en **Service manual**

Wheel loader

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Manufacturer: Liebherr Machinery (Dalian) Co. Ltd.
Valid for: L 580-1495

Contact

Liebherr Machinery (Dalian) Co. Ltd.
No.30, Wanli Street
Dalian

LBH/11827707/11/211-20191111_102412/en

Symbol	Meaning
—	**List** Identifies individual items of a list.

Tab. 3: Symbols

010.1.2 Intended use

010.1.2.1 Laws, rules, guidelines and safety regulations

To ensure safe operation:
- Ask work site manager for safety regulations at place of use.
- Adhere to safety regulations at place of use.
- Adhere to traffic regulations.
- Adhere to valid guidelines from insurers (for example employers' professional liability insurance companies, accident insurance et cetera).
- Avoid working methods that can endanger safety.
- Adhere to all intervals specified for recurrent checks and inspections in this operator's manual.

010.1.2.2 Intended use

Wheel loader is used to pick up, move and dump following materials:
- Soil
- Stones
- Broken rocks
- Bulk materials

This applies to a standard machine in normal operating conditions. Special applications are described in a separate options operator's manual.

To ensure intended use:
- Adhere to operator's manual.
- Adhere to maintenance intervals.
- Observe inspection and maintenance tasks.
- Adhere to specifications in the technical data.
- When using machine on public roads, make sure it complies with applicable national regulations.
- Only lift loads with intended working attachments (fork prongs, crane boom), which must be fitted and functioning.
- Make sure that machines used underground (mining and tunnel construction) are fitted with systems to reduce exhaust emissions (such as diesel particulate filters).
- Adhere to individual country's requirements for underground operation.
- For special uses use special working attachments and if necessary special safety equipment.
- Exclusively mount and use special working attachments with approval and as per stipulations of manufacturer of basic machine.
- Only use approved tyres.
- A suitably equipped workshop is absolutely essential for performing repair work.

Note

▶ Any other use or use beyond the stated use is improper use.

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010.1.6.3 Transporting machine

Danger to life

Machine tipping

- Make sure that the transport vehicle is authorised for the machine weight and machine size.
- Do not manoeuvre while driving on ramps.
- Before driving on ramps, clean mud, snow and ice off tyres or travel gear.
- Make sure that a spotter is available if necessary.
- To load and unload machine, use only sturdy, stable loading ramps.
- Make sure that width and angle of ramps match the gauge and climbing ability of machine.

Incorrect transport

- Park machine on level ground during preparation for transport (disassembly, cleaning).
- Secure machine against rolling away.
- Apply parking brake.
- Pull out ignition key.
- Leave operator's cab.
- All doors, windows and service access points are closed.
- Make sure that nobody is on the machine during transport.
- If necessary, dismantle a portion of working attachment from machine for duration of transport.
- Make sure that the road to be travelled is known.
- Make sure that all applicable limitations for width, height and weight are known.
- Drive carefully under electric cables and bridges.
- Drive carefully through tunnels.

010.1.6.4 Access to machine

Injury

Incorrect entry and exit

- Clean dirt, oil, ice and snow from steps, ladders, anti-slip mats, handrails and handles.
- Enter and exit carefully on muddy roads, ice, snow, traffic on access roads and in narrow conditions.
- Regularly check steps, ladders, anti-slip mats, handrails and handles and have them repaired if necessary.
- Before entering machine, clean mud, grease, ice and snow from shoes and climbing aids.
- Put on gloves for secure grip.
- Do not climb up or down using tyres, wheel hubs or rims.
- When exterior influences (for example wind) make opening and closing the door more difficult: Always guide door with your hand.
- Make sure that the opened or closed door has engaged properly.
- If the machine is still moving: Do not stand up from the operator's seat.
- Never jump off machine.
- Enter and leave the machine exclusively using the access system.
- Do not use control elements as handles.
- Keep your face towards machine during entry and exit.

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Designation	ID no.	All wheel loaders	Remark
Test probe, black	884191114	All wheel loaders	For measurements at plug connections
Solenoid tester	10028268	All wheel loaders	For testing solenoid valves
Battery plug tool	11839123	All wheel loaders	For opening the plugs on the battery cells
Wiring harness repair and diagnosis set	11113798	All wheel loaders	For repairing and troubleshooting the electrical system
ID numbers for other tools and plug connections of the electrical system can be taken from the wiring harness repair and diagnostic set.			
Wiring harness repair and diagnosis set: Liebherr Service Documentation - General information - wiring harness repair and diagnostic set			

Tab. 6: Special electrical tools

010.2.4 Special tools for the transmission

Designation	ID no.	Use	Remarks
Fixing spanner	10016179	L550 - L586	For loosening and tightening the slotted nut on the coupling 1
Special socket	10016180	L550 - L586	For loosening and tightening the slotted nut on the coupling 1
Positioning tool	10016181	L550 - L586	For installing and removing the snap ring on the couplings

Tab. 7: Special tools for the transmission

010.2.5 Special tools for front axle MT-L II

Designation	ID no.	Use	Remarks
Positioning tool	10296879	L550 - L586, L580 LG	For mounting the bevel gear shaft seal ring
Measuring disc	11160201	L550 - L586, L580 LG	For measuring the gap size

Tab. 8: Special tools for front axle MT-L II

010.2.6 Special tools for rear axle MT-L II

Designation	ID no.	Use	Remarks
Positioning tool	10296879	L550 - L586, L580 LG	For mounting the bevel gear shaft seal ring
Measuring disc	11160201	L550 - L586, L580 LG	For measuring the gap size

Tab. 9: Special tools for rear axle MT-L II

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state of the art and practical experience, the friction values for the various coatings are complied with for small bolt diameters.

010.3.2 Liebherr standards for assembly instructions and tightening torques

Liebherr standards for assembly instructions and tightening torques for hydraulic cylinders are stored in Liebherr service documentation.

Storage location: Genearl – Liebherr standards

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020.1 Overall machine

020.1.1 Complete machine with loading bucket

Valid for: L580-1495/31403-;

Values stated refer to machine:

- In standard version
- With 26.5R25 L3 tyres (For more information see: 020.11.3 Tyres, page 020-30)
- Including all lubricants
- With a full fuel tank
- With ROPS/FOPS cab and operator
- On level and stable ground

Note
Tyres and working attachment affect operating mass and tip load.

