

Mecalac



HANDBOOK OF REPAIR

MANUFACTURER : "MECALAC SAS"

14 MBX

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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 standard or telescopic stabilizers (option) with independent control, 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).

An electronic control panel groups together the machine's operating and safety information.

2.7 Controls

The controls are grouped together on the instrument panel and integrated in consoles situated on either side of the seat.

2.8 Seat

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

2.9 Equipment

The equipment is controlled by manipulators enabling the movements to be combined flexibly and efficiently. It is in the centre of the machine and made up of four elements: the boom, the intermediate boom, the jib 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 142° travel.

The offset jib permits, by the action of a hydraulic ram, the symmetrical offset of the dipper and the tool in order to dig outside the machine's boundaries.

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. The bucket or tool has mechanical and automatic locking, only their unlocking is hydraulically controlled.

[illegible]

3. Technical characteristics

3.1 Turbocharged engine

- Type:CUMMINS 4BTA3.9 ELITE
- Diesel: 4 in-line cylinders
- Net horsepower at flywheel (DIN 70020 / ECE-R2403): 82 kW at 2,200 rpm
- Max. net torque at flywheel (DIN 70020 / ECE-R2403): 460 Nm at 1,400 rpm
- Cubic capacity: 3922 cm³
- Bore x stroke: 102 mm x 120 mm
- Cooling by: coolant
- Air filter: with dry cyclonic cartridge

3.2 Axles

- **Rigid axle on the front chassis section:** DANA 112 / 121
Gear ratios:
 - Bevel gear: 12/35
 - Epicyclic wheel reducer, 4 planet wheels: 1/6
- **Oscillating axle on the rear chassis section:** DANA 357 / 112 / 158
With gearbox:..... DANA 357
Gear ratios:
 - Gearbox integrated in the rear axle:
 - 1st gear: RANGE 1.....1/4.06
 - 2nd gear: RANG 2.....1/1.62
 - Bevel gear: 12/35
 - Epicyclic wheel reducer, 4 planet wheels: 1/6
- **Self-blocking differential:** limited slip 45%
 - **Integrated oil-bath hydraulic disc brakes:** 8 discs at the front
: 8 discs at the rear

3.3 Capacities

- Hydraulic oil tank:..... 110 l
- Total capacity of the hydraulic circuit: 220 l
- Front axle housing: 7,1 l
- Rear axle housing: 7,4 l
- Transfer box coupled on the rear axle / gearbox: 1,6 l
- Wheel reducer: 1,25 l
- Diesel engine + filter (sump: 13 l) mini.: 11,5 l - maxi.: 14,5 l
- Diesel fuel tank: 190 l
- Cooling system: 20 l

3.4 Electrical system

- Batteries: 24 V (2 x 100 Ah-500 A)
- Starter: 24 V - 2,8 KW
- Alternator: 24 V - 40 Ah
- Battery cut-out.
- 28-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:**..... 107 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 manual speed ranges operated by the selector:**

This change of speed must be done when stationary, with the 'Commodo' in neutral (N) and the brake pedal fully depressed.

- Selector **OFF** = **Range 1**, "Site" speed,
- Selector **ON** = **Range 2**, "Road" speed.

For each of these 2 speed ranges, it is possible to operate 2 speeds for both directions of travel selected by the 'Commodo' electric control, i. e. in all 4 speeds:

- **RANGE 1:** (L) speed from 0 to 4 kph,
(H) speed from 0 to 12 kph.
- **RANGE 2:** (L) speed from 0 to 10 kph,
(H) speed from 0 to 30 kph.

Note: For Germany, between 0 and 20 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 bars 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:

- **Axial piston pump with variable displacement and power control:**
 - Cubic capacity: 95 cm³
 - Max. delivery: 207 l/min.
- **Associated functions by solenoid-operated valves:**
 - Low pressure..... ~ 35 bars
 - Accelerator.
 - Oscillation lock.
 - Seat pivoting console safety device.
 - High pressure: ~ 310 bars
 - Stabilizers.
 - Tool unlocking.
 - Offset.
- **Combined SX18 “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 SM12 type.
 - Proportionality of the functions always complied with irrespective of each element's pressure level.
 - Anti-cavitation pressure relief valve on each element.
 - Hydraulicall-assisted proportional function controls, by manipulators or foot-operated controls supplied at low pressure with stand-by accumulator.

3.5.3 Slewing and hydrostatic steering circuit:

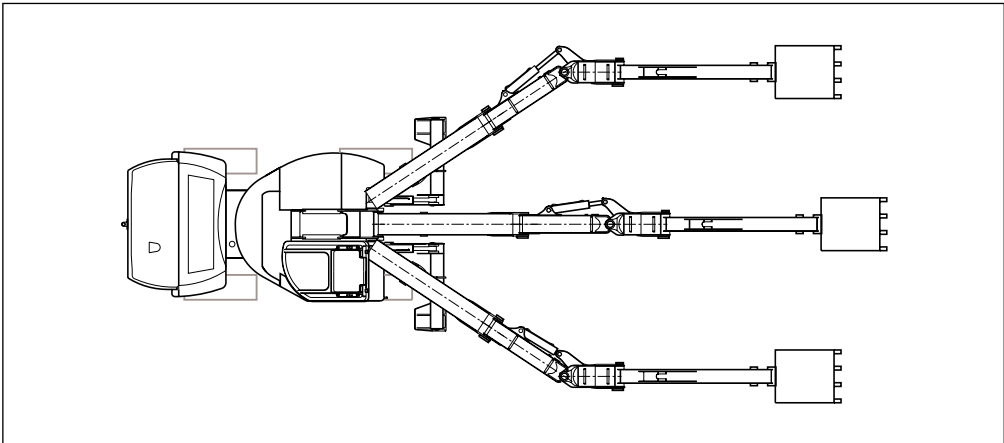
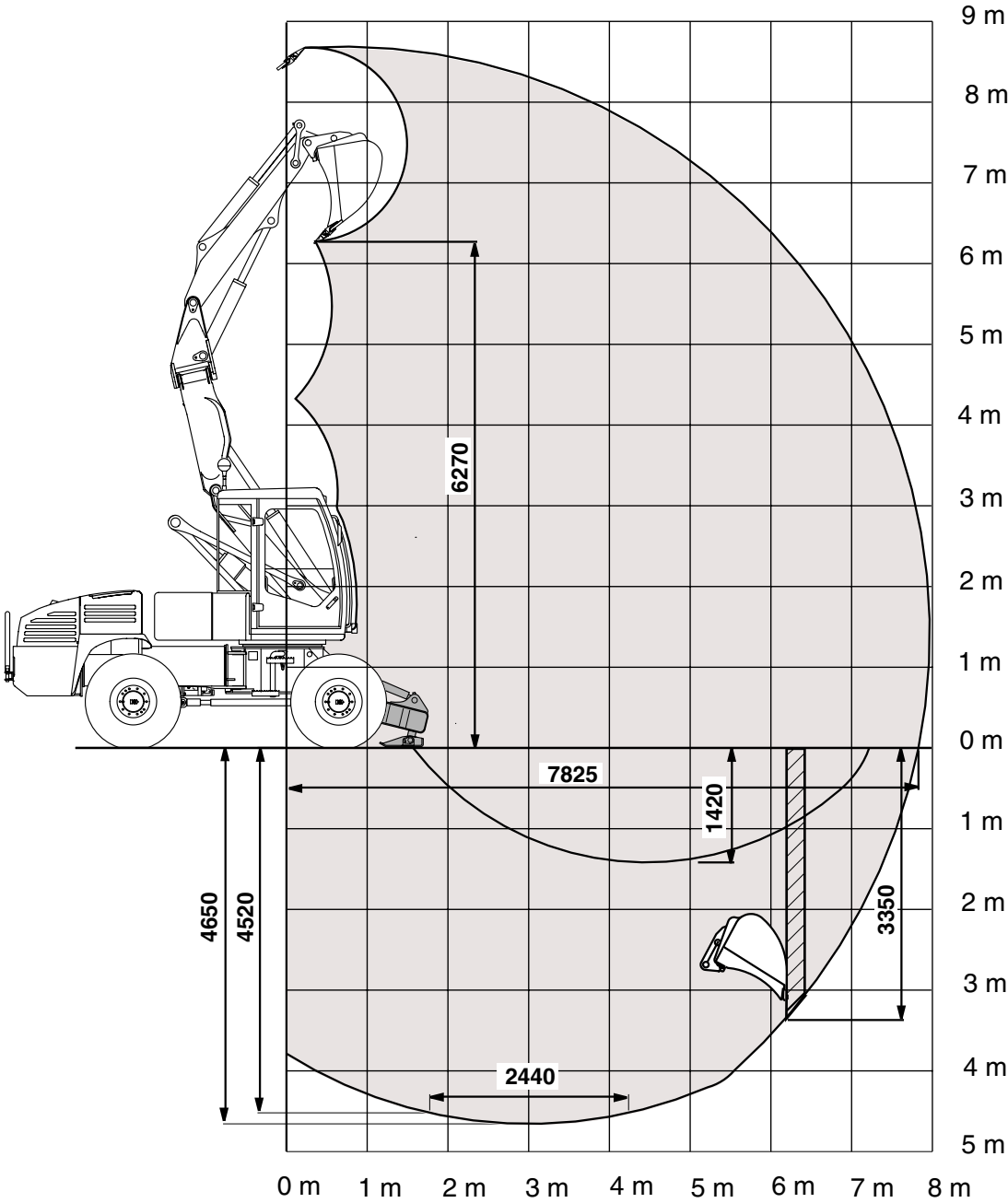
- **Hydrostatic steering:**

Double-acting ram protected by two 240 bars anti-shock valves, controlled by a 125/440 cc double-displacement ORBITROL unit and a priority valve operated by “Load-sensing” signal.

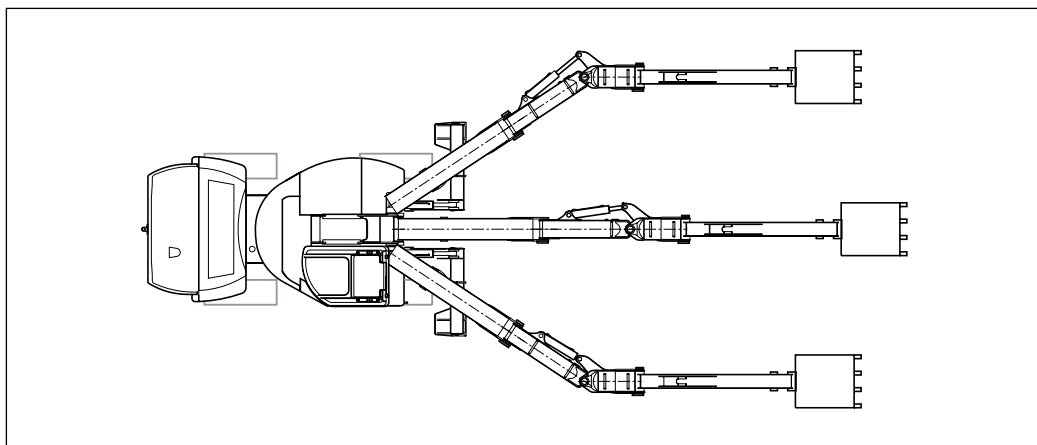
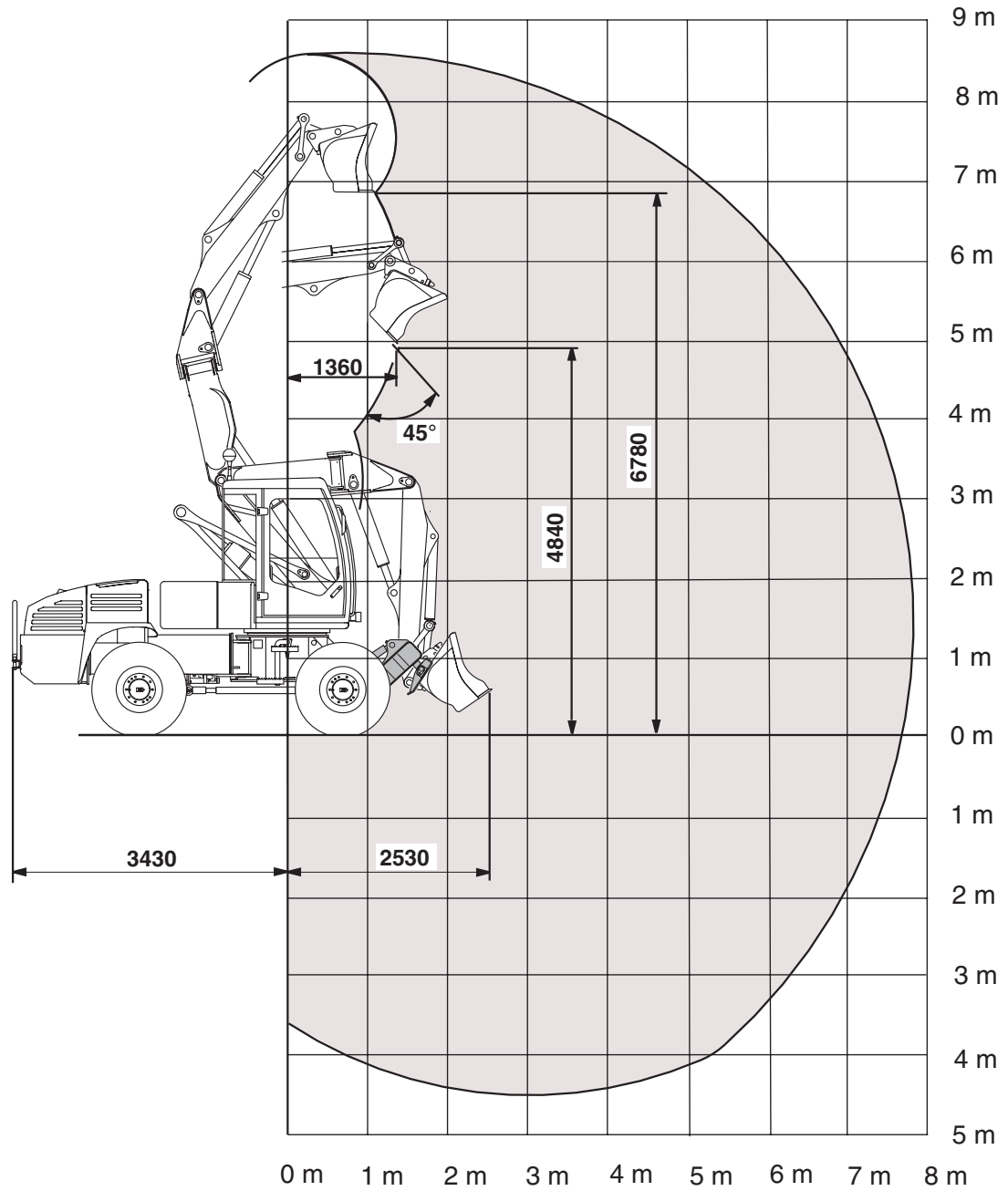
 - Fixed displacement gear pump:
 - Cubic capacity: 34 cm³
 - Max. delivery: ~ 75 l/min.
 - Max. pressure: 190 bars
- **Slewing:**
 - Hydraulic motor: MSE08 with brake F08
 - Max. pressure.: 250 bars
 - Cubic capacity: 1250 cm³
 - Slewing internal (ball) crown wheel with remote greasing.
 - Rotation speed: 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



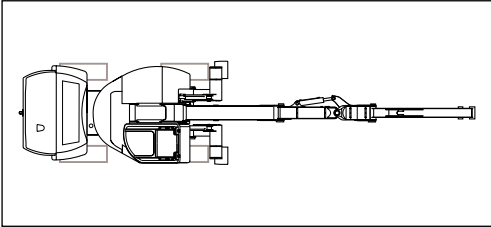
4.2 In loading bucket position



5. Table of stability loads in KG

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

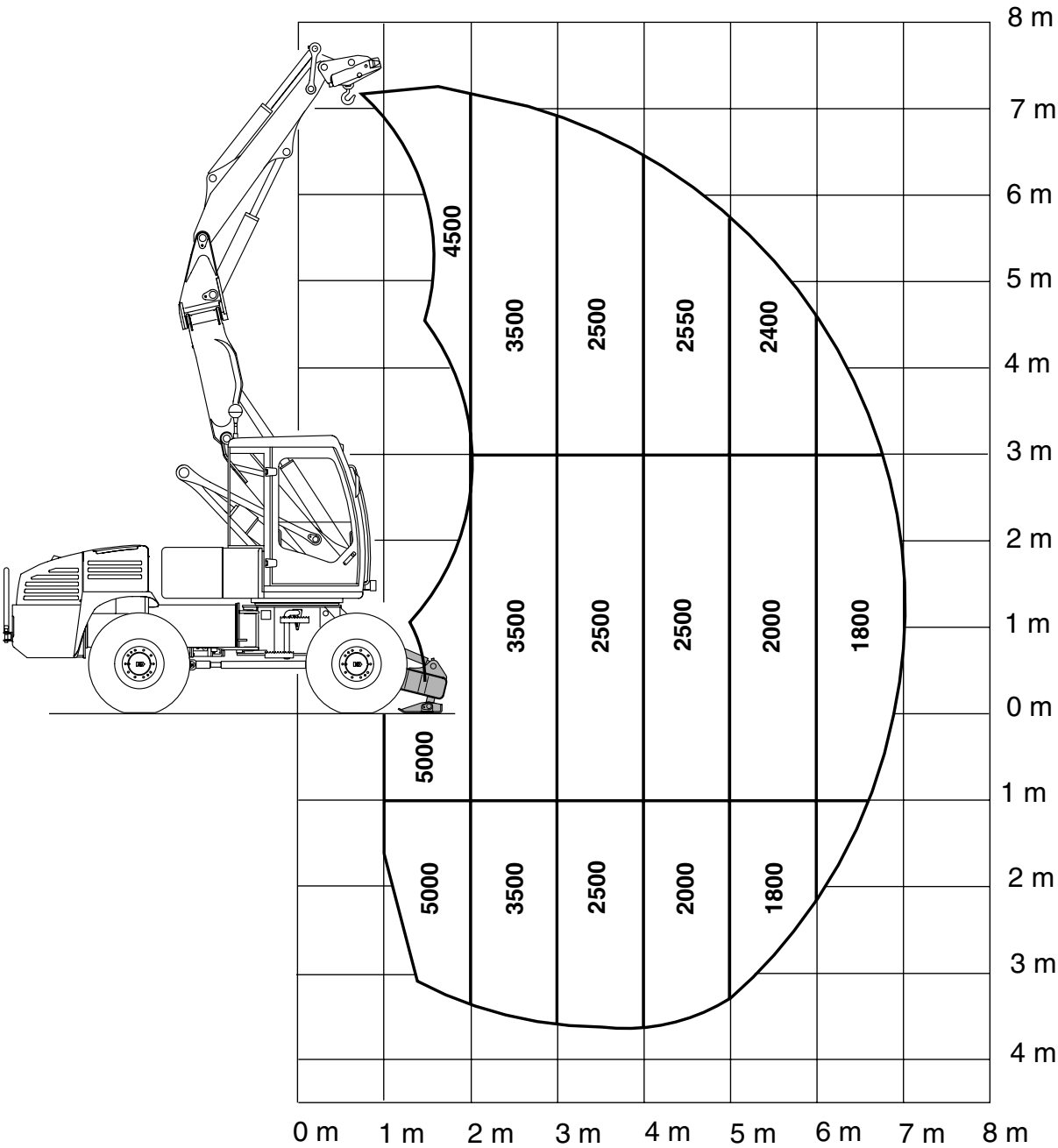
Working conditions:



- On wheels with the stabilizers fully extended,
- 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.

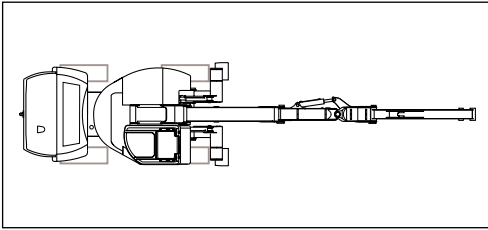


Stability loads and hydraulic limits according to standard ISO 10567.



5.2 Lifting and handling in the longitudinal position without stabilizers

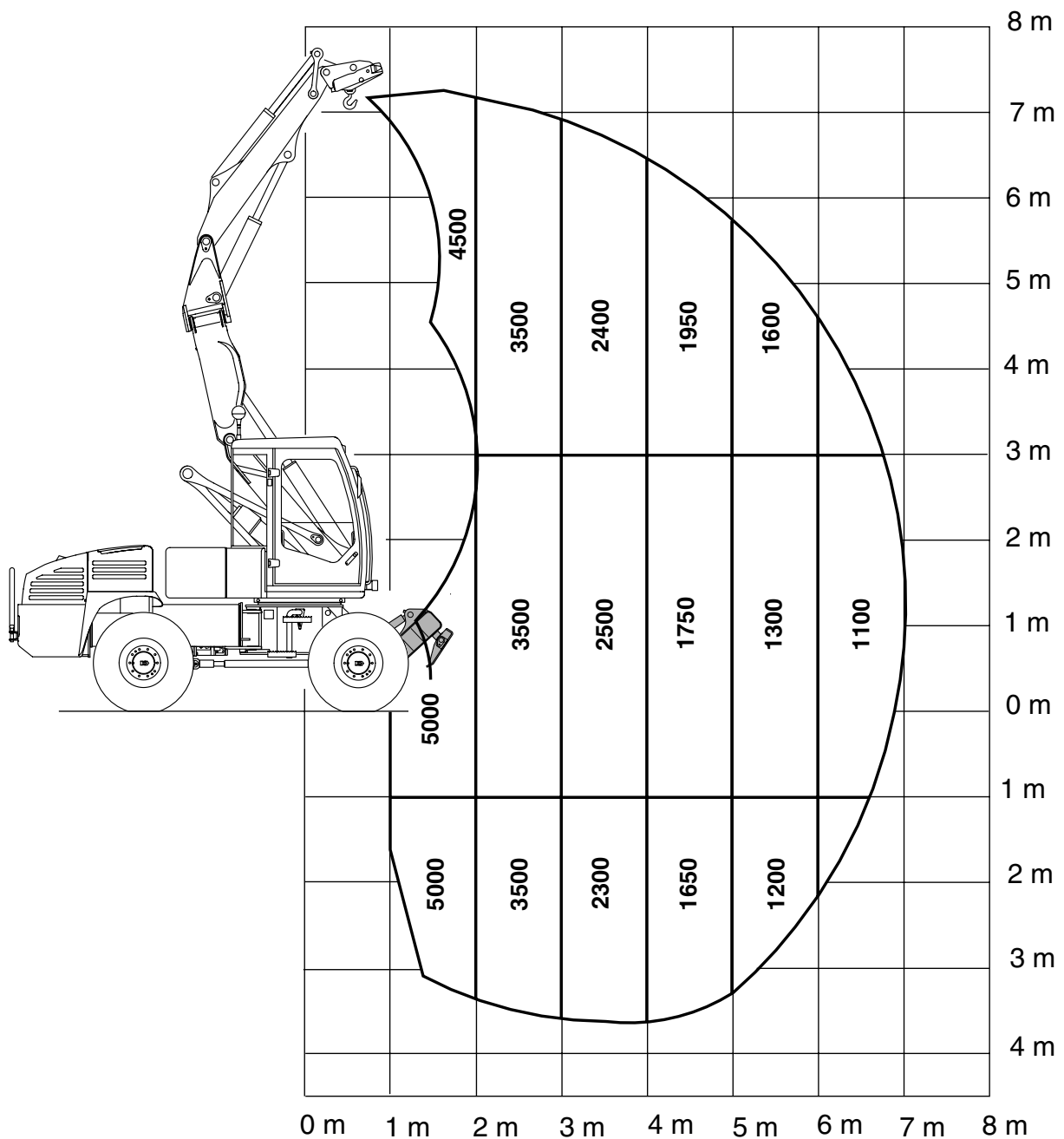
Working conditions:



- 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.



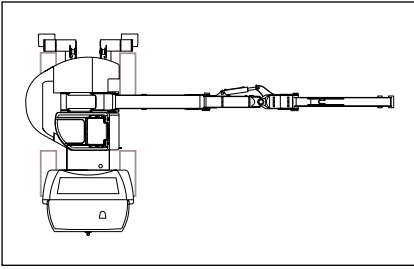
Stability loads and hydraulic limits according to standard ISO 10567.



