

en

Service manual

Wheel loader

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Valid for: L 508-1817

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010.1.3.4 Operator

Responsibility

Operator is responsible for following:

- Read the operator's manual.
- Read included documentation:
 - Operator's manuals for components
 - Operator's manuals from third party manufacturers
 - Additional instructions
- Wear personal protective equipment.
- Operate machine as intended.
- Avoid working methods that can endanger safety.
- Adhere to safety regulations at place of use.
- Maintain visual contact or voice contact with spotter.
- During operation, do not allow any other persons on machine.
- Report all changes to machine that affect safety to operating company.
- If it is no longer possible to work safely, stop operating the machine immediately.
- Only perform retrofittings of machine after consultation with manufacturer.
- Use original Liebherr spare parts wherever possible.

Requirement

The operator has following qualification and skills:

- Has completed the legally specified minimum age.
- Is physically and mentally capable of operating the machine safely.
 - Satisfactory eyesight
 - Satisfactory hearing ability
 - Quick reactions
 - Is able to estimate distance, height and gaps.
- Has the necessary authorisation for operation of machine.
- The operator has the necessary education (theoretical and practical) for the following:
 - Handling the machine type
 - Attaching
 - Spotting
 - Handling fire extinguishing equipment
- Knows all means of escape in an emergency.
- Is not under any physical or mental impairment that limits one of the prescribed requirements.
- Is not under the influence of alcohol.
- Is not under the influence of drugs.

010.1.3.5 Maintenance staff

Responsibility

The maintenance staff are responsible for the following:

- Read the operator's manual.
- Read included documentation:
 - Operator's manuals for components
 - Operator's manuals from third party manufacturers
 - Additional instructions
- Maintain machine for safe and reliable function.
- Execute all maintenance tasks specified for maintenance staff in the maintenance and inspection schedule.

Injuries

Incorrect protection

- If there is a danger of falling objects: Exclusively use machines with suitable falling object protective structures.
- If there is a danger of objects penetrating the operator's cab: Exclusively use machines with suitable falling object protective structures.
- If machine is used in toxic environment: Insert filters approved for the use in air conditioning.
- If machine is used in dust-intensive environment: Insert filters approved for the use in air conditioning.

Incorrect refuelling

- Do not touch fuels with your skin.
- Do not inhale fuel vapours.

Incorrect maintenance

- Make sure there is nobody in the danger area.
- Park machine and secure to prevent rolling or driving away.
- Park machine on level, firm ground.
- Park machine with lowered working attachment.
- When searching for leaks in the hydraulic system wear protective gloves.
- Exclusively search for leaks in the hydraulic system with cardboard or similar material.
- Hydraulic system must be depressurised before work can be carried out on it.
- Repairs to hydraulic hoses and hose lines are carried out by authorised specialist staff only.
- Lay and install hydraulic hoses and hose lines professionally.
- Do not weld or solder accumulators.
- Do not perform mechanical work on accumulators.
- Make sure that the permanent labelling of the accumulators (operating data) is kept visible.
- Be especially careful when removing or inserting bolts and pins as this can cause serious injury.
- Make sure that machine is supported in a proper and secure manner.

Crushing injuries

Unexpected movements of machine

- Make sure there is nobody in the danger area.
- Park machine and secure to prevent rolling or driving away.
- Do not work under working attachment unless it is supported or resting on ground.

Unintentional closing of service access points

- Ensure that the service access points cannot close unintentionally.

Incorrect lifting tackle

- Exclusively use undamaged lifting accessories.
- Ensure that the load and tensile capacity of the lifting tackle is sufficient.

Designation	ID no.	Use	Remark
Valve insert remover	11834779	All wheel loaders	For changing valve inserts in filling port of air conditioning hoses.
Vacuum pump	7027552	All wheel loaders	For evacuating the air conditioning system
4-valve test fitting	7027558	All wheel loaders	For testing, evacuating and filling the air conditioning system
Filling hose, blue 1500 mm	7027553	All wheel loaders	For the test fitting
Filling hose, yellow 1500 mm	7027554	All wheel loaders	For the test fitting
Filling hose, red 1500 mm	7027555	All wheel loaders	For the test fitting
Car coupling 253a	7027556	All wheel loaders	For the test fitting
Car coupling 254a	7027557	All wheel loaders	For the test fitting

Tab. 13: Special tools for air conditioning system

010.2.11 Special tools for cab glazing

Description	ID no.	Use	Remarks
Toolbox complete with suction cups	10021147	All wheel loaders	For removing and installing bonded panes

Tab. 14: Special tools for cab glazing

010.2.12 Special tools for the central lubrication system

Designation	ID number	Use	Remark
Liebherr filling press	10009239	All wheel loaders with Liebherr central lubrication system	For quickly filling the reservoir
Filling press	10333342	All wheel loaders with Liebherr central lubrication system	For quickly filling the reservoir
Liebherr filling port	7029283	All wheel loaders with Liebherr central lubrication system	For quickly filling the reservoir

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010.4 Preservation guidelines

010.4.1 General information

All parts of a construction machine are exposed to corrosion when out of use. Corrosion can be compared to wear. However, the effects can be much more serious than mechanical wear and can significantly reduce the service life of the parts. This means the machines and their components must be preserved according to certain guidelines when out of use.

Generally these guidelines are based on the following time-scales:

- Out of service for an unknown period of time
- Putting the machine out of service
 - Out of service for up to 2 months
 - Out of service for up to 12 months
 - Out of service for longer than 12 months
- Putting back into service

The required measures are also scaled according to the time periods. The preservation measures are not strictly standardized, and are to be shortened or lengthened depending on necessity (e.g. because of environmental conditions).

Such conditions are, for example:

- The machine's location (e.g. in unprotected open space, in closed space, with roof, temperature-controlled environment)
- The type of climate (e.g. extreme temperatures, storage near the sea or the coast, etc.)

010.4.2 Machine out of service for an unknown period of time

If the machine is out of use for a lengthy period without preservation, it must be **put back into service at intervals of no more than 14 days** in order to prevent increased corrosion and the resulting damage.

- All oil levels must be checked before putting into service and filled up where necessary.
- Carry out all the prescribed daily maintenance work every day before putting into service. Carry out all the additional maintenance work subject to time limits as per the inspection plan and the additional diesel engine operator's manual by the specified intervals at the latest.
- Put machine back into service according to operating instructions and operate until the diesel engine and hydraulics system have reached the prescribed operating temperature in the hydraulic tank and in the coolant circulation.
- Activate all the functions of the travel and working hydraulics and of the other hydraulic components, and operate alternately for approx. 20 minutes in total. Hydraulic cylinders must each be extended and retracted over their full stroke length.
- When switching off the machine, retract all the hydraulic cylinders completely if possible, and fill up the fuel tank. If the surface is soft, put the machine on wooden blocks or similar, and secure against rolling.
- Check batteries and, if necessary, remove and recharge. Check electronic contact points and grease with terminal grease if needed.

	Designation	Unit	Value
	Bucket capacity as per ISO 7546 ^{C)}	m ³	1.0
	Bucket width	mm	2100
	Specific material weight	t/m ³	1.8
A	Dumping height at maximum lifting height and 42° tilt out angle	mm	2640
B	Dump height	mm	3000
C	Maximum bucket base height	mm	3180
D	Maximum bucket pivot point height	mm	3370
E	Maximum bucket upper edge height	mm	4260
F	Reach at maximum lifting height and 42° tilt out angle	mm	810
F max.	Maximum reach at 42° tilt out angle	mm	1600
G	Digging depth	mm	57
H	Height above operator's cab	mm	2460
I	Height above exhaust	mm	1810
J	Ground clearance	mm	325
K	Wheelbase	mm	2150
L	Overall length	mm	5515
	Turning radius over bucket outer edge (transport position)	mm	4465
	Breakout force (SAE)	kN	56
	Tipping load when straight	kg	4400
	Tipping load when articulated (ISO 14397-1)	kg	3850
	Operating weight	kg	5600

Tab. 20: Complete machine with loading bucket

- A) Z-bar kinematics including quick coupler
 B) Welded tooth holder with plug-in teeth
 C) In practice, the bucket capacity can be around 10% greater than as calculated using the ISO 7546 standard. This depends on the type of material.

020.1.2 Working attachment: 4 in 1 bucket

Valid for: L508-1817;

Values stated refer to machine:

- With 340/80R18 tyres
- Including all lubricants
- With a full fuel tank
- With ROPS/FOPS cab and operator
- On level and stable ground



Note

Tyres and working attachments affect operating mass and tip load.

- ▶ Note tyre and working attachment specifications.
- ▶ See separate operator's manual for more information.

020.4.7 Tilt cylinder

Valid for: L508-1817;

Description	Unit	Value
Piston diameter	mm	100
Piston rod diameter	mm	50
Minimum installation length	mm	1270
Stroke length	mm	380
Weight	kg	51.2
Tightening torque of piston rod bearing	Nm	800
Tightening torque of piston	Nm	400
Tightening torque of piston nut	Nm	200

020.12 Steel parts of the basic machine

020.12.1 Ballast weight

Valid for: L508-1817;

Description	Unit	Value
Ballast weight	kg	987

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030.3.3 Converting hydraulic system from mineral oils to biodegradable hydraulic fluids

For operation of Liebherr earth moving machines with biodegradable hydraulic fluids, we recommend **Liebherr Hydraulic Plus**.

In the case of a machine equipped with biodegradable hydraulic fluid at the factory, a corresponding information label is attached.

Procedure for later conversion

NOTICE

Non-approved oil!
Damage to the hydraulic system.

- ▶ Only use oil that meets the Liebherr specifications.
 - ▶ Do not mix different oils.
-
- ▶ In case of subsequent conversion of machine to a biodegradable hydraulic fluid, contact Liebherr customer service!
 - ▶ Request **instructions** and **conversion guidelines** from Liebherr and observe them!

030.3.4 Diesel fuels

Valid for: L508-1817;

030.3.4.1 Minimum quality requirement

Approved diesel fuels	As per DIN EN 590, ASTM D 975 1-D / 2-D
	Emission stage V
Maximum sulphur content	10 ppm
Minimum cetane number	45
Lubricity at 60 °C (HFRR)	Maximum 460 µm

Tab. 27: Minimum quality requirement

Do not mix diesel fuel with additives.

030.3.4.2 Operating temperatures of diesel fuels

Approved diesel fuels according to DIN EN 590	Cloud point	Ambient temperature
Class standard	-7 °C	to -10 °C
Arctic class 0	-10 °C	to -13 °C
Arctic class 1	-16 °C	to -20 °C

Tab. 28: Operating temperatures of diesel fuels

**CAUTION**

Engine hood falling shut
Injury.

- ▶ Only open the engine hood when the gas-filled springs function properly.

To open engine bonnet:

- ▶ Open the lock with the ignition key.
- ▶ Open the engine hood **2** with the handle **1**.
 - ▷ The engine hood **2** is held in this position by gas-filled springs.

Troubleshooting

If the gas-filled spring does not hold the hood open:

- ▶ Contact Liebherr customer service.

To close engine bonnet:

- ▶ Close the engine hood **2** with the handle **1**.
- ▶ Close the lock with the ignition key.

030.4.2.3 Turning off battery main switch

Valid for: L508-1817;

Battery main switch is located on left side of engine compartment.

For certain maintenance tasks, battery main switch must first be turned off.

Find out from descriptions of relevant maintenance tasks whether battery main switch must be turned on or off.

Turn on battery main switch after completing these maintenance tasks.

NOTICE

Voltage fluctuations!
Damage to the electrical system.

- ▶ Never turn off the battery main switch when the engine is running.

2 Locking screw

4 Sample container

**Note**

Contaminated fuel sample!
Incorrect analysis result.

- ▶ Clean hand pump 3 only with clean cloth.
- ▶ Ensure that sampling hose 1 is new.
- ▶ Clean sampling point before opening.


-
- ▶ Screw in new sampling container 4 immediately after removing cover in hand pump 3.
 - ▶ Shorten new sampling hose 1 to suitable length.
 - ▶ Guide sampling hose 1 through hand pump 3 into sampling container 4.
 - ▶ Screw locking screw 2 closed.
 - ▷ Sampling hose 1 is clamped air tight in hand pump 3.

Preparing sample container for shipping

- ▶ Fill out sample information form ([For more information see: Operating fluid analysis: filling out sample information form, page 030-36](#)).
- ▶ Glue barcode of sample information form to sample container.
- ▶ Separate sample receipt from sample information form and keep it safe.
- ▶ Insert sample information form into outer opening of plastic bag.
- ▶ Place sample container into plastic bag.
- ▶ Close plastic bag.
- ▶ Enter sender data on front of plastic bag.
- ▶ Enter details of sampling area on plastic bag.
- ▶ Apply postage to shipping bag.
 - ▷ Sample container is ready for shipment.

**Note**




The operating fluid analysis is performed by Oelcheck GmbH.

Cover colour	Appearance		Wear	Additives	Contamination	PQ index	Viscosity 40 °C	Viscosity 100 °C	Viscosity index	Oxidation	IR index	Water with IR	Water according to K. F.	Neutralisation number	Optical particle counting
	Appearance	Wear													
	X	X	X	X	X	X	X	X	X	X	X		X	X	X

Tab. 59: Scope of analysis of transmission oils



Transmission

Transmission oils

Cover colour	Appearance		Wear	Additives	Contamination	PQ index	Viscosity 40 °C	Viscosity 100 °C	Viscosity index	Oxidation	IR index	Water with IR	Water according to K. F.	Neutralisation number	Optical particle counting
	Appearance	Wear													
	X	X	X	X	X	X	X	X	X	X	X	X			
	X	X	X	X	X	X	X	X	X	X	X		X		
	X	X	X	X	X	X	X	X	X	X	X		X	X	X

Tab. 60: Scope of analysis of transmission oils

Pump distributor gear oils

Cover colour	Appearance		Wear	Additives	Contamination	PQ index	Viscosity 40 °C	Viscosity 100 °C	Viscosity index	Oxidation	IR index	Water with IR	Water according to K. F.	Neutralisation number	Optical particle counting
	Appearance	Wear													
	X	X	X	X	X	X	X	X	X	X	X	X			
	X	X	X	X	X	X	X	X	X	X	X		X		

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Draining oil

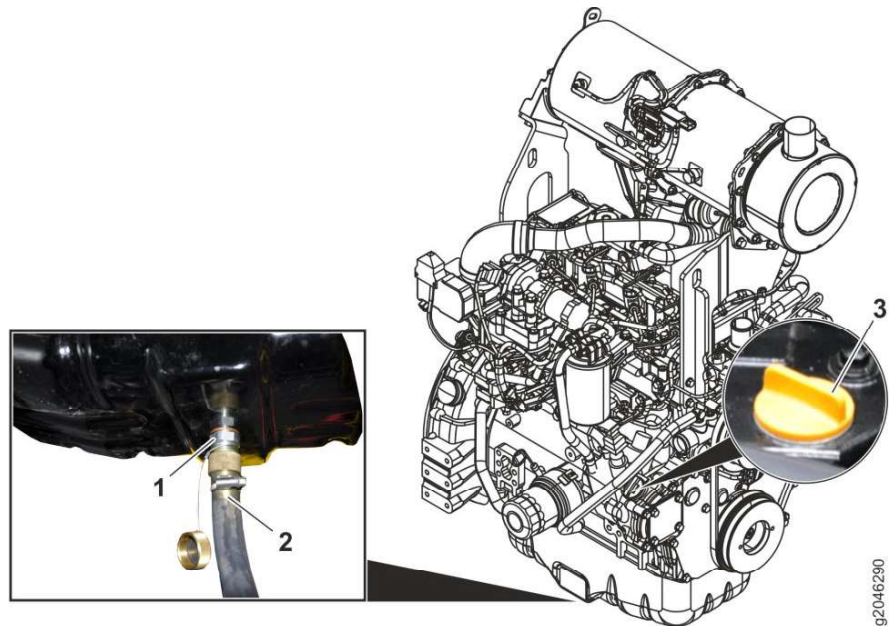


Fig. 113: Draining oil

- 1 Drain valve
2 Drain hose

- 3 Cover

- ▶ Unscrew cover 3.
 - ▷ Crankshaft housing is ventilated. Flow of engine oil is thereby accelerated.
- ▶ Place collecting pan under diesel engine.