▶ Note information about tyres and working attachment.

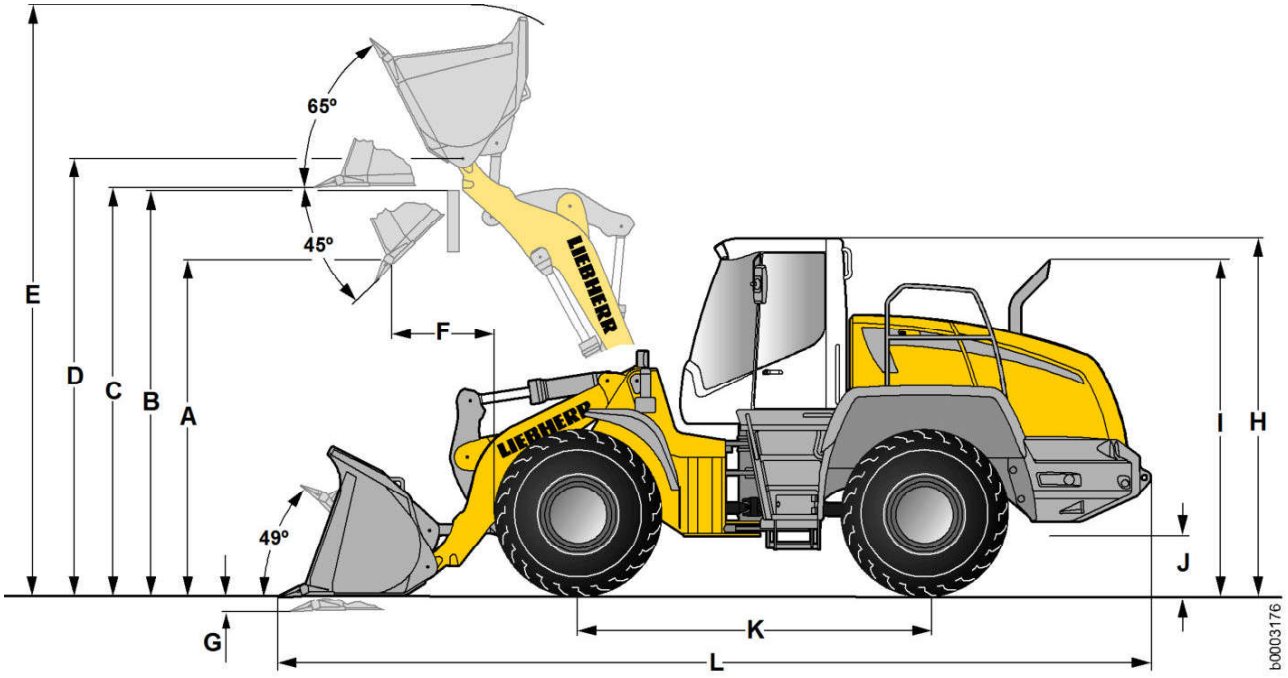

Fig. 13: Complete machine with loading bucket

	Designation	Unit	Value		
	Hydraulic quick coupler		No	No	No
	Load geometry		A)	A)	A)
	Bucket type		B)	B)	B)
	Cutting tool		C)	C)	C)

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020.3 Cooling system

020.3.1 Fan gear pump

Valid for: L580-1495/31403-;

Description	Unit	Value
Displacement per turn	cm^3	20
Direction of rotation		Clockwise

020.3.2 Fan gear motor

Valid for: L580-1495/31403-;

Description	Unit	Value
Displacement per turn	cm^3	19
Direction of rotation		Clockwise
Coil resistance	ohms	4.7
Proportional pressure relief valve tightening torque	Nm	$124^{\pm 41}$
Spanner size	mm	41

020.3.3 Hydraulic oil temperature sensor B8

Valid for: L580-1495/31403-;

Description	Unit	Value
Minimum temperature	°C	-30
Maximum temperature	°C	130
Resistance at 20 °C	Ω	1000
Connecting thread	mm	M14x1.5
Tightening torque	Nm	30

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020.8.5 Accumulator charge pressure switch B19

Valid for: L580-1495/31403-;

Description	Unit	Value
Type		Electronic pressure switch
Switch type		Normally open
Switching point, falling	bar	$120^{\pm 5}$
Connecting thread	mm	M12x1.5

020.8.6 Parking brake hydro accumulator

Valid for: L580-1495/31403-;

(ID no. 10288602)

Description	Unit	Value
Hydro accumulator volume	cm^3	320
Preload pressure (nitrogen filling)	bar	80

020.8.7 Overspeed protection solenoid valve Y16

Valid for: L580-1495/31403-;

Description	Unit	Value
Current consumption	A	0.9
Resistance	ohms	30

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020.14 Lubrication system

020.14.1 Central lubrication system (Liebherr)

Valid for: L580-1495/31403-;

020.14.1.1 Central lubrication pump

Description	Unit	Value
Delivery per stroke	mm^3	120
Pumped medium		Grease up to NLGI class 2
Maximum operating pressure	bar	280
Operating temperature	°C	min. -35 max. +70
Supply voltage	V	24
Protection class		IP 65
Factory-set cycle time 75%	minutes	45
Factory-set cycle time 100%	minutes	30
Factory-set cycle time 125%	minutes	20

020.14.1.2 Progressive distributor

MX-F

Description	Unit	Value
Maximum operating pressure at inlet	bar	300
Temperature range	°C	min. -35 max. +100
Pumped medium		Grease up to NLGI class 2

MX-F 25

Description	Unit	Value
Flow per outlet	mm^3	25
Flow per element	mm^3	50
Piston diameter	mm	3

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030.3 Lubricants and fuels

030.3.1 General information on lubricants and fuels

030.3.1.1 General questions

For general questions on lubricants and fuels, please contact the Liebherr Lubricant Hotline by e-mail.

Liebherr Lubricant Hotline (e-mail): lubricants@liebherr.com

030.3.1.2 Safety data sheets

Safety data sheets for lubricants and fuels are available online via the Liebherr lubricant portal.

Liebherr lubricant portal: lubricants.liebherr.com

030.3.1.3 Technical data sheets

Technical data sheets for lubricants and fuels are available online via the Liebherr lubricant portal.

