	ZF / AP - R725 4472 030 069

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake, front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B resp. API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil - first filling:	approx. 9.5	engine oil
Hydraulic oil (tank and system) first filling:	approx. 67.0	hydraulic oil
Hydraulic oil tank (change):	approx. 51.0	hydraulic oil
Fuel tank:	approx. 72.0	diesel
Front axle - central housing:	approx. 7.5	transmission oil
Front axle - wheel hub:	approx. 0.7	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx. 8.0	transmission oil
Rear axle - wheel hub:	approx. 0.7	transmission oil, each
Service brake:	approx. 0.25	ATF oil
Cooling agent:	approx. 13.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1004-42
Performance acc. to DIN 70020 (ECE-R 24):	kW/PS	52 / 70 at 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	4,200
High idle:	min^{-1}	2,350 $^{+70}$
Low idle:	min^{-1}	750 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	215
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Torque of cylinder head studs (only in case of repair):	Nm	110
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	12 / 55
Starter:	V/kW/PS	12 / 2.8 / 3.8
Starting aid:		glow system
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm. H4 halogen headlamps

TRANSMISSION

Travel pump:		type	A 4 VG 56 DA with pressure cut-off
Displacement:		max. cm^3/rev.	56
Travel motor:	20 / 36 km/h-version	type	A 6 VM 80 DA 2 / A 6 VM 80 DA 2
Displacement:	20 / 36 km/h-version	max. cm^3/rev.	80 / 80

TRAVEL RANGE

Symbol „tortoise“ 20 / 36 km/h version:	km/h	0 - 6.0 / 0 - 17
Symbol „rabbit“ 20 / 36 km/h version:	km/h	0 - 20 / 0 - 36

Cardan shaft rev. at **20 km/h - version**

			adjustment at nominal speed tortoise / rabbit
and standard tyres	405/70 R20:	min^{-1}	590 / 2,010
	14,5-20:	min^{-1}	590 / 2,025
	16/70-20:	min^{-1}	590 / 2,090
	375/75 R20:	min^{-1}	590 / 2,060

Cardan shaft rev. at **36 km/h - version**

			adjustment at nominal speed tortoise / rabbit		
			1./2. gear	/	1./2. gear
and standard tyres	405/70 R20:	min^{-1}	530 / 1,140		1,505 / 3,235
	14,5-20:	min^{-1}	530 / 1,140		1,515 / 3,260
	16/70-20:	min^{-1}	530 / 1,140		1,565 / 3,365
	375/75 R20:	min^{-1}	530 / 1,140		1,540 / 3,315

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	$0{,}5^{\pm 0{,}1}$
Charge pressure (high idle):	bar	30^{+5}
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	2,100 at 250 bar (see also setting instructions, chapter 5, measuring method 2)
Start-up speed:	min^{-1}	$1{,}150^{\pm 50}$
Engine stalling (rabbit) - dynamic:	min^{-1}	$2{,}000^{\pm 50}$ at 270 bar HP
Brake inching beginning / end:	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	25

PRESSURE AND SETTING VALUES — working

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift:	bar	300
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280
- shovel dump out:	bar	160
- additional control circuit:	bar	230 / 230
- pilot pressure (charge pressure):	bar	30^{+5}

STEERING

Steering unit:	type	LAGUV 250/125/400
Steering pump:	make	Commercial
Displacement:	cm^3/rev:	32
Steering pressure (high idle):	bar	175
Priority valve:	type	LSPSD 2.329-1

WORKING HYDRAULICS

Working pump:	make	Commercial
Displacement:	cm^3/rev.	32
Control valve:	type	F 130 CF
Pilot-operated valve:	type	PRSV C01

WORKING CYCLES

Lifting frame lift:	s	5.2
Lifting frame lower:	s	3.3
Shovel dump in:	s	1.2 in upper position
Shovel dump out:	s	1.2 in upper position

AXLES

Front axle with self-locking differential, 20 km/h version:	make / type ZFP AP-R725
Rear axle with self-locking differential, 20 km/h version:	make / type ZFP AP-R725
Front / rear axle, 36 km/h version:	make / type ZFP AP-R725

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake at the front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B resp. API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil - change:	approx. 9.5	engine oil
Hydraulic oil (tank and system) - first filling:	approx. 80.0	hydraulic oil
Hydraulic oil tank - change:	approx. 61.0	hydraulic oil
Fuel tank:	approx. 112.0	diesel
Front axle - central housing:	approx. 7.5	transmission oil
Front axle - wheel hub:	approx. 0.7	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx. 8.0	transmission oil
Rear axle - wheel hub:	approx. 0.7	transmission oil, each
Service brake:	approx. 0.25	ATF oil
Cooling agent:	approx. 17.5	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1004-42
Performance acc. to DIN 70020 (ECE-R 24):	kW/PS	59 / 80 at 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	4,200
High idle:	min^{-1}	2,350 $^{+70}$
Low idle:	min^{-1}	750 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	215
Injection nozzle pressure:	bar	250
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Torque of cylinder head studs	Nm	110 (only in case of repair)
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	12 / 55
Starter:	V/kW/PS	12 / 2.8 / 3.8
Starting aid:		glow system
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm. H4 halogen headlamps

TRANSMISSION

Travel pump:		type	A 4 VG 71 DA with pressure cut-off
Displacement:		max. cm^3/rev.	71
Travel motor	20 / 36 km/h - version:	type	A 6 VM 107 DA 5 / A 6 VM 107 DA 5
Displacement	20 / 36 km/h - version::	max. cm^3/rev.	107 / 107

TRAVEL RANGE

Symbol „tortoise“	20 / 36 km/h - version:	km/h	0 - 6.0 / 0 - 17
Symbol „rabbit“	20 / 36 km/h - version:	km/h	0 - 20 / 0 - 36

Cardan shaft rev. at **20 km/h - version**			adjustment at nominal speed tortoise / rabbit	
and standard tyres	405/70 R20:	min^{-1}	560 / 1,765	
	16/70-20:	min^{-1}	560 / 1,835	
	425/75 R20:	min^{-1}	560 / 1,690	
Cardan shaft rev. at **36 km/h - version**			adjustment at nominal speed tortoise / rabbit	
			1./2. gear /	1./2. gear
and standard tyres	405/70 R20:	min^{-1}	505 / 1,090	1,475 / 3,180
	16/70-20:	min^{-1}	505 / 1,090	1,530 / 3,300
	425/75 R20:	min^{-1}	505 / 1,090	1,420 / 3,050

PRESSURE AND SETTING VALUES — travel

Suction pressure:	max. bar	$0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	28^{+2}
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	2,100 at 220 bar
	(see also setting instructions, chapter 5, measuring method 2)	
Start-up speed:	min^{-1}	$1,150^{\pm 50}$
Engine stalling (rabbit) - dynamic:	min^{-1}	$2,000^{\pm 50}$ at 240 bar
Brake inching beginning / end:	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	25

STEERING

Steering unit:	type	LAGUV 250/125/400
Steering pump:	make	Commercial
Displacement:	cm^3/rev:	33
Steering pressure (high idle):	bar	175
Priority valve:	type	LSPSD 2.329-1

WORKING HYDRAULICS

Working pump:	make	Commercial
Displacement:	cm^3/rev.	33
Control valve:	type	F 130 CF
Servo-controlled valve:	type	PRSV C01

PRESSURE AND SETTING VALUES — working

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift:	bar	300
- lifting frame lower:	bar	anti-cavitation
- shovel dump in:	bar	280
- shovel dump out:	bar	160
- additional control circuit:	bar	230 / 230
- pilot pressure (charge pressure):	bar	28^{+2}

WORKING CYCLES

Lifting frame lift:	s	5.5
Lifting frame lower:	s	3.6
Shovel dump in:	s	1.3 in upper position
Shovel dump out:	s	1.3 in upper position

AXLES

Front axle with self-locking differential:	make/type	ZF / AP-R735
Rear axle with self-locking differential:	make/type	ZF / AP-R735
Front / rear axle - fast travel version:	make/type	ZF / AP-R735

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake at the front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B resp. API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil - change:	approx. 9.5	engine oil
Hydraulic oil (tank and system) - first filling:	approx. 80.0	hydraulic oil
Hydraulic oil tank - change:	approx. 61.0	hydraulic oil
Fuel tank:	approx. 112.0	diesel
Front axle - central housing:	approx. 7.0	transmission oil
Front axle - wheel hub:	approx. 0.7	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx. 8.5	transmission oil
Rear axle - wheel hub:	approx. 0.7	transmission oil, each
Service brake:	approx. 0.25	ATF oil
Cooling agent:	approx. 17.5	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1006-6
Performance acc. to DIN 70020:	kW/PS	88/120 at 2.200 min^{-1}
Construction:		6 cylinders in line
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	5,980
High idle:	min^{-1}	2,350 $^{+50}$
Low idle:	min^{-1}	850 $^{+50}$
Tappet clearance - inlet cold:	mm	0.2
Tappet clearance - outlet cold:	mm	0.45
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	24
Battery:	V/Ah/A	2 x 12 / 105 / 450
Generator:	V/A	24 / 55
Starter:	V/kW/PS	24 / 3.7 / 5
Starting aid:		4 glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

TRANSMISSION

Travel pump:	type	A 4 V 90 DA with pressure cut-off
Displacement:	max. cm^3/rev.	90
Travel motor:	type	A 6 VM 107 DA 3
Displacement:	max. cm^3/rev.	107
Travel motor:	type	A 6 VMN 107 HD 1 D
Displacement:	max. cm^3/rev.	107

TRAVEL RANGE

Symbol „tortoise“:	km/h	0 to 8
Symbol „rabbit“:	km/h	0 to 20
Cardan shaft revolutions:	min^{-1}	2,060 at 20 km/h with 17.5 - 25

PRESSURE AND SETTING VALUES

	travel	
Suction pressure:	max. bar	- 0.25
Charge pressure (high idle):	bar	26 $^{+1}$
High pressure (SV):	bar	470
Pressure cut-off:	bar	440 $^{+10}$
Case pressure:	max. bar	2.5
Regulation start (DA-motor):	bar	250
Pressure regulator (HD-motor):	bar	240
Start-up speed:	min^{-1}	1,150 $^{+50}$
Engine stalling (tortoise):	min^{-1}	2,000 $^{\pm 30}$ at full throttle and 290 bar HP
Brake inching beginning / end:	bar	5 - 13

STEERING

Steering unit:	type	OSPCX 200 LS dyn.
Flow amplifier:	type	Danfoss OSQA 4
Steering pump:	make	Bosch (see working hydraulics)
Steering pressure:	bar	$175\ ^{+10}/_{-5}$

WORKING HYDRAULICS

Working and steering pump:	make	Bosch
Displacement:	cm^3/rev.	45
Working and brake pump (accessory drive):	make	Bosch
Displacement:	cm^3/rev.	16
Joystick:	type	PRSV C01
Control valve:	type	H 170 CF
Control valve (hydraulically elevating cab):	type	KA 10 Commercial

PRESSURE AND SETTING VALUES

	working	
Safety valve at the pump:	max. bar	280
Main pressure relief valve:	max. bar	250
Line relief pressures:		
- Lifting frame lift:	bar	280
- Lifting frame lower:	bar	anti-cavitation
- Shovel dump in:	bar	280
- Shovel dump out:	bar	150
- Additional circuit:	bar	230 / 230
- Brake accumulator pressure:	bar	110 - 140
- Brake pressure:	bar	60
- Hydraulically elevating cab lift:	bar	175
- Hydraulically elevating cab lower:	bar	175

WORKING CYCLES

Lifting frame lift:	s	9.3
Lifting frame lower:	s	5.2
Shovel dump in:	s	1.3 in upper position
Shovel dump out:	s	1.3 in upper position
Hydraulically elevating cab lift:	s	4.0
Hydraulically elevating cab lower:	s	4.0

AXLES

Front axle:	make/type	ZF / AP-R 765 / BK with self-locking differential
Rear axle:	make/type	ZF / AP-R 765 with self-locking differential

BRAKE SYSTEM

Service brake:		oil-immersed multi-disk brake, brake system Safim S6 of the front axle
Parking brake (hydr. hand brake valve):		drum brake at the rear axle
Brake pressure pump (accessory drive):	make	Bosch (see working hydraulics)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B resp. API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	hydraulic oil

MAINTENANCE PARTS

see instruction book

CAPACITIES

	ltr.	
Engine oil (first filling):	approx. 14.5	engine oil
Hydraulic oil (tank and system):	approx. 170.0	hydraulic oil
Hydraulic oil tank (change):	approx. 120.0	hydraulic oil
Fuel tank:	approx. 185.0	diesel
Front axle - central housing:	approx. 9.0	transmission oil
Front axle - wheel hub:	approx. 1.0	transmission oil, each
Rear axle - central housing:	approx. 8.0	transmission oil
Rear axle - reduction gear:	approx. 1.7	transmission oil
Rear axle - wheel hub:	approx. 1.0	transmission oil, each
Service brake:	connected to the hydraulic system	
Cooling agent:	approx. 30.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Deutz
Type:		F 4 L 1011 F
Performance acc. to ISO 9249 (ECE-R 24):	kW/PS	37 / 50 at 2,300 min^{-1}
Construction:		4 cylinders in line
Cooling:		oil / air
Injection:		direct injection
Capacity:	cm^3	2,732
High idle:	min^{-1}	2,480
Low idle:	min^{-1}	910
Spec. fuel consumption under full load:	g/kWh	225
Tappet clearance - inlet cold:	mm	0.3
Tappet clearance - outlet cold:	mm	0.5
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 72 / 420
Generator:	V/A	14 / 60
Starter:	V/kW/PS	12 / 2.2 / 3.0
Starting aid:		glow filament
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm H4 halogen headlamps

TRANSMISSION

Travel pump:	type	A 4 VG 40 DA with pressure cut-off
Displacement:	max. cm^3/rev.	40
Travel motor:	type	A 6 VM 55 DA 5
Displacement:	max. cm^3/rev.	55

TRAVEL RANGE

Symbol „tortoise“:		km/h	0 to 6.0
Symbol „rabbit“:		km/h	0 to 20
Cardan shaft rev. with 20 km/h			adjustment at nominal speed tortoise / rabbit
with standard tyres:	12 - 16,5:	min^{-1}	815 / 2,120
	10,0/75 - 15,3 8PR:	min^{-1}	815 / 2,250
	10 - 16,5TL 6PR:	min^{-1}	815 / 2,350

PRESSURE AND SETTING VALUES (travel)

Suction pressure:	bar	max. 0.5 $^{\pm 0.1}$
Charge pressure (high idle):	bar	30 $^{\pm 1}$
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50 ° C:	max. bar	2.5
Regulation start, dynamic:	min^{-1}	2,150 at 240 bar HP (see also setting instructions, chapter 5, measuring method 2)
Start-up speed:	min^{-1}	1,150 $^{\pm 50}$
Engine stalling (rabbit) - dynamic:	min^{-1}	2,200 $^{-100}$ at 270 bar HP
Brake inching (beginning - end) :	bar	5 - 13
Pressure switch (hydrostatic brake):	bar	25

CRAWLER GEAR, OPTIONAL

3-stage-switch:

0	⇒	crawler gear	(infinitely variable by potentiometer)	
1	⇒	working gear	(„tortoise")	0 - 6 km/h
2	⇒	driving gear	(„rabbit")	0 - 20 km/h

STEERING

Steering unit:	type	Danfoss OSPC 160 LS dyn.
Steering pump:	make	Bosch
Displacement:	cm^3/rev.	16
Steering pressure (high idle):	bar	175
Priority valve:	type	Danfoss OLS 80 dyn.
Steering valve / joystick:	type	VOAC - P70CF 01
Joystick steering / servo controlled valve:	type	PCL 402

WORKING HYDRAULICS

Working pump:	make	Bosch
Displacement:	cm^3/rev.	16
Valve bank **I**: loader hydraulics	type	VOAC - P70CF 02
Valve bank **II**: joystick steering	type	VOAC - P70CF 01
Servo controlled valve:	type	PCL 402

OPTION I 3RD CONTROL CIRCUIT **36.8 l/min**

Valve bank:	type	VOAC - P70CF 03 (instead of P70CF 02)

OPTION II 3RD CONTROL CIRCUIT **94.3 l/min**

Additional pump flanged to the travel pump:	make	Bosch
Displacement:	cm^3/rev.	25
Valve bank **III**:	type	VOAC - F130CF01 (in addition to P70CF02)

PRESSURE AND SETTING VALUES

Pilot pressure (charge pressure):	bar	30

Valve bank I: loader hydraulics

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift / lower:	bar	280 / anti-cavitation
- shovel dump in / out:	bar	230 / 160
- only with option: add. control circuit 36.8 $^{l}/_{min}$	bar	230 / 230

Valve bank II: joystick steering

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- steering left / right:	bar	230 / 230

Valve bank III: only with option additional control circuit 94.3 $^{l}/_{min}$

Main pressure relief valve (high idle):	max. bar	175
Line relief pressures:		
- additional control circuit	bar	230 / 230

WORKING CYCLES

Lifting frame lift:	s	4.8
Lifting frame lower:	s	3.3
Shovel dump in:	s	1.1 in upper position
Shovel dump out:	s	0.8 in upper position

AXLES

Front axle with self-locking differential:	make/type	ZF / AP-R 715	4472 004 040
Rear axle without self-lock differential:	make/type	ZF / AP-R 715	4472 004 041

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake, front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	s. Schaeff hydr. oil recommendation table
Transmission oil:	MIL-L 2105 B or API-GL 5 respectively, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	ATF Typ A Suffix A or Dexron II D

MAINTENANCE PARTS

please see operating manual

CAPACITIES

		ltr.	
Engine oil with oil filter (change):	approx.	10.5	engine oil
Hydraulic oil (tank and system) - first filling:	approx.	75.0	hydraulic oil
Hydraulic oil tank (change):	approx.	58.0	hydraulic oil
Fuel tank:	approx.	62.0	diesel
Front axle - central housing:	approx.	3.5	transmission oil
Front axle - wheel hub:	approx.	0.4	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx.	4.5	transmission oil
Rear axle - wheel hub:	approx.	0.4	transmission oil, each
Service brake:	approx.	0.25	ATF oil

DIESEL ENGINE

Manufacturer:		Perkins
Type:		704-30
Performance acc. to DIN 70020 (ECE-R 24):	kW/PS	44 / 60 at 2,300 min^{-1}
Construction:		4 cylinders in line
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	3,000
High idle:	min^{-1}	2,520 $^{+50}$
Low idle:	min^{-1}	800 $^{+50}$
Spec. fuel consumption under full load:	g/kWh	215
Tappet clearance - inlet cold:	mm	0.35
Tappet clearance - outlet cold:	mm	0.35
Torque of cylinder head studs	Nm	50 / 85 (only in case of repair)
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	12 / 65
Starter:	V/kW/PS	12 / 2.5 / 3.4
Starting aid:		glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm. H4 halogen headlamps

TRANSMISSION

Travel pump:		type	A 4 VG 56 DA with pressure cut-off
Displacement:		max. cm^3/rev.	56
Travel motor	20 km/h - version:	type	A 6 VM 80 DA 5
Travel motor	30 km/h - version:	type	A 6 VM 107 DA 5
Travel motor	36 km/h - version:	type	A 6 VM 80 DA 5
Displacement	20 km/h - version:	max. cm^3/rev.	80
Displacement	30 km/h - version:	max. cm^3/rev.	107
Displacement	36 km/h - version:	max. cm^3/rev.	80

TRAVEL RANGE

Symbol „tortoise“	/ 20/30/36 km/h-version :	km/h	0 - 6.5 / 0 - 6.5 / 0 - 6.5
Symbol „rabbit“	/ 20/30/36 km/h-version :	km/h	0 - 20 / 0 - 30 / 0 - 36

Cardan shaft rev. at **20 km/h - version**			adjustment at nominal speed tortoise / rabbit
and standard tyres	12,5-20:	min^{-1}	615 / 1,910
	335/80 R20:	min^{-1}	615 / 1,860
Cardan shaft rev. at **30 km/h - version**	**up to ser.no.: 633/0185**		adjustment at nominal speed tortoise / rabbit
and standard tyres	12,5-20 :	min^{-1}	625 / 2,550
	335/80 R20:	min^{-1}	625 / 2,480
Cardan shaft rev. at **36 km/h - version**	**from ser.no.: 633/0186**		adjustment at nominal speed tortoise / rabbit 1./2. gear / 1./2. gear
and standard tyres	12,5-20:	min^{-1}	610 / 1,215 / 1,710 / 3,400
	335/80 R20:	min^{-1}	610 / 1,215 / 1,665 / 3,310

PRESSURE AND SETTING VALUES (service temperature)

Suction pressure:	max. bar	0.5 $^{\pm 0.1}$
Charge pressure (high idle):	bar	30 $^{+5}$
High pressure (SV):	bar	480
Pressure cut-off:	bar	450
Case pressure at + 50° C:	max. bar	2.5
Regulation start:	min^{-1}	2,200 at 210 bar HP
	(see setting instructions, chapter 5)	
Start-up speed:	min^{-1}	1,150
Engine stalling (rabbit) - dynamic:	min^{-1}	2,100 at 220 bar HP
Brake inching beginning / end:	bar	5 -13
Pressure switch (hydrostatic brake):	bar	22

STEERING

Steering unit:	type	Danfoss OSPC 250 LS dyn.
Steering pump:	make	Commercial
Displacement:	cm^3/rev.	21
Steering pressure (high idle):	bar	175
Priority valve:	type	Danfoss OLS 80 dyn.

WORKING HYDRAULICS

Working pump:	make	Commercial
Displacement:	cm^3/rev.	21
Valve bank:	type	VOAC HV 07
Servo-controlled valve:	type	Brown PRSV

PRESSURE AND SETTING VALUES (service temperature)

Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- lifting frame lift (B2):	bar	280
- lifting frame lower (A2):	bar	anti-cavitation
- shovel dump in (B3):	bar	280
- shovel dump out (A3):	bar	150
- additional control circuit (A1/B1):	bar	230 / 230
- slewing right (A4):	bar	230
- slewing left (B4):	bar	230
- pilot pressure (charge pressure):	bar	30 $^{+5}$

WORKING CYCLES

Lifting frame lift:	s	4.7
Lifting frame lower:	s	3.5
Shovel dump in:	s	1.2 in upper position
Shovel dump out:	s	1.2 in upper position
Slewing right / left:	s	2.2

AXLES

Front axle	20 km/h - version:	make/type	ZF 4472 030 068
Rear axle	20 km/h - version:	make/type	ZF 4472 030 069
Front axle	30 km/h - version:	make/type	ZF 4472 030 068
Rear axle	30 km/h - version:	make/type	ZF 4472 030 070
Front axle	36 km/h - version:	make/type	ZF 4472 030 085
Rear axle	36 km/h - version:	make/type	ZF 4472 030 116

BRAKE SYSTEM

Service brake:		hydraulically operated drum brake, front axle
Parking brake:		drum brake at the front axle
Master cylinder:	make	ATE (mineral oil)

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B resp. API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see instruction book

CAPACITIES

		ltr.	
Engine oil with oil filter:	approx.	8.2	engine oil
Hydraulic oil (tank and system), first filling:	approx.	67.0	hydraulic oil
Hydraulic oil tank, change:	approx.	51.0	hydraulic oil
Fuel tank:	approx.	72.0	diesel
Front axle - central housing:	approx.	4.5	transmission oil
Front axle - wheel hub:	approx.	0.7	transmission oil, each
Rear axle - central housing and reduction gearbox:	approx.	5.5	transmission oil
Rear axle - wheel hub:	approx.	0.7	transmission oil, each
Service brake:	approx.	0.25	ATF oil
Cooling agent:	approx.	13.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

SKB 2000

Manufacturer:		Perkins
Type:		1004-42
Performance acc. to ISO 9249 (ECE-R 24):	kW/PS	59 / 80 at 2,200 min^{-1}
Construction:		4 cylinders in line
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	4,200
High idle:	min^{-1}	2,350 $^{+70}$
Low idle:	min^{-1}	750 $^{+50}$
Spec. fuel consumption:	g/kWh	215
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Tightening torque cylinder head studs (only in case of repair):	Nm	110
Further data:		see engine instruction book

SKB 2000 S

Manufacturer:		Perkins
Type:		1004-40T
Performance acc. to ISO 9249 (ECE-R 24):	kW/PS	71.0 / 97 at 2,000 min^{-1}
Construction:		4 cylinders in line
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	4,000
High idle:	min^{-1}	2,350 $^{+70}$
Low idle:	min^{-1}	750 $^{+50}$
Spec. fuel consumption:	g/kWh	215
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Tightening torque cylinder head studs (only in case of repair):	Nm	110
Further data:		see engine instruction book

ELECTRIC SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	12 / 65
Starter:	V/kW/(PS)	12 / 2.8 / (3.8)
Starting aid:		flame-type system
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm H4 halogen floodlights

DRIVE

SKB 2000

Travel pump:	type	A 4 VG 90 DA
Displacement:	cm^3/rev.	90
Travel motor:	type	A 6 VM 160 DA
Displacement:	max. cm^3/rev.	160

SKB 2000 S

Travel pump:	type	A 4 VG 90 DA
Displacement:	cm^3/rev.	90
Travel motor:	type	A 6 VM 160 DA
Displacement:	max. cm^3/rev.	160

Travel range:

SKB 2000 – 20 km/h version:

tortoise/rabbit:	km/h	0 to 6 / 0 to 20

SKB 2000 S – 36 km/h version:
Four (4) pre-selectable travel speeds, electro-hydraulically operated

Low gear:	tortoise / rabbit	km/h	0 to 6 / 0 to 18
High gear:	tortoise / rabbit	km/h	0 to 12 / 0 to 36

Cardan shaft rev. with **20 km/h version**			adjustment at nominal speed tortoise / rabbit
and standard tyres	16/70-20 EM:	min^{-1}	490 / 1,470
	405/70-R20 Dunlop:	min^{-1}	490 / 1,415
	425/75-R20 Michelin:	min^{-1}	490 / 1,350
	455/70-R20 Dunlop:	min^{-1}	490 / 1,330

Cardan shaft rev. with 36 **km/h version**			adjustment at nominal speed tortoise low/high gear	/ rabbit low/high gear
and standard tyres	16/70-20 EM:	min^{-1}	410 / 800	/ 1,360 / 2,640
	405/70-R20 Dunlop:	min^{-1}	410 / 800	/ 1,310 / 2,540
	425/75-R20 Michelin:	min^{-1}	410 / 800	/ 1,250 / 2,430
	455/70-R20 Dunlop:	min^{-1}	410 / 800	/ 1,230 / 2,390

Pressure and setting values:	**travel**	
Suction pressure:	bar	max. $0.5^{\pm 0.1}$
Charge pressure (high idle):	bar	30
High pressure (SV):	bar	480^{+10}
Pressure cut-off:	bar	450^{+10}
Case pressure at + 50°C:	bar	2.5
Regulation start – **20 km/h version**:	min^{-1}	$2{,}100^{-50}$ at 180 bar HP
– **36 km/h version**:	min^{-1}	$2{,}100^{-50}$ at 230 bar HP (also see setting instructions chapter 5)
Start-up speed:	min^{-1}	$1{,}150^{\pm 50}$
Engine stalling (rabbit) – dynamic:		
20 km/h version:	min^{-1}	$2{,}000^{-100}$ at 190 bar HP
36 km/h version:	min^{-1}	$2{,}000^{-100}$ at 240 bar HP
Brake inching beginning / end:	bar	5 - 13

STEERING

Steering unit:	type	Rexroth LAGU 400/130–11/LD 240-175
Servo selector valve:	type	integrated in the control valve
Steering pump:	make	Brueninghaus (see working hydraulics)
Steering pressure:	bar	175

WORKING HYDRAULICS

Working and steering pump:	make	Brueninghaus/Rexroth
	type	A10 VO 60 DFR 1
Displacement:	cm^3/rev.	60
	ltr./min	132
Stand-by pressure (flow regulator):	bar	30^{+2}
Servo-controlled valve loader:	type	PRSV C01
Servo-controlled valve excavator:	type	4 TH 6
Control valve:	type	Rexroth 8 M6-15

Pressure and setting values:

		Working
Main pressure relief valve (high idle):	max. bar	250
Line relief pressures:		
- Lifting frame, lift:	bar	280
- Lifting frame, lower:	bar	anti-cavitation
- Shovel, tilt back:	bar	280
- Shovel, dump:	bar	160
- Additional control circuit:	bar	230 / 230
- Pilot pressure:	bar	---

CYCLE TIMES:

Lifting frame, lift:	s	4.9
Lifting frame, lower:	s	3.8
Shovel, tilt back:	s	1.4 in upper position
Shovel, dump:	s	1.2 in upper position

AXLES

Front axle:	**20 km/h:**	make/type	Clark-Hurth 311 / 112 / 88
Rear axle with self-locking differential	**20 km/h**:	make/type	Clark-Hurth 112 / 81
Front axle:	**36 km/h**:	make/type	Clark-Hurth 360 / 112 / 52
Rear axle with self-locking differential	**36 km/h**:	make/type	Clark-Hurth 112 / 80

BRAKE SYSTEM

Service brake:	**20 km/h**:	Disk brake in the front axle, hydraulically operated
	36 km/h:	Disk brake in the front and rear axle, hydraulically operated
Parking brake:	**20 and 36 km/h**:	Spring-loaded brake at the front axle, hydraulically operated
Additional brake:		Hydrostatic through closed circuit of the travel drive

Brake pump (accessory drive):	make	Rexroth
Brake pressure (service brake):	max. bar	41^{+2}
Accumulator charge valve:	make	Rexroth type LT 12 at 20 km/h LT 13 at 36 km/h
Cut-in/ cut-off pressure:	bar	120 – 150
Sequence valve (pressure sequence valve):	bar	Δp 13 (e.g. a brake pressure value of 41 bar corresponds to 41 bar at the inching valve and to 28 bar at the brake)
Displacement:	cm^3/rev.	11
	ltr./min	24
Opening pressure (parking brake):	bar	17
Setting value, parking brake:	bar	25

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. With lithium.
Brake medium:	ATF type A Suffix A or Dexron II D

MAINTENANCE PARTS

see operating manual

CAPACITIES

		ltr.	
Engine oil with oil filter - change:	approx.	9.5	engine oil
Hydraulic oil (tank + system) – first filling:	approx.	130.0	hydraulic oil
Hydraulic oil tank - change:	approx.	82.0	hydraulic oil
Fuel tank:	approx.	133.0	diesel
Front axle – central housing:	approx.	6.3	transmission oil
Front axle – wheel hub:	approx.	0.7	transmission oil each
– reduction gear 20 km/h:	approx.	1.5	transmission oil
– reduction gear 36 km/h:	approx.	3.4	transmission oil
Rear axle – central housing and reduction gear	approx.	6.7	transmission oil
Rear axle – wheel hub:	approx.	0.7	transmission oil each
Service brake:			integrated in the hydraulic system
Coolant:	approx.	22.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1004-4 (up to serial no. 204/0395)
Type:		1004-42 (from serial no. 204/0396)
Performance acc. to DIN 70020:	kW/PS	59 / 80 at 2,200 min^{-1}
Cooling:		water
Injection:		direct injection
Capacity:	cm^3	4,000 (up to serial no. 204/0395)
Capacity:	cm^3	4,200 (from serial no. 204/0396)
Capacity:	cm^3	40
High idle:	min^{-1}	2,350 $^{+50}$
Low idle:	min^{-1}	750 $^{\pm 50}$
Spec. fuel consumption:	g/kWh	215
Injection nozzle pressure:	bar	250
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Further data:		see engine instruction book

ELECTRIC SYSTEM

Voltage:	V	12
Battery:	V/Ah	12 / 105
Generator:	V/A	12 / 55
Starter:	V/kW/PS	12 / 2.8 / 3.8
Starting aid:		glow system
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

DRIVE

Travel pump:	type	A 4 VG 90 DA with pressure cut-off
Displacement:	cm^3/rev.	0 to 90
Travel motor:	type	A 6 VM 160 DA
Displacement:	max. cm^3/rev.	160

Travel range:

Symbol „tortoise“:	km/h	0 to 7.5
Symbol „rabbit“:	km/h	0 to 20
Cardan shaft rev. at **20 km/h**		adjustment at nominal speed tortoise / rabbit
and standard tyres 16/70-20:	min^{-1}	630 / 1,810
405/70 R20 Michelin:	min^{-1}	630 / 1,820
405/70 R20 Dunlop:	min^{-1}	630 / 1,765

Pressure and setting values:

Suction pressure:	bar	max. - 0.25
Charge pressure (high idle):	bar	28
High pressure (SV):	bar	480
Pressure cut-off:	bar	420 $^{+10}$
Case pressure:	bar	2.5
Regulation start:	bar	165
Start-up speed:	min^{-1}	1,100 $^{\pm 50}$
Engine stalling (tortoise):	min^{-1}	2,000 $^{+100}$ at 170 bar HP

STEERING

Steering unit:	type	ZF-Hydraulik Nord LAGCSD200
Steering pump:	make	Bosch
Displacement:	cm^3/rev.	19
Steering pressure:	bar	150_{-5}
Priority valve:	type	ZF-Hydraulik Nord LSPSD

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 10 VO 71 DFLR
Displacement:	cm^3/rev.	0 to 71
Gear pumps:	type	Bosch
Displacement:	cm^3/rev.	19^{+2}
Pressure cut-off:	bar	230
LS-regulator (standby pressure):	bar	20 at 1,000 min^{-1}
Servo-controlled valve (cross servo control stick):	type	2 x PCL 401
Servo-controlled valve, linear lever (articulation):	type	1 x PCL 402
Servo-controlled valve, linear lever (stabilizer):	type	1 x PCL 402
Servo-controlled valve, pedal (tel. stick/breaker) - MONO boom:	type	1 x PCL 404
Valve bank 1:	type	PVG 32
Valve bank 2:	type	HV 07

Pressure and setting values:

Main pressure relief valve 1 (PVG 32):	bar	280 (SV) SV = safety valve
Main pressure relief valve 2 (HV 07):	bar	220
Line relief pressures (valve bank 1):		
- Boom lift / lower:	bar	280 / 175
- Dipperstick out / in:	bar	280 / 280
- Bucket out / in:	bar	280 / 280
- Telescopic stick out / in:	bar	150 / 280
- Breaker:	bar	280
- Lifting frame lift / lower:	bar	280 / 280
- Shovel out / in:	bar	150 / 280
Line relief pressures (valve bank 2):		
- Slewing:	bar	----
- Articulation:	bar	anti-cavitation
- Additional circuit:	bar	250 / 250
- Stabilizing:	bar	----
Pilot pressure (charge pressure):	bar	28 high idle

SLEW DRIVE

Slew gear:	type	HD 4
Slew motor:	type	A 2 FM 28
Slew pressure (valves at the slew motor):	bar	210

AXLES

Front axle:	make/type	Hurth 311 / 279 / 64
Rear axle:	make/type	Hurth 279 / 198

BRAKES

Brake pump:	make	Bosch
Displacement:	cm³/rev.	2
Brake shut-off valve:	make	Safim
Switching range:	bar	120 to 150
Foot brake valve:	make	Safim
Brake pressure:	bar	60
Beginning/end of brake inching:	bar	5 - 13 brake pressure
Parking brake:		spring-loaded brake at the front axle
Service brake:		oil-immersed multi-disk brake, front axle

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B / API-GL 5, SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. With lithium.

MAINTENANCE PARTS

please see operators manual

CAPACITIES

		ltr.	
Engine oil (first filling):	approx.	8.5	engine oil
Engine oil (change):	approx.	7.5	engine oil
Hydraulic oil (tank and system):	approx.	185.0	hydraulic oil
Hydraulic oil (change):	approx.	120.0	hydraulic oil
Fuel tank:	approx.	120.0	diesel
Front axle - central housing:	approx.	7.4	transmission oil
Rear axle - central housing:	approx.	7.4	transmission oil
Reduction gear:	approx.	1.5	transmission oil
Wheel hubs front axle:	approx.	0.5	transmission oil, each
Wheel hubs rear axle:	approx.	0.5	transmission oil, each
Slew gear:	approx.	1.2	transmission oil
Service brake:			connected to the hydraulic system
Cooling agent:	approx.	15.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Deutz
Type:		F 4 L 1011
Performance acc. to DIN 70020:	kW/PS	38 / 52 at 2,600 min^{-1}
Cooling:		oil / air
Injection:		direct injection
Capacity:	cm^3	2,732
High idle:	min^{-1}	2,750
Low idle:	min^{-1}	900
Spec. fuel consumption under full load:	g/kWh	225
Injection valve opening pressure:	bar	250 $^{+8}$
Tappet clearance - inlet cold:	mm	0.3
Tappet clearance - outlet cold:	mm	0.5
Torque cylinder head studs:	1. stage, Nm	30
	2. stage, Nm	80
	3. stage, Nm	160 at 120°
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 420
Generator:	V/A	14 / 60
Starter:	kW/PS	2.2 / 3
Starting aid:		glow filament
Lighting:		acc. to German motor vehicle construction and use regulation and Euronom

TRANSMISSION

Travel pump:	type	A 4 VG 28 DA without pressure cut-off
Displacement:	max. cm^3/rev.	0 to 28
Travel motor:	type	A 6 VM 55 HA
Displacment:	max. cm^3/rev.	55

TRAVEL RANGE

Symbol „tortoise“:	km/h	0 to 6
Symbol „rabbit“:	km/h	0 to 20
Cardan shaft rev. at 20/25 km/h:		see separate chart

PRESSURE AND SETTING VALUES

	travel	
Suction pressure:	bar	max. - 0.25
Charge pressure (high idle):	bar	28 to 32
High pressure:	bar	440
Case pressure at + 50° C:	max. bar	2.5
Regulation start:	bar	320
Start-up speed:	min^{-1}	1,100 $^{+100}$
Engine stalling:	min^{-1}	2,500
Brake inching:	bar	travel pump „inches“ at 280-300 bar

STEERING

Steering unit:	type	OSPC 160 LS dyn.
Steering pump:	make	Bosch
Displacement:	cm^3/rev.	14
Steering pressure (high idle):	bar	120
Priority valve:	type	OLS 40 dyn.

WORKING HYDRAULICS

Gear pump:	make	Bosch
Displacement:	cm^3/rev.	14+14+8+8
Servo-controlled valve (cross servo control stick):	type	PCL 401
Servo-controlled valve, linear lever (articulation):	type	PCL 402
Servo-controlled valve, linear lever (stabilizing):	type	PCL 402
Servo-controlled valve, pedal (telescopic stick) - MONO boom:	type	PCL 404
Servo-controlled valve, pedal (breaker) - articulated boom:	make	Hamworthy
Valve bank 1:	type	HV 07
Valve bank 2:	type	HV 07
Valve bank 3:	type	HV 07

PRESSURE AND SETTING VALUES	**working**	
Main pressure relief valve-valve bank 1 (high idle):	bar	210
Main pressure relief valve-valve bank 2 (high idle):	bar	210
Main pressure relief valve-valve bank 3 (high idle):	bar	200
Line relief pressures (control valve 1)		
- boom:	bar	250 / 250
- bucket:	bar	250 / 250
- stabilizing:	bar	---
- summation:	bar	---
Line relief pressures (control valve 2)		
- dipperstick:	bar	250 / 250
- intermediate boom / tel. stick:	bar	140 / 250
- stabilizing:	bar	---
- summation:	bar	---
Line relief pressures (control valve 3)		
- slewing (valves at slew motor):	bar	---
- add. circuit/breaker:	bar	250 / 250
- articulation:	bar	220 / 300
- summation:	bar	---
Shut-off valve:	make	Buchholz
Shut-off pressure (high idle):	bar	110
Pilot pressure (charge pressure):	bar	28 to 32 (high idle)

SLEW DRIVE

Slew gear:	type	HD 2.3
Slew motor:	type	A 2 FM 23
Slew pressure (valves at slew motor):	bar	190 (high idle)

AXLES

Front axle:	make/type	Hurth 278 / 145
Rear axle:	make/type	Hurth 302 / 171 / 267

BRAKES

Service brake:		oil-immersed multi-disk brake, front axle
Master cylinder:	make	ATE (mineral oil)
Parking brake:		spring-loaded brake, front axle

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L 2105 B / API-GL5 SAE 85 W 90 LS or SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.
Brake fluid:	ATF Typ A Suffix A or Dexron IID

MAINTENANCE PARTS

please see operators manual

CAPACITIES:

		ltr.	
Engine oil (first filling):	approx.	14.0	engine oil
Engine oil (change):	approx.	10.5	engine oil
Hydraulic oil (tank and system):	approx.	100.0	hydraulic oil
Hydraulic oil (change)	approx.	58.0	hydraulic oil
Fuel tank:	approx.	85.0	diesel
Front axle - central housing:	approx.	8.8	transmission oil
Rear axle - central housing:	approx.	6.5	transmission oil
Reduction gear:	approx.	1.5	transmission oil
Wheel hubs front axle:	approx.	0.6	transmission oil
Wheel hubs rear axle:	approx.	0.6	transmission oil
Slew gear:	approx.	1.6	transmission oil
Service brake:	approx.	0.5	ATF-oil

DIESEL ENGINE

Manufacturer:		Perkins
Type:		1004-4
Performance acc. to DIN 70020:	kW/PS	59 / 80 at 2,200 min^{-1}
Cooling:		water
Injection:		direct injection
High idle:	min^{-1}	2,290 $^{+40}$
Low idle:	min^{-1}	650 - 850
Spec. fuel consumption under full load:	g/kWh	215
Injection nozzle pressure:	bar	250
Tappet clearance - inlet cold:	mm	0.20
Tappet clearance - outlet cold:	mm	0.45
Further data:		see engine instruction book

ELECTRICAL SYSTEM

Voltage:	V	24
Battery:	V/Ah	2 x 12 / 95
Generator:	V/Ah	24 / 55
Starter:	kW/PS	3.7 / 5.0
Starting aid:		glow system
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm

TRANSMISSION

Travel pump:		see working pump
Travel motor:	type	Linde BMR 135
Displacement:	cm^3/rev.	135

TRAVEL RANGE

Symbol „tortoise“:	km/h	0 to 6
Symbol „rabbit“:	km/h	0 to 20
Cardan shaft revolution „rabbit“:	min^{-1}	1,560 $^{+50}$

PRESSURE AND SETTING VALUES — travel

High pressure (travel motor):	bar	420 (gauge port: LS at valve bank)
Engine stalling (rabbit):	min^{-1}	2,200 (at 300 bar, gauge port LS)

STEERING

Steering unit:	type	OSPC 160 LS dyn.
Steering pump:	make	Bosch
Displacement:	cm^3/rev.	11
Steering pressure (high idle):	bar	150 $_{-5}$ (gauge port: gaupe port strip 3)
Priority valve:	type	OLSB 80

WORKING HYDRAULICS

Working pump:	type	Linde HPR 100 R
Flow rate:	l/min	220
Gear pump:	type	Bosch
Displacement:	cm^3/rev.	15.5
Gear pump (grab/articulated cylinder/intermediate boom/slew bucket):	type	Bosch
Displacement:	cm^3/rev.	11
LS-consumer pressure:	bar	320 $_{-5}$ (gauge port: LS-pressure cut-off)
Stand-by (full throttle):	bar	28 - 45 (gauge port: LS-pressure cut-off)
Servo-controlled valve (cross servo control stick):	type	Rexroth 4TH6
Servo-controlled valve (linear lever) - stabilizing, adjustable boom:	type	Rexroth 2TH6
Servo-controlled valve (pedals) - travel:	type	Rexroth 2TH6
Control valve:	type	Linde VT6/VM18

PRESSURE AND SETTING VALUES

		working
Main pressure relief valve (pressure cut-off at control valve):	bar	320 $_{-5}$

Line relief pressures:

Slewing right:	bar	110 / 230
Slewing left:	bar	110 / 230
Boom cylinder in / out:	bar	350 $^{+20}$
Bucket cylinder in / out:	bar	350 $^{+20}$
Dipperstick cylinder in / out:	bar	350 $^{+20}$
Intermediate boom in / out:	bar	350 $^{+20}$
Stabilizing cylinder:	bar	---
Control pressure (pilot control block):	bar	32

SLEW DRIVE

Slew gear:	type	Linde GD 3,5
Slew motor:	type	Linde HFM 35 - 02
Slew pressure, both sides (service pressure):	bar	205 $_{-5}$

AXLES

Front axle:	make/type	ZF APL - B 745
Rear axle:	make/type	ZF AP - B 745
Travel gear:	make/type	ZF 2 HL 100

BRAKES

Brake pump:	type	Bosch
Displacement:	cm^3/rev.	2
Parking brake valve:		
Service brake:	bar	60
Parking brake:	bar	11
Brake switch-on pressure:	bar	123
Brake switch-off pressure:	bar	150
Parking brake:		integrated in axle transfer case (locking of both gears)
Service brake:		Oil-immersed multi-disk brake of front and rear axle

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	ISO VG 46 H-LP 46 DIN 51525
Transmission oil:	SAE 90 API-GL 5
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. With lithium
High pressure resistant grease:	ULTRALUBS III

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel tank:	approx. 185.0	diesel
Engine oil:	approx. 7.0	HD-oil
Hydraulic oil tank:	approx. 200.0	hydraulic oil (change)
Oscillating axle:	approx. 9.0	transmission oil
Rigid axle:	approx. 12.0	transmission oil
Load shifting gear:	approx. 3.4	engine oil
Wheel hubs:	approx. 0.9	transmission oil, each
Slew gear:	supply by hydraulic system of the excavator	
Service brake:	supply by hydraulic system of the excavator	
Cooling system:	approx. 20.0	cooling agent
Windscreen wiper system:	approx. 2.0	water with window cleaner
Grab gear:	approx. 0.7	transmission oil

DIESEL ENGINE

Manufacturer:		Deutz
Type:		F 4 L 1011 F
Output acc. to DIN 70020:	kW/PS	40 / 54 at 2,600 min^{-1}
Cooling:		oil / air
Injection:		direct injection
Capacity:	cm^3	2,732
High idle:	min^{-1}	2,750
Low idle:	min^{-1}	900
Spec. fuel consumption (full load):	g/kWh	225
Injection valve opening pressure:	bar	250 $^{+8}$
Tappet clearance-inlet cold:	mm	0.3
Tappet clearance-outlet cold:	mm	0.5
Torque of cylinder head studs:	1. stage Nm	30
	2. stage Nm	80
	3. stage Nm	160 at 120°
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 420
Generator:	V/A	14 / 60
Starter:	kW/PS	2.2 / 3
Starting aid:		glow filament

TRANSMISSION

Travel gear:	make	Lohmann-Stolterfoht
2-stage variable displacement motor (integrated in the travel gear):	type	A 10 VT 45

Travel range:

Travel range I:	km/h	1.4 forward + reverse
Travel range II:	km/h	2.8 forward + reverse
Overdrive:	km/h	4.4 forward

WORKING HYDRAULICS

Gear pump:	make	Bosch
Displacement:	cm^3/rev.	14+14+8+8
Servo-controlled valve (cross servo control stick):	type	PCL 401
Servo-controlled valve, linear lever (articulation):	type	PCL 402
Servo-controlled valve, linear lever (stabilizer):	type	PCL 402

Servo-controlled valve, pedal		
(articulated boom / telescopic stick):	type	PCL 404
Pedal (breaker / additional control circuit):	type	PCL 404
Valve bank 1:	type	HV 07
Valve bank 2:	type	HV 07
Valve bank 3:	type	HV 07

PRESSURE AND SETTING VALUES

Main pressure relief valve -		
valve bank 1 (high idle):	bar	210
Main pressure relief valve -		
valve bank 2 (high idle):	bar	210
Main pressure relief valve -		
valve bank 3 (high idle):	bar	200
Line relief pressures (valve bank 1)		
- Boom:	bar	250 / 250
- Bucket:	bar	250 / 250
- Travel right:	bar	----
- Summation:	bar	----
Line relief pressures (valve bank 2)		
- Dipperstick:	bar	250 / 250
- Intermediate boom / telescopic stick:	bar	140 / 250
- Travel left:	bar	----
- Summation:	bar	----
Line relief pressures (valve bank 3)		
- Slewing (valves at the slew motor):	bar	----
- Additional control circuit / breaker:	bar	---- / ----
- Articulation:	bar	220 / 300
- Dozer blade:	bar	----
- Overdrive:	bar	----
- Summation:	bar	----
Shut-off valve:	make	Buchholz
Shut-off pressure (high idle):	bar	110
Servo-controlled valve (priority valve):	make	Vickers
	type	SPV/SPX
	bar	25

SLEW DRIVE

Slew gear:	type	HD 2,3
Slew motor:	type	A 2 FM 23
Slew pressure (valves at slew motor):	bar	190 (high idle)

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B or API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825 with lithium. Dripping point over 170° C.

MAINTENANCE PARTS see operation manual

CAPACITIES

Engine oil (change) with filter:	approx.	10.5	engine oil, oil dipstick is decisive
Hydraulic oil (tank and system):	approx.	100.0	hydraulic oil
Hydraulic oil (change):	approx.	58.0	hydraulic oil
Fuel tank:	approx.	85.0	diesel
Slew gear:	approx.	1.6	transmission oil
Travel gear:	approx.	1.0	transmission oil

DIESEL ENGINE

Manufacturer:		Perkins
Type:		704-30
Output acc. to DIN 70020:	kW/PS	44 / 60 at 2,300 min^{-1}
Cooling:		water
Capacity:	cm^3	3,000
Injection:		direct injection
High idle:	min^{-1}	2,520 $^{+50}$
Low idle:	min^{-1}	800 $^{+50}$
Spec. fuel consumption (full load):	g/kWh	215
Tappet clearance - inlet cold:	mm	0.35
Tappet clearance - exhaust cold:	mm	0.35
Torque of cylinder head studs:	Nm	50 / 85
Further data:		see engine operating manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	14 / 65
Starter:	kW/PS	3.1 / 4.0
Starting aid:		4 glow plugs

TRANSMISSION

Travel gear (up to serial no. 121/0160):	make	Lohmann-Stolterfoht GFT 8
Travel gear (from serial no. 121/0161):	make	Lohmann-Stolterfoht GFT 9
2-stage variable displacement motor (integrated in the travel gear):	type	A 10 VT 45
Travel brake:		installed in the travel motor

Travel range:

Travel range I:	km/h	0 - 1.8 forward + reverse
Travel range II:	km/h	0 - 3.5 forward + reverse

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	Brueninghaus A 10 VO 045 DFLR
Displacement:	cm^3/rev.	0 till 45 = Q max. 103 $^{l}/_{min}$
Gear pump:	type	Commercial
Displacement:	cm^3/rev.	10 + 8 = 28 + 23 $^{l}/_{min}$
Servo-controlled valve (cross servo control stick):	type	PCL 401
Servo-controlled valve, linear lever (articulation):	type	PCL 402
Servo-controlled valve, linear lever (stabilizer):	type	PCL 402
Servo-controlled valve, pedal (articulated boom / telescopic stick):	type	2 TH 6
Pedal (breaker / additional control circuit):	type	2 TH 6
Valve bank 1, MONO boom/articulated boom:	type	VOAC 6 / 7 L 90 LS
Valve bank 2:	type	VOAC HV 07

PRESSURE AND SETTING VALUES

LS-pressure relief valve, valve bank 1:	bar	230
Main pressure relief valve 1 (L90 LS) safety valve:	bar	260
Main pressure relief valve, valve bank 2 (high idle):	bar	200
Line relief pressures (valve bank 1)		
- Boom:	bar	260 / 260
- Dipperstick:	bar	260 / 260
- Bucket:	bar	260 / 260
- Telescopic stick out / in:	bar	140 / 260
- Articulated boom out / in:	bar	140 / 260
- Breaker, MONO boom / articulated boom (up to 121/0202):	bar	210
- Additional control circuit / breaker (from 121/0203):	bar	
- Travel left:	bar	----
- Travel right:	bar	----
Line relief pressures (valve bank 2)		
- Slewing (valves at the slew motor):	bar	190 / 190
- Dozer blade:	bar	----
- Articulation:	bar	----
- Additional control circuit (up to 121/0202):	bar	250 / 250
Shut-off valve (up to serial no. 121/0142):	make	Buchholz
Shut-off valve (from serial no. 121/0143):	make	Bergin
Shut-off pressure (high idle):	bar	110
Servo-controlled valve (priority valve):	make	Vickers
	type	SPV/SPX
	bar	35

SLEW DRIVE

Slew gear:	type	HD 2,3
Slew motor:	type	A 2 FM 23
Slew pressure (valves at slew motor):	bar	190 (high idle)
Slew brake (in gearbox), opening pressure:	bar	25 (pilot pressure)

CYCLE TIMES - MONO / articulated boom / telescopic stick

Boom up / down:	sec.	3.5 / 3.0 from ground / till ground
Dipperstick in / out:	sec.	3.5 / 3.5
Intermediate boom up / down:	sec.	3.5 / 3.5
Bucket in / out:	sec.	2.6 / 2.0
Telescopic stick in / out:	sec.	2.5 / 2.5

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B / API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825 with lithium. Dripping point over 170° C.

MAINTENANCE PARTS	see operation manual

CAPACITIES	**ltr.**	
Engine oil (change) with filter:	approx. 8.2	engine oil, oil dipstick is decisive
Hydraulic oil (tank and system):	approx. 120.0	hydraulic oil
Hydraulic oil (change):	approx. 104.0	hydraulic oil
Fuel tank:	approx. 115.0	diesel
Slew gear:	approx. 1.6	transmission oil
Travel gear:	approx. 1.0	transmission oil

DIESEL ENGINE

Manufacturer:		KHD
Type:		BF 4 M 1012 E
Output acc. to DIN 70020:	kW/PS	53 / 72 at 2,000 min^{-1}
Cooling:		water
Capacity:	cm^3	3,200
Injection:		direct injection
High idle:	min^{-1}	2,150
Low idle:	min^{-1}	800
Spec. fuel consumption (full load):	g/kWh	208
Tappet clearance-inlet cold:	mm	$0.3^{+0,1}$
Tappet clearance-outlet cold:	mm	$0.5^{+0,1}$
Torque of cylinder head studs:	Nm	30, 80 , 90°
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	14 / 55
Starter:	kW/PS	3.1 / 4
Starting aid:		4 glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronorm.

TRANSMISSION

Travel gear:	make	Lohmann Stolterfoht GFT 17 T3
2-stage variable displacement motor (integrated in the travel gear):	type	A 10 VE 45 HZ

TRAVEL RANGE:

Travel range I / Travel range II:	km/h	1.8 / 4.0

WORKING HYDRAULICS

Working pump (variable displacement pump):	type	A 10 VO 71 DFLR
Displacement:	cm^3/rev.	0 to 71
Gear pumps:	make	Bosch
Displacement:	cm^3/rev.	14+8+5
LS-pressure relief valve:	bar	250 (valve bank 1)
LS-regulator (stand-by pressure variable displacement pump):	bar	25
Servo-controlled valve (cross servo control stick):	type	Rexroth 4TH6
Servo-controlled valve, linear lever (articulation):	type	VOAC PCL 402
Servo-controlled valve, linear lever (stabilizing):	type	VOAC PCL 402
Servo-controlled valve, pedal (travel):	type	Rexroth 2TH6
Servo-controlled valve, pedal (breaker) - articulated boom:	type	Rexroth 2TH6
Valve bank 1 (MONO):	type	6 SX 18
Valve bank 1 (MONO/telescopic stick + articulated boom):	type	7 SX 18
Valve bank 2:	type	4 SM 12

PRESSURE AND SETTING VALUES

Main pressure relief valve 1 (6 SX 18) + (7 SX 18):	bar	280 (SV)
Main pressure relief valve 2 (4 SM 12) (high idle):	bar	220
Line relief pressures (valve bank 1):		
- Boom - articulated boom, MONO boom:	bar	280 / 280, 150 / 280
- Dipperstick:	bar	280 / 280
- Bucket:	bar	280 / 280
- Intermediate boom out / in:	bar	150 / 280
- Breaker (up to 033/2165):	bar	200 (except for 033/2155, /2158, /2161)
- Add. control circuit / breaker (from 033/2166):	bar	250 / 250 (and 033/2155, /2158, /2161)
- Travel left / travel right:	bar	--- / ---
Line relief pressures (valve bank 2):		
- Slewing (valves at the slew motor):	bar	190 / 190 (high idle)
- Dozer blade:	bar	----
- Articulation:	bar	----
- Additional control circuit (up to 033/2165):	bar	250 / 250 (except for 033/2155, /2158, /2161)
Shut-off valve:	make	Buchholz
Shut-off pressure (high idle):	bar	110
Control oil unit (pilot control):	make	Vickers
	type	SPV / ACX
Pilot pressure - high idle	bar	35 $^{+5}$

SLEW DRIVE

Slew gear:	type	HD 4
Slew motor:	type	A 2 FM 32
Slew pressure (valves at slew motor):	bar	190 (high idle)

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see Schaeff hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B / API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170° C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

		ltr.	
Engine oil (change):	approx.	10.0	engine oil
Hydraulic oil (tank and system):	approx.	150.0	hydraulic oil
Hydraulic oil (change):	approx.	120.0	hydraulic oil
Fuel tank:	approx.	140.0	diesel
Travel gear:	approx.	1.8	transmission oil, each
Slew gear:	approx.	1.6	transmission oil Lifetime
Cooling agent:	approx.	12.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		KHD
Type:		BF 4 M 1012 E
Output acc. to DIN 70020:	kW/PS	59 / 80 at 2,300 min^{-1}
Cooling:		water
Capacity:	cm^3	3,200
Injection:		direct injection
High idle:	min^{-1}	2,450
Low idle:	min^{-1}	800
Spec. fuel consumption (full load):	g/kWh	208
Tappet clearance-inlet cold:	mm	$0.3^{+0.1}$
Tappet clearance-outlet cold:	mm	$0.5^{+0.1}$
Torque of cylinder head studs:	Nm	30, 80, 90°
Further data:		see engine operator's manual

ELECTRICAL SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	14 / 55
Starter:	kW/PS	3.1 / 4
Starting aid:		4 glow plugs
Lighting:		acc. to German motor vehicle construction and use regulation and Euronom

TRANSMISSION

Travel gear:	make	Lohmann-Stolterfoht GFT 17 T3
2-stage variable displacement motor (integrated in the travel gear):	type	A 10 VE 45 HZ

Travel range:

Travel range I:	km/h	2.2
Travel range II:	km/h	4.0

WORKING HYDRAULICS

Working pump (variable displacment pump):	type	A 10 VO 100 DFSR
Displacement:	cm^3/rev.	0 to 100
Gear pumps:	type	Bosch
Displacement:	cm^3/rev.	14+8+5
LS-pressure relief valve:	bar	250 (control valve 1)
LS-regulator (standby-pressure):	bar	25 at 2,450 min^{-1} (variable displacement pump)

Servo-controlled valve (cross servo control stick):	type	Rexroth 4TH6 E 70
Servo-controlled valve, linear lever (articulation):	type	VOAC PCL 402 - 1543 A
Servo-controlled valve, linear lever (stabilizing):	type	VOAC PCL 402 - 1543 A
Servo-controlled valve, pedal (travel):	type	Rexroth 2TH6 RP20
Servo-controlled valve, pedal (breaker - articulated boom):	type	Rexroth 2TH6 RP20
Valve bank 1:	type	7 SX 18 (28 038 301)
Valve bank 2:	type	4 SM 12 (28 039 500)

PRESSURE AND SETTING VALUES	**working**	
Main pressure relief valve 1 (7 SX 18):	bar	280 (SV)
Main pressure relief valve 2 (high idle):	bar	220
Line relief pressures (valve bank 1)		
- Boom - articulated boom, MONO boom:	bar	280 / 280, 200 / 280
- Dipperstick:	bar	280 / 280
- Bucket:	bar	280 / 280
- Intermediate boom out / in:	bar	150 / 280
- Breaker (up to 331/0211):	bar	200
- Add. control circuit / breaker (from 331/0212):	bar	250 / 250
- Travel left / travel right:	bar	----/----
Line relief pressures (valve bank 2):		
- Slewing (valves at the slew motor):	bar	210 / 210 (high idle)
- Blade:	bar	----
- Articulation:	bar	----
- Additional control circuit (up to 331/0211):	bar	250 / 250
Shut-off valve (up to serial no. 331/0211):	make	Buchholz
Shut-off valve (from serial no. 331/0212):	make	Bergin
Shut-off pressure (high idle):	bar	110
Control oil unit (pilot control):	make	Vickers
	type	SPV / SPX
Pilot pressure - high idle:	bar	35^{+2}

SLEW DRIVE		
Slew gear:	type	HD 4
Slew motor:	type	A 2 FM 28
Slew pressure (valves at slew motor):	bar	210 (high idle)

LUBRICANTS	
Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Transmission oil:	MIL-L-2105 B / API-GL5, SAE 85 W 90 LS or SAE 90 LS
Multiple-purpose grease:	acc. to DIN 51825. Dripping point over 170 ° C. With lithium.

MAINTENANCE PARTS	see operation manual		
CAPACITIES	**ltr.**		
Engine oil (change) with filter:	approx.	10.0	engine oil
Hydraulic oil (tank and system):	approx.	180.0	hydraulic oil
Hydraulic oil (change):	approx.	110.0	hydraulic oil
Fuel tank:	approx.	150.0	diesel
Travel gear:	approx.	1.8	transmission oil each
Slew gear:	approx.	1.6	transmission oil Lifetime
Cooling agent:	approx.	12.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Deutz
Type:		BF 4 M 1012 E
Performance acc. to DIN 70020:	kW/PS	59 / 80 at 2,300 min^{-1}
Construction:		4-stroke direct injector turbocharger
Cooling:		water - anti-freeze agent
Low idle:	min^{-1}	800
High idle:	min^{-1}	2,450
Spec. fuel consumption under full load:	g/kWh	208
Injection nozzle pressure:	bar	260 $^{+8}$
Tappet clearance - inlet cold:	mm	0.3 $^{+0.1}$
Tappet clearance - outlet cold:	mm	0.5 $^{+0.1}$
Torque cylinder head stud bolts:	Nm	30 - 80, then 90°
Further data:		see engine instruction book

ELECTRIC SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	12 / 55
Starter:	kW/PS	3.1 / 4
Starting aid:		glow plugs
Lighting:		1 working headlight

DRIVE

Pump (accessory drive displacement):	cm^3/rev.	---
Travel gear:	type	---
Two-stage travel motors:	type	---

Displacement:	max. cm^3/rev.	---

TRAVEL RANGE

Travel speed range „I“:	km/h	---
Travel speed range „II“:	km/h	---

HYDRAULIC SYSTEM

Variable displacement pump:		A10VO 100 DFSR
Flow rate:	ltr./min.	0 - 100
Double gear pump, displacement:	cm^3/rev.	19 + 19
2 gear pumps, displacement each:	cm^3/rev.	8
Valve bank I:	type	SX 18
Valve bank II and III:	type	SM 12
Servo-controlled lever, 2x:	type	4 TH 6
Servo-controlled pedal, 4x:	type	PCL 2 FM
Double linear lever, 2x:	type	PCL 402

Shut-off valve	**HS 41**	(up to s/n 038/0517)	make	Buchholz
Shut-off valve	**HS 41**	(from s/n 038/0518)	make	Bergin

PRESSURE AND SETTING VALUES

Variable displacement pump stand-by pressure:	bar	25 (flow controller)
Valve bank I (SX 18):	bar	250 load-sensing valve
Valve bank I (SX 18):	bar	280 safety valve
Valve bank I, SX 18,		
Line relief pressures:		
Boom lift / lower:	bar	280 / 280
Dipperstick in / out:	bar	280 / 280
Bucket in / out:	bar	280 / 280
Telescopic stick in / out:	bar	230 / 160
Breaker:	bar	200
Valve bank II, SM 12, main pressure relief valve:	bar	270 $^{+5}$
Line relief pressures:		
Travel forward / reverse:	bar	--- / ---
Stabilizing, rear, left:		without
Stabilizing, rear, right:		without
Slewing (see slew drive)		
Valve bank III, SM 12, main pressure relief valve:	bar	250 $^{+5}$
Line relief pressures:		
Travel forward / reverse:	bar	--- / ---
Stabilizing, front, left:		without
Stabilizing, front, right:		without
Articulation:		without
Additional control circuit:	bar	160 / 160
Pilot pressure supply = from the double pump at the accessory drive via shuttle valve and the variable displacement pump to pressure reducing valve:	type	MHST E 561 X / 30 - 40
Pressure setting:	bar	35 (safety valve 40)
Pressure accumulator:	bar/ltr.	10 / 0.75

Working cycles:

Boom cylinder extend:	sec.	5.0
Boom cylinder retract:	sec.	5.0
Dipperstick cylinder extend:	sec.	4.5
Dipperstick cylinder retract:	sec.	4.5
Bucket cylinder extend:	sec.	3.5
Bucket cylinder retract:	sec.	2.5
Telescopic stick cylinder Ø 90 extend:	sec.	4.0
Telescopic stick cylinder Ø 90 retract:	sec.	3.5
Telescopic stick cylinder Ø 80 extend:	sec.	3.0
Telescopic stick cylinder Ø 80 retract:	sec.	3.0

Slew drive

Turns upper carriage:	rpm	0 - 8
Slew gear (planetary gear):		HD 4
Slew motor:		A2 FM 31 62
Displacement:	cm^3/rev.	32
Pressure setting (2-stage valves, left /right):	bar	190 / 280 / 190 / 280
Add. supply from pump at accessory drive via shut-off valve:	bar	130

STEERING

Pressure supply, pumps at accessory drive, displacement each:	$cm^3/rev.$	8
Steering valve block:	type	6935 PO 695
Pressure setting, main pressure relief valve:	bar	250
Pressure setting, line relief valve, 2x:	bar	290
Pressure setting, cross-over valve:	bar	260
Pressure relief valve, steering cylinder, bottom side:	bar	140 (tie rod compensation)

BRAKE (travel)

Brake:	spring-loaded wheel lock, hydraulic release

BRAKE (slewing)

Automatic spring-loaded muti-disk brake:	in the slew gear
Opening pressure ⇒ (pilot pressure)	via relay-valve

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Travel gear GO 90 LS transmission oil:	MIL-L 2105 B resp. API - GL 5
Slew gear:	SAE 85 W 90 LS - SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.		
Fuel:	approx.	210.0	diesel
Engine oil (first filling):	approx.	10.0	HD-oil
Hydraulic oil tank (change):	approx.	140.0	hydraulic oil
Travel gears:	approx.	1.8	transmission oil, each
Slew gear:	approx.	1.6	transmission oil
Coolant - engine:	approx.	15.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Deutz
Type:		BF 4 M 1012 E
Performance acc. to DIN 70020:	kW/PS	59 / 80 at 2,300 min^{-1}
Construction:		4-stroke direct injector turbocharger
Cooling:		water - anti-freeze agent
Low idle:	min^{-1}	800
High idle:	min^{-1}	2,450
Spec. fuel consumption under full load:	g/kWh	208
Tappet clearance - inlet cold:	mm	$0.3^{+0.1}$
Tappet clearance - outlet cold:	mm	$0.5^{+0.1}$
Torque cylinder head stud bolts:	Nm	30 - 80, then 90°
Further data:		see engine instruction book

ELECTRIC SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	12 / 55
Starter:	kW/PS	3.1 / 4
Starting aid:		glow plugs
Lighting:		1 working headlight

DRIVE

Pump (accessory drive displacement):	cm^3/rev.	19 + 19
Travel gear:	type	GFT 17 TB 1031
Two-stage travel motors:	type	A10V VT 45 HZ (gearbox is integrated)
Displacement:	max. cm^3/rev.	0 - 45

TRAVEL RANGE

Travel speed range „I“:	km/h	0 - 2.4
Travel speed range „II“:	km/h	0 - 6.0

HYDRAULIC SYSTEM

Variable displacement pump:		A10VO 100 DFSR
Flow rate:	ltr./min.	0 - 100
Double gear pump, displacement:	cm^3/rev.	19 + 19
2 gear pumps, displacement each:	cm^3/rev.	8
Valve bank I:	type	SX 18
Valve bank II and III:	type	SM 12
Servo-controlled lever, 2x:	type	4 TH 6
Servo-controlled pedal, 4x:	type	PCL 2 FM
Double linear lever, 2x:	type	PCL 402
Shut-off valve **HS 41 M** (up to s/n 141/0135)	make	Buchholz
Shut-off valve **HS 41 M** (from s/n 141/0136)	make	Bergin

PRESSURE AND SETTING VALUES

Variable displacement pump stand-by pressure:	bar	25 (flow controller)
Valve bank I (SX 18):	bar	250 load-sensing valve
Valve bank I (SX 18):	bar	280 safety valve
Valve bank I, SX 18,		
Line relief pressures:		
Boom lift / lower:	bar	280 / 280
Dipperstick in / out:	bar	280 / 280
Bucket in / out:	bar	280 / 280
Telescopic stick in / out:	bar	230 / 160
Breaker:	bar	200
Valve bank II, SM 12, main pressure relief valve:	bar	270 $^{+5}$
Line relief pressures:		
Travel forward / reverse:	bar	250 / 250
Stabilizing, rear, left:		without
Stabilizing, rear, right:		without
Slewing (see slew drive)		
Valve bank III, SM 12, main pressure relief valve:	bar	250 $^{+5}$
Line relief pressures:		
Travel forward / reverse:	bar	280 / 280
Stabilizing, front, left:		without
Stabilizing, front, right:		without
Articulation:		without
Additional control circuit:	bar	160 / 160
Pilot pressure supply = from the double pump at the accessory drive via shuttle valve and the variable displacement pump to pressure reducing valve:	type	MHST E 561 X / 30 - 40
Pressure setting:	bar	35 (safety valve 40)
Pressure accumulator:	bar/ltr.	10 / 0.75

WORKING CYCLES

Boom cylinder extend:	sec.	5.0
Boom cylinder retract:	sec.	5.0
Dipperstick cylinder extend:	sec.	4.5
Dipperstick cylinder retract:	sec.	4.5
Bucket cylinder extend:	sec.	3.5
Bucket cylinder retract:	sec.	2.5
Telescopic stick cylinder Ø 90 extend:	sec.	4.0
Telescopic stick cylinder Ø 90 retract:	sec.	3.5
Telescopic stick cylinder Ø 80 extend:	sec.	3.0
Telescopic stick cylinder Ø 80 retract:	sec.	3.0

Slew drive

Turns upper carriage:	rpm	0 - 8
Slew gear (planetary gear):		HD 4
Slew motor:		A2 FM 31 62
Displacement:	cm^3/rev.	32
Pressure setting (2-stage valves, left /right):	bar	190 / 280 / 190 / 280
Add. supply from pump at accessory drive via shut-off valve:	bar	130

STEERING

Pressure supply, pumps at accessory drive, displacement each:	cm^3/rev.	8
Steering valve block:	type	6935 PO 695
Pressure setting, main pressure relief valve:	bar	250
Pressure setting, line relief valve, 2x:	bar	290
Pressure setting, cross-over valve:	bar	260
Pressure relief valve, steering cylinder, bottom side:	bar	140 (tie rod compensation)

BRAKE (travel)

Automatic multi-disk brake:	in the travel gear
Opening pressure ⇒ (pilot pressure):	via relay-valve

BRAKE (slewing)

Automatic spring-loaded muti-disk brake:	in the slew gear
Opening pressure ⇒ (pilot pressure)	via relay-valve

LUBRICANTS

Engine oil:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Travel gear GO 90 LS transmission oil:	MIL-L 2105 B resp. API - GL 5
Slew gear:	SAE 85 W 90 LS - SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

		ltr.	
Fuel:	approx.	210.0	diesel
Engine oil (first filling):	approx.	10.0	HD-oil
Hydraulic oil tank (change):	approx.	140.0	hydraulic oil
Travel gears:	approx.	1.8	transmission oil, each
Slew gear:	approx.	1.6	transmission oil
Coolant - engine:	approx.	15.0	water with anti-corrosive and anti-freeze agent

DIESEL ENGINE

Manufacturer:		Deutz
Type:		BF 4 M 1012 E
Performance acc. to DIN 70020:	kW/PS	59 / 80 at 2,300 min^{-1}
Construction:		4-stroke direct injector turbocharger
Cooling:		water - anti-freeze
Low idle:	min^{-1}	800
High idle:	min^{-1}	2,450
Spec. fuel consumption under full load:	g/kWh	208
Tappet clearance - inlet cold:	mm	$0.3^{+0.1}$
Tappet clearance - exhaust cold:	mm	$0.5^{+0.1}$
Torque cylinder head studs:	Nm	30 - 80, then 90°
Further data:		see engine instruction book

ELECTRIC SYSTEM

Voltage:	V	12
Battery:	V/Ah/A	12 / 105 / 450
Generator:	V/A	12 / 55
Starter:	kW/PS	3.1 / 4
Starting aid:		glow plugs
Lighting:		1 working headlamp

DRIVE

Pump (accessory drive, displacement):	cm^3/rev.	19 + 19
Travel gear:	type	GFT 17 T3 / 1095
Two-stage travel motors:	type	A10V VT 45 HZ (gearbox is integrated)
Displacement:	max. cm^3/rev.	0 - 45

TRAVEL RANGE

Travel speed range „I“:	km/h	0 - 2.3
Travel speed range „II“:	km/h	0 - 5.2

HYDRAULIC SYSTEM

Variable displacement pump:		A10VO 100 DFSR
Flow rate:	ltr./min.	215
Double gear pump displacement:	cm^3/rev.	19 + 19
2 gear pumps, displacement each:	cm^3/rev.	8
Valve bank I:	type	SX 18
Valve bank II and III:	type	SM 12
Servo-controlled lever, 2x:	type	4 TH 6
Servo-controlled pedal, 4x:	type	PCL 2 FM
Double linear lever, 2x:	type	PCL 402
Shut-off valve (serial no. 341/0100):	make	Buchholz
Shut-off valve (from serial no. 341/0101):	make	Bergin

PRESSURE AND SETTING VALUES

Variable displacement pump stand-by pressure:	bar	25 (flow control)
Valve bank I (SX 18):	bar	250 load-sensing valve
Valve bank I (SX 18):	bar	280 safety valve
Valve bank I, SX 18,		
Line relief pressures:		
Boom lift / lower:	bar	280 / 280
Dipperstick in / out:	bar	280 / 280
Bucket in / out:	bar	280 / 280
Telescopic stick in / out:	bar	230 / 160
Breaker:	bar	280 / 280
Valve bank II, SM12, main pressure relief valve:	bar	270 $^{+5}$
Line relief pressures:		
Travel forward / reverse:	bar	280 / 280
Stabilizing, left rear:		without
Stabilizing, right rear:		without
Slewing (see slew drive)		
Valve bank III, SM 12, main pressure relief valve:	bar	270 $^{+5}$
Line relief pressures:		
Travel forward / reverse:	bar	280 / 280
Stabilizing, left front:		without
Stabilizing, right front:		without
Articulation:		without
Additional control circuit:	bar	160 / 160
Pilot pressure supply = from the double pump at the accessory drive via shuttle valve and the variable displacement pump to pressure reducing valve:	type	MHST E 561 X / 30 - 40
Pressure setting:	bar	35 (safety valve 40)
Pressure accumulator:	bar/ltr.	10 / 0.75

WORKING CYCLES

Boom cylinder extend:	sec.	5.0
Boom cylinder retract:	sec.	5.0
Dipperstick cylinder extend:	sec.	4.5
Dipperstick cylinder retract:	sec.	4.5
Bucket cylinder extend:	sec.	3.5
Bucket cylinder retract:	sec.	2.5
Telescopic stick cylinder Ø 90 extend:	sec.	4.0
Telescopic stick cylinder Ø 90 retract:	sec.	3.5
Telescopic stick cylinder Ø 80 extend:	sec.	3.0
Telescopic stick cylinder Ø 80 retract:	sec.	3.0

SLEW DRIVE

Turns upper carriage:	rpm	0 - 8
Slew gear (planetary gear):		HD 4
Slew motor:		A2 FM 32
Displacement:	cm^3/rev.	32
Pressure setting (2-stage valves, left /right):	bar	190 / 280 /// 190 / 280
Add. supply from pump at accessory drive via shut-off valve:	bar	110

STEERING

Pressure supply pumps at accessory drive, each:	cm^3/rev.	8
Steering valve block:	type	6935 PO 695
Pressure setting main pressure relief valve:	bar	250
Pressure setting line relief valve, 2x:	bar	290
Pressure setting cross-over valve:	bar	260
Pressure relief valve steering cylinder bottom side:	bar	140 (tie rod compensation)

BRAKE (travel)

Automatic multi-disk brake:	in the travel gear
Opening pressure ⇒ (pilot pressure):	via relay-valve

BRAKE (slewing)

Automatic spring-loaded muti-disk brake:	in the slew gear
Opening pressure ⇒ (pilot pressure)	via relay-valve

LUBRICANTS

Engine:	see engine instruction book
Hydraulic oil:	see hydraulic oil recommendation table
Travel gear GO 90 LS transmission oil:	MIL-L 2105 B resp. API - GL 5
Slew gear:	SAE 85 W 90 LS - SAE 90 LS
Multi-purpose grease:	acc. to DIN 51825. Dripping point over 170°C. With lithium.

MAINTENANCE PARTS

see operation manual

CAPACITIES

	ltr.	
Fuel:	approx. 210.0	diesel
Engine oil (first filling):	approx. 10.0	HD-oil
Hydraulic oil tank (change):	approx. 140.0	hydraulic oil
Travel gear:	approx. 1.8	transmission oil, each
Slew gear:	approx. 1.6	transmission oil
Coolant - engine:	approx. 15.0	water with anti-corrosive and anti-freeze agent

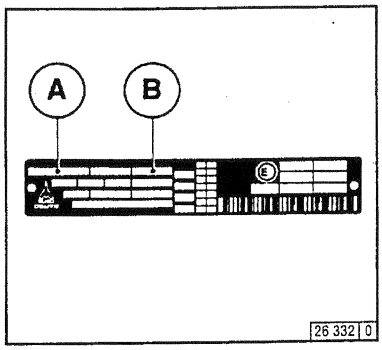
SUBGROUP LIST

DIESEL ENGINES

HML 21 SCL 515	/	HR 21	DEUTZ FL 1011 F	3.200
SKL 823 SKS 633 HML 22	/	SKL 833 HR 22	PERKINS 704-30	3.400

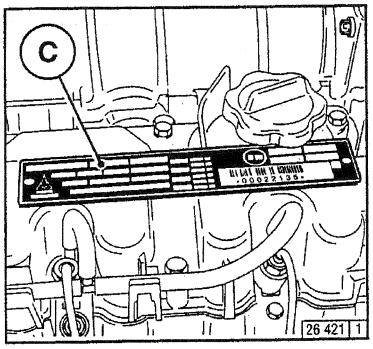
TEREX | SCHAEFF

Rating Plate



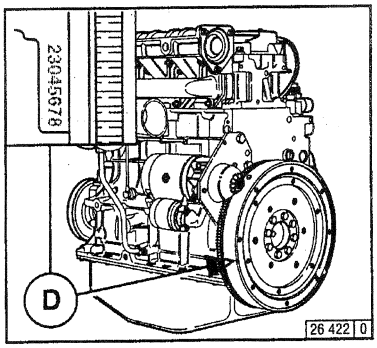
The model **A**, the engine serial number **B** and the performance data are stamped on the rating plate.
The model and engine serial number must be given when ordering parts.

Rating Plate Location



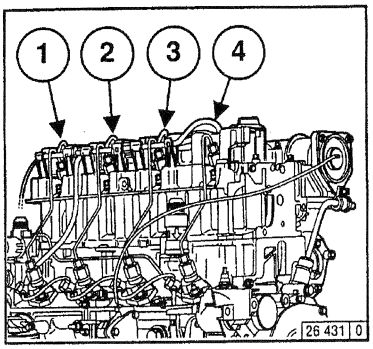
The rating plate **C** is attached to the valve cover.

Engine Serial Number



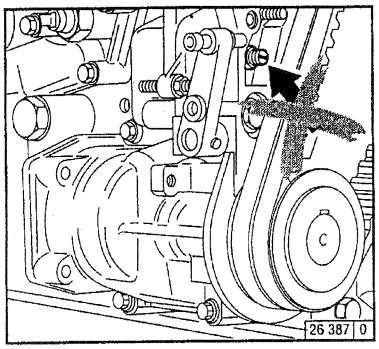
The engine serial number **B** is stamped on the crankcase **D** as well as the rating plate.

Cylinder Numbering



Cylinders are numbered consecutively, beginning at the flywheel end.

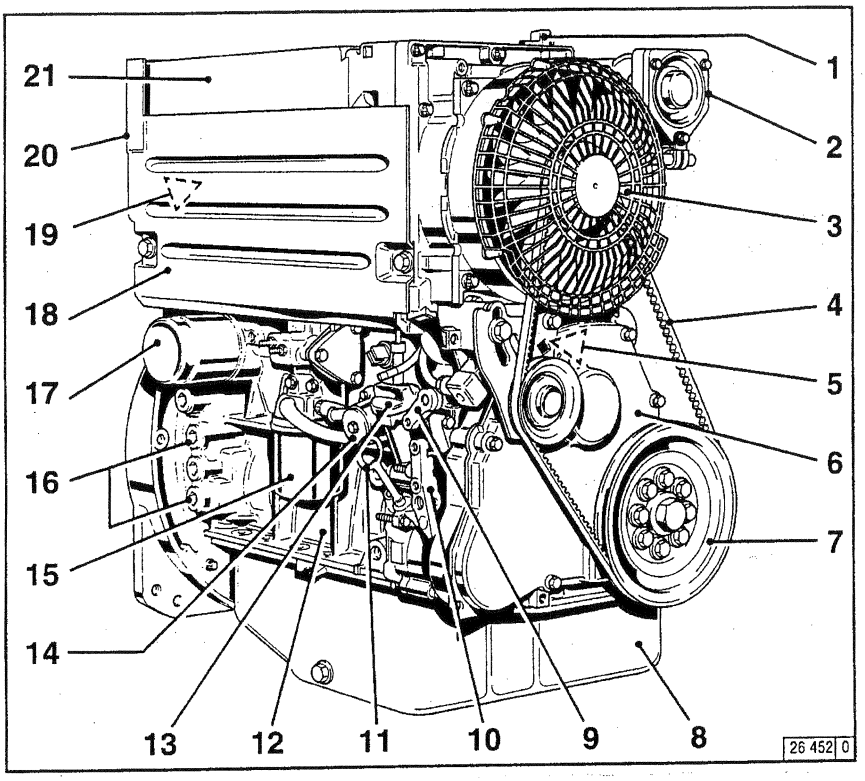
Fuel Delivery Lock



The manufacturer shall not be held liable for damages resulting from adjustments made to the regulator by the operator.
The lock screws are protected in order to prevent this:

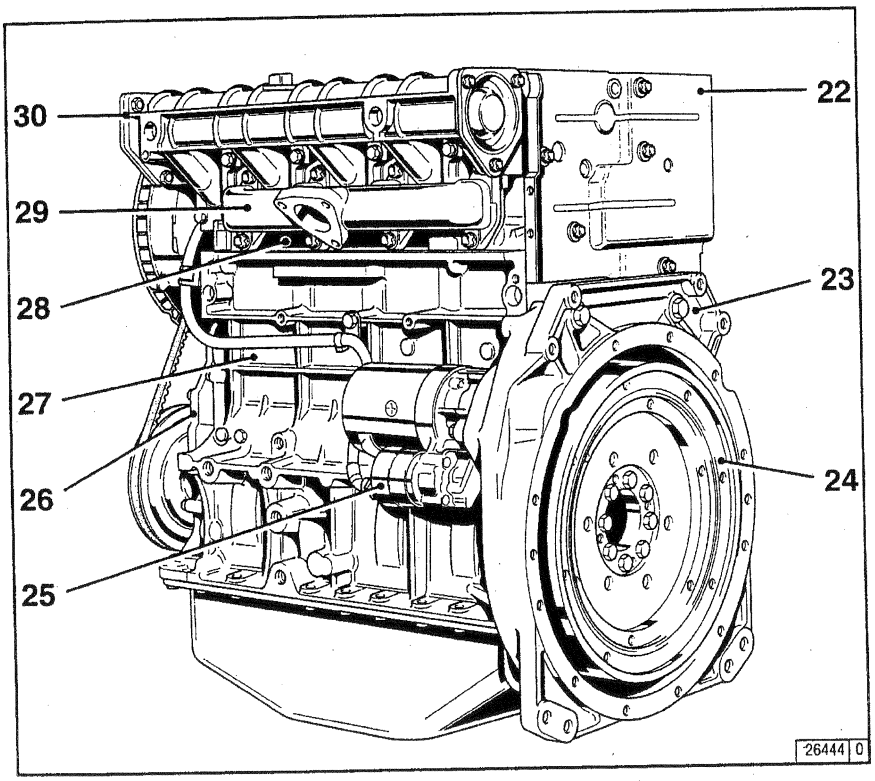
1. with locking paint on model:
   torque balancer
2. with plastic protective cap on model:
   without torque balancer.

Adjustments to the regulator are to be carried out only by authorized DEUTZ SERVICE - specialists.



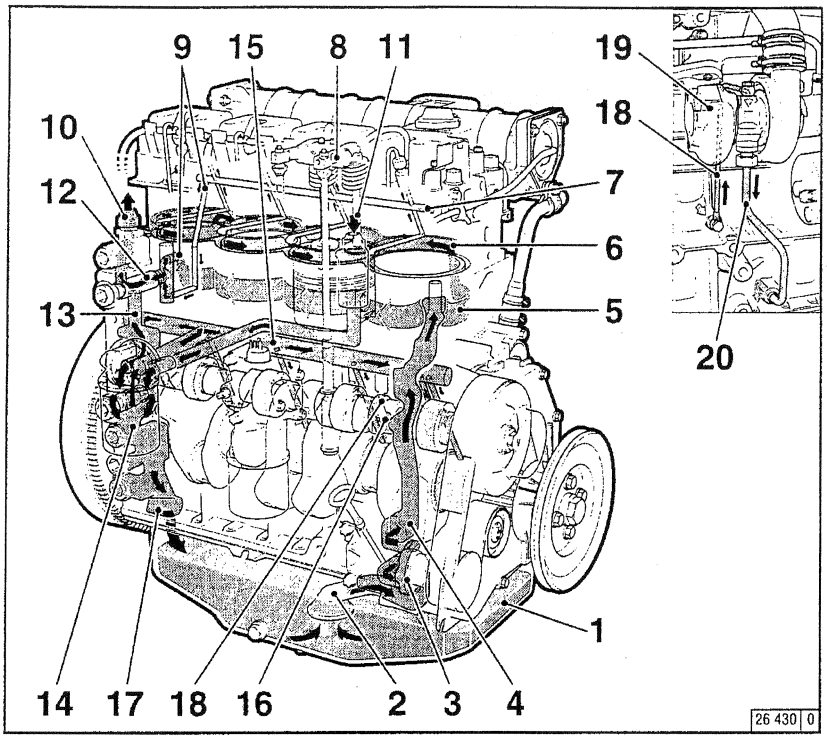
1 Oil filler neck (valve-gear cover)
2 Charge-air line / air-intake line
3 Fan with integrated generator
4 Narrow V-belt
5 Solenoid
6 Toothed belt cover
7 V-belt pulley on crankshaft
8 Oil sump
9 Cut-out handle
10 Speed control lever
11 Oil dipstick
12 Crankshaft housing
13 Oil fill point (on side of crankcase)
14 Fuel pump
15 Easy-change fuel filter
16 Connecting facility for oil heater
17 Lube oil easy-change filter
18 Removable coolant intake hood
19 Injection pumps
20 Date plate
21 Oil cooler

Service Side
FL 1011F



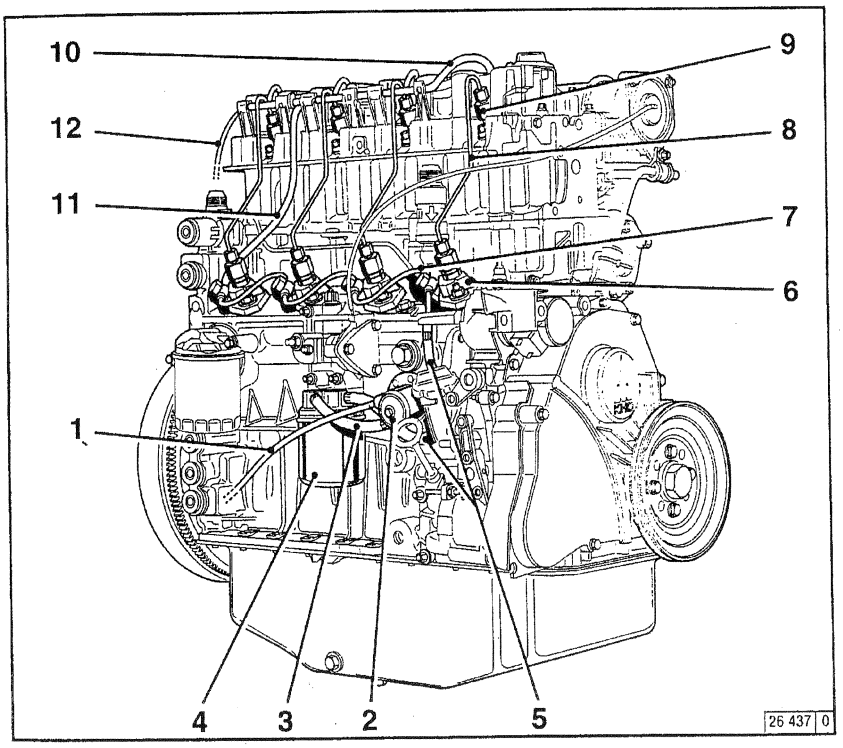
22 Date plate
23 Connection housing (SAE)
24 Flywheel with ring gear
25 Starter
26 Front cover
27 Crankcase
28 Cylinder head
29 Exhaust manifold pipe
30 Air-intake pipe

Exhaust side
FL 1011F



1 Oil sump
2 Intake manifold
3 Oil pump
4 Main oil duct
5 Oil-cooled cylinder
6 Cylinder head cooling neck
7 Oil duct for rocker arm lubrication
8 Rocker arm
9 Oil manifold for the thermostat
10 Intake to external engine oil cooler
11 Return from external engine oil cooler
12 Thermostat housing with slide thermostat
13 Oil duct to oil filter
14 Oil filter
15 Oil duct to the cam, con-rod and crankshaft bearing
16 Injection jet for cooling the pistons
17 Oil return via crankcase to the oil sump
18 Lube oil intake to turbocharger
19 Turbocharger
20 Return from turbocharger to oil sump

Lube Oil Circuit Schematic



1 Fuel line from tank to fuel pump
2 Fuel pump
3 Fuel line from fuel pump to easy-change fuel filter
4 Easy-change fuel filter
5 Fuel line from filter to injection pump
6 Injection pumps
7 Fuel distributor line
8 Injection lines
9 Injection valves
10 Fuel leakage line
11 Fuel overflow pipe
12 Fuel return line to tank

Fuel system schematic

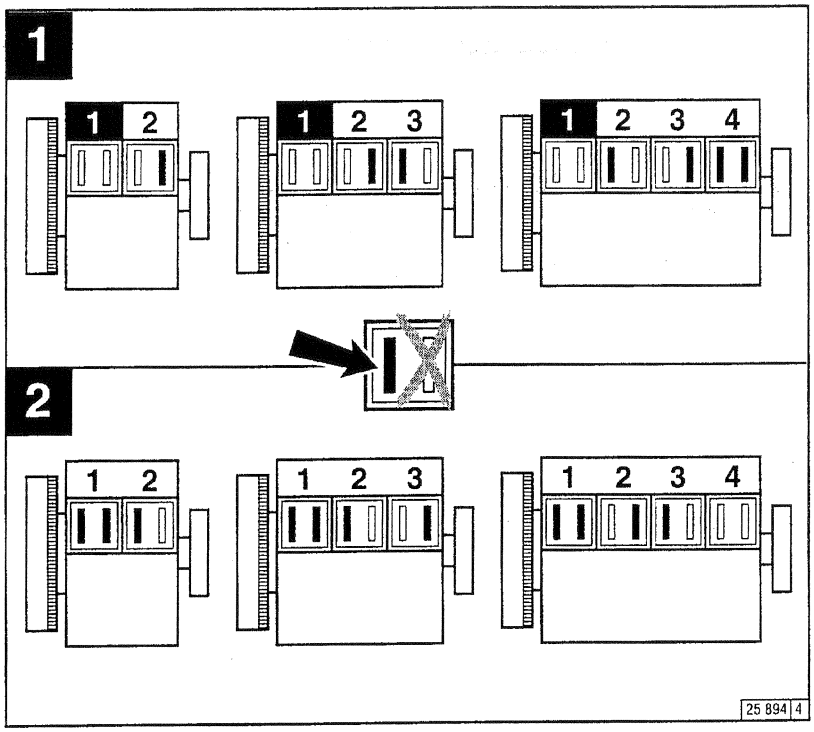
Model		F2L 1011F	F3L 1011F	F4L 1011F
Numbers of cylinders		2	3	4
Cylinder arrangement		vertical in line		
Bore	[mm]	91		
Stroke	[mm]	105		
Total displacement	[cm³]	1366	2049	2732
Compression ratio	[ε]	18,5		
Working cycle		4-stroke diesel engine		
Combustion system		naturally aspirated engine with direct injection		
Direction of rotation		counter clockwise		
Weight incl. integrated cooling system as per DIN 70020-A (without starter, with alternator)	ca.[kg]	167	208	249,5
Engine power	[kW (PS)]	[1)]		
Speed	[1/min]	[1)]		
Lubrication		pressure lubrication		
SAE oil		20 W 20		
Max. oil temperature in oil sump	[°C]	130		
Min. oil pressure in warm condition, oil temperature 110 °C at: 900/min (low idling speed)	[bar]	1,4 [3)]		
1800 /min	[bar]	2,2 [3)]		
max. 3300 /min	[bar]	3 [3)]		
Oil change quantity (oil sump) ca.	[ltr.]	6 [2)]	5,5 [2)]	10 [2)]
Oil change quantity with filter (Standard 0.5 ltr.) ca.	[ltr.]	6,5 [2)]	6 [2)]	10,5 [2)]
Valve clearance with cold engine	[mm]	inlet 0.3		
(Engine cooling time at least 30 Min.: Oil temperature below 80°C)	[mm]	exhaust 0.5		
Start of delivery	[°crank angle b TDC]	[1)]		
Injector opening pressure: Vehiclé/Aggregat	[bar]	210 / 250^{+8}		
Firing order		1 - 2	1 - 2 - 3	1 - 3 - 4 - 2
V-belt: Tension/ Retension (15 minutes after engine has run under load)	[N]	400/ 300 ±20		

[1)] Engine power, speed, start of delivery are stamped on engine rating plate, see also 2.1.
[2)] Ca. value can vary depending on model. **The upper oil dipstick marking should always be taken as authoritative.**
[3)] Values for engines without engine oil heating.

Torque Wrench Settings

Location	Preload [Nm]			Torquing Load [Nm]				Total [Nm]	Remarks
	1st Stage	2nd Stage	3rd Stage	1st Stage	2nd Stage	3rd Stage	4th Stage		
Rocker cover								8,5	
Rocker arm set screw								21	
Air intake manifold								21	
Exhaust manifold								40	
Oil drain plug								55	
Injector mounting								21	TORX
Injector line mounting								15	
Oil pan (cast iron)								31	
Oil pan (sheet metal)								21	

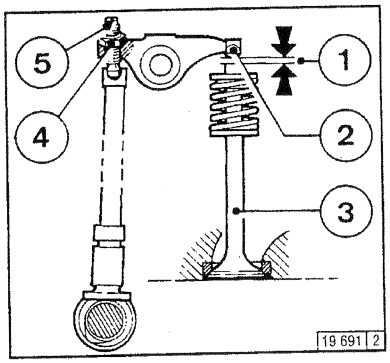
Valve Clearance Adjustments
Schematic

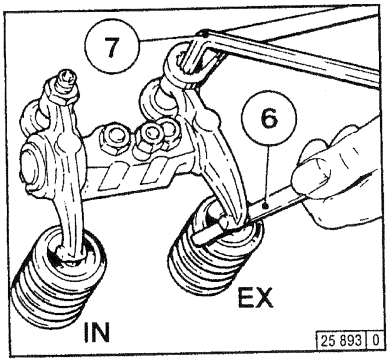


- **Crankshaft Position 1:**
  Turn crankshaft until both valves in cylinder 1 overlap (exhaust valve about to close, inlet valve about to open). Adjust clearance of valves **marked in black** on schematic. Mark respective rocker arm with chalk to show that adjustment has been done.

- **Crankshaft Position 2:**
  Turn crankshaft one full revolution (360°). Adjust clearance of valves **marked in black** on schematic.

Checking / Adjusting Valve Clearances





- Remove the cylinder head cover.
- Position crankshaft as per schematic 6.6.1.1.
- Before adjusting valve clearance, allow engine to cool down for at least 30 minutes. The oil temperature should be below 80 °C.
- Check valve clearance 1 between rocker arm / tappet contact face 2 and valve stem 3 with feeler gauge 6 (there should be only slight resistance when feeler blade is inserted).
  For permissible valve clearance, see 9.1.

- Adjust valve clearance if necessary:
  - Release locknut 4.
  - Use allen key 7 to turn setscrew 5 so that the correct clearance is attained after locknut 4 has been tightened.
- Check and adjust valve clearance on all remaining cylinders.
- Replace cylinder head cover (use new gasket if needed).

Basic engine data

Number of cylinder 4

Cylinder arrangement . . . . . In line

Cycle . . . . . Four stroke

Induction system . . . . . Naturally aspirated

Combustion system . . . . . Direct injection

Nominal bore . . . . . 97.0 mm (3.82 in)

Stroke . . . . . 100.0 mm (3.94 in)

Compression ratio 17.5:1

Cubic capacity . . . . . 3 litres (183 in^3)

Firing order 1,3,4,2

Static timing angle for fuel injection pump
(compression stroke on number 1 cylinder) . . . . . 16° BTDC

Atomisers (two stage injection)
Code letters . . . . . UA

Set pressures:
- Stage one . . . . . 190 atm (2756 lbf/in^2) 19.2 MPa
- Stage two . . . . . 230 atm (3336 lbf/in^2) 23.3 MPa

Reset pressure:
- Stage one . . . . . 200 atm (2900 lbf/in^2) 20.3 MPa
- Stage two . . . . . 243 atm (3524 lbf/in^2) 24.6 MPa

Valve tip clearances (cold):
- Inlet and exhaust . . . . . 0,35 mm (0.014 in)

Minimum oil pressure when engine is started . . . . . 180 kPa (26.1 lbf/in^2) 1.84 kgf/cm^2

Lubricating oil pressure at maximum engine
speed and normal engine temperature:
minimum pressure . . . . . 280 kPa (41.0 lbf/in^2) 2.86 kgf/cm^2
maximum pressure . . . . . 420 kPa (61.0 lbf/ in^2) 4.28 kgf/cm^2

Direction of rotation . . . . . Clockwise from the front

Typical dry installed engine weight . . . . . 200 kg (440 lb)

Torque tensions

Most of the fasteners referred to in this Service Manual have standard torque tensions indicated in the table below. Those fasteners which need special torque tensions are listed in separate tables together with some standard torque tensions most frequently used.

The torque tensions (standard or special) of the procedures referred to in this Service Manual are indicated in the text and also listed in the tables for special torque tensions.

Standard torque tensions for setscrews and nuts

	Torque tension	
Thread	Nm	kgf m
M 6 x 1.00	9	0.9
M 8 x 1.25	22	2.2
M 10 x 1.50	44	4.5
M 12 x 1.75	78	8.0
M 14 x 2.00	124	12.6
M 16 x 2.00	190	19.3

Special torque tensions for setscrews and nuts

		Torque tension	
Description	Thread	Nm	kgf m
Cylinder head assembly			
Cylinder head screws	**please respect instructions by Perkins**		
Setscrew, rocker shaft bracket	M6	9	0.9
Nut, rocker shaft bracket	M8	22	2.2
Cap nut, rocker cover	M8	11	1.1
Glow plug	M10	17	1.7
Glow plug connection	M4	1.5	0.2
Setscrew, engine lift bracket	M8	22	2.2
Crankshaft assembly			
Setscrew, main bearing cap	M14	147	15.0
Nut, connecting rod big end cap	M9	54	5.5
Setscrew, crankshaft pulley to crankshaft	M16	185	19.0

How to set the valve tip clearances

Notes:

· The valve tip clearance is checked with feeler gauge between the top of the valve stem and the rocker lever (A), with the engine cold. The correct clearance for the inlet valves and the exhaust valves is 0,35 mm (0.014 in).

· The arrangement of the valves and the cylinders is shown in (B) and in the table below. Number 1 cylinder is at the front of the engine.

· Clockwise rotation is when seen from the front of the engine.

1 Disconnect the breather pipe. Remove the cap nuts (C1), the steel washers (C2) and the rubber seals (C3). Lift the rocker cover.

2 Rotate the crankshaft in a clockwise direction until the valve (B7) has just opened and the valve (B8) has not closed completely. Check the clearances of the valves (B1) and (B2) and adjust them, if necessary.

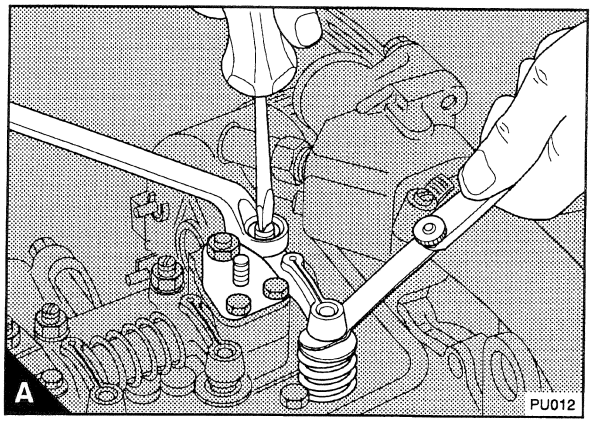
3 Rotate the crankshaft in a clockwise direction until the valve (B3) has just opened and the valve (B4) has not closed completely. Check the clearances of the valves (B5) and (B6) and adjust them, if necessary.

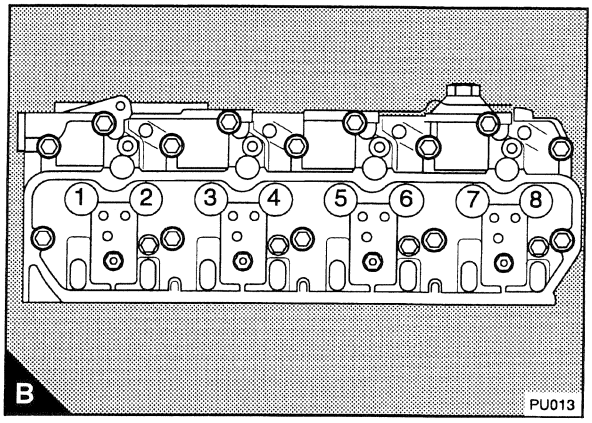
4 Rotate the crankshaft in a clockwise direction until the valve (B1) has just opened and the valve (B2) has not closed completely. Check the clearances of the valves (B7) and (B8) and adjust them, if necessary.

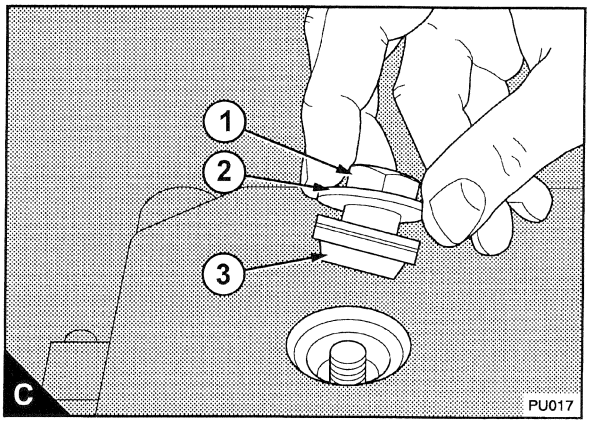
5 Rotate the crankshaft in a clockwise direction until the valve (B5) has just opened and the valve (B6) has not closed completely. Check the clearances of the valves (B3) and (B4) and adjust them, if necessary.

Caution: If the cap nut (C1) is overtightened, the stud and plate assembly (A), for the rocker pedestal may be damaged.

6 Fit the rocker cover. Ensure that the cap nuts, washers and the rubber seals are fitted correctly. Tighten the cap nuts to 11 Nm (8 lbf ft) 1,1 kgf m. Fit the breather pipe.







Cylinder and valve arrangement

Cylinder number	1		2		3		4	
Valve number	1	2	3	4	5	6	7	8
Valve type I = Inlet E = Exhaust	I	E	I	E	I	E	I	E

Note: number 1 cylinder is at the front of the engine

Atomiser fault

Warnings !

· If your skin comes into contact with high-pressure fuel, obtain medical assistance immediately.

· Keep away from moving parts during engine operation. Some moving parts cannot be seen clearly while the engine runs.

An atomiser fault can cause an engine misfire.

In order to find which atomiser is defective, operate the engine at a fast idle speed. Loosen and tighten the union nut of the high-pressure fuel pipe at each atomiser. When the union nut of the defective atomiser is loosened, it has little or no effect on the engine speed.

How to renew an atomiser

Notes:

- When atomisers are removed from the engine, the clamps for the atomisers must be discarded. Always use new clamps when atomisers are fitted to the engine.
- The code letters for the atomiser are stamped onto the lower part of the body of the atomiser.
- Do not allow dirt to enter the fuel system. Before a connection is disconnected, clean thoroughly the area around the connection. After a component has been disconnected, fit a suitable cover to all open connections.
- Use a separate spanner to prevent movement of the outlets of the fuel injection pump when the high pressure pipes are released or tightened.
- Ensure that the sharp edges (A4) do not damage the new "O"ring (A1).

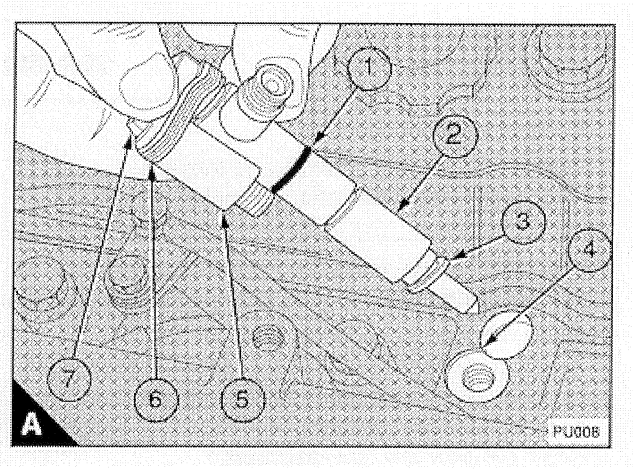
1 Clean thoroughly the area around the atomiser to be removed.

2 Remove the fuel leak-off pipe.

3 Remove the union nuts of the high-pressure pipe from the atomiser and from the fuel injection pump. Do not bend the pipe. If necessary, remove the pipe clamps.

4 Remove the setscrew (A6) of the atomiser clamp and remove the clamp (A5), the spacer (A4), the atomiser (A2) and its seat washer (A3).

5 Put the new atomiser in position together with a new seat washer and a new 'O' ring (A1). Fit the new clamp and the spacer and engage the clamp setscrew. Ensure that the atomiser is not tilted and tighten the setscrew to 22 Nm (16 lbf ft) 2,2 kgf m.



Cautions:

· If there is a leakage from the union nut, ensure that the pipe is correctly aligned with the atomiser inlet.

· Do not tighten the union nuts of the high-pressure pipes more than the recommended torque tension as this can cause a restriction at the end of the pipe. This can affect the fuel delivery.

6 Fit the high-pressure fuel pipe and tighten the union nuts to 22 Nm (16 lbf ft) 2,2 kgf m. If necessary, fit the pipe clamps.

7 Fit the leak-off pipes.

8 Eliminate air from the fuel system, (see page 3.400.02).

9 Operate the engine and check for leakage of fuel and air.

Fuel injection pump

To remove and to fit

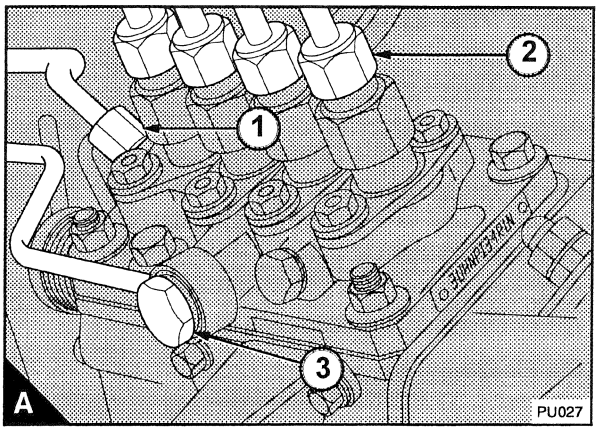
The fuel injection pump is fitted directly into the cylinder block and is retained in position by two dowels, four flanged setscrews and two flanged nuts. The fuel injection timing is set at the factory and should only alter if the cylinder block or the camshaft for the fuel injection pump are renewed. If this occurs, the timing will have to be checked and if necessary set to the correct figure. The timing is controlled by the use of a specific size shim that is fitted between the flange of the fuel injection pump and the cylinder block.

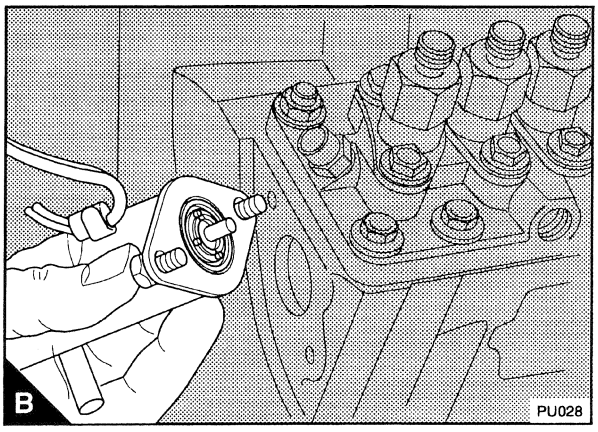
If the fuel injection pump is removed for any other reason, it can be fitted again with a new shim, of the same size, and the timing will not have altered.

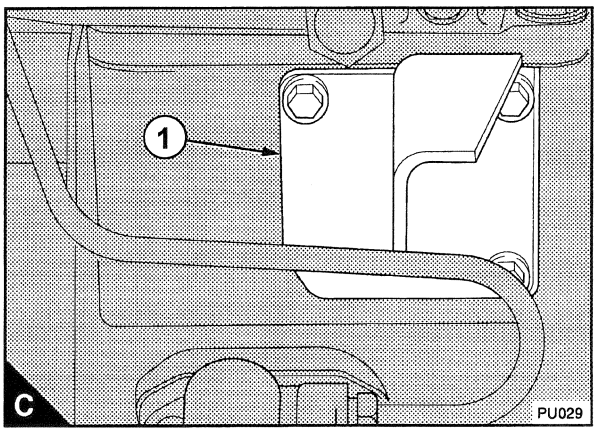
For this operation, the position of the crankshaft is not important.

Cautions:

- *Clean around the edges of the fuel injection pump before it is removed. Dirt may enter the inside of the engine if this is not done.*
- *Use a separate spanner to prevent movement of the outlets of the fuel injection pump when the high-pressure pipes are released or tightened*







To remove

1 Disconnect the battery.

2 Remove the fuel pipe (A3) that is fitted between the fuel injection pump and the fuel filter.

3 Remove the fuel pipe (A1) that is fitted between the fuel pump and the leak-off connection on top of the fuel filter.

Caution: *Use a separate spanner to prevent movement of the outlets of the fuel injection pump when the high-pressure pipes are released or tightened.*

4 Release the union nuts (A2) of the high-pressure pipes from the atomisers and from the fuel injection pump and remove the pipes. Do not bend the pipes.

5 Remove the electrical stop solenoid (B).

6 Remove the support bracket / blanking plate (C1) from the side of the cylinder block. Record the position of the four setscrews because on some earlier engines, they are of different lengths.

Continued

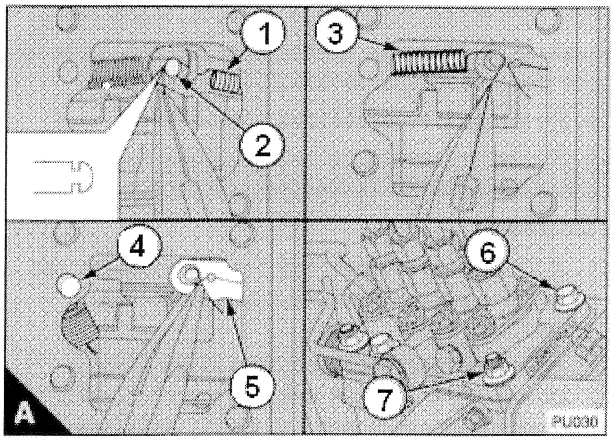
7 Disconnect the spring (A1) from the groove in the peg (A2) on the rack.

Caution: *When the spring (A3) is disconnected from the peg (A2), it is possible for the spring to become disconnected from the pin (A4). If this occurs, the spring can fall into the sump!*

8 Disconnect the spring (A3) from the groove in the peg on the rack.

9 Disconnect the governor control link (A5) from the peg on the rack.

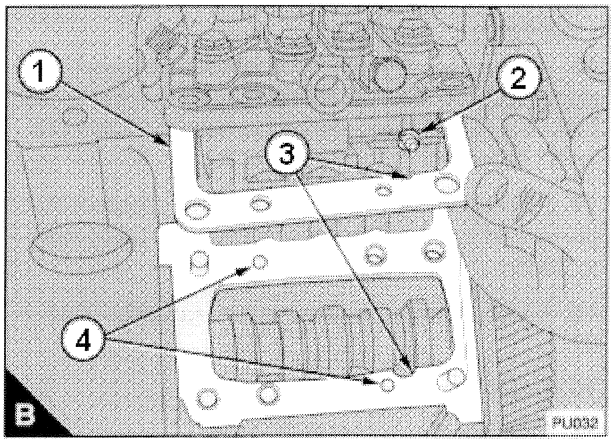
10 Remove the four flanged setscrews (A6), the two flanged nuts (A7) and lift the pump from the cylinder block.



To fit

Cautions:

- *Debris may fall into the engine if the hole in the cylinder block for the pump is not protected.*
- *When the pump is fitted, new shim of the correct size must be fitted, without sealant. A thin layer of sealant is included within the final thickness of each new shim. Extra sealant will affect the timing of the fuel injection.*



1 Clean the surface of the flanges for both the pump and the cylinder block. Fit a new shim (B1) of the the correct size (see table opposite) to the flange on the cylinder block.

2 Ensure that the peg (B2) is aligned with the cutout (B3) and that the shim is fitted onto the two dowels (B4). Carefully fit the pump onto the studs and the dowels and ensure that the link (A5) is not damaged.

3 Fit the nuts (A7) and setscrews (A6) and tighten them evenly to 22 Nm (16 lbf ft) 2,2 kgf m.

4 Fit the governor control link (A5) onto the peg (A2) on the rack.

5 Fit the spring (A3) to the groove in the peg (A2) on the rack.

Caution: *The spring (A1)* ***must*** *retain at all times, the spring (A3) and the governor control link (A5) onto the peg (A2). If the governor control link becomes separated from the peg, control of the engine speed will be lost!*

6 Fit the spring (A1) into the groove on the peg.

continued

Timing shims

Part number	Thickness mm (in)
3621 F011	0,1 (0.004)
3621 F012	0,2 (0.008)
3621 F013	0,3 (0.012)
3621 F014	0,4 (0.016)
3621 F015	0,5 (0.020)

7 Clean the surfaces for the joint for the blanking plate (C1). Fit a new joint and the blanking plate to the side of the cylinder block.

8 Fit the stop solenoid (B).

9 Fit the high-pressure fuel pipes and tighten the union nuts (A2) to 22 Nm (16 lbf ft) 2,2 kgf m.

Cautions:

· *If there is a leakage from the union nut, ensure that the pipe is correctly aligned with the atomiser inlet*

· *Do not tighten the union nuts of the highpressure pipes more than the recommended torque tension as this can cause a restriction at the end of the pipe. This can affect the fuel delivery.*

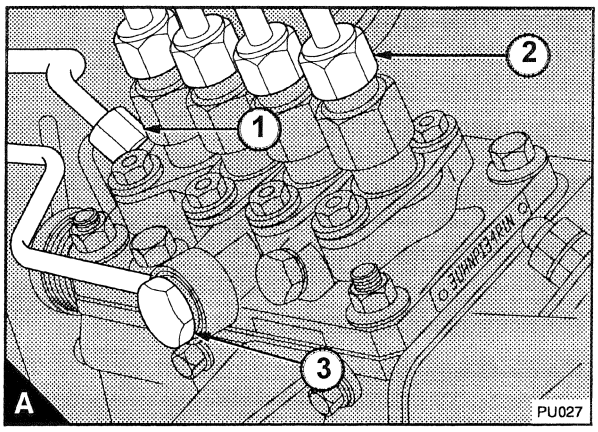
10 Fit the fuel pipe (A1) that is fitted between the pump and the leak-off connection on the top of the fuel filter, and tighten the union nuts to 20 Nm (15 lbf ft) 2,0 kgf m.

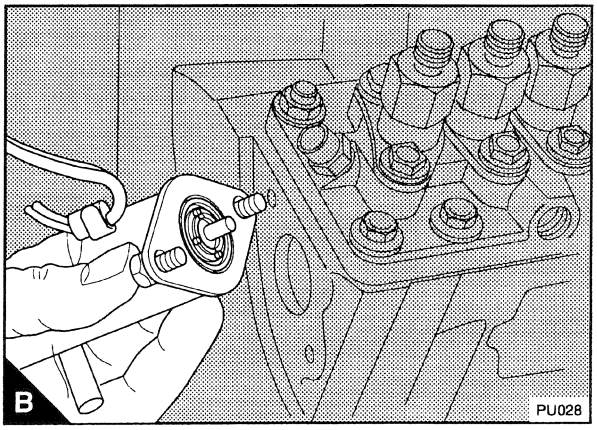
11 Fit the fuel pipe (A3) that is fitted between the pump and the fuel filter and tighten the union nuts to 20 Nm (15 lbf ft) 2,0 kgf m.

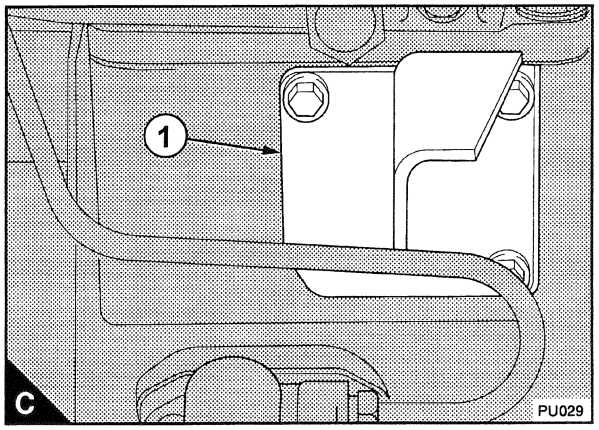
12 Eliminate air from the system.

13 Connect the battery.

14 Operate the engine and check for leakage of fuel and air.







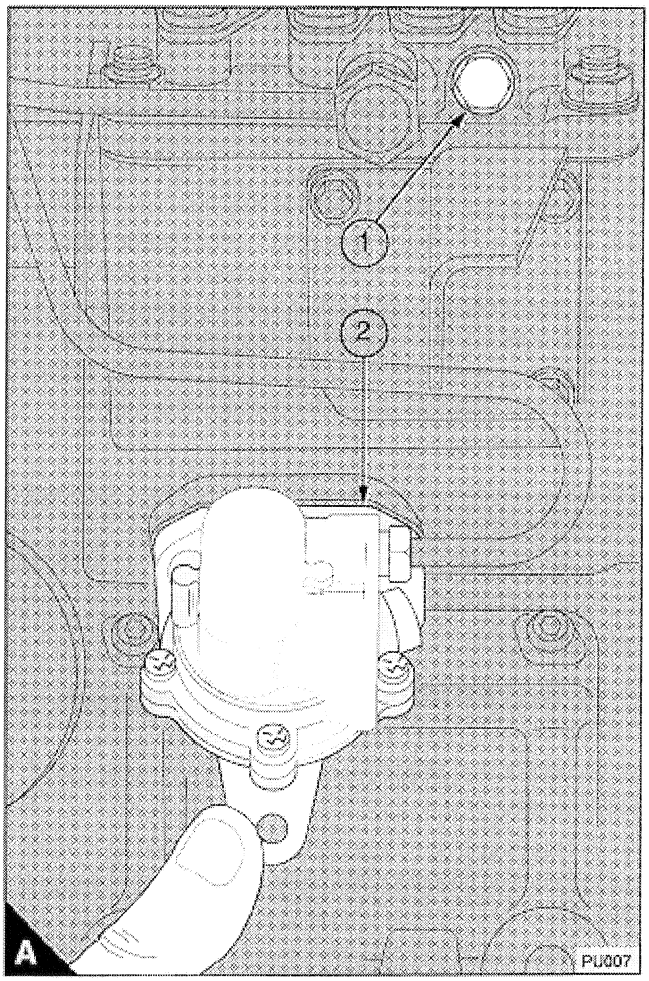
To eliminate air from the fuel system

If air enters the fuel system, it must be eliminated before the engine can be started.

Air can enter the system if:

- The fuel tank is drained during normal operation.
- The low-pressure fuel pipes are disconnected.
- A part of the low-pressure fuel system leaks during engine operation.

In order to eliminate air from the fuel system, proceed as follows:



1 Loosen the vent plug (A1) on the side of the fuel injection pump.

2 Operate the priming lever of the fuel lift pump (A2) until fuel, free from air, comes from the vent point. Tighten the vent plug.

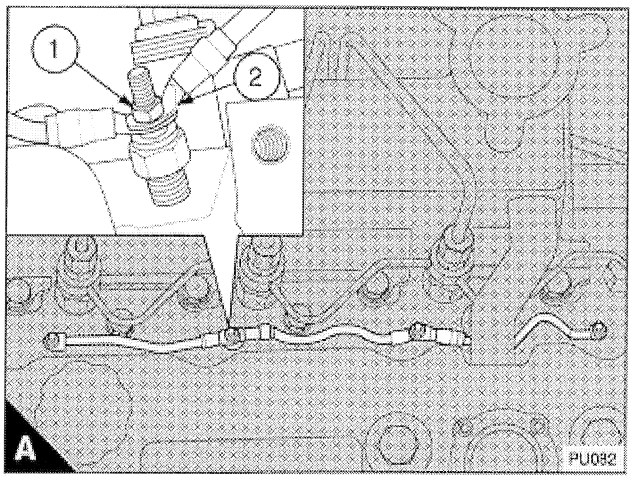
3 Turn the start key to the "ON" position.

4 Operate the starter motor for intervals of 15 seconds until the engine starts. If the engine runs correctly for a short time and then stops or runs roughly, check for air in the fuel system. If there is air in the fuel system, there is probably a leakage in the low pressure system. Stop the engine and turn the start key to the "OFF" position.

General description

The starting aid for these engines consists of a set of glow plugs, one for each cylinder. The glow plugs used on UA and UB engines are different. The glow plugs are fitted in the cylinder head near to the atomisers. The tip of the glow plugs reaches into the combustion chamber in the piston crown of UA engines or the pre-combustion chamber of UB engines.

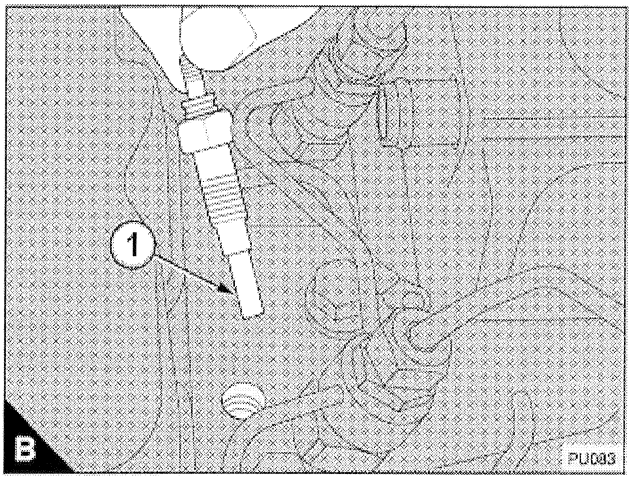
The glow plugs are operated electrically, usually through the start switch. When the glow plugs are energised, their tips become very hot and improve the combustion process during cold start conditions.



Glow plugs

To remove and to fit a glow plug

Note: In order to remove the glow plugs on the UA engine, some types of induction manifold will have to be removed first. The induction manifolds fitted to UB engines need not be removed.



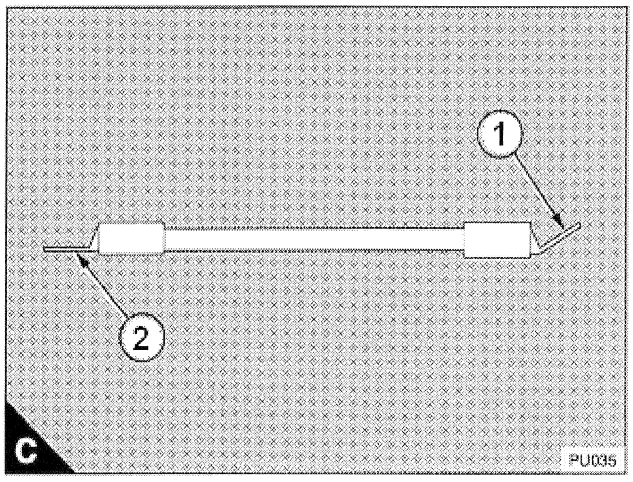
To remove

1 Disconnect the battery.

2 Remove the pipe work to the induction manifold. Remove the engine breather pipe. Release the setscrews for the induction manifold and remove the manifold and the gasket. Discard the gasket.

3 Remove the nut (A1) from the terminal on the glow plug. Remove the electrical connections (A2) from the glow plug.

4 Release and remove the glow plug (B1).



To fit

Cautions · *Ensure that the cables for the glow plug does not contact the high pressure fuel pipes. On early engines, bend the connections* (A2) away *from the high-pressure pipes after the cables have been fitted. If this is not done, it is possible for a short circuit to occur between the connection and the high pressure pipe.*

· *Later engines are fitted with a cable (C) which has a terminal (C1) that is already bent to the correct shape.*

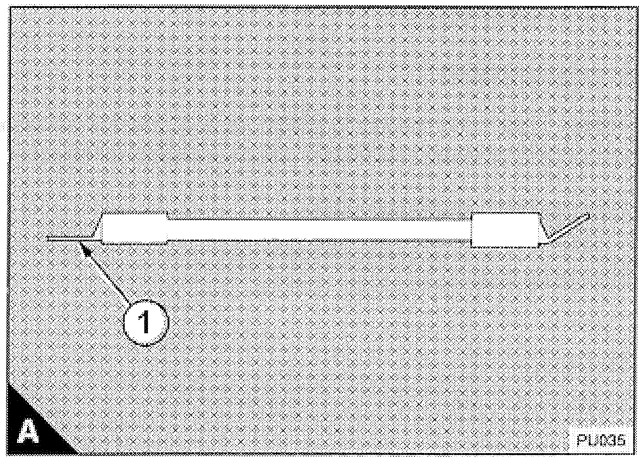
1 Fit the glow plug (B2); sealant is not necessary. Tighten it to 17 Nm (12.5 lbf ft) 1,7 kgf m.

2 Put the electrical connections (A2) in position, ensure that there is no contact with other components.

For UA engines: fit the cable with the straight connection (A1) toward the front of the engine For UB engines: fit the cable with the straight connection (A1) toward the rear of the engine.

Continued

3 Fit and tighten the nuts for the terminals to 1,2 Nm (10.2 lbf in) 11,7 kgf cm.
4 To ensure correct alignment of the induction manifold, fit two guide studs. Fit a new gasket without jointing compound; the gasket may be fitted either way around. Put the manifold in position on the guide studs. Fit the inner setscrews and remove the guide studs. Fit the outer setscrews. Tighten the setscrews to 22 Nm (16 lbf ft) 2,2 kgf m.
5 Fit the engine breather pipe between the rocker cover and the induction manifold. Fit the pipe work between the induction manifold and the air filter.
6 Connect the battery.



To check power supply and continuity

1 Disconnect the glow plug connection.
2 Apply one probe of a multi-meter, which can check continuity, to the terminal of the glow plug and apply the other probe to a suitable earth. If the continuity is correct the multi-meter will give an audible signal. If there is no audible signal, renew the glow plug. Repeat this check for all of the glow plugs.
3 If a multi-meter is not available, connect a 12V test lamp between the positive terminal of the battery and earth to check that the lamp will light.
4 Connect the test lamp between the terminal of the glow plug, which is furthest away from the power supply, and earth. Operate the control switch and the test lamp should be illuminated if the power supply is correct.
5 Disconnect the cables at each glow plug.
6 Connect the test lamp to the positive terminal of the battery and to the terminal of a glow plug. The lamp will be illuminated if the continuity is correct. If the test lamp is not illuminated, renew the glow plug.
7 When all of the glow plugs have been checked, connect the cables to the glow plugs.

To check the operation of glow plugs

1 Disconnect the power supply cable and the connection cables from the terminals of the glow plugs.
2 Connect a 50-0-50 ammeter between the power supply cable and the terminal of a glow plug. Connect a voltmeter between the glow plug terminal and earth.
3 Engage the control switch and check the readings of the ammeter and the voltmeter. With a 12 volt supply, there should be an initial current of approximately 12.5 amperes, which should reduce to approximately 7 t 1 amperes after 30 seconds for UA engines. For UB engines, the initial current should be approximately 12.5 amperes, which should reduce to approximately 6.5 t 1 amperes after 30 seconds.
If the ammeter reading is low or there is no reading, renew the glow plug. If there is no voltmeter reading, check the switch and the power cable.
4 When all of the glow plugs have been checked, remove the ammeter and the voltmeter and connect the power supply cable. Check that the glow plugs have been connected correctly.

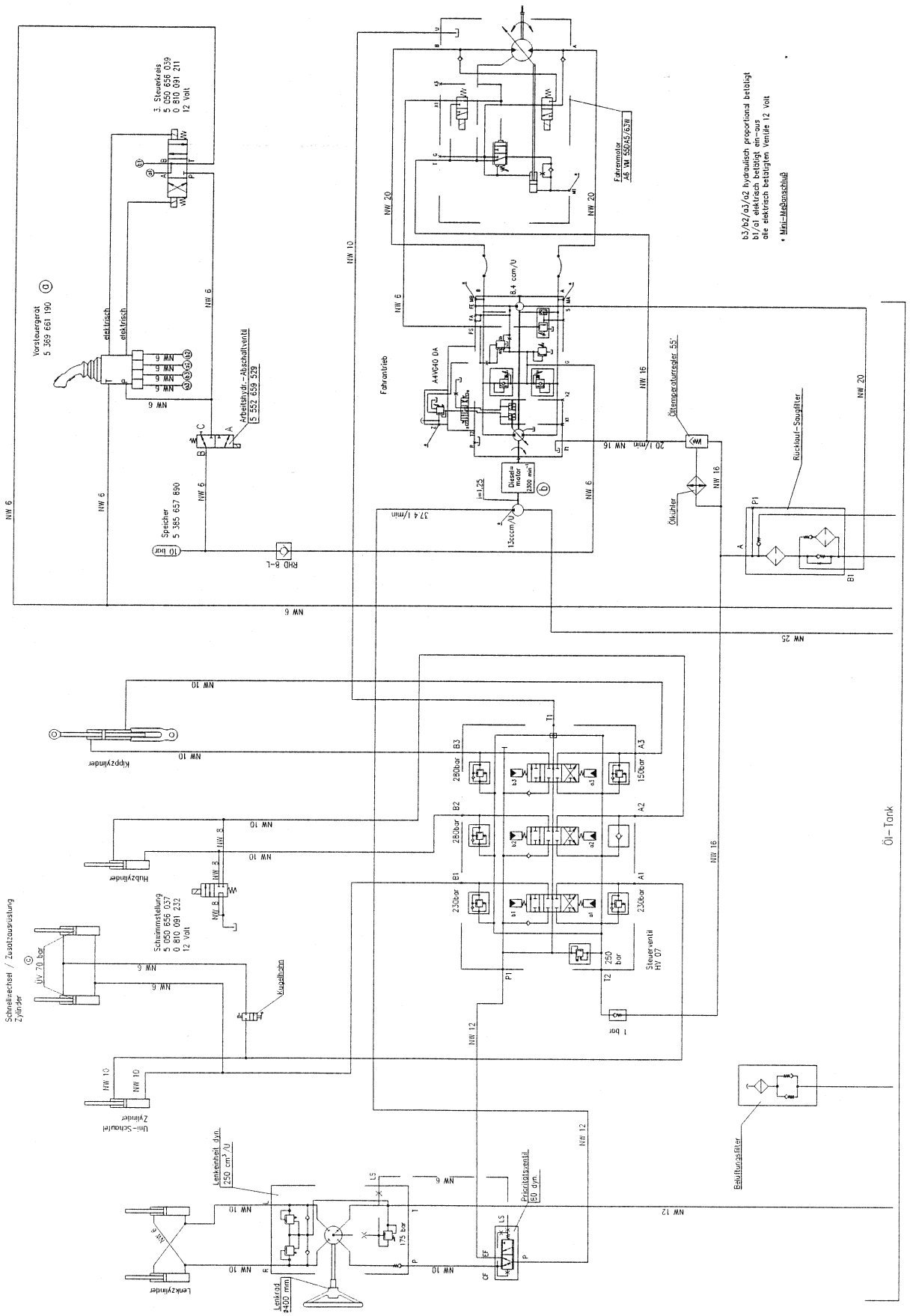
SUBGROUP LIST

Hydraulic system

Diagrams - schemes

SKL 823	4.03
SKL 823 Basic	4.04
SKL 833	4.05
SKL 833 Basic	4.06
SKL 843	4.07
SKL 853	4.09
SKL 877	4.15
SCL 515	4.20
SKS 633	4.35
SKB 2000	4.45
SMB 2041	4.46
HML 21	4.48
HML 51S	4.54
HR 21	4.62
HR 22	4.63
HR 31	4.64
HR 41	4.66
HS 41	4.84
HS 41 M	4.85
HS 41 MM	4.86

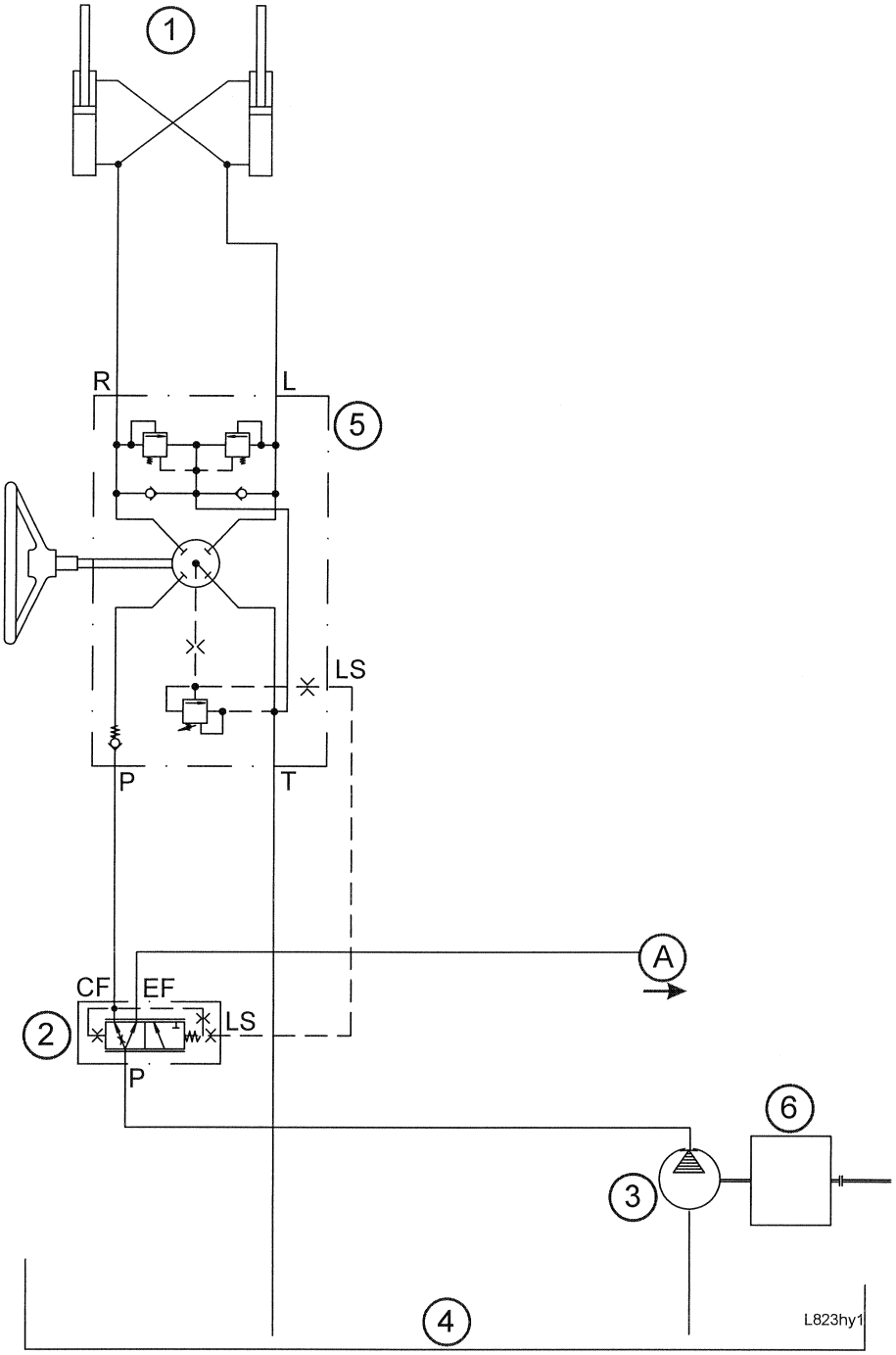
TEREX | SCHAEFF



SCHAEFF	Typ/Model/Type **SKL 823**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.03.01**

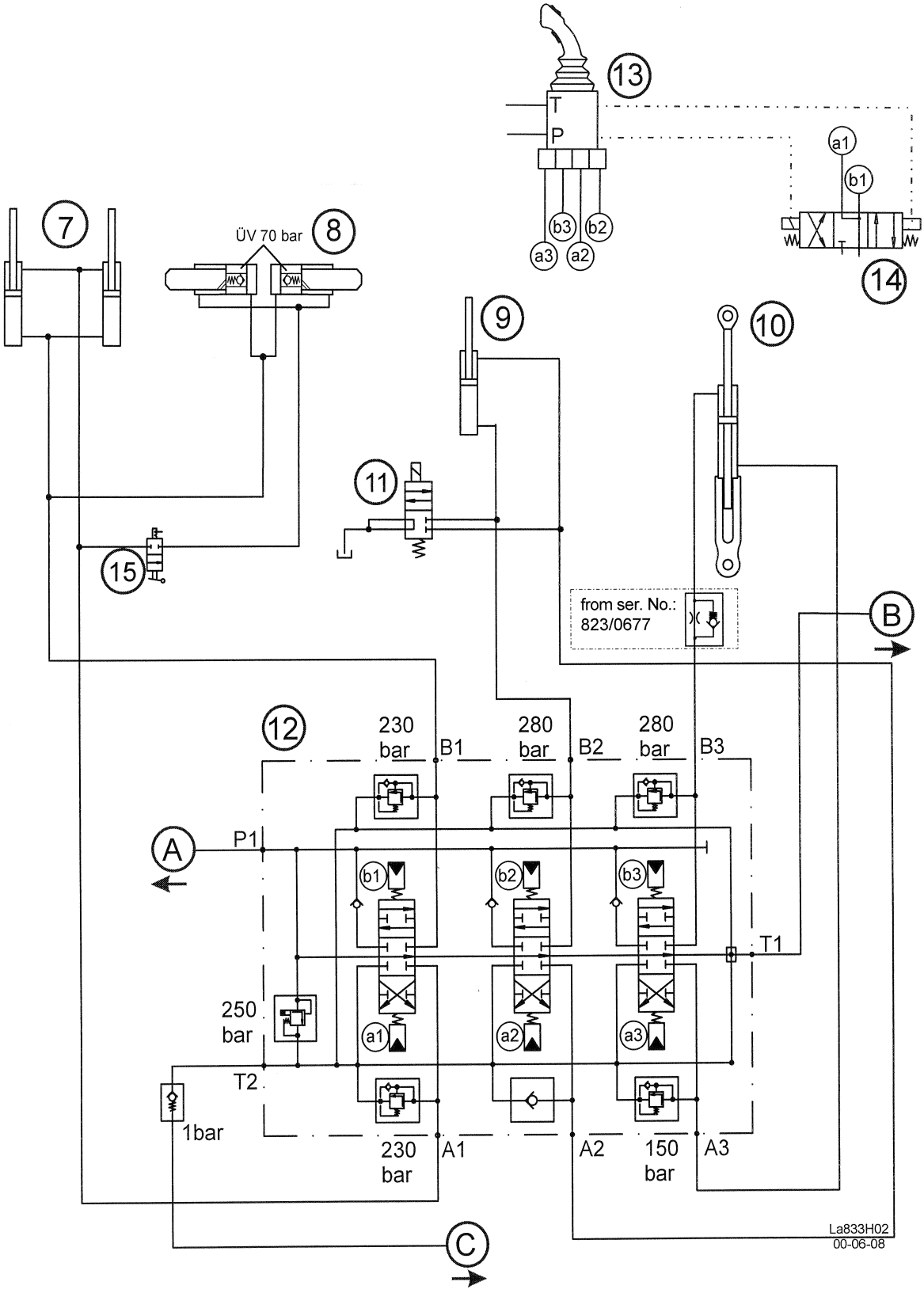
Legend to hydraulic diagram

*Mini-Meßanschluß	gauge port
alle elektrisch betätigten Ventile 12 Volt	all electrically operated valves: 12 V
Arbeitshydraulik-Abschaltventil	working hydraulics cut-off valve
b1/a1 elektrisch betätigt ein-aus	b1/a1 electrically operated ON-OFF
b3/b2/a3/a2 hydraulisch proportional betätigt	b3/b2/a3/a2 hydraulically operated
Belüftungsfilter	ventilation filter
Dieselmotor	diesel engine
elektrisch	electric
Fahrantrieb	transmission
Fahrenmotor	travel motor
Hubzylinder	lift cylinder
Kippzylinder	tilt cylinder
Kugelhahn	ball valve
Lenkeinheit	steering unit
Lenkrad	steering wheel
Lenkzylinder	steering cylinder
Ölkühler	oil cooler
Öltank	oil tank
Öltemperaturregler	oil temperature regulator
Prioritätsventil	priority valve
Rücklauf-Saugfilter	return line suction filter
Schnellwechsel Zylinder	quick-mount hitch cylinder
Schwimmstellung	float position
Speicher	accumulator
3. Steuerkreis	3rd control circuit
Steuerventil	valve bank
Uni-Schaufel Zylinder	multi-purpose bucket cylinder
Vorsteuergerät	pilot-operated valve
Zusatzausrüstung	additonal equipment



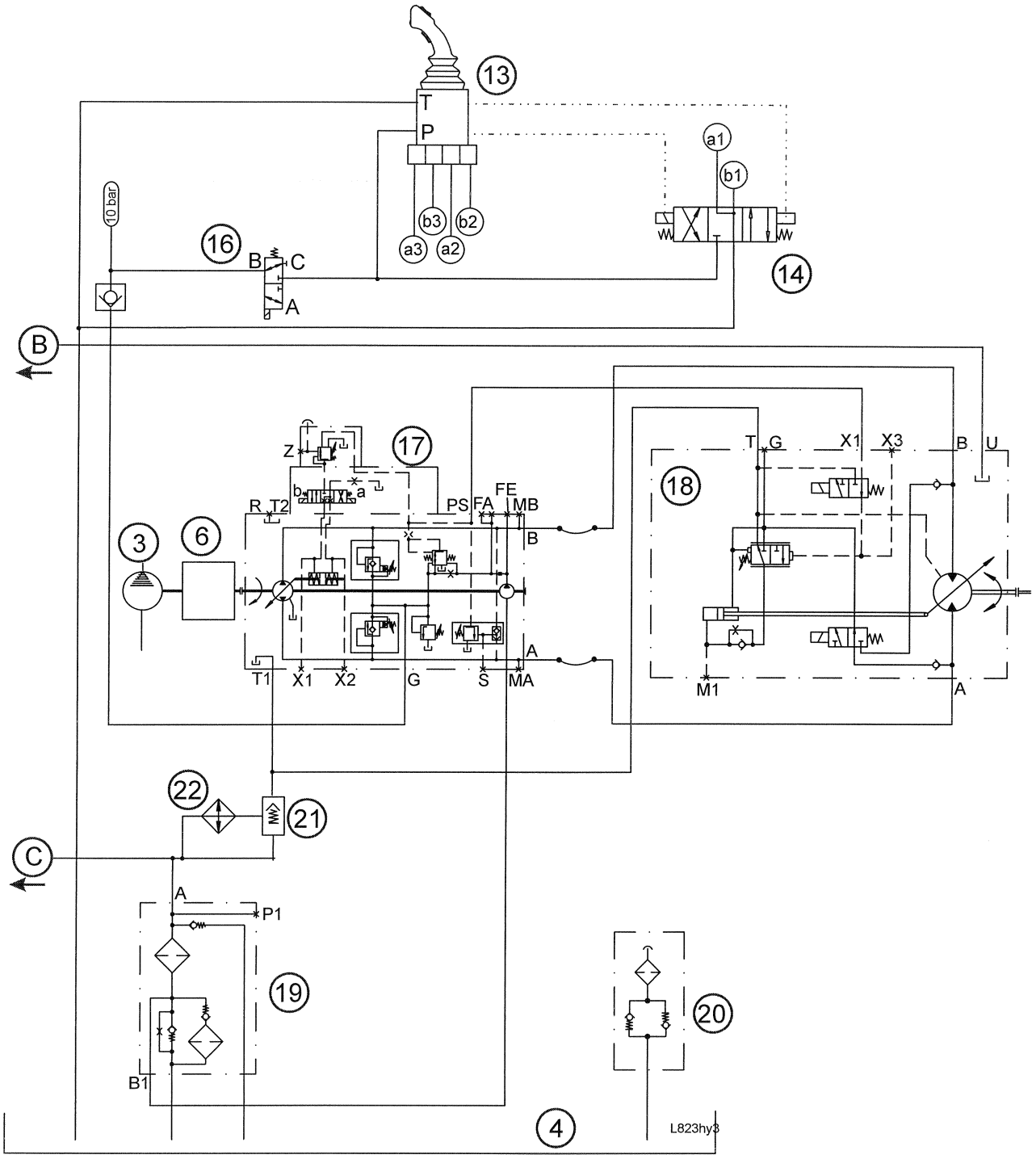
1 Steering cylinder
2 Priority valve
3 Steering/loading pump
4 Hydraulic oil tank
5 Steering unit
6 Diesel engine

SCHAEFF	Typ/Model/Type **SKL 823**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram steering**	Blatt/Page/Feuille **4.03.02**

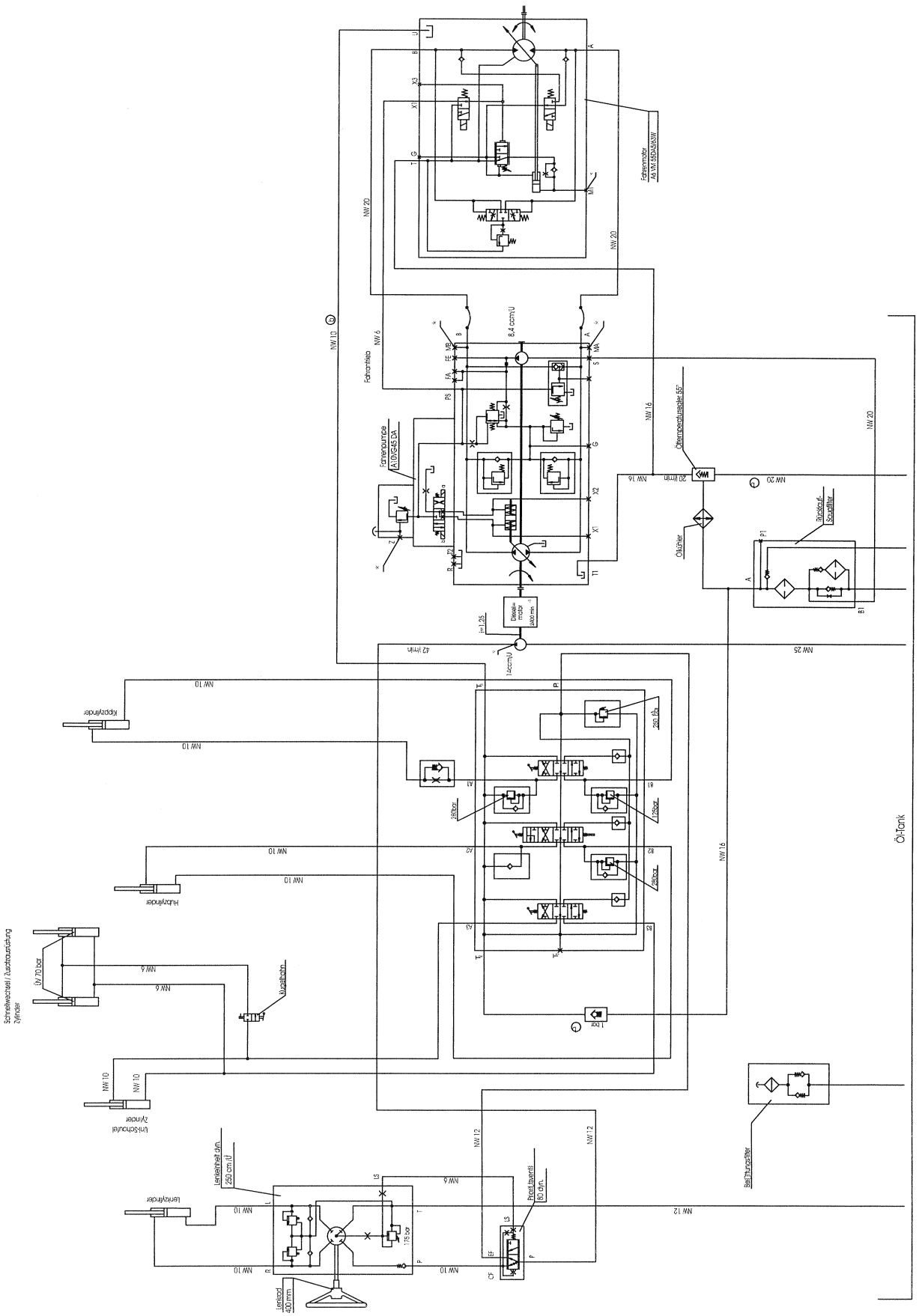


7 Hydr. cylinder - Multi-purpose bucket, etc.
8 Hydr. cylinder - Quick-mount hitch
9 Hydr. cylinder - Lifting frame
10 Hydr. cylinder - Tilt bucket
11 Float position
12 Control valve
13 Joystick
14 Additional control circuit
15 Ball valve

SCHAEFF	Typ/Model/Type: SKL 823	Datum/Edition/Date: 02.2001
	Benennung/Description/Dénomination: Hydraulic diagram, loading system	Blatt/Page/Feuille: 4.03.03



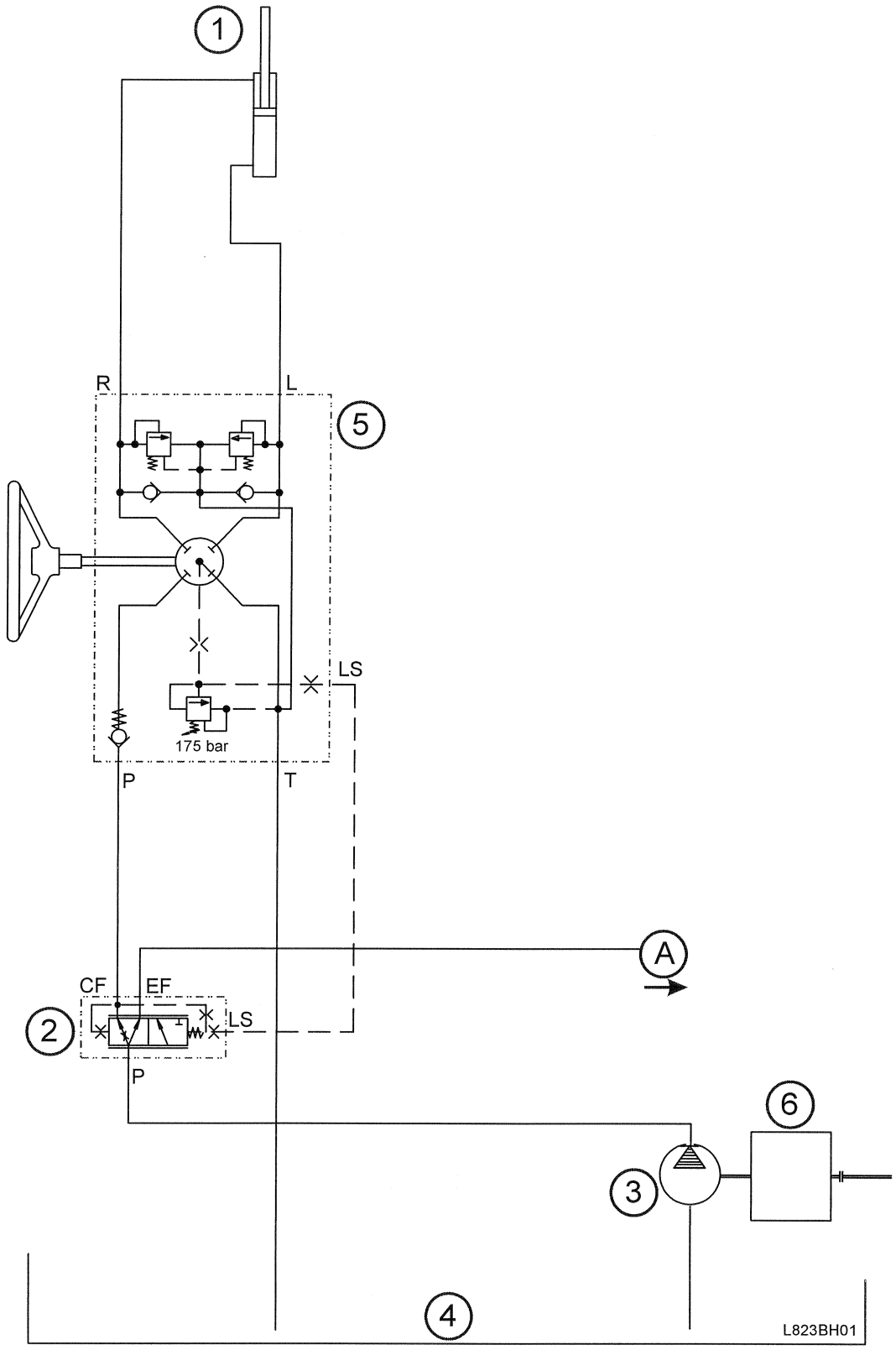
3	Steering/loading pump	17	Travel pump
4	Hydraulic oil tank	18	Travel motor
6	Diesel engine	19	Hydraulic oil combined filter
13	Joystick	20	Ventilation filter
14	Additional control circuit valve	21	Hydraulic oil temperature regulator
16	Cut-off valve - working hydraulics	22	Hydraulic oil cooler



SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	SKL 823 Basic	**02.2001**
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram	**4.04.01**

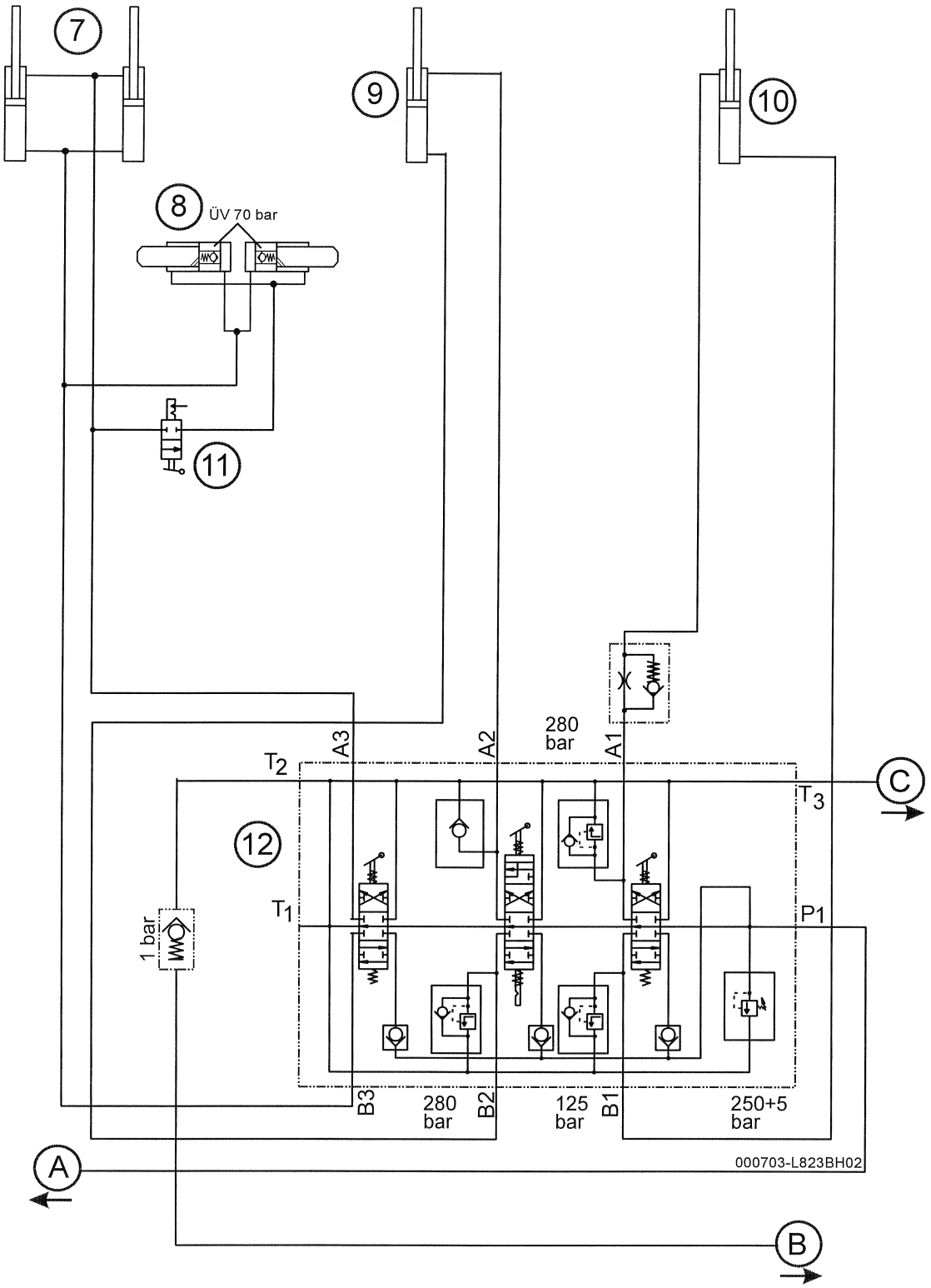
Legend to hydraulic diagram

*Mini-Meßanschluß	gauge port
alle elektrisch betätigten Ventile 12 Volt	all electrically operated valves: 12 V
Arbeitshydraulik-Abschaltventil	working hydraulics cut-off valve
b1/a1 elektrisch betätigt ein-aus	b1/a1 electrically operated ON-OFF
b3/b2/a3/a2 hydraulisch proportional betätigt	b3/b2/a3/a2 hydraulically operated
Belüftungsfilter	ventilation filter
Dieselmotor	diesel engine
elektrisch	electric
Fahrantrieb	transmission
Fahrenmotor	travel motor
Hubzylinder	lift cylinder
Kippzylinder	tilt cylinder
Kugelhahn	ball valve
Lenkeinheit	steering unit
Lenkrad	steering wheel
Lenkzylinder	steering cylinder
Ölkühler	oil cooler
Öltank	oil tank
Öltemperaturregler	oil temperature regulator
Prioritätsventil	priority valve
Rücklauf-Saugfilter	return line suction filter
Schnellwechsel Zylinder	quick-mount hitch cylinder
Schwimmstellung	float position
Speicher	accumulator
3. Steuerkreis	3rd control circuit
Steuerventil	valve bank
Uni-Schaufel Zylinder	multi-purpose bucket cylinder
Vorsteuergerät	pilot-operated valve
Zusatzausrüstung	additonal equipment



