

Mecalac



HANDBOOK OF REPAIR

MANUFACTURER: "MECALAC SAS"

12 MXT

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1. Safety precautions

Throughout this book the symbol  is used to draw your attention to areas where special care is required, to prevent accidents and injury.

- Construction sites are busy places, often with wet, muddy ground, conditions which impede other workers ability to avoid carelessly driven machinery. Skid-steers are designed to be highly manoeuvrable and compact in operation. They are rugged and can be operated under a variety of conditions, and the operator may be presented with hazards associated with operating this machine.
- ***Be vigilant and “think safety”.***
- **DO NOT** operate this machine unless you have been properly instructed on its control and safe operation.
- These operating instructions are designed to familiarise the user with the machine and its designated use. The instruction manual contains important information on how to operate the machine safely, properly and most efficiently. Observing these instructions help to avoid danger, to reduce repair costs and down-time and to increase the reliability and life of the machine.
- The operating instructions must always be available wherever the machine is in use. These operating instructions must be read and applied by any person in charge of carrying out work with and on the machine, such as:
 - care and disposal of fuels and consumables.
 - maintenance (servicing, inspection, repair) and/or transport.
- In addition to the operating instructions and to the mandatory rules and regulations for accident prevention and environmental protection in the country and place of use of the machine, the general recognised technical rules for safe and proper working must also be observed.

2. Description of the machine

The excavator is made up of a front chassis section, a rear chassis section, a turntable, a cab and equipment consisting of four elements.

2.1 Central joint

The ground contact of the four wheels is provided by the oscillation of the rear axle. The ground contact of the four wheels is provided by the oscillation of the rear axle.

2.2 Stabilizers

Two independently-controlled stabilizers combined with the oscillation lock stabilize the machine during operation.

2.3 Rear chassis

The rear chassis section is equipped with a water-cooled 4 in-line-cylinder engine.

- The engine drives two variable displacement pumps which perform the following functions:
 - Transfer movement pump: coupled in a closed circuit with a variable displacement motor, the assembly forming a hydrostatic transmission.
 - Equipment pump: movements of the rams, power-assistance of the controls and associated functions.
- The engine also drives a fixed displacement pump which performs the machine's steering and slewing movements.

2.4 Transmission

The transmission is of the permanent 4x4 type, with a limited-slip differential on both axles.

2.5 Turntable

The turntable is connected to the front chassis section by a slewing crown wheel. The turntable supports the operator's cab, the excavator's equipment and the counterweight.

The slewing internal crown wheel is driven by a hydraulic motor equipped with a negative brake in the event of a power-assistance pressure fault.

2.6 Cab

The monocoque cab is closed and heated. It is "FOPS" and "ROPS" approved (falling objects and roll-over protective structure).

2.7 Controls

The cross position of the equipment controls makes it possible to combine the various actions flexibly and efficiently.

2.8 Seat

The seat is sprung, dampened, height-adjustable and adjustable lengthwise.

2.9 Equipment

The equipment is in the centre of the machine. It is made up of four elements: the boom, the intermediate boom, the coupling and the dipper.

The boom is controlled by the parallelogram formed by the boom ram, the braces and the boom connecting rods. This gives it the advantage of a 140° travel.

The equipment can be offset on both sides by means of a hydraulic ram.

2.10 Tool-holder

At the end of the dipper is the tool-holder permitting the instant changing of the bucket or tool from the cab without manual intervention. Buckets or tools are taken up automatically. Only their unlocking requires hydraulic energy.

3. Technical characteristics

3.1 Turbocharged engine

- Type:.....CUMMINS 4BT4.5C
- Diesel: 4 in-line cylinders
- Net horsepower at flywheel (DIN 70020 / ECE-R2403): 74 kW at 2,200 rpm
- Maximum net torque at flywheel (DIN 70020 / ECE-R2403): 414 N.m at 1,500 rpm
- Cubic capacity: 4506 cm³
- Bore x stroke: 102 mm x 138 mm
- Cooling by: coolant
- Air filter: with dry cyclonic cartridge

3.2 Axles

- **Rigid axle on the front chassis section:** DANA 112 / 132
 Gear ratios:
 - Bevel gear: 11 / 35
 - Epicyclic wheel reducer, 4 planet wheels: 1 / 6
- **Oscillating axle on the rear chassis section:** DANA 311 / 112 / 102
 With transfer box: DANA 311
 Gear ratios:
 - Coupled transfer box: 1 / 1,77
 - Bevel gear: 11 / 35
 - Epicyclic wheel reducer, 4 planet wheels: 1 / 6
- **Self-blocking differential:** limited slip 45%
- **Integrated oil-bath disc brakes:** 6 discs at the front
 : 6 discs at the rear

3.3 Capacities

- Hydraulic oil tank: 82 l
- Total capacity of the hydraulic circuit: 135 l
- Front and rear axle housing, each: 6.8 l
- Transfer box on the rear axle: 0.75 l
- Wheel reducer: 0.75 l
- Diesel engine, Sump: 11 l
- Diesel fuel tank: 130 l
- Cooling system: 14 l

3.4 Electrical system

- Battery: 12 V 175 Ah
- Starter: 12 V - 2.7 KW
- Alternator: 12 V - 62 Ah
- Alternator (air conditioning option): 12 V - 95 Ah
- Battery cut-out.
- Track rotating commutator, all of whose wires (white) are marked with a number.
- Engine shut-off device which works by cutting off the diesel fuel supply.
- Lighting and signalling complying with the highway code.
- Relay / fuse box (under the cab seat).
- Wiring harnesses with waterproof connectors.
- Negative pole to the chassis.

3.5 Hydraulic system

Three completely independent circuits: hydrostatic transmission, equipment circuit, and steering and slewing circuit.

3.5.1 Hydrostatic transmission

Reversible closed circuit, with declutching bypass valves in case towing is necessary.

- **Transfer movement pump:** 71 cm³
- **Transfer movement engine:**..... 140 cm³
- **Axial piston engine and pump:**

Variable displacement and axial piston motor and pump permitting the continuous variation of the transmission ratio over the machine's entire speed range. Automatic adjustment of the optimum transmission ratio to suit the motion resistance and accelerator setpoint of the diesel engine: it is automobile control.

- **Selection of direction of travel:**

(F) "forward" or (R) "reverse" by electric control on the steering "Commodo", without being obliged to stop.

- **Two speeds:**

For both directions of travel selected by the "Commodo" steering electric control:

- (L) "site" (between 0 and 6 kph).
- (H) "road" (between 0 and 26 kph).

Possibility of control in "loader mode" (L) or (H) and (F) or (R) using the right manipulator.

- **Inching" slow approach control:**

Allows reducing the displacement speed at a constant engine regime and therefore applying a constant power to the wheels in both front / reverse directions.

- **Handbrake (parking and emergency):**

It works by lack of pressure on the integrated discs on the front axle.

- **Hydrostatic foot brake:**

Foot-operated control with Inching device, main brake function and working brake function.

- **Main brake:**

In the initial part of its travel, it reduces the machine's travel speed by means of the valve (Inching function), then if the braking pressure exceeds 13 bar it acts simultaneously on the integrated discs on the front and rear axles (main brake function). This system increases the service life of the brake discs.

- **Working brake:**

A switch locks the foot-operated control in the braked position and makes it possible to work by releasing the brake pedal while at the same time having the brakes locked.

3.5.2 Equipment circuit:

- **Variable displacement, axial piston pump:**
 - Cubic capacity: 63 cm³
 - Maximum delivery: 140 l/min
- **Associated functions by solenoid-operated valves:**
 - Low pressure: ~ 35 bar
 - Accelerator.
 - Oscillation lock.
 - Seat pivoting console safety device.
 - High pressure: ~ 280 bar
 - Stabilizers.
 - Tool unlocking.
 - Offset.
- **Combined SX14 “LUDV” valve block:**
 - Five elements of proportional Load Sensing function with individual balancing for each element: boom, intermediate boom, dipper, bucket and auxiliary.
 - One input element.
 - One open-centre element for slewing with separate supply.
 - Proportionality of the functions always complied with irrespective of each element's pressure level.
 - Anti-cavitation pressure relief valve on each element.
 - Hydraulic-assisted proportional function controls, by manipulators or foot-operated controls supplied at low pressure with standby accumulator.

3.5.3 Slewing and hydrostatic steering circuit:

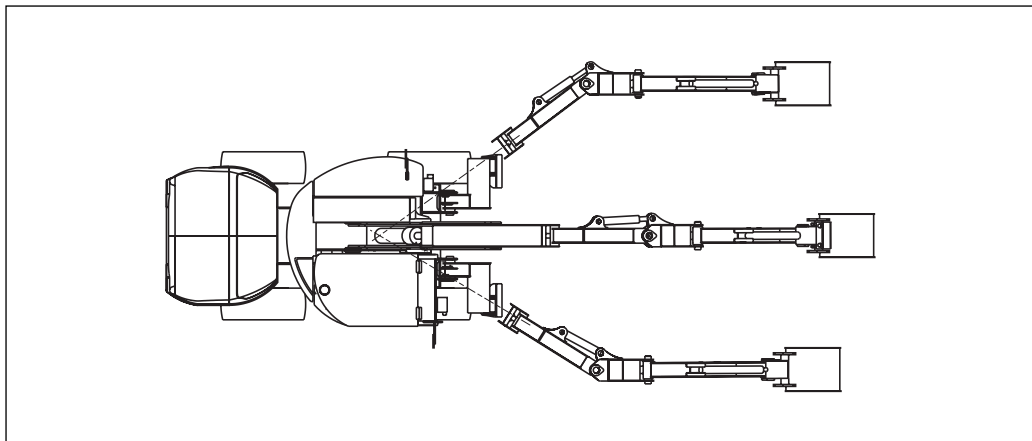
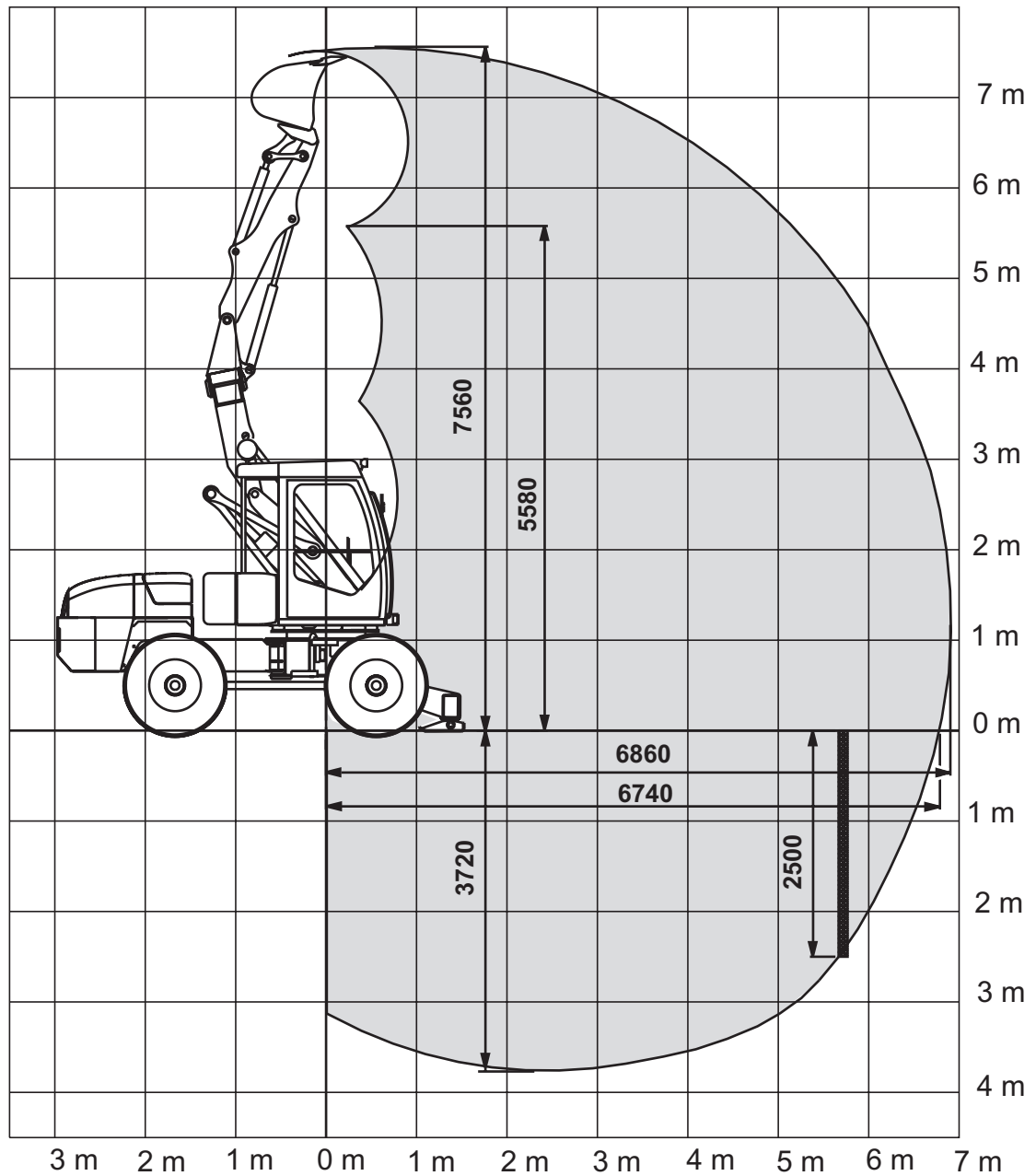
- **Hydrostatic steering:**

Double-acting ram controlled by a ORBITROL unit, protected by two anti-shock valves

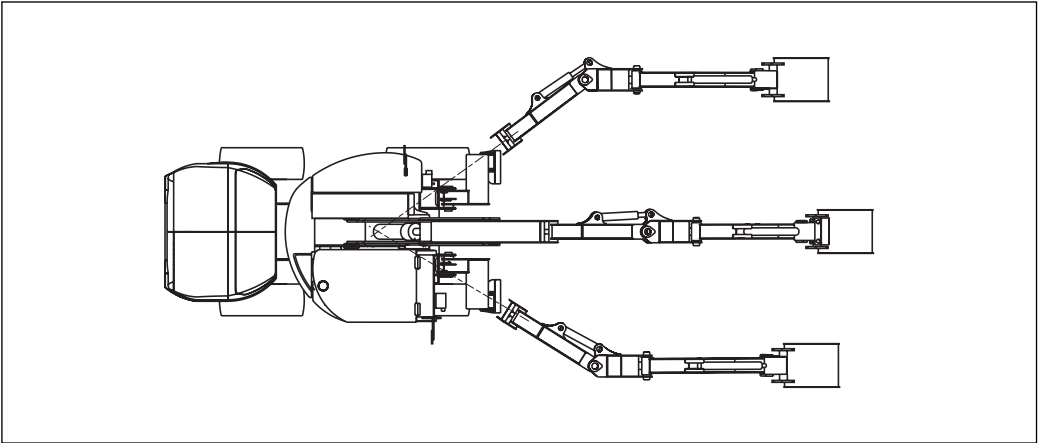
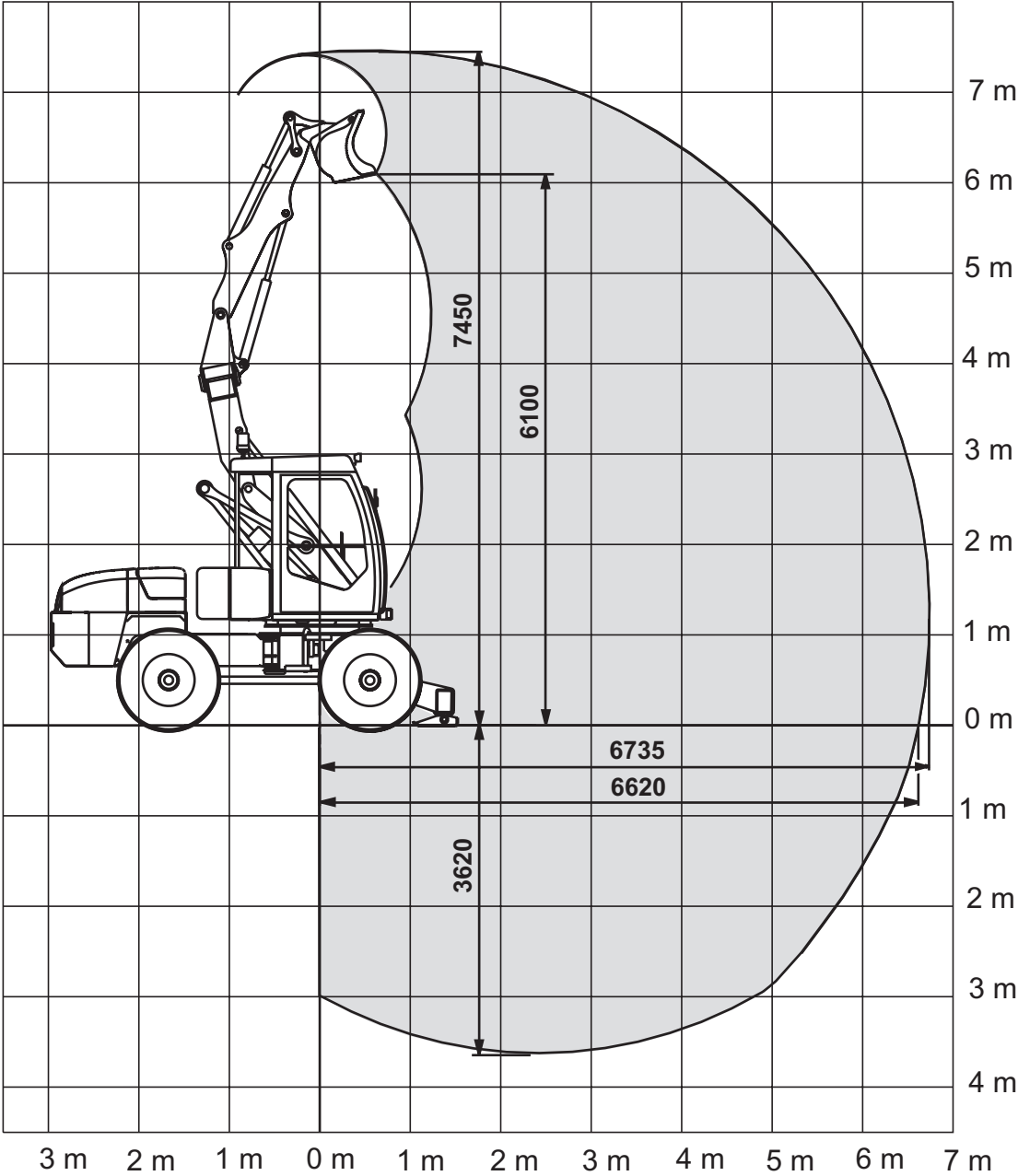
 - Fixed displacement gear pump:
 - Cubic capacity: 19 cm³
 - Maximum delivery: ~ 43 l/min
 - Maximum pressure: 175 bar
- **Slewing:**
 - Hydraulic motor: MSE05 with brake F07
 - Maximum pressure: 230 bar
 - Cubic capacity: 750 cm³
 - Slewing internal (balls) crown wheel with remote greasing.
 - Rotation speed: 8 rpm
- **Hydraulic filtration:**
 - on return circuit for the equipment (10 μ).
 - on booster pump circuit for travel (10 μ).
- **Paint:**
 - Polyurethane paint: Grey VOLVO 80BR3
 - Polyurethane paint: Yellow VOLVO 80BR3
 - Solidifying agent: DT6
 - Thinner (diluent): X400
 - Basic mixture ratios: 100 parts color to 30 parts solidifying agent, with 5 to 15 % thinner for total.

4. Equipment's travel curves

4.1 In back-hoe bucket position



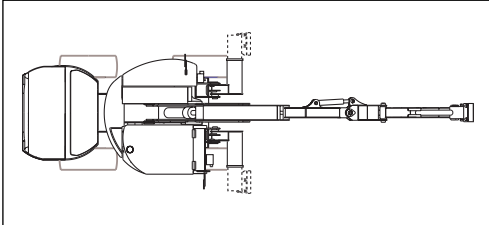
4.2 In loading bucket position



5. Table of stability loads in kg

5.1 Lifting and handling in the longitudinal position with standard or telescopic stabilizers

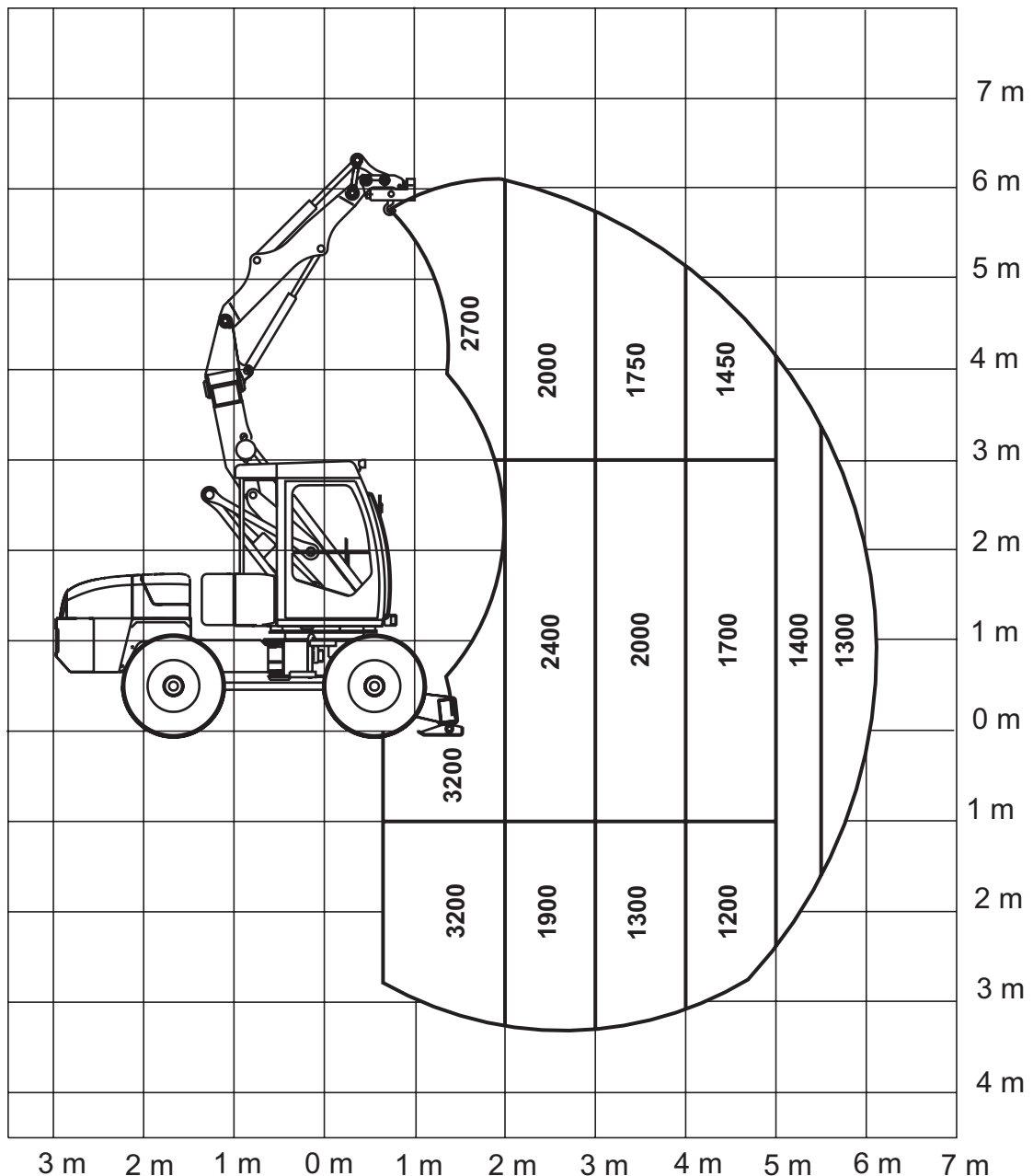
Working conditions:



- On wheels with the stabilizers.
- On level, compact ground.
- Equipment used without any offset.
- Front and rear chassis sections aligned.
- Without any tool (bucket, loader, etc.) with handling plate + hook.

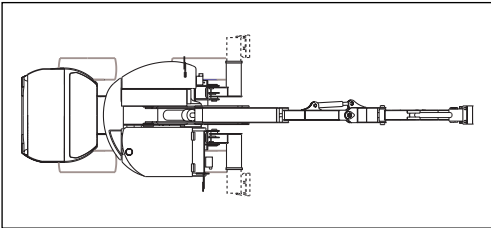


Stability loads and hydraulic limits according to standard ISO 10567.



5.2 Lifting and handling in the longitudinal position without stabilizers

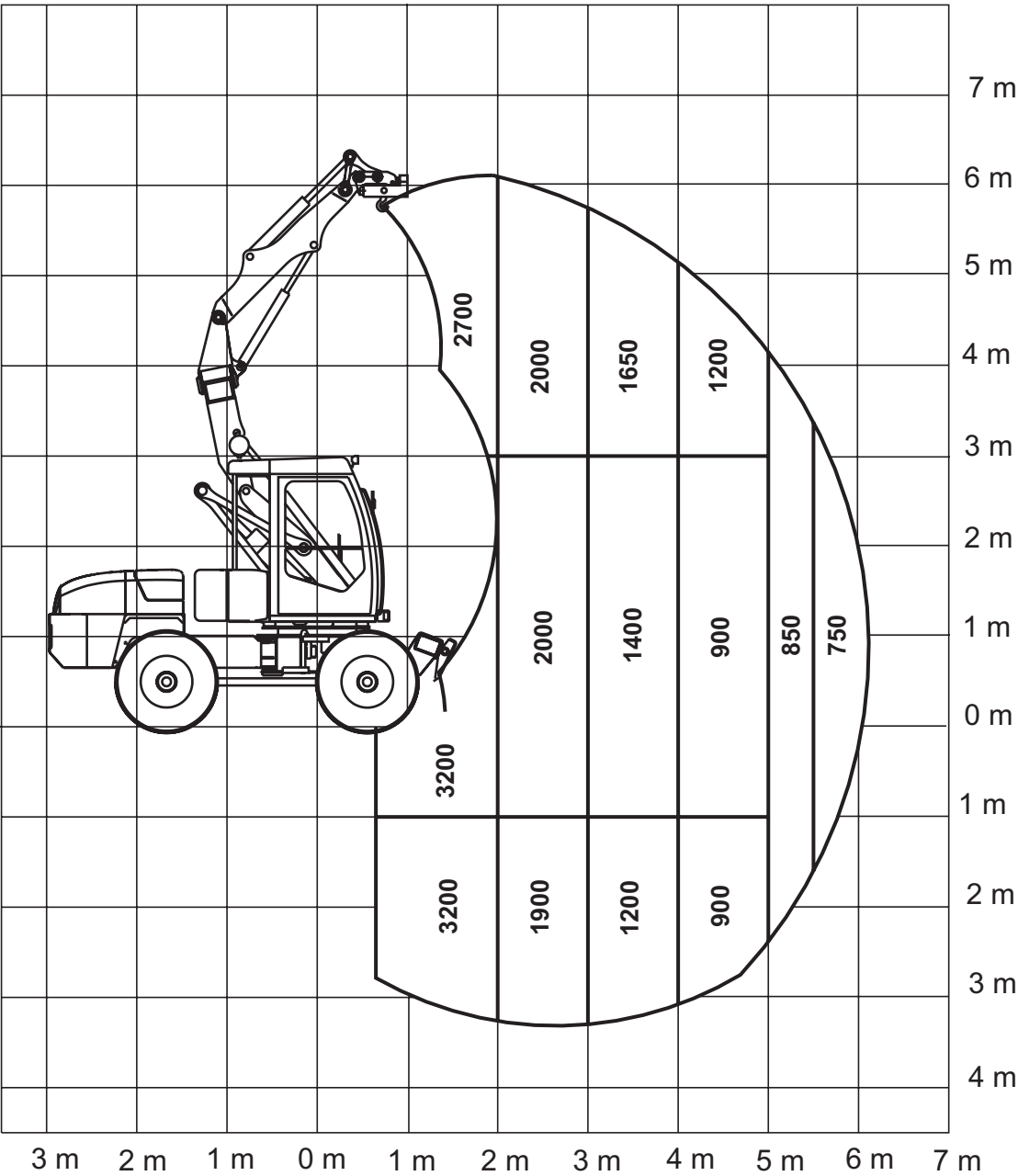
Working conditions:



- On wheels without the stabilizers.
- On level, compact ground.
- Equipment used without any offset.
- Front and rear chassis sections aligned.
- Without any tool (bucket, loader, etc.) with handling plate + hook.



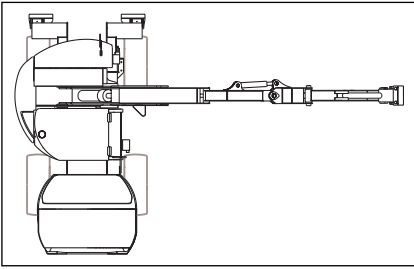
Stability loads and hydraulic limits according to standard ISO 10567.



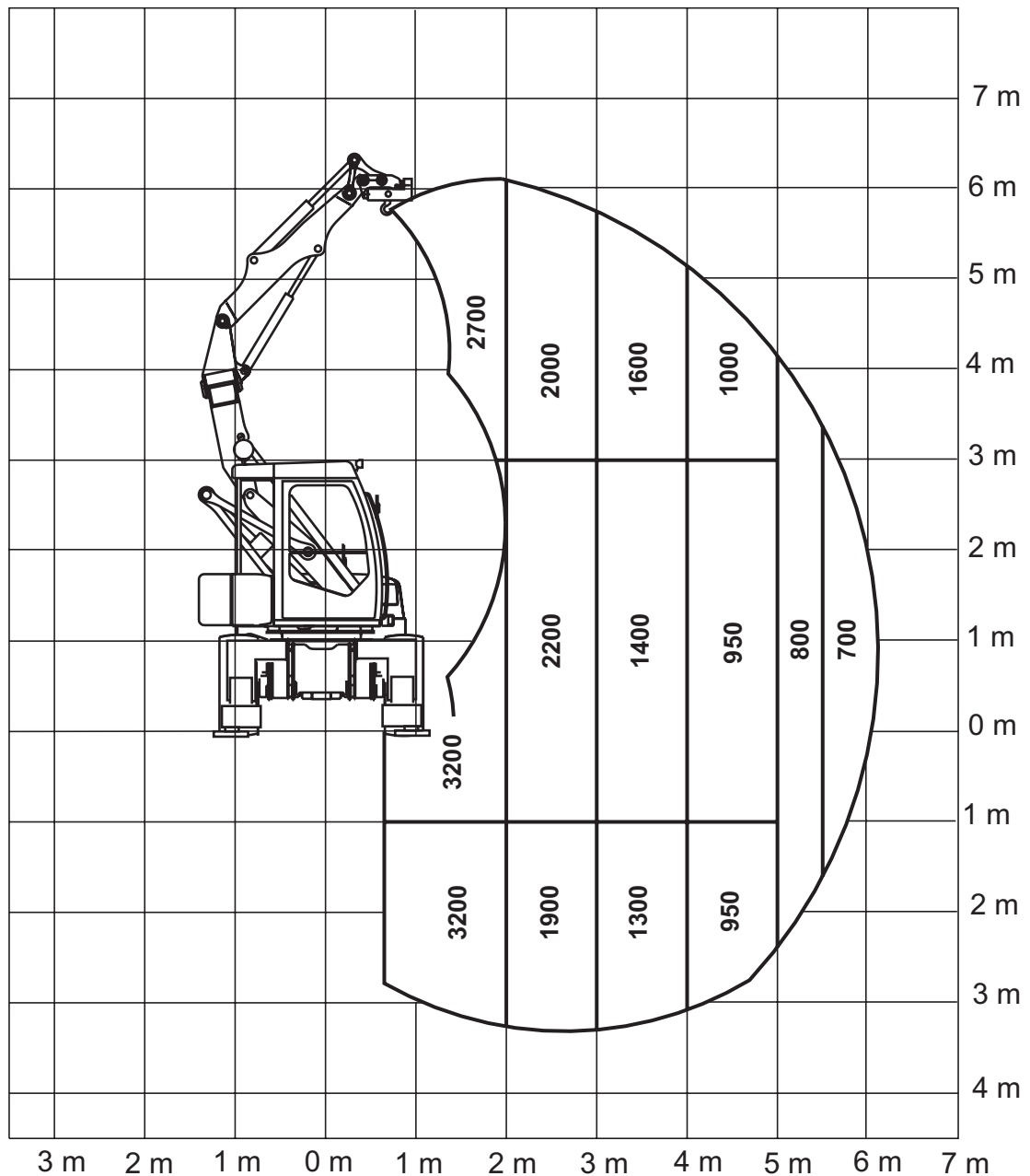
5.3 Lifting and handling in the transverse position with standard stabilizers

Working conditions:

- On wheels with the stabilizers.
- On level, compact ground.
- Equipment used without any offset.
- Front and rear chassis sections aligned.
- Rear axle oscillation locked.
- Without any tool (bucket, loader, etc.) with handling plate + hook.



