

Service Manual

Mobile excavator

6503



Machine model	6503
Edition	2.0
Language	English
Article number	1000165866

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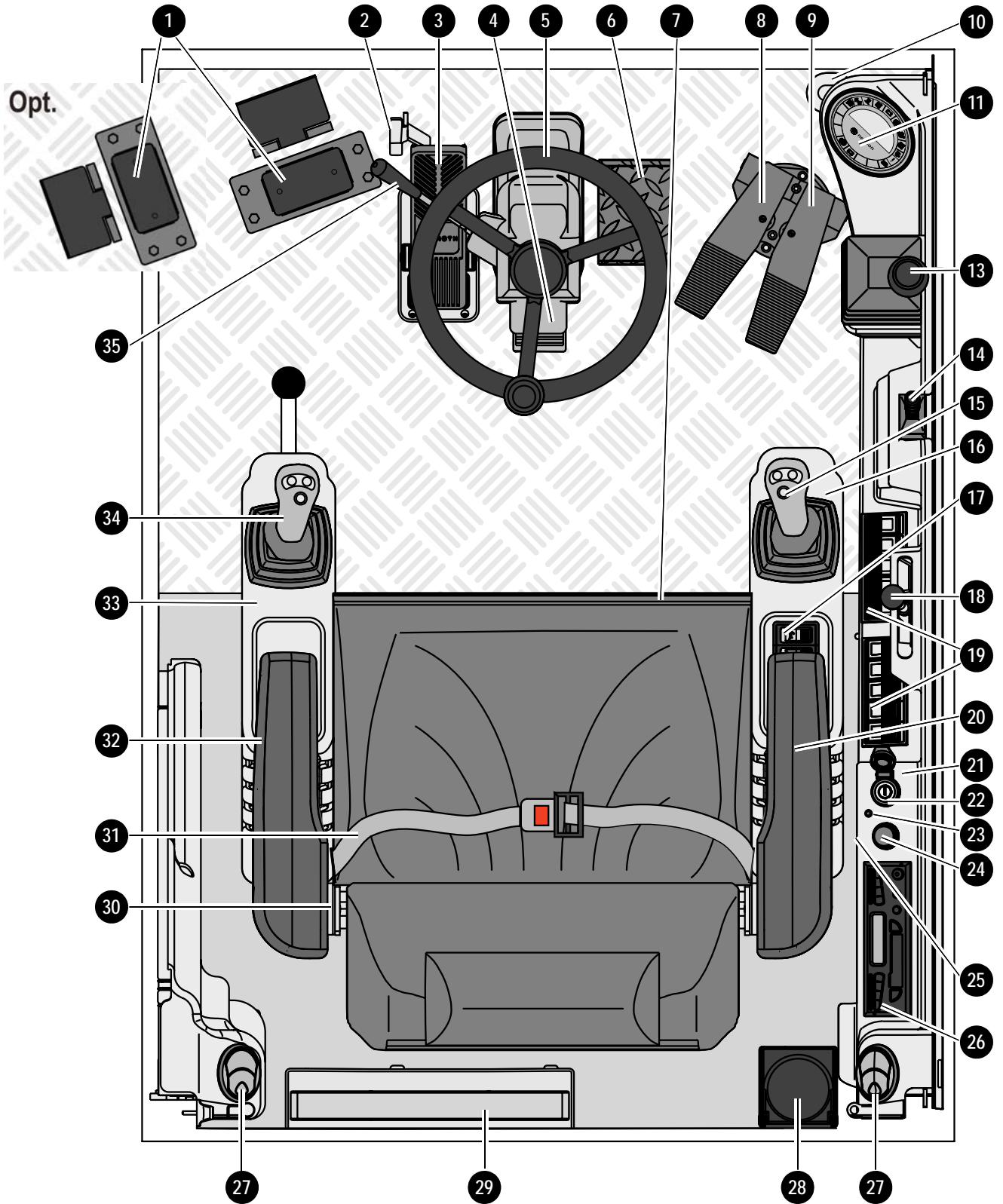
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From serial no. AH00708



1.14 Summer/winter operation

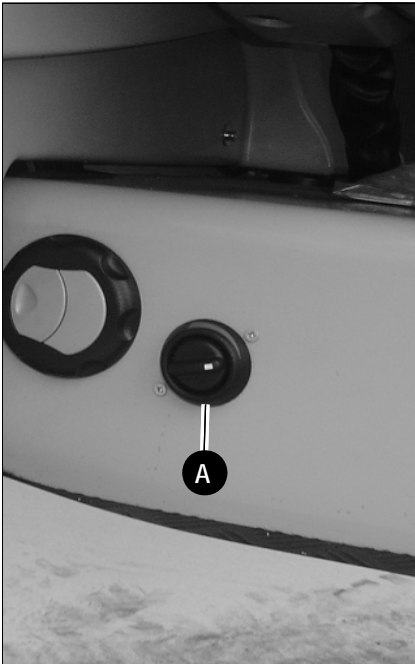


Fig. 12: Heating adjustment

Adjust cab temperature as follows:

Pos.	Function
A	Heating control

☞ Set the temperature in the cab as required with the heating controller.



Fig. 13: Fresh air

Selection of "cold" or "preheated" fresh air in winter.

A deflector plate on the heater can be set to two different positions.

- Fresh air: heater takes in air from outside the cab [Fig. 13](#).
- Preheated fresh air: heater takes in air from the chassis [Fig. 14](#).



Fig. 14: Preheated fresh air

Change from fresh air to preheated fresh air as follows:

- ☞ Tilt the cab – see [Tilting the cab on page 1-16](#)
 - The deflector plate is located on the heater under the cab.
- ☞ Slacken both fastening screws.
- ☞ Reposition and fit the deflector plate back on again.
- ☞ Tilt the cab back down again and secure it.

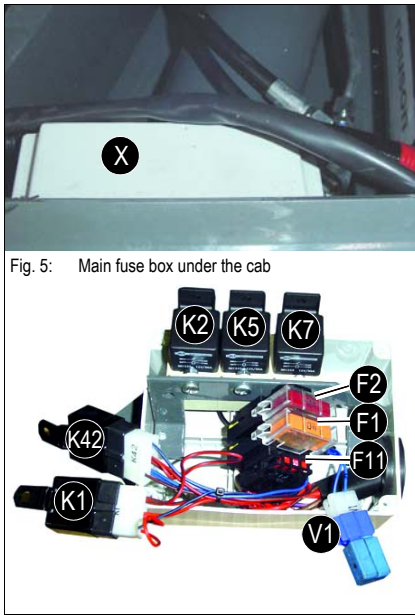
Main fuse box with relays from serial no. AH00708


Fig. 5: Main fuse box under the cab

Main fuse box X is located under the cab, next to the swivelling console.

Fuse no.	Rated current (A)	Protected circuit
F1	40 A	– Start, preheat
F2	50 A	– Fuel-filling pump, main fuse, ignition lock
F11	10 A	– E-ECU, engine relay

Relay no.	
K1	– Engine electronics main relay
K2	– Fuel-filling pump relay
K5	– Preheating high current relay
K7	– Start high current relay
K42	– Fuel injection pump relay
V1	– Blocking diode

2.7 Noise levels

Sound power level	Model 6503
Sound power level (L_{WA})	98 dB (A)
Sound pressure level (L_{PA})	78 dB (A)

 **Important!**

Measurement of sound power level according to EC Directive 2000/14 EC. Noise level at the driver's ear measured according to EC Directives 84/532/EEC, 89/514/EEC and 95/27/EEC. Measurements carried out on asphalted surface.

2.8 Vibration

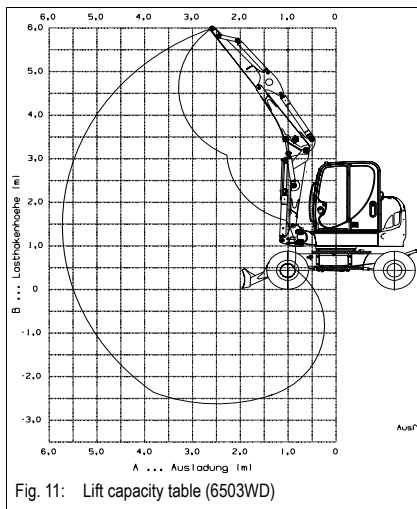
Vibration	
Effective acceleration value for the upper extremities of the body *	< Trigger value
Effective acceleration value for the body *	< Trigger value

* Measurements as per 2002/44/EC (excavating, driving and hammering with a Wacker Neuson hammer). Machine and attachment operation and maintenance as per Operator's Manual.

2.9 Coolant compound table

Outside temperature	Coolant: Halvoline XLC (based on ethylene glycol)			
	Water	Anticorrosion agent		Antifreeze agent
Up to °C (°F)	% by volume	cm ³ /l (in ³ /gal)	% by volume	% by volume
4 (39)	99	10 (2.6)	1	–
-10 (14)	79			20
-20 (-4)	65			34
-25 (-13)	59			40
-30 (-22)	55			44

2.18 Lift capacity table 6503 with twin tyres (option) and triple articulation boom (option)



All table indications in kg (lb) and horizontal position on firm ground without bucket.

A			5.0 m (16'5")		4.0 m (13'1")		3.0 m (9'10")		2.0 m (6'7")	
B										
5.0 m (16'5")	1335* (2943*)	1200 (2646)								
4.0 m (13'1")	1210* (2668*)	895 (1973)	1215* (2679*)	885 (1951)						
3.0 m (9'10")	1160* (2557*)	770 (1698)	1200* (2646*)	885 (1951)	1380* (3042*)	1235 (2723)				
2.0 m (6'7")	1135* (2502*)	710 (1565)	1270* (2800*)	860 (1896)	1590* (3505*)	1175 (2590)	2320* (5115*)	1745 (3847)		
1.0 m (3'3")	1120* (2469*)	695 (1532)	1330* (2932*)	830 (1830)	1755* (3869*)	1120 (2469)	2670* (5886*)	1630 (3594)		
0.0 m (0'0")	1095* (2414*)	720 (1587)	1310* (2888*)	815 (1797)	1775* (3913*)	1090 (2403)	2595* (5721*)	1595 (3516)		
-1.0 m (-3'3")	1040* (2293*)	805 (1775)	1090* (2403*)	820 (1808)	1600* (3527*)	1080 (2381)	2250* (4960*)	1600 (3527)	3210* (7077*)	3020 (6658)
-2.0 m (-6'7")	880* (1940*)	1020 (2249)					1615* (3560*)	1635 (3605)	2140* (4718*)	3080 (6790*)

max.	Admissible load on extended stick
A	Reach from live ring centre
B	Load hook height
*	Lift capacity limited by hydraulics

	With the stabiliser blade in driving direction
	Without the stabiliser blade, 90° to driving direction

If equipped with a bucket or other attachments, lift capacity or tilt load is reduced by bucket or attachment dead weight.

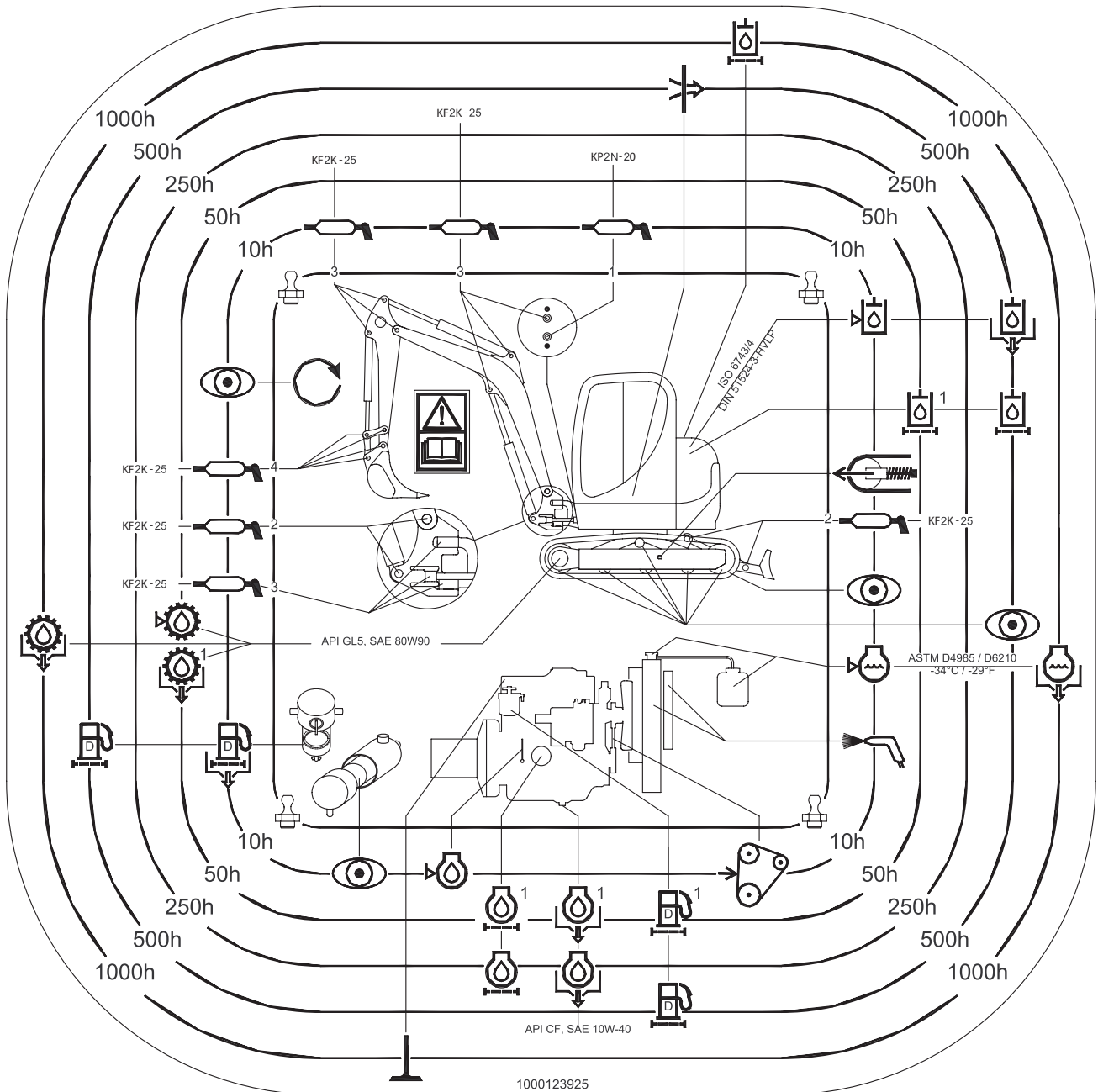
Calculation basis: according to ISO 10567

The track excavator's lift capacity is restricted by the settings of the pressure limiting valves and the hydraulic system's stabilising features.