CAUTION

Hot fluids!
Burns.

- ▶ Avoid skin contact with fluids.

Drain valve 1 is on underside of diesel engine.

- ▶ Screw drain hose 2 onto drain valve 1.
 - ▷ Open drain valve. Engine oil drains out.
- ▶ Unscrew drain hose 2.
- ▶ Change oil filter. (For more information see: [Diesel engine: changing oil filter, page 030-56](#))

Topping up oil

NOTICE

Non-approved oil!
Damage.

- ▶ Only use oil that meets the Liebherr specifications.

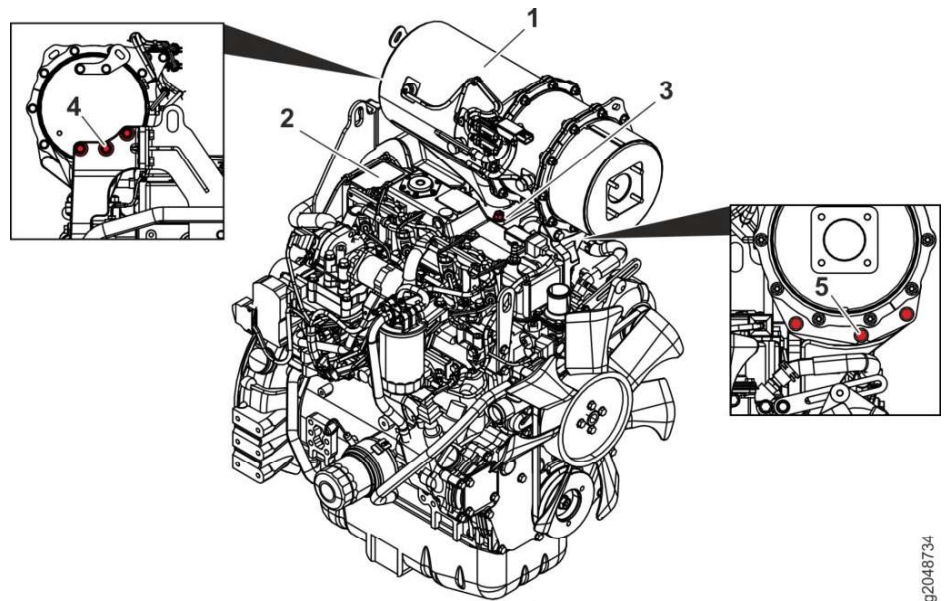


Fig. 125: Removing DPF, exposing valves

- | | |
|-----------------------------------|--------------------------------|
| 1 Diesel particulate filter (DPF) | 4 Screws on input module (3x) |
| 2 Valve cover | 5 Screws on output module (3x) |
| 3 Screws on exhaust manifold (4x) | |

- ▶ Replace seal on the exhaust manifold.
- ▶ Position screws on the exhaust manifold 3.
- ▶ Position screws on the input module 4.
- ▶ Position screws on the output module 5.
- ▶ Tighten screws on the exhaust manifold 3 to a tightening torque of 49 ± 4.9 Nm.
- ▶ Tighten screws on the output module 5 to a tightening torque of 49 ± 4.9 Nm.
- ▶ Tighten screws on the input module 4 to a tightening torque of 49 ± 4.9 Nm.
- ▶ Connect the electrical cables on the diesel particulate filter 1.
- ▶ Start diesel engine and let it run for 3 minutes at medium idling speed.



WARNING

Rotating parts!
Risk of injury.

- ▶ Do not touch rotating parts of the engine.



WARNING

Hot components!
Risk of injury.

- ▶ Do not touch components of the exhaust system and the engine.

- ▶ Check that valve cover and valve cover seal do not leak.

- ▶ Turn off diesel engine.

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Installing the main element

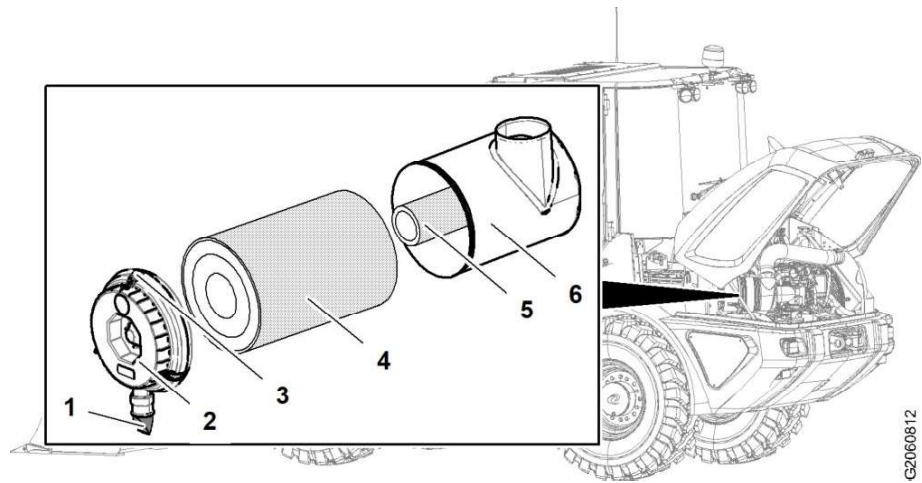


Fig. 136: Installing the main element

- | | | | |
|---|----------------------|---|----------------|
| 1 | Dust discharge valve | 4 | Main element |
| 2 | Service cover | 5 | Safety element |
| 3 | Fixing clips | 6 | Filter housing |

- ▶ Lightly oil the sealing face of the main element 4.
- ▶ Install the main element 4.
- ▶ Put the clean service cover 2, with the dust discharge valve 1 facing down, on the filter housing 6.
- ▶ Close the fixing clips 3.



Note

If *air filter contamination* symbol lights up again a few operating hours after main element has been cleaned:

- ▶ Change main element.



Note

If *air filter contamination* symbol remains lit after main element has been changed:

- ▶ Change safety element.

030.4.4.14 Changing the safety element of the air filter system

Valid for: L508-1817;

NOTICE

Always carry out maintenance correctly.
Damage to the engine.

- ▶ Do not clean the safety element.
- ▶ Only replace the safety element.

Make sure that following requirements are met:

- Machine is in maintenance position 1.
- Service access is open.

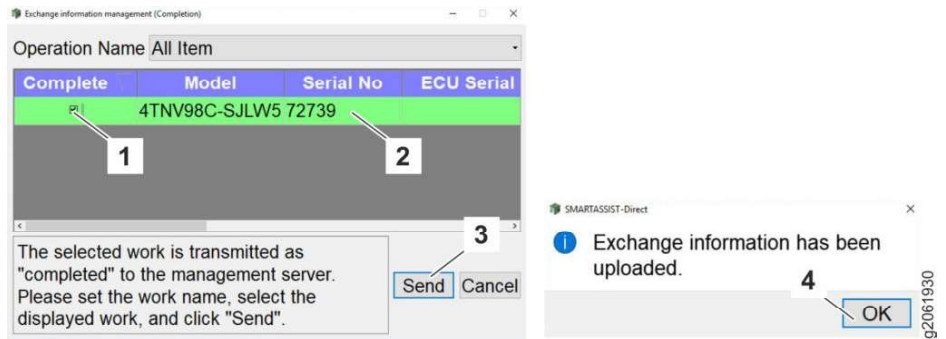


Fig. 147: Sending data to Yanmar server

- 1 Checkbox
- 2 Data record
- 3 "Send" function
- 4 "OK" function

- ▶ Select Checkbox 1 for data record 2 of corresponding diesel engine.
- ▶ Select "Send" function 3.
 - ▷ Data is sent to Yanmar server.
- ▶ Select "OK" function 4.
 - ▷ Sending data to Yanmar server is completed.

030.4.5 Cooling system

030.4.5.1 Checking coolant level in cooling system

Valid for: L508-1817;

Make sure that following requirements are met:

- Machine is in maintenance position 1.
- Service access is open.
- Diesel engine has cooled down.

Checking coolant level

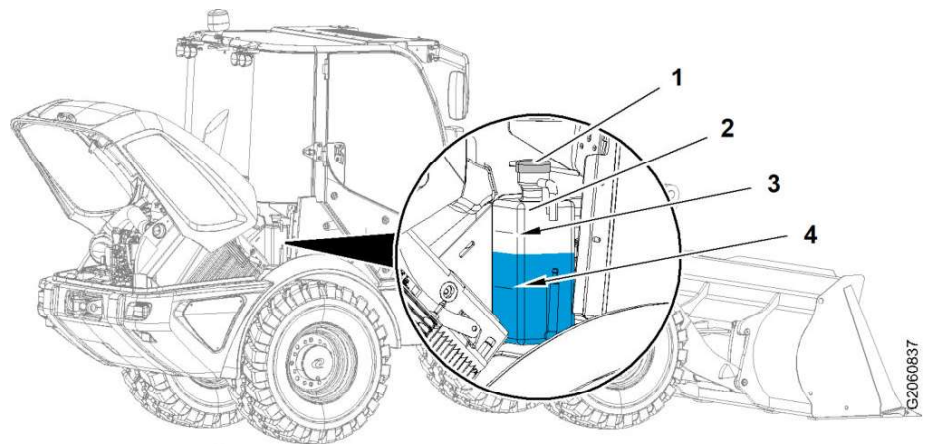


Fig. 148: Checking the coolant level

- 1 Equalising reservoir cap
- 2 Equalising reservoir
- 3 Maximum coolant level
- 4 Minimum coolant level

- ▶ Check coolant level in equalising reservoir 2.
 - ▷ The coolant level must be between the maximum 3 and minimum 4.

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NOTICE

Incorrect cleaning!
Damage to diesel engine.

- ▶ When cleaning with engine bonnet open, close opening to air filter system so is it watertight.

NOTICE

Incorrect cleaning!
Damage to the cooling system.

- ▶ Do not use hard objects or excessive water pressure.

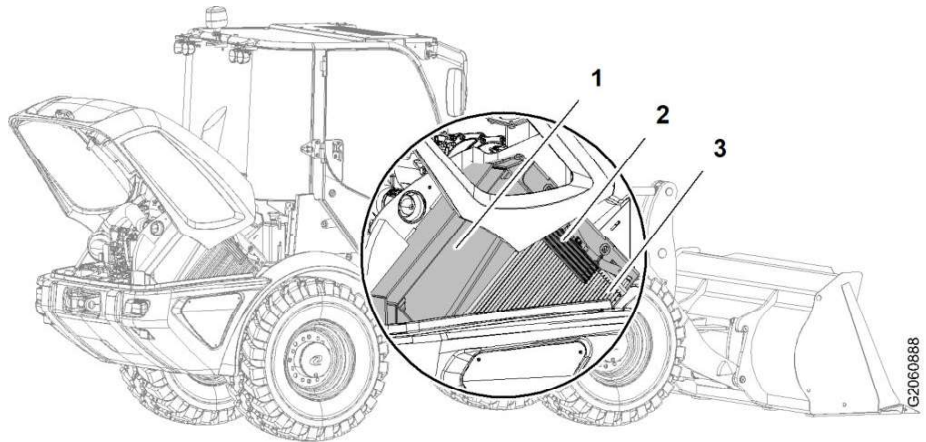


Fig. 157: Cleaning cooling system

- | | | | |
|---|-------------|---|-------------------------|
| 1 | Cooler unit | 3 | Condenser unit (option) |
| 2 | Fuel cooler | | |

- ▶ Clean cooler units 1, fuel cooler 2 and condenser unit 3 with a high-pressure cleaner or compressed air.

030.4.5.4 Cooling system: changing coolant

Valid for: L508-1817;

Make sure the following preconditions are met:

- Machine is cold.
- Machine is in maintenance position 1.
- Service access is open.

Make sure that following tools are ready:

- Drain hose
- Receptacle (12 l)

Make sure that following consumables are ready:

- Coolant as specified in table. (For more information see: 030.2.2 Fuel and operating fluid filling quantity, page 030-13)

**Note**

Information on coolant specification:

- ▶ See "Lubricants and fuels: Diesel engine coolants". (For more information see: 030.3.7 Coolant, page 030-17)

- ▶ Mount guard **5** with fastening bolts **4**.
- ▶ Top up oil.

Topping up oil

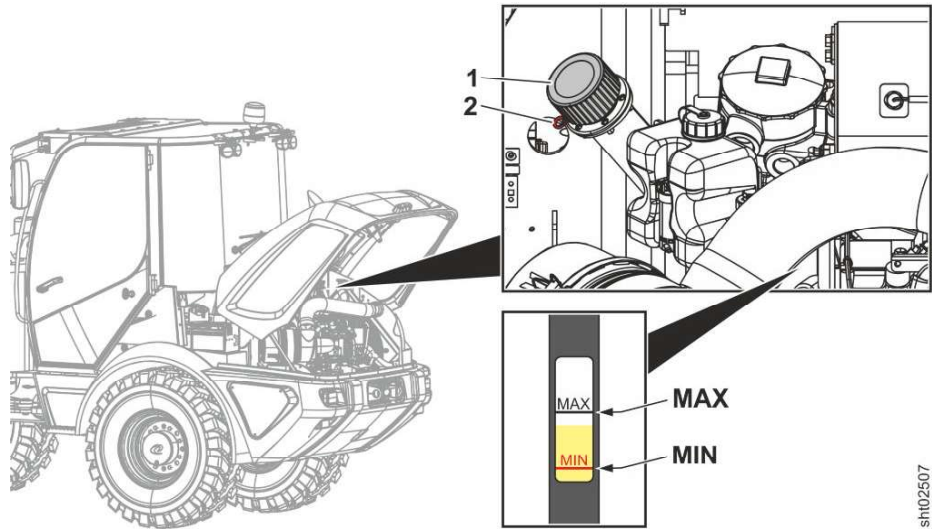


Fig. 167: Topping up oil

- | | |
|--|---|
| <p>1 Breather filter with filler strainer</p> <p>2 Plug connection</p> | <p>MIN Minimum oil level</p> <p>MAX Maximum oil level</p> |
|--|---|

NOTICE

Contamination in hydraulic oil!
Damage to hydraulics.