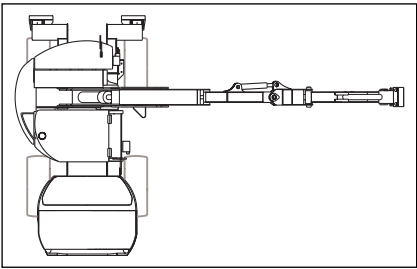
Stability loads and hydraulic limits according to standard ISO 10567.



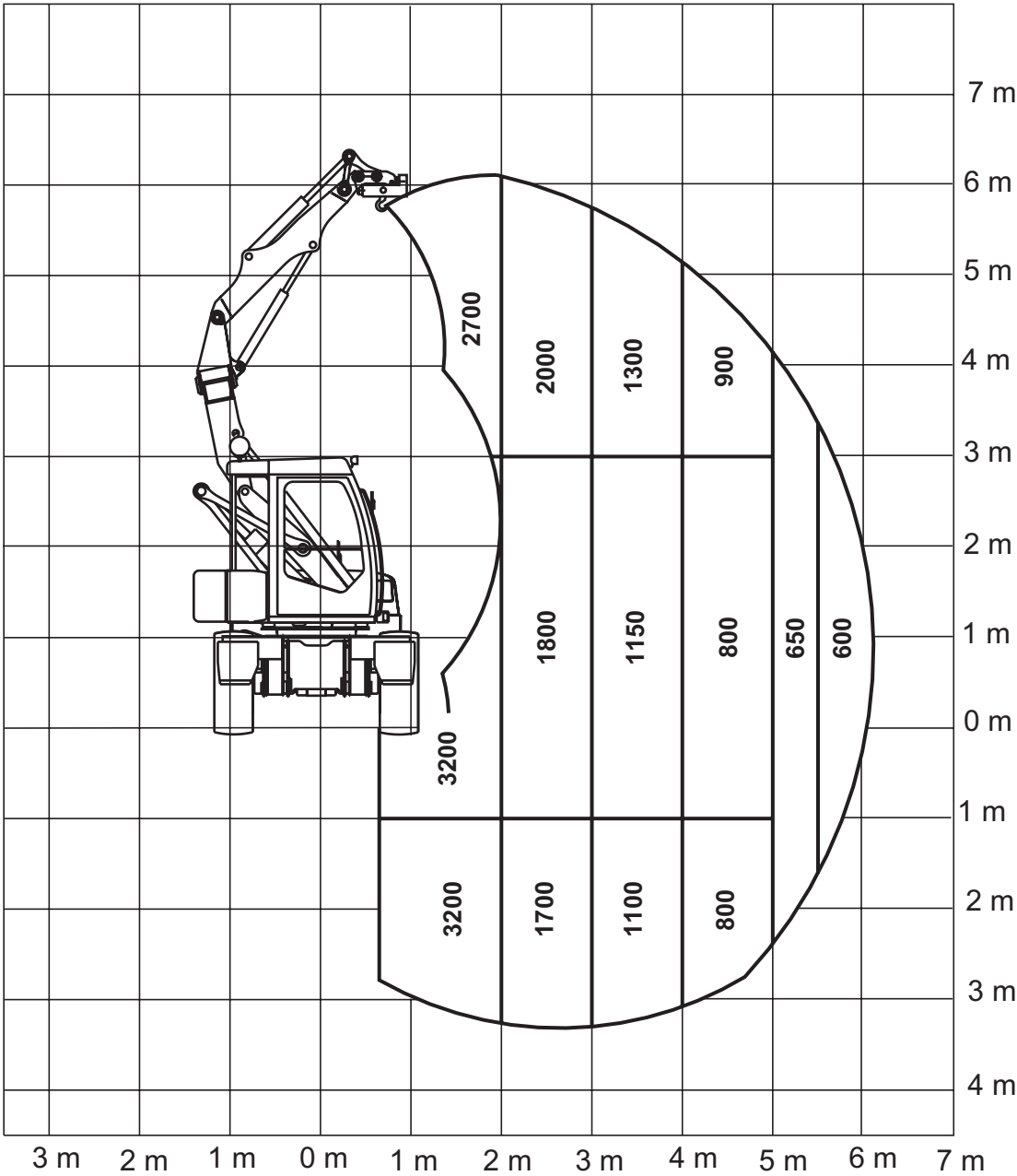
5.4 Lifting and handling in the transverse position without stabilizers

Working conditions:

- On wheels without the stabilizers.
- On level, compact ground.
- Equipment used without any offset.
- Front and rear chassis sections aligned.
- Rear axle oscillation locked.
- Without any tool (bucket, loader, etc.) with handling plate + hook.



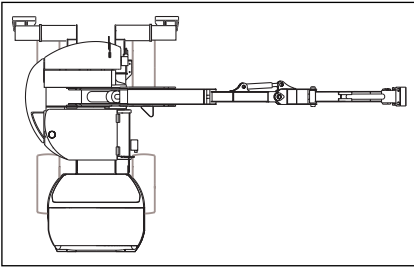
Stability loads and hydraulic limits according to standard ISO 10567.



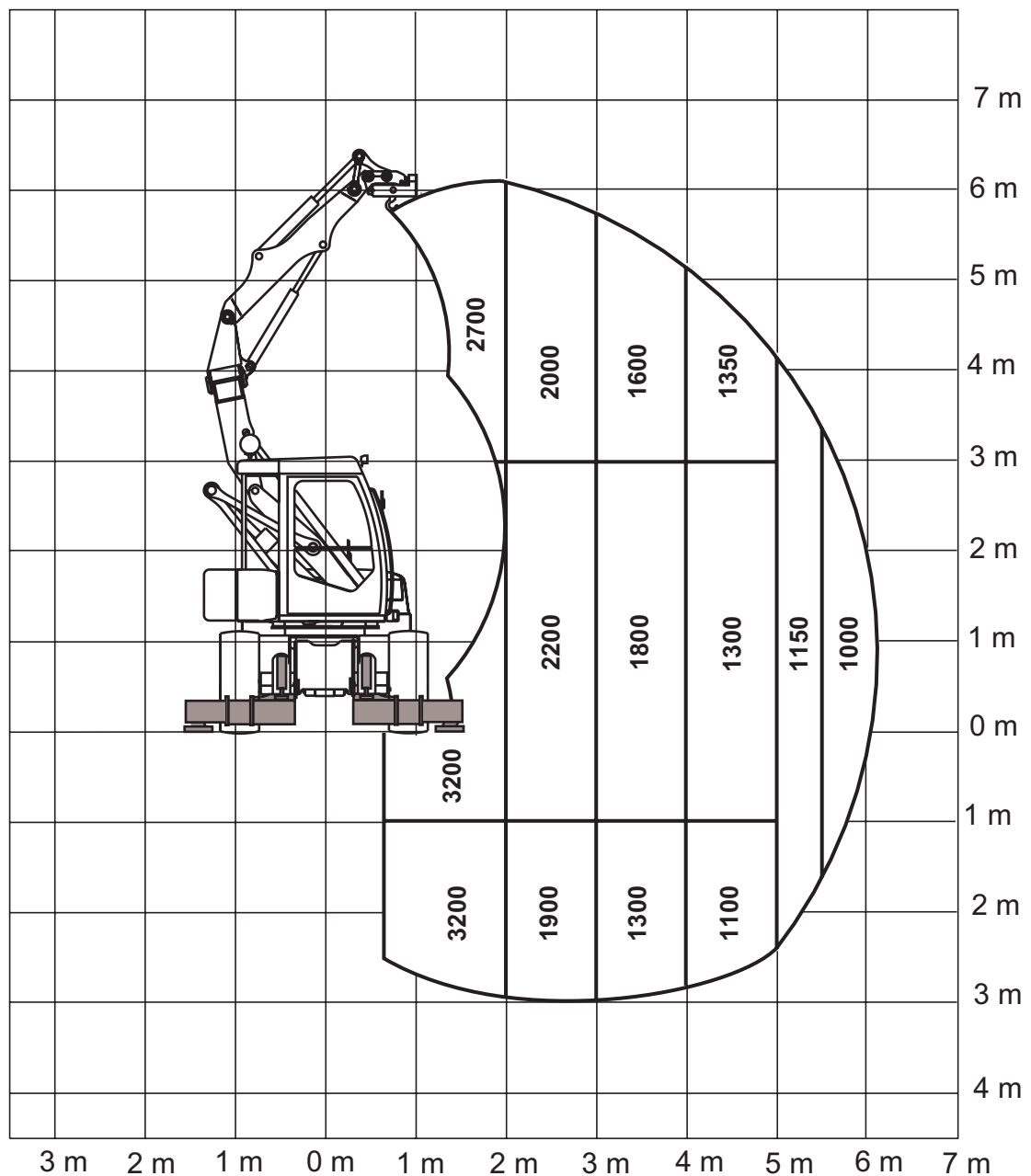
5.5 Lifting and handling in the transverse position with telescopic stabilizers

Working conditions:

- On wheels with the telescopic stabilizers fully extended.
- On level, compact ground.
- Equipment used without any offset.
- Front and rear chassis sections aligned.
- Rear axle oscillation locked.
- Without any tool (bucket, loader, etc.) with handling plate + hook.



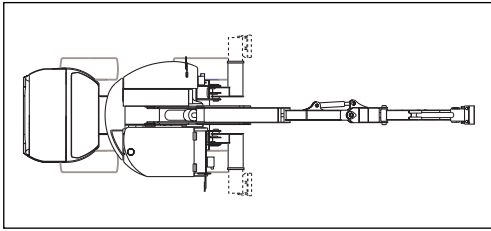
Stability loads and hydraulic limits according to standard ISO 10567.



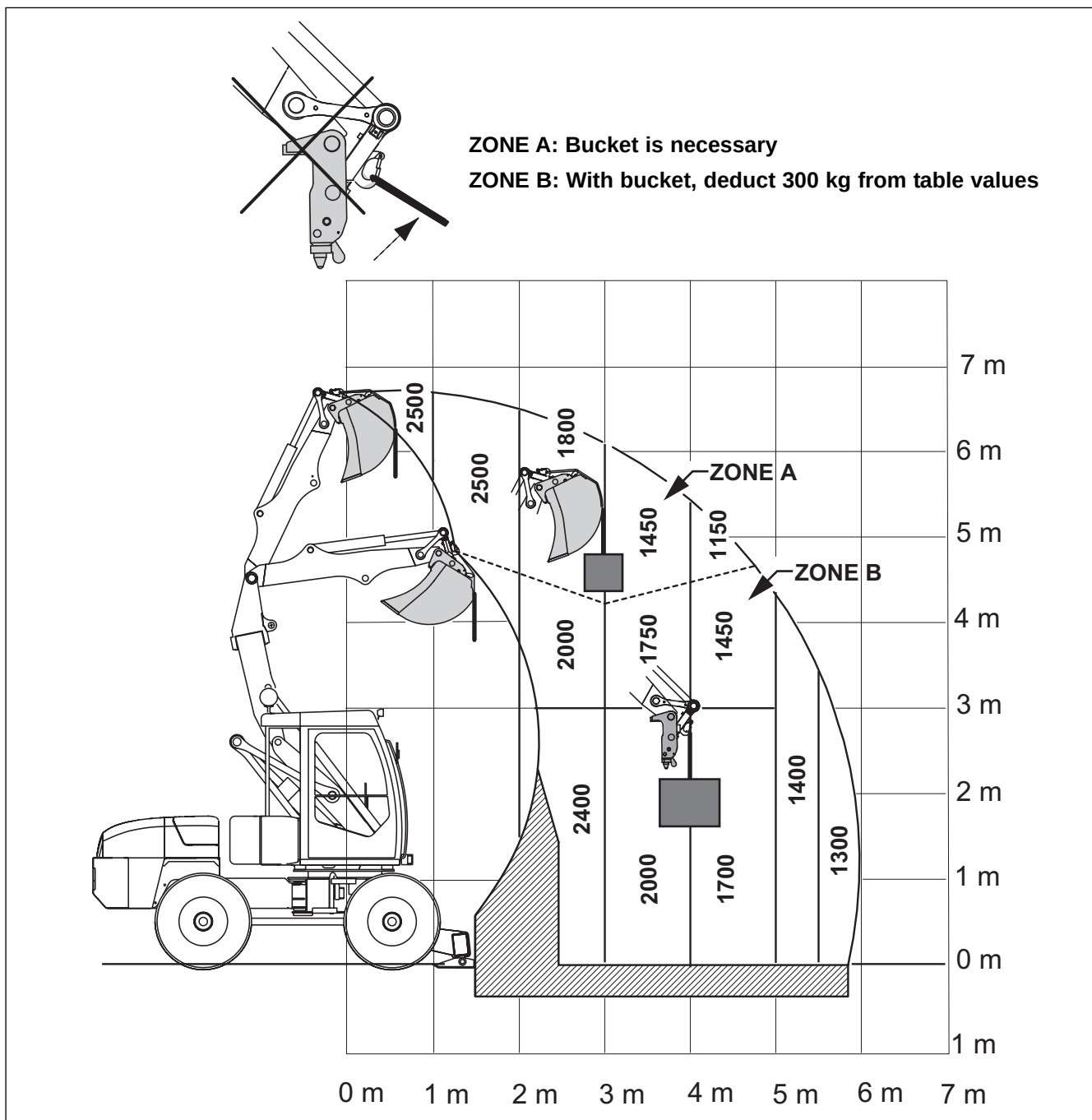
5.6 Lifting and handling in the longitudinal position with stabilizers

Working conditions:

- On level, compact ground.
- Equipment used without any offset.
- Front and rear chassis sections aligned.
- Without any tool (bucket, loader, etc.).
- **Bucket ram always full extended with hook fixed on tool-holder rod.**



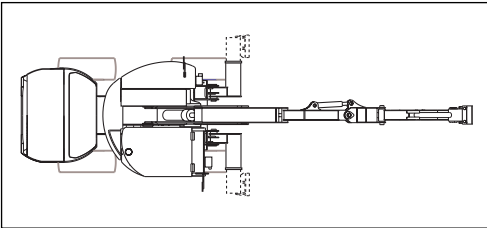
Stability loads and hydraulic limits according to standard ISO 10567.



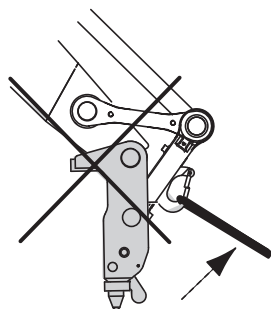
5.7 Lifting and handling in the longitudinal position without stabilizers

Working conditions:

- On level, compact ground.
- Equipment used without any offset.
- Front and rear chassis sections aligned.
- Without any tool (bucket, loader, etc.).
- **Bucket ram always full extended with hook fixed on tool-holder rod.**

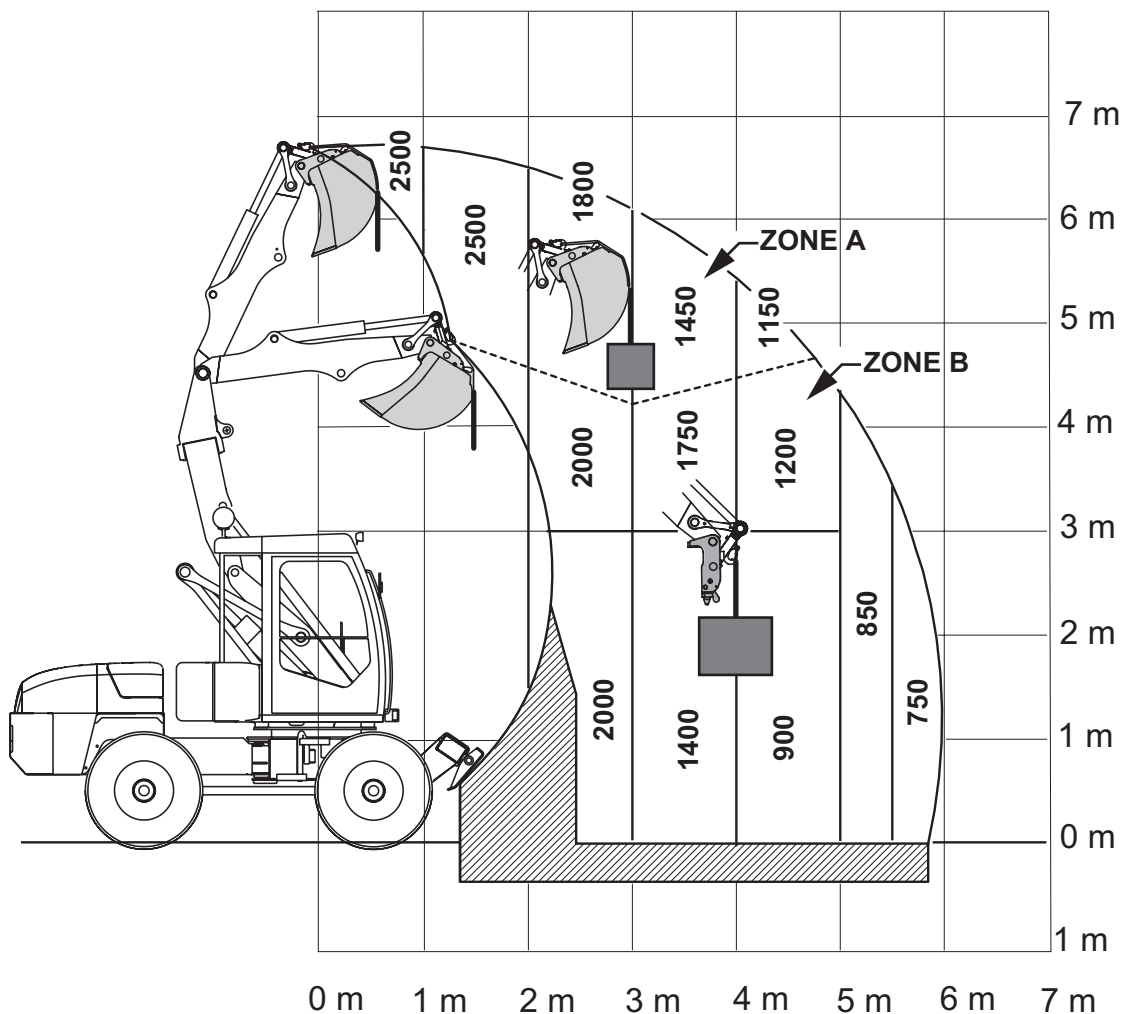


Stability loads and hydraulic limits according to standard ISO 10567.



ZONE A: Bucket is necessary

ZONE B: With bucket, deduct 300 kg from table values

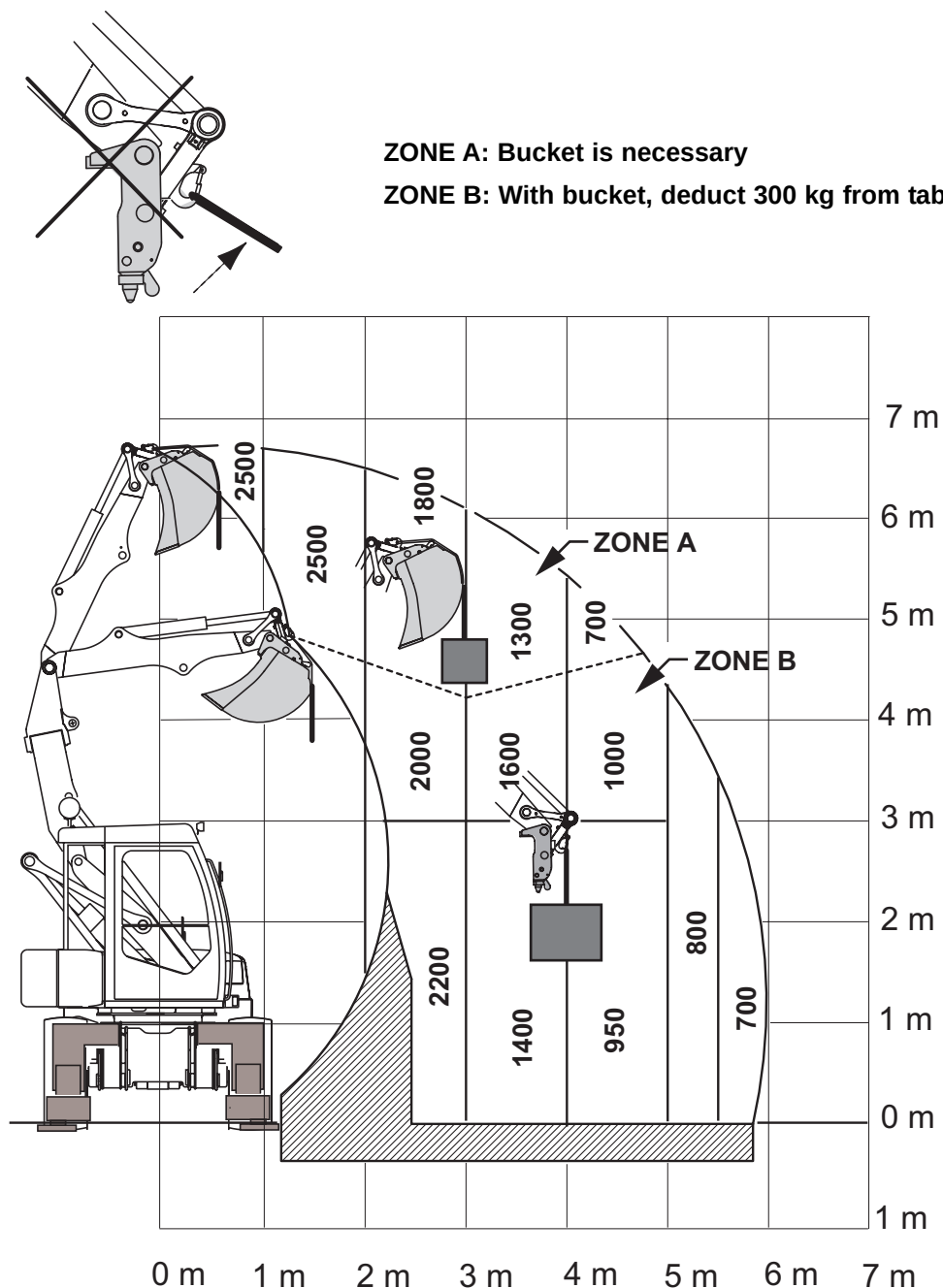


Working conditions:

- On level, compact ground.
- Equipment used without any offset.
- Front and rear chassis sections aligned.
- Rear axle oscillation locked.
- Without any tool (bucket, loader, etc.).
- **Bucket ram always full extended with hook fixed on tool-holder rod.**



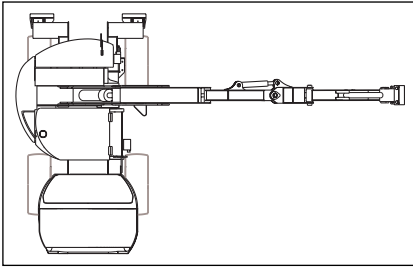
Stability loads and hydraulic limits according to standard ISO 10567.



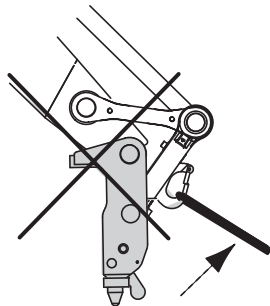
5.9 Lifting and handling in the transverse position without stabilizers

Working conditions:

- On level, compact ground.
- Equipment used without any offset.
- Front and rear chassis sections aligned.
- Rear axle oscillation locked.
- Without any tool (bucket, loader, etc.).
- **Bucket ram always full extended with hook fixed on tool-holder rod.**

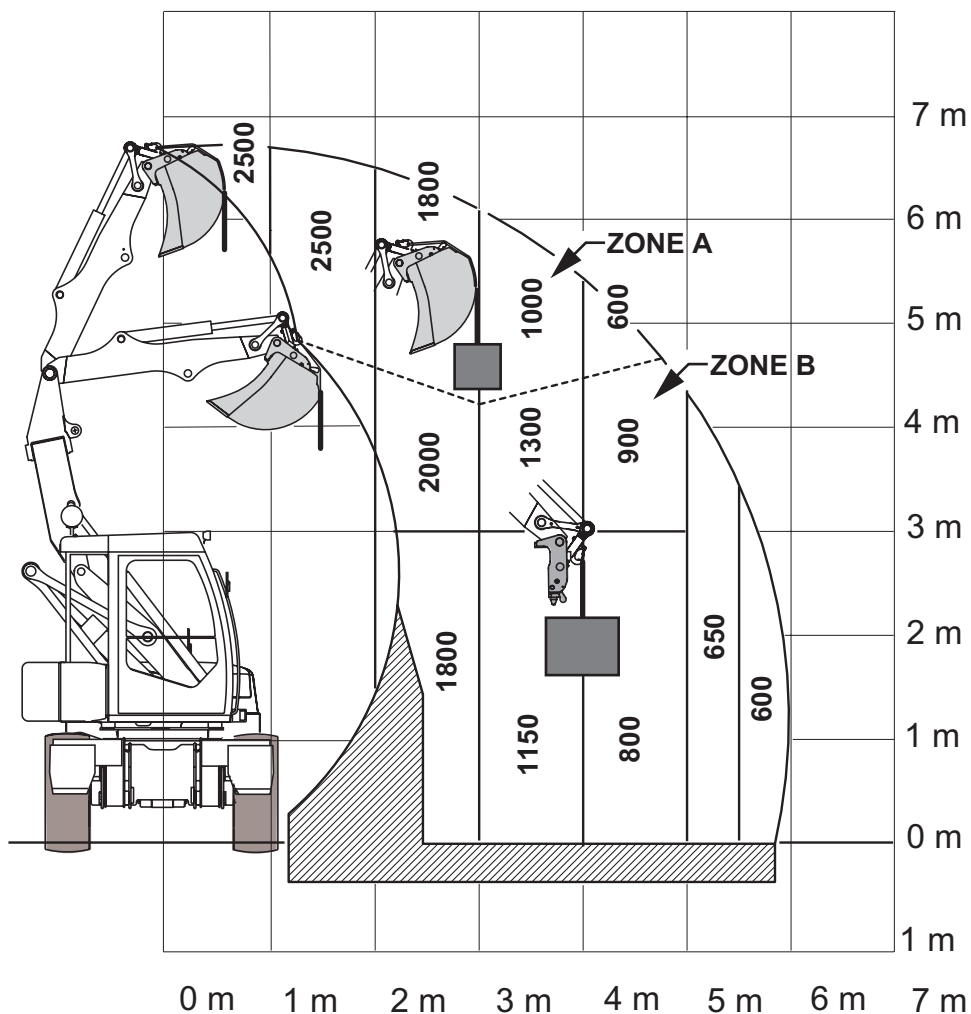


Stability loads and hydraulic limits according to standard ISO 10567.



ZONE A: Bucket is necessary

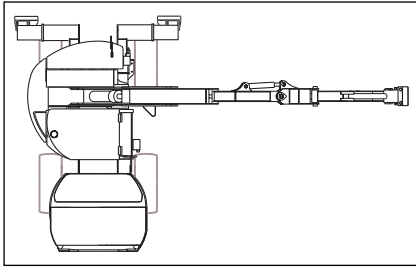
ZONE B: With bucket, deduct 300 kg from table values



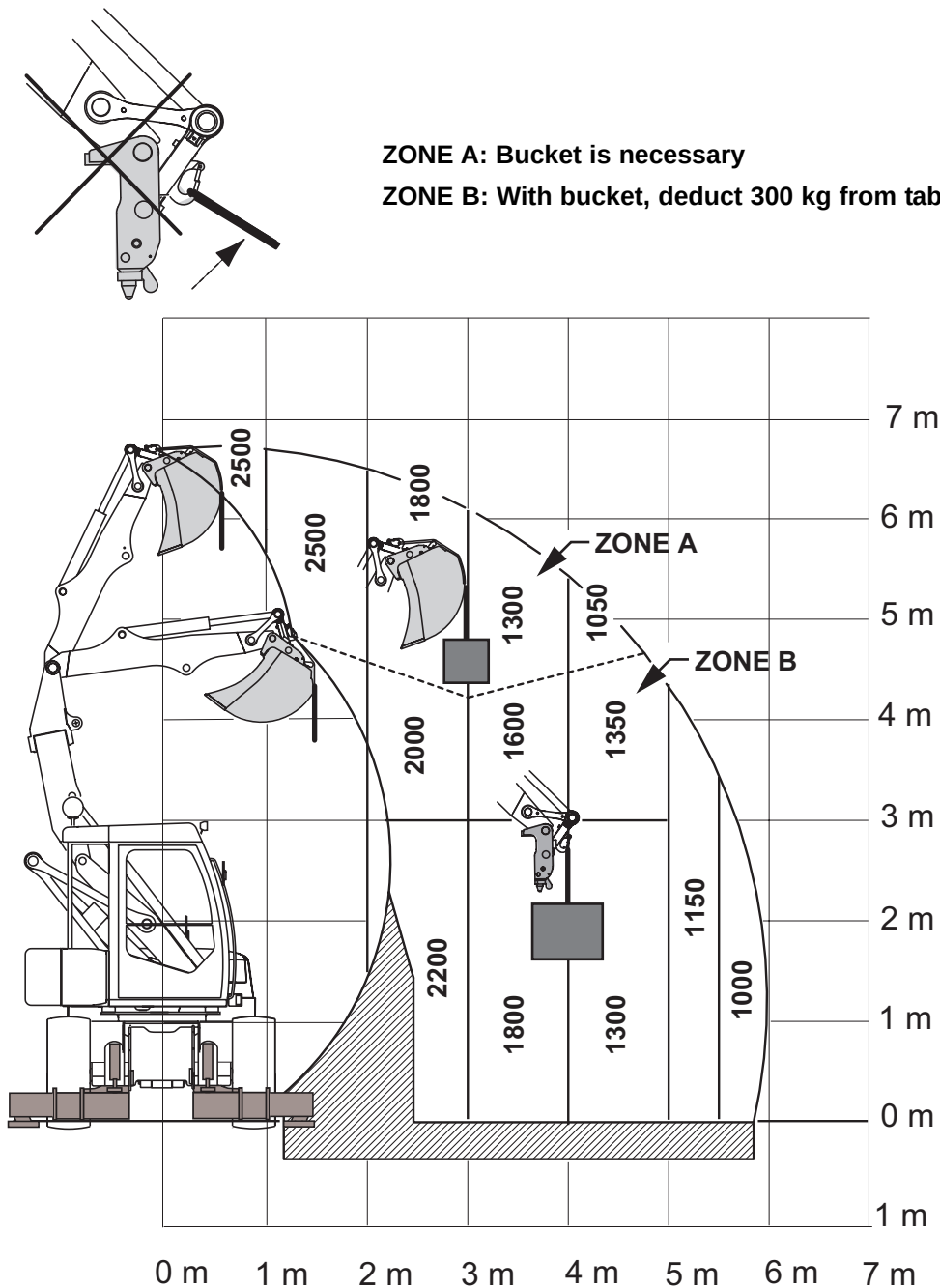
5.10 Lifting and handling in the transverse position with telescopic stabilizers

Working conditions:

- Telescopic stabilizers extended in maximum position.
- On level, compact ground.
- Equipment used without any offset.
- Front and rear chassis sections aligned.
- Rear axle oscillation locked.
- Without any tool (bucket, loader, etc.).
- **Bucket ram always full extended with hook fixed on tool-holder rod.**



Stability loads and hydraulic limits according to standard ISO 10567.



6. Towing

6.1 Disconnection of the hydrostatic travel

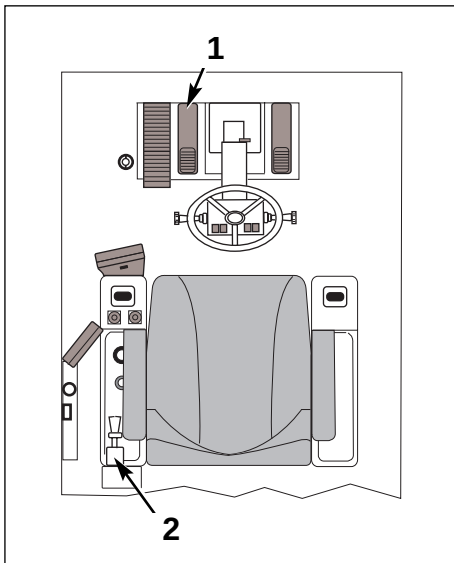


Fig. 1



Before carrying out any hydrostatic travel disconnecting operation, make sure that the parking brake is applied and that the tow bar is properly coupled to the towing vehicle.

- Apply the parking brake (2 fig. 1).
- Undo the heads of the limiters on the bypass valves (1 fig. 2) situated under the transfer movement pump 2 or 3 turns, using a 22 mm open-ended spanner.
- **Release the parking brake only after connecting the machine to the tractor's towing bar.**



Note: If the accumulator pressure is not sufficient to release the parking brake, red indicator light (1 fig. 4), unscrew the ram rod's lock nut (1 fig. 3) using a 24 mm open-ended spanner in order to release the disc brakes.

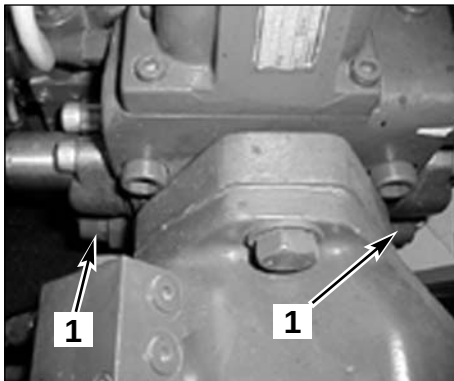


Fig. 2



When the hydrostatic travel is disconnected, the machine can be towed but the main brake (1 fig. 1) is no longer active.