Neither 75 % of the static tilt load nor 87 % of the hydraulic lift capacity is exceeded.



Symbol	Assembly	Explanation
	Radiator fins	Clean
	Heating, air conditioning	Change cab air filter



3.7 Engine lubrication system



Caution!

If the engine oil level is too low or if an oil change is overdue, this can cause

Engine damage or loss of output!

☞ *Have the oil changed by an authorised workshop – see Maintenance plan (overview) on page 3-5.*

Checking the oil level



Important!

Check the oil level once a day. We recommend checking it before starting the engine. After switching off a warm engine, wait at least 5 minutes before checking.

Checking the oil level

☞ *Proceed as follows:*

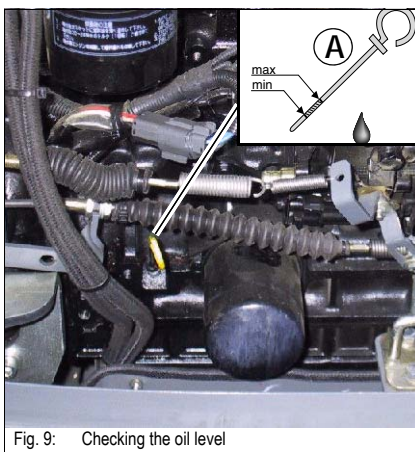
- Park the machine on level ground.
- Switch off the engine.
- Fold the control lever base up.
- Let the engine cool down.
- Open the engine cover.
- Clean the area around the oil dipstick with a lint-free cloth.
- Pull out oil dipstick A.

☞ *Wipe it with a lint-free cloth.*

☞ *Push it back in as far as possible.*

☞ *Withdraw it and read off the oil level.*

☞ *However if necessary, fill up oil at the latest when the oil reaches the MIN mark on the oil dipstick A.*



3.10 V-belt



Danger!

Only check or retighten/replace the V-belt when the engine is switched off –

Danger of personal injury!

- ☞ Switch off the engine before carrying out inspection work in the engine compartment.
- ☞ Disconnect the battery or the battery master switch.
- ☞ Let the engine cool down.



Caution!

Cracked and stretched V-belts cause engine damage.

- ☞ Have the V-belt replaced by an authorised workshop.

Check the V-belt once a day, and retighten if necessary!

Retighten new V-belts after about 15 minutes of running time.

Checking V-belt tension

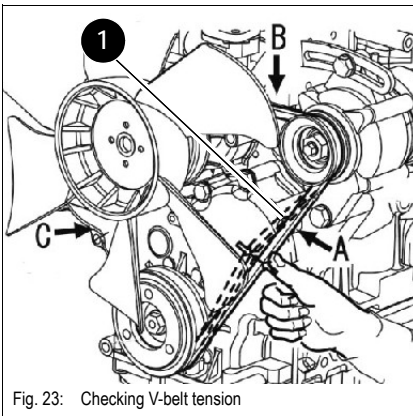
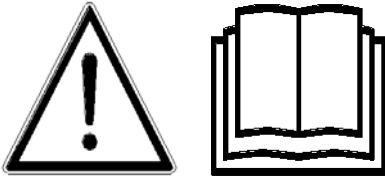


Fig. 23: Checking V-belt tension

- Check as follows:
 - ☞ Switch off the engine.
 - ☞ Fold the control lever base up.
 - ☞ Remove the key and carry it with you.
 - ☞ Disconnect the battery or the battery master switch.
 - ☞ Let the engine cool down.
 - ☞ Open the engine cover.
 - ☞ Carefully check V-belt 1 for damage, cracks or cuts.
 - ☞ Replace the V-belt if it touches the base of the V-belt groove or the discs of the pulley.
- If the V-belt is damaged:
 - ☞ Have the V-belt replaced by authorised staff.
 - ☞ Press with your thumb to check the deflection of the V-belt between the crankshaft disc and the fan wheel position C. A new V-belt should have a deflection of 6 to 8 mm (0.2" – 0.3"), a used V-belt (after about 5 minutes running time) should have a deflection of 7 to 9 mm (0.3" – 0.35")
 - ☞ Retighten the V-belt if necessary.

3.13 Hydraulic system

Specific safety instructions



- Release the pressure in all lines carrying hydraulic oil prior to any maintenance and repair work. To do this:
 - Lower all hydraulically controlled attachments to the ground
 - Move all control levers of the hydraulic control valves several times.
- Fold the control lever base up.
- Hydraulic oil escaping under high pressure can penetrate the skin and cause serious injuries. Therefore always consult a doctor immediately, even in the case of minor wounds – otherwise serious infections could set in.
- If the hydraulic oil in the sight glass is cloudy, this indicates that water or air has penetrated the hydraulic system. This can cause damage to the hydraulic pump.
- Oil or fuel flowing out of high pressure lines can cause fire or malfunctions, and severe injuries or damage to property. Interrupt work immediately if slack nuts and damaged hoses and lines are detected.
 - ☞ Contact your Wacker Neuson dealer immediately.
- Replace the hose or line if one of the problems mentioned below is detected:
 - ☞ Damaged or leaky hydraulic seals.
 - ☞ Worn or torn shells or uncovered reinforcement branches.
 - ☞ Expanded shells in several positions.
 - ☞ Entangled or crushed movable parts.
 - ☞ Foreign bodies jammed or stuck in protective layers.



Caution!

Dirty hydraulic oil, lack of oil or wrong hydraulic oil –

Danger of severe damage to the hydraulic system!

- ☞ *Take care to avoid dirt when working.*
- ☞ *Always fill in hydraulic oil by means of a strainer or the reflux filter.*
- ☞ *Only use authorised oils of the same type – see Fluids and lubricants on page 3-1.*
- ☞ *Always fill up hydraulic oil before the level gets too low – see Filling up hydraulic oil on page 3-36.*
- ☞ *If the hydraulic system is filled with biodegradable oil, then only fill up with biodegradable oil of the same type – observe the sticker on the hydraulic oil tank.*
- ☞ *Contact customer service if the hydraulic system filter is dirty and contains metal chippings. Otherwise, follow-on damage can result.*



Environment!

Collect drained hydraulic oil and biodegradable oil in a suitable container. Dispose of drained oil and used filters by an ecologically safe method. Always contact the relevant authorities or commercial establishments in charge of oil disposal before disposing of biodegradable oil.

Battery**Danger!**

Battery acid is highly caustic.

Danger of caustic injury!

Therefore when recharging and/or working near the battery:

☞ *Always wear goggles and protective clothing with long sleeves.*

If acid is spilled:

☞ *Thoroughly rinse all affected surfaces immediately with plenty of water.*

☞ *Thoroughly wash any part of the body touched by the sulphuric acid immediately with plenty of water and seek medical attention at once.*

Especially when charging batteries, as well as during normal operation of batteries, an oxyhydrogen mixture is formed in the battery cells –

Danger of explosion!

☞ *Avoid naked lights and sparks in the vicinity of the battery and do not smoke.*

☞ *Do not attempt to jump-start the machine if the battery is frozen or if the acid level is low. The battery can rupture or explode.*

- Replace the battery immediately.

☞ *Always disconnect the negative terminal (-) from the battery before starting repair work on the electric system.*

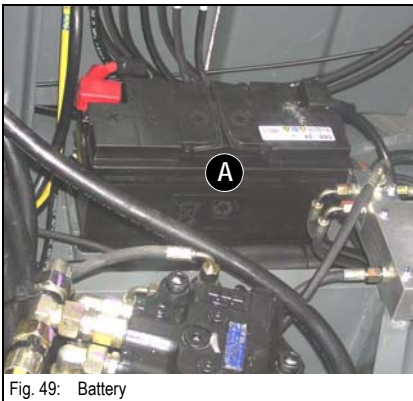


Fig. 49: Battery

The battery A is located in the chassis underneath the cab behind the jack. The battery is “maintenance-free”. However have the battery checked at regular intervals to make sure the electrolyte level is between the MIN and MAX marks.

Checking the battery requires it to be removed and must be carried out by an authorised workshop.

Always follow the specific battery safety instructions.

**Important!**

Do not disconnect the battery while the engine is running.

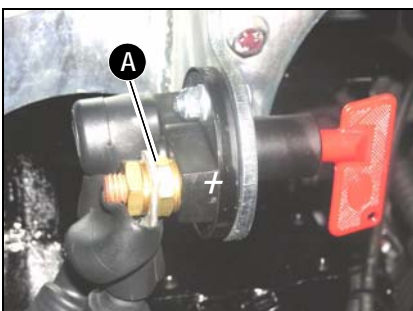
Jump-starting the engine

Fig. 50: Battery master switch

☞ *Connect the plus lead of the starting aid with plus lead B on the battery master switch of the machine requiring jump-start.*

☞ *Connect the earthing lead of the starting aid to a bare part of the chassis of the machine with the flat battery.*

☞ *Charge the flat battery for a few minutes.*

➡ **Start the engine.**

☞ *Remove the earthing lead of the starting aid from the chassis.*

☞ *Remove the plus lead of the starting aid from the emergency off switch.*



4.3 Removing the valve cover



Important!

The injection lines on this engine run through the valve cover. Therefore, remove the valve cover with extreme care.

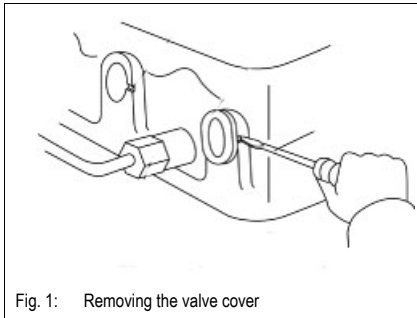


Fig. 1: Removing the valve cover

Remove as follows:

- ☞ Unscrew all fuel injection lines from the valve cover.
- ☞ Slightly fold the injection lines away from the engine.
- ☞ Carefully remove the rubber grommets from the valve cover with a screw driver.
- ☞ Unscrew the valve cover.