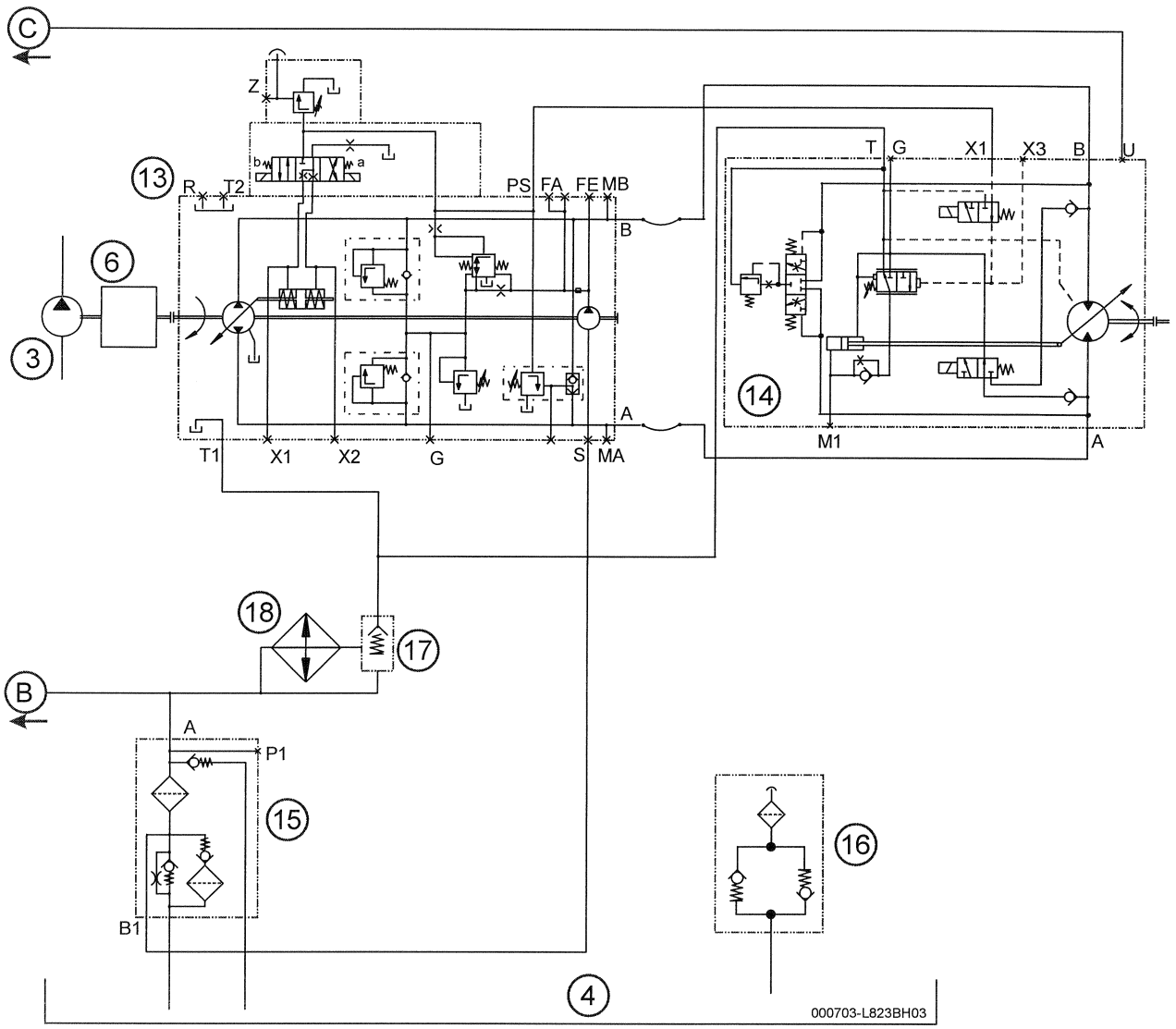
1	Steering cylinder	4	Hydraulic oil tank
2	Priority valve	5	Steering unit
3	Steering/loading pump	6	Diesel engine

SCHAEFF	Typ/Model/Type **SKL 823 Basic**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram steering**	Blatt/Page/Feuille **4.04.02**

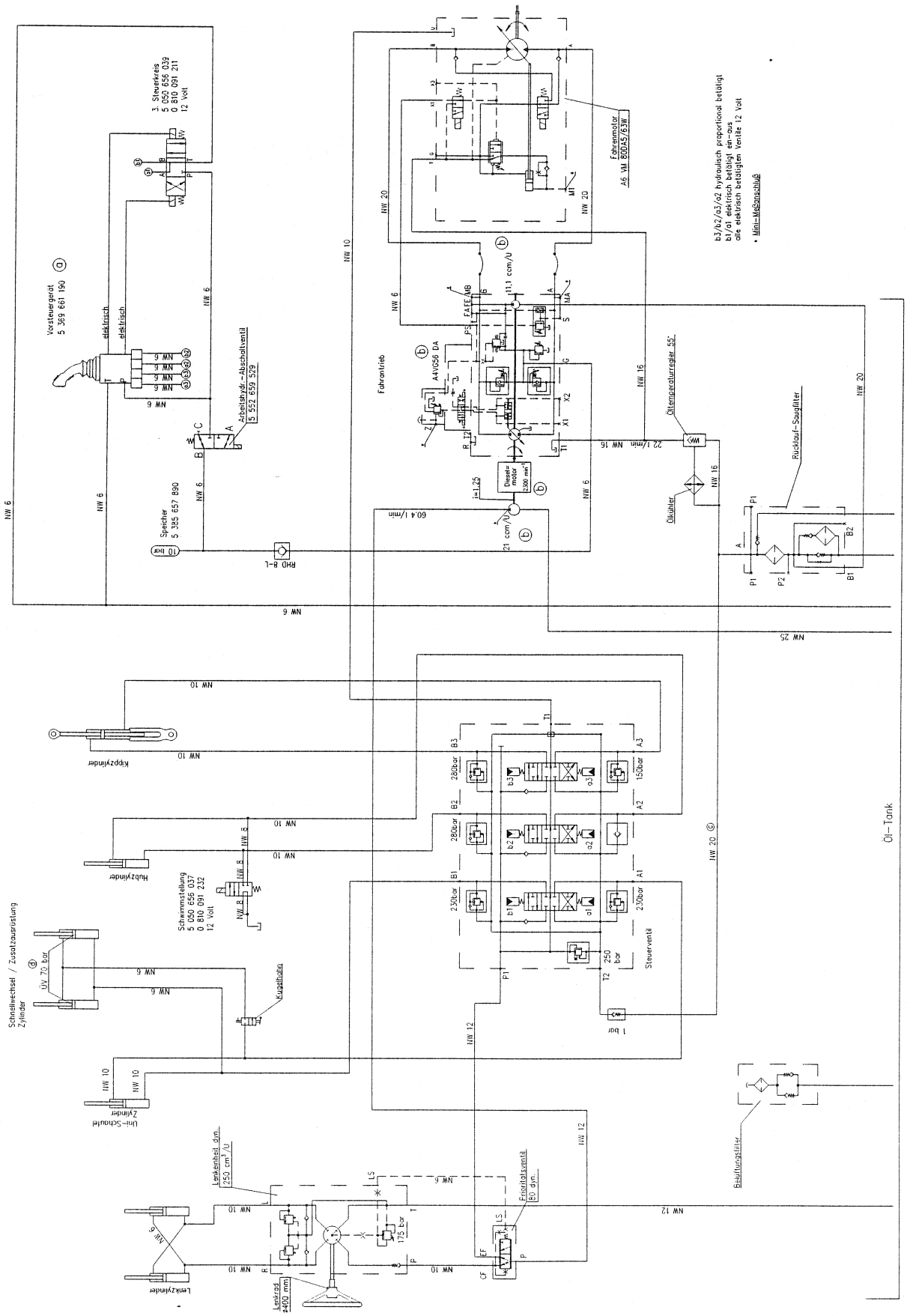


7	Hydr. cylinder - Multi-purpose bucket, etc.	10	Hydr. cylinder - Tilt bucket
8	Hydr. cylinder - Quick-mount hitch	11	Ball valve
9	Hydr. cylinder - Lifting frame	12	Control valve

SCHAEFF	Typ/Model/Type **SKL 823 Basic**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram, loading system**	Blatt/Page/Feuille **4.04.03**



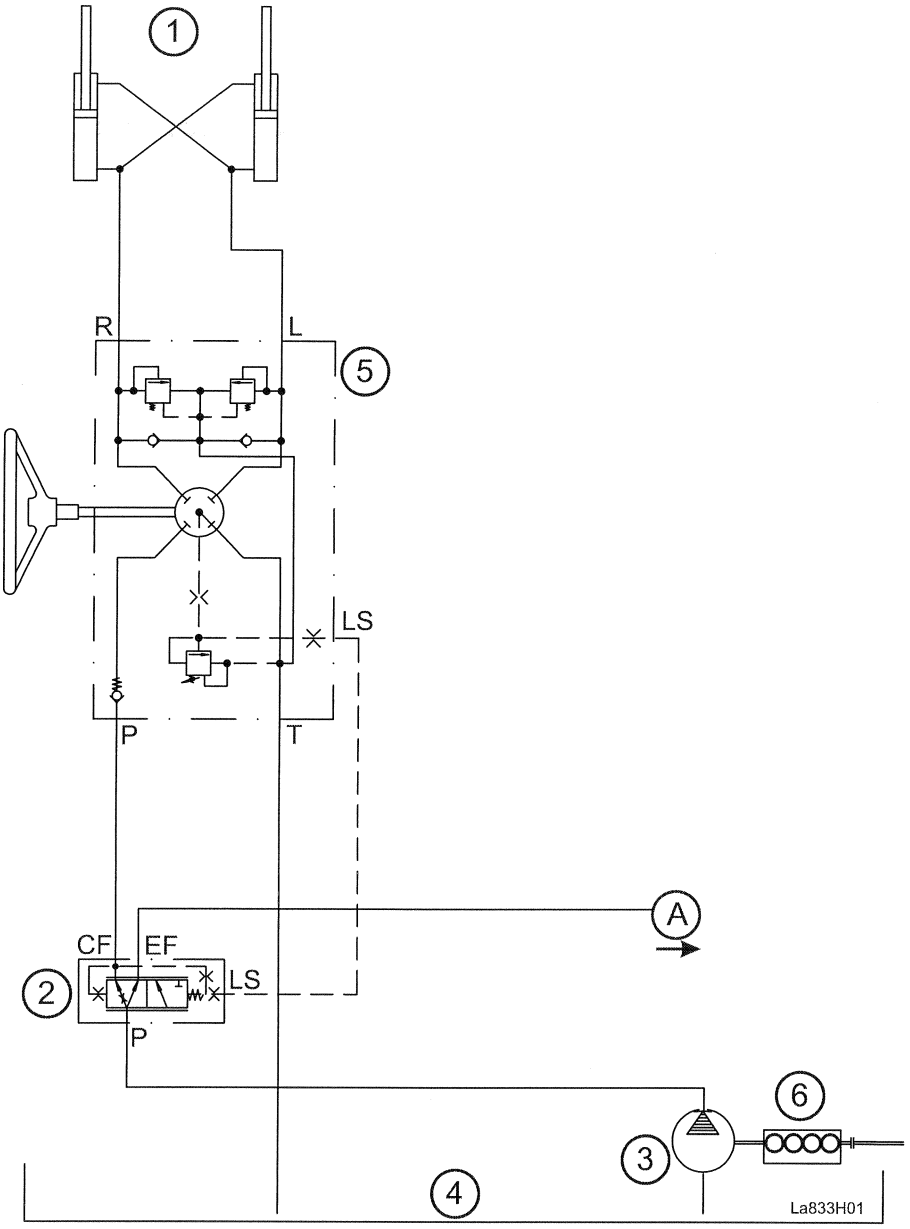
3	Steering/loading pump	15	Hydraulic oil combined filter
4	Hydraulic oil tank	16	Ventilation filter
6	Diesel engine	17	Hydraulic oil temperature regulator
13	Travel pump	18	Hydraulic oil cooler
14	Travel motor		



SCHAEFF	Typ/Model/Type **SKL 833**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.05.01**

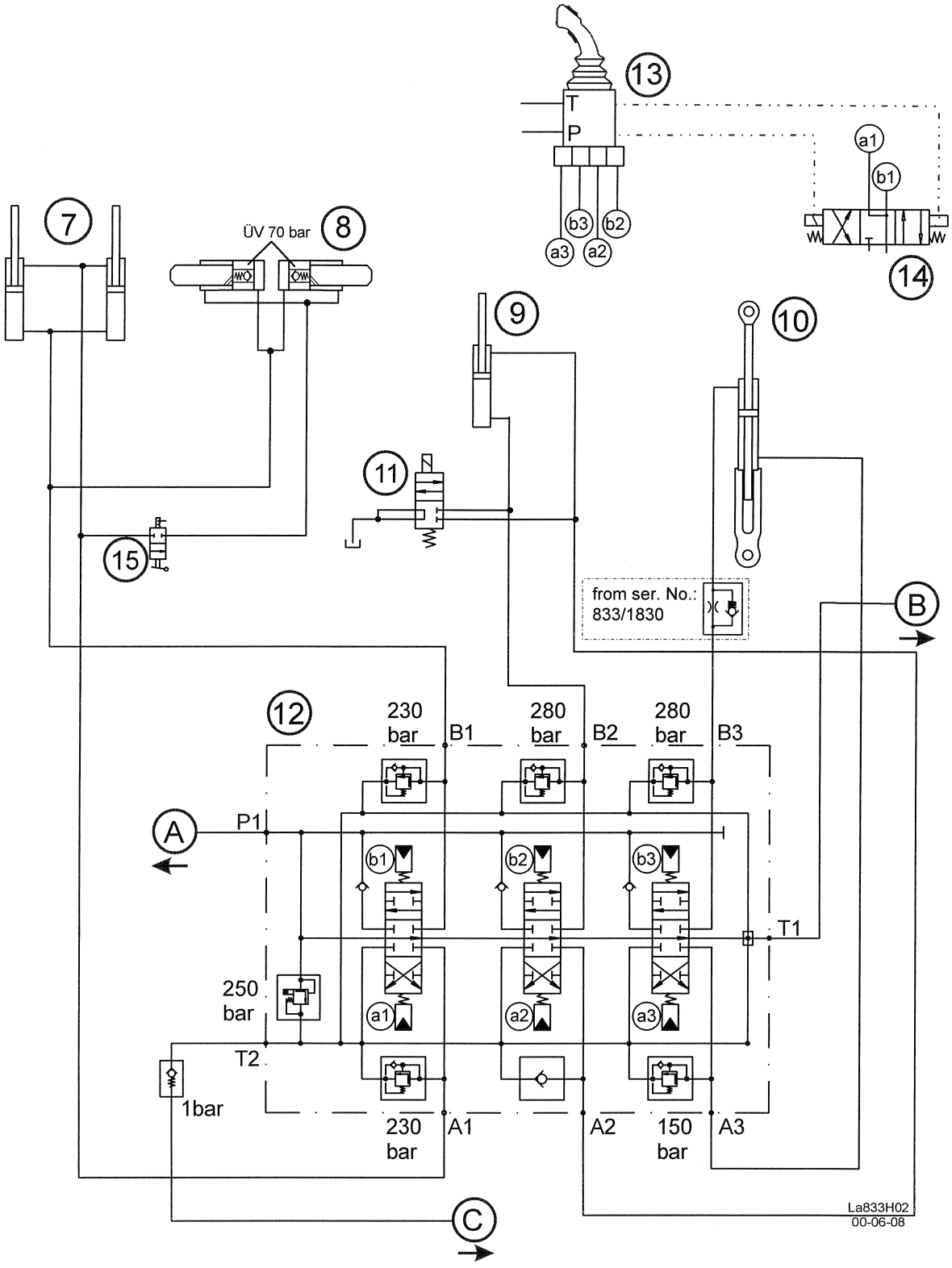
Legend to hydraulic diagram

*Mini-Meßanschluß	gauge port
alle elektrisch betätigten Ventile 12 Volt	all electrically operated valves: 12 V
Arbeitshydraulik-Abschaltventil	working hydraulics cut-off valve
b1/a1 elektrisch betätigt ein-aus	b1/a1 electrically operated ON-OFF
b3/b2/a3/a2 hydraulisch proportional betätigt	b3/b2/a3/a2 hydraulically operated
Belüftungsfilter	ventilation filter
Dieselmotor	diesel engine
elektrisch	electric
Fahrantrieb	transmission
Fahrenmotor	travel motor
Hubzylinder	lift cylinder
Kippzylinder	tilt cylinder
Kugelhahn	ball valve
Lenkeinheit	steering unit
Lenkrad	steering wheel
Lenkzylinder	steering cylinder
Ölkühler	oil cooler
Öltank	oil tank
Öltemperaturregler	oil temperature regulator
Prioritätsventil	priority valve
Rücklauf-Saugfilter	return line suction filter
Schnellwechsel Zylinder	quick-mount hitch cylinder
Schwimmstellung	float position
Speicher	accumulator
3. Steuerkreis	3rd control circuit
Steuerventil	valve bank
Uni-Schaufel Zylinder	multi-purpose bucket cylinder
Vorsteuergerät	pilot-operated valve
Zusatzausrüstung	additonal equipment



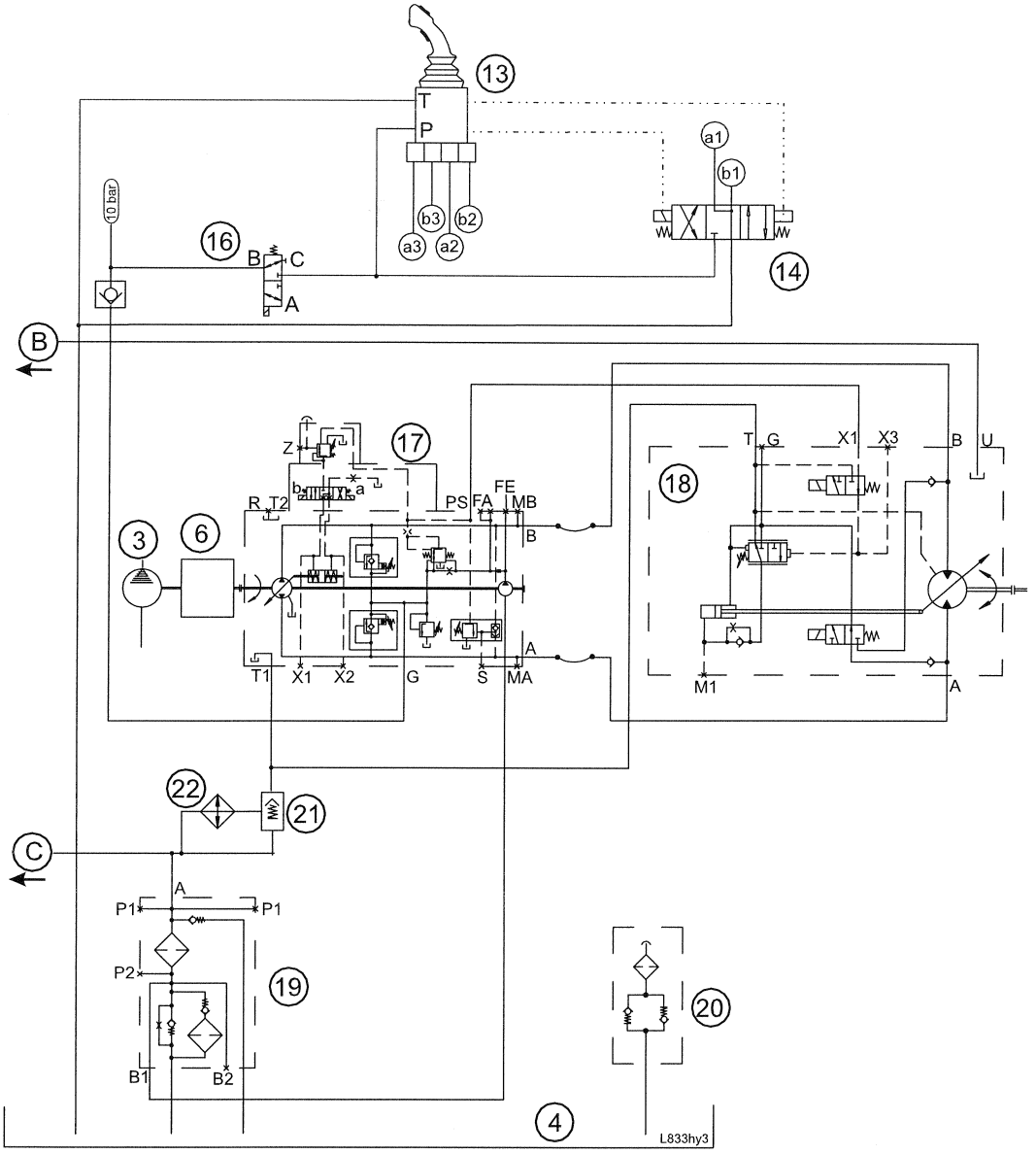
1 Steering cylinder
2 Priority valve
3 Steering/loading pump
4 Hydraulic oil tank
5 Steering unit
6 Diesel engine

SCHAEFF	Typ/Model/Type **SKL 833**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, steering**	Blatt/Page/Feuille **4.05.02**



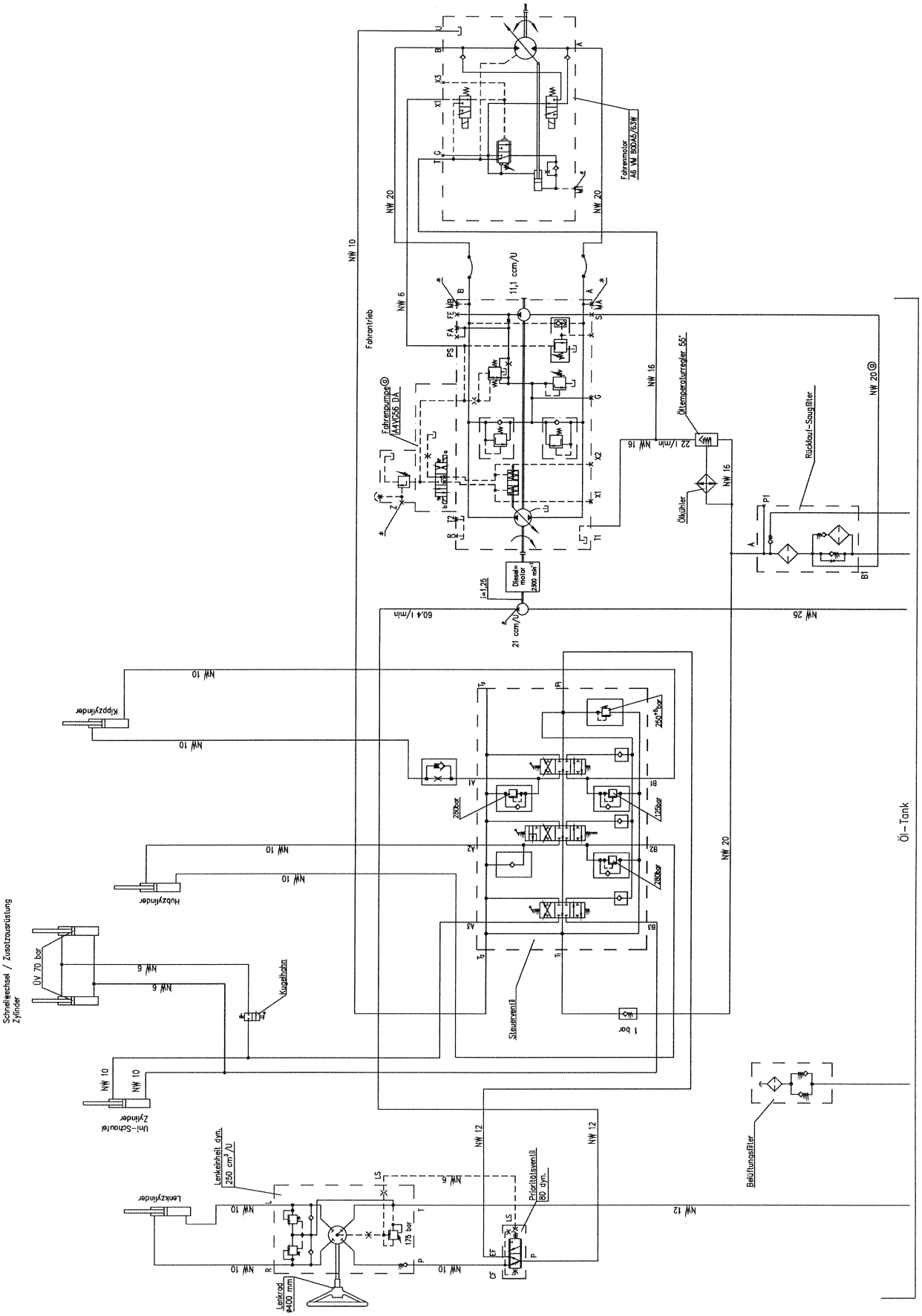
7 Hydr. cylinder - Multi-purpose bucket, etc.
8 Hydr. cylinder - Quick-mount hitch
9 Hydr. cylinder - Lifting frame
10 Hydr. cylinder - Tilt bucket
11 Float position
12 Control valve
13 Joystick
14 Additional control circuit
15 Ball valve

SCHAEFF	Typ/Model/Type **SKL 833**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram, loading system parallel kinematics**	Blatt/Page/Feuille **4.05.03**



3	Steering/loading pump
4	Hydraulic oil tank
6	Diesel engine
13	Joystick
14	Additional control circuit
16	Shut-off valve working hydr.
17	Travel pump
18	Travel motor
19	Hydraulic oil combined filter
20	Ventilation filter
21	Hydraulic oil temperature regulator
22	Hydraulic oil cooler

SCHAEFF	Typ/Model/Type **SKL 833**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, transmission - pilot control**	Blatt/Page/Feuille **4.05.04**

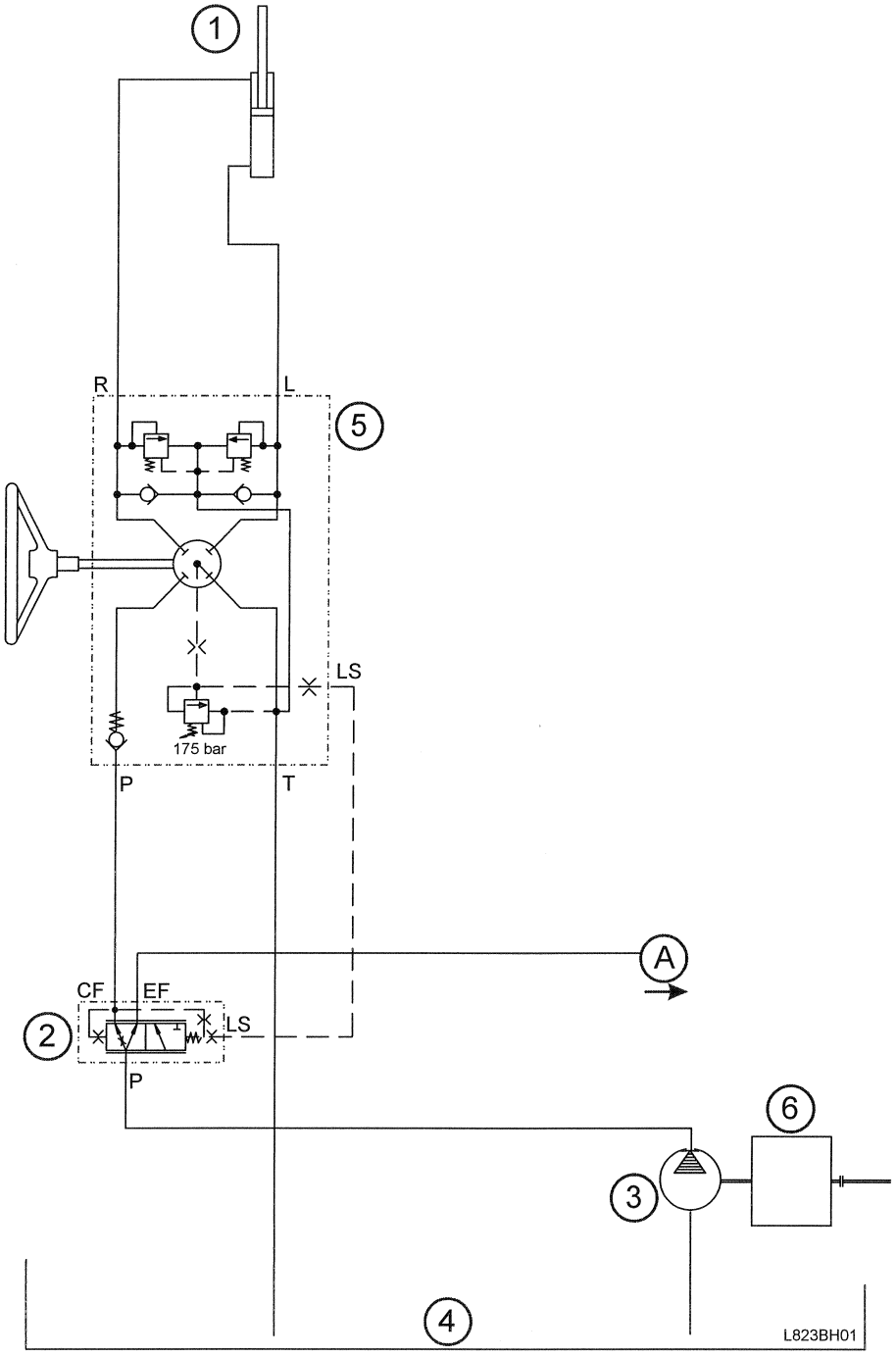


SCHAEFF	Typ/Model/Type **SKL 833 Basic**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.06.01**

Legend to hydraulic diagram

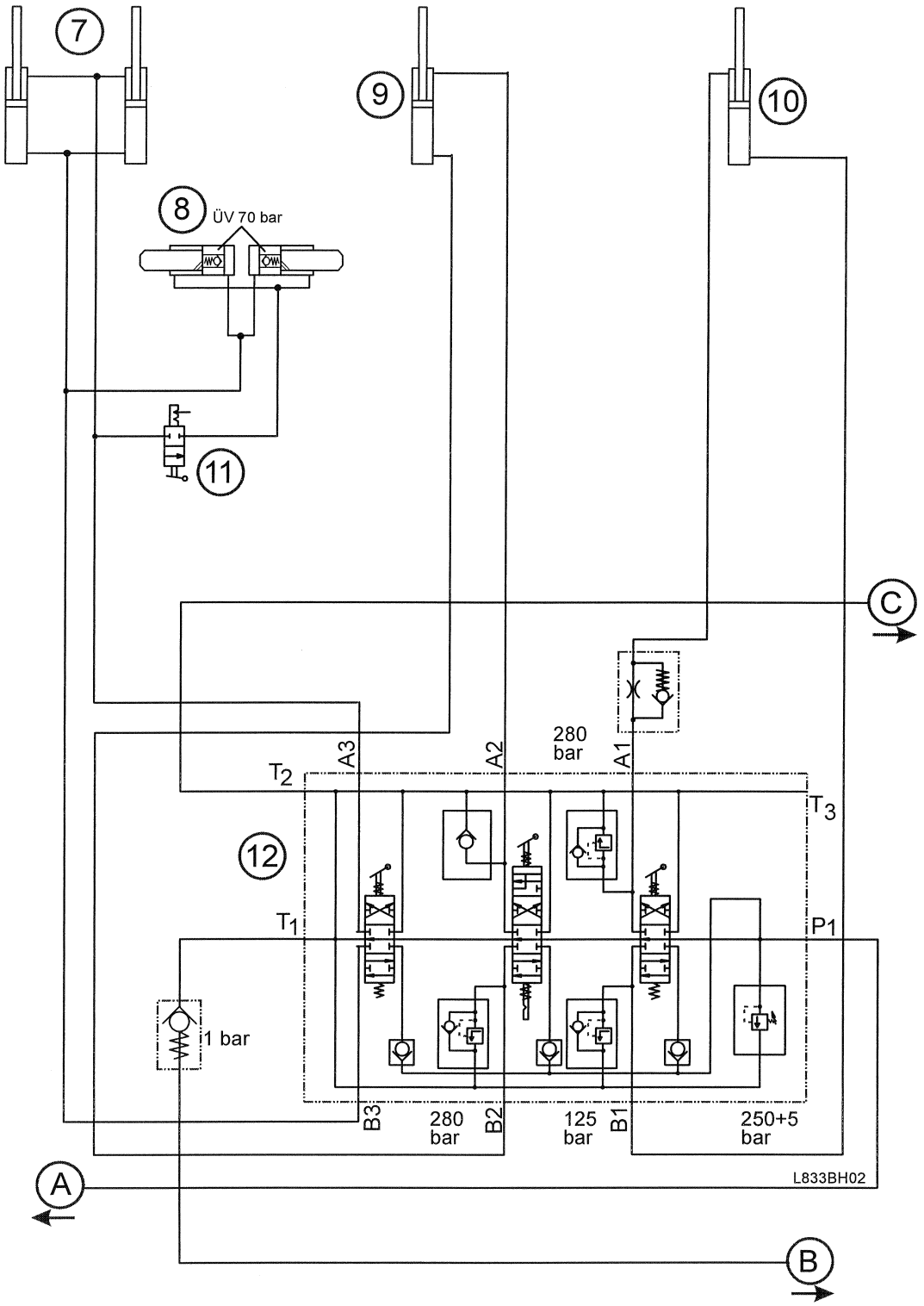
*Mini-Meßanschluß	gauge port
alle elektrisch betätigten Ventile 12 Volt	all electrically operated valves: 12 V
Arbeitshydraulik-Abschaltventil	working hydraulics cut-off valve
b1/a1 elektrisch betätigt ein-aus	b1/a1 electrically operated ON-OFF
b3/b2/a3/a2 hydraulisch proportional betätigt	b3/b2/a3/a2 hydraulically operated
Belüftungsfilter	ventilation filter
Dieselmotor	diesel engine
elektrisch	electric
Fahrantrieb	transmission
Fahrenmotor	travel motor
Hubzylinder	lift cylinder
Kippzylinder	tilt cylinder
Kugelhahn	ball valve
Lenkeinheit	steering unit
Lenkrad	steering wheel
Lenkzylinder	steering cylinder
Ölkühler	oil cooler
Öltank	oil tank
Öltemperaturregler	oil temperature regulator
Prioritätsventil	priority valve
Rücklauf-Saugfilter	return line suction filter
Schnellwechsel Zylinder	quick-mount hitch cylinder
Schwimmstellung	float position
Speicher	accumulator
3. Steuerkreis	3rd control circuit
Steuerventil	valve bank
Uni-Schaufel Zylinder	multi-purpose bucket cylinder
Vorsteuergerät	pilot-operated valve
Zusatzausrüstung	additonal equipment

Steering



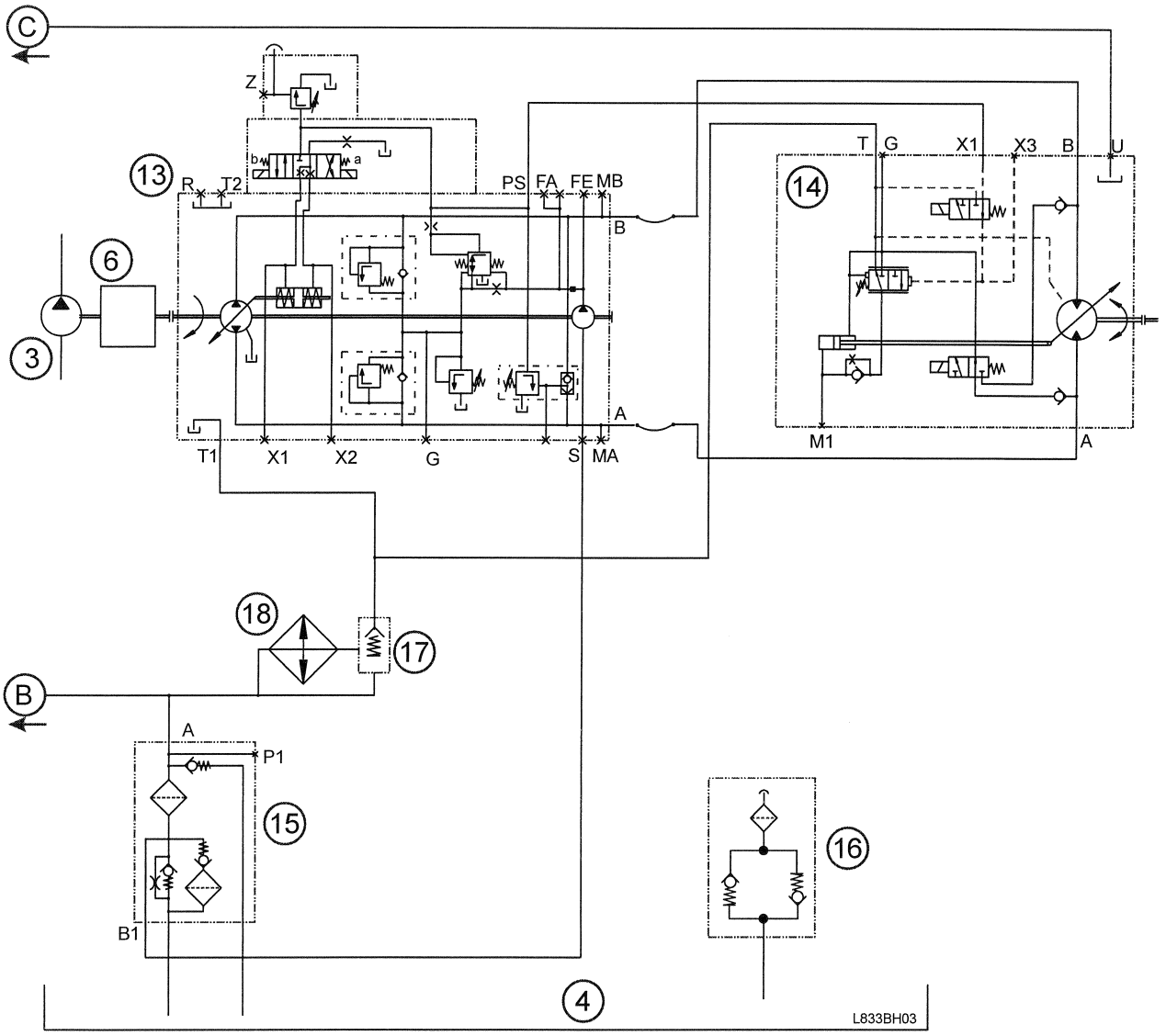
1	Steering cylinder	4	Hydraulic oil tank
2	Priority valve	5	Steering unit
3	Steering/loading pump	6	Diesel engine

Loading system

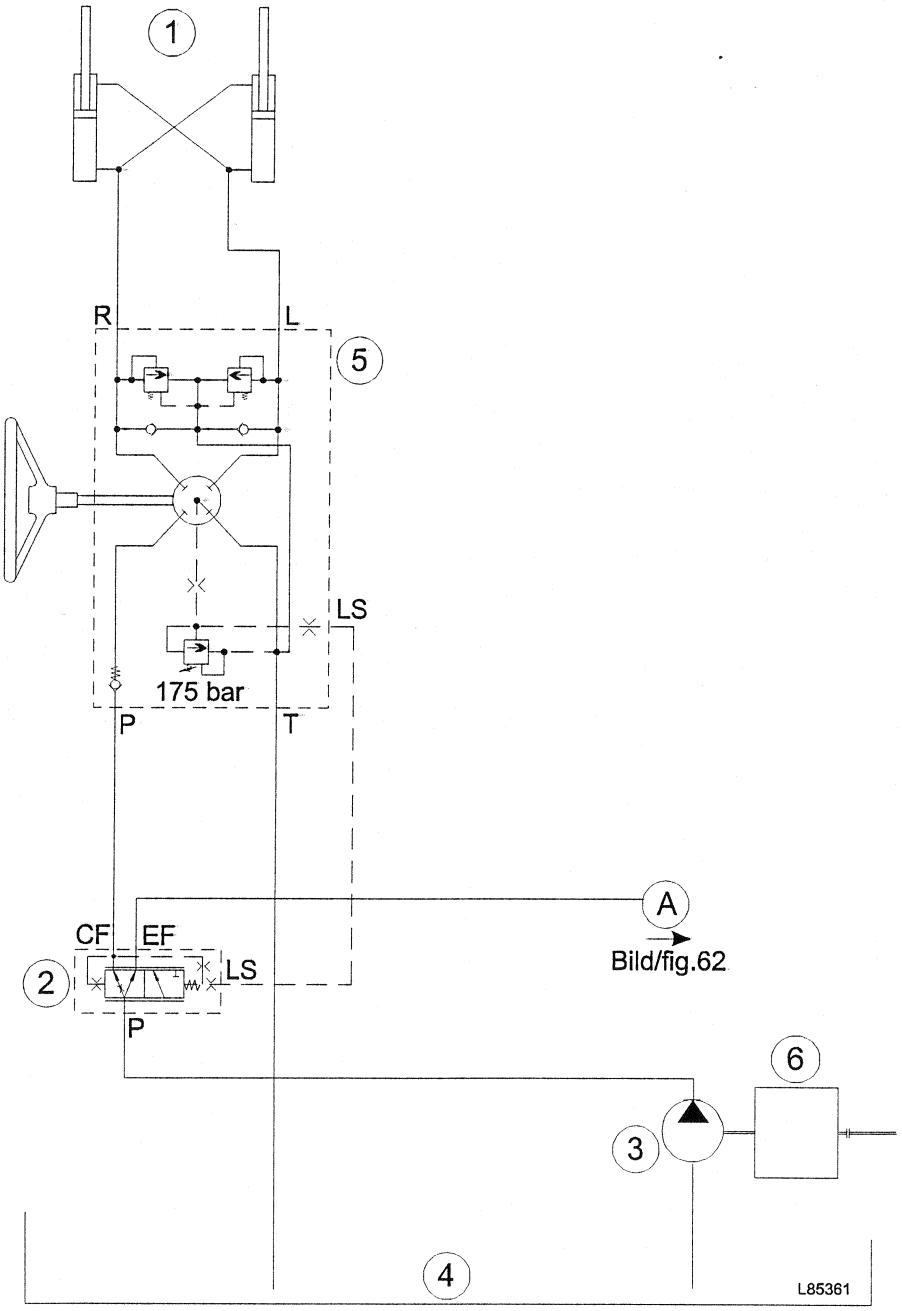


7	Hydr. cylinder - Multi-purpose bucket, etc.	10	Hydr. cylinder - Tilt bucket
8	Hydr. cylinder - Quick-mount hitch	11	Ball valve
9	Hydr. cylinder - Lifting frame	12	Control valve

Transmission

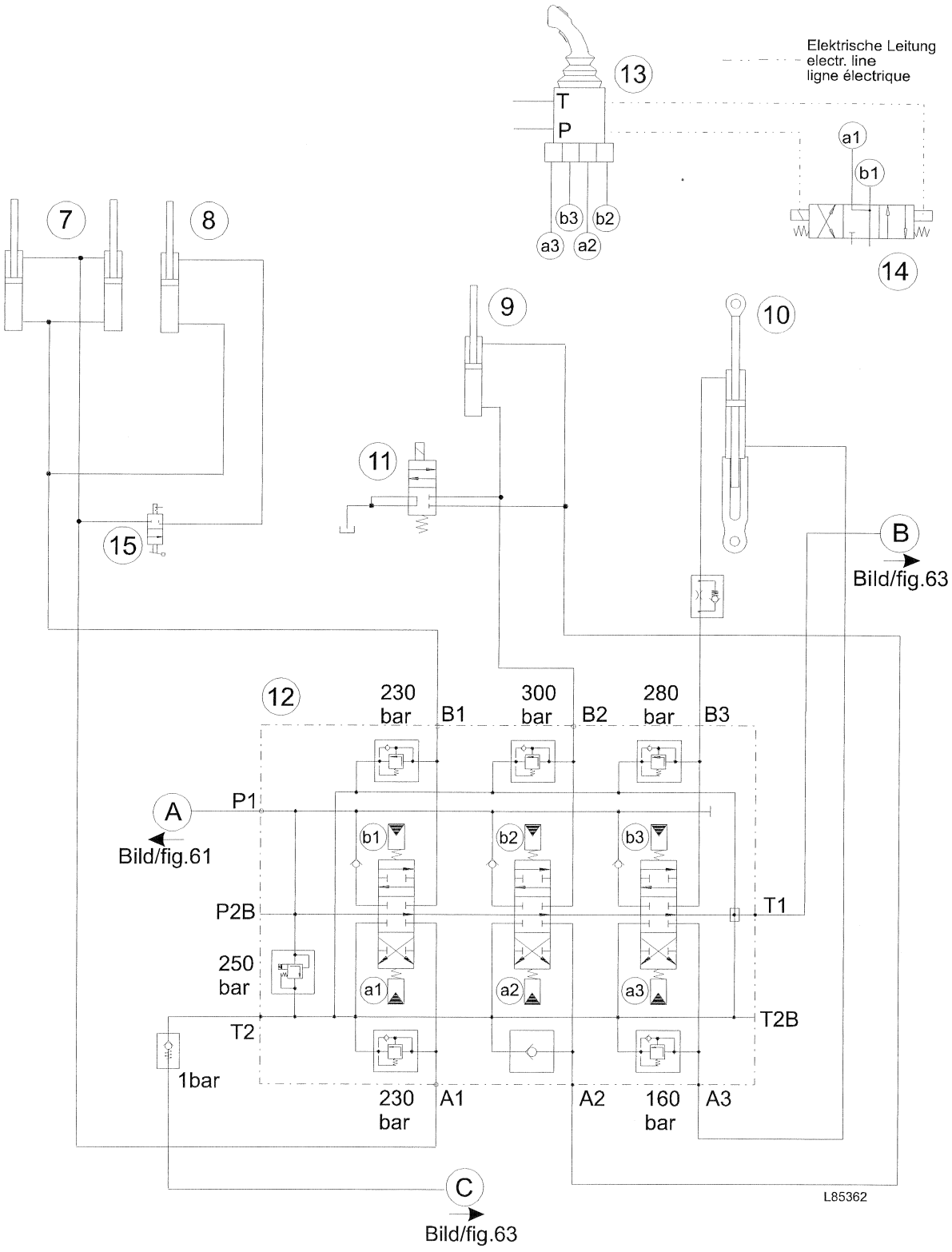


3	Steering/loading pump	15	Hydraulic oil combined filter
4	Hydraulic oil tank	16	Ventilation filter
6	Diesel engine	17	Hydraulic oil temperature regulator
13	Travel pump	18	Hydraulic oil cooler
14	Travel motor		



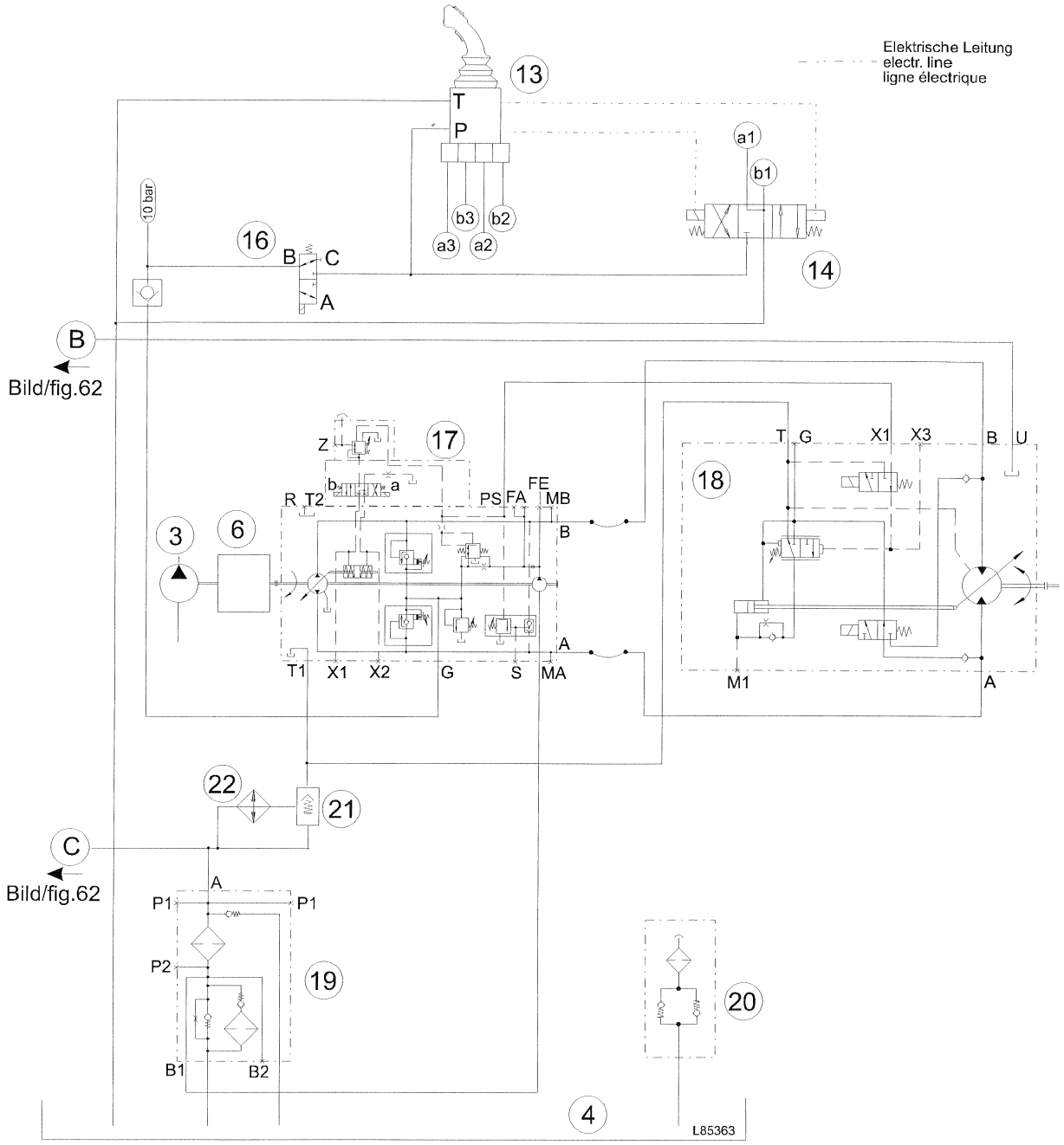
1 Steering cylinder
2 Priority valve
3 Steering/loading pump
4 Hydraulic oil tank
5 Steering unit
6 Diesel engine

SCHAEFF	Typ/Model/Type **SKL 843 (from serial no. 843/0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, steering**	Blatt/Page/Feuille **4.07.01**

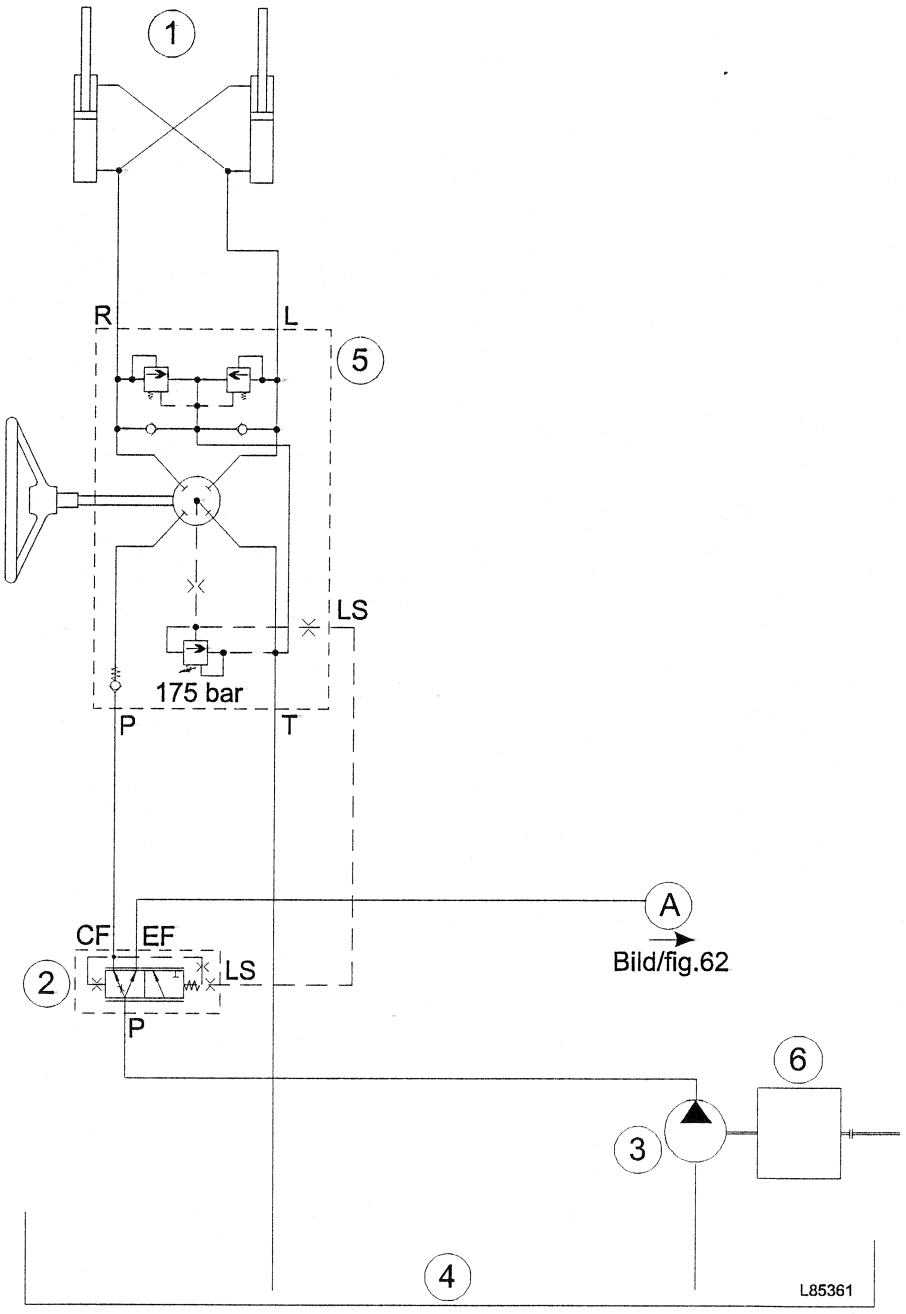


7	Hydr. cylinder - Multi-purpose bucket, etc.	12	Control valve
8	Hydr. cylinder - Quick-mount hitch	13	Joystick
9	Hydr. cylinder - Lifting frame	14	Additional control circuit valve
10	Hydr. cylinder - Tilt bucket	15	Ball valve
11	Float position		

SCHAEFF	Typ/Model/Type **SKL 843 (from serial no. 843/0100)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram, working**	Blatt/Page/Feuille **4.07.02**

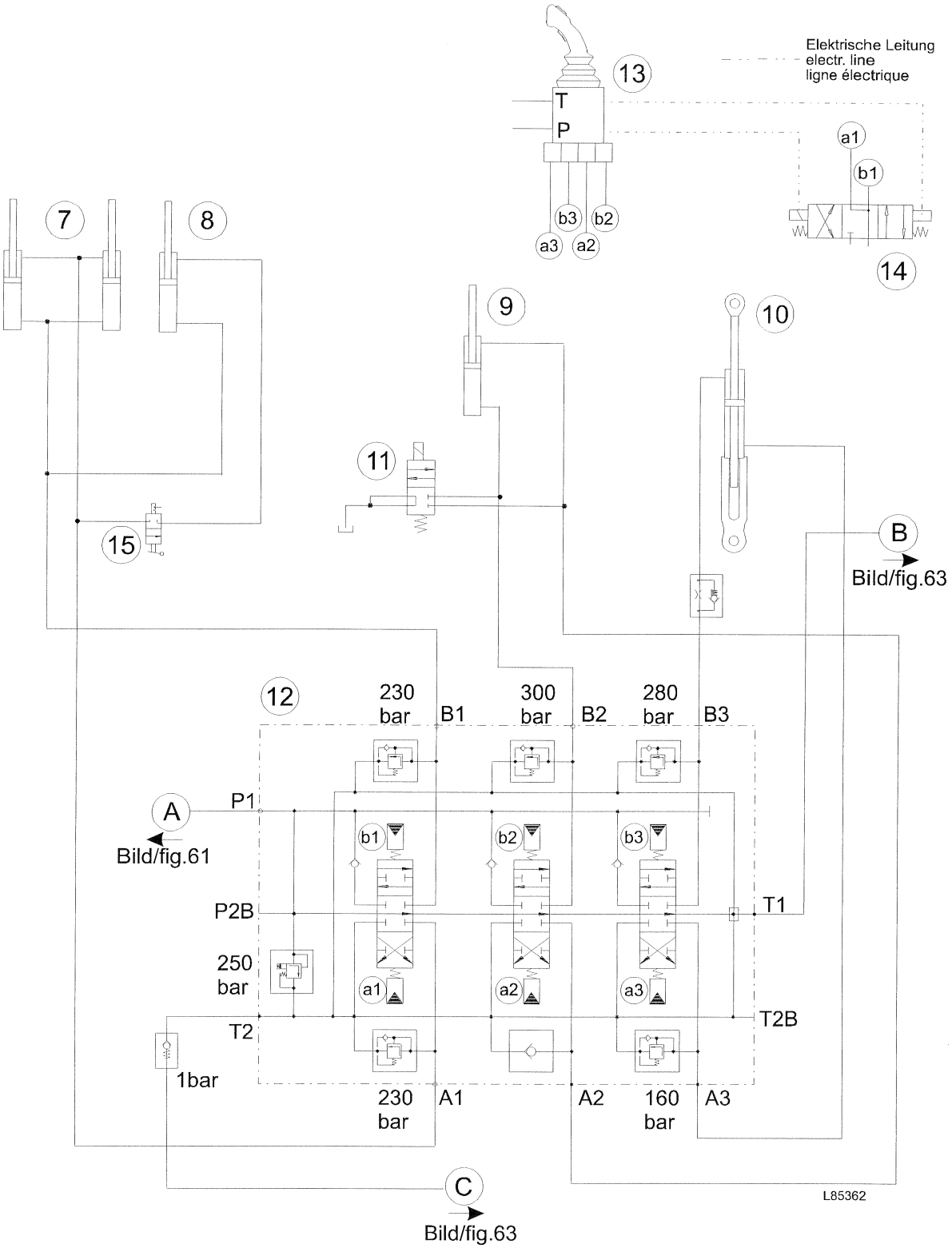


3	Steering/loading pump	17	Travel pump
4	Hydraulic oil tank	18	Travel motor
6	Diesel engine	19	Hydraulic oil combined filter
13	Joystick	20	Ventilation filter
14	Additional control circuit valve	21	Hydraulic oil temp. regulator
16	Cut-off valve - working hydraulics	22	Hydraulic oil cooler



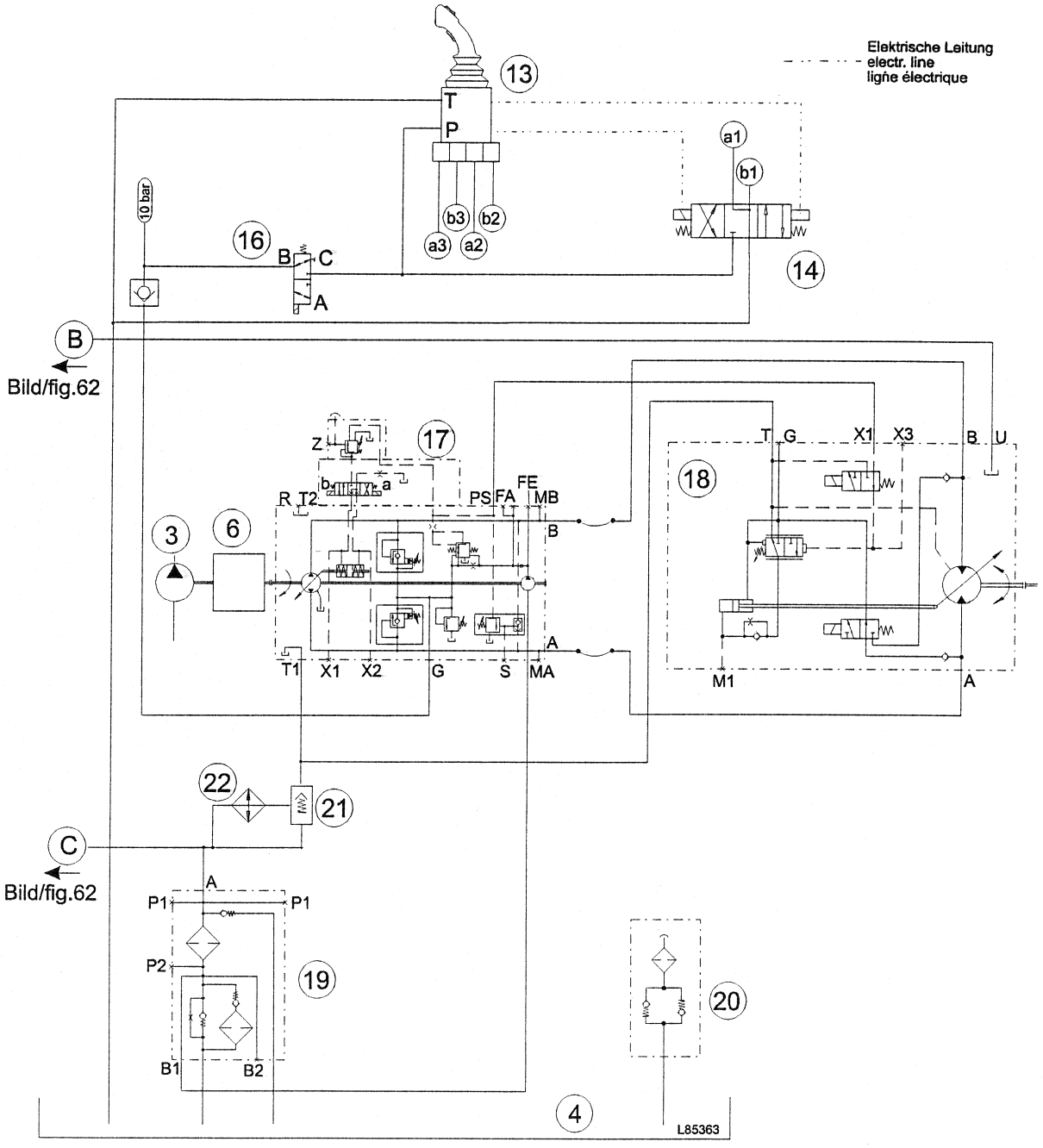
1 Steering cylinder
2 Priority valve
3 Steering/loading pump
4 Hydraulic oil tank
5 Steering unit
6 Diesel engine

SCHAEFF	Typ/Model/Type **SKL 853 (from serial no. 853/0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, steering**	Blatt/Page/Feuille **4.09.01**



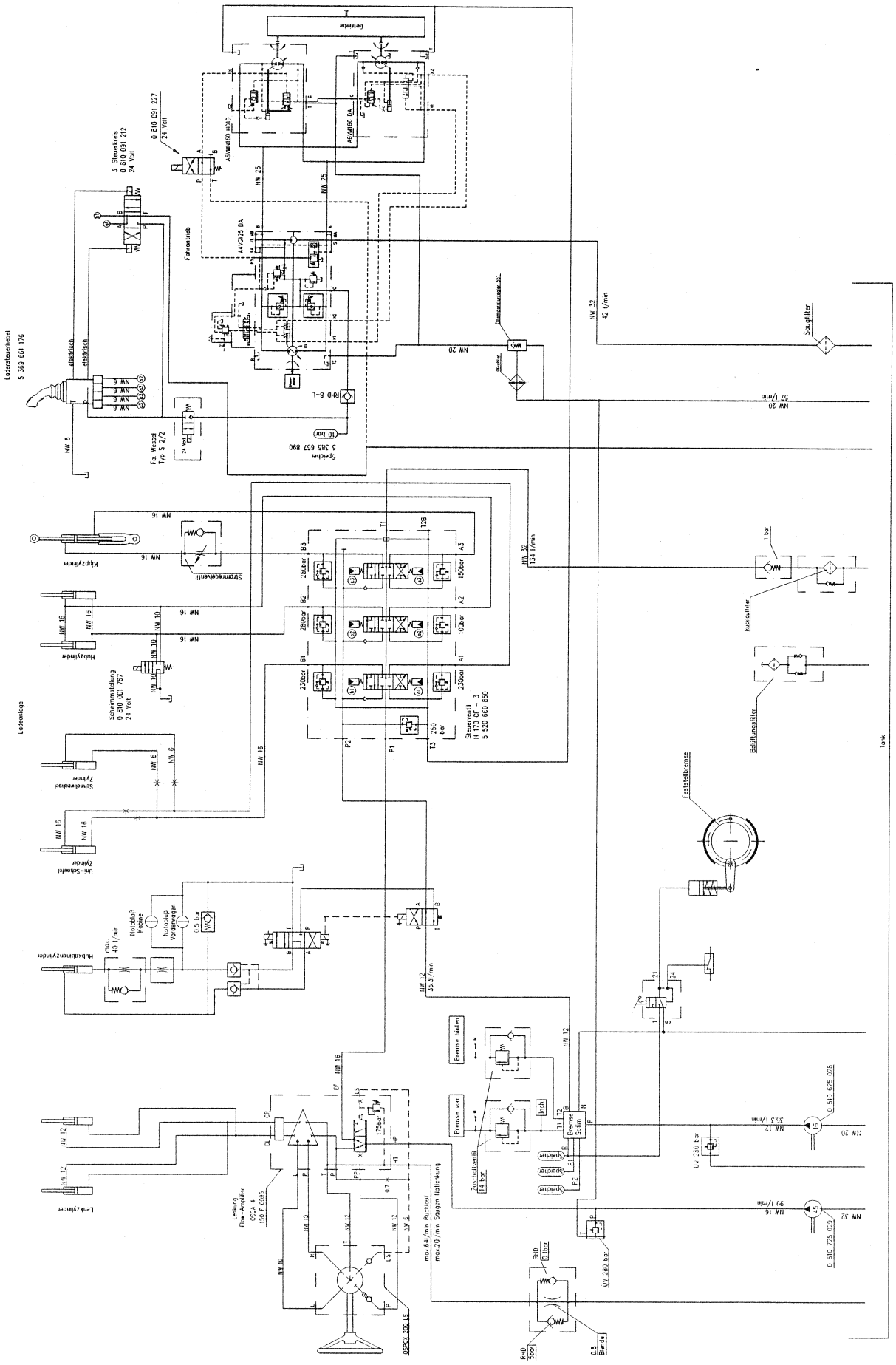
7	Hydr. cylinder - Multi-purpose bucket, etc.
8	Hydr. cylinder - Quick-mount hitch
9	Hydr. cylinder - Lifting frame
10	Hydr. cylinder - Tilt bucket
11	Float position
12	Control valve
13	Joystick
14	Additional control circuit valve
15	Ball valve

SCHAEFF	Typ/Model/Type **SKL 853 (from serial no. 853/0100)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram, working**	Blatt/Page/Feuille **4.09.02**



3	Steering/loading pump	17	Travel pump
4	Hydraulic oil tank	18	Travel motor
6	Diesel engine	19	Hydraulic oil combined filter
13	Joystick	20	Ventilation filter
14	Additional control circuit	21	Hydraulic oil temp. regulator
16	Shut-off valve working hydraulics	22	Hydraulic oil cooler

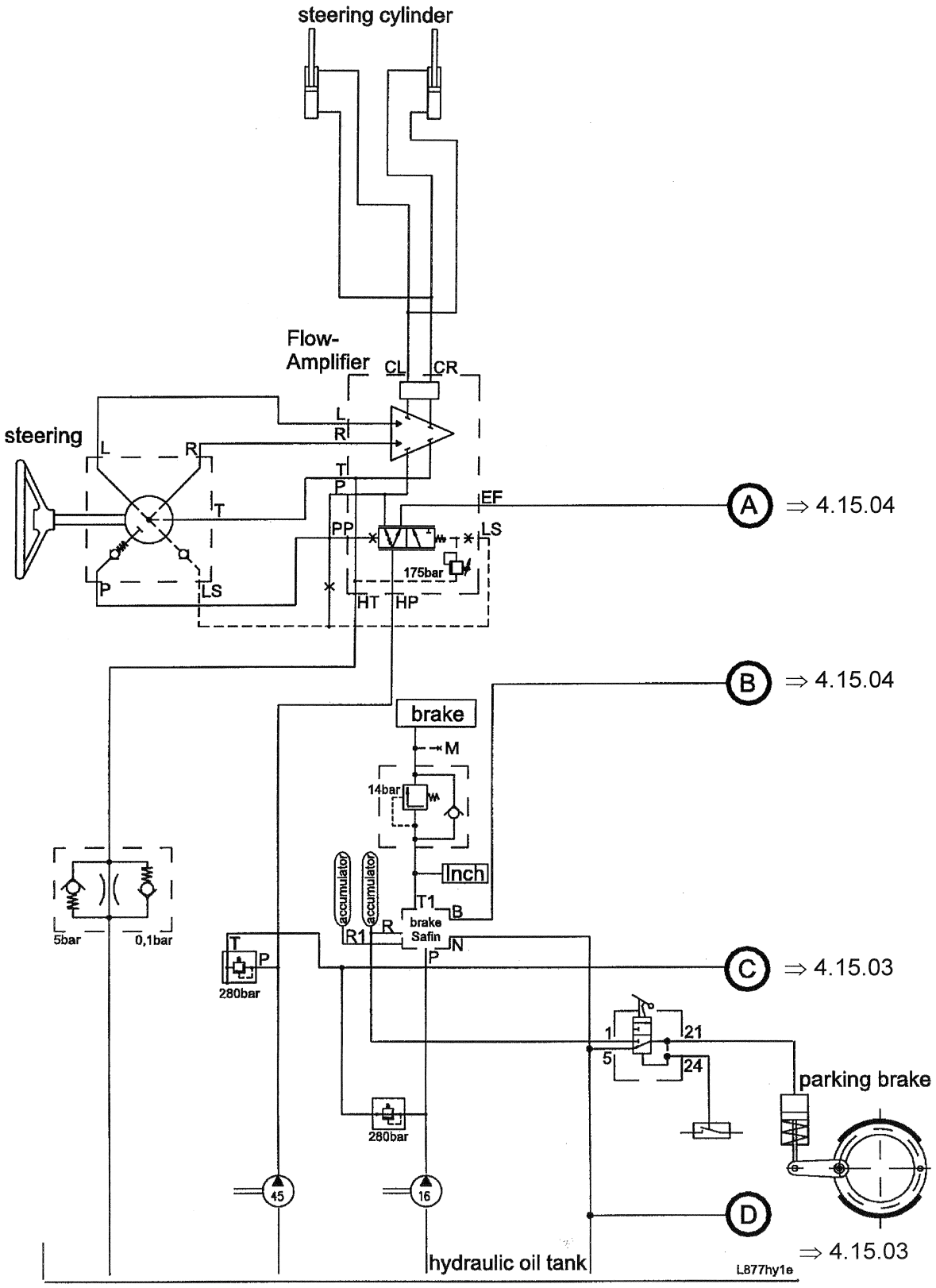
SCHAEFF	Typ/Model/Type **SKL 853 (from serial no. 853/0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, travelling**	Blatt/Page/Feuille **4.09.03**



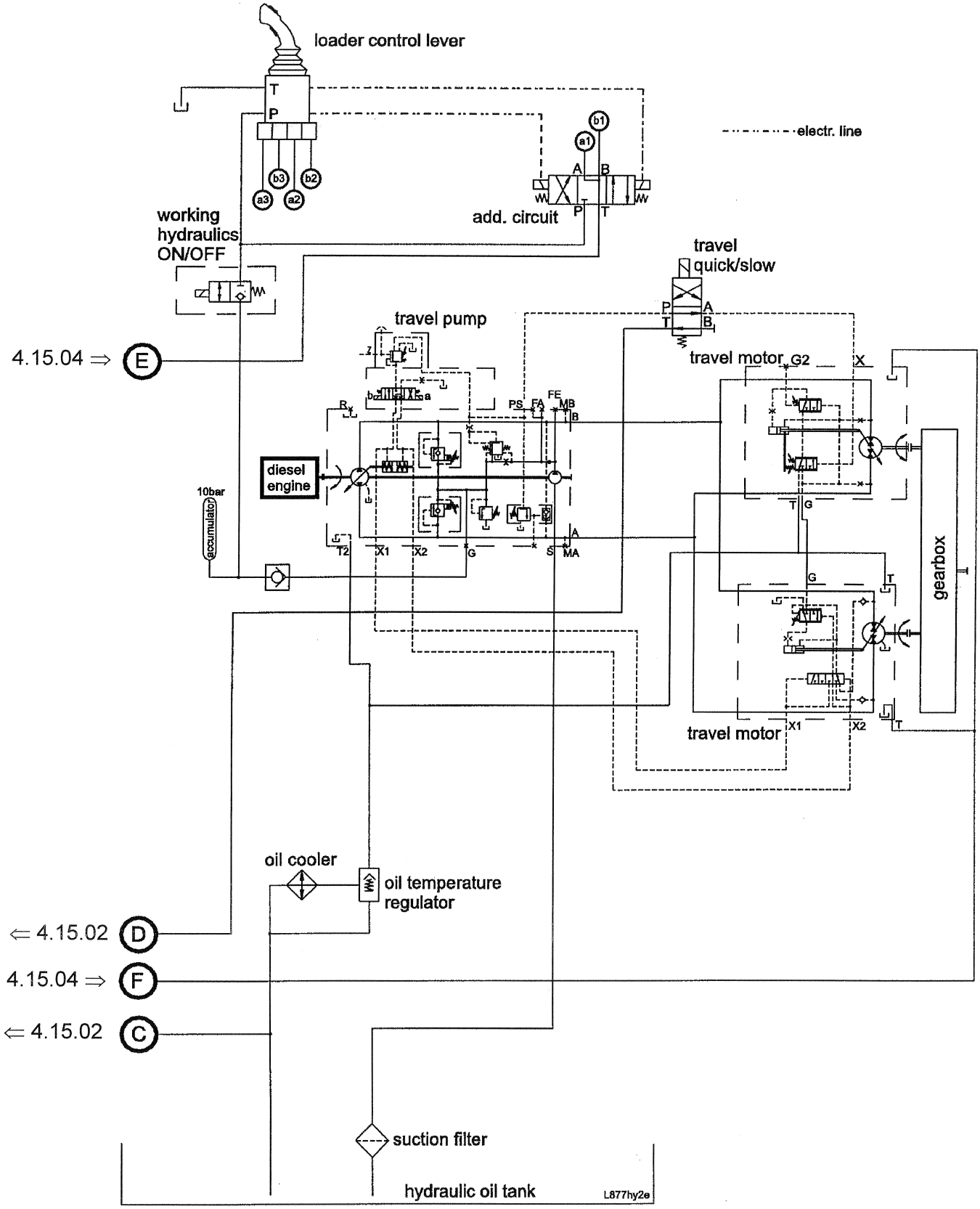
SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	SKL 877	**01.2000**
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram	**4.15.01**

Legend to hydraulic diagram

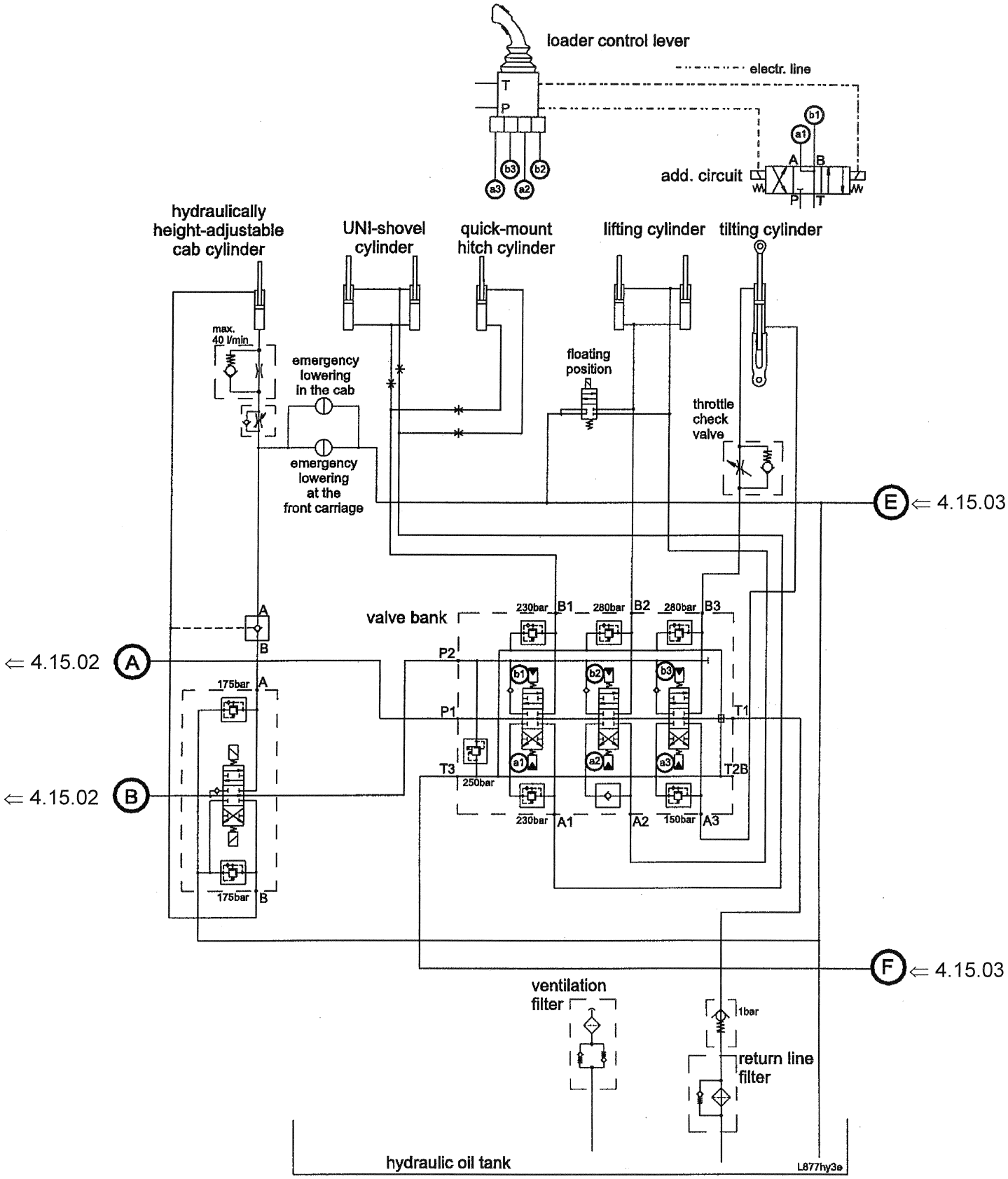
Belüftungsfilter	ventilation filter
Blende	orifice
Bremse	brake
Bremse vorn	brake, front
Bremse hinten	brake, rear
Dieselmotor	diesel engine
elektrisch	electric
Fahrantrieb	transmission
Fahrenmotor	travel motor
Feststellbremse	parking brake
Getriebe	gearbox
Hubzylinder	lift cylinder
Kippzylinder	tilt cylinder
Kugelhahn	ball valve
Ladeanlage	loading system
Ladersteuerhebel	joystick
Lenkeinheit	steering unit
Lenkrad	steering wheel
Lenkung	steering
Lenkzylinder	steering cylinder
Notabsenkung in Kabine	emergency lowering in cabin
Notabsenkung am Vorderwagen	emergency lowering at front carriage
Notlenkung	emergency steering
Ölkühler	oil cooler
Öltank	oil tank
Öltemperaturregler	oil temperature regulator
Prioritätsventil	priority valve
Rücklauf	return line
Rücklauf-Saugfilter	return line suction filter
Rücklauffilter	return line filter
Saugfilter	suction filter
Saugen	suction
Schnellwechsel Zylinder	quick-mount hitch cylinder
Schwimmstellung	float position
Speicher	accumulator
3. Steuerkreis	3rd control circuit
Steuerventil	valve bank
Stromregelventil	flow control valve
Uni-Schaufel Zylinder	multi-purpose bucket cylinder
Vorsteuergerät	pilot-operated valve
Zusatzausrüstung	additonal equipment
Zuschaltventil	sequence valve



SCHAEFF	Typ/Model/Type **SKL 877**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic system - steering, brake**	Blatt/Page/Feuille **4.15.02**



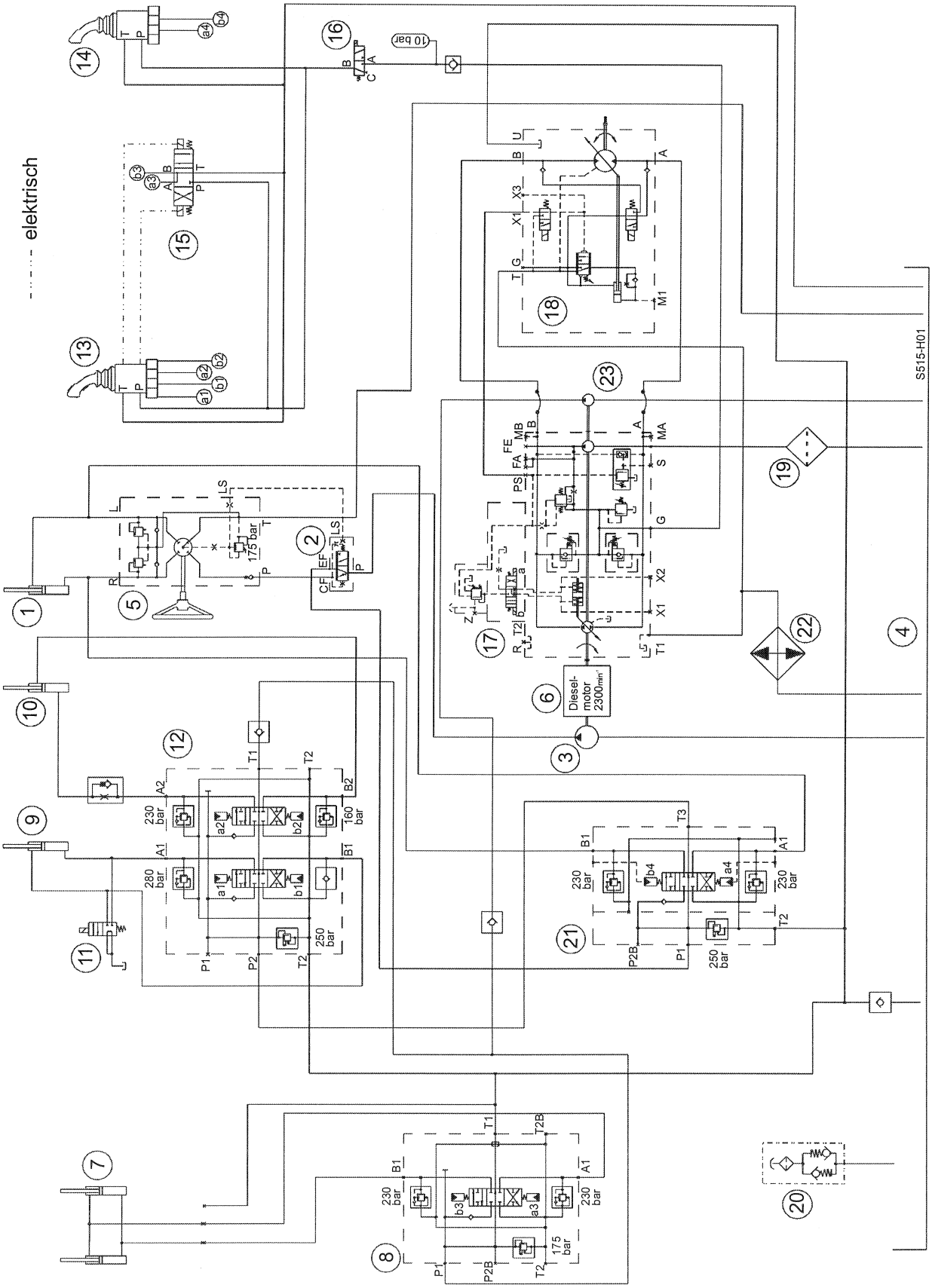
SCHAEFF	Typ/Model/Type **SKL 877**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic system - travelling, pilot control for loading system**	Blatt/Page/Feuille **4.15.03**



SCHAEFF	Typ/Model/Type **SKL 877**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic system - loading system**	Blatt/Page/Feuille **4.15.04**

Hydraulic system

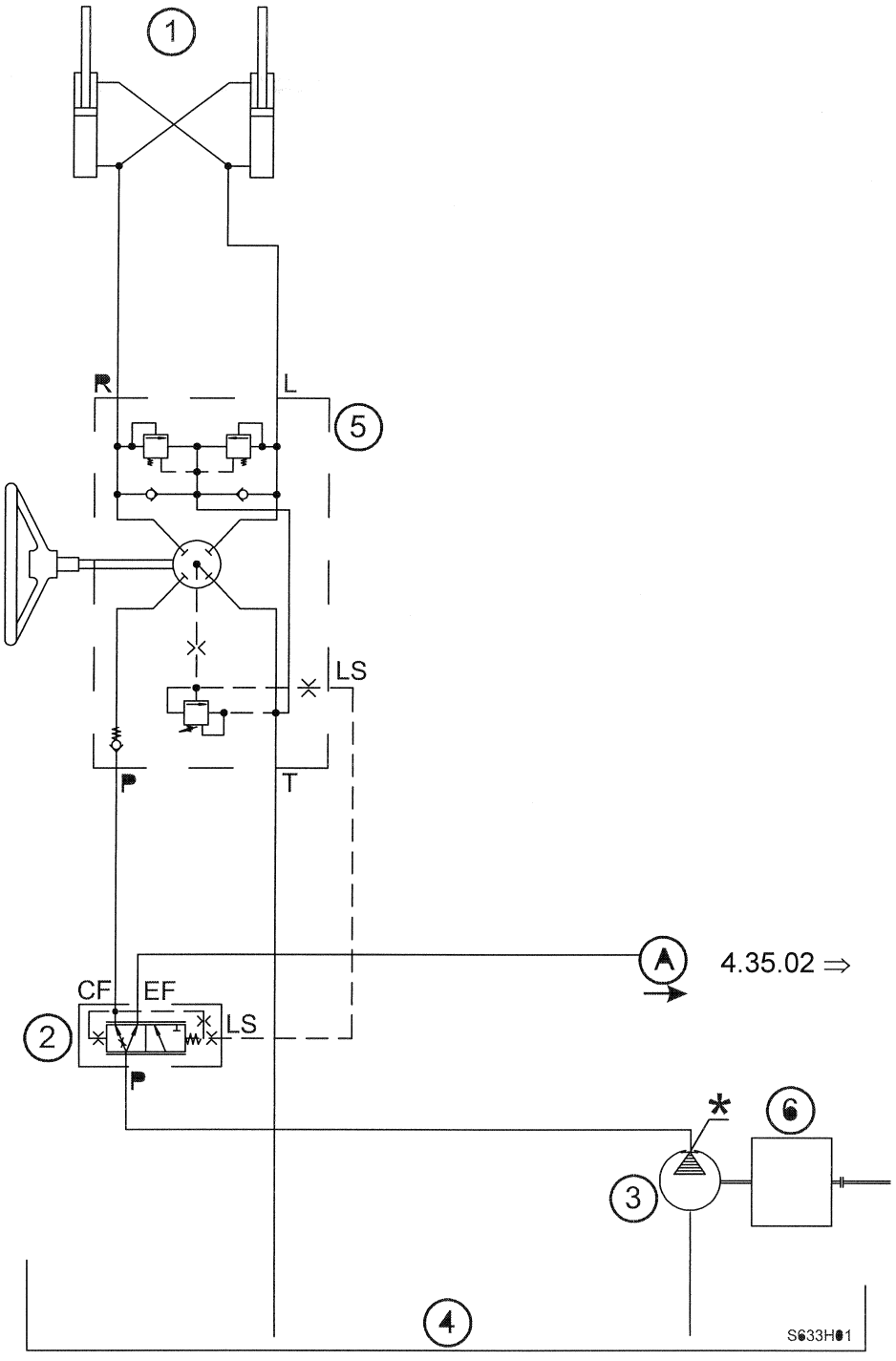
option: 3rd control circuit 94.3 l/min



SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	SCL 515	02.2001
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram	4.20.01

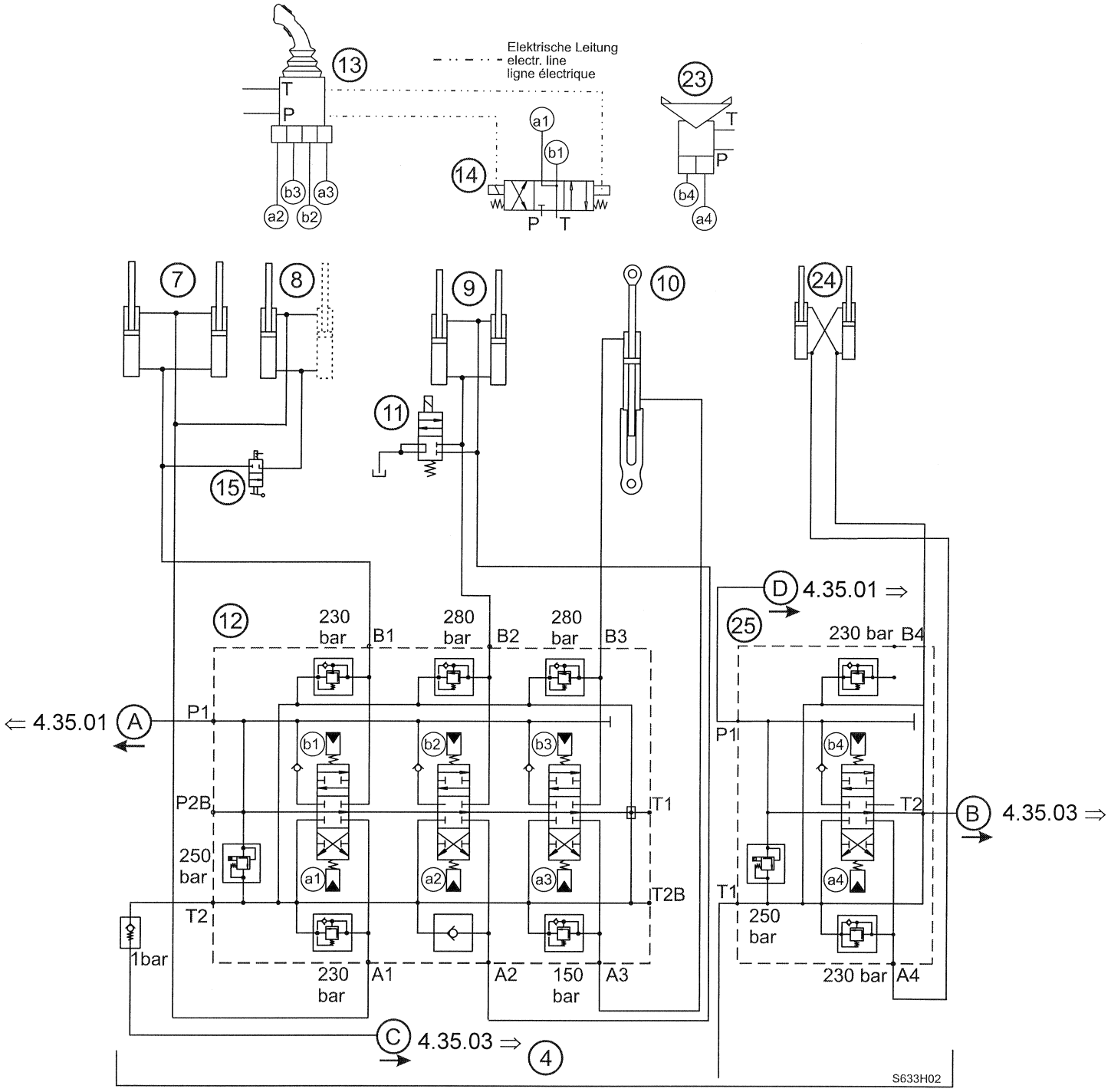
1	Steering cylinder
2	Priority valve
3	Steering- / Loader pump
4	Hydraulic oil tank
5	Steering unit
6	Diesel engine
7	Hydr. cylinder - multi-purpose bucket, etc.
8	Control valve - additional control circuit (option)
9	Hydr. cylinder - lifting frame
10	Hydr. cylinder - tilt bucket
11	Float position
12	Control valve
13	Joystick
14	Steering control lever
15	Additional control circuit
16	Working hydraulics cut-off valve
17	Travel pump
18	Travel motor
19	Hydraulic oil filter
20	Ventilation filter
21	Steering control valve
22	Hydraulic oil radiator
23	Additional gear pump (option)

1	Steering cylinder
2	Priority valve
3	Steering unit
4	Steering control lever
5	Cut-off valve for dead man's control
6	Steering control valve
7	Diesel engine
8	Travel pump
9	Travel motor
10	Hydraulic oil filter
11	Hydraulic oil radiator
12	Hydraulic oil tank
13	Hydraulic cylinder - lift frame
14	Float position
15	Control valve
16	Hydraulic cylinder - bucket tilt
17	Loader control lever
18	Additional control circuit
19	Hydraulic cylinder - multi-purpose bucket, etc.
21	Working hydraulics cut-off
22	Steering / loading pump
23	Ventilation filter



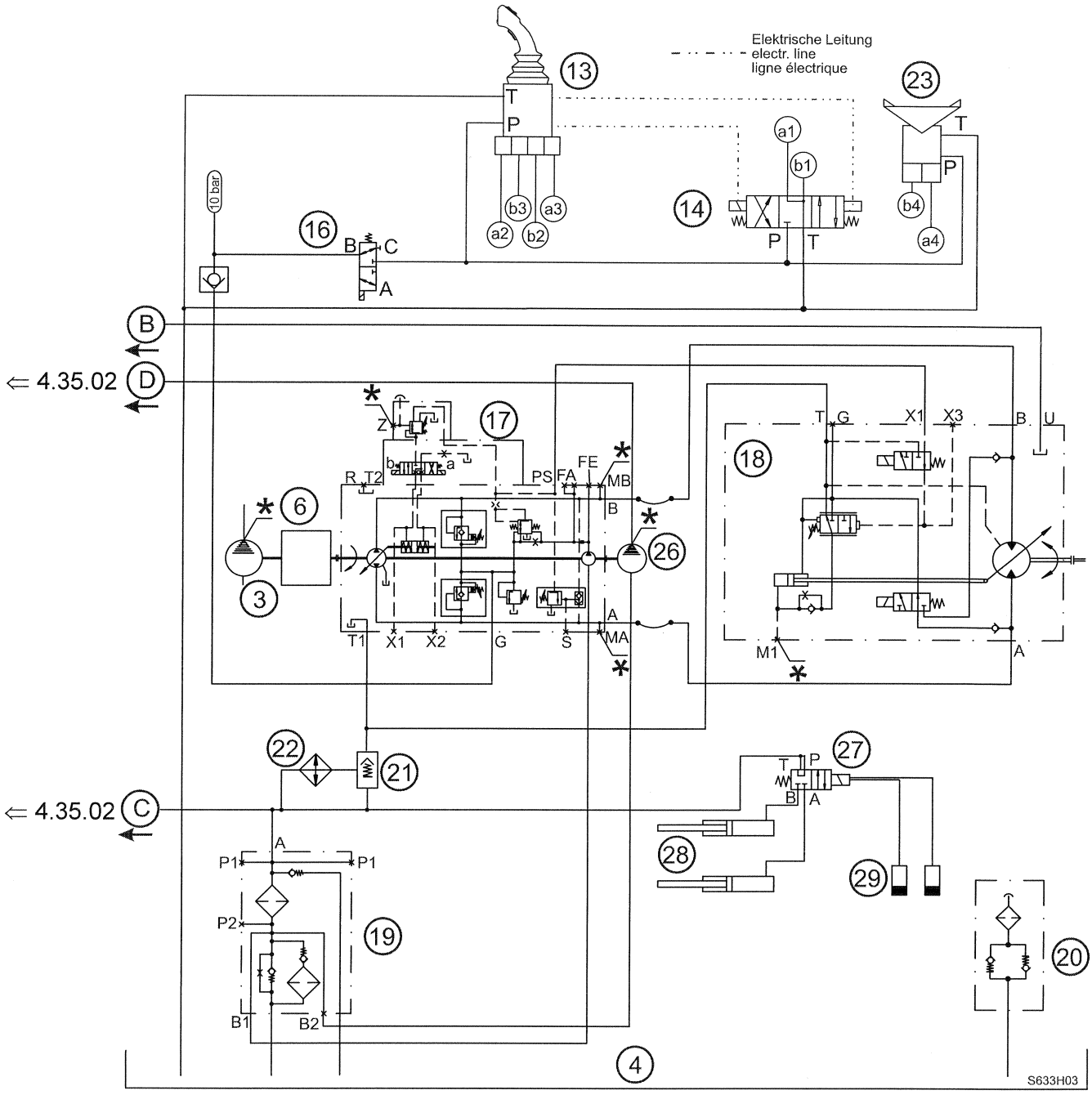
1 Steering cylinder
2 Priority valve
3 Hydr. pump - steering/loading
4 Hydraulic oil tank
5 Steering unit
6 Diesel engine
* Test port

SCHAEFF	Typ/Model/Type **SKS 633**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, steering**	Blatt/Page/Feuille **4.35.01**



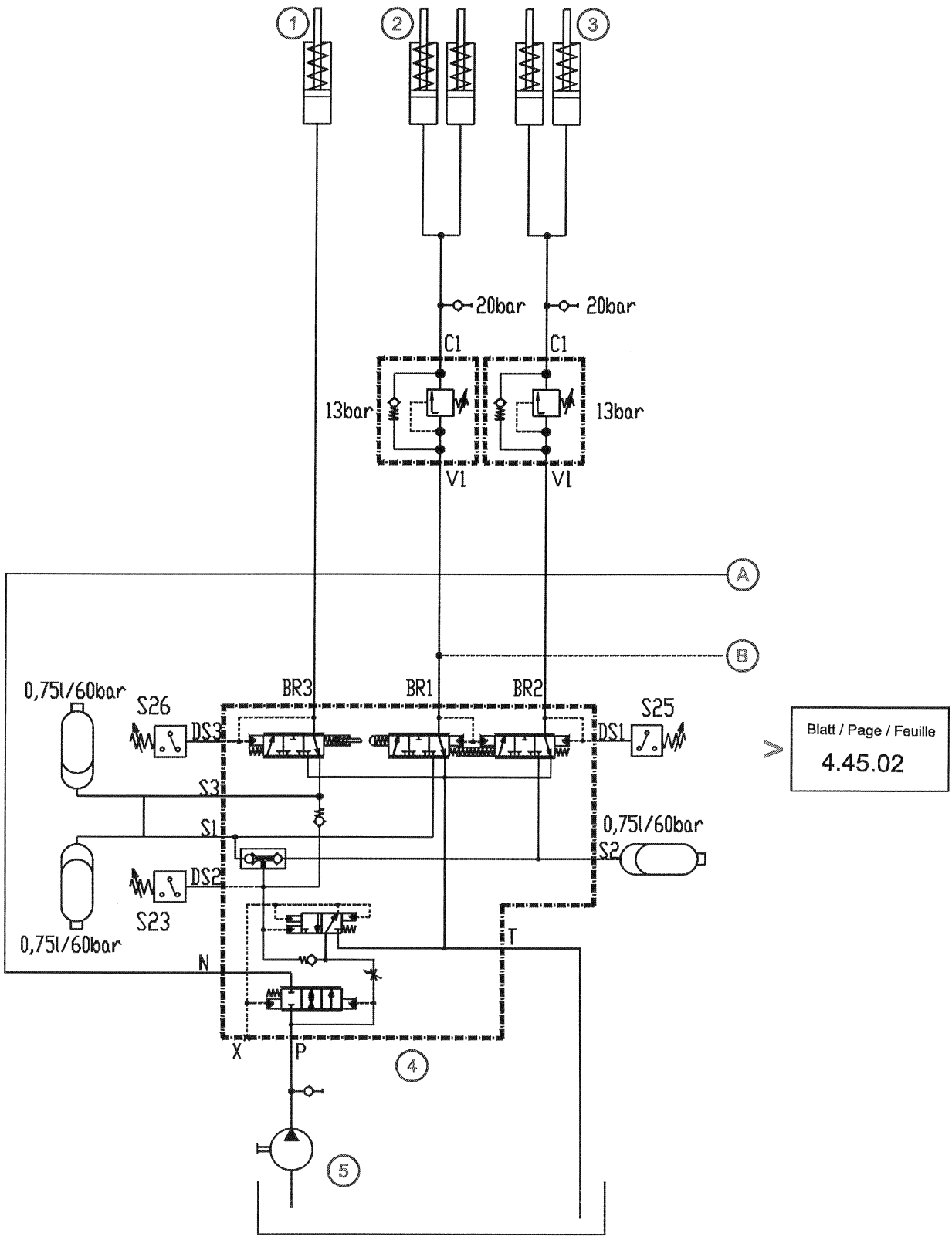
4 Hydraulic oil tank
7 Hydr. cylinder - Multi-purpose bucket, etc.
8 Hydr. cylinder - Quick-mount hitch
9 Hydr. cylinder - Lifting frame
10 Hydr. cylinder - Tilt shovel
11 Float position
12 Control valve
13 Joystick
14 Additional control circuit
15 Ball valve
23 Pedal - slewing
24 Hydr. cylinder - slewing
25 Control valve - slewing

SCHAEFF	Typ/Model/Type **SKS 633**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram, loading system**	Blatt/Page/Feuille **4.35.02**



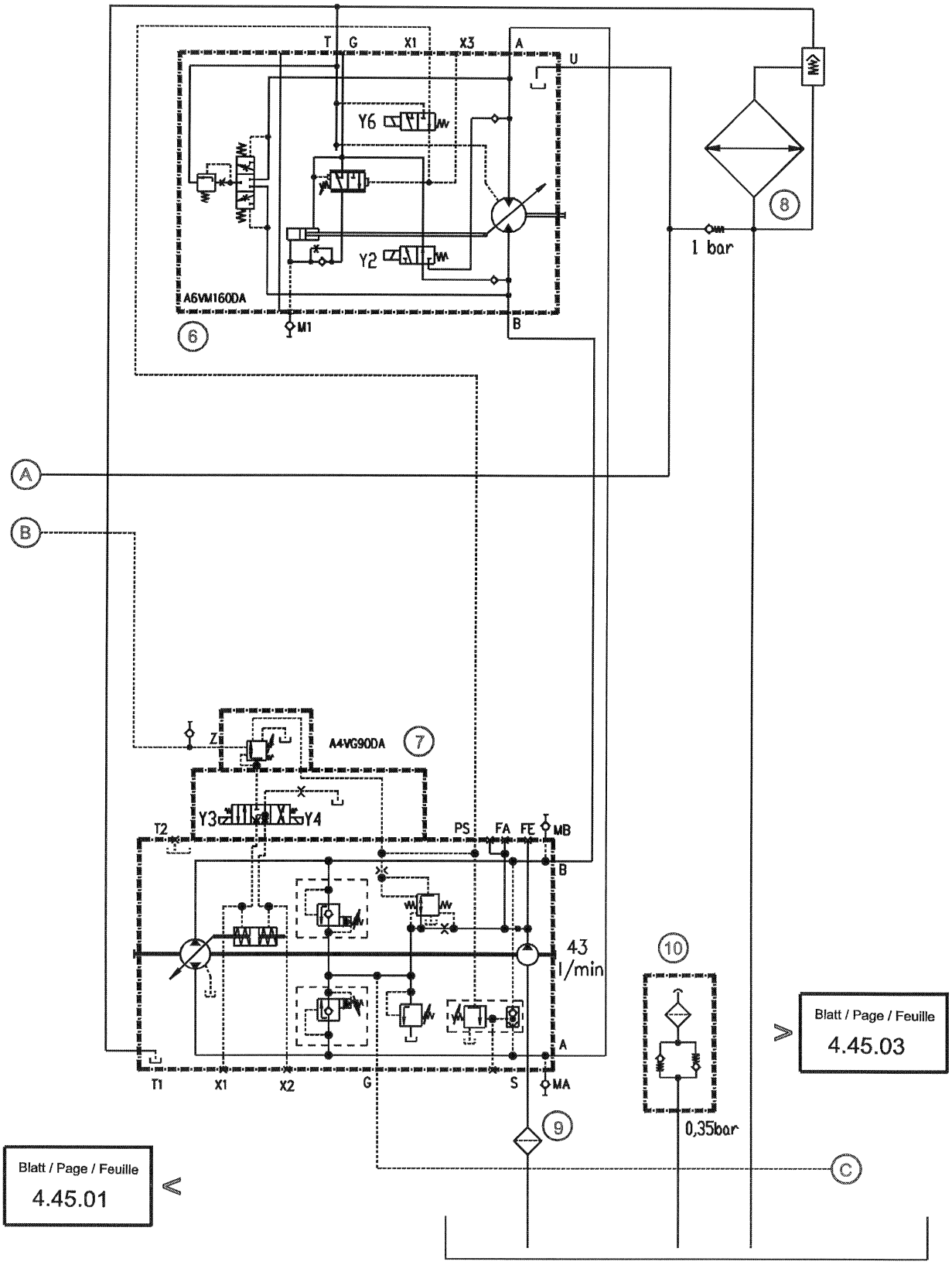
3	Steering/loading pump	21	Hydr. oil temp. regulator 55°C
4	Hydraulic oil tank	22	Hydraulic oil cooler
6	Diesel engine	23	Pedal - slewing
13	Joystick	26	Hydr. pump - slewing
14	Additional control circuit	27	Valve - oscillating axle lock
16	Shut-off valve - working hydr.	28	Hydraulic cyl. -oscillat. axle lock.
17	Travel pump	29	Proximity switch
18	Travel motor	*	Test port
19	Hydr. oil - combined filter		
20	Ventilation filter		

SCHAEFF	Typ/Model/Type **SKS 633**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram - travel, pilot control for loading system**	Blatt/Page/Feuille **4.35.03**



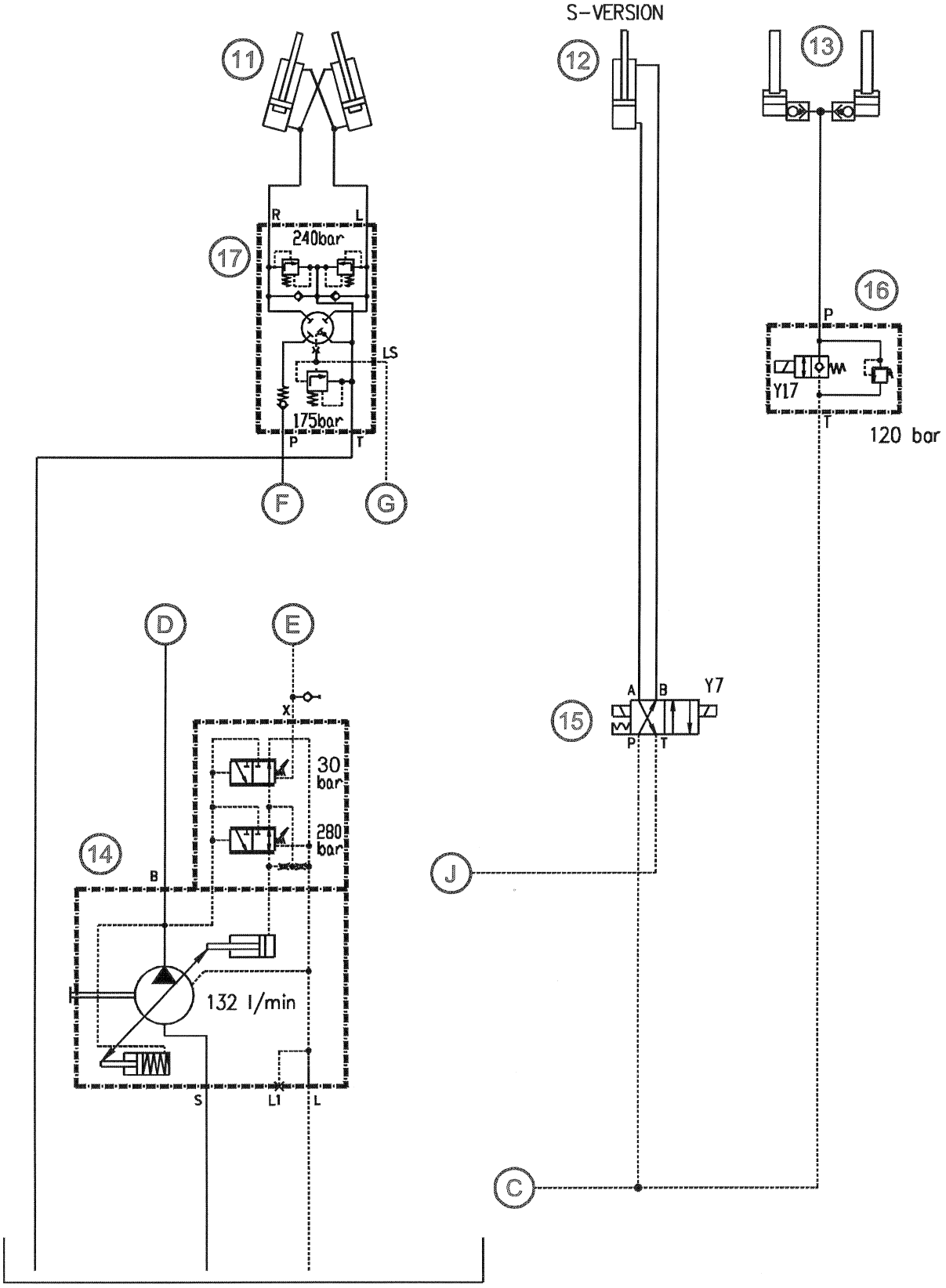
SCHAEFF	Typ/Model/Type **SKB 2000 (from serial no. 200/0101)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (brake)**	Blatt/Page/Feuille **4.45.01**

1	Feststellbremse Vorderachse	Parking brake front axle	Frein de stationnement pont AV
2	Betriebsbremse Vorderachse	Service brake front axle	Frein de service pont AV
3	Betriebsbremse Hinterachse	Service brake rear axle	Frein de service pont AR
4	Fremdkraftbremse	Brake valve	Soupape de frein
5	Zahnradpumpe	Gear pump	Pompe à engrenages



SCHAEFF	Typ/Model/Type **SKB 2000 (from serial no. 200/0101)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (transmission)**	Blatt/Page/Feuille **4.45.02**

6	Fahrmotor	Hydraulic motor (drive)	Moteur hydraulique (translation)
7	Fahrpumpe	Hydraulic pump (drive)	Pompe hydraulique (translation)
8	Hydraulikölfilter	Hydraulic oil filter	Filtre d'huile hydraulique
9	Hydrauliköl-Saugfilter	Hydraulic oil suction Filter	Filtre d'aspiration huile hydraulique
10	Belüftungsfilter	Vent filter	Filtre d'aération

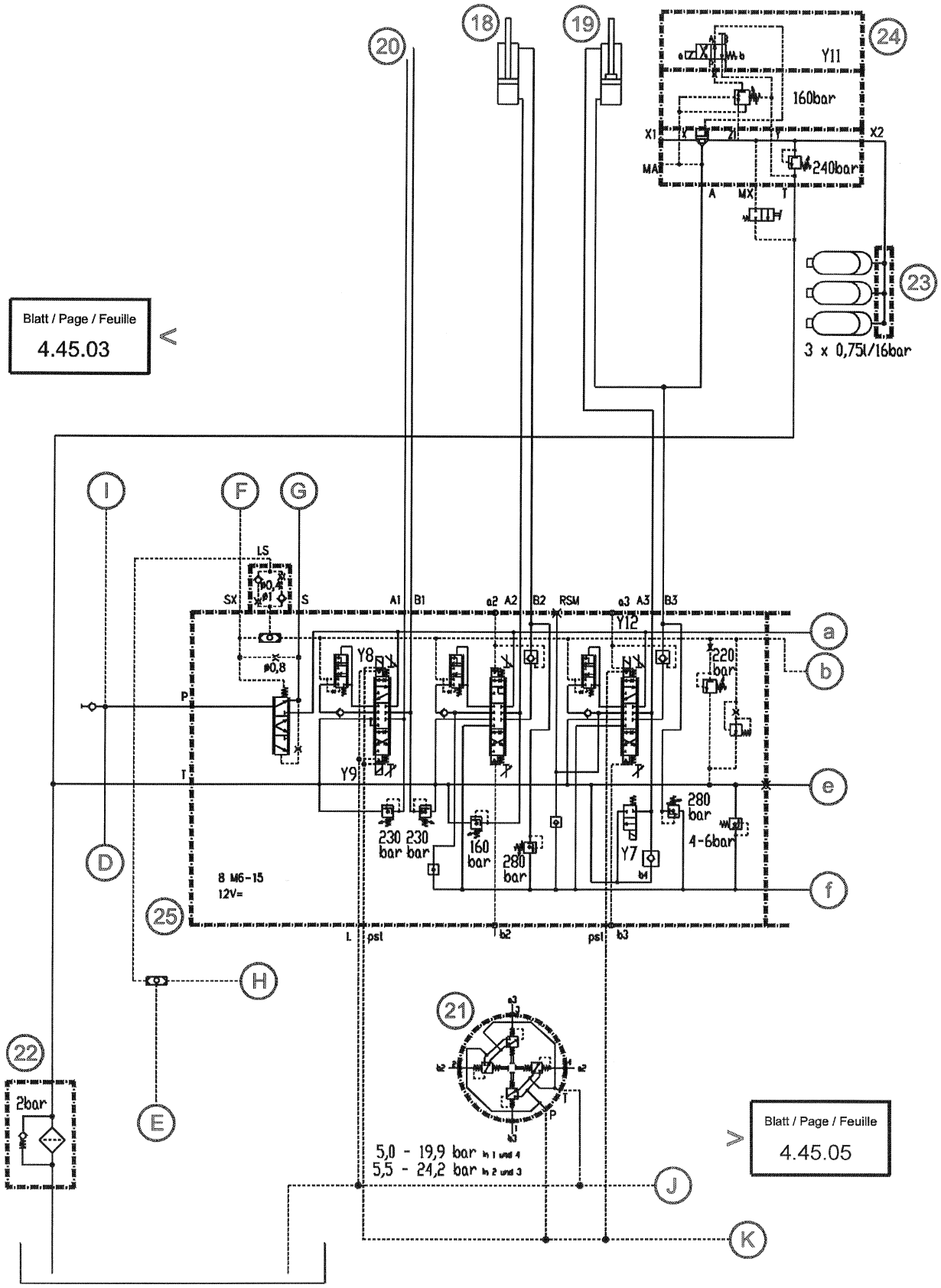


Blatt / Page / Feuille
4.45.02
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Blatt / Page / Feuille
4.45.04

SCHAEFF	Typ/Model/Type **SKB 2000 (from serial no. 200/0101)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (steering, stabilising, switching)**	Blatt/Page/Feuille **4.45.03**

11	Lenkzylinder	Steering cylinder	Vérin de direction
12	Stellzylinder (Schaltgetriebe)	Adjusting cylinder (gearbox)	Vérin de régulation (réducteur)
13	Stabilisator	Stabiliser	Stabilisateur
14	Verstellpumpe	Variable displacement pump	Pompe à débit variable
15	4/2-Wegeventil (Schaltgetriebe)	Solenoid valve (gearbox)	Electrovanne (réducteur)
16	Abschaltventil mit Magnet	Cut-off valve with solenoid	Valve de coupure avec électro-aimant
17	Lenkeinheit	Steering unit	Unité de direction

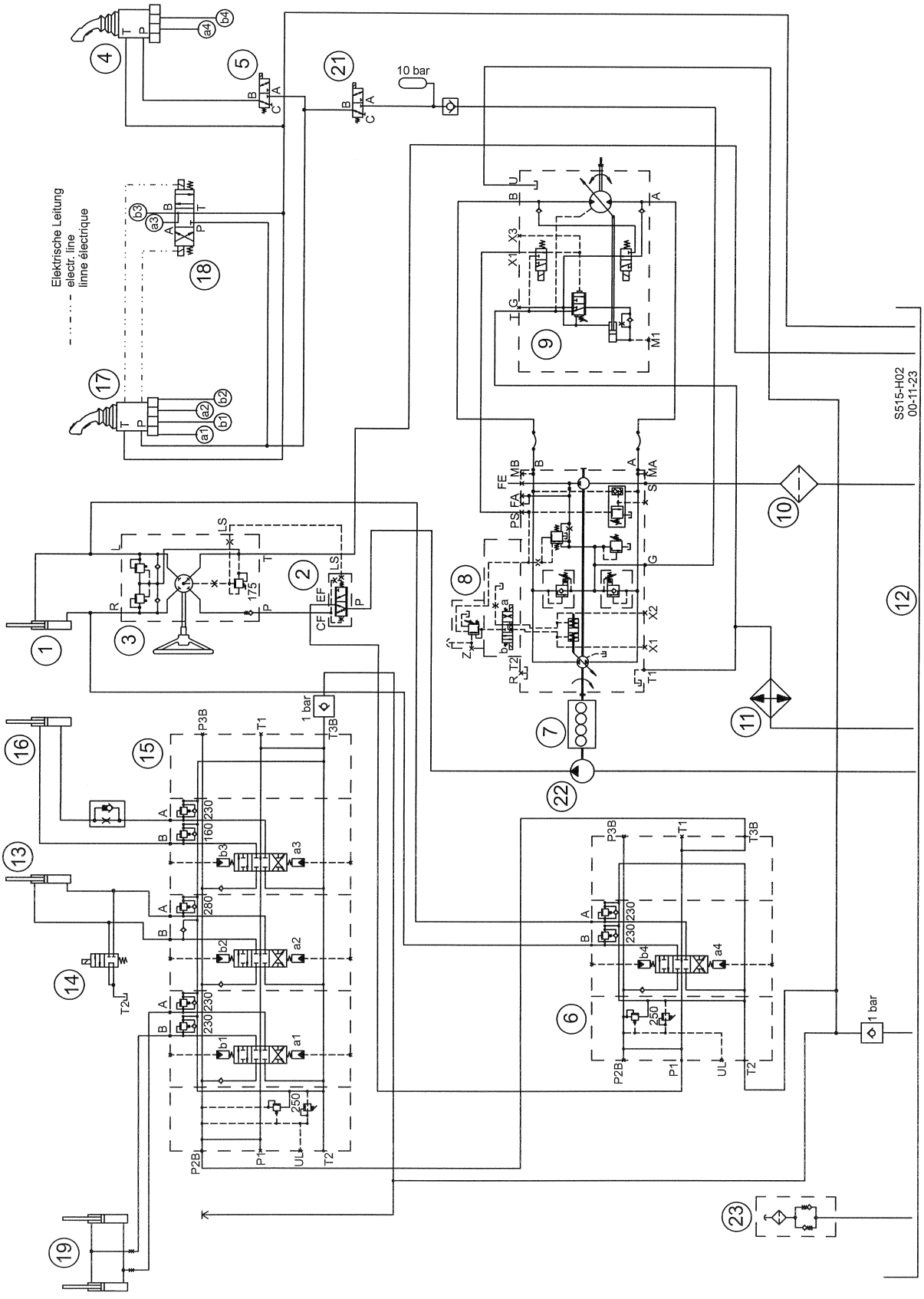


SCHAEFF	Typ/Model/Type **SKB 2000 (from serial no. 200/0101)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (loading)**	Blatt/Page/Feuille **4.45.04**

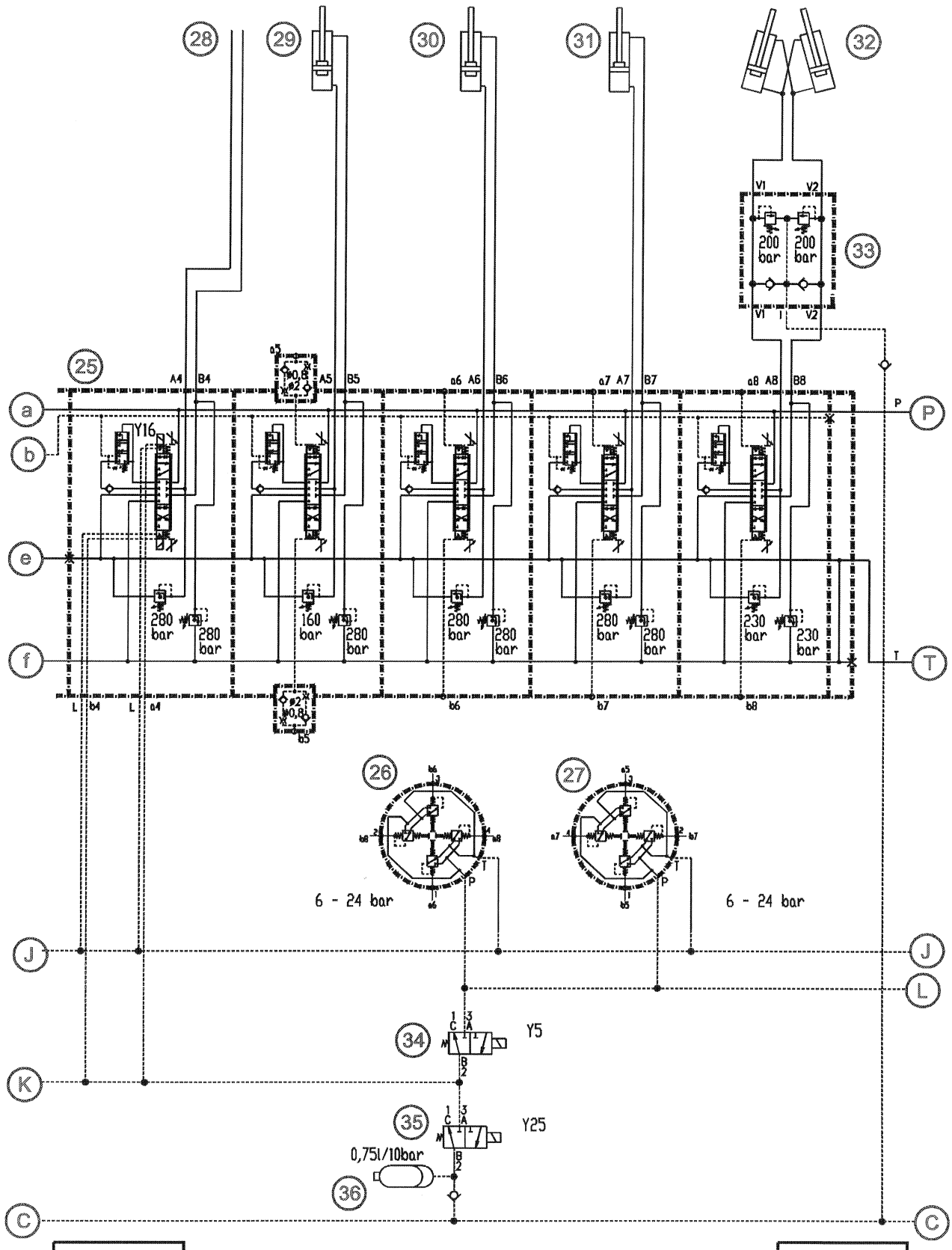
18	Hydraulikzylinder - Schaufel kippen	Hydraulic cylinder - dump shovel	Vérin hydraulique - basculement godet
19	Hydraulikzylinder - Hubrahmen	Hydraulic cylinder - lifting frame	Vérin hydraulique - bras de levage
20	Zusatzsteuerkreis – Lader	Additional control circuit - loader	Circuit supplémentaire - chargeur
21	Vorsteuergerät – Lader	Pilot-operated valve – loader	Distributeur à commande assistée - chargeur
22	Saugfilter	Suction filter	Filtre d'aspiration
23	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique
24	Stabilisierungsmodul	Stabilizer module	Module de stabilisateur
25	Blocksteuergerät -Teil1	Valve bank – part 1	Distributeur – partie 1

Hydraulic system

option: 3rd control circuit 36.8 $^{l}/_{min}$



SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	SCL 515	02.2001
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram	4.20.02

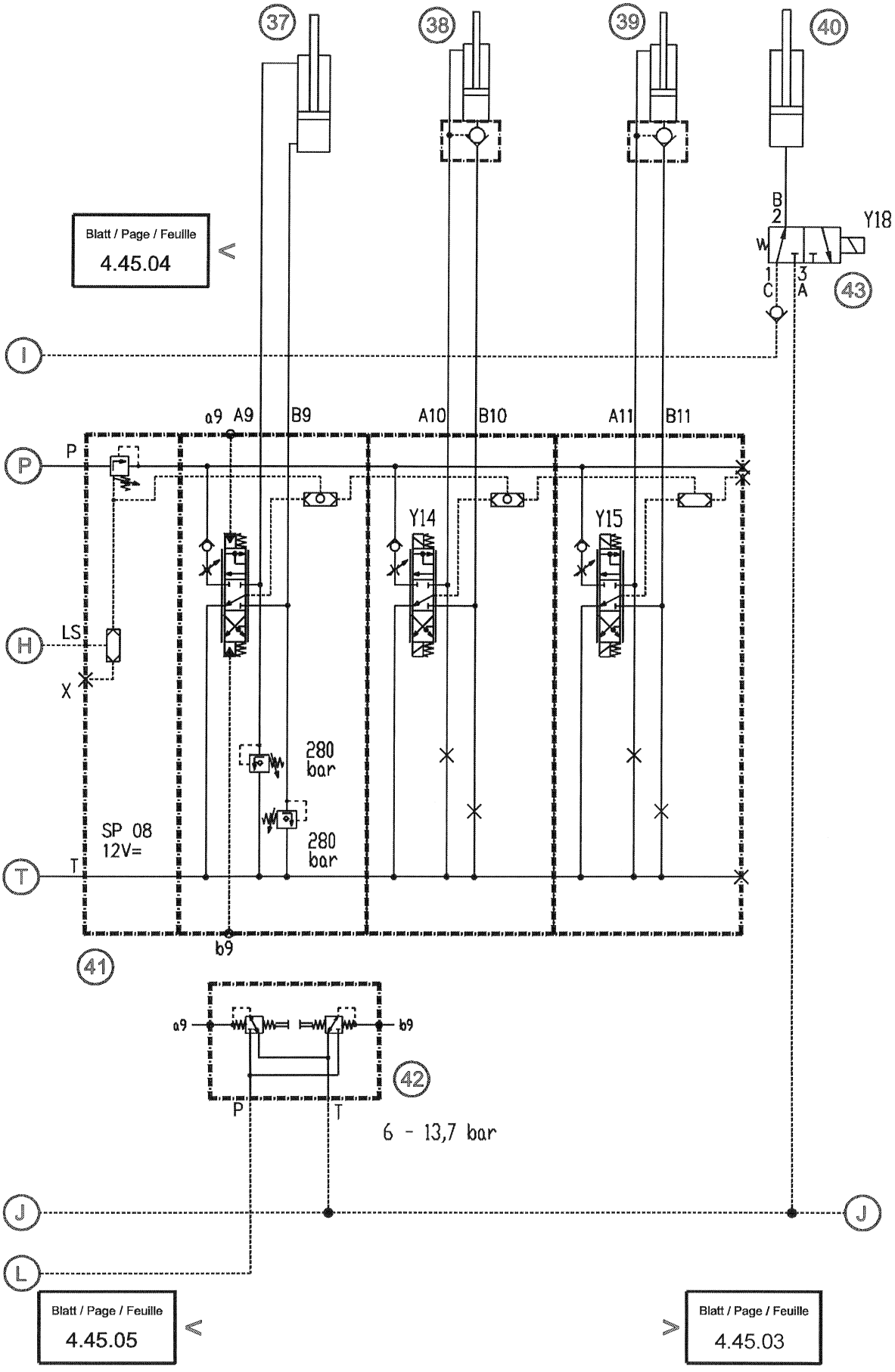


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4.45.04
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4.45.06

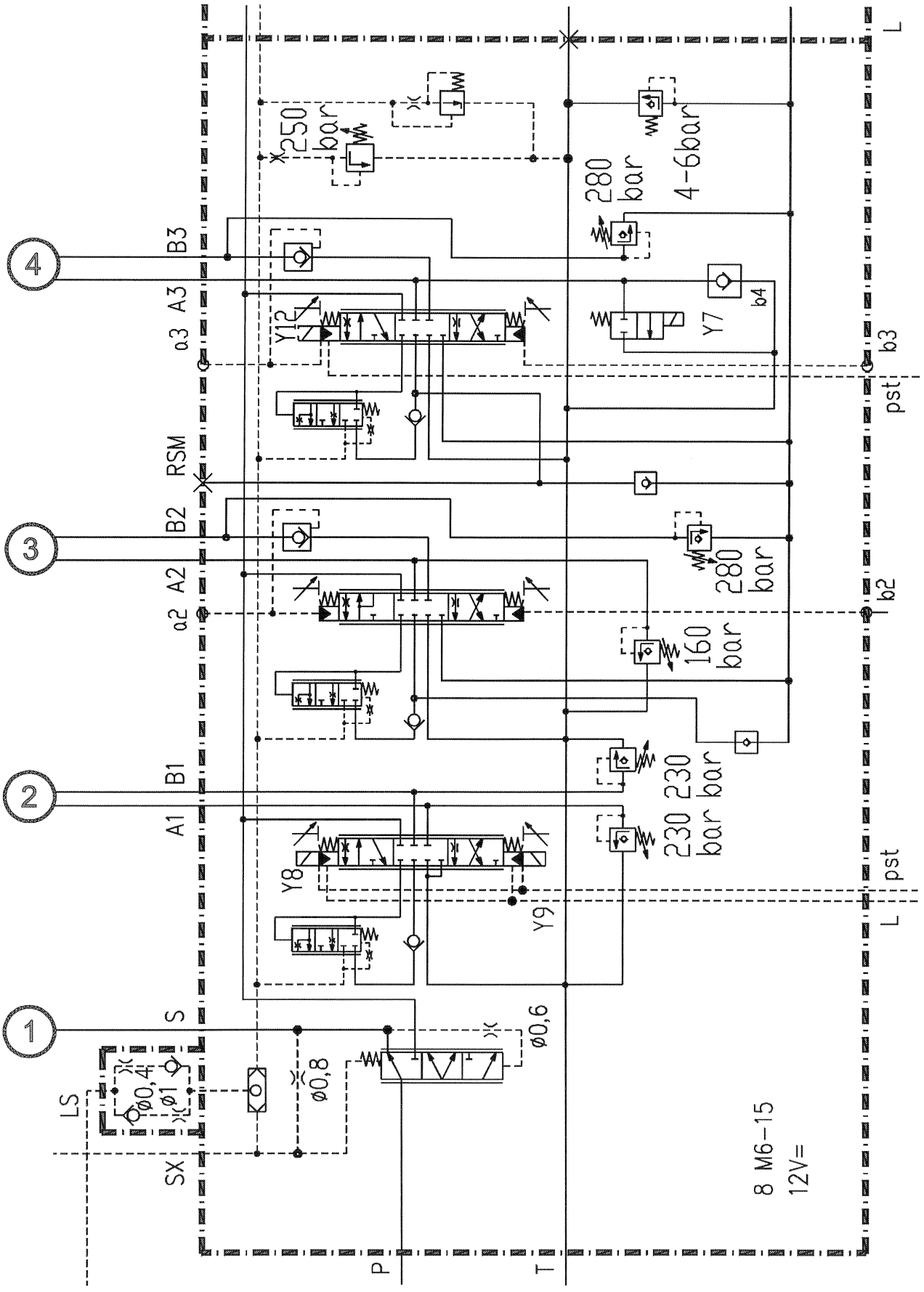
SCHAEFF	Typ/Model/Type **SKB 2000 (from serial no. 200/0101)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (Working equipment Mono boom)**	Blatt/Page/Feuille **4.45.05**

25	Blocksteuergerät –Teil 2	Valve bank - part 2	Distributeur - partie 2
26	Vorsteuergerät - Bagger (Fahrtrichtung rechts)	Pilot-operated valve – excavator (travel direction right)	Distributeur à commande assistée – pelle (sens de marche à droite)
27	Vorsteuergerät - Bagger (Fahrtrichtung links)	Pilot-operated valve - excavator (travel direction left)	Distributeur à commande assistée – pelle (sens de marche à gauche)
28	Zusatzsteuerkreis – Bagger	Additional control circuit - excavator	Circuit supplémentaire – pelle
29	Hydraulikzylinder – Ausleger	Hydraulic cylinder – Boom	Vérin hydraulique – flèche
30	Hydraulikzylinder – Löffelstiel	Hydraulic cylinder – dipper arm	Vérin hydraulique – balancier
31	Hydraulikzylinder – Löffel	Hydraulic cylinder – bucket	Vérin hydraulique – godet
32	Hydraulikzylinder – Schwenken	Hydraulic cylinder – Swing	Vérin hydraulique - orientation
33	Druckbegrenzungs-ventil mit Nachspeisung	Pressure valve with regulation	Limiteur de pression avec régulateur
34	Druckabschaltventil – Bagger	Shut-off valve - excavator	Valve de coupure - pelle
35	Druckabschaltventil – Lader, Bagger	Shut-off valve – loader, excavator	Valve de coupure - chargeur, pelle
36	Hydrospeicher	Hydraulic accumulator	Accumulateur hydraulique



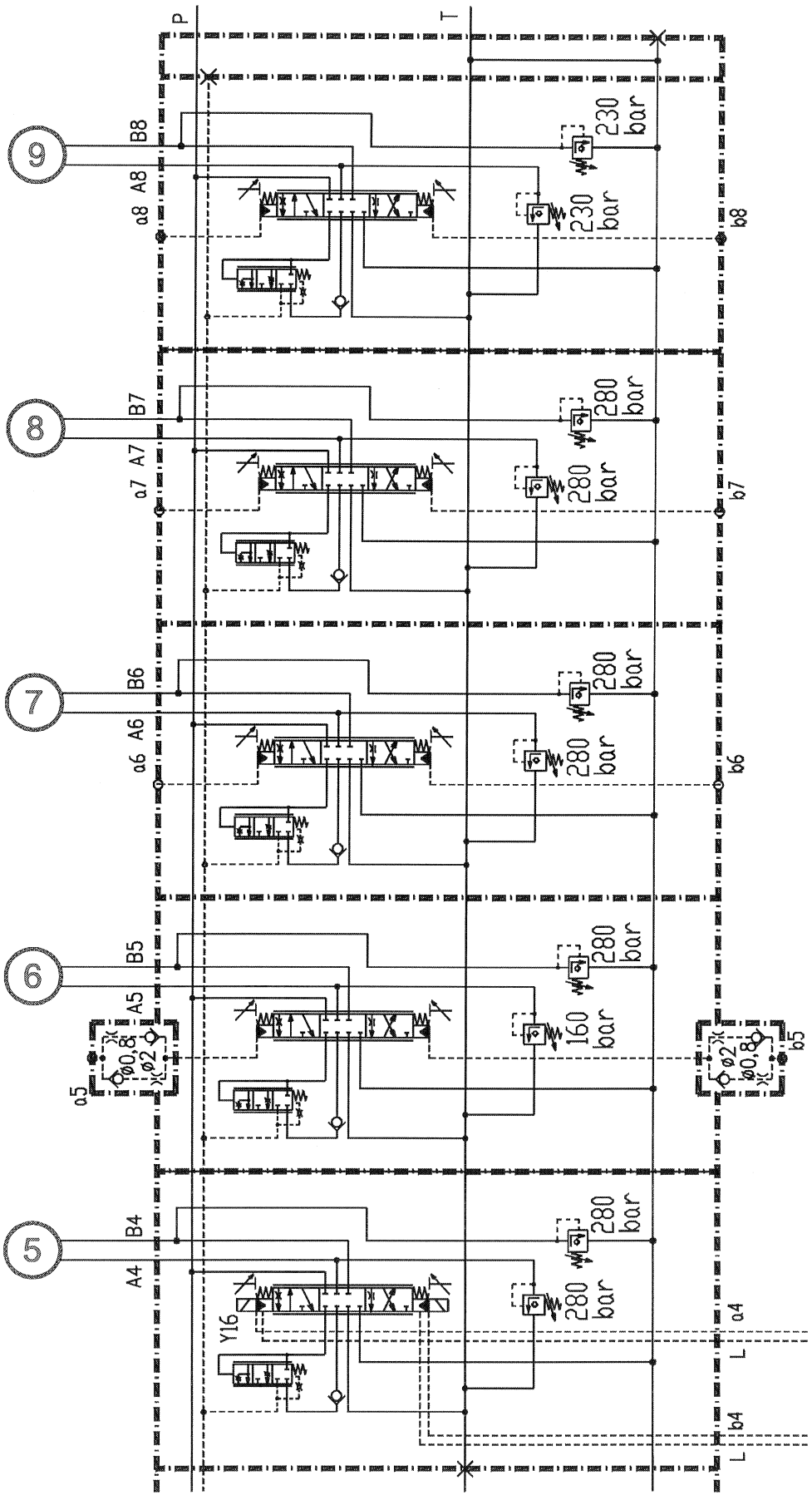
SCHAEFF	Typ/Model/Type **SKB 2000 (from serial no. 200/0101)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (stabilising, lock, telescopic stick)**	Blatt/Page/Feuille **4.45.06**

37	Hydraulikzylinder - Teleskoplöffelstiel	Hydraulic cylinder - Telescopic stick	Vérin hydraulique - Balancier télescopique
38	Hydraulikzylinder – Abstützen links	Hydraulic cylinder - outrigger left	Vérin hydraulique - stabilisateur gauche
39	Hydraulikzylinder – Abstützen rechts	Hydraulic cylinder - outrigger right	Vérin hydraulique - stabilisateur droit
40	Hydraulikzylinder – Klemmen	Hydraulic cylinder - lock	Vérin hydraulique - verrouillage
41	Blocksteuergerät 2	Valve bank 2	Distributeur 2
42	Vorsteuergerät – Fußpedal	Pilot-operated valve - foot pedal	Distributeur à commande assistée – pédale
43	Druckabschaltventil – Klemmen (lösen)	Cut-off valve - lock (release)	Valve de coupure - verrouillage (détacher)



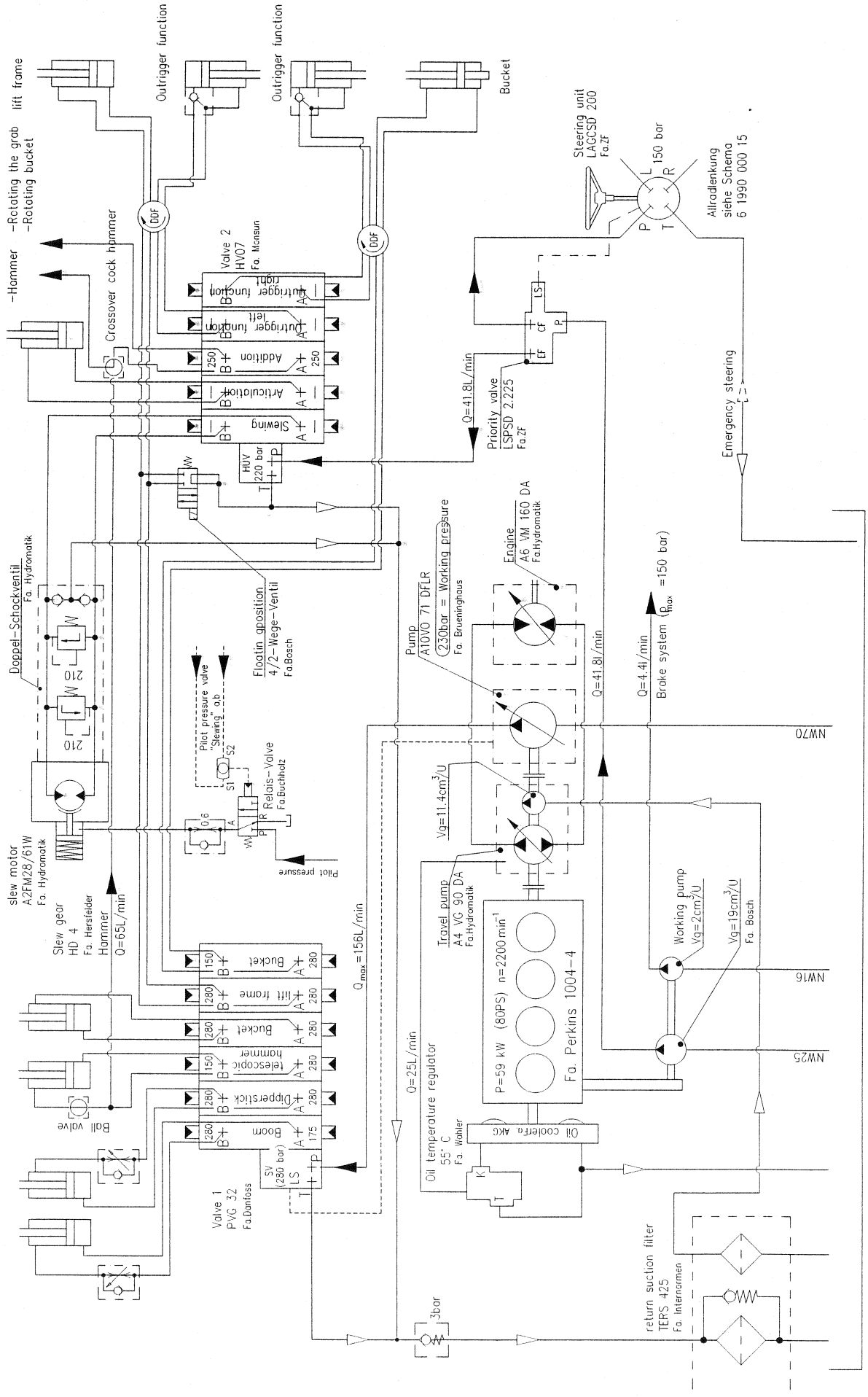
SCHAEFF	Typ/Model/Type **SKB 2000 (from serial no. 200/0101)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (Valve bank 8M6-15 part 1)**	Blatt/Page/Feuille **4.45.07**

1	Lenkeinheit	Steering unit	Unité de direction
2	Zusatzsteuerkreis – Lader	Additional control circuit – loader	Circuit supplémentaire – chargeur
3	Hydraulikzylinder – Schaufel kippen	Hydraulic cylinder – dump shovel	Vérin hydraulique – basculement godet
4	Hydraulikzylinder – Hubrahmen	Hydraulic cylinder – lifting frame	Vérin hydraulique – bras de levage

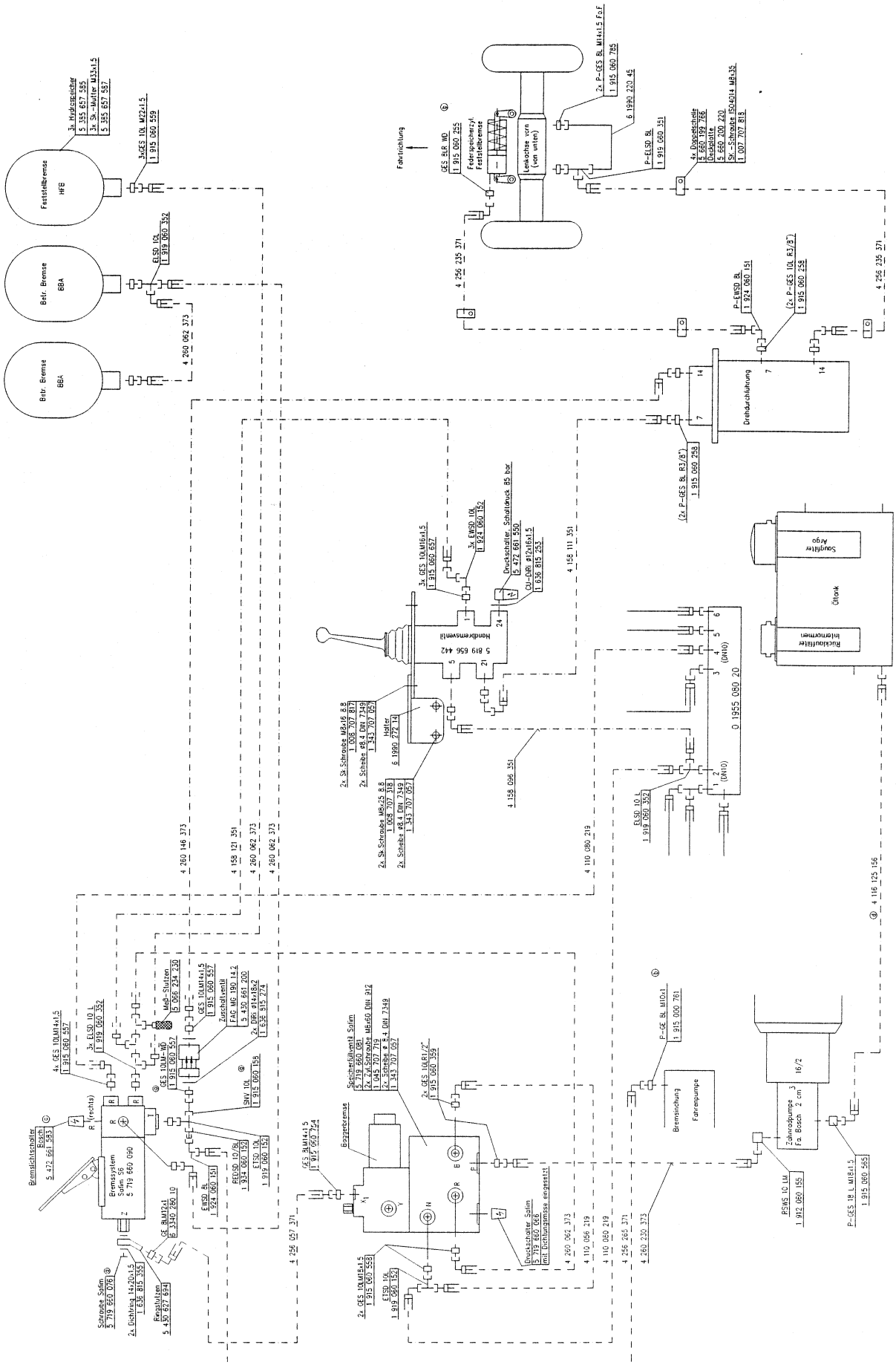


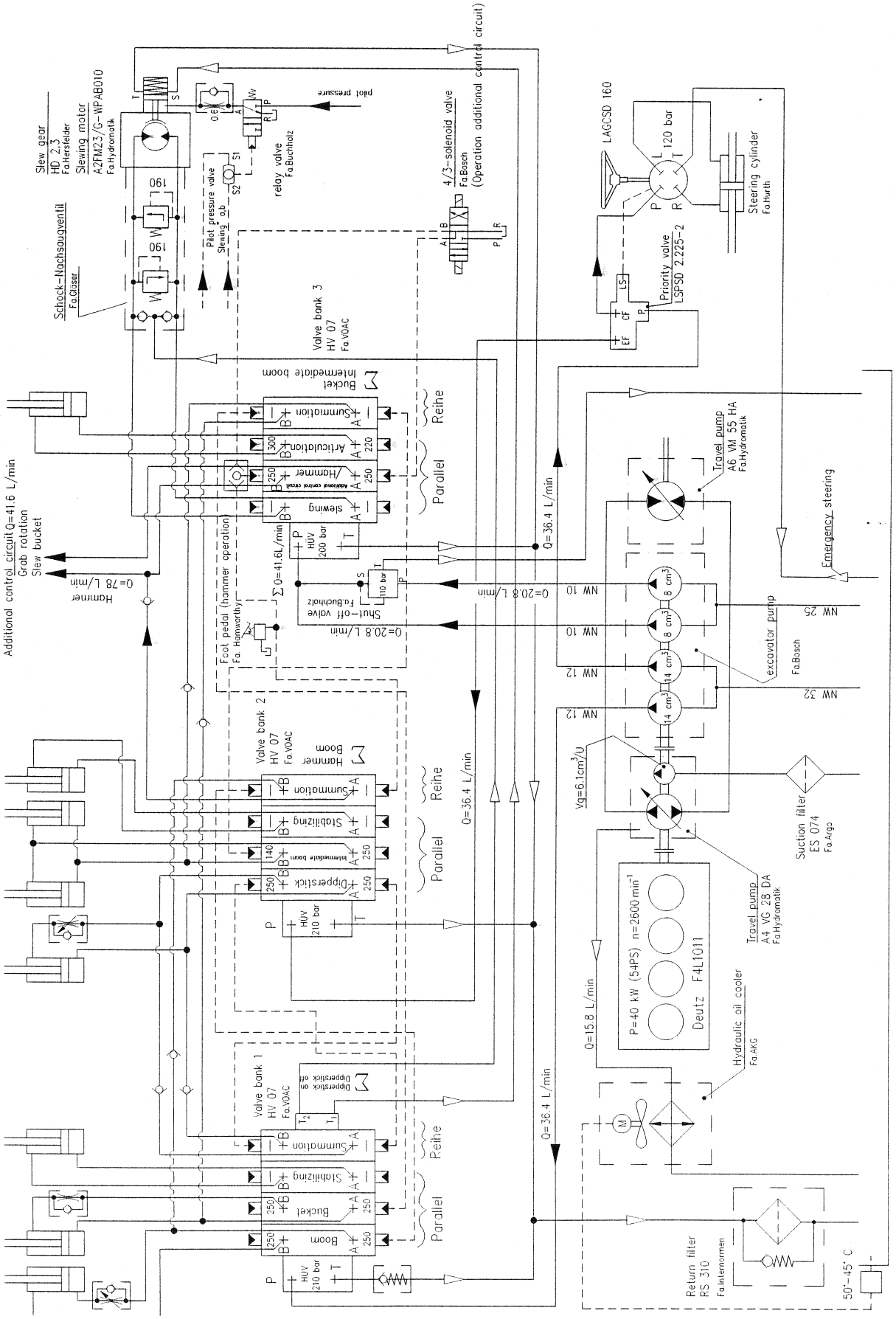
SCHAEFF	Typ/Model/Type **SKB 2000 (from serial no. 200/0101)**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Hydraulic diagram (Valve bank 8M6-15 part 2)**	Blatt/Page/Feuille **4.45.08**

5	Zusatzsteuerkreis – Bagger	Additional control circuit – excavator	Circuit supplémentaire – pelle
6	Hydraulikzylinder – Ausleger	Hydraulic cylinder – boom	Vérin hydraulique – flèche
7	Hydraulikzylinder – Löffelstiel	Hydraulic cylinder – dipper arm	Vérin hydraulique – balancier
8	Hydraulikzylinder – Löffel	Hydraulic cylinder – bucket	Vérin hydraulique – godet
9	Druckbegrenzungsventil mit Nachspeisung, Hydraulikzylinder – Schwenken	Pressure valve with regulation, hydraulic cylinder – swing	Limiteur de pression avec régulateur, vérin hydraulique – orientation



SCHAEFF	Typ/Model/Type **SMB 2041 (from serial no. 204/0328)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.46.01**


Feststellbremse
HFB
Betr. Bremse
BBA
Betr. Bremse
BBA
Fahrrichtung
Drehdurchführung
Handbremsventil
Bremsventil Sofim
Bremsventil Sofim
Bremsventil Sofim



SCHAEFF	Typ/Model/Type **HML 21**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.48.01**

Drehen

Fahren

Pendelachszylinder
ø85x160

Option
Fine-Mode

Option
Hydro-Hammer

Abstützzylinder
Stützschild
ø100/65x250

Option
Abstützzylinder
Stützschild und 2-Punkt-Abstützung
ø100/65x250 ø110/60x505

Zwischenauslegerzylinder
ø100/60x500

Stielzylinder
ø120/75x885

Löffelzylinder
ø100/70x850

Auslegerzylinder
ø110/70x850
mit Option Rohr-bruchventil und Überlastwarneinrichtung

Greifer öffnen

Greifer schließen

GD 3,5
HMF 35

Anschluß ②
Nebenkreis
(4,4 l/min. bei 2200 min⁻¹)

BMR 135

Anschluß ①
Nebenkreis
(24,2 l/min. bei 2200 min⁻¹)

Option
Sperrventil

Lastschaltgetriebe
2 HL 100
i=15
i=5,35/1,39

Getriebeschaltung

Getriebeschaltventil

Park-Bremsventil

29/24 bar

0,5 bar

3 bar
(nur für Kupplhammer)

3 bar

2 bar

Thermo-block

50 l/min
0,6 bar

Perkins 1004-4
59 KW/2200 min⁻¹

15,5 cm³ /U(34,1 l/min)

3,1-4,2 bar
10 mm

Vorsteuerblock
(32 bar)

Option
Klimaanlage

Kompressor

Option
Dosierbare
Hilfsbremsanlage

Handbremsventil
ohne Restdruck

0,5 bar

0,1-2,0 bar
10 mm

Abstützung

Verstellausleger

Stiel

Drehen

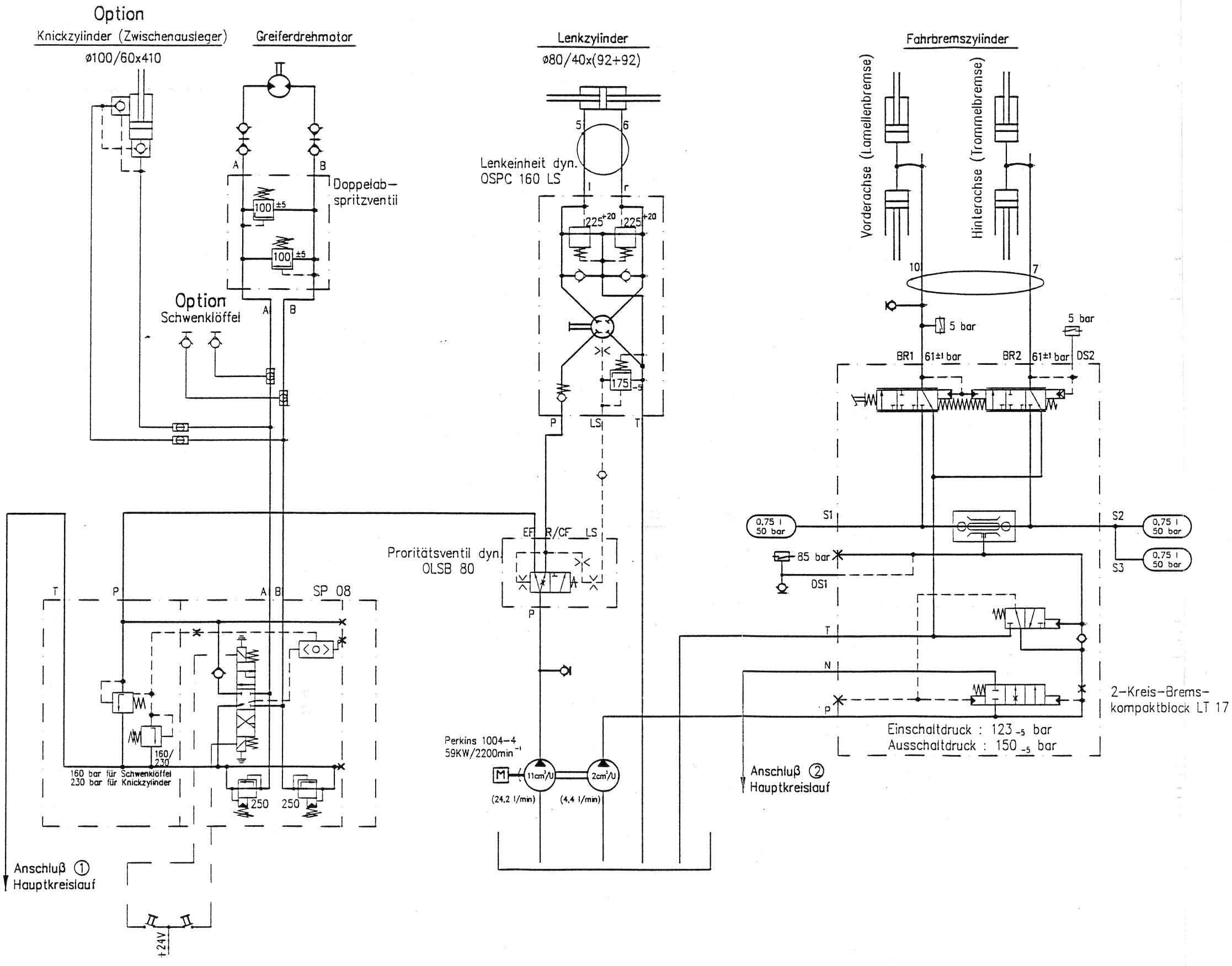
Ausleger

Löffel

Fahren

Sammler

SCHAEFF	Typ/Model/Type: HML 51 S	Datum/Edition/Date: 01.2000
	Benennung/Description/Dénomination: Hydraulic diagram main control circuit	Blatt/Page/Feuille: 4.54.01



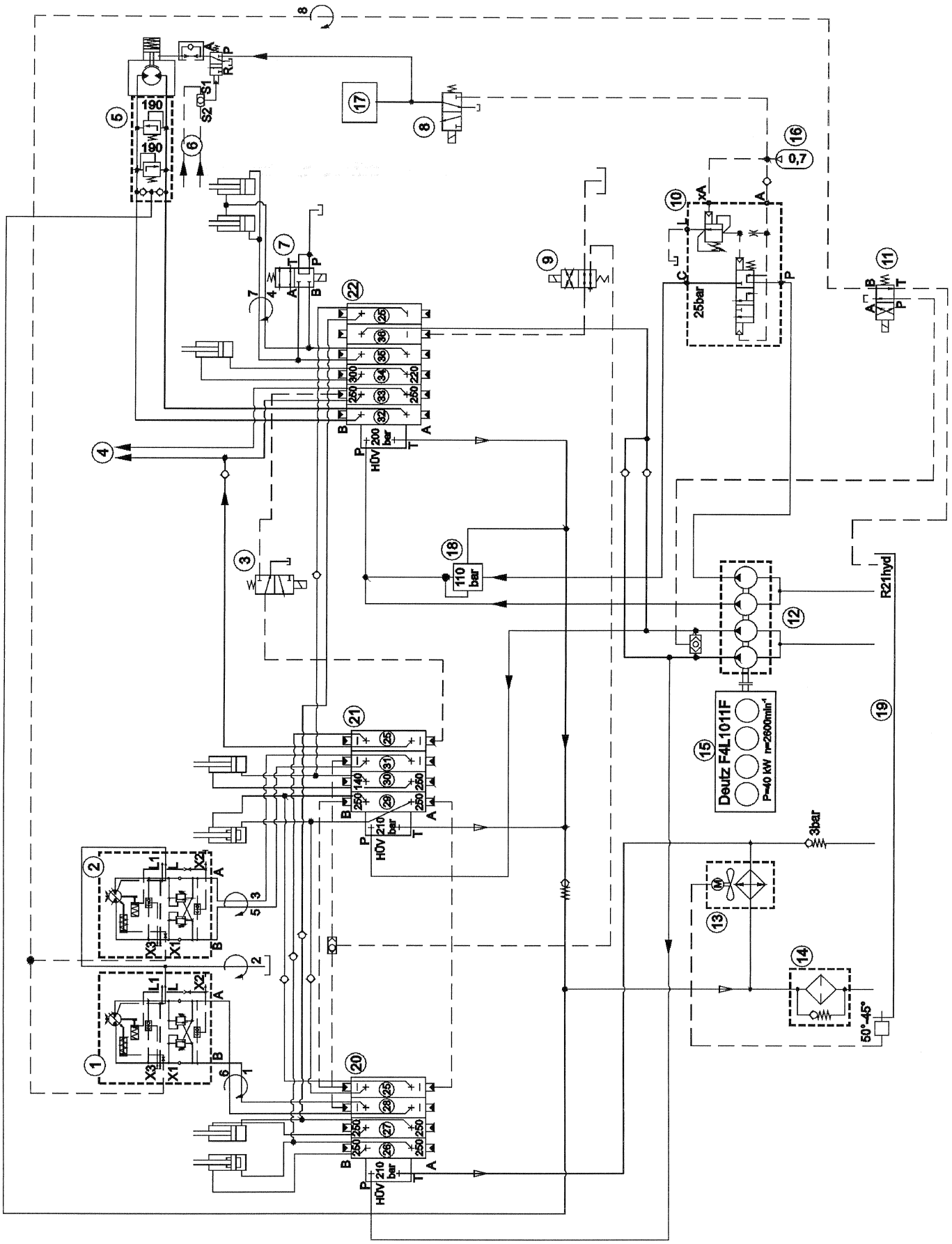
SCHAEFF	Typ/Model/Type: HML 51 S	Datum/Edition/Date: 01.2000
	Benennung/Description/Dénomination: Hydraulic diagram auxiliary control circuit	Blatt/Page/Feuille: 4.54.02

