TEREX ATLAS

Workshopmanual 1704 / 1804



TEREX ATLAS

CONTENTS

Service manual for the

TEREX-ATLAS
Model 1704 -1804

Backhoe and industrial rehandler range.
Including Mobile and Tracked variants.
Built from 1993 onwards

1. 935 series operators cabin

2. Deutz - Engine

3. Lubrication

4. 1704 - 1804. 372, 282 series

5. 1704 - 1804. 373, 283 series

6. 1704 - 1804. 374, 284 series

7. Welding

8. Electric - Electronic

9. Theory

TEREX ATLAS

This manual has been produced from various resources to aid the serviceman and mechanic in carrying out maintenance and repair of the:-

TEREX - ATLAS, Model 1704 - 1804.

372, 373, 374, 282, 283, and 284 series
produced from 1993 onwards.

During this period the basic model has undergone 2 major design changes.
These changes are covered in 3 separate series sections.

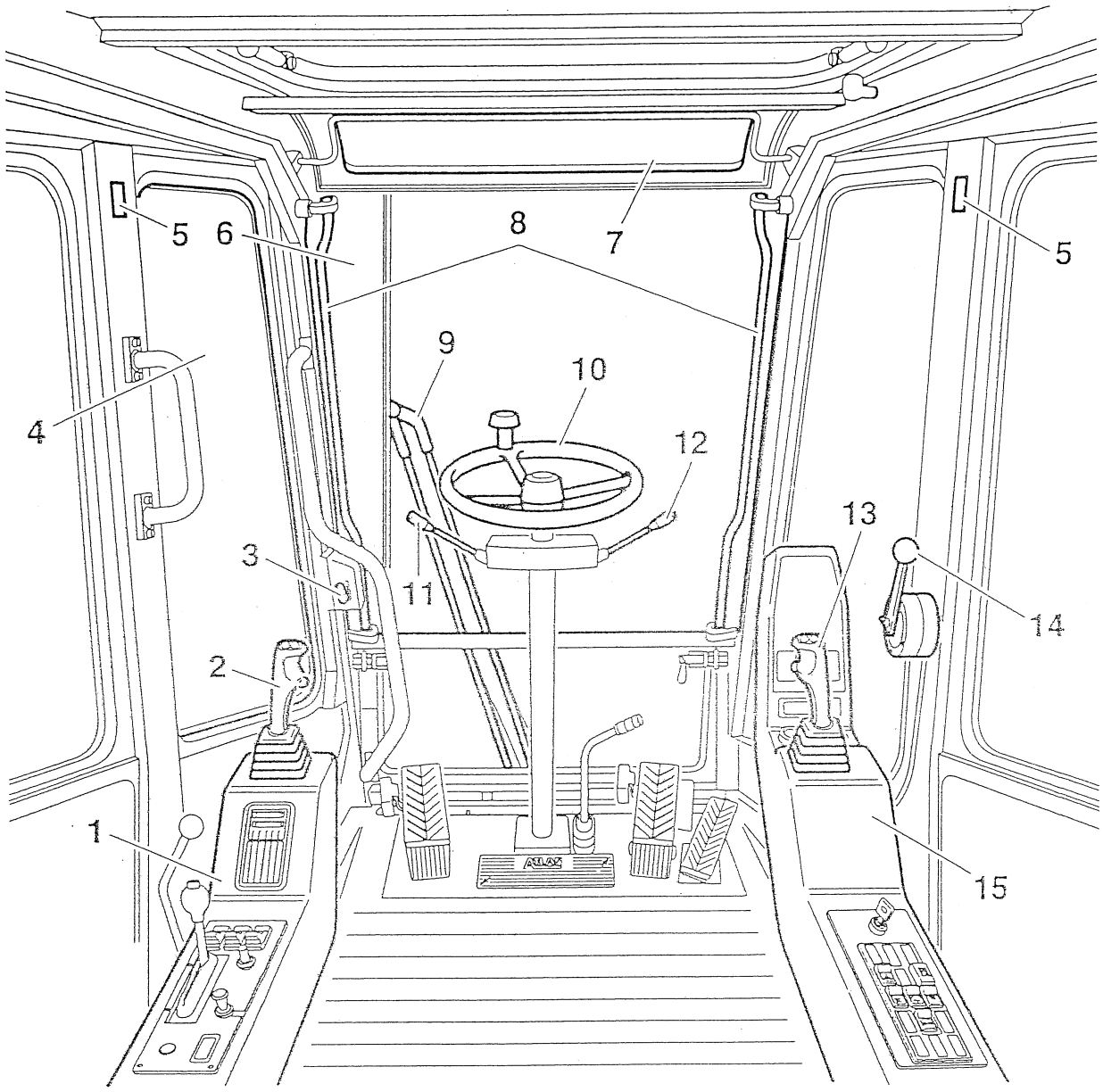
Please refer to relevant manufactures manuals for the repair and overhaul procedure of components. Engine, Deutz. Pumps & Motors, Linde. etc.

TEREX ATLAS

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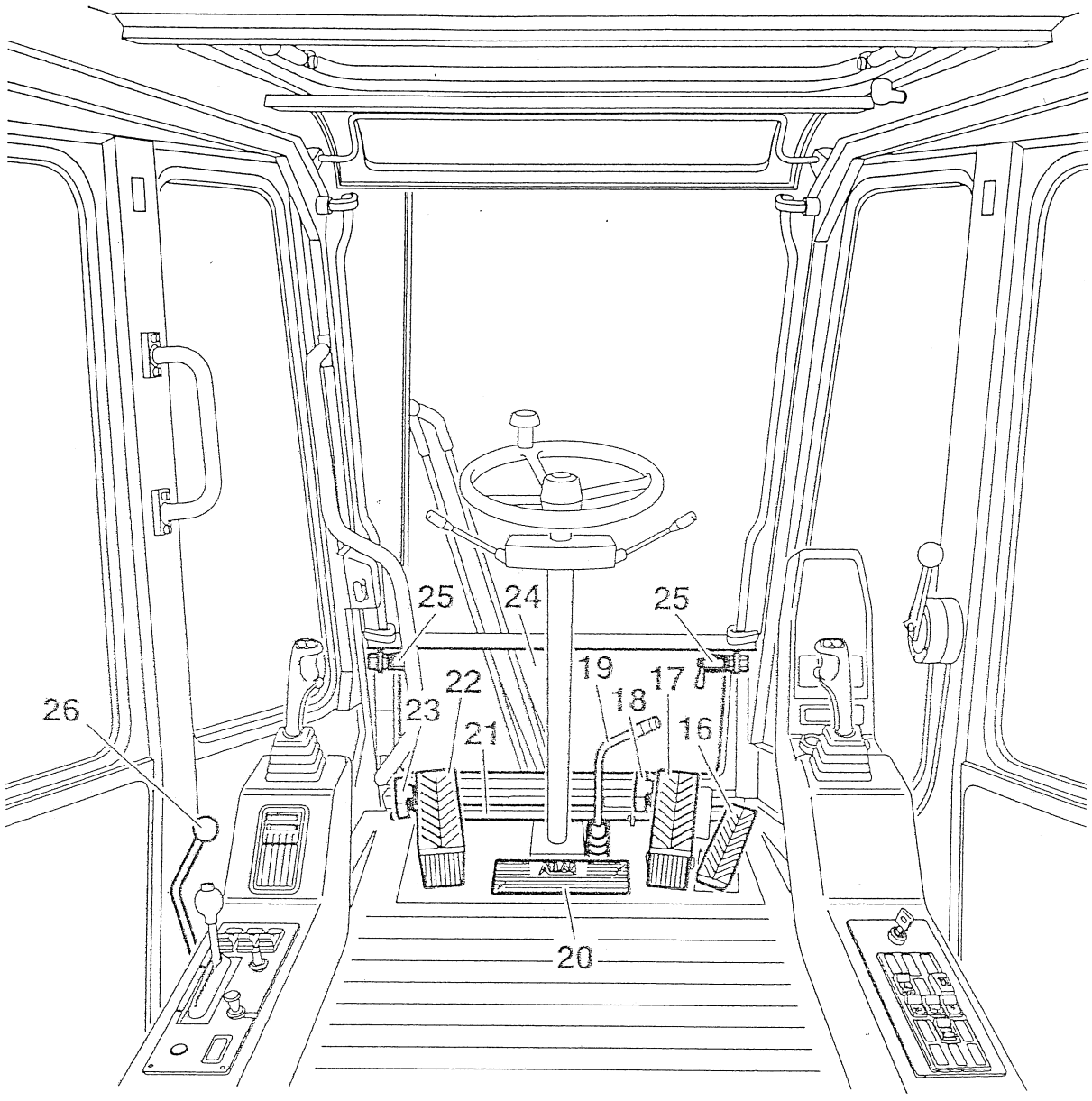
Page	
1 - 5	General view of mobile and tracked operators cabin
6	Right hand switch panel
7	Left hand switch panel
8 - 9	Functions (standard and optional) left / right hand panels
10	Multifunction levers (mobile only)
11	Adjustable steering column (mobile only)
12 - 22	Displays and controls

GENERAL VIEW OF CAB



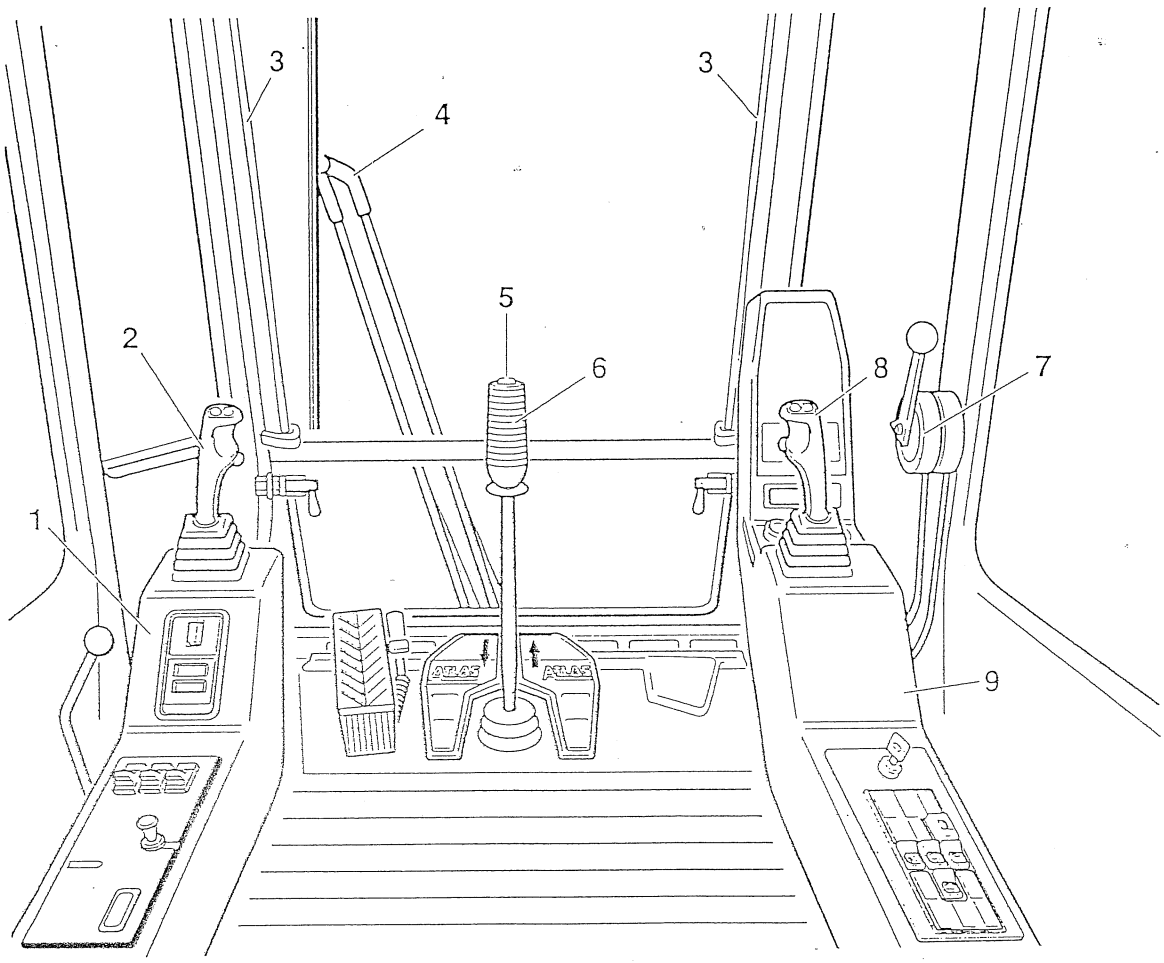
1 Left console
2 Control lever for:
Jib
Slewing
3 Lever for cab door
4 Cab door
5 Interior lights
6 Windshield
7 Sun visor
8 Windshield locking rods, left/right
9 Windshield wiper
10 Steering wheel
11 Left multifunction lever for:
Inching
Intermittent wipe
Windshield washer
Preselecting travel direction
12 Right multifunction lever for:
Low and high beam headlights
Horn
Flashing direction indicators
13 Control lever for:
Lifting
Lowering
Bucket/grab
14 Engine speed control lever
15 Right console

GENERAL VIEW OF CAB



16 Accelerator pedal
17 Brake pedal-driving
18 Brake pedal lock-driving
19 Lever for dozer blade
20 Boom luffing pedal
21 Windshield vent outlet
22 Slewing brake pedal
23 Slewing brake pedal lock
24 Plug-in window
25 Plug-in window catch
26 Hydraulic pilot control circuit shutdown

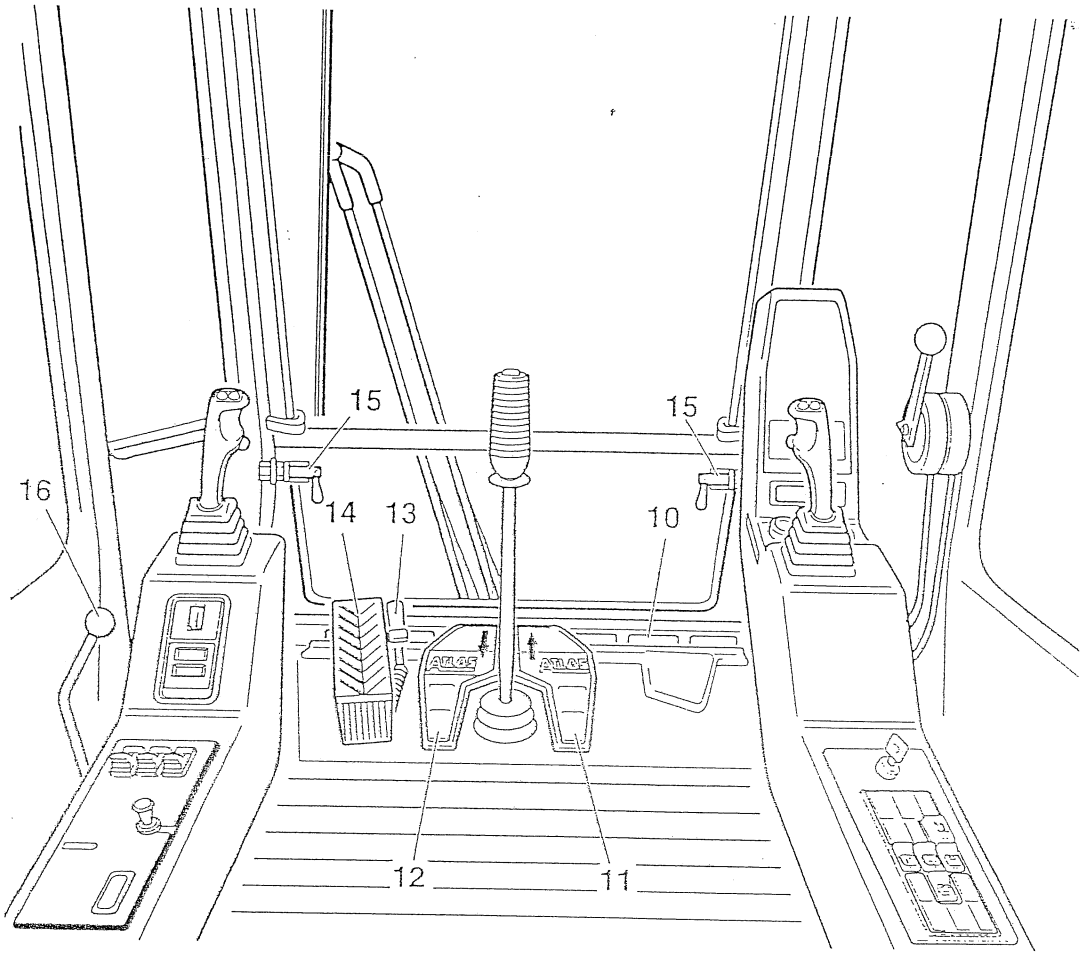
GENERAL VIEW OF CAB



1 Left console
2 Control lever for:
Jib
Slewing
3 Windshield locking rods, left/right
4 Windshield wiper
5 Speed selector switch
6 Control lever for travel
7 Engine speed control lever
8 Control lever for:
Lifting
Lowering
Bucket/grab
9 Right console

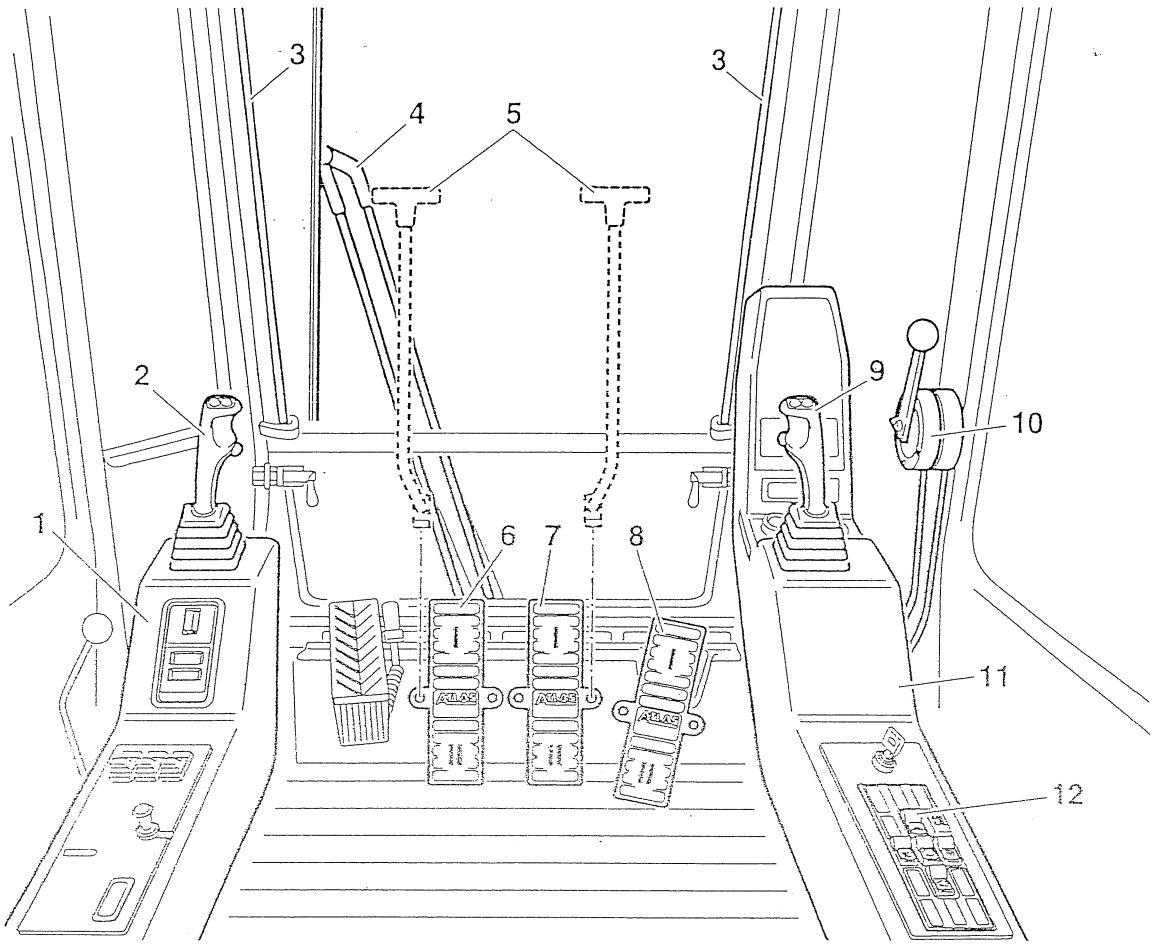
GENERAL VIEW OF CAB

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.97



10 Windshield vent outlet
11 Pedal for:
forward travel
extending boom
12 Pedal for:
reversing
retracting boom
13 Slewing brake pedal lock
14 Slewing brake pedal
15 Plug-in window catch
16 Hydraulic pilot control circuit
shutdown

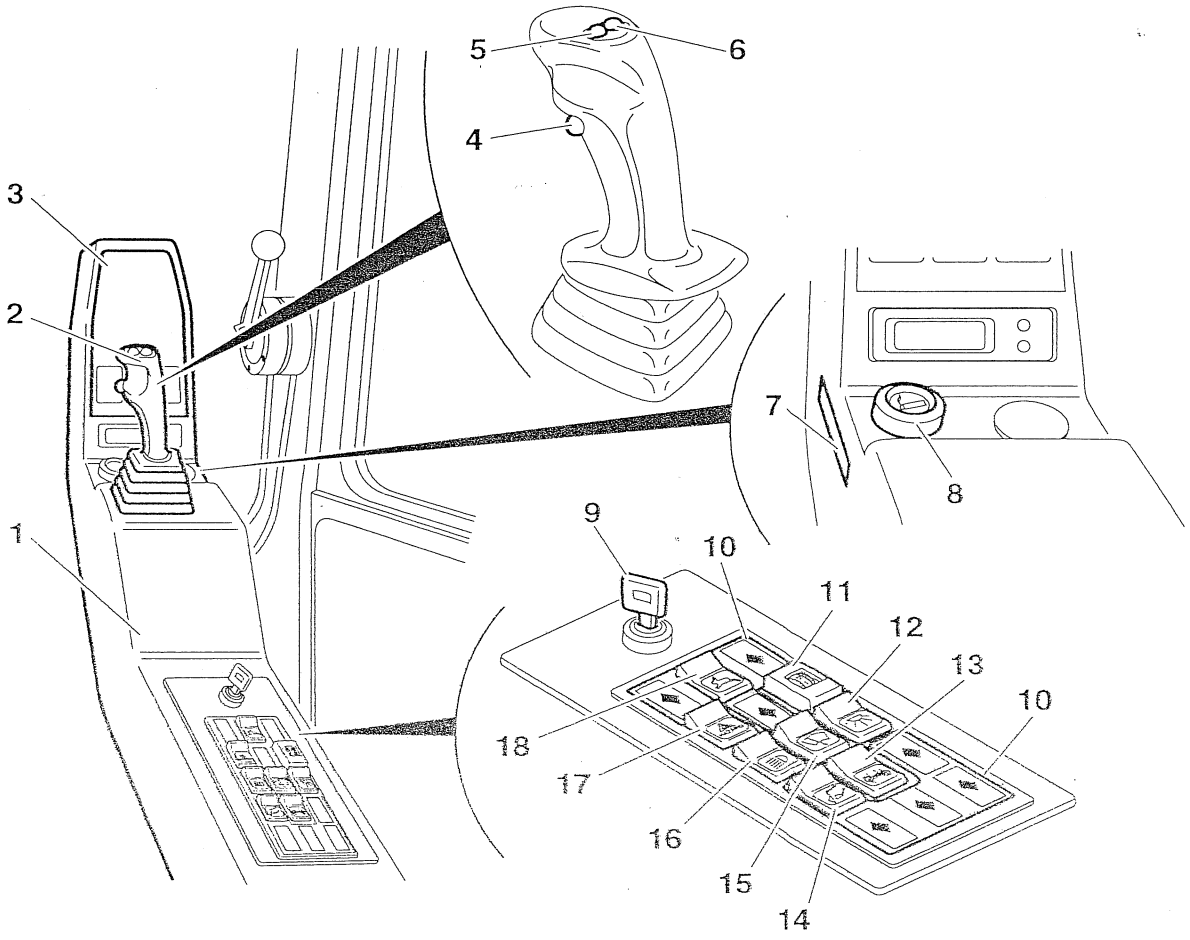
GENERAL VIEW OF CAB



1 Left console
2 Control lever for:
Jib
Slewing
3 Windshield locking rods, left/right
4 Windshield wiper
5 Levers for precision control of the pedals (6 and 7)
Note
The levers (5) are in a holder underneath the seat.
6 Pedal for travel:
I L.h. crawler track forwards
II L.h. crawler track reverse
7 Pedal for travel:
I R.h. crawler track forwards
II R.h. crawler track reverse
8 Pedal for operating boom:
I Extend boom
II Retract boom
9 Control lever for:
Lifting
Lowering
Bucket/grab
10 Engine speed control lever
11 Right console
12 Crawler speed switch

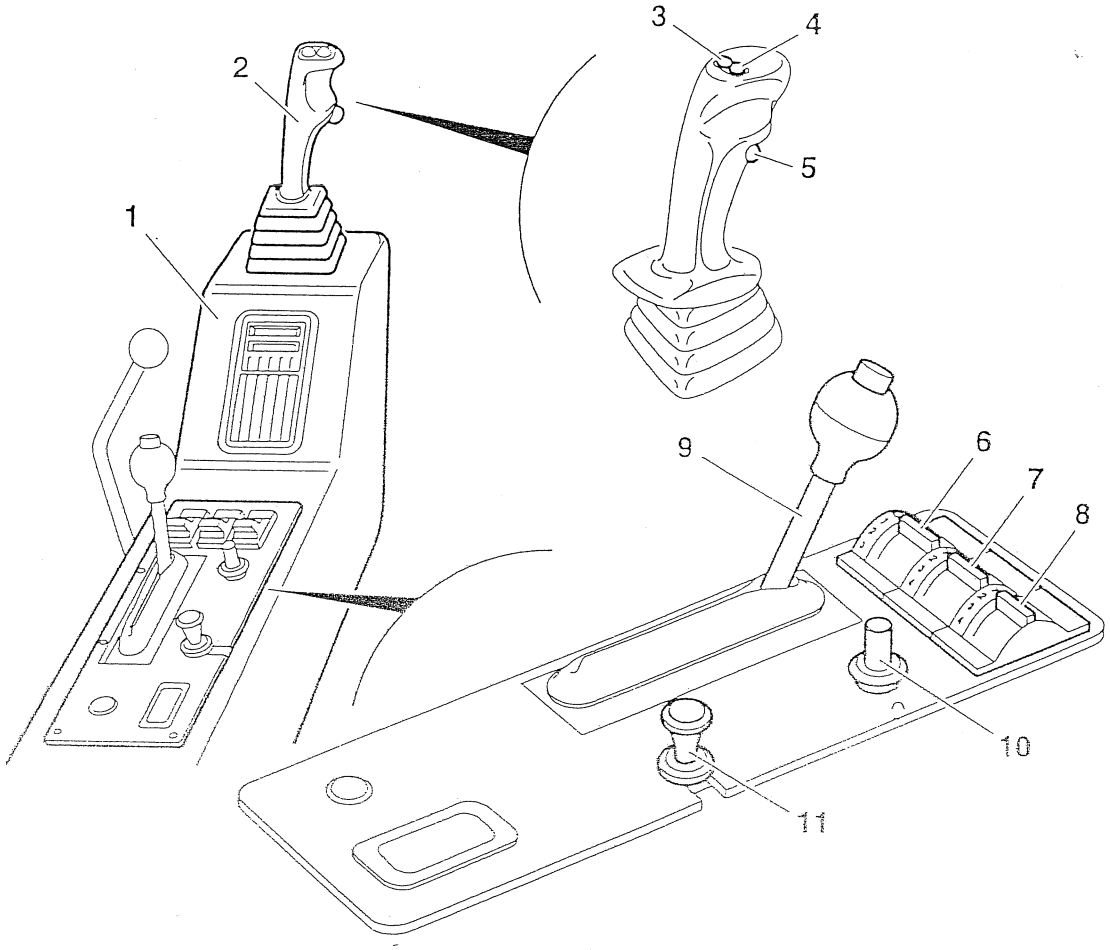
RIGHT SWITCH PANAL

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.97

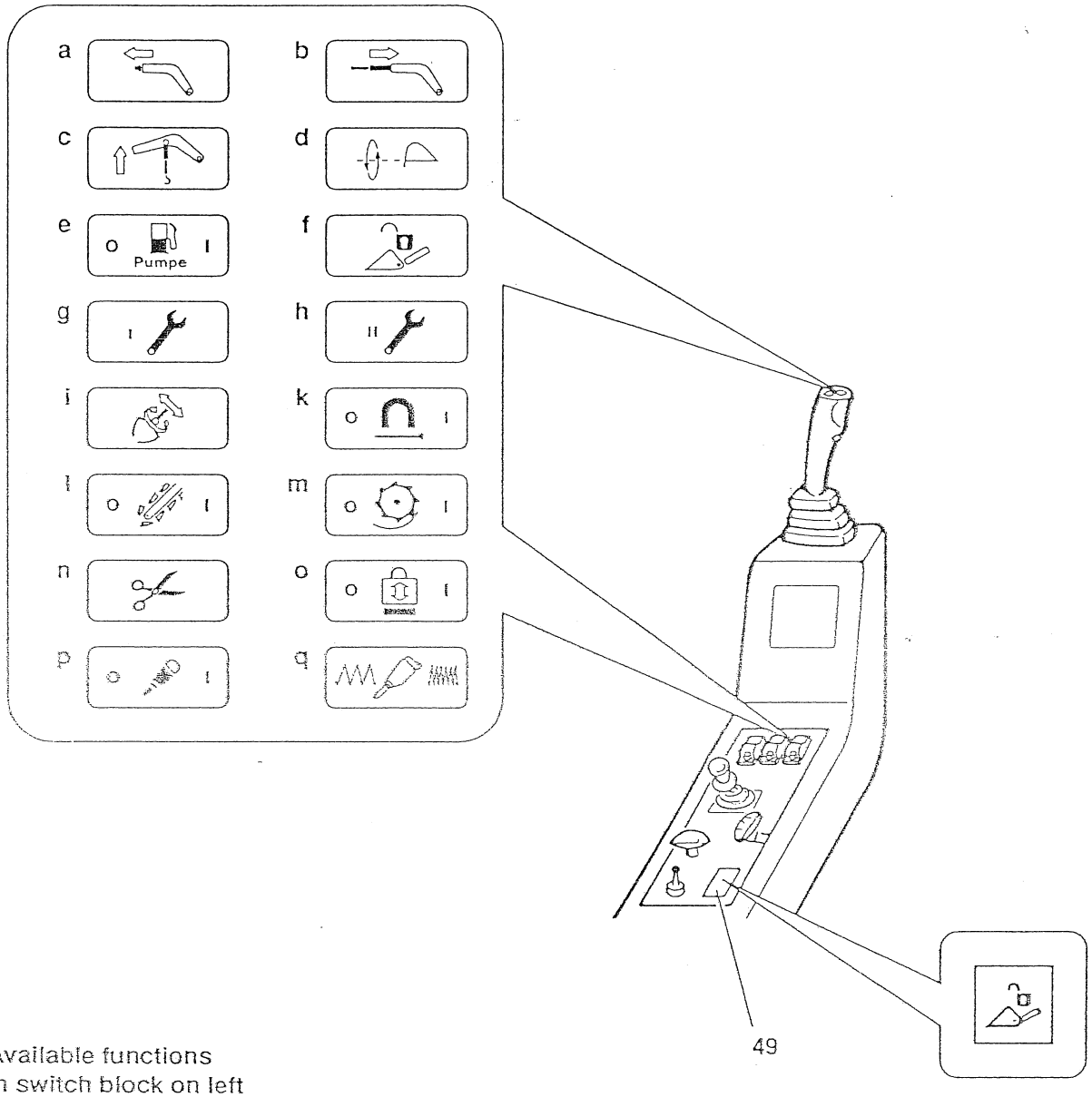


Right switch panel

1 Right console
2 Control lever for:
Lifting
Lowering
Bucket/grab
3 Display panel with control and warning lights
4 Pushbutton to cancel precision control
5 Pushbutton to rotate grab to left
6 Pushbutton to rotate grab to right
7 Operating hour meter
8 Cigarette lighter/electric power socket
9 Ignition key
10 Spare, for optional extra (♦)
11 Continuously variable potentiometer for precision control
12 Interior lights switch
13 Swing axle lock switch
14 Switch to cancel jib cut-off
15 Windshield wiper switch
16 Switch for parking and driving lights
17 Hazard warning flasher switch
18 Switch for external oil summation and separation control



1 Left console
2 Control lever for:
Folding jib
Slewing
3 Left pushbutton for additional working attachments
4 Right pushbutton for additional working attachments
5 Pushbutton for horn
6 Blower switch (speeds 1 to 3)
7 Preselector switch for left pushbutton (3), (positions 0 to 4)
8 Preselector switch for right pushbutton (4), (positions 0 to 4)
The functions of preselector switches (7) and (8) vary, depending on the optional extras fitted to the excavator.
Refer to the plate with "Preselect" symbols on the cab wall to establish which additional attachments or functions can be selected.
9 Parking brake lever
10 Gear shift switch to select either on-road or off-road ratio
11 Pull switch for heating



Available functions
in switch block on left

a Extend telescopic boom

b Retract telescopic boom

c Pulling ram

d Slew bucket

e Refuelling pump
(Operation see page 105)

f Rapid changeover device
(Operation is effected via
"grab rotating", see page 70)

g Tool 1

h Tool 2

i Sorting grab

k Magnet attachment

l Trench cutter

m Mowing attachment

n Scrap cutter

o Pile driver

p Hand-held hydraulic hammer

q Hydraulic hammer
(frequency switch)

49 Rapid changeover device

Special equipments ✦

Available functions (59)
in switch block on right

a Headlight on roof, front (orange)

b Headlight on roof, rear (orange)

c Rotary beacon (yellow)

d Rear fog light (green)

e Fuel preheating (yellow)

f Hydraulic oil heating (green)

g Seat heating (yellow)

h Mirror heating (yellow)

i Cab lift up / down (green)
Vario cab up / down (green)

k Vario cab forward / back (red)

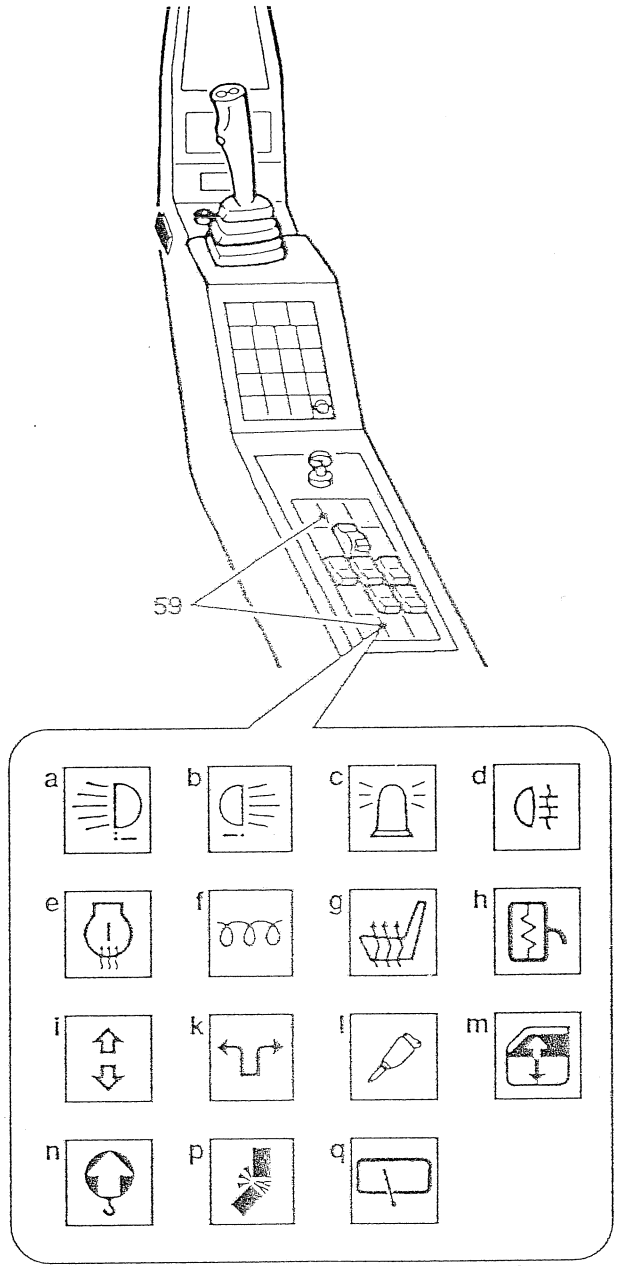
l Hydraulic hammer (blue)

m Electric window lift (green)

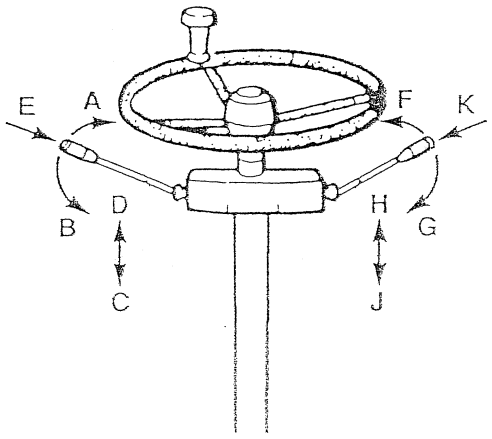
n Overload warning device (yellow)

p Reverse safety function (red)

q Rear window wiper (green)



Multifunction levers



Left multifunction lever

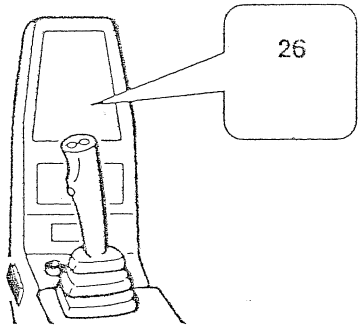
A Preselection - direction forwards .....

B Preselection - direction reverse .....

C Inching speed - on .....

D Inching speed - off .....

E Windshield wiper - intermittent action, ... windshield washer ⌖
Telltale light (26) comes on.



Right multifunction lever

F --
G --
H --
J --

Flashing turn indicators ...

No function of the 1804 wheeled excavator

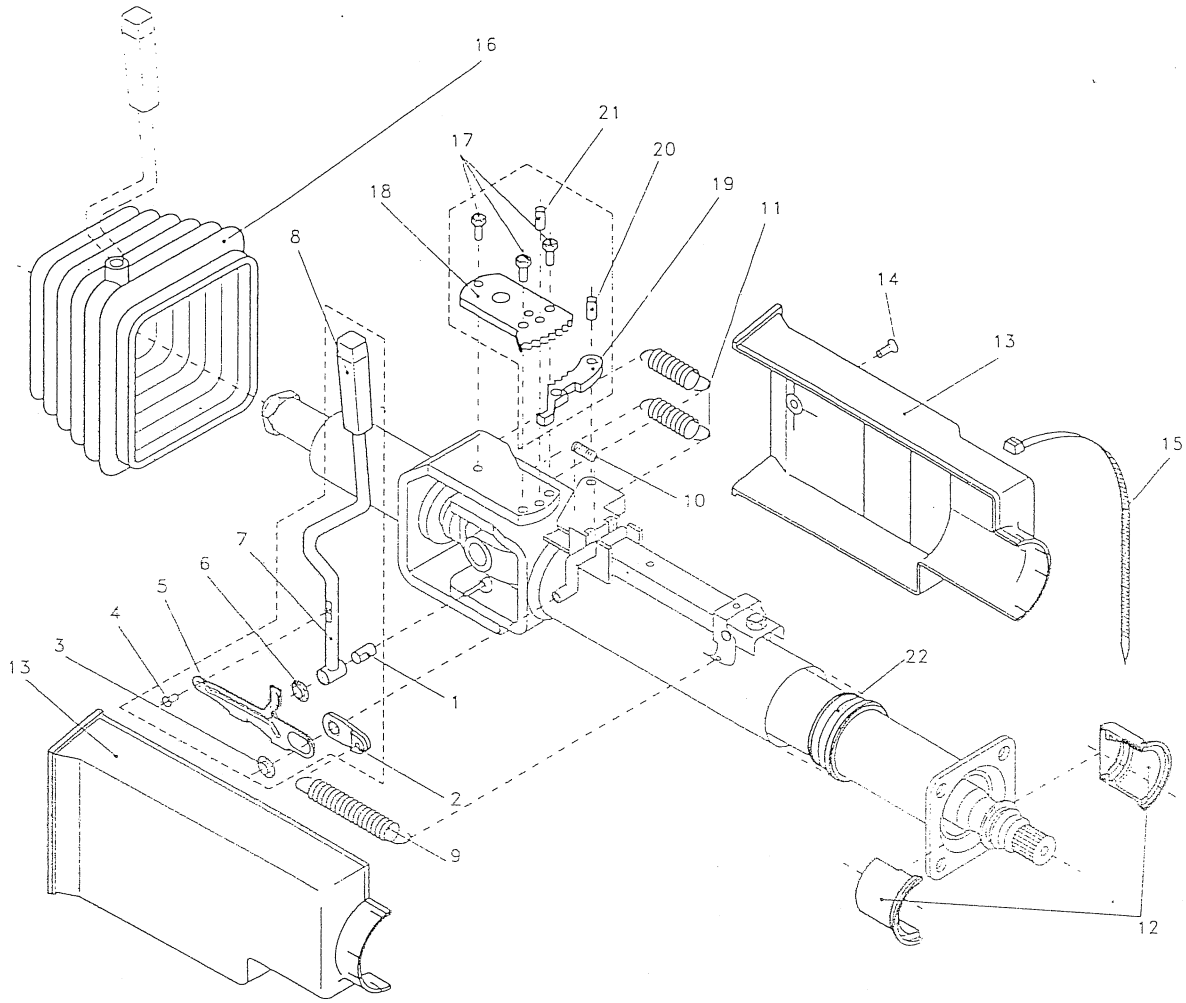
Low and high headlight beams .....

K Horn .....

STEERING COLUMN

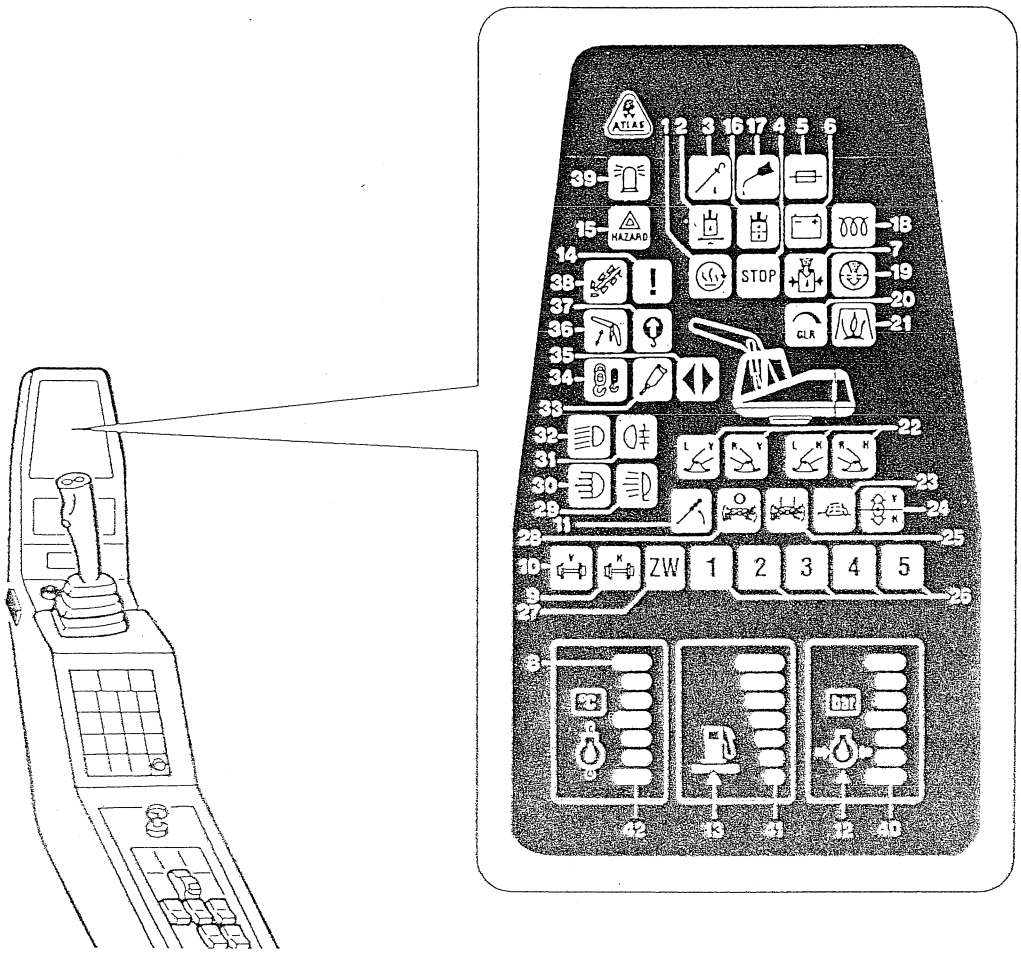
for cab 935 and 980

Schulungszentrum
Name : Ro.
Datum: 04.99



1	Bush	12	Bush
2	Bore/shift lever	13	Cover
3	Locking disk	14	Screw
4	Rivet	15	Cable string
5	Shift lever	16	Siphon
6	Locking disk	17	Screw
7	Lever	18	Tootshed segment
8	Lever with knobbed	19	Blocking lever
9	Spring	20	Pin
10	Spring	21	Pin
11	Spring	22	Bush

Displays and controls



Warning lights (red, yellow)

1 Cylinder head temperature and hydraulic fluid temperature (red) .....

2 Hydraulic fluid level (red) .....

3 Engine oil level (red)

4 Stop engine (red) .....
- faulty V-belt
- overheating

5 Fuse monitor (red) .....

6 Alternator (red)
- charge telltale .....

7 Pilot pressure (red) .....
- hydraulic fluid tank

8 Engine oil overheated (red) ..

9 Track roller pressure, rear (red) (road/rail excavator)

10 Track roller pressure, front (red) (road/rail excavator)

11 Parking brake (red) .....

12 Engine oil pressure (red) .....

13 Fuel level (red) .....
- minimum

14 Caution (yellow) .....
- electrical/electronic fault

15 Hazard warning flashers (red)

Telltale lights (yellow, green, orange, blue)

16 Hydraulic oil filter (yellow) .....

17 Central lubrication (green) ...

18 Auxiliary heater (green)

19 Air cleaner (yellow) .....

20 Load limit control (orange) ...
- fault

21 Preheating (orange) .....

22 Preselection - support pads (green) .....
- LV = front left
- RV = front right
- LH = rear left
- RH = rear right

23 Inching speed (green) .....

24 Preselection - direction (yellow) .....
- V = forwards
- H = reverse

25 Separate swing axle lock (orange) .....

26 Reserve (orange)
- 1 to 5 special functions

27 Road/rail excavator (yellow)

28 Swing axle lock (yellow) .....

29 Headlight on roof (orange)

30 High-beam headlights (blue)

31 Rear fog light (green)

32 Side and driving lights (green)..

33 Hydraulic hammer (orange)....

34 Pressure boost stage (yellow)

35 Indicators (green)

36 Lifting/lowering limit function (yellow)

37 Overload warning device (yellow) .....

38 Trench cutter (orange)

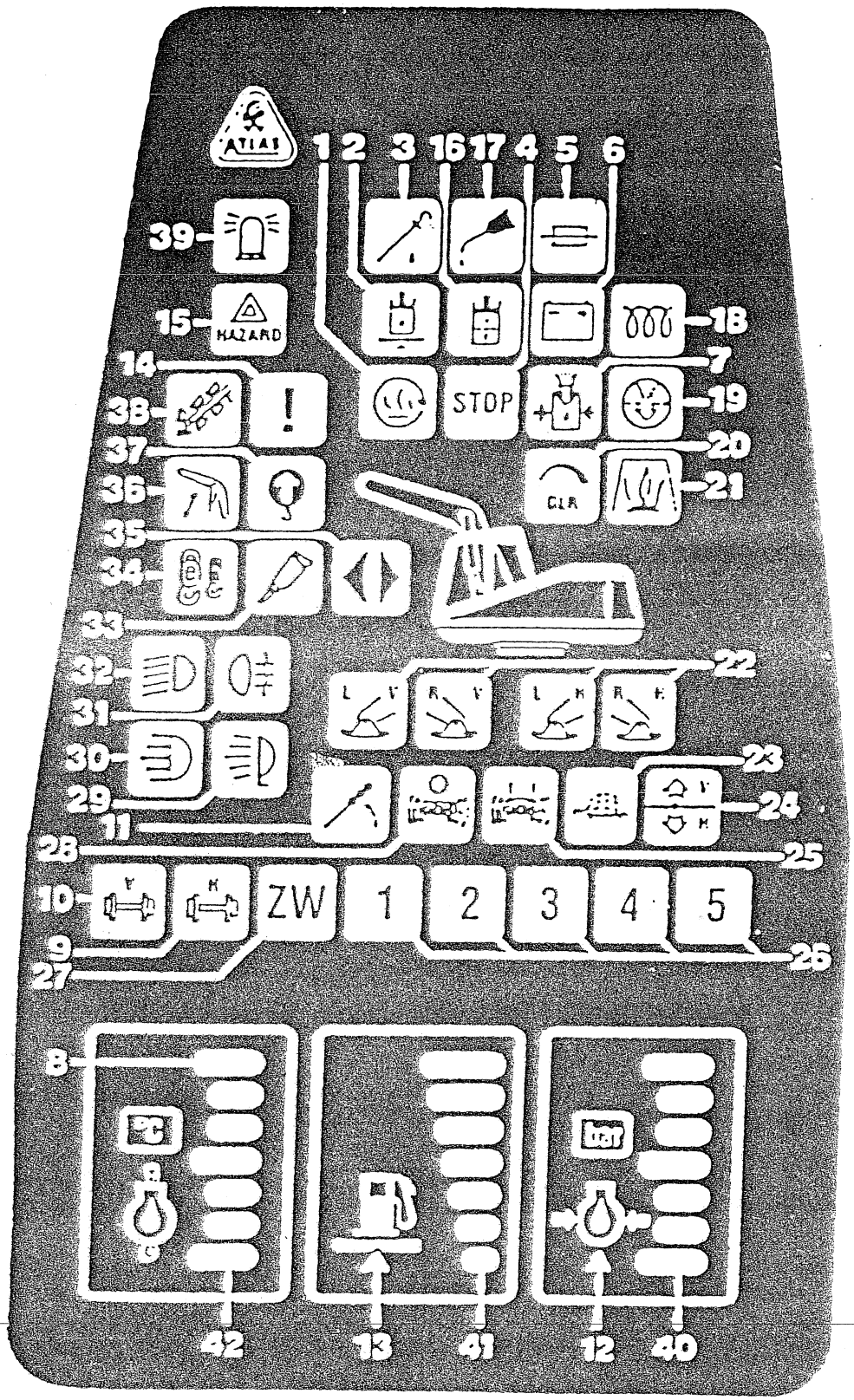
39 Rotating beacon (yellow)

Bar displays (green)

40 Engine oil pressure .....

41 Fuel level .....

42 Engine oil temperature .....


1 2 3 16 17 4 5 6
39
15
HAZARD
18
14
7
38
STOP
19
37
20
36
CLR
21
35
34
33
22
32
31
30
23
29
24
11
28
25
10
ZW
1
2
3
4
5
9
27
26
8
42
13
41
12
40

1. Cylinder head temperature / hydraulic fluid temperature (1704 - 1804)

   warning light - red
   in case of overheating of cylinder head - permanent lighting
   sensor in 1. cylinder head (only air cooled engine)
   in case of overheating of hydraulic fluid - flashing light
   sensor in suction line of oil pressure pump
   If these faults occur the pump capacity will automatically be reduced

2. Hydraulic fluid level (1004 - 1304 extra) , 1404 - 1804 serie

   warning light - red
   If the hydraulic fluid level is too low - permanent lighting
   controlling takes place only during starting the engine.
   Additional visual control on sight glass of oil tank.

3. Engine oil level (not installed)

   warning light - red
   For automatic controlling of engine oil level.
   Controlling takes place only during starting the engine.

4. Stop engine

   warning light - red

V- belt defective (air cooled engine 1204 - 1804)	- permanent lighting - additioinal a buzzer sounds
Engine oil pressure too low Main hydraulic brake pressure below (< 100 bar)	- permanent lighting,additionally the warning light (12) flashes,and a buzzer sounds with the engine running.
Engine oil overheating (<120°) (air cooled engines)	- permanent lighting,additional the warning light (8) flashes and a buzzer sounds.
Cooling water (>118°) (water cooled engines)	- permanent lighting,additional the warning light (8) flashes and a buzzer sounds.
Cooling water level too low (water cooled engine)	- permanent lighting,additional the warning light (8) lights up and a buzzer sounds.

5. Fuse monitor

warning light - red
Turn ignition key into position (1) - permanent lighting.
If the engine runs only permanent lighting.
Fuse defective. Each single defective fuse will be indicated on the board by a luminos diode.

6. Generator, charge telltale

warning light - red
charge telltale - permanent lighting

7. Air pressure - hydraulic fluid tank
(excavator without air pressure system no indication)
warning light - red
No or too low air pressure (< 0.3 bar) in the hydraulic fluid tank - permanent lighting
Pressure switch at the hydraulic fluid tank.

8. Engine oil monitoring
(air cooled engine)
warning light - red
If the engine oil is overheated (>120°) - flashing lights the warning light (4) lights up additionally and a buzzer sounds.

Water check temperature
and water level
(water - cooled engines)
If the cooling water is overheated - flashing lights the warning light (4) lights up additionally and a buzzer sounds.

Cooling water level too low - permanent lighting the warning light (4) lights up additionally and a buzzer sounds.

9. Track rolier pressure - rear
warning light - red
Contact pressure too low - permanent lighting and a buzzer sounds.
Only for 2 - way - excavator

10. Track roller pressure - front
warning light - red - permanent lighting and a buzzer sounds.
Contact pressure too low
Only for 2 - way - excavator

11. Hand brake

Excavator already braked - permanent lighting
Pressure switch below the cabin

12. Engine oil pressure

warning light - red
If engine oil pressure is too low at running engine - flashing light, and the warning light (4) lights up, and a buzzer additionally sounds.
Pressure switch on engine (filter console)

13. Fuel level - minimum

warning light - red
If the fuel level is going down to 1/8 - flashing light
Sensor inside the tank

14. Caution

warning light - yellow
Fault inside the computer - permanent lighting
Incandescent lamp defective (brake light, flash turn indicators) - flashing light

15. Hazard warning flashers

warning light - red
If hazard warning flashers is engaged - flashing light, also the control light (35) is flashing.

16. Hydraulic fluid filter

control light - yellow
Hydraulic fluid filter contaminated - permanent lighting
Remarks : 4 seconds after switching on the ignition the engine oil temperature and cooling water temperature will be interrogated once.

In case of <40°C - the control light will be suppressed for 30 minutes

In case of >40°C - the control light will immediately light up if the hydraulic fluid filter is contaminated.

17. Central lubrication
(extra, 1804 series)

warning light - green
Every 3 hours automatically a lubrication process of
8 minutes is being carried out.
(from EPROM V 2.09 the lubrication process is being carried out
every 4 operating hours)
(from EPROM V 2.11 the lubrication process is being carried out
every 4 operating hours for 3 minute.
During this process - permanent lighting

18. Additional heater

control light - green
switched on pressurized oil heater - permanent lighting

19. Air cleaner warning device

control light - yellow
with blocked air cleaner - permanent lighting
Pressure switch at air cleaner

20. Power limit controlled system GLR (1004 - 1604)

control light - yellow
In case of troubles in the limited load regulation and
with emergency control switched on - permanent lighting
The mistaken are automatically displayed through LED no. 8
in the diagnosis window of the LINDE box.

Power limit controlled system (1704 - 1804)
In case of troubles in the limit load regulation - permanent lighting
The mistaken can be called through a diagnosis of errors.

Precision control (extra - 1304)

precision control switched on - permanent lighting

21. Preheater (extra)

control light - orange
Turn ignition key on position II and wait for light to
come on - start engine.

22. Stabilizer choosing

control light - green
The choosed stabilizer will be indicated - permanent lighting

LV - left front
RV - right front
LH - left rear
RH - right rear

The change-over valves will be operated by high and low gear.

23. Crawler speed

control light - green
with switched crawler speed (switch at steering column-down)
permanent lighting
Magnet valve under cabin

24. Indicator - driving direction

control light - yellow
with choosed driving direction - permanent lighting
Attention: with switched indicator - no engine start possible

25. Swing axle lock

control light - orange
The switch has three positions

Position o = axle is unlocked
Position 1 = axle is locked with footbrake
Position 2 = axle continously locked - permanent lighting

26. Control lights 1 - 5

control lights - orange
1.) Windscreen wiper interval
2.) Slewing restriction
3.) Seat haeter, mirror heater, air condition
4.) Changeover from stabilizer to dozer blade, automatic idling system
5.) Reserve

27. Two way excavator

control light - yellow
Switched on - permanent lighting
Warning light is flashing

28. Swing axle lock

see discription item 25

29. Working light (extra)

control light - yellow

30. Head light

control light - blue
(Switch right from steering colum-down)
permanent lighting
Attention: head light only on wheeled excavators.

31. Rear fog light (extra)

control light - green

32. Parking- and low beam headlights

control light - green
when lights are switched on - permanent lighting

33. Hydraulic hammer (extra)
control light - orange
hammer operation on - permanent lighting
hammer will be operated over foot-key.

34. Pressure cut in stage (heavy lift)

control light - yellow
pressure cut in stage on - permanent lighting
(1704 / 1804 no control light)

35. Flashing indicators

control light - green
flashing indicator switched on - flashing light,
a buzzer additionally sounds in flashing frequency

36. Lifting/lowering limit function (extra, except Two way excavator)

control light - yellow
when in operation - permanent lighting

37. Overload warning device

control light - yellow
overload warning device on
permitted load limit exceeded

- permanent lighting
- flashing light,
  a buzzer additionally sounds in
  flashing frequency

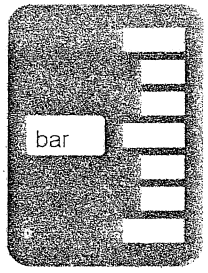
38. Trench cutter (extra)

control light - orange
when in operation - permanent lighting

39. Rotating beacon (extra)

control light - yellow
when in operation - permanent lighting

40. Engine oil pressure



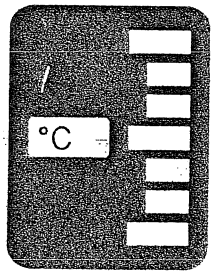
----- 3 bar
----- 2 bar
----- 1 bar

bar display - green
the momentary engine oil pressure is displayed.
If the cable or sensor is faulty, the bar in the
middle is flashing.

41. Fuel level

bar display - green
the actual fuel level is displayed
If the cable or sensor is faulty, the bar in the
middle is flashing.

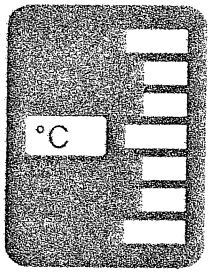
42. Engine oil temperature (air-cooled engine)



----- > 120°
----- > 120°
----- 101° - 120°
----- 82° - 100°
----- 64° - 81°
----- 45° - 63°
----- < 45°

bar display - green
the actual engine temperature is displayed
Remarks: **Should there be any short circuit or interruption the middle bar display does not flash.**
If the transmitter line is interrupted only the first bar display lights up.In case of a short circuit on the transmitter line all the green bars will light up.

Cooling water temperature (water-cooled engine)



----- > 118°
----- > 110°
----- 96° - 110°
----- 81° - 95°
----- 61° - 80°
----- 35° - 60°
----- < 35°

bar display - green
the actual cooling water temperature is displayed by the bar display
Remarks: **Should there be any short circut or interruption the middle bar display does not flash.**
If the transmitter line is interrupted only the first bar display lights up.In case of a short circiut on the transmitter line all the green bars and the red bar (warning contact) will light up, additionally the warning light (4) lights up and the buzzer sounds.

Discription of the starting procedur

After switching on the ignition a light test of appr. 4 seconds will be carried out. During this time all control and warning lights will light up.
If the light test is finished the following control an warning lights continue to light up or to flash:

4 Stop engine

6 Generator

12 Engine oil pressure,
triangle flashing light, red

20 GLR - power limit controlled system (1704-2004)
(only for units with GLR)

41 Fuel level, bar display

42 Engine oil temperature / Cooling water temperature

Ignition key into position (III) - Start of engine

12 Engine oil pressure, off, depending of oil pressure the bar display is on (40) - green

20 GLR, off (1704-2004) - load sensing (1304)

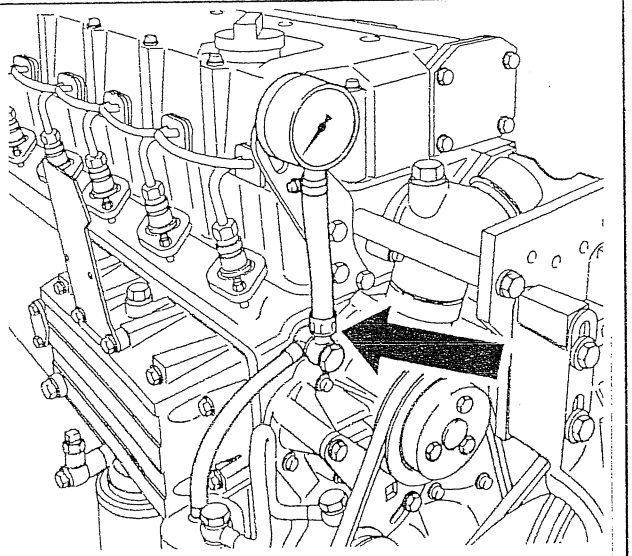
42 Fuel level, depending on inside level the bar display is on - green

42 Engine oil temperature, depending on temperature the bar display is on - green

TEREX ATLAS

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Page	
1	Measurement of fuel pressure Deutz engine BF6M1013 (water cooled)
2	Deutz engine BF6L913 CT (air cooled) special adjusting instructions
3	Tappet adjustment procedure. Valve clearance Deutz engine BF6M1013 (water cooled)



Measurement of fuel admission pressure

The minimum value of fuel admission pressure depends upon the design of the injection system and thus also upon the design of the pressure resistance valve. The fuel admission pressure is checked at the inlet to the crank case. As there is no connection available for a pressure gauge this has to be provided for. (hollow screw with measuring connection)

BF4M 1012E Series

The pressure resistance valve (1.8 bar) has been built into the motors up to number **0144.276**. If it is necessary to replace parts then only the revised pressure resistance valve (1.8 bar) with Deutz number 02111520 may be used.
As from motor number **0144.277** (since July 1996) the pressure resistance valve has been changed to 5.0 bar.

	minimum rpm unloaded 1030 min1	maximum rpm unloaded 2450 min1
pressure resistance valve - old design (1.8 bar)	1.1bar	2.2 bar
pressure resistance valve - new design (1.8 bar)	1.1bar	2.2 bar
pressure resistance valve - design (5.0 bar)	2.0bar	4.2 bar

BF4M 1013E Series

If it is necessary to replace parts then only the revised pressure resistance valve (1.8) with Deutz number 02111520 may be used.

BF6 M 1013E / EC Series

Motors up to number **130.132** have a built in pressure resistance valve (1.8 bar). If it is necessary to replace parts then only the revised pressure resistance valve with Deutz number 02111520 may be used.
As from motor number **0130.133** the pressure resistance valve has been altered to 5.0 bar.

	minimum rpm unloaded 1030 min1	maximum rpm unloaded 2450 min1
pressure resistance valve - old design (1.8bar)	1.1bar	2.0 bar
pressure resistance valve - new design (1.8 bar)	1.1bar	2.0 bar
pressure resistance valve - design (5.0 bar)	2.0 bar	4.0 bar

Special adjusting instruction

Adjusting of minimum engine revolution on ATLAS-Excavators
RSV - regulator

1.) Bring engine into working temperature. Engine oil temperature min. 70° Celsius.

2:) Remove the bowden-cable from engine speed control lever, Pos. 9 and push back the cable for engine stop. Cable should sag slightly.

3.) Remove cap. Pos. 1 + 5

4.) Loosen counter-nut, Pos. 4

5.) Screw out spring sleeve, Pos. 2, at running engine until no reduction of engine revolution can be noticed, then screw out one turn more.

6.) Loosen counter-nut, Pos. 7

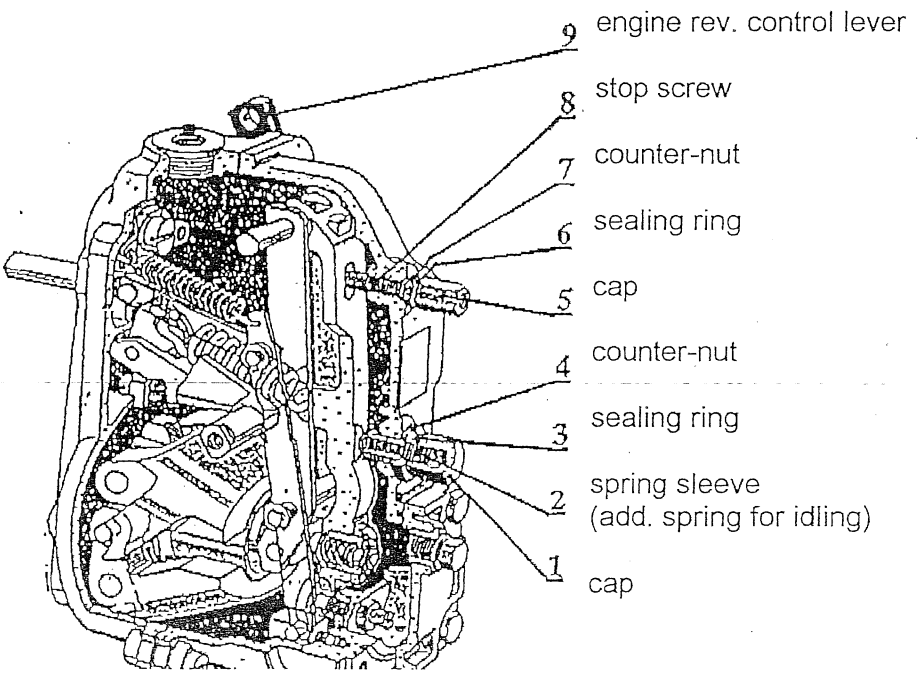
7.) Adjust with stop screw, Pos. 8, the engine revolution up to 950 - 970 rpm and secure with counter-nut, Pos. 7.

8.) Increase the engine-revolution as adjusted under item 7 for 5 - 20 rpm over spring sleeve, Pos. 2 and secure with counter-nut, Pos. 4. (removing of eventually existing „sawing" of the engine)

9.) Screw on cap, Pos. 1 + 5, with sealing ring.

10.) Fix bowden-cable on engine speed control lever, Pos. 9. The adjustment of this cable should not increase the engine revolution as adjusted under item 8.

11.) Increase for a short time the engine revolution over the engine speed control in the cabin and turn back to minimum idling. The engine speed control lever, Pos. 9, must be on stop screw, Pos. 8 again.



TAPPET CLEARANCE SETTING SCHEME

BFM 1013

Schulungszentrum
Tafel:
Name: Ro.
Datum: 01.96

A tappet clearance setting is possible both with a cold or warm engine. The cooling time should at least be 30 minutes and the engine oil temperature must not exceed 80°C.
Remove cylinder head cap and crankcase breather. Turn over engine until a valve overlapping of cylinder 1 is effected. Valve overlapping means: outlet valves is not yet closed, inlet valve begins to open. In doing so both tappet rods are not rotatable. Adjust tappet clearance setting on the respective cylinder with feeler gauge blade.

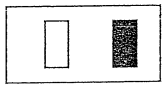
Tappet clearance: inlet - 0,3mm
outlet - 0,5mm

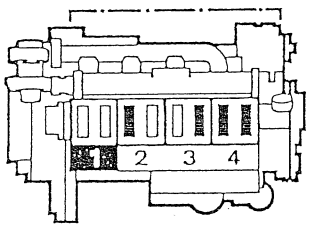
Crankshaft position **1**

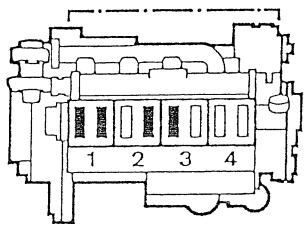
Turn over engine until the valve overlapping on cylinder No. 1 is obtained

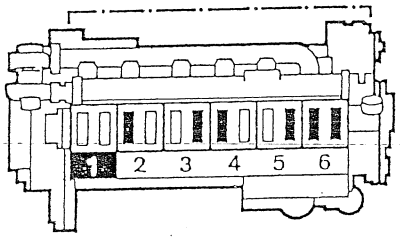
Crankshaft position **2**

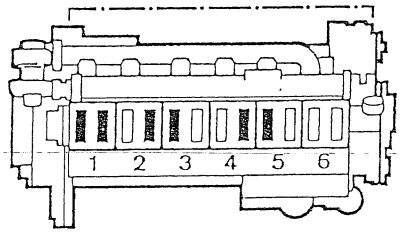
Turn engine by a full rotation (360°).

not adjustable —  — adjustable









TEREX ATLAS

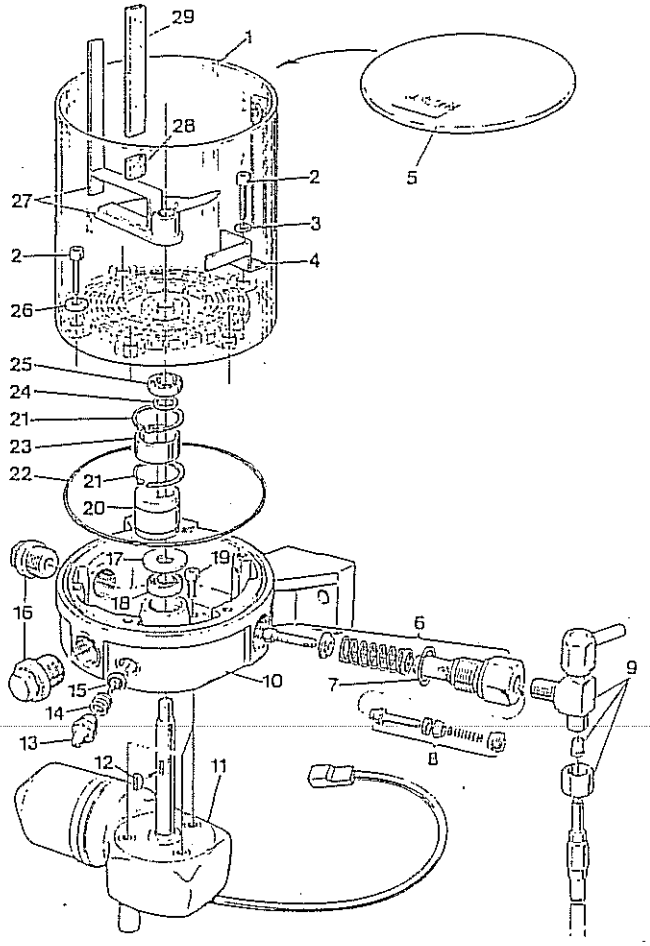
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11	Ball slew ring / turntable bearing. Internal gear teeth lubrication

AUTOMATIC CENTRAL LUBRICATING SYSTEM

Schulungszentrum
Tafel:
Name: Ro.
Datum: 08.97

Individual components of QUICKLUB pump 103 CS, 2-litre container



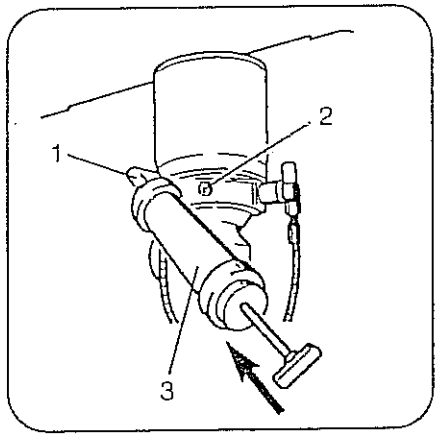
1	Kit: container 2XNKF with items 2, 3, 26, 26
2	Hex bolt
3	Toothed washer
4	Vertical vane
5	Lid
6	Pump element with piston (6 mm dia.), complete
7	Sealing ring
8	Non-return valve, complete
9	Pressure valve, 350 bar
10	Housing
11	Repair kit: 12 V motor* with items 2, 3, 18, 26, 28, 27, 29 24 V motor with items 2, 3, 18, 26, 28, 27, 29 Repair kit for 12 V motor** Repair kit for 24 V motor**
12	Curved washer
13	Tapered lubricating nipple
14	Spring
15	Filter insert
16	Screw plug
17	Washer
18	Rotary shaft sealing ring
19	Hex bolt
20	Cam
21	Securing ring
22	O-type ring
23	Inner ring
24	Washer
25	Grooved ball bearing
26	Washer
27	Stirring vane
28	Rubber scraper, short
29	Rubber scraper, long

Start-up procedure

Only necessary after first-time assembly or repairs.

Before putting into operation, fill the container with lubricant:

- Via the filling connection (1) using a grease pump (3)
  Via the filling nipple (2) using a conventional grease press (grease gun).



Unscrew and remove lubricating lines at all lubricating points. Operate the central lubricating system until lubricant emerges at all lubricating points. Switch off central lubricating system. Connect up all lubricating points again.

Bleeding the pump

If the container is not topped up in good time, the pump will have to be bled:

- Unscrew and remove line from pump outlet.
- Top up container (see above).
- Operate central lubricating system until lubricant emerges at the pump outlet.
- Switch off central lubricating system.
- Reconnect line to pump outlet.

"Progressive" plunger metering device — How it works!

Fig. 8 shows an actual photograph of a sectional 8-outlet SSV metering device. The pistons and the connecting passageways can be clearly seen.

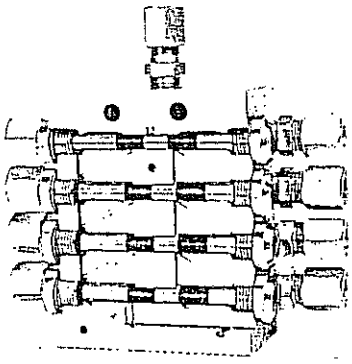


Fig. 8

The following 5 diagrams show what actually occurs in the metering devices, in the exact progressive sequence, as each outlet receives and delivers the same precise volume of lubricant.

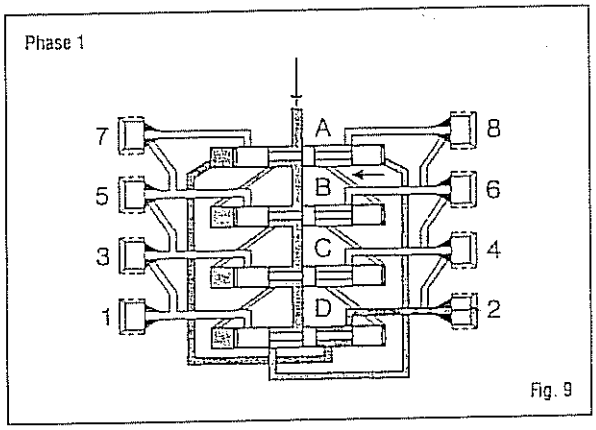


Fig. 9

Phase 1

Lubricant enters the lubricant metering device and flows in the direction of arrow (red) until the right end of piston A.
The lubricant pressure causes piston A to shift to the left. The lubricant stored in front of the left end of piston A (blue) is now delivered in the direction of arrow (green) to outlet 2 and from there via the feed line to the lubrication point.

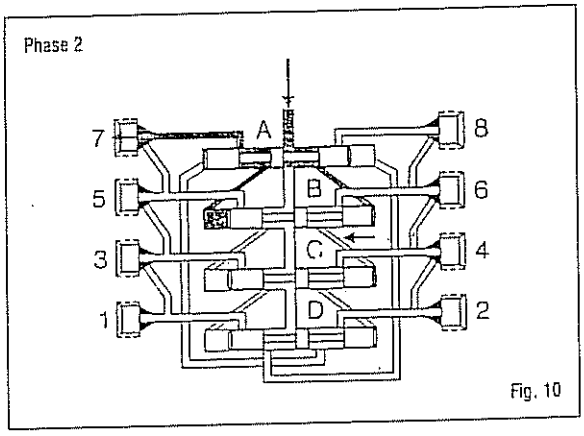


Fig. 10

Phase 2

After piston A has reached its extreme left position, the connecting passage to the right end of piston B is opened. Lubricant flows in the direction of the arrow (red) and causes piston B also to move to the left. The lubricant (blue) stored in front of the left end of piston B is delivered in the direction of the arrow (green) to outlet 7.

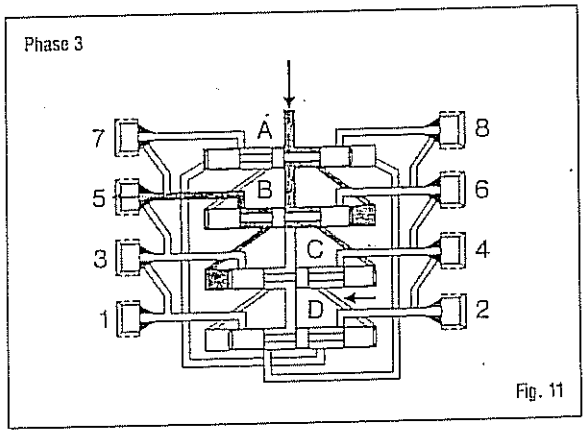


Fig. 11

Phase 3

After piston B has reached its extreme left position, the connecting passage to the right end of piston C is opened allowing the lubricant to flow in the direction of the arrow (red) and causing piston C to shift to the left. The lubricant (blue) stored in front of the left end of piston C is hence delivered in the direction of the arrow (green) to outlet 5.

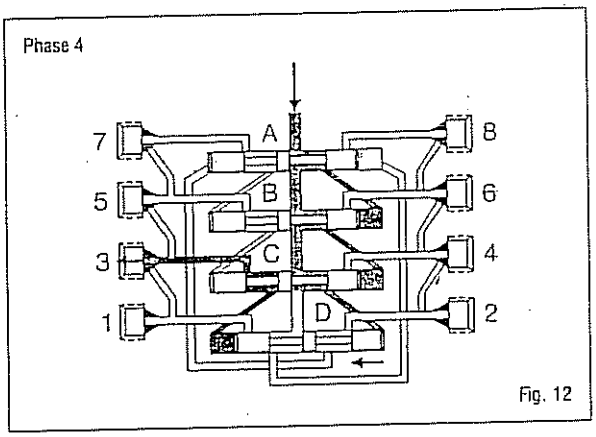


Fig. 12

Phase 4

Now the passage to piston D is open and the lubricant flows in the direction of the arrow (red) until the right end of piston D. The lubricant (blue) stored in front of the left end of piston D is delivered in the direction of the arrow (green) to outlet 3.

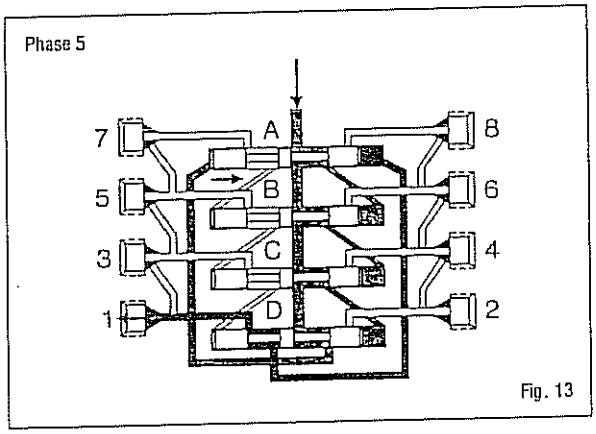


Fig. 13

Phase 5

After piston D has opened the passage to the left end of piston A, the lubricant flows in the direction of arrow (red) and shifts piston A to the right.
The lubricant stored in front of the right end of piston A is delivered in the direction of the arrow (green) to outlet 1. This is the completion of one lubrication cycle and the next cycle will start during which the pistons B through D are being shifted from the left to the right.

Note:

This principle of operation of the progressive plunger metering device results in a positive interlocking of the system. The system is immediately blocked as soon as one single piston cannot move or deliver its lubricant. This interlocking feature allows to visually or electrically monitor the complete system by controlling the movement of any of the pistons by means of an indicator pin.
There is no other lubrication system to provide any such reliable and economical monitoring!

Crossporting of outlets

The important things to know and observe during installation and/or service.

Fig. 14 shows an 8-outlet metering device one half of which is sectioned to show the 4 outlets and the internal crossport passages.

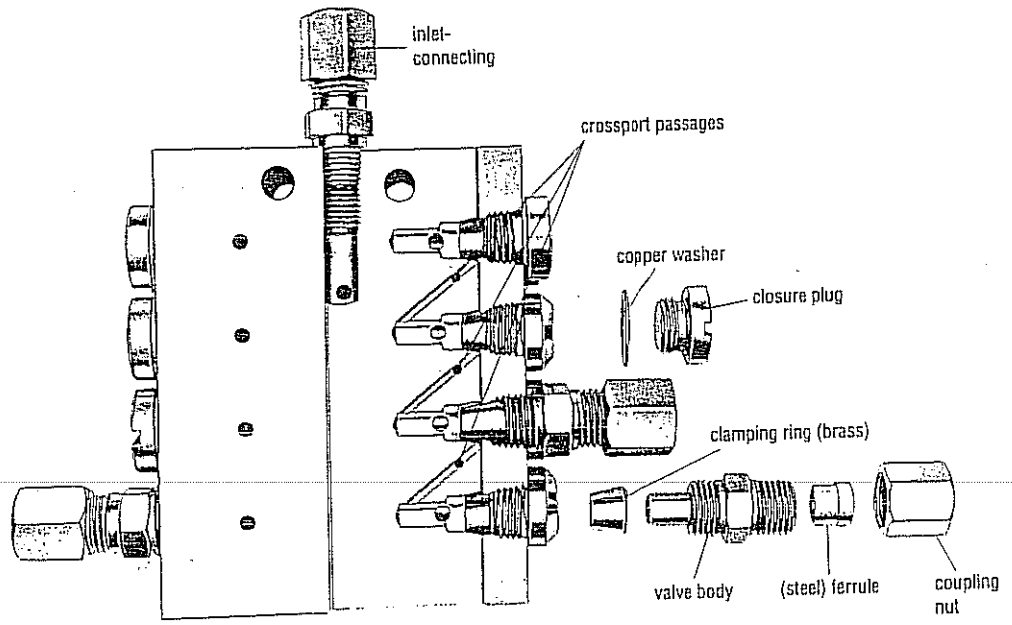
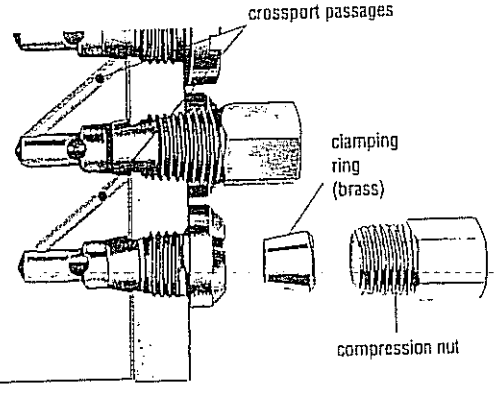


Fig. 14

When an outlet is used, the crossport passages are closed by means of a brass clamping ring. When an outlet is not used, i. e. when it is closed, these passages are kept open. It is via these crossport passages that the lubricant volume is redirected to the next adjacent outlet in descending numerical order (see Fig. 17–20).



see note 2 on page 6

Fig. 15

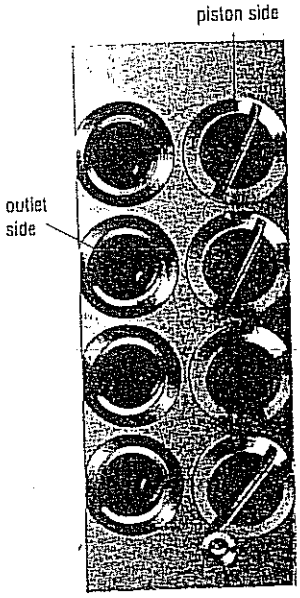


Fig. 16

AUTOMATIC CENTRAL LUBRICATING SYSTEM

Schulungszentrum
Tafel:
Name: Ro.
Datum: 08.97

Four examples of crossporting showing the flow path and the final amount of lubricant output

× — outlet closed
← outlet open

Example 1

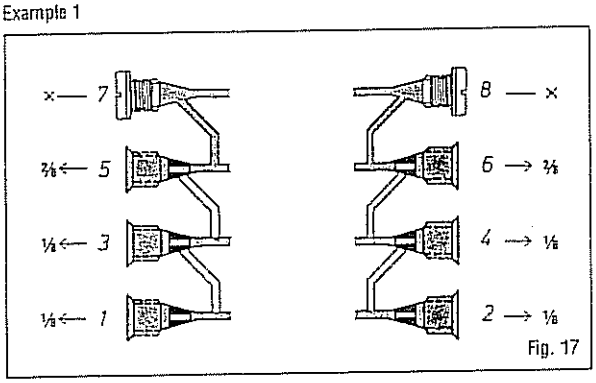


Fig. 17

Example 2

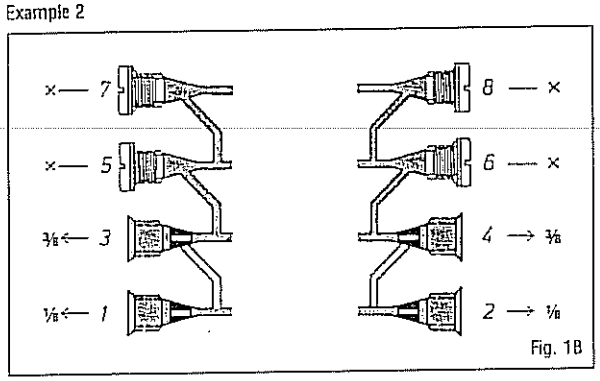


Fig. 18

Example 3

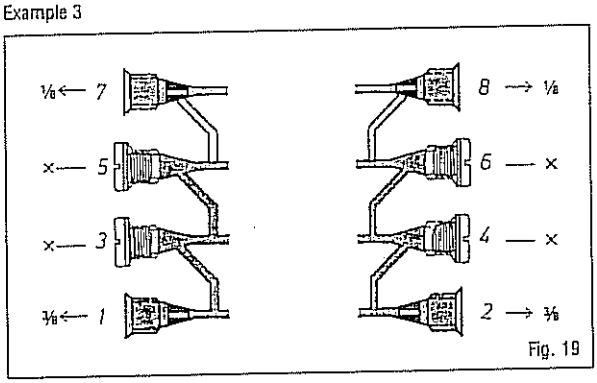


Fig. 19

Example 4

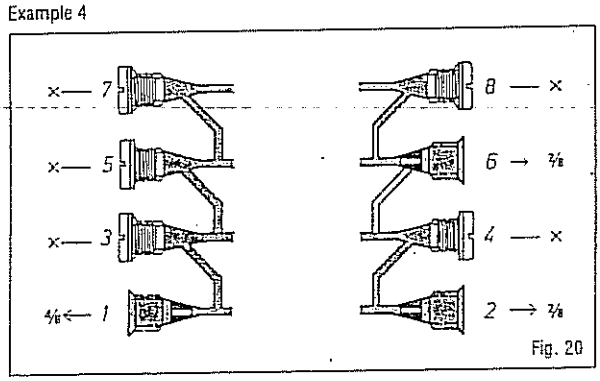


Fig. 20

Important notes:

1. Never close outlets 1 and 2.
2. Check valve outlet fittings must be fitted in primary metering devices and/or secondary metering devices in both oil and grease systems. In systems where the differential pressures between two opposite outlets are expected to be low, it is possible to use compression nuts with brass clamping rings in secondary metering devices.

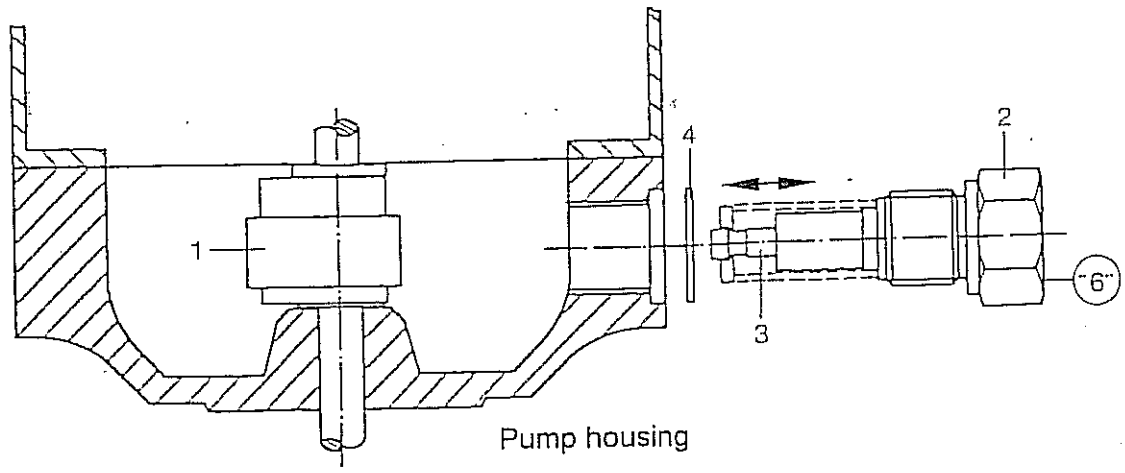
Note: When using the compression nut and polyamide tubing 6 × 1.5 mm (without check valve), insert reinforcing sleeve 432-24116-1 into the polyamide tube.

3. Always use original QUICKLUB outlet fittings.
4. Always ensure that the brass clamping ring is correctly assembled in outlets to be used and removed when subsequently closing an outlet.
5. Always check that the outlet fittings are tightened firmly into the outlet port to ensure that the brass clamping ring completely seals the crossport passage.
6. Always commence assembly and tightening of the outlet fittings from either the top or bottom outlet on either side and continue one after the other to allow full spanner access.
7. Always fully tighten closure plugs. Always replace copper washer each time the closure plug is loosened.

Troubleshooting

Problem	Solution
1. **Blockage in the system or at any connected bearing.** 1.1 Manual Systems. It is difficult or even impossible to move the hand lever. 1.2 Systems with pneumatic pumps. System cycles, however no delivery. 1.3 Systems with electrical pumps. Safety valve actuated, grease emerges. 1.4 Indicator pin on metering device does not move or electrical control is actuated.	**Trace source of blockage and rectify.** **PROCEDURE** 1. First check that delivery pump is operating and delivering lubricant correctly into primary metering device. Commence loosening pump outlet and let pump run. As soon as pump operates properly, reassemble pump outlet. (Conclusion: pump operates satisfactorily.) 2. Let pump run until blockage occurs or until pressure increases to inadmissably high value. Let pump continue to run, do not relieve the pressure. Loosen the inlet fittings at the metering devices one after the other. The metering device from which lubricant suddenly emerges under pressure (with inlet fittings being loosened), leads to the source of malfunction. Re-tighten the inlet fittings. Then loosen the respective inlet fittings of the bearings one after the other. The bearing from which lubricant suddenly emerges under pressure (with inlet fittings being loosened) is the blokked one. Clear bearing blockage.
2. **Blocked metering device.** 2.1 After all outlets of the primary metering device and/or those of the secondary metering devices have been loosened, no lubricant is emerging from the outlets; the metering device is blocked.	1. Replace the blocked metering device. 2. In the case of emergency, the metering device may be cleaned on condition that the following instructions are observed: 2.1 The working place must be clean. 2.2 Remove all tube connection fittings. 2.3 Remove the piston closure plugs using a strong screwdriver, possibly hammer at the screw. 2.4 The pistons are to be driven out by means of a smooth triblet (possibly made of plastic, whose dia. is less than 6 mm). **Very important:** It must be marked which piston belongs to which hole because the pistons must not be exchanged. 2.5 Carefully rinse the metering device body in fat-solvent detergent several times and blow through with air. 2.6 At the thread ends of the piston closure holes there are slant channels of 1.5 mm dia. which must be punched through using a wire or a pin. 2.7 The metering device must again be rinsed and blown through. 2.8 Remove any hardened grease which may be in the piston closure plugs. 2.9 Reassemble the metering device while replacing all copper washers. 2.10 Before the tube outlet fittings are being reassembled, oil must be pumped several times into the metering device by means of a hand pump or similar pump. The back pressure should not exceed 25 bar, otherwise the metering device is not properly clean or the piston holes are damaged. If, in spite of all efforts, the operating pressure of the metering device will not fall below 25 bar, the metering device has become unserviceable and must be replaced.

Pump element



Exchanging pump element

The pump element can only be replaced when the pump is stationary.

The scraper on the stirrer vane (1) must be positioned opposite the pump element to be installed.

Unscrew pump element (2) and pull out straight so that the piston (3) does not fall into the housing.

When screwing in the new pump element, make sure the sealing ring (4) is fitted properly. Tightening torque: 30 - 35 Nm.

NOTE: Only use pump element with piston (6 mm dia.).
The number „6" is embossed on the face.

Threaded hose connections

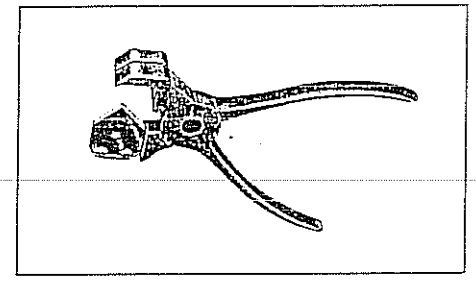
General

When installing a new central lubricating system, only use grease-filled high-pressure plastic hoses with press-fit hose fittings.

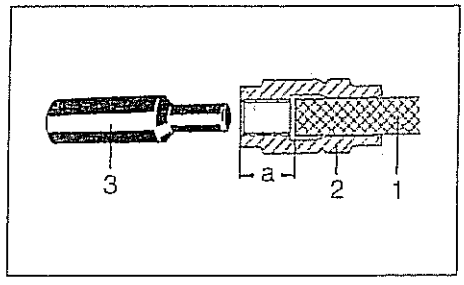
If these are not available, high-pressure plastic hoses can be fitted manually with the ppropriate threaded hose connections (e.g. during repairs).

Fitting hose screw connections:

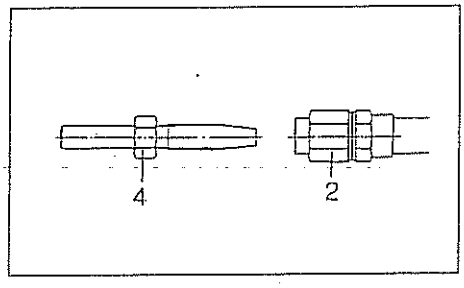
- Hose ends should be cut off with special shears.
  A sharp knife can also be used.
  Never use side cutters, nipper pliers etc.



- Screw the end of the hose (1) into the screw sleeve (2) until the correct distance (a = 11 mm) is reached.
  (Left-hand thread)
  Use a special adjusting gauge (3) if necessary.



- Oil the thread of the hose connecting piece and screw it into the screw sleeve (2).



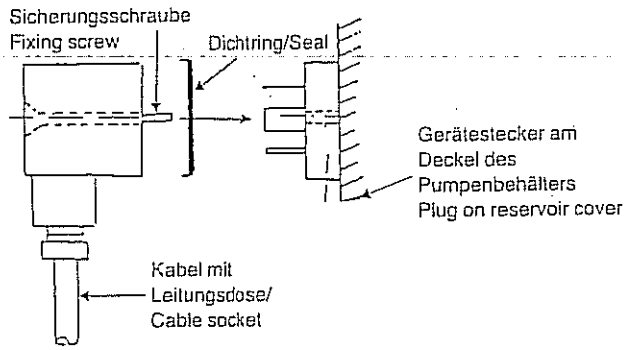
IMPORTANT: The high-pressure plastic hose must be filled with grease before it is installed.
Check hose screw connection is not blocked.

Trouble shooting

Problem	Solution
Pump does not operate after switching on.	Check fuses and electrical supply. Check the electrical supply to the connecting plug on the pump unit. – In the event that there is no electrical supply to the pump plug, trace the electric cable to its source and rectify the problem. – In the event that the electrical supply is available to the pump plug and the pump will not start, then the pump should be changed.
The pump operates but the pump element does not deliver lubricant.	Air pocket at the inlet of the pump element. – Disconnect the main delivery line from the pump element outlet. Then operate the pump unit continously until the lubricant is delivered without air pockets. If after approximately 20 minutes operating time still no lubricant is delivered from the element outlet, then it is possible that the suction inlet of the pump element is blocked with a foreign particle. Remove the pump element from the pump body and inspect the suction inlet port for foreign particles. Then set the pump in operation and as soon as the lubricant begins to appear out of the pump body outlet, re-insert the pump element and securely tighten. If the pump element still does not deliver lubricant then the pump element must be exchanged. NOTE: Depending upon the ambient temperature and/or the type of lubricant it can take up to ten minutes before the full delivered volume is achieved out of the pump element.
Pump allowed to operate with an empty reservoir.	First fill the reservoir to the "MAX" level and then set the pump in operation (see "Filling of the pump"). Disconnect the main delivery line from the pump element outlet and observe when air free lubricant is delivered from the outlet. Re-connect the main delivery line to the pump element outlet and securely tighten.
Pump unit in operation with a LINCOLN Quicklub progressive distribution system The operating pressure of the pumpl unit rises to the maximum setting of the relief valve. Lubricants is discharged from the relief valve outlet and/or the indicator pin of the progressive system gives an optical warning of the "pressure stalled" system.	Blockage in the distribution system or in one of the connected bearings. Trace and cure the blockage. – Maintain the pump unit in the switched on condition and begin to loosen each outlet of the main progressive divider valve one after the other. The outlet from which lubricant begins to leak out, indicates clearly in which distribution line the blockage is to be found. – Once again re-tighten all outlets of the main progressive divider valve and trace the blocked line to the next progressive divider valve. Repeat the loosening of the outlets one after the other as previously until the blocked feed line/bearing is found. Re-connect and tighten all outlets from the progressive divider valves and rectify the blockage in the relevant bearing.

Important Information

1. The plastic material of the pump reservoir can be damaged if trichlorethylen, acetone or other similar cleaning or thinning chemicals are brought into contact.
2. When for any reason, a cable socket is removed from the corresponding plug on the pump reservoir cover, it is important to observe that during re-assembly of the cable socket onto the plug, the seal is correctly positioned between the two halves before finally tightening the fixing screw.

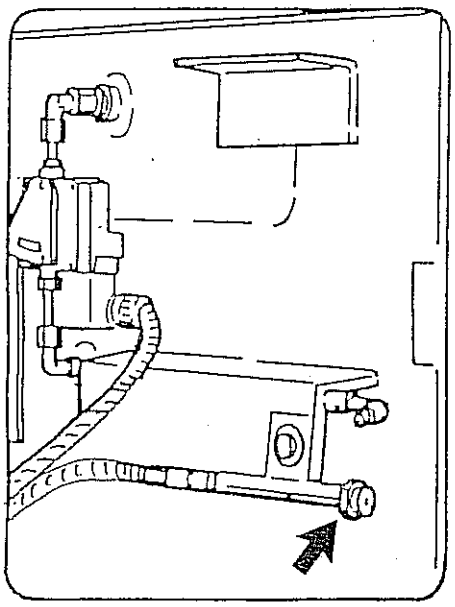


Lubrication

Various lubricants are used:
„Regular grease" - for ball track
„Special grease" - for gear teeth

In order to avoid confusion when lubricating, a flat nipple is fitted to the lubricating point for the gear teeth.

A suitable reinforced hose is included with the accessories.



Repeat lubrication

Top up approx. 15 - 20 % of the pinion area every 100 operating hours.

For 1304 approx. 0,2 kg = ½ cartridge
1704 approx. 0,4 kg = 1 cartridge
1804 approx. 0,6 kg = 1 ½ cartridges

EDP numbers:	Flat nipple	-	0392650
	Reinforced hose	-	3625987
	Cartridge of „special grease"	-	3620153

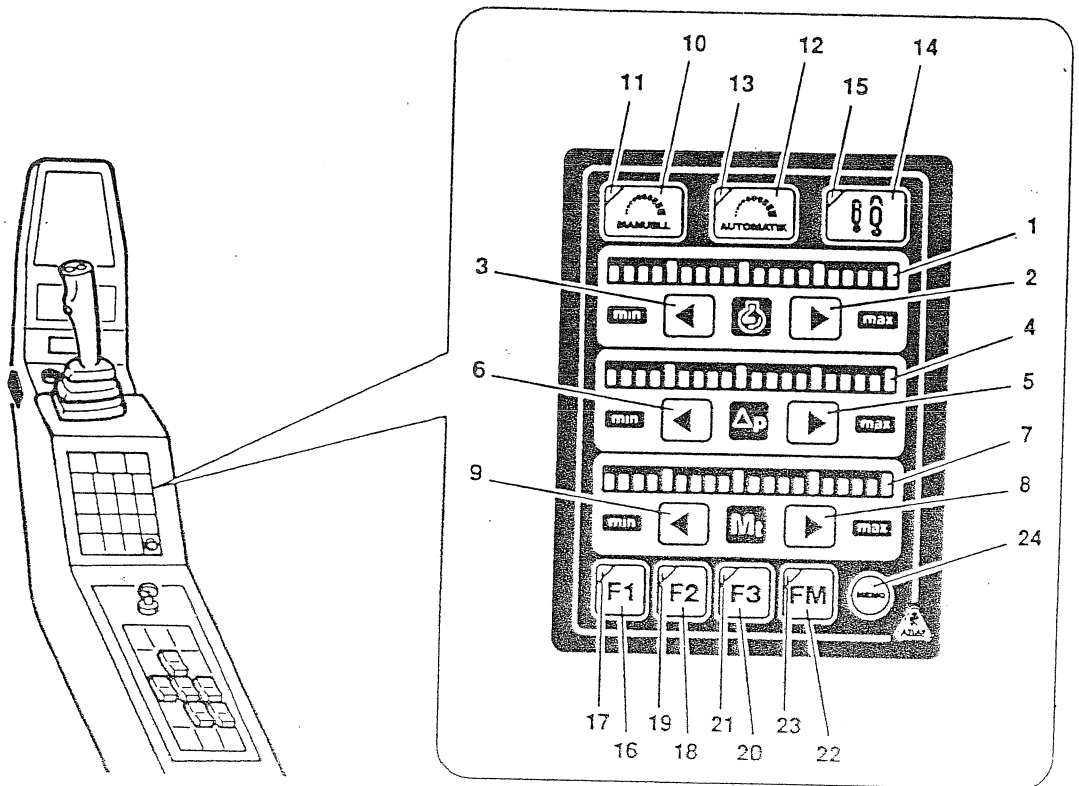
TEREX ATLAS

CONTENTS

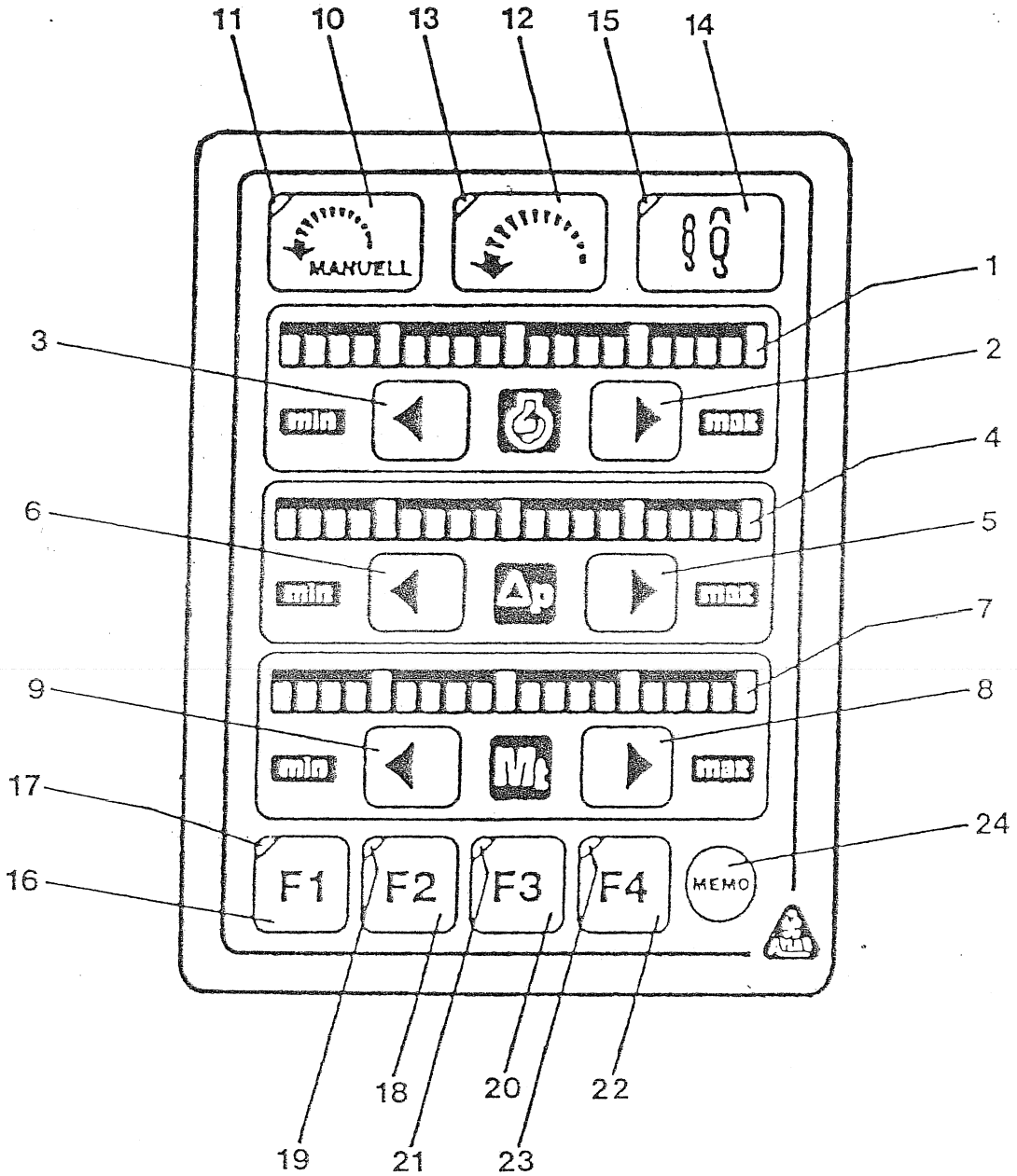
1704 - 1804. 372 & 282 series (1993 - 1995)

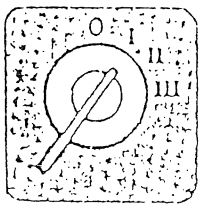
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8	Diagrammatic view of system
9	Adjustment of engine speed sensor (air cooled engine only)
10	Speed check
11 -12	Engine speed regulator
13	Linde HPR variable twin pump (cross section)
14	Load sensing regulator
15	Load limit control regulation (schematic diagram)
16	Emergency control valve
17	Slew motor
18	Secondary valve (slewing)
19 -21	Torque control (TC) plate (slewing)
22	Valve unit (pressure cut off, pressure cut in stage, primary valve for pump P1 and P2
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24	4/3 way valve. (forward -reverse selection (mobile))
25 -26	Feed valve unit. (Travel motor (mobile))
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30	Cooling system, hydraulic oil. (mobile)
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32	Radiator protection valve
33	Hydraulic diagram. Elevating cabin.
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38-57	Adjustment information (372 and 282 series only)
58-59	Pressure adjustment table,1704, 372 series
60-61	Pressure adjustment table, 1804, 282 series
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1 Revolution counter
2 Switch-raise engine speed
3 Switch-lower engine speed
4 Precision control display
5 Switch for precision control
6 Switch for precision control
7 Engine torque display
8 Switch-raise engine torque
9 Switch-lower engine torque
10 Switch-lower engine speed(idle speed)
11 Telltale for reduced engine speed(idle speed)
12 Switch for automatic idling
13 Telltale for automatic idling
14 Switch for pressure boost stage
15 Telltale for pressure boost stage
16 Read-only memory F1
17 Telltale F1
18 Read-only memory F2
19 Telltale F2
20 Read-only memory F3
21 Telltale F3
22 Memory FM (F4)
23 Telltale FM (F4)
24 MEMO store key


11
10
13
12
15
14
MANUELL
1
3
2
min
mak
4
6
5
Δp
7
9
8
M
17
24
F1
F2
F3
F4
MEMO
16
18
20
22
19
21
23



Turn ignition key to position (I) - "ignition on".

The following functions are pre-programmed:

Automatic idling (12) with telltale (13).
Read-only memory F1 (16) with telltale (17).
The bar displays (LEDs) for engine speed (1), Δp (4) and engine torque (7) come on according to read-only memory F1 (16).

The excavator is fitted with an automatic warm-up device which is controlled by the temperature of the hydraulic fluid.
The max. warm-up phase is approx. 3 minutes.

Press the ignition key and turn to position (III) - "start engine".

At a hydraulic fluid temperature of below 20 °C, warm-up takes place at an engine speed of 1480 rpm. After approx. 3 minutes the system switches to automatic idling (12, engine speed 1140 rpm) and read-only memory F1 (16).

The warm-up phase does not function at a hydraulic fluid temperature above 20 °C.

If the automatic idling mode is not required, press key (12) to switch it off.
The system then switches automatically to read-only memory F1.

NOTE: during the warm-up phase, the bar display (1) indicates the actual value as a bar LED and the target value (F1) as a dot LED.

Operating modes - read-only memory F1-F4

Fixed-programmed operating modes:

	Power utilisation	Engine speed	Engine torque	Δp
F1 (16)	87.5 %	1800 rpm	100 %	17 bar
F2 (18)	95 %	2000 rpm	100 %	20 bar
F3 (20)	100 %	2200 rpm	100 %	23 bar
F4 (22)	80 %	1600 rpm	100 %	14 bar

Each operating mode is indicated by a telltale light (17, 19, 21 or 23).

The selected operating mode can be altered individually. This is done by activating the appropriate key (2, 3, 5, 6, 8 or 9). Alterations are indicated in the bar display (1, 4 or 7).

NOTE: alterations are deleted when the diesel engine is switched off and the ignition turned off. When the engine is started again, automatic idling (12) and the read-only memory F1 (16) are reselected.

Operating mode F4 can be programmed and stored as required. Pre-select the required program. To store, keep the MEMO key (24) pressed down and press the key marked F4 (22).
The operator can now select the right excavator settings to suit working conditions.

Manual engine speed reduction

An operating mode has been selected. Activate control switch (10) Telltale (11) comes on. Engine speed is reduced to 1030 rpm. If the control switch is pressed a second time, the manual engine speed reduction function is switched off and the operating mode previously selected reappears.

Automatic idling - engine speed reduction

An operating mode has been selected. Activate control switch (12). Telltale (13) comes on. If no operating function is switched on or is interrupted for more than 6 seconds, the automatic idling function reduces engine speed to 1140 rpm.
If an operating function is switched on, the pre-selected operating mode returns immediately.
Setting for pressure switch in pump line - 70 bar.

If the control switch is pressed a second time, the automatic idling function is switched off and the previously selected operating mode reappears.

NOTE: if automatic idling is in operation, the bar display (1) indicates the actual value as a bar LED and the target value (F1) as a dot LED.

Pressure cut-in stage

Activate control switch (14). Telltale (15) comes on.
Engine speed is reduced to 1680 rpm and Dp to 10 bar. The programmed operating mode and individual adjustment cease to function.
The operating movements lifting, lowering, folding and bucket operation can be carried out at increased pressure.
If the control switch is pressed again, the pressure cut-in stage is switched off. The operating mode previously selected and individual adjustment cease to function.

Adjusting engine speed

Control switch (3) = min, control switch (2) = max.
Engine speed can be altered by activating the relevant control switch. This is indicated by LED in the bar display (1).
One LED is equivalent to approx. 70 rpm.

Pre-selection precision control (Dp)

Control switch (6) = min, control switch (5) = max.
Control pressure (Dp) is altered by activating the relevant control switch. This means that, if required, the precision control range can be put to maximum use. This is indicated by LED in the bar display (4).
One LED is equivalent to approx. 0.7 bar.

Torque (Mt) - reducing output

Control switch (9) = min, control switch (8) = max.
The diesel engine's output can be reduced as required from 100 % to 40 % by activating the relevant control switch. This is indicated by LED in the bar display (7).
One LED is equivalent to approx. 3 %.

Fault diagnosis

Only to be carried out following the warm-up phase and when the engine is running!
Not all faults in the electronic and load limit control systems are indicated by the telltale (GLR) coming on and staying on in the display zone.
These faults can, however, be detected by a "check function" in the electronic operating panel.
The "check function" is switched on by activating the MEMO (24) and pressure cut-in stage (14) keys at the same time. Faults are indicated by LED in the bar display (1, 4 or 7).

Fault table

Bar display (1)
Display reads from left to right.

LED	Component	GLR telltale
1	Speed sensor	Comes on
2	Voltage supply, travelling	-
3	-	-
4	Temperature sensor, diesel engine	Comes on
5	Temperature sensor, hydraulic fluid	Comes on
6	LS magnet, load limit control valve	Comes on
7	Magnetic actuator, diesel engine	Comes on
8	Relay for pressure cut-in stage	-
9	Output signal, load limit control	-
10	Output signal, temperature monitoring, diesel engine	-
11	Supply voltage, electronics box < 20 Volt	-
12	Electronics box	-
13	Electronics box, reset	-
14	Data line, electronic operating panel	Comes on
15	Electronic operating panel, pressed	-
16	Electronics box, switch contact, switched on	-

Information on diagnosis - LED 16
The following functions are assigned to this LED:
pressure switch - automatic idling
Kick-down key - in the right-hand operating lever

Bar display (4)

The bar display indicates the setting of the travel pressure switch:

LED 1-3 Pressure switch open = excavating
LED 1-20 Pressure switch closed = travel

Bar display (7)

The bar display indicates the pre-selected target value. It flashes if the following faults occur:

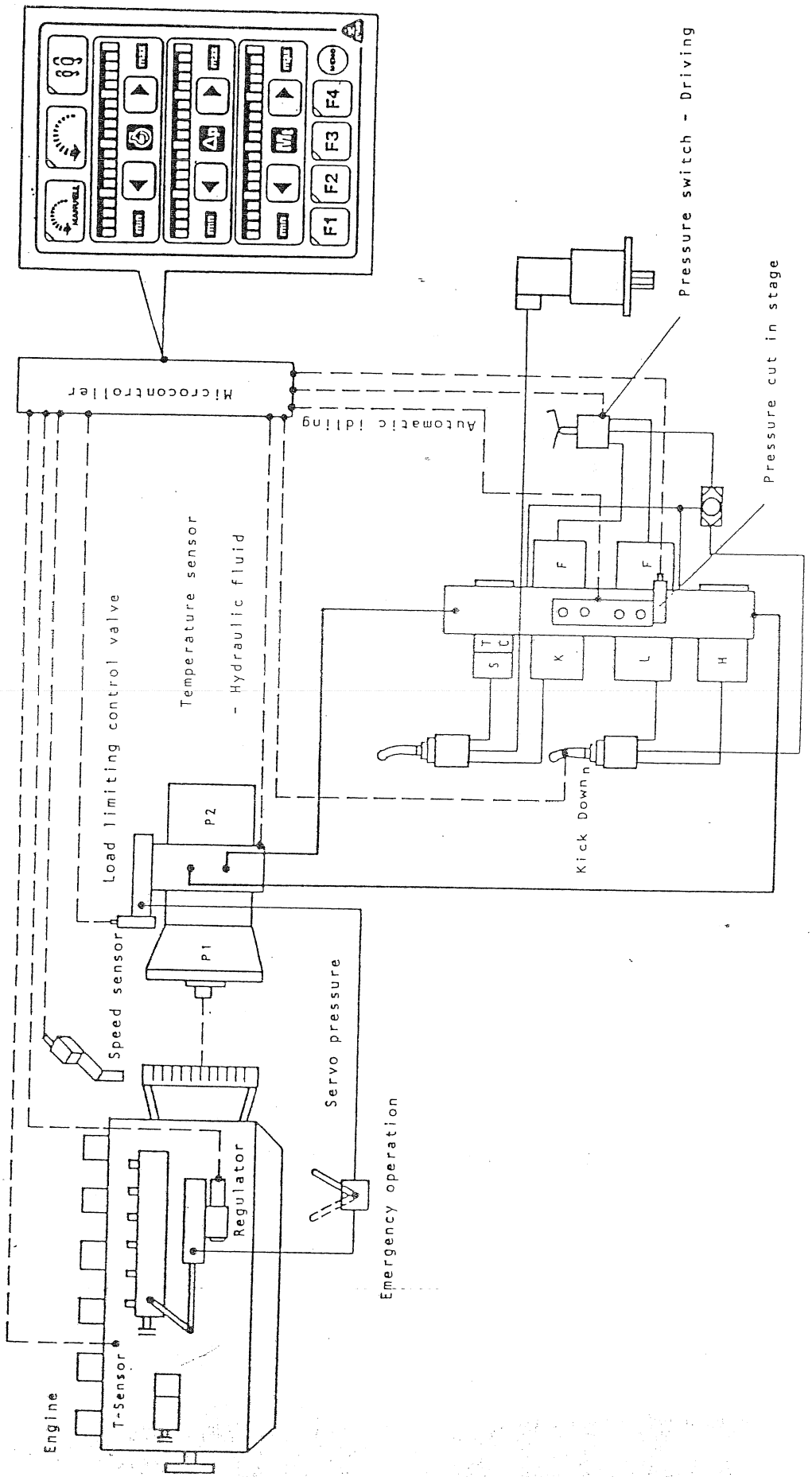
In the electronics box, in the data transfer system or if a key sticks.

If a fault develops in the data transfer system as soon as the "check function" is switched on, all bar displays flash.

The "check function" can be interrupted at any time. This is done by activating the MEMO (24) and the pressure cut-in stage (14) keys at the same time.

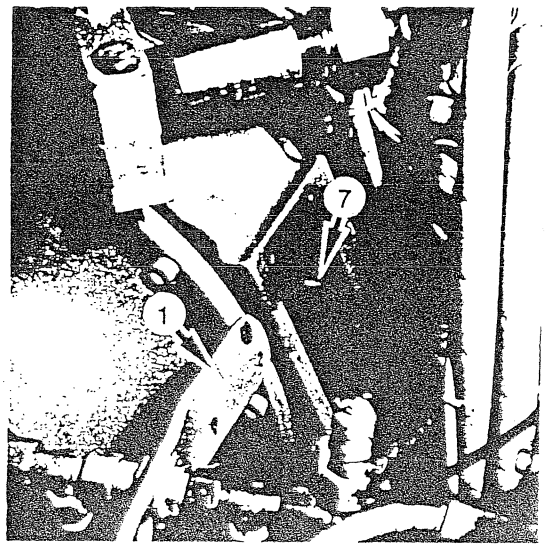
Emergency circuit

If faults develop in the electronics, the excavator can be operated at reduced output by the emergency circuit.
The emergency circuit is put into operation by switching over the lever ( ) and pulling the plug out of the electronics box.


F1
F2
F3
F4
Microcontroller
Automatic idling
Pressure switch - Driving
Pressure cut in stage
Temperature sensor
- Hydraulic fluid
Load limiting control valve
Speed sensor
Servo pressure
Emergency operation
Kick Down
Regulator
T-Sensor
Engine
P1
P2
F
K
L
H
S
T
C

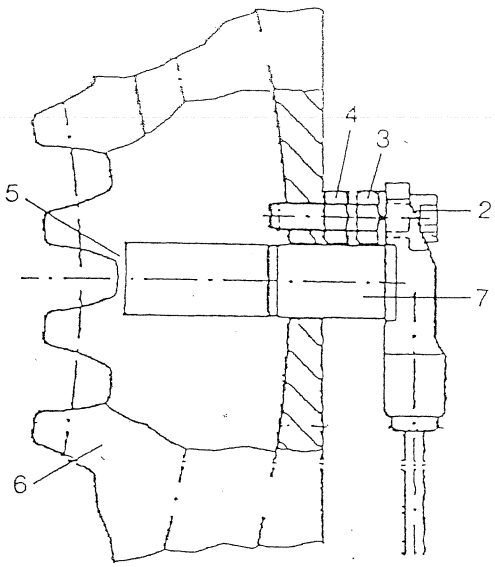
Function

The speed sensor (7) is screwed into the diesel engine, 1 mm away from the gear ring (6) of the flywheel.
When the diesel engine is running, induced voltage is produced by the gaps between adjacent teeth. This is input to the electronic system.

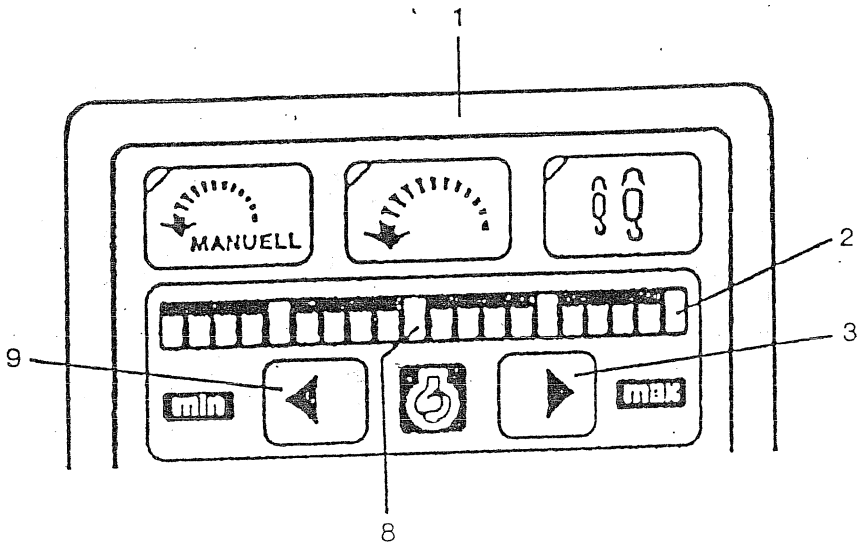


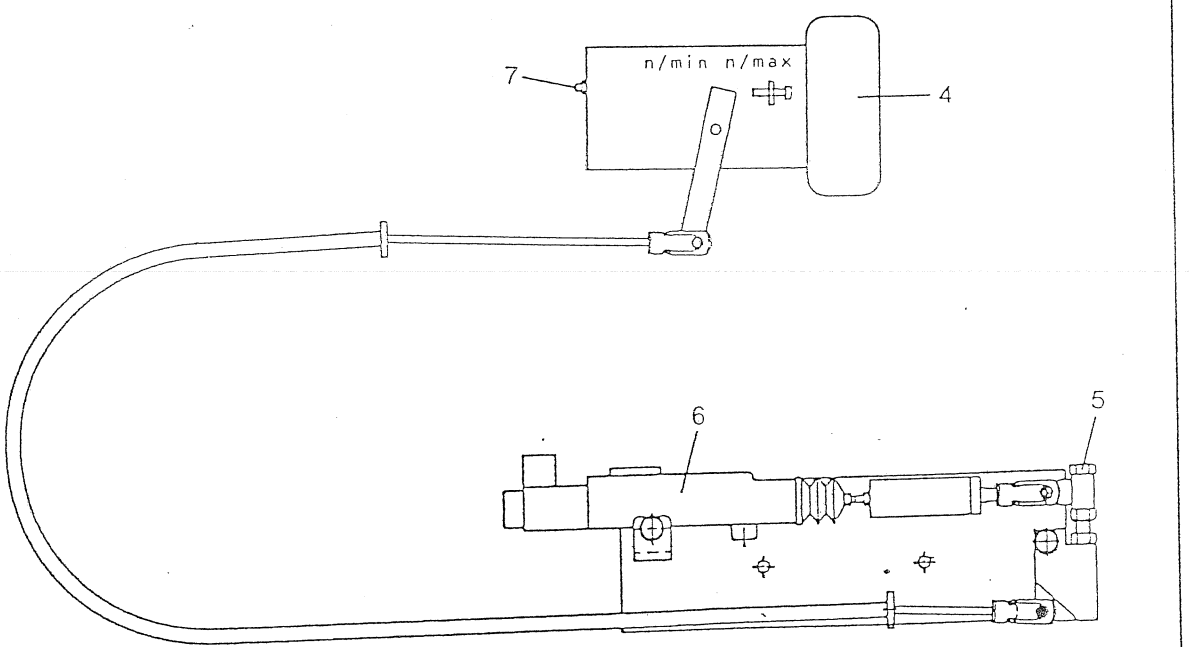
Adjusting

Unscrew and remove holder (1) and locking plate. Slacken off securing nuts (3, 4). Screw adjusting screw (2) in or out until the correct distance (5) is obtained.
Tighten securing nuts (3, 4) and check the distance with a feeler gauge.
Screw on holder (1) and locking plate.



1 Holder
2 Adjusting screw
3 Securing nut
4 Securing nut
5 Distance = 1 mm
6 Flywheel with gear ring
7 Speed sensor



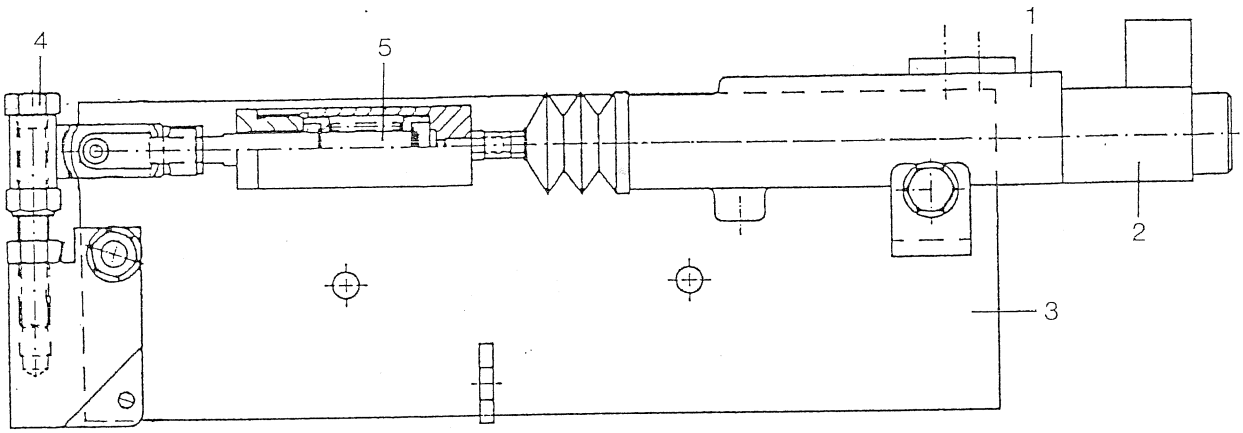


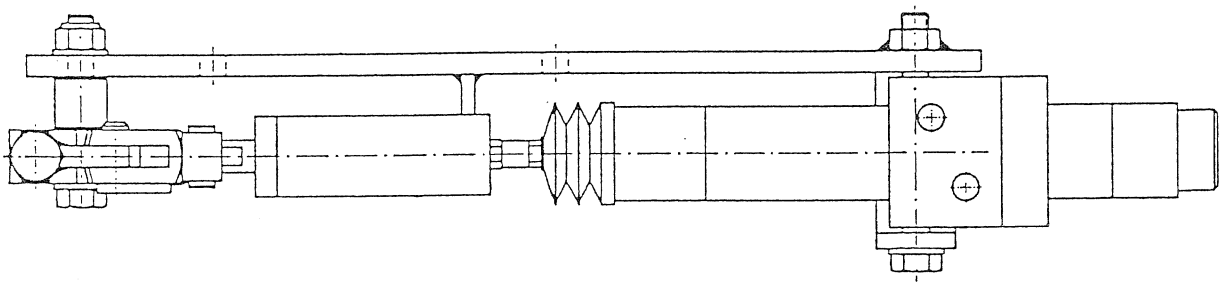
1 Control panel
2 Revolution counter
3 Switch-raise engine speed
4 Injection pump
5 Adjusting screw
6 Regulator
7 Idling-Adjusting screw
8 Center revolution counter
9 Switch-lower engine speed

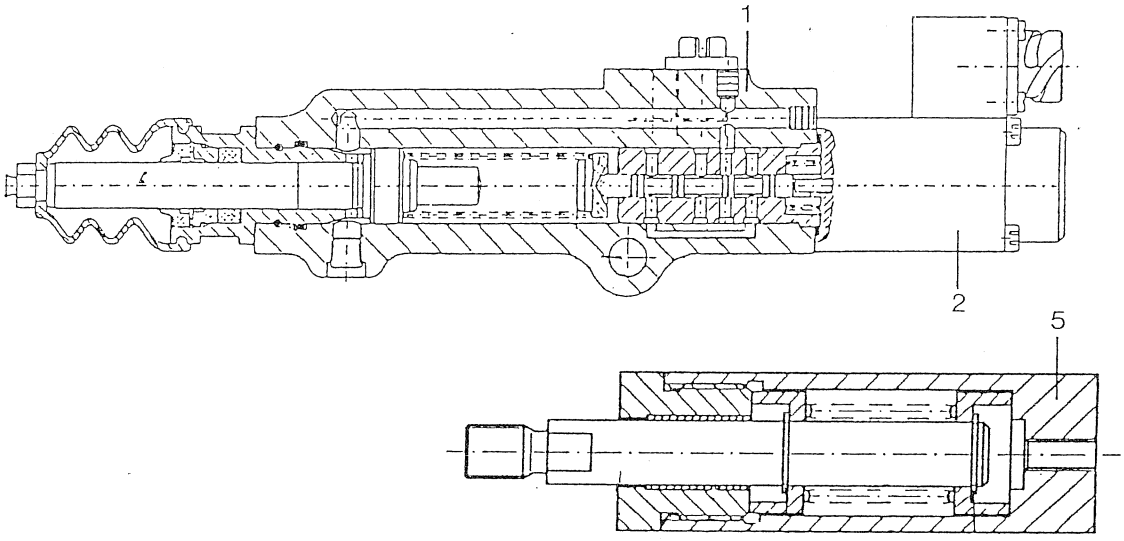
REGULATOR
with damping cylinder

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.94

P 11







1 Regulator

2 Soleniod valve

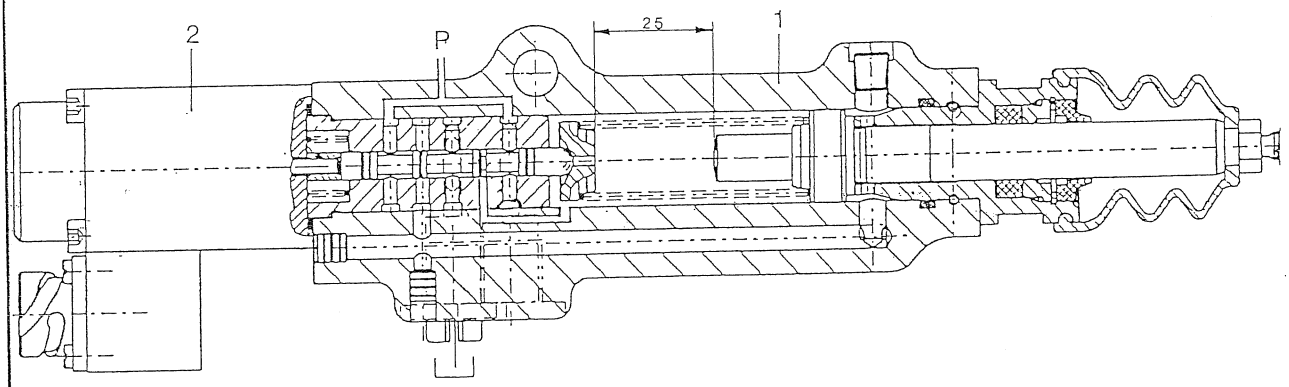
3 Plate

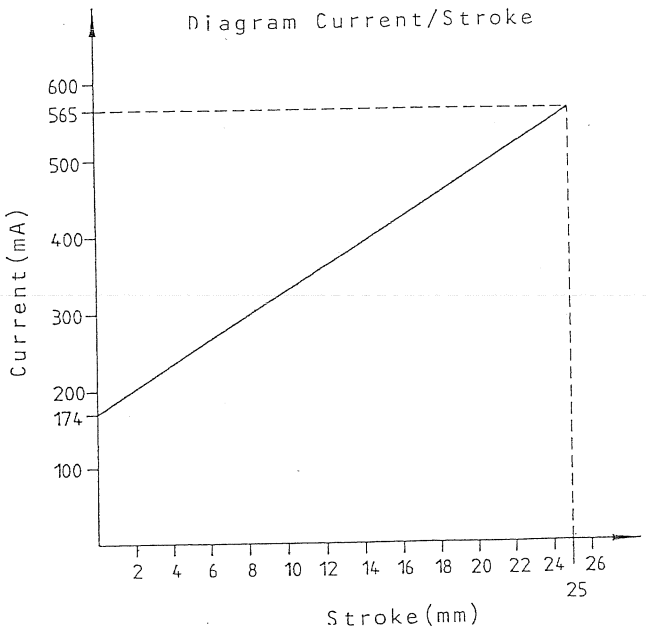
4 Adjusting screw

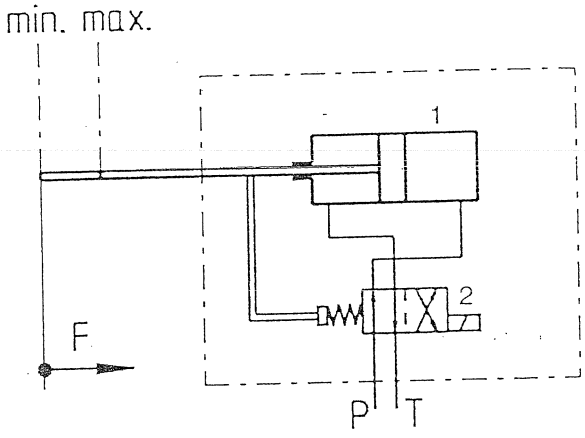
5 Damping cylinder

REGULATOR

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.94







1 Regulator

2 Soleniod valve

P Connection - Servo pressure

T Connection - Tank

F Force

min. / max. Engine speed

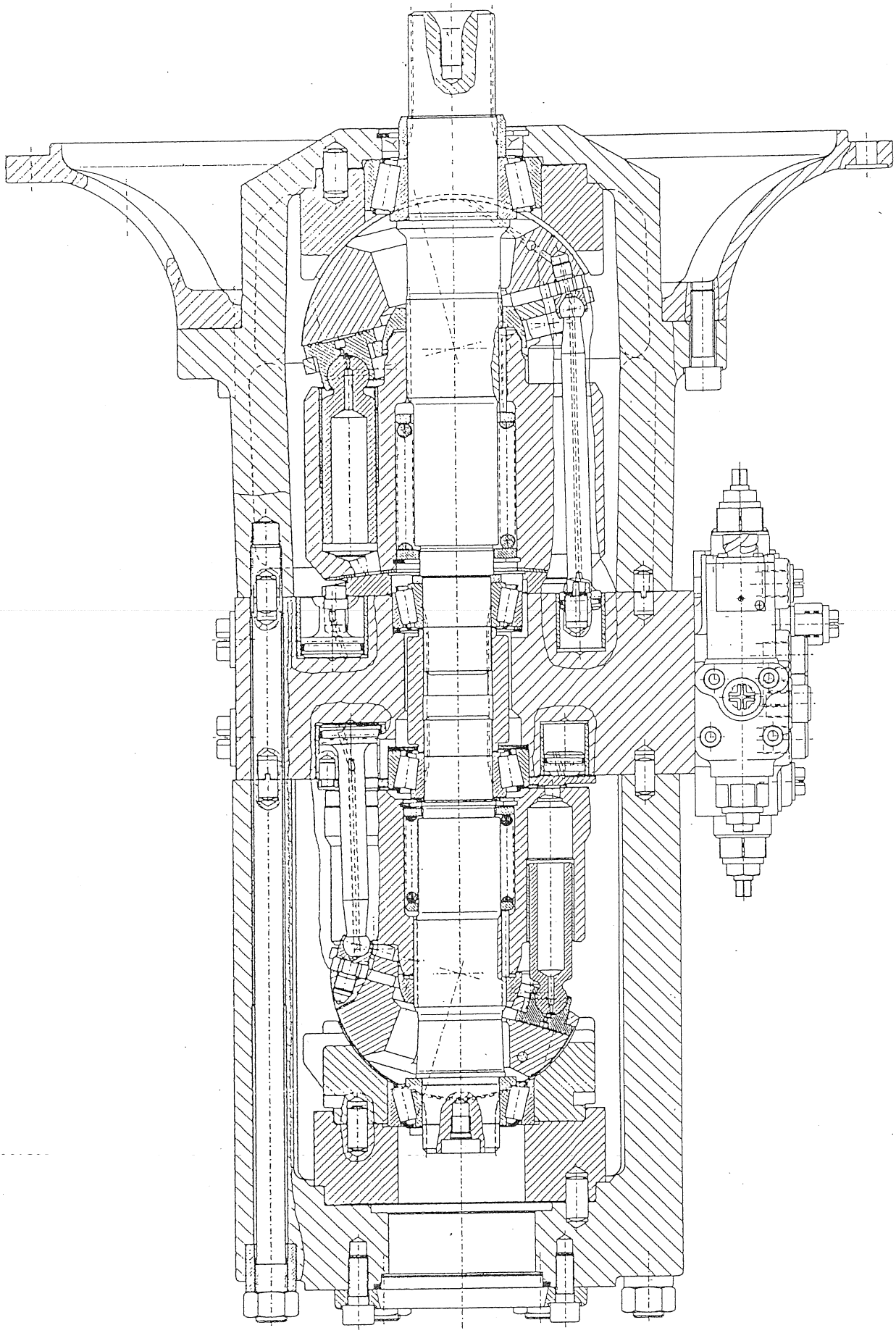
VARIABLE TWIN PUMP
1704,1804

Schulungszentrum

Tafel:

Name: Ro.

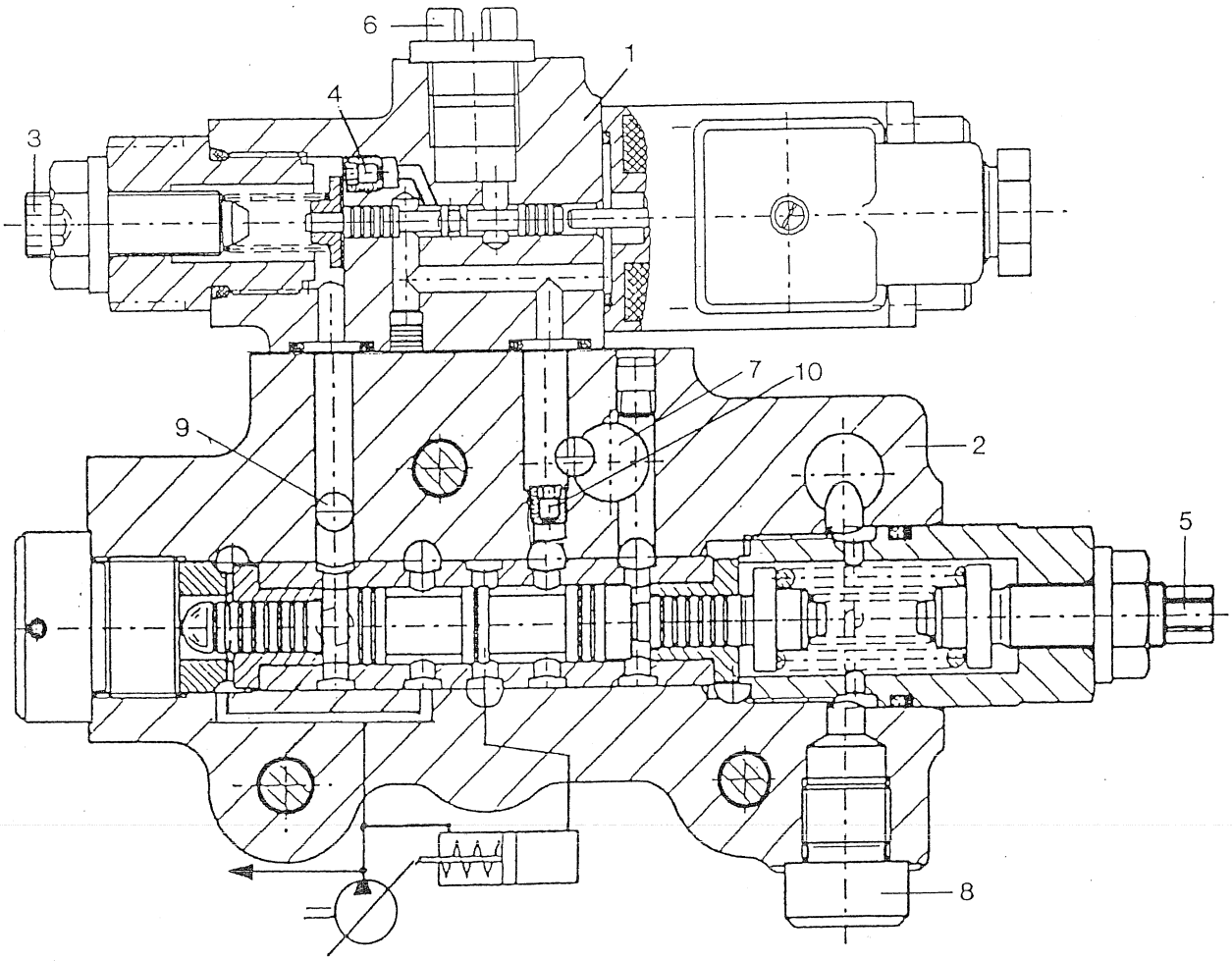
Datum: 07.94



LOAD SENSING REGULATOR
with load limit control valve

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.94

P14



1 Load limit control valve

2 Load sensing regulator

3 Adjusting screw - Regulator

4 Orifice Ø 1mm

5 Adjusting screw - Load sensing regulator

6 Connection - Servo pressure

7 Connection - Tank

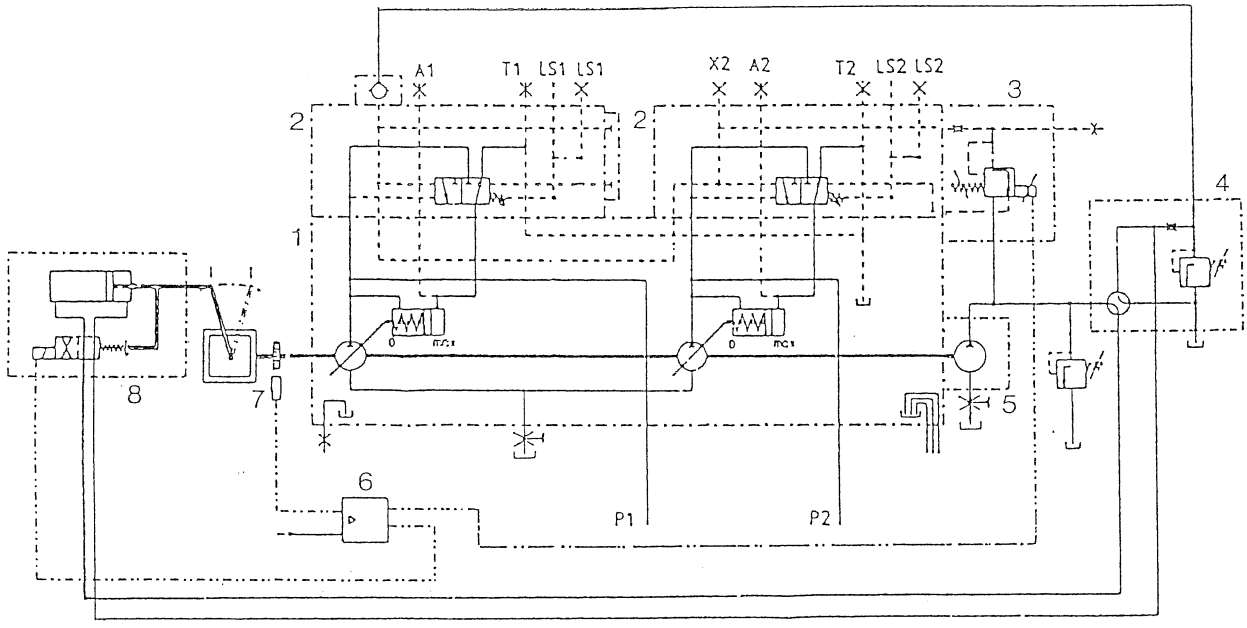
8 Connection - Load sensing

9 Connection - Emergency control

10 Orifice Ø 1,7 mm

LOAD LIMIT CONTROL REGULATION
with emergency control

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.94



1 Variable twin pumps

2 Load sensing regulator

3 Limit control valve

4 Emergency control

5 Servo pump

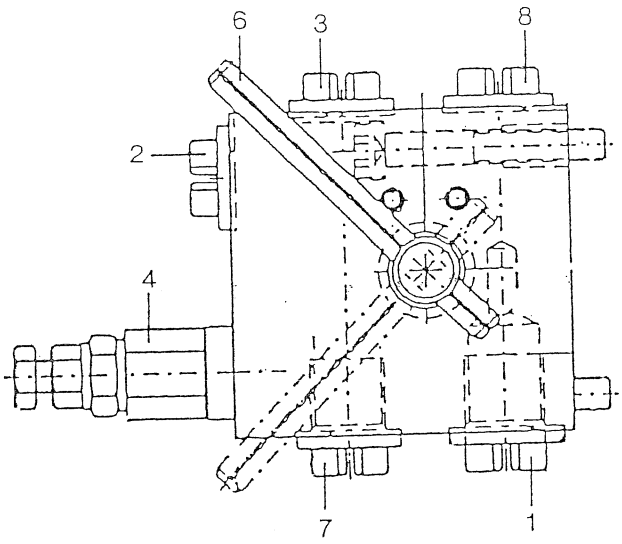
6 Electronic box

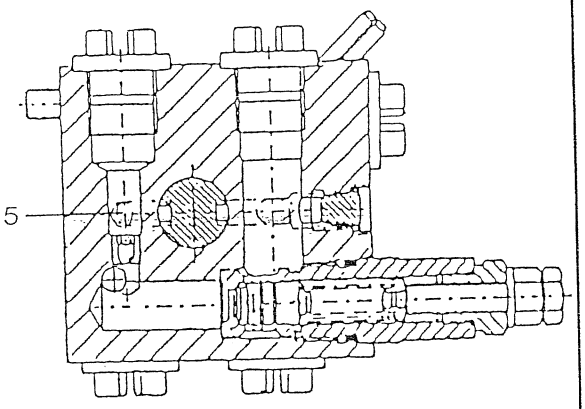
7 Speed sensor

8 Regulator

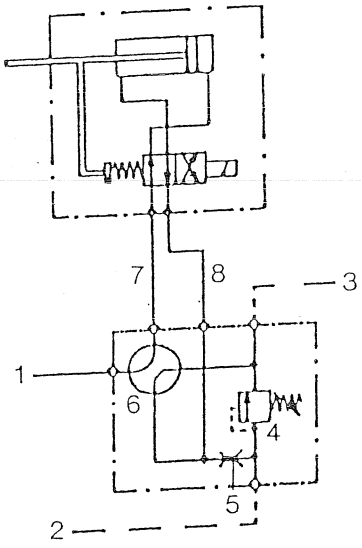
EMERGENCY CONTROL VALVE

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Tafel:
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Datum: 07.94

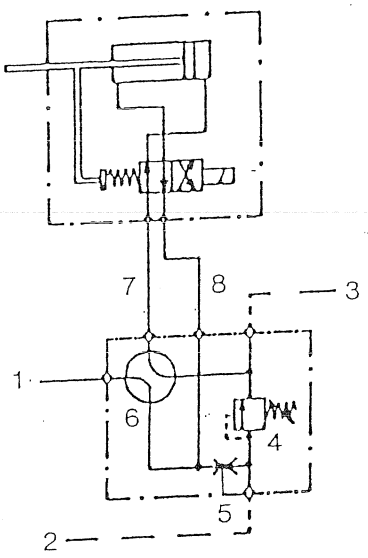




working position



emergency control



1 Connection - Servo pressure pump

2 Load sensing regulator

3 Tank

4 Pressure relief valve for emergency control

5 Orifice Ø 1,5mm

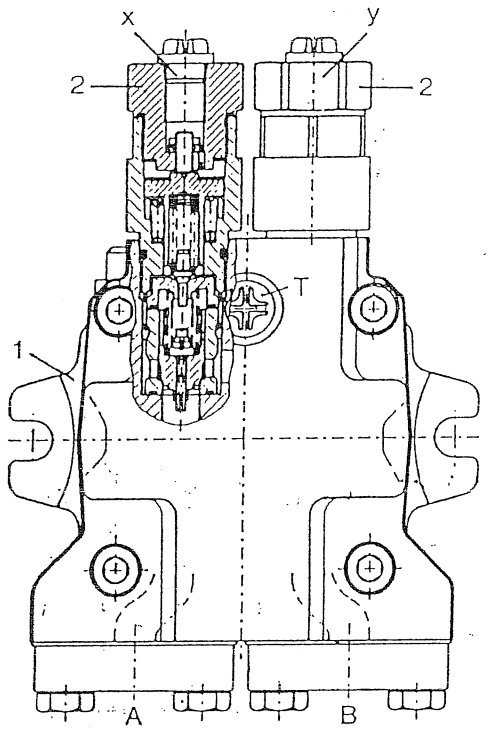
6 Shut off lever

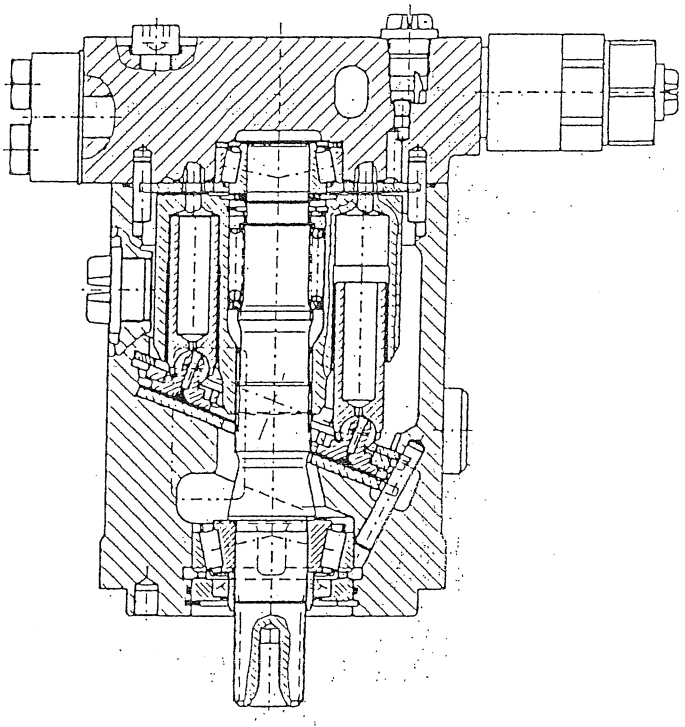
7 Connection - Servo pressure regulator

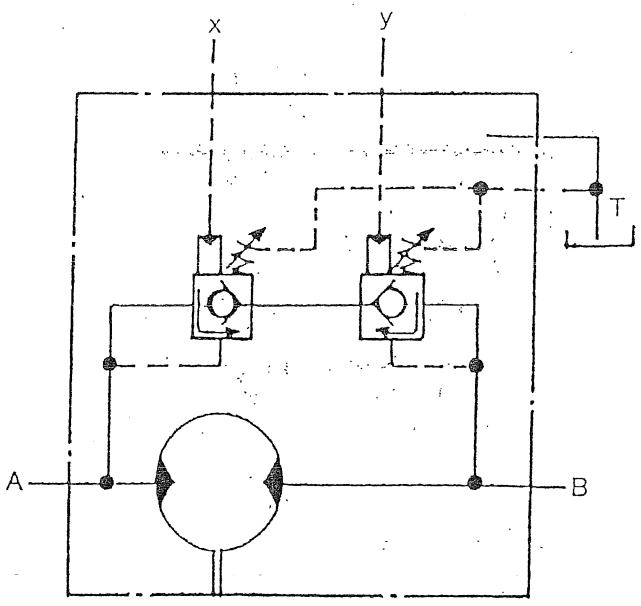
8 Connection - Tank regulator

SLEWING MOTOR
with pressure cut-in stage secondary valve

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.94

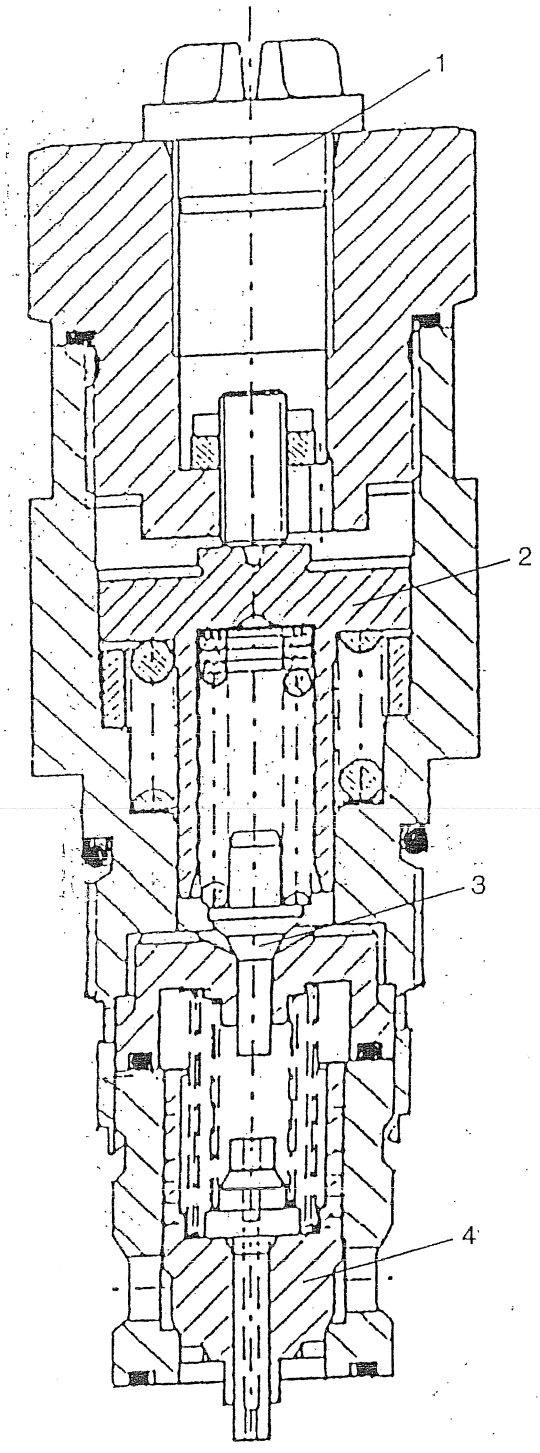






1	Slewing motor
2	Secondary valve
A	Plate valve
B	Plate valve
x	Servo control
y	Servo control
T	Tank

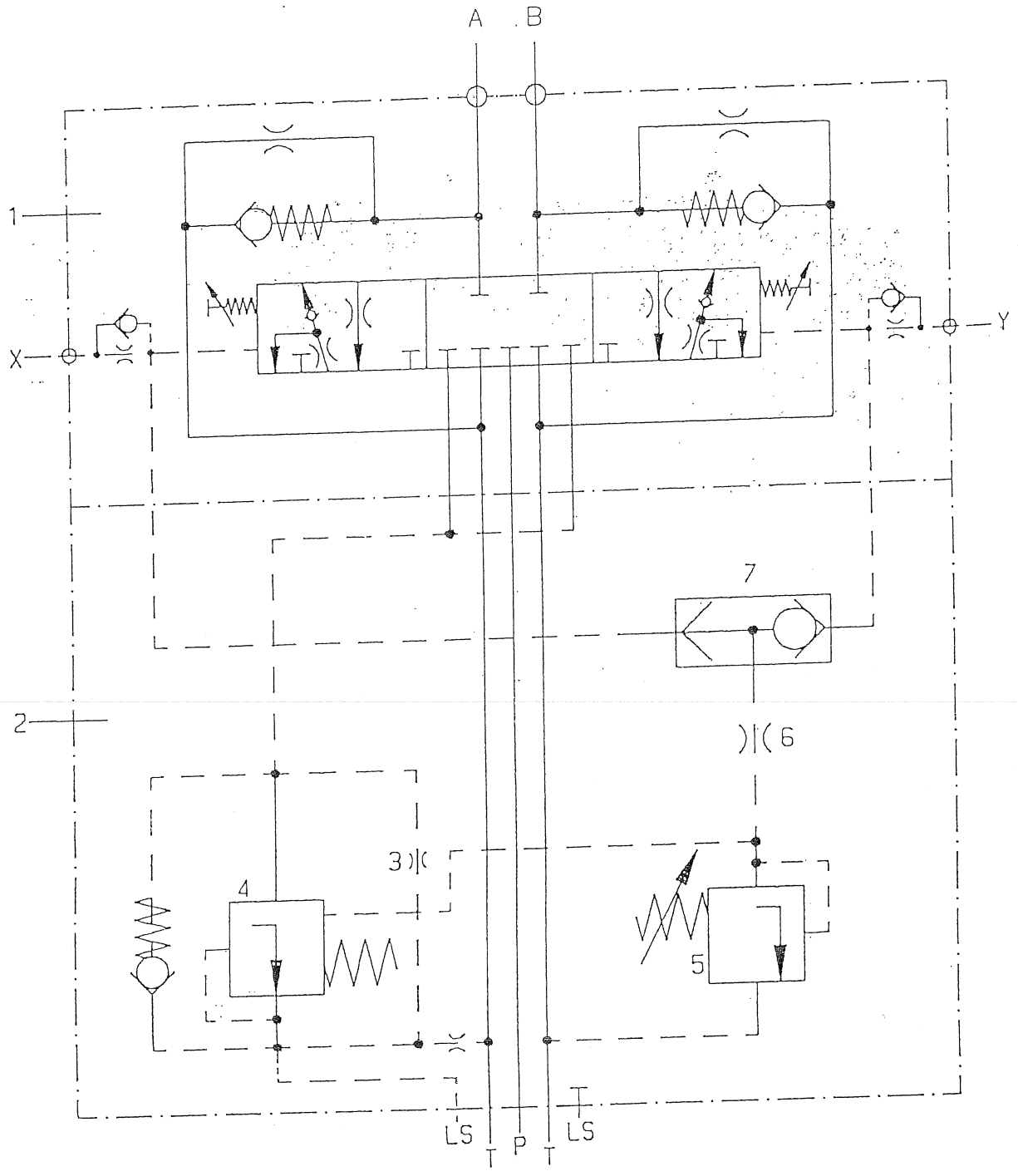
SECONDARY VALVE
with pressure cut-in stage



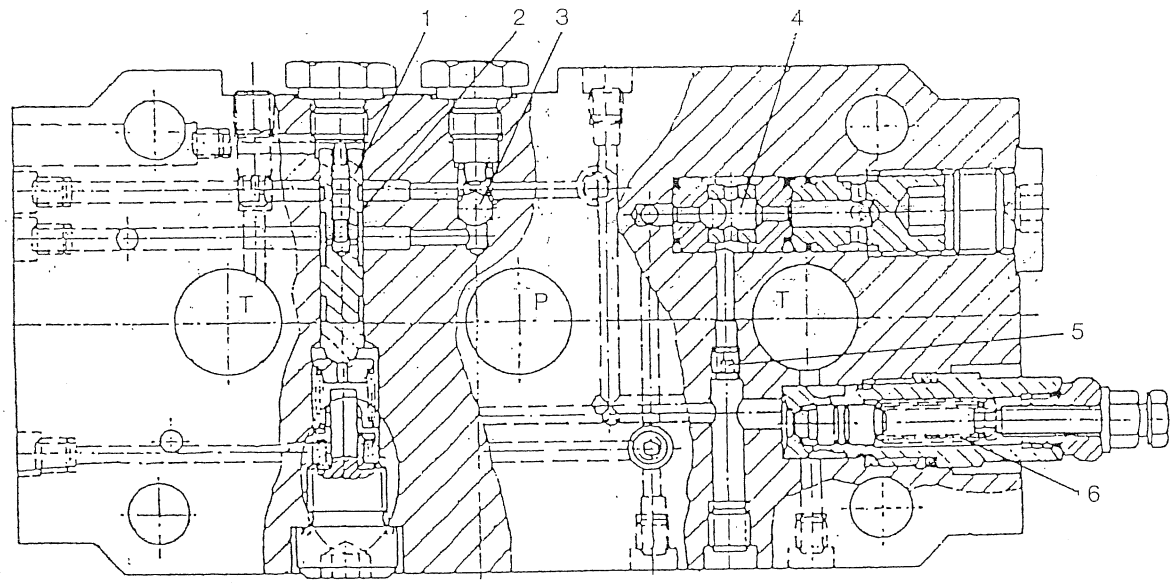
1 Servo control from slewing
2 Type piston
3 Pilot piston
4 Main operation piston

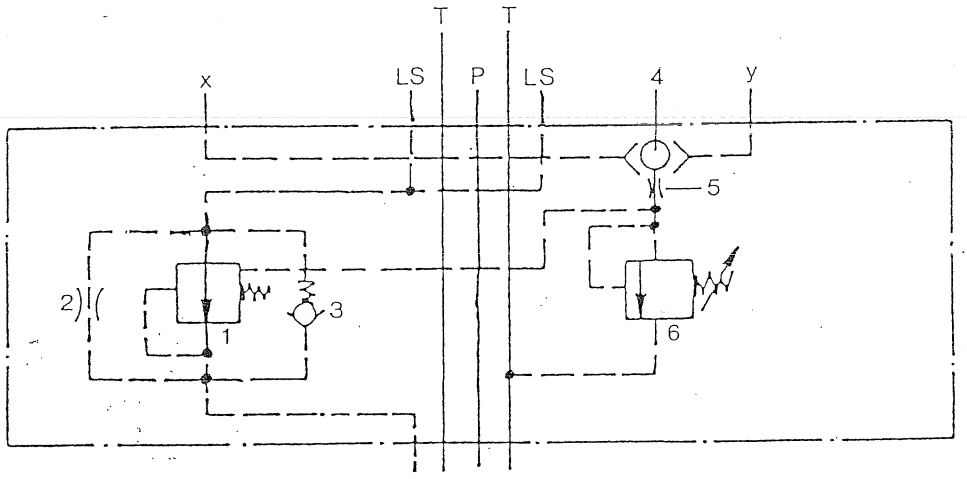
PLATE VALVE - SLEWING
with TC -Plate

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.94



1	Plate valve, slewing	A	Connection - Slewing motor
2	TC- plate	B	Connection - Slewing motor
3	Tolerance on TC - piston	X	Connection - Servo control pressure
4	TC - valve	Y	Connection - Servo control pressure
5	Reducing valve, servo pressure	P	Connection - Pump
6	Orifice, Ø 0,8 mm controlled	T	Connection - Tank
7	Shuttle valve		

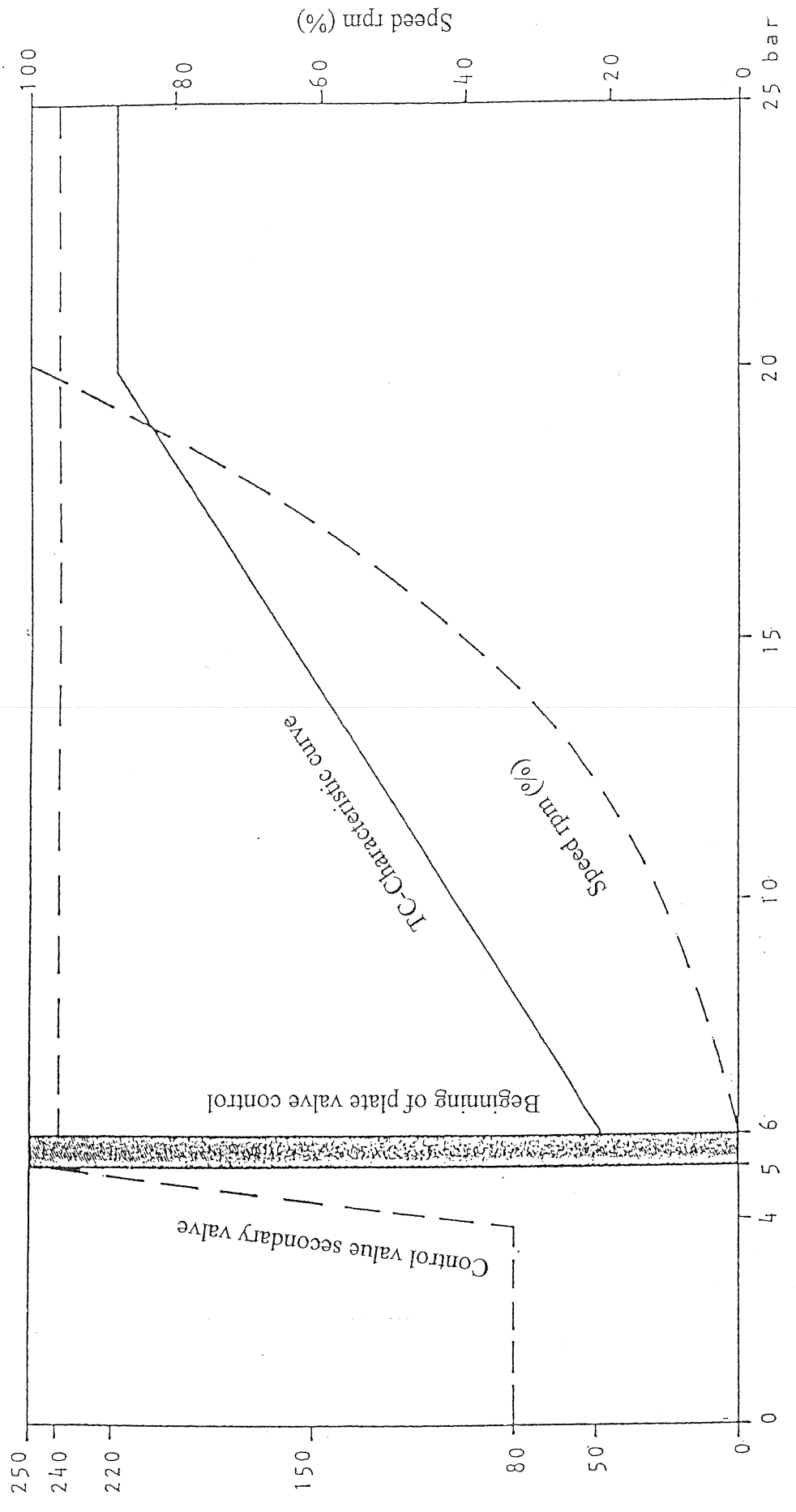




1	TC-valve	x	Servo pressure, slewing right
2	Tolerance on TC-piston	y	Servo pressure, slewing left
3	Non return valve	LS	Control line to the load sensing regulator
4	Shuttle valve	T	Tank
5	Orifice - ø 0,8 mm	P	Pump
6	Reducing valve, servo pressure controlled		

HYDRAULIC DIAGRAM
TC-Plate

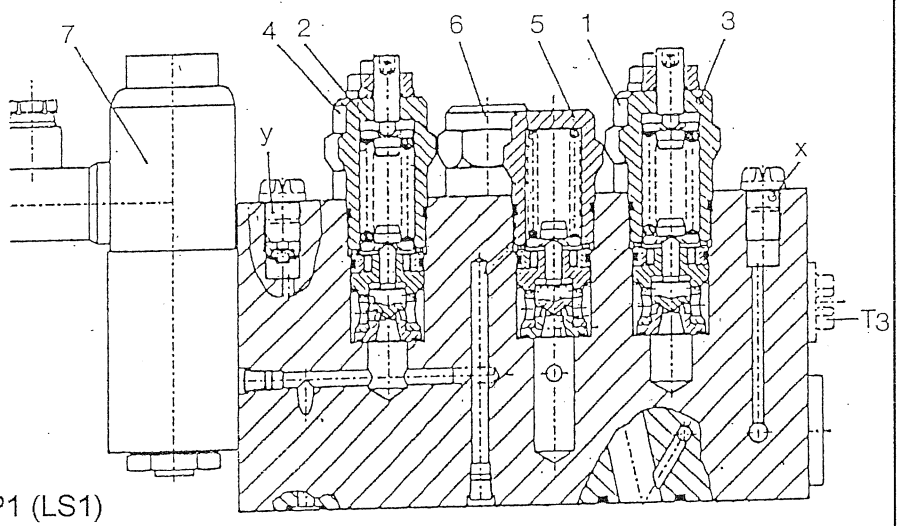
Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.94



VALVE UNIT

1704 - from serial no. : 372. 5955
1804 - from serial no. : 282. 5968

Schulungszentrum
Tafel: Ro.
Name:
Datum: 07.94



1 Pressure cut off valve P1 (LS1)

2 Pressure cut off valve P2 (LS2)

3 Pressure cut in stage valve (LS1H)

4 Pressure cut in stage valve (LS2H)

5 Primary valve P1

6 Primary valve P2

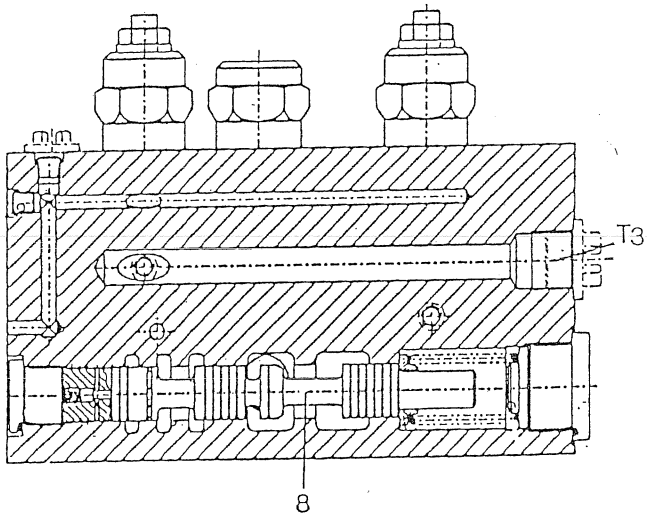
7 Solenoid valve pressure cut in stage

8 Pumps separation piston

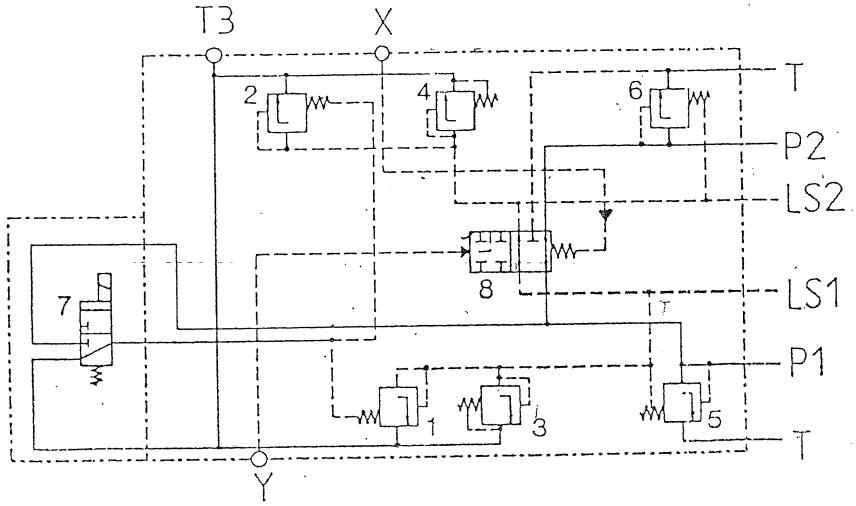
x Control line - Tank

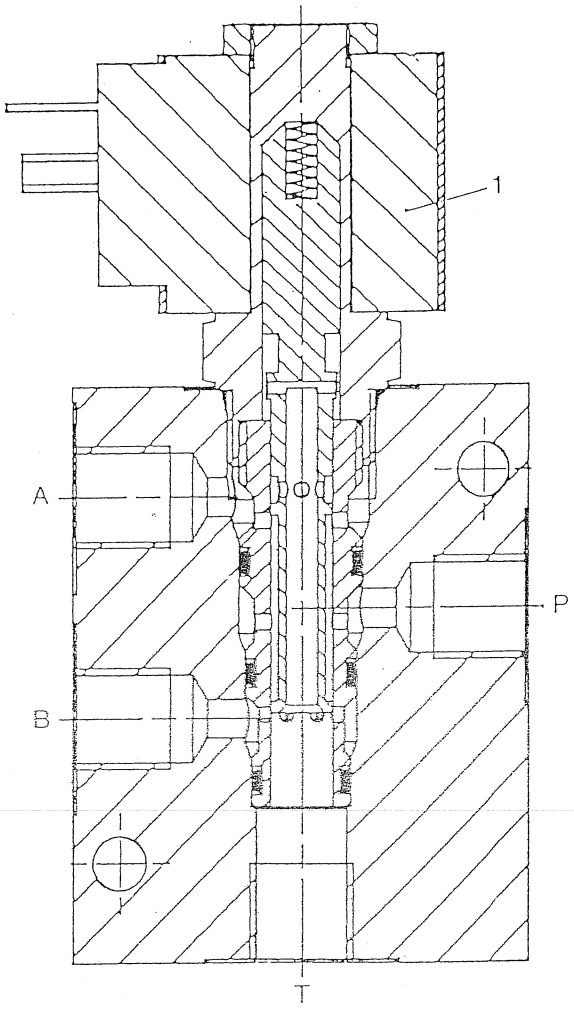
y Control line - for separation process

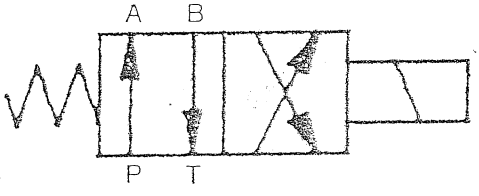
T3 Connection - Tank



Tightening torque for the assembly screw 110 Nm.