4.4 Checking and adjusting valve clearance

- ☞ Standard setting of valve clearance is possible:
 - ➔ On a cold engine

Checking valve clearance

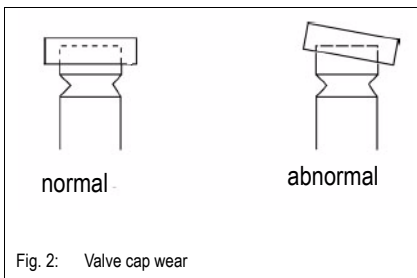


Fig. 2: Valve cap wear

- ☞ Remove the valve cover.
- ☞ Turn the engine (as in 4.8) until the cylinder reaches the top dead centre of the compression cycle.
 - ➔ Valve overlapping
- ☞ Check the valve cap for abnormal wear

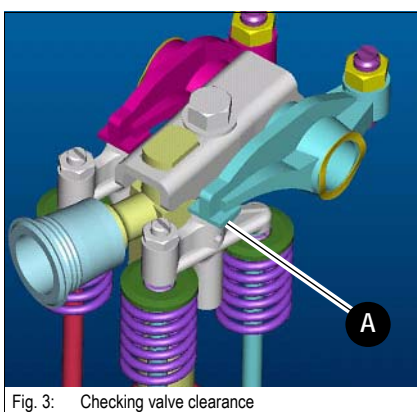
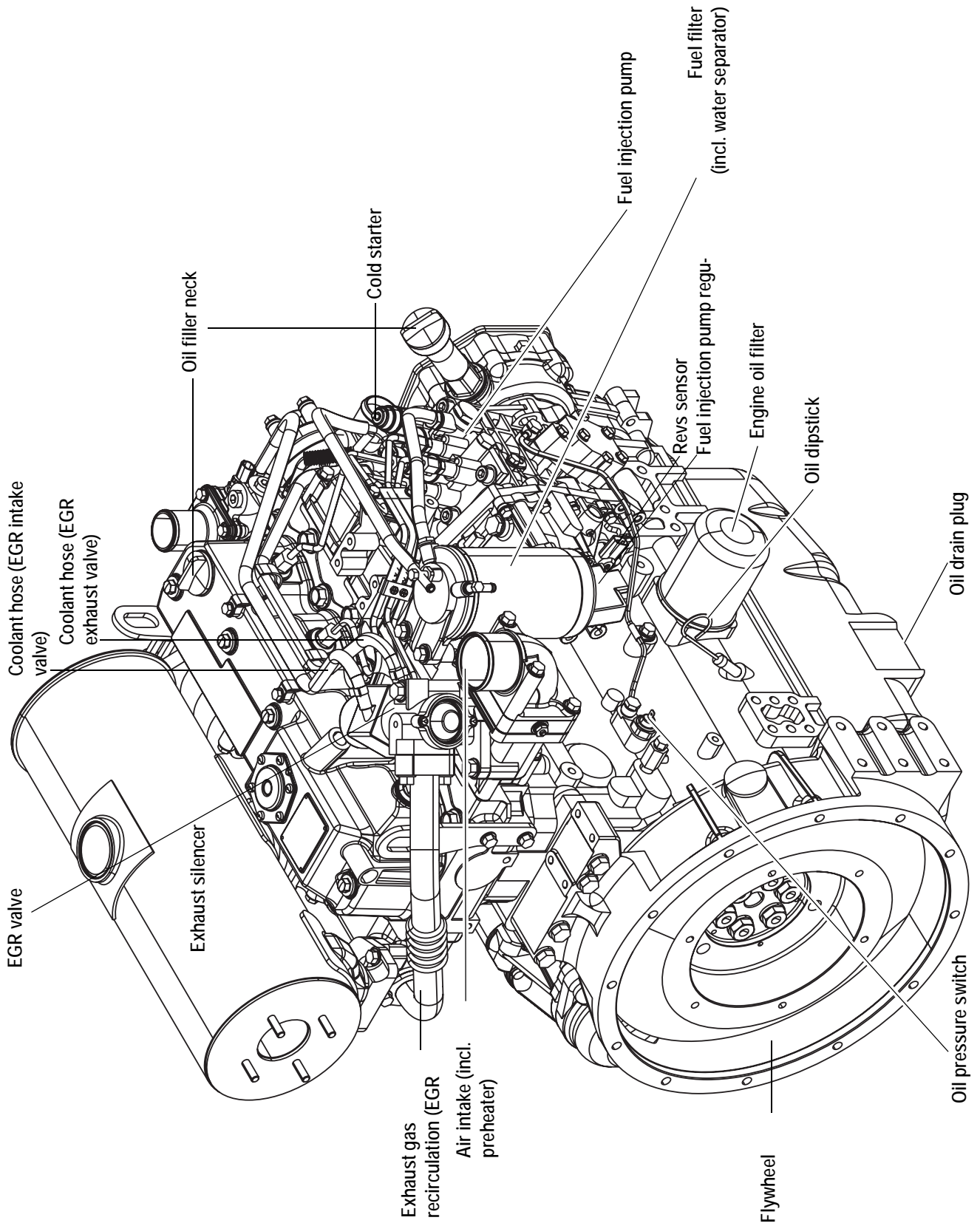


Fig. 3: Checking valve clearance

- ☞ Check valve clearance **3/A** with a feeler gauge.
 - ➔ Valve clearance: 0.15 – 0.25 mm (0.006 – 0.01")
- ☞ Repeat the procedure for each cylinder.
- ☞ Place the valve cover gasket
- ☞ Mount the valve cover



4.15 Engine 4TNV98-ZVNS from serial no. AH00708



4.23 Compression

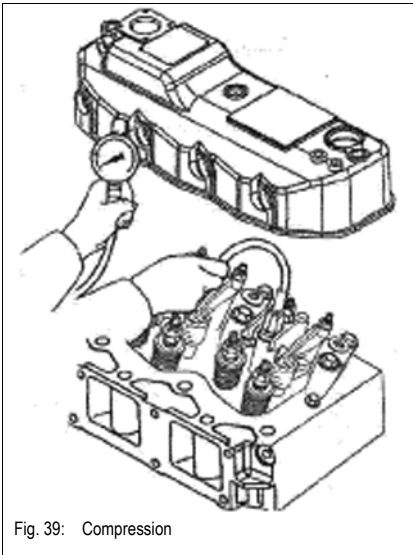


Fig. 39: Compression

- Remove the injection lines and the injection nozzles.
- Set the fuel injection pump to zero delivery (remove the plug for the cutoff solenoid).
- Turn the engine.
- Mount the compression gauge on the cylinder you want to measure.
- Turn the engine with the starter and read the pressure off the pressure gauge.
 - Specified value: 33.3 – 35.3 bar (483 – 512 psi) at 250 rpm
 - Threshold value: 26.5 – 28.5 bar (384 – 413 psi) at 250 rpm

4.24 Checking the coolant thermostat

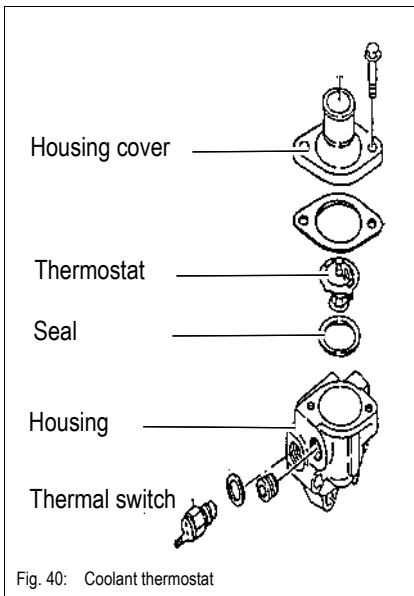
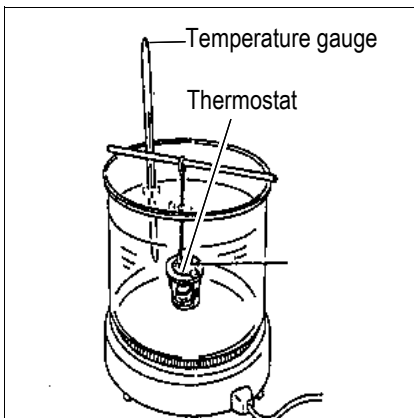


Fig. 40: Coolant thermostat

- Remove the thermostat.



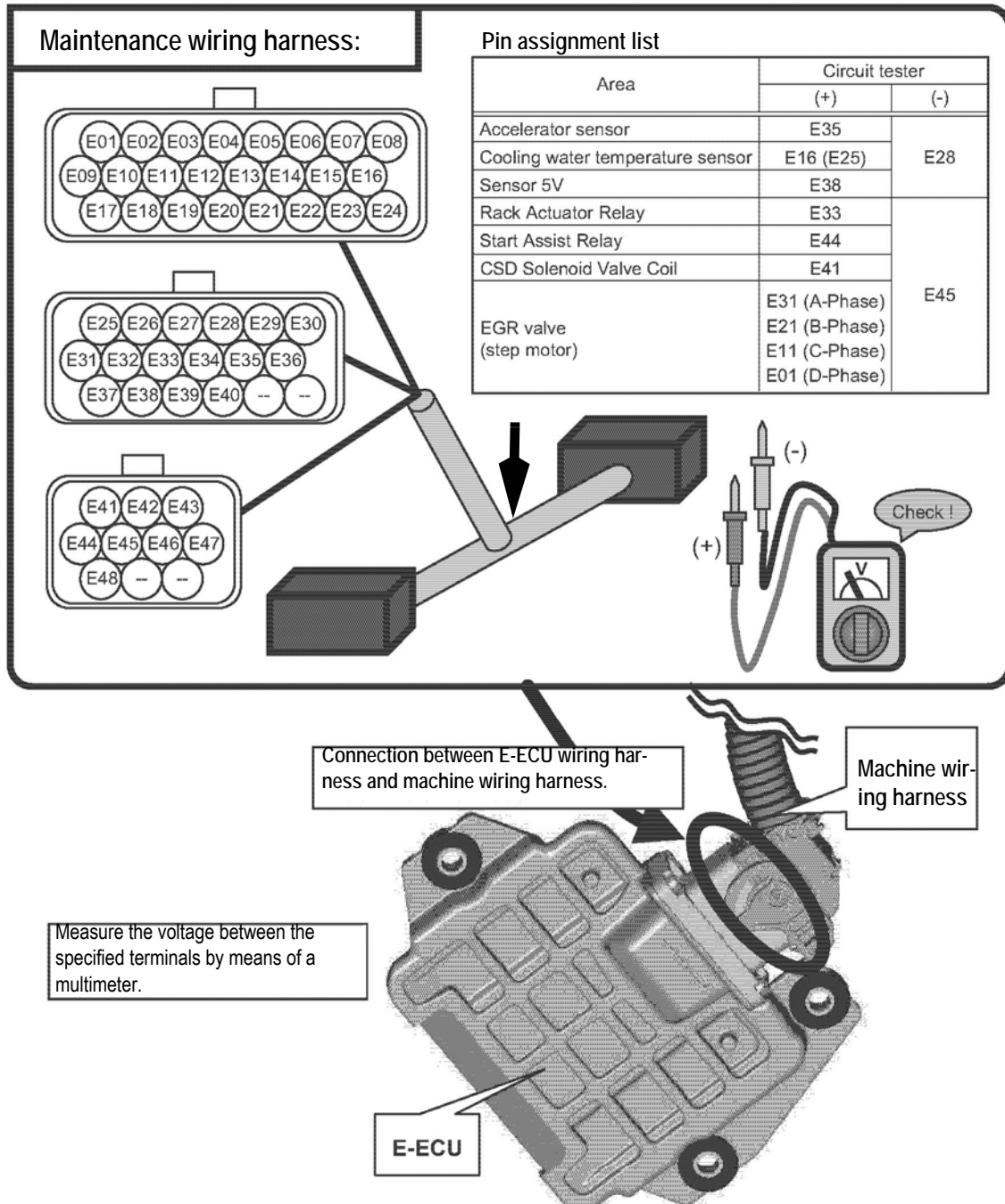
- Warm up the thermostat in a container with water.
- Check whether the thermostat opens at the specified temperature (check with a temperature gauge).
 - Thermostat opening temperature: 69.5 – 72.5 °C (157.1 – 162.5 °F)

Important information on the ECU maintenance wiring harness

Error diagnosis within the scope stated in this document includes measuring voltages with the maintenance wiring harness. Therefore, disconnect the E-ECU and the machine wiring harness before carrying out error diagnosis, and connect the maintenance wiring harness between the E-ECU and the machine wiring harness.

The ECU maintenance wiring harness can be ordered stating no. 1000188305.

- See below for details on the error diagnosis for the specific areas.
- Use a multimeter to measure the voltage in accordance with the following list.