Legend to hydraulic diagram „main control circuit“ HML 51 S

Abstützung	Stabilizing
Abstützzylinder Stützschild	Stabilizing cylinder support blade
Anschluß Nebenkreis	Connection auxiliary control circuit
Ausleger	Boom
Auslegerzylinder mit Option Rohrbruch-ventil und Überlastwarneinrichtung	Boom with cylinder with option hose rupture valve and overload warning device
Drehen	Slewing
Fahren	Travel
Getriebeschaltung	Gear shifting
Getriebeschaltventil	Gear shifting valve
Greifer öffnen	Clamshell grab opening
Greifer schließen	Clamshell grab closing
Handbremsventil ohne Restdruck	Hand brake valve without remaining pressure
Kompressor	Compressor
Lastschaltgetriebe	Load shifting gear
Löffel	Bucket
Löffelzylinder	Bucket cylinder
nur für Krupphammer	only for Krupp hammer
Option Abstützzylinder Stützschild und 2-Punkt-Abstützung	Option stabilizing cylinder support blade and 2-point-stabilizing
Option Dosierbare Hilfsbremsanlage	Option dosing auxiliary brake system
Option Fine-Mode	Option fine-mode
Option Hydro-Hammer	Option hydro-hammer
Option Klimaanlage	Option air conditioning
Option Sperrventil	Option lock valve
Parkbremsventil	Parking brake valve
Pendelachszylinder	Oscillating axle cylinder
Sammler	Collector
Stiel	Stick
Stielzylinder	Stick cylinder
Thermoblock	Thermostatic valve
Verstellausleger	Adjustable boom
Vorsteuerblock	Servo control valve
Zwischenauslegerzylinder	Intermediate boom cylinder

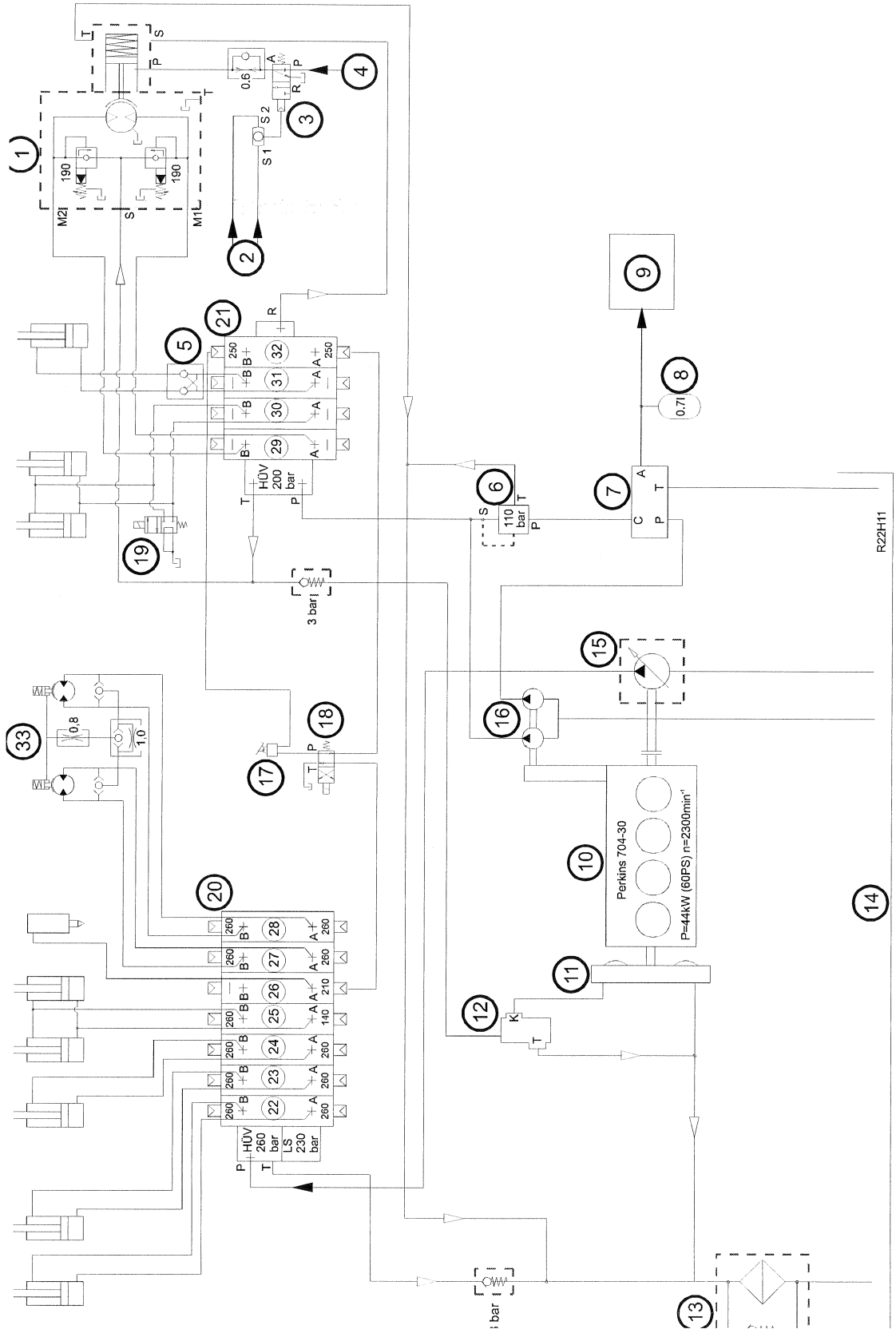
Legend to hydraulic diagram „auxiliary control circuit“ HML 51 S

2-Kreis-Bremskompaktblock	2-circuit-brake valve bank
Anschluß Hauptkreislauf	Connection main control circuit
Ausschaltdruck	Switch-off pressure
Doppelabspritzventil	Line relief valve
Einschaltdruck	Switch-on pressure
Fahrbremszylinder	Travel brake cylinder
für Knickzylinder	For articulation cylinder
für Schwenklöffel	For slow bucket
Greiferdrehmotor	Grab rotation motor
Hinterachse (Trommelbremse)	Rear axle (drum brake)
Lenkeinheit	Steering unit
Lenkzylinder	Steering cylinder
Option Knickzylinder (Zwischenausleger)	Option articulation cylinder (intermediate boom)
Option Schwenklöffel	Option slew bucket
Prioritätsventil	Priority valve
Vorderachse (Lamellenbremse)	Front axle (multi-disk brake)


SCHAEFF
Typ/Model/Type
HR 21
Datum/Edition/Date
01.2000
Benennung/Description/Dénomination
Hydraulic diagram
Blatt/Page/Feuille
4.62.01
Deutz F4L1011F
P=40 kW n=2600min⁻¹
R21hyd
25bar
3bar
110 bar
200 bar
210 bar
0,7
190
50°-45°

Legend to hydraulic diagram

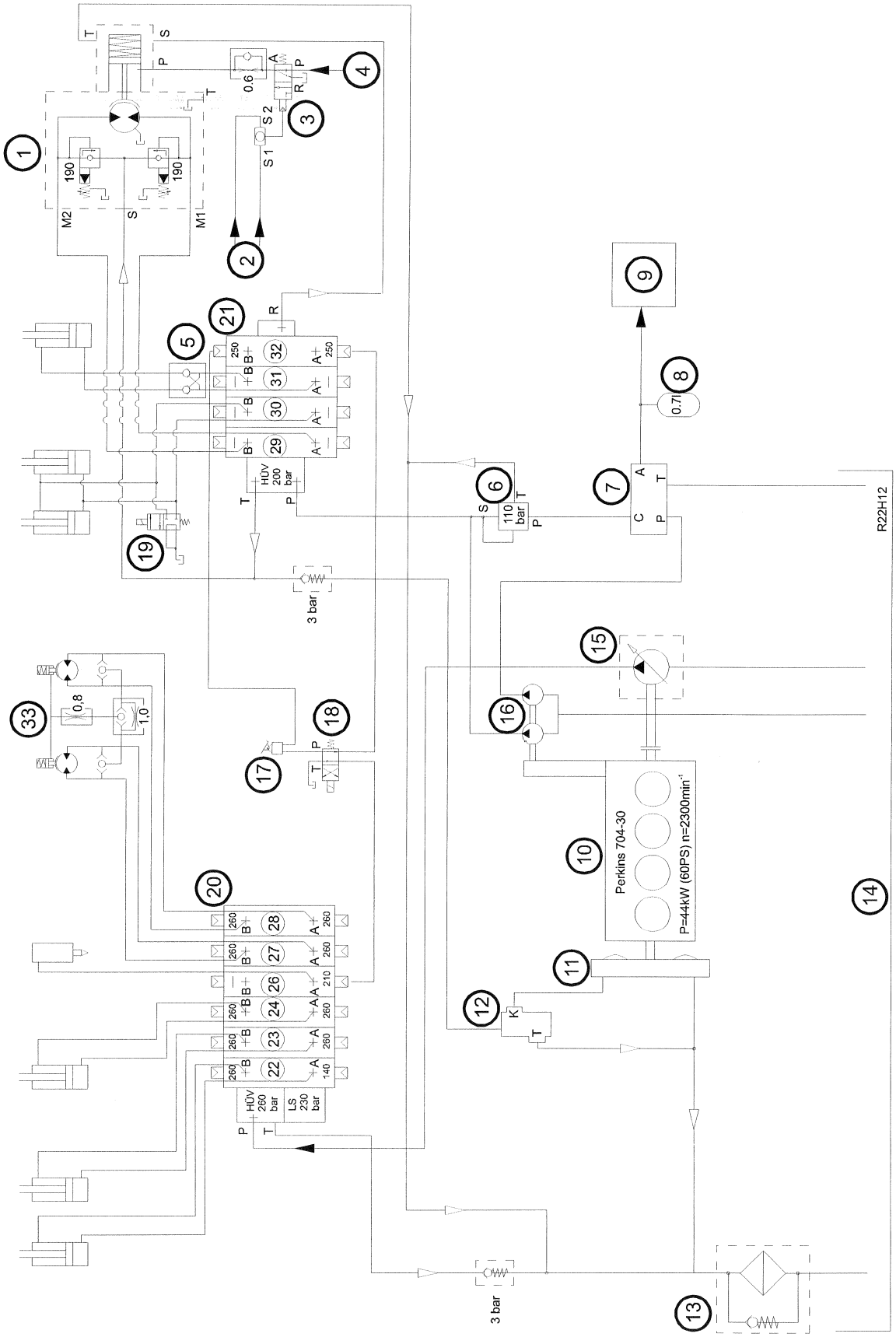
1 Travel motor right
2 Travel motor left
3 Summation of two hydraulic circuits for breaker operation
4 Additional control circuit:
    Grab
    Slew bucket
    Breaker
5 Slew drive
6 Pilot-operated valve "Slewing" a, b
7 Floating position
8 Working hydraulics cut-off
9 Overdrive -pilot-operated valve
10 Control oil unit
11 Fast/slow
12 Excavator pump
13 Hydraulic oil cooler
14 Return line filter
15 Diesel engine
16 Accumulator - pilot pressure
17 Pilot control
18 Cut-off valve
19 Hydraulic oil tank
20 Valve bank 1
21 Valve bank 2
22 Valve bank 3
23 ---
24 ---
25 Summation
26 Boom
27 Bucket
28 Travel right
29 Dipperstick
30 Telescopic stick/intermediate boom
31 Travel left
32 Slewing
33 Additional control circuit
34 Articulation
35 Dozer blade
36 Overdrive



SCHAEFF	Typ/Model/Type **HR 22 (serial no. 121/0124 - 121/0202)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (articulated boom)**	Blatt/Page/Feuille **4.63.01**

Hydraulic installation, articulated boom type

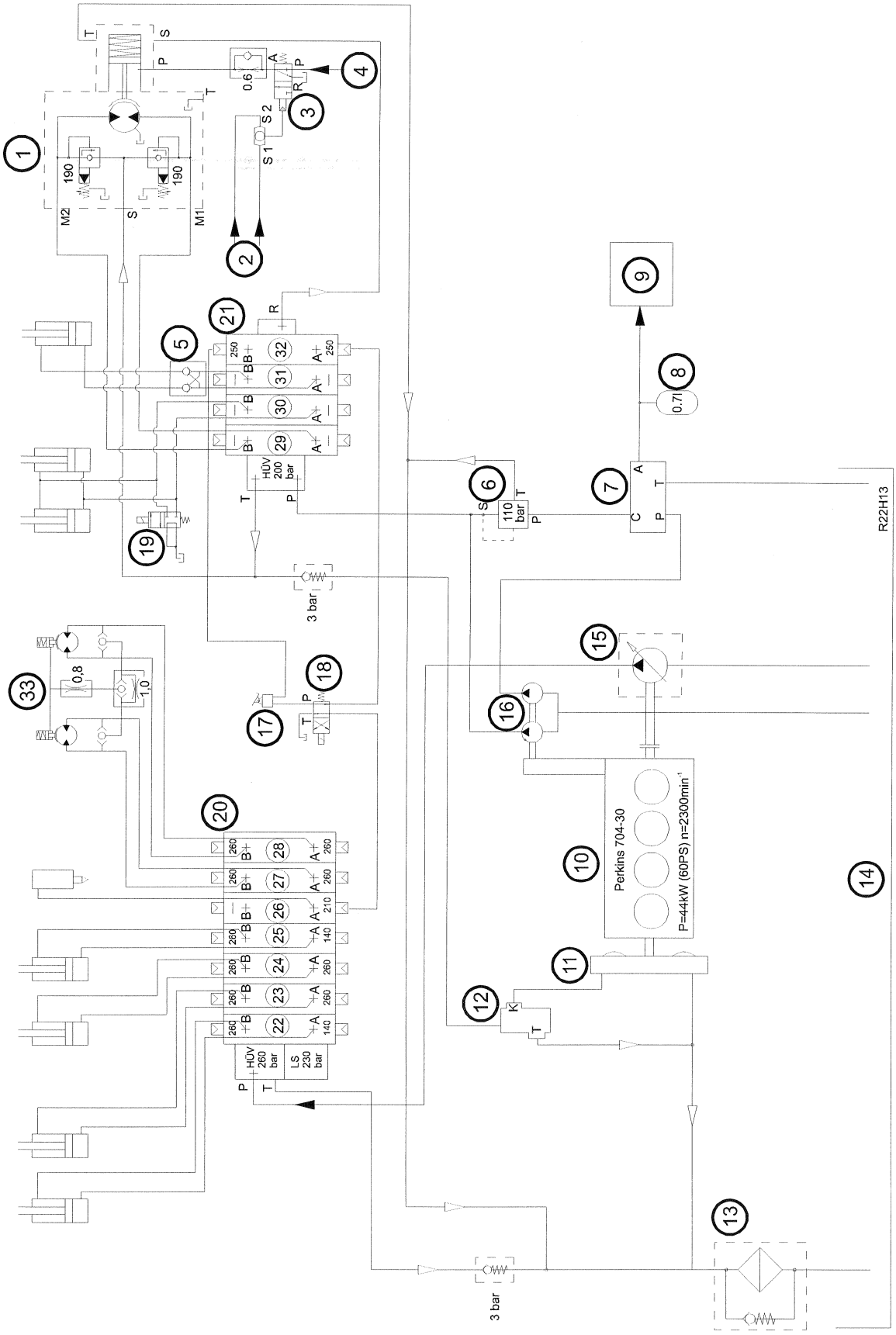
1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Cut-off valve
7	Control oil unit
8	Accumulator - pilot pressure
9	Pilot control
10	Diesel engine
11	Hydraulic oil cooler
12	Hydraulic oil temperature regulator
13	Return line filter
14	Hydraulic oil tank
15	Excavator - variable displacement pump
16	Excavator - gear pump
17	Breaker pedal
18	Reversing valve, breaker - additional control circuit
19	Floating position
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Intermediate boom
26	Breaker
27	Travel left
28	Travel right
29	Slewing
30	Dozer blade
31	Articulation
32	Additional control circuit
33	Transmission



SCHAEFF	Typ/Model/Type **HR 22 (serial no. 121/0124 - 121/0202)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (Mono boom)**	Blatt/Page/Feuille **4.63.02**

Hydraulic installation, Mono boom type

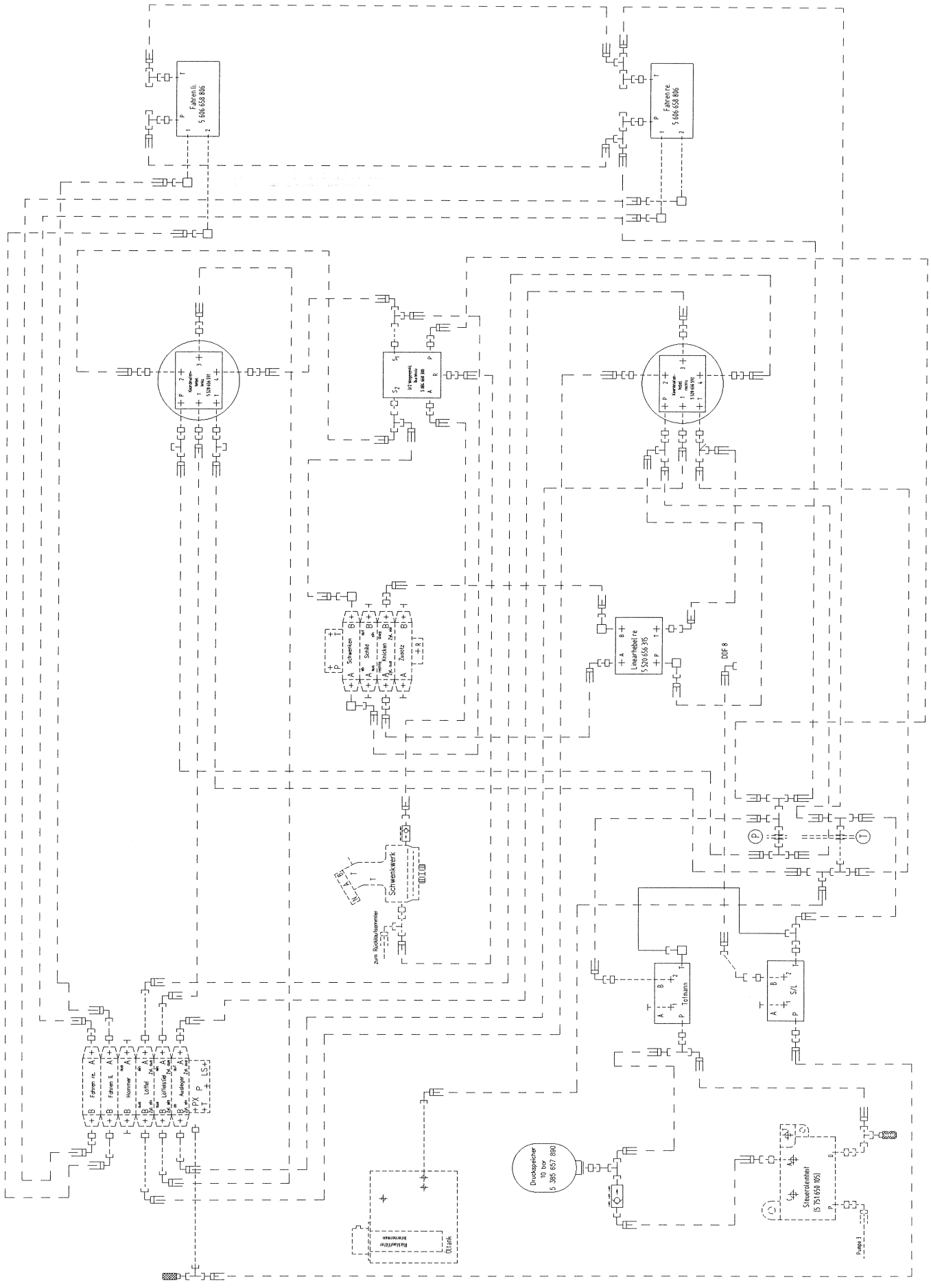
1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Cut-off valve
7	Control oil unit
8	Accumulator - pilot pressure
9	Pilot control
10	Diesel engine
11	Hydraulic oil cooler
12	Hydraulic oil temperature regulator
13	Return line filter
14	Hydraulic oil tank
15	Excavator - variable displacement pump
16	Excavator - gear pump
17	Breaker pedal
18	Reversing valve, breaker - additional control circuit
19	Floating position
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	--
26	Breaker
27	Travel left
28	Travel right
29	Slewing
30	Dozer blade
31	Articulation
32	Additional control circuit
33	Transmission



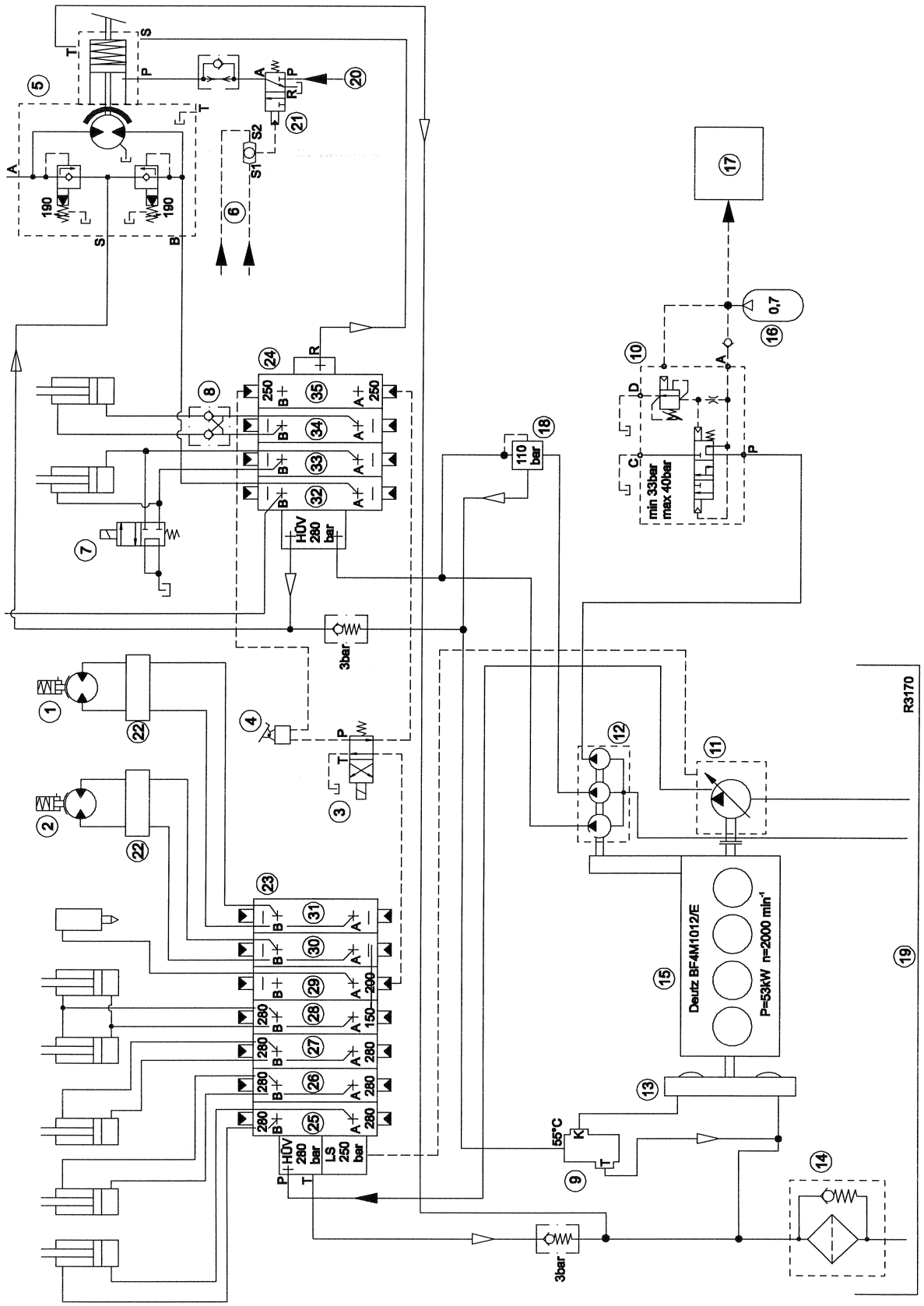
SCHAEFF	Typ/Model/Type **HR 22 (serial no. 121/0124 - 121/0202)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram (telescopic stick)**	Blatt/Page/Feuille **4.63.03**

Hydraulic installation, telescopic stick

1	Slew drive
2	Pilot-operated valve „slewing“ a, b
3	Valve slew brake opening
4	Pilot pressure
5	Twin check valve
6	Cut-off valve
7	Control oil unit
8	Accumulator - pilot pressure
9	Pilot control
10	Diesel engine
11	Hydraulic oil cooler
12	Hydraulic oil temperature regulator
13	Return line filter
14	Hydraulic oil tank
15	Excavator - variable displacement pump
16	Excavator - gear pump
17	Breaker pedal
18	Reversing valve breaker - additional control circuit
19	Floating position
20	Valve bank 1
21	Valve bank 2
22	Boom
23	Dipperstick
24	Bucket
25	Telescopic stick
26	Breaker
27	Travel left
28	Travel right
29	Slewing
30	Dozer blade
31	Articulation
32	Additional control circuit
33	Transmission



SCHAEFF	Typ/Model/Type **HR 22 (serial no. 121/0124-121/0202)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic installation, pilot control**	Blatt/Page/Feuille **4.63.04**

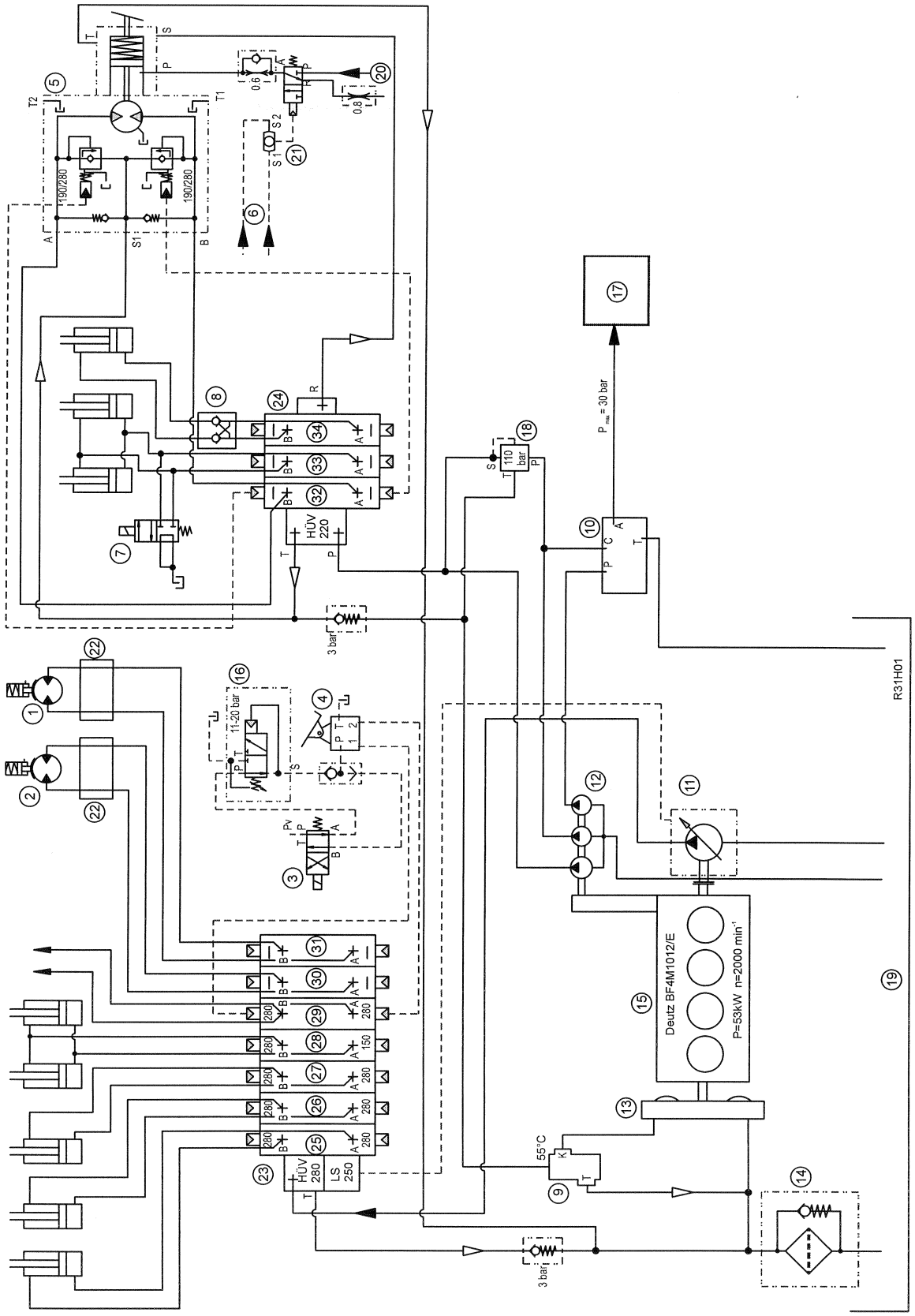


SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	HR 31 (ser. no. 033/2122 up to 033/2182)	02.2001
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram	4.64.01

Hydraulic installation

1	Travel motor, right
2	Travel motor, left
3	Changeover, pilot control - breaker / additional control circuit
4	Pilot-operated valve - breaker / additional control circuit
5	Slew drive
6	Pilot-operated valve "slewing" a, b
7	Floating position
8	Check valve
9	Hydraulic oil temperature regulator
10	Control oil unit
11	Excavator - variable displacement pump
12	Excavator - gear pump
13	Hydraulic oil cooler
14	Return line filter
15	Diesel engine
16	Pilot pressure accumulator
17	Pilot control
18	Cut-off valve
19	Hydraulic oil tank
20	Pilot pressure
21	Valve for slew brake opening
22	Travel brake valve
23	Valve bank 1
24	Valve bank 2
25	Boom
26	Dipperstick
27	Bucket
28	Telescopic stick / intermediate boom
29	Breaker
30	Travel, left
31	Travel, right
32	Slewing
33	Dozer blade
34	Articulation
35	Additional control circuit

Hydraulic system, articulated boom:

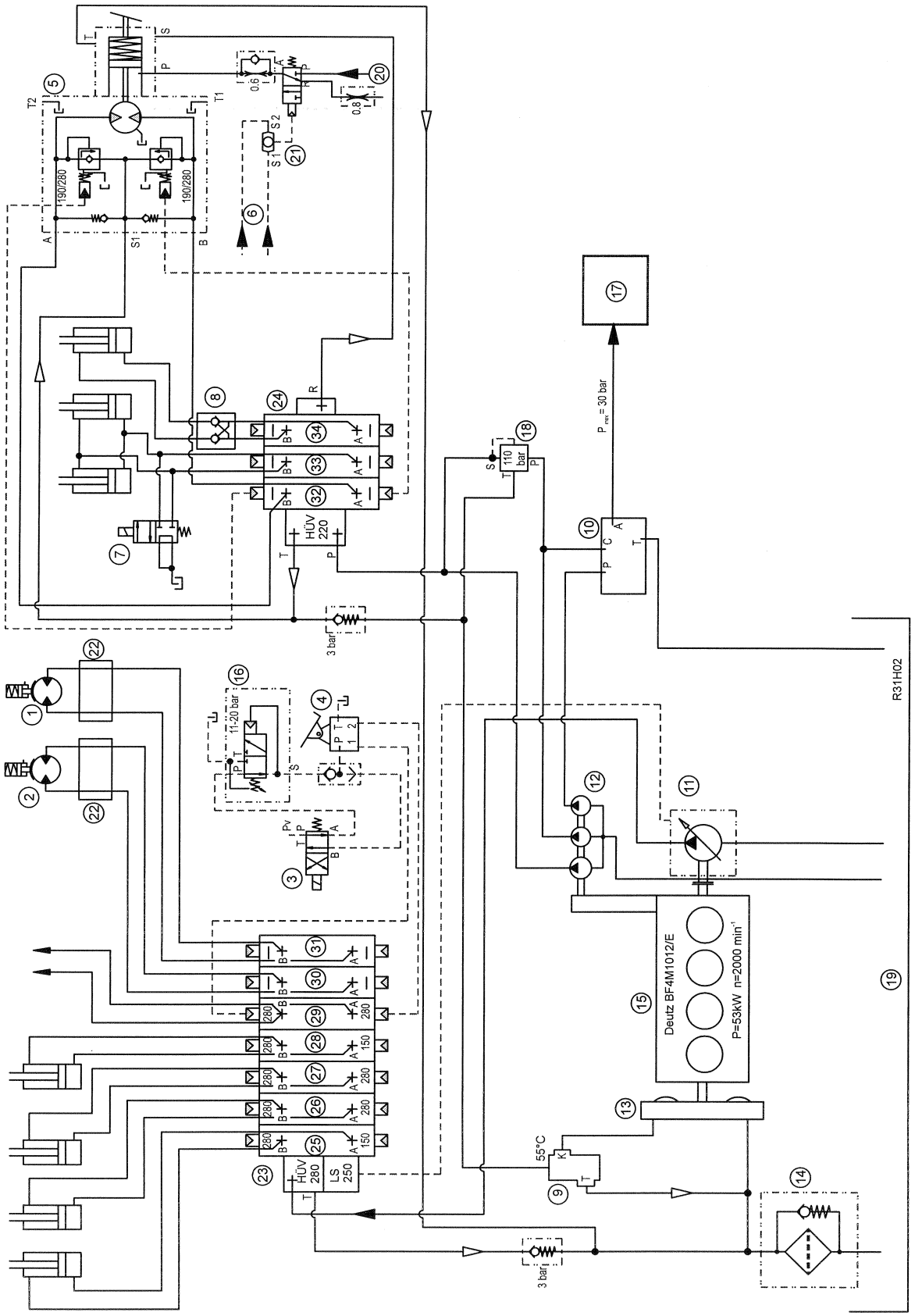


SCHAEFF	Typ/Model/Type **HR 31 (from serial no. 033/2183)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram (articulated boom)**	Blatt/Page/Feuille **4.64.02**

Explanation of hydraulic installation

1	Travel motor, right
2	Travel motor, left
3	Changeover, pilot control - breaker / additional control circuit
4	Pilot-operated valve - breaker / additional control circuit
5	Slew drive
6	Pilot-operated valve "slewing" a, b
7	Float position
8	Dual check valve
9	Hydraulic oil temperature regulator
10	Control oil unit
11	Excavator - variable displacement pump
12	Excavator - gear pump
13	Hydraulic oil radiator
14	Return filter
15	Diesel engine
16	Pressure reducing valve
17	Pilot control
18	Cut-off valve
19	Hydraulic oil tank
20	Pilot pressure
21	Valve for slew brake release
22	Travel brake valve
23	Control valve 1
24	Control valve 2
25	Boom
26	Dipperstick
27	Bucket
28	Intermediate boom
29	Additional circuit / Rock breaker
30	Travel left
31	Travel right
32	Slewing
33	Dozer blade
34	Articulation

Monobloc boom / Telescopic stick:

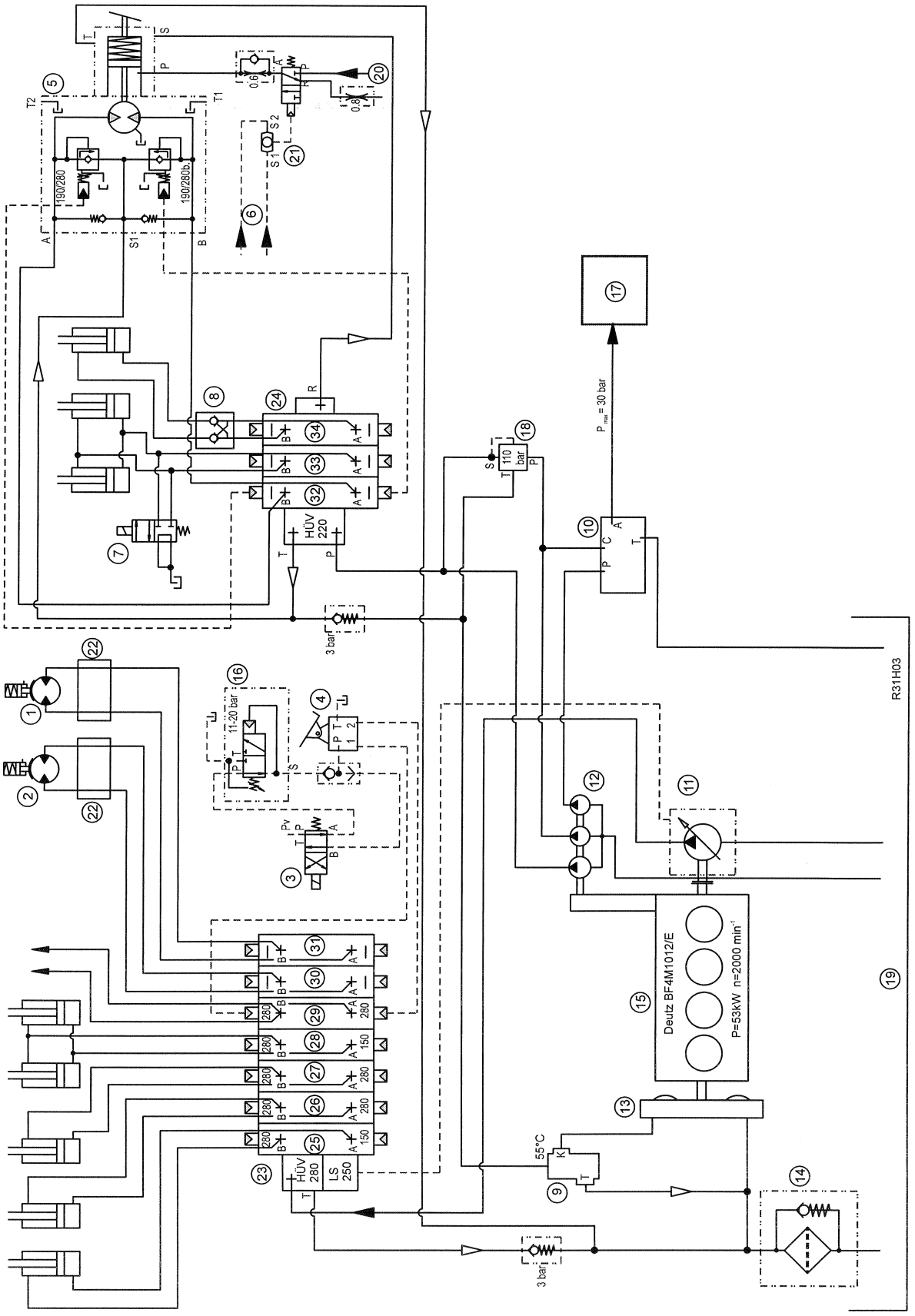


SCHAEFF	Typ/Model/Type **HR 31 (from serial no. 033/2183)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram** **Monobloc boom / Telescopic stick**	Blatt/Page/Feuille **4.64.03**

Explanation of hydraulic installation

1	Travel motor, right
2	Travel motor, left
3	Changeover, pilot control - breaker / additional control circuit
4	Pilot-operated valve - breaker / additional control circuit
5	Slew drive
6	Pilot-operated valve "slewing" a, b
7	Float position
8	Dual check valve
9	Hydraulic oil temperature regulator
10	Control oil unit
11	Excavator - variable displacement pump
12	Excavator - gear pump
13	Hydraulic oil radiator
14	Return filter
15	Diesel engine
16	Pressure reducing valve
17	Pilot control
18	Cut-off valve
19	Hydraulic oil tank
20	Pilot pressure
21	Valve for slew brake release
22	Travel brake valve
23	Control valve 1
24	Control valve 2
25	Boom
26	Dipperstick
27	Bucket
28	Telescopic stick (option)
29	Additional circuit / rock breaker
30	Travel left
31	Travel right
32	Slewing
33	Dozer blade
34	Articulation

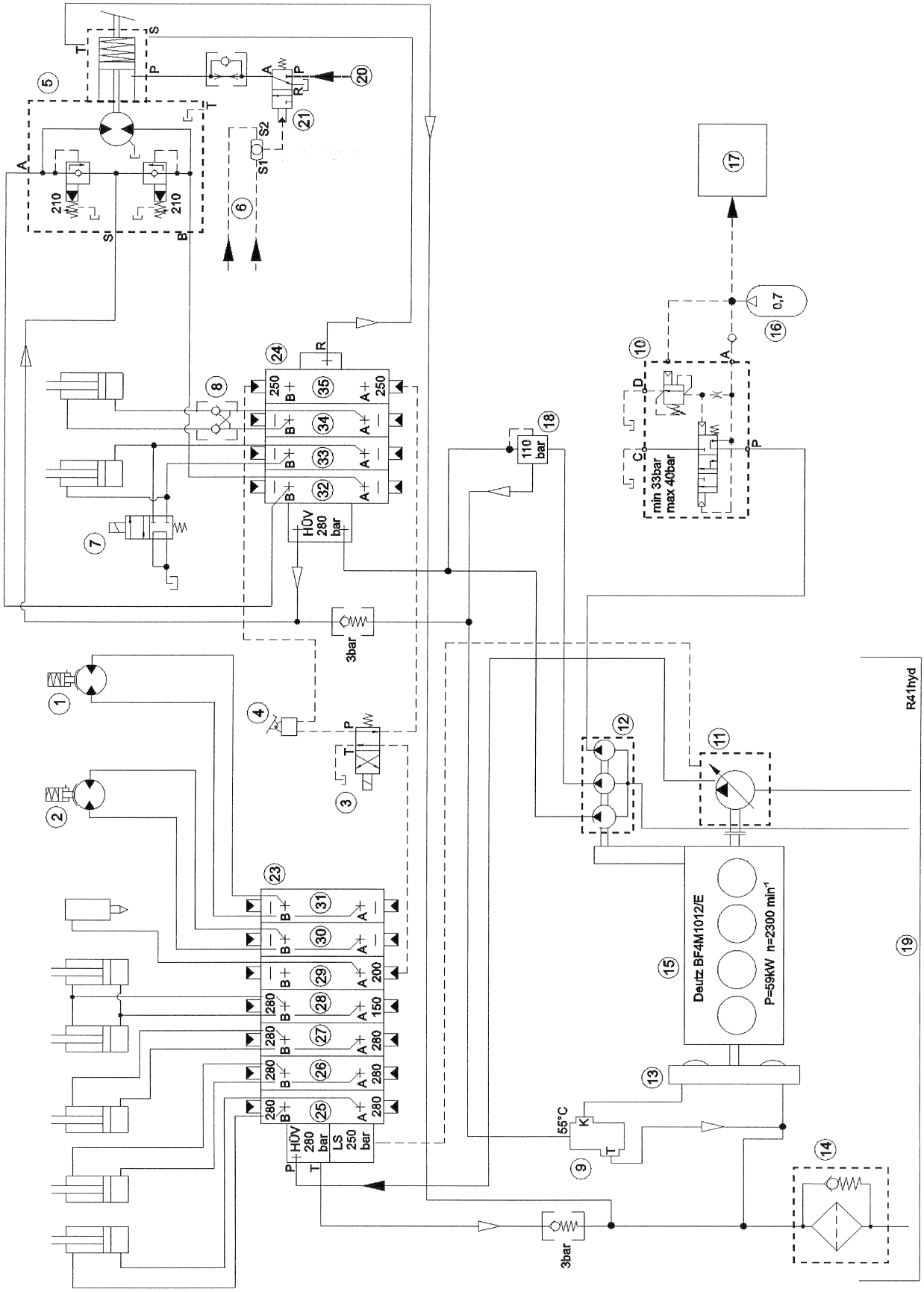
Circular boom:



SCHAEFF	Typ/Model/Type **HR 31 (from serial no. 033/2183)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Hydraulic diagram - Circular boom**	Blatt/Page/Feuille **4.64.04**

Explanation of hydraulic installation

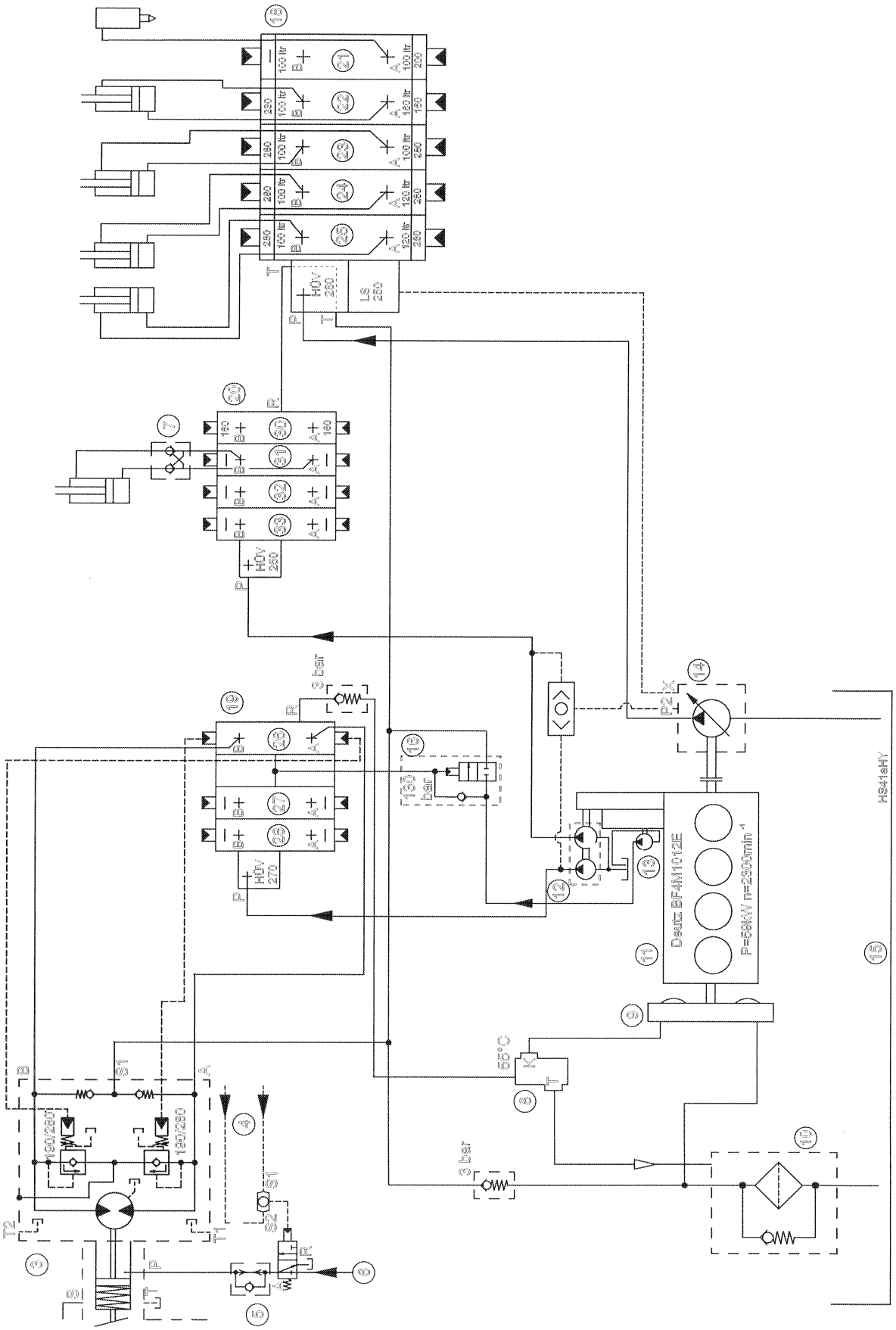
1	Travel motor, right
2	Travel motor, left
3	Changeover, pilot control - breaker / additional control circuit
4	Pilot-operated valve - breaker / additional control circuit
5	Slew drive
6	Pilot-operated valve "slewing" a, b
7	Float position
8	Dual check valve
9	Hydraulic oil temperature regulator
10	Control oil unit
11	Excavator - variable displacement pump
12	Excavator - gear pump
13	Hydraulic oil radiator
14	Return filter
15	Diesel engine
16	Pressure reducing valve
17	Pilot control
18	Cut-off valve
19	Hydraulic oil tank
20	Pilot pressure
21	Valve for slew brake release
22	Travel brake valve
23	Control valve 1
24	Control valve 2
25	Boom
26	Dipperstick
27	Bucket
28	Intermediate boom
29	Additional circuit / Rock breaker
30	Travel left
31	Travel right
32	Slewing
33	Dozer blade
34	Articulation



SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	HR 41	01.2000
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram	4.66.01

Legend to hydraulic diagram

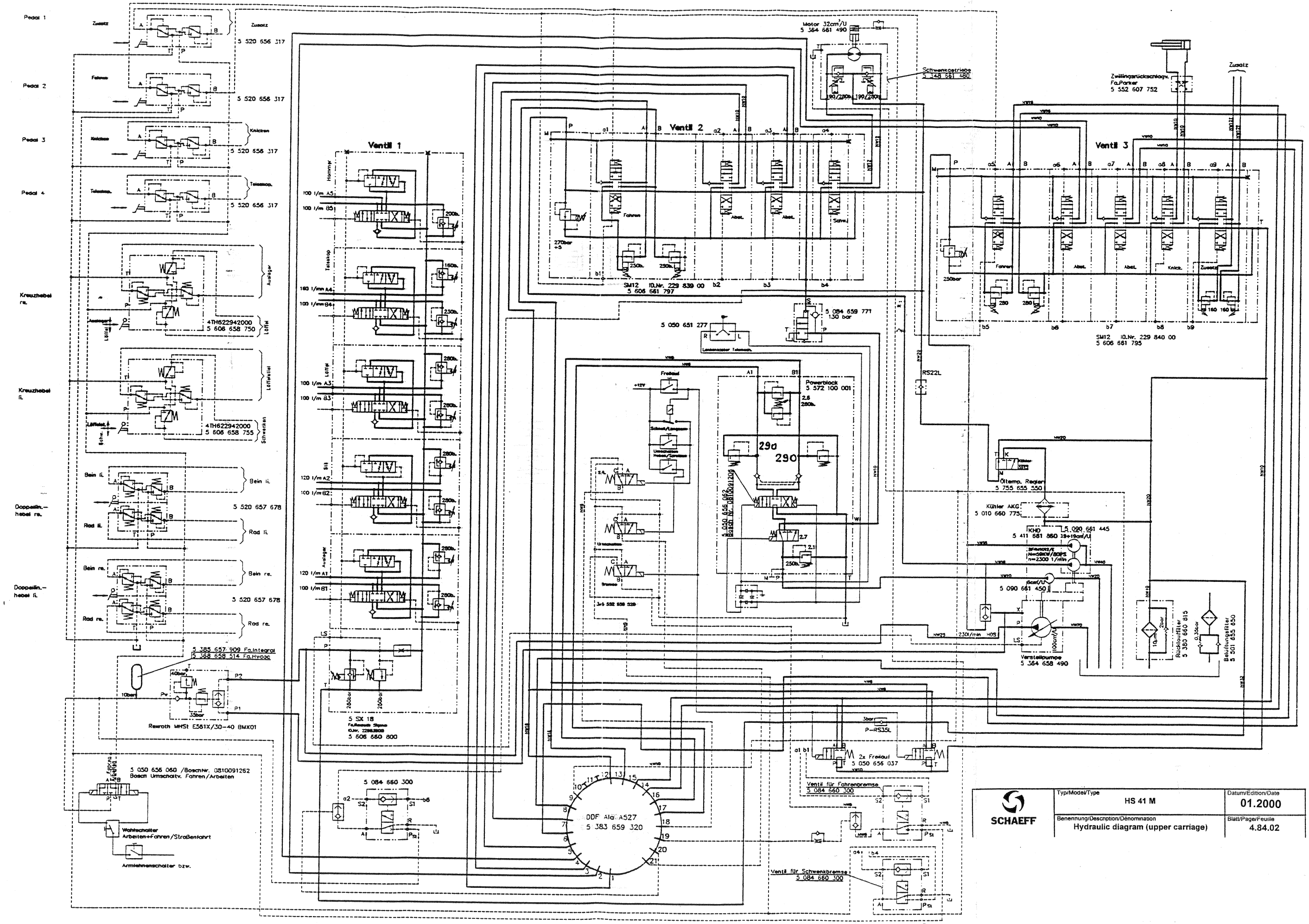
1	Travel motor right
2	Travel motor left
3	Changeover, pilot control - breaker / additional control circuit
4	Pilot-operated valve - breaker / additional control circuit
5	Slew drive
6	Pilot-operated valve "slewing" a, b
7	Floating position
8	Check valve
9	Hydraulic oil temperature regulator
10	Control oil unit
11	Excavator - variable displacement pump
12	Excavator - gear pump
13	Hydraulic oil cooler
14	Return line filter
15	Diesel engine
16	Accumulator - pilot pressure
17	Pilot control
18	Cut-off valve
19	Hydraulic oil tank
20	Pilot pressure
21	Valve slew brake opening
22	---
23	Valve bank 1
24	Valve bank 2
25	Boom
26	Dipperstick
27	Bucket
28	Telescopic stick/intermediate boom
29	Breaker
30	Travel left
31	Travel right
32	Slewing
33	Dozer blade
34	Articulation
35	Additional control circuit



SCHAEFF	Typ/Model/Type **HS 41 M**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram**	Blatt/Page/Feuille **4.84.01**

Explanation of hydraulic installation

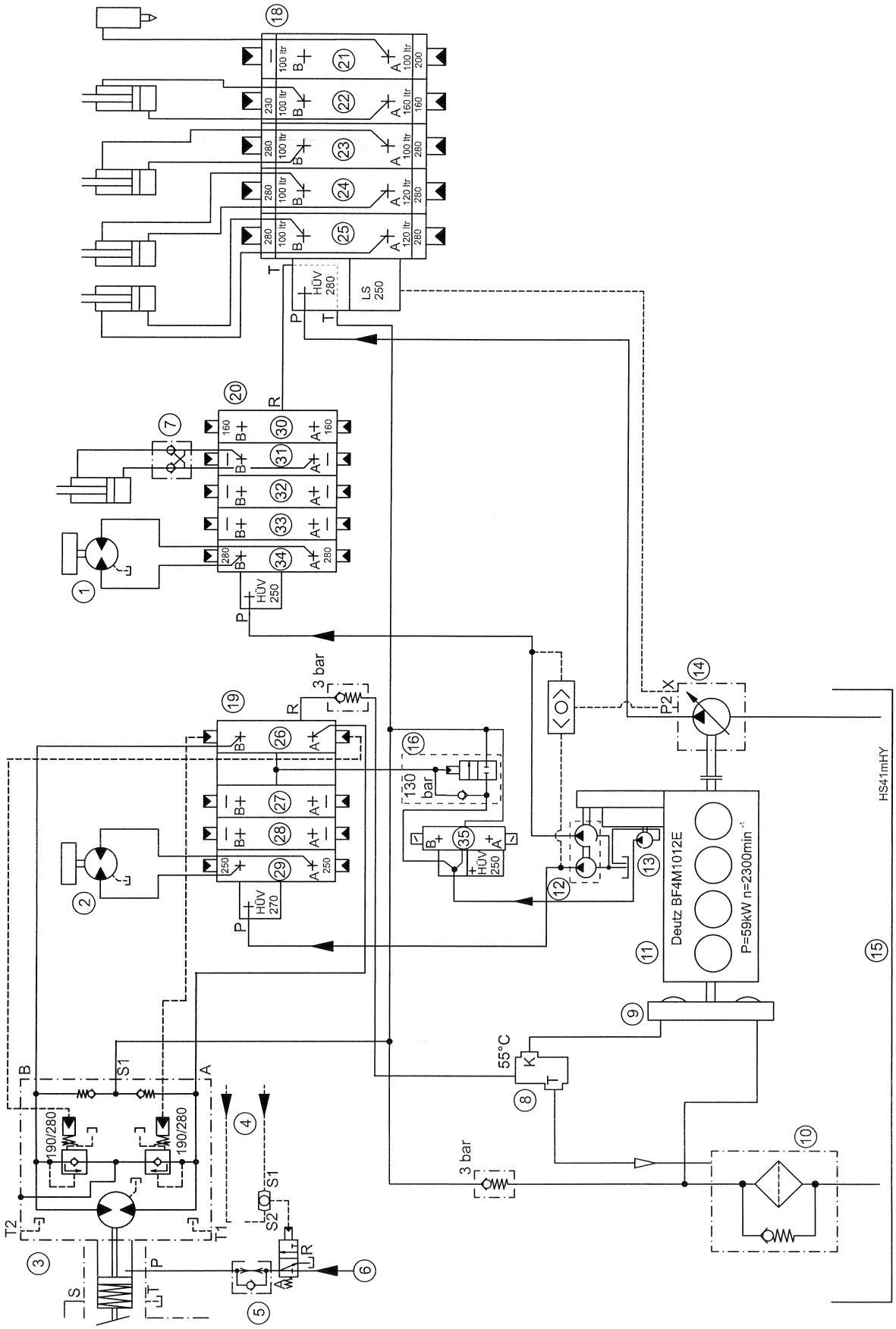
1	---
2	---
3	Slew drive
4	Pilot-operated valve for “slewing” a, b
5	Valve for slew brake release
6	Pilot pressure
7	Pilot-operated valve
8	Hydraulic oil temperature regulator
9	Hydraulic oil radiator
10	Return line filter
11	Diesel engine
12	Gear pump
13	Gear pump
14	Excavator variable displacement pump
15	Hydraulic oil tank
16	Cut-off valve
17	--
18	Valve bank 1
19	Valve bank 2
20	Valve bank 3
21	Breaker
22	Telescopic stick
23	Bucket
24	Dipperstick
25	Boom
26	Slewing
27	Outrigger, rear right (wheel)
28	Outrigger, rear left (wheel)
29	---
30	Additional control circuit
31	Articulation
32	Outrigger, front right (leg)
33	Outrigger, front left (leg)



SCHAEFF	Typ/Model/Type: HS 41 M	Datum/Edition/Date: 01.2000
	Benennung/Descnption/Dénomination: Hydraulic diagram (upper carriage)	Blatt/Page/Feuille: 4.84.02

Legend - Hydraulic diagram (upper carriage) HS 41 M

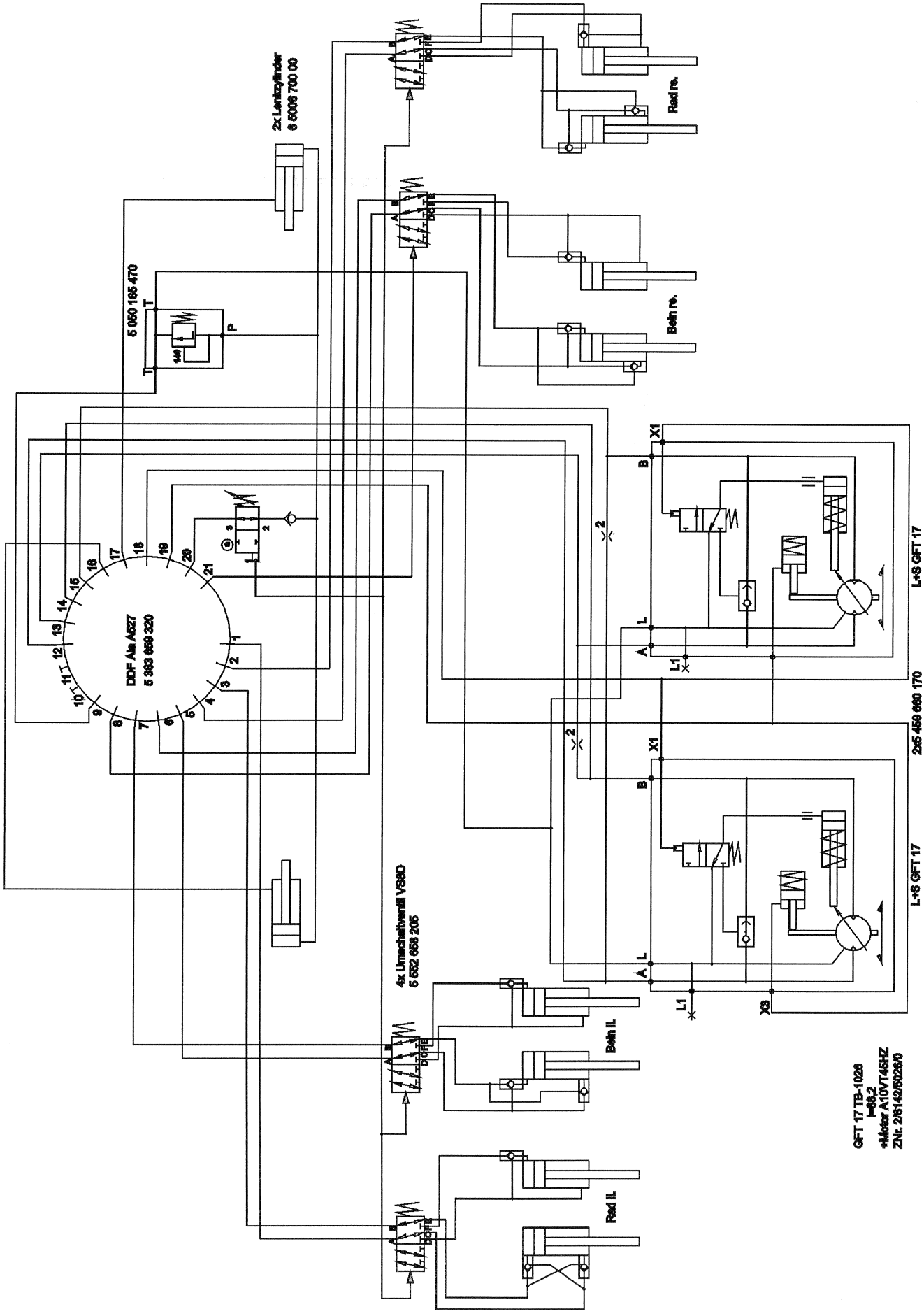
Abst.	stabilizer
Armlehnenschalter bzw. Taster	armrest switch resp. push button
Ausleger	boom
Bein li.	leg, left
Bein re.	leg, right
Belüftungsfilter	ventilation filter
Bremse	brake
DDF	rotary transfer
Doppellin.-hebel li.	double linear lever, left
Doppellin.-hebel re.	double linear lever, right
Fahren	travel
Freilauf	free-wheel
Hammer	breaker
Knicken	articulation
Kreuzhebel li.	cross control lever, left
Kreuzhebel re.	cross control lever, right
Kühler	cooler
Lenkentaster	steering switch
Löffel	bucket
Löffelstiel	dipperstick
Motor	engine
Öltemp.Regler	oil temperature regulator
Pedal	pedal
Rad li.	wheel, left
Rad re.	wheel, right
Rücklauffilter	return line filter
Schwenken	slewing
Schwenkgetriebe	slew gear
Stiel	stick
Teleskop	telescopic stick
Umschalten	switch-over
Umschaltv. Fahren/Arbeiten	switch-over valve travel/working
Ventil	valve bank
Ventil für Fahrenbremse	valve for travel brake
Ventil für Schwenkbremse	valve for slew brake
Verstellpumpe	variable displacement pump
Wahlschalter Arbeiten+	selector switch working +
Fahren/Straßenfahrt	travel/driving on roads
Zusatz	additional circuit
Zwillingsrückschlagv.	twin check valve



SCHAEFF	Typ/Model/Type	Datum/Edition/Date
	HS 41 M	**01.2000**
	Benennung/Description/Dénomination	Blatt/Page/Feuille
	Hydraulic diagram	**4.85.01**

Explanation of hydraulic installation

1	Travel motor, right
2	Travel motor, left
3	Slew drive
4	Pilot-operated valve for “Slewing” a, b
5	Valve for slew brake release
6	Pilot pressure
7	Pilot-operated valve
8	Hydraulic oil temperature regulator
9	Hydraulic oil radiator
10	Return filter
11	Diesel engine
12	Excavator gear pump
13	Steering gear pump
14	Excavator variable capacity pump
15	Hydraulic oil tank
16	Cut-off valve
17	--
18	Valve bank 1
19	Valve bank 2
20	Valve bank 3
21	Rock breaker
22	Telescopic stick
23	Bucket
24	Dipperstick
25	Boom
26	Slewing
27	Outrigger, rear right (wheel)
28	Outrigger, rear left (wheel)
29	Travel, left
30	Additional control circuit
31	Articulation
32	Outrigger, front right (leg)
33	Outrigger, front left (leg)
34	Travel, right
35	Steering



SCHAEFF	Typ/Model/Type **HS 41 M**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Hydraulic diagram undercarriage**	Blatt/Page/Feuille **4.85.03**

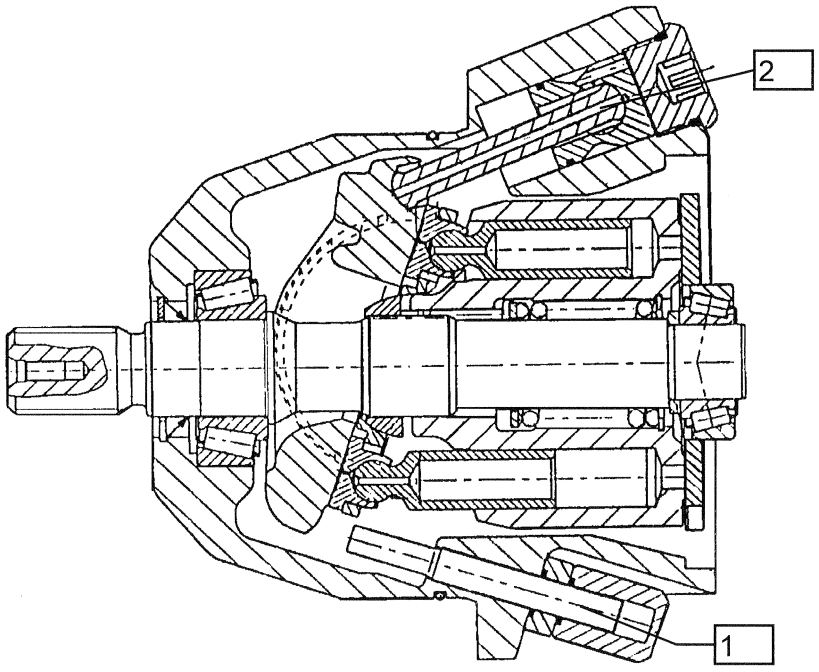
SUBGROUP LIST

Setting instructions

HS 41 M	**Steering valve**	**5.85**
HML 51 S	**Setting values**	**5.540**
SKL 843 **SKL 853**	**Working hydraulics**	**5.600**

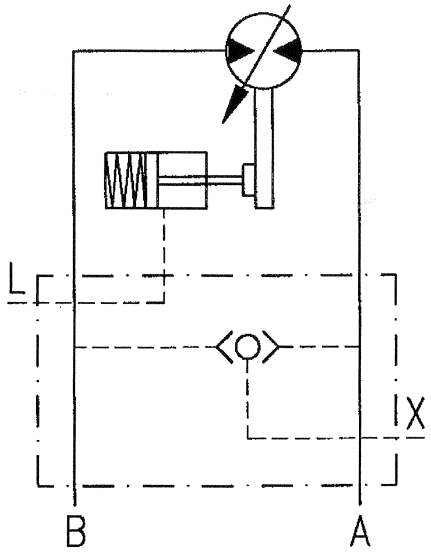
TEREX | SCHAEFF

- Operate the machine until it reaches a hydraulic oil temperature of + 60° C (jack up)
- Connect 600 bar - gauge to gauge port of the valve bank VOAC L90LS
- The circuit pressures have to be nearly identical in „forward“ and „reverse“ position as well as on the „right“ and on the „left“
- Circuit pressures: Travel range I approx. 100 bar with both tracks
  Travel range II approx. 120 bar with both tracks
- Apply colour markings at both travel gears (sprocket side)
- Set diesel engine to max. rpm (2,500 min^{-1})
- Select travel range I (tortoise)
- Adjust the spool stroke limitation at the valve bank VOAC L 90 LS in such a manner that an rpm value of 23 - 24 min^{-1} is reached at the sprocket when both tracks are operated „forward“ and „reverse“
- Setting of travel range II (rabbit) **(up to serial no. 121/0160)**
  Adjust swash plate stop bolt (1) at the right and left travel motor in such a manner that a value of 42 min^{-1} is reached at each sprocket
- Travel range II (rabbit) **(from serial no. 121/0161)**
  not adjustable any more. There is no setscrew (1).

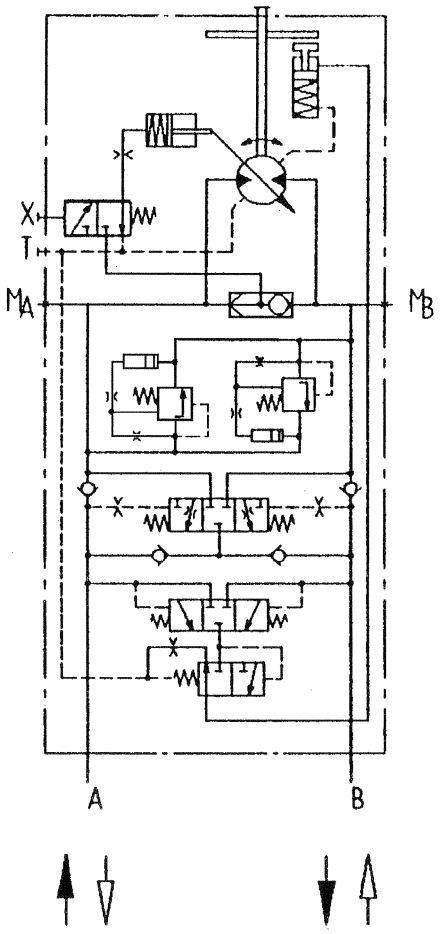


1 - swash plate stop bolt
2 - piston quick / slow

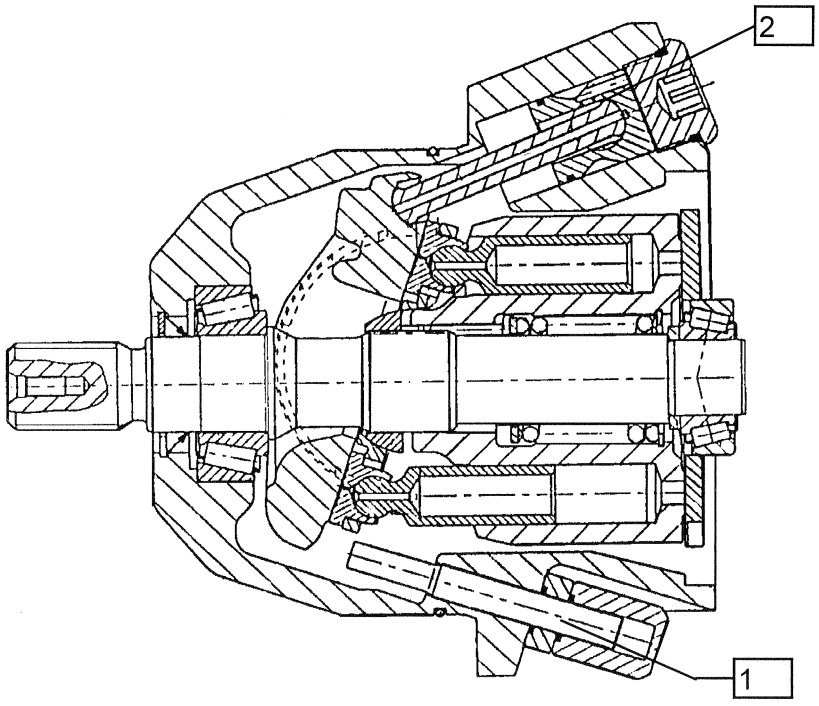
Diagram, travel motor HR 22, from serial no. 121/0124 to serial no. 121/0160



Diagram, travel motor, HR 22, from serial no. 121/0161

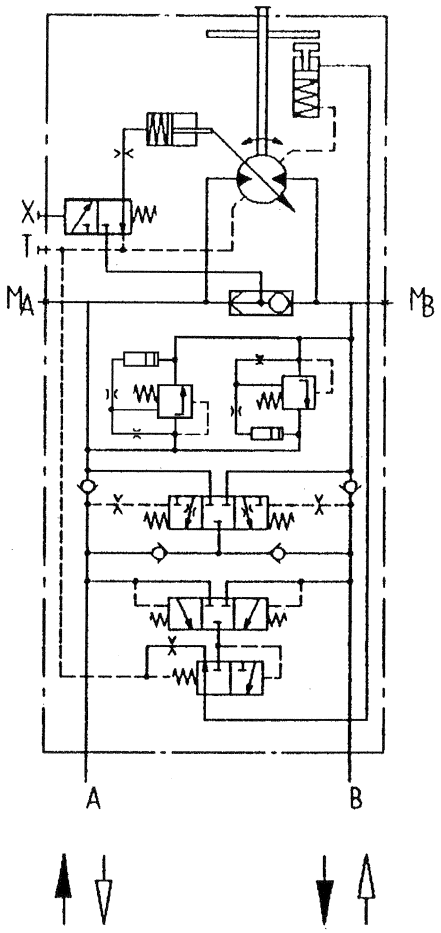


- Operate the machine until it reaches a hydraulic oil temperature of + 60° C (jack up)
- Connect 600 bar - gauge to the gauge port of the Rexroth valve bank SX 18
- The circuit pressures have to be nearly identical in „forward“ and „reverse“ position as well as on the „right“ and on the „left“
- Circuit pressures: Travel range I approx. 80 bar with both tracks
  Travel range II approx. 110 - 120 bar with both tracks
- Apply colour markings at both travel gears (sprocket side)
- Set diesel engine to max. rpm (2,150 min^{-1})
- Select travel range I (tortoise)
- Adjust spool stroke limitation at the valve bank Rexroth SX 18 in such a manner that an rpm value of 21 min^{-1} is reached at the sprocket when both tracks are operated „forward“ and „reverse“
- Setting of travel range II (rabbit)
  Adjust swash plate stop bolt (1) at the right and left travel motor in such a manner that a value of 36 min^{-1} is reached at each sprocket

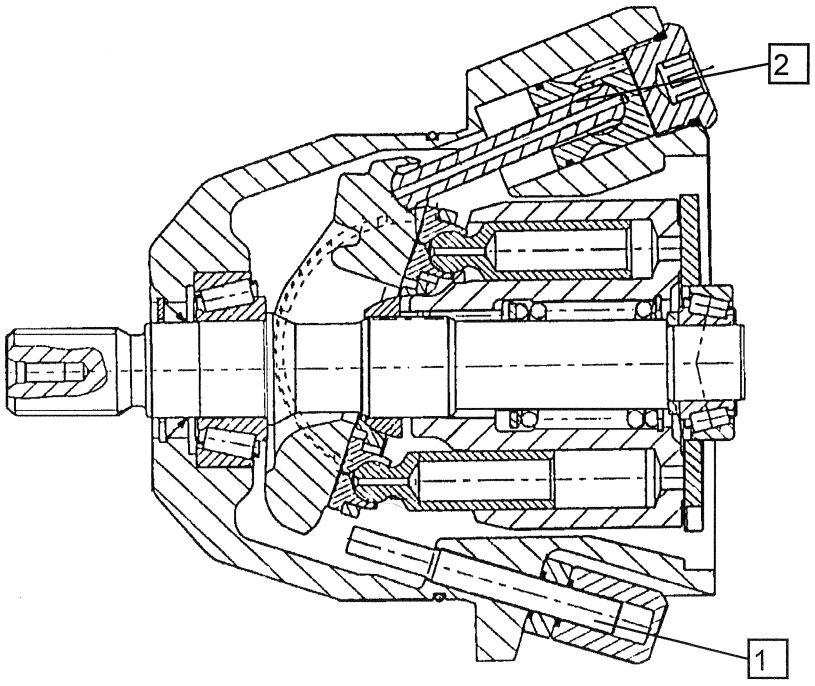


1 - swash plate stop bolt
2 - piston quick / slow

Diagram, travel motor HR 31, from serial no. 033/2122

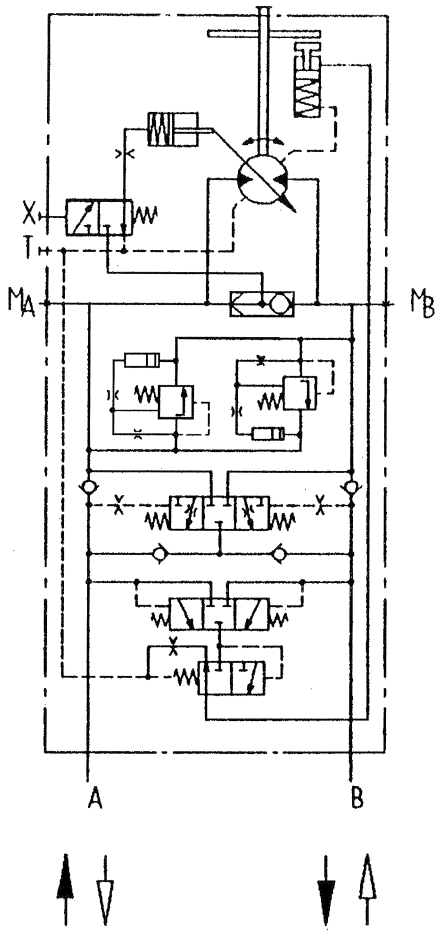


- Operate the machine until it reaches a hydraulic oil temperature of + 60° C (jack up)
- Connect 600 bar - gauge to gauge port of the Rexroth valve bank SX 18
- The circuit pressures have to be nearly identical in „forward“ and „reverse“ position as well as on the „right“ and on the „left“
- Circuit pressures: Travel range I approx. 100 bar with both tracks
  Travel range II approx. 125 bar with both tracks
- Apply colour markings at both travel gears (sprocket side)
- Set diesel engine to max. rpm (2,300 min^{-1})
- Select travel range I (tortoise)
- Adjust spool stroke limitation at the Rexroth valve bank SX 18 in such a manner that an rpm value of 23 min^{-1} is reached at the sprocket when both tracks are operated „forward“ and „reverse“
- Setting of travel range II (rabbit)
  Adjust swash plate stop bolt (1) at the right and left travel motor in such a manner that a value of 39 min^{-1} is reached at each sprocket.



1 - swash plate stop bolt
2 - piston quick / slow

Diagram, travel motor HR 41, from serial no. 331/0200



SUBGROUP LIST
Functioning description

SKL 877	Description raise/lower height-adjustable cabin	**6.15**
HML 51S	Functioning description of machine Adjustment of the power limitation, variable displacement pump Description of lowering lock valve Illustration variable displacement pump Illustration travel motor Illustration slew motor Description of Synchro Control System	6.54
HS 41/41M	Description and hydraulic diagram, steering	**6.85**
HR 21/HR41	Control oil unit SPV/SPX pilot control	**6.620**
HML 22/31/41 **HR 22/31/41** **SMB 2041** **HS 41/41M**	Monitoring module, dashboard	**6.900**

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The 3rd solenoid valve is activated by a rocker switch. This valve contains a double shock valve (up + down). To raise the cabin, the oil is supplied to the hydraulic cylinder (bottom side) of the height-adjustable cab via an adjustable throttle valve and a hose rupture valve (40 ltr.). The corresponding valve is opened by the pressure built up during raising and lowering .

In case of hose rupture thus resulting in excessive oil flow, the hose rupture valve, which is installed at the cylinder bottom side, closes to a minimum and the cabin is lowered very slowly. There are ball cock valves for emergency lowering in the cabin and directly at the hydraulic tank. In the hydraulic line (piston rod side) there is an anti-cavitation valve (check valve) which becomes effective in case of emergency lowering.

1. General

The HML 51 S is equipped with a load-sensing hydraulic system (oil flow demand regulation). This system consists of:

1.) an axial piston pump for the main circuit with flanged pilot control pump
2.) a double Bosch pump for steering and service brake
3.) a base valve plate with flanged pressure cut-off and one valve section (control spool) for each of the following functions: Travel, slewing, boom cylinder, intermediate boom cylinder, dipperstick cylinder and bucket cylinder.

2. Functioning of the hydraulic system

Prior to the diesel engine's start, the pump is held in max. displacement by a spring. A stand-by pressure of 28 - 45 bar (at test point P at the valve bank) is built up between the pump (pump regulator) and the valve bank immediately after starting. The big setting piston is activated via the pump regulator and the pump slews to min. pump displacement. The stand-by pressure remains constant.

When the control spool is actuated and the oil is supplied to a consumer (e.g. lifting cylinder), the LS-regulator at the pump receives a signal, coming from the valve bank via the LS-line, to slew the pump to a larger displacement.

Inside the pump there is a small setting piston (Q max.), supported by a pressure spring, and a big setting piston (twice as large), which resets the pump to Q min.

Example: When a valve bank spool is activated, a specific quantity of oil is sent to the consumer. Via the LS-line, a signal is sent to the LS-pump regulator which sets the pump to the necessary oil flow. Each valve section is pre-set to a determined oil flow by a limit screw. If some or all valve sections are used simultaneously, the pump is regulated to more flow. Now the oil flow, however, is smaller than the flow which all valve sections could process due to their adjustments. The consumers receive a corresponding percentage of the oil flow from the pump, fed through each section. That means that all functions gradually slow down simultaneously. Since all sections have different working pressures, the pump regulation is dominated by the highest pressure.

3. Description of the individual functions

a.) Travel

The control piston of the pilot control valve (2 pedals) continuously varies from 0 to 32 bar. The variable displacement travel motor is at Q min. = highest rpm. As the pressure rises, the motor regulates to Q max. and the rpms decrease. The dual brake valve, flanged to the travel motor, is activated when the travel pressure decreases.

If, in downhill travel, the pressure in front of the travel motor decreases or collapses completely, the brake valve closes and throttles the oil flow coming from the travel motor. Two 420 bar pressure relief valves (forward-reverse) prevent an overload.

When the parking brake is closed, the P control line to the travel control valve is cut off by a solenoid valve (machine does not move anymore).

2. Slewing

Gently activate the slewing function with the control lever. When the slewing procedure stops, the slew motor continues turning by the mass of the machine (boom with grab bucket) and, as the control piston is only possible in a blocked version in the load-sensing system, the return flow from the slew motor is braked by the slow return of the control lever or control piston. Two pressure relief valves (220 bar) incorporated in the slew motor safeguard the slew system. Both anticavitation valves are integrated in the slew section (valve bank).

Between the valve plate and the slew section there is a valve plate with a pressure relief valve which activates the slew pressure at the slew motor from 0 to 205 bar via a shuttle valve (slewing right - left) depending on the activated pilot control pressure. A sensitive slewing movement is herewith achieved.

Both control lines are connected to a shuttle valve which when slewing (right or left) activates a hydraulic valve with the control pressure which opens the spring-loaded disk brake via an adjustable throttle (see slew brake).

2a. Slewing

In the slew motor two pilot-operated line relief valves with pressure hook-up 110 - 230 bar are installed.

When slewing right or left both line relief valves receive pilot control pressure. Thus they reach the (higher) line relief pressure of 230 bar. Before the slewing procedure is stopped, the pilot control pressure decreases. The valves already open at 110 bar so that the upper carriage has a softer stop.

3. Raise and lower boom

The A-port of the valve section (hydraulic cylinder bottom side) is for raising, the B-port (hydraulic cylinder rod side) for lowering.

A throttle for lowering is not available. At the valve section A-port there is a check valve which safeguards the lifting cylinder or the boom against lowering during road travel.

4. Intermediate boom

The section intermediate boom is activated with a control valve (foot pedal). The intermediate boom cylinders are safeguarded against retracting and extending by two check valves flanged to the valve section.

5. Retract and extend dipperstick cylinder

When extending, the A-port of the valve section (hydraulic cylinder bottom side) is activated, when retracting, it is the B-port. In the base valve plate behind the flanged section (B-port) an adjustable lowering throttle is installed.

6. Open and close bucket or grab

With the A-port valve section the hydraulic cylinder bottom side of the bucket cylinder or grab cylinder is extended. In this line there is a 3-way ball cock valve at the dipperstick for changing to grab operation.

7. Dozer blade up and down

All hydraulic cylinders or feed lines have check valves (lock valves) at the bottom and rod ends.

8. Breaker operation (additional equipment)

For breaker operation a valve section is additionally installed at the valve plate (valve bank). This section is only connected to the A-port. The return oil of the breaker is fed back to the tank. The installed line relief valve is adjusted according to the specifications of the breaker manufacturer.

9. Pilot pressure

The pilot pressure is provided by the smaller auxiliary pump flanged to the main hydraulic pump (Linde). The oil flows into a pilot control block in which a pressure relief valve backs up the oil to 35 - 40 bar and a pressure relief valve leading the constant pressure of 32 bar to the control circuit. A check valve, pressure accumulator (0.7 ltr. 15 bar) and a test port are installed in the pilot control valve bank or screwed directly resp.

10. Pilot control circuit

All manually and solenoid-operated control valves are connected to the pilot control circuit.

A triple solenoid valve supplies the different functions (starting from P inlet port):

1. Valve for control valves in armrest (working hydraulics)
2. Valve for oscillating axle lock
3. Valve for pilot control valve travel (forward - reverse)

The solenoid valve no. 1 located in the instrument panel and manually switched with the armrest and proximity switch, situated at the maintenance access stairs, blocks all functions of the manual control valves in the armrests.

Attention: When the parking brake is closed and the engine is shut off, the electric circuit to this valve is interrupted, too. In order to be able to lower the working equipment even if the engine is turned off, push the by-pass switch at the instrument panel.

11. Oscillating axle lock

When the service brake is activated, the solenoid valve no. 2 (oscillating axle lock) is switched off via the brake light switches. With the rocker switch at the instrument panel, the oscillating axle can be locked when the service brake is released.

When the working function is switched on, the brake lights are out of order. The oscillating axle is closed automatically with the service brake. When the working function (road travel) is switched off, the brake lights are active. In addition, the oscillating axle solenoid valve gets current and remains open while braking.

12. Gear shifting - parking brake (combination)

The gear can be shifted during travel. A shift safeguard prevents the shifting back from high speed to low speed when the speed is too high.

From the pilot control circuit (32 bar) the valve block for gear shifting and parking brake is supplied via a 0.5 bar check valve. The following parts are installed or assembled in the valve block:

1. A remaining pressure brake valve (pressure relief valve 11 bar)
2. The parking brake valve (1st solenoid valve with emergency locking)
3. The gear shifting valve (2nd solenoid valve)
4. A pressure accumulator (8 bar), a test port and a 24 bar pressure switch

Gear shifting function

Low speed solenoid valve without current
High speed solenoid valve switched on

At low speed the multiple disk brake is closed and the coupling open (planet engaged). At high speed the multi-disk brake is open and the coupling is closed (planet not engaged).

The lubrication of the gear is done by the drain oil of the opened coupling or multi-disk brake and fed back to the tank together with the drain oil from the travel motor.

Attention: When starting or doing repair jobs, the gear has to be activated in low speed first.
Between the planet and the spur wheels, there is a claw coupling which has to be switched off by a lever to tow the machine. In this case the parking brake is out of order.

Parking brake function

When activating the parking brake, the first solenoid valve does not get current any longer and the pressure exisiting at the coupling or brake piston relieves at the remaining brake pressure valve to the preset value of 11 bar.

Caused by the pressure drop, the 24 bar pressure switch cuts off the pilot-operated travel valve (see travel functions).

The parking brake valve has an emergency locking. At a power failure the parking brake valve (solenoid valve) can be released mechanically.

When closing the parking brake, the spring-loaded multi-disk coupling and the spring-loaded multi-disk brake are closed. By doing this, the exisiting pressure is slowly lowered to 11 bar via the remaining pressure valve so that the brake does not operate jerkily. The 8 bar pressure accumulator guarantees a sufficient oil flow for this procedure.

13. 2-circuit service brake 0 - 60 bar

The second (smallest) Bosch pump feeds the oil directly into a 2-circuit brake compact block (pedal valve). In this brake block the switch-off valve and the pedal valve are integrated. The switch-on pressure is 123 bar, the switch-off pressure 150 bar. At each brake circuit a pressure accumulator 0.7 l, 50 bar is installed. If the charge pressure drops below 85 bar, a pressure switch or a warning lamp indicates low pressure. In each brake circuit there is a 5 bar brake light switch.

14. Slew brake

As already described under 2 "slewing", the machine is hydraulically braked by the blocked slew section (control piston) by slowly releasing the control lever. As soon as the control pressure between the manually controlled valve and the slew section drops below 5 bar, the hydraulic control valve closes, the pressure at the disk brake drops and the brake closes. The closing of the brake can be adjusted by the throttle in the brake line.
The brake should only close when the uppercarriage is no longer turning.

15. Secondary circuit

The first Bosch pump at the engine is the so-called steering pump. It supplies the oil via priority valve from the preferred outlet to the steering, second outlet to the grab rotation valve.

16. Steering

From the priority valve the oil flows via a check valve to the steering unit. A load-sensing line between steering unit and priority valve controls the oil flow during steering.

17. Grab rotation

From the priority valve the oil reaches the grab valve block. In the inlet of the block there is a 160 bar primary valve situated as well as two 250 bar line relief valves.
In the grab lines at the dipperstick, there is a double relief valve which is set to 100 bar.
The control block is solenoid-controlled by the right-hand control lever (by means of a push button).

17 a. Slew bucket

If the machine is equipped with a hydraulic slew bucket, in each grab line there is a 3-way ball valve which does not feed the oil through the grab pressure limitation valve (100 bar) at slew bucket operation but directly to the slew bucket hydraulic cylinder. In this position the primary valve of 160 bar reacts and if the control block is not in function, the two secondary valves of 250 bar do.

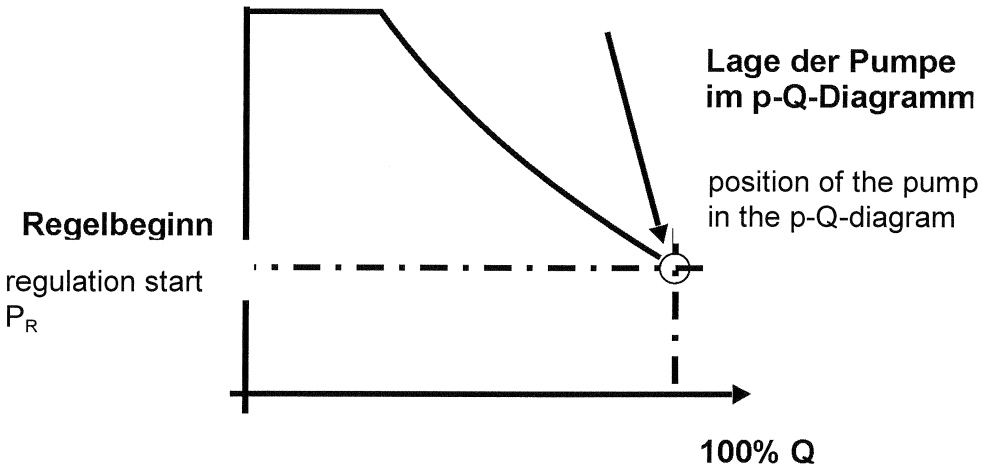
17. b. Articulated boom

At articulated boom, the two lines to the articulated cylinder are connected to the grab lines via ball valves. The 3-way ball valves are set to the slew bucket and the primary pressure to 230 bar.

The horse power control is a torque limitation and keeps the torque received from the pump constant, independently of the diesel engine rpm.

Extend the stick and operate it until stop. Adjust the line relief valve in such a manner that a pressure value which is approximately 20 bar below the recommended regulation start of the pump can be read at P, i.e. big swash plate angle of the pump, when the pressure at the X-port is between 0 and 10 bar. Now slowly increase the line relief valve pressure.

The pump starts regulating at the P-pressure at which - at the X-port - the setting pressure suddenly increases to approximately half pump pressure, i.e. the pump begins to regulate, see p-Q diagram.



Regulation start of the pump: 112 bar

Increase the pressure of the line relief valve of the stick after having finished the adjustment.

These cartridge valves are used for drain oil free consumer lock and can be found in machines with hydraulic pilot control.

When the pilot control port "X" is not pressurized, these valves are drain oil tight.

The check valve function is guranteed when the oil flow goes from A to A'.

The rear of the cartridge is released when the pilot control port "X" is pressurized with more than 4 bar. There is only a minimum pilot control oil drain via port "Y".

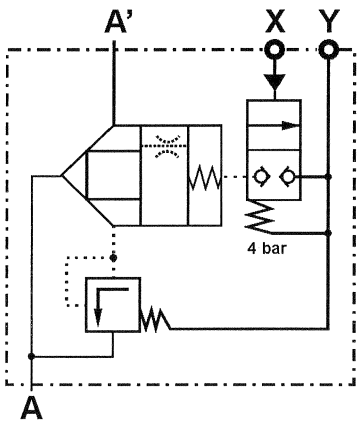
The connection A' - A opens completely and the load is supported at the main valve bank. When the servo control pressure is < approx. 2 - 3 bar, the valve closes again.

In order to prevent pressure peaks at consumer A' in closed position, a directly controlled pressure relief valve is mounted in parallel with overload function to the A line.

As it is the case in mobile valve banks, there has to be a second pressure relief valve with unloading effect to the tank.

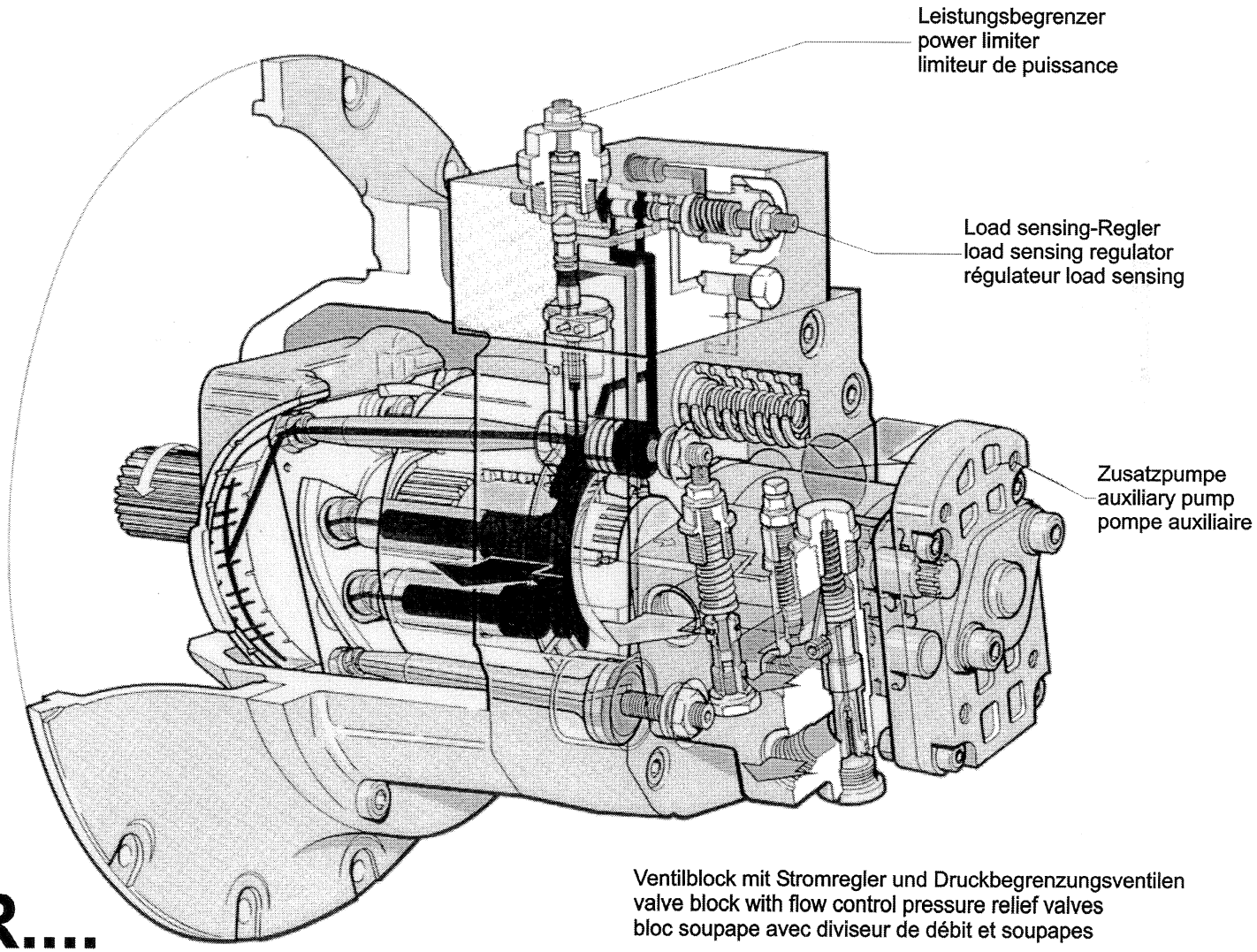
Due to the special design of the integrated directly controlled pressure relief valve, there is no need for a separate return line. It is only necessary to connect a drain line at port „Y".

The closing procedure of the lock valve - the servo pressure is by 2 - 3 bar lower - is delayed to prevent any impact on the main valve bank functions.



SCHAEFF

Typ/Model/Type	Datum/Edition/Date
HML 51 S	**01.2000**
Benennung/Description/Dénomination	Blatt/Page/Feuille
Variable displacement pump	**6.54.06**

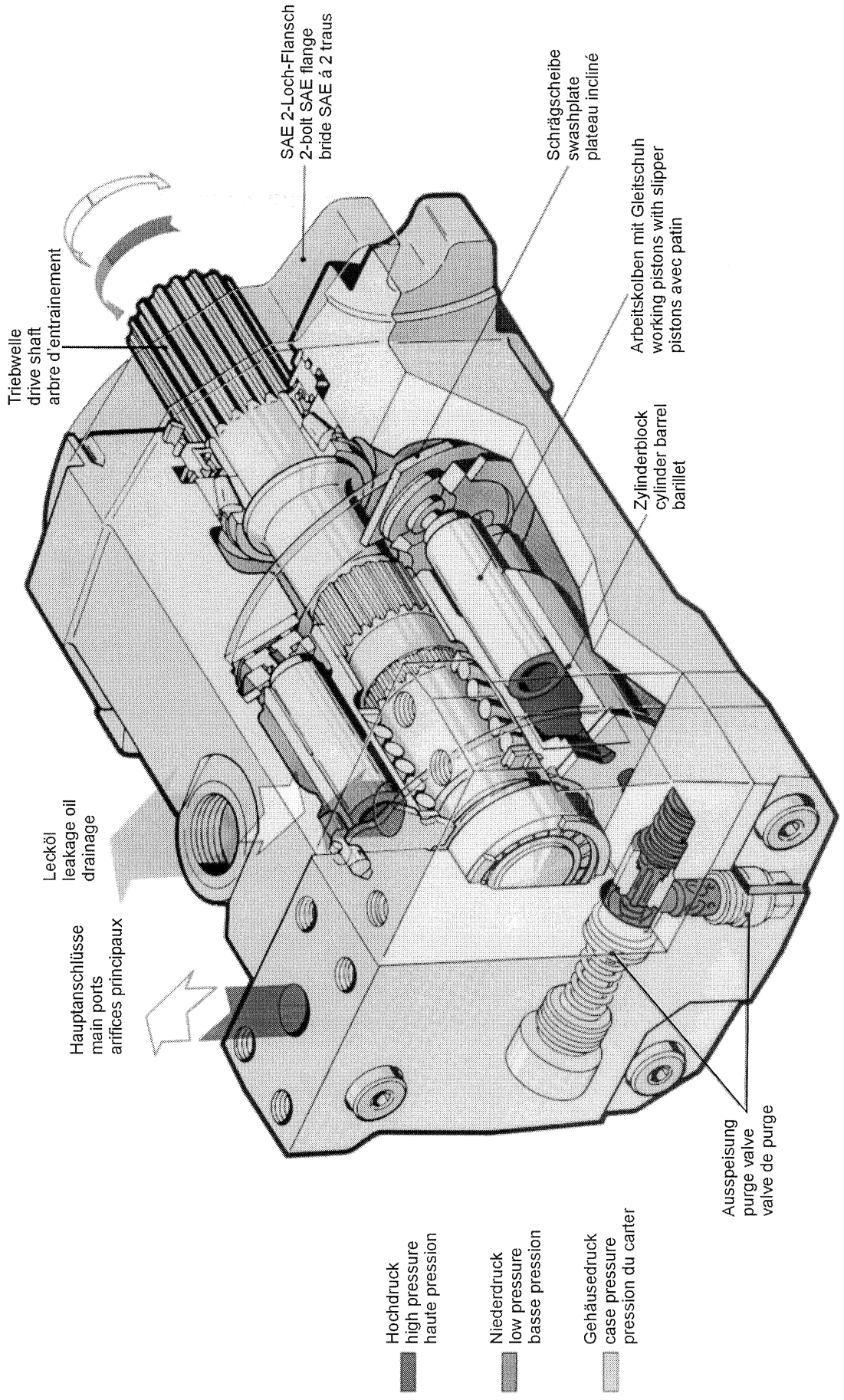


HPR....

mit load sensing-Regler und Leistungsbegrenzung
with load sensing control and power limiter
avec régulateur load sensing et limiteur de puissance

Ventilblock mit Stromregler und Druckbegrenzungsventilen
valve block with flow control pressure relief valves
bloc soupape avec diviseur de débit et soupapes

SCHAEFF	Typ/Model/Type **HML 51 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Travel motor**	Blatt/Page/Feuille **6.54.07**



SCHAEFF	Typ/Model/Type **HML 51 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Slew motor**	Blatt/Page/Feuille **6.54.08**

In order to operate several consumers depending on one pump, you need a certain number of valve banks acting as variable throttle points dividing the total oil flow into the partial flows requested. The relationship of the free sectional areas determines the relationship of the partial flows. This, however, can be disturbed if the pressure drops Δp at the control spool edges change during operation.

This disadvantage can be corrected by a corresponding compensation device.

For these purposes the patented Synchro-Control-System (LSC) uses the so-called pressure balances which are located downstream referring to the control spool edges. In connection with a special valve system it is achieved that the pressure difference at the throttle points in operation can always be held constant (see diagram). Thus the rate of the flow only depends on the rate of the free section. The free section area in a valvebank is equal to the size of the stroke of the spool.

The relationship between the oil flows of two or several functions then only depends on the relationship of the spool strokes in the valve banks. The constant pressure drop at the test ports is maintained by the pump and set at the load-sensing flow controller of the pump.

Among others, the system has one very important feature:

If the operator demands more oil than the pump can supply or if the horse power control device limits the available pump flow, then the system limits the speed of **all** actuated consumers. The proportional relationship of the consumer speeds to each other persists in the manner given by the operator's control lever position of the pilot-operated valves.

The above-mentioned shuttle valve system queries the corresponding service pressures in the consumers of the system and selects the one with the highest signal. This highest load pressure is communicated to all pressure balances. The common pressure difference Δp is balanced in comparison to this load pressure. This procedure is done automatically, without any influence of the operator.

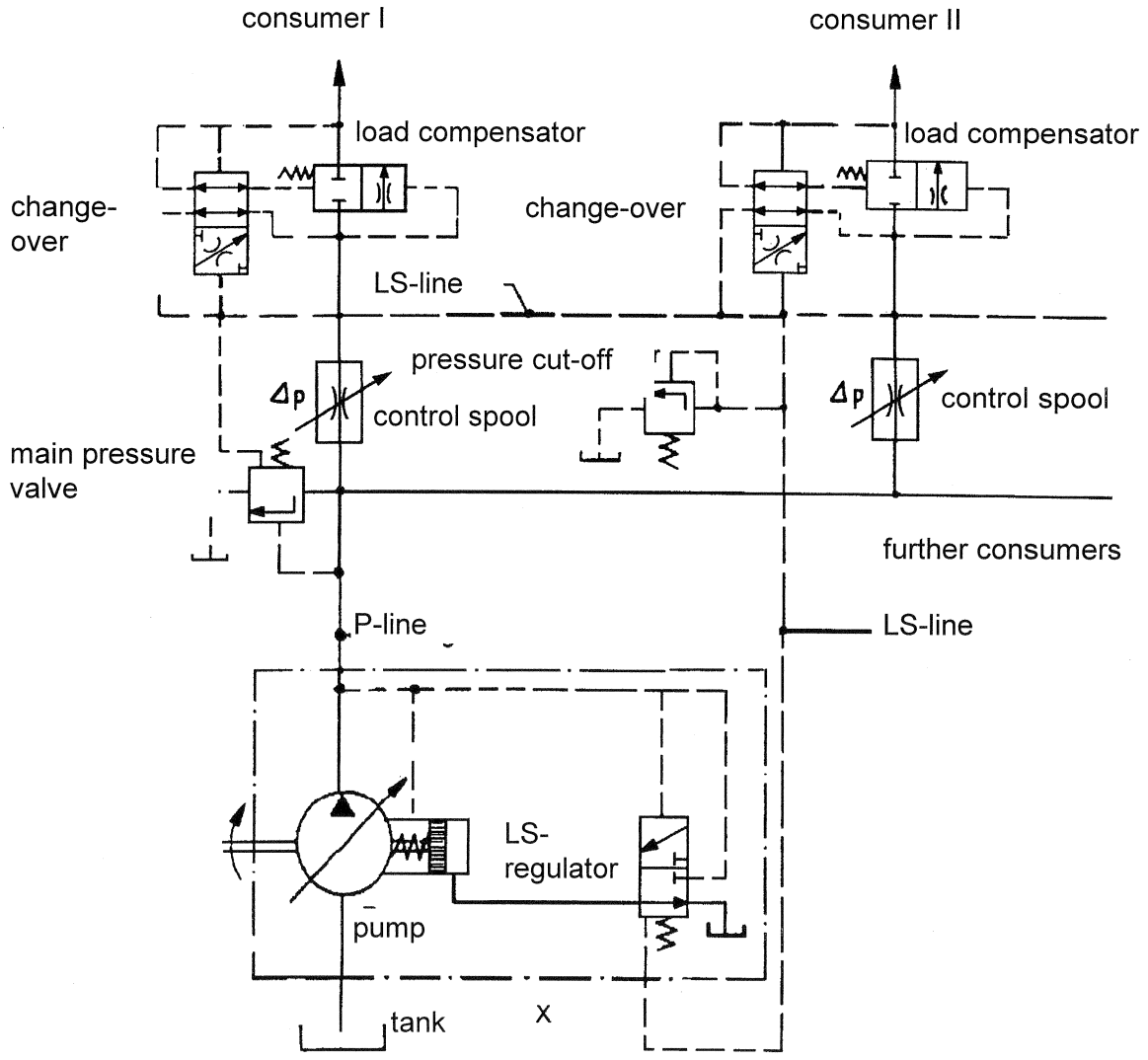
The pump which is used in this system has to be variable with a load-sensing (LS) flow controller. This valve is regulating the pump outlet flow in the way to obtain a constant pressure difference at the control spool edges of the valve system, independently of the load pressure at the different consumers. When reaching the maximum service pressure, the pressure regulator (pressure cut-off) which swings the pump back into neutral position is overridden. This prevents that energy is destroyed at the pressure relief valves and that additional heat, which is not necessary, is created. Normally the pumps also have a device for horse power limitation which limits the product Q x p = P and also protects the diesel engine from overload.

The horse power limitation can also be designed as a so-called limited load control which measures the diesel engine rpm and swings the pump back excactly when the engine is stalled due to overload.

The Synchro-Control (LSC)-valves consist of different valve sections. The suitable combination for different machines can be effected by mounting single sections onto corresponding valve plates. These valve plates only contain the connection channels such as inlet from the pump, connection channels to and from the valves, the return line and the port of the return line to the tank.

The elements for the functions are located in the valve sections. The valves themselves are made in spool design and have a spring-centered, closed zero position and are hydraulically operated. The max. spool stroke is adjustable, and due to the fact that the pressure drop is kept constant at the control spool edges, the max. oil flow to be fed through the valve can be limited at the mechanical stops of the valve bank.

The before-mentioned pressure balance is spool-integrated, the shuttle valves for the LS-signal are located inside the pressure balances. Both move together in these spools.



The diagram shown on page 6.54.11 shows a cut-off view of this valve.

In neutral position normally all ports, such as the pump inlet (P), the return lines (T) and the consumer lines (A and B) are closed.

If one of both end caps of the valve is pressurized, the spool moves out of its neutral position. The stroke is proportional to the pilot pressure.

At first the control spool edge opens towards the consumer and the load pressure acts on the pressure balance in closing direction. At this moment the pressure balance acts as a check valve preventing the lowering of a load. When the spool moves further out of the neutral position, the pump channel is opened and there is an oil flow to the consumer via the opened pressure balance.

At the same time a bore is opened to the load-sensing (LS)-line. The shuttle valve connects the LS-side of the pressure balance (opposite the P-side) with LS-pressure. The highest operating pressure is always existing in the LS-line and it is thus selected. This can be the feedback from an own or a neighbouring port.

As its two sides are equal, the pressure balance assumes a position to allow that there is LS-pressure at the P-side, too. If necessary, the pressure at the throttle point to the consumer ports A or B will be reduced more and more if the pressure in these ports is lower than the LS-pressure. This is always the case when the pressure of two simultaneously operated consumers is different.

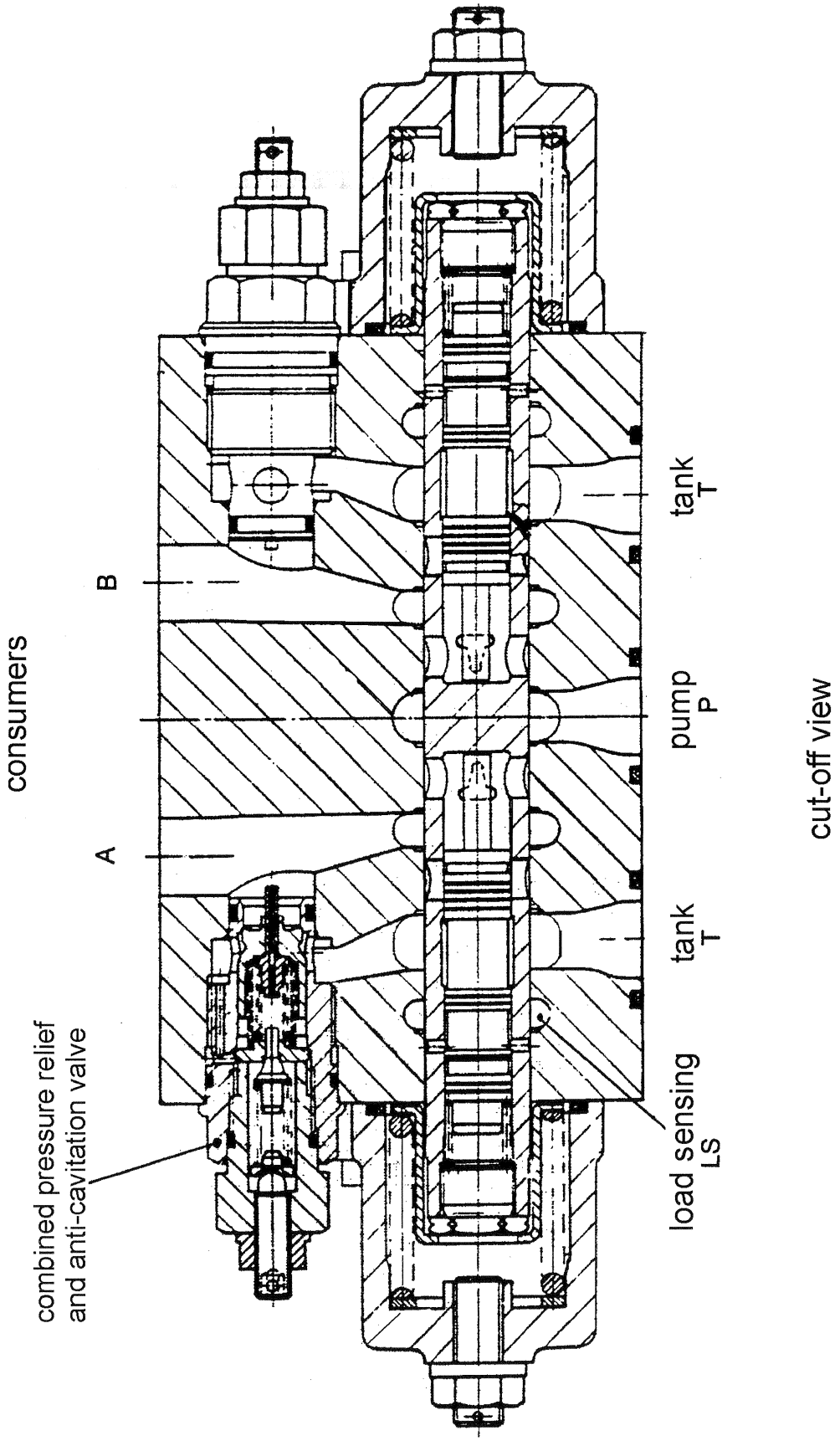
The LS-pressure is signalled to the pump regulator, so the pump delivers enough oil in order to maintain the pressure drop Δp at the throttle point at a constant level. This throttle point is located between inlet port P and the chamber in front of the P-side of the pressure balance.

The LS-signal controls the pump and determines the rate of the oil flow. So it can be used to give the pump overriding control functions, e.g. horse power limitation or pressure cut-off.

These controls can be executed in a simple way and stabilized when taking oil out of the LS-line and leading it to the tank. The design of the pressure balances and selector valves is specially synchronized according to the demands in the hydraulic excavator.

Pumps

There are variable displacement pumps with short reaction times, with LS-control and the possibilities of superimposing pressure cut-off and horse power control as well as limited load control. These pumps pump automatically when the diesel engine is running and they do not need hydraulic tank pre-load.



cut-off view

SCHAEFF	Typ/Model/Type **HML 51 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Synchro Control valve**	Blatt/Page/Feuille **6.54.11**

Steering operated: e.g. steering left

The steering oil is supplied by one of the accessory drive gear pumps **(1)**. The pumpflow rate is 21 l/min, the pump pressure is limited by the adjustable 250 bar main pressure relief valve **(2)** situated in the power block.

By operating the mini-joystick steering **(3)** in the dashboard, the priority valve **(5)** and the solenoid valve steering (left/right) **(6)** are at the same time electrically switched via the bridge rectifier **(4)**. (If the steering is not operated, the oil flow is fed to the slew circuit via a 130 bar shut-off valve).

Furthermore, the oil flow is directed to the rod side of the corresponding steering cylinder **(11)** via a pilot-operated check valve **(7)** and the line relief valves **(8)** (290 bar) as well as the cross-over valves **(9)** (260 bar) and the swivel pass **(10)**.

In order to prevent internal leakages of the solenoid valve **(6)** in neutral position, two pilot-operated check valves **(7)** are mounted.

The cross-over valves **(9)** and line relief valves **(8)** protect the steering system against external and internal forces (e.g. steering stops). The cross-over valves **(9)** which are set lower than the line relief valves **(8)**, only effect a parallel displacement of both wheels by directing the oil to the opposite side.

They also respond if the driver did not turn the steering in straight travel direction before spreading.

In this situation one of the two steering cylinders reaches its mechanical stop. Due to this, the piston rod of this hydraulic cylinder is pulled out with the displaced oil being transmitted to the opposite side via the cross-over valve **(9).**

In order to avoid „hydraulic play" in the steering, especially during spreading, the „hydraulic tie rod" gets additional pilot pressure (35 bar).

The steering cylinders remain rigid, as missing oil is supplied.

Permanent pressurization, however, would overstrain the „hydraulic tie rod". The surplus oilis therefore drained off via a pressure relief valve **(12)** (140 bar) when steering until mechanical stop.

In order to prevent any steering displacement when travelling, and especially when working, the solenoid valve **(13)** must be in position „lift/lower", i.e. the locking position (0).

This solenoid valve closes the anti-cavitation line so that the steering cylinder, acting as a pump when working, cannot get too much oil and thus open the line relief valves.

Legend

Denominations in the hydraulic diagram and the description

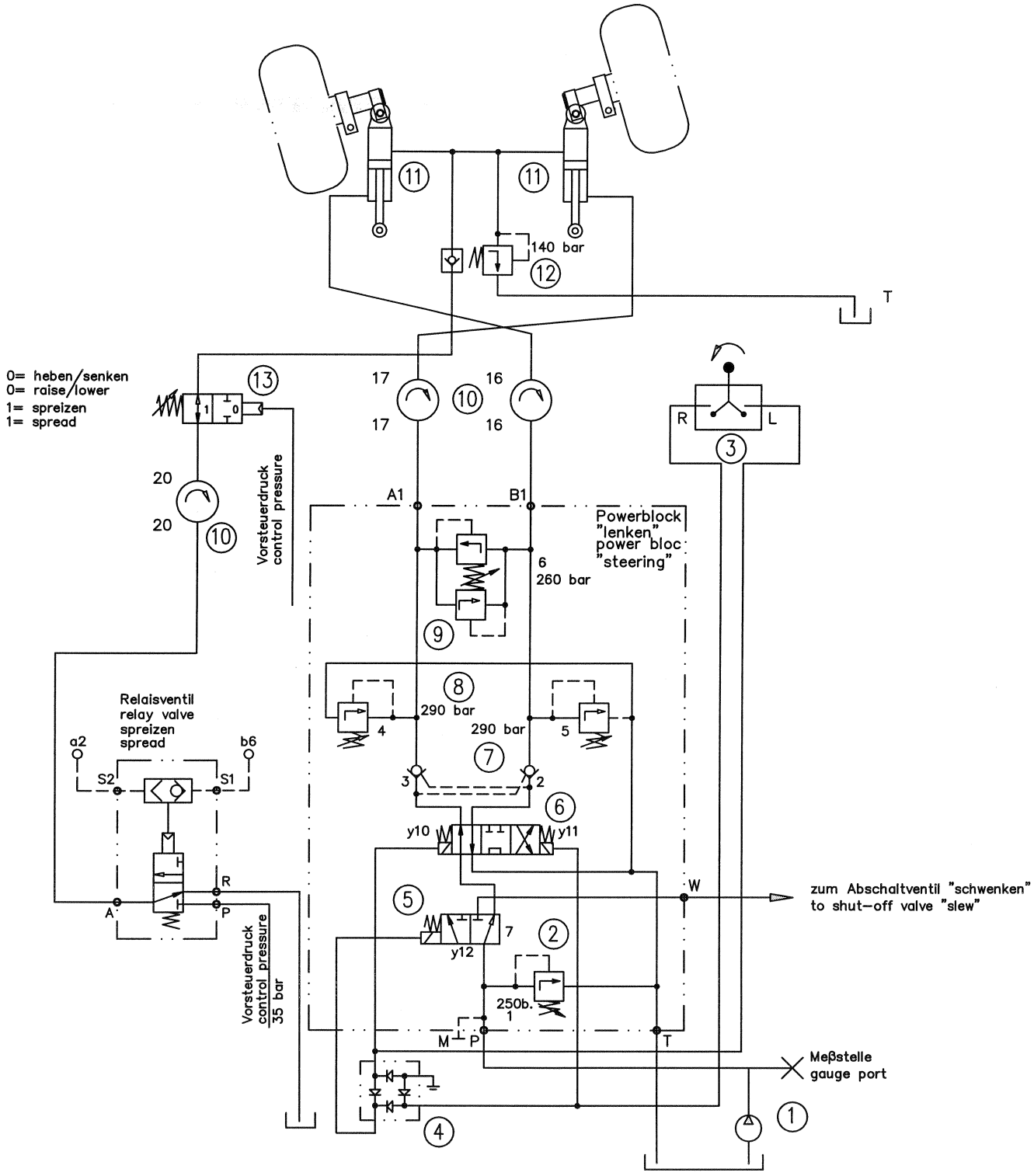
1	=	accessory drive gear pump
2	=	power block, adjustable 250 bar main pressure relief valve
3	=	mini-joystick steering
4	=	bridge rectifier
5	=	power block, priority valve
6	=	power block, 4/3 way valve, steering right / left (Y 10 / Y 11)
7	=	power block, pilot-operated check valves
8	=	power block, line relief valves 290 bar (sealed)
9	=	power block, cross-over valves 260 bar
10	=	swivel pass
11	=	steering cylinder
12	=	pressure relief valve, 140 bar
13	=	pilot-operated solenoid valve „lift/lower" - „spread"

16	=	swivel pass channel 16
17	=	swivel pass channel 17
20	=	swivel pass channel 20

Punched position markings at the power block

1	=	main pressure relief valve 250 bar
2, 3	=	pilot-operated check valve **7**
4, 5	=	line relief valve 290 bar
6	=	cross-over valves 260 bar
7	=	priority valve (solenoid valve Y 12)

W	=	line to the shut-off valve „slewing"
T	=	tank port
P	=	pressure inlet
M	=	gauge port (closed)
A 1, B 1	=	to the consumer (steering cylinder)



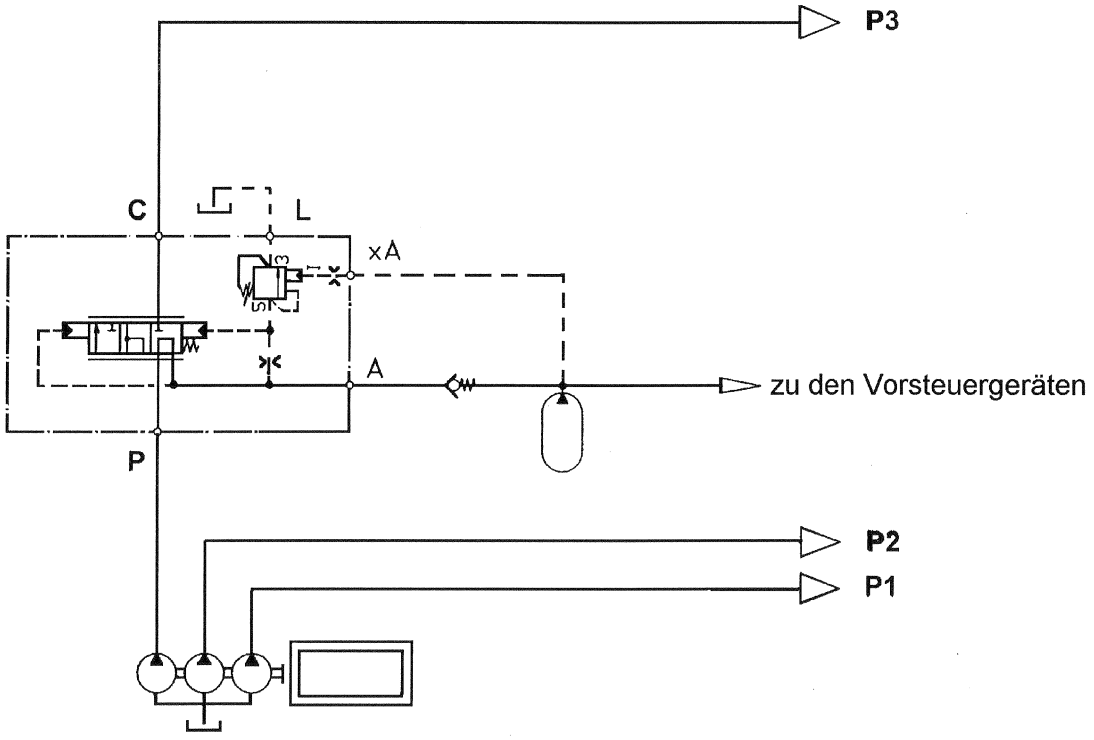
SCHAEFF	Typ/Model/Type **HS 41 M**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Description and hydraulic diagram steering, left**	Blatt/Page/Feuille **6.85.02**

This valve serves for the priority hydraulic oil supply of the pilot control. The accumulator operation for the pilot pressure supply has priority over the following working function.

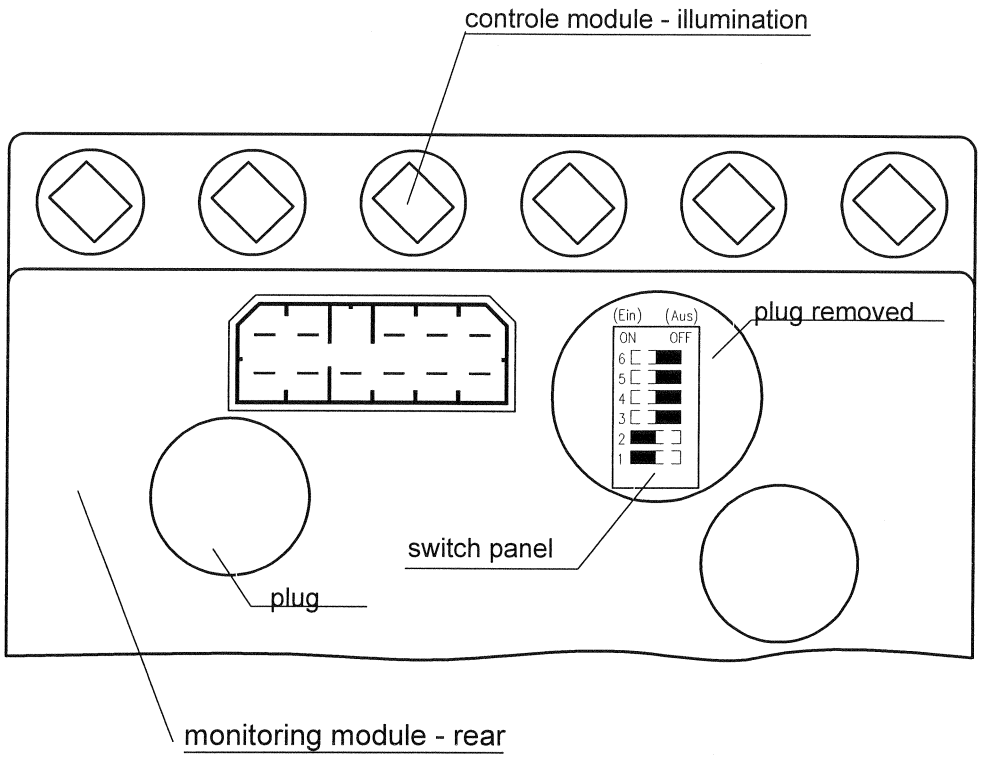
If the pressure in the pilot control circuit drops, the oil flow will for a short time be withdrawn from the main circuit and will thus be available to the following control valve (e.g. HR 21). In order to cover oil peak requirements in the pilot control circuit, the latter is equipped with an accumulator.

In general this results in the following advantages:

- Quick oil supply of the pilot control by a gear pump, even at low diesel engine rpm.
- Automatic accumulator charge operation.
- Mimimum loss of performance.
- Emergency function due to accumulator operation.

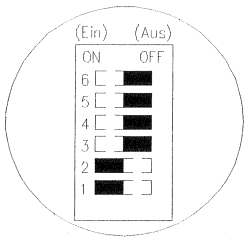


zu den Vorsteuergeräten = to the pilot-operated valves



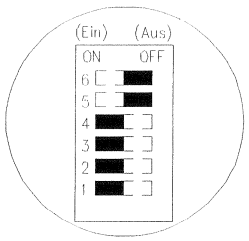
Legend - switch panel

micro switch no.	responsible for
1 ⇒ 2	fuel level
3	cooling water temperature
4 ⇒ 5	load warning device - pressure setting
6	(must be in position "OFF")



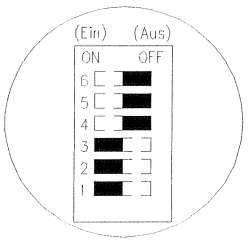
Switch positions valid for:

SMB 2041 articulated boom
HML 22 Mono / articulated boom
HR 22 Mono / articulated boom



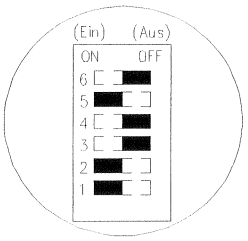
Switch positions valid for:

HML 31 Mono / articulated boom
HR 31 Mono / articulated boom
HML 41 Mono boom
HR 41 Mono boom



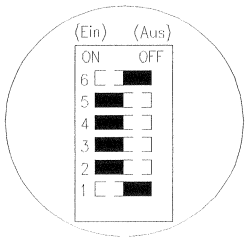
Switch positions valid for:

HML 41 articulated boom
HR 41 articulated boom



Switch positions valid for:

SMB 2041 Mono



Switch positions valid for:

HS 41
HS 41 M

If a monitoring module is replaced, the switch panel must be re-set.

Switch no. 6 is always in position OFF

SCHAEFF	Typ/Model/Type **HML 22, HML 31, HML 41, SMB 2041 HR 22, HR 31, HR 41, HS 41, HS 41M**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Setting of monitoring module**	Blatt/Page/Feuille **6.900.02**

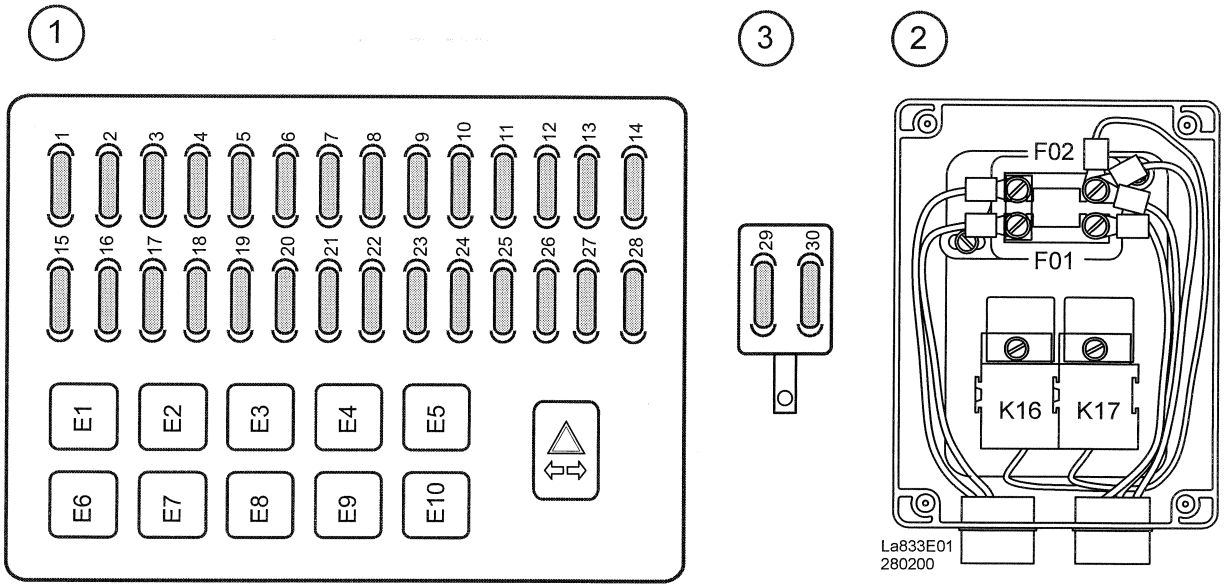
SUBGROUP LIST
Electrical system
Fuse assignment diagrams / wiring diagrams

SKL 823	7.03
SKL 823 Basic	7.04
SKL 833	7.05
SKL 833 Basic	7.06
SKL 843	7.07
SKL 853	7.09
SKL 877	7.15
SCL 515	7.20
SKS 633	7.35
SKB 2000	7.45
SMB 2041	7.46
HML 21	7.48
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HR 21	7.62
HR 22	7.63
HR 31	7.64
HR 41	7.66
HS 41	7.84
HS 41 M	7.85

TEREX | SCHAEFF

Electrical system

Fuse and relay box - Assignment diagram



1 = Fuse and relay box ..... Seat console, right, bottom

2 = Starter box ..... Engine compartment dividing wall - tank side, right

3 = Fuse box ..... Behind fuse and relay box (pos. 1)

Location	Relay	Function
E 1	--	not assigned
E 2	K 2	Starting safeguard
E 3	K 3	Travel, in reverse
E 4	K 4	Travel, forward
E 5	K 5	Float position
E 6	K 6	Additional valve
E 7	K 7	Additional valve
E 8	K 8	Brake inching
E 9	K 9	Working floodlight, front
E 10	K 10	Working floodlight, rear
⇕▷	K 11	Flasher transmitter
	K 13	Pre-heat relay (engine compartment dividing wall - near generator)
	K 16	Shut-off
	K 17	Start-up

Fuse and diode assignment

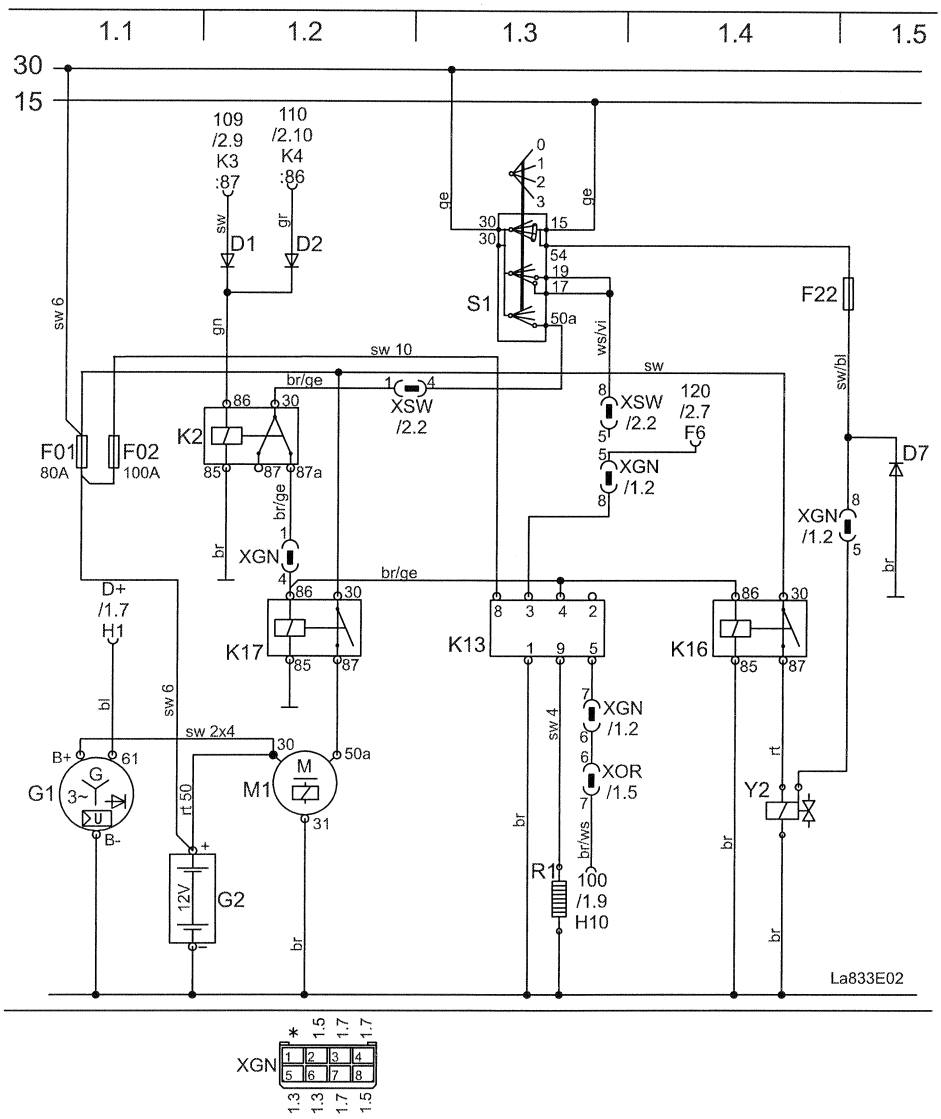
Position	Ampere	Assigned to	Position	Ampere	Assigned to
F 1	10	Hazard warning switch Immobilizer	F 15	10	Hazard warning switch Immobilizer
F 2	15	Working hydraulics cut-off	F 16	10	Rotating beacon Interior light
F 3	15	Travel - Fast/ slow	F 17	10	Socket Radio
F 4	15	Parking brake switch Travel, forward & in reverse Hydrostatic brake	F 18	15	Low beam
F 5	10	Signal horn	F 19	15	High beam
F 6	10	Brake light	F 20	10	Side marker lamp, left Working floodlights, front
F 7	15	Heater fan	F 21	10	Instrument light Working floodlights, rear Side marker lamp, right
F 8	15	Front wiper	F 22	20	Engine shut-off
F 9	15	Rear wiper	F 23 D 5	Diode 3A	Back-up alarm
F 10	10	Instruments	F 24 D 4	Diode 3A	Hydrostatic brake
F 11	15	Float position relay	F 25 D 3	Diode 3A	Activation fast / slow Hydrostatic brake
F 12	10	Radio	F 26 D 1	Diode 3A	Start-up safeguard
F 13	10	Additional control circuit	F 27 D 2	Diode 3A	Start-up safeguard
F 14 D 6	Diode 3A	Three-phase alternator	F 28 D 7	Diode 3A	Engine shut-off recovery diode
F 29 *	15	Working floodlights, front	F 30 *	15	Working floodlights, rear
F 01	80	Pre-heat/ starter switch	F 02	100	Starter

* These fuses are located behind the fuse and relay carrier. This part has to be removed to reach the fuses.