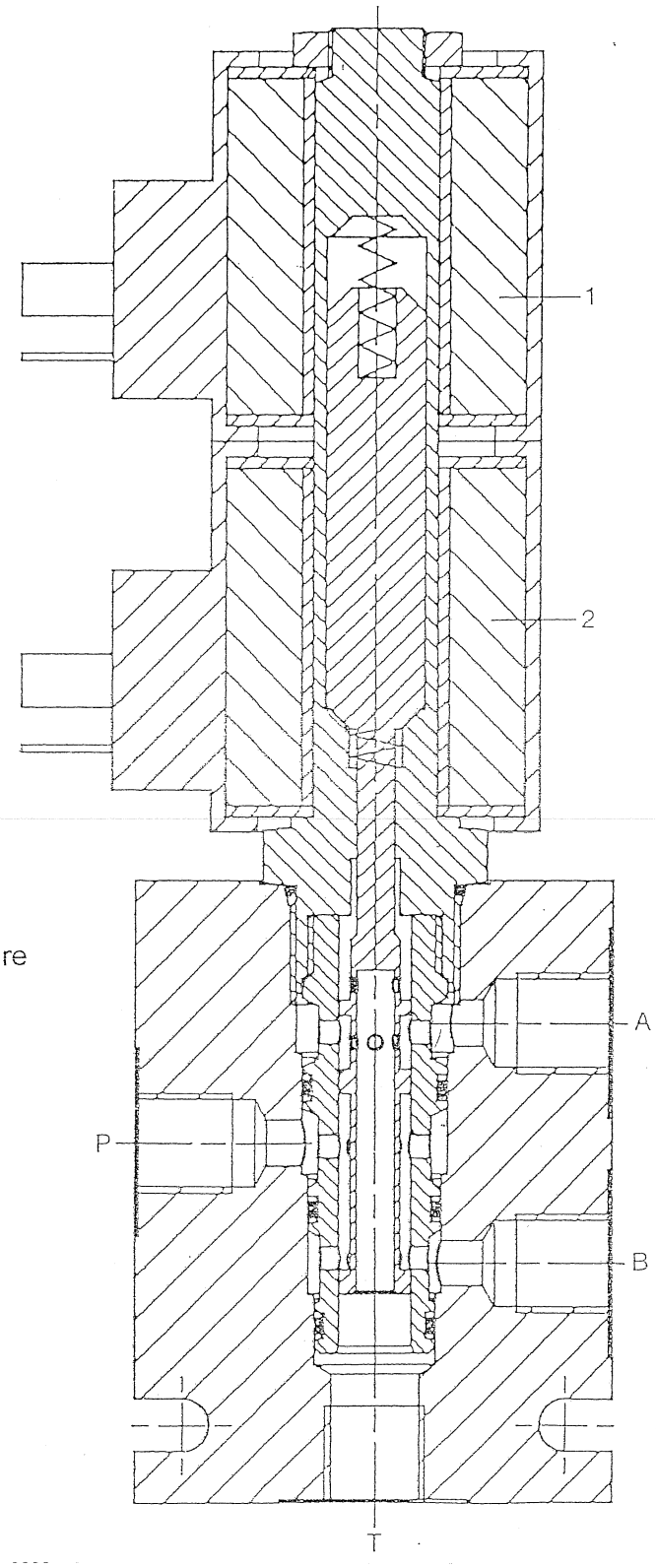




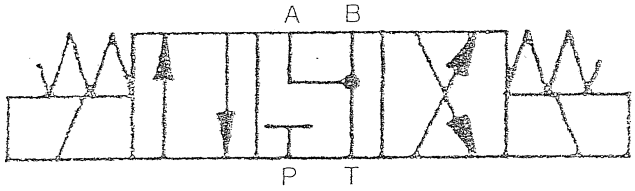


1	Magnetic field coil
A	Connection-Plate valve
B	Connection-Plate valve
P	Connection-Pump, servo pressure
T	Connection-Tank

4/3 - VALVE
Selection-Driving / Wheeled excavator



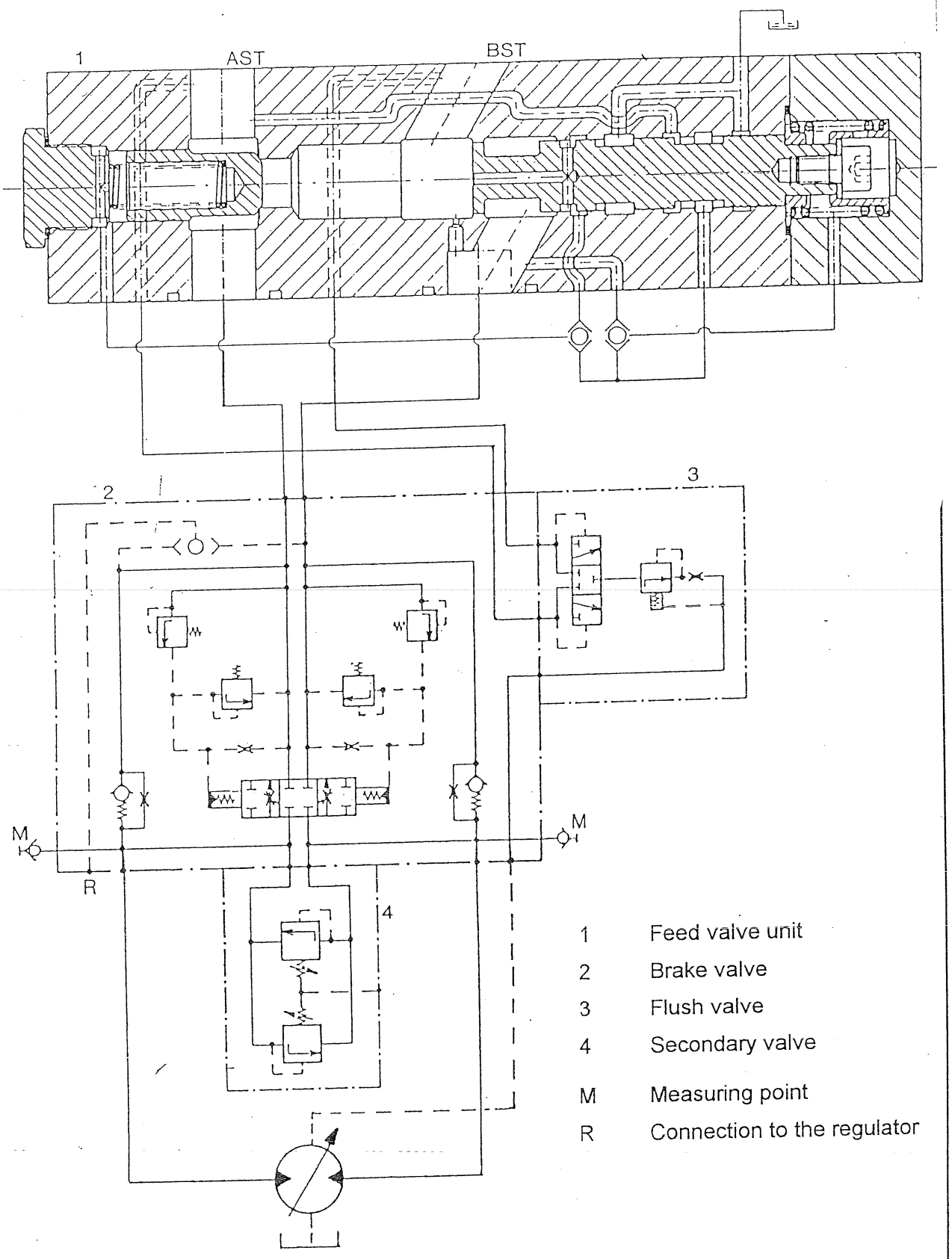
1	Magnetic field coil
2	Magnetic field coil
P	Connection-Pump, servo pressure
A	Connection-Plate alve
B	Connection-Plate valve
T	Connection-Tank



FEED VALVE UNIT
with anti rolling device and brake valve

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.94

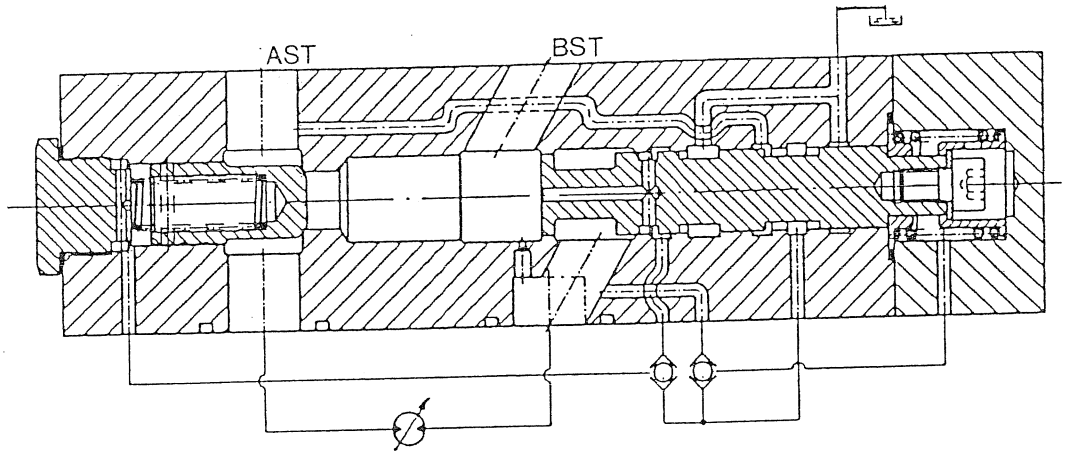
P25



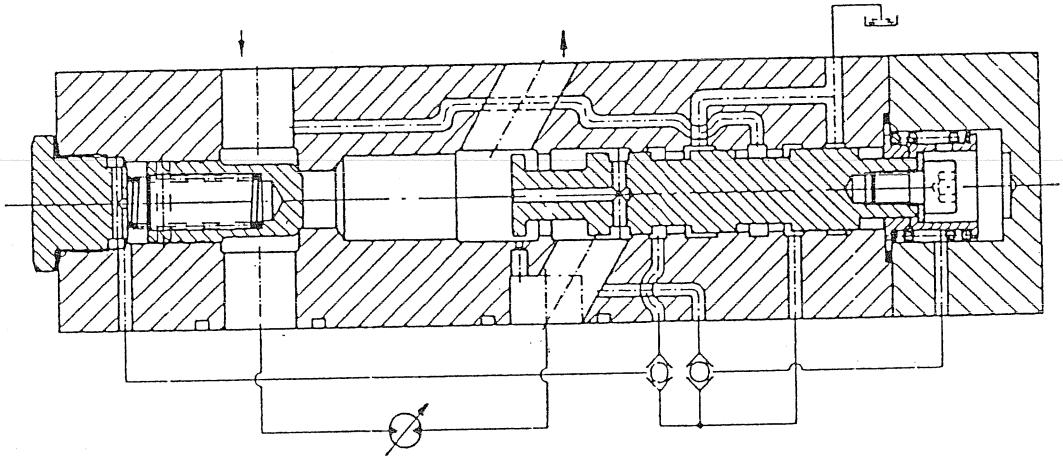
1	Feed valve unit
2	Brake valve
3	Flush valve
4	Secondary valve
M	Measuring point
R	Connection to the regulator

FEED VALVE UNIT
with anti rolling device

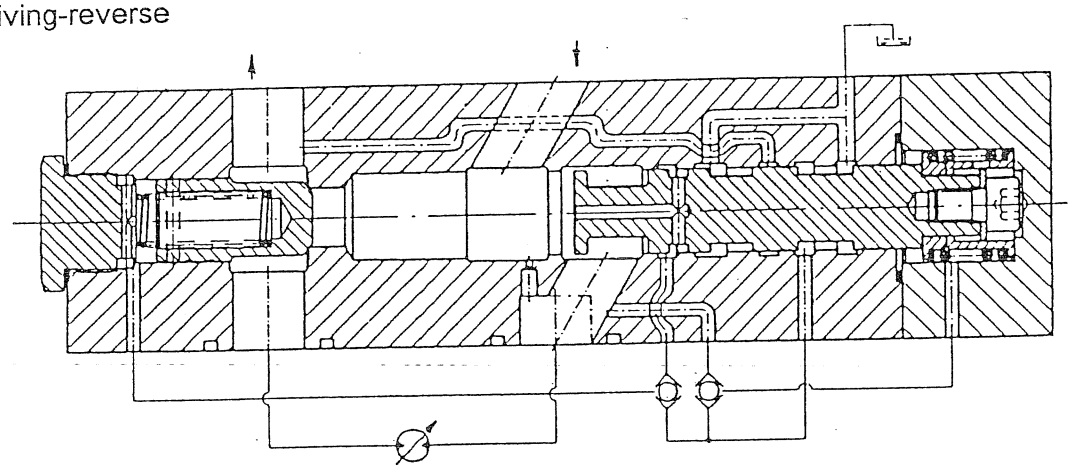
Neutral-with anti rolling device



Driving-forward



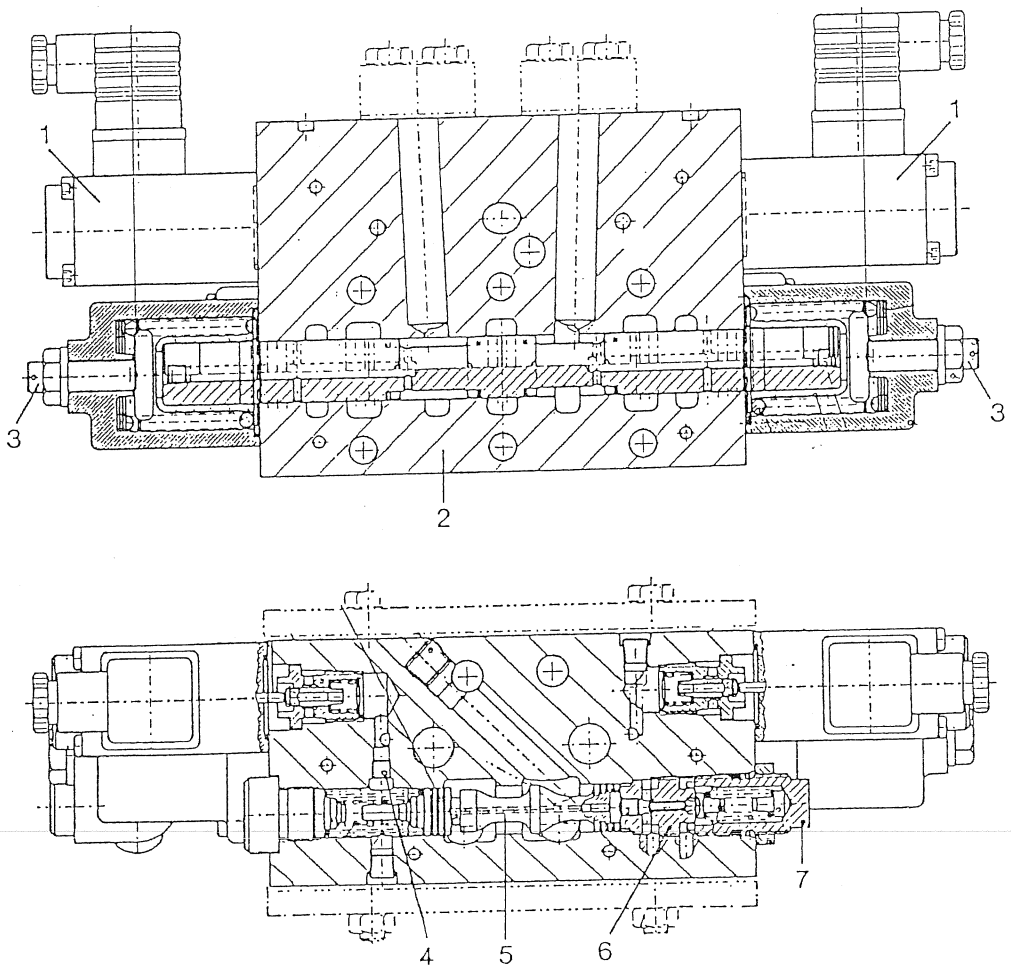
Driving-reverse



Tighting torque for the assembly screw: 100 Nm.

ADDITIONAL VALVE - VW 14

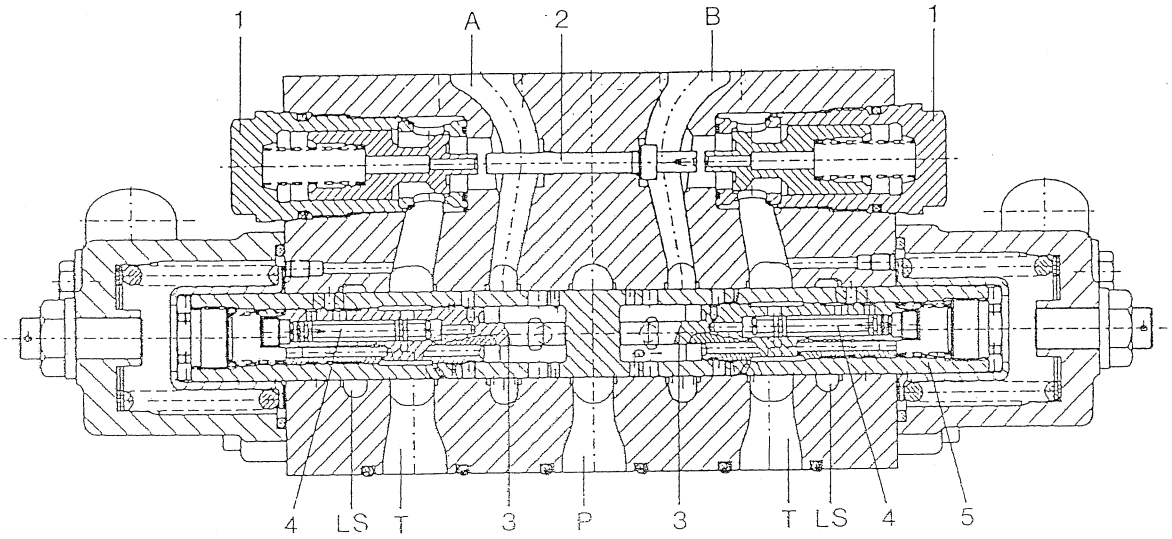
Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.94



1	Solenoid valves
2	Plate valve
3	Adjustment-stroke limiter
4	Plug
5	Priority pressure balance valve
6	Pressure cut-off valve
7	Adjustment-pressure cut-off valve
8	Non return valve, LS-Channel
Z	Connection-Servo control
LS	Connection-Load sensing
T	Connection-Tank
P	Connection-Pump

PLATE VALVE
Driving - wheeled excavator

Schulungszentrum
Tafel:
Name: Ro.
Datum: 09.94

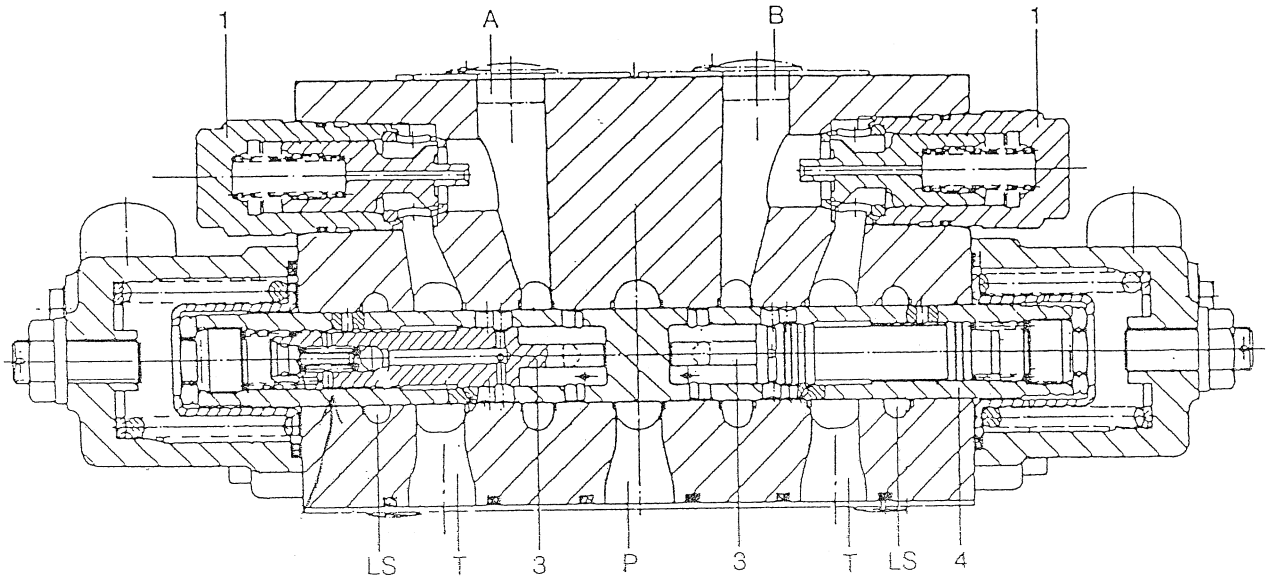


1	Anticavitation valve
2	Piston
3	Pressure balance valve
4	Piston
5	Valve spool
LS	LS Load sensing channel
P	Connection-Pump
T	Connection-Tank
A	Connection-Consumer
B	Connection-Consumer

PLATE VALVE

Driving - Tracked excavator

Schulungszentrum
Tafel: 080.00
Name: Ro.
Datum: 02.01.90

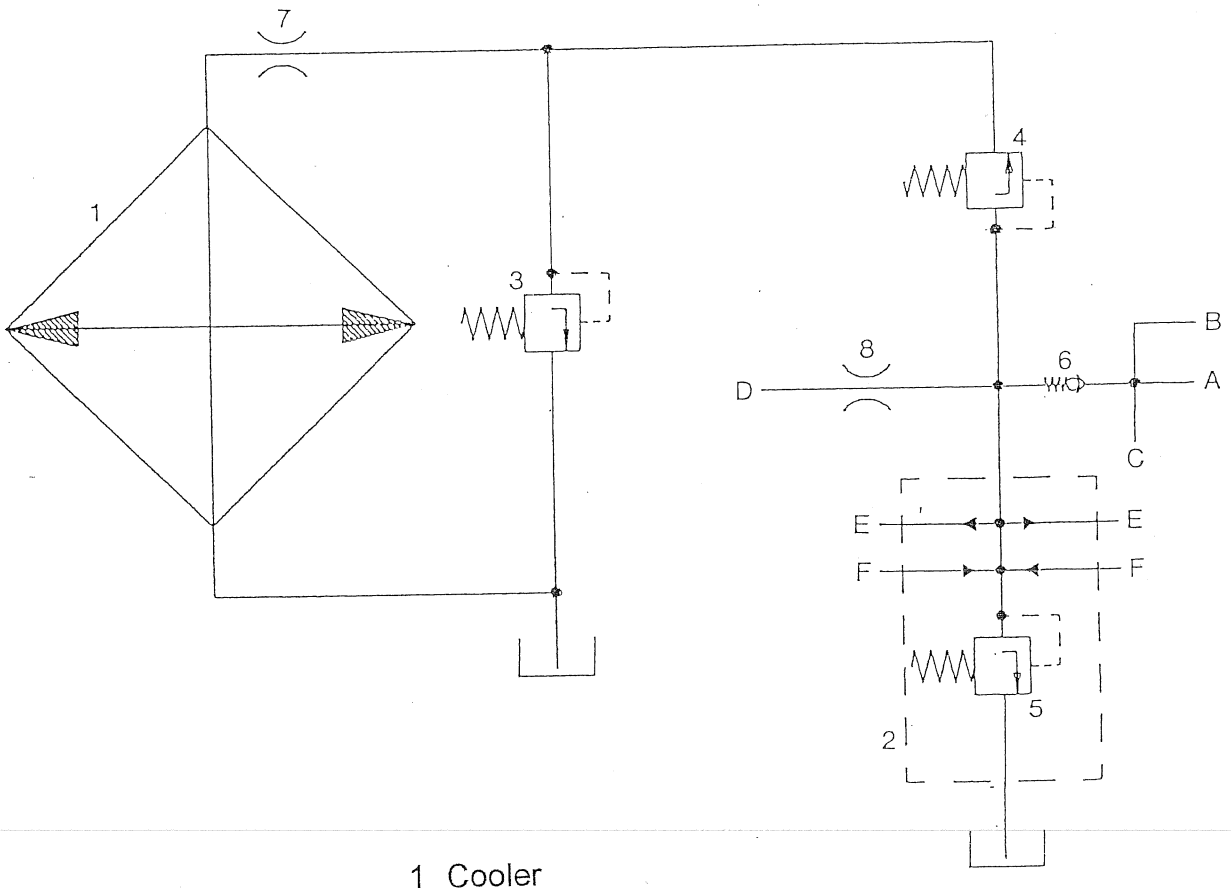


1 Anti-cavitation valve
3 Pressure balancing valve
4 Valve spool

P Connection - Pump
T Connection - Tank
LS Load sensing channel
A Connection - Consumer
B Connection - Consumer

COOLING SYSTEM - 1704,1804

Wheeled excavator



1 Cooler

2 Plate valve VW 14

3 Radiator protection valve - 7bar

4 Pressurizing valve - 0,8 bar

5 Pressurizing valve - 5 bar

6 Non return valve

7 Restrictor Ø 14mm

8 Restrictor Ø 1,5mm

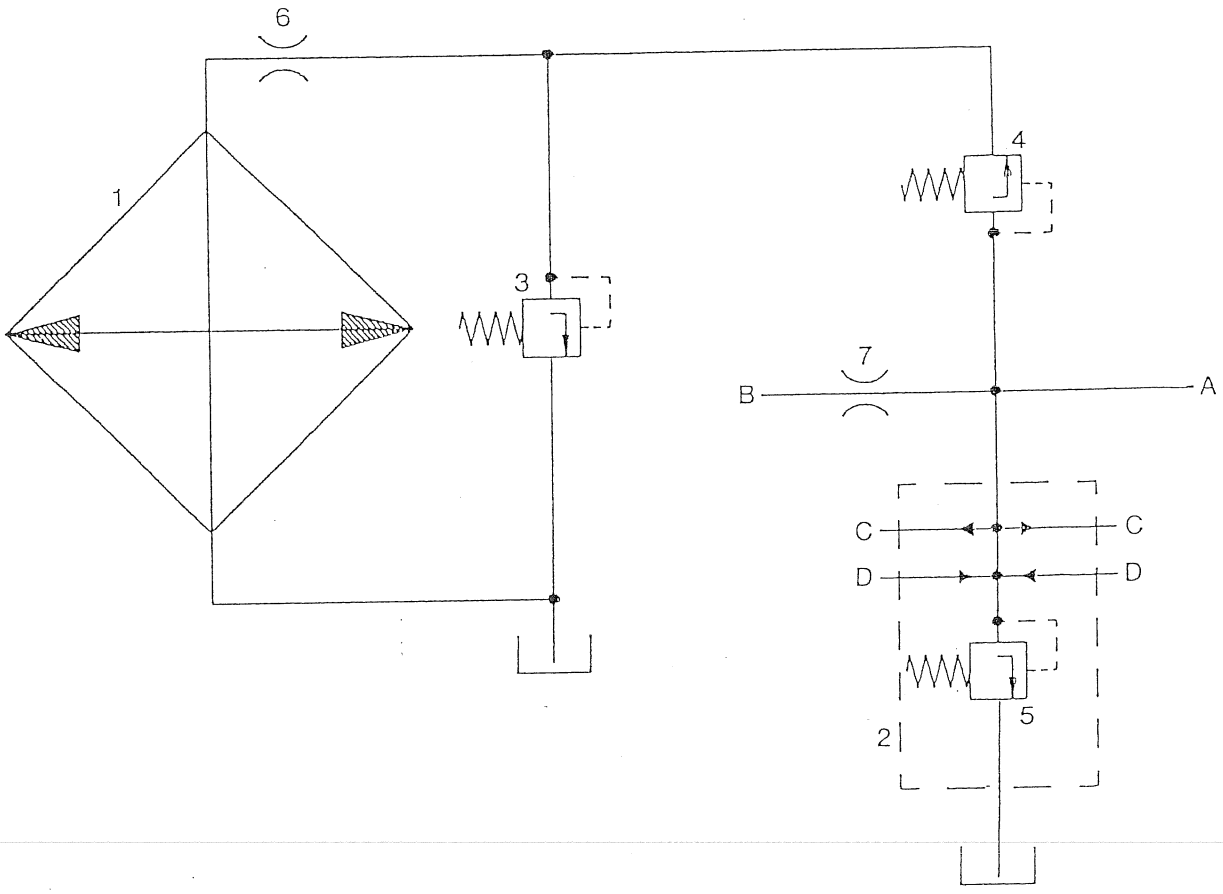
A Connection - Return line, fan motor

B Connection - Return line, steering unit

C Connection - Feed line, driving

D Connection - Slewing gear box (flash line)

E Connection - Feed line, Consumer



1 Cooler

2 Plate valve VW 14

3 Radiator protection valve - 7bar

4 Pressurizing valve - 0,8 bar

5 Pressurizing valve - 5 bar

6 Restrictor Ø 14mm

7 Restrictor Ø 1,5mm

A Connection - Return line, fan motor

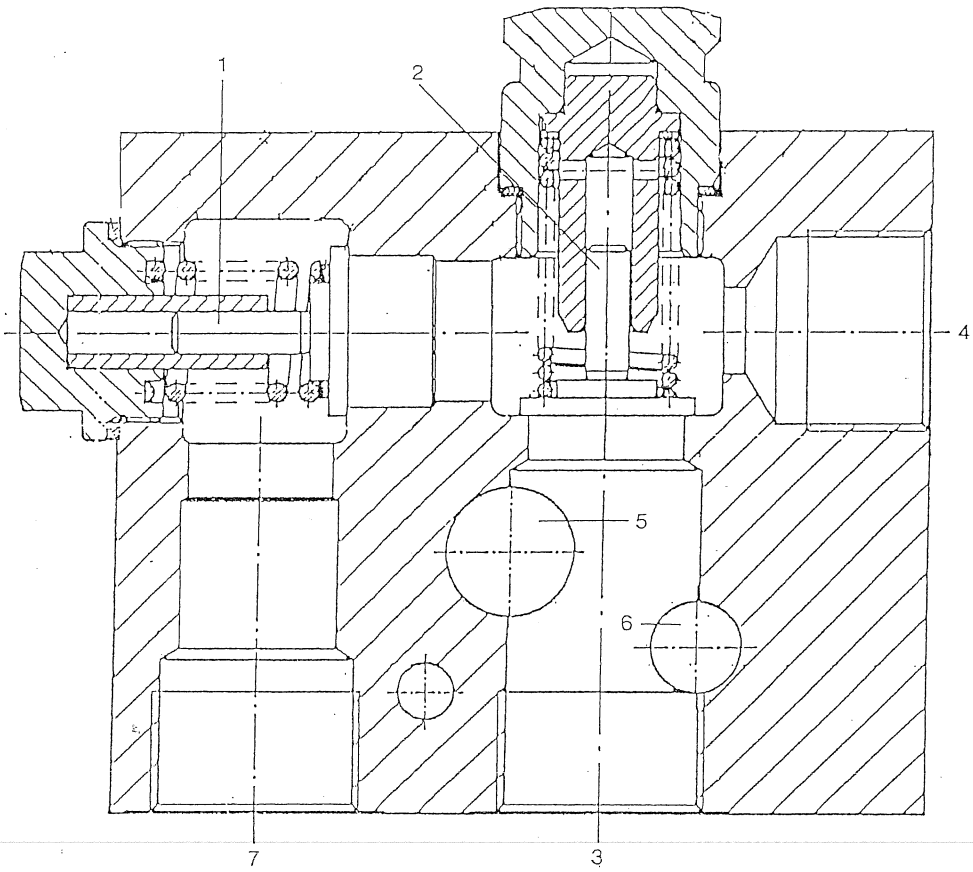
B Connection - Slewing gear box (flash line)

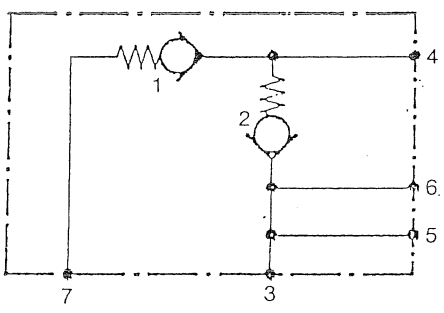
C Connection - Feed line, Consumer

D Connection - Return line, Consumer

RADIATOR PROTECTION VALVE

Pressurize valve





1 Radiator protection valve - 7bar

2 Pressurizing valve - 0,8 bar

3 Connection - Control valve block

4 Connection - Cooler

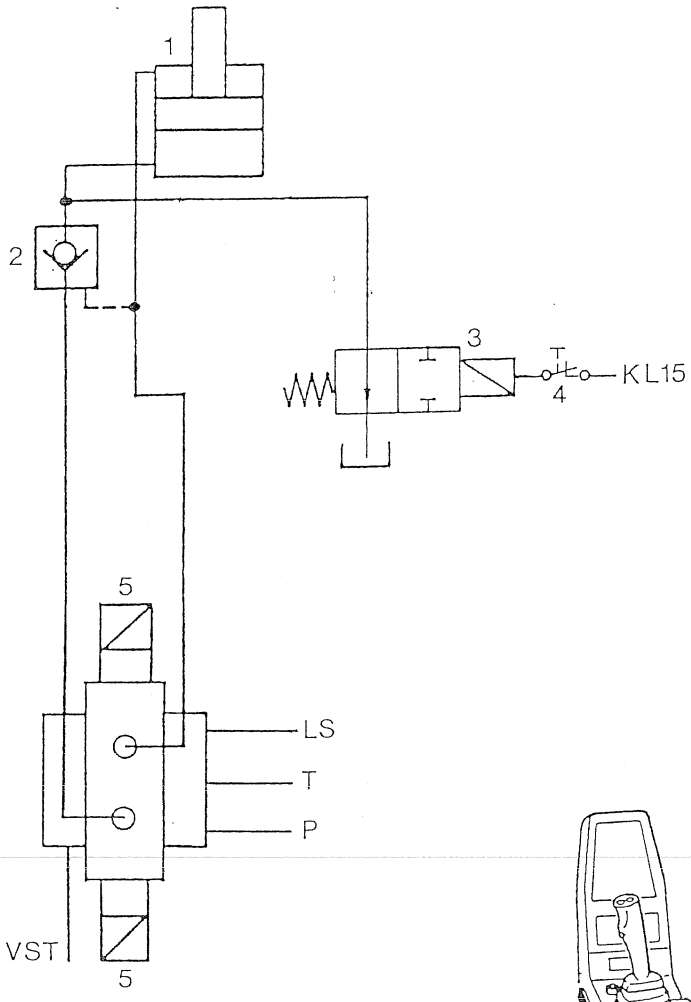
5 Connection - Return line, fan motor

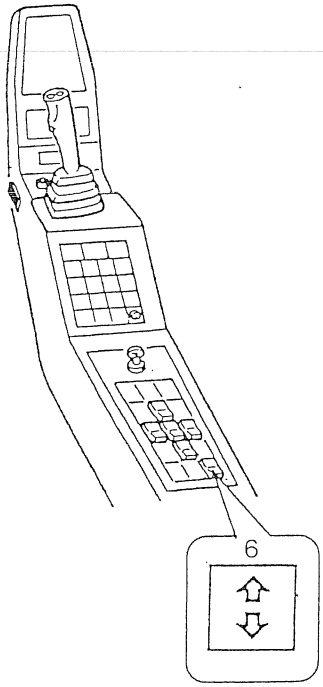
6 Connection - Slewing gear box (flash line)

7 Connection - Tank

HYDRAULIC DIAGRAM
Cab lift

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.94





1 Cylinder - Cab lifting

2 Check valve

3 Solenoid valve for emergency control

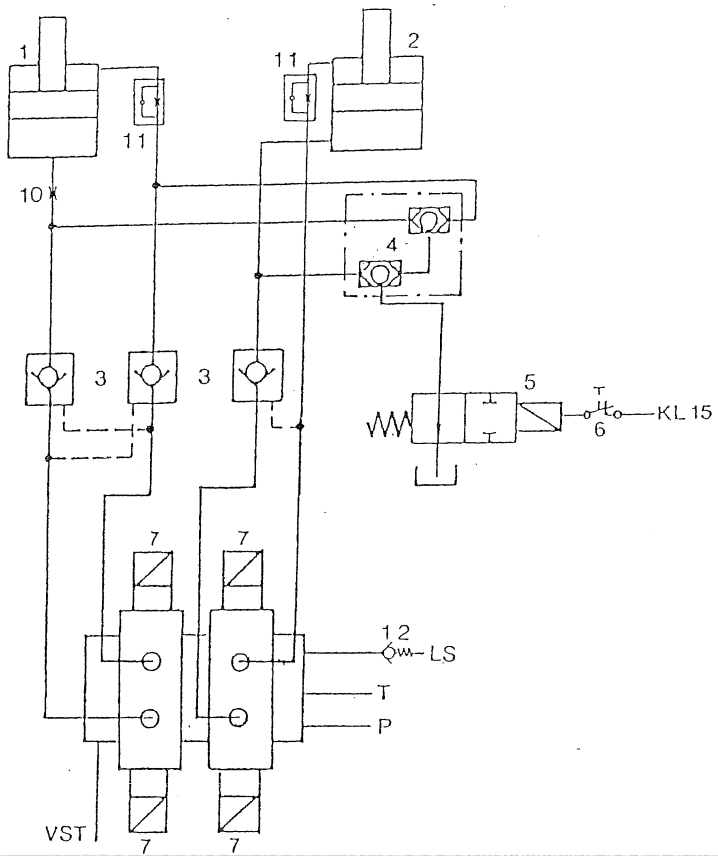
4 Switch for emergency control located on the side cover.

5 Solenoid valves

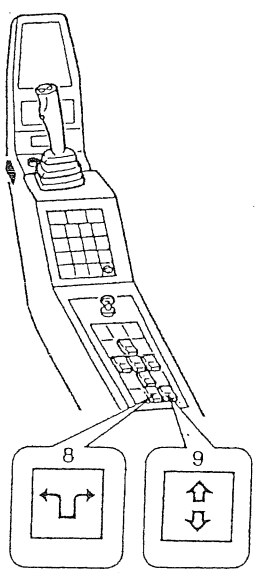
6 Switch for lifting / lowering

Working pressure : Cab lifting / lowering 210 bar

Attention : In case of emergency, switch of the ignitation key or press the button which is located



1 Cylinder -Cab forward extending
2 Cylinder - Cab lifting
3 Check valves
4 Valve unit with shuttle valves
5 Solenoid valve for emergency control
6 Switch for emergency control located on the side cover
7 Solenoid valves (2 orifice Ø 0,6 mm installed)
8 Switch for extending and retracting the cab
9 Switch for lifting and lowering the cab
10 Restrictor Ø 1,5 mm
11 Check and restrictor valves
12 Check valve

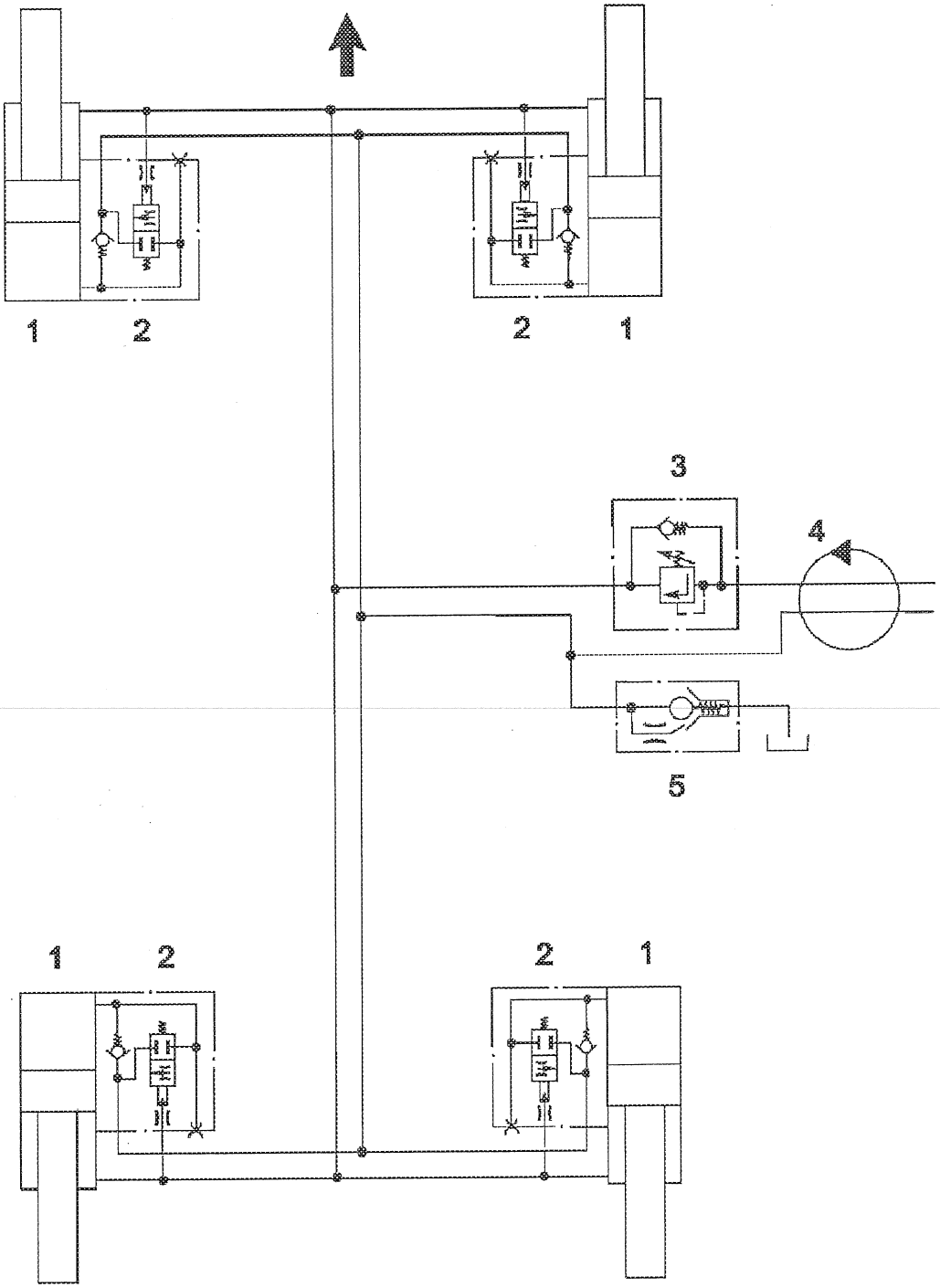


Timing in second
Extending -25
Retracting -24
Lifting -8
Lowering -7
Adjustment take place on stroke limiter

Attention : In case of emergency, switch of the ignitation key or press the button which is located on the side cover.

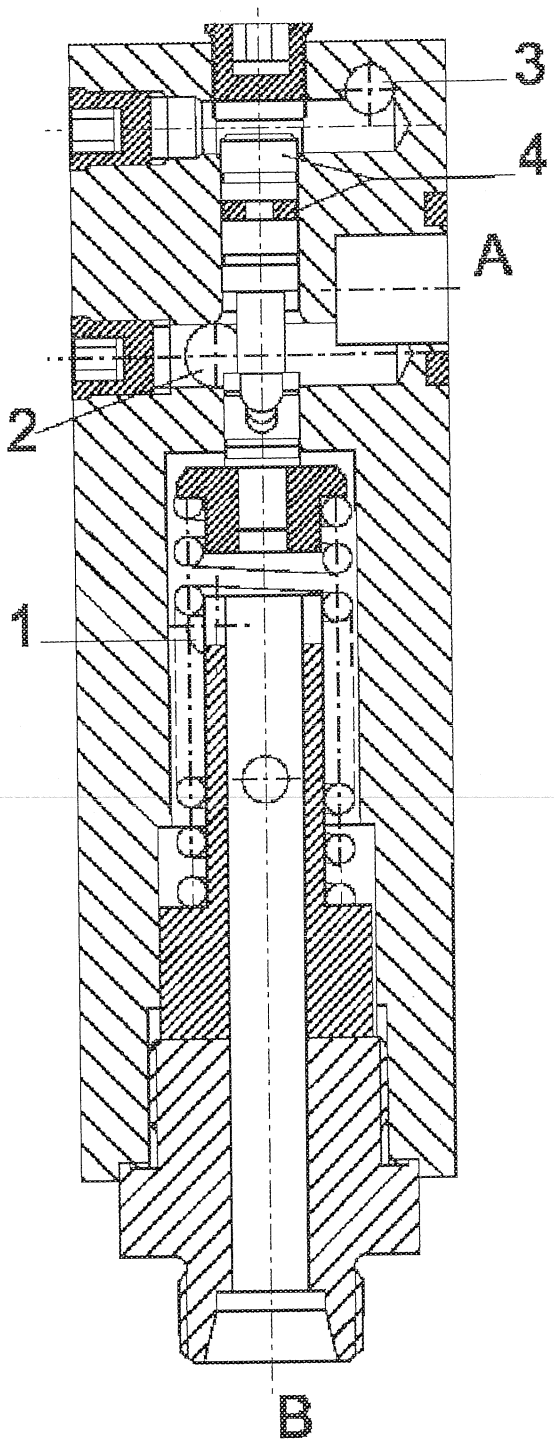
Support pads - 4-fold

Simultaneously switchable



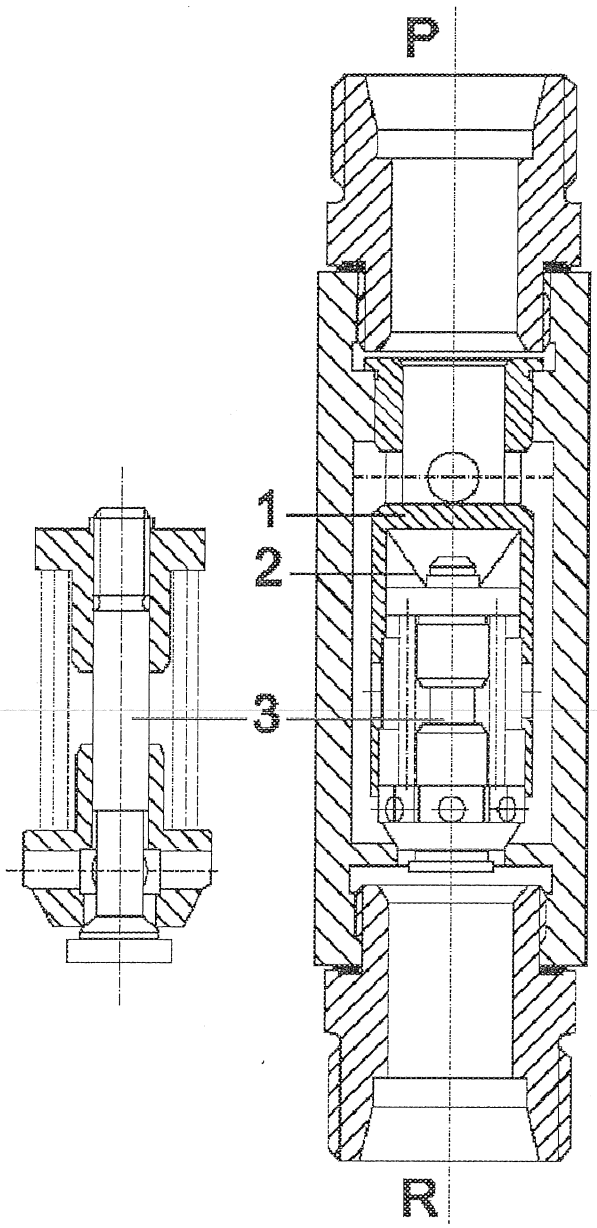
1 Support cylinder
2 Check valve, pilot-controlled
3 Pilot-controlled valve
4 Main rotary connection
5 Check valve, auto-unlock

Support pads - 4-fold
Check valve, pilot-controlled



1	to check valve
2	from check valve
3	control line from small cylinder side
4	control piston with Turcon-Glyd-Ring, must be assembled with assembly device
A	Connection - big cylinder side
B	Connection - plate valve

Support pads - 4-fold
Pilot-controlled valve



1 Guide piece

2 Spring

3 Valve unit

P Connection - control block

R Connection - small cylinder side

1704 - 1804 ("93" generation)

1. System bleeding
2. Diesel engine speed - actuator
3. Pilot control
4. Emergency circuit
5. Load limit control valve
6. Row of measuring sockets
7. LS controller
8. Pressure cutoff
9. Pressure cut-in stage
10. Secondary valves
11. Back pressure - travel brake valve
12. Reverse flow throttles
13. Auxiliary assemblies
14. Pressure adjustment table

General information:

a) All adjustments must be made using an electronic measuring device. The measuring device must permit at least two pressure displays to be read off at the same time.

b) The temperature of the hydraulic fluid must be between 40 - 60 °C.

The hydraulic system is warmed up by activating individual working movements in the normal way; limit positions should only be held for a brief period.

c) Before opening existing locking screws etc., the preload pressure of the hydraulic fluid reservoir must be allowed to escape.

d) See the pressure adjustment table for individual settings.

SAFETY INFORMATION

Making adjustments involves working at high pressure. Take suitable safety precautions, e.g. wear protective goggles. See German VBG 1 § 4.

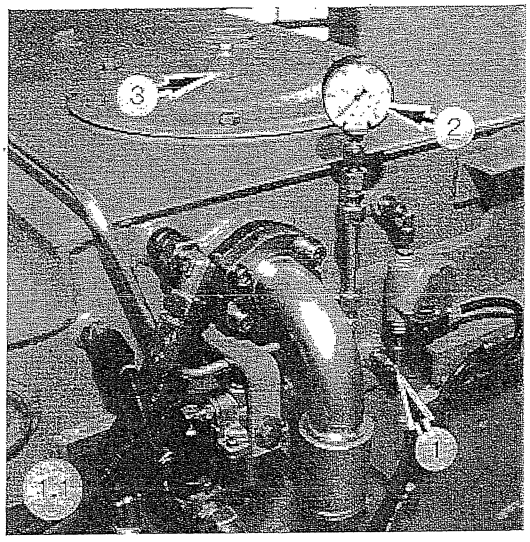
1. Bleeding the system

1.1 The system must be bled before starting up operation for the first time or after replacing the pump.
An external application of compressed air is necessary for bleeding purposes. This takes place via the compressed-air connection (1).

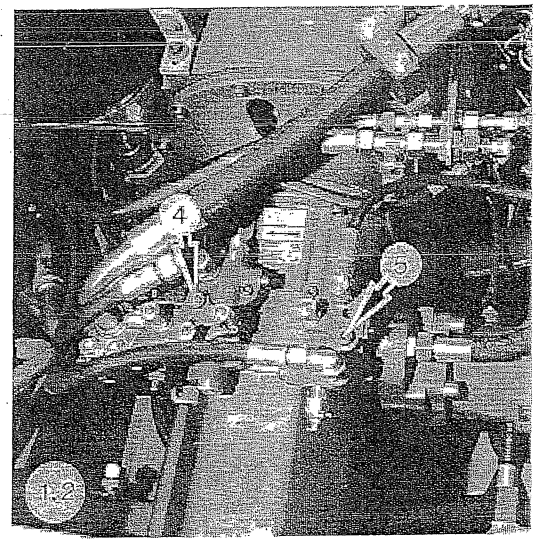
Important: The gauge display must not exceed 0.5 bar!

Compressed-air gauge (2) is not fitted, and must be installed for monitoring purposes.

Undo bleed screw. Retighten it as soon as bubble-free hydraulic fluid starts to emerge.

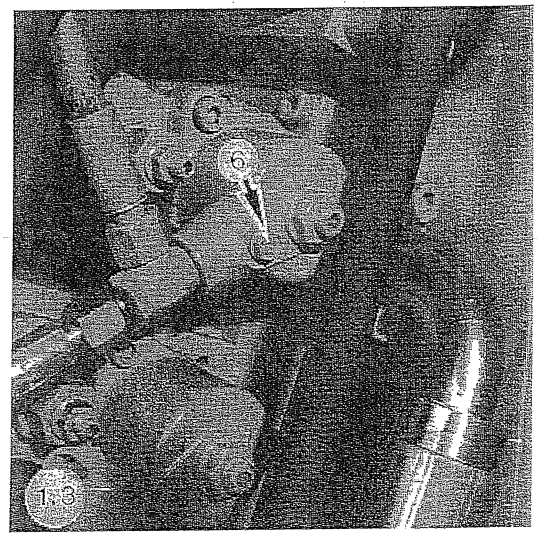


1.2 Then bleed the double pump at the bleed screws (4 and 5) in the same way.

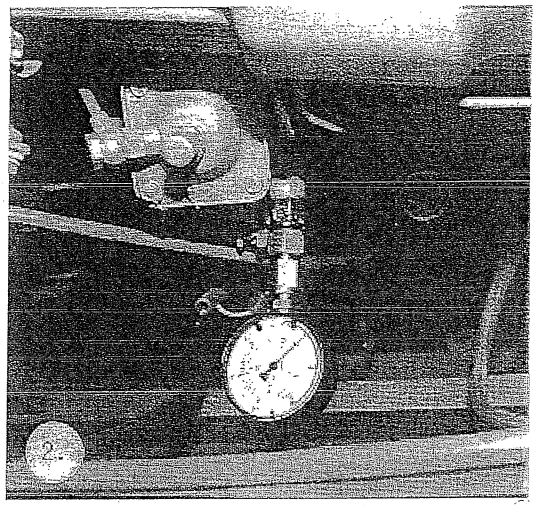


1.3 All valve caps must be bled before starting up operation for the first time.
This is also necessary if the valve caps have to be opened during repair work.
Valve caps are bled by undoing the relevant bleed screws (6).

In the case of bleed screws situated low down, the valve cap must also be undone.



Electronics box - Type CEB 10/03-AB



2. Engine speed

Checking fuel delivery pressure at injection pump:

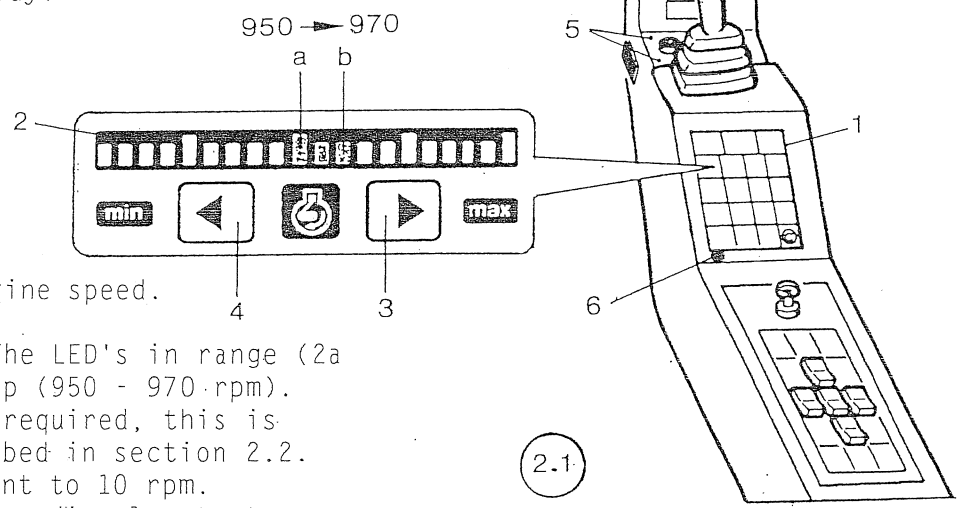
Maximum engine speed
off-load = 1.0 bar
Maximum engine speed
under load = 0.9 bar

2.1 Procedure
Check at bar display (2) on operating panel (1).

For this, the following work is required:
Unscrew and remove Allen screws (5).
Lift up console and reset toggle switch (6).
Middle LED (2a) lights up.

Disconnect yoke (7) on diesel actuator element (8). Refer to 2.2.

Switch on engine.
Engine speed and any deviations then appear on the display.



Setting minimum engine speed.

Press button (4). The LED's in range (2a to 2b) must light up (950 - 970 rpm).
If a correction is required, this is performed as described in section 2.2.
One LED is equivalent to 10 rpm.
Reconnect yoke (7) on diesel actuator element.

Checking maximum engine speed.

Press button (3). If LED (2a) does not display any deviation, the maximum engine speed is correct (2350 rpm).
Deviation - one LED is permitted. If a correction is required, this is performed as described in section 2.2.
One LED is equivalent to 10 rpm.

Reset toggle switch (6) again and secure console.

Electronics box - Type CEB 10/03 D
(installation approx. week 48/1993

2. Engine speed

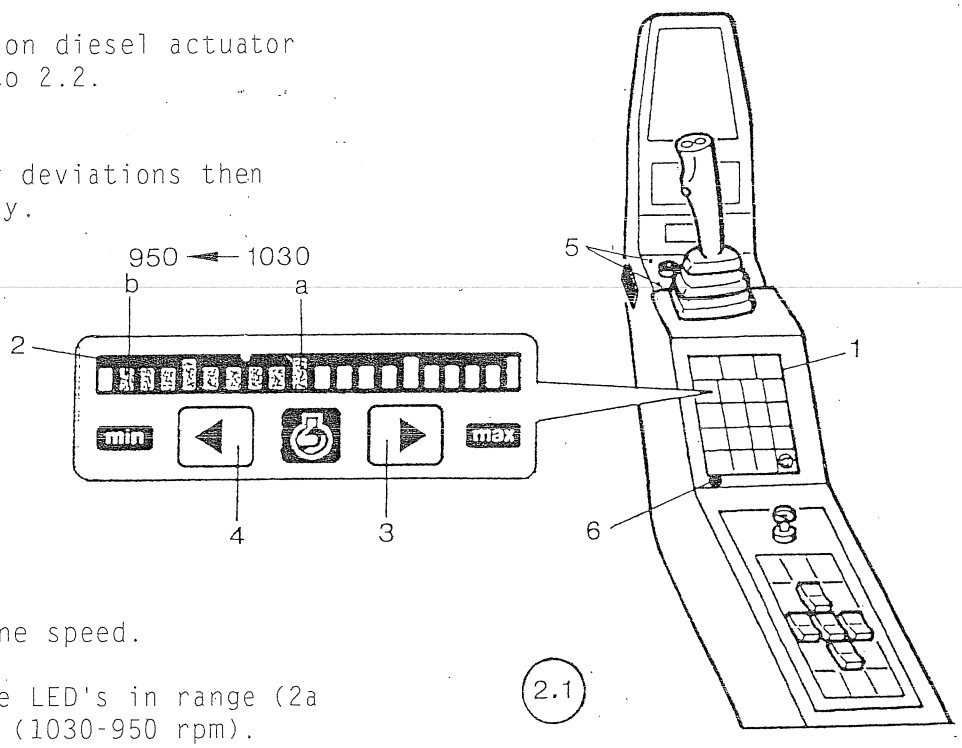
Check fuel delivery pressure, Page 35.

2.1 Procedure
Check pressure at bar display (2) on operating panel (1).

For this, the following work is required:
Unscrew and remove Allen screws (5).
Lift up console and reset toggle switch (6).
Middle LED (2a) then lights up.

Disconnect yoke (7) on diesel actuator element (8). Refer to 2.2.

Switch on engine.
Engine speed and any deviations then appear on the display.



Setting minimum engine speed.

Press button (4). The LED's in range (2a to 2b) must light up (1030-950 rpm).
If a correction is required, this is performed as described in section 2.2.
One LED is equivalent to 10 rpm.
Reconnect yoke (7) on diesel actuator element.

Checking maximum engine speed.

Press button (3). If LED (2a) does not display any deviation, the maximum engine speed is correct (2350 rpm).
Deviation - one LED is permitted. If a correction is required, perform it as described in section 2.2.
One LED is equivalent to 10 rpm.

Reset toggle switch (6) again and secure the console.

2.2 Diesel actuator

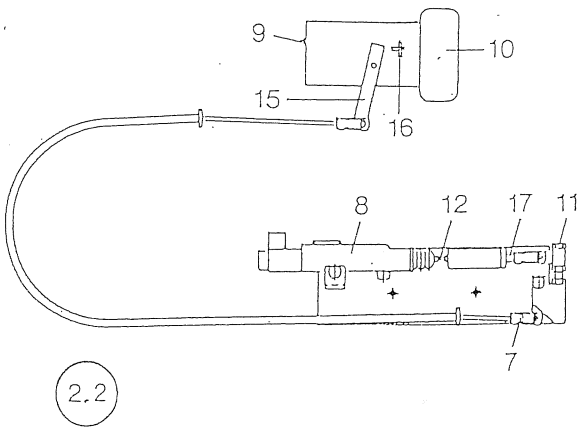
Basic setting

Switch on rocker switch (6)
(refer also to 2.1)

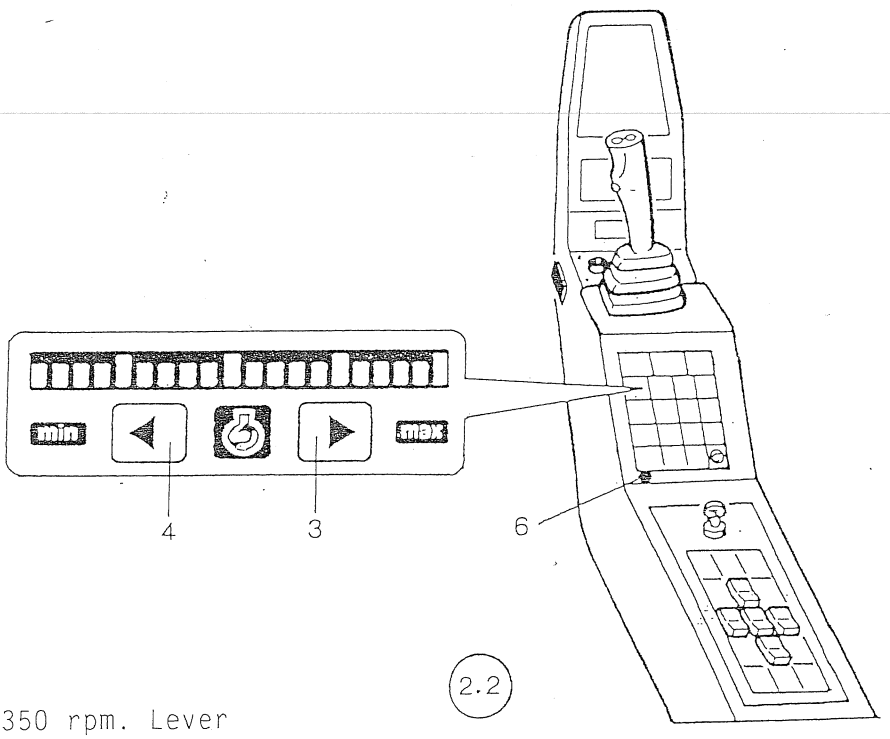
Disconnect fork head (7) from diesel actuator.

Start engine.

Set the minimum engine speed at the idling adjusting screw (9) on the injection pump (10) to 950-970rpm. Deflection lever with adjusting screw (11) must be in a vertical position. Any corrections should be made at the piston rod (12).
Adjust fork head as necessary and hook up again.



2.2



2.2

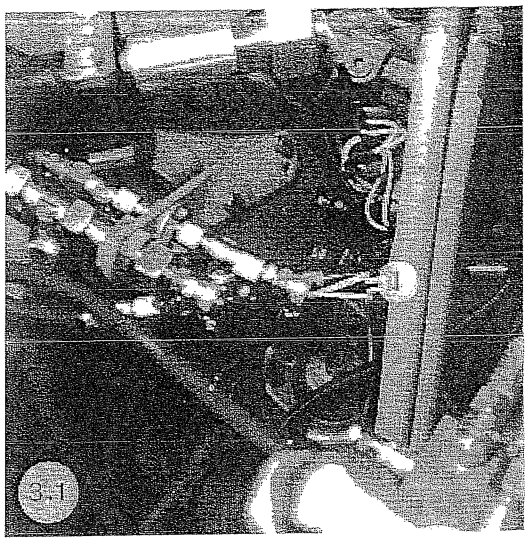
Start engine.
Press key (3).

Engine speed must be 2350 rpm. Lever (15) on the injection pump (10) must be positioned against the adjusting screw (16) for maximum engine speed.
Undo locknuts on the adjusting screw (11). Screw out adjusting screw until approx. 2 mm of the groove marking can be seen on the piston rod (17).
Tighten locknuts.

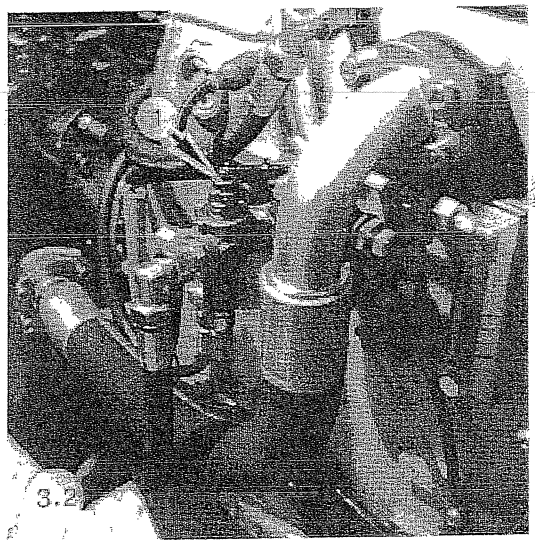
Press keys (3 and 4)) to check engine speed again.

3. Pilot control

3.1 Connect up electronic measuring device to measuring socket (I).

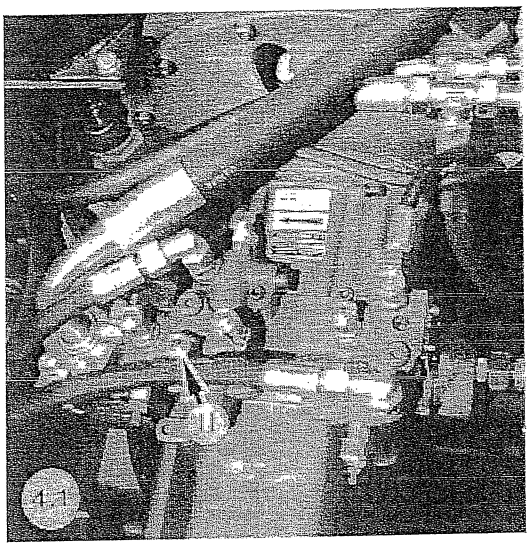


3.2 Correct by screwing the adjusting screw (1) in or out.

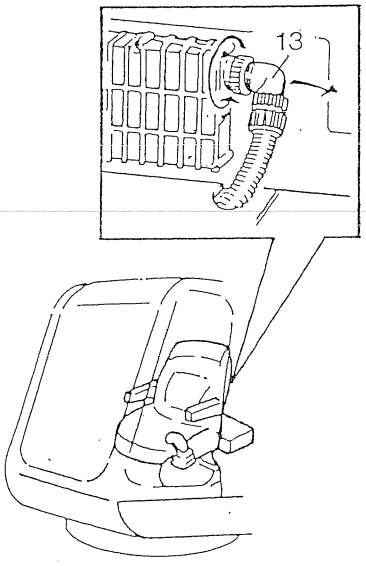


4. Emergency circuit

4.1 Connect up electronic measuring device to measuring socket (II).



4.2 With the ignition key in the 0 position, remove plug adapter (13) from the electronics box behind the seat.



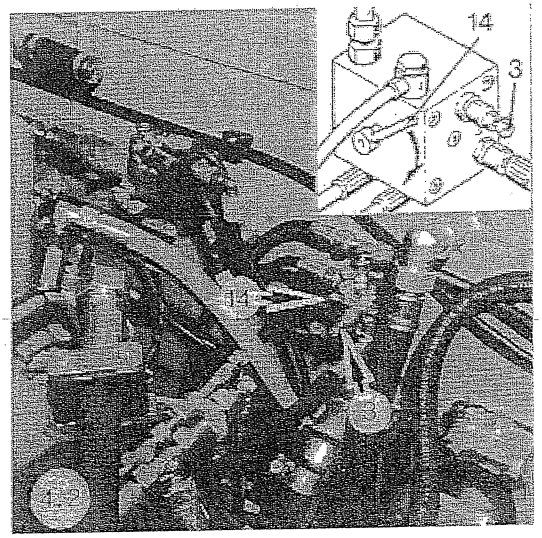
Switch on emergency circuit with lever (14).

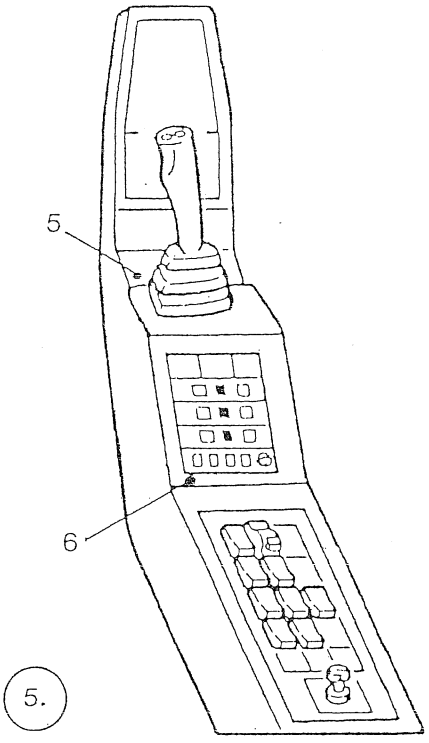
Start engine.

Corrections can be made by screwing the adjusting screw (3) in or out.

Switch off engine.
Turn ignition key to the 0 position.

Connect up plug adapter (13) and switch off the emergency circuit with lever (14).





5. Load limit control valve

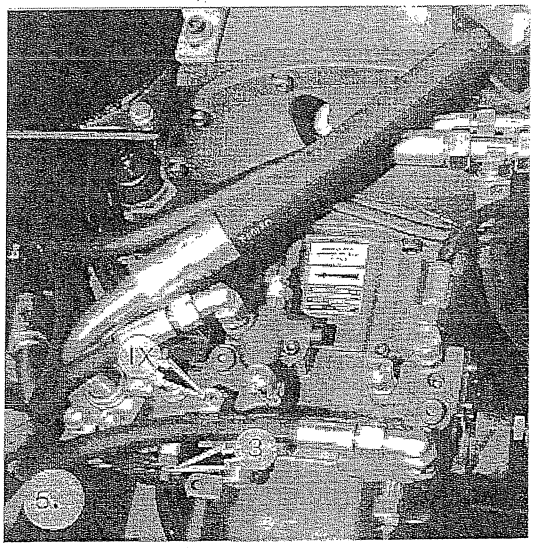
5.1 Undo and remove screws (5) for checking and adjusting purposes. Lift up console and switch over rocker switch (6).
A fixed control current from the electronic system (300 mA) controls the load limit control valve.

Connect up electronic measuring device to measuring socket (IX).

Start engine.
The control pressure displayed must be 8.5 bar ± 0.2 plus tank preload.

Corrections can be made by screwing the adjusting screw (3) in or out.

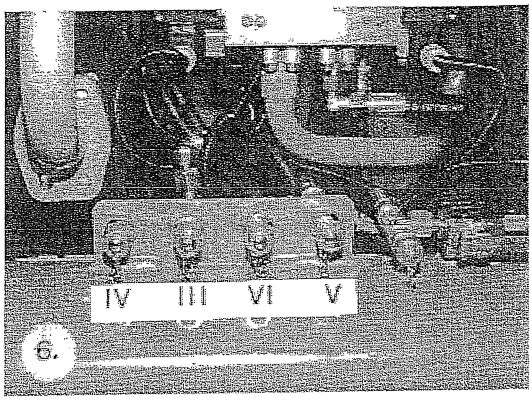
Switch rocker switch (6) back again and re-attach console.



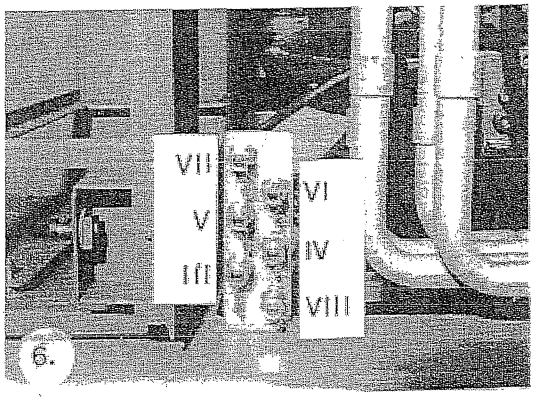
6. Row of measuring sockets

Measuring sockets:

III - P1
IV - LSI
V - P2
VI - LS2



III - P1
IV - LS1
V - P2
VI - LS2
VII - oiltight shutoff
- lifting
VIII - feed pressure/return flow



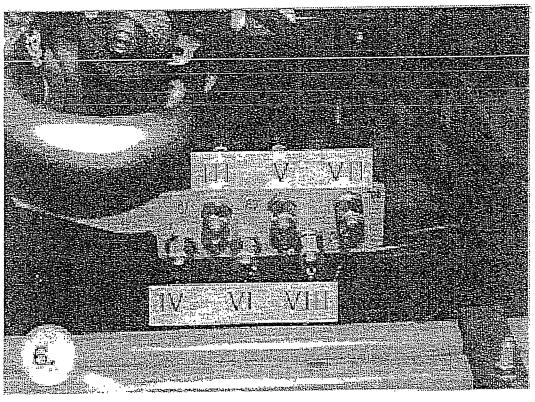
1704 - from Serial No: 372.5955

7. LS controller (P1 and P2)
7.1 LS controller (P1 (1)

Connect up electronic measuring device to measuring sockets (III and IV).

Start engine and preselect operating mode F3. Make sure the boom/jib equipment is extended.

Press key (Dp) on the electronic measuring device.
Initiate the "lift" function slowly and read off control pressure (Dp).
The LS controller can be adjusted at the adjusting screw (3).



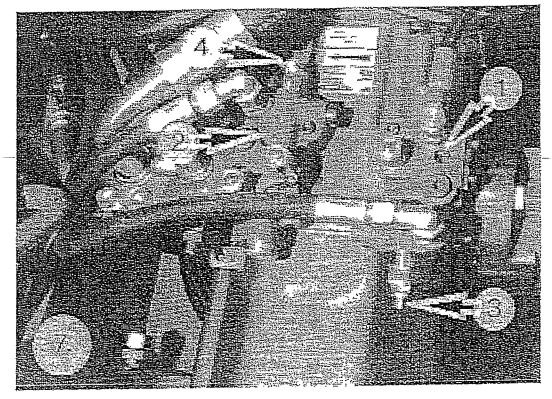
1804 - from Serial No: 282.5968

7.2 LS controller P2 (2)

Connect up electronic measuring device to measuring sockets (V and VI).

Start engine and preselect operating mode F3.

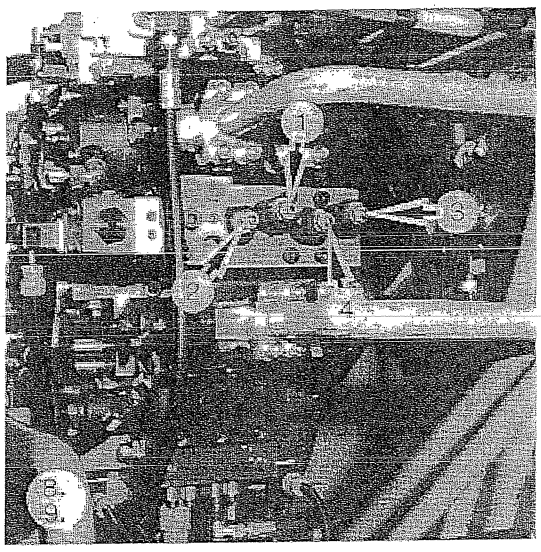
Press key (Dp) on the electronic measuring device.
Initiate the "lift" and "fold out jib" functions slowly and read off pressure (Dp).
The LS controller can be adjusted at the adjusting screw (4).



8. Pressure cutoff

8.1 Connect up electronic measuring device to measuring sockets (III) for P1 and (V) for P2.
Start engine and preselect operating mode F3.
Move "fold in jib" and "close bucket" functions simultaneously to the limit positions, and hold in place.

Corrections can be made by screwing adjusting screw (1) or (2) in or out.



9. Pressure cut-in stage

9.1 Connect up electronic measuring device to measuring socket (III) for P1.
Switch on pressure cut-in stage.
Move "lift" function to the limit position and hold in place.
Pressure increase is indicated.

Corrections can be made by screwing adjusting screw (3) in or out.

Connect up electronic measuring device to measuring socket (V) for P2.

Mobile excavator: move "lower dozer blade" function to the limit position and hold in place.
Pressure increase is indicated.

Corrections can be made by screwing adjusting screw (4) in or out.

Crawler-tracked excavator: checks and adjustments are both carried out in the same way via the "adjust boom" function.

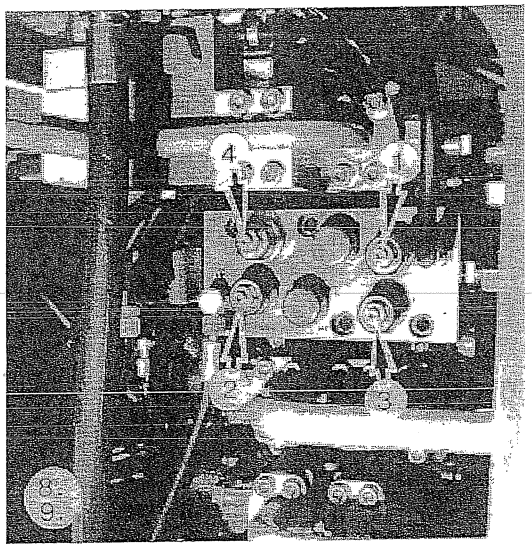
If the crawler-tracked excavator is not fitted with a luffing boom, then proceed as described on Page 43, "Raising P2".

1704 - from Serial No: 372.5955
1804 - from Serial No: 282.5968

8. Pressure cutoff

8.1 Connect up electronic measuring device to measuring sockets (III) for P1 and (V) for P2.
Start engine and preselect operating mode F3.
Move "fold in jib" and "close bucket" functions simultaneously to the limit position and hold in place.

Corrections can be made by screwing adjusting screw (1) or (2) in or out.



9. Pressure cut-in stage

9.1 Connect up electronic measuring device to measuring socket (III) for P1.
Switch on pressure cut-in stage.
Move "lift" function to the limit position and hold in place.
Pressure increase is indicated.

Corrections can be made by screwing adjusting screw (3) in or out.

Connect up electronic measuring device to measuring socket (V) for P2.

Mobile excavator: move "lower dozer blade" function to the limit position and hold in place.
Pressure increase is indicated.

Corrections can be made by screwing adjusting screw (4) in or out.

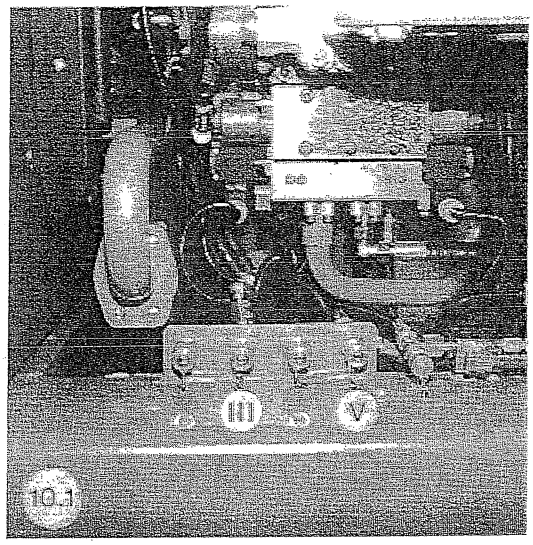
Crawler-tracked excavator: checks and adjustments are both carried in the same way via the "adjust boom" function.

If the crawler-tracked excavator is not fitted with a luffing boom, then proceed as described on Page 44, "Raising P2".

10. Secondary valves

10.1 Connect up electronic measuring device to measuring sockets (III) for P1 and (V) for P2.

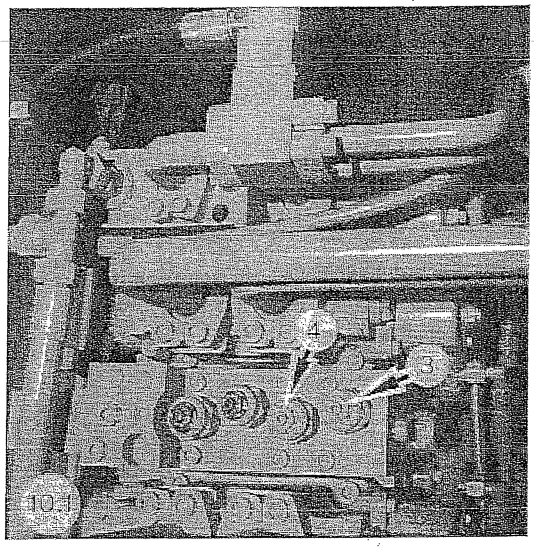
Start engine and switch on pressure cut-in stage.



Raising P1:

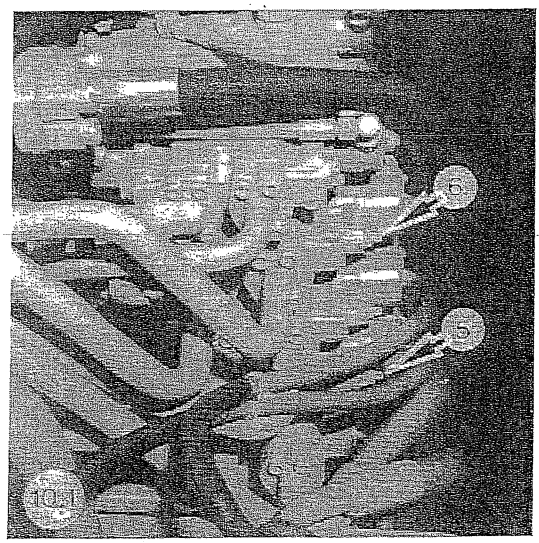
Move "lift" function to the limit position and hold in place. Pressure increase is indicated. Screw in adjusting screw (3) on pressure cut-in valve until the set value of the secondary valve (5) is displayed. Then screw in 1/4 turn further.

Important: Do not exceed pressure of 460 bar!



Raising P2:

Move "fold in jib" and "close bucket" functions to the limit position and hold in place. The secondary pressure of "fold in jib" is displayed. Screw in adjusting screw (6) one complete turn. Screw in adjusting screw on pressure cut-in valve (4) until max. 460 bar is reached.

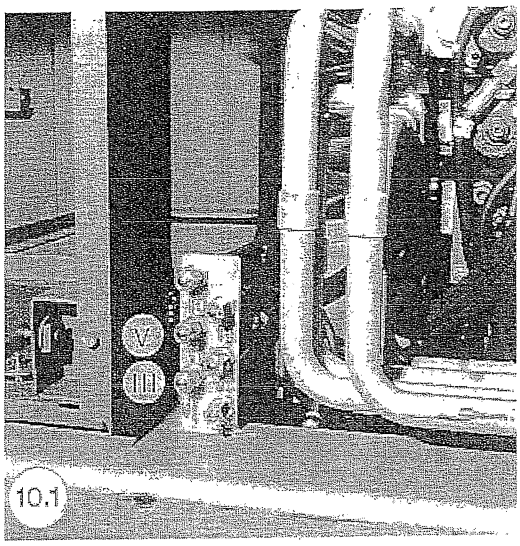


1704 - from Serial No: 372.5955
1804 - from Serial No: 282.5968

10. Secondary valves

10.1 Connect up electronic measuring device to measuring sockets (III) for P1 and (V) for P2.

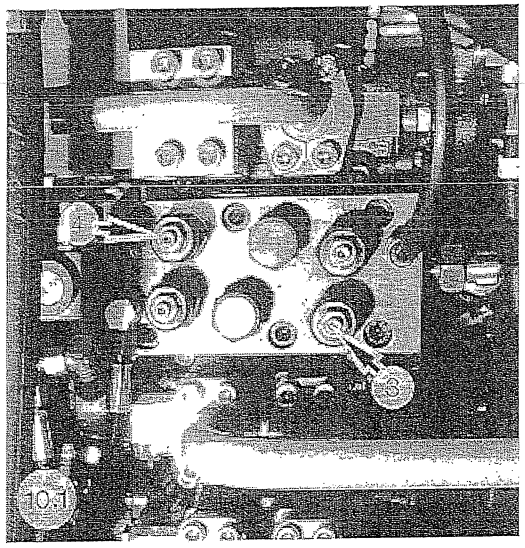
Start engine and switch on pressure cut-in stage.



Raising P1:

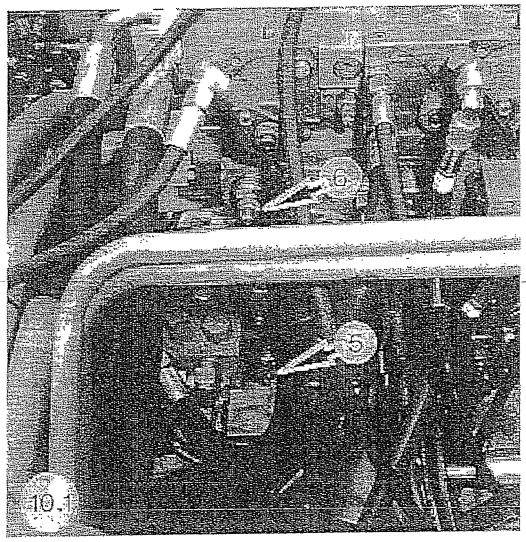
Move "lift" function to the limit position and hold in place. Pressure increase is indicated. Screw in adjusting screw (3) on pressure cut-in valve until the set value of the secondary valve (5) is displayed. Then screw in 1/4 turn further.

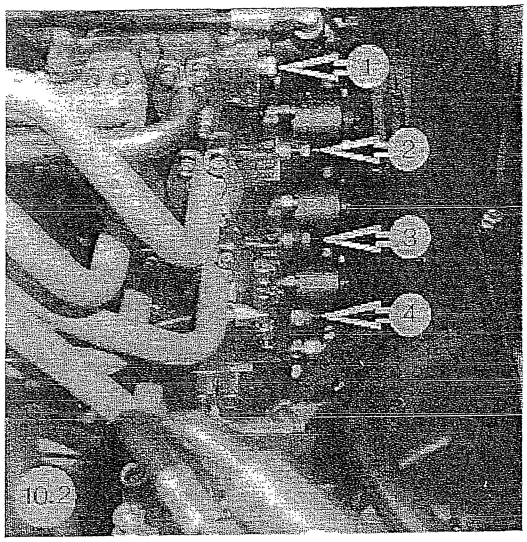
Important: Do not exceed pressure of 460 bar!



Raising P2:

Move "fold in jib" and "close bucket" functions to the limit position and hold in place. The secondary pressure of "fold in jib" is displayed. Screw in adjusting screw (6) one complete turn. Screw in adjusting screw on pressure cut-in valve (4) until max. 460 bar is reached.

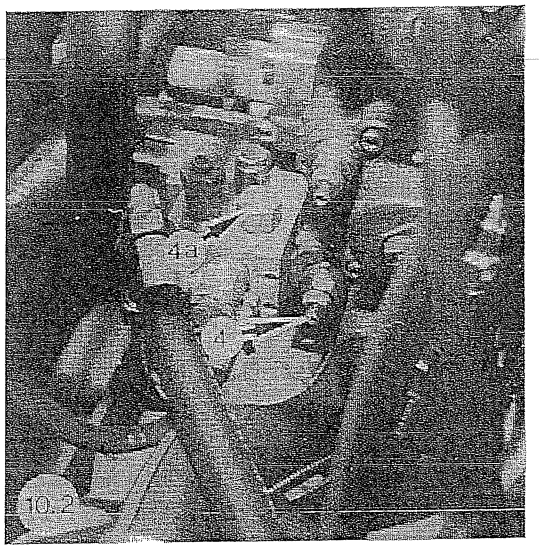




10.2 Checks and adjustments are made with the pressure cut-in stage switched on.

All the following secondary valves (except the one for "folding jib") can now be checked and adjusted.

1 - Slewing - TC plate
2 - Folding in - do not reset yet
- Folding out (opposite)
3 - Closing bucket
- Opening bucket (opposite)
4 - Lifting - plate valve
- Lowering (opposite)
4a - Lifting - oiltight shutoff
5 - Extend positioning rams
- Retract positioning rams (opposite)



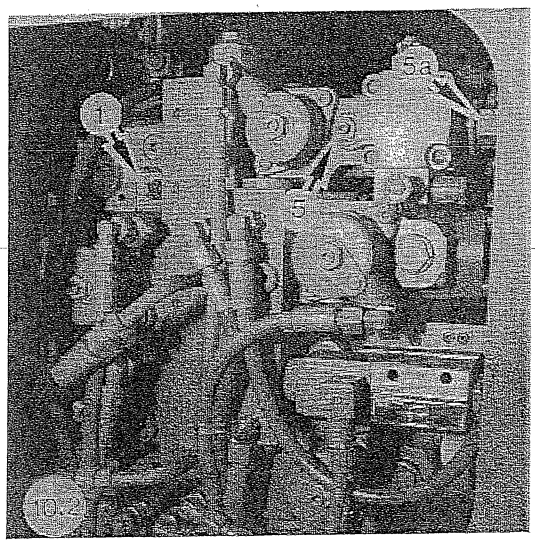
Lifting
Screw in adjusting screw for "lift" (4) approx. 1/2 turn.

Secondary pressure is set at the secondary valve (4a) of the oiltight shutoff with discs.

Then return the secondary valve for the "lift" function (4) to the specified pressure.

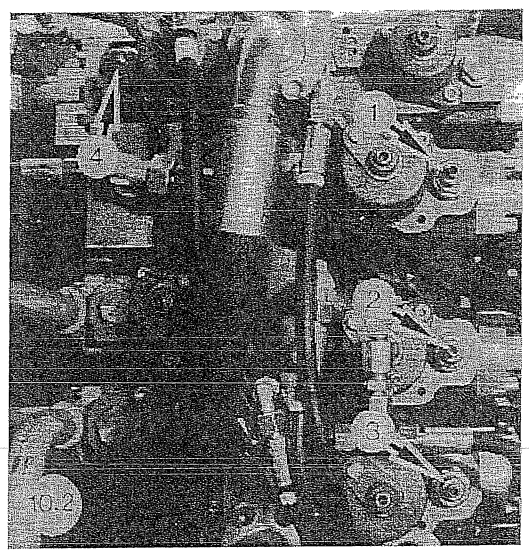
Slewing
Adjustments are made at the adjusting screw (1) at maximum engine speed.

The secondary valve of the oiltight shutoff for positioning rams is checked and adjusted as described above under "lifting".

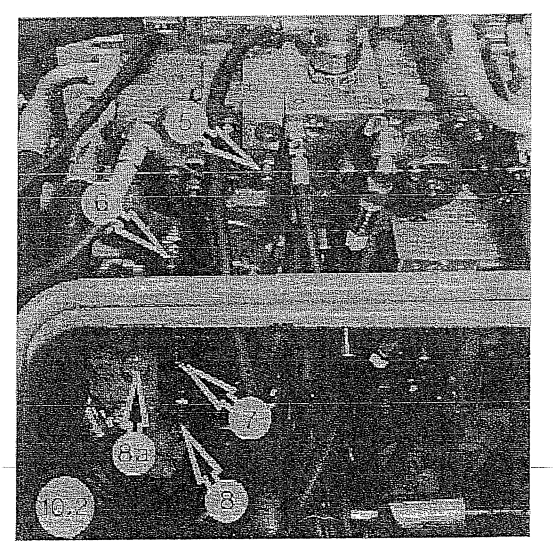


1704 - from Serial No: 372.5955
1804 - from Serial No: 282.5968

10.2 Secondary valves are checked and adjusted as described on Page 47.



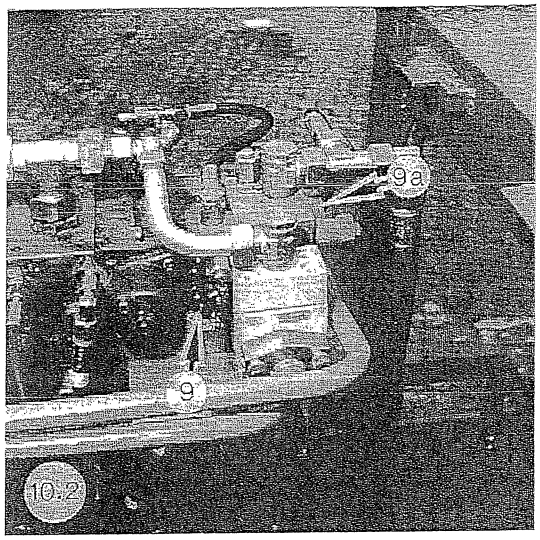
1 - Folding out jib
2 - Opening bucket
3 - Lowering
4 - Retracting positioning rams



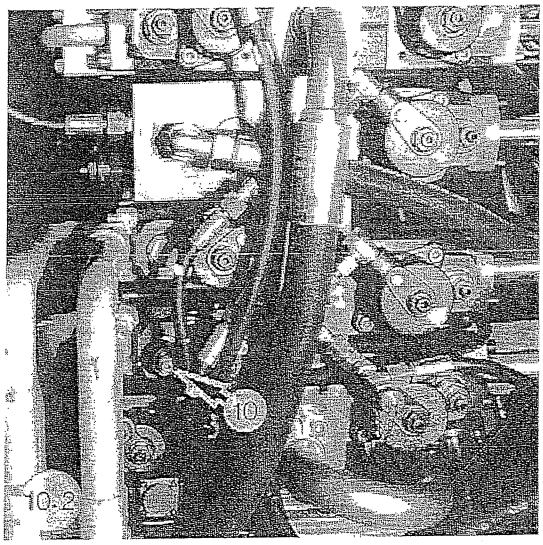
5 - Slewing - TC plate
6 - Folding in jib - do not reset yet
7 - Close bucket
8 - Lifting - plate valve
8a - Lifting - oiltight shutoff

9 - Extend positioning rams - plate valve

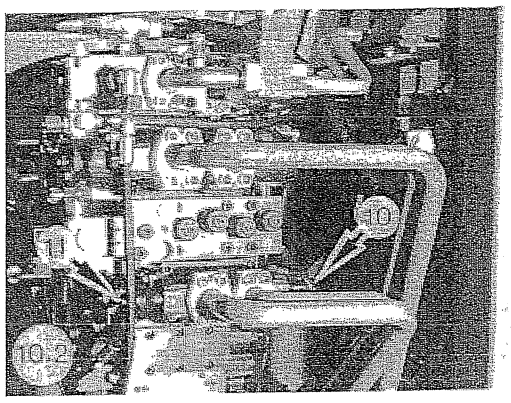
9a - Extend positioning rams - oiltight shutoff



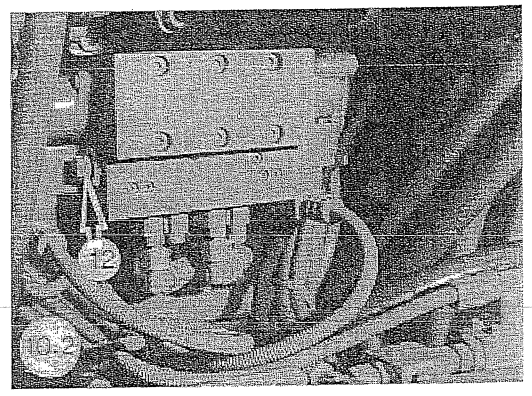
10 - Dozing - upward movement



10 - Dozing/stabilising up
11 - Dozing/stabilising down



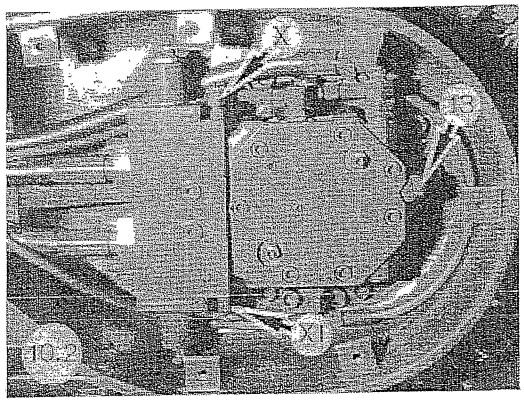
12 - Grab rotation for both sides



13 - Travelling - crawler-tracked excavator
The secondary valve (13) for both travel directions is situated at the travel motor.

Connect up gauge (0-600 bar) at measuring sockets (X, XI).

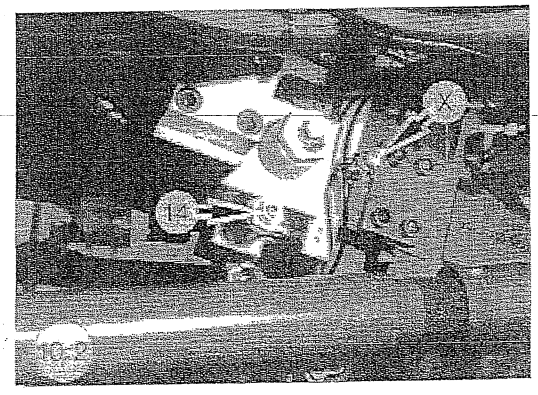
NOTE: check travel motors individually, with the lever control.



14 - Travelling - mobile excavator
The secondary valve (14) for both travel directions is situated at the travel brake valve of the travel motor.

Connect up gauge (0-600 bar) at measuring sockets (X) or (XI, opposite).

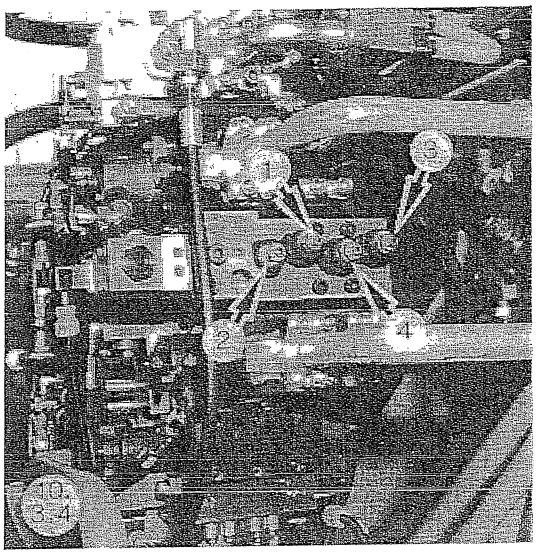
NOTE: adjustments should always be made in a unpressurised state!



10.3 Pumps

Reset P1

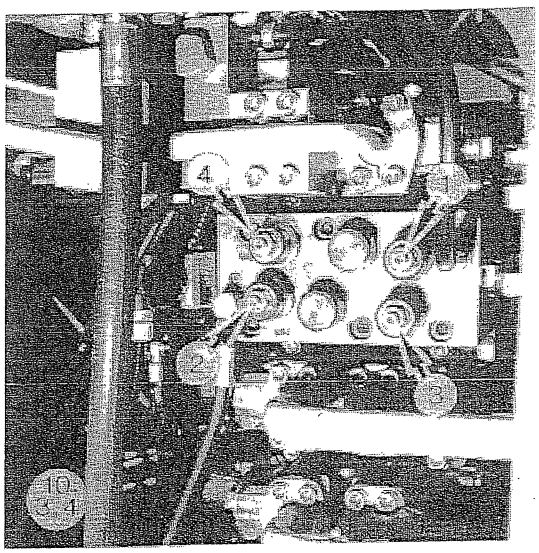
Reset pressure cut-in stage.
Move "lift" function to the limit position and hold in place. Slacken off adjusting screw (3) until the set value is reached.



Reset P2

Reset pressure cut-in stage.
Move "fold in jib" and "close bucket" functions to the limit position and hold in place. Slacken off adjusting screw (4) until the set value is reached.

NOTE: Now reset secondary valve for "fold in jib" to specified value.



10.4 Pressure cutoff

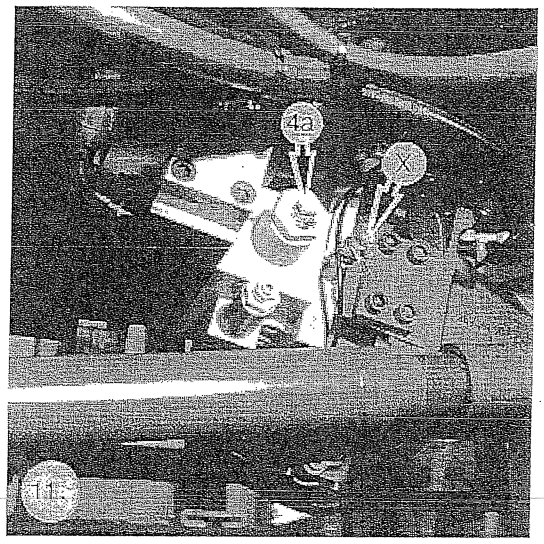
Switch if pressure cut-in stage.
Preselect operating mode F3.
Move "fold in jib" and "close bucket" functions to the limit position and hold in place.
Reset pressure cutoff (1, 2) to specified value.

1704 - from Serial No: 372.5955

1804 - from Serial No: 282.5968

11. Back pressure - travel brake valve

11.1 Mobile excavator

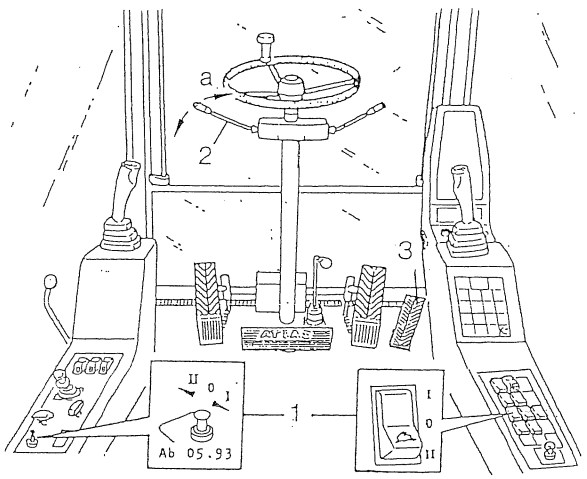


Connect up electronic measuring device to measuring sockets (X) and (XI, opposite).

Activate switch (1) to set manual gearbox to 0.
Start engine and preselect operating mode F3.
Use the multifunctional lever (2) to preselect forwards travel (a).
Depress the accelerator (3) pedal completely.
The measuring device displays different pressures.
The lower pressure is the back pressure, which can be adjusted at stop screws (4a and 4b).

Back pressure at X = stop screw (4a)
Back pressure at XI = stop screw (4b)

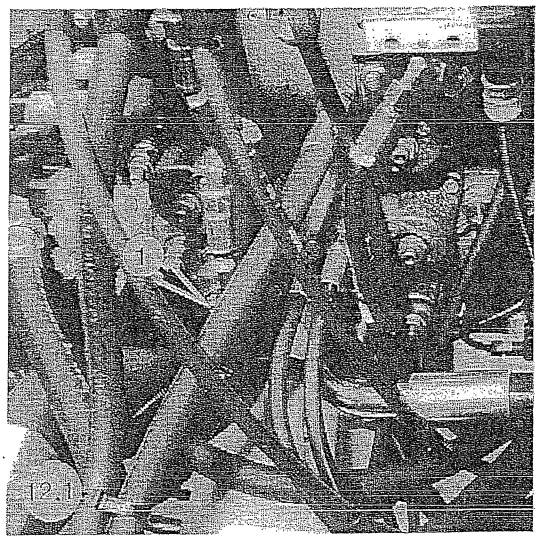
Check back pressures again with the excavator raised, in roadgoing gear.



12. Return-flow throttles

The specified pressures apply when implements are fitted.

Connect electronic measuring device or pressure gauge (0 - 600 bar) to measuring unions (III, IV).



12.1 Lowering

Arm equipment unfolded and lifting ram fully extended.
At max. engine speed, select full "Lower" movement.

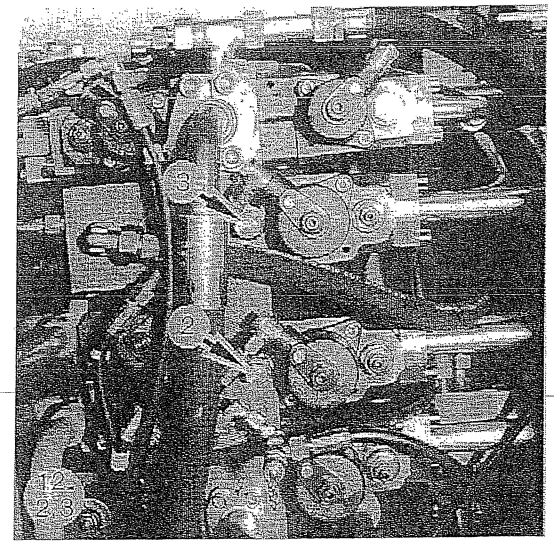
If any correction is required, adjust the stroke limiting feature on the control slide valve.

The detent screw (1) must be tightened if pressure is too high or slackened off if it is too low.

12.2 Folding movements

Arm equipment extended.
At max. engine speed, select full "Fold jib" movement.

If any correction is required, reset the adjusting screw (2).
When screwed in, pressure is increased.
When unscrewed, pressure is reduced.



12.3 Closing grab

Grab fully open.
At max. engine speed, select the full "Close grab" position.
If any correction is required, use the adjusting screw (3).
When screwed in, pressure is increased.
When unscrewed, pressure is reduced.

* Check / adjust at max. engine speed
** Check / adjust with pressure cut-in stage engaged
*** Check with hand pump.
Figures shown in bar or in rpm
Hydraulic fluid temp. 40-60° C.

		Electronics box Type CEB 10/03 _AB	_D
	ENGINE SPEEDS		
	Min. idle speed	980	1050
	Max. idle speed - F1	1890	1905
	- F2	2090	2103
	- F3	2300	2300
	- F4	1680	1708
	- Pressure cut-in stage	1680	1708
	- Operating temp. speed	1480	1511
	- Emergency shift	2350	2350
	Min. idle speed - automatic idle	1140	1182
	PRIMARY VALVES		
*	Pump - P1	60	60
	- P2	60	60
*	Pressure cut-off - P1	320	320
	- P2	320	320
*	Pressure cut-off - P1	380	380
	stage - P2	380	380
*	Pilot pump	25 - 27	25 - 27
*	Pr. lim. valve - emergency shift	15	15
*	Fan pump	100	100
*	Steering pump	160	160
	POWER-SHIFT CONTROLLER (deltap		
*	Pump, P1 and P2 - F1	17	17
	- F2	20	20
	- F3	23	23
	- F4	14	14
*	Pressure cut-in stage	10	13
	SECONDARY VALVES		
**	Lifting rams - raising	435+20	435+20
	- leak-free cut-off - plate valve	415+20	415+20
	- lowering	365+20	365+20
**	Folding ram	365+20	365+20
**	Grab operating ram	365+20	365+20
	Slewing motor (fixed setting)	80/280	115/310
*	TC plate	265	265
**	Drive motor - wheeled	380+20	380+20
	- tracked	415+20	415+20
**	Gripper rotary motor - plate valve	160	160
	- motor	75	75
**	Actuating ram - extend	435+20	435+20
	- leak-free cut-off - plate valve	415+20	415+20
	- retract	415+20	415+20
**	Dozer blade support ram	395+20	395+20
**	Stabilizer support pad ram	365+20	365+20
***	Steering ram	200	200

	SWING AXLE INTERLOCK	
**	Pressure-limiting valve	45
	REGULATED TRAVEL MOTOR	
*	Pressure regulator	250
	TRAVEL BRAKE VALVE	
*	Back-up pressure - wheeled - forwards	40+10
	reverse	40+10
	tracked - forwards	30+10
	reverse	30+10
	LEAK-FREE SHUT-OFF	
**	Valve for minimum reduction	3+1
	FEED PRESSURE VALVES (without tank preload)	
*	Stop valve	3
*	Return baseplate	5
*	Cooler protection valve	4.5
	RETURN FLOW THROTTLES (without implements + 15 bar)	
*	Lowering	65
*	Folding	85
*	Closing grab	85
	PRESSURE SWITCH	
**	Automatic idle	70
	SPEEDS	
*	Fan motor	2300+100
*	Slewing	8
*	Propeller shafts	620
	COMPRESSED AIR VALVES	
	Wheeled - pressure regulator	8
	- flow relief valve	5
	- pressure reduction valve (turbocharger supply)	0.5
	- tire pressure	6.5
	Tracked - pressure reduction valve (turbocharger supply)	0.5

The right to make modifications is reserved.

* Check / adjust at max. engine speed
** Check / adjust with pressure cut-in stage engaged
*** Check with hand pump.
Figures shown in bar or in rpm
Hydraulic fluid temp. 40-60° C.

		Electronics box Type CEB 10/03 _AB	_D
	ENGINE SPEEDS		
	Min. idle speed	980	1050
	Max. idle speed - F1	1890	1905
	- F2	2090	2103
	- F3	2300	2300
	- F4	1680	1708
	- Pressure cut-in stage	1680	1708
	- Operating temp. speed	1480	1511
	- Emergency shift	2350	2350
	Min. idle speed - automatic idle	1140	1182
	PRIMARY VALVES		
*	Pump - P1	60	60
	- P2	60	60
*	Pressure cut-off - P1	320	320
	- P2	320	320
*	Pressure cut-off - P1	380	380
	stage - P2	380	380
*	Pilot pump	25 - 27	25 - 27
*	Pr. lim. valve - emergency shift	15	15
*	Fan pump	100	100
*	Steering pump	160	160
	POWER-SHIFT CONTROLLER (deltap		
*	Pump, P1 and P2 - F1	17	17
	- F2	20	20
	- F3	23	23
	- F4	14	14
*	Pressure cut-in stage	10	13
	SECONDARY VALVES		
**	Lifting rams - raising	435+20	435+20
	- leak-free cut-off - plate valve	415+20	415+20
	- lowering	365+20	365+20
**	Folding ram	365+20	365+20
**	Grab operating ram	365+20	365+20
	Slewing motor (fixed setting)	80/280	115/310
*	TC plate	240	240
**	Drive motor - wheeled	380+20	380+20
	- tracked	415+20	415+20
**	Gripper rotary motor - plate valve	160	160
	- motor	75	75
**	Actuating ram - extend	435+20	435+20
	- leak-free cut-off - plate valve	415+20	415+20
	- retract	415+20	415+20
**	Dozer blade support ram	395+20	395+20
**	Stabilizer support pad ram	365+20	365+20
***	Steering ram	200	200

	SWING AXLE INTERLOCK	
**	Pressure-limiting valve	45
	REGULATED TRAVEL MOTOR	
*	Pressure regulator	250
	TRAVEL BRAKE VALVE	
*	Back-up pressure - wheeled - forwards	40+10
	reverse	40+10
	tracked - forwards	30+10
	reverse	30+10
	LEAK-FREE SHUT-OFF	
**	Valve for minimum reduction	3+1
	FEED PRESSURE VALVES (without tank preload)	
*	Stop valve	3
*	Return baseplate	5
*	Cooler protection valve	4.5
	RETURN FLOW THROTTLES (without implements + 15 bar)	
*	Lowering	65
*	Folding	85
*	Closing grab	85
	PRESSURE SWITCH	
**	Automatic idle	70
	SPEEDS	
*	Fan motor	2300+100
*	Slewing	8
*	Propeller shafts	620
	COMPRESSED AIR VALVES	
	Wheeled - pressure regulator	8
	- flow relief valve	5
	- pressure reduction valve (turbocharger supply)	0.5
	- tire pressure	6.5
	Tracked - pressure reduction valve (turbocharger supply)	0.5

The right to make modifications is reserved.

The Linde power limit controlled system CEB 10/20 is the control for the normal and industrial design of the excavator types 1704 and 1804.

The old design of the Linde power limit controlled system CEB 10/03 could only be used for the normal design of the excavator types 1704 and 1804.

For the industrial design or special control collect CEB 10/17 was required.

On the nameplate of the Linde Elektronic box there is stated the modification level and thes the usability by means of the last letter of the indification.

Main groups version	Modification lever	N LK	N WK	I LK	I WK	Ht. °C	Zt. °C	Remarks
CEB - 06/17 3633125								Special control for carrier units PILEDRIVER
CEB - 10/17 3643423				X		80°	190°	Special control for industrial units
CEB - 10/03 2694820	_AB	X				80°	190°	Warm-up period measured through hydraulic oil temperature setting function indication min. speed 950 Rpm.
CEB - 10/03 2694820	_D	X				80°	190°	Cold starting aid and warm-up period measured through cylinder head temperature setting function indication min. speed 1030 Rpm.
CEB - 10/03 3669489	_E	X				95°	190°	Modification of hydraulic oil temperature
CEB - 10/20 3669912	_A	X		X		95°	210°	Modification of the cylinder head temperature summary of the normal and industrial design
CEB - 10/20 3663596	_B	X	X	X		95°	210°	Also for normal design with water cooling
CEB - 10/20 3670595	C	X	X	X	X	95°	210°	SAME AS "B" BUT FOR WATER COOLED INDUSTRIAL MACHINES

N = Normal design
I = Industrial design
LK = Air cooling
WK = Water cooling
Ht = Hydraulic oil temperature
Zt = Cylinder head temperature

SET-UP AB Box 950 Rpm

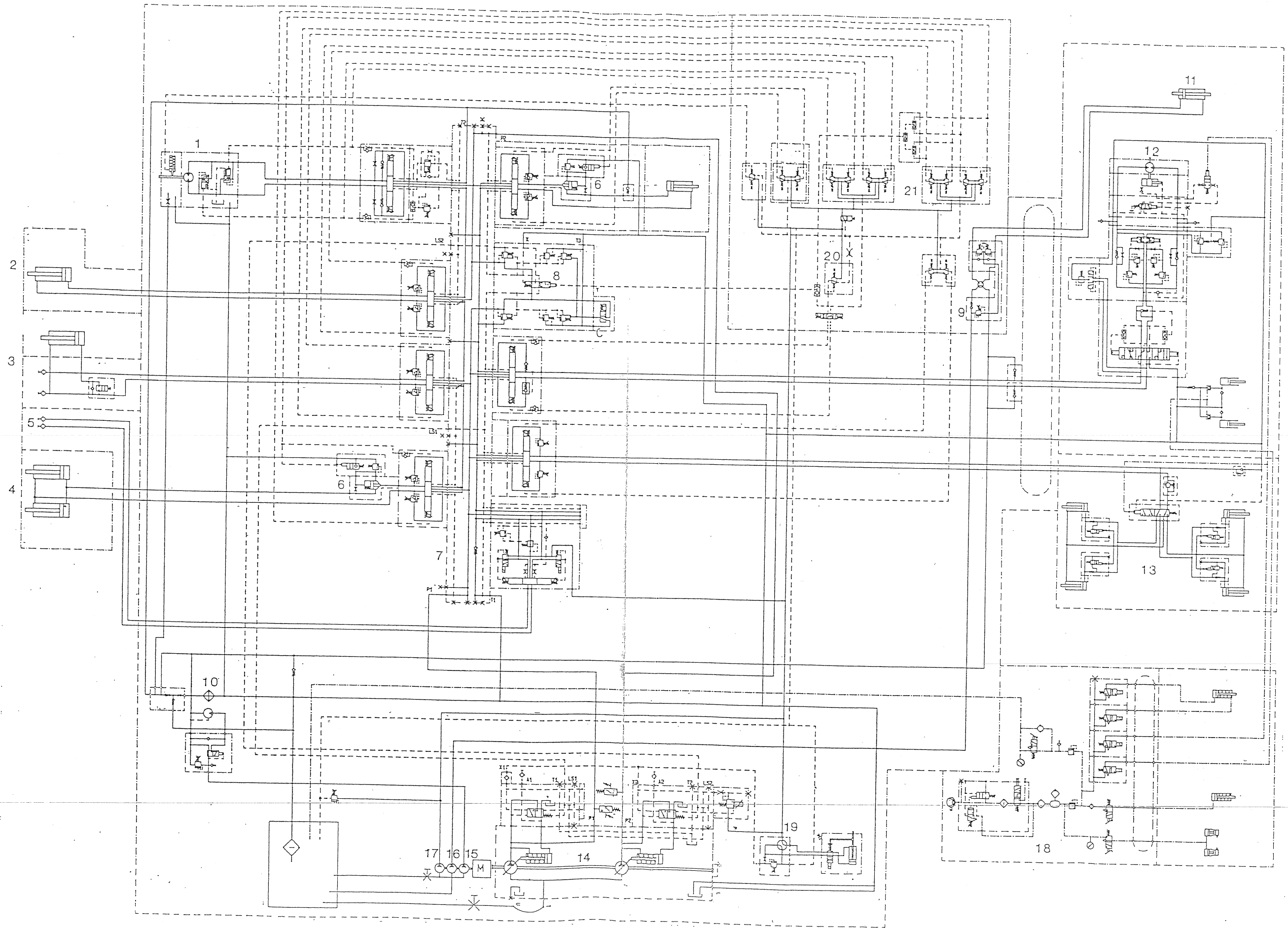
SET-UP AB D Box 1030 Rpm

1 Slewing
2 Jib folding
3 Bucket/Grab
4 Lifting/Lowering
5 Grab rotation
6 Shuttoff valve
7 Base plate with plate valves
8 Valve unit
9 Steering unit
10 Hydraulic oil cooler
11 Steering
12 Driving
13 Dozer blade/Support ram
14 Variable twin pump
15 Cooling pump
16 Steering pump
17 Servo pump
18 Compressed air system
19 Emergency control
20 Driving-Foot operated
21 Servo units

HYDRAULIC DIAGRAM - 1704,1804

Wheeled excavator

Schulungszentrum
Tafel: -
Name: Ro.
Datum: 09.94



HYDRAULIC DIAGRAM - 1704,1804

Tracked excavator

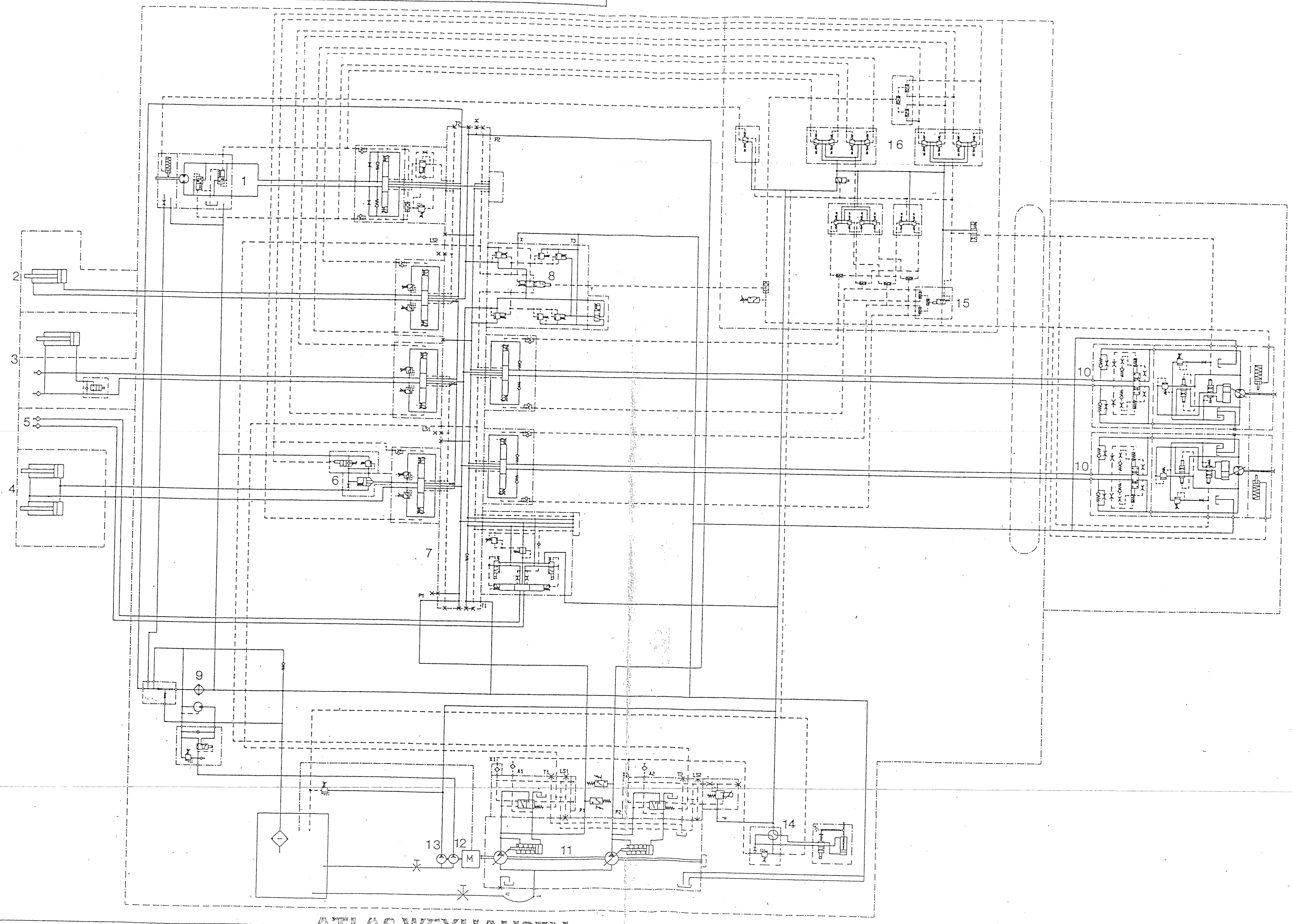
Schulungszentrum
Tafel: -
Name: Ro.
Datum: 09.94

1 Slewing
2 Jib folding
3 Bucket/Grab
4 Lifting/Lowering
5 Grab rotation
6 Shuttoff valve
7 Base plate with plate valves
8 Valve unit
9 Hydraulic oil cooler
10 Driving
11 Variable twin pump
12 Cooling pump
13 Servo pump
14 Emergency control
15 Brake relase block
16 Servo units

HYDRAULIC DIAGRAM - 1704,1804

Tracked excavator

Schulungszentrum
Tafel: -
Name: Ro.
Datum: 09.94



TEREX ATLAS

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57-61	Hose rupture protection valve (early type) option
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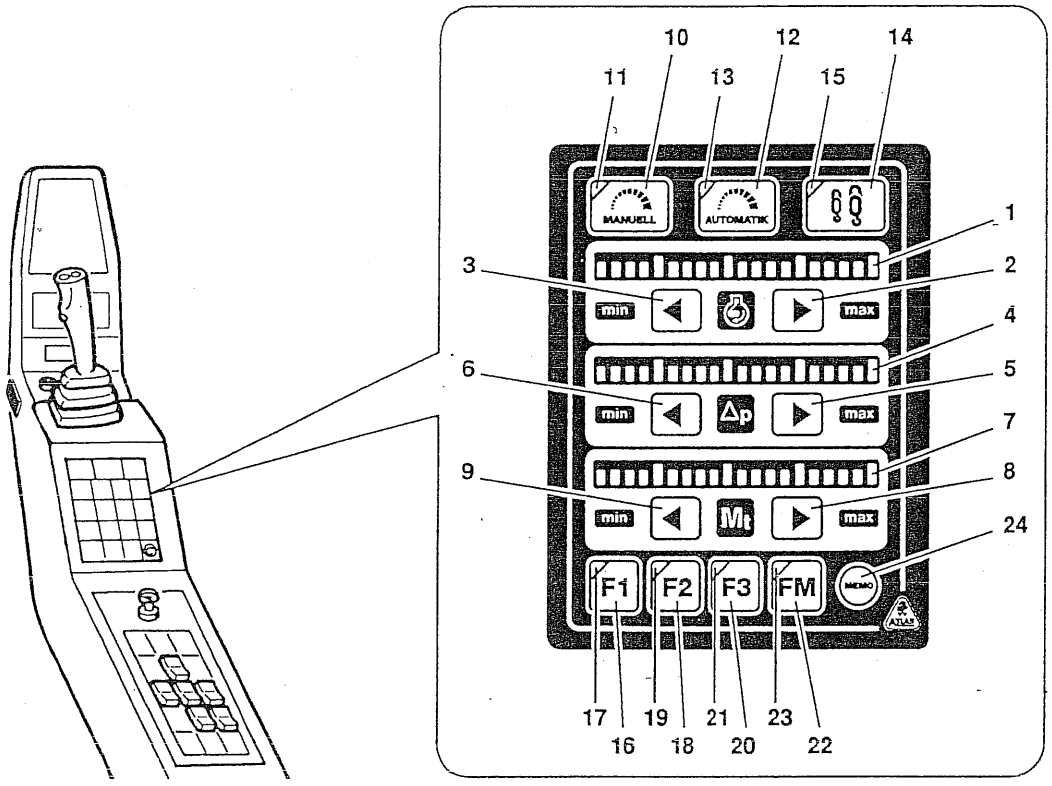
68-69 Pressure adjustment table,1704, 373 series (Backhoe)

70-71 Pressure adjustment table, 1704, 373 series (Industrial)

72-73 Pressure adjustment table,1804, 283 series (Backhoe)

74-75 Pressure adjustment table, 1804, 283 series (Industrial)

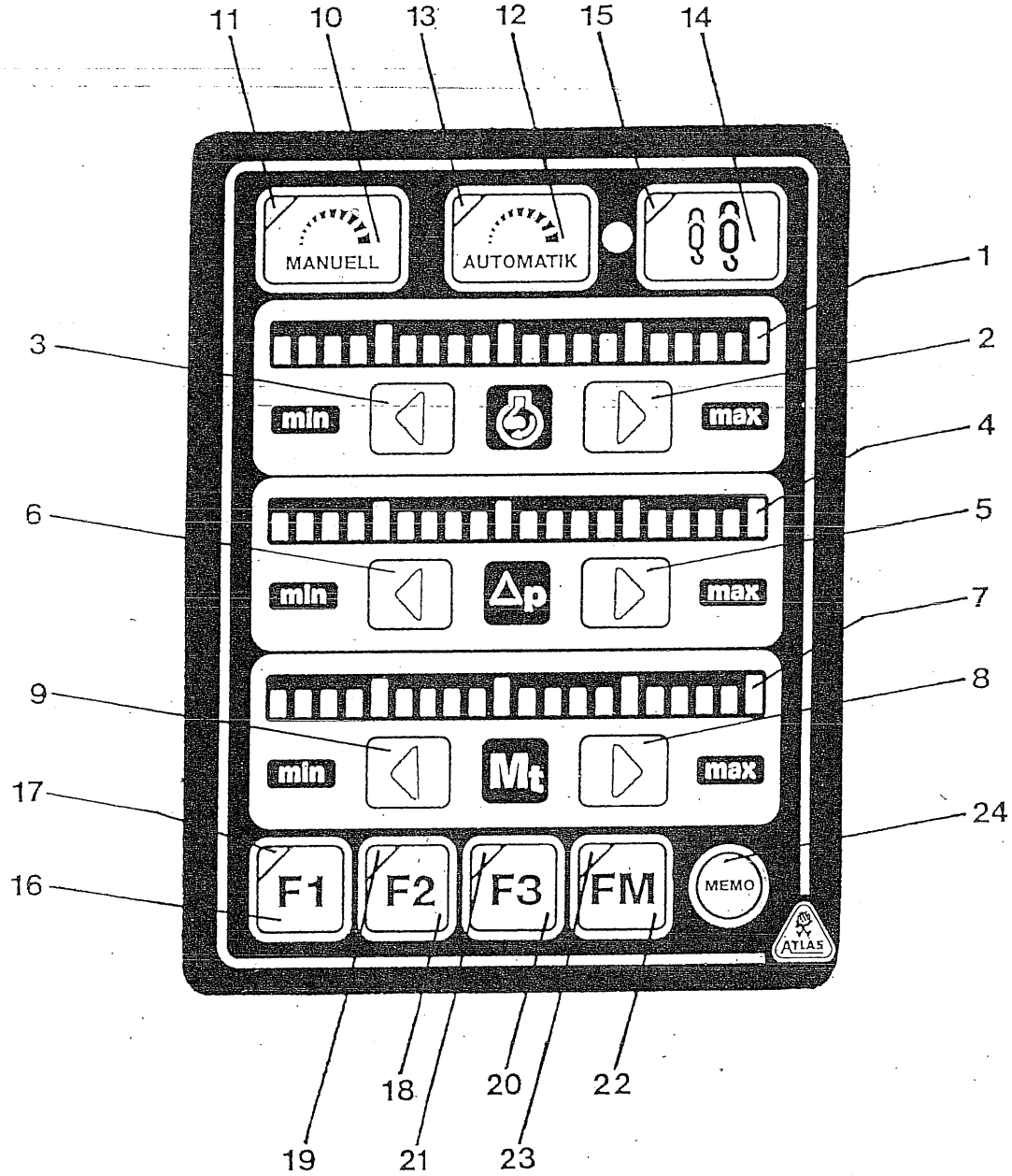
76-83 Hydraulic diagram 1704,1804 372, 282 series



1	Revolution counter
2	Switch-raise engine speed
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4	Precision control display
5	Switch for precision control
6	Switch for precisin control
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10	Switch-lower engine speed (idle speed)
11	Telltale for reduced engine speed (idle speed)
12	Switch for automatic idling
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14	Switch for pressure cut in stage
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16	Read-only memory F1
17	Telltale F1
18	Read-only memory F2
19	Telltale F2
20	Read-only memory F3
21	Telltale F3
22	Memory FM (F4)
23	Telltale FM (F4)
24	MEMO store key

ELEKTRONIC OPERATING PANEL

Schulungszentrum
Tafel:
Name: Ro.
Datum: 07.97



Method of operation of the Linde CEB -10 /... load limit control

After the ignition has been switched on, the automatic-idle (key 12) is

a) turned on automatically (control panel, old version)
b) turned off (control panel, new version)

and the F1 read-only memory (key 16) is always pre-selected automatically.

The bar displays for engine speed (1), Delta-P (4) and Mt (engine torque) show the nominal values from the F1 read-only memory.

Excavators with air-cooled engines are equipped with an automatic cold-starting aid and warm-up device, which is controlled by cylinder-head temperature.

When cylinder-head temperature is below 30° C, starting is automatically accomplished with the cold-start aid, at 1,750 rpm. As soon as the engine reaches 1,100 rpm, it switches to the warm-up phase at 1,500 rpm.

During the warm-up phase, it is not possible to make any changes at the control panel.

After approx. 3 minutes, or when cylinder-head temperature rises above 30° C, the warm-up phase is ended and the function keys on the control panel are enabled.

If cylinder-head temperature is greater than 30° C, the warm-up device is out of action.

Excavators with liquid-cooled engines are not equipped with this warm-up device. On these machines only the automatic idle is put out of operation (for 1 minute) after the ignition has been turned on. All other functions can be actuated immediately at the control panel.

Note: Control panel – old version
The alignment function can be turned on or off by actuating the toggle switch at the bottom of the control panel.

Control panel – new version
The alignment function can be turned on or off by actuating the Memo (24) and Manual (10) keys.

	Power utilization	Engine speed	Mt torque	Delta-P
F1 (16)	87,5%	1900 rpm	100%	17bar
F2 (18)	95%	2100 rpm	100%	20 bar
F3 (20)	100%	2300 rpm	100%	23 bar
FM (22)	80%	1700 rpm	100%	14 bar

F1 - FM read only memory modes
Permanently programmed operating modes:

The respective operating mode is displayed by the pilot lamp (17, 19, 21 ir 23).

The selected operating mode can be individually changed. This is carried out by actuating the respective pushbutton (2, 3, 5, 6, 8 or 9). The change is displayed in the bar diagram (1, 4, and 7).

NOTE: The change is deleted after the diesel engine is shut down and the ignition is switched off. The engine switches over to the automatic idling system (12) and the F1 read-only memory (16) when the engine is restarted.

The FM operating mode can be freely programmed and stored. Preselect the desired program. To store the program, hold down the MEMO key (24) and press the FM key (22).

This enables the operator to set the bagger optimally, depending on its intended use.

MANUAL engine speed reduction.

An operating mode is selected. Actuate pushbutton (10). The pilot light (11) illuminates. The engine speed is reduced to 1030 rpm. The manual engine speed reduction is deactivated by actuating the pushbutton again.

AUTOMATIC IDLING - engine speed reduction

An operating mode is selected. Actuate pushbutton (12). The pilot lamp (13) illuminates.
The automatic idling system switches back the engine speed to 1180 rpm if no operating function is activated or if the function is interrupted for longer than 8 seconds.
The preselected operating mode is obtained again immediately when an operating function is activated. The setting of the pressure regulator in the pump piping is 70 bar. The automatic idling system is deactivatd and the previously selected operating mode appears again when the switch is actuated again.
NOTE: The actual value is displayed as a bar LED in the bar diagram and the set value is displayed as a dot LED.

PRESSURE CUT-IN STAGE

Actuate pushbutton (14). The pilot light (13) illuminates.
The engine speed is reduced to 1700 rpm and delta-P is reduced to 13 bar.
The programmed operating mode and individual adjustment are not functioning.
The raising, lowering, buckling and scooping operational movements can be performed with the increased pressure.
The pressure cut-in stage is deactivated when the pushbutton is actuated again.
The previously selected operating mode and individual adjustment are functioning again.

KICK-DOWN

The kick-down function has priority over the other functions. The previously selected function is interrupted when the kick-down pushbutton (right-hand pilot lever) is actuated and all set values are raised again to 100 %.
The previously selected function is activated again after the kick-down pushbutton is released.

SPEED ADJUSTMENT

Pushbutton (3) - min., pushbutton (5) max.
The engine speed is adjusted when the respective pushbutton is actuated.
This is displayed by the LED in the bar diagram (1).
An LED corresponds to approx. 70 rpm.

PRECISION CONTROL MODE (delta-P)

Pushbutton (6) - min., pushbutton (5) - max.
The control pressure (delta-P) is changed by actuating the respective pushbutton. This allows the precision control range to be optimally used, if required. The LED displays this in the bar diagram (4). An LED corresponds to approx. 0.7 bar.

TORQUE (Mt) - POWER REDUCTION

Pushbutton (9) - min., pushbutton (8) - max.
The power of the diesel engine can be individually reduced from 100 % to 40 %, depending on the requirements, by actuating the respective pushbutton.
This is displayed by the LED in the bar diagram (7).
An LED corresponds to approx. 3 %.

ERROR DIAGNOSIS

The Linde electronics are equipped with an error diagnosis function which may only be performed when the engine is running.
The error diagnosis function is called up by actuating the MEMO key (24) and additionally actuating the pressure cut-in stage key (14).
Pending errors are displayed by means of the LEDs in the bar diagrams (1, 4 and 7) on the control panel. Not all of the errors in the load limit control device are displayed by the continuous illumination of the malfunction lamp in the display panel.

Error table for the bar diagram (1).
The information is displayed from left to right

LED	Component	Possible error	Load limit contol device malfunction lamp
1	Speed sensor	Short circuit, interruption, signal too low	On
2	Drive pushbutton	Power for press switch failed	Off
3	-	-	
4	Cylinder head sensor	Short circuit, interruption, sensor defective	On
5	Hydraulic oil sensor	Short circuit, interruption, sensor defective	On
6	Magnetic load limit valve	Short circuit, interruption, magnet defective	On
7	Magnetic diesel actuator	Short circuit, interruption, magnet defective	On
8	Relay presssure cut-in stage	Short circuit,interruption, relay coil defective	Off
9	Signal output for load limit contol device	Wiring harness defective or Atlas electronics defective	Off
10	Signal output for excess temperatures	Wiring harness defective or Altas electronics defective	On
11	Power supply	Battery voltage less than 21 V	Off
12	Electronics box	Electronics box defective	Off
13	Electronics box "reset	Electronics box defective	Off
14	Data transmission in E-box / control panel	Connection fault or interruption	On
15	Control panel	Button actuated*)	Off
16	Idling pushbutton, kick-down pushbutton high - speed function	Switching contact closed	Off

*) The control panel automatically jumps to the errror diagnosis if a button on the control panel is pressed for longer than 20 sec. during normal operation.

Bar display (4)

The bar display indicates the setting of travel pressure switch :

LED 1 - 3	Pressure switch open	=	excavating
LED 1 - 20	Pressure switch closed	=	travel

Bar display (7)

The bar display indicates the pre - selected target value.It flashes if the following faults occur :

In the electronics box, in the data transfer line or if a key sticks.

If a fault develops in the data transfer system as soon as the „check function" is switched on, all bar displays flash.

The „check function" can be interrupted at any time. This is done by activating the MEMO (24) and the pressure cut in stage (14) keys at the same time.

Emergency control

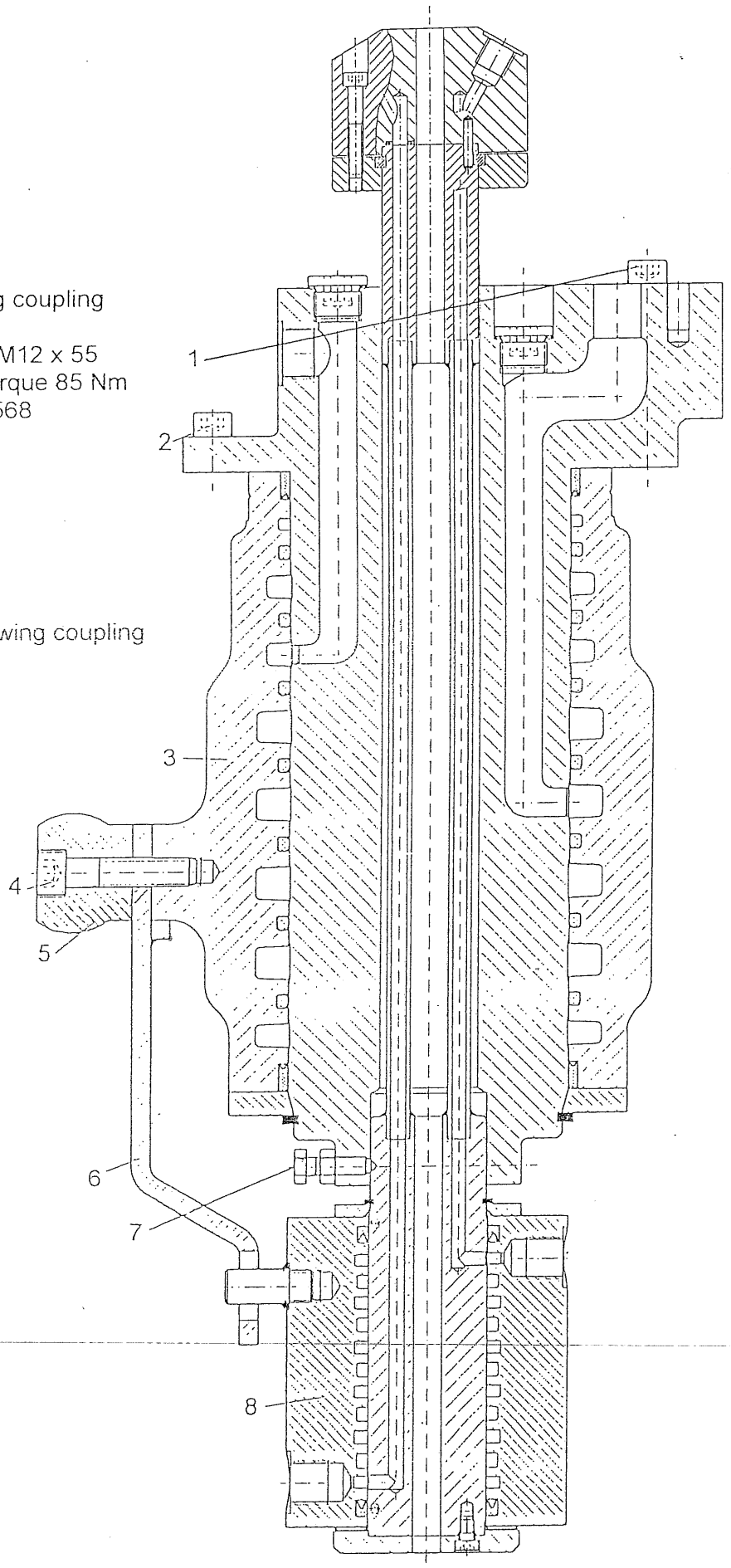
If a fault develop in the electronics, the excavator can be operated at reduced output by the emergency control.
The emergency control is put into operation by switching over the valve lever and pulling the plug out of the electronics box.

SLEWING COUPLING

Schulungszentrum
Tafel:
Name: Ro.
Datum: 05.97

Arrangement

1	Allen screw
2	Allen screw
3	Main slewing coupling
4	Allen screw M12 x 55 tightening torque 85 Nm use Loctite 568
5	Ball end
6	Locking
7	Bolt M 8x30
8	Auxiliary slewing coupling

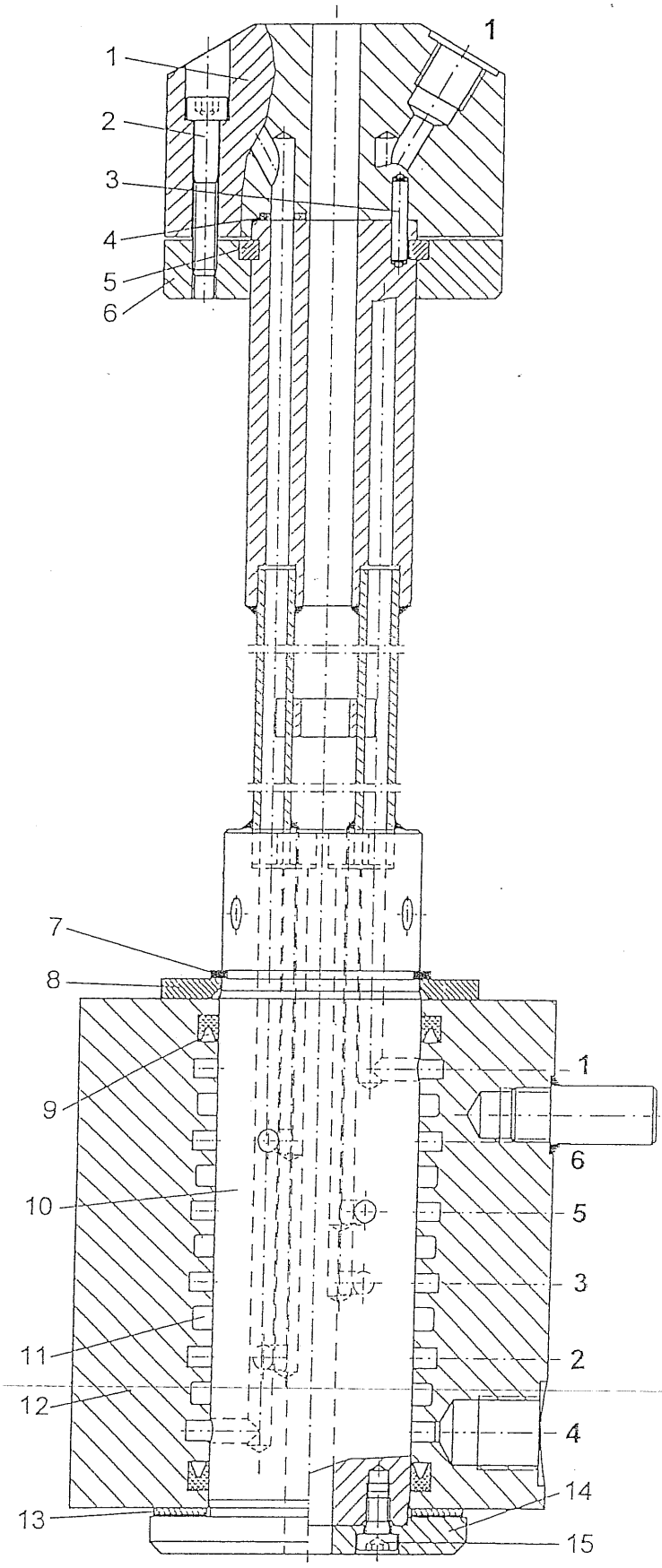


Arrangement

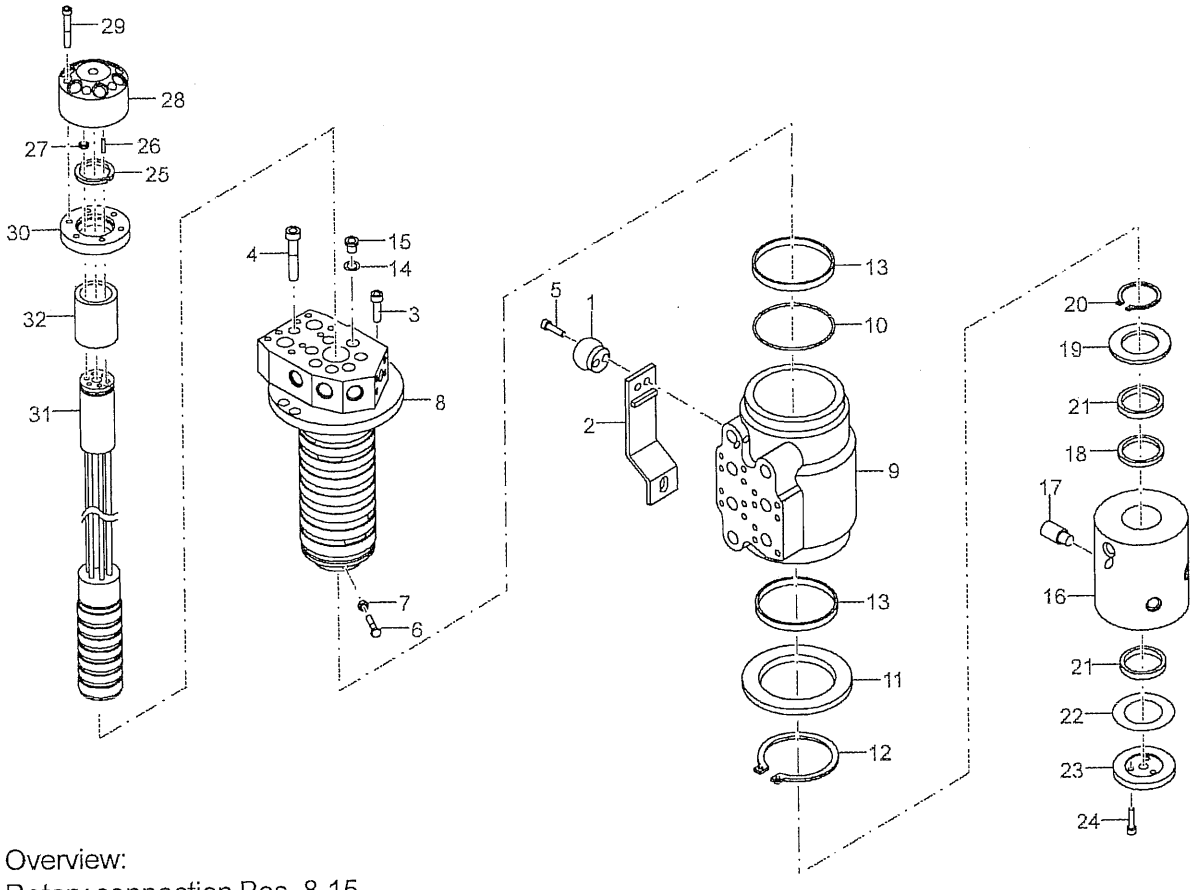
1	Connection block
2	Allen screw
3	Dowel pin
4	Stircomatic packing
5	Disk
6	Counterring
7	Circlip
8	Slid disk
9	U - Ring
10	Inner part
11	Rotomatic ring
12	Outer part
13	Disk
14	Flange
15	Allen screw use Loctite 243

On the connection block and outer part the connections are marked with numbers.

1	Gear shifting
6	Swing axle
5	Creep speed
3	Parking brake
2	Foot brake
4	Gear shifting



12.1 Rotary connection and rotary transmission lead through structure



Overview:
Rotary connection Pos. 8-15
Rotary transmission lead through Pos. 16-32

1 Ball head
2 Locking
3 Cylinder screw
4 Cylinder screw
5 Cylinder screw
6 Hexagon bolt
7 Hexagon nut
8 Internal part
9 External part
10 Rotation set
11 Slide disk
12 Safety ring
13 Nut ring
14 Sealing ring
15 Sealing plug
16 External part
17 Driver
18 Rotomatic ring
19 Slide disk
20 Safety ring
21 Nut ring
22 Accelerating disk
23 Flange
24 Cylinder screw
25 Disk
26 Cylinder pin
27 Stircomatic conical nipple
28 Connection log
29 Cylinder screw
30 Counter ring
31 Internal part
32 Protection hose

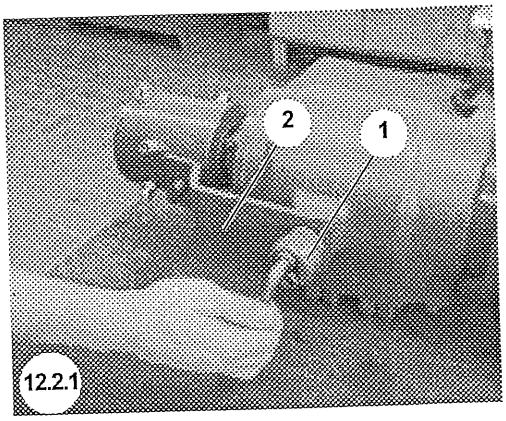
The line connections have been marked:

Rotary connection:
Port 1 = Steer
2 = Steer
3 = Drive
4 = Drive
5 = Support
6 = Support
7 = Leak oil

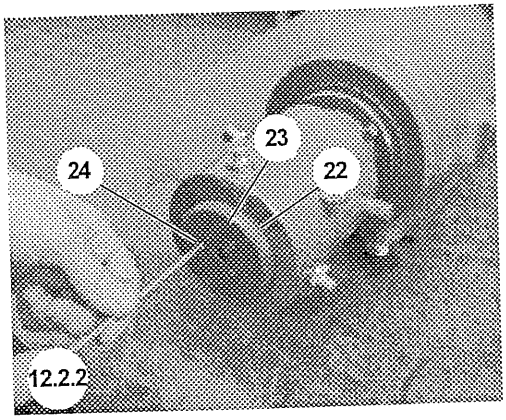
Rotary transmission:
Port 1 = Gear shifting
2 = Operation brake (1 circle at the front)
3 = Operation brake (2 circles at the rear)
4 = Fastening brake
5 = Regulation bypass
6 = Joint cross shaft axle blocking

12.2Maintenance of the rotary connection

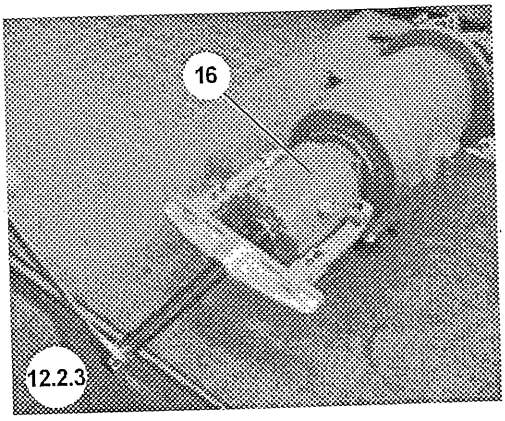
12.2.1 Remove the ball head (1) and remove the Locking (2).



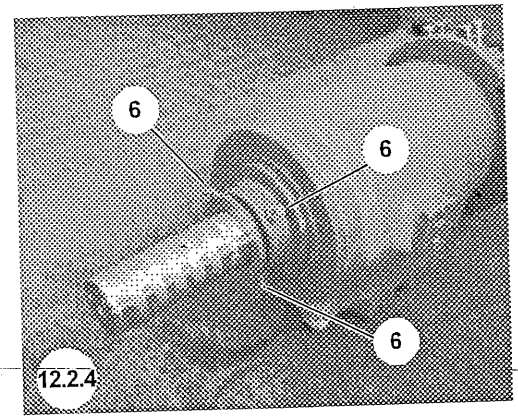
12.2.2 Remove the cylinder screws (24) and remove the flange (23) with the starting disk (22).



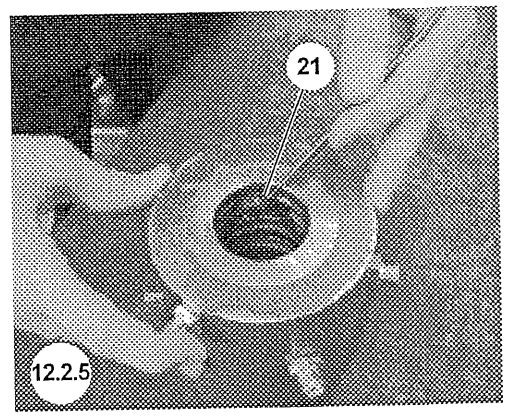
12.2.3 Remove the exterior part (16).



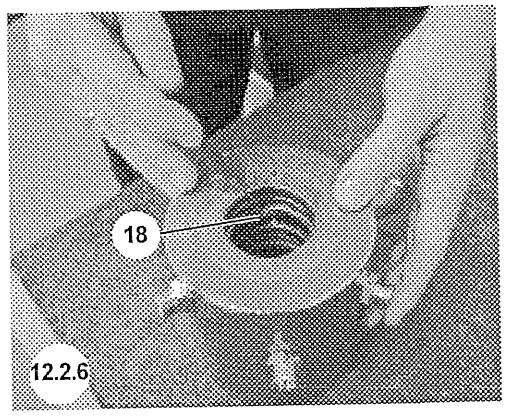
12.2.4 Remove the fastening screws (6).



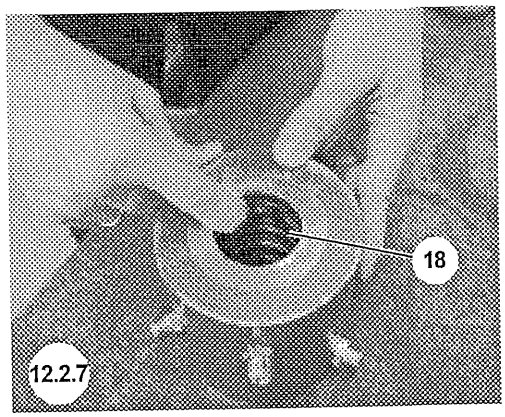
12.2.5 Remove the nut rings (21).



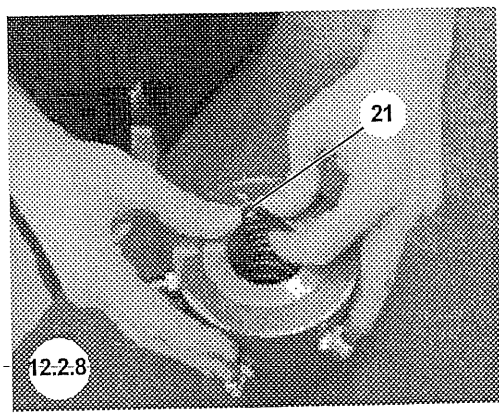
12.2.6 Remove the Rotomatic rings (18).



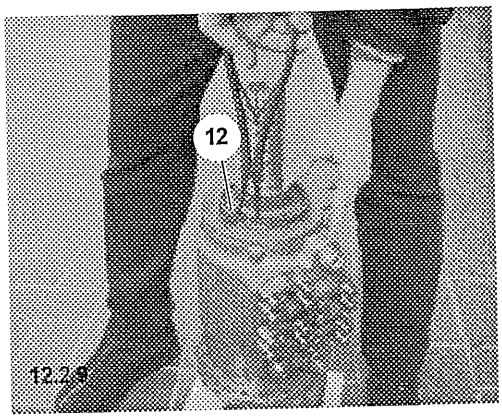
12.2.7 Insert the Rotomatic rings (18).



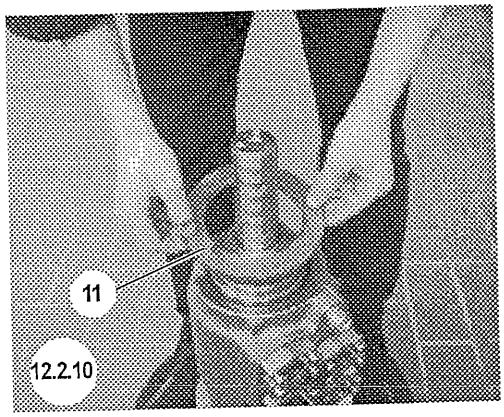
12.2.8 Insert the nut rings (21)



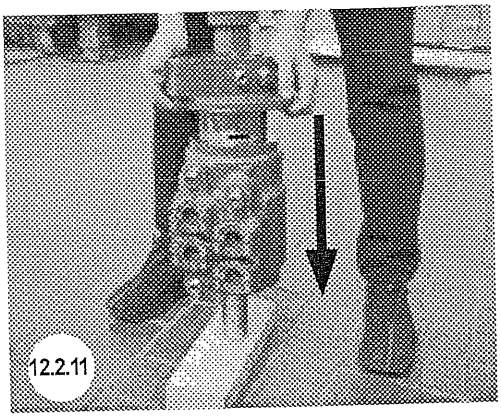
12.2.9 Mark the exterior part of the interior part. Safety ring (12) must be rebounded.



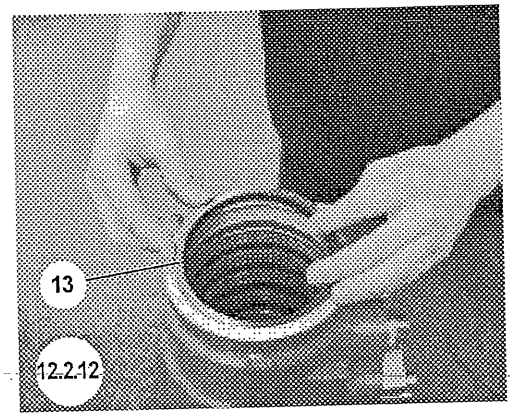
12.2.10 Remove the slide disk (11).



12.2.11 Separate the exterior part from the interior part by lightly placing it onto the ground

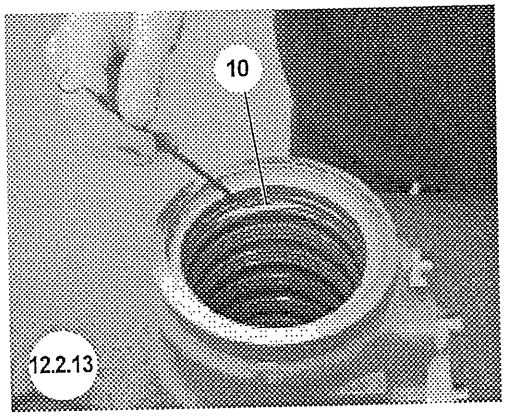


12.2.12 Remove the nut rings (13).

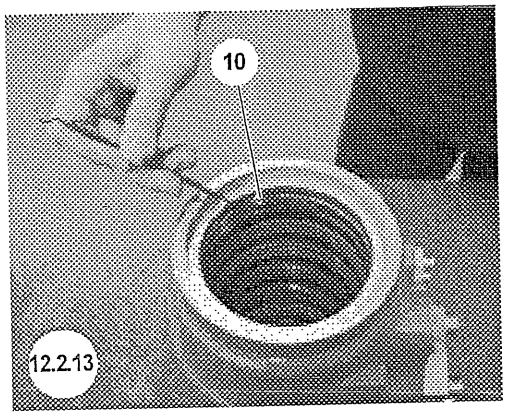


12.2.13 Remove the rotation sealing sets (10):

1. Support rings

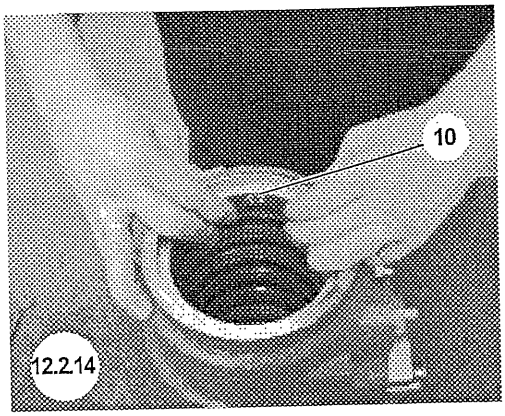


2. Sealing rings

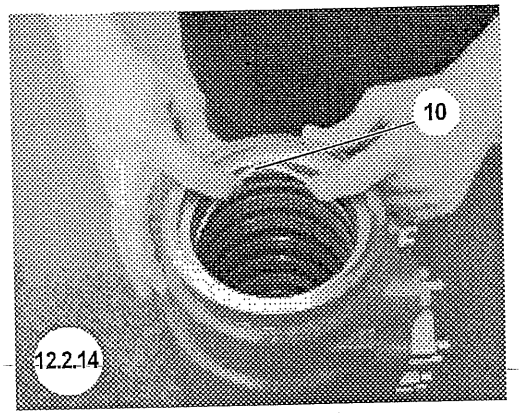


12.2.14 Clean the exterior and interior part and check them for damages.
Insert the rotation sealing set (10):

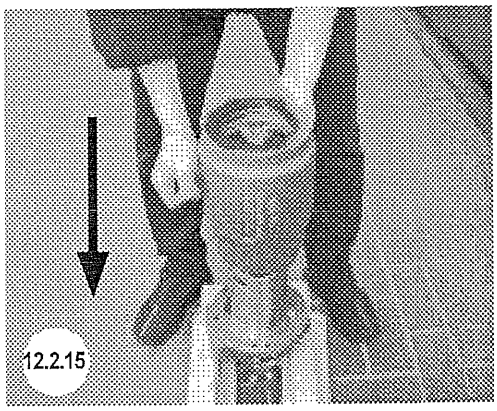
1.Sealing rings



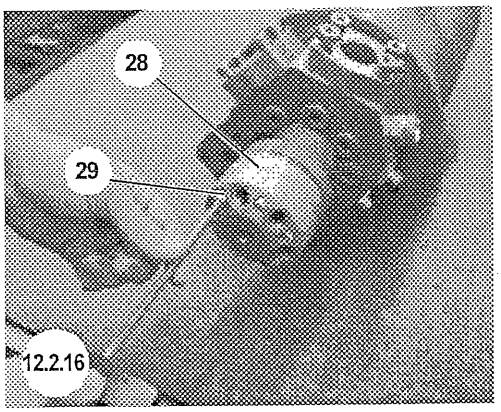
2.Support rings



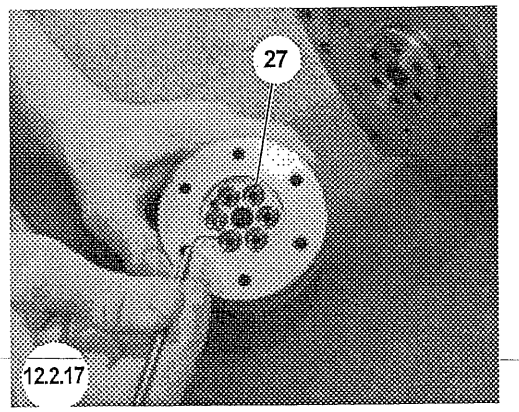
12.2.15 Lubricate the interior part and press on the exterior part.
If necessary, open it lightly.



12.2.16 Remove the cylinder screws (29) and remove the connection log (28).



12.2.17 Replace the Stircomatic sealings (27).

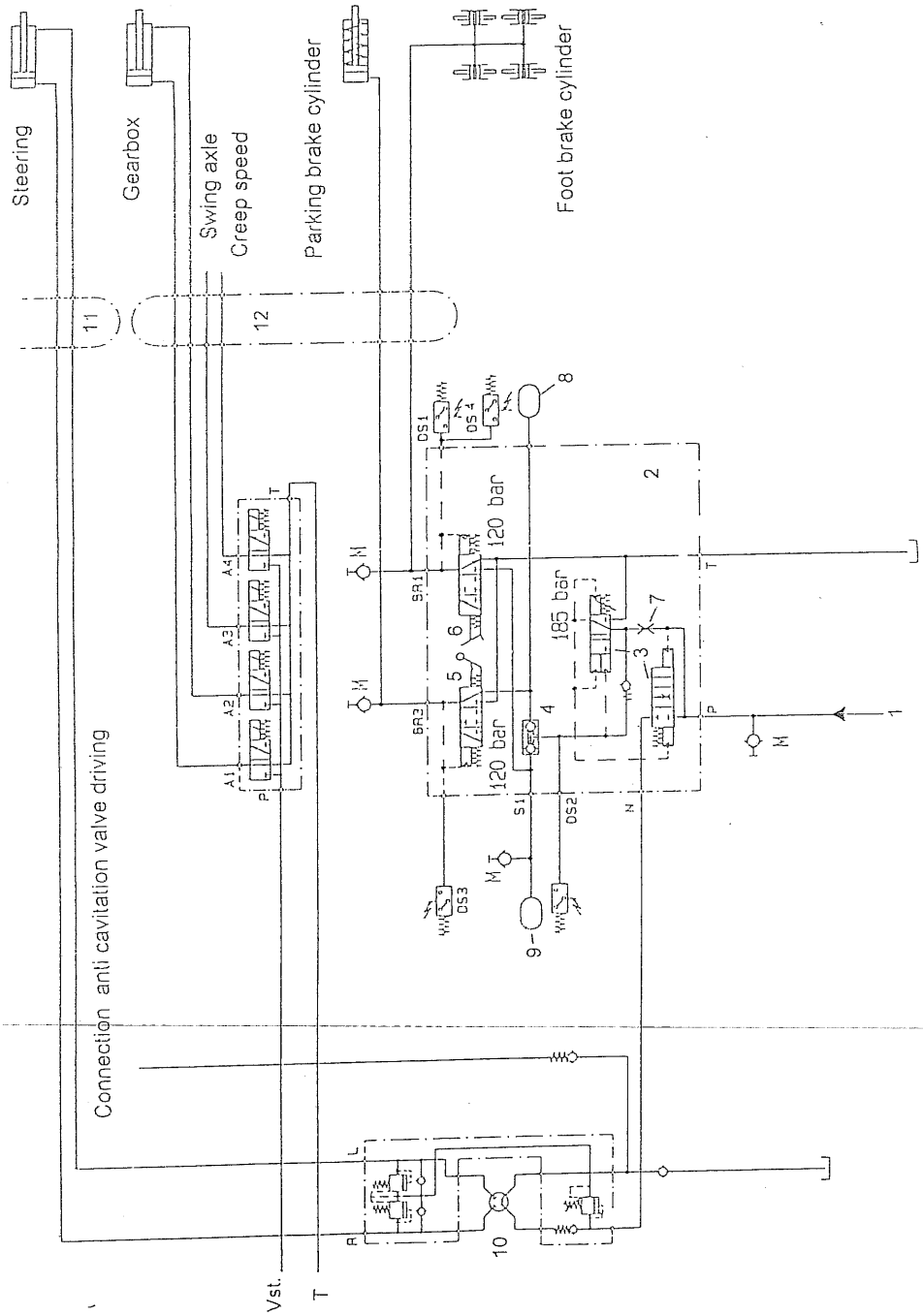


The remaining installation is done accordingly in the opposite order.