- ▶ Always top up oil through filler strainer into hydraulic tank.

- ▶ Fill oil through filler strainer **1** into hydraulic tank up to maximum oil level **MAX**.
- ▶ Screw on breather filter **1** and tighten it.
- ▶ Start diesel engine.
- ▶ At medium engine speed, operate all functions of working hydraulics to their furthest extent.
 - ▷ Oil is circulated.
- ▶ Put machine in maintenance position 1.
- ▶ Unscrew bleeder filter **1**.
- ▶ Fill oil through filler strainer **1** into hydraulic tank until oil level is between minimum **MIN** and maximum **MAX**.
- ▶ Screw on breather filter **1** and tighten it.
- ▶ Pull out plug connection **2** and keep it in a safe place.
 - ▷ Breather filter **1** is protected from accidental opening.

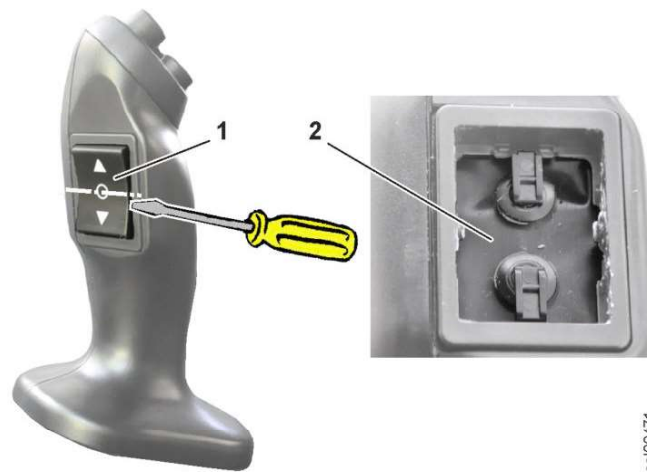


Fig. 178: Changing the travel direction switch

1 Rocker

2 Seal

NOTICE

Thin seal!
Damage to the seal.

▶ Do not put in the screwdriver more than 5 mm.

-
- ▶ Insert tip of a small screwdriver between rocker **1** and travel direction switch below the central axis.
 - ▶ Prise out rocker.
 - ▶ Check seal **2** for damage.

If seal is damaged:

- ▶ Replace travel direction switch.
- ▶ Fit a new rocker on the travel direction switch.

Changing push button covering (option)

Make sure the following preconditions are met:

- Machine is in maintenance position 1.

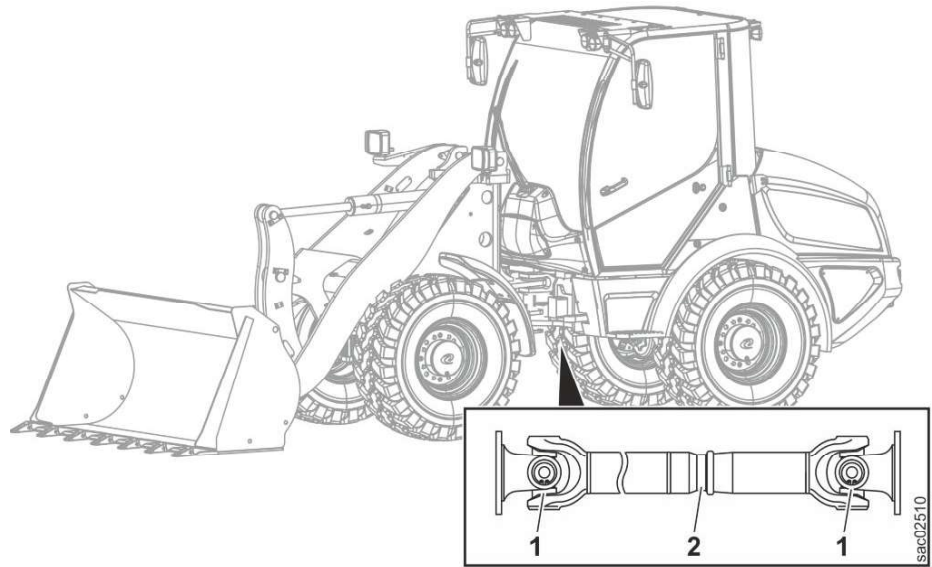


Fig. 188: Checking drive shafts

- 1 Universal joint (2x)
- 2 Extension

► Check drive shaft for play in universal joints 1 and extension 2.



Note

There may not be any play at all in universal joints and extension.

If there is play in a universal joint 1 or extension 2:

► Replace drive shaft.

030.4.11.5 Tyres: checking tyre pressure

Valid for: L508-1817;

Make sure the following preconditions are met:

- Machine is in maintenance position 1.
- You have the recommended tyre pressures from the manufacturer or dealer at hand.

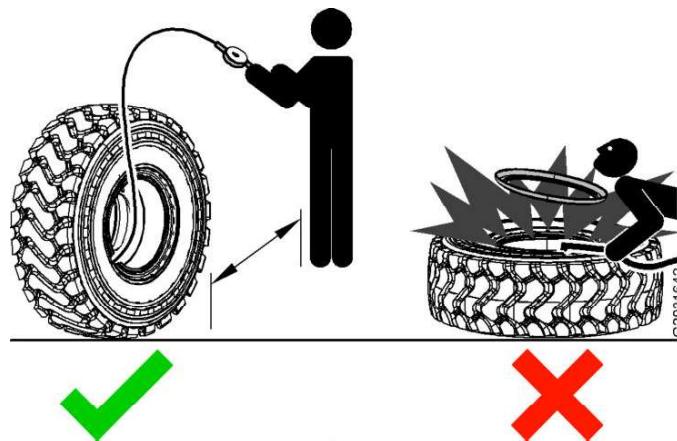


Fig. 189: Tyres: checking tyre pressure

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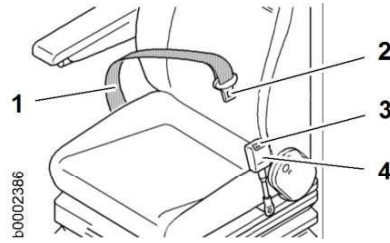


Fig. 200: Safety belt: checking condition and function

- | | | | |
|---|-------|---|---------------|
| 1 | Strap | 3 | Unlock button |
| 2 | Lug | 4 | Belt lock |

- ▶ Check operator's seat safety belt for proper function and damage.
- ▶ Replace damaged parts.

030.4.14.4 Windscreen washer system: testing

Valid for: L508-1817;

Make sure that following requirements are fulfilled:

- The machine is parked in a safe place.
- The electrical system of the machine is switched on.

To check the front windscreen washer system:

- ▶ Activate the windscreen washer system using the steering column switch.
 - ▷ Washer fluid is squirted onto the front windscreen.
 - ▷ The windscreen wiper is switched on.

To check rear windscreen washer system:

- ▶ Activate the windscreen washer system using the switch.
 - ▷ Washer fluid is sprayed onto the rear windscreen.
 - ▷ The windscreen wiper is switched on.

030.4.14.5 Windscreen washer system: filling windscreen washer fluid

Valid for: L508-1817;

Make sure that following requirements are fulfilled:

- Machine is in maintenance position 1.
- Service access is open.

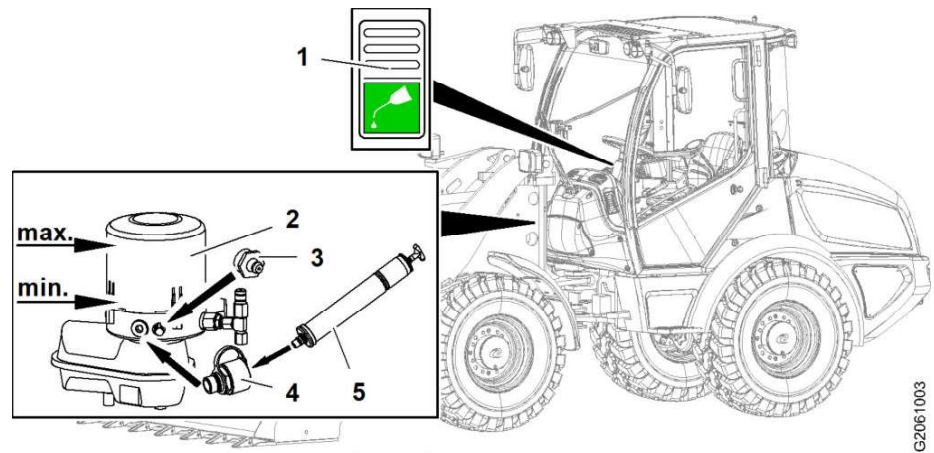


Fig. 211: Central lubrication system: checking level in grease reservoir

- | | | | |
|---|-----------------------------------|---|---------------------------------|
| 1 | Central lubrication system button | 4 | Filling coupling (fast filling) |
| 2 | Grease reservoir | 5 | Fast filling pump |
| 3 | Grease fitting | | |

- ▶ Visually check the level in the grease reservoir 2.
 - ▷ It must be within the minimum and maximum lubricant levels.



Note

Mixing of lubricant greases!
Malfunction in central lubrication system.

- ▶ Ensure proper miscibility of lubricant greases.
- ▶ If necessary, contact **Liebherr Lubricant Hotline**.

NOTICE

Dirty grease reservoir!
Damage to the central lubrication system.

- ▶ Pay attention to cleanliness when filling the grease reservoir.

To fill grease reservoir:

- ▶ Fill grease reservoir via grease fitting 3.

or

for rapid filling, connect the fast filling pump 5 to the filling coupling 4.

030.4.15.2 Central lubrication system: checking pipes, hoses and lubrication points for leaks and damage.

Valid for: L508-1817;

This equipment is optional.

Make sure the following preconditions are met:

- Machine is in maintenance position 2.

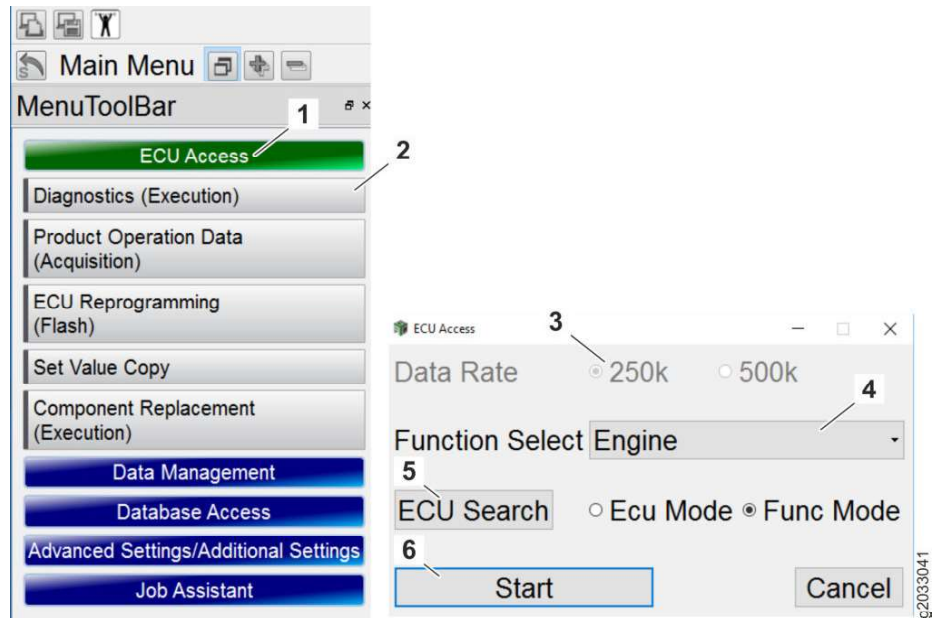


Fig. 216: Connect the SMARTASSIST-Direct diagnostics software to the diesel engine.

- | | | | |
|---|----------------------------------|---|---------------------|
| 1 | ECU Access tab | 4 | Engine function |
| 2 | Diagnostics (Execution) function | 5 | ECU Search function |
| 3 | Data Rate function | 6 | Start function |

- ▶ Select the ECU Access tab 1.
- ▶ Select the Diagnostics (Execution) function 2.
- ▶ For the Data Rate function 3 select a connection speed of 250k.
- ▶ Select the Engine function 4.
- ▶ Select the ECU Search function 5.
 - ▷ A connection is made to the engine control unit (ECU).
- ▶ Select the Start function 6.
 - ▷ The "Diagnostics" screen opens.

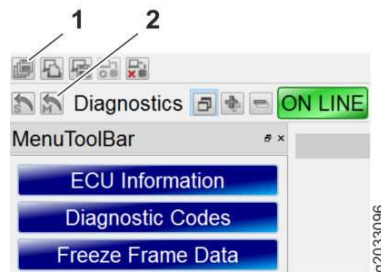


Fig. 217: "Diagnostics" screen

- | | | | |
|---|------------------------|---|--------------------|
| 1 | ECU DATA SAVE function | 2 | Main Menu function |
|---|------------------------|---|--------------------|

- ▶ Select the ECU DATA SAVE function 1.
 - ▷ Data is loaded by the engine and saved internally in the SMARTASSIST-Direct diagnostic software.
- ▶ Select the Main Menu function 2.
 - ▷ The "Main Menu" screen opens.

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Fig. 233: Transferring setting data of old engine control unit

- | | | | |
|---|----------------------------|---|---|
| 1 | Write (PC to ECU) function | 4 | Setting data of old engine control unit |
| 2 | Old ECU data function | 5 | Next function |
| 3 | Next function | | |

- ▶ Select Write (PC to ECU) function 1.
- ▶ Select Old ECU data function 2.
- ▶ Select Next function 3.
- ▶ Select setting data of old engine control unit 4.
- ▶ Select Next function 5.

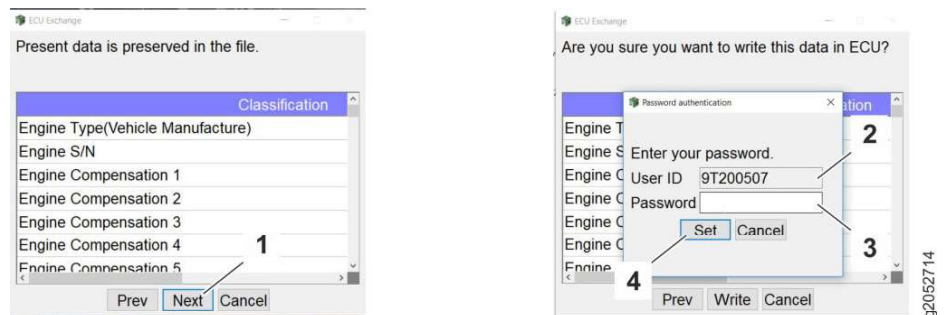


Fig. 234: Transferring setting data of old engine control unit

- | | | | |
|---|---------------|---|--------------|
| 1 | Next function | 3 | Password |
| 2 | User number | 4 | Set function |

- ▶ Select Next function 1.

For security reasons, transmission of setting data must be confirmed by entering password 3.

- ▶ Enter password 3.
- ▶ Select Set function 4.
 - ▷ Setting data is transferred.

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- ▶ Check the routing of the hydraulic line, correct if necessary.