Registration is required to access the technical data sheets.

Liebherr lubricant portal: lubricants.liebherr.com

030.3.1.4 Specific Liebherr standards

Specific Liebherr standards for lubricants and fuels are available via the technical customer service of the respective manufacturer.

030.3.2 General information on changing lubricants and fuels

The values stated for filling quantities in the lubricant table and fuels table are only guidelines. After every oil change or refill, check the corresponding level.

NOTICE
Improper change of lubricants and fuels!
Damage to machine.

▶ Observe manufacturer's instructions for lubricants and fuels.

NOTICE
Contamination due to dirt!
Damage to machine.

▶ Clean filler plugs, filler caps and drain plugs, including their environment, before opening.

When inspecting and changing lubricants and fuels, consider following, among other things:
- Local environmental guidelines.
- Specifications according to operator's manual.
- Avoid naked lights and fire.

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LS = limited slip additive:
– Not required for splitter boxes

If Liebherr oils cannot be purchased locally, oils that comply with the specifications must be used instead (after consultation with customer service).

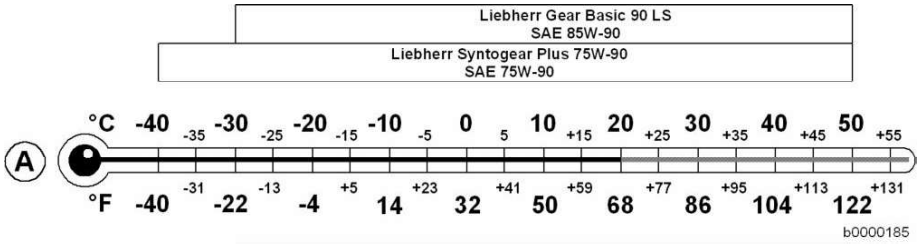

Fig. 31: Selection of the SAE class according to temperature

A Ambient temperature

The temperature ranges specified in the diagram are guidelines and can be briefly exceeded or fallen short of.

030.3.10 Lubricating oils for transmissions

Valid for: L580-1495/31403-;

Recommended lubricant	Specification
Liebherr Hydraulic Gear ATF	GM: Dexron II D ZF: TE-ML 03D, 04D, 11A, 14A, 17C

Tab. 39: Lubricating oil specifications

If Liebherr oils cannot be purchased locally, you must use oils according to the specifications instead (after consultation with customer service).

NOTICE
Oil quality

▶ Mixing various types of oil is not permitted.

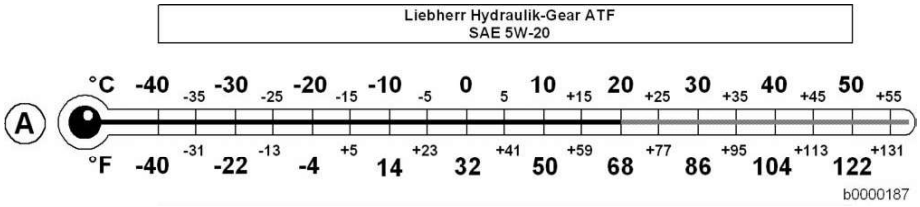

Fig. 32: Selection of the SAE class according to temperature

A Ambient temperature

The temperature ranges specified in the diagram are guidelines and can be briefly exceeded or fallen short of.

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Thorough cleaning prevents dirt and foreign particles from entering the machine. Clean oil, fuel and maintenance products from all connections and bolts.

The machine must be particularly cleaned after the following jobs:
– Working in salty environments (in winter, after contact with road salt during transport on icy roads, when working near the sea or at ports etc.)
– Working with alkaline or acidic compounds
– Working with corrosive materials (lime compounds, cement etc.)

Note
High-pressure cleaners (steam cleaners) can damage the paintwork.

▶ Do not use high-pressure cleaners in the first two months of using the machine (or after a respray).

▶ Observe the operating instructions for the high-pressure cleaner. Note the information on the pressure and the distance from the high-pressure nozzle to the object to be cleaned.

Washing the machine

CAUTION
Risk of accidents from the high-pressure jet of the high-pressure cleaner.

▶ Wear appropriate protective clothing and safety glasses.

Electrical devices such as the emergency steering pump, refuelling pump, sensors and electric components are not watertight.

Every time you clean the machine with a high-pressure cleaner, regrease all lubrication points on the machine.

NOTICE
Beware of damaging the soundproofing mats.
The soundproofing mats can be damaged if you clean them with high pressure. Damaged soundproofing mats increase the sound output level above that guaranteed by the manufacturer.

▶ Do not expose soundproofing mats to water or steam jets.

NOTICE
There is a risk of damaging electrical devices.
When using a high-pressure cleaner, you may damage electrical devices such as the emergency steering pump, refuelling pump, sensors and electrical components.

▶ Do not expose electrical devices to water or steam jets.

Make sure that the machine is in maintenance position 2.

▶ Wash the machine.

▶ Regrease all lubrication points on the machine.

Washing the engine

When washing the engine using water or steam jet, take care not to expose electronic devices such as the starter, alternator, sensors and engine control unit directly to the jet.

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Topping up the engine oil

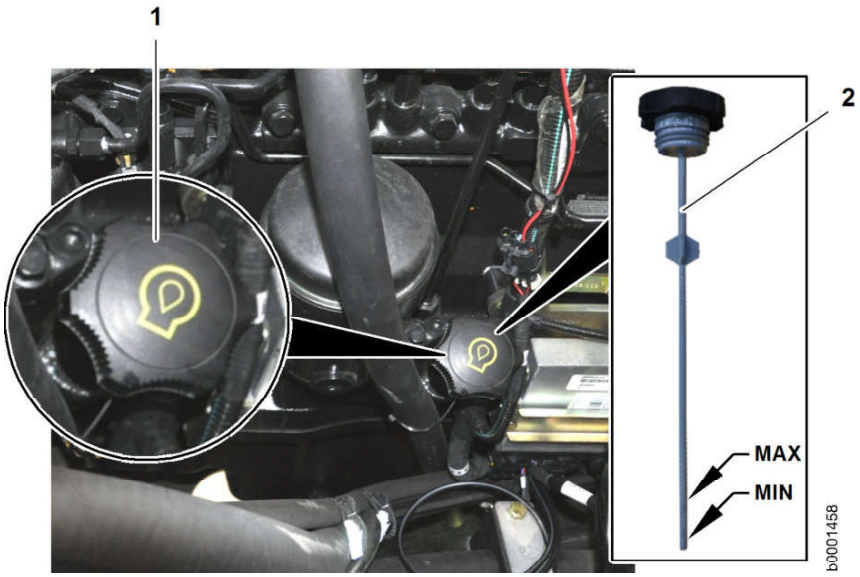

Fig. 50: Topping up the engine oil

1 Filler neck **2** Dipstick

▶ Pour new engine oil into the filler neck **1** to between the MIN and MAX markings on the dipstick **2.** (For more information see: 030.3.5 Lubricating oils for diesel engines, page 030-19)

▶ Clean the filler cap, place it on the filler neck **1** and tighten it.