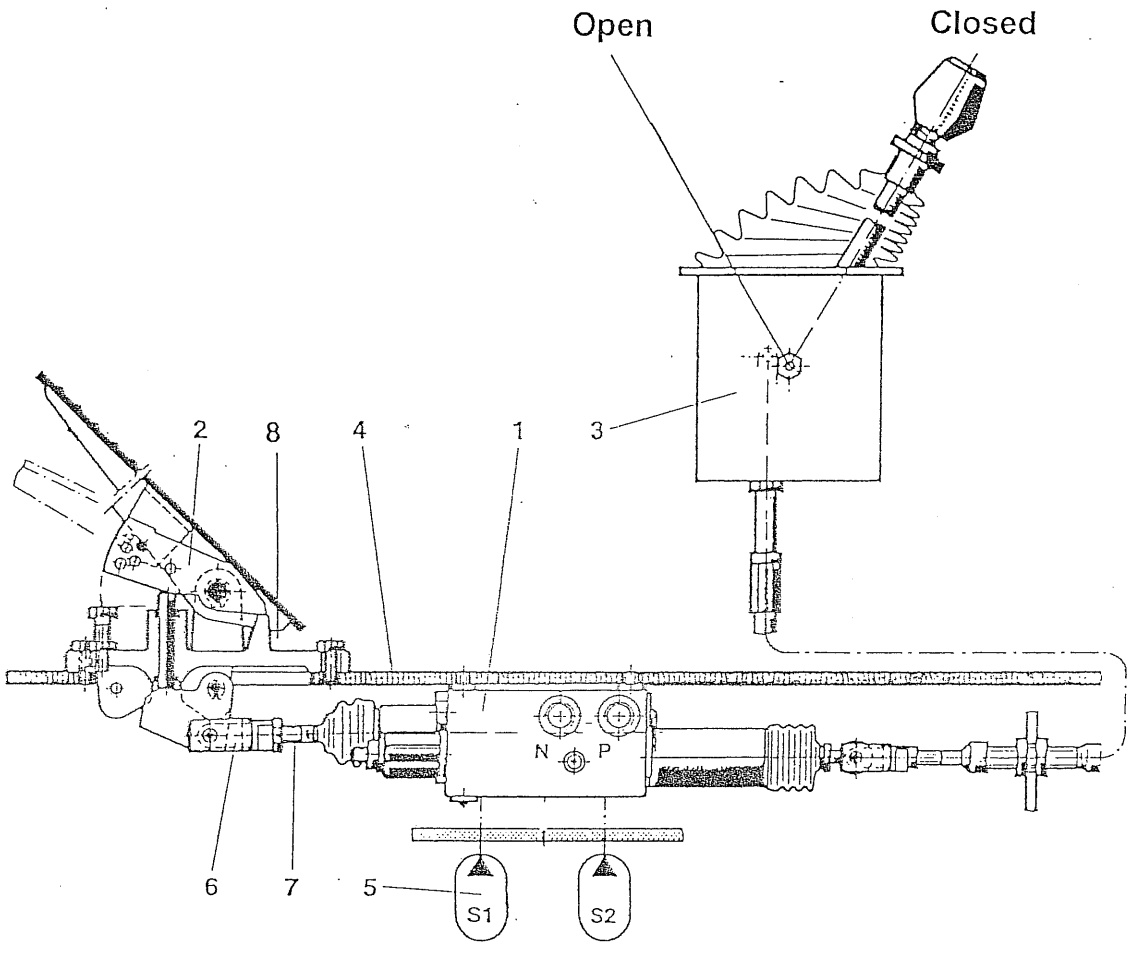
REMOTELY POWERED BRAKING VALVE

Tafel:
Name:
Datum: Ro. 05.97

1 Steering pump
2 Remotely powered braking valve
3 Accumulator loading valve
4 Double non return valve
5 Parking brake valve
6 Foot brake valve
7 Restrictor Ø 1.8mm
8 Pressure accumulator 0.35 ltr. / 60 bar
9 Pressure accumulator 1.0 ltr. / 65 bar
10 Steering unit
11 Auxiliary slewing coupling
12 Main slewing coupling
DS1 Pressure switch / Brake light 5 bar
DS2 Pressure switch / Functional check 100bar
DS3 Pressure switch / Parking brake 25 bar
DS4 Pressure switch / Swing axle 5 bar
VST Servo pressure
T Tank connection



Arrangement



1 Compact brake block

2 Pedal

3 Operation of parking brake

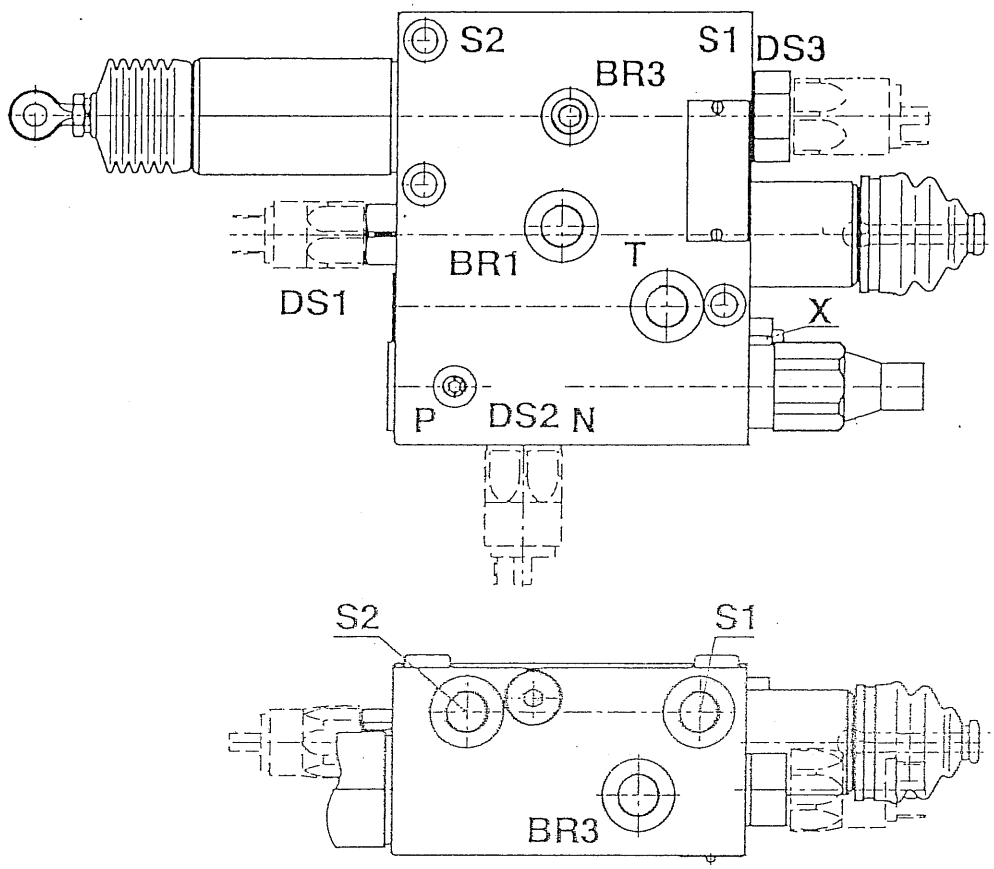
4 Base plate

5 Accumulator

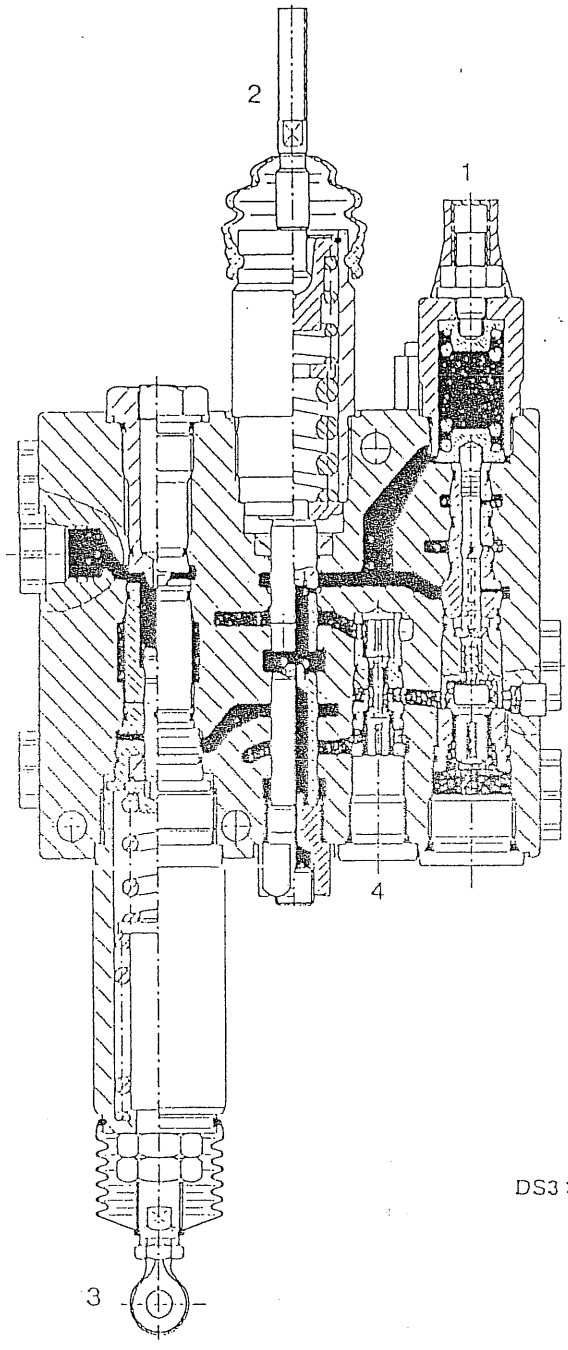
6 Forked clevis

7 Actuating rod

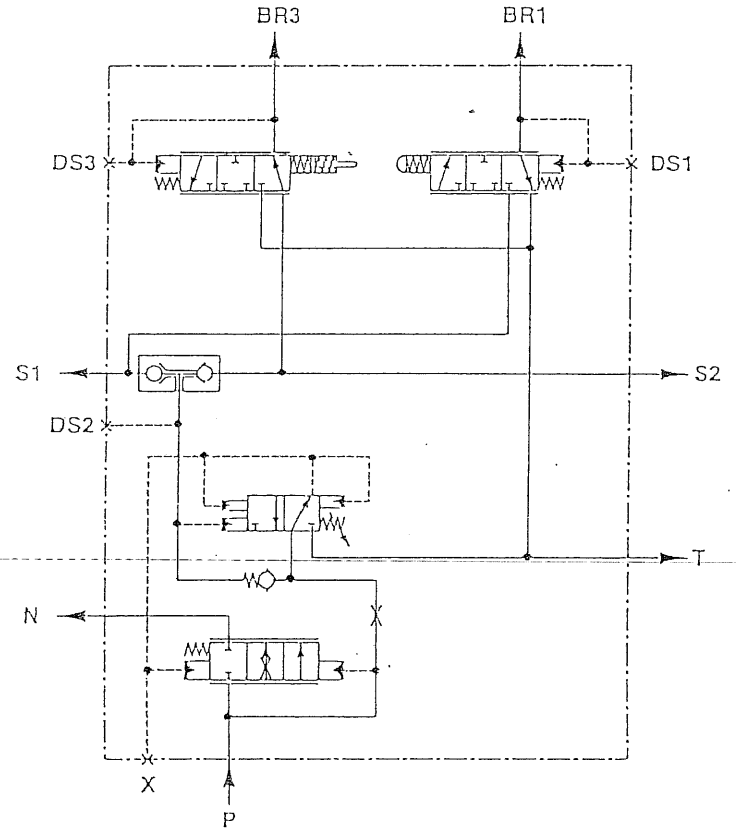
8 Adjusting screw



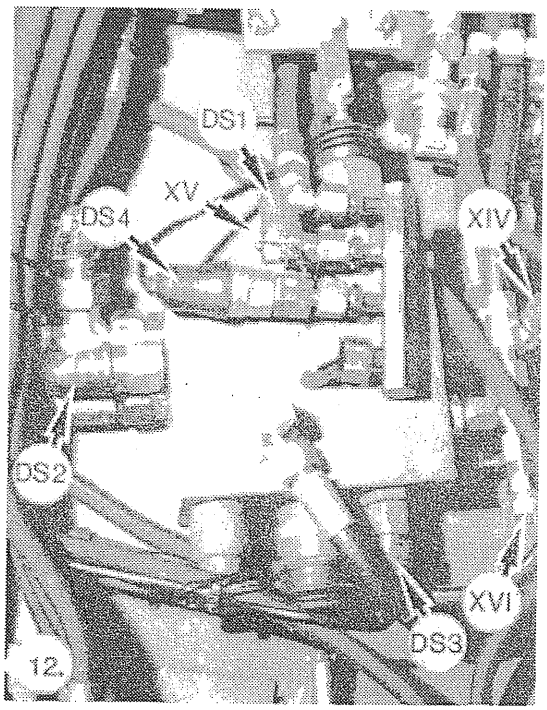
P	Pump
N	Subsequently added consumer
T	Tank
BR 1	Foot brake
BR 3	Parking brake
X	Load signal
S1	Accumulator foot brake
S3	Accumulator parking brake
DS 1	Pressure switch brake light
SD 2	Pressure switch accumulator pressure
SD 3	Pressure switch parking brake



1	Adjusting screw accumulator loading pressure
2	Foot brake valve
3	Parking brake valve
4	Double non return valve
S1	Pressure accumulator 1 Ltr. / 65 bar
S2	Pressure accumulator, 35 Ltr. / 60 bar
DS1	Pressure switch / Brake light
DS2	Pressure switch / Functional check
DS3	Pressure switch / Parking brake 25 bar
DS4	Pressure switch / Swing axle 5 bar
P	Connection - Steering pump
N	Connection - Steering valve
T	Connection - Tank



12. Remotely powered braking valve



Measuring unions:

XIV Accumulator loading valve
XV Foot brake
XVI Parking brake

Pressure switches:

PS 1 Pressure switch, brake light
PS 2 Pressure switch, functional check
PS 3 Pressure switch, parking brake
PS 4 Pressure switch, swing axle

Venting:

Accumulator loading valve
- Connect "minimess" measuring hose to measuring union (XIV).
Hold hose end in a suitable receptacle.

Foot brake
- Connect "minimess" measuring hose to measuring union (XV).
Hold hose end in a suitable receptacle.
(energise pedal-operated valve slightly)

Parking brake
- Connect "minimess" measuring hose to measuring union (XV).
Hold hose end in a suitable receptacle.
(apply parking brake slightly)

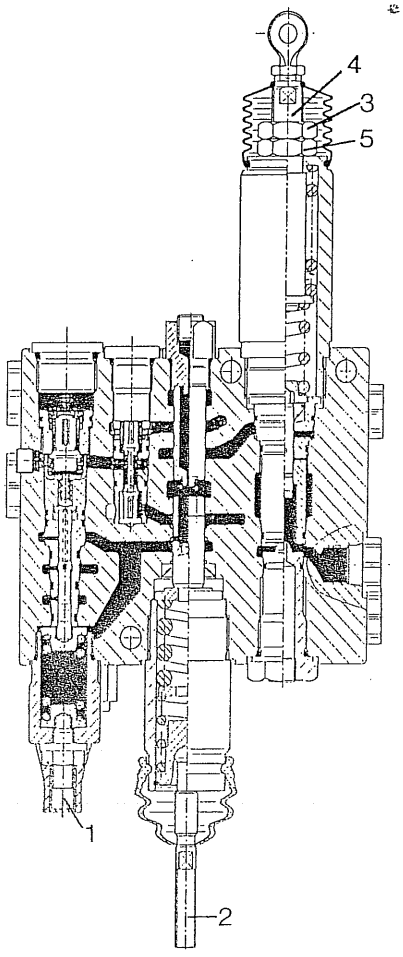
Checking/adjusting

Connect pressure gauge (0 - 400 bar) to measuring unions XIV, XV and XVI.

Accumulator loading valve

Start the engine.

An accumulator pressure of 185 bar is displayed instantly.
By operating the pedal-operated brake valve several times, the accumulator pressure can be lowered to the adjustment value of 152 bar and will then increase again to 185 bar. Adjustment to 152 bar takes place at adjusting screw (1).



Slackening off adjusting screw:
- feed pressure lower

Tightening adjusting screw:
- feed pressure higher

Foot brake

Prevent the pedal-operated brake valve from moving.

A braking pressure of 120 bar must be displayed.
Adjustment takes place at threaded rod (2).

Screwing threaded rod (2) into fork-end sleeve: braking pressure lower
Screwing threaded rod (2) out of fork-end sleeve: braking pressure higher

Pedal-operated brake valve released.

Connect pressure gauge (0 - 6 bar) to measuring union XV.

A braking pressure between 1 - 1.8 bar must be shown.
Adjustment takes place at adjusting screw (8). - Page 7.

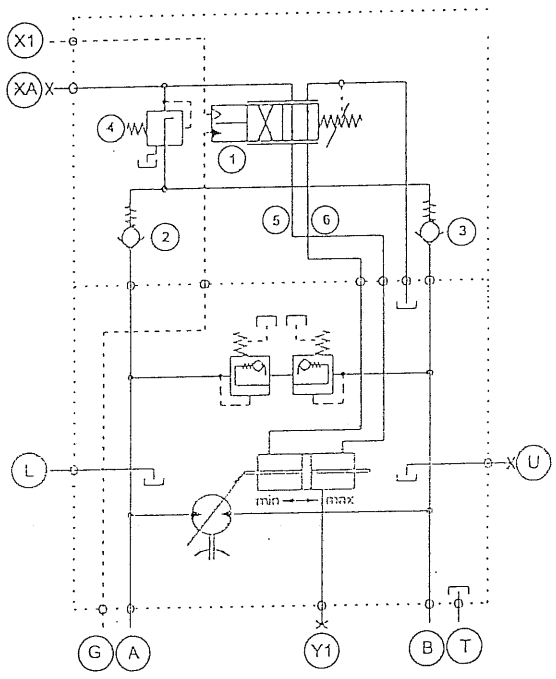
Parking brake

Release parking brake.

An operating pressure of 120 bar must be displayed.
Adjustment takes place at adjusting screw (4).
- Push gaiter away
- Loosen locknut (3).
- Tightening adjusting screw (5) further: operating pressure higher
- Loosening adjusting screw (5): operating pressure lower

Description of function

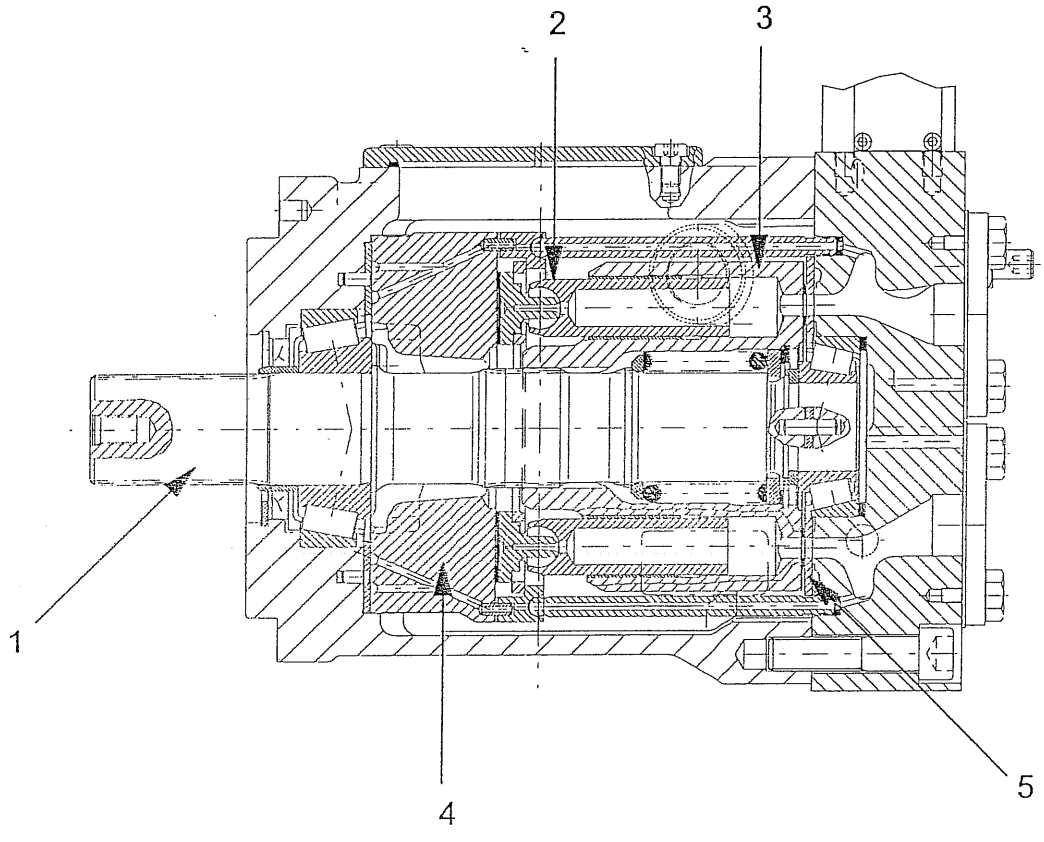
For this regulating system, the motor is always set to minimum intake volume. Once a preselected pressure is reached, the motor's pitch is adjusted steplessly towards maximum intake volume.
The changeover valve in the travel brake valve connects the pressure regulator (1) with whichever travel pressure of A or B is higher, via connection G. The higher pressure from the high-pressure connections A or B is supplied to the pressure reducing valve (4) via the check valves (2) and (3). The reduced pressure reaches the regulator (1), and the adjusting piston for minimum intake volume via port (5). The motor is adjusted towards a small angle of pitch. The adjusting piston for maximum intake volume is breathed via the port (6) to the motor-housing hydraulic tank. The regulator's (1) pressure setting determines the start of the regulating action, i.e. the pressure at which the motor's pitch starts to move towards maximum intake volume. The pilot piston acts in the opposite direction of the preset spring load. The pressure reducing valve's (4) actuating pressure reaches the port (6) for the adjusting piston and moves the motor towards the maximum angle of pitch. The end of the regulating process is reached when the pressure of the adjusting piston for minimum intake volume has been dissipated via the port (5) to the motor-housing hydraulic tank. This can be measured at union Y1.
Adjustment to the required torque takes place steplessly and the motor remains dependent on high pressure at all positions between Qmin and Qmax.



Regulator bypass function

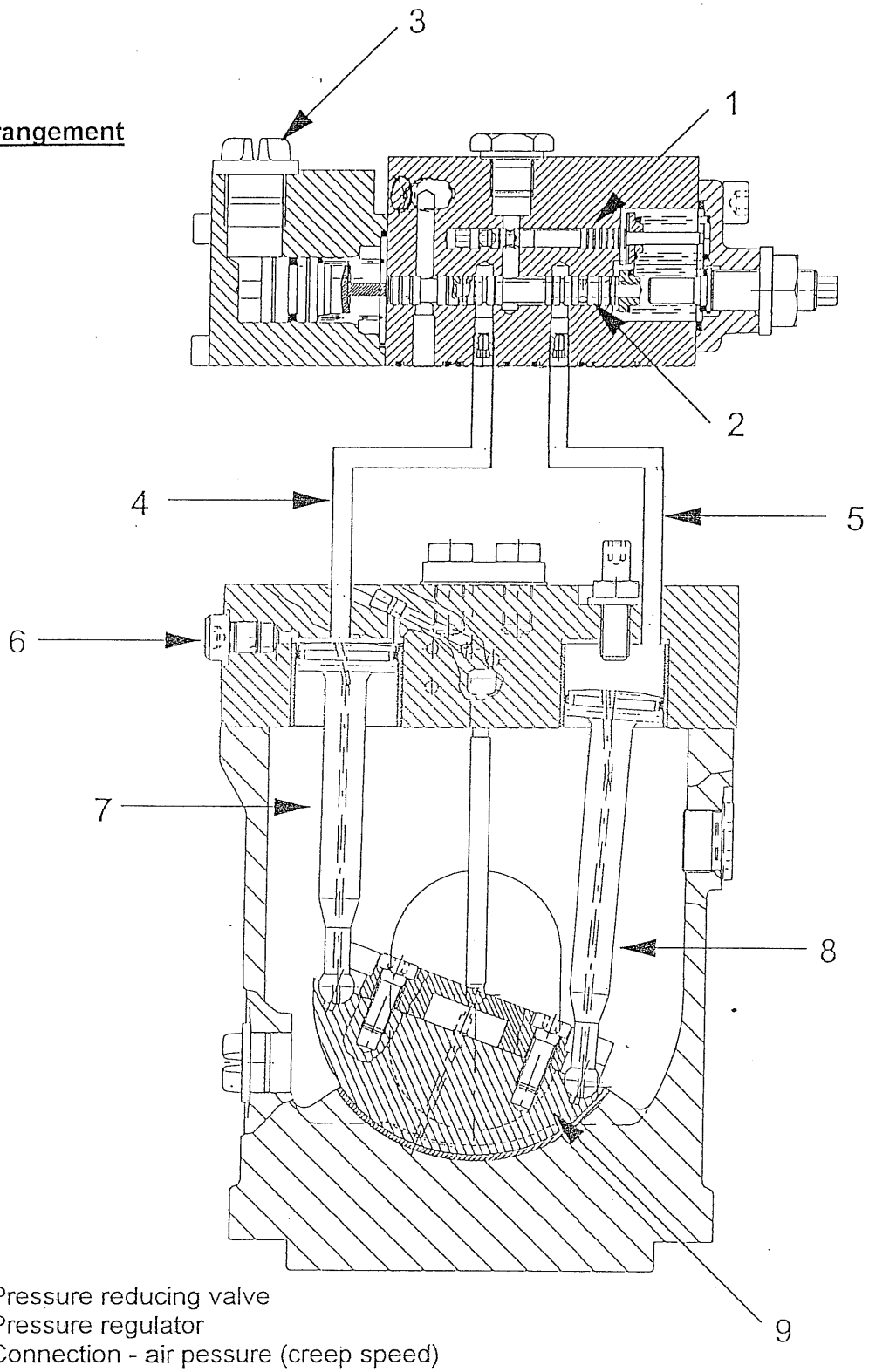
For various tasks it is necessary to switch the motor directly to maximum intake volume, regardless of when the regulating process starts. This is done by switching on the regulator bypass function (inching speed). An external control pressure (compressed air) of approx. 4-8 bar actuates the regulator (1) via connection X1.

Arrangement



1 Drive shaft
2 Piston
3 Cylinder block
4 Swash plate
5 Control bottom

Arrangement

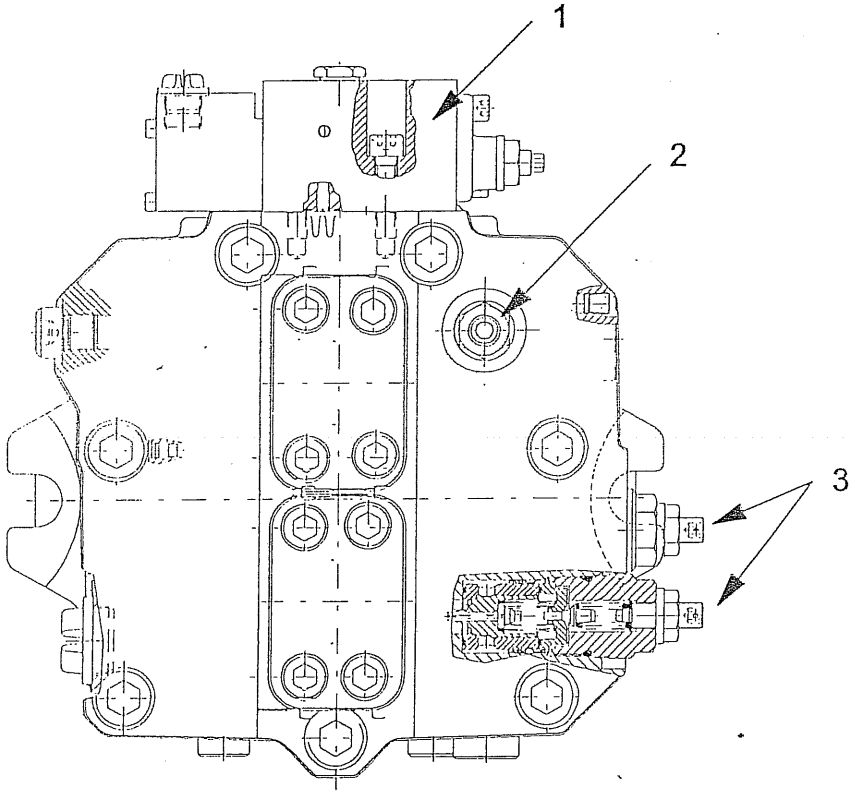


1 Pressure reducing valve
2 Pressure regulator
3 Connection - air pessure (creep speed)
4 Connection - line (5)
5 Connection - line (6)
6 Measuring point (Y1)
7 Control piston q max
8 Control piston q min
9 Swash plate

VARIABLE SPEED MOTOR
HMR - 02

Schulungszentrum
Tafel:
Name: Ro.
Datum: 11.95

Arrangement



1 Pressure regulator
2 Stop screw q min
3 Secondary relieve

Function

Travelling on the flat

When moving forwards, the oil flow moves from the control block to the AST connection for the brake valve. The flow divider (12) terminates the port (9). The check valve simultaneously opens to the flow divider and the pressurised oil flows to the travel motor (AM). The travel pressure in the spring compartment is generated via the tolerance at the brake piston (11) and the cold-starting valve (3). The brake piston (4) moves to the right against the spring pressure and opens the port (9) for reverse travel (BM). The oil in the opposite valve cap can escape slowly via the tolerance (11) and check valve (2).
The oil flowing back from the travel motor (BM) closes the check valve in the flow divider and simultaneously opens the connection with the brake piston (4) via port (9). The oil flows back to the control block without restriction.

Travelling downhill

When travelling downhill, the travel pressure and therefore the pressure in the spring compartment fall. The coil spring moves the brake piston (4) to the left against the falling pressure, and the cross-section of the restrictor zone (S) is reduced. The return oilflow is restricted and a braking effect is achieved.

Coasting

If the operator takes his foot off the accelerator pedal, the control spool valve moves to the neutral position. The incoming pressure simultaneously falls and the travel brake valve begins to take effect at about 50 bar. A "gentle" braking effect is achieved. The excavator rolls slowly to a standstill. Shortly before it comes to a halt, the braking action becomes slightly "firmer".
Note: the control spool valve must have an A - T - B - T connection.

Cavitation

For this version of the travel brake valve, no additional feed valve block is needed. The feed valves (1) are responsible for the supply.

Scavenging

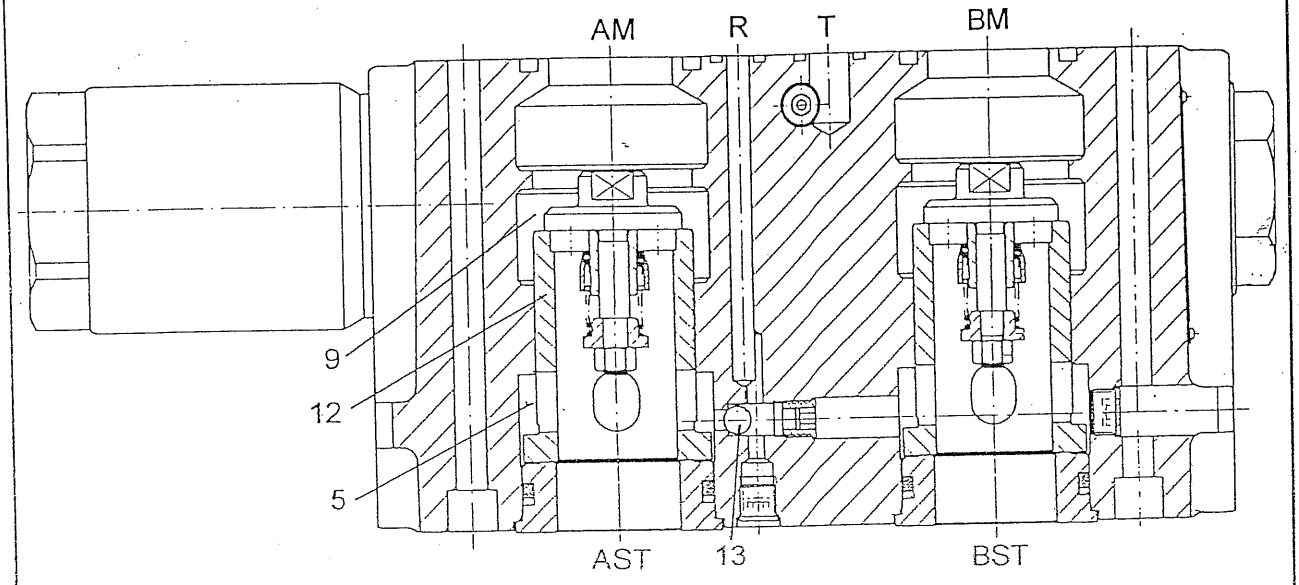
While on the move, the travel motor is continuously flushed at a rate of approx. 6 - 7 l/min. by the scavenging valve (10):

Regulation of travel motor

The changeover valve (13) is connected up to the AST and BST ahead of the brake piston (4). The brake pressure thus has no influence on the process of regulating the travel motor (unintentional increase in pitch).

BRAKE VALVE
Wheeled excavator

Arrangement

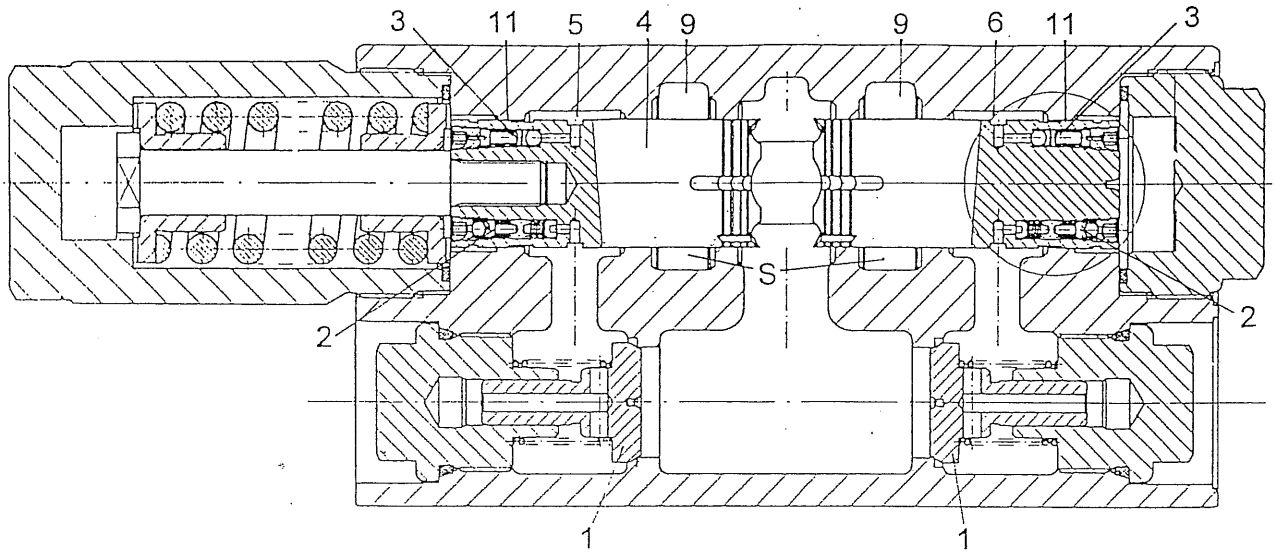


AST	Connection control unit
BST	Connection control unit
AM	Connection drive motor
BM	Connection drive motor
R	Connection pressure regulator drive motor
T	Connection flush valve drive motor
5	Line AST
9	Line to the brake piston
12	Flow valve with non return valves
13	Shuttle valve

BRAKE VALVE
Wheeled excavator

Schulungszentrum
Tafel:
Name: Ro.
Datum: 11.95

Arrangement



1 Feed valves

2 Non return valves -with preload

3 Cold start valve

4 Brake piston (fixed adjusted)

5 Line from AST

6 Line from BST

7 Connection AM - driving motor

8 Connection BM - driving motor

9 Line to the brake piston

10 Flush valve

11 Tolerance at the brake piston

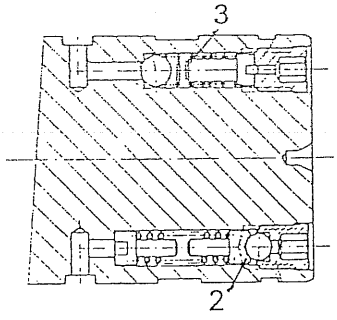
12 Flow valve

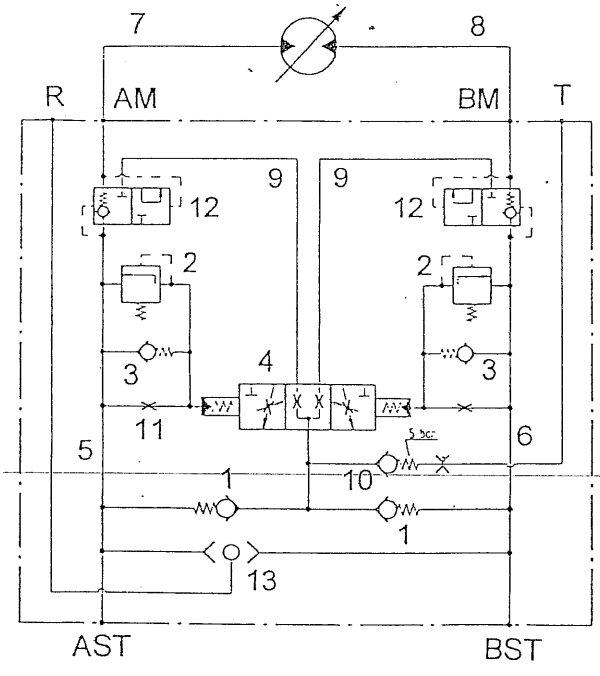
13 Shuttle valve

R Connection - pressure regulator - drive motor

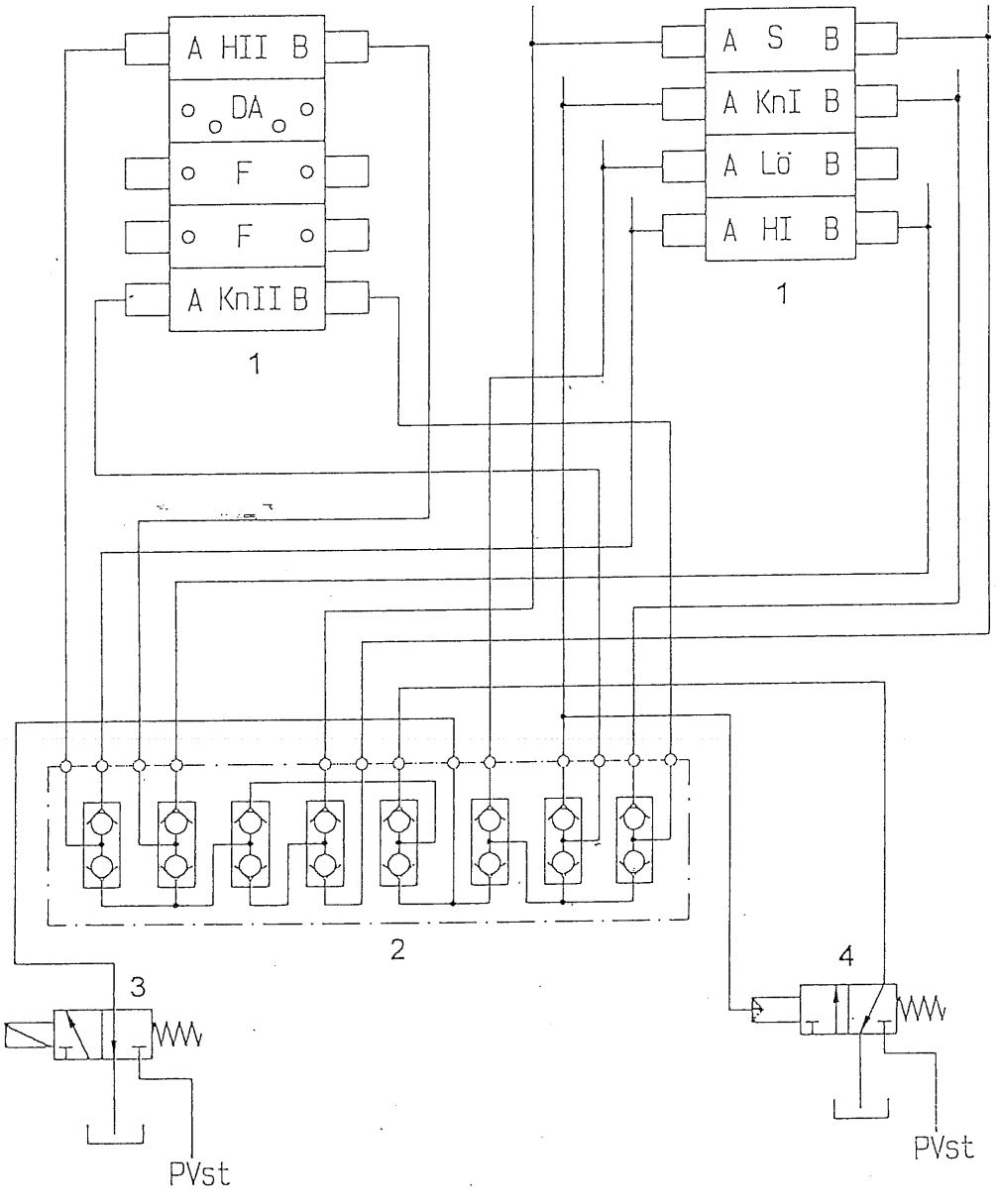
T Connection - Flush valve - drive motor

S Pressureized area



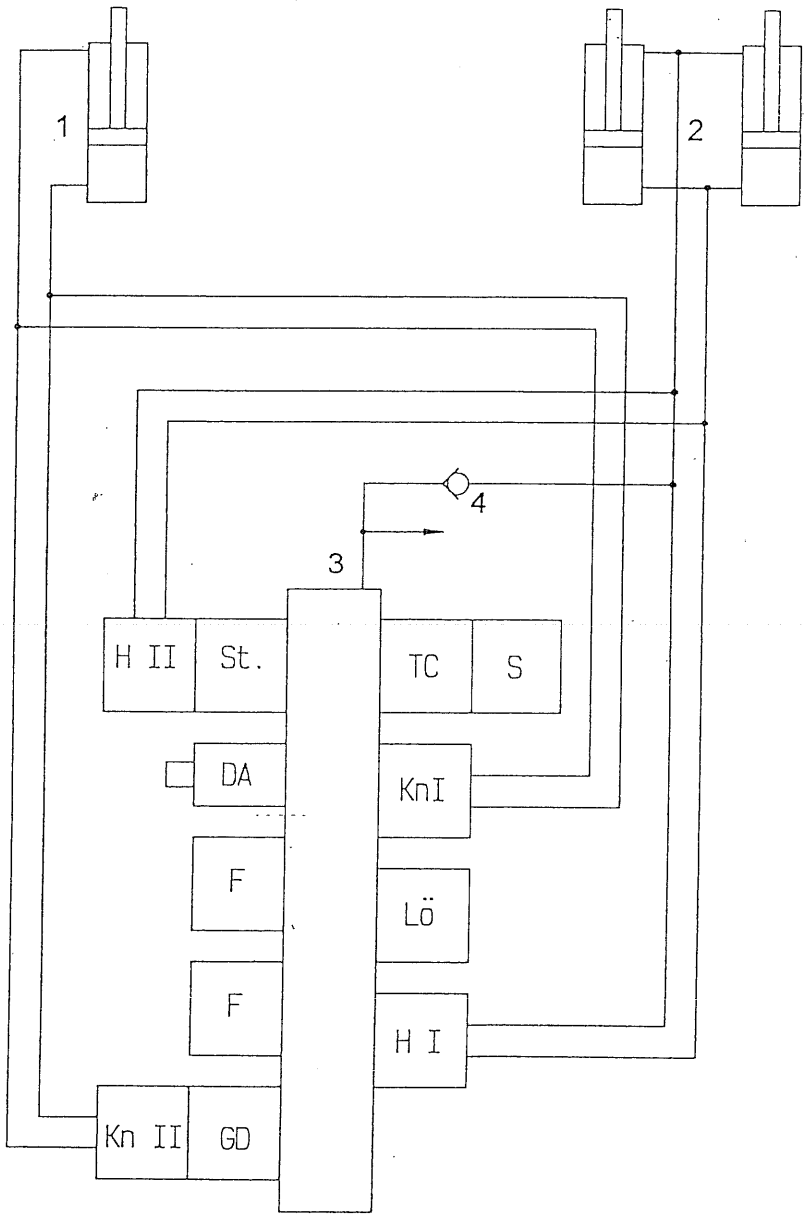


Arrangement



1 Distributor	F	Driving	(P1)
2 Shuttle valve unit	S	Slewing	(P2)
3 3/2 way solenoid valve	H - I	Lifting 1	(P1)
4 3/2 way valve	H - II	Lifting 2	(P2)
P - Vst Servo pressure	K - I	Jib folding 1	(P2)
A - B Port	K - II	Jib folding 2	(P1)
DA - Valve unit			

Arrangement

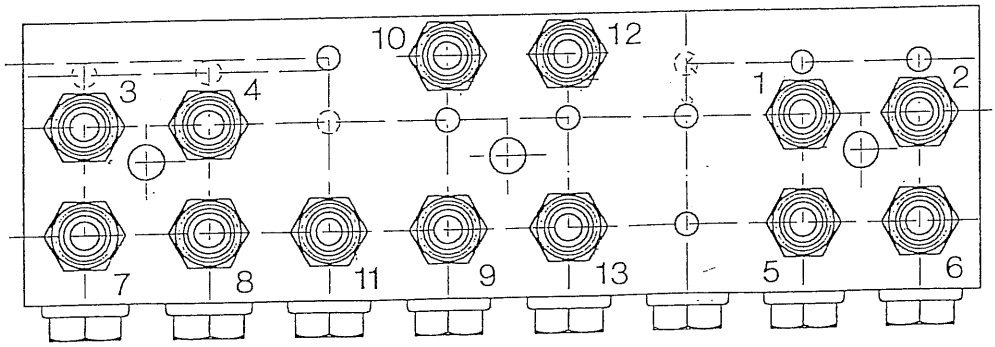


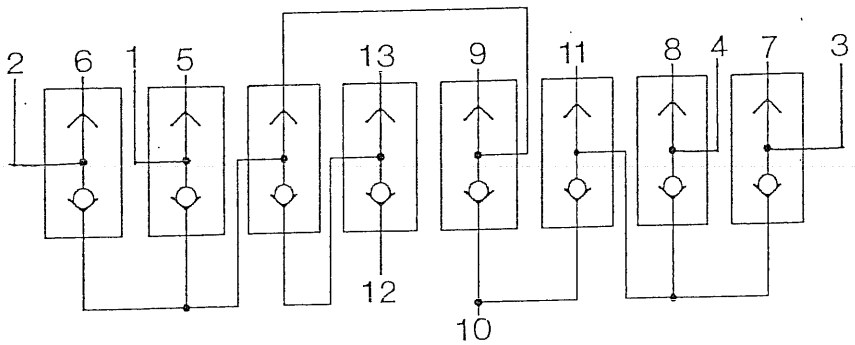
1 Jib ram

2 Lifting ram

3 Distributor with plate valves

4 Anti cavitation valve „Lowering"





The numbers on the connections of the shuttle valve unit refering to the servo connections of the valve caps and 3/2 way valves.

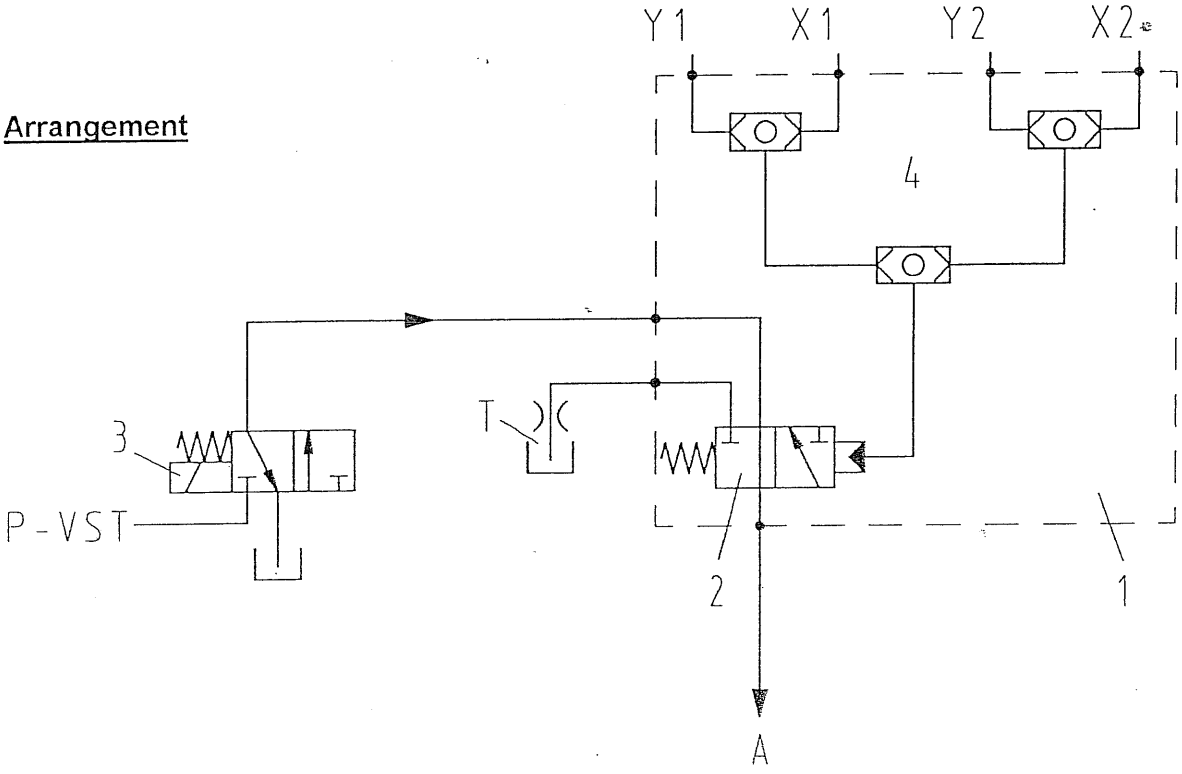
1	Lowering II
2	Lifting II
3	Jib folding out II
4	Jib folding in II
5	Lowering I
6	Lifting I
7	Jib folding out I
8	Jib folding in I , 3/2 way valve, Connection (X)
9	3/2 way valve, Connection (A)
10	3/2 solenoid valve, Connection (A)
11	Bucket close
12	Slewing
13	Slewing

HYDRAULIC DIAGRAM

autom. steering torque increast
Tracked excavator

Schulungszentrum
Tafel:
Name: Ro.
Datum: 11.95

Arrangement



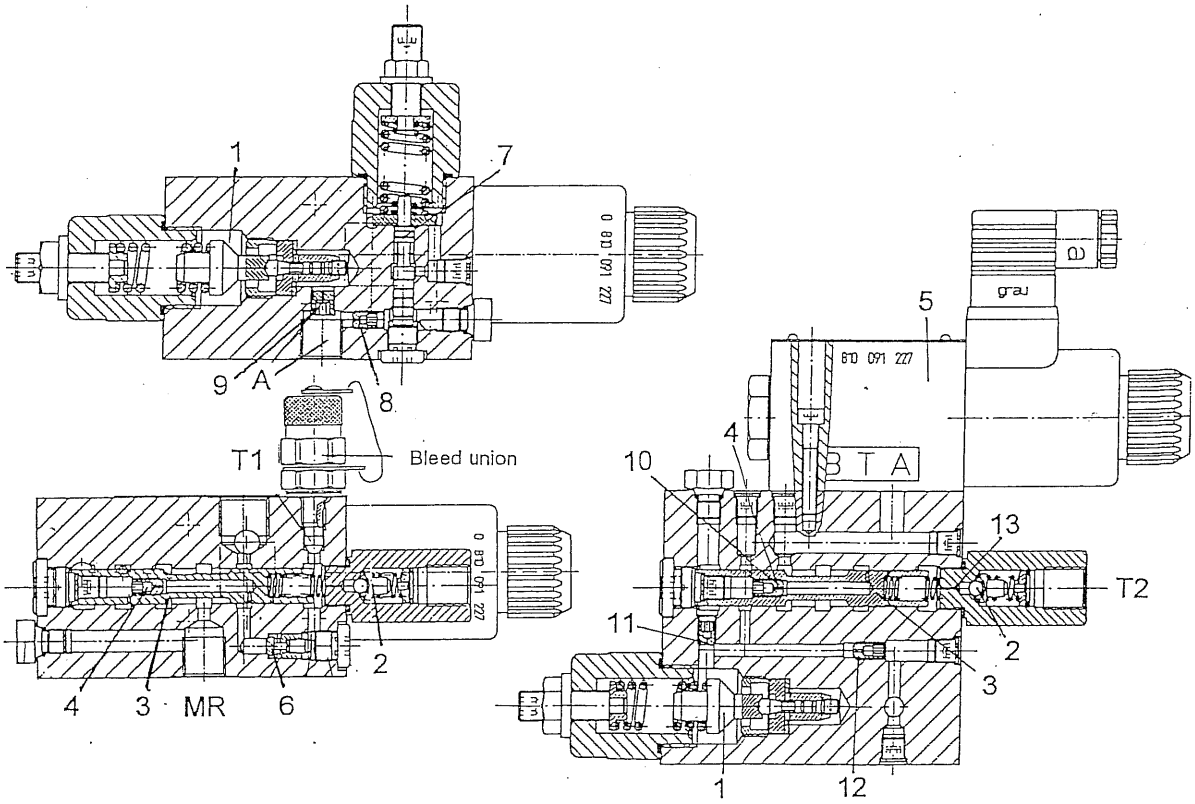
1	Valve unit
2	Pilot valve
3	3 / 2 way valve
4	Shuttle valve
Y 1	Connection - pilot pressure - servo unit hand lever control
X2	ect.
Y2	ect.
X2	ect.
P-VST	Connection - servo pressure
A	Connection - two stage motor
T	Tank

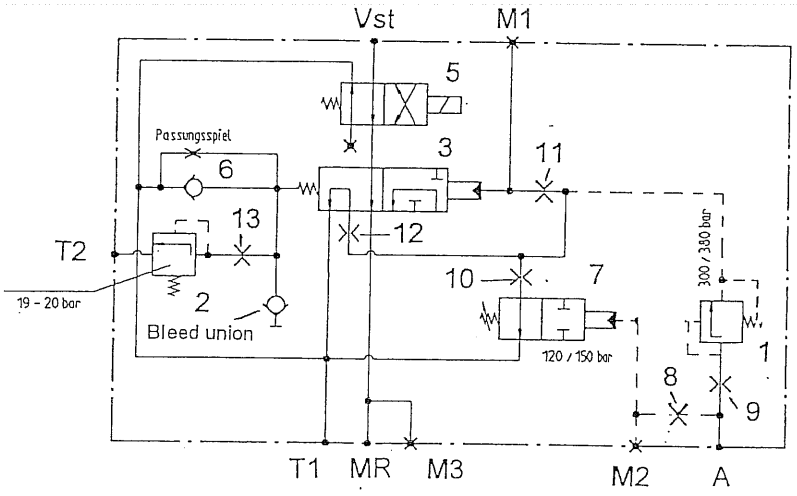
VARIABLE DRIVE MOTOR

Tracked excavator

Name : Ro.

Datum: 07.99

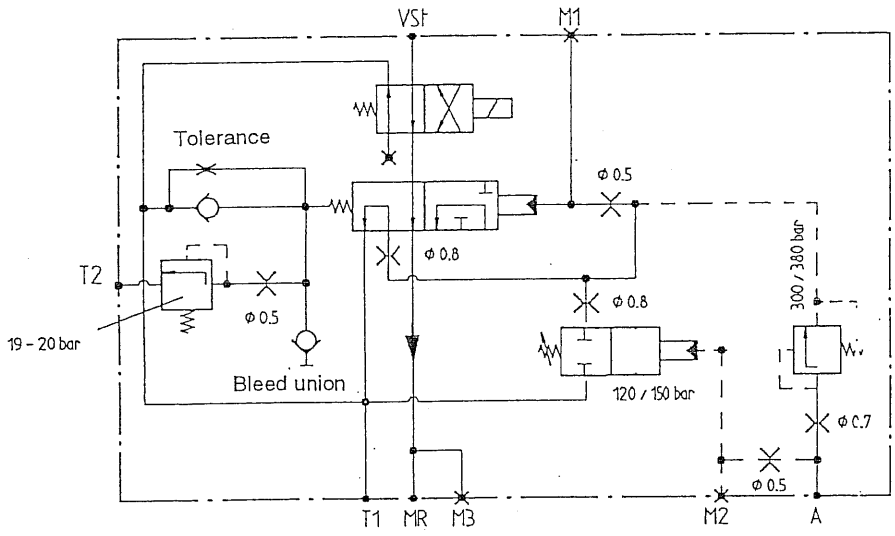




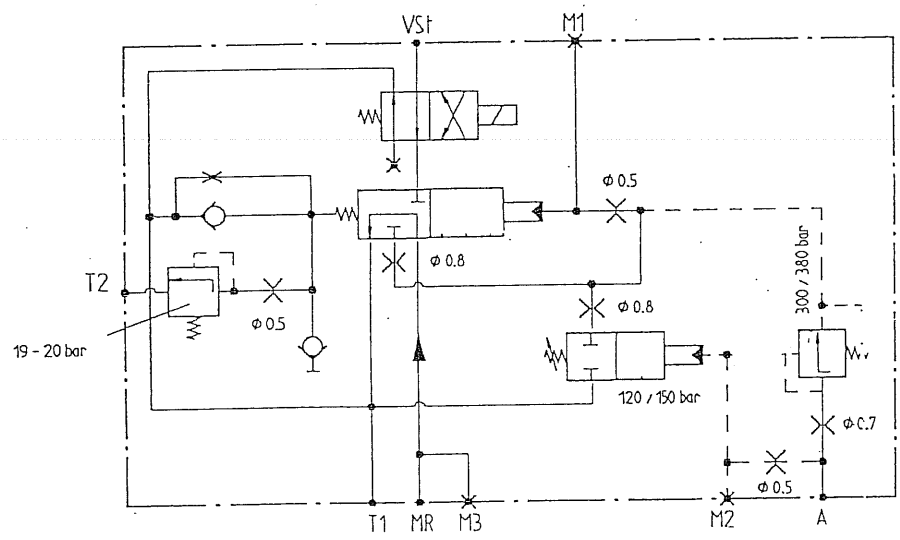
1 Pressure reducing valve
2 Pressure relief valve
3 Change over piston
4 Non return valve (with relief bore)
5 Solenoid valve
6 Non return valve
7 Change over valve
8 Orifice ∅ 0,5 mm
9 Orifice ∅ 0,7 mm
10 Orifice ∅ 0,8 mm
11 Orifice ∅ 0,5 mm
12 Orifice ∅ 0,8 mm
13 Orifice ∅ 0,5 mm

A - Connection - Driving pressure
MR - Connection - Regulation of Driving motors
T1 - Connection - Tank
T2 - Connection - Tank
VST - Connection - Servo pressure
M1 - Measuring union
M2 - Measuring union
M3 - Measuring union

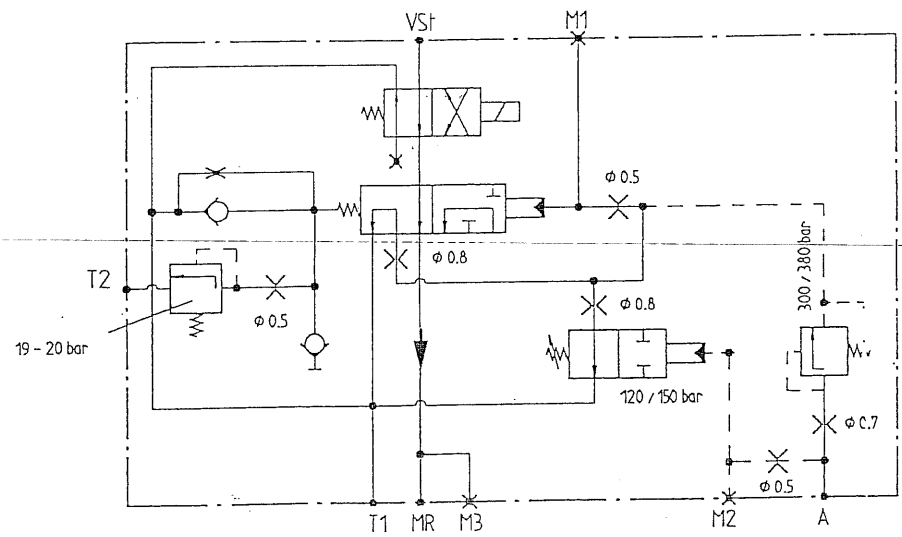
Driving pressure below regulating point approx. 200bar.



Driving pressure above regulating point approx. 300bar.



Driving pressure drops below regulating point approx. 150bar.



Function

Travelling on the flat

When moving forwards, the oil flow moves from the distributor to the AST connection for the brake valve.The flow divider (12) terminates the port (9). The check valve simultaneously opens to the flow divider and the pressurised oil flows to the travel motor (AM). The travel pressure in the spring compartment is generated via the tolerance at the brake piston (10) and cold - starting valve (3). The brake piston (4) moves to the right against the spring pressure and opens the port (9) for reverse travel (BM). The oil in the opposite valve cap can escape slowly via the tolerance (10) and check valve (2).

The oil flowing back from the travel motor (BM) closes the check valve in the flow divider and simultaneously opens the connection with the brake piston (4) via port (9). The oil flows back to the distributor without restriction.

Travelling downhill

When travelling downhill,the travel pressure and therefore the pressure in the spring compartment fall. The coil spring moves the brake piston (4) to the left against the falling pressure, and the cross- section of the restrictor zone (S) is reduced. The return oilflow is restricted and a braking effect is achieved.

Stopping

If the operator takes his foot off the accelerator pedal, the ditributor piston moves to the neutral position.The incoming pressure simultaneously falls and the travel brake piston (4) moves and a braking effect is achieved.

Cavitation

For this version of the travel brake valve, no additional feed valve block is needed. The check valves (1) are responsible for supply.

Scavenging

While on the move, the travel motor is continuously flushed at a rate of approx. 6 - 7 l/min by the scavenging valve (11).

Checking, adjustment

The track chains must have the prescribed sag (Operating instruction).

Connect one pressure gauge (0-600bar) each to measuring connection (M1 and M2). Move the upperstructure cross to the driving direction and lift up the undercarriage.

At max. engine speed move the travel lever to ist end position.

The pressure gauges showing different values.

For example: **M1** high pressure

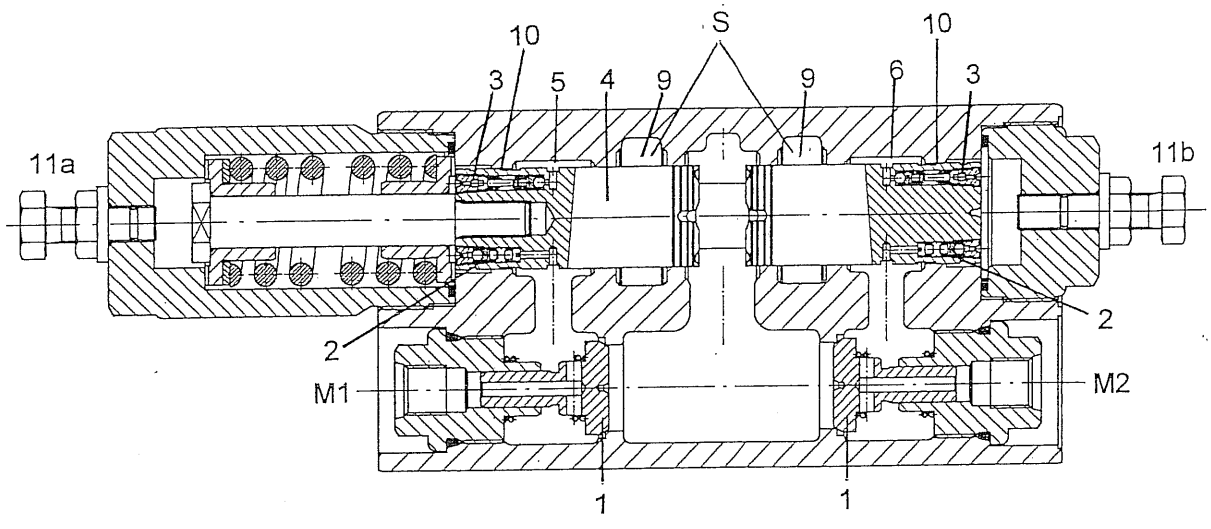
M2 low pressure

Unscrew the adjusting screw (11b) until the pressure on gauge (M1) stops to decrease.

Then tighten the adjusting screw (11b) until the pressure gauge (M1) increased approximately 5 bar.

This adjusting procedure has to made on both tracks in each travel direction.

Arrangement



1 Check valves

2 Check valves - with preloal

3 Coold start valves

4 Brake piston

5 Line from - AST

6 Line from - BST

7 Connection AM - Driving motor

8 Connection BM - Driving motor

9 Line to the brake piston

10 Tolerance at the brake piston

11a Adjusting screw

11b Adjusting screw

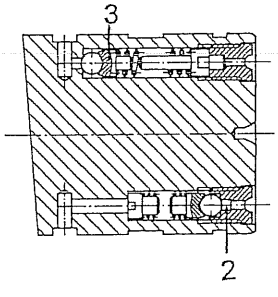
12 Flow divider (Check valve)

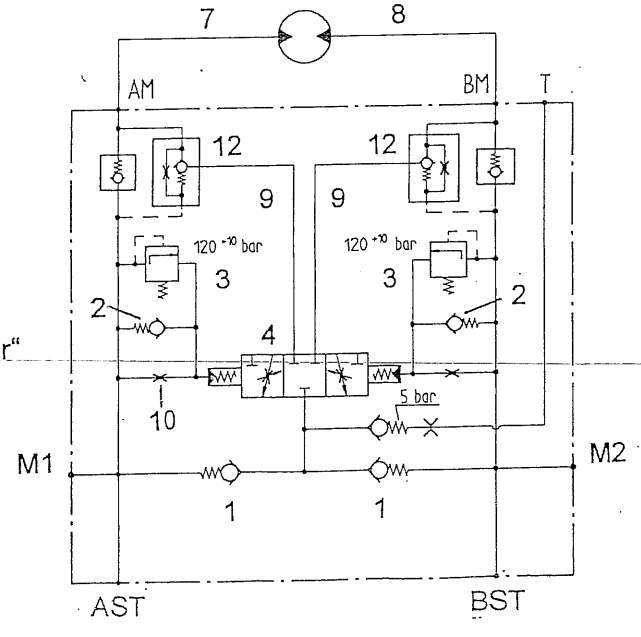
T Connection - Flush valve „Drive motor"

S Pressureized area

M1 Measuring union

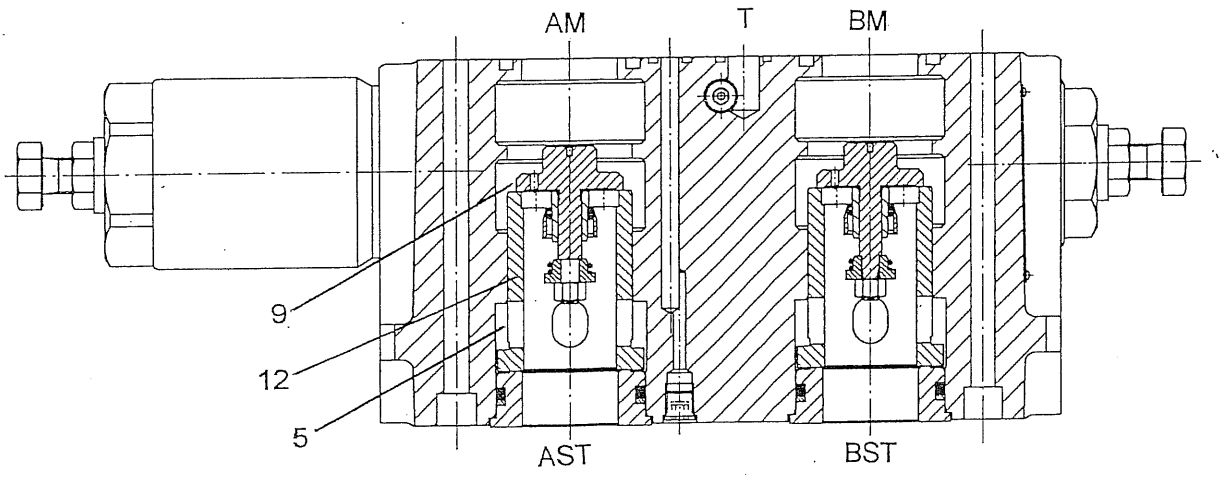
M2 Measuring union





BRAKE VALVE
Tracked excavator

Arrangement



AST - Connection – Distributor

BST - Connection – Distributor

AM - Connection – Drive motor

BM - Connection – Drive motor

T - Connection – Scavening / Drive motor

5 - Connection line to AST

9 - Line to the brake piston

12 - Flow divider with check valve

This adjusting instruction is for excavator typs 1704 / 1804 with serial number 373.../ 283...

a) Oil separation and summation control

b) External oil summation control (symbol Rabbit)

c) Industrial - Maschines

1. Bleeding the system
2. Engine speed
3. Pilot control
4. Emergency operation
5. Load-limit regulating valve
6. Measuring-union panel
7. LS (power stage) regulator
8. Pressure cut-off
9. Pressure cut-in stage
10. Secondary valve
11. Reverse flow restrictors
12. Speed of universal-joint shaft
13. Pilot control pressure - travel - wheeled excavator
14. Pressure adjusting table

General notes:

a) All adjustments must be made using an electronic measuring instrument. This must provide two visible pressure displays simultaneously.

b) Hydraulic oil temperature must be between 40 and 60° C.

The hydraulic system is heated up during normal operation of the various working movements, so that the limit position should only be selected for a short time.

c) Before opening any screw plugs etc., preload pressure in the hydraulic-oil tank must be bled.

d) The relevant adjustment settings should be taken from the pressure adjusting table

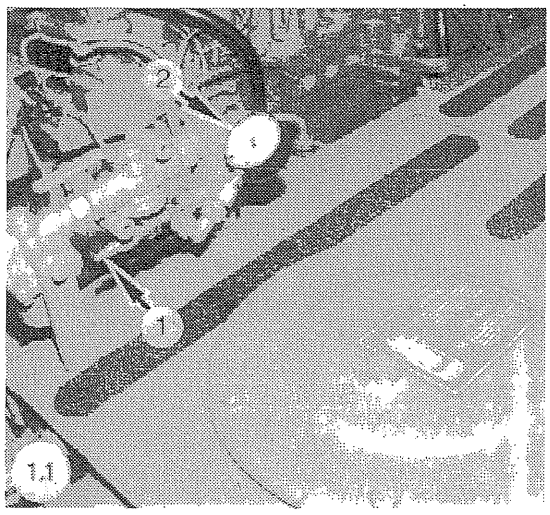
Safety note:
The adjusting procedure involves working with high pressures. The relevant safety measures must therefore be taken, e.g. wearing protective glasses. See industrial accident insurers' regulations, e.g. VBG 1, § 4.

1. Bleeding the system

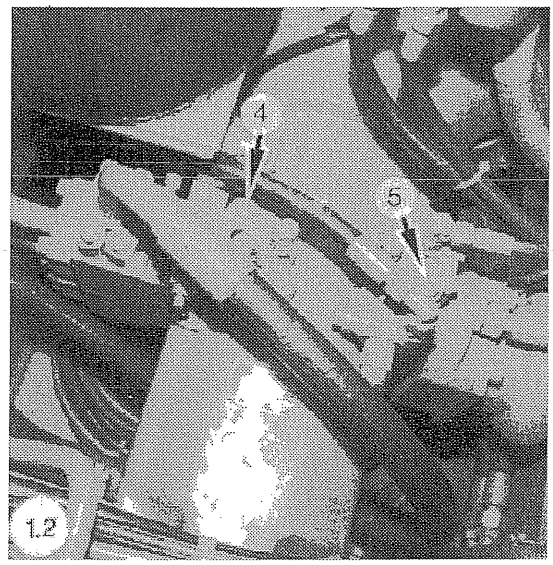
1.1 Before starting up for the first time or after exchanging the pump, it is necessary to bleed the system.
To bleed the system, an external compressed air supply is needed. Connect it to compressed air union (1).

Caution: the pressure gauge reading must not exceed 0.5 bar.

Pressure gauge (2) is not normally fitted, and must be installed for checking purposes. Slacken off the bleed screw (3). As soon as the hydraulic fluid emerging is free from bubbles, tighten it again.

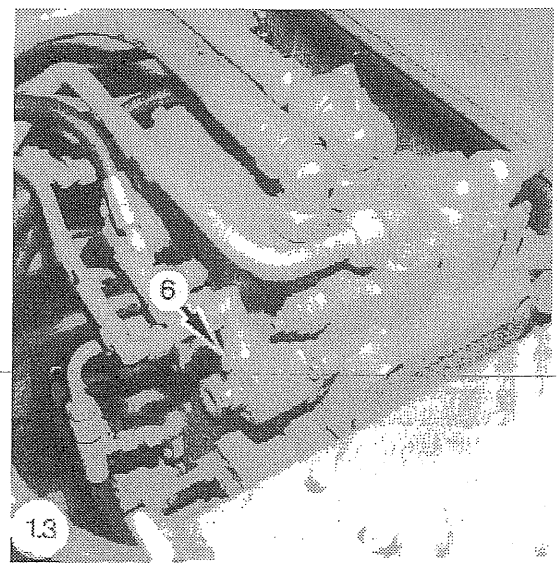


1.2 Now use the same method to bleed the double pump by means of bleed screws (4 & 5).



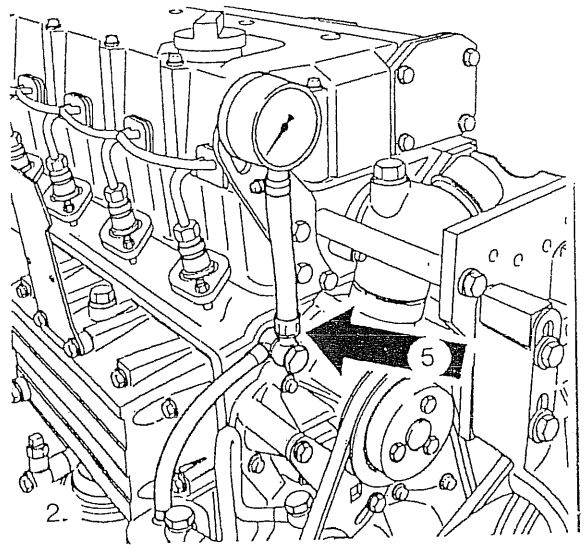
1.3 When starting up for the first time, all valve caps must be bled! This is also necessary if the valve caps have had to be opened in order to carry out any repair work. Slacken off the appropriate bleed screws (6) to bleed the system.

If the bleed screw is on the underside, the valve cap should also be released.



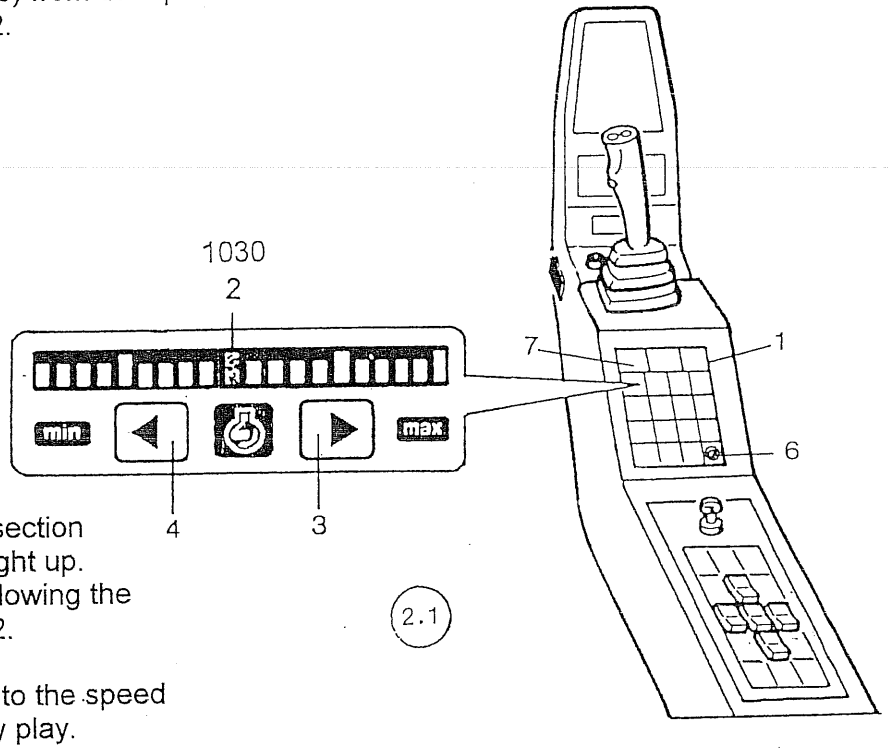
2. ENGINE SPEED

This item only needs to be checked or adjusted if the speed regulating device has been repaired or the electronics box changed.
Connect up revolution counter.
Remove protective hood for alternator.
Install measuring union (5) for pressure gauge (0 - 6 bar).
Start the engine.
Fuel delivery pressure must be checked at maximum engine speed **under load**.
(specify register 14 page 1)



2.1 Checking

Check at the bar display (2) in the control panel (1).
Press the **MEMO** key (6) and the **MANUAL** key (7) to call up the speed display on the control panel.
The central LED (2) lights up (1030 rpm).
Disconnect the fork head (8) from the speed adjusting lever (9). See 2.2.
Start the engine.
The engine speed and any change are displayed.



Adjusting minimum engine speed:
Press key (4).
The LEDs in the relevant section 2 (1030 +- 10 rpm) must light up.
Correct if necessary by following the procedure described in 2.2.
One LED equals 10 rpm.
Connect the fork head (8) to the speed adjusting lever without any play.

Adjusting maximum engine speed:
Press key (3). If the LED (2) shows no change, maximum engine speed is correct. (2350 rpm); a change of two LED is tolerable.
Correct if necessary following the procedure described in 2.2.
One LED equals 10 rpm.

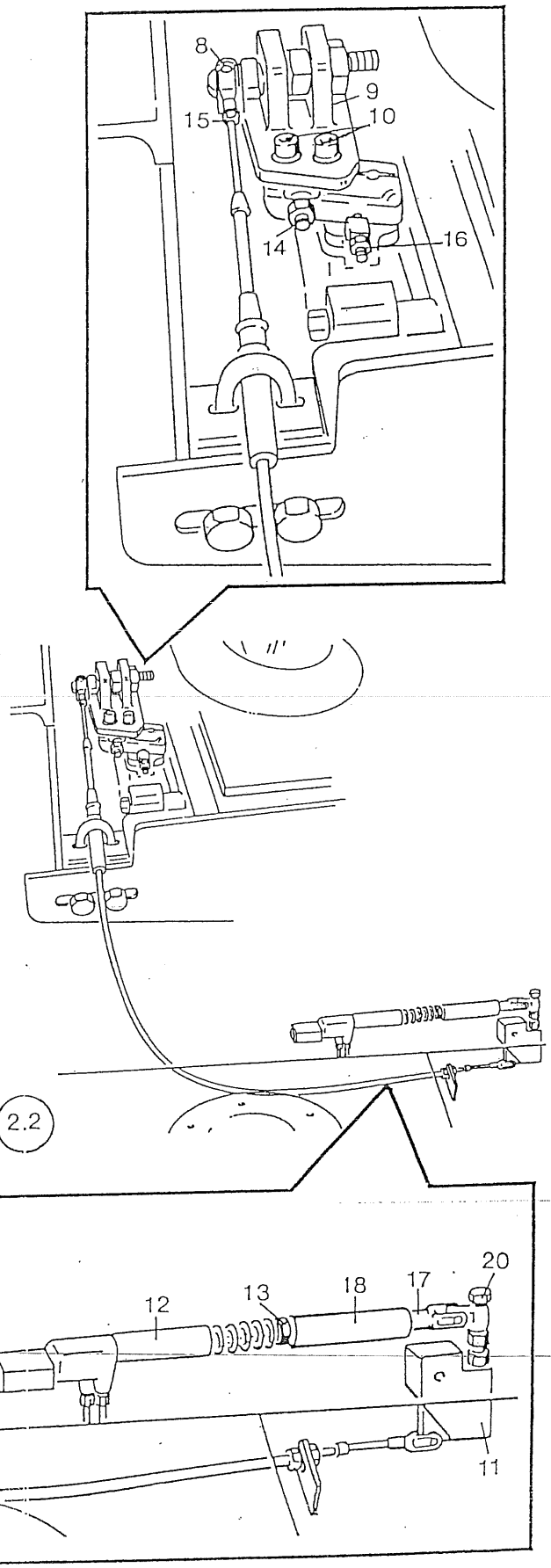
2.2 Diesel actuator

Basic adjustment
Disconnect the fork head (8) from the speed adjusting lever (9).
The speed adjusting lever must be set at 90° to the crankshaft. Correct if necessary at the adjusting screws (10). The reversing lever (11) at the diesel actuator (12) must be vertical. Correct if necessary at the piston rod (13).

Start the engine.
Press the **MEMO** and **MANUAL** keys. See 2.1.
The minimum engine speed displayed must be 1030 ± 10 rpm.
Correct if necessary at the adjusting screw (14).
Attach the fork head (8) without any play; the wire cable should not hang down slack.
Correct if necessary at the adjusting nuts (15).

Press key (3).
Engine speed must be 2350 rpm. The speed adjusting lever (9) must be in contact with the maximum speed adjusting screw (16).
Correct if necessary at the adjusting screw (16).

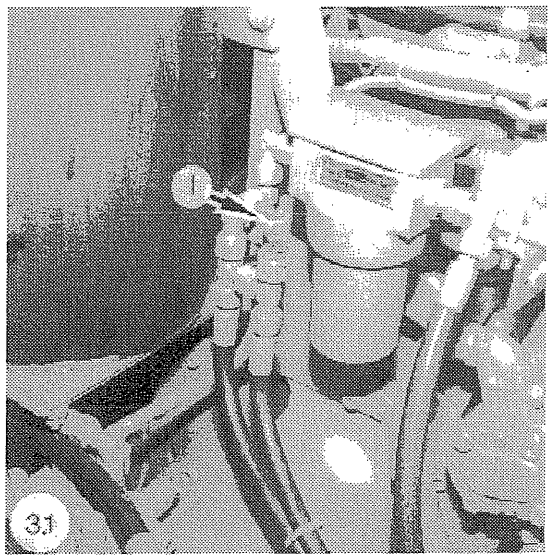
Damper/diesel actuator
At maximum speed, the ring-groove markings must be visible for approx. 2 - 3 mm at the piston rod (17) of damper (18).
Adjust at screw (20).
Tighten - ring groove clearance greater
Slacken off - ring groove clearance smaller



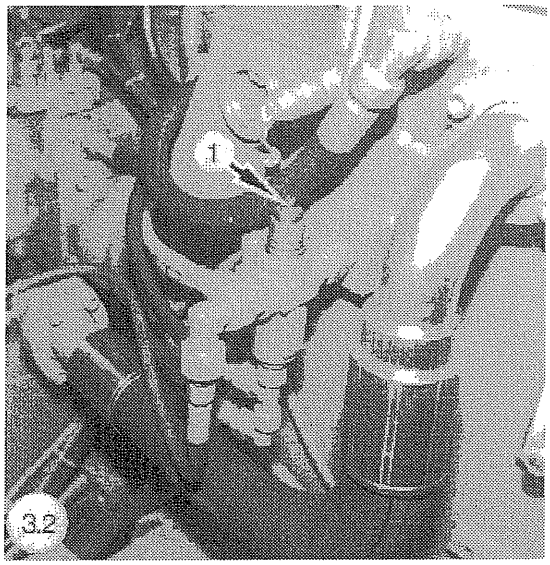
2.2

3. Pilot control

3.1 Connect the electronic measuring instrument to the measuring union (I).

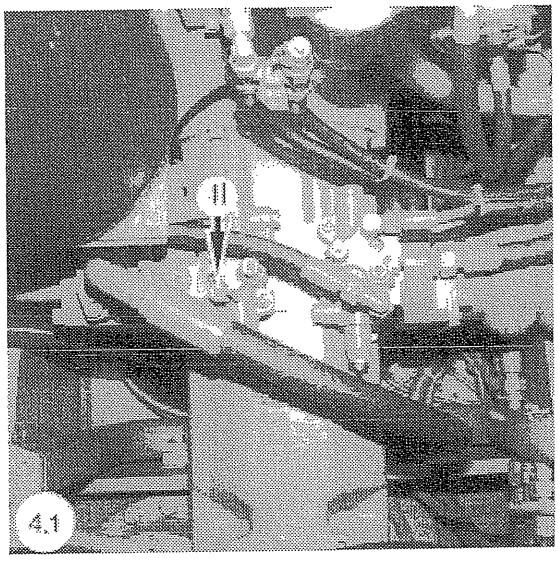


3.2 Correct if necessary by tightening or loosening the adjusting screw (1).

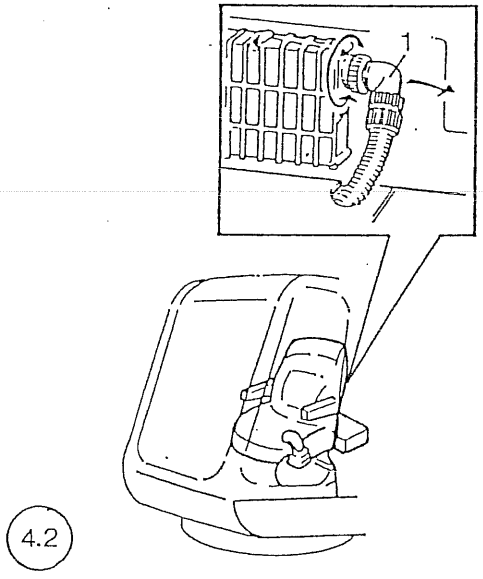


4. Emergency operation

4.1 Connect the electronic measuring instrument to measuring union (II).



4.2 The ignition must be in the 0 position. Remove the screw plug (1) from the electronics box behind the seat.

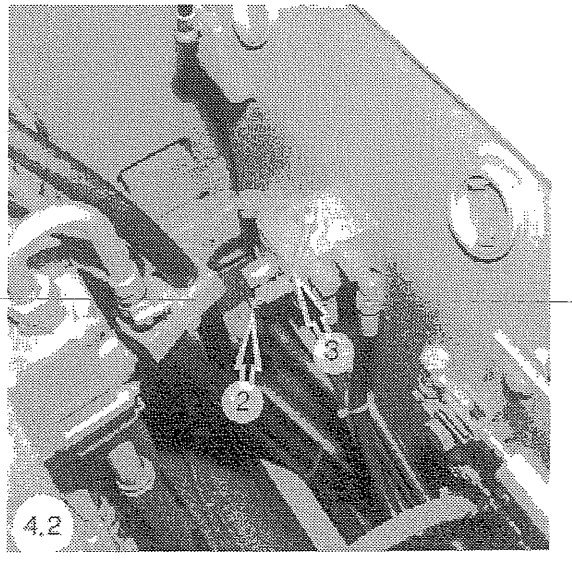


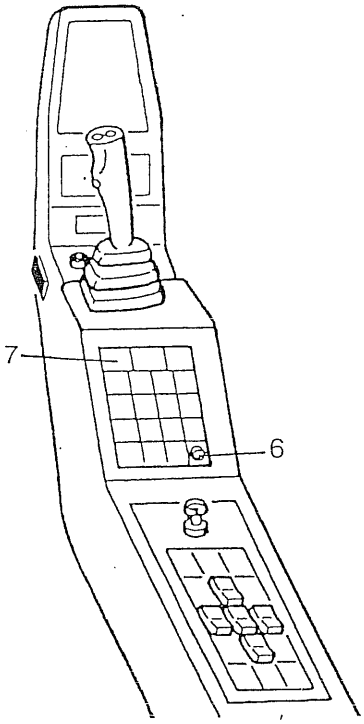
Initiate emergency operation by means of lever (3).

Start engine.
Correct by tightening or loosening the adjusting screw (2).

Switch off engine.
Switch ignition to the 0 position.

Connect the plug adapter (II) and switch off emergency operation with lever (3).





5. Load-limit regulating valve

5.1 Checking or adjustment

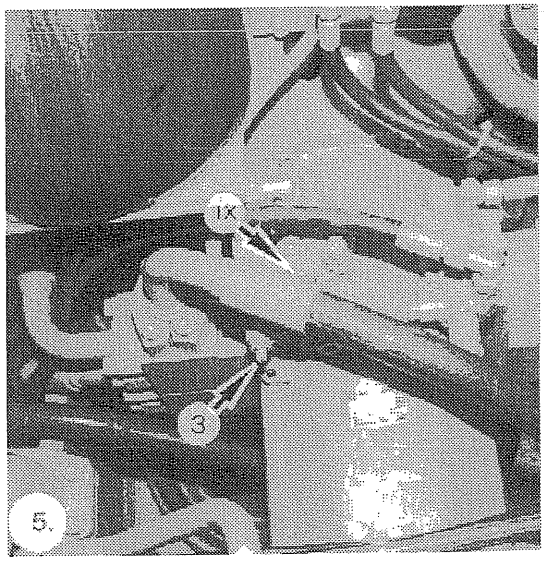
Connect the electronic measuring instrument to measuring union (IX).

Start the engine.
Press the **MEMO** (6) and **MANUAL** (7) keys.

A control current now emitted by the electronics (300 mA) energises the load-limit regulating valve.

The displayed control pressure must be 8.5 +- 0.2 bar plus the tank preload pressure.

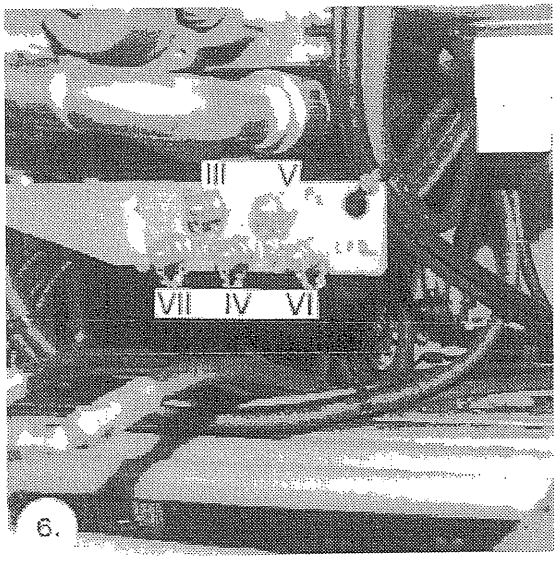
Correct by tightening or loosening the adjusting screw (3).
Press the **MEMO** (6) and **MANUAL** (7) keys to conclude the adjusting procedure.



6. Measuring-union panel

Measuring unions:

III - P 1
IV - LS 1
V - P 2
VI - LS 2
VII - feed pressure/return flow

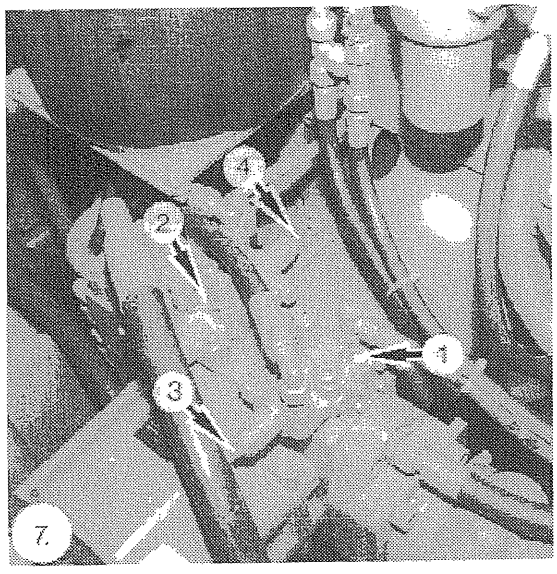


7. LS regulator (P1 and P2)

7. 1 LS regulator P1 (1)
Connect the electronic measuring instrument to measuring unions (III and IV).

Start the engine and preselect the F3 mode of operation. The boom must be fully extended.

Turn on the (Δp) key at the electronic measuring instrument.
Slowly initiate the "Raise" function and note the pressure (Δp).
Adjust the LS regulator at the adjusting screw (3).



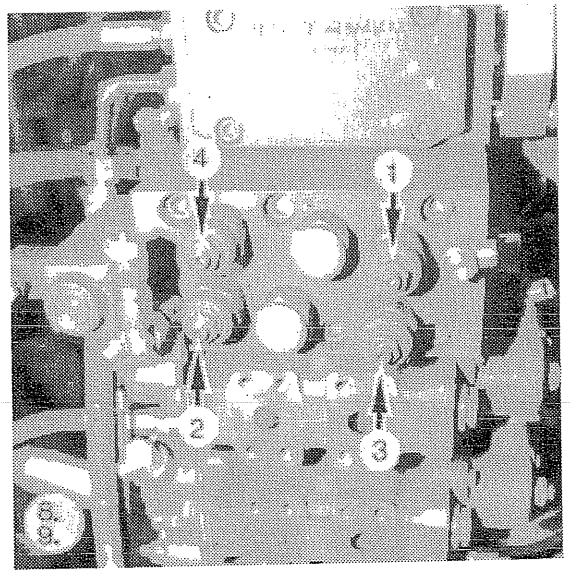
7.2 LS controller P2 (2)
Connect the electronic measuring instrument to measuring unions (V - VI).

Start the engine and preselect the F3 mode of operation.

Turn on the (Δ p) key at the electronic measuring instrument.
Slowly initiate the "Raise" and "Fold out" functions and note the pressure ($^{\Delta}$ p).
Adjust the LS regulator at the adjusting screw (4).

8. Pressure cut-off

8.1 Connect the electronic measuring instrument to measuring unions (III) for P1 and (V) for P2.
Start the engine and preselect the F3 mode of operation.
Switching off high-speed function.
(symbol Rabbit)
Move "Fold out" and "Close bucket" functions simultaneously to the limit position and hold there.
Correct by tightening or loosening the adjusting screw (1) or (2).



9. Pressure cut-in stage

9.1 Connect the electronic measuring instrument to measuring union (III) for P1.
Switching off high-speed function.
(symbol Rabbit)
Turn on the pressure cut-in switch.
Move the "Raise" function to the limit position and hold there.
The pressure limiter position is displayed.

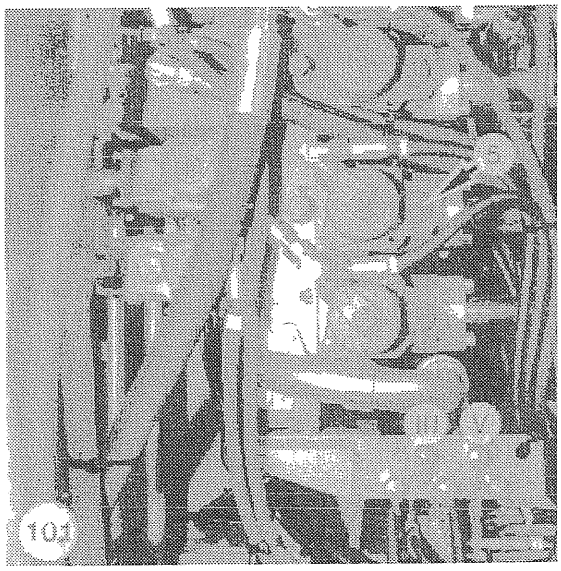
Correct by tightening or loosening the adjusting screw (3).

Connect the electronic measuring instrument to measuring union (V) for P2.
Switching off high-speed function.
(symbol Rabbit)
Move „Luffing jib in" and „Open bucket" functions simulaneously to the limit position and hold there.
The pressure limiter position is displayed.
Correct by tightening or loosening the adjusting screw (4).

If the excavator does not have a luffing jib, follow the procedure described in "Raising P2".

10. Secondary valves

10.1 Connect the electronic measuring instrument to measuring unions (III) for P1 and (V) for P2.
Start engine and switch on pressure cut-in stage.



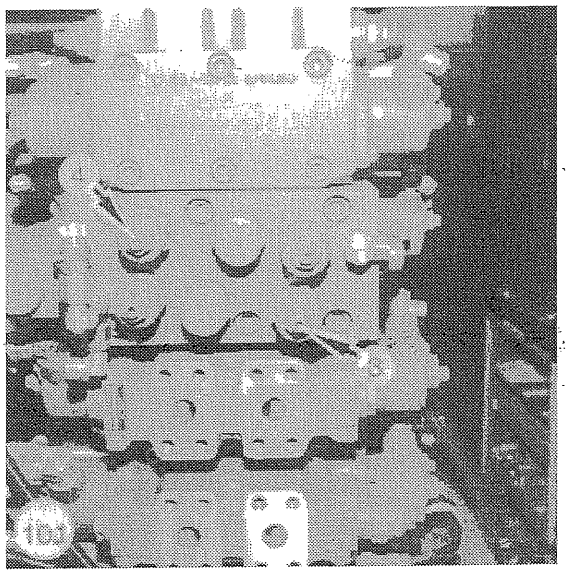
Switching off high-speed function.
(symbol Rabbit)

Raising P1:

Move „Open bucket" function to the limit position and hold there. The pressure limit position will be displayed. Tighten the adjusting screw (5) from the secondary valve by approx. 1½ turn.
Tighten the adjusting screw (3) for the pressure cut-in stage valve.
(20 bar above the maximum secondary pressure setting)

Caution: Pressure must **not** exceed 460 bar.

The secondary valves „Lifting ,Closing bucket, Driving" and on the wheeled excavator „Dozer blade can be checked or set to the recommended value.



Resetting P1:

Reset the pressure cut-in stage.
Move the „Open bucket" function to the limit position and hold there.
Loosen the adjusting screw (3) until the setting is reached.
Now set the adjusting srew (5) from the secondary valve „Open bucket" to the recommended value.

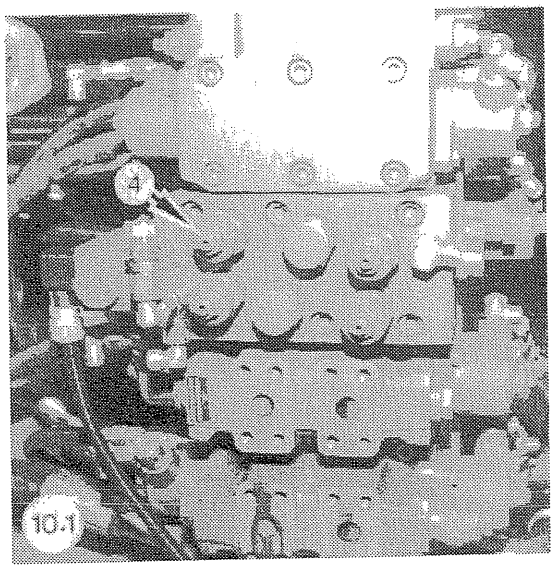
When checking or adjusting the secondary valves of P2 the „ Raise" function always has to be oparated first.

Rasing P2 :

Move the „Fold out" and "Raise" function to the limit position and hold there. The secondary „Fold out" function is displayd.
Tighten the adjusting screw (6 and 6a) from the secondary valves „Fold out" approx. 1½ turn.
Tighten the adjusting screw (4) for pressure cut-in valve.
(20 bar above the maximum secondary pressure setting)

Caution: Pressure must **not** exceed 460bar.

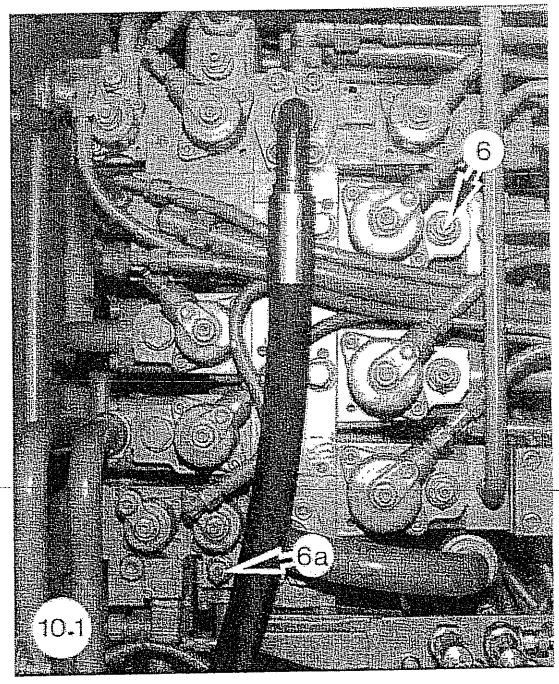
The secondary valves „Fold in, Luffing boom, Slewing TC- plate" can be checked or set to the recommended value.
Note : See item 10.2



Resetting P2 :

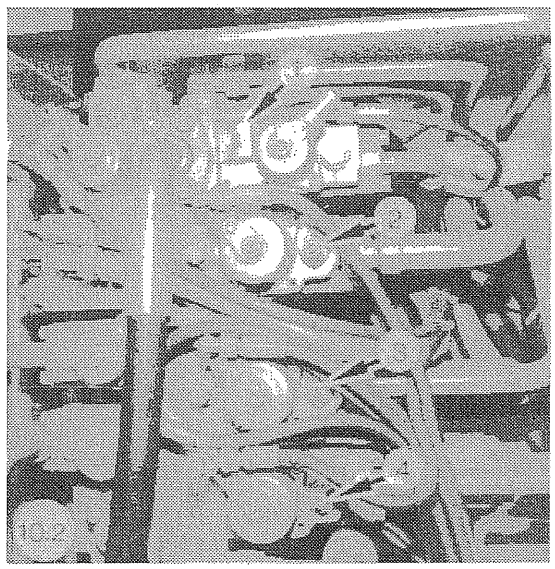
Reset the pressure cut-in stage.
Move „Fold out" and „Raise" function to the limit position and hold there.
Loosen the adjusting screw (4) until the setting is reached.

Note :Now return the „Fold out" secondary valve to the specified setting.



10.2 Checking and adjusting takes place with the pressure cut-in stage switched on.
Switching off-high speed function
(symbol Rabbit)

In case the distritutor valve „ Fold II and Raise II" are equiped with secondary valves the adjustment has to be assimilated to „Fold I and Raise I ".



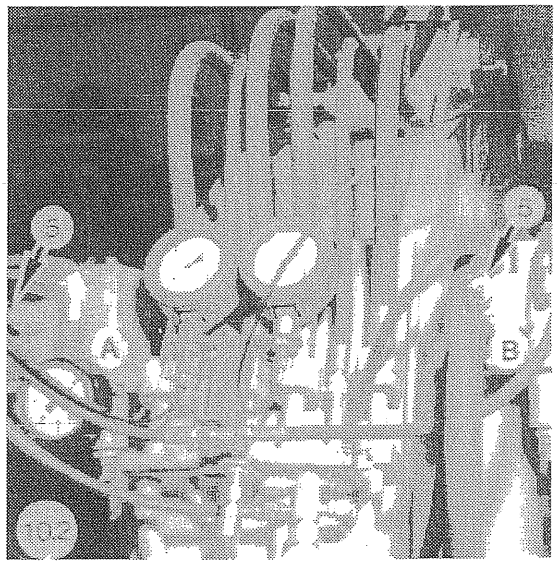
1 - Slewing - TC - plate

2 - Fold out - do not reset yet

- Fold in - opposite
(actuate switch to cancel Fold in cut-off)

3 - Open bucket - do not reset yet

- Close bucket - opposite



4 - Lower - plate valve

- Raise - opposite

4a- Raise - anti-leakage shut-off

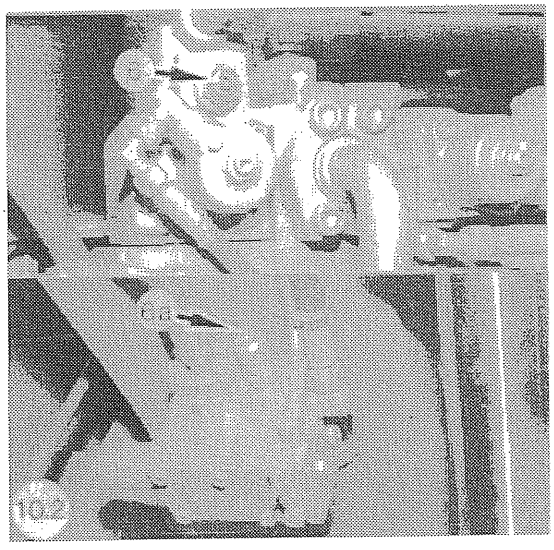
5 - Raise - anti-rupture device
(only on types with adjustable secondary valves)

Tighten the adjusting screw (5) on valve (B) by one turn and adjust it to the specified secondary pressure using the adjusting screw (5) on valve (A).
The pressure will be displayed on both pressure gauges.
Slowly loosen the adjusting screw (5) on valve (B) until both pressure gauges begin falling.
Both secondary valves are now in equilibrium.



Now return the secondary "Raise" valve to the specified setting.

Raise - anti-leakage shut-off
Secondary pressure can be adjusted on the "Anti-leakage shut-off" secondary valve (4a) by means of discs.
Now return the secondary "Raise" valve to the specified setting.

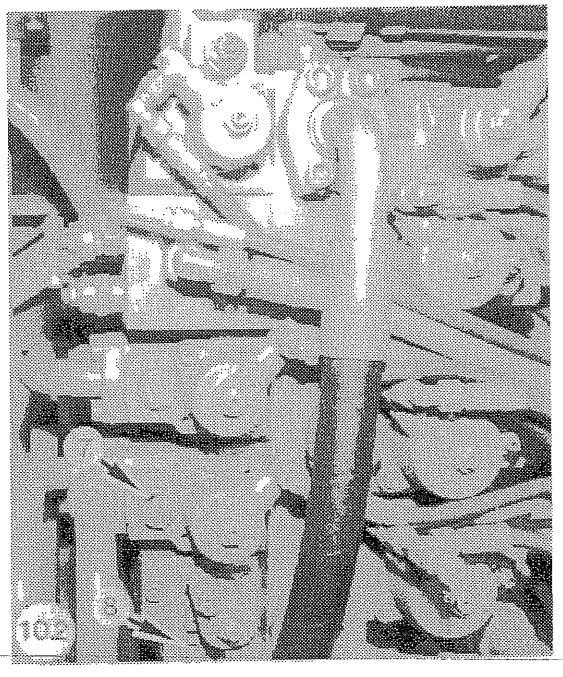


6 - Extending the actuating ram - plate valve

6a - Extending the actuating ram - anti-pipe rupture device

Tighten the adjusting screw (6) on the plate valve by half a turn. Move the "Extend actuating ram" function to the limit position and hold there. Adjust to the specified pressure at the adjusting screw (6a).

- Retracting actuating ram - opposite

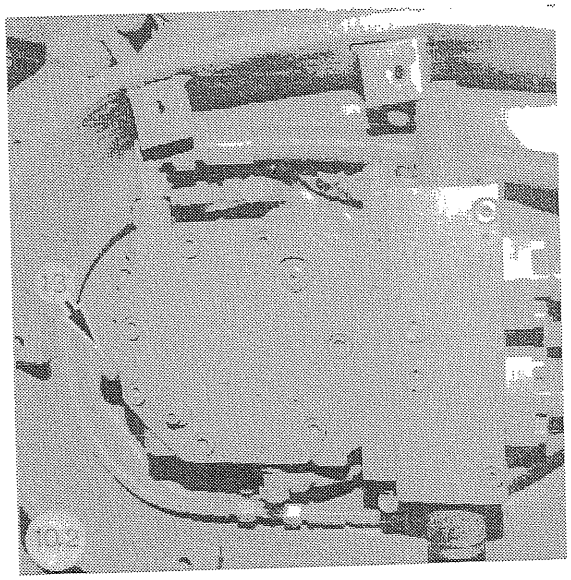


7 - Dozer/supports - forwards

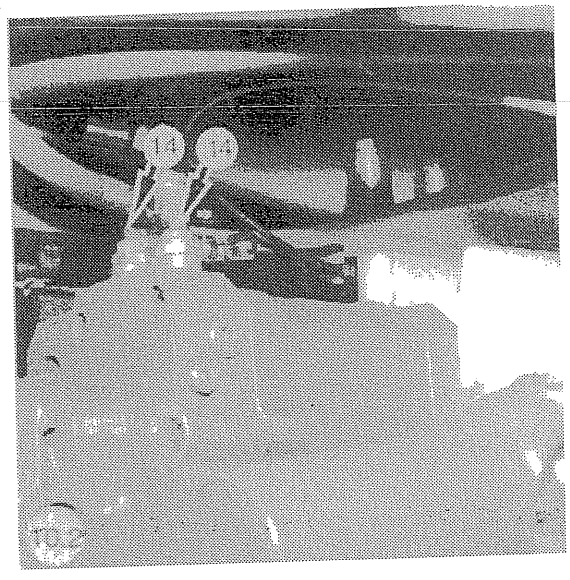
8 - Grab rotation - for both sides

9 - Travel - tracked excavator
The secondary valve (13) for both travel directions is located at the travel motor.

NOTE: Check each travel motor separately with the hand-lever control.



10 - Travel - wheeled excavator
The secondary valves (14) are located at the travel motor.



11. Reverse current restrictors

The pressures stated are valid with a mounted working appliance.

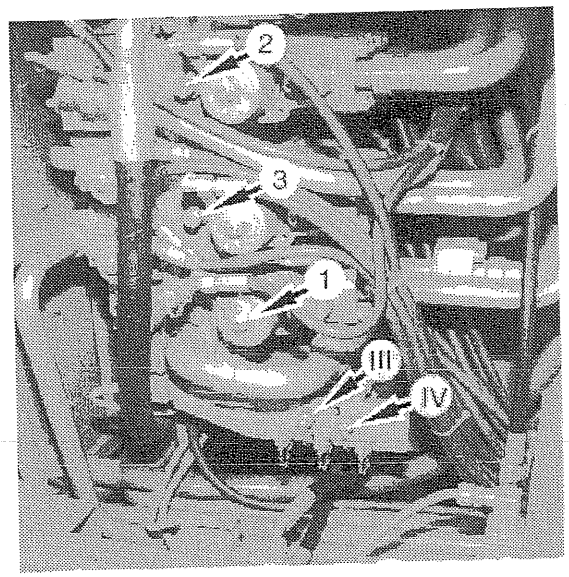
Connect the electronic measuring instrument or pressure gauge (0 - 600 bar) to measuring unions (III and V).

11.1 Lowering

The boom must be extended, and the lifting ram also at full extension.
At maximum speed, select the full "Lower" position.

Correct if necessary by adjusting the spool valve - lifting limiter.

If the pressure is too great, the adjusting screw (1) must be tightened accordingly; if the pressure is too low, it must be unscrewed.



11.2 Folding in

The boom must be extended.
At maximum speed, select the full "Fold in" position.

Correct if necessary by means of the actuating screw (2).
Tighten to increase pressure; loosen to reduce it.

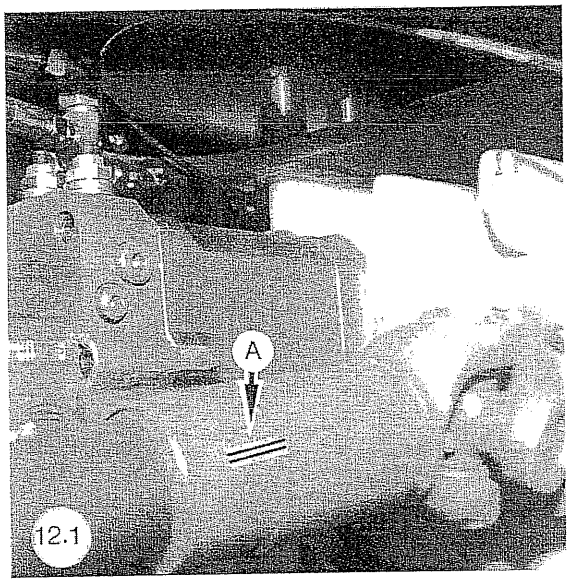
11.3 Closing the bucket

The bucket must be fully open.
At maximum speed, select the full "Close bucket" position.

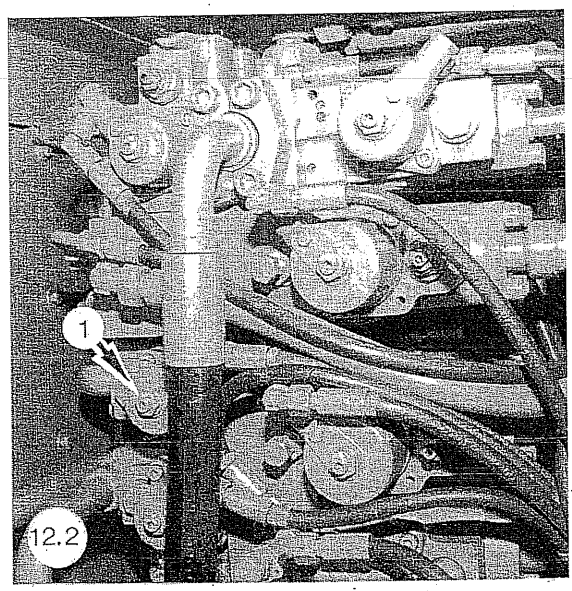
Correct if necessary by means of the actuating screw.
Tighten to increase pressure; loosen to reduce it.

12. Speed of universal-joint shaft
forwards/backwards (620 rpm)

12.1 The speed of the universal-joint shaft (A) is measured in the off-road ratio, at maximum engine speed and with the regulator bypass switched off.



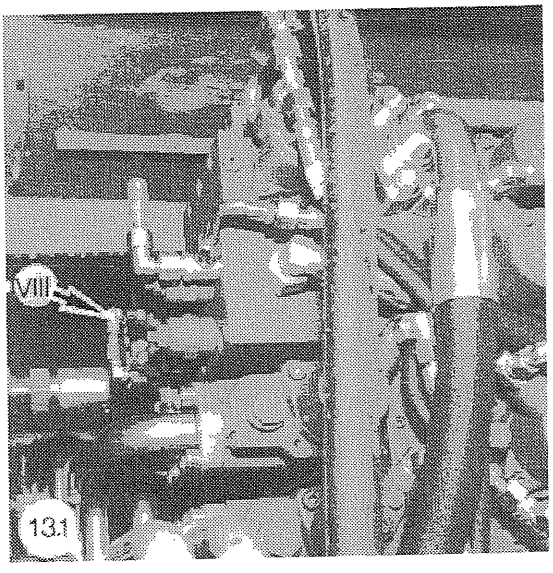
12.2 Correct at the travel limiter spool valve (1).



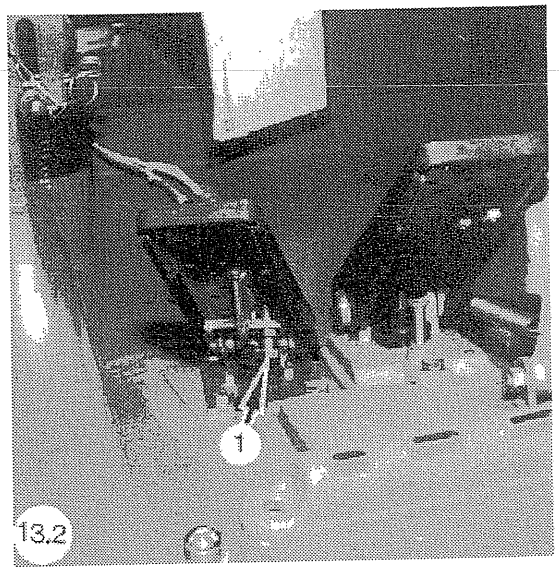
13. Pilot control pressure - travelling - wheeled

Checking/adjustment (24 bar)

13.1 Connect the electronic measuring instrument to measuring union (VIII).

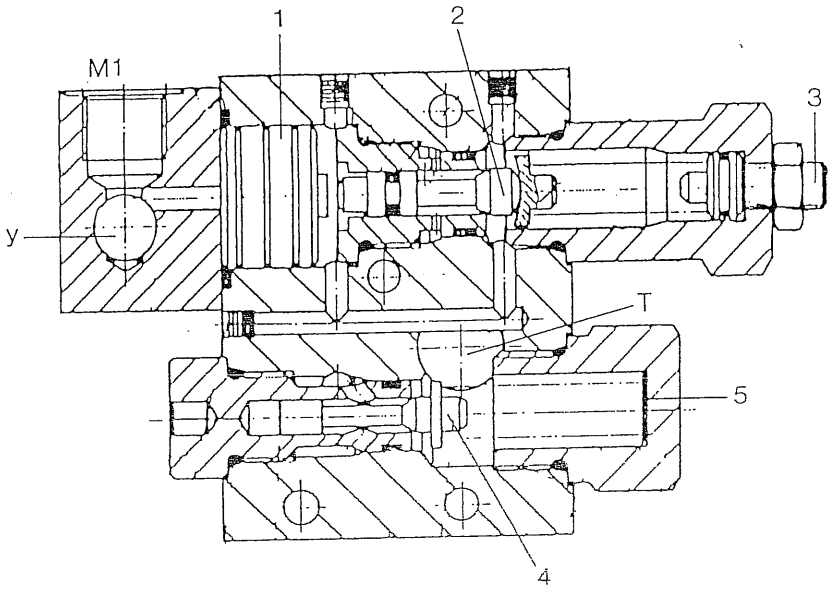


13.2 Correct at the adjusting screw (1) on the travel pedal.

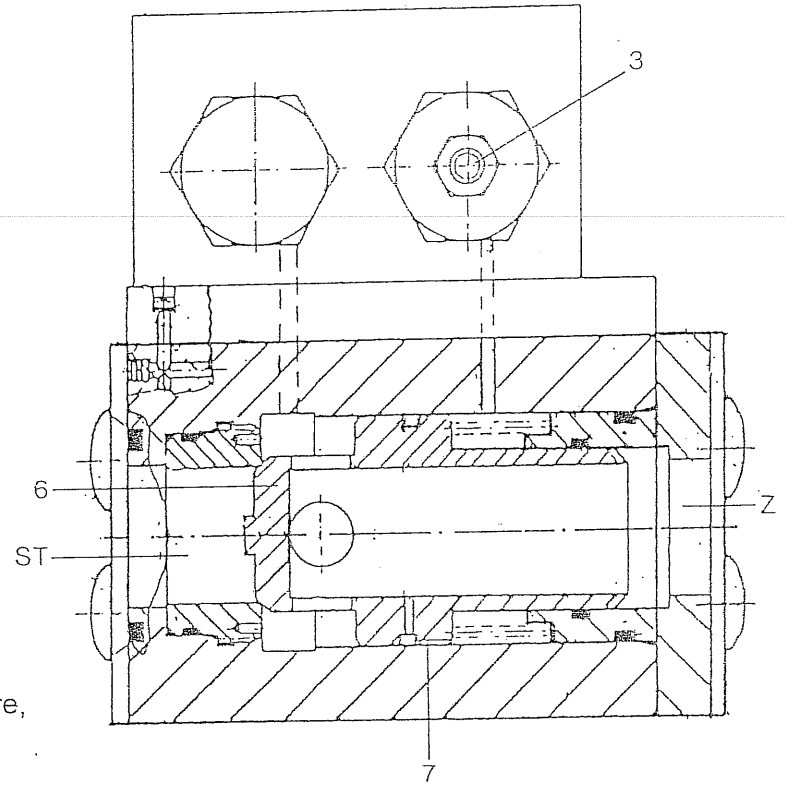


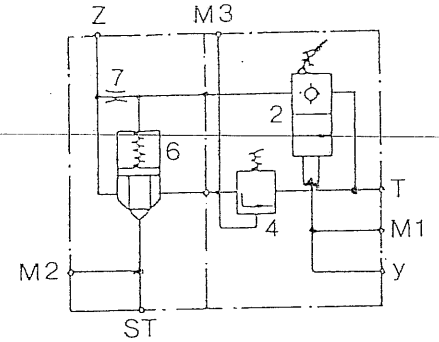
SHUT OFF VALVE
with no oil leak through

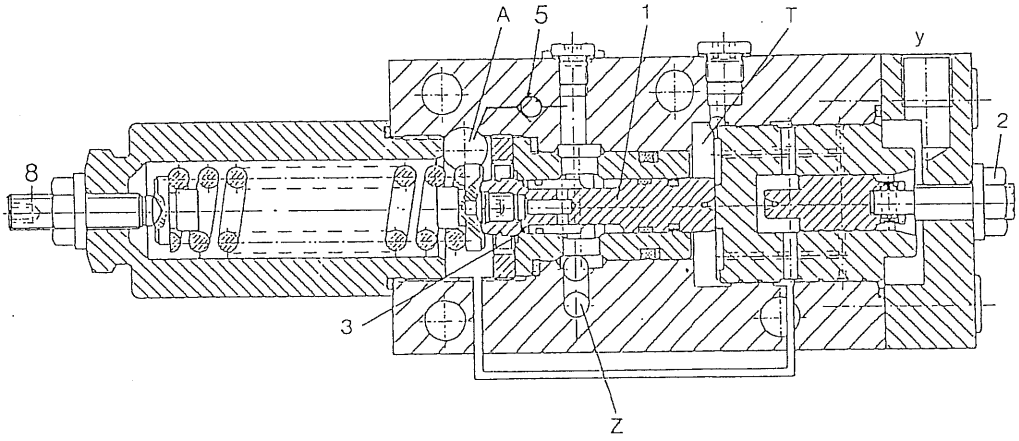
Schulungszentrum P56
Tafel:
Name: Ro.
Datum: 09.94

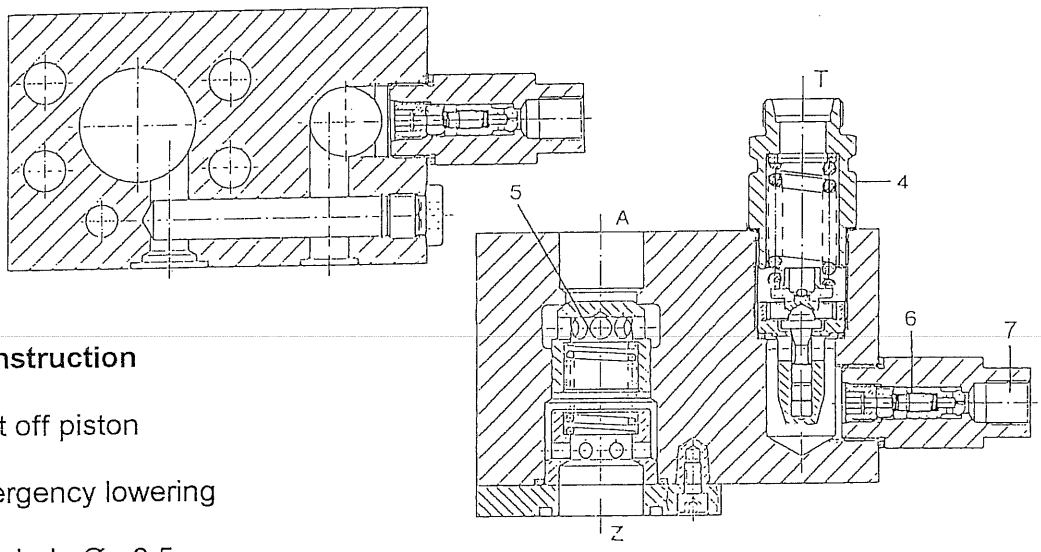


1	Control piston for minimum lowering
2	Valve piston
3	Adjusting screw for minimum lowering
4	Valve piston for secondary valve
5	Shims
6	Shut off piston
7	Orifice
M1	Measuring point
M2	Measuring point
M3	Measuring point
y	Connection-Servo pressure, „lowering“
Z	Connection-Ram
ST	Connection-Valve plate
T	Connection-Tank









2. **Construction**

1 Shut off piston

2 Emergency lowering

3 Bore hole Ø - 0.5mm

4 Secondary valve

5 Return valve

6 Check valve with relief hole

7 Compensating line

8 Adjuster screw - switch point

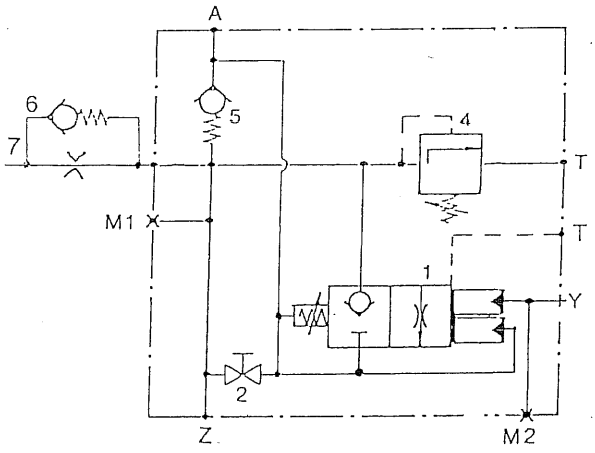
A connection - Distributor valve

Z connection - Cylinder

Y connection - Pilot pressure

T connection - Tank

M1 / M2 measuring connection

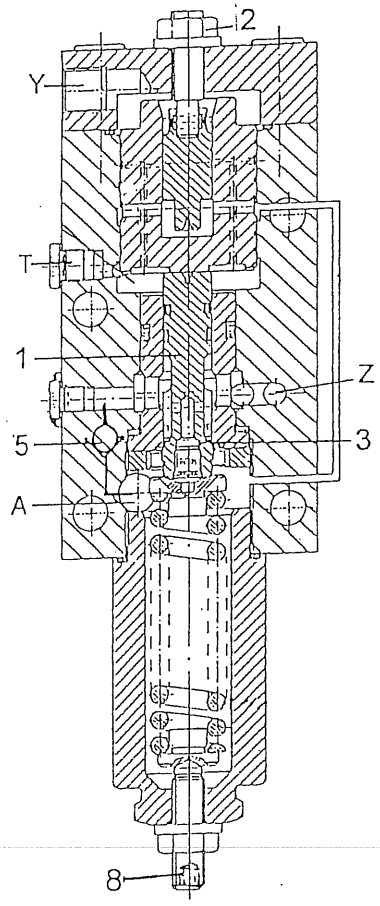


1.General
2.Construction
3.Function

1. General

Hydraulic excavators with a maximum carrying load corresponding to ISO 10567 of more than 1000 kg must, in accordance with the CE norm, be equipped with a line breakage safety device for lifting operations. These are operations which involve the lifting, transporting and lowering of loads with the use of lifting gear (ropes, chains etc) and which require assistance during lashing and unloading. The lifting leads must be secured thus preventing an uncontrolled dropping of the load and equipment.

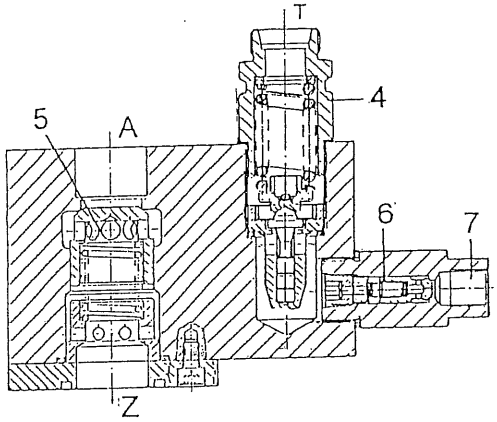
The prescribed line breakage safety device is directly flange-mounted onto the cylinder. Do not use tubes or hoses as a connection between cylinder and line breakage safety device.
Further details regarding the technical requirements are contained in the ISO 8643 (excerpt from the EC norm prerequisites for hydraulic excavators).

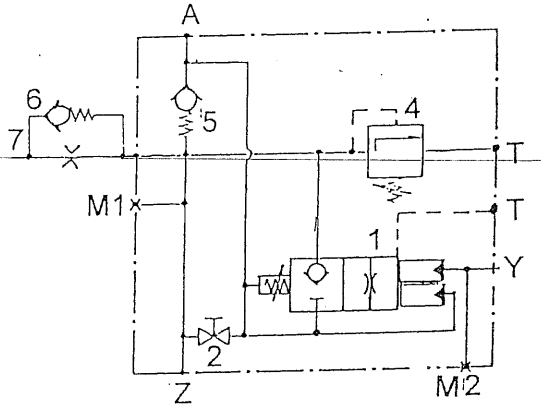


2. Construction

1 Shut off piston
2 Emergency lowering
3 Bore hole Ø - 0.5mm
4 Secondary valve
5 Return valve
6 Check valve with relief hole
7 Compensating line
8 Adjuster screw - switch point

A connection - Distributor valve
Z connection - Cylinder
Y connection - Pilot pressure
T connection - Tank
M1 / M2 measuring connection

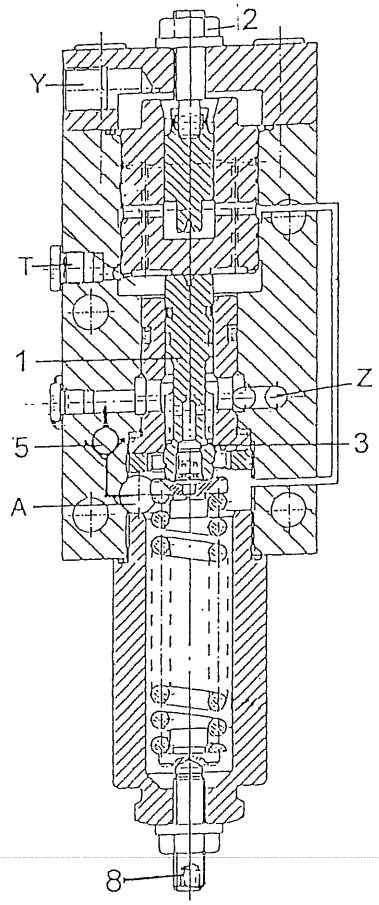




3. Operating control

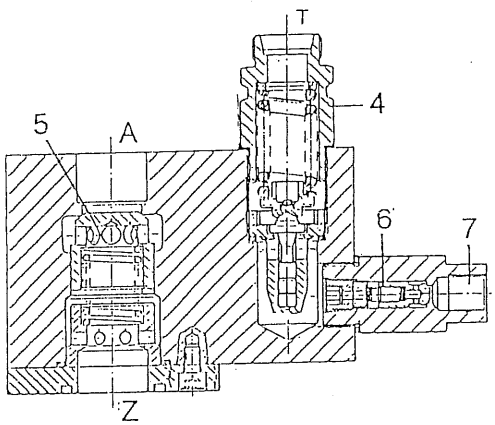
3.1 Boom - Lift

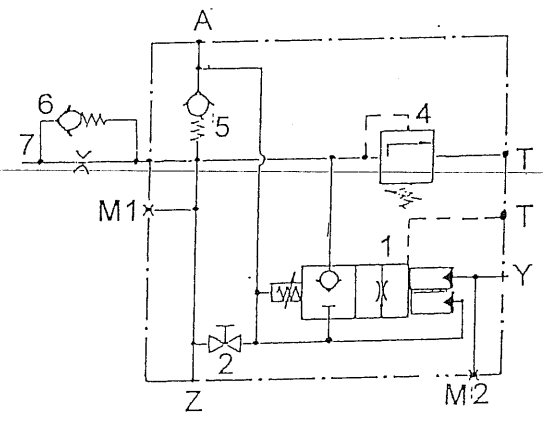
The oil runs from the distributor valve through connection (A) and return valve (5) to the lifting cylinder (Z) . If a line breakage occurs during the lifting process then the static pressure of the lifting cylinder immediately closes the return valve (5). This prevents an uncontrolled sinking of the boom. The connection (7) is for the compensating line and the overload warning system between the two lifting cylinders. If a breakage occurs in these lines then only a small amount of oil is released and the boom sinks very slowly due to the regulating return valve at connection (7). This is admissable according to ISO 8643.



3.2 Boom - Lower

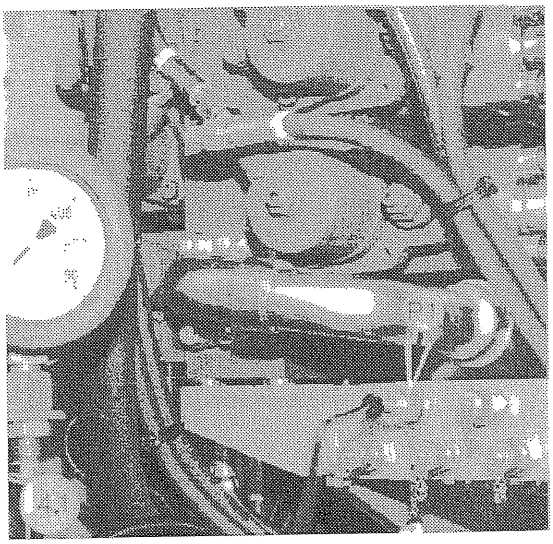
During lowering , pilot control pressure is applied to the distributor valve and via connection (Y) to the control piston. The control piston lies mechanically on the shut off piston (1). If the control piston moves then the shut off piston (1) pushes against the compression spring. The shut off piston opens and oil flows from cylinder (Z) to the distributor valve via connection (A). In addition the return-flow pressure reaches the control piston via a connection and keeps the shut off piston open. Oil flows back to the tank via distributor valve.



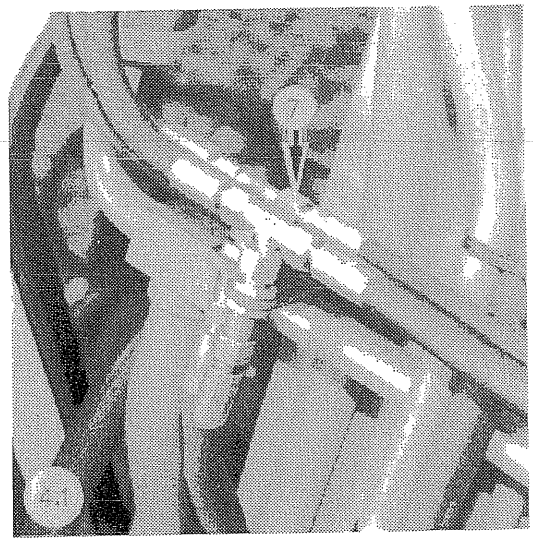


4. Checking and setting

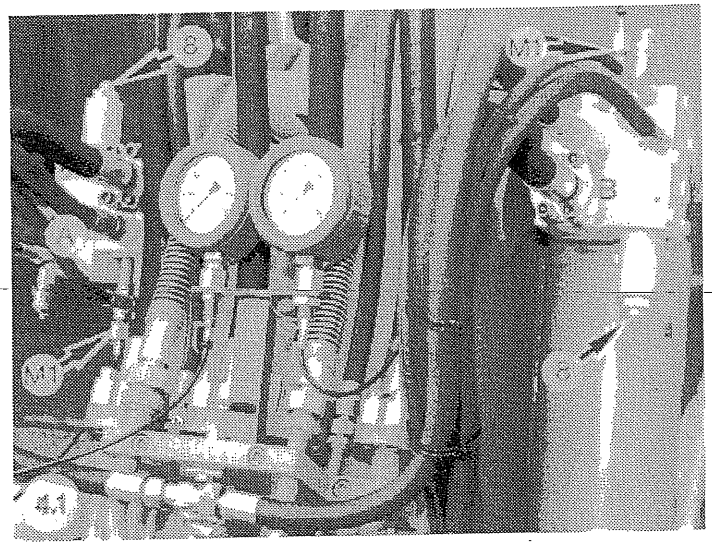
Checking or setting is carried out at an operational hydraulic oil temperature of 40° - 60° C , at maximum rpm and with the attached working equipment.



4.1 Attach the pressure gauge (0-600 bar) to the measuring connection P1 and M1. Unscrew compensating lines (7). Fit the stop cock or seal off. Tighten the adjuster screws of both valves by about three turns. Lift the boom about 3 metres above ground level. The pressure gauges display the amount of static pressure in the cylinders. Engage the"lower" function until the pressure gauge of P1displays a pressure level of around 50 - 80 bar. Maintain this level of pressure and unscrew the adjuster screws (8) on valve (A) until the static pressure on the pressure gauge (0-600 bar) drops. Remove the adjuster screws (8) from valve (B) until the boom begins to sink.

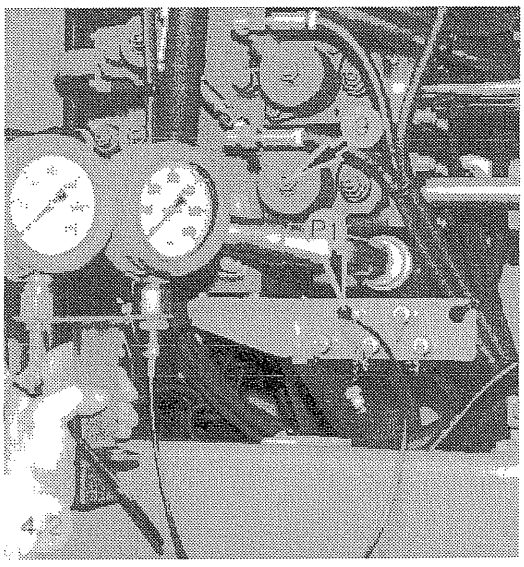


Check:
During the lowering operation check that both shut off pistons open simultaneously. A maximum tolerance of 30 bar is allowed. A later alignment is possible by setting the adjuster screws (8) of valve (B). Reattach the compensating line (7).

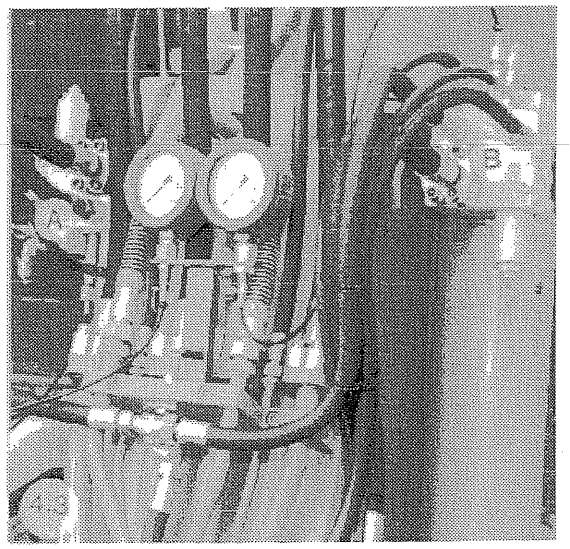


4.2 Basic adjustment of the return flow throttles. (with attached working equipment)

Attach the pressure gauge (0-600 bar) to the measuring connection (P1). Set the stroke limiter screw (9) so that a pressure level of approx. 65 bar is displayed during the lowering operation.
Note:
The stroke limiter screw (9) is to be found on the opposite side in the valve cap.



4.3 Secondary valves.
It is not necessary to adjust the secondary valves which have been set before leaving the factory. If, however, it is necessary to carry out a check then the following should be noted:
Checks on excavators with load limit control system (except 1704/1804) are carried out with a engine rpm of approx. 1400 l/min. Attach the pressure gauge (0-600 bar) at the measuring connection P1 and M2. Increase the pump pressure to approx. 20 bar above the prescribed secondary pressure level. The setting for each respective excavator is given in the pressure adjustment instructions.
Place a washer on valve (B). Set the prescribed secondary pressure at valve (A) with washers. The pressure level is then displayed on both pressure gauges. Remove washers as required from valve (B) until the pressure levels of both pressure gauges begins to drop. Both secondary valves are now aligned with each other.



LINE BREAK PROTECTION VALVE

Version "C" Ident. No. XXX.XXX.930.9

Arrangement

1 Lowering speed adjusting screw

2 Adjusting cap
Switching point - shut-off piston

3 Non-return valve

4 Hole, 0.5 mm dia.

5 Shut-off piston

6 Non-return valve

7 Non-return valve
with tank relieving

8 Emergency lowering

9 Balance line with one-way restrictor

10 Secondary valve
(Fixed setting)

11 Piston

12 Spring

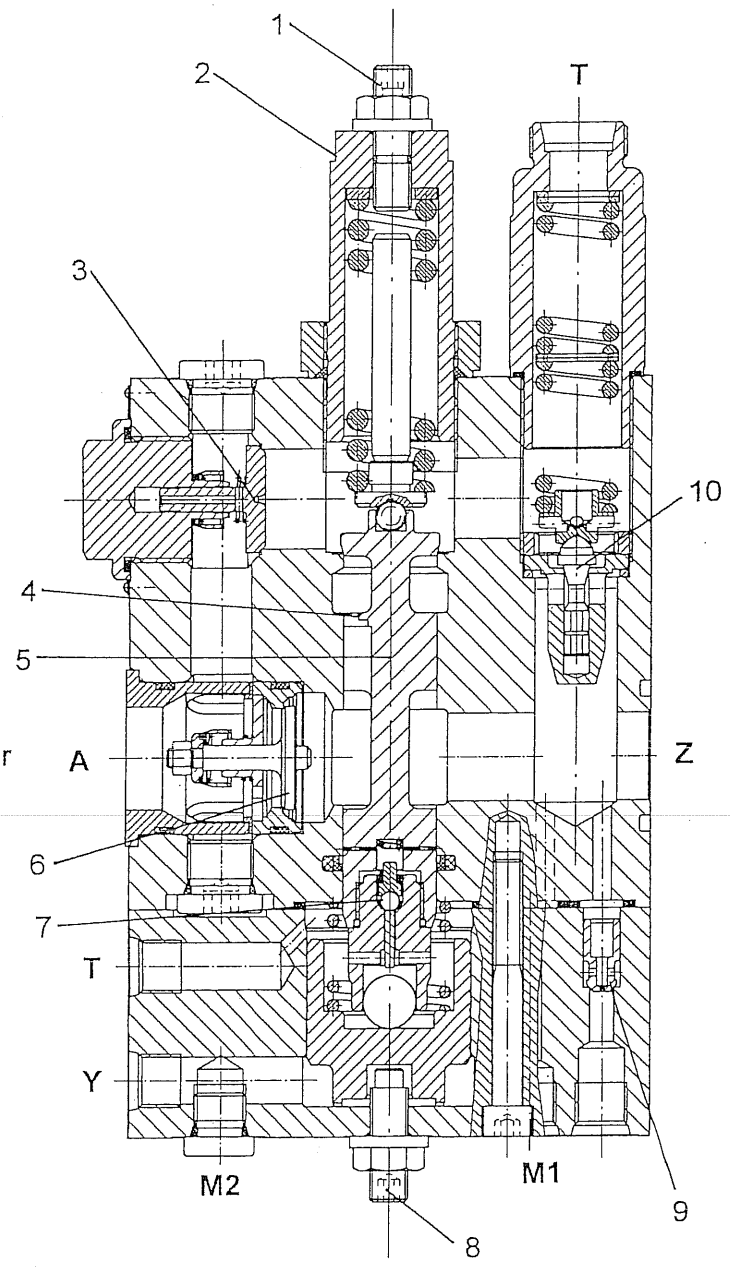
A Union - plate valve

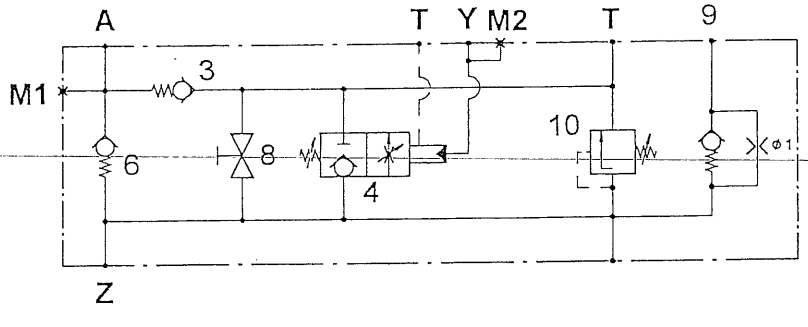
Z Union - cylinder

Y Union - pilot control
"Lowering"

T Union - tank

M1/M2 Measuring union





LINE BREAK PROTECTION VALVE

Version "C" Ident. No. XXX.XXX.930.9

Schulungszentrum
Name : Ro.
Datum: 07.99

Arrangement

1 Lowering speed adjusting screw

2 Adjusting cap
Switching point - shut-off piston

3 Non-return valve

4 Hole, 0.5 mm dia.

5 Shut-off piston

6 Non-return valve

7 Emergency lowering

8 Balance line with one-way restrictor

9 Secondary valve
(Fixed setting)

10 Piston

11 Spring

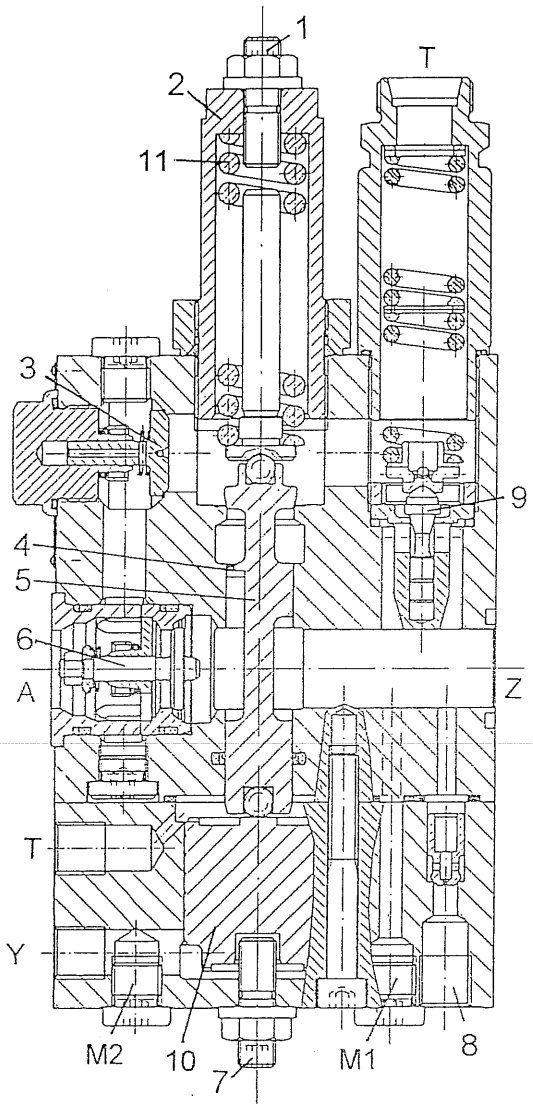
A Union - plate valve

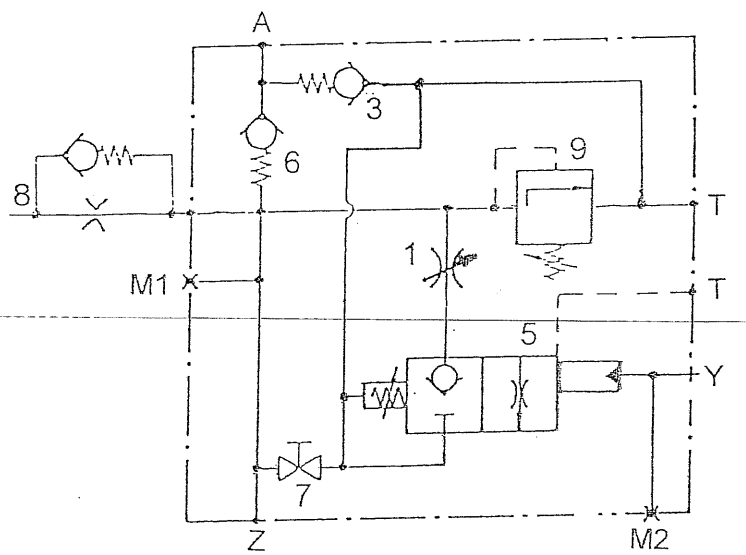
Z Union - cylinder

Y Union - pilot control
"Lowering"

T Union - tank

M1/M2 Measuring union





LINE BREAK PROTECTION VALVE

Version "C" Ident. No. XXX.XXX.930.9

1. General

2. Arrangement

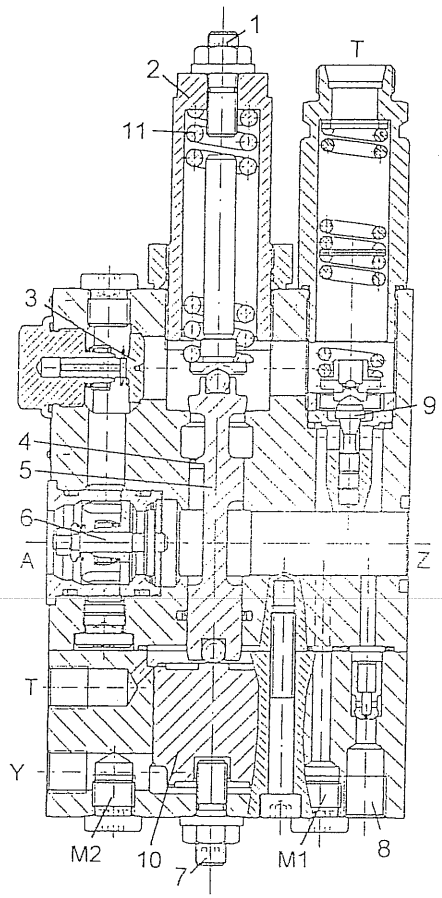
3. Operation

1. General

According to the CE standard, hydraulic excavators with a maximum permitted load of more than 1000 kg in accordance with ISO 10567 must be fitted with a line break safeguard if they are to be used with lifting gear. Use of lifting gear includes lifting, transporting and lowering loads with lifting tackle (rope, chain etc.) where the load must be attached and released by hand. For lifting applications, the lines must be protected in such a way that the load and the tackle cannot fall in an uncontrolled manner.

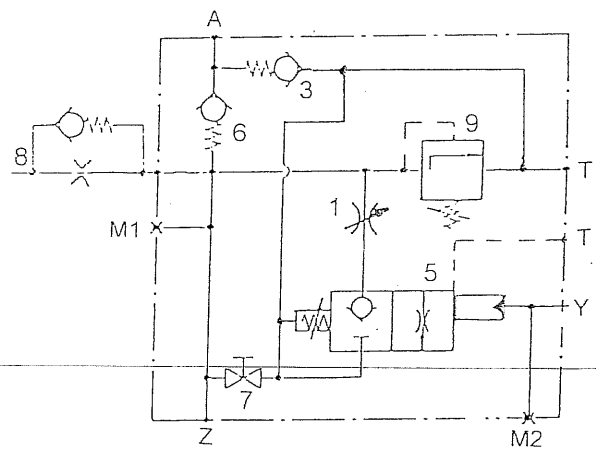
The line break safeguard required is flanged directly to the cylinders. The use of pipes and hoses for connecting cylinders to the line break safeguard is not permitted.

More detailed information on the technical requirements can be found in ISO 8643 (excerpt from EC standard on requirements for hydraulic excavators).



2. Arrangement

1 Adjusting screw for the lowering speed
2 Adjusting screw - switching point - shut-off piston
3 Non-return valve
4 Shut-off piston
5 Emergency lowering
6 Non-return valve
7 Hole ∅ 0.5 mm
8 Balance line with one-way restrictor
9 Secondary valve
10 Piston
11 Spring



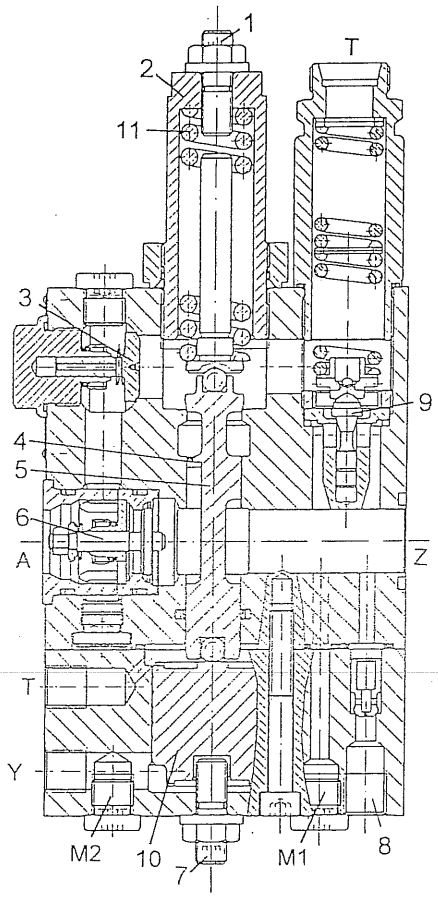
A Union - plate valve
Z Union - cylinder
Y Union - pilot control "Lowering"
T Union - tank
M1/M2 Measuring union

3. Operation

3.1 Jib - raising

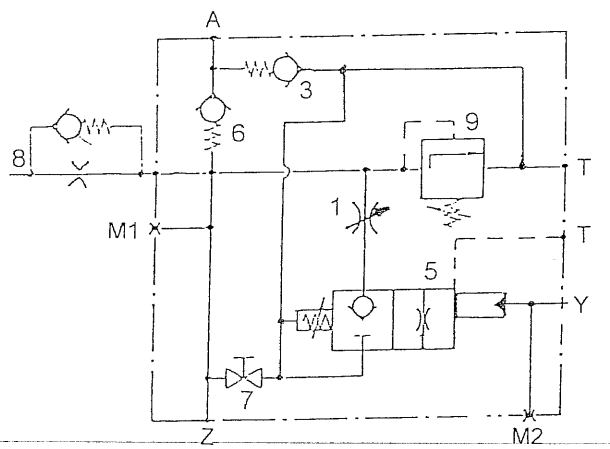
From the control block, the oil flows to the lifting cylinder (Z) via union (A) and non-return valve (6). If a line breaks during the lifting procedure, non-return valve (6) is immediately closed by the static pressure of the lifting cylinder. This prevents the jib from descending in an uncontrolled manner.

Union (8) is for the balance line and the union for the overload warning device between the two lifting cylinders. If one of these lines breaks, the one-way restrictor in union (8) ensures that only a small amount of oil can flow out and the jib descends slowly. This is permitted by ISO 8643.



3.2 Jib - lowering

To lower the jib, pilot pressure is applied to the control spool in the plate valve and, via union (Y) to piston (10). Piston (10) rests mechanically against the shut-off piston (5).
If piston (10) switches, the shut-off piston (5) is operated counter to the spring (11). The shut-off piston opens and the oil flows from the cylinder (Z) to union (T). As the lowering speed increases, the non-return valve (3) opens and the oil flows via union (A) to the plate valve.

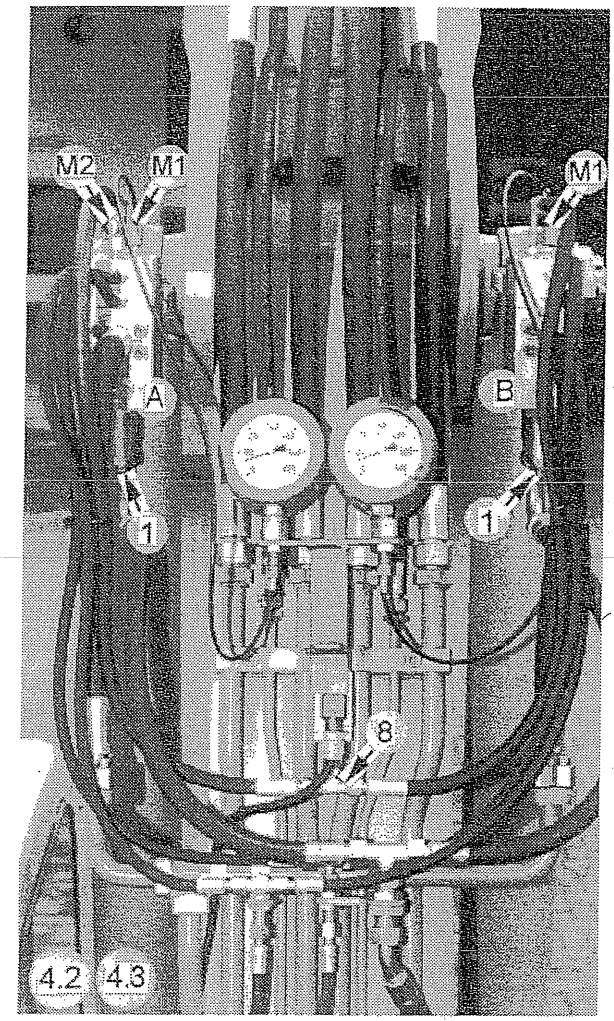


4.2 Basic setting, lowering restrictor
(with implement attached)

Connect pressure gauge (0 - 600 bar) to measuring union (P1).
Connect pressure gauge (0 - 600 bar) to valves (A) and (B).
Unscrew and blank off balance lines.
Switch lowering function fully on.
Turn the adjusting screws (1) of valves (A) and (B) so that both pressure gauges (M1) show approximately the same value.
A deviation of ± 5 bar is permitted.

The required lowering pressure measured at (P1) should be taken from the appropriate pressure table.

If this value is not achieved, make a correction at the adjusting screws (1).



4.3 Secondary valves

The secondary valves are set at the factory and do not need to be adjusted. However, if a check is to be carried out, one of the following procedures may be adopted.

Option 1: Checking with a hand pump.
Interrupt the balance lines (8). Extend the lifting cylinder fully. Connect hand pump to measuring union (M1). Build up pressure with the hand pump until it stops rising. The pressure indicated is the setting pressure of the secondary valve. Appropriate shims can be used for adjustment. Follow the same procedure for the other valve. Screw the balance lines (8) back in again.

Option 2: Checking with the static pressure of the lifting cylinders.
You will need a weight appropriate to the excavator. Connect the pressure gauges (0 - 600 bar) to the measuring unions (M1/M2). Interrupt the balance lines (8). Move the jib to the horizontal position. Raise the weight with the jib by about 0.5 m. Extending the jib increases the static pressure in the lifting cylinders. The jib must only start to descend when the specified pressure is reached. Both pressure gauges must show the same pressure. Appropriate shims can be used for adjustment. Screw the balance lines (8) back in again.

LINE BREAK PROTECTION VALVE

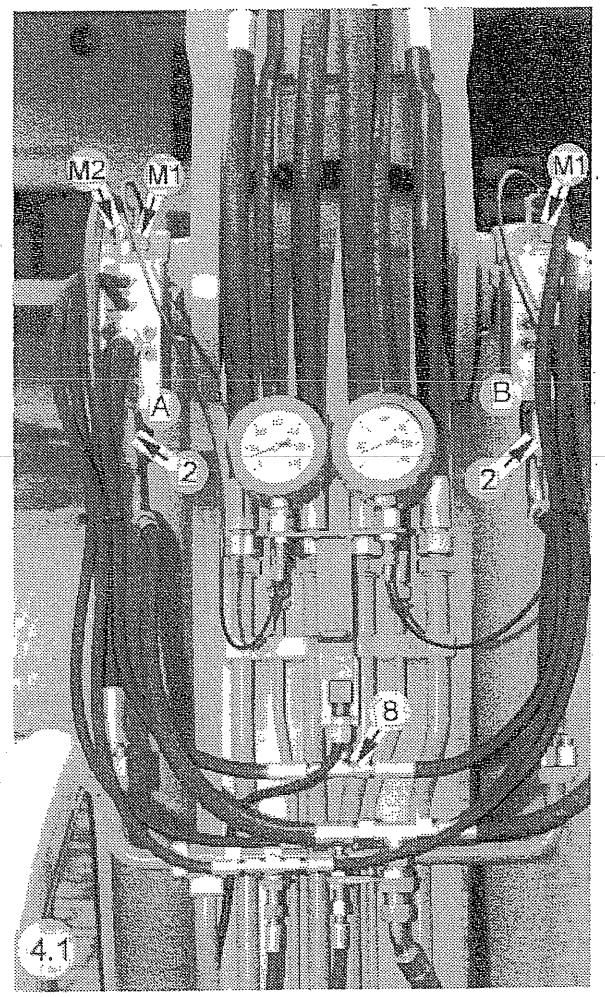
Version "C" Ident. No. XXX.XXX.930.9

Schulungszentrum
Name : Ro.
Datum: 07.99

4. Checking, adjustment

Checking and adjustment are carried out at an operating temperature of the hydraulic oil of about 40 - 60°C and maximum motor speed, with an implement attached.

4.1 Determine the switching point of the control spool in the control block.
Connect the test pressure gauges (0-600 bar) to the corresponding measuring union for P1 (pump pressure) and M2 (pilot pressure).
Screw in the adjusting screw (2) of both valves by about 3 turns.
Raise the jib about 3 m above the ground. The test pressure gauges show the static pressure in the cylinders.
Switch slowly to lowering and watch both pressure gauges. If the reading on the pressure gauge for P1 rises, read off the pilot pressure from pressure gauge (M2) (when the control spool begins to switch).



Adjusting the point at which the shut-off piston begins to switch.
Connect pressure gauges (0-600 bar) to the measuring unions (M1) of valves A and B. Unscrew and blank off balance lines (8). Raise jib about 3 m above the ground. Operate lowering function until the pressure gauge (0-60 bar) shows 1 bar when the control spool begins to switch. Maintain this pressure and unscrew the adjusting screw (2) for valve (A) until the static value at the pressure gauge falls.
Unscrew the adjusting screw (2) from the valve (B) until the jib begins to descend.

CHECK:

As the jib is lowered, check whether both shut-off pistons open simultaneously. The maximum permitted tolerance is 30 bar. Any matching that is required is carried out by turning the adjusting screw (2) of valve (B).
Screw in balance lines (8) again.

PRESSURE ADJUSTMENT TABLE - 1704

Wheeled and tracked excavators
From serial no. 373 M 6390

Schulungszentrum P68
Tafel:
Name: Ro
Datum: 08.96

* Check / adjust at max. engine speed
** Check / adjust with pressure cut-in stage engaged
*** Check with hand pump.
Figures shown in bar or in rpm
Hydraulic fluid temp. 40-60° C.

	ENGINE SPEEDS		
	Min. idle speed		1030 -30
	Max. idle speed	- F1	1905
		- F2	2103
		- F3	2300
	Nominal speed		2200 -40
	Pressure cut-in stage		1708
	Emergency shift		2350
	Min. idle speed - automatic idle		1182
	PRIMARY VALVES		
*	Pump	- P1	60
		- P2	60
*	Pressure cut-off	- P1	320
		- P2	320
**	Pressure cut-off	- P1	380
	stage	- P2	380
*	Pilot pump		25 - 27
*	Pr. lim. valve - emergency shift		14
*	Fan pump		125
*	Steering pump		140
	POWER-SHIFT CONTROLLER (delta p)		
	Pump, P1 and P2	- F1	17
		- F2	20
		- F3	23
**	Pressure cut-in stage		13
*	Load limit control valve (+ air pressure on hydraulic tank)		8.5+-0.2
	SECONDARY VALVE		
**	Lifting rams	- raising - plate valve	420 -10
**	Line rupture protection valve		420 -10
		- lowering	365+20
**	Folding ram		365+20
**	Bucket / Grab operating ram		365+20
	Slewing motor (fixed setting)		115/310
*	TC plate		285
**	Drive motor	- wheeled	420+20
		- tracked	400+20
**	Grab rotation motor - plate valve		150
		- motor	75
**	Actuating ram - extend -plate valve		365+20
	Line rupture protection valve / Leak-free cut-off		435+20
		- retract	415+20
**	Dozer blade support ram		365+20

PRESSURE ADJUSTMENT TABLE - 1704

Wheeled and tracked excavators
From serial no. 373 M 6390

**	Stabilizer support pad ram	365+20
***	Steering ram	200
**	Telescop ram - extend	150+20
	- retract	350+20
	SWING AXEL INTERLOCK	
***	Pressure - limiting valve	45
	REGULATED TRAVEL MOTOR	
**	Pressure regulator	260
	TRAVEL BRAKE VALVE	
*	Back-up pressure - wheeled - forwards	60
	- reverse	60
	- tracked - forwards	50
	- reverse	50
	LEAK-FREE SHUT-OFF	
**	Valve for minimum reduction	3+1
	FEED PRESSURE VALVES (without tank preload)	
*	Wheeled	15
*	Return baseplate	5
*	Cooler protection valve	7
	RETURN FLOW THROTTLES (without implements + 15 bar)	
*	Lowering	50
*	Folding	75
*	Closing bucket	75
	PRESSURE SWITCH	
**	Automatic idle	70
	SPEEDS	
*	Fan motor	1500
*	Slewing	8.5
*	Propeller shafts	620
	COMPRESSED AIR VALVES	
	Wheeled - pressure regulator	8
	- flow relief valve	5
	- pressure reduction valve	0.5
	- tire pressure	6.5
	Tracked - pressure reduction valve	0.8

The right to make modifications is reserved.

* Check / adjust at max. engine speed
** Check / adjust with pressure cut-in stage engaged
*** Check with hand pump.
Figures shown in bar or in rpm
Hydraulic fluid temp. 40-60° C.

	ENGINE SPEEDS		
	Min. idle speed		1030 -30
	Max. idle speed	- F1	1905
		- F2	2103
		- F3	2300
	Nominal speed		2200 -40
	Pressure cut-in stage		1708
	Emergency shift		2350
	Min. idle speed - automatic idle		1182
	PRIMARY VALVES		
*	Pump	- P1	60
		- P2	60
*	Pressure cut-off	- P1	320
		- P2	320
**	Pressure cut-in stage	- P1	380
		- P2	320
*	Pilot pump		25 - 27
*	Pr. lim. valve - emergency shift		14
*	Fan pump		125
*	Steering pump		140
	POWER-SHIFT CONTROLLER (delta p)		
	Pump, P1 and P2	- F1	17
		- F2	20
		- F3	23
**	Pressure cut-in stage		13
*	Load limit control valve (+ air pressure on hydraulic tank)		8.5+-0.2
	SECONDARY VALVES		
**	Lifting rams	- raising - plate valve	420 -30
**	Line rupture protection valve		420 -30
		- lowering	365+20
**	Folding ram	- plate valve	365+20
	Line rupture protection valve		365 -10
**	Bucket/Grab operating cylinder	- plate valve	365+20
	Intermediate plate - grab reducing valve	- open	230
	- grab reducing valve	- close	230
	Slewing motor (fixed setting)		115/310
*	TC plate		285
**	Drive motor	- wheeled	420
		- tracked	400+20
**	Grab rotation motor	- plate valve	150
		- motor	75
**	Dozer blade support cylinder		365+20

**	Stabilizer support pad cylinder		365+20
***	Steering cylinder		200
**	Elevating Cab	- up and down	210
**	Vario Cab	- up and down	320
		- forward / backward	230
**	Telescop cylinder	- extend	150+20
		- retract	350+20

SWING AXEL INTERLOCK

***	Pressure - limiting valve	45

REGULATED TRAVEL MOTOR

**	Pressure regulator	260

TRAVEL BRAKE VALVE

*	Back-up pressure	- wheeled - forwards	60
		- reverse	60
		- tracked - forwards	50
		- reverse	50

LEAK-FREE SHUT-OFF

**	Valve for minimum reduction	3+1

FEED PRESSURE VALVES (without tank preload)

*	Wheeled	15
*	Return base plate	5
*	Cooler protection valve	7

RETURN FLOW THROTTLES (without implements + 15 bar)

*	Lowering	50
*	Folding	75
*	Closing bucket	70

PRESSURE SWITCH

**	Automatic idle	70

SPEEDS

*	Fan motor		1500
*	Slewing		8.5
*	Universal joint shaft	- pneumatic tires	620
		- solid tires	500

COMPRESSED AIR VALVES

Wheeled	- pressure regulator	8
	- flow relief valve	5
	- pressure reduction valve	0.5
	- tire pressure	6.5
Tracked	- pressure reduction valve	0.8

ACCUMULATOR – SIZE 1LITER

Inflation pressure	190

The right to make modifications is reserved.