Cable and plug colors

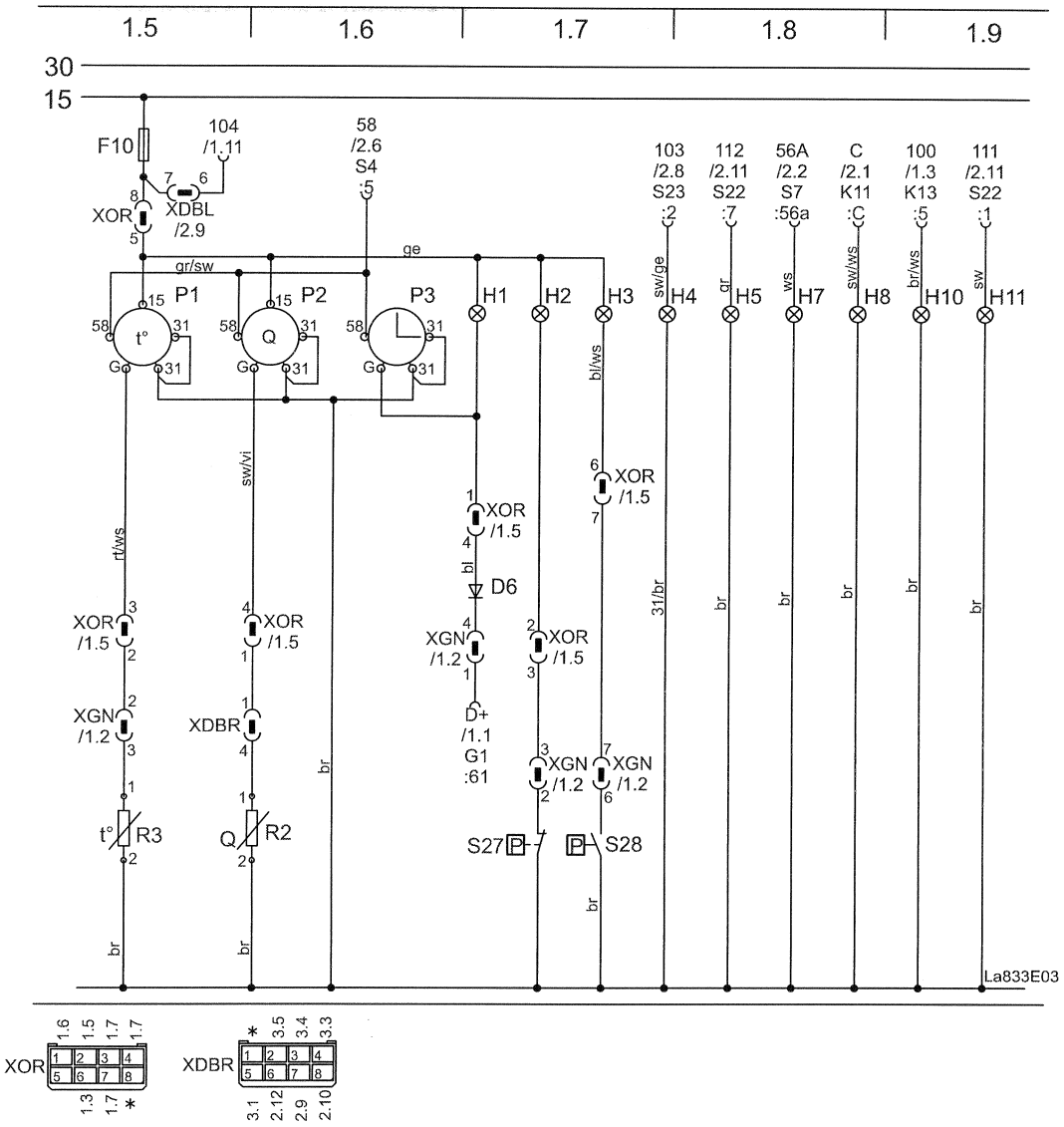
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bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Pre-heat, start-up system



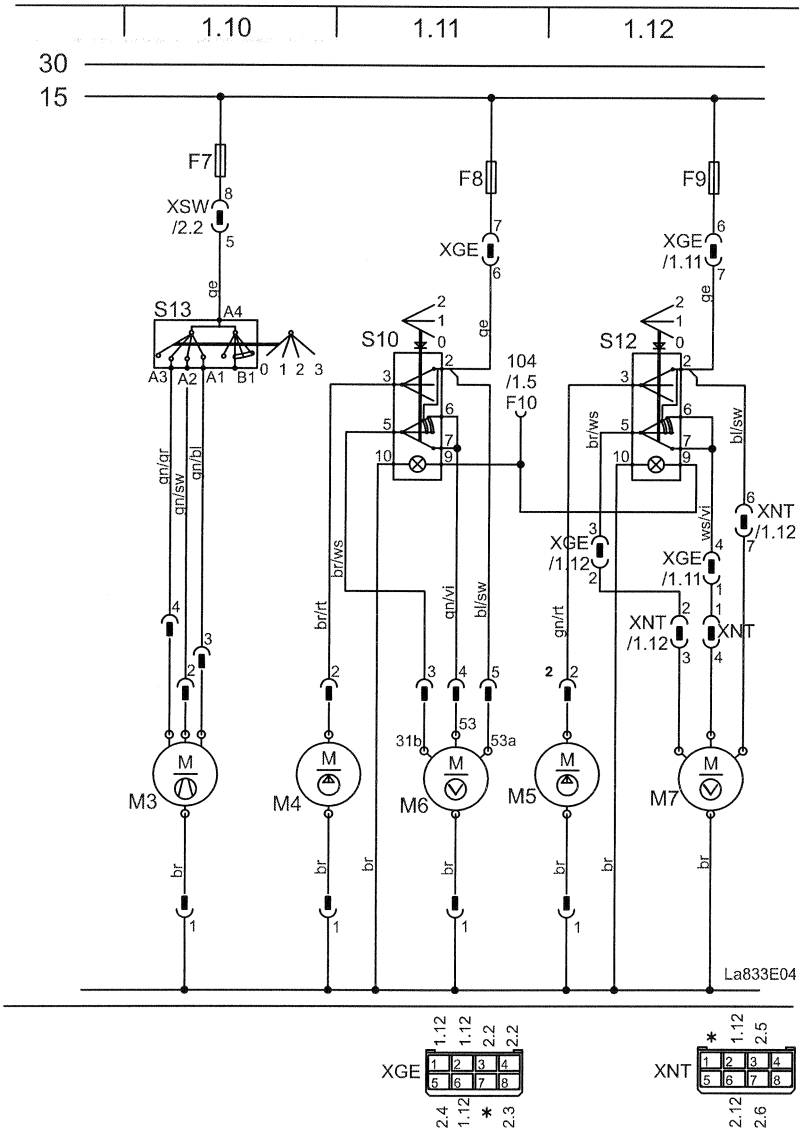
Path	Desig-nation	Device	Path	Desig-nation	Device
		Pre-heat, start-up system	1.2	D1	Diode
1.1	G1	Generator	1.2	D2	Diode
1.1	G2	Battery 12 V	1.3	S1	Pre-heat/ starter switch
1.2	M1	Starter	1.3	K13	Pre-heat relay
1.2	K2	Starting relay (starting safeguard)	1.4	K16	Cut-off relay
1.2	K17	Starting relay (starting aid)	1.4	Y2	Electrical engine cut-off
1.1	F01	Blade-type fuse 80A	1.3	R1	Glow plugs
1.1	F02	Blade-type fuse 100A	1.5	D7	Diode
			1.5	F22	Fuse

Instruments, display elements



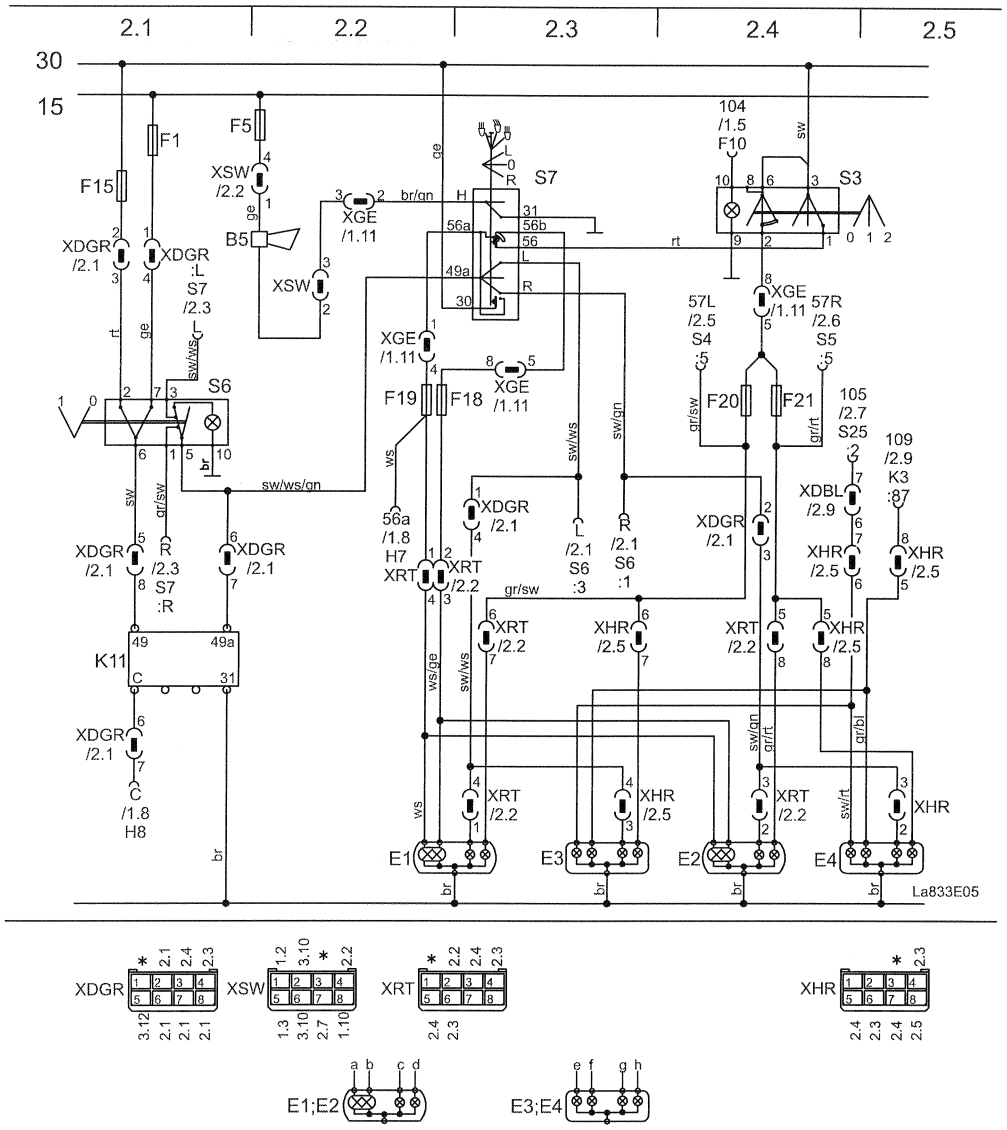
Path	Desig-nation	Device	Path	Desig-nation	Device
		Instruments, indicating units	1.7	H4	Parking brake indicator lamp
1.5	P1	Temperature indicator	1.8	H5	Travel, forward
1.6	P2	Fuel gauge	1.9	H11	Travel, in reverse
1.6	P3	Operating hour meter	1.8	H7	Upper beam indicator lamp
1.5	R3	Coolant temperature sensor	1.8	H8	Direction indicator
1.6	R2	Fuel gauge transmitter	1.9	H10	Pre-heat indicator lamp
1.5	F10	Fuse	1.7	D6	Diode
1.7	H1	Charge control lamp	1.7	S27	Engine oil pressure switch
1.7	H2	Engine oil pressure indicator lamp	1.7	S28	Air filter clogging switch
1.7	H3	Air filter clogging indicat.lamp			

Heater fan	Wash/ wipe system



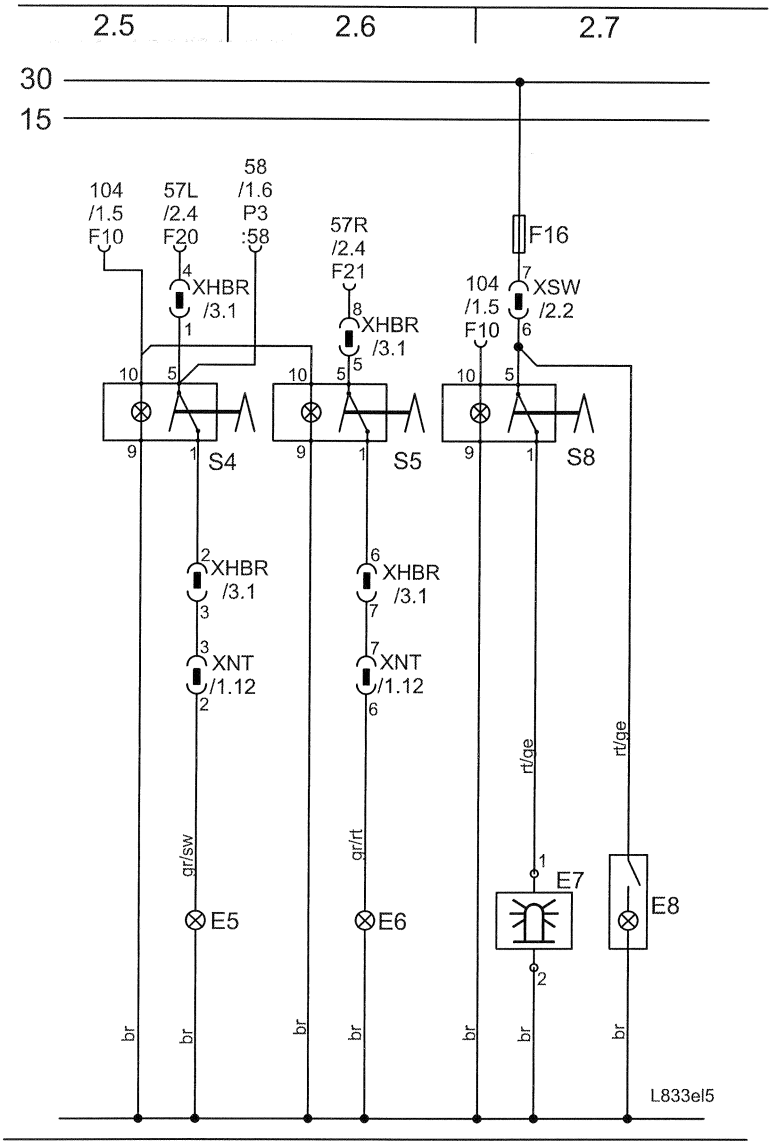
Path	Desig-nation	Device
		Heater fan
1.10	F7	Fuse
1.10	S13	Heater fan switch
1.10	M3	Heater fan
		Wash/ wipe system
1.11	F8	Fuse
1.12	F9	Fuse

Path	Desig-nation	Device
1.11	S10	Front wash/ wipe switch
1.12	S12	Rear wash/ wipe switch
1.10	M4	Front washer pump
1.11	M6	Front washer motor
1.12	M5	Rear washer pump
1.12	M7	Rear washer motor



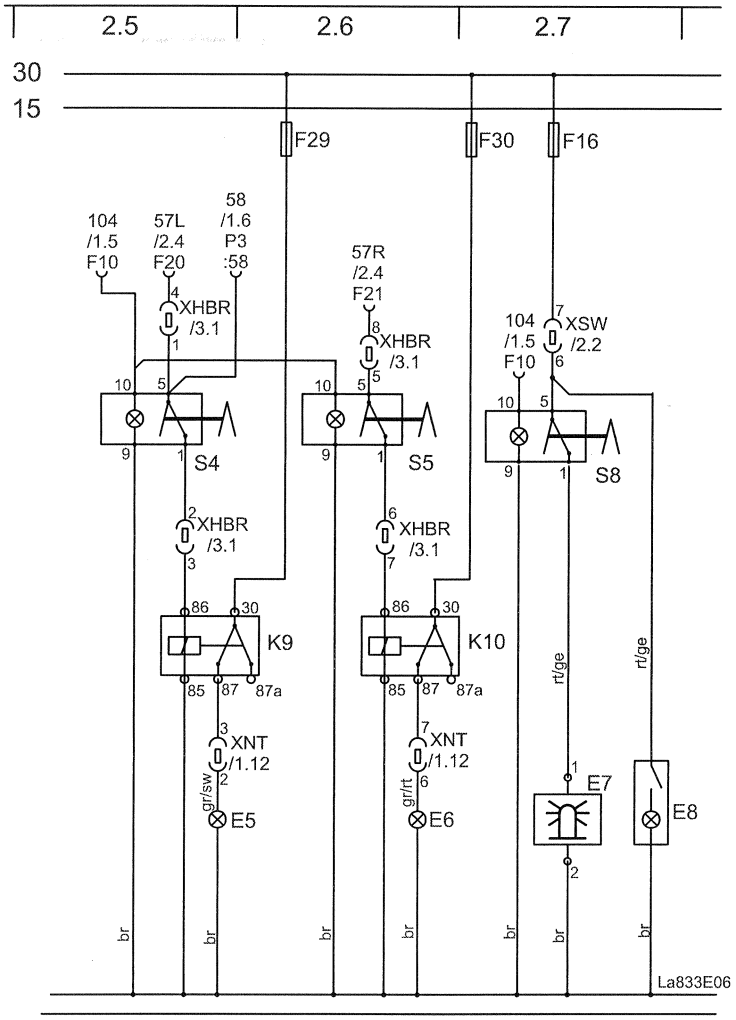
a = Upper beam
b = Lower beam
c = Direction indicator
d = Side marker lamp
e = Brake light
f = Back-up lamp
g = Direction indicator
h = Side marker lamp

Path	Designation	Device	Path	Designation	Device
		Lighting and signaling system	2.2	F18	Fuse
2.1	F15	Fuse	2.4	F20	Fuse
2.1	F1	Fuse	2.4	F21	Fuse
2.2	F5	Fuse	2.1	K11	Direction indicator relay
2.2	B5	Horn	2.2	E1	Headlamp, left
2.1	S6	Hazard warning switch	2.4	E2	Headlamp, right
2.3	S7	Steering column switch	2.3	E3	Back light, left
2.4	S3	Light switch	2.5	E4	Back light, right
2.2	F19	Fuse			



Path	Desig-nation	Device	Path	Desig-nation	Device
		Lighting and signaling system			
2.7	F16	Fuse	2.5	E5	Front working floodlight
2.5	S4	Front working floodlight	2.6	E6	Rear working floodlight
2.6	S5	Rear working floodlight	2.7	E7	Rotating beacon
2.7	S8	Rotating beacon	2.7	E8	Cab lighting

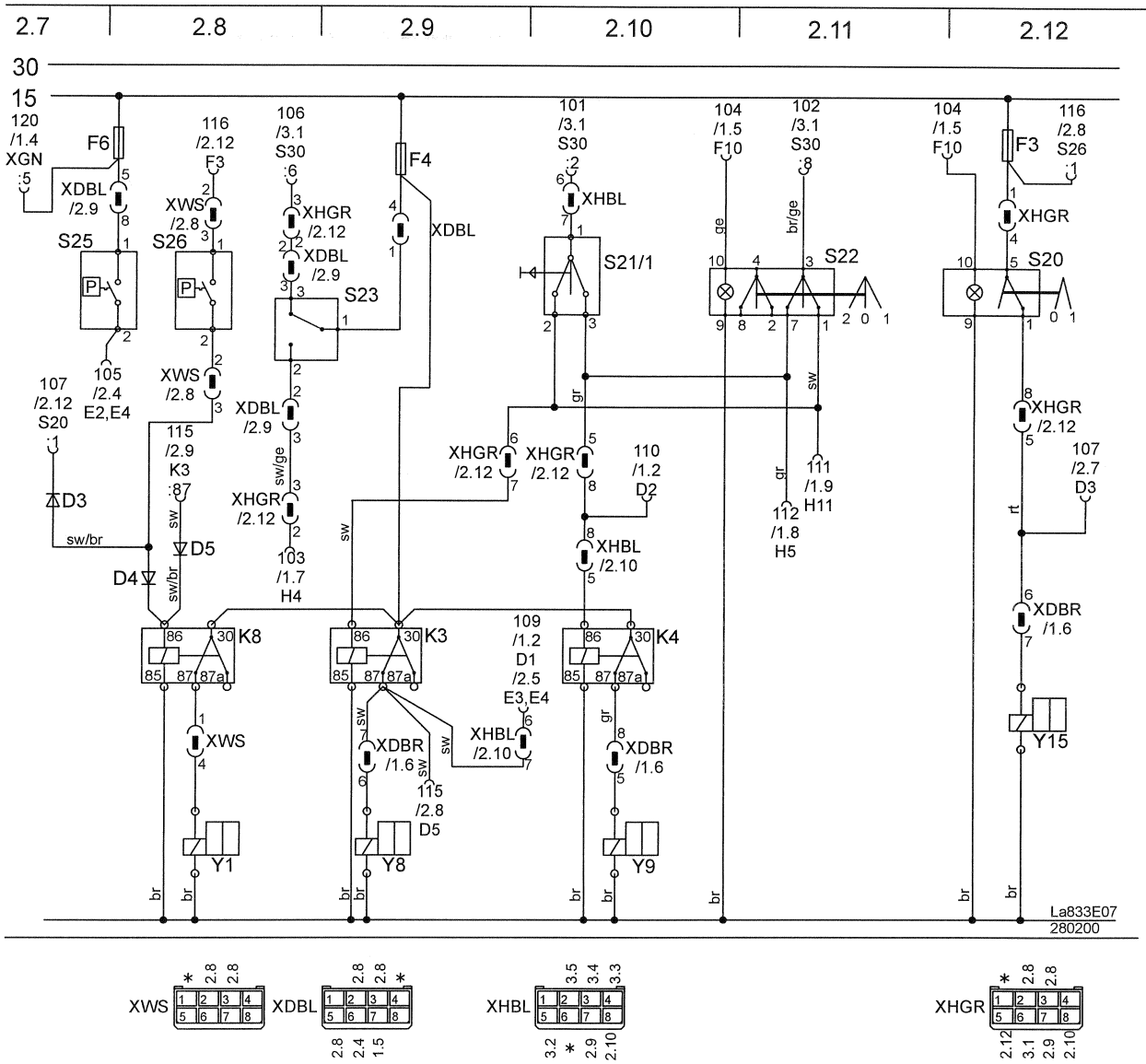
Lighting and signaling system from serial no. 823/0275



Path	Desig-nation	Device
		Lighting and signaling system
2.7	F16	Fuse
2.5	S4	Front working floodlight
2.6	S5	Rear working floodlight
2.7	S8	Rotating beacon

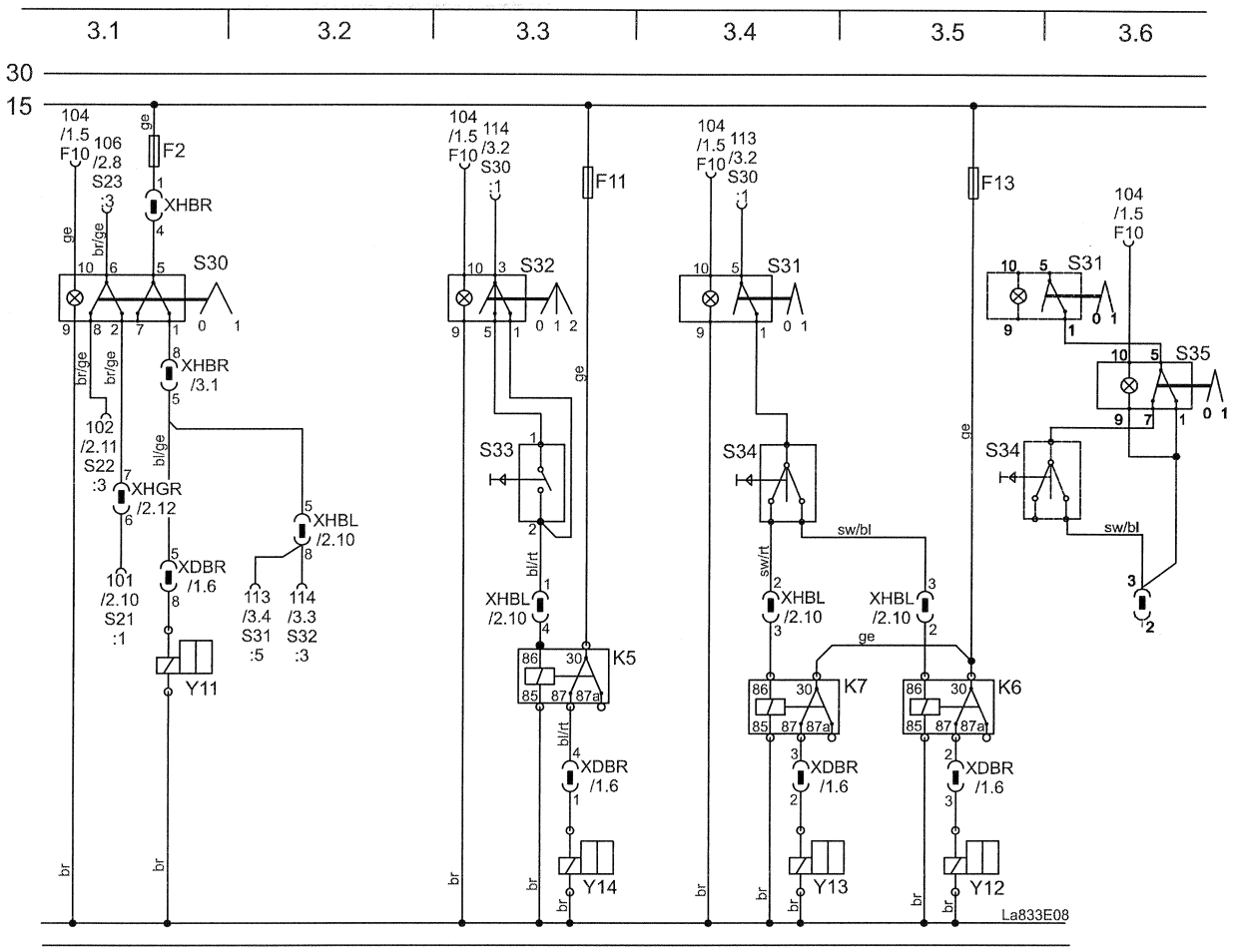
Path	Desig-nation	Device
2.5	K 9	Front working floodlight
2.6	K 10	Rear working floodlight
2.5	E5	Front working floodlight
2.6	E6	Rear working floodlight
2.7	E7	Rotating beacon
2.7	E8	Cab lighting

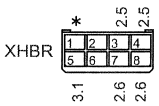
Travel, brakes



Path	Designation	Device	Path	Designation	Device
		Travel, brakes	2.7	D3	Diode
2.8	F6	Fuse	2.8	D4	Diode
2.9	F4	Fuse	2.8	D5	Diode
2.12	F3	Fuse	2.8	K8	Hydrostatic brake
2.8	S25	Brake light switch	2.9	K3	Travel, in reverse
2.8	S26	Hydrostatic brake	2.10	K4	Travel, forward
2.8	S23	Parking brake switch	2.8	Y1	Direction-of-travel recognition
2.10	S21/1	Coordinate lever	2.9	Y8	Valve for travel, in reverse
2.11	S22	Travel, forward - in reverse	2.10	Y9	Valve for travel, forward
2.12	S20	Travel, fast - slow	2.12	Y15	Valve for travel, fast - slow

Working hydraulics	Float position	Additional control circuit	Option

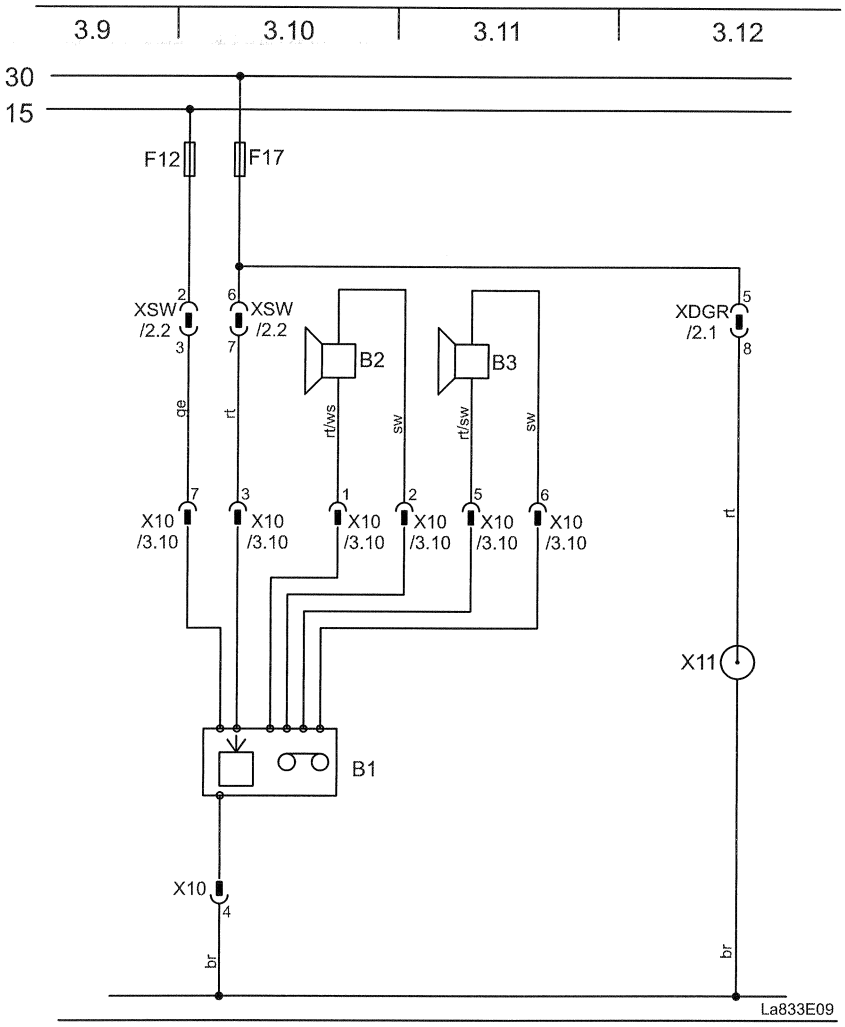


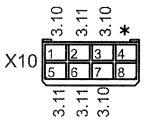


Path	Desig-nation	Device
		Working hydraulics
3.1	F2	Fuse
3.1	S30	Working hydraulics cut-off
3.1	Y11	Working hydraulics valve
		Float position
3.3	F11	Fuse
3.2	S32	Float position
3.3	S33	Float posit.,coordinate lever
3.3	K5	Float position relay
3.3	Y14	Float position valve

Path	Desig-nation	Device
		Additional control circuit
3.5	F13	Fuse
3.4	S34	Coordinate lever for 3rd control circuit
3.4	S31	3rd control circuit cut-off
3.4	K7	Relay for additional control circuit
3.5	K6	Relay for additional control circuit
3.4	Y13	Additional control circuit
3.5	Y12	Additional control circuit
		Option
3.6	S 35	Continuous operation for 3rd control circuit

Radio, socket

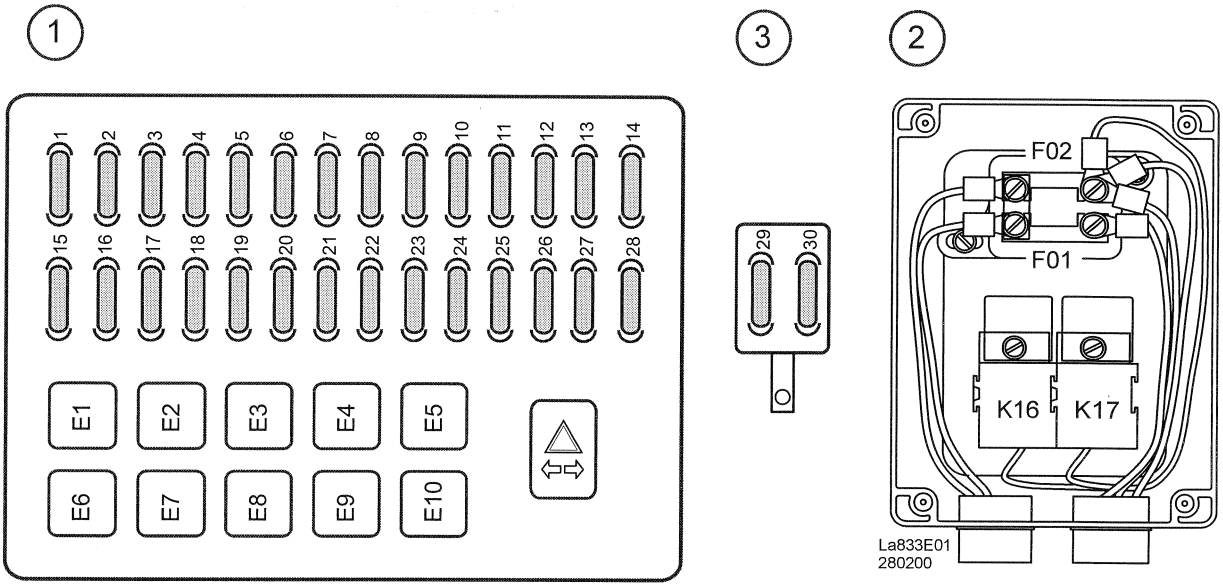




Path	Desig-nation	Device	Path	Desig-nation	Device
		Radio, socket	3.11	B3	Loudspeaker
3.10	F12	Fuse	3.10	B1	Radio
3.10	F17	Fuse	3.12	X11	Socket
3.10	B2	Loudspeaker	3.10	X10	Radio socket (AMP)

Electrical system

Fuse and relay box - Assignment diagram



1 = Fuse and relay box ..... Seat console, right, bottom
2 = Starter box ..... Engine compartment dividing wall - tank side, right
3 = Fuse box ..... Behind fuse and relay box (pos. 1)

Location	Relay	Function
E 1	--	not assigned
E 2	K 2	Starting safeguard
E 3	K 3	Travel, in reverse
E 4	K 4	Travel, forward
E 5	--	not assigned
E 6	--	not assigned
E 7	--	not assigned
E 8	K 8	Brake inching
E 9	K 9	Working floodlight, front
E 10	K 10	Working floodlight, rear
	K 11	Flasher transmitter
	K 13	Pre-heat relay (engine compartment dividing wall - near generator)
	K 16	Shut-off
	K 17	Start-up

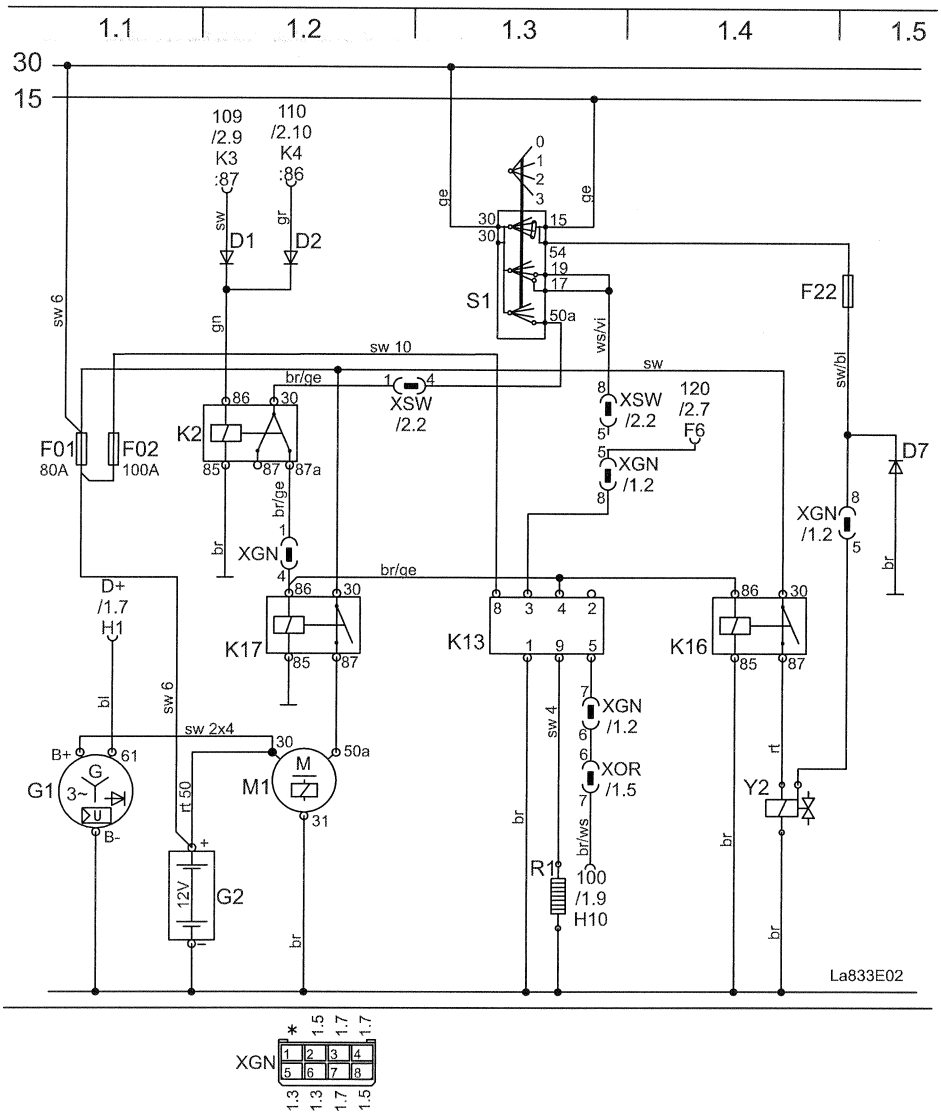
Fuse and diode assignment

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Immobilizer	F 15	10	Hazard warning switch Immobilizer
F 2	--		F 16	10	Rotating beacon Interior light
F 3	15	Travel - Fast/ slow	F 17	10	Socket Radio
F 4	15	Hand brake switch Travel, forward/ reverse Hydrostatic brake	F 18	15	Lower beam
F 5	10	Horn	F 19	15	Upper beam
F 6	10	Brake light	F 20	10	Side marker lamp, left Front working floodlight
F 7	15	Heater fan	F 21	10	Instruments' lighting Rear working floodlight Side marker lamp, right
F 8	15	Front wiper	F 22	20	Shut-off
F 9	15	Rear wiper	F 23 D 5	Diode 3A	Back-up alarm
F 10	10	Instruments	F 24 D 4	Diode 3A	Hydrostatic brake
F 11	--		F 25 D 3	Diode 3A	Connection fast / slow when hydrostatic brake is actuated
F 12	10	Radio	F 26 D 1	Diode 3A	Starting safeguard
F 13	--		F 27 D 2	Diode 3A	Starting safeguard
F 14 D 6	Diode 3A	Three-phase alternator	F 28 D 7	Diode 3A	Engine shut-off recovery diode
F 29	15	Front working floodlight	F 30	15	Rear working floodlight
F 01	80	Pre-heat/ starter switch	F 02	100	Starter

Cable and plug colors

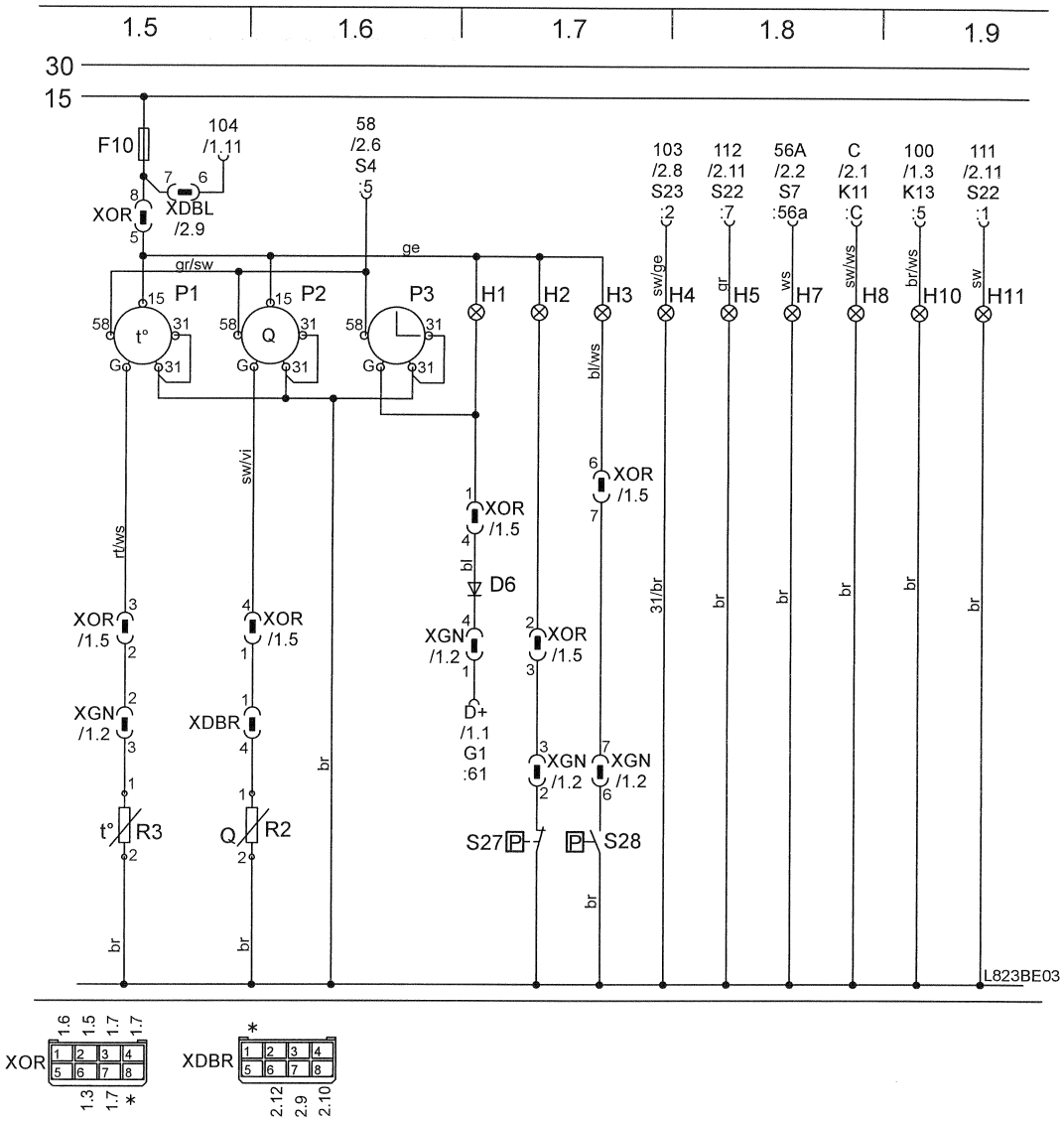
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bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Pre-heat, start-up system



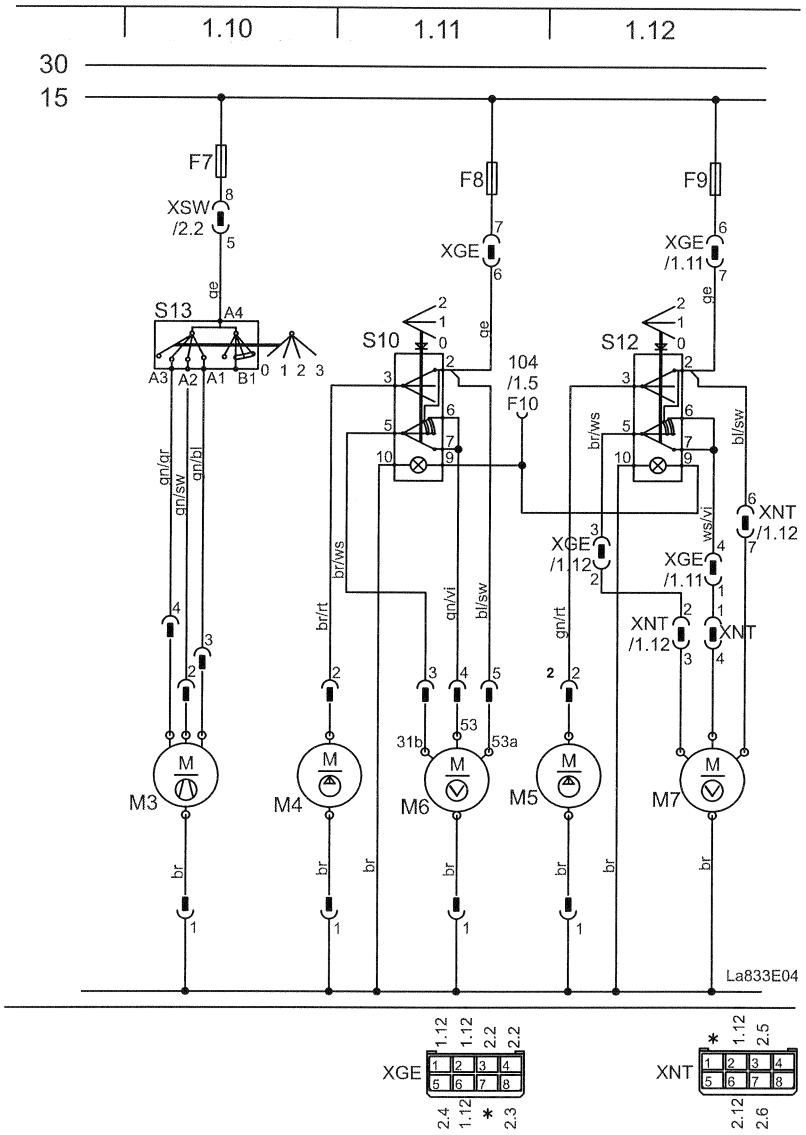
Path	Desig-nation	Device	Path	Desig-nation	Device
		Pre-heat, start-up system	1.2	D2	Diode
1.1	F01	Blade-type fuse 80A	1.3	R1	Glow plugs
1.1	F02	Blade-type fuse 100A	1.3	S1	Pre-heat/ starter switch
1.1	G1	Generator	1.3	K13	Pre-heat relay
1.1	G2	Battery, 12 V	1.4	K16	Cut-off relay
1.2	M1	Starter	1.4	Y2	Shut-off
1.2	K2	Starting relay (starting safeguard)	1.5	D7	Diode
1.2	K17	Starting relay (starting aid)	1.5	F22	Fuse
1.2	D1	Diode			

Instruments, indicators



Path	Desig-nation	Device	Path	Desig-nation	Device
		Instruments, indicators	1.7	H4	Parking brake indicator lamp
1.5	P1	Temperature indicator	1.8	H5	Travel, forward
1.6	P2	Fuel gauge	1.9	H11	Travel, in reverse
1.6	P3	Operating hour meter	1.8	H7	Upper beam indicator lamp
1.5	R3	Coolant temperat.sensor	1.8	H8	Direction indicator
1.6	R2	Fuel gauge transmitter	1.9	H10	Pre-heat indicator lamp
1.5	F10	Fuse	1.7	D6	Diode
1.7	H1	Charge control lamp	1.7	S27	Engine oil pressure switch
1.7	H2	Engine oil pressure indicator lamp	1.7	S28	Air filter clogging switch
1.7	H3	Air filter clogging indicator lamp			

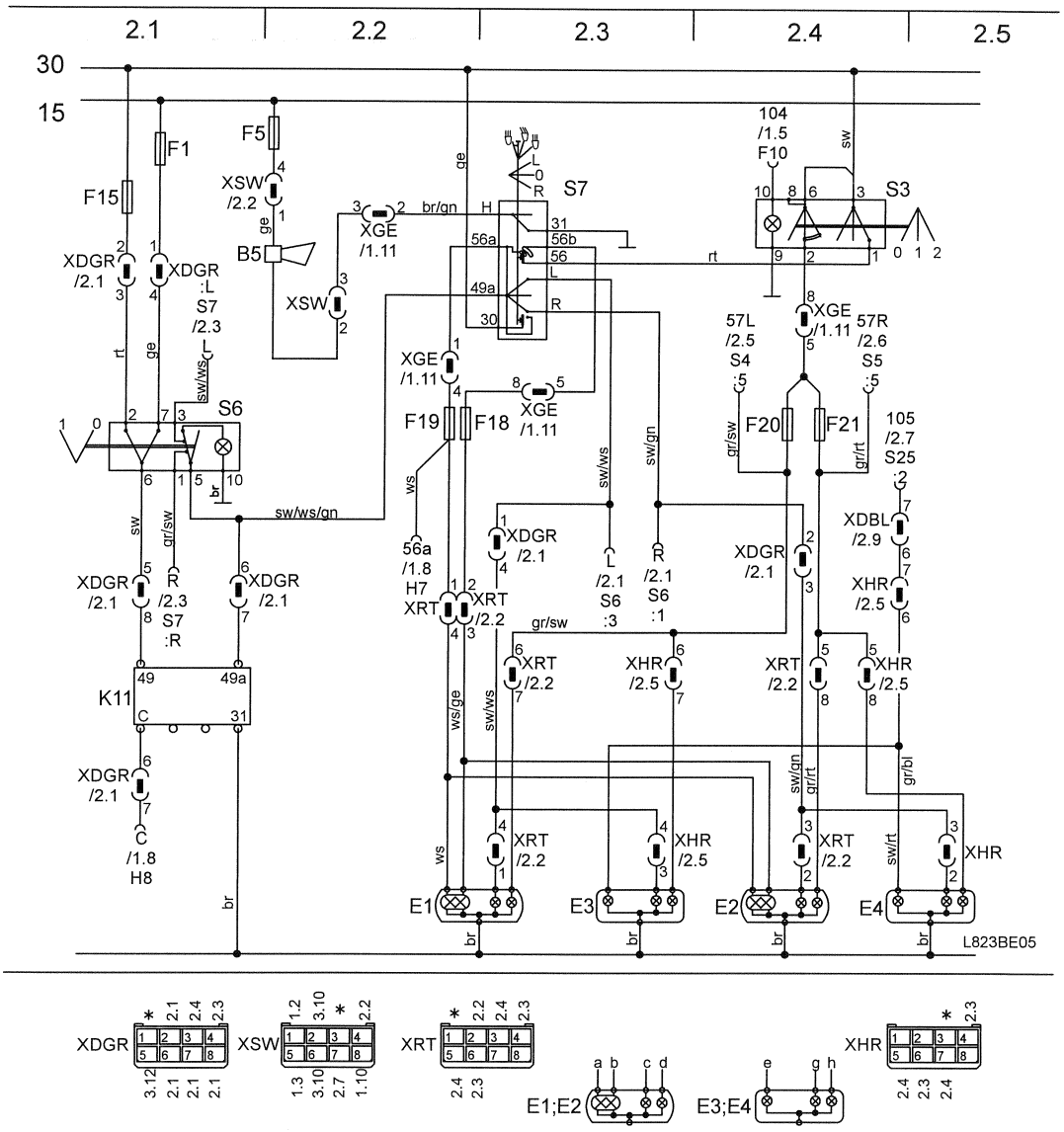
Heater fan	Wash / wipe system



Path	Desig-nation	Device
		Heater fan
1.10	F7	Fuse
1.10	S13	Heater fan switch
1.10	M3	Heater fan
		Wash/ wipe system
1.11	F8	Fuse
1.12	F9	Fuse

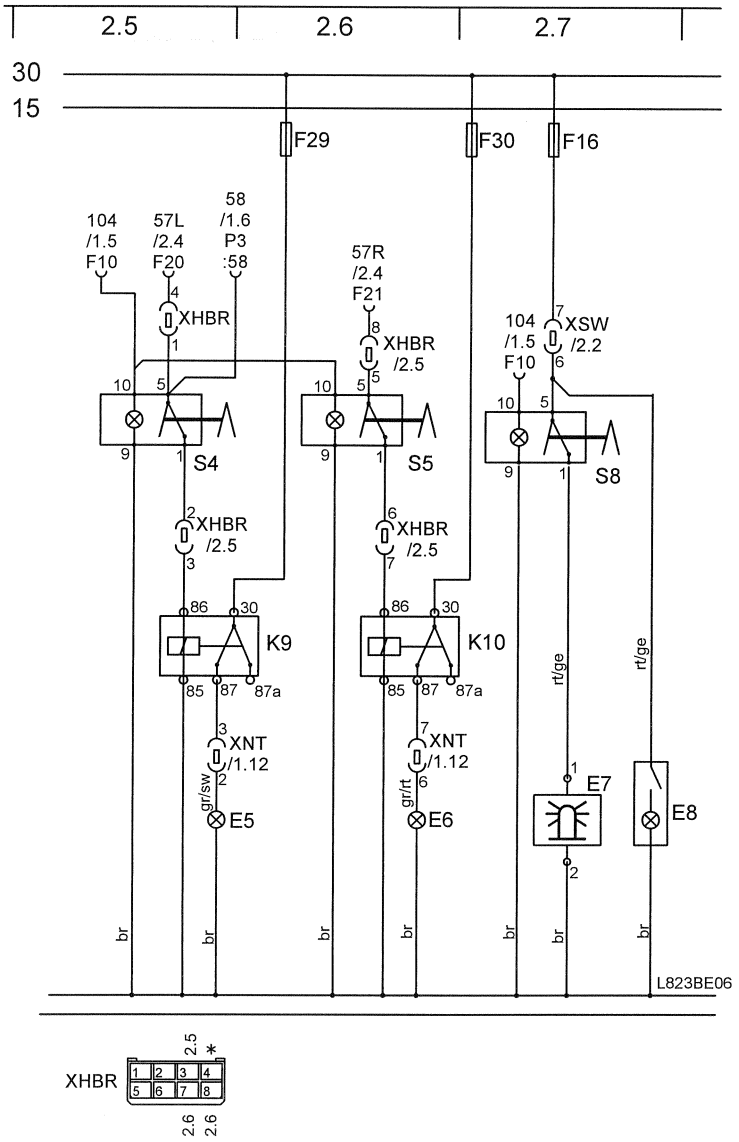
Path	Desig-nation	Device
1.11	S10	Front wash/ wipe switch
1.12	S12	Rear wash/ wipe switch
1.10	M4	Front washer pump
1.11	M6	Front wiper motor
1.12	M5	Rear washer pump
1.12	M7	Rear wiper motor

Lighting and signaling system



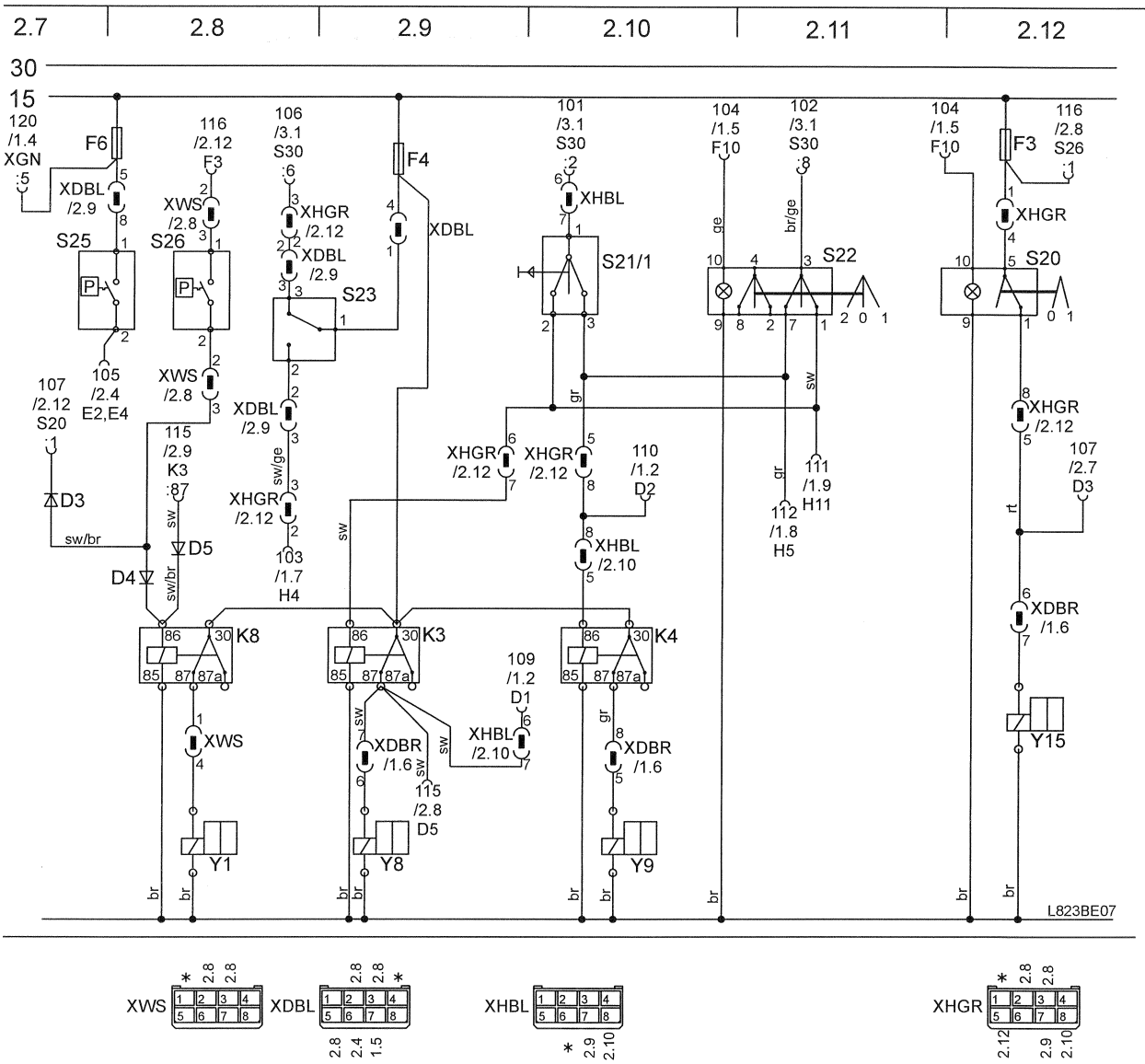
a = Upper beam
b = Lower beam
c = Direction indicator
d = Side marker lamp
e = Brake light
g = Direction indicator
h = Side marker lamp

Path	Desig-nation	Device	Path	Desig-nation	Device
		Lighting and signaling system			
2.1	F15	Fuse	2.2	F18	Fuse
2.1	F1	Fuse	2.4	F20	Fuse
2.2	F5	Fuse	2.4	F21	Fuse
2.2	B5	Horn	2.1	K11	Direction indicator relay
2.1	S6	Hazard warning switch	2.2	E1	Headlamp, left
2.3	S7	Stalk control	2.4	E2	Headlamp, right
2.4	S3	Light switch	2.3	E3	Back light, left
2.2	F19	Fuse	2.5	E4	Back light, right



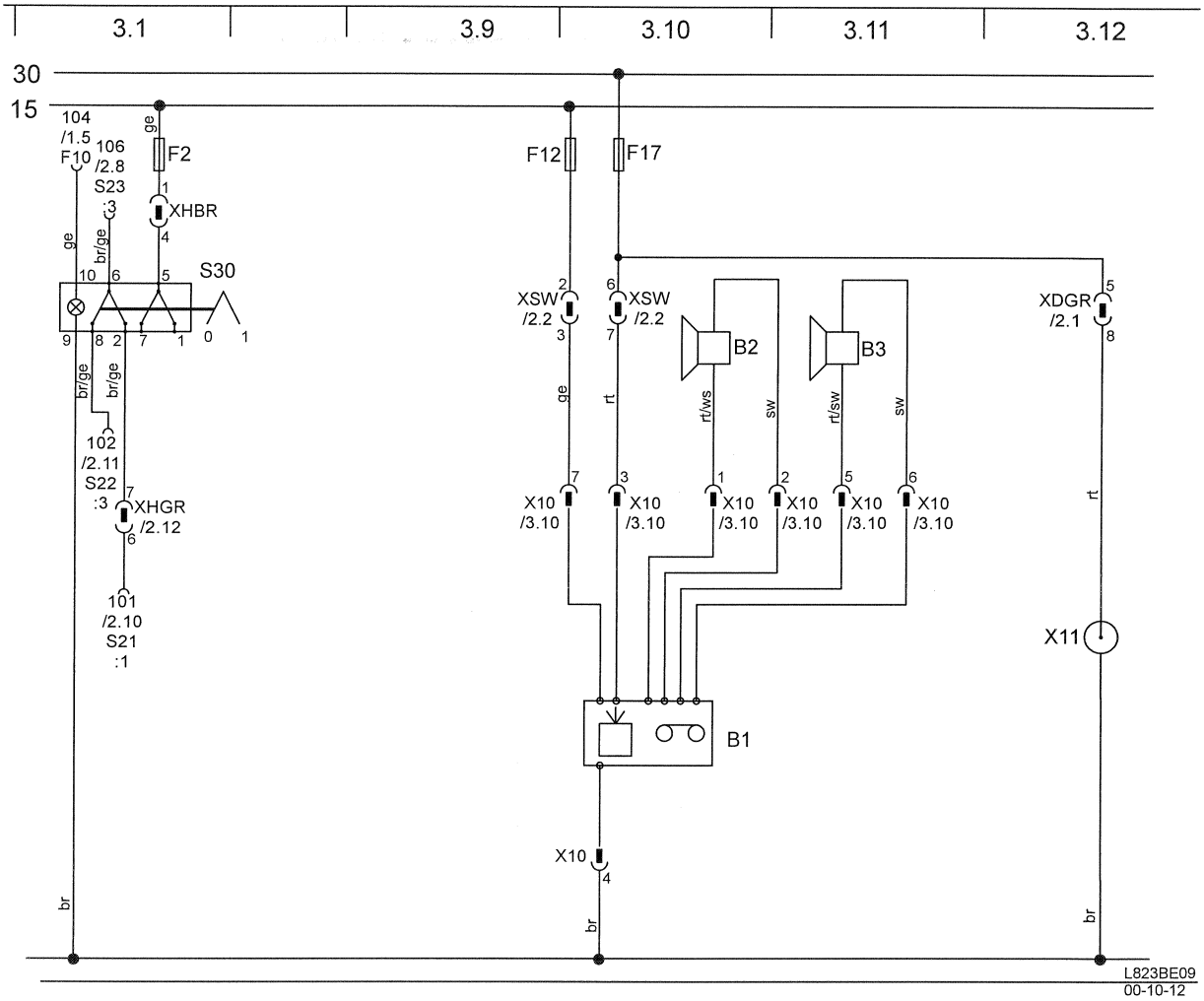
Path	Desig-nation	Device	Path	Desig-nation	Device
		Lighting and signaling system	2.5	K 9	Front working floodlight
2.7	F16	Fuse	2.6	K 10	Rear working floodlight
2.5	S4	Front working floodlight	2.5	E5	Front working floodlight
2.6	S5	Rear working floodlight	2.6	E6	Rear working floodlight
2.7	S8	Rotating beacon	2.7	E7	Rotating beacon
			2.7	E8	Cab lighting

Travel, brakes



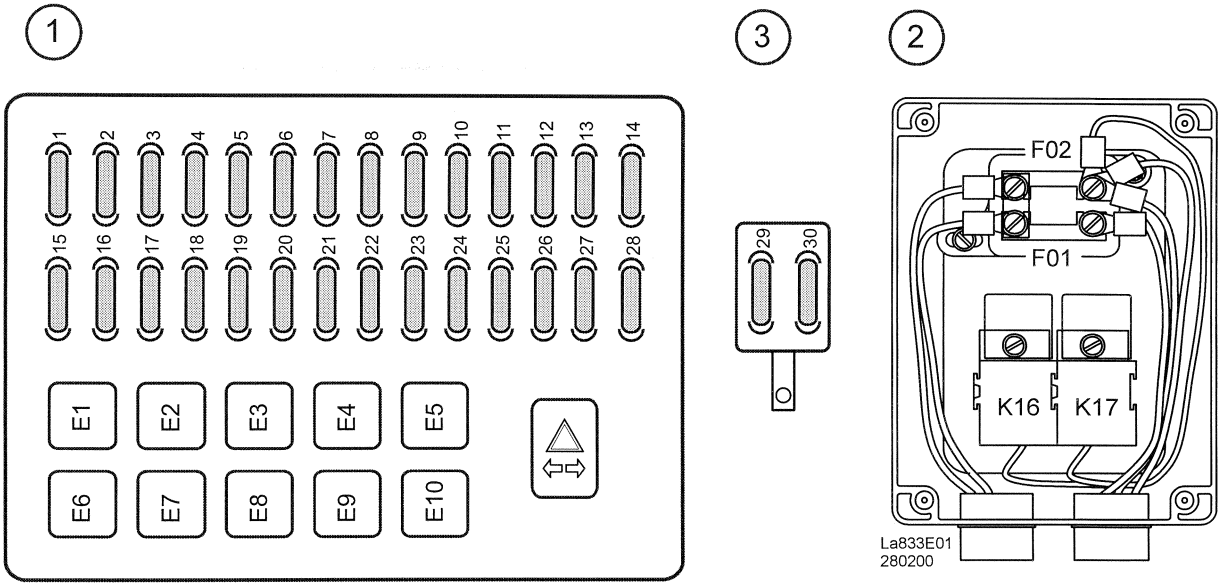
Path	Designation	Device	Path	Designation	Device
		Travel, brakes	2.7	D3	Diode
2.8	F6	Fuse	2.8	D4	Diode
2.9	F4	Fuse	2.8	D5	Diode
2.12	F3	Fuse	2.8	K8	Hydrostatic brake
2.8	S25	Brake light switch	2.9	K3	Travel, in reverse
2.8	S26	Hydrostatic brake	2.10	K4	Travel, forward
2.8	S23	Parking brake switch	2.8	Y1	Direction-of-travel recognition
2.10	S21/1	Travel coordinate lever	2.9	Y8	Valve for travel, in reverse
2.11	S22	Travel, forward - in reverse	2.10	Y9	Valve for travel, forward
2.12	S20	Travel, fast - slow	2.12	Y15	Valve for travel, fast - slow

Working hydraulic, Radio, Socket



Path	Designation	Device	Path	Designation	Device
		Working hydraulic			***Radio, Socket***
3.1	F2	Fuse	3.10	F12	Fuse
3.1	S30	Working hydraulic	3.10	F17	Fuse
			3.10	B2	Loudspeaker
			3.11	B3	Loudspeaker
			3.10	B1	Radio
			3.12	X11	Socket
			3.10	X10	Radio socket (AMP)

Fuse and relay box - Assignment diagram



1 = Fuse and relay box — seat console, bottom right-hand side

2 = Starter box — engine compartment dividing wall - right-hand tank side

3 = Fuse box — behind fuse and relay box (pos. 1)

Location	Relay	Function
E 1	--	not assigned
E 2	K 2	Start-up safeguard
E 3	K 3	Travel, in reverse
E 4	K 4	Travel, forward
E 5	K 5	Float position
E 6	K 6	Additional valve
E 7	K 7	Additional valve
E 8	K 8	Brake inching
E 9	K 9	Working floodlights, front
E 10	K 10	Working floodlights, rear
⇧⇩ ▷	K 11	Flasher transmitter
	K 13	Pre-heat relay (engine compartment dividing wall - near generator)
	K 16	Stop
	K 17	Start

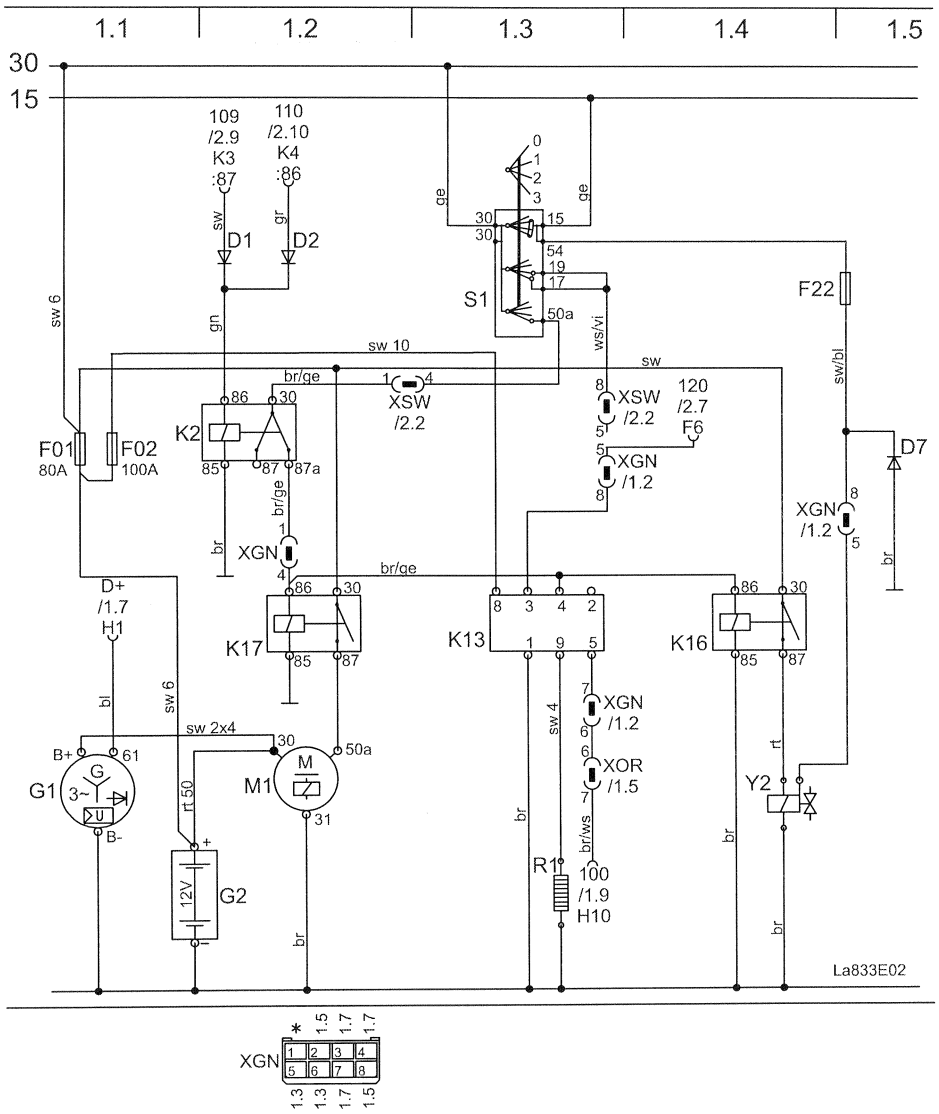
Fuse and diode assignment

Position	Ampere	Assigned to	Position	Ampere	Assigned to
F 1	10	Hazard warning switch Immobilizer	F 15	10	Hazard warning switch Immobilizer
F 2	15	Working hydraulics cut-off	F 16	10	Rotating beacon Interior light
F 3	15	Travel - Fast/ slow	F 17	10	Socket Radio
F 4	15	Parking brake switch Travel, forward & in reverse Hydrostatic brake	F 18	15	Low beam
F 5	10	Signal horn	F 19	15	High beam
F 6	10	Brake light	F 20	10	Side marker lamp, left Working floodlights, front
F 7	15	Heater fan	F 21	10	Instrument light Working floodlights, rear Side marker lamp, right
F 8	15	Front wiper	F 22	20	Engine shut-off
F 9	15	Rear wiper	F 23 D 5	Diode 3A	Back-up alarm
F 10	10	Instruments	F 24 D 4	Diode 3A	Hydrostatic brake
F 11	15	Float position relay	F 25 D 3	Diode 3A	Activation fast / slow Hydrostatic brake
F 12	10	Radio	F 26 D 1	Diode 3A	Start-up safeguard
F 13	10	Additional control circuit	F 27 D 2	Diode 3A	Start-up safeguard
F 14 D 6	Diode 3A	Three-phase alternator	F 28 D 7	Diode 3A	Engine shut-off recovery diode
F 29 *	15	Working floodlights, front	F 30 *	15	Working floodlights, rear
F 01	80	Pre-heat/ starter switch	F 02	100	Starter

Cable and plug colors

bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

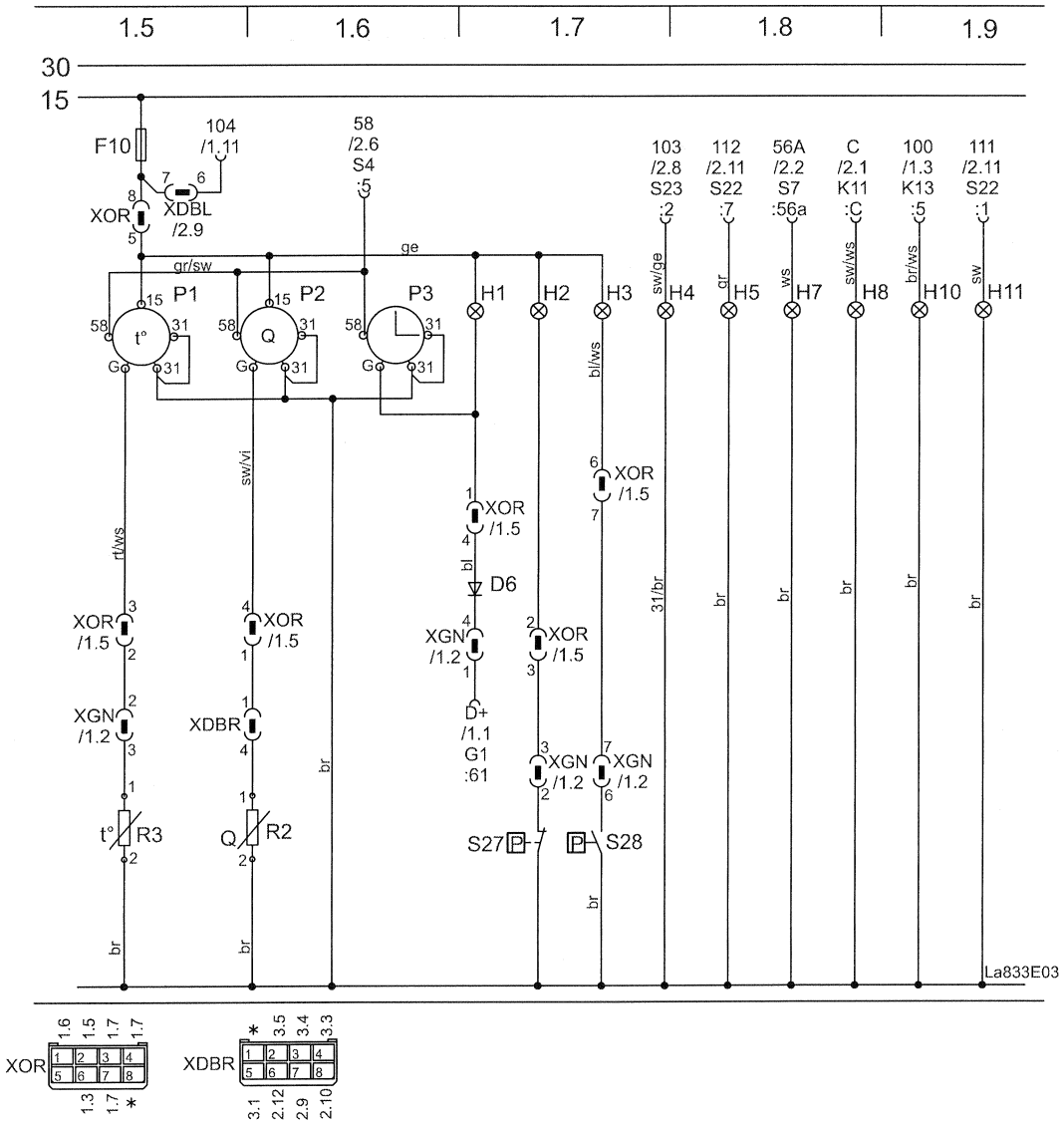
Pre-heat, start-up system



Path	Designation	Device
		Pre-heat, start-up system
1.1	G1	Generator
1.1	G2	Battery 12 V
1.2	M1	Starter
1.2	K2	Starting relay (starting safeguard)
1.2	K17	Starting relay (starting aid)
1.1	F01	Blade-type fuse 80A
1.1	F02	Blade-type fuse 100A

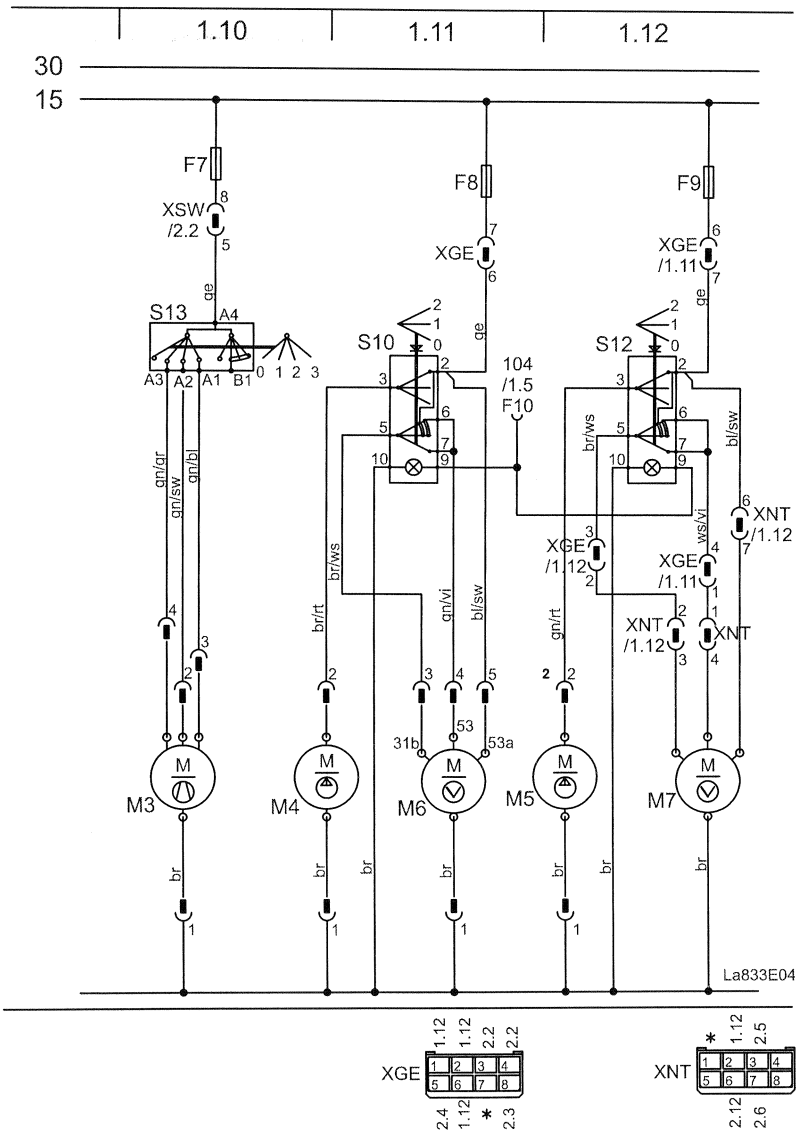
Path	Designation	Device
1.2	D1	Diode
1.2	D2	Diode
1.3	S1	Pre-heat/ starter switch
1.3	K13	Pre-heat relay
1.4	K16	Cut-off relay
1.4	Y2	Electrical engine cut-off
1.3	R1	Glow plugs
1.5	D7	Diode
1.5	F22	Fuse

Instruments, Display units



Section	Designation	Device	Section	Designation	Device
		Instruments, display units	1.7	H4	Parking brake indicator lamp
1.5	P1	Temperature indicator	1.8	H5	Travel, forward
1.6	P2	Fuel gauge	1.9	H11	Travel, in reverse
1.6	P3	Operating hour meter	1.8	H7	High beam indicator lamp
1.5	R3	Coolant temperature sensor	1.8	H8	Turning indicator
1.6	R2	Fuel gauge sensor	1.9	H10	Pre-heating indicator lamp
1.5	F10	Fuse	1.7	D6	Diode
1.7	H1	Battery charge indicator lamp	1.7	S27	Engine oil pressure switch
1.7	H2	Engine oil pressure indicator lamp	1.7	S28	Air filter clogging switch
1.7	H3	Air filter clogging indicat. lamp			

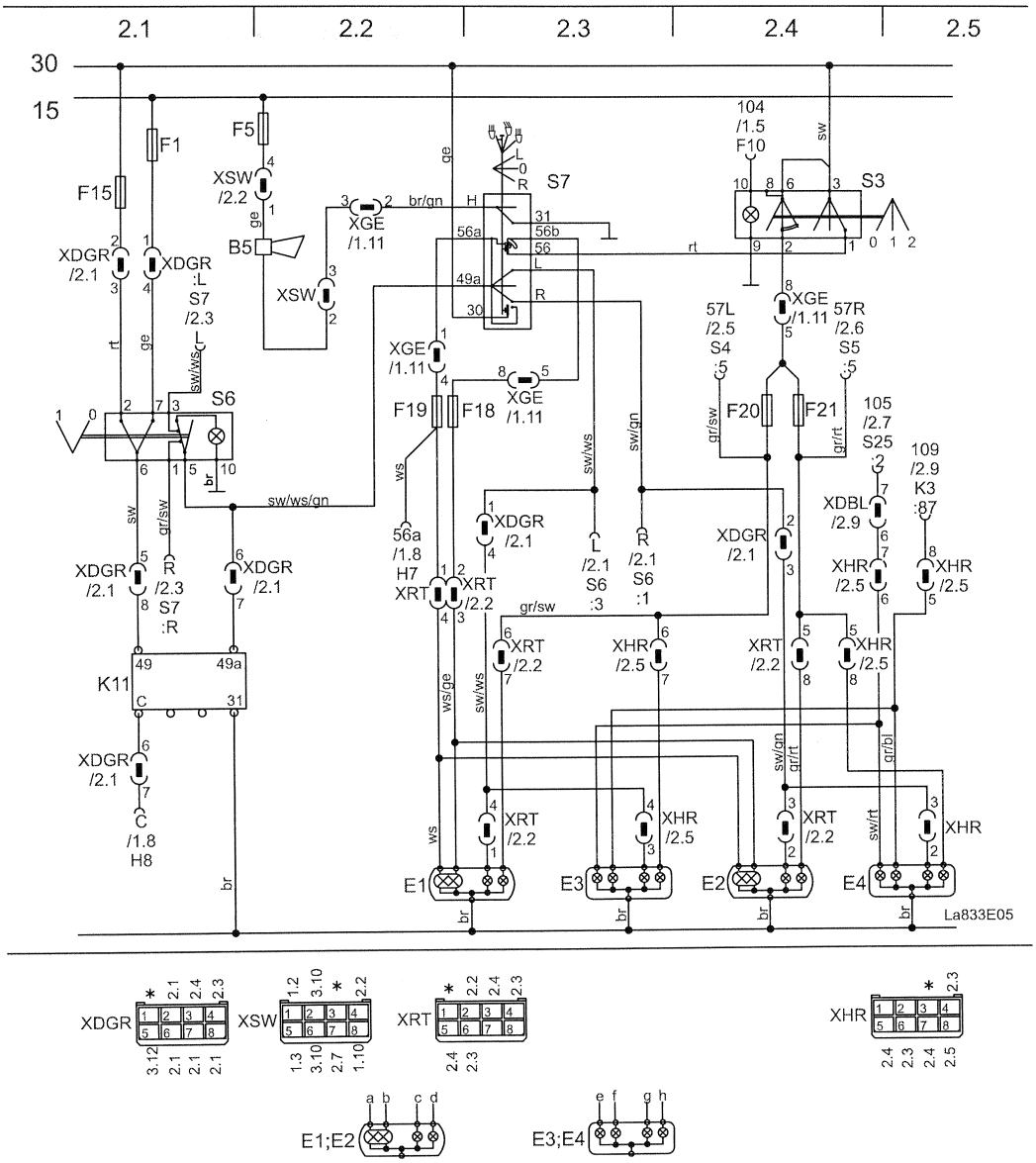
Heater fan	Wash/ wipe system



Section	Designation	Device	Section	Designation	Device
		Heater fan	1.11	S10	Wash/ wipe switch, front
1.10	F7	Fuse	1.12	S12	Wash/ wipe switch, rear
1.10	S13	Heater fan switch	1.10	M4	Washer pump, front
1.10	M3	Heater fan	1.11	M6	Wiper motor, front
		Wash/ wipe system	1.12	M5	Washer pump, rear
1.11	F8	Fuse	1.12	M7	Wiper motor, rear
1.12	F9	Fuse			

SCHAEFF	Typ/Model/Type **SKL 833 (from serial no. 833/0100)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.05.03**

Lighting and signalling system

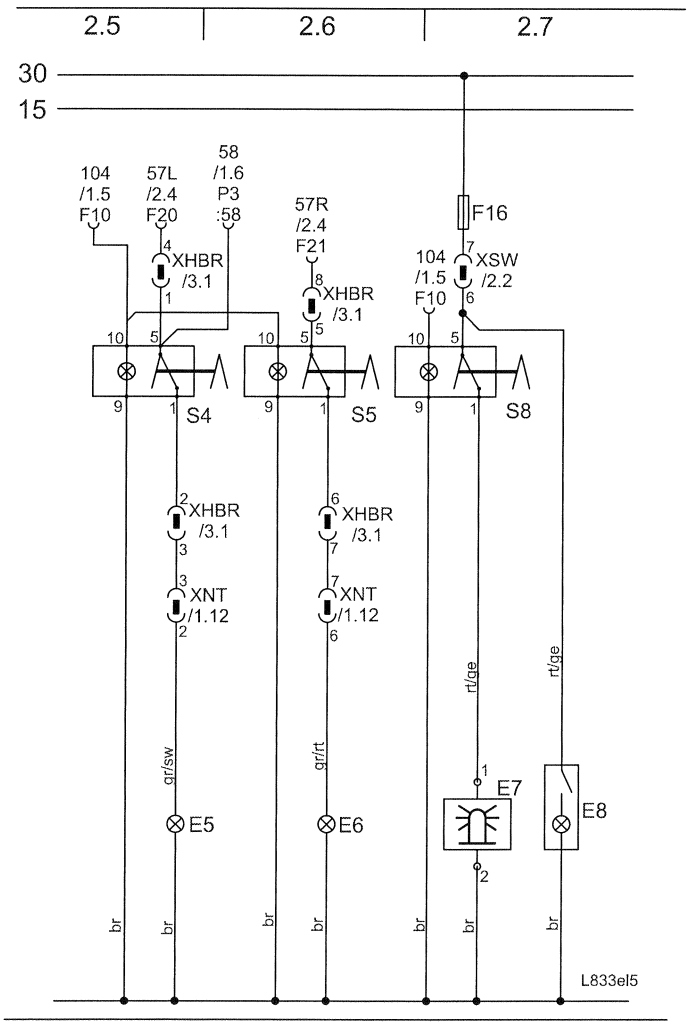


a = High beam
b = Low beam
c = Turning indicator
d = Side marker lamp
e = Brake light
f = Back-up lamp
g = Turning indicator
h = Side marker lamp

Section	Desig-nation	Device
		Lighting and signalling system
2.1	F15	Fuse
2.1	F1	Fuse
2.2	F5	Fuse
2.2	B5	Horn
2.1	S6	Hazard warning switch
2.3	S7	Steering column switch
2.4	S3	Light switch
2.2	F19	Fuse

Section	Desig-nation	Device
2.2	F18	Fuse
2.4	F20	Fuse
2.4	F21	Fuse
2.1	K11	Turning indicator relay
2.2	E1	Headlamp, left
2.4	E2	Headlamp, right
2.3	E3	Back lamp, left
2.5	E4	Back lamp, right

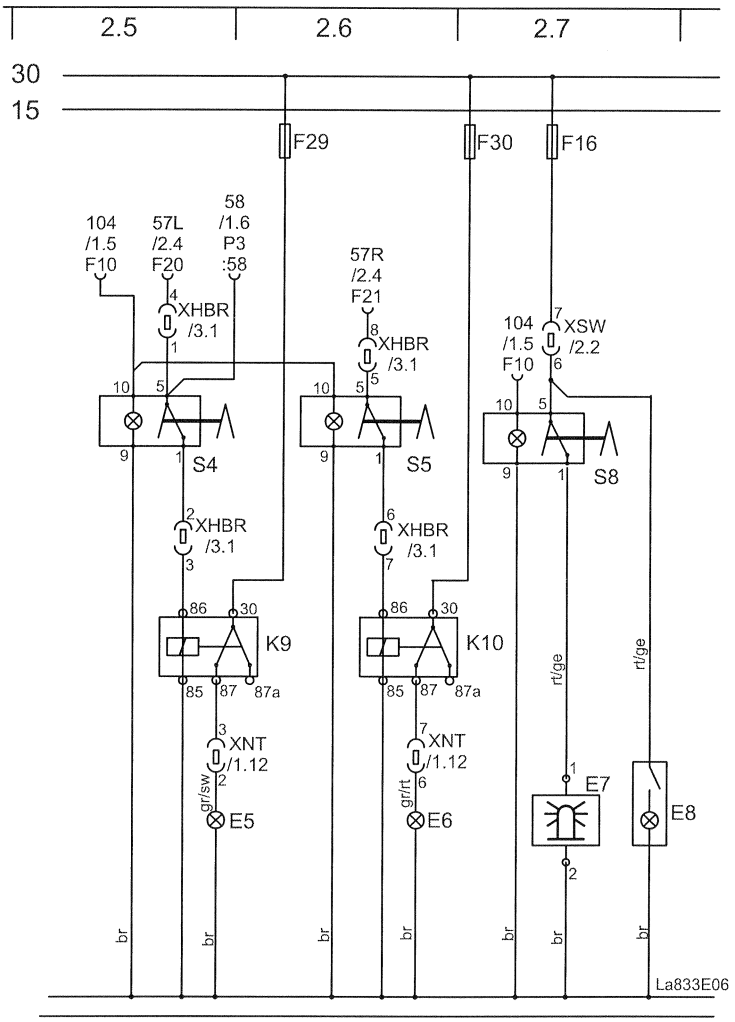
up to serial no. 833/0459



Section	Desig-nation	Device	Section	Desig-nation	Device
		Lighting and signalling system			
2.7	F16	Fuse	2.5	E5	Working floodlight, front
2.5	S4	Working floodlight, front	2.6	E6	Working floodlight, rear
2.6	S5	Working floodlight, rear	2.7	E7	Rotating beacon
2.7	S8	Rotating beacon	2.7	E8	Cab lighting

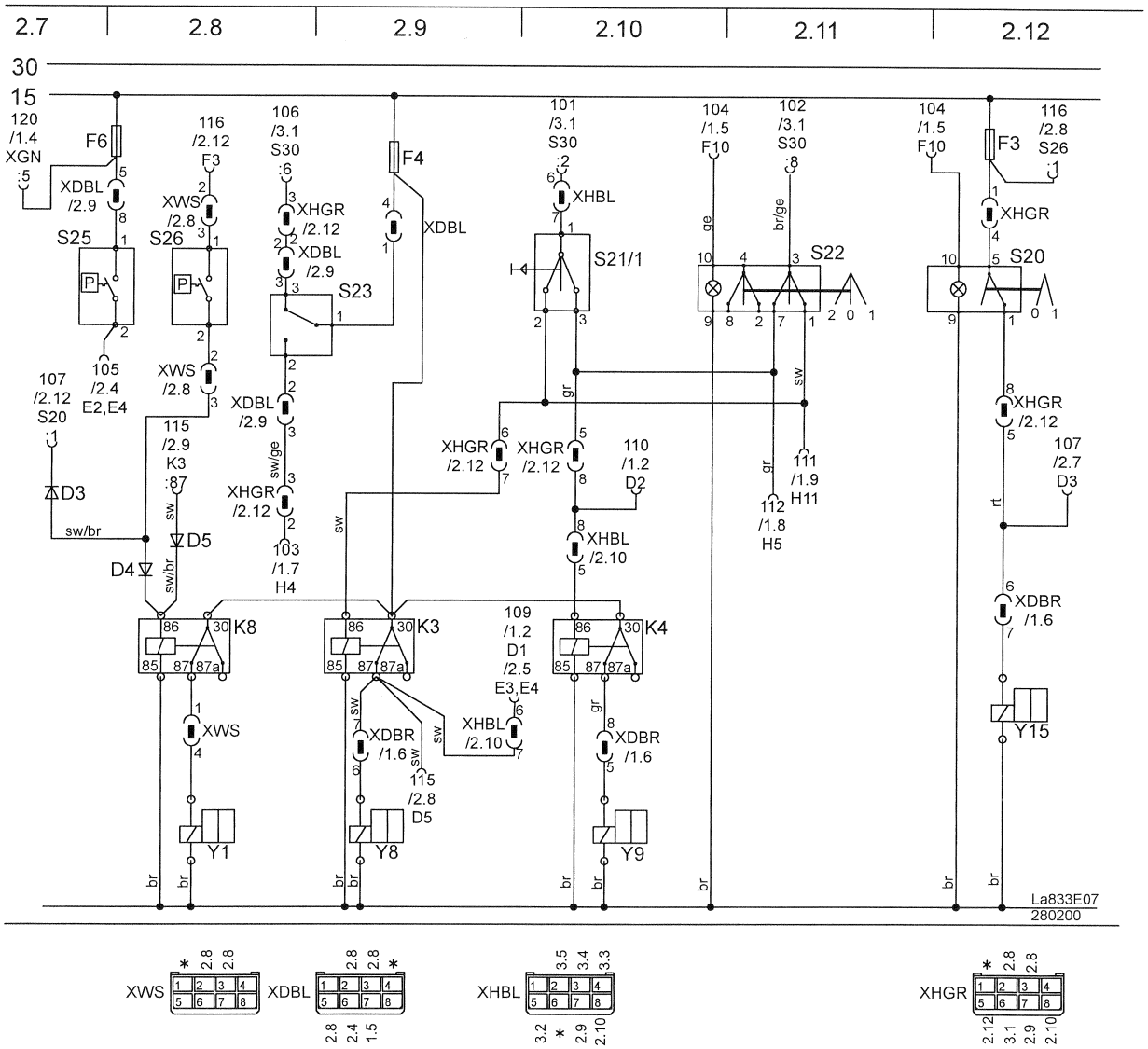
Lighting and signalling system

from serial no. 833/0460



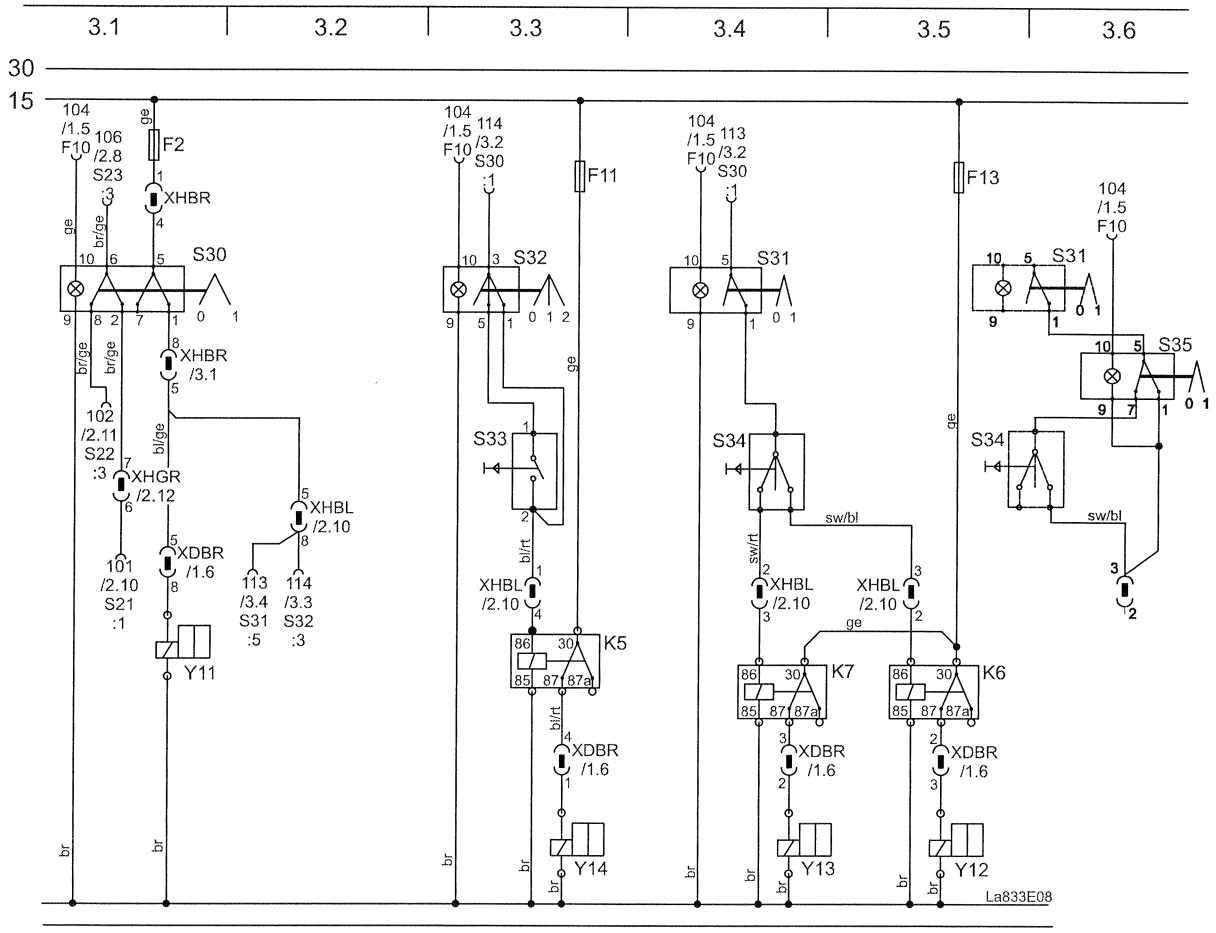
Section	Desig-nation	Device	Section	Desig-nation	Device
		Lighting and signalling system	2.5	K 9	Working floodlight, front
2.7	F16	Fuse	2.6	K 10	Working floodlight, rear
2.5	S4	Working floodlight, front	2.5	E5	Working floodlight, front
2.6	S5	Working floodlight, rear	2.6	E6	Working floodlight, rear
2.7	S8	Rotating beacon	2.7	E7	Rotating beacon
			2.7	E8	Cab lighting

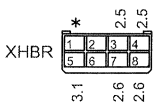
Travel, brakes



Section	Desig-nation	Device	Section	Desig-nation	Device
		Travel, brakes	2.7	D3	Diode
2.8	F6	Fuse	2.8	D4	Diode
2.9	F4	Fuse	2.8	D5	Diode
2.12	F3	Fuse	2.8	K8	Hydrostatic brake
2.8	S25	Brake light switch	2.9	K3	Travel, in reverse
2.8	S26	Hydrostatic brake	2.10	K4	Travel, forward
2.8	S23	Parking brake switch	2.8	Y1	Direction of travel recognition
2.10	S21/1	Travel coordinate lever	2.9	Y8	Valve for travel in reverse
2.11	S22	Travel, forward & in reverse	2.10	Y9	Valve for travel forward
2.12	S20	Travel, fast/ slow	2.12	Y15	Valve for travel fast /slow

Working hydraulics	Float position	Additional control circuit	Option

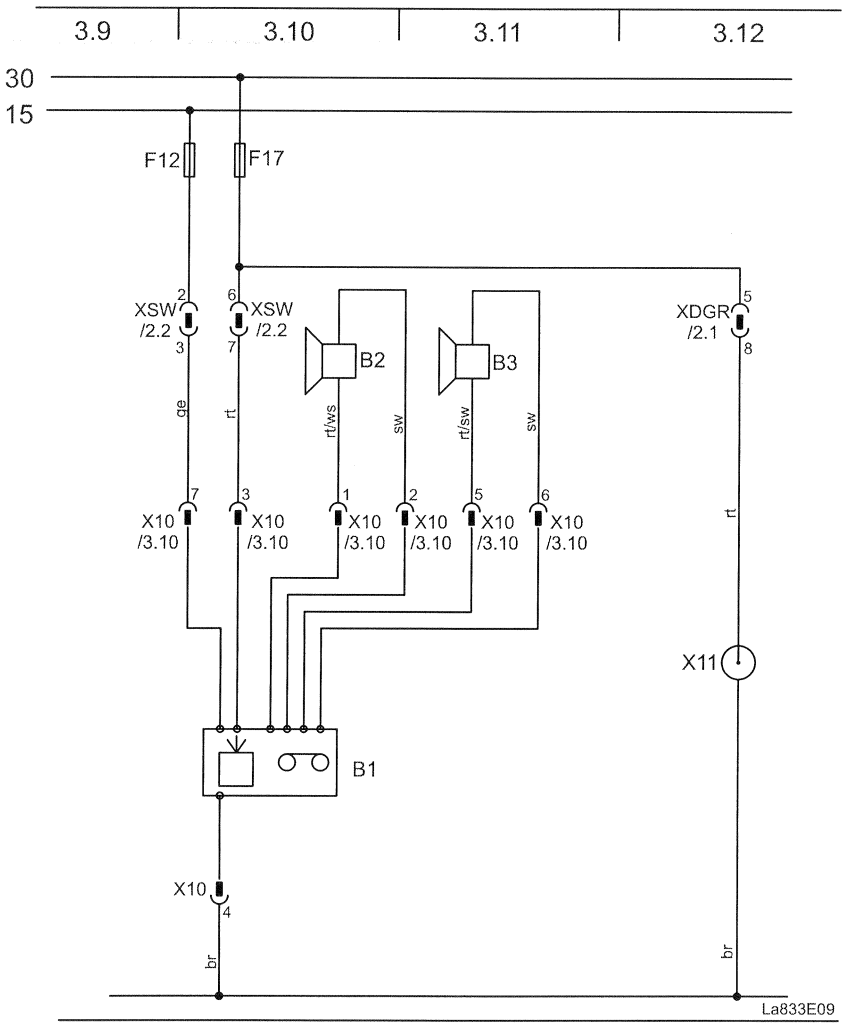


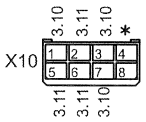


Section	Desig-nation	Device
		Working hydraulics
3.1	F2	Fuse
3.1	S30	Switch for working hydraulics cut-off
3.1	Y11	Valve for working hydraulics
		Float position
3.3	F11	Fuse
3.2	S32	Float position
3.3	S33	Float posit. coordinate lever
3.3	K5	Float position relay
3.3	Y14	Float position valve

Section	Desig-nation	Device
		Additional control circuit
3.5	F13	Fuse
3.4	S34	Coordinate lever for 3rd control circuit
3.4	S31	Switch for 3rd control circ.cut-off
3.4	K7	Relay for addit. control circuit
3.5	K6	Relay for addit. control circuit
3.4	Y13	Additional control circuit
3.5	Y12	Additional control circuit
		Option
1	S 35	Continuous operation of 3rd control circuit

Radio, Socket

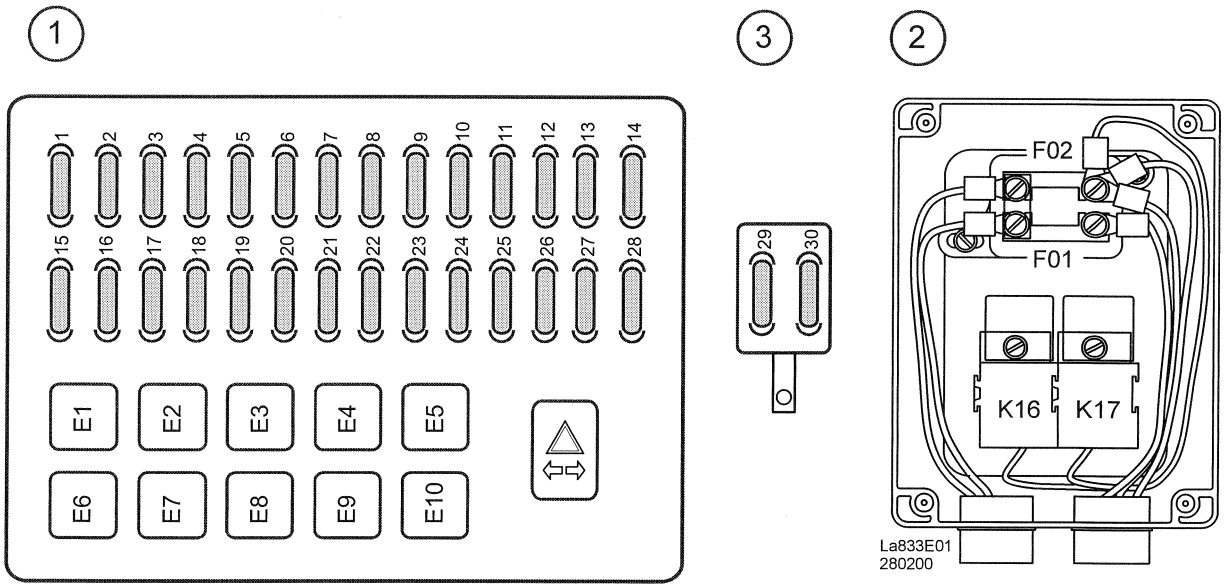




Section	Desig-nation	Device	Section	Desig-nation	Device
		Radio, socket			
3.10	F12	Fuse	3.10	B1	Radio
3.10	F17	Fuse	3.12	X11	Socket
3.10	B2	Loudspeaker	3.10	X10	Radio plug (AMP)
3.11	B3	Loudspeaker			

Electrical system

Fuse and relay box - Assignment diagram



1 = Fuse and relay box ..... Seat console, right, bottom

2 = Starter box ..... Engine compartment dividing wall - tank side, right

3 = Fuse box ..... Behind fuse and relay box (pos. 1)

Location	Relay	Function
E 1	--	not assigned
E 2	K 2	Starting safeguard
E 3	K 3	Travel, in reverse
E 4	K 4	Travel, forward
E 5	--	not assigned
E 6	--	not assigned
E 7	--	not assigned
E 8	K 8	Brake inching
E 9	K 9	Working floodlight, front
E 10	K 10	Working floodlight, rear
	K 11	Flasher transmitter
	K 13	Pre-heat relay (engine compartment dividing wall - near generator)
	K 16	Shut-off
	K 17	Start-up

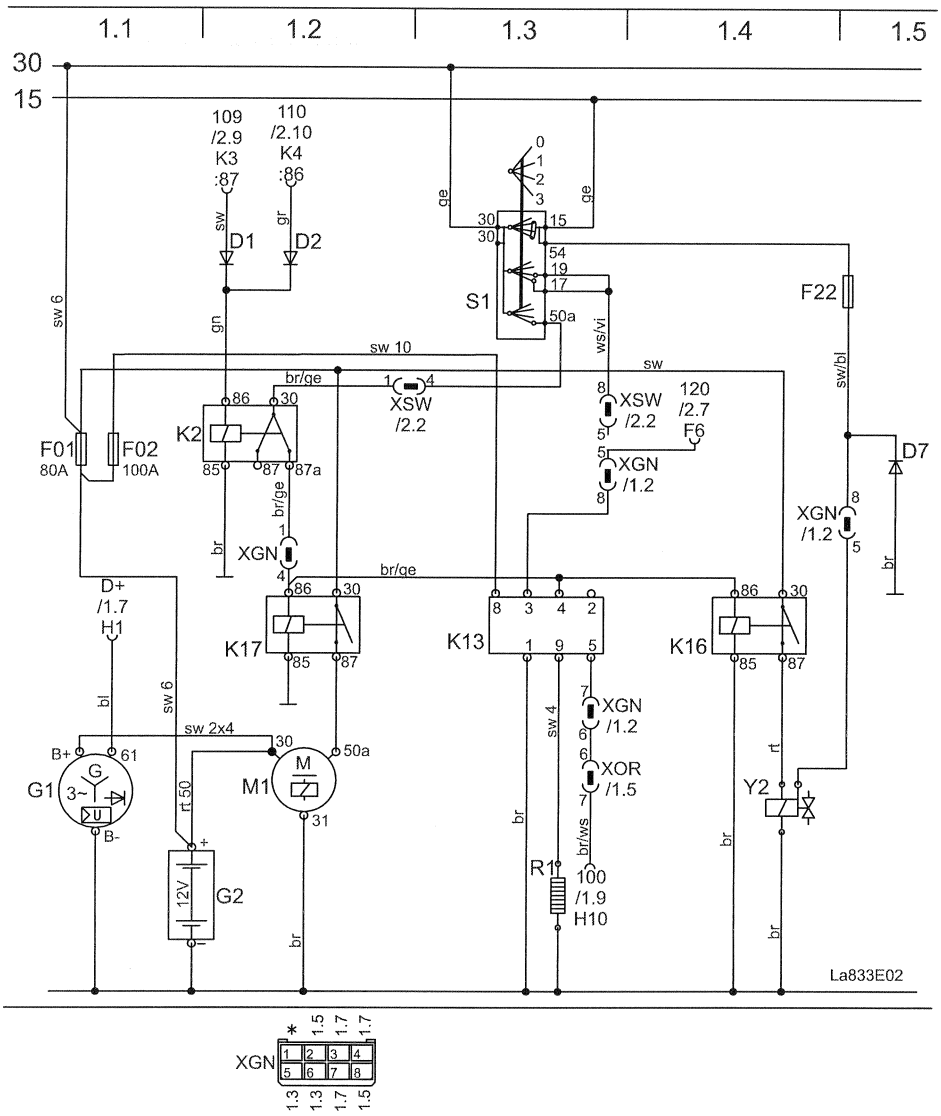
Fuse and diode assignment

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Immobilizer	F 15	10	Hazard warning switch Immobilizer
F 2	--		F 16	10	Rotating beacon Interior light
F 3	15	Travel - Fast/ slow	F 17	10	Socket Radio
F 4	15	Hand brake switch Travel, forward/ reverse Hydrostatic brake	F 18	15	Lower beam
F 5	10	Horn	F 19	15	Upper beam
F 6	10	Brake light	F 20	10	Side marker lamp, left Front working floodlight
F 7	15	Heater fan	F 21	10	Instruments' lighting Rear working floodlight Side marker lamp, right
F 8	15	Front wiper	F 22	20	Shut-off
F 9	15	Rear wiper	F 23 D 5	Diode 3A	Back-up alarm
F 10	10	Instruments	F 24 D 4	Diode 3A	Hydrostatic brake
F 11	--		F 25 D 3	Diode 3A	Connection fast / slow when hydrostatic brake is actuated
F 12	10	Radio	F 26 D 1	Diode 3A	Starting safeguard
F 13	--		F 27 D 2	Diode 3A	Starting safeguard
F 14 D 6	Diode 3A	Three-phase alternator	F 28 D 7	Diode 3A	Engine shut-off recovery diode
F 29	15	Front working floodlight	F 30	15	Rear working floodlight
F 01	80	Pre-heat/ starter switch	F 02	100	Starter

Cable and plug colors

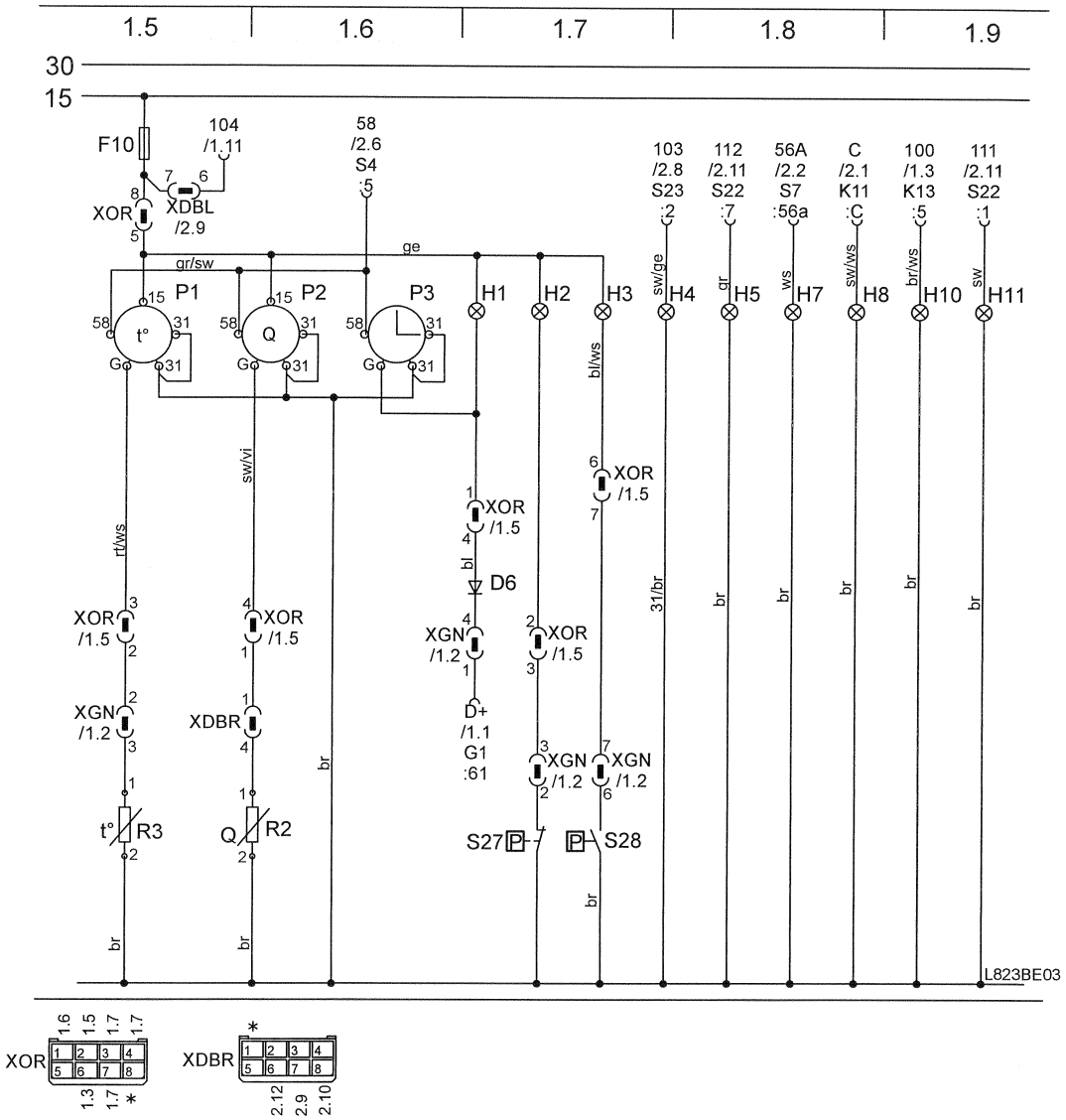
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bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Pre-heat, start-up system



Path	Designation	Device	Path	Designation	Device
		Pre-heat, start-up system	1.2	D2	Diode
1.1	F01	Blade-type fuse 80A	1.3	R1	Glow plugs
1.1	F02	Blade-type fuse 100A	1.3	S1	Pre-heat/ starter switch
1.1	G1	Generator	1.3	K13	Pre-heat relay
1.1	G2	Battery, 12 V	1.4	K16	Cut-off relay
1.2	M1	Starter	1.4	Y2	Shut-off
1.2	K2	Starting relay (starting safeguard)	1.5	D7	Diode
1.2	K17	Starting relay (starting aid)	1.5	F22	Fuse
1.2	D1	Diode			

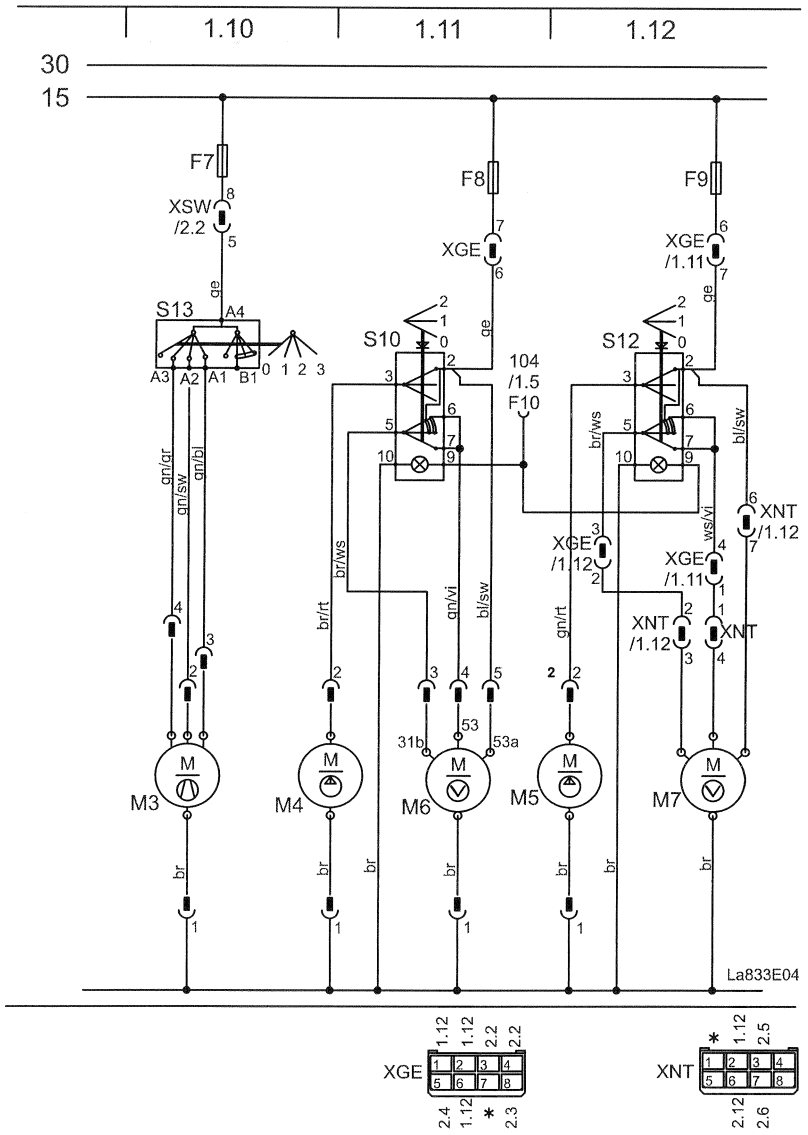
Instruments, indicators



Path	Designation	Device
		Instruments, indicators
1.5	P1	Temperature indicator
1.6	P2	Fuel gauge
1.6	P3	Operating hour meter
1.5	R3	Coolant temperat.sensor
1.6	R2	Fuel gauge transmitter
1.5	F10	Fuse
1.7	H1	Charge control lamp
1.7	H2	Engine oil pressure indicator lamp
1.7	H3	Air filter clogging indicator lamp

Path	Designation	Device
1.7	H4	Parking brake indicator lamp
1.8	H5	Travel, forward
1.9	H11	Travel, in reverse
1.8	H7	Upper beam indicator lamp
1.8	H8	Direction indicator
1.9	H10	Pre-heat indicator lamp
1.7	D6	Diode
1.7	S27	Engine oil pressure switch
1.7	S28	Air filter clogging switch

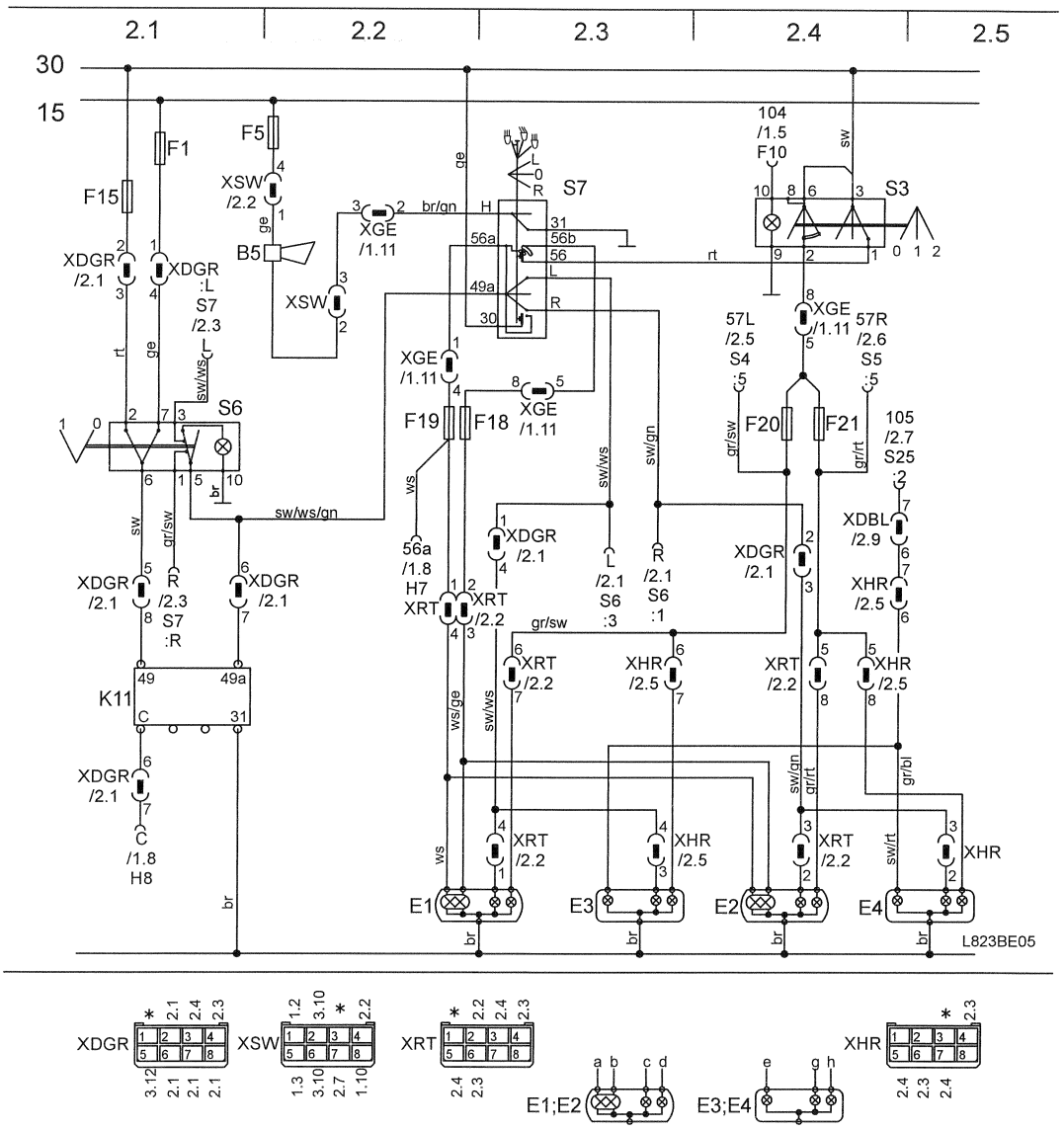
Heater fan	Wash / wipe system



Path	Designation	Device	Path	Designation	Device
		Heater fan	1.11	S10	Front wash/ wipe switch
1.10	F7	Fuse	1.12	S12	Rear wash/ wipe switch
1.10	S13	Heater fan switch	1.10	M4	Front washer pump
1.10	M3	Heater fan	1.11	M6	Front wiper motor
		Wash/ wipe system	1.12	M5	Rear washer pump
1.11	F8	Fuse	1.12	M7	Rear wiper motor
1.12	F9	Fuse			

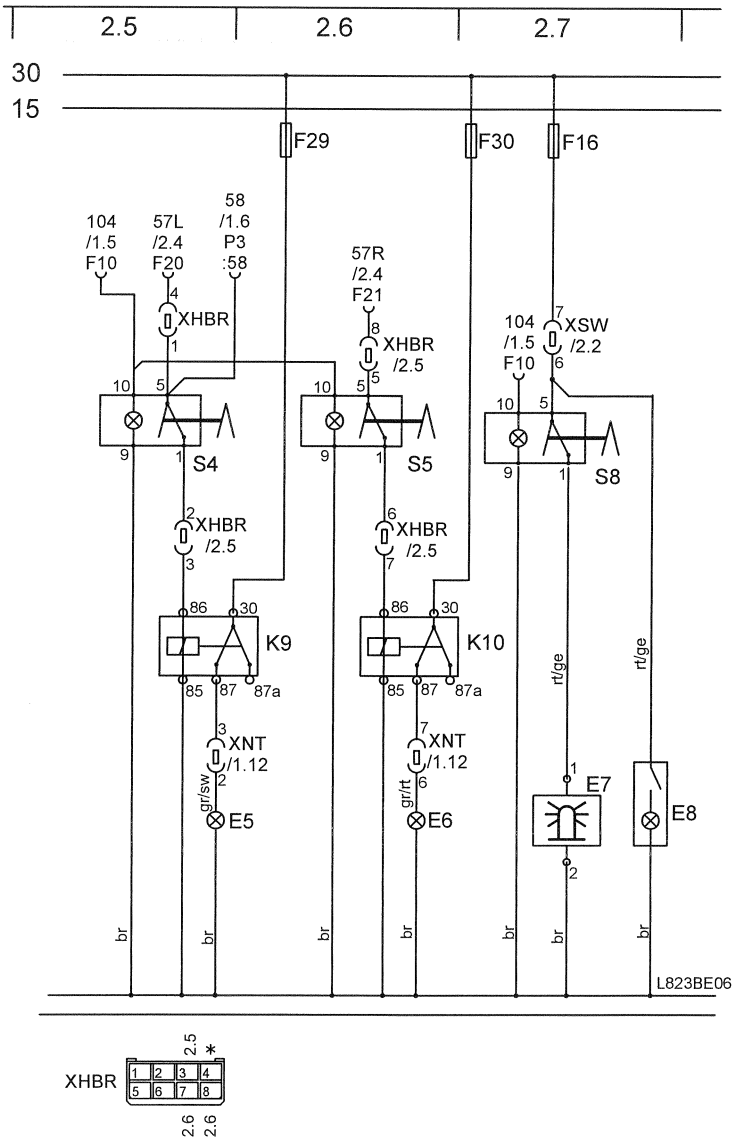
SCHAEFF	Typ/Model/Type **SKL 833 Basic (from serial no. 833/2215)**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.06.03**

Lighting and signaling system



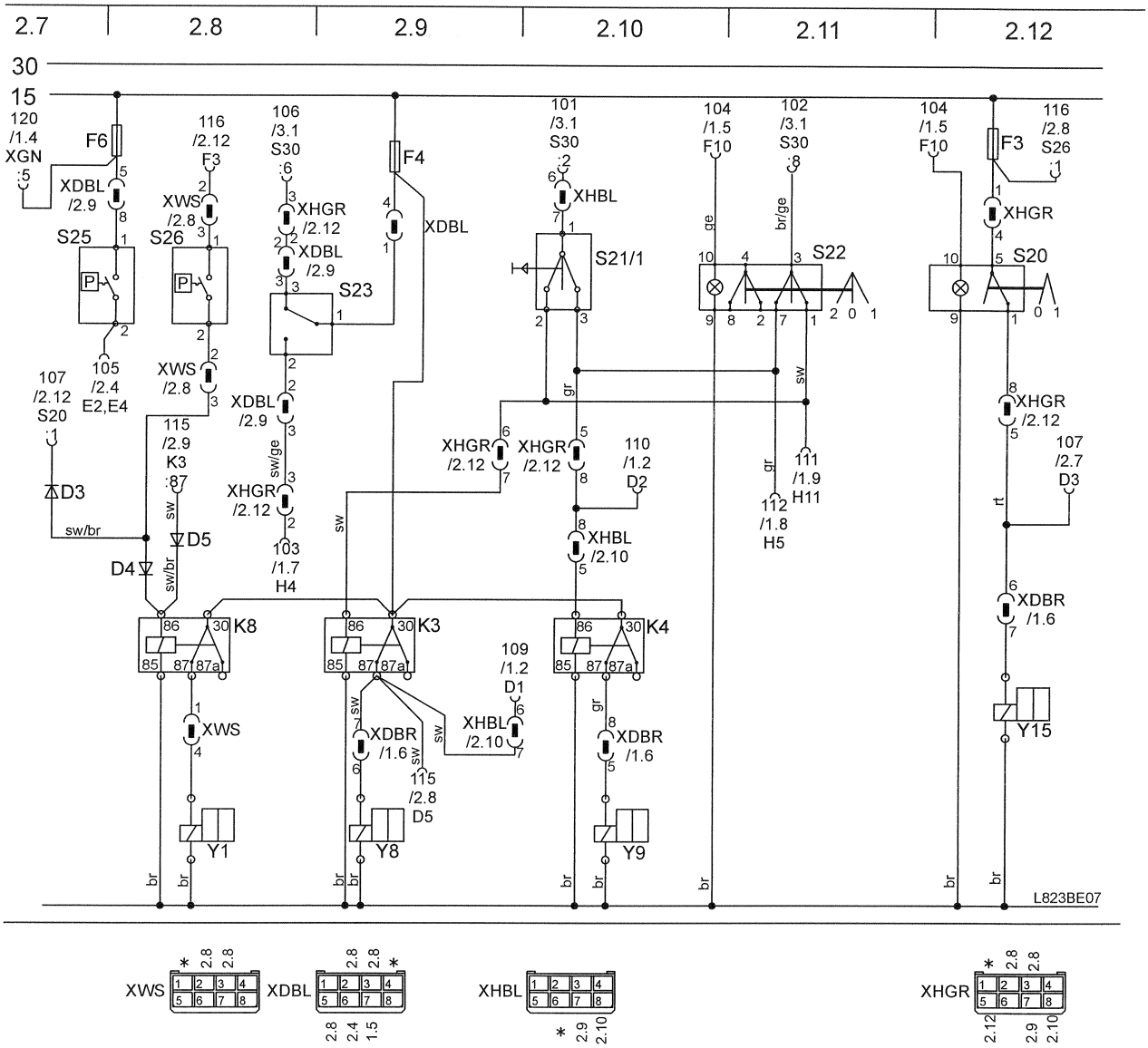
a = Upper beam
b = Lower beam
c = Direction indicator
d = Side marker lamp
e = Brake light
g = Direction indicator
h = Side marker lamp

Path	Desig-nation	Device	Path	Desig-nation	Device
		Lighting and signaling system			
2.1	F15	Fuse	2.2	F18	Fuse
2.1	F1	Fuse	2.4	F20	Fuse
2.2	F5	Fuse	2.4	F21	Fuse
2.2	B5	Horn	2.1	K11	Direction indicator relay
2.1	S6	Hazard warning switch	2.2	E1	Headlamp, left
2.3	S7	Stalk control	2.4	E2	Headlamp, right
2.4	S3	Light switch	2.3	E3	Back light, left
2.2	F19	Fuse	2.5	E4	Back light, right



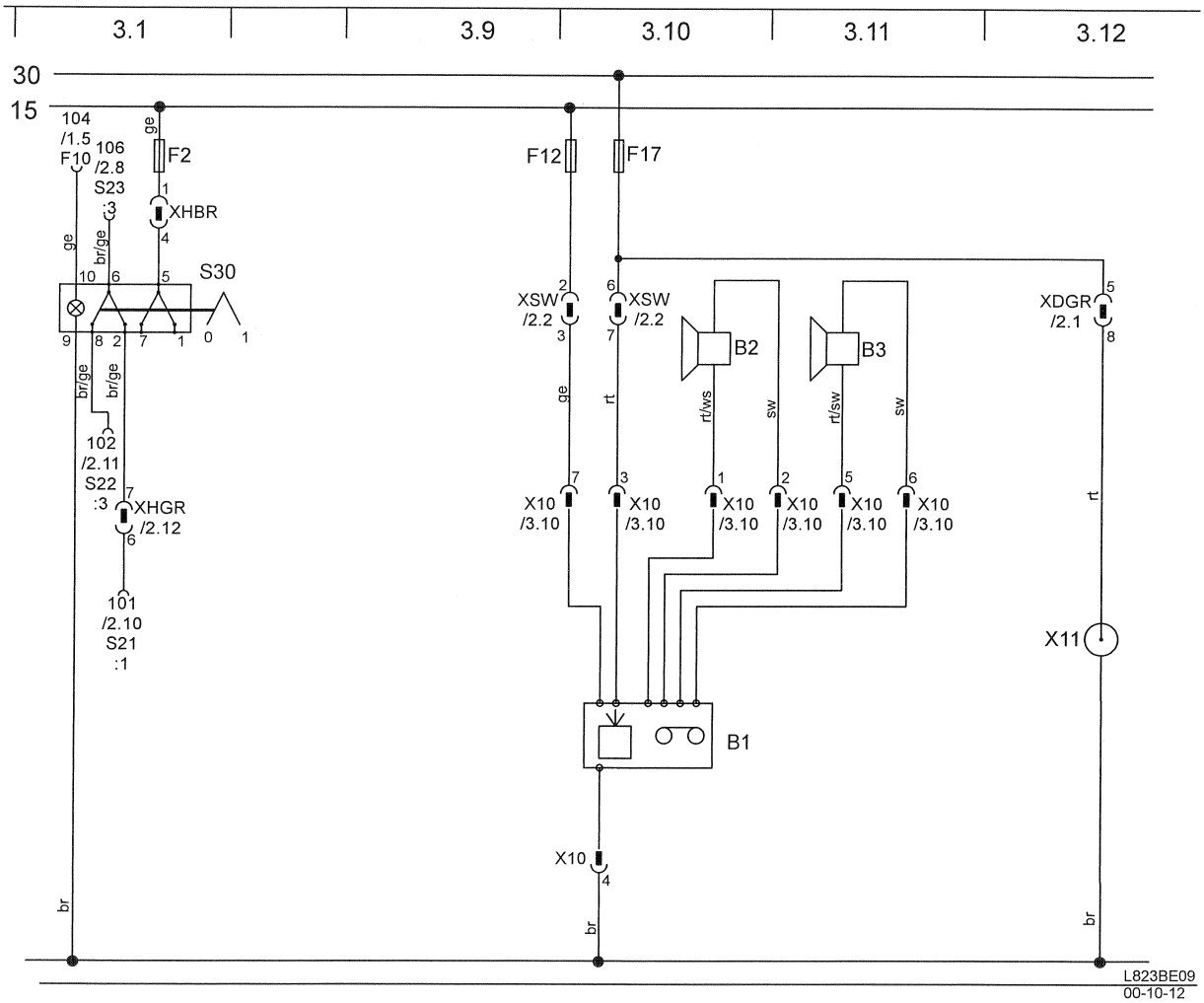
Path	Desig-nation	Device	Path	Desig-nation	Device
		Lighting and signaling system	2.5	K 9	Front working floodlight
2.7	F16	Fuse	2.6	K 10	Rear working floodlight
2.5	S4	Front working floodlight	2.5	E5	Front working floodlight
2.6	S5	Rear working floodlight	2.6	E6	Rear working floodlight
2.7	S8	Rotating beacon	2.7	E7	Rotating beacon
			2.7	E8	Cab lighting

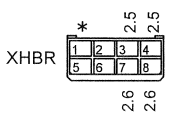
Travel, brakes

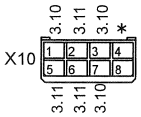


Path	Designation	Device	Path	Designation	Device
		Travel, brakes	2.7	D3	Diode
2.8	F6	Fuse	2.8	D4	Diode
2.9	F4	Fuse	2.8	D5	Diode
2.12	F3	Fuse	2.8	K8	Hydrostatic brake
2.8	S25	Brake light switch	2.9	K3	Travel, in reverse
2.8	S26	Hydrostatic brake	2.10	K4	Travel, forward
2.8	S23	Parking brake switch	2.8	Y1	Direction-of-travel recognition
2.10	S21/1	Travel coordinate lever	2.9	Y8	Valve for travel, in reverse
2.11	S22	Travel, forward - in reverse	2.10	Y9	Valve for travel, forward
2.12	S20	Travel, fast - slow	2.12	Y15	Valve for travel, fast - slow

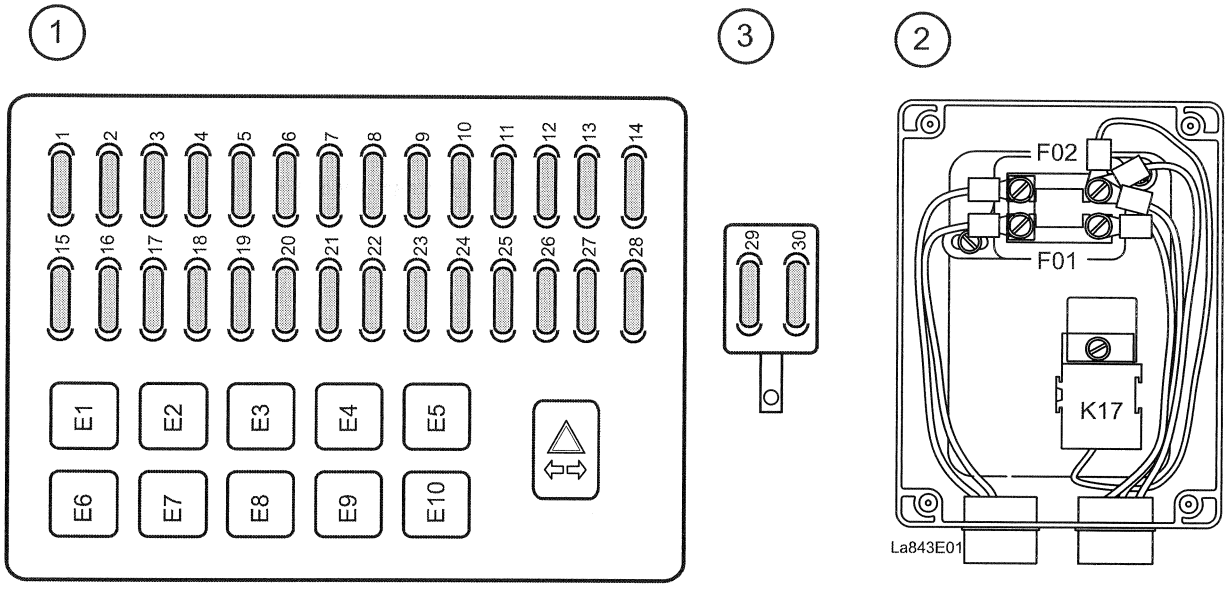
Working hydraulic, Radio, Socket







Path	Desig-nation	Device	Path	Desig-nation	Device
		Working hydraulic			***Radio, Socket***
3.1	F2	Fuse	3.10	F12	Fuse
3.1	S30	Working hydraulic	3.10	F17	Fuse
			3.10	B2	Loudspeaker
			3.11	B3	Loudspeaker
			3.10	B1	Radio
			3.12	X11	Socket
			3.10	X10	Radio socket (AMP)



1 = fuse and relay box.....seat console, bottom right

2 = starter box .....engine compartment dividing wall - tank side, right

3 = fuse box.....behind fuse and relay box (pos. 1)

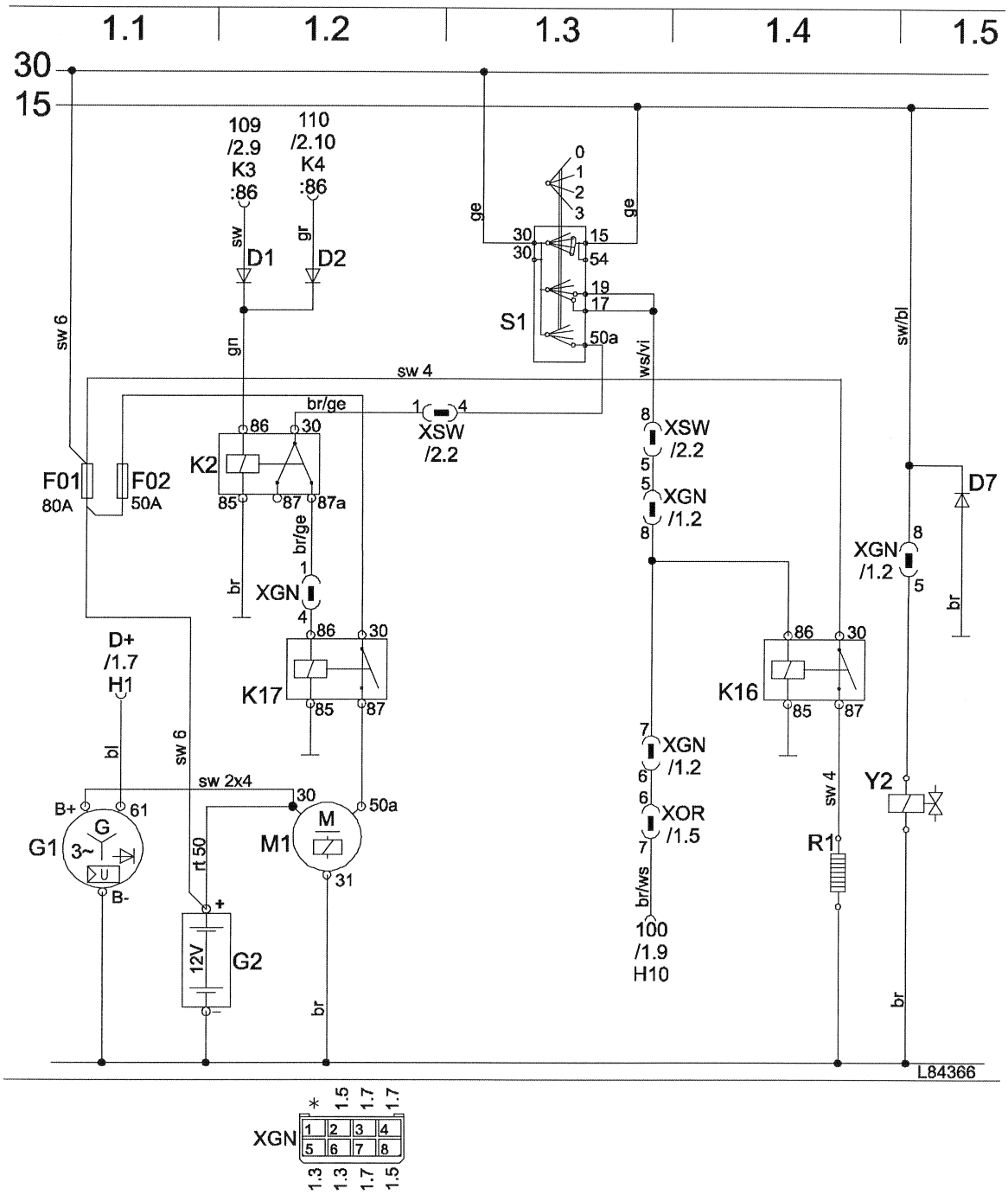
Location	Relay	Function
E 1	--	not assigned
E 2	K 2	Starting safety
E 3	K 3	Travel - reverse
E 4	K 4	Travel - forward
E 5	K 5	Float position
E 6	K 6	Additional valve
E 7	K 7	Additional valve
E 8	K 8	Brake inching
E 9	K 9	Working floodlights front
E 10	K 10	Working floodlights rear
⇳▷	K 11	Flasher transmitter
	K 17	Start-up
	K 18	Pre-heating time control (engine compartment dividing wall - near generator)

Position	Ampere	Assigned to	Position	Ampere	Assigned to
F 1	10	Hazard warning switch Immobilizer	F 15	10	Hazard warning switch Immobilizer
F 2	15	Working hydraulics cut-off	F 16	10	Rotating beacon Cab light
F 3	15	Travel - quick/ slow Hydrostatic brake	F 17	15	Socket Radio
F 4	15	Parking brake relay	F 18	15	Lower beam
F 5	10	Signal horn	F 19	15	Upper beam
F 6	10	Brake light	F 20	10	Left side marker light Front working floodlight relay
F 7	15	Heater fan	F 21	10	Instruments' illumination Rear working floodlight relay Right side marker light
F 8	15	Front wiper	F 22	20	Engine cut-off
F 9	15	Rear wiper	F 23 D 5	Diode 3A	Back-Alarm
F 10	10	Instruments	F 24 D 4	Diode 3A	Hydrostatic brake
F 11	15	Float position relay	F 25 D 3	Diode 3A	Connection fast / slow Hydrostatic brake
F 12	10	Radio	F 26 D 1	Diode 3A	Starting safety
F 13	10	Additional control circuit	F 27 D 2	Diode 3A	Starting safety
F 14 D 6	Diode 3A	Three-phase alternator	F 28 D 7	Diode 3A	Diode engine shut-off
F 29*	15	Front working floodlights	F 30*	15	Rear working floodlights
F 01	80	Pre-heat/ starter switch	F 02	50	Starter

* These fuses are located behind the fuse and relay carrier. They have to be unscrewed for access.

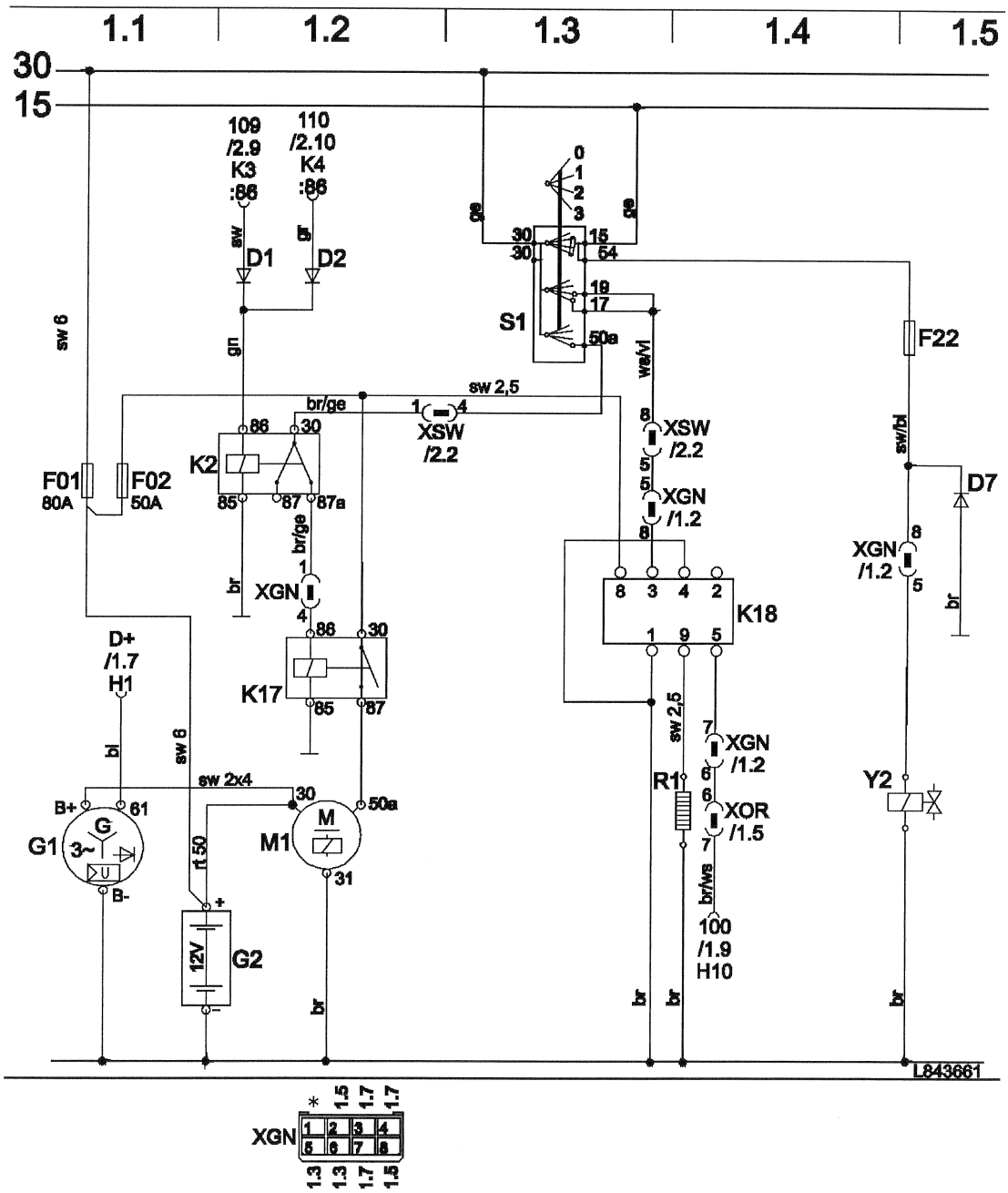
Cable colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		



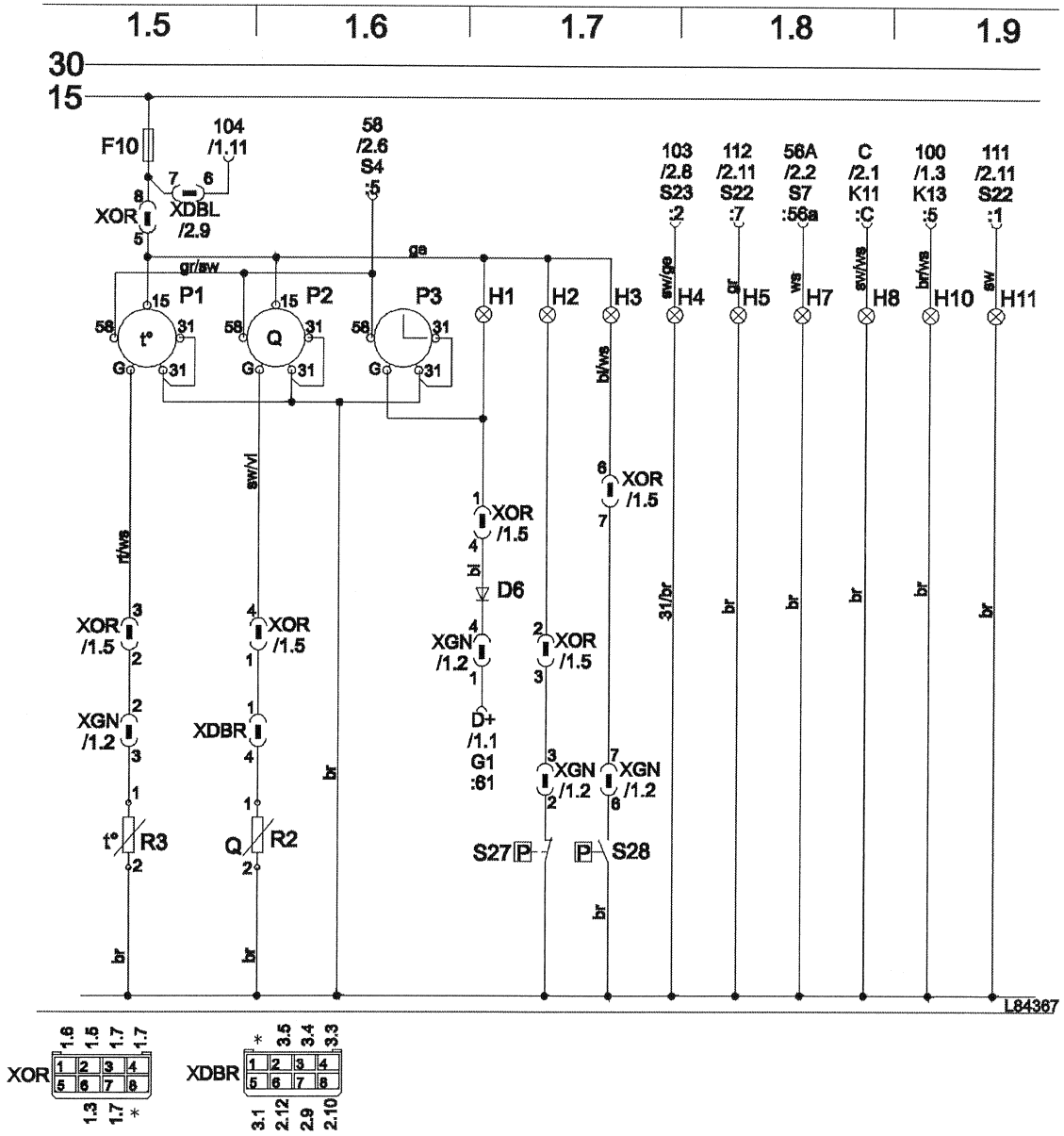
Path	Designation	Device	Path	Designation	Device
1.1	G1	Generator	1.2	D1	Diode
1.1	G2	Battery 12V	1.2	D2	Diode
1.2	M1	Starter	1.3	S1	Glow plug/ starter switch
1.2	K2	Starting relay (starting safety)	1.4	K16	Cut-off relay
1.2	K17	Starting relay (starting aid)	1.4	Y2	Cut-off
1.1	F01	Flat-type fuse 80A	1.4	R1	Glow plugs
1.1	F02	Flat-type fuse 50A	1.5	D7	Diode

Start-up, pre-heater system SKL 843: **from 843/0242**



Path	Designation	Device	Path	Designation	Device
1.1	G1	Generator	1.2	D1	Diode
1.1	G2	Battery 12V	1.2	D2	Diode
1.2	M1	Starter	1.3	S1	Glow plug/ starter switch
1.2	K2	Starting relay (starting safety)	1.4	K18	Glow time relay
1.2	K17	Starting relay (starting aid)	1.4	Y2	Cut-off
1.1	F01	Flat-type fuse 80A	1.4	R1	Glow plugs
1.1	F02	Flat-type fuse 50A	1.5	D7	Diode
			1.5	F22	Fuse

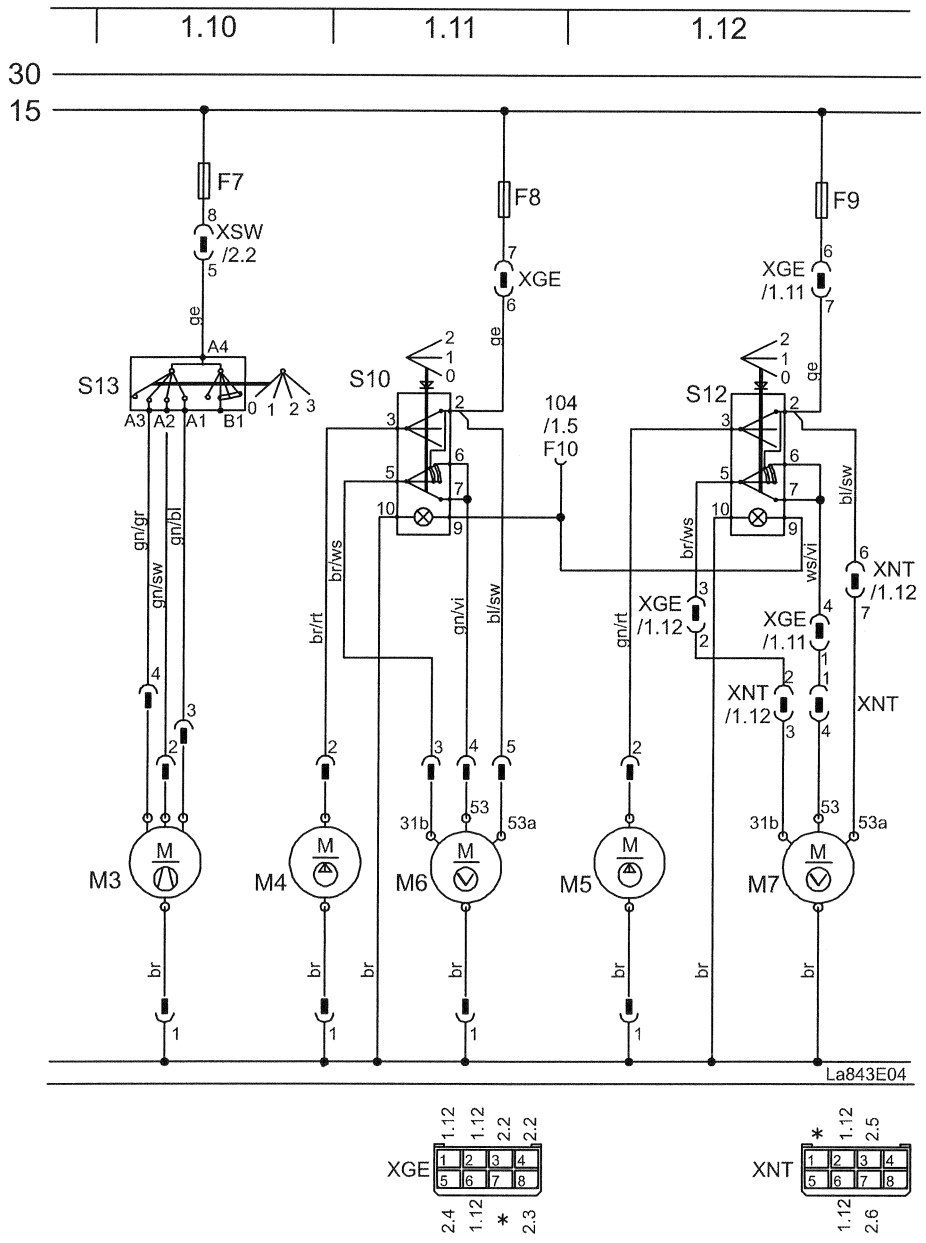
Instruments, indicating units



Path	Designation	Device
		Instruments, indicating units
1.5	P1	Temperature indicator
1.6	P2	Fuel gauge
1.6	P3	Operating hour meter
1.5	R3	Temperature sensor - coolant
1.6	R2	Fuel gauge transmitter
1.5	F10	Fuse
1.7	H1	Battery charge indic. lamp
1.7	H2	Engine oil pressure indicator lamp
1.7	H3	Air filter clogging indicator lamp

Path	Designation	Device
1.7	H4	Parking brake indicator lamp
1.8	H5	Travel - forward
1.9	H11	Travel - reverse
1.8	H7	Upper beam indicator lamp
1.8	H8	Flasher
1.9	H10	Pre-heater indicator lamp
1.7	D6	Diode
1.7	S27	Engine oil pressure switch
1.7	S28	Air filter clogging switch

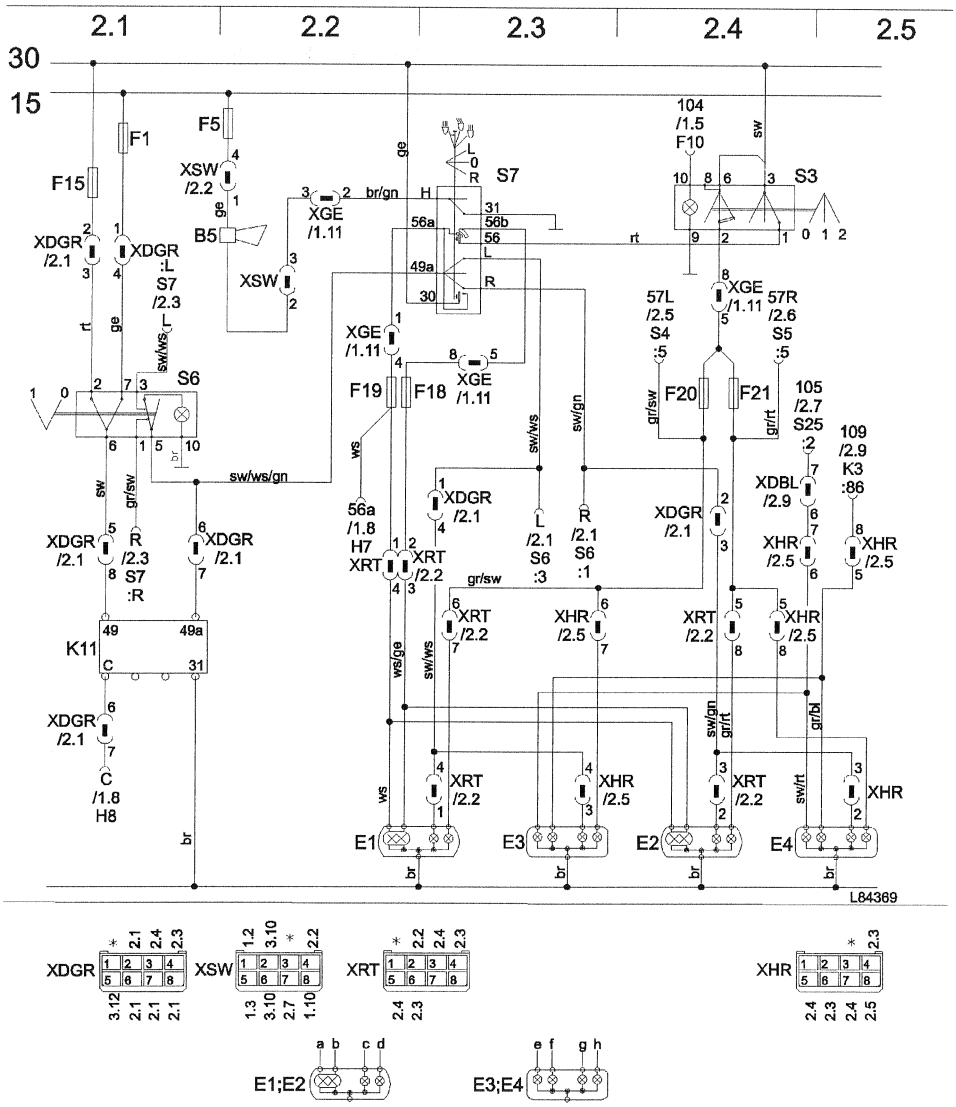
Heater fan	Wash/ wipe system



Path	Desig-nation	Device
		Heater fan
1.10	F7	Fuse
1.10	S13	Heater fan switch
1.10	M3	Heater fan
		Wash/ wipe system
1.11	F8	Fuse
1.12	F9	Fuse

Path	Desig-nation	Device
1.11	S10	Front wash/ wipe switch
1.12	S12	Rear wash/ wipe switch
1.10	M4	Front wash pump
1.11	M6	Front wipe motor
1.12	M5	Rear wash pump
1.12	M7	Rear wipe motor

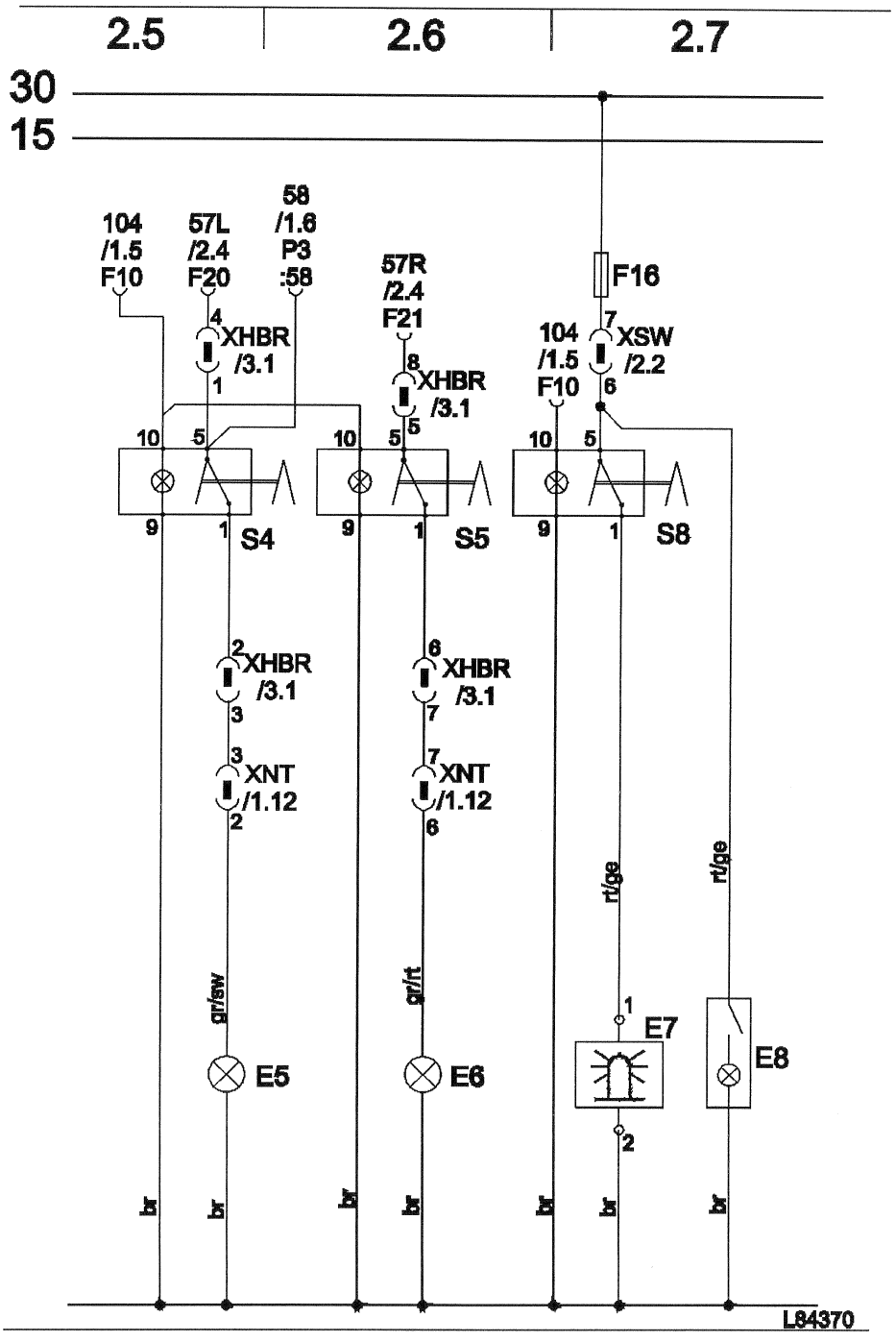
Illumination and signalling system



a = Upper beam
b = Lower beam
c = Turning indicator
d = Side marker light
e = Brake light
f = Reversing headlight
g = Turning indicator
h = Side marker light

Path	Desig-nation	Device	Path	Desig-nation	Device
		Illumination and signalling system	2.2	F18	Fuse
2.1	F15	Fuse	2.4	F20	Fuse
2.1	F1	Fuse	2.4	F21	Fuse
2.2	F5	Fuse	2.1	K11	Flasher relay
2.2	B5	Horn	2.2	E1	Left-hand headlights
2.1	S6	Hazard warning switch	2.4	E2	Right-hand headlights
2.3	S7	Steering column switch	2.3	E3	Left-hand back light
2.4	S3	Light switch	2.5	E4	Right-hand back light
2.2	F19	Fuse			

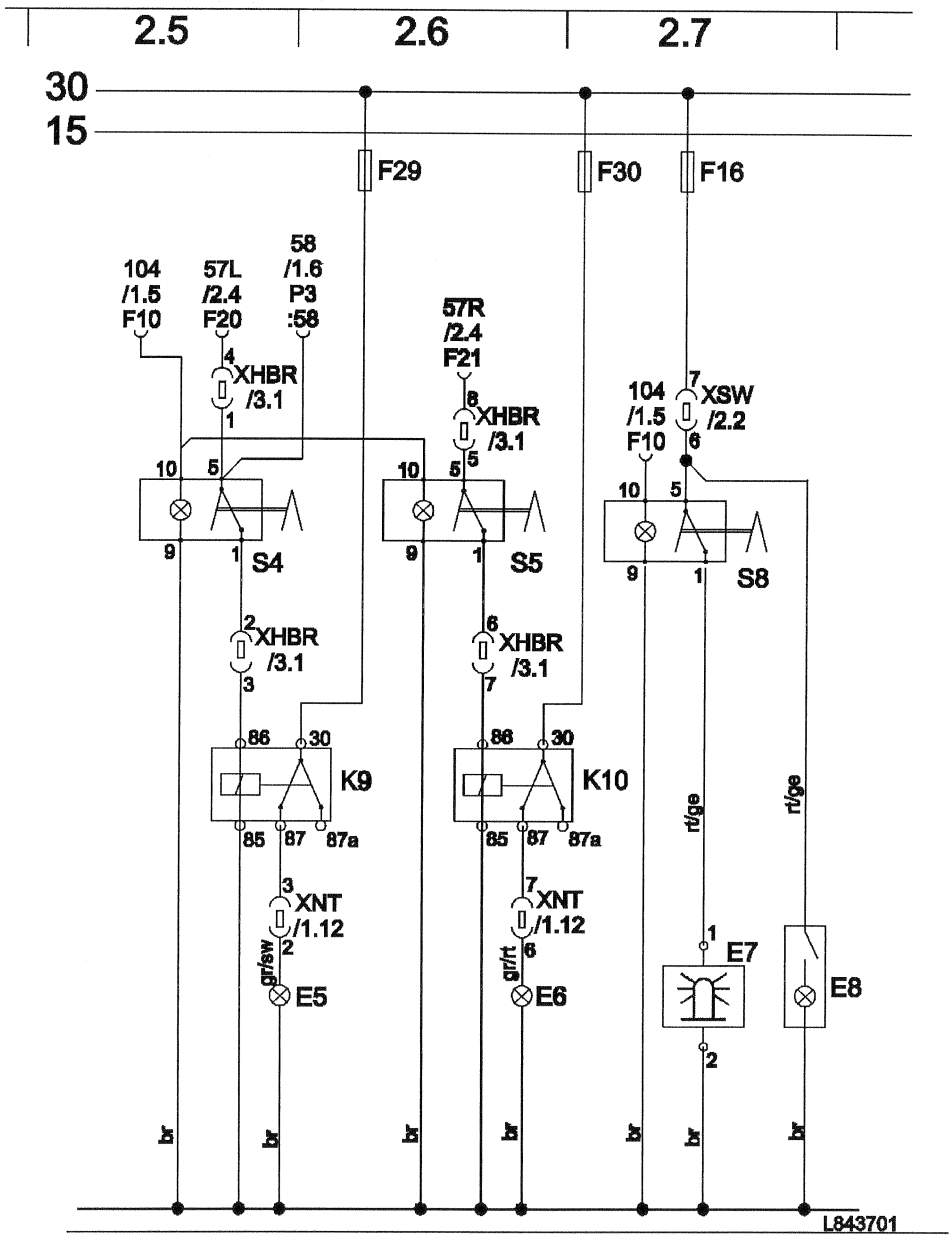
up to serial no. 843/0180 (apart from /0170, /0174, /0179)



Path	Designation	Device	Path	Designation	Device
		Illumination and signalling system			
2.7	F16	Fuse	2.5	E5	Front working floodlights
2.5	S4	Front working floodlights	2.6	E6	Rear working floodlights
2.6	S5	Rear working floodlights	2.7	E7	Rotating beacon
2.7	S8	Rotating beacon	2.7	E8	Cab illumination

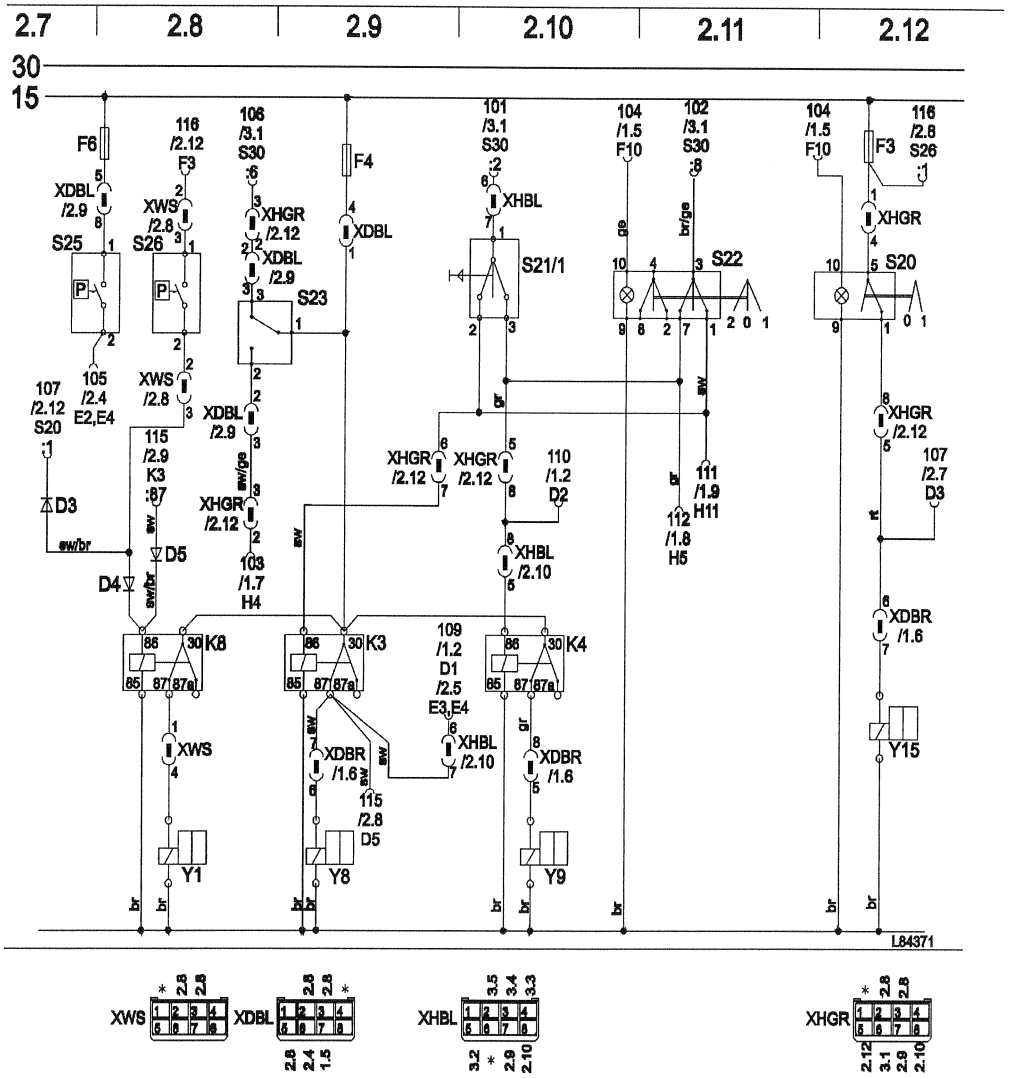
Illumination and signalling system

from serial no. 843/0181, and /0170, /0174, /0179



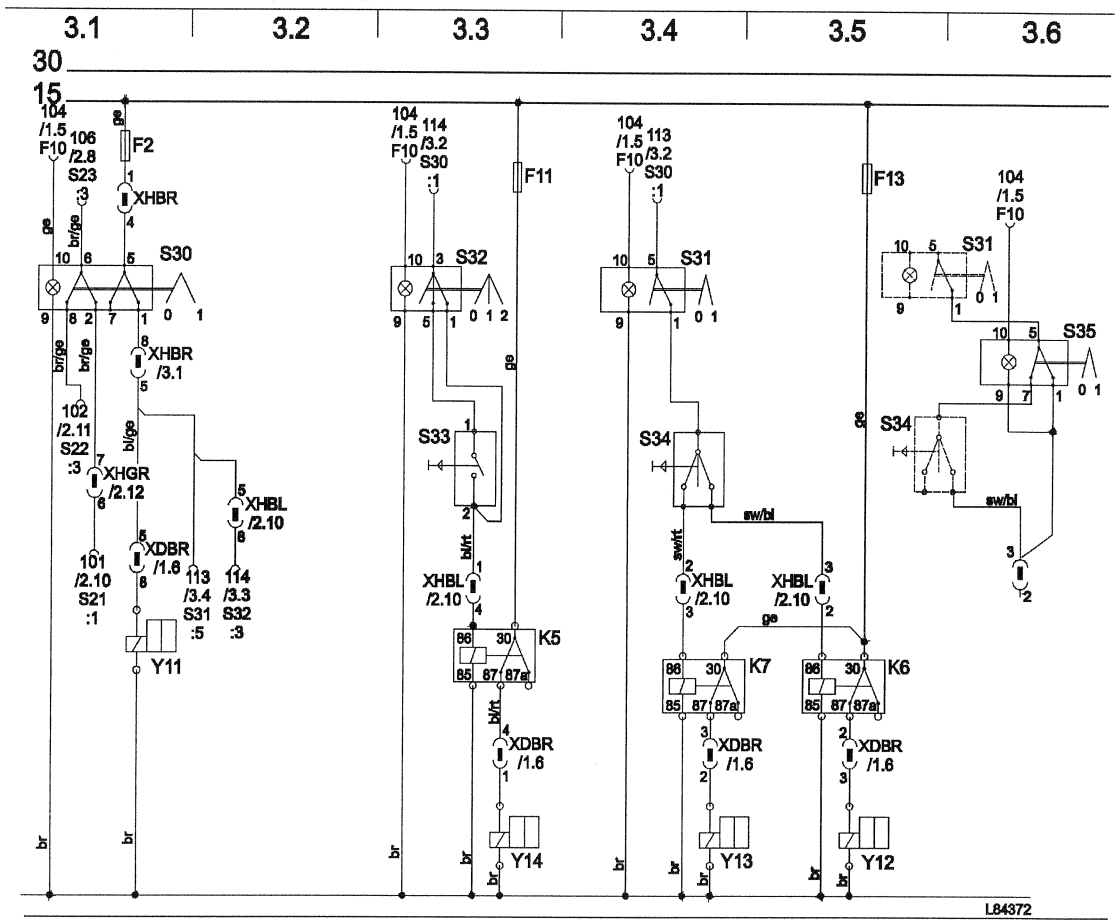
Path	Desig-nation	Device	Path	Desig-nation	Device
		Illumination and signalling system	2.5	K 9	Front working floodlights
			2.6	K 10	Rear working floodlights
2.7	F16	Fuse	2.5	E5	Front working floodlights
2.5	S4	Front working floodlights	2.6	E6	Rear working floodlights
2.6	S5	Rear working floodlights	2.7	E7	Rotating beacon
2.7	S8	Rotating beacon	2.7	E8	Cab illumination

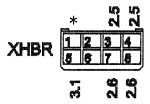
Travel, brakes



Path	Desig-nation	Device	Path	Desig-nation	Device
		Travel, brakes	2.7	D3	Diode
2.8	F6	Fuse	2.8	D4	Diode
2.9	F4	Fuse	2.8	D5	Diode
2.12	F3	Fuse	2.8	K8	Hydrostatic brake
2.8	S25	Brake light switch	2.9	K3	Travel reverse
2.8	S26	Hydrostatic brake	2.10	K4	Travel forward
2.8	S23	Parking brake switch	2.8	Y1	Direction-of-travel recognition
2.10	S21/1	Co-ordinate lever	2.9	Y8	Valve for travel reverse
2.11	S22	Travel forward - reverse	2.10	Y9	Valve for travel forward
2.12	S20	Travel quick - slow	2.12	Y15	Valve for travel quick - slow

Working hydraulics	Float position	3rd control circuit	Option



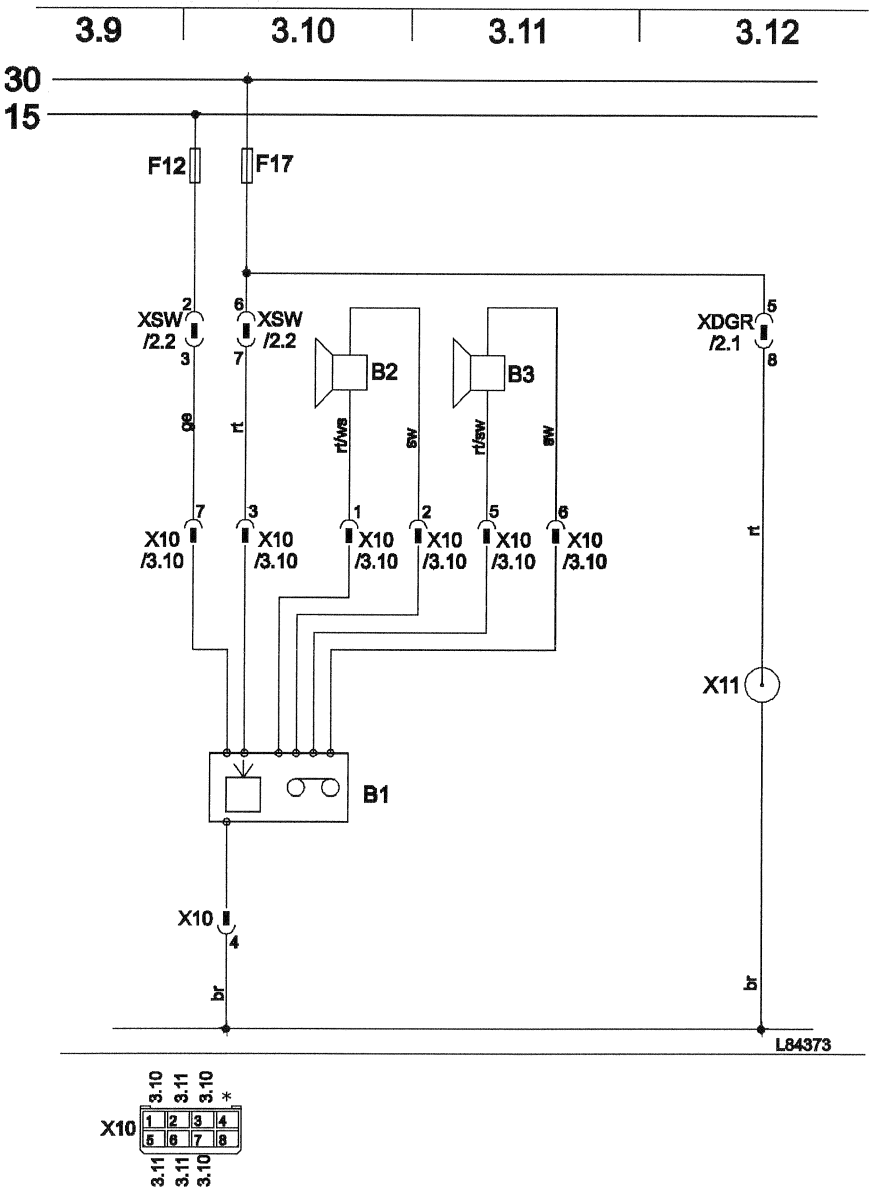


Path	Desig-nation	Device
		Working hydraulics
3.1	F2	Fuse
3.1	S30	Working hydraulics cut-off
3.1	Y11	Working hydraulics valve
		Float position
3.3	F11	Fuse
3.2	S32	Float position
3.3	S33	Co-ordinate lever float position
3.3	K5	Float position relay
3.3	Y14	Float position valve

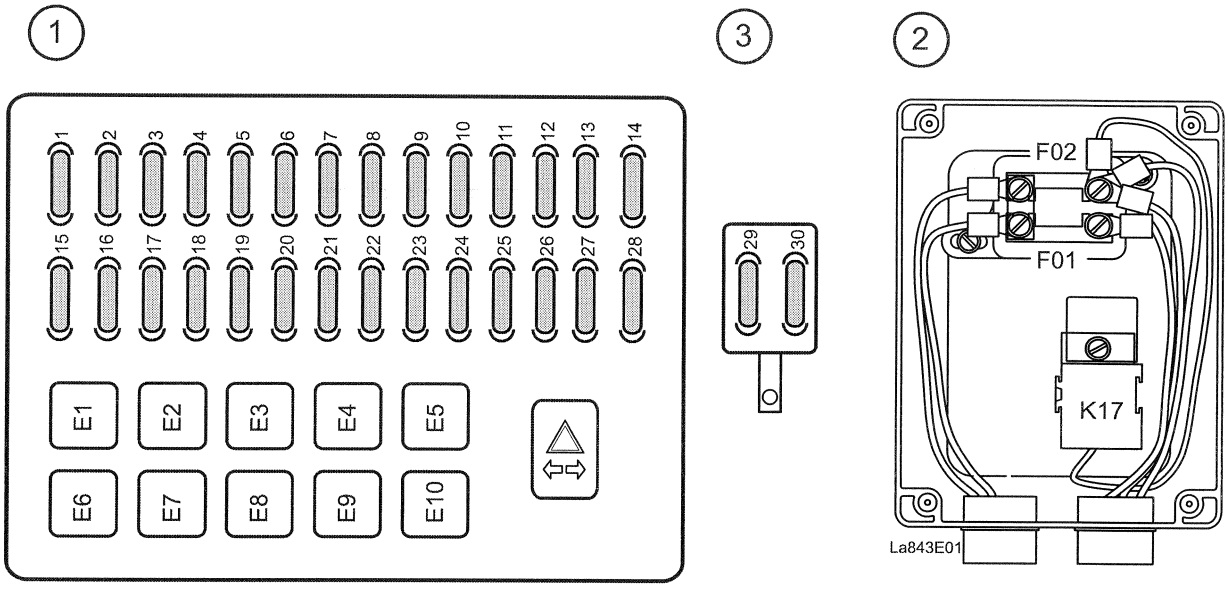
Path	Desig-nation	Device
		3rd control circuit
3.5	F13	Fuse
3.4	S34	Co-ordinate lever 3rd control circuit
3.4	S31	3rd control circuit cut-off
3.4	K7	3rd control circuit relay
3.5	K6	3rd control circuit relay
3.4	Y13	3rd control circuit valve
3.5	Y12	3rd control circuit valve
		Option
3.6	S35	3rd control circuit continuous operation

SCHAEFF	Typ/Model/Type **SKL 843 (from serial no. /0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.07.06**

Radio, socket



Path	Desig-nation	Device	Path	Desig-nation	Device
		Radio, socket			
3.10	F12	Fuse			
3.10	F17	Fuse			
3.10	B2	Loudspeaker			
3.11	B3	Loudspeaker			
3.10	B1	Radio			
3.12	X11	Socket			
3.10	X10	Radio socket (AMP)			



1 = fuse and relay box.....seat console, bottom right

2 = starter box .....engine compartment dividing wall - tank side, right

3 = fuse box.....behind fuse and relay box (pos. 1)

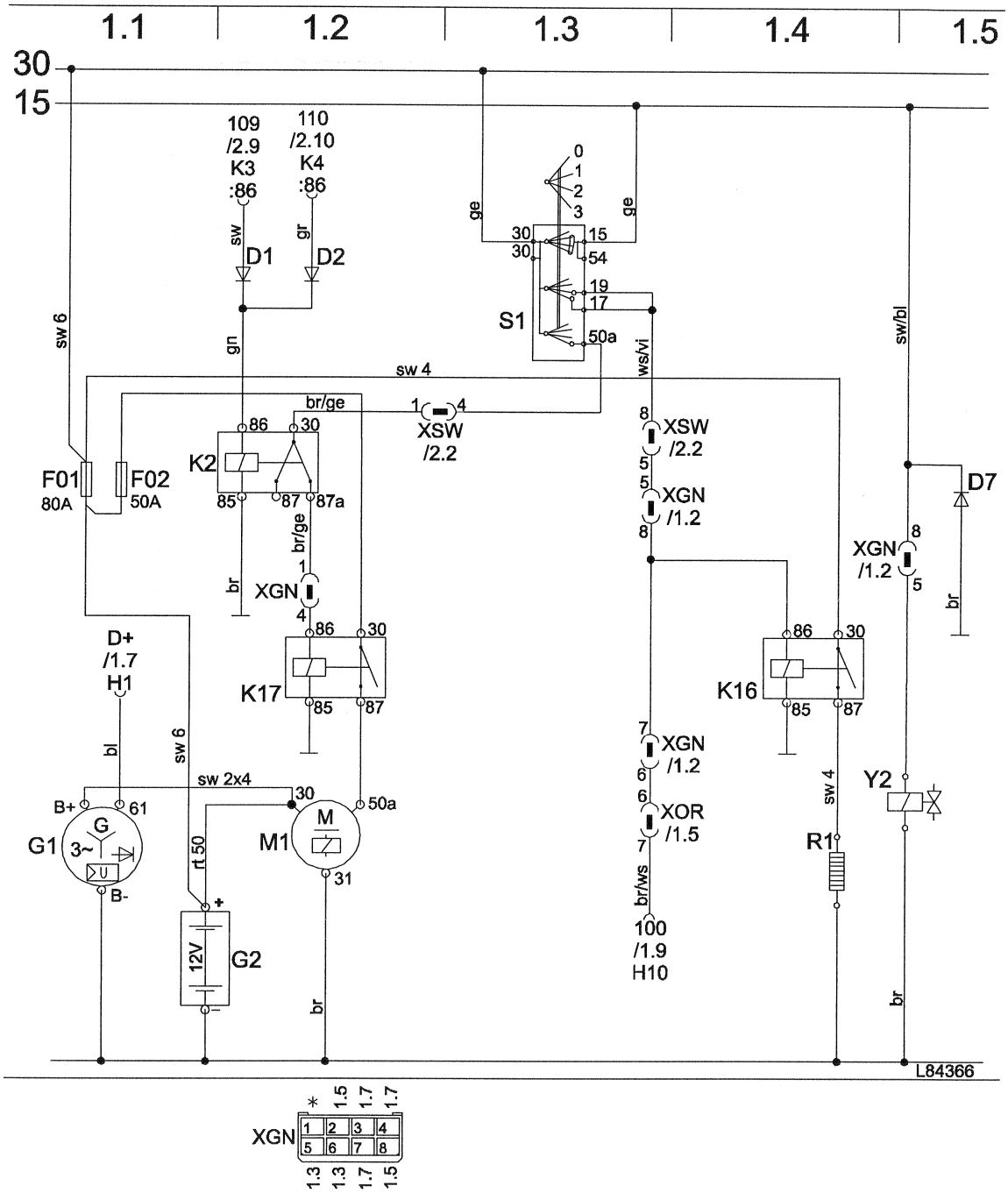
Location	Relay	Function
E 1	--	not assigned
E 2	K 2	Starting safety
E 3	K 3	Travel - reverse
E 4	K 4	Travel - forward
E 5	K 5	Float position
E 6	K 6	Additional valve
E 7	K 7	Additional valve
E 8	K 8	Brake inching
E 9	K 9	Working floodlights front
E 10	K 10	Working floodlights rear
⇕▷	K 11	Flasher transmitter
	K 17	Start-up
	K 18	Pre-heating time control (engine compartment dividing wall - near generator)

Position	Ampere	Assigned to	Position	Ampere	Assigned to
F 1	10	Hazard warning switch Immobilizer	F 15	10	Hazard warning switch Immobilizer
F 2	15	Working hydraulics cut-off	F 16	10	Rotating beacon Cab light
F 3	15	Travel - quick/ slow Hydrostatic brake	F 17	15	Socket Radio
F 4	15	Parking brake relay	F 18	15	Lower beam
F 5	10	Signal horn	F 19	15	Upper beam
F 6	10	Brake light	F 20	10	Left side marker light Front working floodlight relay
F 7	15	Heater fan	F 21	10	Instruments' illumination Rear working floodlight relay Right side marker light
F 8	15	Front wiper	F 22	20	Engine cut-off
F 9	15	Rear wiper	F 23 D 5	Diode 3A	Back-Alarm
F 10	10	Instruments	F 24 D 4	Diode 3A	Hydrostatic brake
F 11	15	Float position relay	F 25 D 3	Diode 3A	Connection fast / slow Hydrostatic brake
F 12	10	Radio	F 26 D 1	Diode 3A	Starting safety
F 13	10	Additional control circuit	F 27 D 2	Diode 3A	Starting safety
F 14 D 6	Diode 3A	Three-phase alternator	F 28 D 7	Diode 3A	Diode engine shut-off
F 29*	15	Front working floodlights	F 30*	15	Rear working floodlights
F 01	80	Pre-heat/ starter switch	F 02	50	Starter

* These fuses are located behind the fuse and relay carrier. They have to be unscrewed for access.