▶ Start the engine and check the oil pressure.

▶ Turn off the engine.

▶ After 2 to 3 minutes, check the oil level on the dipstick **2.**
▷ Top up with oil if necessary.

030.4.4.3 Changing the engine oil filter

Valid for: L580-1495/31403-;

The oil filter is fitted on the right side of the engine compartment.

Make sure that the following requirements are fulfilled:
❑ The machine is in maintenance position 1.
❑ The engine compartment hood is open.
❑ You have a screwdriver available.
❑ You have a suitable receptacle and genuine Liebherr oil filter cartridges ready.

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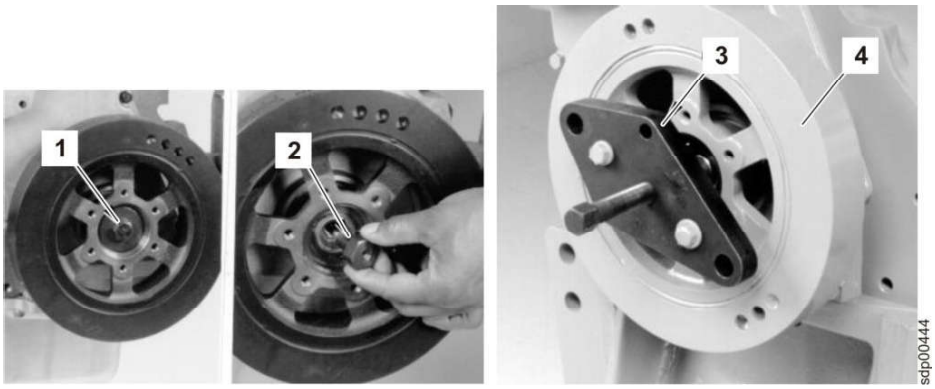

Fig. 61: Extractor tool

1	Hex bolt	**3**	Extractor tool
2	Thread guard	**4**	Rear torsional vibration damper

The rear torsional vibration damper **4** is attached to the crankshaft with a hex bolt **1** and a washer.

▶ Unscrew the hex bolt.

▶ Remove the hex bolt and the washer.

Note
To remove the rear torsional vibration damper, the tensioning device of the V-ribbed-belt must be relieved and removed.

▶ Relieve and remove the tensioning.

The rear torsional vibration damper can be pulled off the crankshaft with the extractor tool **3**.

▶ Screw in the thread guard **2**.

▶ Attach the extractor tool.

▶ Pull off the rear torsional vibration damper.

▶ Remove the extractor tool and the thread guard.

Note
The crankshaft torsional vibration damper is designed as a two-part torsional vibration damper. Both parts must be replaced.

▶ Replace the front torsional vibration damper.

▶ Replace the rear torsional vibration damper.

When installing the new rear torsional vibration damper, take note of the installation position.

▶ Attach the new rear torsional vibration damper.

▶ Attach the pulley with the front torsional vibration damper.

▶ Fit the V-ribbed-belt.

After completing the maintenance work:

▶ Start the engine.

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Removing the main element

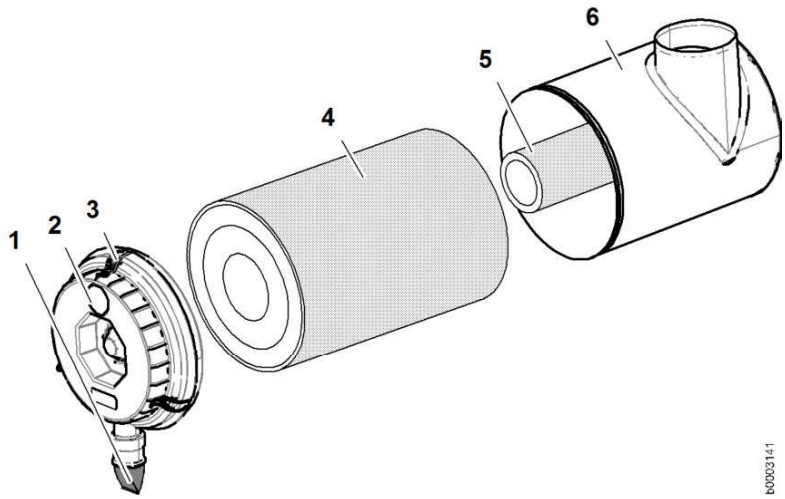

Fig. 71: Removing the main element

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

NOTICE
Do not use a damaged filter element
Otherwise the engine may be damaged.

▶ Replace damaged filter elements.

▶ Release the fixing clips **3** on the service cover **2**.

▶ Take off the service cover **2**.

▶ Remove the main element **4** and check it for damage before cleaning it.

Cleaning the main element

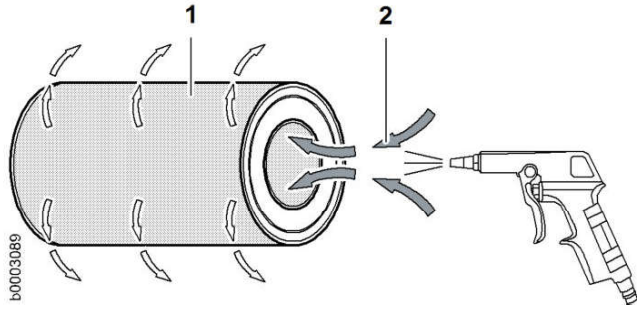

Fig. 72: Cleaning the main element

1	Main element	**2**	Compressed air

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NOTICE
Mixing different antifreeze/corrosion inhibitors can result in damage to the cooling system.