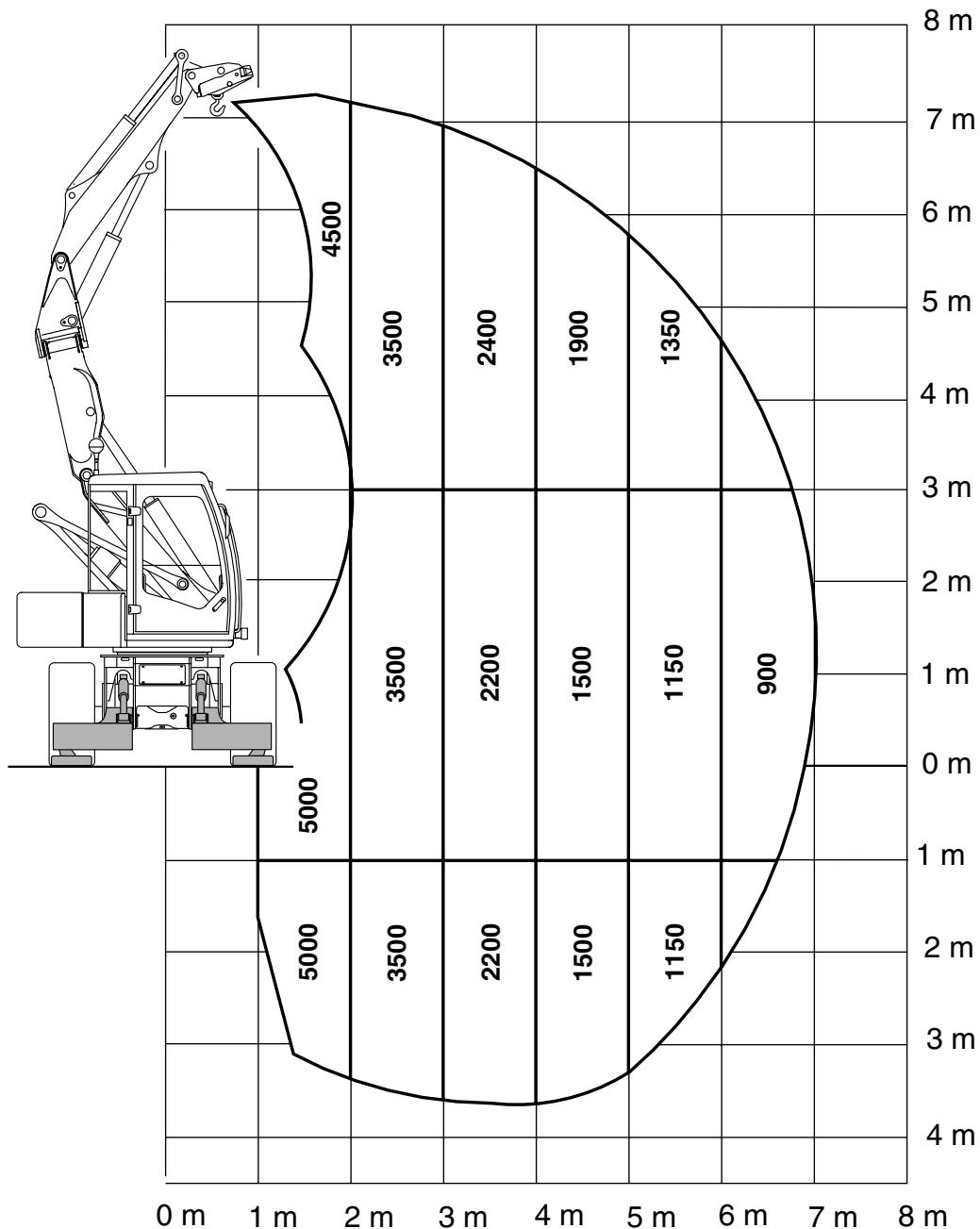
5.3 Lifting and handling in the transverse position with standard stabilizers

Working conditions:

- On wheels with the stabilizers 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.



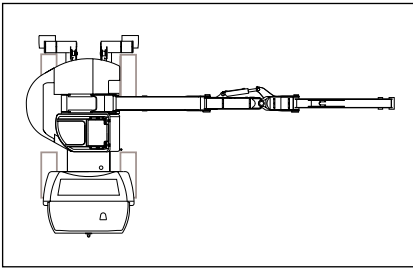
Stability loads and hydraulic limits according to standard ISO 10567.



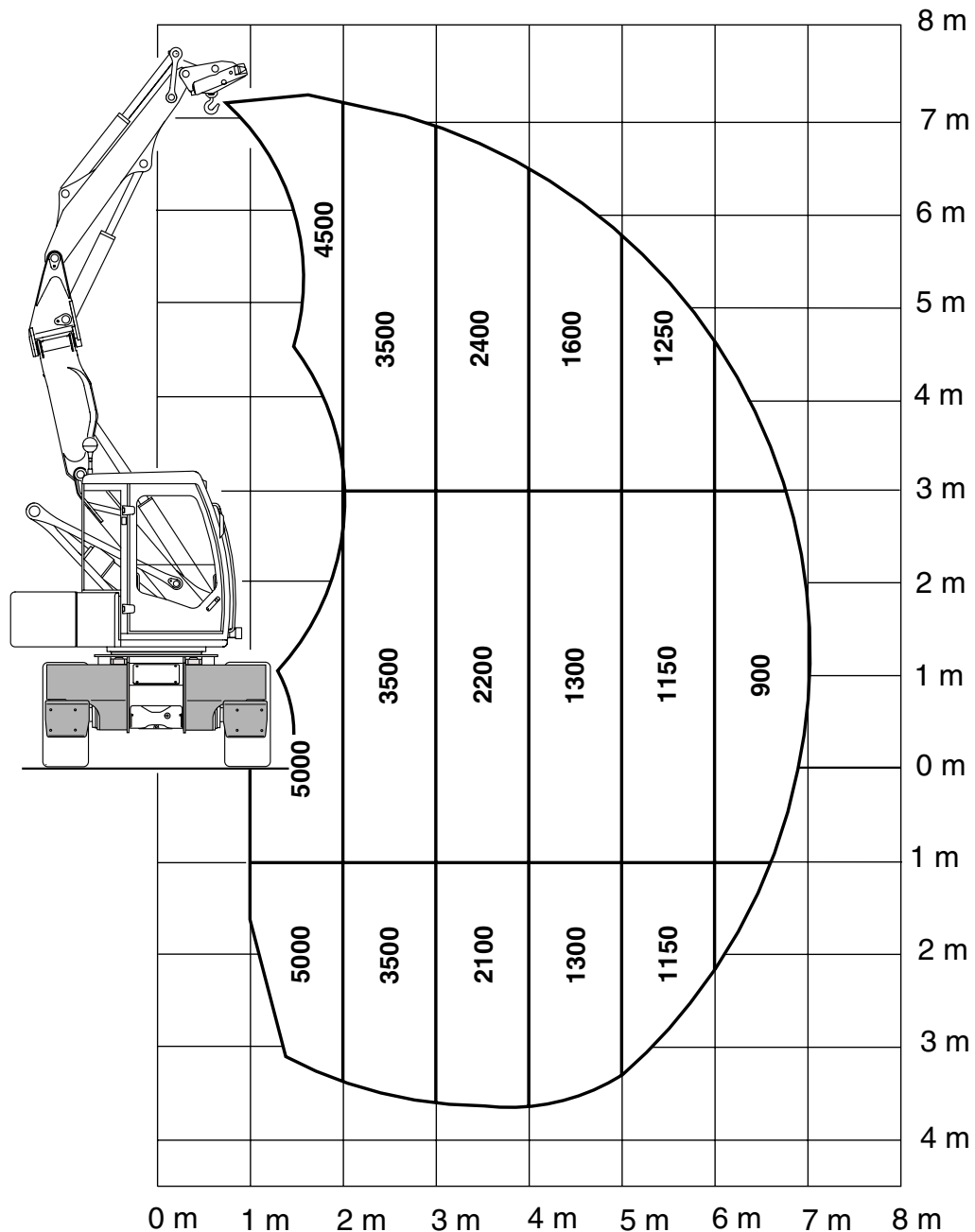
5.4 Lifting and handling in the transverse position without stabilizers

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.



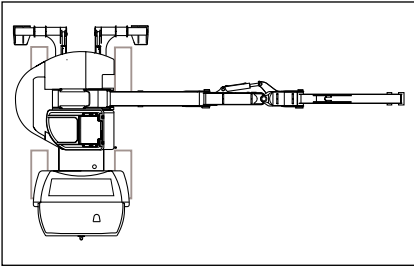
Stability loads and hydraulic limits according to standard ISO 10567.



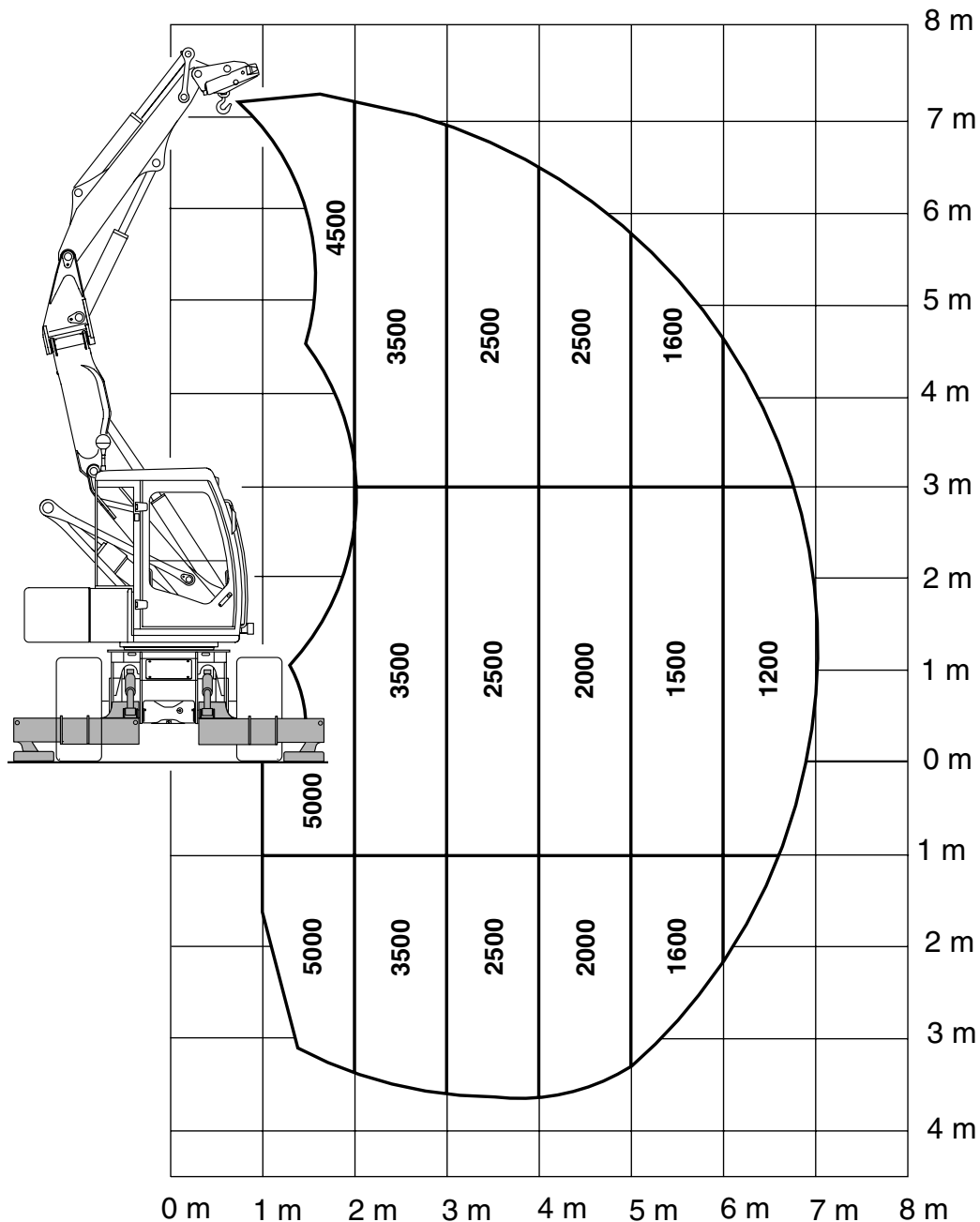
5.5 Lifting and handling in the transverse position with telescopic stabilizers

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.



6. Towing

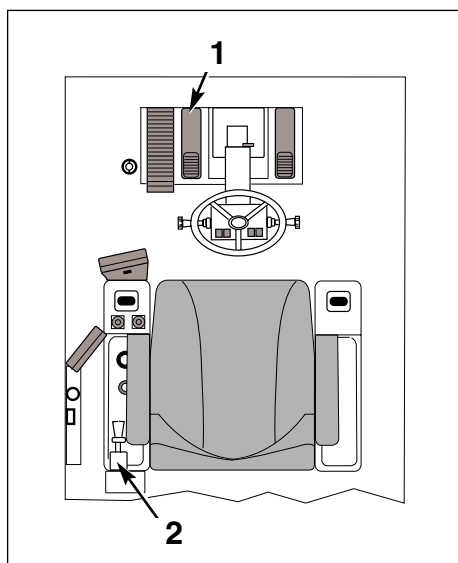


Fig. 1

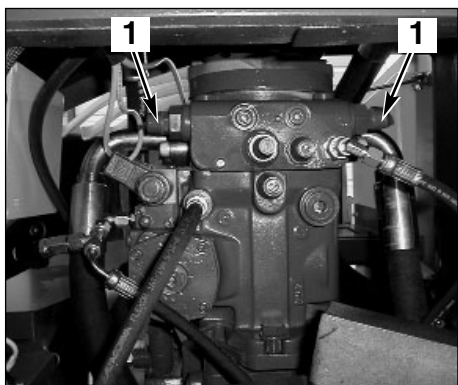


Fig. 2

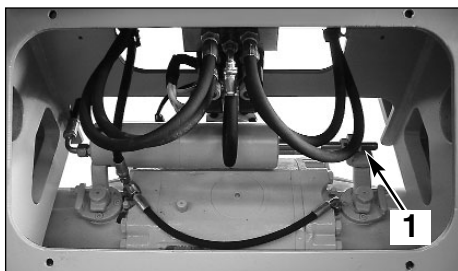


Fig. 3

6.1 Disconnection of the hydrostatic travel



Before carrying out any hydrostatic travel disconnecting operation, make sure that the parking brake is applied.

- 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.



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.

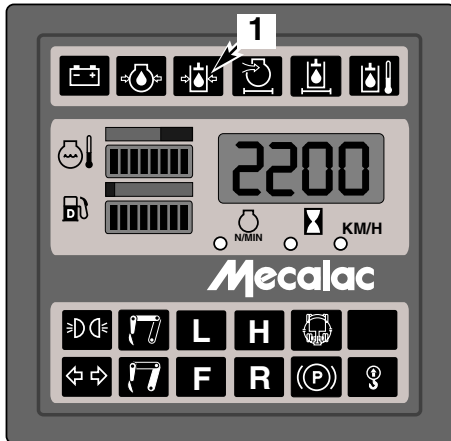


Fig. 4

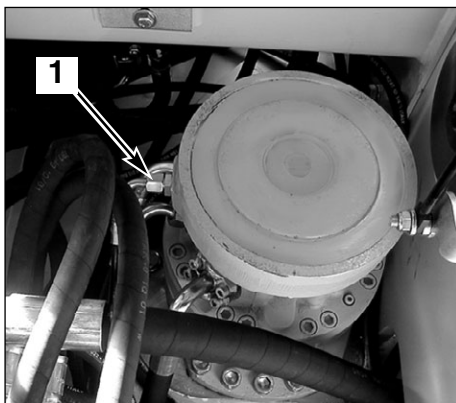


Fig. 5

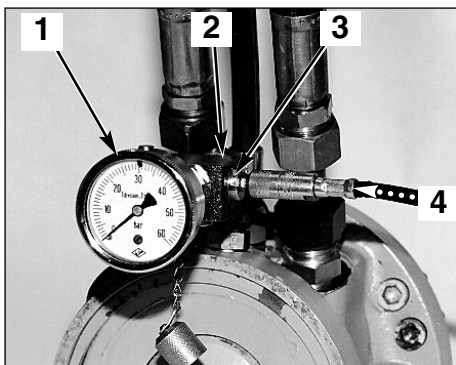


Fig. 6

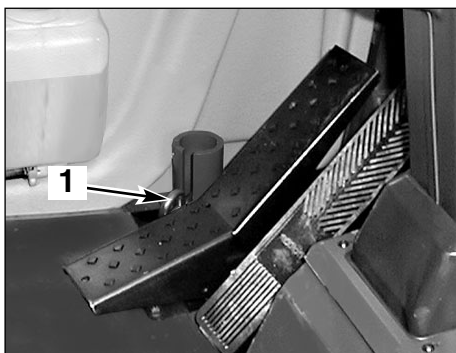


Fig. 7

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 bars 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 bars (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 (max. 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

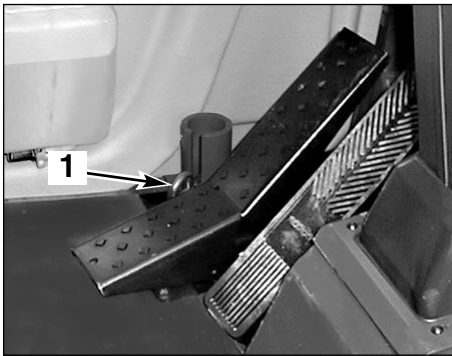


Fig. 2

- 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).
- Position the equipment so that the top part is below the height of the cab, while resting it on the tool holder or the stops of the levers (D fig. 3) using the control manipulators (1 and 2 fig. 4).

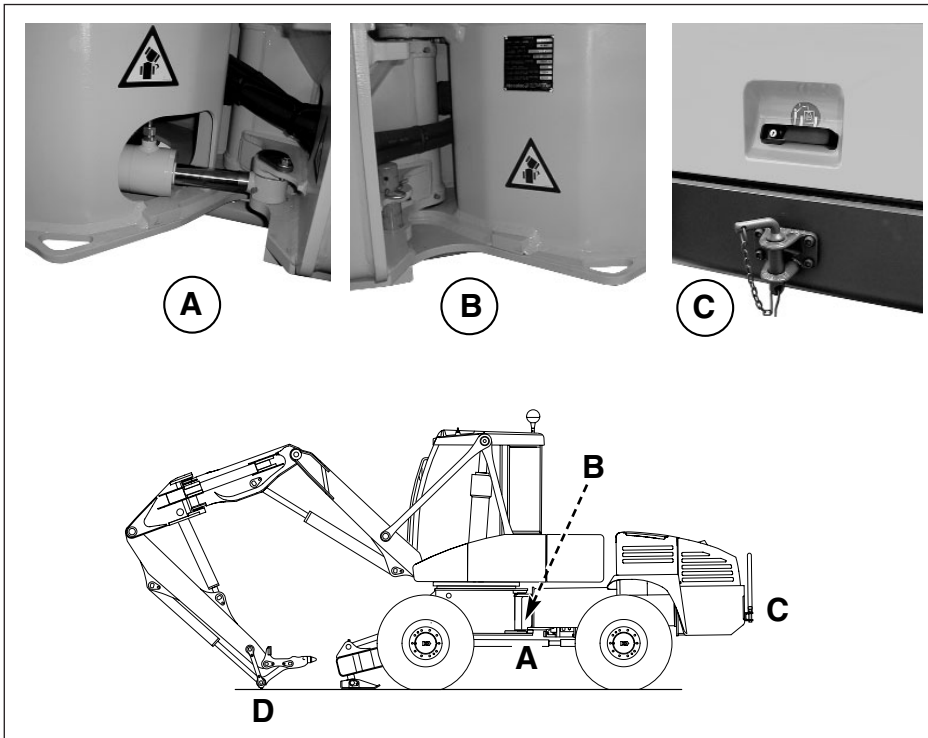


Fig. 3

7.2 Slinging 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 pin (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).

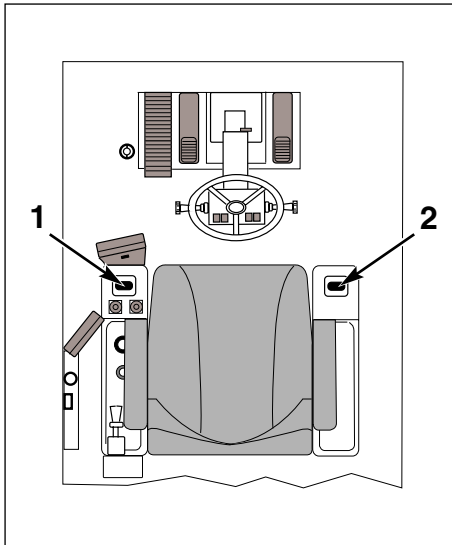


Fig. 4

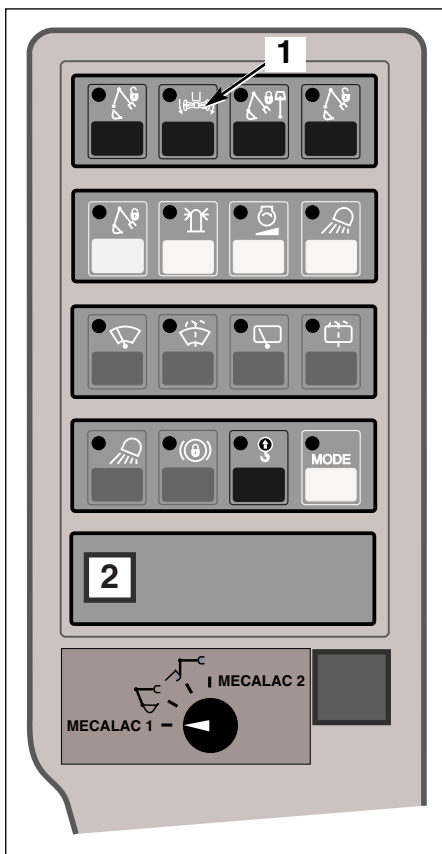


Fig. 5

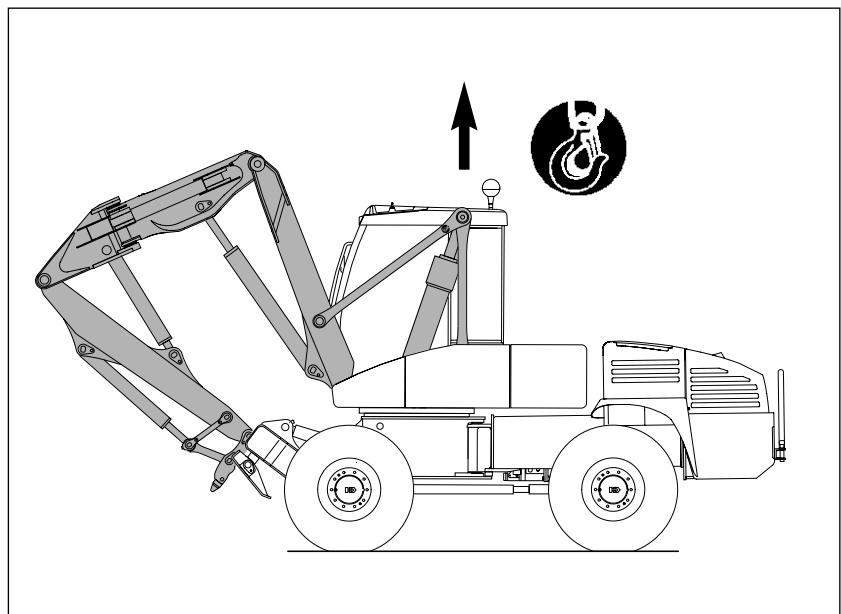
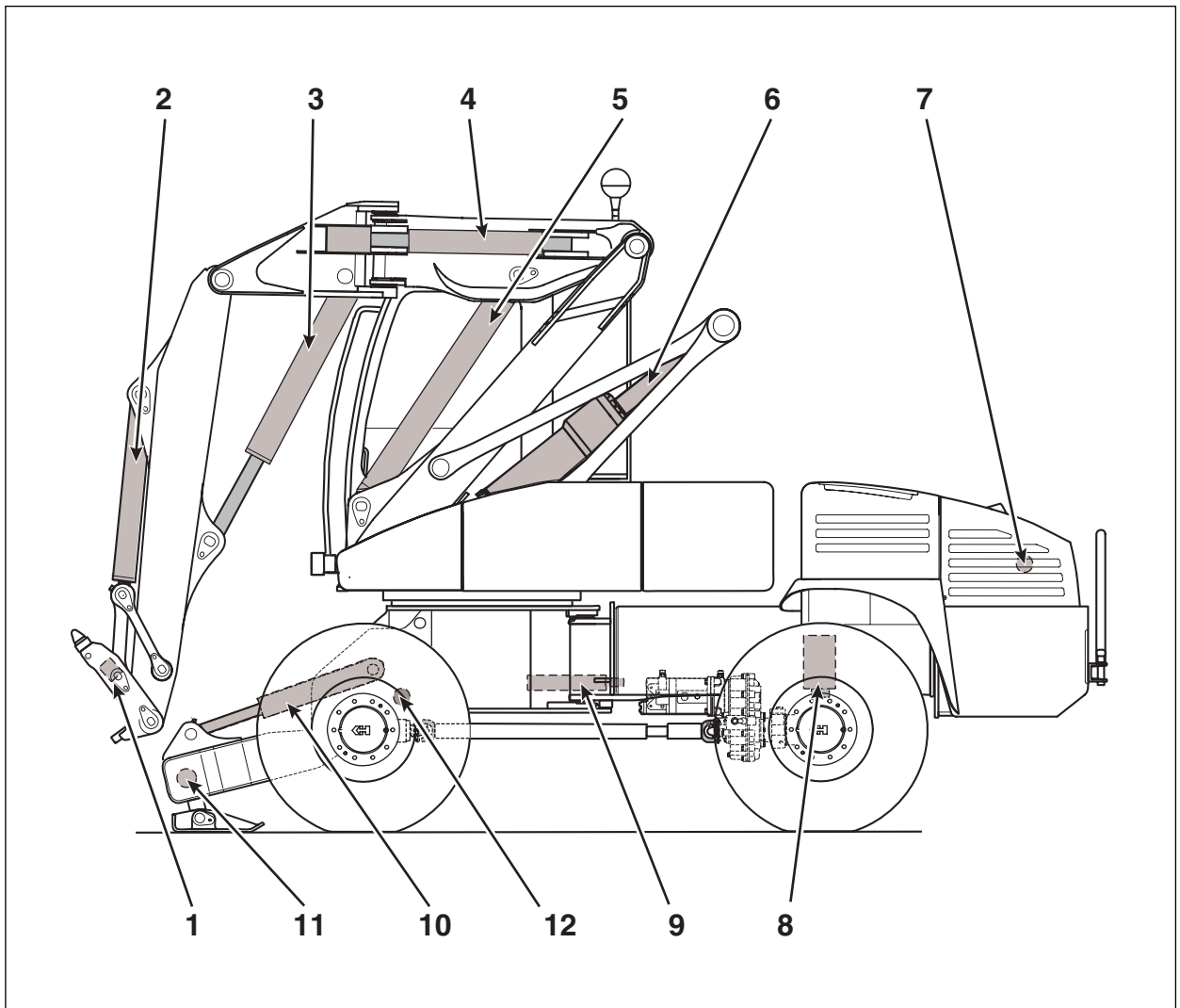
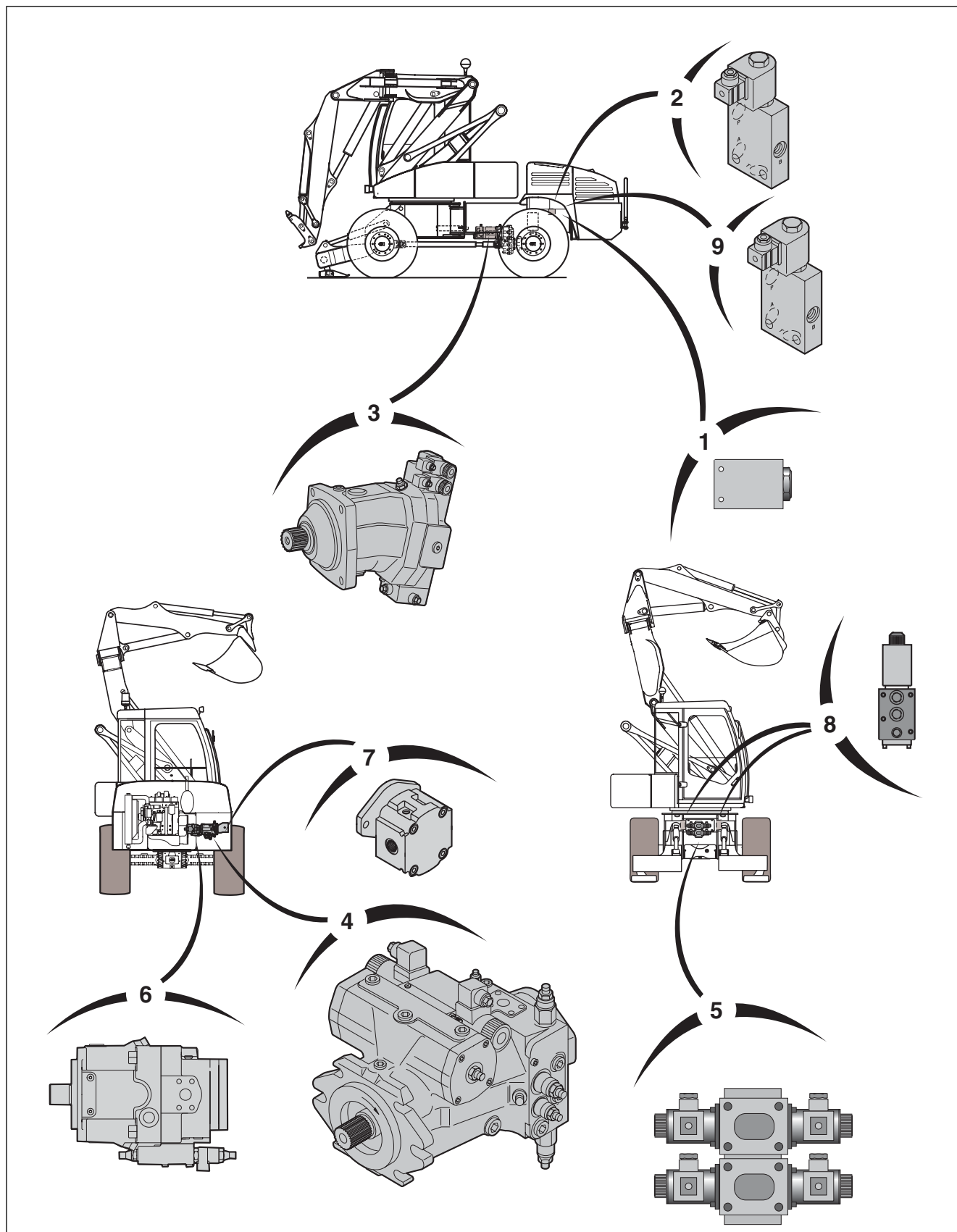