PRESSURE ADJUSTMENT TABLE - 1804

Wheeled and tracked excavators
From serial no. 283.R 6411

Schulungszentrum P72
Tafel:
Name: Ro.
Datum: 08.96

* Check / adjust at max. engine speed
** Check / adjust with pressure cut-in stage engaged
*** Check with hand pump.
Figures shown in bar or in rpm
Hydraulic fluid temp. 40-60° C.

ENGINE SPEEDS

Min. idle speed		1030 -30
Max. idle speed	- F1	1905
	- F2	2103
	- F3	2300
Nominal speed		2200 -40
Pressure cut-in stage		1708
Emergency shift		2350
Min. idle speed - automatic idle		1182

PRIMARY VALVES

*	Pump	- P1	60
		- P2	60
*	Pressure cut-off	- P1	320
		- P2	320
**	Pressure cut-off	- P1	380
	stage	- P2	380
*	Pilot pump		25 - 27
*	Pr. lim. valve - emergency shift		14
*	Fan pump		125
*	Steering pump		140

POWER-SHIFT CONTROLLER (delta p)

	Pump, P1 and P2	- F1	17
		- F2	20
		- F3	23
**	Pressure cut-in stage		13
*	Load limit control valve (+ air pressure on hydraulic tank)		8.5+-0.2

SECONDARY VALVE

**	Lifting rams	- raising - plate valve	420-10
**	Line rupture protection valve		420-10
		- lowering	365+20
**	Folding ram		365+20
**	Bucket / Grab operating ram		365+20
	Slewing motor (fixed setting)		80 /280
*	TC plate		265
**	Drive motor	- wheeled	400+20
		- tracked	400+20
**	Grab rotatio motor - plate valve		150
		- motor	75
**	Actuating ram	- extend -plate valve	365+20
	Line rupture protection valve / Leak-free cut-off		435+20
		- retract	415+20
**	Dozer blade support ram		365+20

PRESSURE ADJUSTMENT TABLE - 1804

Wheeled and tracked excavators
From serial no. 283.R 6411

Schulungszentrum
Tafel:
Name: Ro.
Datum: 08.96

**	Stabilizer support pad ram	365+20
***	Steering ram	200
**	Telescop ram - extend	150+20
	- retract	350+20
	SWING AXEL INTERLOCK	
***	Pressure - limiting valve	45
	REGULATED TRAVEL MOTOR	
**	Pressure regulator	260
	TRAVEL BRAKE VALVE	
*	Back-up pressure - wheeled - forwards	60
	- reverse	60
	- tracked - forwards	50
	- reverse	50
	LEAK-FREE SHUT-OFF	
**	Valve for minimum reduction	3+1
	FEED PRESSURE VALVES (without tank preload)	
*	Wheeled	15
	Return baseplate	5
*	Cooler protection valve	7
	RETURN FLOW THROTTLES (without implements + 15 bar)	
*	Lowering	50
*	Folding	75
*	Closing grab	75
	PRESSURE SWITCH	
**	Automatic idle	70
	SPEEDS	
*	Fan motor	1350
*	Slewing	8.5
*	Propeller shafts	620
	COMPRESSED AIR VALVES	
	Wheeled - pressure regulator	8
	- flow relief valve	5
	- pressure reduction valve	0.5
	- tire pressure	6.5
	Tracked - pressure reduction valve	0.8

The right to make modifications is reserved.

PRESSURE ADJUSTMENT TABLE – 1804
INDUSTRIAL – MASCHINES
Wheeled and tracked excavators
From serial no. 283 S 6411

Schulungszentrum
Name :Ro.
Datum:08.99

* Check / adjust at max. engine speed
** Check / adjust with pressure cut-in stage engaged
*** Check with hand pump.
Figures shown in bar or in rpm
Hydraulic fluid temp. 40-60° C.

	ENGINE SPEEDS		
	Min. idle speed		1030 -30
	Max. idle speed	- F1	1905
		- F2	2103
		- F3	2300
	Nominal speed		2200 -40
	Pressure cut-in stage		1708
	Emergency shift		2350
	Min. idle speed - automatic idle		1182
	PRIMARY VALVES		
*	Pump	- P1	60
		- P2	60
*	Pressure cut-off	- P1	320
		- P2	320
**	Pressure cut- in stage	- P1	380
		- P2	320
*	Pilot pump		25 - 27
*	Pr. lim. valve - emergency shift		14
*	Fan pump		125
*	Steering pump		140
	POWER-SHIFT CONTROLLER (delta p)		
	Pump, P1 and P2	- F1	17
		- F2	20
		- F3	23
**	Pressure cut-in stage		13
*	Load limit control valve (+ air pressure on hydraulic tank)		8.5+-0.2
	SECONDARY VALVES		
**	Lifting rams	- raising - plate valve	420 -10
**	Line rupture protection valve		420 -10
		- lowering	365+20
**	Folding ram	- plate valve	365+20
	Line rupture protection valve		365 -10
**	Bucket/Grab operating cylinder	- plate valve	365+20
	Intermediate plate - grab reducing valve	- open	230
	- grab reducing valve	- close	230
	Slewing motor (fixed setting)		80/280
*	TC plate		265
**	Drive motor	- wheeled	400+20
		- tracked	400+20
**	Grab rotation motor	- plate valve	150
		- motor	75
**	Dozer blade support cylinder		365+20

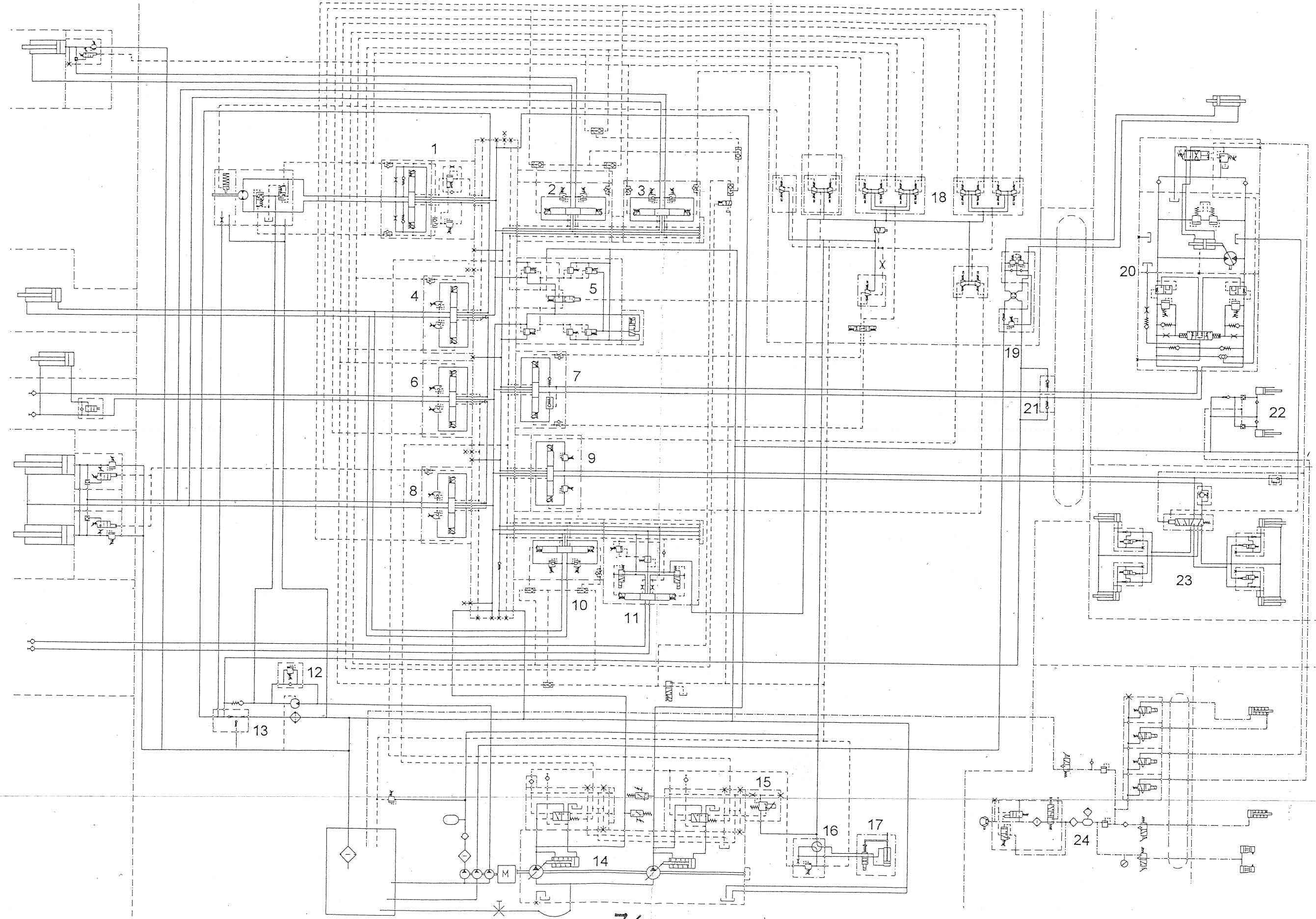
**	Stabilizer support pad cylinder		365+20
***	Steering cylinder		200
**	Elevating Cab	- up and down	210
**	Vario Cab	- up and down	320
		- forward / backward	230
**	Telescop cylinder	- extend	150+20
		- retract	350+20
	SWING AXEL INTERLOCK		
***	Pressure - limiting valve		45
	REGULATED TRAVEL MOTOR		
**	Pressure regulator		260
	TRAVEL BRAKE VALVE		
*	Back-up pressure	- wheeled - forwards	60
		- reverse	60
		- tracked - forwards	50
		- reverse	50
	LEAK-FREE SHUT-OFF		
**	Valve for minimum reduction		3+1
	FEED PRESSURE VALVES (without tank preload)		
*	Wheeled		15
*	Return base plate		5
*	Cooler protection valve		7
	RETURN FLOW THROTTLES (without implements + 15 bar)		
*	Lowering		50
*	Folding		75
*	Closing bucket		70
	PRESSURE SWITCH		
**	Automatic idle		70
	SPEEDS		
*	Fan motor		1350
*	Slewing		8.5
*	Universal joint shaft	- pneumatic tires	620
		- solid tires	500
	COMPRESSED AIR VALVES		
	Wheeled	- pressure regulator	8
		- flow relief valve	5
		- pressure reduction valve	0.5
		- tire pressure	6.5
	Tracked	- pressure reduction valve	0.8
	ACCUMULATOR – SIZE 1LITER		
	Inflation pressure		190

The right to make modifications is reserved.

HYDRAULIC DIAGRAM 1704

with external oil summation and separation control
Wheeled excavator from serial No. **373 M 301275**

Schulungszentrum
Tafel:
Name: Ro.
Datum: 04.97



HYDRAULIC DIAGRAM 1704

with external oil summation and separation control
Wheeled excavator from serial No. **373 M 301275**

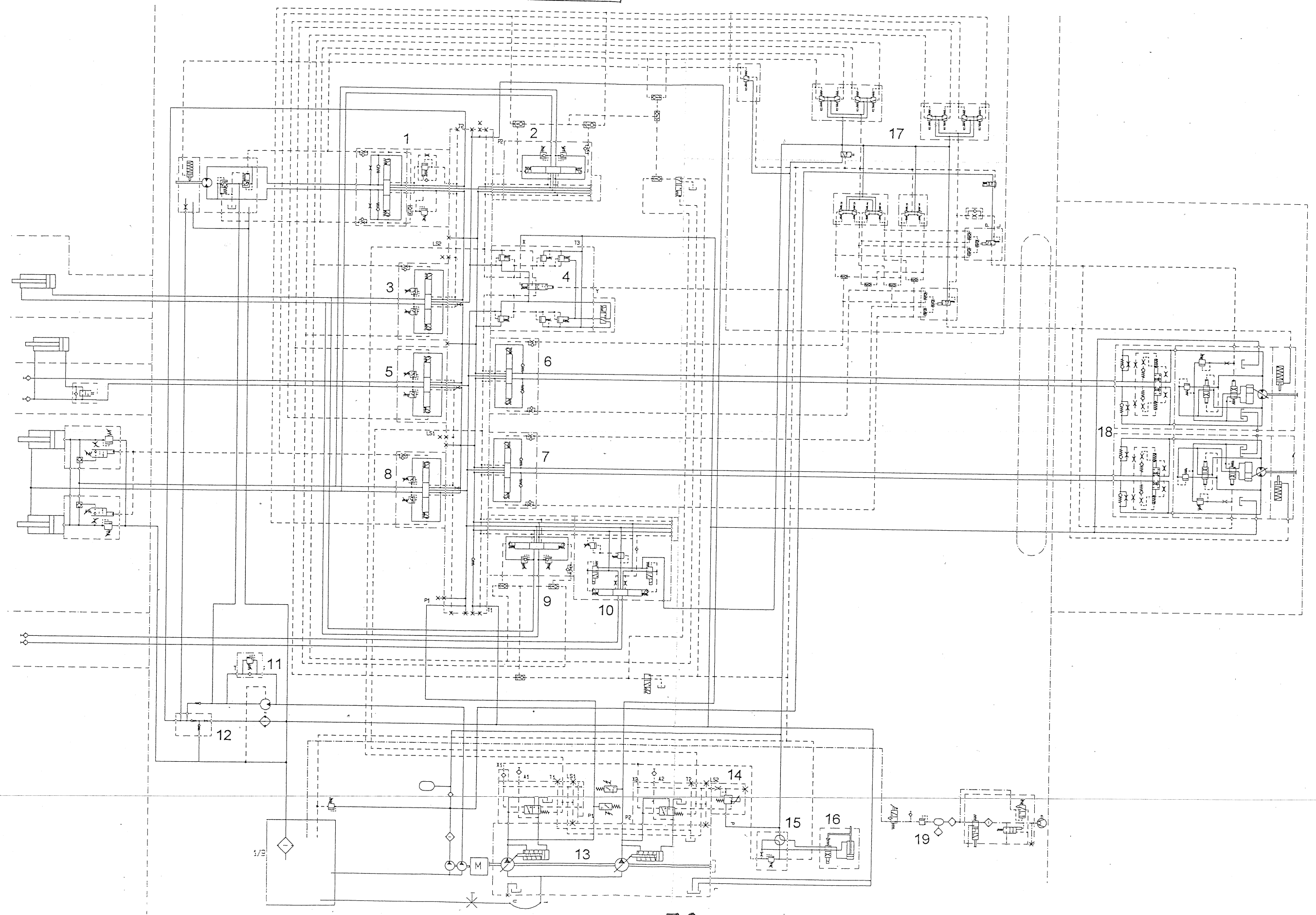
Schulungszentrum
Tafel: Ro.
Name: 04.97
Datum:

1	Slewing plate valve and TC plate
2	Plate valve Luffing boom
3	Plate valve Lifting 2
4	Plate valve Jib folding 1
5	Valve unit with separation piston
6	Plate valve Bucket
7	Plate valve Driving
8	Plate valve Lifting 1
9	Plate valve Dozer blade / Stabilizer
10	Plate valve Jib folding 2
11	Plate valve Grab rotating
12	Pressure relief valve with anti cavitation valve
13	Cooler protection and preloaded valve
14	Pump HPR 160 / 160
15	Load limit control valve
16	Emergency control valve
17	Speed regulator
18	Servo valve unit
19	Steering unit
20	Brake valve and drive motor HMR
21	Feed valve
22	Swing axel interlock
23	Stabilizer support pad ram
24	Air system

HYDRAULIC DIAGRAM 1704

with external oil summation and separation control
Tracked excavator from serial No. 373 R 6759

Schulungszentrum
Tafel:
Name: Ro
Datum: 04.97



HYDRAULIC DIAGRAM 1704

with external oil summation and separation control
Tracked excavator from serial No. **373 R 6759**

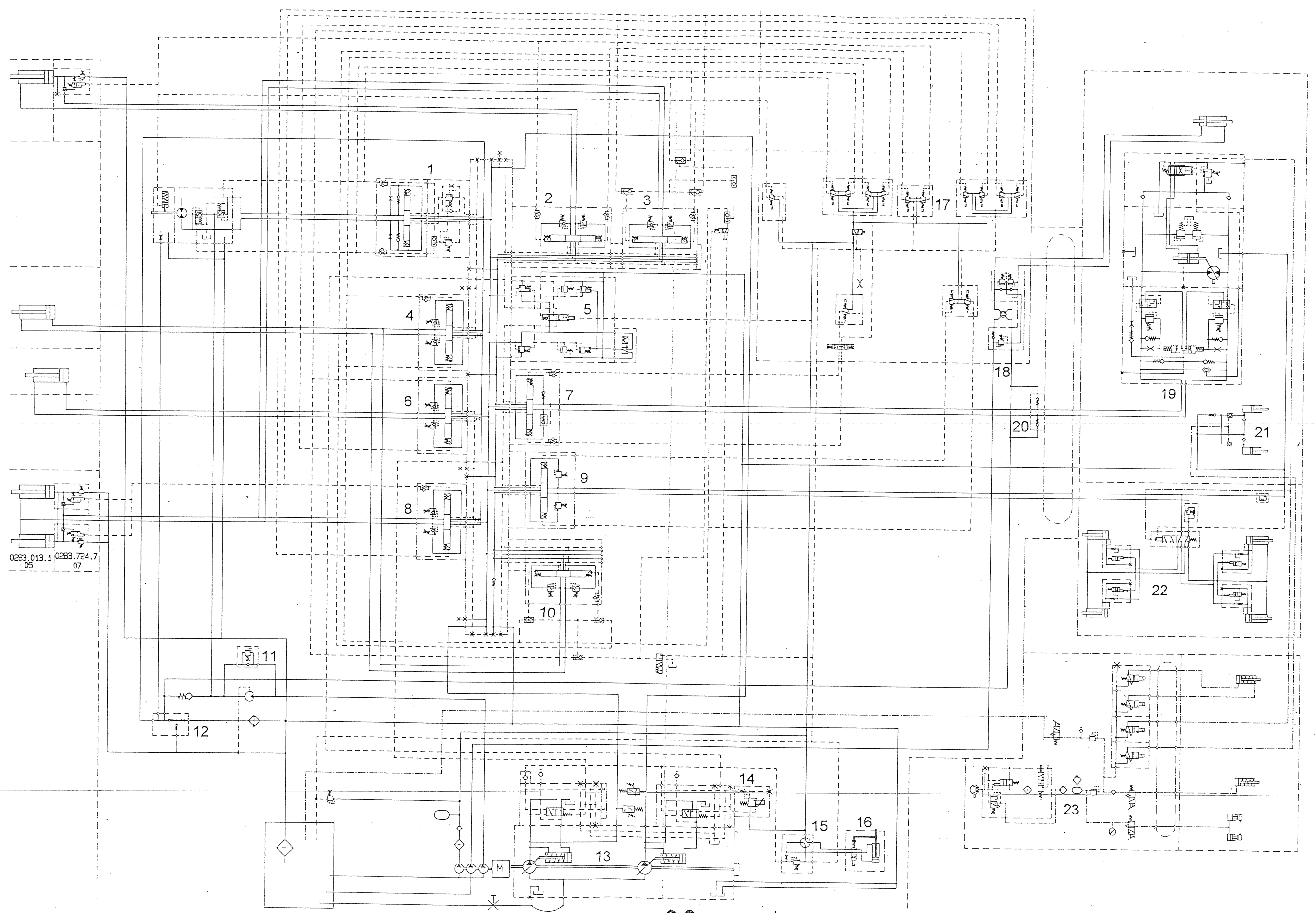
Schulungszentrum
Tafel:
Name: Ro.
Datum: 04.97

1	Slewing plate valve and TC plate
2	Plate valve Lifting 2
3	Plate valve Jib folding 1
4	Valve unit with separation piston
5	Plate valve Bucket
6	Plate valve Driving
7	Plate valve Driving
8	Plate valve Lifting 1
9	Plate valve Jib folding 2
10	Grab rotation
11	Pressure relief valve with anti cavitation valve
12	Cooler protection and preloaded valve
13	Pump HPR 160 / 160
14	Load limit control valve
15	Emergency control valve
16	Speed regulator
17	Servo valve unit
18	Brake valve and drive motor HMR
19	Air system

HYDRAULIC DIAGRAM 1804

with external oil summation and separation control
Wheeled excavator from serial No. 283 M 301274

Schulungszentrum
Tafel:
Name: Ro.
Datum: 04.97



HYDRAULIC DIAGRAM 1804

with external oil summation and separation control
Wheeled excavator from serial No. **283 M 301274**

Schulungszentrum
Tafel:
Name: Ro.
Datum: 04.97

P1

1	Slewing plate valve and TC plate
2	Plate valve Luffing boom
3	Plate valve Lifting 2
4	Plate valve Jib folding 1
5	Valve unit with separation piston
6	Plate valve Bucket
7	Plate valve Driving
8	Plate valve Lifting 1
9	Plate valve Dozer blade / Stabilizer
10	Plate valve Jib folding 2
11	Pressure relief valve with anti cavitation valve
12	Cooler protection and preloaded valve
13	Pump HPR 160 / 160
14	Load limit control valve
15	Emergency control valve
16	Speed regulator
18	Steering unit
19	Brake valve and drive motor HMR
20	Feed valve
21	Swing axel interlock
22	Stabilizer support pad ram
23	Air system

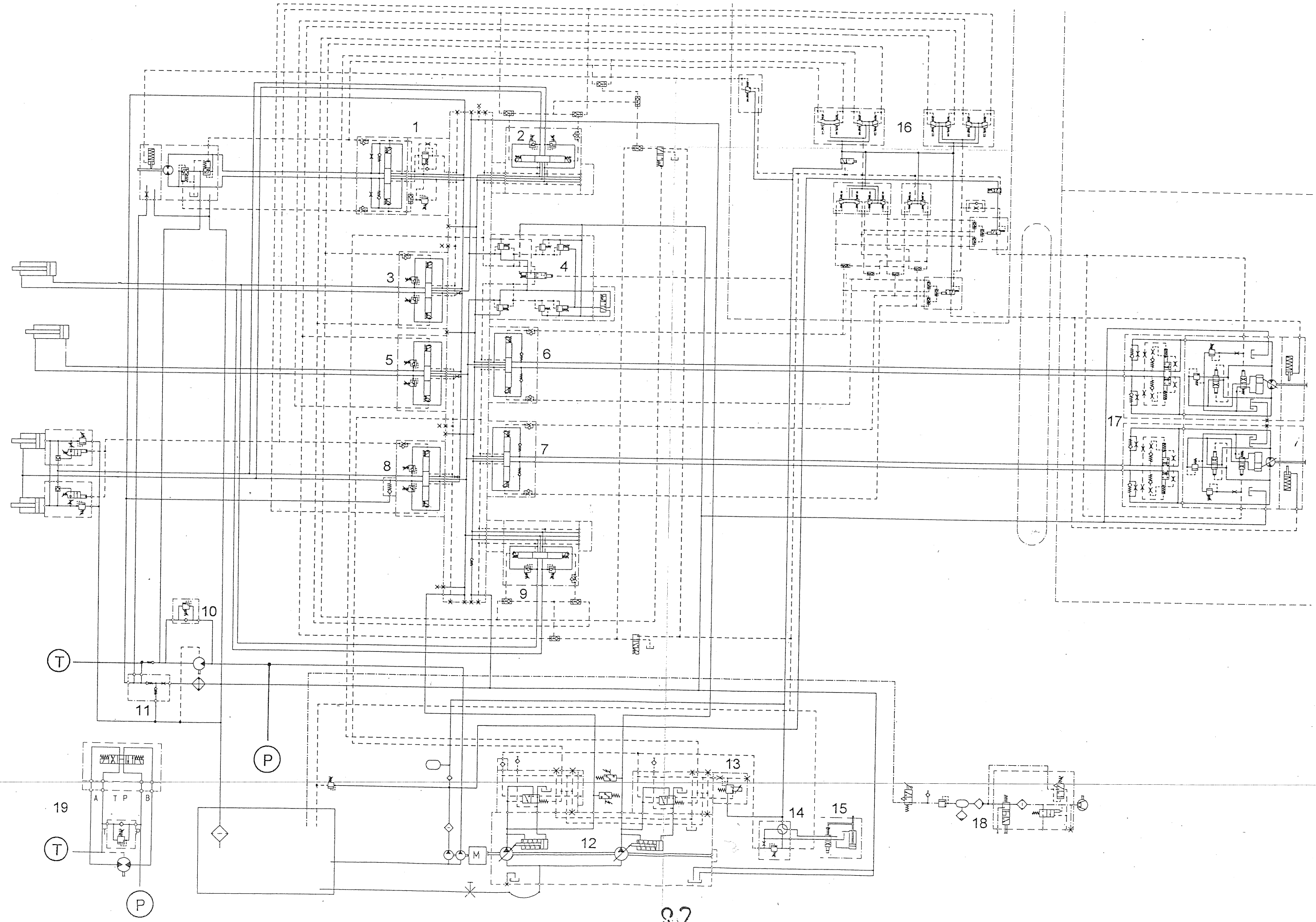
01

HYDRAULIC DIAGRAM 1804

with external oil summation and separation control
Tracked excavator from serial No. 283 R 6770

Schulungszentrum
Tafel:
Name: Ro.
Datum: 04.97

PT



ATLAS WEYHAUSEN

HYDRAULIC DIAGRAM 1804

with external oil summation and separation control
Tracked excavator from serial No. **283 R 6770**

Schulungszentrum
Tafel:
Name: Ro.
Datum: 04.97

1	Slewing plate valve and TC plate
2	Plate valve Lifting 2
3	Plate valve Jib folding 1
4	Valve unit with separation piston
5	Plate valve Bucket
6	Plate valve Driving
7	Plate valve Driving
8	Plate valve Lifting 1
9	Plate valve Jib folding 2
10	Pressure relief valve with anti cavitation valve
11	Cooler protection and preloaded valve
12	Pump HPR 160 / 160
13	Load limit control valve
14	Emergency control valve
15	Speed regulator
16	Servo valve unit
17	Brake valve and drive motor HMR
18	Air system
19	Cooler cleaning circuit (optional equipment)

TEREX ATLAS

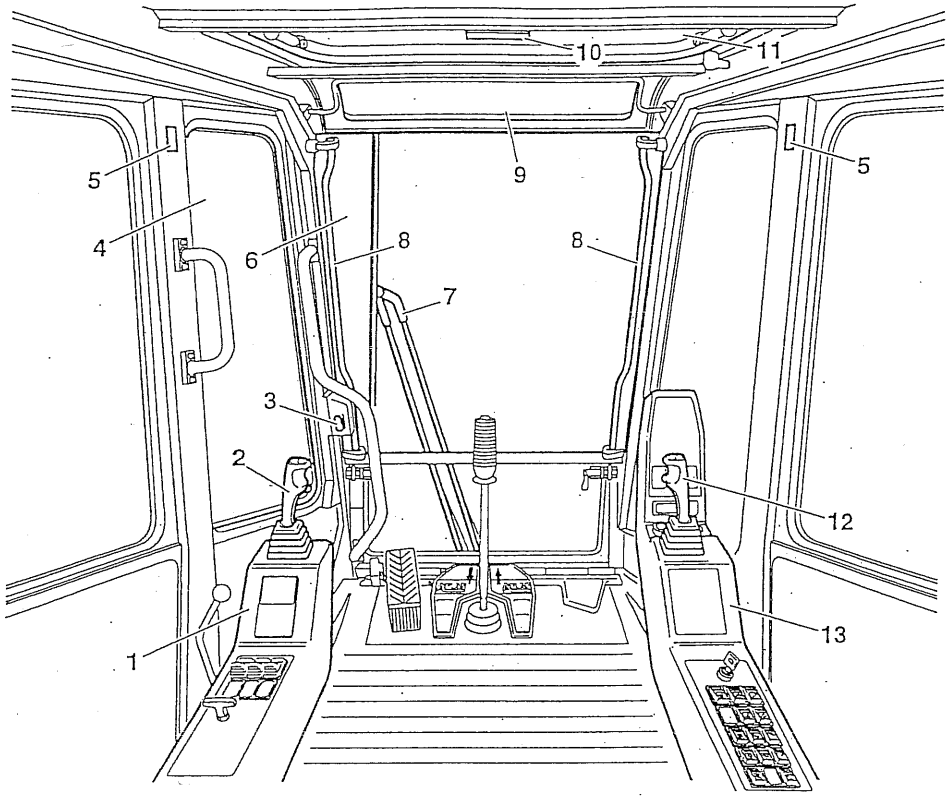
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5	Left hand switch panel. (tracked)
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6-7	Technical information
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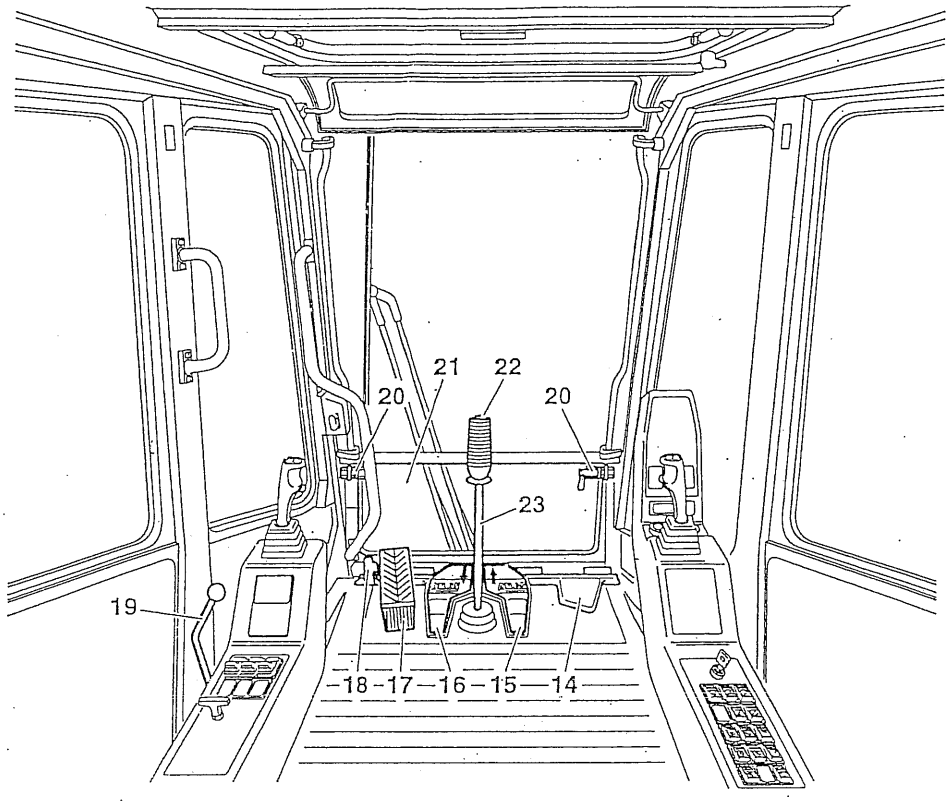
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58	Travel gear transmission 1704 / 1804 WY199
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GENERAL VIEW OF CAB



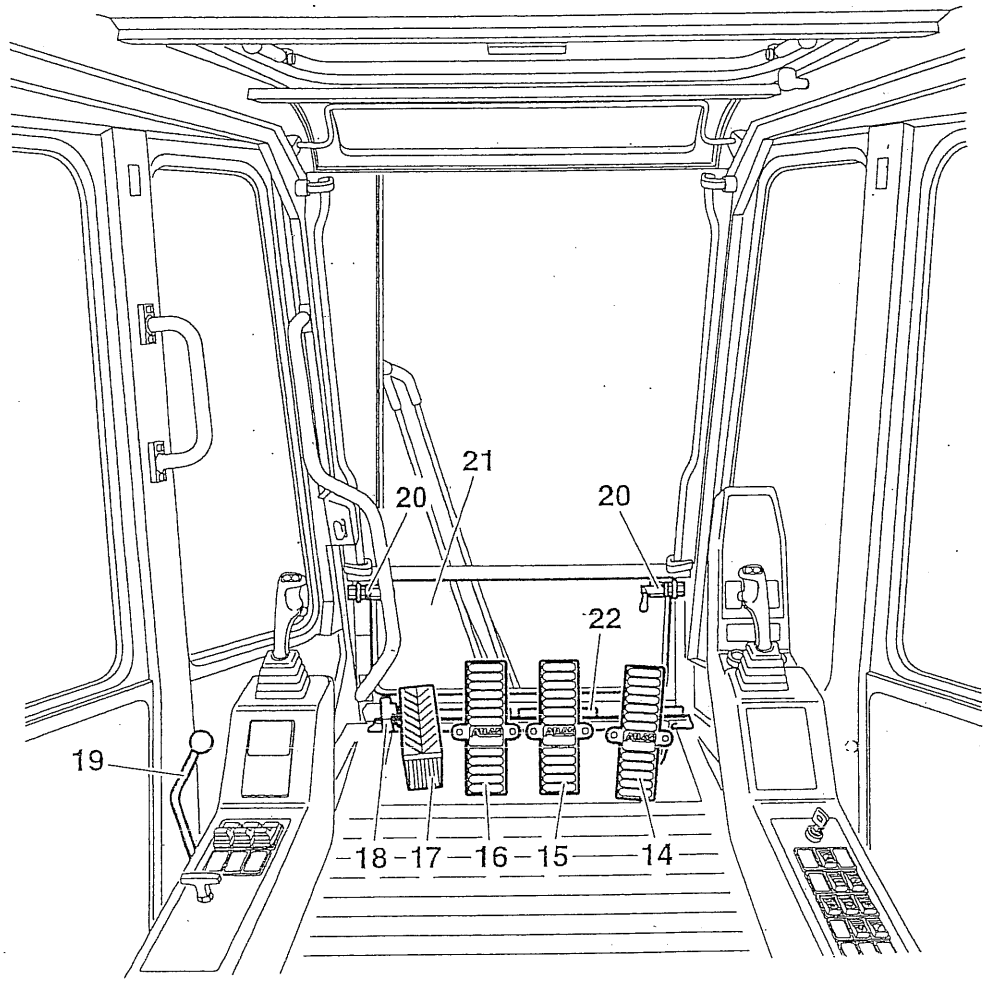
1	Left console
2	Control lever for: Jib / Slewing
3	Lever for cab door
4	Cab door
5	Interior lights
6	Windshield
7	Windshield wiper
8	Windshield locking rods, left/right
9	Sun visor
10	Skylight lock
11	Skylight
12	Control lever for : Lifting / Lowering, Bucket / Grab
13	Right console

GENERAL VIEW OF CAB



14	Windshield vent outlet
15	Pedal for: Forward travel, luffing boom
16	Pedal for: Reversing, retracting luffing boom
17	Slewing brake pedal
18	Slewing brake pedal lock
19	Hydraulic pilot control circuit shutdown
20	Plug-in window catch
21	Plug-in window
22	Speed selector switch
23	Control lever for travel

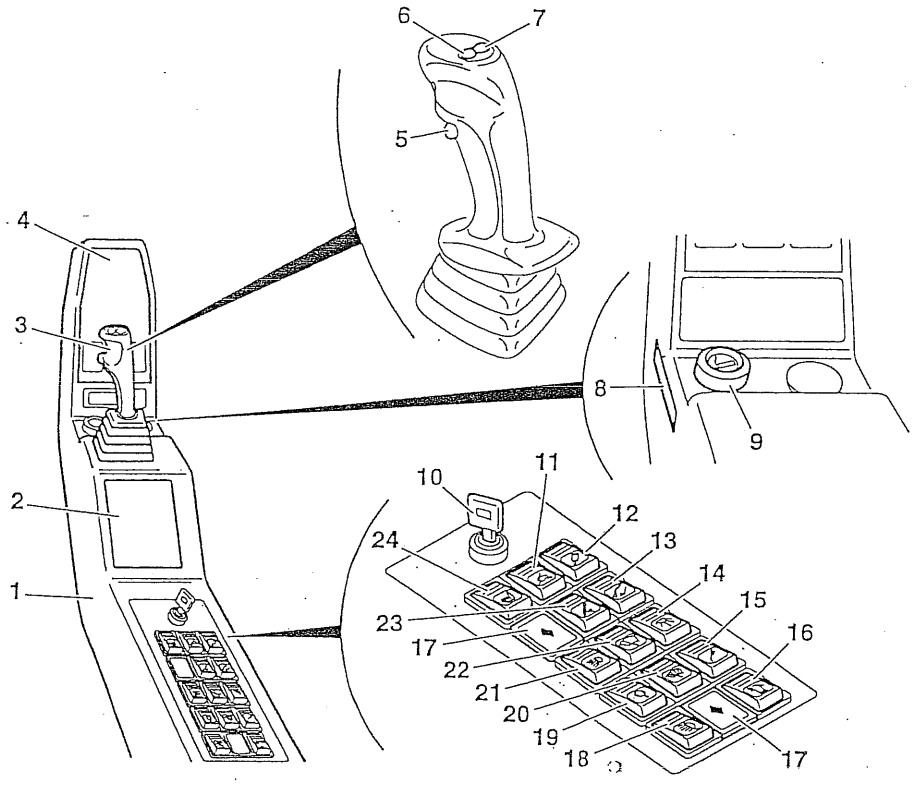
GENERAL VIEW OF CAB



14	Pedal for operating boom: Extend luffing boom Retract luffing boom
15	Pedal for travel: R.h. crawler track forwards R.h. crawler track reverse
16	Pedal for travel: L.h. crawler track forwards L..h. crawler track reverse
17	Slewing brake pedal
18	Slewing brake pedal lock
19	Hydraulic pilot control circuit shutdown
20	Plug-in window catch
21	Plug-in window
22	Windshield vent outlet

GENERAL VIEW OF CAB

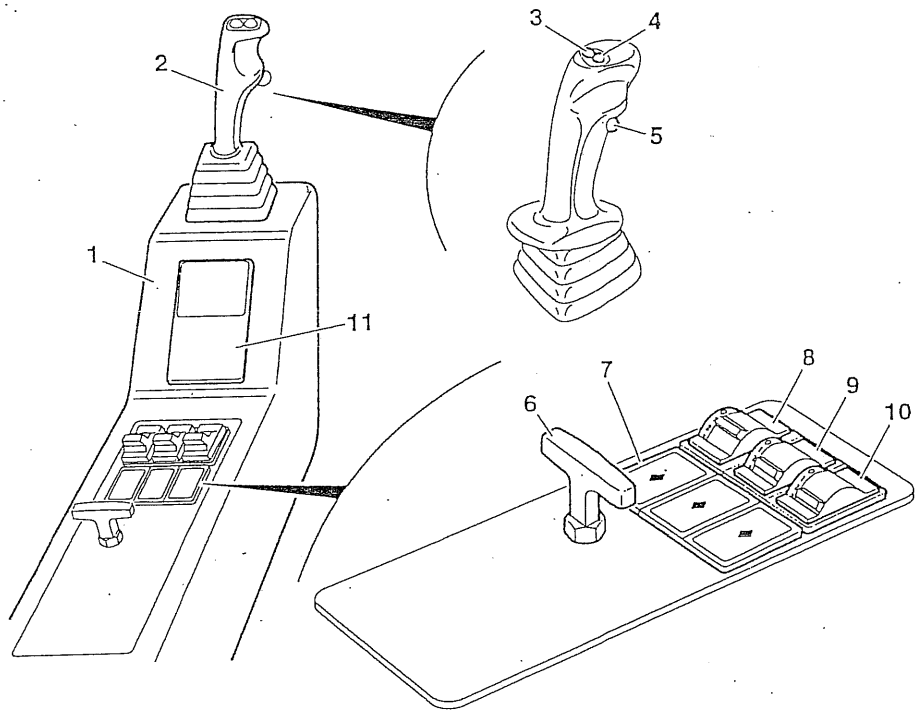
Right switch panel



1	Right console
2	Control panel
3	Control lever for: Lifting / Lowering, Bucket / Grab
4	Display panel with control and warning lights
5	Pushbutton for max. working
6	Pushbutton to rotate grab to left
7	Pushbutton to rotate grab to right
8	Operating hour meter
9	Cigarette lighter/electric power socket
10	Ignition key
11	Switch for external oil summation and separation control
12	Hydraulic hammer
13	Switch to cancel jib cut- off
14	Interior lights switch
15	Pushbutton for central lubrication system
16	Switch for rotating beacon light
17	Spare, for optional extra
18	Switch for work area light
19	Switch overload warning device
20	Pushbutton for:Intermittent wipe, windshield washer
21	Switch for parking lights and low-beam headlights
22	Windshield wiper switch
23	Switch for crawler speed (only for excavators with ISO control system) Changeover switch for travel/luffing boom (only for excavators witch ATLAS control system and luffing boom)
24	Switch for seat heating

GENERAL VIEW OF CAB

Left switch panel



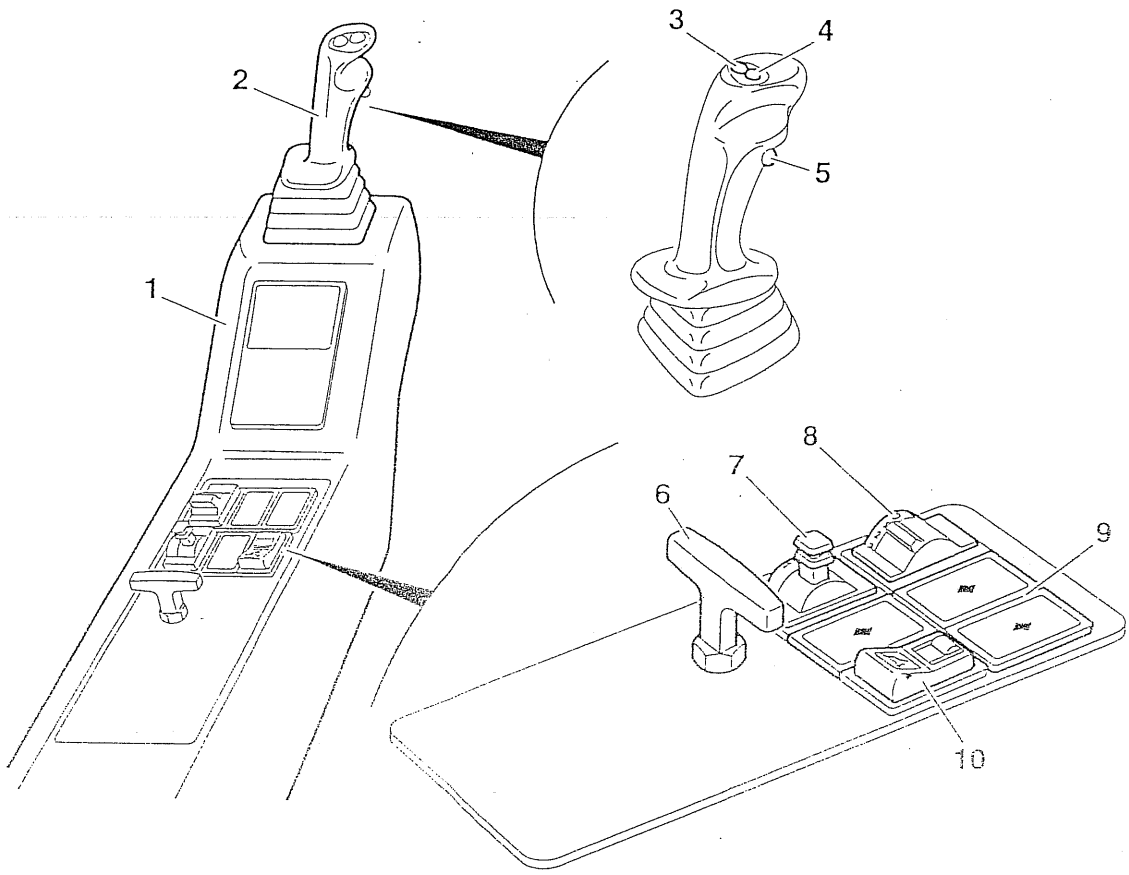
1	Left konsole
2	Control lever for: Folding jib, Slewing
3	Left pushbutton for additional working attachments
4	Right pushbutton for additional working attachments
5	Pushbutton for horn
6	Pull switch for heating
7	Spare, for optional extra
8	Blower switch (speeds 1 to 2)
9	Preselector switch for left pushbutton (3) (positions 0 to 4)
10	Preselector switch for right pushbutton (4) (positions 0 to 4)
11	Ashtray

Hint: The allocation of the preselector switches (9, 10) depends on the optional extras for the excavator. Which working attachment or which function can be selected with which switch position can be taken from the switch symbols for the preselector switches (9, 10) on the symbol panel on the cab wall.

GENERAL VIEW OF CAB

Left switch panel

Schulungszentrum
Name : Ro.
Datum: 04.99



1	Left console
2	Control lever for: Jib and Slewing
3	Left pushbotton for special functions
4	Right pushbotton for special functions
5	Pushbotton for horn
6	Pull switch for heating
7	Parking brake lever
8	Blower switch (speed 1 to 3)
9	Spare, for optional extras
10	Opion Gearshift, On road - Off road gear

Diesel engine : Deutz BF6M 1013 E, output 122 KW at 2000 rpm

Pumps : Linde Duopumpe HPR 160 / 130 flow rate 1 x 320 litres / 1 x 260 litres/min.

Fan pump : 14 cc, flow rate 35 litres/min.

Pilot pump : 8 cc, flow rate 20 litres/min.

Steering pump : 11 cc, flow rate 27.7 litres/min.

Fan motor : 16 cc absorption volume

Slewing motor : HMF 75 – 02

Slewing gear transmission : GD 6 / 12 Z

Hydraulic drive motor : HMV 105 – 02

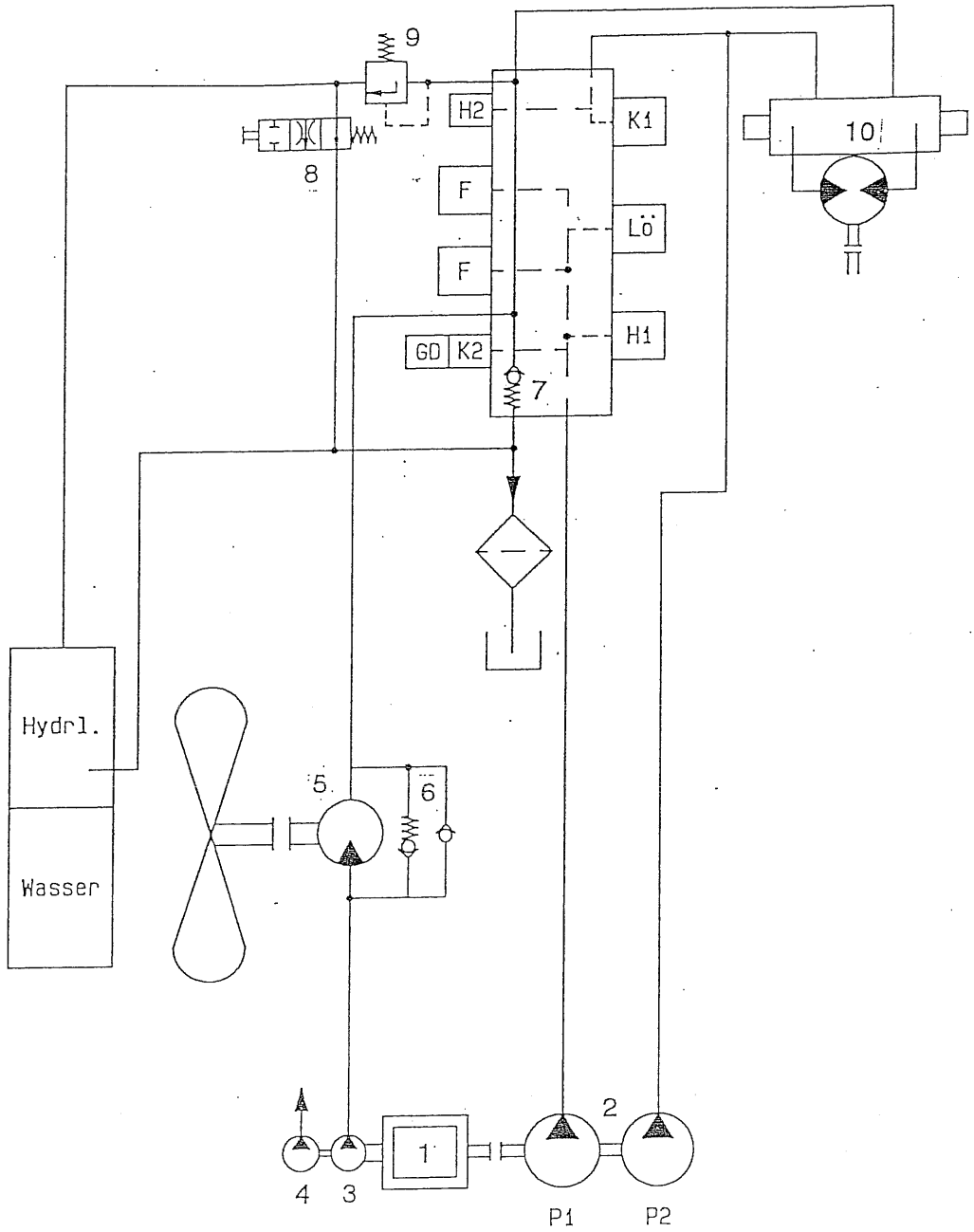
Travel speed : **Tracked HD -** continuously variable 0 – 2.2 km/h
continuously variable 0 – 4.5 km/h
LC - continuously variable 0 – 2.63 km/h
continuously variable 0 – 5.37 km/h

Travel gear : **Tracked** Trasmital **HD** 713 – 02 **LC** 711 – 02
Wheeled NAF WY 199

Control block : Linde distributor plate VT 7 with external summation control for lifting /folding.
New: The oil summation for jib folding while closing the bucket.
Pressure cut in stage P1.

Hydraulic oil cooler : Thermostat controlled.
Hydraulic fluid temperature less than 40°C – thermostat valve in bypass to tank opened.
Hydraulic fluid temperature greater than 55°C – thermostat valve in bypass to tank closed.

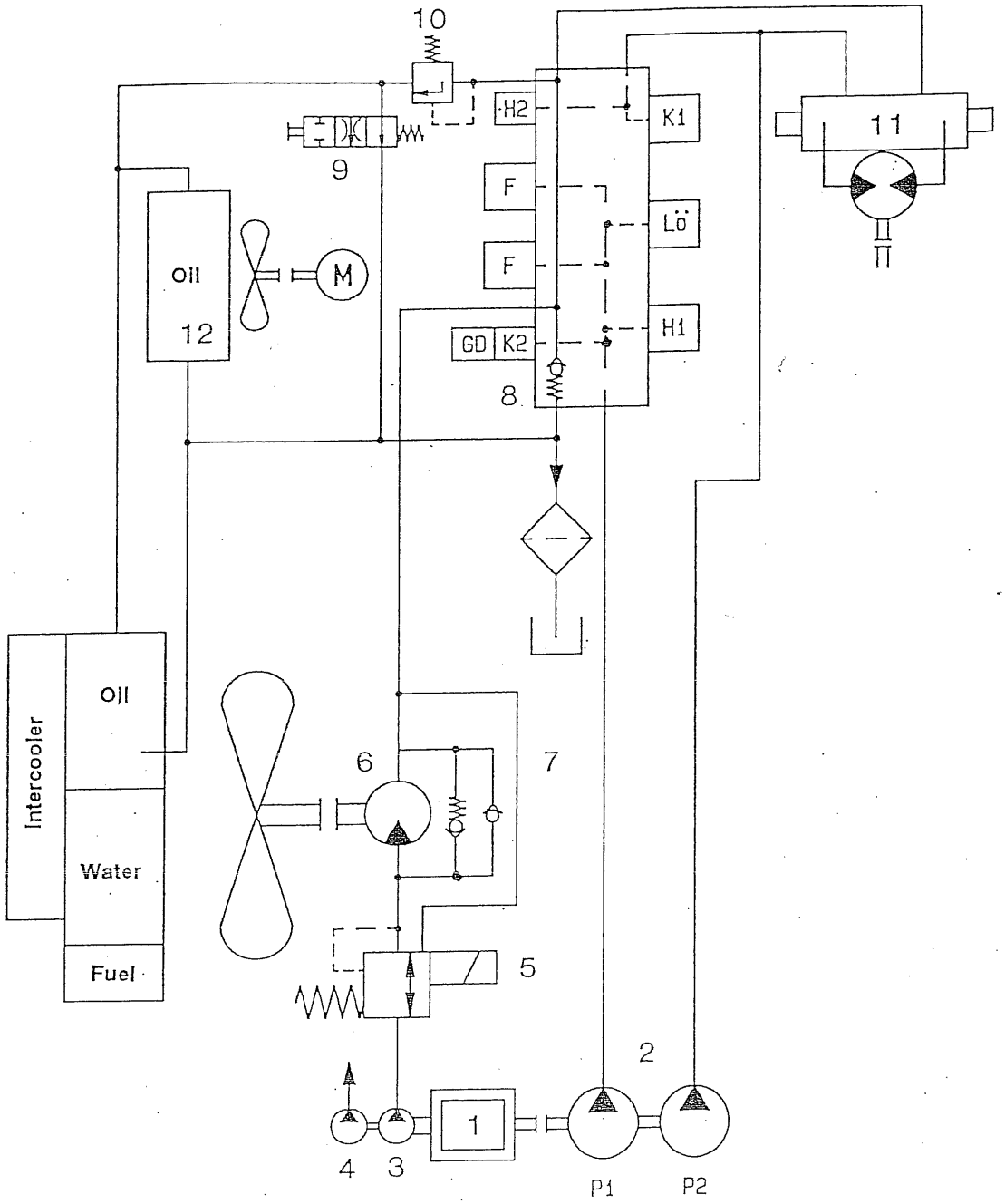
Diesel engine	: Deutz BF6M 1013 ECP, output 161 KW at 1900 rpm.
Pumps	: Linde Duopumpe HPR 160 / 160, flow rate 2 x 304 litres per minute.
Fan pump	: 14 cc, flow rate 34.5 litres/min.
Pilot pump	: 8 cc, flow rate 19.5 litres/min.
Steering pump	: 11 cc, flow rate 26.3 litres/min.
Fan motor	: 16 cc absorption volume
Slewing motor	: HMF 105 – 02
Slewing gear transmission	: GD 9 / 12 Z
Hydraulic drive motor	: HMV 105 – 02
Travel speed:	**Tracked:** continuously variable 0 – 2.1 km/h continuously variable 0 – 4.5 km/h
Drive transmission	: **Tracked:** Trasmital 713 – 02 **Wheeled:** NAF WY 199
Control block	: Linde distributor plate VT 7 with external summation control for lifting / folding. New: The oil summation for jib folding while closing the bucket. Pressure cut in stage P1.
Hydraulic oil cooler	: Thermostat controlled. Hydraulic fluid temperature less than 40°C – thermostat valve in bypass to tank opened. Hydraulic fluid temperature greater than 55°C – thermostat valve in bypass to tank closed.
Fan speed	: Proportionally controlled pressure limiting valve No current – valve closed – max. fan speed approx. 1900 rpm With current – valve opens in relation to hydraulic fluid temperature Minimum fan speed 1350 ± 50 up to 28°C hydraulic fluid temperature. The pressure is then 80 bar. Fan runs up from 52°C hydraulic fluid temperature. Max. fan speed 1770 ± 50 above 60°C hydraulic fluid temperature. The pressure is then 130 bar.
Additional oil cooler	: Electric motor fan drive, 3100 rpm/min Detection of hydraulic oil temperature via a sensor in the fan pump Switch-on temperature from 53°C Switch-off temperature below 51°C



1 Engine BF6 M 1013 E
2 Variable pump HPR – 160/130 Duo
3 Gear pump – Fan drive
4 Gear pump – Servo system
5 Fan motor
6 Anti cavitation valve
7 Cooler protection valve
8 Thermostat valve
9 Check valve 2.5 bar
10 Slewing motor HMF 105-02 include distributor valve

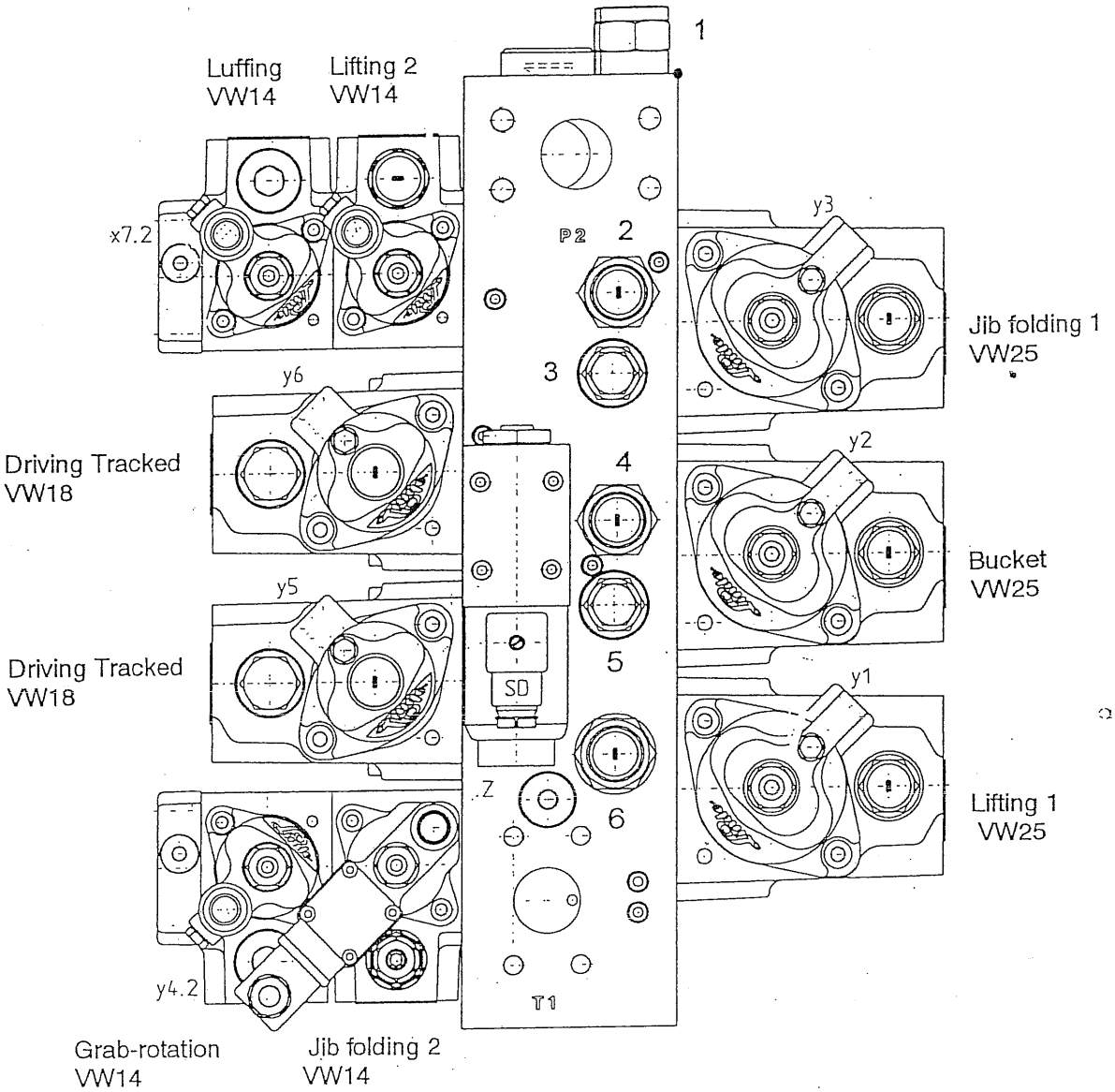
HYDRAULIC DIAGRAM

1804 Serial 284

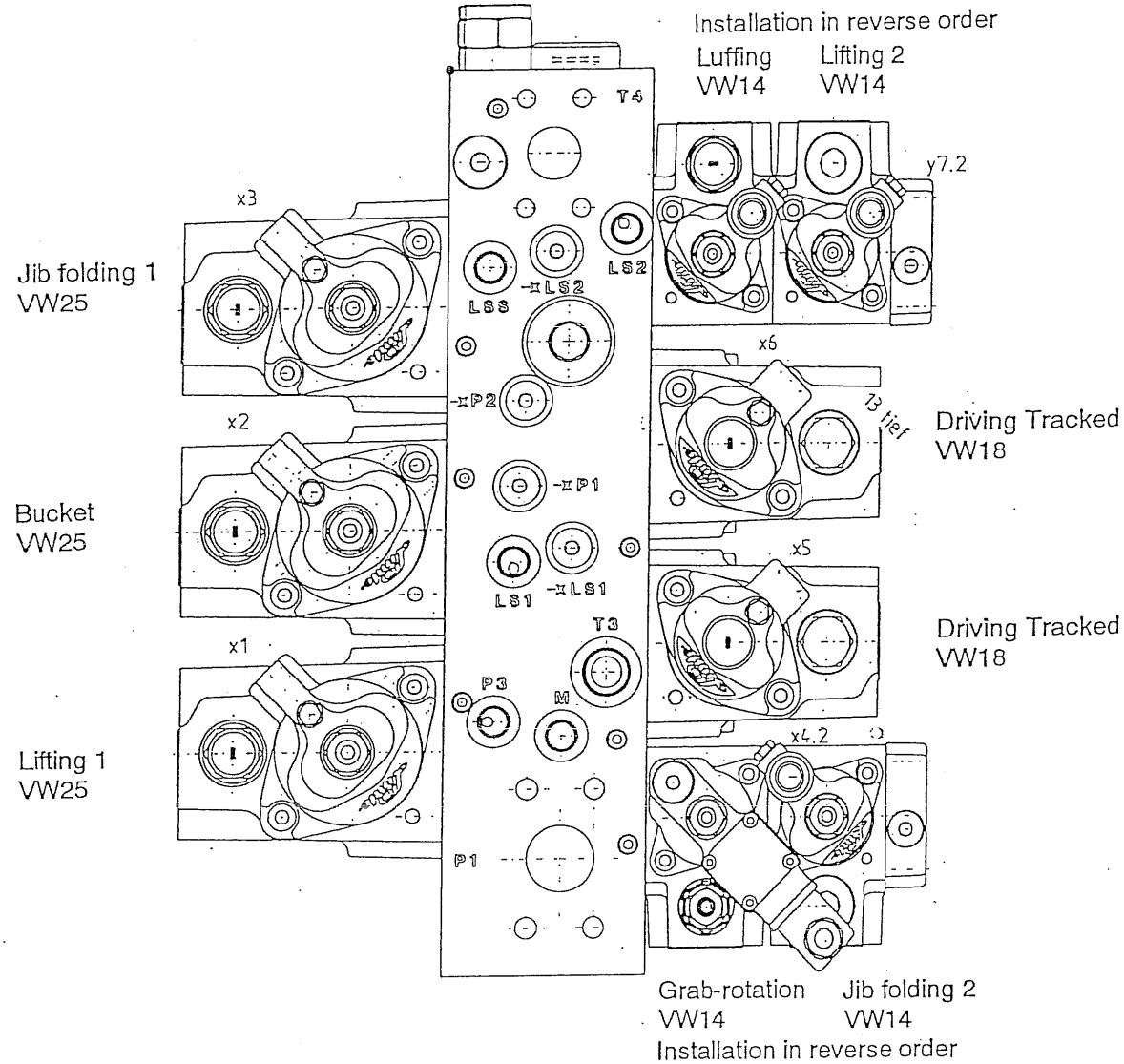


1 Engine BF6 M 1013 EC – P
2 Variable pump HPR – 160 Duo
3 Gear pump – Fan drive
4 Gear pump – Servo system
5 Proportional soleniod valve
6 Fan motor
7 Anti cavitation valve
8 Cooler protection valve
9 Thermostat valve
10 Check valve 2.5 bar
11 Slewing motor HMF 105-02 include distributor valve
12 Auxiliary cooler with electrical fan drive (option)

CONTROL BLOCK VT 7



1	Primary valve LS controlled
2	Pressure cut off valve P2
3	Restrictor (Jib folding in)
4	Pressure cut off valve P1
5	Restrictor (Bucket closed)
6	Pressure cut in stage valve
P2	Connection – Pump
T1	Connection – Tank



P1 Connection - Pump

LS1 Connection – Load sensing signal P1

LS2 Connection – Load sensing signal P2

LSS Connection – Slewing

T4 Connection – Return line tank

XP1 Measuring union

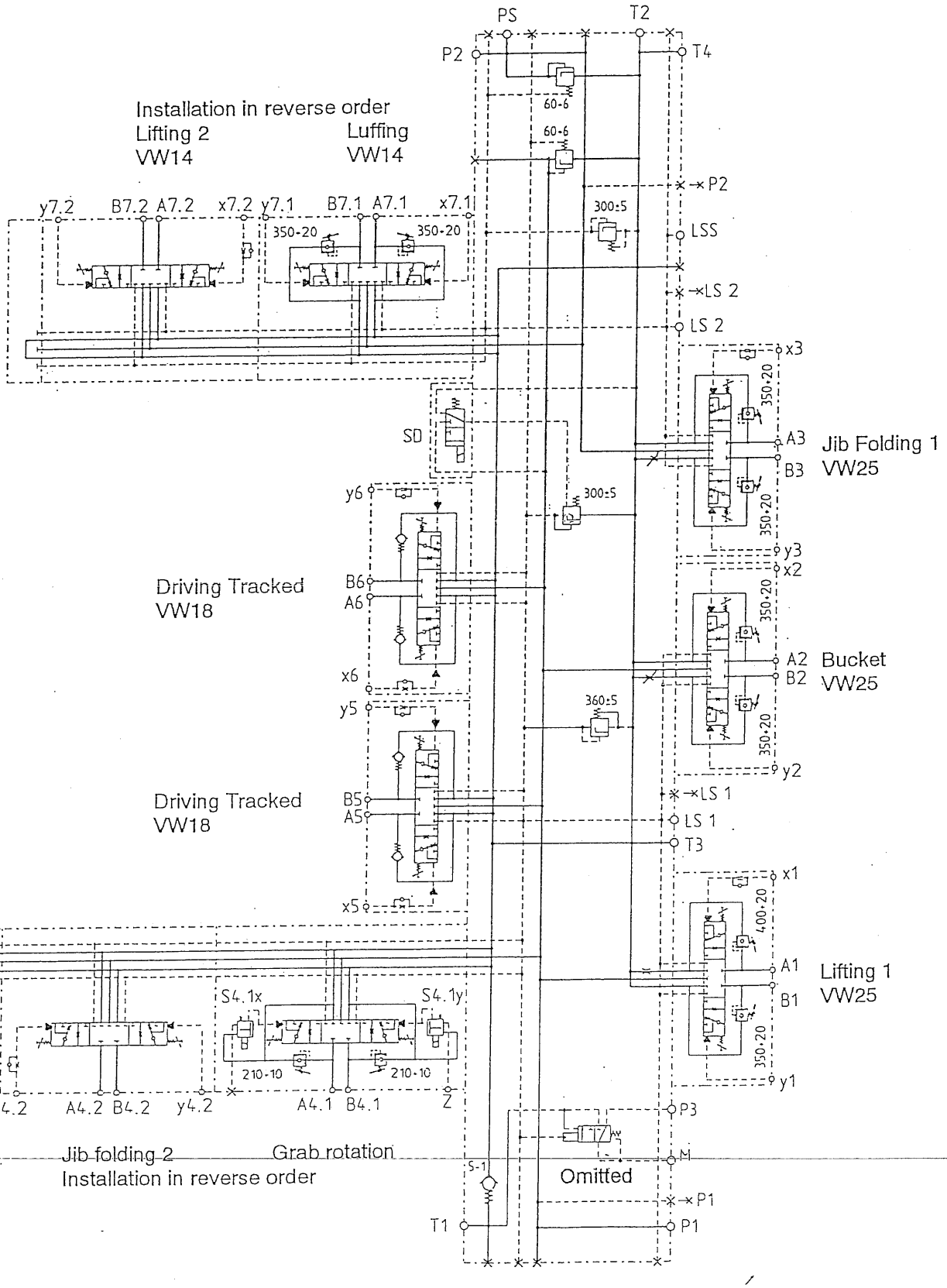
XLS1 Measuring union

XP2 Measuring union

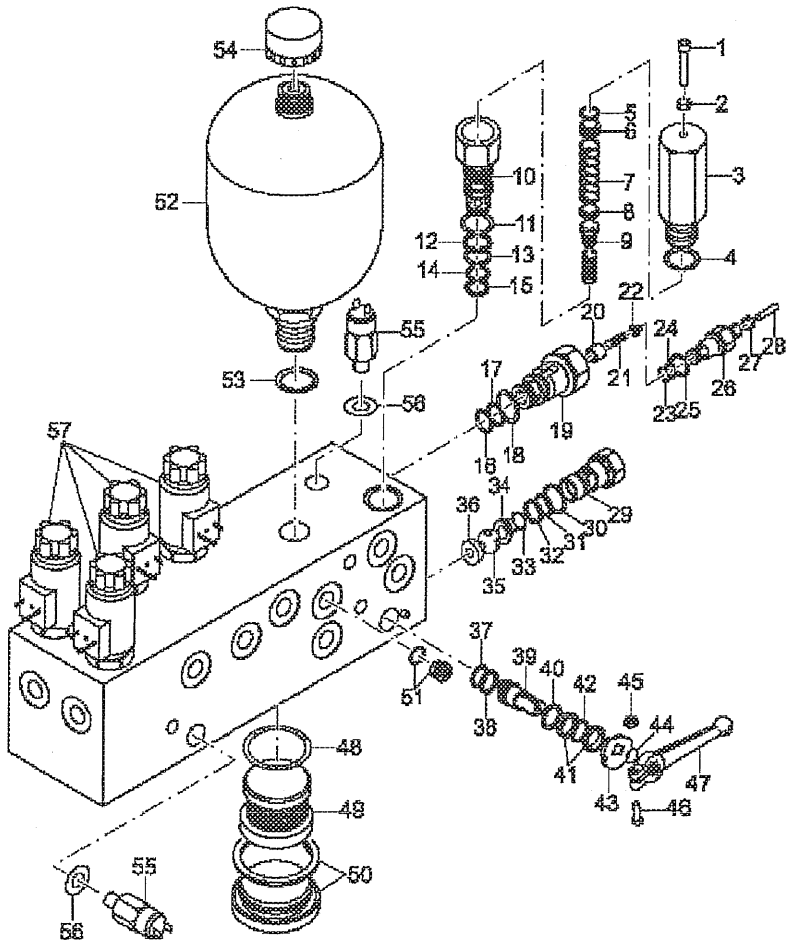
XLS2 Measuring union

CONTROL BLOCK VT 7

Hydraulic diagram

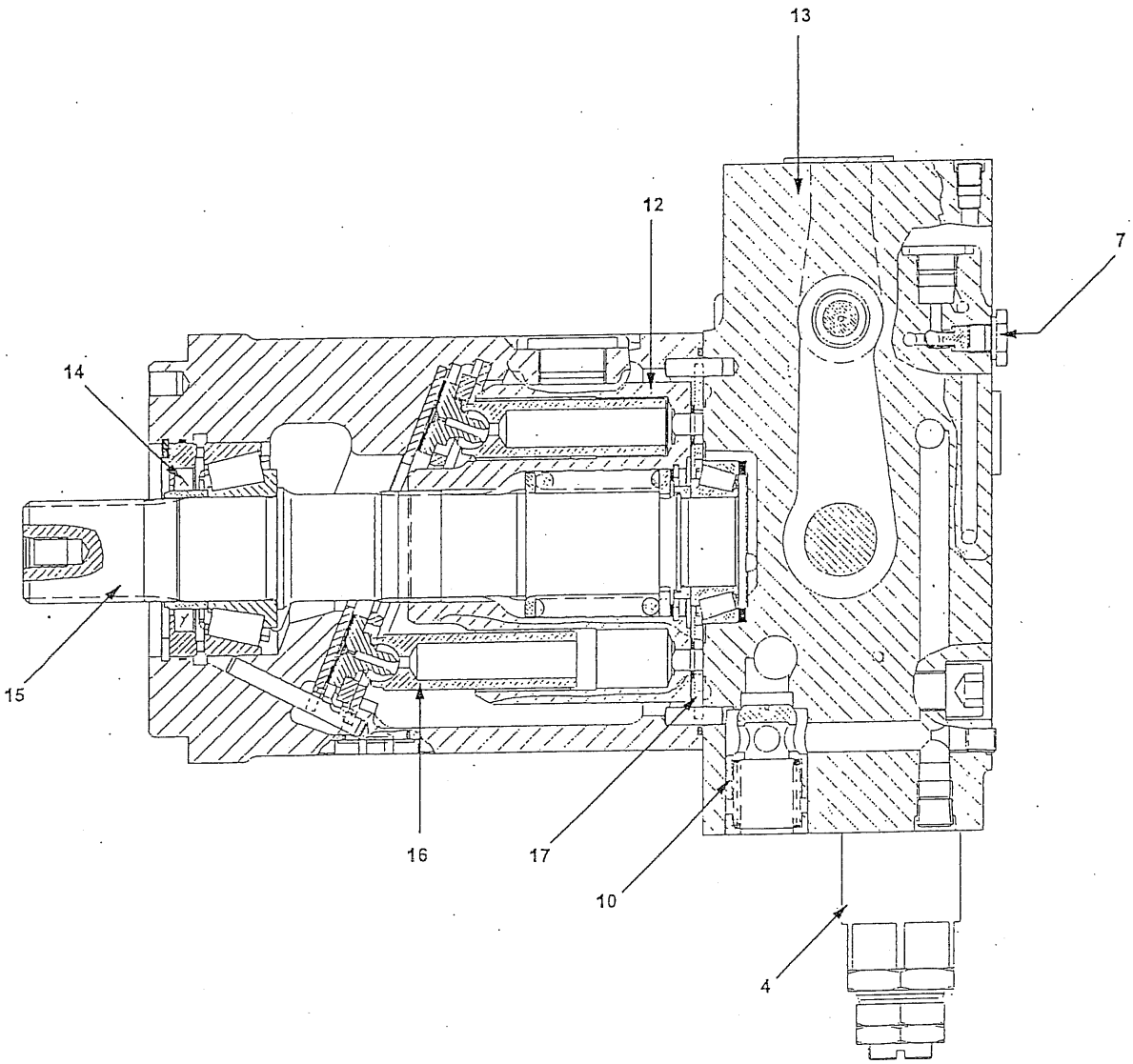


Pilot control block



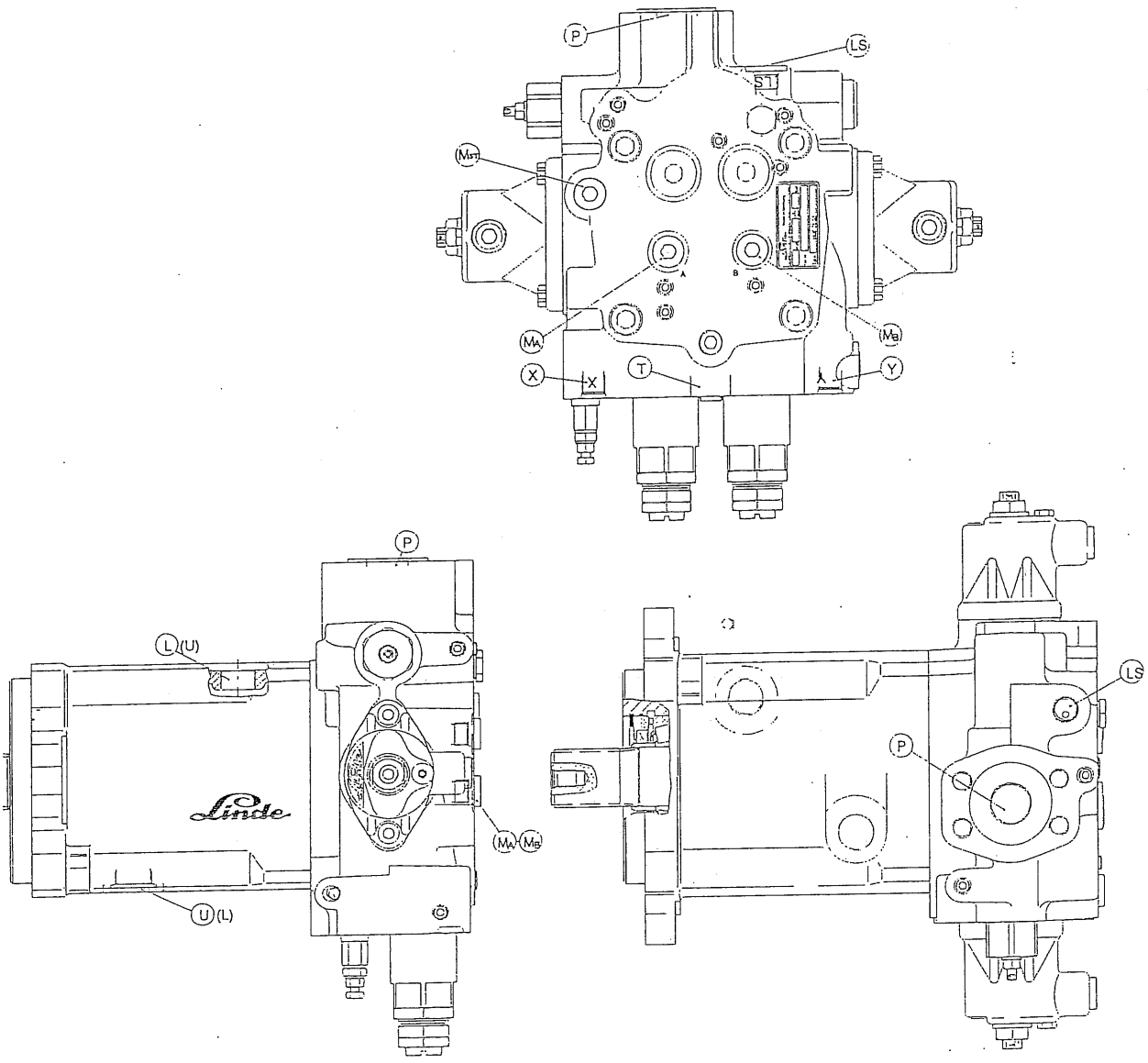
Overview:		10	Valve body
Pilot control block	Pos.1-57	22	Air vent
Pressure-control valve	Pos.1-15	27	Hexagonal nut A3C
Set of seals	Pos. 4,5,11-15	28	Headless pin
Pressure control valve	Pos.16-28	29	Joining piece
Set of seals	Pos.16-18,23-25	35	Ball
Ball valve installation kit	Pos. 29-47	39	Spindle
Set of seals	Pos. 30-34,36-38,40,42,44	41	Ring
Filter element	Pos. 48,49	43	Washer
Pressure accumulator	Pos. 52-54	47	Changeover lever
		48	O-Ring
1	Cyl. head scr. with hexagon A3C	49	Small filter element
2	Hexagonal nut B A3C	50	Screw plug A3C
3	Housing	51	Check valve
6	Spring plate	53	O-Ring
7	Pressure spring	55	Switch
8	Spring plate	56	Conical nipple
9	Piston	57	Magnet valve

Arrangement



4 High pressure relief and make up valves with relief pressure step up VD 20-05
7 Check valve (LS passage)
10 Check valve (return oil to reservoir)
12 Cylinder barrel
13 Valve plate housing
14 Shaft seal
15 Shaft
16 Working piston
17 Valve plate

Working and gage connection ports

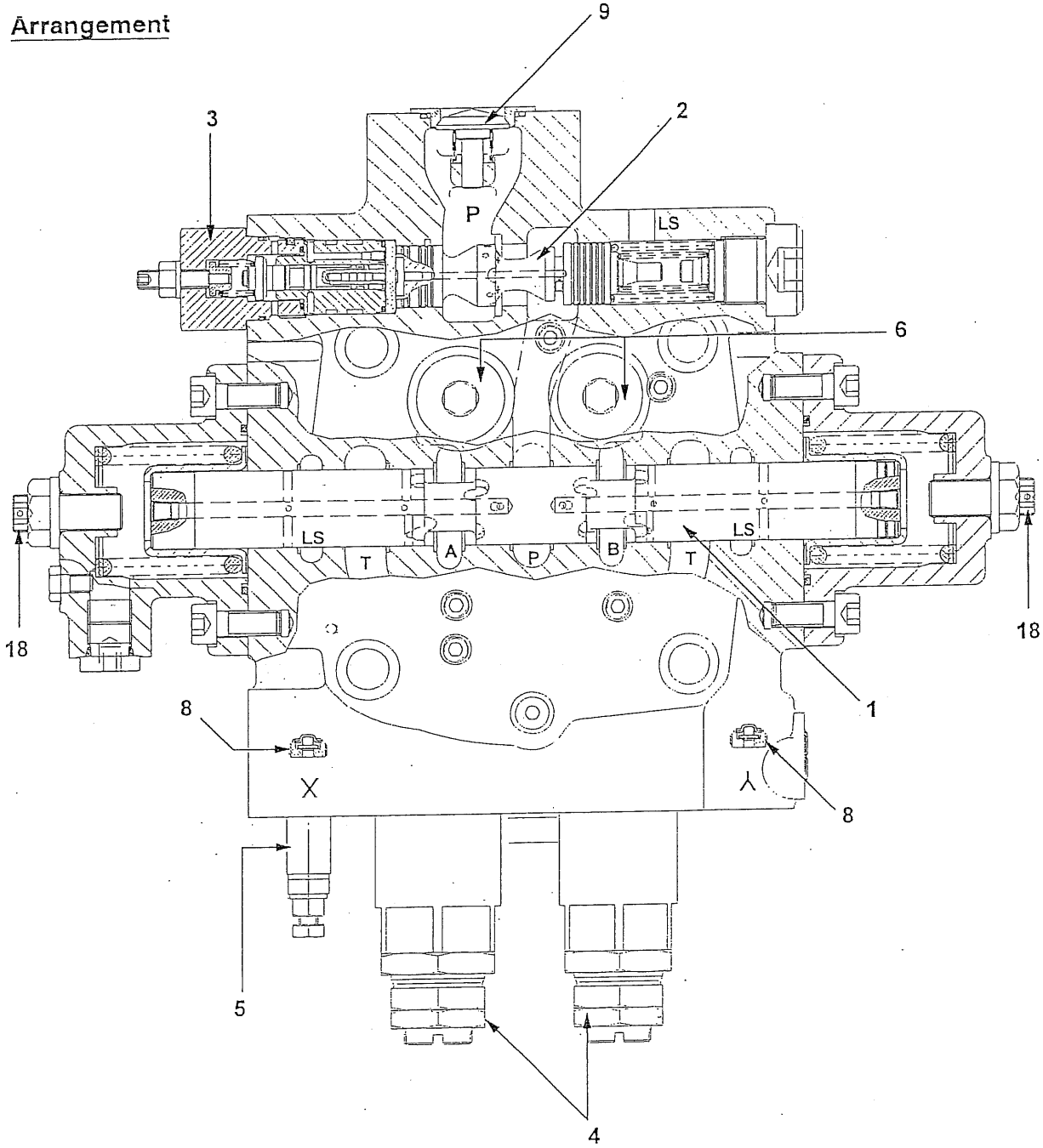


Explanations

P	Pump
T	Tank
LS	Load sensing signal
L,U	Drain and vent connection ports, ensuring filling of case
X,Y	Pilot pressure ports
MA,MB	Gauge ports, slewing pressure
Mst	Control pressure, at TC valve
X	Pilot pressure (in) – rotation clockwise
Y	Pilot Pressure (in) – rotation counter clockwise

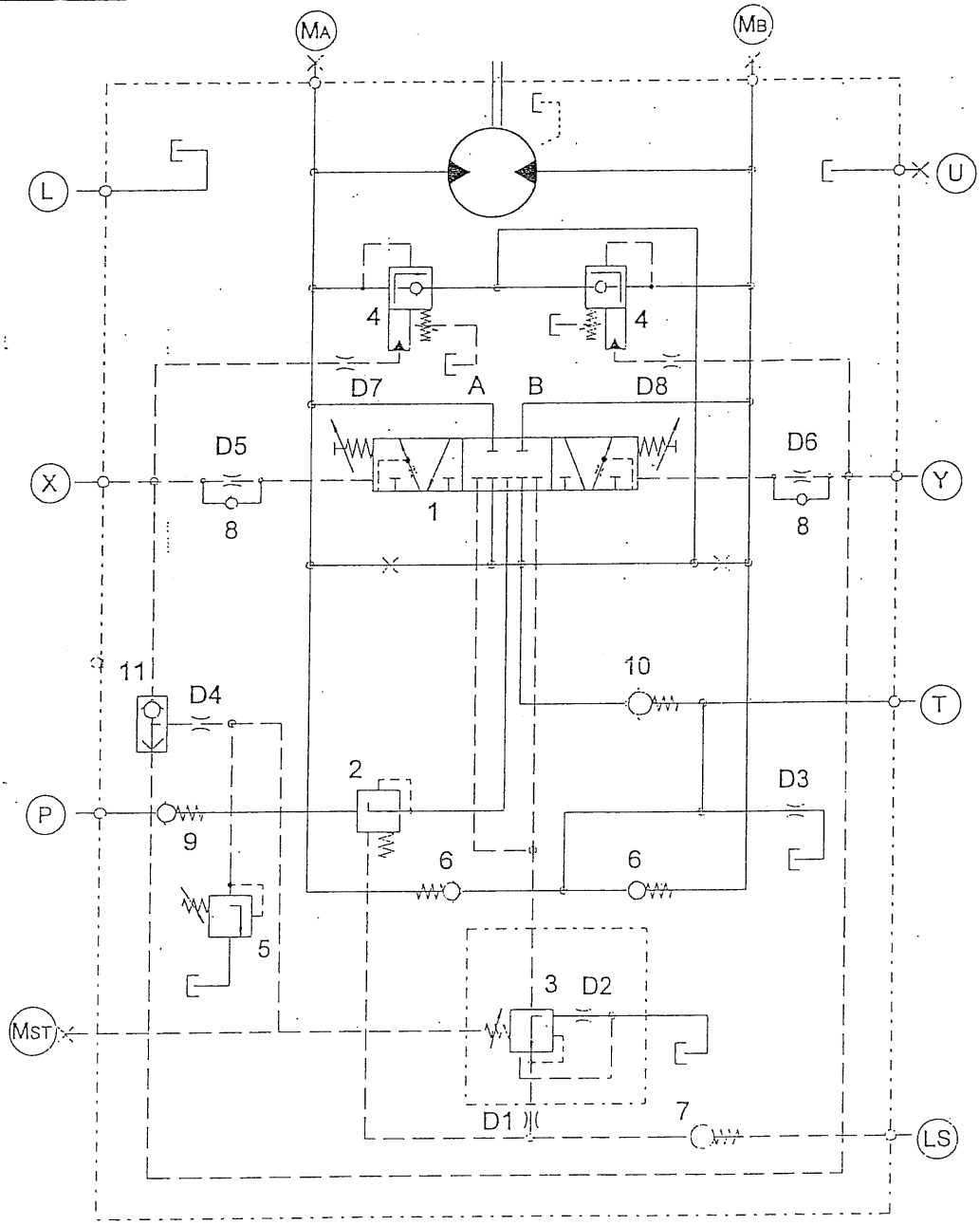
SLEWING MOTOR HMF...02P
with integral multiple control

Arrangement



1 Main valve spool
2 Priority pressure balance valve (Compensator)
3 TC valve cartridge
4 High pressure relief and make up
with relief pressure step up VD – 20-05
5 Pressure relief valve for max. TC pressure DBE6
6 Feed valves
8 Throttle check valves
9 Check valve
18 Mechanical stroke limitation

Circiut diagram

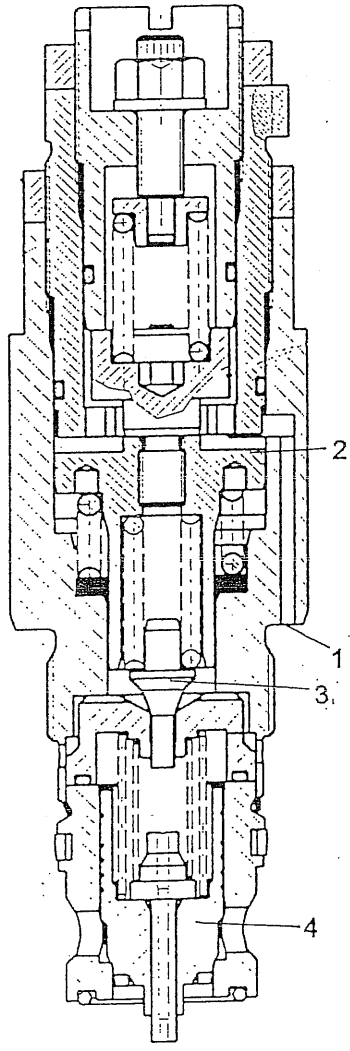


Exlpanations

P	Pump
T	Tank
LS	Load sensing signal
L,U	Drain and vent connection ports, ensuring filling of case
X,Y	Pilot pressure ports
MA,MB	Gauge ports, slewing pressure
Mst	Control pressure, at TC valve
X	Pilot pressure (in) – rotation clockwise
Y	Pilot pressure (in)- rotation counter clockwise

Secondary valve with pressure cut in stage

Arrangement



1 Connection servo slewing

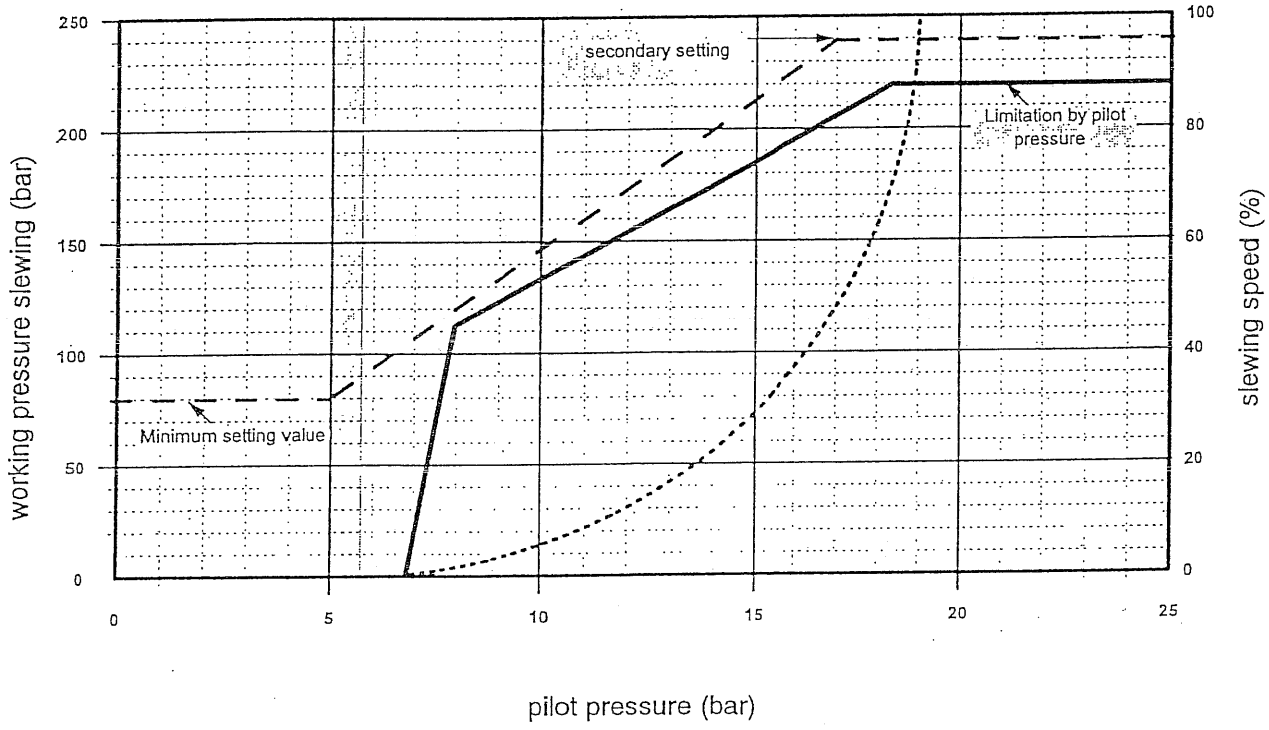
2 Piston

3 Pilot piston

4 Operating piston

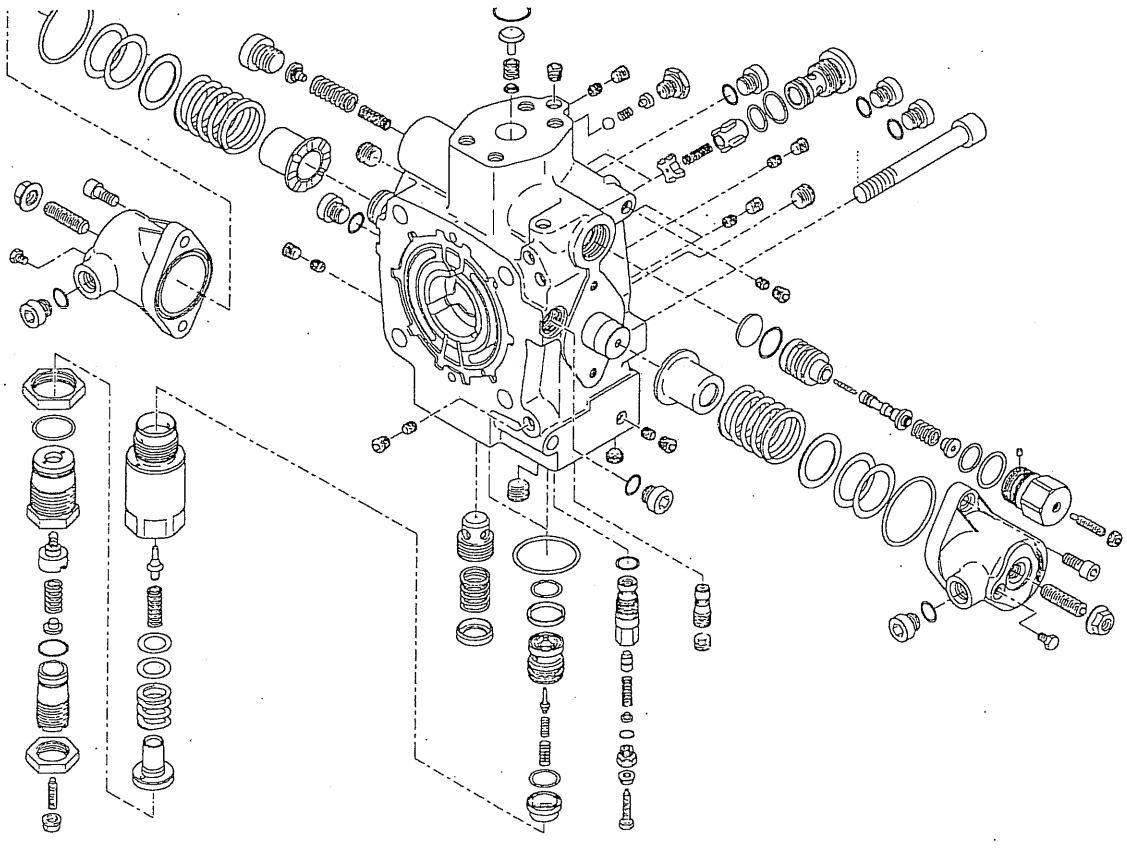
Diagram

Torque control



TC – characteristic (bar) Secondary valve (bar) Speed (%)

Exploded view of valve plate housing



Functional discription

The basic unit is a fixed displacement motor of the HMF ... - 02 P type. It is an axial piston motor of swash plate design for open loop. This motor has been designed for use as swing motor. It has been equipped with all functions for optimum swing drive. The following functions are integrated in the valve plate housing of the motor:

a. Directional control valve
b. Priority for swing drive
c. Torque Control (TC - valve)
d. Pressure relief and make up valves VD 20-05
e. Feed valves

Technical Description

a. Directional Control valve

The control spool (1) of the directional control valve (please refer to circuit diagram) is used for controlling the speed of the motor. This control spool is centered in neutral position by two springs. The pump pressure is fed to the motor via port "P". Depending on the requested direction of swing pressure is built up within the respective spring chamber (X or Y) by means of a pilot controller (joystick). The control spool (1) is moved acc. to the pre selected control pressure and connects oil flow from P to A (B) and B (A) to T. The opened cross-section has the function of an orifice behind which LS - pressure is taken off and is reported to the pump control. Depending of the pilot pressure the oil quantity (swing speed) is adjusted. The max. spool stroke and consequently the max. flow can be limited by means of an adjusting screw. The trotthle check valves (8) dampen the control spool (1) in both directions.

b. Priority swing drive function

Inside channel "P" and connected in series to the control spool (1) there is an up stream compensator (2) . Together with the check valve (7) priority for the swing drive is realized.

Functional discription

c. Torque Control (TC - valve)

The TC - valve (3) defines the accelerating pressure. By means of the pilot controller the operator selects not only the requested oil quantity but also the variable accelerating pressure Thus waste of energy by oil passing the high - pressure relief valves (4) (secondary valves) is avoided. The max. accelerating pressure is defined at the TC - pressuer relief valve (5) (please refer to diagram page , example). It should be below the setting of the high - pressure relief valves (4).

d. High pressure relief and make up valves with relief pressure step up VD 20-05

These relief valves are variable. They are set at a basic value (see diagram, example). With a pilot pressure > 5 bar at port X or Y the set pressure of the valve is raised from basic to top value. As control pressure the remote control pressure of the directional control valve is used. During the acceleration phase the setting of the respective valve is changed by pilot pressure to the maximum setting according to a characteristic curve. If smooth coasting is desired by the shovel operator, the pilot valve must be held in zero position.
The upper carriage will then run against the lower setting of the secondary valves (minimum setting 50 bar). If the upper carriage is to stop harshly, the driver has to overcenter and switch the corresponding secondary valve to its maximum value. Now the upper carriage will brake against the maximum pressure. According to the pilot pressure chosen by the operator the braking pressure can be tuned along a curve between the maximum and minimum value. Both the maximum and minimum value are mechanically adjustable from the outside, see corresponding Service Info.
The correlation between pilot pressure and TC curve can also be adjusted from outside.
The discharge side of the pressure relief valves (4) is always connected to the pressurized return line to reservoire so that the make up valves can fulfil their function.

e. Feed Valves

In order to avoid cavitation direct feeding of the swing system via the feed valves (6) which are connected to the return line to reservoir is possible. The check valve (9) (in P-line) makes sure that this function is maintained even during countering and at lowest system pressure.

These adjusting instructions are for the excavator types 1704/1804, Series 374.../284...

a) External cumulative-output circuit (hare symbol)
b) Industrial machines

Connections for measuring purposes

1 Bleeding air from the system
2 Engine speed, calibrating and teach-in function
3 Pilot control
4 Emergency circuit
5 Load limit regulating valve
6 Measuring union rail
7 LS controller
8 Pressure cut-off
9 Pressure cut-in stage
10 Secondary valves
11 Reverse flow restrictors
12 Line break safety switch
13 Propeller shaft speed
14 Pilot pressure – travel – wheeled excavators
15 Travel motor pitch adjustment (crawler-tracked excavators)
16 Load-moment control for orange-peel grab
17 Secondary valve/slewing motor

General instructions:

a) All adjustments must be carried out with an electronic measuring device. It must be capable of displaying at least two pressure values at the same time.
b) Hydraulic fluid temperature must be between 40 - 60°C. Warming up the hydraulic system is by normal actuation of the individual operating movements, but only a short holding-on period at the limit stop is permitted.
c) Before opening any screw plugs etc., the preload pressure must be reduced at the hydraulic fluid tank.
d) The correct settings are to be taken from the pressure adjusting table.

Safety instructions

High pressures will be encountered during adjustment. Take appropriate protective action, e.g. wear safety glasses. See VBG 1 § 4.

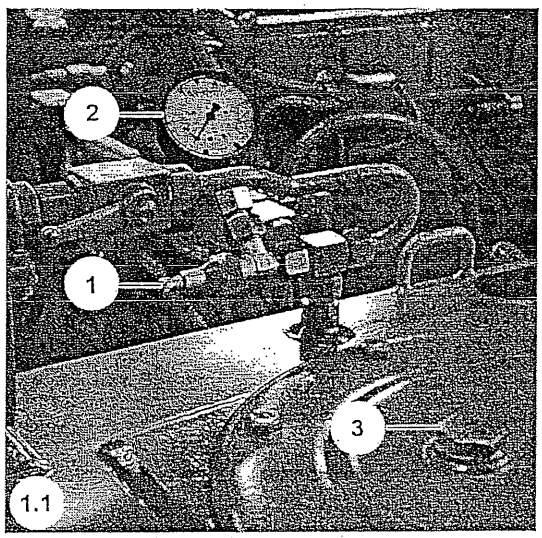
M1	Pump 1	
M2	LS 1	
M3	Pump 2	
M4	LS 2	
M5	Pilot pressure	
M6	Emergency circuit	
M7	Fuel pre-pressure	
M8	Load limit regulating valve	
M9	Slewing to right	
M10	Slewing to left	
M11	Travelling forward	
M12	Travelling in reverse	
M13	Reducing pilot pressure	– at the line-break safety switch
M14	Static pressure	– at the line-break safety switch
M15	Pilot control pressure	– travel, wheeled excavator
M16	Pilot control pressure	– crawler-tracked travel motor pitch adjustment
M17	Bleeding	– crawler-tracked travel motor pitch adjustment

1. Bleeding air from the system

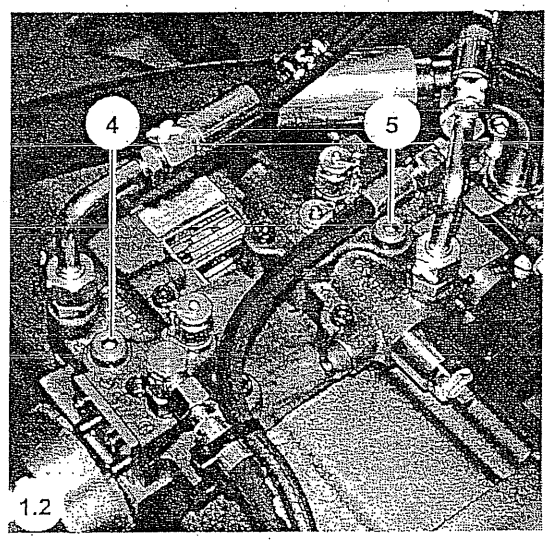
1.1 Before initial operation or after exchanging the pump, air must be bled from the system.
To do this an external compressed air input is necessary. This is carried out via the compressed air connection (1).

Note: The pressure gauge display must not exceed 0.3 bar.

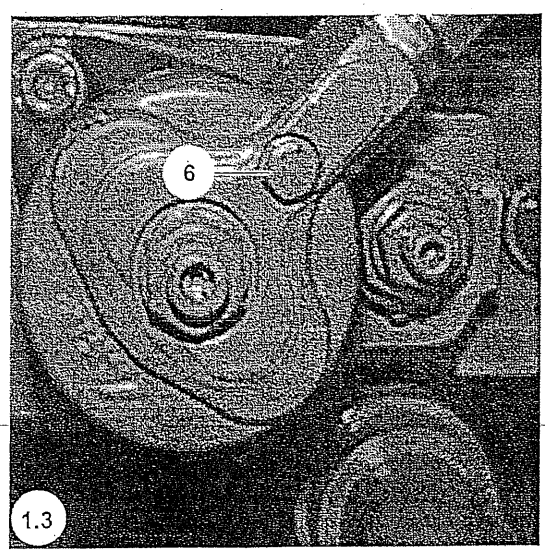
The compressed air gauge (2) is not standard equipment and must be installed for checking purposes.
Loosen bleed screw (3). Re-tighten as soon as hydraulic fluid flows out free from air bubbles.



1.2 After this, bleed the dual pump in the same manner at the bleed screws (4 and 5).



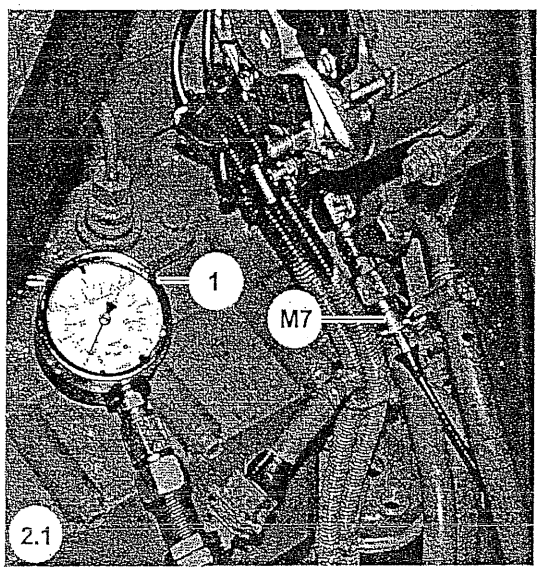
1.3 Before initial operation, all valve caps must have been bled.
This is also necessary if the valve caps had to be opened for repair work.
Bleeding takes place by loosening the appropriate bleed screw (6).



2. Engine speed, calibrating and teach-in function (TI)

Checking or adjustment is only necessary during initial start-up, adjustments or repairs to the diesel engine and when exchanging the electronics box.
Note: If the teach-in function is not carried out, the GLR lamp will flash.

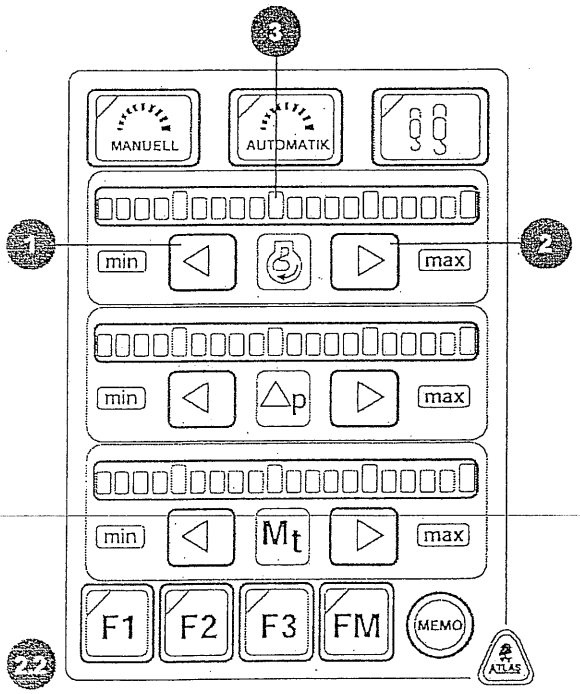
2.1 Fuel pre-pressure
Install measuring union (M7) for 0 – 6 bar pressure gauge (1). Fuel pre-pressure must be measured at maximum and minimum engine speed.
Max. engine speed off-load – 3.5 bar
Min. engine speed off-load – 2.0 bar



2.2 Fine adjustment function, checking the engine speed
By operating the **MEMO** and **MANUAL** switches, the speed can be displayed at the operating console.

Press switch (1) "**min**"
The central LED (3) must light up.
1704: 1030 rpm
1804: 1030 rpm
A deviation of 2 LEDs to the left is permitted.
(If correction is necessary, see 2.4)

Press switch (2) "**max**"
The central LED (3) must light up.
1704: 2150 rpm
1804: 2050 rpm
A deviation of 5 LEDs to the right is permitted.
(If correction is necessary, see 2.4)
Press the **MEMO** and **MANUAL** switches again to return to normal operation.



2.3 Teach-in function (TI)

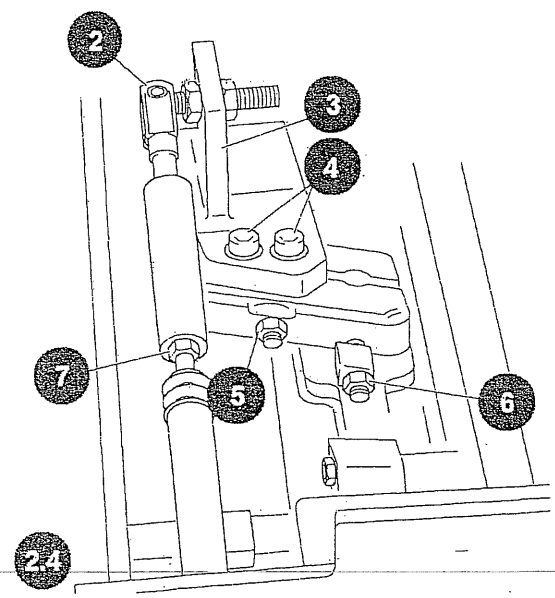
After setting and checking the engine speed, the Teach-In function is called up.
By pressing the **MEMO** and **MANUAL** switches, the fine adjustment function is called up. In addition, press the **AUTOMATIC** switch for the Teach-In function.
The fault status of the last TI carried out is displayed for about 5 seconds on the engine speed bar display:

LED 1...20 light up	TI fault free
LED 1... lights up	TI not fault free
LED 1...2 light up	Max. engine speed too low
LED 1...3 light up	Min engine speed too high
LED 1...4 light up	Engine speed unstable during TI
LED 1...5 light up	Engine speed not constant (n to mA)
LED 1...6 light up	Characteristic memory defect

After the display, calibration of the engine speed adjustment characteristic takes place automatically. The LEDs run up step by step from 1...20 and then decrease from 20...1.This procedure is subsequently repeated and at the end fault monitoring is carried out according to the display in the fault status.
If TI is fault-free, all the LEDs in the engine speed bar display light up.
Ending the **teach-in** and **fine adjustment function:**
Press the **MEMO** and **MANUAL** switches to return to normal operation.
Note: If there is already a fault at the teach-in stage, the GLR lamp will flash and the procedure must be repeated.

2.4 Diesel speed adjuster (basic setting)

Disconnect the fork head (2) at the engine speed adjusting lever (3). This lever must be fitted at 90° to the crankshaft. Correct if necessary at adjusting screws (4).

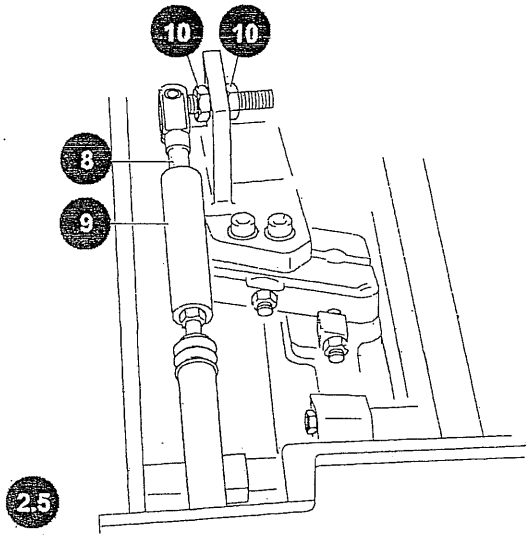


Start the engine.
Press the **MEMO** and **MANUAL** switches. The calibrating function is called up (see 2.2). The minimum engine speed displayed must be 1030 rpm. A correction may be needed at adjusting screw (5). Reconnect the fork head (2) so it is free of play. A correction may be needed at adjusting screw (7).

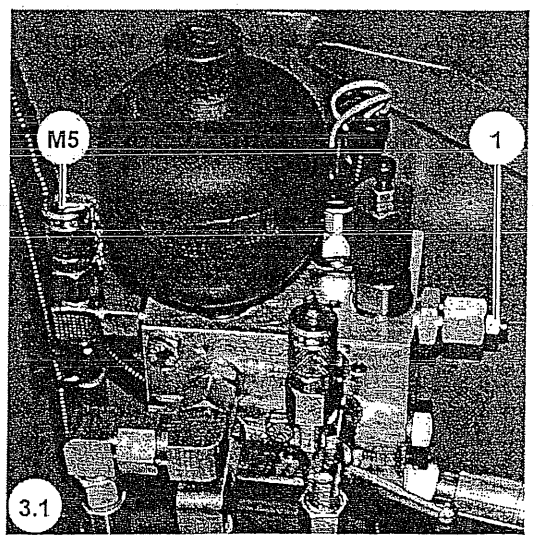
Press the **max** switch.
The engine speed must be:
1704 – 2150 rpm
1804 – 2050 rpm
The engine speed adjustment lever (3) must be next to the setting screw (6) for maximum engine speed. A correction may be needed at adjusting screw (6).

2.5 Damper / Diesel adjuster

The ring groove marking must align with the housing at the piston rod (8) of damper (9) at maximum engine speed (fine adjustment function).
Setting is carried out by loosening the locknuts (10) and adjusting lever travel as necessary.



Crawler-tracked

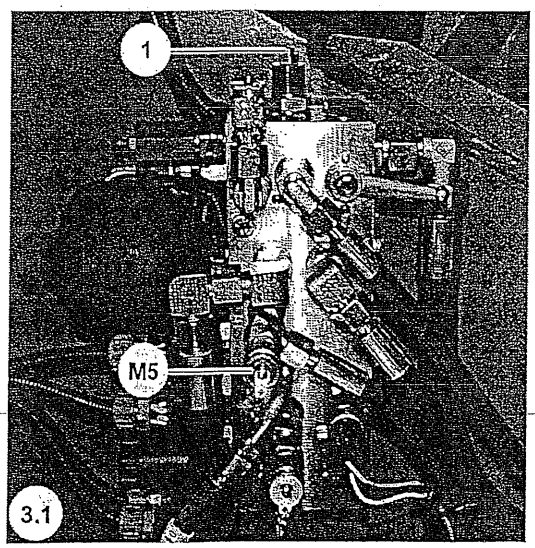


3. Pilot control

3.1 Connect electronic measuring device to the measuring union (M5).

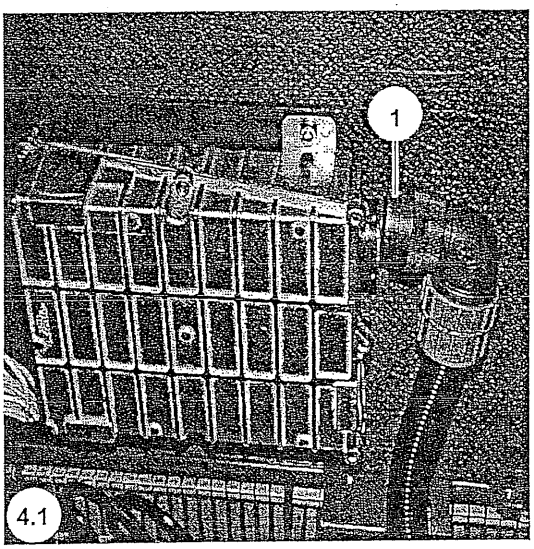
Correct by tightening or loosening the setting screw (1).

Wheeled

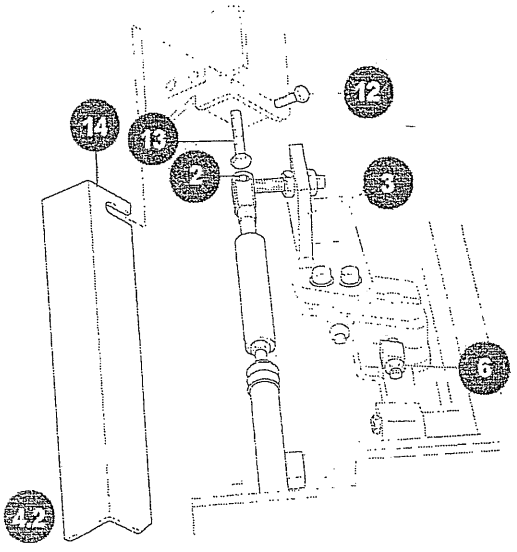


4. Emergency circuit

If the electronics fail, the excavator can be operated further at reduced power in the emergency mode.



4.1 Switching on the emergency circuit.
Ignition key in O position. Remove the screw-in plug (1) from the electronics box (behind the seat).

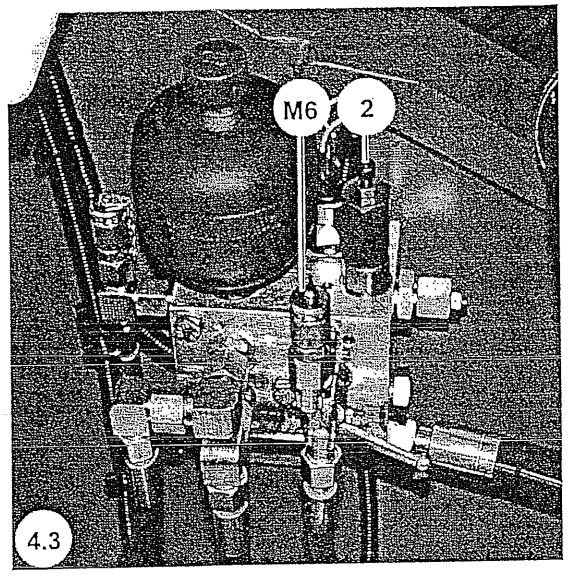


4.2 Loosen securing screw (12) and pull guard (14) to the side and secure.
Dismantle the fork head (2).
Unscrew hexagon screw (13) until it is touching the engine speed adjustment lever (3) and continue to turn until the engine speed adjustment lever (3) strikes the adjusting screw (6).

4.3 Connect the electronic measuring device to the measuring union (M6).

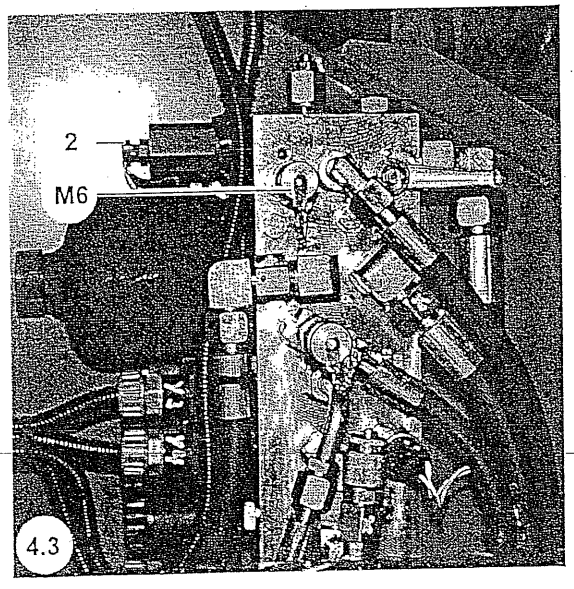
The control pressure must be measured at maximum engine speed.

Crawler-tracked



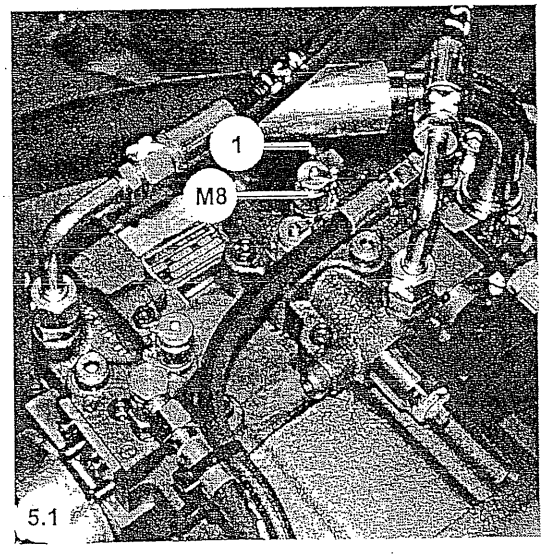
Correction is by tightening or loosening the setting screw (2).

Wheeled



5. Load limit control valve

5.1 Checking and adjusting



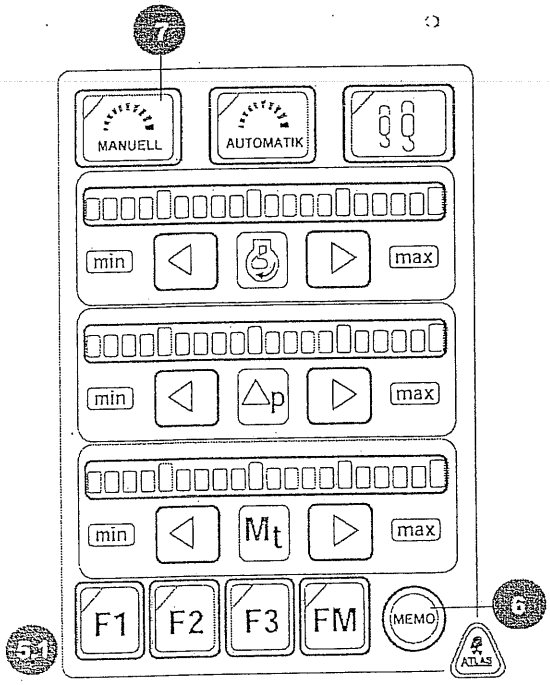
5.1

Connect the electronic measuring device to the measuring union (M8).

Start the engine.
Press the **MEMO** (6) and **MANUAL** (7) switches (fine adjustment function).

A pre-set control current from the electronics (300mA) now controls the load limit control valve.

The control pressure displayed must be 8.5 bar ± 0.2 plus tank pre-load.

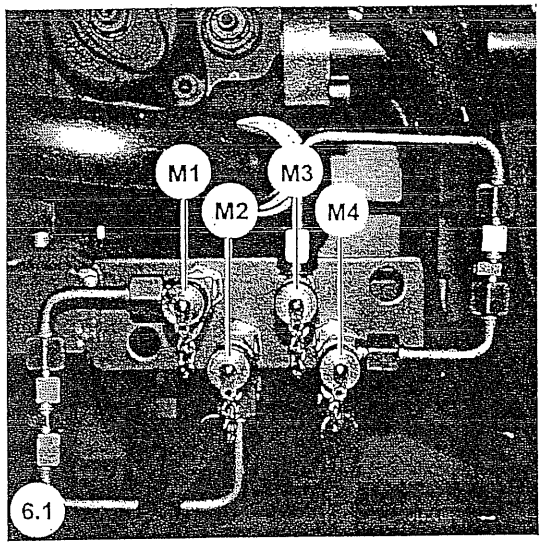


Correction is by tightening or loosening adjusting screw (1).
Press the **MEMO** (6) and **MANUAL** (7) switches to end the fine adjustment function.

6. Measuring union rail

6.1 Measuring unions:

M 1 – P 1
M 2 – LS 1
M 3 – P 2
M 4 – LS 2



7. LS (load sensing) controller (P1 and P2)

7.1 LS controller P1 (1)
Connect electronic measuring device to measuring unions (M1 and M2).

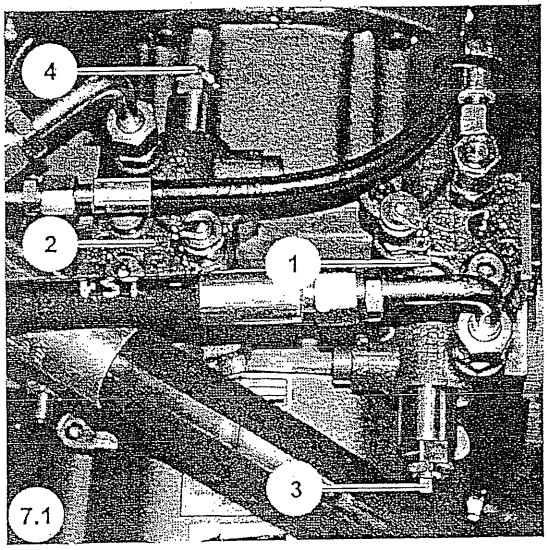
Start the engine and pre-select operation F3. Boom and jib extended. Switch off the high-speed circuit (**hare** symbol).

Turn on the (^p) switch at the electronic measuring device.
Operate "lift" slowly and read off the pressure (^p).
Adjustment is carried out at adjusting screw (3) on the LS controller.

LS controller P2 (2)
Connect electronic measuring device to measuring unions (M3 and M4).

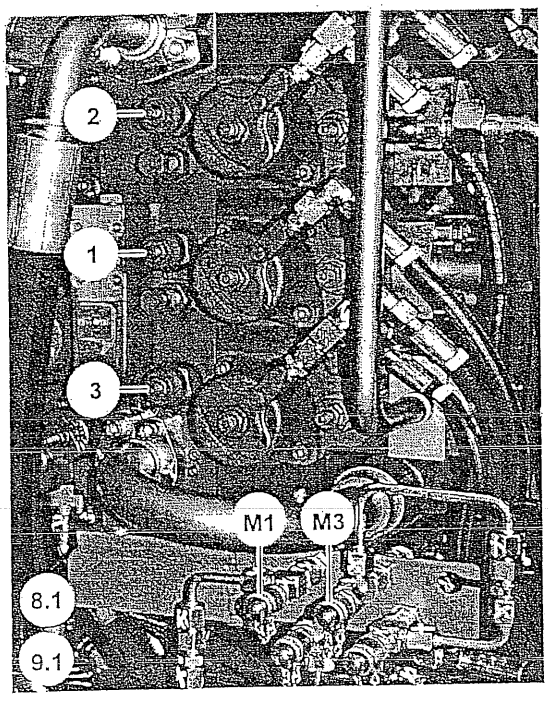
Start the engine and pre-select operation F3. Set the jib to a vertical position.
Switch off the high-speed circuit (**hare** symbol).

Turn on the (^p) switch at the electronic measuring device.
Slowly set to "extend" and read off the pressure (^p).
Adjustment is carried out at adjusting screw (4) on the LS controller.



8. Pressure cut-off

8.1 Connect the electronic measuring device to measuring unions M1 (for P1) and M3 (for P2).
Start the engine and pre-select operation F3.
Switch off the high-speed circuit (**hare** symbol).
Move the "lift" and "fold out" functions against the stops at the same time and hold there.
Correction is by tightening or loosening adjusting screw (1) for P1 and (2) for P2.



9. Pressure cut-in stage

9.1 Connect the electronic measuring device to the measuring union (M1) for P1.
Switch off the high-speed circuit (**hare** symbol).
Switch on the pressure cut-in stage.
Move the "lift" function to the stop and hold there.
The increased pressure is displayed.

Correction is by tightening or loosening adjusting screw (3).

10. Secondary valve

10.1 Connect the electronic measuring device to measuring union M1 (for P1) and M3 (for P2).
Start the engine and switch on the **pressure cut-in stage**.

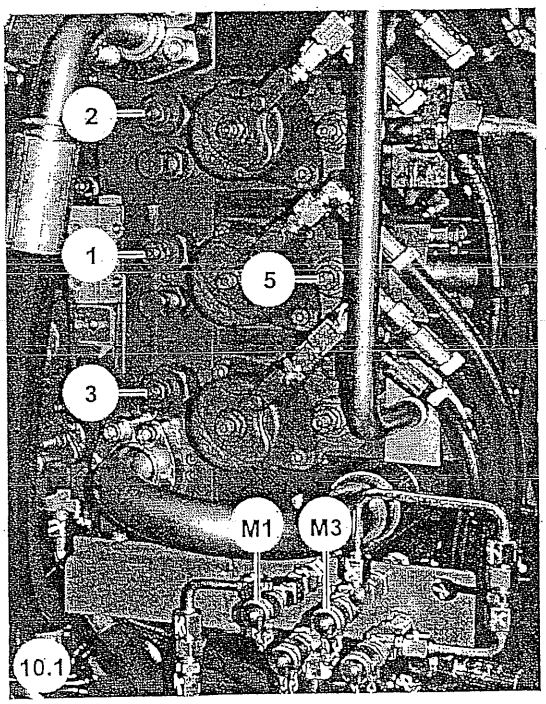
Switch off the high-speed circuit (**hare** symbol).

Set P1 to high:

Move "open bucket" function to the stop and hold there. The pressure for "open bucket" is displayed. Tighten adjusting screw (5) for the secondary valve by approx. 1 ½ turns.
Tighten setting screw (3) for the pressure cut-in valve. (20 bar above the highest secondary pressure that can be set).

Note: This pressure must not exceed 460 bar.

Follow this by checking and if necessary the setting of the "lift", "close bucket", "travel" and "grading" secondary valves.



Return P1 to original level:

Return pressure cut-in valve to original level.
Move "open bucket" function to the stop and hold there. Loosen the adjusting screw for pressure cut-in valve (3) until the setting is reached.
After this, reset adjusting screw (5) for the "open bucket" secondary valve to the pre-set value.

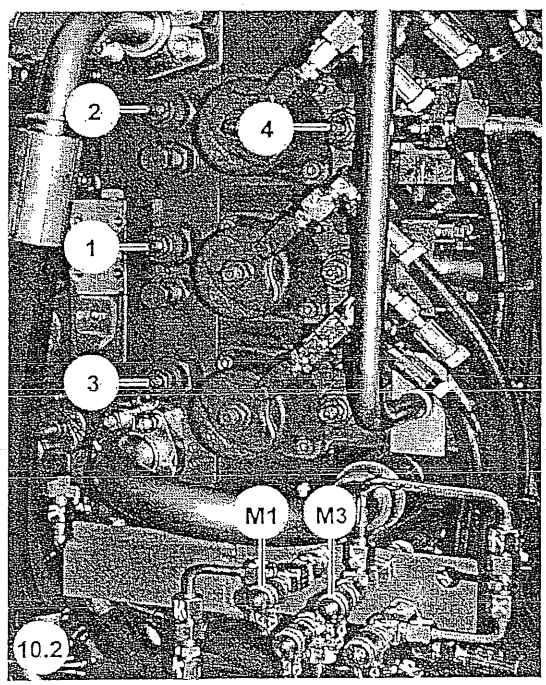
10.2

Set P2 to high:

Move the "fold out" function to the stop and hold there.
The "fold out" pressure is displayed.
Tighten the adjusting screw (4) of the "fold out" secondary valve by approx. 1 ½ turns.
Tighten the adjusting screw of pressure cut-off (2) to 20 bar above the highest secondary pressure that can be set.

Note: The pressure must **not** exceed **460 bar.**

Then check and if necessary adjust the "fold in", "adjust boom", and "slewing" (TC valve) secondary valves.



Return P2 to original level:

Move the "fold out" function to the stop and hold there.

Press switch F3.
Move the "fold out" function to the stop and hold there.
Slacken off the adjusting screw of pressure cut-off (2) until the setting is reached.

10.3

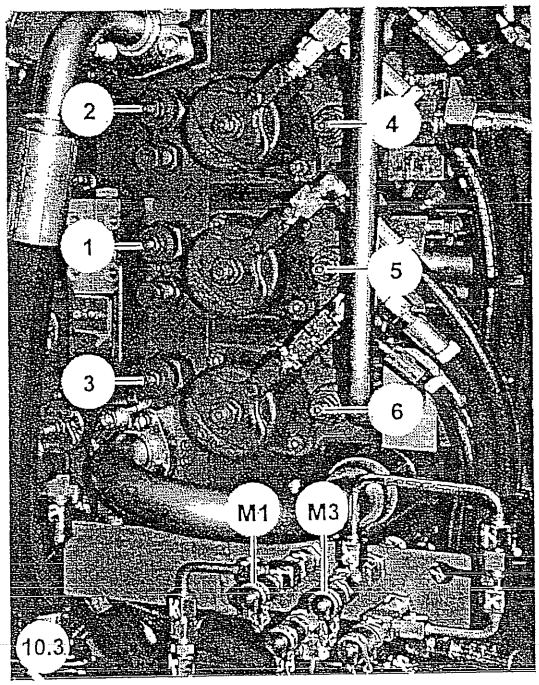
Checking and adjusting the secondary valves.
Start the engine and switch on the pressure cut-in stage.
Switch off the high-speed circuit (hare symbol).

Adjustment of the secondary valves is by tightening or loosening the appropriate setting screws.

4 - Fold out
- Fold in – opposite
- Note: press boom cut-off switch.

5 - Open bucket – do not yet return to original setting
- Close bucket – opposite

6 - Lower
- Lift – opposite
- Lift line-break safety switch
- See Section 12.3

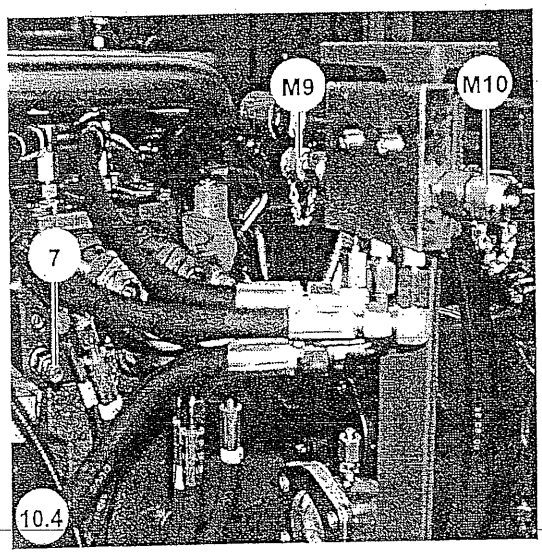


10.4

7 - Slewing TC - valve

Checking and adjusting take place at maximum engine speed (F3).

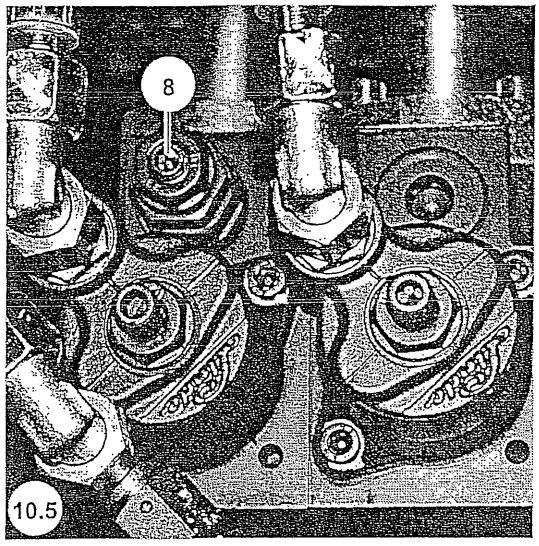
Connect electronic measuring device to measuring unions (M9) left and (M10) right.



10.5

8 - Extend actuating ram – plate valve

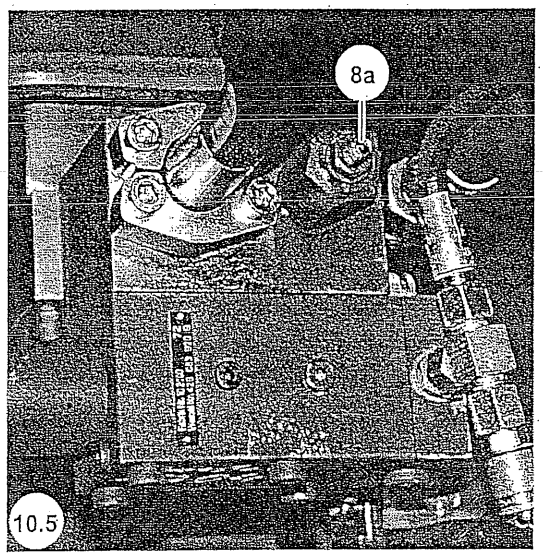
- Retract actuating ram – opposite



8a - Extend actuating ram – line-break safety device

Tighten setting screw (8) at the plate valve by half a turn. Move the actuating ram function against the stop and hold there. Set the prescribed pressure at adjusting screw (8a).

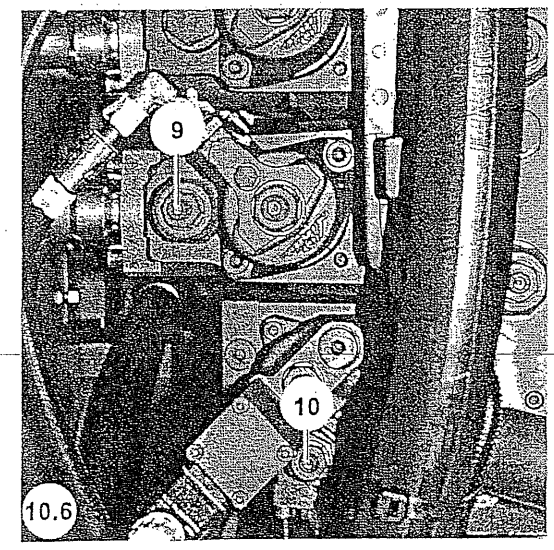
Return adjusting screw (8) to the prescribed pressure after this.



10.6

9 - Grading/supporting – upwards

10 - Grab rotation (extra)



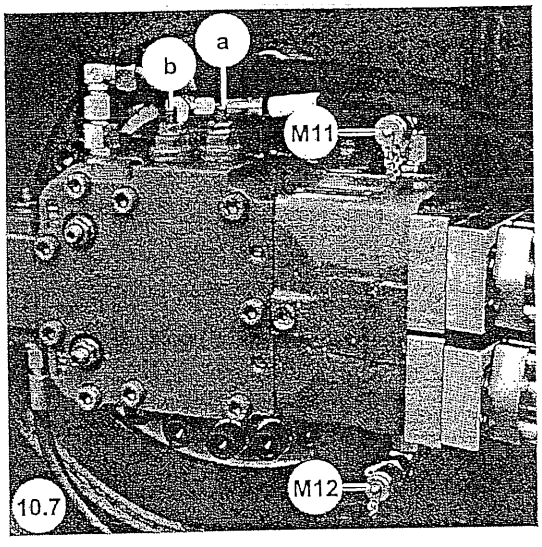
10.7

Travel – crawler-tracked excavator
The secondary valves are on the travel motor.

Connect the electronic measuring device to measuring unions M11 (forwards) and M12 (reverse).

a – forwards
b – reverse

NOTE: Check the travel motors separately with the lever control.

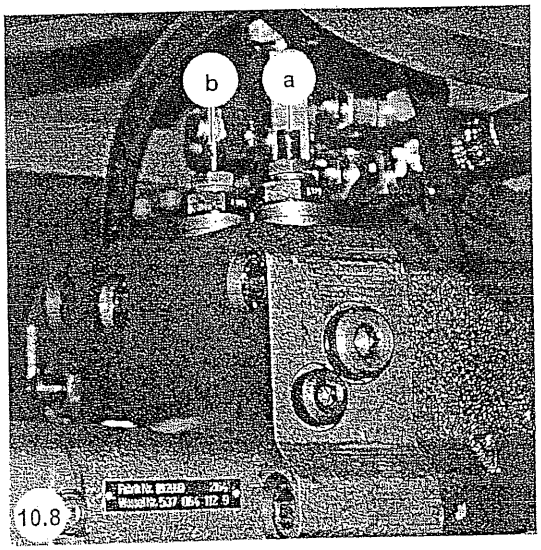


10.8

Travel – wheeled excavator
The secondary valves are on the travel motor.

Connect the electronic measuring device to measuring union M1 (see Section 6.1).

a – forwards
b – reverse



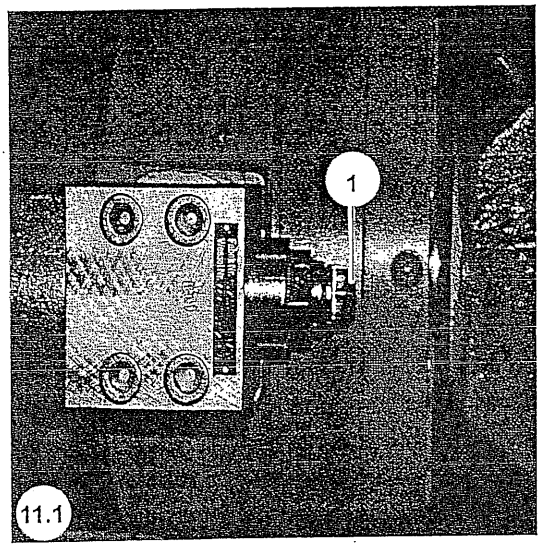
11. Reverse flow restrictors

11.1 Reverse flow restrictors for retracting movement

The pressures stated apply with working attachment fitted.

Connect the electronic measuring device or pressure gauge (0 – 600 bar) to the measuring unions (M1 and M2).

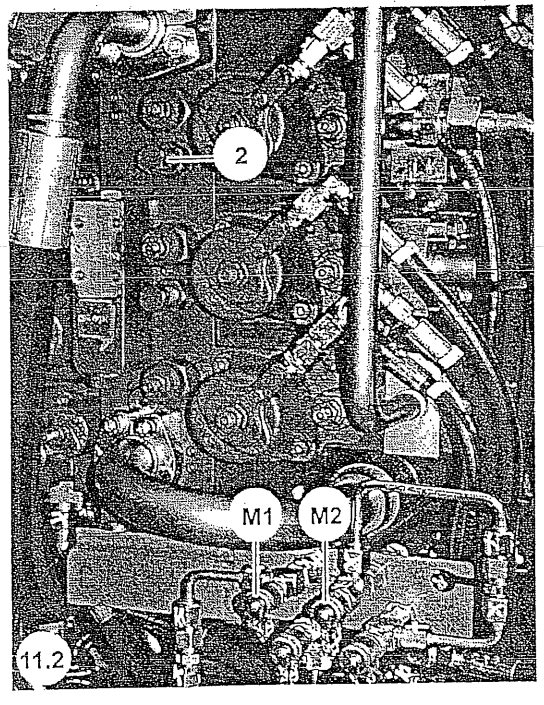
Loosen adjusting screw (1) of the reverse flow restrictor by 3 turns at the jib ram.



11.2 Reverse flow restrictor in valve plate

Switch off the high-speed circuit (**hare** symbol).

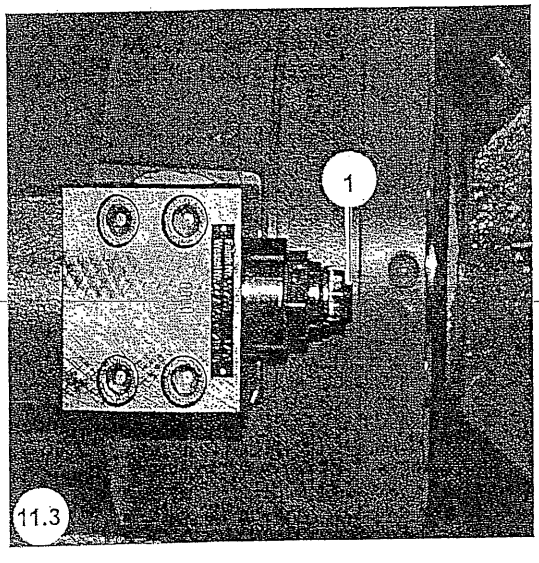
Boom extended.
Fully activate "fold in" at maximum engine speed.
The P2 pressure is displayed at the measuring union (M2) (see pressure table for setting).
If a correction is necessary, it is carried out via the adjusting screw (2) at the valve plate.
Tightening the adjusting screw (2) increases the pressure, unscrewing it reduces the pressure.



11.3 Reverse flow restrictor at the jib ram

Switch on the high-speed circuit (**hare** symbol).
Boom extended.
Fully activate "fold in" at maximum engine speed.
The displayed pressure P1 at the measuring union (M1) must be identical to the P2 pressure.

If a correction is necessary, this is carried out via the adjusting screw (1) of the reverse flow restrictor at the jib ram.
Tightening the adjusting screw (1) increases the pressure, unscrewing it reduces the pressure.

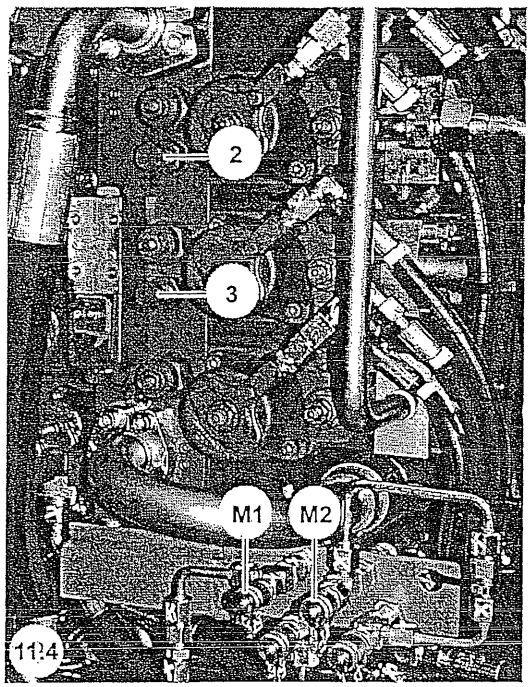


11.4 Closing the bucket

Bucket opened fully.
Fully activate "close bucket" at max. engine speed.

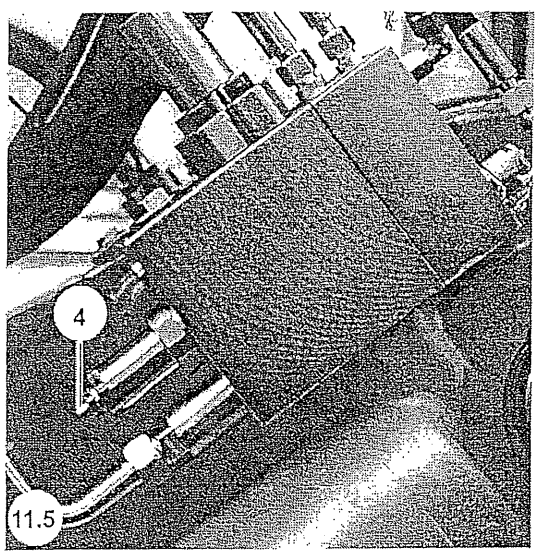
Correction is at adjusting screw (3).
Tightening increases the pressure, unscrewing reduces the pressure.

.



11.5

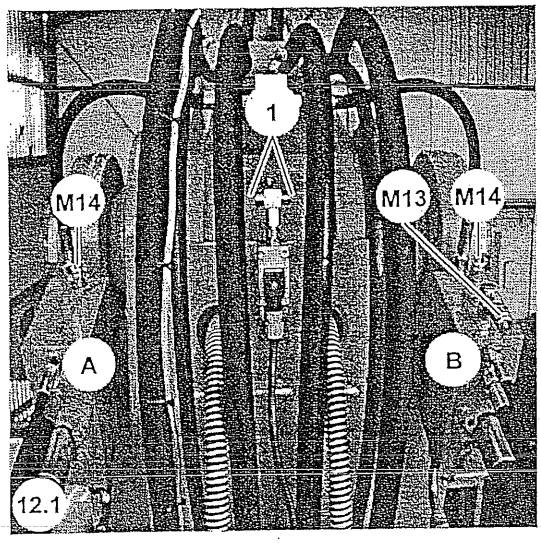
The reverse flow regulating valve (4) for lowering is set at the supply interruption safety switch (see Section 12.2).



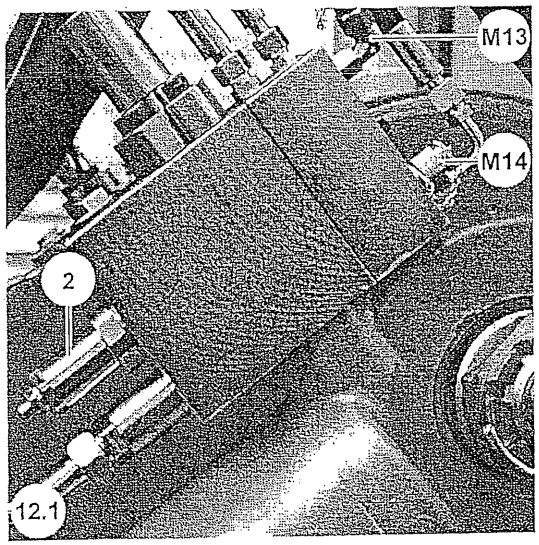
12. Supply interruption safety switch

Checking and adjusting.
Checking and adjusting takes place at a hydraulic fluid operating temperature of approx. 40 – 60°C, maximum engine speed and with attached working tool.

12.1 Determine the start of spool valve movement in the control block.
Connect test pressure gauges (0 – 600 bar) to the appropriate measuring union M1 for P1 (pump pressure) and M13 (pilot pressure for lowering).
Tighten adjusting screw (2) at both valves (A) and (B) by approx. 2 turns.
Lift the boom about 2 metres above the ground or floor surface.
The test pressure gauges display the static pressure in the cylinders.
Slowly switch to "lowering" and observe both pressure gauges. If pressure increases on the pressure gauge at P1, pilot pressure should be read off at the (M13) pressure gauge (start of spool valve switching).



Adjusting the start of locking piston switching.
Connect pressure gauges (0 – 600 bar) to the measuring unions (M14) of valves (A) and (B).
Unscrew and seal compensating lines (1) with plugs. Lift the boom to about 2 metres above the ground. Press the "lower" function until the pressure gauge (0 – 60 bar) shows the pressure to be 1 bar under the point at which spool valve switching starts. Maintain this pressure and unscrew the adjusting screw (2) at valve (A) until the static pressure at the pressure gauge drops.
Unscrew adjusting screw (2) at valve (B) until the boom begins to drop.

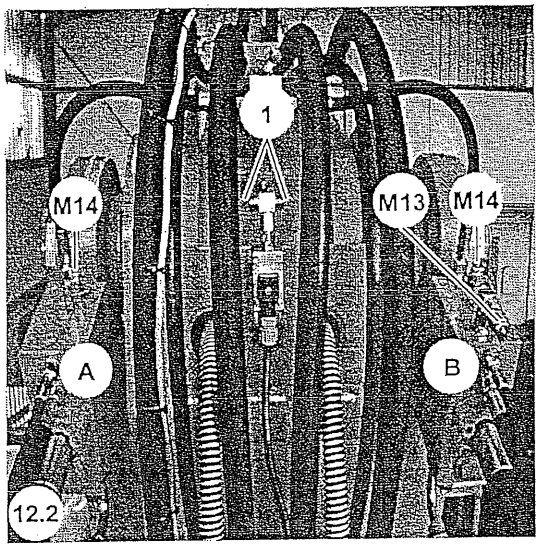


CHECKING:

Check that both locking pistons open at the same time during the lowering procedure (in the fine control zone). A tolerance of max. 30 bar is allowed. Any adjustment needed is carried out at the adjusting screw (2) of valve (B).
Re-tighten compensating lines (1).

12.2 Basic setting, lowering restrictor (with attached working tool)

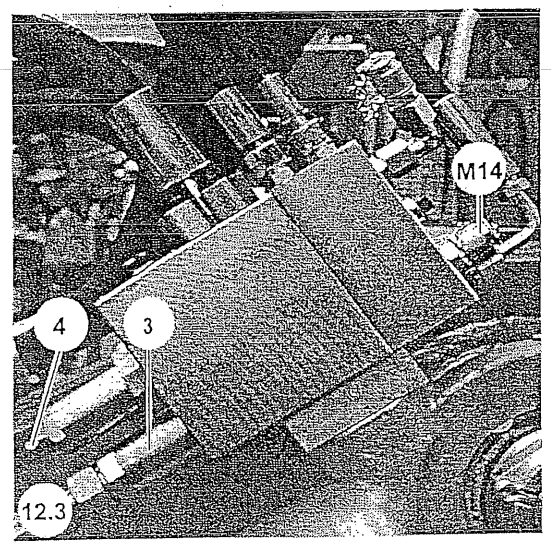
Connect a pressure gauge (0 – 600 bar) to measuring union M1 (P1).
Connect a pressure gauge (0 – 600 bar) to valve (A) M14 and (B) M14.
Unscrew compensating lines (1) and seal with a plug.
Switch to the full "lower" function.
Adjust screws (4) of valves (A) and (B) in such a way that both pressure gauges (M14) display approximately the same value.
A deviation of ± 5 bar is allowed.



Care should be taken that the prescribed lowering pressure, measured at (M1), is reached (see pressure table).

If this value is not reached, a correction should be made at both setting screws (4).

12.3 Secondary valves
The customer does not have to adjust the secondary valves (3), which are delivered a fixed setting. If checking is necessary, however, a choice can be made between two methods.



Version 1: Checking with a hand pump.
Detach the compensating lines (1). Completely extend the lifting ram. Connect the hand pump to the measuring union (M14). Increase pressure with the hand pump until the pressure no longer rises. The pressure displayed is the setting of the secondary valve. Correction is carried out with suitable shim washers. Proceed in the same way for the other valve. Screw the compensating lines (1) back on.

Version 2: Checking with static pressure of lifting rams.
A weight corresponding to that of the excavator is necessary for this method. Connect pressure gauges (0 – 600 bar) to the measuring union (M14) for valves (A) and (B). Disconnect the compensating lines (1). Move the jib to a vertical position. Lift the weight with the boom by approx. 0.5 metre. By extending the jib, the static pressure in the lifting cylinders is increased. Only when the specified pressure has been reached should the boom begin to fall. Both pressure gauges must display the same pressure. Correction is carried out with suitable shim washers.

Re-tighten the compensating lines (1).

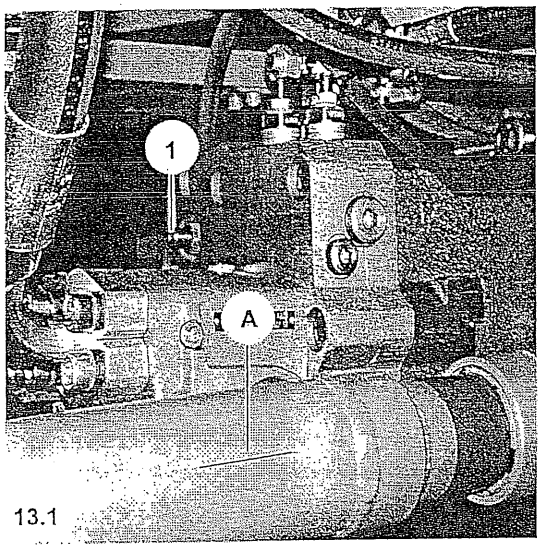
13. Propeller shaft speed

Forwards/reverse (625 rpm)

13.1.Locating the marking (A).

The propeller shaft speed is measured in the off-road ratio, at maximum engine speed and with the controller bypass switched off.

Correction is carried out at the adjusting screw (1) on the travel motor.

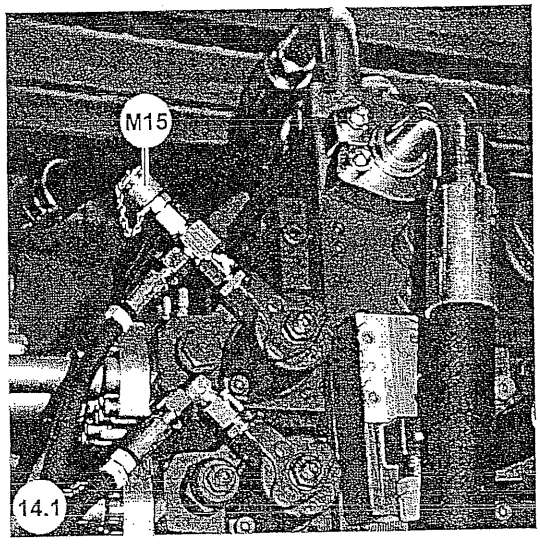


13.1

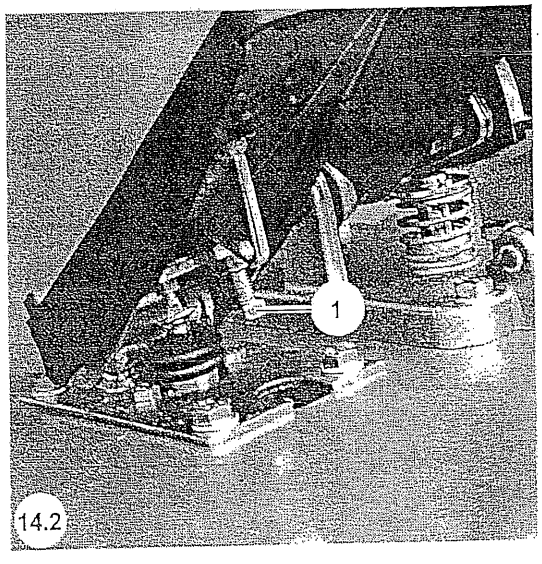
14. Pilot pressure – travel – wheeled excavator

Checking/adjusting (25 bar)

14.1 Connect the electronic measuring device to the measuring union (M15).



14.2 Correct at the adjusting screw (1) on the travel pedal.



15. Travel motor adjustment

Checking/setting

15.1 Connect 0 – 60 bar pressure gauge to measuring union (M16) and 0 – 600 bar pressure gauge to measuring union (M1).

Apply the brake.
Unscrew brake pipe at the brake release block.

Before initial start-up, air must be bled from the valve.
This is also necessary after repairs to the valve.

Bleed by connecting a "Minimess" measuring hose to the measuring union (M17). Collect the escaping oil in a suitable container.
When the oil is free of air bubbles, unscrew and remove the measuring hose.

Switch on travel step 2.
Pilot pressure (25 – 27 bar) must be displayed at the measuring union (M16).

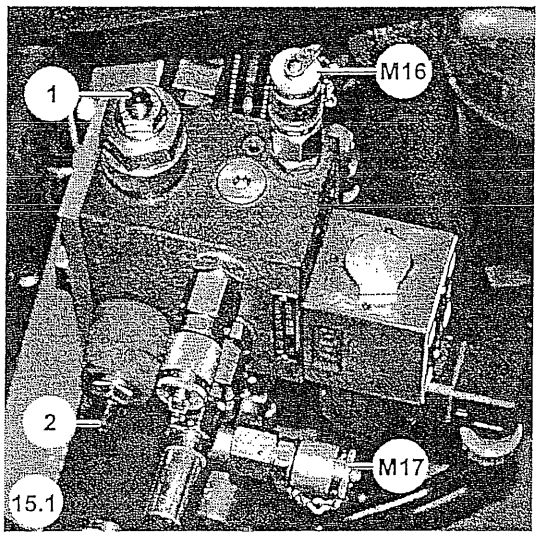
Slowly increase the travel pressure with the travel lever.
After reaching 330 – 350 bar, the pilot pressure at measuring union (M16) should fall.

Correction is by tightening or unscrewing adjusting screw (1).

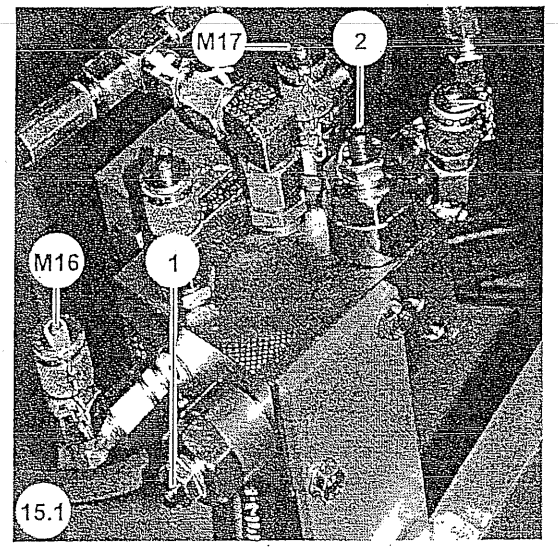
Slowly reduce the travel pressure with the travel lever.
After reaching 150 – 180 bar, the pilot pressure at measuring union (M16) should be displayed again (25 – 27 bar).

Correction is by tightening or unscrewing adjusting screw (2).

1704



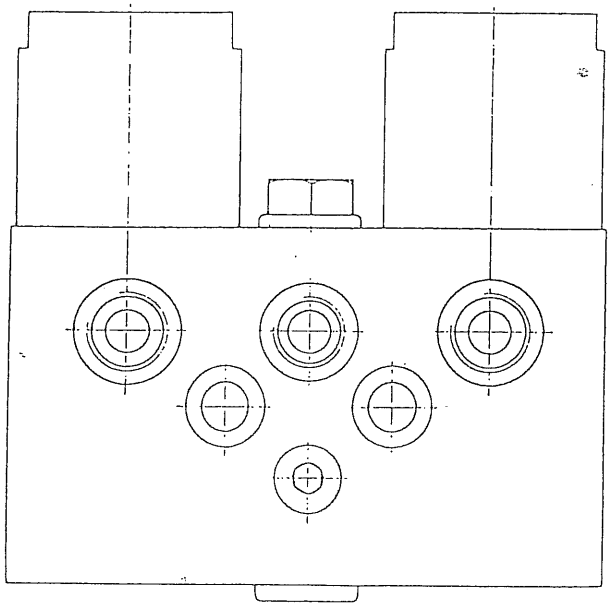
1804

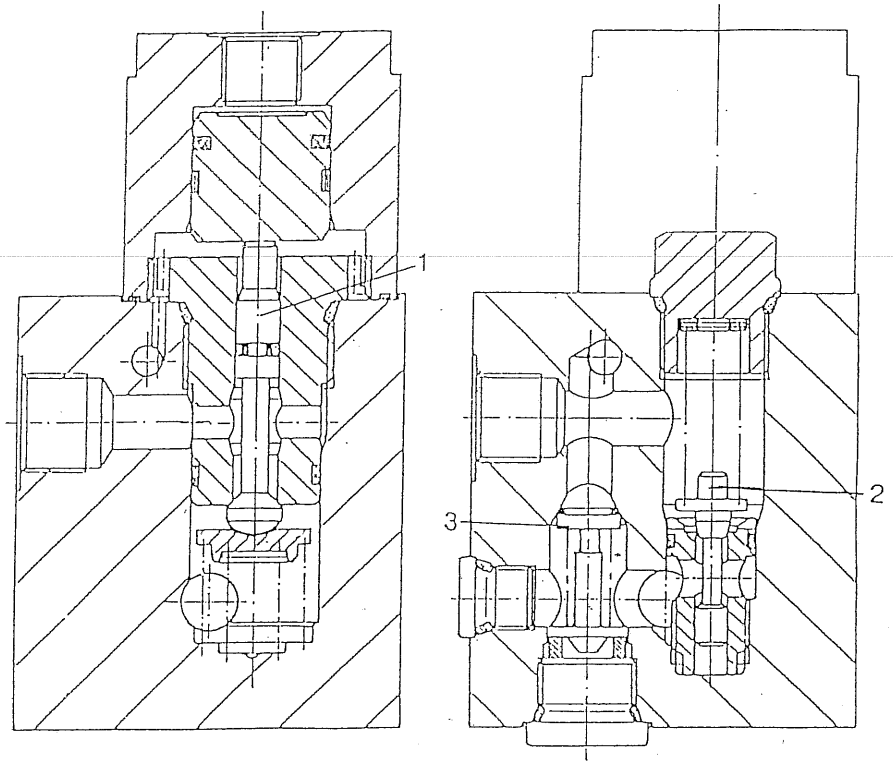


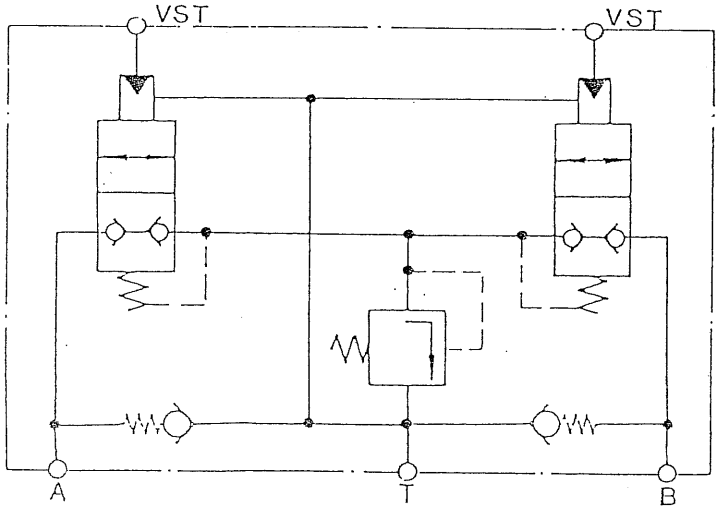
VALVE UNIT
for swing axle interlock

Schulungszentrum
Tafel:
Name: Ro.
Datum: 05.97

1	Shut off valve
2	Relief valve
3	Non return valve with spring
A	Connection - Cylinder
B	Connection - Cylinder
T	Connection - Tank
VST	Connection - Servo pressure







Axle blocking

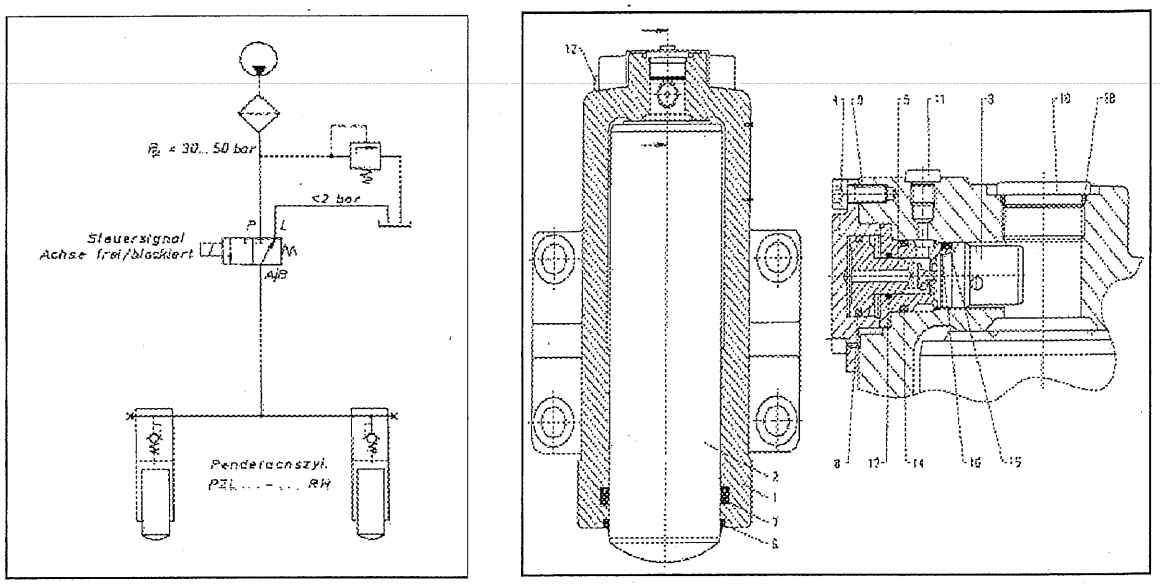
Functional description

Design as plunger-cylinder with integrated shut-off valve.
The shut-off valve is designed as leak-oil free ball valve which is capable of being opened through a control piston.

Area relations ψ= 16 : 1
Pilot-opening pressure P_{St} = 30 bar

The control line is connected to the connecting line of both supporting cylinders, i.e. the pilot-opening pressure with which the shut-off valve in the cylindrical head is loaded for unlocking, is at the same time, the pre-load pressure for the cylinder during swinging, i.e. only one line to the cylinder is required.

Points to be observed:
The pressure in the tank line must be smaller than 2 bars in the locked state. The axle-seating should be even, hardened and greased.
The screwing areas for the cylinder on the undercarriage must be even to avoid extra tensions on the cylinder housing during screwing.



Picture 3: Swinging axle cylinder with shut-off valve

Putting into operation and de-aeration

To put into operation, all components must be filled with mineral oil and de-aerated. This will be performed as follows

- The screw plug (pos. 10) is removed on the swinging axle cylinder.
- The rod is pressed downwards until the axle seat.
  ATTENTION! Depending on the type of cylinder, the check-valve element pos. 3 may protrude more or less far into the oil fill-up boring. The valve element shall not be damaged while the rod is being pressed down.
  The rod may as well be pressed down hydraulically.
- Fill the cylinder space with oil and screw-in screw-plug once again M_A = 180 Nm.
- To de-aerate the two cylinders, screw-out the de-aeration screw pos. 11 and fill-up with oil until no further air-bubble is let out.
- Screw-in the de-aeration screw but do not tighten same. The screw shall remain slightly loosened.
- Exert control-pressure on the cylinder and tighten de-aeration screw (M_A = 28 Nm), as soon as bubble-free oil flows out. This concludes the de-aeration process.

Extreme cleanliness shall be observed during the entire de-aeration process.

Trouble-shooting

a) Should the supporting effect of a cylinder recede in the stiff state of an axle, the rod-sealing pos. 7 as well as the leak-proof of the check-valve element pos. 3 shall be verified, if necessary, the parts shall be renewed.

b) Should the swinging axle be incapable of being placed in a labile position after several switching, the following shall be verified:

- In case of a very high cylinder load, unlocking cannot be performed against the inner cylinder pressure (see function description).
- The system must be de-aerated (see Initial Operation and de-aeration).
- Should the re-establishment of the axle-function through de-aeration fail, it should be verified if sufficient control-pressure is available (see function description).
- Should no defect be determined in the face of the aforementioned points, then the control piston pos. 5 of the shut-off valve must still be verified for smooth-running (see Repair Guide).

Repair Guide (see picture 3).

a) Replacement of the rod-sealing

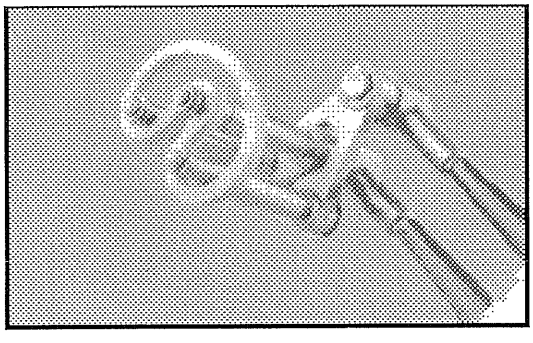
- Remove screw-plug pos. 10.
- Press-out rod pos. 2 downwards.
  ATTENTION! Do not damage surface of rod.
- Lift out grooved ring pos. 7 with rounded tool.
  ATTENTION! Do not damage puncture surface.
- Lead-in new grooved ring by pressing it together in a kidney-form and press into the groove. (Picture 4 and 5).
- Check stripper pos. 6 for damages and replace if necessary.
- Grease-in sealings.
- Re-position rod.

b) Repairing the check-valve

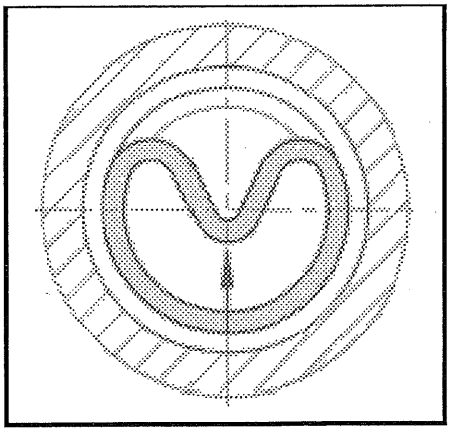
- Remove screw-plugs pos. 9.
- Remove screw-plug pos. 4.
- Remove screw-plug pos. 5. Control piston must be smooth-running in the check-valve element as well as in the switch-cylinder.
- Press check-valve element pos. 3 outwards from the inside through the fill-in bore pos. 10.
- Check sealing pos. 8, 14, 15, 16 and 17 for damages and replace if necessary.
- The check-valve element pos. 3 cannot be further dismantled.
- Assemble in reversed order.
- Grease-in sealings for assembly..
- Tightening torque for cylinder-head screws pos. 9 M_A = 16 Nm.
  ATTENTION! Use only cylinder-head screws with tensile strength 12.9!