▶ Do not mix coolants with and without silicates.

NOTICE
Beware of damaging the engine.
Too much antifreeze and corrosion inhibitor impairs the cooling effect.
This eventually causes damage to the engine.

▶ Never use more than 60% antifreeze and corrosion inhibitor.

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▶ Insert the plug **4** in the breather filter.
▷ The anti-twist device of the breather filter is released.

▶ Unscrew the breather filter **3** by two turns.
▷ The tank preload pressure is released.

▶ Unscrew the venting screw **1**.
▷ The oil level goes down.

▶ Unscrew the bolts on the filter cover and carefully lift off the filter cover together with the magnetic rod **2**.

▶ Check the magnetic rod **2** for excessive dirt and coarse particles.

Note
Excessive dirt and coarse particles on the magnetic rod indicate damage in the hydraulic system.

▶ Check the hydraulic system for damage if the magnetic rod is very dirty.

▶ Carefully clean the magnetic rod **2**.

▶ Put the O-ring and filter cover on the housing.

▶ Tighten the bolts on the filter cover.

▶ Screw the venting screw **1** back in.

▶ Screw on the breather filter **3**.

▶ Remove the plug **4** and keep it in a safe place.

030.4.7.3 Draining off condensate and sediment from the hydraulic tank

Valid for: L580-1495/31403-;

Make sure that the following requirements are fulfilled:
❑ The machine has not been started for at least one hour (condensate can build up).
❑ The machine is in maintenance position 1.
❑ The service hatches are open.
❑ You have a suitable collecting pan ready.
❑ You have a drain hose ready.

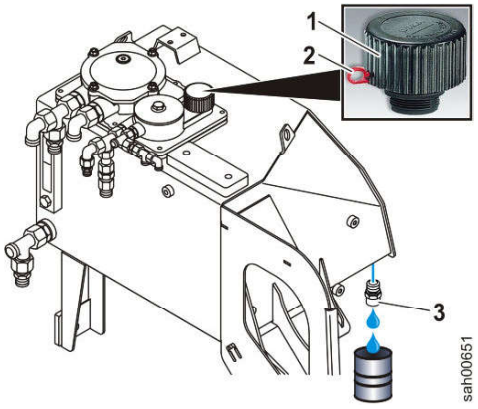

Fig. 94: Draining off condensate and sediment from the hydraulic tank

▶ Insert the plug **2** on the breather filter **1**.
▷ The anti-twist device of the bleeder filter is released.

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Checking the wear on the brake linings

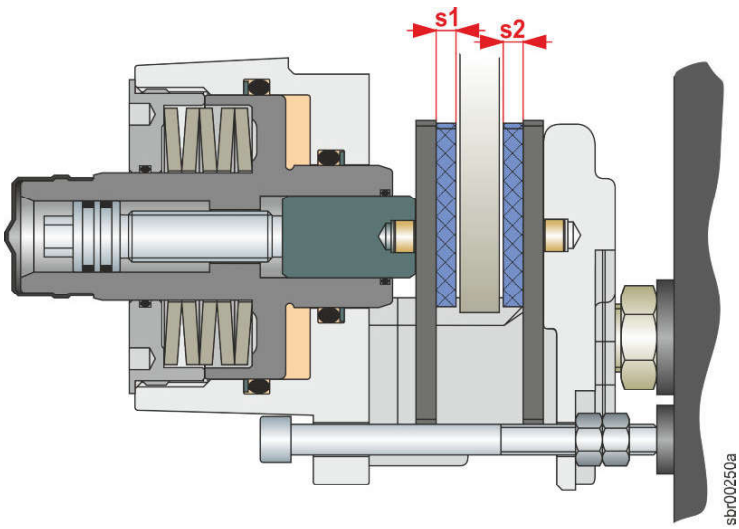

Fig. 107: Checking the wear on the brake linings

s1 Brake lining thickness **s2** Brake lining thickness

▶ Check that the brake linings **s1** and **s2** are the required thickness.

Description	Unit	Value
Thickness of brake linings **s1** and **s2** (each)	mm	More than 1.0

If values are correct:

▶ Check the gap. (For more information see: Check the gap, page 030-98)

If the value is not correct:

▶ Replace the brake shoes. (For more information see: Replace the brake shoes, page 030-99)

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030.4.11.2 Changing the transmission oil

Valid for: L580-1495/31403-;

Make sure that the following requirements are fulfilled:
- ❑ The transmission is at operating temperature.
- ❑ The machine is in maintenance position 2.
- ❑ The specified gear oil is at hand. (For more information see: 030.2.1 Recommended lubricants, page 030-15)
- ❑ You have a suitable collecting pan ready.

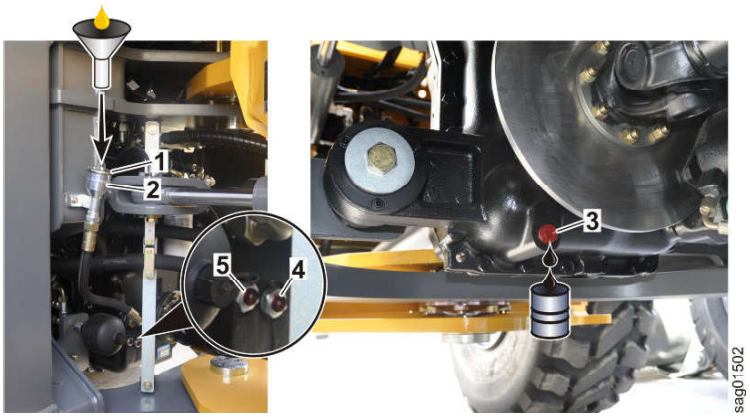

Fig. 117: Changing the transmission oil

1	Sealing cap	**4**	Bottom oil sight glass
2	Filler neck	**5**	Top oil sight glass
3	Drain plug		

CAUTION
Risk of scalding by hot, pressurised oil.

- ▶ Carefully open the sealing cap and the drain plug.
- ▶ Wear protective clothing (oil-proof gloves and safety glasses).

- ▶ Carefully open the cap **1**.
- ▶ Carefully open the drain plug **3** and drain the oil into the collecting pan.