Fig. 6

8. Location of the hydraulic components

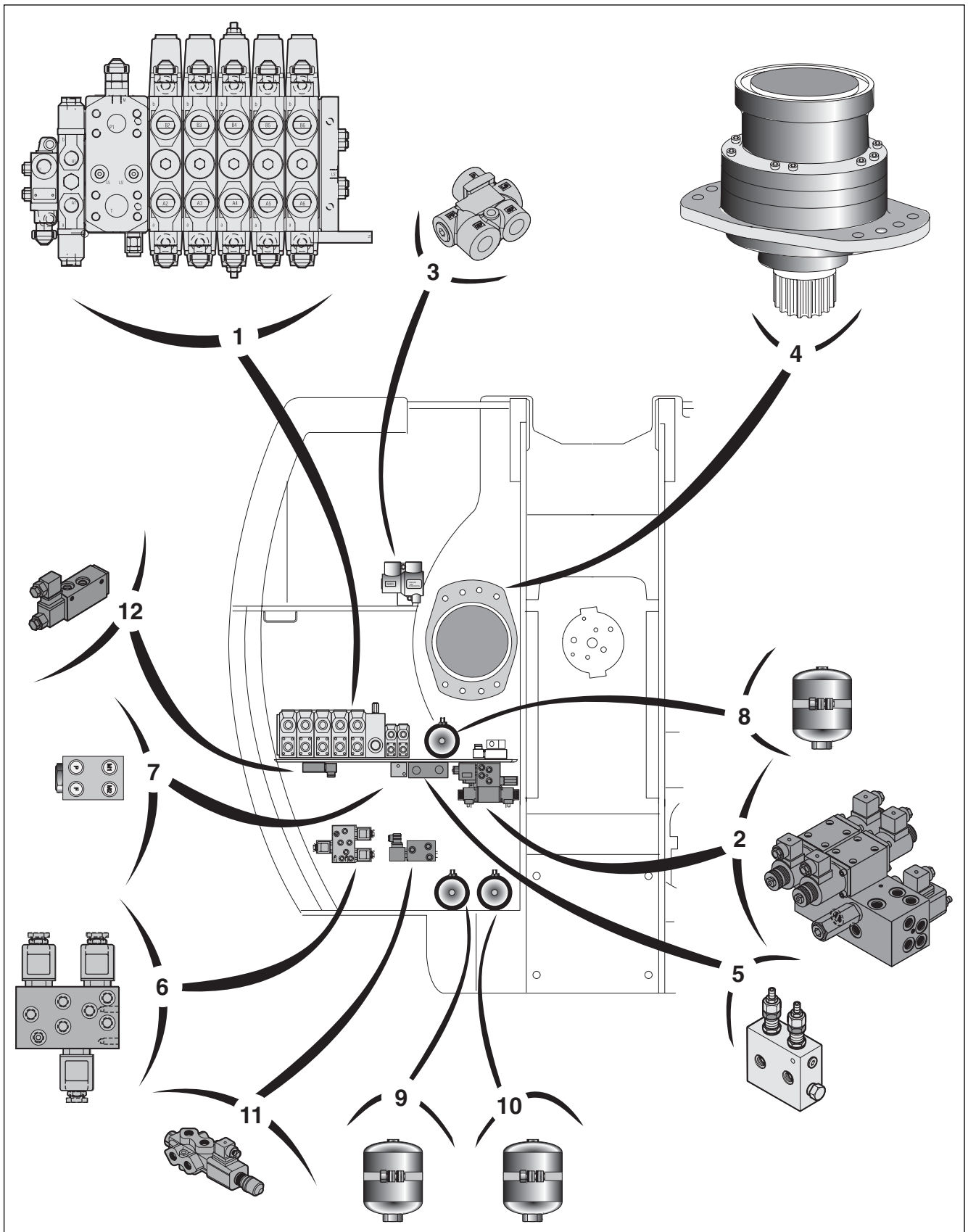


- | | |
|---------------------------|--------------------------------|
| 1 - Tool-holder ram | 7 - Accelerator ram |
| 2 - Bucket ram | 8 - Oscillation locking ram |
| 3 - Dipper ram | 9 - Steering rams |
| 4 - Offset ram | 10 - Stabilizer ram |
| 5 - Intermediate boom ram | 11 - Telescopic stabilizer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



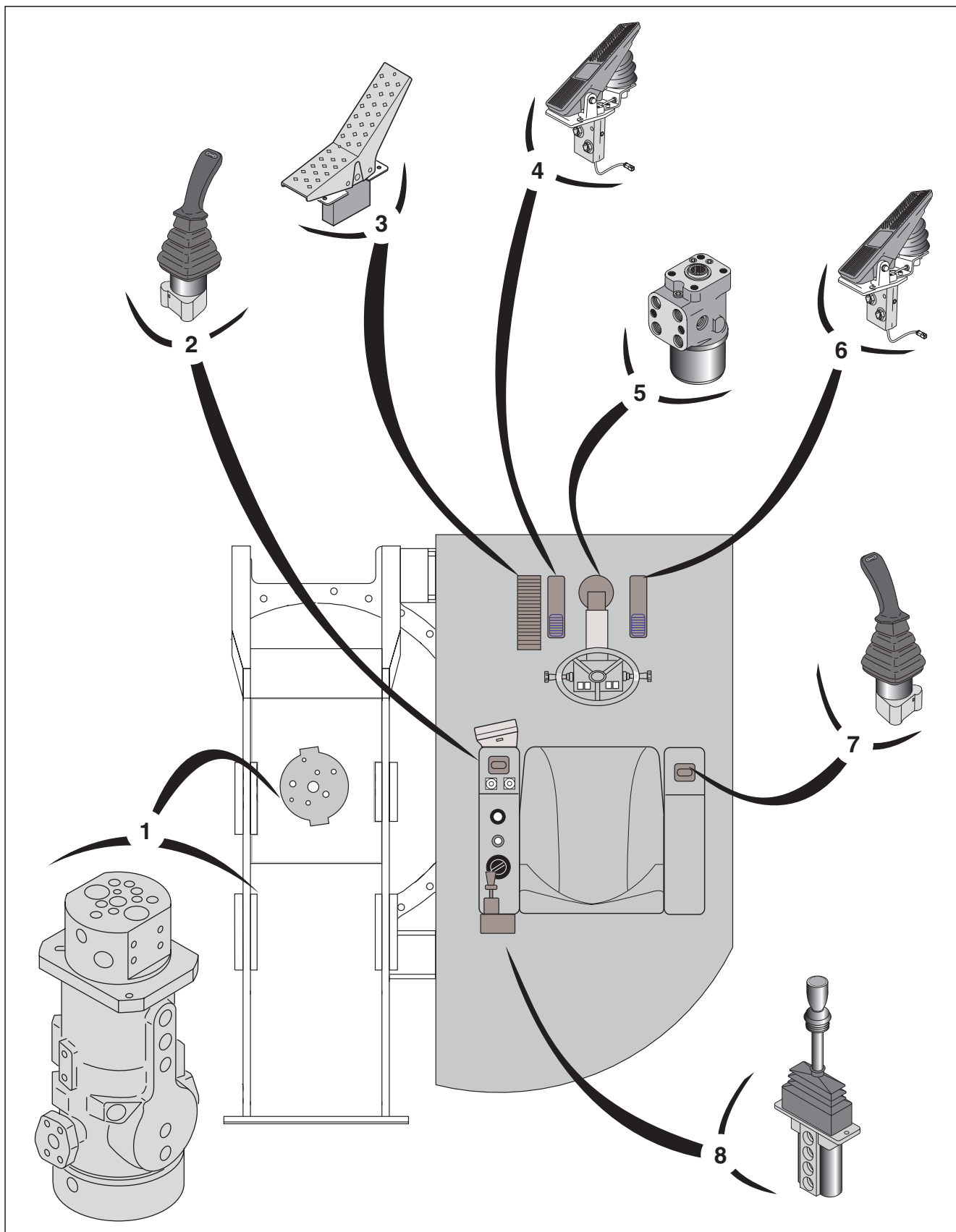
- 1 - Sequence valve
- 2 - Solenoid - op. oscillation locking valve
- 3 - Transfer movement engine
- 4 - Transfer movement pump
- 5 - Stabilizers solenoid-operated valve

- 6 - Equipment pump
- 7 - Orientation pump
- 8 - Telescopic stabilizer selector
- 9 - "Road / Site" speed solenoid - operated valve



- 1 - SX18 valve block
- 2 - Power-assistance pressure solenoid-operated valve
- 3 - Priority valve
- 4 - Orientation engine
- 5 - CROSS-OVER valve
- 6 - Boom / intermediate boom control unit

- 7 - Braking block
- 8 - Accumulator
- 9 - Accumulator
- 10 - Accumulator
- 11 - Solenoid-operated coupling valve
- 12 - Solenoid-operated bucket direction inversion valve

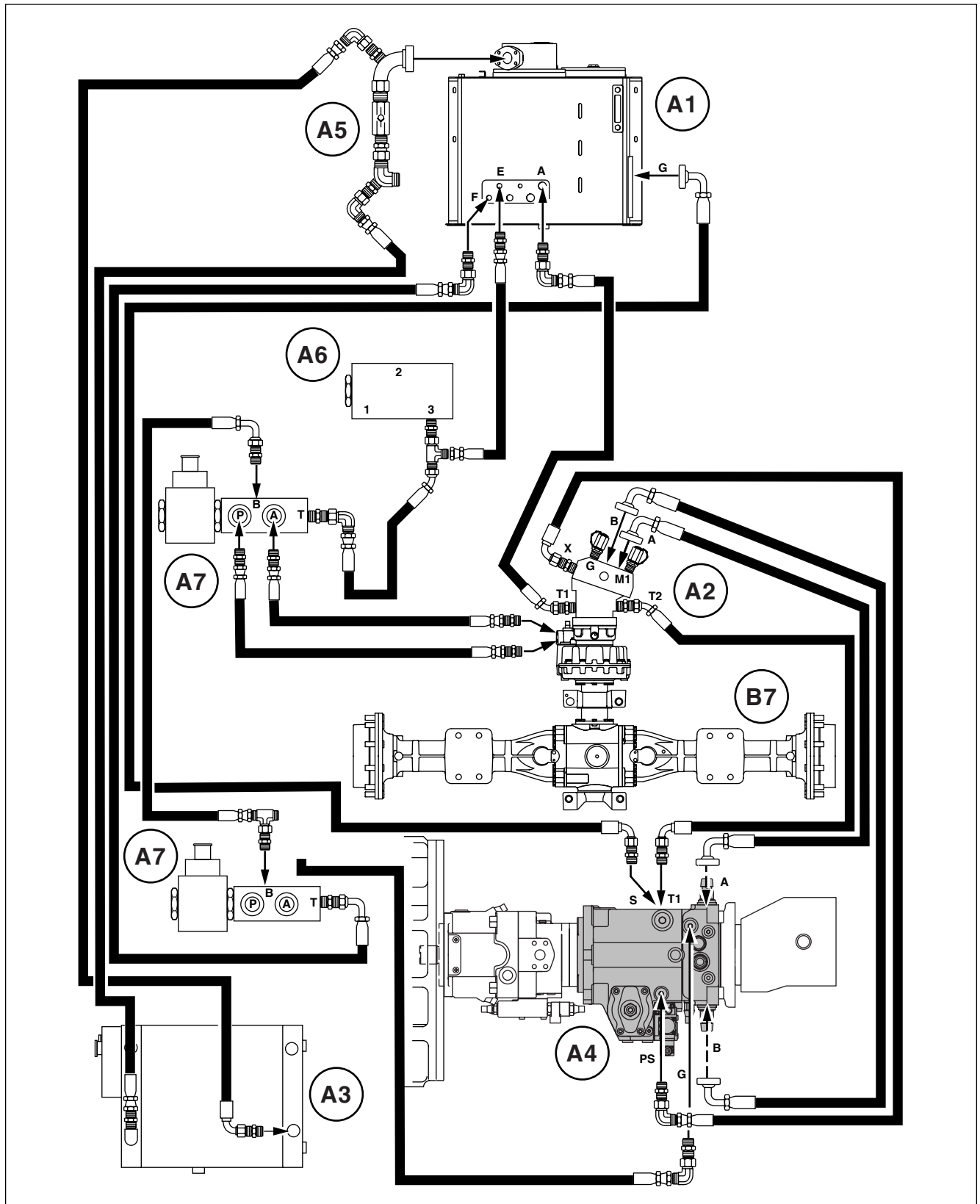


- 1 - Rotary coupling
- 2 - Left manipulator
- 3 - Additional functions foot control
- 4 - Brake / inching foot control

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

9. Hydraulic diagrams

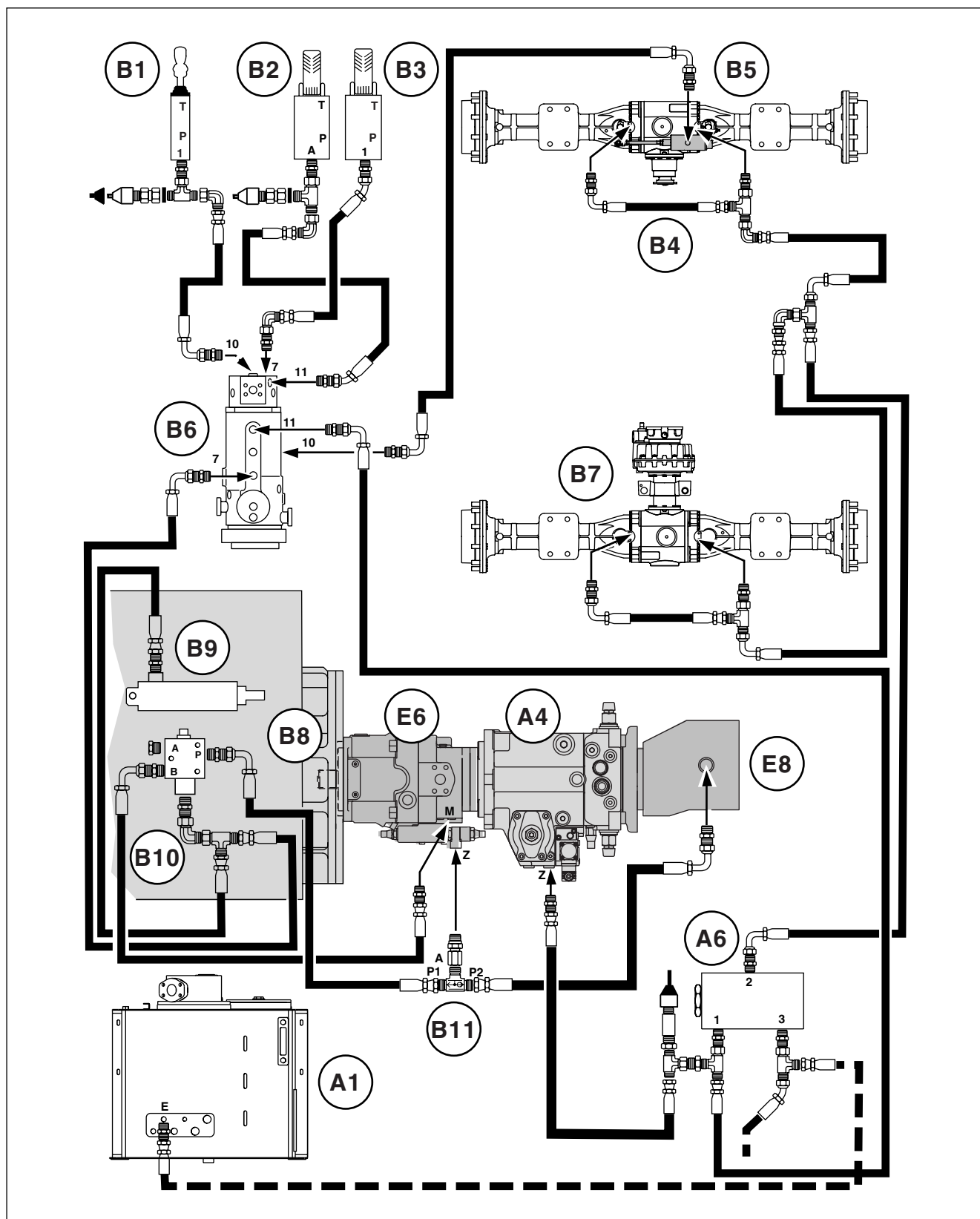
9.1 Travel circuit



- A1** - Hydraulic reservoir
- A2** - Transfer movement engine
- A3** - Oil cooler
- A4** - Transfert movement pump

- A5** - Non-return valve
- A6** - Sequence valve
- A7** - Gear change blocks
- B7** - Rear axle

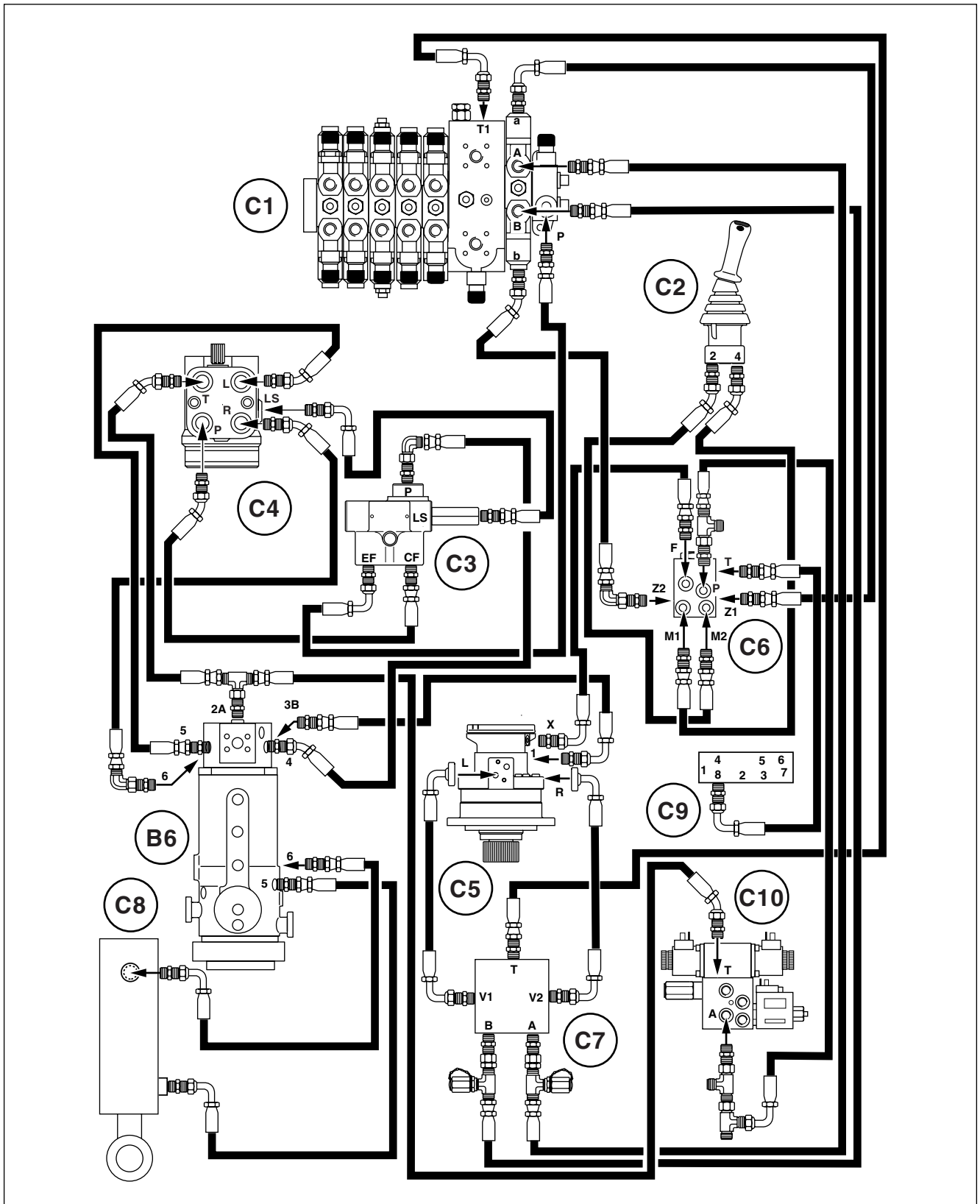
9.2 Accelerator, main and parking brake circuits



- A1** - Hydraulic reservoir
- A4** - Transfer movement pump
- A6** - Sequence valve
- B1** - Parking brake control
- B2** - Brake foot control
- B3** - Accelerator foot control
- B4** - Parking brake ram
- B5** - Front axle

- B6** - Rotary coupling
- B7** - Rear axle
- B8** - Diesel engine
- B9** - Accelerator ram
- B10** - Anti-stalling 3 - ways valve
- B11** - Selector
- E6** - Equipment pump
- E8** - Slewing pump