Cable colours

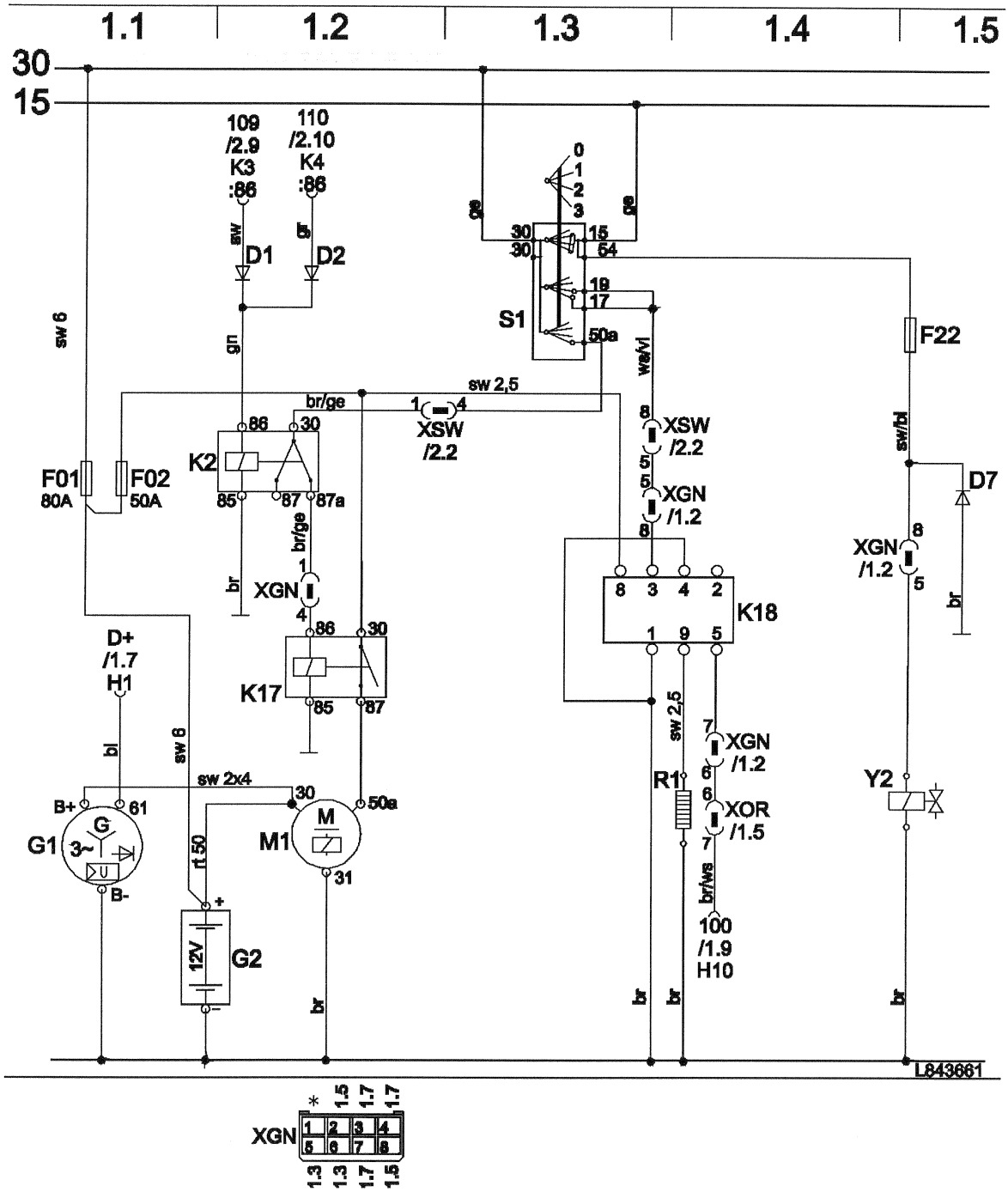
bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		



Path	Desig-nation	Device	Path	Desig-nation	Device
		Start-up, pre-heater system			
1.1	G1	Generator	1.2	D1	Diode
1.1	G2	Battery 12V	1.2	D2	Diode
1.2	M1	Starter	1.3	S1	Glow plug/ starter switch
1.2	K2	Starting relay (starting safety)	1.4	K16	Cut-off relay
1.2	K17	Starting relay (starting aid)	1.4	Y2	Cut-off
1.1	F01	Flat-type fuse 80A	1.4	R1	Glow plugs
1.1	F02	Flat-type fuse 50A	1.5	D7	Diode

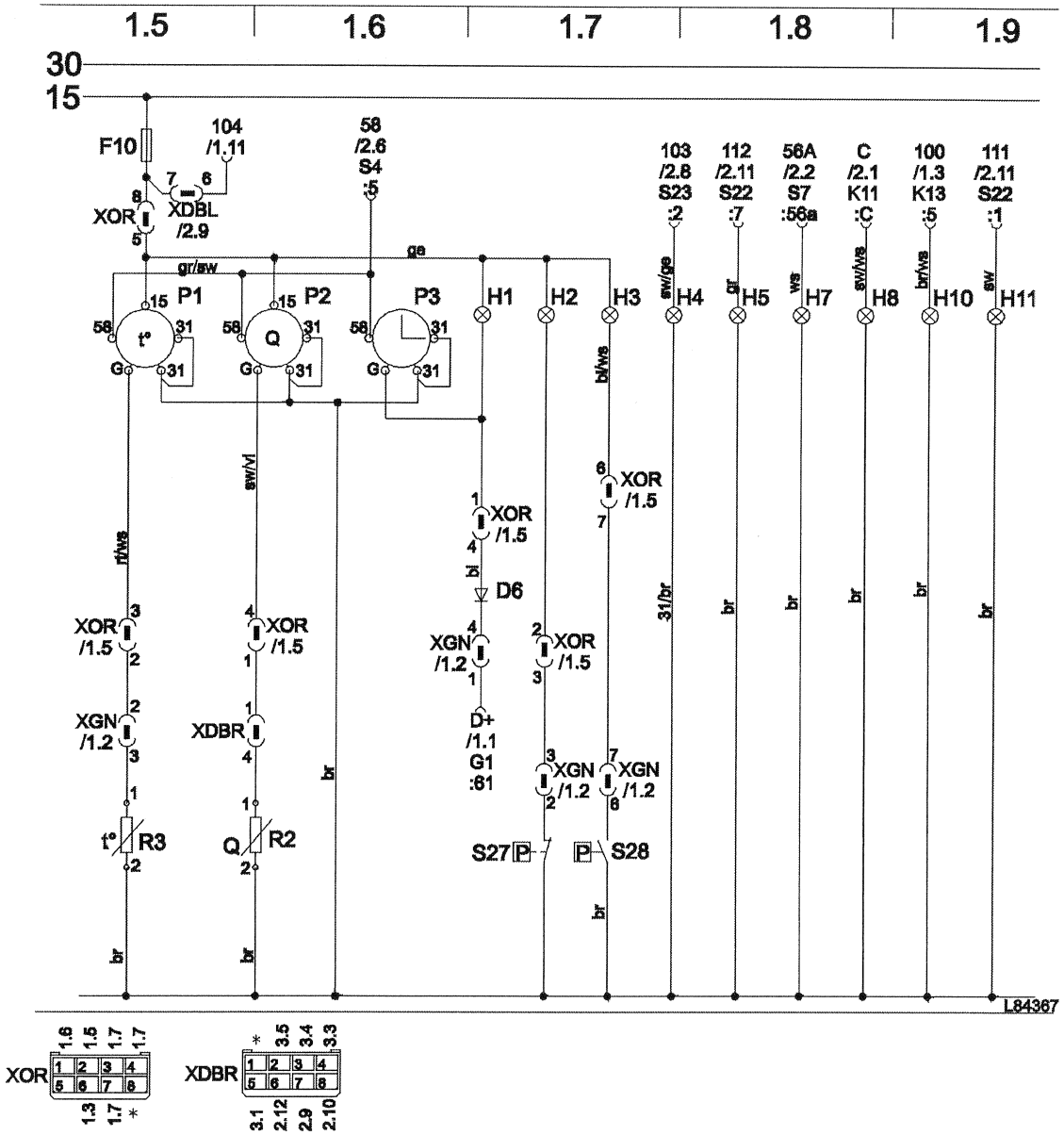
SCHAEFF	Typ/Model/Type **SKL 853 (from serial no. /0100)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.09.02**

Start-up, pre-heater system SKL 853: **from 853/0200**



Path	Desig-nation	Device	Path	Desig-nation	Device
		Start-up, pre-heater system			
1.1	G1	Generator	1.2	D1	Diode
1.1	G2	Battery 12V	1.2	D2	Diode
1.2	M1	Starter	1.3	S1	Glow plug/ starter switch
1.2	K2	Starting relay (starting safety)	1.4	K18	Glow time relay
1.2	K17	Starting relay (starting aid)	1.4	Y2	Cut-off
1.1	F01	Flat-type fuse 80A	1.4	R1	Glow plugs
1.1	F02	Flat-type fuse 50A	1.5	D7	Diode
			1.5	F22	Fuse

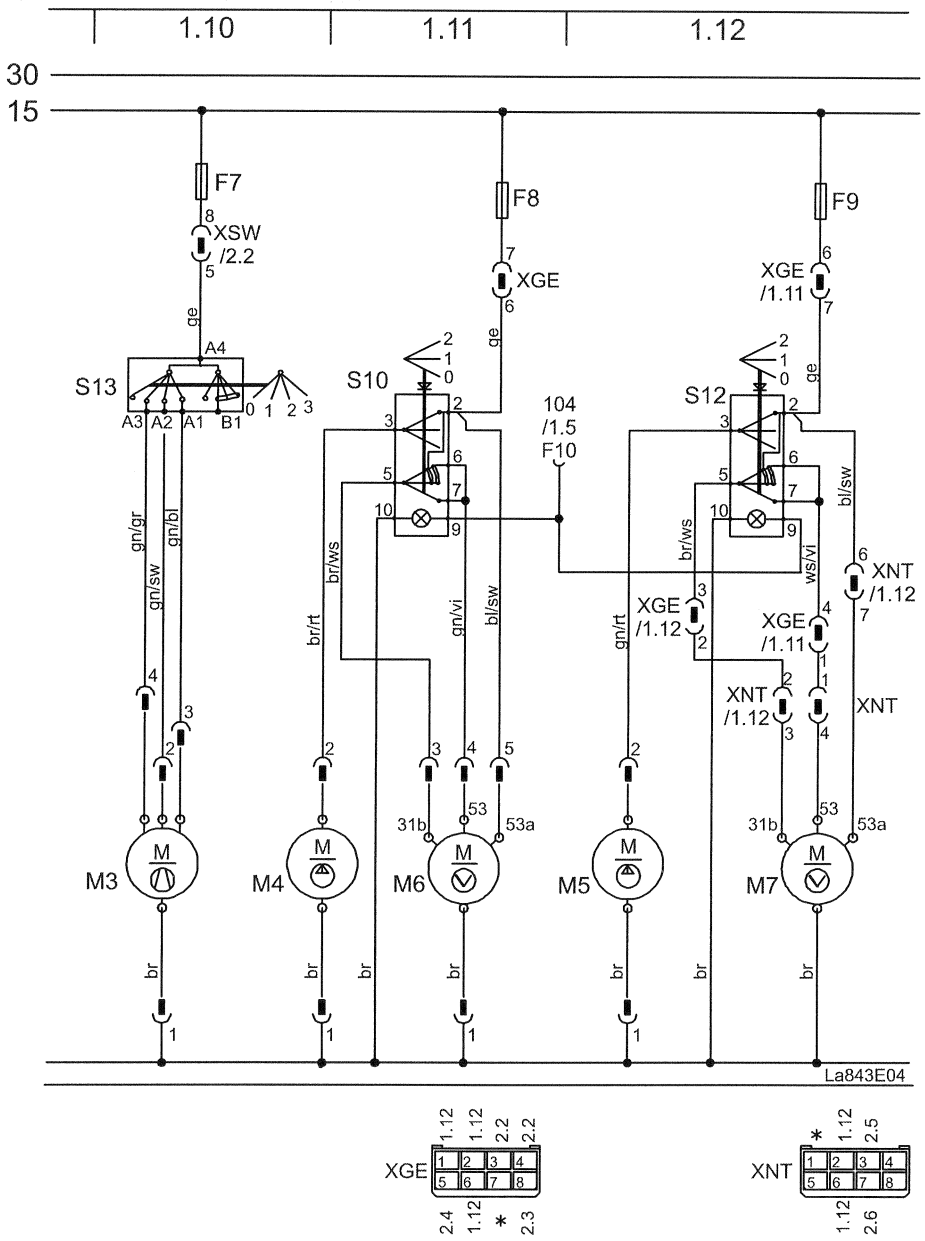
Instruments, indicating units



Path	Designation	Device
		Instruments, indicating units
1.5	P1	Temperature indicator
1.6	P2	Fuel gauge
1.6	P3	Operating hour meter
1.5	R3	Temperature sensor - coolant
1.6	R2	Fuel gauge transmitter
1.5	F10	Fuse
1.7	H1	Battery charge indic. lamp
1.7	H2	Engine oil pressure indicator lamp
1.7	H3	Air filter clogging indicator lamp

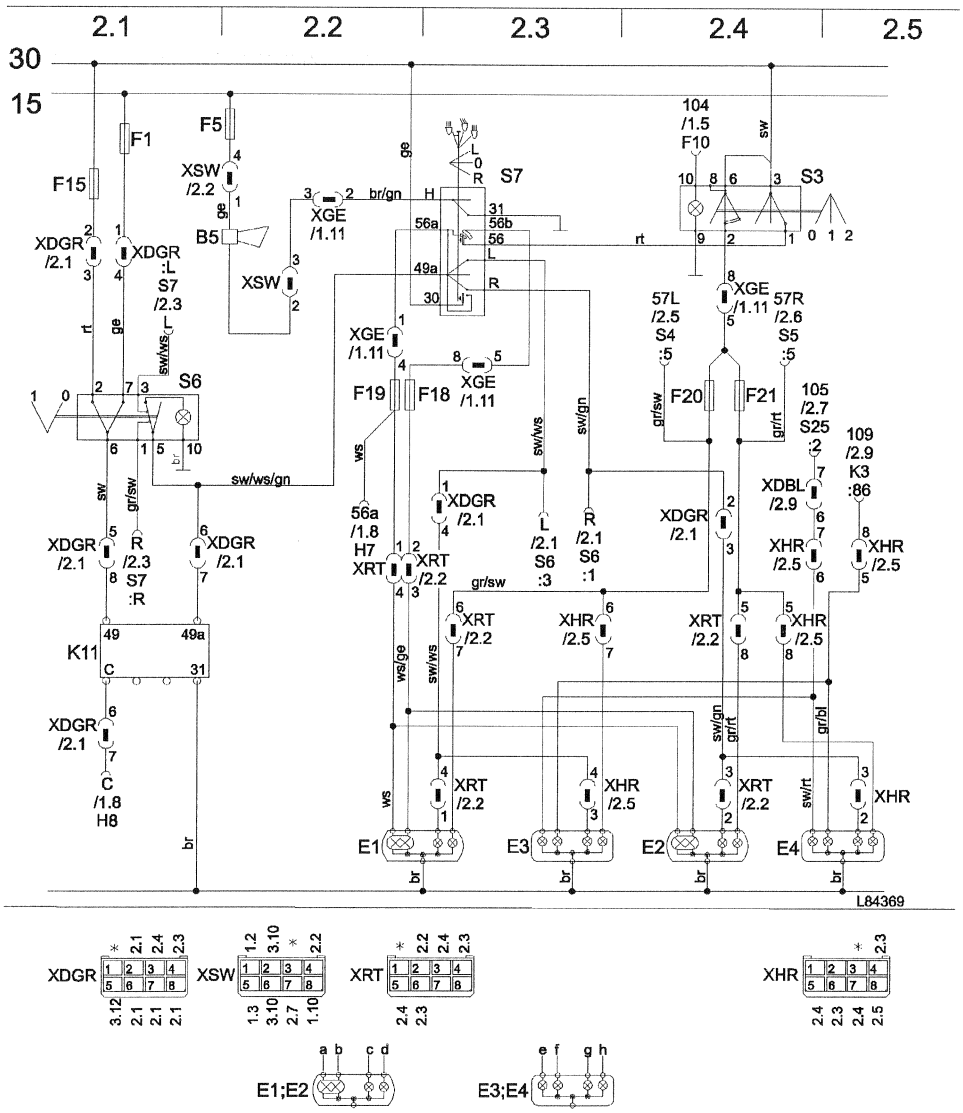
Path	Designation	Device
1.7	H4	Parking brake indicator lamp
1.8	H5	Travel - forward
1.9	H11	Travel - reverse
1.8	H7	Upper beam indicator lamp
1.8	H8	Flasher
1.9	H10	Pre-heater indicator lamp
1.7	D6	Diode
1.7	S27	Engine oil pressure switch
1.7	S28	Air filter clogging switch

Heater fan	Wash/ wipe system



Path	Desig-nation	Device	Path	Desig-nation	Device
		Heater fan	1.11	S10	Front wash/ wipe switch
1.10	F7	Fuse	1.12	S12	Rear wash/ wipe switch
1.10	S13	Heater fan switch	1.10	M4	Front wash pump
1.10	M3	Heater fan	1.11	M6	Front wipe motor
		Wash/ wipe system	1.12	M5	Rear wash pump
1.11	F8	Fuse	1.12	M7	Rear wipe motor
1.12	F9	Fuse			

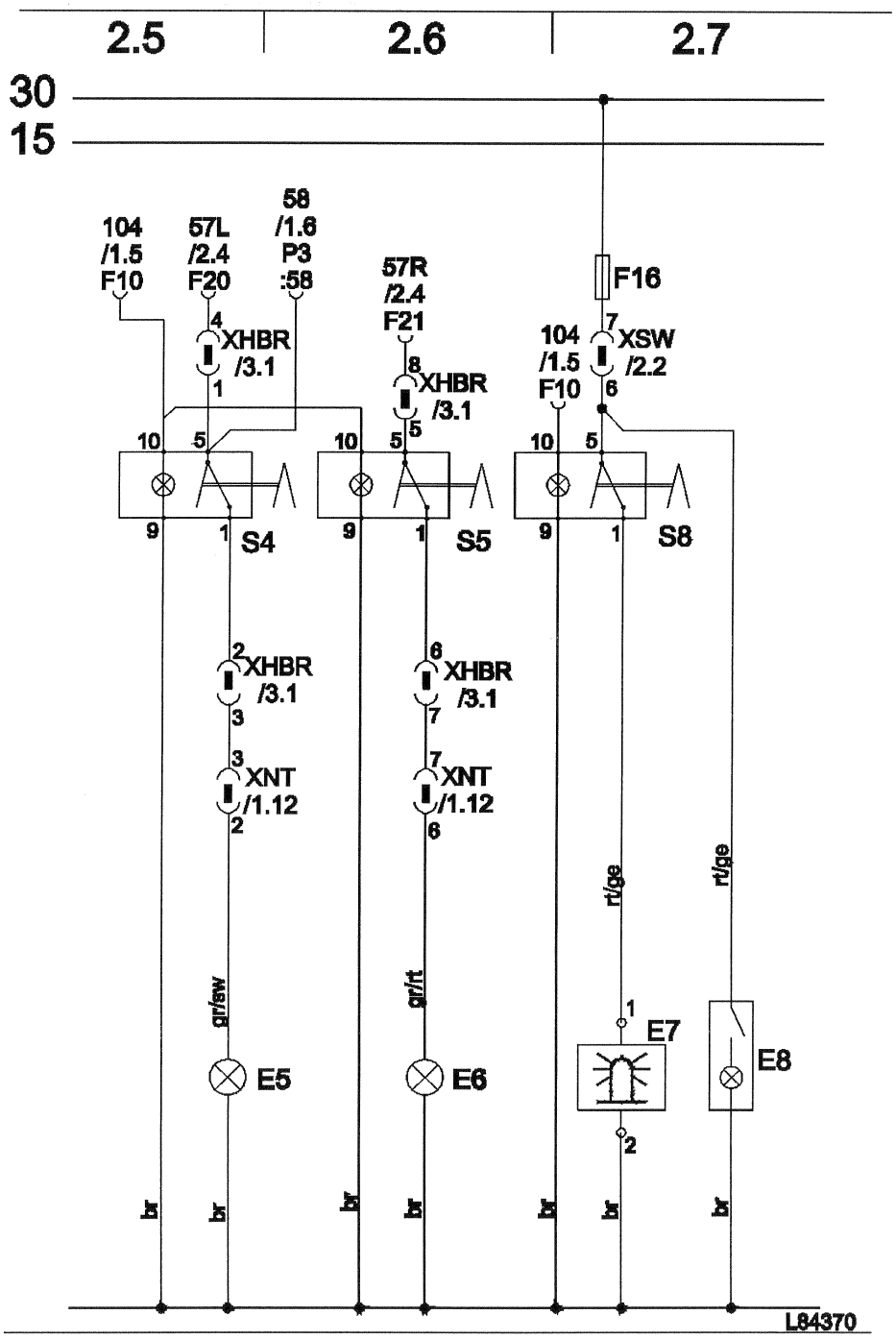
Illumination and signalling system



a = Upper beam
b = Lower beam
c = Turning indicator
d = Side marker light
e = Brake light
f = Reversing headlight
g = Turning indicator
h = Side marker light

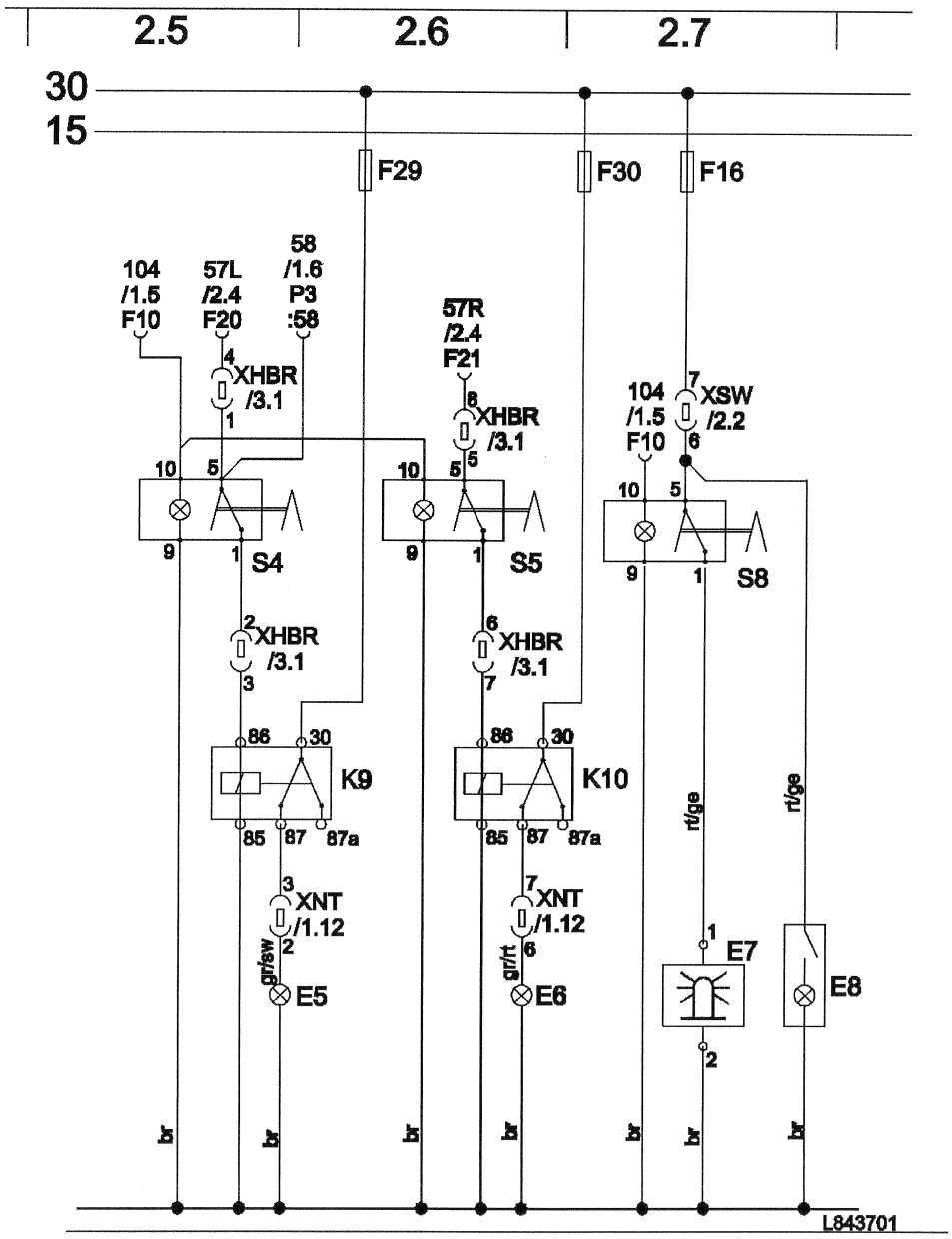
Path	Designation	Device	Path	Designation	Device
		Illumination and signalling system	2.2	F18	Fuse
2.1	F15	Fuse	2.4	F20	Fuse
2.1	F1	Fuse	2.4	F21	Fuse
2.2	F5	Fuse	2.1	K11	Flasher relay
2.2	B5	Horn	2.2	E1	Left-hand headlights
2.1	S6	Hazard warning switch	2.4	E2	Right-hand headlights
2.3	S7	Steering column switch	2.3	E3	Left-hand back light
2.4	S3	Light switch	2.5	E4	Right-hand back light
2.2	F19	Fuse			

up to serial no. 853/0151 (apart from /0136, /0138, /0140, /0142 - /0144)



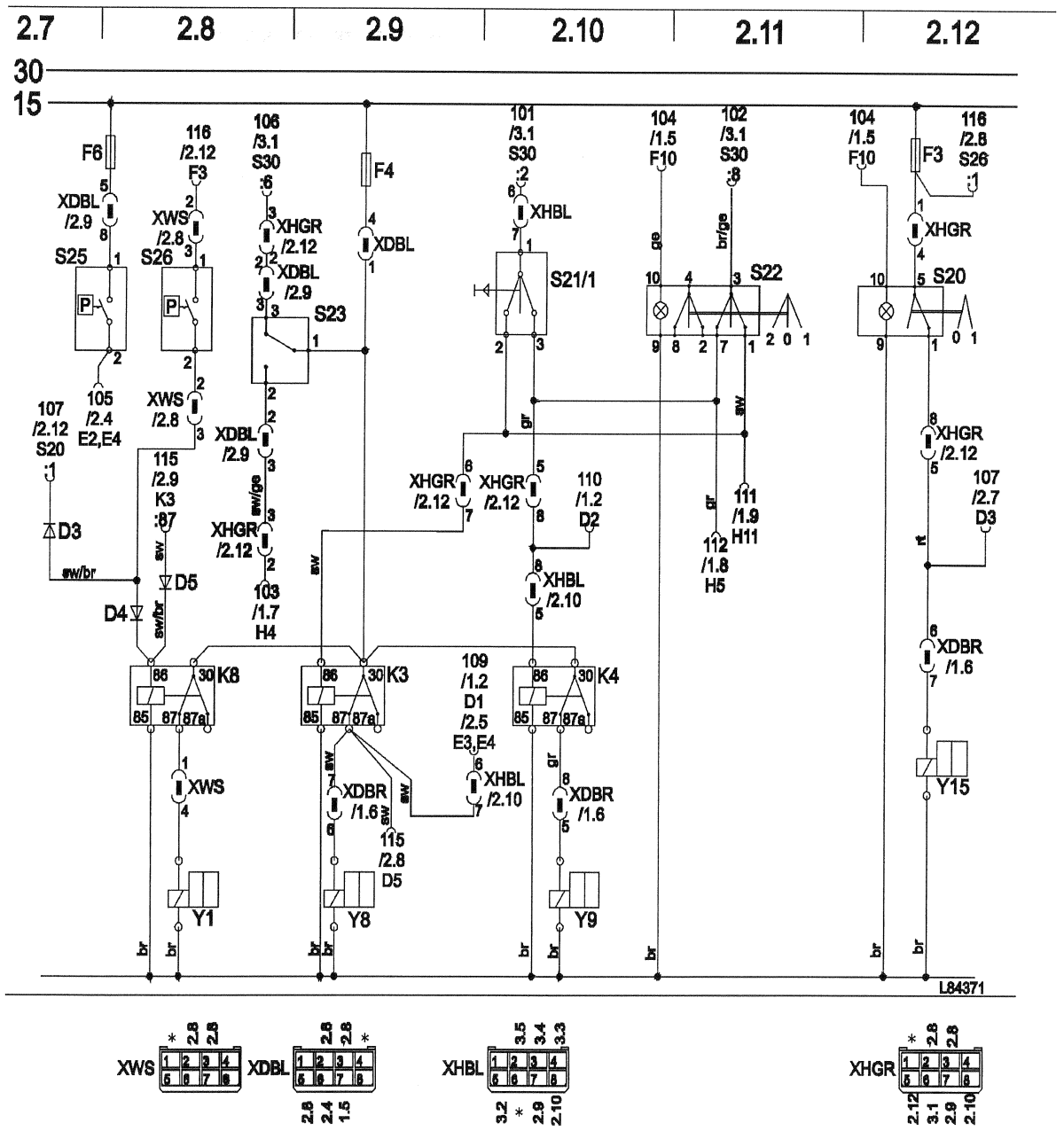
Path	Desig-nation	Device	Path	Desig-nation	Device
		Illumination and signalling system			
2.7	F16	Fuse	2.5	E5	Front working floodlights
2.5	S4	Front working floodlights	2.6	E6	Rear working floodlights
2.6	S5	Rear working floodlights	2.7	E7	Rotating beacon
2.7	S8	Rotating beacon	2.7	E8	Cab illumination

from serial no. 853/0152, (and /0136, /0138, /0140, /0142 - /0144)



Path	Desig-nation	Device	Path	Desig-nation	Device
		Illumination and signalling system	2.5	K 9	Front working floodlights
			2.6	K 10	Rear working floodlights
2.7	F16	Fuse	2.5	E5	Front working floodlights
2.5	S4	Front working floodlights	2.6	E6	Rear working floodlights
2.6	S5	Rear working floodlights	2.7	E7	Rotating beacon
2.7	S8	Rotating beacon	2.7	E8	Cab illumination

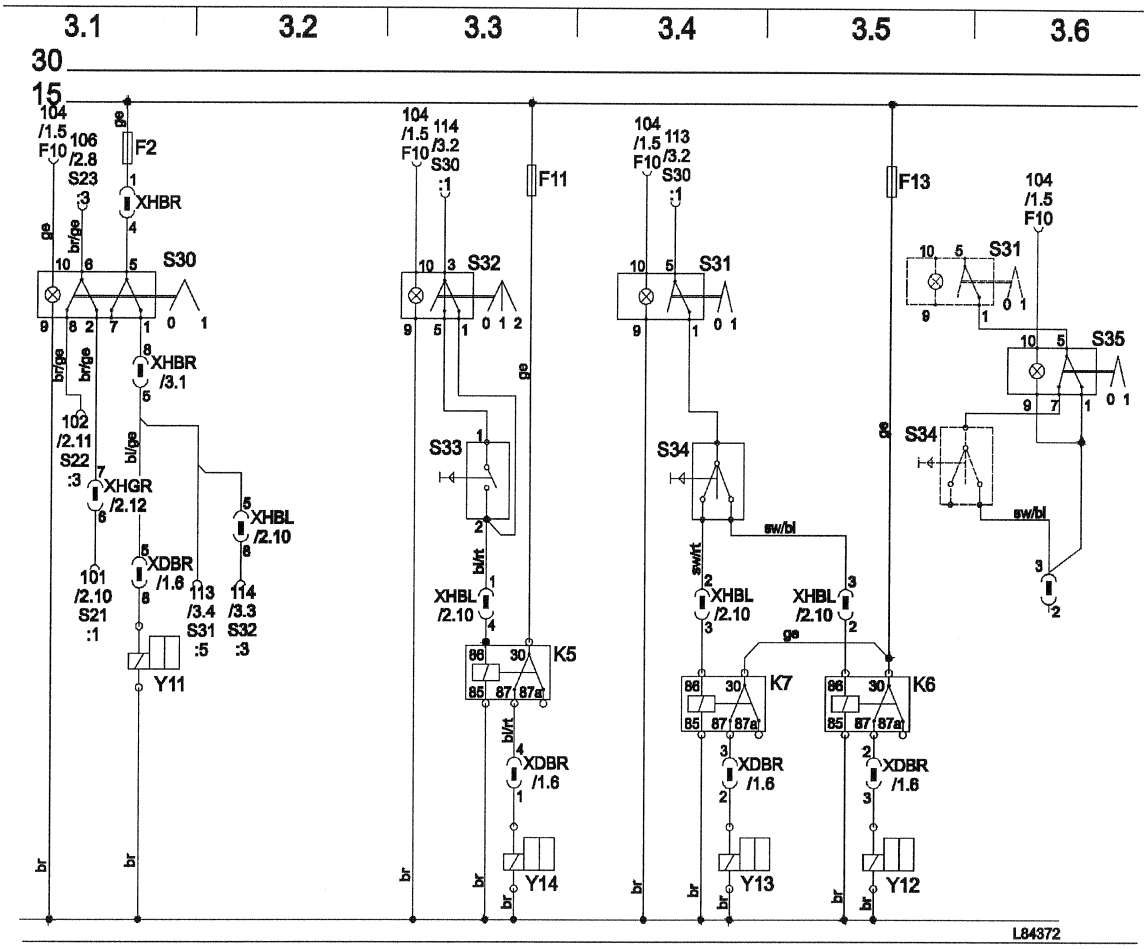
Travel, brakes

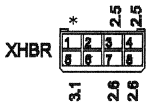


Path	Designation	Device
	Travel, brakes	
2.8	F6	Fuse
2.9	F4	Fuse
2.12	F3	Fuse
2.8	S25	Brake light switch
2.8	S26	Hydrostatic brake
2.8	S23	Parking brake switch
2.10	S21/1	Co-ordinate lever
2.11	S22	Travel forward - reverse
2.12	S20	Travel quick - slow

Path	Designation	Device
2.7	D3	Diode
2.8	D4	Diode
2.8	D5	Diode
2.8	K8	Hydrostatic brake
2.9	K3	Travel reverse
2.10	K4	Travel forward
2.8	Y1	Direction-of-travel recognition
2.9	Y8	Valve for travel reverse
2.10	Y9	Valve for travel forward
2.12	Y15	Valve for travel quick - slow

Working hydraulics	Float position	3rd control circuit	Option

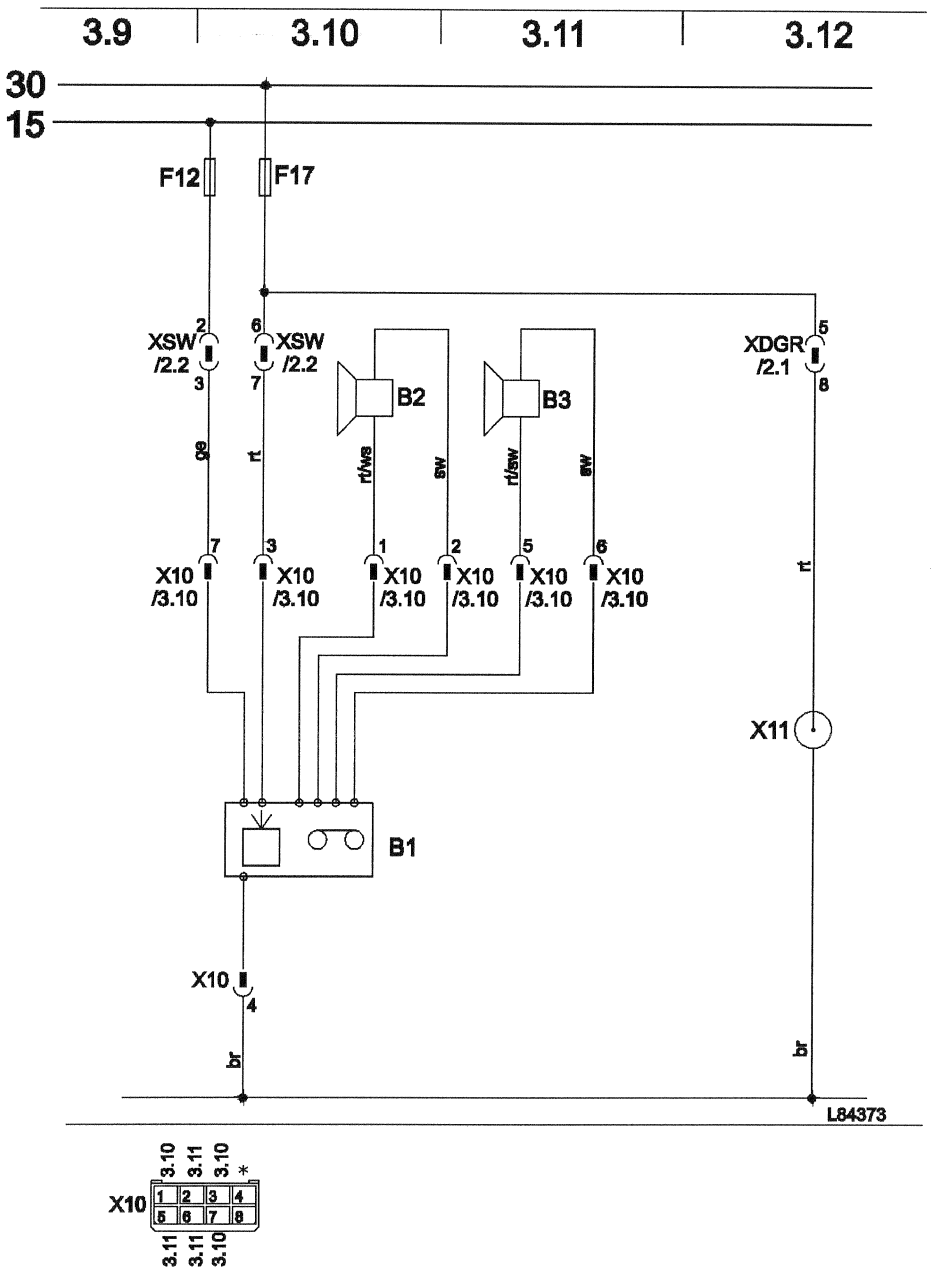




Path	Designation	Device
		Working hydraulics
3.1	F2	Fuse
3.1	S30	Working hydraulics cut-off
3.1	Y11	Working hydraulics valve
		Float position
3.3	F11	Fuse
3.2	S32	Float position
3.3	S33	Co-ordinate lever float position
3.3	K5	Float position relay
3.3	Y14	Float position valve

Path	Designation	Device
		3rd control circuit
3.5	F13	Fuse
3.4	S34	Co-ordinate lever 3rd control circuit
3.4	S31	3rd control circuit cut-off
3.4	K7	3rd control circuit relay
3.5	K6	3rd control circuit relay
3.4	Y13	3rd control circuit valve
3.5	Y12	3rd control circuit valve
		Option
3.6	S35	3rd control circuit continuous operation

Radio, socket



Path	Desig-nation	Device	Path	Desig-nation	Device
		Radio, socket			
3.10	F12	Fuse			
3.10	F17	Fuse			
3.10	B2	Loudspeaker			
3.11	B3	Loudspeaker			
3.10	B1	Radio			
3.12	X11	Socket			
3.10	X10	Radio socket (AMP)			

Fuse box positioning

1	2	3	4	5	6

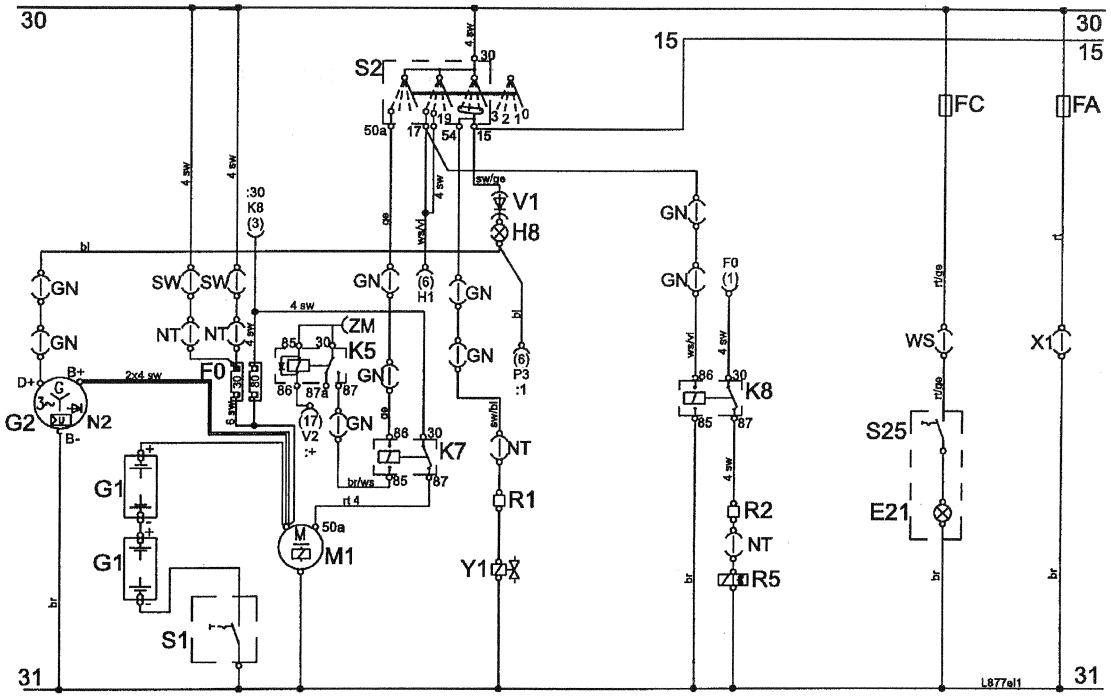
F	E	D	C	B	A

Position	Fuse	Component
A	10 A	Warning light switch Socket
B	10 A	Instruments Control lamps Electrical engine shut-off
C	15 A	Cab lamp Heating ventilation
D	10 A	Travel Parking brake
E	10 A	Windshield wiper front Washer front Windshield wiper rear Washer rear
F	10 A	Brake light Warning light switch Horn

6	10 A	Floating position Solenoid valve charge pressure
5	10 A	Shut-off working hydraulics Pilot control Travel speed selector fast - slow
4	10 A	Side marker light left Working floodlights rear
3	10 A	Side marker light right Control lamps for instruments Working floodlights front
2	10 A	Low beam
1	10 A	High beam

Replacement bulbs/ fuses	Type	Spare part no.
Headlights	24 V 75/70W H4	5 350 660 912
Flasher front / rear	24 V 21 W	1 813 000 009
Side marker light	24 V 5 W	1 813 000 027
Rear light	24 V 10 W	1 813 000 011
Brake light	24 V 21 W	1 813 000 009
Control light strip	24 V 2 W	1 813 000 026
Switch	24 V 1,2 W	1 813 000 121
Cab light	24 V 5 W Soffitte	1 814 000 008
Contour light	24 V 5 W	1 813 000 027
Fuse	10 A	5 050 650 264
Fuse	15 A	5 050 650 271
Blade-type fuse	30 A	5 050 165 810
Blade-type fuse	80 A	5 050 165 880

1. Power supply	2. Starting system	3. Glow system	5. Cabin lamp

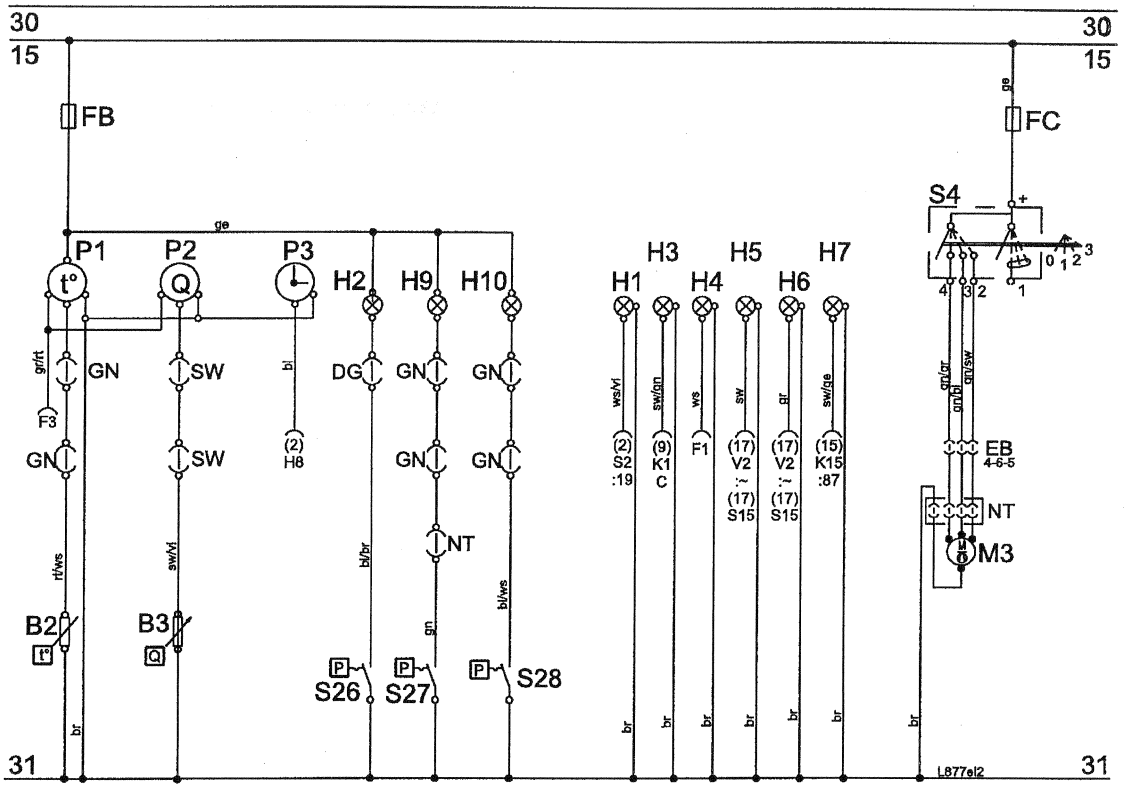


Section Qty.	Code	Unit
1		***Power supply***
1	G2	Generator
1	N2	Generator regulator
2	G 1	Battery 12V 105 Ah
2	NT	4-fold plug connection
2	FO	Blade-type fuses
2	GN	Plug connection
2	SW	Plug connection
	ZM	Ground strap
1	S1	Battery disconnecting
2		***Starting system***
1	S2	Glow starting system
1	V1	Blocking diode BY 251
1	H8	Generator warning lamp
1	K5	Starting relay - start safety
1	M 1	Starter
1	NT	4-fold plug connection
1	K7	Starting relay 24V; 40A

Section Qty.	Code	Unit
6	GN	Plug connection
1	R1	Pre-resistance 24-12 V
1	Y1	Electr. engine cut-off
3		***Glow system***
2	GN	Plug connection
1	K8	Pre-glow relay
1	NT	Plug connection
1	R2	Pre-resistance 24-12 V
1	R5	Glow system
switch		
5		***Cabin lamp***
1	FC	Fuse
1	WS	Plug connection
1	S25	Cabin lamp switch
1	E21	Cabin lamp
1	FA	Fuse
1	X1	Socket

SCHAEFF	Typ/Model/Type **SKL 877**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.15.02**

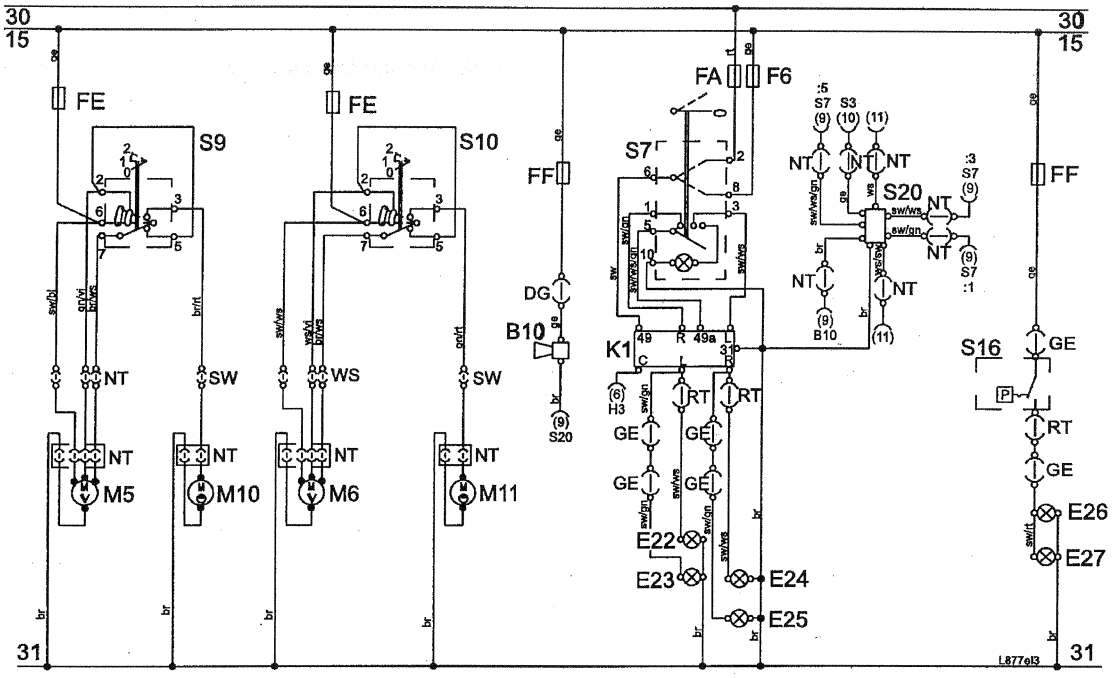
6. Indicators	7. Ventilator



Section Qty.	Code	Unit
6		***Indicators***
1	FB	Fuse
1	P1	Cooling water temperature indicator
2	GN	Plug connection
1	B2	Temperature sensor cooling water
1	P2	Fuel level indicator
2	SW	Plug connection
1	B3	Fuel level - transmitter
1	P3	Working hour meter
1	H10	Air filter clogging warning lamp
2	GN	Plug connection
1	S28	Switch, air filter clogging
1	H1	Pre-glow monitoring
1	H9	Engine oil pressure warning lamp
2	GN	Plug connection

Section Qty.	Code	Unit
1	NT	Plug connection
1	S27	Switch, engine oil pressure
1	H6	Travel - forward
1	H5	Travel - reverse
1	H3	Flasher control
1	H4	High beam warning lamp
1	H7	Parking brake lamp
1	H2	Accumulator pressure
1	DG	Plug connection
1	S26	Switch, accumulator press.
7		***Ventilator***
1	FC	Fuse
1	S4	Switch, heating fan
1	E8	Plug connection
1	NT	Plug connection
1	M3	Heating fan

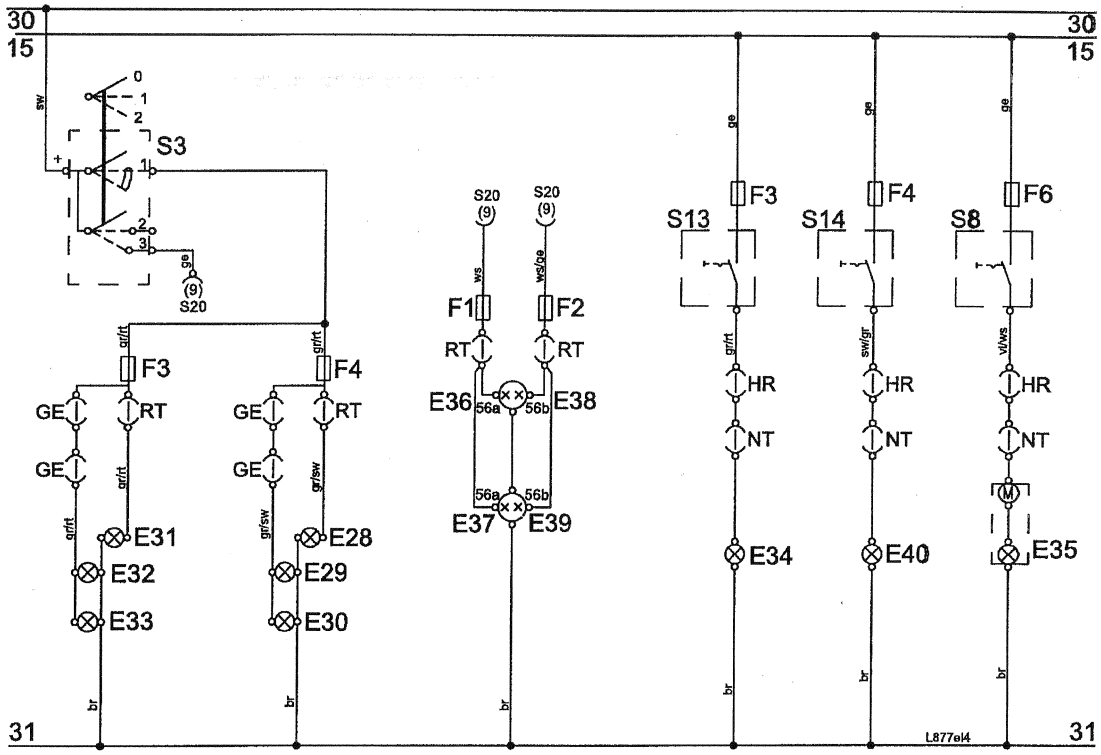
8. Wiper system	9. Signal system



Section Qty.	Code	Unit	Section Qty	Code	Unit .
8		**Wiper system**	1	NT6	Plug connection
1	FE	Fuse	1	F5	Fuse
1	S9	Wiper switch, front	1	FA	Fuse
2	NT	Plug connection	1	S7	Hazard light switch
1	M5	Wiper motor	1	K1	Flasher transmitter
1	SW	Plug connection	4	GE	Plug connection
1	NT	Plug connection	2	RT	Plug connection
1	M 10	Washer pump front	1	E22	Flasher left front
1	FE	Fuse	1	E23	Flasher left rear
1	S10	Wiper switch, rear	1	E24	Flasher right front
1	WS	Plug connection	1	E25	Flasher right rear
1	NT	Plug connection	1	S20	Flasher switch-push button
1	M6	Wiper motor	2	NT	Plug connection
1	SW	Plug connection	1	FF	Fuse
1	NT	Plug connection	1	GE	Plug connection
1	M11	Washer pump rear	1	S16	Stop light switch
			1	RT	Plug connection
9		**Signal system**	1	GE	Plug connection
1	FF	Fuse	1	E26	Stop light left
1	DG	Plug connection	1	E27	Stop light right
1	B10	Signal horn			

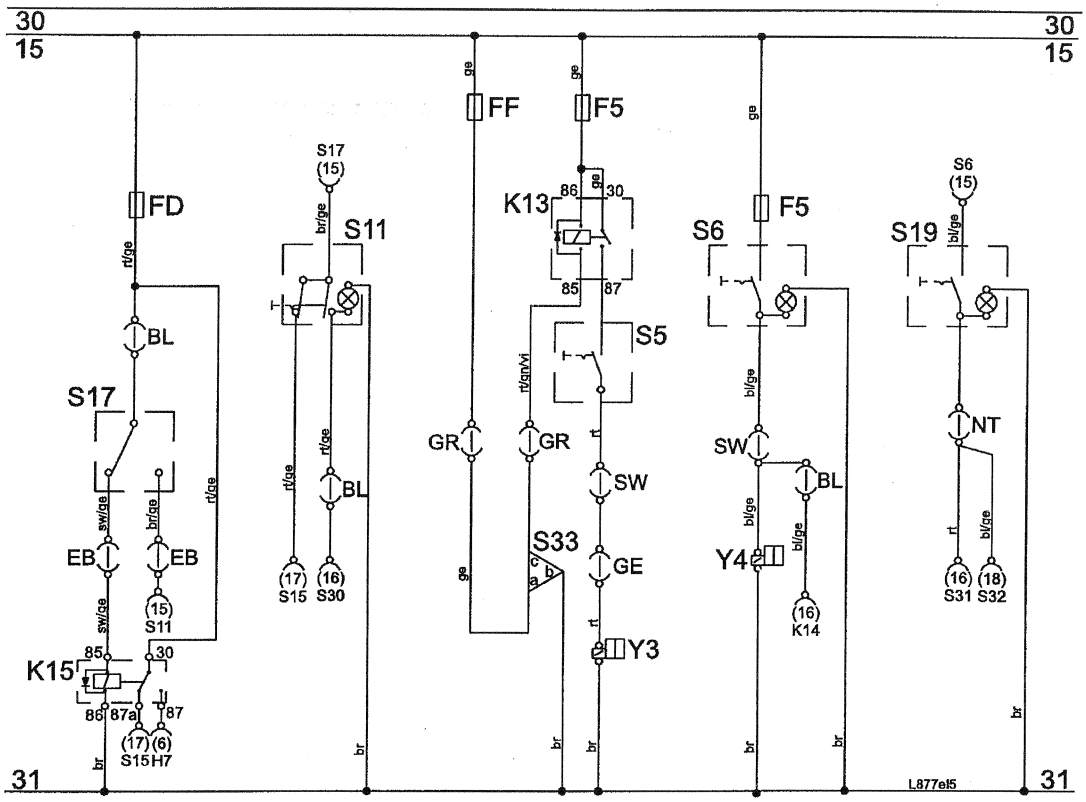
SCHAEFF	Typ/Model/Type **SKL 877**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.15.03**

10. Lamps	11. Headlamps	12. Working floodlight, rotating beacon



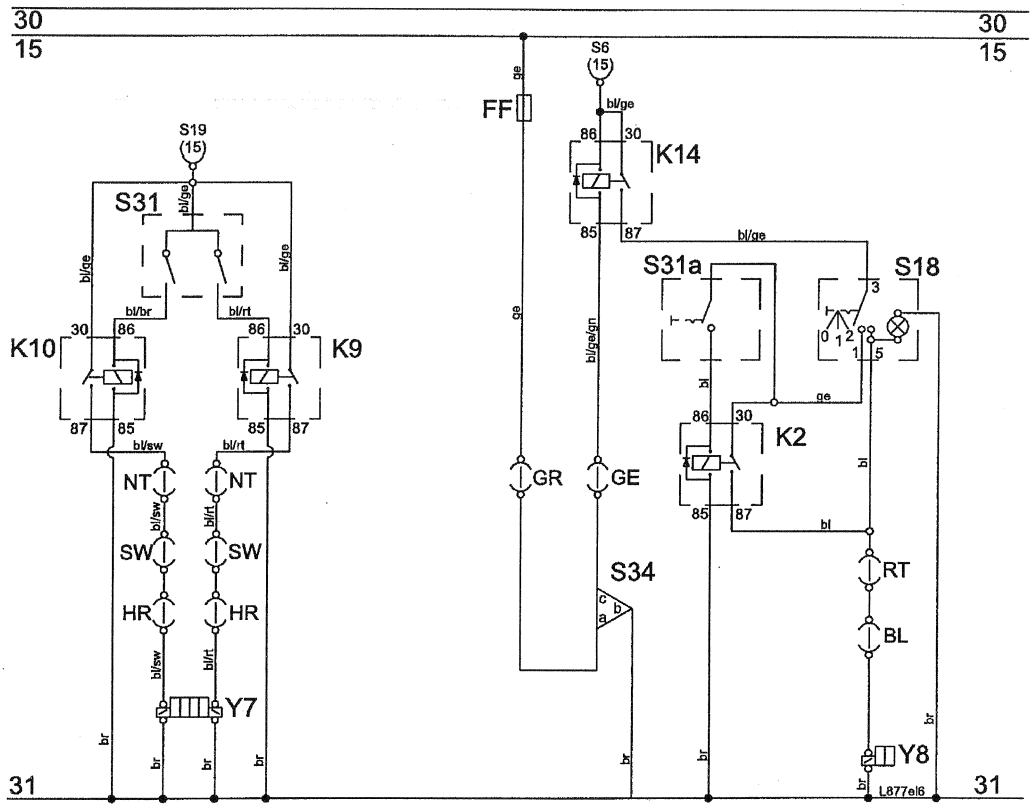
Section Qty.	Code	Unit	Section Qty.	Code	Unit .
10		**Lamps**	1	RT	Plug connection
1	S3	Light switch	1	E38	Low beam left
1	F4	Fuse	1	E39	Low beam right
2	GE	Plug connection			
1	RT	Plug connection	***12***		**Working floodlight**
1	E28	Side marker light left front	1	F3	Fuse
1	E29	Side mark. light left middle	1	S13	Switch working
1	E30	Side marker light left rear			floodlight front
1	F3	Fuse	1	HR	Plug connection
2	GE	Plug connection	1	NT	Plug connection
1	RT	Plug connection	1	E34	Working floodlight front
1	E31	Side marker light right front	1	F4	Fuse
1	E32	Side mark. light right middl.	1	S14	Switch working
1	E33	Side marker light right rear			floodlight rear
			1	HR	Plug connection
11		**Headlamps**	1	NT	Pug connection
1	F1	Fuse	1	E40	Working floodlight rear
1	RT	Plug connection	1	F6	Fuse
1	E36	High beam left	1	SB	Switch rotating beacon
1	E37	High beam right	1	HR	Plug connection
1	F2	Fuse	1	NT	Plug connection
			1	E35	Rotating beacon

15. Hand brake

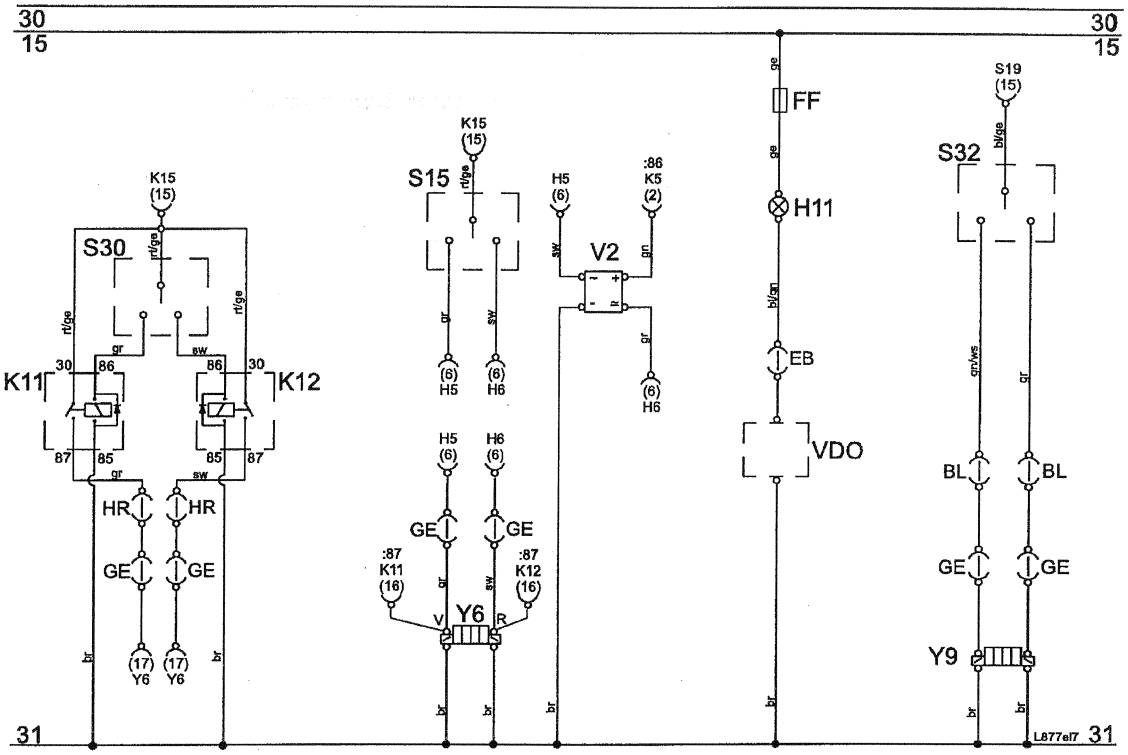


Section Qty.	Code	Unit	Section Qty.	Code	Unit
15		***Hand brake***	1	S5	Switch quick - slow
1	FD	Fuse	1	SW	Plug connection
1	BL	Plug connection	1	GE	Plug connection
1	S17	Hand brake switch	1	Y3	Valve: quick - slow
2	EB	Plug connection	1	F5	Fuse
1	S11	Travel switch-over	1	S6	Switch shut-off working hydraulics
1	BL	Plug connection			
1	FF	Fuse	1	SW	Plug connection
1	GR	Plug connection	1	BL	Plug connection
1	F5	Fuse	1	Y4	Valve: working hydraulics
1	K13	Relay quick - slow	1	S19	Switch-off 3rd contr. circuit
1	GR	Plug connection	1	NT	Plug connection
1	S33	Proximity switch lifting frame	1	K15	Relay parking brake

16. 3rd control circuit, floating position



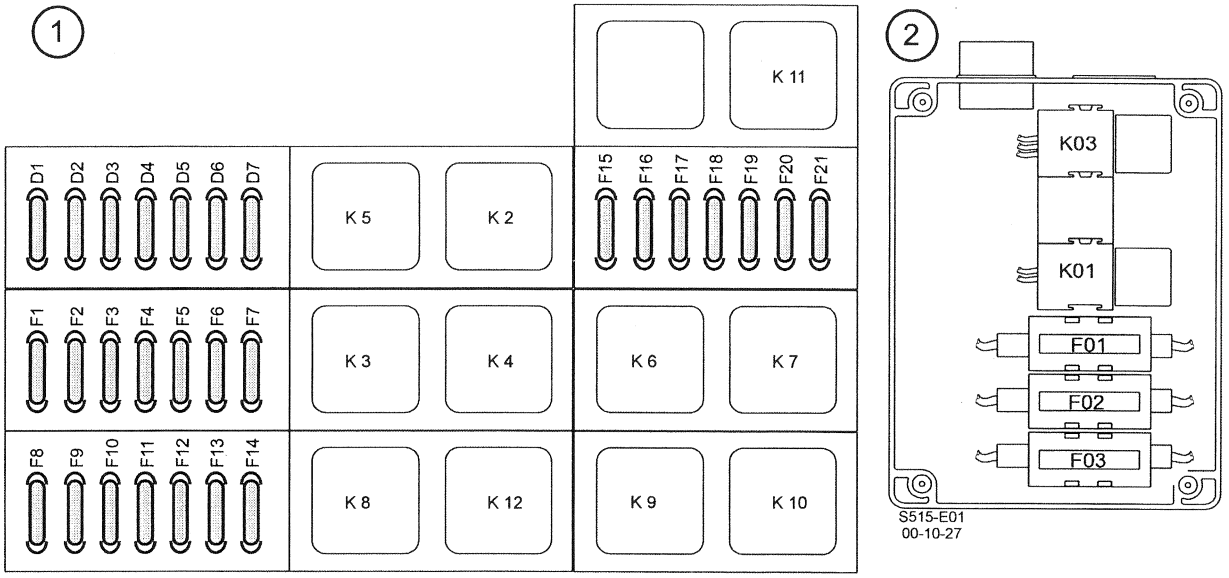
Section Qty.	Code	Unit	Section Qty.	Code	Unit
16		***3rd control circuit, floating position***	1	K 14	Relay floating position
			1	GE	Plug connection
1	S31	Coordinate lever	1	S34	Proximity switch
		3rd control circuit			lifting frame
2	NT	Plug connection	1	S18	Switch floating position
2	SW	Plug connection	1	S31 a	Coordinate lever
2	HR	Plug connection			floating position
1	Y7	Valve 3rd control circuit	1	K2	Relay floating position
1	K10	Relay 3rd control circuit	1	RT	Plug connection
1	K 9	Relay 3rd control circuit	1	BL	Plug connection
1	FF	Fuse	1	Y8	Valve: floating position
1	GR	Plug connection			



Section Qty.	Code	Unit	Section Qty.	Code	Unit
16		**Travelling**	***17***		***Height adjustable cab***
1	S30	Switch: travel forward - reverse	1	S32	Switch: height-adjust. cab
			2	BL	Plug connection
1	K11	Relay: travel forward	2	GE	Plug connection
1	K12	Relay: travel reverse	1	Y9	Valve: height-adjust. cab
2	HR	Plug connection			
2	GE	Plug connection			
17		***Transmission***			
1	S15	Switch: forward - reverse			
4	GE	Plug connection			
1	Y6	Valve: forward - reverse			
1	V2	Bridge rectifier			
1	FF	Fuse			
1	EB	Plug connection			
1	H 11	Electronic accelerator monitoring			
1	VDO	Control device VDO			

Electrical system

Fuse and relay box - Assignment diagram



1 = Fuse and relay box ..... under instrument panel

2 = Starter box ..... engine compartment dividing wall, right-hand side

Relay	Function
K 2	Starting safeguard
K 3	Travel, in reverse
K 4	Travel, forward
K 5	Float position
K 6	Additional control circuit - option
K 7	Additional control circuit - option
K 8	Travel direction recognition
K 9	Working floodlight, front - option
K 10	Working floodlight, rear - option
K 11	Flasher transmitter - option
K 12	Manual throttle
K 01	Start-up
K 02	Pre-heat relay (engine compartment dividing wall - near air filter)
K 03	Hydraulic oil radiator

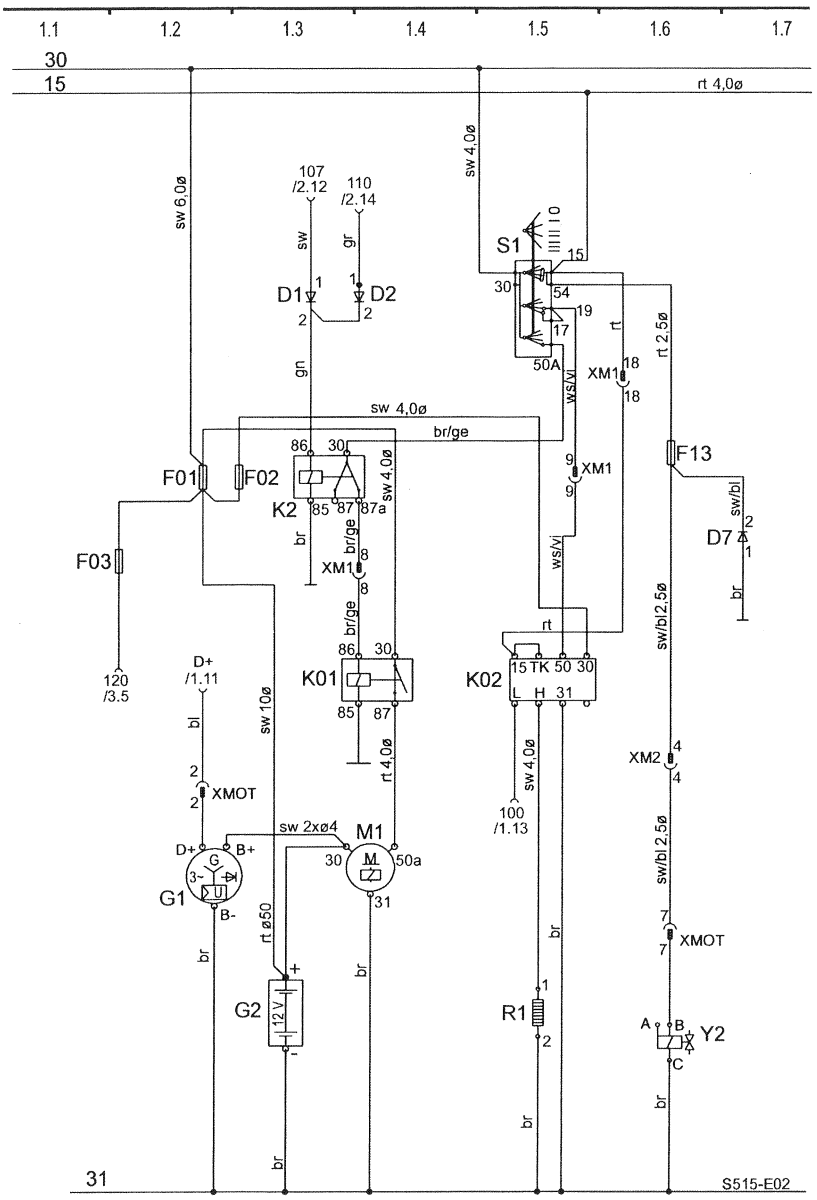
Fuse and diode assignment

Items	Amps	Assigned to	Items	Amps	Assigned to
F 01	50	Pre-heat/ starter switch	F 02	30	Starter
F 03	40	Hydraulic oil radiator			
D 1	Diode 3A	Starting safeguard	D 2	Diode 3A	Starting safeguard
D 3	Diode 3A	Travel fast, slow	D 4	Diode 3A	Travel direction recognition
D 5	Diode 3A	Travel direction recognition	D 6	Diode 3A	Charge control
D 7	Diode 3A	Engine shut-off recovery diode			
F 1	15	Socket	F 2	15	Front working floodlight
F 3	15	Rear working floodlight	F 4	15	Working hydraulics cut-off
F 5	15	Travel, forward/ reverse	F 6	10	Horn
F 7	15	Wiper, front	F 8	15	Wiper, rear
F 9	10	Instruments	F 10	15	Float position relay
F 11	15	Heater fan	F 12	10	Additional control circuit
F 13	20	Shut-off	F 14	--	
F 15	10	Hazard warning switch	F 16	10	Hazard warning switch
F 17	15	Lower beam	F 18	15	Upper beam
F 19	10	Side marker lamp, right	F 20	10	Side marker lamp, left
F 21	--				

Cable and plug colors

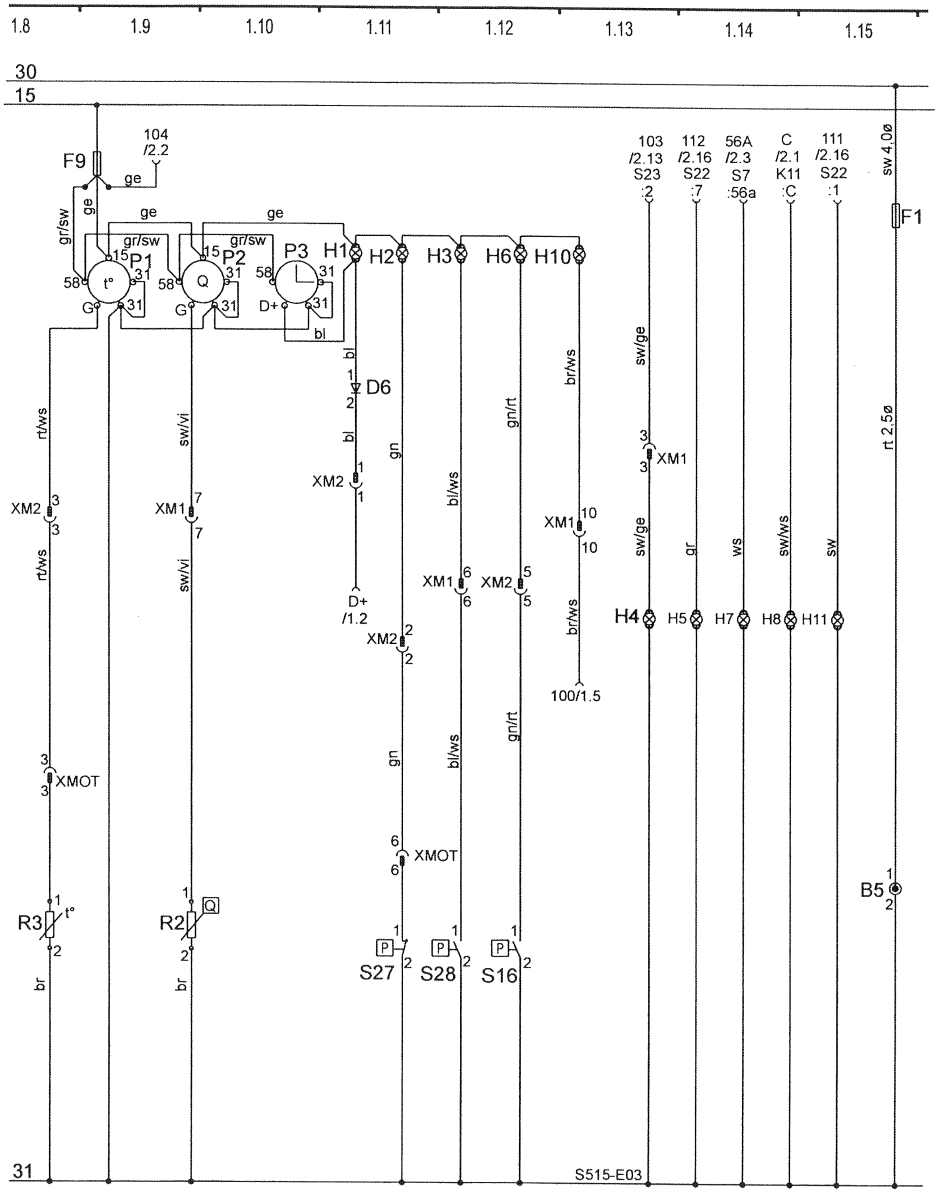
bg	beige	dgr	dark gray	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Start-up/ pre-heat system



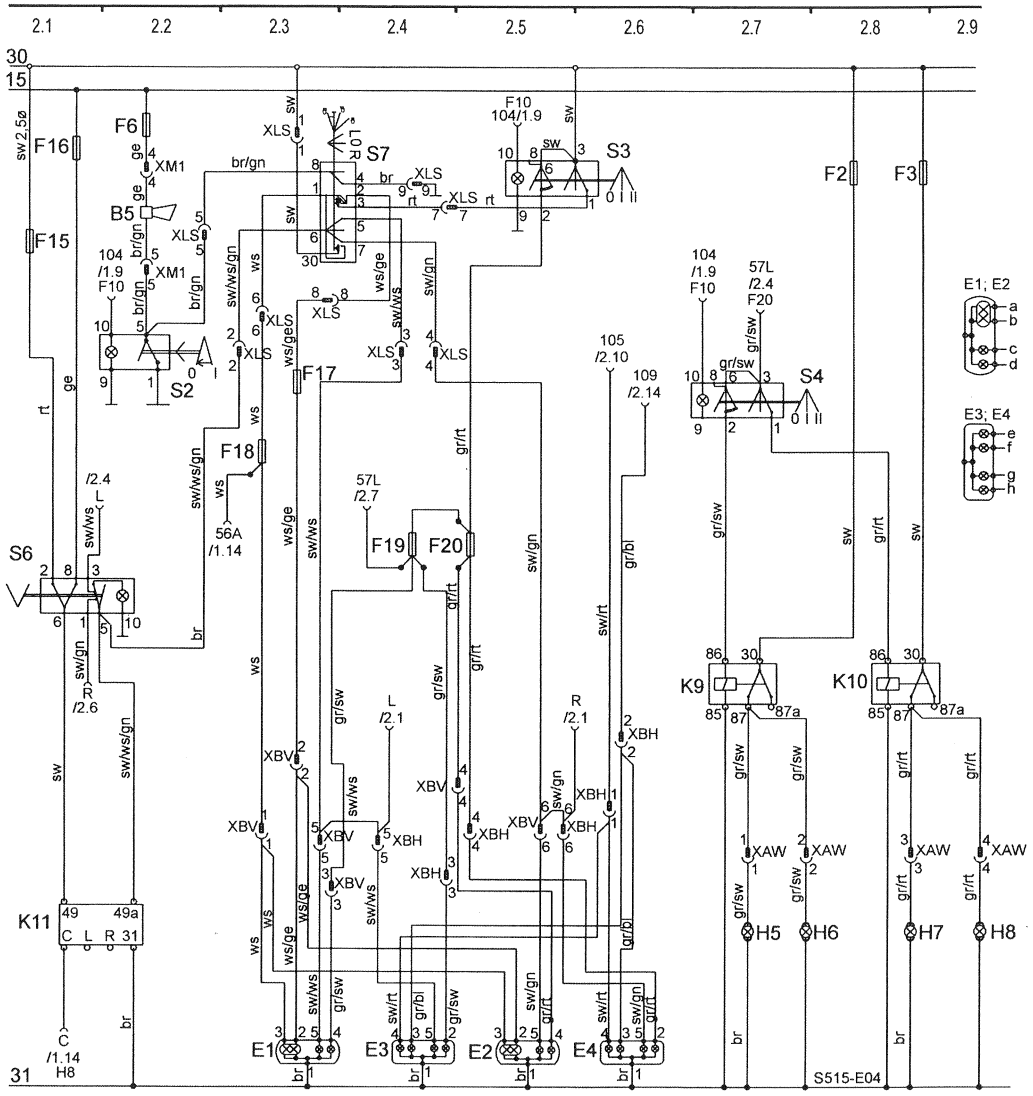
Path	Designation	Device	Path	Designation	Device
		Start-up/ pre-heat system	1.4	K01	Starting relay (starting aid)
1.2	F01	Fuse	1.4	M1	Starter
1.2	F02	Fuse	1.5	S1	Pre-heat/ starter switch
1.2	F03	Fuse	1.5	K02	Pre-heat relay
1.2	G1	Generator	1.5	R1	Glow plugs
1.3	D1	Diode	1.6	F13	Fuse
1.4	D2	Diode	1.6	Y2	Shut-off
1.3	G2	Battery	1.7	D7	Diode
1.3	K2	Starting relay (starting safeguard)			

Instruments, indicators



Path	Desig-nation	Device	Path	Desig-nation	Device
		Instruments, indicators	1.12	H3	Air filter clogging
1.9	F9	Fuse	1.12	S28	Sensor
1.9	P1	Temperature indicator	1.12	H6	Hydr. oil temperature indicator
1.8	R3	Coolant temperature sensor	1.12	S16	Sensor
1.9	P2	Fuel gauge	1.13	H10	Pre-heating
1.9	R2	Fuel gauge transmitter	1.13	H4	Hand brake
1.10	P3	Operating hour meter	1.14	H5	Travel, forward
1.11	H1	Battery charge indicator lamp	1.14	H7	High beam
1.11	D6	Diode	1.14	H8	Turn signals
1.11	H2	Engine oil pressure	1.15	H11	Travel, reverse
1.11	S27	Sensor	1.15	B5	Socket

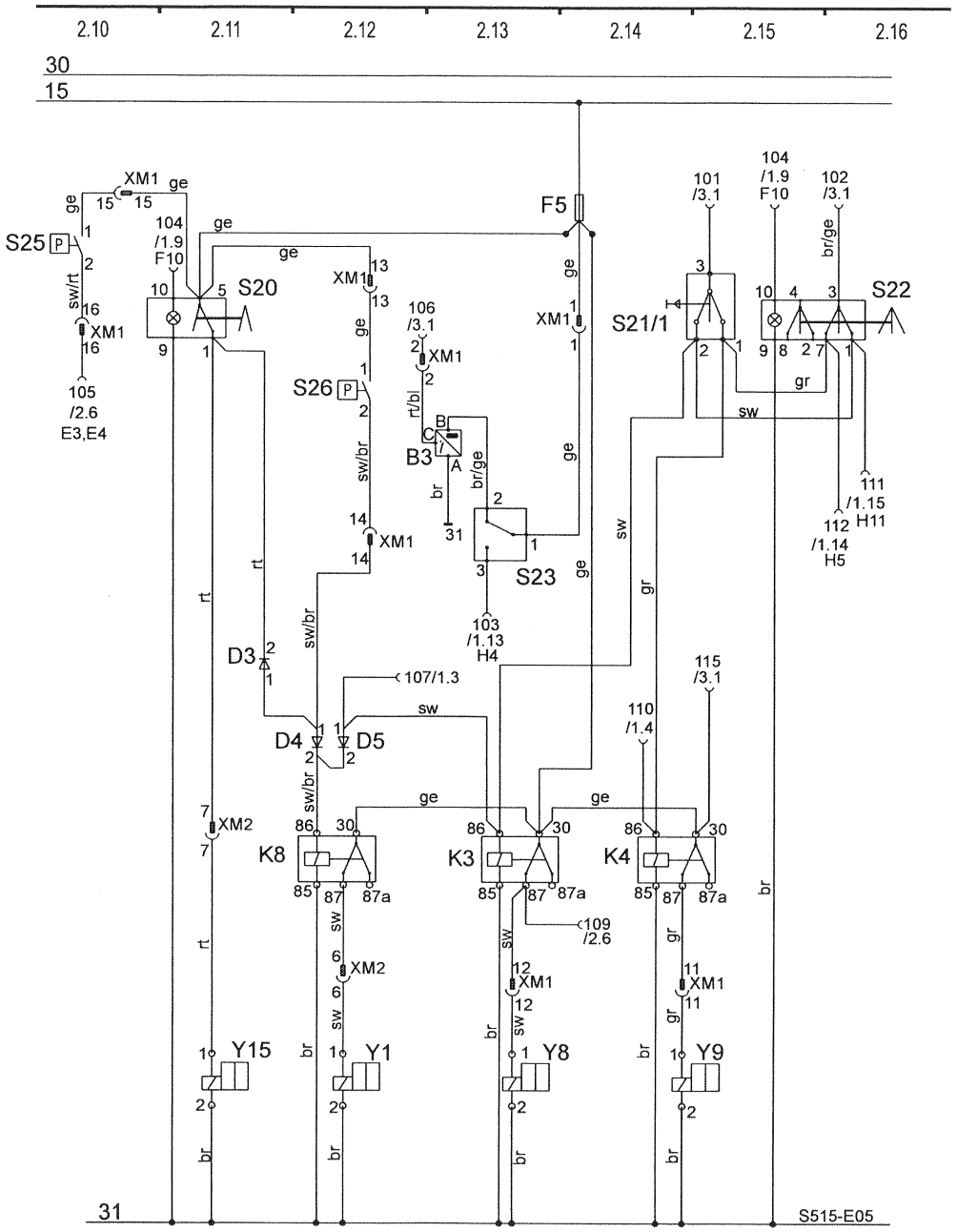
Lighting and signaling



E1, E2	a	High beam	c	Direction indicator	e	Brake light	g	Direction indicator
E3, E4	b	Low beam	d	Side marker lamp	f	Back-up light	h	Side marker lamp

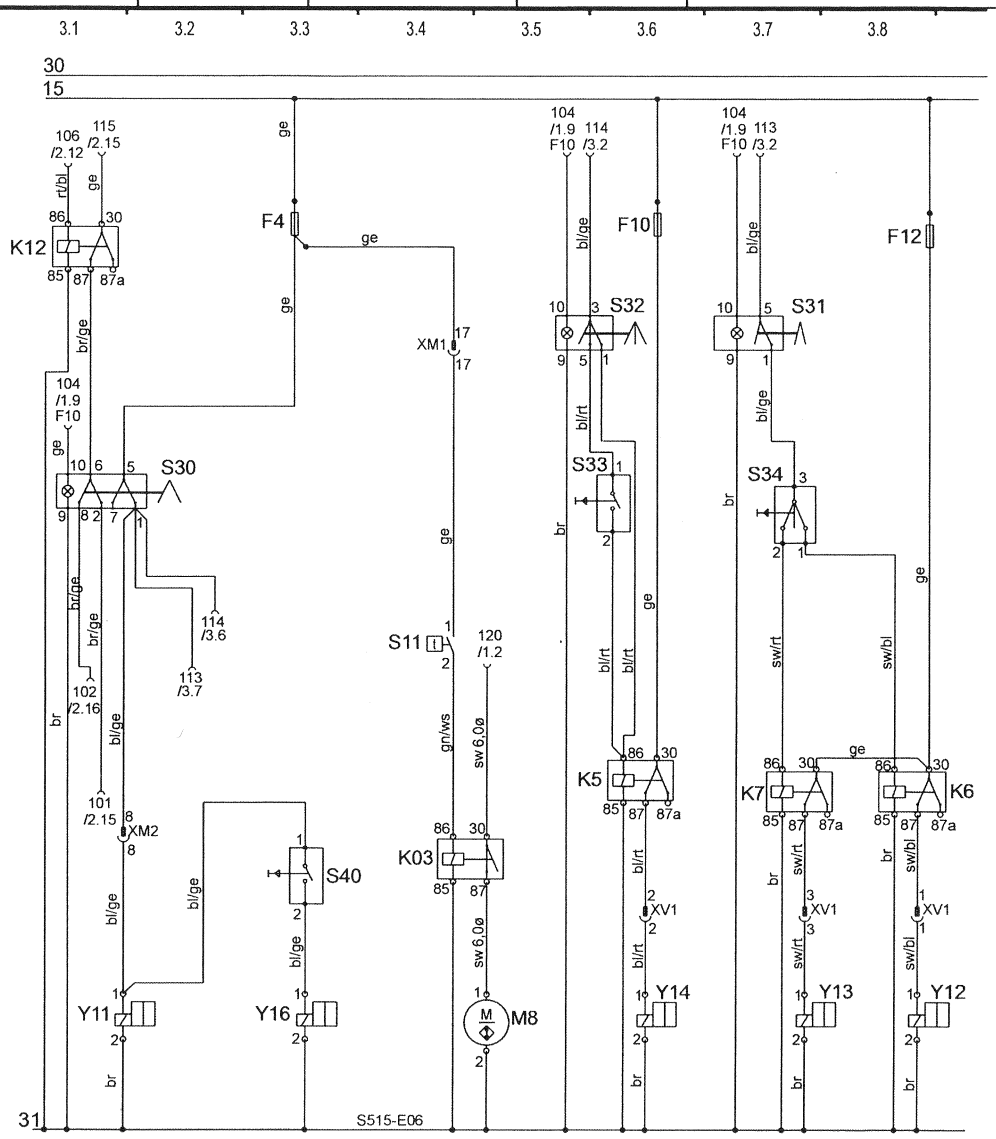
Path	Desig-nation	Device	Path	Desig-nation	Device
		Lighting and signaling	2.4	F20	Fuse
2.1	F15	Fuse	2.3	E1	Headlamp
2.1	F16	Fuse	2.5	E2	Headlamp
2.1	S6	Hazard warning switch	2.4	E3	Rear light
2.1	K11	Flashing relay	2.6	E4	Rear light
2.2	F6	Fuse	2.7	S4	Working floodlight switch
2.2	B5	Horn	2.7	K9	Relay
2.2	S2	Horn switch	2.7	H5	Working floodlight, front
2.3	F18	Fuse	2.7	H6	Working floodlight, front
2.3	F17	Fuse	2.8	K10	Relay
2.3	S7	Stalk control	2.8	H7	Working floodlight, rear
2.4	F19	Fuse	2.9	H8	Working floodlight, rear

Travel, brakes



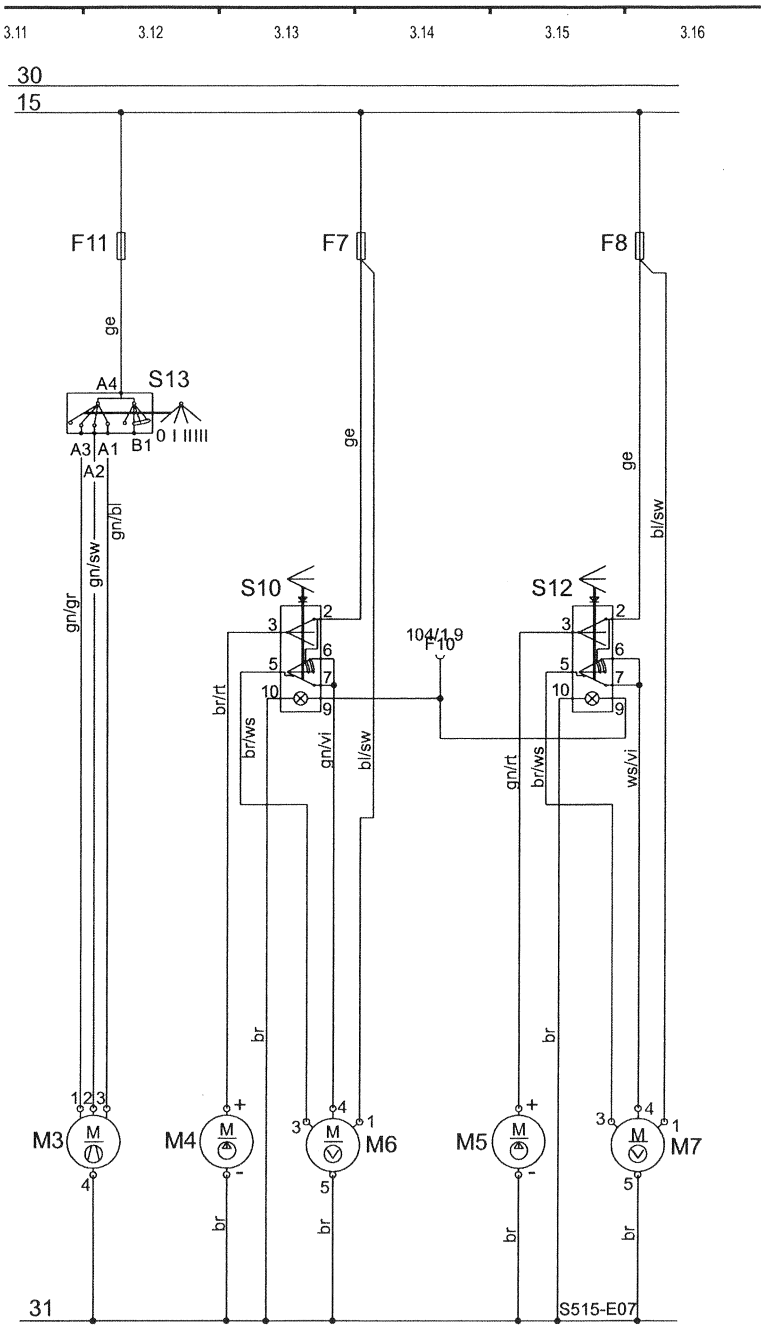
Path	Desig-nation	Device	Path	Desig-nation	Device
		Travel, brakes	2.13	B3	Sensor
2.10	S25	Brake light switch	2.13	S23	Hand brake
2.11	S20	Travel fast/slow	2.13	F5	Fuse
2.11	Y15	Valve, travel, fast/slow	2.13	K3	Relay, travel reverse
2.11	D3	Diode	2.13	Y8	Valve, travel reverse
2.11	D4	Diode	2.14	S21/1	Joystick switch
2.12	D5	Diode	2.14	K4	Relay, travel forward
2.12	S26	Hydrostatic brake	2.14	Y9	Valve, travel forward
2.12	K8	Hydrostatic brake	2.16	S22	Travel, forward/reverse
2.12	Y1	Recognition of travel direction			

Working hydraulics	Joystick steering	Hydraulic oil radiator	Float position	Additional control circuit



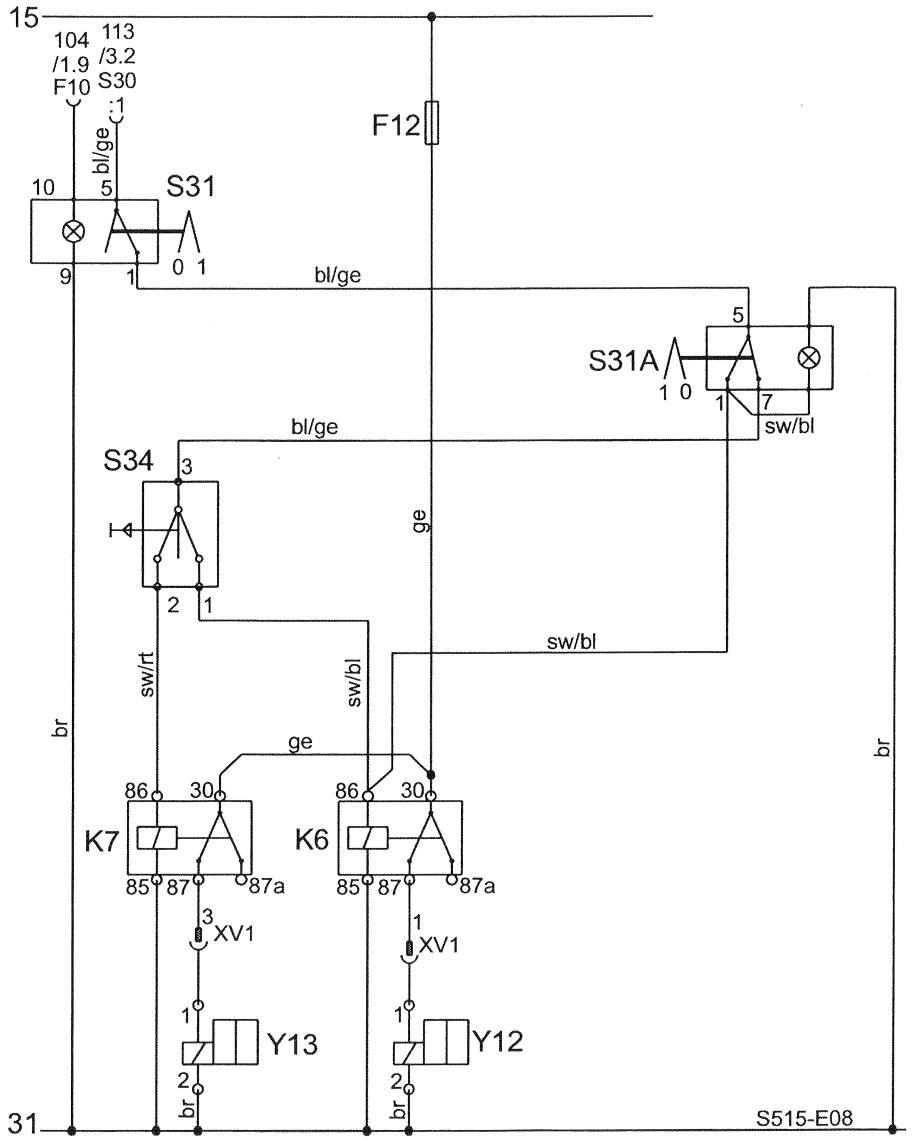
Path	Desig-nation	Device	Path	Desig-nation	Device
		Working hydraulics	3.6	S33	Float position joystick
3.1	K12	Relay	3.6	F10	Fuse
3.2	S30	Working hydraulics cut-off	3.6	K5	Relay
3.2	Y11	Working hydraulics valve	3.6	Y14	Valve
3.3	F4	Fuse	3.7	S31	Additional control circuit cut-off
3.3	S40	Steering safety switch	3.7	S34	Additional control circuit joystick
3.3	Y16	Valve	3.7	K7	Additional control circuit relay
3.4	S11	Temperature switch	3.7	Y13	Additional control circuit valve
3.4	K03	Relay	3.8	F12	Fuse
3.5	M8	Hydraulic oil radiator	3.8	K6	Additional control circuit relay
3.6	S32	Float position	3.8	Y12	Additional control circuit

Heater	Wiper / washer system

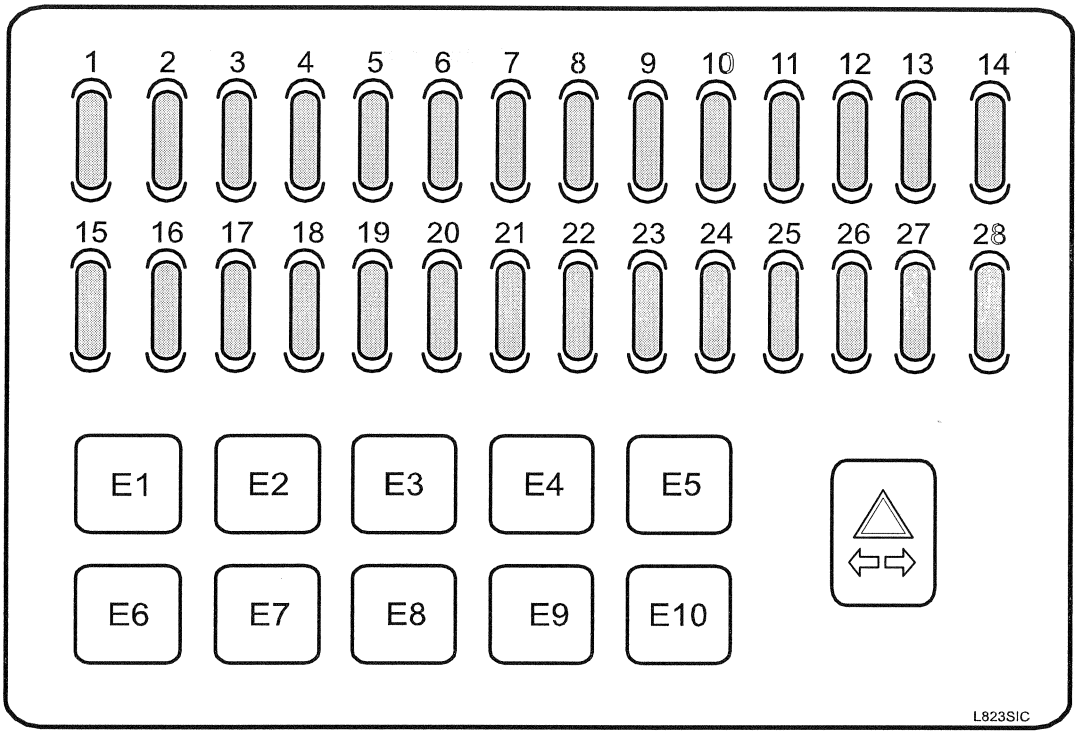


Path	Desig-nation	Device	Path	Desig-nation	Device
		Heater, wiper/washer system	3.16	F8	Fuse
3.12	F11	Fuse	3.15	S12	Wiper/washer switch, rear
3.12	S13	Heater switch	3.15	M5	Washer pump
3.12	M3	Heater fan	3.15	M7	Wiper motor
3.13	F7	Fuse			
3.13	S10	Wiper/washer switch, front			
3.13	M4	Washer pump			
3.13	M6	Wiper motor			

3rd control circuit installed — continuous operation (option)



Path	Designation	Device	Path	Designation	Device
--	S31	Additional control circuit cut-off	--	F12	Fuse
--	S34	Additional control circuit joystick	--	K6	Additional control circuit relay
--	K7	Additional control circuit relay	--	Y12	Additional control circuit valve
--	Y13	Additional control circuit valve	--	S31A	Continuous operation switch



Location	Relay	Function
E 1	K 1	Oscillating axle lock
E 2	K 2	Starting safety
E 3	K 3	Travel - reverse
E 4	K 4	Travel - forward
E 5	K 5	Float position
E 6	K 6	Additional control circuit valve
E 7	K 7	Additional control circuit valve
E 8	K 8	Brake inching
E 9	K 9	Working floodlights, front
E 10	K 10	Working floodlights, rear
⇕▷	K 11	Flasher transmitter

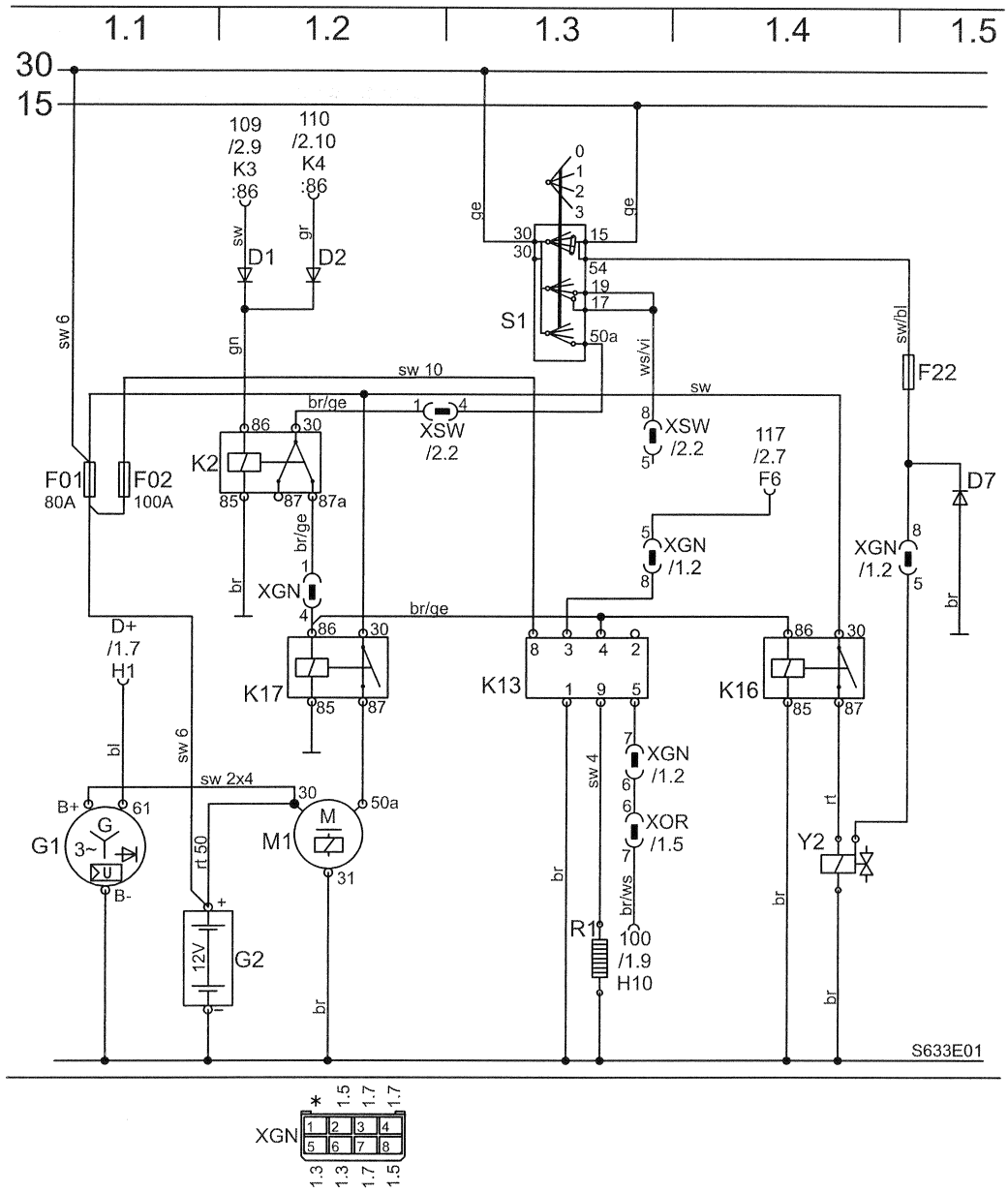
Fuse and diode assignment

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Immobilizer	F 15	10	Hazard warning switch Immobilizer
F 2	15	Working hydraulics cut-off Pre-glow / oscillating axle lock	F 16	10	Rotating beacon Cab light
F 3	15	Travel - quick / slow Hydrostatic brake	F 17	15	Socket Radio
F 4	15	Parking brake relay	F 18	15	Lower beam
F 5	10	Signal horn	F 19	15	Upper beam
F 6	10	Brake light	F 20	10	Left side marker light Front working floodlights
F 7	15	Heater fan	F 21	10	Instruments' illumination Rear working floodlights Right side marker light
F 8	15	Front wiper	F 22	20	Engine cut-off
F 9	15	Rear wiper	F 23 D 5	Diode 3A	Back-Alarm
F 10	10	Instruments	F 24 D 4	Diode 3A	Hydrostatic brake
F 11	15	Float position relay	F 25 D 3	Diode 3A	Connection quick / slow Hydrostatic brake
F 12	10	Radio	F 26 D 1	Diode 3A	Starting safety
F 13	10	Additional control circuit	F 27 D 2	Diode 3A	Starting safety
F 14 D 6	Diode 1A	Three-phase alternator	F 28 D 7	Diode 3A	Diode engine shut-off
F 29	15	Front working floodlights	F 30	15	Rear working floodlights

Cable and plug colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

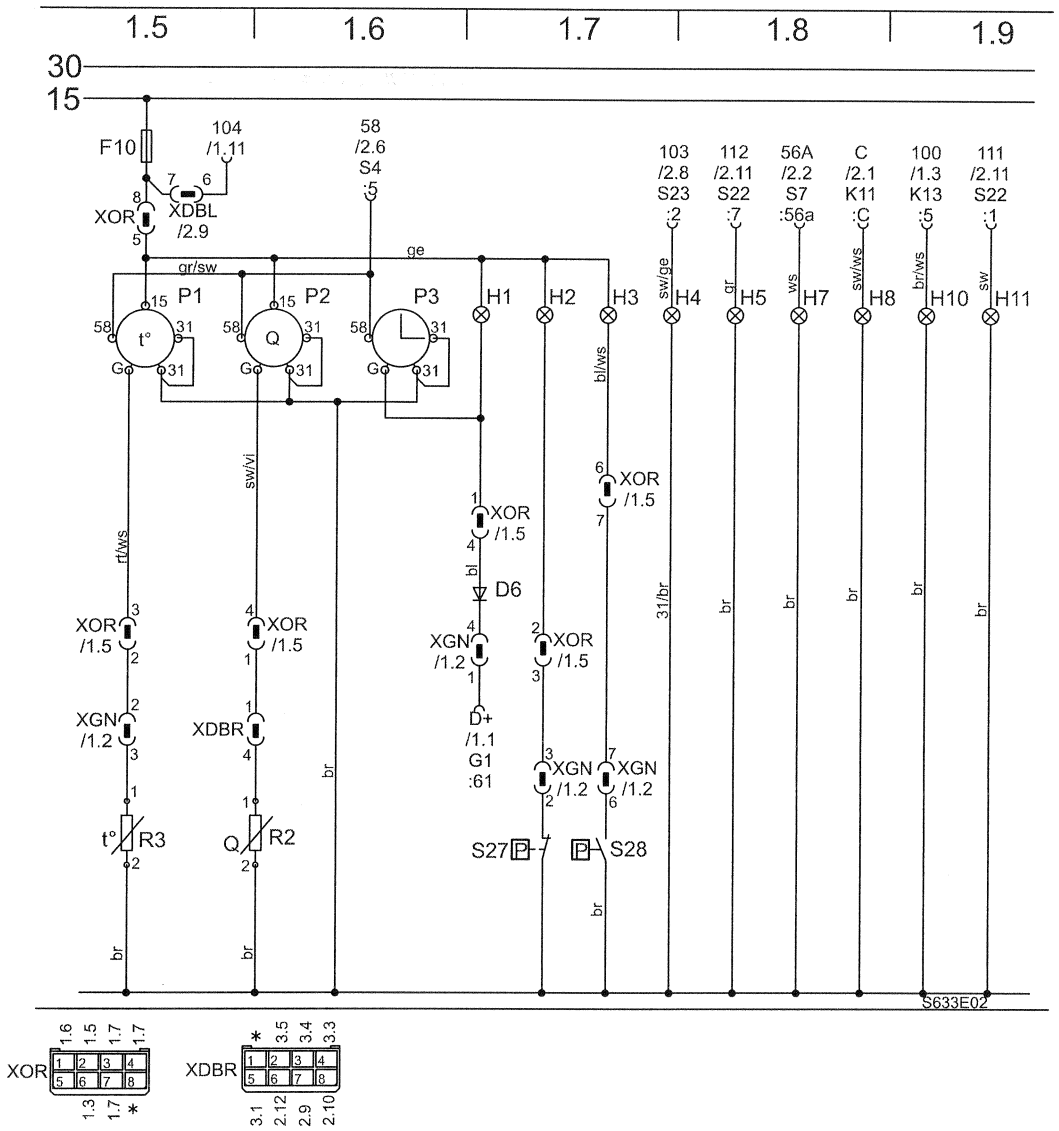
Start-up, pre-heater system



Path	Desig-nation	Device	Path	Desig-nation	Device
		Start-up, pre-heater system	1.2	D1	Diode
1.1	G1	Generator	1.2	D2	Diode
1.1	G2	Battery 12V	1.3	S1	Pre-heater switch
1.2	M1	Starter	1.3	K13	Glow time control relay
1.2	K2	Starting relay (starting safety)	1.4	K16	Cut-off relay
1.2	K17	Starting relay (starting aid)	1.4	Y2	Cut-off
1.1	F01	Flat-type fuse 80A	1.3	R1	Glow plugs
1.1	F02	Flat-type fuse 100A	1.5	D7	Diode

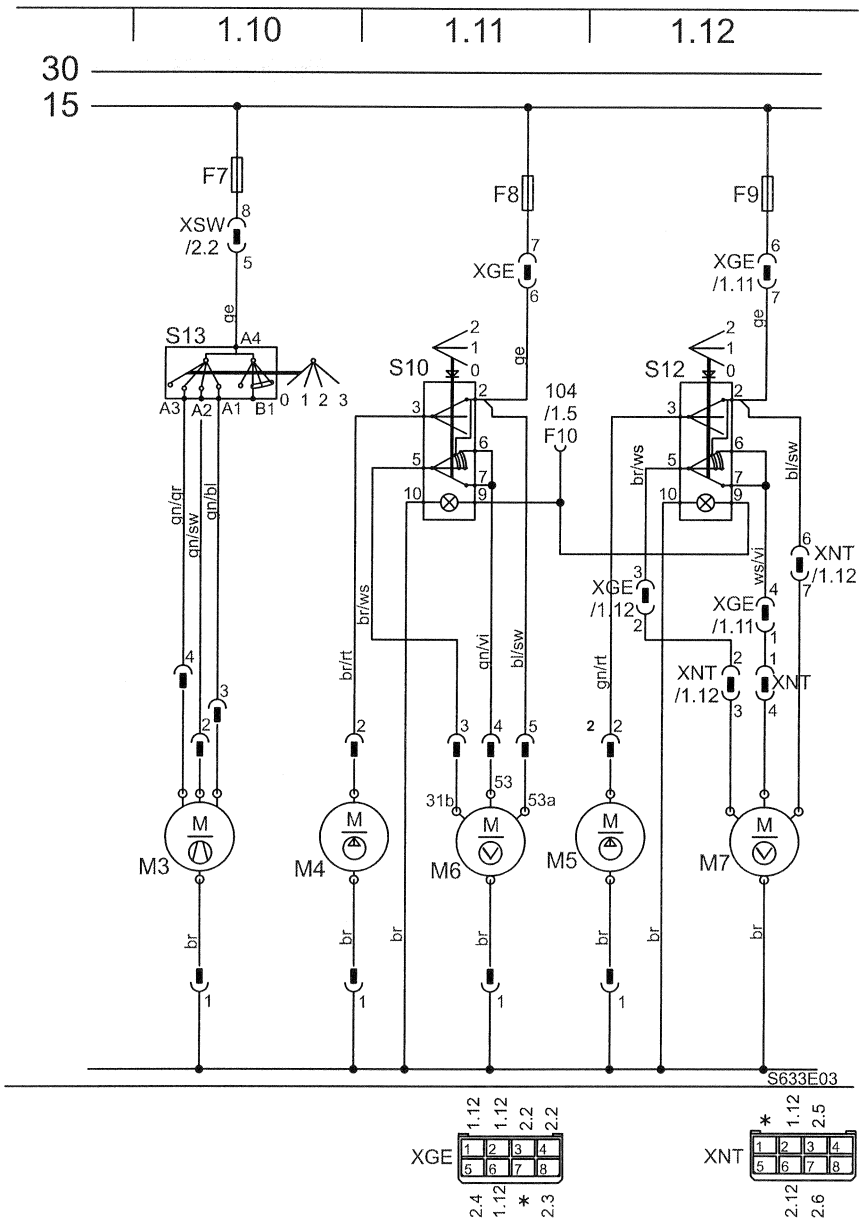
SCHAEFF	Typ/Model/Type **SKS 633**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.35.02**

Instruments, indicating units



Path	Desig-nation	Device	Path	Desig-nation	Device
		Instruments, indicating units	1.7	H4	Parking brake indicator lamp
1.5	P1	Temperature indicator	1.8	H5	Travel - forward
1.6	P2	Fuel gauge	1.9	H11	Travel - reverse
1.6	P3	Operating hour meter	1.8	H7	Upper beam indicator lamp
1.5	R3	Temperature sensor - coolant	1.8	H8	Flasher
1.6	R2	Fuel gauge transmitter	1.9	H10	Pre-heater indicator lamp
1.5	F10	Fuse	1.7	D6	Diode
1.7	H1	Battery charge indicator lamp	1.7	S27	Engine oil pressure switch
1.7	H2	Engine oil pressure indicator lamp	1.7	S28	Air filter clogging switch
1.7	H3	Air filter clogging indicator lamp			

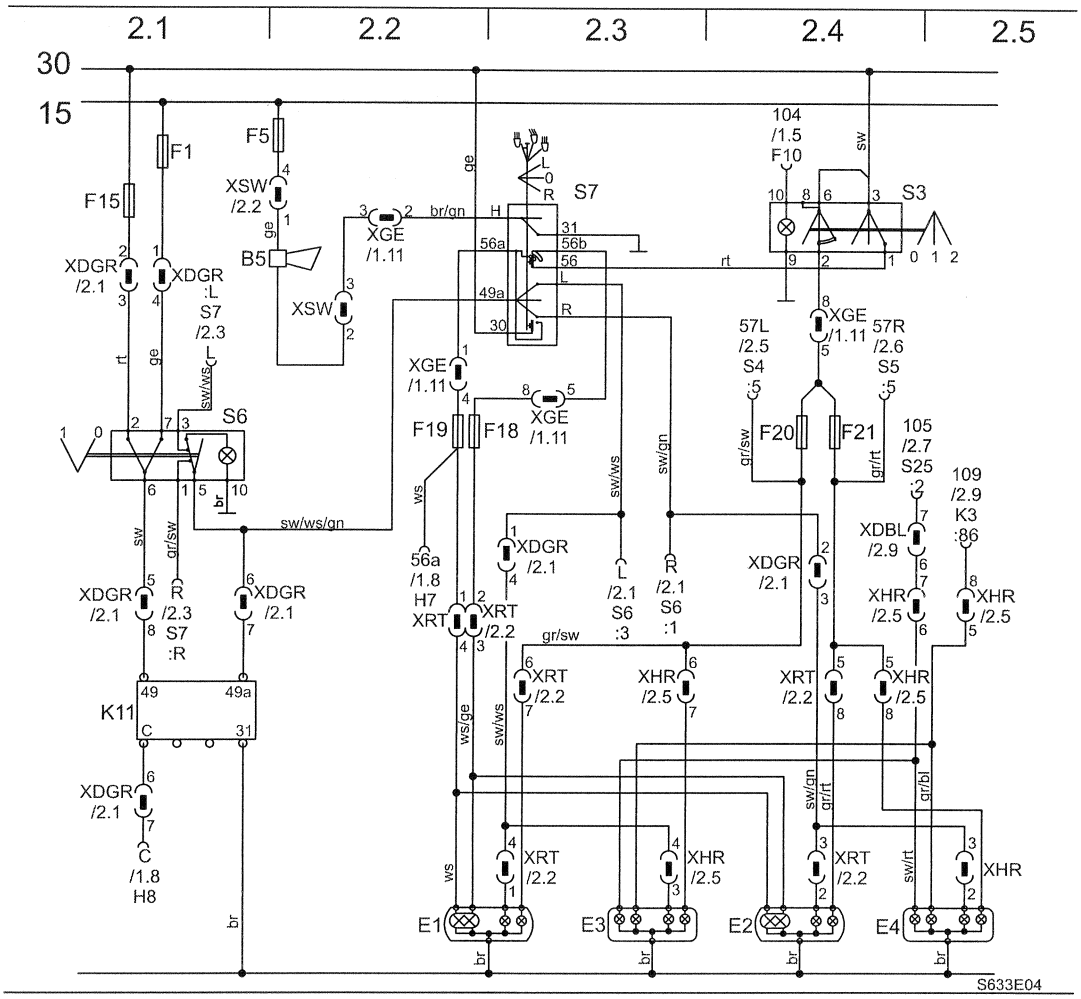
Heater fan	Wash/ wipe system

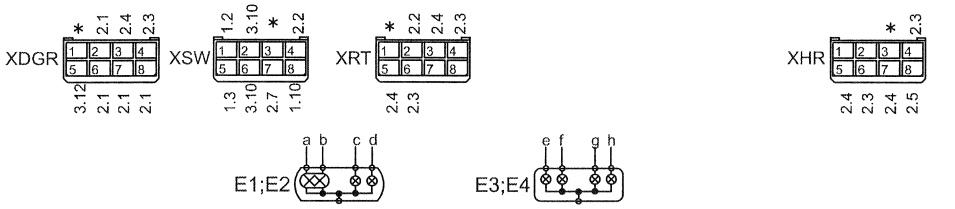


Path	Desig-nation	Device	Path	Desig-nation	Device
		Heater fan	1.11	S10	Front wash/ wipe switch
1.10	F7	Fuse	1.12	S12	Rear wash/ wipe switch
1.10	S13	Heater fan switch	1.10	M4	Front wash pump
1.10	M3	Heater fan	1.11	M6	Front wipe motor
		Wash/ wipe system	1.12	M5	Rear wash pump
1.11	F8	Fuse	1.12	M7	Rear wipe motor
1.12	F9	Fuse			

SCHAEFF	Typ/Model/Type **SKS 633**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.35.03**

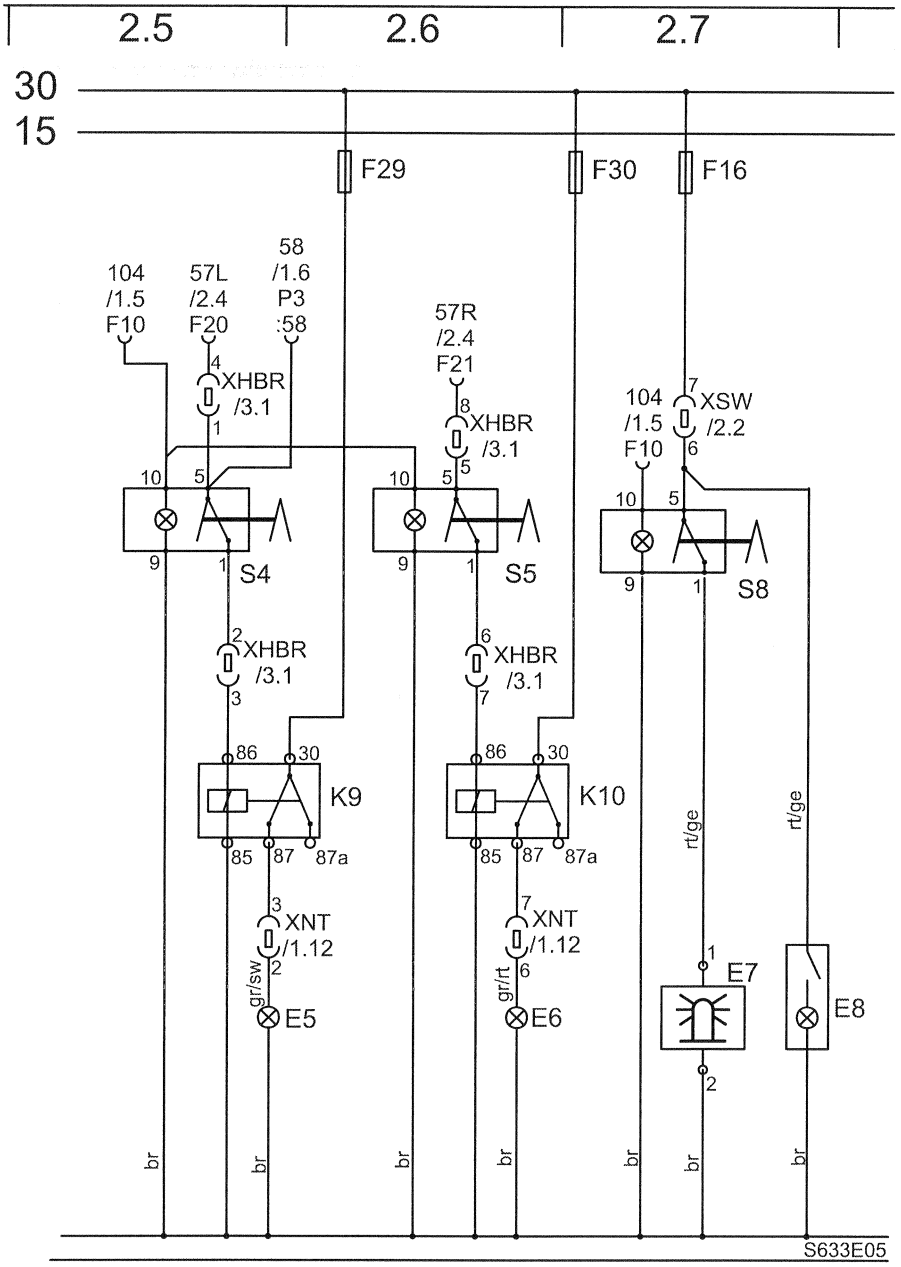
Illumination and signalling system





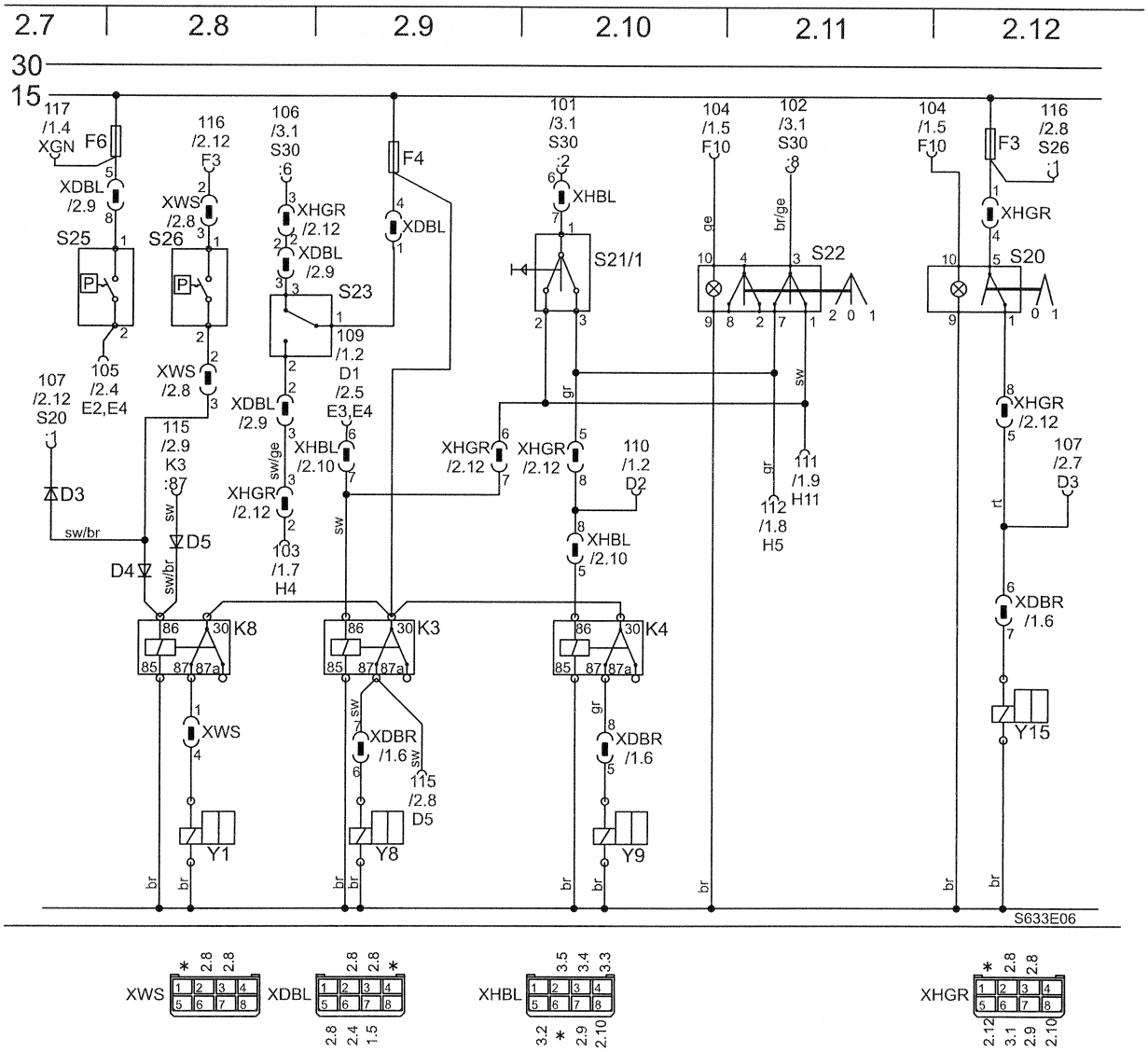
a = Upper beam
b = Lower beam
c = Flasher
d = Side marker light
e = Brake light
f = Reversing lamp
g = Flasher
h = Side marker light

Path	Desig-nation	Device	Path	Desig-nation	Device
		Illumination and signalling system	2.2	F18	Fuse
2.1	F15	Fuse	2.4	F20	Fuse
2.1	F1	Fuse	2.4	F21	Fuse
2.2	F5	Fuse	2.1	K11	Flasher relay
2.2	B5	Horn	2.2	E1	Left-hand headlamp
2.1	S6	Hazard warning switch	2.4	E2	Right-hand headlamp
2.3	S7	Steering column switch	2.3	E3	Left-hand back light
2.4	S3	Light switch	2.5	E4	Right-hand back light
2.2	F19	Fuse			



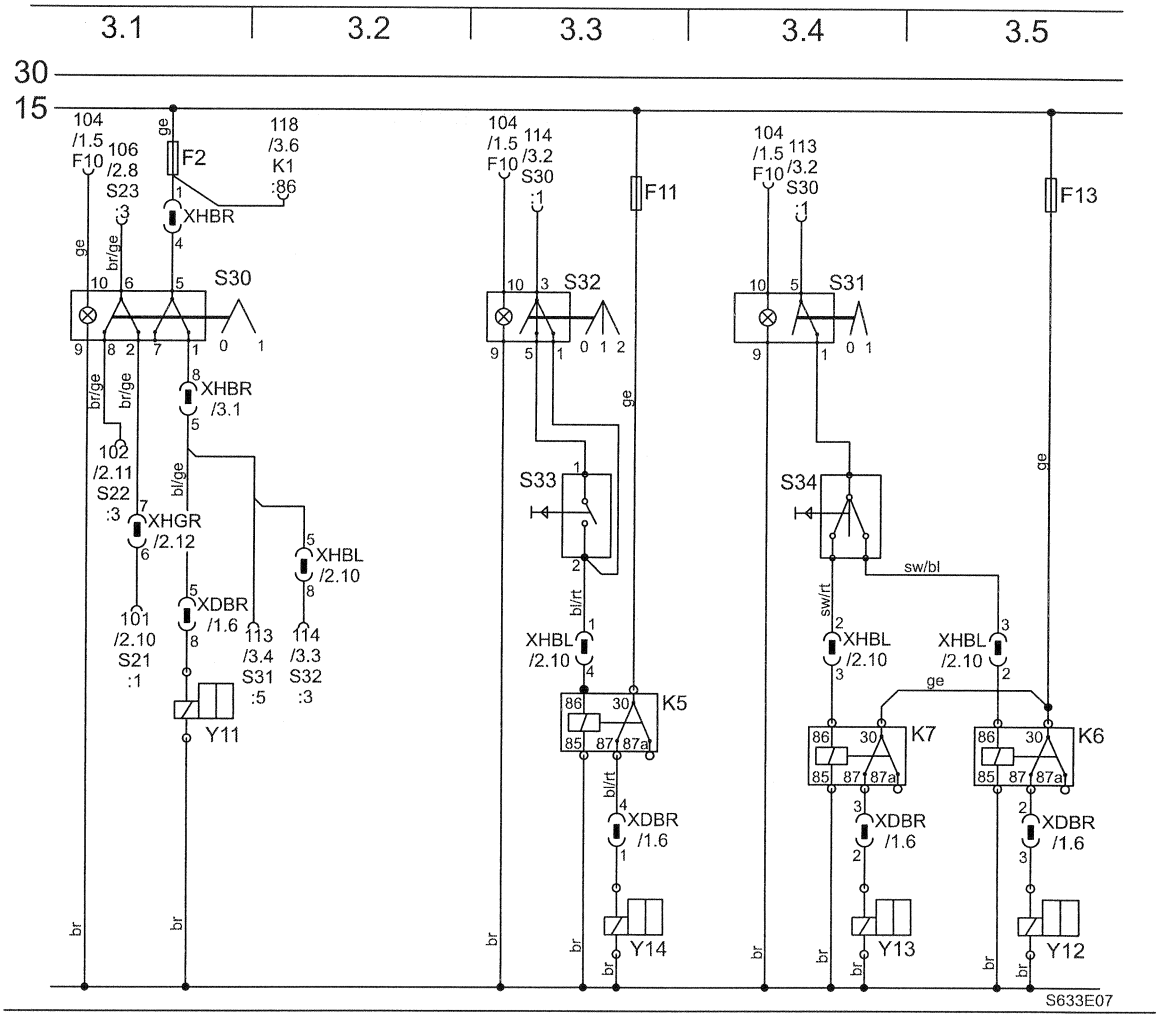
Path	Desig-nation	Device	Path	Desig-nation	Device
		Illumination and signalling system	2.6	K 10	Rear working floodlights
			2.6	E6	Rear working floodlights
2.7	F16	Fuse	2.6	F29	Fuse
2.5	S4	Front working floodlights	2.7	F30	Fuse
2.5	K 9	Front working floodlights	2.7	S8	Rotating beacon
2.5	E5	Front working floodlights	2.7	E7	Rotating beacon
2.6	S5	Rear working floodlights	2.7	E8	Cab lighting

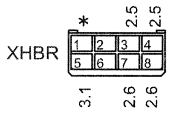
Travel, brakes



Path	Desig-nation	Device	Path	Desig-nation	Device
		Travel, brakes	2.7	D3	Diode
2.8	F6	Fuse	2.8	D4	Diode
2.9	F4	Fuse	2.8	D5	Diode
2.12	F3	Fuse	2.8	K8	Hydrostatic brake
2.8	S25	Brake light switch	2.9	K3	Travel - reverse
2.8	S26	Hydrostatic brake	2.10	K4	Travel - forward
2.8	S23	Hand brake switch	2.8	Y1	Direction-of-travel recognition
2.10	S21/1	Co-ordinate lever	2.9	Y8	Valve for travel reverse
2.11	S22	Travel forward - reverse	2.10	Y9	Valve for travel forward
2.12	S20	Travel quick - slow	2.12	Y15	Valve for travel quick - slow

Working hydraulics	Float position	Additional control circuit



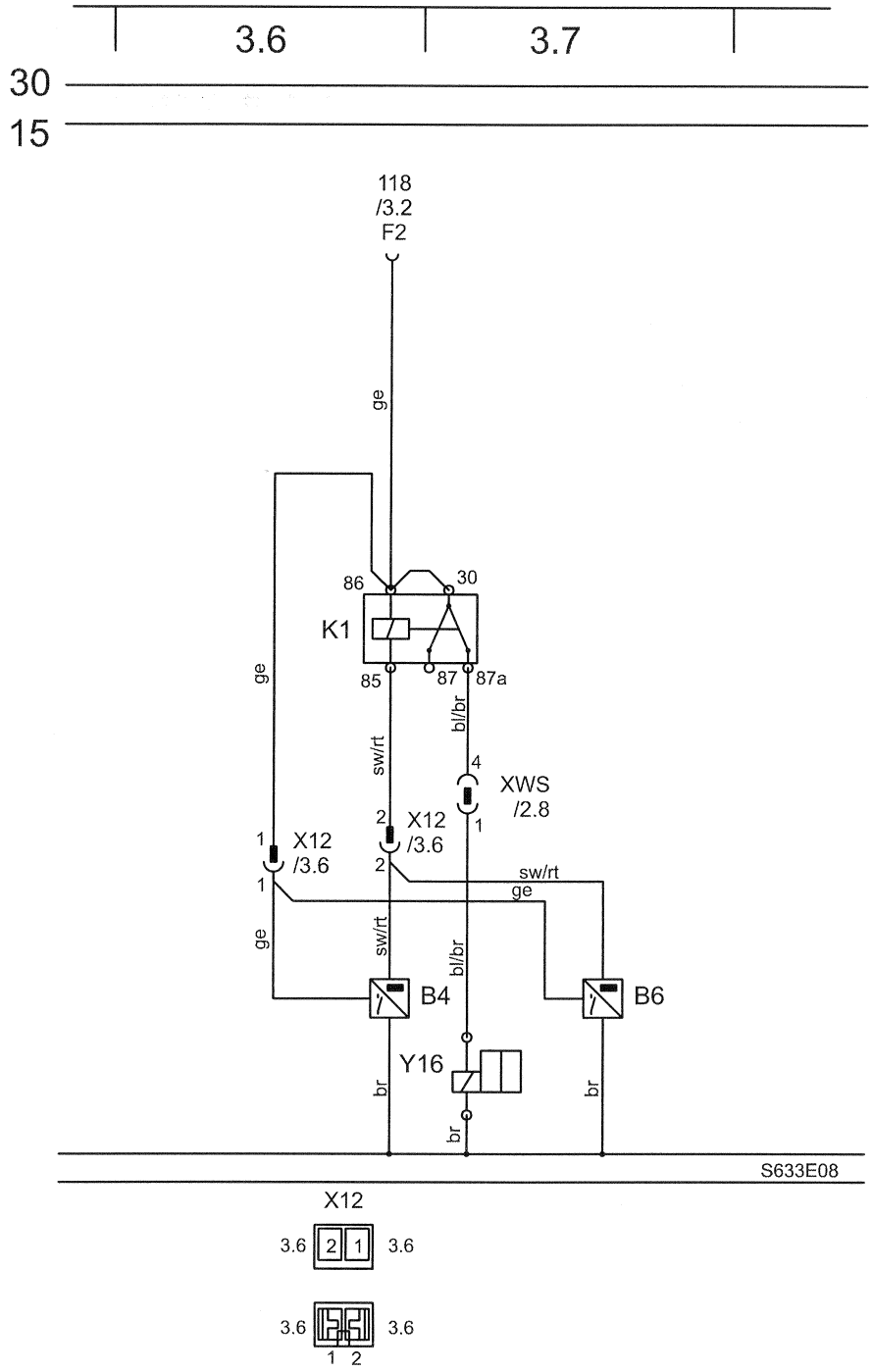


Path	Desig-nation	Device
		Working hydraulics
3.1	F2	Fuse
3.1	S30	Working hydraulics cut-off
3.1	Y11	Working hydraulics valve
		Float position
3.3	F11	Fuse
3.2	S32	Float position
3.3	S33	Co-ordinate lever Float position
3.3	K5	Float position relay
3.3	Y14	Float position valve

Path	Desig-nation	Device
		Additional control circuit
3.5	F13	Fuse
3.4	S34	Co-ordinate lever 3rd control circuit
3.4	S31	3rd control circuit cut-off
3.4	K7	Relay for add. control circuit
3.5	K6	Relay - add. control circuit
3.4	Y13	Additional control circuit
3.5	Y12	Additional control circuit

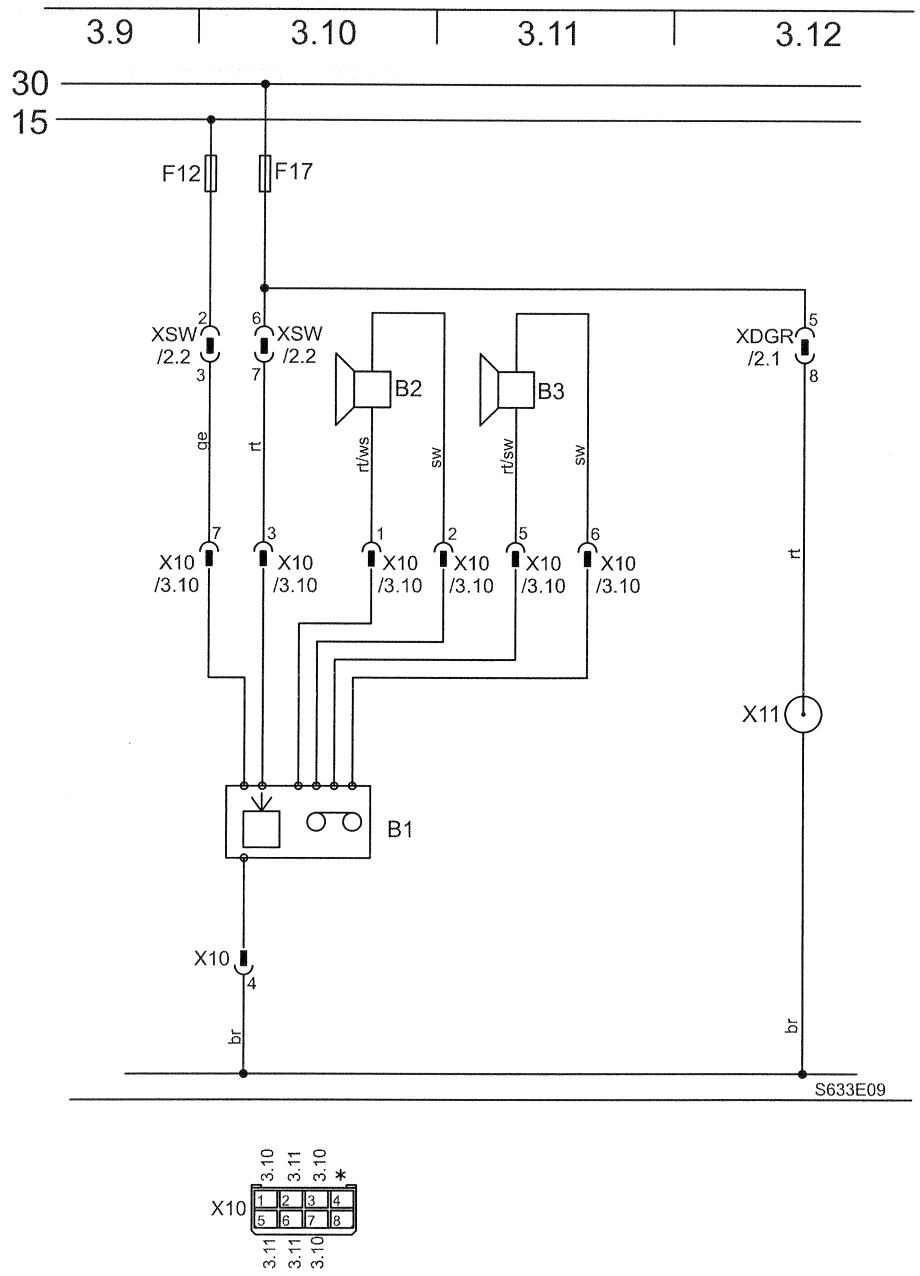
SCHAEFF	Typ/Model/Type **SKS 633**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.35.05**

Oscillating axle lock



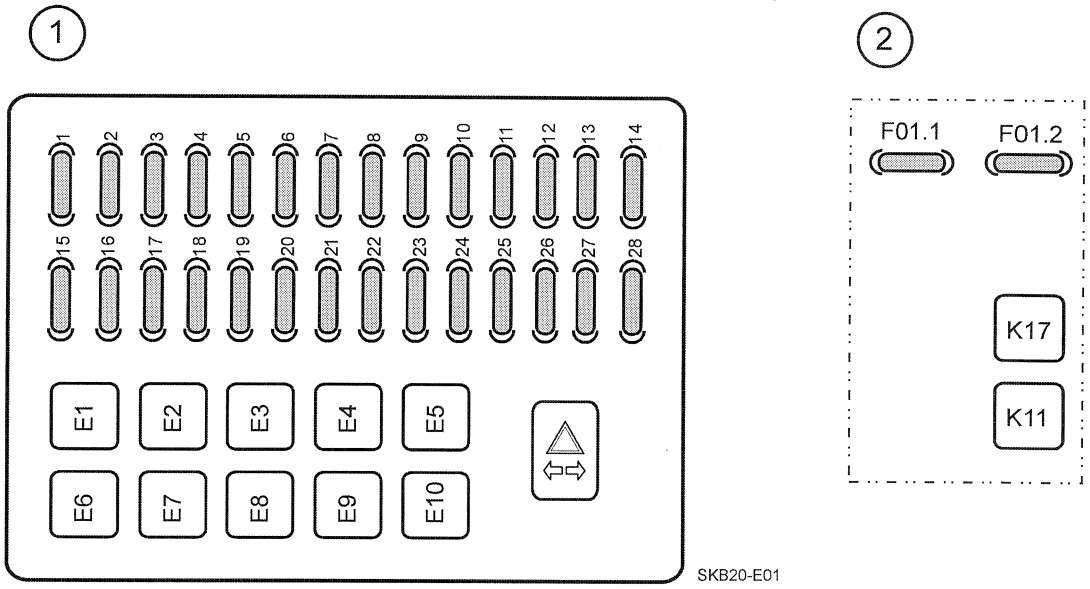
Path	Desig-nation	Device	Path	Desig-nation	Device
		Oscillating axle lock			
3.6	K1	Oscillating axle lock relay			
3.6	B4	Left proximity switch			
3.7	B6	Right proximity switch			
3.7	Y16	Oscillating axle lock valve			

Radio, socket



Path	Desig-nation	Device	Path	Desig-nation	Device
		Radio, socket			
3.10	F12	Fuse	3.10	B1	Radio
3.10	F17	Fuse	3.12	X11	Socket
3.10	B2	Loudspeaker	3.10	X10	Radio socket (AMP)
3.11	B3	Loudspeaker			

Fuse and relay box - Assignment diagram



1 = Fuse and relay box seat console, bottom right
2 = Starter unit engine compartment dividing wall, left

Location	Relay	Function
⇕▷	K 0	Flasher transmitter
E 1	K 1	Start-up safeguard
E 2	K 2	Hand brake/ Travel
E 3	K 3	Travel, reverse
E 4	K 4	Travel, forward
E 5	K 5	Stop light
E 6	K 6	Additional control circuit
E 7	K 7	Additional control circuit
E 8	K 8	Working floodlight, front
E 9	K 9	Working floodlight, rear
E 10	K 10	Working hydraulics
	K 11	Backhoe hydraulics lock
	K 17	Start-up
	K 18	Pre-heat relay (machine rear side panel, right, near generator)

Fuse and diode assignment

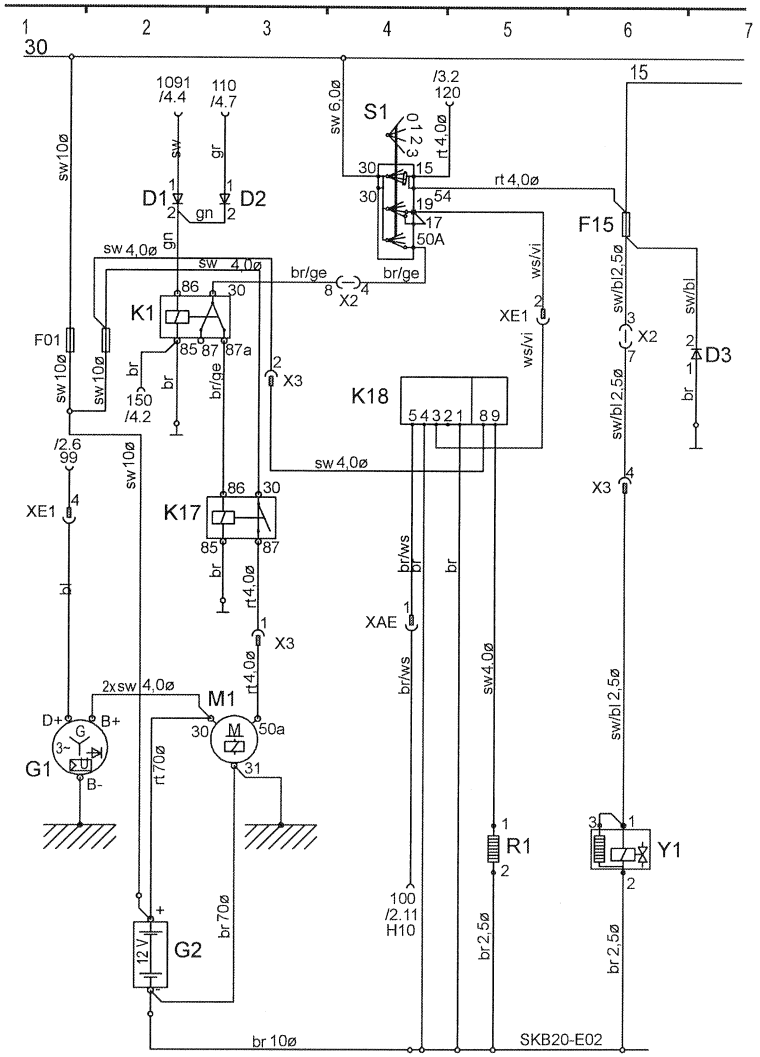
Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Immobilizer	F 15	15	Engine shut-off
F 2	10	Travel — Fast/Slow	F 16	10	Heater fan
F 3	10	Working hydraulics cut-off Float position, additional control circuit	F 17	10	Wiper, front
F 4	10	Instruments	F 18	10	Wiper, rear
F 5	10	Horn	F 19		Option
F 6	10	Stop light	F 20 D7	Diode 3A	Blocking diode
F 7		Option	F 21 D8	Diode 3A	Blocking diode
F 8	10	Working floodlight, front	F 22 D9	Diode 3A	Blocking diode
F 9	10	Working floodlight, rear	F 23	10	Side marker lamp, front
F 10	10	Hazard warning switch, immobilizer	F 24	10	Side marker lamp, right
F 11	10	Rotating beacon Interior light	F 25 D6	Diode 3A	Blocking diode D+
F 12	10	Socket, radio	F 26 D1	Diode 3A	Start-up safeguard
F 13	10	Low beam	F 27 D2	Diode 3A	Start-up safeguard
F 14	10	High beam	F 28 D3	Diode 3A	Engine shut-off recovery diode

F 01.1	50	Pre-heat/ starter switch	F 02.2	50	Starter

Cable and plug colors

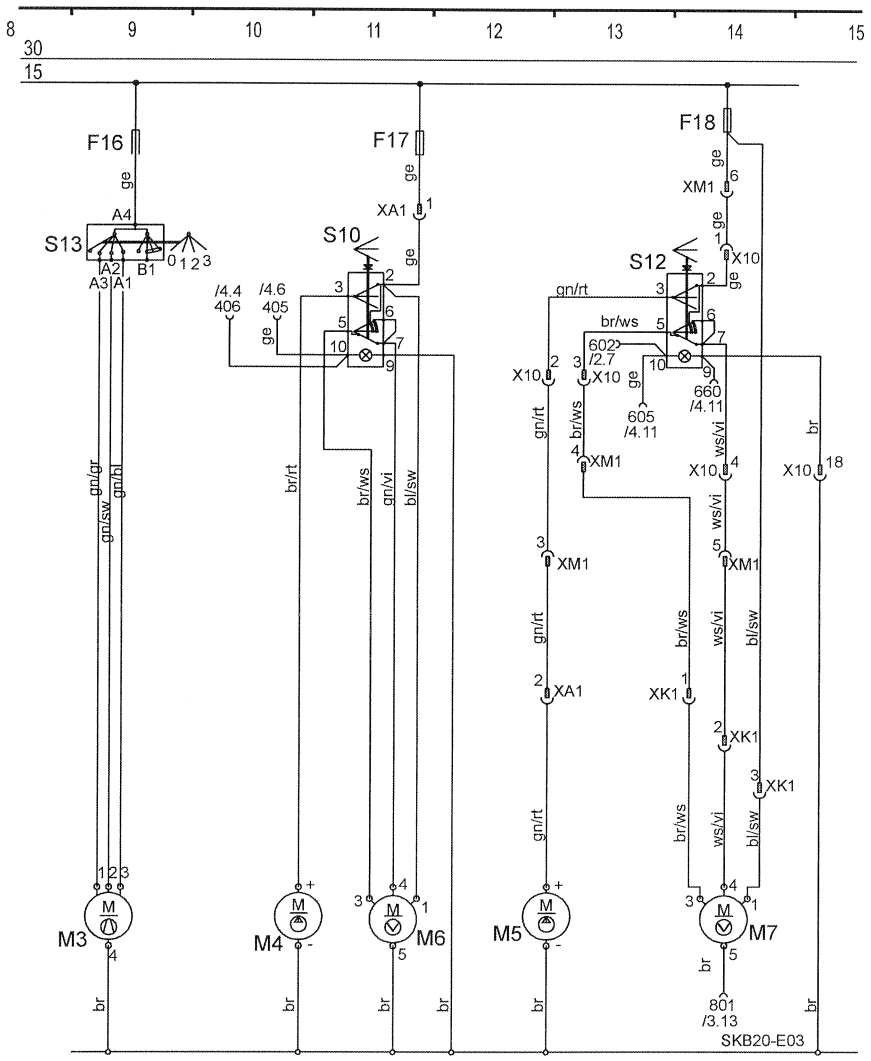
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bl	blue	ge	yellow	hgr	light gray	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	gray	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