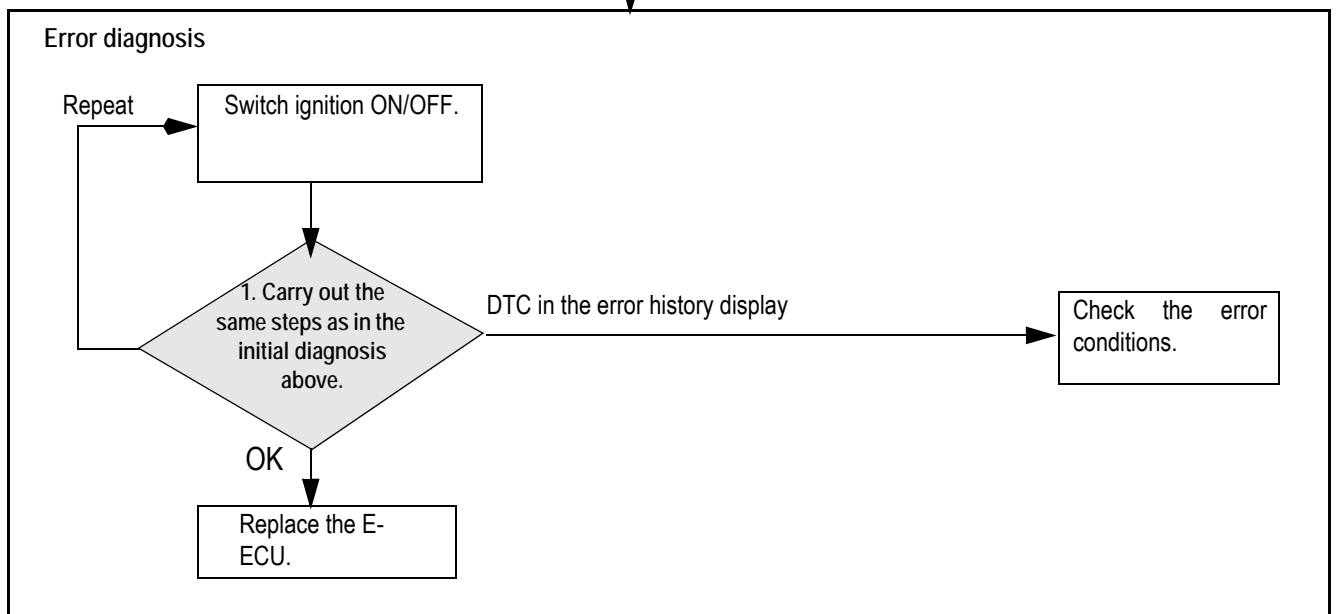
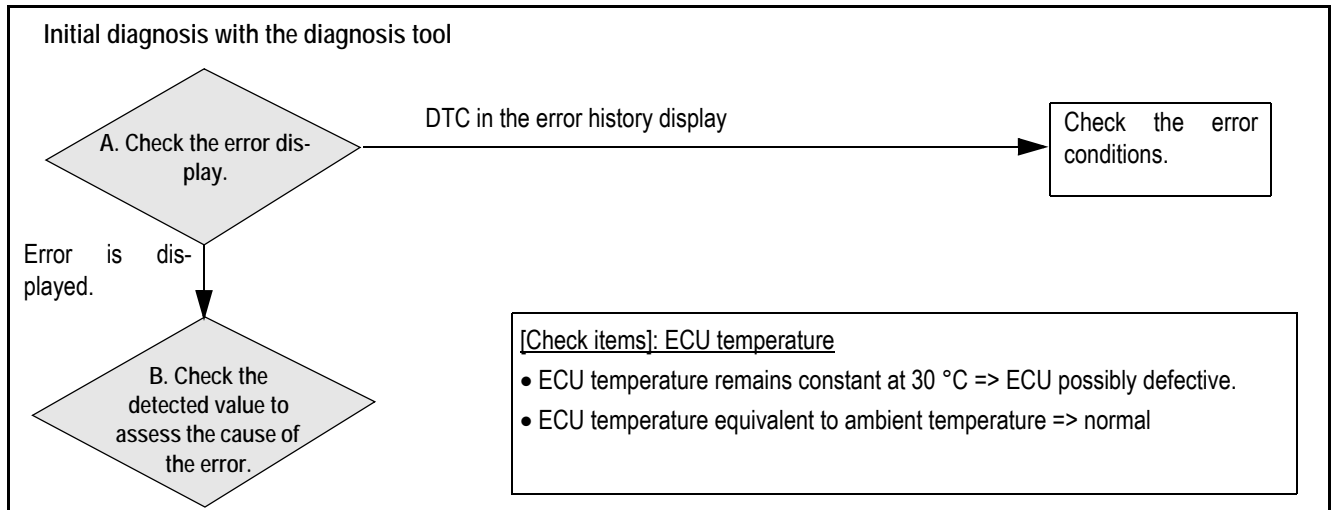




Flash code 4-1 ECU temperature sensor and 2-5 ECU temperature rise alarm

Related DTC

DTC	P0668/4	ECU temperature sensor error (voltage too low)
	P0669/3	ECU temperature sensor error (voltage too high)
	P1644/2	Intermittent error with ECU temperature sensor



(2) P0563/0: power supply voltage error (voltage too high)

DTC	P0563/0	Power Supply Voltage Error (High Voltage)
-----	---------	---

DTC detection conditions

1 – Prerequisite; 2 – Detection condition(s); 3 – Flash code in error display	Check points
1. Engine runs.	Battery
2. E-ECU supply voltage over 16 [V]	Alternator
3. 2 flash pulses followed by 3 flash pulses.	Wiring harness

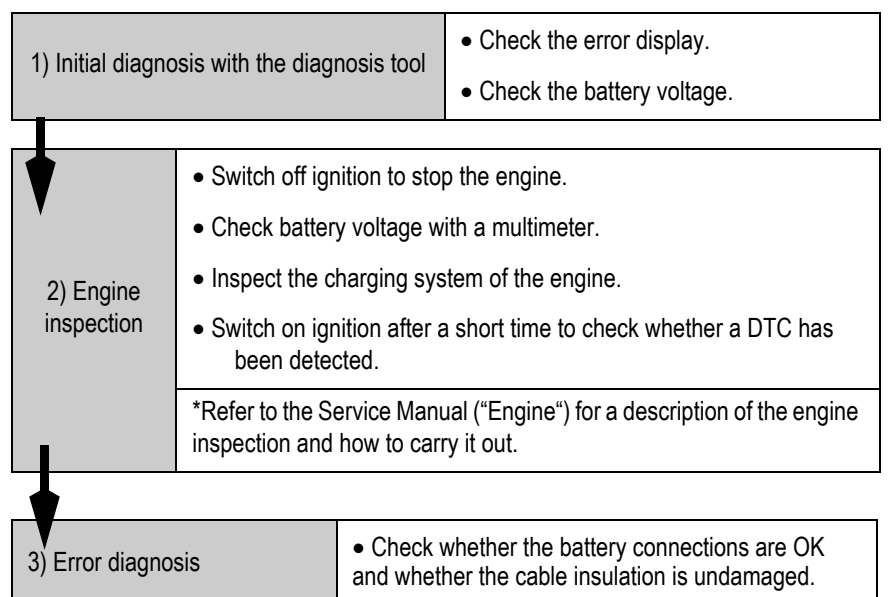
Troubleshooting

Error mode	[Operation is resumed]: The system lets the engine run without any restrictions after the error has been detected.
Operation restrictions?	No.
Recovery conditions	Yes: This error is automatically reset if a normal supply voltage (10 to 16 [V]) is applied.
Remarks	

Possible error cause/condition

- An incompatible battery (such as a 24 V battery) has possibly been used.
- Wrong battery connection.
- Alternator defect.
- Wiring harness disconnected or short-circuited.
- Defect in internal E-ECU circuit.

Diagnosis description



Work description

1. Check the relay coil resistance value (relay only):
 - Disconnect the proportional solenoid relay of the injection pump from the wiring harness.
 - Measure the resistance between terminals C and D on the relay side by means of a multimeter.

Measurement conditions		Measured value	Status
Tester (+) side	Tester (-) side		
Terminal C	Terminal D	Existing (*)	OK if both are normal
Terminal D	Terminal C	Infinite (*)	
Terminal C	Terminal D	Infinite (*)	NG: internal relay circuit error
Terminal D	Terminal C		

*A series-connected diode integrated in reverse direction requires using the checking method mentioned above and causes the measured value to vary depending on the multimeter used.

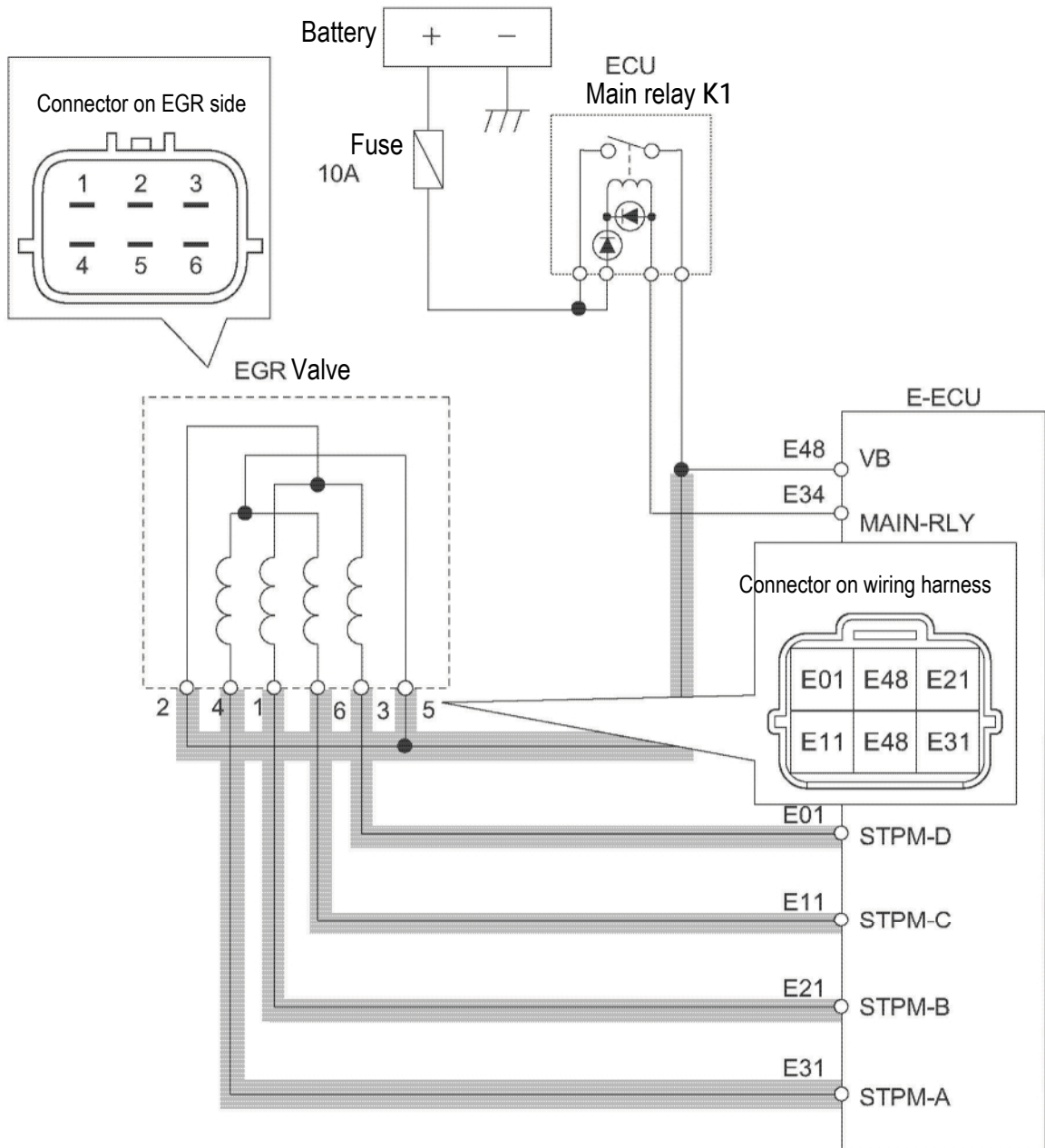
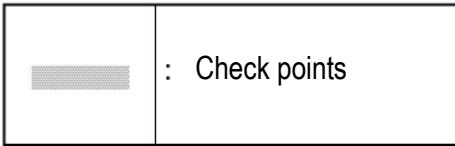
NG	Replace the proportional solenoid relay of the injection pump.
OK	With the proportional solenoid relay of the injection pump and the wiring harness connected, check the relay coil resistance. -> Next: [2. Check the relay coil resistance value (relay + wiring harness side):]

2. Check the relay coil resistance value (relay + wiring harness side):
 - Connect the proportional solenoid relay of the injection pump onto the wiring harness.
 - Disconnect the E-ECU from the wiring harness.
 - Measure the resistance between E-ECU connectors E07 and E33 by means of a multimeter.

Measurement conditions		Measured value	Status
Tester (+) side	Tester (-) side		
E07	E33	Existing (*)	OK: normal
E33	E07	Infinite (*)	
E07	E33	Infinite (*)	NG: wiring harness error
E33	E07		

*A series-connected diode integrated in reverse direction requires using the checking method mentioned above and causes the measured value to vary depending on the multimeter used.

NG	Check the wiring harness for continuity. -> Next: [3. Check the wiring harness for continuity:]
OK	Check the movement of the proportional solenoid relay of the injection pump with the diagnosis tool. -> Next: [4. Check the relay for movement:]

Wiring diagram

*E-ECU connector assignment – see *E-ECU connector assignment* on page 4-33.