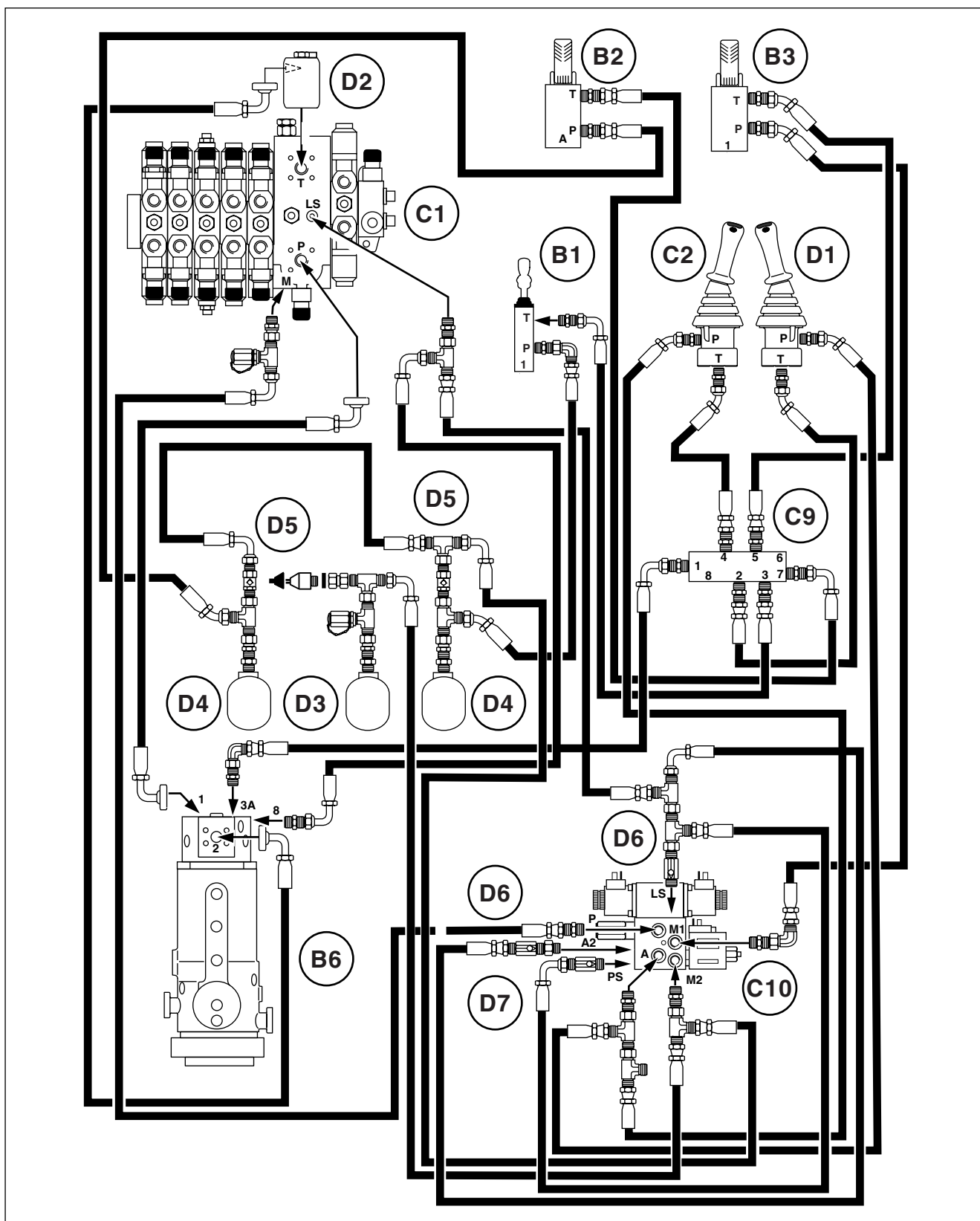
9.3 Steering and slewing circuits



- B6** - Rotary coupling
- C1** - SX18 valve block
- C2** - Left manipulator
- C3** - Priority valve
- C4** - ORBITROL steering device
- C5** - Hydraulic turntable slewing motor

- C6** - Turntable rotation, brake release block
- C7** - CROSS-OVER block with damped valve
- C8** - Steering ram
- C9** - Drain block
- C10** - Functions block

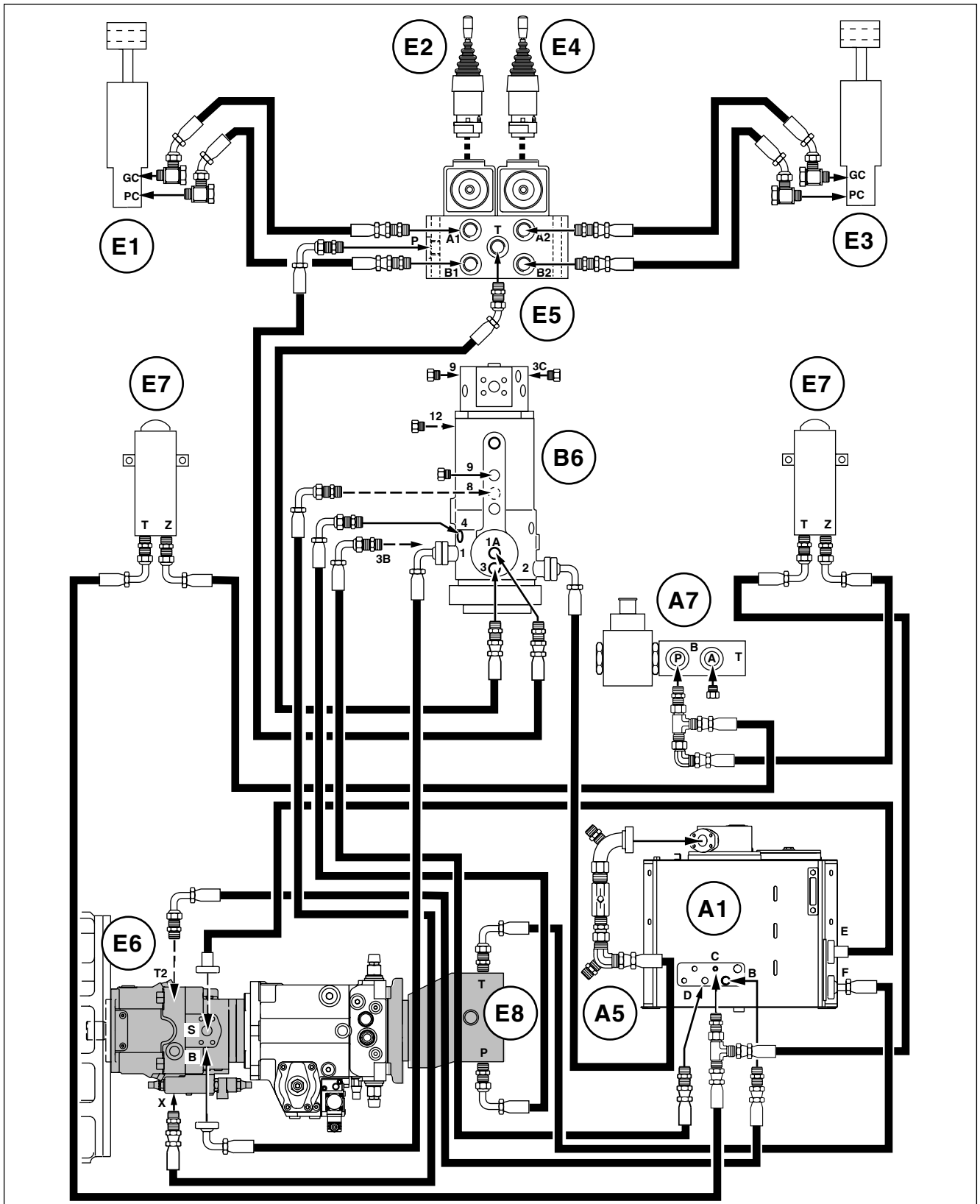
9.4 Turntable supply and return circuit



- B1** - Parking brake control
- B2** - Brake foot control
- B3** - Accelerator foot control
- B6** - Rotary coupling
- C1** - SX18 valve block
- C2** - Left manipulator
- C9** - Drain block
- C10** - Functions block

- D1** - Right manipulator
- D2** - Valve
- D3** - Accumulator 0.35 l 1.5 bar
- D4** - Accumulators 0.7 l 18 bars
- D5** - Non-return valves
- D6** - Nozzle / non-return valve
- D7** - Non-return valve

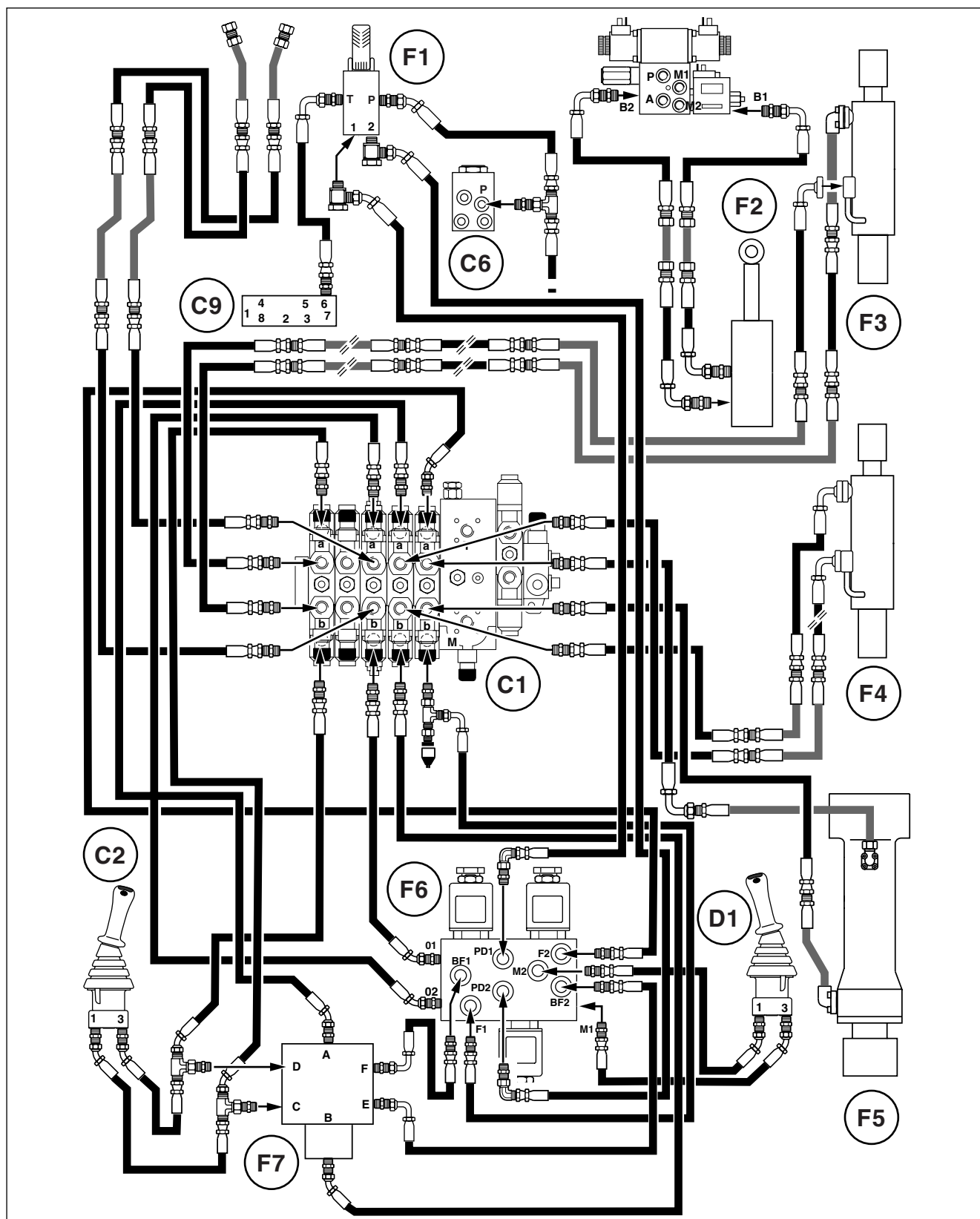
9.5 Equipment pump, standard stabilizers and steering lock circuits



- A1 - Hydraulic reservoir
- A5 - Non-return valve
- A7 - Gear change blocks
- B6 - Rotary coupling
- E1 - Left stabilizer ram
- E2 - Left electric manipulator

- E3 - Right stabilizer ram
- E4 - Right electric manipulator
- E5 - Stabilizers solenoid-operated valve
- E6 - Equipment pump
- E7 - Oscillation locking rams
- E8 - Slewing pump

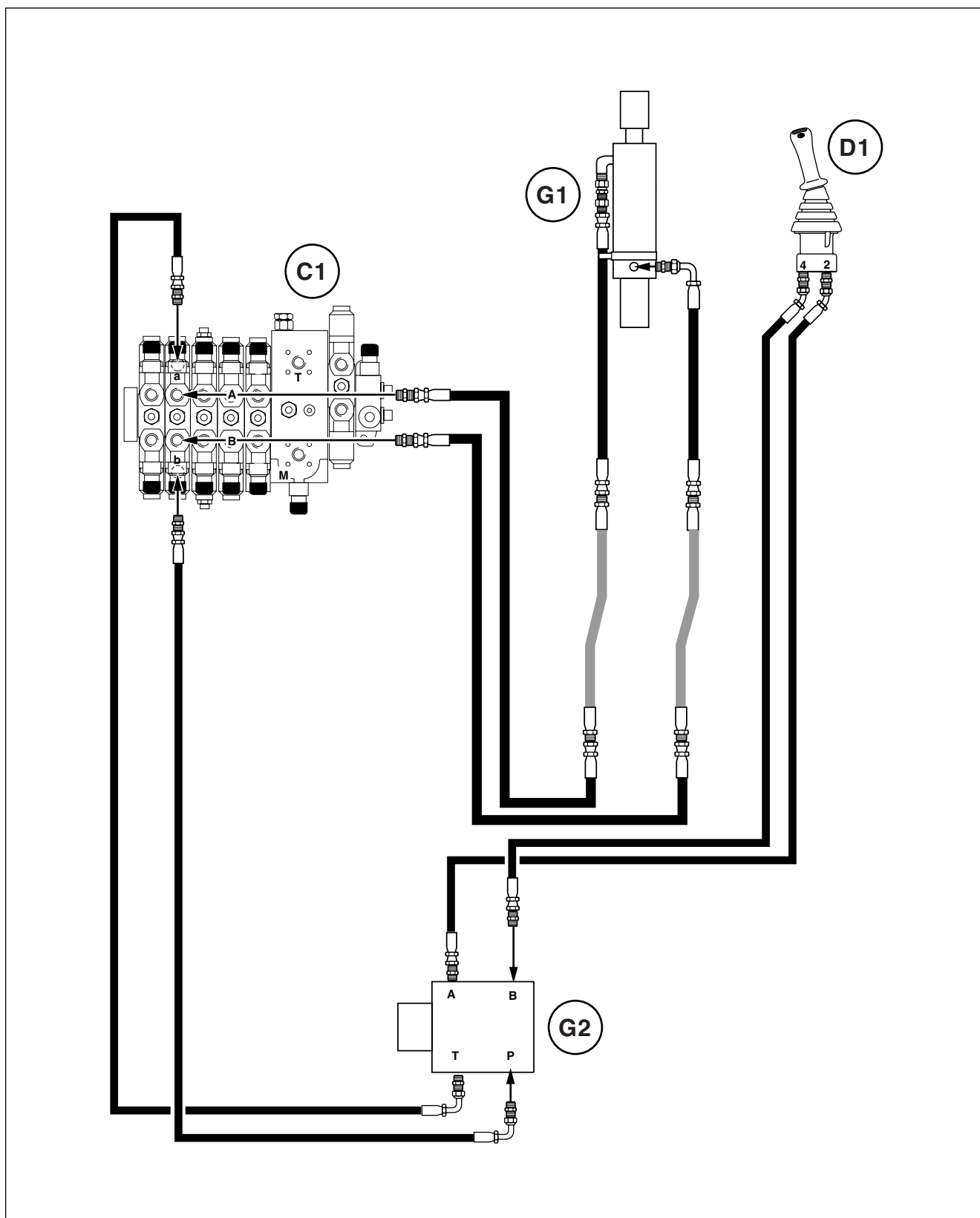
9.6 Boom, intermediate boom, dipper, offset and additional functions circuits



- C1** - SX18 valve block
- C2** - Left manipulator
- C6** - Turntable rotation, brake release block
- C9** - Drain block
- D1** - Right manipulator
- F1** - Additional functions foot control
- F2** - Offset ram

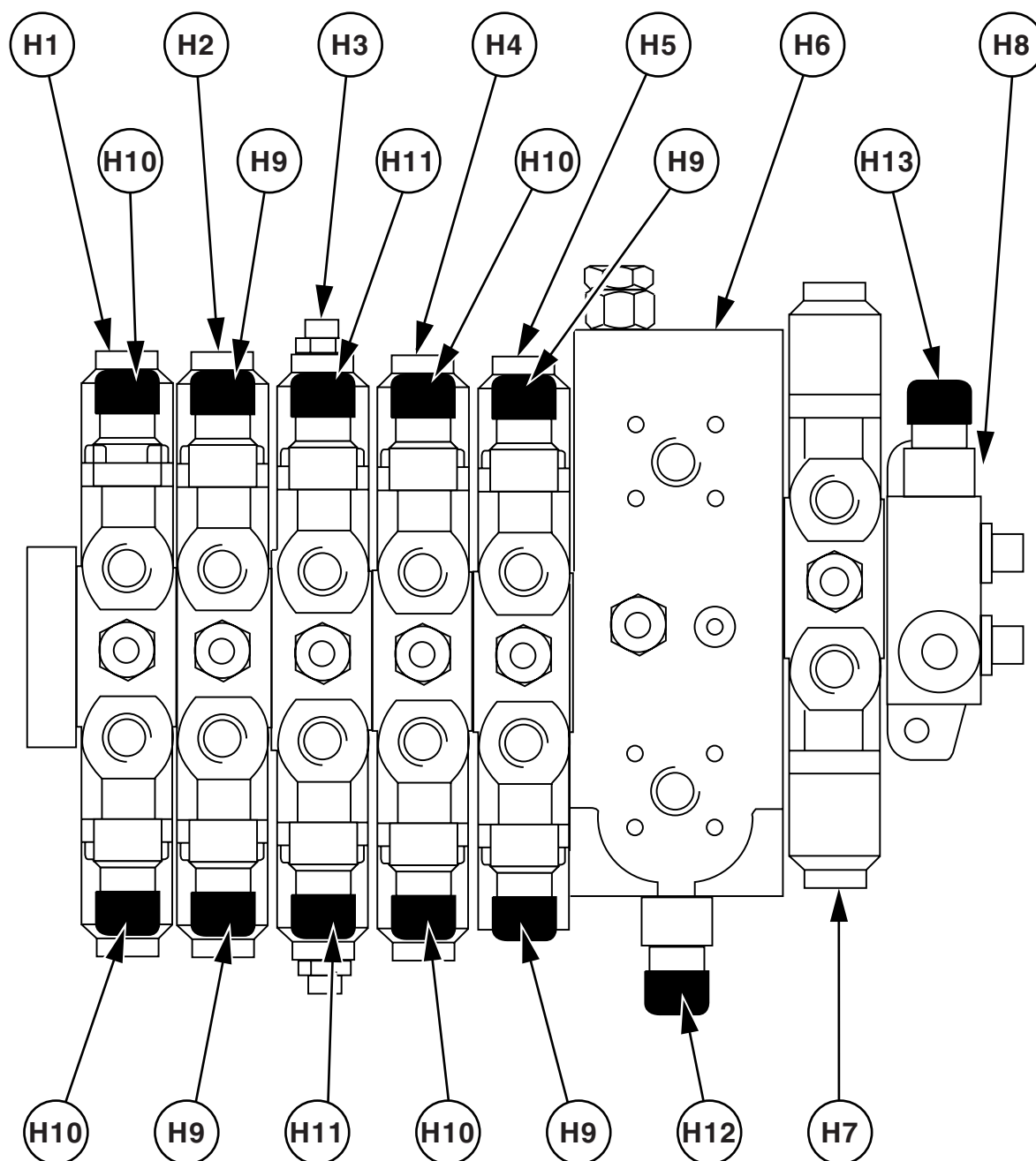
- F3** - Dipper ram
- F4** - Intermediate boom ram
- F5** - Boom ram
- F6** - Solenoid-operated boom / intermediate boom valve
- F7** - Solenoid-operated ram coupling valve, "EXCAVATOR" function

9.7 Bucket circuit



- C1** - SX18 valve block
- D1** - Right manipulator
- G1** - Bucket ram
- G2** - Solenoid-operated bucket direction inversion valve, "LOADER" function

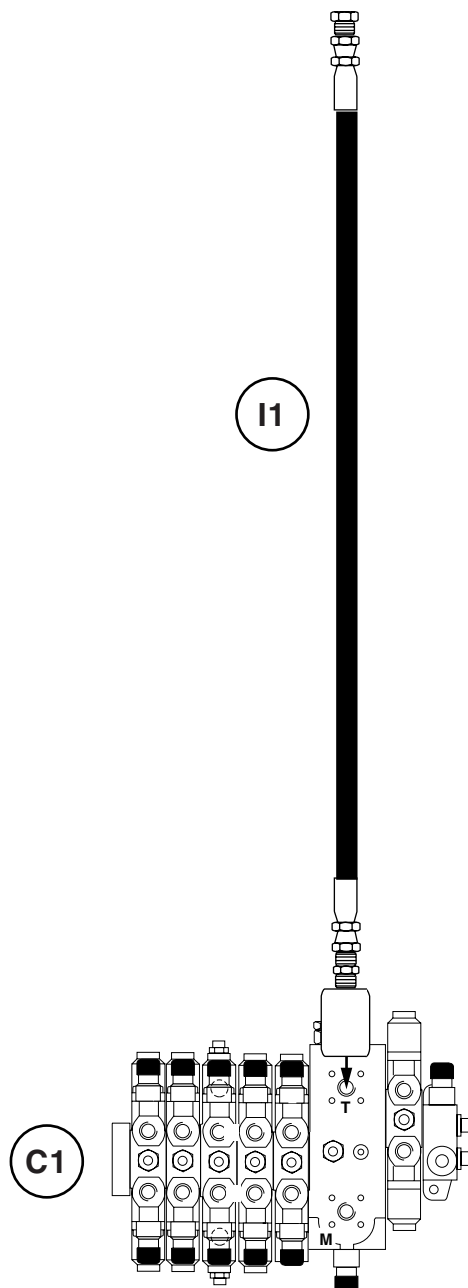
9.8 5-spool valve



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

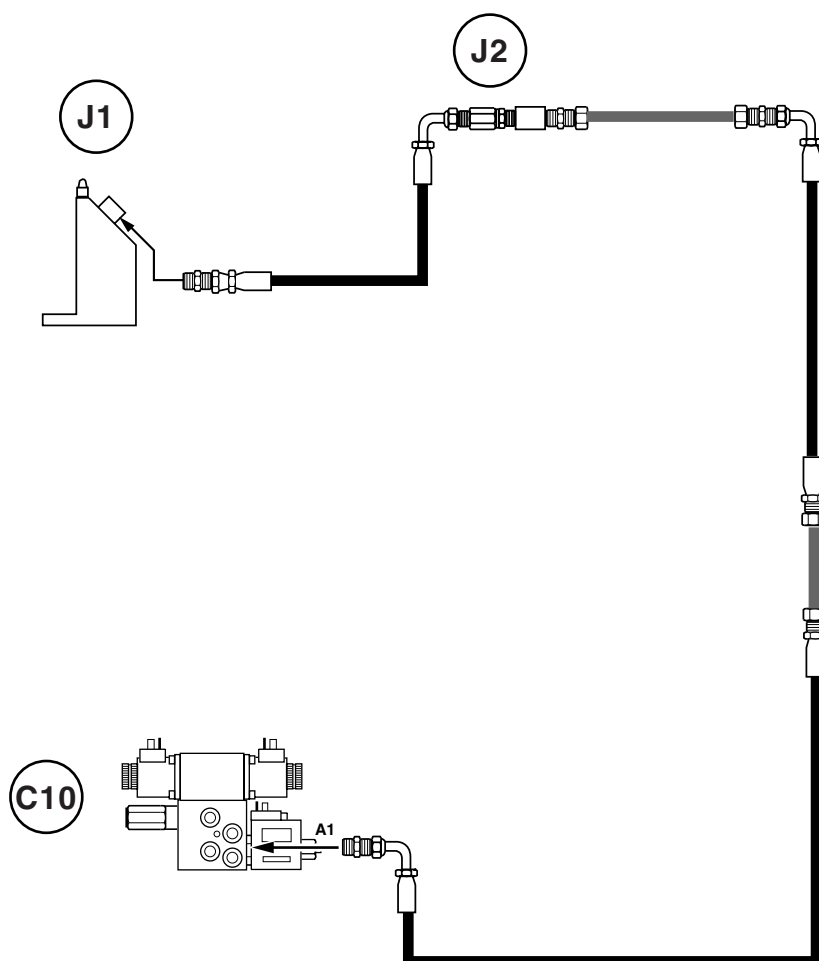
- H8** - Slewing supply inlet element
- H9** - Pressure limiter (calibration 400 bars)
- H10** - Pressure limiter (calibration 420 bars)
- H11** - Pressure limiter (calibration 180 bars)
- H12** - Pressure limiter (calibration 360 bars)
- H13** - Pressure limiter (calibration 250 bars)