If the condition deteriorates:

- ▶ Replace the hydraulic lines.

Moist surfaces, no visible oil leak

Moist spots can be seen on the surface. An oil leak or oil drops are not visible. As long as you do not observe an obvious oil leak, it is classified as minor damage.



Fig. 242: Moist surfaces, no visible oil leak

- ▶ Document the damage and observe whether the condition deteriorates.

If the condition deteriorates:

- ▶ Replace the hydraulic lines.

Medium damage to the hydraulic lines

Cracks or cuts up to the steel fabric or steel fabric exposed due to damage to the outer jacket

The damage to the outer jacket (such as cracks, cuts or abrasions) through which the steel fabric is exposed is classified as medium damage if the steel fabric is undamaged. Damage to the steel fabric is classified as severe damage.

- ▶ Connect a pressure gauge (600 bar) to high pressure test connection **MH** on travel pump.
- ▶ Start diesel engine.

**DANGER**

Unintentional movement of the machine!
Fatal injury.

- ▶ Make sure there is nobody in danger area.
- ▶ Be ready to brake.

- ▶ Select forward travel direction.
- ▶ Carefully increase diesel engine speed until travel high pressure **MH** is exactly 400 bar.
- ▶ Check that diesel engine speed matches specified value.

Description	Unit	Value
Engine speed at high pressure of 400 bar	rpm	1650 ± 100

If required value is not reached:

- ▶ Turn off diesel engine and take out ignition key.
- ▶ Adjust eccentric adjusting screw **1**.

**Note**

Position of control lens **5** is adjusted with cam **2** of eccentric adjusting screw **1**.

- ▶ Check position of cam **2** using monitoring groove **4**.

- ▶ Repeat check and adjustment until required value is reached.

If required value is reached:

- ▶ Turn off diesel engine and take out ignition key.
- ▶ Disconnect pressure gauge from high pressure test connection **MH**.

030.6.6.5 Travel pump: high pressure relief valves

Valid for: L508-1817;

**Note**

Opening pressure of high pressure relief valves is above opening pressure of pressure cut-off.

- ▶ Before testing, set pressure cut-off to a higher value. (For more information see: [Preparations, page 030-186](#))

Make sure that following requirements are fulfilled:

- Hydraulic oil is at operating temperature.
- Machine is in maintenance position for adjustment procedures.
- Machine is in blocked condition.
- Service access is open.

Make sure that following tools are ready:

- Laptop with Sculi diagnostic software
- Pressure gauge (600 bar)

To save the setting:

- ▶ Press the button for 1 second in save mode:
 - ▷ The setting is saved.

After setting the service hours:

- ▶ Attach the rubber sleeve **2**.
- ▶ Mount the display.

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2.8 Oil pump

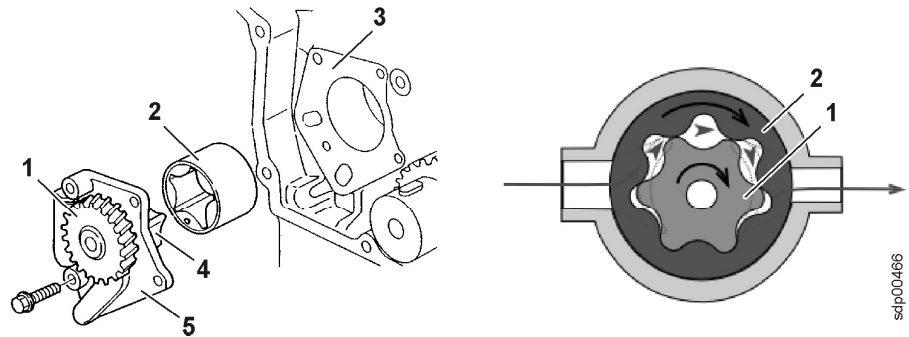


Fig. 265: Oil pump

- | | | | |
|---|----------------------|---|---------------|
| 1 | Drive gear | 4 | Internal gear |
| 2 | Outer gear rim | 5 | Cover plate |
| 3 | Transmission housing | | |

Oil pump is situated in front transmission housing 3. It is driven by same transmission as camshaft and fuel injection pump.

Oil pump is an internal gear pump. Oil flows between internal gear 4 and outer gear rim 2. Teeth of internal gear mesh with those of outer gear rim. This displaces oil and builds up pressure.

040.1.4.3 Vacuum switch for air filter

Valid for: L508-1817;

1.1 Layout

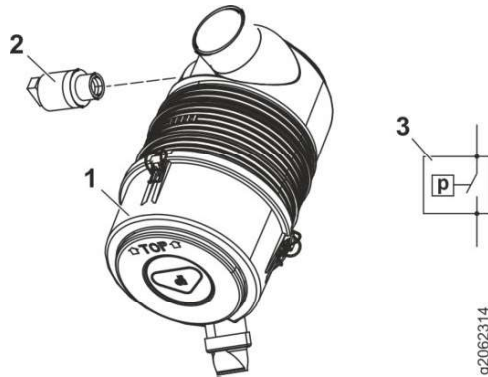


Fig. 276: Vacuum switch for air filter with symbol

- | | | | |
|---|---------------------------------|---|--------|
| 1 | Air filter | 3 | Symbol |
| 2 | Vacuum switch for air filter B4 | | |

Air filter vacuum switch 2 is fitted on air filter 1.

2.1 Function



Air filter vacuum switch 2 monitors pressure behind air filter 1 and is an N/O contact. It triggers air filter contamination symbol in display when filters are dirty (excessive vacuum detected).

When there is neutral pressure, vacuum switch is open and closes when vacuum reaches 54 mbar.

040.1.5 Exhaust system

050.2 Cooler

050.2.1 Water cooler

Valid for: L508-1817;

1 Layout

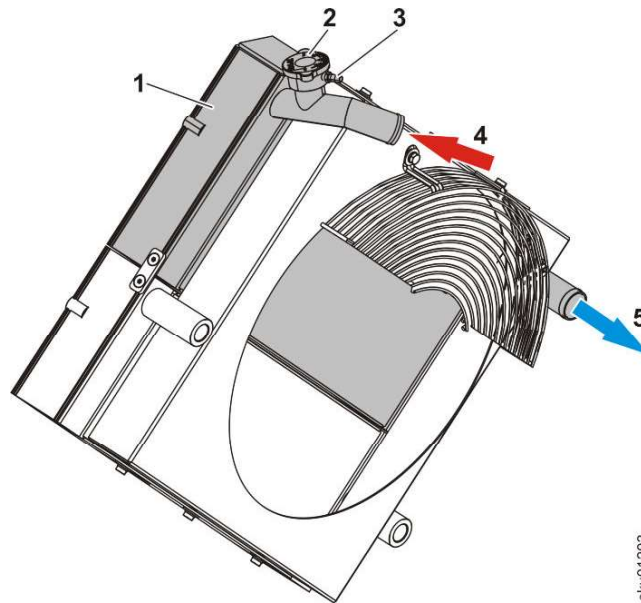


Fig. 293: Water cooler

- | | | | |
|---|---------------------------------|---|--------------|
| 1 | Water cooler | 4 | Thermostat |
| 2 | Cooler cover | 5 | Coolant pump |
| 3 | Equalising reservoir connection | | |

The water cooler 1 is integrated in the cooler mount.

A serpentine pipe runs through the water cooler to which the cooler fins are attached. The surface of the pipe is thereby increased and the cooling output accordingly improved.

The cooler cover 2 and the equalising reservoir 3 are located at the highest point.

2 Function

2.1 Basic function

When the coolant temperature reaches 71 °C, the thermostat 4 opens. When the coolant temperature reaches 85 °C, the thermostat is completely opened. The hot coolant flows through the water cooler 1.

The fan draws ambient air in through the water cooler. The cooler fins transfer the heat from the coolant into the air.

The water pump 5 draws in the cooled coolant once more.

2	Breather filter	25	Working pump	50	Secondary pressure relief valve for tilting in
3	Fine filter	26	Gear pump	51	Secondary pressure relief valve for tilting out
4	Outlet valve 0.35 bar	27	Priority valve	52	Lift cylinder load retaining valve
5	Inlet valve 0.03 bar	28	Throttle 1	53	Lift cylinder spool valve
6	Filler strainer 800 µm	29	Fine filter	54	Mechanical lock of working hydraulics lockout
7	Return suction filter	30	Throttle 2	55	Mechanical lock of float position
8	Temperature valve	31	Throttle 3	56	Secondary pressure relief valve for lifting
9	Throttle	32	Load sensing signal from servostat	57	Feeder valve for lowering
10	Filter element 10 µm	33	Oil supply to servostat	58	Lift cylinder
11	Strainer for replenishing pump	34	Travel pump	60	Stabilization module (option)
12	Preload valve 0.5 bar	35	Diesel engine	61	Ride control valve spool
13	Feeder valve	40	Control block	62	Throttle check valve
14	Bypass valve 2.5 bar	41	Primary pressure relief valve	63	Ride control solenoid valve
15	Steel tank	42	Load retaining valve for 3rd function	64	Safety valve
16	Sight glass for hydraulic oil level	43	Spool valve for 3rd function	65	Hydro accumulator relief valve
17	Hydraulic oil drain valve	44	Secondary pressure relief valve for 3rd function A1	66	Ride control hydro accumulator
18	Replenishing pump suction port	45	Secondary pressure relief valve for 3rd function B1	67	Tilt cylinder
19	Travel pump leak oil	46	Tilt cylinder load retaining valve	68	Quick coupler for 3rd function (2x)
20	Return flow from inching valve	47	Tilt cylinder spool valve	69	Open solenoid valve for quick coupler
21	Return flow from servostat	48	Mechanical lock of working hydraulics lockout	70	Quick coupler locking hydraulic cylinder

Name	Test point
PA	Working hydraulics high pressure

Tab. 87: Test points

BMK	Function	BMK	Function	BMK	Function
B8	Hydraulic oil temperature sensor	S2a.X 103	Retaining magnet for working hydraulics lockout (tilt cylinder)	Y20	Solenoid for ride control
S2a.X 102	Retaining magnet for working hydraulics lockout (lift cylinder)	S2a.X 104	Retaining magnet for control lever lock (option)	Y53	Solenoid for opening quick coupler

Tab. 88: Equipment codes

Working hydraulics is an open circuit. This means that, after leaving the consumer, the oil flows to the hydraulic tank rather than directly back to the pump.

BMK	Function	BMK	Function	BMK	Function
S2a.X 102	Retaining magnet for working hydraulics lockout (lift cylinder)	S2a.X 103	Retaining magnet for working hydraulics lockout (tilt cylinder)	S2a.X 104	Retaining magnet for control lever lock (option)

Tab. 91: Equipment codes

Control valve block is installed behind cover on right of operator's cab.

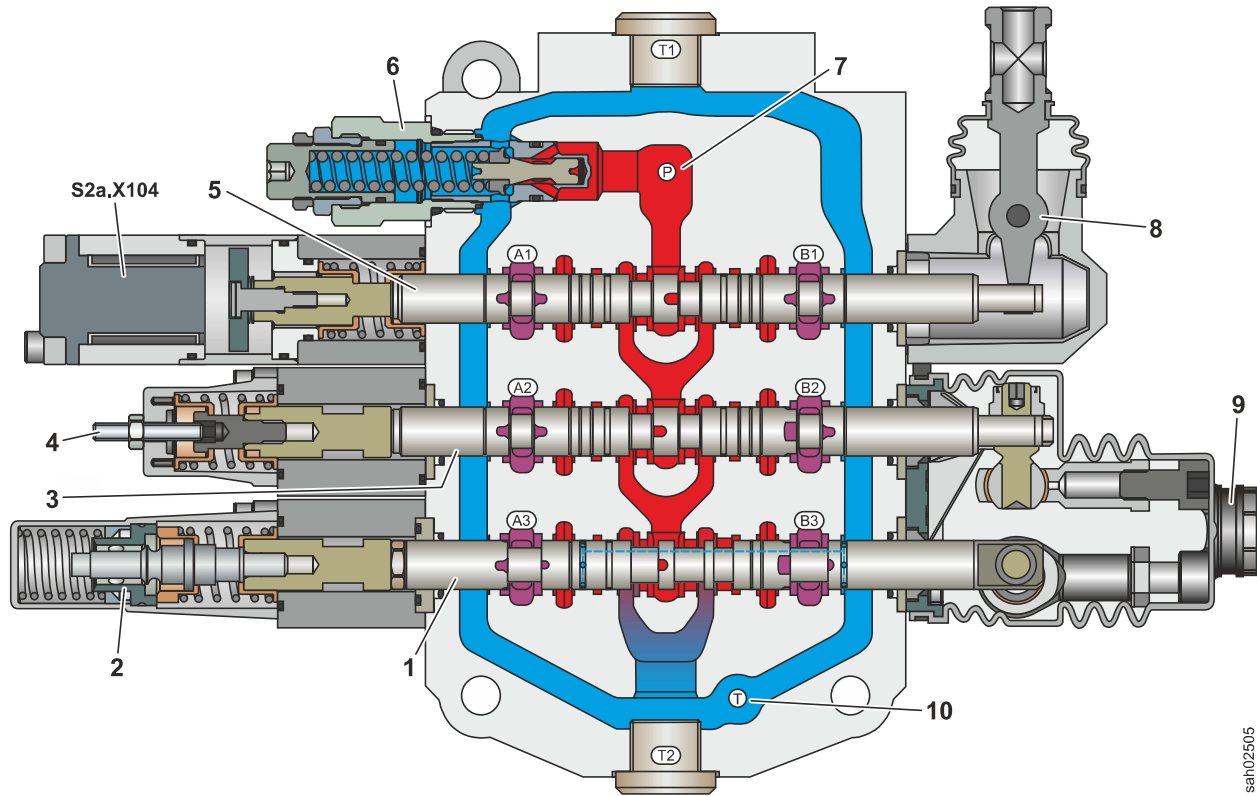


Fig. 310: Control block: sectional view

- | | | |
|--|---|--|
| 1 Lift cylinder spool valve | 5 Spool valve for 3rd function | 9 Linkage by control lever |
| 2 Mechanical lock for float position | 6 Mechanical lock for working hydraulics lockout | 10 Return flow to return suction filter |
| 3 Tilt cylinder spool valve | 7 Oil supply from working pump | |
| 4 Tilt-out speed adjusting screw (option) | 8 Linkage by additional control lever | |

BMK	Function
S2a.X 104	Retaining magnet for control lever lock (option)

Tab. 92: Equipment codes

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module 6 connects piston side of lift cylinder to ride control hydro accumulator 12. Nitrogen filling in ride control hydro accumulator 12 cushions shocks.