- Once towing is complete, tighten the heads of the limiters on the bypass valves (1 fig. 2) as far as they will go using a 22 mm open-ended spanner.

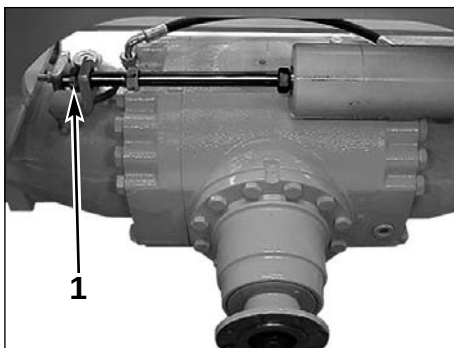


Fig. 3



Fig. 4

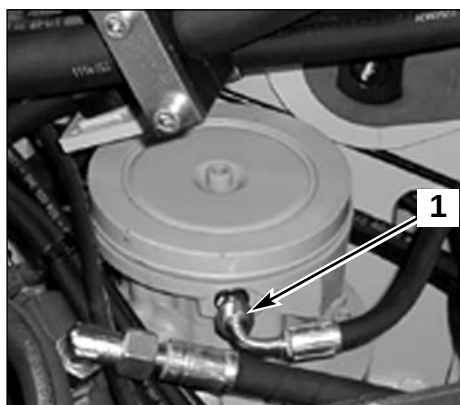


Fig. 5

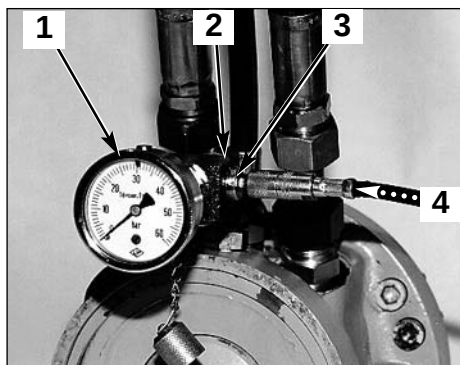


Fig. 6

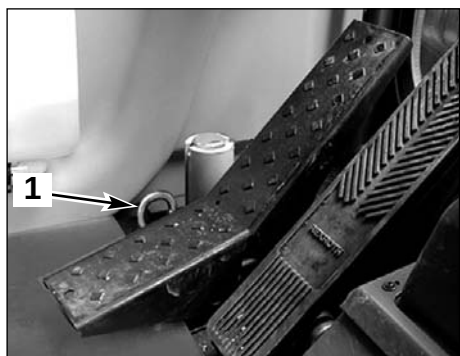


Fig. 7

6.2 If the turntable is badly oriented

The slewing motor is equipped with a safety brake which locks the turntable in the event of a power-assistance pressure fault, red warning light (1 fig. 4).

In this case, if the machine needs to be towed and if the turntable is incorrectly oriented, it is necessary to release the motor brake. To do this, use an ordinary grease gun and a 0 - 40 bar pressure gauge.

- Disconnect the supply to the brake (1 fig. 5).
- Fit a connecting block (2 fig. 6) equipped with a standard grease nipple (3 fig. 6).
- Make sure that the brake is filled with oil.
- Connect the grease gun (4 fig. 6).
- Operate the gun until the pressure gauge reads 30 bar (1 fig. 6).
- Align the turntable and lock it mechanically (1 fig. 7).
- Tow the machine.
- Cause the pressure to drop using the gun's grease nipple (3 fig. 6).
- Remove the connecting block (2 fig. 6).
- Reconnect the supply to the brake (1 fig. 5).



On sloping ground, brake release may well cause the turntable to rotate in an untimely manner. Lower the equipment to the ground before doing any manoeuvre.



Towing must be done at a very low speed (maximum 2 kph) and only to clear the way and get on or off the transporter (risk of damage to the hydraulic components if the speed and distance are too great).

7. Transporting the machine

7.1 Loading on a trailer

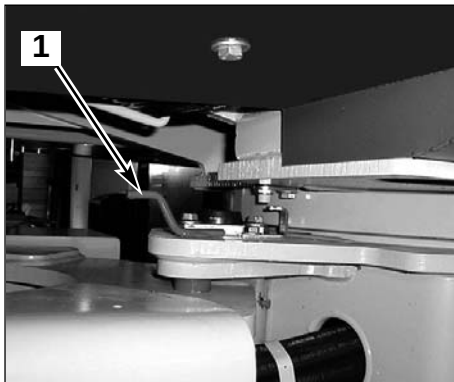


Fig. 1

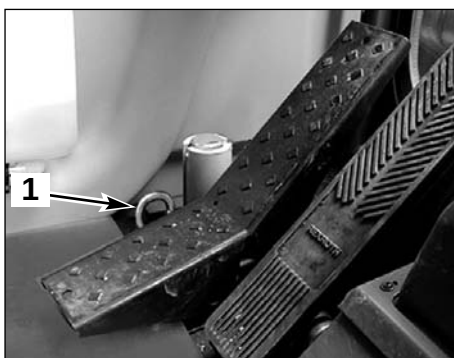


Fig. 2

- Install access ramps whose slope does not exceed 30% if the trailer is not equipped with them originally.
- Fastening points: (A-B-C fig. 3).
- Lock the chassis (1 fig. 1).
- Lock the turntable (1 fig. 2).
- Lower the equipment to the ground using the control manipulators (1 and 2 fig. 4).

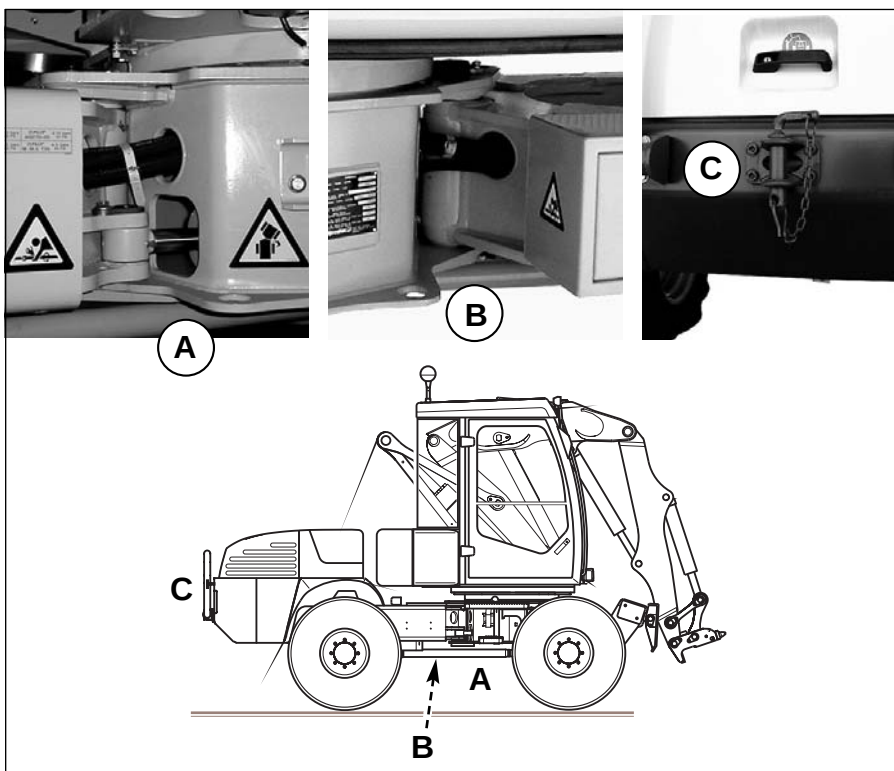


Fig. 3

7.2 Slings for lifting

- Put the equipment in the “boom ram vertical” position (2 fig. 4) and (fig. 6).
- Lock the oscillation (1 fig. 5). The machine will not be articulated.
- Lock the chassis sections using the links (1 fig. 1).
- Lock the turntable (1 fig. 2).



Note: If necessary, correct the machine's balance by adjusting the inclination of the boom ram (2 fig. 4).

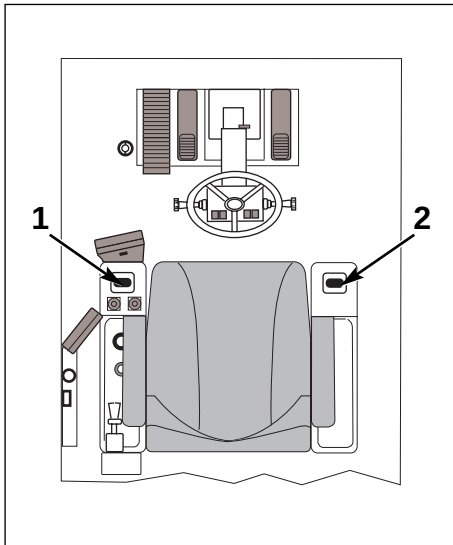


Fig. 4

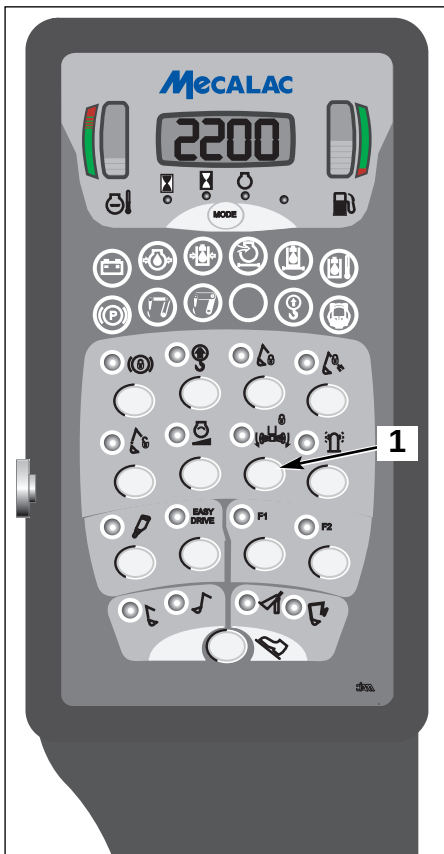


Fig. 5

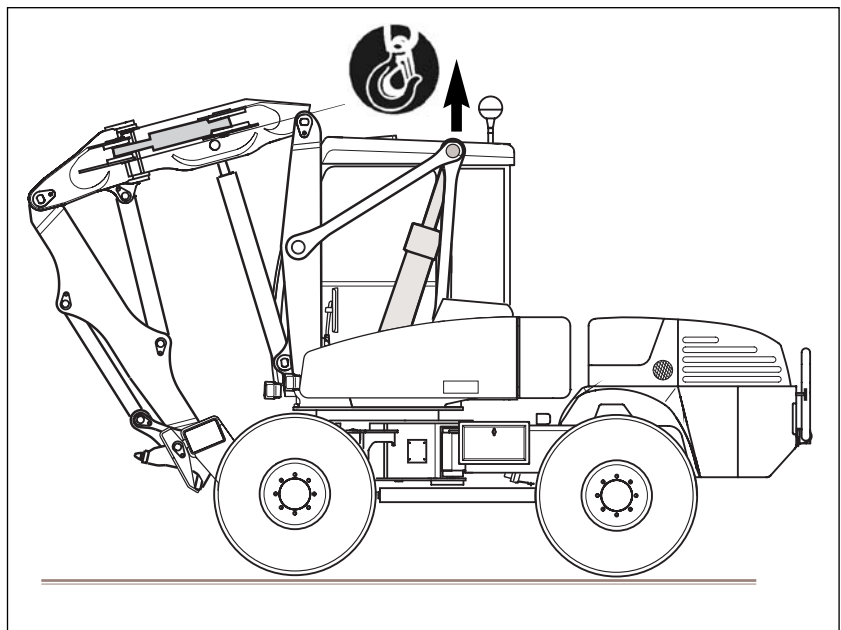
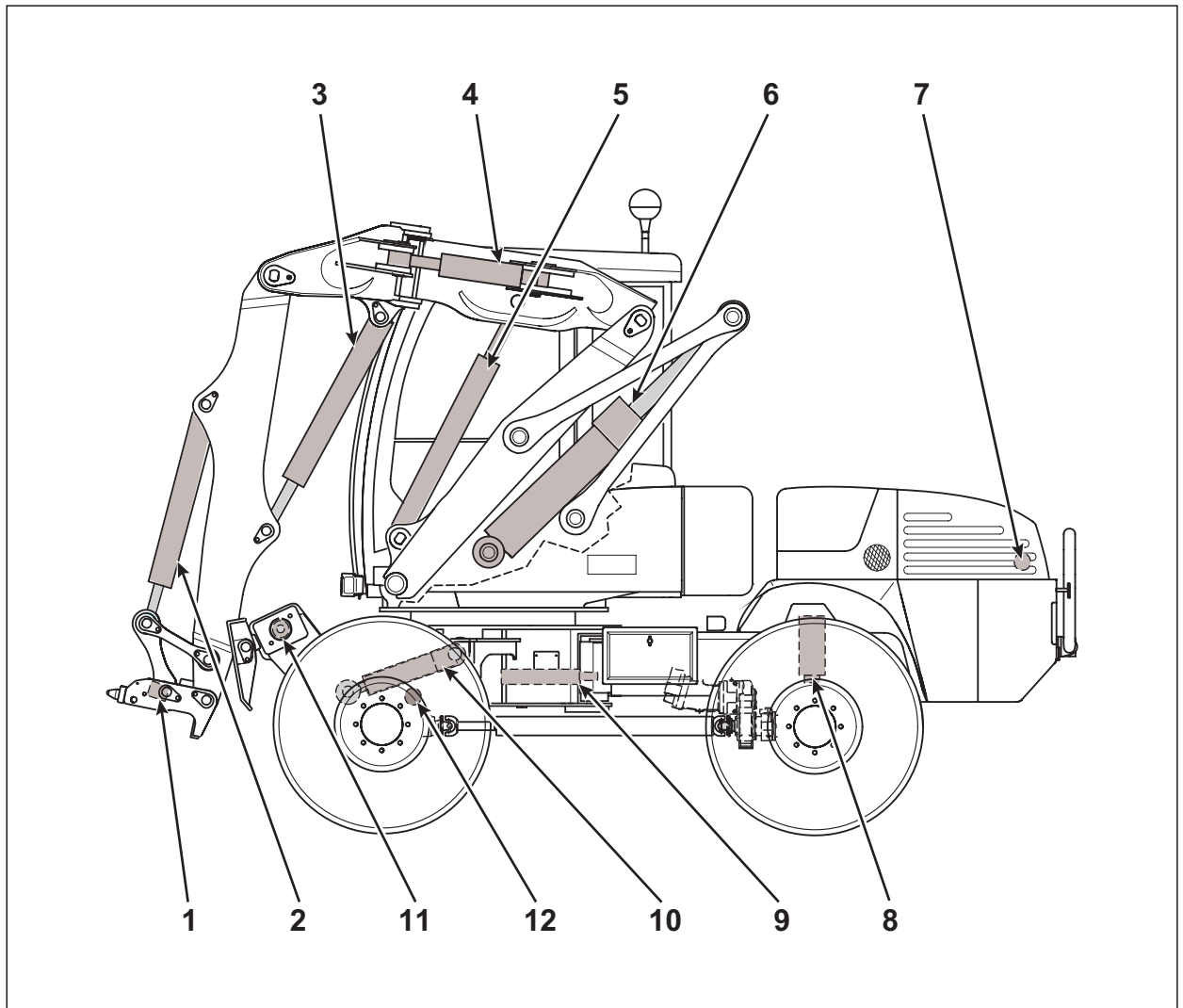
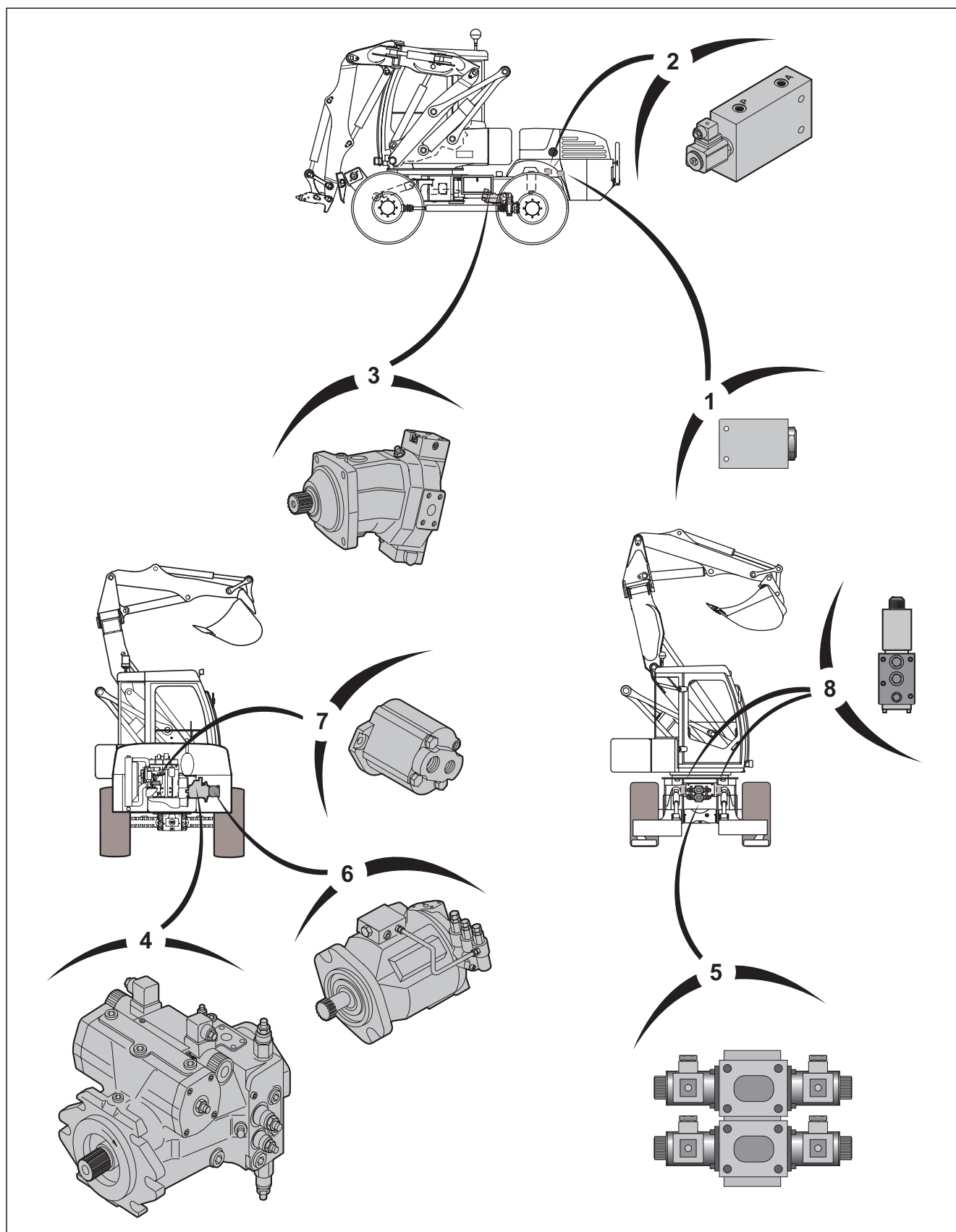


Fig. 6

8. Location of the hydraulic components

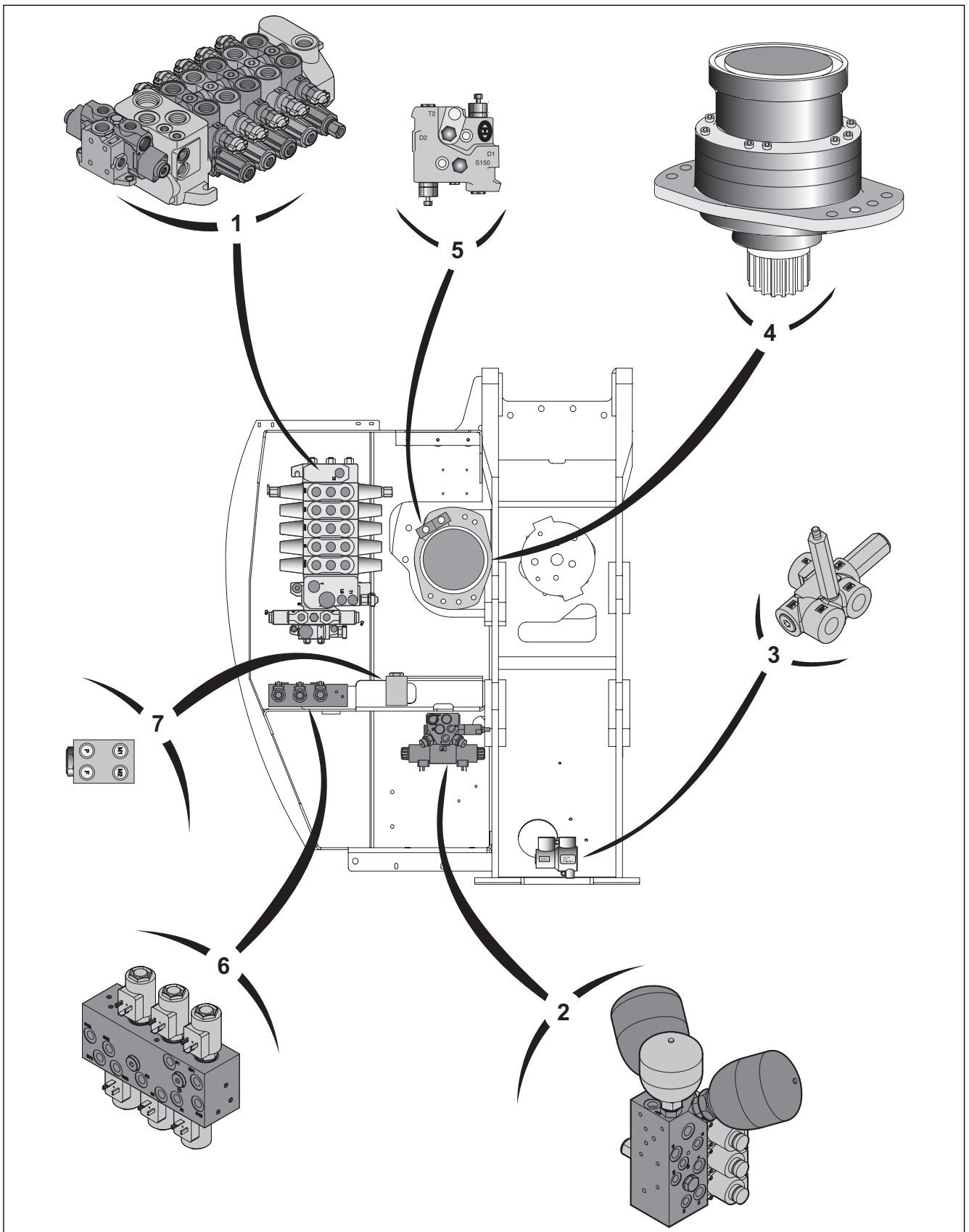


- | | |
|---------------------------|--------------------------------|
| 1 - Tool-holder ram | 7 - Accelerator ram |
| 2 - Bucket ram | 8 - Oscillation locking ram |
| 3 - Dipper ram | 9 - Steering ram |
| 4 - Offset ram | 10 - Stabilizer ram |
| 5 - Intermediate boom ram | 11 - Telescopic stabilizer ram |
| 6 - Boom ram | 12 - Parking brake ram |



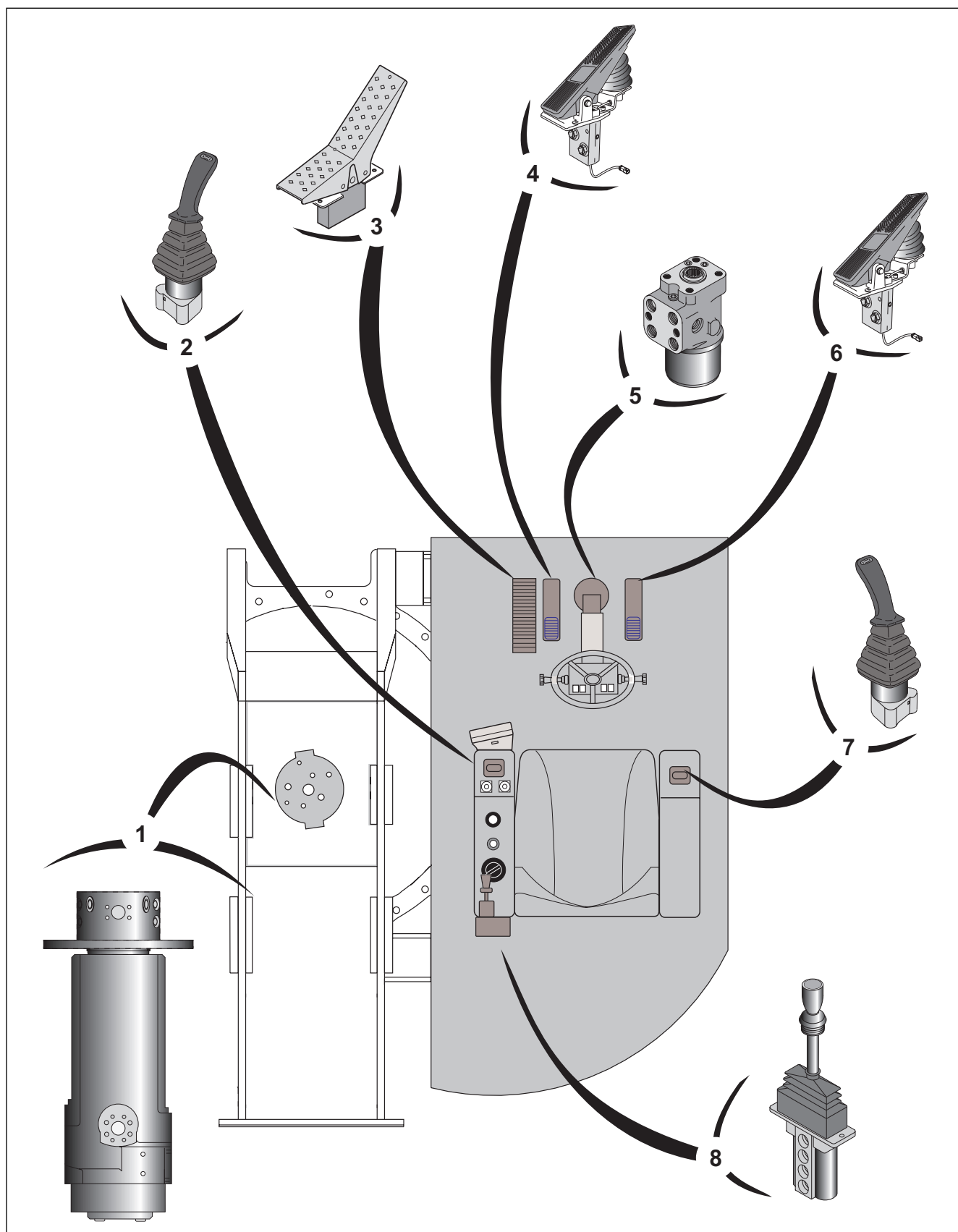
- 1 - Sequence valve
- 2 - Solenoid-operated oscillation locking valve
- 3 - Transfer movement engine
- 4 - Transfer movement pump

- 5 - Stabilizers solenoid-operated valve
- 6 - Equipment pump
- 7 - Orientation pump
- 8 - Telescopic stabilizer selector



- 1 - SX14 valve block
- 2 - High pressure function block
- 3 - Priority valve
- 4 - Orientation engine

- 5 - CROSS OVER valve
- 6 - Low pressure driving unit
- 7 - Braking block

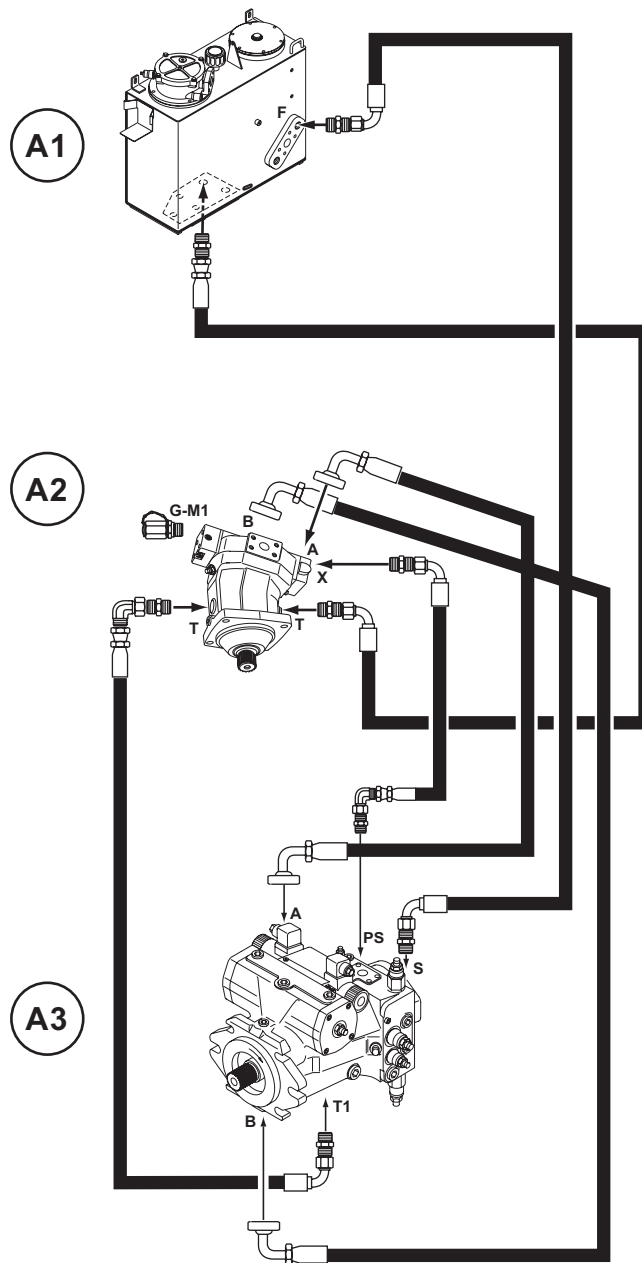


- 1 - Rotary coupling
- 2 - Left manipulator
- 3 - Additional functions foot control
- 4 - Brake / Inching foot control

- 5 - ORBITROL steering device
- 6 - Accelerator foot control
- 7 - Right manipulator
- 8 - Parking brake control lever