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



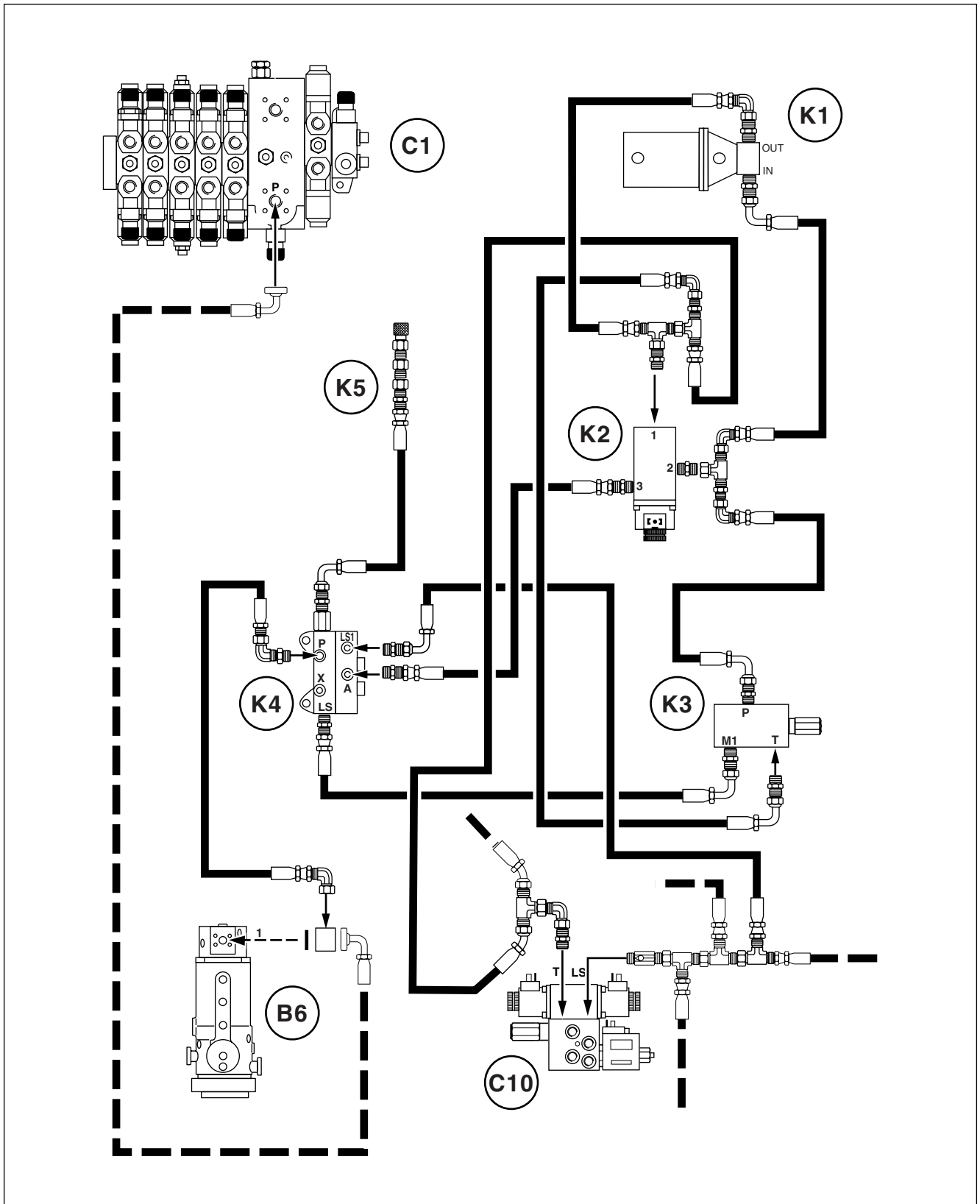
- C1** - SX18 valve block
- I1** - Hose

9.10 Tool-holder circuit (option)



- C10** - Functions block
- J1** - Tool-holder ram
- J2** - Rotary coupling

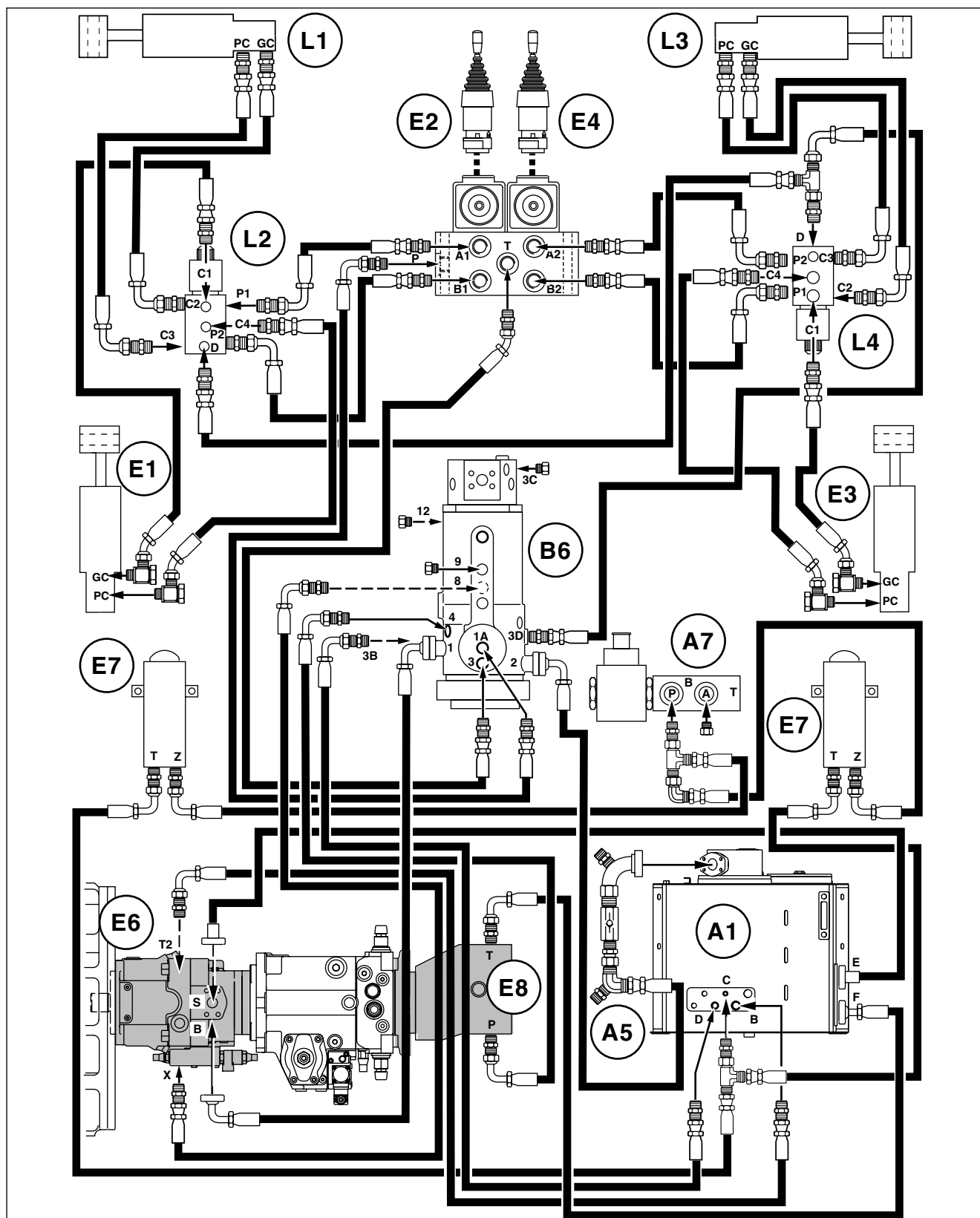
9.11 Air conditioning circuit (option)



- B6** - Rotary coupling
- C1** - SX18 valve block
- C10** - Functions block
- K1** - Hydraulic motor

- K2** - Solenoid-operated valve
- K3** - Pressure reducing valve
- K4** - Priority valve
- K5** - Pressure tap

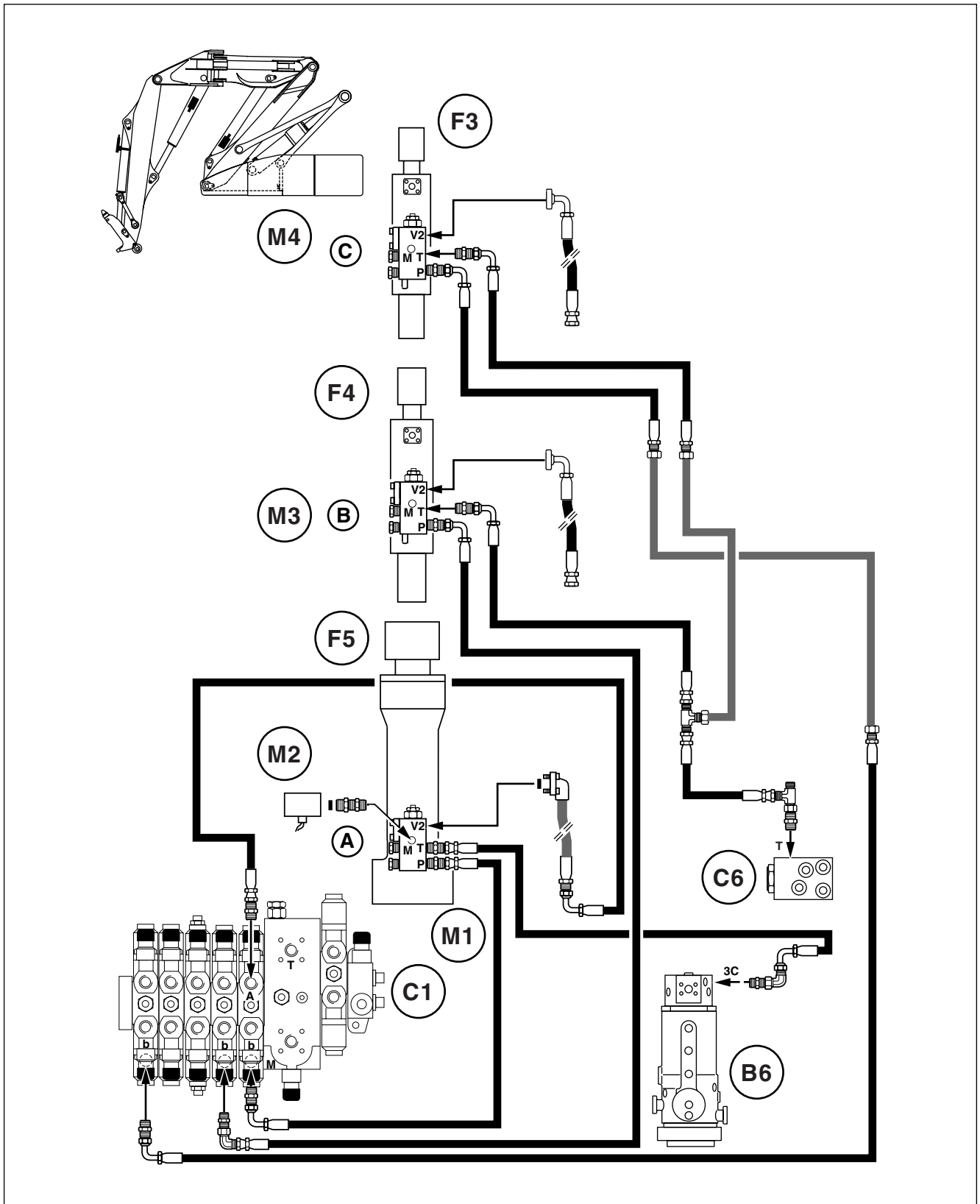
9.12 Equipment pump, telescopic stabilizers and steering lock circuits (option)



- A1** - Hydraulic reservoir
- A5** - Non-return valve
- A7** - Gear change blocks
- B6** - Rotary coupling
- E1** - Left stabilizer ram
- E2** - Left electric manipulator
- E3** - Right stabilizer ram
- E4** - Right electric manipulator

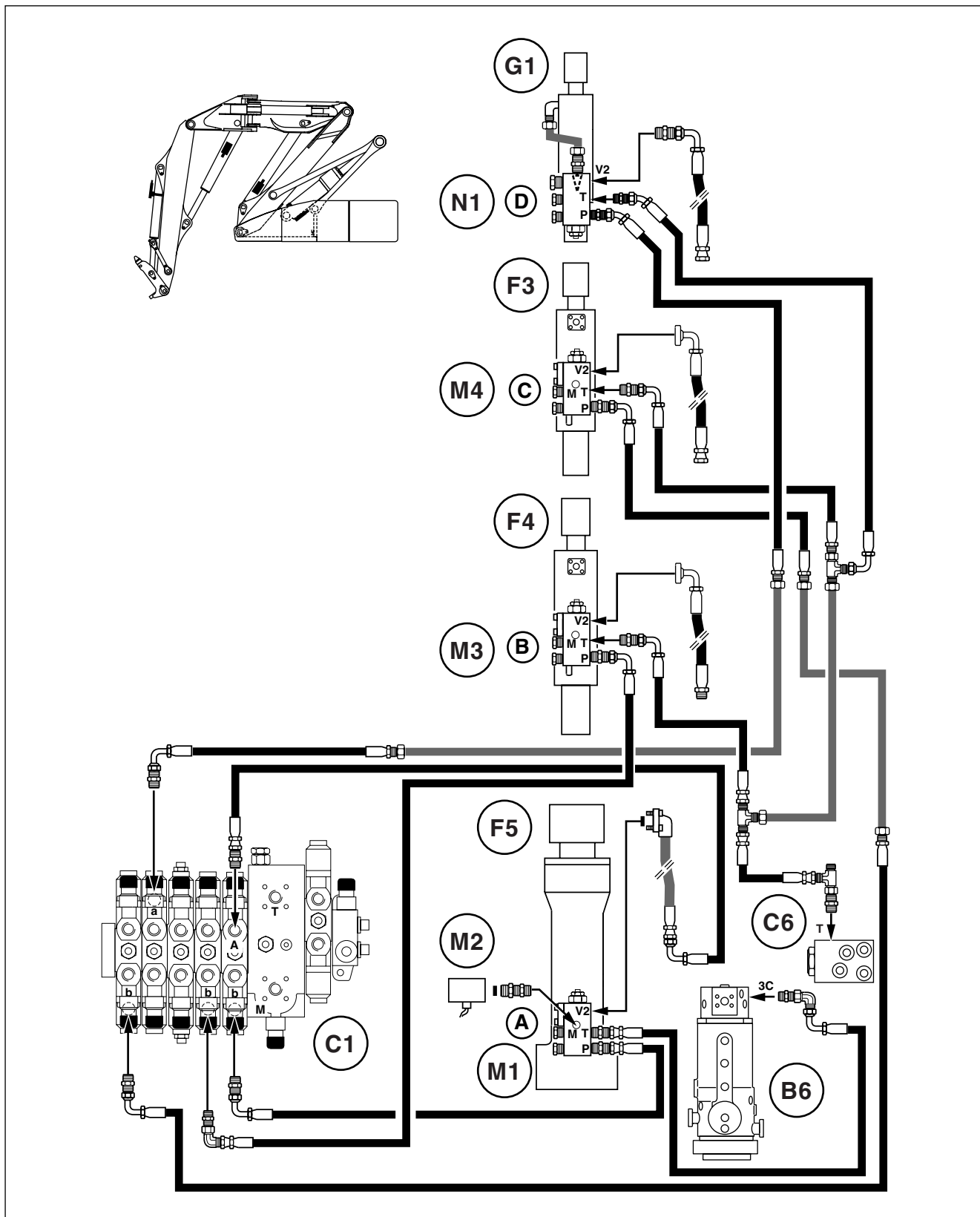
- E6** - Equipment pump
- E7** - Oscillation locking rams
- E8** - Slewing pump
- L1** - Left stabilizer extension ram
- L2** - Left stabilizer selector block
- L3** - Right stabilizer extension ram
- L4** - Right stabilizer selector block

9.13 Fitting of 3 safety valves on the equipment (option)



- | | |
|---|---|
| B6 - Rotary coupling | F5 - Boom ram |
| C1 - SX18 valve block | M1 - Boom ram valve |
| C6 - Turntable rotation, brake release block | M2 - Load detector |
| F3 - Dipper ram | M3 - Intermediate boom ram valve |
| F4 - Intermediate boom ram | M4 - Dipper ram valve |

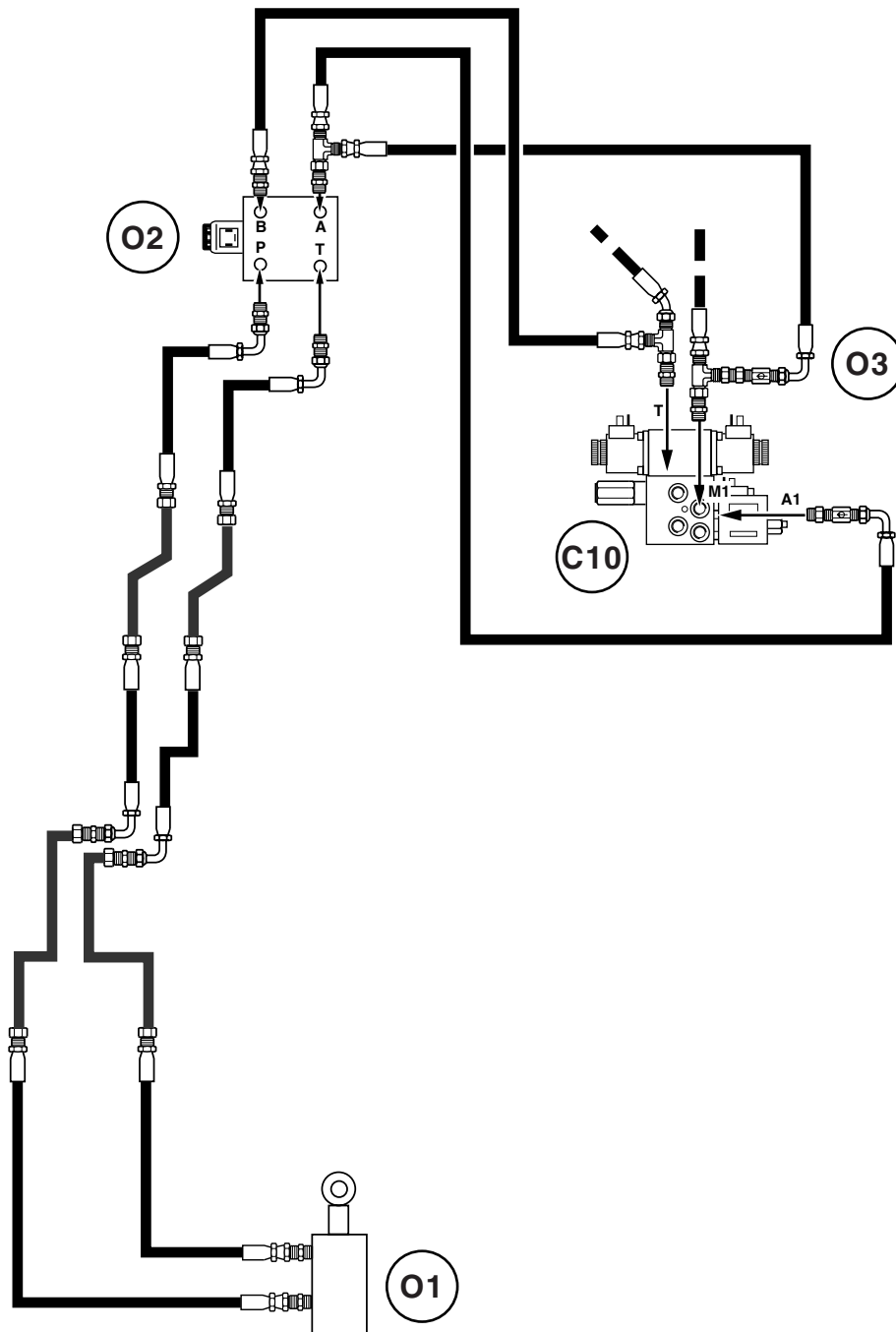
9.14 Fitting of 4 safety valves on the equipment (option)



- B6** - Rotary coupling
- C1** - SX18 valve block
- C6** - Turntable rotation, brake release block
- F3** - Dipper ram
- F4** - Intermediate boom ram
- F5** - Boom ram

- G1** - Bucket ram
- M1** - Boom ram valve
- M2** - Load detector
- M3** - Intermediate boom ram valve
- M4** - Dipper ram valve
- N1** - Bucket ram valve

9.15 VOLVO tool-holder (option)



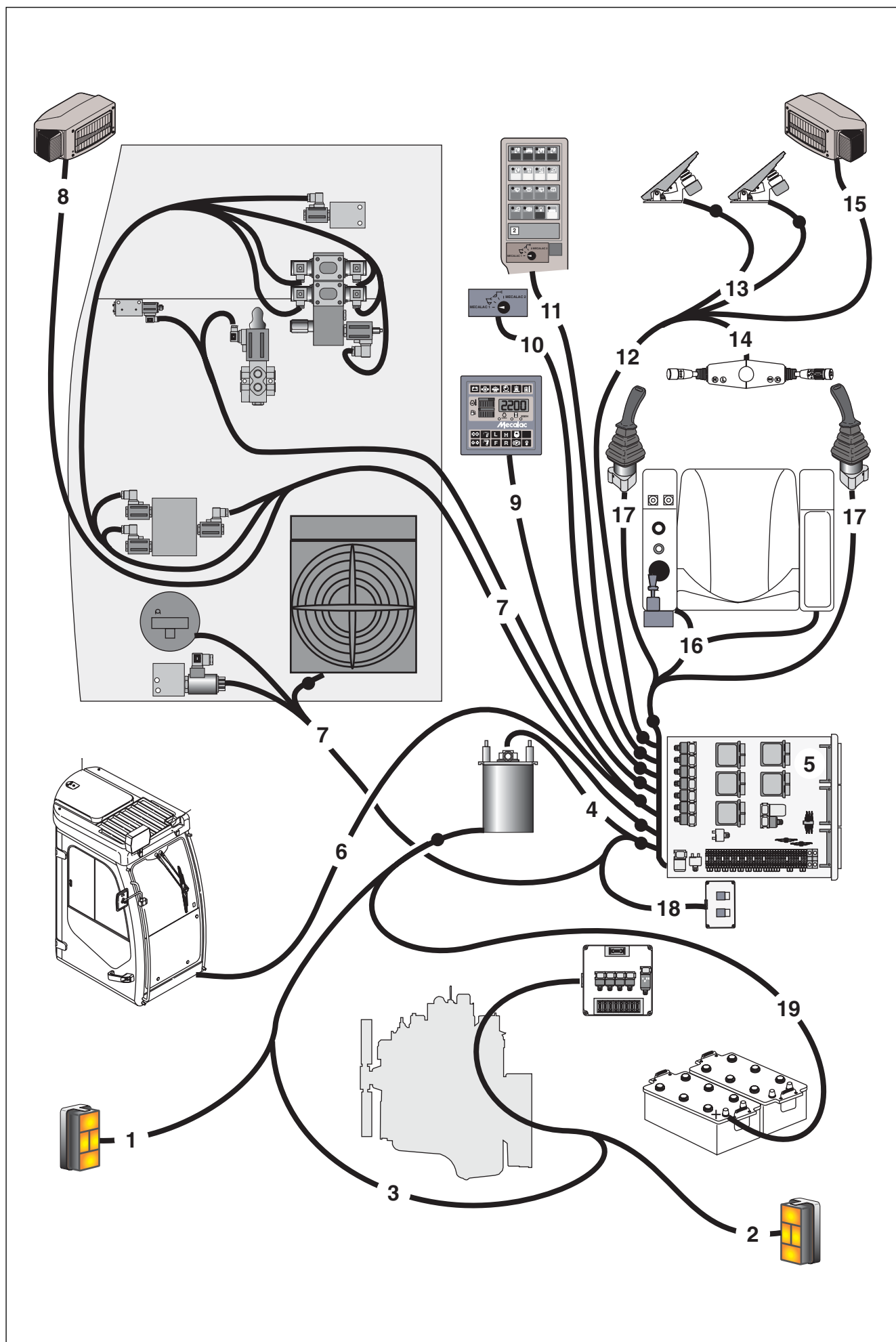
- C10** - Functions block
- O1** - Tool-holder ram
- O2** - Solenoid-operated tool-holder valve
- O3** - Nozzle non-return valve

[illegible]

10. Parts list of the hydraulic diagram

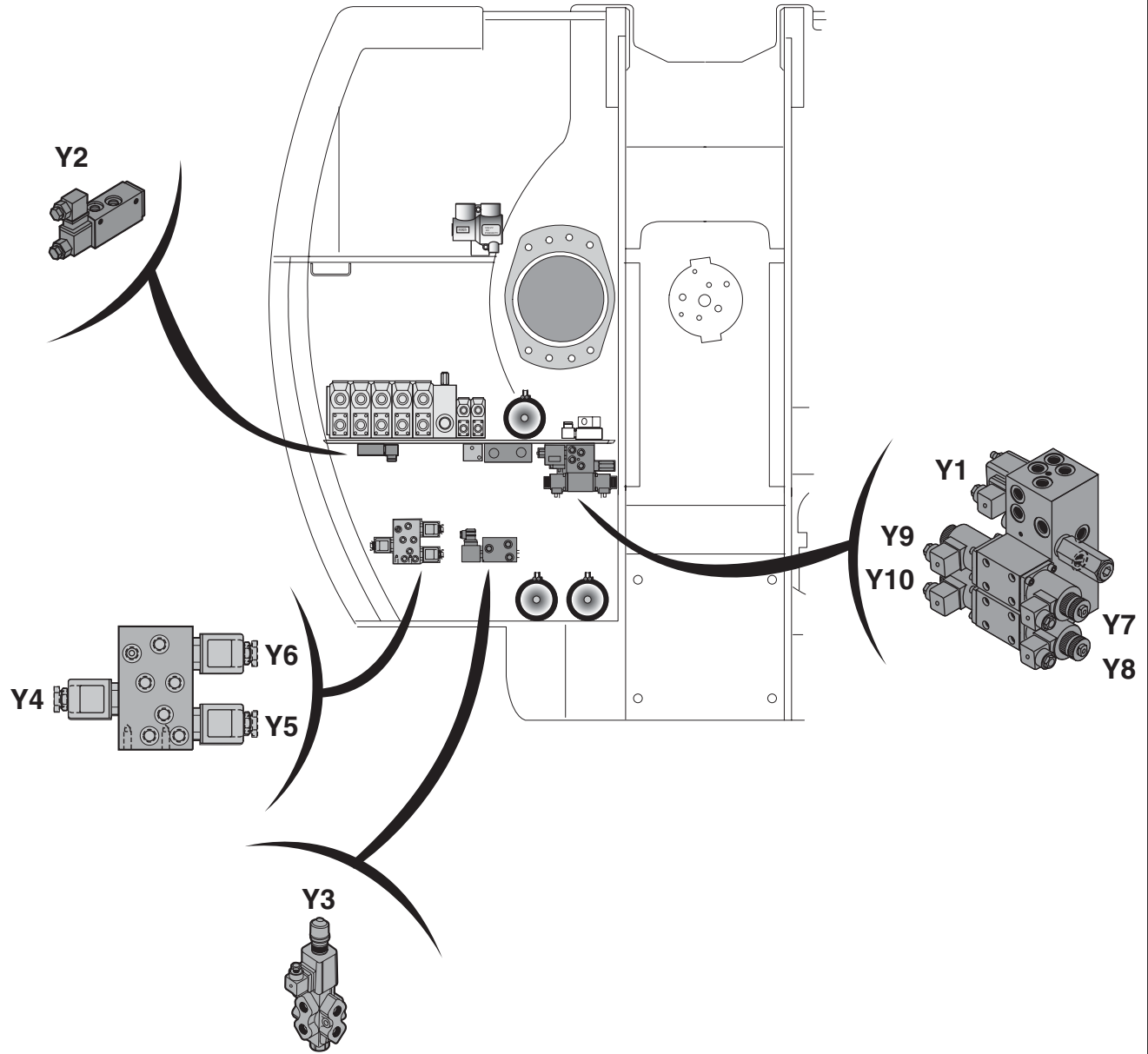
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- | | |
|--|--|
| 1 - Auxiliary function | 34 - Left stabilizer ram |
| 2 - Dipper ram | 35 - Stabilizer block |
| 3 - Bucket ram | 36 - Rotary coupling |
| 4 - Intermediate boom ram | 37 - Hydraulic reservoir |
| 5 - Boom ram | 38 - Deviative block 6 ways |
| 6 - Orientation engine | 39 - Inversion bucket block |
| 7 - Hydro-Sensor block | 40 - Auxiliary pedal control |
| 8 - Braking block | 41 - Accelerator ram |
| 9 - Offset ram | 42 - Heat engine |
| 10 - Tool unlock ram | 43 - Right stabilizer ram |
| 11 - Gear change block | 44 - Oscillation locking block |
| 12 - Left manipulator | 45 - Service brake ram |
| 13 - Right manipulator | 46 - 3 bars valve |
| 14 - Boom / intermediate boom selection block | 47 - Cooling system |
| 15 - Parking brake manipulator | 48 - 0.5 bar valve |
| 16 - Brake / inching foot control | 49 - 9 bars valve |
| 17 - Accelerator foot control | 50 - SX18 valve block |
| 18 - Drain block | 51 - 1.7 bar manocontact |
| 19 - Function block | 52 - 15 bars manocontact |
| 20 - Priority valve | 53 - 10 bars manocontact |
| 21 - ORBITROL steering device | 54 - Accumulator 0.35 l / 15 bars |
| 22 - Steering ram | 55 - Accumulator 0.7 l / 22 bars |
| 23 - Steering / rotation pump | 56 - Accumulator 0.7 l / 13 bars |
| 25 - Equipment pump | 57 - 25 bars manocontact |
| 26 - Cramming filter | 58 - 15 bars manocontact |
| 27 - Transfer movement pump | 59 - 120 bars manocontact |
| 28 - Transfer movement engine | 60 - Left stabilizer extension ram |
| 29 - Parking brake ram | 61 - Right stabilizer extension ram |
| 30 - Inching valve | 62 - Anti-stalling valve 3 ways |
| 31 - Return filter | 63 - Circuit selector |
| 32 - 350 g pressurised air valve | 64 - 30 bars manocontact (Italy) |
| 33 - Oscillation locking ram | 65 - Pressure brake alarm (Italy) |