060.6.2 Stabilization module

Valid for: L508-1817;

1 Layout

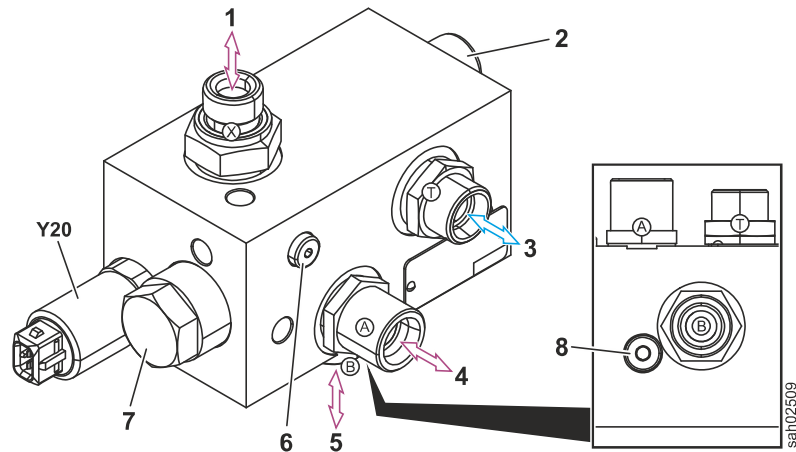


Fig. 323: Stabilization module (from front left)

- | | | | |
|---|--|---|--|
| 1 | Ride control hydro accumulator connection | 5 | Connection to ring side of lift cylinder |
| 2 | Safety valve | 6 | Hydro accumulator relief valve |
| 3 | Return flow to return suction filter | 7 | Ride control valve spool |
| 4 | Connection to piston side of lift cylinder | 8 | Throttle check valve |

BMK	Function
Y20	Solenoid for ride control

Tab. 100: Equipment codes

Stabilisation module is fitted in front section below lift cylinder.

BMK	Function	BMK	Function
S2a.X103	Retaining magnet for working hydraulics lockout (tilt cylinder)	Y203a	Proportional solenoid for 3rd function B1

Tab. 110: Equipment codes

Control valve block is installed behind cover on right of operator's cab.

2 Function

2.1 Basic function

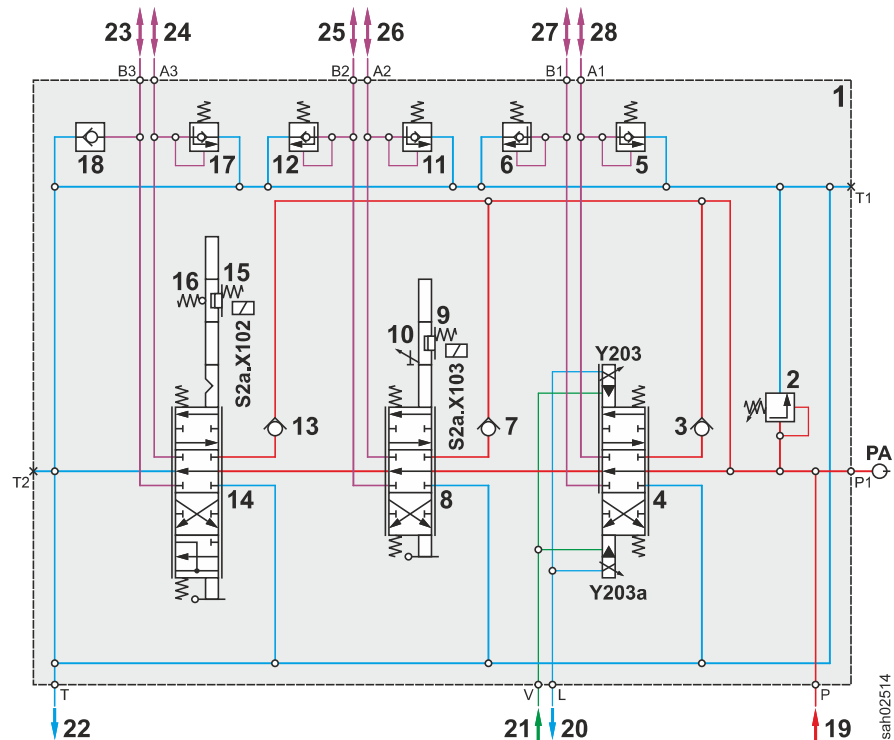


Fig. 333: Control block for 3rd function with electrohydraulic pilot control: hydraulic diagram (diesel engine running)

- | | |
|---|---|
| 1 Control block for 3rd function with electrohydraulic pilot control | 15 Mechanical lock of working hydraulics lockout |
| 2 Primary pressure relief valve | 16 Mechanical lock of float position |
| 3 Load retaining valve for 3rd function | 17 Secondary pressure relief valve for lifting |
| 4 Spool valve for 3rd function | 18 Feeder valve for lowering |
| 5 Secondary pressure relief valve for 3rd function A1 | 19 Oil supply from working pump |
| 6 Secondary pressure relief valve for 3rd function B1 | 20 Control oil return flow to hydraulic tank |
| 7 Tilt cylinder load retaining valve | 21 Control oil from replenishing pump |
| 8 Tilt cylinder spool valve | 22 Return flow to return suction filter |
| 9 Mechanical lock of working hydraulics lockout | 23 Connection to ring side of lift cylinder |

See next page for continuation of the image legend

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060.10 Pipe break protection

060.10.1 Pipe break protection: overview

Valid for: L508-1817;

This equipment is optional.

1 Layout

Pipe break protection consists of following components:

- One valve block for pipe break protection on each hydraulic cylinder of working hydraulics ([For more information see: 060.10.2 Valve block for pipe break protection, page 060-50](#))
- Pressure switch for pipe break protection

070.2 Travel pump

Valid for: L508-1817;

1 Layout

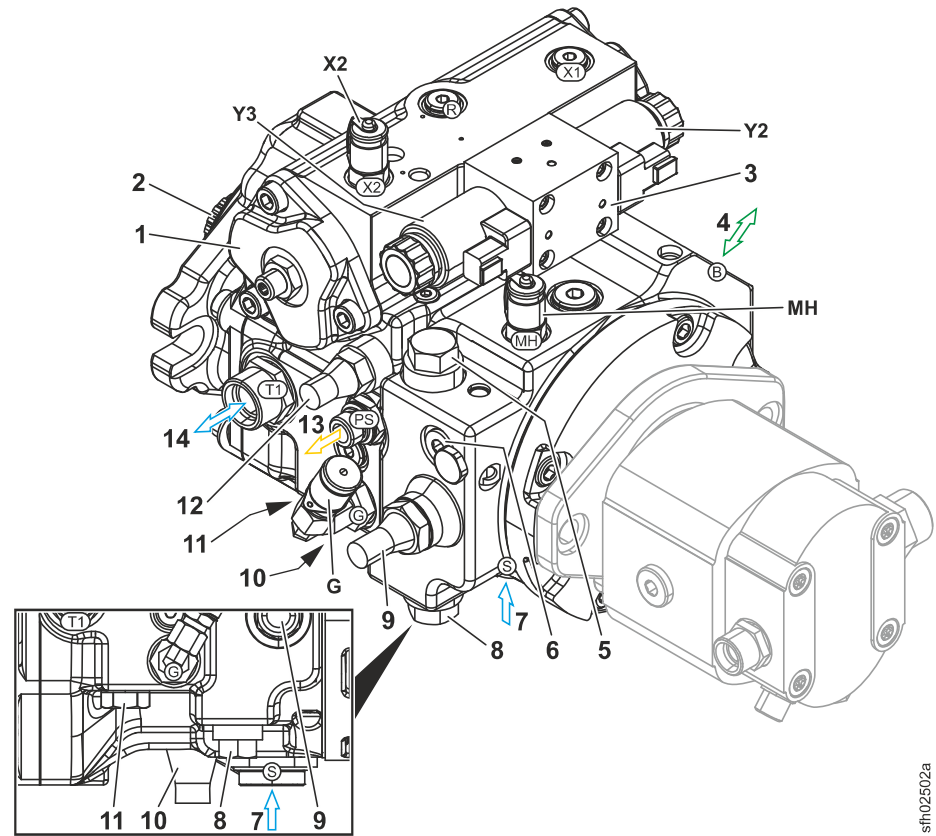


Fig. 344: Travel pump (from front left)

- | | |
|---|---|
| <ul style="list-style-type: none"> 1 Positioning piston 2 Drive shaft 3 Valve block for travel direction 4 Oil supply for travel motor (forward travel direction high pressure) 5 Forward travel direction high pressure relief valve 6 Shuttle valve and bypass for towing 7 Suction port of replenishing pump of return suction filter | <ul style="list-style-type: none"> 8 Reverse travel direction high pressure relief valve 9 Control valve 10 Eccentric adjusting screw 11 Replenishing pressure relief valve 12 Pressure cut-off valve 13 Control pressure for travel motor and inching valve 14 Leak oil to travel motor |
|---|---|

Name	Test point	Name	Test point	Name	Test point
G	Replenishing pressure	MH	Travel pump high pressure	X2	Control pressure for forward travel direction

Tab. 128: Test points

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2.5 Positioning piston and travel direction valve

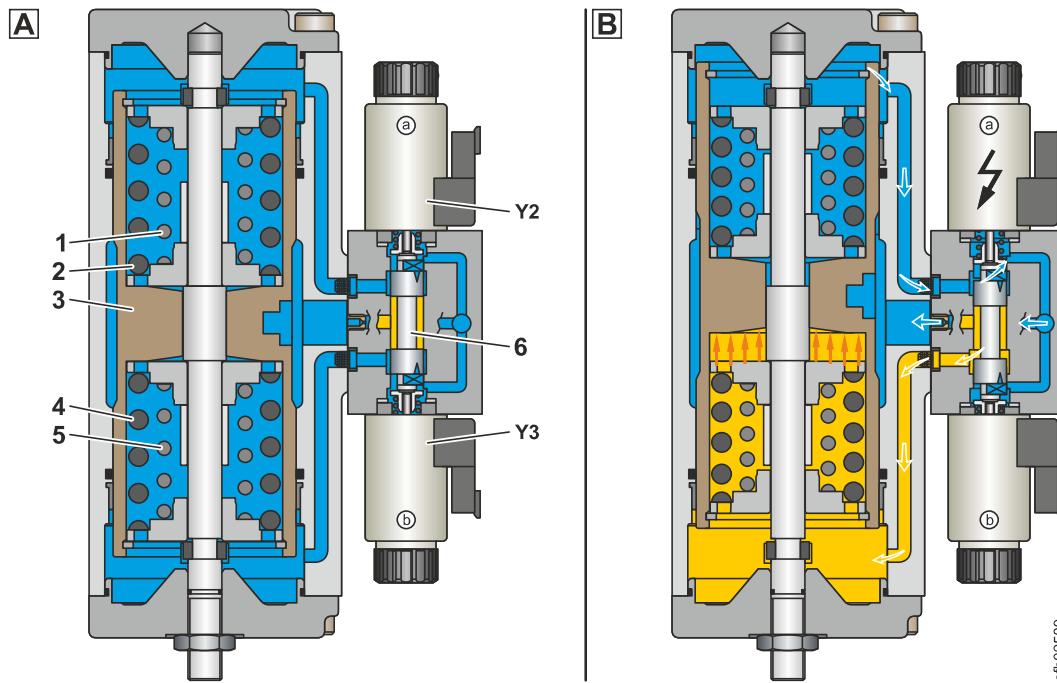


Fig. 354: No travel direction selected / forward travel direction selected

- | | | | | | |
|---|--------------------|---|--------------------|---|------------------------|
| 1 | Compression spring | 3 | Positioning piston | 5 | Compression spring |
| 2 | Compression spring | 4 | Compression spring | 6 | Travel direction valve |

BMK	Function	BMK	Function
Y2	Forward travel direction solenoid	Y3	Reverse travel direction solenoid

Tab. 135: Equipment codes

The positioning piston **3** moves the swivel plate out of zero position. To this end, pressure is applied to one side of positioning piston **3** by the travel direction valve **6**, depending on the selected travel direction. The other side of positioning piston is depressurised via the travelling direction valve toward the pump housing.

If no travel direction is selected, the compression springs hold the positioning piston **3** in the zero position.

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2.3 Speed-dependent regulation (DA regulation)

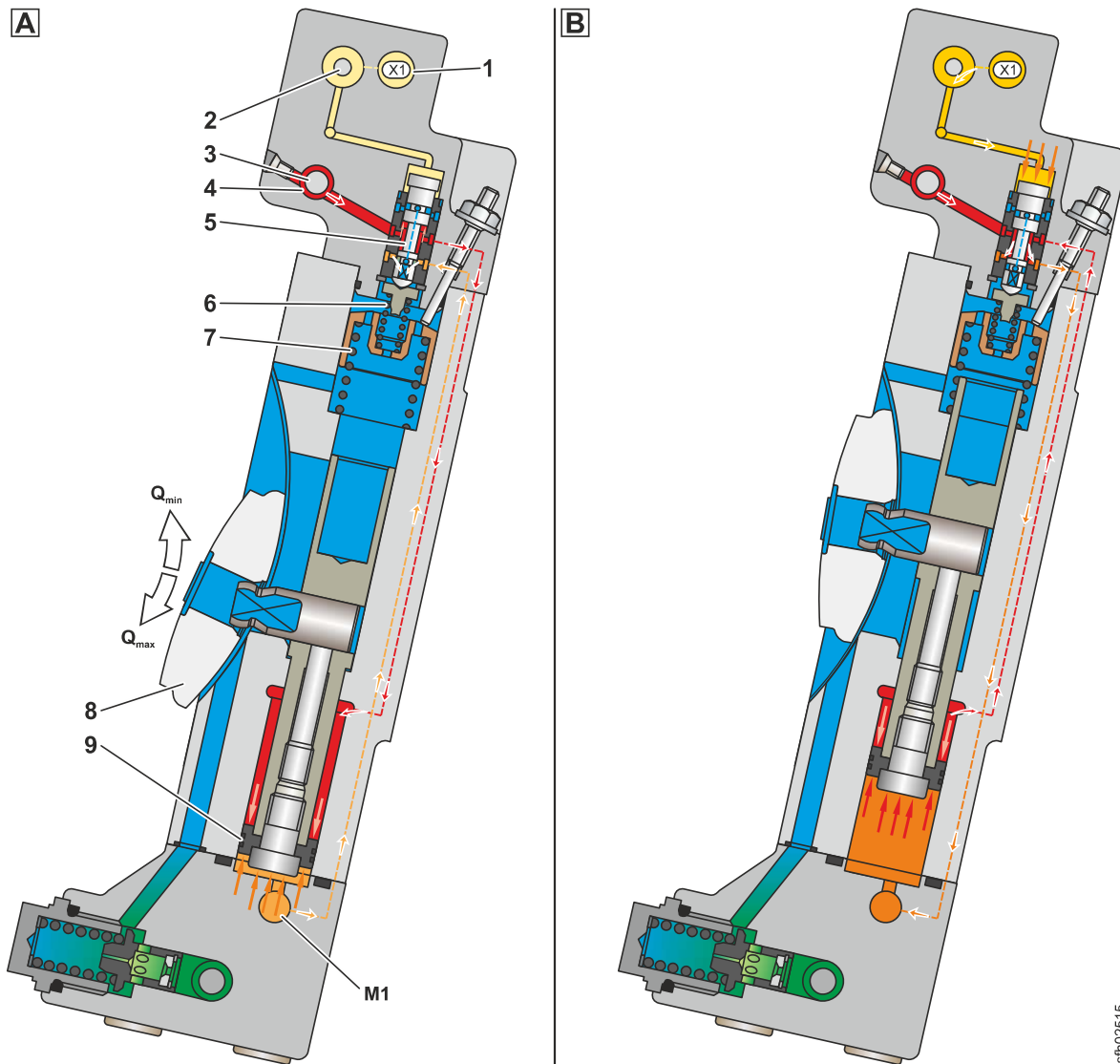


Fig. 363: Travel motor is at maximum swivel angle / travel motor regulates to smaller swivel angle