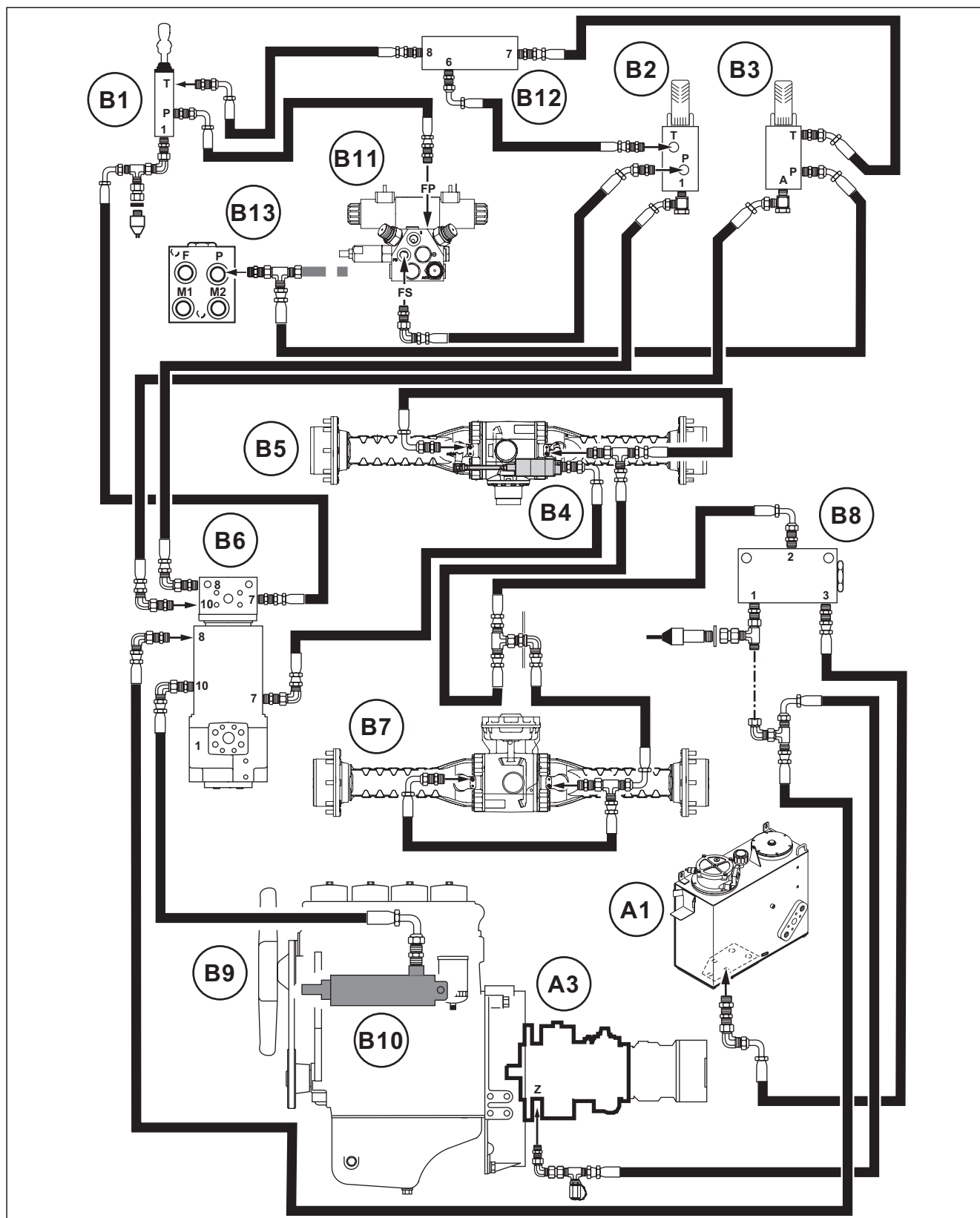
9. Hydraulic diagrams

9.1 Travel circuit



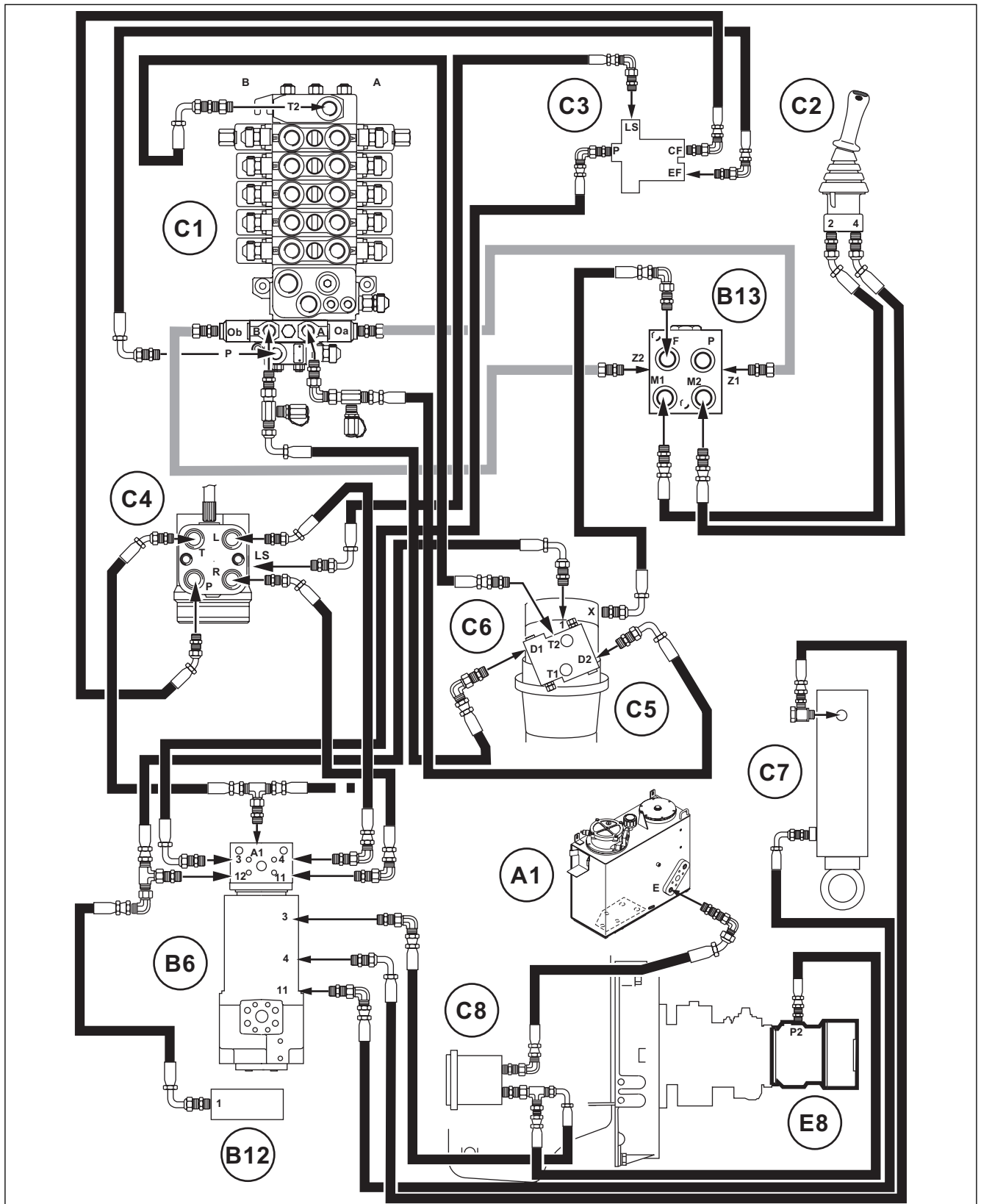
- A1 - Hydraulic reservoir
- A2 - Transfer movement engine
- A3 - Transfer movement pump

9.2 Accelerator, main and parking brake circuits



- | | |
|--------------------------------------|--|
| A1 - Hydraulic reservoir | B7 - Rear axle |
| A3 - Transfer movement pump | B8 - Sequence valve |
| B1 - Parking brake control | B9 - Diesel engine |
| B2 - Brake foot control | B10 - Accelerator ram |
| B3 - Accelerator foot control | B11 - Functions block (High pressure) |
| B4 - Parking brake ram | B12 - Drain block |
| B5 - Front axle | B13 - Turntable rotation |
| B6 - Rotary coupling | |

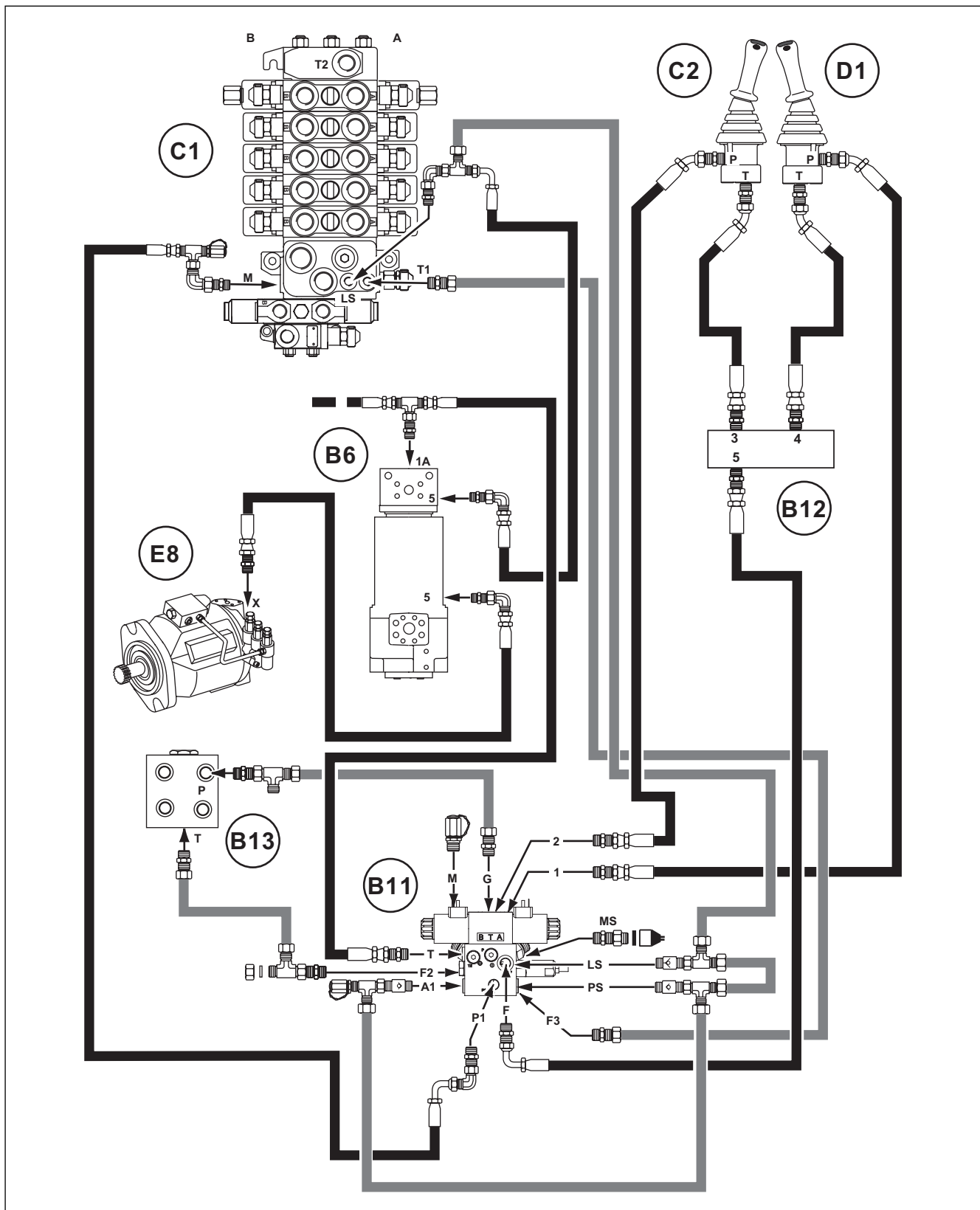
9.3 Steering and slewing circuits



- A1** - Hydraulic reservoir
- B6** - Rotary coupling
- B12** - Drain block
- B13** - Turntable rotation
- C1** - SX14 valve block
- C2** - Left manipulator
- C3** - Priority valve

- C4** - ORBITROL steering device
- C5** - Hydraulic turntable slewing motor
- C6** - CROSS OVER block with damped valve
- C7** - Steering ram
- C8** - Slewing pump
- E8** - Equipment pump

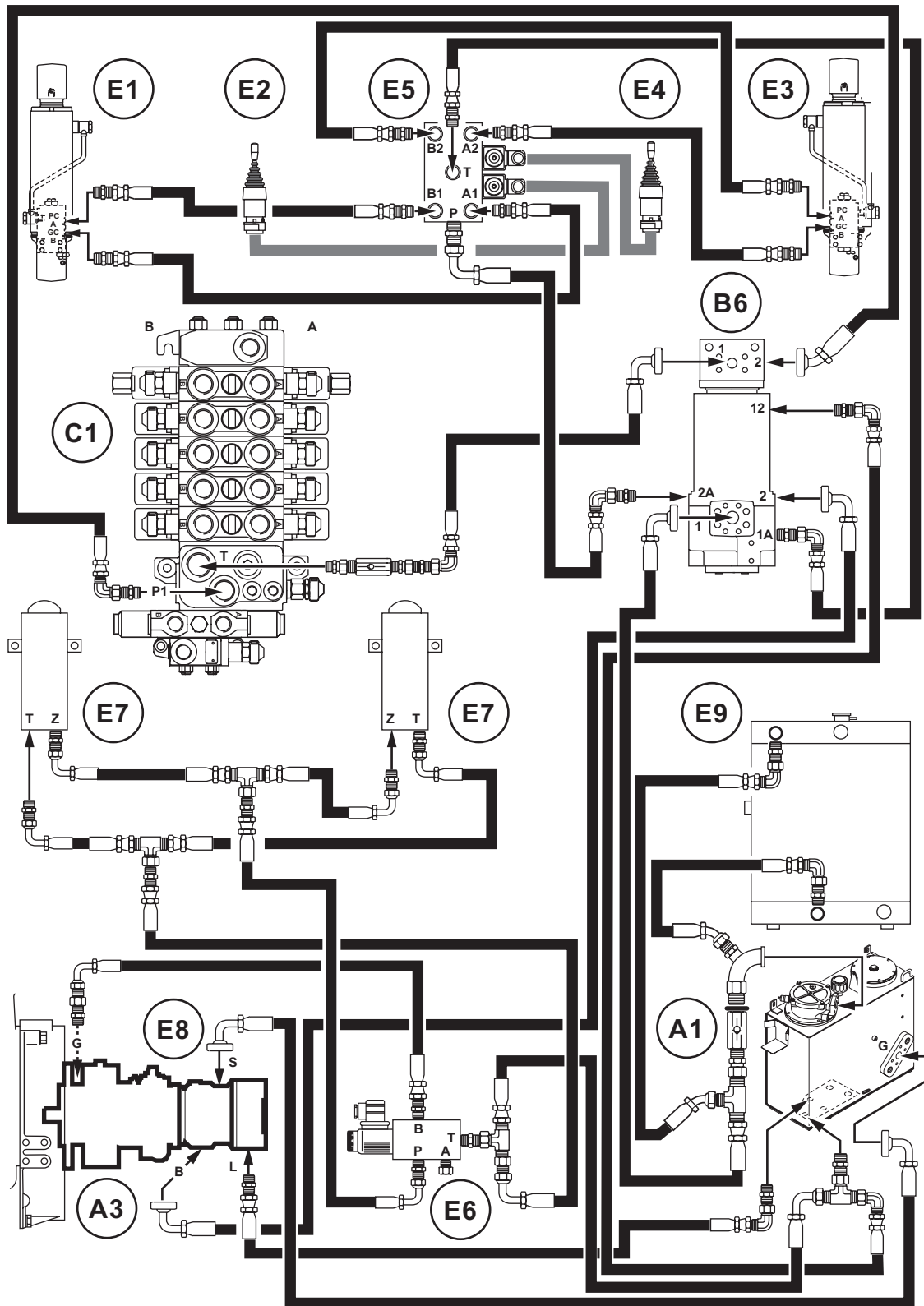
9.4 Turntable supply and return circuit



B6 - Rotary coupling
B11 - Functions block (High pressure)
B12 - Drain block
B13 - Turntable rotation

C1 - SX14 valve block
C2 - Left manipulator
D1 - Right manipulator
E8 - Equipment pump

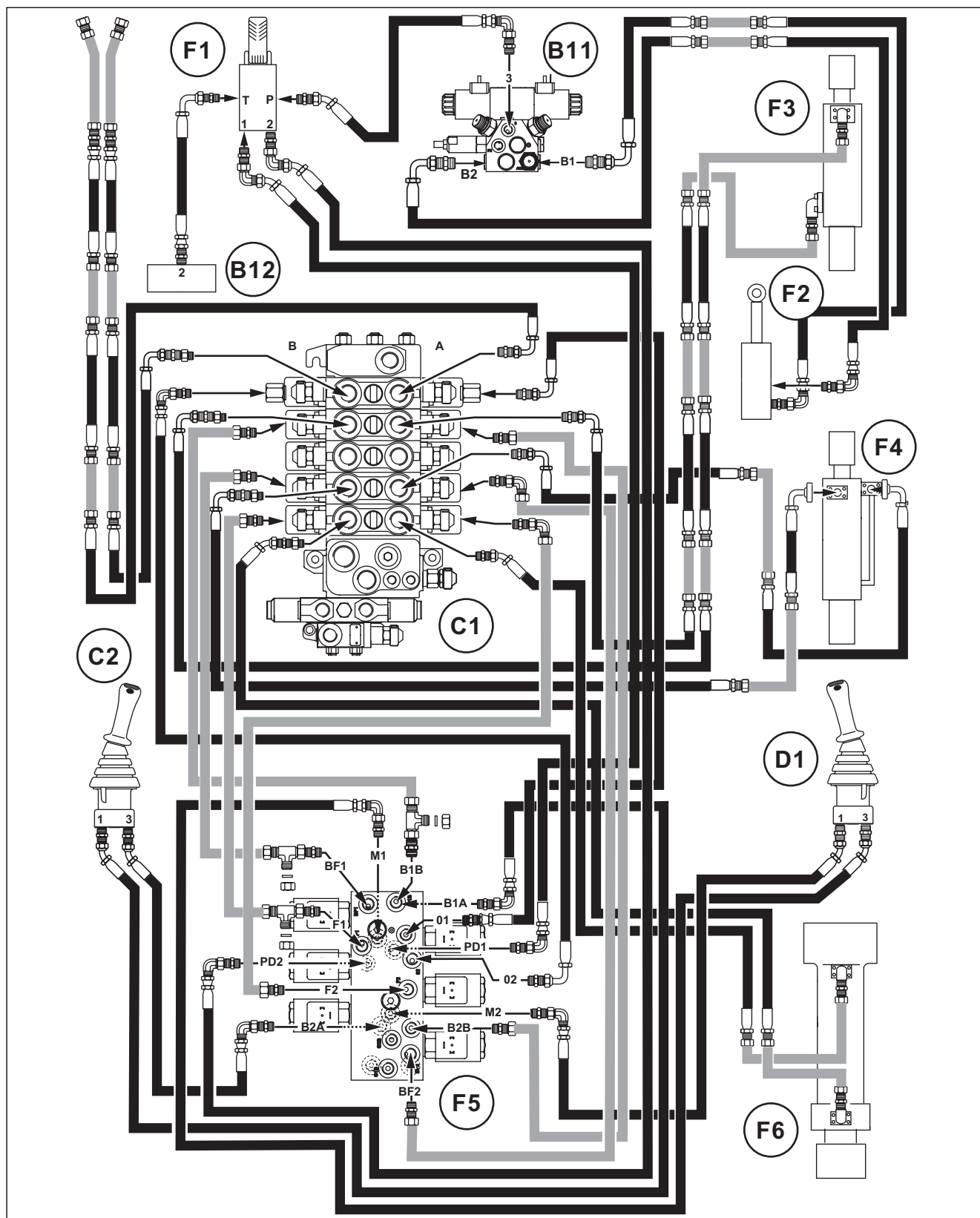
9.5 Equipment pump, stabilizers, Oscillation lock and cooling circuits



- A1** - Hydraulic reservoir
- A3** - Transfer movement pump
- B6** - Rotary coupling
- C1** - SX14 valve block
- E1** - Left stabilizer ram
- E2** - Left electric manipulator
- E3** - Right stabilizer ram

- E4** - Right electric manipulator
- E5** - Stabilizers solenoid-operated valve
- E6** - Oscillation lock piloting unit
- E7** - Oscillation lock rams
- E8** - Equipment pump
- E9** - Oil cooler

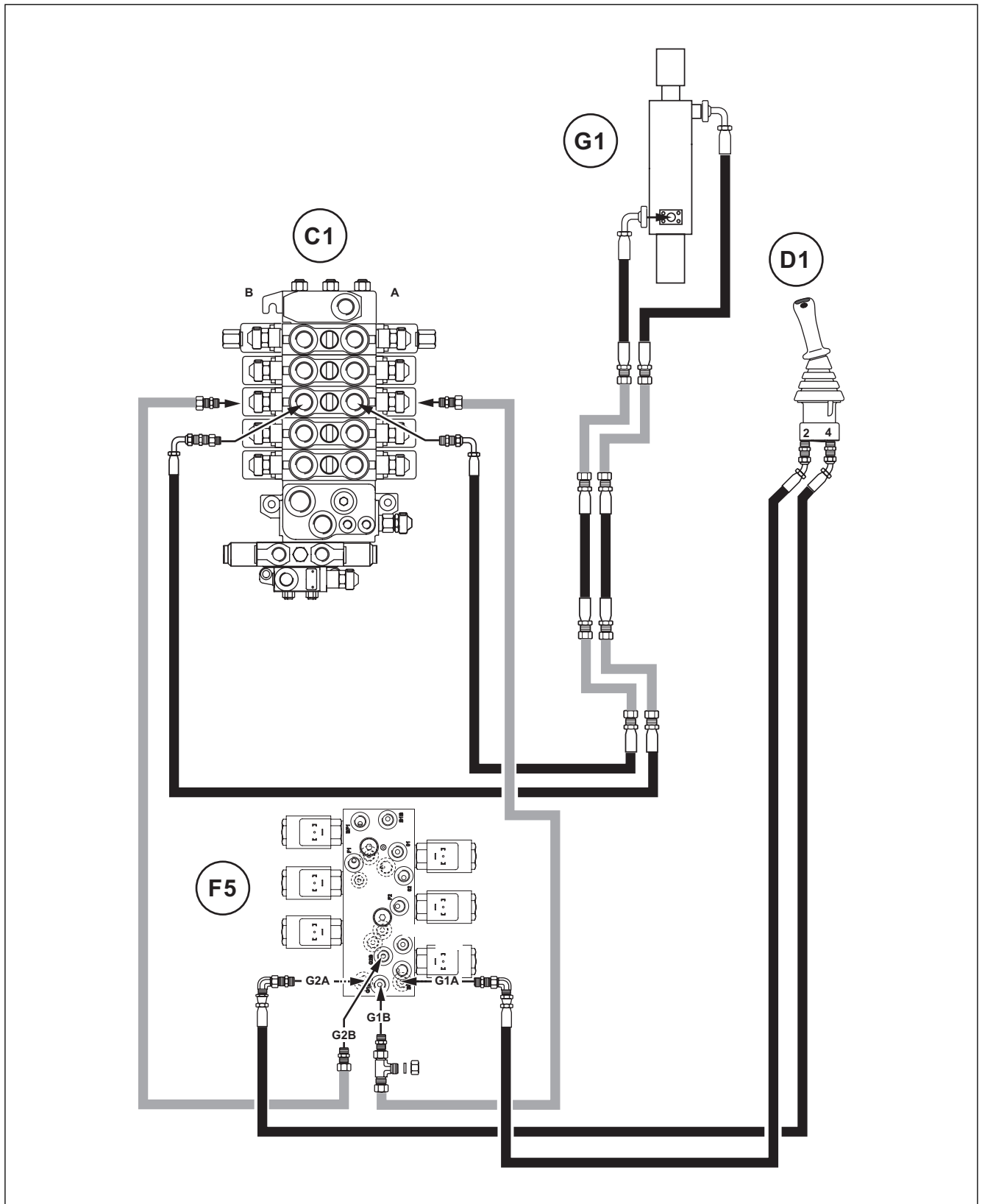
9.6 Boom, intermediate boom, dipper, offset and additional functions



B11 - Functions block (High pressure)
B12 - Drain block
C1 - SX14 valve block
C2 - Left manipulator
D1 - Right manipulator
F1 - Additional functions foot control

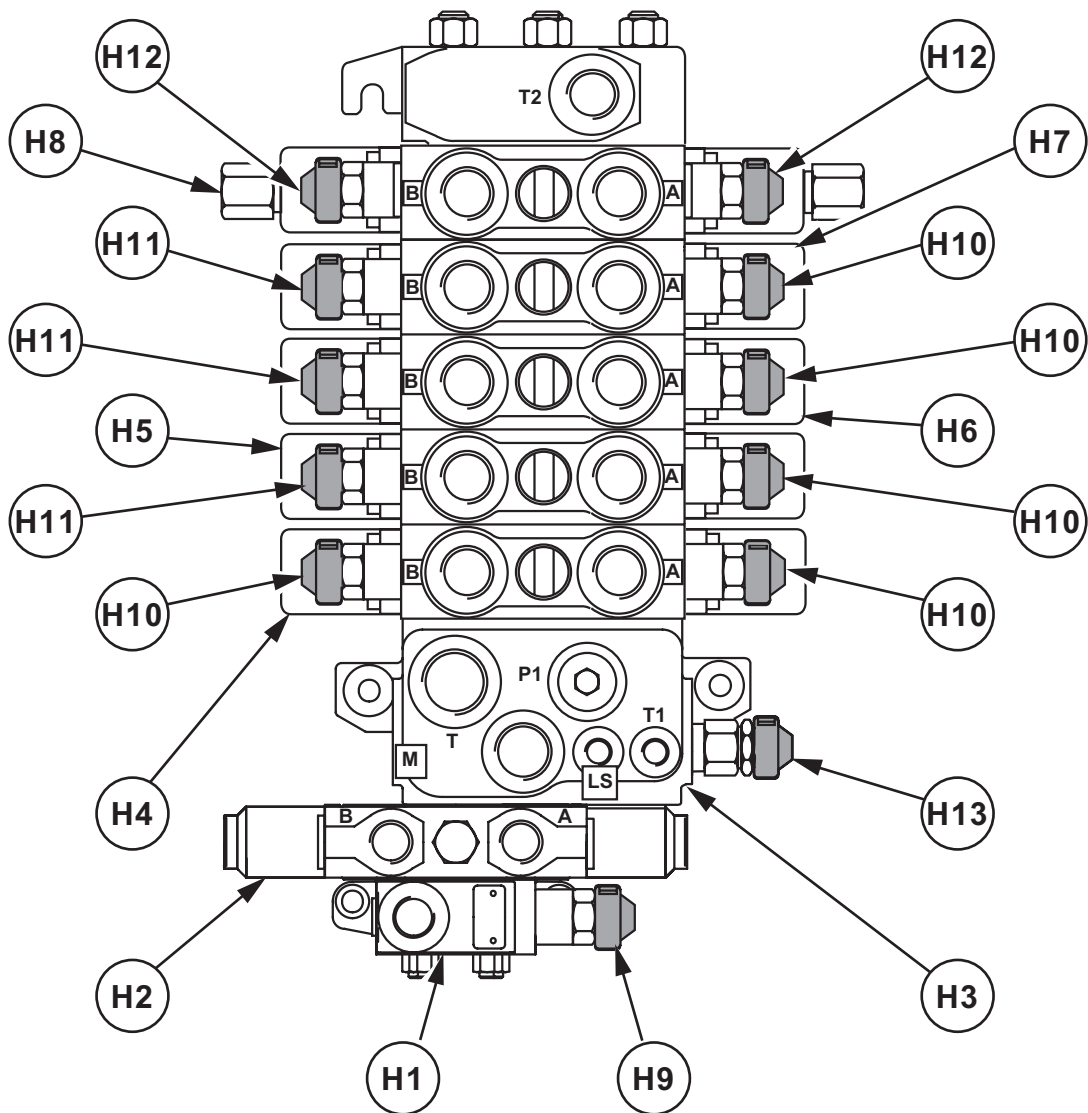
F2 - Offset ram
F3 - Dipper ram
F4 - Intermediate boom ram
F5 - Piloting unit (Low pressure)
F6 - Boom ram

9.7 Bucket circuit



- C1** - SX14 valve block
- D1** - Right manipulator
- F5** - Piloting unit (Low pressure)
- G1** - Bucket ram

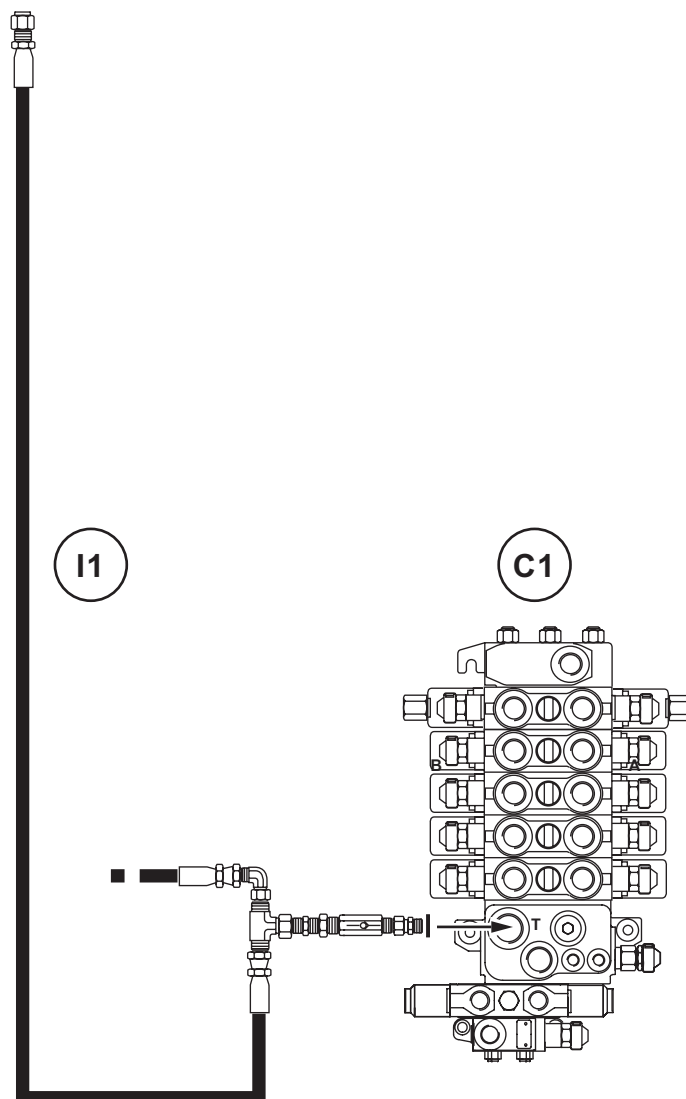
9.8 Spool valve (A / Down - B / Upper)



- H1** - Slewing supply inlet element
- H2** - Slewing control element
- H3** - Equipment supply inlet element
- H4** - Boom control element
- H5** - Intermediate boom control element
- H6** - Bucket control element
- H7** - Dipper control element

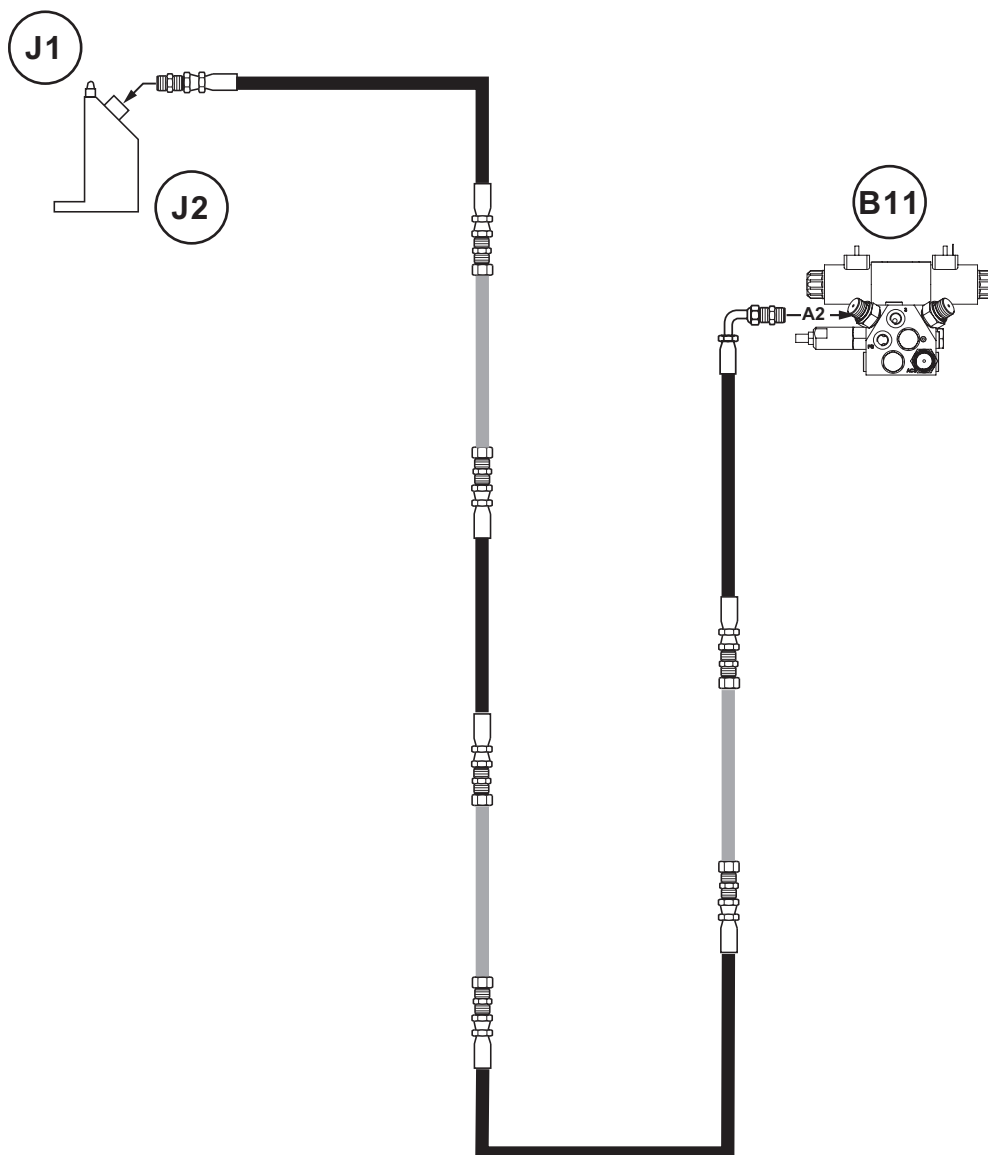
- H8** - "Additional functions" control element
- H9** - Pressure limiter (calibration 225 bar)
- H10** - Pressure limiter (calibration 400 bar)
- H11** - Pressure limiter (calibration 420 bar)
- H12** - Pressure limiter (calibration 180 bar)
- H13** - Pressure limiter (calibration 280 bar)