11. Installation of the electric bundles

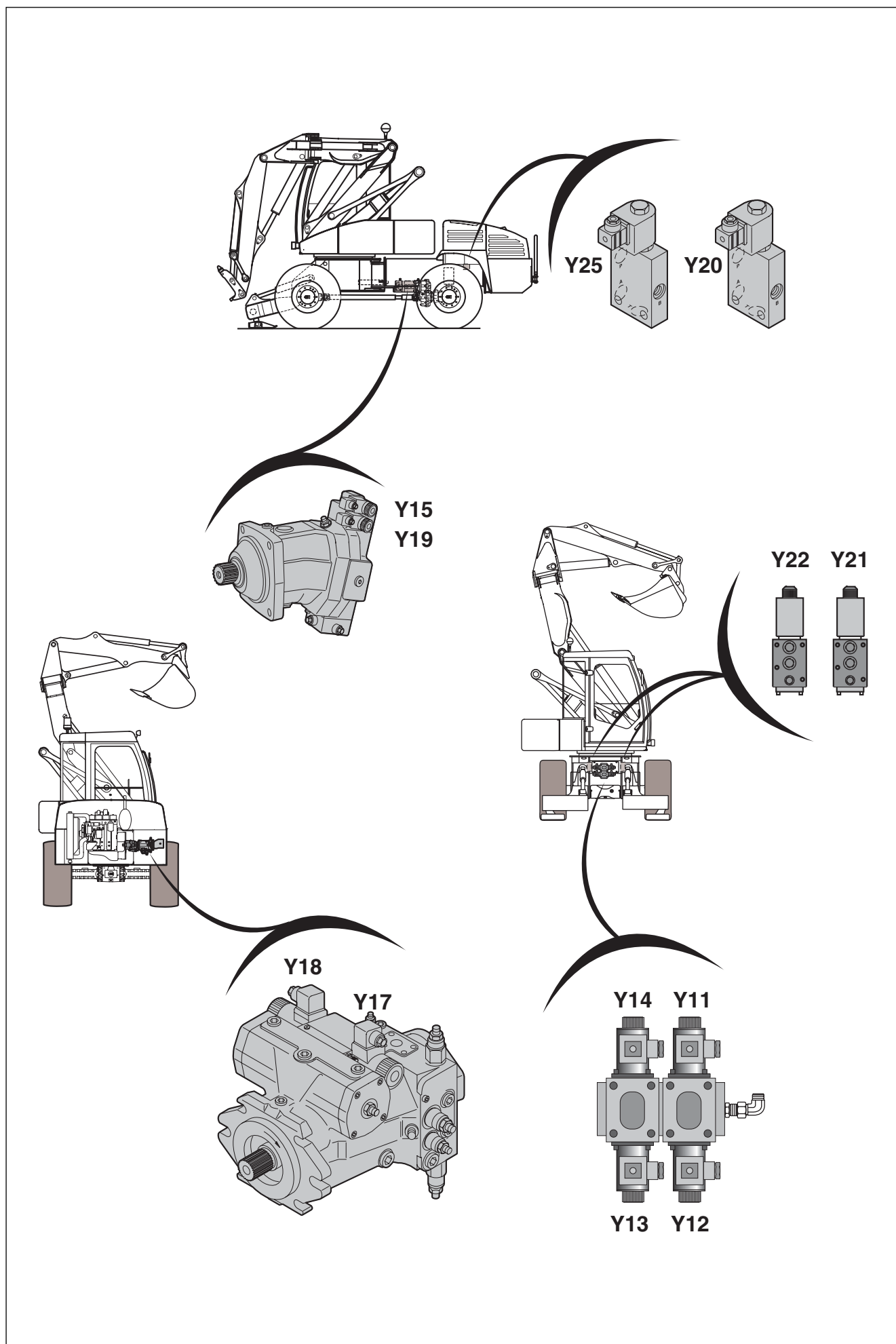
- 1 - Left rear light connection
- 2 - Right rear light connection
- 3 - Rear chassis bundle
- 4 - Electric collector bundle
- 5 - Relay plate bundle
- 6 - Cab connection
- 7 - Solenoid-operated valves bundle
- 8 - Left front headlight connection
- 9 - Control table bundle
- 10 - Selection bundle
- 11 - Instrument panel bundle
- 12 - Foot controls bundle
- 13 - Foot controls electromagnet connection
- 14 - Commodities connection
- 15 - Right front headlight connection
- 16 - Electric manipulators and seat bundle
- 17 - Hydraulic manipulators connection (on seat bundle)
- 18 - Air conditioning relay box bundle
- 19 - Air conditioning bundle



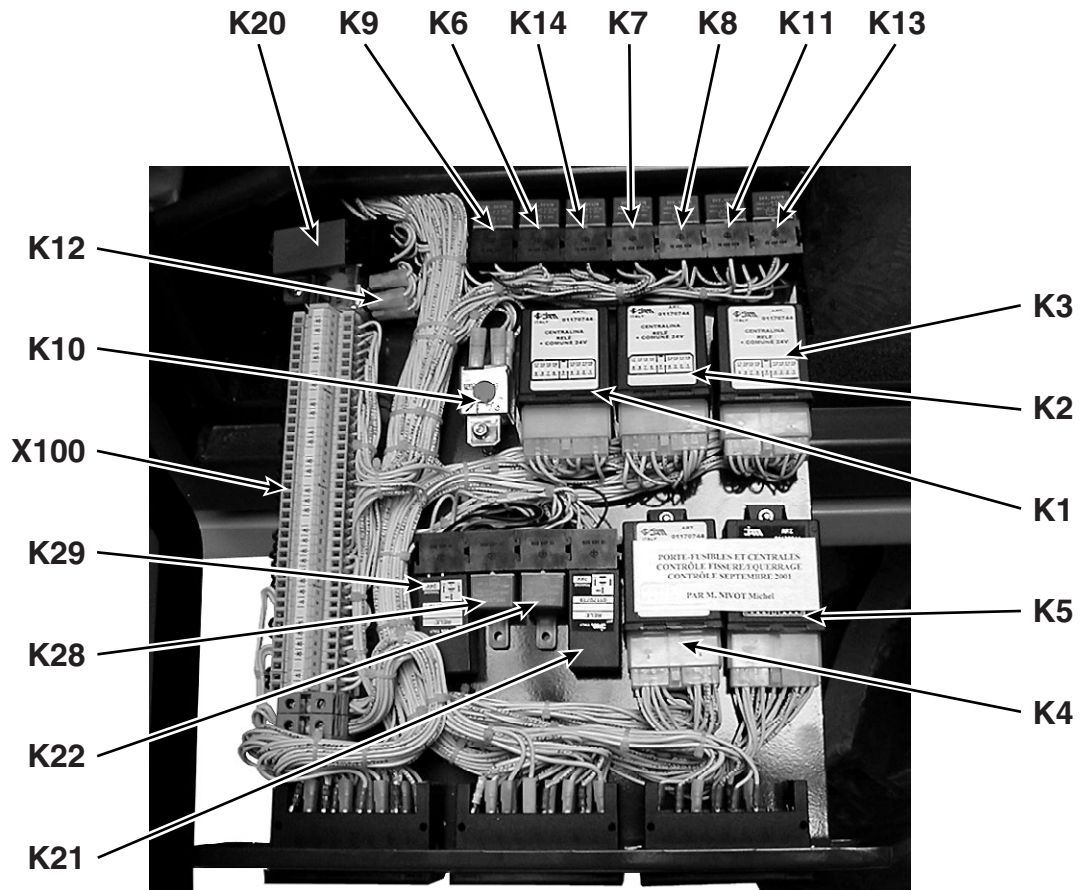
12. Location of the electric components

12.1 Solenoid-operated valves

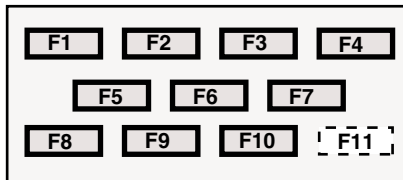
Designation	
Y1	Hydraulic lock solenoid-operated valve (power-assistance pressure block)
Y2	Inversion of direction of bucket solenoid - operated valve
Y3	Coupling of rams solenoid-operated valve
Y4	"MECALAC 2" option solenoid-operated valve (control unit)
Y5	Boom / inter. boom solenoid-operated valve (control unit)
Y6	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)



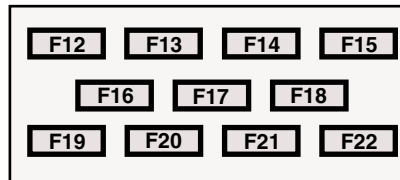
Designation	
Y11	Left stabilizer raising solenoid - operated valve
Y12	Left stabilizer lowering solenoid - operated valve
Y13	Right stabilizer raising solenoid - operated valve
Y14	Right stabilizer lowering solenoid - operated valve
Y15	Low speed solenoid - operated valve
Y17	Reverse solenoid - operated 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
Y25	“Road / Site” speed solenoid - operated valve



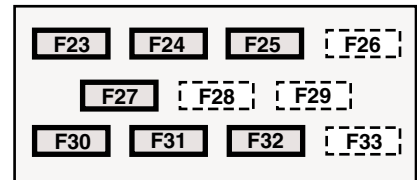
FU1



FU2



FU3

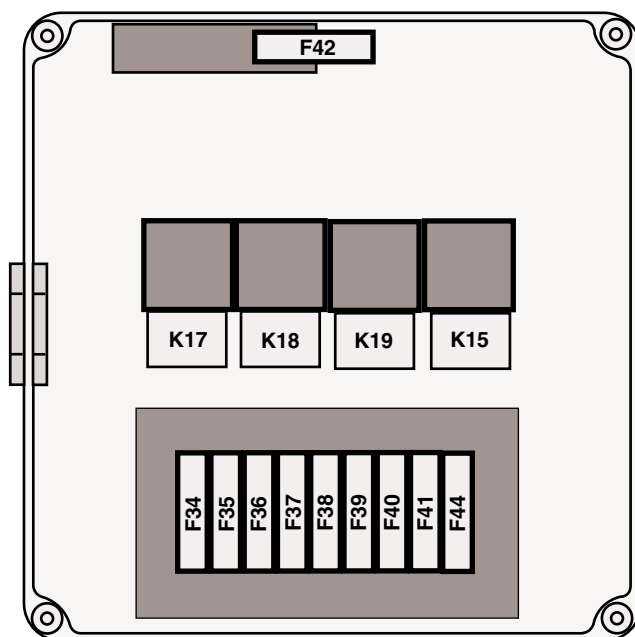


12.2 Relay / fuse box (under the cab seat)

FU1	-	Fuse block	
F1	-	7.5A fuse	: Rear screen wiper
F2	-	7.5A fuse	: Forward (F) and reverse (R), low speed (L)
F3	-	7.5A fuse	: Revolving light
F4	-	7.5A fuse	: Horn and brake lock
F5	-	7.5A fuse	: Hazard warning lights
F6	-	7.5A fuse	: Front windscreen wiper and washer
F7	-	5A fuse	: Proximity detector, parking brake and load overshoot
F8	-	3A fuse	: K2 relay unit and "Loader mode" module
F9	-	3A fuse	: K3 relay unit and windscreen wiper module
F10	-	10A fuse	: Oscillation lock
FU2	-	Fuse block	
F12	-	10A fuse	: Boom, intermediate boom, coupling of rams and 4th foot-operated ram
F13	-	5A fuse	: "Road / Site" speed
F14	-	10A fuse	: Working lights
F15	-	20A fuse	: Offset, stabilizers and blocks, load sensing, tool unlocking and hydraulic lock
F16	-	3A fuse	: Direction indicators
F17	-	3A fuse	: K4 relay unit and tool unlocking module
F18	-	3A fuse	: Control panel safety lights
F19	-	7.5A fuse	: Dipped beams
F20	-	7.5A fuse	: Main beams
F21	-	3A fuse	: K5 relay unit and working light module
F22	-	7.5A fuse	: Radio
FU3	-	Fuse block	
F23	-	3A fuse	: Resetting and front windscreen wiper
F24	-	25A fuse	: Lighting
F25	-	5A fuse	: Starting relay
F27	-	5A fuse	: Position lights, clearance lights and number plate lights
F30	-	3A fuse	: Not used
F31	-	7.5A fuse	: Horn
F32	-	7.5A fuse	: Cigarette lighter and ceiling light
K1	-	Relay	: Relay unit, see electrical diagram
K2	-	Relay	: Relay unit, see electrical diagram
K3	-	Relay	: Relay unit, see electrical diagram
K4	-	Relay	: Relay unit, see electrical diagram
K5	-	Relay	: Relay unit, see electrical diagram
K6	-	Relay	: Brake lock safety
K7	-	Relay	: Accelerator lock safety
K8	-	Relay	: Safety in "Loader mode"
K9	-	Relay	: Forward (F) and reverse (R) in "Loader mode"
K10	-	Relay	: Low speed (L) and High speed (H) in "Loader mode"
K11	-	Relay	: 4th foot-operated ram
K12	-	Relay	: Boom and intermediate boom
K13	-	Relay	: Coupling of rams
K14	-	Relay	: Working lights
K20	-	Direction indicator central unit	
K21	-	Relay	: Forced forward (F)
K22	-	Relay	: Forward (F) and reverse (R) piloting in "Loader mode"
K28	-	Relay	: Starting safety
K29	-	Relay	: "Road / Site" speed
X100	-	Terminal board	

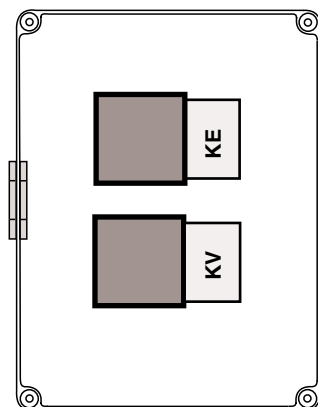
12.3 Electrical box (in the rear chassis section)

F34	-	5A fuse	:	Engine shut-off and ignition switch
F35	-	15A fuse	:	Reversing lights, audible reversing signal and direction inverter
F36	-	3A fuse	:	Rear left direction indicator
F37	-	3A fuse	:	Rear right direction indicator
F38	-	3A fuse	:	Rear right position light
F39	-	3A fuse	:	Rear left position light
F40	-	3A fuse	:	Number plate light
F41	-	25A fuse	:	Heating
F42	-	40A fuse	:	Turntable supply
F44	-	3A fuse	:	Engine shut-off relay
K15	-	Relay	:	Engine shut-off
K17	-	Relay	:	Direction inverter safety
K18	-	Relay	:	Direction inverter safety
K19	-	Relay	:	Reversing lights and audible reversing signal



12.4 Air conditioning relays box (option) (under the cab floor)

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



13. Parts list of the electric diagram

- | | |
|--|--|
| B1 - Load overload pressure switch | F27 - 5A fuse: Position lights, clearance lights and number plate lights |
| B2 - Load overload pressure switch | F30 - 3A fuse: Not used |
| B3 - Stop lights pressure switch | F31 - 7.5A fuse: Horn |
| B4 - Parking brake pressure switch | F32 - 7.5A fuse: Cigarette lighter and ceiling light |
| B5 - Proximity detector | F34 - 5A fuse: Engine shut - off and direction inverter |
| B6 - Engine oil pressure switch | F35 - 15A fuse: Reversing lights, audible reversing signal and direction inverter |
| B7 - Power-assistance oil pressure switch | F36 - 3A fuse: Rear left direction indicator |
| B8 - Air filter clogged pressure switch | F37 - 3A fuse: Rear right direction indicator |
| B9 - Hydraulic return filter clogged manometer | F38 - 3A fuse: Rear right position light |
| B11 - Steering circuit pressure switch | F39 - 3A fuse: Rear left position light |
| B12 - Gear change safety pressure switch | F40 - 3A fuse: Number plate light |
| BP - Dehydrator pressure switch | F41 - 25A fuse: Heating |
| E1 - Cigarette lighter | F42 - 40A fuse: Turntable supply |
| E2 - Ceiling light | F44 - 3A fuse: Engine shut-off relay |
| E3 - Number plate lighting | F45 - 25A fuse: Air conditioning condenser |
| E4 - Front left main beam | G1 - Battery |
| E5 - Front right main beam | G2 - Alternator |
| E6 - Front left dipped beam | G3 - Battery |
| E7 - Front right dipped beam | H1 - Horn |
| E9 - Rear working light | H2 - Engine oil pressure warning light |
| E10 - Front working light | H3 - Power-assistance oil pressure warning light |
| E11 - Water temperature probe | H4 - Air filter clogged warning light |
| E12 - Fuel gauge | H5 - Hydraulic filter clogged warning light |
| F1 - 7.5A fuse: Rear screen wiper | H7 - Turntable alignment light |
| F2 - 7.5A fuse: Forward (F) and reverse (R), low speed (L) | H8 - Direction indicators light |
| F3 - 7.5A fuse: Revolving light | H9 - Position lights light |
| F4 - 7.5A fuse: Horn and brake lock | H10 - High speed (H) light |
| F5 - 7.5A fuse: Hazard warning lights | H11 - Low speed (L) light |
| F6 - 7.5A fuse: Front windscreen wiper and washer | H12 - Reverse (R) light |
| F7 - 5A fuse: Proximity detector, parking brake and load overshoot | H13 - Forward (F) light |
| F8 - 3A fuse: K2 relay unit and "loader mode" module | H14 - Battery charge light |
| F9 - 3A fuse: K3 relay unit and "Windscreen wiper" module | H15 - Revolving light (option) |
| F10 - 10A fuse: Oscillation lock | H16 - Parking brake light |
| F12 - 10A fuse: Boom, intermediate boom, coupling of rams and 4th foot - operated ram | H17 - Audible reversing signal |
| F13 - 5A fuse: "Road / Site" speeds | H18 - Reversing light |
| F14 - 10A fuse: Working lights | H19 - Rear left direction indicator |
| F15 - 20A fuse: Offset, stabilizers and blocks, load sensing, tool unlocking and hydraulic lock | H20 - Front left direction indicator |
| F16 - 3A fuse: Direction indicators | H21 - Rear right direction indicator |
| F17 - 3A fuse: K4 relay unit and "Tool unlocking" module | H22 - Front right direction indicator |
| F18 - 3A fuse: Control panel safety lights | H23 - Rear left position light |
| F19 - 7.5A fuse: Position lights | H24 - Rear right position light |
| F20 - 7.5A fuse: Headlights | H25 - Front right position light |
| F21 - 3A fuse: K5 relay unit and "Working light" module | H26 - Right clearance light |
| F22 - 7.5A fuse: Radio | H27 - Left clearance light |
| F23 - 3A fuse: Resetting and front windscreen wiper | H28 - Front left position light |
| F24 - 25A fuse: Lighting | H29 - Control panel lighting |
| F25 - 5A fuse: Starting relay | H30 - Load overshoot warning light |
| | H31 - Stop lights |
| | H32 - Boom light |
| | H33 - Dipper ram indicator |
| | H34 - Bucket ram light (German version) |
| | H35 - Overload buzzer option |
| | H37 - Min. braking pressure threshold buzzer (Italy option) |
| | H38 - Right side flashing light (Italy option) |

- H39** - Left side flashing light (Italy option)
- H40** - "Road" speed indicator light
- II** - Air conditioning option
- K1** - Relay unit
- K1.1** - Starting safety relay
- K1.2** - Brake lock relay
- K1.3** - Horn relay
- K1.4** - Not used
- K2** - Relay unit
- K2.1** - Accelerator lock relay
- K2.2** - "Loader mode" relay
- K2.3** - "Loader mode" relay
- K2.4** - Revolving light relay
- K3** - Relay unit
- K3.1** - Front windscreen washer relay
- K3.2** - Front screen wiper relay
- K3.3** - Rear screen wiper relay
- K3.4** - Not used
- K4** - Relay unit
- K4.1** - Hydraulic lock relay
- K4.2** - Bucket direction inversion relay
- K4.3** - Tool unlocking relay
- K4.4** - Oscillation lock relay
- K5** - Relay unit
- K5.1** - Load overshoot relay
- K5.2** - "Loader mode" relay
- K5.3** - Front working light relay
- K5.4** - Rear working light relay
- K6** - Brake lock safety relay
- K7** - Accelerator lock safety relay
- K8** - Safety in "Loader mode" relay
- K9** - Forward (**F**) and reverse (**R**) in "Loader mode" relay
- K10** - "Loader mode" low (**L**) speed relays
- K11** - 4th foot-operated ram relay
- K12** - Boom and intermediate boom relay
- K13** - Ram coupling relay
- K14** - Working light relay
- K15** - Engine shut-off relay
- K16** - Starting relay
- K17** - Direction inverter safety relay
- K18** - Direction inverter safety relay
- K19** - Reversing lights and audible reversing signal relay
- K20** - Direction indicators central unit
- K21** - Forced forward (**F**) relay
- K22** - Forward (**F**) and reverse (**R**) in "Loader mode" piloting relay
- K28** - Starting safety relay
- K29** - "Road / Site" speed relay
- KE** - Air-conditioning starting relay
- KV** - Air conditioning condenser's relay
- L1** - Brake lock coil
- L2** - Accelerator's lock coil
- L3** - Engine shut-off coil
- M1** - Starter
- M2** - Rear screen wiper
- M3** - Front windscreen wiper
- M4** - Front windshield washer
- M5** - Heating fan
- MV** - Air conditioning condenser's fan
- P1** - Rev counter
- P2** - Hour counter
- P3** - Temperature indicator
- P4** - Fuel level indicator
- Q1** - Battery cut-out
- R** - Option for the Italy versions
- S1** - Boom / dipper control
- S2** - Forward (**F**) and reverse (**R**) control in "Loader mode"
- S3** - Slow speed (**S**) control in "Loader mode"
- S4** - Audible warning control
- S5** - Left and right offset control
- S6** - Tool unlock module control
- S7** - Working light module control
- S8** - Options control
- S9** - Key-operated ignition switch
- S10** - "Loader mode" module control
- S11** - Warning signal lights control
- S12** - Windscreen wiper module control
- S13** - Left stabilizer brake block control
- S14** - Right stabilizer brake block control
- S15** - Lights, direction indicators and windscreen wipers controls under steering wheel
- S16** - Hydraulic system locking controls (switch under right arm rest)
- S18** - Tool unlocking pushbutton
- S19** - Heater fan control
- S20** - Air conditioning switch
- S21** - "Road / Site" speeds selector
- Y1** - Hydraulic lock solenoid-operated valve
- Y2** - Inversion of direction of bucket solenoid - operated valve
- Y3** - Coupling of rams solenoid-operated valve
- Y4** - "MECALAC 2" option solenoid-operated valve
- Y5** - Boom / inter. boom solenoid-operated valve
- Y6** - Boom / inter. boom solenoid-operated valve
- Y7** - Tool unlocking solenoid - operated valve
- Y8** - Left offset solenoid - operated valve
- Y9** - Load sensing solenoid - operated valve
- Y10** - Right offset solenoid - operated valve
- 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 (**L**) solenoid - operated valve
- Y17** - Reverse (**R**) solenoid - operated valve
- Y18** - Forward (**F**) 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
- Y25** - "Road / Site" speeds solenoid-op. valve
- YA** - Solenoid-operated air conditioning valve
- *** - Commutator

6857008

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

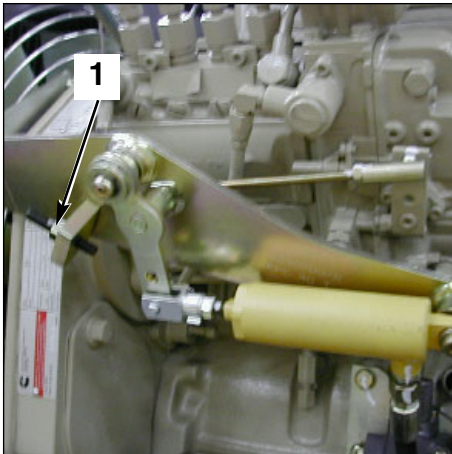


Fig. 1 Injection pump

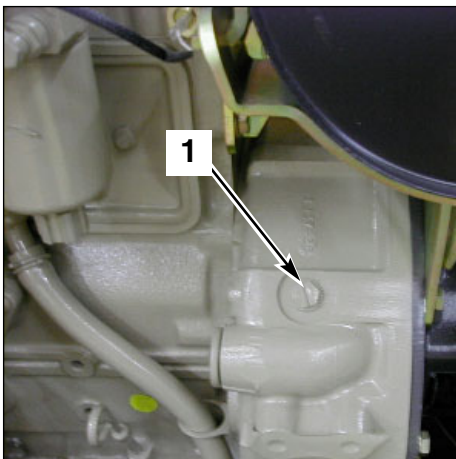


Fig. 2 Heat engine



Note: Number of teeth on engine wheel: 159.