De-aeration shall be performed prior to initial operation in accordance with item 2.

ATTENTION! All verifications and repairs shall be performed with the maintenance of extreme cleanliness.



Picture 4: Grooved ring pressed together in a kidney form



Picture 5: Positioning the grooved ring in the closed groove

AUXILIARY SLEWING COUPLING

Dual circuit braking system

Schulungszentrum

Name :Ro.

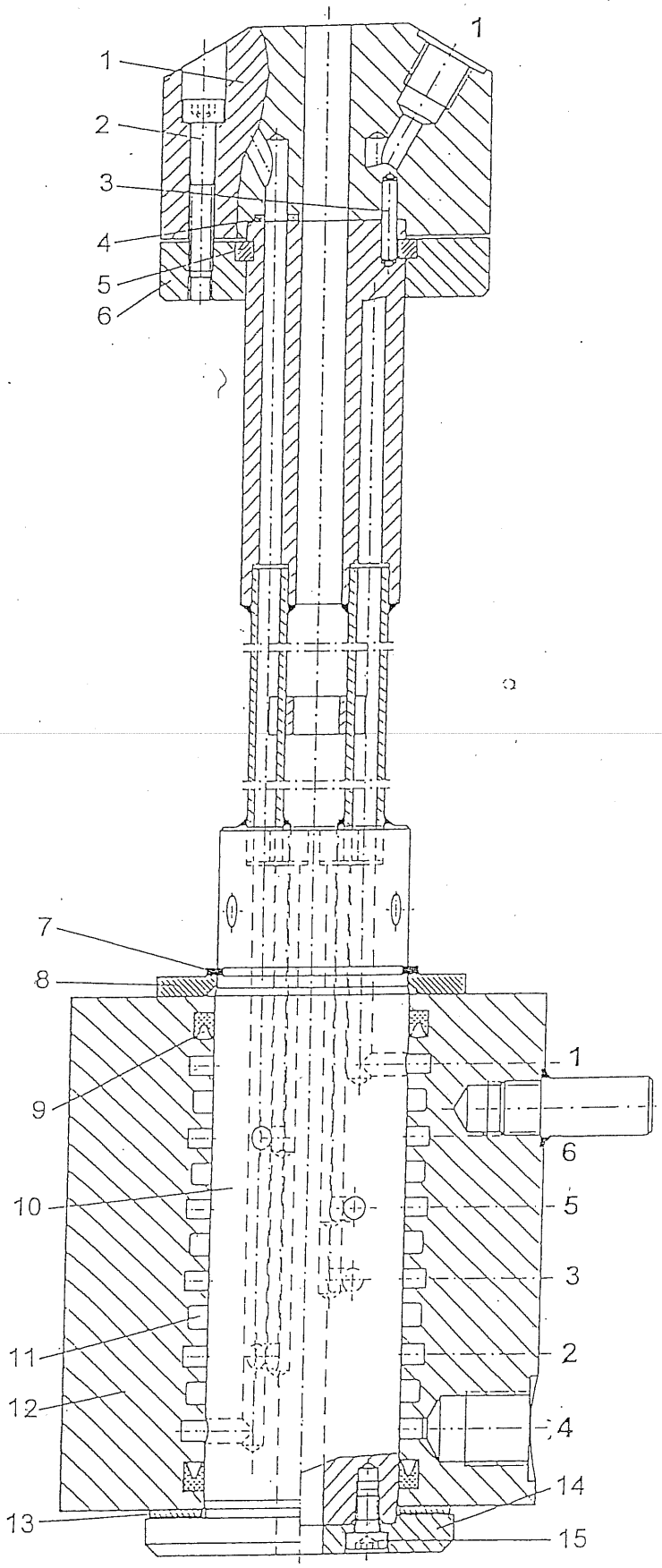
Datum:07.00

Arrangement

1	Connection block
2	Allen screw
3	Dowel pin
4	Stircomatic packing
5	Disk
6	Counterring
7	Circlip
8	Slid disk
9	U - Ring
10	Inner part
11	Rotomatic ring
12	Outer part
13	Disk
14	Flange
15	Allen screw use Loctite 243

On the connection block and outer part the connections are marked with numbers.

1	Gear shifting	Y3
6	Swing axle	Y9
5	Creep speed	Y7
3	Foot brake	
2	Foot brake	
4	Parking brake	Y4



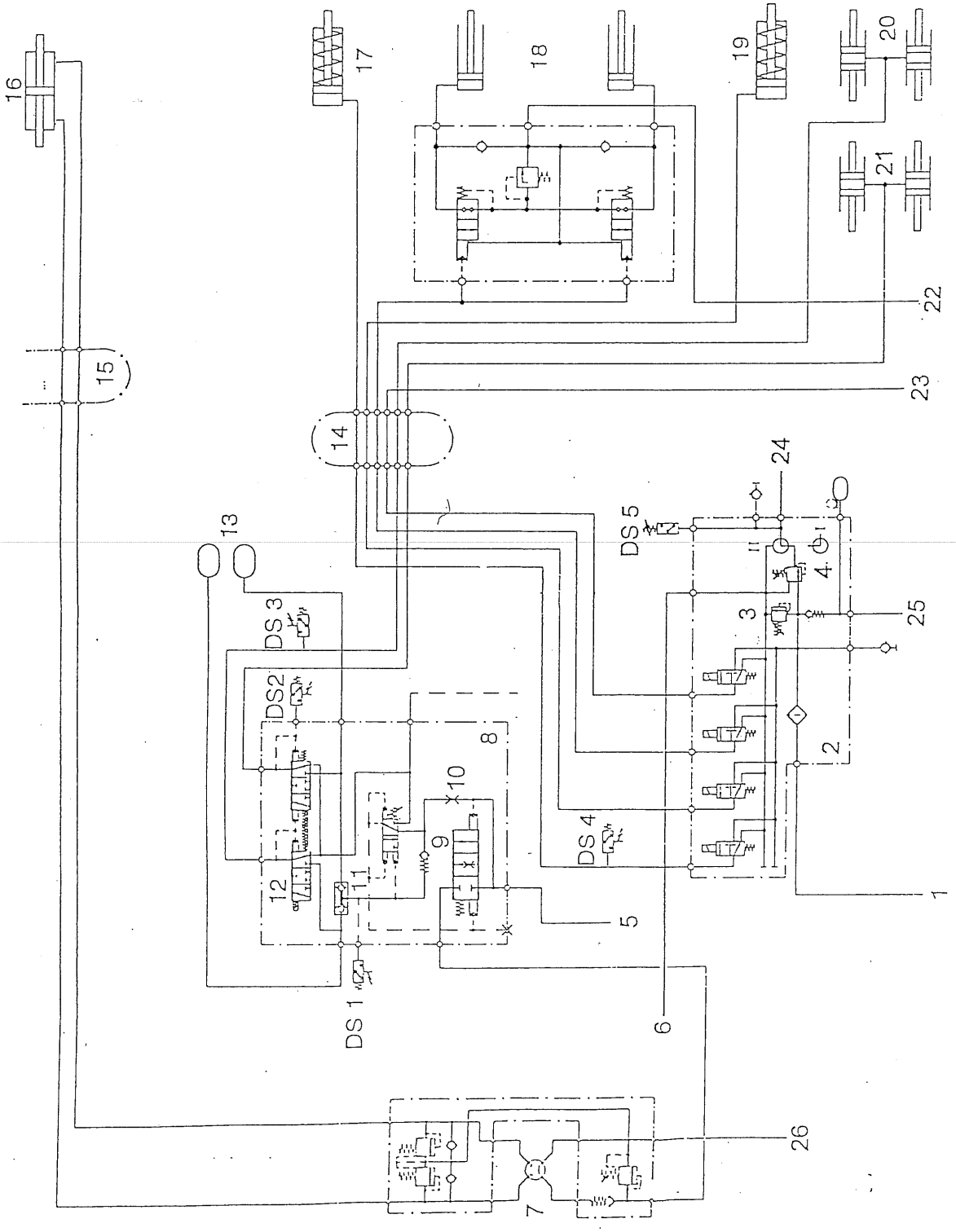
REMOTELY POWERED BRAKING VALVE

Dual circuit braking system

Schulungszentrum

Name: Ro.

Datum: 07.00



REMOTELY POWERED BRAKING VALVE

Dual circuit braking system

Schulungszentrum

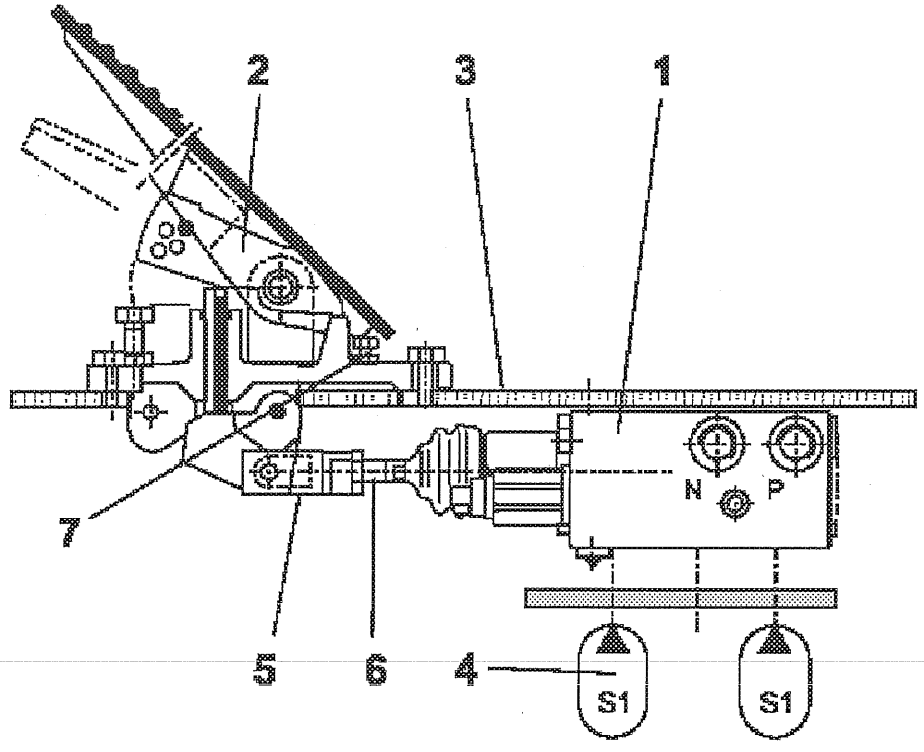
Name : Ro.
Datum: 07.00

1 Connection servo pump
2 Valve unit
3 Primary valve servo system
4 Emergency valve
5 Connection steering pump
6 Connection tank
7 Steering unit
8 Remotely powered braking valve
9 Accumulator loading valve
10 Restrictor
11 Double non return valve
12 Foot brake valve
13 Accumulator
14 Auxiliary slewing coupling
15 Main slewing coupling
16 Steering cylinder
17 Parking brake cylinder
18 Swing axle interlock
19 Gear shift cylinder
20 1. Brake circuit
21 2. Brake circuit
22 Leak- oel con. „Driving Motor"
23 Connection Creep speed
24 Connection Emergency shift
25 Connection Servo units
26 Connection Feed valve Driving

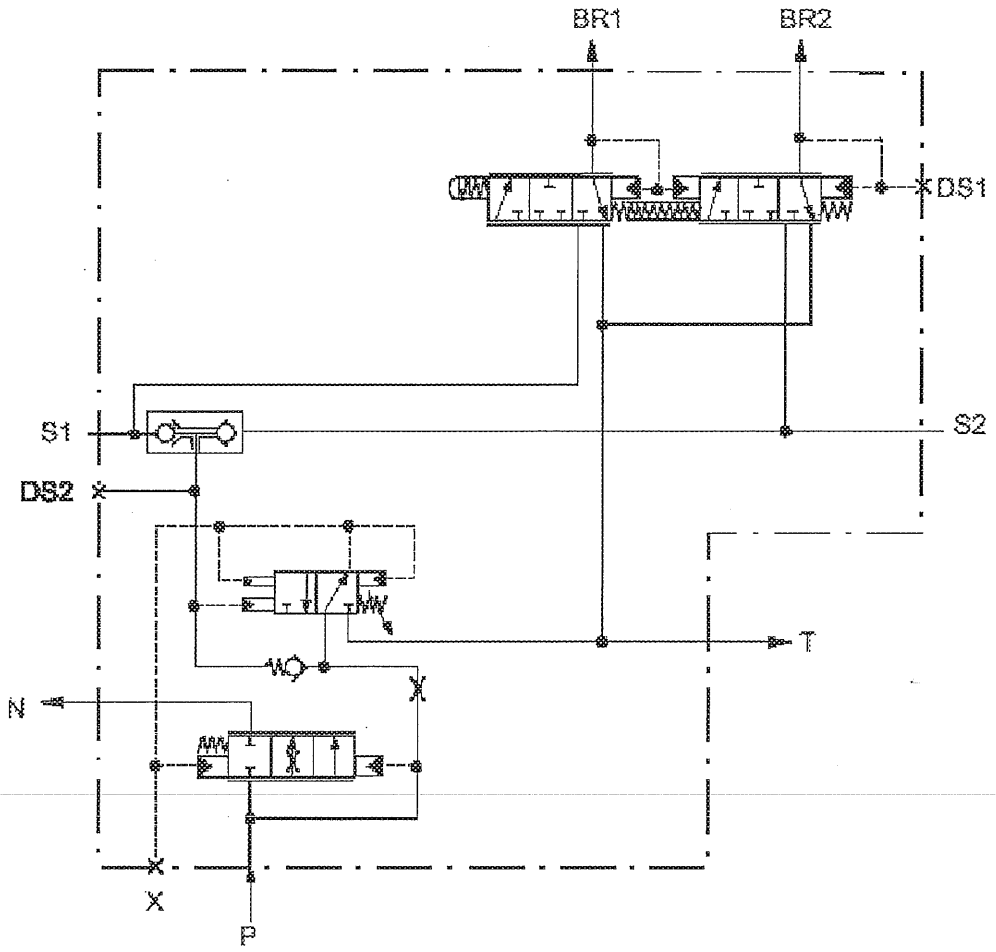
DS1 Switch / Functional check 100 bar
DS2 Switch / Brake light 5 bar
DS3 Switch / Swing axle 25 bar
DS4 Switch / Parking brake 5 bar
DS5 Switch / Emergency operation 5 bar

Power brake system

Structure



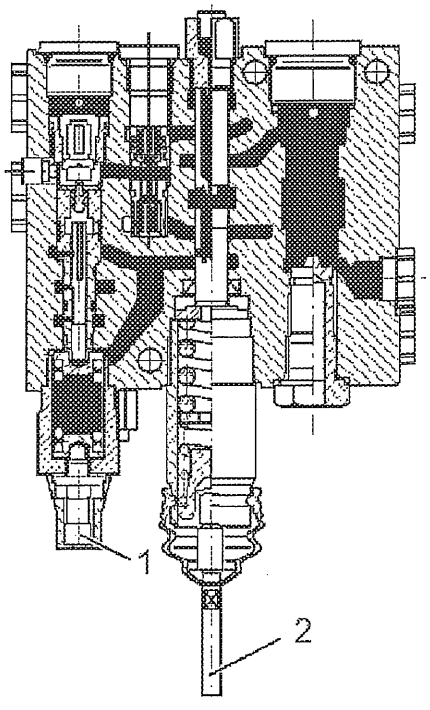
1 Compact brake block
2 Pedal
3 Base plate
4 Accumulator
5 Prong head
6 Activation rod
7 Adjustment screw



P	Steering pump	DS1	Pressure switch brake pressure
N	to steering unit	DS2	Pressure switch Function control 100 bar
BR1	to the brake cylinders 1st circuit S1		Pressure accumulator
BR1	to the brake cylinders 2nd circuit S2		Pressure accumulator
X	Measurement connection		

E 1

SETTING REGULATION



Verification / Setting
Connect manometer (0 - 400 bar) to the measurement connection XIV, XV.

Shut-off valve

Start engine.

The accumulator pressure of 185 bar is displayed immediately. By activating the pedal-operated brake valve several times, the accumulated pressure plunges to the set value of 152 bar and then rises again to 185 bar.
The setting of 152 bar is done on the adjustment screw (1).

Screw-out adjustment screw: - charge pressure lesser Screw-in adjustment screw: - charge pressure higher

Foot brake

Arrest pedal-operated brake valve.
A brake pressure of 120 bar must be displayed. Adjustment is performed on the thread rod (2).

Thread rod (2) in the bushing of the idler fork: - screw-in: - Brake pressure lesser
Screw-out: - Brake pressure higher

Pedal-operated brake valve released.
Connect manometer (0 -6 bar) to the measurement connection XV.

A brake pressure of 0.5 bar must be displayed.
Adjustment is performed on the adjustment screw (7) (see page 11).
Attention: This adjustment is for industrial machines with drum brakes only.

Power brake valve

Measurement connections:

XIV Shut-off valve

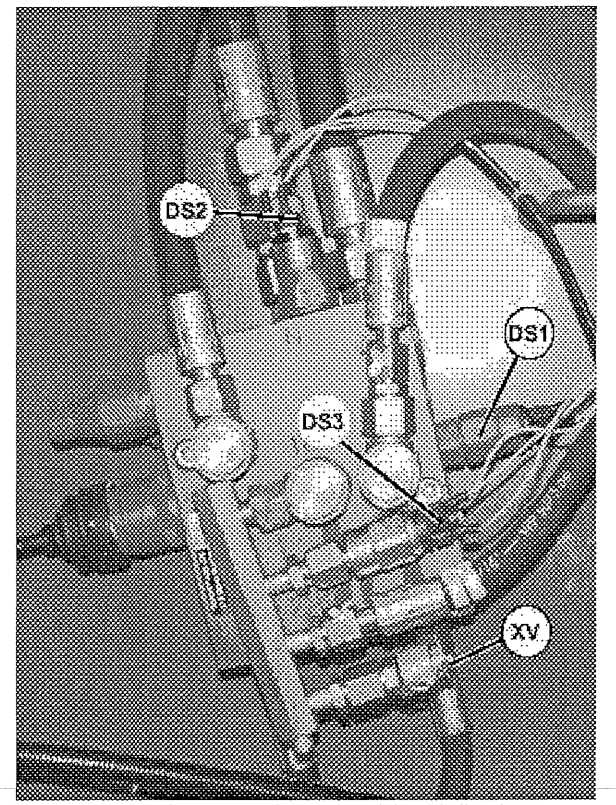
XV Foot brake

Pressure switch:

DS1 Pressure switch brake lights

DS2 Pressure switch Function control

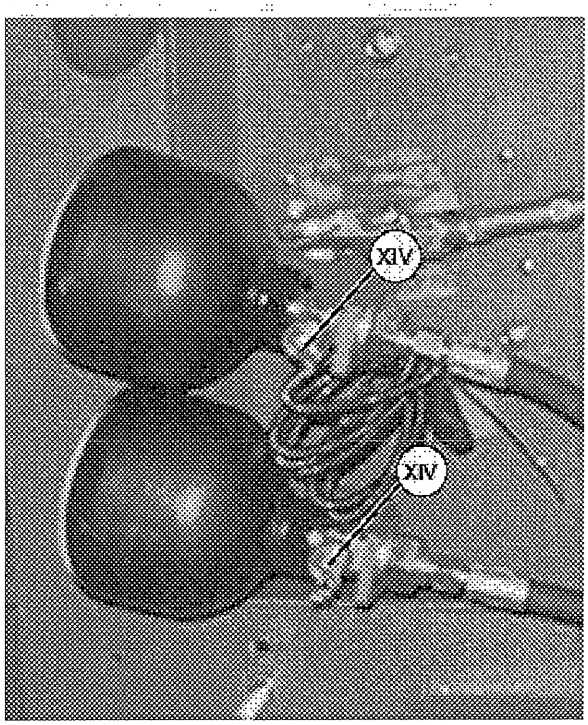
DS3 Pressure switch swinging axles



Venting:

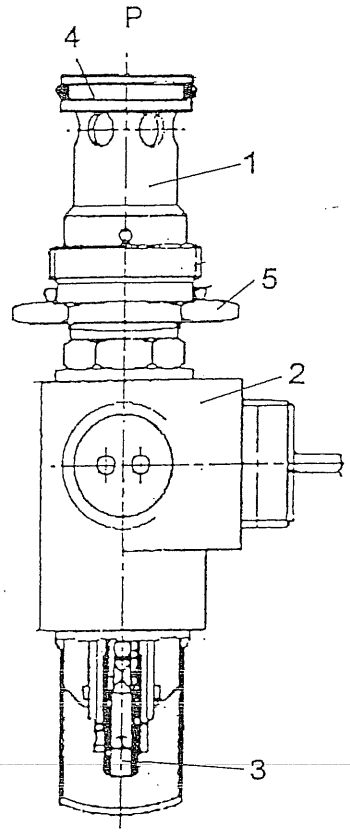
Shut-off valve – Connect mini-measurement hose with measurement connection (XIV). Keep end of hose in an adequate container.

Foot brake – Connect mini-measurement hose with measurement connection (XIV). Keep end of hose in an adequate container.
(Slightly activate plate valve)



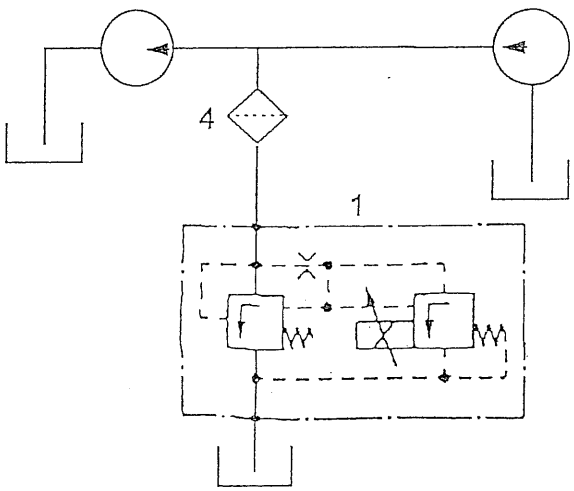
Application

This is a control element with a falling characteristic for hydraulic fan operation in vehicles.
The pressure limiting valve opens proportionally or switches a bypass to the fan motor.
When fully open (max. flow), the complete oil flow from the pump flows via the valve to the tank.
The fan is then inactive. If on the other hand the magnet is not energised, the valve is closed and the fan motor turns the fan at maximum speed (safety circuit +).
This valve is used with a separate configuration of the fan drive components, pump, fan motor and control element. The position of the valve cartridge in the hydraulic system is determined by a special connection block.



1 Valve
2 Solenoid valve
3 Air bleed screw
4 Mesh filter in valve base
5 Tightening torque
124 + 41 Nm

P -Pump connection

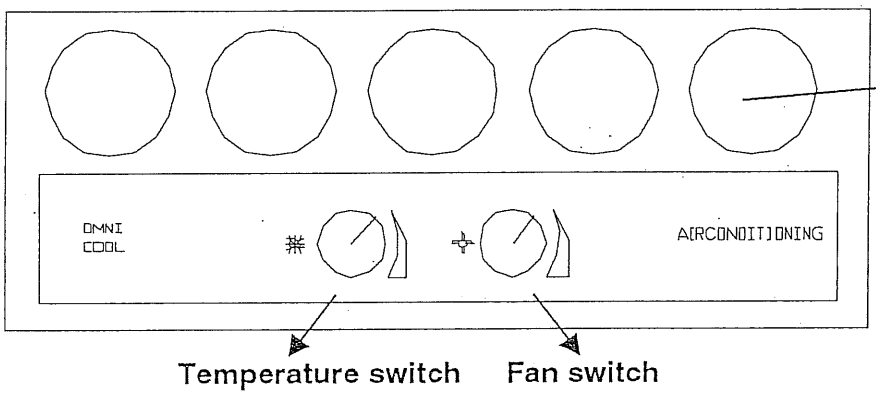


Operation

The air conditioning only works if:

- the vehicle's engine is running
- the blower's rotary switch is at setting 1, 2 or 3
- there is enough coolant in the unit (see "Troubleshooting").

The operating panel for the condenser is shown below from the front.



Fan switch

The outflowing volume of air and thus the cooling effect are controlled via the three blower settings. There are four possible switch positions:

• Position 0	Unit switched off	
• Position 1	Minimum air flow speed	241 cu. m /h
• Position 2	Intermediate air flow speed	293 cu. m /h
• Position 3	Maximum air flow speed	372 cu. m /h

Temperature switch
The temperature of the outflowing air can be continuously varied.

- Left: min. External temperature
- Right: max. Condenser cools down to approx. +2°C

Continuous operation
The air conditioning unit can only function correctly if the cabin windows are closed.

The outflowing air can be directed to any required point by the tilting nozzles.
CAUTION – Only direct the nozzles directly on to your body for a short time – risk of catching a cold!

As soon as the cabin temperature has dropped to a suitable level, you can set the blower and the temperature switch to lower settings again. We recommend a difference of 6°C to 8°C below the outside temperature.

Maintenance instructions

- Note the safety precautions for all maintenance work.
- Work on the refrigerating circuit must only be carried out by a specialist workshop.

Weekly

- Is the condenser dirty?
  If so, then it must be cleaned with compressedair. CAUTION – do not use a high pressure cleaner, or the condenser's plates could be damaged.

Monthly

- General condition and tightness of the V-belts
- Is the compressor fixed securely?
- Are there chafe marks on hoses and pipes?
- Can the condensed water drain away?
- Filling status of the unit: when active, the coolant in the observation glass should be free of bubbles.

Annually

- Check coolant volume / measure the intake and outflow side pressures with a suitable gauge.
- Every two years the filter dehumidifier must be renewed.

HYDRAULIC FLUID TEMPERATURE

Measurement of hydraulic oil temperature via the resistance value at the temperature sensor

Type 1704 and 1804 excavators with electronic load limit control are equipped with an hydraulic fluid temperature sensor.
The hydraulic fluid temperature can be determined via this sensor with the help of a digital multimeter.
The digital multimeter is attached to the sensor and the measurement range 2 KΩ pre-selected. The resistance reading can be allocated to a temperature value by reference to the table.

Example: Resistance reading = 1.456 KΩ = 76° C

Note: A firm connection between sensor and the digital multimeter can be obtained with the engine speed measuring adapter (EDP No. 4147377).
The two-pin socket housing is attached to the temperature sensor and the measuring wires from the digital multimeter placed in the red and blue connecting sockets.

The wiring harness is not connected to the measuring adapter for this measurement.

Table:

°C	0	1	2	3	4	5	6	7	8	9
0	1.000	1.006	1.011	1.017	1.022	1.028	1.033	1.039	1.044	1.050
10	1.058	1.061	1.067	1.072	1.078	1.084	1.090	1.095	1.101	1.107
20	1.112	1.118	1.124	1.130	1.136	1.141	1.147	1.153	1.159	1.165
30	1.171	1.177	1.182	1.188	1.194	1.200	1.206	1.212	1.218	1.224
40	1.230	1.236	1.242	1.248	1.254	1.260	1.267	1.273	1.279	1.285
50	1.291	1.297	1.303	1.310	1.316	1.322	1.328	1.335	1.341	1.347
60	1.353	1.360	1.366	1.372	1.379	1.386	1.392	1.398	1.404	1.411
70	1.417	1.424	1.430	1.437	1.443	1.450	1.456	1.463	1.469	1.476
80	1.483	1.489	1.490	1.502	1.508	1.516	1.522	1.528	1.536	1.543
90	1.549	1.556	1.563	1.570	1.577	1.583	1.590	1.597	1.604	1.611
100	1.618	1.625	1.632	1.639	1.646	1.653	1.660	1.667	1.674	1.681
110	1.688	1.695	1.702	1.709	1.716	1.724	1.731	1.738	1.745	1.753
120	1.760	1.767	1.774	1.782	1.789	1.796	1.804	1.811	1.819	1.826

Neutral switching of the travel gear transmission

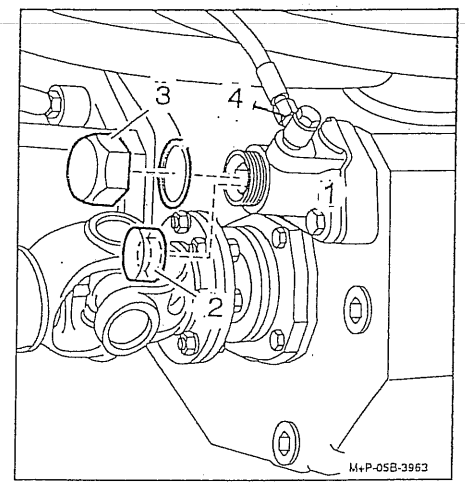
The WY199 1704 / 1804 travel gear transmission has two speeds, which are changed by pilot control pressure and an opposing spring (in the shift cylinder).

When the excavator's engine is running, the travel gear transmission is active.

1. Speed selected with pilot control pressure
2. Speed selected by opposing spring, pilot control pressure switched off.

For the neutral position e.g. when towing the vehicle, an aluminium disc (2) included with the delivered components must be installed.

1. Shift cylinder
2. Aluminium disc
3. Sealing cap
4. Pilot control connection



PRESSURE ADJUSTMENT TABLE – 1704

Wheeled and Tracked excavators
From serial no. 374 M 301265

Schulungszentrum
Name : Ro.
Datum: 05.00

* Check / adjust at max. engine speed
** Check / adjust with pressure cut-in stage engaged
*** Check with hand pump.
Figures shown in bar or in rpm
Hydraulic fluid temp. 40-60° C.

	ENGINE SPEEDS			
	Min. idle speed			1030 -30
	Max. idle speed	- F3		2100
		- F2		1930
		- F1		1770
	Nominal speed			1900 -40
	Pressure cut-in stage			1550
	Emergency shift			2150
	Automatic idle speed			1150
	PRIMARY VALVES			
*	Pump	- P1		50-60
		- P2		50-60
*	Pressure cut-off	- P1		320
		- P2		320
**	Pressure cut- in stage	- P1		380
*	Pilot pump			25 - 27
*	Pr. lim. valve - emergency shift			14
*	Fan pump			85+5
*	Steering pump			140+5
	POWER-SHIFT CONTROLLER (delta p)			
	Pump, P1 and P2	- F3		23
		- F2		20
		- F1		17
**	Pressure cut-in stage			13
*	Load limit control valve (+ air pressure on hydraulic tank)			8.5+-0.2
	SECONDARY VALVES			
**	Lifting cylinder	- raising	-plate valve	420 -30
***	Line rupture protection valve			420 -30
		-lowering		365+20
**	Folding cylinder		-plate valve	365+20
***	Line rupture protection valve			365 -10
**	Bucket/Grab operating cylinder		-plate valve	365+20
	Slewing motor (fixed setting)			50/250+10
*	TC plate			240
**	Drive motor		-wheeled	400+20
			-tracked	400+20
**	Grab rotation motor		-plate valve	150
	Quick change coupling		-plate valve	210
	Slewable ditching bucket		-plate valve	210
			-motor	75
**	Dozer blade support cylinder			365+20
**	Luffing boom cylinder	- extend	-plate valve	365+20
***	Line rupture protection valve /	Leak-free cut-off		435+20
**		- retract		415+20

**	Stabilizer support pad cylinder		365+20
***	Steering cylinder		200
	SWING AXEL INTERLOCK		
***	Pressure - limiting valve		45
	REGULATED DRIVING MOTOR		
**	Wheeled	- pressure regulator	260
**	Tracked	- pressure reducing valve	350+10
		- change over valve	150
	LEAK-FREE SHUT-OFF		
**	Valve for minimum reduction		3+1
	FEED PRESSURE VALVES	(without tank preload)	
*	Wheeled		15
*	Return base plate		5
*	Cooler protection valve		2.5+0.3
	RETURN FLOW THROTTLES	(without implements + 15 bar)	
*	Lowering		50
*	Folding		75
*	Closing bucket		70
	PRESSURE SWITCH		
**	Automatic idle		70
	SPEEDS		
*	Fan motor		1500+50
*	Slewing		7.5+0.5
*	Universal joint shaft (q min)	- gear shift 1	625
	(q max)	- gear shift 1	370
	REMOTELY POWERED BRAKING VALVE		
*	Accumulator loading valve	- cutting in pressure	152
		- cutting out pressure	185
*	Foot brake		120
*	Parking brake		25-27
*	Accumulator pressure	- foot brake	65
	COMPRESSED AIR VALVES		
	Wheeled	- pressure regulator	8
		- flow relief valve	5
		- pressure reduction valve	0.5
		- tire pressure	6.5
	Tracked	- pressure reduction valve	0.3

The right to make modifications is reserved.

* Check / adjust at max. engine speed
** Check / adjust with pressure cut-in stage engaged
*** Check with hand pump.
Figures shown in bar or in rpm
Hydraulic fluid temp. 40-60° C.

	ENGINE SPEEDS		
	Min. idle speed		1030 -30
	Max. idle speed	- F3	2000
		- F2	1850
		- F1	1700
	Nominal speed		1900 -40
	Pressure cut-in stage		1550
	Emergency shift		2050
	Automatic idle speed		1150
	PRIMARY VALVES		
*	Pump	- P1	50-60
		- P2	50-60
*	Pressure cut-off	- P1	320
		- P2	320
**	Pressure cut- in stage	- P1	380
*	Pilot pump		25 - 27
*	Pr. lim. valve - emergency shift		14
*	Fan pump		180
*	Steering pump		140
	POWER-SHIFT CONTROLLER (delta p)		
	Pump, P1 and P2	- F3	23
		- F2	20
		- F1	17
**	Pressure cut-in stage		13
*	Load limit control valve (+ air pressure on hydraulic tank)		8.5+-0.2
	SECONDARY VALVES		
**	Lifting cylinder	- raising -plate valve	420 -30
***	Line rupture protection valve		420 -30
		-lowering	365+20
**	Folding cylinder	-plate valve	365+20
***	Line rupture protection valve		365 -10
**	Bucket/Grab operating cylinder	-plate valve	365+20
	Slewing motor (fixed setting)		50/250+10
*	TC plate		240
**	Drive motor	-wheeled	400+20
		-tracked	400+20
**	Grab rotation motor	-plate valve	150
	Quick change coupling	-plate valve	210
	Slewable ditching bucket	-plate valve	210
		-motor	75
**	Dozer blade support cylinder		365+20
**	Luffing boom cylinder	- extend -plate valve	365+20
***	Line rupture protection valve / Leak-free cut-off		435+20
**		- retract	415+20

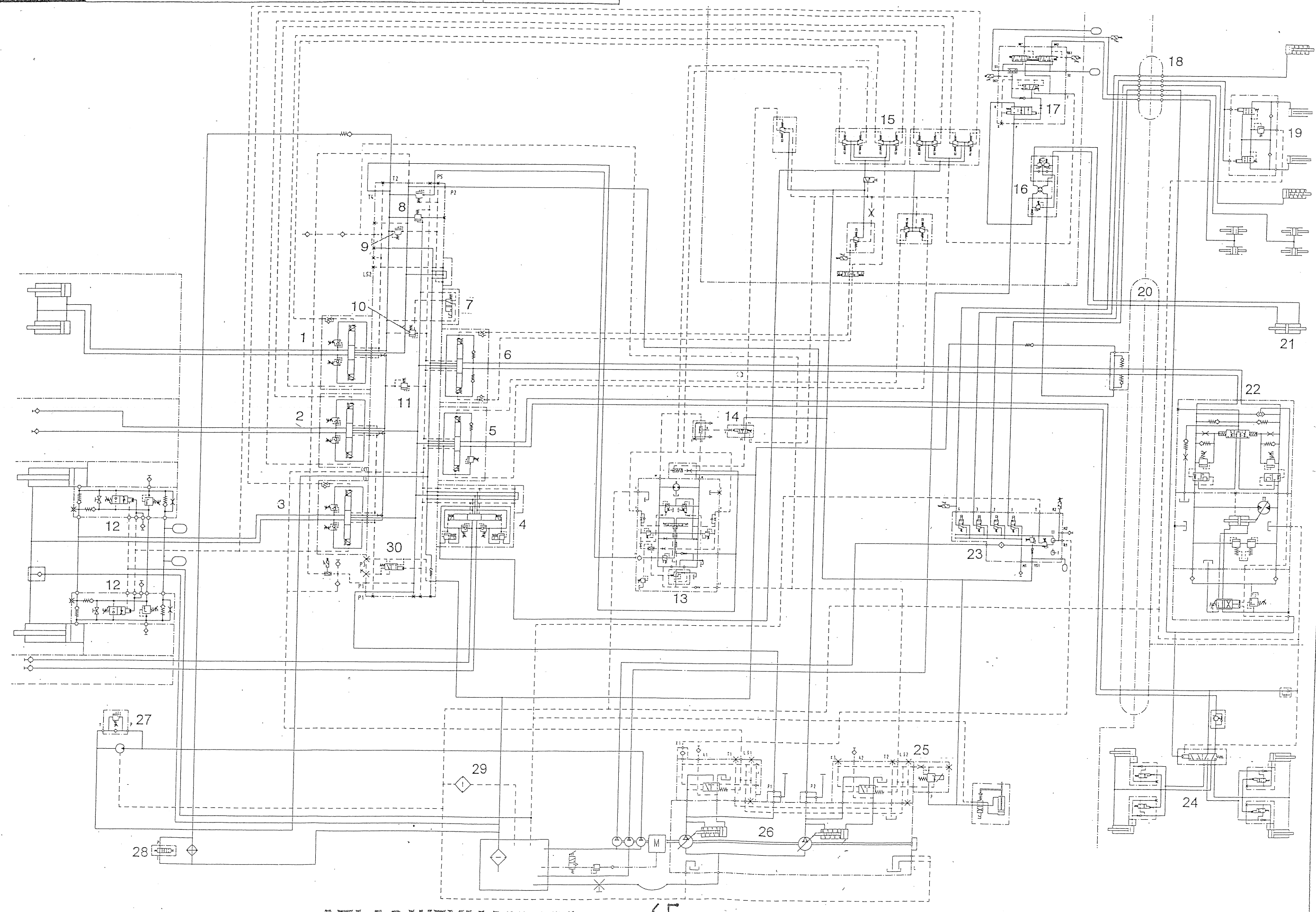
**	Stabilizer support pad cylinder		365+20
***	Steering cylinder		200
	SWING AXEL INTERLOCK		
***	Pressure - limiting valve		45
	REGULATED DRIVING MOTOR		
**	Wheeled	- pressure regulator	260
**	Tracked	- pressure reducing valve	350+10
		- change over valve	150
	LEAK-FREE SHUT-OFF		
**	Valve for minimum reduction		3+1
	FEED PRESSURE VALVES	(without tank preload)	
*	Wheeled		15
*	Return base plate		5
*	Cooler protection valve		2.5+0.3
	RETURN FLOW THROTTLES	(without implements + 15 bar)	
*	Lowering		50
*	Folding		75
*	Closing bucket		70
	PRESSURE SWITCH		
**	Automatic idle		70
	SPEEDS		
*	Fan motor		1350 to 1750+50
*	Slewing		7.5+1
*	Universal joint shaft (q min)	- gear shift 1	625
	(q max)	- gear shift 1	370
	REMOTELY POWERED BRAKING VALVE		
*	Accumulator loading valve	- cutting in pressure	152
		- cutting out pressure	185
*	Foot brake		120
*	Parking brake		25-27
*	Accumulator pressure	- foot brake	65
	COMPRESSED AIR VALVES		
	Wheeled	- pressure regulator	8
		- flow relief valve	5
		- pressure reduction valve	0.5
		- tire pressure	6.5
	Tracked	- pressure reduction valve	0.3

The right to make modifications is reserved.

HYDRAULIC DIAGRAM 1704
INDRUSTRIAL - MASCHINES
from serial no. 374 S 301265

Schulungszentrum

Name : Sch.
Datum: 01.00



HYDRAULIC DIAGRAM 1704
INDRUSTRIAL - MASCHINES
from serial no. 374 S 301265

Schulungszentrum
Name : Ro.
Datum: 06.00

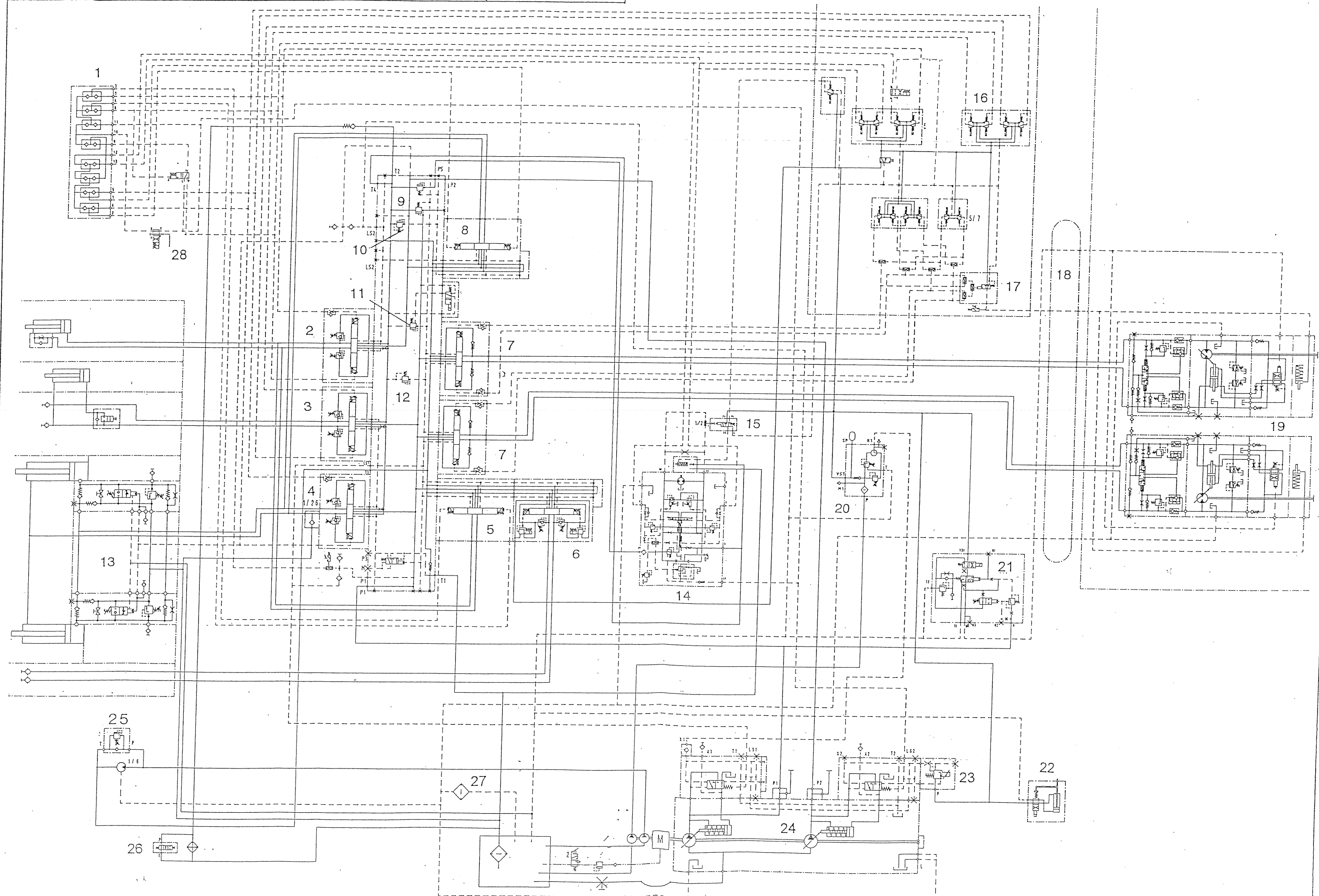
1 Plate valve Jib folding
2 Plate valve Bucket
3 Plate valve Lifting
4 Plate valve Grab rotating
5 Plate valve Dozer blade / Stabilizer
6 Plate valve Driving
7 Solenoid valve, pressure cut- in stage
8 Primary valve LS controlled
9 Pressure cut- off valve 2
10 Pressure cut- off valve 1
11 Pressure cut- in stage valve P1
12 Line repture protection valve
13 Slewing motor HMF 02 with integral multiple control
14 Shut- off valve slewing brake
15 Servo valve unit
16 Steering unit
17 Remotely powerd braking valve
18 Auxiliary slewing coupling
19 Valve unit, swing axle interlock
20 Main slewing coupling
21 Steering cylinder
22 Driving
23 Emergency control valve
24 Stabilizer support pad ram
25 Load limit control valve
26 Variable duo pump HPR 160/130
27 Fan motor with protection valve
28 Thermostat valve
29 Hydraulic filter (only leakoil)
30 Omitted

HYDRAULIC DIAGRAM 1704

from serial no. 374 R 301265

Schulungszentrum

Name : Pa.
Datum: 06.00



HYDRAULIC DIAGRAM 1704

from serial no. 374 R 301265

Schulungszentrum
Name : Ro.
Datum: 06.00

1	Shuttle valve unit (external summation and separation circuit)
2	Plate valve Jib folding 2
3	Plate valve Bucket
4	Plate valve Lifting 1
5	Plate valve Jib folding 1
6	Plate valve Grab rotating
7	Plate valve Driving
8	Plate valve Lifting 2
9	Primary valve LS controlled
10	Pressure cut- off valve 2
11	Pressure cut- off valve 1
12	Pressure cut- in stage P1
13	Line repture protection valve
14	Slewing motor HMF 02 with integral multiple control
15	Shut- off valve slewing brake
16	Servo valve unit
17	Brake release unit
18	Main slewing coupling
19	Final drive
20	Emergency control valve
21	Variable drive motor with automatic control
22	Speed regulator
23	Load limit control valve
24	Variable duo pump HPR 160/130
25	Fan motor with protection valve
26	Thermostat valve
27	Hydraulic filter (only leakoil)
28	Connection - Servo pressure

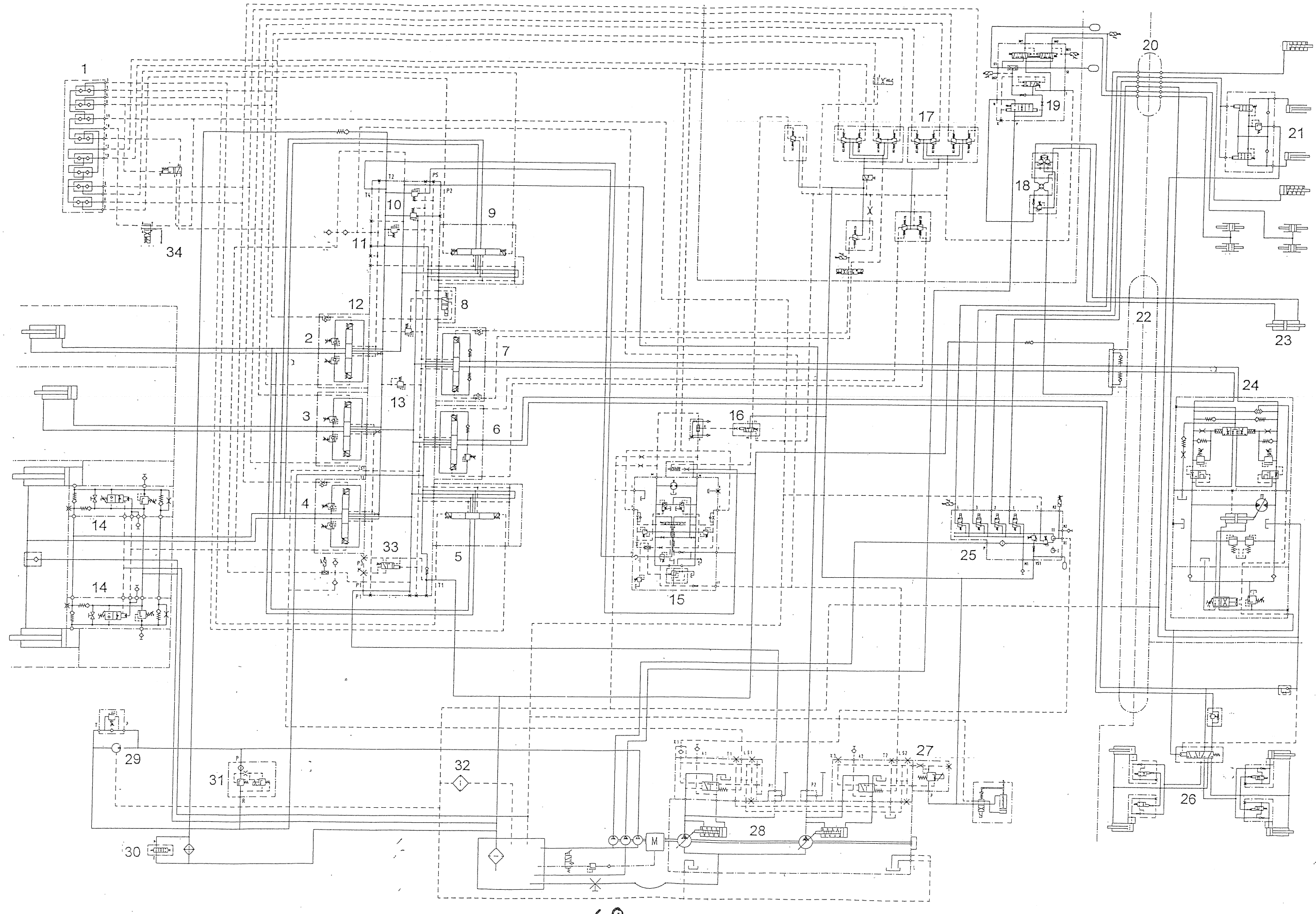
ATLAS WEYHAUSEN - 6.0

HYDRAULIC DIAGRAM 1804

from serial no. 284 M 301266

Schulungszentrum

Name : Sch.
Datum: 06.00



HYDRAULIC DIAGRAM 1804

from serial no. 284 M 301266

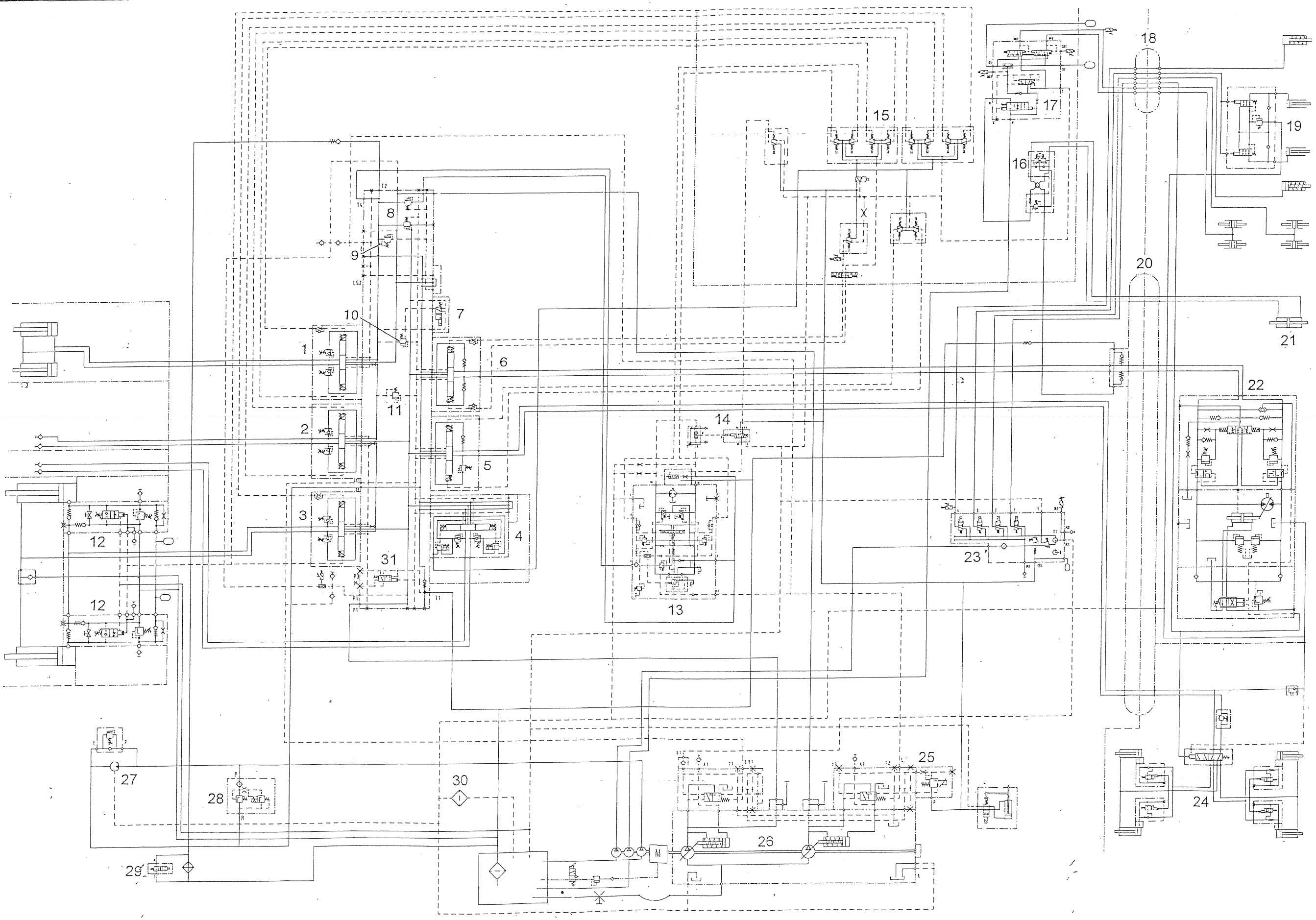
Schulungszentrum
Name : Ro.
Datum: 06.00

1 Shuttle valve unit (external summation and separation circuit)
2 Plate valve Jib folding 1
3 Plate valve Bucket
4 Plate valve Lifting 1
5 Plate valve Jib folding 2
6 Plate valve Grab rotating
7 Plate valve Dozer blade / Stabilizer
8 Plate valve Driving
9 Plate valve Lifting 2
10 Primary valve LS controlled
11 Pressure cut- off valve 2
12 Pressure cut- off valve 1
13 Pressure cut- in stage P1
14 Line repture protection valve
15 Slewing motor HMF 02 with integral multiple control
16 Shut- off valve slewing brake
17 Servo valve unit
18 Steering unit
19 Remotely powerd braking valve
20 Auxiliary slewing coupling
21 Valve unit, swing axle interlock
22 Main slewing coupling
23 Steering cylinder
24 Driving
25 Emergency control valve
26 Stabilizer support pad ram
27 Load limit control valve
28 Variable duo pump HPR 160/160
29 Fan motor with protection valve
30 Thermostat valve
31 Proportional pressure valve
32 Hydraulic filter (only leakoil)
33 Omitted
34 Connection - Servo pressure

HYDRAULIC DIAGRAM 1804
INDRUSTRIAL - MASCHINES
from serial no. 284 S 301266

Schulungszentrum

Name : Sch.
Datum: 01.00



HYDRAULIC DIAGRAM 1804
INDRUSTRIAL - MASCHINES
from serial no. 284 S 301266

Schulungszentrum
Name : Ro.
Datum: 06.00

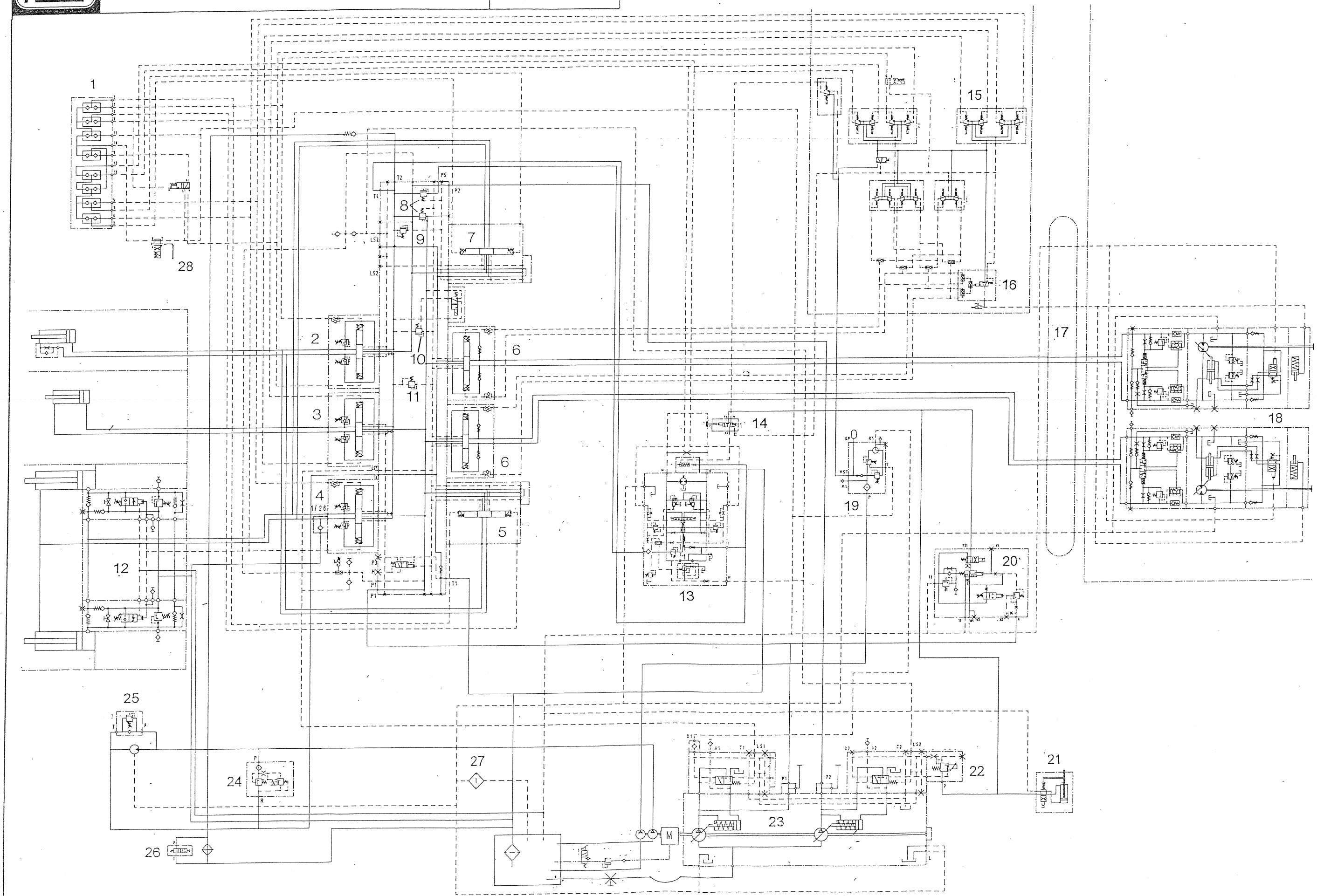
1	Plate valve Jib folding
2	Plate valve Bucket
3	Plate valve Lifting
4	Plate valve Grab rotating
5	Plate valve Dozer blade / Stabilizer
6	Plate valve Driving
7	Solenoid valve, pressure cut- in stage
8	Primary valve LS controlled
9	Pressure cut- off valve 2
10	Pressure cut- off valve 1
11	Pressure cut- in stage valve P1
12	Line repture protection valve
13	Slewing motor HMF 02 with integral multiple control
14	Shut- off valve slewing brake
15	Servo valve unit
16	Steering unit
17	Remotely powerd braking valve
18	Auxiliary slewing coupling
19	Valve unit, swing axle interlock
20	Main slewing coupling
21	Steering cylinder
22	Driving
23	Emergency control valve
24	Stabilizer support pad ram
25	Load limit control valve
26	Variable duo pump HPR 160/130
27	Fan motor with protection valve
28	Proportional pressure valve
29	Thermostat valve
30	Hydraulic filter (only leakoil)
31	Omitted

HYDRAULIC DIAGRAM 1804

from serial no. 284 R 301265

Schulungszentrum

Name : Pa.
Datum: 06.00



HYDRAULIC DIAGRAM 1804

from serial no. 284 R 301266

Schulungszentrum
Name : Ro.
Datum: 06.00

1 Shuttle valve unit (external summation and separation circuit)

2 Plate valve Jib folding 1

3 Plate valve Bucket

4 Plate valve Lifting 1

5 Plate valve Jib folding 2

6 Plate valve Driving

7 Plate valve Lifting 2

8 Primary valve LS controlled

9 Pressure cut- off valve 2

10 Pressure cut- off valve 1

11 Pressure cut- in stage P1

12 Line repture protection valve

13 Slewing motor HMF 02 with integral multiple control

14 Shut- off valve slewing brake

15 Servo valve unit

16 Brake release unit

17 Main slewing coupling

18 Final drive

19 Emergency control valve

20 Variable drive motor with automatic control

21 Speed regulator

22 Load limit control valve

23 Variable duo pump HPR 160/160

24 Proportional pressure valve

25 Fan motor with protection valve

26 Thermostat valve

27 Hydraulic filter (only leakoil)

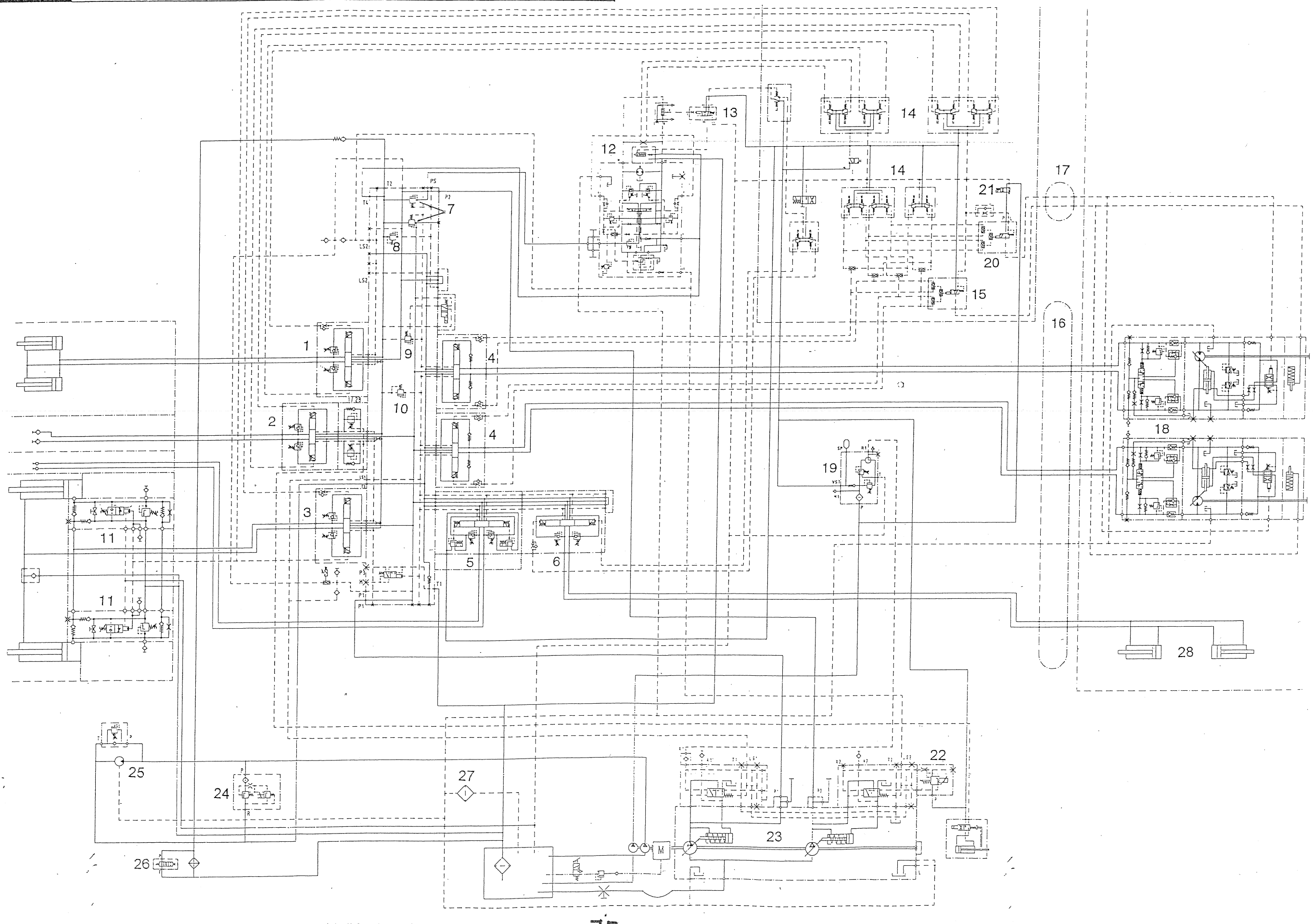
28 Connection - Servo pressure

ATLAS WEYHAUSEN

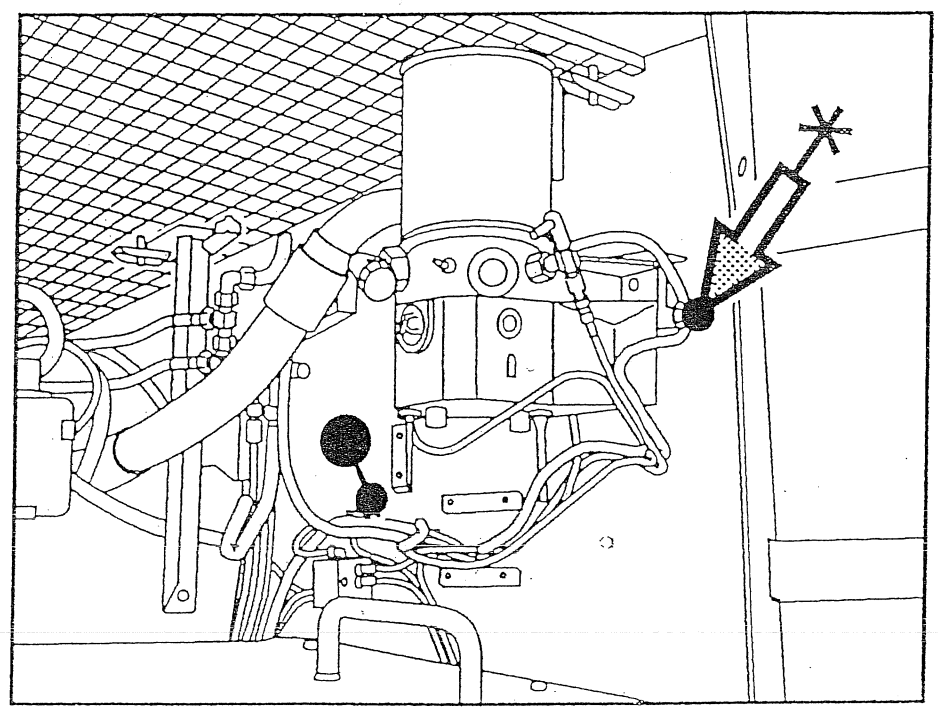
HYDRAULIC DIAGRAM 1804

with tower extensinos
serial no 284 R 301293

Schulungszentrum
Name : Ro.
Datum: 09.00



If the central lubrication systems fails, use the —● designated grease nipple.



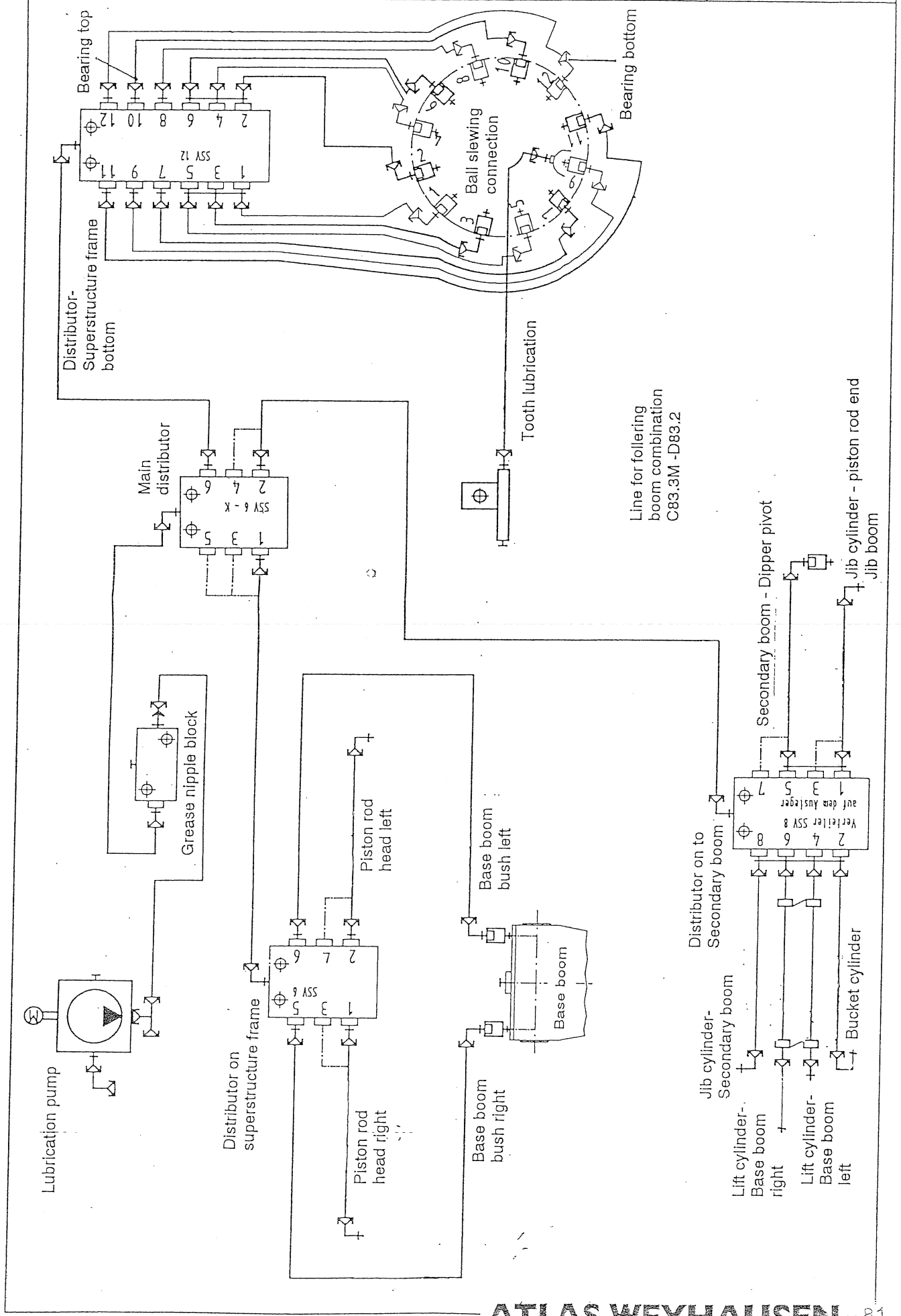
*⇨ Every 100 hours of operation with approx. 1,5 cartridges of special grease for slewing ring (Order No. 3620153). This greasenipple is larger than the others.

AUTOMATIC LUBRICATION SYSTEM

1804 – Serial: 284
with mono boom

Schulungszentrum

Name : Ro.
Datum: 06.00

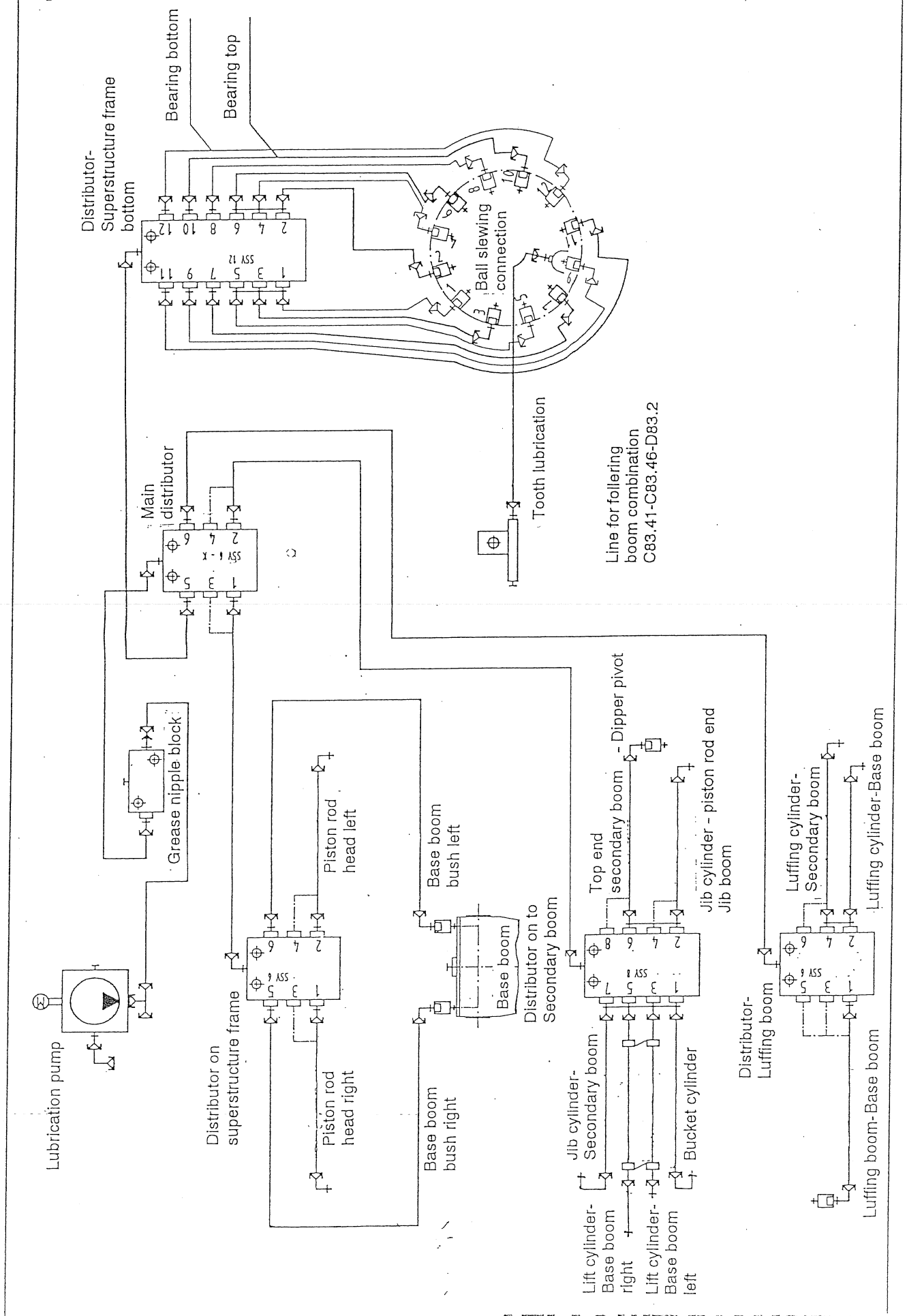


AUTOMATIC LUBRICATION SYSTEM

1804 – Serial: 284
with luffing boom

Schulungszentrum

Name : Ro.
Datum: 06.00



ATLAS WEYHAUSER

TEREX ATLAS

CONTENTS

1704 - 1804. All models

WELDING REPAIR INSTRUCTIONS.

Page

1 - 7 Procedures and techniques to be adopted when carrying out welding repairs on 1704 - 1804 machines.

Important Notice

When carrying out any electric arc welding on the machine the following procedure must be strictly adhered to, inorder to avoid accidental damage to electronic components.

1. **Do not** isolate or disconnect the batteries.
2. **Remove** the ignition key from the ignition switch.
3. **Unplug** the LINDE Load Limit Control Computer (LLC). This is the small aluminium enclosure located at the rear of the operators cabin. Take care that you only twist the outer ring of the plug and not the whole plug assembly.
   Twist the ring approx., ¼ turn to loosen and pull the plug.
4. **Ensure** the welding earth is good, and that it is as close to the area of welding as possible. **Do not** allow the earth to run through the Slew ring / Turntable bearing.

Take care when reinstalling the plug into the Linde (LLC) computer that you don't damage any pins.

Repair Instruction for Welded Assemblies

1. General

1.1 Area of application
1.2 General problems

1. Introduction

This regulation was created for ATLAS excavators and ATLAS cranes. In case welding is needed for repair, it is always important to obtain assistance from the Service organization. The repair should be discussed with the Service organization to clarify details and to eliminate difficulties in advance.

1.1 Area of application

This Repair Instruction offers replies to the most common and most basic questions arising when welding work has to be done in cases of damage. It can be used for damage on all components on either cranes or excavators; please note that you should consult the Service organization in certain cases.

1.2 General problems

You should be generally aware of the fact that an ever-increasing number of components in the crane, even in the excavator field, are manufactured from high-strength fine-grained structural steels. These materials should be treated specifically to prevent the material from losing its beneficial properties. Moreover, the components are charged by oscillations, and the material is loaded with the limit to reduce weight.
Any repair welding work should always be carried out, as far as possible, in a preferred welding position (trough location). This might require the dismounting of the component to be welded, unless the weld is of a minor importance.
The machines will arrive from service and will therefore be splashed with oil, dirty and also primed and painted.
On the next pages you will find a description how to cope with these difficulties.

Important note:
Only repairs which are completed with extreme care will be permanently lasting!

2. Damage evaluation

2.1 General
2.2 Course of crack

2. Damage evaluation

2. 1 General

If you find a crack in a component, start action immediately. For damage evaluation, it is better to first clean the surroundings of the damaged place with the help of a high-pressure cleaner. Then remove any paint or other coatings from the area of the crack. Also take off any parts which might be obstructive to inspection (pipes, hoselines, control boxes, electric cables etc.).

2.2 Course of crack

The course of the crack is vital for all repairs to be carried out accordlingly. To determine the crack head and tail end with maximum precision, use appropriate means (dye penetration test, magnaflux test or such). Prior to consulting the Service organization, determine the following criteria:
a) Crane / excavator serial no. b) Accurate crack position
c) Length of crack d) Crack in a weld or through the basic material

3. Consulting the Service organization

Discuss all items which are necessary for repair. The Service organization will determine if repair is possible.

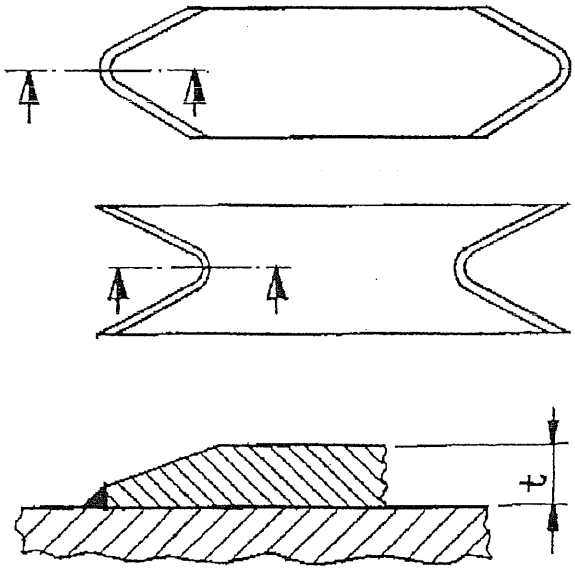
If the crack area is close to the seat of a bearing and negative impact on the associated fit must be expected from warping due to welding, repair may generally be out of question.

If this is not the case, the repair should be either completed according to this Repair Instruction for Welded Modules, or the Service organization will suggest special procedures fixed for the concerned type of damage.

Doubler of metal sheet
If a doubler of metal sheet is necessary from the point of view of the Service organization, you have to fix dimensions and material.

Material: similar to basic material
Sheet metal thickness: approximately 2/3 x basic material thickness
Shape: soft transitions to eliminate stiffness leaps

Drawings / Examples
chamfer as from 10 mm



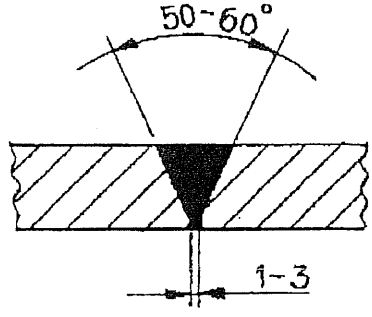
4. Preparing the repair

Thoroughly remove any traces of grease, oil, paint, moistness and other pollutions and coatings,since these would strongly affect the weld quality.

1. Always bore out the crack head and tail end. Bore hole diameters have to be adapted to sheet metal thickness:
   with t = 3 mm sheet metal thickness -bore hole 5 mm
   with t > 10 mm sheet metal thickness -bore hole 10 mm

2. Grind the crack internally in the shape of a V over its whole length.
   Opening angle should be between 50 and 60 degrees.

Drawing



You can also produce the groove by means of a gouging blowpipe or groove electrodes. Here gain, groove flanks should be clean and smooth, ground with the help of an angle grinder, if necessary.

If you wish to carry out the repair in the open, protect the welding area from atmospheric exposure (wind, rain, snow).

Preheating the welding area
Preheating is required if:

a) workpiece temperature is lower than 5 °C when the welding process is started.
b) the design of the component for repair is very rigid.
c) components of fine-grained structural steel of a wall thickness exceeding 10 mm are used or repaired respectively. Preheating temperature abt. 150 -200 °C
d) components from S355 J2G3 of a wall thickness exceeding 20 mm Preheating temperature abt. 120 °C

5. Qualification of the welding personnel

Only welders with proof of qualification are authorized to carry out repair welding work!
Welding qualification acc. to DIN EN 287 Part 1

The choice of the welder should be based on the basic material, welding method, welding position and other criteria. Have an experienced welder carry out the repair to ensure that the welding work is solid and of a high quality.

Qualified welders

111 - welding process: manual arc welding

135 - welding process: Active gas metal-arc welding (MAG)

P - sheet metal

BW - butt welding

FW - fillet weld

WO1 - material group: plain carbon steel

WO3 - material group: fine-grained structural steels, upper yield point $Ó_{ch}$ > 355N/mm2

wm - with filler metal

t - sheet metal thickness

PF - welding position: rising

ss - single-fillet welding

nb - welding without weld pool securing

6. Selecting the filler metal

The filler metal depends on the basic material. As most components nowadays consist of high-strength fine-grained structural steels, you also have to use corresponding welding rods or stick electrodes. The manufacturer's instructions have to be observed imperatively:

such as current type and polarity
Back-drying
Current intensity
Welding position

Welding wire selection

Basic material		**Welding wire**		
new name	former name.	new name	former name	Welder acc. DIN EN 287/1
S235 J2G3	ST37-3	G4 Si 1	SG 3	
S355 J2G3	ST52-3	G4 Si 1	SG 3	135 PBW W01 wm t10 PF ss nb
StE 460	-	G4 Si 1	SG 3	
StE 550	-	NiMo	-	135 PFW W03 w m t1 0 PF ss nb
StE 690	-	NiMo	-	

Stick electrode selection

Basic material		**Stick electrodes DIN EN 499**	
new name	former name		Welder acc. DIN EN 287/1
S235 J2G3	ST37 -3	E35 4 B 42 H5	
S355 J2G3	ST52-3	E42 2 RB 32 H10	111 PBW W01 Bt10 PF ss nb
StE 460	-	E42 2 RB 32 H10	
StE 550	-	E50 4 B 42 H5	111 PFW W03 Bt10 PF ss nb
StE 690	-	E69 6 Mn NiCrMo B 42 H5 prEN 757	

Stick electrodes should be preheated prior to being processed.
Preheating temperature: 220 -250 °C

7. Repair sequence

When all preparatory work is finished, start with the repair welding work. The following criteria have been observed:

a) material quality and sheet metal thickness
b) component and/or preheating temperature
c) welders with appropriate qualificiations
d) filler metal selection according to present basic material
e) processing instructions supplied by the filler metal manufacturer
f) notes and rules of the Service organization

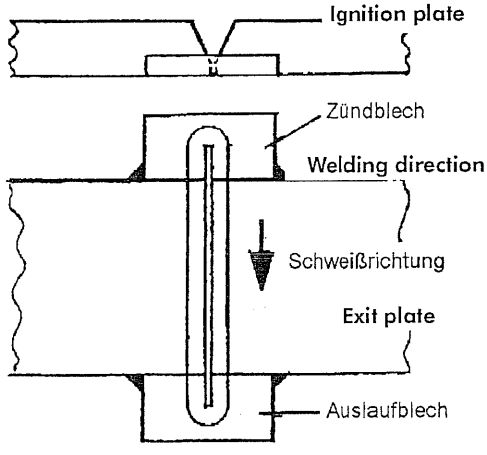
When treating fine-grained structural steels, which are most commonly used, it is important to weld with low drawing energy, ie you should weld thin and narrow welds. Wide welds will allow a large application of heat and thus reduce the mechanical strength properties of the basic material.

If the crack is going as far as to the material outside edge, you have to ensure with an ignition plate that approach errors are not situated within the weld but in the ignition plate which you remove afterwards. This plate should beground and must not be knocked off in order to prevent the material from tearing.

Welding should be done:

- from the outside towards the inside
- shear welds prior to tension welds prior to compression welds
- always in the most beneficial welding position (descending wels are prohibited)
- with extreme care

ignition plates + exit plates (drawing)



8. Follow-up work

Remove the ignition plate without damaging the basic material. Then grind the weld end to remove notches.

Welding work with removal of notches are especially important for transition areas from the weld to the basic material.

If the Service organization has recommended the attachment of a reinforcement metal sheet, weld this one on, making sure that a minimum amount of air remains between the metal sheets during tacking.

If no crack is visible any more, clean the repaired area and apply some appropriate antirust agent.

TEREX ATLAS

CONTENTS

1704 - 1804. Electric - Electronic
372,373,282 & 283 series (1993 - 1999)
373 & 284 series (1999 onwards)

Page	
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2	Symbols
3	Cable number codes
4	Jump starting proccedure
5	Description of ATLAS computer panel (rechner)
6	Description of electronic boards 1 to 4 (platine)
7	Identification of the Linde load limit control computer (LLC)
10	Linde load limit control. type and part numbers Not to be used on 374 and 284 series.
11	Explanation of the EPROM
12	Encoding cable coneections
13-14.1	Encoding switch
15	Water temperature sensor
16	Fluid level sensors

Page

18 Engine oil pressure switch

19 100 bar brake pressure switch

20 Emergency control switch, (374 & 284 series only)

21 Pressure switch. (axle lock, and travel indication)

Sheet
1-7.2 Electrical construction drawing (baushaltplan)
for 1704 -1804, 372, 373, 282 & 283 series
(1993 - 1999)

Electrical flow drawings (stromlaufplan)
For board (platine 1 to 4)
1704 -1804, 372, 373, 282 & 283 series
(1993 - 1999)

----------DIVIDER PAGE----------

Page
1 Description of electronic boards 1 to 4 (platine)
As fitted to 374 & 284 series. (1999 onwards)

Sheet
1-7 Electrical construction drawing (baushaltplan)
for 1704 -1804, 374 & 284 series
(1999 onwards)

Electrical flow drawings (stromlaufplan)
For board (platine 1 to 4)
1704 -1804, 374 & 284 series
(1999 onwards)

Code letters

Operating equipment

A	Assemblies
B	Converters
D	Memories
E	Lights
F	Protective equipment
G	Alternators, power suppliers
H	Signalling devices
K	Relays
M	Motors
R	Resistors
S	Switches
V	Diodes, LEDs
X	Terminal, plug connections
Y	Electrically-operated mechanical equipment

Examples

A1	= Display zone
B1	= Engine oil temperature sensor
D12	= Input modules
E1	= Headlight, front left
F1	= Main fuse (160A)
G1	= Battery
G3	= Alternator
H1	= Operating hours counter
H2	= Buzzer
K1	= Input relay
M2	= Starter
R1	= R = 2.21 Kilo Ohm
S1	= Main battery switch
S3	= Ignition starter switch
V2	= Diode
V3	= LED
X1/13	= Terminal
X5/1	= Plug connections
Y	= Solenoid valve

Terminal designations

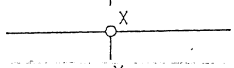
30	Permanently positive
31	Negative
15	Ignition
19	Ignition starter switch, preheating
17	Ignition starter switch, preheating when starting
50a	Ignition starter switch, starter activation
58	Parking light
58R	Parking light, right
58L	Parking light, left
56	Driving light
56a	High-beam light
56b	Low-beam light
R	Turn indicator, right
L	Turn indicator, left
54	Brake light
B+	Alternator, battery + (terminal 30)
D+	Alternator for charge monitoring (engine stationary = negative /engine running = positive)
WK	Warning contact for telltales, e.g. oil pressure/oil temperature
G	Sensor contact for display e.g. oil pressure/oil temperature
86	Relay activation +, coil
85	Relay activation -, coil
30	Relay switch input
87	Relay switch output, make contact
87a	Relay switch output, break contact
49	Flasher relay, input
49a	Flasher relay, output
C	Flasher relay, check
53a	Windscreen wiper motor, input
53	Windscreen wiper motor, 1st stage
53b	Windscreen wiper motor, 2nd stage
31b	Windscreen wiper motor, limit-position shutdown

Symbols

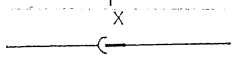
Housing or assembly disconnection

Line, general


Permanent connection

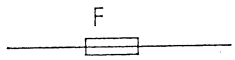


Detachable connection

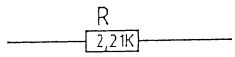


Plug-in connection

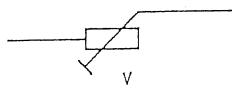

Earth (ground) connection

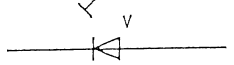


Fuse

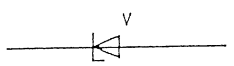


Resistance e.g. R = 2.21 kilo Ohm

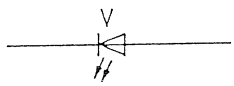

Variable resistance



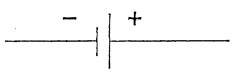
Diode



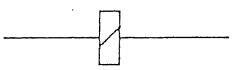
Z-type diode

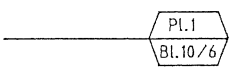


Light-emitting diode (LED)

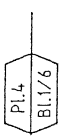


Power supply source, e.g. battery

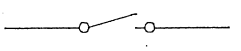

Relay or magnetic coil

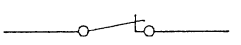


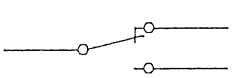
Note: continued on another page,
e.g. P1.1 = board1/B1.10 = page 10/6 = section 6



Note: continued on another page,
from board to board via D-sub
e.g. P1.4 = board 4/Bl.1 = page 1/6 = section 6


Make contact


Break contact


Changeover contact


Manual momentary switch actvation


Manual maintain contact switch activation


Key switch activation


Mechanical activation, e.g. V-belt switch


Electronic activation, e.g. proximity switch



Temperature activation



Pressure activation

Line number codes

Circuit diagram

Example 1:

5 - 31 Q6

06 = Cross-section 2,50 mm²
31 = Pin 31 on printed circuit board
5 = Plug X5 on printed circuit board

Example 2:

0 - 28 Q3

Q3 = Cross-section 0,75 mm²
28 = Consecutive numbers without reference
0 = No direct connection to printed circuit board

All lines are „yellow“,
except negative lines (31) which are „white“.

Line cross-sections

Q2 = 0,50 mm²
Q3 = 0,75 mm²
Q4 = 1,00 mm²
without Q = 1,50 mm²
Q6 = 2,50 mm²
Q7 = 4,00 mm²
Q9 = 6,00 mm²
Q10 = 10,00 mm²
Q12 = 25,00 mm²
Q15 = 50,00 mm²

JUMP STARTING / STARTING WITH A FLAT BATTERY

Schulungszentrum
Tafel:
Name: Ro.
Datum: 08.97

The following rules must be observed in order to protect installed electronic components:

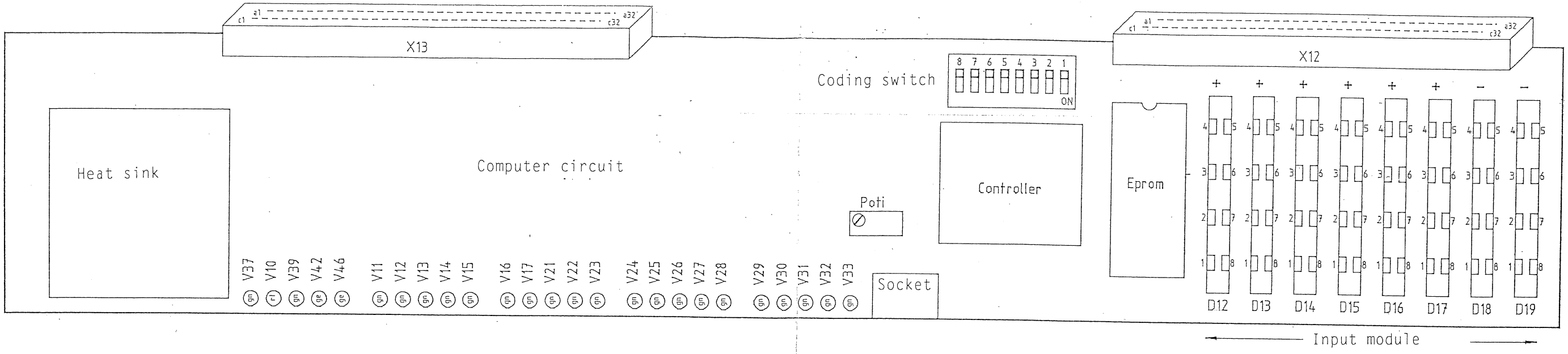
- Chargers with starting aid (220 - 240 V mains units): only use chargers with a controlled and stabilised output.
- If the excavator is to be started by another vehicle using jump leads, to avoid voltage peaks the other vehicles engine should not be running.
- When jump starting, make sure the leads are connected up to the correct poles, otherwise the excavators electronic system could be damaged.
- When jump starting, voltage should never exceed 24 Volt.
- Use a charger with controlled and stabilised output to charge batteries. In addition, disconnect batteries from vehicles electrical system.
- When quick-charging the batteries, open the cell cover to prevent batteries from exploding.
- Make sure the specified battery water level is maintained. If it needs topping up, use distilled water only.
- Check charge state, i. e. acid density, if possible.
- Never run the engine with the batteries disconnected.
- Never activate the battery disconnecting switch with the engine running, as voltage peaks could damage printed circuit boards.

ELECTRICS / ELECTRONICS - 1992 EXCAVATOR GENERATION

" Modified input module "

Schulungszentrum
Tafel:
Name: Ro.
Datum: 09.94

DESCRIPTION OF LIGHT-EMITTING DIODES (LED) - COMPUTER BOARD



Inputs / outputs

V37	+ Output	Precision control (1304)	>	Solenoid valve	Y12
V10	+ Output	Computer fault (rt)	>	Display zone	A1
V39	+ Output	Bulb monitoring	>	Display zone	A1
V42	+ Input	Fault (GLR) (ge)			
V46	+ Input	Cylinder-head temp. = permanent light (ge)	<	Control unit (GLR)	A4
		Hydraulic fluid temp. = flashing light (ge)	<	Control unit (GLR)	A4
V11	+ Output	Buzzer	>	Buzzer	H2
V12	+ Output	Windscreen washer pump	>	Relay	K15
V13	+ Output	Intermittent windscreen wipers	>	Relay	K13
V14	+ Output	Central lubricating pump	>	Relay	K12
V15	+ Output	Display zone test	>	Display zone	A1
V16	- Output	Automatic idling (1304-1604)	>	Relay	K56
V17	Spare				
V21	+ Output	Additional fuel pump	>	Relay	K10
V22	+ Output	Preselector switch, left, 1st stage	>	Relay	K28
V23	+ Output	Preselector switch, left, 2nd stage	>	Relay	K29
V24	+ Output	Preselector switch, left, 3rd stage Refuelling pump	>	Relay	K30
V25	+ Output	Preselector switch, left, 4th stage	>	Relay	K31
V26	+ Output	Grab rotation, anti-clockwise	>	Relay	K24
V27	Spare				
V28	+ Output	Horn via control lever	>	Relay	K9
V29	+ Output	Preselector switch, right, 1st stage	>	Relay	K32
V30	+ Output	Preselector switch, right, 2nd stage	>	Relay	K33
V31	+ Output	Preselector switch, right, 3rd stage	>	Relay	K34
V32	+ Output	Preselector switch, right, 4th stage	>	Relay	K35
V33	+ Output	Grab rotation, clockwise	>	Relay	K2534

Inputs

D12
+
1 = Turn indicator, left
2 = Turn indicator, right
3 = Horn via control lever
4 = Safety system for reversing
5 = Grab rotation, clockwise
6 = Kick-down
7 = Intermittent windscreen wipers
8 = Grab rotation, anti-clockwise

D13
+
1 = Two-way excavator, light
2 = Two-way excavator, additional lifting power
3 = Two-way excavator, slew restriction, anti-clockwise
4 = Two-way excavator, slew restriction, clockwise
5 = Two-way excavator, pressure loss
6 = Two-way excavator, fault
7 = Two-way excavator, track rollers, rear
8 = Two-way excavator, track rollers, front

D14
+
1 = Flame pre-heat system
2 = Two-way excavator
3 = Main-beam light
4 = Running engine
5 = Rear fog lights
6 = Reverse travel
7 = Work-area lights
8 = Rotating beacon

D15
+
1 = Forward travel
2 = Crawling gear
3 = Automatic idling (1304-1604)
4 = Pressure cut-in stage (1304-1604)
5 = Stabiliser, front right
6 = Stabiliser, front left
7 = Axle locking, via brake
8 = Axle locking, continuous operation

D16
+
1 = Stabiliser, rear left
2 = Stabiliser, rear right
3 = Dozer blade
4 = Overload reached
5 = Restricted lifting/lowering
6 = Engine speed control
7 = Slew restriction "ON"
8 = Overload "ON"

D17
+
1 = Hammer
2 = Trench cutter
3 = Air conditioning
4 = Seat heating
5 = Safety system for reversing
6 = Starting procedure (terminal 50a)
7 = Heated mirror
8 = Independent heating

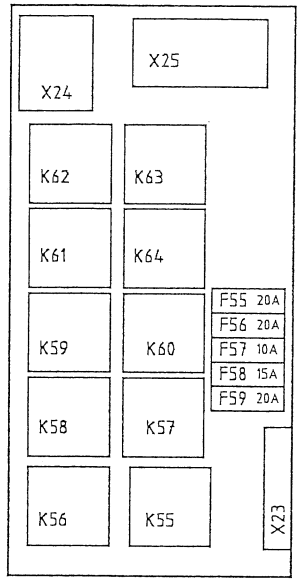
D18
-
1 = Attachments, left
2 = Attachments, right
3 = Pressure cut-in, automatic idling (1304-1604)
4 = Central lubricating system
5 = Filter contamination
6 = Handbrake
7 = V-belt
8 = Engine oil temperature (terminal WK)

D19
-
1 = Engine oil level
2 = Monitoring central lubrication
3 = Tank preload
4 = Hydraulic fluid filter
5 = Refuelling pump "ON"
6 = Spare
7 = Engine oil pressure
8 = Hydraulic fluid level

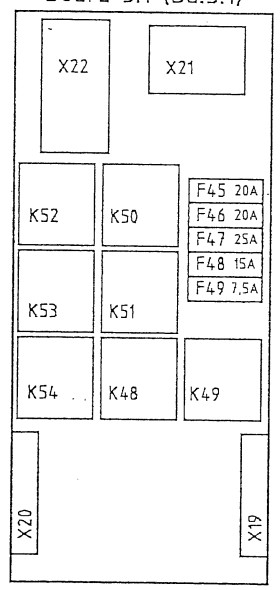
GENERAL DISCRIPTION
electronic board 1 to 4

Schulungszentrum
Tafel:
Name: Br.
Datum: 11.96

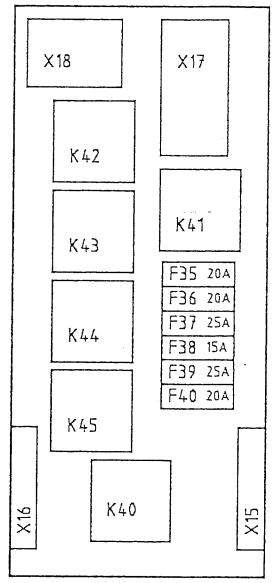
Board 4 (Bd.4)



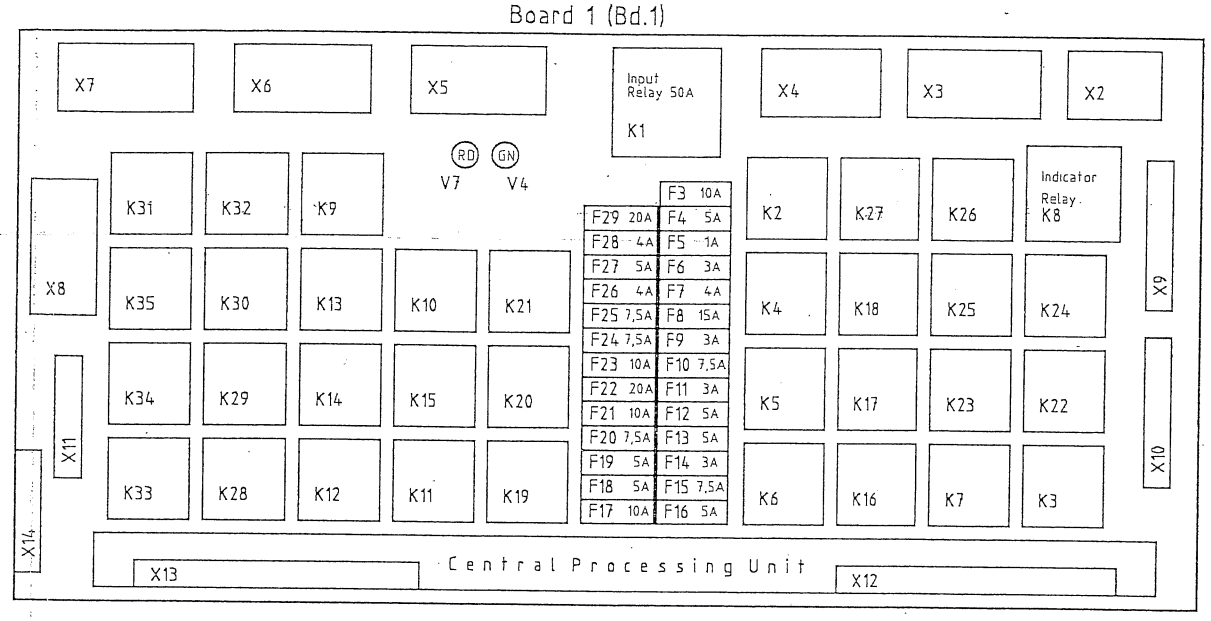
Board 3.1 (Bd.3.1)



Board 2.1 (Bd.2.1)



Board 1 (Bd.1)



Fuse

F55 = 20A T.30 Input Fuse
F56 = 20A T.30 Input Fuse
F57 = 10A T.15 Automatic Idling (1304-1604)
Pressure Connect. Step
electric power window
Reversing Safety Device
F58 = 15A T.15 Rear Window Wiper
Warning Beacon
F59 = 20A T.15 Operation Light

Relay

K55 = Input Relay
K56 = Automatic Idling
K57 = Pressure Connection Step
K58 = Electric Window
K59 = Electric Window
K60 = Reversing Safety Device
K61 = Rear Window Wiper
K62 = Warning Beacon
K63 = Operation Light Front
K64 = Operation Light Rear

Fuse

F45 = 20A T.30 Input Fuse
F46 = 20A T.30 Input Fuse
F47 = 25A T.30 Auxiliary Heating
F48 = 15A T.15 Seat Heating
Seat Adjustment
F49 = 7.5A T.15 Vario Cabin
Cabin Lift
Emergency Movement
Mirror Heating
Mirror Adjustment

Relay

K48 = Vario Cabin "Backward"
K49 = Vario Cabin "Forward"
K50 = Input Relay
K51 = Seat Heating
K52 = Emergency Movement
K53 = Vario Cabin / Cabin Lift "Up"
K54 = Vario Cabin / Cabin Lift "Down"

Fuse

F35 = 20A T.30 Input Fuse
F36 = 20A T.30 Input Fuse
F37 = 25A T.17 or 19 Glow System
F38 = 15A T.15 Protection Ventilation System
F39 = 25A T.15 Fuel Filter Heating
, Oil Pressure Heating
F40 = 15A T.15 Air Conditioning System

Relay

K40 = Input Relay
K41 = Protection Ventilation System
K42 = Air Conditioning System
K43 = Fuel Filter Heating
K44 = Oil Pressure Heating
K45 = Oil Pressure Heating

ATTENTION !!

To prevent damage to the electrical installation, note the OBSERVE !

- Electric connections must be disconnected and connected be currentless, i.e. Ignition "Off"
- Check correct Amperage (Damage to Boards) when changing fuses
- All fuses must be plugged in at all times (fuse monitoring)
- Welding: Provide good earth connection as close as possible to welding point and Do Not Disconnect Batteries (Diconnect Control Device LLSC-Linde)
- Disconnect batteries from electrical system while using charger
- In case of external ignition please check if power source is stable
- Operate only with Digital Multimeter (EDP: 3607862) or Voltage Tester (EDP: 3607872) (No Test Lamp)

Fuse

F1 = 80A T.30 Main Fuse (in Battery Case)
F2 = not present
F3 = 10A T.30 Input Fuse "Board 1"
F4 = 5A T.15 Input Fuse "Central Processing Unit"
F5 = 1A T.15 Running Time Meter / Oil Level
Water Level
F6 = 3A T.15 Display
F7 = 4A T.15 (24 Volt) Voltage Transformer - Radio
F8 = 15A T.15 Cigarette Lighter / Interior Illumination
F9 = 3A T.15 Switch Illumination
F10 = 7.5A T.30 Timer / Sidelights (58)
F11 = 3A T.58L Left Sidelights
F12 = 5A T.56B Left Dipped Headlights
F13 = 5A T.56A Left Main Beam
F14 = 3A 58R Right Sidelight
F15 = 7.5A T.56b Right Dipped Headlight
F16 = 5A T.56a Right Main Beam
F17 = 10A T.15 Main Beam (56)
F18 = 5A T.15 Brake Light (54)
F19 = 5A T.15 Flashing Indicators (l, r)
F20 = 7.5A T.30 Hazard Warning Lights
F21 = 10A T.15 Horn / Sound Signal / Engine Stop
Supplementary Feed Valve
F 22 = 20A T.15 Hydraulic Oil Cooling Fan
Central lubrication
F23 = 10A T.15 Windscreen Wiper Front
Windscreen Washer
F24 = 7.5A T.15 Heater Fan
F25 = 7.5A T.15 Gear Shifting 1.2. Gear
Gear Shifting Forward, Backward
Creep Speed (By-pass Control)
Motor Adjustment
Anti-theft Device
F26 = 4A T.15 Full Floating Axle Inhibition
Turn grab "left" a. "right"
Claw Control (Preselection)
F27 = 5A T.15 Overload Display / Fine Control
Pressure Connect. Step
F28 = 4A T.15 LLSC (Load Limit Sensing Control)
F29 = 20A T.15 Additional Functions, e.g.
Refuel Pump

Relay

K1 = Input Relay 50A
K2 = Starter Safeguard Lock
K3 = Voltage with Running Engine
K4 = Sidelight
K5 = Dipped Headlight
K6 = Main Beam (must be plugged in at all times)
K7 = Brake Light
K8 = Indicator Relay
K9 = Horn / Sound Signal
K10 = Supplementary Feed Valve (Injection Pump)
K11 = Hydr. Oil Cooling Fan
K12 = Pump Central Lubrication
K13 = Disconnection Wiper with Front Window "Open"
K14 = Wiper Front
K15 = Pump Windscreen Washer
K16 = Solenoid Valve 2. Gear
K17 = Solenoid Valve 1. Gear
K18 = Solenoid Valve Backward
K19 = Solenoid Valve Forward
K20 = Solenoid Valve Creep Speed (By-pass Control)
K21 = Solenoid Valve MV (Motor Adjustment)
K22 = Solenoid Valve Full Floating Axle Inhibition
K23 = Two-way Digger
K24 = Solenoid Valve Turn Grab "Left"
K25 = Solenoid Valve Trun Grab "Right"
K26 = free
K27 = Solenoid Valve Pres. Connec.
K28 = 1. Step Additional Function L
K29 = 2. Step Additional Function L
K30 = 3. Step Additional Function L, e.g. Refuel Pump
K31 = 4. Step Additional Function L
K32 = 1. Step Additional Function R
K33 = 2. Step Additional Function R
K34 = 3. Step Addit. Functi. R, e.g. Switch over Foot Pedal
K35 = 4. Step Additional Function R

Light Emitting Diodes (LED)

V4 = Input Monitoring Permanent Plus (30)
V7 = Fuse Monitoring F1 (80A)

4290791

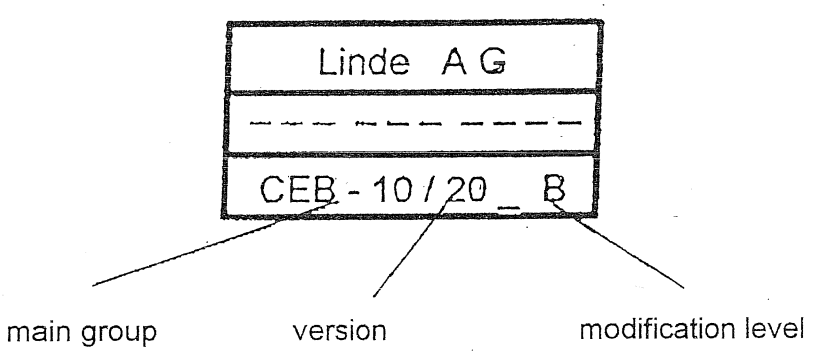
Identification of the Linde electronic box.

There are two Linde electronic boxes for all excavator types.

For the excavator types 1004 up to 1604 the electronic box CEB-12/... is used.

For the excavator types 1704 and 1804 the electronic box CEB-10/... is used.

The different controls and the modification levels can be noted from the nameplate.



Any indications not intended for the identification are only being started by a line. Additionally the Linde boxes are being provided with a further nameplate from the second half of the year 1994 on which the ATLAS EDP No. is mentioned.

LINDE - LIMIT POWER CONTROL SYSTEM

1704 - 1804

Schulungszentrum
Name : Ro.
Datum: 10.99

The Linde limit power control system CEB - 10 / .... is the control for normal and industrial design of the excavator types 1704 and 1804.
The old design of the Linde power controlled system CEB 10 / 03 could only be used for normal design of excavator types 1704 and 1804.
For the industrial design or special control collect CEB 10 / 17 was required.
The limit power control system will accordingly be extended for new excavator types provided for the market .
On the name plate of the Linde electronic box there is stated the modification level and these useability by means of the last letter of the indication.

Main group Version	Modification level	N		I		HT.	CT.	Remarks
		LK	WK	LK	W K	°C	°C	
CEB - 06 /17 3633125								Special control for carrier units
CEB - 10 /17 3643423				X		80°	190°	Special control for industrial units
CEB - 10/03 2694820	- AB	X				80°	190°	Warm - up period measured through hydraulic oil temperature setting function indication in. speed 950 rpm.
CEB - 10/03 2694820	- D	X				80°	190°	Cold starting aid and warm - up period measured through cylinder head temperature setting function indication min. speed 1030 rpm.
CEB - 10/03 3669489	- E	X				95°	190°	Modification of hydraulic oil temperature
CEB - 10/20 3669912	- A	X		X		95°	210°	Modification of the cylinder head temperature summary of the normal and industrial design
CEB - 10/20 3663596	- B	X	X	X		95°	210°	Also for normal design with water cooled engine
CEB - 10/20 3670595	- C	X	X	X	X	95°	210°	Extend for all excavator types with control system CEB - 10/ ...
CEB - 10/20	_ D	X	X	X	X	95°	210°	Starting gradient has been changed for tracked excavator with high pressure controlled drive motor

N = Normal design
I = Industrial design
Ht = Hydraulic oil temperature

LK = Air cooled
WK = Water cooled
Ct = Cylinder head temperature

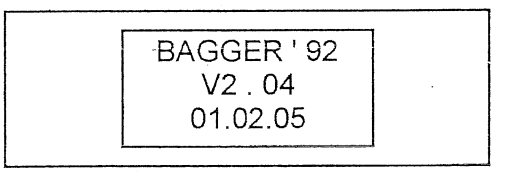
Label and use

The EPROM is an electronic module that is used to program and store the complete electronic control program.
There are currently five different electronic control systems that require such an EPROM and the program that goes with it.

Each control system is equipped with an appropriate EPROM version on the computer circuit board that goes with it.

There is a sticker on the EPROM that shows which control system it is programmed for.

Example: EPROM for the excavator electronics



Bagger ' 92	=	Excavator with electronics
V 2	=	Version 2
0 4	=	Fourth change
01.02.95	=	Date of change (01 Feb. 95)

Version	Program	Location
V 1	Track roller control for the road/rail excavator (old version, type reference 164 s)	Computer circuit board on the superstructure
V 2	Excavator electronics control system (new generation)	Computer circuit board 1
V 3	Special control system for stationary excavator with electric motor	Computer circuit board 1
V 4	Track roller control for the road/rail excavator (ZW - 2 generation)	Computer circuit board 2.1 in conection board 5
V 5	Track roller control for the road/rail excavator (ZW - 3 generation)	Computer circuit board 2.1 in conection board 5.1
V6	Oil volume and pressure regulation	Computer circuit board 8
V7	Track roller control for the road/rail excavator (ZW - 4 generation)	Computer circuit board 2.2 in conection board 5.1

Excavator type coding CEB – 10/...
Coding is performed by inserting relevant cables (0-23, 0-24, 0-25 and 0-27) in terminal block X1 at cable duct on negative potential.

Encoding is effected by placing the relevant cables (0-23, 0-24, 0-25,and 0-27) in cable duct.

Excavator type / Encoding bridge	1704				1804				1704		1804	
	M		R		M		R		M	R	M	R
	N	I	N	I	N	I	N	I	N+I			
	LK								WK/6			
X42/B auf X42/x	0-23	0-23	—	—	0-23	0-23	—	—	0-23	—	0-23	—
X42/B auf X42/y	—	—	—	—	0-24	0-24	0-24	0-24	—	—	0-24	0-24
X42/B auf X42/z	—	0-25	—	0-25	—	0-25	—	0-25	—	—	—	—
X42/B auf X42/h	—	—	—	—	—	—	—	—	0-27	0-27	0-27	0-27

M = Wheeled excavator
R = Tracked excavator

N = Standard design
I = Industrial desigh

LK = Air cooled engine
WK = Water cooled engine

Function of the encoding switch

With the EPROM V2.04, from 01 Feb. '94 on, the encoding switch on the computer circuit board has been integrated into the excavator control program.

Make sure that the encoding switch is set in accordance with the EPROM program.
There is a sticker near the encoding switch that shows the proper settings.
The information on the sticker is always based on the initial configuration of the computer circuit board.

EPROM EDP No.	Function of the encoding switch		
V2 . 04 01.02.94 3654959	Switches 1-6: Switch 7: Switch 8:	Not used Lubrication system without monitoring Lubrication system with monitoring Air-cooled engine Water-cooled engine	 = OFF = ON = OFF = ON
V2 . 05 30.08.94 3672871	Switches 1-7: Switch 8:	Not used Air-cooled engine Water-cooled engine	 = OFF = ON
V2 . 06 05.01.95 3688879	Switches 1-6: Switch 7: Switch 8:	Not used Oil-cooler fan without cleaning function Oil-cooler fan with cleaning function Air-cooled engine Water cooled engine	 = OFF = ON = OFF = ON
V2 . 07 16.03.95 4600684	No change. Functions as described for V2 . 06		
V2 . 08 14.06.95 4603756	No change. Functions as described for V2 . 06		
V2 . 09 28.09.95 4607658	No change. Functions as described for V2 . 06		
V2 . 10 10.11.95 4611847	No change. Functions as described for V2 . 06		
V2 . 11 11.06.96 4641821	No change. Functions as described for V2 . 06		

THE ENCODING SWITCH
EPROM V2

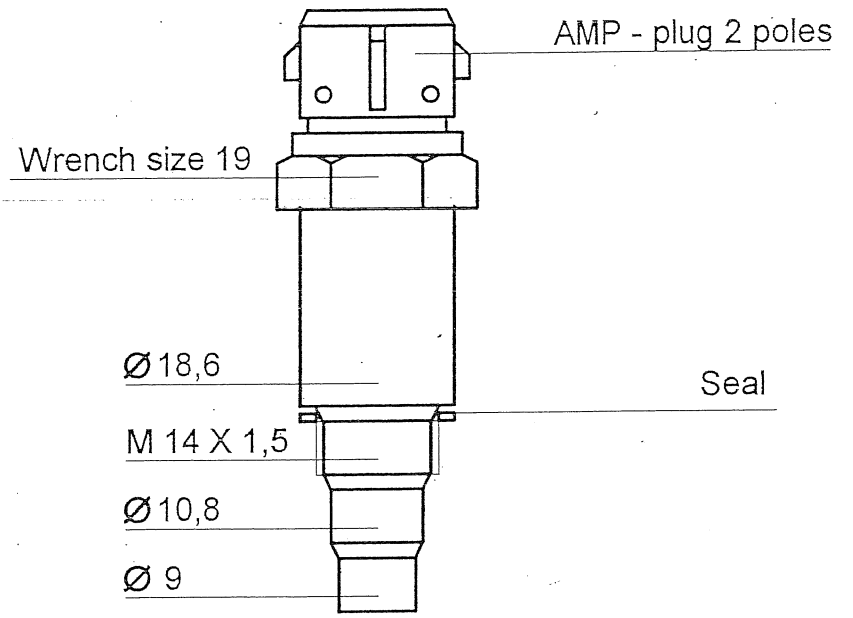
Version/ change status Date of change EDP No.	Changes and program extensions	Function of the encoding switch
V 2.11 06.11.96 4641821	Central lubrication system Lubrication time shortened from 8 min. to 4 min. For excavators with water-cooled engines, the pressure switch contact at the hydraulic brake system's pressure reservoir has been turned to maintain the cable - break display function.	Switches 1-6: not used Switch 7: Fan without cleaning function = OFF Fan with cleaning function = ON Switch 8: Air-cooled engine = OFF Water-cooled engine = ON
V 2.12 4658933 20.02.97	Automatic idle speed system for excavators 1004 up to and including 1604: The time for the autom. idle engine speed system has been shortened from 9 sec. to 5.5 sec.	Switches 1-6: not used Switch 7: Fan without cleaning function = OFF Fan with cleaning function = ON Switch 8: Air-cooled engine = OFF Water-cooled engine = ON
V 2.13 28.07.97 4670871	If the signal " pressure in pressure accumulator too low " comes on (Stop - lamp), the buzzer sounds only when diesel engine is running.	Switches 1-6: not used Switch 7: Fan without cleaning function = OFF Fan with cleaning function = ON Switch 8: Air- cooled engine = OFF Water cooled engine = ON
V 2.14 17.12.98 5623376 Attention	This Eprom can be used for computer REC. 1 and REC. 1.2 (electromagnetic compatibility is safer). Eprom - version V2.00 to V2.13 cannot be used for computer REC 1.2.	Switches 1-6: not used Switch 7: Fan without cleaning function = OFF Fan with cleaning function = ON Switch 8: Air- cooled engine = OFF Water cooled engine = ON

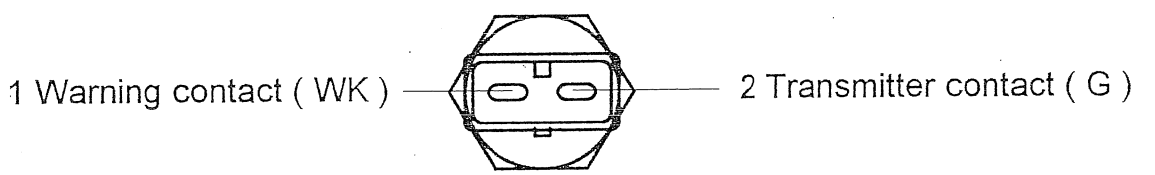
Version / change status Date of change EDP No.	Changes and program extensions	Function of the encoding switch
V 2.15 06.04.99 5628508	The additional preselection of the direction of travel, by means of the pushbuttons in the left pilot control lever, can be turned from a pushbutton function into a switch function by changing coding switch 1. When in switch function, the direction of travel is displayed in the display panel. Thermostatically controlled hydraulic fluid cooling. The hydraulically driven fan motor is controlled via a proportional valve and an additional eiectric fan is activated from a hydraulic fluid temperature of approx. 50° C onwards. Malfunction message in the bar display for engine oil pressure has been changed. in case of interruption only lower bar. In case of short circuit all bars. Engine oil or water temperature indicator. There were undesired changes in the above mentioned temperature indicators with Eprom V2.14 i.e. too high a temperature was indicated. This malfunction has been eliminated.	Switch 1:Master control activated by pushbutton in left pilot control lever. pushbutton function = OFF switch function = ON Switch 2: Thermostatically controlled fan activation. without = OFF with = ON Switches 3 - 6 = free Switch 7: fan without cleaning function = OFF fan with cleaning function = ON Switch 8: air - cooled engine = OFF water - cooled engine = ON
V 2.16 01.10.99 5634200	The option "automatic slewing brake" can be activated by means of the electronics. With coding switch 2 in position ON (temperaturecontrolled fan control) the control of relay K 35 was mistakenly blocked by the pilot control lever during change V2.15. This malfunction has been eliminated.	The allocation of coding switches 1 - 8 remains unchanged.

Sensor for watertemperature

Schulungszentrum
Tafel:
Name: Br.
Datum: 03.96

This sensor for watertemperature is valid for all watercooled engines





Tightening torque max. 20 Nm

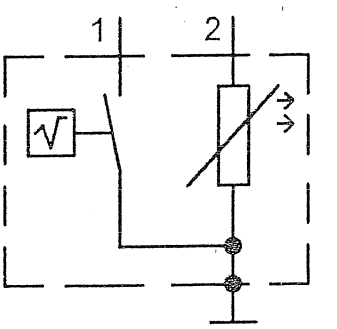
Switch power output (without induced current) max. 3 W

Nominal voltage 6 - 24 V DC

Switching point (WK) at 118°C
Switching off point max. 5°C below switching on point
Closing with increasing temperature

EDP - No. 3667976

Wiring diagram



Resistance values at the following temperatures

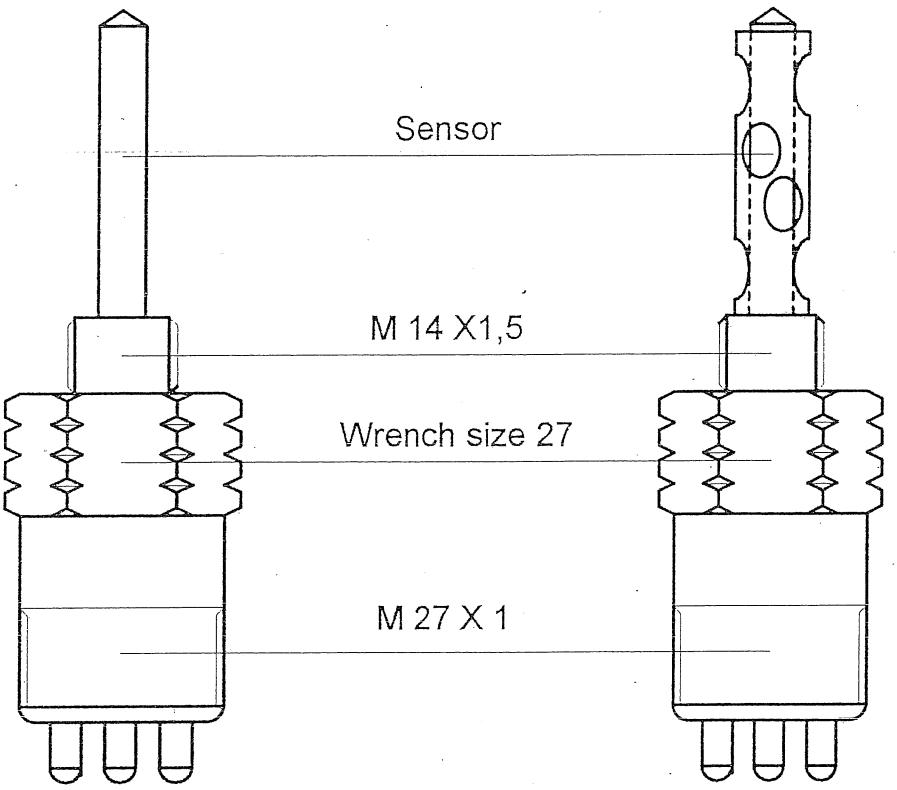
at + 20°C	=	1138,3 Ohm + / -	140,8 Ohm
at + 60°C	=	225,5 Ohm + / -	22,9 Ohm
at + 90°C	=	83,3 Ohm + / -	7,0 Ohm
at + 120°C	=	36,8 Ohm + / -	2,2 Ohm
at + 130°C	=	28,9 Ohm + / -	1,5 Ohm

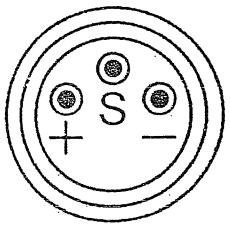
Fluid sensors

Schulungszentrum
Tafel:
Name: Br.
Datum: 01.97

Sensor for aqueous media
EDP - No. 3649601

Oil and fuel sensor
EDP - No. 3625943



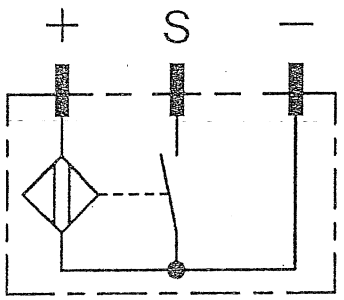


Technical data

Operating voltage	9 - 36 V DC
Output power	24 W at 24 V (1 A) transistor output
Signal delay	7 sek.
Pressure on sensor	max. 25 bar
Temperature of medium	Water -30°C bis +110°C
	Oil -30°C bis +125°C

Switch contact closes when sensor is in medium

Wiring diagram

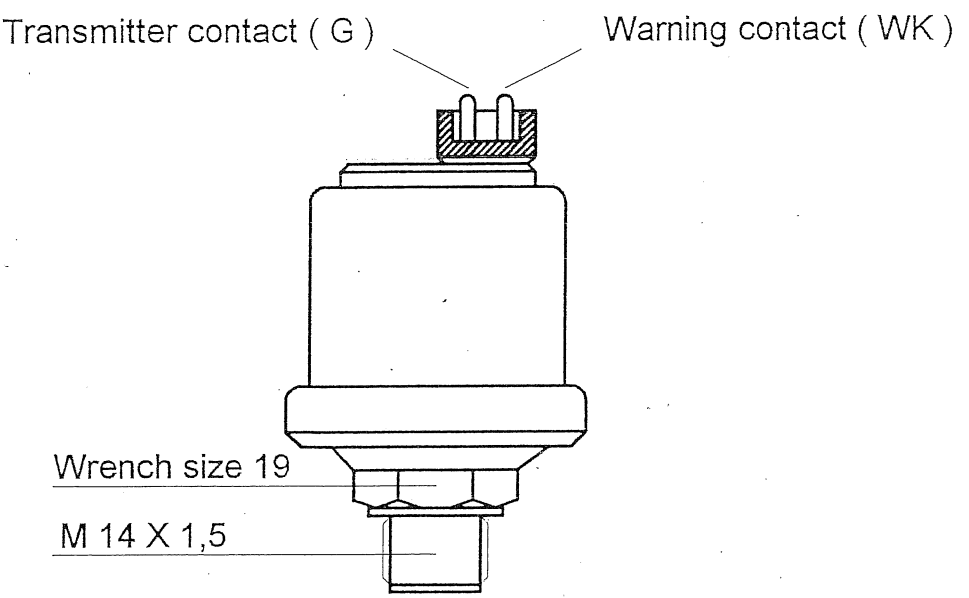


WARNING: There is a risk of permanent damage if the negative potential is connected to the signal connection and the positive potential to the negative connection.

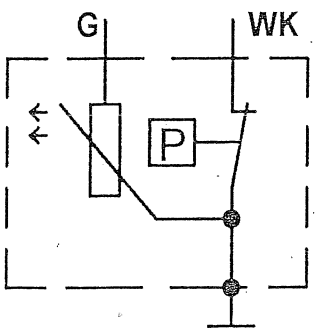
Oil pressure switch

Schulungszentrum
Tafel:
Name: Br.
Datum: 04.96

Engine - oil pressure switch for all water - cooled engines.



Wiring diagram



Tightening torque max. 60 Nm
Measuring range 0 - 5 bar
Switching capacity (non - inductive) max. 5 W
Nominal voltage 6 - 24 V DC
Warning contact closes when pressure drops
Switching point of warning contact 0,4 + 0,2 bar

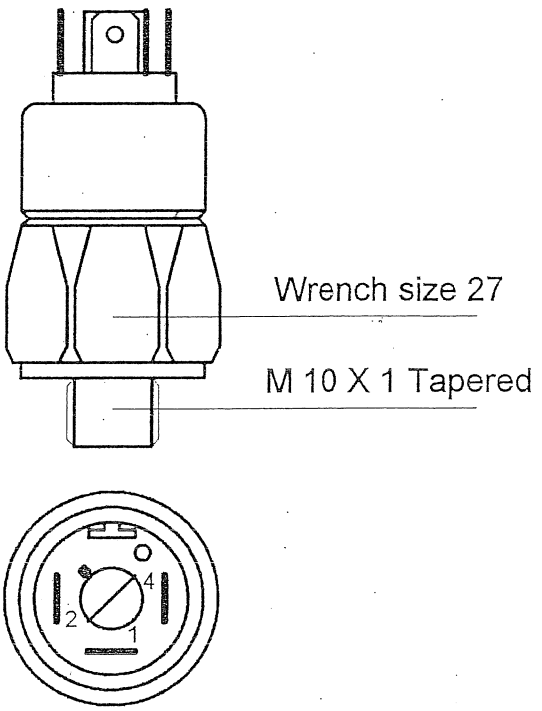
EDP - No. 3668035

Resistance values at the following pressures

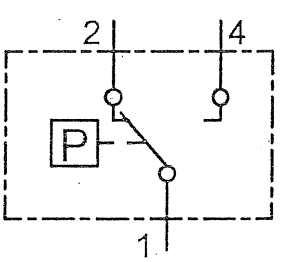
at 0 bar = 10 Ohm +/- 4 Ohm
at 1 bar = 48 Ohm +/- 4 Ohm
at 2 bar = 82 Ohm +/- 4 Ohm
at 3 bar = 116 Ohm +/- 5 Ohm

Pressure switch

Pressure warning switch for power brake pressure accumulator.



Wiring diagram



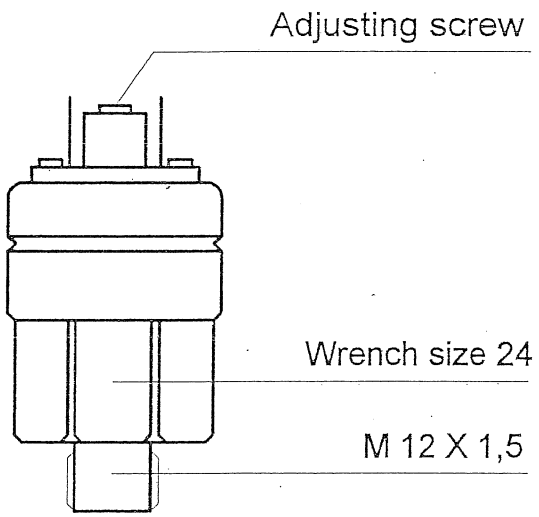
Nominal voltage 42 V
Measuring range 50 - 200 bar
Set pressure value 100 bar
Switching capacity 96 W (4 A)

EDP - No. 4638213

Pressure - operated switch - emergency control 1004 - 1604

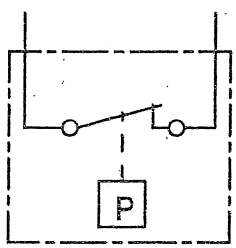
Schulungszentrum
Tafel:
Name: Br.
Datum: 11.96

Pressure switch for the emergency control's "On" functional display (excavator types 1004 - 1604 with load limit control).



EDP - No. 3676353

Wiring diagram



Measuring range	2 - 10 bar
Set pressure value	4 bar
Overpressure protection	400 bar
Nominal voltage	42 V
Load	2 A

Opens when pressure increases

Pressure - operated switch

Schulungszentrum
Tafel:
Name: Br.
Datum: 12.96

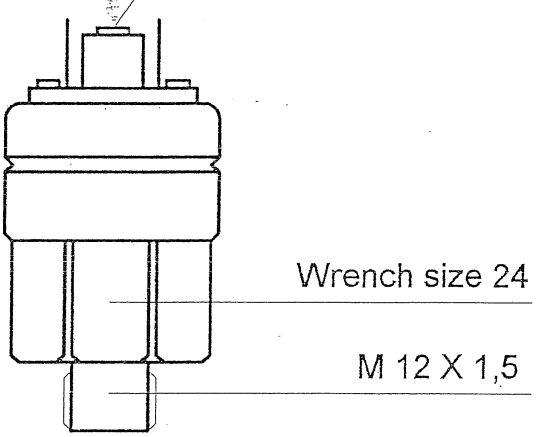
This pressure switch is installed in two connection versions:

a. M 12 X 1,5 mm conneting thread
b. Pipe element for collar nut 10 L with cutting ring

The technical data of these pressure - operated switches are identical. The pressure switch is used for the following functions:

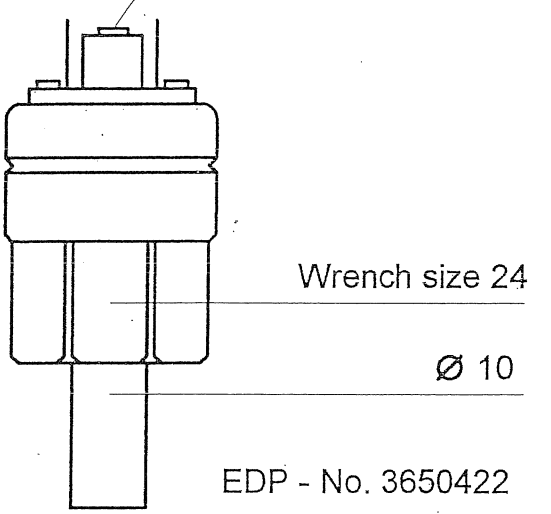
- " Travel " switch signal on all machines fitted with load limit control.
- Pressure step - up during travel (only on 1604 with 90 KW engine).
- Locking of swing axel when actuating the foot brake, on all excavator types fitted with a power brake system.
- Releasing the slewing movement restriction (ZW - 3).

a.



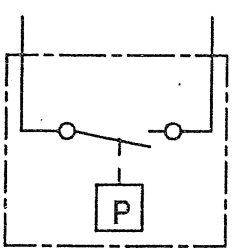
EDP - No. 3668295

b.



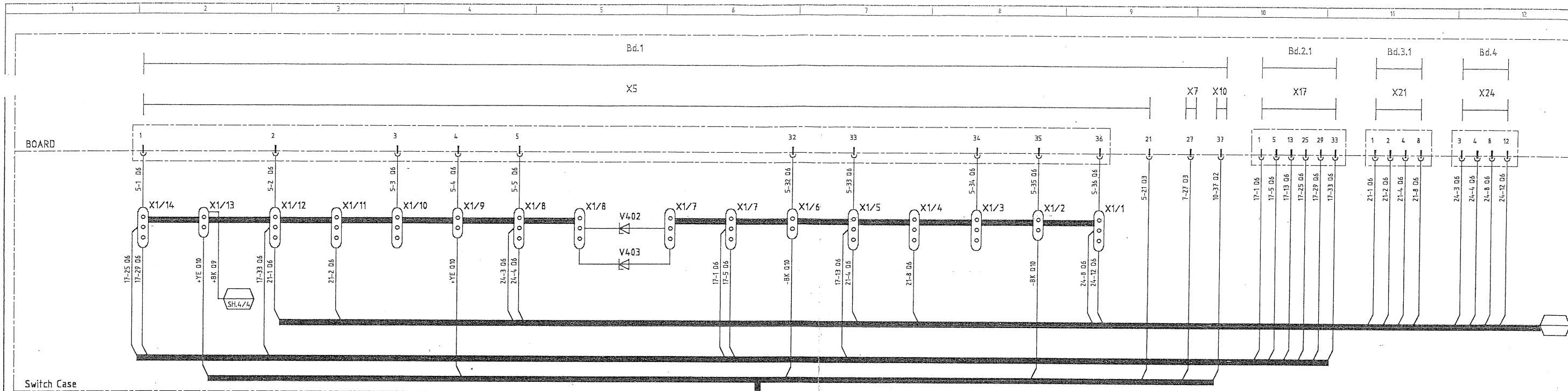
EDP - No. 3650422

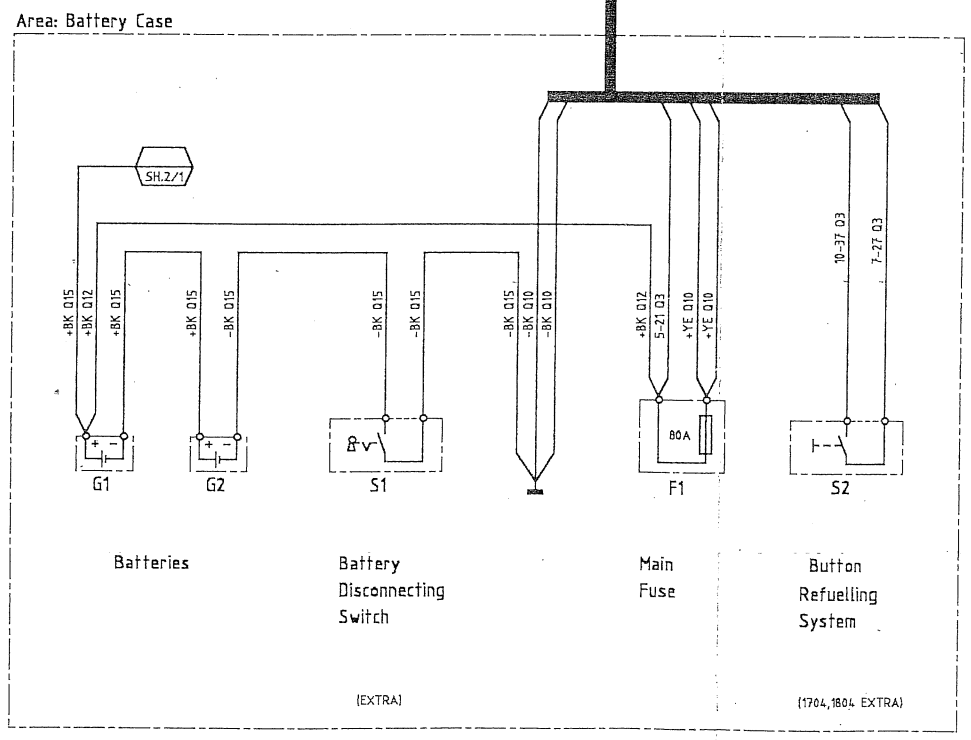
Wiring diagram



Measuring range	2 - 10 bar
Set pressure value	5 bar
Overpressure protection	400 bar
Nominal voltage	42 V
Load current	2 A

Closes when pressure increases

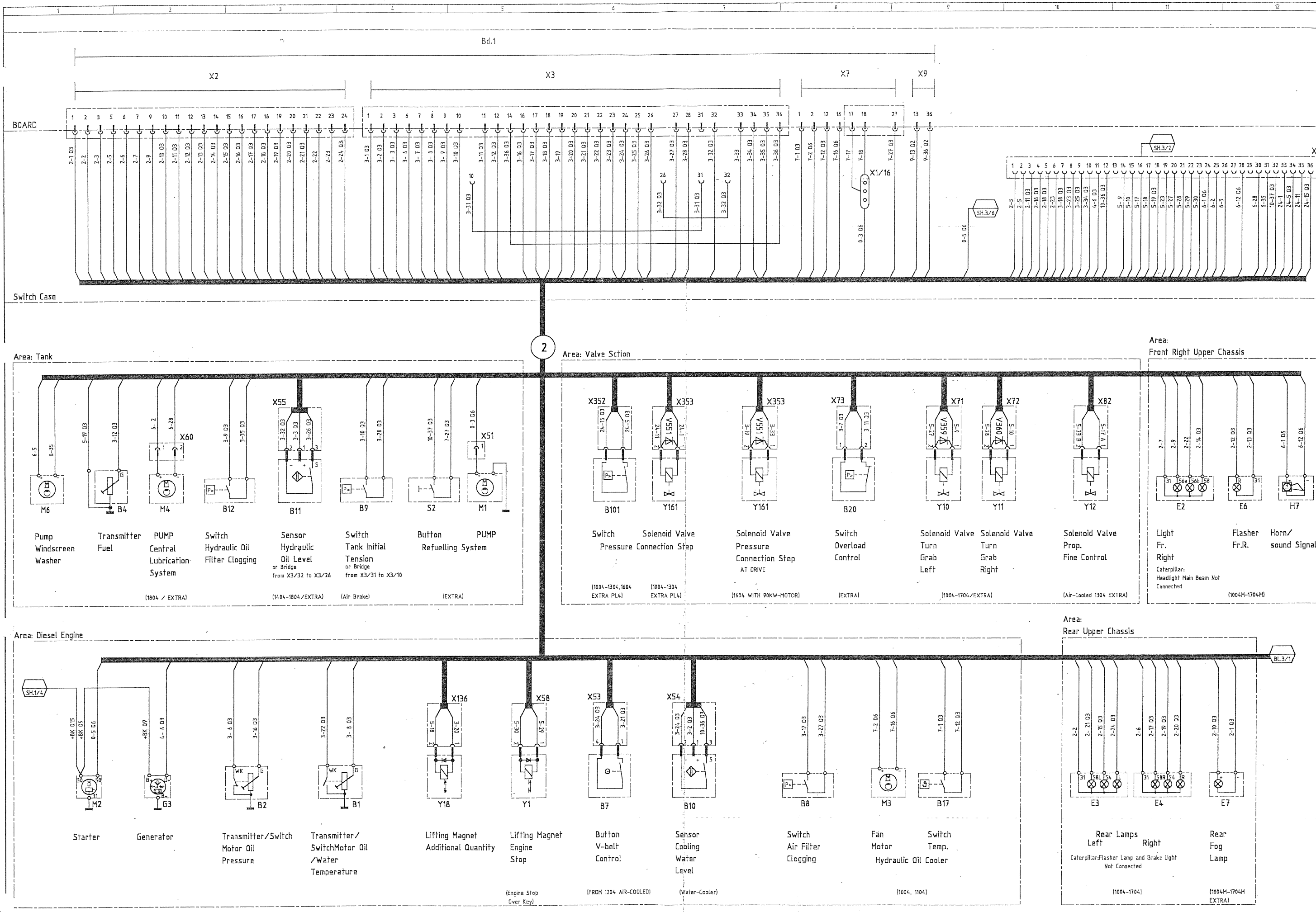




Cables with No. Q 2 have a Cross-section of 0.50mm²
Cables with No. Q 3 have a Cross-section of 0.75mm²
Cables with No. Q 4 have a Cross-section of 1.00mm²
Cables without No. Q have a Cross-section of 1,50mm²
Cables with No. Q 6 have a Cross-section of 2.50mm²

Cables with No. Q 7 have a Cross-section of 4.00mm²
Cables with No.Q 9 have a Cross-section of 6,00mm²
Cables with No. Q 10 have a Cross-section of 10.00mm²
Cables with No. Q 12 have a Cross-section of 25.00mm²
Cables with No. Q 15 have a Cross-section of 50.00mm²

PART-NR.:			4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:
DIN			3				7				DATE	07.08.1996	ATLAS-WEYHAUSEN GmbH		BAUSCHALTPLAN
MATERIAL			2				6				DESIGN.	U. Panzram	MASCHINENFABRIK STEDINGER STR.324	GB	
			1				5				CHECKED				3800.315.10.05/000
ALL RIGHTS RESERVED DIN 34			IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	27.10.1994			SHEET 1



Cables with No. Q 2 have a Cross-section of 0.50mm²
Cables with No. Q 3 have a Cross-section of 0.75mm²
Cables with No. Q 4 have a Cross-section of 1.00mm²
Cables without No. Q have a Cross-section of 1.50mm²
Cables with No. Q 6 have a Cross-section of 2.50mm²
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DIN		3		7		DATE · 07.08.1996	NAME:
MATERIAL		2		6		DESIGN. U. Panzram	ATLAS-WEYHAUSEN GmbH
		1		5		CHECKED	MASCHINENFABRIK STEDINGER STR.324

GB

BAUSCHALTPLAN

7800 715 10 05/000

SHEET

Bd.1

BOARD

X4

X5

X8

X87

X1/15

X45

SH.2/11

SH.2/9

SH.4/2

X88

Switch Case

Buzzer

H2

3

Area: Underbody of Cabin

X69 X79 X80 X81 X70 X68 X64 X65 X66 X67

Y8 S16 Y19 Y20 Y9 Y7 Y3 Y4 Y5 Y6

Solenoid Valve MV Motor Adjustment (Caterpillar)

Switch MV Motor Adjustment (Caterpillar)

Solenoid Valve Switch: Driving > ADJ. Boom
Add. Operation by control handle left: adjustabel boom > driving
(Caterpillar With Hydr. Adjustable Boom)

Solenoid Valve Solenoid Valve
Full Floating Axle Inhibition (Mobile)
Creep Speed (Mobile)

Solenoid Valve Gear Shifting 2. Gear (Mobile)

Solenoid Valve Gear Shifting 1. Gear (Mobile)

Solenoid Valve Driving Direction Backward (Mobile)

Solenoid Valve Driving Direction Foward (Mobile)

Area: Underbody of Cabin

BL.2/12

X61 X63 X57 X62

B6 B29 M5 E1 E5 S6 S32 B19 B13 B6 M7

Switch Pressucre Tank (Hydr. Brake)

Switch Hand Brake (Mobile Hydr. Brake)

Switch Pressure Connection Step Drive
Bridge from X24/1 to X9/47
(1604 WITH 90KW-MOTOR)

Windscreen Wiper Motor Front

Light Fr. Left
Caterpillar: Main Beam Not Connected

Flasher Fr. Left (1004M-1704M)

Steering Column Switch Left
Backward/Forward, Creep Speed On/Off, Interval and Wish-
(Mobile)

Steering Column Switch Right
Flasher Left/Right, Dipped Headlight/Headlight Main Beam Horn
Caterpillar: Bridge from X4/6 to X4/27

Button Hammer (Foot Switch) (EXTRA)

Switch Full Floating Axle Inhibition (Mobile)

Switch Brake Light (1004M-1704M)

Switch Hand Brake (Mobile with Air Brake)

Heather Fan

Cables with No. Q 2 have a Cross-section of 0.50mm²
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Cables without No. Q have a Cross-section of 1.50mm²

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Cables with No.Q 9 have a Cross-section of 6,00mm²
Cables with No. Q 10 have a Cross-section of 10.00mm²
Cables with No. Q 12 have a Cross-section of 25.00mm²
Cables with No. Q 15 have a Cross-section of 50.00mm²

PART-NR.:		4			8				Dwg with CAD		
DIN		3			7				DATE	07.08.1996	
MATERIAL		2			6				DESIGN.	U. Panzram	
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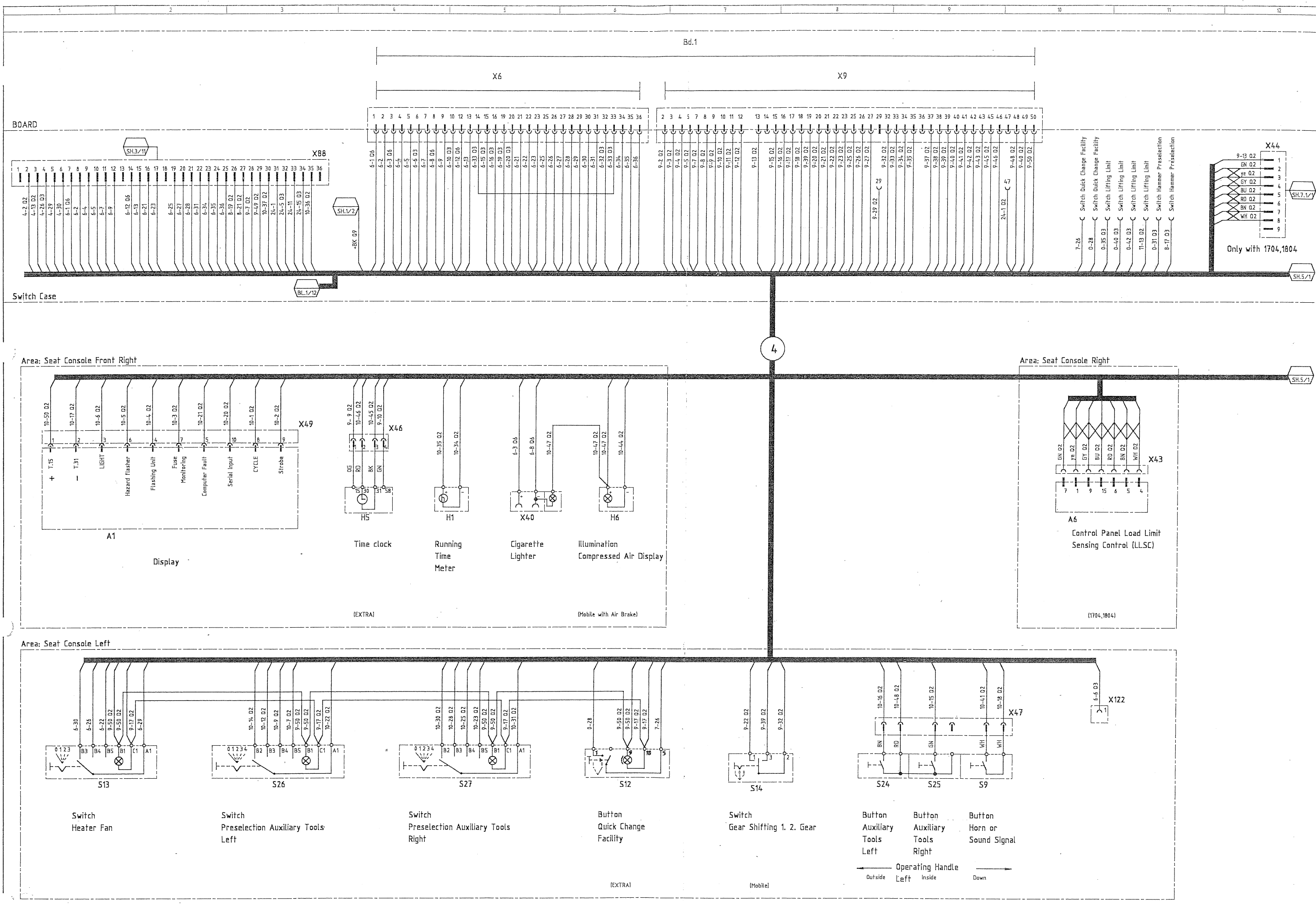
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

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7800.715.10.05/000

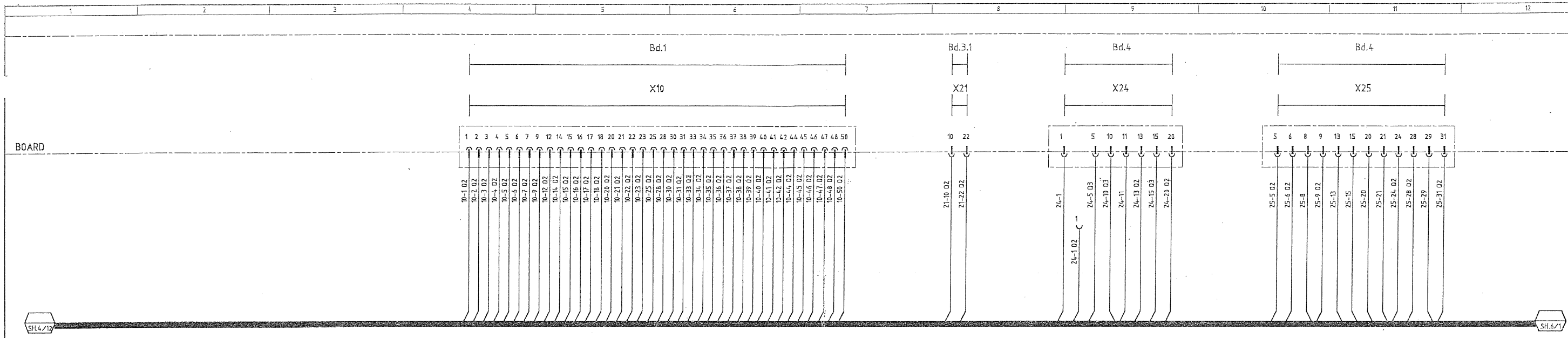
SHEET



Cables with No. Q 2 have a Cross-section of 0.50mm²
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Cables with No. Q 6 have a Cross-section of 2.50mm²

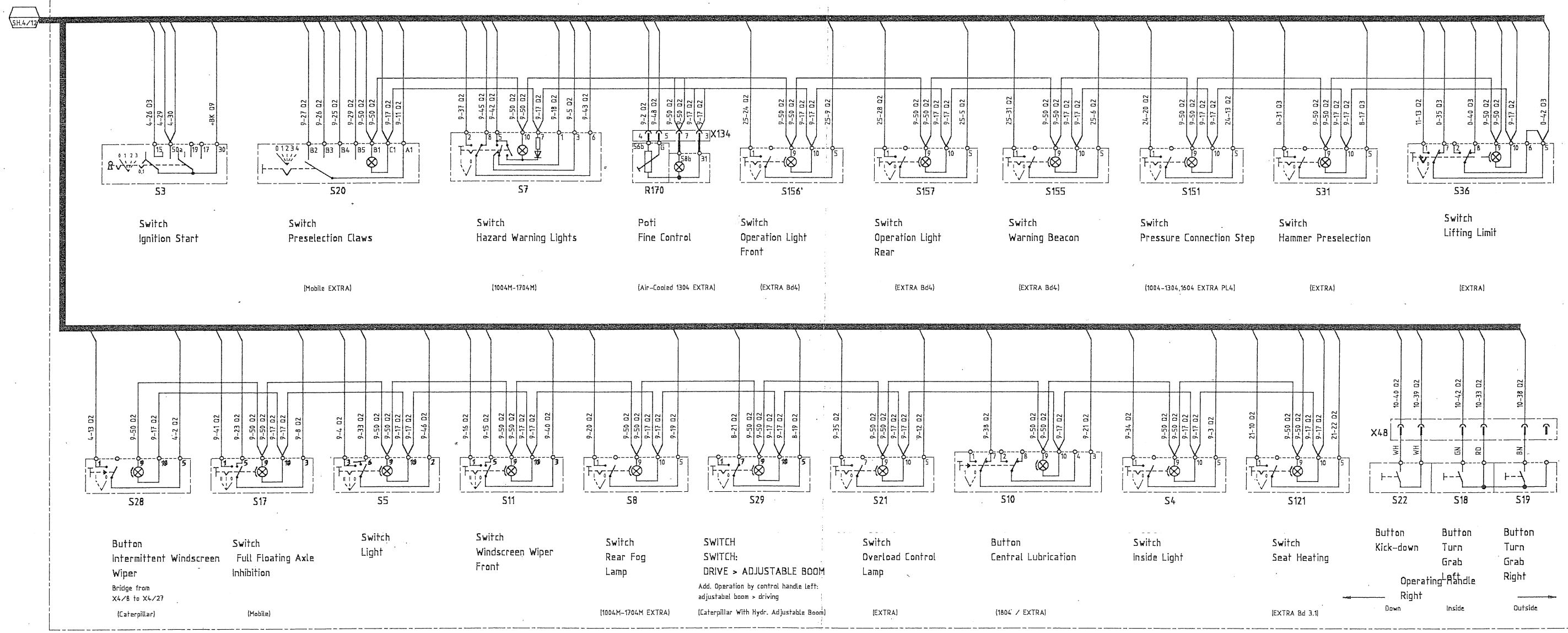
Cables with No. Q 7 have a Cross-section of 4.00mm²
Cables with No.Q 9 have a Cross-section of 6,00mm²
Cables with No. Q 10 have a Cross-section of 10.00mm²
Cables with No. Q 12 have a Cross-section of 25.00mm²
Cables with No. Q 15 have a Cross-section of 50.00mm²

PART-NR.:		4			8				Dwg with CAD	PURGE DATE FOR FABRICATION: NAME:
DIN		3			7				DATE 07.08.1996	ATLAS-WEYHAUSEN MASCHINENFABRIK GmbH STEDINGER STR.324
MATERIAL		2			6				DESIGN. U. Panzram	GB
		1			5				CHECKED	BAUSCHALTPLAN
										7800.315.10.05/000 SHEET



Switch Case

Area: Seat Console Right



Switch
Ignition Start

Switch
Preselection Claws

(Mobile EXTRA)

Switch
Hazard Warning Lights

(1004M-1704M)

Poti
Fine Control

(Air-Cooled 1304 EXTRA)

Switch
Operation Light
Front

(EXTRA Bd4)

Switch
Operation Light
Rear

(EXTRA Bd4)

Switch
Warning Beacon

(EXTRA Bd4)

Switch
Pressure Connection Step

(1004-1304,1604 EXTRA PL4)

Switch
Hammer Preselection

(EXTRA)

Switch
Lifting Limit

(EXTRA)

Button
Intermittent Windscreen
Wiper

Bridge from
X4/8 to X4/27

(Caterpillar)

Switch
Full Floating Axle
Inhibition

(Mobile)

Switch
Light

Switch
Windscreen Wiper
Front

Switch
Rear Fog
Lamp

(1004M-1704M EXTRA)

SWITCH
SWITCH:
DRIVE > ADJUSTABLE BOOM

Add. Operation by control handle left:
adjustabel boom > driving

(Caterpillar With Hydr. Adjustable Boom)

Switch
Overload Control
Lamp

(EXTRA)

Button
Central Lubrication

(1804 / EXTRA)

Switch
Inside Light

Switch
Seat Heating

(EXTRA Bd 3.1)

Button
Kick-down

Button
Turn
Grab
Left

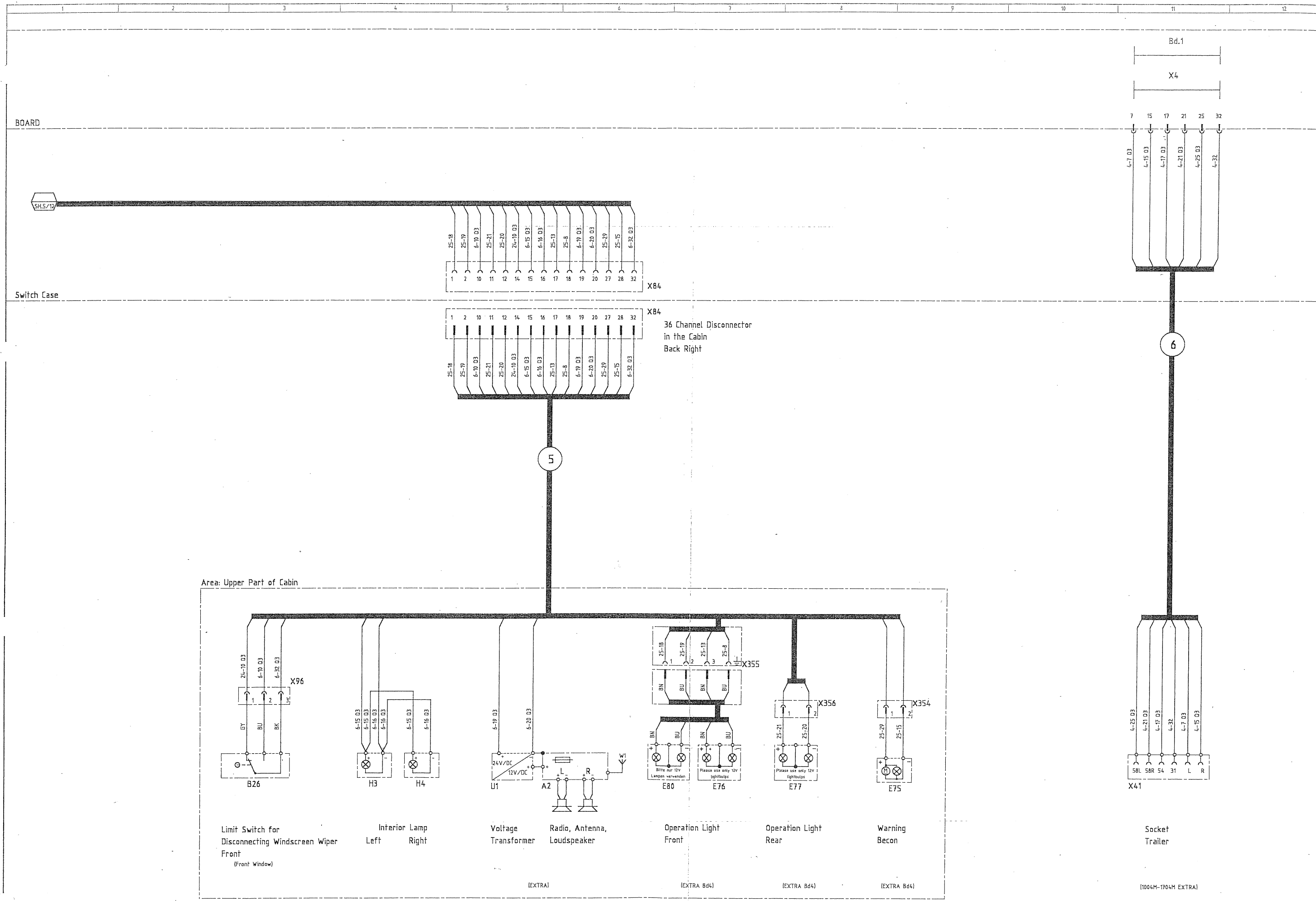
Button
Turn
Grab
Right

Operating Handle
Right
Down
Inside
Outside

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PART-NR.:			4				8					Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:	
DIN			3				7					DATE	07.08.1996				
MATERIAL			2				6					DESIGN.	U. Panzram	ATLAS-WEYHAUSEN GmbH	GB	BAUSCHALTPLAN	
			1				5					CHECKED		MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST		7800.715.10.05/000	SHEET
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	17.12.1996					



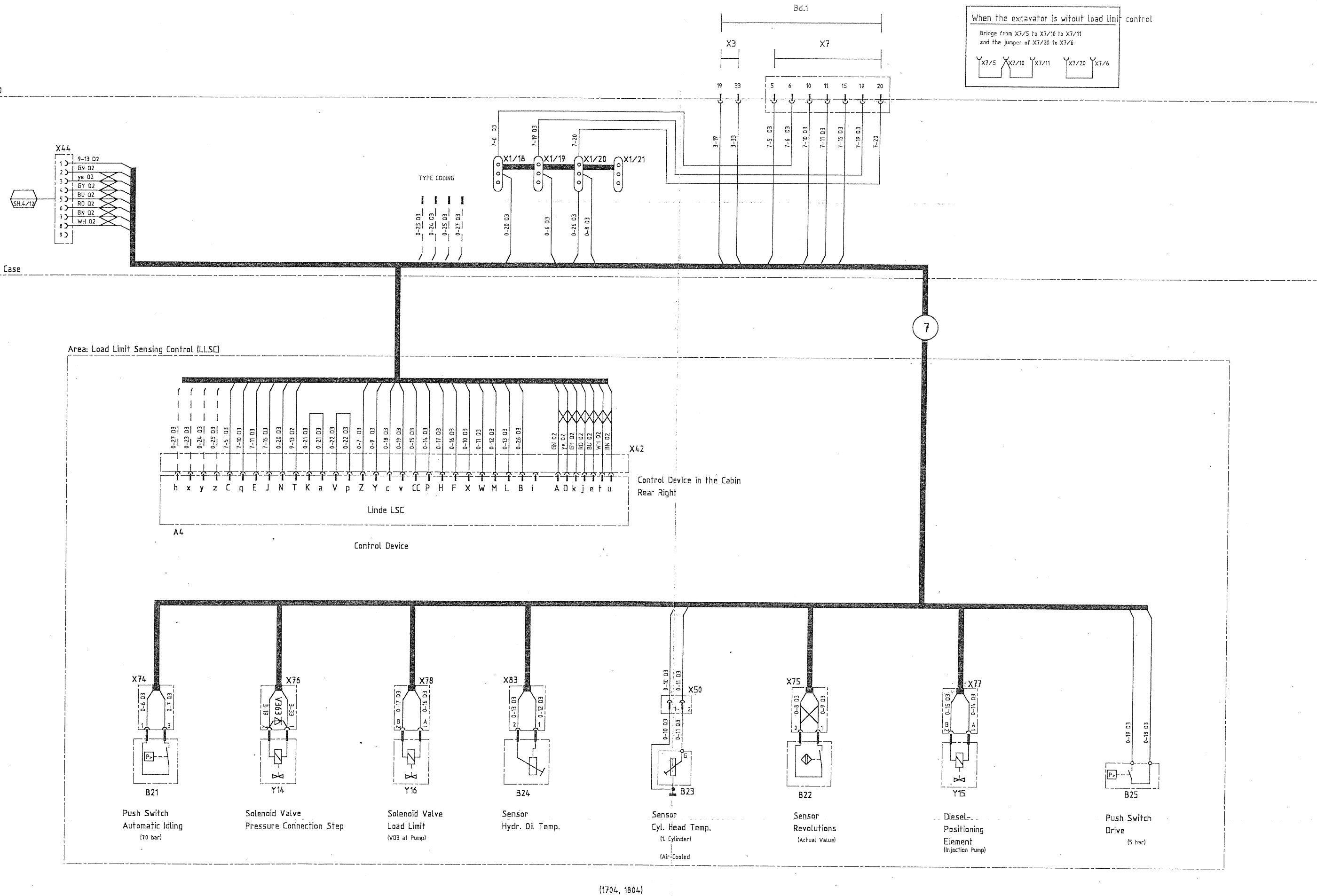
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DIN		3				7				DATE 07.08.1996	ATLAS-WEYHAUSEN GmbH
MATERIAL		2				6				DESIGN. U. Panzram	MASCHINENFABRIK STEDINGER STR.324
		1				5				CHECKED	GB

BAUSCHALTPLAN

7800.715.10.05/000



(1704, 1804)

Cables with No. Q 2 have a Cross-section of 0.50mm²
Cables with No. Q 3 have a Cross-section of 0.75mm²
Cables with No. Q 4 have a Cross-section of 1.00mm²
Cables without No. Q have a Cross-section of 1.50mm²
Cables with No. Q 6 have a Cross-section of 2.50mm²

Cables with No. Q 7 have a Cross-section of 4.00mm²
Cables with No. Q 9 have a Cross-section of 6.00mm²
Cables with No. Q 10 have a Cross-section of 10.00mm²
Cables with No. Q 12 have a Cross-section of 25.00mm²
Cables with No. Q 15 have a Cross-section of 50.00mm²

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
QTY		3				7				DATE	07.08.1996		
MATERIAL		2				6				DESIGN.	U. Panzram		
		1				5				CHECKED			
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	17.12.1996		

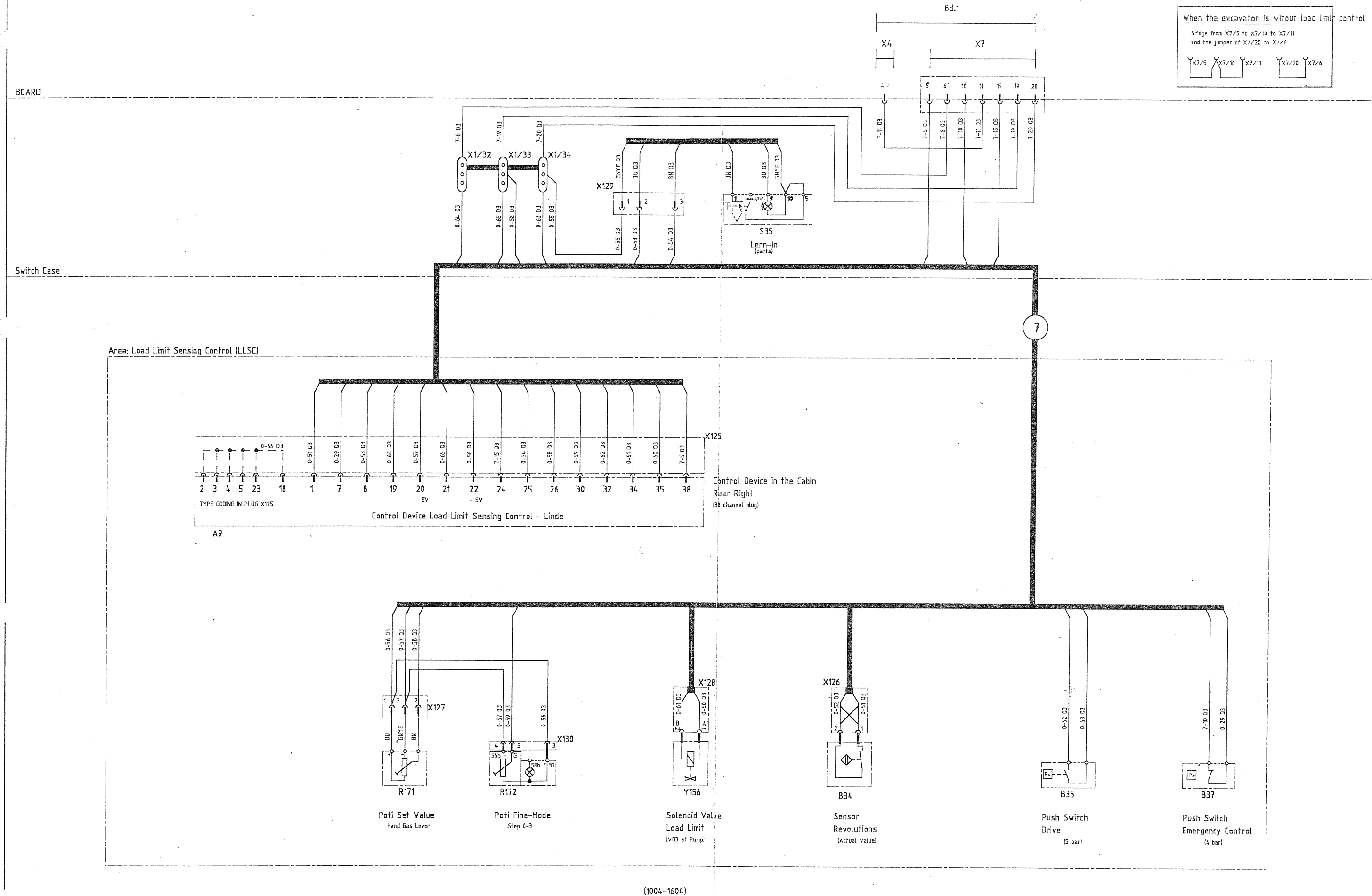
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