9.9 Additional hydraulic equipment for fitting of the hammer return on the equipment (option)



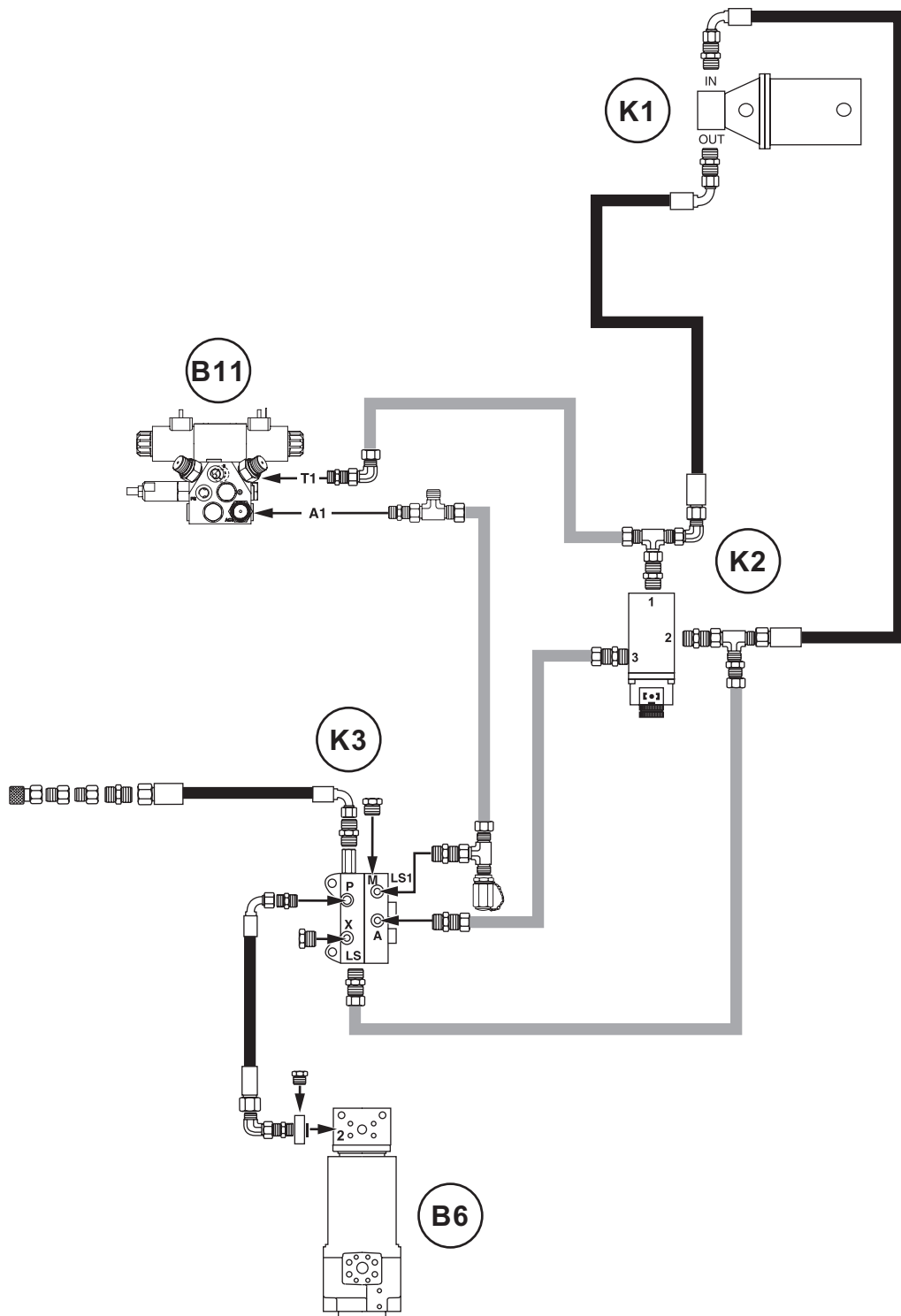
- C1** - SX14 valve block
- I1** - Hammer return hose

9.10 Tool-holder circuit (option)



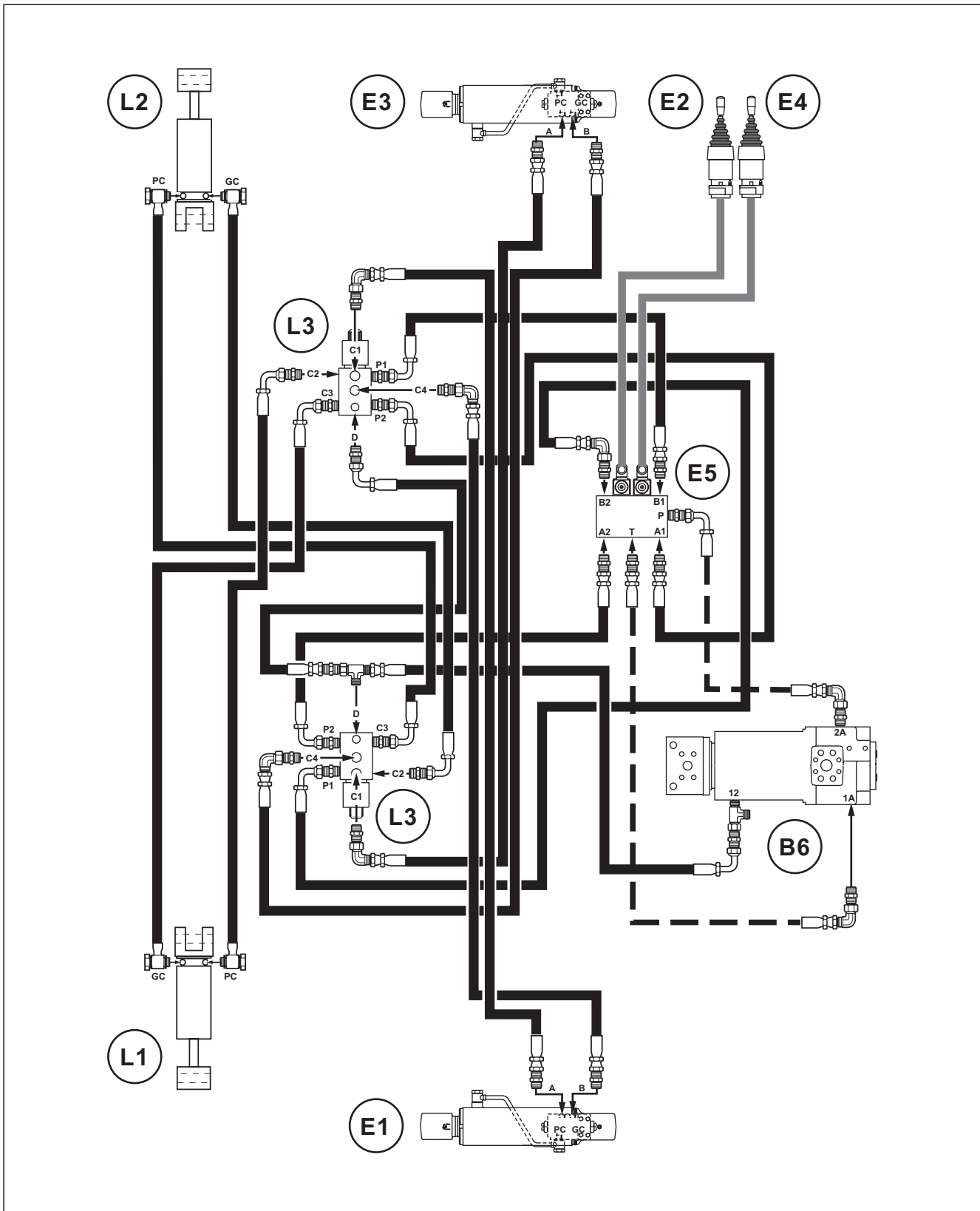
- B11** - Functions block (High pressure)
J1 - Tool-holder ram
J2 - Tool-holder

9.11 Air conditioning circuit (option)



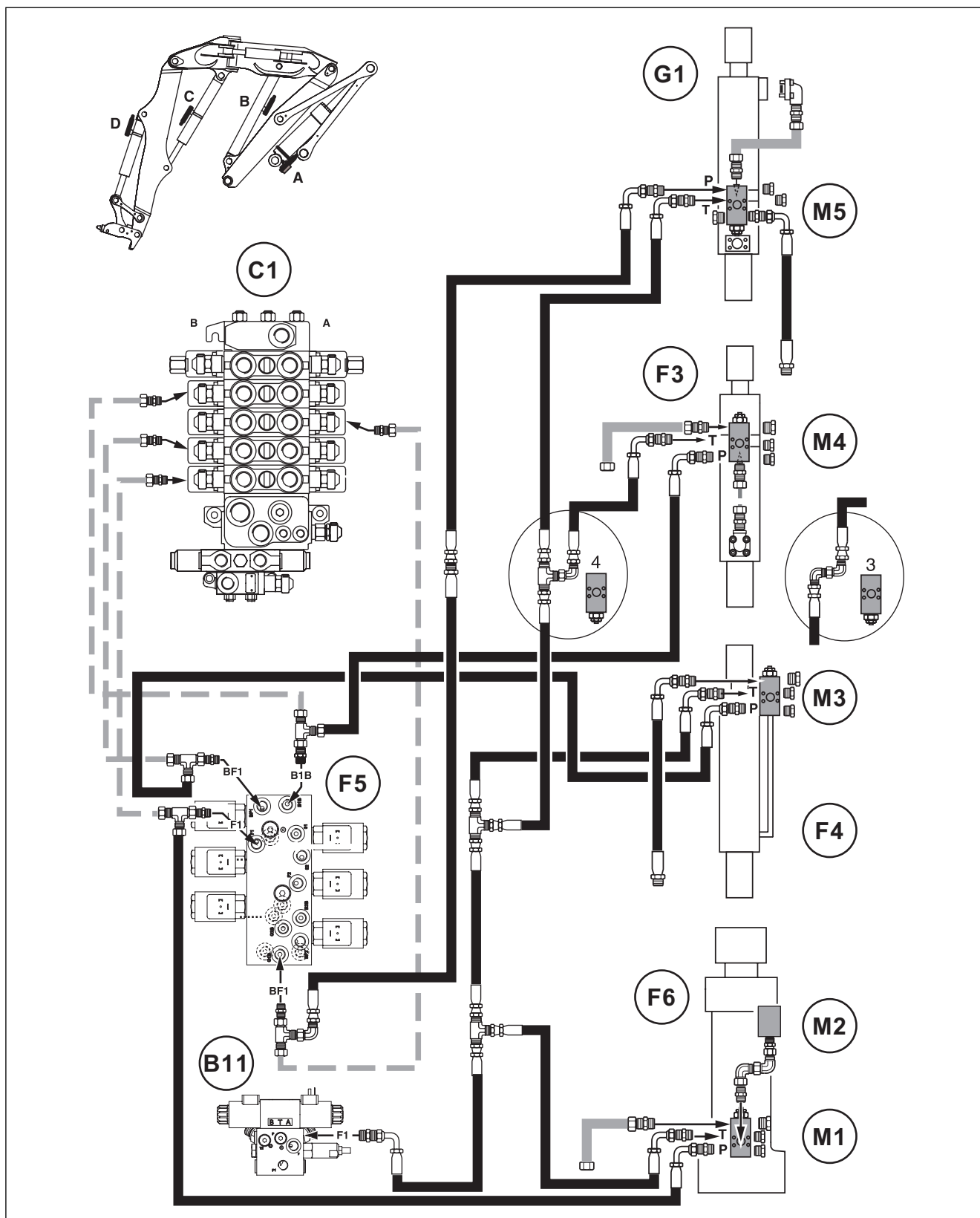
- B6** - Rotary coupling
- B11** - Functions block (High pressure)
- K1** - Compressor
- K2** - Solenoid-valve
- K3** - Priority block

9.12 Telescopic stabilizers (option)



- | | |
|--|---|
| B6 - Rotary coupling | E5 - Stabilizers solenoid-operated valve |
| E1 - Left stabilizer ram | L1 - Left telescopic stabilizer ram |
| E2 - Left electric manipulator | L2 - Right telescopic stabilizer ram |
| E3 - Right stabilizer ram | L3 - Selector block |
| E4 - Right electric manipulator | |

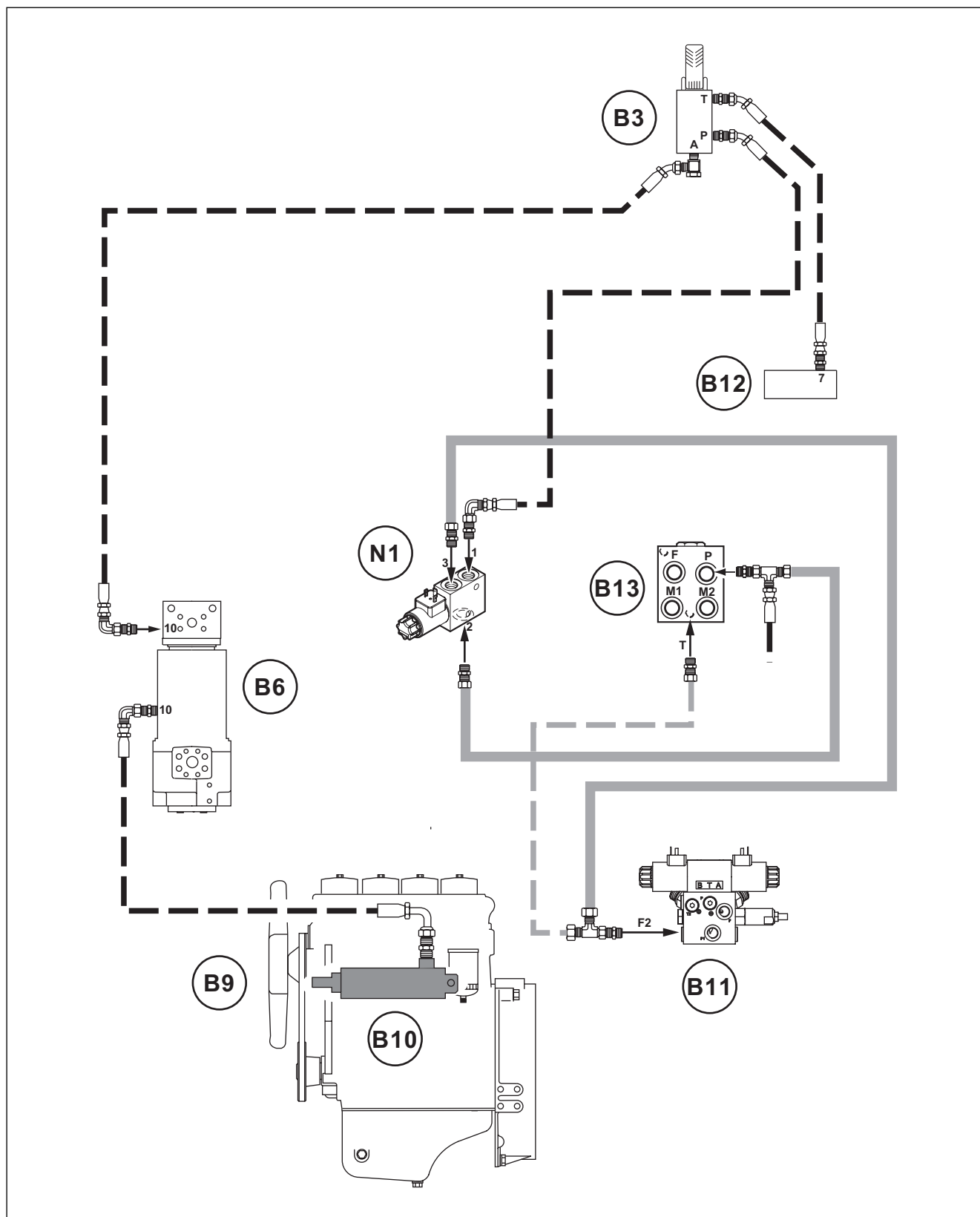
9.13 Safety valves (option)



- B11** - Functions block (High pressure)
- C1** - SX14 valve block
- F3** - Dipper ram
- F4** - Intermediate boom ram
- F5** - Piloting unit (Low pressure)
- F6** - Boom ram

- G1** - Bucket ram
- M1** - Boom ram valve
- M2** - Load detector
- M3** - Intermediate boom ram valve
- M4** - Dipper ram valve
- M5** - Bucket ram valve

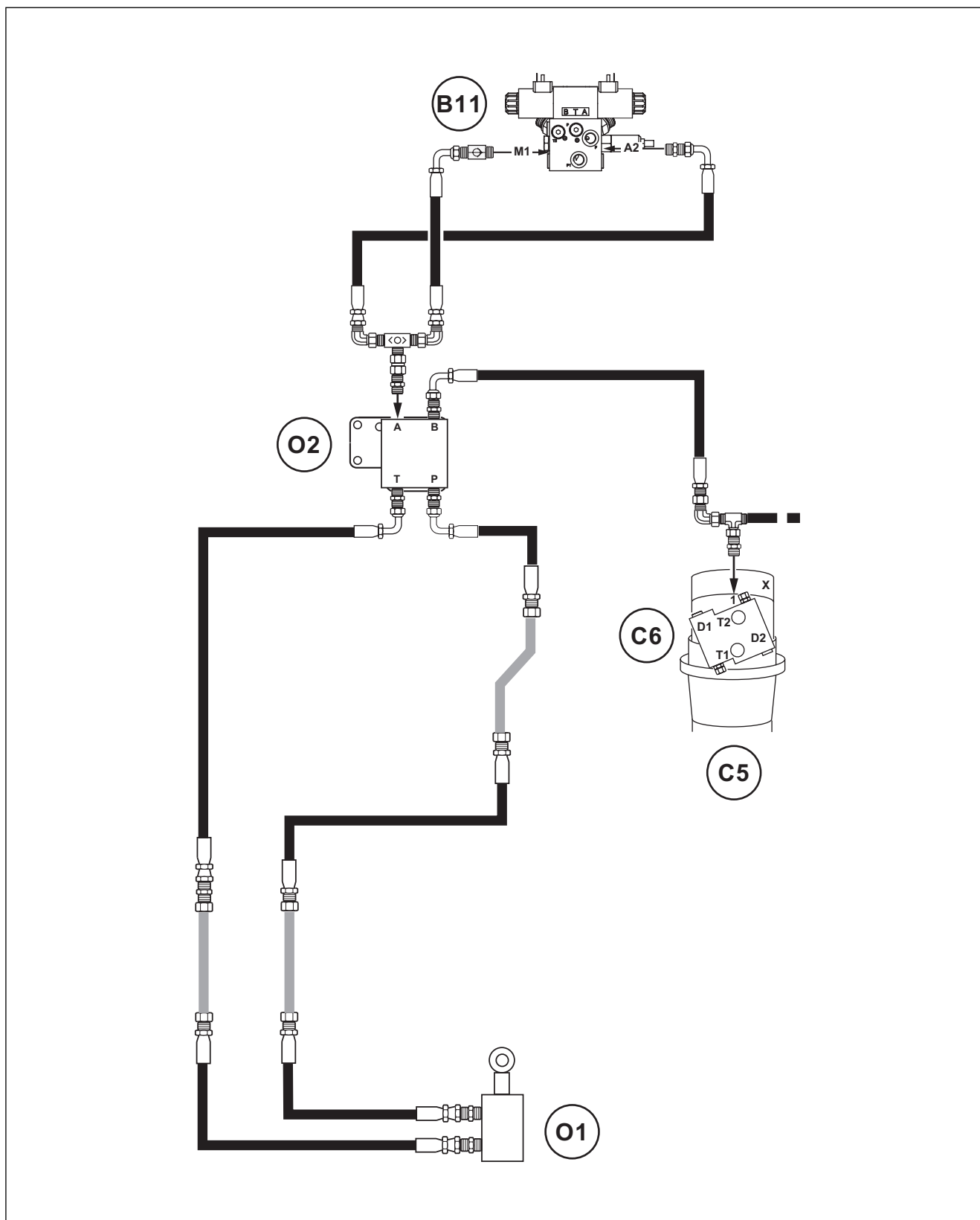
9.14 Manual accelerator (option)



B3 - Accelerator foot control
B6 - Rotary coupling
B9 - Diesel engine
B10 - Accelerator ram

B11 - Functions block (High pressure)
B12 - Drain block
B13 - Turntable rotation
N1 - Pressure reducer 45 bar

9.15 Volvo tool-holder (option)



B11 - Functions block (High pressure)

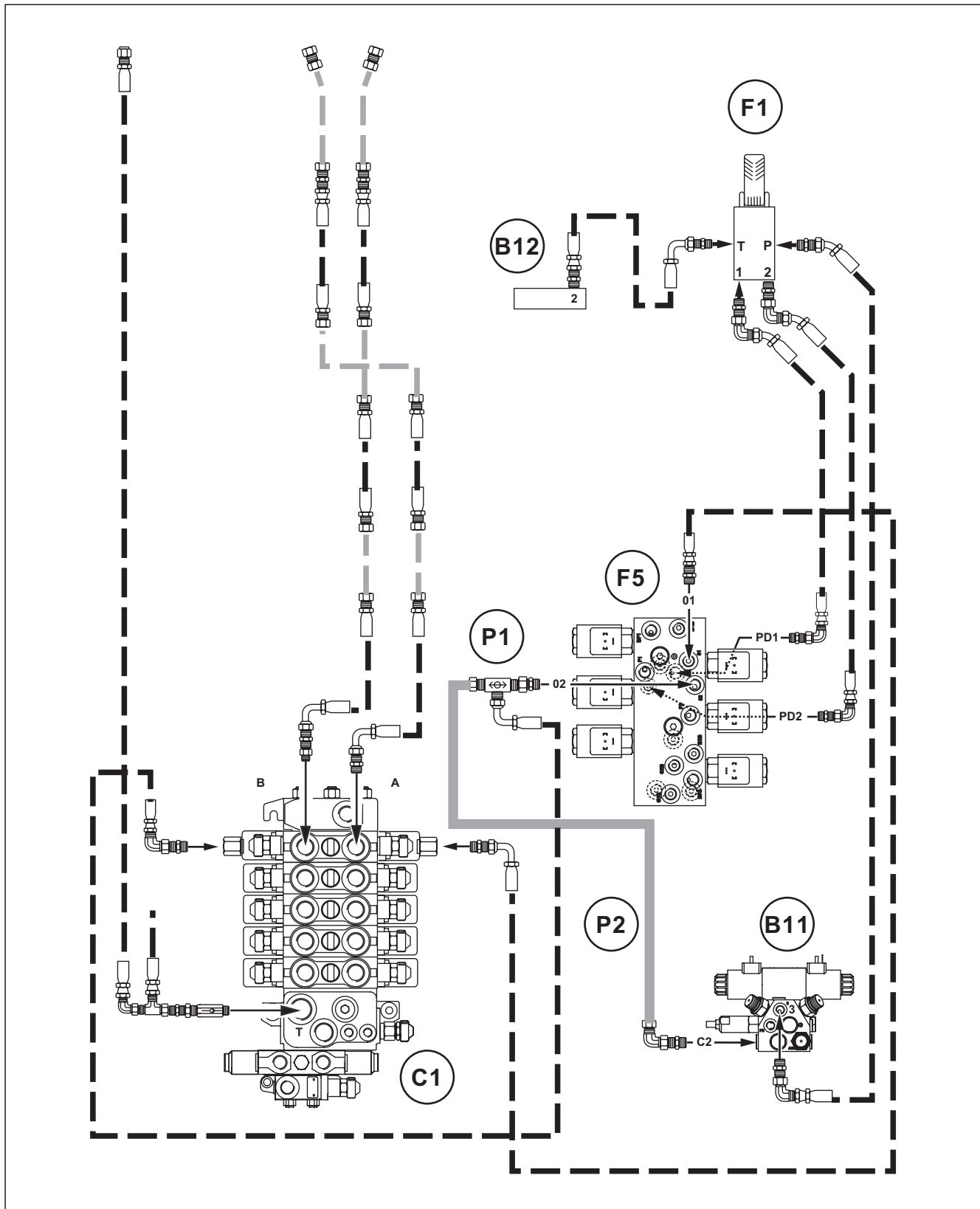
C5 - Hydraulic turntable slewing motor

C6 - CROSS OVER block with damped valve

O1 - Tool-holder ram

O2 - Tool-holder solenoid-operated valve

9.16 Additional hydraulic, electrical control of the additional function (option)

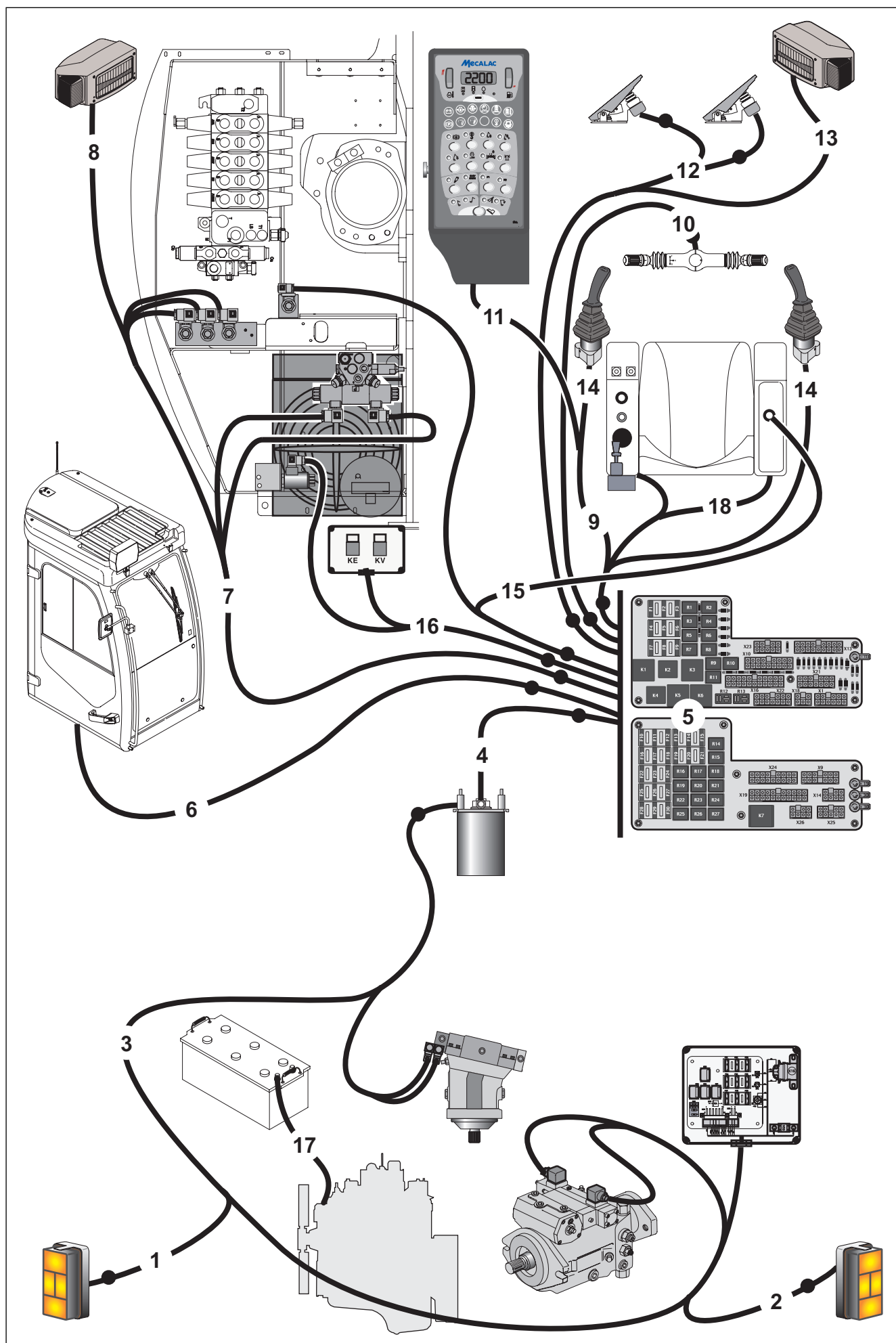


B11 - Functions block (High pressure)
B12 - Drain block
C1 - SX14 valve block
F1 - "Additional functions" foot control

F5 - Piloting unit (Low pressure)
P1 - Selector
P2 - Tube

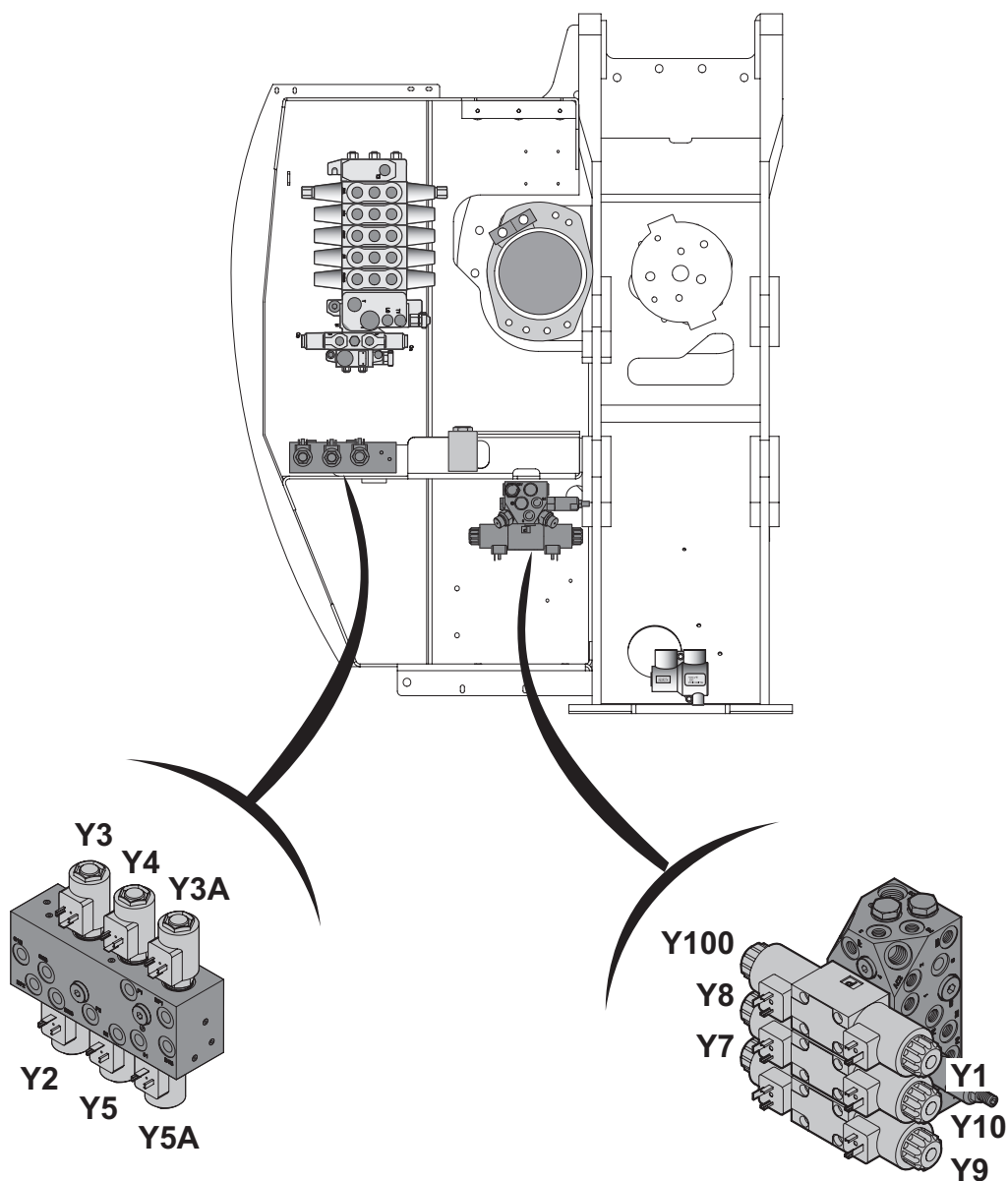
10. Parts list of the hydraulic diagram

- | | |
|-----------------------------------|---|
| 1 - Auxiliary function | 36 - Rotary coupling |
| 2 - Dipper ram | 37 - Hydraulic reservoir |
| 3 - Bucket ram | 38 - Service brake ram |
| 4 - Intermediate boom ram | 39 - Check valve ARQ 0.5 bar |
| 5 - Boom ram | 40 - Auxiliary pedal control |
| 6 - Orientation engine | 41 - Accelerator ram |
| 7 - Hydro-Sensor block | 42 - Heat engine |
| 8 - Braking block | 43 - Right stabilizer ram |
| 9 - Offset ram | 44 - Oscillation locking block |
| 10 - Tool unlock ram | 45 - Service brake ram |
| 11 - 1 bar valve | 46 - 3 bar valve |
| 12 - Left manipulator | 47 - Cooling system |
| 13 - Right manipulator | 48 - 0.5 bar valve |
| 14 - H.P. function block | 49 - 0.5 bar valve |
| 15 - Parking brake manipulator | 50 - 6 bar valve |
| 16 - Brake / Inching foot control | 51 - SX14 valve block |
| 17 - Accelerator foot control | 52 - 1.7 bar manocontact |
| 18 - LP function block | 53 - 15 bar manocontact |
| 19 - Safety valve | 54 - 10 bar manocontact |
| 20 - Priority valve | 55 - Accumulator 0.35 l / 15 bar |
| 21 - ORBITROL steering device | 56 - Accumulator 0.35 l / 15 bar |
| 22 - Steering ram | 57 - Accumulator 0.7 l / 18 bar |
| 23 - Steering / rotation pump | 58 - 26 bar manocontact |
| 24 - 15 bar manocontact | 59 - 1 bar valve |
| 25 - Equipment pump | 60 - 15 bar manocontact |
| 26 - Check valve ARQ 0.5 bar | 61 - 120 bar manocontact |
| 27 - Transfer movement pump | 62 - Stabilizer ext. offset block |
| 28 - Transfer movement engine | 63 - Stabilizer ext. offset block |
| 29 - Parking brake ram | 64 - Left stabilizer extension ram |
| 30 - Inching valve | 65 - Right stabilizer extension ram |
| 31 - Return filter | 66 - Air conditioning block |
| 32 - 350 g pressurised air valve | 67 - Air conditioning motor |
| 33 - Oscillation locking ram | 68 - Solenoid-operated air conditioning valve |
| 34 - Left stabilizer ram | 69 - Manual accelerator block |
| 35 - Stabilizer block | 70 - Two-ways valve |