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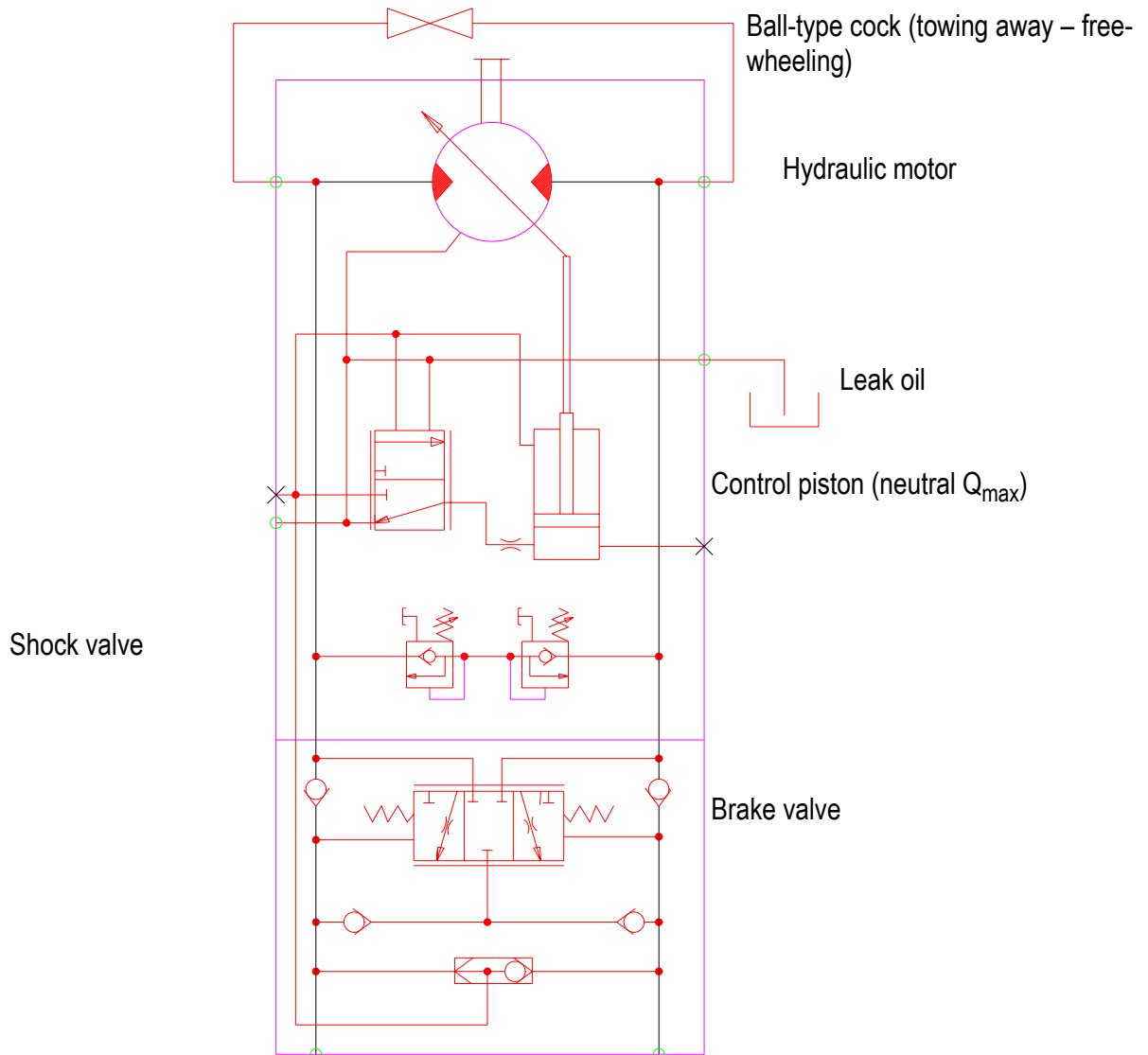
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4. Check the proportional injection pump solenoid for movement:
- Connect all connectors (proportional injection pump solenoid, E-ECU).
 - Connect the diagnosis tool, switch on ignition and log in to the diagnosis tool.
 - With the diagnosis tool "Diagnosis test: active control", carry out the position control for the proportional solenoid. Place the control rack in any position within the settings.
 - Then check whether the proportional injection pump solenoid has moved to the control rack position that has been set.

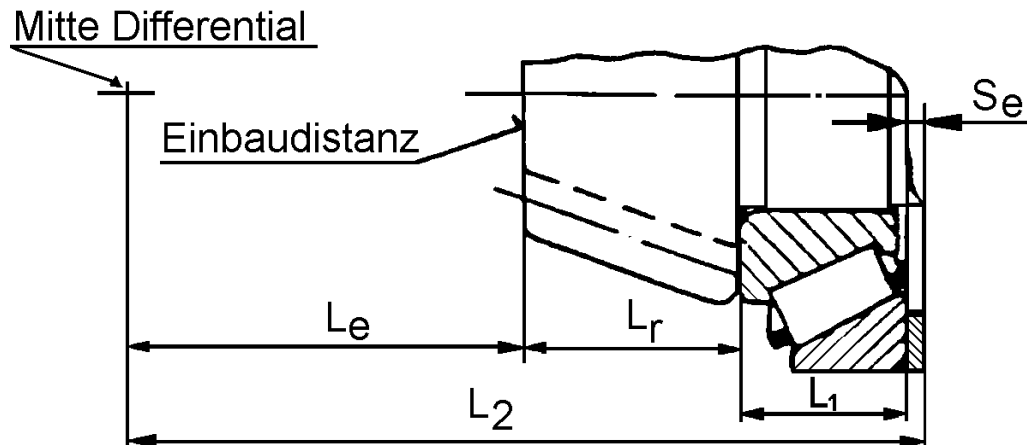
NG	Check the wiring harness for continuity. -> Next: [3. Check the wiring harness for continuity:]
OK	Check the solenoid for movement by means of the diagnosis tool. -> Next: [4. Check the proportional injection pump solenoid for movement:]

Hydraulic motor diagram

**General:**

Axial piston motors are displacement machines in which pistons 1 are positioned in parallel to the axis of rotation. In this case the piston stroke movement is converted into a drive movement similarly to a bent axis machine. Cylinder drum 2 is guided by centre journal 3 and slewed as a bent axis. The displacement volume changes as a function of this slewing angle. The piston and drive flange 4 are linked via a ball-socket connection. During the suction phase, the pistons move away from the ball-socket connection, and during the pressure phase, they are pressed into the socket. As shown above, control piston 6 controls the slewing angle between 25° and 11.7° , depending on the driving situation.

5.10 Determining the thickness of the spacer (4/36) (setting the contact pattern)



- Calculate the thickness (Se) of spacer 4/36:

$$Se = L2 - Le - Lr - L1$$

"L2" = measure between bearing seat 4/35 and centre of differential

"Le" = rated setting value (engraved on end surface of pinion, about 60.1 to 60.4 mm)

"Lr" = measure addendum of pinion. Measure "Lr" can be within 34.5 and 34.9 mm (1.36" and 1.37").

"L1" = measure the true bearing height of the new bearing 4/35. Measure "L1" can be within 29.37 (1.156") and 29.57 mm (1.164") (slide gauge with a nose length of a min. 100 mm/3.9").

- Select the next 2/10 thickness of the washer.

5.11 Adjusting the pinion bearing

- Apply Loctite 639 to the entire circumference and threaded length of pinion 4/34 and nut 4/33.
- Apply friction and seizure-resistant paste to the end surface side of nut 4/33.
- Screw nut 4/33 onto pinion 4/34 and tighten it to 400 – 600 Nm (295 – 443 ft. lbs.), counter at cardan flange 4/32 as you do so. After a few short blows on the outside, slacken nut 4/33 again, tighten it to 220 – 250 Nm (162 – 184 ft. lbs.) and make it rotate 3 turns applying short blows on either side as you do so. Now (and no earlier) set the final friction torque of 2 Nm (1.5 ft. lbs.). Position must be reached within 2 – 5 minutes.
- Check the initial stress of the pinion bearing with a torque wrench, correct if necessary and make a note of it.

5.12 Adjusting the crown wheel bearing

- Insert the differential, insert flange 4/2 with auxiliary nut 4/1 and fasten the auxiliary mounting ring (1000159166) with 4 auxiliary screws M12x30 for test purposes.
- Tighten auxiliary nut 4/1 applying short blows until the friction torque of cardan flange 4/32 is about 0.5 Nm (0.37 ft. lbs.) higher than for adjusting the pinion bearing (value you have made a note of in the last chapter).
- Check the circumferential backlash between the crown wheel and the pinion (0.15 – 0.25 mm/0.006 – 0.01"), replace spacer 4/11 on taper roller bearing 4/10 if necessary.



Important!

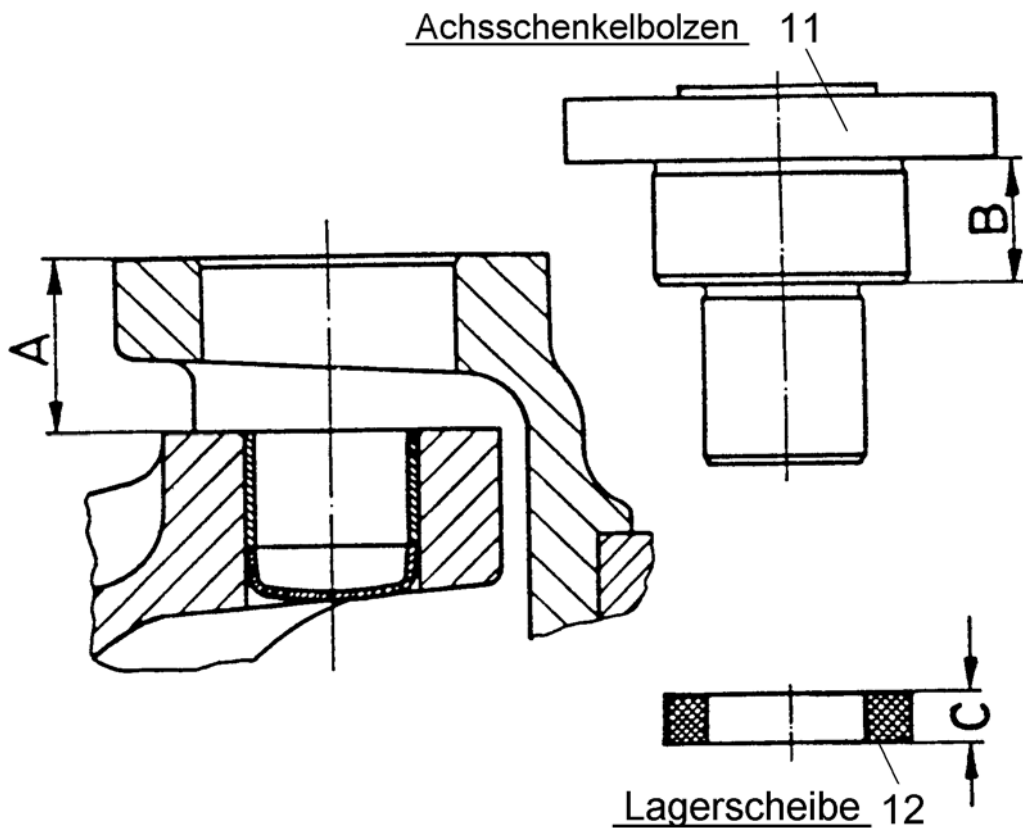
0.15 – 0.25 mm (0.006 – 0.01") at the average diameter of pinion 4/34

5.13 Checking the contact pattern

- Remove the auxiliary ring, flange 4/2 and differential case 4/5.

5.26 Determining the thickness of the bearing washers

- Slide the complete spherical axle joint in place.
- Insert lower kingpin 8/11 and press it upwards and hold it in this position together with the spherical axle joint by means of a jack, up to the plane face of the axle carrier.
- Determine the thickness of bearing washers 8/12.
 - ➔ Measure C: $C = A - B + 0.2$
 - ➔ Measure A: use a depth gauge to measure from the upper edge of the spherical axle joint to the plane face of the axle carrier.
 - ➔ Measure B: use a depth gauge to measure the flange height on the kingpin.



5.38 Replacing the drive pinion and the bearing



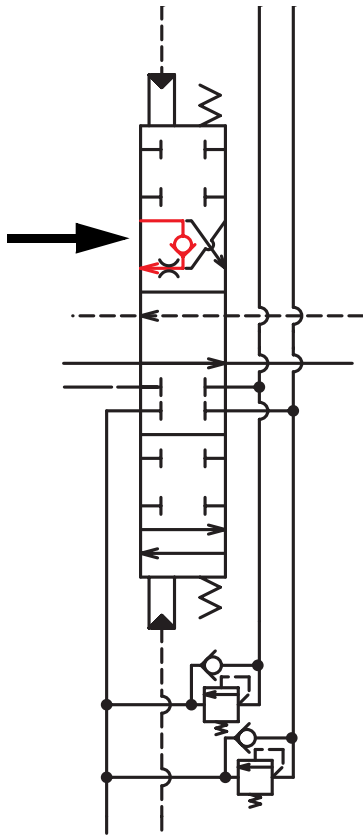
Important!

This work requires removing the gearbox from the machine.