GB

BAUSCHALTPLAN

7800.715.10.05/000

SHEET 7



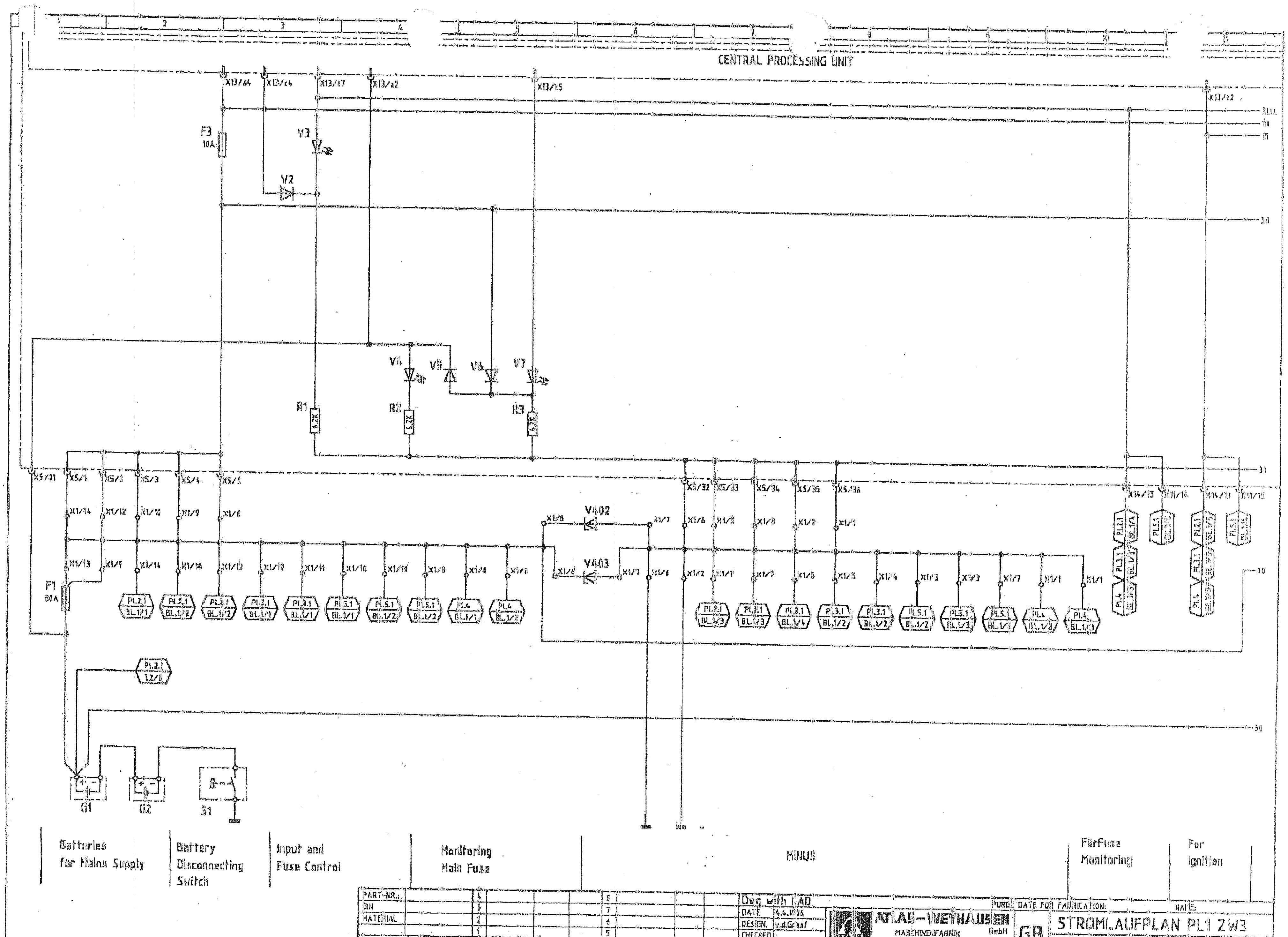
(1004-1604)

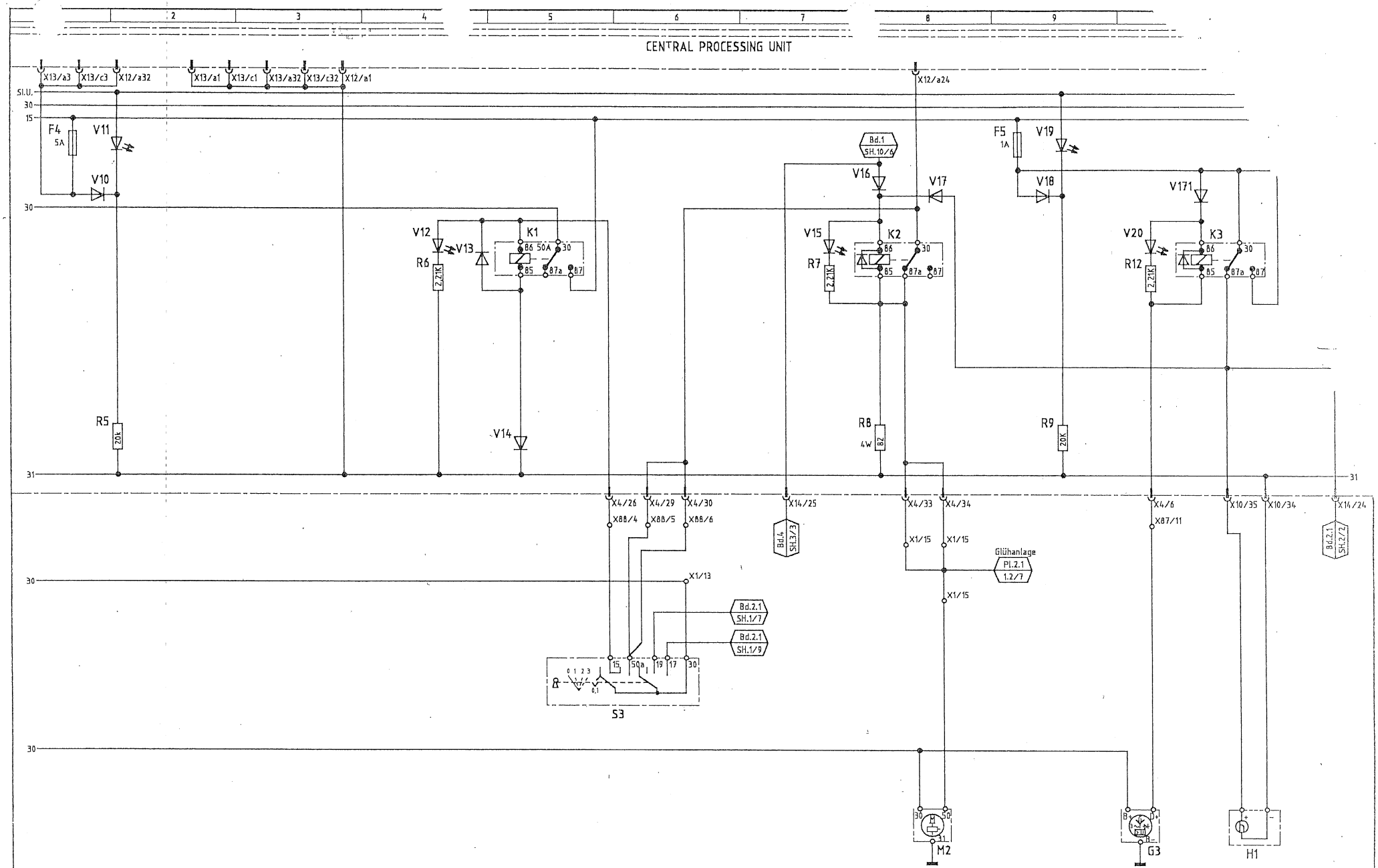
Cables with No. Q 2 have a Cross-section of 0.50mm²
Cables with No. Q 3 have a Cross-section of 0.75mm²
Cables with No. Q 4 have a Cross-section of 1.00mm²
Cables without No. Q have a Cross-section of 1.50mm²
Cables with No. Q 6 have a Cross-section of 2.50mm²

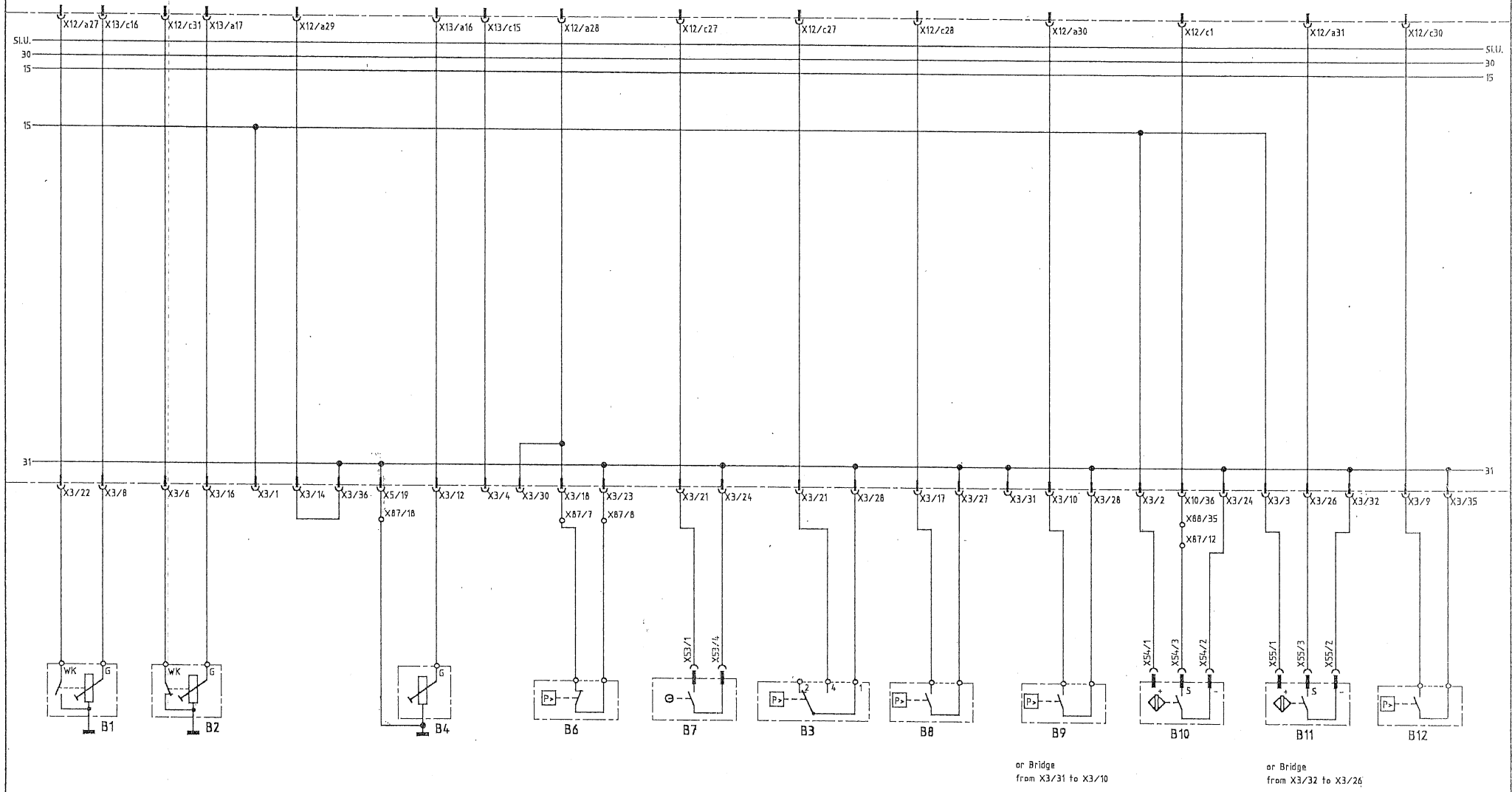
Cables with No. Q 7 have a Cross-section of 4.00mm²
Cables with No.Q 9 have a Cross-section of 6.00mm²
Cables with No. Q 10 have a Cross-section of 10.00mm²
Cables with No. Q 12 have a Cross-section of 25.00mm²
Cables with No. Q 15 have a Cross-section of 50.00mm²

PART-NR.:		4			8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:
DIN		3			7				DATE	07.08.1996	ATLAS-WEYHAUSEN MASCHINENFABRIK GmbH STEDINGER STR.324	GB	BAUSCHALTPLAN
MATERIAL		2			6				DESIGN.	U. Panzram			7900.715.10.05/000
		1			5				CHECKED				SHEET 7

ALL RIGHTS RESERVED DIN 34


CENTRAL PROCESSING UNIT
X13/a4
X13/c4
X13/c7
X13/a2
X13/c5
X13/c2
F3
10A
V3
V2
V4
V5
V6
V7
R1
R2
R3
6.2K
X5/21
X5/1
X5/2
X5/3
X5/4
X5/5
X5/32
X5/33
X5/34
X5/35
X5/36
V402
V403
F1
80A
G1
G2
S1
PL.2.1 BL.1/1
PL.5.1 BL.1/2
PL.3.1 BL.1/2
PL.4 BL.1/1
PL.4 BL.1/2
PL.2.1 12/8
Batteries for Mains Supply
Battery Disconnecting Switch
Input and Fuse Control
Monitoring Main Fuse
MINUS
FürFuse Monitoring
For Ignition
PART-NR.
DIN
MATERIAL
ALL RIGHTS RESERVED DIN 34
Dwg with CAD
DATE 4.4.1996
DESIGN. v.d.Graaf
CHECKED
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
GB
DATE FOR FABRICATION:
NAME:
STROMLAUFPLAN PL1 ZW3


CENTRAL PROCESSING UNIT
X13/a3
X13/c3
X12/a32
X13/a1
X13/c1
X13/a32
X13/c32
X12/a1
X12/a24
SI.U.
30
15
31
F4
5A
V11
V10
F5
1A
V19
V18
V171
V16
V17
Bd.1
SH.10/6
V12
V13
K1
R6
2.2K
V14
V15
K2
R7
V20
K3
R12
R5
20K
R8
4W
82
R9
X4/26
X4/29
X4/30
X88/4
X88/5
X88/6
X14/25
Bd.4
SH.3/3
X4/33
X4/34
X1/15
Glühanlage
Pl.2.1
1.2/7
X4/6
X87/11
X10/35
X10/34
X14/24
Bd.2.1
SH.2/2
X1/13
Bd.2.1
SH.1/7
Bd.2.1
SH.1/9
15
50a
19
17
S3
M2
G3
H1
Mains Supply For Central Processing Unit
Input Relay
50A
Ignition Starter Switch
Starter Safeguard Lock
and Starting Motor
Charge Control and
Generator
Running Time
Meter
PART-NR.:
DIN
MATERIAL
ALL RIGHTS RESERVED DIN 34
IND
MODIFICAT.
DATE
NAME
MODIFICATION
Dwg with CAD
DATE
27.11.1996
DESIGN.
U. Panzram
CHECKED
24.07.1997
PURGE DATE FOR FABRICATION:
NAME:
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST
GB
STROMLAUFPLAN PL1
7800.715.20.06/000
SHEET 2
SH



Motor Oil or Water Temperature	Motor Oil Pressure	Motor Oil Level (Prepared)	Tank Transmitting Device	Hand Brake (Mobile)	V-belt Monitoring (FROM 1204 AIR COOLED)	Pressure Tank (Hydr.-Brake)	Air Filter Polution	Tank initial tension (Air Brake)	Water Level (Water-Cooler)	Hydralic Oil Level (FROM 1404 / EXTRA)	Hydralic Oil Filter Dirt Of

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:	
DIN		3				7				DATE	20.08.1996				
MATERIAL		2				6				DESIGN.	U. Panzram				
		1	4471	06.03.96	Panzram	5				CHECKED					
ALL RIGHTS RESERVED DIN 34		IND.	MODIFICAT.	DATE	NAME	IND.	MODIFICATION	DATE	NAME	DATE	24.07.1997				

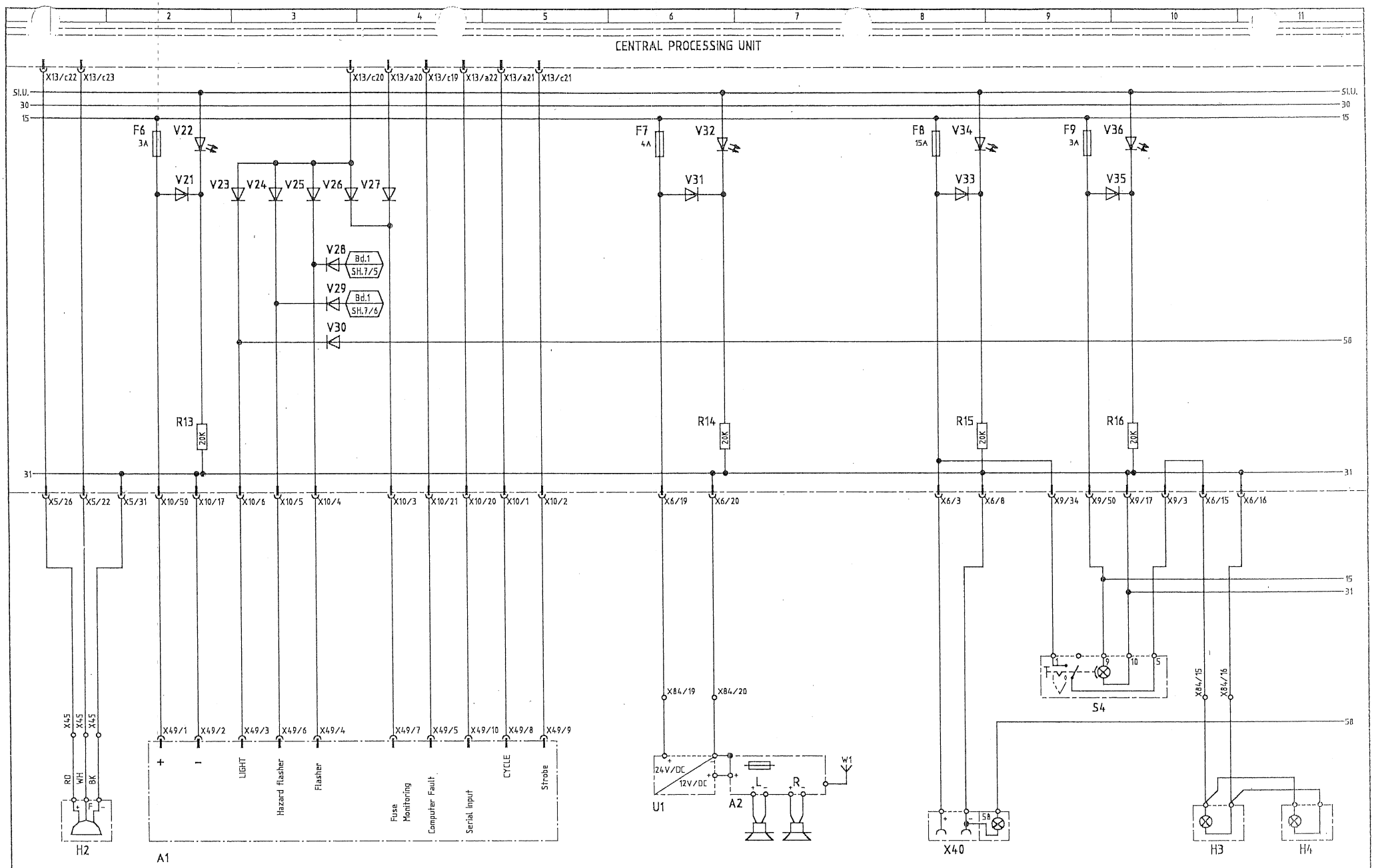
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7800.715.20.06/000

SHEET 3



PART-NR.:		4				B				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	14.08.1996		
MATERIAL		2				6				DESIGN.	U. Panzram		
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ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	24.07.1997		

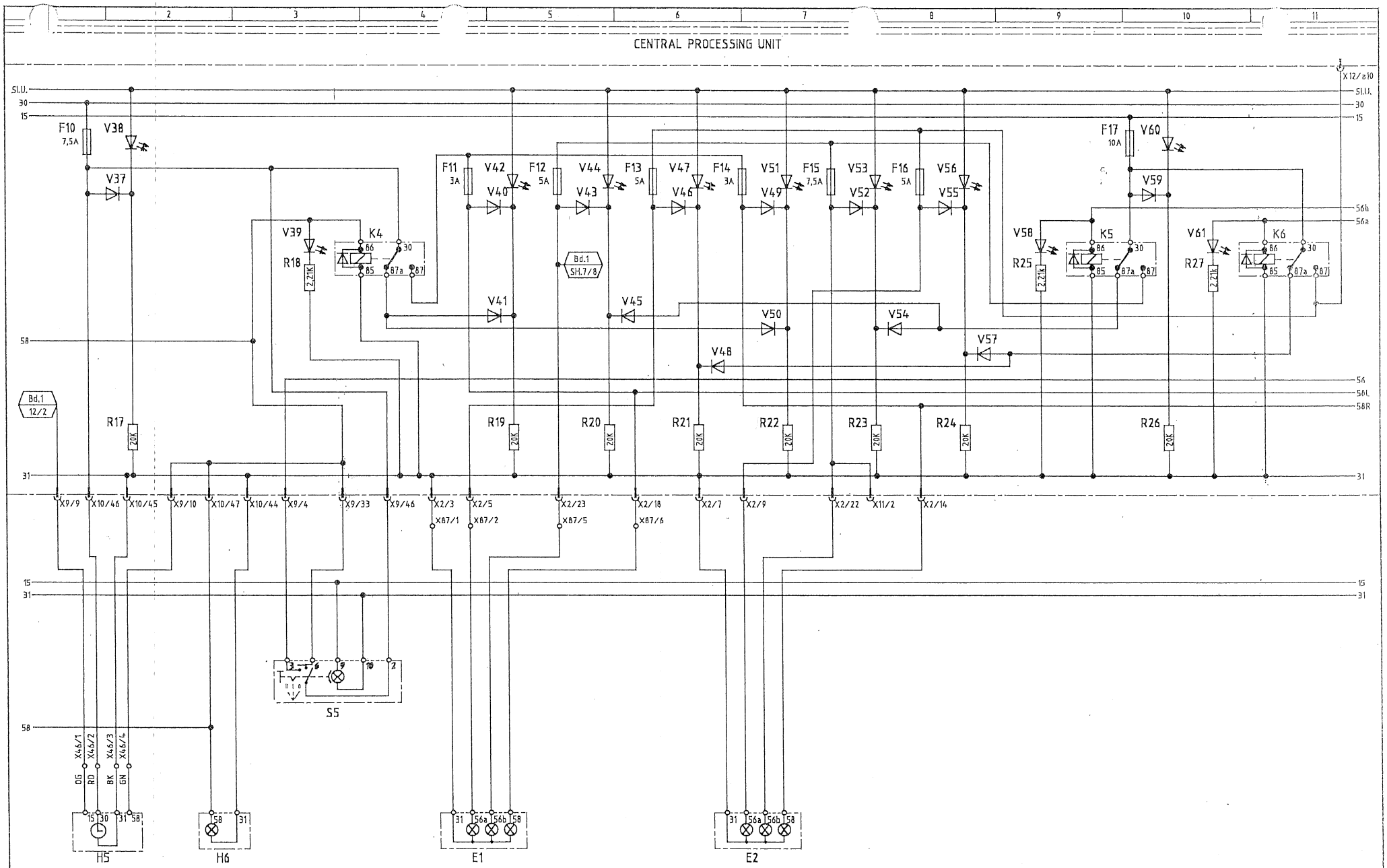
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SHEET 4
SH



Time clock	Illumination Compressed Air Display	Light Switch and Sidelight	Light Front Left	Light Front Right	Dipped Headlight	Main Beam
(EXTRA)	(Mobile with Air Brake)		Caterpillar: Headlight Main Beam Not Connected	Caterpillar: Headlight Main Beam Not Connected		Relay K6 must always be plugged in (Mobile)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:	
DIN		3				7				DATE	20.08.1996				
MATERIAL		2				6				DESIGN.	U. Panzram				
		1	4471	06.08.96	Panzram	5				CHECKED					
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	24.07.1997				

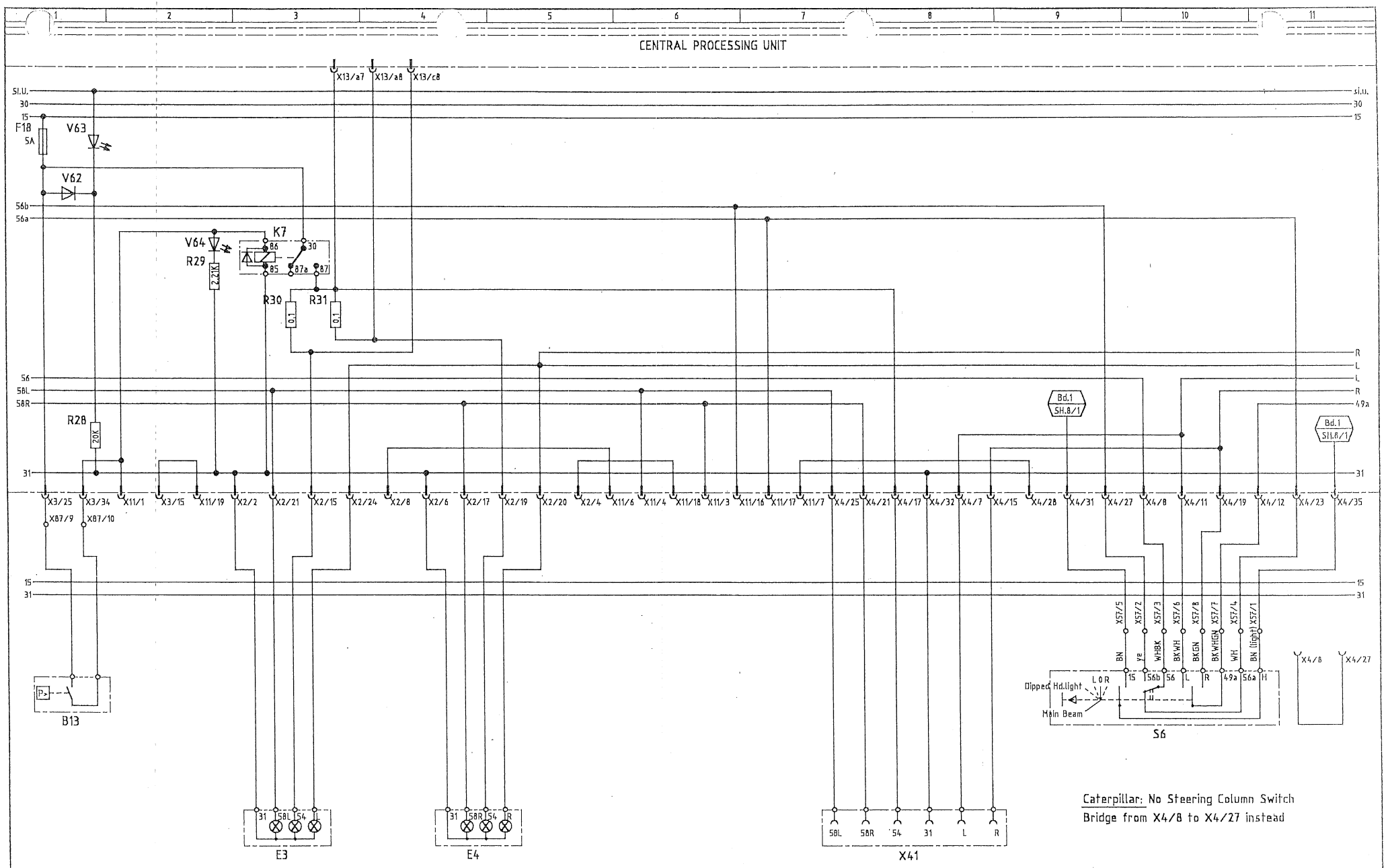
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SHEET 5
SH



Brake Light	Rear Lamp Left	Rear Lamp Right	Trailer Socket	Steering Column Switch Right
(1004M-1704M)	Caterpillar:Flasher Lamp and Brake Light Not Connected (1004-1704)	Caterpillar:Flasher Lamp and Brake Light Not Connected (1004-1704)	(1004M-1704M EXTRA)	Flasher Left/Right, Dipped Headlight/Headlight Main Beam Horn (Mobile)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:			
DIN		3				7				DATE	20.08.1996						
MATERIAL		2				6				DESIGN.	U. Panzram						
		1	4471	06.08.96	Panzram	5				CHECKED							
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	24.07.1997						

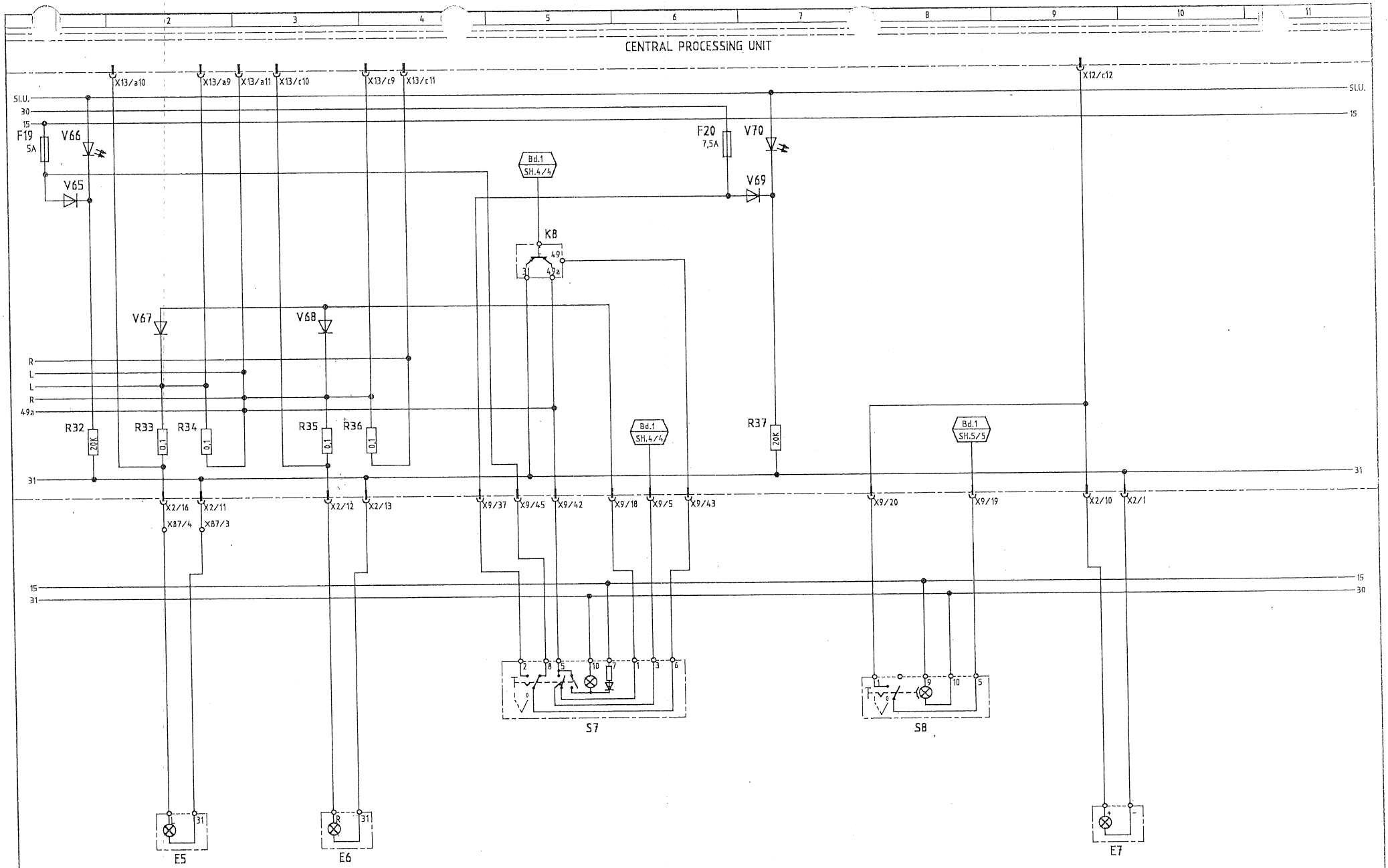
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SHEET 0
SII



Flasher Front Left

(1004M-1704M)

Flasher Front Right

(1004M-1704M)

Hazard flasher

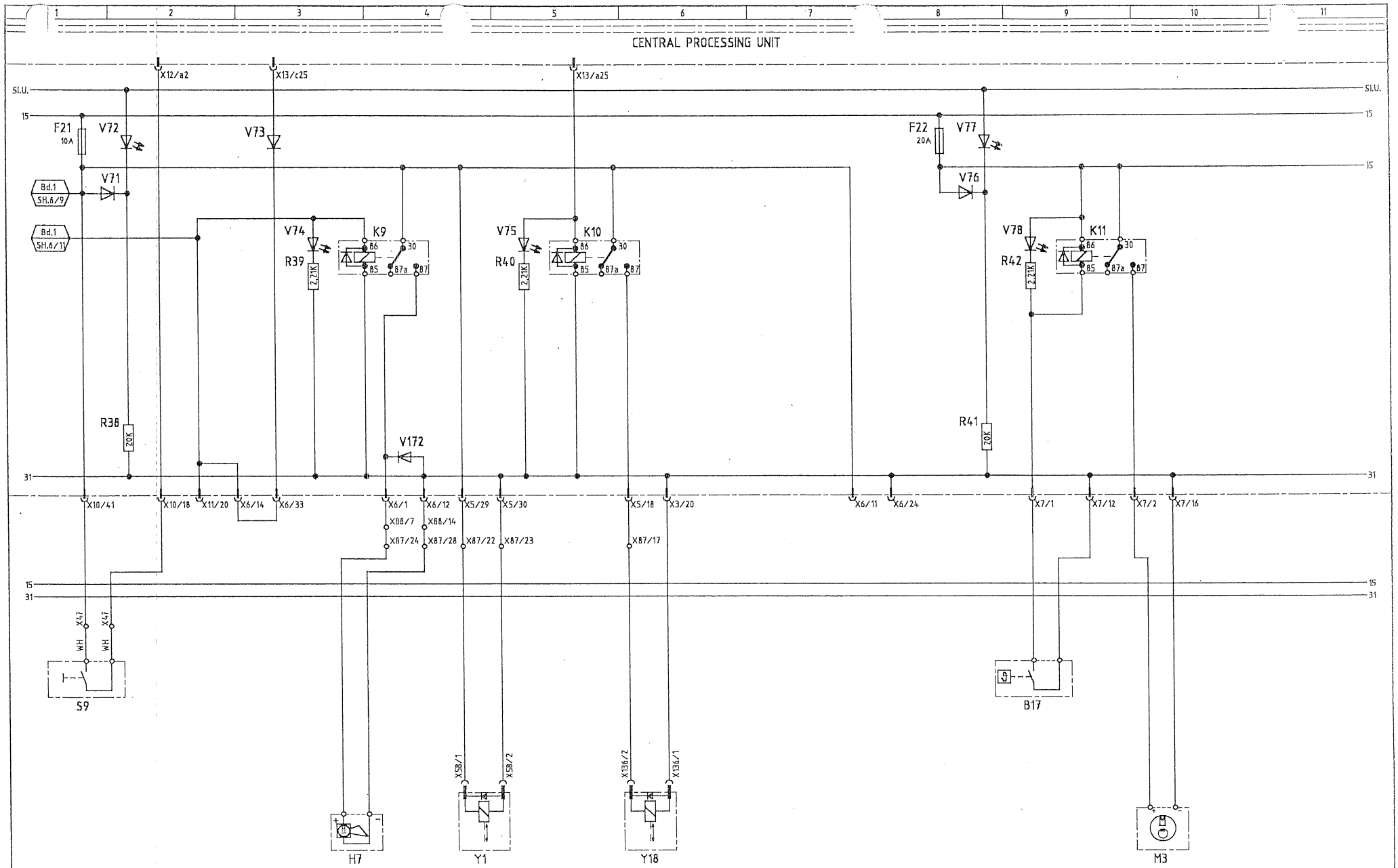
(1004M-1704M)

Rear Fog Lamp

(1004M-1704M EXTRA)

PART-NR.:		4				8				Dwg with CAD	PURGE DATE FOR FABRICATION: NAME:
DIN		3				7				DATE 20.08.1996	ATLAS-WEYHAUSEN GmbH
MATERIAL		2				6				DESIGN. U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST
		1	4471	06.08.96	Panzram	5				CHECKED	GB
		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE 24.07.1997	STROMLAUFPLAN PL1
											7800.715.20.06/000
											SHEET 7 SH

ALL RIGHTS RESERVED DIN 34



Button
Operating Handle Left
Below

Sound Signal / Horn

Motor Stop
(Engine Stop Over Key)

Lifting Magnet
Additional Quantity

Hydraulic Oil Cooling Fan
(1004, 1104)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	20.08.1996		
MATERIAL		2				6				DESIGN.	U. Panzram		
		1	4471	06.08.96	Panzram	5				CHECKED			
ALL RIGHTS RESERVED DIN 34		IND.	MODIFICAT.	DATE	NAME	IND.	MODIFICATION	DATE	NAME	DATE	24.07.1997		

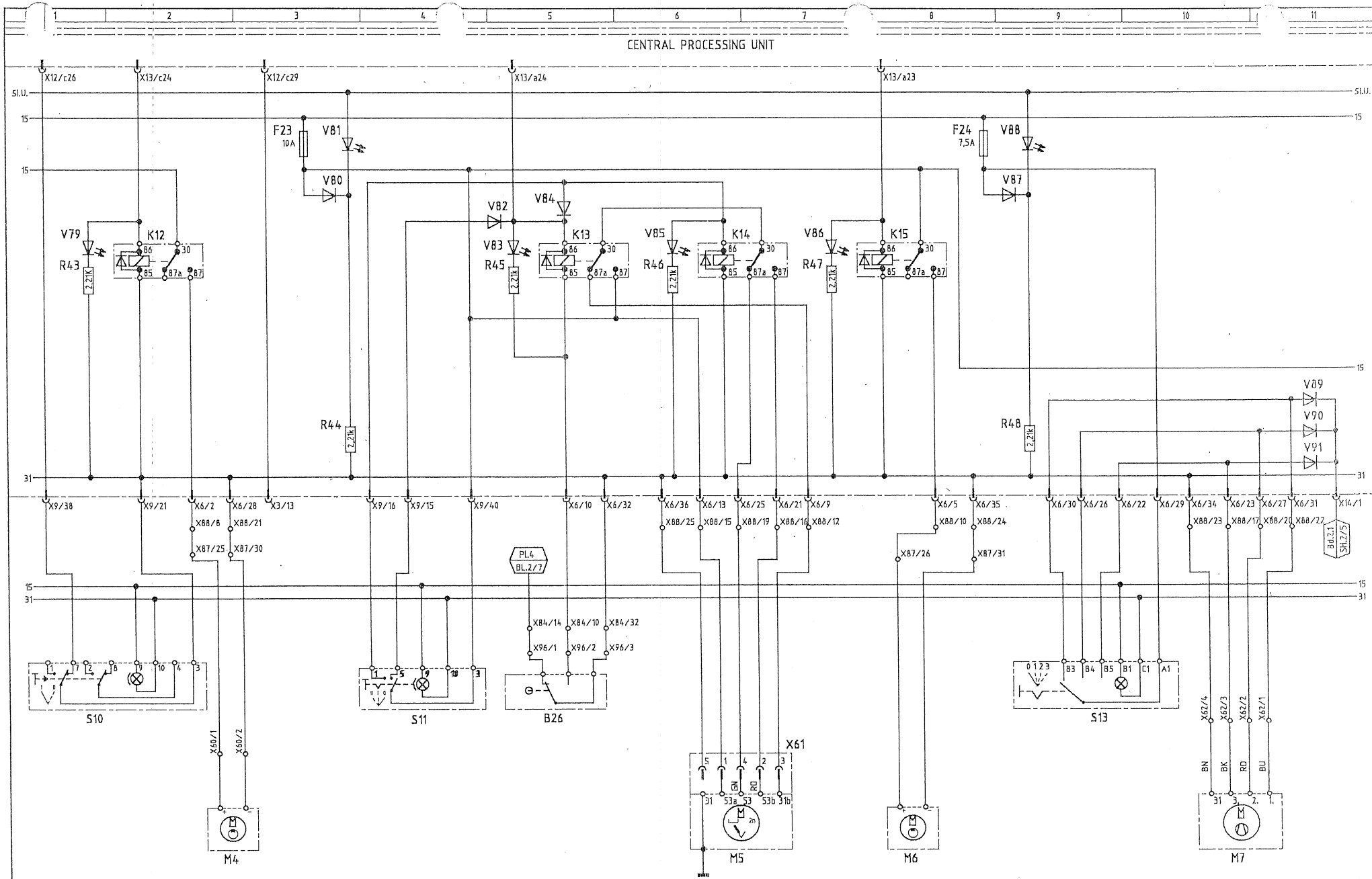
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STROMLAUFPLAN PL1

7800.715.20.06/000

SHEET 6
SH



Central Lubrication

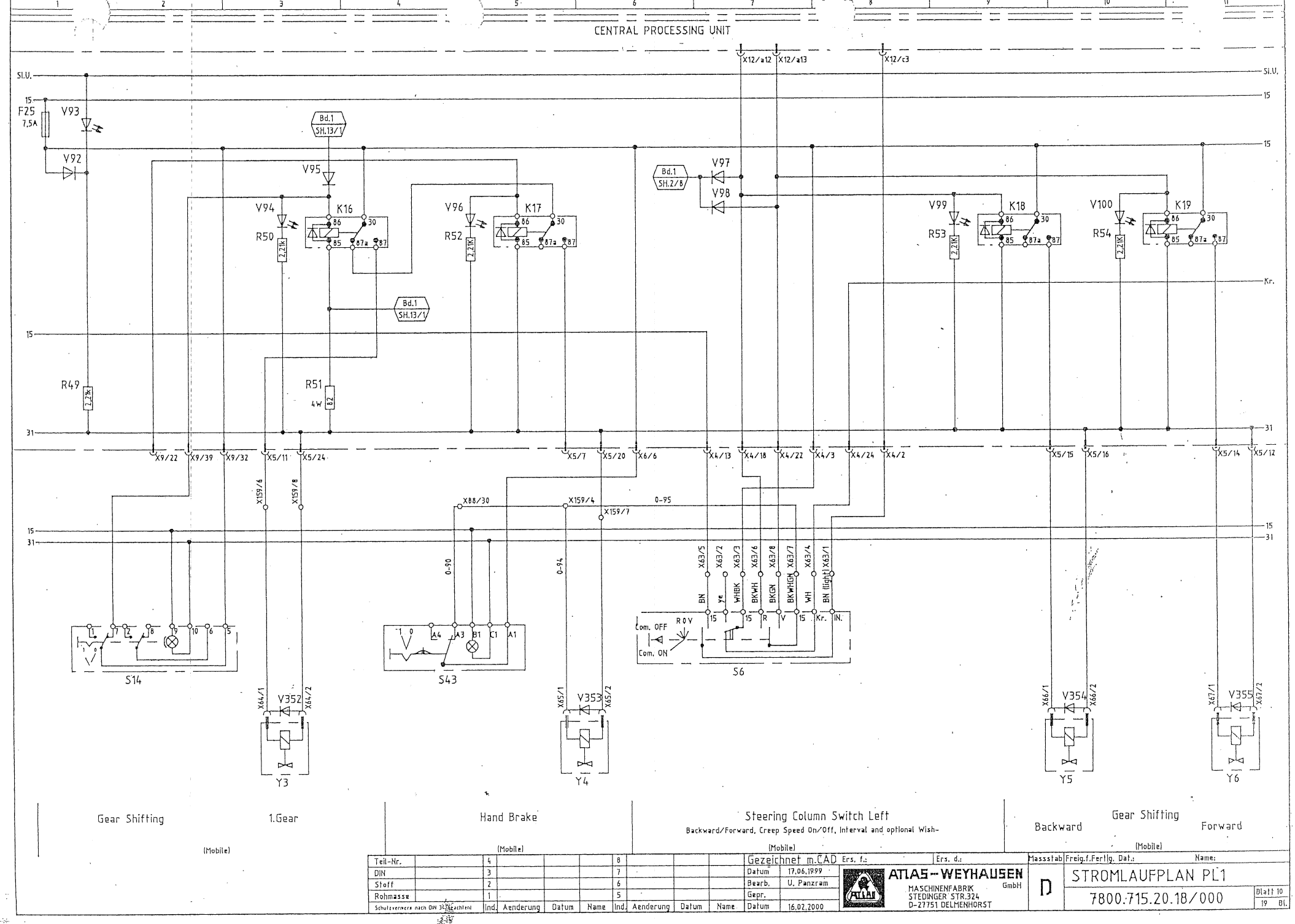
(1804 / EXTRA)

Intermittend windshield wiper front and limit stop front window

Windscreen Wiper

Heather Fan

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:	
DIN		3				7				DATE	20.08.1996	ATLAS-WEYHAUSEN GmbH	GB	STROMLAUFPLAN PL1	
MATERIAL		2				6				DESIGN.	U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST			
		1	4471	06.08.96	Panzram	5				CHECKED				7800.715.20.06/000	SHEET 9
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	24.07.1997				SI1



Teil-Nr.		4				8					Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:	
DIN		3				7					Datum 17.06.1999						
Stoff		2				6					Bearb. U. Panzram						
Rohmasse		1				5					Gepr.						
Schutzvermerk nach DIN 34 beachten		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name		Datum 16.02.2000						

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STEDINGER STR.324
D-27751 DELMENHORST

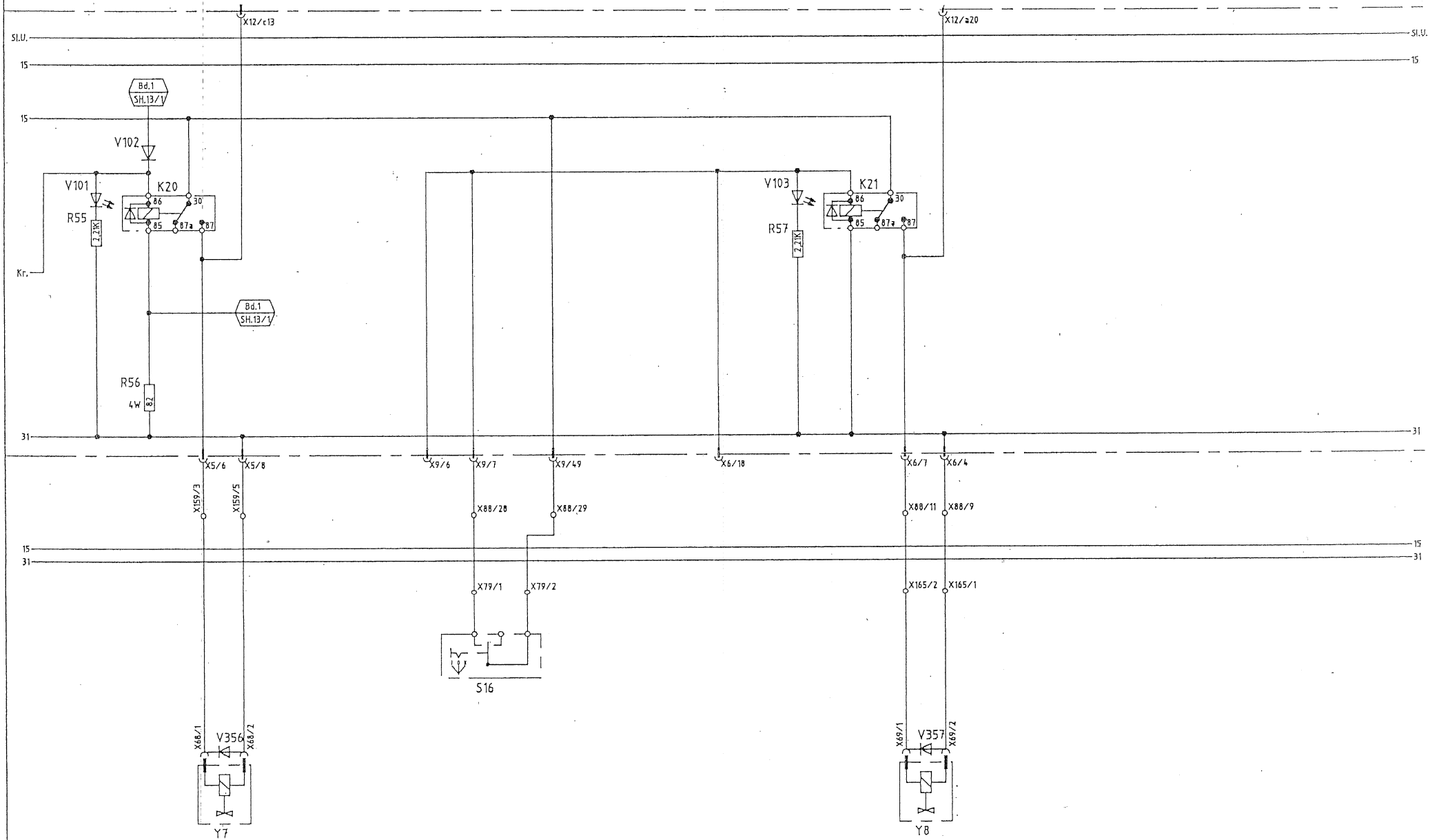
D

STROMLAUFPLAN PL1

7800.715.20.18/000

Blatt 10
19 Bl.

CENTRAL PROCESSING UNIT



Creep Speed

(Mobile)

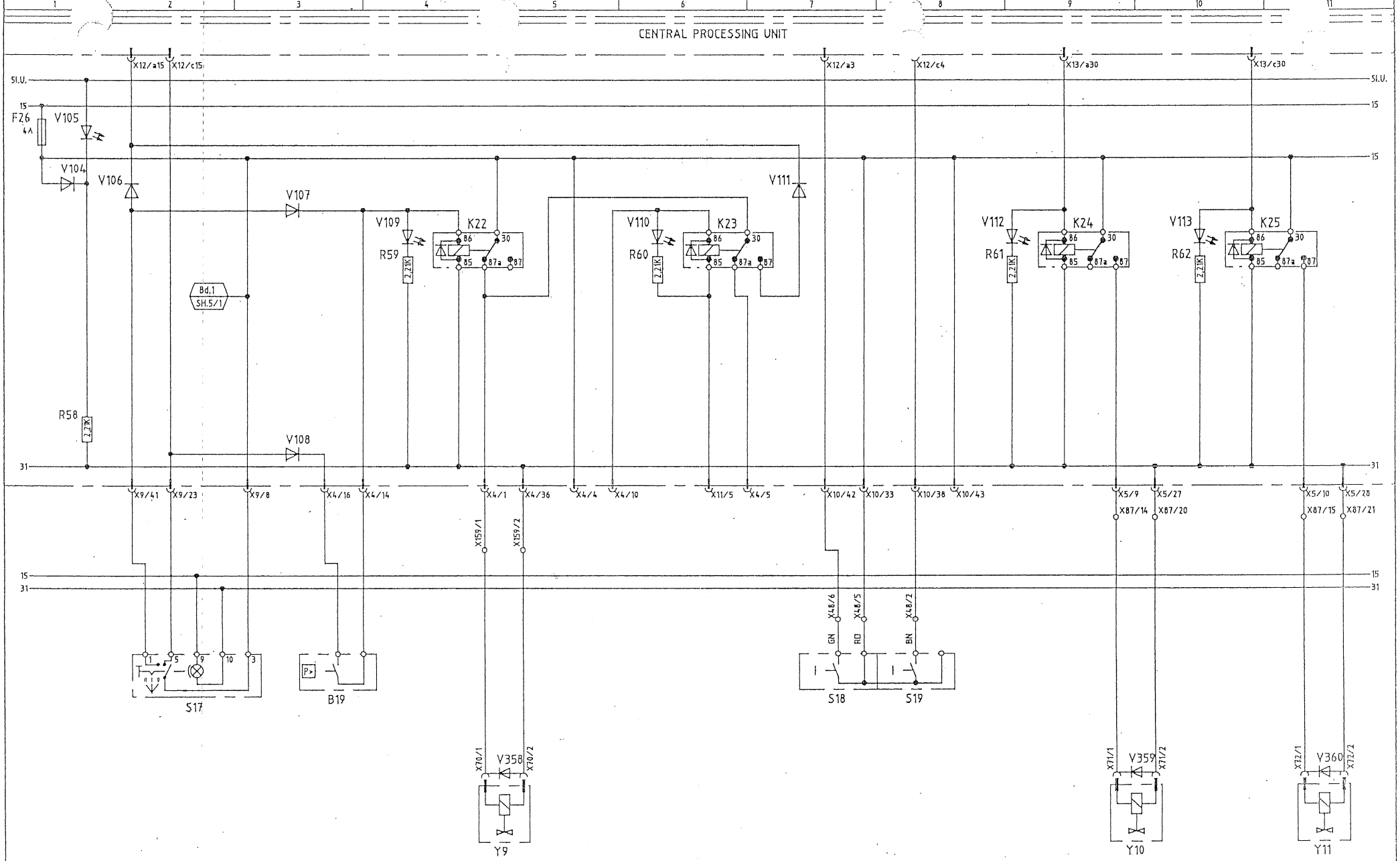
Switch
Driving Lever
Middle

Motor Adjustment
(Caterpillar)

Solenoid-Valve current-carrying:
= Slow Drive

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:		Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:
DIN		3				7				Datum	17.06.1999			D	STROMLAUFPLAN PL1	
Stoff		2				6				Bearb.	U. Panzram					
Rohmasse		1				5				Gepr.					7800.715.20.18/000	Blatt 11 19 Bl.
Schutzvermerk nach DIN 34 beachtend		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000					

ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST



Full Floating Axle Inhibition

(Mobile)

Solenoid Valve current-carrying:
× Axle free

Turn Grab Left
Button
Operating Handle Right
Inside

Turn Grab Right
Button
Operating Handle Right
Outside

Turn Grab Left

Turn Grab Right

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:		
DIN		3				7				Datum	17.06.1999						
Stoff		2				6				Bearb.	U. Panzram						
Rohmasse		1				5				Gepr.							
Schutzvermerk nach DIN 34 beachtet		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000						

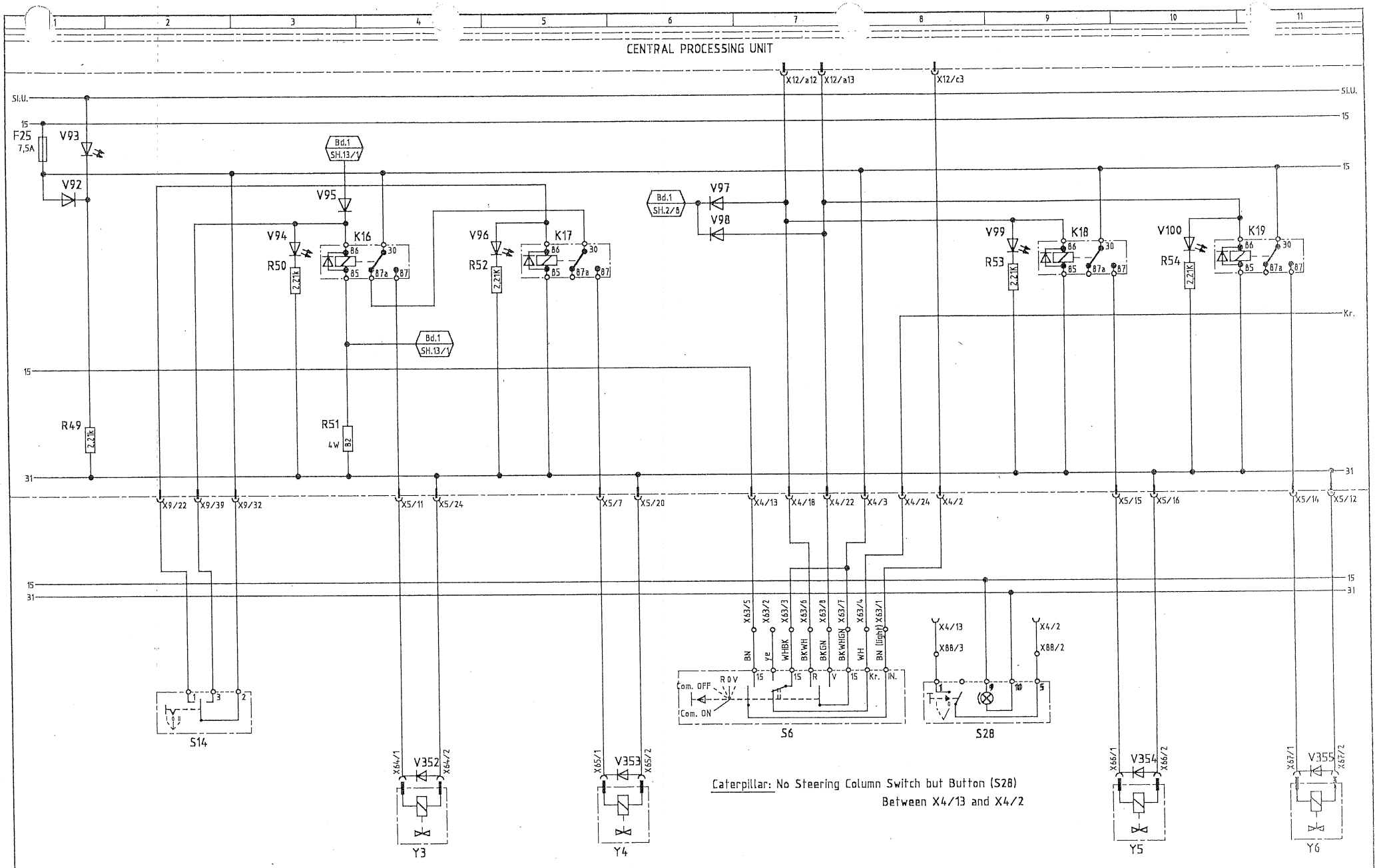
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D

STROMLAUFPLAN PL1

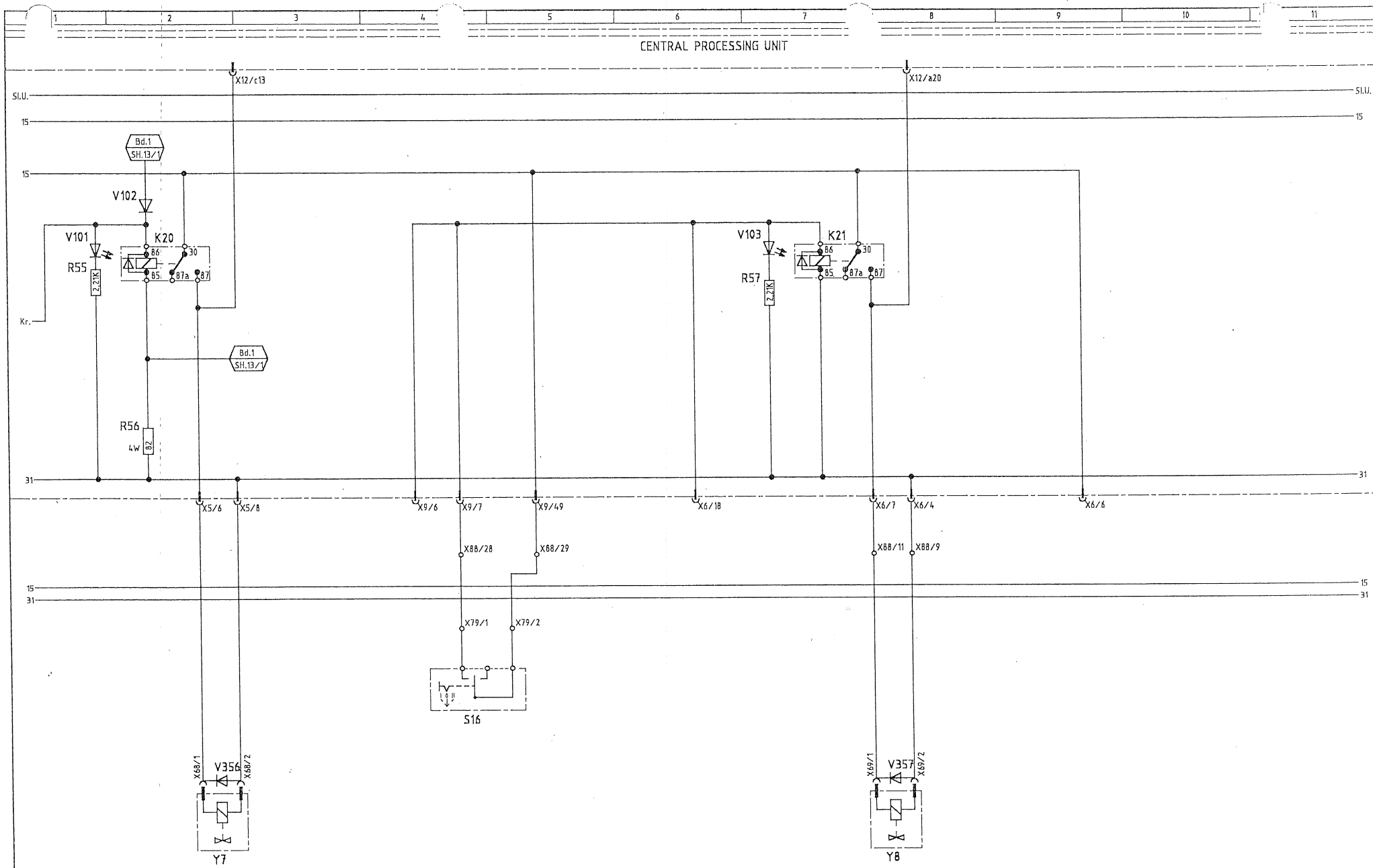
7800.715.20.18/000

Blatt 12
19 Bl.



PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:		
DIN		3				7				DATE	20.08.1996	ATLAS-WEYHAUSEN GmbH	GB	STROMLAUFPLAN PL1	
MATERIAL		2				6				DESIGN.	U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST		7800.715.20.06/000	SHEET 10
		1	4471	06.08.96	Panzram	5				CHECKED					SI
		IND.	MODIFICAT.	DATE	NAME	IND.	MODIFICATION	DATE	NAME	DATE	24.07.1997				

ALL RIGHTS RESERVED DIN 34



Creep Speed

(Mobile)

Switch
Driving Lever
Middle

Motor Adjustment

(Caterpillar)

Solenoid Valve current-carrying:
= Slow Drive

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	27.11.1996		
MATERIAL		2				6				DESIGN.	U. Panzram		
		1	4471	06.08.96	Panzram	5				CHECKED			
ALL RIGHTS RESERVED DIN 34		IND.	MODIFICAT.	DATE	NAME	IND.	MODIFICATION	DATE	NAME	DATE	24.07.1997		

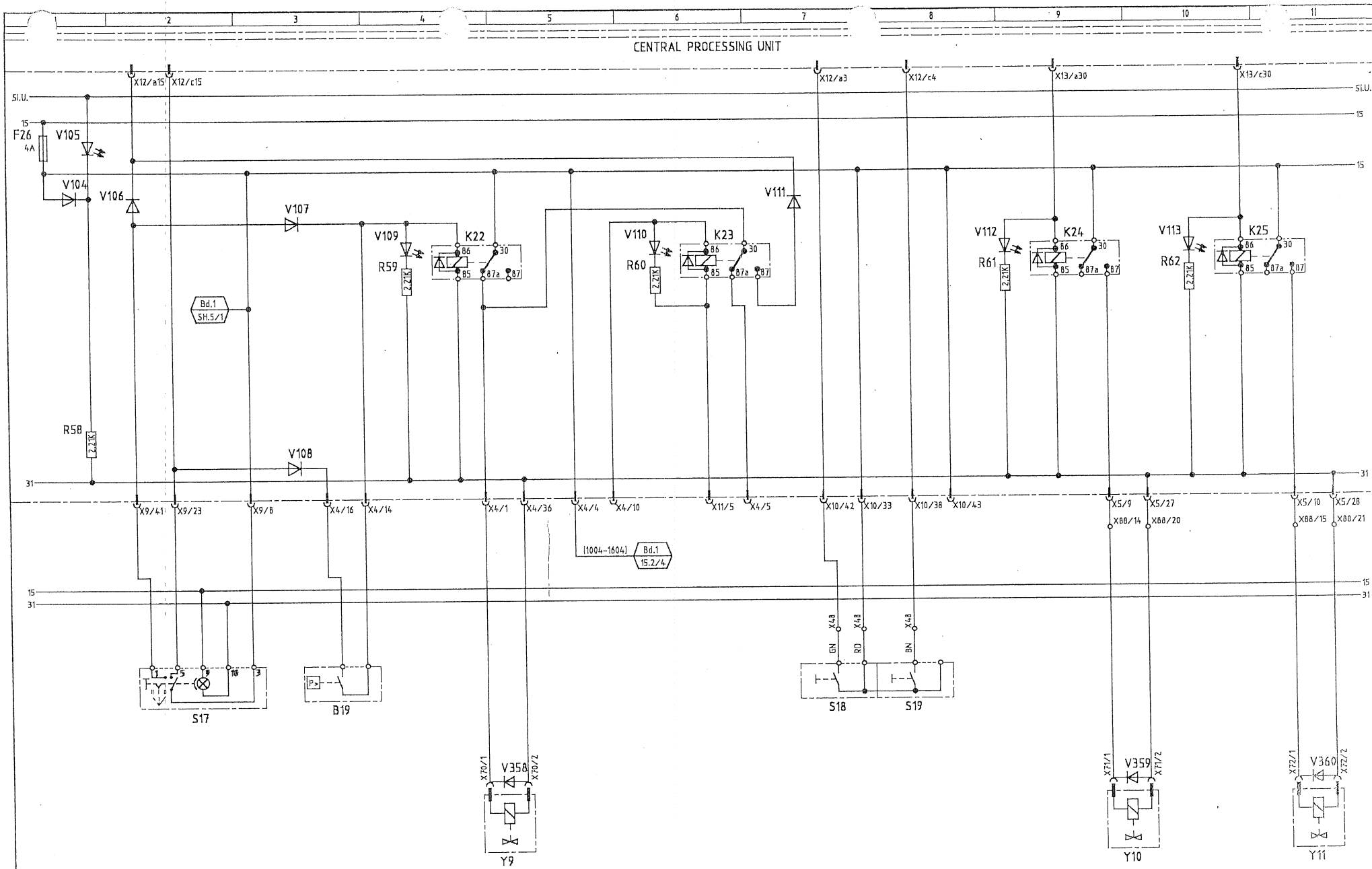
ATLAS-WEYHAUSEN GmbH
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GB

STROMLAUFPLAN PL1

7800.715.20.06/000

SHEET 11
SH



Full Floating Axle Inhibition

(Mobile)

Solenoid Valve current-carrying:
= Axle free

Turn Grab Left Button Operating Handle Right Inside

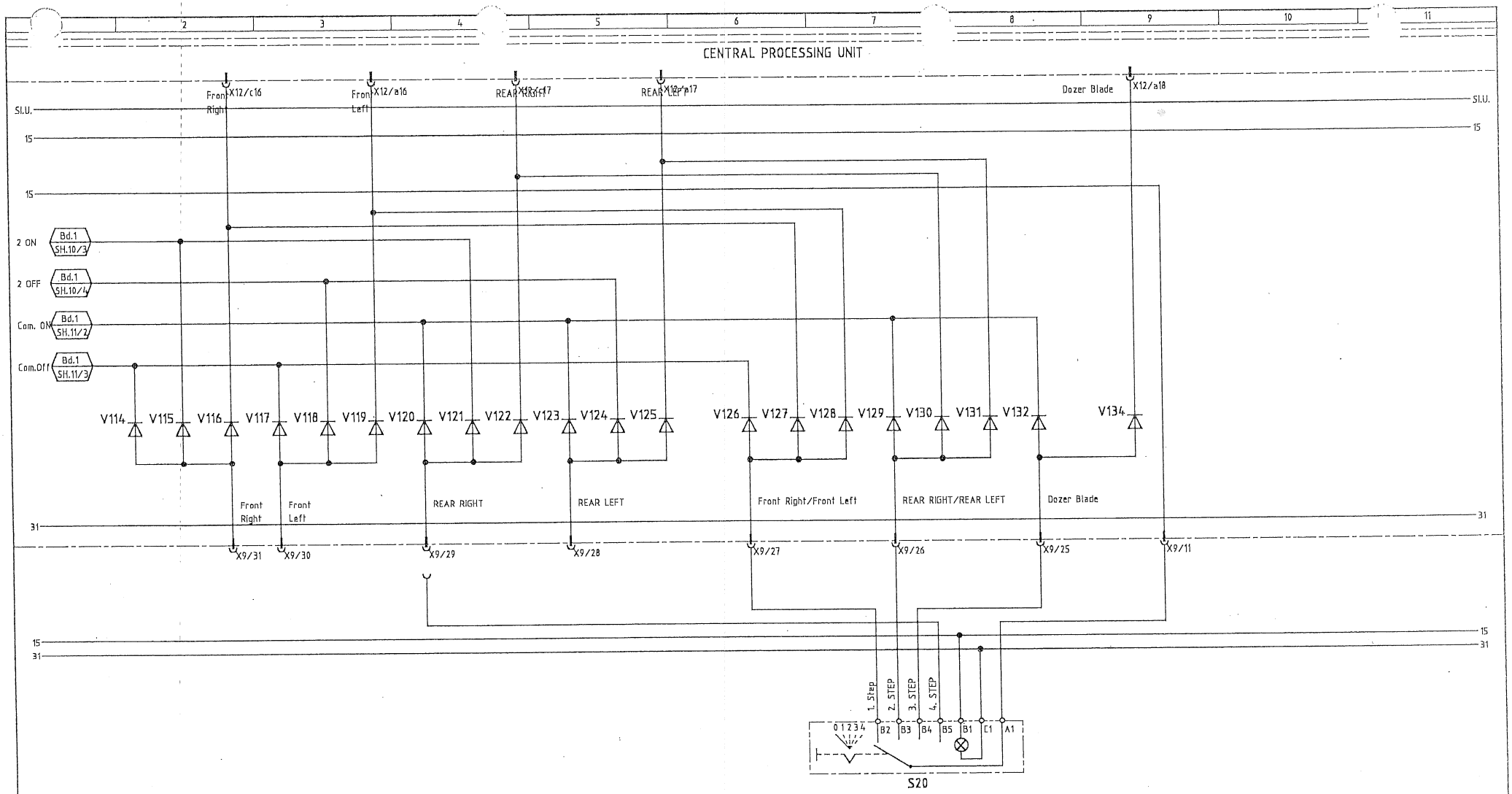
Turn Grab Right Button Operating Handle Right Outside

Turn Grab Left

Turn Grab Right

(1004-1704 / EXTRA)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	20.08.1996		
MATERIAL		2				6				DESIGN.	U. Panzram	ATLAS-WEYHAUSEN GmbH	STROMLAUFPLAN PL1
		1	4471	06.08.96	Panzram	5				CHECKED		MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST	GB 7800.715.20.06/000
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	24.07.1997		SHEET 12 SI



Claw Control

Right Front	Left Front	Right Rear	Left Rear	Front	Rear	Dozer Blade
2. Step	1. Step	when in individual control: 4. Step	3. Step			

(Mobile EXTRA)

PART-NR.:		4				8				
DIN		3				7				
MATERIAL		2				6				
		1	4471	06.08.96	Panzram	5				

Dwg with CAD
DATE 20.08.1996
DESIGN. U. Panzram
CHECKED

PURGE DATE FOR FABRICATION:

NAME:

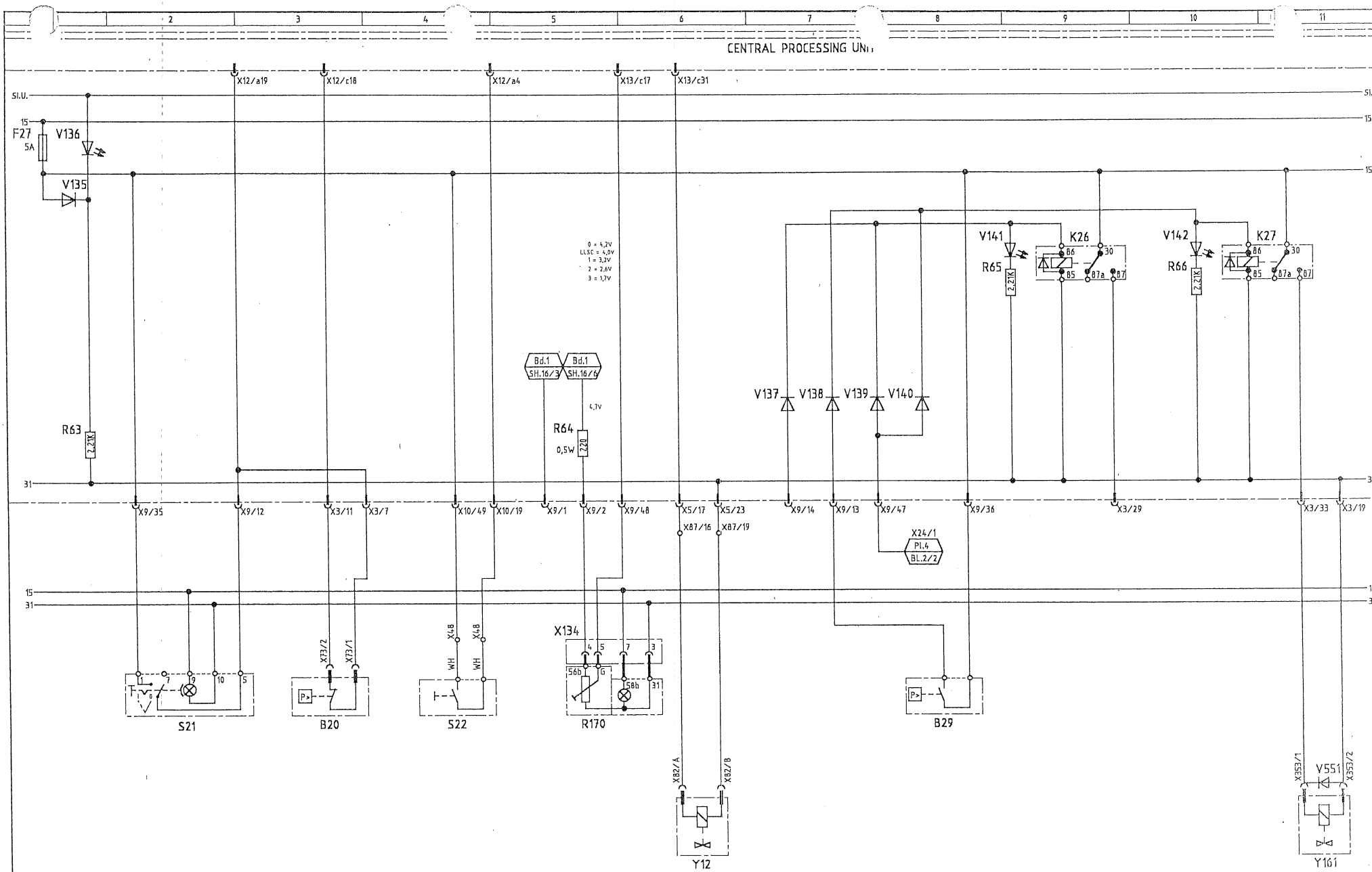
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SHEET 13



Display Excess Load

(EXTRA)

Fine Control

Button
Operating Handle Right
Below

(Air-Cooled 1304 EXTRA)

Push Switch
Drive

(1604 WITH 90KW-MOTOR)

PART-NR.:		4				8				Dwg with CAD	PURGE DATE FOR FABRICATION: NAME:
DIN		3				7				DATE 27.11.1996	
MATERIAL		2				6				DESIGN. U. Panzram	
		1	4471	06.08.96	Panzram	5				CHECKED	
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE 02.12.1996	

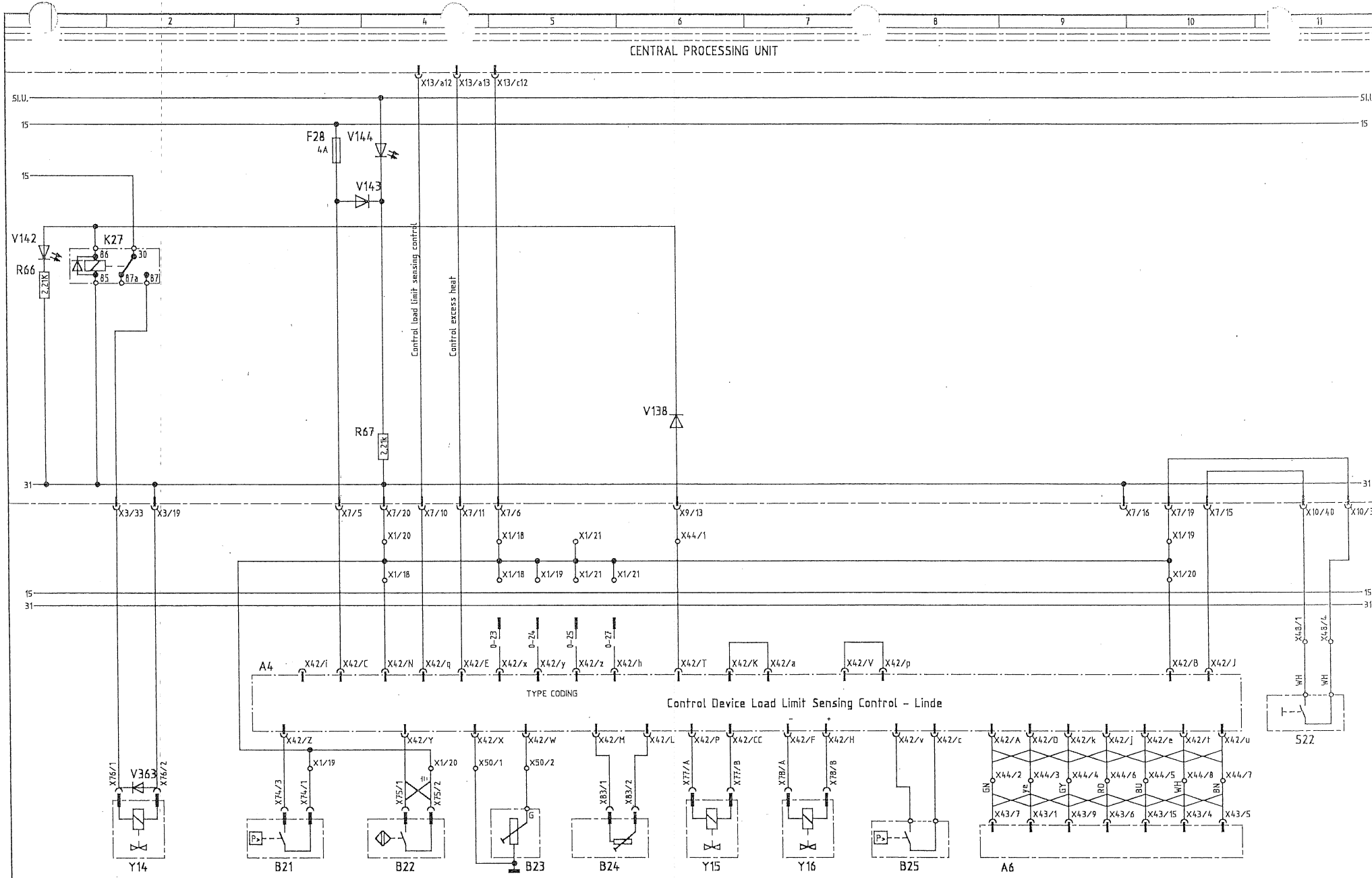
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

GB

STROMLAUFPLAN PL1

7800.715.20.06/000

SHEET 14
SH



PART-NR.:		4				8				Dwg with CAD		
DIN		3				7				DATE	20.08.1996	
MATERIAL		2				6				DESIGN.	U. Panzram	
		1	4471	06.08.96	Panzram	5				CHECKED		
ALL RIGHTS RESERVED PURSU		IND.	MODIFICAT.	DATE	NAME	IND.	MODIFICATION	DATE	NAME	DATE	24.07.1997	

PURGE DATE FOR FABRICATION: NAME:

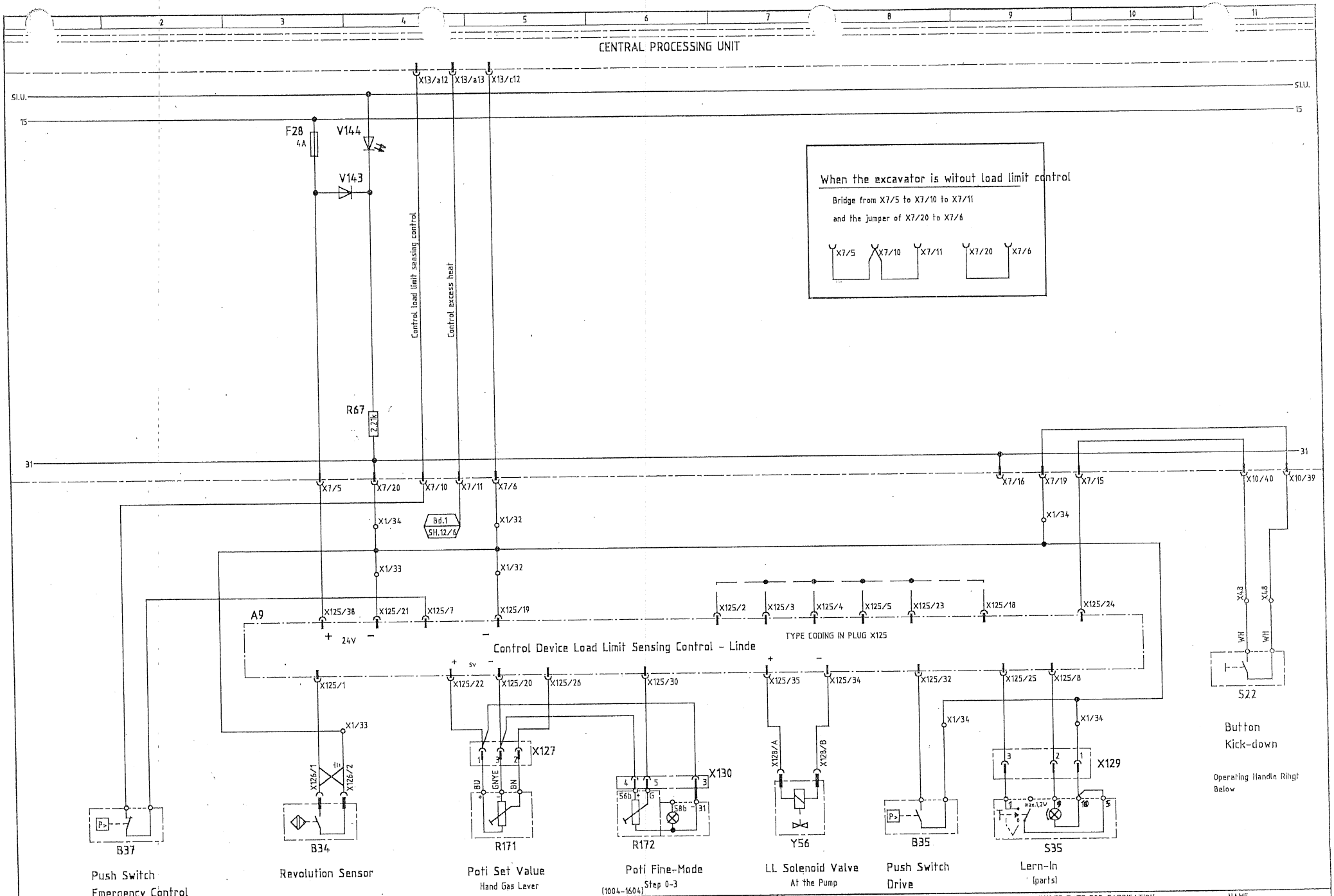
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

GB

STROMLAUFPLAN PL1

7800.715.20.06/000

SHEET 15.1
SU



PART-NR.:		4				8				Dwg with CAD		
DIN		3				7				DATE	20.08.1996	
MATERIAL		2				6				DESIGN.	U. Panzram	
		1	4471	06.08.96	Panzram	5				CHECKED		
		IND.	MODIFICAT.	DATE	NAME	IND.	MODIFICATION	DATE	NAME	DATE	02.12.1996	

PURGE DATE FOR FABRICATION: NAME:

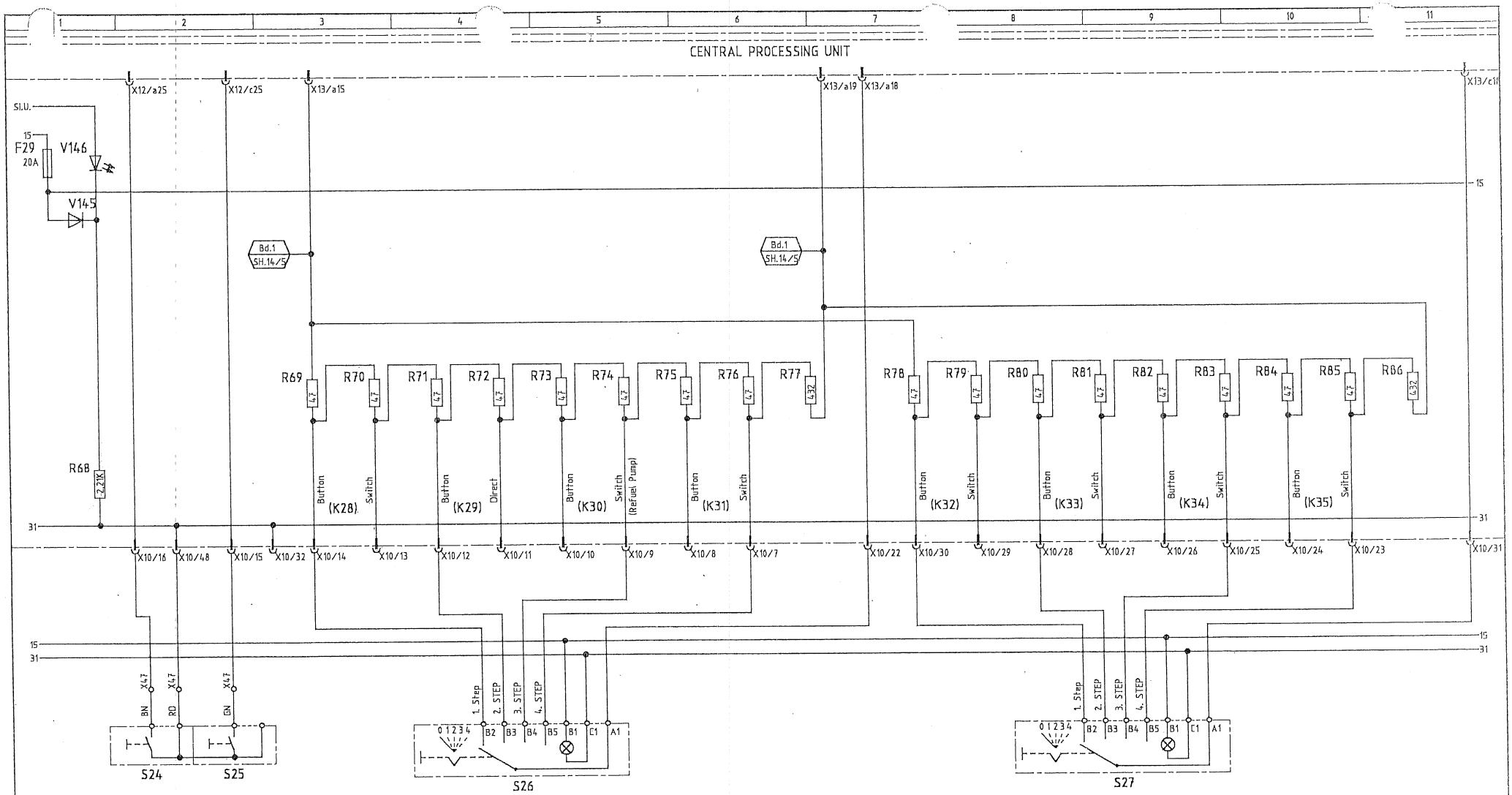
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

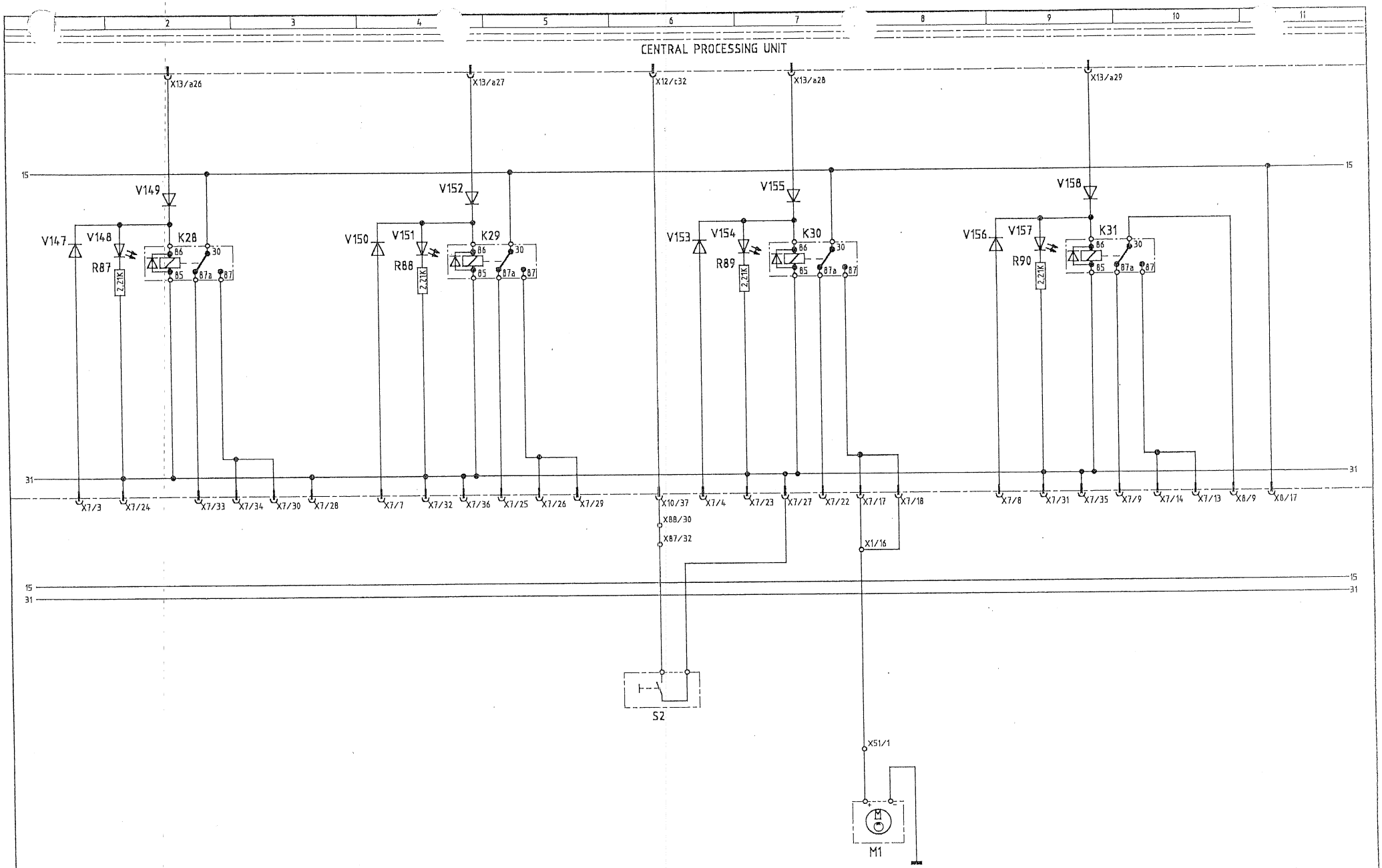
GB

STROMLAUFPLAN PL1

7800.715.20.06/000

SHEET 15.2
SH


CENTRAL PROCESSING UNIT
X12/a25
X12/c25
X13/a15
X13/a19
X13/a18
X13/c18
SI.U.
15
F29
20A
V146
V145
Bd.1
SH.14/5
Bd.1
SH.14/5
R69
R70
R71
R72
R73
R74
R75
R76
R77
R78
R79
R80
R81
R82
R83
R84
R85
R86
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.7
4.32
4.32
R68
2.21K
Button
(K28)
Switch
Button
(K29)
Direct
Button
(K30)
Switch
(Refuel Pump)
Button
(K31)
Switch
Button
(K32)
Switch
Button
(K33)
Switch
Button
(K34)
Switch
Button
(K35)
Switch
31
X10/16
X10/48
X10/15
X10/32
X10/14
X10/13
X10/12
X10/11
X10/10
X10/9
X10/8
X10/7
X10/22
X10/30
X10/29
X10/28
X10/27
X10/26
X10/25
X10/24
X10/23
X10/31
15
31
X47
X47
X47
BN
RD
GN
S24
S25
1. Step
2. STEP
3. STEP
4. STEP
0 1 2 3 4
B2
B3
B4
B5
B1
C1
A1
S26
S27
Caterpillar with Adjustable Boom:
Line 10-25 changed to X10/26
Aaxiliary Tools Left
Button
Operating Handle Left
Outside
Auxiliary Tools Right
Button
Operating Handle Left
Inside
Preselection Switch L.
For Button
Operating Handle Left
Outside
Preselection Switch R.
For Button
Operating Handle Left
Inside
PART-NR.:
DIN
MATERIAL
ALL RIGHTS RESERVED DIN 34
IND
MODIFICAT.
DATE
NAME
Dwg with CAD
DATE 20.08.1996
DESIGN. U. Panzram
CHECKED
02.12.1996
PURGE DATE FOR FABRICATION:
NAME:
ATLAS-WEYHAUSEN
MASCHINENFABRIK GmbH
STEDINGER STR.324
D-27751 DELMENHORST
GB
STROMLAUFPLAN PL1
7800.715.20.06/000
SHEET 16
SH



Output For Auxiliary Tools Left

Output For Auxiliary Tools Left

Button
Battery Case

Refuelling System

Output For Auxiliary Tools Left

(EXTRA)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	20.08.1996		
MATERIAL		2				6				DESIGN.	U. Panzram		
		1	4471	06.08.96	Panzram	5				CHECKED			
ALL RIGHTS RESERVED DIN 34		IND.	MODIFICAT.	DATE	NAME	IND.	MODIFICATION	DATE	NAME	DATE	02.12.1996		

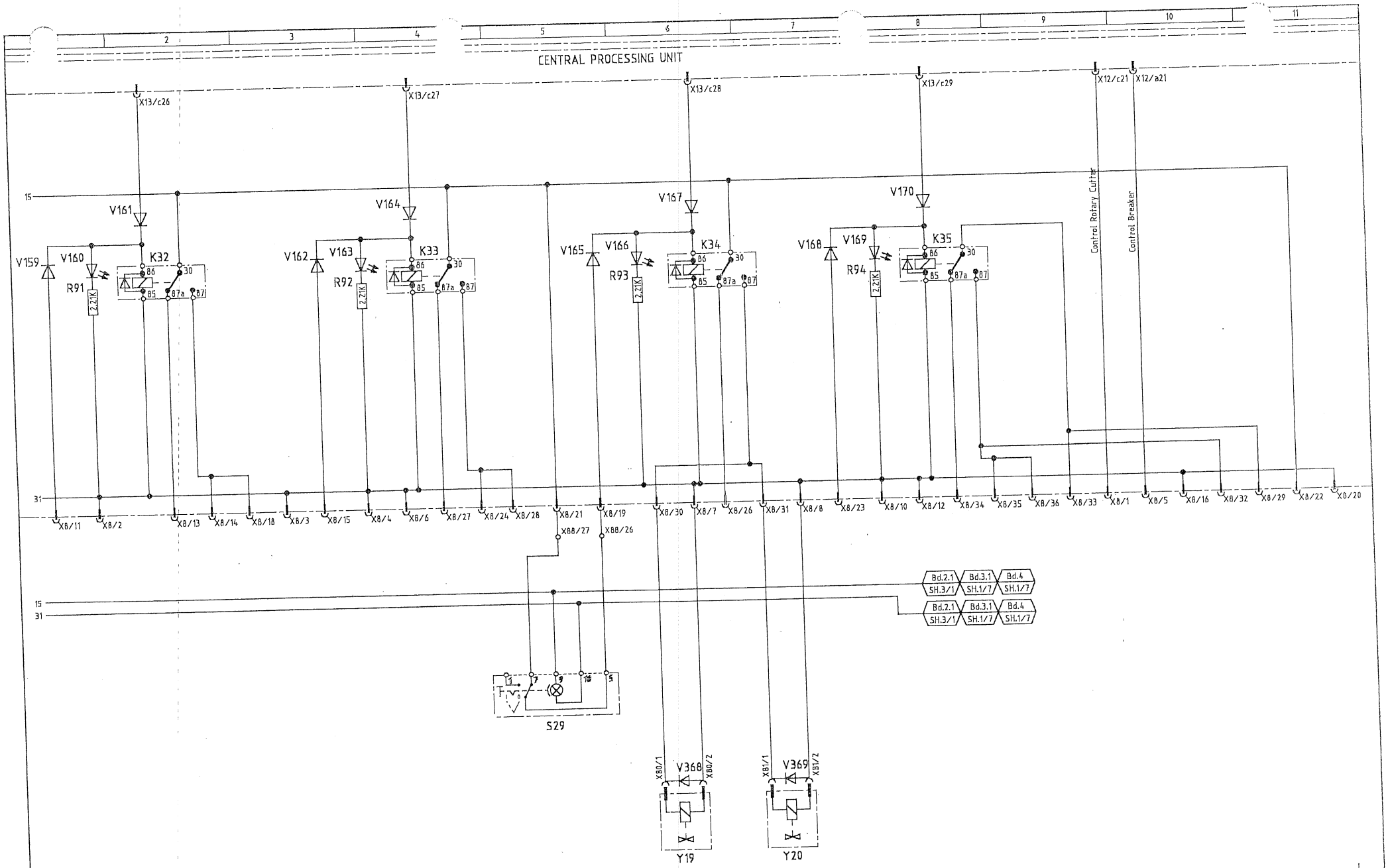
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

GB

STROMLAUFPLAN PL1

7800.715.20.06/000

SHEET 17
SH



OUTPUT FOR AUXILIARY TOOLS RIGHT

OUTPUT FOR AUXILIARY TOOLS RIGHT

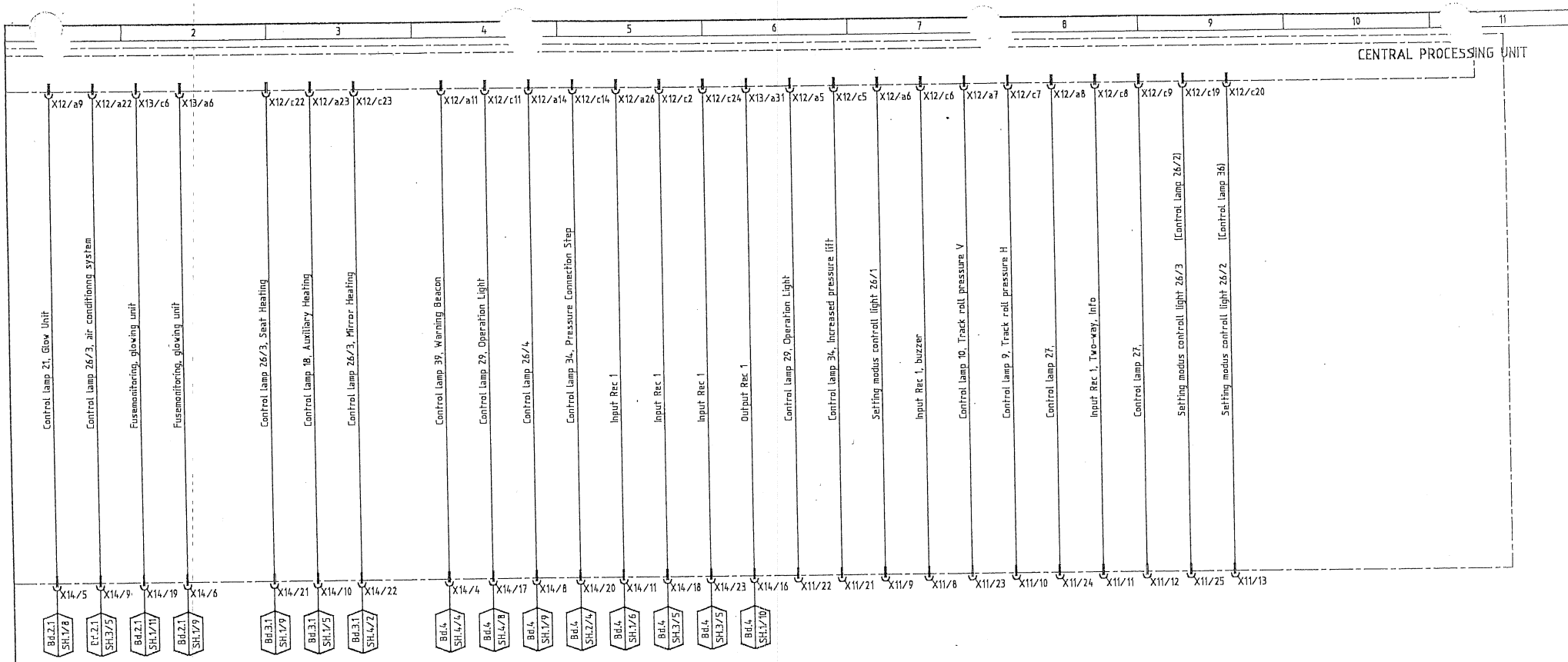
Switch: Driving > ADJ. Boom

Add. Operation by control handle left: adjustabel boom > driving

(Caterpillar With Hydr. Adjustable Boom)

Output For Auxiliary Tools Right

PART-NR.:		4				6	Dwg with CAD	PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7	DATE 20.08.1996	ATLAS-WEYHAUSEN GmbH	STROMLAUFPLAN PL1
MATERIAL		2				6	DESIGN. U. Panzram	MASCHINENFABRIK STEDINGER STR.324	GB
		1	1.1/71	06.08.96	Panzram	5	CHECKED		7800.715.20.06/000
									SHEET 18



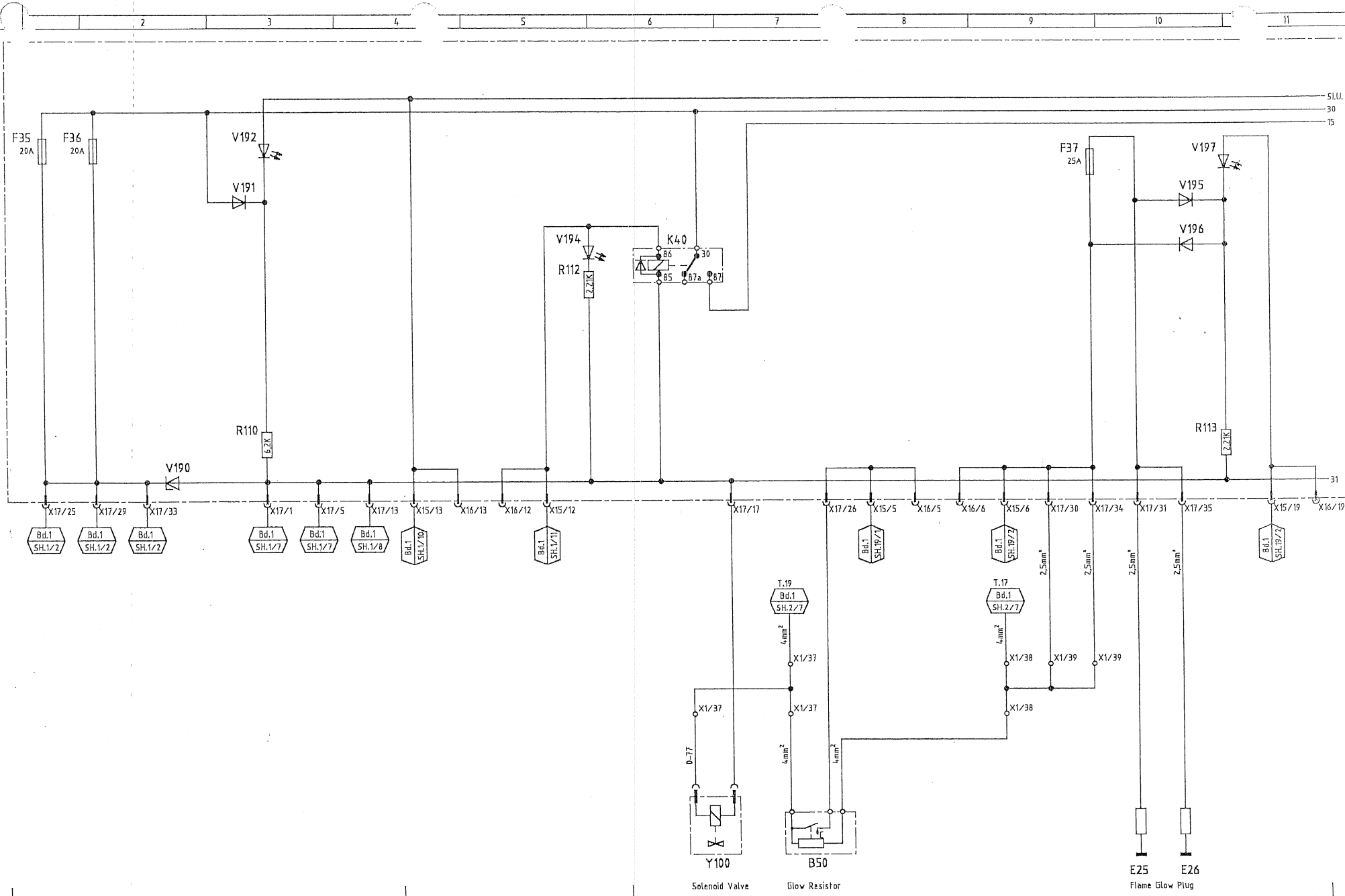
Bd.2.1

Bd.3.1

Bd.4

Two-way Digger

PART-NR.:		4				8				Dwg with CAD	PURGE DATE FOR FABRICATION:	NAME:	
DIN		3				7				DATE 20.08.1996	ATLAS-WEYHAUSEN GmbH	GB	STROMLAUFPLAN PL1
MATERIAL		2				6				DESIGN. U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST		7800.715.20.06/000
		1	4471	06.08.96	Panzram	5				CHECKED			SHEET 19
							MODIFICATION	DATE	NAME	DATE			SH



PART-NR.:		4				8			Dwg with CAD		
DIN		3				7			DATE	20.08.1996	
MATERIAL		2				6			DESIGN.	U. Panzram	
		1				5			CHECKED		

PURGE DATE FOR FABRICATION: NAME:

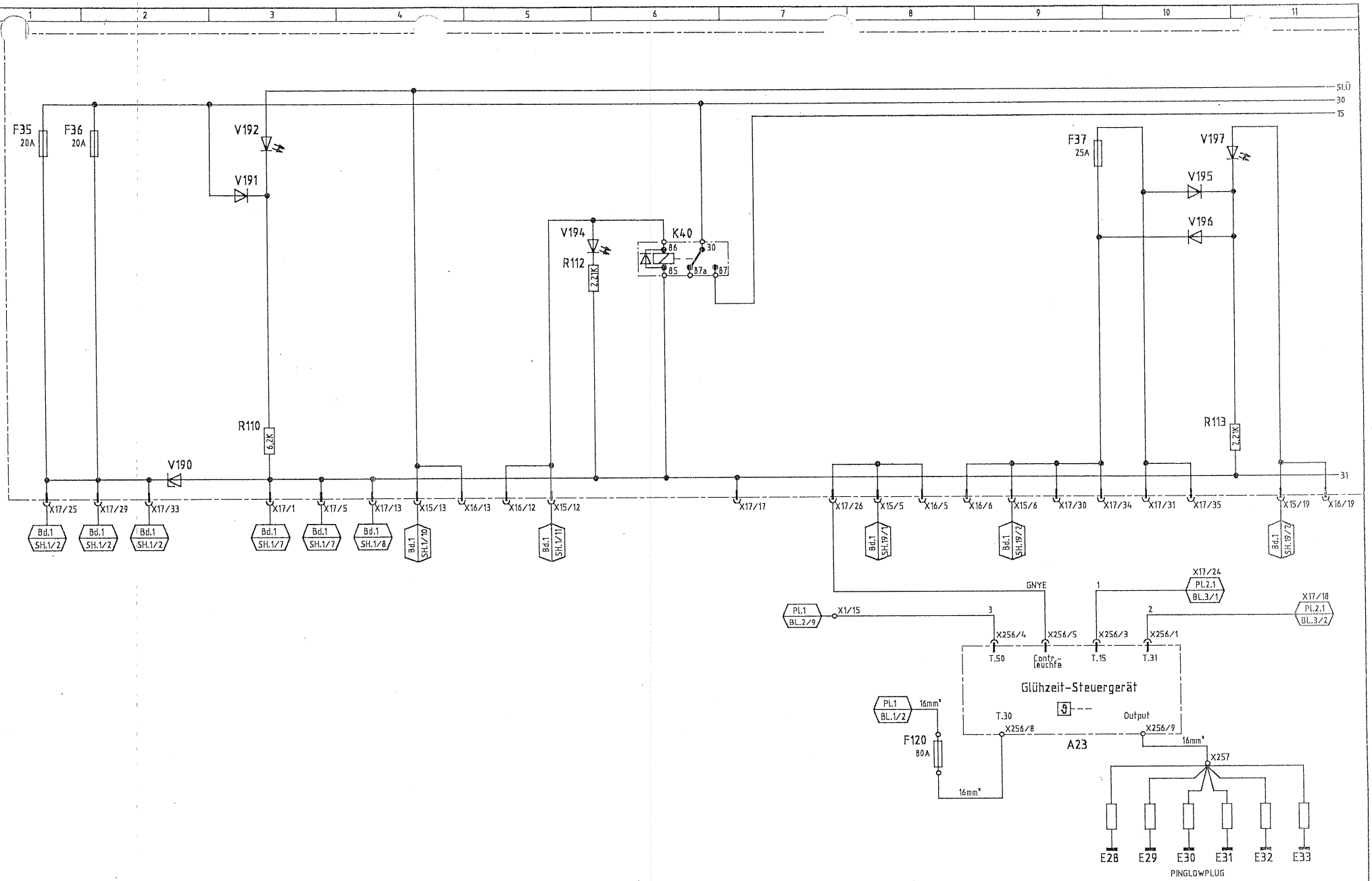
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324

GB

STROMLAUFPLAN PL2.1

7800 715 20 07/000

SHEET 1.1



Mains Supply

(EXTRA)

Main Relay

(EXTRA)

Glow System

(Water-Cooled EXTRA)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	20.08.1996		
MATERIAL		2				6				DESIGN.	U. Panzram		
		1				5				CHECKED			
ALL RIGHTS RESERVED DIN 34		IND.	MODIFICAT.	DATE	NAME	IND.	MODIFICATION	DATE	NAME	DATE	24.07.1997		

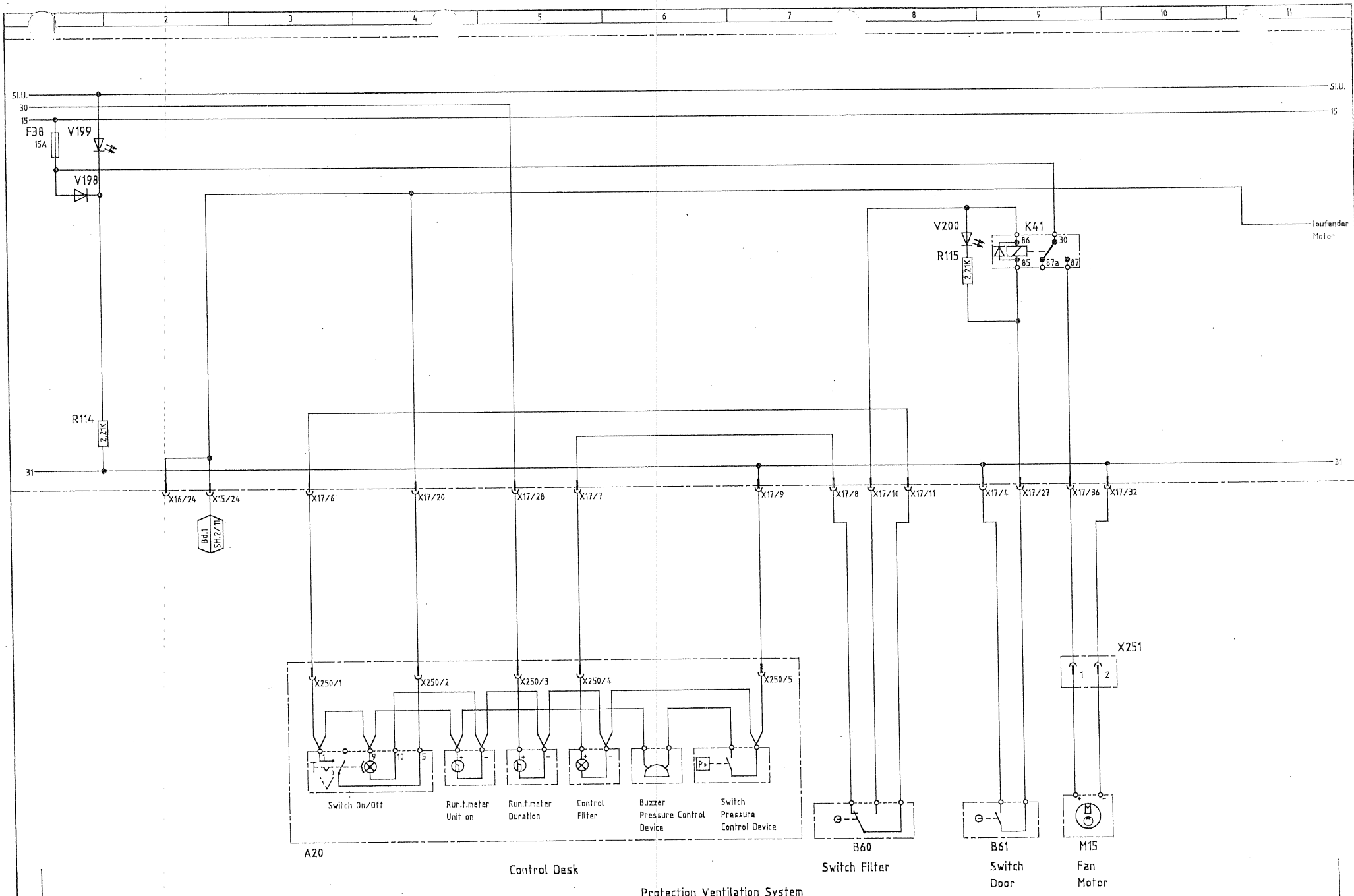
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

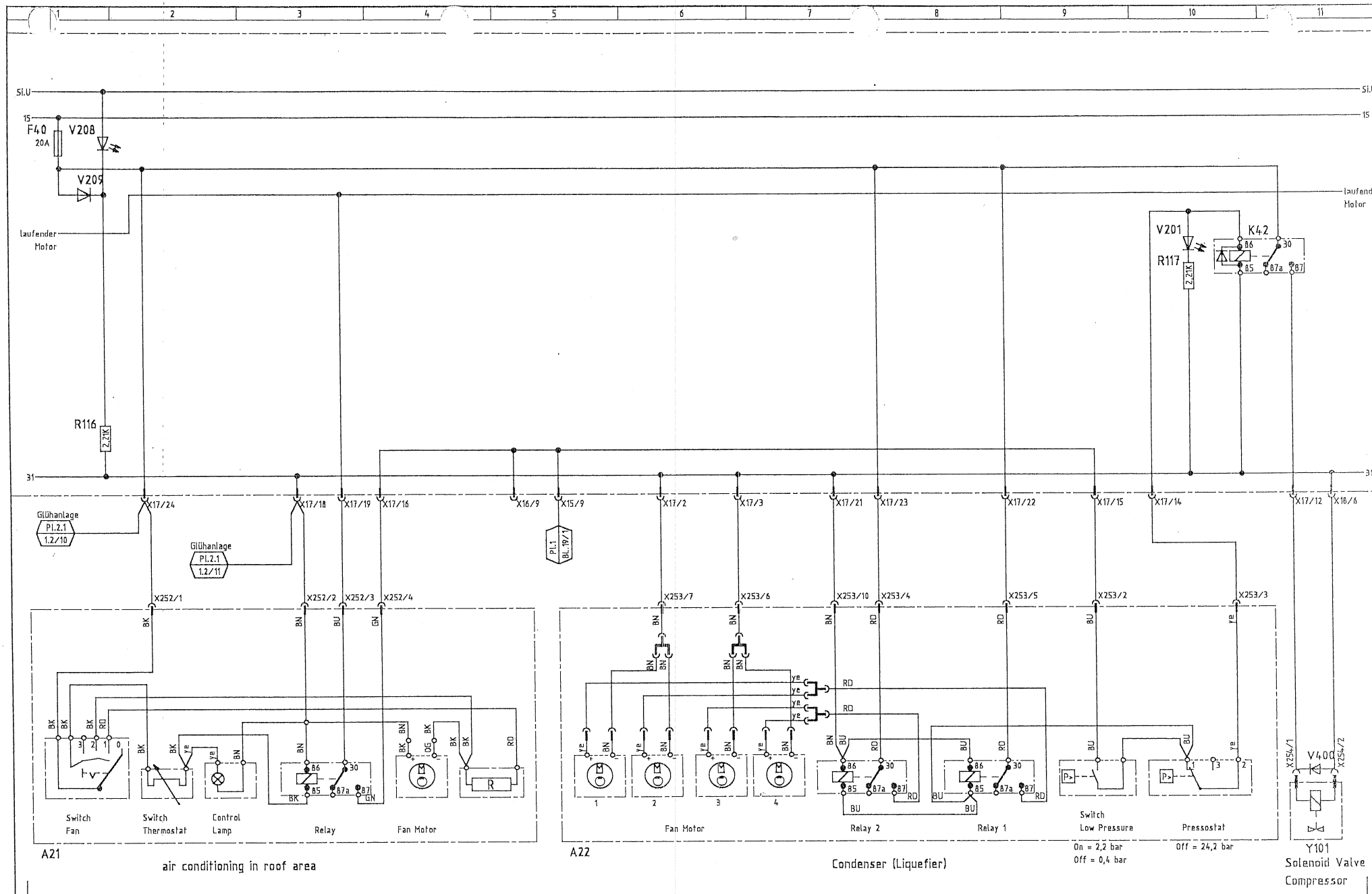
GB

STROMLAUFPLAN PL2.1

7800.715.20.07/000

SHEET 1.2
SH

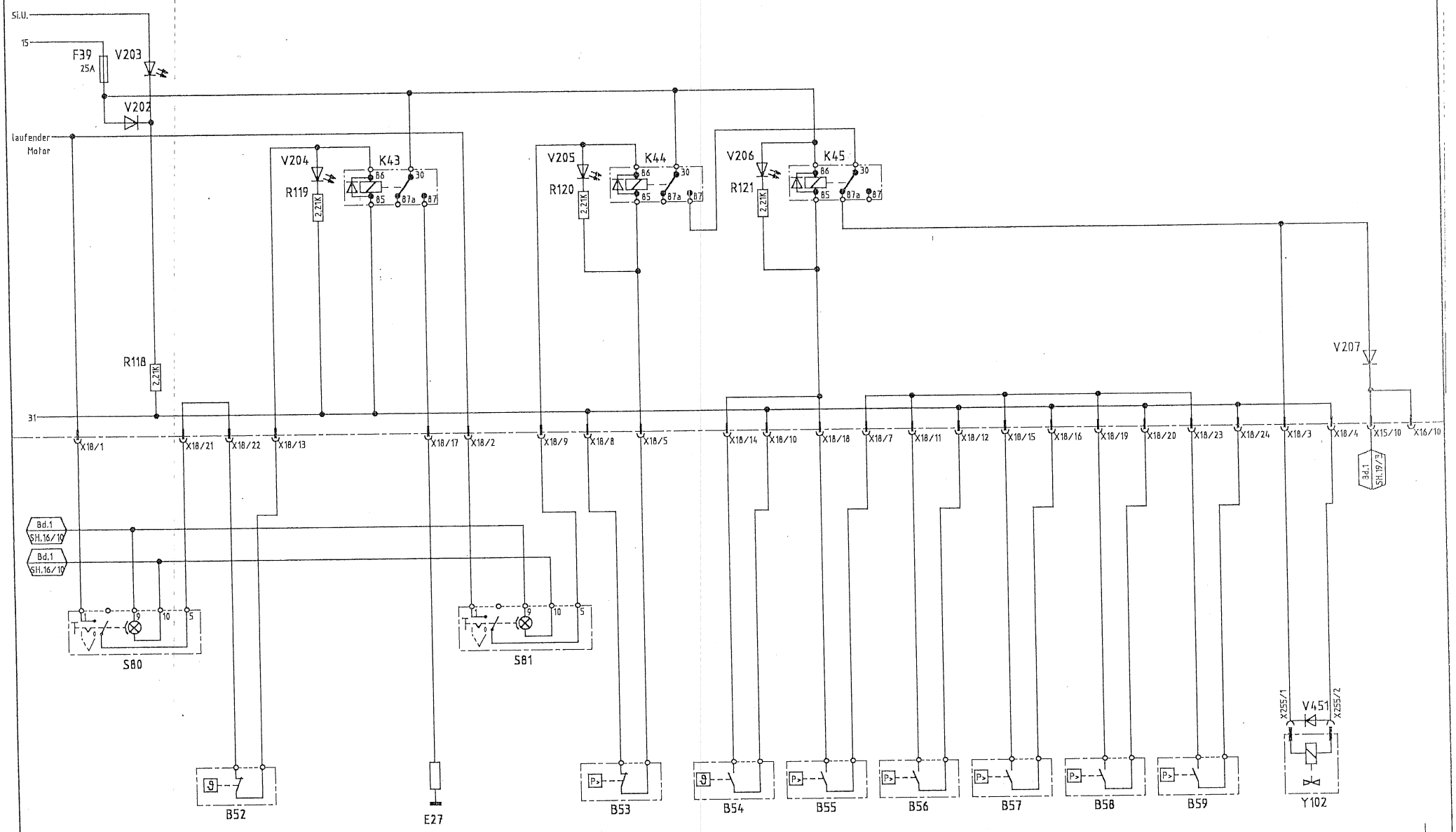

2
3
4
5
6
7
8
9
10
11
SI.U.
30
15
F38
15A
V199
V198
R114
2.2IK
31
X16/24
X15/24
Bd.1
SH.2/11
X17/6
X17/20
X17/28
X17/7
X17/9
X17/8
X17/10
X17/11
X17/4
X17/27
X17/36
X17/32
V200
K41
R115
2.2IK
86
30
85
87a
87
laufender
Motor
X250/1
X250/2
X250/3
X250/4
X250/5
Switch On/Off
Run.t.meter
Unit on
Run.t.meter
Duration
Control
Filter
Buzzer
Pressure Control
Device
Switch
Pressure
Control Device
A20
Control Desk
B60
Switch Filter
B61
Switch
Door
X251
M15
Fan
Motor
Protection Ventilation System
(EXTRA)
PART-NR.:
DIN
MATERIAL
ALL RIGHTS RESERVED DIN 34
IND
MODIFICAT.
DATE
NAME
MODIFICATION
Dwg with CAD
DATE 20.08.1996
DESIGN. U. Panzram
CHECKED
DATE 24.07.1997
PURGE DATE FOR FABRICATION:
NAME:
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST
GB
STROMLAUFPLAN PL2.1
7800.715.20.07/000
SHEET 2
SH



Air Conditioning System

(EXTRA)

PART-NR.:			4					8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:					
DIN			3					7				DATE	20.08.1996	ATLAS-WEYHAUSEN GmbH		STROMLAUFPLAN PL2.1					
MATERIAL			2					6				DESIGN.	U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST	GB	7800.715.20.07/000		SHEET 3			
			1					5				CHECKED						SI1			
ALL RIGHTS RESERVED DIN 34			IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME		DATE	24.07.1997								



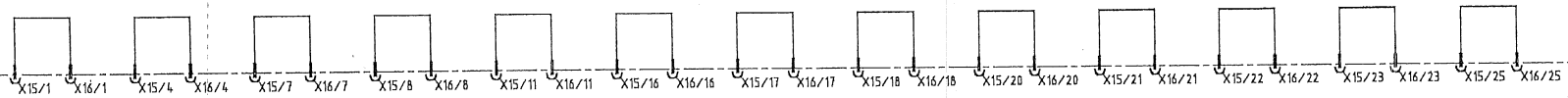
Fuel Preheating

(EXTRA)

Oil Pressure Heating

(EXTRA)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	20.08.1996	ATLAS-WEYHAUSEN GmbH	STROMLAUFPLAN PL2.1
MATERIAL		2				6				DESIGN.	U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST	GB
		1				5				CHECKED			7800.715.20.07/000
ALL RIGHTS RESERVED DIN 34	IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME		DATE	24.07.1997		SHEET 4



PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	20.08.1996		
MATERIAL		2				6				DESIGN.	U. Panzram		
		1				5				CHECKED			
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	24.07.1997		

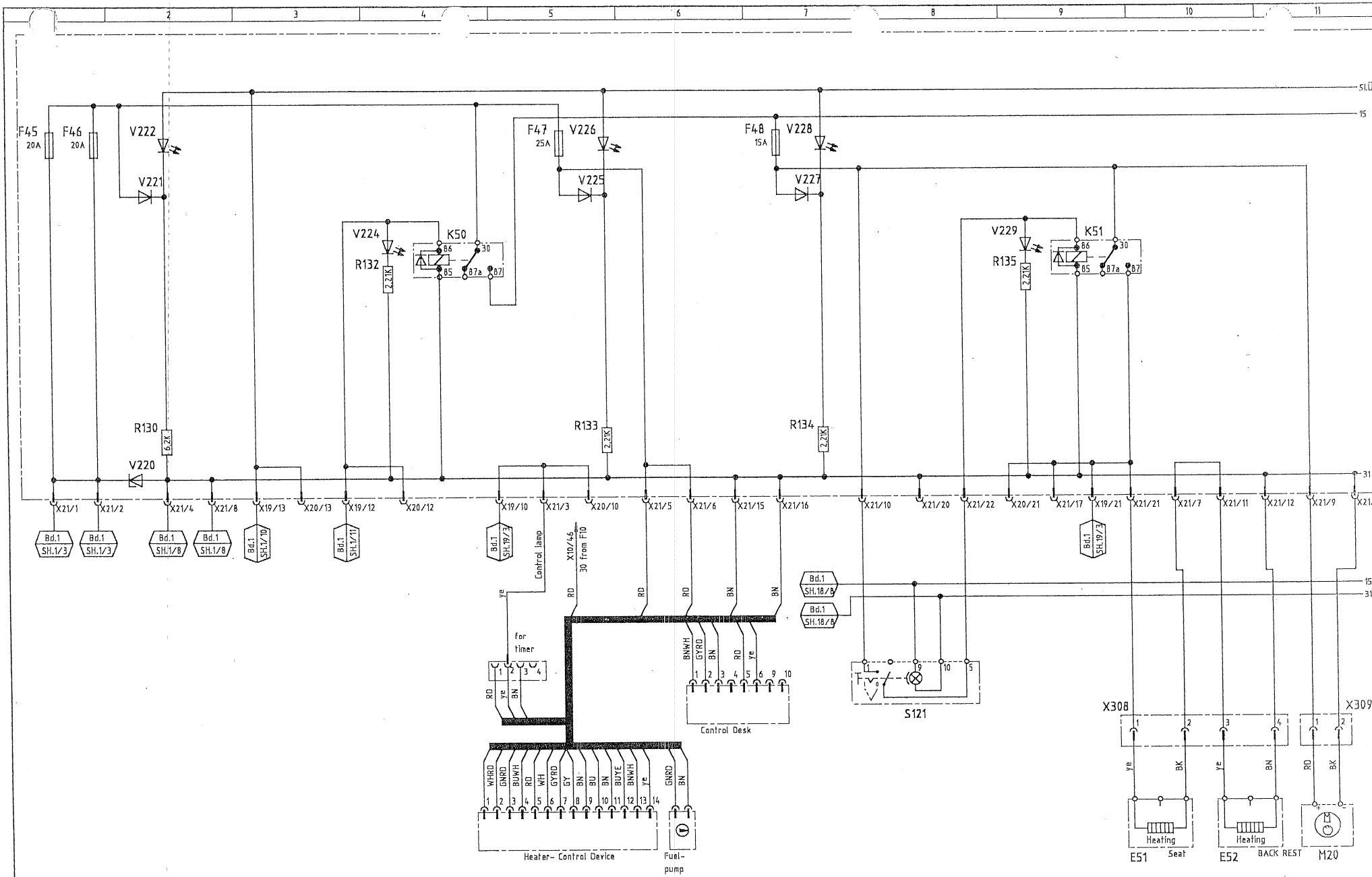
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

GB

STROMLAUFPLAN PL2.1

7800.715.20.07/000

SHEET 5
51



Mains Supply

(EXTRA)

Main Relay

(EXTRA)

Auxiliary Heating

(EXTRA)

Seat Heating

(EXTRA)

Seat Adjustment Compressor

(EXTRA)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	20.08.1996		
MATERIAL		2				6				DESIGN.	U. Panzram		
		1				5				CHECKED			
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	24.07.1997		

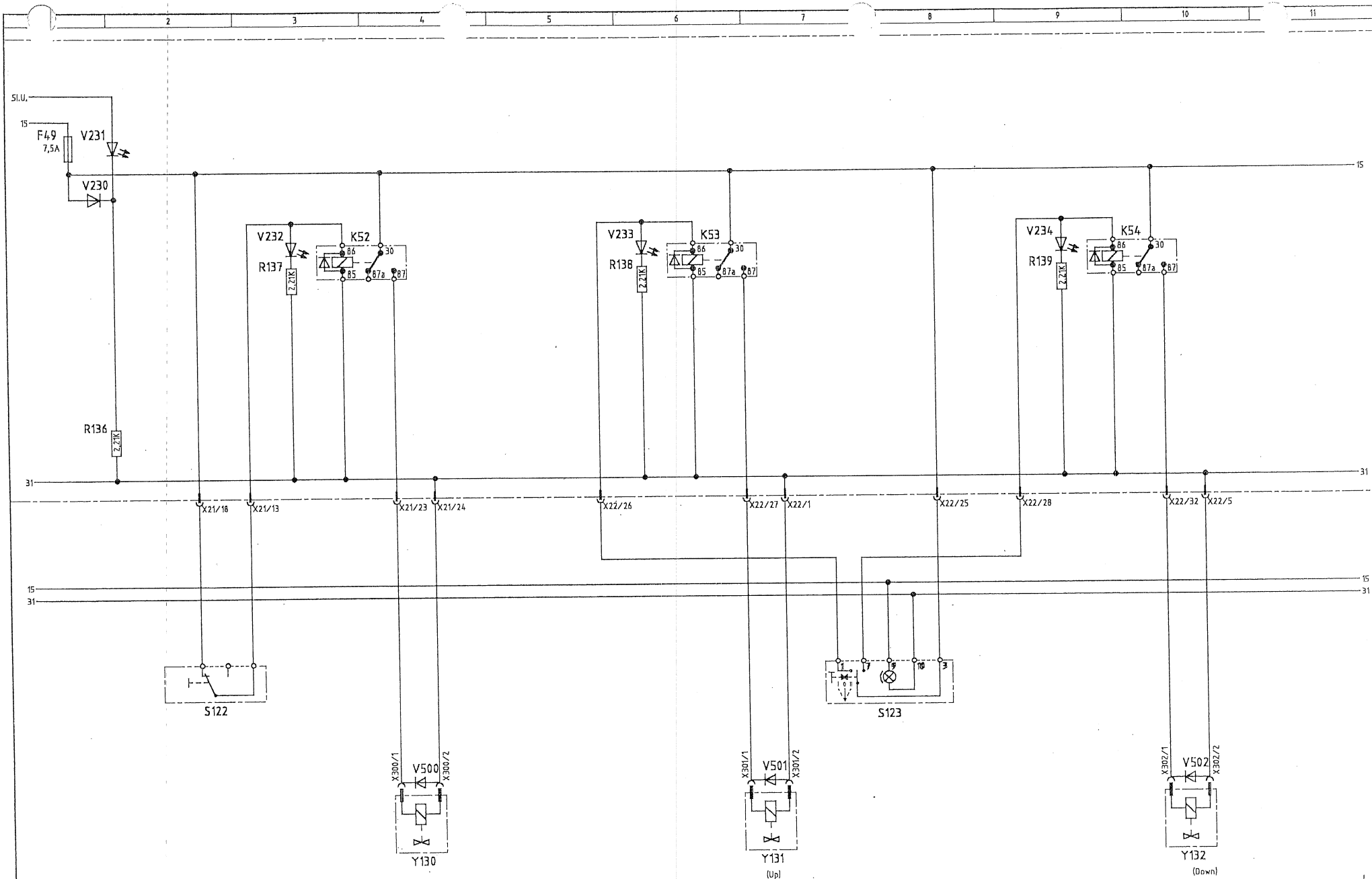
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

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STROMLAUFPLAN PL3.1

7800.715.20.08/000

SHEET 1
SH



Emergency Movement For Vario, Lift Bethwen

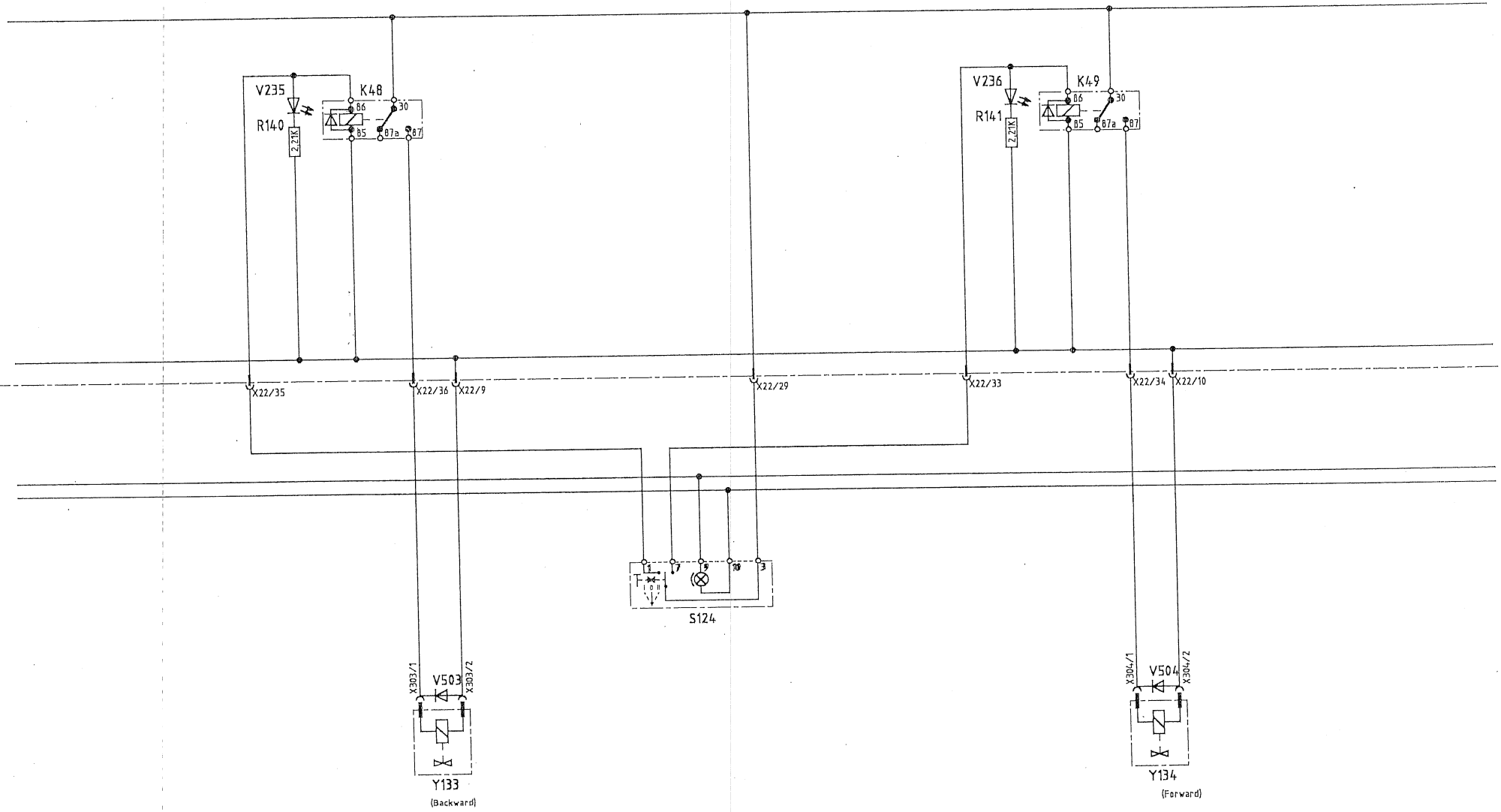
(1304-1804 EXTRA)

Vario Cabin or Cabin Lift Up/Down

(Vario: 1704-1804 EXTRA / Cabin Lift: 1304-1804 EXTRA)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	20.08.1996	ATLAS-WEYHAUSEN GmbH	STROMLAUFPLAN PL3.1
MATERIAL		2				6				DESIGN.	U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST	GB
		1				5				CHECKED			7800.715.20.08/000
		IND.	MODIFICAT.	DATE	NAME	IND.	MODIFICATION	DATE	NAME	DATE	24.07.1997		SHEET 2 SH.

ALL RIGHTS RESERVED DIN 34



Vario Cabin Forward/Backward

(1704-1804 EXTRA)

PART-NR.:		4				8					
DIN		3				7					
MATERIAL		2				6					
		1				5					

Dwg with CAD	
DATE	20.08.1996
DESIGN.	U. Panzram
CHECKED	

PURGE DATE FOR FABRICATION:

NAME:

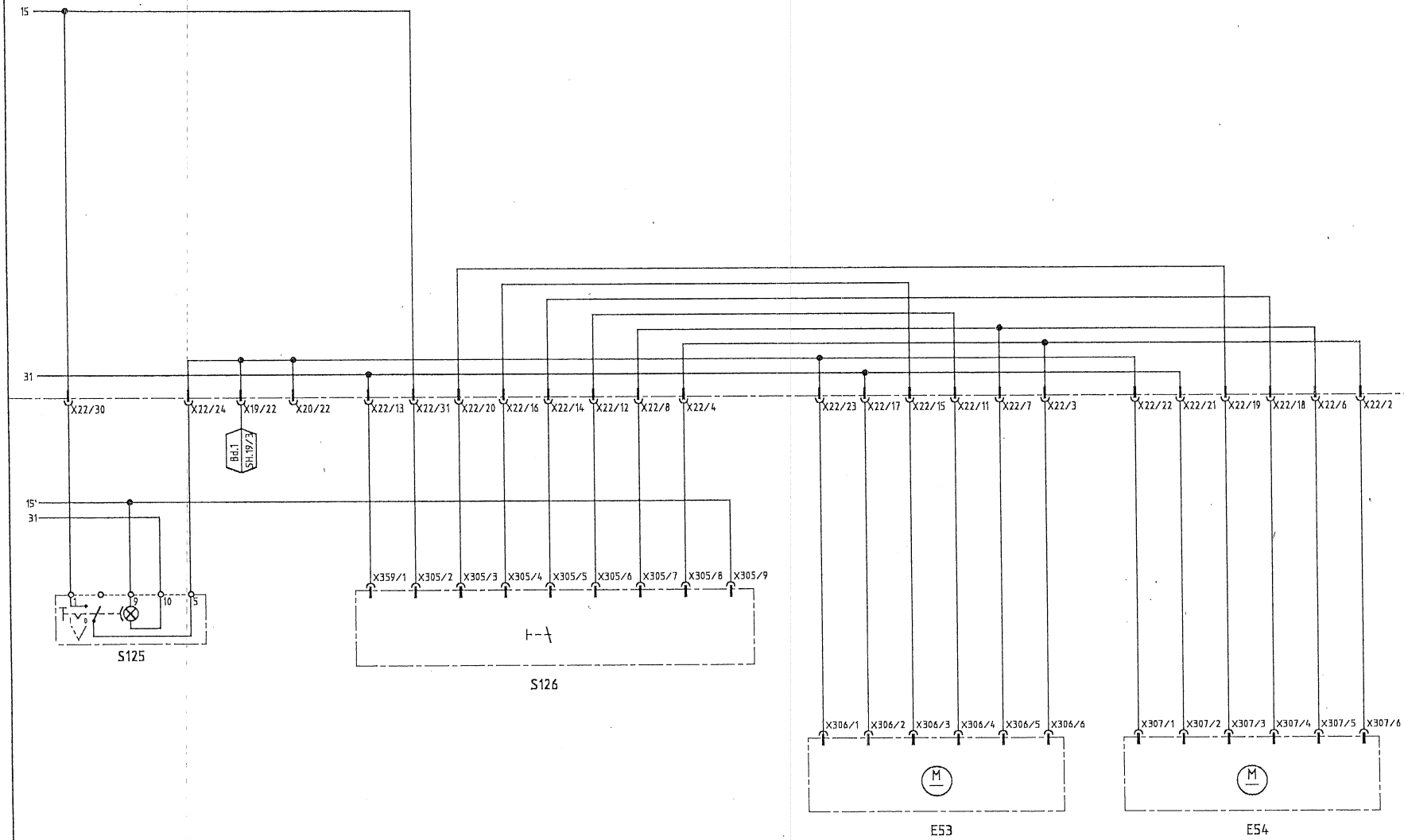
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

GB

STROMLAUFPLAN PL3.1

7800.715.20.08/000

SHEET 3



Mirror Heating

(EXTRA)

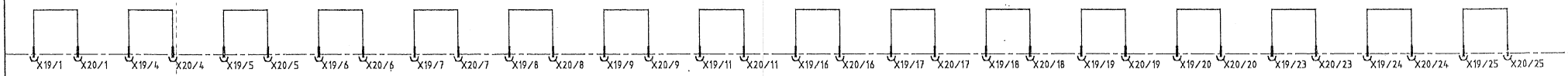
Mirror Adjustment

(EXTRA)

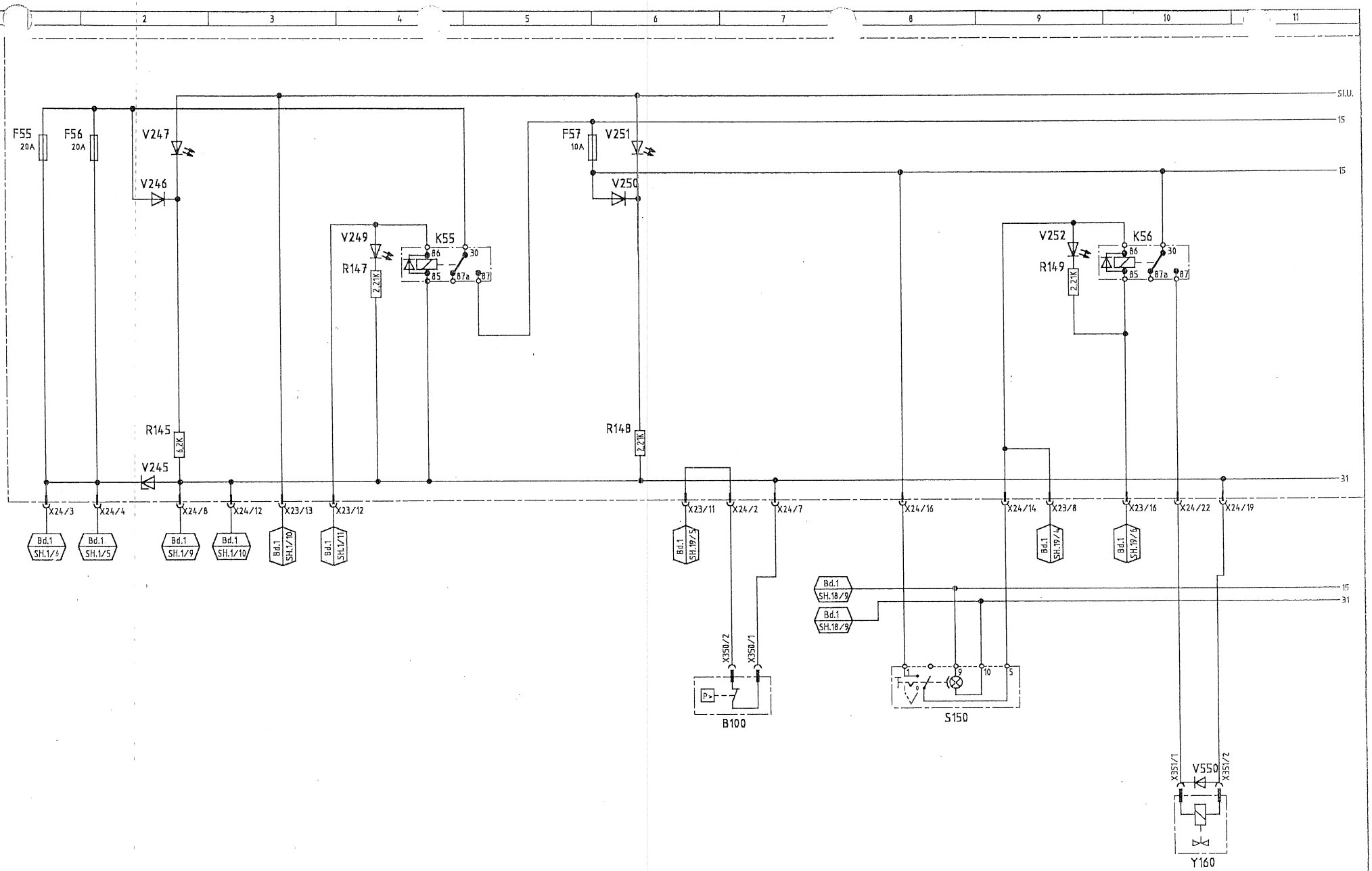
Mirror Left

Mirror Right

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:	
DIN		3				7				DATE	20.08.1996				
MATERIAL		2				6				DESIGN.	U. Panzram	ATLAS-WEYHAUSEN GmbH	GB	STROMLAUFPLAN PL3.1	
		1				5				CHECKED		MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST		7800.715.20.08/000	SHEET 4
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	24.07.1997				511



PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:	
DIN		3				7				DATE	20.08.1996	ATLAS-WEYHAUSEN MASCHINENFABRIK GmbH STEDINGER STR.324 D-27751 DELMENHORST	GB	STROMLAUFPLAN PL3.1	
MATERIAL		2				6				DESIGN.	U. Panzram				
		1				5				CHECKED				7800.715.20.08/000	SHEET 5
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	24.07.1997				5 11



Mains Supply

(EXTRA)

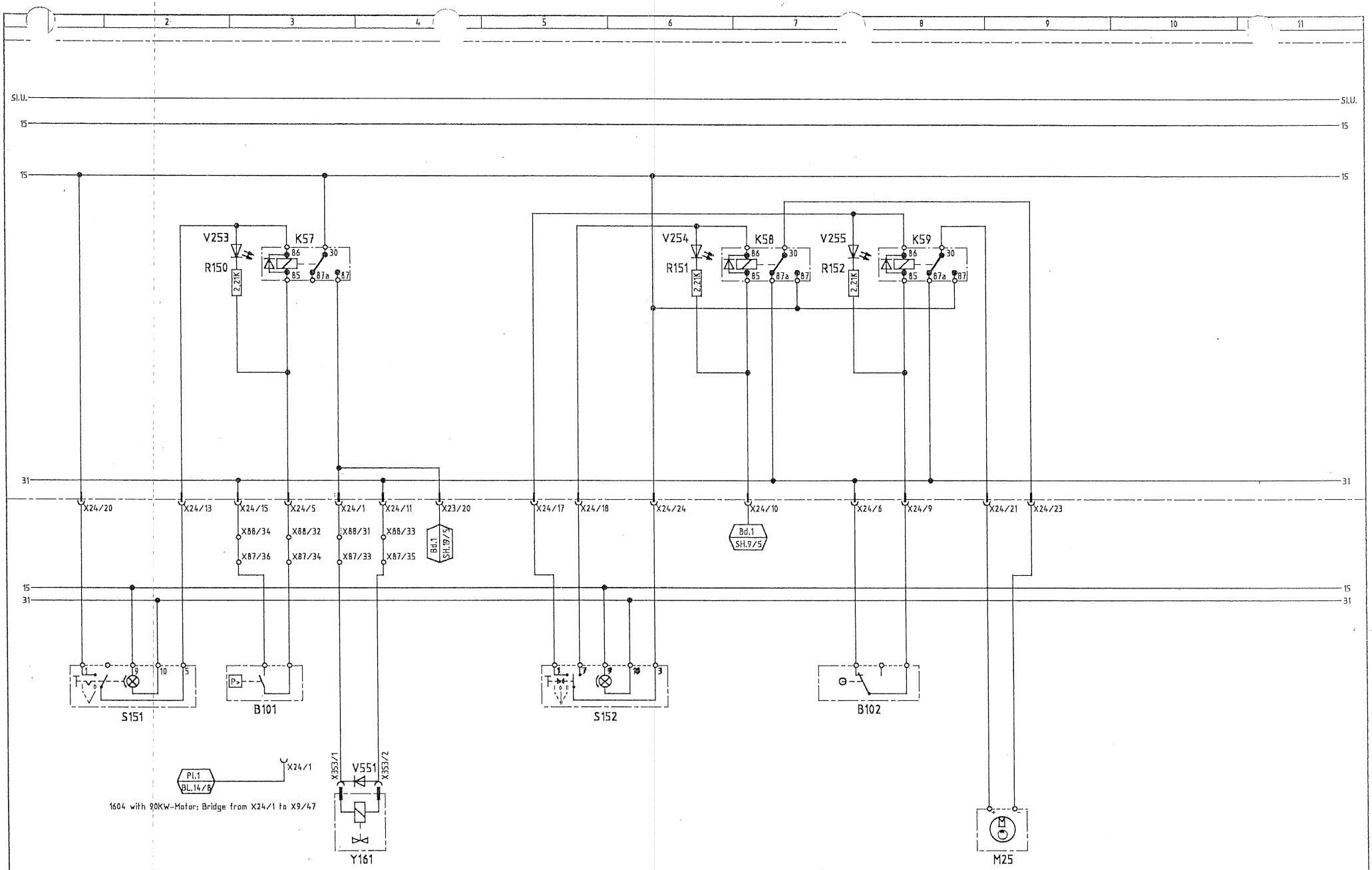
Main Relay

(EXTRA)

Automatic Idling

(Without load limit sensing EXTRA)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:	
DIN		3				7				DATE	20.08.1996	ATLAS-WEYHAUSEN GmbH	GB	STROMLAUFPLAN PL4	
MATERIAL		2				6				DESIGN.	v.d.Graaf	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST		7800.715.20.09/000	SHEET 1
		1				5				CHECKED					SII
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	20.03.1997				



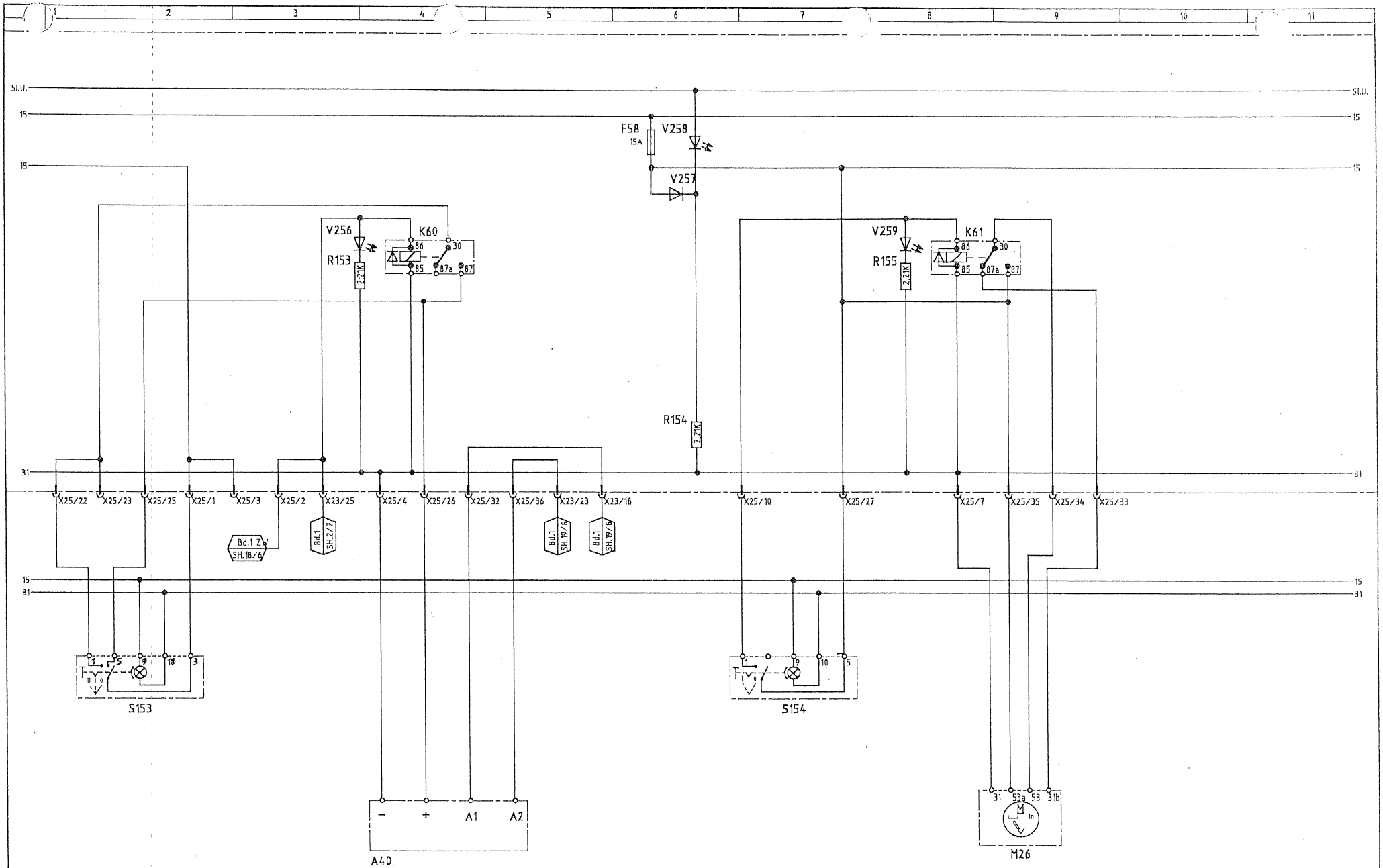
Pressure Connection Step

(1004-1304,1604 EXTRA)

Electric Window

(EXTRA)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	20.08.1996	ATLAS-WEYHAUSEN GmbH	STROMLAUFPLAN PL4
MATERIAL		2				6				DESIGN.	v.d.Graaf	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST	GB
		1				5				CHECKED			7800.715.20.09/000
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	20.03.1997		SHEET 2 SH



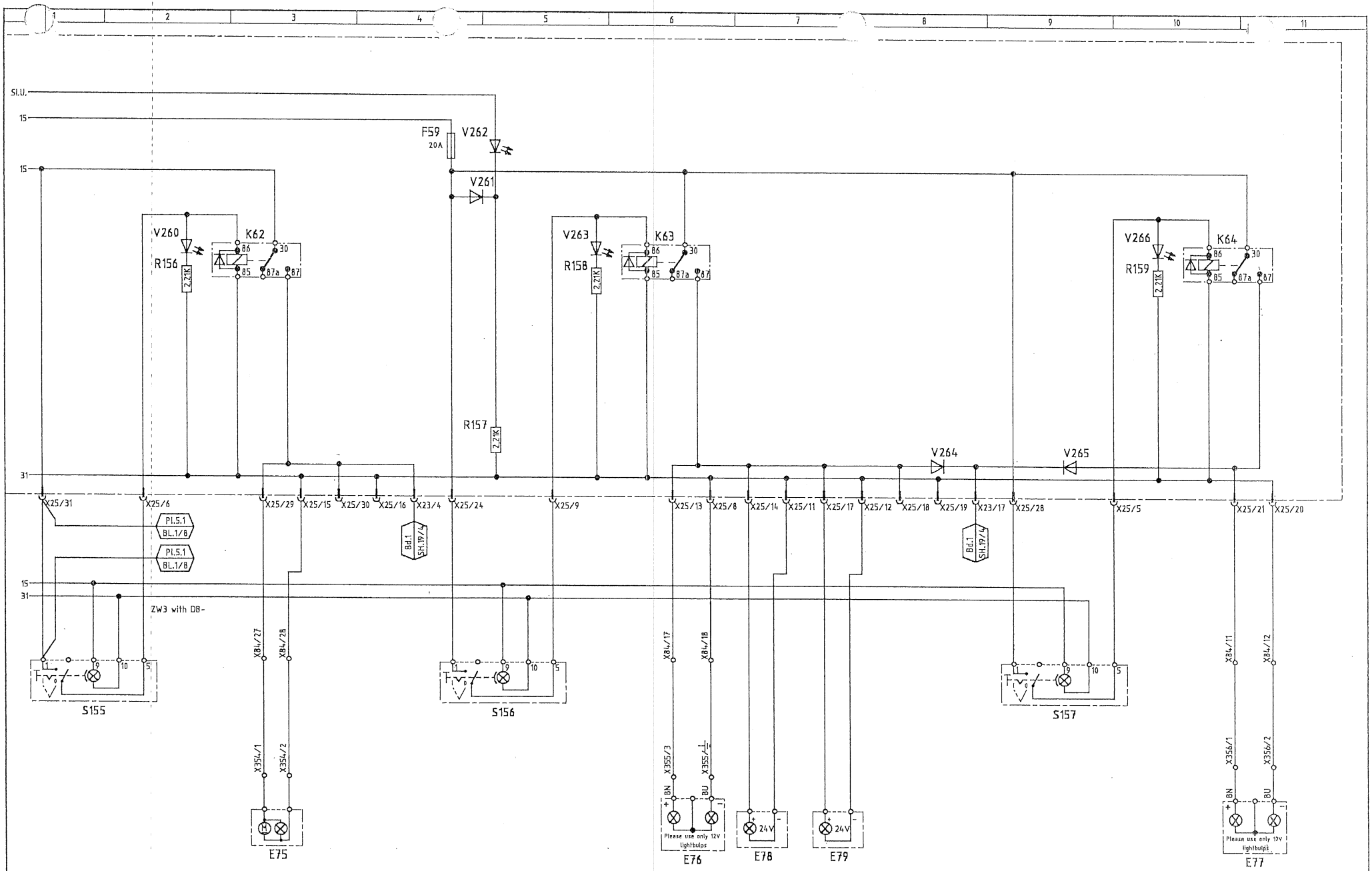
Reversing Safety Device

(EXTRA)

Windscreen Wiper Rear

(EXTRA)

PART-NR.:		4				B				Dwg with CAD		PURGE DATE FOR FABRICATION:	NAME:
DIN		3				7				DATE	20.08.1996	ATLAS-WEYHAUSEN GmbH	STROMLAUFPLAN PL4
MATERIAL		2				6				DESIGN.	v.d.Graaf	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST	GB
		1				5				CHECKED			7800.715.20.09/000
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	20.03.1997		SHEET 3 S11



Warning Becon

(EXTRA)

Operation Light Front

Cabin ARM ARM

(EXTRA)

Operation Light Rear

Cabin

(EXTRA)

PART-NR.:		4				8				Dwg with CAD		PURGE DATE FOR FABRICATION:		NAME:	
DIN		3				7				DATE	07.11.1996				
MATERIAL		2				6				DESIGN.	v.d.Graaf				
		1				5				CHECKED					
ALL RIGHTS RESERVED DIN 34		IND	MODIFICAT.	DATE	NAME	IND	MODIFICATION	DATE	NAME	DATE	20.03.1997				

ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

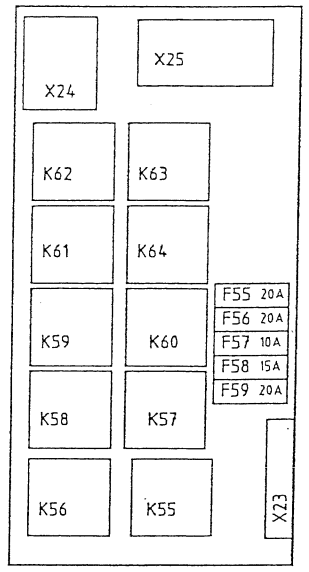
GB

STROMLAUFPLAN PL4

7800.715.20.09/000

SHEET 4
SH

Board 4 (Bd.4)



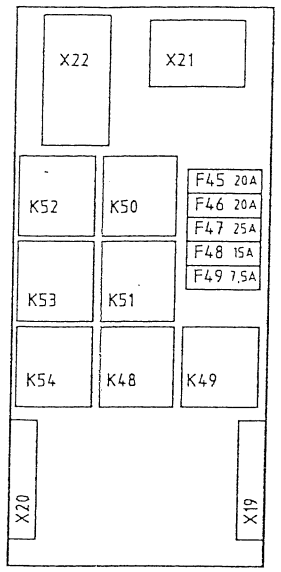
Fuse

F55 = 20A Kl.30
F56 = 20A Kl.30
F57 = 10A Kl.15 Free
F58 = 15A Kl.15 Windscreen Wiper Rear
Warning Becon
F59 = 20A Kl.15 Flood lamp

Relay

K55 = Input Relay
K56 = Free
K57 = Free
K58 = Free
K59 = Free
K60 = Free
K61 = Windscreen Wiper Rear
K62 = Warning Becon
K63 = Operation Light Front
K64 = Operation Light Rear

Board 3.1 (Bd.3.1)



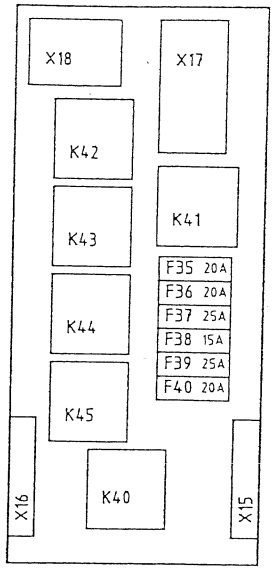
Fuse

F45 = 20A Kl.30
F46 = 20A Kl.30
F47 = 25A Kl.30 Auxiliary Heating
F48 = 15A Kl.15 Seat Heating
Seat Adjustment
F49 = 7,5A Kl.15 VARIO CABIN
CABINEN LIFT
Emergency Movement

Relay

K48 = VARIO CABIN
K49 = VARIO CABIN
K50 = Input Relay
K51 = Seat Heating
K52 = Emergency Movement
K53 = VARIO CABIN
CABINEN LIFT
K54 = VARIO CABIN
CABINEN LIFT

Board 2.1 (Bd.2.1)



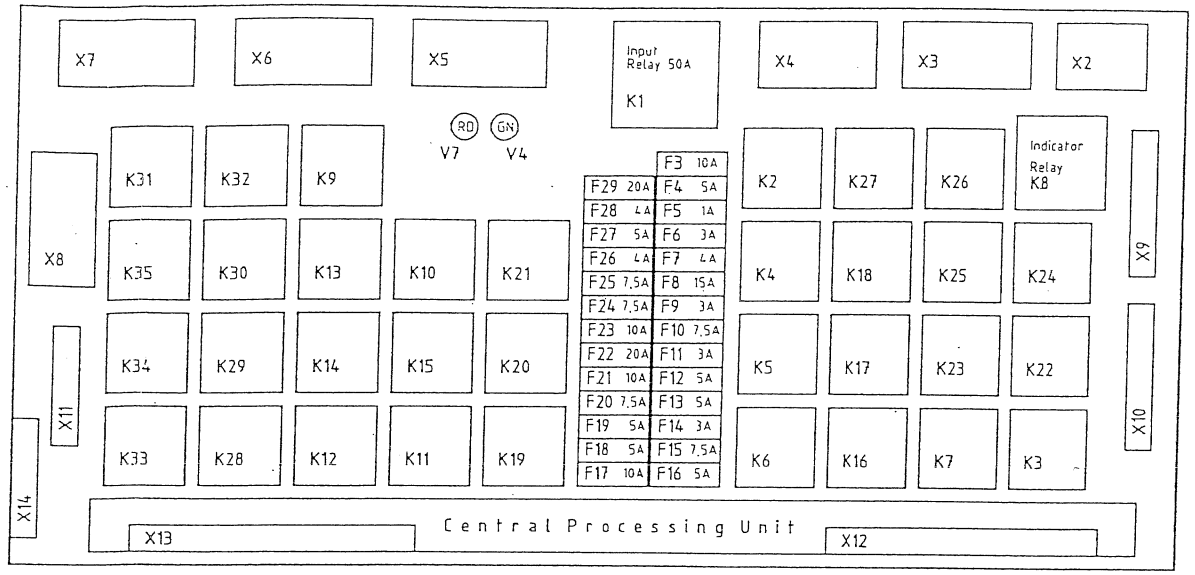
Fuse

F35 = 20A Kl.30
F36 = 20A Kl.30
F37 = 25A Kl.17 Free
F38 = 15A Kl.15 Protection Ventilation System
F39 = 25A Kl.15 Fuel Preheating
F40 = 20A Kl.15 Glow System

Relay

K40 = Input Relay
K41 = Protection Ventilation System
K42 = Free
K43 = Fuel Preheating
K44 = Free
K45 = Free

Board 1 (Bd.1)



Fuse

F1 = 80A Kl.30
F2 = Free
F3 = 10A Kl.30 PL 1
F4 = 5A Kl.15 REC 1.2
F5 = 1A Kl.15 Running T.
Hydralic Oil Level \a2343
F6 = 3A Kl.15 Display
F7 = 4A Kl.15 Voltage
Transformer
F8 = 15A Kl.15 Interior Illumination
F9 = 3A Kl.15 \a2344 Switch
F10 = 7,5A Kl.30 Time clock
F11 = 3A Kl.58L Left
F12 = 5A Kl.56b Dipped Headlight Left
F13 = 5A Kl.56a Main Beam Left
F14 = 3A Kl.58R Right
F15 = 7,5A Kl.56b Dipped Headlight Right
F16 = 5A Kl.56a Main Beam Right
F17 = 10A Kl.15
F18 = 5A Kl.15 Brake Light
F19 = 5A Kl.15 Flashing Unit
F20 = 7,5A Kl.30 Hazard flasher
F21 = 10A Kl.15 Horn/ Supplementary Feed Valve
Motor Signal
F22 = 20A Kl.15 Central Lubrication
F23 = 10A Kl.15 Windscreen Wiper Windscreen Wiper
F24 = 7,5A Kl.15 Heather Fan
F25 = 7,5A Kl.15 Gear Shifting Hand Brake
Creep Speed
Motor Adjustment
F26 = 4A Kl.15 Full Floating Axle Inhibition Turn grab
Claw Control
F27 = 5A Kl.15 Hydraulic Oil Cooling Fan
Pressure Connection Step
F28 = 4A Kl.15 Linde LSC
F29 = 20A Kl.15 :
Refuelling System
Bending Arm Disconnection
Hydraulic Oil Cooling Fan
Switch over

Relay

K1 = Input Relay
K2 = Starter
K3 = Running T.
K4 =
K5 = Dipped Headlight
K6 = Main Beam
K7 = Brake Light
K8 = Flashing Unit
K9 = Horn/
K10 = Supplementary Feed Valve
K11 = (VAS)
K12 = Central Lubrication
K13 = LIMIT SWITSH FRONTWINDOW
K14 = Windscreen Wiper
K15 = Windscreen Wiper
K16 = Gear Shifting
K17 = Hand Brake
K18 = Backward
K19 = Forward
K20 = Creep Speed
K21 = Motor Adjustment
K22 = Full Floating Axle Inhibition
K23 = Free
K24 = Turn Grab Left
K25 = Turn Grab Right
K26 = Free
K27 = Pressure Connection Step
K28 = Additional Tools L
K29 = Additional Tools L
K30 = Additional Tools L Refuelling System
K31 = Additional Tools L Bending Arm Disconnection
K32 = Additional Tools R
K33 = Additional Tools R Hydraulic Oil Cooling Fan
K34 = Additional Tools R Switch over
K35 = Additional Tools R

Light Emitting Diodes (LED)

V4 =
V7 = Monitoring
Main Fuse

ATTENTION !!