Start-up, pre-heating



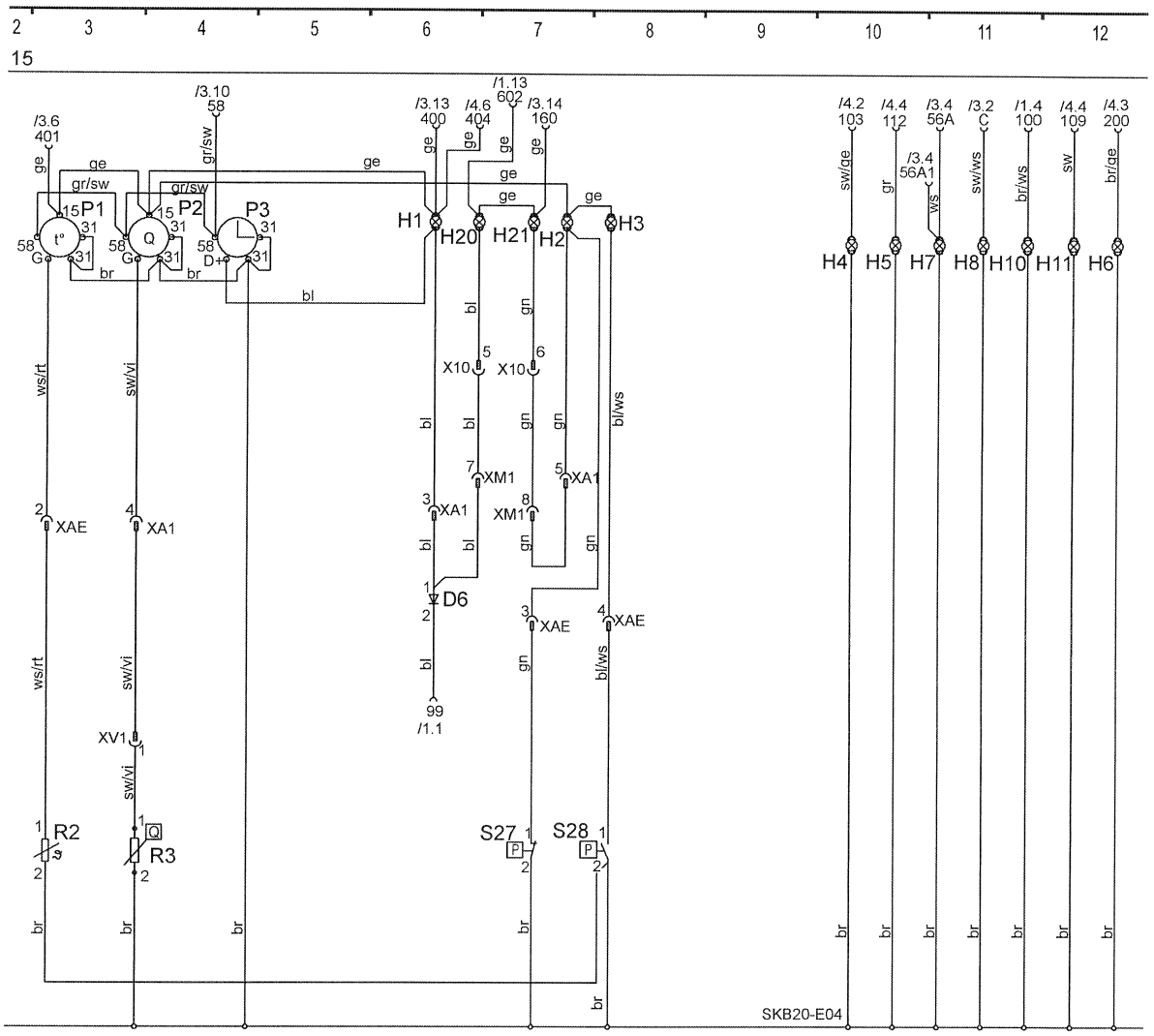
Path	Desig-nation	Device	Path	Desig-nation	Device
1		***Start-up, pre-heat***			
1.1	F01	Fuse 50A/30A	1.2	G2	Battery
1.2	D1	Diode	1.4	S1	Ignition lock
1.3	D2	Diode	1.5	K18	Pre-heat relay
1.2	K1	Start-up safeguard relay	1.5	R1	Glow plugs
1.3	K17	Start-up relay	1.6	F15	Shut-off fuse
1.1	G1	Generator	1.7	D3	Diode
1.3	M1	Starter	1.6	Y1	Shut-off

Heater	Wash/ wipe system



Path	Desig-nation	Device	Path	Desig-nation	Device
		Heater			***Wash/wipe system, rear***
1.9	F16	Fuse	1.14	F18	Fuse
1.9	S13	Switch	1.14	S12	Switch
1.9	M3	Heater fan	1.13	M5	Washer pump
		Wash/wipe system, front	1.14	M7	Wiper motor
1.11	F17	Fuse			
1.11	S10	Switch			
1.11	M4	Washer pump			
1.11	M6	Wiper motor			

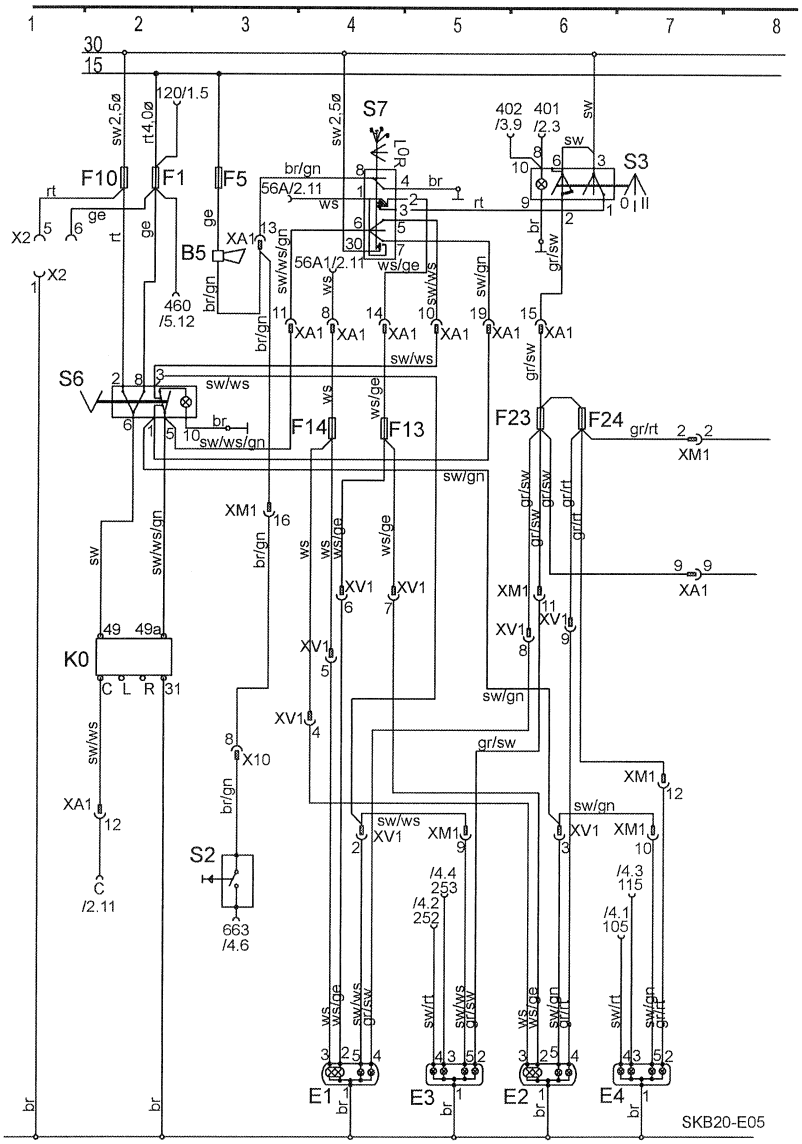
Display instruments	Indicator lamps



Path	Designation	Device
		Display instruments
2.3	P1	Temperature indicator
2.3	R2	Temperature sensor
2.4	P2	Fuel gauge
2.4	R3	Tank sensor
2.4	P3	Operating hour meter
		Indicator lamps
2.6	H1	Charge indicator (loader)
2.6	D6	Diode
2.7	H2	Oil pressure indicator lamp
2.7	S27	Oil pressure switch

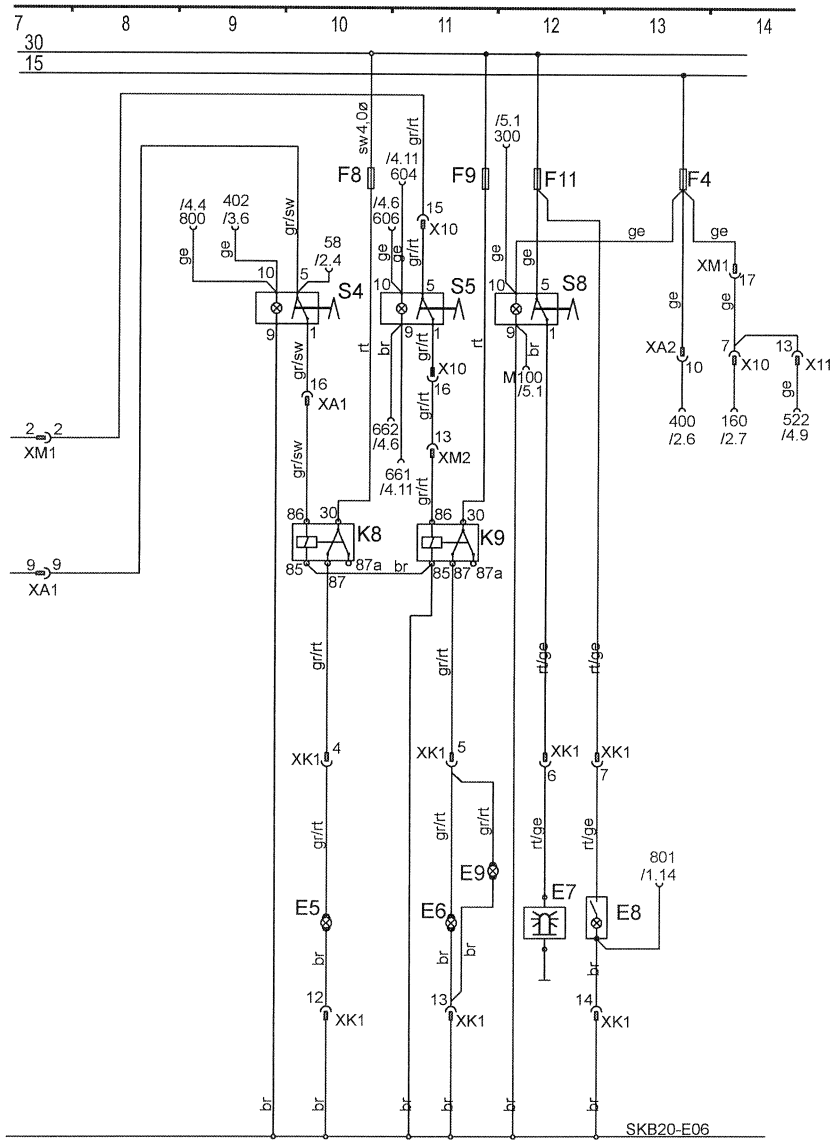
Path	Designation	Device
2.7	H20	Charge indicator (backhoe)
2.7	H21	Oil pressure indicator lamp
2.8	H3	Air filter indicator lamp
2.8	S28	Air filter service switch
2.10	H4	Hand brake indicator lamp
2.10	H5	Travel (forward) indicator lamp
2.10	H7	High beam indicator lamp
2.11	H8	Direction indicator lamp
2.11	H10	Pre-heat indicator lamp
2.12	H11	Travel (reverse) indicator lamp
2.12	H6	Spring accumulator for travel readiness

Signaling and lighting system



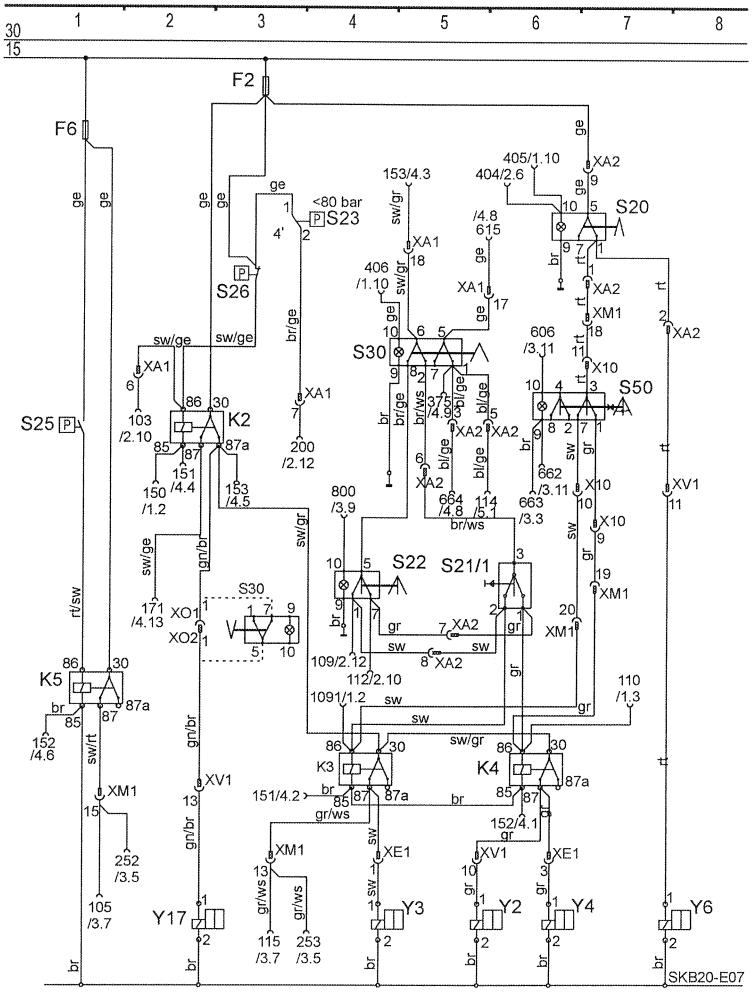
Path	Designation	Device	Path	Designation	Device
		Signaling and lighting system	3.4	F13	Low beam fuse
3.2	F10	Hazard flasher fuse	3.4	F14	High beam fuse
3.2	F1	Direction indicator fuse	3.4	E1	Headlamp, left
3.2	S6	Hazard warning switch	3.5	E3	Tail light, left
3.2	K0	Flasher relay	3.6	S3	Light switch
3.3	F5	Horn fuse	3.6	F23	Side marker lamp fuse, left
3.3	B5	Horn	3.6	F24	Side marker lamp fuse, right
3.3	S2	Coordinate lever horn	3.6	E2	Headlamp, right
3.4	S7	Steering column mounted switch	3.7	E4	Tail light, right

Working floodlights, rotating beacon



Path	Desig-nation	Device	Path	Desig-nation	Device
		Working floodlights, rotating beacon	3.11	K9	Relay for working floodlight, rear
3.10	S4	Switch for working floodlight, front	3.11	E6	Working floodlight, rear
3.10	F8	Fuse for working floodlight, front	3.12	F11	Fuse for rotating beacon
3.10	K8	Relay for working floodlight, front	3.12	S8	Switch for rotating beacon
3.10	E5	Working floodlight, front	3.12	E7	Rotating beacon
3.11	S5	Switch for working floodlight, rear	3.13	E8	Interior light
3.12	F9	Fuse for working floodlight, rear	3.14	F4	Fuse for illumination of instruments

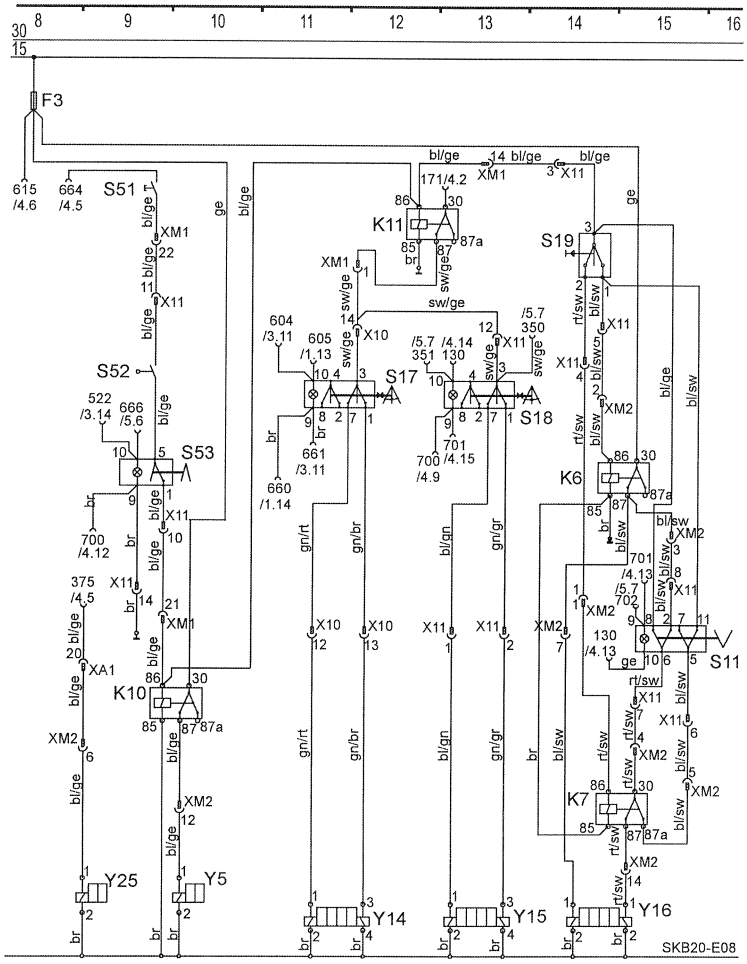
Travel



Path	Designation	Device
		Travel
4.2	F6	Brake light fuse
4.2	S25	Brake light switch
4.2	K5	Brake light relay
4.2	Y17	Oscillating axle lock valve
4.3	K2	Relay travel hand brake
4.4	F2	Travel fuse
4.4	S23	Accumulator pressure
4.4	S26	Hand brake switch
4.4	S22	Switch for travel forward/reverse (loader)

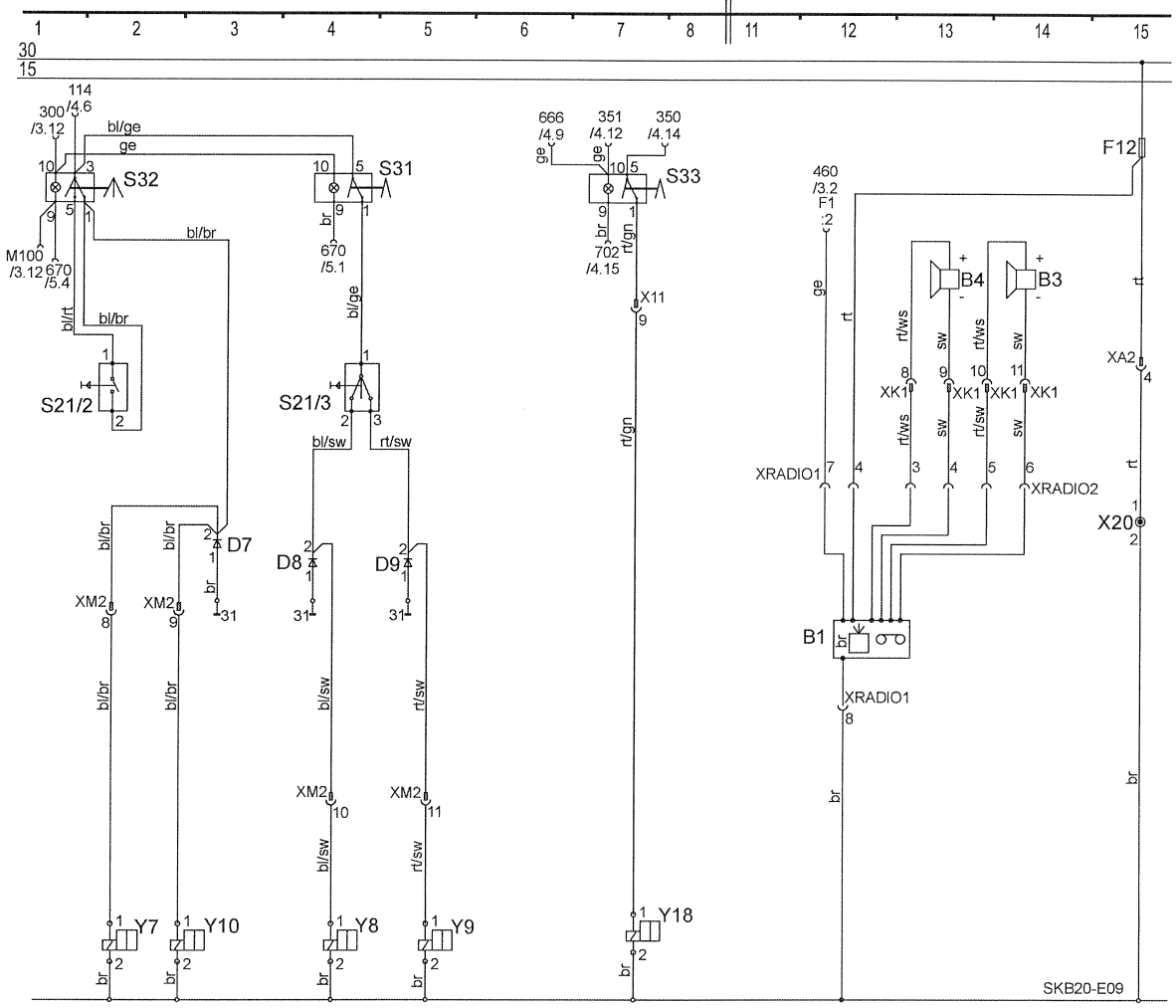
Path	Designation	Device
4.4	K3	Relay for travel, reverse
4.4	Y3	Valve for travel, reverse
4.5	Y2	Valve for travel, forward
4.5	S30	Working hydraulics cut-off
4.6	S21/1	Coordinate lever for travel, forward/reverse
4.6	K4	Relay for travel, forward
4.6	Y4	Valve for travel, forward
4.7	S20	Travel, fast/slow
4.7	Y6	Valve for travel fast/slow

Working hydraulics; outriggers; backhoe additional control circuit



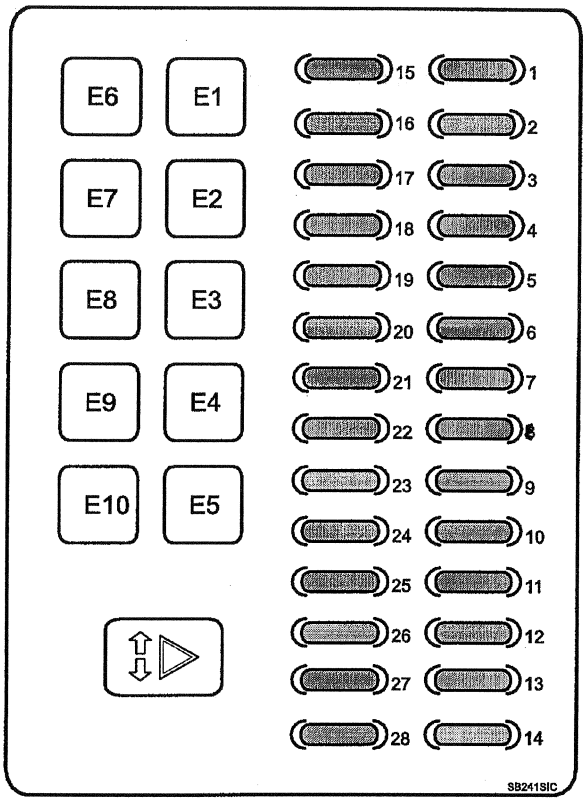
Path	Desig-nation	Device
		Working hydraulics; outriggers; backhoe additional control circuit
4.8	F3	Working hydraulics fuse
4.9	S51	Seat cover pressure switch
4.9	S52	Pressure switch for backhoe console, right
4.9	S53	Working hydraulics switch (backhoe)
4.9	K10	Working hydraulics relay
4.10	S50	Travel switch forward /reverse (backhoe)
4.10	Y5	Valve for backhoe working hydraulics
4.9	Y25	Valve for loader working hydraulics
4.11	Y14	Valve for outrigger, left
4.12	S17	Switch for outrigger, left
4.13	S18	Switch for outrigger, right
4.13	Y15	Switch for outrigger, right
4.13	K11	Relay for backhoe hydraulics lock
4.14	S19	Coordinate lever — push-button for additional control circuit
4.14	K6	Relay — additional control circuit 1
4.14	K7	Relay — additional control circuit 2
4.14	Y16	Additional control circuit valve
4.15	S11	Switch for additional control circuit continuous operation

Float position/ Additional control circuit	Clamping the backhoe	Radio, socket



Path	Desig-nation	Device	Path	Desig-nation	Device
		Float position /Additional control circuit			***Clamping the backhoe***
5.2	S32	Float position switch	5.7	S33	Switch
5.2	S21/2	Coordinate lever — push-button for float position	5.7	Y18	Valve
5.2	D7	Diode			
5.2	Y7	Float position valve			***Radio***
5.2	Y10	Float position valve	5.12	B1	Radio
5.3	S31	Switch for additional control circuit	5.13	B4	Loudspeaker, left
5.3	S21/3	Coordinate lever — push-button for additional control circuit	5.14	B3	Loudspeaker, right
5.4	D8	Diode			
5.5	D9	Diode			***Socket***
5.3	Y8	Valve for additional control circuit 1	5.15	F12	Fuse
5.4	Y9	Valve for additional control circuit, 2	5.15	X20	Socket

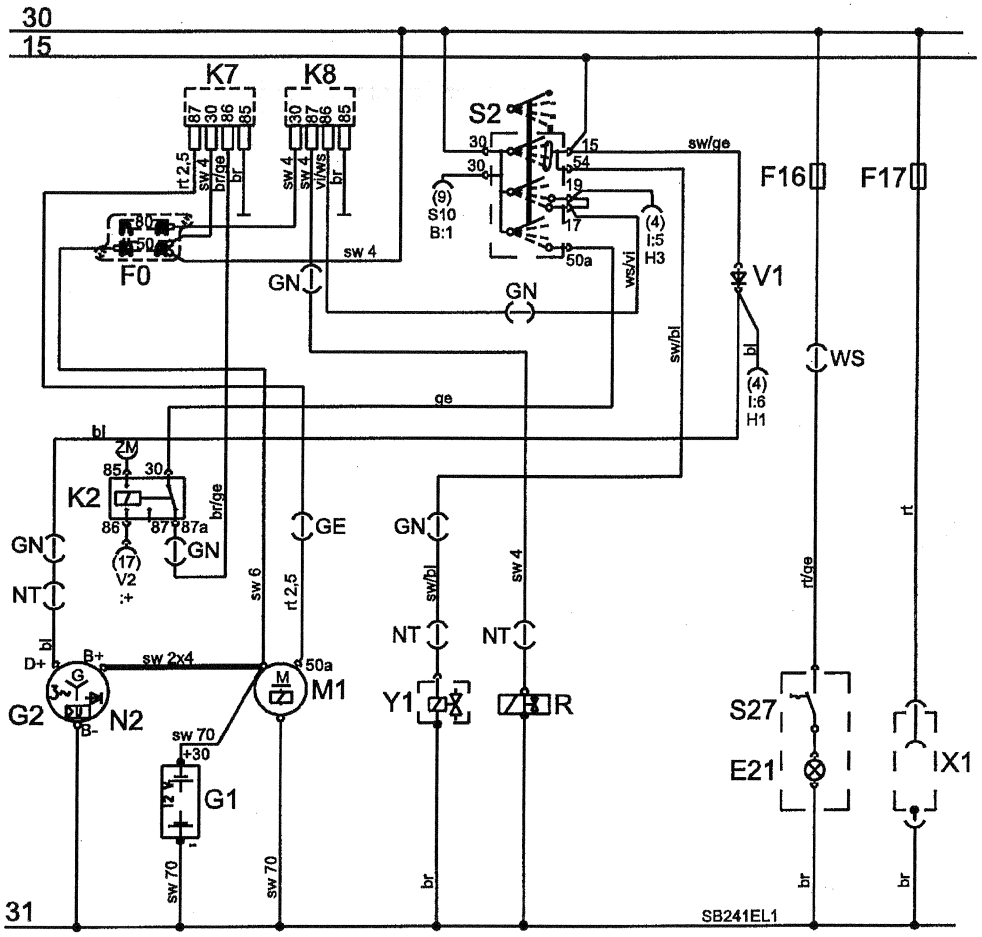
Fuse and relay box - Assignment diagram



Location		Relay Function
E 1	-	unassigned
E 2	K 2	Flasher transmitter
E 3	K 3	Axle lock
E 4	K 4	Parking brake
E 5	K 5	Annulation Slewing limitation
E 6	K 6	Slewing limitation
E 7	K 7	Parking brake
E 8	K 8	Relay for change-over excavator-loader
E 9	-	unassigned
E 10		unassigned
	K1	Flasher transmitter

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch	F 15	10	Hazard warning switch Check module
F 2	10	Working hydraulics cut-off	F 16	10	Rotating beacon Cab light
F 3	15	Wiper switch	F 17	15	Socket, radio
F 4	10	Parking brake relay Driving - fast/ slow	F 18	15	Lower beam
F 5	10	Floating position	F 19	15	Upper beam Upper beam indicator light
F 6	10	Horn, headlight flasher stop light	F 20	10	Left side marker light Front working floodlights
F 7	20	Heater fan	F 21	10	Right side marker light Rear working floodlights
F 8	10	Oscillating axle lock	F 22		--
F 9	10	Level transmitter power supply Load warning device cut-off	F 23		--
F 10	10	Excavator brake, Parking brake	F 24		--
F 11	20	Proximity switch Relief relay for excavator-loader	F 25		--
F 12	10	Radio	F 26		--
F 13	10	Check module Power supply check module	F 27		--
F 14	10	--	F 28	Diode	Electrical motor shut-off

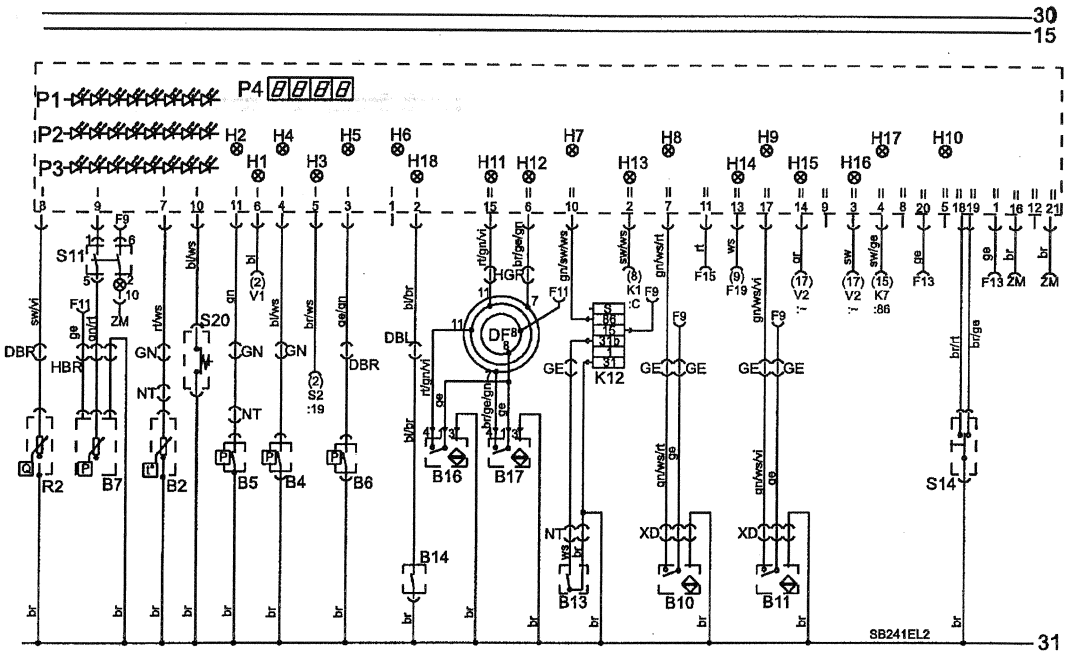
1. Power supply	2. Pre-heater starting system	3. Cab light, socket (radio)



Section Qty.	Desig-nation	Device
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	N2	Generator regulator
2	NT	Plug connection
1	GN	Plug connection
2	FO	Blade-type fuse
1	GN	Plug connection
1	NT	Plug connection
2		***Pre-heater starting system***
1	S2	Glow plug/starter switch
1	V1	Blocking diode
1	K2	Relay - Starting safeguard
1	K7	Starting relay
1	M1	Starter motor

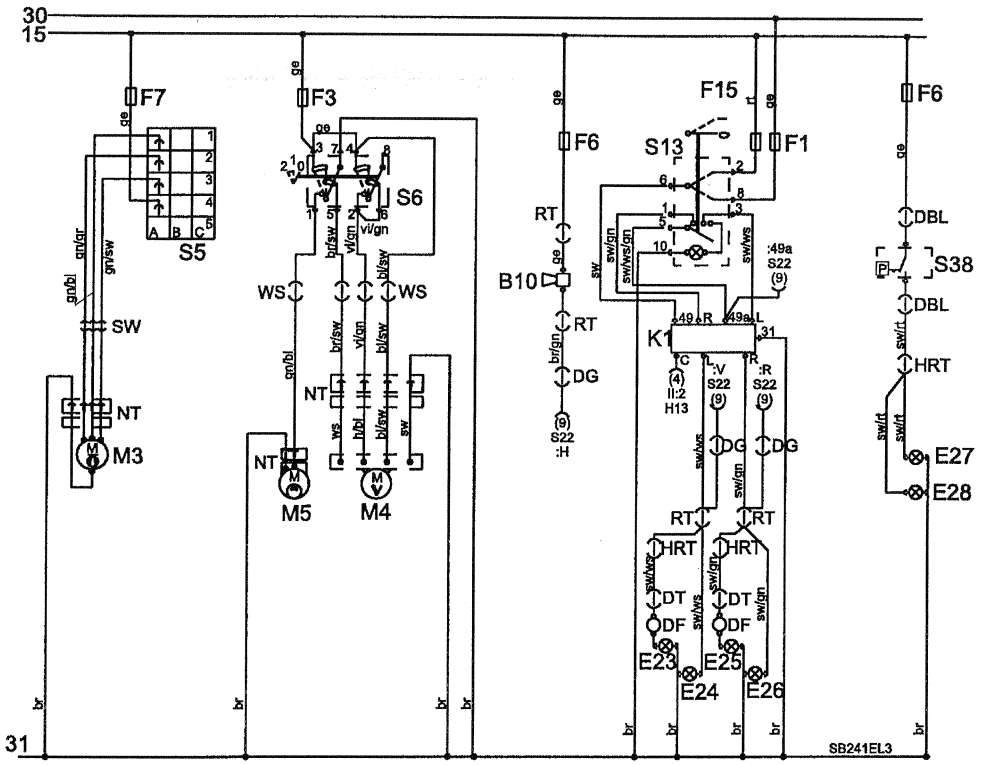
Section Qty.	Desig-nation	Device
1	GN	Plug connection
1	NT	Plug connection
1	Y1	Electr. engine cut-off
1	GN	Plug connection
1	K8	Glow relay
1	R	Flame glow system
3		***Cab light***
1	F16	Fuse
1	WS	Plug connection
1	S27	Cab light switch
1	E21	Cab light
1	F17	Fuse
1	X1	Socket

4. Display units



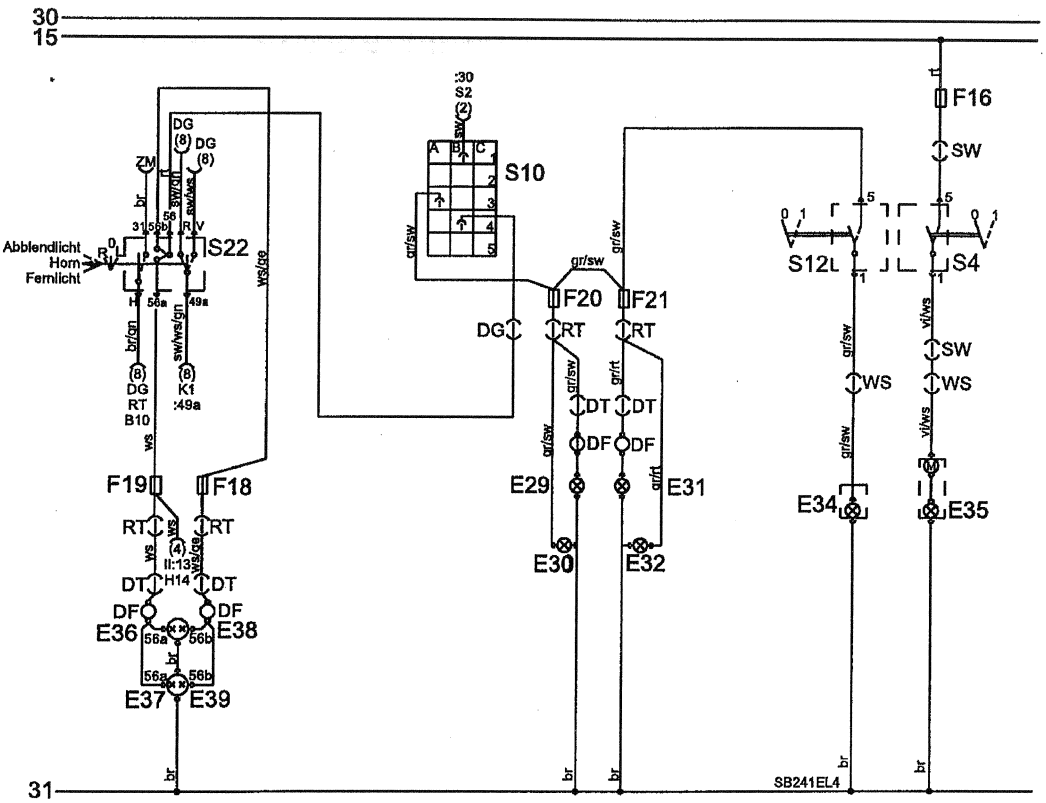
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
4		***Display units***	1	H18	Accumulator pressure
1	P1	Fuel gauge	1	DBL	Plug connection
1	DBR	Plug connection	1	B14	Accumulator pressure sensor
1	R2	Fuel gauge sensor	1	H7	Engine oil level
1	P2	Engine coolant	1	K12	Control electronics
1	P3	Overload warning device	1	GE	Plug connection
1	HBR	Plug connection	1	NT	Plug connection
1	GN	Plug connection	1	B13	Engine oil level sensor
1	S11	Switch on overload warning	1	H13	Travel direction indicator
1	B7	Hydr. oil pressure sensor	1	H8	Engine coolant level
1	GN	Plug connection	2	GE	Plug connection
1	NT	Plug connection	1	B10	Coolant level sensor
1	B2	Coolant temperature sensor	1	H14	High beam indicator
1	S20	Check button	1	H9	Hydraulic oil level
1	P4	Working hour meter	2	GE	Plug connection
1	H2	Engine oil pressure lamp	1	B11	Hydraulic oil level sensor
1	GN	Plug connection	1	H15	Drive forwards
1	NT	Plug connection	1	H16	Drive reverse
1	B5	Engine oil pressure switch	1	H17	Parking brake
1	H1	Battery charge indicator lamp	1	H19	Free
1	H4	Air filter indicator	1	S14	Switch Display (P4)
1	GN	Plug connection	1	H11	Steering movement front axle
1	B4	Air filter clogging	1	HGR	Plug connection
1	H3	Pre-heating indicator	1	DF	Rotary transmission
1	H5	Hydr. oil filter clogging indicator	1	B16	Sensor steering movement VA
1	DBR	Plug connection	1	H12	Steering movement rear axke
1	B6	Hydr. oil filter clogging indicator	1	HGR	Plug connection
1	H10	Free	1	DF	Rotary transmission
1	H6	Free	1	B17	Sensor steering movement HA

6. Heater fan	7. Wash/wipe system	8. Signalling system



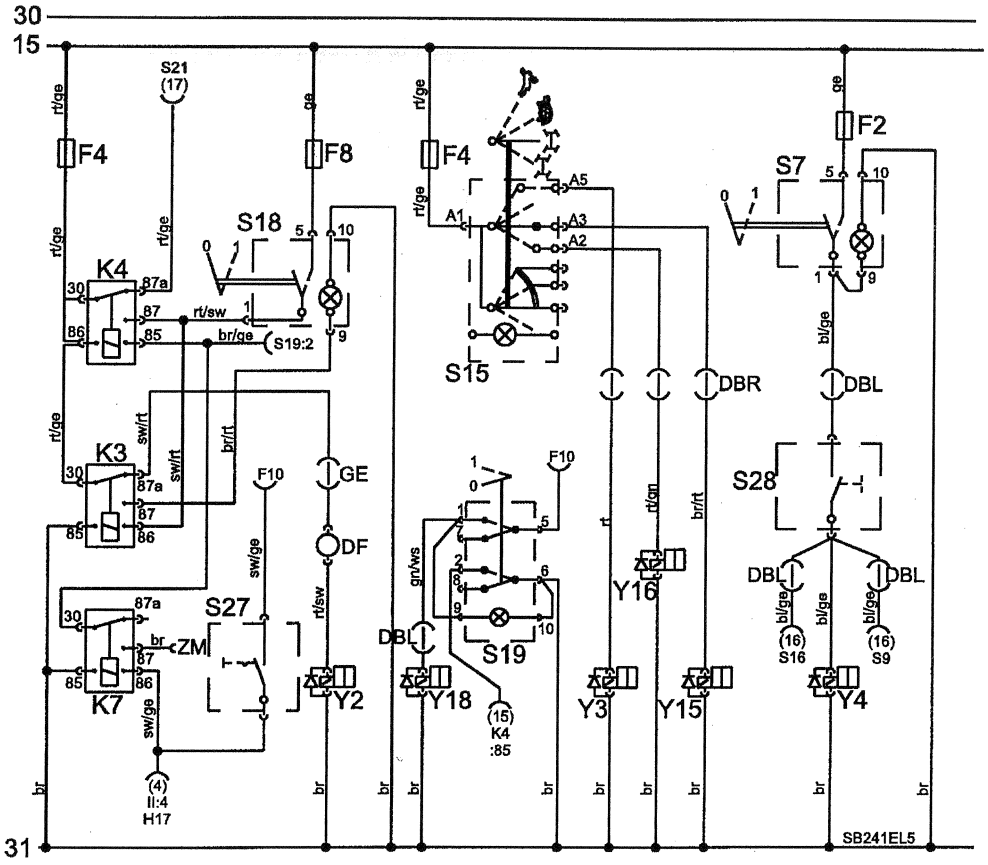
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
6		***Heater fan***	1	F15	Fuse
1	F7	Fuse	1	F1	Fuse
1	S5	Switch for heater fan	1	S13	Hazard warning switch
1	SW	Plug connection	1	K1	Flasher transmitter
1	NT	Plug connection	2	DG	Plug connection
1	M3	Heater fan	2	RT	Plug connection
			2	DT	Plug connection
7		***Wash/wipe system***	1	DF	Rotary transmission
1	F3	Fuse	2	HRT	Plug connection
1	S6	Wiper switch	2	NT	Plug connection
4	WS	Plug connection	1	E23	Turning indicator, front left
1	NT	Plug connection	1	E24	Turning indicator, rear left
1	M4	Wiper motor	1	E25	Turning indicator, front right
1	M5	Washer pump	1	E26	Turning indicator, rear right
			1	DBL	Plug connection
8		***Signalling system***	1	F6	Fuse
1	F6	Fuse	1	S38	Stop light switch
1	RT	Plug connection	1	DBL	Plug connection
1	B10	Horn	1	RT	Plug connection
1	RT	Plug connection	1	E27	Stoplight left
1	DG	Plug connection	1	E28	Stoplight right

9. Lighting system	10. Working floodlights, rotating beacon



Section Qty.	Desig-nation	Device
9		***Lighting system***
1	S25	Turning indicator switch
1	F19	Fuse
1	RT	Plug connection
1	DT	Plug connection
1	DF	Rotary transmission
1	E36	High beam left
1	E37	High beam right
1	F18	Fuse
1	RT	Plug connection
1	DT	Plug connection
1	DF	Rotary transmission
1	E38	Low beam left
1	E39	Low beam right
1	S10	Light switch
1	DG	Plug connection
1	F20	Fuse
1	RT	Plug connection
1	DT	Plug connection

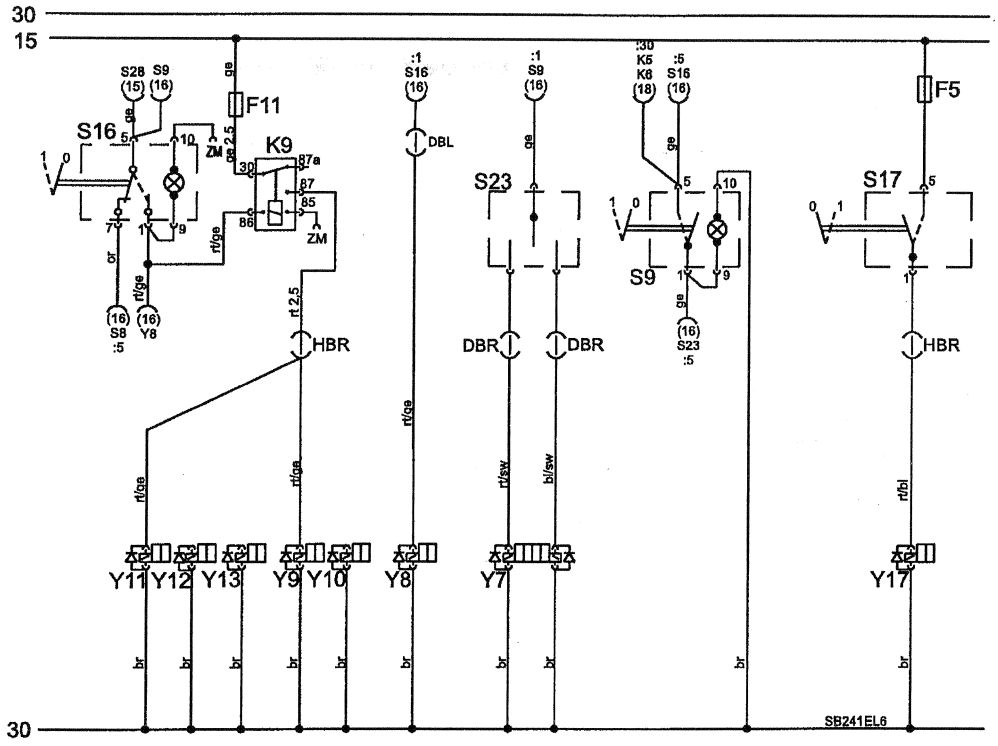
Section Qty.	Desig-nation	Device
1	DF	Rotary transmission
1	E29	Side marker light left front
1	E30	Side marker light left rear
1	F21	Fuse
1	RT	Plug connection
1	DT	Plug connection
1	DF	Rotary transmission
1	E31	Side marker light right front
1	E32	Side marker light right rear
10		***Working floodlights***
1	S12	Switch working floodlights
1	WS	Plug connection
1	E34	Working floodlights
1	F16	Fuse
1	S4	Switch rotating beacon
1	WS	Plug connection
1	E35	Rotating beacon



Section Qty.	Desig-nation	Device
15		***Safe driving***
1	F4	Fuse
1	K4	Relay - Parking brake
1	K3	Relay - Oscillating axle lock
1	K7	Relay - Parking brake
1	S27	Hand brake switch
1	F8	Fuse
1	S18	Switch oscillating axle lock
1	GE	Plug connection
1	DF	Rotary transmission
1	Y2	Valve oscillating axle lock
1	F4	Fuse
1	S15	Switch Fast/Slow
1	S19	Switch Excavator/ Loader

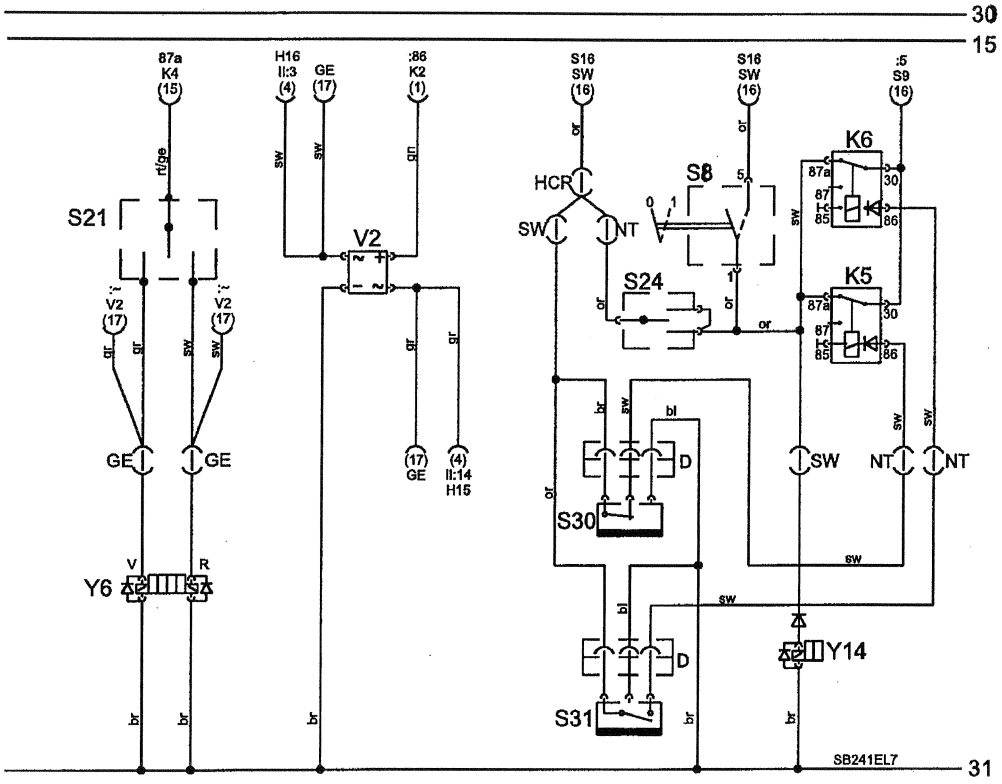
Section Qty.	Desig-nation	Device
1	DBL	Plug connection
1	Y18	Valve oscillating axle lock
3	DBR	Plug connection
1	Y3	Valve Fast/ Slow
1	Y16	Valve four-wheel - crab steering
1	Y15	Valve four-wheel - round
1	F2	Fuse
1	S7	Working hydraulics cut-off
3	DBL	Plug connection
1	S28	Armrest switch
1	Y4	Valve working hydraulics

16. Change-over Excavator - Loader; Additional control circuit; Floating position



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
16		***Attachments***	1	Y8	Reversing valve Excavator/ Loader
1	S16	Change-over excavator/loader	1	S23	Switch for multi-function lever, R
1	F11	Fuse	2	DBR	Plug connection
1	K9	Reversing relay	1	Y7	Valve operation grab/ Multi-
1	HBR	Plug connection	1	S9	Cut-off 3rd control circuit
1	Y11	Reversing valve Excavator/Loader	1	F5	Fuse
1	Y12	Reversing valve Excavator/ Loader	1	S17	Switch floating position
1	Y13	Reversing valve Grab/ Multi-	1	HBR	Plug connection
1	Y9	Reversing valve Excavator/ Loader	1	Y17	Valve floating position
1	Y10	Reversing valve Excavator/ Loader			

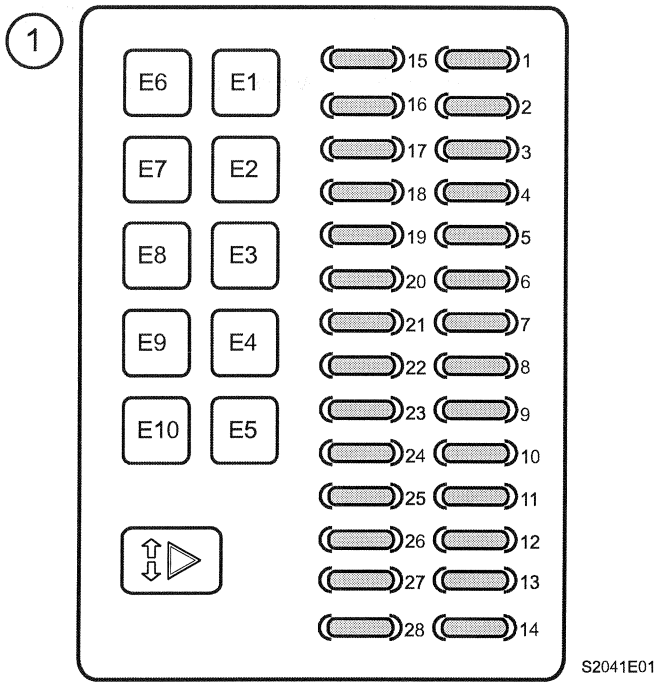
17. Drive	18. Slew safety

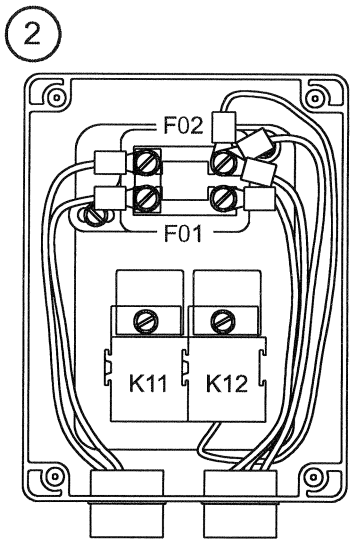


Section Qty.	Desig-nation	Device
17		***Drive***
1	S21	Switch forwards/ reverse
2	GE	Plug connection
1	Y6	Valve forwards/ reverse
1	V2	Bridge-connected rectifier

Section Qty.	Desig-nation	Device
18		***Slew safety***
1	HGR	Plug connection
1	SW	Plug connection
1	NT	Plug connection
1	S24	Switch for multi-function lever, L
2	D	Plug connection
1	S30	Proximity switch Swivel joint
1	S31	Proximity switch Boom
1	S8	Switch slewing limitation
1	SW	Plug connection
1	K6	Relay proximity switch
1	K5	Relay proximity switch
2	NT	Plug connection
1	Y14	Reversing valve pilot control slewing

Fuse and relay box - Assignment





1 = Fuse and relay box ..... Armrest, rear right

2 = starter box ..... Engine compartment dividing wall, left

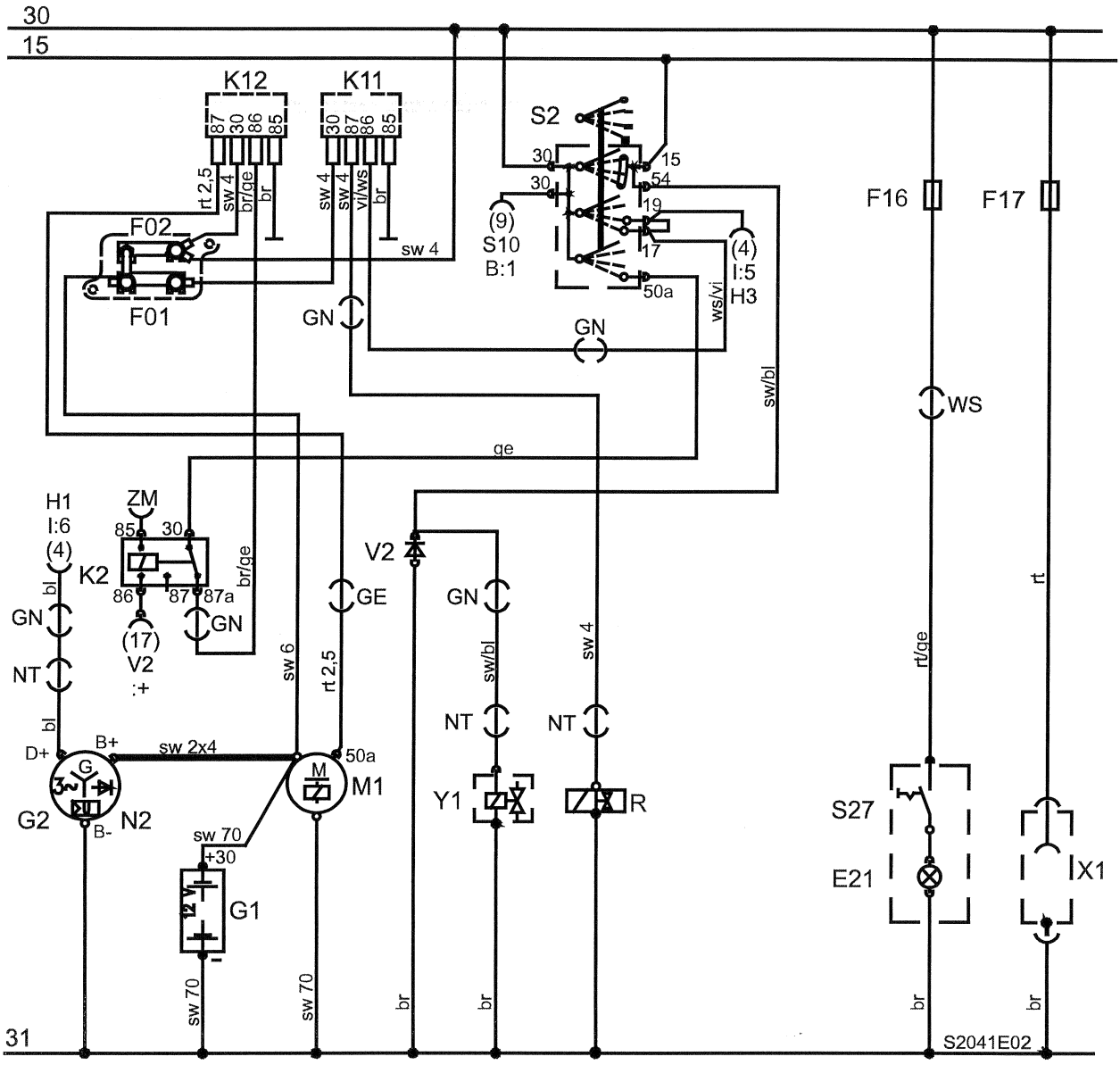
Location	Relay	Function
⇕▷	K 0	Flasher transmitter
E 1	K 1	Working floodlight
E 2	K 2	Start up safeguard
E 3	K 3	Oscillating axle lock
E 4	K 4	Parking Brake
E 5	K 5	Safety device for entry steps
E 6	K 6	Safety device for entry steps pilot control
E 7	K 7	Parking Brake
E 8	K 8	Pedal for driving
E 9	-	not assigned
E 10	-	not assigned
	K 11	Pre-heating time control
	K 12	Start-up

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch	F 15	10	Hazard warning switch Check module
F 2	10	Working hydraulics cut-off	F 16	10	Rotating beacon Cab light
F 3	15	Wiper switch	F 17	15	Socket, radio
F 4	10	Parking brake relay Driving - fast / slow	F 18	15	Lower beam
F 5	10	Floating position	F 19	15	Upper beam Upper beam indication light
F 6	10	Horn, headlight flasher stop light	F 20	10	Side marker light left Working headlight front/rear
F 7	20	Heater fan	F 21	10	Side marker light right
F 8	10	Oscillating axle lock	F 22	10	Working headlight rear
F 9	10	Level transmitter power supply Load warning device cut-off	F 23	10	Working headlight front
F 10	10	Excavator brake, parking brake	F 24		--
F 11	20	Proximity switch; Relief relay for excavator-loader	F 25		Diesel cut-off valve for Immobilizer
F 12	10	Radio	F 26		Electrical tank refuelling pump
F 13	10	Check module Power supply check module	F 27		--
F 14	10	--	F 28	Diode	Electrical engine cut-off, Immobilizer
F 01	30	Pre-heat / starter switch	F 02	50	Start-up

Colours of cables and plugs

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

1. Power supply	2. Pre-heater starting system	3. Cab light, Socket (Radio)

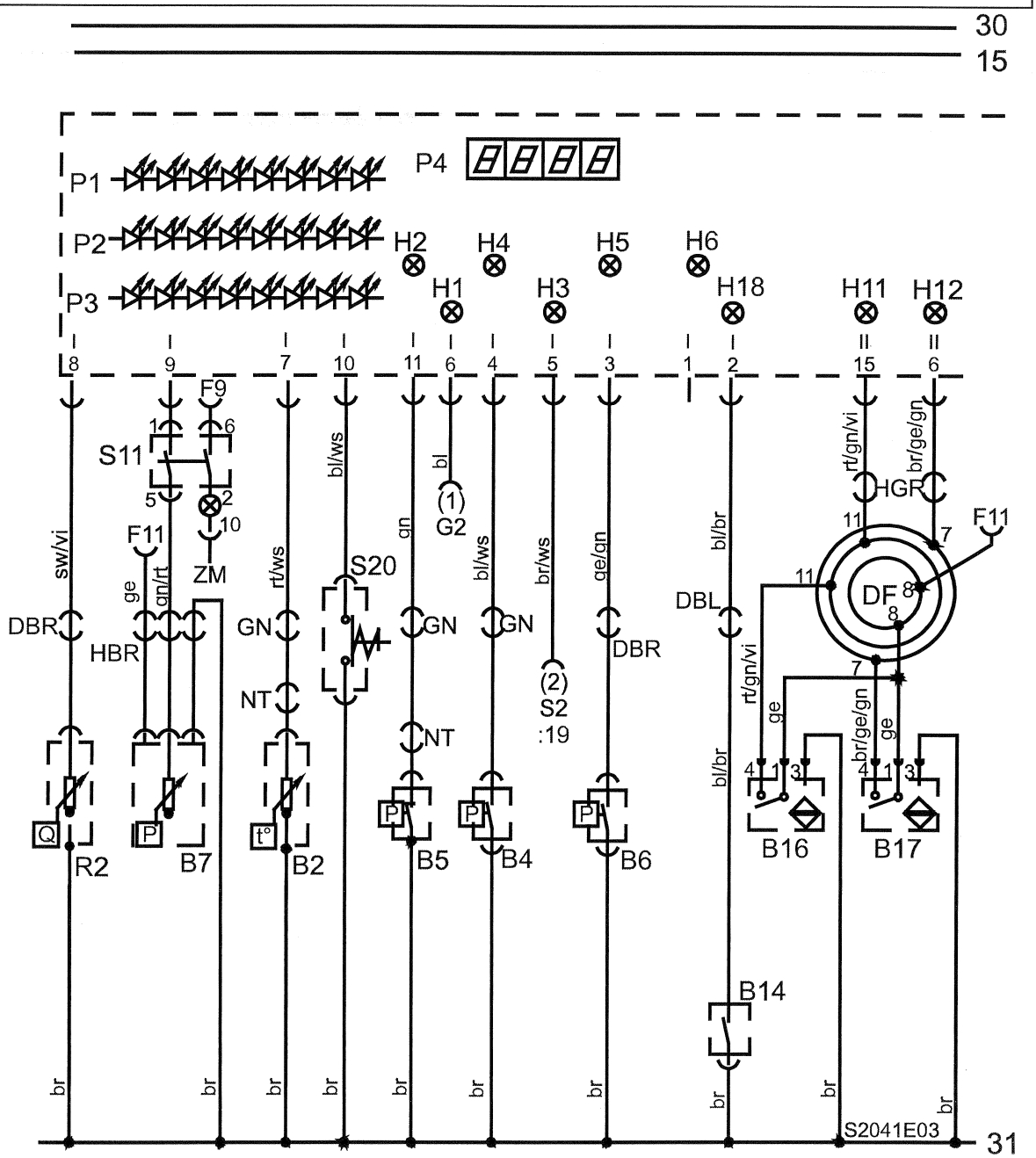


Section Qty.	Desig-nation	Device
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	N2	Generator regulator
2	F01/02	Flat type fuse
2		***Pre-heater starting system***
1	S2	Glow plug / starter switch
1	V2	Blocking diode
1	K2	Relay - starting safeguard
1	K12	Starting relay

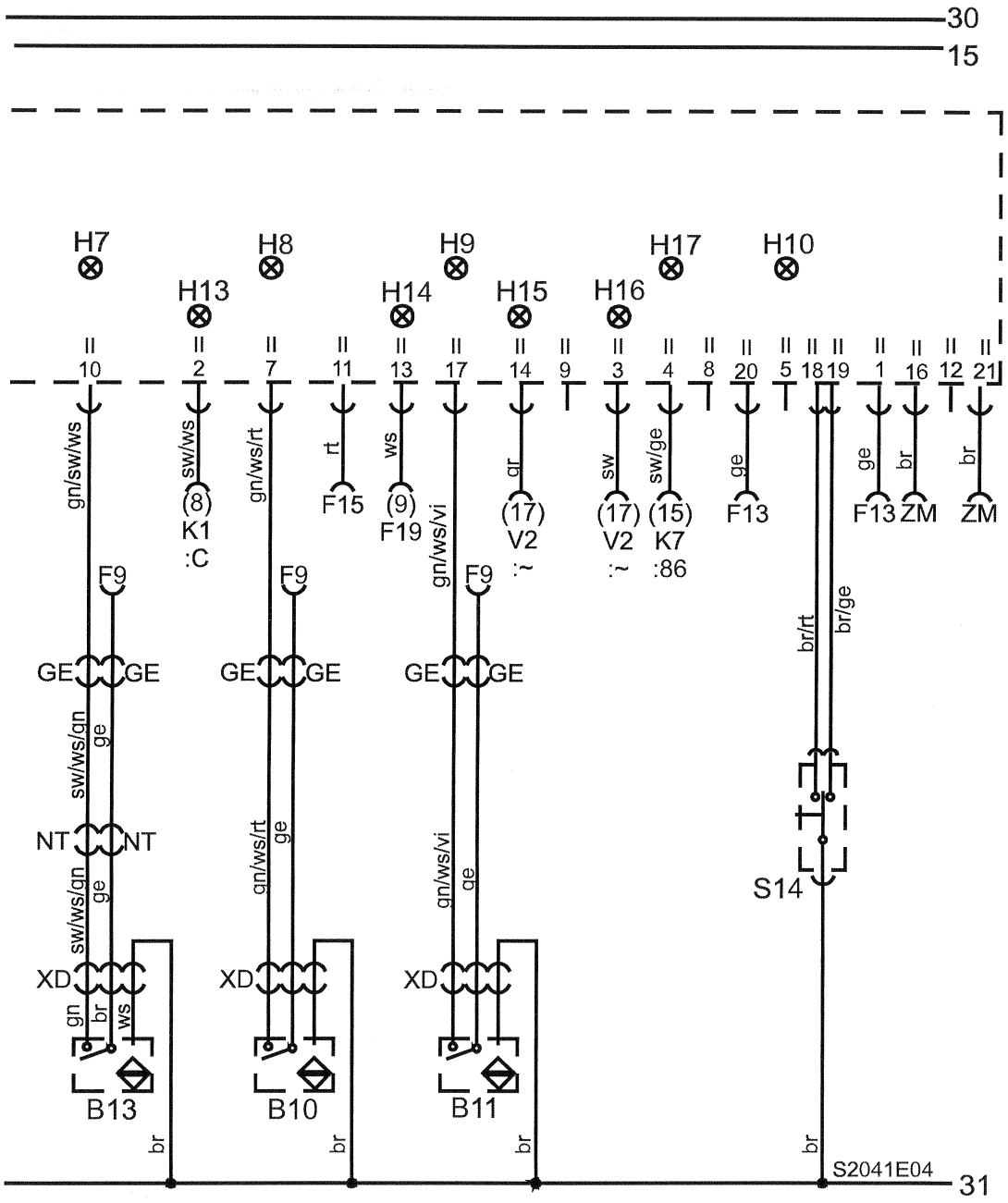
Section Qty.	Desig-nation	Device
1	M1	Starter motor
1	Y1	Electr. engine cut-off
1	K11	Glow relay
1	R	Flame glow system
3		***Cab light***
1	F16	Fuse
1	S27	Cab light switch
1	E21	Cab light
1	F17	Fuse
1	X1	Socket

SCHAEFF	Typ/Model/Type **SMB 2041 (from serial no. 204/0396)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.46.07**

4. Display units

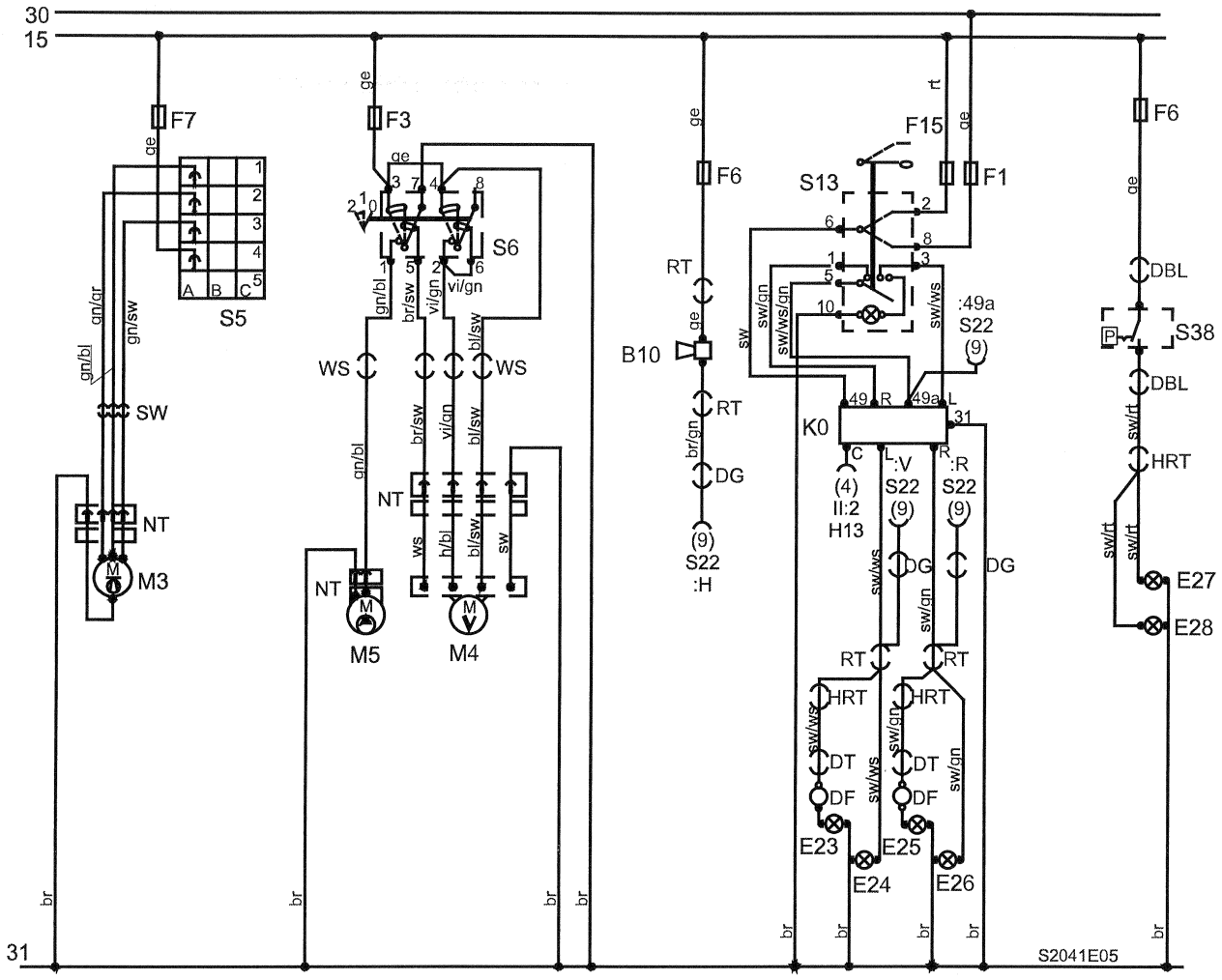


Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
4		***Display units***	1	B4	Air filter clogging
1	P1	Fuel gauge	1	H3	Pre-heating indicator
1	R2	Fuel gauge sensor	1	H5	Hydr.oil filter clogging indicator lamp
1	P2	Engine coolant	1	B6	Hydr.oil filter clogging
1	P3	overload warning device	1	H6	Free
1	S11	Switch overload warning	1	H18	Accumulator pressure indicator lamp
1	B7	Hydr. oil pressure sensor	1	B14	Accumulator pressure sensor
1	B2	Coolant temperature sensor	1	H11	Steering movement front axle
1	S20	Check button			
1	P4	Working hour meter	1	DF	Rotary transfer
1	H2	Engine oil pressure indicator lamp	1	B16	Steering movement sensor front axle
71	B5	Engine oil pressure switch	1	H12	Steering movement rear axle
1	H1	Battery charge indicator lamp	1	B17	Steering movement sensor rear axle
1	H4	Air filter indicator lamp			



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
4		***Display units***	1	H9	Hydraulic oil level indicator
1	H7	Engine oil level indicator	1	B11	Hydraulic oil level sensor
1	B13	Engine oil level sensor	1	H15	Travel, forward
1	H13	Travel direction indicator	1	H16	Travel, reverse
1	H8	Engine coolant level indicator	1	H17	Parking brake
1	B10	Engine coolant level sensor	1	H10	Free
1	H14	Upper beam indicator	1	S14	Switch Display (P4)

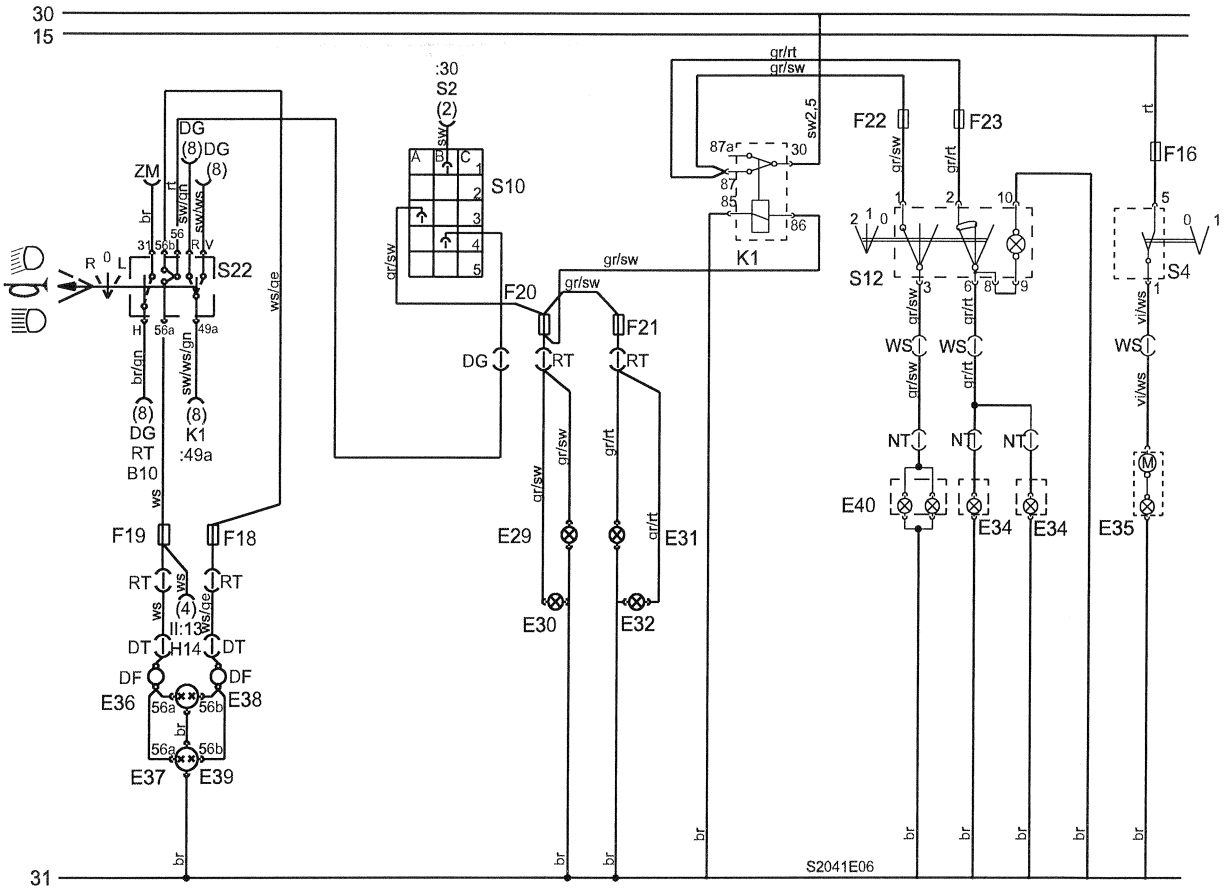
6. Heater fan	7. Wash / wipe system	8. Signalling system



Section Qty.	Desig-nation	Device
6		***Heater fan***
1	F7	Fuse
1	S5	Switch heater fan
1	M3	Heater fan
7		Wash / wipe system
1	F3	Fuse
1	S6	Wiper switch
1	M4	Wiper motor
1	M5	Wiper pump
8		***Signalling system***
1	F6	Fuse
1	B10	Horn

Section Qty.	Desig-nation	Device
1	F15	Fuse
1	F1	Fuse
1	S13	Hazard warning switch
1	K 0	Flasher transmitter
1	DF	Rotary transmission
1	E23	Flashlight turn signal, front left
1	E24	Flashlight turn signal, rear left
1	E25	Flashlight turn signal, front right
1	E26	Flashlight turn signal, rear right
1	F6	Fuse
1	S38	Stop light switch
1	E27	Stop light left
1	E28	Stop light right

9. Lighting system	10. Working headlight Rotating beacon

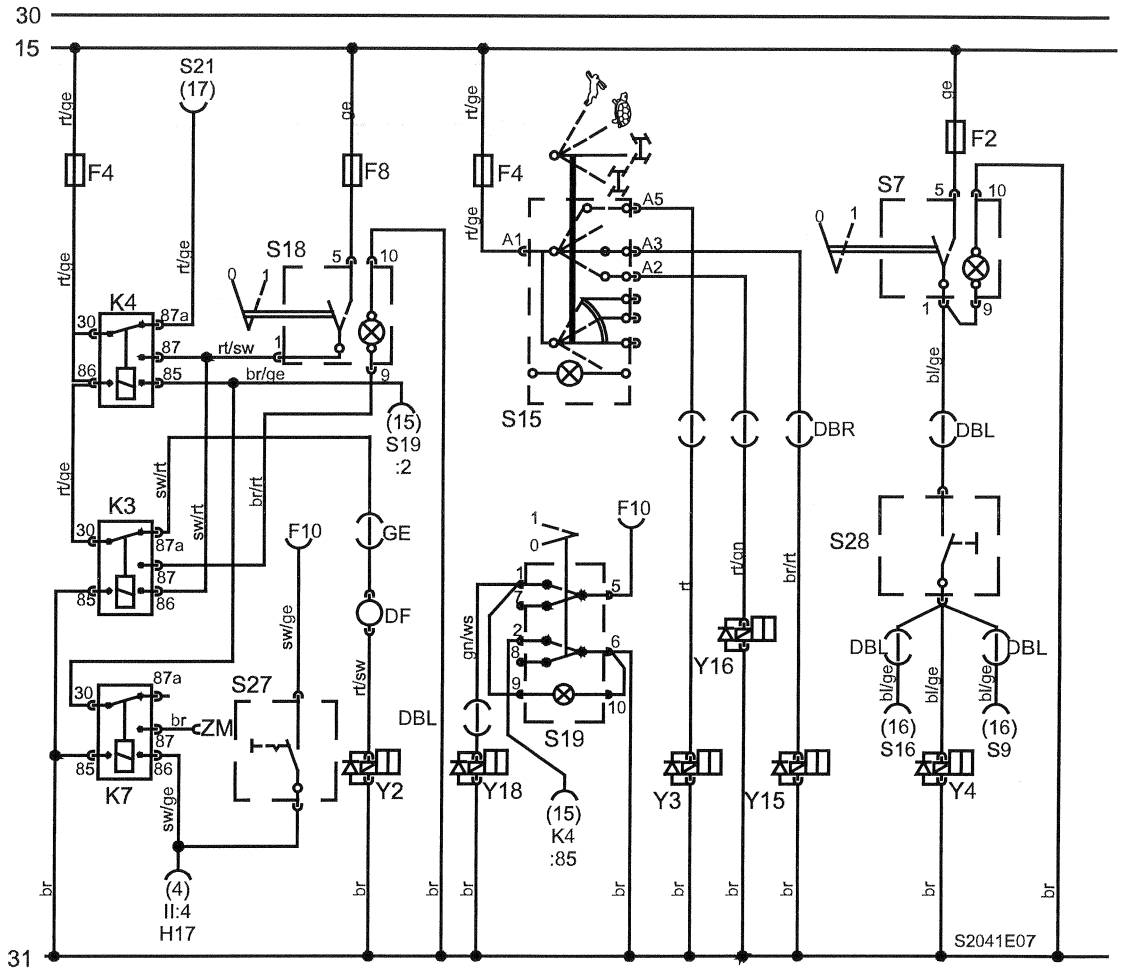


Section Qty.	Desig-nation	Device
9		***Lighting system***
1	S25	Turning indicator switch
1	F19	Fuse
1	DF	Rotary transmission
1	E36	Upper beam left
1	E37	Upper beam right
1	F18	Fuse
1	DF	Rotary transmission
1	E38	Lower beam left
1	E39	Lower beam right
1	S10	Light switch
1	F20	Fuse
1	DF	Rotary transmission
1	E29	Side marker light front left
1	E30	Side marker light rear left

Section Qty.	Desig-nation	Device
1	F21	Fuse
1	DF	Rotary transmission
1	E31	Side marker lamp right front
1	E32	Side marker lamp right rear
10		***Working headlight***
1	K1	Relay working headlight
1	F22	Fuse
1	F23	Fuse
1	S12	Switch working headlight
1	E34	Working headlight
1	E40	Working headlight
1	F16	Fuse
1	S4	Rotating beacon switch
1	E35	Rotating beacon

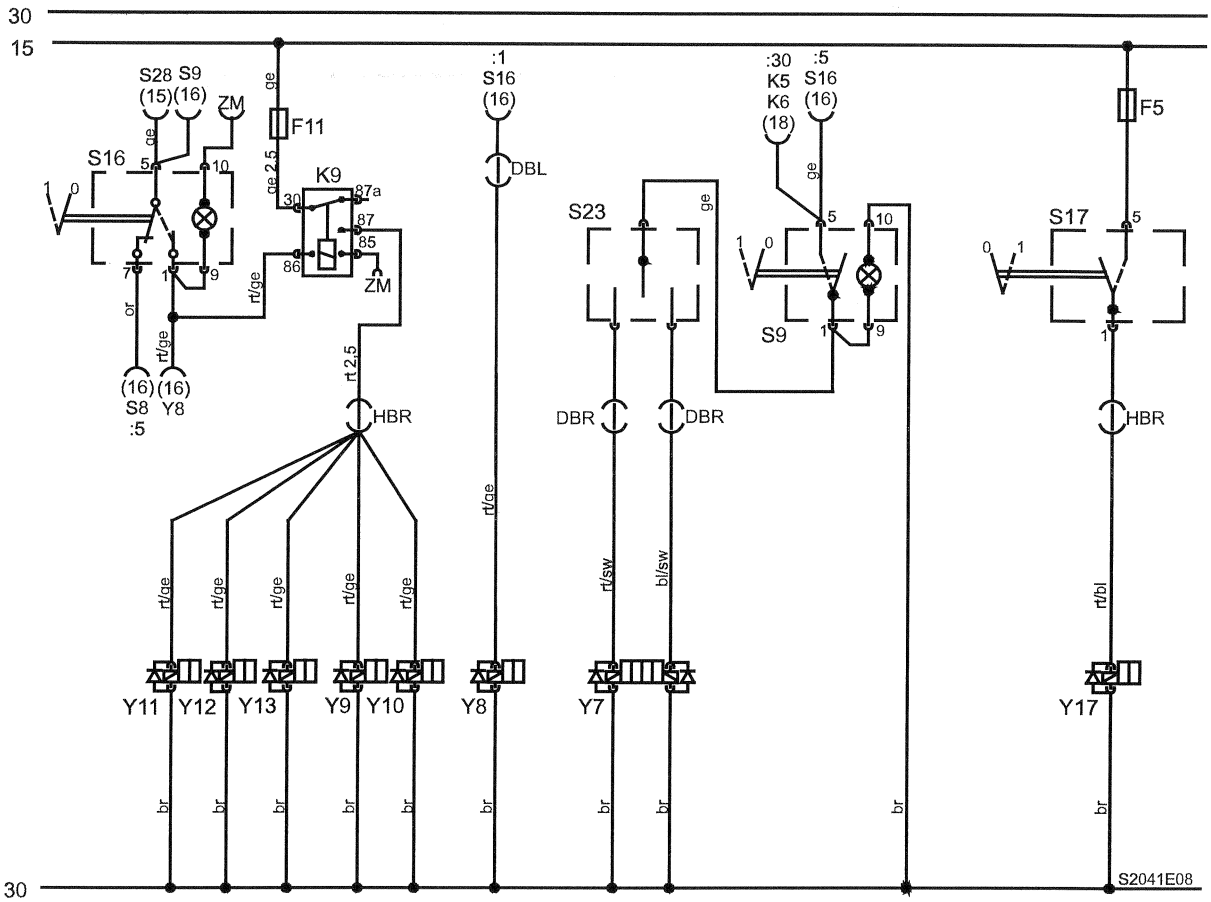
SCHAEFF	Typ/Model/Type **SMB 2041 (from serial no. 204/0396)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.46.09**

15. Safe driving



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
15		**Safe driving**	1	F4	Fuse
1	F4	Fuse	1	S15	Fast/ slow switch
1	K4	Parking brake relay	1	S19	Excavator brake switch
1	K3	Oscillating axle lock relay	1	Y18	Excavator brake valve
1	K7	Parking brake relay	1	Y3	Fast/ slow valve
1	S27	Hand brake switch	1	Y16	Four-wheel "crab" steer valve
1	F8	Fuse	1	Y15	Four-wheel "round" steer valve
1	S18	Oscillating axle lock switch	1	F2	Fuse
1	DF	Rotary transmission	1	S7	Working hydraulics cut-off
1	Y2	Valve Oscillating axle lock	1	S28	Armrest switch
			1	Y4	Working hydraulics valve

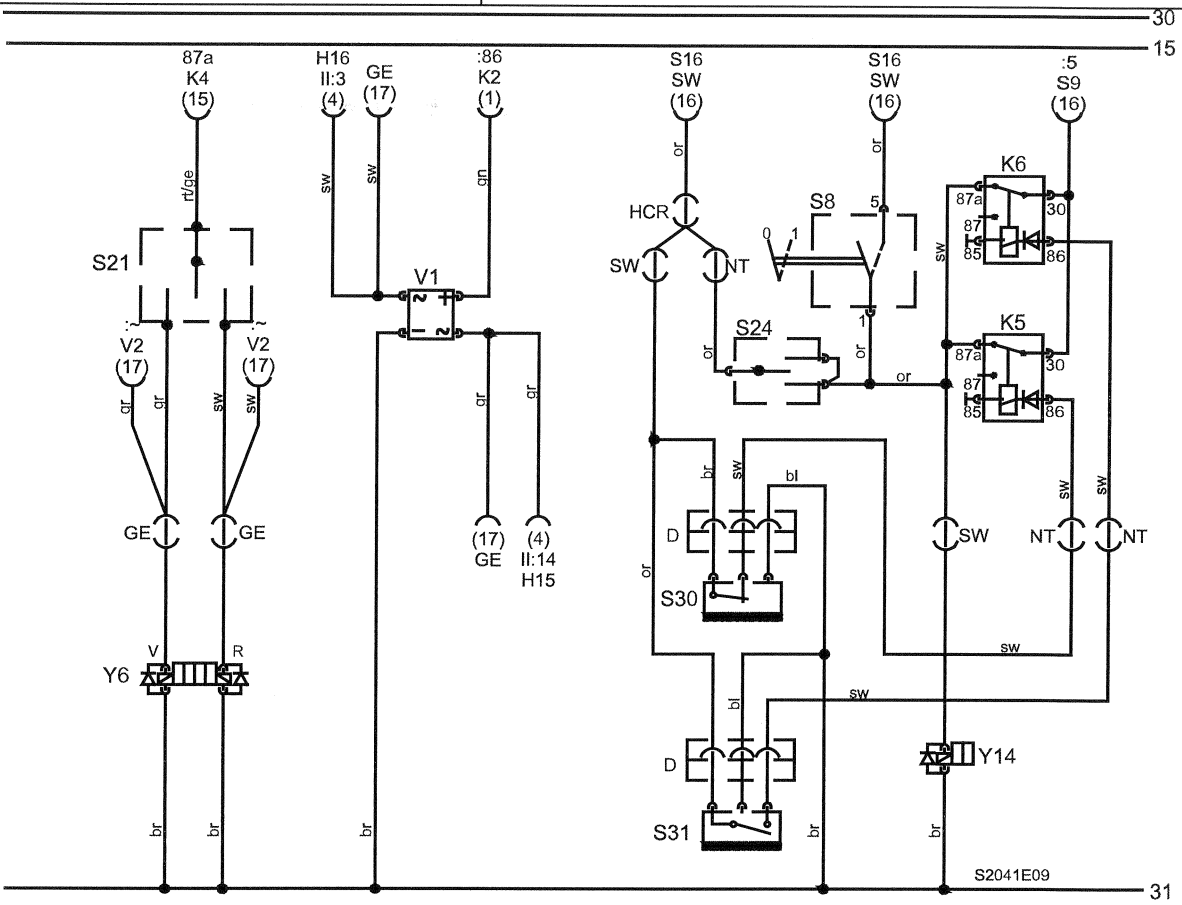
16. Excavator - loader change-over; additional control circuit, float position



Section Qty.	Desig-nation	Device
16		***Attachments***
1	S16	Excavator/ loader change-over
1	F11	Fuse
1	K9	Relief relay
1	Y11	Excavator/ loader reversing valve
1	Y12	Excavator/ loader reversing valve
1	Y13	Grab/ multi-purpose bucket reversing valve
1	Y9	Excavator/ loader reversing valve
1	Y10	Excavator/ loader reversing valve

Section Qty.	Desig-nation	Device
1	Y8	Excavator/ loader reversing valve
1	S23	Coordinate lever switch, right
1	Y7	Valve for grab/ multi-purpose bucket actuation
1	S9	3rd control circuit cut-off
1	F5	Fuse
1	S17	Switch for float position
1	Y17	Valve for float position

17. Travel drive	18. Slewing safety



Section Qty.	Desig-nation	Device
17		***Travel drive***
1	S21	Switch forward/ reverse
1	Y6	Valve forward/ reverse
1	V1	Bridge rectifier

Section Qty.	Desig-nation	Device
18		***Slewing safety***
1	S24	Switch for coordinate lever, left
1	S30	Proximity switch for ring gear
1	S31	Proximity switch for boom
1	S8	Switch for slewing limitation
1	K6	Relay for proximity switch
1	K5	Relay for proximity switch
1	Y14	Reversing valve for slewing pilot control

Fuse box - assignment diagram

H	G	F	E	D	C	B	A

1	2	3	4	5	6	7	8

Position	Ampere	assigned with
H	10 A	Warning light switch
G	30 A	Relay hydraulic oil cooler - ventilation Cab light
F	20 A	Socket Light horn
E	10 A	Rotating beacon
D	10 A	Side marker light left Working flood light
C	10 A	Side marker light right
B	10 A	Low beam
A	10 A	High beam High beam - control light

1	10 A	Warning light switch Windscreen wiper front
2	10 A	Control lamps for instruments Shut-off working hydraulics
3	10 A	Travel range switch fast - slow Relay parking brake control Travel range switch forward - reverse
4	10 A	
5	15 A	Relay hydraulic oil cooler - control
6	10 A	Brake light Signal horn
7	15 A	Heating ventilation
8	10 A	Oscillating axle lock Additional fuse support

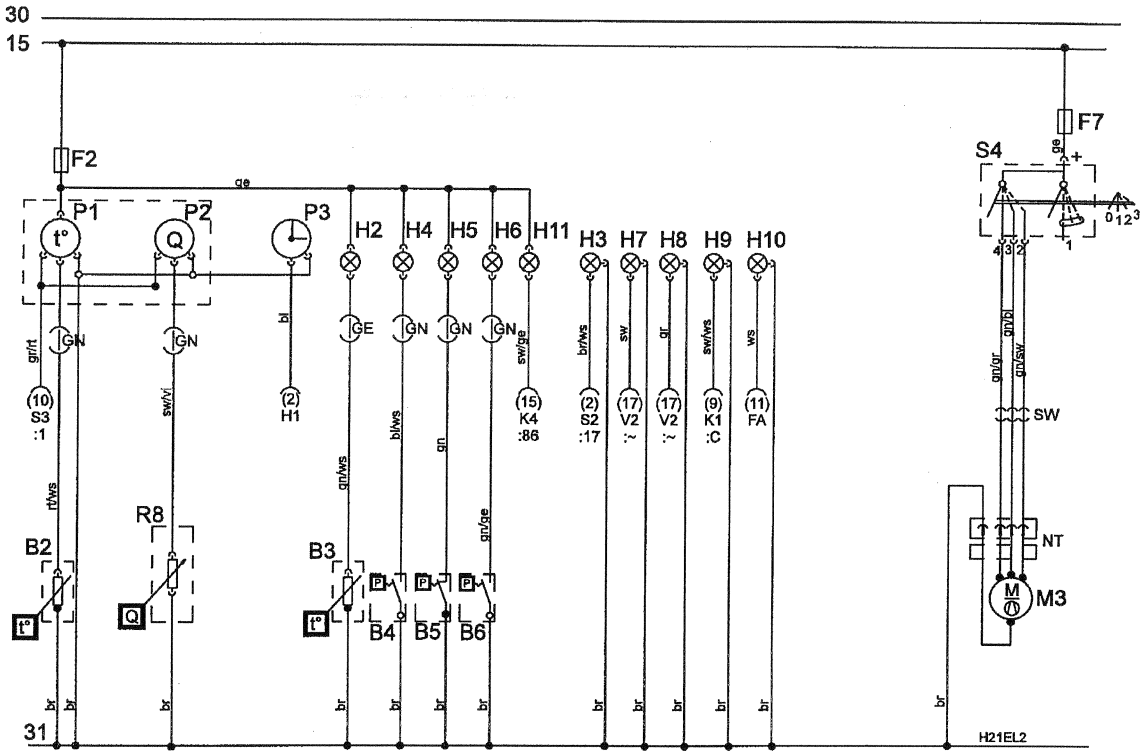
Addition A	10 A	Radio
Addition B	10 A	

Replacement bulbs / fuses	**Type**	**Spare part no.**
Headlamp	12 V H4	1 813 000 022
Flasher front / rear	12 V 21 W	1 813 000 005
Side marker light	12 V 4 W	1 813 000 002
Tail light	12 V 10 W	1 813 000 004
Brake light	12 V 21 W	1 813 000 005
Control elements	12 V 1,2 W	5 755 659 355
Cab light	12 V 5 W	1 814 000 101
Switch	12 V 1,2 W	1 813 000 021
Blade-type fuse	60 A	5 050 165 860
Fuse	10 A	5 050 650 264
Fuse	15 A	5 050 650 271
Fuse	20 A	5 050 650 266
Fuse	30 A	5 050 650 277

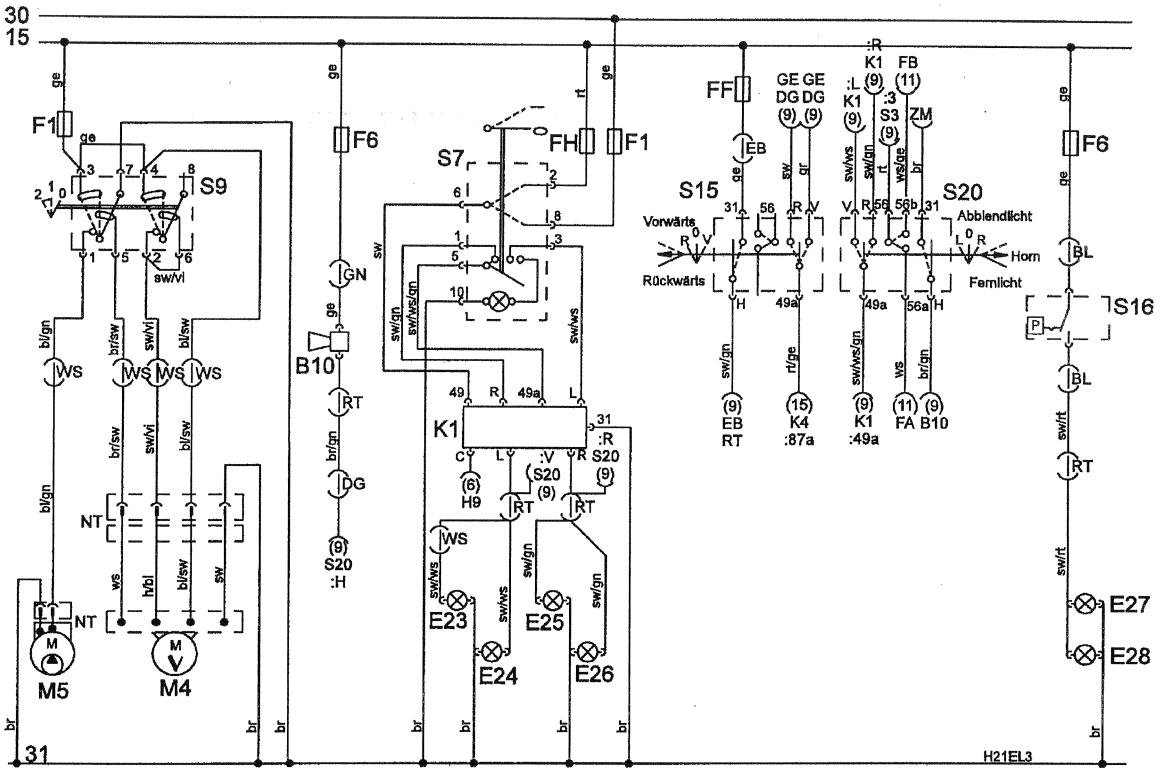
Cable colours:

ws white	sw black	ge yellow
br brown	gr gray	gn green
rt red	bl blue	vi violet

6. Indicators	7. Heating ventilation

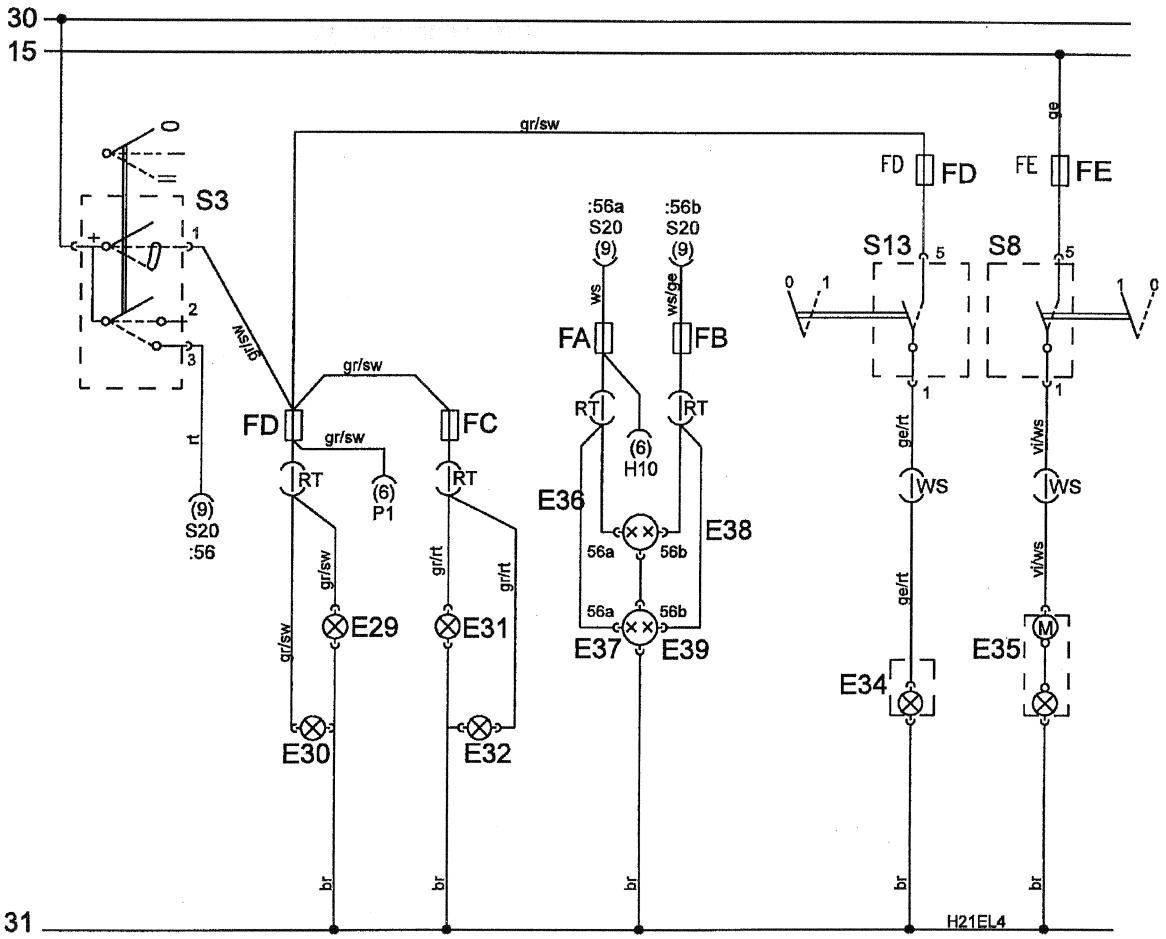


Section Qty.	Code	Unit	Section Qty.	Code	Unit
6		***Indicators***			
1	F2	Fuse	1	GN	Plug connection
1	P1	Engine oil temperature indicat.	1	B6	Switch, Hydraulic oil filter
1	GN	Plug connection			contamination indicator
1	B2	Temperature sensor engine oil	1	H 11	Control lamp parking brake
1	P2	Fuel level gauge	1	H3	Glow monitoring
1	GN	Plug connection	1	H7	Control lamp - forward
1	R8	Fuel gauge transmitter	1	H8	Control lamp - reverse
1	P3	Working hour meter	1	H9	Travel direction indicator
1	H2	Hydr. oil temperature	1	H10	High beam control
1	GE	Plug connection			
1	B3	Temperature sensor hydraulic oil			
1	H4	Air filter control lamp	***7***		***Heating ventilation***
1	GN	Plug connection	1	F7	Fuse
1	B4	Switch air contamination	1	S4	Switch heating ventilation
1	H5	Control lamp engine oil	1	SW	Plug connection
			pressure		
1	GN	Plug connection	1	NT	Plug connection
1	B5	Switch engine oil pressure	1	M3	Heating ventilation
1	H6	Hydr. oil filter control lamp			

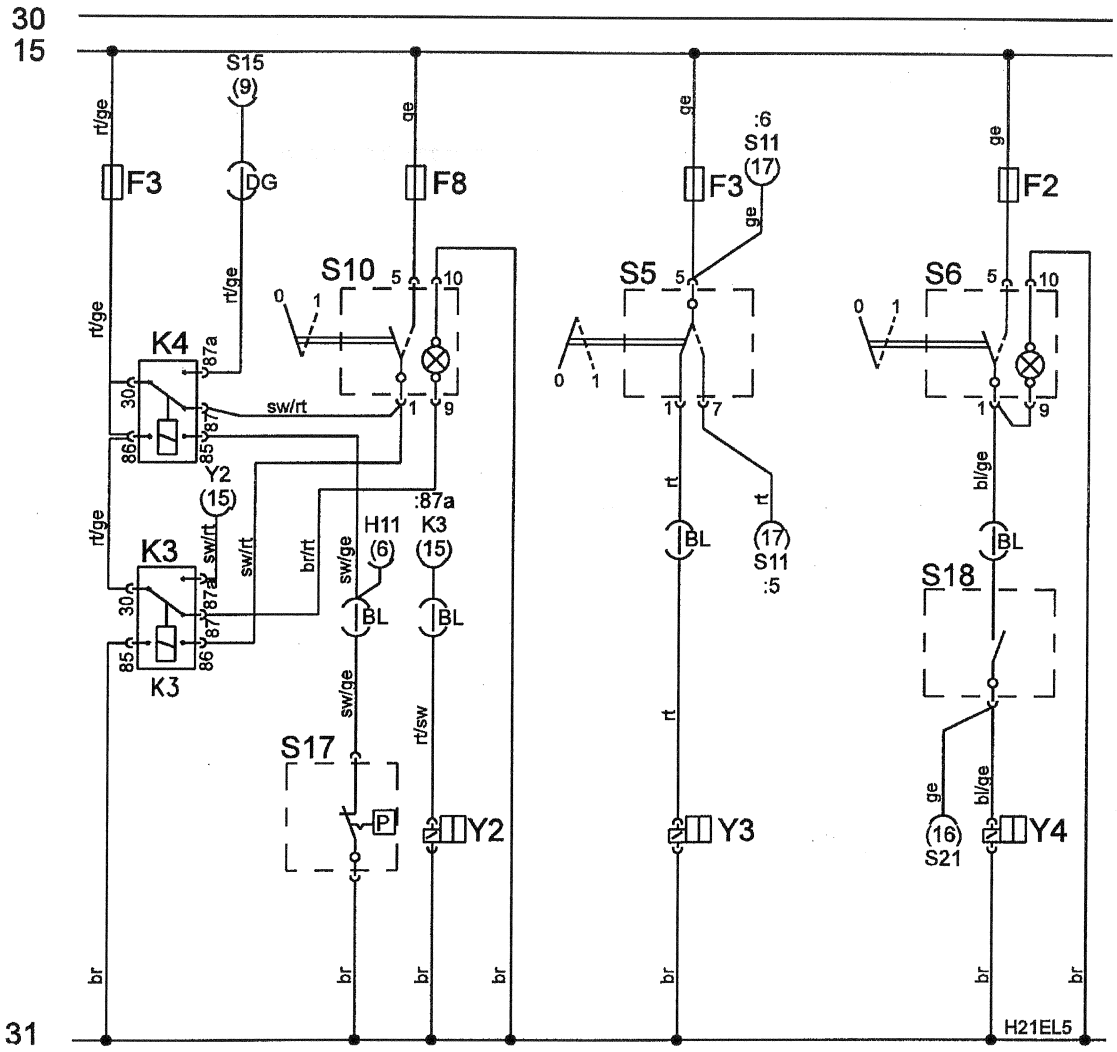


Section Qty.	Code	Unit	Section Qty.	Code	Unit
8		***Wiper and washer system***	1	K1	Flasher transmitter
1	F1	Fuse	2	RT	Plug connection
1	S9	Wiper switch	1	WS	Plug connection
4	WS	Plug connection	1	E23	Flasher light front
1	NT	Plug connection	1	E24	Flasher light rear
1	M4	Wiper motor	1	E25	Flasher light right front
1	M5	Washer motor	1	E26	Flasher light right rear
			1	S15	Switch forward-reverse
9		***Signal system***	1	S20	Flasher switch
1	F6	Fuse	1	EB	Plug connection
1	GN	Plug connection	1	F6	Fuse
1	B10	Signal horn	1	BL	Plug connection
1	RT	Plug connection	1	S16	Stop light switch
1	DG	Plug connection	1	BL	Plug connection
1	F1	Fuse	1	RT	Plug connection
1	FH	Fuse	1	E27	Stop light left
1	S7	Warning flasher	1	E28	Stop light right

10. Lamps	11. Headlamps	12. Working floodlight, rotating beacon

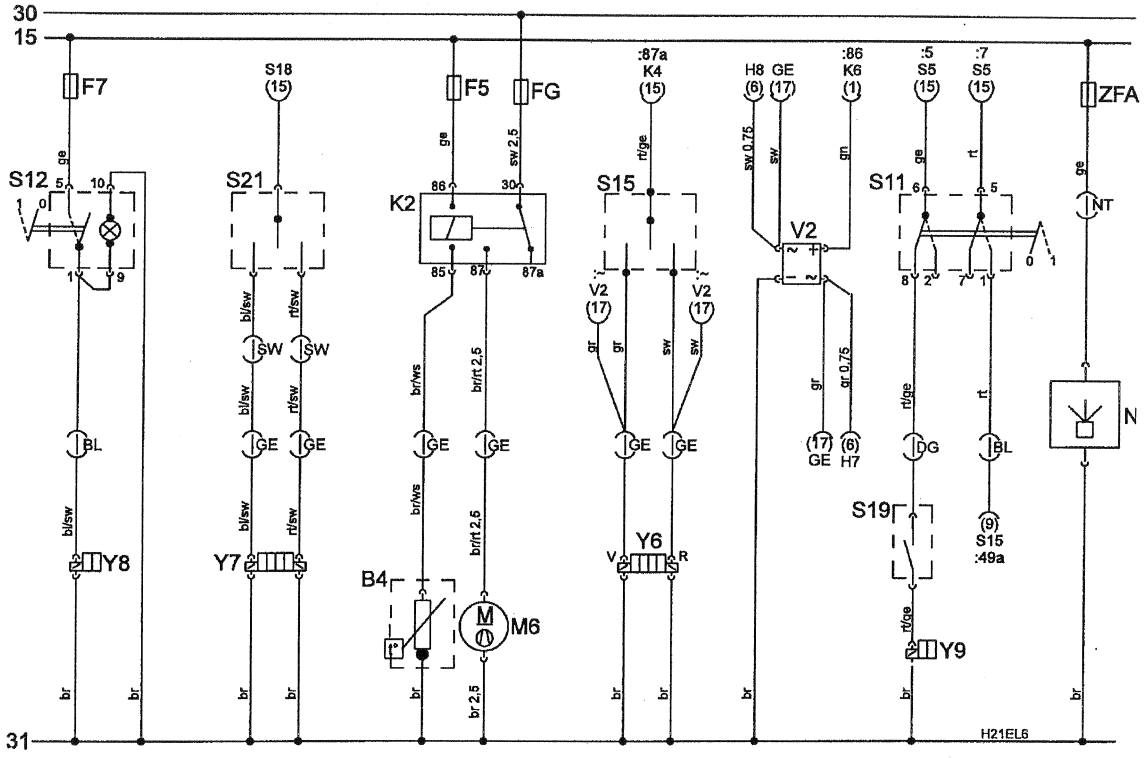


Section Qty.	Code	Unit	Section Qty.	Code	Unit
10		***Lamps***	1	FB	Fuse
1	S3	Light switch	1	RT	Plug connection
1	FD	Fuse	1	E38	Low beam left
1	RT	Plug connection	1	E39	Low beam right
1	E29	Side marker light left front			
1	E30	Side marker light left rear			
1	FC	Fuse	***12***		***Working floodlights***
1	RT	Plug connection	1	FD	Fuse
1	E31	Side marker light right front	1	S13	Switch working floodlight
1	E32	Side marker light right rear	1	WS	Plug connection
			1	E34	Working floodlight
11		***Headlamps***	1	FE	Fuse
1	FA	Fuse	1	S8	Switch rotating beacon
1	RT	Plug connection	1	WS	Plug connection
1	E36	High beam left	1	E35	Rotating beacon
1	E37	High beam right			

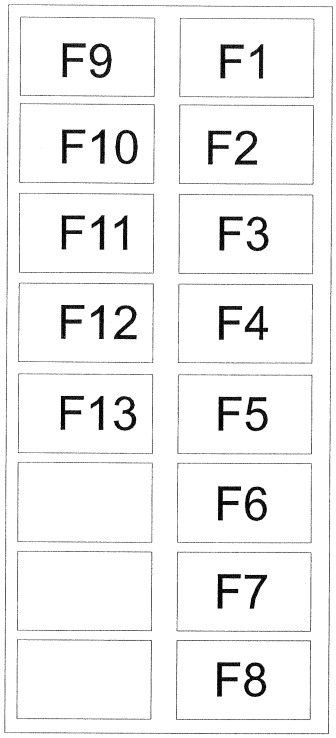


Section Qty.	Code	Unit	Section Qty.	Code	Unit
15		***Travel safety***			
1	F3	Fuse	1	Y2	Valve oscillating axle lock
1	K4	Relay parking brake	1	F3	Fuse
1	K3	Relay axle lock	1	S5	Switch Fast- slow
1	DG	Plug connection	1	BL	Plug connection
1	BL	Plug connection	1	Y3	Valve Fast - slow
1	S8	Fuse	1	F2	Fuse
1	S10	Switch oscillating axle lock	1	S6	Shut-off working hydraulics
1	BL	Plug connection	1	BL	Plug connection
1	S17	Hand brake switch	1	S18	Armrest switch
1	BL	Plug connection	1	Y4	Valve pilot control

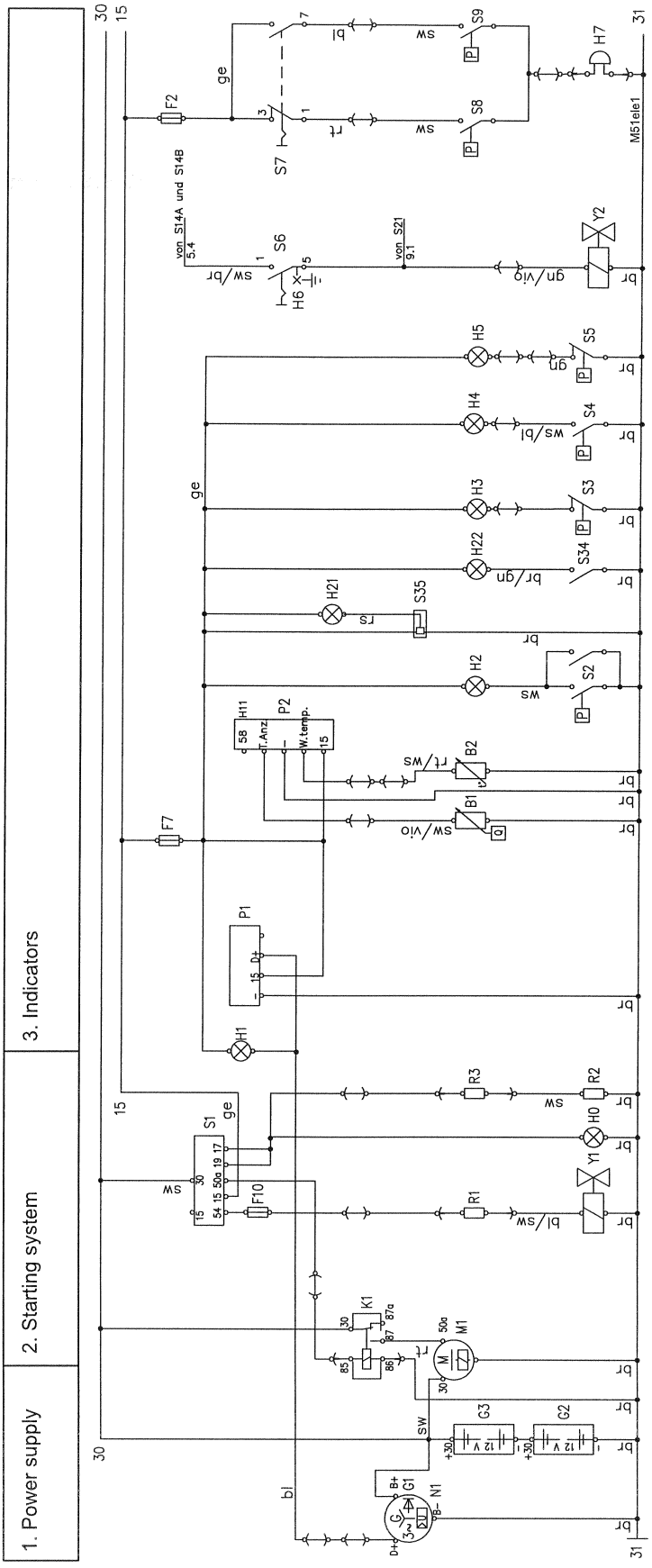
16. Front blade, Grab, Oil cooler	17. Travel drive, pedal-driving	18. Radio



Section Qty.	Code	Unit	Section Qty.	Code	Unit
16		***Attachments***	***17***		***Drive***
1	F7	Fuse	1	S15	Switch forward - reverse
1	S12	Switch front blade -	2	GE	Plug connection
		articulation			
1	BL	Plug connection	1	Y6	Valve forward - reverse
1	Y8	Valve front blade - articulation	1	V2	Bridge rectifier
1	S21	Rocker switch	1	S11	Switch - pedal driving
		-Coordinate lever right	1	DG	Plug connection
2	SW	Plug connection	1	BL	Plug connection
2	GE	Plug connection	1	S19	Armrest switch 2
1	Y7	Additional valve	1	Y9	Valve - pedal driving
		(e.g. turning the grab)			
1	F5	Fuse	***18***		***Radio***
1	FG	Fuse	1	ZFA	Fuse
1	K2	Relay Hydr. oil cooler	1	NT	Plug connection
2	GE	Plug connection	1	N	Radio
1	B4	Thermo switch			
1	M6	Hydr. oil cooler - ventilation			

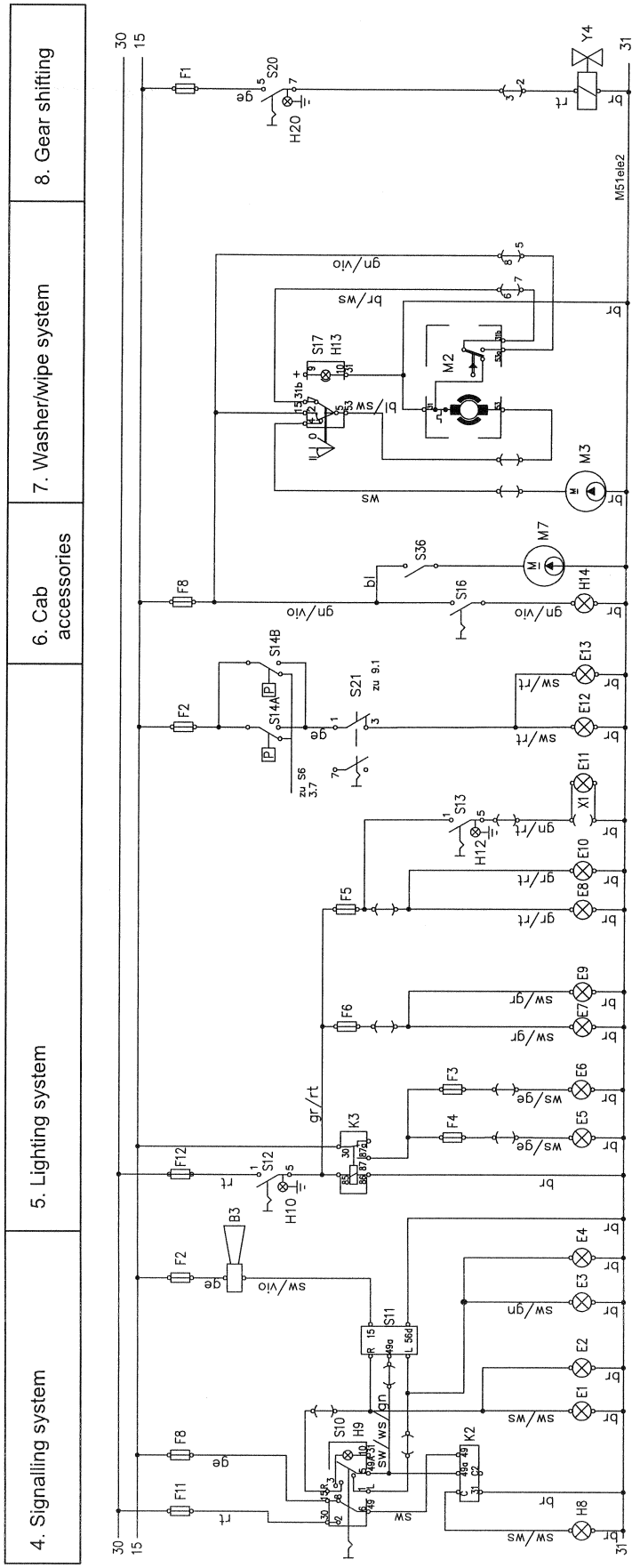


Fuses for electrical system		
Item	Ampere	Assigned with:
F1	15	Working hydraulics, grab, travel quick-slow
F2	15	Horn, brake light, overload warning device, oscillating axle
F3	15	High beam
F4	15	High beam
F5	15	Parking light, working floodlight
F6	15	Parking light
F7	15	Instruments, hydraulic oil, hammer
F8	15	Flasher, cabin lighting, windscreen wipers
F9	15	Heating fan
F10	15	Engine shut-off
F11	15	Hazard light system
F12	15	High beam
F13	15	Radio



SCHAEFF	Typ/Model/Type **HML 51 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.54.02**

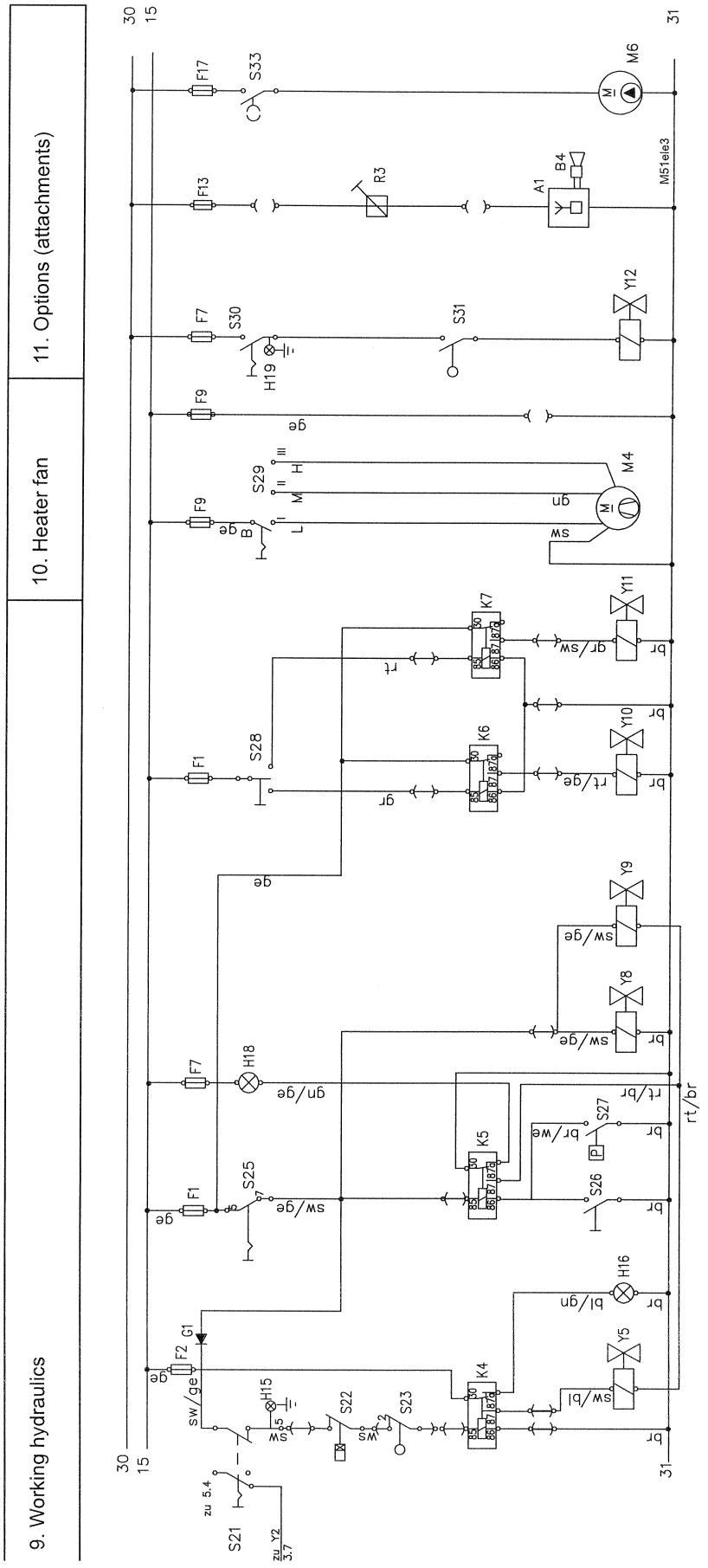
Section	Code	Unit	Section	Code	Unit
1		***Power supply***		H2	Indicator hydr. oil filter
	G1	Generator		S2	Pressure switch
	G2/G3	Battery		H21	Indicator oil level
	N1	Regulator		S35	Oil level transmitter
				H22	Indicator oil temperature
2		***Starting system***		S34	Temperature transmitter
	M1	Starter		H3	Brake pressure
	K1	Starting relay		S3	Pressure switch
	S1	Pre-glow starter switch		H4	Indicator air filter
	F10	Fuse 15 A		S4	Air filter
	R1	Resistance		H5	Indicator engine oil press.
	Y1	Electric engine shut-off		S5	Oil pressure switch
	R3	Resistance		F2	Fuse 15 A
	H1	Charge warning lamp		S6	Switch oscillating axle
	HO	Pre-glow indicator		H6	Indicator oscillating axle
	R2	Glow plug		Y2	Valve oscillating axle
				F2	Fuse 15A
3		***Indicators***		S7	Switch load warning
	P1	Working hour meter		S8	Pressure switch
	F7	Fuse 15A		S9	Pressure switch
	P2	Comb. indicator instrument		H7	Buzzer signal
	B1	Transmitter tank			
	B2	Transmitter water temp.			



SCHAEFF	Typ/Model/Type **HML 51 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.54.03**

Section	Code	Unit
4		***Signalling system***
	F11	Fuse 15 A
	F8	Fuse 15 A
	S10	Hazard light switch
	H9	Indicator hazard light
	K2	Flasher relay
	H8	Indicator travel direction
	E1	Flasher left front
	E2	Flasher left rear
	S11	Steering column switch
	E3	Flasher right front
	E4	Flasher right rear
	F2	Fuse 15 A
	B3	Horn
5		***Lighting system***
	S12	Switch high beam
	H10	Indicator light
	K3	Change-over relay
	F4	Fuse 15 A
	E5	Headlamp right
	F3	Fuse 15 A
	E6	Headlamp left
	F12	Fuse 15 A
	F6	Fuse 15 A
	E7	Parking light left front
	E9	Parking light right front
	F5	Fuse 15 A
	E8	Parking light left rear
	E10	Parking light right rear

Section	Code	Unit
	S13	Switch working floodlight
	H12	Indicator working floodlight
	X1	Socket
	E11	Working floodlight
	F2	Fuse 15 A
	S14A	Pressure switch 5 bar
	S14B	Pressure switch 5 bar
	E12	Brake light
	E13	Brake light
6		***Cab accessories***
	F8	Fuse 15 A
	S16	Switch cabin lamp
	H14	Cabin lamp
	S36	Switch seat compressor
	M7	Seat compressor
7		***Washer/wiper system***
	M3	Windscreen wiper pump
	S17	Switch windscreen wiper
	H13	Indicator windscreen wiper
	M2	Wiper motor
8		***Gear shifting***
	F8	Fuse 15 A
	S20	Switch quick / slow
	Y4	Valve gear shifting
	H20	Indicator gear shifting

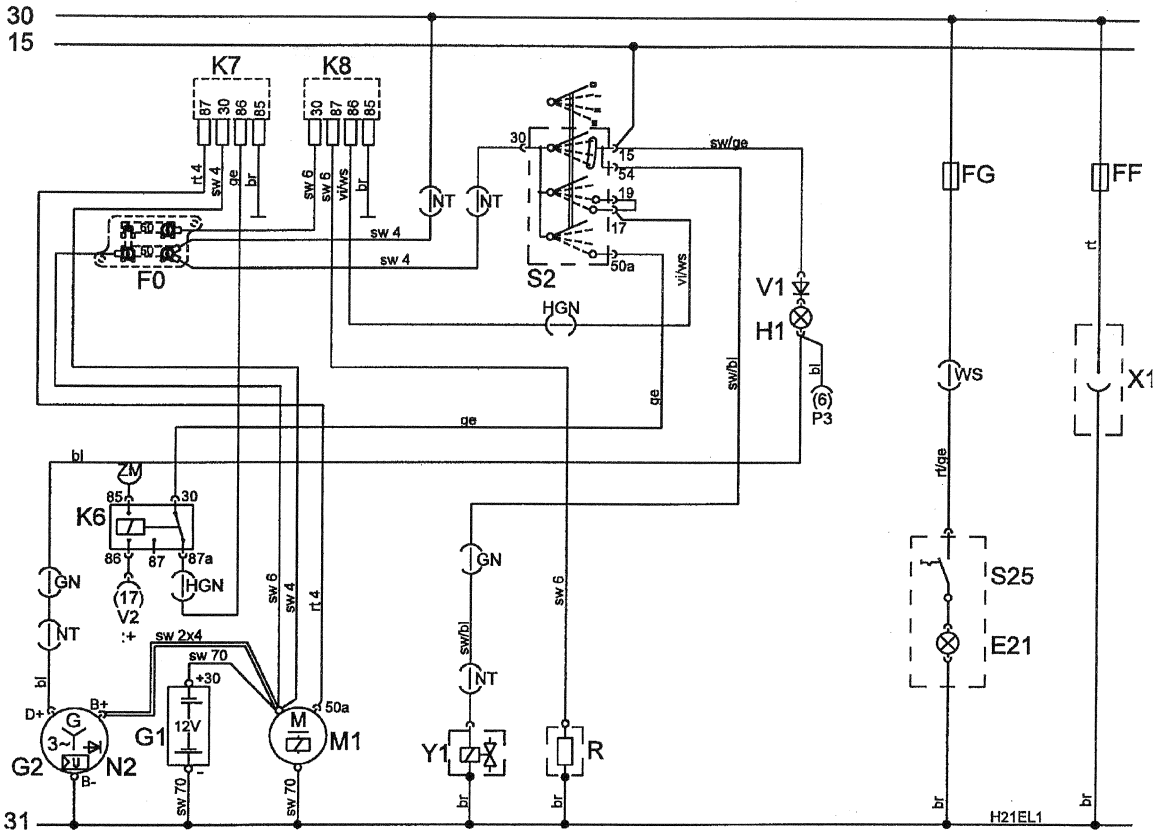


SCHAEFF	Typ/Model/Type **HML 51 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.54.04**

Section	Code	Unit
9		***Working hydraulics***
	F2	Fuse 15 A
	S21	Switch working hydraulics
	H15	Indicator switch hydraulics
	S22	Proximity switch ascent stairs
	S23	Switch armrest
	K4	Change-over relay
	Y5	Valve working hydraulics
	H16	Indicator work. hydraulics
	S25	Switch parking brake
	H18	Indicator parking brake
	K5	Change-over relay
	S26	Button pressure relief
	S27	Pressure switch
	Y8	Valve parking brake
	Y9	Valve travel ON/OFF
	F1	Fuse 15 A
	S28	Switch grab rotation
	F7	Fuse 15 A
	K6	Change-over relay
	Y10	Valve grab rotation
	K7	Change-over relay
	Y11	Valve grab rotation

Section	Code	Unit
10		***Heater fan***
	F9	Fuse 15 A
	S29	Switch heating
	M4	Ventilator motor
11		***Options***
	F7	Fuse
	S30	Switch hammer
	S31	Foot switch
	Y12	Valve hammer
	H19	Indicat. hammer operation
	F13	Fuse 15 A
	R3	Resistance
	A1	Radio
	B4	Loudspeaker
	F17	Fuse 20 A
	S33	Switch
	M6	Fuel pump

1. Current supply	2. Start-up system	3. Glow system	5. Cab light, socket



Section Qty.	Code	Unit	Section Qty,	Code	Unit
1		***Current supply***	1	GN	Plug connection
1	G1	Battery	1	NT	Plug connection
1	G2	Generator	1	Y1	Electrical engine shut-off
1	N2	Generator regulator			
2	NT	Plug connection	***3***		***Glow system***
1	GN	Plug connection	1	HGN	Plug connection
2	FO	Blade-type fuse	1	K8	Pre-glow relay
1	HGN	Plug connection	1	R	Spiral wound filament
1	NT	Plug connection			
			5		***Cab light***
2		***Start up system***	1	FG	Fuse
1	S2	Glow-start switch	1	WS	Plug connection
1	V1	Blocking diode	1	S25	Cab light switch
1	H1	Generator control lamp	1	E21	Cab light
1	K6	Starting relay - start safety	1	FF	Fuse
1	K7	Starting relay	1	X1	Socket
1	M1	Start-up engine (starter)			

H	G	F	E	D	C	B	A

1	2	3	4	5	6	7	8

Position	Ampere	Assigned to
H	10	--
G	30	--
F	20	Socket
E	10	Cab lamp Radio
D	10	Working floodlights
C	10	Boom-mounted working floodlights
B	10	Hydraulic oil radiator - fan relay
A	10	--

1	10	Windscreen wiper
2	10	Floating Position Indicator Camps for Instruments
3	10	Horn Instrument panel illumination
4	10	Heater fan
5	15	Hydraulic oil radiator - control relay
6	10	Working hydraulics cut-off relay Hammer - summation valve
7	15	Fast - slow Overdrive
8	10	Radio

Additional fuse box

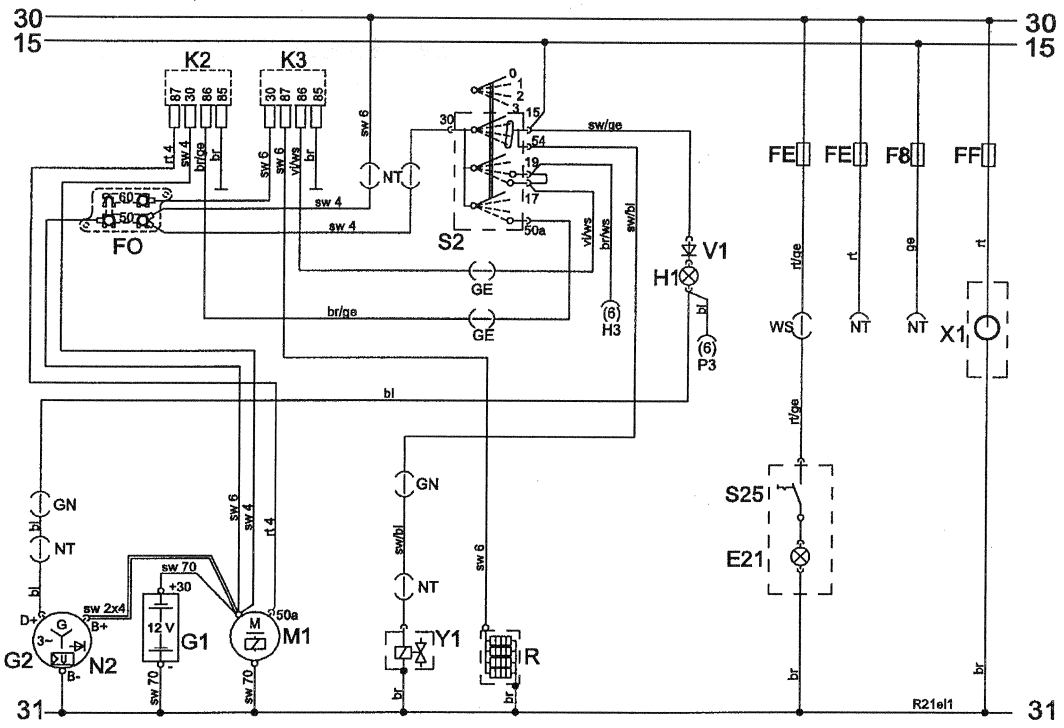
1	10	--
2	10	--

Spare bulbs/ Fuses	Type	Spare Part number
Working floodlights	12 V H4	1 813 000 022
Control elements	12 V 1,2 W	5 755 659 355
Cab lamp	12 V 5 W	1 814 000 101
Switch	12 V 1,2 W	1 813 000 021
Flat-type fuse	30 A	5 050 165 810
Flat-type fuse	50 A	5 050 165 815
Fuse	10 A	5 050 650 264

Cable colours

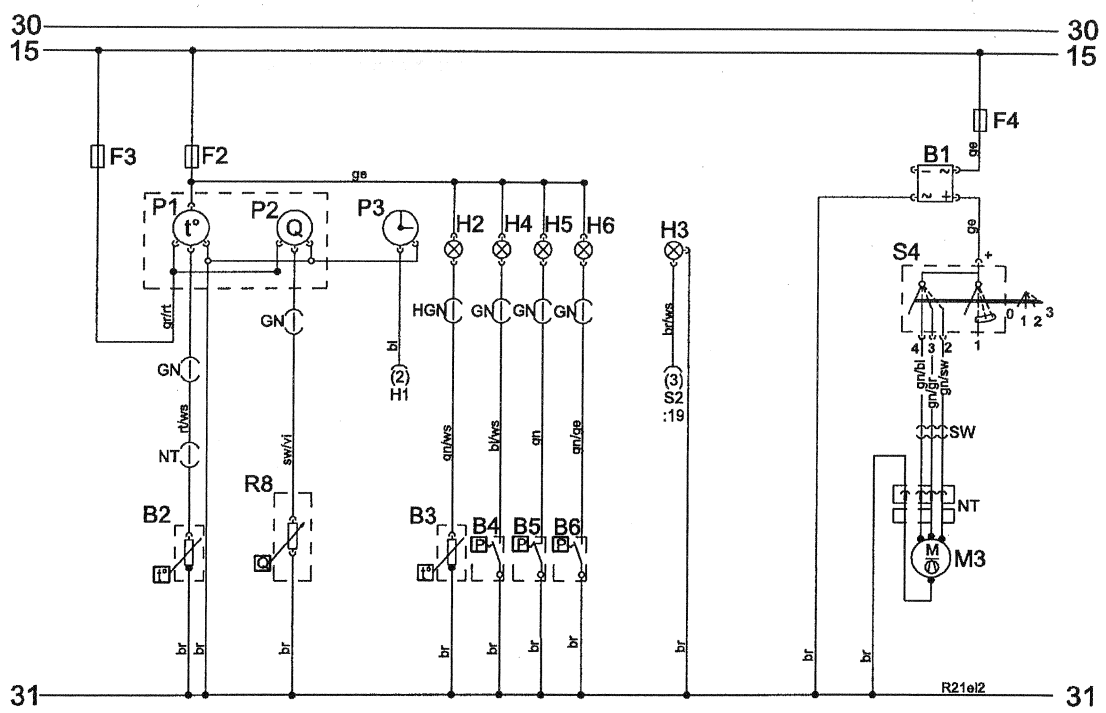
wh white	bk black	ye yellow	bn brown	gr grey
gn green	rd red	bl blue	vi violet	or orange

1. Power supply	2. Starting system	3. Pre-heater system	5. Cab lamp, radio, clock, socket



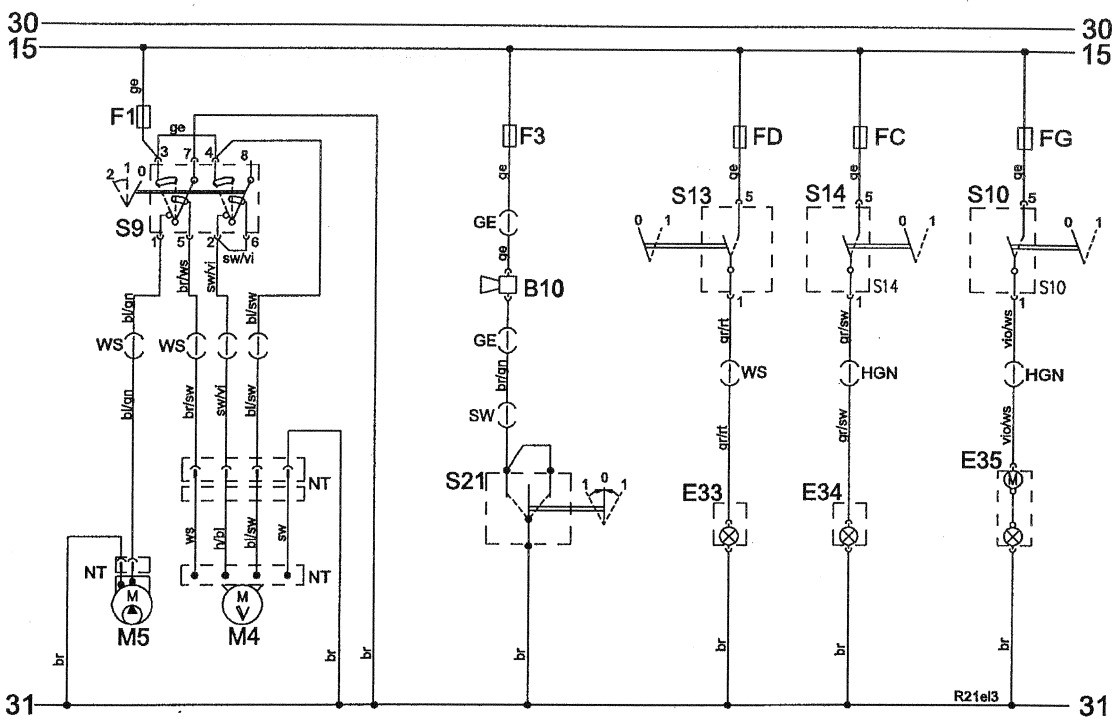
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
1		***Power supply***	***3***		***Pre-heater system***
1	G1	Battery	1	S2	Glow plug/ starter switch
1	G2	Generator	1	GE	Plug connection
1	N2	Generator regulator	1	K3	Pre-heater relay
1	NT	Plug connection	1	R	Glow plugs
1	GN	Plug connection			
2	FO	Flat-type fuse			
2	NT	Plug connection	***5***		***Cab lamp***
			1	FE	Fuse
2		***Starting system***	1	WS	Plug connection
1	S2	Glow plug/ starter switch	1	S25	Cab lamp switch
1	V1	Blocking diode	1	E21	Cab lamp
1	H 1	Generator indicator lamp	1	FF	Fuse
1	GE	Plug connection	1	NT	Plug connection
1	K2	Starting relay	1	F8	Fuse
1	M1	Starter motor	1	FE	Fuse
1	GM	Plug connection	1	X1	Socket
1	NT	Plug connection			
1	Y1	Electr. motor shut-off			

6. Indicating units	7. Heater fan



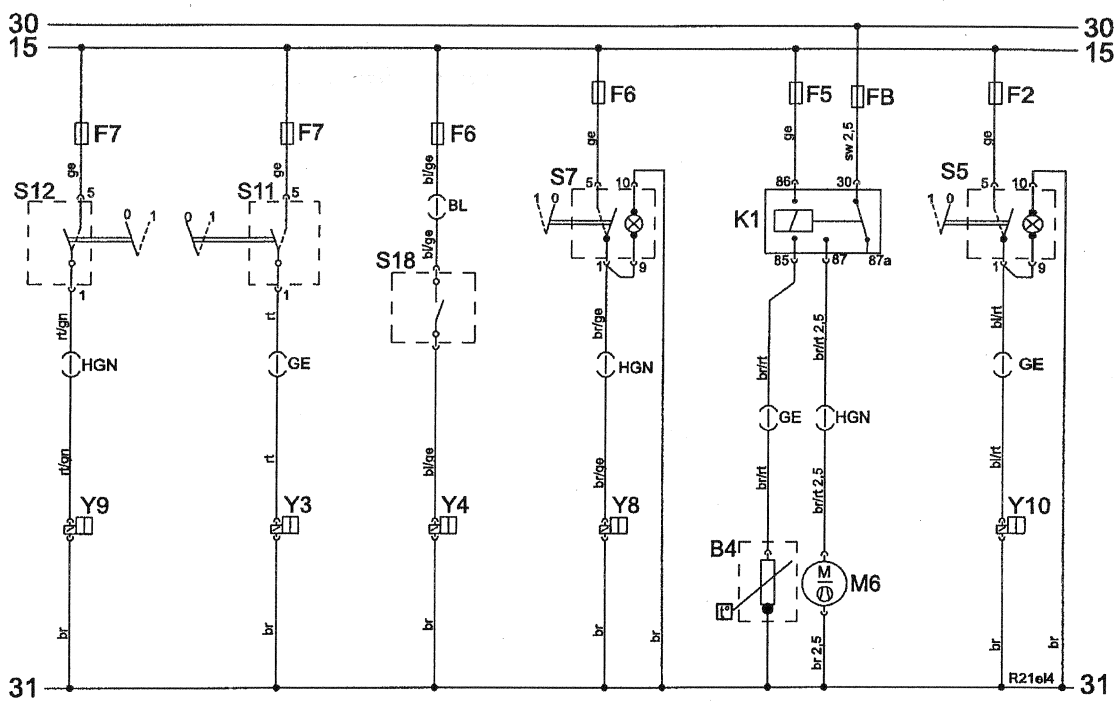
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
6		Indicating units	1	B4	Switch, air filter clogging
1	F2	Fuse	1	H5	Engine oil pressure indicator lamps
1	F3	Fuse	1	GN	Plug connection
1	P1	Engine oil temperature indicator	1	B5	Switch, engine oil pressure
1	GN	Plug connection	1	H6	Hydr. oil Filter indicator lamp
1	NT	Plug connection	1	GN	Plug connection
1	B2	Temperature sensor engine oil	1	B6	Switch - Hydr. Oil clogging
1	P2	Fuel gauge	1	H3	Pre-heating monitoring
1	GN	Plug connection			
1	R8	Fuel gauge-sensor	7		*Heater fan*
1	P3	Operating hour meter	1	F4	Fuse
1	H2	Hydr. oil temperature	1	S4	Switch, heater fan
1	HGN	Plug connection	1	B1	Bridge rectifier
1	B3	Temperature sensor, hydraulic oil	1	SW	Plug connection
1	H4	Air Filter indicator lamp	1	NT	Plug connection
1	GN	Plug connection	1	M3	Heater fan

8. Wipe and flushing system	9. Signalling system	10. Working floodlights



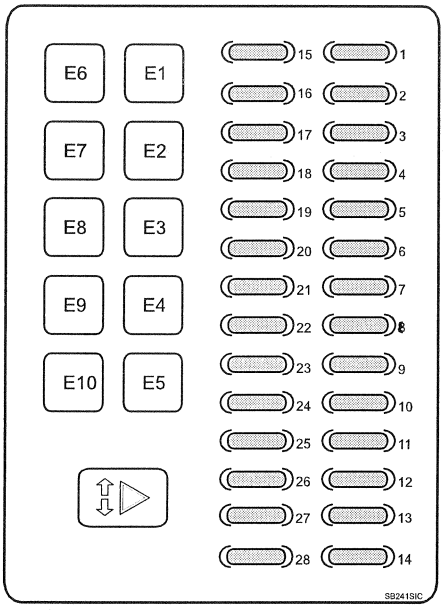
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
8		***Wipe and flushing system***	***10***		***Working floodlights***
1	F1	Fuse	1	FD	Fuse
1	S9	Wiper switch	1	S13	Switch for working floodlights
1	WS	Plug connection	1	WS	Plug connection
1	NT	Plug connection	1	E33	Working floodlights
1	M4	Wiper motor	1	FC	Fuse
1	M5	Washer motor	1	S14	Switch for working floodlights
			1	HGN	Plug connection
			1	E34	Working floodlights
9		***Signalling system***	1	FG	Fuse
1	F3	Fuse	1	S10	Switch for rotating beacon
1	GE	Plug connection	1	HGN	Plug connection
1	B10	Horn	1	E35	Rotating beacon
1	GE	Plug connection			
1	SW	Plug connection			
1	S21	Horn button			

11. Safe driving overdrive; Fast-Slow, working hydraulics cut-off	12. Hammer, oil radiator	13. Floating position



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
11		**Safe *driving; overdrive fast-slow; working hydraulics cut-off***	***12***		***Hammer; oil radiator***
1	F7	Fuse	1	F6	Fuse
1	S12	Overdrive switch	1	S7	Hammer switch
1	HGN	Plug connection	1	HGN	Plug connection
1	Y9	Overdrive valve	1	Y6	Hammer valve
1	F7	Fuse	1	F5	Fuse
1	S11	Fast-slow switch	1	FB	Fuse
1	GE	Plug connection	1	K1	Hydr. oil radiator relay
1	Y3	Fast-slow valve	1	GE	Plug connection
1	F6	Fuse	1	HGN	Plug connection
1	BL	Plug connection	1	B4	Thermo switch
1	S18	Armrest switch	1	M6	Hydr.oil radiator - fan
1	Y4	Working hydraulics valve			
			13		***Floating Position***
			1	F2	Fuse
			1	S5	Floating Position switch
			1	GE	Plug connection
			1	Y10	Floating Position valve

Fuse and relay box - Assignment plan



Location		Relay Function
E 1	-	not assigned
E 2	-	not assigned
E 3	-	not assigned
E 4	-	not assigned
E 5	-	not assigned
E 6	K 6	pilot control
E 7	-	not assigned
E 8	-	not assigned
E 9		not assigned
E 10	-	not assigned
⇧⇩▷		not assigned

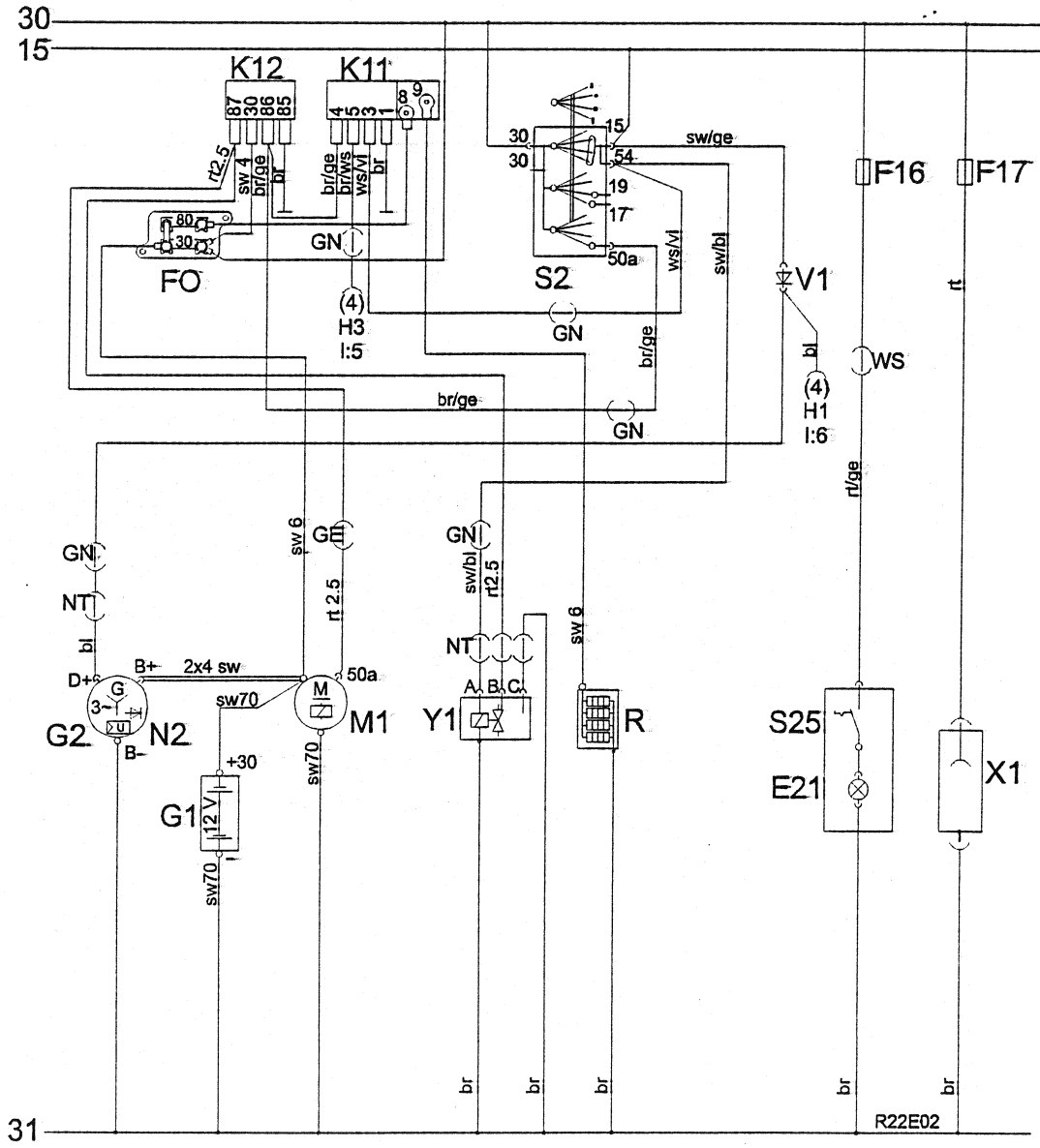
Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Wipers	F 15	10	Check module
F 2	10	Working hydraulics cut-off (pilot control)	F 16	10	Rotating beacon, internal light
F 3	10	Working floodlights, front	F 17	20	Socket, radio
F 4	10	Working floodlights, rear	F 18	10	
F 5	10	Float position	F 19	15	
F 6	10	Horn	F 20	10	
F 7	10	Heater fan	F 21		
F 8	10	Travel, fast / slow	F 22		
F 9	10	Overload warning device	F 23		--
F 10	10	Rock breaker	F 24		--
F 11	10	Service ladder proximity switch, overload warning device transmitter	F 25		--
F 12	10	Radio	F 26		--
F 13	10	Check module Power supply check module	F 27		--
F 14	10	--	F 28	Diode 1 A	Electrical engine shut-off

Cable colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

SCHAEFF	Typ/Model/Type **HR 22 (from serial no. 121/0124)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Fuse and relay box assignment diagram**	Blatt/Page/Feuille **7.63.01**

1. Power supply	2. Pre-glow starting system	3. Cabin lamp, radio, clock, socket

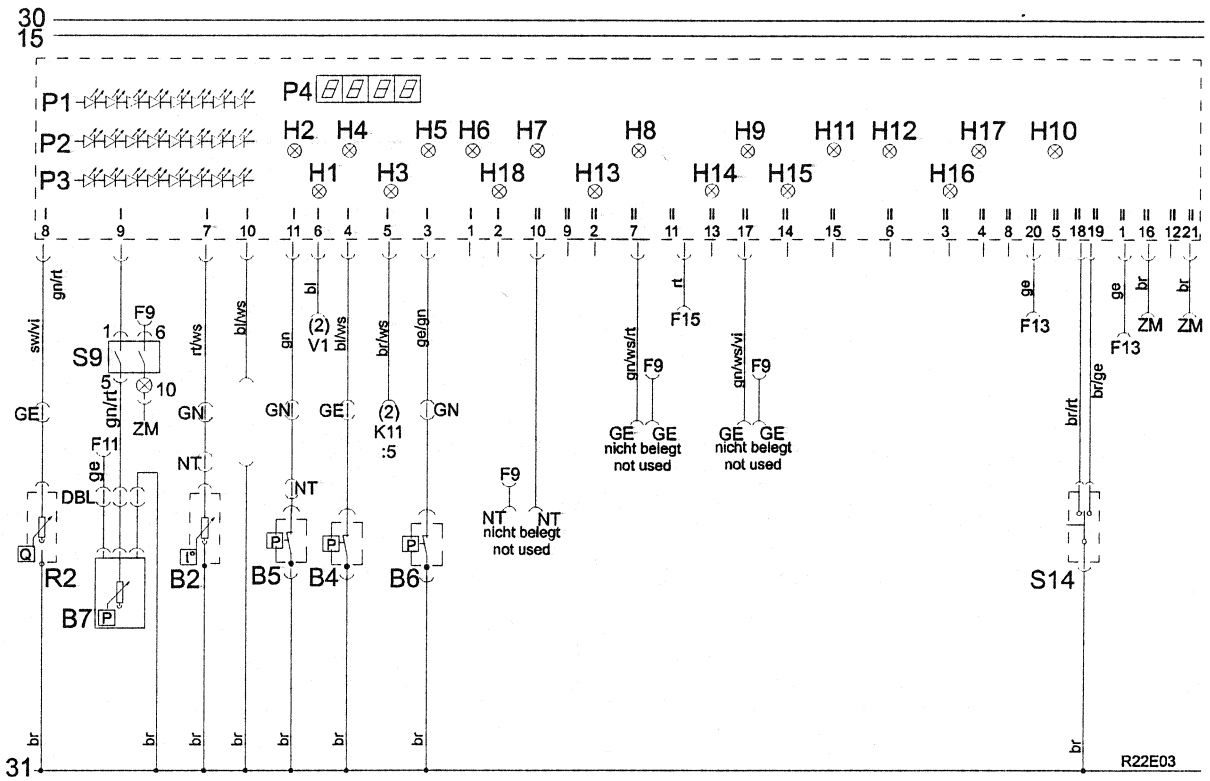


Section Qty.	Code	Unit
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	N2	Generator regulator
2	FO	Blade-type fuses
2		***Pre-glow starting system***
1	S2	Glow starter switch
1	V1	Blocking diode
1	K12	Starting relay
1	M1	Starter

Section Qty.	Code	Unit
1	Y1	Electr. engine shut-off
1	S2	Glow starter switch
1	K11	Pre-glow relay
1	R	Glow plugs
3		***Cabin lamp***
1	F16	Fuse
1	S25	Cabin light switch
1	E21	Cabin lamp
1	F17	Fuse
1	X1	Socket

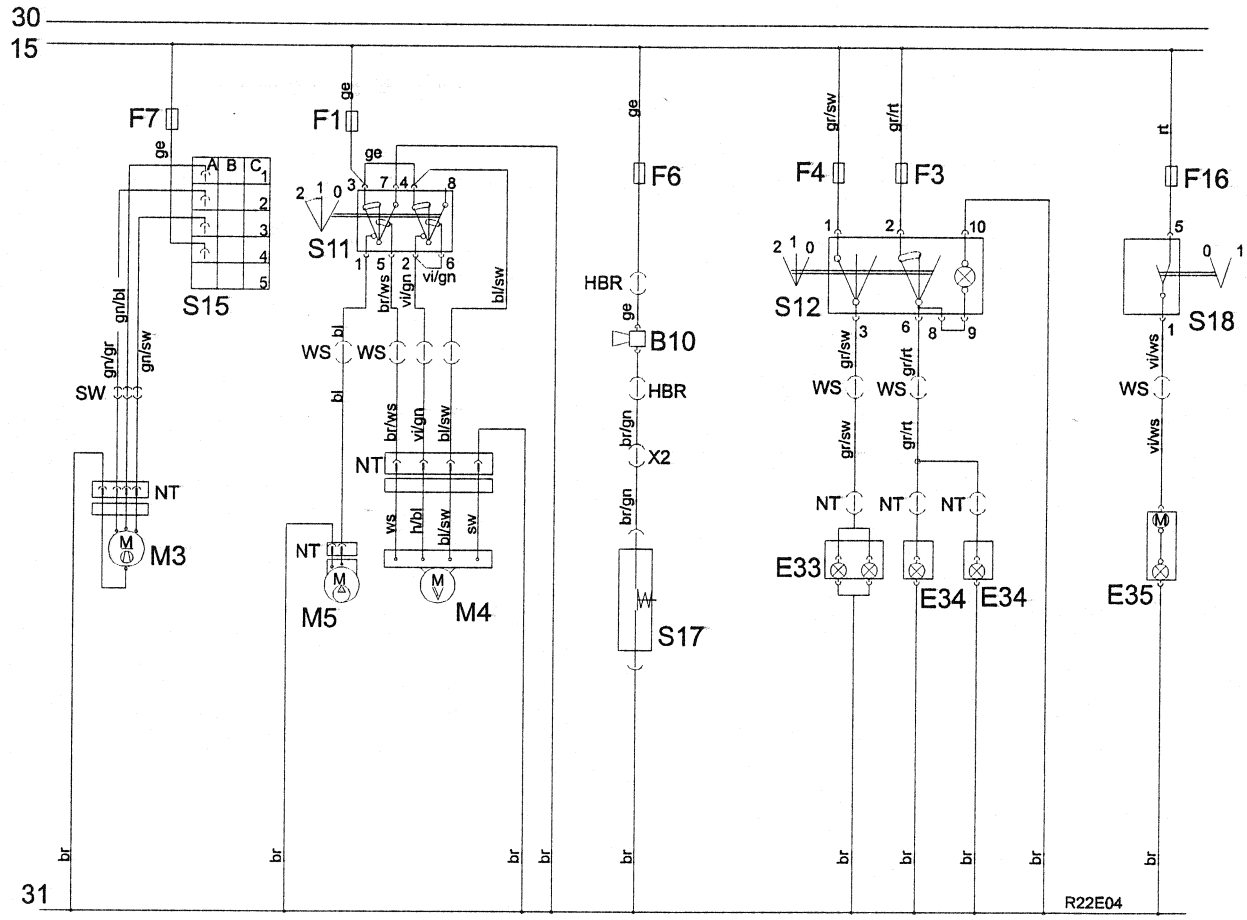
SCHAEFF	Typ/Model/Type **HR 22 (from serial no. 121/0124)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.63.02**