- Slacken nut 13/5, carry it to about 100 °C (212 °F) to ease work.
 - ➔ Slackening torque can be up to 800 Nm (590 ft. lbs.).
- Extract cardan flange 13/1 together with the brake drum.
- Slacken hexagon head screws 13/44 and the hexagon socket screws.
- Remove screw plug 13/14 and carefully separate both housing halves 13/41 and 13/40 with an auxiliary screw M 20x1.5/60 (2.4"). Avoid jamming by applying slight blows with a plastic hammer.
- Raise housing half 13/40 off housing half 13/41. If necessary, apply slight blows with a Ø 16 mm (0.6") brass mandrel through the threaded bore of screw plug 13/14 or on the end face of pinion 13/11 if it does not come off easily. Both shafts 13/20 or 13/25 remain in housing 13/41 for the time being.
- Extract circlip 13/10 and expel drive pinion 13/11 with a Ø 16 mm (0.6") brass mandrel through the threaded bore for screw plug 13/14.
- Extract circlip 13/13 and press out needle bearing 13/12 with a Ø 55 mm (2.2") die.
- Press the new needle bearing 13/12 into housing 13/41 with a Ø 59 mm (2.3") die and insert circlip 13/13.
- Press the new grooved ball bearing 13/9 onto drive pinion 13/11, put supporting washer 13/8 in place for the circlip and insert circlip 13/7.
- Slide drive pinion 13/11 into housing 13/40 and insert circlip 13/10.
- Insert both parallel pins 13/42 and put the new seal 13/43 in place.
- Put housing 13/40 in place and tighten hexagon head screws 13/44 or hexagon socket screws to 46 Nm (34 ft. lbs.).
- Slide cardan flange 13/1 in place together with the brake drum.
- Remove dirt, oil and preservatives from thread M 24x1.5 of nut 13/5 and shaft 13/25.
- Apply Loctite 262 to the entire circumference and length of both threads.
- Screw nut 13/5 onto shaft 13/25 and tighten it to 600 Nm (443 lbf ft). The final position must be reached within 2 – 5 minutes for the Loctite to be fully effective.
- Connect the cardan shaft and fill in oil up to the oil check bore.

Hydraulic system

6.4 Regeneration – stick section



Problem

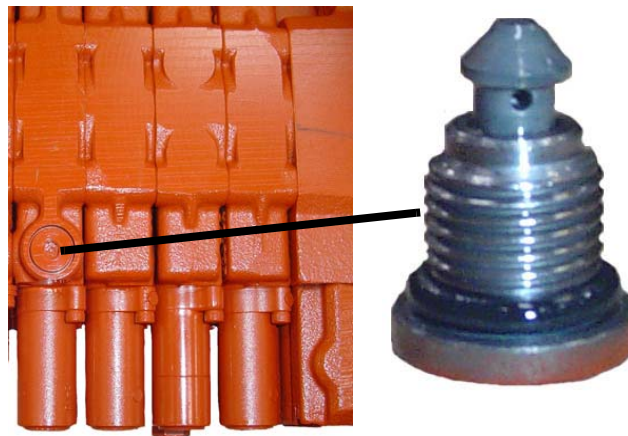
High loads on the stick can cause the stick ram to be “emptied” on the base side, which can cause the stick to stop in vertical position.

Solution

A non-return valve is integrated in the spool valve so the rod-side oil can flow to the base side.

Location

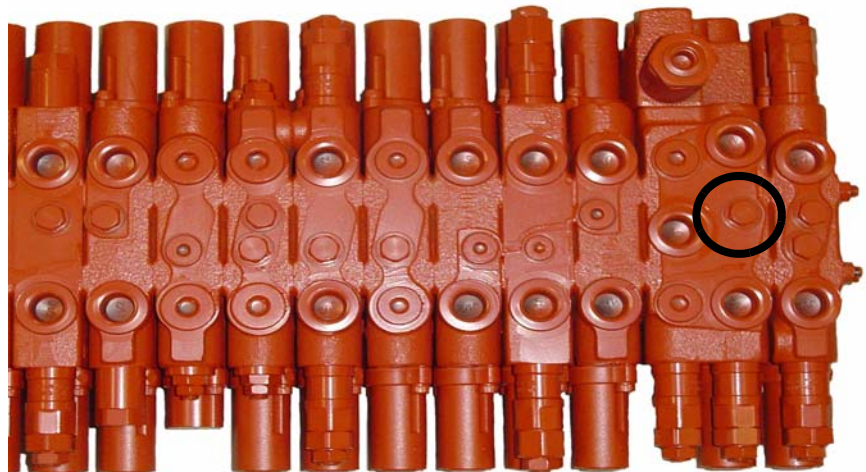
The regeneration valve is located in the stick segment on the lower side.



6.5 Bucket pre-tension

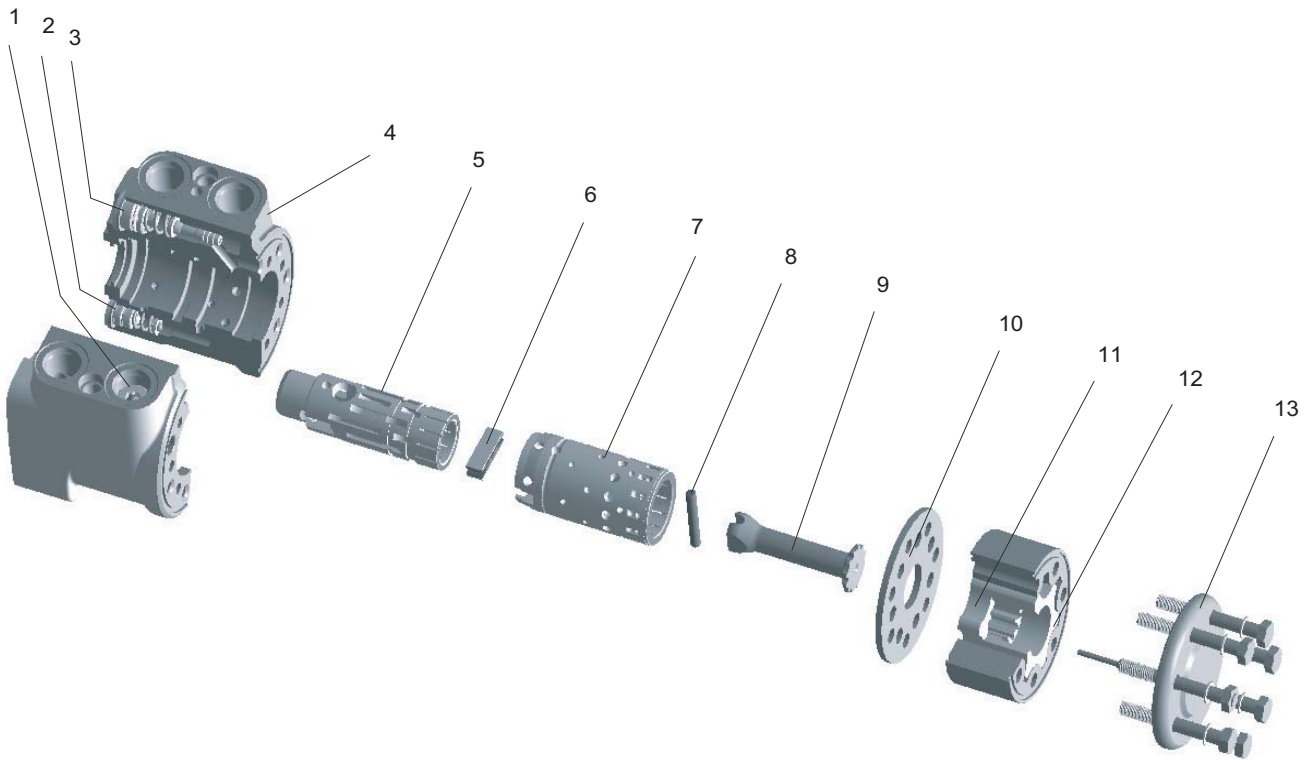
A nozzle and a non-return valve are integrated in the pressure line of the bucket segment. If the bucket and the boom (both supplied with oil by the same pump) are actuated at the same time, both move simultaneously, and not the bucket (with its smaller mass) first, and then the boom with its larger mass. This nozzle is marked “S” in the diagram and is located in the boom section.

Location:



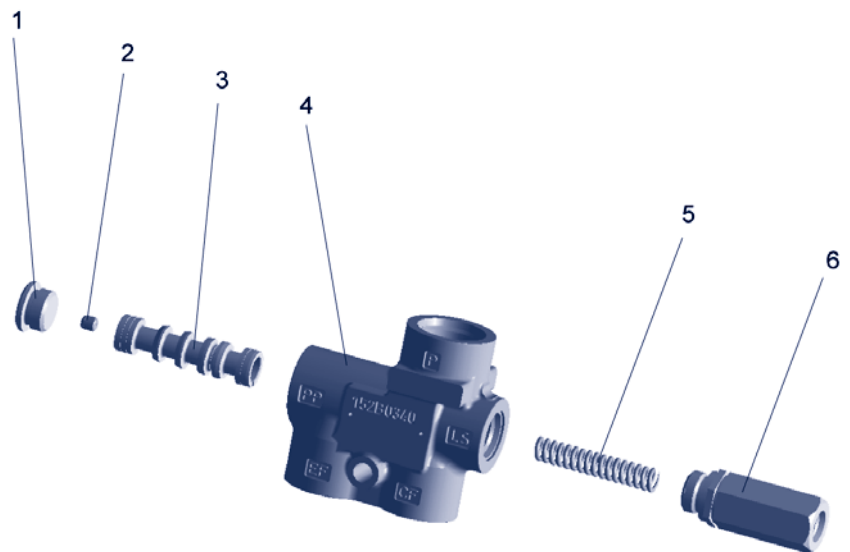


Steering system and priority valve



Pos.	Description	Pos.	Description
1	Non-return valve	8	Pin
2	Shock valve	9	Cardan shaft
3	Pressure limiting valve	10	Distributor plate
4	Steering unit housing	11	Gear
5	Inner slider	12	Ring gear
6	Spring	13	Cover
7	Outer slider		

Pos.	Description
1	Plug
2	Damping element
3	Valve spool
4	Priority valve housing
5	Spring
6	LS plug with throttle



6.13 Breather filter

The breather filter is in charge of:

- Air intake and outlet for pressure compensation in the hydraulic oil tank (varying oil level) – prevents the oil tank from inflating.
- Pre-tension of oil tank to 0.4 ± 0.06 bar (5.8 ± 0.9 psi) -> supports the variable displacement pump's suction.
- Filtering the intake air.



Fig. 3: Breather filter position

The breather filter is located under the tank cover, between the hydraulic filler inlet and the fuel filler inlet.

Replace the breather filter according to the instructions in the maintenance plan – see *Maintenance plan (overview)* on page 3-5.

i Important!

The breather filter must be replaced at 1000 s/h.

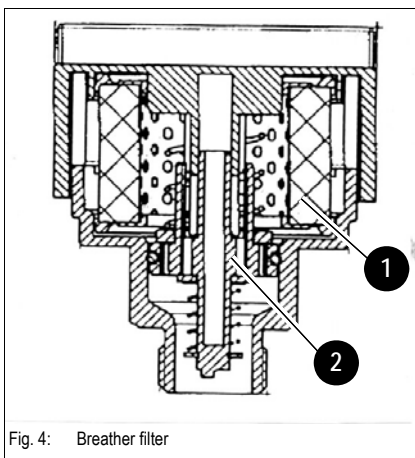


Fig. 4: Breather filter

Pos.	Description
1	Filter fabric
2	Bleeder valve

Electric system

7.15 Alternator

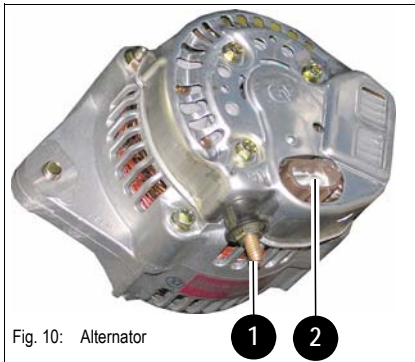


Fig. 10: Alternator

The alternator charges the battery and supplies direct current to electric consumers.