- | | | |
|---------------------------------------|---------------------|----------------------|
| 1 Control pressure from travel pump | 4 High pressure | 7 Readjusting spring |
| 2 Solenoid valve for 1st travel range | 5 Spool | 8 Control lens |
| 3 Travel direction solenoid valve | 6 Regulating spring | 9 Positioning piston |

Name	Test point
M1	Travel motor servo pressure

Tab. 142: Test points

Travel pump generates control pressure 1 based on diesel engine speed. (For more information see: [Speed-dependent regulation \(DA regulation\)](#), page 070-16)

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5	Sight glass for hydraulic oil level	15	Main brake cylinder	25	Tilt cylinder
6	Hydraulic oil drain valve	16	Inching valve	26	Quick coupler for 3rd function (2x)
7	Hydraulic oil cooler	17	Drum brake	27	Open solenoid valve for quick coupler
8	Diesel engine	18	Equalising reservoir	28	Quick coupler locking hydraulic cylinder
9	Working pump	19	Filler strainer	29	Servostat
10	Travel pump	20	<i>Parking brake</i> lever	30	Steering cylinder

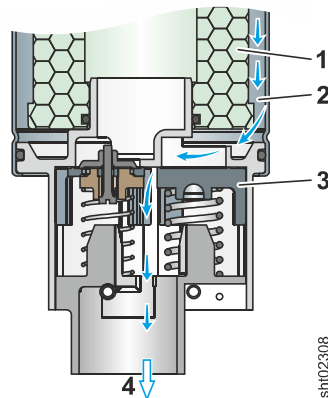
Name	Test point	Name	Test point	Name	Test point
G	Replenishing pressure	M1	Travel motor servo pressure	X2	Control pressure for forward travel direction
MH	Travel pump high pressure	PA	Working hydraulics high pressure		

Tab. 146: Test points

BMK	Function	BMK	Function	BMK	Function
B5	Switch for parking brake	S2a.X 103	Retaining magnet for working hydraulics lockout (tilt cylinder)	Y6	Travel range 1 solenoid
B8	Temperature switch for hydraulic oil	S2a.X 104	Retaining magnet for control lever lock (option)	Y20	Solenoid for ride control
B12	Brake light pressure switch	Y2	Forward travel direction solenoid	Y26	Travel direction solenoid (travel motor)
S2a.X 102	Retaining magnet for working hydraulics lockout (lift cylinder)	Y3	Reverse travel direction solenoid	Y53	Solenoid for opening quick coupler

Tab. 147: Equipment codes

2.4 Bypass valve



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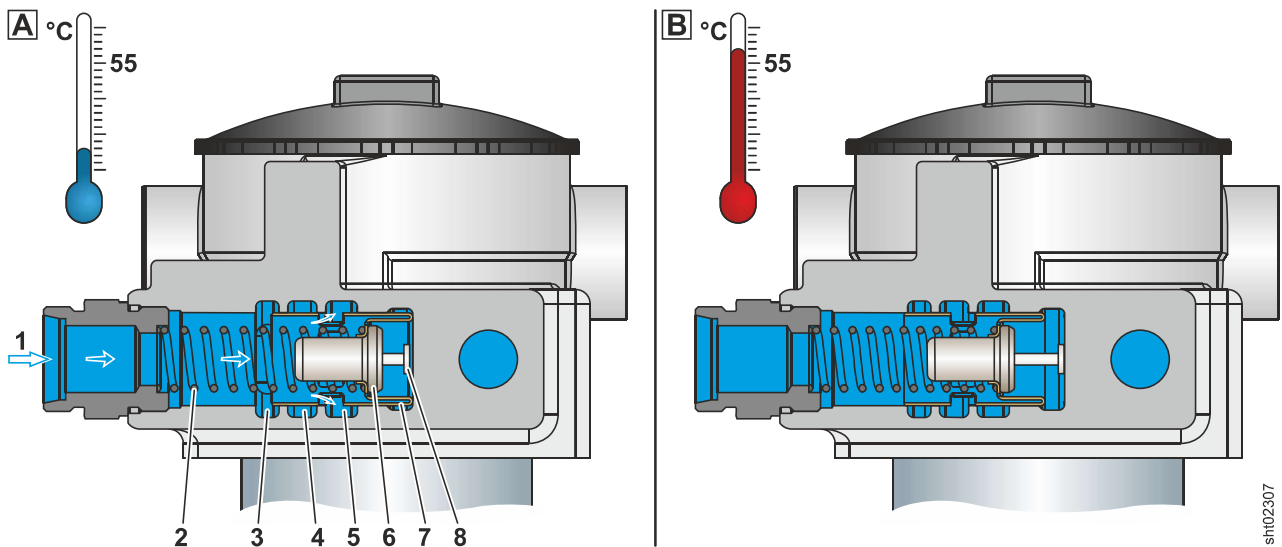
Fig. 378: Bypass valve

- | | | | |
|---|----------------------|---|--------------------------|
| 1 | Filter element 10 µm | 3 | Bypass valve |
| 2 | Filter housing | 4 | Connection to steel tank |

Bypass valve 3 protects system from excessive pressure.

If not enough hydraulic oil passes through filter element because oil is cold or filter element 1 is clogged, some of oil flows unfiltered via bypass valve 3 directly into steel tank 4. This prevents hydraulic components being damaged.

2.5 Temperature valve



shh02307

Fig. 379: Temperature valve with cold hydraulic oil / temperature valve with hot hydraulic oil.

- | | | | | | |
|---|--|---|------------------------------------|---|--------------|
| 1 | Leak oil from travel pump and travel motor | 4 | Bypass channel (closed at one end) | 7 | Valve sleeve |
| 2 | Compression spring | 5 | Connection to filter housing | 8 | Pin |
| 3 | Bypass channel with restrictor (closed at one end) | 6 | Temperature element | | |

Leak oil connections from travel pump and travel motor 1 are connected with hydraulic oil cooler and, via temperature valve, return-suction filter.

LBH/12242502/05/211-20210402_1031271en

090.3 Servostat

Valid for: L508-1817;

1 Layout

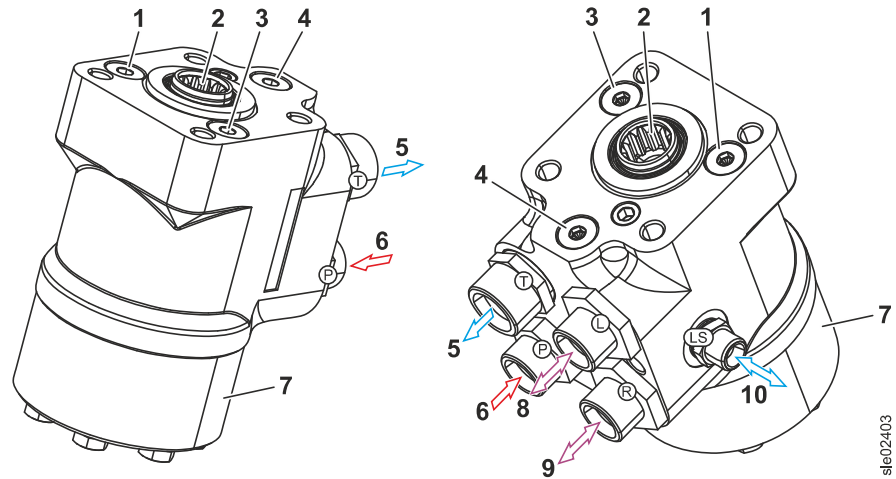


Fig. 387: Servostat (from front left and from rear right)

- | | | | |
|---|---|----|--|
| 1 | Secondary pressure relief valve for steering to left | 6 | Oil supply from working pump |
| 2 | Connection for steering wheel shaft | 7 | Metering pump |
| 3 | Secondary pressure relief valve for steering to right | 8 | Connection for steering to left |
| 4 | LS pressure relief valve | 9 | Connection for steering to the right |
| 5 | Return flow to return suction filter | 10 | Load sensing signal to priority valve (working pump) |

The servostat is bolted underneath the cab floor.

2 Function

2.1 Basic function

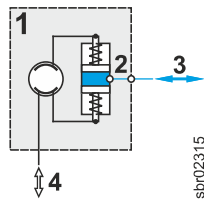


Fig. 395: Drum brake: hydraulic diagram (not actuated)

- | | |
|---|-------------------------------------|
| 1 Drum brake | 3 Inch/brake unit connection |
| 2 Brake piston for service brake | 4 Parking brake bowden cable |

Drum brake acts both as service brake and parking brake. Because there is no differential in gearbox, drum brake acts on both axles.

When braking, stationary brake linings are pressed on inside against rotating brake drum. Friction this generates causes braking effect.

2.1.1 Service brake

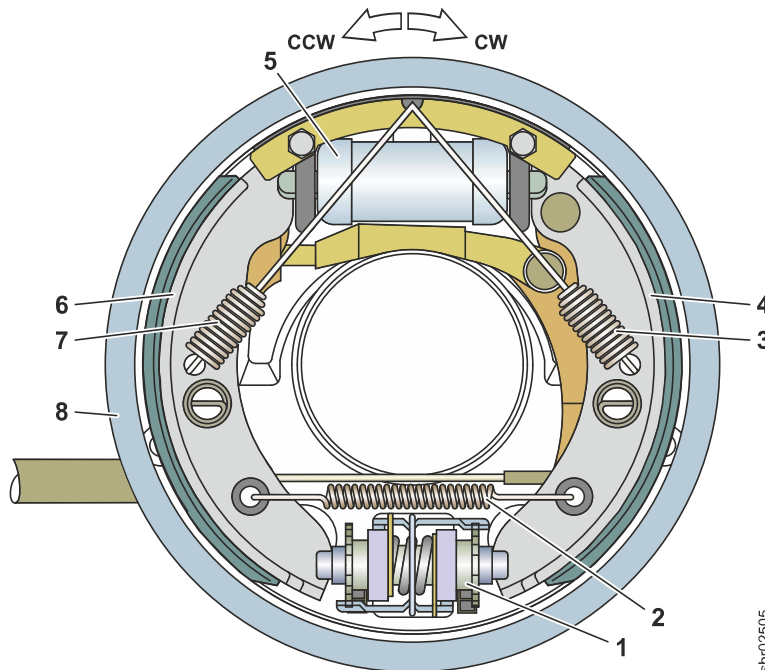


Fig. 396: Service brake

- | | |
|-----------------------------|-----------------------------|
| 1 Adjuster | 5 Brake piston |
| 2 Readjusting spring | 6 Left brake shoe |
| 3 Readjusting spring | 7 Readjusting spring |
| 4 Right brake shoe | 8 Brake drum |

Name	Direction of rotation	Name	Direction of rotation
CW	Clockwise	CCW	Anticlockwise

Tab. 158: Test points

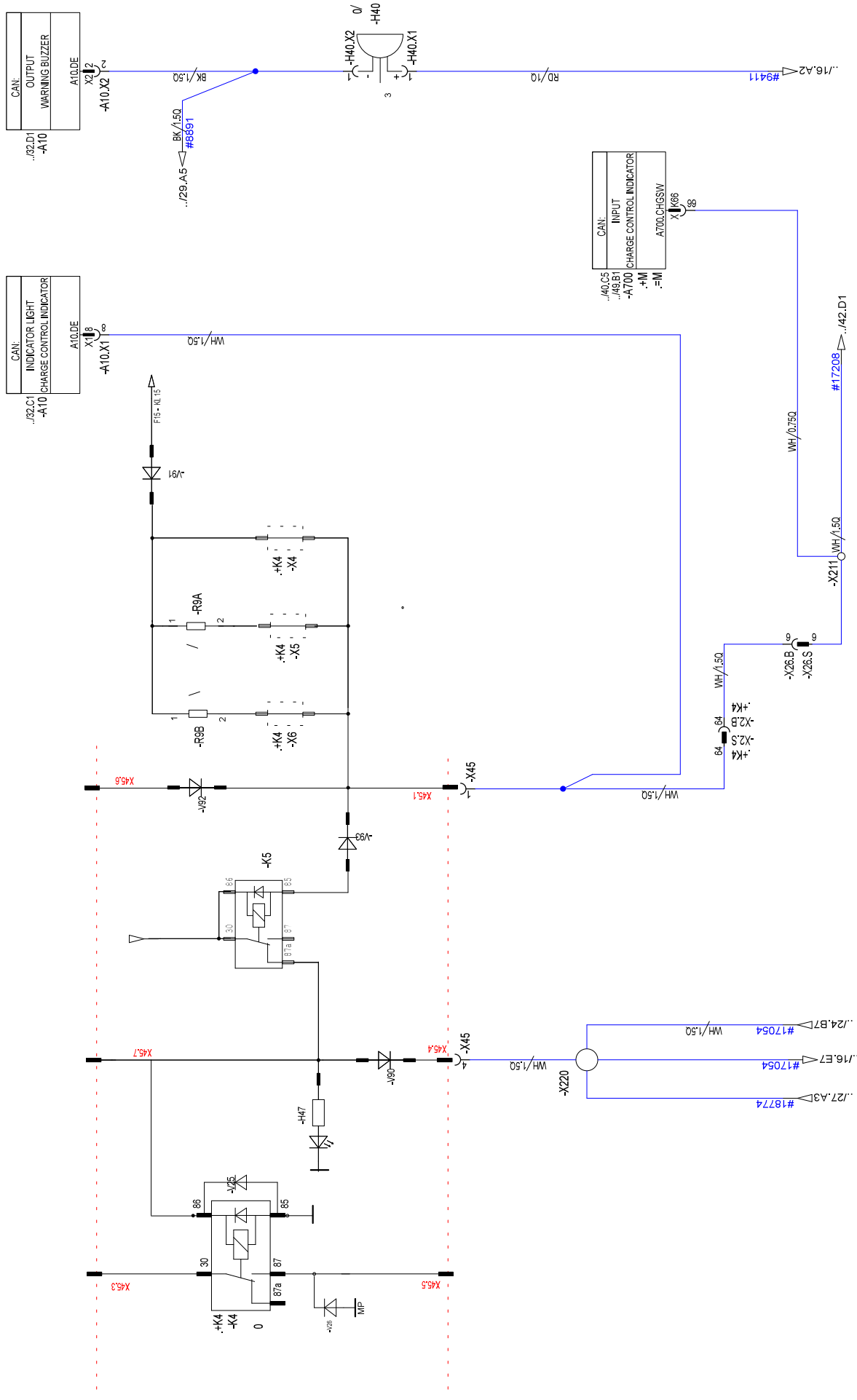
LBH/12242502/05/211-20210402_103127len

110 Electrical system

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CHARGE CONTROL INDICATOR WARNING BUZZER