Operation	Speed (rpm)	Adjustment (ref. no.)
Maximum regime	2,300 (+ 20 - 20)	1 fig. 1

14.1.2 Adjustment during minimum regime
(slowed down)



13 flat spanner
Flat screwdriver
Inductive sensor

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

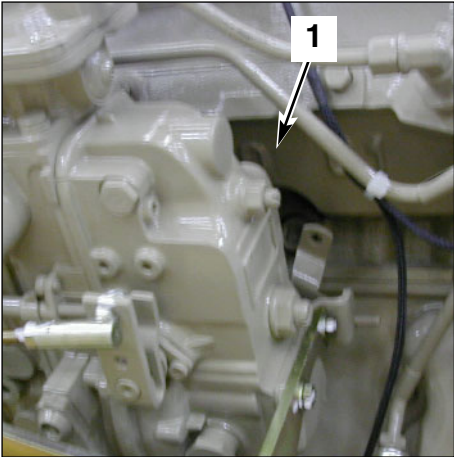


Fig. 1 Injection pump

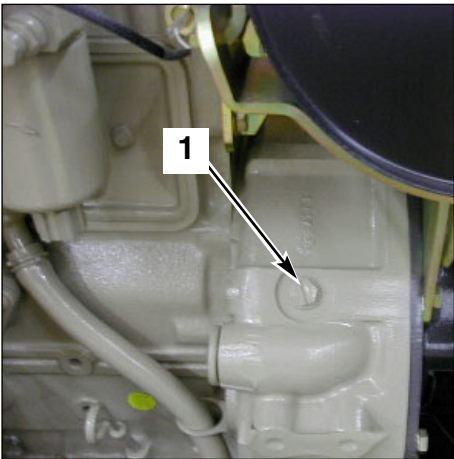


Fig. 2 Heat engine



Note: Number of teeth on engine wheel: 159.



Note: For the air-conditioning version of the machines,
minimum regime = 1,050 (+ 50 - 0)

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 bars

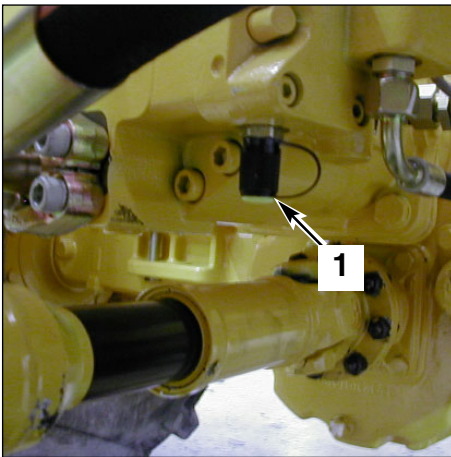


Fig. 1 Transfer movement engine

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

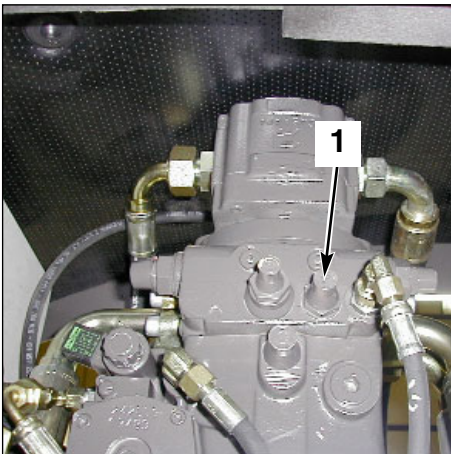


Fig. 2 Transfer movement pump

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

Operation	Pressure (bars)	Mesure (ref. no.)	Adjustment (ref. no.)
Power-feed pressure	28 (+ 2 - 1)	1 fig. 1	1 fig. 2

14.2.2 Starting

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

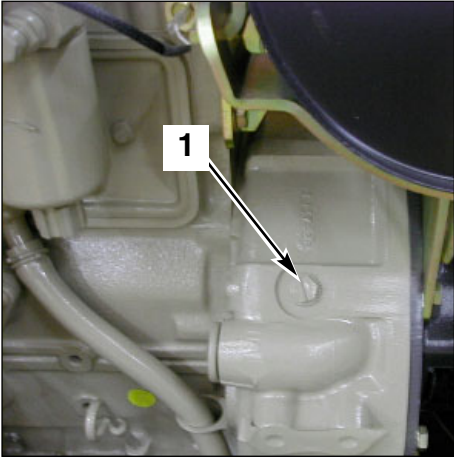


Fig. 1 Heat engine

- 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).

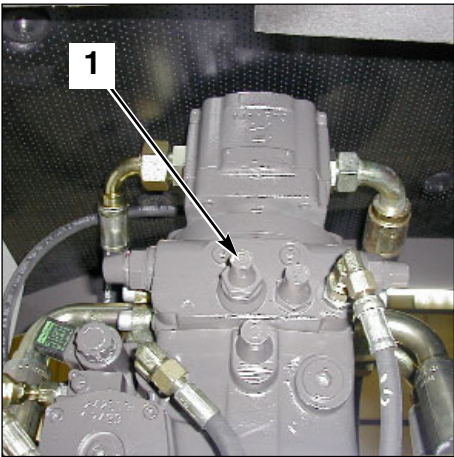


Fig. 2 Transfer movement pump

- 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.



Note: For the air-conditioning version of the machines,
starting point N = 1,100 (+ 50 - 0).
There must be a difference of at least 50 rpm between the minimum regime and the starting point.

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.)

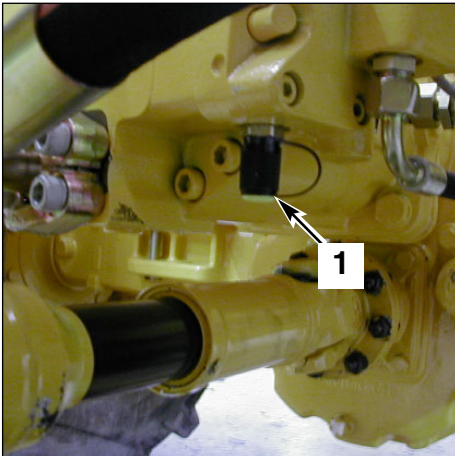


Fig. 1 Transfer movement engine

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

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

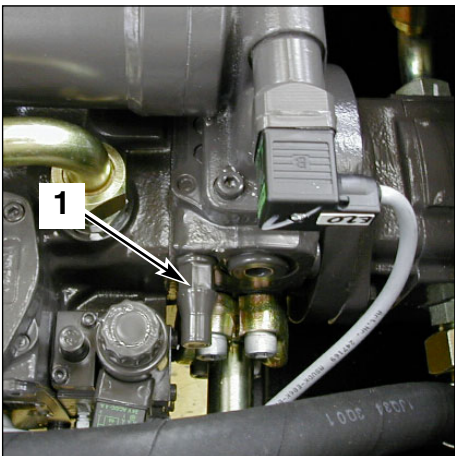


Fig. 2 Transfer movement pump

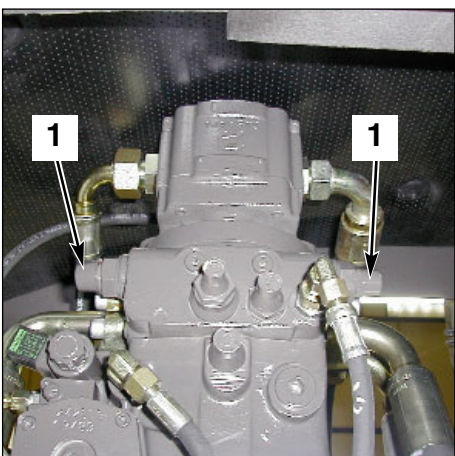


Fig. 3 Transfer movement pump



Note: The HP shock absorbers (1 fig. 3) for forward and reverse movement are tared at 480 bars (+ 40 - 0 bars).

Operation	High pressure (bars)	Measurement (ref. no.)	Adjustment (ref. no.)
High pressure in forward movement	440 (+ 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
Inductive sensor
Manometer, 0-600 bars

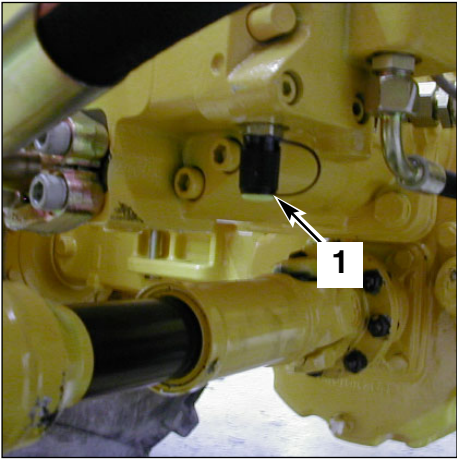


Fig. 1 Transfer movement engine

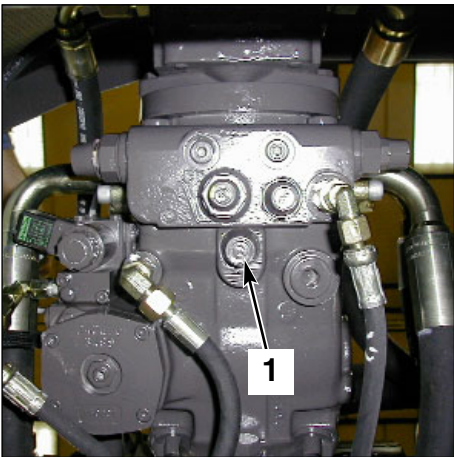


Fig. 2 Transfer movement pump

- 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 HP circuit.
- 3-
- Read the speed in rpm by placing an inductive sensor on the fan pulley.
- 4-
- Measure the high pressure (1 fig. 1) using the manometer.
- 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 (bars)	Speed (rpm)	Adjustment (ref. no.)
Heat gring	1 fig. 1 400 (+ 5 - 5)	1700 (+ 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 bars

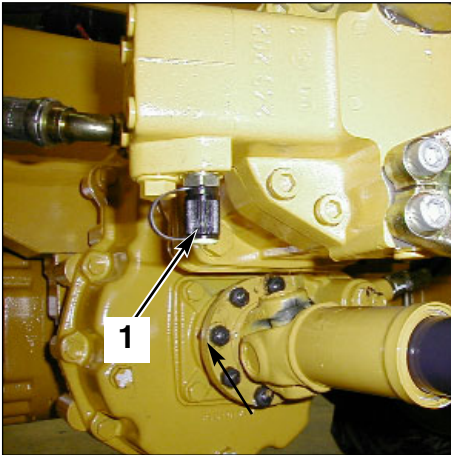


Fig. 1 Transfer movement engine

- 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.

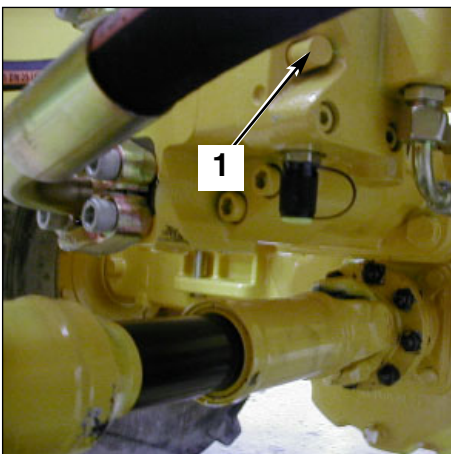


Fig. 2 Transfer movement engine

- 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 250 (+ 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 road configuration 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	2,450 (+ 25 - 25)	Joint	1 fig. 1
Minimum capacity GERMANY 20 Km/h	1,700 (+ 25 - 25)	Joint	1 fig. 1

14.2.7 Adjusting the Inching flex



17 flat spanner
 5 flat hexagonal spanner
 Manometer, 0-600 bars

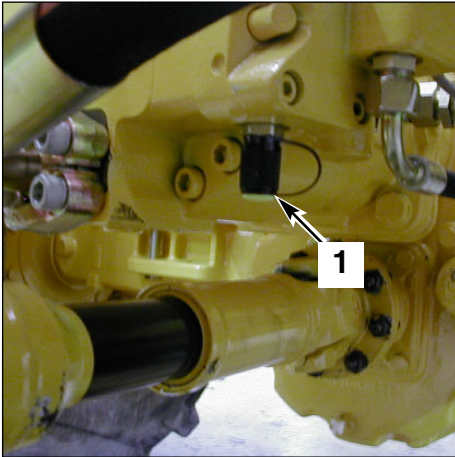


Fig. 1 Transfer movement engine

- 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.

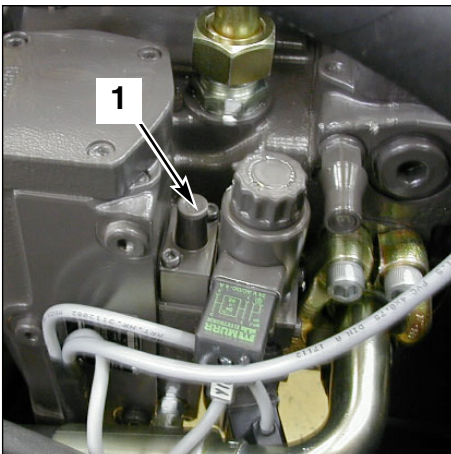


Fig. 2 Transfer movement pump

- 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 (bars)	Measurement (ref. no.)	Adjustment (ref. no.)
Inching and brake	No sharp rise	1 fig. 1	1 fig. 2

14.3 Direction adjustment procedure

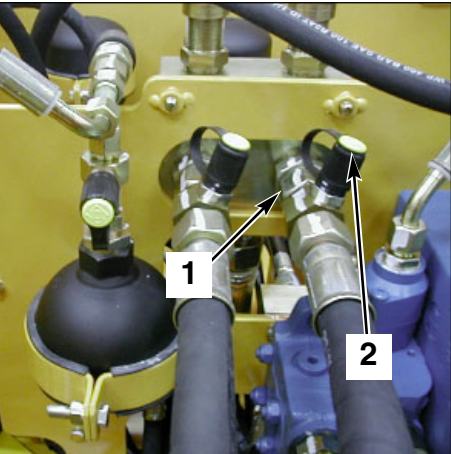


Fig. 1 Cross-over unit



17, 27 and 30 flat spanners
5 male hexagonal spanner
G DS16 1/2" female stopper
G DS16 1/2" male stopper
Manometer, 0-600 bars

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.

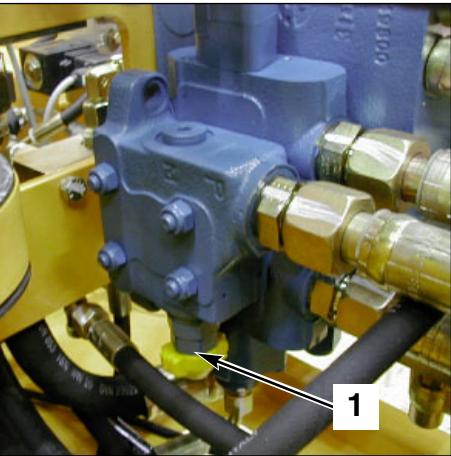


Fig. 2 SX18 valve block

- 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 (2 fig. 1) using the manometer.
- 5- Loosen the lock nut and turn the pressure controller screw (1 fig. 2) clockwise to increase the pressure.
- 6- Reconnect the flex and move on to adjusting the ΔP of the cross-over valve.

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

14.3.2 Adjusting the ΔP of the cross-over valve



17 flat spanner
 5 flat hexagonal spanner
 2 manometers, 0-600 bars

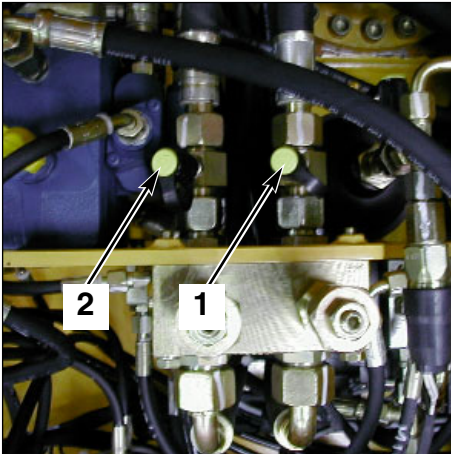


Fig. 1 Cross-over unit

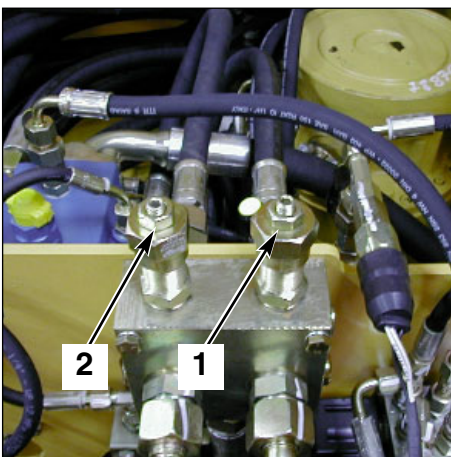


Fig. 2 Cross-over unit

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 (bars)	Measurement (ref. no.)	Adjustment (ref. no.)
ΔP direction	225 (+ 5 - 5)	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



- 5/16" male hexagonal spanner
- 1/4" male hexagonal spanner
- Manometer, 0-60 bars

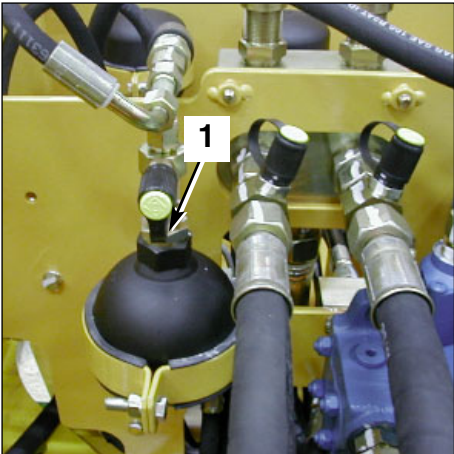


Fig. 1 Accumulator

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

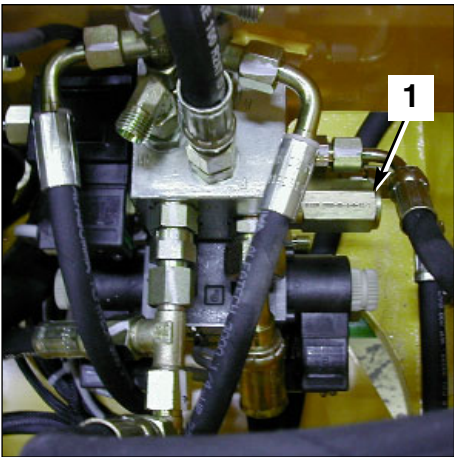


Fig. 2 Assistance pressure unit

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

Operation	Pressure (bars)	Measurement (ref. no.)	Adjustment (ref. no.)
Assistance pressure	36 (+ 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)

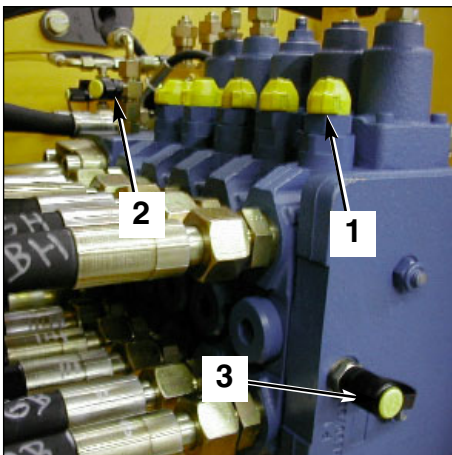


Fig. 1 SX18 valve block



13 and 30 flat spanners
 4 male hexagonal spanner
 2 manometers, 0-600 bars



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.

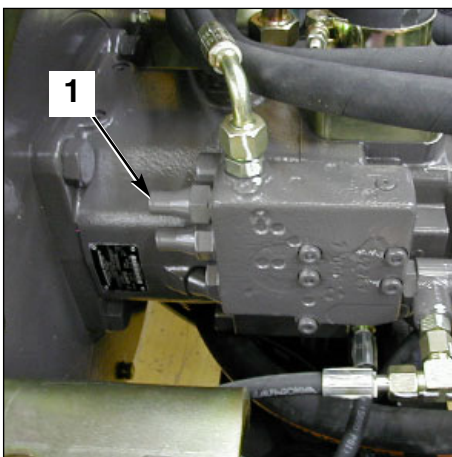
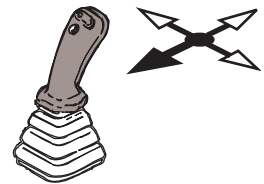
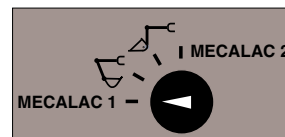


Fig. 2 Equipment pump

- 1- Remove the anti-shock controller (1 fig. 1) (small chamber of the dipper ram).
- 2- Raise the regulation controller into its position.
Ref = E536A0018 (taring at 50 bars).
- 3- With engine in maximum regime, set the selector to MECALAC 1 and pull the left key towards the back (blocked position) to allow the oil to circulate .



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

Operation	Pressure (bars)	Measurement (ref. no.)	Adjustment (ref. no.)
ΔP of equipment	15 (+ 1 - 1)	2 fig. 1 and 3 fig. 1	1 fig. 2

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



30 flat spanner
36 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.

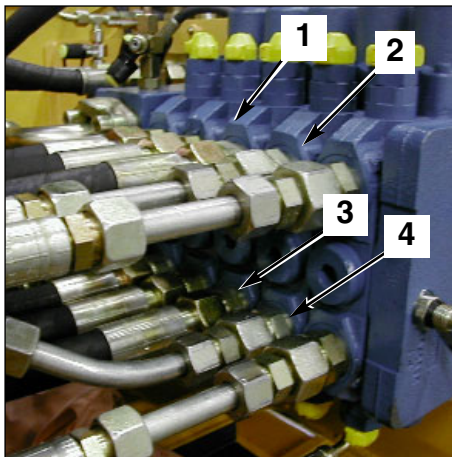


Fig. 1 SX18 valve block

1- Remove the hoses from the valve block:

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

2- Fit the flow meter conversion kit:

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



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

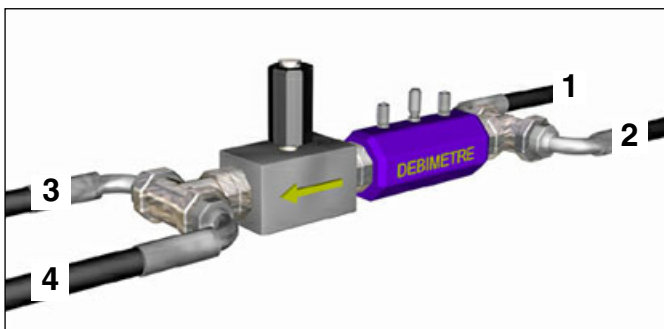


Fig. 2 Flow meter adaptation kit (Top-Test/MX)



13 flat spanner
4 male hexagonal spanner
2 manometers, 0-600 bars

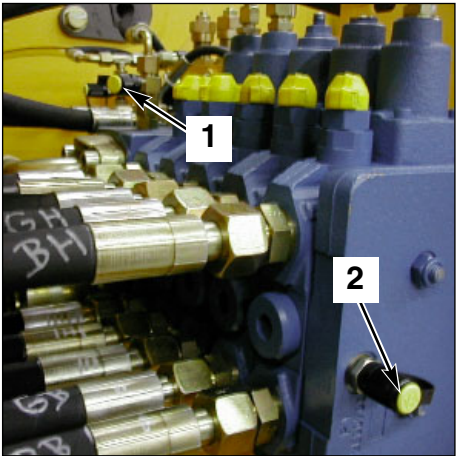
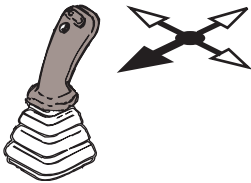


Fig. 3 SX18 valve block

- 3- Set the selector to MECALAC 1 and pull the left key towards the back (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 (2 fig. 3) using the two manometers.

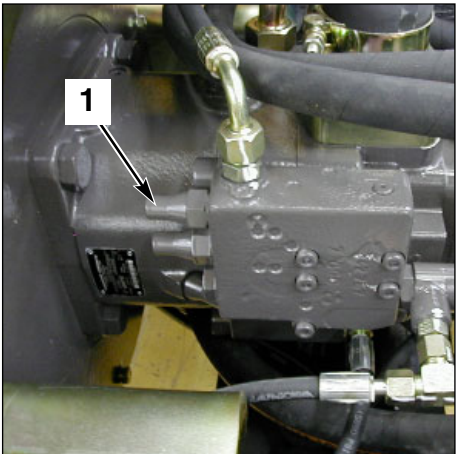


Fig. 4 Equipment pump

- 5- Turn the screw (1 fig. 4) clockwise in order to increase the ΔP .