11. Installation of the electric bundles

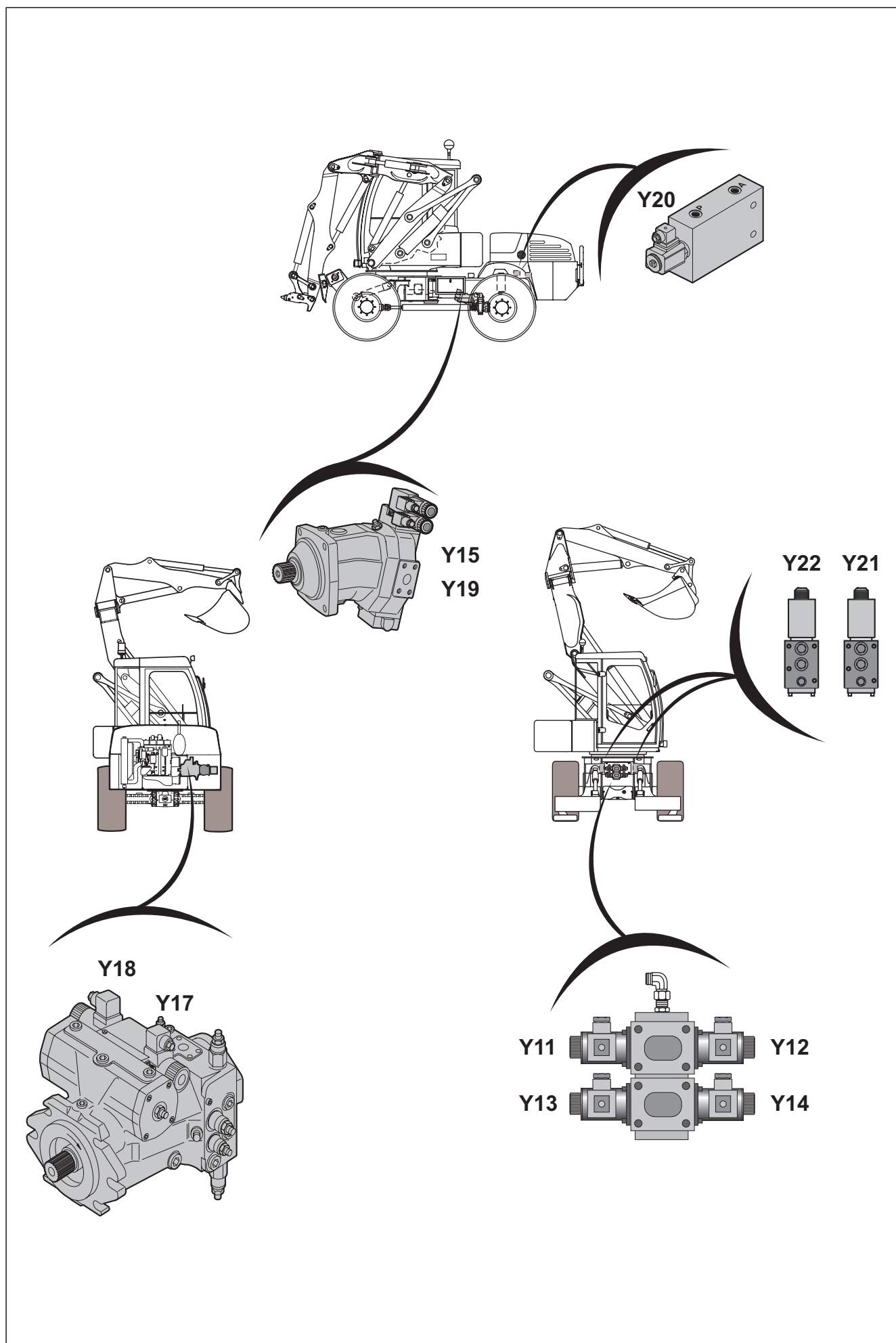
- 1 - Left rear light connection
- 2 - Right rear light connection
- 3 - Motor bundle
- 4 - Electric collector bundle
- 5 - Relay plate bundle
- 6 - Cab connection
- 7 - Solenoid-operated valves bundle
- 8 - Left front headlight connection
- 9 - Driver station bundle
- 10 - Steering column bundle
- 11 - Instrument panel connection
- 12 - Foot controls bundle
- 13 - Right front headlight connection
- 14 - Hydraulic manipulators connection (on driver station bundle)
- 15 - Manual accelerator bundle
- 16 - Air conditioning bundle
- 17 - Battery bundle
- 18 - Seat bundle (option)



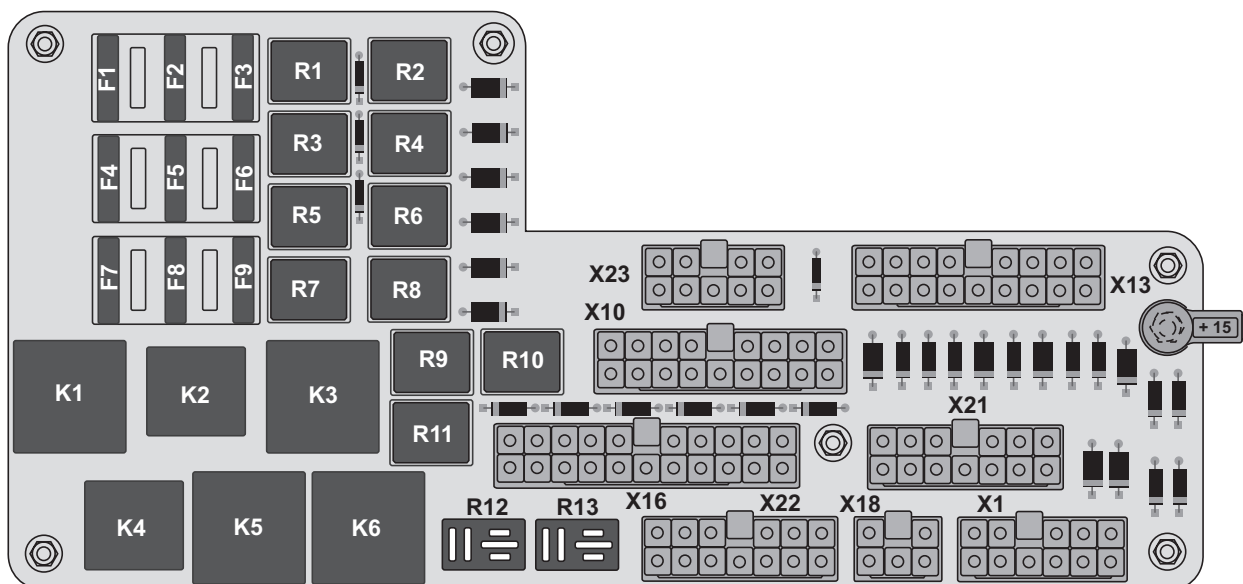
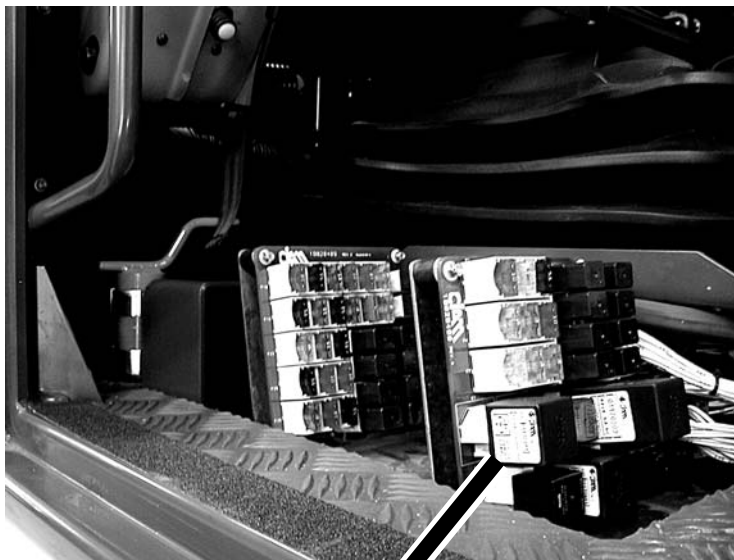
12. Location of the electric components

12.1 Solenoid-operated valves

Designation	
Y1	Hydraulic lock solenoid-operated valve (power-assistance pressure block)
Y2	Inversion of direction of bucket solenoid-operated valve
Y3	Coupling of rams solenoid-operated valve
Y3A	Coupling of rams solenoid-operated valve
Y4	“MECALAC 2” option solenoid-operated valve (control unit)
Y5	Boom / inter. boom solenoid-operated valve (control unit)
Y5A	Boom / inter. boom solenoid-operated valve (control unit)
Y7	Tool unlocking solenoid-operated valve
Y8	Left offset solenoid-operated valve (hydraulic functions block)
Y9	Load Sensing solenoid-operated valve (hydraulic functions block)
Y10	Right offset solenoid-operated valve (hydraulic functions block)
Y100	Hammer option solenoid-operated valve

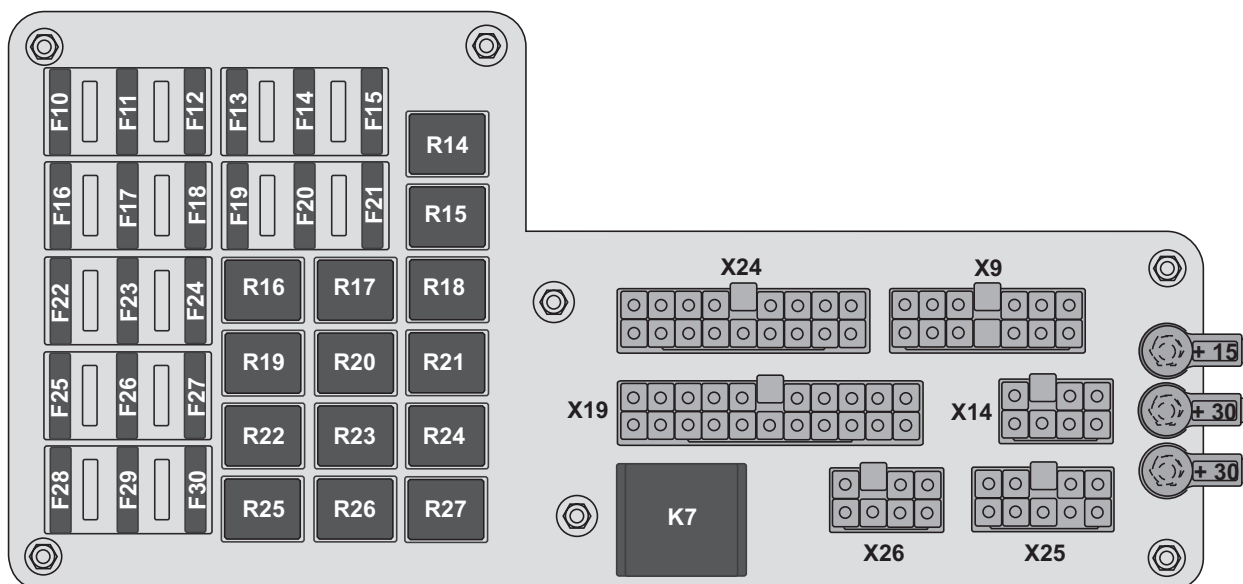
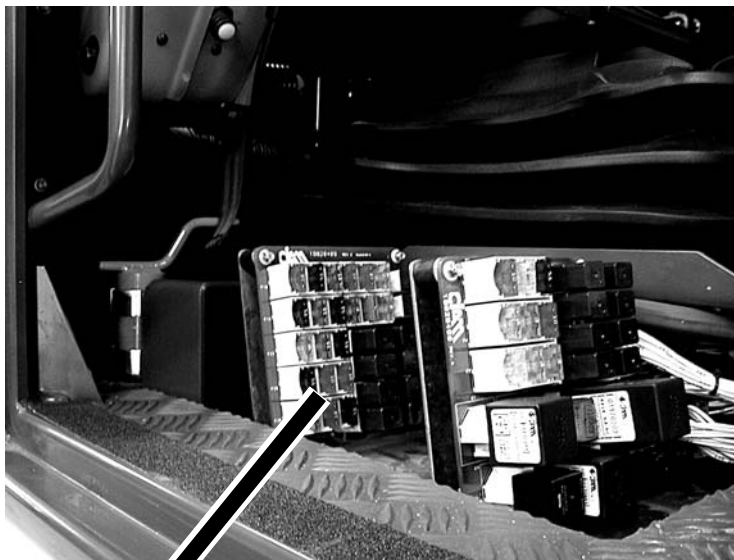


Designation	
Y11	Left stabilizer raising solenoid-operated valve
Y12	Left stabilizer lowering solenoid-operated valve
Y13	Right stabilizer raising solenoid-operated valve
Y14	Right stabilizer lowering solenoid-operated valve
Y15	Low speed solenoid-operated valve
Y17	Reverse solenoid-operated valve
Y18	Forward solenoid-operated valve
Y19	Inversion of direction of travel solenoid-operated valve
Y20	Oscillation lock solenoid-operated valve
Y21	Left stabilizer block solenoid-operated valve
Y22	Right stabilizer block solenoid-operated valve



12.2 A relay plate (under the cab seat)

F1	-	10 A fuse	: Boom, intermediate boom, coupling of rams and 4th foot-operated ram
F2	-	20 A fuse	: Offset, stabilizers and blocks, Load Sensing, tool unlocking and hydraulic lock
F3	-	7.5 A fuse	: Forward (F) and reverse (R)
F4	-	5 A fuse	: Not used
F5	-	3 A fuse	: Instrument panel safety
F6	-	10 A fuse	: Automatic lubricating pump (option)
F7	-	20 A fuse	: Instrument panel power outlet
F8	-	5 A fuse	: Engine shut-off relay and Meck Lock
F9	-	5 A fuse	: Not used
R1	-	Relay	: "Loader function"
R2	-	Relay	: Reverse (R) solenoid-operated valve
R3	-	Relay	: Safety in "Loader mode"
R4	-	Relay	: Forward (F) and reverse (R) in "Loader function"
R5	-	Relay	: Low speed (I)
R6	-	Relay	: Forward (F) solenoid-operated valve
R7	-	Relay	: Forward (F), "Commodo"
R8	-	Relay	: Forward (F) and reverse (R) inversion
R9	-	Relay	: "MECALAC mode"
R10	-	Relay	: Starting safety
R11	-	Relay	: Bucket inverter
R12	-	Relay	: Not used
R13	-	Relay	: Hammer option
K1	-	Bistable relay	: Boom / intermediate boom
K2	-	Relay	: Hydraulic lock
K3	-	Bistable relay	: Forced forward (F)
K4	-	Relay	: Ram coupling
K5	-	Bistable relay	: Low speed (I) in "Loader function"
K6	-	Bistable relay	: Low (I) or high (II) speed
X1	-	11- way connector	: "A" relay plate
X10	-	17- way connector	: "A" relay plate
X13	-	21- way connector	: "A" relay plate
X16	-	21- way connector	: "A" relay plate
X18	-	13- way connector	: "A" relay plate (Easy drive option)
X21	-	13- way connector	: "A" relay plate
X22	-	5- way connector	: "A" relay plate
X23	-	9- way connector	: "A" relay plate

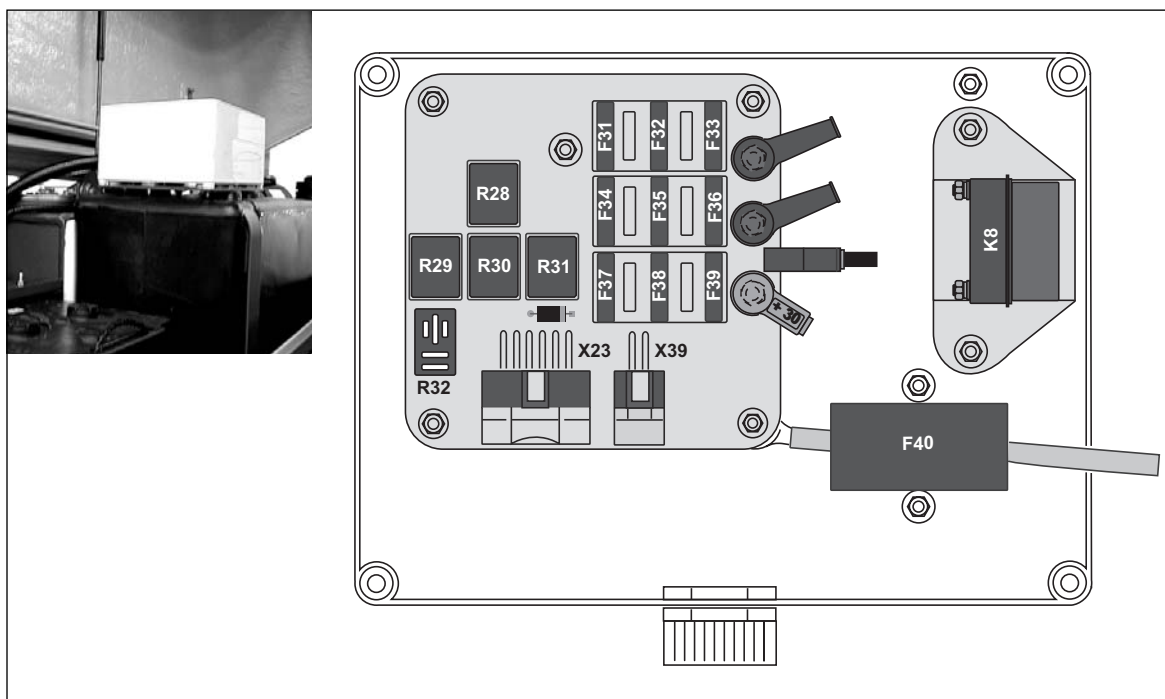


12.3 B relay plate (under the cab seat)

F10	-	10 A fuse	:	Not used
F11	-	7.5 A fuse	:	Front windscreen wiper and washer
F12	-	15 A fuse	:	Front / rear working lights
F13	-	10 A fuse	:	Dipped beams
F14	-	10 A fuse	:	Main beams
F15	-	5 A fuse	:	Lighting and direction indicators
F16	-	7.5 A fuse	:	Rear windscreen wiper and washer
F17	-	15 A fuse	:	Radio, ceiling light and cigarette lighter
F18	-	7.5 A fuse	:	Hazard warning lights
F19	-	3 A fuse	:	Resetting and rear windscreen wiper
F20	-	3 A fuse	:	Resetting and front windscreen wiper
F21	-	5 A fuse	:	Position lights
F22	-	5 A fuse	:	Oscillation lock
F23	-	15 A fuse	:	Not used
F24	-	7.5 A fuse	:	Revolving light
F25	-	7.5 A fuse	:	Horn
F26	-	10 A fuse	:	Pneumatic seat compressor
F27	-	10 A fuse	:	F1 / F2 options
F28	-	3 A fuse	:	Turntable alignment
F29	-	10 A fuse	:	Manual accelerator (option)
F30	-	7.5 A fuse	:	Stop light and brake lock
R14	-	Relay	:	Dipped beams
R15	-	Relay	:	Main beams
R16	-	Relay	:	Rear windscreen wiper
R17	-	Relay	:	Rear working light
R18	-	Relay	:	Front working lights
R19	-	Relay	:	Rear windscreen washer
R20	-	Relay	:	Revolving light
R21	-	Relay	:	Front windscreen washer
R22	-	Relay	:	F1 option
R23	-	Relay	:	Horn
R24	-	Relay	:	Front windscreen wiper
R25	-	Relay	:	F2 option
R26	-	Relay	:	Oscillation lock
R27	-	Relay	:	Brake lock
K7	-	Direction indicator central unit		
X9	-	13- way connector	:	"B" relay plate
X14	-	9- way connector	:	"B" relay plate
X19	-	7- way connector	:	"B" relay plate
X24	-	7- way connector	:	"B" relay plate
X25	-	17- way connector	:	"B" relay plate
X26	-	21- way connector	:	"B" relay plate

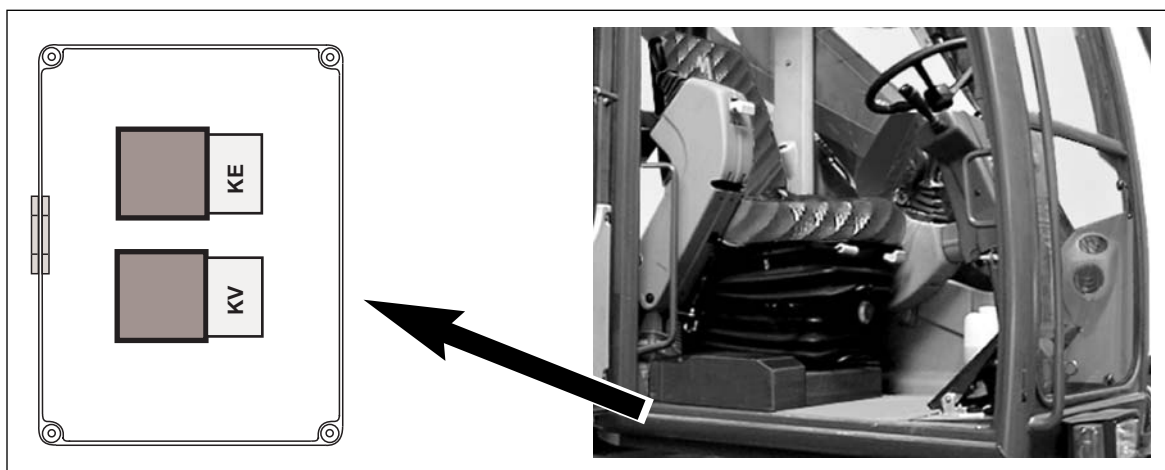
12.4 Relay box (on fuel tank)

F31	- 15 A fuse	: Reversing lights, audible reversing signal and direction inverter
F32	- 5 A fuse	: Engine shut-off relay
F33	- 25 A fuse	: Condenser fan supply (air conditioning)
F34	- 3 A fuse	: Rear left position light
F35	- 3 A fuse	: Rear right position light
F36	- 25 A fuse	: Heating fan supply
F37	- 3 A fuse	: Number plate light
F38	- 25 A fuse	: Not used
F39	- 15 A fuse	: Not used
F40	- 60 A fuse	: Turntable supply
R28	- Relay	: Reversing lights and audible reversing signal
R29	- Relay	: Forward (F)
R30	- Relay	: Reverse (R)
R31	- Relay	: Engine shut-off
R32	- Relay	: Not used
K8	- Relay	: Starting relay



12.5 Air conditioning relay box (option) (under the cab floor)

KE	- Relay	: Air conditioning ON
KV	- Relay	: Air conditioning condenser



13. Parts list of the electric diagram

BP	- Dehydrator pressure switch	F23	- Not used
B1	- Load overload pressure switch	F24	- 7.5 A fuse: Revolving light
B2	- Load overload pressure switch	F25	- 7.5 A fuse: Horn
B3	- Stop lights pressure switch	F26	- 10 A fuse: Pneumatic seat compressor
B4	- Parking brake pressure switch	F27	- 10 A fuse: F1 / F2 option
B5	- Proximity detector	F28	- 3 A fuse: Turntable alignment
B6	- Engine oil pressure switch	F29	- 10 A fuse: Manual accelerator (option)
B7	- Power-assistance oil pressure switch	F30	- 7.5 A fuse: Stop light and brake lock
B8	- Air filter clogged pressure switch	F31	- 15 A fuse: Audible reversing signal and lights, direction inverter
B9	- Hydraulic filter clogged pressure switch	F32	- 5 A fuse: Engine shut-off relay
B10	- Cold start coil control pressure switch	F33	- 25 A fuse: Condenser fan supply (air conditioning)
E1	- Cigarette lighter	F34	- 3 A fuse: Rear left position light
E2	- Ceiling light	F35	- 3 A fuse: Rear right position light
E3	- Number plate lighting	F36	- 25 A fuse: Heating fan supply
E4	- Front left dipped beam	F37	- 3 A fuse: Number plate light
E5	- Front right dipped beam	F38	- Not used
E6	- Front left main beam	F39	- Not used
E7	- Front right main beam	F40	- 60 A fuse: Turntable supply
E9	- Rear working light	G1	- 12 volt battery
E10	- Front working lights	G2	- Alternator
E11	- Water temperature probe	H1	- Horn
E12	- Fuel gauge	H8	- Direction indicators light
E13	- Cigarette lighter lighting	H9	- Position lights light
E14	- Fuel gauge / radio	H10	- High speed (I) light
E15	- Working light	H11	- Low speed (II) light
E16	- Buzzer	H12	- Reverse (R) light
F1	- 10 A fuse: Boom, intermediate boom, coupling of rams and 4th foot-operated ram	H13	- Forward (F) light
F2	- 20 A fuse: Offset, stabilizers and blocks, Load Sensing, tool unlocking and hydraulic lock	H15	- Revolving light
F3	- 7.5 A fuse: Forward (F) and reverse (R)	H17	- Audible reversing signal
F4	- Not used	H18	- Reversing light
F5	- 3 A fuse: Instrument panel safety	H19	- Rear left direction indicator
F6	- 7.5 A fuse: Automatic lubricating pump (option)	H20	- Front left direction indicator
F7	- 20 A fuse: Instrument panel power outlet	H21	- Rear right direction indicator
F8	- 5 A fuse: Engine shut-off relay and Meck Lock	H22	- Front right direction indicator
F9	- Not used	H23	- Rear left position light
F10	- Not used	H24	- Rear right position light
F11	- 7.5 A fuse: Front windscreen wiper and washer	H25	- Front right position light
F12	- 15 A fuse: Front / rear working lights	H26	- Right clearance light
F13	- 10 A fuse: Dipper beams	H27	- Left clearance light
F14	- 10 A fuse: Main beams	H28	- Front left position light
F15	- 5 A fuse: Lighting and direction indicators	H31	- Stops lights light
F16	- 7.5 A fuse: Rear windscreen wiper and washer	H40	- Not used
F17	- 15 A fuse: Radio, ceiling light and and cigarette lighter	J1	- Instrument panel connector
F18	- 7.5 A fuse: Hazard warning lights	J3	- Instrument panel connector
F19	- 3 A fuse: Resetting and rear windscreen wiper	J4	- Instrument panel connector
F20	- 3 A fuse: Resetting and front windscreen wiper	J5	- 3-pushbutton module connector
F21	- 5 A fuse: Position lights	KE	- Starting relay (air conditioning)
F22	- 5 A fuse: Oscillation lock	KV	- Condenser relay (air conditioning)
		K1	- Boom / intermediate boom relay
		K2	- Hydraulic lock relay
		K3	- Forced forward (F) relay
		K4	- Ram coupling relay
		K5	- Low speed (I) in "Loader function" relay
		K6	- Low (I) or high (II) speed option relay
		K7	- Direction indicators central unit
		K8	- Starting relay

L1	- Brake lock coil	S18	- Tool unlocking pushbutton
L2	- Accelerator's lock coil	S19	- Heating fan switch
L3	- Engine shut-off coil	S20	- Air conditioning switch
L4	- Cold start coil	S21	- Pushbutton for "hammer on left manipulator" option
MV	- Condenser fan (air conditioning)	X1	- "A" relay plate connector
M1	- 12 V starter	X9	- "B" relay plate connector
M2	- Rear screen wiper motor	X10	- "A" relay plate connector
M3	- Front windscreen wiper motor	X13	- "A" relay plate connector
M4	- Front windshield washer motor	X14	- "B" relay plate connector
M5	- Heating fan	X16	- "A" relay plate connector
P15A	- Connector (option)	X18	- "A" relay plate connector
Q1	- Battery cut-out	X19	- "B" relay plate connector
R1	- "Loader function" relay	X21	- "A" relay plate connector
R2	- Reverse (R) solenoid-operated valve relay	X22	- "A" relay plate connector
R3	- Safety in "Loader mode" relay	X23	- "A" relay plate connector
R4	- Forward (F) and reverse (R) in "Loader function" relay	X24	- "B" relay plate connector
R5	- Low speed (I) relay	X25	- "B" relay plate connector
R6	- Forward (F) solenoid-operated valve relay	X26	- "B" relay plate connector
R7	- Forward relay (F), "Commodo"	X38	- Engine bundle's relay plate connector
R8	- Forward (F) and reverse (R) inversion relay	X39	- Engine bundle's relay plate connector
R9	- "MECALAC mode" relay	YA	- Solenoid-operated air conditioning valve
R10	- Starting safety relay	Y1	- Hydraulic lock solenoid-operated valve
R11	- Bucket inverter relay	Y2	- Inversion of direction of bucket solenoid-operated valve
R12	- Not used	Y3A	- Coupling of rams solenoid-operated valve
R13	- "Hammer" option relay	Y3	- Coupling of rams solenoid-operated valve
R14	- Dipper beams relay	Y4	- "MECALAC 2" option solenoid-operated valve
R15	- Main beams relay	Y5A	- Boom / intermediate boom solenoid-operated valve
R16	- Rear screen wiper relay	Y5	- Boom / intermediate boom solenoid-operated valve
R17	- Rear working light relay	Y7	- Tool unlocking solenoid-operated valve
R18	- Front working light relay	Y8	- Left offset solenoid-operated valve
R19	- Rear windshield washer relay	Y9	- Load Sensing solenoid-operated valve
R20	- Revolving light relay	Y10	- Right offset solenoid-operated valve
R21	- Front windshield washer relay	Y11	- Left stabilizer raising solenoid-operated valve
R22	- F1 option relay	Y12	- Left stabilizer lowering solenoid-operated valve
R23	- Horn relay	Y13	- Right stabilizer raising solenoid-operated valve
R24	- Front windscreen wiper relay	Y14	- Right stabilizer lowering solenoid-operated valve
R25	- F2 option relay	Y15	- Low speed (I) solenoid-operated valve
R26	- Oscillation lock relay	Y17	- Reverse (R) solenoid-operated valve
R27	- Brake lock relay	Y18	- Forward (F) solenoid-operated valve
R28	- Audible reversing signal and lights relay	Y19	- Inversion of direction of travel solenoid-operated valve
R29	- Forward (F) relay	Y20	- Oscillation lock solenoid-operated valve
R30	- Reverse (R) relay	Y21	- Left stabilizer block solenoid-operated valve
R31	- Engine shut-off relay	Y22	- Right stabilizer block solenoid-operated valve
R32	- Not used	Y24	- Tool overlocking solenoid-operated valve
S1	- Boom / intermediate boom pushbutton,	Y100	- "Hammer" option solenoid-operated valve
S2	- Forward (F) and reverse (R) in "Loader function" pushbutton	*	- Cold start system (bundle fitted on the engine)
S3	- Low speed (I) in "Loader function" toggle switch		
S4	- Horn pushbutton		
S5	- Left and right offset toggle switch		
S8	- Lighting (lights) switch		
S9	- Key-operated ignition switch		
S10	- Loader mode module control		
S11	- Hazard warning lights pushbutton		
S13	- Left stabilizer block control manipulator		
S14	- Right stabilizer block control manipulator		
S15	- Commodo		
S16	- Hydraulic controls locking switch (under the seat's right-hand console)		

14. Adjustment procedure

14.1 Adjustment procedure for the heat engine

14.1.1 Adjustment of maximum regime



13 flat spanner
4 hexagonal male spanner
Inductive sensor

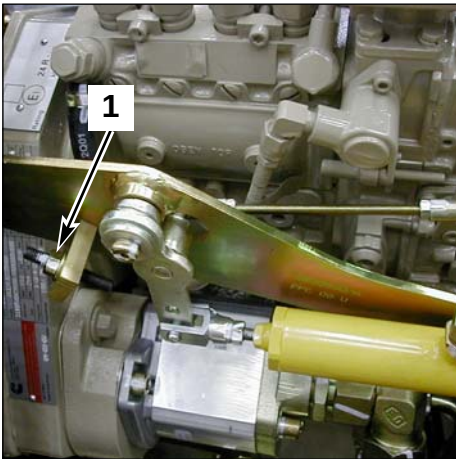


Fig. 1 Injection pump

- 1- Loosen the lock nut and turn the stop screw (1 fig. 1).

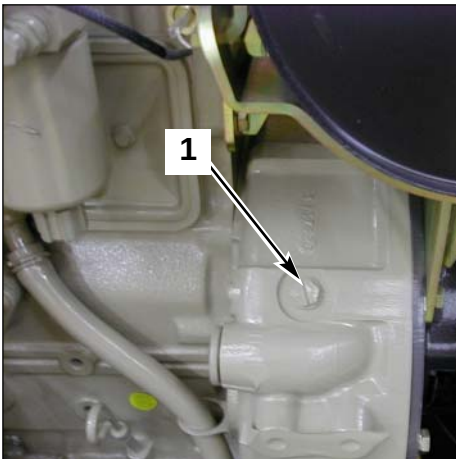


Fig. 2 Heat engine



Note: Number of teeth on engine wheel = 159

Operation	Speed (rpm)	Adjustment (ref. no.)
Maximum regime	2,225 (+25 -25)	1 fig. 1

14.1.2 Adjustment during minimum regime (slowed down)

	13 flat spanner Flat screwdriver Inductive sensor
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1- Loosen the lock nut and turn the stop screw (1 fig. 1).