Pos.	Description
1	Connection B (battery)
2	Connection P starting relay
	Connection IG telltale (112 V)
	Port L telltale (during service 12 V, otherwise 0 V)

7.16 Starter

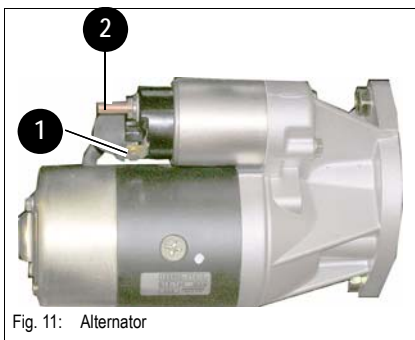


Fig. 11: Alternator

Pos.	Description
1	Connection S starting relay
2	Connection B battery

7.25 Engine wiring harness up to serial no. AD07227 (legend)

No	Up to	To	Colour	mm ²
1	G1/B alternator	M1 starter	red	10
2	G1/B alternator	F1 main fuse	red	6
3	M1 starter	F2 main fuse	red	6
4	F1 main fuse	K5/30 preheating relay	red	4
5	K5/30 preheating relay	K9/30 cutoff solenoid relay	red	4
6	F1 main fuse	K7/A start high current relay	red	4
7	F2 main fuse	X3/A main connection	red	6
8	F2 main fuse	M7 fuel-filling pump	red	4
9	GND	M7 fuel-filling pump	blk	4
10	K7/B start high current relay	M1 starter	wht/red	4
11	K5/87 preheating relay	R1 glow plug	brn	6
12	K9/87 cutoff solenoid switching relay	Y1/1 cutoff solenoid	wht	4
13	M9/1 fuel pump	Y1/2 cutoff solenoid	blu	1
14	GND	Y1/3 cutoff solenoid	blk	2.5
15	K8 cutoff solenoid time lag relay	X1/2 engine/chassis connection	blu	1
16	K8 cutoff solenoid time lag relay	V1 blocking diode	blu	1
16	V1 blocking diode	K7/1 start high current relay	blu	1
A				
17	M9/1 fuel pump	X1/2 engine/chassis connection	blu	1
18	G1/2 alternator	X1/1 engine/chassis connection	blu	1
19	K6 preheating time lag relay	X1/3 engine/chassis connection	brn	1
20	K6 preheating time lag relay	K5/86 preheating relay	brn	1
21	K6 preheating time lag relay	X1/4 engine/chassis connection	wht/blk	1
22	K6 preheating time lag relay	K7/3 start high current relay	wht/blk	1
23	K6 preheating time lag relay	X1/5 engine/chassis connection	gry/red	1
24	K8 cutoff solenoid time lag relay	K9/86 cutoff solenoid switching relay	blu/blk	1
25	K8 cutoff solenoid time lag relay	K9/85 cutoff solenoid switching relay	pnk/blk	1
26	K7/6 start high current relay	G1/3 alternator	blk/blu	1
26A	G1/3 alternator	X1/12 engine/chassis connection		
27	GND	K5/85 preheating relay	blk	1
28	K5/85 preheating relay	K6 preheating time lag relay	blk	1
29	K6 preheating time lag relay	K8 cutoff solenoid time lag relay	blk	1
30	K8 cutoff solenoid time lag relay	V1 blocking diode	blk	1
30A	V1 blocking diode	K7/5 start high current relay	blk	1
31	G1/1 alternator	X1/6 engine/chassis connection	pnk	1
32	S2 engine oil pressure switch	X1/7 engine/chassis connection	wht/grn	1
33	S3 engine temperature switch	X1/8 engine/chassis connection	blk/grn	1

No	Up to	To	Colour	mm ²
34	S3 engine temperature switch	X1/9 engine/chassis connection	grn/wht	1
35	S4 air filter pressure switch	X1/10 engine/chassis connection	gry/blu	1
36	S4 air filter pressure switch	S4.1 air filter switch	gry/blu	1
37	B1 fuel level indicator	X1/11 engine/chassis connection	vio/blk	1
38	GND	X16/2 drive alarm connection	blk	1
38A	B1 fuel level indicator	X16/2 drive alarm connection	blk	1
39	B1 fuel level indicator	S5 preheating start switch	blk	1
40	S5 preheating start switch	X2/1 engine/chassis connection	org/wht	1
41	X16/1 drive alarm connection	X1/1 engine/chassis connection	blu	1
44	S21.1 high-speed tip switch (prepared)	X2/2 engine/chassis connection	gry	1
45	S21.1 high-speed tip switch (prepared)	B2 horn	gry	1
46	B2 horn	X5/5 armrest/chassis connection	org	1
47	X19 socket	X2/4 engine/chassis connection	red/blk	1.5
48	X19 socket	GND	blk	1.5
49	M5 washer pump	X2/5 engine/chassis connection	blk/wht	1
50	M5 washer pump	GND	blk	1
51	XS41/1 safe load indicator	X2/6 engine/chassis connection	vio/blu	1
52	XS41/2 safe load indicator	GND	blk	1
53	XE11/1 boom working light	X2/7 engine/chassis connection	grn/yel	1
54	XE11/2 boom working light	GND	blk	1
55	S21.1/1 high-speed tip switch (prepared)	X2/8 engine/chassis connection	brn/blk	1
56	Y3 high-speed solenoid valve	S21.1/2 gearshift switch	brn/blk	1
57	Y3 high-speed solenoid valve	GND	blk	1
58	Y13 solenoid valve for safety valve	X5/4 armrest/chassis connection	brn/wht	1
60	GND	Y13 solenoid valve for safety valve	blk	1
61	GND	M9/2 fuel pump	blk	1
62	Y15/1 auxiliary hydraulics/swivel solenoid valve	X5/1 armrest/chassis connection	blu/yel	1
63	Y15/2 auxiliary hydraulics/swivel solenoid valve	GND	blk	1
64	Y16/1 electr. auxiliary hydraulics solenoid valve	X5/2 armrest/chassis connection	gry/yel	1
65	Y16/2 electr. auxiliary hydraulics solenoid valve	GND	blk	1
66	Y17/1 electr. auxiliary hydraulics solenoid valve	X5/3 armrest/chassis connection	gry/grn	1
67	Y17/2 electr. auxiliary hydraulics solenoid valve	GND	blk	1
68	S52 air conditioning pressure switch	X5/7 armrest/chassis connection	yel/red	1
69	S52 air conditioning pressure switch	X2/11 engine/chassis connection	yel/red	1
70	X2/11 engine/chassis connection	Y31 air conditioning solenoid valve	yel/red	1
71	S4 air filter pressure switch	GND	brn/grn	1
72	S4.1 air filter switch	GND	blk	1
73	GND	X5/6 armrest/chassis connection	blk	1



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Electric system

7.33 Cab wiring harness up to serial no. AD07227 (legend)

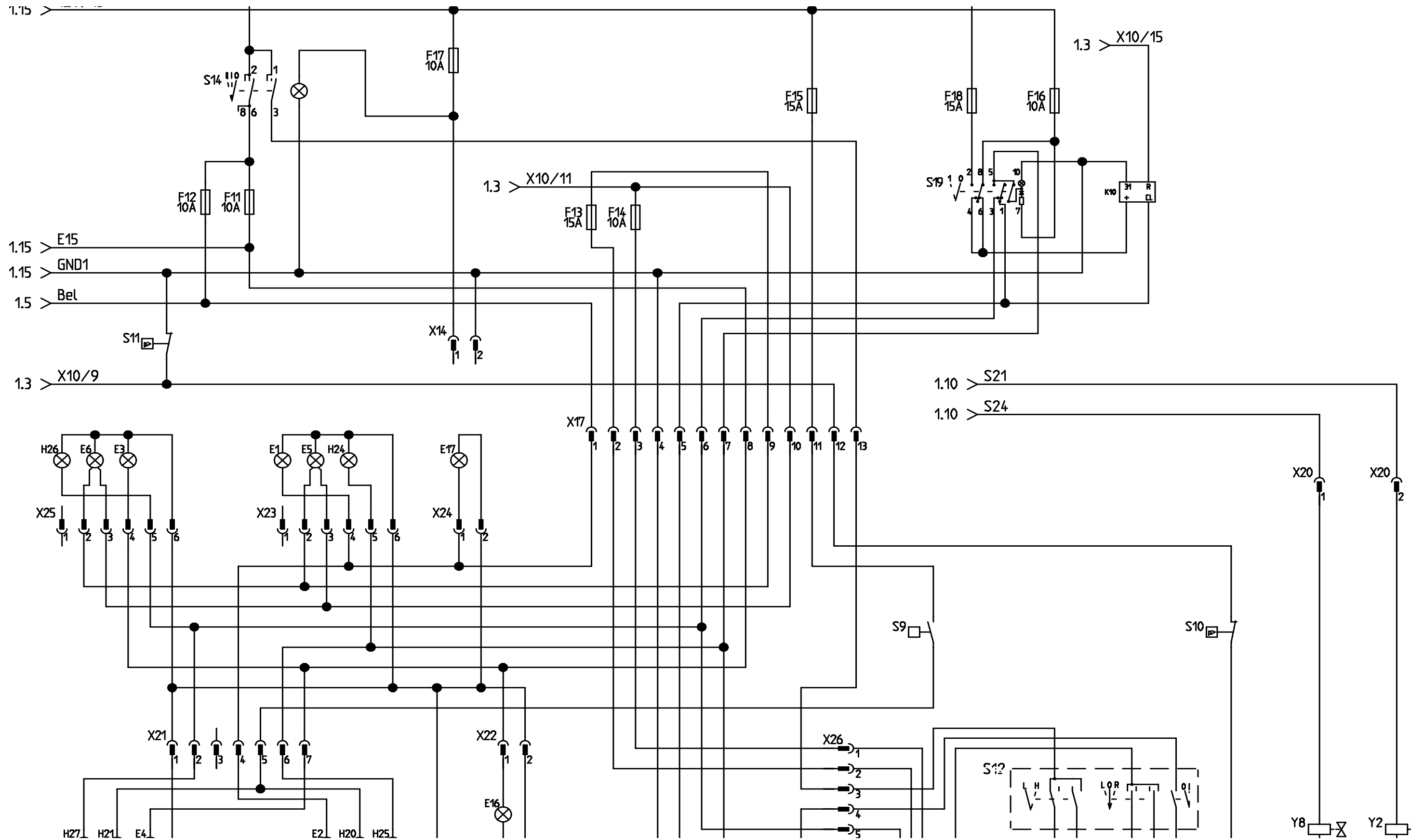
No.	Up to	To	Colour	mm ²
44	X5/5 armrest chassis connection	X7/5 joystick (right) connection	gry	1
58	X5/4 armrest chassis connection	S29/5 work hydraulics lock switch	gry	1
62	X5/1 armrest chassis connection	X8/2 joystick (left) connection	blu/yel	1
64	X5/2 armrest chassis connection	X8/3 joystick (left) connection	gry/yel	1
66	X5/3 armrest chassis connection	X8/6 joystick (left) connection	grn/gry	1
69	X5/7 armrest chassis connection	S54 air conditioning thermostat	yel/red	1
73	X5/6 armrest chassis connection	X7/4 joystick (right) connection	blk	1
74	X5/6 armrest chassis connection	M4/2 fan	blk	1
75	M4/2 fan	X8/4 joystick (left) connection	blk	1
77	X6/5 armrest switch connection	S28 left-hand side safety switch	gry	1
78	S28 left-hand side safety switch	X8/1 joystick (left) connection	gry	1
81	X6/5 armrest switch connection	X7/1 joystick (right) connection	gry	1
82	X6/2 armrest switch connection	S54 air conditioning thermostat	yel/red	1
83	X6/3 armrest switch connection	M4/1 fan	yel/blk	1
84	X6/4 armrest switch connection	M4/3 fan	yel/blu	1
85	X8/5 joystick (left) connection	X7/3 joystick (right) connection	gry/blk	1
175	X20/1	S24/5 oscillating axle interlock switch	vio/wht	1
176	X20/2	S21/5 high-speed switch	brn/blk	1
177	X6/1 armrest switch connection	X7/2 joystick (right) connection	brn/grn	1
178	X7/1 joystick (right) connection	S24/1 oscillating axle interlock switch	gry	1
179	S21/1 high-speed switch	S24/1 oscillating axle interlock switch	gry	1
180	S21/1 high-speed switch	S21/1 high-speed switch	gry	1
181	S24/10 oscillating axle interlock switch	S21/10 high-speed switch	gry	1
182	S24/10 oscillating axle interlock switch	S29/10 work hydraulics lock switch	gry	1
183	X7/4 joystick (right) connection	X21/9	blk	1
184	S24/9 oscillating axle interlock switch	S21/9 high-speed switch	blk	1
185	24/9 oscillating axle interlock switch	S29/9 work hydraulics lock switch	blk	1