CAN:	..32.D1
	OUTPUT
	WARNING BUZZER
	-A10
	A10.DE

CAN:	..32.C1
	INDICATOR LIGHT
	CHARGE CONTROL INDICATOR
	-A10
	A10.DE

CAN:	..40.C5
	INPUT
	CHARGE CONTROL INDICATOR
	-A700
	+M
	-M
	A700.CHGSSW

12829112
ITEM CODE

001
DRAWING INDEX

Kompaktlader_EU_USA
1817 00090 01 00

PROJECT
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MACHINE TYPE
LIDOS Gerät

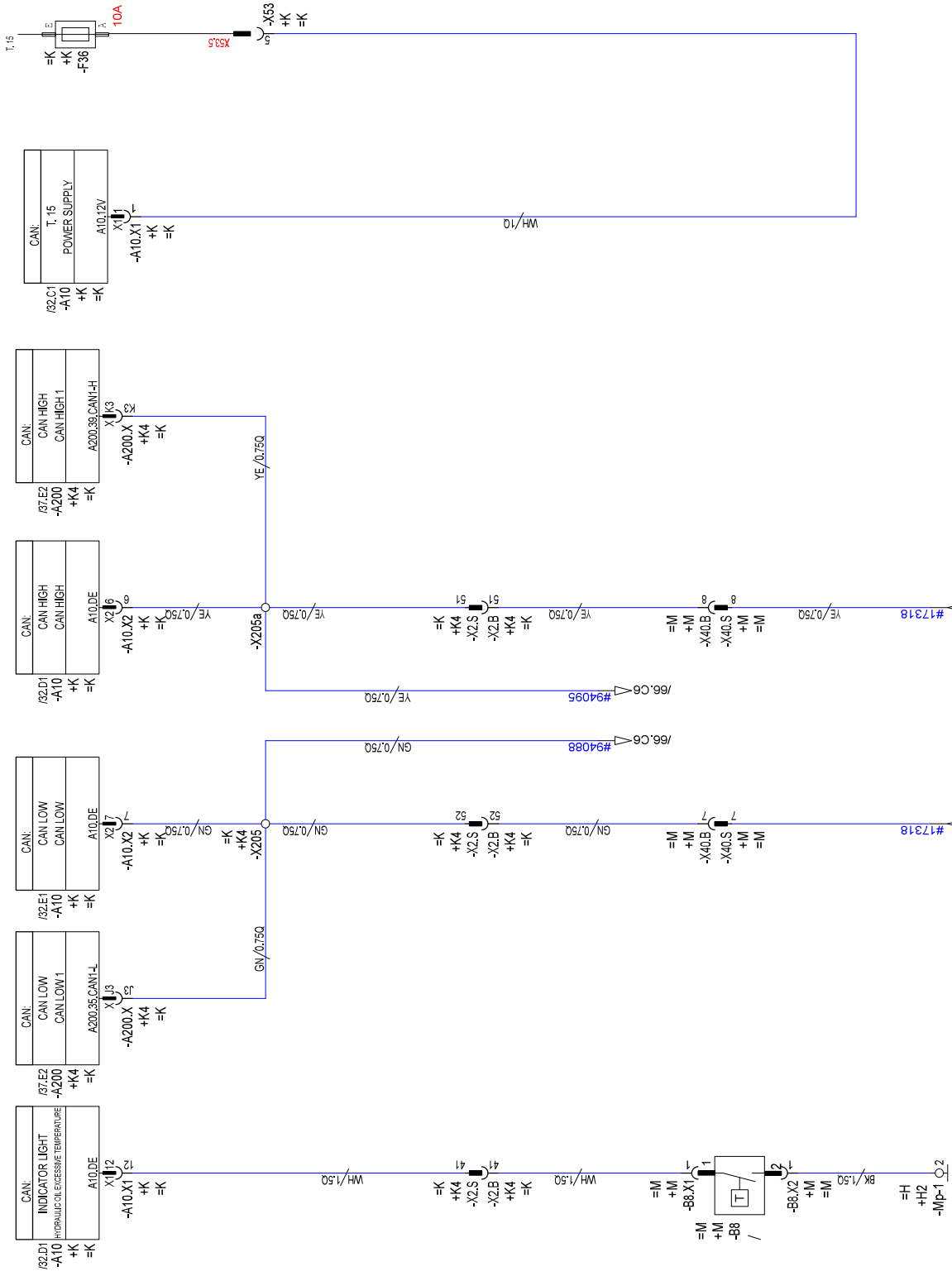
SERIAL NUMBER
XXXXX

HYDRAULIC OIL EXCESSIVE TEMPERATURE
E-SCHEMA

LIEBHERR
FACTORY LBH

PAGE 23 OF

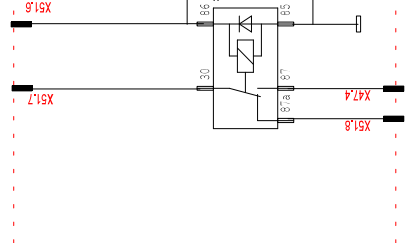
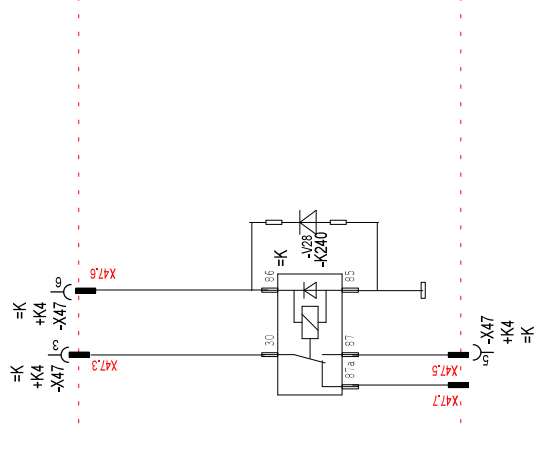
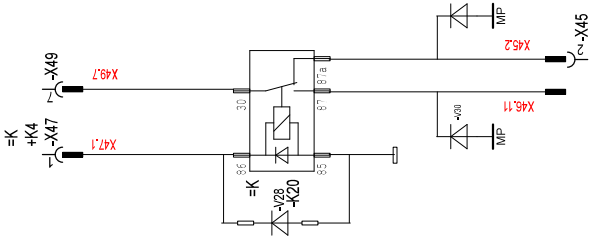
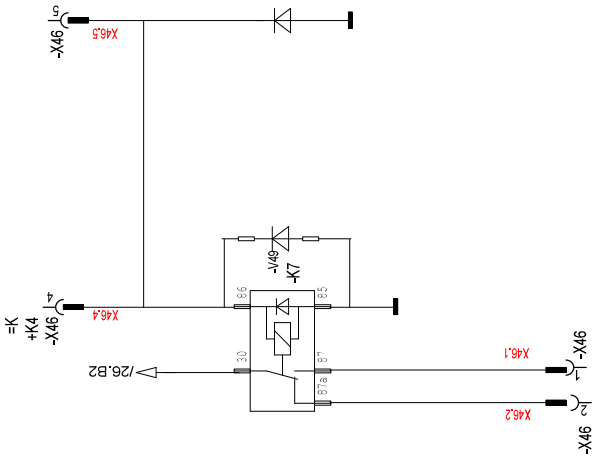
CREATION DATE 10.09.2019 10:44



RESERVE FUSE RESERVE RELAY

PROJECT: Kompaktlader_EU_USA
 ITEM CODE: 12829112
 DRAWING INDEX: 001
 DRAWING NUMBER: 1817 0090 01 00

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LIDOS Gerät

SERIAL NUMBER
XXXXX

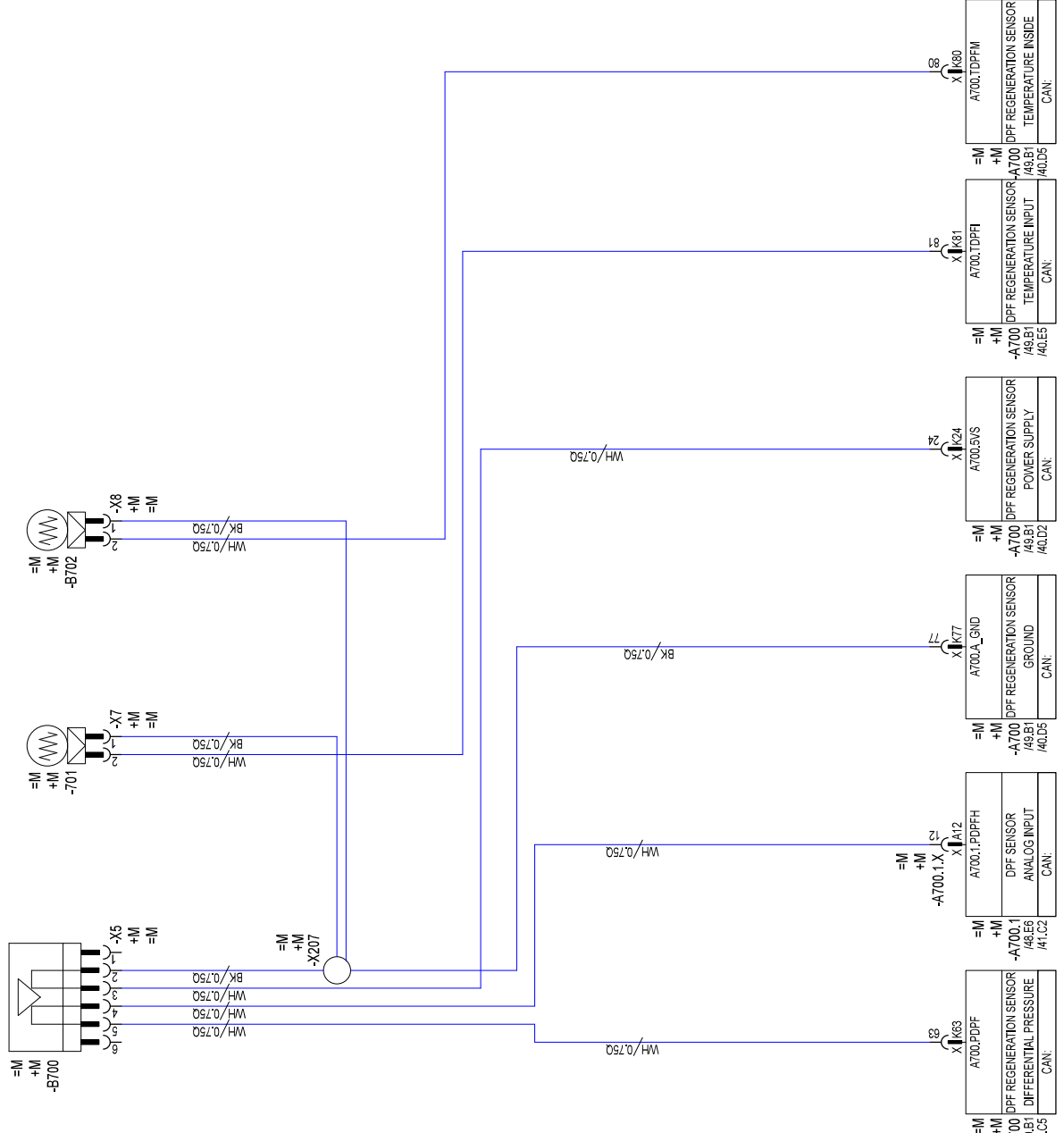
LIEBHERR
 FACTORY LBH

RESERVE FUSE RESERVE RELAY
 E-SCHEMA

PAGE 33 OF

CREATION DATE 10.09.2019 10:44

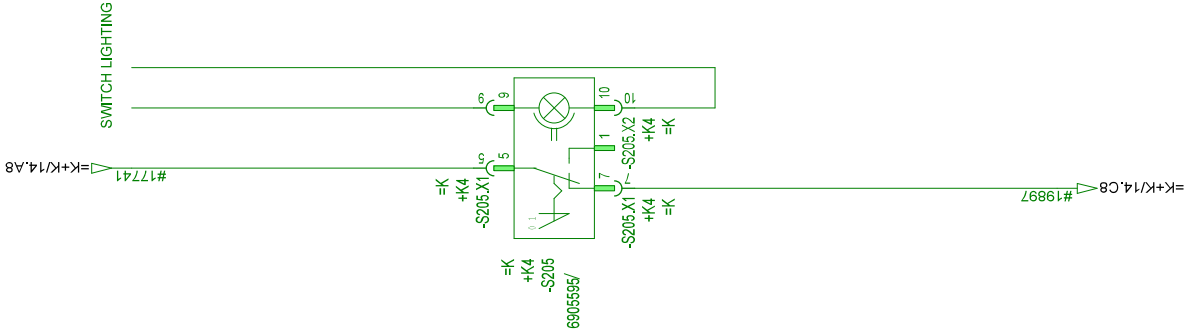
ENGINE CONTROL UNIT DIESEL PARTICULATE FILTER



12829112
 001
 ITEM CODE
 DRAWING INDEX
 Kompaktlader_EU_USA
 1817 00090 01 00
 DRAWING NUMBER
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OPTION AUDIBLE REVERSING ALARM 0-1



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MACHINE TYPE
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SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

OPTION REVERSING ALARM
E-SCHEMA

PAGE 53 OF
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ITEM CODE

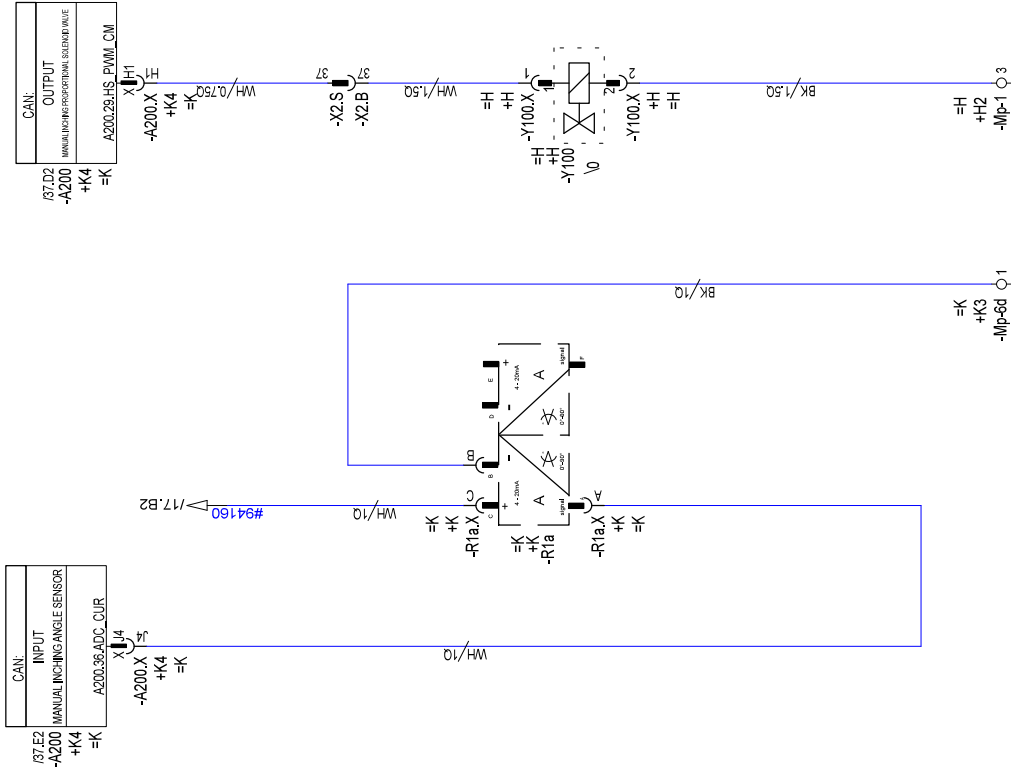
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OPTION MANUAL INCING ANGLE SENSOR



MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

OPTION MANUAL INCING ANGLE SENSOR
E-SCHEMA

PAGE 63 OF

CREATION DATE 10.09.2019 10:44

1 2 3 4 5 6 7 8

A

B

C

D

E

F

1.1.1 Function of the fuse test

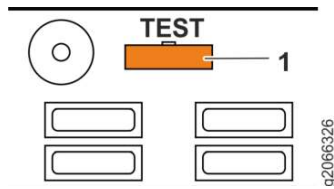


Fig. 419: Function of the fuse test

1 Socket for fuse test

The fuse board A4 has a socket 1 for testing fuses.