Note
Remember to change the oil filter every 2000 operating hours.

- ▶ Change the oil filter before filling the fresh gear oil. (For more information see: Changing the transmission oil filter, page 030-108)

- ▶ Close the drain plug **3**.
- ▶ Fill oil in via the filler neck **2** until oil can be seen in the **top** sight glass **5**.
- ▶ Engage the articulation lock.
- ▶ Start the engine and let it run at low idling speed.
- ▶ Engage the parking brake.

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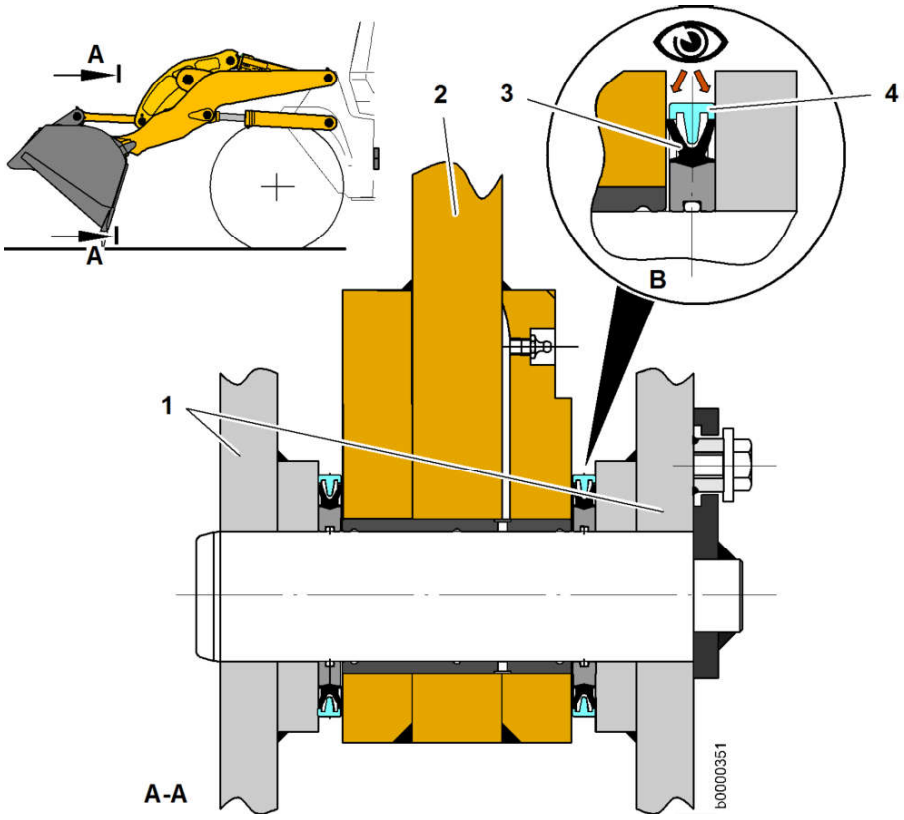

Fig. 130: Checking the bucket bearing seal

1	Bucket bearing plate	**4**	Dirt guard
2	Bucket arm	**B**	Bucket bearing seal
3	Sealing lips		

▶ Clean the bucket bearing seal **B** using a steam jet.

▶ Visual inspection whether the sealing lips **3** touch the sides of the bucket arm **2** and bucket bearing plate **1**.

Replace the bucket bearing seal if:
– The bucket bearing seal **B** is damaged
– The sealing lips **3** do not touch the bucket bearing plate **1**
– The sealing lips **3** do not touch the bucket arm **2**

Note
To replace the bucket bearing seal:

▶ Contact Liebherr customer service.

Checking the bearing bushings for wear

Dirt or insufficient lubrication causes wear on the bearing bushings. Wear is recognisable through increased play between the pin and bearing bushing or through loud noises. Replace the bearing bushings in good time to prevent damage to the bucket arms.

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- ▶ Start the diesel engine.
- ▶ Warm up the machine until the coolant temperature is at least 80 °C.
- ▶ Switch off the air conditioning unit.
- ▶ Set the fan to level 2.
- ▶ Set the temperature control to minimum.
- ▶ Run the engine for 1 minute at medium speed.
- ▶ Measure the outlet temperature at the right driver-level nozzle.
  - ▷ The outlet temperature should be roughly (±2 °C) the same as the outside temperature.
- ▶ Set the temperature control to maximum.
- ▶ Run the engine for 1 minute at medium speed.
  - ▷ The outlet temperature increases.
- ▶ Measure the outlet temperature at the right driver-level nozzle.
  - ▷ Measured outlet temperature: at least 60 °C

030.4.16 Lubrication system

030.4.16.1 Checking the lubrication system grease reservoir level

Valid for: L580-1495/31403-;

This equipment is optional.

Make sure that the machine is in maintenance position 1.

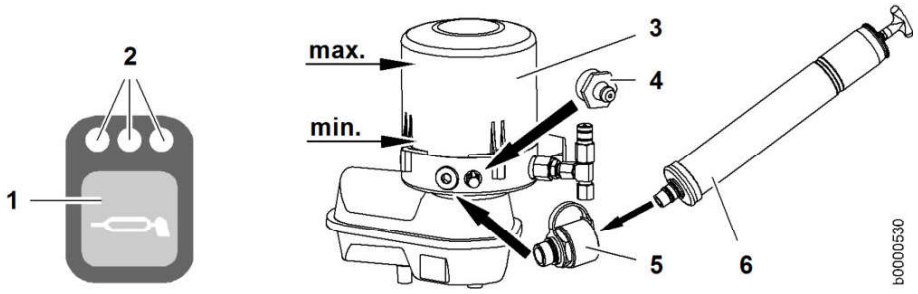

Fig. 144: Checking the filling level of the grease reservoir

1	*Central lubrication system* key	**4**	Grease fitting
2	LEDs	**5**	Filling coupling (fast filling)
3	Grease reservoir	**6**	Fast filling pump

- ▶ Visually check the level in the grease reservoir **3**.
  - ▷ Stay within the minimum and maximum lubricant levels.
  - ▷ It the amount of grease in the grease reservoir is too low, all the LEDs **2** on the *central lubrication system* key **1** light up.