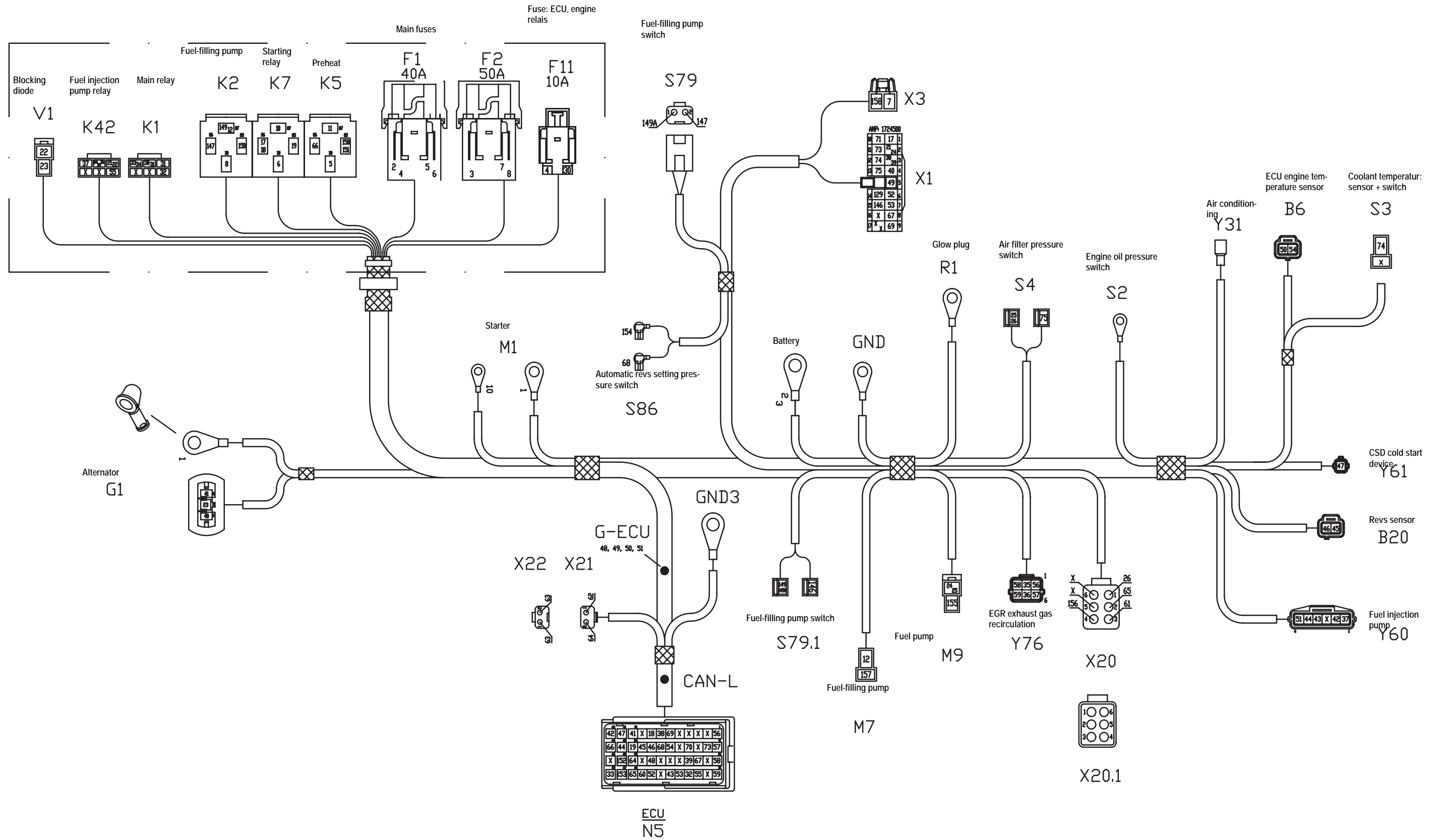
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Electric system

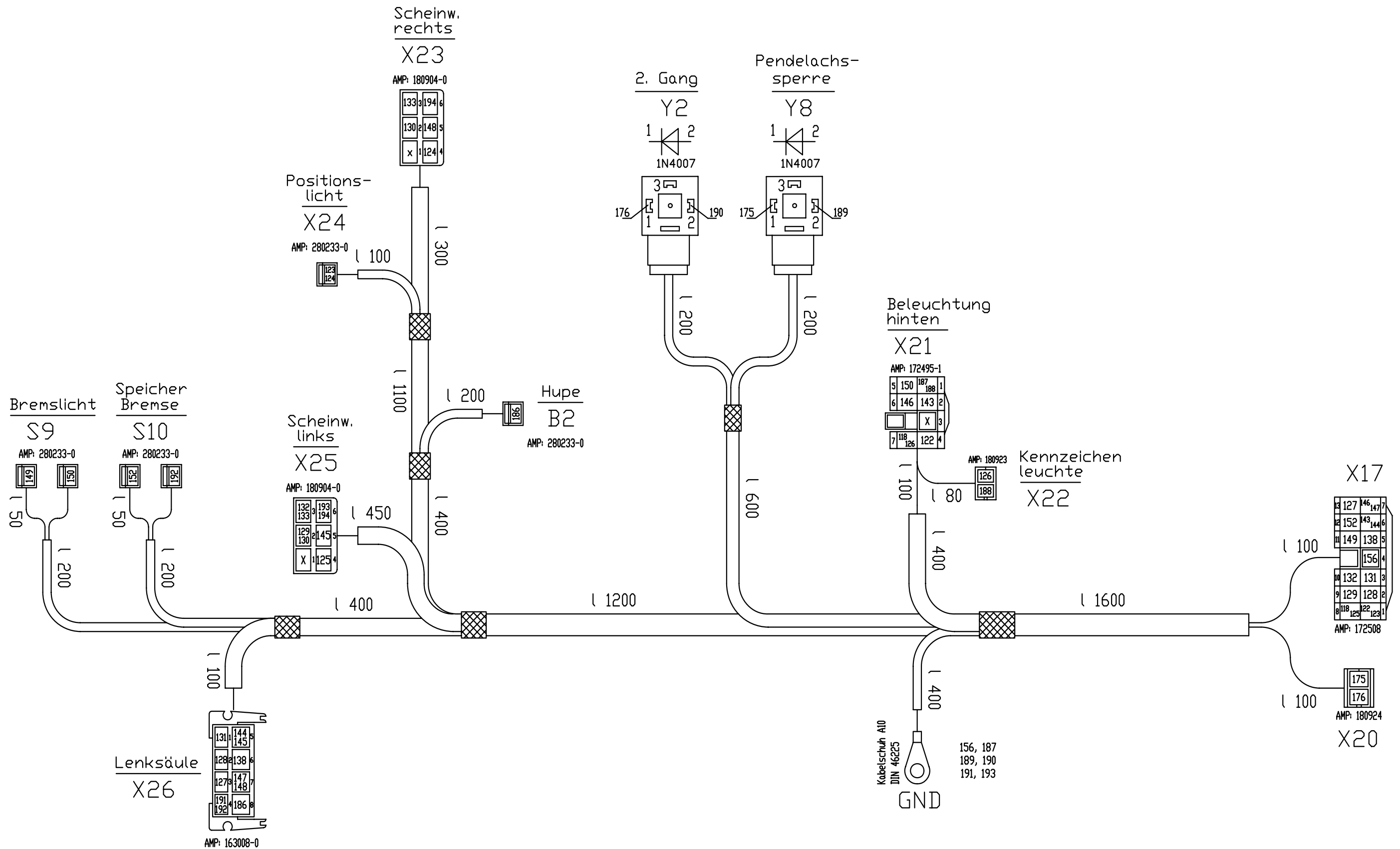
7.44 Wiring diagram up to serial no. AD07227



7.54 Engine wiring harness 1000173970 from serial no. AH00708



7.64 Lights wiring harness up to serial no. AD07227



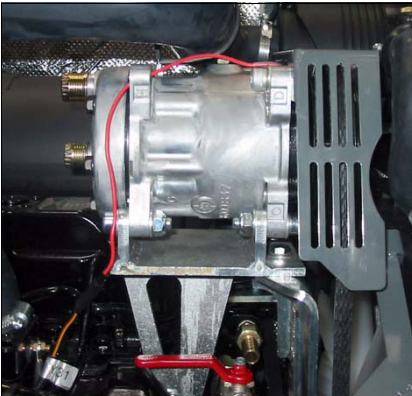


Fig. 1: Compressor

Compressor

The compressor takes in the gaseous refrigerating agent from the evaporator, compresses it and presses the refrigerating agent into the condenser. The diesel engine drives the compressor via a V-belt and an electro-magnetic clutch.

Condenser

The condenser condenses the compressed refrigerating agent, i.e. it is delivered to the condenser in gaseous state and emerges at the lowest position of the condenser in liquid form.



Fig. 1: Dehumidifier with pressure switch

Dehumidifier with pressure switch

The dehumidifier consists of a collector with integrated dryer, a sight glass and a pressure switch.

The dehumidifier serves as an expansion receptacle and tank for the refrigerating agent. It can bind a small quantity of water chemically, thereby withdrawing it from the circuit.

A sight glass on the dehumidifier enables to check the level of the circuit.



Important!

The cooling system is not working properly if gas bubbles appear in the sight glass. Replace the dehumidifier if the sight glass is cloudy or shows traces of corrosion.



Caution!

Always keep the dehumidifier closed otherwise the dryer is saturated by the humidity in the air and is no longer serviceable.

8.8 Central lubrication system

Grease-based central lubrication system with 12 lubrication points

Position



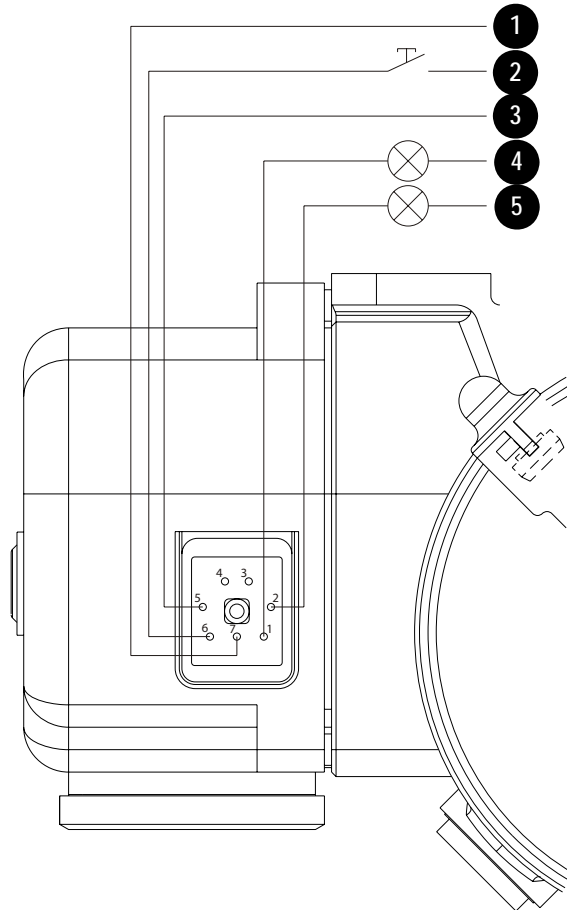
Fig. 11: Central lubrication system pump

The electric pump for the central lubrication system is installed over the hydraulic pump.

The electric pump presses the grease through the lubrication line towards the distributing block on the boom.

From the distributing block, the grease passes on to the lubrication points.

Ports



Pos.	Description
1	- Earth (brown)
2	+ Intermediate lubrication tip switch connection (orange)
3	+ Ignition (black)
4	- Error telltale (red)
5	+ Lubrication telltale (green)

8.12 3rd control circuit

Function

The 3rd control circuit allows you to operate a range of attachments with up to 3 hydraulic circuits.

- The 3rd control circuit is actuated electrically via the proportional slide switch on the left-hand side joystick.

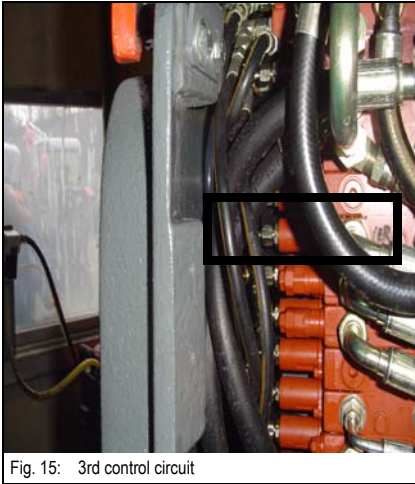
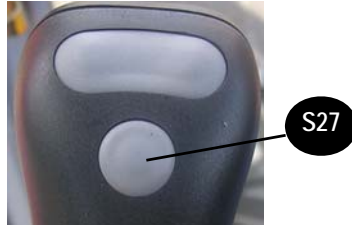
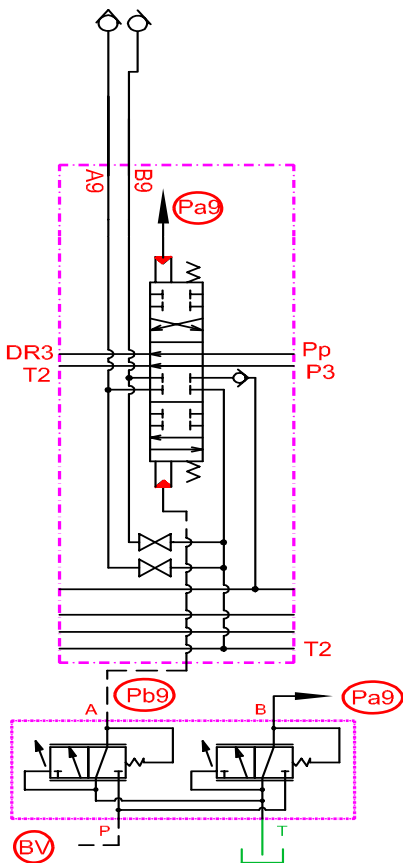


Fig. 15: 3rd control circuit



- If equipped with other options such as triple articulation boom and proportional controls for auxiliary hydraulics, the 3rd control circuit is actuated via the right-hand side joystick and proportional controls for auxiliary hydraulics are actuated via the left-hand side joystick.

Diagram



Port	Legend	Controlled via
Pa9	3rd control circuit (control)	
Pb9	3rd control circuit (control)	
A9	3rd control circuit (connection)	
B9	3rd control circuit (connection)	
P3	High-pressure supply	Pump 3
Pp	Circulation pressure of drive counterbalancing system	
BV	Pilot control pressure	

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