4. Indicators



Section Qty.	Code	Unit	Section Qty.	Code	Unit
4		***Indicators***	1	H6	Free
1	P1	Fuel level gauge	1	H18	Free
1	R2	Fuel level gauge - transmitter	1	H7	Free
1	P2	Engine cooling water	1	H13	Free
1	B2	Temp. sensor - cooling water	1	H8	Free
1	P3	Load warning indicator	1	H14	Free
1	S9	Load warning shut-off	1	H9	Free
1	B7	Hydr. oil pressure transmitter	1	H15	Free
1	P4	Working hour meter, daily hours	1	H11	Free
1	H2	Engine oil pressure warning lamp	1	H12	Free
1	B5	Engine oil pressure switch	1	H16	Free
1	H1	Charge warning lamp	1	H17	Free
1	H4	Air filter check	1	H10	Free
1	B4	Air filter clogging	1	S14	Change-over display
1	H3	Pre-glow check			
1	XB	Connector			
1	H5	Hydraulic oil filter - filter clogging indicator			
1	B6	Transmitter - hydraulic oil filter - filter clogging indicator			

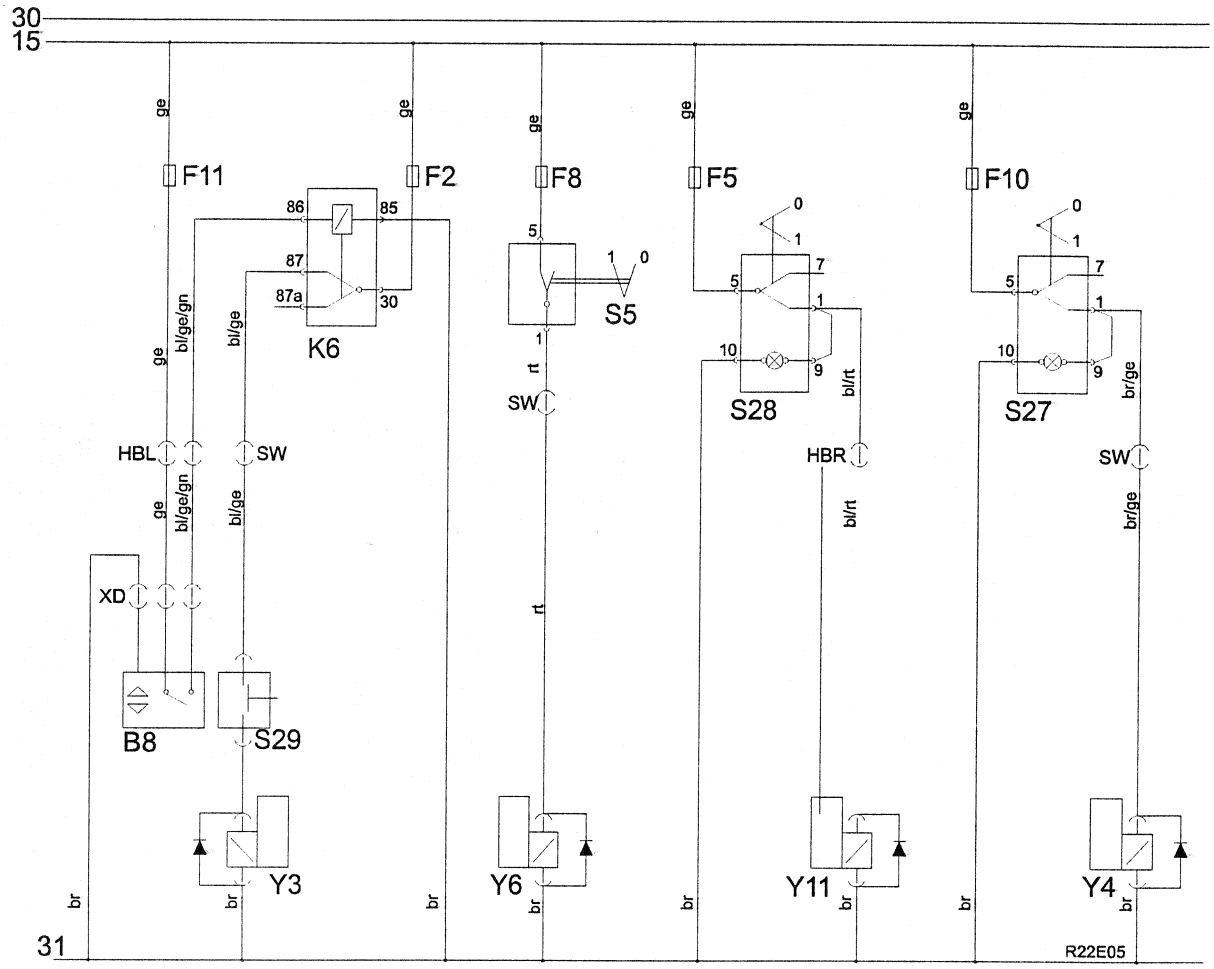
6. Heater fan	7. Wiper and washer system	8. Signalling system	9. Working floodlights



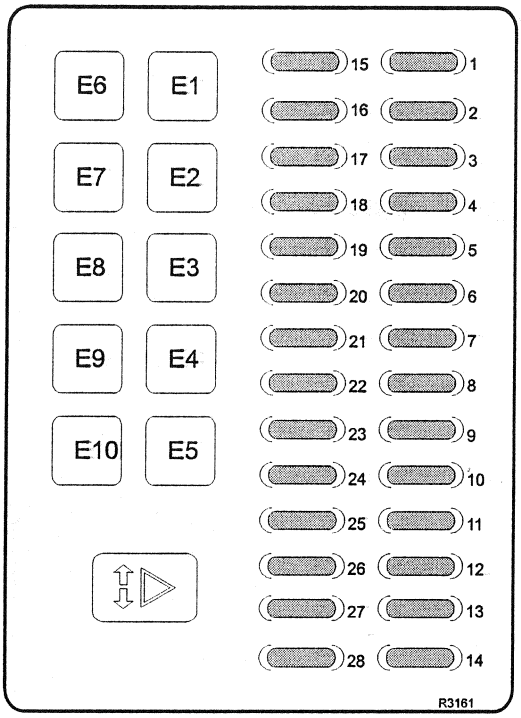
Section Qty.	Code	Unit
6		***Heater fan***
1	F7	Fuse
1	S15	Switch - heater fan
1	M3	Heater fan
7		***Wiper and washer system***
1	F1	Fuse
1	S11	Wiper switch
1	M4	Wiper motor
1	M5	Washer pump
8		***Signalling system***
1	F6	Fuse
1	B10	Signal horn

Section Qty.	Code	Unit
1	X2	Connector
1	S17	Horn pushbutton
9		***Working floodlights***
1	F3	Fuse
1	S12	Switch - working floodlights front / rear
2	E34	Working floodlights front
1	F4	Fuse
1	E33	Working floodlights rear
1	F16	Fuse
1	S18	Switch rotating beacon
1	E35	Rotating beacon

10. Shut-off working hydraulics	11. Quick - slow	12. Floating position	13. Breaker



Section Qty.	Code	Unit	Section Qty.	Code	Unit
10		***Shut-off working hydraulics***	***12***		***Floating position***
1	F11	Fuse	1	F5	Fuse
1	XD	Plug connection	1	S28	Switch: floating position
1	B8	Proximity switch	1	Y11	Valve: floating position
1	F2	Fuse			
1	K6	Relais: safety, service ladder	***13***		***Breaker***
1	S29	Armrest switch	1	F10	Fuse
1	Y3	Valve: shut-off working hydraulics	1	S27	Switch, breaker
			1	Y4	Valve: breaker
11		***Quick-slow***			
1	F3	Fuse			
1	S5	Switch, quick - slow			
1	Y6	Valve: quick - slow			



Location		Relay Function
E 1	-	not assigned
E 2	-	not assigned
E 3	-	not assigned
E 4	-	not assigned
E 5	-	not assigned
E 6	K 6	Pilot control
E 7	-	not assigned
E 8	-	not assigned
E 9		not assigned
E 10	-	not assigned
⇕▷		not assigned

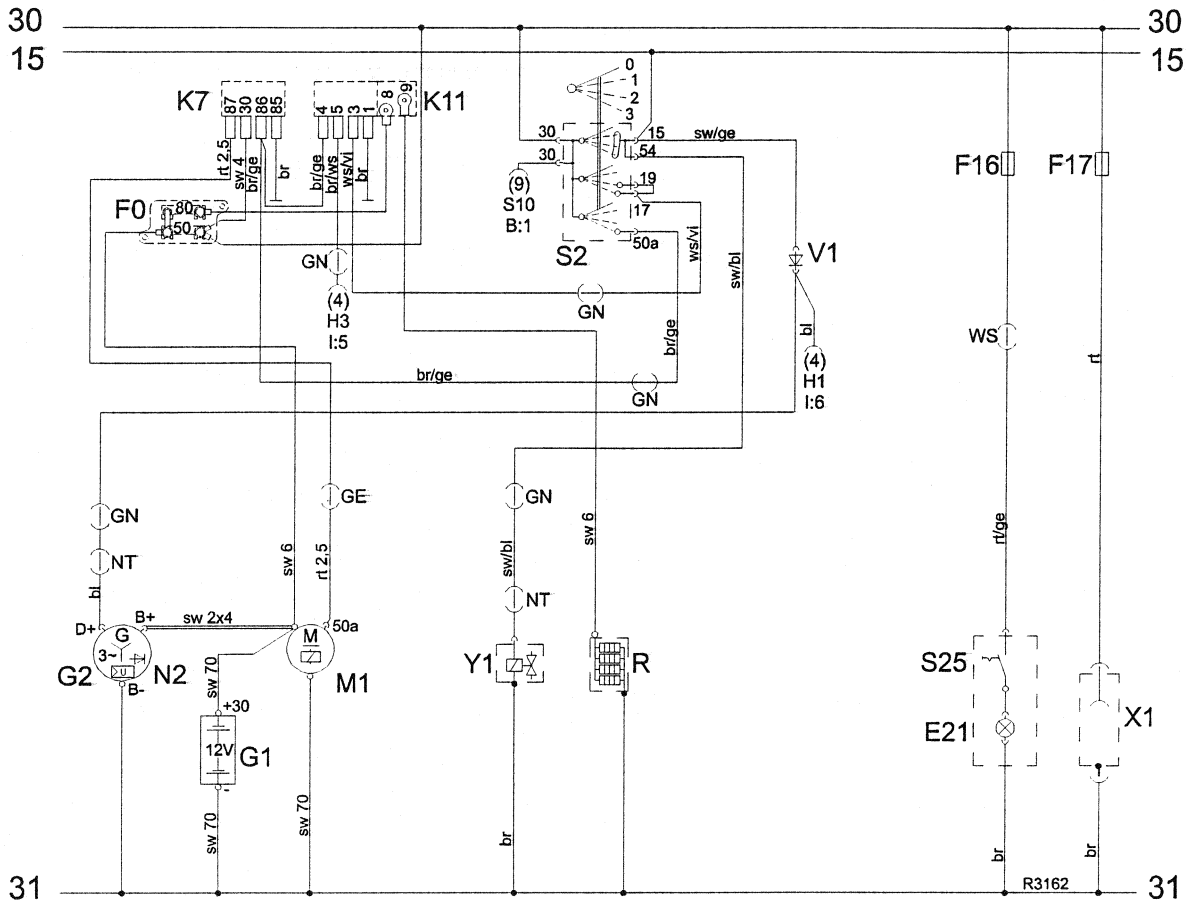
Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Wiper	F 15	10	Check module
F 2	10	Working hydraulics cut-off	F 16	10	Rotating beacon, internal light
F 3	10	Working floodlight, front	F 17	20	Socket, Radio
F 4	10	Working floodlight, rear	F 18	10	
F 5	10	Float position	F 19	15	
F 6	10	Horn	F 20	10	
F 7	15	Heater fan	F 21	10	Working floodlight, front
F 8	10	Travel fast/ slow	F 22		Working floodlight, rear
F 9	10	Power supply level sensor	F 23		--
F 10	10	Hammer	F 24		--
F 11	10	Proximity switch - maintenance steps	F 25		--
F 12	10	Radio	F 26		--
F 13	10	Check module Check module power supply	F 27		--
F 14	10	--	F 28	Diode 1 A	Electrical engine shut-off

Cable colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	light red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	whie
dbr	dark brown	hbl	light blue	or	orange		

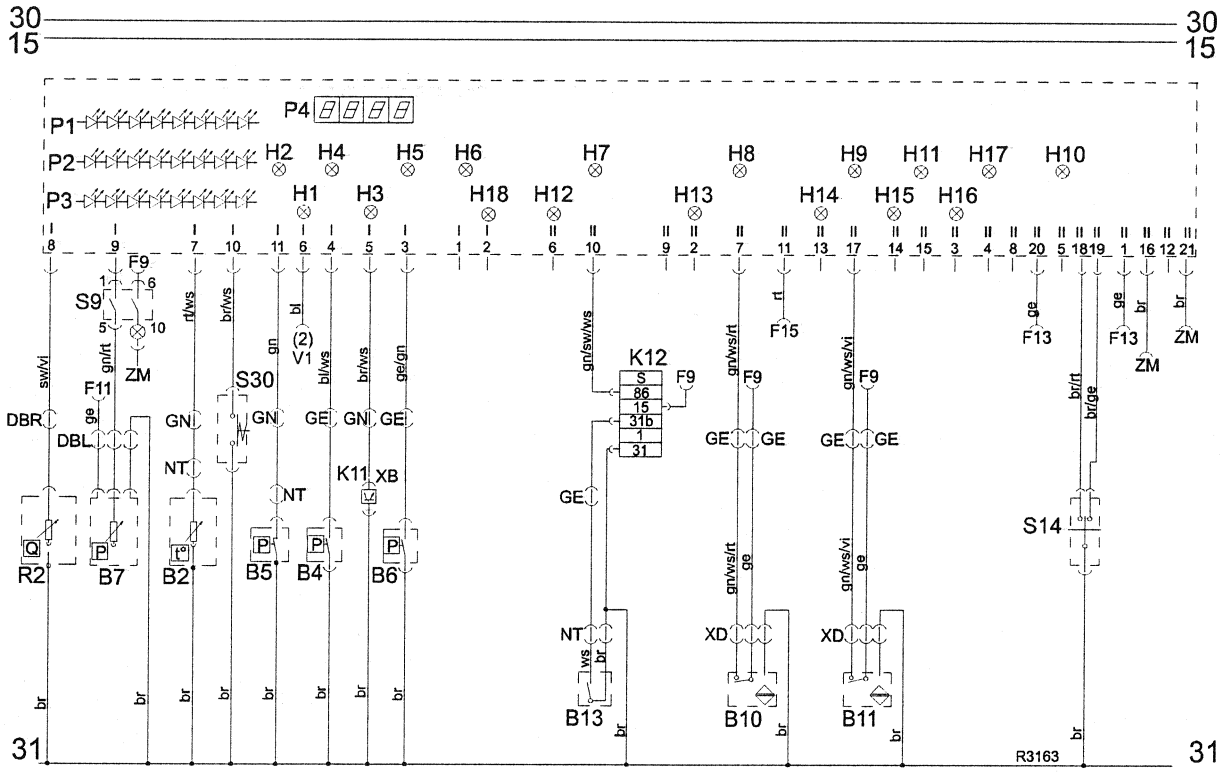
SCHAEFF	Typ/Model/Type **HR 31 (from serial no. 033/2122)**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Fuse and relay box**	Blatt/Page/Feuille **7.64.01**

1. Power supply	2. Pre-heater starting system	3. Internal light, radio, clock socket



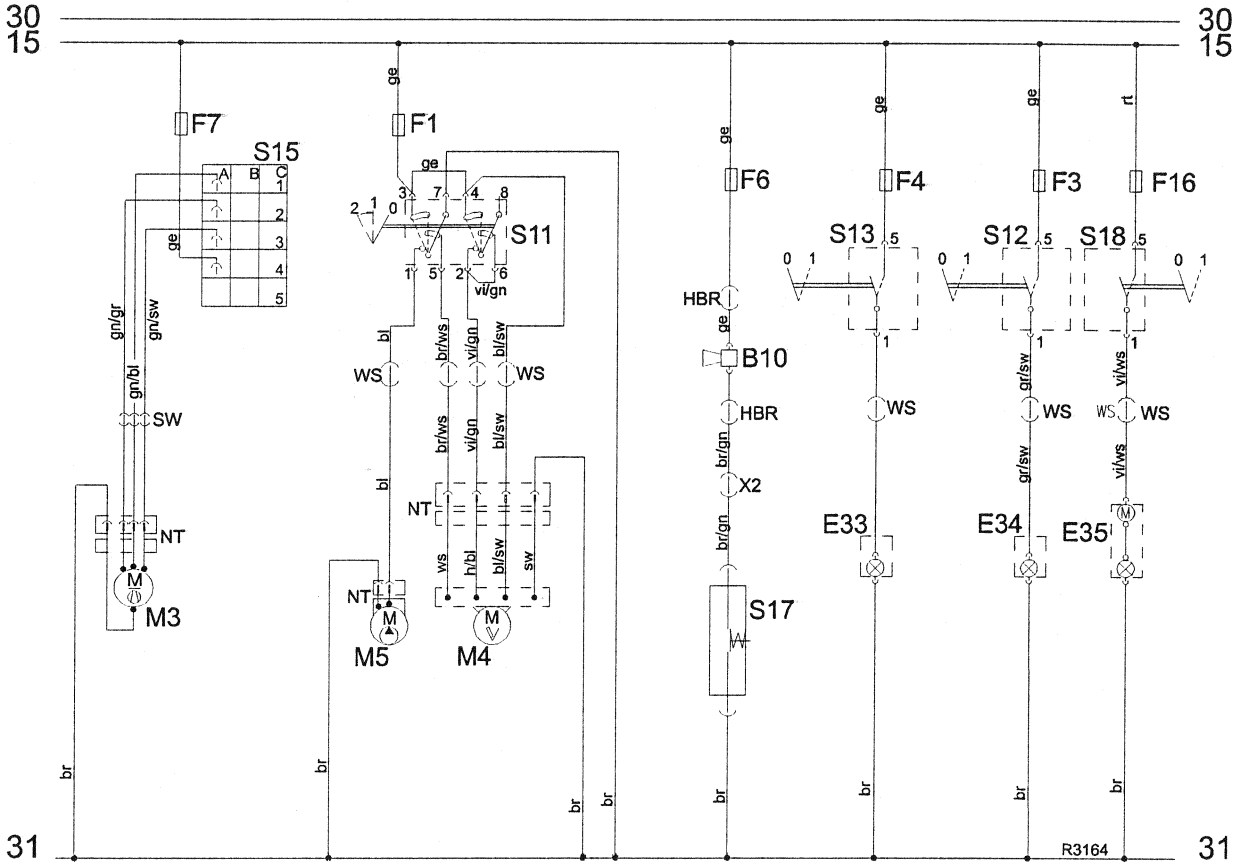
Section Qty.	Desig-nation	Device
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	M2	Generator regulator
2	FO	Slimline fuses
2		***Pre-heater starting system***
1	S2	Glow plug/starter switch
1	V1	Blocking diode
1	K7	Starting relay
1	M1	Starter motor

Section Qty.	Desig-nation	Device
1	Y1	Electr. motor cut-off
1	S2	Glow plug/starter switch
1	K11	Pre-heating time control unit
1	R	Glow plugs
3		***Internal light***
1	F16	Fuse
1	S25	Internal light switch
1	E21	Internal light
1	F17	Fuse
1	X1	Socket



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
4		***Display units***	1	H6	Free
1	P1	Fuel gauge	1	H18	Free
1	R2	Fuel gauge transmitter	1	H12	Free
1	P2	Engine coolant	1	H14	Free
1	P3	Overload warning device	1	H15	Free
1	S9	Overload warning cut-off	1	H7	Engine oil level
1	B7	Hydr. oil pressure sensor	1	K12	Engine oil control electronics
1	B2	Coolant temperature sensor	1	B13	Engine oil level sensor
1	S30	Check button	1	H13	Free
1	P4	Elapsed hour meter, daily counter	1	H8	Engine coolant level
1	H2	Engine oil pressure lamp	1	XD	Plug
1	B5	Engine oil pressure switch	1	B10	Coolant level sensor
1	H1	Battery charge indicator lamp	1	H9	Hydraulic oil level
1	H4	Air filter indicator	1	XD	Plug
1	B4	Air filter clogging	1	B11	Hydraulic oil level
1	H3	Pre-heating indicator	1	H11	Free
1	XB	Plug	1	H16	Free
1	K11	Pre-heating time relay	1	H17	Free
1	H5	Hydraulic filter clogging indicator	1	H10	Free
1	B6	Hydraulic filter clogging	1	S14	Display changeover switch

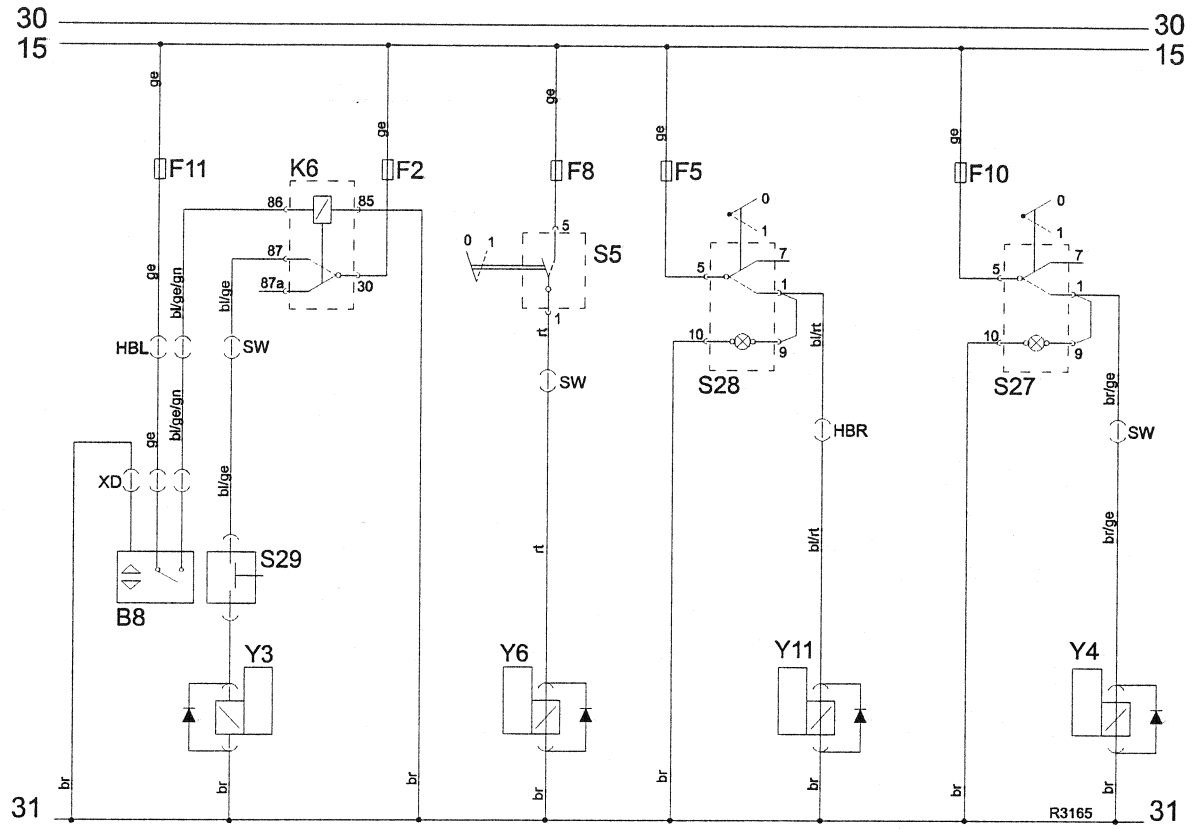
6. Heater fan	7. Wash/wipe system	8. Signalling system	9. Working floodlights



Section Qty.	Desig-nation	Device
6		***Heater fan***
1	F7	Fuse
1	S15	Switch for heater fan
1	M3	Heater fan
7		***Wash/wipe system***
1	F1	Fuse
1	S11	Wiper switch
1	M4	Wiper motor
1	M5	Washer pump
8		***Signalling system***
1	F6	Fuse
1	B10	Horn

Section Qty.	Desig-nation	Device
1	X2	Plug connection
1	S17	Horn button
9		***Working floodlights***
1	F3	Fuse
1	S12	Switch for working floodlights, front
1	E34	Working floodlights, front
1	F16	Fuse
1	S18	Switch for rotating beacon
1	E35	Rotating beacon
1	F4	Fuse
1	S13	Switch for working floodlights, rear
1	E33	Working floodlight

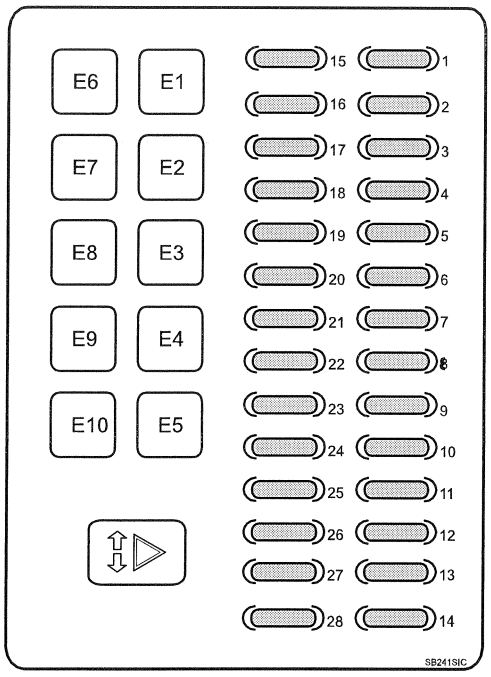
10. Working hydraulics cut-off	11. Fast-Slow	12. Float position	13. Hammer



Section Qty.	Desig-nation	Device
10		***Working hydraulics cut-off***
1	F11	Fuse
1	XD	Plug
1	B6	Proximity switch
1	F2	Fuse
1	K6	Relay: Safety device for entry steps
1	S29	Armrest switch
1	Y3	Valve for working hydraulics cut-off
11		***Fast-Slow***
1	F8	Fuse
1	S5	Switch for fast-slow
1	Y6	Valve for fast-slow

Section Qty.	Desig-nation	Device
12		***Float position***
1	F5	Fuse
1	S28	Switch for float position
1	Y11	Valve for float position
13		***Hammer***
1	F10	Fuse
1	S27	Switch; hammer
1	Y4	Valve: hammer

Fuse and relay box - assignment



Location	Relay	Function
E 1	-	unassigned
E 2	-	unassigned
E 3	-	unassigned
E 4	-	unassigned
E 5	-	unassigned
E 6	K 6	pilot control
E 7	-	unassigned
E 8	-	unassigned
E 9	-	unassigned
E 10	-	unassigned
⇧⇩ ▷		unassigned

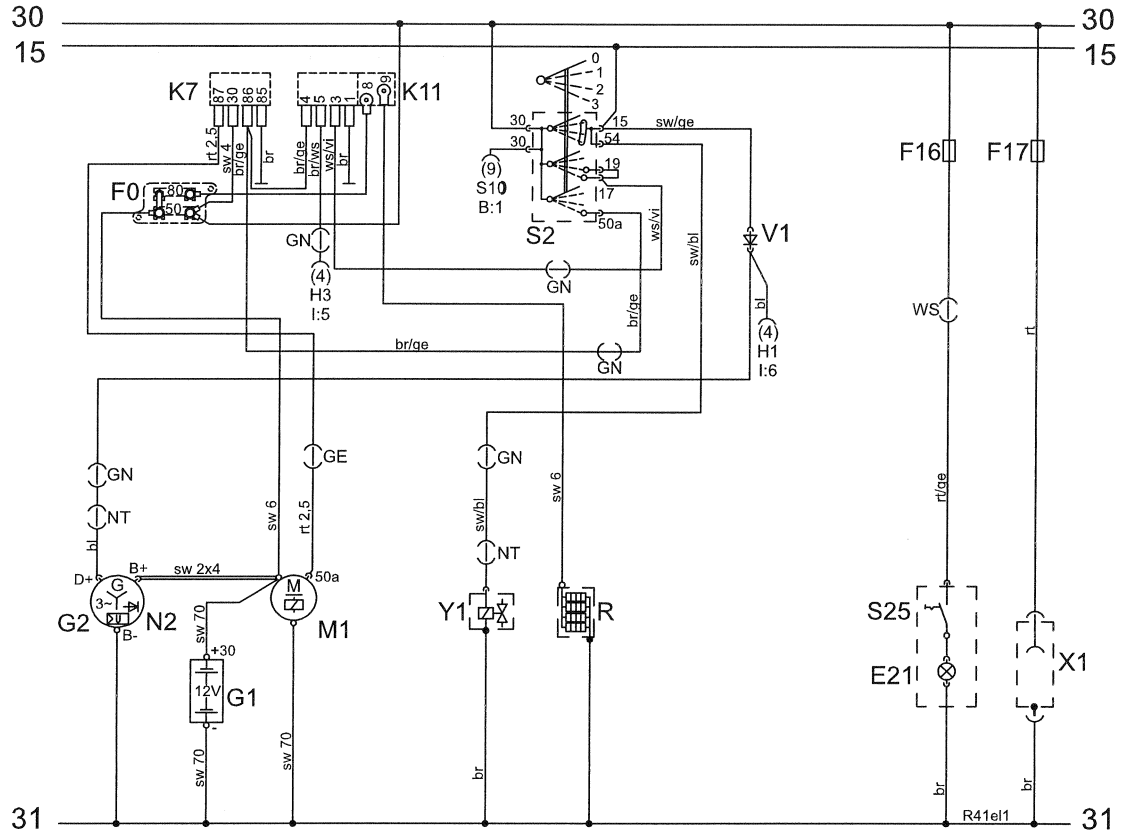
Item	Ampere	Assigned with	Item	Ampere	Assigned with
F 1	10		F 15	10	Control module
F 2	10	Shut-off working hydraulics	F 16	10	Rotating beacon Cabin lamp
F 3	15	Wiper switch	F 17	15	Socket, radio
F 4	10	Travel - quick / slow	F 18	15	
F 5	10		F 19	15	
F 6	10	Horn	F 20	10	
F 7	20	Heater fan	F 21	10	Working floodlights front
F 8	10		F 22		Working floodlight rear
F 9	10	Power supply level - transmitter	F 23		--
F 10	10		F 24		--
F 11	20		F 25		--
F 12	10	Radio	F 26		--
F 13	10	Control module Control module power supply	F 27		--
F 14	10	--	F 28	Diode	Electr. motor shut-off

Cable and connector colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	bright red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

SCHAEFF	Typ/Model/Type **HR 41**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Fuse and relay box - assignment diagram**	Blatt/Page/Feuille **7.66.01**

1. Power supply	2. Pre-glow starting system	3. Cabin lamp, radio, clock, socket

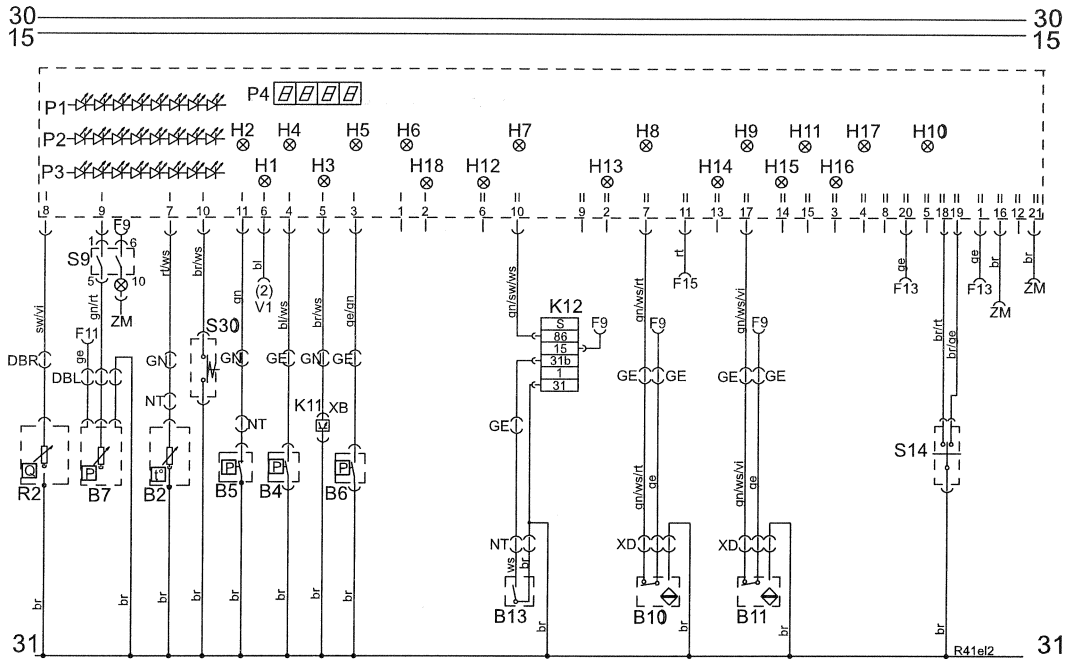


Section Qty.	Code	Unit
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	M2	Generator regulator
2	NT	Plug connection
1	GN	Plug connection
2	FO	Blade-type fuses
1	GN	Plug connection
1	NT	Plug connection
2		***Pre-glow starting system***
1	S2	Glow starter switch
1	V1	Blocking diode
1	K7	Starting relay
1	M1	Starter motor

Section Qty.	Code	Unit
1	GN	Plug connection
1	NT	Plug connection
1	Y1	Electr. motor shut-off
1	S2	Glow starter switch
1	GN	Plug connection
1	K11	Pre-glow time control unit
1	R	Glow plugs
3		***Cabin lamp***
1	F:16	Fuse
1	WS	Plug connection
1	S25	Cabin lamp switch
1	E21	Cabin lamp
1	F:17	Fuse
1	X1	Socket

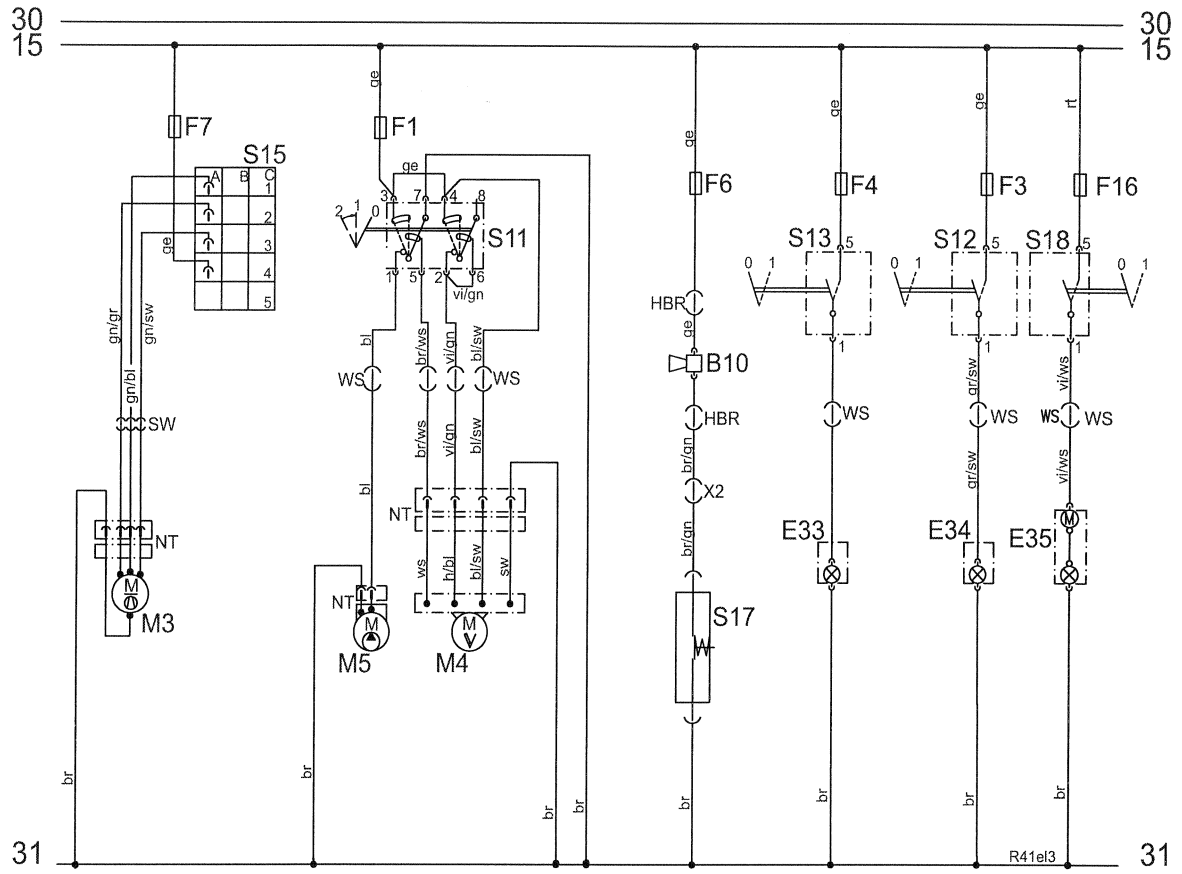
SCHAEFF	Typ/Model/Type **HR 41**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.66.02**

4. Indicators



Section Qty.	Code	Unit	Section Qty.	Code	Unit
4		***Indicators***	1	H5	Hydr. filter clogging indicator
1	P1	Fuel level indicator	1	GE	Plug connection
1	DBR	Plug connection	1	B6	Hydr. filter clogging
1	R2	Fuel level transmitter	1	H6	Blank
1	P2	Engine cooling water	1	H18	Blank
1	P3	Load warning indicator	1	H12	Blank
1	DBL	Plug connection	1	H14	Blank
1	GN	Plug connection	1	H15	Blank
1	S9	Load warning shut-off	1	H7	Level engine oil
1	B7	Hydr. oil pressure transmitter	1	K12	Electronic control device - engine oil
1	GN	Plug connection	1	GE	Plug connection
1	NT	Plug connection	1	NT	Plug connection
1	B2	Temp. sensor cooling water	1	B13	Level transmitter engine oil
1	S30	Check push button	1	H13	Blank
1	P4	Working hour meter, daily hours	1	H8	Level engine oil cooling water
1	H2	Engine oil pressure lamp	2	GE	Plug connection
1	GN	Plug connection	1	XD	Plug connection
1	NT	Plug connection	1	B10	Level transmitt. cooling water
1	B5	Engine oil pressure switch	1	H9	Level hydraulic oil
1	H1	Charge warning lamp	2	GE	Plug connection
1	H4	Air filter control	1	XD	Plug connection
1	GE	Plug connection	1	B11	Level transmitter hydr. oil
1	B4	Air filter clogging	1	H11	Blank
1	H3	Pre-glow control	1	H16	Blank
1	GN	Plug connection	1	H17	Blank
1	XB	Connector	1	H10	Blank
1	K11	Pre-glow relay	1	S14	Switch-over display

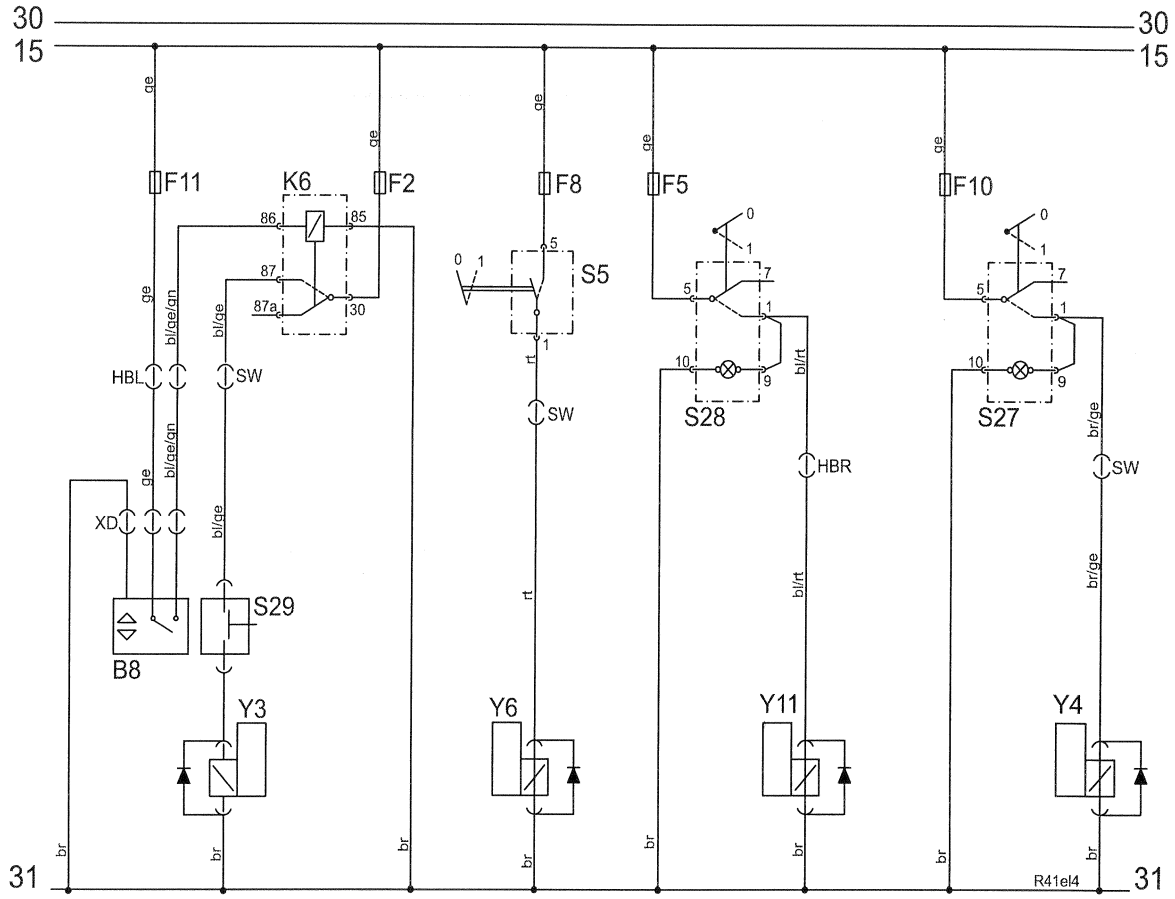
6. Heating ventilator	7. Wiper and washer system	8. Signal system	9. Working flood-light



Section Qty.	Code	Unit
6		***Heating ventilator***
1	F:7	Fuse
1	S15	Switch, heating ventilator
1	SW	Plug connection
1	NT	Plug connection
1	M 3	Heating ventilator
7		***Wiper and washer system***
1	F:1	Fuse
1	S11	Wiper switch
4	WS	Plug connection
1	NT	Plug connection
1	M4	Wiper motor
1	M5	Washer pump
8		***Signal system***
1	F:6	Fuse
1	HBR	Plug connection
1	B10	Signal horn

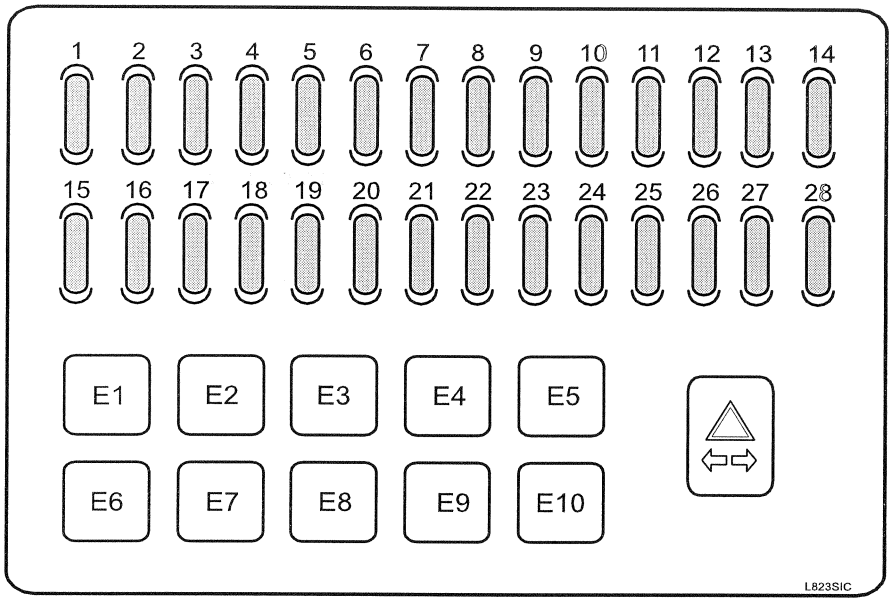
Section Qty.	Code	Unit
1	HBR	Plug connection
1	X2	Plug connection
1	S17	Horn push button
9		***Working floodlight***
1	F:3	Fuse
1	S12	Switch working floodlight front
1	WS	Plug connection
1	E34	Working floodlight front
1	F:16	Fuse
1	S18	Switch rotating beacon
1	WS	Plug connection
1	E35	Rotating beacon
1	F:4	Fuse
1	S13	Switch working floodlight rear
1	WS	Plug connection
1	E33	Working floodlight

10. Shut-off working hydraulics	11. Quick - slow	12. Floating position	13. Hammer



Section Qty.	Code	Unit
10		***Shut-off working hydraulics***
1	F:11	Fuse
1	HBL	Plug connection
1	XD	Plug connection
1	B6	Proximity switch
1	F:2	Fuse
1	K6	Relay: Safety ascent stairs
1	SW	Plug connection
1	S29	Armrest switch
1	Y3	Valve: Shut-off working hydraulics
11		***Quick - slow***
1	F:8	Fuse
1	S5	Switch, quick - slow
1	SW	Plug connection
1	Y6	Valve: quick-slow

Section Qty.	Code	Unit
12		***Floating position***
1	F:5	Fuse
1	S28	Switch floating position
1	HBR	Plug connection
1	Y11	Valve: floating position
13		***Hammer***
1	F:10	Fuse
1	S27	Switch, hammer
1	SW	Plug connection
1	Y4	Valve: hammer



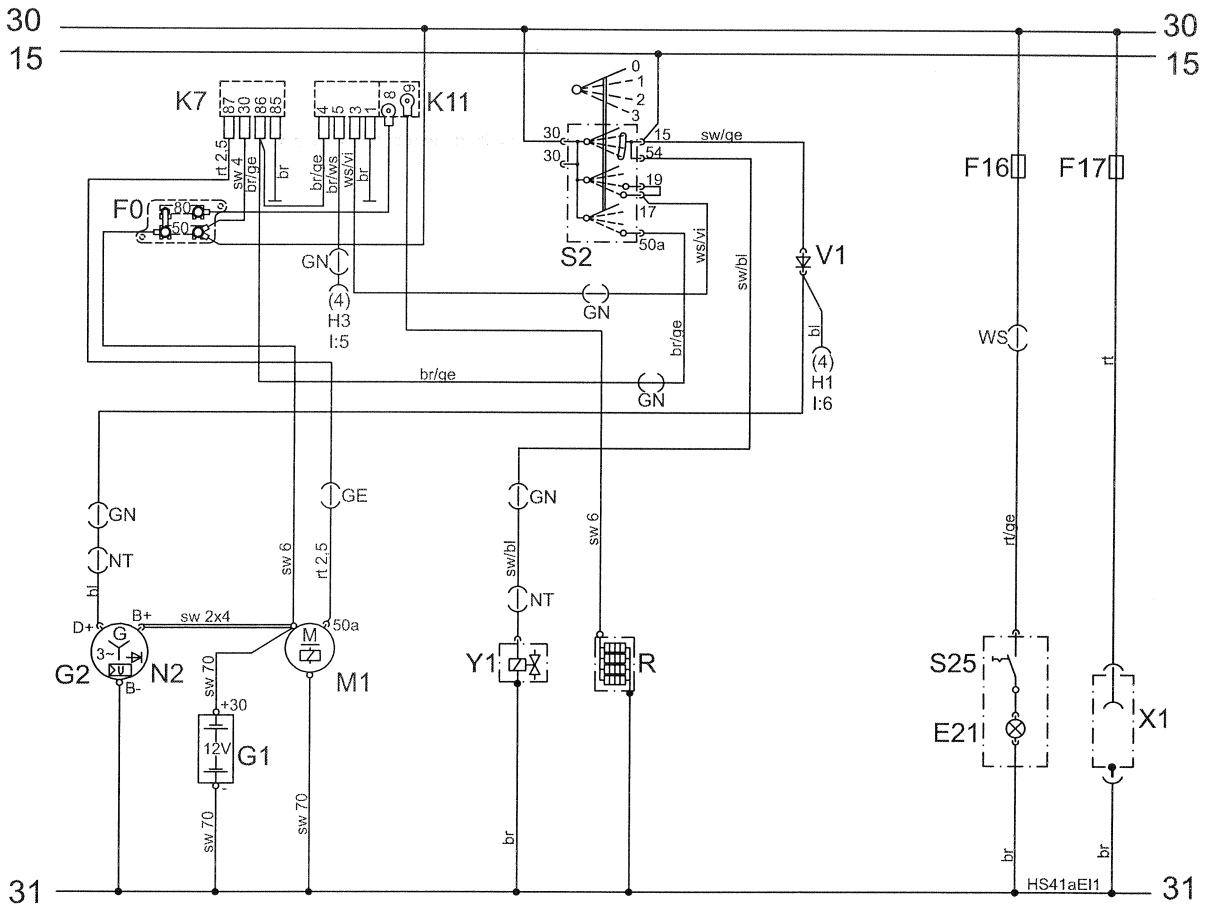
Fuse and diode assignment

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Wiper switch	F 15	10	Check module
F 2	10	Working hydraulics cut-off	F 16	10	Rotating beacon Interior light
F 3	10	Working floodlight, front	F 17	20	Socket, radio
F 4	10	Working floodlight, rear	F 18		
F 5	10	Lift - Spread	F 19		
F 6	10	Horn	F 20		
F 7	15	Heater fan	F 21		
F 8		--	F 22		
F 9	10	Power supply, level transmitter	F 23		
F 10	10	Wheel lock	F 24		
F 11	10	Overload warning device	F 25		
F 12	10	Radio	F 26		
F 13	10	Check module Check module, power supply	F 27		
F 14		--	F 28	Diode	Engine cut-off

Cable and connector colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	bright red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

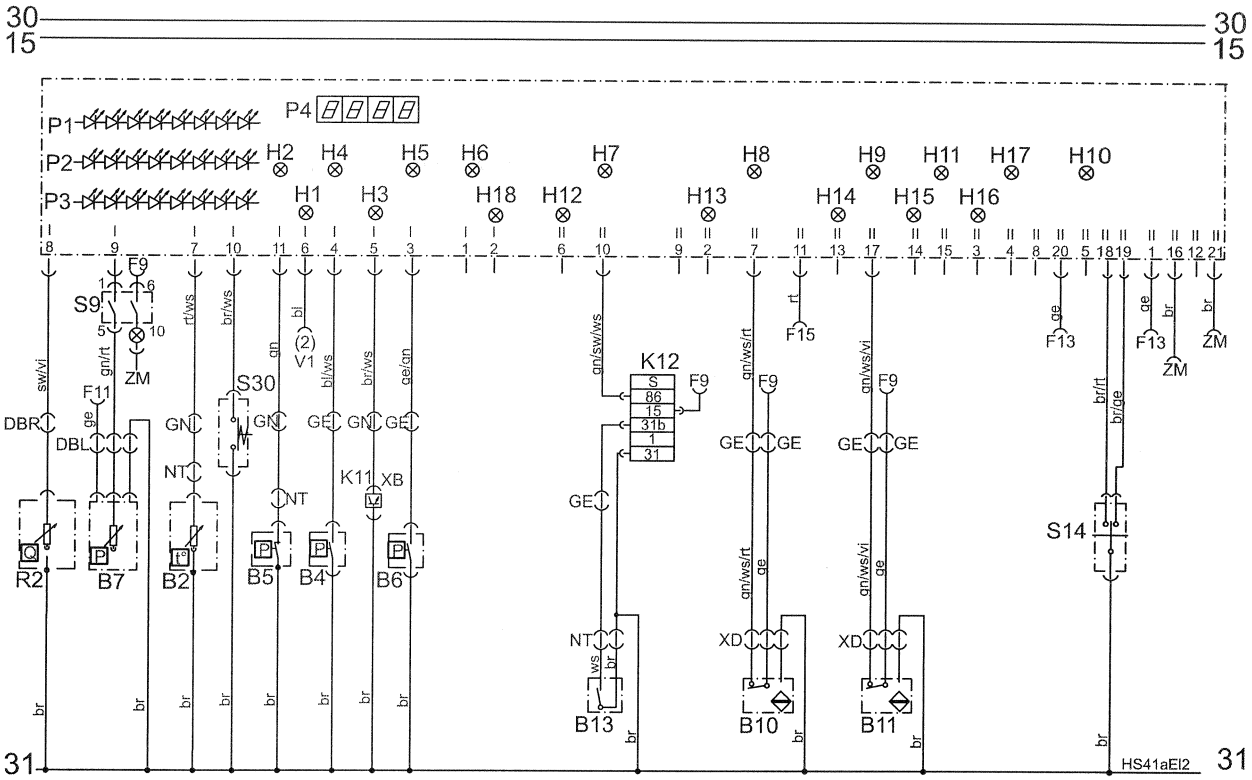
1. Power supply	2. Pre-heat/ starting system	3. Interior light, socket



Section Qty.	Designation	Device
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	N2	Generator regulator
2	FO	Blade-type fuses
2		***Pre-heat/ starting system***
1	S2	Pre-heat/ starter switch
1	V1	Blocking diode
1	K7	Starting relay
1	M1	Starter motor (starter)

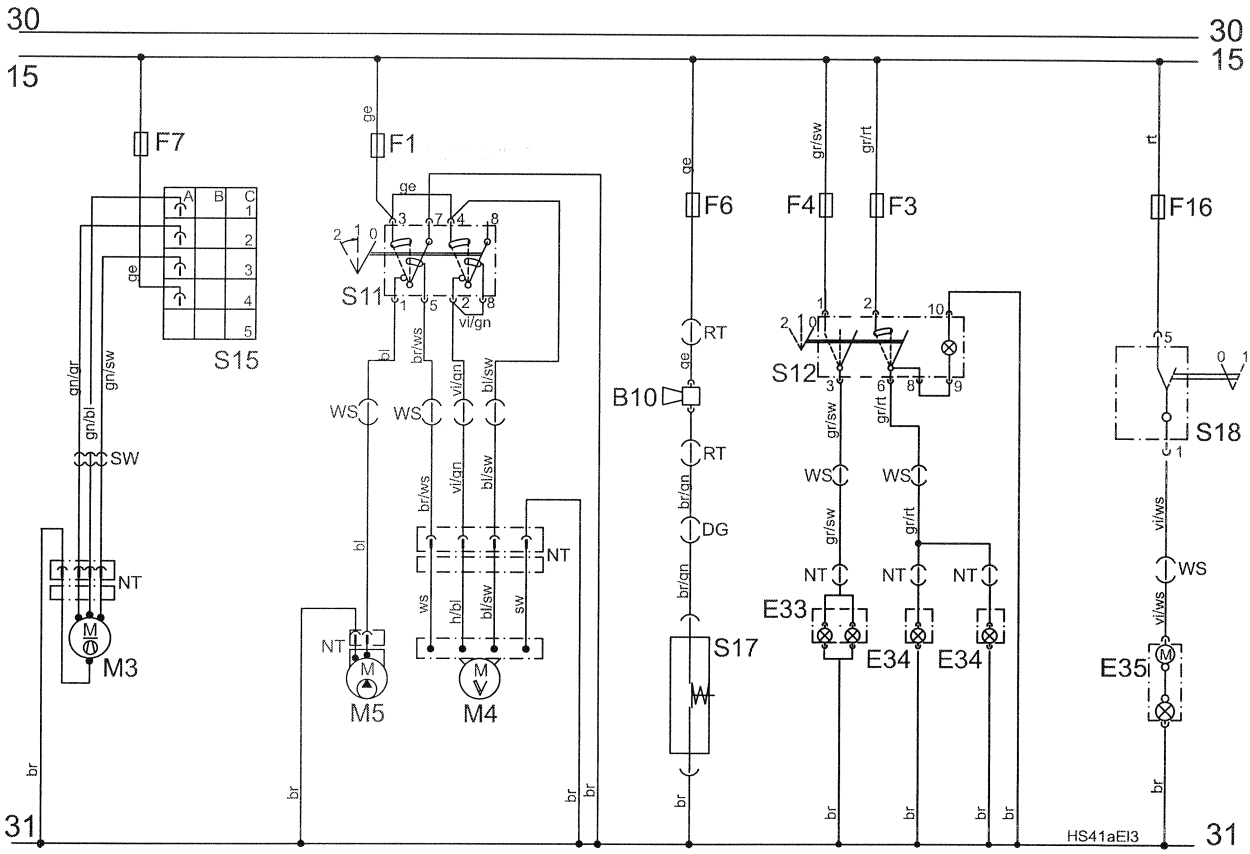
Section Qty.	Designation	Device
1	Y1	Electric engine cut-off
1	K11	Glow duration unit
1	R	Glow plugs
3		***Interior light***
1	F 16	Fuse
1	S25	Interior light switch
1	E21	Interior light
1	F 17	Fuse
1	X1	Socket

4. Display units



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
4		***Display units***			
1	P1	Fuel gauge	1	H6	unassigned
1	R2	Fuel gauge sensor	1	H18	unassigned
1	P2	Engine coolant	1	H12	unassigned
1	P3	Overload warning device	1	H14	unassigned
1	S9	Cut-off for overload warning de-vice	1	H15	unassigned
1	B7	Hydraulic oil pressure sensor	1	H7	Engine oil level
1	B2	Coolant temperature sensor	1	K12	Engine oil of control electronics
1	S30	Check button	1	B13	Engine oil level sensor
1	P4	Operating hour meter, trip recorder, watch	1	H13	unassigned
1	H2	Engine oil pressure lamp	1	H8	Engine coolant level
1	B5	Engine oil pressure switch	2	XD	Plug
1	H1	Battery charge indicator lamp	1	B10	Coolant level sensor
1	H4	Air filter indicator	1	H9	Hydraulic oil level
1	B4	Air filter clogging	1	B11	Hydraulic oil level sensor
1	H3	Pre-heating monitor	1	H11	unassigned
1	XB	Plug	1	H16	unassigned
1	K11	Pre-heating relay	1	H17	unassigned
1	H5	Hydr. filter clogging indicator	1	H10	unassigned
1	B6	Hydr. filter clogging	1	S14	Display of changeover switch

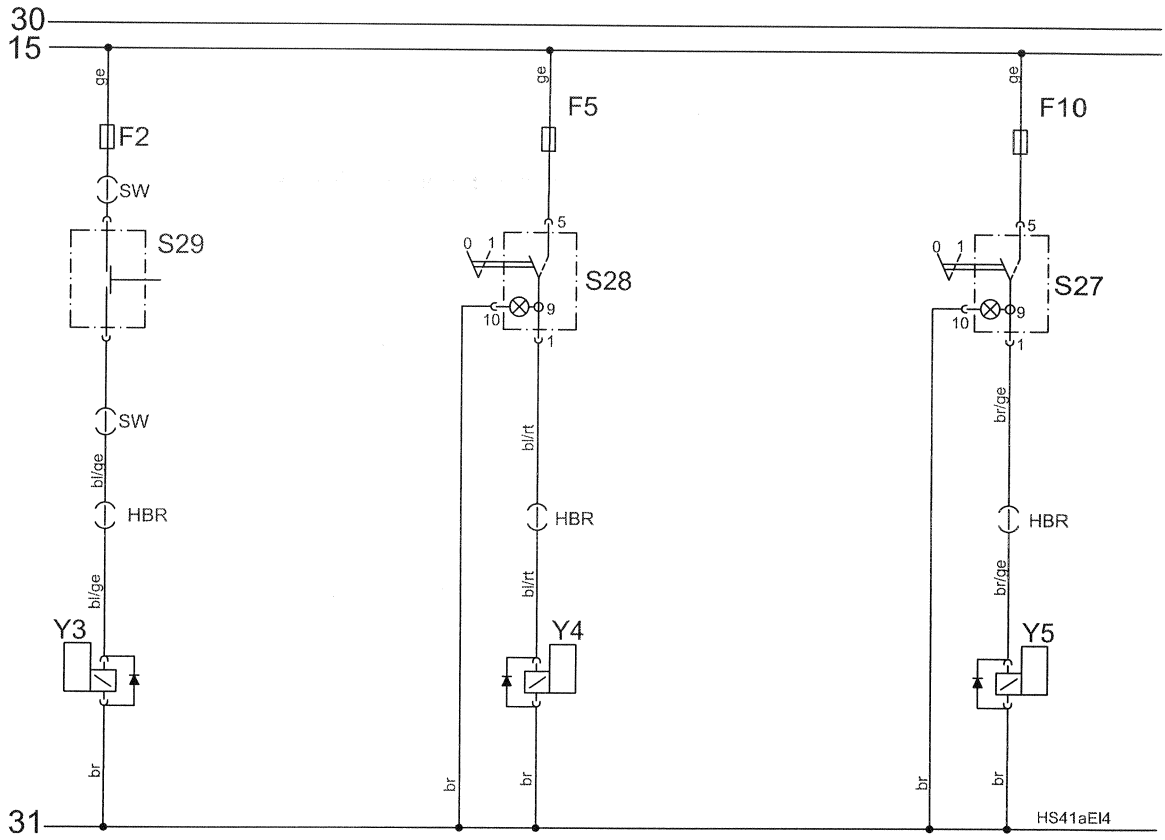
6. Heater fan	7. Wash/ wipe system	8. Signalling system	9. Working floodlights, rotating beacon



Section Qty.	Desig-nation	Device
6		***Heater fan***
1	F 7	Fuse
1	S15	Heater fan switch
1	M3	Heater fan
7		***Wash/ wipe system***
1	F 1	Fuse
1	S11	Wiper switch
1	M4	Wiper motor
1	M5	Washer pump
8		***Signalling system***
1	F 6	Fuse
1	B10	Signal horn
1	S17	Horn

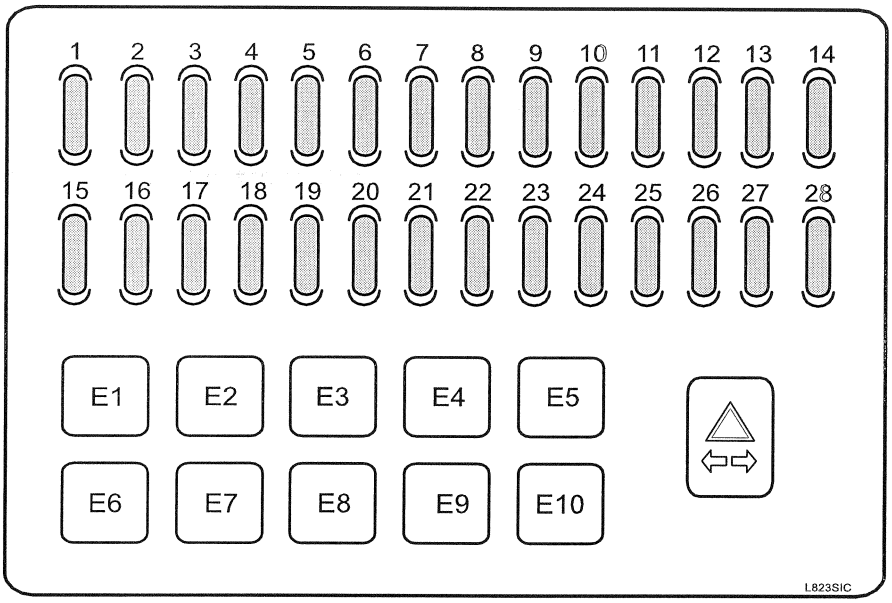
Section Qty.	Desig-nation	Device
9		***Working floodlights***
	F3	Fuse
	S12	Working floodlight switch
	E34	Working floodlight, front
	F4	Fuse
	S13	Working floodlight switch
	E33	Working floodlight, rear
	F16	Fuse
	S18	Rotating beacon switch
	E35	Rotating beacon

10. Pilot control	11. Lift - spread	12. Wheel lock



Section Qty.	Desig-nation	Device
10		***Pilot control***
1	F2	Fuse
1	S29	Armrest switch
1	Y3	Pilot control
11		***Lift - Spread***
1	F5	Fuse
1	S28	Lift - spread
1	Y4	Lift - spread

Section Qty.	Desig-nation	Device
12		***Wheel lock***
1	F10	Fuse
1	S27	Wheel lock
1	Y5	Wheel lock



Location	Relay	Function
E 1	--	not assigned
E 2	K 2	Pilot control
E 3	K 3	Brake/ free-wheel
E 4	K 4	Mowing
E 5	--	not assigned
E 6	--	not assigned
E 7	--	not assigned
E 8	--	not assigned
E 9	--	not assigned
E 10	--	not assigned
	K 1	Directional indicator

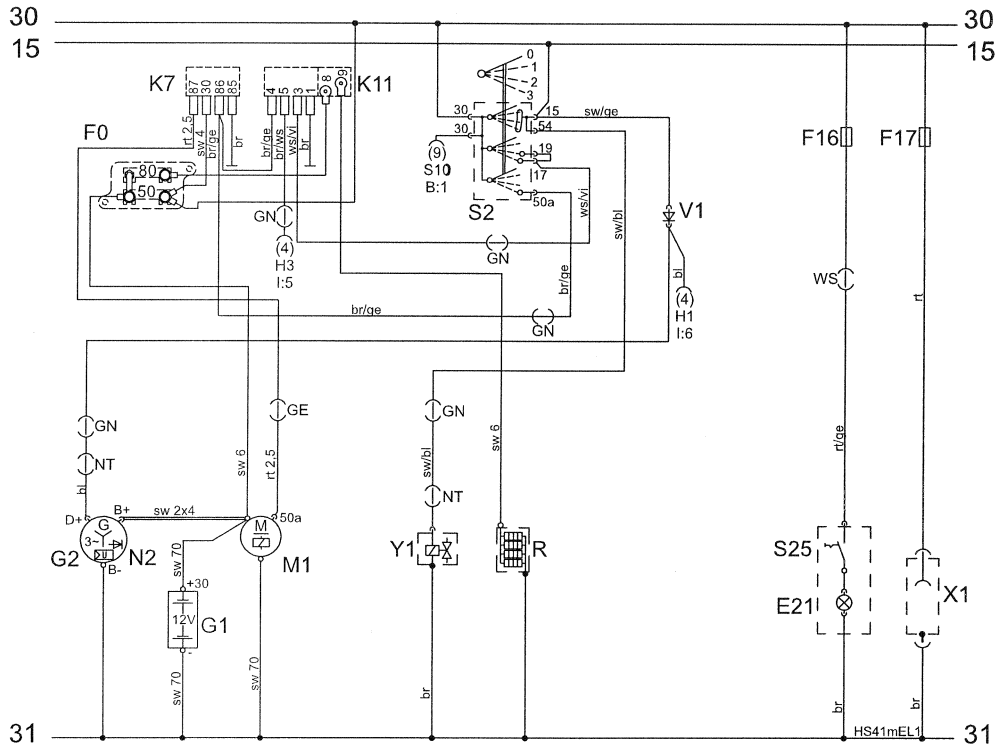
Fuse and diode assignment

Item	Amps	Assigned to	Item	Amps	Assigned to
F 1	10	Hazard warning switch Wiper switch	F 15	10	Hazard warning switch Check module
F 2	10	Working hydraulics cut-off	F 16	10	Rotating beacon Interior light
F 3	10	Fast - Slow	F 17	20	Socket Radio
F 4	10	Brake/ free-wheel	F 18	15	Lower beam
F 5	10	Working floodlight, front	F 19		
F 6	10	Horn, headlamp flasher Working floodlight, rear	F 20	10	Side marker light, left
F 7	15	Heater fan	F 21	10	Side marker light, right
F 8	10	Lift - Spread	F 22		
F 9	10	Power supply, level transmitter	F 23		
F 10	10	Mowing	F 24		
F 11	10	Pressure sensor for overload warning	F 25		
F 12	10	Radio	F 26		
F 13	10	Check module Check module power supply	F 27		
F 14		--	F 28	Diode	Engine cut-off

Cable and connector colours

bg	beige	dgr	dark grey	hbr	light brown	rt	red
bl	blue	ge	yellow	hgr	light grey	sw	black
br	brown	gn	green	hr	bright red	vi	violet
dbl	dark blue	gr	grey	nt	nature	ws	white
dbr	dark brown	hbl	light blue	or	orange		

1. Power supply	2. Pre-heat/ starting system	3. Interior light, socket

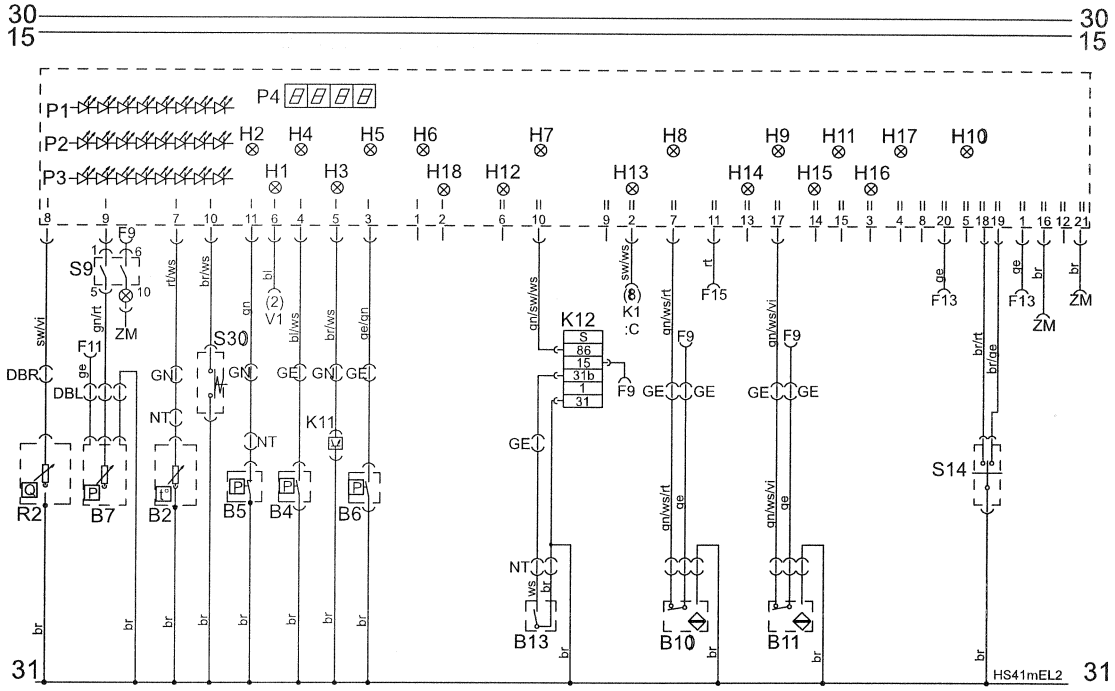


Section Qty.	Desig-nation	Device
1		***Power supply***
1	G1	Battery
1	G2	Generator
1	N2	Generator regulator
2	FO	Blade-type fuses
2		***Pre-heat/ starting system***
1	S2	Pre-heat/ starter switch
1	V1	Blocking diode
1	K7	Starting relay
1	M1	Starter motor (starter)

Section Qty.	Desig-nation	Device
1	Y1	Electrical engine cut-off
1	S2	Pre-heat/ starter switch
1	K11	Glow duration unit
1	R	Glow plugs
3		***Interior light***
1	F 16	Fuse
1	S25	Interior light switch
1	E21	Interior light
1	F 17	Fuse
1	X1	Socket

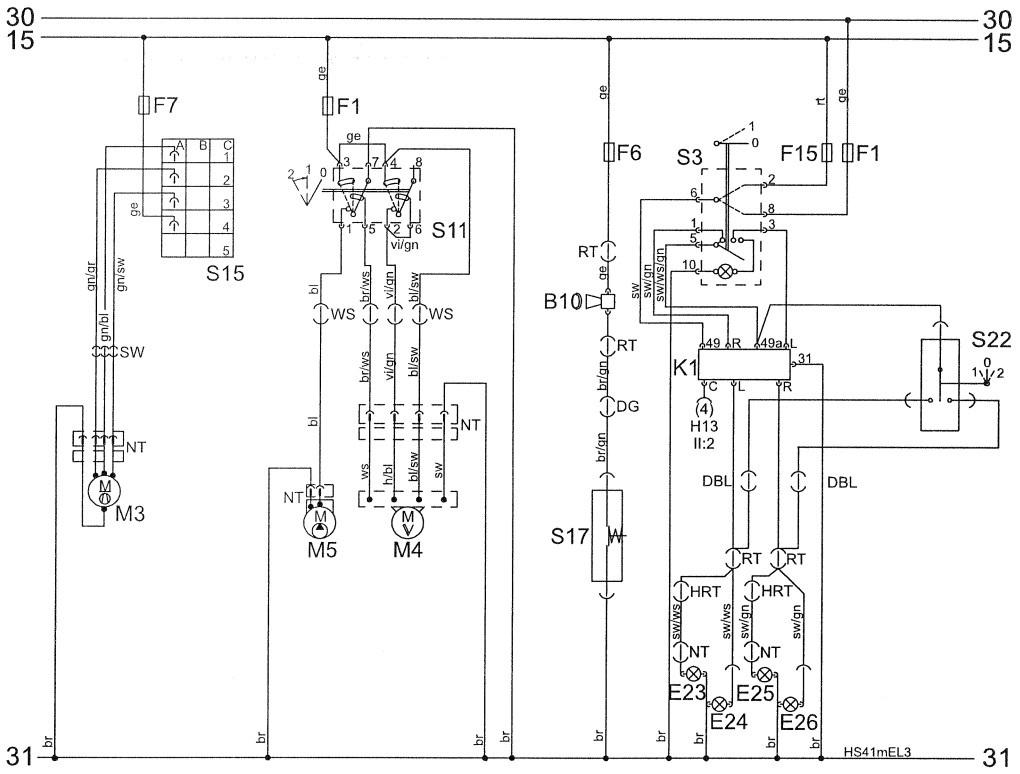
SCHAEFF	Typ/Model/Type **HS 41 M**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Wiring diagram**	Blatt/Page/Feuille **7.85.02**

4. Display units



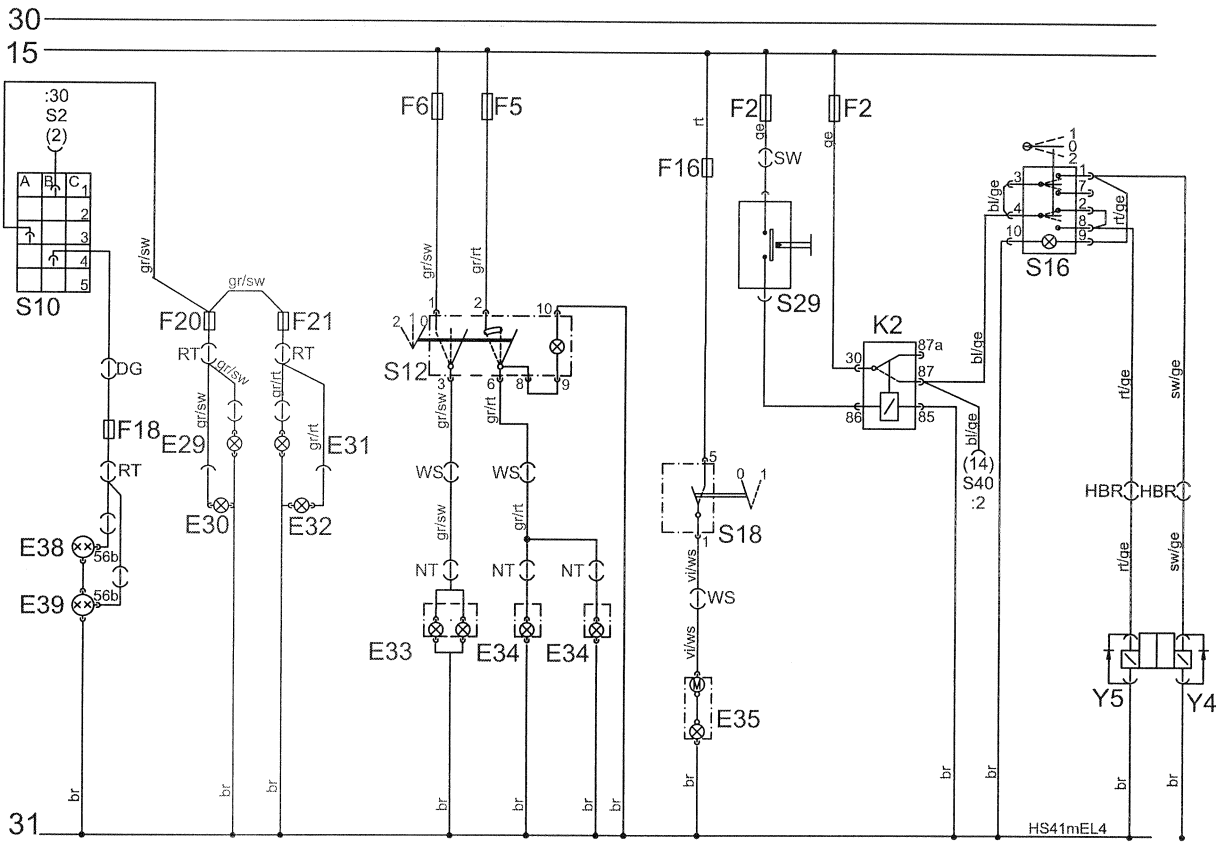
Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
4		***Display units***			
1	P1	Fuel gauge	1	H6	unassigned
1	R2	Fuel gauge sensor	1	H18	unassigned
1	P2	Engine coolant	1	H12	unassigned
1	P3	Overload warning device	1	H14	unassigned
1	S9	Cut-off for overload warning device	1	H15	unassigned
1	B7	Hydraulic oil pressure sensor	1	H7	Engine oil level
1	B2	Coolant temperature sensor	1	K12	Engine oil, control electronics
1	S30	Check button	1	B13	Engine oil, level sensor
1	P4	Operating hour meter, trip recorder, watch	1	H13	unassigned
1	H2	Engine oil pressure lamp	1	H8	Engine coolant level
1	B5	Engine oil pressure switch	2	XD	Plug connection
1	H1	Battery charge indicator lamp	1	B10	Coolant level sensor
1	H4	Air filter indicator	1	H9	Hydraulic oil level
1	B4	Air filter clogging	1	B11	Hydraulic oil level sensor
1	H3	Pre-heating monitor	1	H11	unassigned
1	XB	Plug	1	H16	unassigned
1	K11	Pre-heating relay	1	H17	unassigned
1	H5	Hydraulic filter clogging indicator	1	H10	unassigned
1	B6	Hydraulic filter clogging	1	S14	Display, changeover switch

6. Heater fan	7. Wash/ wipe system	8. Signaling system



Section Qty.	Desig-nation	Device	Section Qty.	Desig-nation	Device
6		***Heater fan***	1	S17	Horn button
1	F 7	Fuse	1	F 1	Fuse
1	S15	Switch for heater fan	1	F 15	Fuse
1	M3	Heater fan	1	S3	Hazard warning switch
			1	K1	Directional indicator
7		***Wash/ wipe system***	1	E23	Flashlight turn signal, front left
1	F 1	Fuse	1	E24	Flashlight turn signal, rear left
1	S11	Wiper switch	1	E25	Flashlight turn signal, front right
1	M4	Wiper motor	1	E26	Flashlight turn signal, rear right
1	M5	Washer pump	1	S22	Indicator control switch
8		***Signaling system***			
1	F 6	Fuse			
1	B10	Horn			

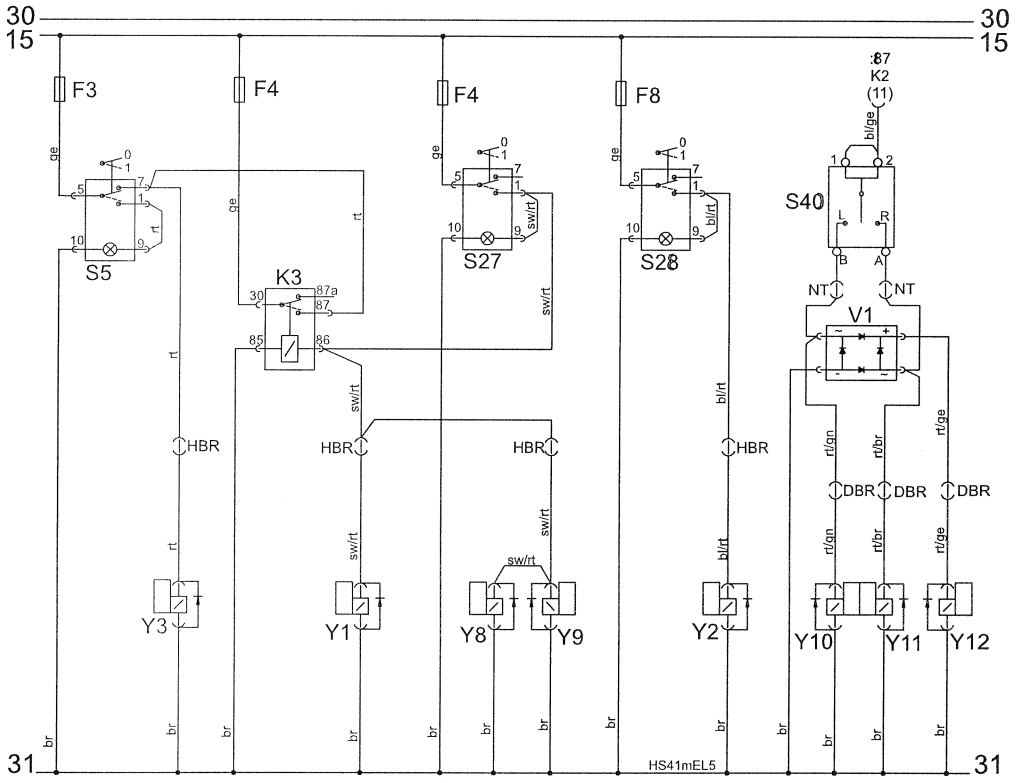
9. Lighting system	10. Working floodlights	11. Working hydraulics cut-off



Section Qty.	Desig-nation	Device
9		***Lighting system***
1	S10	Light switch
1	F 18	Fuse
1	E38	Lower beam, left
1	E39	Lower beam, right
1	F20	Fuse
1	E29	Side marker lamp, front left
1	E30	Side marker lamp, rear left
1	F21	Fuse
1	E31	Side marker lamp, front right
1	E32	Side marker lamp, rear right
10		***Working floodlights***
1	F5	Fuse
1	F6	Fuse
1	S12	Switch for working floodlights

Section Qty.	Desig-nation	Device
1	E34	Working floodlight, front
1	E33	Working floodlight, rear
1	F 16	Fuse
1	S18	Switch for rotating beacon
1	E35	Rotating beacon
11		***Working hydraulics cut-off***
2	F 2	Fuse
1	S29	Armrest switch
1	K2	Pilot control relay
1	S16	Changeover switch: work - travel
1	Y5	Valve: work
1	Y4	Valve: travel

12. Travel, brake, free-wheel drive mechanism	13. Lift-Spread	14. Steering



Section Qty.	Desig-nation	Device
12		***Travel, brake, free-wheel***
1	F 3	Fuse
1	S5	Fast - slow
1	Y3	Valve: fast - slow
2	F4	Fuse
1	K3	Brake/ free-wheel relay
1	Y1	Valve: brake
1	S27	Free-wheel
1	Y8	Valve: free-wheel
1	Y9	Valve: free-wheel

Section Qty.	Desig-nation	Device
13		***Lift - Spread***
1	F 8	Fuse
1	S26	Spread - Lift
1	Y2	Valve: Spread - Lift
14		***Steering***
1	S40	Steering
1	V1	Bridge rectifier
1	Y10	Valve: steering, left
1	Y11	Valve: steering, right
1	Y12	Valve: additional control circuit for steering

SUBGROUP LIST

Maintenance
Inspection plans and test certificates

SKL 823	8.03
SKL 823 Basic	8.04
SKL 833	8.05
SKL 833 Basic	8.06
SKL 843	8.07
SKL 853	8.09
SKL 877	8.15
SCL 515	8.20
SKS 633	8.35
SKB 2000	8.45
SMB 2041	8.46
HML 21	8.48
HML 51S	8.54
HR 21	8.62
HR 22	8.63
HR 31	8.64
HR 41	8.66
HS 41	8.84
HS 41M	8.85
HS 41MM	8.86

TEREX | SCHAEFF

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter		X	X	X	X	X	X		X
6	Check air intake	O	O	O	O	O	O	O		
7	Change air filter - main cartridge	**acc. to service indicator**								X
8	Change air filter - safety cartridge **1)**	**as required**								
9	Clean cooling fins of combined hydraulic oil/water radiator. ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
10	Check antifreeze level in coolant									O
11	Change coolant **1)**	**as required**								
12	Check V-belt tension	O	O	O	O	O	O	O		
13	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
14	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
15	Check valve lash of engine and adjust if necessary			O		O		O		
16	Check injection nozzles **2)**			O		O		O		
17	Replace crankcase breather in valve cover **1)**					X				
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Clean dust filter for cab ventilation and replace if necessary	O	O	X	O	X	O	X		X
20	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
21	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
22	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O	O	O	O	O	O		
24	Check that door catches function perfectly, and replace if necessary	O	O	O	O	O	O	O		
25	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		

1) at least every 2 years

2) every 3,000 operating by trained personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
26	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O	O	O	O	O	O		
28	Check or change hydraulic oil **3)**	O	O	X	O	X	O	X		X
29	Replace hydraulic oil filter insert.	X	X	X	X	X	X	X	X	
30	Replace ventilation filter.			X		X		X		X
31	Differential of rear axle and gearbox-oil check or oil change	O	X	O	X	O	X	O		X
32	Differential of front axle - oil check or oil change	O	X	O	X	O	X	O		X
33	Wheel hubs of front and rear axles - oil check or oil change.	O	X	O	X	O	X	O		X
34	Check function of brakes, change brake oil	O	O	O	O	X	O	O		X
35	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
36	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
37	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
38	Test run and test work	O	O	O	O	O	O	O		
39	Initial inspection cards and return to **Schaeff**	O	O	O						

3) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample intervals as specified by test lab.

SKL 823, up to serial no. 823/0717

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2520^{+50}						
Engine, low idle running speed	min^{-1}	800^{+50}						
Charge pressure, pilot pressure	bar	30^{+5}						high idle running speed
Start-up speed	min^{-1}	1150						
Engine stalling	min^{-1}	2100						full throttle, 280 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	270						dynamic at 2200 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	22						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	150	280					
Add. control circuit	bar	230	230					
Steering	bar	175	175					

SKL 823, from serial no. 823/0718

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2600^{+50}						
Engine, low idle running speed	min^{-1}	800^{+50}						
Charge pressure, pilot pressure	bar	30^{+5}						high idle running speed
Start-up speed	min^{-1}	1150						
Engine stalling	min^{-1}	2100						full throttle, 280 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	270						dynamic at 2200 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	22						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	150	280					
Add. control circuit	bar	230	230					
Steering	bar	175	175					

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours								
	Perform work with machine at operating temperature	100	500	1000	1500	2000	2500	3000	min 2x year-ly	min 1x year-ly
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter		X	X	X	X	X	X		X
6	Check air intake	O	O	O	O	O	O	O		
7	Change air filter - main cartridge	**acc. to service indicator**								X
8	Change air filter - safety cartridge **1)**	**as required**								
9	Clean cooling fins of combined hydraulic oil/water radiator. ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
10	Check antifreeze level in coolant									O
11	Change coolant **1)**	**as required**								
12	Check V-belt tension	O	O	O	O	O	O	O		
13	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
14	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
15	Check valve lash of engine and adjust if necessary			O		O		O		
16	Check injection nozzles **3)**							O		
17	Replace crankcase breather in valve cover **1)**					X				
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Clean dust filter for cab ventilation and replace if necessary	O	O	X	O	X	O	X		X
20	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
21	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
22	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary	O	O	O	O	O	O	O		
24	Check that door catches function perfectly, and replace if necessary	O	O	O	O	O	O	O		

1) at least every 2 years

3) every 3,000 operating hours by specialist personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
25	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
26	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O	O	O	O	O	O		
28	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
29	Replace hydraulic oil filter insert	X	X	X	X	X	X	X	X	
30	Replace ventilation filter			X		X		X		X
31	Differential of rear axle - oil check or oil change	O	X	O	X	O	X	O		X
32	Differential of front axle - oil check or oil change	O	X	O	X	O	X	O		X
33	Reduction gear: oil check or oil change	O	X	O	X	O	X	O		X
34	Wheel hubs of front and rear axles - oil check or oil change	O	X	O	X	O	X	O		X
35	Check function of brakes, change brake oil	O	O	O	O	X	O	O		X
36	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
37	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
38	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
39	Test run and test work	O	O	O	O	O	O	O		
40	Initial inspection cards and return to **SCHAEFF**	O	O	O						

2) Extension of hydraulic oil change interval - **Hydraulic oil change according to oil sample analysis and lab report. Oil sample intervals as specified by test lab**

SKL 823 Basic, from serial no. 823/0772

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2600 $^{+50}$						
Engine, low idle running speed	min^{-1}	800 $^{+50}$						
Charge pressure	bar	30 $^{+5}$						high idle running speed
Start-up speed	min^{-1}	1150 $^{\pm 50}$						
Engine stalling	min^{-1}	2100						210 bar HP, rabbit, dyn.
Pressure cut-off	bar	390 $^{+10}$						
High pressure (SV)	bar	420 $^{+10}$						
Regulation start DA-motor	bar	200						dynamic at 2250 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	22						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	140	280					
Add. control circuit	bar	---	---					
Steering	bar	175	175					

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter		X	X	X	X	X	X		X
6	Check air intake	O	O	O	O	O	O	O		
7	Change air filter main cartridge	**acc. to service indicator**								X
8	Change air filter safety cartridge **1)**	**as required**								
9	Clean cooling fins of combined hydraulic oil/ water radiator. ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
10	Check antifreeze level in coolant									O
11	Change coolant **1)**	**as required**								
12	Check V-belt tension	O	O	O	O	O	O	O		
13	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
14	Check engine speed adjustment, top-end and bottom end idle speed	O	O	O	O	O	O	O		
15	Check valve lash of engine and adjust if necessary			O		O		O		
16	Check injection nozzles **2)**							O		
17	Replace engine breather assembly in valve cover **1)**					X				
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Clean dust filter for cab ventilation or replace	O	O	X	O	X	O	X		X
20	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
21	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
22	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O	O	O	O	O	O		
24	Check that door catch functions perfectly, and replace if necessary	O	O	O	O	O	O	O		
25	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		

1) at least every 2 years

2) every 3,000 operating by trained personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
26	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
28	Check or change hydraulic oil **3)**	O	O	X	O	X	O	X		X
29	Replace hydraulic oil filter insert.	X	X	X	X	X	X	X	X	
30	Replace breather.			X		X		X		X
31	Differential of rear axle and transmission - oil check or oil change	O	X	O	X	O	X	O		X
32	Differential of front axle - oil check or oil change	O	X	O	X	O	X	O		X
33	Wheel hubs of front and rear axles - oil check or oil change.	O	X	O	X	O	X	O		X
34	Check function of brakes, change brake oil	O	O	O	O	X	O	O		X
35	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
36	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
37	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
38	Test run and test work	O	O	O	O	O	O	O		
39	Initial inspection cards and return to **Schaeff**	O	O	O						

3) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample intervals as specified by test lab.

SKL 833, serial no. 833/.....

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2520^{+50}						
Engine, low idle running speed	min^{-1}	800^{+50}						
Charge pressure, pilot pressure	bar	30^{+5}						high idle running speed
Start-up speed	min^{-1}	1150						
Engine stalling	min^{-1}	2100						full throttle, 220 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	210						dynamic at 2200 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	22						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	150	280					
Add. control circuit	bar	230	230					
Steering	bar	175	175					

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Replace fuel filter		X	X	X	X	X	X		X
6	Check air intake	O	O	O	O	O	O	O		
7	Replace air filter main cartridge	**acc. to service indicator**								X
8	Replace air filter safety cartridge **1)**	**as required**								
9	Clean cooling fins of combined hydraulic oil/ water radiator. ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
10	Check antifreeze level in coolant									O
11	Change coolant **1)**	**as required**								
12	Check V-belt tension	O	O	O	O	O	O	O		
13	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
14	Check engine speed adjustment, top-end and bottom end idle speed	O	O	O	O	O	O	O		
15	Check valve lash of engine and adjust if necessary			O		O		O		
16	Check injection nozzles **2)**							O		
17	Replace engine breather assembly in valve cover **1)**					X				
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Clean dust filter for cab ventilation or replace	O	O	X	O	X	O	X		X
20	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
21	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
22	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary	O	O	O	O	O	O	O		

1) at least every 2 years

2) every 3,000 operating hours by specialist personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x yearly	min 1x yearly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
24	Check that door catch functions perfectly, and replace if necessary	O	O	O	O	O	O	O		
25	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
26	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
28	Check or change hydraulic oil **3)**	O	O	X	O	X	O	X		X
29	Replace hydraulic oil filter insert	X	X	X	X	X	X	X	X	
30	Replace breather			X		X		X		X
31	Differential of rear axle and transmission - oil check or oil change	O	X	O	X	O	X	O		X
32	Differential of front axle - oil check or oil change	O	X	O	X	O	X	O		X
33	Wheel hubs of front and rear axles - oil check or oil change	O	X	O	X	O	X	O		X
34	Check function of brakes, change brake oil	O	O	O	O	X	O	O		X
35	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
36	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
37	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
38	Test run and test work	O	O	O	O	O	O	O		
39	Initial inspection cards and return to **SCHAEFF**	O	O	O						

3) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample intervals as specified by test lab.

SKL 833 Basic, from serial no. 833/2215

	Desired value	Actual value	Adjusted	Remark
Engine, transmission, brake, steering, loading				
Engine, high idle running speed min^{-1}	2520 $^{+50}$			
Engine, low idle running speed min^{-1}	800 $^{+50}$			
Charge pressure bar	30 $^{+5}$			high idle running speed
Start-up speed min^{-1}	1150 $^{\pm 50}$			
Engine stalling min^{-1}	2100			220 bar HP, rabbit, dyn.
Pressure cut-off bar	450 $^{+10}$			
High pressure (SV) bar	480 $^{+10}$			
Regulation start DA-motor bar	210			dynamic at 2200 min^{-1}
Cardan shaft rev. min^{-1}	see Techn. Data Chapter 2			
Beginning / end of inching bar	5 - 13			
Pressure switch, hydrostatic brake bar	22			
Main pressure relief valve bar	250			full throttle, 50° - 60° C

Line relief pressures	**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders							
Lifting frame bar	280	---					
Tilting bar	140	280					
Add. control circuit bar	---	---					
Steering bar	175	175					

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter		X	X	X	X	X	X		X
6	Clean fuel pump and screen		O	O	O	O	O	O		O
7	Check air intake	O	O	O	O	O	O	O		
8	Change air filter - main cartridge	**acc. to service indicator**								X
9	Change air filter - safety cartridge **1)**	**as required**								
10	Clean cooling fins of combined hydraulic oil/ water radiator. *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
11	Check antifreeze level in coolant									O
12	Change coolant **1)**	**as required**								
13	Check V-belt tension	O	O	O	O	O	O	O		
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
15	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
16	Check valve lash of engine and adjust if necessary	O		O		O		O		O
17	Check condition of engine breather system and clean **1)**					O				
18	Check acid level and connections of battery	O	O	O	O	O	O	O		
19	Clean dust filter for cab ventilation and replace if required	O	O	X	O	X	O	X		X
20	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
21	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
22	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
24	Check that door catches function perfectly, and replace if necessary	O	O	O	O	O	O	O		
25	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
26	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
28	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
29	Replace insert of hydraulic oil filter	X	X	X	X	X	X	X	X	
30	Replace ventilation filter			X		X		X		X
31	Rear axle differential with transmission - oil check or oil change	O	X	O	X	O	X	O		X
32	Front axle differential - oil check or oil change	O	X	O	X	O	X	O		X
33	Wheel hubs of front and rear axles: oil check or oil change	O	X	O	X	O	X	O		X
34	Check function of brakes and replace brake oil	O	O	O	O	X	O	O		X
35	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
36	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
37	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
38	Test run and test work	O	O	O	O	O	O	O		
39	Initial inspection cards and return to **Schaeff**	O	O	O						

2) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample intervals as specified by test lab.

SKL 843, serial no. 843/.....

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2350^{+70}						
Engine, low idle running speed	min^{-1}	750^{+50}						
Charge pressure, pilot pressure	bar	30^{+5}						high idle running speed
Start-up speed	min^{-1}	1150						
Engine stalling	min^{-1}	2000						full throttle, 270 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	250						dynamic at 2100 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	25						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	300	---					
Tilting	bar	160	280					
Add. control circuit	bar	230	230					
Steering	bar	175	175					

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter		X	X	X	X	X	X		X
6	Clean fuel pump and screen		O	O	O	O	O	O		O
7	Check air intake	O	O	O	O	O	O	O		
8	Change air filter - main cartridge	**acc. to service indicator**								X
9	Change air filter - safety cartridge **1)**	**as required**								
10	Clean cooling fins of combined hydraulic oil/ water radiator. *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
11	Check antifreeze level in coolant									O
12	Change coolant **1)**	**as required**								
13	Check V-belt tension	O	O	O	O	O	O	O		
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
15	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
16	Check valve lash of engine and adjust if necessary	O		O		O		O		O
17	Check condition of engine breather system and clean **1)**					O				
18	Check acid level and connections of battery	O	O	O	O	O	O	O		
19	Clean dust filter for cab ventilation and replace if required	O	O	X	O	X	O	X		X
20	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
21	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
22	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
23	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
24	Check that door catches function perfectly, and replace if necessary	O	O	O	O	O	O	O		
25	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
26	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
28	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
29	Replace insert of hydraulic oil filter	X	X	X	X	X	X	X	X	
30	Replace ventilation filter			X		X		X		X
31	Rear axle differential with transmission - oil check or oil change	O	X	O	X	O	X	O		X
32	Front axle differential - oil check or oil change	O	X	O	X	O	X	O		X
33	Wheel hubs of front and rear axles: oil check or oil change	O	X	O	X	O	X	O		X
34	Check function of brakes and replace brake oil	O	O	O	O	X	O	O		X
35	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
36	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
37	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
38	Test run and test work	O	O	O	O	O	O	O		
39	Initial inspection cards and return to **Schaeff**	O	O	O						

2) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample intervals as specified by test lab.

SKL 853, serial no. 853/.....

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2350^{+70}						
Engine, low idle running speed	min^{-1}	750^{+50}						
Charge pressure, pilot pressure	bar	28^{+5}						high idle running speed
Start-up speed	min^{-1}	1150						
Engine stalling	min^{-1}	2000						full throttle, 240 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	220						dynamic at 2100 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	25						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	300	---					
Tilting	bar	160	280					
Add. control circuit	bar	230	230					
Steering	bar	175	175					

Inspection plan

To be carried out by trained specialist dealer personnel.

O = Checking, maintenance X = *Replacement*		Operating hours							min	min. every 1.200 hours
	Work to be carried out while machine is warm	100	300	600	900	1200	1500	1800	2 times per year	1 time per year
1	Check whether machine-specific instruction book is in the machine.	O	O	O	O	O	O	O		
2	Change engine oil.	X	X	X	X	X	X	X		X
3	Change engine oil filter.	X	X	X	X	X	X	X		X
4	Drain water from fuel tank.	O	O	O	O	O	O	O	O	
5	Change fuel filter.	X	X	X	X	X	X	X		X
6	Clean fuel pump and screen.	O	O	O	O	O	O	O		O
7	Check air intake.	O	O	O	O	O	O	O		
8	Change air filter - main cartridge.	**acc. to service indicator**								X
9	Change air filter - safety cartridge. **1)**	**as required**								
10	Clean cooling fins of combined hydraulic oil-water cooler. ! note In case of stronger ratio of dust, shorten the cleaning intervals.	O	O	O	O	O	O	O		
11	Check coolant anti-freeze.									O
12	Change coolant. **1)**	**as required**								
13	Check V-belt tension.	O	O	O	O	O	O	O		
14	Check engine suspension and fastening of pumps.	O	O	O	O	O	O	O		
15	Check engine speed regulation, upper and lower idle-running speed.	O	O	O	O	O	O	O		
16	Check acid level and connections of battery.	O	O	O	O	O	O	O		
17	Check tappet clearance of engine and adjust, if necessary. **1)**					O				
18	Check injection nozzles. **1)**					O				
19	Check condition of tires, tire pressure and tightness of wheel nuts.	O	O	O	O	O	O	O		
20	Check tightness of axles and cardan shaft.	O	O	O	O	O	O	O		
21	Check bushes and bolts of working attachments and replace, if necessary.	O	O	O	O	O	O	O		
22	Check bolts and bushes of the articulation and the articulated steering and replace, if necessary.	O	O	O	O	O	O	O		
23	Check door catches, locks, hinges, pneumatic springs, etc. for good condition and excellent functioning, and replace, if necessary.	O	O	O	O	O	O	O		
24	Check electrical control and warning elements as well as lighting system.	O	O	O	O	O	O	O		
25	Check smooth running of all operating elements and adjust, if necessary.	O	O	O	O	O	O	O		

1) at least every 2 years

O = Checking, maintenance X = *Replacement*		Operating hours							min	min. every 1.200 hours
Work to be carried out while machine is warm		100	300	600	900	1200	1500	1800	2 times per year	1 time per year
26	Check tightness of all lines, hoses, control valves, hydraulic pumps, cylinders, etc. ! note When tightening hose and pipe connections, counterlock fittings to prevent turning.	O	O	O	O	O	O	O		
27	Check hydraulic oil, change, if necessary. **2)**	O	O	X	O	X	O	X		X
28	Change hydraulic oil - suction filter, filter insert.	X	X	X	X	X	X	X	X	
29	Change hydraulic oil return filter insert.	X	X	X	X	X	X	X		X
30	Change ventilation filter.			X		X		X		X
31	Check correct functioning of brakes and brake lamella clearance, change brake oil.	O	O	O	O	O	O	O		
32	Differential rear axle - check oil or change oil, resp.	O	X	O	X	O	X	O		X
33	Differential front axle - check oil or change oil, resp.	O	X	O	X	O	X	O		X
34	Transfer gear-box - check oil or change oil, resp.	O	X	O	X	O	X	O		X
35	Wheel hubs of front and rear axles: check oil or change oil, resp.	O	X	O	X	O	X	O		X
36	Grease machine according to overview of lubrication points.	O	O	O	O	O	O	O		
37	Check function, condition and completeness of safety devices.	O	O	O	O	O	O	O		
38	Check hydraulic functions and pressure of functions.	O	O	O	O	O	O	O		
39	Test run and test work	O	O	O	O	O	O	O		
40	Initial inspection cards and return to Messrs. Schaeff.	O	O	O						

2) **Extension of hydraulic oil - changing intervals -** Hydraulic oil change according to oil sample analysis and laboratory report. Oil sample intervals according to laboratory.

SKL 877, serial no. 877/.....

		Desired value		Actual value		Adjusted		Remark
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2350^{+70}						
Engine, low idle running speed	min^{-1}	700^{+50}						
Charge pressure, pilot pressure	bar	26^{+1}						high idle running speed
Start-up speed	min^{-1}	1150^{+50}						
Engine stalling	min^{-1}	2000 ±30						full throttle, 290 bar HP, tortoise
Pressure cut-off	bar	440^{+10}						
High pressure (SV)	bar	470						
Regulation start DA-motor	bar	250						dynamic
Pressure regulator HD-motor	bar	240						dynamic
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Brake accumulator pressure	bar	110 - 140						
Brake pressure	bar	60						
Safety valve	bar	280						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	150	280					
Add. control circuit	bar	230	230					
Raise/lower cabin	bar	175	175					
Steering	bar	175	175					

Inspection plan

To be carried out by trained specialist dealer personnel.

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 500	every 1000	every 2000			
1	Check whether machine-specific instruction book is in the machine	O	O					--
2	Change engine oil	X	X [2)]				X	
3	Change engine oil filter	X	X				X	
4	Drain water from fuel tank	O	O			O		
5	Change fuel filter		X				X	
6	Check air intake	O	O					
7	Change air filter - main cartridge	**according to service indicator**					X	
8	Change air filter - safety cartridge **1)**	**as required [1)]**						
9	Clean cooling fins of hydraulic oil radiator. *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
10	Clean cooling fins of engine oil radiator. *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
11	Check V-belt tension	O	O					
12	Check engine mounts and pump attachments	O	O					
13	Check engine speed adjustment, top-end and bottom-end idle speed	O	O					
14	Check valve lash of engine and adjust if necessary			O				
15	Check injection nozzles				O			
16	Check toothed belt and/or replace toothed belt with idler pulley [3)]			O				
17	Check acid level and battery connections	O	O					
18	Check condition of tires, tire pressure and tightness of wheel nuts	O	O					
19	Check secure fastening of axles and propeller shaft	O	O					
20	Check bearing bushings and bolts of work equipment and replace if necessary	O	O					
21	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O					
22	Check that door catches function perfectly, and replace if necessary (option)	O	O					

O = *Checking, maintenance* X = *Replacement*		Operating hours				min. 2x yearly	min. 1x yearly	
Perform work with machine at operating temperature		after 100	every 500	every 1000	every 2000			
23	Check electrical indicating and warning elements, and lighting system	O	O					
24	Check smooth running of operator controls and adjust if necessary	O	O					
25	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O					
26	Check or change hydraulic oil **2)**	O	O	X 2)			X	
27	Replace hydraulic oil suction filter cartridge.	X	X			X		
28	Replace ventilation filter.			X			X	
29	Check function of brakes, replace brake oil	O	O		X		X	
30	Bleed brake	O	O					
31	Differential of rear axle incl. transmission - oil check or oil change	X	O	X 2)			X	
32	Differential of front axle - oil check or oil change	X	O	X 2)			X	
33	Wheel hubs of front and rear axles - oil check or oil change.	X	O	X 2)			X	
34	Grease machine according to overview of lubricating points	O	O					
35	Check function, condition and completeness of safety equipment	O	O					
36	Hydraulic function check with pressure function test	O	O					
37	Test run and test work	O	O					
38	Initial inspection card and return to **SCHAEFF**	O	O 4)	O 4)				

1) At least every 2 years

2) Extension of oil change interval according to **SCHAEFF** oil sample analysis and lab report.

3) Every 5 years and 4,500 operating hours respectively

4) Within warranty

SCL 515, serial no. 515/.....

	Desired value	Actual value	Adjusted	Remark
Engine, transmission, brake, steering, loading				
Engine, high idle running speed min^{-1}	2450 $^{+50}$			
Engine, low idle running speed min^{-1}	800 $^{+50}$			
Charge pressure, pilot pressure bar	30 $^{\pm 1}$			high idle running speed
Start-up speed min^{-1}	1150 $^{\pm 50}$			
Engine stalling min^{-1}	2100 $^{-100}$			full throttle, 220 bar HP, rabbit, dyn.
Pressure cut-off bar	450			
High pressure (SV) bar	480			
Regulation start DA-motor bar	240			dynamic at 2150 min^{-1}
Cardan shaft rev. min^{-1}	see Techn. Data Chapter 2			
Beginning / end of inching bar	5 - 13			
Pressure switch, hydrostatic brake bar	25			
Main pressure relief valve **I** bar Lifting frame / Shovel / Option add. control circuit 36,8 l/min	250			full throttle, 50° - 60° C
Main pressure relief valve **II** bar Joystick steering	250			full throttle, 50° - 60° C
Main pressure relief valve **III** bar only with option additional control circuit 94.3 l/min	175			full throttle, 50° - 60° C

Line relief pressures	**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders							
Lifting frame bar	280	---					
Tilting bar	160	230					
Add. control circuit bar	230	230					
Steering bar	175	175					

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter		X	X	X	X	X	X		X
6	Check air intake	O	O	O	O	O	O	O		
7	Change air filter - main cartridge	**according to service indicator**								X
8	Change air filter - safety cartridge **1)**	**as required**								
9	Clean cooling fins of combined hydraulic oil/ water radiator *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
10	Check antifreeze level in coolant									O
11	Change coolant **1)**	**as required**								
12	Check V-belt tension	O	O	O	O	O	O	O		
13	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
14	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
15	Check valve lash of engine and adjust if necessary			O		O		O		
16	Check injection nozzles			O		O		O		
17	Replace engine breather assembly in valve cover **1)**					X				
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Clean or replace the dust filter for cab ventilation	O	O	X	O	X	O	X		X
20	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
21	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
22	Check that ring gear attachment screws are securely fastened	O	O	O	O	O	O	O		
23	Check function of axle lock and vent cylinders	O	O	O	O	O	O	O		
24	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
25	Check bushings and bolts of the articulation and the articulated steering and replace if necessary.	O	O	O	O	O	O	O		
26	Check that door catches function perfectly, replace if necessary	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
27	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
28	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
30	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
31	Replace insert of hydraulic oil filter	X	X	X	X	X	X	X	X	
32	Replace ventilation filter			X		X		X		X
33	Differential of rear axle and transmission- oil check or oil change	O	X	O	X	O	X	O		X
34	Differential of front axle - oil check or oil change	O	X	O	X	O	X	O		X
35	Wheel hubs of front and rear axles - oil check or oil change	O	X	O	X	O	X	O		X
36	Check function of brakes; replace brake oil	O	O	O	O	X	O	O		X
37	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
38	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
39	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
40	Test run and test work	O	O	O	O	O	O	O		
41	Initial inspection cards and return to **Schaeff**	O	O	O						

2) Extension of hydraulic oil change interval

Hydraulic oil change according to oil sample analysis and lab report. Oil sample intervals as specified by test lab.

SKS 633, serial no. 633/....

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, brake, steering, loading								
Engine, high idle running speed	min^{-1}	2520^{+50}						
Engine, low idle running speed	min^{-1}	800^{+50}						
Charge pressure, pilot pressure	bar	30^{+5}						high idle running speed
Start-up speed	min^{-1}	1150 ±50						
Engine stalling	min^{-1}	2100 ±50						full throttle, 220 bar HP, rabbit, dyn.
Pressure cut-off	bar	450						
High pressure (SV)	bar	480						
Regulation start DA-motor	bar	210						dynamic at 2200 min^{-1}
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Pressure switch, hydrostatic brake	bar	22						
Main pressure relief valve	bar	250						full throttle, 50° - 60° C
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Lifting frame	bar	280	---					
Tilting	bar	150	280					
Add. control circuit	bar	230	230					
Slewing	bar	230	230					
Steering	bar	175	175					full throttle

Inspection plan

To be carried out by trained dealer service personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours				at least 2x	at least 1x	
Perform work with machine at operating temperature		after 100	every 500	every 1000	every 2000	yearly	yearly	
1	Check whether machine-specific instruction book is in the machine	O	O					
2	Change engine oil	X	X [2)]				X	
3	Change engine oil filter	X	X				X	
4	Drain water from fuel tank	O	O			O		
5	Change fuel filter		X				X	
6	Clean fuel pump and screen		O				O	
7	Check air intake	O	O					
8	Change air filter main cartridge	**to service indicator**					X	
9	Change air filter safety cartridge	**as required [1)]**						
10	Clean cooling fins of combined hydraulic oil/water radiator. ⚠ *In case of high exposure to dust, shorten the cleaning intervals.*	O	O			O		
11	Check antifreeze level in coolant						O	
12	Change coolant	**as required [1)]**						
13	Check V-belt tension	O	O					
14	Check engine mounts and pump attachments	O	O					
15	Check engine speed adjustment, top-end and low idle speed	O	O					
16	Check valve lash of engine and adjust if necessary	O		O			O	
17	Check condition of crankcase breather and clean				O			
18	Check acid level and battery connections	O	O					
19	Clean the cab ventilation dust filter and replace if required		O	X			X	
20	Check condition of tires, tire pressure and tightness of wheel nuts	O	O					
21	Check secure fastening of axles and cardan shaft	O	O					
22	Check bearing bushings and bolts of the loader and the backhoe work equipment and replace if necessary	O	O					
23	Check bushings and bolts of the central steering and oscillation and replace if required	O	O					

O = *Checking, maintenance* X = *Replacement*		Operating hours				at least 2x	at least 1x	
Perform work with machine at operating temperature		after 100	every 500	every 1000	every 2000	yearly	yearly	
24	Check that door catches function perfectly, and replace if necessary	O	O					
25	Check electrical indicating and warning elements, and lighting system	O	O					
26	Check smooth running of loader and backhoe operator controls and adjust if necessary	O	O					
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O					
28	Check or change hydraulic oil	O	O	X [2)]			X	
29	Replace insert of hydraulic oil suction filter	X	X			X		
30	Replace insert of hydraulic oil return filter	X	X			X		
31	Replace breather			X			X	
32	Check function of brakes	O	O					
33	Bleed brake	O	O					
34	Differential of rear axle - oil check or oil change	X	O	X [2)]			X	
35	Differential of front axle - oil check or oil change	X	O	X [2)]			X	
36	Reduction gear: oil check or oil change	X	O	X [2)]			X	
37	Wheel hubs of front and rear axles - oil check or oil change	X	O	X [2)]			X	
38	Grease machine according to overview of lubricating points	O	O					
39	Check function, condition and completeness of safety equipment	O	O					
40	Hydraulic function check with pressure function test	O	O					
41	Test run and test work	O	O					
42	Initial inspection cards and return to **SCHAEFF**	O	O [3)]					

1. at least every 2 years
2. extension of oil change intervals according to **SCHAEFF** oil sample analysis and lab report.
3. within warranty

SKB 2000 (20 km/h aspirating engine), serial no. 200/.....

		Desired value	Actual value	Adjusted	Remarks
Engine, transmission, steering, working					
Engine, high idle	min^{-1}	2350^{+70}			
Engine, low idle	min^{-1}	750^{+50}			
Charge pressure	bar	$32^{\pm1}$			full throttle
Start-up speed	min^{-1}	$1150^{\pm50}$			
Engine stalling	min^{-1}	2100^{-50}			at 180 bar HP, rabbit, dynamic
Pressure cut-off	bar	450			
High pressure (SV)	bar	480			
Regulation start	bar	180			dynamic
Cardan shaft rev.	min^{-1}	see Technical Data chapter 2			
Beginning / end of inching	bar	5 - 13			
Brake accumulator pressure	bar	120 - 150			
Brake pressure	bar	41 / 28			
Steering left / right	bar	$200^{+10}/_{-5}$			
Stand-by pressure	bar	26			at 2150 min^{-1}
Pressure cut-off	bar	250			full throttle
Pilot pressure/ charge pressure	bar	30^{+2}			full throttle
Main pressure relief valve (4M6)	bar	250			full throttle
Cut-off valve	bar	110			
Swing	bar	230^{+10}			
Pressure limitation Swing	bar	200^{+10}			

Line relief pressures		**out**	**In**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom Mono	bar	160	280					
Dipperstick	bar	280	280					
Boom	bar	280	280					
Telescopic stick	bar	280	280					
Add. control circuit	bar	280	280					
Breaker	bar	280	280					
Stabilizer	bar	----	----					
Lift (loader)	bar	280	----					
Tilt (loader)	bar	160	280					
3rd control circuit (loader)	bar	230	230					

SKB 2000 (36 km/h turbo engine), serial no. 200/.....

		Desired value	Actual value	Adjusted	Remarks
Engine, transmission, steering, working					
Engine, high idle	min^{-1}	2350^{+70}			
Engine, low idle	min^{-1}	750^{+50}			
Charge pressure	bar	$32^{\pm1}$			full throttle
Start-up speed	min^{-1}	$1150^{\pm50}$			
Engine stalling	min^{-1}	2100^{-50}			at 240 bar HP, rabbit, dynamic
Pressure cut-off	bar	450			
High pressure (SV)	bar	480			
Regulation start	bar	230			dynamic
Cardan shaft rev.	min^{-1}	see Technical Data chapter 2			
Beginning / end of inching	bar	5 - 13			
Brake accumulator pressure	bar	120 - 150			
Brake pressure	bar	41 / 28			
Steering left / right	bar	$200^{+10}/_{-5}$			
Stand-by pressure	bar	26			at 2150 min^{-1}
Pressure cut-off	bar	250			full throttle
Pilot pressure/ charge pressure	bar	30^{+2}			full throttle
Main pressure relief valve (4M6)	bar	250			full throttle
Cut-off valve	bar	110			
Swing	bar	230^{+10}			
Pressure limitation Swing	bar	200^{+10}			

Line relief pressures		**out**	**In**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom Mono	bar	160	280					
Dipperstick	bar	280	280					
Boom	bar	280	280					
Telescopic stick	bar	280	280					
Add. control circuit	bar	280	280					
Breaker	bar	280	280					
Stabilizer	bar	----	----					
Lift (loader)	bar	280	----					
Tilt (loader)	bar	160	280					
3^{rd} control circuit (loader)	bar	230	230					

To be carried out by trained specialist dealer personnel

O = Checking, maintenance **X = Replacement**		**Operating hours**							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter		X	X	X	X	X	X		X
6	Clean fuel pump and screen		O	O	O	O	O	O		O
7	Check air intake	O	O	O	O	O	O	O		
8	Change air filter main cartridge	**acc. to service indicator**								X
9	Change air filter safety cartridge 1)	**as required**								
10	Clean cooling fins of combined hydraulic oil/water radiator. *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
11	Check antifreeze level in coolant									O
12	Change coolant 1)	**as required**								
13	Check V-belt tension	O	O	O	O	O	O	O		
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
15	Check engine speed adjustment, top-end and bottom end idle speed	O	O	O	O	O	O	O		
16	Check valve lash of engine and adjust if necessary	O		O		O		O		O
17	Check condition of crankcase breather and clean **1)**					O				
18	Check acid level and battery connections	O	O	O	O	O	O	O		
19	Check condition of tires, tire pressure and tightness of wheel nuts	O	O	O	O	O	O	O		
20	Check secure fastening of axles and propeller shaft	O	O	O	O	O	O	O		
21	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		
22	Check that door catches, locks, hinges, pneumatic springs, etc. are in good condition and function perfectly, and replace if necessary	O	O	O	O	O	O	O		
23	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
24	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		

1) at least every 2 years

O = Checking, maintenance X = Replacement		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
25	Check function of hydraulic axle lock and vent plunger cylinders	O	O	O	O	O	O	O		
26	Check function of steering	O	O	O	O	O	O	O		
27	Check condition and function of stabilizers	O	O	O	O	O	O	O		
28	Check hose-rupture safety valves of stabilizers	O	O	O	O	O	O	O		
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O	O	O	O	O	O		
30	Check or change hydraulic oil 2)	O	O	X	O	X	O	X		X
31	Replace insert of hydraulic oil suction filter	X	X	X	X	X	X	X	X	
32	Replace insert of hydraulic oil return filter	X	acc. to service indicator							X
33	Replace breather			X		X		X		X
34	Check function of brakes and play of discs	O	O	O	O	O	O	O		
35	Differential of rear axle - oil check or oil change	O	X	O	X	O	X	O		X
36	Differential of front axle - oil check or oil change	O	X	O	X	O	X	O		X
37	Transfer box - oil check or oil change	O	X	O	X	O	X	O		X
38	Wheel hubs of front and rear axles - oil check or oil change	O	X	O	X	O	X	O		X
39	Swing gear - oil check	O	O	O	O	O	O	O		
40	Check that ring gear attachment screws are securely fastened	O	O	O	O	O	O	O		
41	Check that swing-gear attachment (hydraulic motor and transmission) is securely fastened	O	O	O	O	O	O	O		
42	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
43	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
44	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
45	Test run and test work	O	O	O	O	O	O	O		
46	Initial inspection cards and return to Schaeff	O	O	O						

2) **Extension of hydraulic oil change interval -**
Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

SMB 2041, serial no. 204/.....

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, brake, steering, working hydraulics								
Engine, high idle running speed	min^{-1}	2350^{+50}						
Engine, low idle running speed	min^{-1}	750 ±50						
Charge pressure	bar	28						
Start-up speed	min^{-1}	1100 ±50						
Engine stalling	min^{-1}	2050^{+100}						170 bar HP, tortoise
Pressure cut-off	bar	420^{+10}						
High pressure (SV)	bar	480						
Regulation start	bar	165						
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	5 - 13						
Brake accumulator pressure	bar	120 - 150						
Brake pressure	bar	60						
Steering left / right	bar	150						
Stand-by pressure	bar	20						at 1000 min^{-1}
Pressure cut-off	bar	230						
Pilot pressure	bar	28						charge pressure, high idle running speed
Main pressure relief valve (Danfoss)	bar	280						full throttle
Main pressure relief valve (VOAC)		220						full throttle
Slewing right/ left	bar	210						
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	175	280					
Dipperstick	bar	280	280					
Boom	bar	280	280					
Telescopic stick	bar	150	280					
Breaker	bar	280						
Lifting frame	bar	280	280					
Loader shovel	bar	150	280					
Articulation	bar	---	---					
Add. control circuit	bar	250	250					
Stabilizing	bar	---	---					

Inspection plan
To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x jährlich	min 1x jährlich
	Work to be carried out while machine is warm	100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine.	O	O	O	O	O	O	O		
2	Change engine oil.	X	X	X	X	X	X	X		X
3	Change engine oil filter.	X	X	X	X	X	X	X		X
4	Drain water from fuel tank.	O	O	O	O	O	O	O		
5	Change fuel filter.	X	X	X	X	X	X	X		X
6	Change fuel pre-filter.	X		X		X		X		
7	Check air intake pipe system.	O	O	O	O	O	O	O		
8	Change air filter - main cartridge.	**acc. to service indicator**								X
9	Change air filter - safety cartridge. **1)**	**as required**								
10	Clean cooling fins of engine oil - cooler. **Note** In case of stronger ratio of dust, shorten the cleaning intervals.	O	O	O	O	O	O	O		
11	Clean cooling fins of hydraulic oil - cooler. **Note** In case of stronger ratio of dust, shorten the cleaning intervals.	O	O	O	O	O	O	O		
12	Check V-belt tension.	O	O	O	O	O	O	O		
13	Check engine suspension.	O	O	O	O	O	O	O		
14	Check engine speed regulation, upper and lower idle-running speed.	O	O	O	O	O	O	O		
15	Check tightness of exhaust system.	O	O	O	O	O	O	O		
16	Check acid level and connections of battery.	O	O	O	O	O	O	O		
17	Check tappet clearance of engine and adjust, if necessary.		O		O		O			
18	Check toothed belts.	O	O	O	O	O	O	O		
19	Check condition of tyres, tyre pressure and tightness of wheel nuts.			O		O		X		
20	Check fastening of axles and cardan shaft.	O	O	O	O	O	O	O		
21	Check brake oil and replace it, if need be.	O	O	O	O	O	O	O		
22	Check function of brakes.	O	O	O	O	O	O	O		
23	Check bolts and bushes of the working equipment and replace, if necessary.	O	O	O	O	O	O	O		
24	Check door catches for good condition and excellent functioning, and replace, if necessary.	O	O	X	O	X	O	X		X
25	Check electrical control and warning elements as well as lighting system.	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x jähr-lich	min 1x jähr-lich
	Work to be carried out while machine is warm	100	500	1000	1500	2000	2500	3000		
26	Check smooth running of all operating elements and adjust, if necessary.	O	O	O	O	O	O	O		
27	Check hydraulic axle lock and vent plunger cylinders.	O	O	O	O	O	O	O		
28	Check correct function of steering.	O	O	O	O	O	O	O		
29	Check condition and correct function of outrigger equipment.	O	O	O	O	O	O	O		
30	Check tightness of all lines, hoses, control valves, hydraulic pumps, cylinders, etc. **! Note** When tightening hose and pipe connections, counterlock fittings to prevent turning.	O	O	O	O	O	O	O		
31	Check pump fastening.	O	O	O	O	O	O	O		
32	Check hydraulic oil, change, if necessary. **2)**	O	O	X	O	X	O	X		X
33	Change hydraulic oil - suction filter, filter insert.	X	X	X	X	X	X	X	X	
34	Change hydraulic oil return filter insert.	**acc. to service indicator**								X
35	Change ventilation filter.	X		X		X		X		X
36	Differential rear axle - check oil or change oil, resp.	O	X	O	X	O	X	O		X
37	Differential front axle - check oil or change oil, resp.	O	X	O	X	O	X	O		X
38	Reduction gear at rear axle: oil control or oil change, resp.	O	X	O	X	O	X	O		X
39	Wheel hubs of front and rear axles: check oil or change oil, resp.	O	X	O	X	O	X	O		X
40	Swivel joint: oil check	O	O	O	O	O	O	O		
41	Check tightness of swivel joint locking screws.	O	O	O	O	O	O	O		
42	Check slew gear unit fastening (hydromotor and gear).	O	O	O	O	O	O	O		
43	Grease machine according to overview of lubricating points.	O	O	O	O	O	O	O		
44	Check function, condition and completeness of safety devices.	O	O	O	O	O	O	O		
45	Check hydraulic functions and pressure.	O	O	O	O	O	O	O		
46	Test run and test work	O	O	O	O	O	O	O		
47	Initial inspection cards and return to Messrs. Schaeff.	O	O	O						

2) Extension of hydraulic oil change interval
Hydraulic oil change after oil sample analysis and lab report. Oil sample interval as specified by test lab.

HML 21, serial no. 131/....

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2750						
Engine, low idle running speed	min^{-1}	900						
Charge pressure	bar	30 ±2						high idle running speed
Start-up speed	min^{-1}	1100 $^{+100}$						
Engine stalling	min^{-1}	2500						at 330^{+10} bar HP
High pressure	bar	440						pressure cut-off
Regulation start	bar	320						dynamic
Cardan shaft rev.	min^{-1}	see Techn. Data Chapter 2						
Beginning / end of inching	bar	280 - 300						high pressure
Steering left / right	bar	120						
Pilot pressure	bar	28 - 32						charge pressure, high idle
Main pressure relief valve 1	bar	210						full throttle
Main pressure relief valve 2	bar	210						full throttle
Main pressure relief valve 3	bar	200						full throttle
Cut-off valve	bar	110						
Slewing right / left	bar	190						
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	250	250					
Dipperstick	bar	250	250					
Bucket	bar	250	250					
Stabilizing	bar	---	---					
Summation	bar	---	---					
Intermediate boom/ telescopic stick	bar	140	250					
Add. control circuit / breaker	bar	250	250					
Articulation	bar	220	300					

Inspection plan

To be carried out by trained specialist dealer personnel

0 = Checking, maintenance X = Replacement Perform work with machine at operating temperature		daily	weekly	monthly	Working hours 50	150	250	500	1000	1500	2000	2500	3000	at least once a year
1	All maintenance and inspection jobs have to be carried out in accordance to the separate engine operation manual.	0	0			0		0	0	0	0	0	0	
2	Engine oil level	0												
3	Correct V-belt tension		0											
4	Engine suspension					0		0	0	0	0	0	0	
5	Fuel level	0												
6	Engine speed adjustment					0		0	0	0	0	0	0	
7	Check tightness of exhaust system					0		0	0	0	0	0	0	
8	Replace air filter main cartridge	acc. to service indicator												
9	Replace air filter safety cartridge	as required												
10	Electric control and warning elements and lighting system	0				0		0	0	0	0	0	0	
11	Functioning and completeness of safety devices	0				0		0	0	0	0	0	0	
12	Smooth running of the operating elements	0				0		0	0	0	0	0	0	
13	Functioning of the steering	0				0		0	0	0	0	0	0	
14	Bearing bushings and bolts or working equipment		0					0	0	0	0	0	0	
15	Fastening of the axle and the cardan shaft		0			0		0	0	0	0	0	0	
16	Check wheel nuts		0			0		0	0	0	0	0	0	
	Tyre pressure and damages of the tyres					0		0	0	0	0	0	0	
17	Oscillating and rigid axle: oil check / oil change			0		X					X			X
18	Check brake disks for wear (service brake)													0
19	Wheel hub: oil check / oil change			0		X					X			X
20	Load-shifting gear: oil check oil change			0		X					X			X
21	Check functioning of the door stop and gas spring at the engine bonnet etc.	0												
22	Functioning of the brake	0												
23	Obvious damages on the rotary transfer			0										
24	Tight seat at the slew mechanism			0										
25	Pump drives					0		0	0	0	0	0		
26	Check tightness: Pipes, hoses, valve bank, hydraulic pumps, cylinders etc.	0												
27	Return line filter					X		X	X					X
28	Hydr. oil check and / or change	0							X				X	X
29	Clean cooling fins of the hydr. oil and water cooler	as required												
30	Hydraulic axle lock		0											
31	Hydraulic functioning control with pressure check					0		0	0	0	0	0	0	
32	Outrigger equipment					0		0	0	0	0	0	0	

0 = Checking, maintenance X = Replacement Perform work with machine at operating temperature!		daily	weekly	monthly	Working hours									at least once a year
					50	150	250	500	1000	1500	2000	2500	3000	
33	Grease machine according to lubrication overwiev	0	0											
34														
35	Visual check (general), e.g. for material tears, exterior damage	0												
36	Sign service booklet	see service booklet no. 1, no. 2 and no.3												
37	Cooling agent	0											X	X
38	Oil check / oil change at grab			0									X	

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Change fuel filter	X	X	X	X	X	X	X		X
6	Clean fuel pump - screen filter			O		O		O		
7	Check air intake	O	O	O	O	O	O	O		
8	Change air filter main cartridge	**acc. to service indicator**								X
9	Change air filter safety cartridge **1)**	**as required**								
10	Clean cooling fins of engine oil radiator. **Note** In case of high exposure to dust, shorten the cleaning intervals.	O	O	O	O	O	O	O		
11	Clean cooling fins of hydraulic oil radiator. **Note** In case of high exposure to dust, shorten the cleaning intervals.	O	O	O	O	O	O	O		
12	Check V-belt tension	O	O	O	O	O	O	O		
13	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
14	Check engine speed adjustment, top-end and bottom end idle speed	O	O	O	O	O	O	O		
15	Check tightness of exhaust system	O	O	O	O	O	O	O		
16	Check acid level and battery connections	O	O	O	O	O	O	O		
17	Check valve lash of engine and adjust if necessary		O		O		O			
18	Check toothed belt			O		O		X		
19	Check injection valves **1)**							O		
20	Check condition of grouser plates on gear crawlers **Note** After replacement of grouser plates, check all screws after the first, third and fifth day of operation. Tightening torque: 200 Nm	O	O	O	O	O	O	O		
21	Crawler drive - check fastening of sprocket, travel gear and hydraulic motor.	O	O	O	O	O	O	O		
22	Check smooth running of idlers and carrier rollers	O	O	O	O	O	O	O		
23	Check function of parking brake	O	O	O	O	O	O	O		
24	Check bearing bushes and bolts of work attachment and replace, if necessary.	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
25	Check that door catches function perfectly, and replace if necessary	O	O	O	O	O	O	O		
26	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
27	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
28	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. **Note** When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation	O	O	O	O	O	O	O		
29	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
30	Replace filter insert of hydraulic oil return filter	X	**acc. to service indicator**							X
31	Replace ventilation filter			X		X		X		X
32	Travel gear: Check or replace oil.	X		X		X		X		X
33	Slewing gear - oil check	O	O	O	O	O	O	O		
34	Check that slewing-ring attachment screws are securely fastened	O	O	O	O	O	O	O		
35	Check that slewing-gear attachment (hydraulic motor and gear) is securely fastened	O	O	O	O	O	O	O		
36	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O		
37	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O		
38	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
39	Test run and test work	O	O	O	O	O	O	O		
40	Initial inspection cards and return to **Schaeff**	O	O	O						

2) Extension of hydraulic oil change interval

Hydraulic oil change according to oil sample analysis and lab report.
Oil sample interval as specified by test lab.

HR 21, serial no. 121/....

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2750						
Engine, low idle running speed	min^{-1}	900						
Pilot pressure	bar	25						
Main pressure relief valve 1 (SM 12)	bar	210						high idle running speed
Main pressure relief valve 2 (SM 12)	bar	210						high idle running speed
Main pressure relief valve 3 (SM 12)	bar	200						high idle running speed
Cut-off valve	bar	110						
Slewing right / left	bar	190						
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	250	250					
Dipperstick	bar	250	250					
Bucket	bar	250	250					
Articulation	bar	220	300					
Intermediate boom	bar	140	250					
Dozer blade	bar	---	---					
Travel right	bar	---	---					
Travel left	bar	---	---					

Inspection plan

To be carried out by trained specialist dealer personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000	year-ly	year-ly
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain water from fuel tank	O	O	O	O	O	O	O	O	
5	Replace fuel filter		X	X	X	X	X	X		X
6	Check air intake	O	O	O	O	O	O	O		
7	Replace air filter main cartridge	**acc. to service indicator**								X
8	Replace air filter safety cartridge **1)**	**as required**								
9	Clean cooling fins of combined hydraulic oil/ water radiator. *In case of high exposure to dust, shorten the cleaning intervals.*	O	O	O	O	O	O	O		
10	Check antifreeze level in coolant									O
11	Change coolant **1)**	**as required**								
12	Check V-belt tension	O	O	O	O	O	O	O		
13	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
14	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
15	Check tightness of exhaust system	O	O	O	O	O	O	O		
16	Check acid level and battery connections	O	O	O	O	O	O	O		
17	Check tappet clearance (engine) and adjust if necessary	O			O			O		O
18	Check injection nozzles			O		O		O		
19	Replace the engine breather assembly in the valve cover **1)**					X				
20	Check the condition and fastening of the grouser plates (track shoes) on the undercarriage crawler chains *After the replacement of the track shoes, all screws must be checked after the first, third and fifth working day.* *Tightening torque: 200 Nm*	O	O	O	O	O	O	O		
21	Check secure fastening of chain drive sprocket, crawler gear unit and hydraulic motor.	O	O	O	O	O	O	O		
22	Check smooth running of lower rollers and carrier rollers.	O	O	O	O	O	O	O		
23	Check function of parking brake	O	O	O	O	O	O	O		
24	Check bearing bushes and bolts of work equipment and replace them if necessary	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min 2x year-ly	min 1x year-ly
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000		
25	Check that door catches, locks, hinges, pneumatic springs, etc. are in good condition and function perfectly, and replace if necessary	O	O	O	O	O	O	O		
26	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
27	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
28	Check condition and function of dozer blade	O	O	O	O	O	O	O		
29	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. ☞ *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O	O	O	O	O	O		
30	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
31	Replace filter insert of hydraulic oil return filter	X	**acc. to service indicator**							X
32	Replace ventilation filter			X		X		X		X
33	Crawler gear unit: Check or replace oil.	X			X			X		X
34	Swing gear: Check oil.	O	O	O	O	O	O	O		
35	Check that ring gear fastening screws are securely fastened.	O	O	O	O	O	O	O		
36	Check that swing gear attachment (hydraulic motor and gear) is securely fastened	O	O	O	O	O	O	O		
37	Grease machine according to overview of lubricating points.	O	O	O	O	O	O	O		
38	Check function, condition and completeness of safety equipment.	O	O	O	O	O	O	O		
39	Hydraulic function check with pressure function test	O	O	O	O	O	O	O		
40	Test run and test work	O	O	O	O	O	O	O		
41	Initial inspection cards and return to Messrs. Schaeff.	O	O	O						

2) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HR 22, serial no. 121/....

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2520 +50						
Engine, low idle running speed	min^{-1}	800 +50						
Pilot pressure	bar	35						
LS pressure relief valve	bar	230						high idle valve bank 1
Stand-by pressure	bar	25						high idle
Main pressure relief valve 1	bar	260						high idle valve bank 1
Main pressure relief valve 2	bar	200						high idle valve bank 2
Cut-off valve	bar	110						high idle
Slewing right / left	bar	190						high idle
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Articulated boom	bar	260	260					
Mono boom	bar	140	260					
Dipperstick	bar	260	260					
Bucket	bar	260	260					
Intermediate boom	bar	140	260					
Telescopic stick	bar	140	260					
Breaker	bar	210	----					
Travel right	bar	----	----					
Travel left	bar	----	----					
Articulation	bar	----	----					
Dozer blade	bar	----	----					

Inspection plan

To be carried out by dealer's trained Service Personnel

O = *Checking, maintenance* X = *Replacement* **Perform work with machine at operating temperature**		Operating hours							min 2x year -ly	min. 1x year- ly
		100	500	1000	1500	2000	2500	3000		
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain fuel tank	O	O	O	O	O	O	O	O	
5	Replace fuel filter	X	X	X	X	X	X	X		X
6	Replace fuel pre-filter	X	X	X	X	X	X	X		X
7	Check air intake	O	O	O	O	O	O	O		
8	Replace air filter main cartridge	**acc. to service indicator**								X
9	Replace air filter safety cartridge **1)**	**as required**								
10	Clean cooling fins of the combined hydraulic oil / water radiator. *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
11	Check antifreeze level in coolant									O
12	Change coolant **1)**	**as required**								
13	Check V-belt tension	O	O	O	O	O	O	O		
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
15	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
16	Check acid level and battery connections	O	O	O	O	O	O	O		
17	Check valve lash of engine and adjust if necessary	O			O			O		O
18	Check the condition and fastening of the grouser plates (track shoes) on the undercarriage crawler chains After changing the grouser plates check all screws after the first, third and fifth working day. Tightening torque: 200 Nm	O	O	O	O	O	O	O		
19	Check secure fastening of chain sprocket, crawler gear unit and hydraulic motor.	O	O	O	O	O	O	O		
20	Check smooth running of lower rollers and carrier rollers.	O	O	O	O	O	O	O		
21	Check function of parking brake	O	O	O	O	O	O	O		
22	Check bearing bushes and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O		

1) at least every 2 years

O = Checking, maintenance X = Replacement		Operating hours							min 2x	min 1x
Perform work with machine at operating temperature		100	500	1000	1500	2000	2500	3000	year -ly	year -ly
23	Check that door catches, locks, hinges, pneumatic springs, etc. are in good condition and function perfectly, and replace if necessary	O	O	O	O	O	O	O		
24	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		
25	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
26	Check condition and function of dozer blade	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.*	O	O	O	O	O	O	O		
28	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
29	Replace filter insert of hydraulic oil return filter	X	**acc. to service indicator**							X
30	Replace ventilation filter			X		X		X		X
31	Crawler gear unit: Check or replace oil.	X			X			X		X
32	Swing gear: Check oil.	O	O	O	O	O	O	O	O	
33	Check that ring gear fastening screws are securely fastened.	O	O	O	O	O	O	O	O	
34	Check that swing gear attachment (hydraulic motor and gear) is securely fastened	O	O	O	O	O	O	O	O	
35	Grease machine according to overview of lubricating points.	O	O	O	O	O	O	O	O	
36	Check function, condition and completeness of safety equipment.	O	O	O	O	O	O	O	O	
37	Hydraulic function check with pressure function test	O	O	O	O	O	O	O	O	
38	Test run and test work	O	O	O	O	O	O	O	O	
39	Initial inspection cards and return to **Messrs. Schaeff**.	O	O	O						

2) Extension of hydraulic oil change interval

Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HR 31, serial no. 033/....

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2150						
Engine, low idle running speed	min^{-1}	800						
Pilot pressure	bar	35						
LS pressure relief valve (SX 18)	bar	250						high idle valve bank 1
Stand-by pressure	bar	25						high idle
Main pressure relief valve 1 (SX 18)	bar	280						high idle valve bank 1
Main pressure relief valve 2 (5 SM 12)	bar	220						high idle valve bank 2
Cut-off valve	bar	110						
Slewing right / left	bar	190						
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	280	280					
Intermediate boom	bar	150	280					
Dipperstick	bar	280	280					
Bucket	bar	280	280					
Add. control circuit	bar	250	250					
Breaker	bar	200						
Travel right	bar	----	----					
Travel left	bar	----	----					
Articulation	bar	----	----					
Dozer blade	bar	----	----					

Inspection plan

To be carried out by dealer's trained Service Personnel

O = *Checking, maintenance* X = *Replacement*		Operating hours							min	min.
Perform work with machine at operating temperat.		100	500	1000	1500	2000	2500	3000	2x yearly	1x yearly
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O		
2	Change engine oil	X	X	X	X	X	X	X		X
3	Change engine oil filter	X	X	X	X	X	X	X		X
4	Drain fuel tank	O	O	O	O	O	O	O	O	
5	Replace fuel filter	X	X	X	X	X	X	X		X
6	Clean fuel pre-filter	X	X	X	X	X	X	X		X
7	Check air intake	O	O	O	O	O	O	O		
8	Replace air filter main cartridge	**acc. to service indicator**								X
9	Replace air filter safety cartridge **1)**	**as required**								
10	Clean cooling fins of the combined hydraulic oil / water radiator. *The cleaning intervals should be shortened if there is high exposure to dust.*	O	O	O	O	O	O	O		
11	Check antifreeze level in coolant									O
12	Change coolant **1)**	**as required**								
13	Check V-belt tension	O	O	O	O	O	O	O		
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O		
15	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O		
16	Check acid level and battery connections	O	O	O	O	O	O	O		
17	Check valve lash of engine and adjust if necessary	O			O			O		O
18	Check the condition and attachment of the grouser plates on the crawlers *After changing the grouser plates check all screws after the first, third and fifth working day. Tightening torque: 200 Nm*	O	O	O	O	O	O	O		
19	Crawler drive - check secure fastening of sprocket, travel gear and hydraulic motor.	O	O	O	O	O	O	O		
20	Check smooth running of idlers and carrier rollers.	O	O	O	O	O	O	O		
21	Check function of parking brake	O	O	O	O	O	O	O		
22	Check bearing bushes and bolts of work equipment and replace them if necessary	O	O	O	O	O	O	O		
23	Check that door catches, locks, hinges, pneumatic springs, etc. are in good condition and function perfectly, and replace if necessary	O	O	O	O	O	O	O		
24	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O		

1) at least every 2 years

O = *Checking, maintenance* X = *Replacement*		Operating hours							min	min.
Perform work with machine at operating temperat.		100	500	1000	1500	2000	2500	3000	2x yearly	1x yearly
25	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O		
26	Check condition and function of dozer blade	O	O	O	O	O	O	O		
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. ☞ *When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation*	O	O	O	O	O	O	O		
28	Check or change hydraulic oil **2)**	O	O	X	O	X	O	X		X
29	Replace insert of hydraulic oil return filter	X	**acc. to service indicator**							X
30	Replace ventilation filter			X		X		X		X
31	Travel gear: Check or replace oil.	X			X			X		X
32	Swing gear: Check or replace oil.	O	O	O	O	O	O	O	O	
33	Check that swivel joint screws are securely fastened.	O	O	O	O	O	O	O	O	
34	Check that slewing-gear attachment (hydraulic motor and gear) is securely fastened	O	O	O	O	O	O	O	O	
35	Grease machine according to overview of lubricating points.	O	O	O	O	O	O	O	O	
36	Check function, condition and completeness of safety equipment.	O	O	O	O	O	O	O	O	
37	Hydraulic function check with pressure function test	O	O	O	O	O	O	O	O	
38	Test run and test work	O	O	O	O	O	O	O	O	
39	Initial inspection cards and return to Messrs. **Schaeff**.	O	O	O						

2) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HR 41, serial no. 331/....

		Desired value		Actual value		Adjusted		Remarks
Engine, travel hydraulics, working hydraulics								
Engine, high idle running speed	min^{-1}	2450						
Engine, low idle running speed	min^{-1}	800						
Pilot pressure	bar	30						
LS pressure relief valve (SX 18)	bar	250						high idle valve bank 1
Stand-by pressure	bar	25						high idle
Main pressure relief valve 1 (SX 18)	bar	280						high idle valve bank 1
Main pressure relief valve 2 (5 SM 12)	bar	220						high idle valve bank 2
Cut-off valve	bar	110						
Slewing right / left	bar	210						
Line relief pressures,		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Mono boom	bar	200	280					
Articulated boom	bar	280	280					
Intermediate boom	bar	150	280					
Dipperstick	bar	280	280					
Bucket	bar	280	280					
Add. control circuit	bar	250	250					
Breaker	bar	200						
Travel right	bar	----	----					
Travel left	bar	----	----					
Articulation	bar	----	----					
Dozer blade	bar	----	----					

Inspection plan

To be carried out by dealer's trained Service Personnel

O = Checking, maintenance X = Replacement		Operating hours							
Perform work with machine at operating temperature !		100	500	1000	1500	2000	2500	3000	min. 1x per year
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O	
2	Change engine oil	X	X	X	X	X	X	X	X
3	Change engine oil filter	X	X	X	X	X	X	X	X
4	Drain fuel tank **1)**	O	O	O	O	O	O	O	
5	Replace fuel filter	X	X	X	X	X	X	X	X
6	Replace fuel pre-filter	X	X	X	X	X	X	X	X
7	Check air intake	O	O	O	O	O	O	O	
8	Replace air filter main cartridge	**acc. to service indicator**							
9	Replace air filter safety cartridge **2)**	**as required**							
10	Clean cooling fins of the combined hydraulic oil/water radiator The cleaning intervals should be shortened if there is high exposure to dust	O	O	O	O	O	O	O	
11	Check antifreeze level in coolant								O
12	Change coolant **2)**	**as required**							
13	Check V-belt tension	O	O	O	O	O	O	O	
14	Check engine suspension and pump attachments	O	O	O	O	O	O	O	
15	Check engine speed adjustment , top-end and bottom-end idle speed	O	O	O	O	O	O	O	
16	Check acid level and battery connections	O	O	O	O	O	O	O	
17	Check valve lash of engine and adjust if necessary	O			O			O	O
18	Check condition of tires, tire pressure and tightness of wheel fastening screws	O	O	O	O	O	O	O	
19	Check function, condition and fastening of stabilizers	O	O	O	O	O	O	O	
20	Check bearing bushings and bolts of working equipment and replace if necessary	O	O	O	O	O	O	O	
21	Check that door catches, locks, hinges, pneumatic springs, etc. are in good condition and function perfectly, and replace if necessary	O	O	O	O	O	O	O	
22	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O	
23	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O	
24	Check function of hydraulic wheel lock-up	O	O	O	O	O	O	O	

1) at least every 2 years

2) at least 2x per year

O = Checking, maintenance X = Replacement		Operating hours							
Perform work with machine at operating temperature !		100	500	1000	1500	2000	2500	3000	at least 1x per year
25	Check hose rupture safety valves of outriggers	O	O	O	O	O	O	O	
26	Check the clearance of the telescopic dipperstick and adjust	O	O	O	O	O	O	O	
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation	O	O	O	O	O	O	O	
28	Check or change hydraulic oil **3)**	O	O	X	O	X	O	X	X
29	Change hydraulic oil return line filter	X	**acc. to service indicator**						X
30	Replace ventilation filter			X		X		X	X
31	Check wheel hub bearing clearance and adjust if necessary	O	O	O	O	O	O	O	
32	Swing gear: Check oil	O	O	O	O	O	O	O	
33	Check that swivel joint screws are securely fastened	O	O	O	O	O	O	O	
34	Check that slewing-gear attachment (hydraulic motor and gear) is securely fastened	O	O	O	O	O	O	O	
35	Grease machine according to overview of lubricating points	O	O	O	O	O	O	O	
36	Check function, condition and completeness of safety equipment	O	O	O	O	O	O	O	
37	Hydraulic function check with pressure function test	O	O	O	O	O	O	O	
38	Test run and test work	O	O	O	O	O	O	O	
39	Initial inspection cards and return to **Messrs. Schaeff**	O	O	O					

3) Extension of hydraulic oil change interval
Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HS 41, serial no. 038/....

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2450						
Engine, low idle running speed	min^{-1}	800						
Stand-by pressure	bar	25						
Main pressure relief valve 1 (SX 18)	bar	250						
Safety valve (SV) (SX 18)	bar	280						
Main pressure relief valve 2 (SM 12)	bar	270						
Main pressure relief valve 3 (SM 12)	bar	250						
Cut-off valve	bar	130						
Main pressure relief valve, steering	bar	250						
Steering left / right	bar	290						
Cross-over valves	bar	260						
Pressure relief valve, steering cylinder, tie rod	bar	140						
Pilot pressure	bar	35						SV = 40 bar
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	280	280					
Dipperstick	bar	280	280					
Telescopic stick	bar	160	230					
Bucket	bar	280	280					
Articulation	bar	---	---					
Slewing right / left	bar	190 / 280						
Travel left	bar	250	250					Valve bank 2
Travel right	bar	280	280					Valve bank 3
Breaker	bar	200						
Add. control circuit	bar	160	160					
Stabilizing	bar	---	---					

Wheel and leg stabilizing: without line relief valves

Inspection plan

To be carried out by trained specialist dealer personnel

O = check, maintenance X = replace		Operating hours							
	Work to be carried out while engine is still warm	100	500	1000	1500	2000	2500	3000	at least 1 x per year
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O	
2	Change engine oil	X	X	X	X	X	X	X	X
3	Change engine oil filter	X	X	X	X	X	X	X	X
4	Drain fuel tank **1)**	O	O	O	O	O	O	O	
5	Replace fuel filter	X	X	X	X	X	X	X	X
6	Replace primary fuel filter	X	X	X	X	X	X	X	X
7	Check air intake	O	O	O	O	O	O	O	
8	Replace air filter main cartridge	**acc. to service indicator**							
9	Replace air filter safety cartridge **2)**	**as required**							
10	Clean cooling fins of the combined hydraulic oil / water radiator. ☞ The cleaning intervals should be shortened if there is high exposure to dust.	O	O	O	O	O	O	O	
11	Check antifreeze level in coolant								O
12	Change coolant **2)**	**as required**							
13	Check V-belt tension	O	O	O	O	O	O	O	
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O	
15	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O	
16	Check acid level and battery connections	O	O	O	O	O	O	O	
17	Check valve lash of engine and adjust if necessary	O			O			O	O
18	Check condition of tires, tire pressure and fastening of wheel nuts	O	O	O	O	O	O	O	
19	Check function, condition and fastening of outriggers	O	O	O	O	O	O	O	
20	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O	
21	Check that door catches, locks, hinges, pneumatic springs, etc. are in good condition and function perfectly, and replace if necessary	O	O	O	O	O	O	O	
22	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O	
23	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O	
24	Check function of steering	O	O	O	O	O	O	O	

1) at least 2 times per year
2) at least every 2 years

O = check, maintenance X = replace		Operating hours							
	Work to be carried out while engine is still warm	100	500	1000	1500	2000	2500	3000	at least 1 x per year
25	Check hose-rupture safety valves of outriggers	O	O	O	O	O	O	O	
26	Check the clearance of the telescopic dipperstick and adjust	O	O	O	O	O	O	O	
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. ☞ When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.	O	O	O	O	O	O	O	
28	Check or change hydraulic oil **3)**	O	O	X	O	X	O	X	X
29	Replace filter insert of hydraulic oil return filter	O	**acc. to service indicator**						X
30	Replace ventilation filter			X		X		X	X
31	Check the wheel hub bearing clearance of the support wheels and adjust if required	O	O	O	O	O	O	O	
32	Travel-drive gear unit: Check or replace oil.	X	O	X	O	X	O	X	X
33	Swing gear: Check oil.	O	O	O	O	O	O	O	
34	Check that ring gear attachment screws are securely fastened.	O	O	O	O	O	O	O	
35	Check that swing-gear attachment (hydraulic motor and transmission) is securely fastened	O	O	O	O	O	O	O	
36	Grease machine according to overview of lubricating points.	O	O	O	O	O	O	O	
37	Check function, condition and completeness of safety equipment.	O	O	O	O	O	O	O	
38	Hydraulic function check with pressure function test	O	O	O	O	O	O	O	
39	Test run and test work	O	O	O	O	O	O	O	
40	Initial inspection cards and return to **Messrs. Schaeff**	O	O	O					

3) Extension of hydraulic oil change interval

Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HS 41 M, serial no. 141/....

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2,450						
Engine, low idle running speed	min^{-1}	800						
Stand-by pressure	bar	25						
Main pressure relief valve 1 (SX 18)	bar	250						
Safety valve (SV) (SX 18)	bar	280						
Main pressure relief valve 2 (SM 12)	bar	270						
Main pressure relief valve 3 (SM 12)	bar	250						
Cut-off valve	bar	130						
Main pressure relief valve, steering	bar	250						
Steering left / right	bar	290						
Cross-over valves	bar	260						
Pressure relief valve, steering cylinder, tie rod	bar	140						
Pilot pressure	bar	35						SV = 40 bar
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	280	280					
Dipperstick	bar	280	280					
Telescopic stick	bar	160	230					
Bucket	bar	280	280					
Articulation	bar	---	---					
Slewing right / left	bar	190 / 280						
Travel left	bar	250	250					Valve bank 2
Travel right	bar	280	280					Valve bank 3
Breaker	bar	200						
Add. control circuit	bar	160	160					
Stabilizing	bar	---	---					

Wheel and leg stabilizing: without line relief valves

Inspection plan

To be carried out by trained specialist dealer personnel

O = check, maintenance X = replace		Operating hours							
Work to be carried out while engine is still warm		100	500	1000	1500	2000	2500	3000	Min. 1x yearly
1	Check whether machine-specific instruction book is in the machine	O	O	O	O	O	O	O	
2	Change engine oil	X	X	X	X	X	X	X	X
3	Change engine oil filter	X	X	X	X	X	X	X	X
4	Drain fuel tank **1)**	O	O	O	O	O	O	O	
5	Replace fuel filter	X	X	X	X	X	X	X	X
6	Replace primary fuel filter	X	X	X	X	X	X	X	X
7	Check air intake	O	O	O	O	O	O	O	
8	Replace air filter main cartridge	**acc. to service indicator**							
9	Replace air filter safety cartridge **2)**	**as required**							
10	Clean cooling fins of the combined hydraulic oil / water radiator. The cleaning intervals should be shortened if there is high exposure to dust.		O	O	O	O	O	O	
11	Check antifreeze level in coolant								O
12	Change coolant **2)**	**as required**							
13	Check V-belt tension	O	O	O	O	O	O	O	
14	Check engine mounts and pump attachments	O	O	O	O	O	O	O	
15	Check engine speed adjustment, top-end and bottom-end idle speed	O	O	O	O	O	O	O	
16	Check acid level and battery connections	O	O	O	O	O	O	O	
17	Check valve lash of engine and adjust if necessary	O			O			O	O
18	Check condition of tires, tire pressure and tightness of wheel fastening screws	O	O	O	O	O	O	O	
19	Check function, condition and fastening of stabilizers	O	O	O	O	O	O	O	
20	Check bearing bushings and bolts of work equipment and replace if necessary	O	O	O	O	O	O	O	
21	Check that door catches, locks, hinges, pneumatic springs, etc. are in good condition and function perfectly, and replace if necessary	O	O	O	O	O	O	O	
22	Check electrical indicating and warning elements, and lighting system	O	O	O	O	O	O	O	

1) at least 2 times per year
2) at least every 2 years

O = check, maintenance X = replace		Operating hours							
	Work to be carried out while engine is still warm	100	500	1000	1500	2000	2500	3000	Min. 1x yearly
23	Check smooth running of operator controls and adjust if necessary	O	O	O	O	O	O	O	
24	Check function of steering	O	O	O	O	O	O	O	
25	Check hose-rupture safety valves of stabilizing equipment	O	O	O	O	O	O	O	
26	Check the plays on the telescopic dipperstick and adjust	O	O	O	O	O	O	O	
27	Check tightness of all pipes, hoses, control valve, hydraulic pumps, cylinders, etc. When tightening hose and pipe connections, screw-in couplings must be locked to prevent rotation.	O	O	O	O	O	O	O	
28	Check or change hydraulic oil **3)**	O	O	X	O	X	O	X	X
29	Replace filter insert of hydraulic oil return filter	X	**acc. to service indicator**						X
30	Replace ventilation filter			X		X		X	X
31	Travel gear: Check or replace oil.	X	O	X	O	X	O	X	X
32	Swing gear: Check or replace oil.	O	O	O	O	O	O	O	
33	Check that ring gear attachment screws are securely fastened.	O	O	O	O	O	O	O	
34	Check that swing-gear attachment (hydraulic motor and transmission) is securely fastened	O	O	O	O	O	O	O	
35	Grease machine according to overview of lubricating points.	O	O	O	O	O	O	O	
36	Check function, condition and completeness of safety equipment.	O	O	O	O	O	O	O	
37	Hydraulic function check with pressure function test	O	O	O	O	O	O	O	
38	Test run and test work	O	O	O	O	O	O	O	
39	Initial inspection cards and return to **Messrs. Schaeff**	O	O	O					

3) Extension of hydraulic oil change interval

Hydraulic oil change according to oil sample analysis and lab report. Oil sample interval as specified by test lab.

HS 41 MM, serial no. 341/....