Note
Mixing of lubricant greases!
Malfunction in the central lubrication system.

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

Make sure that the machine is in the maintenance position for testing and adjustments.

- ▶ Switch on the ignition.
- ▶ Connect the Sculi diagnostic software to the machine.
- ▶ In the variables editor in the group structure, select the ***Pedal calibration*** folder.
- ▶ Change the value of ***MXmaThrottleAdj*** to ***1***.
- ▶ Press the accelerator pedal all the way down and then release it.

The MIN and MAX positions of the accelerator pedal are stored. After 10 seconds, the value automatically returns to ***0*** and calibration is finished.

- ▶ Check that ***MDdrThrThrottle*** is 0% when the pedal is not pressed and 100% when it is pressed right down.
- ▶ Change the value of ***MXmaInchAdj*** to ***1***.
- ▶ Press the inch/brake pedal all the way down and then release it.
  - ▷ The MIN and MAX positions of the inch pedal are stored. After 10 seconds the value automatically returns to ***0***.
  - ▷ The service code 5024 may be displayed.
  - ▷ Calibration is complete.
- ▶ Switch off the ignition.
- ▶ Switch on the ignition.
- ▶ Check that ***MDdrHmoInchFakt*** is 100% when the inch/brake pedal is not pressed and 0% when it is pressed right down.
- ▶ Check whether there are active service codes in the display.
  - ▷ There must not be any active service codes in the display.

030.6.3.2 Checking the engine speed

Valid for: L580-1495/31403-;

The engine speed cannot be mechanically adjusted; it is determined directly by the engine control unit.

- ▶ Start the engine.
- ▶ Check the upper and lower engine speeds.

Description	Unit	Value
Lower idle speed	rpm	$800^{\pm 10}$
Upper idle speed	rpm	$1990^{\pm 10}$

If the required value is not reached:

- ▶ Calibrate the accelerator pedal using the Sculi diagnostic software.
- ▶ Recheck the upper and lower engine speeds.

030.6.3.3 Reading the diesel engine service files

Valid for: L580-1495;

The data required for the diagnosis of the damage to the diesel engine and for handling warranty claims are referred to as service files.

The service file consists of the following information:

– Information and overview of the control unit in the form of a PDF-Files.

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▶ Tighten the adjusting screw on the primary pressure relief valve **2** by one turn.
▷ The opening pressure of the primary pressure relief valve is above the opening pressure of the secondary pressure relief valves.

▶ Tighten the adjusting screw on the LS pressure cut-off valve **1** by one turn.
▷ The opening pressure of the LS pressure cut-off valve is above the opening pressure of the secondary pressure relief valves.

Testing and adjusting

▶ Start the engine.

NOTICE
There is no secondary pressure relief valve for the lowering function.
Activating the lowering function can irreparably damage the working hydraulics pump.

▶ Do not activate the lowering function as far as it will go.

▶ At lower idling speed, activate in succession the lifting, tilting out and tilting in functions, as well as the optional additional functions, as far as they will go and then operate fully.

▶ While doing so, check whether the high pressure **P** is correct.

Description	Unit	Value
High pressure **P** during tilting out **3**	bar	$405^{\pm 5}$
High pressure **P** during tilting in **4**	bar	$405^{\pm 5}$
High pressure **P** during lifting **5**	bar	$425^{\pm 5}$
High pressure **P** during 3rd function A3 **6** (optional)	bar	$250^{\pm 5}$
High pressure **P** during 3rd function B3 **7** (optional)	bar	$250^{\pm 5}$
High pressure **P** during 4th function A4 **8** (optional)	bar	$250^{\pm 5}$
High pressure **P** during 4th function B4 **9** (optional)	bar	$250^{\pm 5}$

If the value is not correct:

▶ Set the bucket down on the ground on its teeth or cutting edge.

▶ Turn off the engine and take out the ignition key.

▶ Turn the adjusting screw of the corresponding secondary pressure relief valve.

Note
To adjust the secondary pressure relief valves:

▶ Turn the adjusting screw clockwise to increase the high pressure.

▶ Turn the adjusting screw anticlockwise to reduce the high pressure.

▶ Check and repeat the adjustment until the value is correct.

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- ▶ Screw the testing and filling device **10** on to the hydro accumulator.
  ▷ The hydro accumulator plug **2** can be opened with the handwheel **12**.
- ▶ Open the hydro accumulator plug **2** with the handwheel **12**.
- ▶ Check that the hydro accumulator filling pressure **11** is correct.

Description	Unit	Value
Filling pressure at a hydro accumulator temperature of 0 °C	bar	$23^{\pm 2}$
Filling pressure at a hydro accumulator temperature of 10 °C	bar	$24^{\pm 2}$
Filling pressure at a hydro accumulator temperature of 20 °C	bar	$25^{\pm 2}$
Filling pressure at a hydro accumulator temperature of 30 °C	bar	$26^{\pm 2}$

If the filling pressure is too low:
- ▶ Open the cylinder valve **4** on the nitrogen cylinder **3**.
- ▶ Adjust the pressure control valve **8** on the pressure reducer **5** until the output pressure gauge **7** shows the required pressure.
- ▶ Open the pressure reducer outlet valve **9**.
- ▶ Wait 2 minutes.
- ▶ Close the pressure reducer outlet valve **9**.

If the filling pressure is too high:
- ▶ Release nitrogen through the drain valve **13** of the hydro accumulator **1** until the filling pressure is correct.

After completing testing and adjustment

When the value is correct:
- ▶ Close the hydro accumulator plug **2** with the handwheel **12**.
- ▶ Take off the testing and filling device **10**.
- ▶ Tighten the hydro accumulator plug **2** to a torque of 20 Nm.
- ▶ Check the tightness of the hydro accumulator plug **2** with a leak spray.
- ▶ Screw the protective cap onto the hydro accumulator **1**.
- ▶ Disconnect the test line from the test connection **MX**.

030.6.5.12 Testing the control valve block for leakage

Valid for: L580-1495/31403-;

Check that the leakage from the spools in the control valve block is in the tolerance range.

Test for leaks when one of the following problems occurs:
- – The lift arms come down too quickly when the bucket is loaded and the working hydraulics are not actuated. Check the lift cylinder spool valve.
- – The loaded bucket tilts out when the working hydraulics are not actuated: Check the tilt cylinder spool valve.
- – When the bucket is tilted in it starts to wobble when the machine is travelling: Check the tilt cylinder spool valve.