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

Operation	Pressure (bars)	Measurement (ref. no.)	Adjustment (ref. no.)
ΔP of equipment	15 (+ 1 - 1)	1 fig. 3 and 2 fig. 3	1 fig. 4

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



13 and 17 flat spanner
 4 and 5 male hexagonal spanner
 Manometer, 0-600 bars

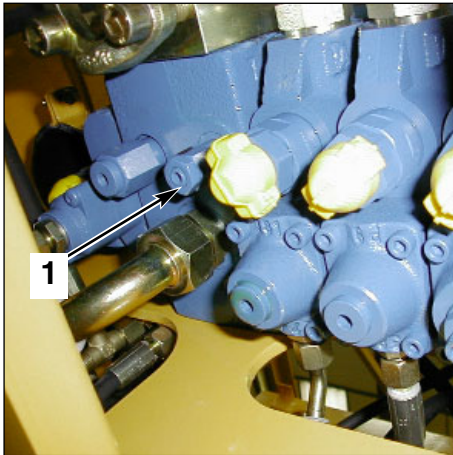


Fig. 1 SX18 valve block

- 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.

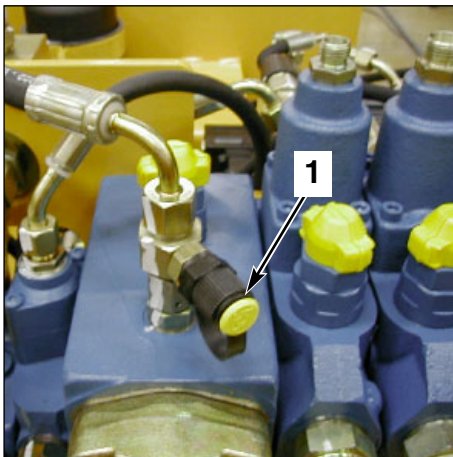


Fig. 2 SX18 valve block

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

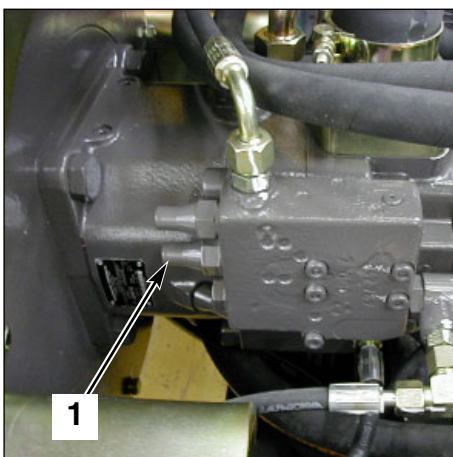


Fig. 3 Equipment pump

Operation	Pressure (bars)	Measurement (ref. no.)	Adjustment (ref. no.)
Maximum pump pressure	340 (+ 10 - 0)	1 fig. 2	1 fig. 3

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

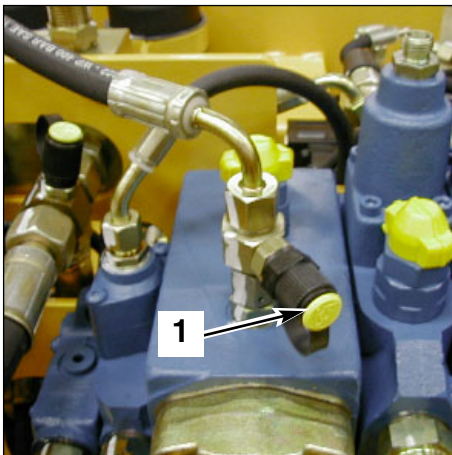


Fig. 1 SX18 valve block



17 flat spanner
 5 male hexagonal spanner
 Manometer, 0-600 bars

- 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.

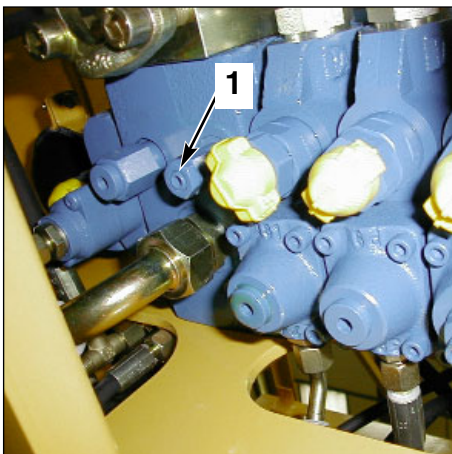


Fig. 2 SX18 valve block

- 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 (bars)	Measurement (ref. no.)	Adjustment (ref. no.)
Maximum equipment pressure	310 (+ 5 - 5)	1 fig. 1	1 fig. 2

14.4.6 Adjusting the power regulation

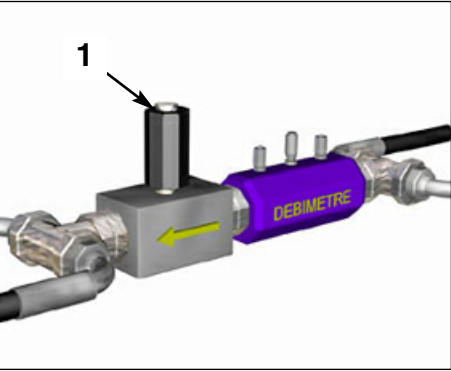


Fig. 1 Flow meter adaptation kit (TOP-TEST/MX)



Fig. 2 SX18 valve block

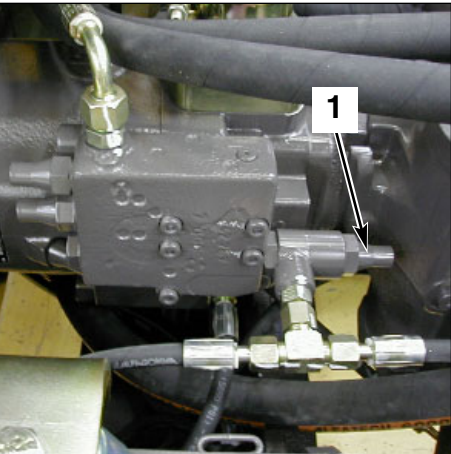
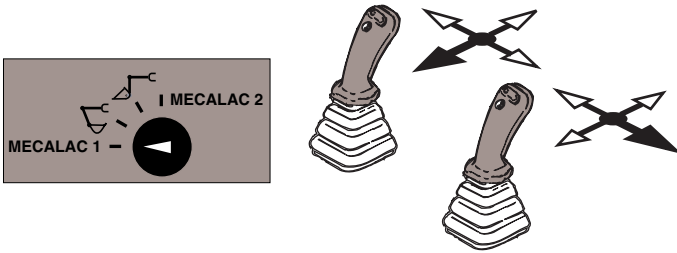


Fig. 3 Equipment pump



13 flat spanner
4 male hexagonal spanner
Inductive sensor
Manometer, 0-600 bars
Flow meter adaptation kit

1- Set the selector switch to “MECALAC 1”, pull the left key towards the back, push the right key to the right (blocked position) to allow the oil to circulate (small chambers of the dipper ram and bucket ram).



- 2- Accelerate the engine to maximum regime.
- 3- Reduce the flow (140 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- Check that the regime of the engine does not exceed 2,000 rpm.



Note: For the air-conditioning type machines, power regulation of equipment pump.
Q = 140 l/mn for 235 bars (+ 10 - 0).
All other values remain unchanged.

Operation	Pressure (bars)	Speed (rpm)	Measurement (ref. no.)	Adjustment (ref. no.)
Power regulation at 140 l/mn	245 (+ 10 - 10)	> 2,000	1 fig. 2	1 fig. 3

14.4.7 Monitoring the power regulation curve with the direction



13 flat spanner
 4 male hexagonal spanner
 Inductive sensor
 Manometer, 0-600 bars
 Flow meter adaptation kit

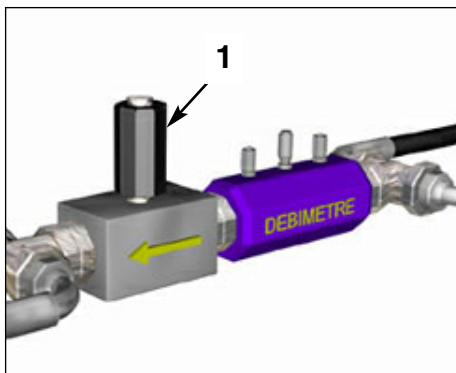
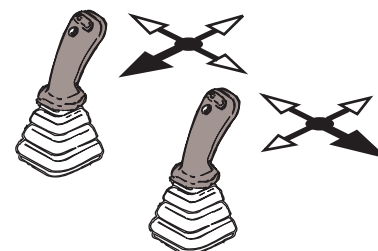


Fig. 1 Flow meter adaptation kit (TOP-TEST/MX)

- 1- Place the equipment in blocked position against a wall, set the selector on "MECALAC 1", pull the left key towards the bac, push the right key to the right (blocked position) to allows the oil to circulate (small chambers of the dipper ram and bucket 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 bars and continue this adjustment until the regime of the engine is brought below 2,000 rpm.

[illegible]

15. Control Sheet

Machine no.:

Engine no.:

Equipment pump no.:

Transfer movement pump no.:

Transfer movement engine no.:

14 MBX adjustment values	Description		Stated or regulated values
	Speed Rpm	Pressure bars	
Engine			
Max. engine speed	2,300 (+20 -20)		
Min. engine speed	950 (+50 -0)		
Direction			
Primary controller		250 (+5 -0)	
Δ P, right		225 (+5 -5)	
Δ P, left		225 (+5 -5)	
Equipment			
Assistance pressure		36 (+3 -0)	
Equipment Δ P		15 (+1 -1)	
Max. pump pressure (D.R.)		340 (+10 -0)	
Max. equipment pressure		310 (+5 -5)	
Power regulation (140 l)		245 (+10 -10)	
Transfer movement			
Maximum power-feed regime.		28 (+2 -1)	
Starting	1,100 (+50 -30)		
H.P. transfer movement (D.R.)		440 (+10 -10)	
Heat grind	1,700 (+50 -50)		
Adjustment of transfert movement engine		250 (+10 -10)	
Minimum capacity FRANCE	2,450 (+25 -25)		
Minimum capacity GERMANY	1,700 (+25 -25)		



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

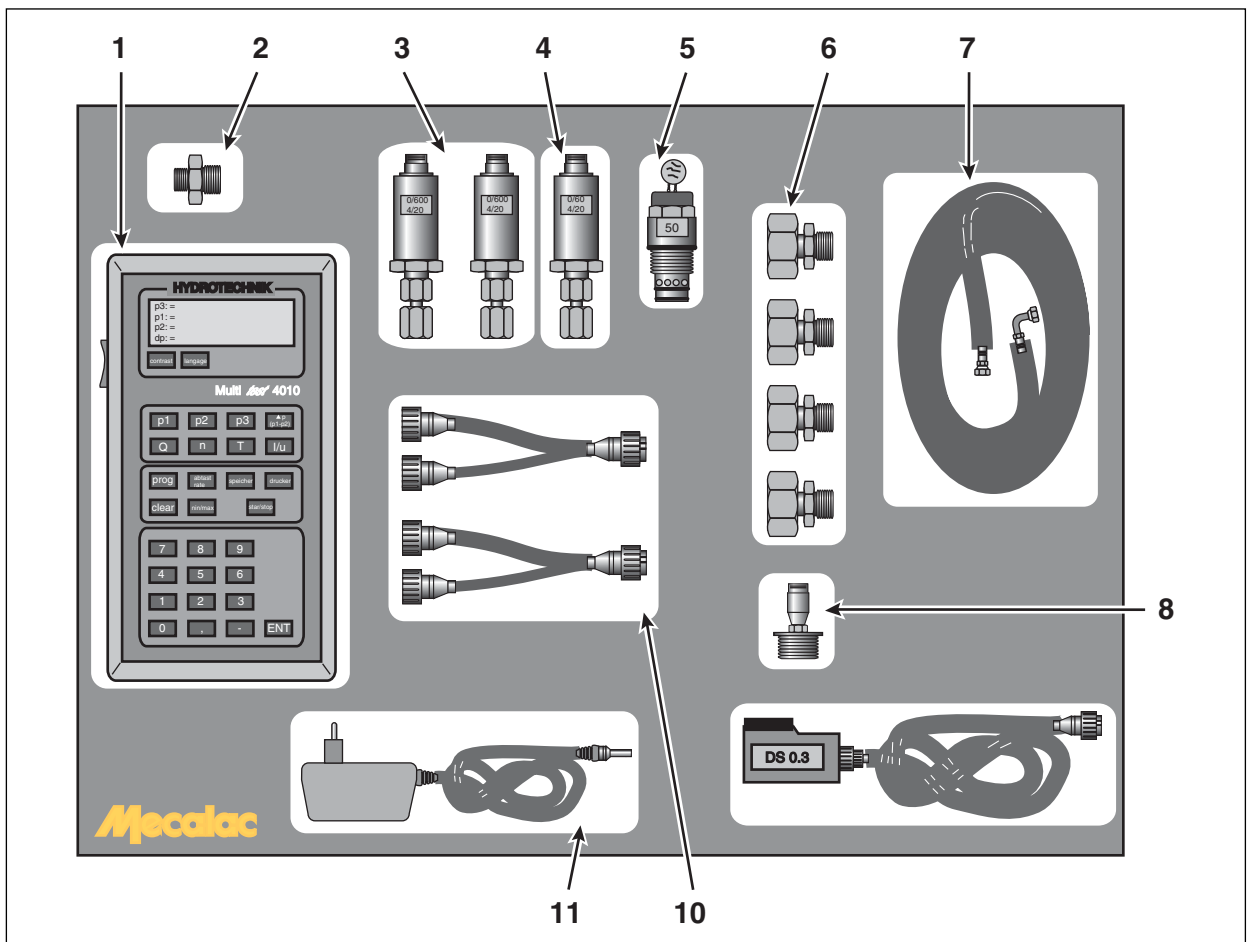


Fig. 2 TOP-TEST MX toolbox, upper foam section

- 1 - Main box MT-4010
- 2 - Male union 4DL8-7/16-unf20
- 3 - Pressure sensor 4/20 mA/ 0-600
- 4 - Pressure sensor 4/20 mA/ 0-60
- 5 - Pressure limiter (50 bars 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

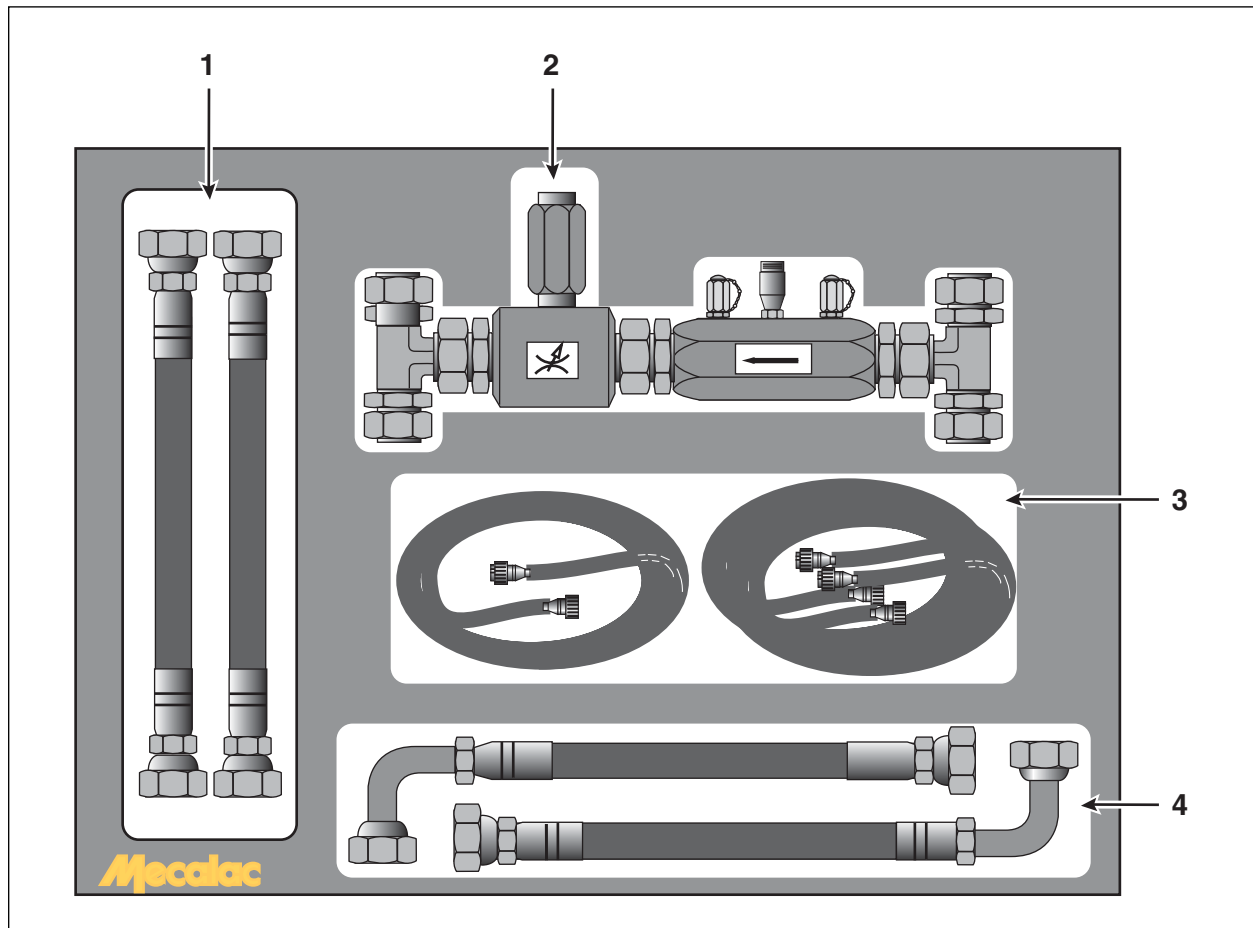


Fig. 3 TOP-TEST MX toolbox, lower foam section

- 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)

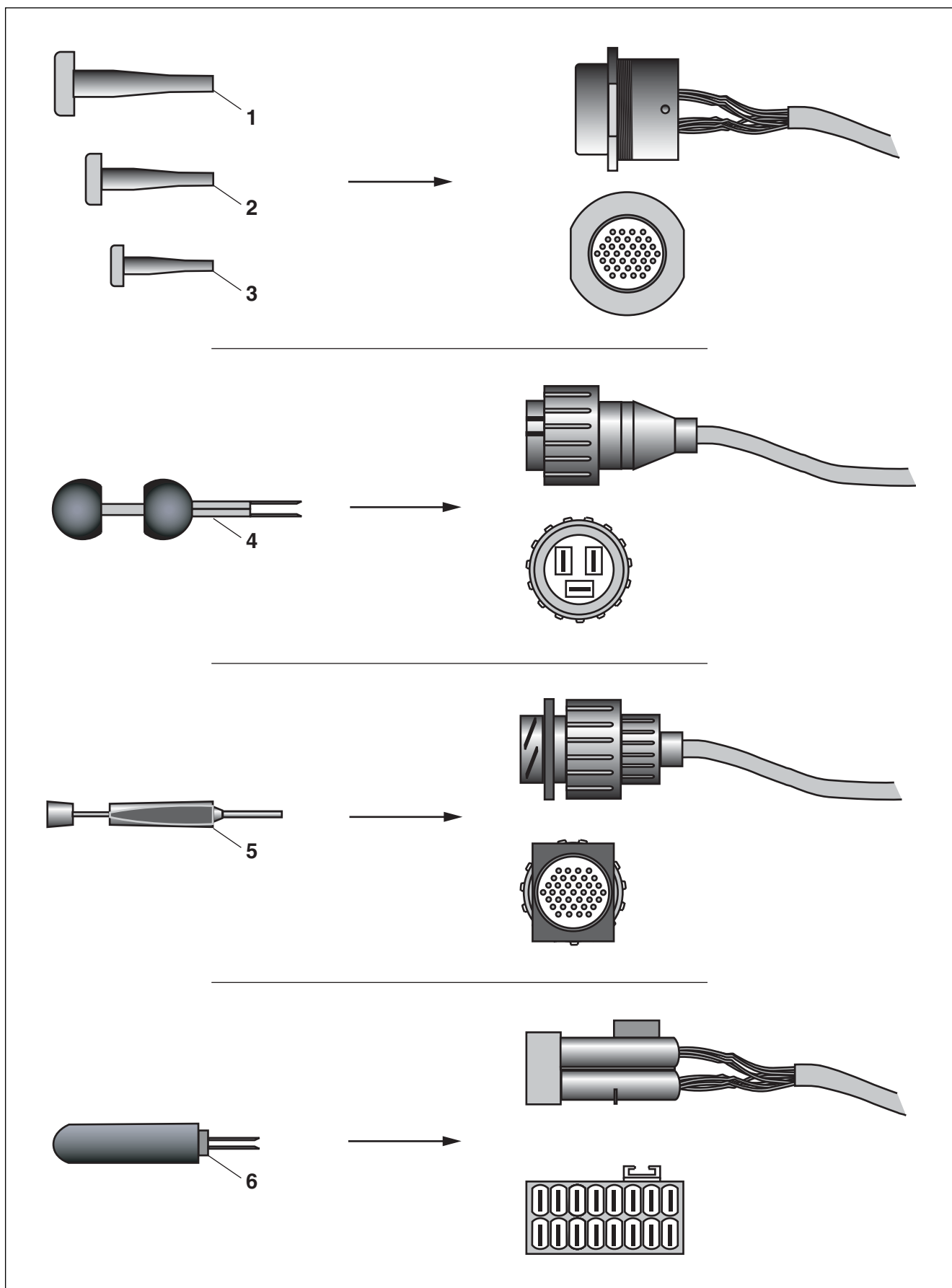


Fig. 4 Special connector tools

- 1 - 5180102
- 2 - 5180103
- 3 - 5180104

- 4 - 6525004
- 5 - 6525003
- 6 - 572A0003

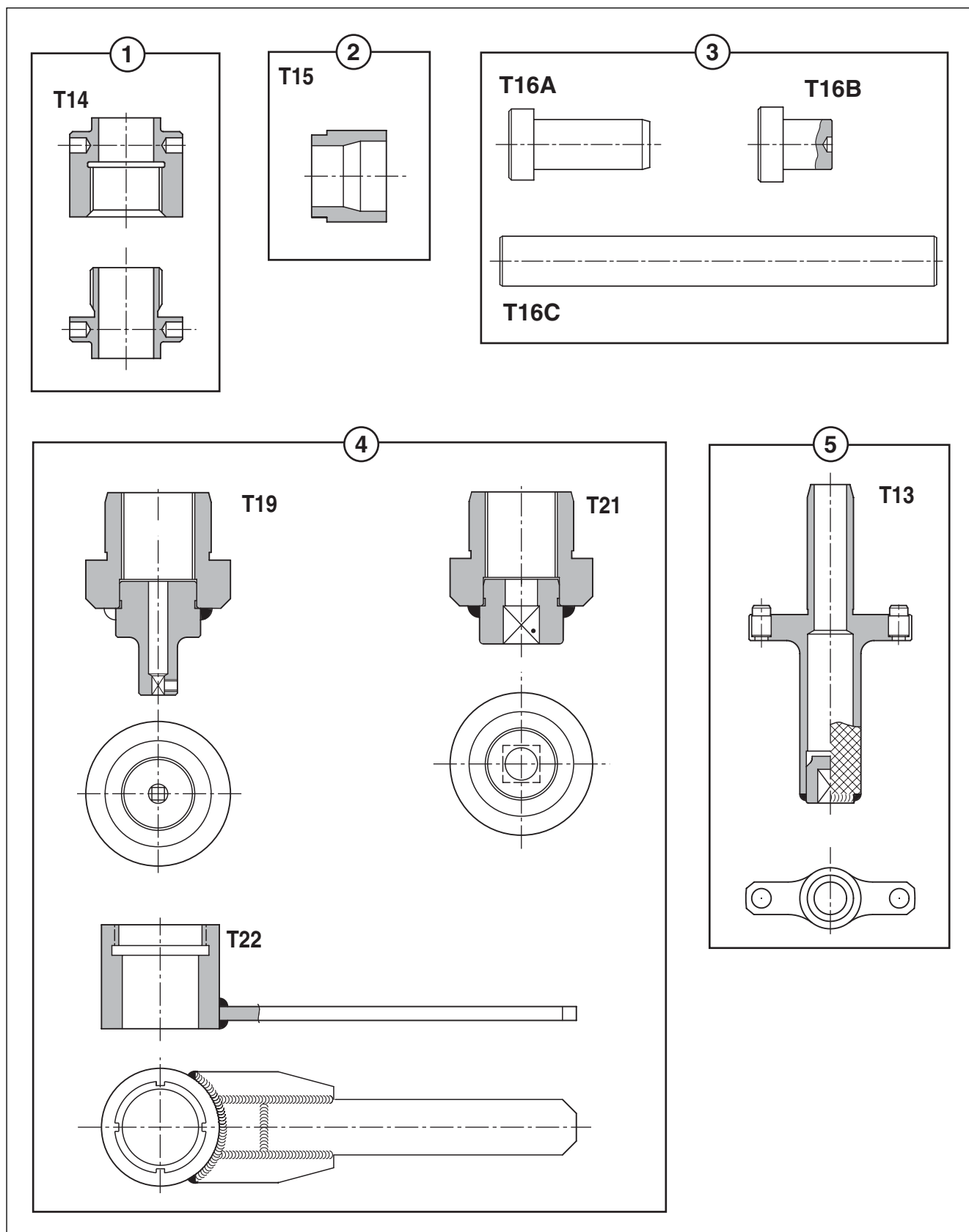


Fig. 5 Axles tool (DANA)

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

GROUPE MECALAC

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