To test a fuse, it must be plugged into the socket.

The LED lights up if the fuse is intact.

The fuse test cannot tell whether a fuse has the correct rating. The fuse rating must be checked using the electrical diagram.

2.2 Speed balance of self-locking differential

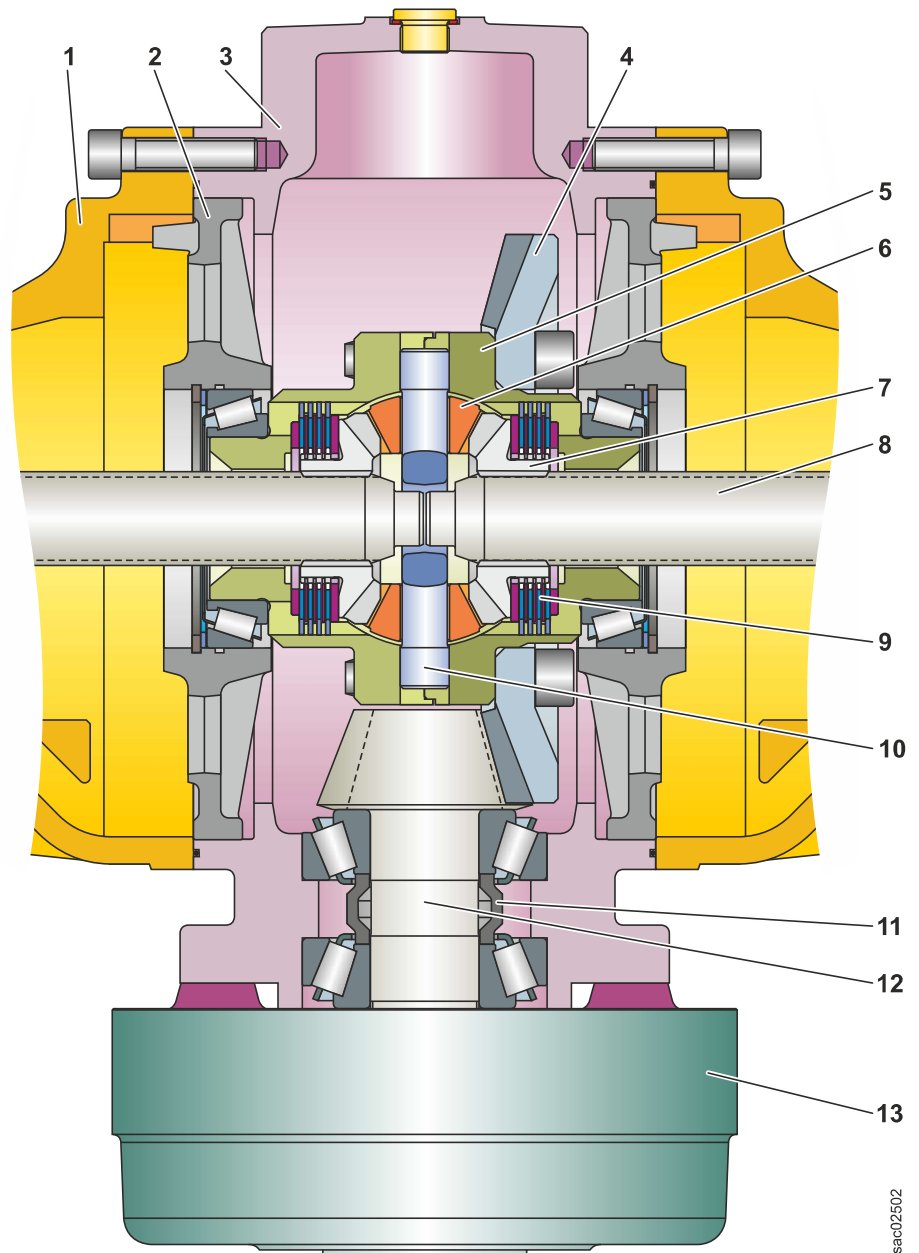


Fig. 424: Differential: sectional view

- | | | | |
|---|---------------------------|----|---|
| 1 | Axle casing | 8 | Half shaft |
| 2 | Differential bearing | 9 | Self-locking differential discs |
| 3 | Main housing | 10 | Compensation axle |
| 4 | Crown wheel | 11 | Bushing for bearing preload |
| 5 | Differential housing | 12 | Axle input shaft (tapered gear) |
| 6 | Compensation tapered gear | 13 | Drum brake with cardan shaft connection |
| 7 | Axle tapered gear | | |

Self-locking differential transmits engine speed and torque to left wheel and right wheel.

150 Working attachment

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160 Operator's cab, heating and air conditioning

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1 Layout

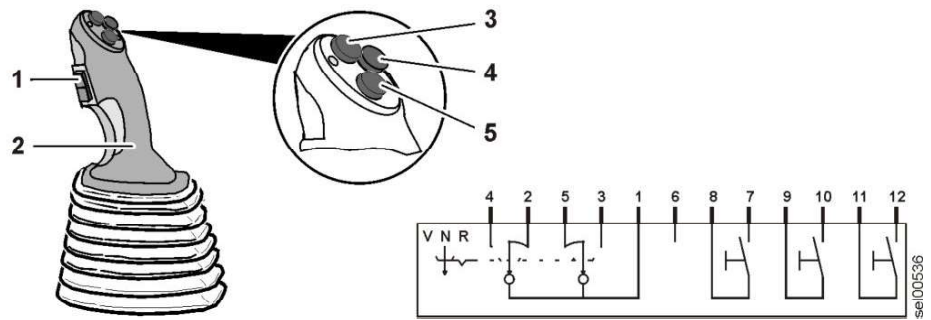


Fig. 463: Control lever with symbol

- 1 Travel direction switch
- 2 Control lever
- 3 Additional equipment 3 button
- 4 Additional equipment 2 button
- 5 Additional equipment 1 button

The control lever 2 includes the *travel direction* switch and buttons for other functions.

Buttons for additional functions can be installed on the top.

The control lever controls the movements of working attachment (lift and tilt cylinders).

2.1 Buttons for additional equipment (option)

If additional equipment is installed or will be installed later, the buttons 3, 4 and 5 can be used to control additional functions.

2.2 Switching the travel direction

Select forward or reverse using the *travel direction* switch 1.

Central control unit A200 reads signals of *travel direction* switch 1.

Forward or reverse travel direction solenoid valves are exclusively activated when parking brake is released.

The travel direction is switched to neutral by closing the parking brake or by switching the *travel direction* 1 switch to neutral "N" (middle position).

For reasons of safety, two signals are transmitted for each travel direction.

Travel direction	Active signal	Active signal
Neutral	Forward direction switch signal 1	Reverse direction switch signal 1
Forward travel direction	Forward direction switch signal 2	Reverse direction switch signal 1
Reverse travel direction	Reverse direction switch signal 2	Forward direction switch signal 1

Tab. 184: Travel direction output signals

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The heat exchanger of heating and air conditioning unit is supplied with hot water from the diesel engine cooling system.

2.3 Air conditioning function (option)

The blower **1** draws in air through the evaporator **4** and pushes it through the heat exchanger **2**.

The air is cooled down by the evaporator **4**. The moisture in the air drawn condenses at the evaporator, whereby a reduction of air moisture is achieved. Two water membranes on the bottom of the housing remove the condensation.

A thermostat **3** with a fixed setting protects the evaporator blades from icing due to freezing condensation. The sensor of the thermostat is inserted between the evaporator blades. The thermostat switches the supply of coolant to the evaporator off at $-1.0^{\pm 0.6}$ °C and back on again at $+2.2^{\pm 0.6}$ °C.

The air flows to the evaporator through the heat exchanger **2**. Air dried by the evaporator can accordingly be reheated. The air is warmed by the heat exchanger according to the water valve position or the flow temperature of coolant.

The cooled air is conducted into the operator's cab through outlet nozzles.

160.3.2.2 Blower

Valid for: L508-1817;

1 Layout

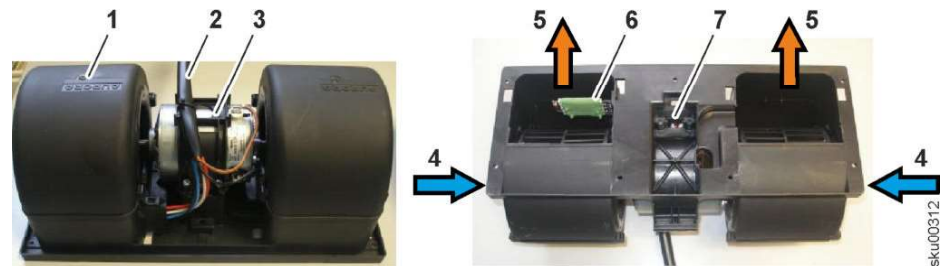


Fig. 471: Views of the blower

- | | |
|--------------------------------|---------------------------|
| 1 Blower | 5 Air outlet |
| 2 Blower wiring harness | 6 Oval resistor |
| 3 Electric motor | 7 Bridge rectifier |
| 4 Air intake | |

The blower is part of the heating and air conditioning unit.

2 Function

The blower is a 3-speed radial fan for ventilation, heating and air conditioning in the driver's cab.

The fan draws the air through the axial air intake **4** and blows it through the radial air outlet **5** to the heat exchanger. Nozzles inside the operator's cab distribute the air.

The air flow is regulated by changing the blower speed.

Regulation and control take place using the heating and air conditioning unit control system. On level 0, the blower is switched off. Level 3 is for maximum air flow.

The oval resistor **6** regulates the speed of the blower.

1 Layout

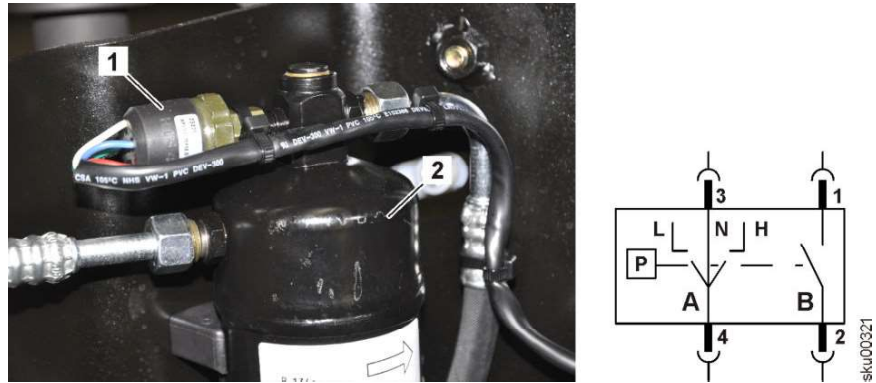


Fig. 477: Air conditioning pressure switch with equivalent circuit diagram

- | | |
|--|--|
| <p>1 Air conditioning pressure switch</p> <p>2 Dryer</p> | <p>A High and low pressure monitor pressure switch</p> <p>B Additional pressure switch</p> |
|--|--|

The air conditioning pressure switch (B27) is installed on the dryer of the refrigerant circuit.

The air conditioning pressure switch consists of two pressure switches that are activated by the same pressure level.

The additional pressure switch **B** is not in use.

2 Function

2.1 Basic function

The high and low pressure monitor pressure switch **A** at the pins **3** and **4** monitors the pressure in the air conditioning circuit. If the pressure is too low or too high, it deactivates the magnetic coupling and thereby the air conditioning compressor.

If the pressure is too low or too high, there is a risk of damaging the components of the air conditioning circuit.

2.2 Monitoring low pressure

If the pressure falls below $1.2^{\pm 0.5}$ bar, the pressure switch opens. By opening the pressure switch, the magnetic coupling is deactivated.

If the pressure rises above $2.4^{\pm 0.5}$ bar once more, the pressure switch is reset and the contact is closed once again.

Insufficient pressure may be caused by:

- A leakage in the air conditioning circuit
- Not enough refrigerant
- Moisture in the air conditioning circuit
- etc.

2.3 Monitoring high pressure

If the pressure rises above $25^{\pm 1.5}$ bar, the pressure switch opens. By opening the pressure switch, the magnetic coupling is deactivated.

If the pressure falls below $19^{\pm 2}$ bar once more, the pressure switch is reset and the contact is closed once again.

Operating status	Signal description	LEDs
Continuous lubrication (if the lubrication time is set longer than the cycle time)	The red and green LEDs flash alternately every second.	<p>The diagram shows two rows of pulses. The top row is for a red LED, with pulses labeled 'ON' and 'OFF' alternating every 1 second. The bottom row is for a green LED, also with pulses labeled 'ON' and 'OFF' alternating every 1 second. The pulses are staggered by 0.5 seconds. A reference code 'g2001286' is at the bottom right.</p>

Tab. 190: Operating statuses

170.1.3 Progressive distributor MX-F

Valid for: L508-1817;

1 Layout

The progressive distributors are manufactured in a variable disc design. The advantage of this is that the distributor can be extended or reduced according to the number of lubrication points.

The flow rate depends on the piston diameter. Each progressive distributor requires at least three pumping elements to work properly.

The progressive distributors of the entire system are coordinated with each other according to the machine type. If a change is made to the combination of the progressive distributors, this can have negative consequences for the entire central lubrication system.

The distributors must always be installed in a horizontal position.

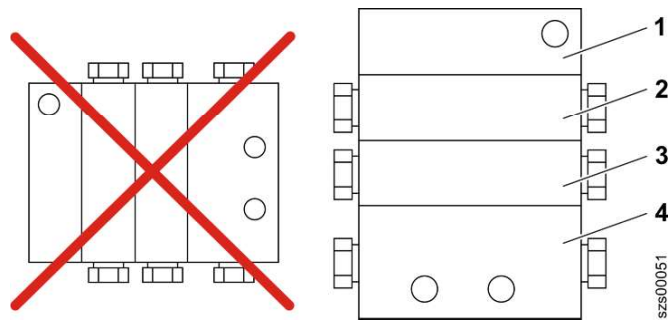


Fig. 490: Installation position of the progressive distributor

- 1 Initial element
- 2 Middle element
- 3 Middle element
- 4 End element

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