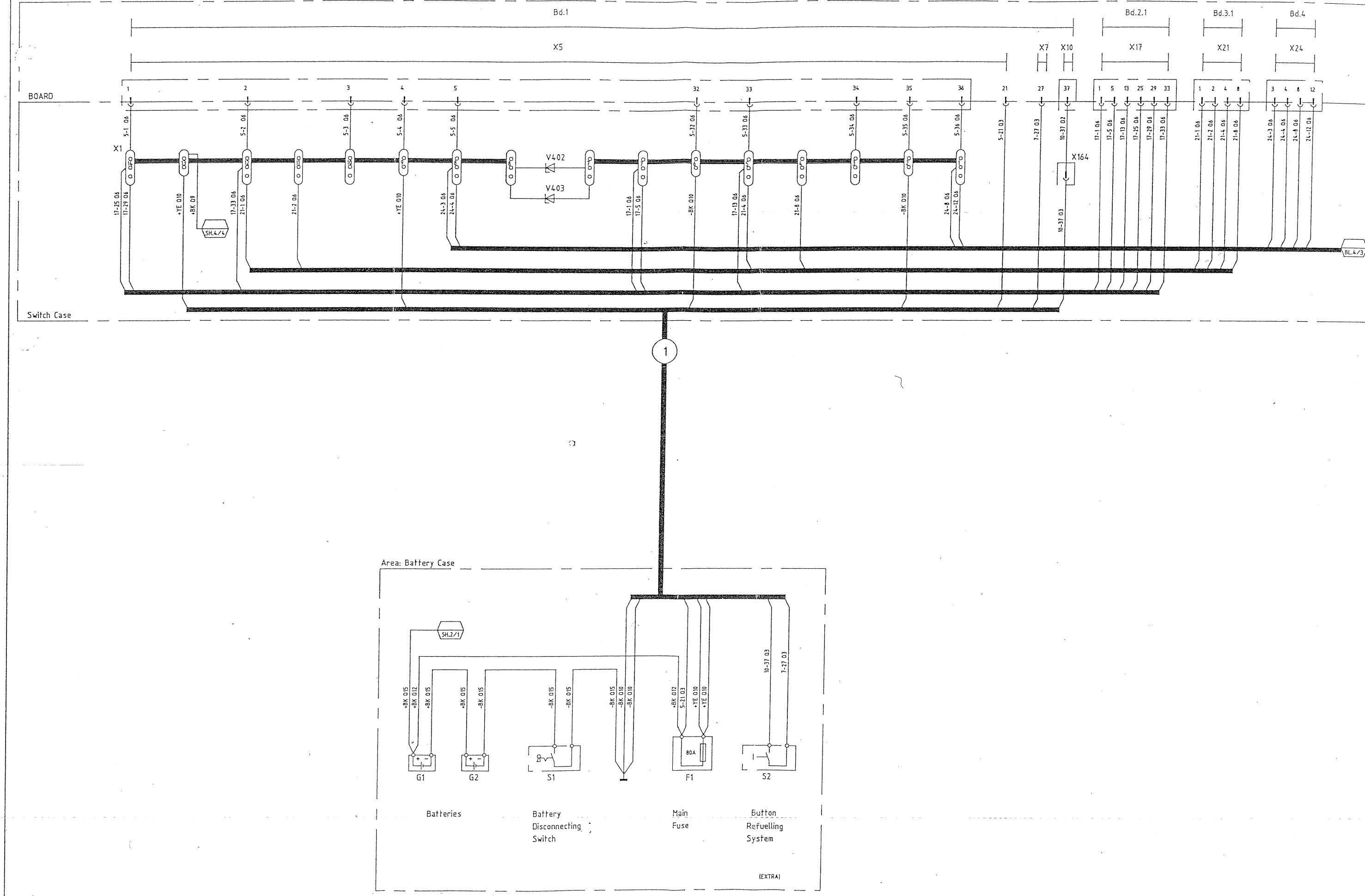
To prevent damage to the electrical installation, note the OBSERVE !

- Electric connections must be must be disconnected and connected be currentless, i.e. Ignition "Off"
- Check correct Amperage (Damage to Boards) when changing fuses
- All fuses must be plugged in at all times (fuse monitoring)
- Welding: Provide good earth connection as close as possible to welding point and Do Not Disconnect Batteries (Diconnect Control Device LLSC-Linde)
- Disconnect batteries from electrical system while using charger
- In case of external ignition please check if power source is stable
- Operate only with Digital Multimeter (EDP: 3607862) or Voltage Tester (EDP: 3607872) (No Test Lamp)

5651676

EDV-Nr.	5651676	Maße	330 X 236
Zusatz	Bd.1,2.1, 3.1, 4 GB		
Grundfarbe	Pure white	RAL 9010	
Schriftfarbe	Jet Black	RAL 9005	
Material	Self-adhesive Plastic Foil	Stärke	0,1
Oberflaeche			

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:		
DIN		3				7				Datum	20.08.1999	ATLAS-WEYHAUSEN GmbH		BESCHRIFTUNGSS.			
Stoff		2				6				Bearb.	U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST	D				
Rohmasse		1				5				Gepr.				7800.300.00.21/001		Blatt 1	
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	14.02.2000					1	Bl.



Cables with No. Q 2 have a Cross-section of 0.50mm²
Cables with No. Q 3 have a Cross-section of 0.75mm²
Cables with No. Q 4 have a Cross-section of 1.00mm²
Cables without No. Q have a Cross-section of 1,50mm²
Cables with No. Q 6 have a Cross-section of 2.50mm²

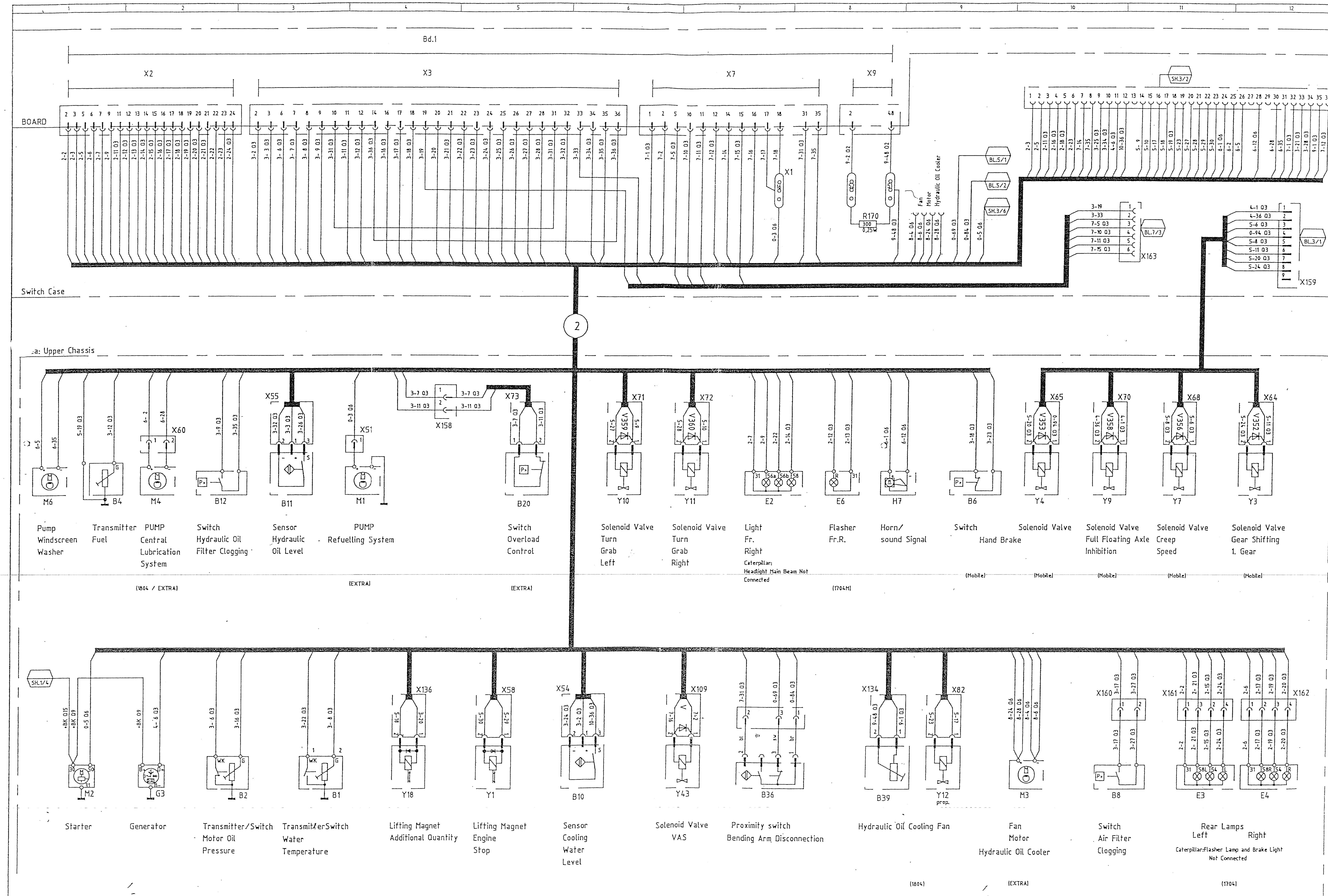
Cables with No. Q 7 have a Cross-section of 4.00mm²
Cables with No.Q 9 have a Cross-section of 6,00mm²
Cables with No. Q 10 have a Cross-section of 10.00mm²
Cables with No. Q 12 have a Cross-section of 25.00mm²
Cables with No. Q 15 have a Cross-section of 50.00mm²

Teil-Nr.			4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:	BAUSCHALTPLAN						
DIN			3				7				Datum	17.06.1999											
Stoff			2				6				Bearb.	U. Panzram											
Rohmasse			1				5				Gepr.												
Schutzrechte nach DIN 34 beachten		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name		Datum	16.02.2000											

ATLAS-WEYHAUSEN MASCHINENFABRIK GmbH
STEDINGER STR.324
D-27751 DELMENHORST

7800.715.10.09/000

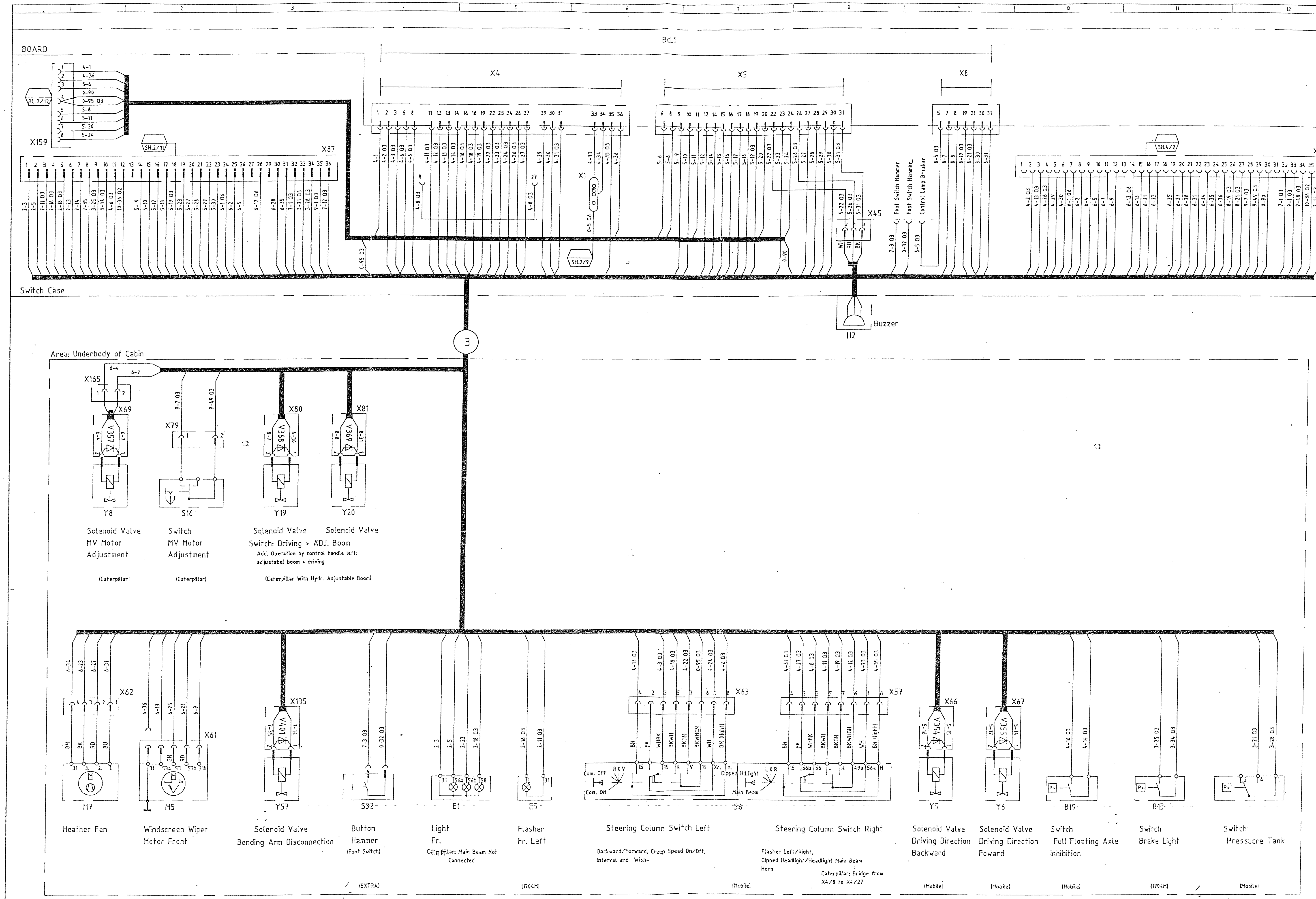
Blatt 1
7 Bl.



Cables with No. Q 2 have a Cross-section of 0.50mm²
Cables with No. Q 3 have a Cross-section of 0.75mm²
Cables with No. Q 4 have a Cross-section of 1.00mm²
Cables without No. Q have a Cross-section of 1,50mm²
Cables with No. Q 6 have a Cross-section of 2.50mm²

Cables with No. Q 7 have a Cross-section of 4.00mm²
Cables with No.Q 9 have a Cross-section of 6,00mm²
Cables with No. Q 10 have a Cross-section of 10.00mm²
Cables with No. Q 12 have a Cross-section of 25.00mm²
Cables with No. Q 15 have a Cross-section of 50.00mm²

Teil-Nr.		4		8		Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:
DIN		3		7		Datum 17.06.1999					
Stoff		2		6		Bearb. U. Panzram	ATLAS-WEYHAUSEN GmbH MASCHINENFABRIK STEDINGER STR.324			BAUSCHALTPLAN	
Rohmasse		1		5		Gepr.				7800 715 10 00 4000	Blatt 2



Cables with No. 0 2 have a Cross-section of 0.50mm²
Cables with No. 0 3 have a Cross-section of 0.75mm²
Cables with No. 0 4 have a Cross-section of 1.00mm²
Cables without No. 0 have a Cross-section of 1,50mm²
Cables with No. 0 6 have a Cross-section of 2.50mm²

Cables with No. 0 7 have a Cross-section of 4.00mm²
Cables with No.0 9 have a Cross-section of 6,00mm²
Cables with No. 0 10 have a Cross-section of 10.00mm²
Cables with No. 0 12 have a Cross-section of 25.00mm²
Cables with No. 0 15 have a Cross-section of 50.00mm²

Teil-Nr.		4		8		Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig. f. Fertig. Dat.:	Name:
DIN		3		7		Datum	17.06.1999	ATLAS-WEYHAUSEN GmbH		BAUSCHALTPLAN	
Stoff		2		6		Bearb.	U. Panzram	MASCHINENFABRIK			
Rohmasse		1		5		Gepr.		STEDINGER STR. 324		7800 715 10 00 4000	Blatt 3

Bd.1

X6

X9

BOARD

X88

SH.3/11

SH.1/2

BL.1/12

+BK 09

X44

Switch Quick Change Facility

Switch Hammer Preselection

SH.5/

BL.7/

BL.5/

Switch Case

4

Area: Seat Console Right

X49

X46

X43

X40

A1

Display

Time clock

H5

Running Time Meter

H1

Cigarette Lighter

A6

Control Panel Load Limit Sensing Control (LLSC)

(EXTRA)

Area: Seat Console Left

S26

S27

S12

S14

S43

X47

S24

S25

S9

Switch Heater Fan

Switch Preselection Auxiliary Tools Left

(EXTRA)

Switch Preselection Auxiliary Tools Right

(EXTRA)

Button Quick Change Facility

(EXTRA)

Switch Gear Shifting

(Mobile)

Switch Hand Brake

(Mobile)

Button Auxiliary Tools Left

Button Auxiliary Tools Right

Button Horn or Sound Signal

Operating Handle Left: Outside / Inside / Down

Cables with No. Q 2 have a Cross-section of 0.50mm²
Cables with No. Q 3 have a Cross-section of 0.75mm²
Cables with No. Q 4 have a Cross-section of 1.00mm²
Cables without No. Q have a Cross-section of 1.50mm²
Cables with No. Q 6 have a Cross-section of 2.50mm²

Cables with No. Q 7 have a Cross-section of 4.00mm²
Cables with No. Q 9 have a Cross-section of 6.00mm²
Cables with No. Q 10 have a Cross-section of 10.00mm²
Cables with No. Q 12 have a Cross-section of 25.00mm²
Cables with No. Q 15 have a Cross-section of 50.00mm²

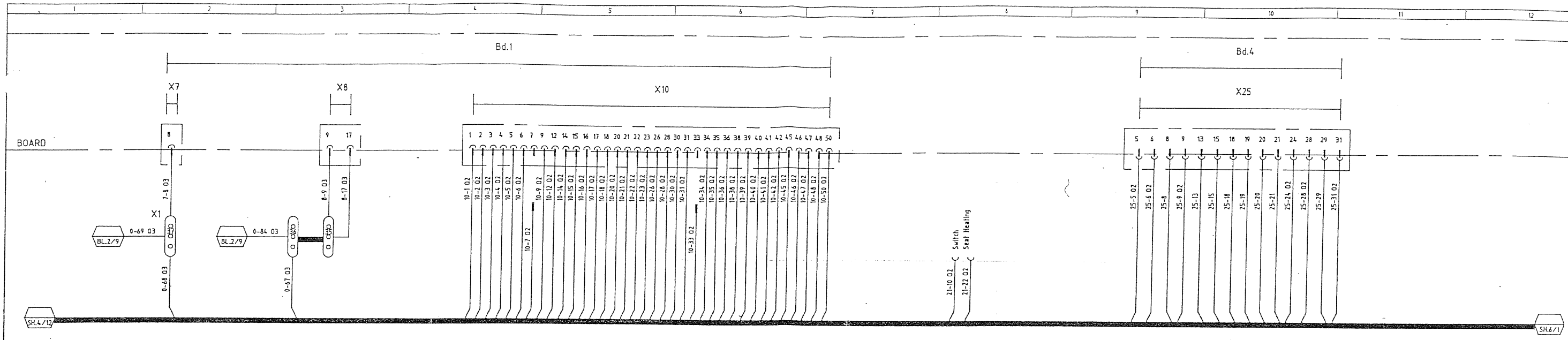
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DIN		3				7				Datum	17.06.1999								
Stoff		2				6				Bearb.	U. Panzram								
Rohmasse		1				5				Gepr.									
Schutzvermerk nach DIN 34 beachten		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000								

ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

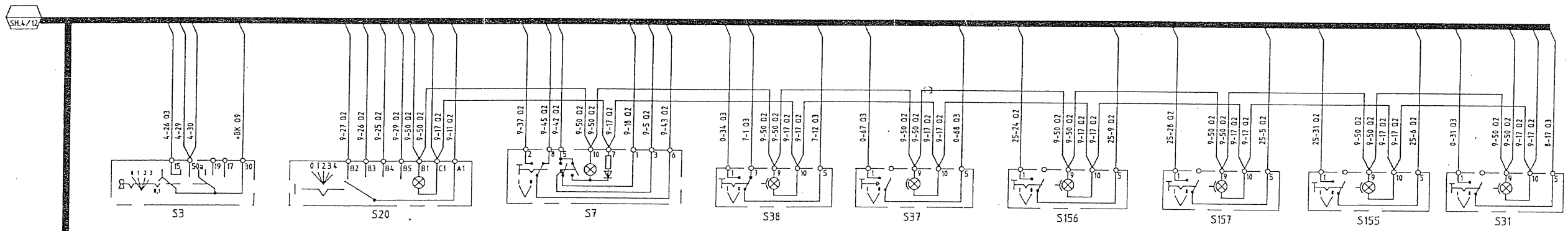
BAUSCHALTPLAN

7800.715.10.09/000

Blatt



Area: Seat Console Right



Switch
Ignition Start

Switch
Preselection Claws

(EXTRA)

Switch
Hazard Warning Lights

(1704M)

Switch
VAS

Button
Bending Arm Disconnection
BRIDGED

Switch
Operation Light
Front

(EXTRA Bd4)

Switch
Operation Light
Rear

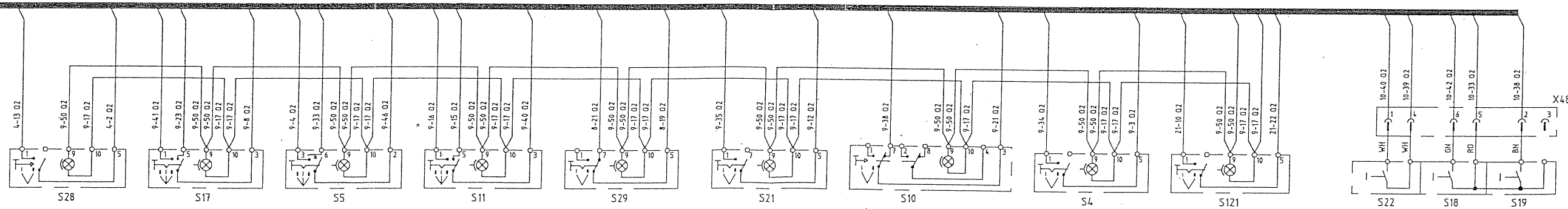
(EXTRA Bd4)

Switch
Warning Beacon

(EXTRA Bd4)

Switch
Hammer Preselection

(EXTRA)



Button
Intermittent Windscreen
Wiper

Bridge from
X4/8 to X4/27

(Caterpillar)

Switch
Full Floating Axle
Inhibition

(Mobile)

Switch
Light

Switch
Windscreen Wiper
Front

SWITCH
SWITCH:
DRIVE > ADJUSTABLE BOOM

Add. Operation by control handle left:
adjustabel boom > driving

(Caterpillar With Hydr. Adjustable Boom)

Switch
Overload Control
Lamp

(EXTRA)

Button
Central Lubrication

(1804 / EXTRA)

Switch
Inside Light

Switch
Seat Heating

(EXTRA Bd 3.11)

Button
Kick-down

Button
Turn
Grab
left

Button
Turn
Grab
Right

Operating Handle

Right

Down | Inside | Outside

Cables with No. Q 2 have a Cross-section of 0.50mm²
Cables with No. Q 3 have a Cross-section of 0.75mm²
Cables with No. Q 4 have a Cross-section of 1.00mm²
Cables without No. Q have a Cross-section of 1.50mm²

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Cables with No.Q 9 have a Cross-section of 6.00mm²
Cables with No. Q 10 have a Cross-section of 10.00mm²
Cables with No. Q 12 have a Cross-section of 25.00mm²

Teil-Nr.						Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Nassstab	Freig.f.Fertig. Dat.:	Name:
DIN						Datum 17.06.1999	ATLAS-WEYHAUSEN MASCHINENFABRIK GmbH			BAUSCHALTPLAN	
Stoff						Bearb. U. Panzram					

BOARD

Switch Case

SH.5/12

25-18 25-19 6-10 03 25-21 25-20 6-15 03 6-16 03 25-13 25-8 6-19 03 6-20 03 25-29 25-15 6-32 03

1 2 10 11 12 14 15 16 17 18 19 20 27 28 32

X84

X84

1 2 10 11 12 14 15 16 17 18 19 20 27 28 32

25-18 25-19 6-10 03 25-21 25-20 24-10 03 6-15 03 6-16 03 25-13 25-8 6-19 03 6-20 03 25-29 25-15 6-32 03

36 Channel Disconnector
in the Cabin
Back Right

5

Area: Upper Part of Cabin

24-10 03 6-10 03 6-32 03 X96

1 2 3

GY BU BK

B26

Limit Switch for
Disconnecting Windscreen Wiper
Front
(Front Window)

6-15 03 6-15 03 6-16 03 6-16 03 6-15 03 6-16 03

H3 H4

Interior Lamp
Left Right

6-19 03 6-20 03

24V/DC 12V/DC

L R W1

U1 A2

Voltage
Transformer

Radio, Antenna,
Loudspeaker

(EXTRA)

25-18 25-19 25-13 25-8 X355

BN BU BN BU

E80 E76

Operation Light
Front

(EXTRA Bd4)

X356

25-21 25-20

E77

Operation Light
Rear

(EXTRA Bd4)

X354

25-29 25-15

E75

Warning
Becon

(EXTRA Bd4)

Cables with No. Q 2 have a Cross-section of 0.50mm²
Cables with No. Q 3 have a Cross-section of 0.75mm²
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Cables with No.Q 9 have a Cross-section of 6,00mm²
Cables with No. Q 10 have a Cross-section of 10.00mm²
Cables with No. Q 12 have a Cross-section of 25.00mm²
Cables with No. Q 15 have a Cross-section of 50.00mm²

Teil-Nr.						4						8											
DIN						3						7											
Stoff						2						6											
Rohmasse						1						5											

Gezeichnet m.CAD	Ers. f.:																						
Datum	17.06.1999																						
Bearb.	U. Panzram																						
Gepr.																							

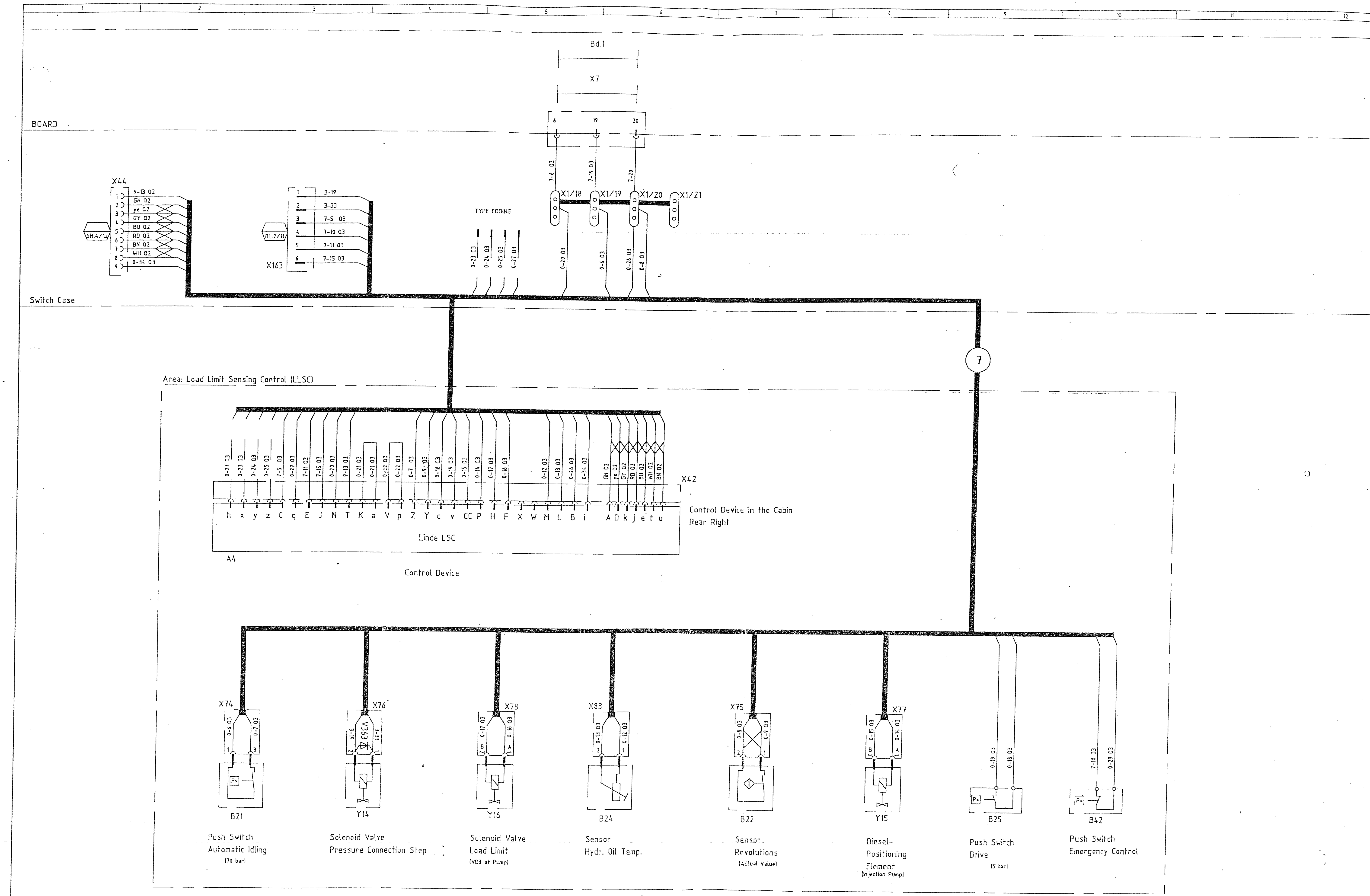
Ers. d.:

Massstab | Freig.f.Fertig. Dat.: | Name:

ATLAS-WEYHAUSEN
MASCHINENFABRIK GmbH

D

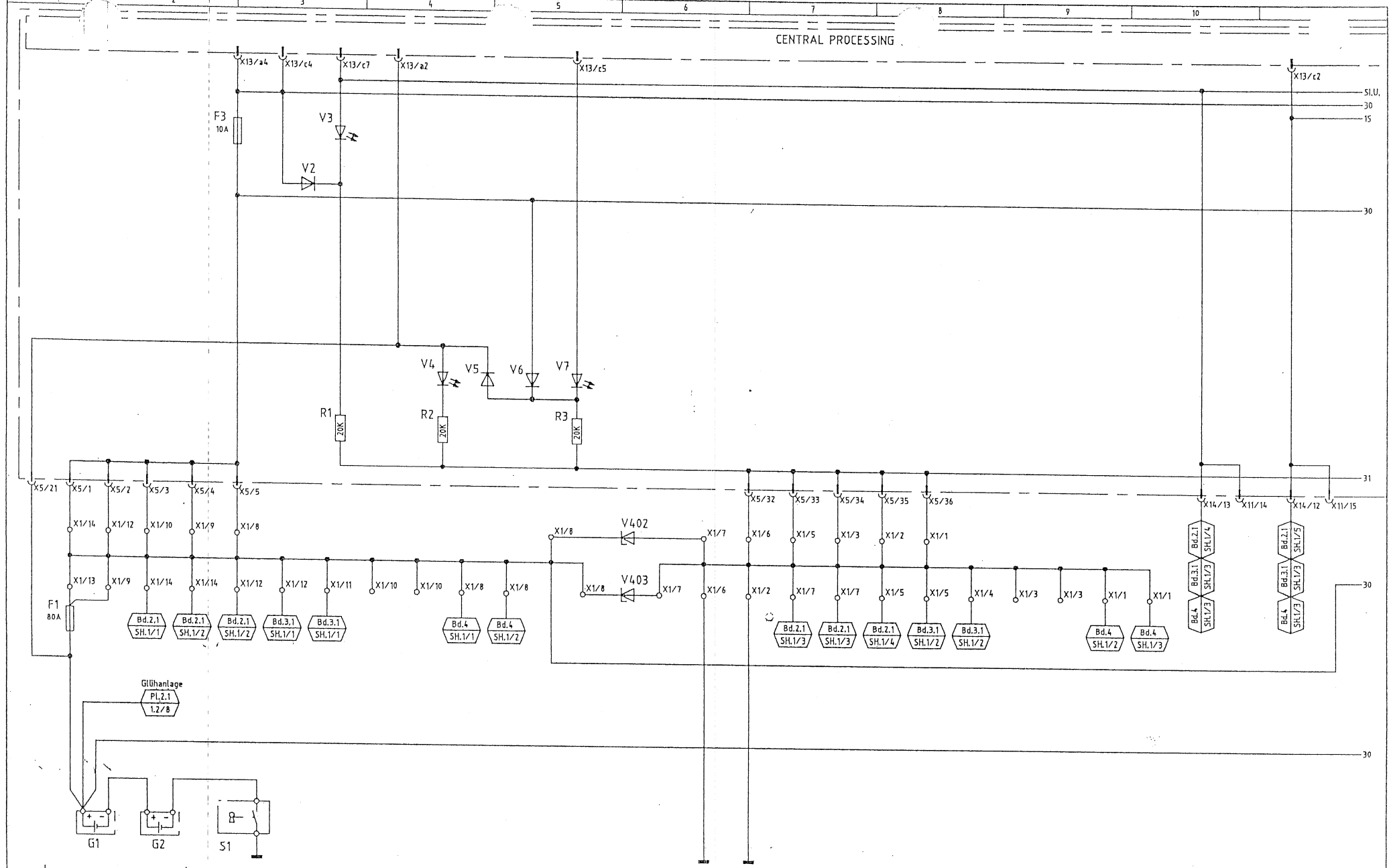
BAUSCHALTPLAN



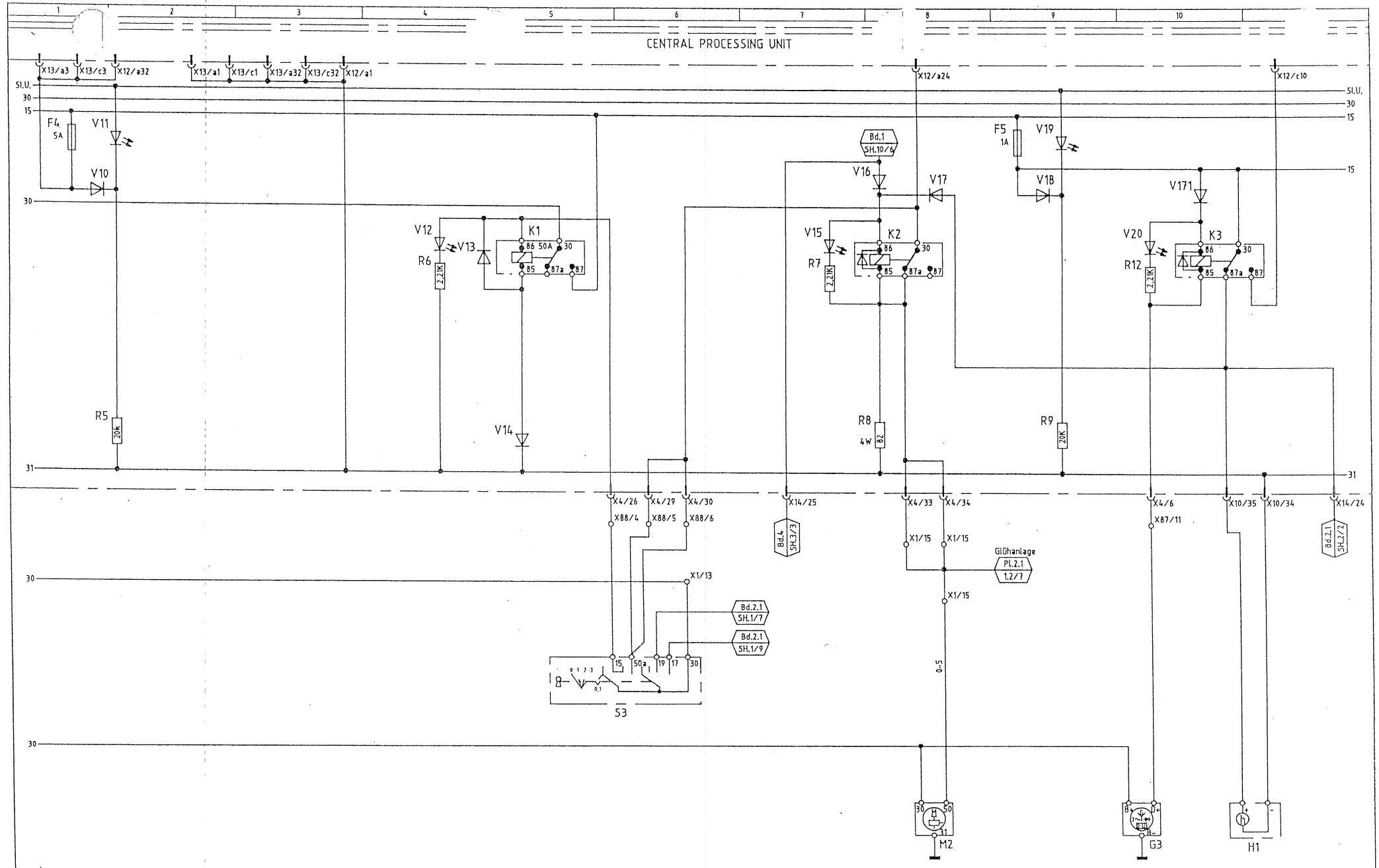
Cables with No. 0 2 have a Cross-section of 0.50mm²
Cables with No. 0 3 have a Cross-section of 0.75mm²
Cables with No. 0 4 have a Cross-section of 1.00mm²
Cables without No. 0 have a Cross-section of 1,50mm²
Cables with No. 0 6 have a Cross-section of 2.50mm²

Cables with No. 0 7 have a Cross-section of 4.00mm²
Cables with No.0 9 have a Cross-section of 6,00mm²
Cables with No. 0 10 have a Cross-section of 10.00mm²
Cables with No. 0 12 have a Cross-section of 25.00mm²
Cables with No. 0 15 have a Cross-section of 50.00mm²

Teil-Nr.		4		8		Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:
DIN		3		7		Datum	17.06.1999	ATLAS-WEYHAUSEN GmbH		BAUSCHALTPLAN	
Stoff		2		6		Bearb.	U. Panzram	MASCHINENFABRIK STEDINGER STR. 324			
Rohmasse		1		5		Gepr.					Blatt 7



Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:		Ers. d.:	Massstab	Freig.f.Fertig. Dat.:		Name:		
DIN		3				7				Datum	17.06.1999	ATLAS-WEYHAUSEN							
Stoff		2				6				Bearb.	U. Panzram		MASCHINENFABRIK GmbH	D	STROMLAUFPLAN PL1				
Rohmasse		1				5				Gepr.			STEDINGER STR.324						
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000		D-27751 DELMENHORST		7800.715.20.18/000			Blatt 1	19 Bl.



Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:				
DIN		3				7				Datum	17.06.1999								
Stoff		2				6				Bearb.	U. Panzram								
Rohmasse		1				5				Gepr.									
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000								

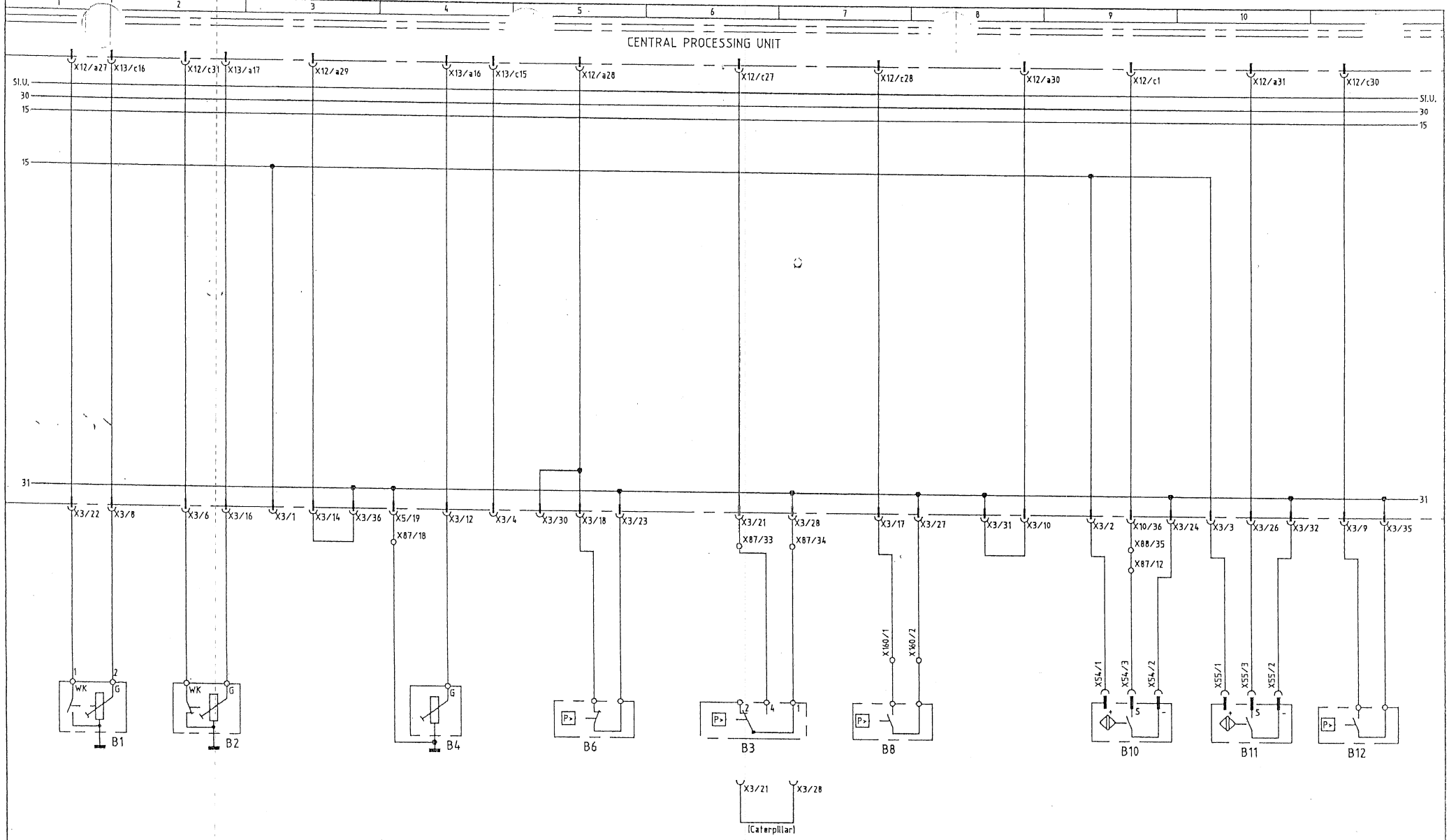
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

D

STROMLAUFPLAN PL1

7800.715.20.18/000

Blatt 2
19 Bl.



Water Temperature	Motor Oil Pressure		Tank Transmitting Device (Mobile)	Hand Brake	Pressure Tank (Mobile)	Air Filter Polution		Water Level	Hydralic Oil Level	Hydralic Oil Filter Dirt Of

Teil-Nr.			4				8				Gezeichnet m.CAD	Ers. f.:		Ers. d.:		Massstab	Freig.f.Fertig. Dat.:		Name:				
DIN			3				7				Datum	17.06.1999											
Stoff			2				6				Bearb.	U. Panzram											
Rohmasse			1				5				Gepr.												
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name		Datum	16.02.2000											

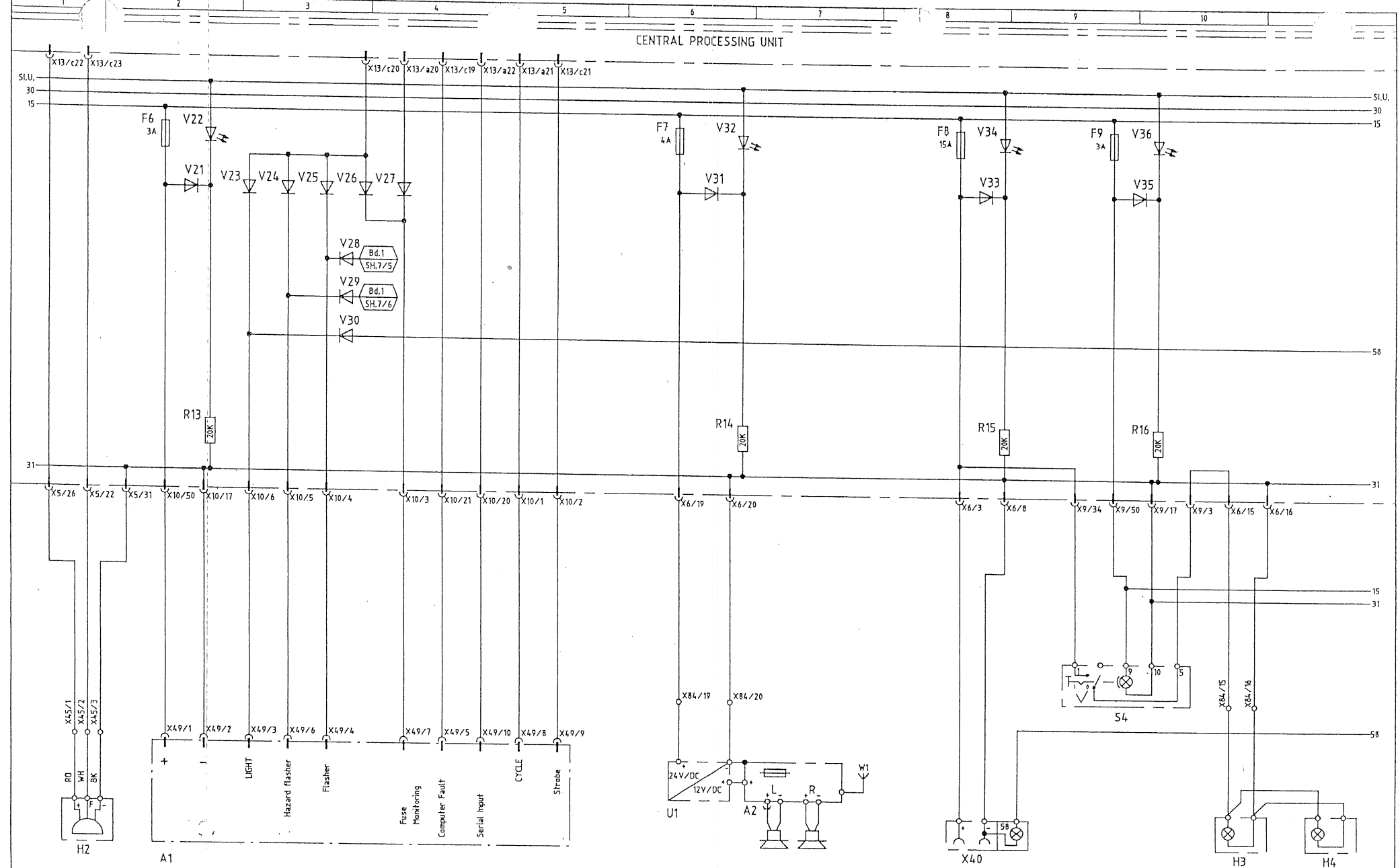
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

D

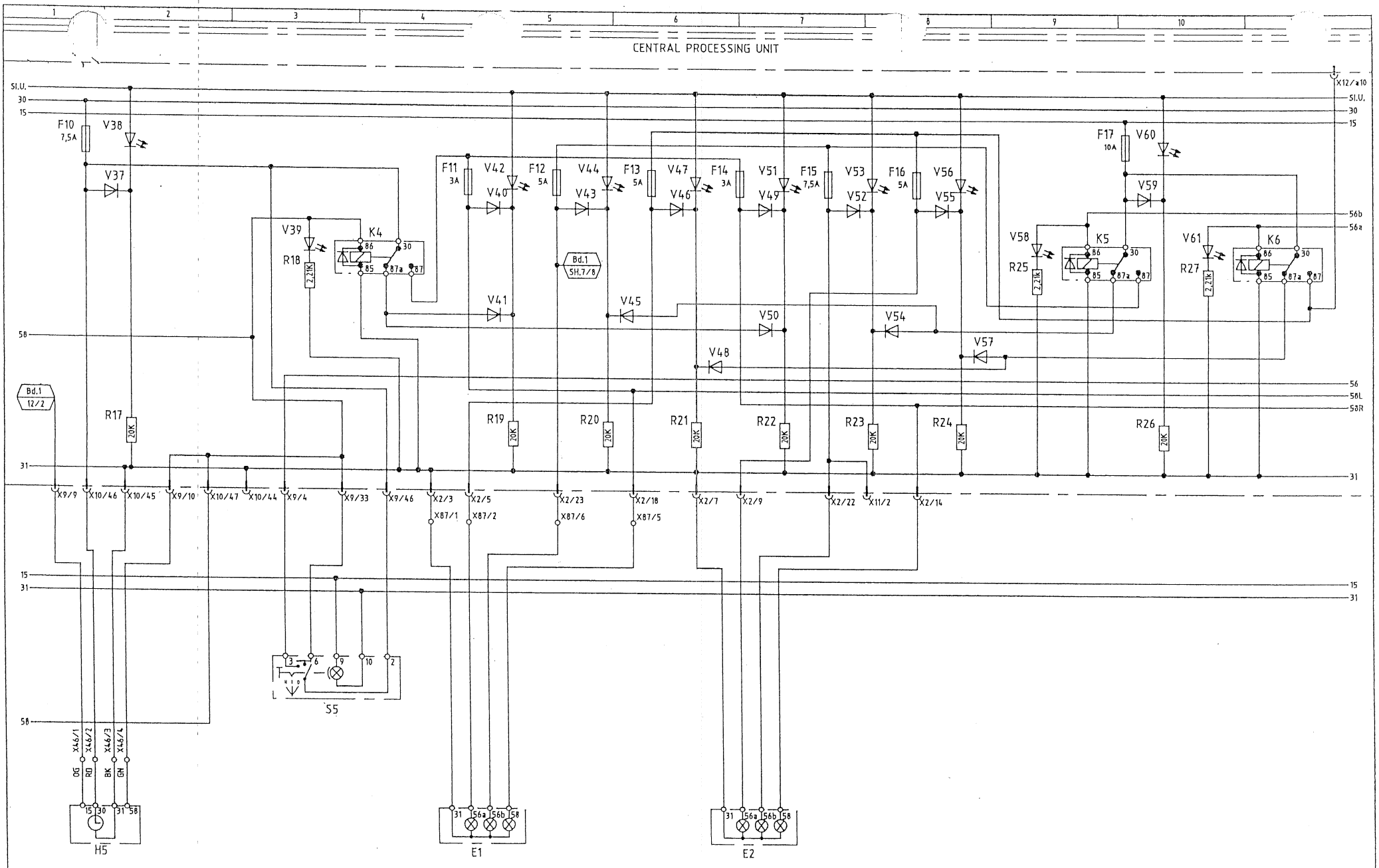
STROMLAUFPLAN PL1

7800.715.20.18/000

Blatt 3
19 Bl.



Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:		
DIN		3				7				Datum	17.06.1999	ATLAS-WEYHAUSEN MASCHINENFABRIK GmbH STEDINGER STR.324 D-27751 DELMENHORST	D	STROMLAUFPLAN PL1			
Stoff		2				6				Bearb.	U. Panzram						
Rohmasse		1				5				Gepr.				7800.715.20.18/000		Blatt 4	
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000					19 Bl.	



Time clock

(EXTRA)

Light Switch and Sidelight

Light Front Left

Caterpillar: Headlight Main Beam Not Connected

Light Front Right

Caterpillar: Headlight Main Beam Not Connected

Dipped Headlight

Main Beam

Relay K6 must always be plugged in

(Mobile)

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:		Ers. d.:		Massstab	Freig.f.Fertig. Dat.:		Name:	
DIN		3				7				Datum	17.06.1999								
Stoff		2				6				Bearb.	U. Panzram								
Rohmasse		1				5				Gepr.									
Schutzvermerk nach DIN 34 beachten		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000								

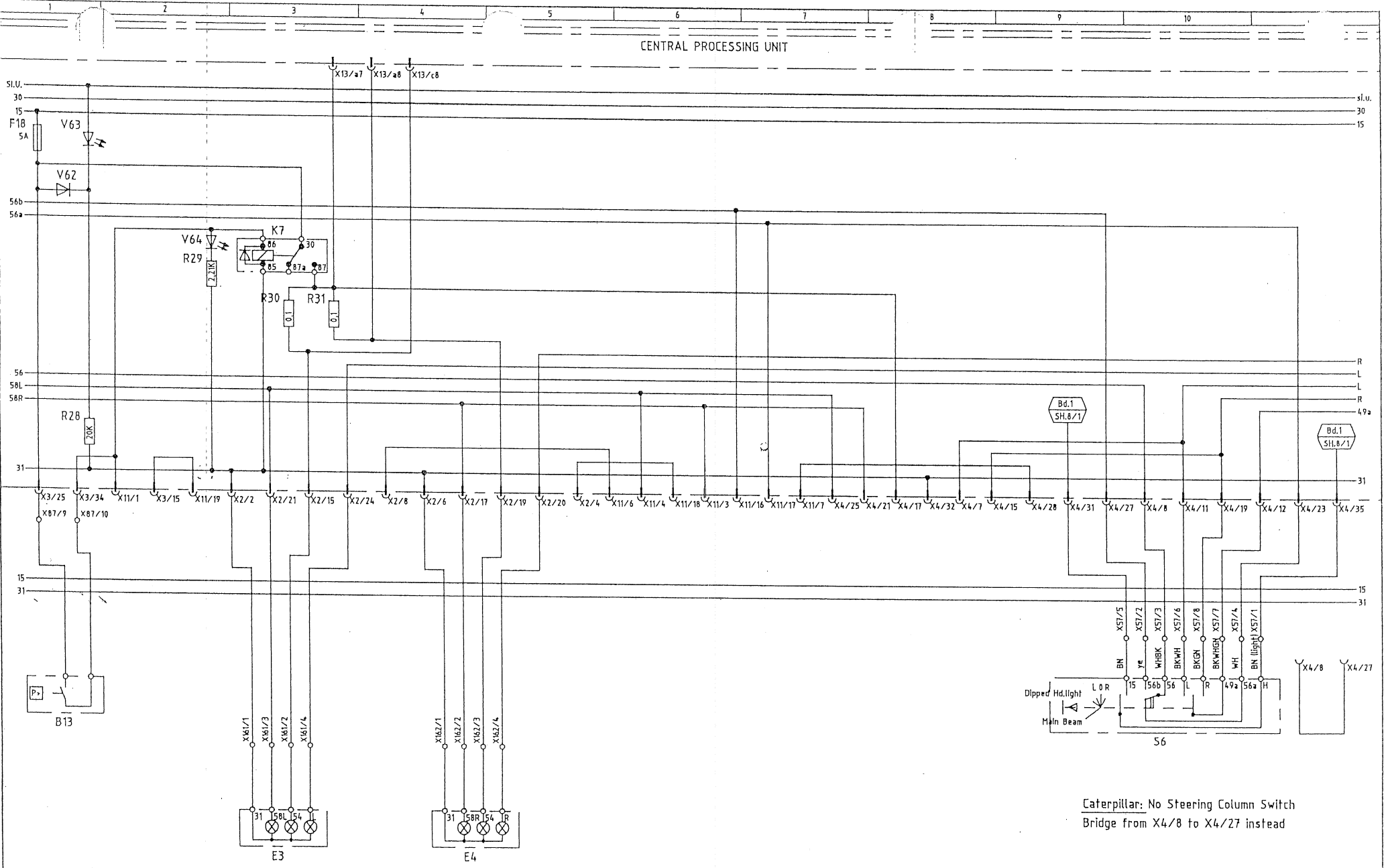
ATLAS-WEYHAUSEN GmbH
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D-27751 DELMENHORST

D

STROMLAUFPLAN PL1

7800.715.20.18/000

Blatt 5
19 Bl.



Caterpillar: No Steering Column Switch
Bridge from X4/8 to X4/27 instead

Brake Light

(1704M)

Rear Lamp Left

Caterpillar:Flasher Lamp and Brake Light
Not Connected
(1704)

Rear Lamp Right

Caterpillar:Flasher Lamp and Brake Light
Not Connected
(1704)

Steering Column Switch Right

Flasher Left/Right, Dipped Headlight/Headlight Main Beam Horn

(Mobile)

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:
DIN		3				7				Datum 17.06.1999					
Stoff		2				6				Bearb. U. Panzram					
Rohmasse		1				5				Gepr.					
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum 16.02.2000					

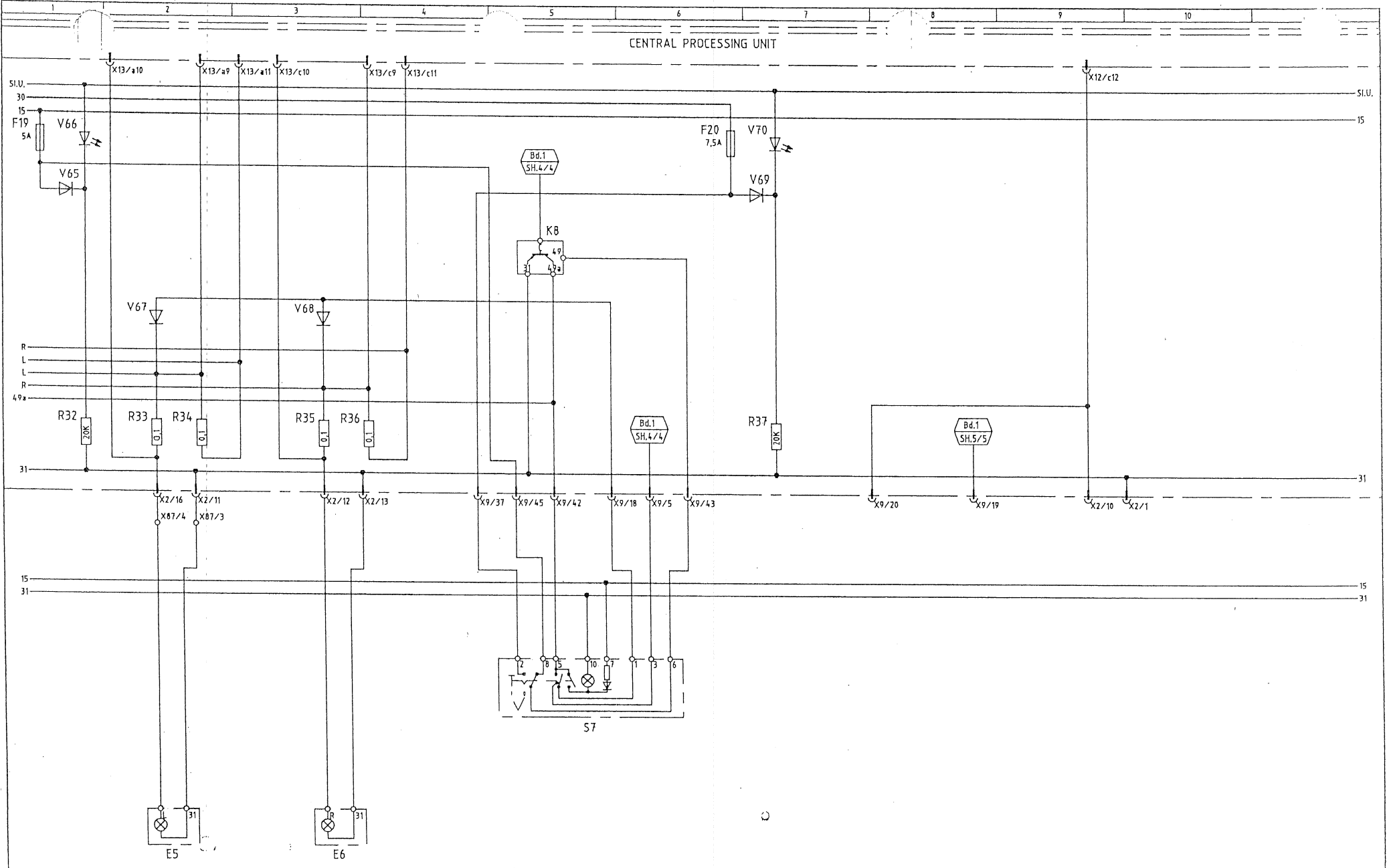
ATLAS-WEYHAUSEN GmbH
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D-27751 DELMENHORST

D

STROMLAUFPLAN PL1

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Blatt 6
19 Bl.



Flasher Front Left

(1704M)

Flasher Front Right

(1704M)

Hazard flasher

(1704M)

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:		
DIN		3				7				Datum	17.06.1999						
Stoff		2				6				Bearb.	U. Panzram						
Rohmasse		1				5				Gepr.							
Schutzvermerk nach DIN 34 beachten	Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name		Datum	16.02.2000						

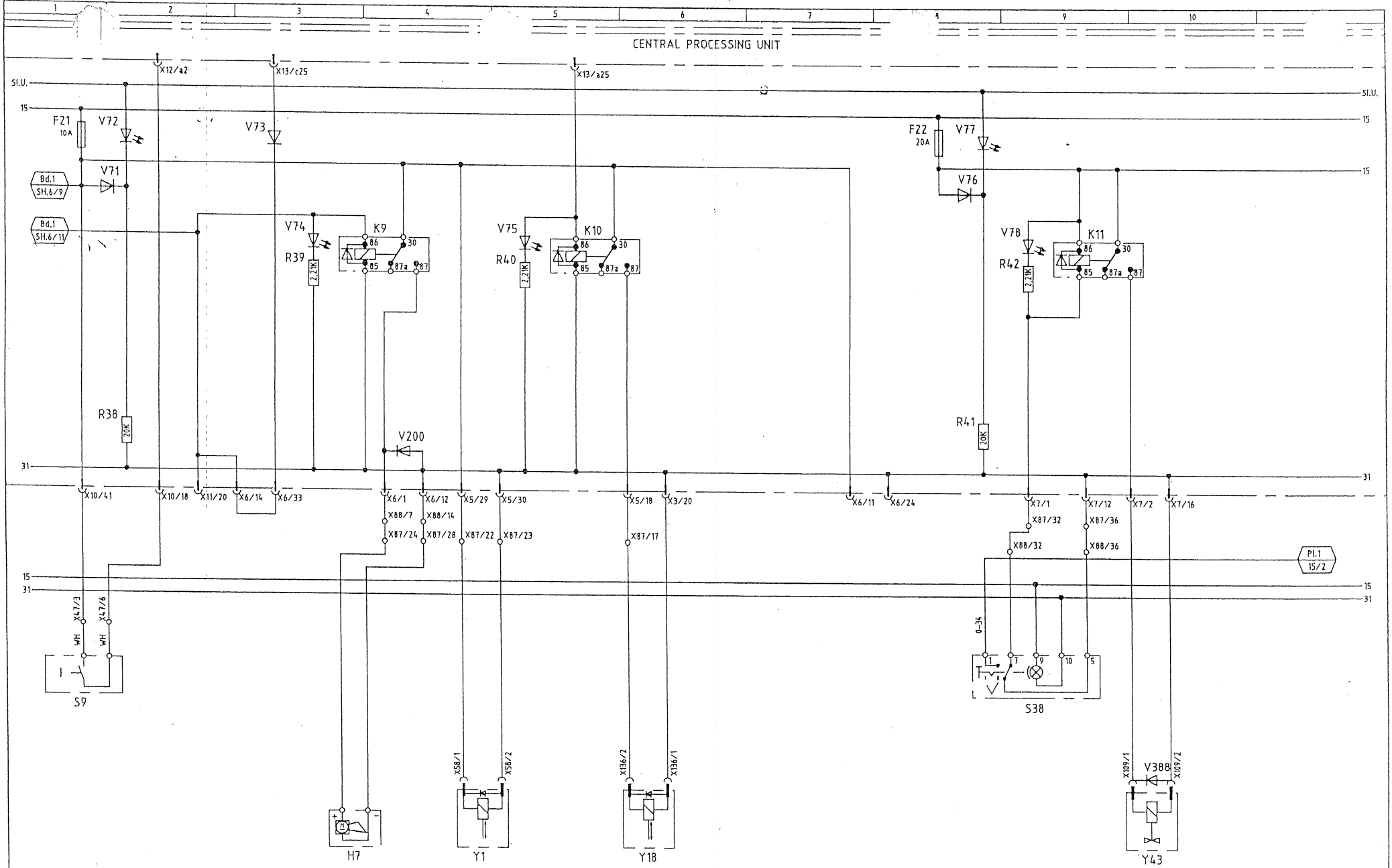
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D-27751 DELMENHORST

D

STROMLAUFPLAN PL1

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Blatt 7
19 Bl.



Button
Operating Handle Left
Below

Sound Signal / Horn

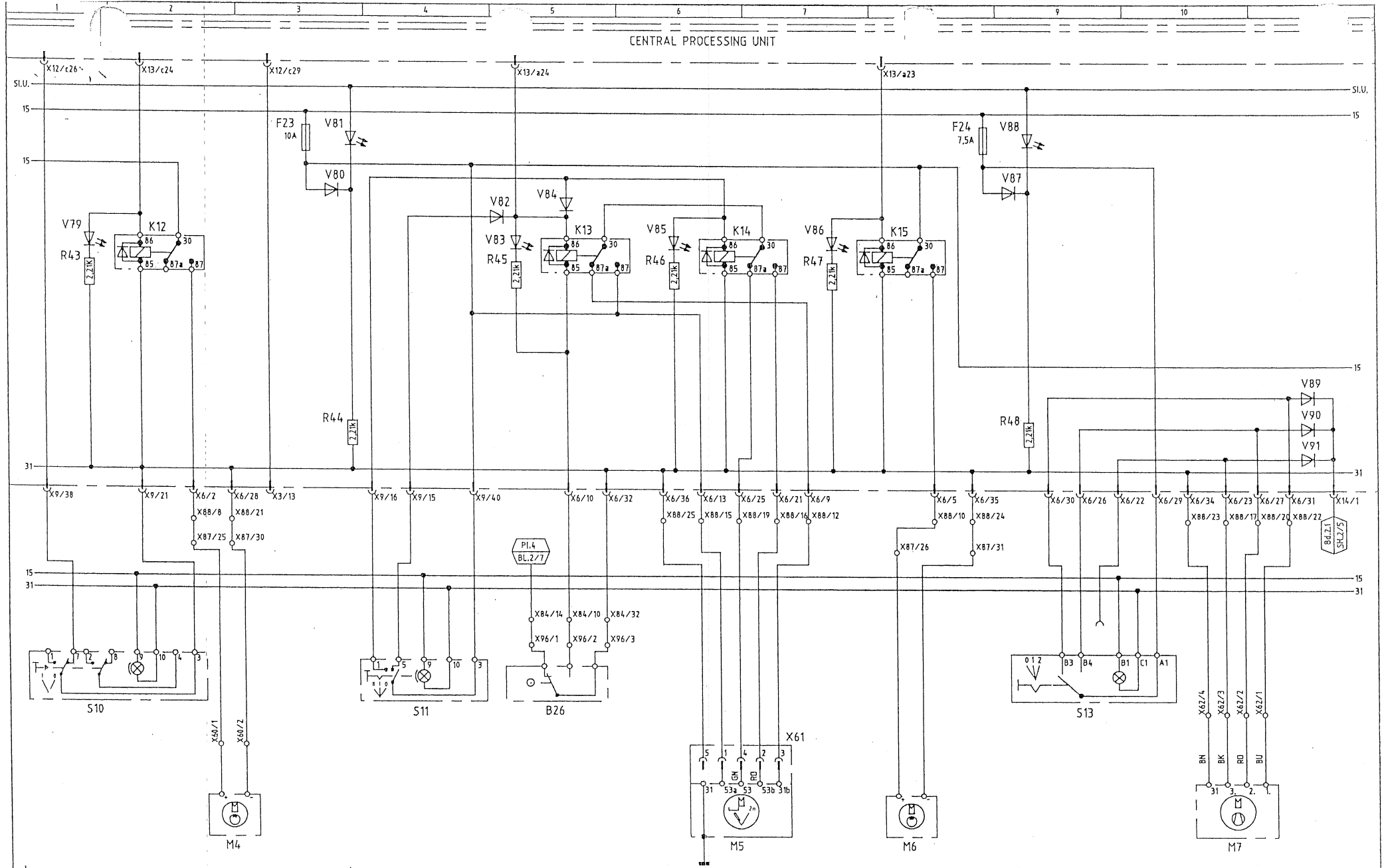
Motor Stop
(Engine Stop Over Key)

Lifting Magnet
Additional Quantity

VAS

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:		
DIN		3				7				Datum	17.06.1999		D	STROMLAUFPLAN PL1			
Stoff		2				6				Bearb.	U. Panzram						
Rohmasse		1				5				Gepr.				7800.715.20.18/000		Blatt 8	
Schutzvermerk nach DIN 34 beachten!	Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name		Datum	16.02.2000					19	Bl.

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STEDINGER STR.324
D-27751 DELMENHORST



Central Lubrication

(1804 / EXTRA)

Intermittend windshield wiper front and limit stop front window

Windscreen Wiper

Heather Fan

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:		
DIN		3				7				Datum	17.06.1999						
Stoff		2				6				Bearb.	U. Panzram						
Rohmasse		1				5				Gepr.							
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000						

ATLAS-WEYHAUSEN GmbH
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D-27751 DELMENHORST

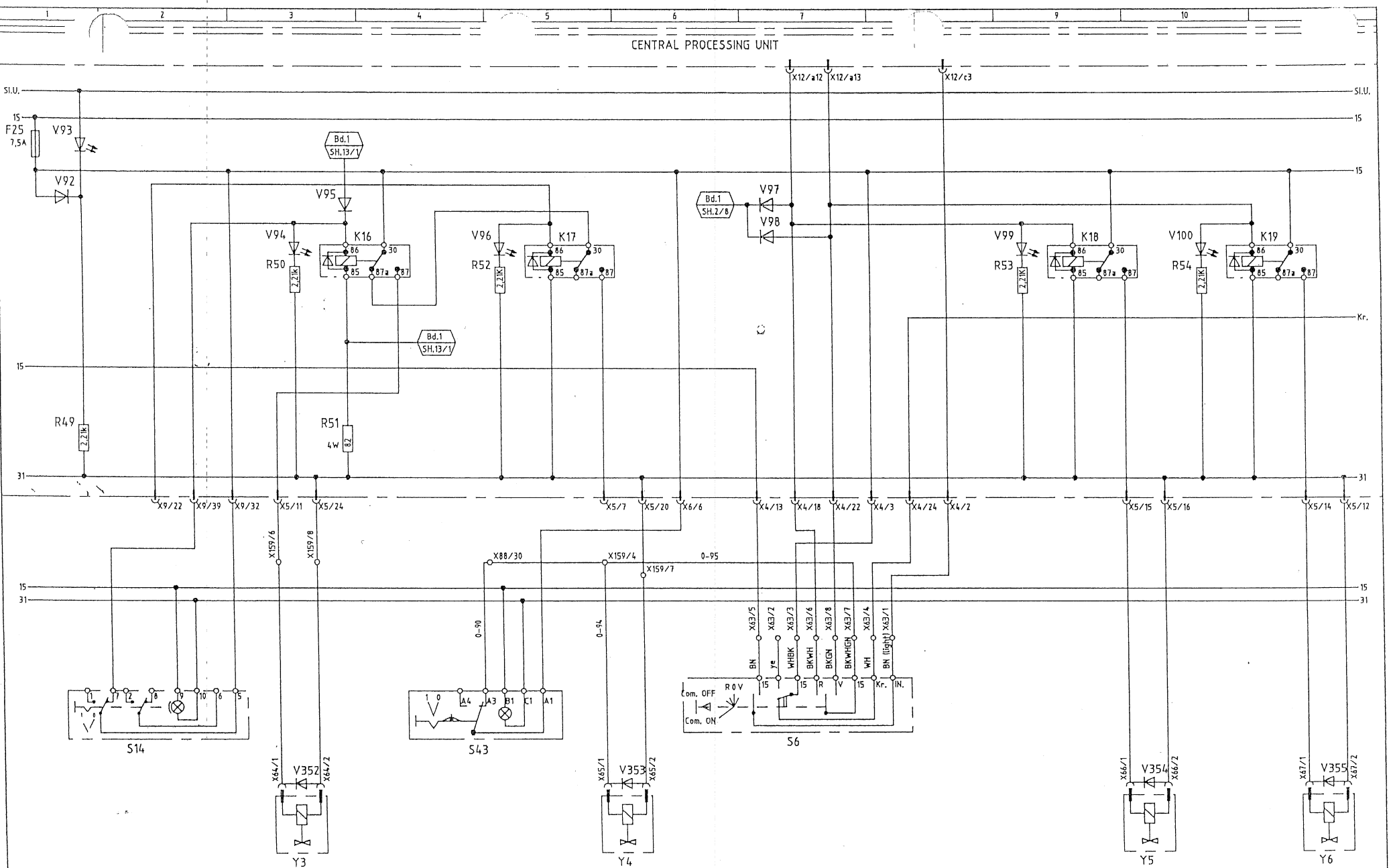
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STROMLAUFPLAN PL1

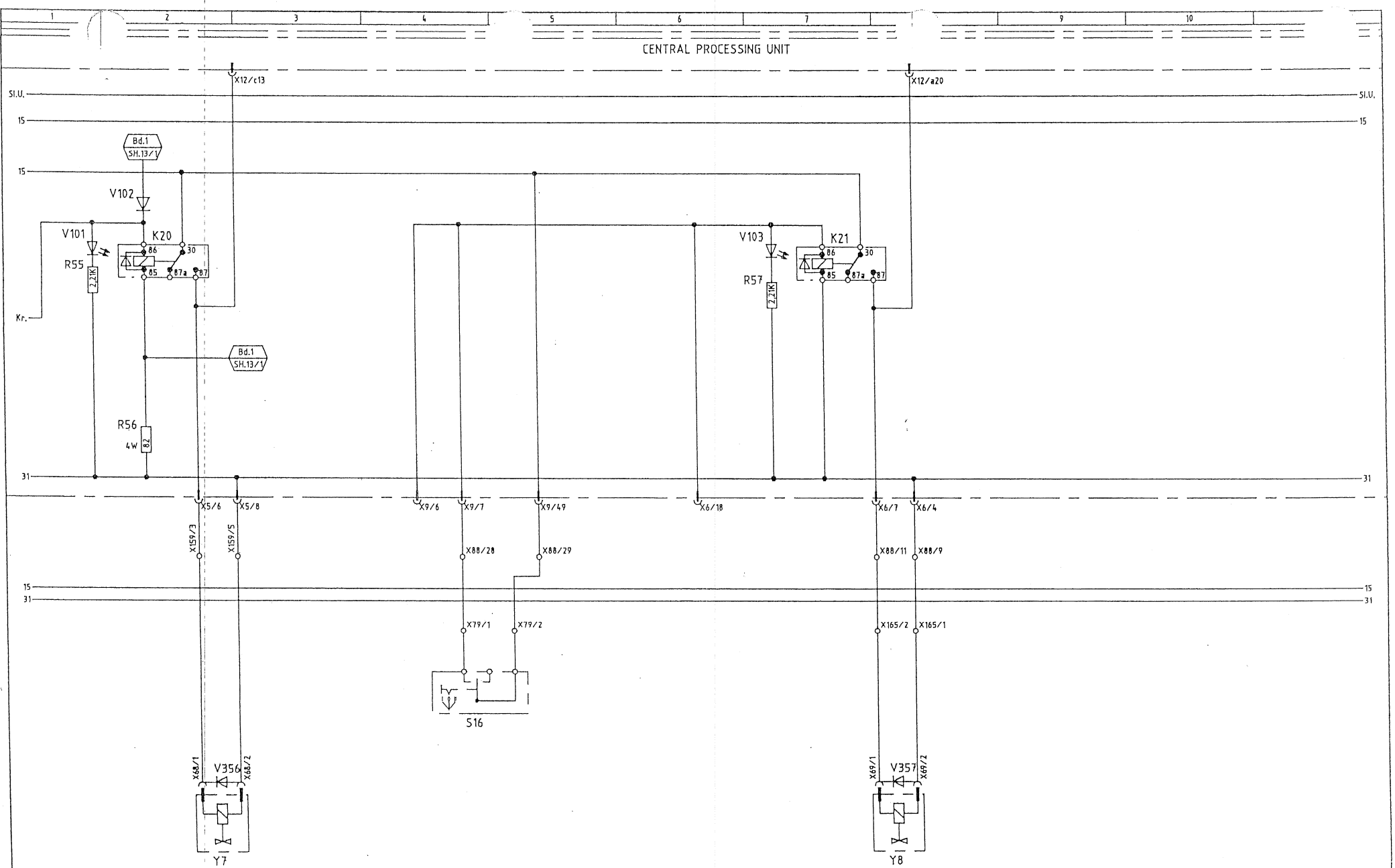
7800.715.20.18/000

Blatt 9

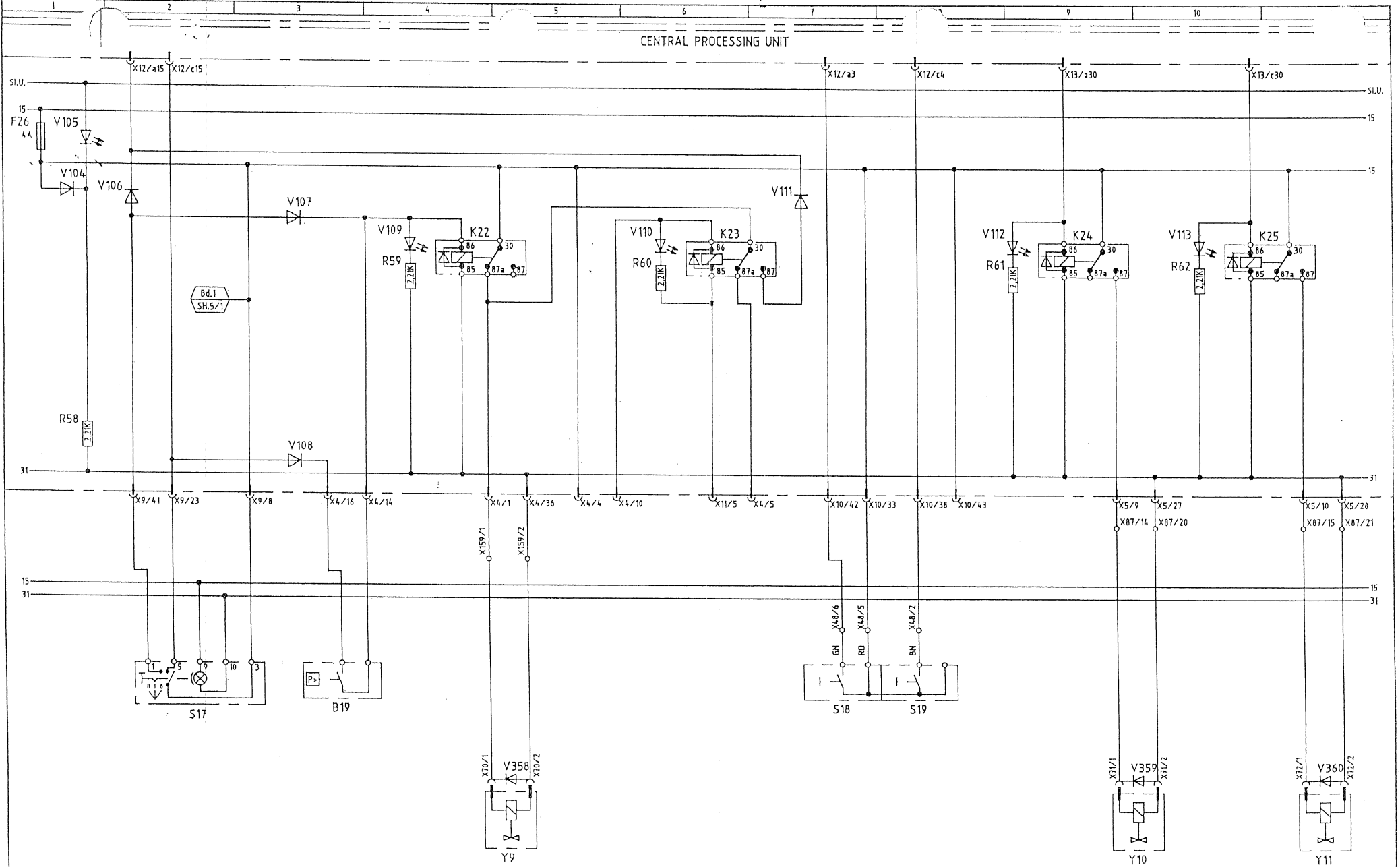
19fb Bl.



Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:		Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:	
DIN		3				7				Datum	17.06.1999	ATLAS-WEYHAUSEN		D	STROMLAUFPLAN PL1		
Stoff		2				6				Bearb.	U. Panzram	MASCHINENFABRIK GmbH					
Rohmasse		1				5				Gepr.		STEDINGER STR.324			7800.715.20.18/000		Blatt 10
Schutzvermerk nach DIN 34 beachten!	Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name		Datum	16.02.2000	D-27751 DELMENHORST					19 Bl.



Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:		
DIN		3				7				Datum	17.06.1999	ATLAS-WEYHAUSEN GmbH	D	STROMLAUFPLAN PL1			
Stoff		2				6				Bearb.	U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST					
Rohmasse		1				5				Gepr.				7800.715.20.18/000		Blatt 11	19 Bl.
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000						



Full Floating Axle Inhibition

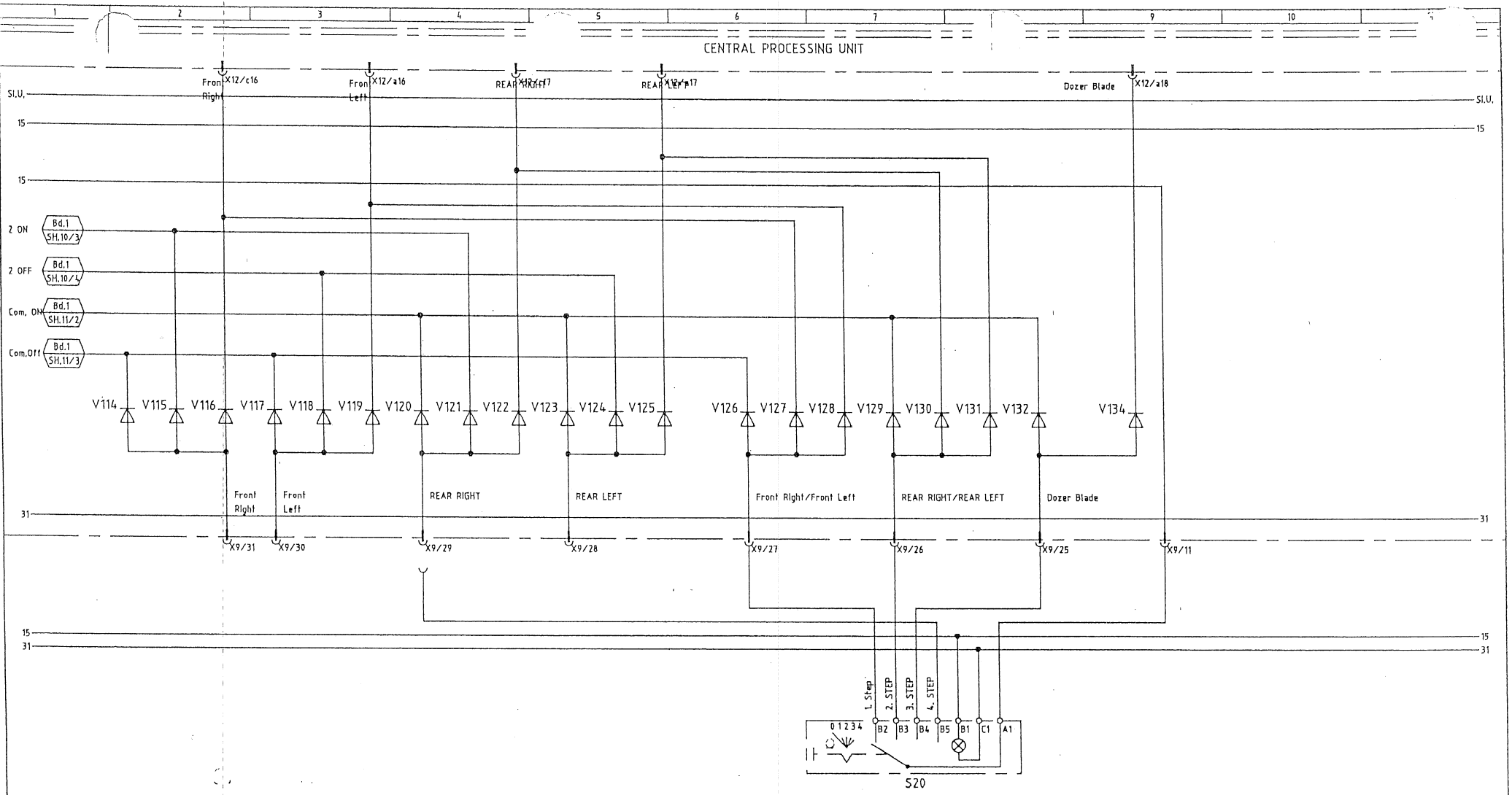
(Mobile)

Solenoid Valve current-carrying:
- Axle free

Turn Grab Left Button	Turn Grab Right Button
Operating Handle Right Inside	Operating Handle Right Outside
Turn Grab Left	Turn Grab Right

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:		
DIN		3				7				Datum	17.06.1999				STROMLAUFPLAN PL1		
Stoff		2				6				Bearb.	U. Panzram		D				
Rohmasse		1				5				Gepr.					7800.715.20.18/000		Blatt 12
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000						19 Bl.

ATLAS-WEYHAUSEN GmbH
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STEDINGER STR.324
D-27751 DELMENHORST



Claw Control

Right Front	Left Front	Right Rear	Left Rear	Front	Rear	Dozer Blade
		when in individual control:				
2. Step	1. Step	4. Step	3. Step			

(Mobile EXTRA)

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:
DIN		3				7				Datum 17.06.1999					
Stoff		2				6				Bearb. U. Panzram					
Rohmasse		1				5				Gepr.					
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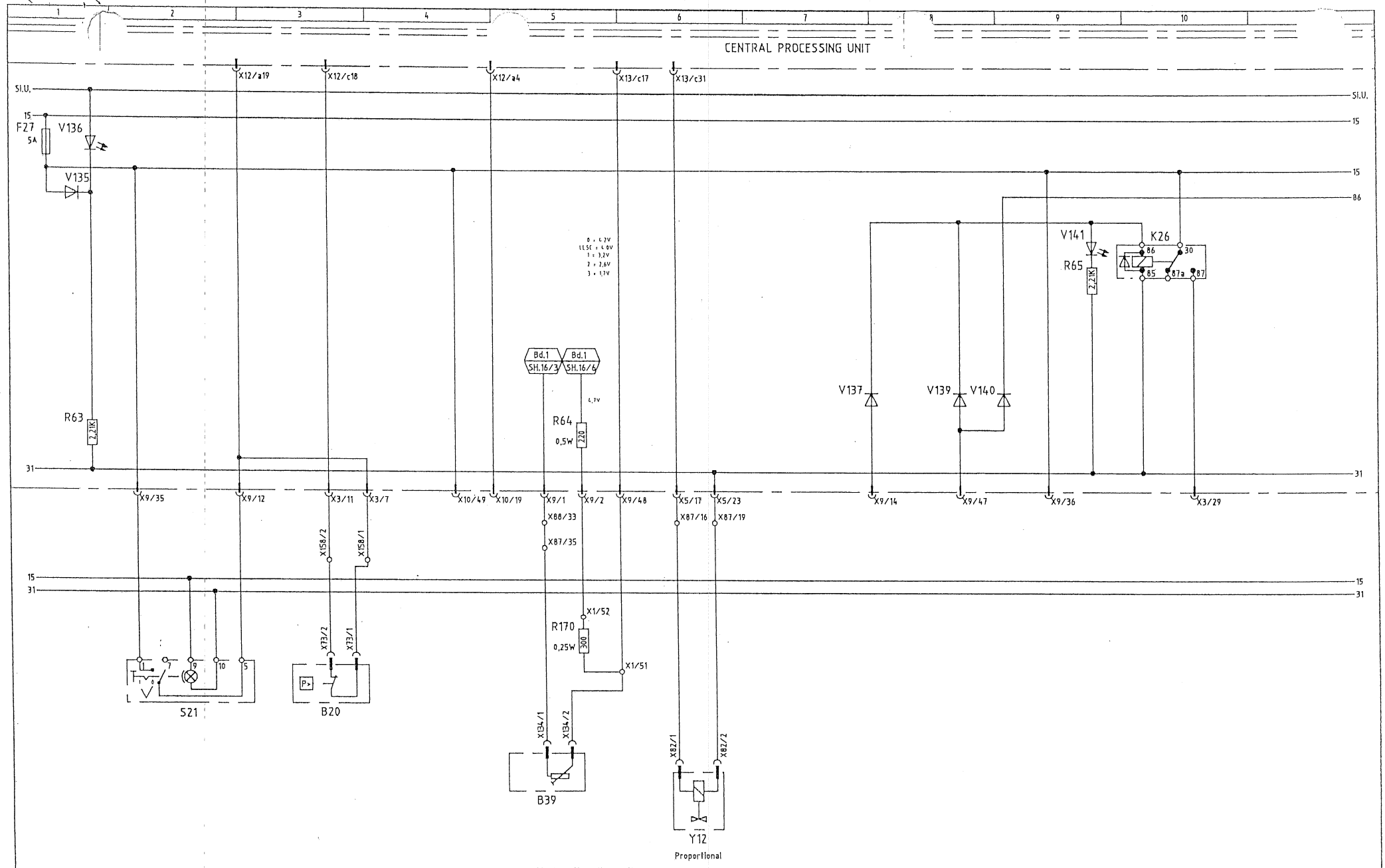
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

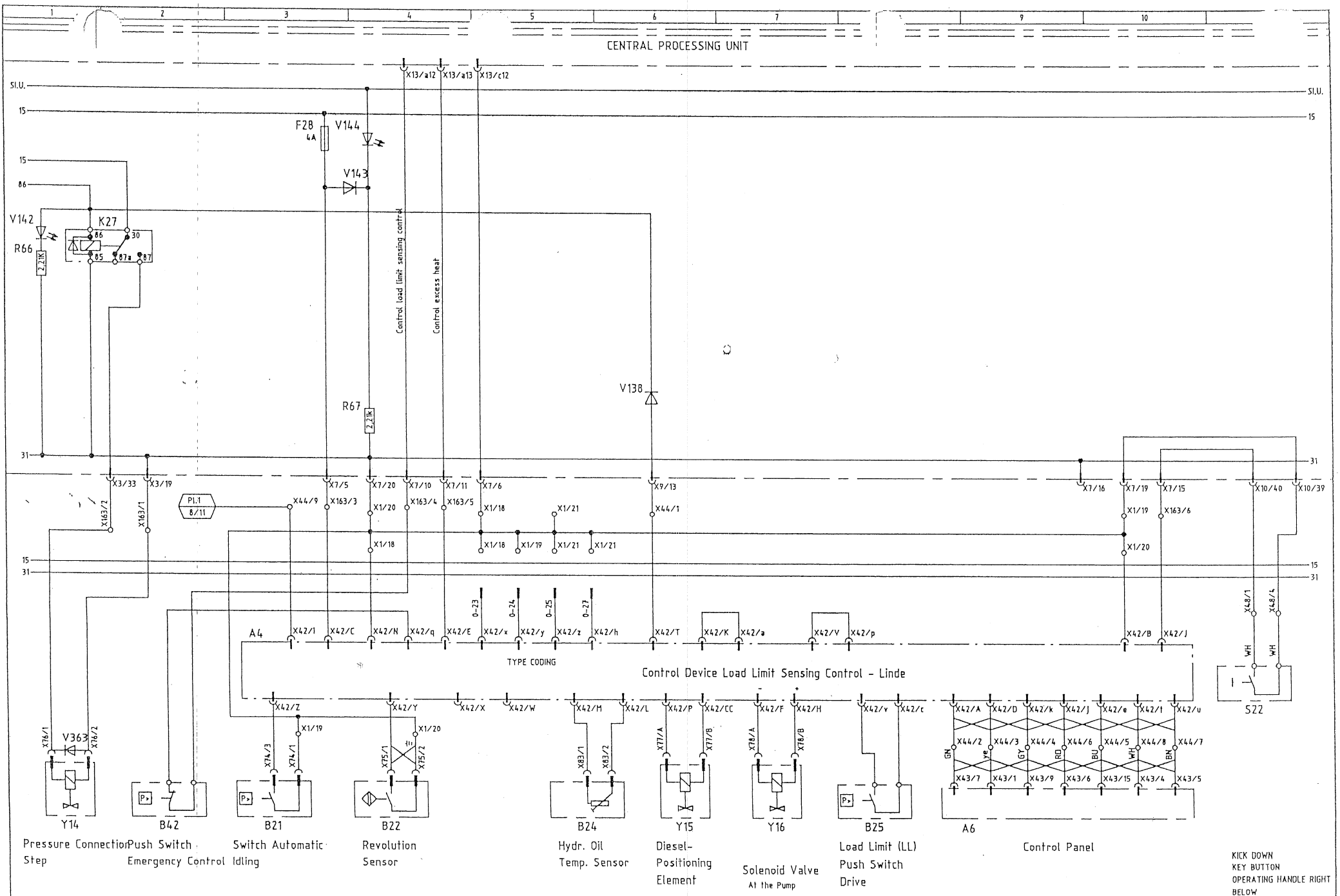
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STROMLAUFPLAN PL1

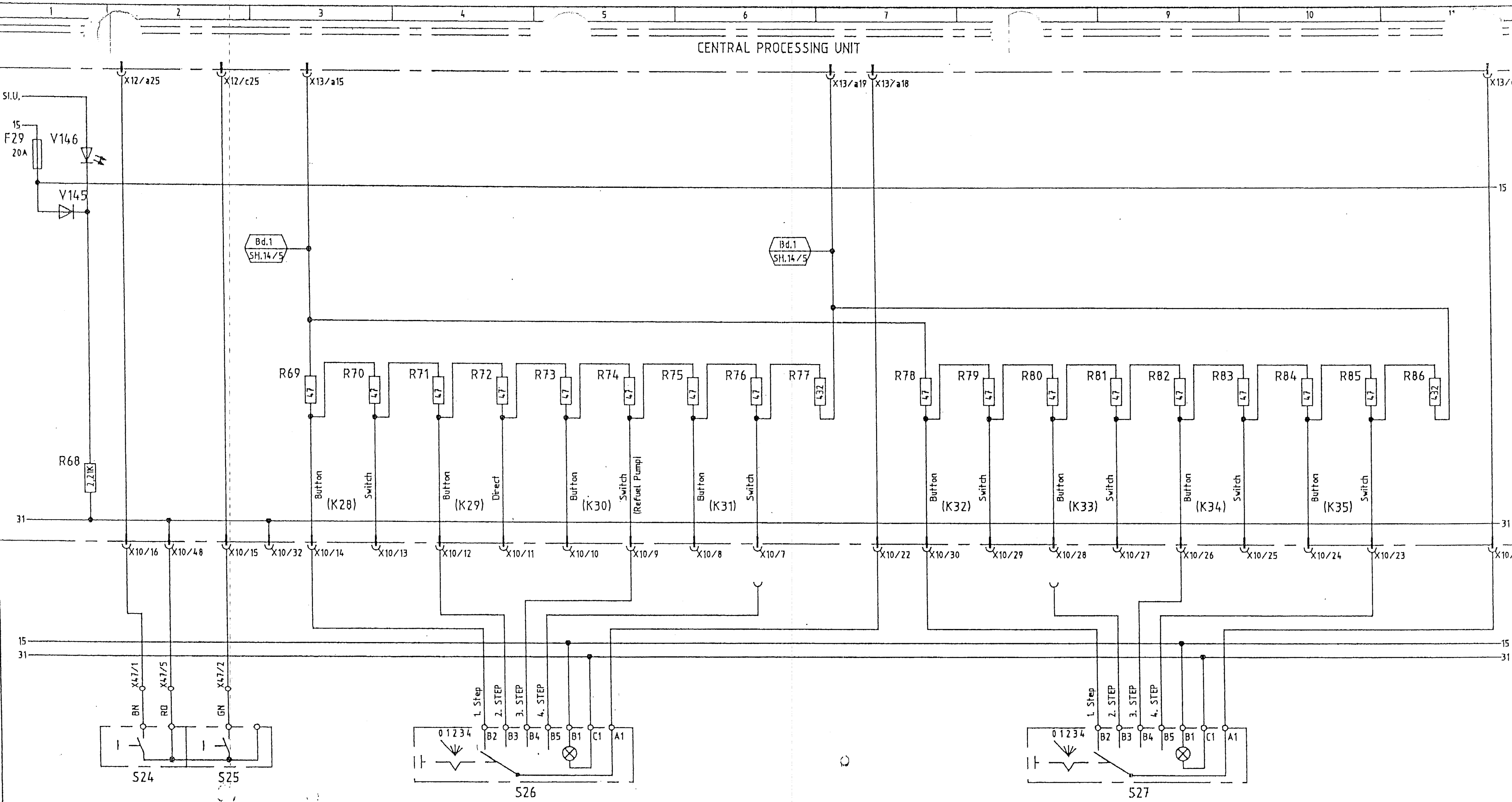
7800.715.20.18/000

Blatt 13
19 Bl.


CENTRAL PROCESSING UNIT
X12/a19
X12/c18
X12/a4
X13/c17
X13/c31
SI.U.
15
F27
5A
V136
V135
31
R63
2,2IK
X9/35
X9/12
X3/11
X3/7
X10/49
X10/19
X9/1
X9/2
X9/48
X5/17
X5/23
X158/2
X158/1
X73/2
X73/1
S21
B20
Bd.1
SH.16/3
Bd.1
SH.16/6
R64
0,5W
220
X88/33
X87/35
X1/52
R170
0,25W
300
X1/51
X134/1
X134/2
B39
X87/16
X87/19
X82/1
X82/2
Y12
Proportional
V137
V139
V140
V141
R65
2,2IK
K26
86
30
85
87a
87
X9/14
X9/47
X9/36
X3/29
Display Excess Load
(EXTRA)
Hydraulic Oil Cooling Fan
CODIERSCHALTER 2 AUF ON
(1804)
Gezeichnet m.CAD
Ers. f.:
Ers. d.:
Massstab
Freig.f.Fertig. Dat.:
Name:
Datum 17.06.1999
Bearb. U. Panzram
Gepr.
Datum 16.02.2000
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST
D
STROMLAUFPLAN PL1
7800.715.20.18/000
Blatt 14
19 Bl.



Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:		Ers. d.:		Massstab	Freig.f.Fertig. Dat.:		Name:	
DIN		3				7				Datum	17.06.1999	ATLAS-WEYHAUSEN GmbH			D	STROMLAUFPLAN PL1			
Stoff		2				6				Bearb.	U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST							
Rohmasse		1				5				Gepr.						7800.715.20.18/000		Blatt 15	
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000							19 Bl.	



Auxiliary Tools Left
Button
Operating Handle Left
Outside

Auxiliary Tools Right
Button
Operating Handle Left
Inside

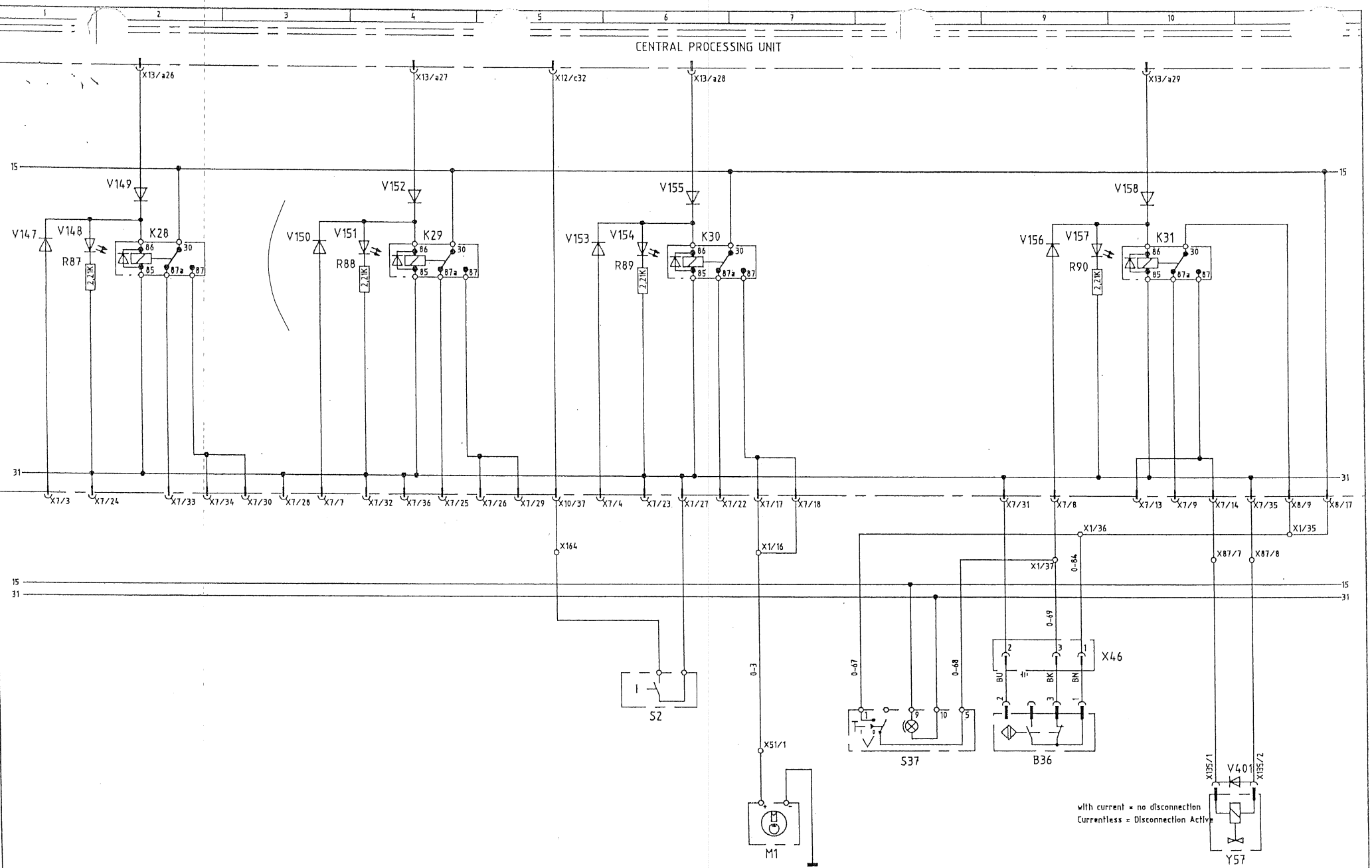
Preselection Switch L.

For Button
Operating Handle Left
Outside
(EXTRA)

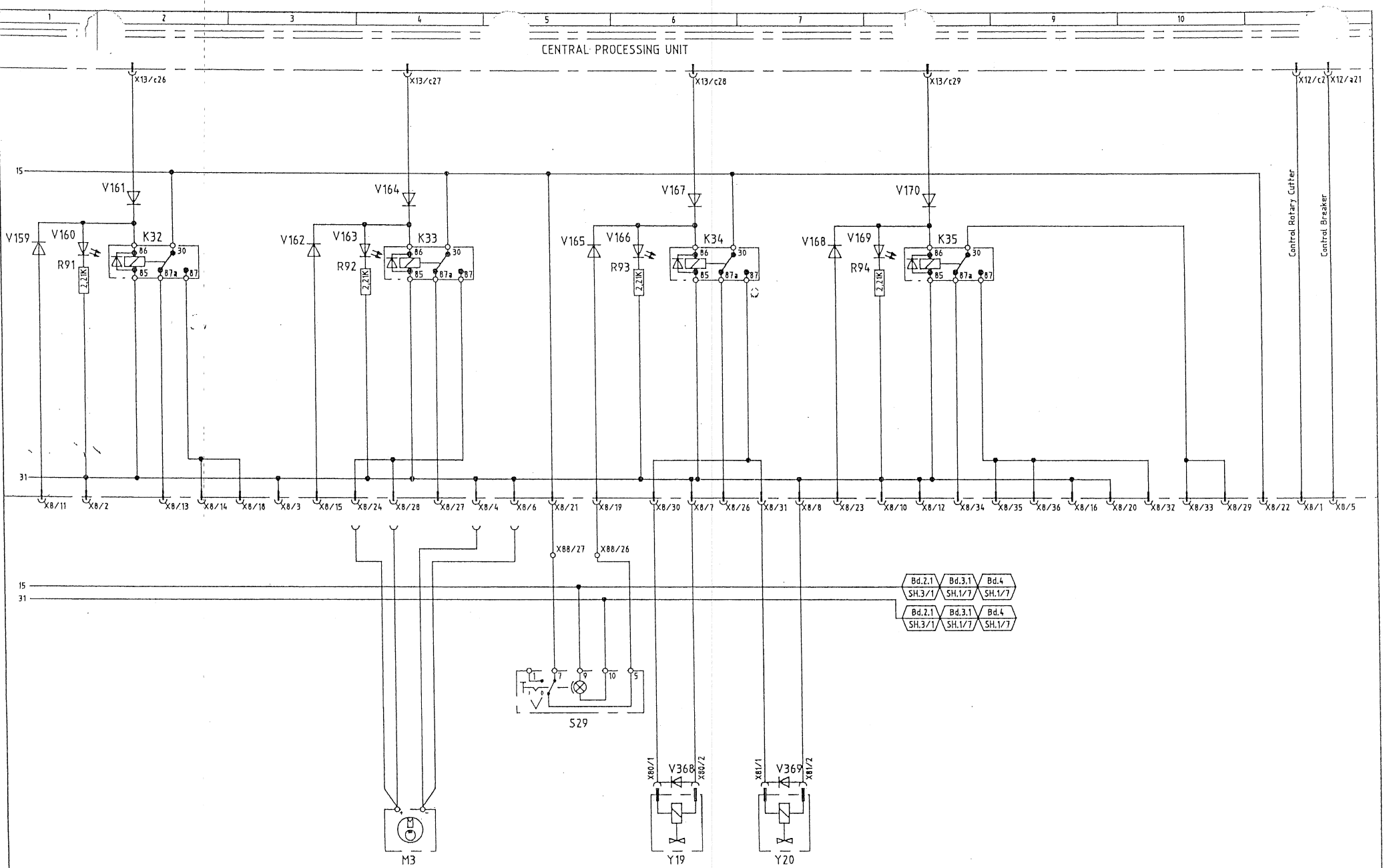
Preselection Switch R.

For Button
Operating Handle Left
Inside
(EXTRA)

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:
DIN		3				7				Datum 17.06.1999	ATLAS-WEYHAUSEN GmbH		D	STROMLAUFPLAN PL1	
Stoff		2				6				Bearb. U. Panzram	MASCHINENFABRIK				
Rohmasse		1				5				Gepr.	STEDINGER STR.324			7800.715.20.18/000	Blatt 16
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum 16.02.2000	D-27751 DELMENHORST				19 Bl.



Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:		Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:	
DIN		3				7				Datum	17.06.1999	ATLAS-WEYHAUSEN GmbH		D	STROMLAUFPLAN PL1		
Stoff		2				6				Bearb.	U. Panzram	MASCHINENFABRIK STEDINGER STR.324 D-27751 DELMENHORST					
Rohmasse		1				5				Gepr.					7800.715.20.18/000		Blatt 17 19 Bl.
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000						



OUTPUT FOR AUXILIARY TOOLS RIGHT

Hydraulic Oil Cooling Fan
CODIERSCHALTER 2 AUF ON

Switch: Driving > ADJ. Boom
Add. Operation by control handle left:
adjustabel boom > driving

Output For Auxiliary Tools Right

(EXTRA) (Caterpillar With Hydr. Adjustable Boom)

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab
DIN		3				7				Datum	17.06.1999		D
Stoff		2				6				Bearb.	U. Panzram		
Rohmasse		1				5				Gepr.			
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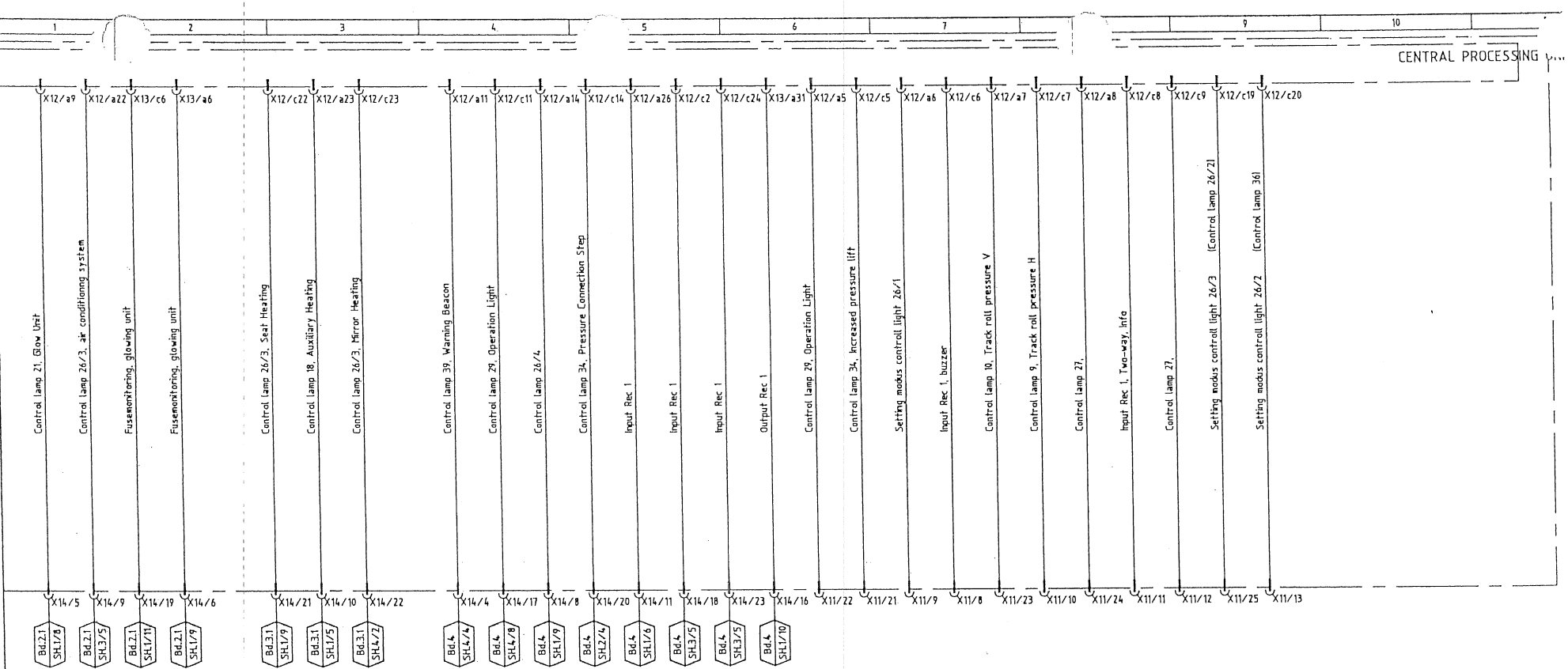
ATLAS-WEYHAUSEN GmbH
MASCHINENFABRIK
STEDINGER STR.324
D-27751 DELMENHORST

Freig.f.Fertig. Dat.: Name:

STROMLAUFPLAN PL1

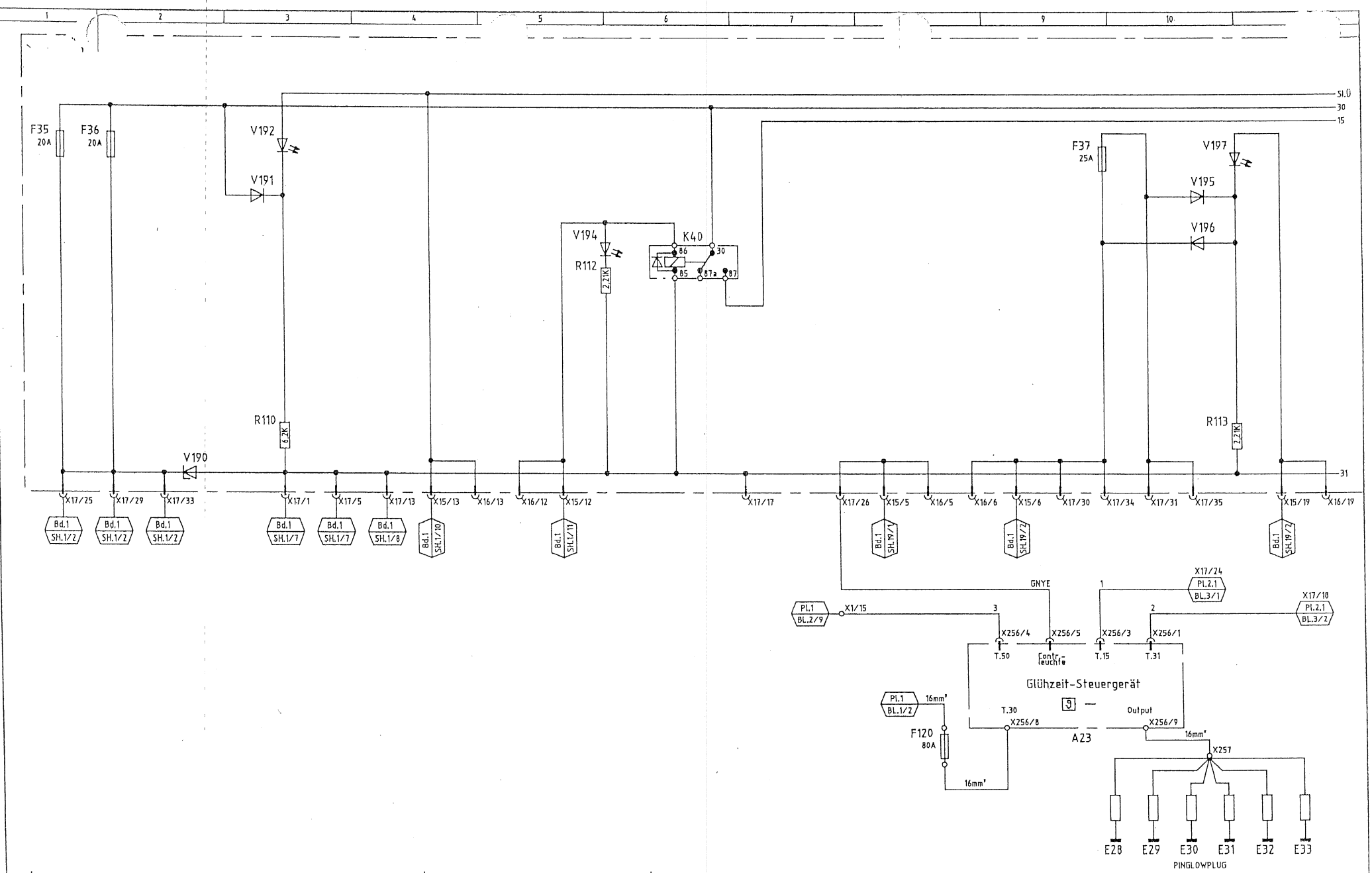
7800.715.20.18/000

Blatt 18
19 Bl.



Bd.2.1 | Bd.3.1 | Bd.4 | Two-way Digger

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:		
DIN		3				7				Datum	17.06.1999	ATLAS-WEYHAUSEN	D	STROMLAUFPLAN PL1			
Stoff		2				6				Bearb.	U. Panzram	MASCHINENFABRIK GmbH					
Rohmasse		1				5				Gepr.		STEDINGER STR.324					
Schutzvermerk nach DIN 34 beachtet!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000	D-27751 DELMENHORST		7800.715.20.18/000		Blatt 19	19 Bl.



Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab	Freig.f.Fertig. Dat.:	Name:				
DIN		3				7				Datum	18.06.1999								
Stoff		2				6				Bearb.	U. Panzram								
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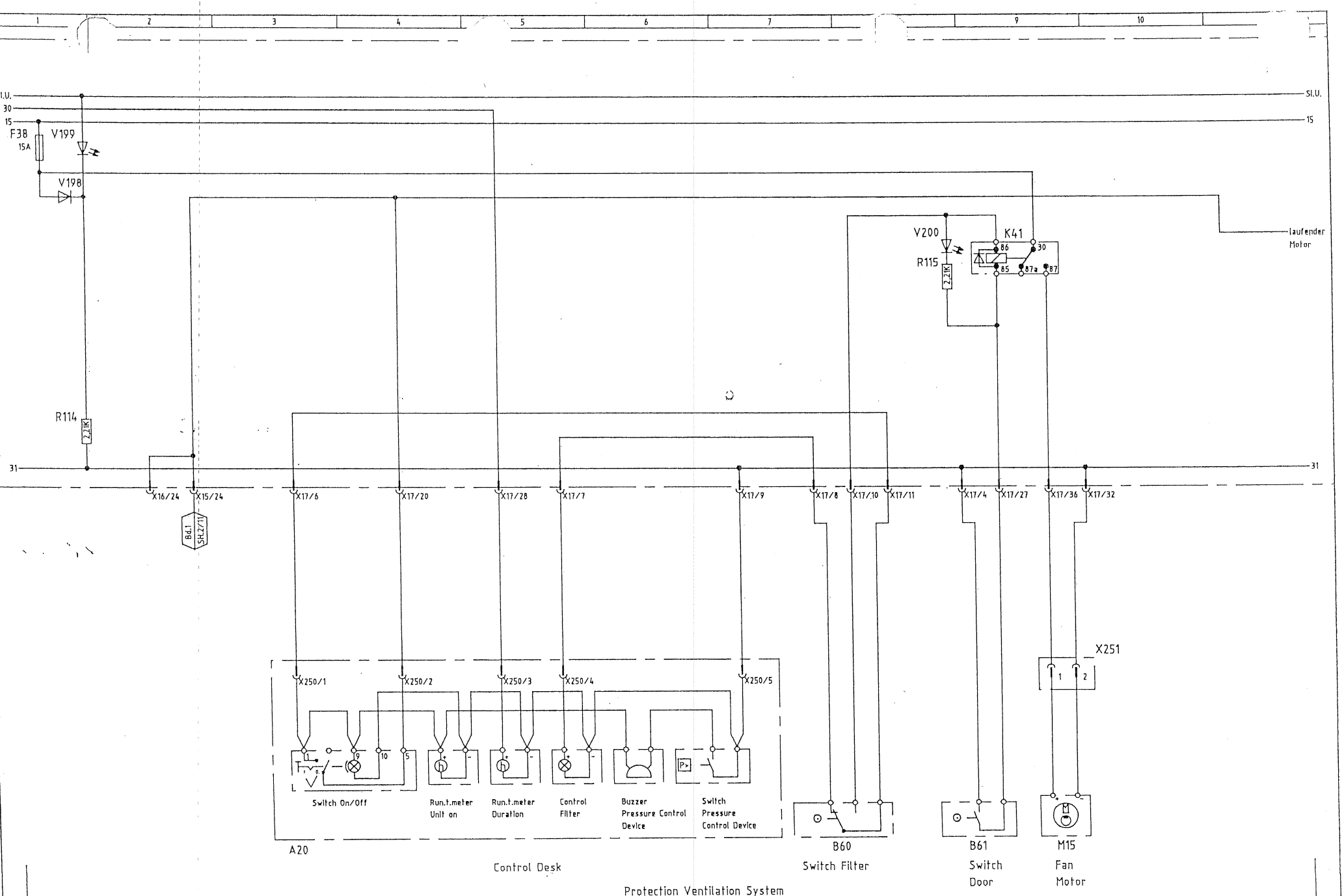
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Protection Ventilation System

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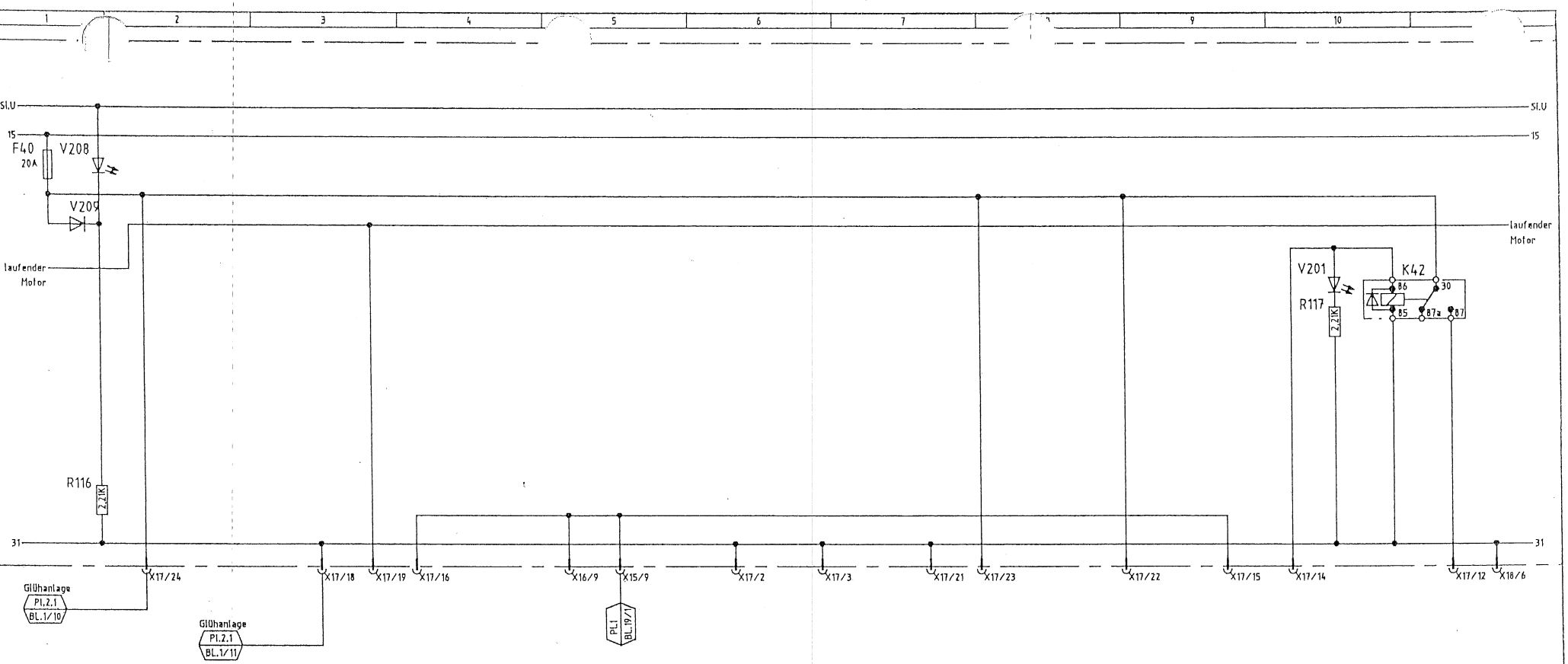
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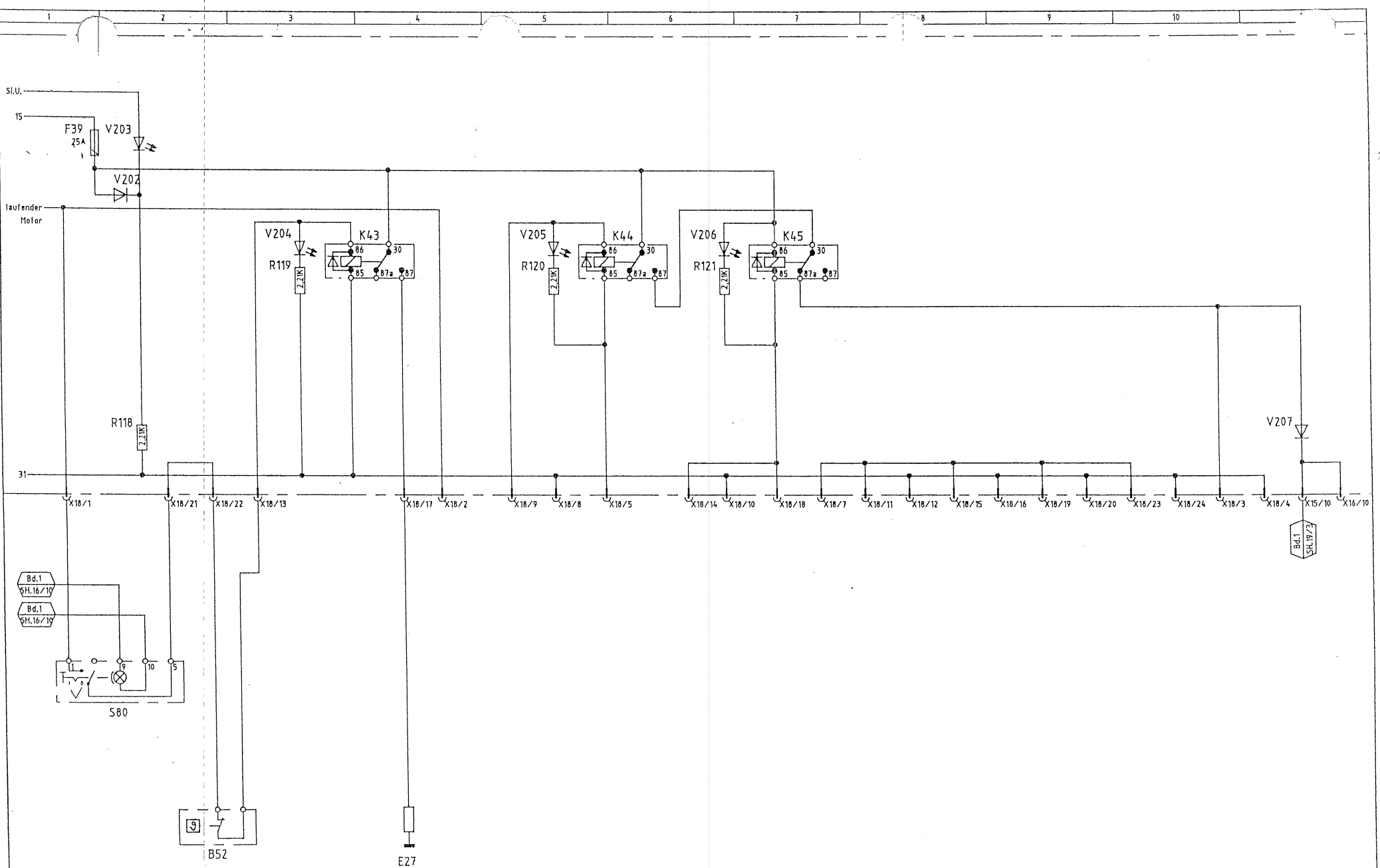
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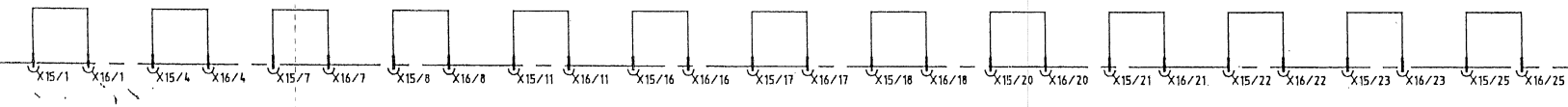
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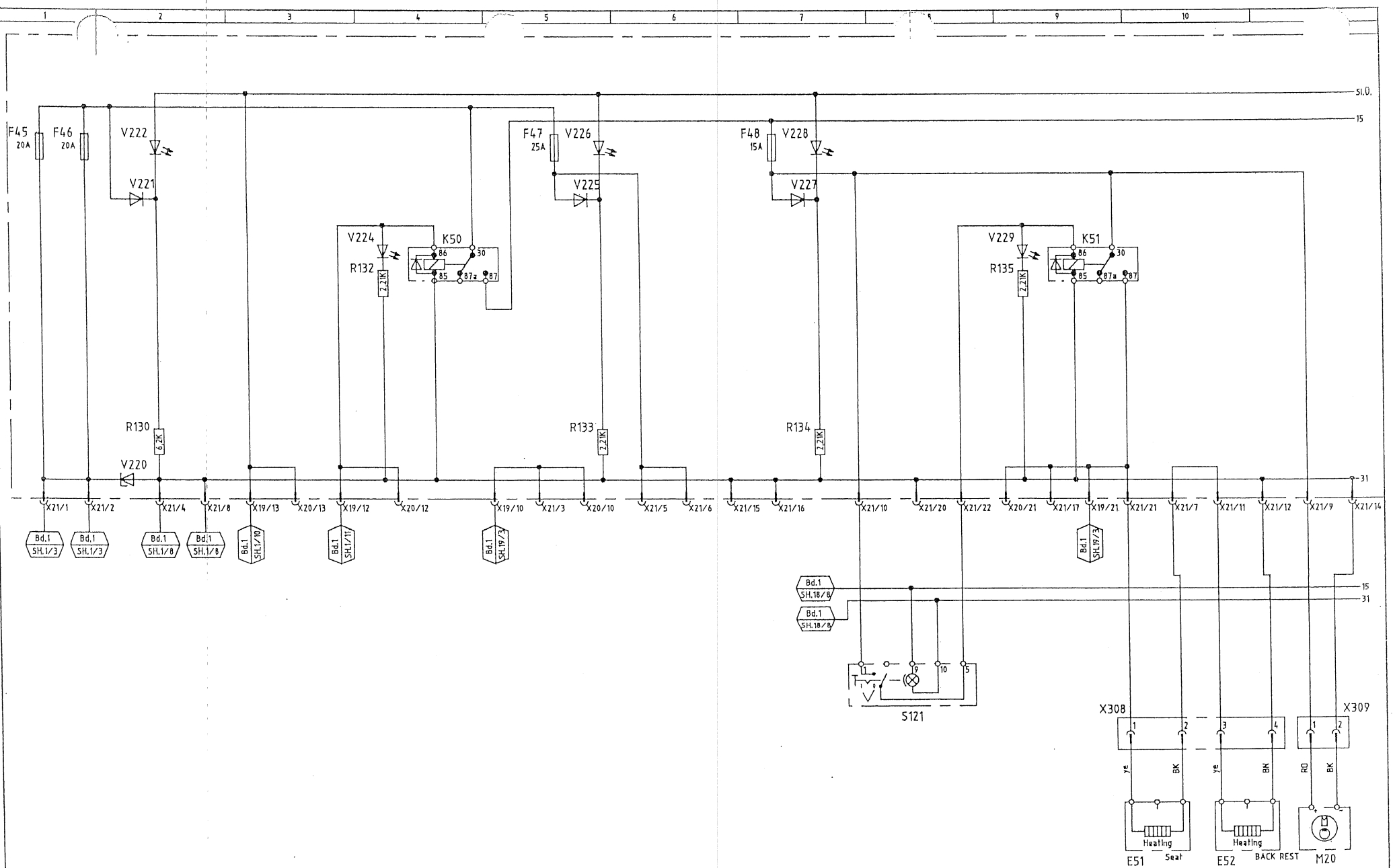
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Mains Supply

(EXTRA)

Main Relay

(EXTRA)

Seat Heating

(EXTRA)

Seat Adjustment Compressor

(EXTRA)

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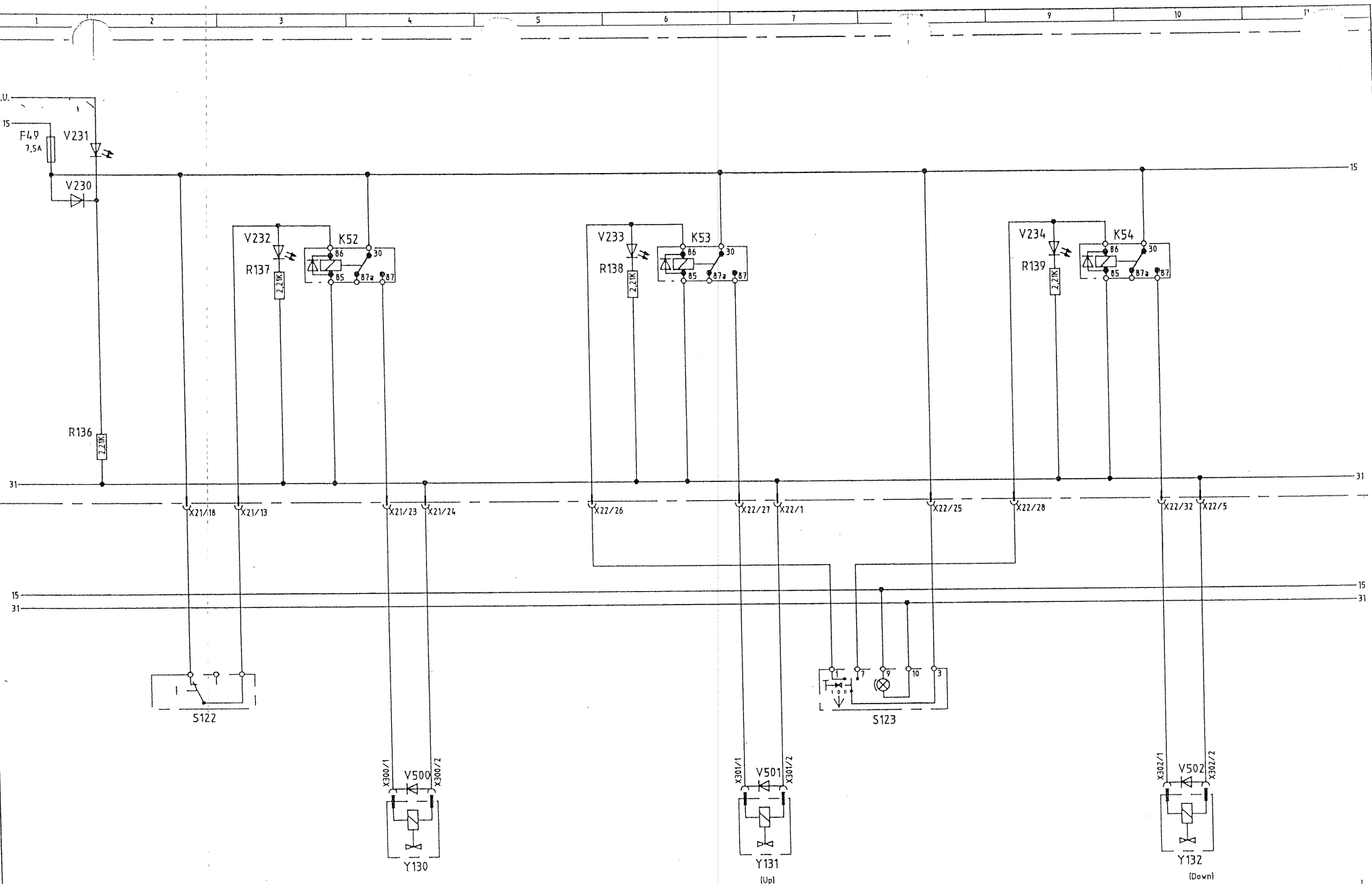
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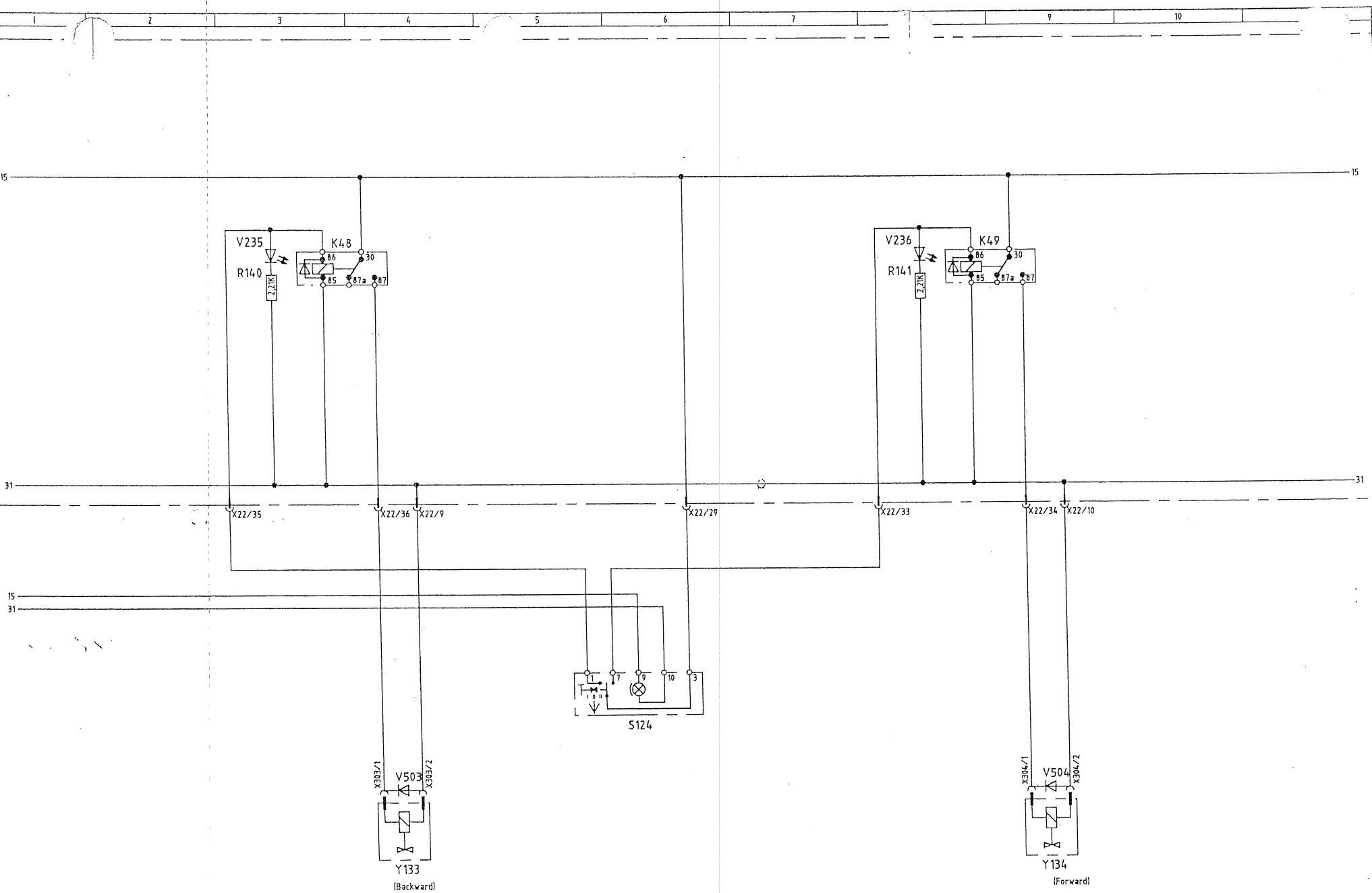
Emergency Movement For Vario, Lift Bethwen

(EXTRA)

Vario Cabin or Cabin Lift Up/Down

(EXTRA)

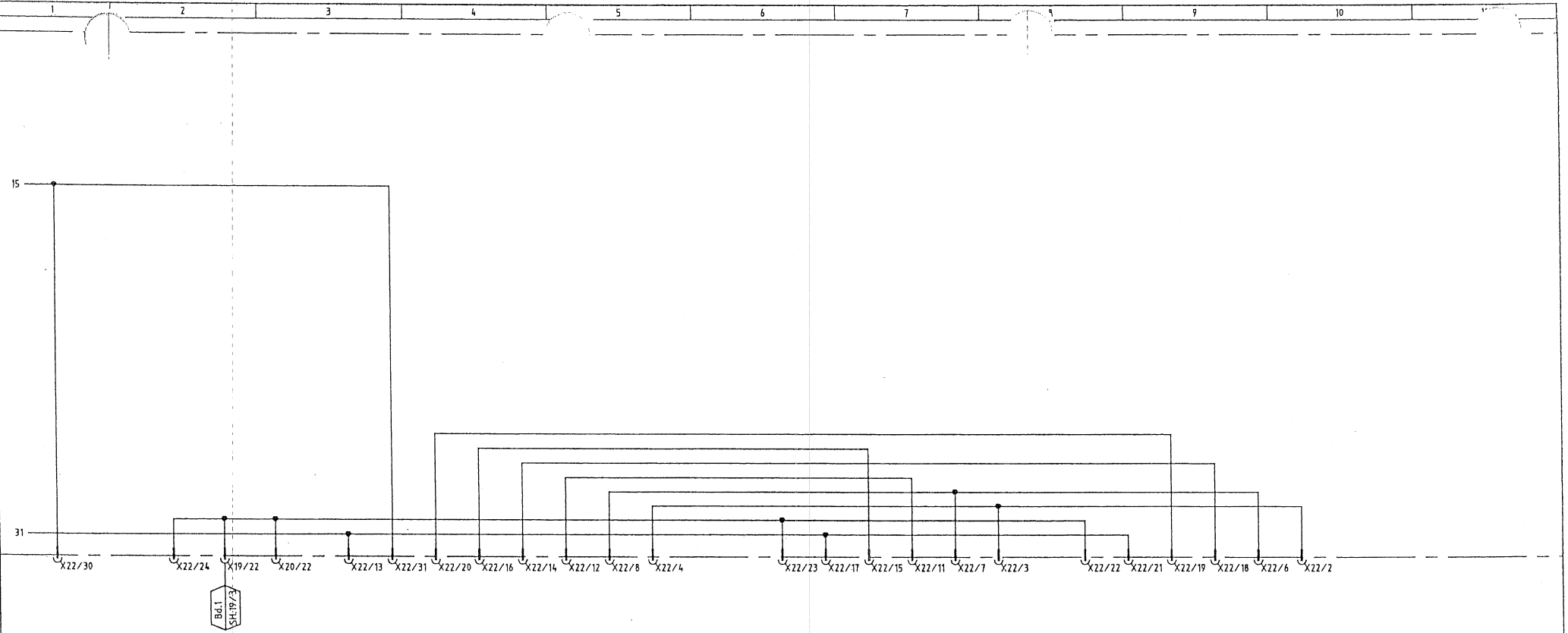
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Vario Cabin Forward/Backward

(EXTRA)

Teil-Nr.		4				8				Gezeichnet m.CAD	Ers. f.:		Ers. d.:		Massstab	Freig.f.Fertig. Dat.:	Name:
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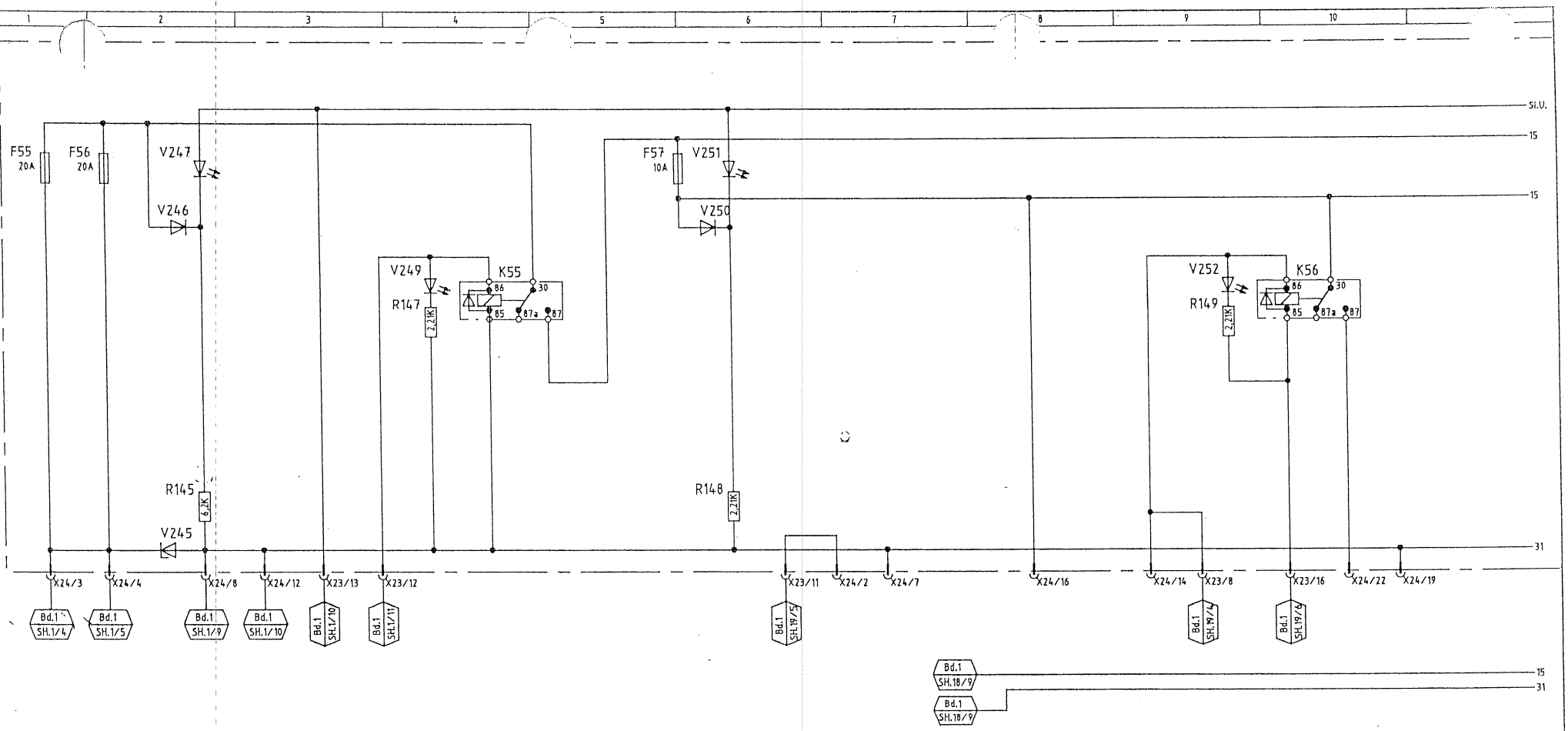
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Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	16.02.2000	D-27751 DELMENHORST			5 Bl.



Mains Supply

(EXTRA)

Main Relay

(EXTRA)

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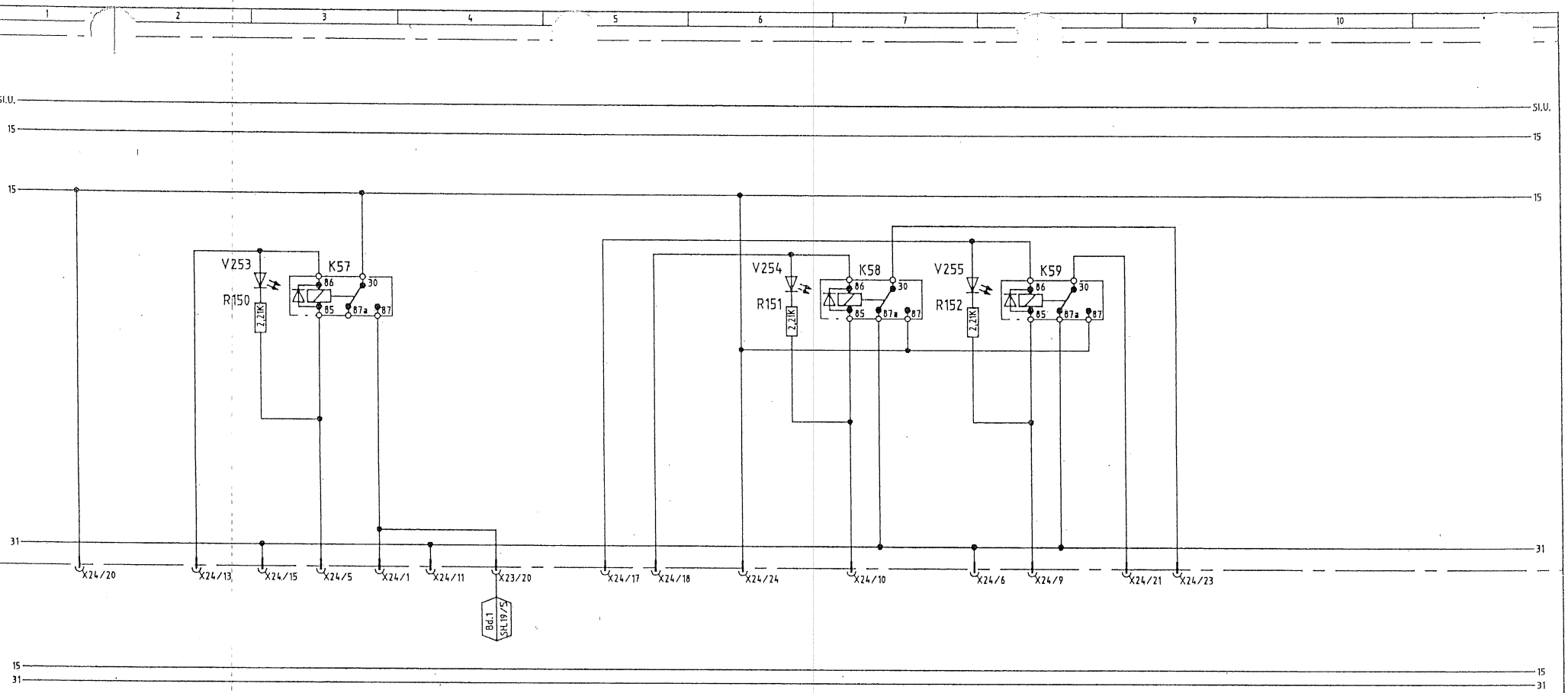
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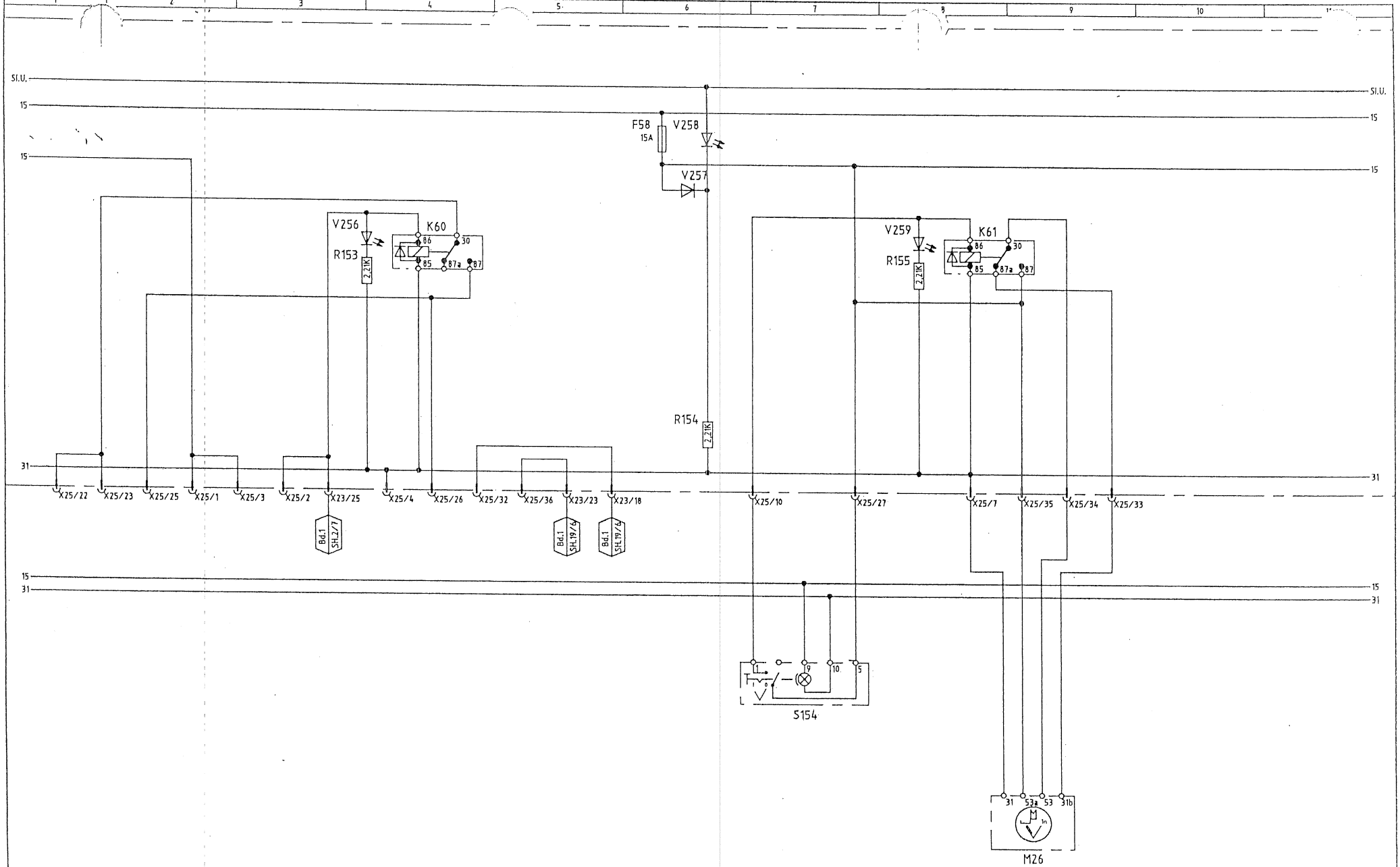
STROMLAUFPLAN PL4

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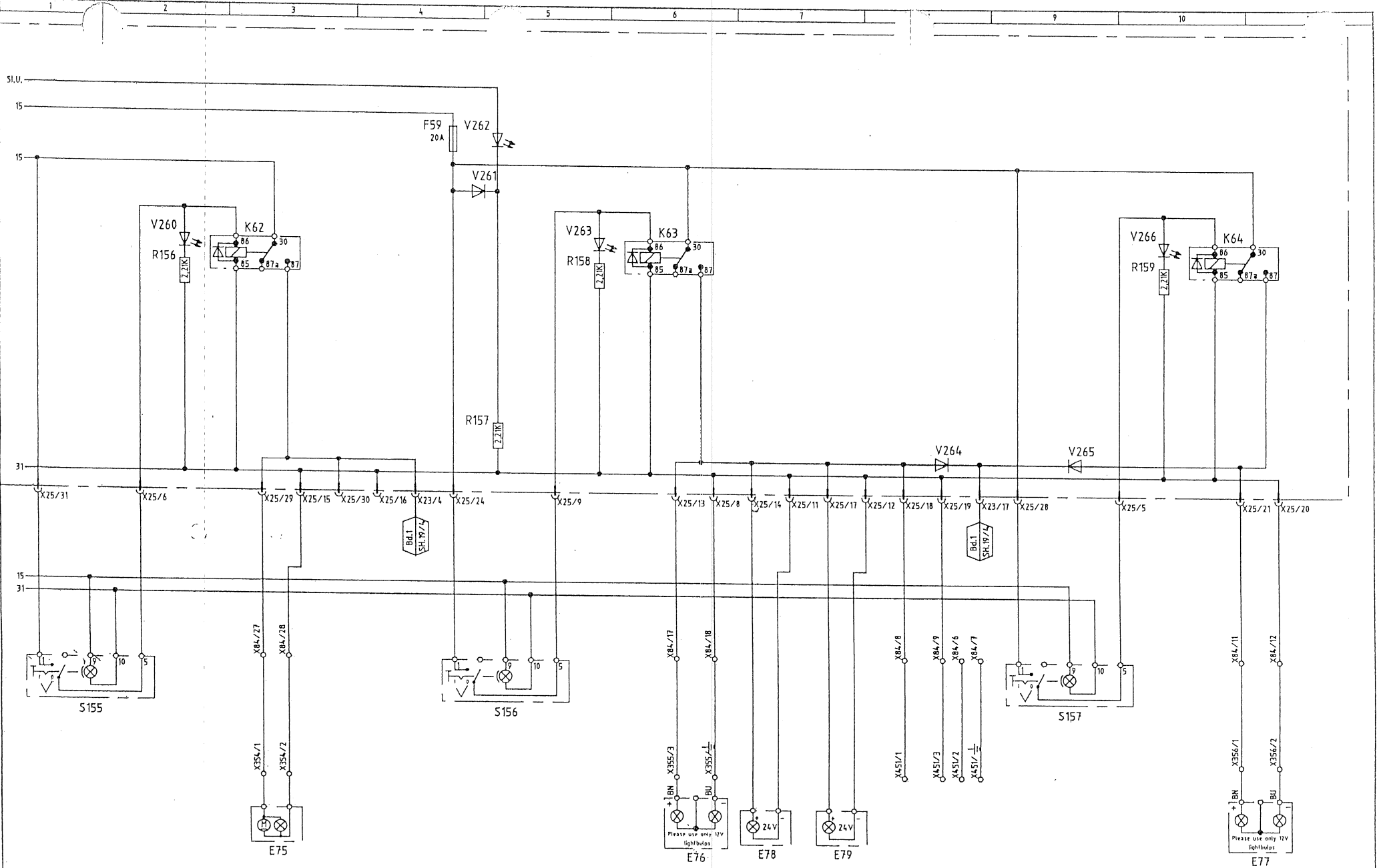
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Windscreen Wiper Rear

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Warning Becon

(EXTRA)

Operation Light Front

Cabin ARM ARM ZW

(EXTRA)

Operation Light Rear

Cabin

(EXTRA)

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TEREX ATLAS

CONTENTS

A selection of notes and drawings helpful in explaining and understanding the principle behind the ATLAS AWE4 hydraulic system

THE NATURE AND USES OF HYDRAULICS

Everything is done by hydraulics, nowadays. We all talk about hydraulics, it is the done thing. Some of those who talk about hydraulics really know something about it, others just think that they know something about it. We shall give here a brief outline of the nature and uses of hydraulics. It will help some readers to refresh their memories, and enable others to acquire a little detailed knowledge of this interesting subject.

What was known a decade ago about hydraulics is no longer adequate to explain the functioning of hydraulic equipment of machines. Why not? Well, naturally we still have pumps, valves, and cylinders (rams), we still suck the liquid out of a tank, and when the liquid has done the job, it returns to the tank. But in this age of automation, the requirements of those branches of industry which employ hydraulic devices have gradually become more differentiated, and the tolerances have become smaller. This made it necessary to redesign the components of hydraulic systems, so as to make them suitable for the job. But anyone who wants to understand these relationships must also study the theory, to some extent, in particular hydrostatics, hydrodynamics, properties of materials, flow dynamics, gas dynamics, electronics, etc.

We shall try to give our readers as much of this, in the appropriate places, as they need to understand the function of the various types of hydraulic equipment.

Coming back, now, to the term "hydraulics".

This is a word derived from the Greek and means "something to do with water" or, more accurately, "water in pipes".

Hydraulics, then, was originally the branch of physics dealing with water. But since it is now known that other liquids behave, in principle, like water, hydraulics is now defined as the branch of physics dealing with the (physical) properties of liquids.

The engineer puts this slightly differently: "The use of liquids for the conversion and transmission of energy".

Water is practically incompressible. It is still used in many modern hydraulic installations. This, then is "water hydraulics". But oil (mineral oil, in general) is usually preferred for the transmission of energy because some physical properties of oil (prevention of corrosion, sliding and lubricating properties, etc) are superior to those of water. We speak in this case of oil hydraulics. In certain cases, flame retardant liquid must be used, for safety reasons. These liquids are based on fully or partly synthetic substances.

As already mentioned, we utilise the property of liquids of transmitting energy or performing work (they transmit power, energy referred to a unit of time) by converting energy of one kind into another.

There are a number of ways of transmitting energy, eg, mechanical, electromechanical, purely electrical (Leonard), and pneumatic systems.

Hydraulic methods of transmitting energy are used if large forces in the form of high, steady pressures have to be transmitted through intricate systems.

A liquid with the best possible (from the engineering point of view) transmission and lubrication properties is sucked up by a pump, charged during its displacement with energy, and pushed into a system of pipes; it is now a pressurised liquid. Valves ensure that the system is not overloaded, correct the speed of flow, and shunt the flow in the required direction, until the energy contained in the liquid has been passed on to a consumer (energy consuming equipment).

A number of losses, caused by a variety of circumstances, occur during the transmission of energy. The final effect is that all these losses appear in the form of heat and are passed on to the outside air. They obviously present a reduction in the amount of energy available at the output of our system. They are caused, for instance, by reactive effects, bearing friction, air resistance, surface wear of seals, factors connected with the speed of the flow (molecular friction, boundary friction, turbulence phenomena,

etc.), change of direction in pipes and hydraulic equipment, leakage (loss of pressure due to loss of energy) and so on.

We have deliberately kept these comparisons at a low, simplified level, they are not intended to present a fully detailed, complete picture. However, they enable us to say that hydraulic power transmission is suitable for many situations, in particular where large forces are to be exerted along definite paths, at infinitely variable speeds. Normally, an electric power input is converted in various different ways and passed on to one or several consuming units and converted into work applied to mechanical equipment.

Major units

Any hydraulic system, no matter how complicated, can be reduced to a basic circuit containing only the main functions, viz:

1. Sources of energy, generators.
2. Converters of energy, pumps.
3. Distributors, valves. These are the parts giving direction to the flow of energy.
4. Consumers, rotary or linear motors converting energy.

Starting with the drive unit, and its first hydraulic energy converter, we can see that the pump is the first major unit.

This piece of hydraulic equipment is usually driven by a diesel engine or electric motor and takes a liquid out of a tank and displaces it, charging it at the same time with energy. This pressurised liquid is pushed into the pipes of a hydraulic system. The pumps used in oil hydraulic systems are usually of the gear, vane, longitudinal piston, or radial piston type. While the driving speed remains constant, the volume of liquid passing through the pumps may be constant or variable.

The liquid coming from the pumps reaches next the pressure valves.

A certain maximum pressure must not be exceeded in a hydraulic system. This is ensured by pressure limiting or relief valves (on the primary and secondary sides). When a preset working pressure is reached, the valve opens and allows the pressurised liquid to return to the tank, the hydraulic energy being converted into heat.

For larger quantities of liquid, the pressure limiting valves are operated not directly (by the pressure of the liquid) but through a pilot valve, utilising the hydraulic pressure gradient, so as to eliminate effects arising from spring constants and jet forces.

In a hydraulic system, the consumers operate normally in two opposite directions of motion. This involves directing the flow of liquid into whatever direction is required. This function is performed by the directional or multiway valve.

In oil hydraulic systems, the valves are mostly piston slide valves, which can be made comparatively cheaply. They are available in all the common sizes and for all methods of actuation. Here again, the jet forces occurring in the case of large flows are eliminated by providing pilot valves. A small pilot valve is actuated to release a flow of liquid to act on the appropriate side of the main control piston and exerts enough force on the active piston area to open or close the valve apertures.

The consumers (like the generators) are devices for the conversion of energy. We make a distinction between equipment for the transmission of rotary, pivoting, or linear motions.

As regards its function, the motor is only a reversed pump. While the pump sucks up liquid at atmospheric pressure, charges it with energy, and passes the pressurised liquid into the system, the motor takes in pressurised liquid, strips it of its energy, passes the energy on to the motor shaft in the form of a torque, and returns the liquid of the system to the tank, which is under atmospheric pressure.

HYDRAULICS TERMS YOU HAVE TO KNOW

Like any other specialist, the oil hydraulics engineer uses a number of technical terms. We shall list here a selection of the most important and most current ones.

It is convenient to divide them into three groups:

a. General terms.

b. Terms used in connection with energy converters.

c. Terms used in connection with control and regulation equipment.

The terms are arranged in alphabetical order within each group.

a. General terms

Acceleration (m/s^2):	A positive rate of change of a speed.
Compressibility:	Property of a liquid to change its volume when a pressure is applied to it.
Control:	Guiding a liquid charged with energy into a given direction so as to exert directional force.
Efficiency:	Total of energy losses in a device or machine, from various causes. A distinction is made between mechanical and columetric efficiencies.
Energy (potential or kinetic):	Ability of a substance (in this case, of a liquid) to perform work.
Energy conversion:	Description of the ability to convert an energy input of one kind into another.
Energy converter:	Equipment for converting one type of energy into another (eg electric motor; it converts electrical into mechanical energy).
Flow (l/min):	Motion of a liquid referred to the effective time.
Flow, laminar:	Regular flow of a moving liquid. The flow is steady and the pressure losses are low (internal and boundary friction of the liquid).
Flow, turbulent:	Irregular flow of a moving liquid due to excessive speed of flow. This type of flow has strong eddies and pressure gradients.
Force (kgf):	The effective magnitude of mechanical energy.
Hydraulics:	Use of liquids for the conversion and transmission of energy.
Hydrodynamics:	Exertion of a force by the mass of a moving liquid.
Hydrostatics:	Transmission of a force by the pressure of a liquid (in a closed system).
Moment (kgf m):	Force referred to the lever arm on which it is acting (linear, swivelling, or rotary motion).
Power:	Work referred to the time during which it is acting: 1 kW = 1.36 hp = 102 kgf m/s (linear, swivelling or rotary motion).
Pressure (kgf/cm^2 = bar):	Force referred to the area on which it acts.
Regulation:	Control of the energy of a liquid with simultaneous indication of the disturbing magnitudes for the system-referred or equipment-referred comparison of the settings and process variables.
Retardation (m/s^2):	Negative rate of change of speed referred to the effective time.
Speed (m/s or m/min):	Rate of motion referred to the distance and effective time.
Stiffness (kgf/cm):	Elastic property of a liquid.
Valve:	Device for carrying out the control or regulation (or both) of a liquid.

Viscosity (°E or cSt):	Description of the viscosity of a liquid; it is a function of the temperature and pressure of the liquid.
Work:	Force referred to the distance along which it acts.

b. Hydraulic equipment for the conversion of energy

Area ration:	In the case of linear motors, the ratio piston area/rod space area. Important for the differential system.
Cavitation:	Caused by inadequate pressure, expressed by a low volumetric efficiency, may cause damage by detachment, and destroy equipment.
Delivered volume (cm^3/rev):	The flow delivered by a pump or absorbed by a motor, referred to one revolution of the shaft; it is a design feature.
Differential system:	An arrangement of a linear motor, where the rod space is under a constant system pressure. The ratio of piston space to rod space is usually 2/1.
Direction of rotation:	Specified direction of rotation of an energy converter, usually indicated by an arrow.
Efficiency:	A nondimensional ratio; the fraction "output power (or removed power) divided by input (or absorbed) power"; P_{out}/P_{in}; obtained by vectorial addition of the various losses in hydraulic equipment, eg bearing + contact friction = mechanical efficiency, slip + leakage = volumetric efficiency.
Filter rating (um):	Minimum size of particles filtered out, as specified or recommended by makers of equipment.
Input (output) power (kW):	The power admitted to (available at) the shaft of an energy converter (in kW, hp, or kgf m/sec).
Input speed, min. (rpm):	Minimum speed at which a rotary motor will just operate satisfactorely; it is a design feature.
Intake pipe:	Pipe, duct, or hose from tank to pump. Intake (suction/speed less than 1 metre/sec.
Jack:	See "Linear Motor".
Leakage pipe (drain pipe):	Pipe, duct or hose removing the leakage liquid from hydraulic equipment. The liquid must normally be returned to a point below liquid level.
Linear motor:	Hydraulic equipment (called cylinder/ram or jack) transmitting a thrust in a straight line along a definite distance (stroke).
Output speed, max. (rpm):	Maximum speed at which a rotary motor will still operate reliably; it is a design feature.
Piston space (cm^3):	The hollow space bounded by cylinder head, liner (or cylinder wall) and piston head in a linear motor or piston pump.
Pivoting (swivelling) motor:	Hydraulic equipment for converting a torque into a pivoting (swivelling) motion (normally extending over less than 360°).

1. Introduction into oil hydraulics:

Material bodies consist of molecules, and these consist of atoms. The type of their accumulation determines the condition of the body. Accordingly, one must discriminate between the following:

a) Solid bodies, which are DIFFICULT to compress and DIFFICULT to deform.

b) Fluids, which are DIFFICULT to compress, but EASY to deform.

c) Gases, which are EASY to compress and easy to deform.

Since the oil hydraulics utilizes fluids as the pressure medium, we wish to give you below a brief explanation regarding their properties:

LAW OF THE HYDROSTATIC PRESSURE (PASCAL'S LAW):

If an inwardly directed force is acting on any part of the surface of a trapped fluid, this force will exert a compression on the fluid, or a pressure will be developed.

This pressure is transmitted uniformly onto the entire fluid quantity trapped, so that it will have the same rating in any point of the surface and of the interior of the fluid, as well as in all directions.

THE FORCES ARE IN PROPORTION TO THE SURFACES:

Example: The piston diameter of a single-piston hand-operated pump is 16 mm ($^5/_8$″). The surface F is 2 sq.cm. (0,31 in.^{2}) according to

$$\text{Formula } F = \frac{D^2 \times \pi}{4}$$

A corresponding lever transmission will apply a force of 200 kg (440 lbs.) onto the pump piston. Accordingly, the pressure developed before the piston, with corresponding resistance, will be 100 kg/sq.cm., i. e. 100 kg will be transferred onto each sq.cm. of surface area.

Combining the terms kg and sq.cm., you have the usual designation Kg/sq.cm. which is equal to "atü" (= ato. = atmospheres overpressure).

Accordingly, our hand-operated pump generates a pressure of 100 kg/sq.cm. = 100 ato.! This pressure oil is now being carried into a working ram and will act on a piston diameter of 160 mm ($6^{19}/_{64}$″). D = 160 mm ($6^{19}/_{64}$″) = 200 sq.cm. (31 in.^{2}).

The force that can be delivered by the working ram is produced by applying 100 kg = 100 kg/sq.cm. (1422,3 lbs./in.^{2}) onto each sq.cm. of the ram!