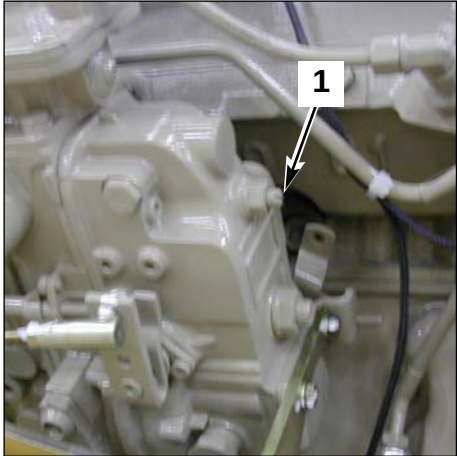


Fig. 1 Injection pump

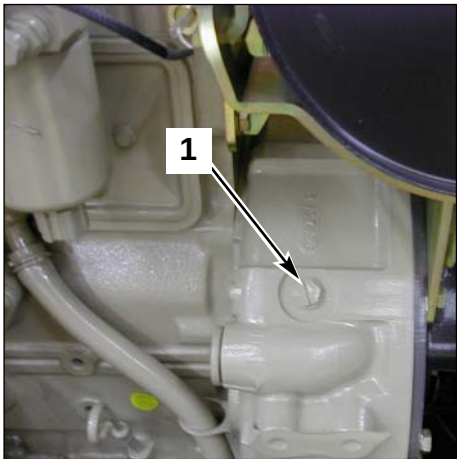


Fig. 2 Heat engine



Note: Number of teeth on engine wheel = 159

Operation	Speed (rpm)	Adjustment (ref. no.)
Minimum regime	950 (+50 -0)	1 fig. 1

14.2 Hydraulic adjustment procedure for the gears



Before carrying out the checks, heat the hydraulic oil to between 50° and 60° in the tank.

14.2.1 Checking the power-feed pressure



17 flat spanner
5 male hexagonal spanner
Manometer, 0 - 60 bar

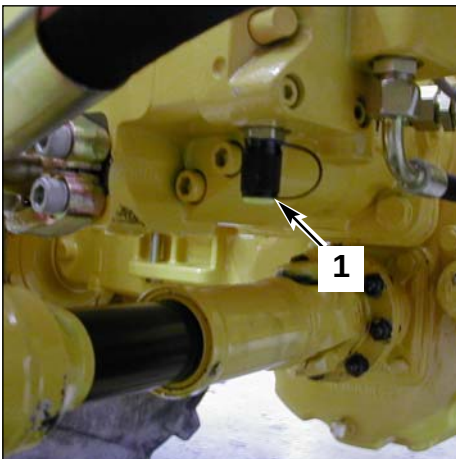


Fig. 1 Transfer movement engine

- 1- Place the machine on the ground, speed in neutral, engine in maximum regime.
- 2- Measure the pressure (1 fig. 1) using the manometer.

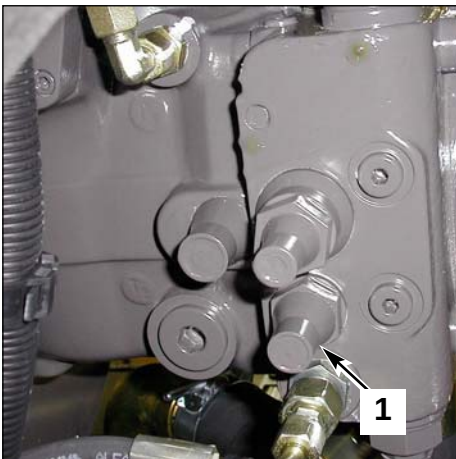


Fig. 2 Transfer movement pump

- 3- If the pressure is too low, turn the screw (1 fig. 2) clockwise in order to increase the pressure.

Operation	Pressure (bar)	Measure (ref. no.)	Adjustment (ref. no.)
Power-feed pressure	26 (+2 -2)	1 fig. 1	1 fig. 2

14.2.2 Starting



- 13 flat spanner
- 4 male hexagonal spanner
- Inductive sensor
- Manometer 0 - 600 bar

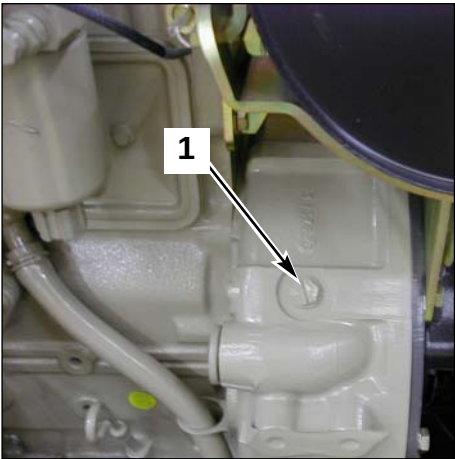


Fig. 1 Heat engine

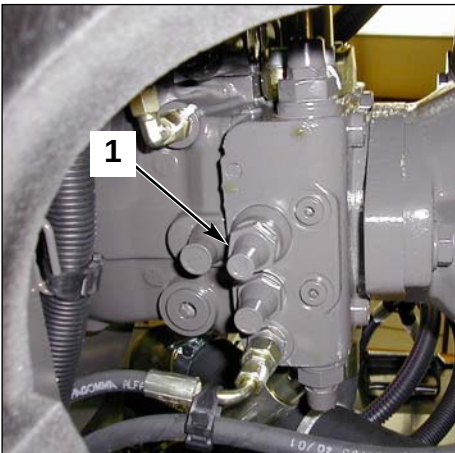


Fig. 2 Transfer movement pump

- 1- Place the machine on a solid, flat surface before engaging high speed.
- 2- Accelerate the engine progressively until the machine starts.
- 3- Read the engine revs by monting an inductive sensor on the flywheel (1 fig. 1).
- 4- If the regime of the engine is too low, turn the screw (1 fig. 2) clockwise in order to increase the speed of the engine.

Operation	Speed (rpm)	Measurement (ref. no.)	Adjustment (ref. no.)
Starting	1,100 (+50 -30)	1 fig. 1	1 fig. 2

14.2.3 Adjusting the high pressure in forward movement (D.R.)

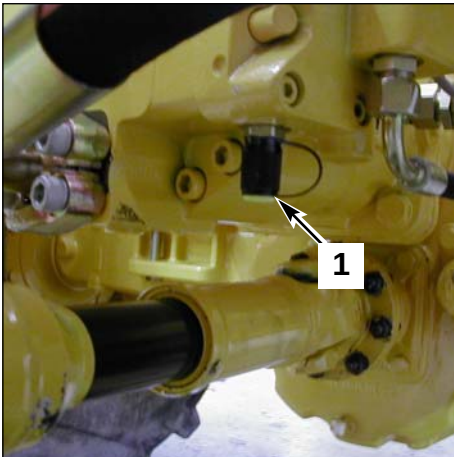


Fig. 1 Transfer movement engine



13 flat spanner
 14 flat spanner
 17 flat spanner
 4 male hexagonal spanner
 Manometer, 0 - 600 bar

- 1- Place the machine in blocked position against a wall, or disconnect and stop up the Inching flex in order to use the service brake.
 Forward movement, high speed engaged, engine in maximum regime.
- 2- Measure the high pressure (1 fig. 1) using the manometer.



Fig. 2 Transfer movement pump

- 3- If the pressure is too low, turn the screw (1 fig. 2) clockwise to increase the pressure.

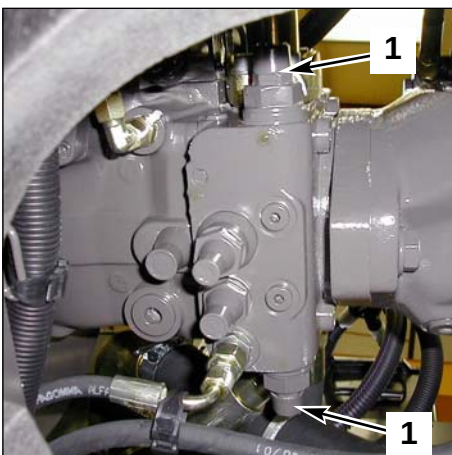


Fig. 3 Transfer movement pump



Note: The H.P. shock absorbers (1 fig. 3) for forward and reverse movement are tared at 490 bar (+10 -10 bar).

Operation	High pressure (bar)	Measurement (ref. no.)	Adjustment (ref. no.)
High pressure in forward movement	460 (+10 -10)	1 fig. 1	1 fig. 2

14.2.4 Adjusting the grind in the heat engine

	19 flat spanner
	6 male hexagonal spanner
	Optoelectronic sensor
	Manometer, 0 - 600 bar

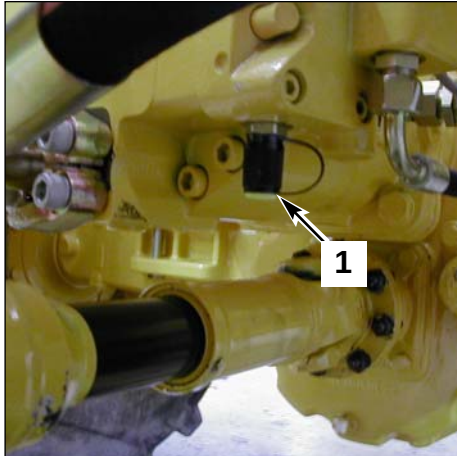


Fig. 1 Transfer movement engine

- 1- Place the machine in blocked position against a wall, or disconnect and stop up the Inching flex in order to use the service brake.
Forward movement, high speed engaged, engine in maximum regime.
- 2- Accelerate the engine slowly in order to raise the pressure gradually in the H.P. circuit.
- 3- Read the speed in rpm by placing an optoelectronic sensor on the fan pulley.
- 4- Measure the high pressure (1 fig. 1) using the manometer.

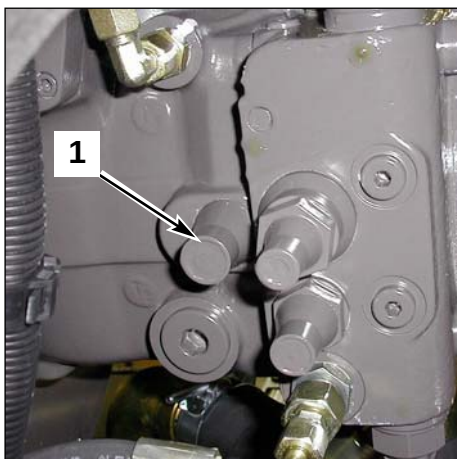


Fig. 2 Transfer movement pump

- 5- If the regime of the engine is too high, turn the screw (1 fig. 2) clockwise in order to reduce the number of rpm.



The adjustment screw acts on an eccentric, therefore it must not be tightened or loosened by more than a quarter-turn .

Operation	High pressure (bar)	Speed (rpm)	Adjustment (ref. no.)
Heat gring	400 (+5 -5)	1,700 (+50 -50)	1 fig. 2

14.2.5 Adjusting the transfer movement engine (switching point)



10 flat spanner
3 male hexagonal spanner
Manometer, 0 - 600 bar

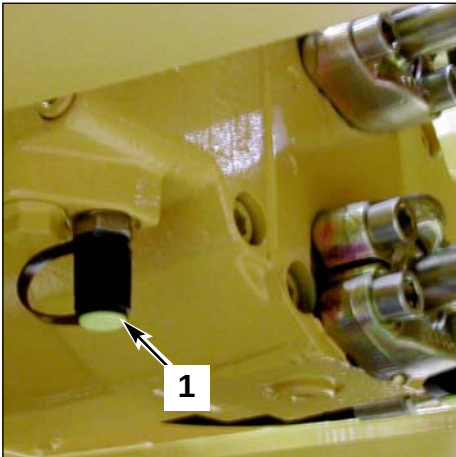


Fig. 1 Transfer movement engine

- 1- Place the machine on stabiliser support, with wheels raised; forward movement with high speed engaged, engine road configuration in maximum regime.
- 2- Raise the pressure in the transfer movement engine by progressively applying the stopping brake or the service brake.
To use the service brake, you must disconnect and stop up the Inching flex.
- 3- The pressure (1 fig. 1) in the transfer movement engine rises slowly and then drops sharply.

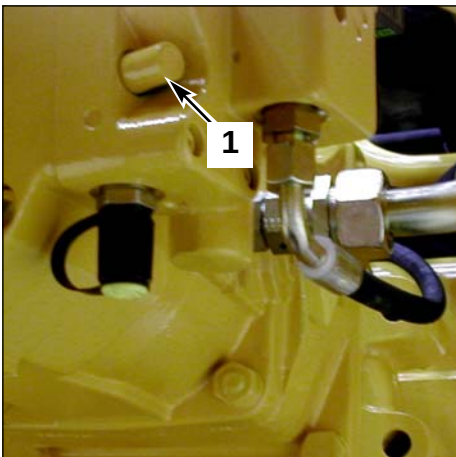


Fig. 2 Transfer movement engine

- 4- Turn the screw (1 fig. 2) clockwise to slow down the sharp fall in pressure in the transfer movement engine, or in the opposite direction to speed it up.



Note: The adjustment point is located at the moment at which the pressure falls sharply.

Operation	Adjustment point	Measurement (ref. no.)	Adjustment (ref. no.)
Adjustment of transfer movement engine	Sharp fall in pressure 270 (+10 -10)	1 fig. 1	1 fig. 2

14.2.6 Adjusting the minimum capacity of the engine (speed of travel)



19 flat spanner
6 male hexagonal spanner
Optoelectronic sensor

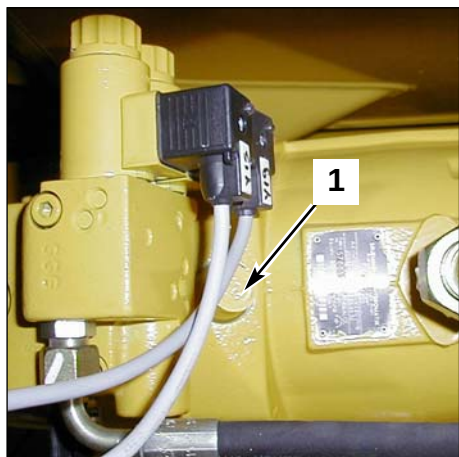


Fig. 1 Transfer movement engine

- 1- Place the machine on stabiliser support, with wheels raised; forward movement with high speed engaged, engine in maximum regime.
- 2- Read the speed in rpm by placing an optoelectronic sensor on the universal gear joint.
- 3- Turn the screw (1 fig. 1) anti-clockwise to increase the number of rpm.

Operation	Speed (rpm)	Measurement (ref. no.)	Adjustment (ref. no.)
Minimum capacity FRANCE 25 km/h	2,510 (+30 -30)	Joint	1 fig. 1
Minimum capacity GERMANY 20 km/h	2,080 (+30 -30)	Joint	1 fig. 1

14.2.7 Adjusting the Inching flex



10 flat spanner
3 flat hexagonal spanner
Manometer, 0 - 600 bar

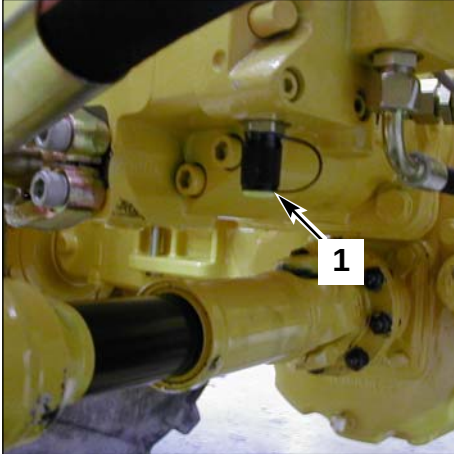


Fig. 1 Transfer movement engine

- 1- Place the machine on stabiliser support, with wheels raised; forward movement with low speed engaged, engine in maximum regime.
- 2- Place full pressure on the Inching pedal until the wheels stop, then gradually release the pedal until the wheels start moving again.
- 3- Measure the high pressure while the wheels are rotating (1 fig. 1) using the manometer.



Note: The pressure should not rise sharply when the wheels begin to rotate again.

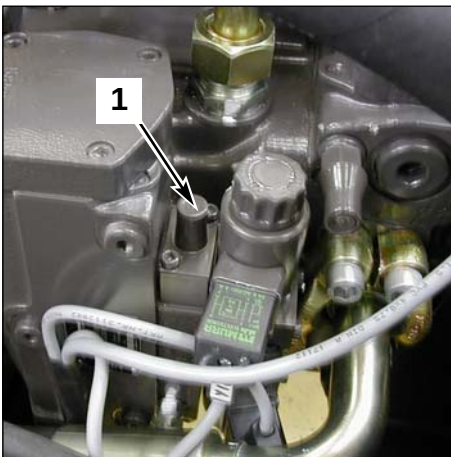


Fig. 2 Transfer movement pump

- 4- If the manometer reading indicates a sharp rise between the transfer of position from brake / Inching, loosen the screw (1 fig. 2).

Operation	High pressure (bar)	Measurement (ref. no.)	Adjustment (ref. no.)
Inching and brake	No sharp rise	1 fig. 1	1 fig. 2

14.3 Direction adjustment procedure

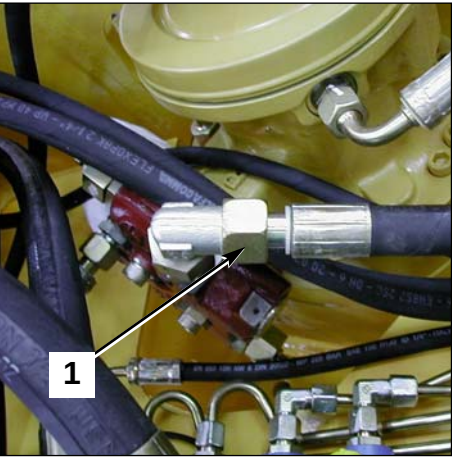


Fig. 1 CROSS OVER unit

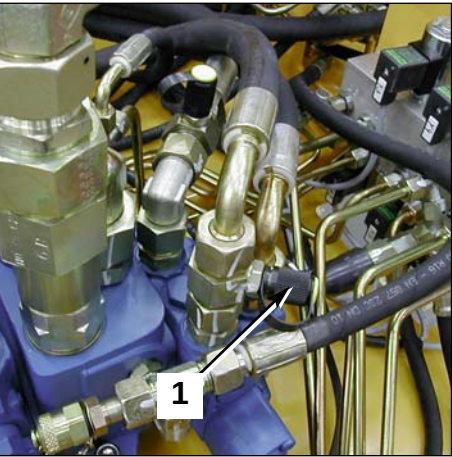


Fig. 2 SX14 valve block

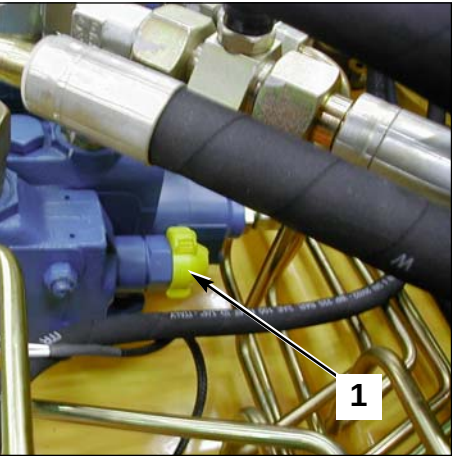


Fig. 3 SX14 valve block



19, 27 and 30 flat spanners
6 male hexagonal spanner
G DS16 1/2" female stopper
G DS16 1/2" male stopper
Manometer, 0 - 600 bar

14.3.1 Adjusting the primary controller

Take great care when removing the flex, as it may be under pressure.



Place the equipment on the ground, stop the engine, make the contact and cancel any residual pressure by activating the keys in all directions.

- 1- Block the direction by using the mechanical locking device located inside the cabin.
- 2- Remove and stop up the flex (1 fig. 1) on the CROSS OVER unit.
- 3- Point the tower to the right (in order to put the flex under pressure), engine in maximum regime.
- 4- Measure the pressure (1 fig. 2) using the manometer.
- 5- Loosen the lock nut and turn the pressure controller screw (1 fig. 3) clockwise to increase the pressure.
- 6- Reconnect the flex and move on to adjusting the ΔP of the CROSS OVER valve.

Operation	Pressure (bar)	Measurement (ref. no.)	Adjustment (ref. no.)
Primary controller	250 (+5 -0)	1 fig. 2	1 fig. 3

14.3.2 Adjusting the ΔP of the CROSS OVER valve



10 flat spanner
 2 manometers, 0 - 600 bar

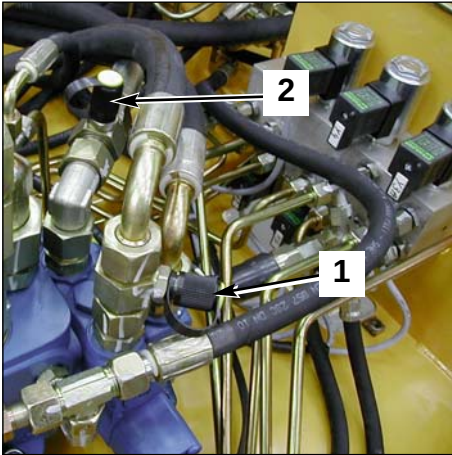


Fig. 1 SX14 valve block

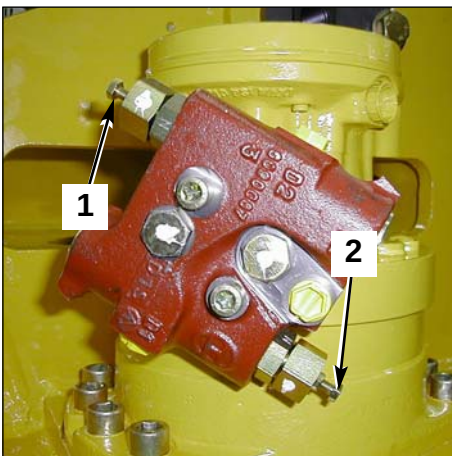


Fig. 2 CROSS OVER unit

Right side:

- 1- Place the machine equipment in a blocked position and turn the direction to the right, engine in maximum regime.
- 2- Measure the difference in pressure between (1 fig. 1) and (2 fig. 1) using the two manometers.
- 3- Loosen the lock nut and turn the screw (1 fig. 2) of the CROSS OVER valve clockwise in order to increase the ΔP of the right side.

Left side:

- 4- Place the machine equipment in a blocked position and turn the direction to the left, engine in maximum regime.
- 5- Measure the difference in pressure between (1 fig. 1) and (2 fig. 1) using the two manometers.
- 6- Loosen the lock nut and turn the screw (2 fig. 2) of the CROSS OVER valve clockwise in order to increase the ΔP of the left side.

Operation	Pressure (bar)	Measurement (ref. no.)	Adjustment (ref. no.)
ΔP direction	225 (+5 -0)	1 fig. 1 and 2 fig. 1 1 fig. 1 and 2 fig. 1	1 fig. 2 2 fig. 2

14.4 Hydraulic adjustment of the equipment



Before carrying out the checks, heat the hydraulic oil to between 50° and 60° in the tank.

14.4.1 Adjusting the assistance pressure



7/32" male hexagonal spanner
14 flat spanner
Manometer, 0 - 60 bar

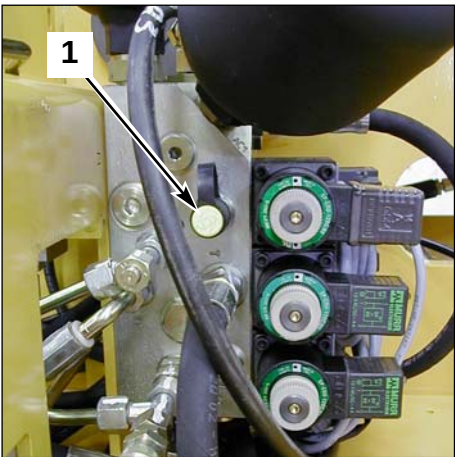


Fig. 1 Assistance pressure unit

- 1- Engine in maximum regime, place a ram in blocked position, for example the bucket ram.
- 2- Measure the pressure on the assistance pressure unit (1 fig. 1) using the manometer.

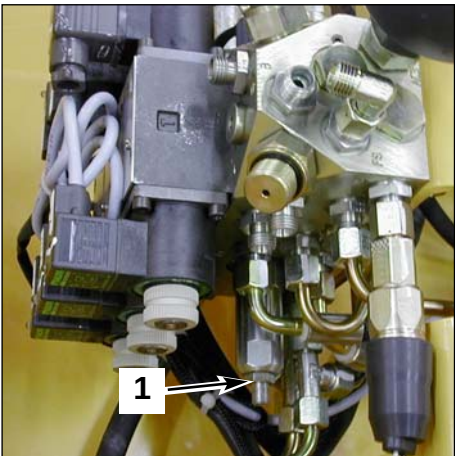


Fig. 2 Assistance pressure unit

- 3- Remove the stopper and turn the controller screw (1 fig. 2) clockwise in order to increase the pressure.

Operation	Pressure (bar)	Measurement (ref. no.)	Adjustment (ref. no.)
Assistance pressure	35 (+3 -0)	1 fig. 1	1 fig. 2

14.4.2 Adjusting the ΔP of the equipment without adjusting the power regulation (F.R. valve)

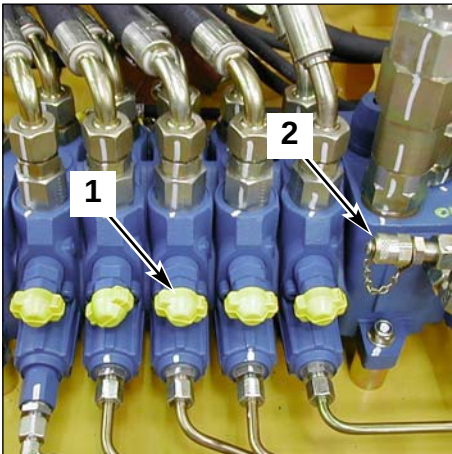


Fig. 1 SX14 valve block



17 and 22 flat spanners
 3 male hexagonal spanner
 2 manometers, 0 - 600 bar



Warning: Take great care when removing the controller, as the chamber for the ram subject to the controller may be under pressure.

Place the equipment on the ground, stop the engine, make the contact and cancel any residual pressure by activating the keys in all directions.

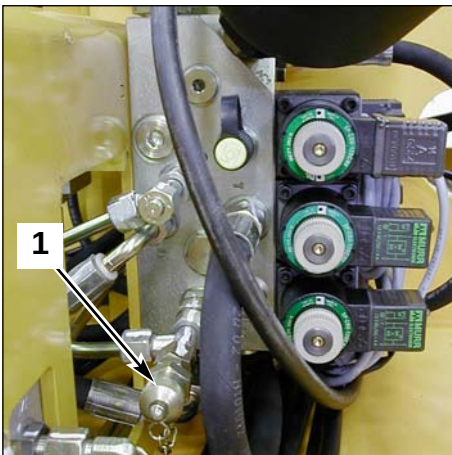
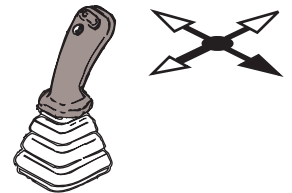


Fig. 2 Assistance pressure unit

- 1- Remove the anti-shock controller (1 fig. 1) (the small bucket ram chamber).
- 2- Raise the regulation controller into its position.
Ref = 536A0107 (taring at 50 bar).
- 3- With engine in maximum regime, place the selector on "MECALAC 1" push the right manipulator to the right (blocked position) to allow oil to circulate.



- 4- Measure the difference in pressure between (2 fig. 1) and (1 fig. 2) using the two manometers.
- 5- Loosen the lock nut and turn the screw (1 fig. 3) clockwise in order to increase the ΔP .



Tare the shock absorber (first use).

- 1- Place the selector on "MECALAC 1" push the right manipulator to the right (blocked position) to allow oil to circulate.
- 2- Loosen the lock nut and turn the screw clockwise to adjust the pressure (2 fig. 1) (50 bar).

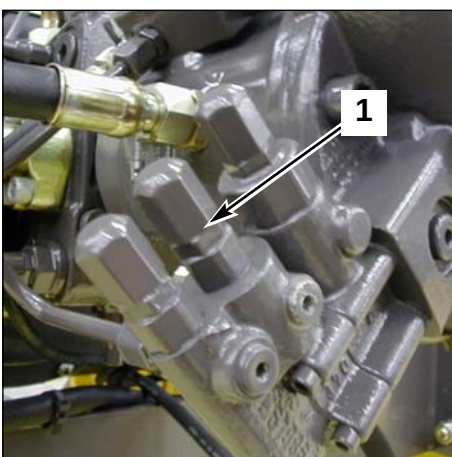


Fig. 3 Equipment pump

Operation	Pressure (bar)	Measurement (ref. no.)	Adjustment (ref. no.)
ΔP of equipment	17 (+1 -0)	2 fig. 1 and 1 fig. 2	1 fig. 3

14.4.3 Adjusting the ΔP of the equipment with adjustment of the power regulation (F.R. valve)



30 flat spanner
Flow meter adaptation kit

Warning: Take great care when removing the controller, as the chamber for the ram subject to the controller may be under pressure.



Place the equipment on the ground, stop the engine, make the contact and cancel any residual pressure by activating the keys in all directions.

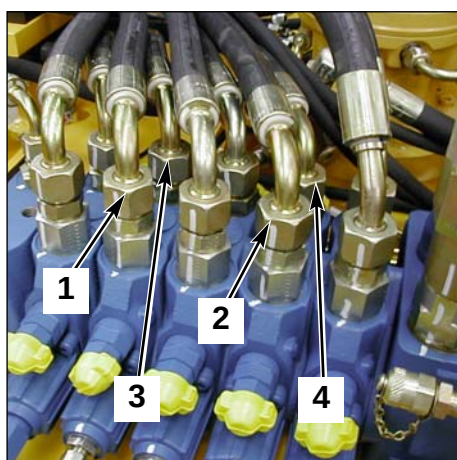


Fig. 1 SX14 valve block

1- Remove the hoses from the valve block:

- small chambers of the dipper ram and intermediate boom ram (1 fig. 1) and (2 fig. 1).
- large chambers of the dipper ram and intermediate boom ram (3 fig. 1) and (4 fig. 1).

2- Fit the flow meter conversion kit:

- small chambers of the dipper ram and intermediate boom ram (1 fig. 2) and (2 fig. 2).
- large chambers of the dipper ram and intermediate boom ram (3 fig. 2) and (4 fig. 2).



Note: The direction of the flow is from the small chamber to the large chamber.

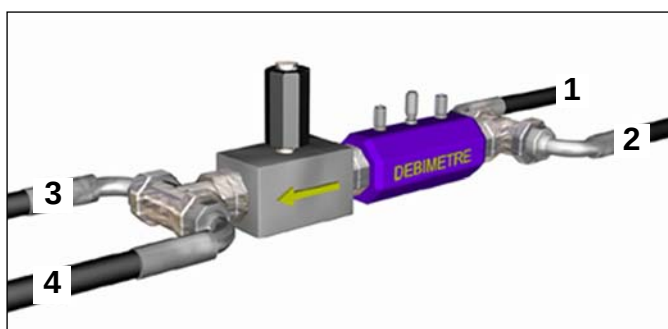


Fig. 2 Flow meter adaptation kit (Top-Test MX)

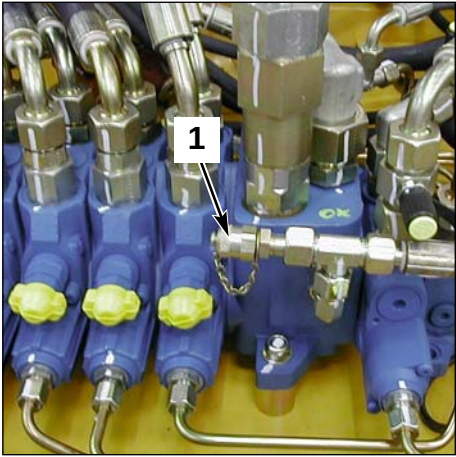
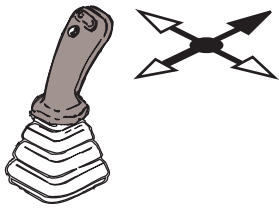


Fig. 3 SX14 valve block



17 flat spanner
3 male hexagonal spanner
2 manometers, 0 - 600 bar

- 3- Set the selector to MECALAC 1 and pull the right key towards the front (blocked position) to allow the oil to circulate (small chamber in the dipper ram).



- 4- Measure the difference in pressure between (1 fig. 3) and (1 fig. 4) using the two manometers.