		Desired value		Actual value		Adjusted		Remarks
Engine, transmission, steering, working								
Engine, high idle running speed	min^{-1}	2,450						
Engine, low idle running speed	min^{-1}	800						
Stand-by pressure	bar	25 $^{\pm 2}$						
Main pressure relief valve 1 (SX 18)	bar	250						
Safety valve (SV) (SX 18)	bar	280						
Main pressure relief valve 2 (SM 12)	bar	270 $^{+5}$						
Main pressure relief valve 3 (SM 12)	bar	270 $^{+5}$						
Cut-off valve	bar	130 $^{\pm 10}$						
Main pressure relief valve, steering	bar	250						
Steering left / right	bar	290						
Cross-over valves	bar	260						
Pressure relief valve, steering cylinder, tie rod	bar	140						
Pilot pressure	bar	35						SV = 40 bar
Line relief pressures		**out**	**in**	**out**	**in**	**out**	**in**	
hydraulic cylinders								
Boom	bar	280	280					
Dipperstick	bar	280	280					
Telescopic stick	bar	160	230					
Bucket	bar	280	280					
Articulation	bar	---	---					
Slewing right	bar	190 / 280						
left	bar	190 / 280						
Travel left	bar	250	250					Valve bank 2
Travel right	bar	280	280					Valve bank 3
Breaker	bar	280	280					
Add. control circuit	bar	160	160					
Stabilizing	bar	---	---					

Wheel and leg stabilizing: without line relief valves

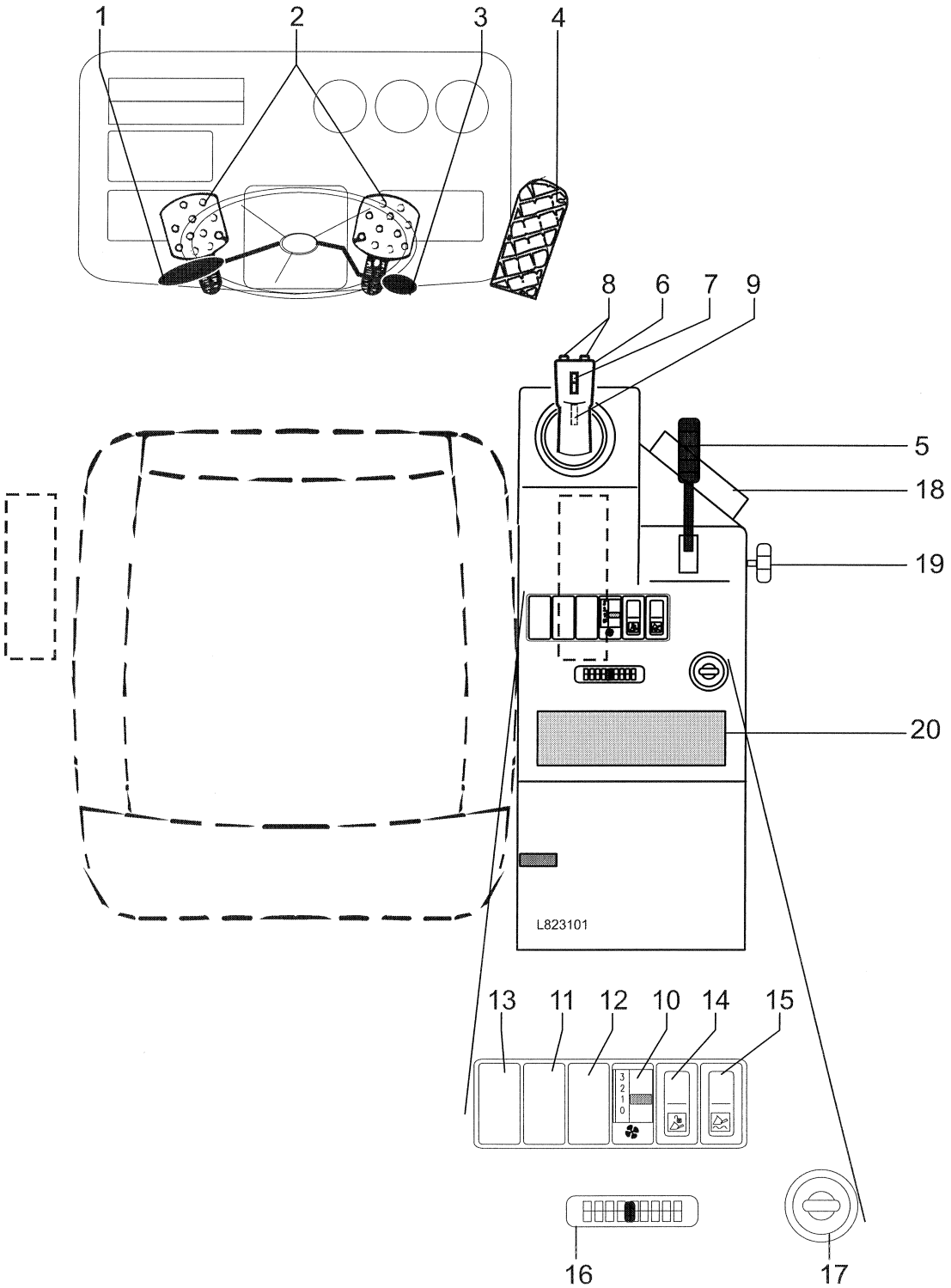
SUBGROUP LIST

Operation

SKL 823	9.03
SKL 823 Basic	9.04
SKL 833	9.05
SKL 833 Basic	9.06
SKL 843	9.07
SKL 853	9.09
SKL 877	9.15
SCL 515	9.20
SKS 633	9.35
SKB 2000	9.45
SMB 2041	9.46
HML 21	9.48
HML 51S	9.54
HR 21	9.62
HR 22	9.63
HR 31	9.64
HR 41	9.66
HS 41	9.84
HS 41M	9.85

TEREX | SCHAEFF

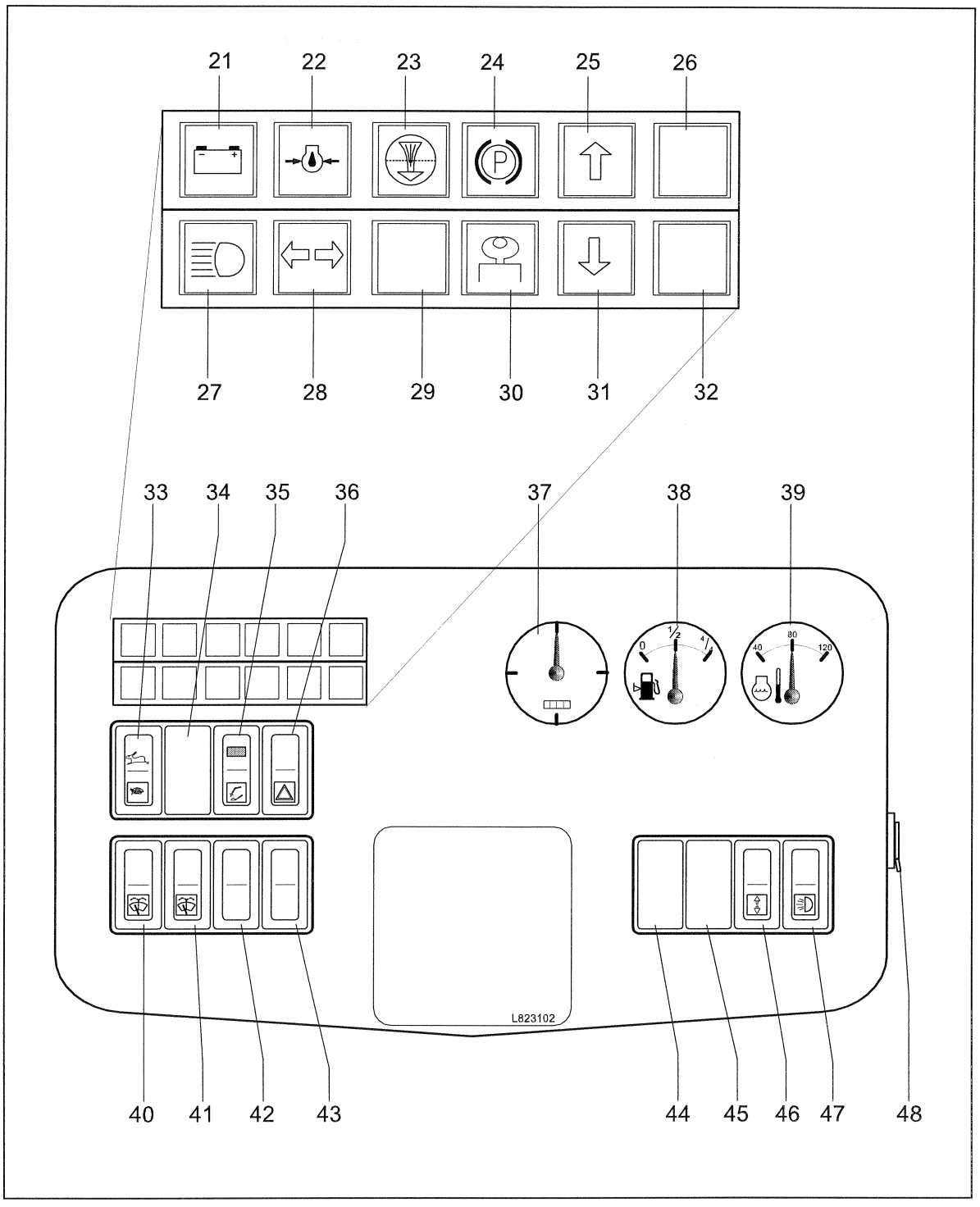
Display and operating elements



	Description
1	Direction indicator - signal horn - low/high beam switch (steering column switch)
2	Double brake inching pedal
3	Steering wheel - tilt adjustment
4	Accelerator pedal
5	Parking brake
6	Operating lever - loading equipment
7	Travel direction selector switch - without function when working hydraulics are switched off
8	Actuation - additional control circuit
9	Actuation of impulse mode - floating position
10	Fan switch
11	not assigned*
12	not assigned*
13	not assigned*
14	Cut-off switch for actuation - additional control circuit (pos. 8)
15	Selection switch floating position - OFF/impulse-/continuous operation mode
16	Slider control - heating
17	Preheat/ starter switch
18	Fuse and relay box
19	Shift lever for fan - fresh air/ circulating air
20	Radio

*e.g. for equipment such as ride control system, bucket re-positioning, etc.

Display elements and operator controls



Description

21 Charge control
22 Engine oil pressure indicator
23 Air filter clogging indicator
24 Parking brake indicator lamp
25 Travel, forward
26 not assigned *
27 Upper beam
28 Direction indicator
29 not assigned *
30 Pre-heat indicator
31 Travel, in reverse
32 not assigned *
33 Gear range switch - fast / slow
34 not assigned *
35 Multi-function switch with lock for work equipment cut-off and change-over of direction-of-travel pre-selectors (from pos. 07 to pos. 46)

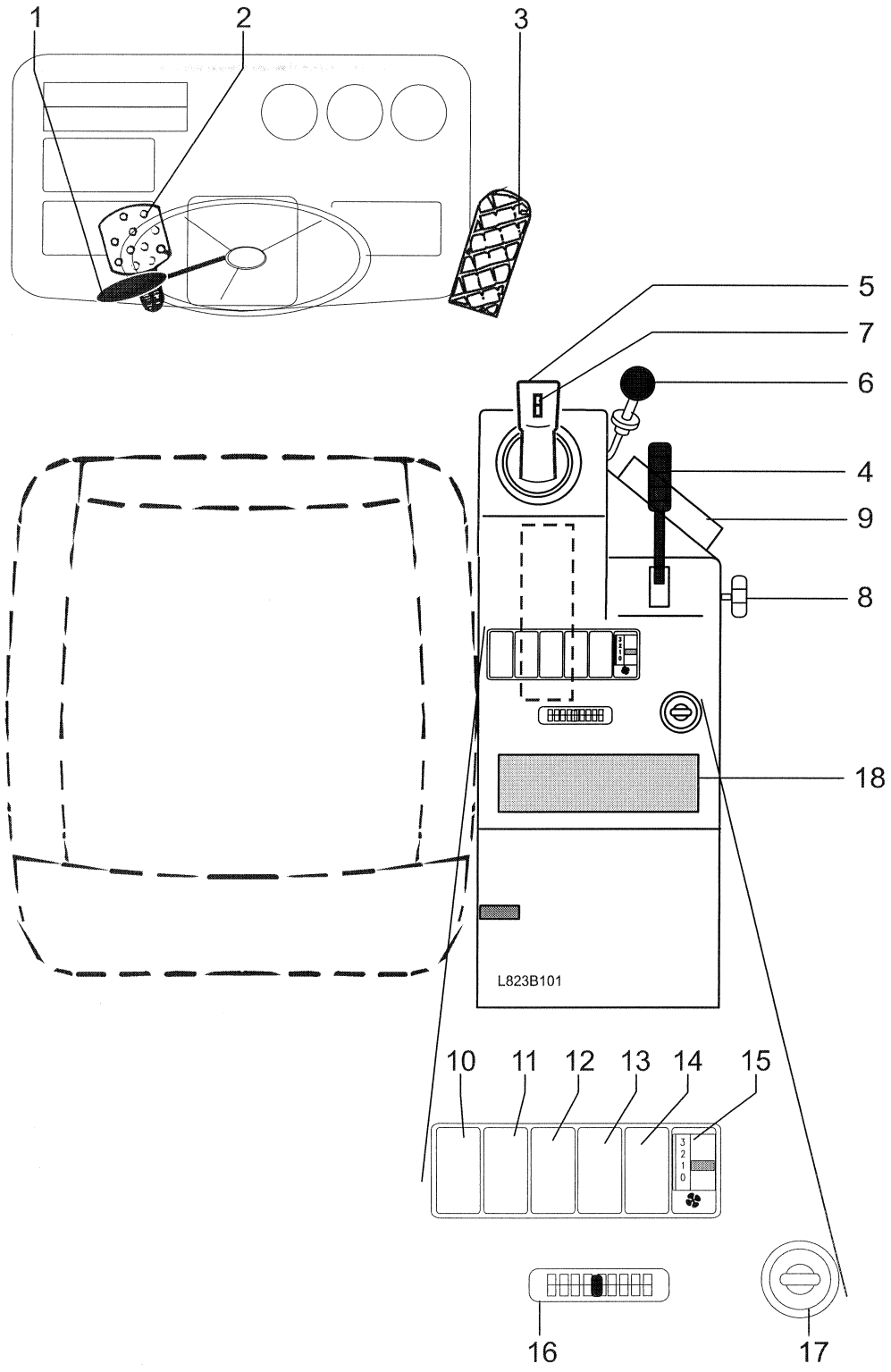
 ***Only press when machine is at standstill!***

36 Hazard warning switch
37 Operating hour meter
38 Fuel gauge
39 Coolant temperature indicator
40 Switch for windshield wiper, front, wash/ wipe function
41 Switch for windshield wiper, rear, wash/ wipe function
42 not assigned *
43 not assigned *
44 not assigned *
45 not assigned *
46 Pre-selection of direction-of-travel - (Function only activated when work equipment switched off)
47 Light switch
48 Socket

* e.g. for accessories such as rotating beacon, water pump for sweeper, additional floodlight(s), etc.

Display elements and operator controls

The following list includes non-standard equipment!



Description

1 Direction indicator - horn - lower/ upper beam switch (stalk control)

2 Brake inching pedal

3 Accelerator pedal

4 Parking brake

5 Control lever for loading equipment with circular interlock

6 Additional control circuit with circular interlock

7 Direction-of-travel pre-selection (without function when working hydraulics are switched off)

8 Fan operation: fresh air/ re-circulating air

9 Fuse and relay box

10 not assigned

11 not assigned

12 not assigned

13 not assigned

14 not assigned

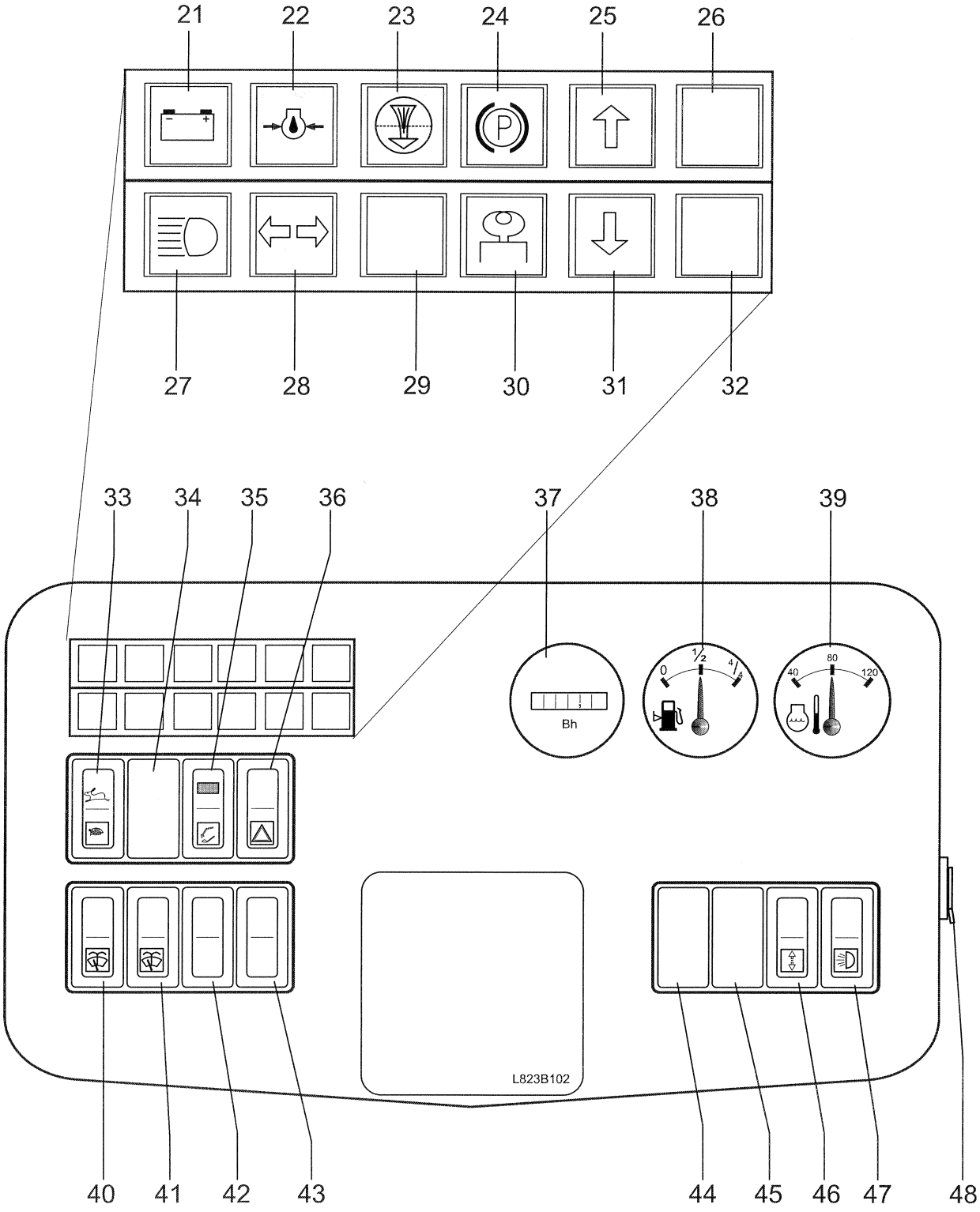
15 Fan switch

16 Heater operation

17 Pre-heat/ starter switch

18 Radio (option)

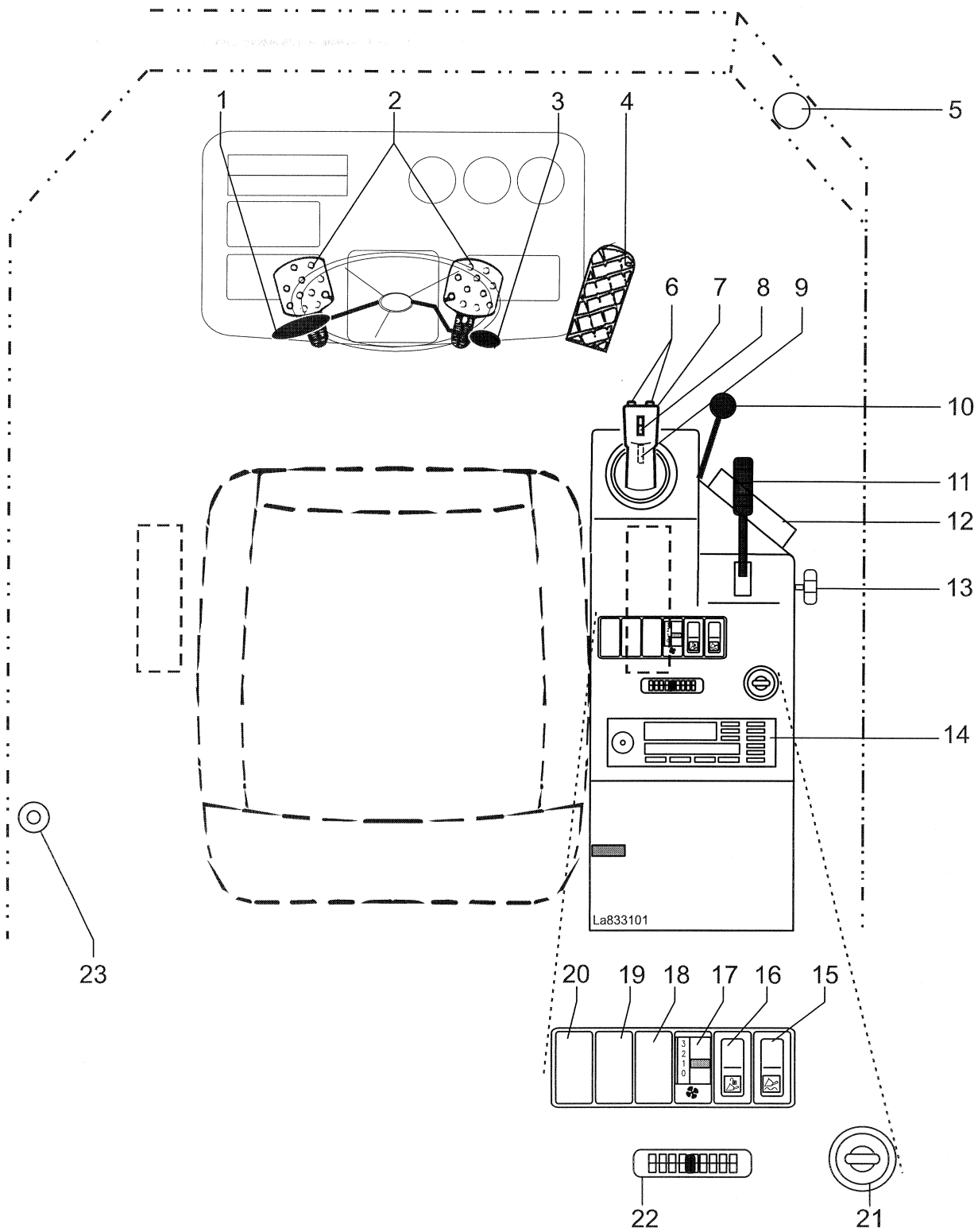
Display elements and operator controls



	Description
21	Charge control
22	Engine oil pressure indicator
23	Air filter clogging indicator
24	Parking brake indicator lamp
25	Travel, forward
26	not assigned *
27	Upper beam
28	Direction indicator
29	not assigned *
30	Pre-heat indicator
31	Travel, in reverse
32	not assigned *
33	Travel speed switch - fast / slow
34	not assigned *
35	Multi-function switch with lock for change-over of direction-of-travel pre-selectors (from pos. 07 to pos. 46)  ***Only press when machine is at standstill!***
36	Hazard warning switch
37	Operating hour meter
38	Fuel gauge
39	Coolant temperature indicator
40	Switch for windshield wiper, front, wash/ wipe function
41	Switch for windshield wiper, rear, wash/ wipe function
42	not assigned *
43	not assigned *
44	not assigned *
45	not assigned *
46	Pre-selection of direction-of-travel - (Function only activated when work equipment switched off)
47	Light switch
48	Socket

* e.g. for accessories such as rotating beacon, water pump for sweeper, additional floodlight(s), etc.

Display and operating elements

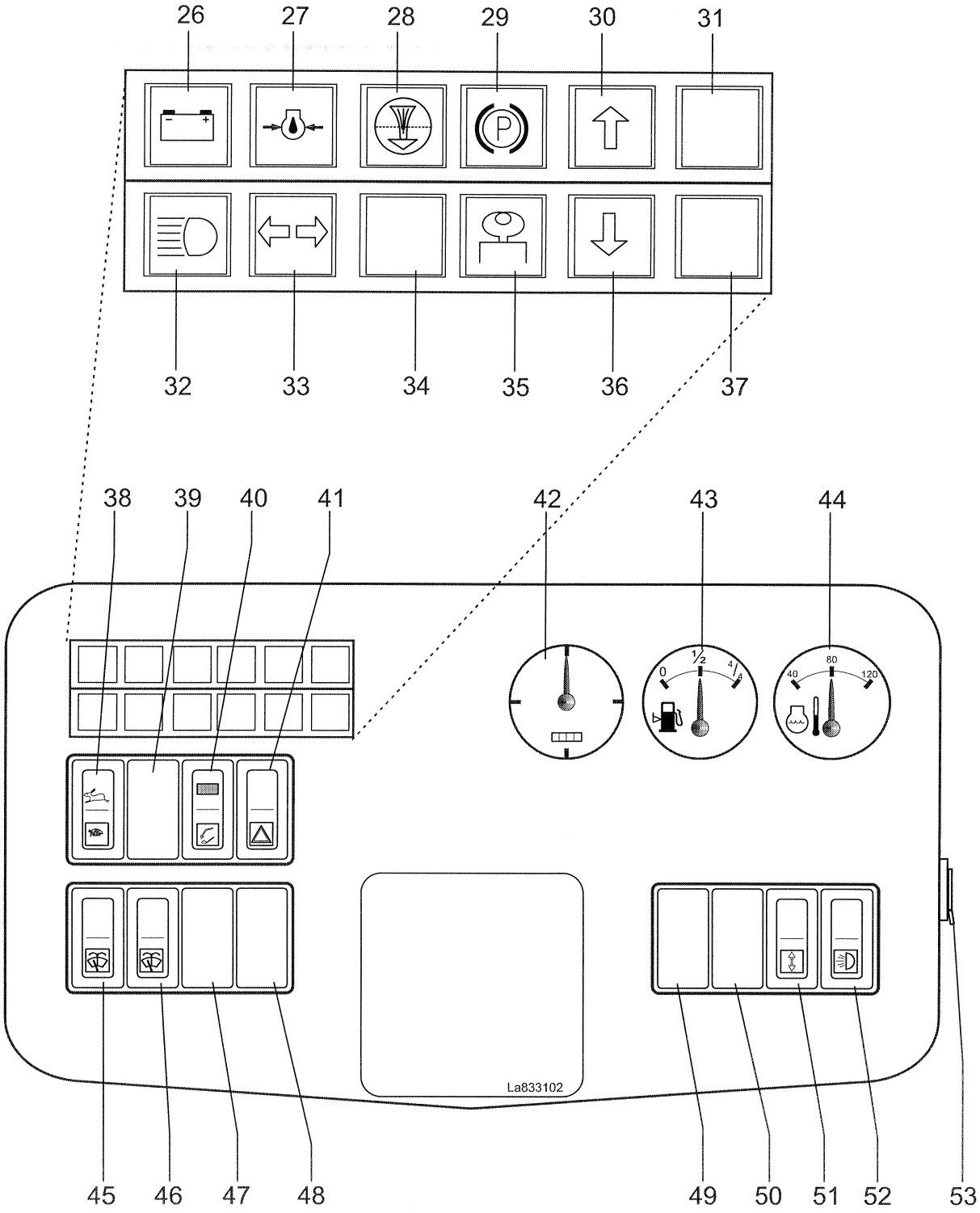


Description

1	Direction indicator - signal horn - low/ high beam switch (steering column switch)
2	Dual brake inching pedal
3	Steering wheel - Tilt adjustment
4	Accelerator pedal
5	Washer tank
6	Actuation - Additional control circuit
7	Joystick (operating lever) for loading equipment
8	Travel direction pre-selection switch - without function when working hydraulics are switched off
9	Actuation of impulse mode - Float position
10	4th control circuit
11	Parking brake
12	Fuse and relay box
13	Shift lever for fan - fresh air/ re-circulating air
14	Radio
15	Pre-selector float position - OFF/Impulse-/Continuous operation mode
16	OFF-switch for actuation of additional control circuit (Pos. 6)
17	Fan switch
18	not assigned *
19	not assigned *
20	not assigned *
21	Pre-heat/ starter switch
22	Heater control
23	Control rod for mechanical quick-mount hitch

*e.g. for accessories such as vibration absorption, bucket return positioner, continuous operation for sweeper, etc.

Operator controls and display elements



Description

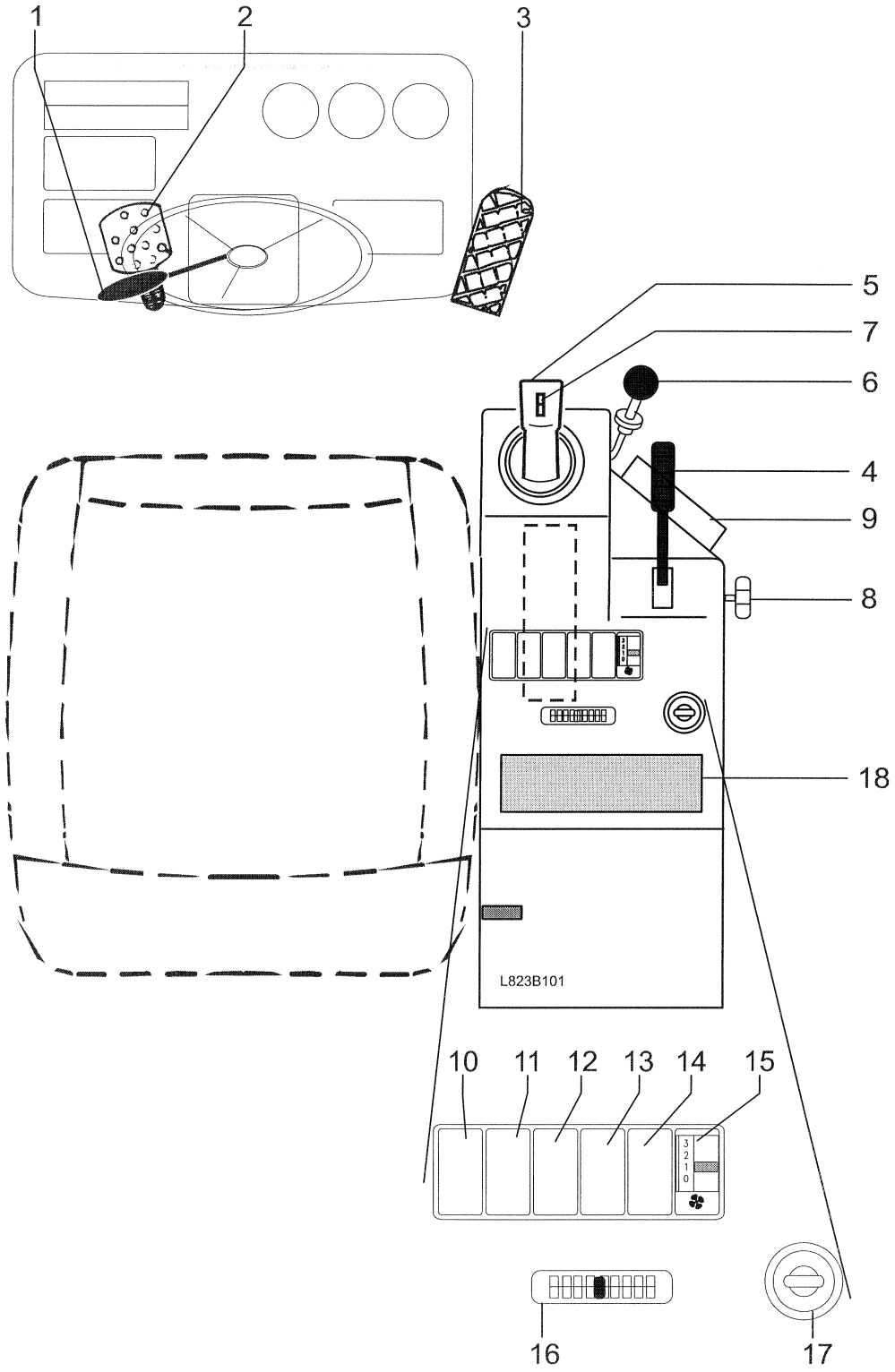
26. Battery charge indicator
27. Engine oil pressure indicator
28. Air filter clogging indicator
29. Parking brake indicator
30. Travel, forward
31. not assigned *
32. High beam
33. Direction indicator
34. not assigned *
35. Pre-heat indicator
36. Travel, in reverse
37. not assigned *
38. Travel range switch - fast/ slow
39. not assigned *
40. Multi-function switch with lock for work equipment cut-off and change-over of direction-of-travel pre-selection switch from pos. 08 to pos. 51

     *Only press the button when machine is at standstill!*
41. Hazard warning switch
42. Operating hour meter
43. Fuel gauge
44. Coolant temperature indicator
45. Switch for windshield wiper, front, wiper/ washer function
46. Switch for windshield wiper, rear, wiper/ washer function
47. not assigned *
48. not assigned *
49. not assigned *
50. not assigned *
51. Travel direction pre-selection - Function only active when working hydraulics are switched off
52. Light switch
53. Socket

* e.g. for accessories such as rotating beacon, water pump for sweeper, additional floodlights, etc.

Display elements and operator controls

The following list includes non-standard equipment!



Description

1 Direction indicator - horn - lower/ upper beam switch (stalk control)

2 Brake inching pedal

3 Accelerator pedal

4 Parking brake

5 Control lever for loading equipment with circular interlock

6 Additional control circuit with circular interlock

7 Direction-of-travel pre-selection (without function when working hydraulics are switched off)

8 Fan operation: fresh air/ re-circulating air

9 Fuse and relay box

10 not assigned

11 not assigned

12 not assigned

13 not assigned

14 not assigned

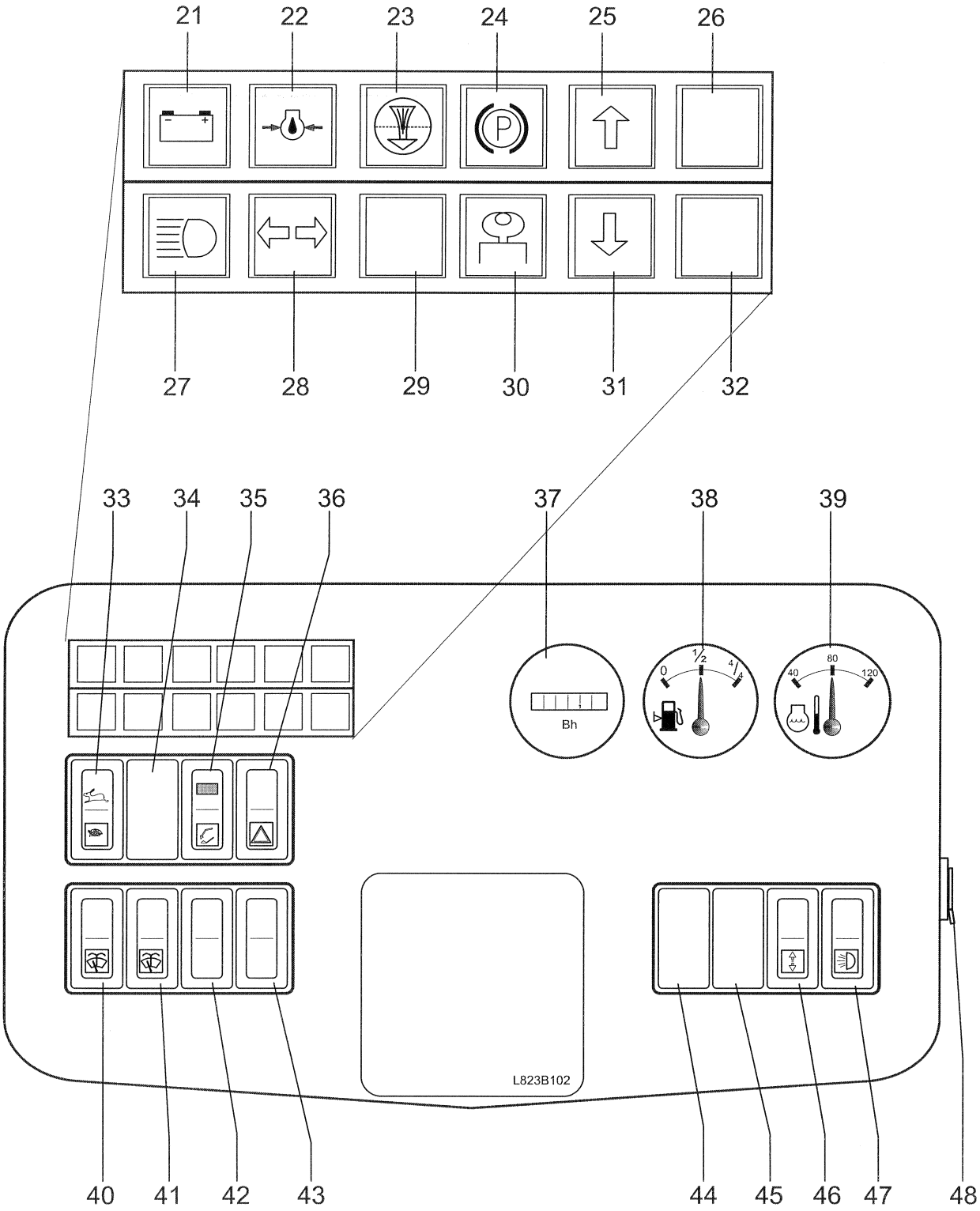
15 Fan switch

16 Heater operation

17 Pre-heat/ starter switch

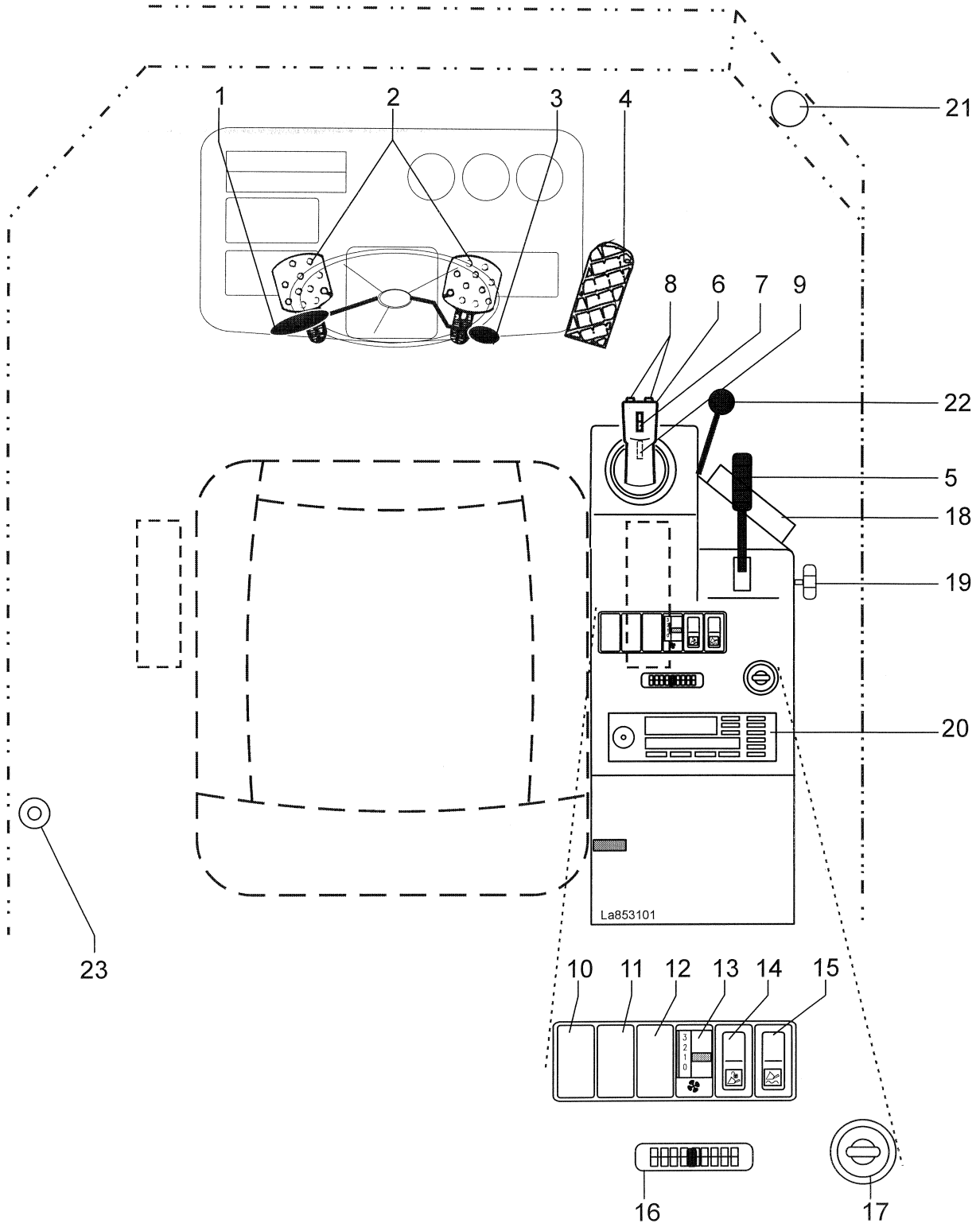
18 Radio (option)

Display elements and operator controls



	Description
21	Charge control
22	Engine oil pressure indicator
23	Air filter clogging indicator
24	Parking brake indicator lamp
25	Travel, forward
26	not assigned *
27	Upper beam
28	Direction indicator
29	not assigned *
30	Pre-heat indicator
31	Travel, in reverse
32	not assigned *
33	Travel speed switch - fast / slow
34	not assigned *
35	Multi-function switch with lock for change-over of direction-of-travel pre-selectors (from pos. 07 to pos. 46)  ***Only press when machine is at standstill!***
36	Hazard warning switch
37	Operating hour meter
38	Fuel gauge
39	Coolant temperature indicator
40	Switch for windshield wiper, front, wash/ wipe function
41	Switch for windshield wiper, rear, wash/ wipe function
42	not assigned *
43	not assigned *
44	not assigned *
45	not assigned *
46	Pre-selection of direction-of-travel - (Function only activated when work equipment switched off)
47	Light switch
48	Socket

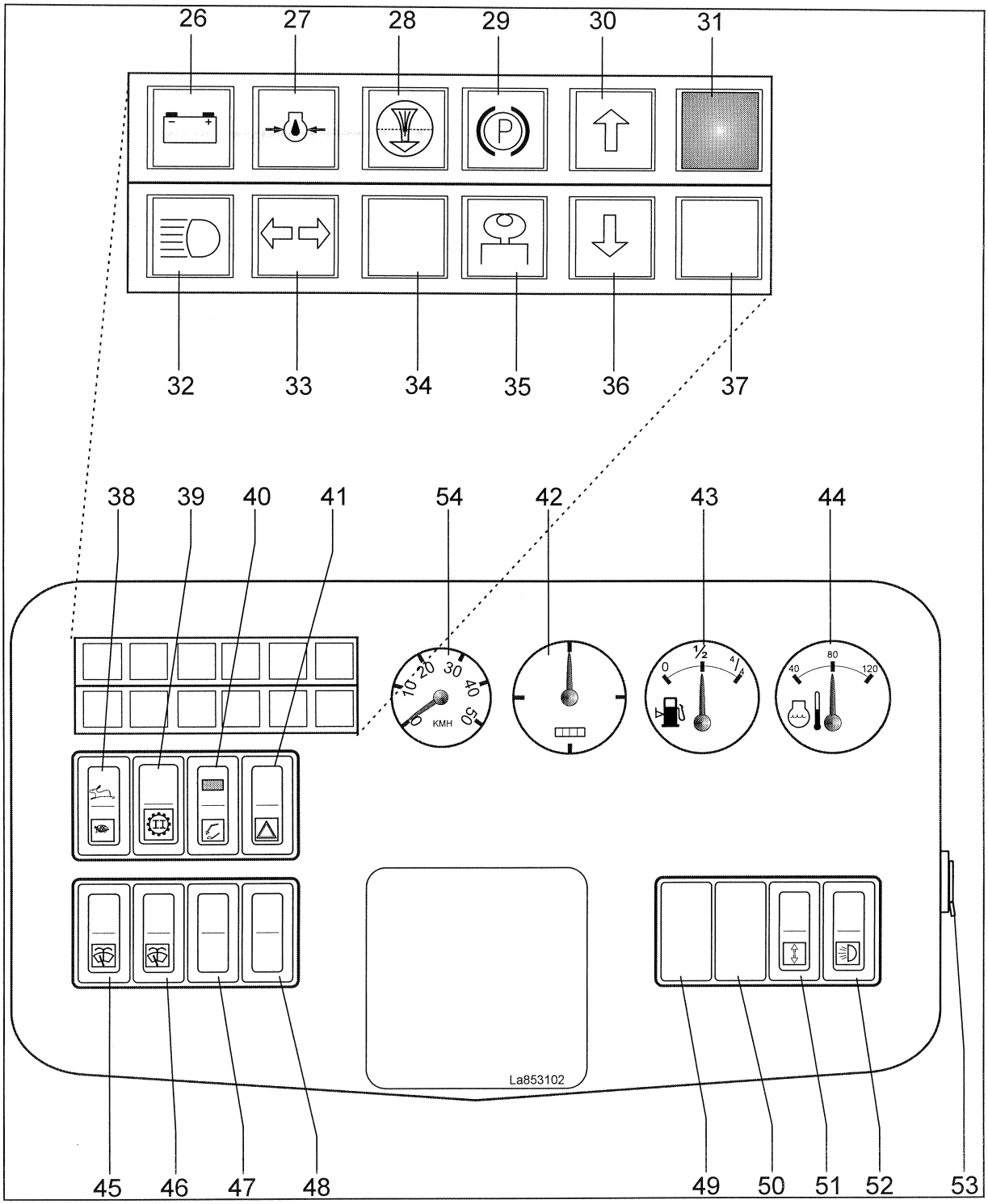
* e.g. for accessories such as rotating beacon, water pump for sweeper, additional floodlight(s), etc.



SCHAEFF	Typ/Model/Type **SKL 843**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.07.01**

	Description
1	Direction indicator - signal horn - low / high beam switch (steering column switch)
2	Double brake inching pedal
3	Steering wheel - tilt adjustment
4	Accelerator pedal
5	Parking brake
6	Actuating lever for loading equipment
7	Travel direction selector switch (without function when working hydraulics are switched off)
8	Actuation - additional control circuit
9	Actuation of impulse mode - floating position
10	not assigned *
11	not assigned *
12	not assigned *
13	Fan switch
14	Cut-off switch for actuation of additional control circuit (pos. 8)
15	Selection switch floating position - OFF/impulse/continuous operation mode
16	Slider control - heating
17	Pre-heat/ starter switch
18	Fuse and relay box
19	Shift lever for fan - fresh air / circulating air
20	Radio
21	Washer tank
22	4^{th} control circuit
23	Actuating rod for mechanical quick-mount hitch

*e.g. for accessories such as ride control system, bucket re-positioning, etc.



SCHAEFF	Typ/Model/Typ **SKL 843**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.07.02**

Description

26 Battery charge indicator
27 Engine oil pressure indicator
28 Air filter clogging indicator
29 Parking brake indicator lamp
30 Travel, forward
31 Indicator lamp for transmission (only high-speed version)



*When the **transmission indicator lamp** lights up, the transmission is in an intermediate position. **The machine is not ready for start!** This can be remedied by brief steering movements so that the transmission engages.*

32 Upper beam
33 Direction indicator
34 not assigned *
35 Pre-heat indicator
36 Travel, in reverse
37 not assigned *
38 Travel speed switch, fast/ slow
39 Change-over switch for high speed



Only press when machine is at standstill!

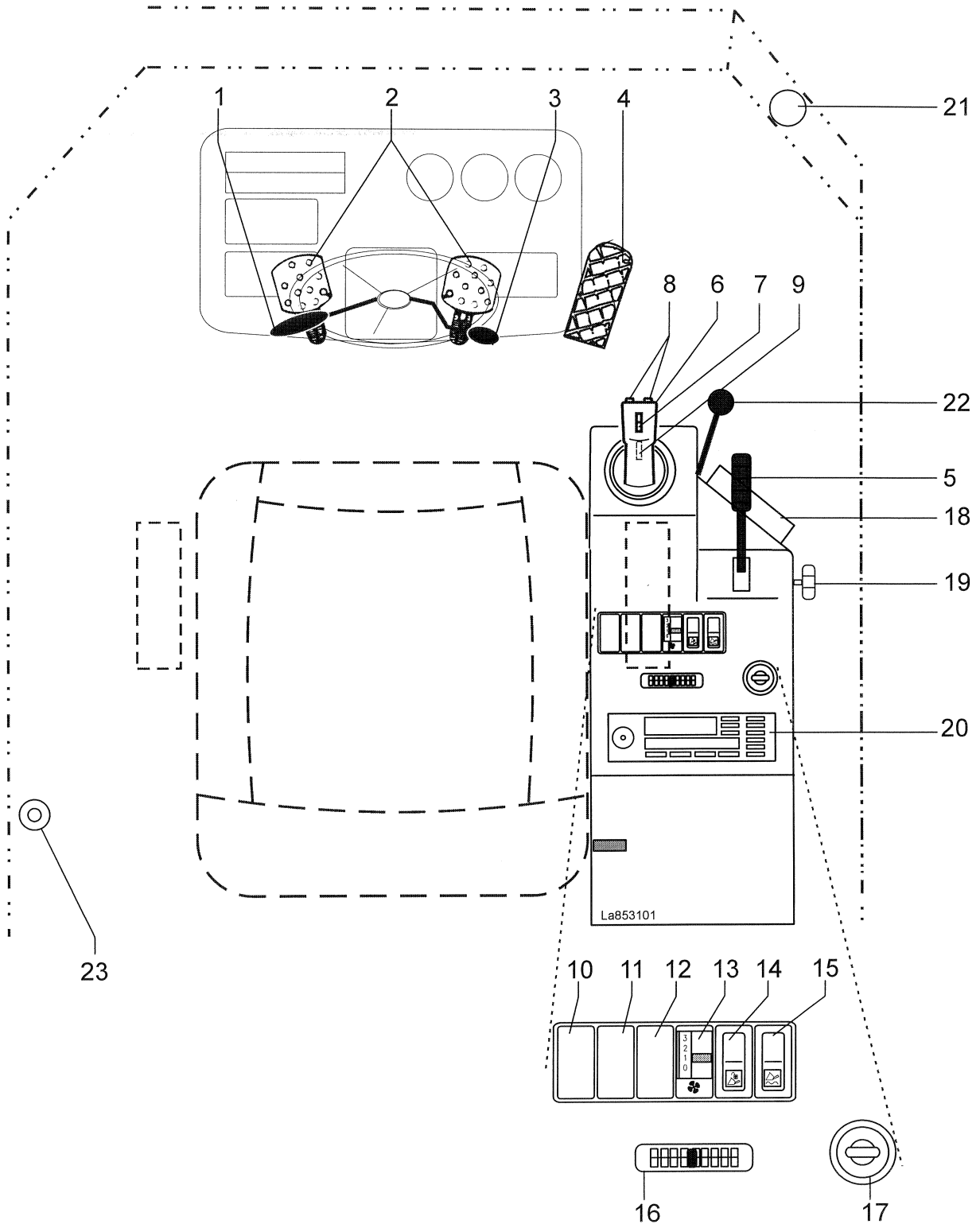
40 Multi-function switch with lock for work equipment cut-off and change-over of the direction-of-travel pre-selection switch from pos. 07 to pos. 46



Only press when machine is at standstill!

41 Hazard warning switch
42 Operating hour meter
43 Fuel gauge
44 Coolant temperature indicator
45 Switch for windshield wiper, front, wash/ wipe function
46 Switch for windshield wiper, rear, wash/ wipe function
47 not assigned *
48 not assigned *
49 not assigned *
50 not assigned *
51 Pre-selection of travel direction - Function only active when working hydraulics are switched off
52 Light switch
53 Socket
54 Speedometer (only high-speed version)

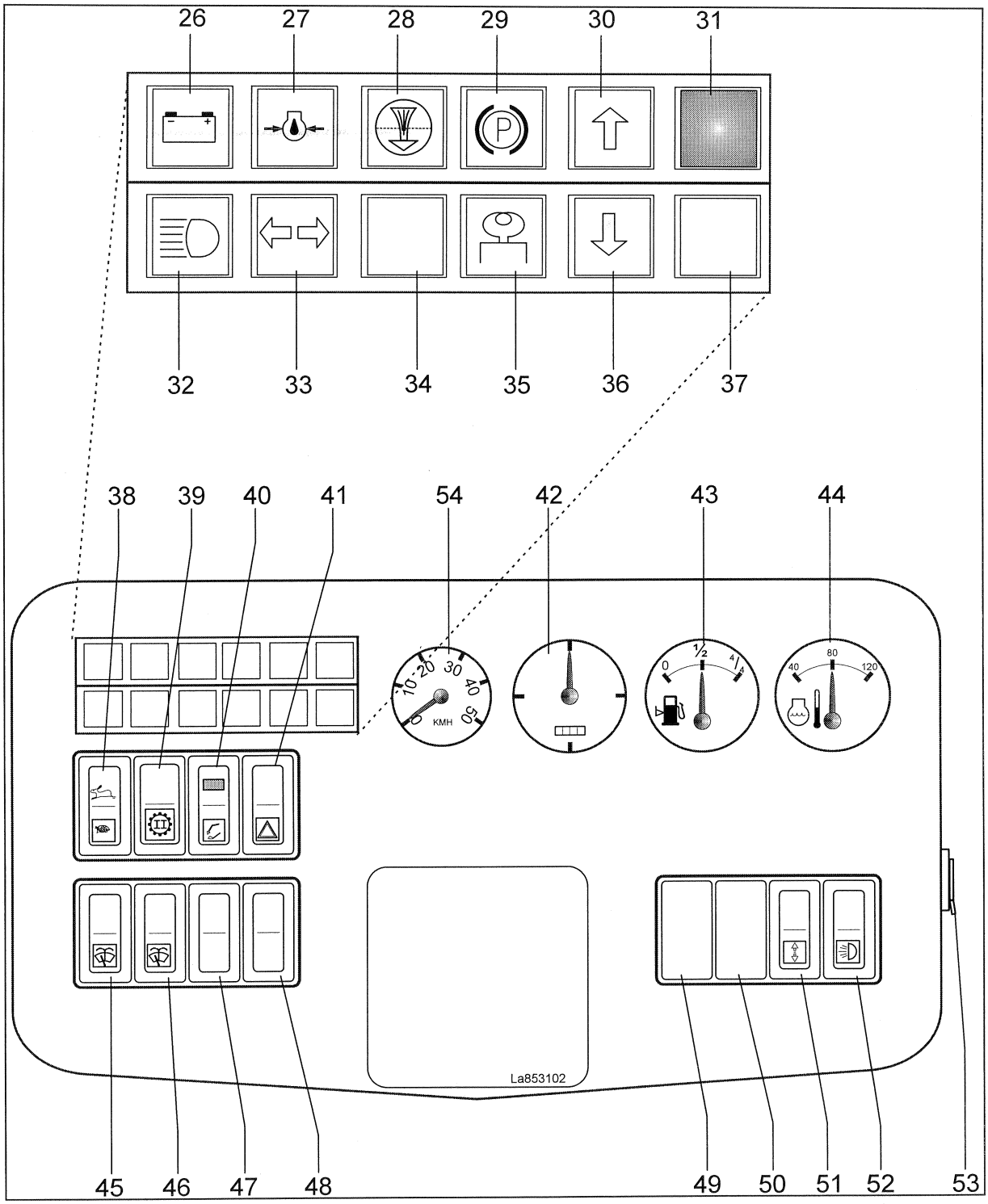
* e.g. for accessories such as rotating beacon, water pump for sweeper, additional floodlights, etc.



SCHAEFF	Typ/Model/Type **SKL 853**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.09.01**

	Description
1	Direction indicator - signal horn - low / high beam switch (steering column switch)
2	Double brake inching pedal
3	Steering wheel - tilt adjustment
4	Accelerator pedal
5	Parking brake
6	Actuating lever for loading equipment
7	Travel direction selector switch (without function when working hydraulics are switched off)
8	Actuation - additional control circuit
9	Actuation of impulse mode - floating position
10	not assigned *
11	not assigned *
12	not assigned *
13	Fan switch
14	Cut-off switch for actuation of additional control circuit (pos. 8)
15	Selection switch floating position - OFF/impulse/continuous operation mode
16	Slider control - heating
17	Pre-heat/ starter switch
18	Fuse and relay box
19	Shift lever for fan - fresh air / circulating air
20	Radio
21	Washer tank
22	4^{th} control circuit
23	Actuating rod for mechanical quick-mount hitch

*e.g. for accessories such as ride control system, bucket re-positioning, etc.



SCHAEFF	Typ/Model/Typ **SKL 853**	Datum/Edition/Date **02.2001**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.09.02**

Description

26 Battery charge indicator
27 Engine oil pressure indicator
28 Air filter clogging indicator
29 Parking brake indicator lamp
30 Travel, forward
31 Indicator lamp for transmission (only high-speed version)


*When the **transmission indicator lamp** lights up, the transmission is in an intermediate position. **The machine is not ready for start!** This can be remedied by brief steering movements so that the transmission engages.*

32 Upper beam
33 Direction indicator
34 not assigned *
35 Pre-heat indicator
36 Travel, in reverse
37 not assigned *
38 Travel speed switch, fast/ slow
39 Change-over switch for high speed


Only press when machine is at standstill!

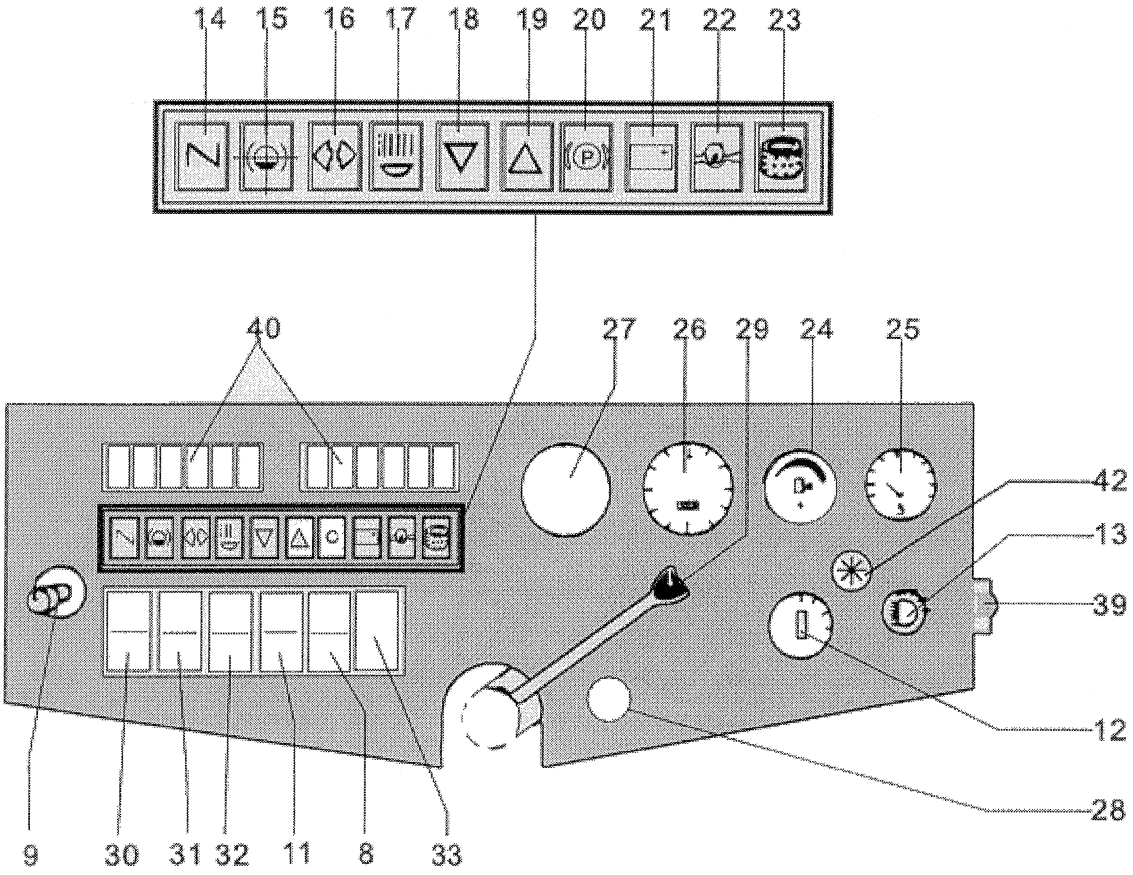
40 Multi-function switch with lock for work equipment cut-off and change-over of the direction-of-travel pre-selection switch from pos. 07 to pos. 46


Only press when machine is at standstill!

41 Hazard warning switch
42 Operating hour meter
43 Fuel gauge
44 Coolant temperature indicator
45 Switch for windshield wiper, front, wash/ wipe function
46 Switch for windshield wiper, rear, wash/ wipe function
47 not assigned *
48 not assigned *
49 not assigned *
50 not assigned *
51 Pre-selection of travel direction - Function only active when working hydraulics are switched off
52 Light switch
53 Socket
54 Speedometer (only high-speed version)

* e.g. for accessories such as rotating beacon, water pump for sweeper, additional floodlights, etc.

Operating levers and dashboard



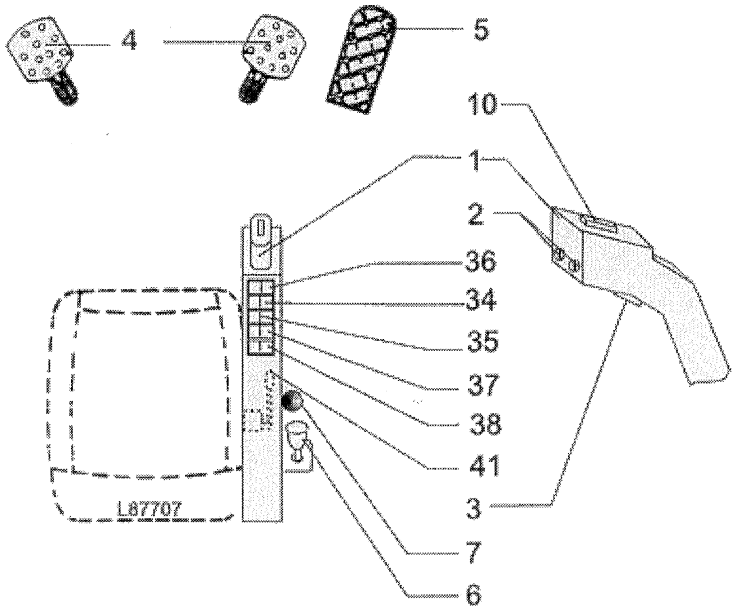


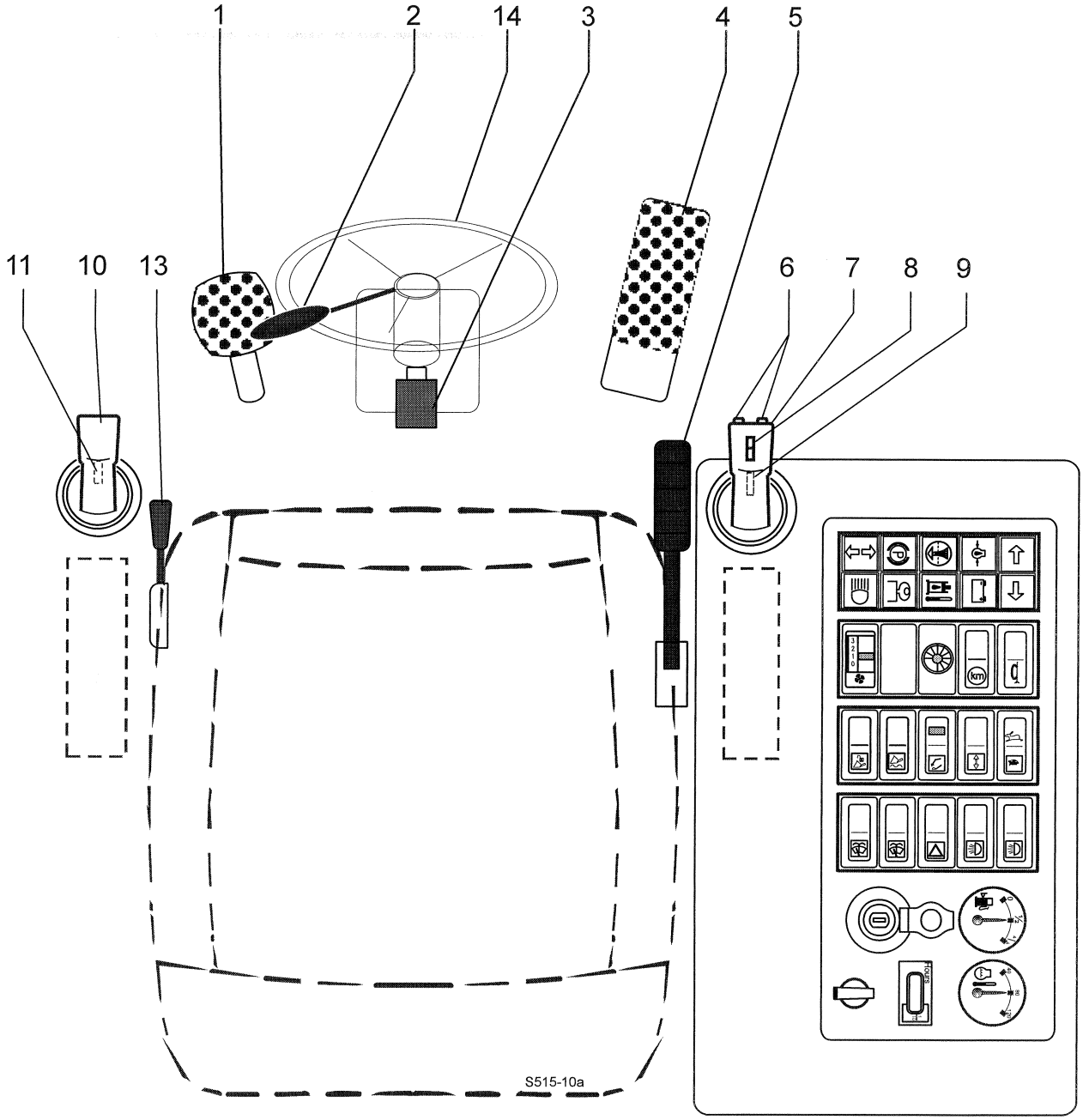
Bild 7

1 Loader lever
2 Additional control circuit
3 Floating position
4 Double brake inching pedal
5 Accelerator pedal
6 Parking brake
7 Heater shut-off
8 Loader hydraulics ON / OFF
9 Travel direction pre-selector at dashboard
10 Travel direction pre-selector in loader lever
11 Switch for windscreen wiper (rear), wiper/ washer function
12 Pre-heat/ starter switch
13 Light switch
14 Red - pre-glow indicator
15 Red - brake pressure
16 Green - flasher
17 Blue - high beam
18 Green - travel in reverse
19 Green - travel forward
20 Red - hand brake applied
21 Red - battery charge lamp
22 Red - oil pressure indicator
23 Yellow - air filter pollution indicator
24 Fuel gauge
25 Cooling water temperature gauge
26 Operating hour meter
27 Load warning indicator
28 Heating switch
29 Flasher - horn - low beam switch (steering column switch)
30 Travel range selector switch - fast/slow
31 Hazard light switch
32 Switch for windscreen wiper (front), wiper/ washer function
33 Change-over switch travel direction pre-selector from Pos. 09 to 10
34 Additional control circuit ON - OFF
35 Cab UP - DOWN
36 Floating Position ON - OFF - CONTINUOUS OPERATION
37 Working flood light front
38 Working flood light rear
39 Socket
40 Fuse box
41 Emergency operation (lowering) for cab
42 Warning indicator accelerator pedal

- This list includes optional equipment

Display elements and operator controls

The following list includes non-standard equipment!



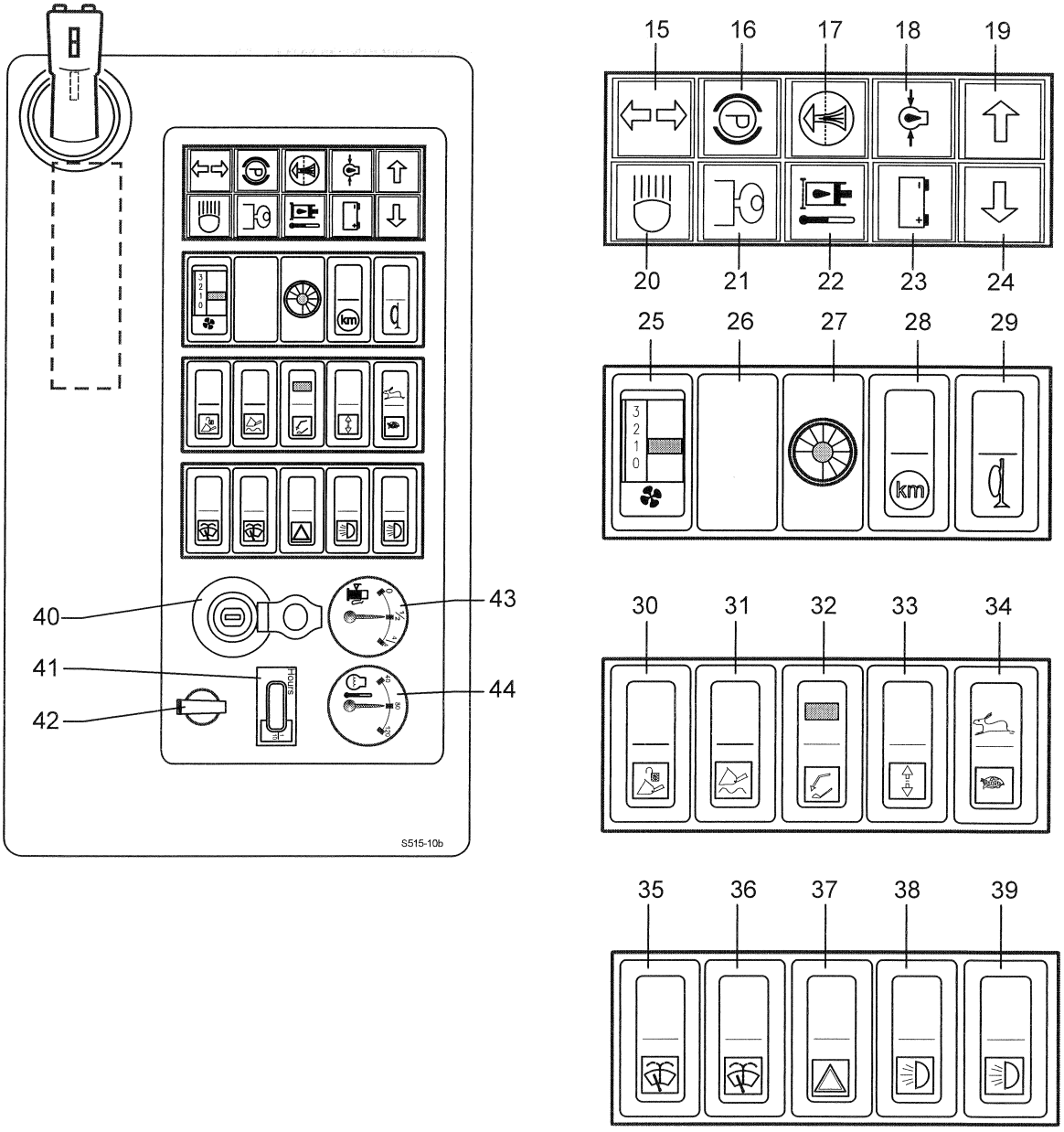
Operator controls

Description

1 Brake inching pedal
2 Direction indicator - horn - lower/ upper beam switch (stalk control) - option
3 Steering wheel - Tilt adjustment
4 Accelerator pedal
5 Parking brake
6 Operation - additional control circuit
7 Control lever (joystick) - loading equipment
8 Pre-selection of travel direction - without function when working hydraulics are switched off
9 Float position, pulse-operated
10 Control lever for steering
11 Safety switch for "steering" control lever
12 Heater shut-off - option
13 Manual throttle - option
14 Steering wheel

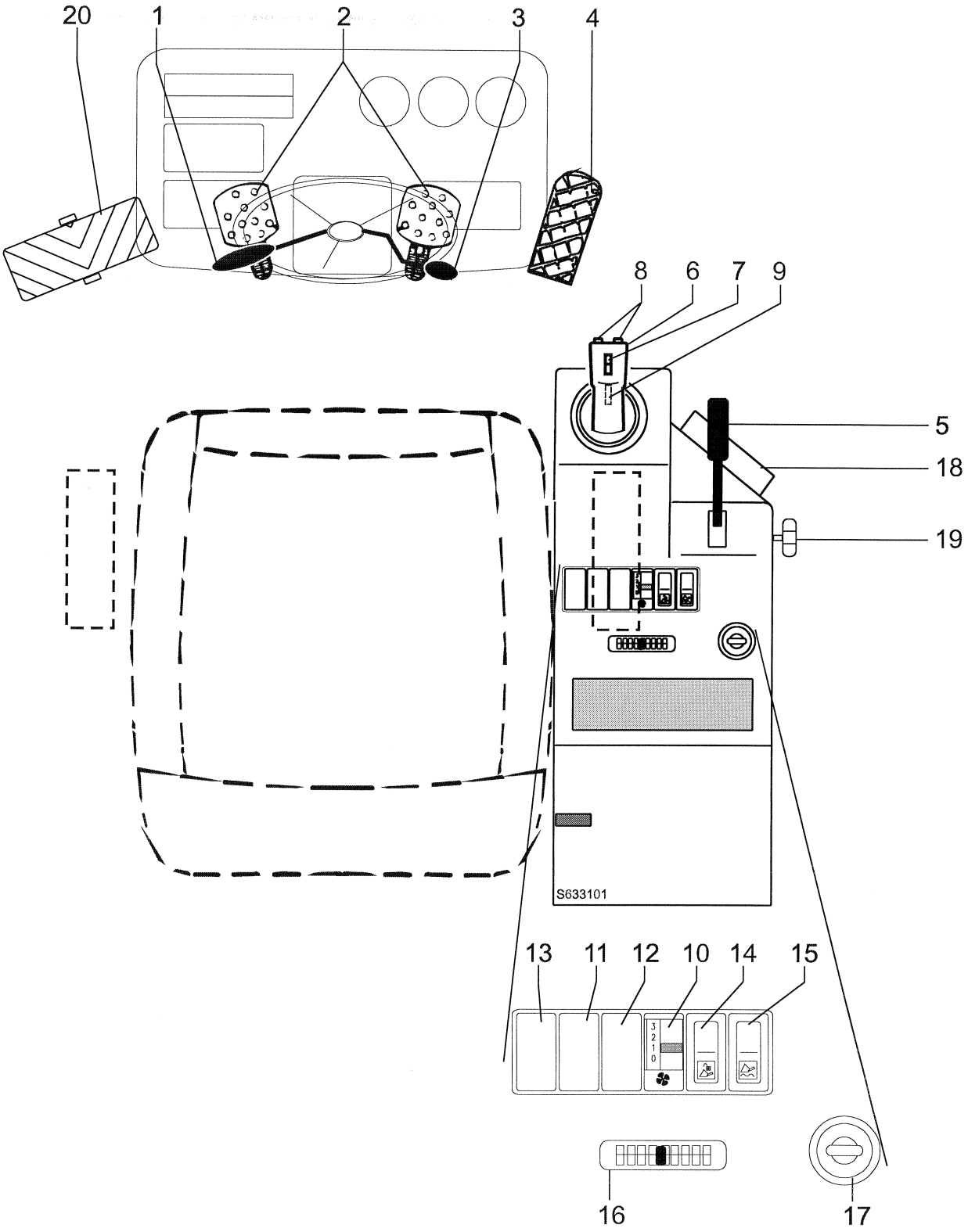
Display elements and operator controls

The following list includes non-standard equipment!



Instrument panel

	Description
15	Direction indicator - option
16	Parking brake indicator lamp
17	Air filter clogging indicator
18	Engine oil pressure indicator
19	Travel, forward
20	Upper beam - option
21	Pre-heat indicator
22	Hydraulic oil temperature indicator
23	Battery charge
24	Travel, in reverse
25	Heater fan switch - option
26	not assigned
27	Creep speed control - option
28	Change-over for creep speed - standard travel operations - option
29	Horn (referring to "lighting" option: in stalk control, pos. 1)
30	OFF-switch for actuation of additional control circuit (pos. 6) - option
31	Pre-selection switch for float position - Off/Impulse/Continuous operation
32	Multi-function switch with lock for "work equipment" cut-off, "control lever for steering" cut-off and change-over of direction-of-travel pre-selectors from pos. 08 to pos. 15 Only press when machine is at standstill!
33	Pre-selection of travel direction - Function only activated when work equipment switched off
34	Fast / Slow switch
35	Switch for windshield wiper, front, wash/ wipe function - option
36	Switch for windshield wiper, rear, wash/ wipe function - option
37	Hazard warning switch - option
38	Working floodlights, front / rear
39	Light switch - option
40	Pre-heat/ starter switch
41	Operating hour meter
42	Socket
43	Fuel gauge
44	Engine oil temperature indicator



SCHAEFF	Typ/Model/Type **SKS 633**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.35.01**

Description

1	Direction indicator - signal horn - lower/upper beam switch (steering column switch)
2	Double brake inching pedal
3	Steering wheel - tilt adjustment
4	Accelerator pedal
5	Parking brake
6	Actuating lever for loading equipment
7	Travel direction selector switch (without function when working hydraulics are switched off)
8	Actuation - additional control circuit
9	Actuation of impulse mode - float position
10	Fan switch
11	not assigned *
12	not assigned *
13	not assigned *
14	Cut-off switch for actuation of additional control circuit (pos. 8)
15	Selection switch for float position - OFF/impulse/continuous operation mode
16	Slider control - heating
17	Pre-heat/ starter switch
18	Fuse and relay box
19	Shift lever for fan - fresh air/ recirculating air
20	Pedal - slewing

*e.g. for accessories such as ride control system, bucket return positioner etc.

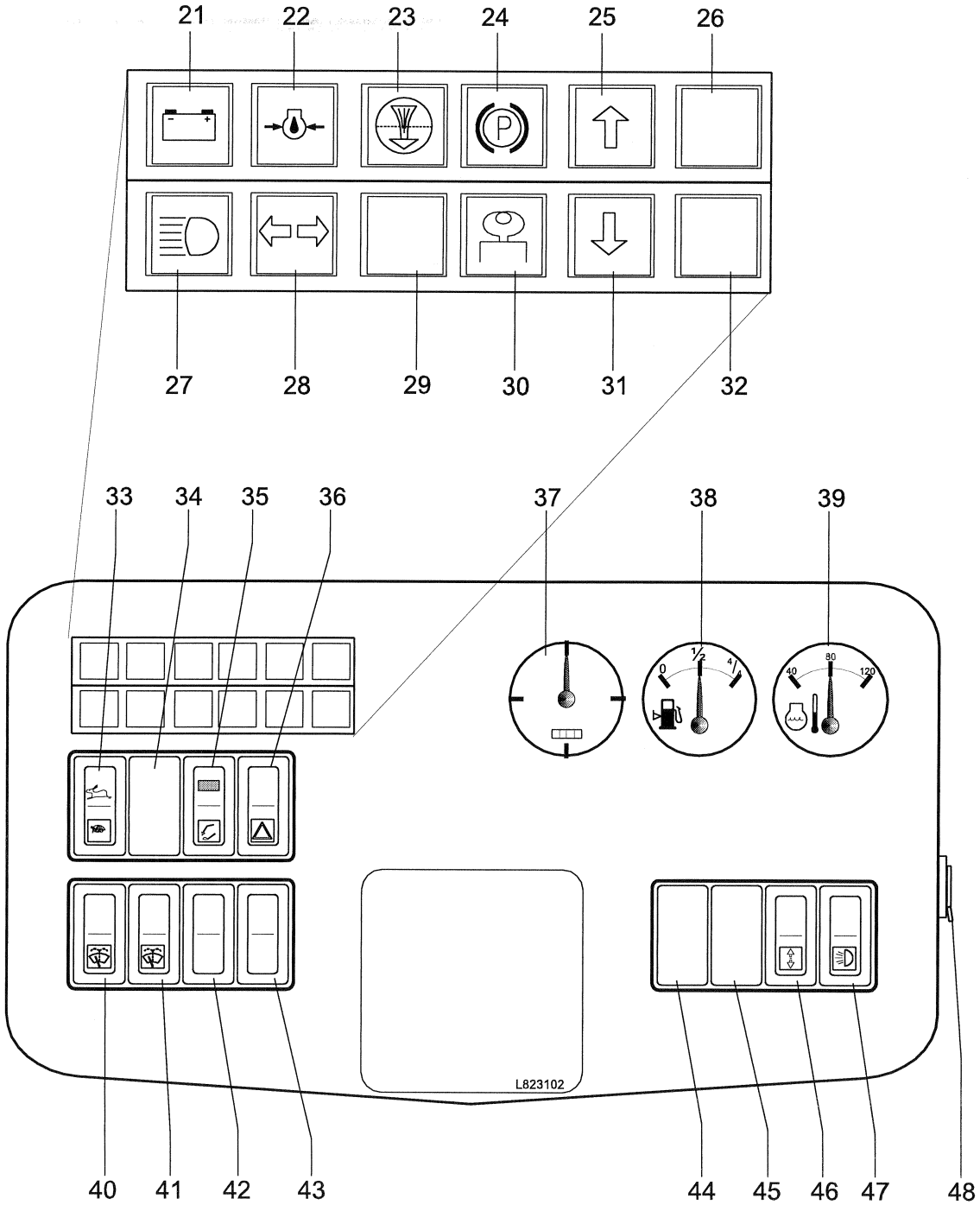

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L823102

Bild 10.2

Description

21 Battery charge indicator
22 Engine oil pressure indicator
23 Air filter clogging indicator
24 Parking brake indicator lamp
25 Travel forward
26 not assigned *
27 High beam
28 Flashlight turn signal
29 not assigned *
30 Pre-heat indicator
31 Travel in reverse
32 not assigned *
33 Travel range switch - fast/ slow
34 not assigned *
35 Multi-function switch with locking function for work equipment cut-off and setting of travel direction switch from pos. 07 to pos. 46

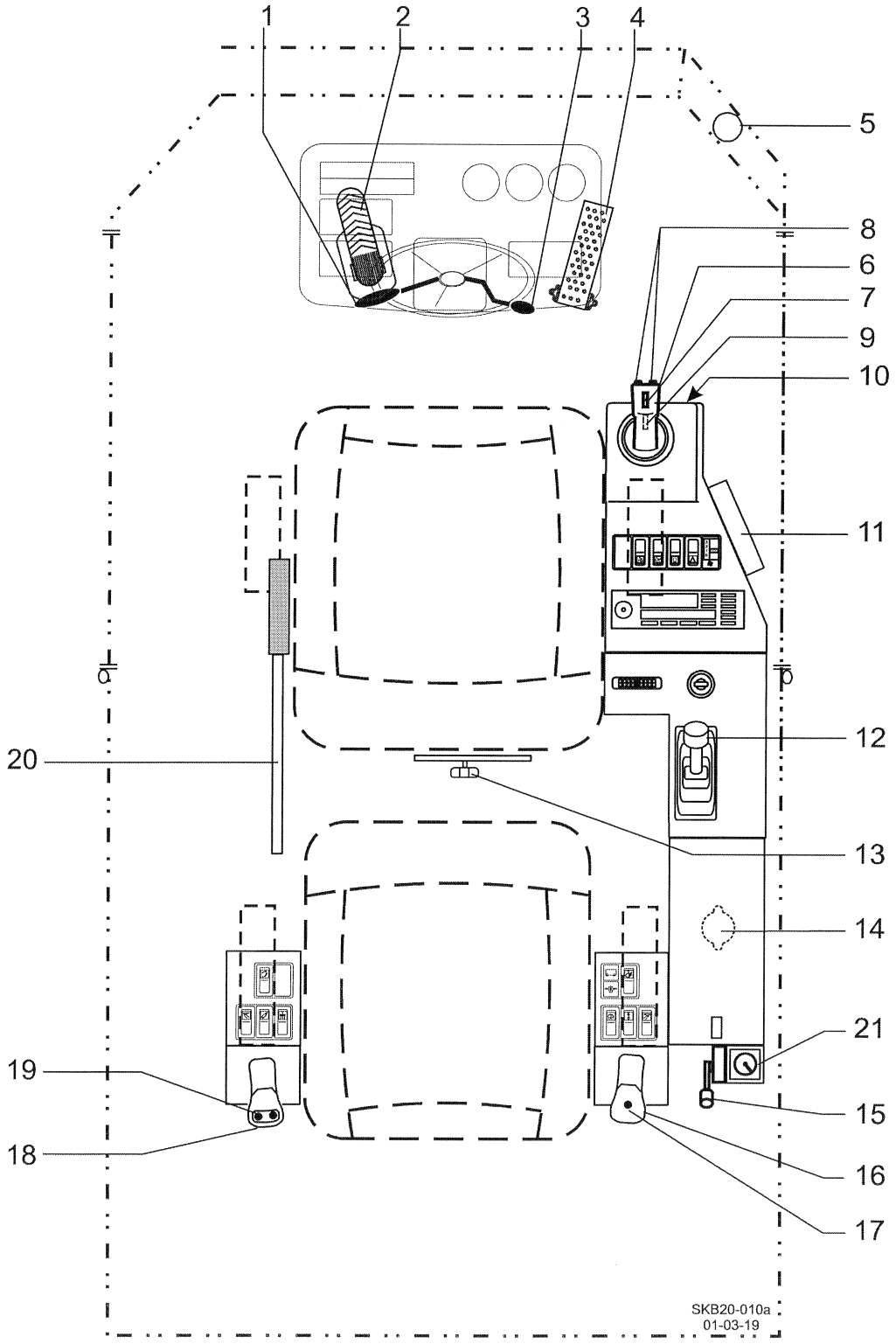
 **Only press the button when machine is at standstill !**

36 Hazard warning switch
37 Operating hour meter
38 Fuel gauge
39 Coolant temperature indicator
40 Switch for windscreen wiper, front, wash/ wipe function
41 Switch for windscreen wiper, rear, wash/ wipe function
42 not assigned *
43 not assigned *
44 not assigned *
45 not assigned *
46 Travel direction selection - Function only when working hydraulics are switched off
47 Light switch
48 Socket

* e.g. for accessories such as rotating beacon, water pump for sweeper, additional floodlights, etc

Display and operator controls

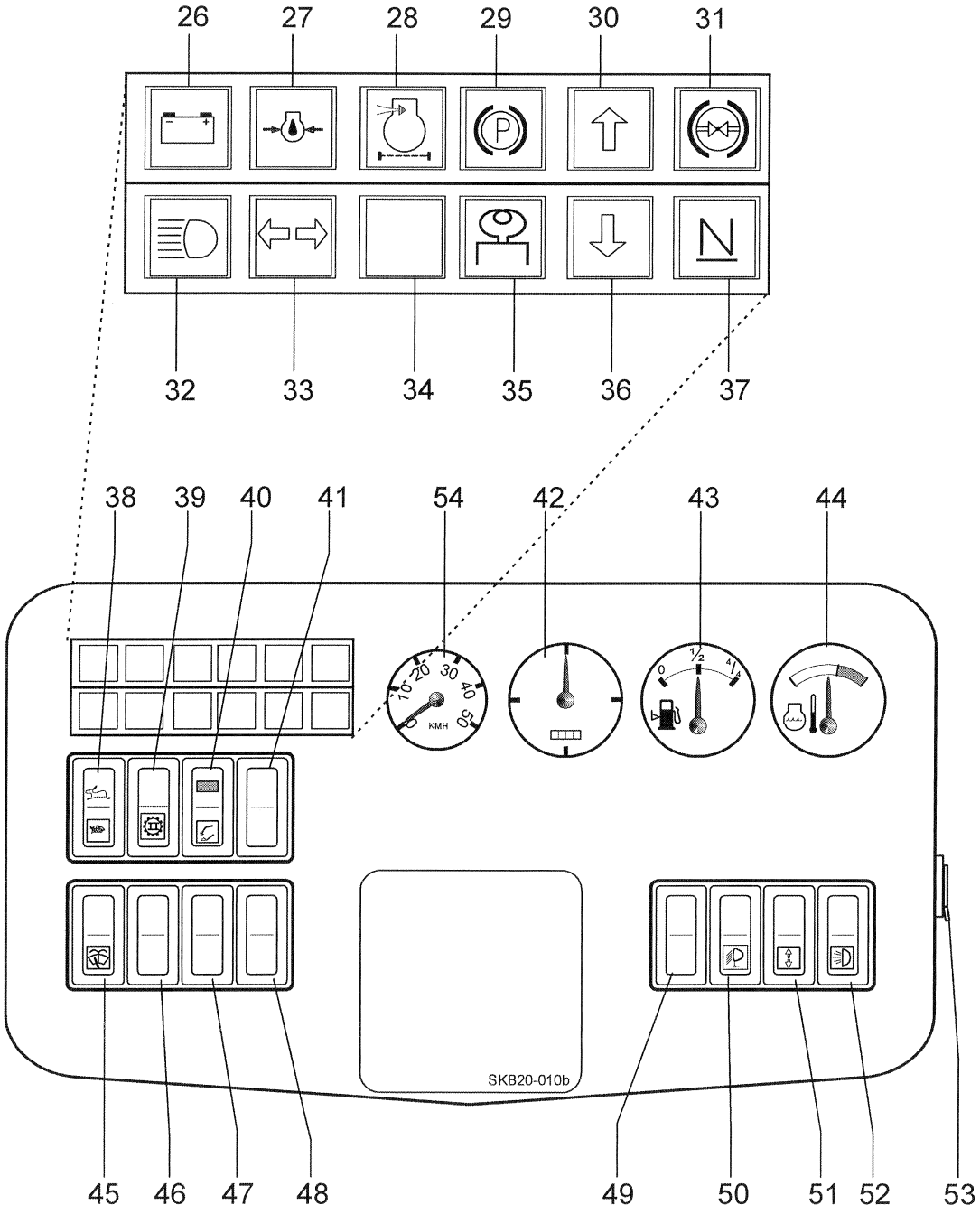
The following list contains special equipment!



SCHAEFF	Typ/Model/Type **SKB 2000**	Datum/Edition/Date **01.2002**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.45.01**

1 Direction indicator — signal horn — low/ high beam switch (steering column mounted switch)
2 Brake inching pedal
3 Steering wheel — Tilt adjustment
4 Accelerator pedal
5 Windshield washer tank
6 Control lever (joystick) — loader installation
7 Direction-of-travel pre-selection — without function with working hydraulics switched off
8 Operation — Additional control circuit
9 Operation of impulse mode — Float position
10 Series fuses and relay carrier
11 Fuse and relay carrier
12 Parking brake
13 Control for fan — fresh air/re-circulating air
14 Expansion tank for cooling water
15 Manual throttle
16 Backhoe operation
17 Horn
18 Excavator operation
19 Excavator additional control circuit
20 Operating rod for mechanical quick-mount hitch (loader/excavator)
21 Backhoe overload warning device manometer

Display and operator controls



26 Battery charge indicator
27 Engine oil pressure indicator lamp
28 Air filter clogging service indicator
29 Parking brake indicator lamp
30 Travel, forward
31 Brake accumulator pressure indicator lamp
32 High beam
33 Direction indicator
34 not assigned
35 Pre-heating monitor
36 Travel, in reverse
37 Transmission indicator lamp (high-speed version only)



*When the **transmission indicator lamp** lights up, the transmission is in an intermediate position. **The machine is not ready to travel!** This can be remedied by brief steering movements until the transmission engages.*

38 Speed switch — fast/slow

39 Change-over switch — mechanical transmission range (high-speed version only)



Only press with machine at standstill!

40 Multi-function switch with lock for work equipment cut-off and change-over of the travel direction pre-selection switches from pos. 07 to pos. 51

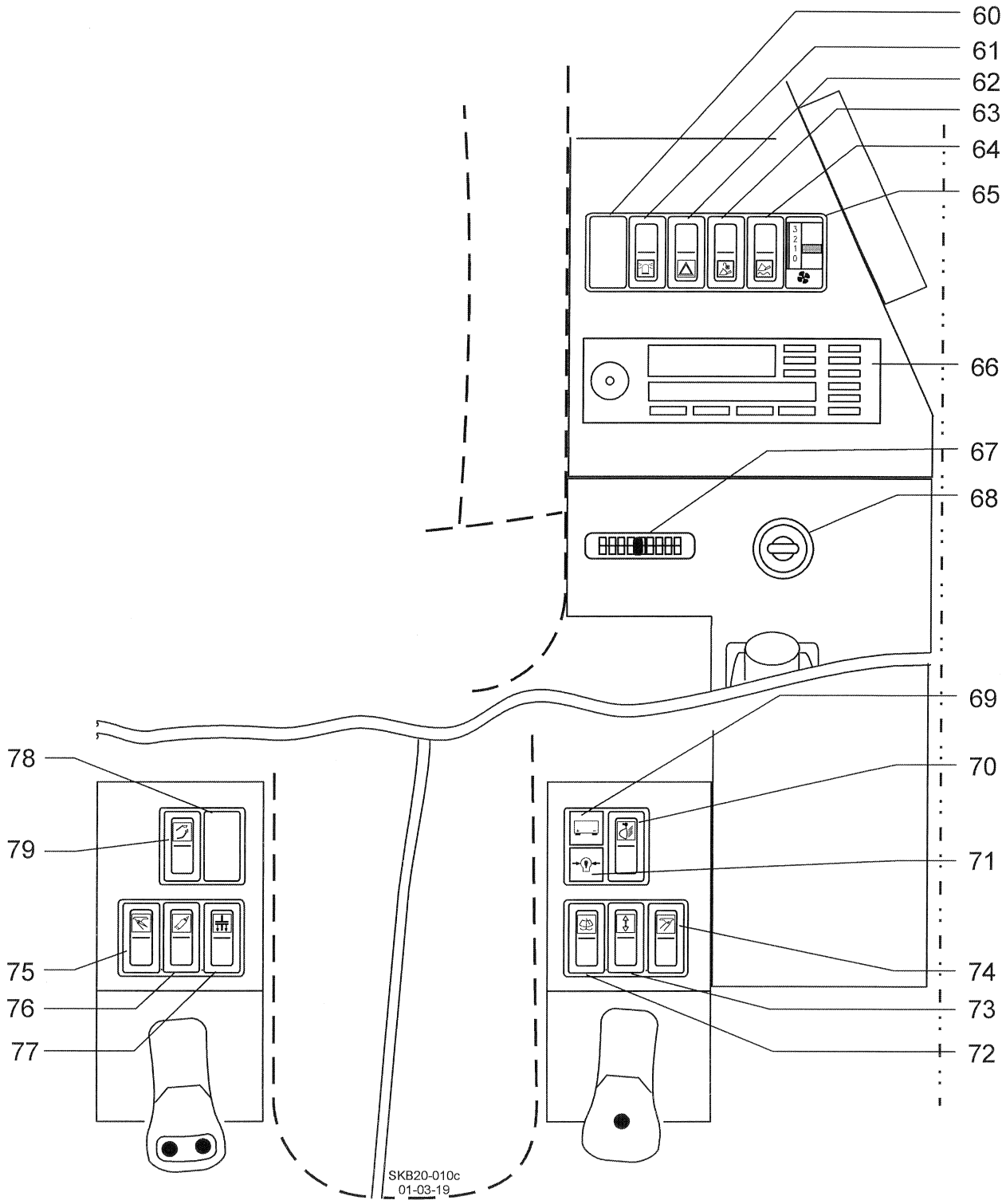


Only press with machine at standstill!

41 not assigned *
42 Elapsed-hour meter
43 Fuel gauge
44 Coolant temperature indicator
45 Switch for windshield wiper front, wash/wipe function
46 not assigned *
47 not assigned *
48 not assigned *
49 not assigned *
50 Working floodlight(s) (option)
51 Pre-selection of travel direction — function only with working hydraulics disabled
52 Light switch
53 Socket
54 Speedometer (high-speed version only)

* e.g. for accessories such as rotating beacon, additional working floodlight, etc.

Operator controls



60 not assigned *

61 Rotating beacon (option)

62 Hazard warning switch

63 OFF switch for operation of additional control circuit (Pos. 8)

64 Float position pre-selection switch — OFF/Impulse/Continuous operation

65 Fan switch

66 Radio

67 Heater control

68 Pre-heat/starter switch

69 Battery charge indicator

70 Working floodlight, rear

71 Engine oil pressure indicator lamp

72 Switch for windshield wiper, rear, wash/wipe function

73 Travel direction switch, forward/reverse, for backhoe operations

74 Backhoe outrigger

75 Backhoe outrigger

76 Rock breaker/grab operation change-over

77 Backhoe clamping

78 not assigned *

79 Backhoe pilot control cut-off

* e.g. for accessories such as rotating beacon, additional working floodlight, etc.

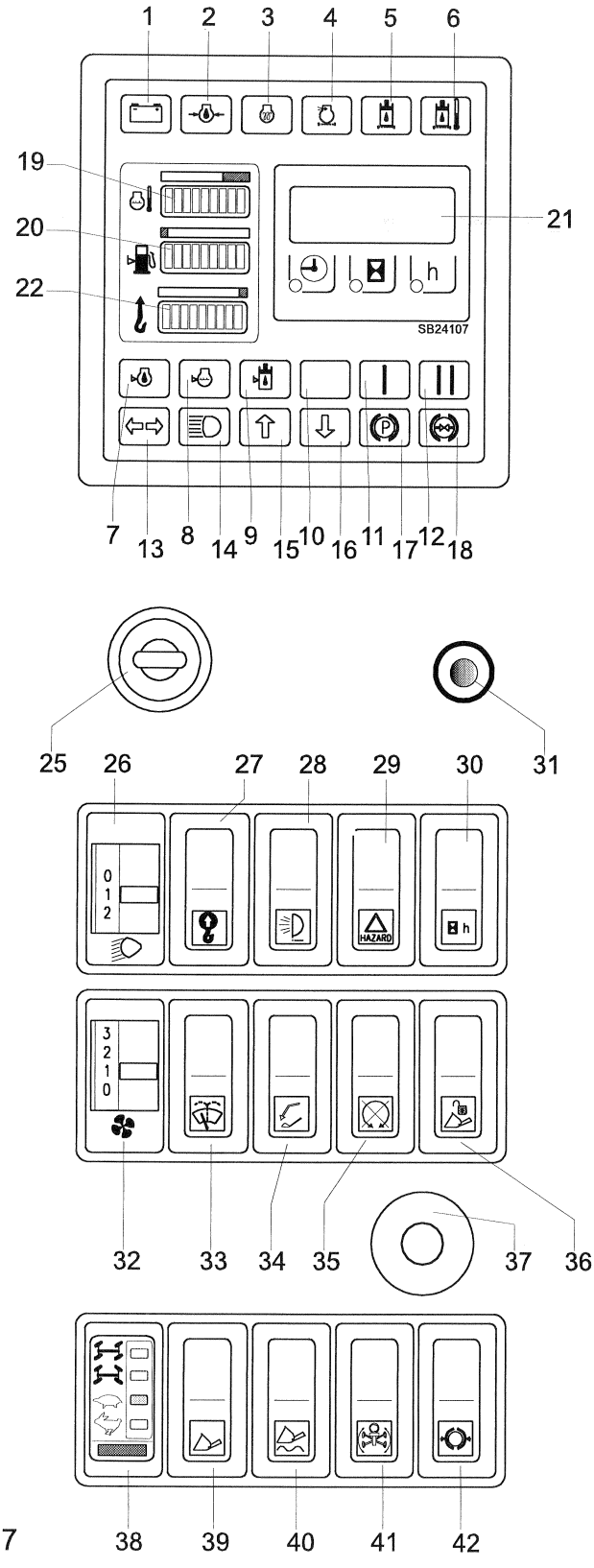


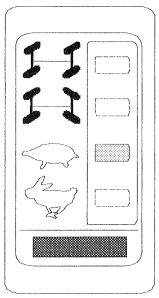
Bild 7

Description - dashboard

1	Battery charge indicator lamp
2	Engine oil pressure
3	Pre-heating monitor
4	Air filter service indicator
5	Hydraulic oil filter clogging indicator
6	Hydraulic oil temperature
7	Engine oil level
8	Coolant level
9	Hydraulic oil level
10	Blank
11	Steering angle control - front axle
12	Steering angle control - rear axle
13	Travel direction indicator
14	High beam warning lamp
15	Travel forward
16	Travel in reverse
17	Parking brake lamp
18	Accumulator pressure indicator lamp
19	Coolant temperature
20	Fuel gauge
21	Operating hour meter / trip recorder / clock
22	Load warning device
25	Pre-heat/ starter switch
26	Light switch
27	Cut-off switch, load warning device
28	Working floodlights
29	Hazard light switch
30	Rocker switch up: display change-over: Display operating hours / trip recorder / clock (item 21) Rocker switch down: setting; reset trip recorder - press the switch for at least 15 seconds
31	Check button
32	Fan switch - heating
33	Windscreen wiper - wash/ wipe system
34	Working hydraulics cut-off
35	Slew lock
36	Fuse for additional control circuit
37	Travel: forward-in reverse
38	Travel range and steering mode switch
39	Change-over excavator-loader
40	Float position
41	Oscillating axle lock
42	Excavator brake

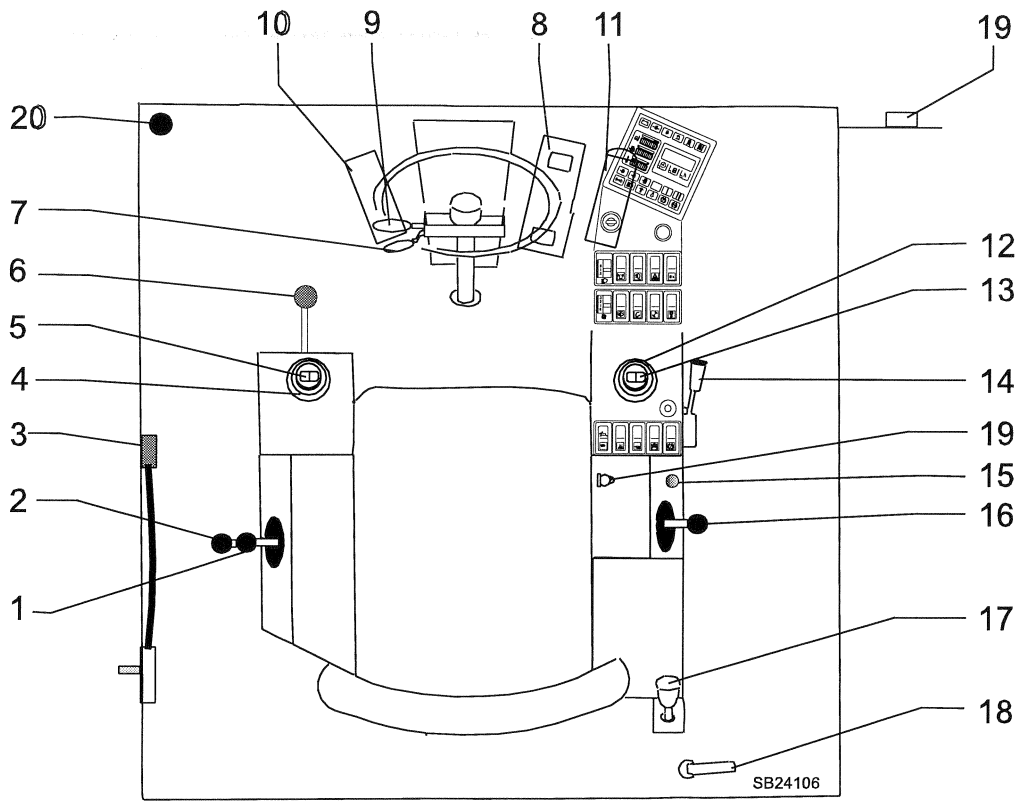
Item 38

Steering	Travel range
Crab	Working
Round	Working
Normal	Working
Normal	Road



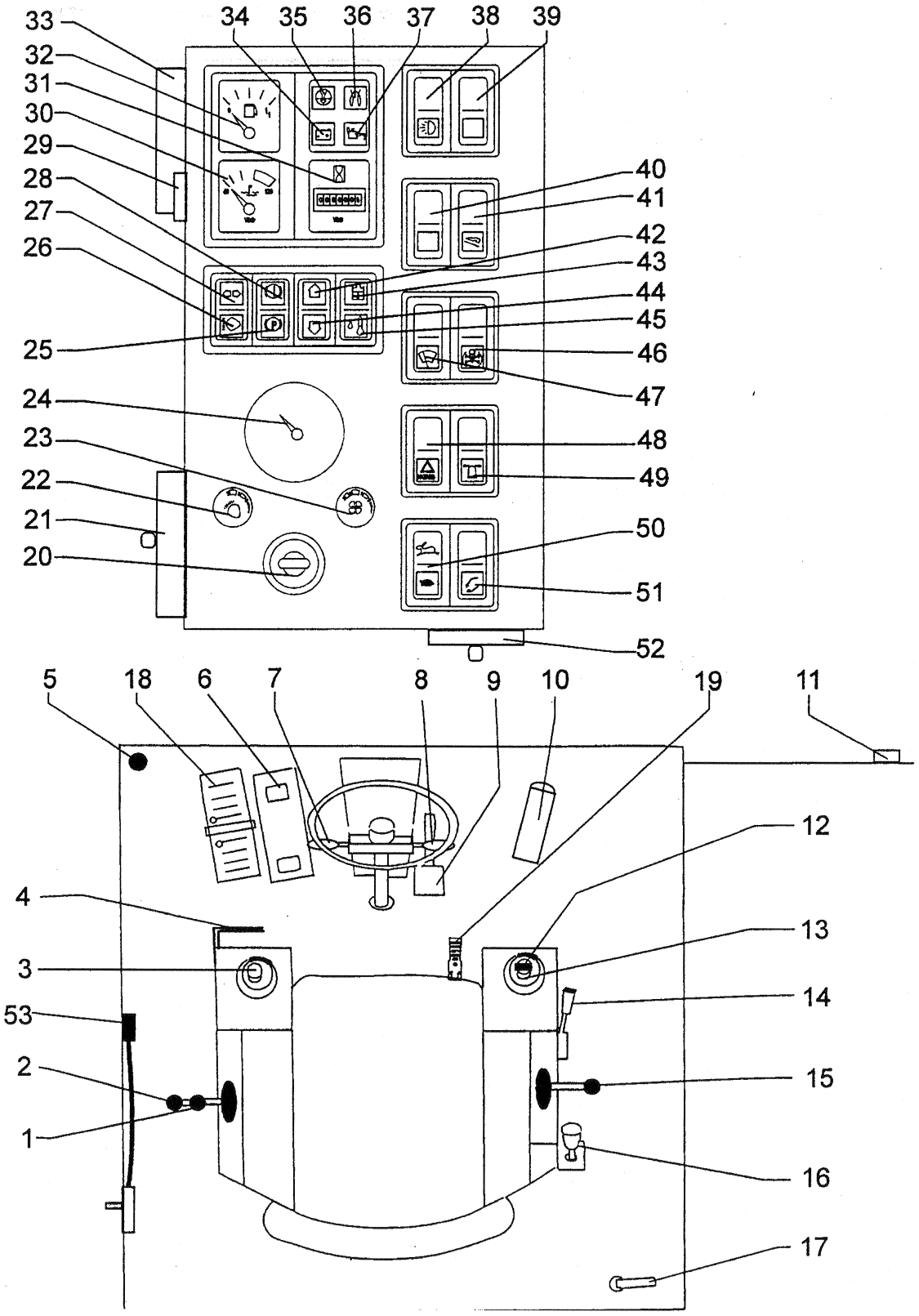
Operating levers and dashboard

This picture contains optional equipment !



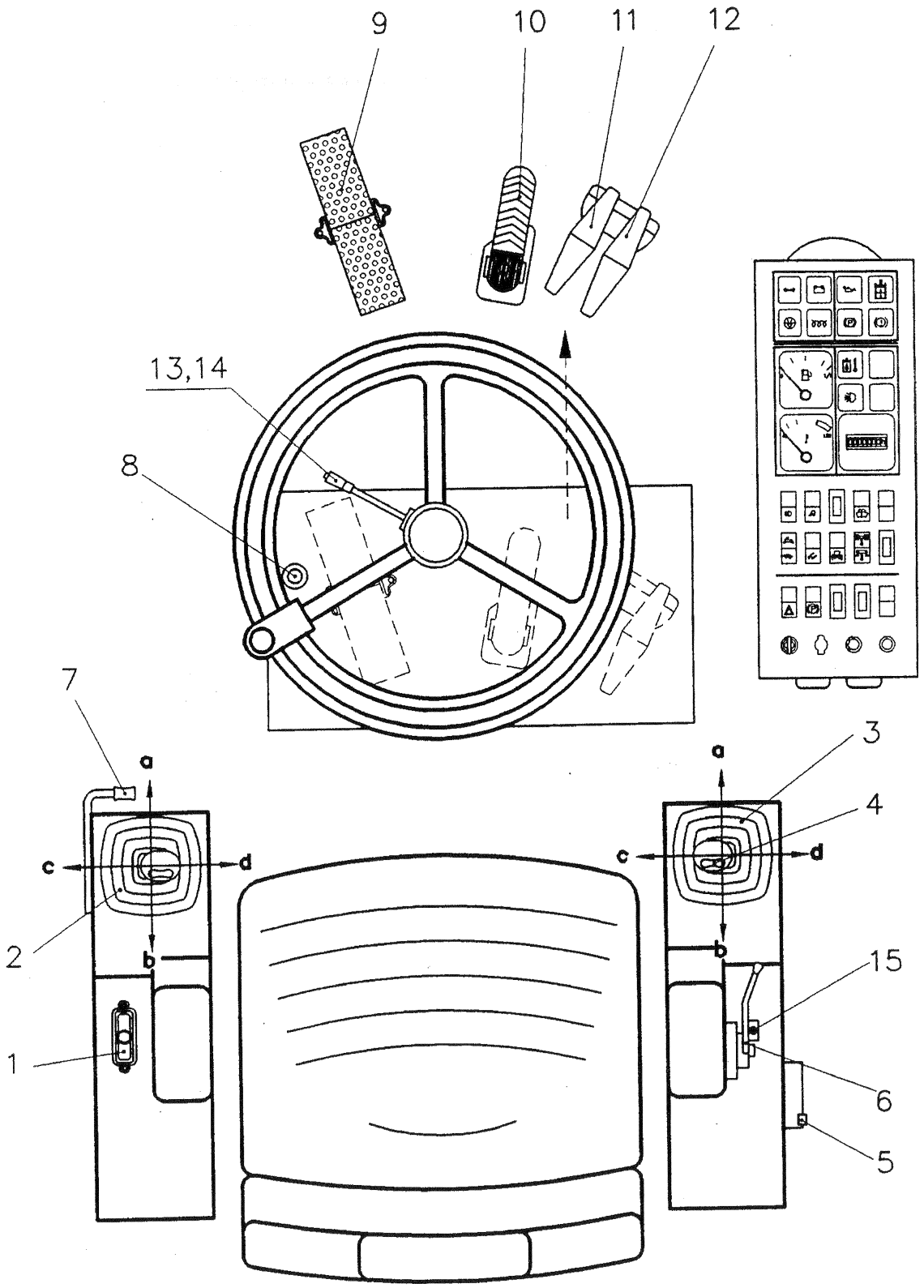
1 Actuating lever - outrigger leg, right
2 Actuating lever - outrigger leg, left
3 Door release
4 Actuating lever - excavator equipment
5 Blank
6 Working hydraulics cut-off (raise control panel)
7 Steering column adjustment
8 Actuation - retract / extend telescopic stick or hammer
9 Direction indicator - signal horn
10 Service brake
11 Accelerator pedal
12 Actuating lever - excavator equipment/ loader equipment
13 Actuation additional control circuit
•Excavator, e.g. turn grab
•Loader, e.g. multi-purpose bucket
14 Hand throttle
15 Cut-off for hot water for heating
16 Actuating lever - articulation
17 Parking brake
18 Uppercarriage - locking bolt
19 Socket
20 Actuating rod for quick-mount hitch

Operating levers and dashboard



Description for operating levers and dashboard

1 Operating lever - outrigger leg right
2 Operating lever - outrigger leg left
3 Operating lever - excavator equipment
4 Working hydraulics cut-off (raise control)
5 Operating rod for quick-mount hitch
6 Operation - extension/retraction of telescopic dipperstick, intermediate boom
7 Flasher switch / high beam
8 Travel direction pre-selector / signal horn
9 Service brake
10 Accelerator pedal
11 Socket for side marker light
12 Operation additional control circuit - turn grab, slew ditch-cleaning bucket
13 Operating lever - excavator equipment
14 Hand throttle
15 Operation - articulation
16 Parking brake
17 Uppercarriage - locking bolt
18 Sensitive travel
19 Hammer operation
20 Starter - pre-glow switch
21 Fusebox
22 Light switch
23 Heating ventilation switch
24 Load warning device
25 Red - parking brake applied
26 Blue - high beam control
27 Green - flasher
28 Blank
29 Socket
30 Engine oil temperature indicator
31 Operating hour meter
32 Fuel gauge
33 Fusebox
34 Red - charge control
35 Yellow - air filter clogging indicator
36 Red - pre-glow indicator
37 Red - engine oil pressure control
38 Working floodlights
39 Blank
40 Blank
41 Change-over - automotive driving
42 Green - forward travel
43 Red - hydraulic oil return filter contamination indicator
44 Green - reverse travel
45 Red - hydraulic oil - temperature control
46 Oscillating axle lock ON-OFF
47 Windscreen wiper, wiper/washer system
48 Warning light switch
49 Rotating beacon
50 Travel range selector FAST-SLOW
51 Working hydraulics ON-OFF
52 Additional fusebox
53 Door release



SCHAEFF	Typ/Model/Type **HML 51 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Cabin - control elements**	Blatt/Page/Feuille **9.54.01**

1 = Operating lever support/ dozer blade or 2-point stabilizing

to the back = retract stabilizers
to the front = extend stabilizers

Machines equipped with support/ dozer blade and 2-point stabilizing:

Electric preselection via rocker switches 29 and 30 (fig. 17).

2 = Hydraulic cross servo control stick, ISO-control

a = Extend dipperstick
b = Retract dipperstick
c = Turn uppercarriage to the left
d = Turn uppercarriage to the right

3 = Hydraulic cross servo control stick, ISO-control

a = Lower boom
b = Lift boom
c = Fill bucket or close grab resp.
d = Empty bucket or open grab resp.

4 = Rocker switch for grab rotation

Turn grab to the right = set switch to the right
Turn grab to the left = set switch to the left

5 = Locking of uppercarriage (to prevent turning)

to the front = open
to the back = locked

6 = Engine speed adjustment lever

to the front = speed reduction
to the back = speed increase

7 = Lifting armrest

! Note

All working functions are switched off when the armrest is lifted!
The indicator 20 (fig. 17) lights up (amber).

***8 = Foot switch hydraulic hammer**

9 = Pedal (rocker) - intermediate boom cylinder operation

to the front = extend cylinder
to the back = retract cylinder

10 = Pedal service brake with locking lever

11 = Left pedal

Forward travel

12 = Right pedal

Reverse travel

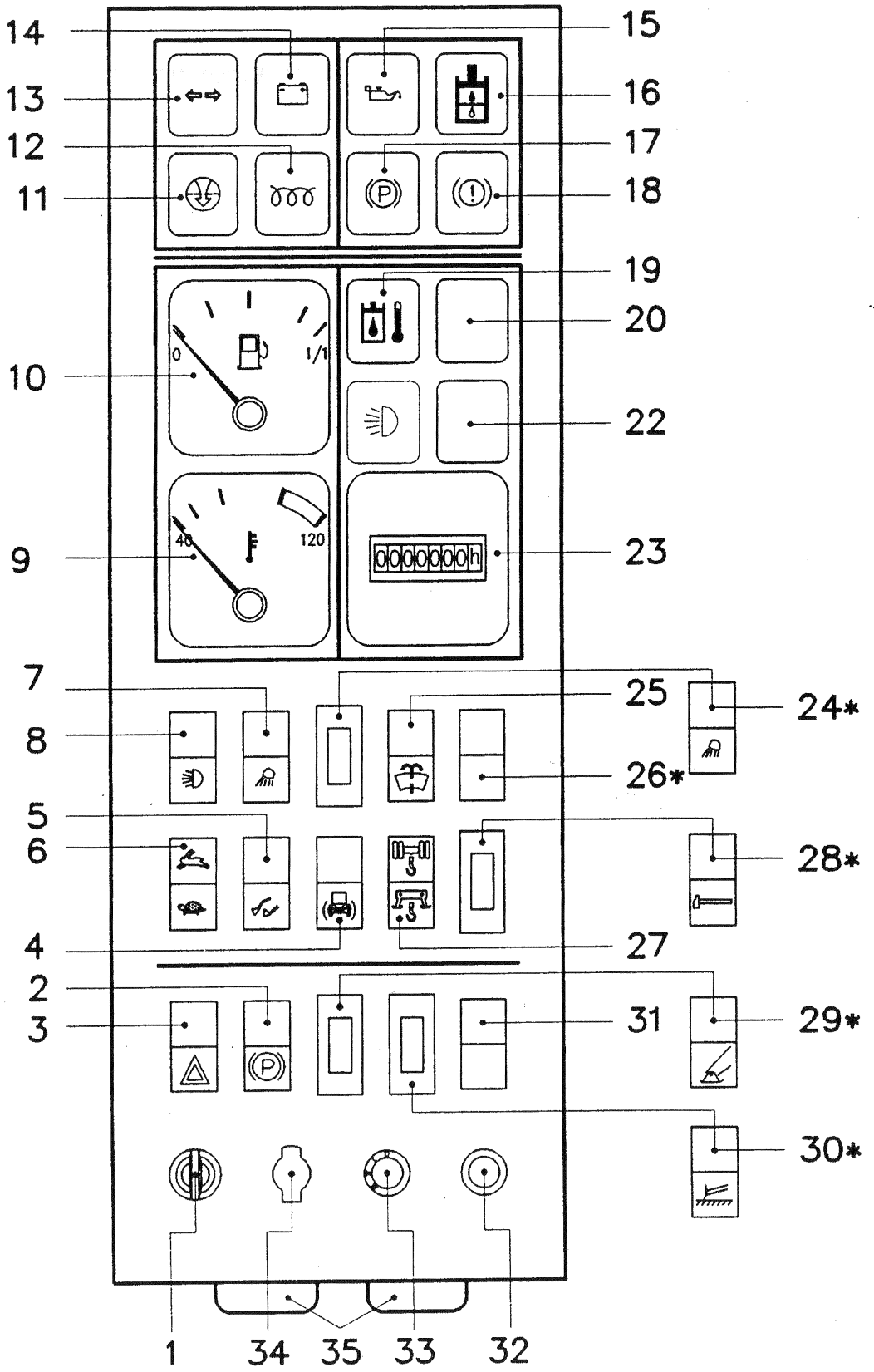
Note: The speed adjustment is also carried out with pedal 11 or 12.

13 = Travel direction indicator (at the steering column)

to the front = flash - right
to the back = flash - left

14 = Horn (lever to the top)

***Special version**



SCHAEFF	Typ/Model/Type **HML 51 S**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Cabin - dashboard**	Blatt/Page/Feuille **9.54.03**

Cabin - dashboard

1 = Ignition lock

0 = ignition OFF
I = ignition ON
II = pre-glow
III = start the engine

2 = Rocker switch parking brake

to the back = brake applied
to the front = brake released
When the brake is applied, the indicator 17 lights up (red).

! Note

The working functions and travelling are switched off when the parking brake is applied.

3 = Rocker switch hazard light system

4 = Rocker switch oscillating axle (orange)

Indicator in the rocker switch lights up when the oscillating axle is not locked.

5 = Rocker switch locking of all working functions

Indicator in the rocker switch lights up when the working functions are not blocked.

6 = Rocker switch gear shifting

Symbol „rabbit“ = high speed
Symbol „tortoise“ = low speed

Switch-over from high speed to low speed and vice versa is not possible during travelling.

7 = Rocker switch working floodlights

8 = Rocker switch headlamps for travelling

9 = Coolant temperature (engine)

10 = Diesel level indicator

11 = Indication of engine air filter clogging (yellow)

Lights up in case of clogged filter, excessive suction vacuum.

12 = Pre-glow indicator (red)

Lights up at ignition key position II.

13 = Flasher control indicator (green)

Lights up when the travel direction indicator is switched on.

14 = Battery charge control (red)

Lights up if battery is not charged.

15 = Engine oil pressure (red)

Lights up if oil pressure is too low.

16 = Clogging indicator hydraulic oil filter (red)

Lights up in case of contaminated filter cartridge.

17 = Parking brake (red)

Lights up when parking brake is applied.

18 = Service brake system (red)

Lights up if brake pressure is too low.

19 = Hydraulic oil temperature (red)

Lights up if oil temperature is too high.

20 = Warning lamp (amber)

Lights up when maintenance stairs are pulled out or / and the armrest 7 (fig. 16) is lifted.
All working functions are blocked !

22 = Hydraulic oil level monitoring (red)

23 = Operating hour meter

***24 = Additional working floodlights**

25 = Rocker switch windscreen wiper / washer system

***26 = Rocker switch Fine-Mode**

Preselector switch for the continuous reduction of the LS-signal from the control block to the pump.

27 = Rocker switch overload warning device

to the back	= machine stabilized
intermediate position	= overload warning device OFF
to the front	= machine not stabilized

***28 = Electric preselection hydraulic hammer**

***29 = Electric preselection 2-point stabilizing, individually operated**

to the back	= extend/retract right stabilizer
intermediate position	= switched OFF
to the front	= extend/retract left stabilizer

Hydraulic operation via lever 1 (fig. 16).

***30 = Electric preselection support/ dozer blade**

to the back	= blade lower/ lift
to the front	= switched off

Hydraulic operation via lever 1 (fig. 16).

31 = Push button pressure relief working equipment

32 = Bowden cable - heating

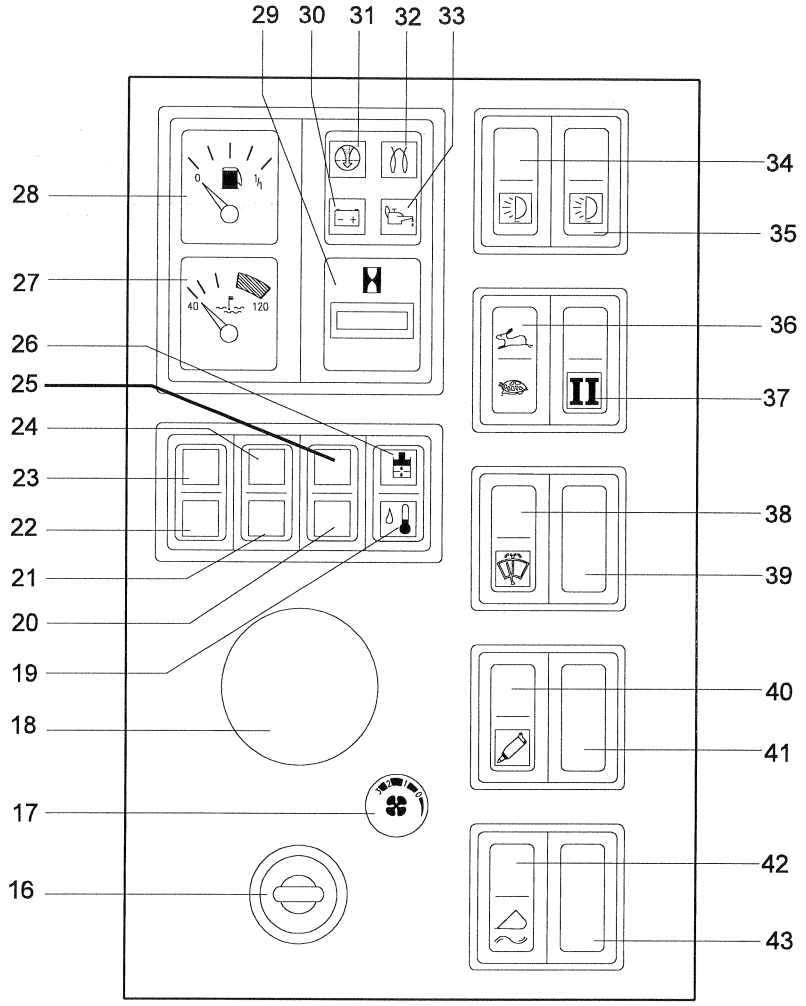
Regulation of the warm water supply

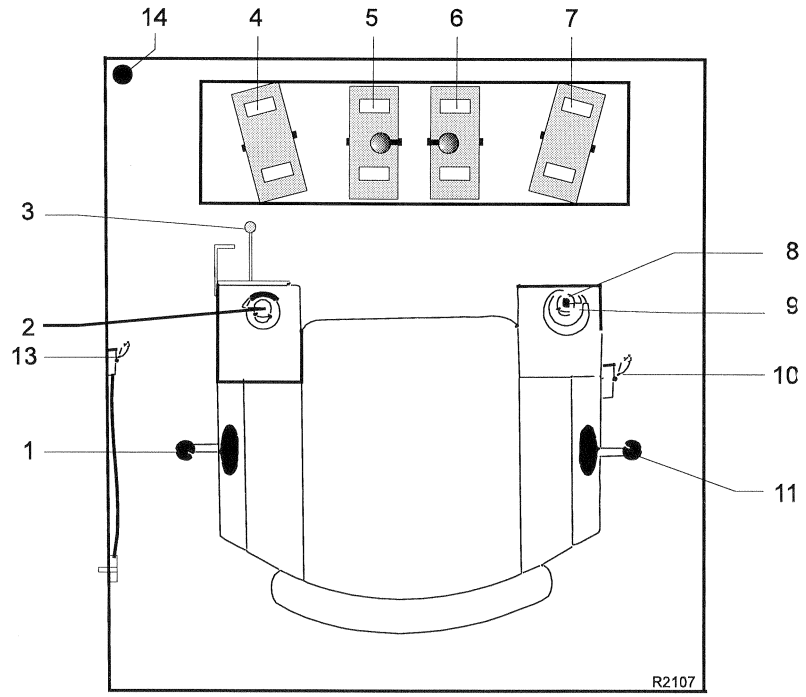
33 = Turn switch ventilation/heating (fan)

34 = Socket

35 = Fuses for electric system

***special version**





SCHAEFF	Typ/Model/Type **HR 21**	Datum/Edition/Date **01.2000**
	Benennung/Description/Dénomination **Operation**	Blatt/Page/Feuille **9.62.01**

Description - Operating levers and instrument panel

1	Dozer blade
2	Actuation - excavator equipment
3	Locking of all hydraulic functions (raising the armrest panel)
4	Actuation - additional control circuit II - intermediate boom, telescopic dipperstick
5	Left-hand crawler drive
6	Right-hand crawler drive
7	Actuation - additional control circuit I, e.g. grab, hammer
8	Signal horn
9	Actuation - excavator equipment
10	Hand throttle
11	Actuation - articulation
13	Door release
14	Operating lever - quick-mount hitch
16	Pre-heat starter switch (ignition lock)
17	Heater
18	Overload warning device
19	Red - Hydraulic oil temperature indicator
20-25	Blank
26	Red - hydraulic oil return filter clogging indicator
27	Engine oil temperature indicator
28	Fuel gauge
29	Working hour meter
30	Red - battery charge indicator
31	Yellow - air filter clogging indicator
32	Red - pre-glow indicator
33	Red - Engine oil pressure control
34	Cab-mounted working headlight
35	Boom-mounted working headlight
36	Fast/ slow
37	Blank
38	Windscreen wiper, wash/wipe system
39	Blank
40	Summation hammer operation
41	Blank
42	Floating position with indicator lamp
43	Blank

This picture contains non-standard equipment!

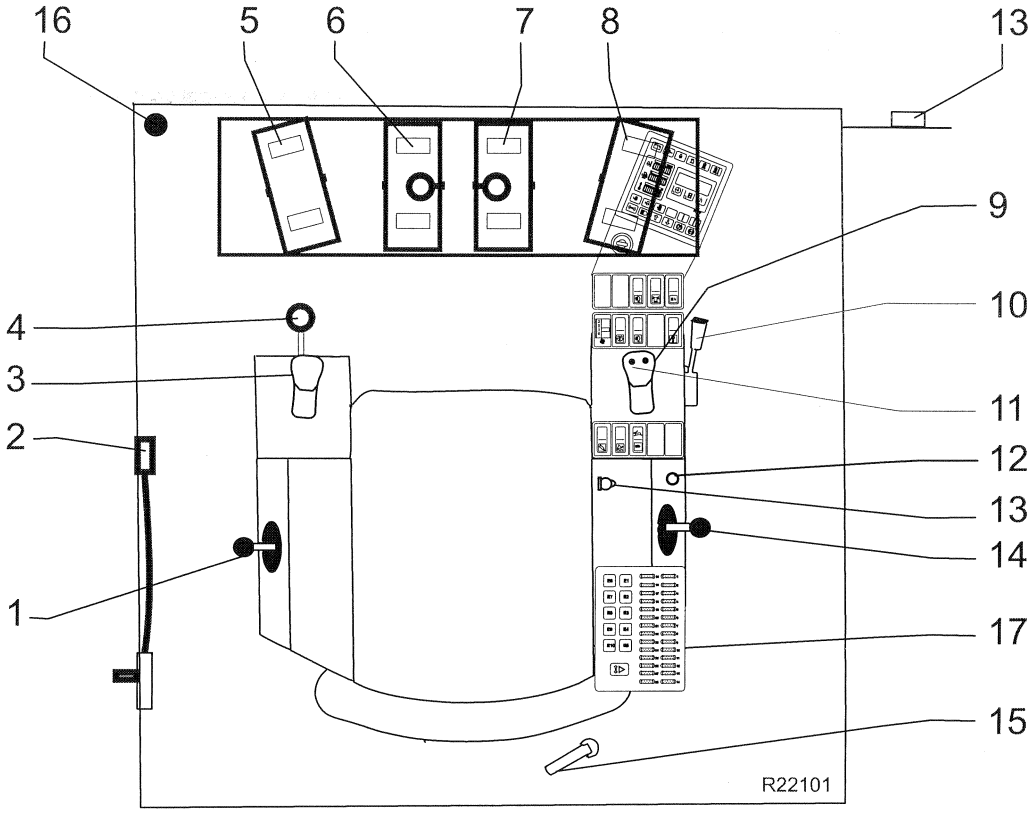
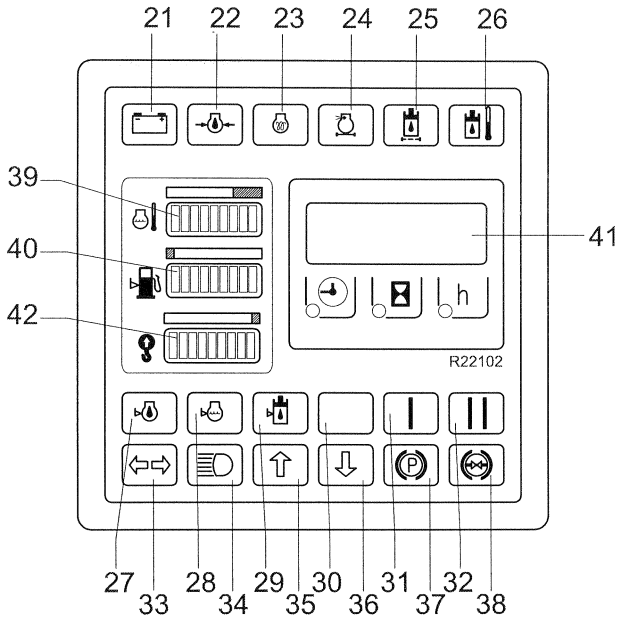
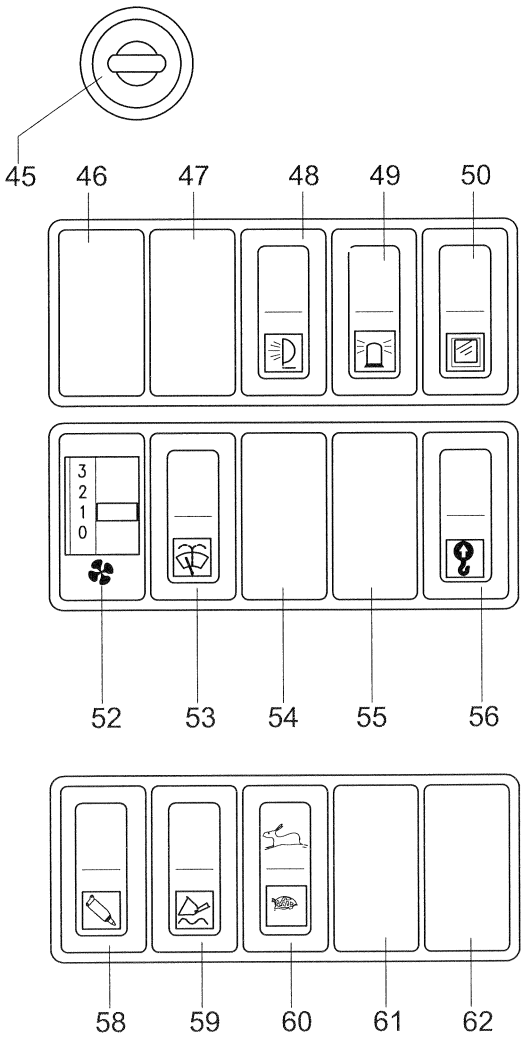


Fig. 10.1 Actuation

1	Actuating lever for dozer blade
2	Door release
3	Actuating lever for excavator equipment
4	Shut-off for working hydraulics (raise armrest)
5	Actuation of intermediate boom or retract / extend telescopic stick
6	Crawler-type undercarriage, left
7	Crawler-type undercarriage, right
8	Additional control circuit II - grab / breaker
9	Actuating lever for excavator equipment
10	Manual throttle
11	Horn
12	OFF switch - hot water for heating
13	Socket
14	Actuating lever for articulation
15	Uppercarriage locking pin
16	Actuating rod for quick-mount hitch
17	Fuse and relay box

Dashboard

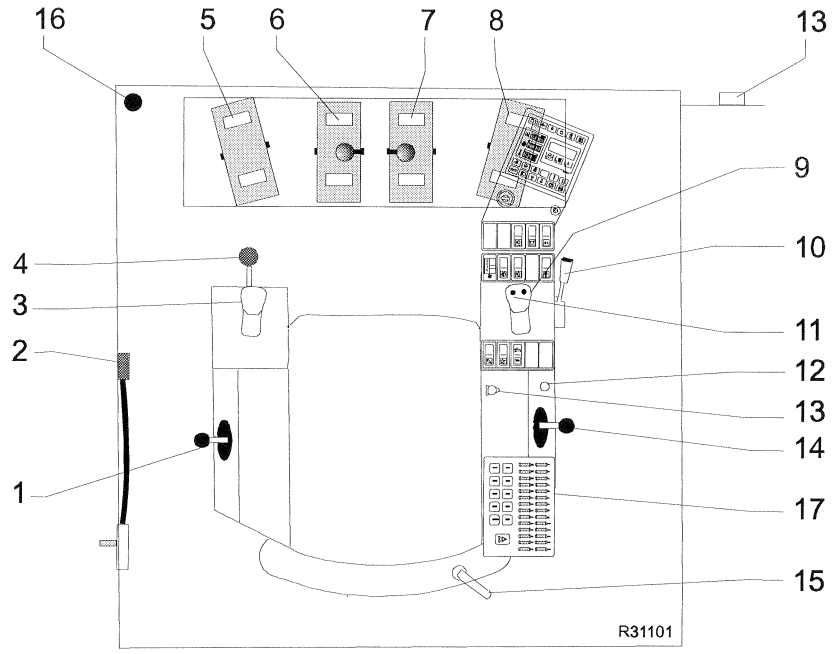

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Description of dashboard

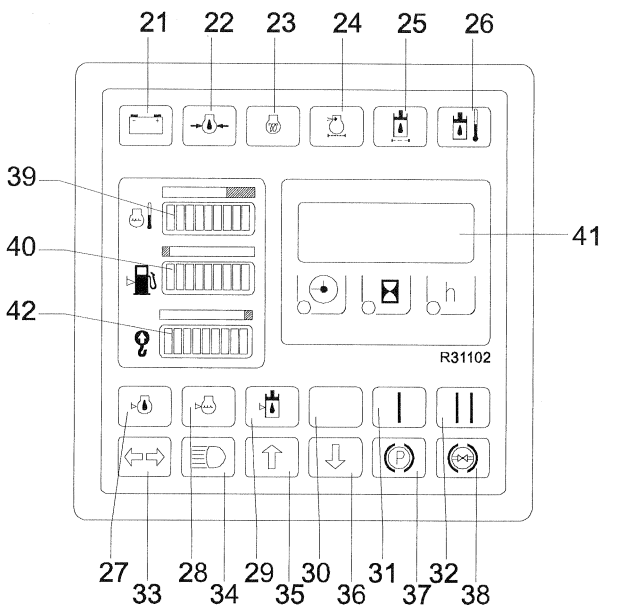
21	Battery charge indicator
22	Engine oil pressure
23	Pre-heating monitor
24	Air filter indicator
25	Hydraulic oil filter - clogging indicator
26	Hydraulic oil temperature
27	Engine oil level
28	Coolant level
29	Hydraulic oil level
30	not assigned
31	not assigned
32	not assigned
33	not assigned
34	not assigned
35	not assigned
36	not assigned
37	not assigned
38	not assigned
39	Coolant temperature
40	Fuel gauge
41	Operating hour meter / trip recorder / clock
42	Load warning device
45	Pre-heat/ starter switch
46	not assigned
47	not assigned
48	Working floodlight, front
49	Rotating beacon
50	Rocker switch up: Change display Operating hours/ trip recorder / clock (item 21) Rocker switch down: Set clock Reset trip recorder (press for at least 15 sec.)
51	Check button
52	Heater fan switch
53	Windscreen wash/ wipe system
54	Working floodlights, rear
55	not assigned
56	Load warning device cut-off
58	Hammer
59	Dozer blade float position
60	Fast - slow
61	not assigned
62	not assigned

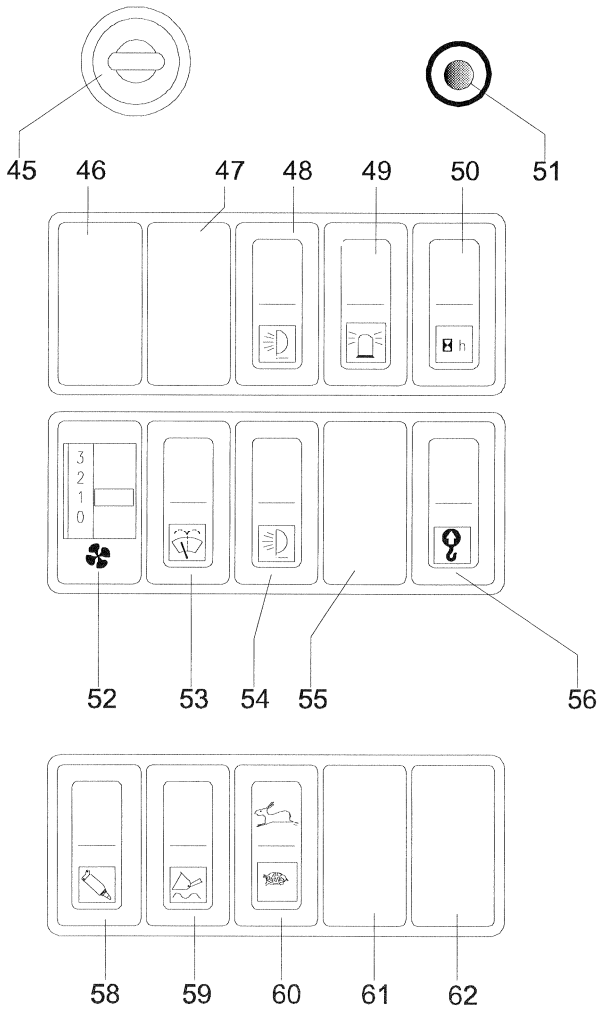
This pictures contains special equipment !



1	Actuating lever for dozer blade
2	Door release
3	Actuating lever for excavator equipment
4	Working hydraulics cut-off lever (raise armrest)
5	Actuation of intermediate boom or retract/ extend telescope
6	Crawler-type undercarriage, left
7	Crawler-type undercarriage, right
8	Additional control circuit II - grab/ hammer
9	Actuating lever for excavator equipment
10	Manual throttle
11	Horn
12	Shut-off - warm water for heating
13	Socket
14	Actuating lever for articulation
15	Uppercarriage locking bolt
16	Actuating rod for quick-mount hitch
17	Fuse and relay box

Dashboard

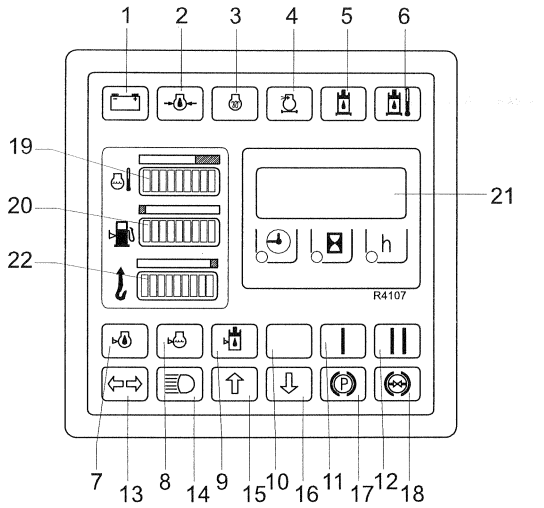

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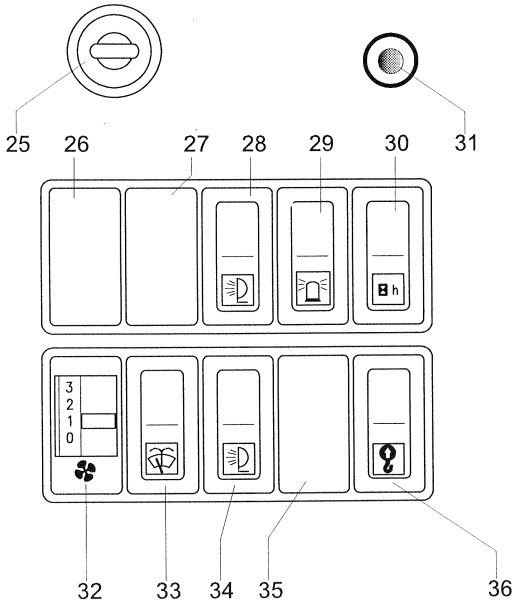

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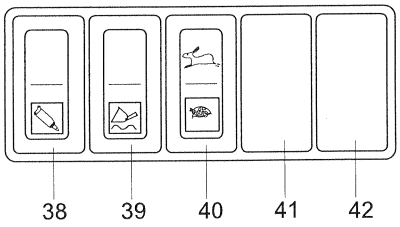
Description - Dashboard

21	Battery charge indicator	
22	Engine oil pressure	
23	Pre-heating monitor	
24	Air filter indicator	
25	Hydraulic oil filter - clogging indicator	
26	Hydraulic oil temperature	
27	Engine oil level	
28	Coolant level	
29	Hydraulic oil level	
30	not assigned	
31	not assigned	
32	not assigned	
33	not assigned	
34	not assigned	
35	not assigned	
36	not assigned	
37	not assigned	
38	not assigned	
39	Coolant temperature	
40	Fuel gauge	
41	Operating hour meter / trip recorder / clock	
42	Load warning device	
45	Pre-heat/ starter switch	
46	not assigned	
47	not assigned	
48	Working floodlights, front	
49	Rotating beacon	
50	Rocker switch up:	Change-over display operating hours/trip recorder/clock (item 21)
	Rocker switch down:	Adjustment ; reset trip recorder switch, keep pressed for at least 15 seconds
51	Check button	
52	Heater fan switch	
53	Windscreen wash/ wipe system	
54	Working floodlights, rear	
55	not assigned	
56	Load warning device cut-off	
58	Hammer	
59	Dozer blade float position	
60	Fast - slow	
61	not assigned	
62	not assigned	

Description - dashboard



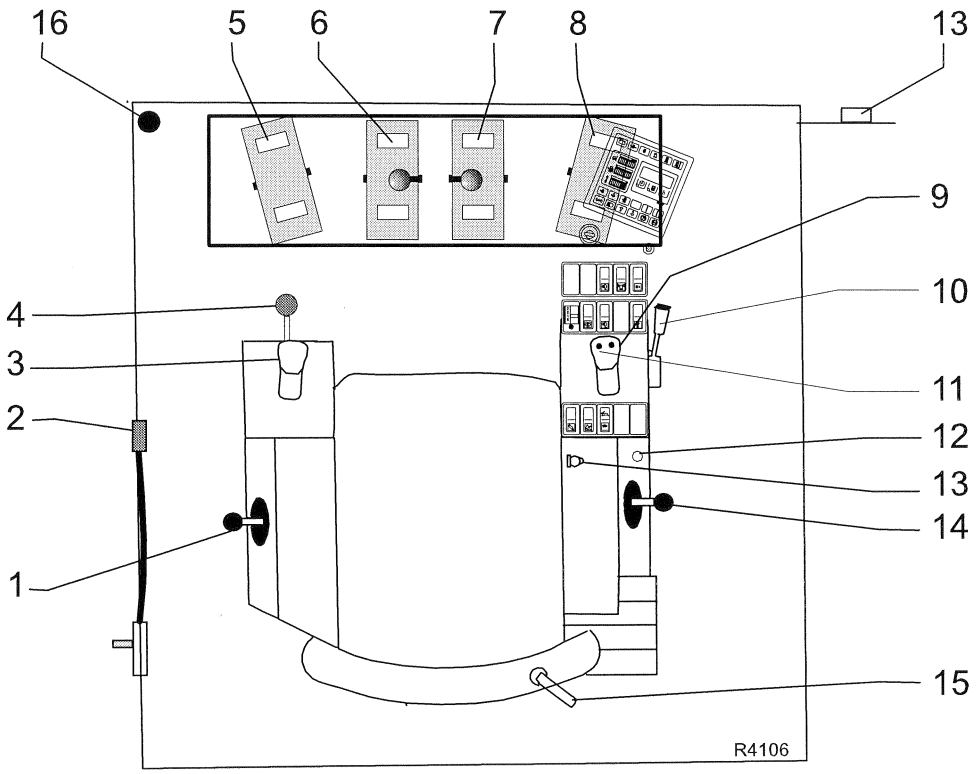




1	Battery charge indicator lamp
2	Engine oil pressure
3	Pre-glow monitoring
4	Ai filter control
5	Hydraulic oil filter clogging indicator
6	not assigned
7	Engine oil level
8	Coolant level
9	Hydraulic oil level
10	not assigned
11	not assigned
12	not assigned
13	not assigned
14 - 15	not assigned
16	not assigned
17	not assigned
18	not assigned
19	Coolant temperature
20	Fuel gauge
21	Operating hour meter / trip recorder / clock
22	Load warning device
23 - 24	--
25	Pre-heat/ starter switch
26-27	not assigned
28	Working floodlight front
29	Rotating beacon
30	Rocker switch up: Display change-over Display operating hours / trip recorder / clock (item 21) Rocker switch down: Set clock; reset trip recorder - keep pressed for at least 15 sec.
31	Check button
32	Fan switch - heating
33	Windscreen wiper - wipe / wash system
34	Working floodlight rear
35	not assigned
36	--
37	--
38	Hammer
39	Float position dozer blade
40	Fast - slow
41-42	not assigned

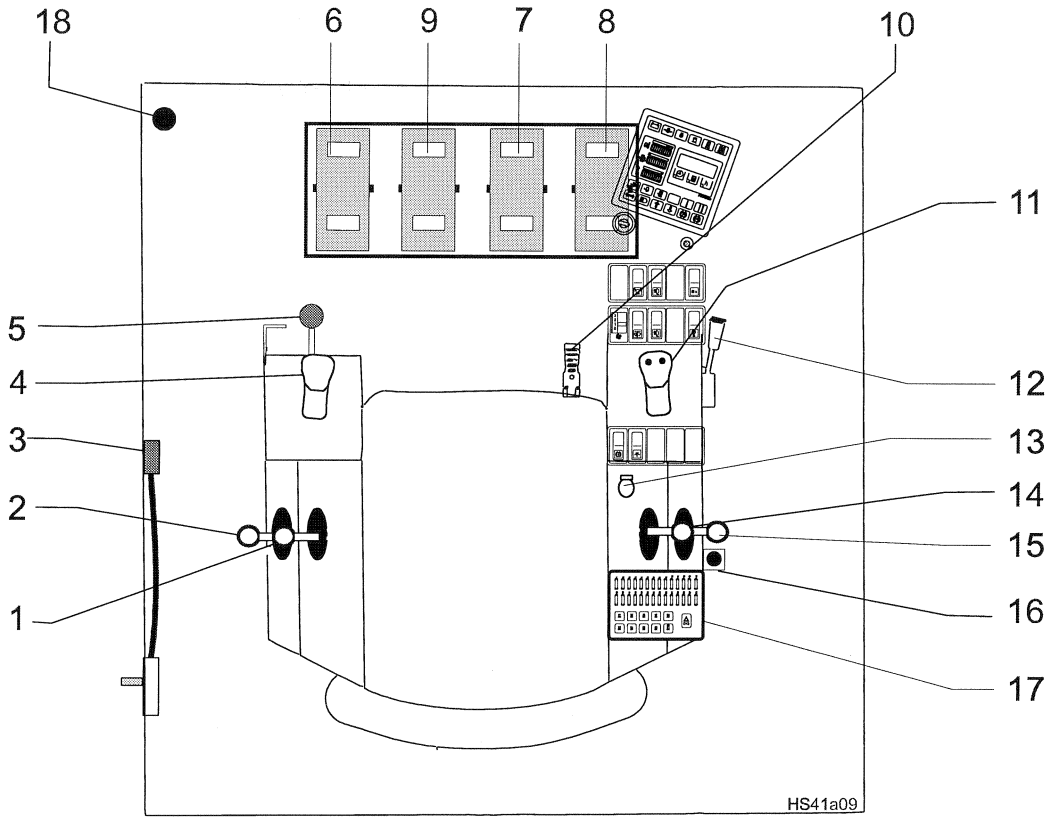
Indicators and operating elements

The following picture contains optional equipment.



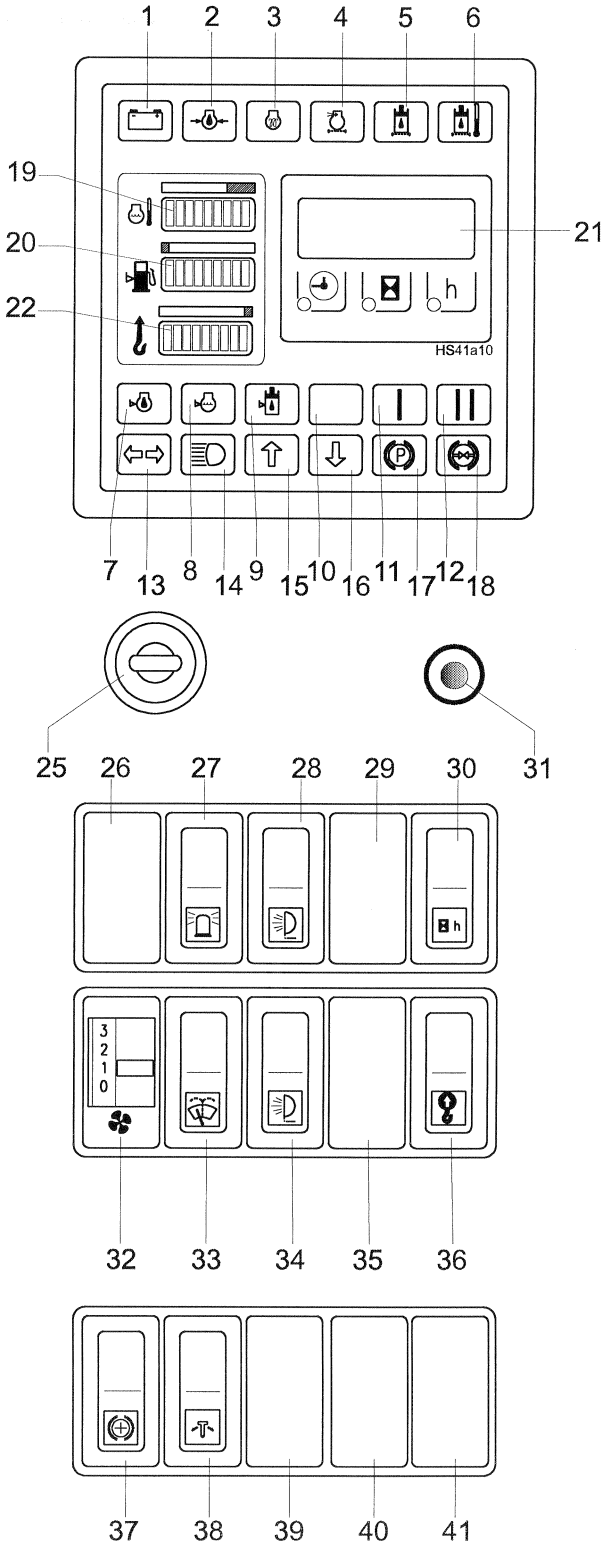
1	Operating lever - dozer blade
2	Door release
3	Operating lever - excavator equipment
4	Cut-off for working hydraulics (raise armrest panel)
5	Operation - extend/retract intermediate boom or telescopic stick
6	Left-hand crawler drive
7	Right-hand crawler drive
8	Additional control circuit II - grab / hammer
9	Operating lever - excavator equipment
10	Hand throttle
11	Signal horn
12	Cut-off - warm water for heating
13	Socket
14	Operating lever - articulation
15	Uppercarriage - locking pin
16	Actuating rod for quick-mount hitch

This picture includes non-standard equipment !



1	Actuating lever - outrigger wheel, left
2	Actuating lever - outrigger leg, left
3	Door release
4	Actuating lever for excavator equipment
5	Working hydraulics cut-off (raise control panel)
6	Actuation - extend/ retract telescope
7	Actuation - travel
8	Actuation - additional control circuit
9	Actuation - articulation
10	Actuation - rock breaker
11	Actuating lever for excavator equipment
12	Manual throttle
13	Socket
14	Actuating lever - outrigger wheel, right
15	Actuating lever - outrigger leg, right
16	OFF switch for hot water for heating
17	Fuse box
18	Control rod for quick-mount hitch

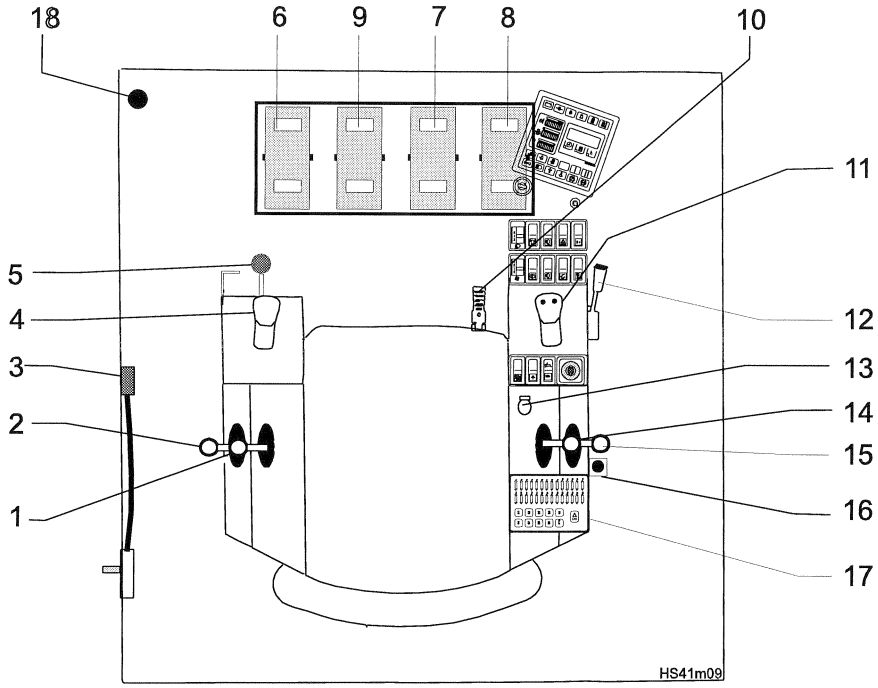
This picture includes non-standard equipment!



Instrument panel

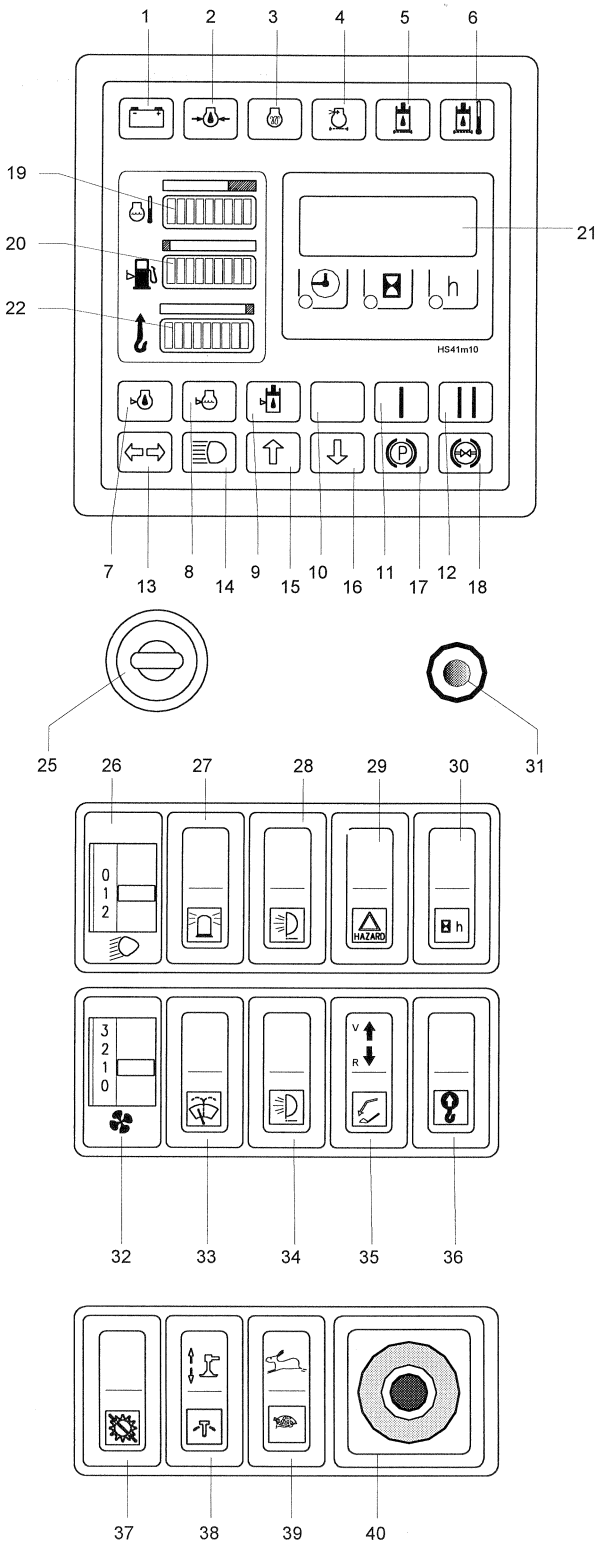
1	Battery charge indicator lamp
2	Engine oil pressure
3	Pre-heating monitor
4	Air filter service indicator
5	Hydraulic oil filter clogging indicator
6	Hydraulic oil temperature
7	Engine oil level
8	Coolant level
9	Hydraulic oil level
10	without function
11	without function
12	without function
13	without function
14	without function
15	without function
16	without function
17	without function
18	without function
19	Coolant temperature
20	Fuel gauge
21	Operating hour meter / trip recorder / clock
22	Overload warning display
25	Pre-heat/ starter switch
26	not assigned
27	Rotating beacon
28	Working floodlight, front
29	not assigned
30	Rocker switch up: Change display (item 21) Rocker switch down: Set clock, reset trip recorder (press for at least 15 sec.)
31	Check button for fluid levels
32	Heater fan switch
33	Windshield wiper - wash/ wipe system
34	Working floodlight, rear
35	not assigned
36	Load warning device
37	Wheel lock-up
38	Change-over switch spread - lift/ lower
39	not assigned
40	not assigned
41	not assigned

This picture includes non-standard equipment !



1	Actuating lever - outrigger wheel, left
2	Actuating lever - outrigger leg, left
3	Door release
4	Actuating lever for excavator equipment
5	Working hydraulics cut-off (raise control panel)
6	Actuation - extend/ retract telescope
7	Actuation - travel
8	Actuation - additional control circuit
9	Actuation - articulation
10	Actuation - rock breaker
11	Actuating lever for excavator equipment
12	Manual throttle
13	Socket
14	Actuating lever - outrigger wheel, right
15	Actuating lever - outrigger leg, right
16	OFF switch for hot water for heating
17	Fuse box
18	Control rod for quick-mount hitch

This picture includes non-standard equipment !



Instrument panel

1	Battery charge indicator lamp
2	Engine oil pressure
3	Pre-heating monitor
4	Air filter service indicator
5	Hydraulic oil filter clogging indicator
6	Hydraulic oil temperature indicator
7	Engine oil level
8	Coolant level
9	Hydraulic oil level
10	without function
11	without function
12	without function
13	Travel direction indicator
14	without function
15	without function
16	without function
17	without function
18	without function
19	Coolant temperature
20	Fuel gauge
21	Working hour meter / trip recorder / clock
22	Load warning display
25	Pre-heat/ starter switch
26	Light switch
27	Rotating beacon
28	Working floodlight, front
29	Hazard warning switch
30	Rocker switch up: Change display (item 21) Rocker switch down: Set clock, reset trip recorder (press for at least 15 sec.)
31	Check button for fluid levels
32	Heater fan switch
33	Windshield wiper - wash/ wipe system
34	Working floodlight, rear
35	Change-over switch, work - travel
36	Overload warning device
37	Free-wheel
38	Change-over switch spread - lift/ lower
39	Fast - slow
40	Steering