According to formula:

$$P = D \times F$$

~~P = 100 kg/sq.cm. x 200 sq.cm. =~~

(1422,3 lbs./in.^{2} x 31 in.^{2})

20 000 kg = 20 tons

(44 000 lbs. = 20 metr. tons)

200 kg of force introduced will produce a shear force of 20 000 kg (44 000 lbs.), which is 100 times as much. Of course, the travel of the piston in the pump is also 100 times as large, since output = force x travel.

This example also does not allow for an efficiency which, being approx. 90 %, would give an effective force of the working ram of 20 000 kg x 0,9 = 18 000 kg.

Therefore, this example clearly shows that hydraulics is merely an element of transmission and of multiplication and/or reduction.

It is only well-engineered hydraulic circuits, high efficiencies and a properly distributed power take-off that offer the great advantages. This is why the saying goes: "Hydraulics problems are control problems".

2. HYDRAULICS IN EXCAVATOR CONSTRUCTION

The demand for more and more efficient machines resulted in considerations to construct excavators which can be controlled most accurately, which are extremely powerful, and which permit non-positive control of all working movements, e. g.: the grab shall not be suspended from a cable making it impossible to exert a corresponding pressure on it, but it should be possible to force the grab into the ground utilizing the entire weight of the excavator. This, as well as many other considerations have resulted in the development of the "Hydraulically-Operated Excavator". Incidentally, the first hydraulically-operated excavator ever to be built was the ATLAS Excavator.

3. THE TERM "ALL-HYDRAULIC"

The term "all-hydraulic" which, in itself, can be clearly defined, unfortunately gives rise very often to misleading and false allegations on the part of various of our competitors.

A machine can be called "all-hydraulic" if all working and travel motions as well as all other functional movements are performed hydraulically-operated.

Of course, it is possible – for instance – to couple a reduction gear to an oil motor, same as a working ram is nearly always acting via a lever arm (e. g. a boom).

Consequently, an excavator performing all working movements hydraulically, but driving mechanically, cannot be called an "all-hydraulic excavator".

It is true that everything which is "ALL-HYDRAULIC" need not, necessarily, be perfect. If, however, one decides to utilize the advantages of hydraulics, it would be absurd to limit these advantages to certain functions only.

4. HYDRAULIC PUMPS

The power source in the excavator is the Diesel engine. The oil pump, however, is equally important; it is subjected to the heaviest and most frequent loading of all hydraulic units.

Different pump systems are being utilized for the most varied employments of the different types of excavators and cranes of the Weyhausen Company.

4a. GEAR-TYPE PUMPS

One oil shot per tooth space is delivered with each revolution of the pump. Due to the large number of teeth (approx. 14 – 30 Nos.), a high frequency which is characteristic of a uniform oil flow will result.

Gear-type pumps, however, have a limited service life and are suitable for the low and medium pressure ranges only, i. e. up to peak pressures of approx.

175 ato. Moreover, the sealing problems within the pump are considerable with gear-type pumps, since large amounts of drip oil settle both between the tooth face, and laterally at the gear teeth. As a rule, gear-type pumps do not feature a higher volumetric efficiency than max. 70–80 %. With advancing years, the efficiency is steadily growing from bad to worse.

Gear-type pumps are particularly sensitive to dirt. In case the housing should get damaged by contamination, gear-type pumps can hardly ever be repaired. Gear-type pumps with lateral hydraulic pressure acting against it, as well as with a thorough filtration of the oil, however, can be brought to an efficiency of more than 90 % and offer a reasonable compromise between purchase price and service life. Gear-type pumps utilized in ATLAS units, on principle, are those with lateral hydraulic pressure contact. Hydraulic oils used in ATLAS equipment are cleaned in a filtering screen before entering the oil reservoir. Prior to being drawn in by the pump, the oil is once again cleaned in a micro-filter.

These measures ensure a long service life also for gear-type pumps.

4b. ROTARY VANE PUMPS

Rotary vane pumps produce their oil flow by means of one or several eccentrics which produce greater or lesser flows according to their shape and width. A well considered shape of the eccentrics will ensure an almost continuous oil flow. The difficulties in regard to the internal sealing are similar to those encountered with the gear-type pump, but rotary vane pumps are not as sensitive to dirt as gear-type pumps. The greatest advantages of these pumps are offered by the possibility of mounting several pumps on one shaft, i. e. no auxiliary gearbox is required for the multiple-pump system. The maximum efficiency of these pumps is 94 %. Filtration of the oil is, preferably, performed in the same manner as described for the gear-type pumps.

4c. PISTON PUMPS

The machining of circular bores and shafts is best possible, from the engineering point of view. This is why piston pumps can be built with such a high degree of precision. The sealing problems within the pump are negligible. Accordingly, piston pumps achieve a volumetric efficiency of 98 % and above. Piston pumps are nearly insensitive to dirt, rugged, have a long life, and maintain their excellent output even if the oil temperature is increasing.

Since piston pumps, for cost reasons, can only have a limited number of pistons, the frequencies within one pump revolution are small, which results in a relatively nonuniform oil flow. This, however, is of almost no importance at higher speeds (above 1,000 RPM).

4d. OIL MOTORS

Almost all pump systems also permit operation as an oil motor. The piston engine, however, ensures the most universal employment, the longest service life, minimum losses, the best starting torque, etc.

4e. VARIABLE DISPLACEMENT PUMPS

The variable displacement pumps used in ATLAS equipment operate on the principle of axial piston pumps. By changing the setting angle of the pistons in relation to the driving shaft, you change the stroke of the pistons and, thus, the rate of oil flow. Depending on the application, this control can be effected either by hand, or by means of an output regulator. Output regulators are cylinders, the pistons of which are forced into a final position by means of a spring. The piston rod of the permanently mounted cylinder is attached to the swivel casing of the variable displacement pump. A connection line from the delivery line to the non spring actuated side of the piston in the regulator cylinder causes the increasing oil pressure to slowly reduce the delivery, according to the design of the spring. Consequently, it is made possible to reduce the rate of oil flow with increasing load application, and vice versa. The technical solution makes it possible to always utilize the full motor output.

5. CONTROL VALVES

Whether a hydraulic system is perfect or poor quality can be determined by taking a look at its control. The special design of the control pistons permits effective utilization of a hydraulic system. There are 1,000 possibilities of influencing the function of a control valve in one way, or the other. Therefore, we only wish to mention here those points which are always being duly considered in the construction of control units:

Control valves must feature a full equalization of pressure, i. e. one-sided pressure on a piston has to be absorbed in order to ensure smooth, sensitive actuation.

Only small pressure drags are allowed within the valve, so that no power will get lost.

As far as large multi-circuit hydraulic systems are concerned, ATLAS control units are always equipped with the patented "high-speed control". This high-speed control permits optional utilization of 1, 2, or more oil pumps for one single working movement.

6. RELIEF AND SAFETY VALVES

Relief valves are those valves which limit a relief pressure produced by the pump. Safety valves are intended to limit forces and overpressures originating from outside, e. g. by stopping the load.

The hydraulic systems of ATLAS units are fully protected, i. e. they are protected from any overpressure originating from outside or inside.

In order to avoid interruptions in piping systems for the incorporation of safety valves, these are already being incorporated in the control valve in the more recent designs.

7. DESIGN AND CONSTRUCTION OF AN "ATLAS" EXCAVATOR

The prime mover (Diesel engine) drives one or several pumps via a clutch and, in isolated instances, via an auxiliary gearbox. These pumps convert the mechanical power of the engine into pressure oil (hydraulic power). The pressure oil flow or flows are conducted to the control valves by means of pipes. Depending on the position and actuation of the control valves, the pressure oil will either flow back to the reservoir, or it will – likewise – be routed to a consumer (oil motor, ram, etc.) via pipes or hoses. At the same time, the return oil will flow back into the tank via the control valve.

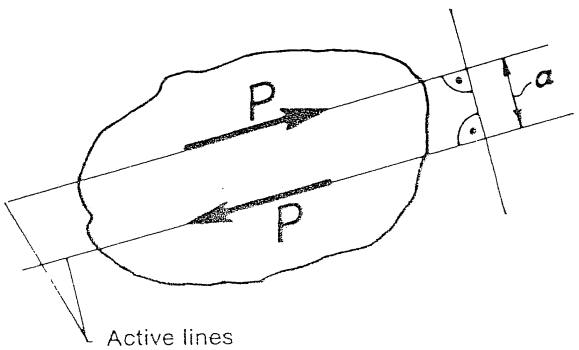
Pressure pipe:	Pipe, duct or hose between pump and consumer. Speed of flow 8 – 10 metres/second.
Pump:	Equipment for moving, by displacement, a liquid charged with energy and to convert mechanical into hydraulic energy, also called a "hydro-generator".
Rack drive:	Hydraulic equipment in which the control liquid brings about rectilinear motion of a floating piston in the form of a rack, which engages with a pinion. The rotary motion of the pinion is limited by the piston stroke.
Ram:	See "Linear motor".
Return pipe:	Pipe, duct or hose returning the flow of liquid from the consumer to the tank. Speed of return flow less than 3 metres/second.
Rod space (cm^3):	Space opposite the piston space in a linear motor; equal in volume to the piston space less the volume of the piston rod.
Rotary motor:	Hydraulic equipment for converting a torque into a rotary motion extending over more than 360°.
Starting moment, starting torque (kgf m):	The moment or torque required to change the state of an energy converter from rest (it may be under pressure, while at rest) to motion.
Suction head (mm):	The maximum difference in level between the liquid levels in the tank and in the pump intake; this value is a design feature of the pump and must not be exceeded.
Swept volume (cm^3):	The capacity of a pump or motor; it is a design feature.
Vacuum (bar):	A defect caused by low temperatures, wrong viscosities, or excessive intake speeds. Causes difficulties with the intake of liquid and damage to the equipment.
Volumetric efficiency (%):	The quantity of liquid absorbed by a pump; it is governed by the output speed and speed of flow. If the volumetric efficiency is too low, there is a danger of cavitation.
Volumetric flow (l/min.):	The displaced flow of liquid referred to time.

The consumer, on its part, reconverts the hydraulic power into mechanical motion, e.g. mechanical power can be taken off from the oil motor shaft. The mechanical power will then act directly, or via a subsequent reduction gear, a corresponding lever arm, or the like.

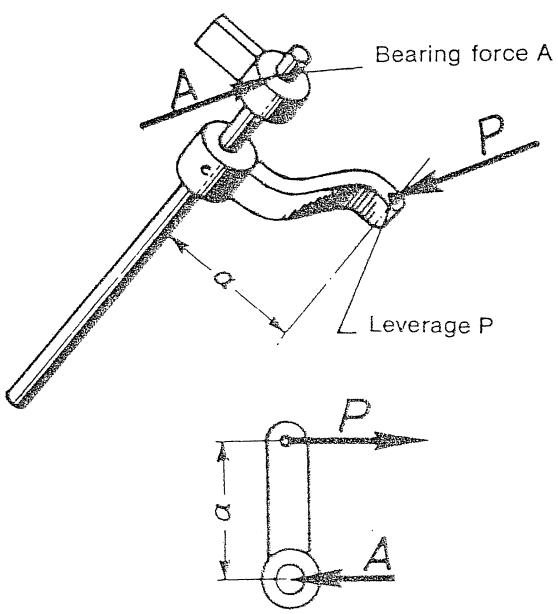
8. In the course of the discussion, terms such as – torque – output – efficiency – will be used.

What is a torque or a couple of forces?

A couple of forces consists of 2 equal, parallel, opposed forces whose active lines have an active spacing (a) from each other, measured at right angles to the active lines.



A couple of forces will act whenever a body is turning or would turn. (Shaft, handwheel, foot pedal, etc.). It is an established fact that, for instance, a supported lever will turn under the action of a point force. If we would take away the bearing, no rotary motion would be possible. The action of torsional force of a couple is called its torque, or also its static moment.



We can feel the amount of the action of torsional force if we try, for instance, to loosen a screw which is seized by rust. We find out that the torsional effect becomes the higher, the more force is applied at the end of the spanner. In addition, the torsional effect will become the higher, the larger the active spacing (a) between the two forces gets, e. g. attaching an extension.

Torque = Force P x Active spacing a
= P x a
= 15 kp x 20 cm = 300 kpcm = 3 kpm
(33 lbs. x $7^7/_8$″ = 21,699 ft. lbs.)

What is output?

A crane lifts a load G of 1000 kp (2200 lbs.) by a height h of 5 m (16′5″). The work done is

A = G x h = 1000 x 5 = 5000 kpm (36 165,1 ft. lbs.)

Since the time required for lifting the load is not at all indifferent, we take the amount of work per second as the output N.

$$\text{Output} = \frac{\text{Work}}{\text{Time}} = N = \frac{A}{t}$$

Assuming the crane will perform the work of 5000 kpm (36 165,1 ft. lbs.) in 5 seconds, this will require an output of

$$N = \frac{A}{t} \quad \frac{= 5000 \text{ kpm}}{(36\,165{,}1 \text{ ft. lbs.})} \quad \frac{= 1000 \text{ kpm}}{(7233 \text{ ft. lbs.})}$$
$$5 \text{ s} \qquad \text{s}$$

$1 \text{ HP} = 75 \frac{\text{kpm}}{\text{s}}$ Consequently, the output of the crane is

$$N = \frac{1000}{75} = 13{,}3 \text{ HP.}$$

Now how do we compute the output from a dynamic torque and speed which, for instance, are indicated for revolving shafts and wheels? Provided the torque Mt and the speed n – e. g. of a gear – are known, we can compute the output N from the following formula:

$$N = \frac{Mt \times n}{716}$$

N = PS (HP) – Mt = kpm – n = RPM – 716 = factor.

A gear delivers a torque of 300 kpm (2169,91 ft. lbs.) at a speed of 80 RPM. Consequently, the output in HP is:

$$N = \frac{Mt \times n}{716} = \frac{300 \times 80}{716} = 33{,}5 \text{ HP}$$

EFFICIENCY:

On our earth, no process takes place without loss. In any machine, when transforming energy and transmitting power, losses are incurred due to friction and development of heat.

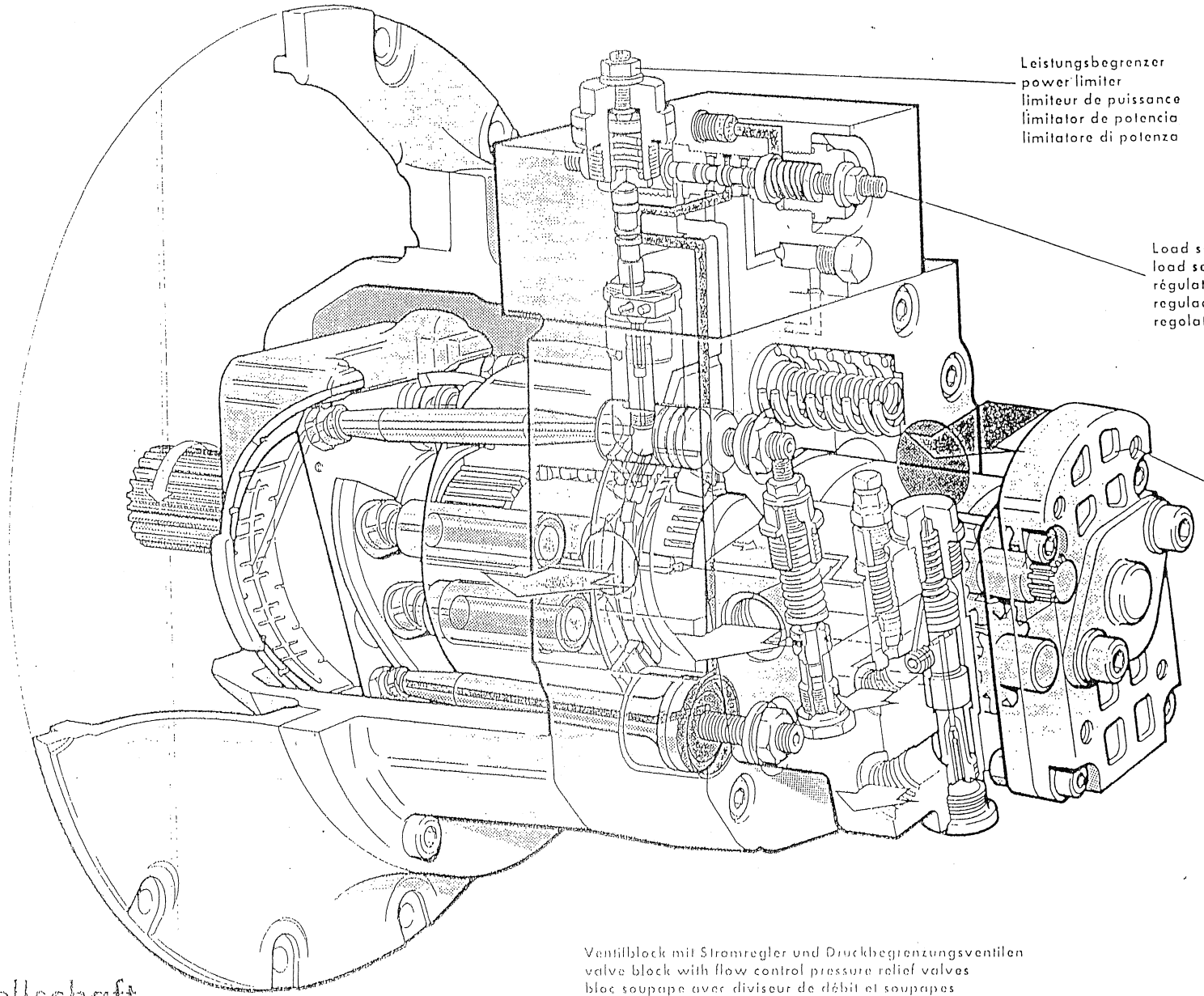
Efficiency is meant to be the relation between usefulness and expenditure, which always gives a figure smaller than 1.

$$n = \frac{\text{power output}}{\text{power input}} (< 1)$$

In part, the efficiency is also given in per cent, e. g. n = 75 %, instead of 0,75, i. e. a power output is 75 % of the power input.

HYDRO-REGELPUMPE

REGULATING PUMP · POMPE REGLABLE · BOMBA REGULABLE · POMPA REGOLABILE



Hochdruck
high pressure
haute pression
alta presión
alta pressione

Niederdruck
low pressure
basse pression
baja presión
bassa pressione

Steuerdruck
control pressure
pression de pilotage
presión de mando
pressione di comando

Load sensing-Druck
load sensing pressure
pression load sensing
load sensing presión
pressione load-sensing

Gehäusedruck
case pressure
pression du carter
presión en carcasa
pressione nel carter

HPR

mit load sensing-Regelung
und Leistungsbegrenzung
with load sensing control
and power limiter
avec régulateur load sensing
et limiteur de puissance
con regulador load sensing
y limitador de potencia
con regolatore load-sensing
e limitatore di potenza

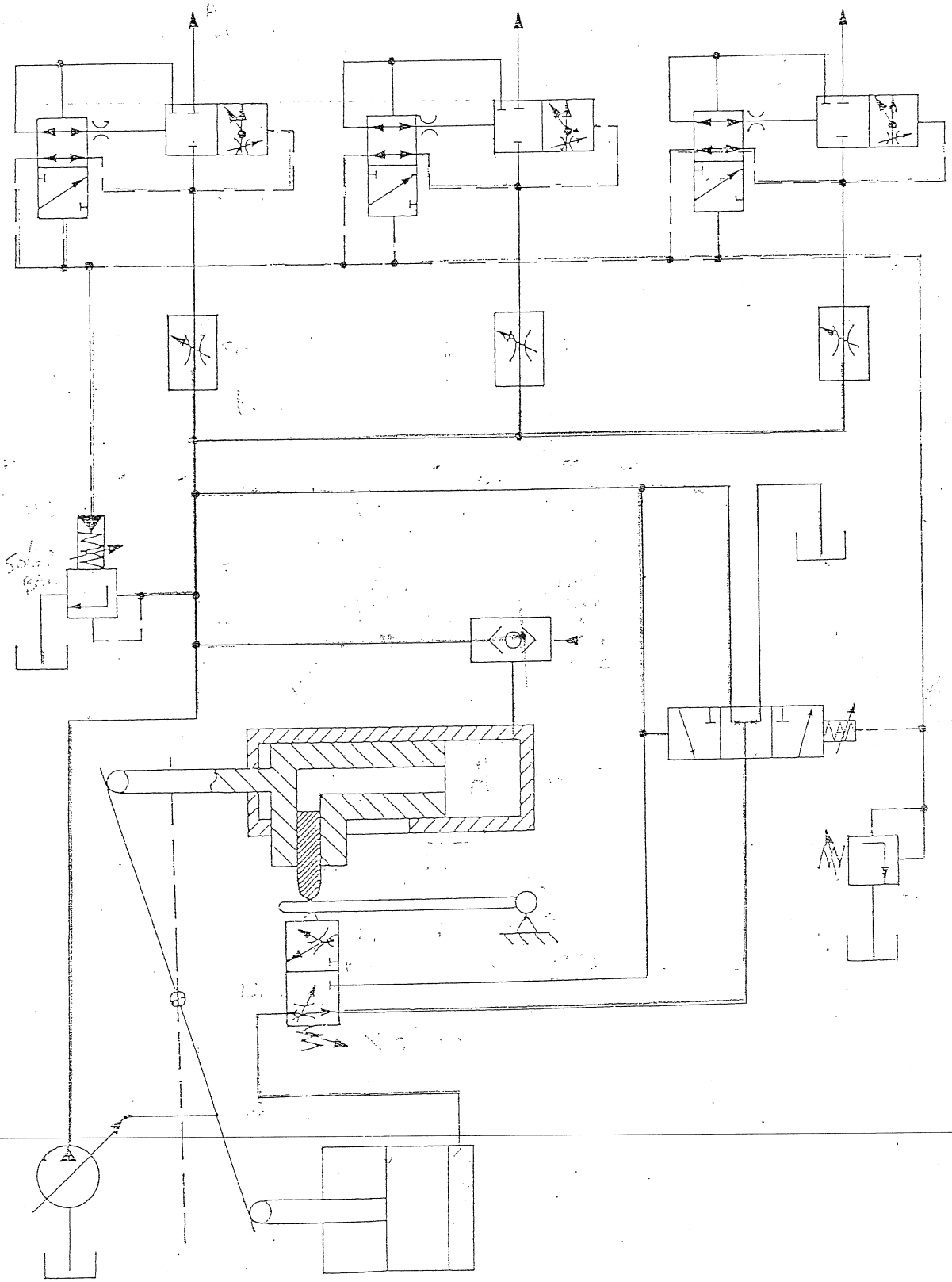
Ventilblock mit Stromregler und Druckbegrenzungsventilen
valve block with flow control pressure relief valves
bloc soupape avec diviseur de débit et soupapes
bloque de válvulas con divisor de caudal y limitador de presión
blocco valvole con regolatore a portata constante e valvole di max. pressione

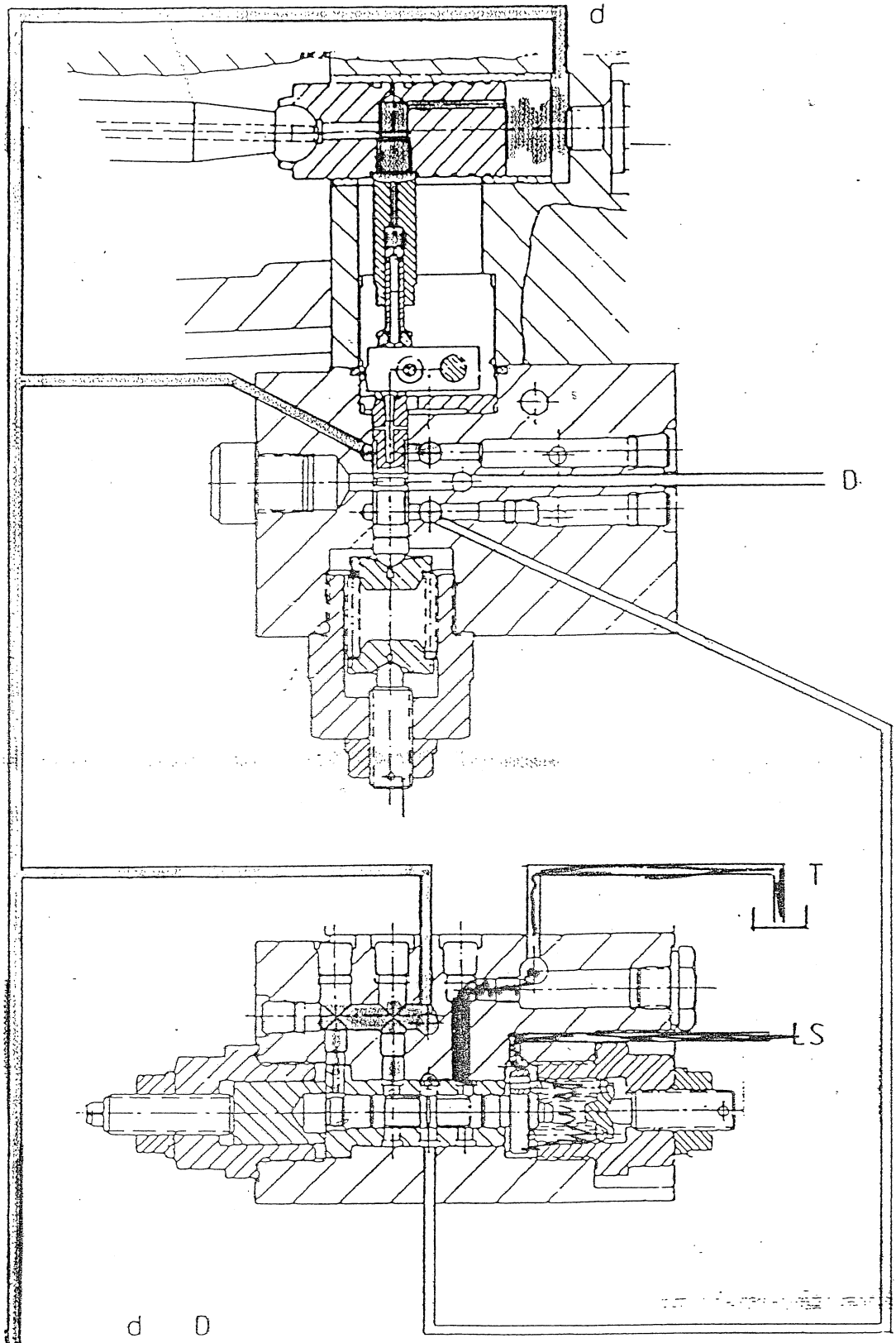
Linde Aktiengesellschaft
Werksgruppe Gabler-Axialkolbenbau

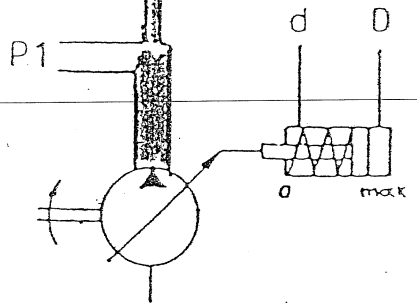
P10
HT 243.0/A.III.89

HYDRAULIC DIAGRAM - AWE 4 SYSTEM

Schulungszentrum
Tafel: 000.00/0
Name: BÖ.
Datum:



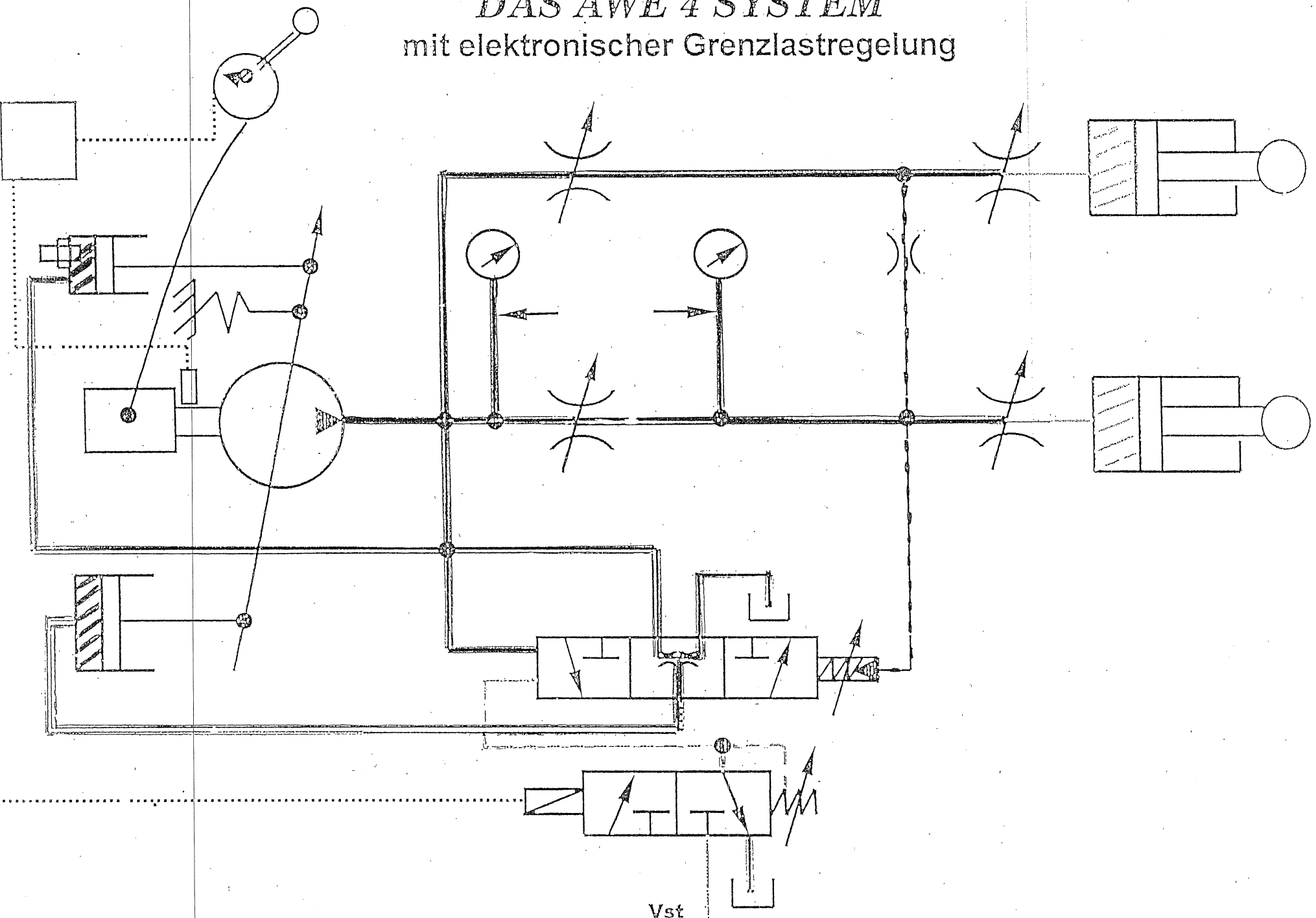


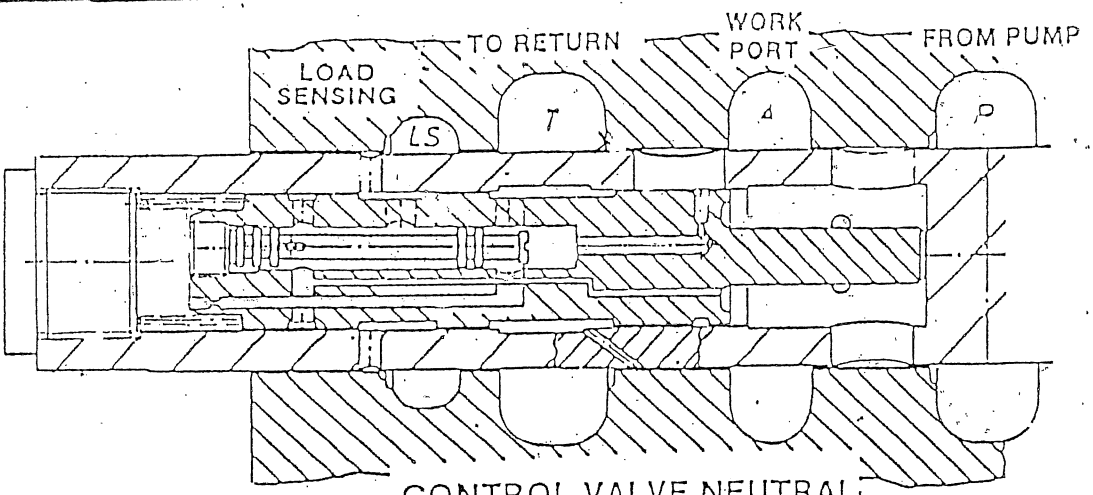


Variable displacement
SWASH PLATE PUMP
HPR

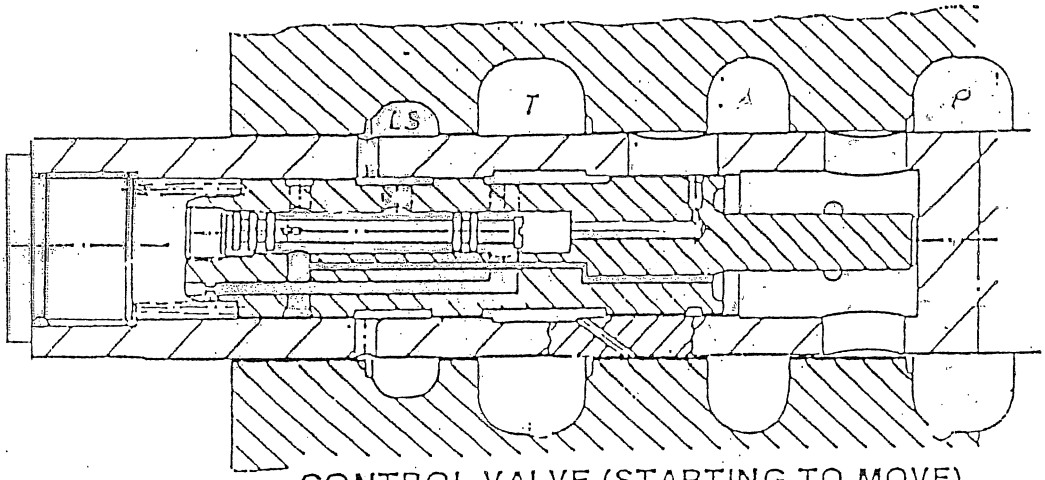
DAS AWE 4 SYSTEM

mit elektronischer Grenzlastregelung

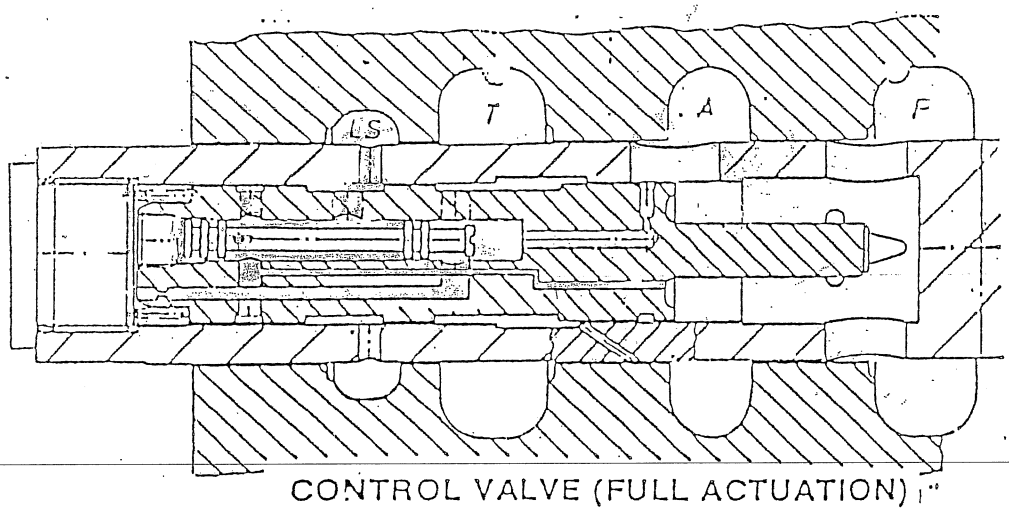




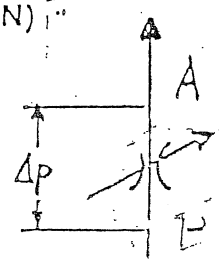
CONTROL VALVE NEUTRAL



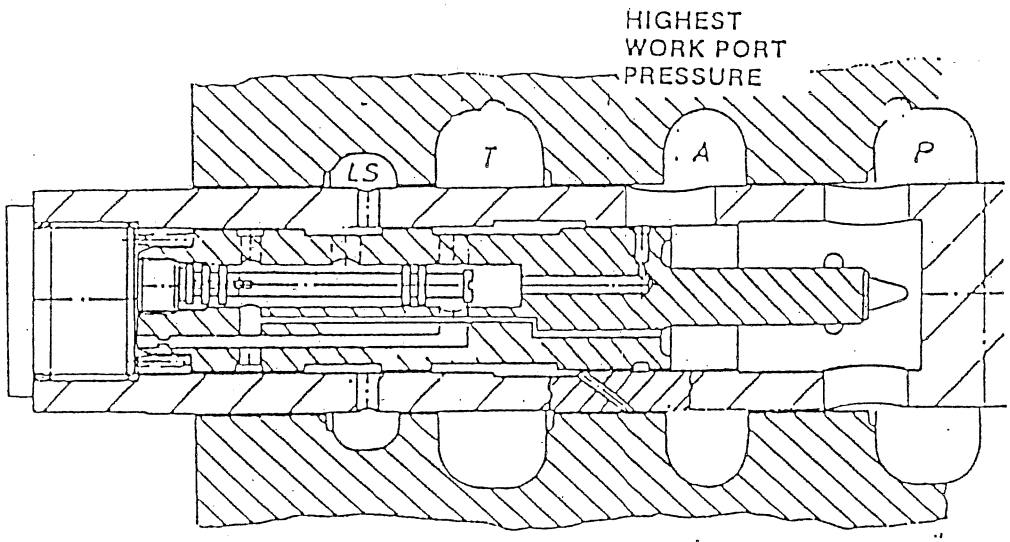
CONTROL VALVE (STARTING TO MOVE)



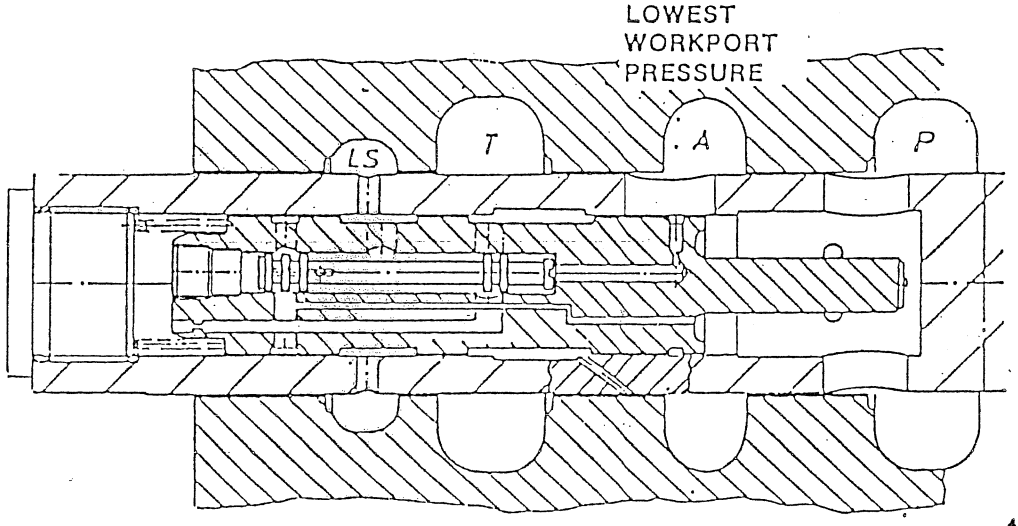
CONTROL VALVE (FULL ACTUATION)

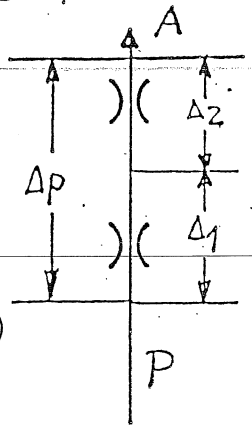


VALVE A

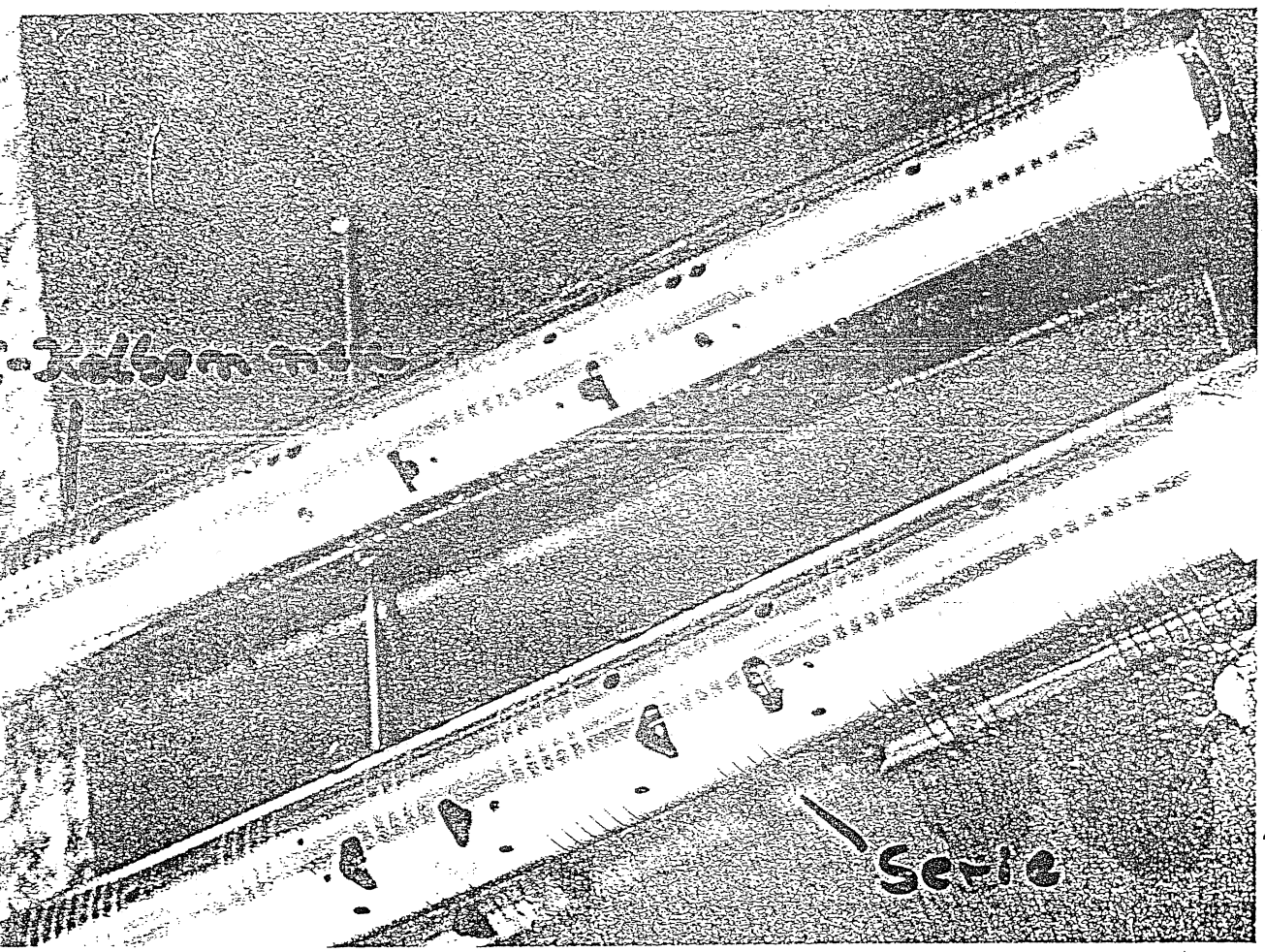


VALVE B



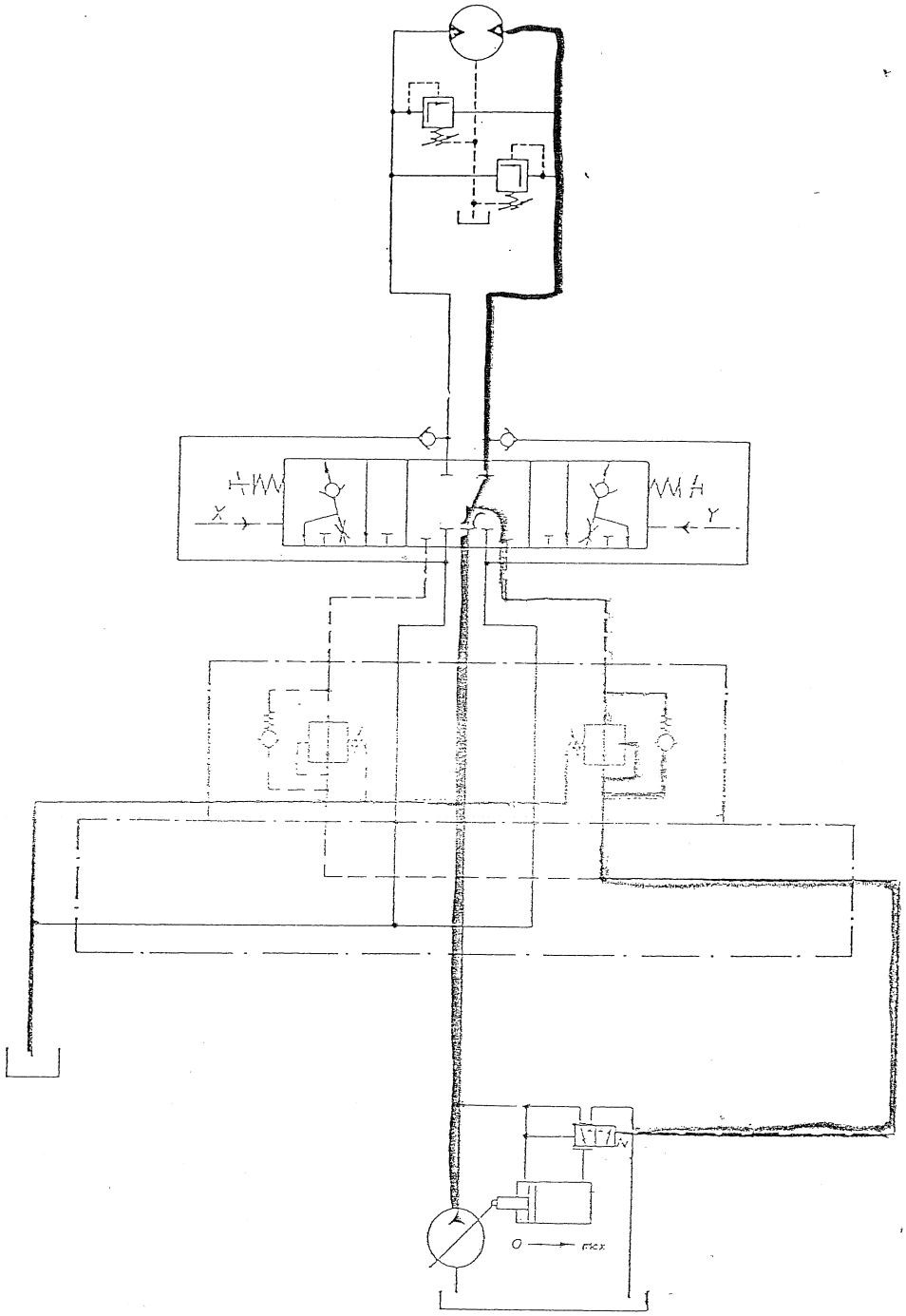


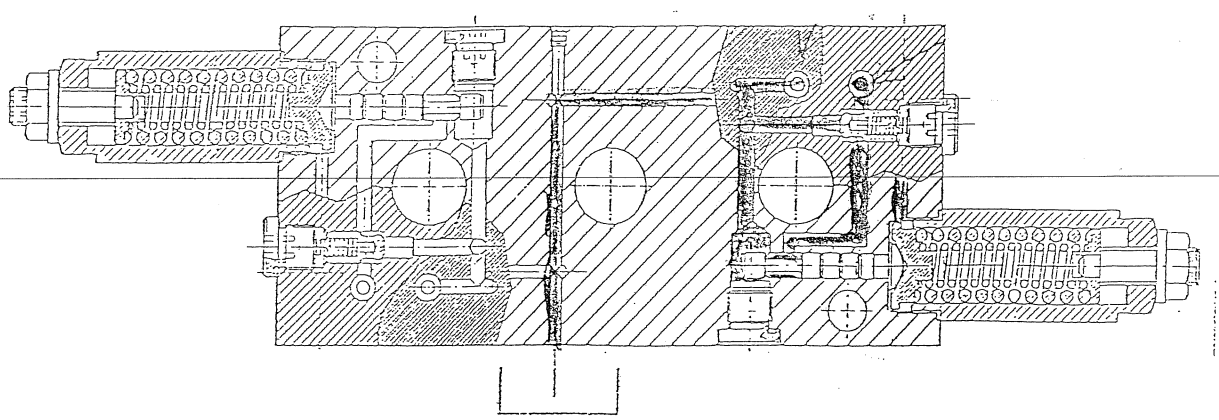
CONTROL VALVE (COMBINED OPERATIONS)


Serie

MOMENTENSTEUERUNG

Schulungszentrum
Tafel:
Name: 26.10.89
Datum:





ADJUSTING INSTRUCTIONS 1704/1804 Series 374/284

ADJUSTING INSTRUCTIONS

TEREX | ATLAS

These adjusting instructions are for the excavatortyps 1704/1804, Series 374.../284...

General Instructions:

a) All adjustments must be carried out with an electronic measuring device. It must be capable of displaying at least two pressure values at the same time.

b) Hydraulic fluid temperature must be between 40 – 60 degree celsius. Warming up the hydraulic system is by normal actuation of individual operating movements, but only ashort holding-on period at the limit stop is permitted.

c) Before opening any screwsand plugs etc., the preload must be reduced of the hydraulic fluid tank.

d) The correct settings are to be taken from the pressure adjusting table.

Safety Instructions

High pressures will be encountered during the adjustment. Take appropiate protective action, e.g. wear safety glasses. See VBG 1§4.

Bleeding air from the system

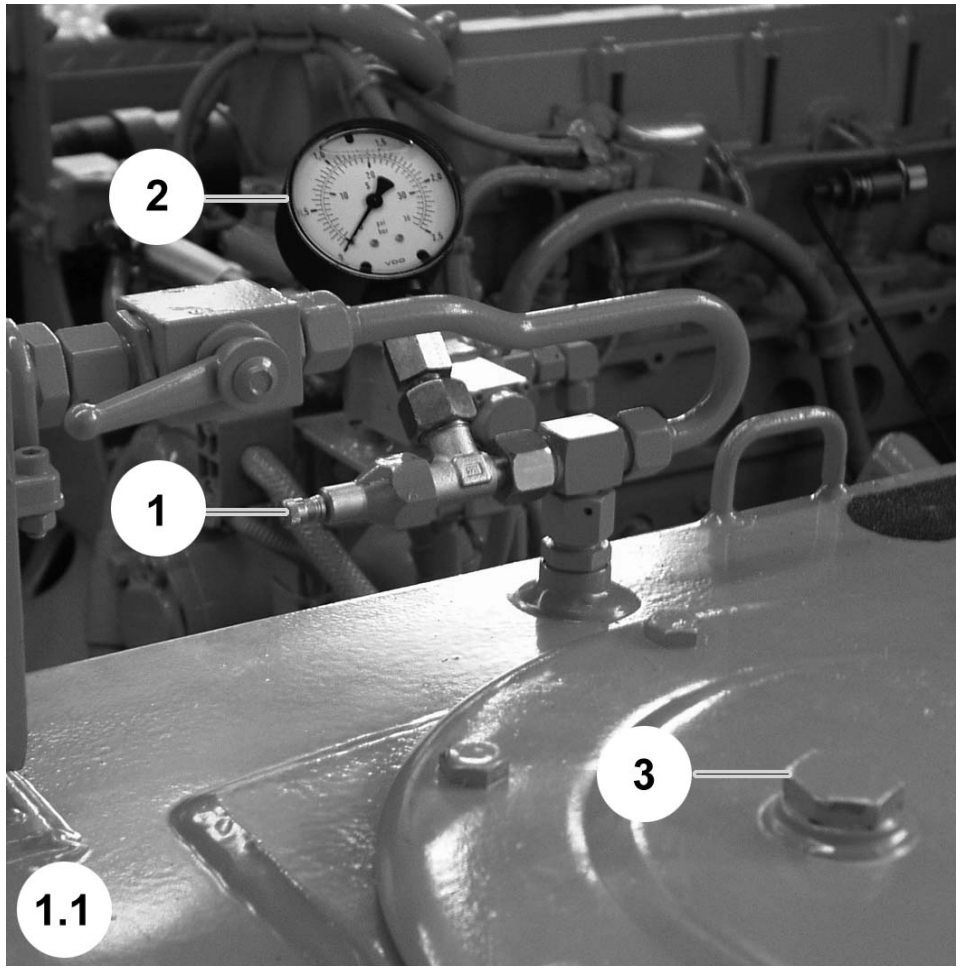
Before initial operation or after exchanging the pump, air must be bled from the system.

To do this an external compressed air input is necessary. This is carried out via the compressed air connection (1).

Note: The pressure gauge display must not exceed 0.3 bar

The compressed air gauge (2) is not standart equipment and must be installed for checking purposes.

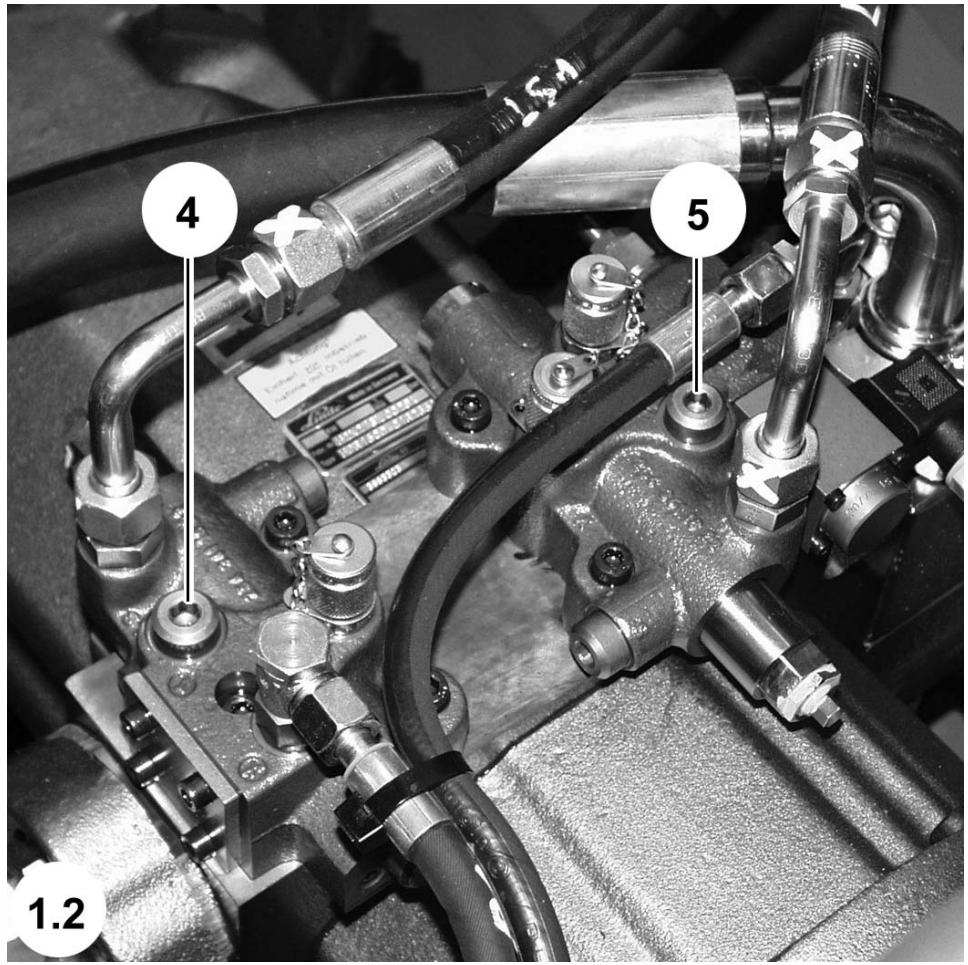
Loosen bleed screw (3). Re-tighten as soon as hydraulic fluid flows out free from air bubbles.



Bleeding air from the system

After this, bleed the dual pump in the same manner at the bleed screws

(4 and 5).

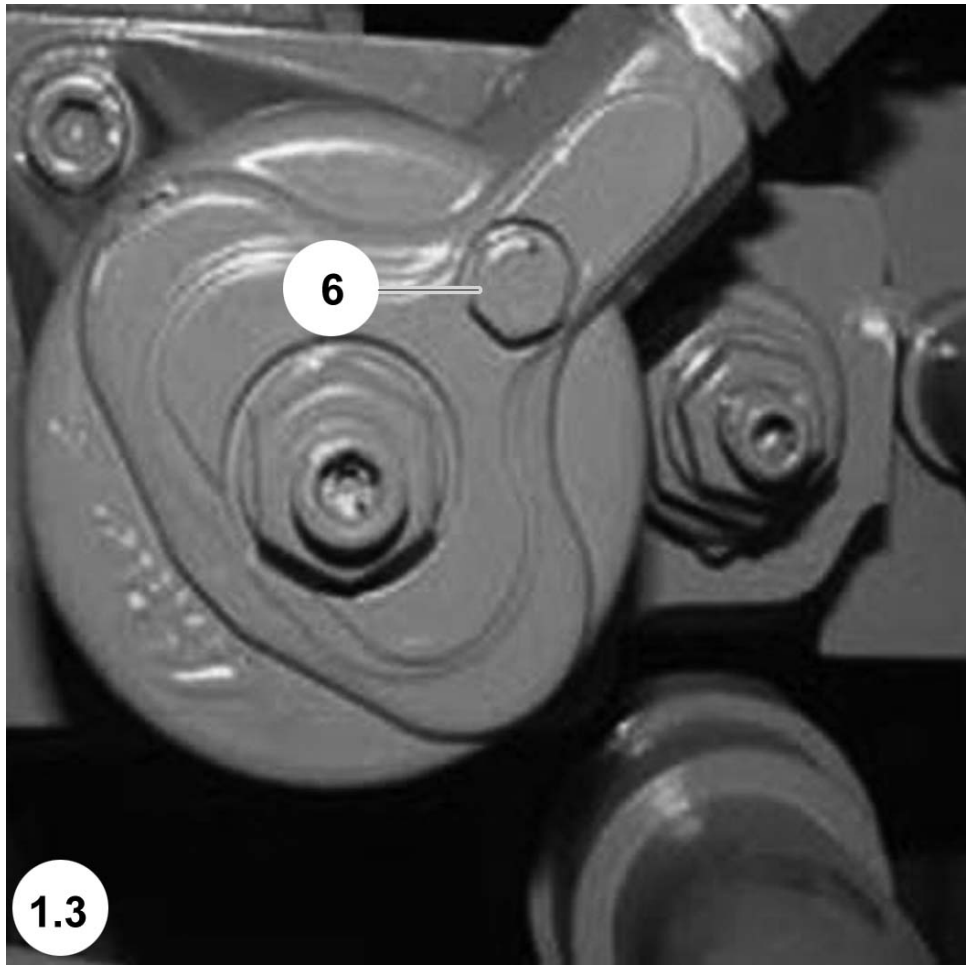


Bleeding air from the system

Before initial operation, all valve caps must have been bleeded.

This is also necessary if the valve caps had to be opened for repair work.

Bleeding takes place by loosening the appropriate bleed screw (6).



CEB 10/40 excavator control

Checking or adjustment is only necessary during initial start up, adjustments or repairs to the diesel engine and when exchanging the electronic box.

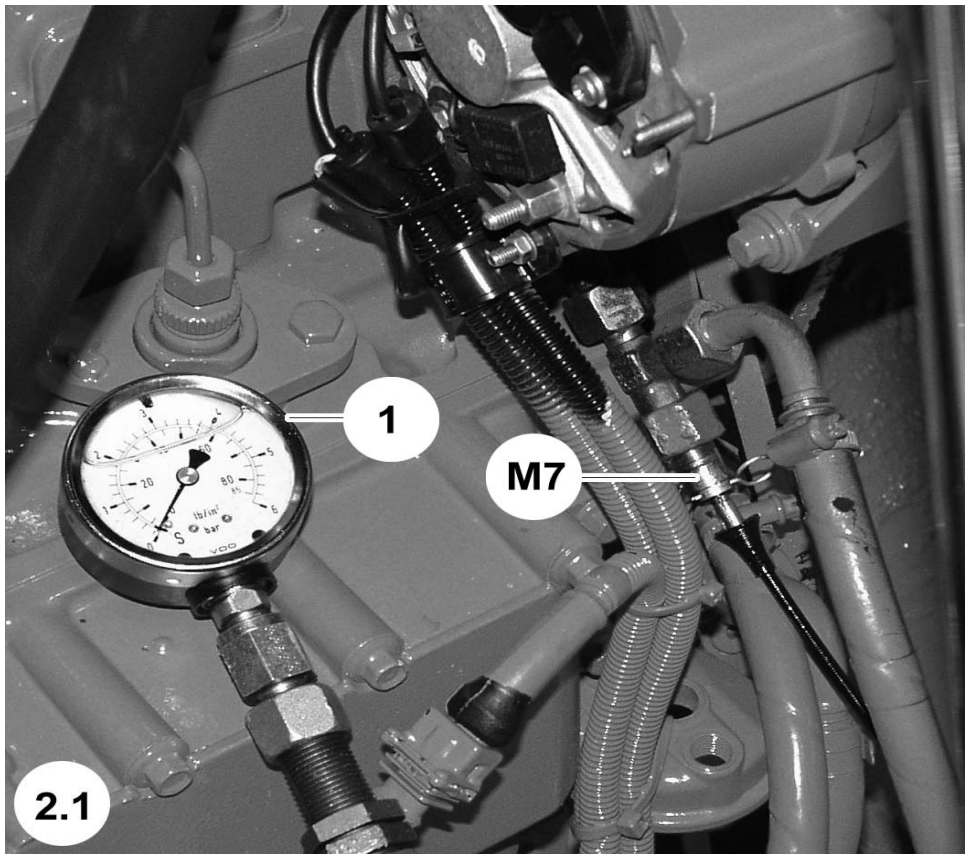
Note:If the teach-in function is not carried out, the GLR lamp will flash.

Fuel pre-pressure

Install measuring union (M7) for 0-6 bar pressure gauge (1). Fuel pressure must be measured at maximum and minimum engine speed.

Max.engine speed off-load – **5 bar**

Min. engine speed off-load – **2 bar**

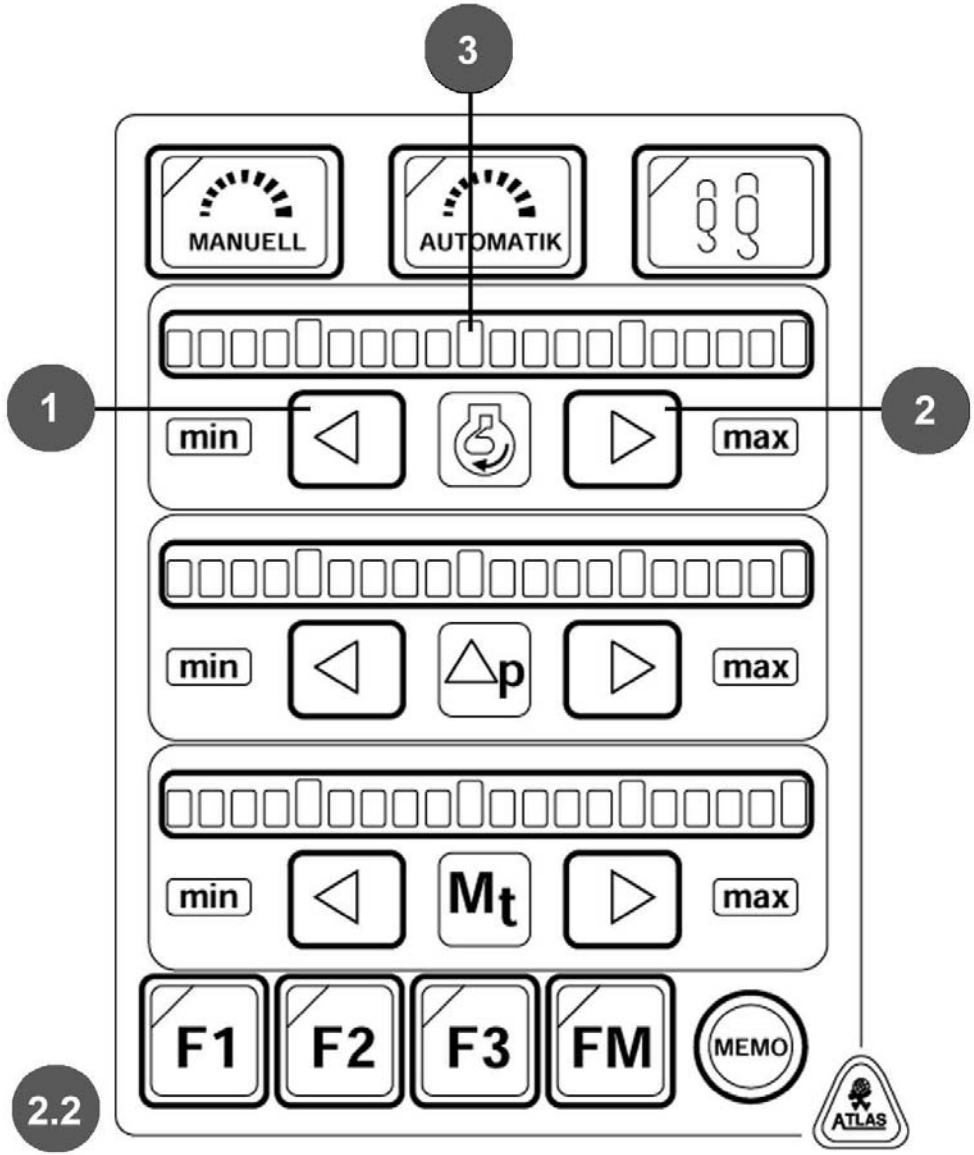


CEB 10/40 excavator control

Fine adjustment function, checking the engine speed by press the **MEMO** and **MANUELL** buttons.

Press button (1) „min“
The central LED (3) must light up.
1704: 1030 rpm
1804: 1030 rpm
A deviation of 2 LEDs to the left is permitted.

Press button (2) „max“
The central LED (3) must light up.
1704: 2150 rpm
1804: 2050 rpm
A deviation of 5 LEDs to the right is permitted.
Press **MEMO** and **MANUELL** buttons again at the same time to return into the normal operation.



CEB 10/40 excavator control

TEREX | ATLAS

Teach In function (TI)

After setting and checking the engine speed, the Teach In function is called up.
By pressing the **MEMO** and **MANUEL**L button the fine adjustment function is called up.
In addition, press the **AUTOMATIC** button for Teach In function.
The fault status of the last TI carried out is now displayed for about 5 seconds on the engine speed bar display:

LED 1....20 lights up	Teach In fault free
LED 1.....lights up	Teach In not fault free
LED 1.....2 lights up	Max. engine speed too low
LED 1..... 3 lights up	Min. engine speed too high
LED 1 .... 4 lights up	Engine speed unstable during TI
LED 1 .....5 lights up	Engine speed not constant (n to mmA)
LED 1 .....6 lights up	Characteristic memory defect

After the display, calibration of the engine speed adjustment characteristic takes place automatically.
The LEDs run up step by step from 1....20 and then decrease from 20....1. This procedure is subsequently repeated and at the end fault monitoring is carried out according to the display in the fault status.

If the Teach In is fault free , all LEDs in the engine speed bar display lights up.

Ending the Tech In and fine adjustment function by pressing MEMO and MANUELL button at the same time and return to the normal operation.

Note: If there is already a fault at the teach in stage, the GLR lamp will flash and the procedure must be repeated.

CEB 10/40 excavator control

TEREX | ATLAS

Diesel speed adjuster (basic settings)

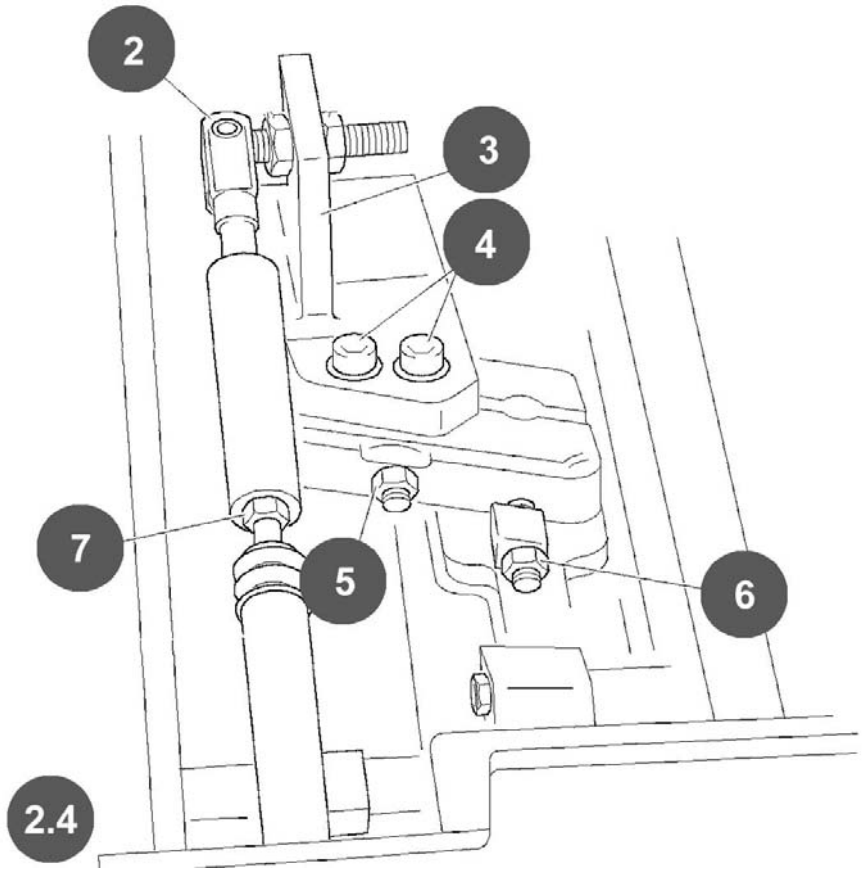
Disconnect the fork head (2) at the engine speed adusting lever (3). This lever must be fitted at 90 degree to the crankshaft. Correct if necessary at the adjusting screws (4).

Start the engine

Press **MEMO** and **MANUELL**. The calibrating function is called up. The minimum engine speed displayed must be 1030 rpm. A correction may be needed at adjusting screw (5). Reconnect the fork head (2) so it ir free of play. A correction may be needed at adjusting screw (7).

Press the max. button.

The engine speed must be
1705 – 2150 rpm
1804 – 2050 rpm
The engine speed adjustment lever (3) must be next to the setting screw (6) for maximum engine speed. A correction may be needed at adjusting screw (6).

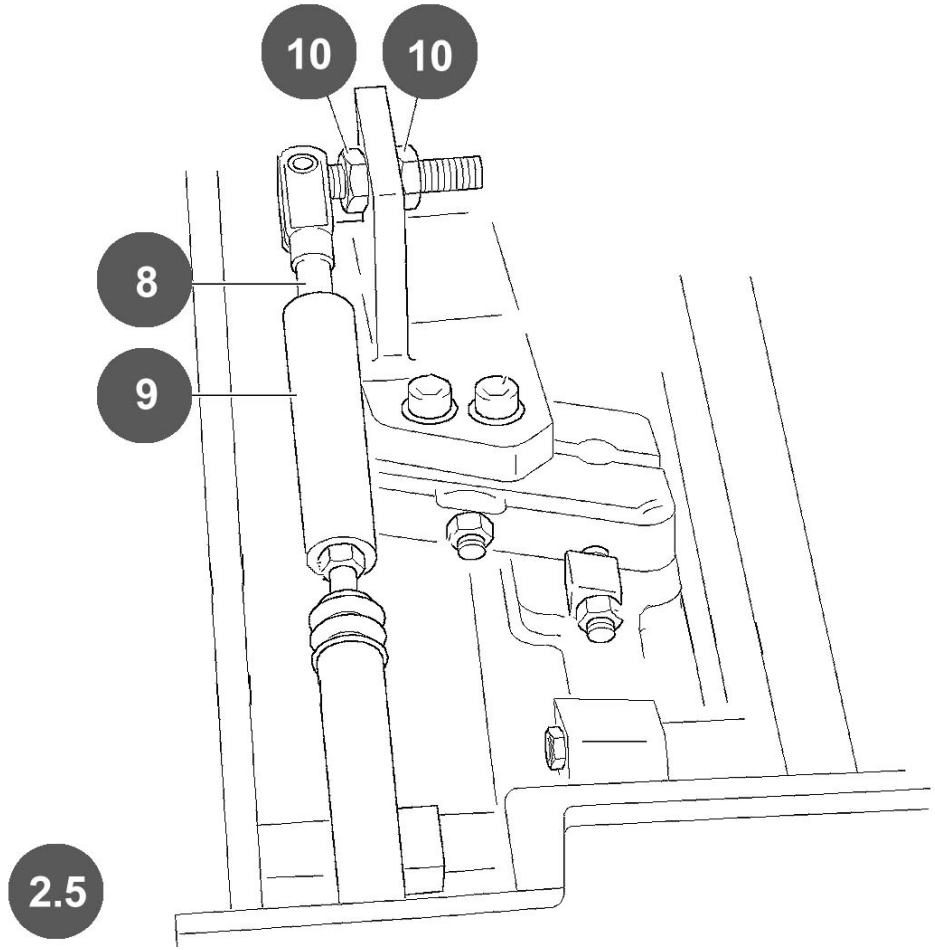


CEB 10/40 excavator control

Damper / Diesel adjuster / Throttle

The ring groove marking must align with the housing at the piston rod (8) of damper (9) at the maximum engine speed (fine adjustment function).

Setting is carried out by loosening the locknuts (10). Move the lever as much it is necessary.



CEB 10_40 COM III

TEREX | ATLAS

The LINDE – Load Limit Regulation CEB - 10 / 40

The LINDE Load Limit Regulation CEB - 10 / 40 is a further development of CEB - 10 / 20.
The Linde Box CEB - 10 / 40 is designed for excavatortyps 1704 from SN 374 ... and 1804 from SN 284 ... and is not adaptable for older excavatortyps. Older excavatortyps must be equiped furthermore with the Linde Box CEB - 10 / 20.

The Linde Box CEB - 10 / 40 is designed for excavatortyps 1704 from SN 374 ... and 1804 from SN 284 ... and is not adaptable for older excavatortyps.
Older excavatortyps must be equiped furthermore with the Linde Box CEB - 10 / 20.

Function Upgrade of CEB - 10 / 40

- Display of actual excavator typcoding in the keypad (MT LED line)
- modified travel start up ramp for mobil and tracked excavator
- New GLR – adjustment for hydraulic and engine changes with max. rpms of 2100 rpm at the 1704 and 2000 rpm at the 1804.
- Teach - In - Funktion (durable teach in of engineforce characteristic line) is removed at the box CEB – 10 / 40_C because there is no mechanic throttle.
  The RPM setpoint is carried out via the DEUTZ EMR-3 control.
- P - Grad - Kompensation

CEB 10_40 COM III

Main Version	Updatestatus	Hydroiltemp.	Remarks
CEB – 10 / 40 5610597	_ A	95 ° C	Only for 1804 with watercooled engine and max engine rpm of 2000 (nominal speed 1900 rpm)
CEB – 10 / 40 5628495	_ B	95 ° C	Advanced for 1704 watercooled engine with max engine speed of 2100 rpm (nominal speed 2000 rpm).
CEB – 10 / 40 6097800	_ C	95 ° C	Advanced for 1804 with COM III engine (from 01.01.06). **No TEACH IN allowed anymore.**

CEB 10_40 COM III

Excavator Typ Coding CEB - 10 / ...

The coding is carried out by connecting the accordingly wires (0 - 23, 0 - 24, 0 - 25 und 0 - 27) at the ground potential for the load limit regulation at X1 area in the wire channel behind the main switch case.

From version CEB - 10 / 40 _A the coding is displayed on the keypad for 5 seconds after ignition on at the motortorque LED line (MT) according to the excavatortyp (see attached Codingtable).

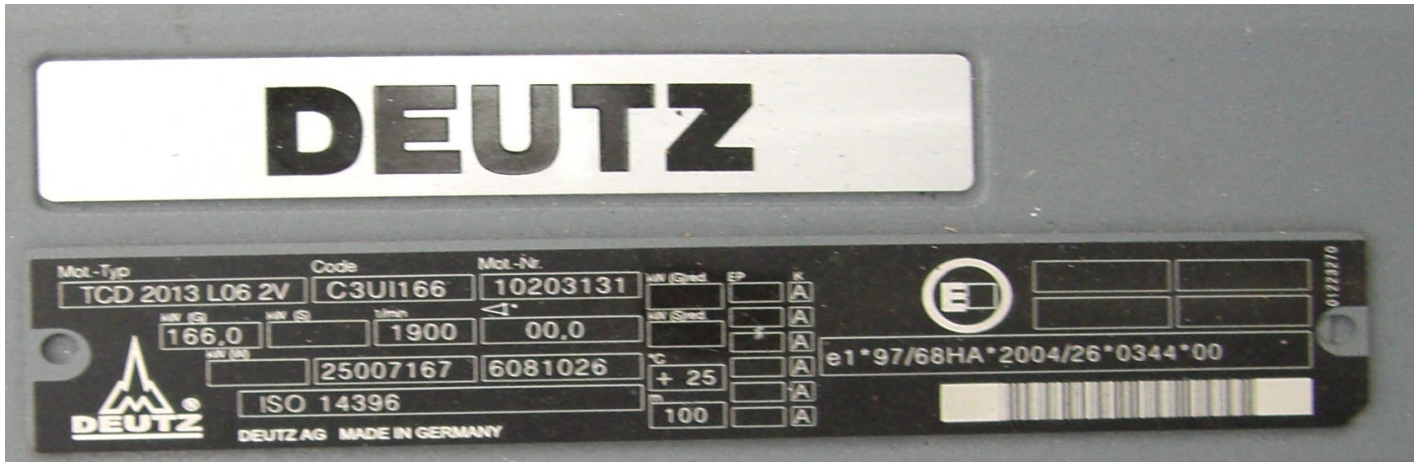
Excavator / Codingbridge	1704				1804				1704		1804		1804	
	M		R		M		R		M	R	M	R	M	R
	N	I	N	I	N	I	N	I	N + I				N + I	
	LK								WK				WK COM - 3	
X42 / B auf X42 / x	0-23	0-23	----	----	0-23	0-23	----	----	0-23	----	0-23	----	0-23	----
X42 / B auf X42 / y	----	----	----	----	0-24	0-24	0-24	0-24	----	----	0-24	0-24	0-24	0-24
X42 / B auf X42 / z	----	0-25	----	0-25	----	0-25	----	0-25	----	----	----	----	0-25	0-25
X42 / B auf X42 / h	----	----	----	----	----	----	----	----	0-27	0-27	0-27	0-27	----	----
Baggertypanzeige ab Version CEB-10/40_A für 5 Sek. nach Anlage – EIN in der MT - Balkenanzeige									1 – 7 LED	1 – 8 LED	1 – 5 LED	1 – 6 LED	1 – 9 LED	1 – 10 LED

M	=	Mobilbagger
R	=	Raupenbagger
N	=	Normal – Ausführung
I	=	Industrie – Ausführung
LK	=	aircooled
WK	=	watercooled

CEB 10_40 COM III

TEREX | ATLAS

TCD 2013 L6 2V ; Turbo Charged Diesel, Line 6, 2 Valves



Engine type		TCD 2013 L6 2V
Number of cylinders		6
Bore/stroke	mm I inch	108/130 I 4.3/5.1
Displacement	l I cu inch	7.1 I 433
Compression ratio		1 : 18.1
Max. rated speed	rpm	2300
Mean piston speed	m/s I ft/sec	10.0 I 32.8
Power ratings (TIER III) [1]		
Power output to ISO 14396	kW I hp	200 I 268
At engine speed	rpm	2300
Mean effective pressure	bar I psi	14.6 I 212
Max. torque	Nm I lb-ft	1100 I 811
At engine speed	rpm	1500
Minimum idle speed	rpm	650
Specific fuel consumption [2]	g/kWh I lb/hp-hr	205 I 0.34
Weight to DIN 70020, Part 7A [3]	kg I lb	612 I 1349

TEREX | ATLAS

3. Shifting of inputsignals at DEUTZ COM 3 engines.

At COM3 engines the inputsignals from the engine are send into the EMR.
These signals were send then via CAN bus to the MSE. The MSE is a link between EMR and LINDE load limit regulation and processor 1.2. The MSE sends via wire 3-8 all necessary informations for processorboard 1.2 These informartions are : watertemperature;engineoilpressure;water/fuel contamination and preheatingtime.
With codingswitch 4 in on position the control is switched over to COM 3 engines.



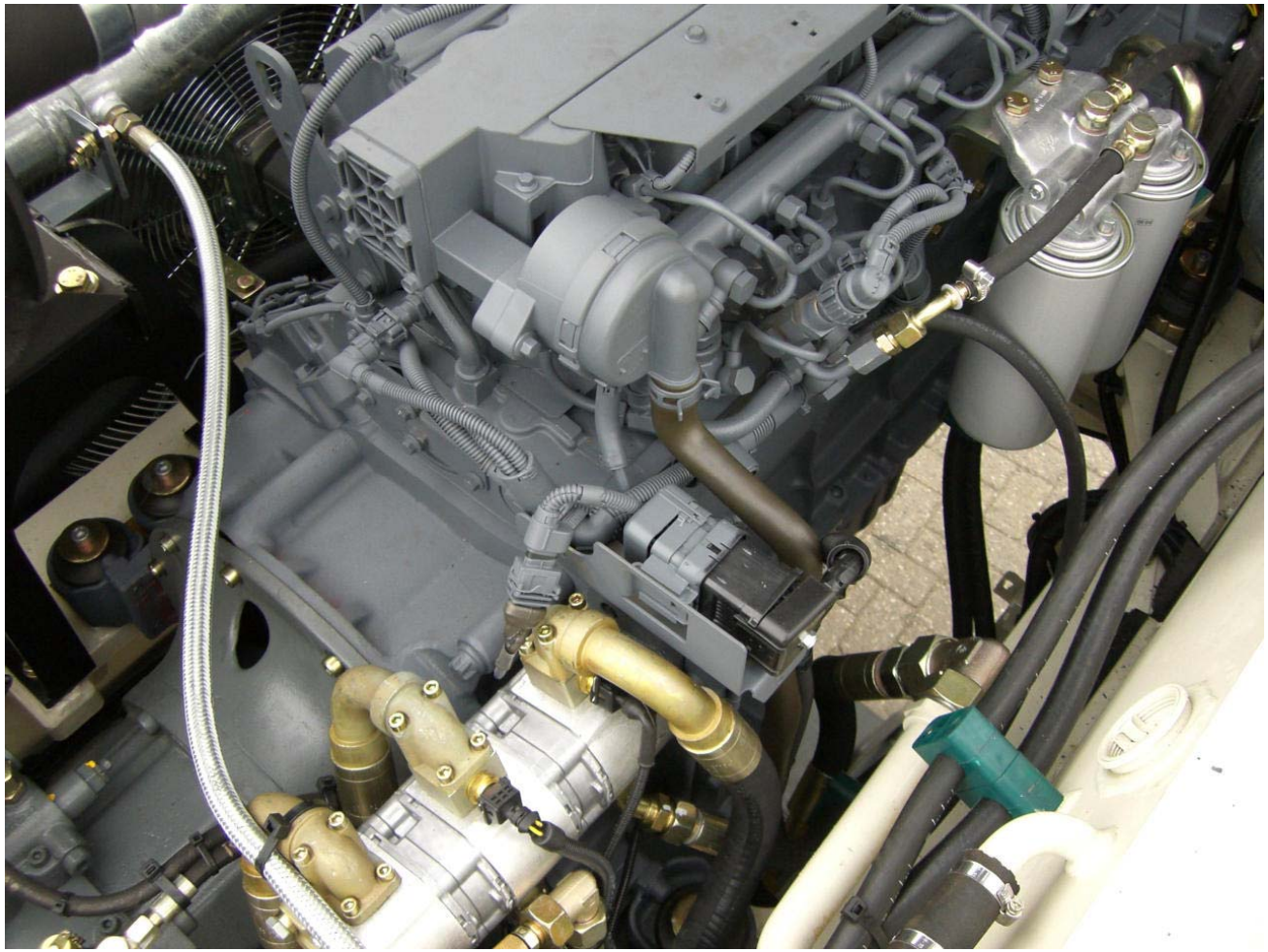
CEB 10_40 COM III

TEREX | ATLAS



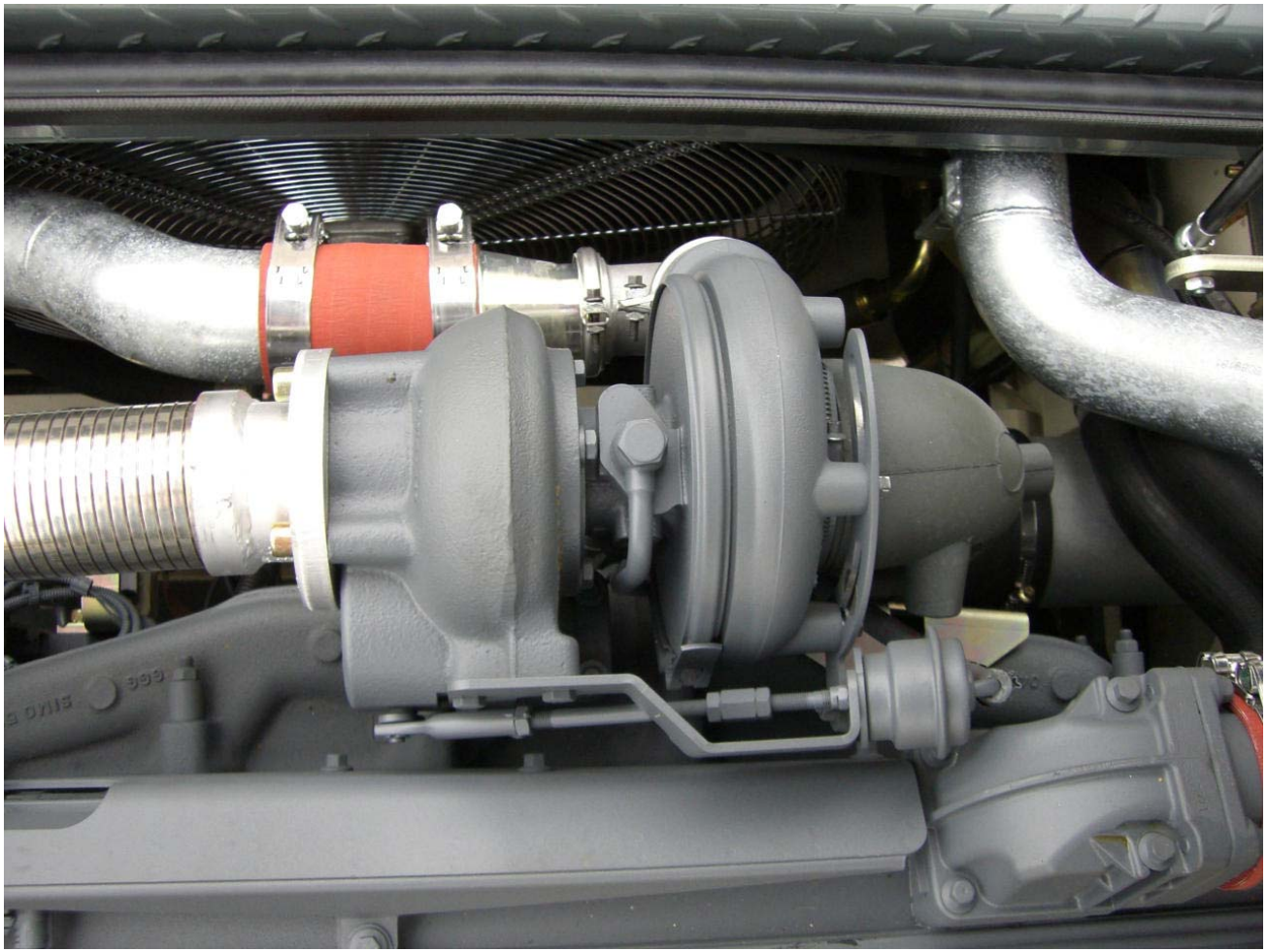
CEB 10_40 COM III

TEREX | ATLAS



CEB 10_40 COM III

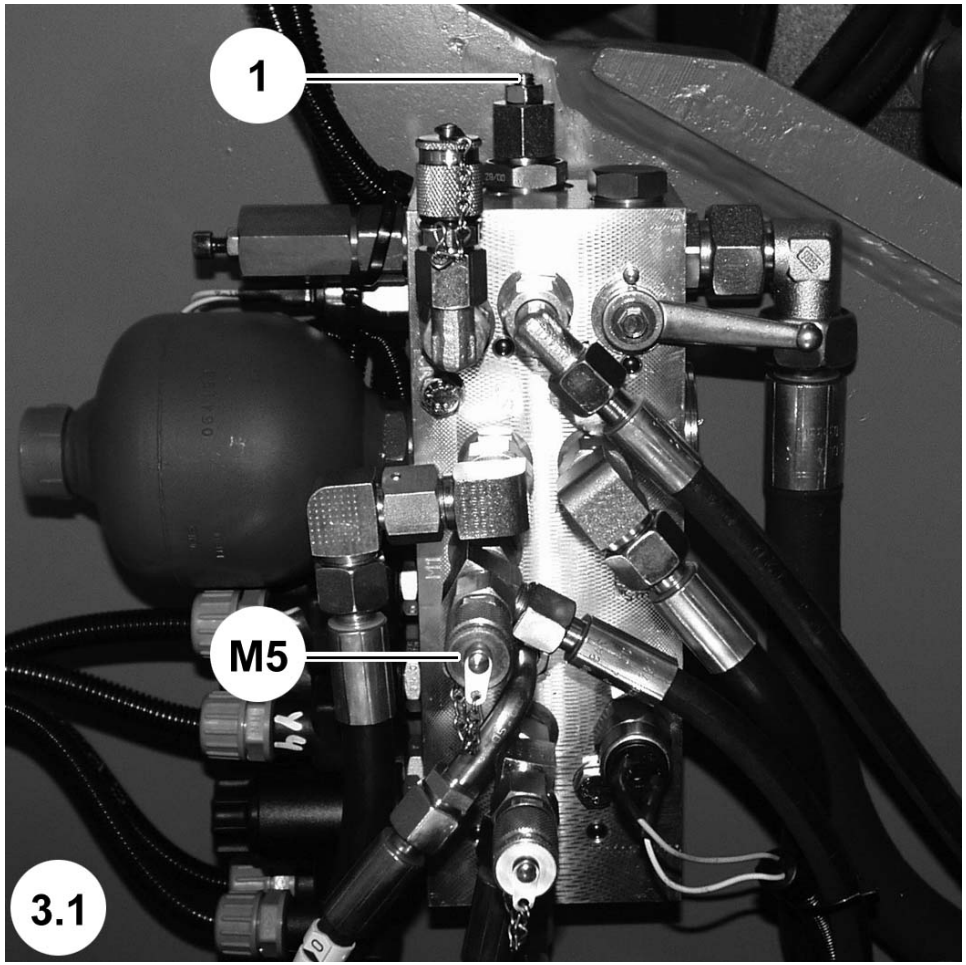
TEREX | ATLAS



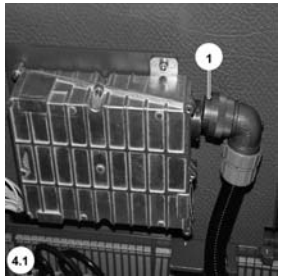
Pilot Control

Connect electronic measuring device to testpoint (M5).

Correct the value of 25 – 27 bar if necessary by tightening or loosing the setting screw (1)

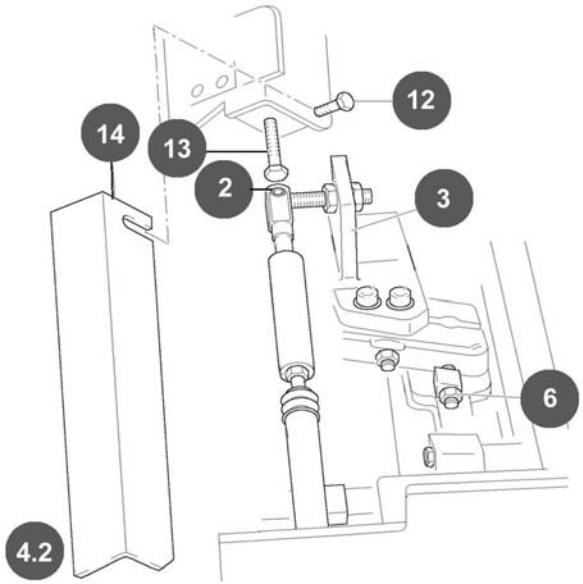


Emergency Circuit

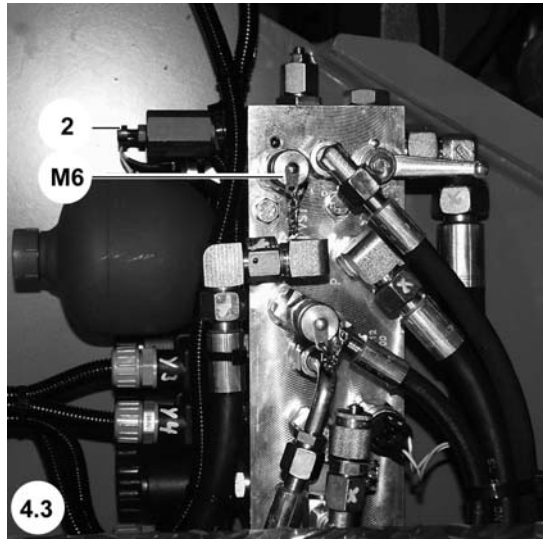


If the electronic fail, the excavator can be operated further at reduced power in the emergency mode.

Ignition key in zero position. Remove the screw in plug (1) from the electronic box behind the driverseat.



Loosen securing screw (12) and pull guard (14) to the side and secure. Dismantle the fork head (2). Unscrew hexagon screw (13) until it is touching the engine throttle and continue to turn until the engine speed adjustment lever (3) strikes the adjusting screw (6).



Connect measuring device to testpoint (M6).

At max. engine speed you should read 14 bar.Correct at screw (2).

Load Limit Control Valve

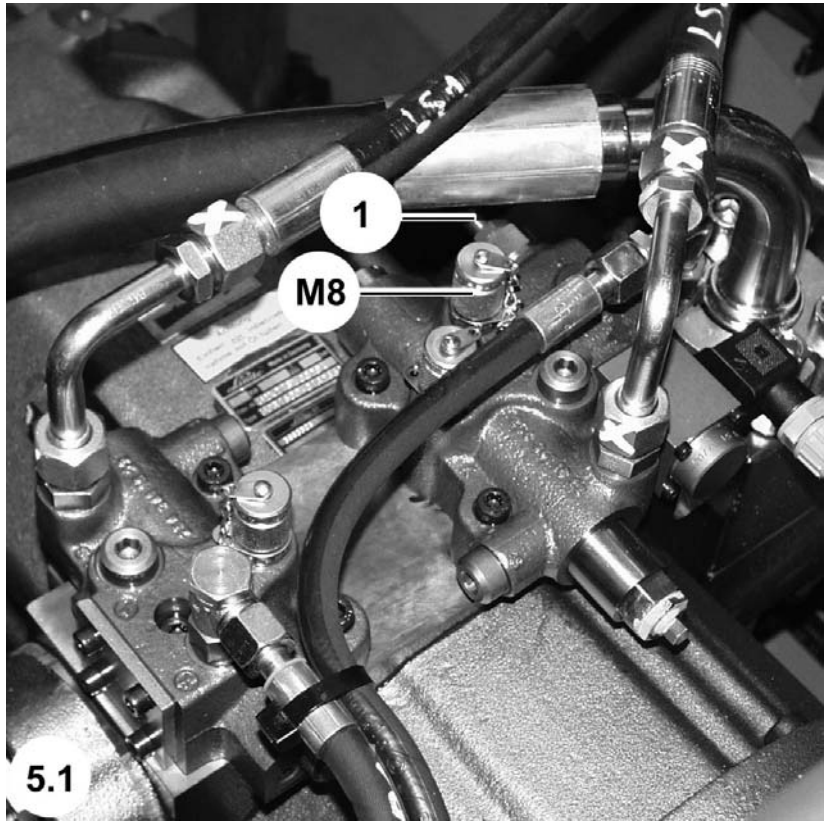
TEREX | ATLAS

Checking and adjusting

Connect the electronic measuring device to testpoint (M8).

Start the engine
Press MEMO (6) and
MANUELL (7) buttons.





A pre-set control current from the electronic (300 mmA) now controls the load limit valve.

The control pressure displayed must be 8.5 bar +/- 0.2 bar plus tank pre load pressure (about 0.5 bar).

Correction is done by tightening or loosening the adjusting screw (1).

Press MEMO and MANUELL buttons to end the fine adjusting function.

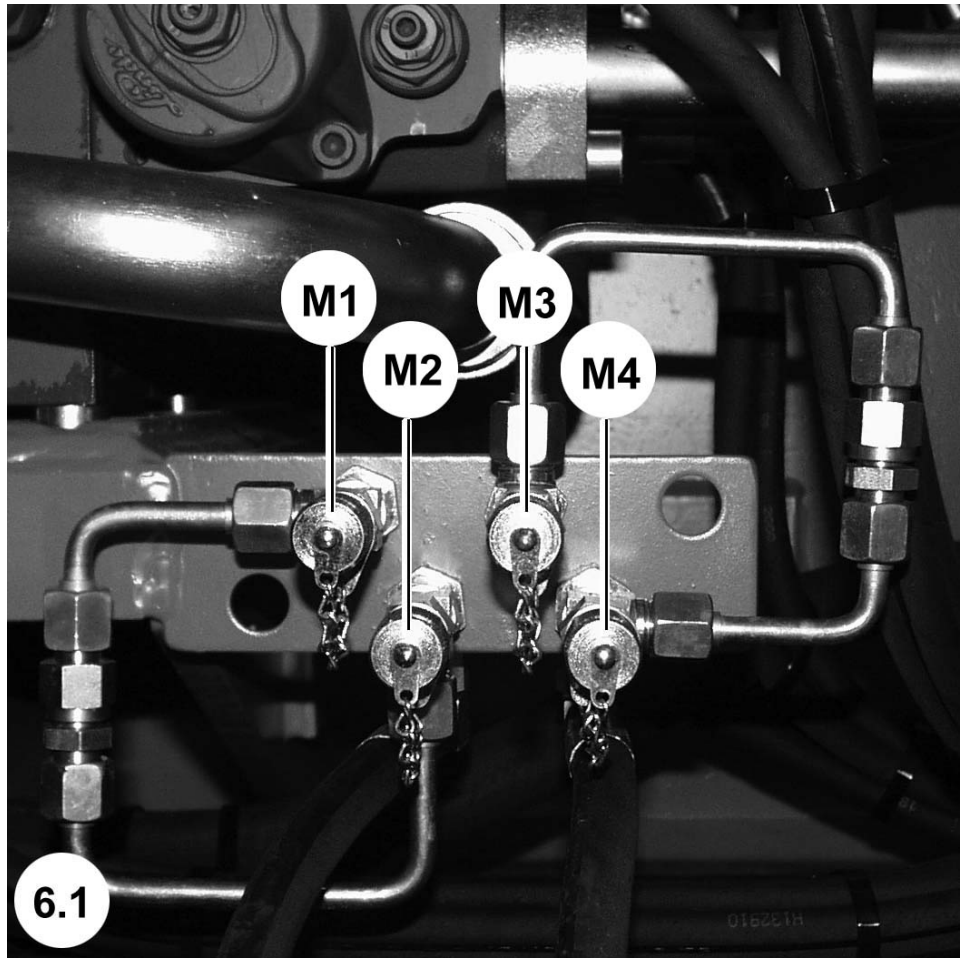
Testpoints

M 1 – P 1

M 2 – LS 1

M 3 – P 2

M 4 – LS 2



LS Controller P1 and P2

LS controller P1 (1)

Connect electronic measuring device to testpoints M1 and M2.

Start the engine and preselect operation mode F3. Extend boom and jib.Turn on electronic measuring device and select delta P mode. Operate lifting slowly and you should read 23 bar delta P.

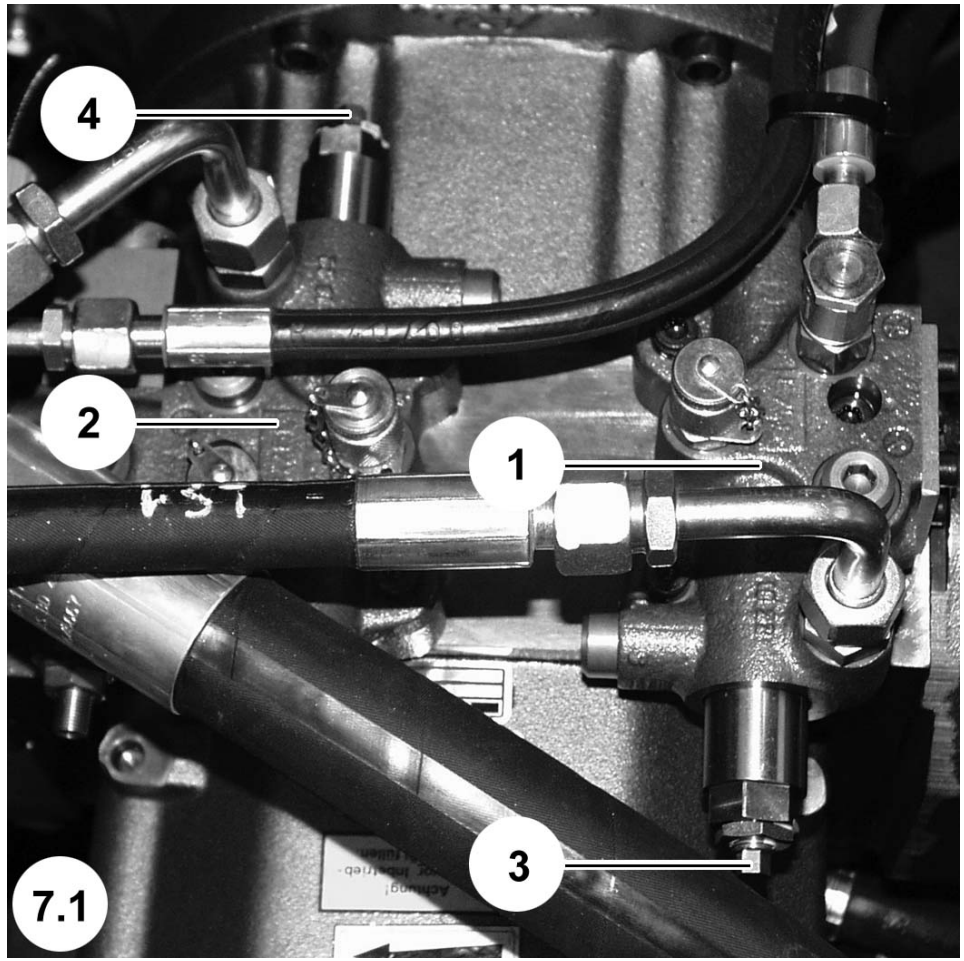
Adjustment is carried out at adjustingscrew 3.

LS controller P2 (2)

Connect electronic measuring device to testpoints M3 and M4.

Same procedure, but operate jib out behind vertical position slowly. You should read 23 bar delta P.

Adjustment is carried out at adjustingscrew 4.

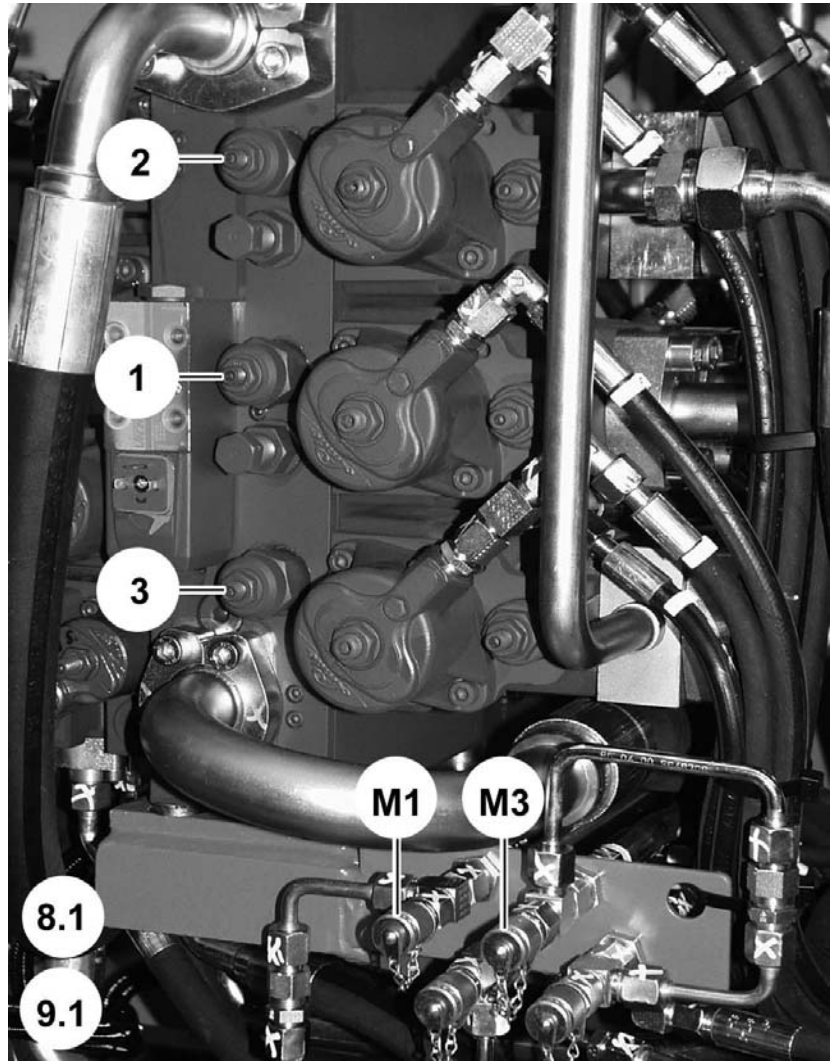


Pressure Cut-Off

Pressure Cut-Off

Connect the electronic measuring device to testpoints M1 (for P1) and M3 (for P2).
Start the engine and preselect F3 mode.
Move the lifting and fold out functions against the stops at the same time and hold there.
You should read 320 bar for each pump.

Corrections may be done by adjusting screw 1 for P1 and screw (2) for P2.



Pressure Cut-In stage

Connect measuring device to testpoint M1 for P1.

Switch on heavy lift button 

and move the lifting function to the stop and hold there. The increased pressure of 380 bar should be displayed.

Corrections may be done by adjustingscrew (3)

Secondary Valve

Connect the electronic measuring device to testpoint M1 (for P1) and M3 (for P2).

Start engine and press heavy lift button.

Set P1 to high:

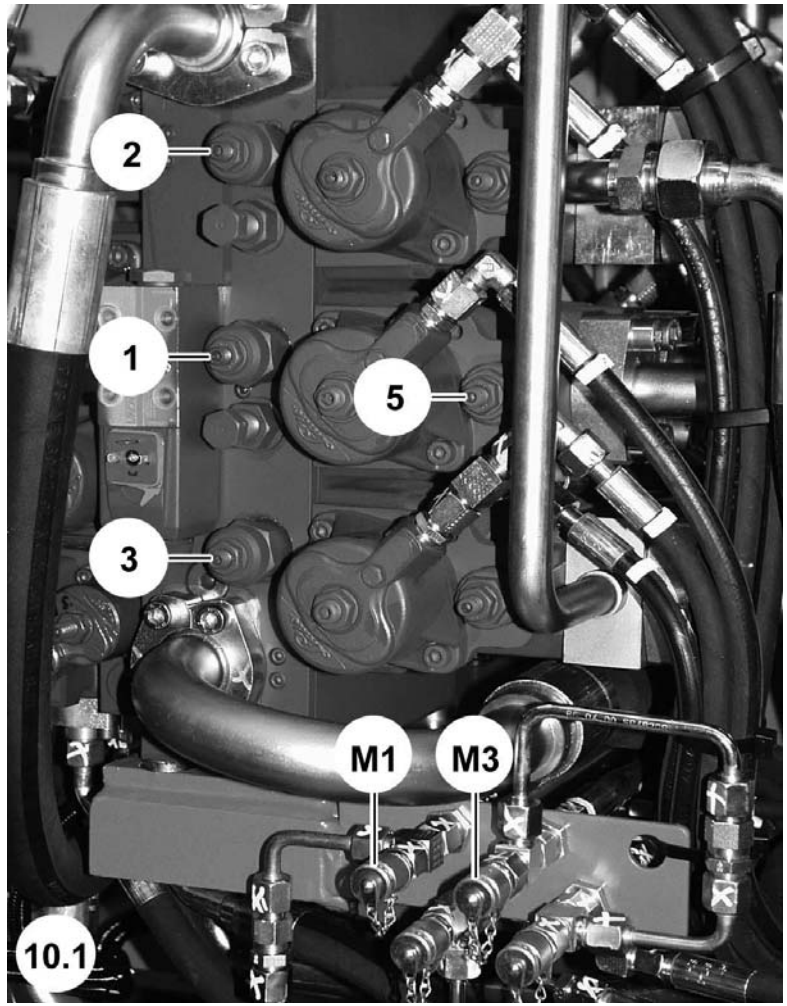
Move „open bucket“ function to the stop and hold there. The pressure of bucket open is displayed. Tighten adjusting screw (5) for the secondary valve by approx. 1 ½ turns. Tighten settingscrew (3) for the pressure cut-in valve (20 bar above the highest secondary pressure that can be set.

Note:This pressure must not exceed 460 bar

Follow this by checking and if necessary the setting of „lifting“, „close bucket“, „travel“ and „grading“ secondary valves.

Return P1 to original level:

Move „open bucket“ to the stop and hold there. Loosen the adjustingscrew (3) until the setting is reached. After this reset adjusting screw (5) to the preset value.



Secondary Valve

Set P2 to high:

Move the „fold out“ function to the stop and hold there.
The fold out pressure is displayed.
Tighten the adjusting screw (4) of fold out secondary valve by approx 1 ½ turns. Tighten the adjusting screw of pressure cut-off (2) to 20 bar above the highest secondary pressure that can be set.

Note: The pressure must not exceed 460 bar

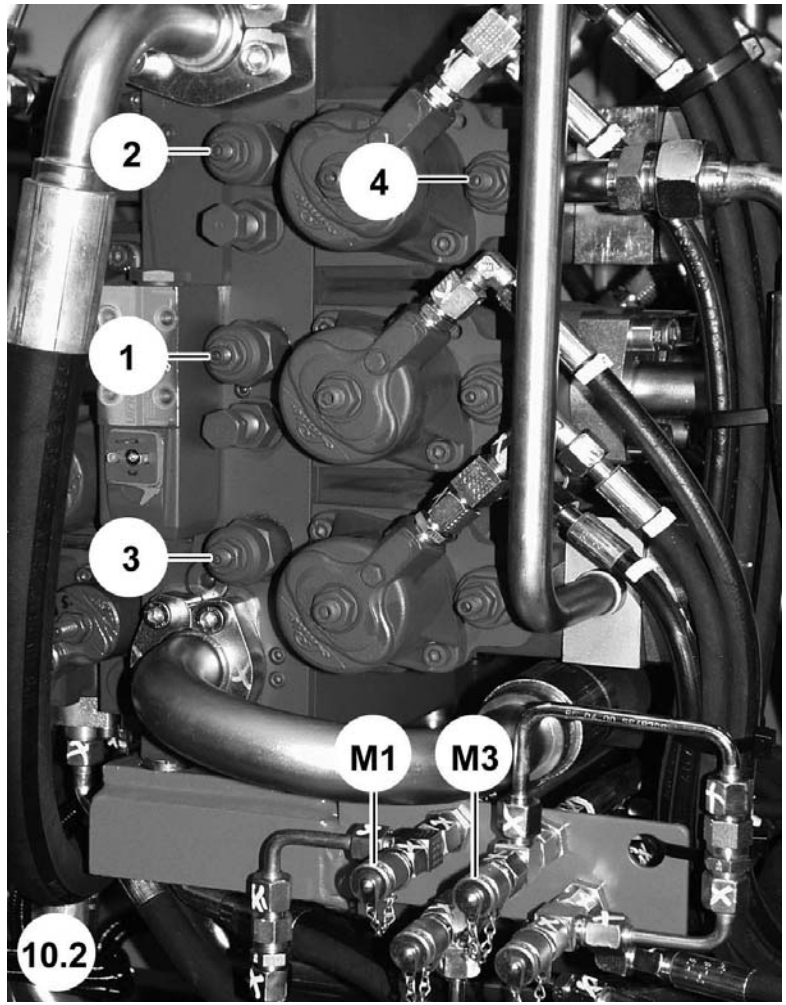
Then check and if necessary adjust the „fold in“, „adjust boom“, and „slewing“ (TC valve) secondary valves.

Return to original level:

Move fold out function to stop and hold there.
Set the secondary valve (4) to the recommended pressure.

Press button „F3“.

Move the fold out function to stop and hold there.
Adjust pressure cut off (2) untilk the setting is reached.



Secondary Valve

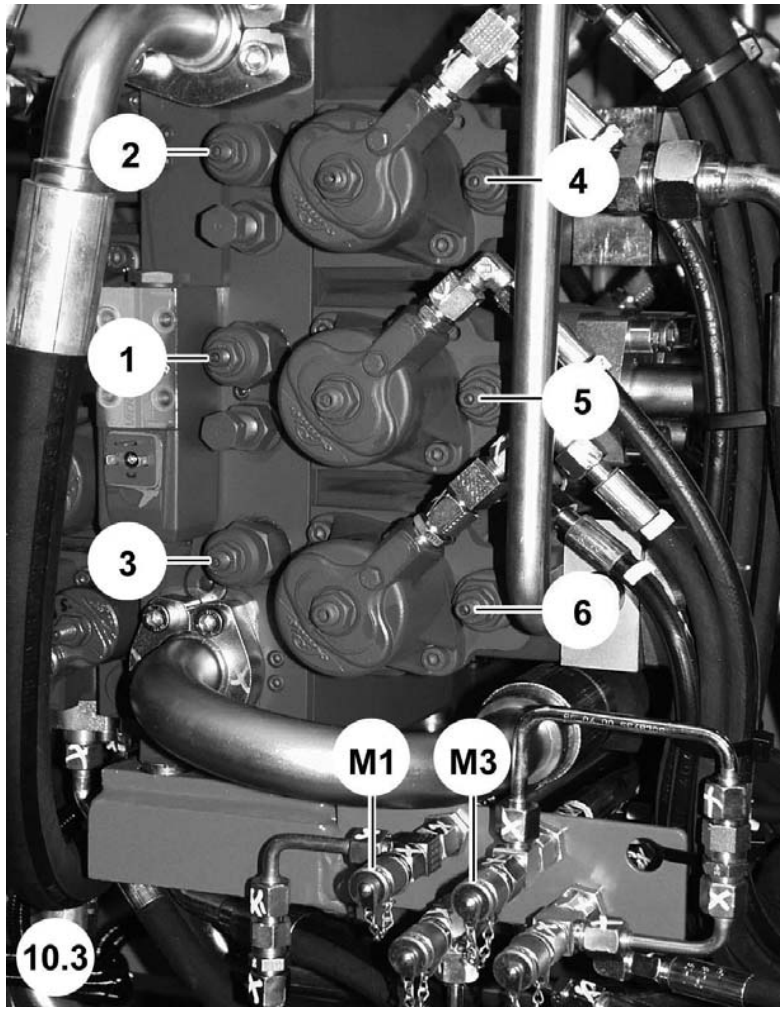
For checking and adjusting the secondary valves switch on heavy lift.

Adjusting is done by tightening or loosening the requested setting screw.

4 Fold out
Fold in – opposite side

5 Open bucket
Close bucket – opposite side

6 Lowering
Lifting – opposite side



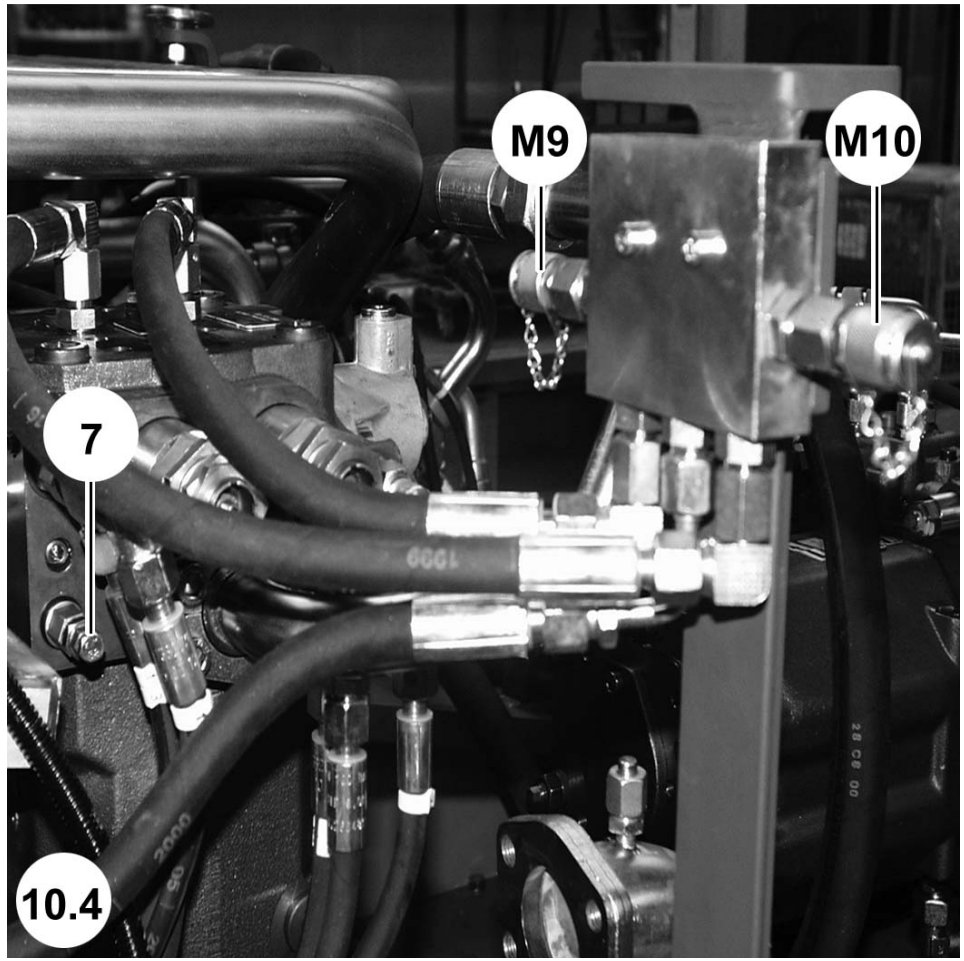
Secondary Valve

Slewing TC valve

Checking and adjusting take place at maximum engine speed (F3).

Connect electronic measuring device to testpoints (M9) for left direction and (M10) for right direction.

You should read 240 bar.

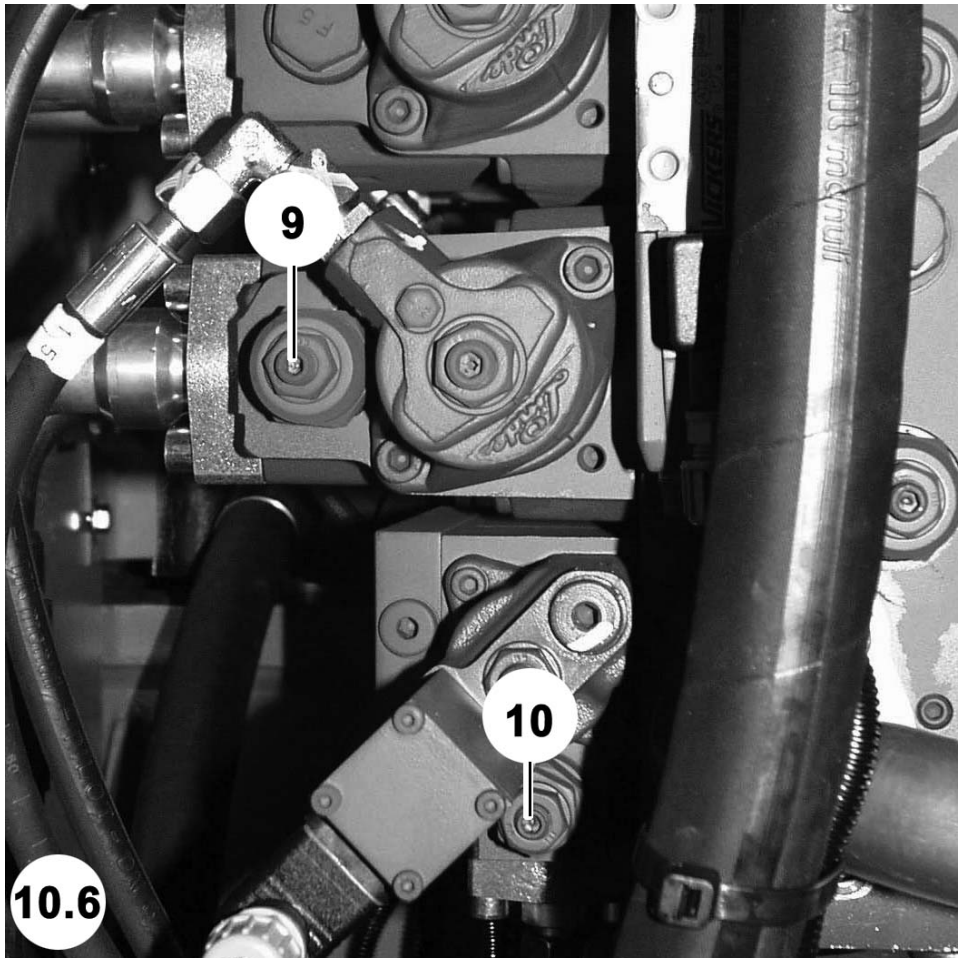


Secondary Valve

TEREX | ATLAS

9 Grading/Support Pads

10 Grab Rotation



Secondary Valve

Travel – crawler excavator

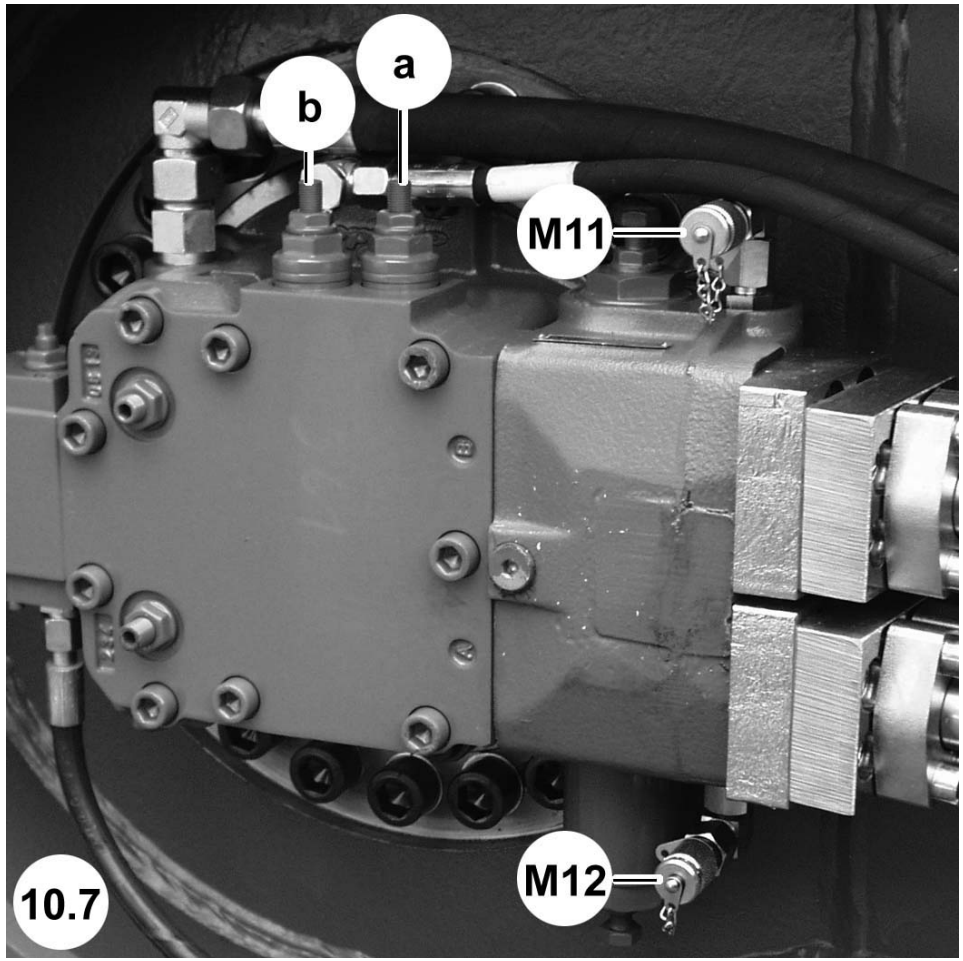
The secondary valves are located directly on the travelmotor.

Connect electronic measuring eqipment to testpoints M11 (forwards) and M12 (backwards).

a forwards

b backwards

Note: Check the travel motors separately with the lever control.



Secondary Valve

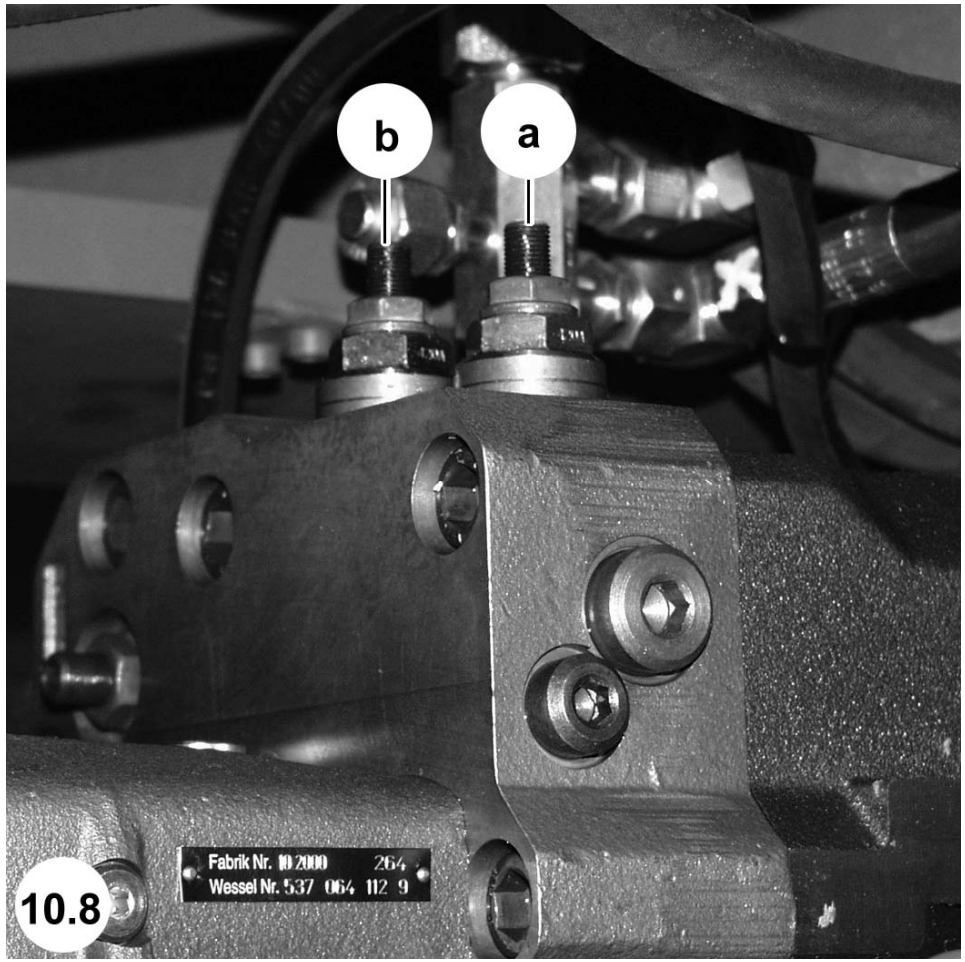
Travel – wheeled excavator

The secondary valves are located directly on the travel motor.

Connect the electronic measuring device to testpoint M1 (for P1).

a forwards

b backwards



Hose Failure Valve

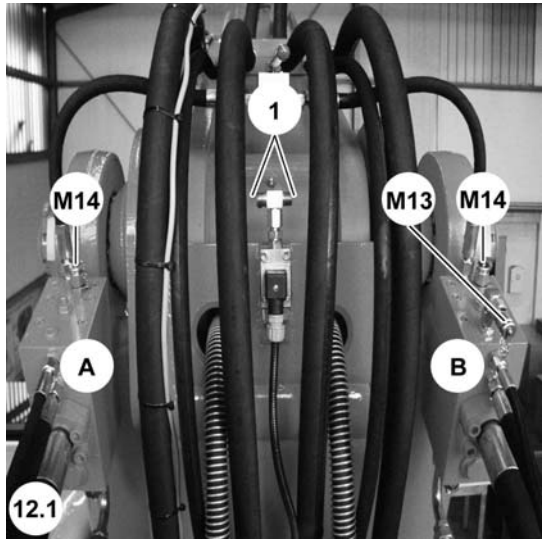
Hose failure valves

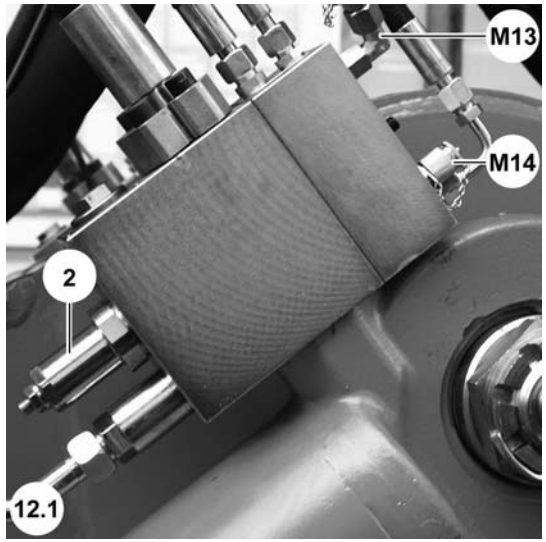
Checking and adjusting takes place at a hydraulic temperature of approx. 40 – 60 degree celsius, maximum engine speed and with attached working tool.

Determine the start of spool valve movement in the controlblock. Connect prssure gauges (0 – 600 bar) to the testpoints M1 for P1 and M13 (pilot pressure for lowering). Tighten adjusting scew (2) at both valves A and B by approx. 2 turns. Lift the boom about 2 meters above the ground or floor surface. The pressure gauges display the statc pressure in the cylinders. Slowly switch to lowering and watch both gauges. If pressure increases on gauge for P1 pilotpressure should be read off at (M13) (start of spool valve switching).
Adjusting the start of locking piston switching. Connect pressure gauges (0 – 600 bar) to the testpoints M14 of valves A and B. Unscrew and seal compensation lines (1) with plugs. Lift boom about 2 meters from the ground. Activate lowering until you see at M13 the pressure 1 bar under the point at which spool valve switching starts. Maintain this pressure and unscrew (2) at valve A until the static pressure drops down. Unscrew then (2) at valve B until the boom starts to drop down.

CHECKING:

Check that both locking pistons open at the same time during the lowering procedure (in the final control zone).
A tolerance of 30 bar is allowed. Any further adjustment shoud be done at adjusting screw 2 of valve B.
Retighten compensation lines (1).

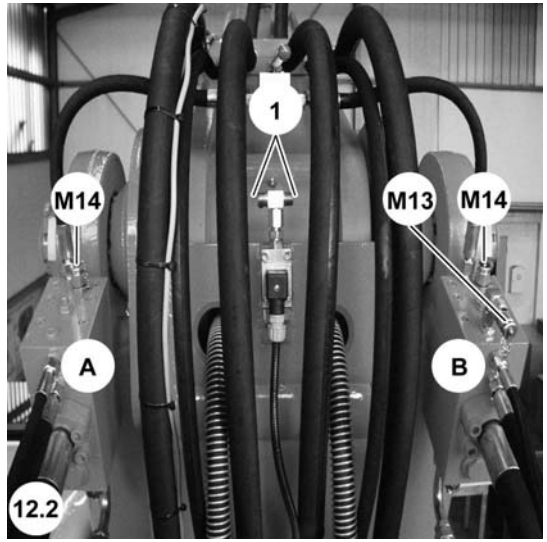




Hose Failure Valve

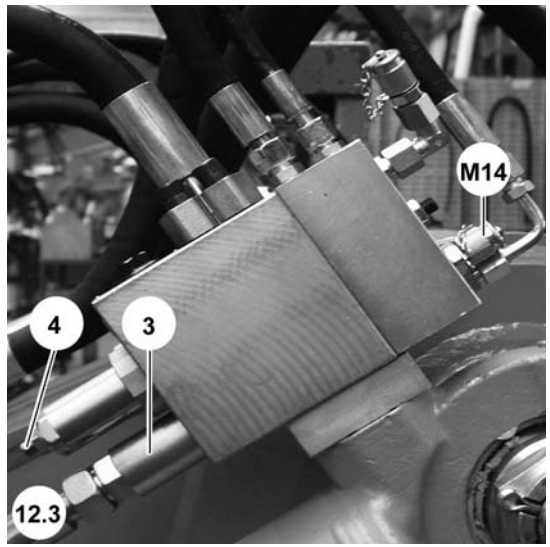
Basic setting of lowering restrictor (with attached working tool)

Connect 600 bar gauges to testpoint M1 for P1 and valves A and B (M14). Unscrew compensation lines (1) and seal with a plug. Activate full the lowering function. A deviation of 5 bar is allowed between M14 A and B.
If this value is not reached a correction should be made at both setting screws (4).



Secondary Valves

Check secondaryvalves via hand pump.
The customer does not have to adjust the secondary valves (3) which are delivered with a fixed setting.



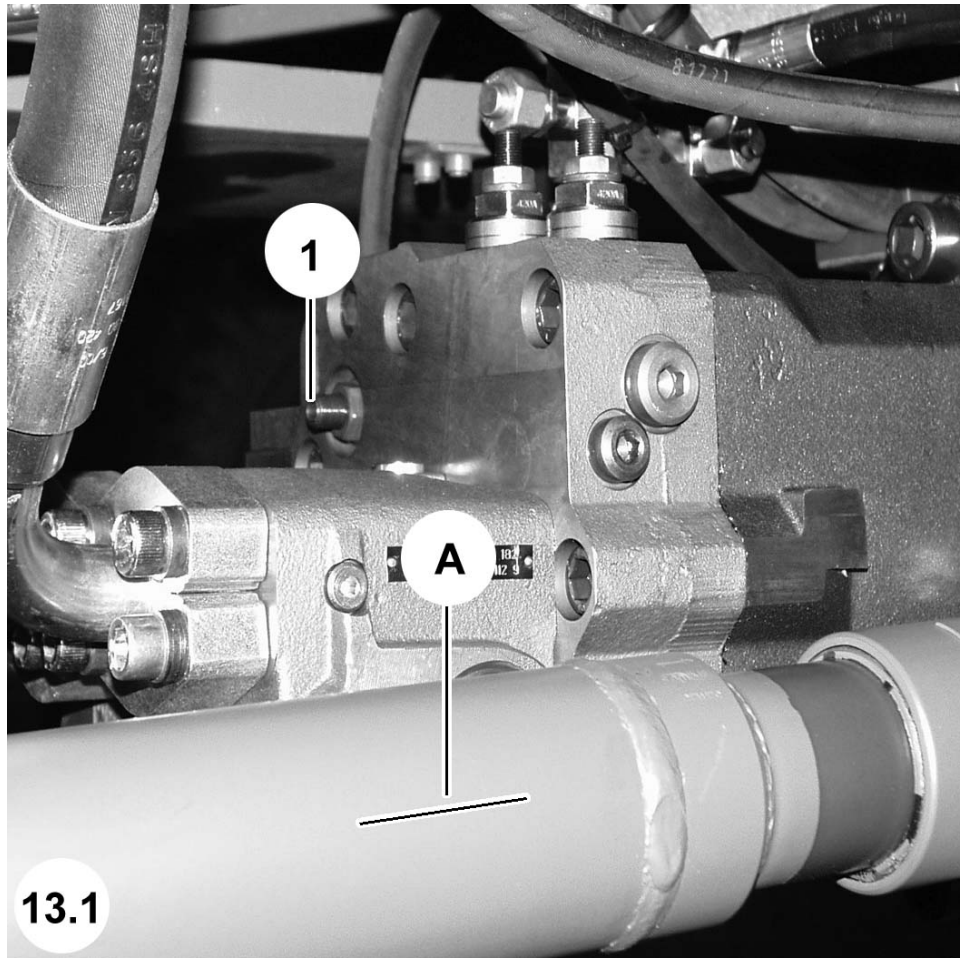
Propeller Shaft Speed

Propeller shaft speed

Forward/Reverse (500 rpm)

The propeller shaft speed is measured in the off road ratio at maximum engine speed and with the controller bypass switched off.

Correction is carried out at the adjusting screw (1) on the travel motor.

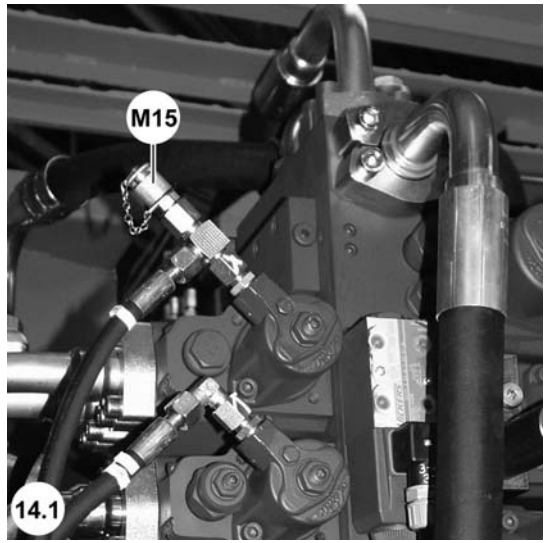


Travel Pilot Pressure

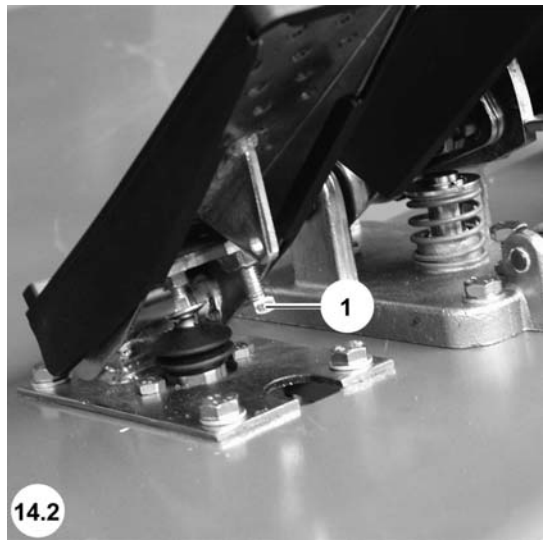
Pilot pressure – travel – wheeled excavator

Checking/Adjusting (25 bar)

Connect pressure gauge at testpoint M15.



Correct at adjusting screw (1) under the travel pedal in the drivercabin.



Moment Plate

Moment control for orange-peel grab

Connect the electronic measuring device to testpoint M1.

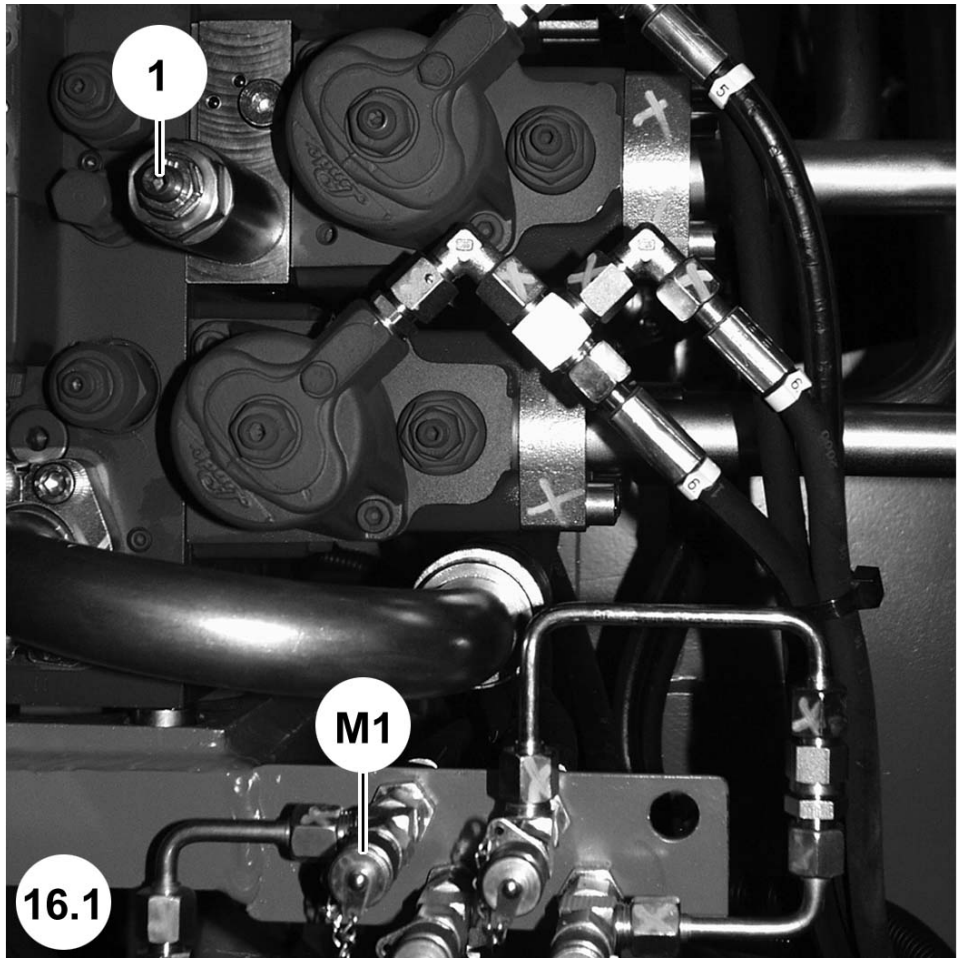
Preselect the maximum engine speed F3

Open the grab against the stop and hold there. The pressure of 230 bar should be displayed.

Correct if necessary at the moment plate at adjusting screw 1.

Close the grab against the stop and hold there. The pressure of 180 bar should be display.

Correct if necessary at the moment plate at the opposite screw of 1.



Swing Motor

Secondary valve / Slewing motor

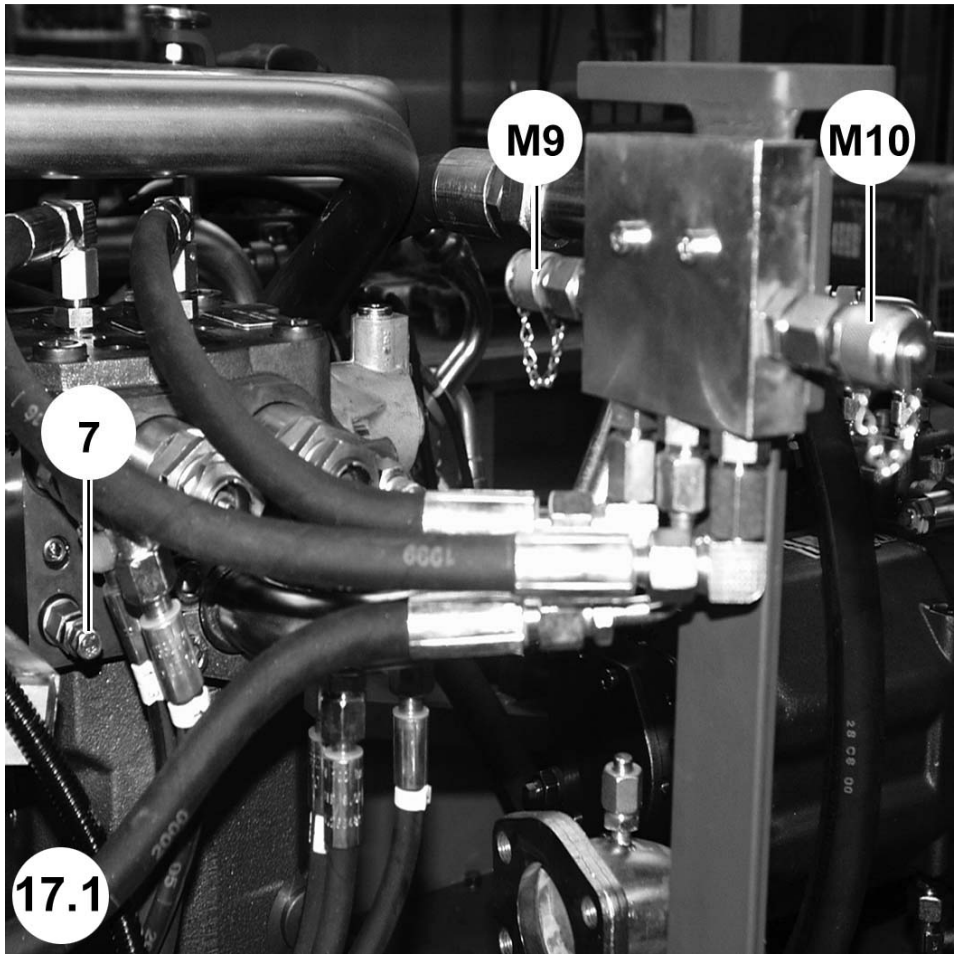
Checking/Adjusting

Slewing to left – valve A – M10

Slewing to right – valve B – M9

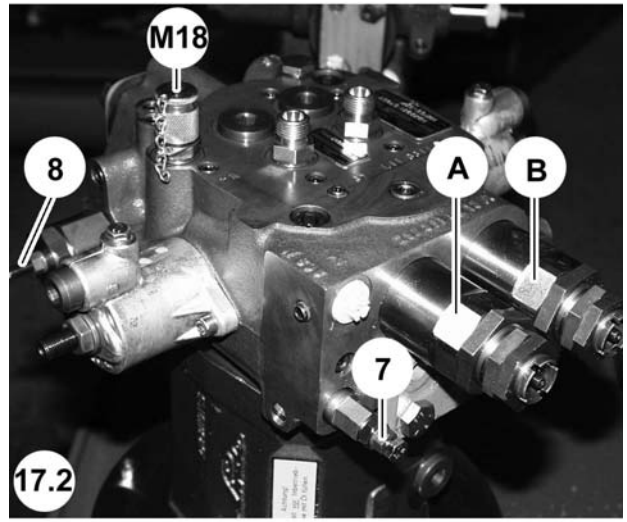
Connect 600 bar pressure gauge to the testpoints M9 and M10.

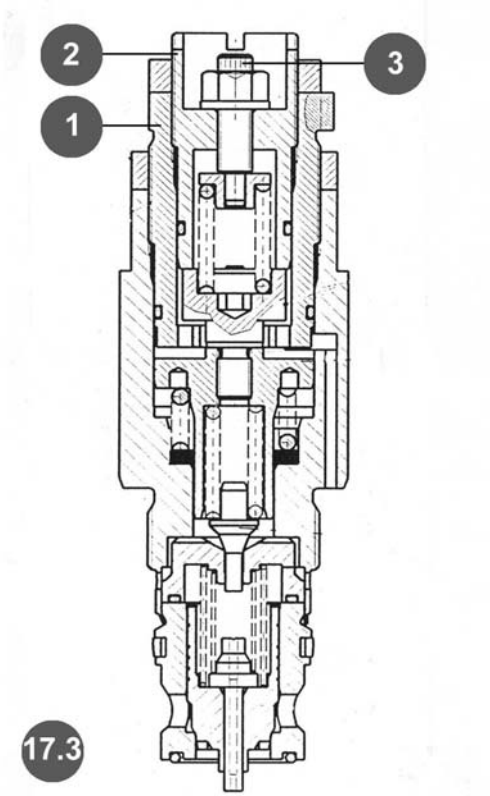
Tighten TC valve adjusting screw 7 fully.



Swing Motor

Block the superstructure and activate slewing to left. The pressure is displayed at M10. Any correction is carried out at valve A with adjusting screw 1.
Adjustments for slewing right is carried out at valve B with adjusting screw 1. The pressure is displeayed at M9.





Adjusting of braking pressure

Connect 600 bar gauge at M9 and M10. Slew to the right with maximum speed and release the joystick to zero. The brake pressure is displayed at M10. Any correction can be carried out at adjusting screw 2.

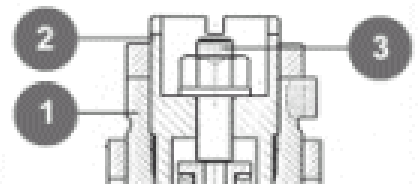
Note:A special tool is required

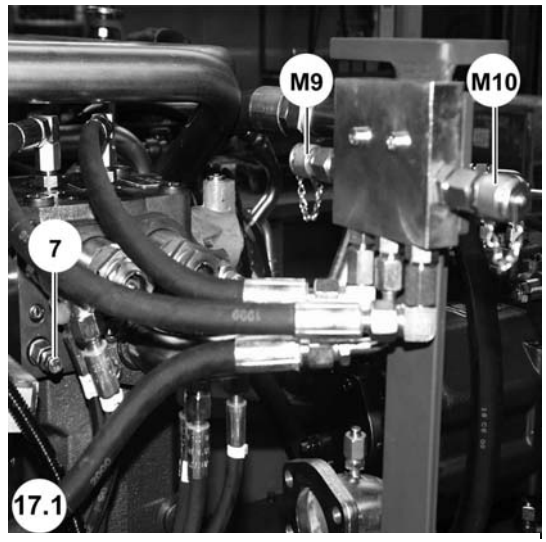
The other slewing direction is checked in a similar way (valve B;gauge M9)

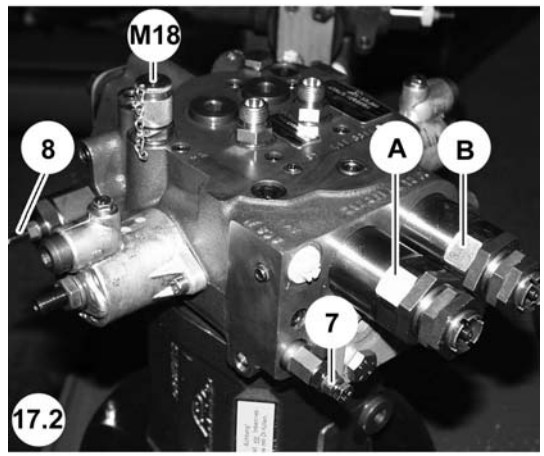
Swing Motor

Adjusting of the pressure control characteristic

Connect 600 bar gauge to testpoints M9 and M10.
Connect further 60 bar gauge to testpoint M18.
This testpoint is not standart.
Tighten adjustingscrew 7 by 2 turns. Block the superstructure.
Activate the right slewing functions and build up pressure of approx. 8 – 9 bar with the pilot control lever at testpoint M18. A pressure of 120 bar must be displayed at testpoint M9.
Adjustments can be carried out at adjusting screw 3 .
The other slewing direction is checked in a similar way. Adjustment is carried out at valve A together with gauge M10.
Finally return adjustment on screw 7 by 2 turns.





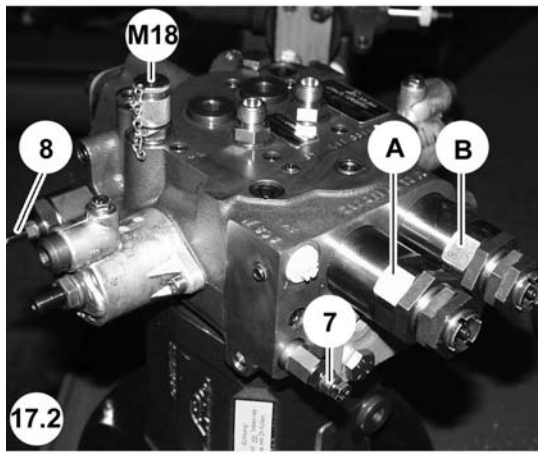


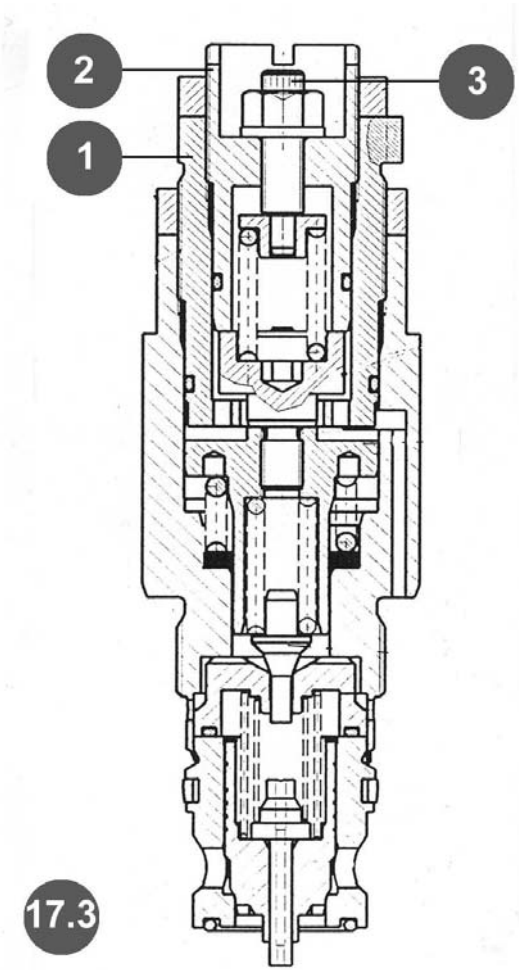
TC Regulating characteristic

Adjusting of TC regulating characteristic

Connect 600 bar gauge at testpoint M18.
This testpoint is not standart.
Block the superstructure and activate slew right at maximum engine speed until a pilot pressure of 16 bar is displayed.
A pressure of 190 bar should be displayed at testpoint M9.

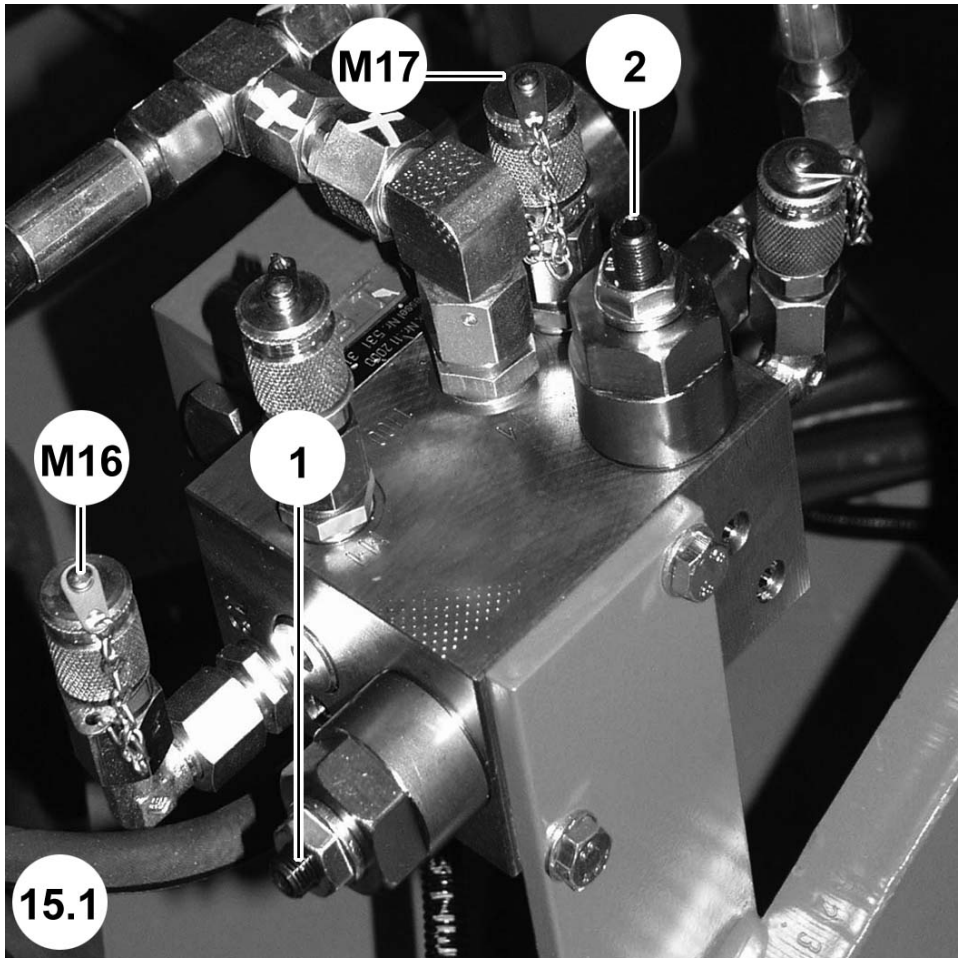
Correct at adjusting screw 8





Travelmotor Adjustment

Manual



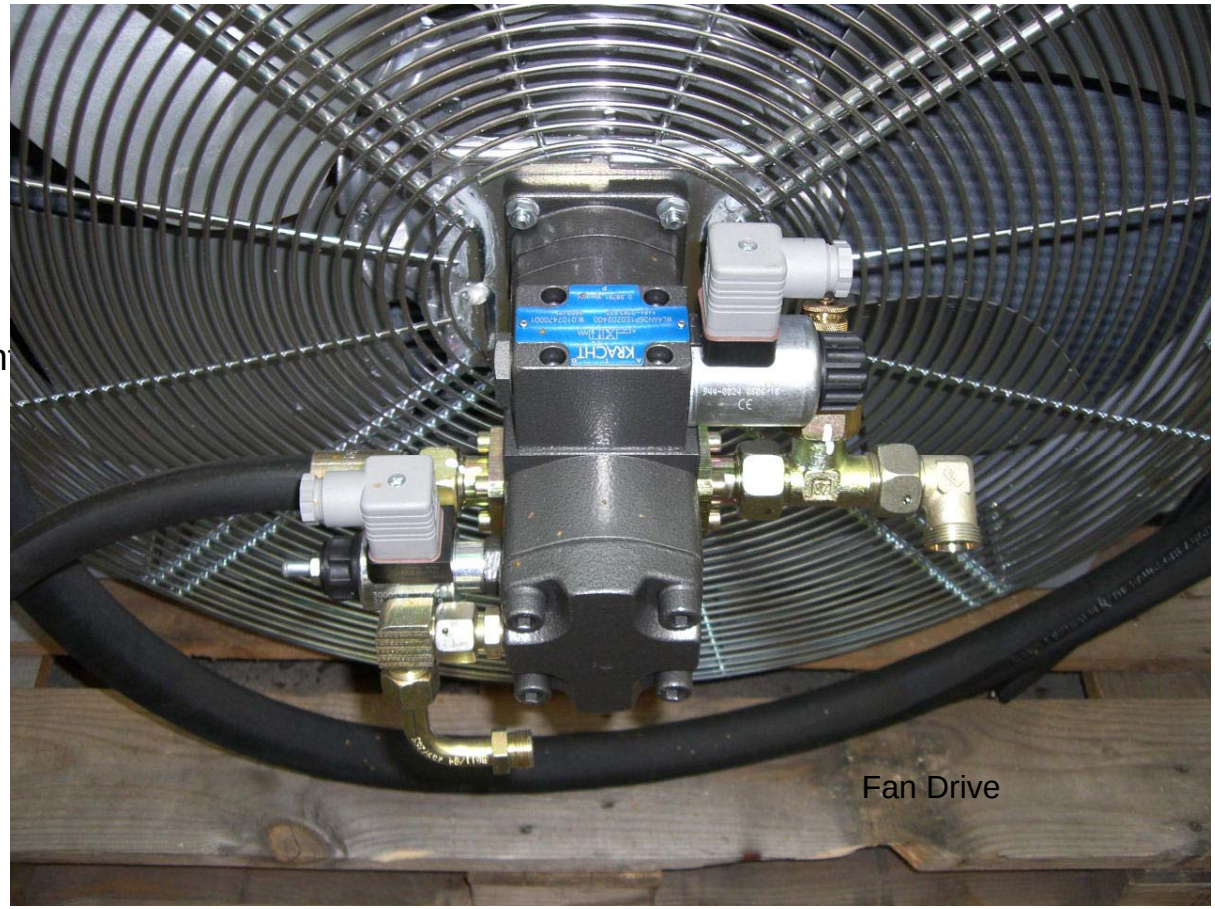
COM III Fan Drive

Fan Control with modified current for the proportional valve.

At excavatortyp 1804 the fandrive changed since COM III engine version. The codingswitch **2** to on activates the thermostatic fandrive. Codingswitch **5** to on activates the new fandrive system.

Cleaning Function

The control needs only one valve for the cleaningfunction. This valve is under power during cleaning. So that the fan dont reverses at high speed the curren rises up before to decrease the fabspeed. Therefore a timedelay of 10 seconds is intended. Codingswitch 7 to on position activates the fan control which is ever programmed into the processor.



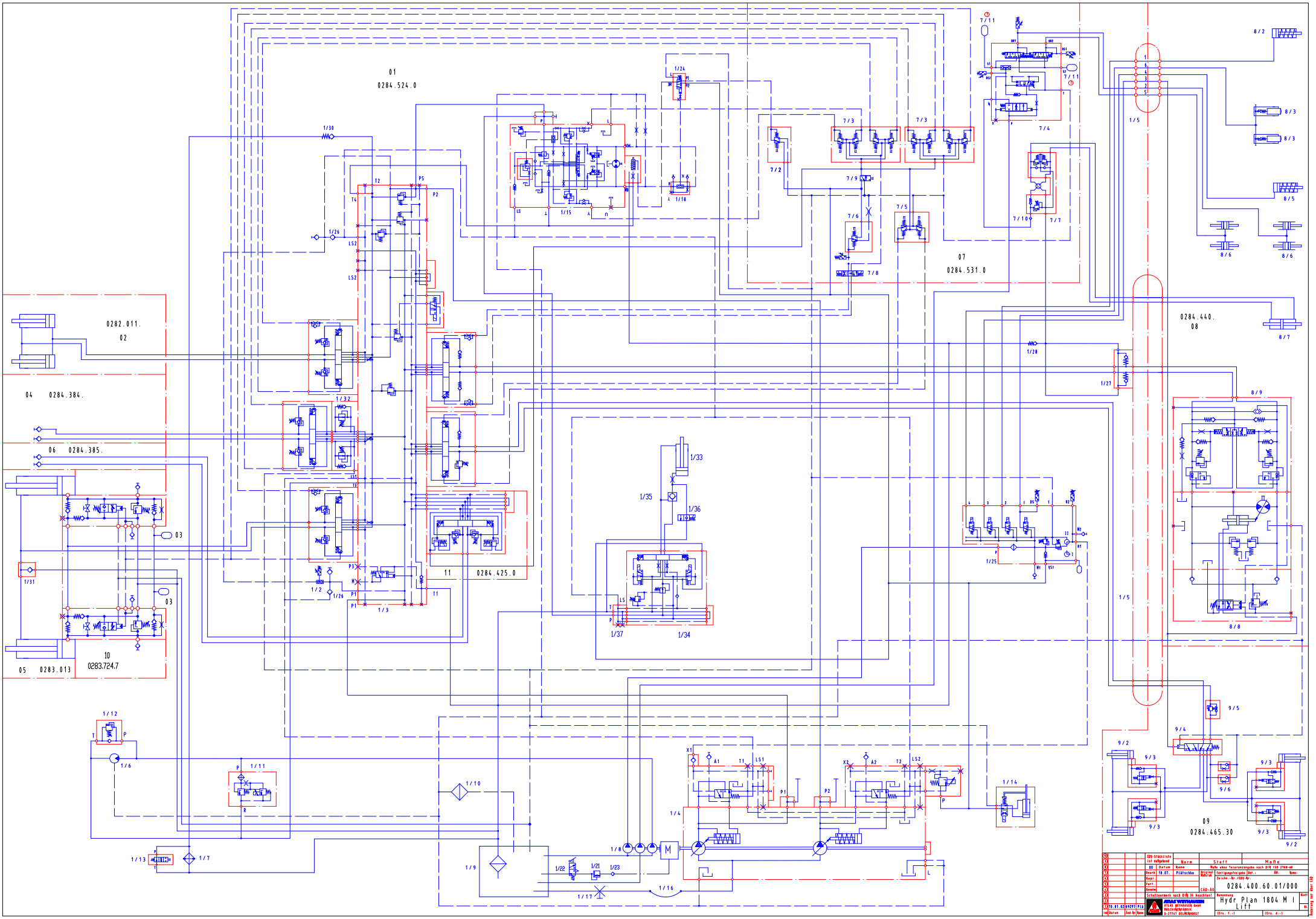
Fan Drive

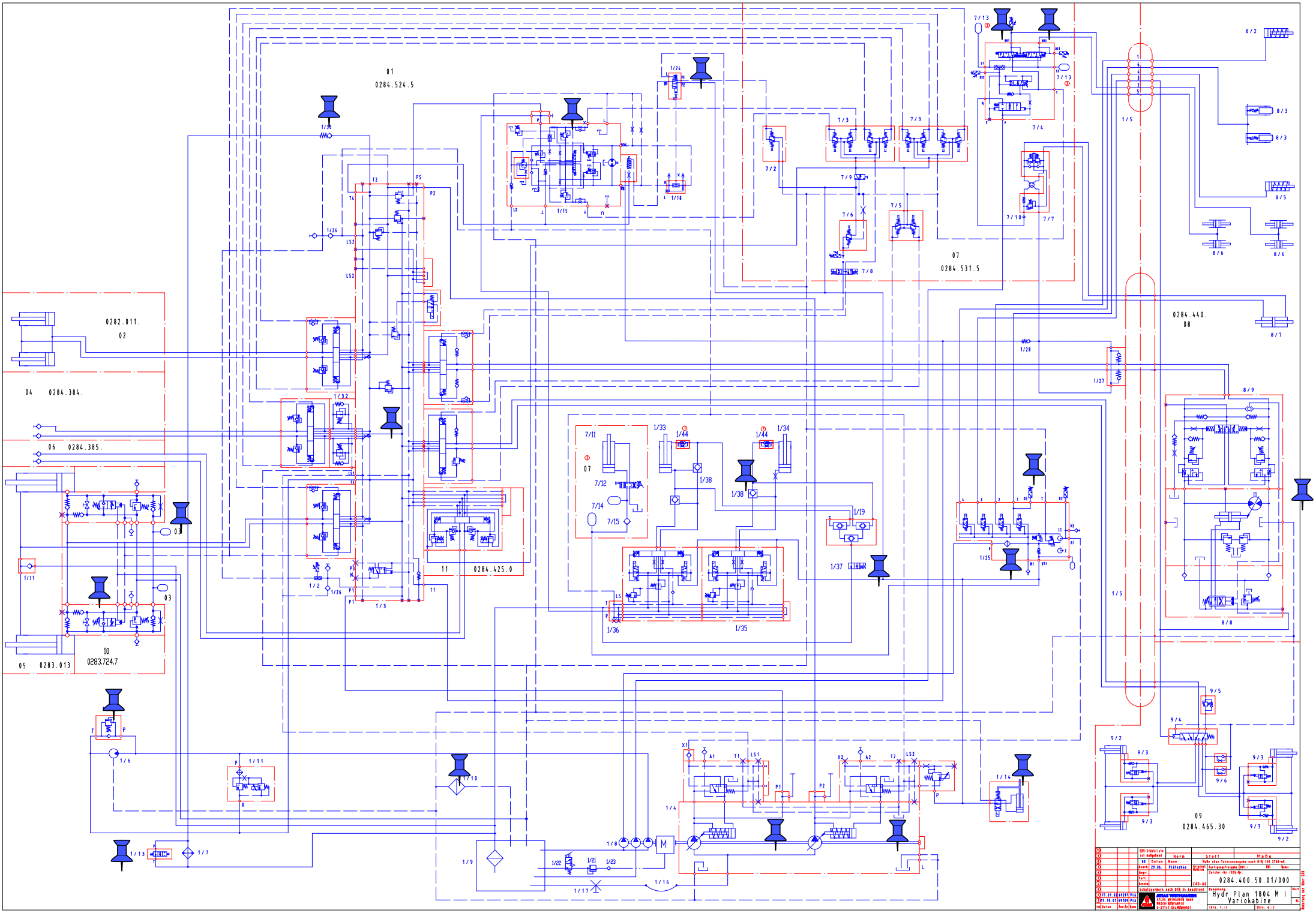
Lift Cab



TEREX | ATLAS

Thank You for your Attention


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06 0284.385.
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Hydr Plan 1804 M I
Lift
ATLAS WEYHAUSEN GmbH
D-27472 CUXHAVEN


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