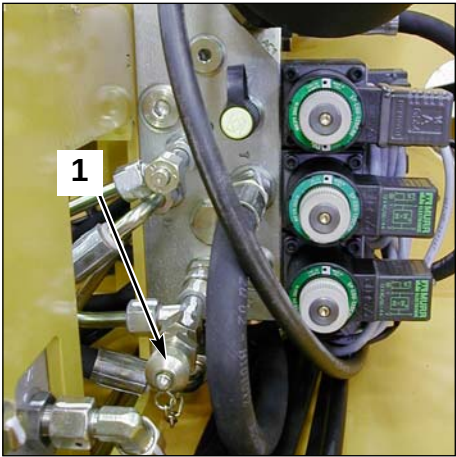


Fig. 4 Assistance pressure unit

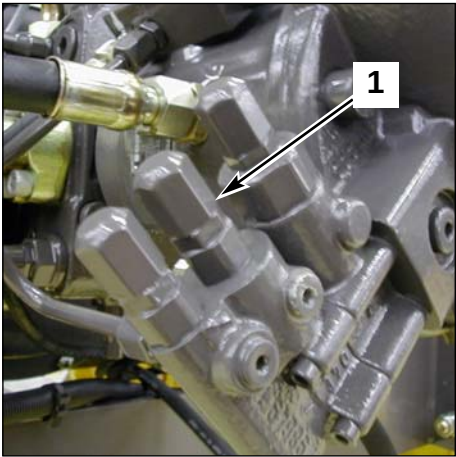


Fig. 5 Equipment pump

- 5- Turn the screw (1 fig. 5) clockwise in order to increase the ΔP .



Note: The flow meter kit shall remain installed for adjusting the power regulation.

Operation	Pressure (bar)	Measurement (ref. no.)	Adjustment (ref. no.)
ΔP of equipment	17 (+1 -0)	1 fig. 3 and 1 fig. 4	1 fig. 5

14.4.4 Adjusting the maximum pressure in the equipment pump (D.R.)

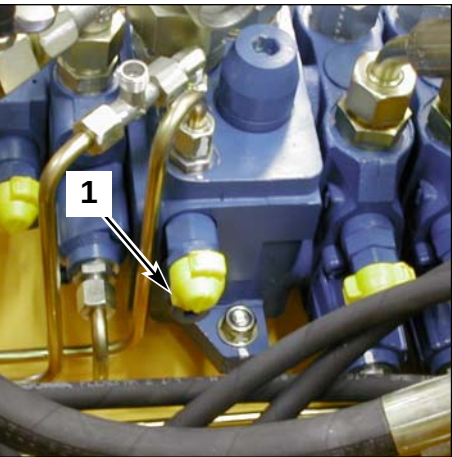


Fig. 1 SX14 valve block

	17 and 19 flat spanner 5 and 3 male hexagonal spanner Manometer, 0 - 600 bar
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- 1- Over-tare the L.S. valve on the valve block by turning the controller screw to blocked position (1 fig. 1).



Note: take care when over-taring the valve.

- 2- Place a ram in blocked position, for example the bucket ram.
Engine in maximum regime.

- 3- Measure the pressure (1 fig. 2) using the manometer.

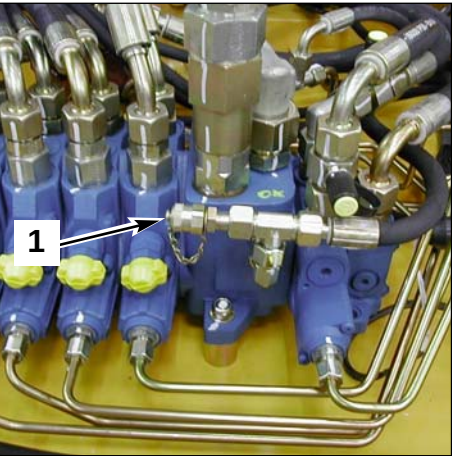


Fig. 2 SX14 valve block

- 4- Loosen the lock nut and turn the pressure controller screw (1 fig. 3) clockwise in order to increase the pressure.



Note: After this step it is mandatory to adjust the maximum pressure on equipment (L.S. valve).

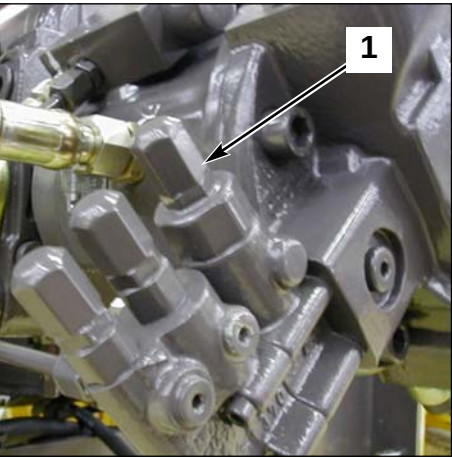


Fig. 3 Equipment pump

Operation	Pressure (bar)	Measurement (ref. no.)	Adjustment (ref. no.)
Maximum pump pressure	300 (+5 -5)	1 fig. 2	1 fig. 3

14.4.5 Adjusting the maximum pressure of the equipment (L.S. valve)



19 flat spanner
 5 male hexagonal spanner
 Manometer, 0 - 600 bar

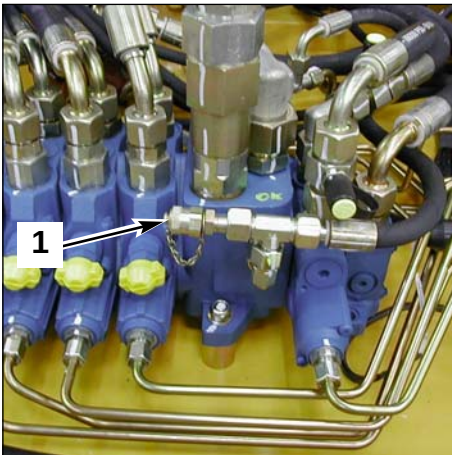


Fig. 1 SX14 valve block

- 1- With engine in maximum regime, place a ram in blocked position, for example the bucket ram.
- 2- Measure the pressure (1 fig. 1) using the manometer.

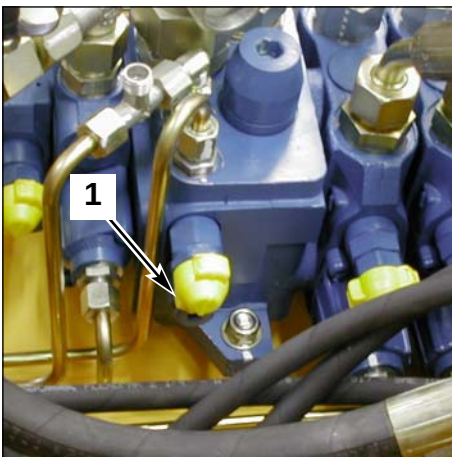


Fig. 2 SX14 valve block

- 3- Loosen the L.S. controller (1 fig. 2) previously over-tared, then adjust the pressure by turning the screw clockwise in order to increase the pressure.

Operation	Pressure (bar)	Measurement (ref. no.)	Adjustment (ref. no.)
Maximum equipment pressure	280 (+5 -5)	1 fig. 1	1 fig. 2

14.4.6 Adjusting the equipment pump (L.R. valve)

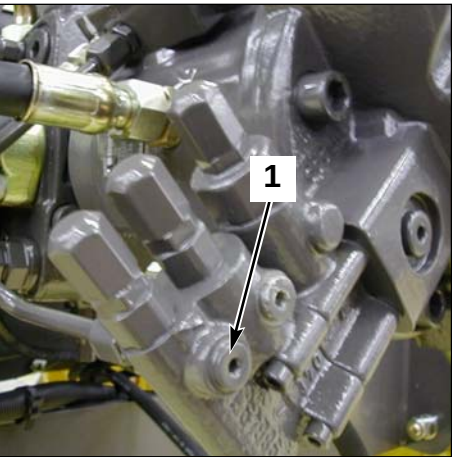


Fig. 1 Equipment pump

	17 flat spanner
	3 male hexagonal spanner
	3/16" male hexagonal spanner
	Connector and hose (TOP-TEST MX)
	Manometer 0 - 60 bar

- 1- Take the plug out of the pump (1 fig. 1) and the breather off the hydraulic tank.
- 2- Fit the male connector at the end of the hose and immerse the other end in the tank.
- 3- Screw in the connector in place of the pump's plug.
- 4- Accelerate the engine to maximum speed.

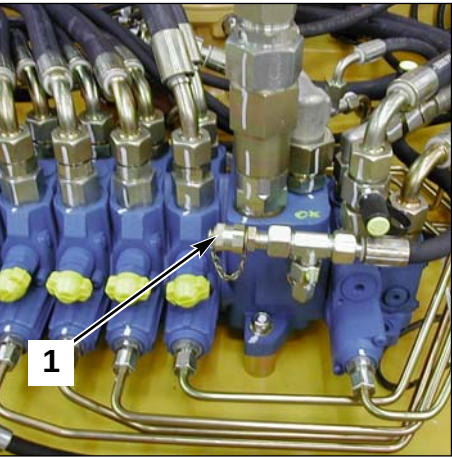


Fig. 2 SX14 valve block

- 5- Measure the pressure (1 fig. 2) using the pressure gauge.

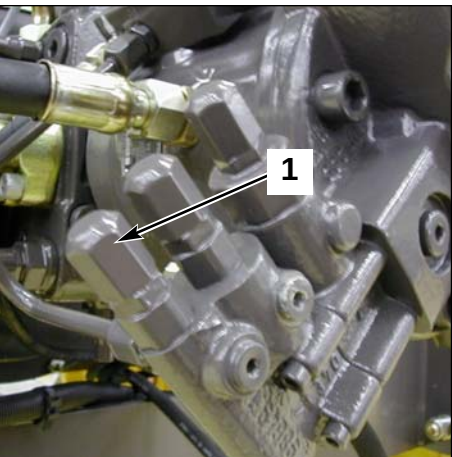


Fig. 3 Equipment pump

- 6- Undo the lock nut and turn the L.R. valve's screw (1 fig. 3) clockwise to increase the pressure.
- 7- Remove the connector with the hose and refit the plug on the pump (1 fig. 1).

Operation	Pressure (bar)	Measurement (ref. no.)	Adjustment (ref. no.)
Valve L.R.pressure	22 (+1 -1)	1 fig. 2	1 fig. 3

14.4.7 Adjusting the power regulation

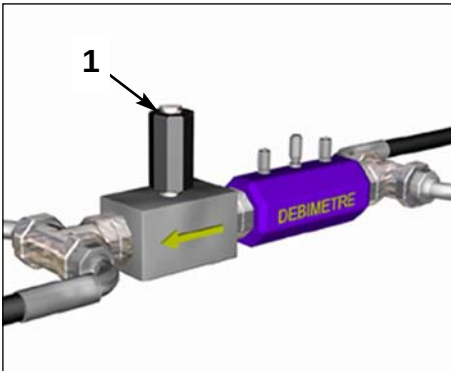


Fig. 1 Flow meter adaptation kit (TOP-TEST MX)

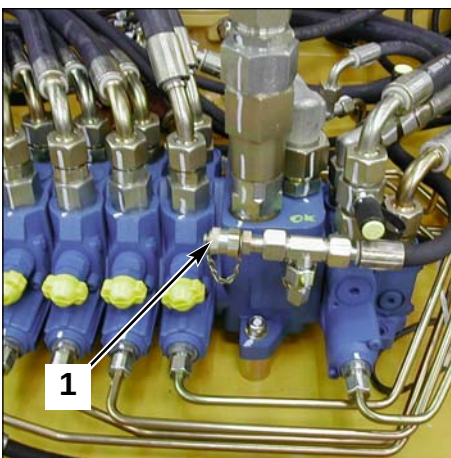


Fig. 2 SX14 valve block

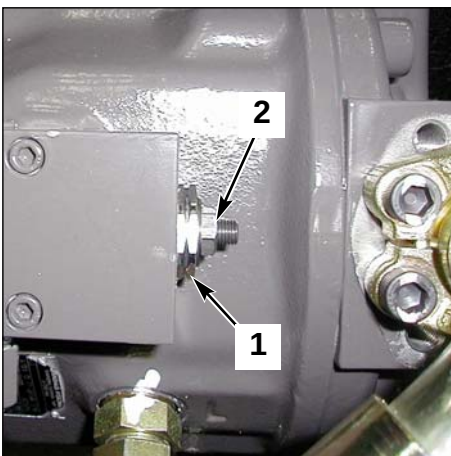
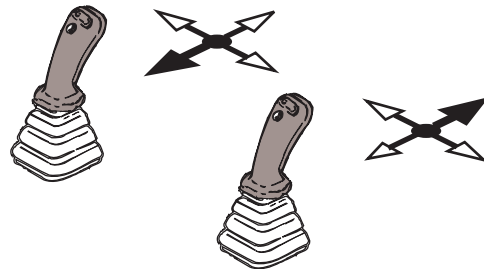


Fig. 3 Equipment pump



13 and 27 flat spanners
 3 male hexagonal spanner
 Inductive sensor
 Manometer, 0 - 600 bar
 Flow meter adaptation kit

- 1- Put the selector switch on "MECALAC 1", pull the left manipulator back, push the right manipulator forward (as far as it will go) to allow the oil to circulate (small chambers of the dipper ram and intermediate boom ram).



- 2- Accelerate the engine to maximum regime.
- 3- Reduce the flow (115 l/min) using the tap on the flow meter (1 fig. 1).
- 4- Measure the pressure (1 fig. 2) using the manometer.
- 5- Loosen the lock nut and turn the pressure controller screw (1 fig. 3) clockwise to increase the pressure.
- 6- Reduce the flow (87 l/min) using the tap on the flow meter (1 fig. 1).
- 7- Measure the pressure (1 fig. 2) using the manometer.
- 8- Loosen the lock nut and turn the pressure controller screw (2 fig. 3) clockwise to increase the pressure.
- 9- Check that the regime of the engine does not exceed 2,000 rpm.

Operation	Pressure (bar)	Speed (rpm)	Measurement (ref. no.)	Adjustment (ref. no.)
Power regulation at 115 l/min	220 (+10 -10)	> 2,000	1 fig. 2	1 fig. 3
Power regulation at 87 l/min	265 (+10 -10)	> 2,000	1 fig. 2	2 fig. 3

14.4.8 Monitoring the power regulation curve with the direction



13 and 27 flat spanners
 3 male hexagonal spanner
 Inductive sensor
 Manometer, 0 - 600 bar
 Flow meter adaptation kit

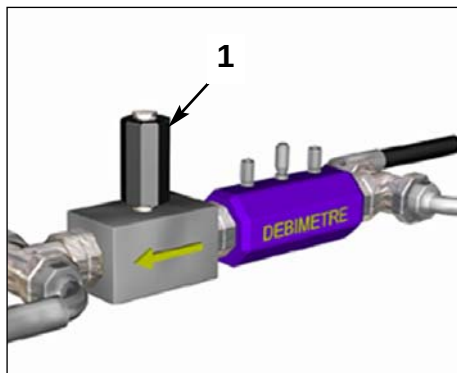
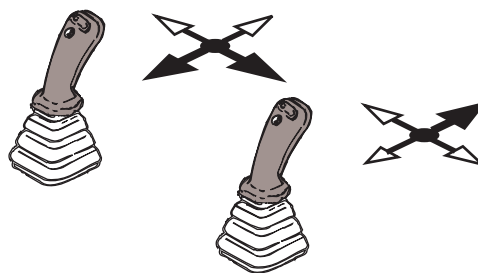


Fig. 1 Flow meter adaptation kit (TOP-TEST MX)

- 1- Place the equipment in blocked position against a wall, put the selector switch on "MECALAC 1", pull the left manipulator back, push the right manipulator forward (as far as it will go) to allow the oil to circulate (small chambers of the dipper ram and intermediate boom ram).



- 2- Force the direction to the right by pushing the left key towards the right (blocked position).
- 3- Screw the tap on the flow meter (1 fig. 1) until the flow is cut off completely.



Note: During this operation, check that the regime of the engine does not exceed 2,000 rpm. If it is in excess, restart the "adjusting the power regulation" process, reduce the pressure by units of 10 bar and continue this adjustment until the regime of the engine is brought below 2,000 rpm.

15. Control Sheet

Machine No.:

Engine No.:

Equipment pump No.:

Transfer movement pump No.:

Transfer movement motor No.:

Adjustment values 12 MXT	Designation		Stated or regulated values
	Speed (rpm)	Pressure (bar)	
Turbocharged engine			
Maximum engine speed	2,225 (+25 -25)		
Minimum engine speed	950 (+50 -0)		
Slewing			
Primary controller		250 (+5 -0)	
Δ P right		225 (+5 -0)	
Δ P left		225 (+5 -0)	
Equipment			
Assistance pressure		35 (+3 -0)	
Equipment D P		15 (+1 -1)	
Equipment pressure (L.R.)		22 (+1 -1)	
Maximum pump pressure (D.R.)		310 (+10 -0)	
Maximum equipment pressure		280 (+5 -5)	
Power control (115 l)		220 (+10 -10)	
Power control (87 l)		265 (+10 -10)	
Transfer movement			
Supercharging pr. at max. speed		26 (+2 -2)	
Beginning of start-up	1,100 (+50 -30)		
Travel H.P. (D.R.)		460 (+10 -10)	
Compression	1,700 (+50 -50)		
Travel motor regulation		270 (+10 -10)	
Min. displacement, FRANCE	2,510 (+30 -30)		
Min. displacement, GERMANY	2,080 (+30 -30)		



Note: In order to obtain the best from our after-sales service, you should fill out this control sheet correctly before sending it.
 In order for the breakdown to be diagnosed properly, describe it on the back of this page.

[illegible]

16. Tools



Fig. 1 TOP-TEST MX toolbox E6160001/00

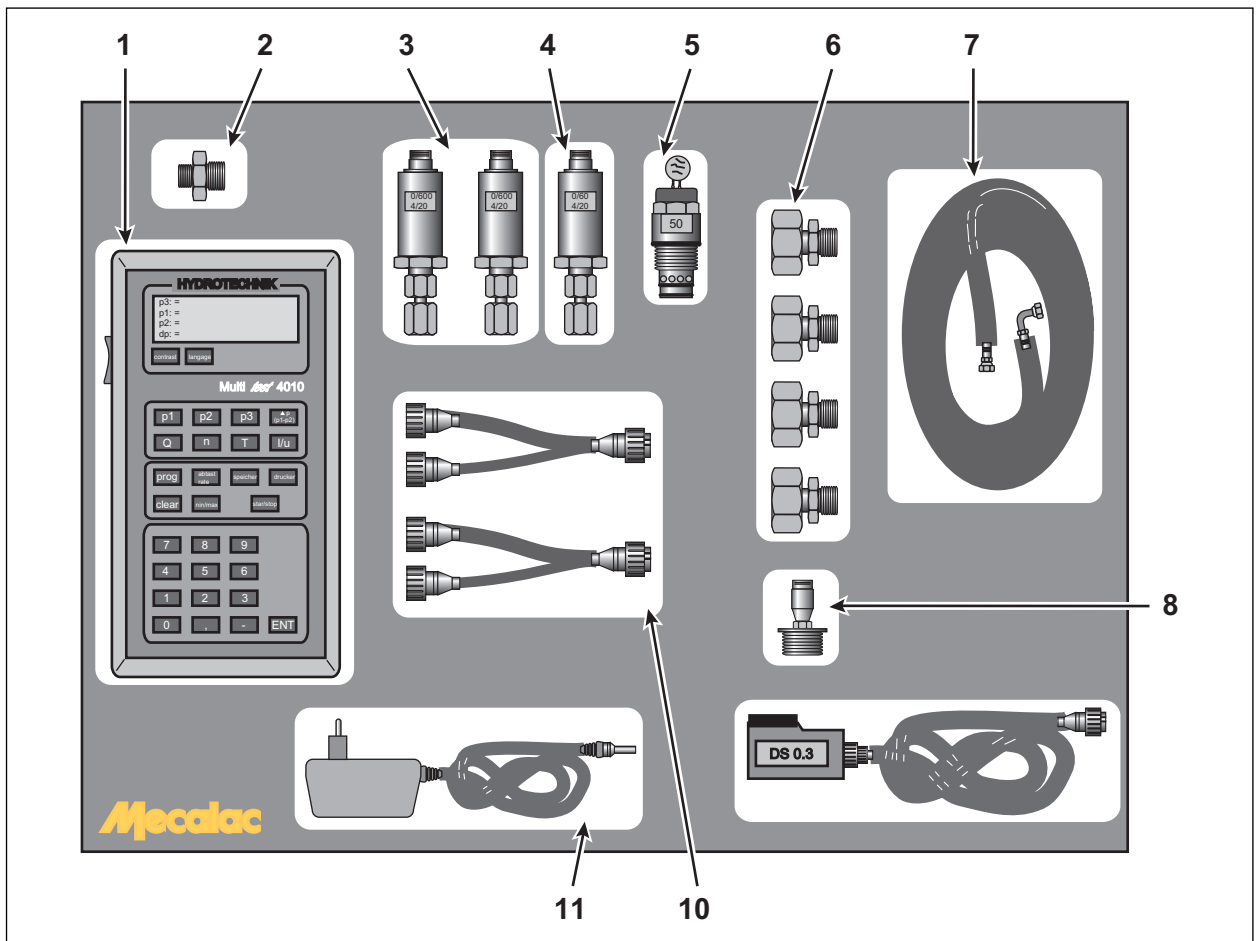


Fig. 2 TOP-TEST MX toolbox, upper foam section

- 1 - Main box MT-4010
- 2 - Male union 4DL8-7/16-unf 20
- 3 - Pressure sensor 4/20 mA / 0-600
- 4 - Pressure sensor 4/20 mA / 0-60
- 5 - Pressure limiter (50 bar taring calibration)
- 6 - Reduction (mounting of the turbine on 14MXT)
- 7 - Flexible hose (attached to the hydraulic reservoir)
- 8 - Inductive rotary sensor (Cummins engine)
- 9 - Optoelectronic rotary sensor (Joint)
- 10 - Double cable
- 11 - Main AC power supply

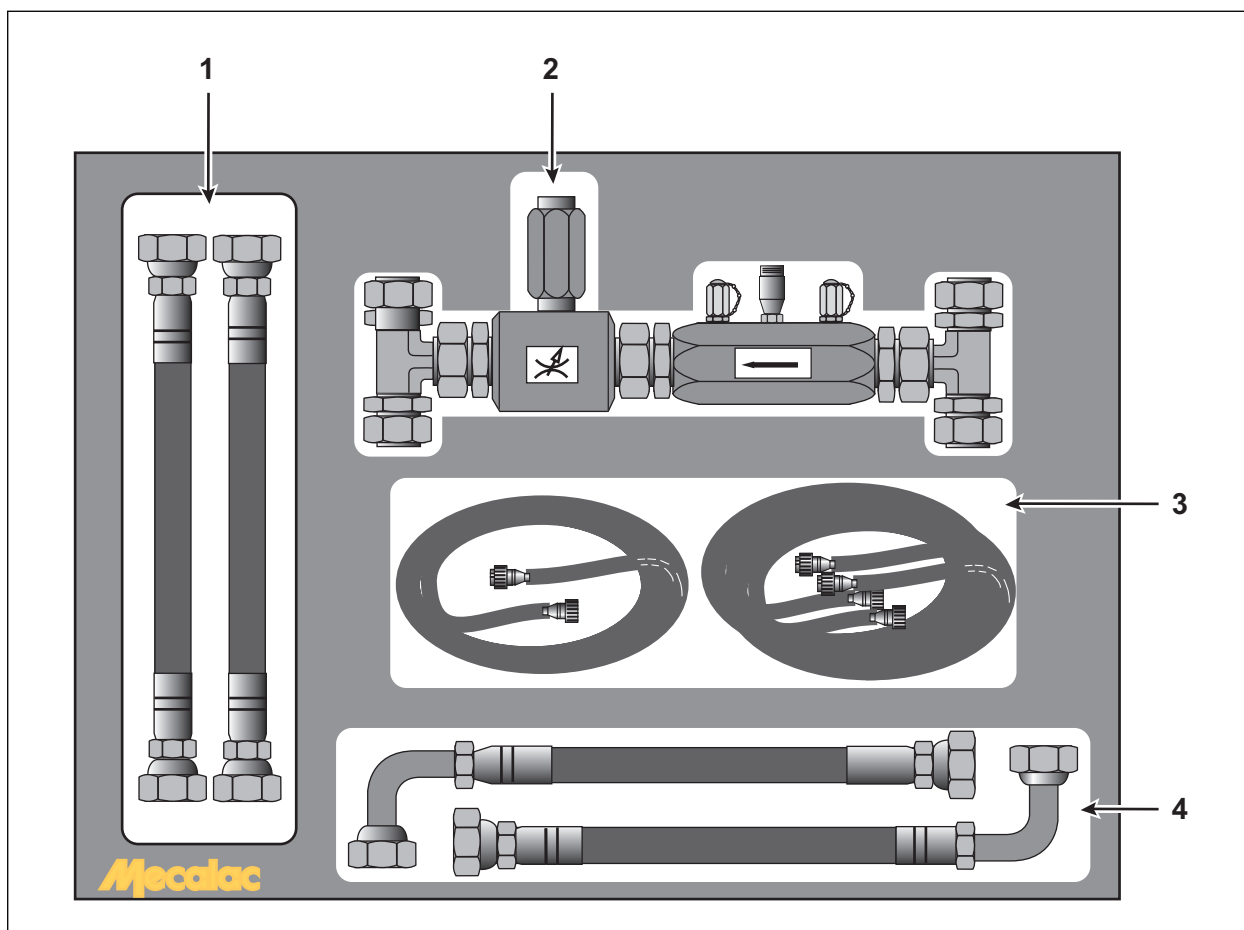


Fig. 3 TOP-TEST MX toolbox, lower foam section

- 1 - Flexible hose (connection from the turbine to the SX18 valve block)
- 2 - Turbine (flow meter)
- 3 - Connecting cable
- 4 - Flexible hose (connection from the turbine to the SX18 valve block)

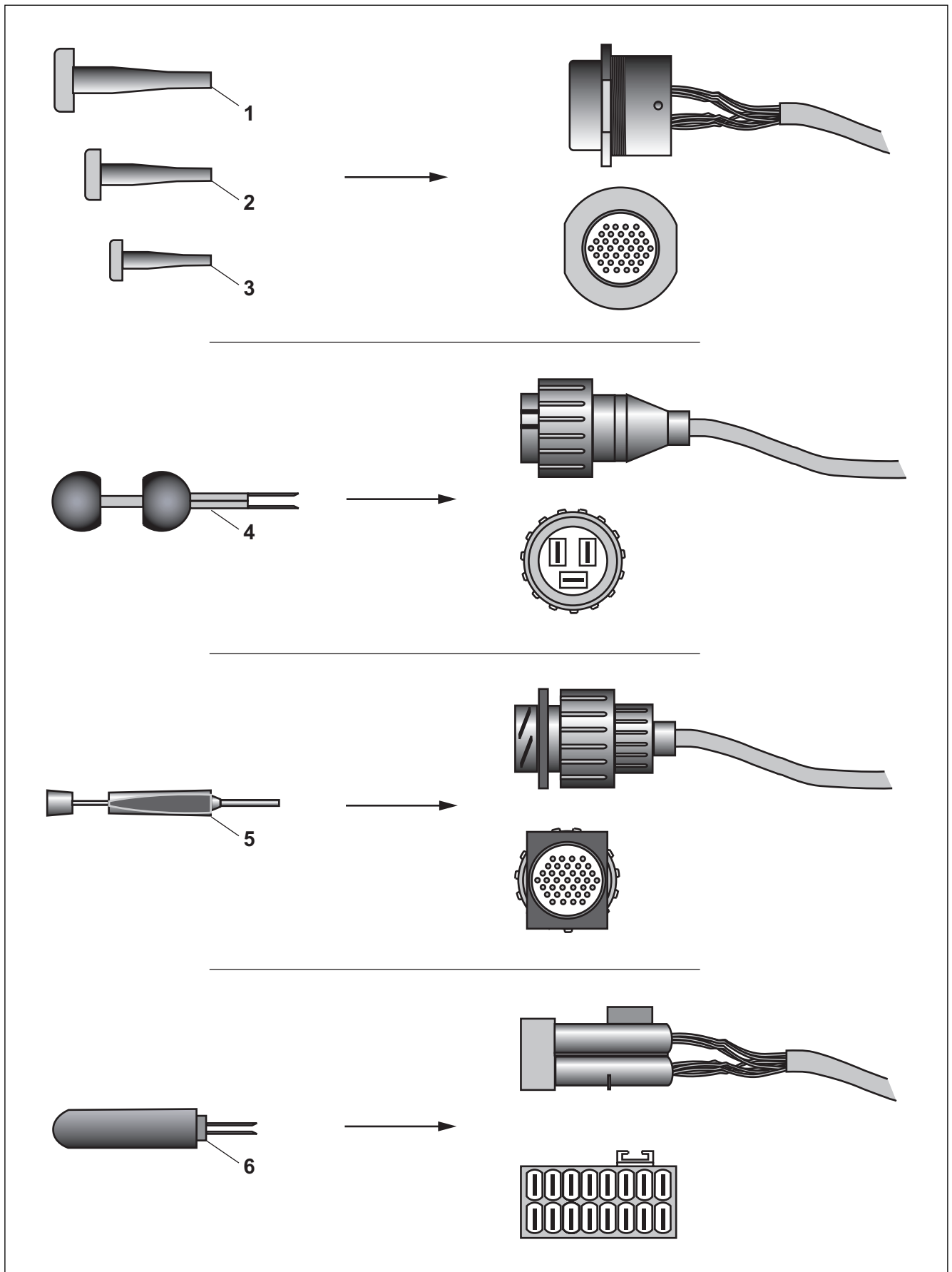


Fig. 4 Special connector tools

1 - 5180102
 2 - 5180103
 3 - 5180104

4 - 6525004
 5 - 6525003
 6 - 572A0003

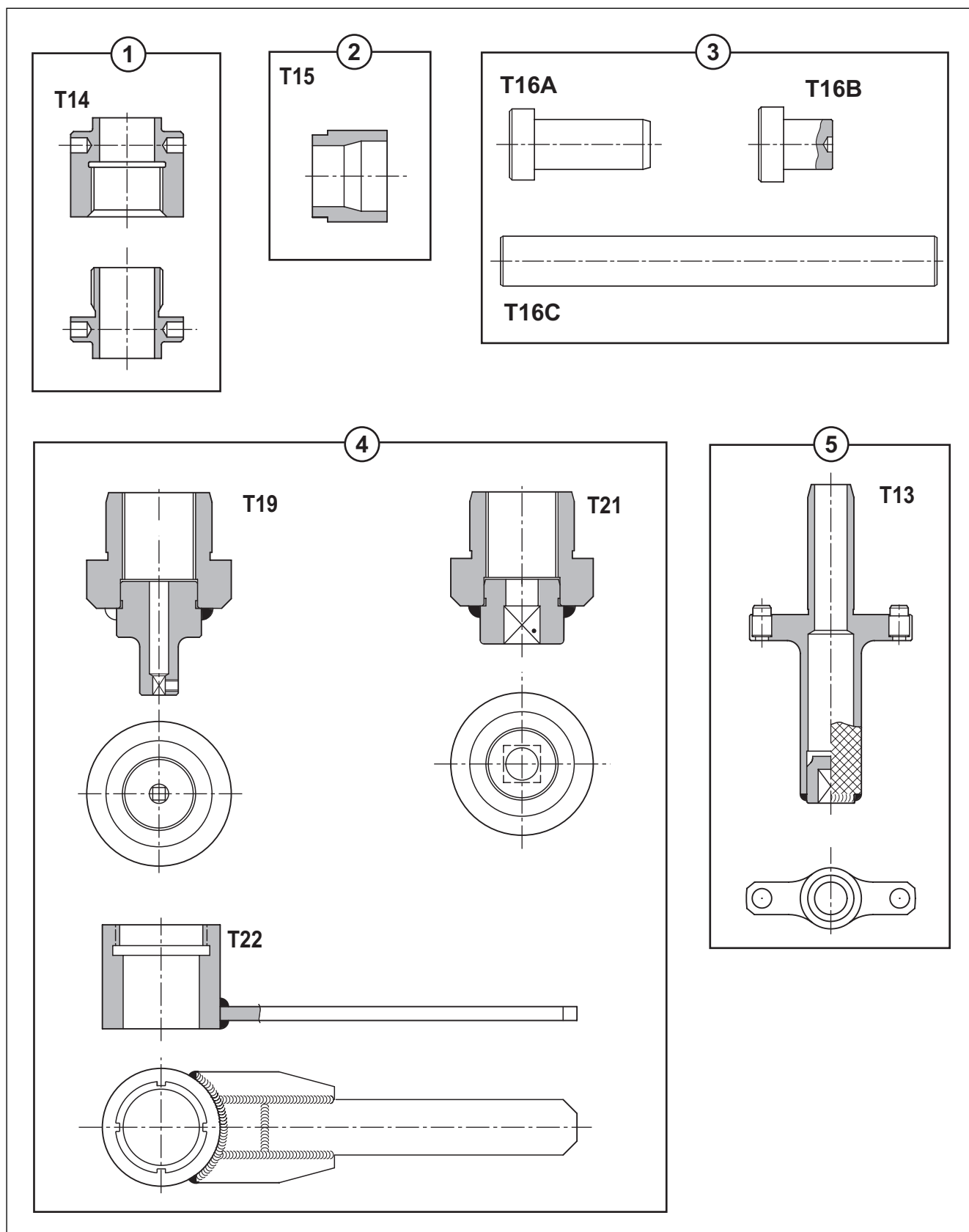


Fig. 5 Axles tool (DANA)

- 1 - 5450060
- 2 - 5450061
- 3 - 5450062
- 4 - 5450063
- 5 - 5450064

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