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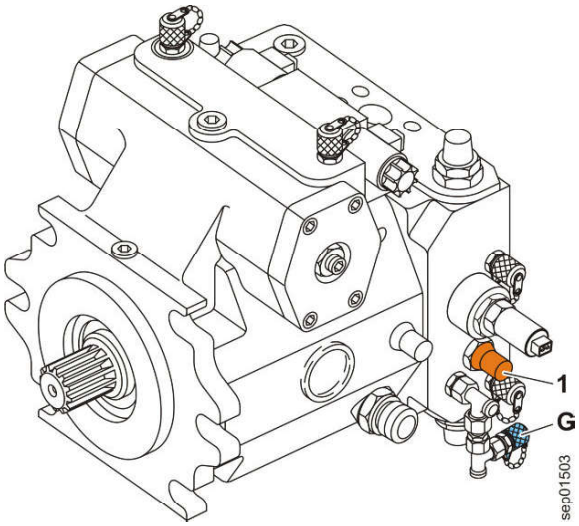

Fig. 178: Travel pump replenishing pressure relief valve

- ▶ Connect a pressure gauge (40 bar) to the replenishing pressure test connection **G** on the travel pump.
- ▶ Start the engine.
- ▶ Increase the engine speed to the upper idle speed.
- ▶ Check that the replenishing pressure **G** is correct.

Description	Unit	Value
Replenishing pressure **G**	bar	$34^{\pm 1}$

If the required value is not reached:

- ▶ Turn off the engine and take out the ignition key.
- ▶ Adjust the adjusting screw of the replenishing pressure relief valve **1**.

Note

To adjust the replenishing pressure relief valve:

- ▶ Turning the adjusting screw clockwise increases the replenishing pressure.
- ▶ Turning the adjusting screw anticlockwise reduces the replenishing pressure.

- ▶ Repeat the procedure and adjustment until the required value is attained.

If the required value is reached:

- ▶ Turn off the engine and take out the ignition key.
- ▶ Disconnect the pressure gauge from the replenishing pressure test connection **G**.

030.6.7.3 Travel pump high pressure relief valves

Valid for: L580-1495/31403-;

To check the high pressure relief valves, the pressure cut-off must be set to a higher value. (For more information see: Preparation, page 030-168)

Make sure the following preconditions are met:

- ❑ Tractive force reduction is switched off.

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Description	Unit	Value
High pressure	bar	$340^{\pm 5}$
Engine speed limit value	rpm	1900

If the engine speed falls below this limit value:
▶ Troubleshoot the engine (air filter, fuel filter etc.) or the travel hydraulics (check the operating pressures).

Once the test has been completed:
▶ Reset the ***CXdrPmpInchOff*** variable to ***0***.
▷ The inching function is activated.

030.6.7.9 Service code M2080 - check hydraulic oil contamination sensor and magnetic rod

Valid for: L580-1495/31403-;

NOTICE
Service code M2080 may indicate serious damage to the travel hydraulics.
The entire hydraulic system may be damaged.

▶ If service code M2080 appears, turn off the engine and do not start it again.

▶ Check for metal particles on the contamination sensor and the magnetic rod.

Service code M2080 appears when metal particles in the hydraulic oil trigger the hydraulic oil contamination sensor.

If service code M2080 appears, the hydraulic oil contamination sensor and the magnetic rod in the hydraulic tank must be checked for metal particles.

Make sure the following preconditions are met:
❑ The machine is cold.
❑ The machine is secured against rolling away.
❑ The ignition key has been taken out.
❑ The battery main switch is off.
❑ The service hatches are open.

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Description	Unit	Value
Brake pressure at least	bar	50

If the required value at the brake pressure test connection **M4** is not reached:
▶ Replace the front axle hydro accumulator **1**.

If the required value at the brake pressure test connection **M5** is not reached:
▶ Replace the rear axle hydro accumulator **2**.

If the required values are reached:
▶ Disconnect the pressure gauge from the accumulator charge pressure test connection **M3**.

▶ Disconnect the pressure gauge from the brake pressure test connection **M4**.

▶ Disconnect the pressure gauge from the brake pressure test connection **M5**.

030.6.9.4 Accumulator charge pressure switch shift pressure

Valid for: L580-1495/31403-;

Make sure that the machine is in the maintenance position for testing and adjustments.

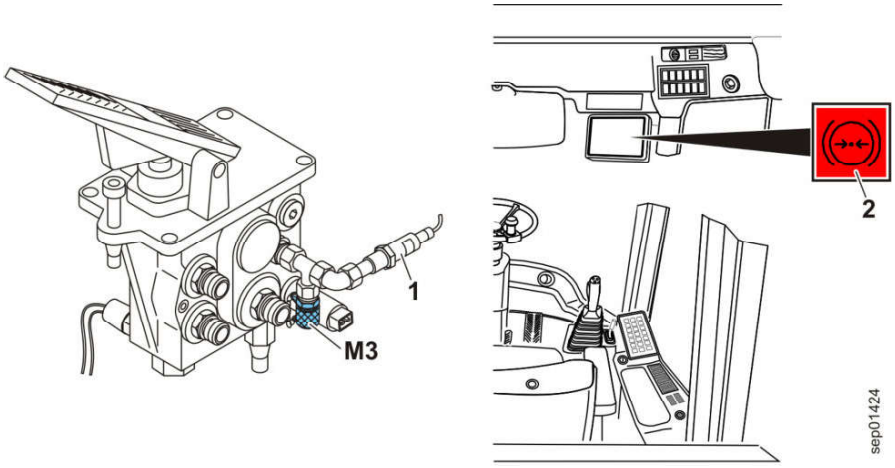

Fig. 192: Accumulator charge pressure switch shift pressure

1 Accumulator charge pressure switch
2 *Brake system accumulator pressure* symbol field
M3 Accumulator charge pressure test connection

▶ Connect a pressure gauge (600 bar) to the accumulator charge pressure test connection **M3** on the compact brake valve.

▶ Switch on the ignition.

▶ Slowly press the compact brake valve down several times until the *brake system accumulator pressure* symbol field in the display lights up.

▶ Check that the shift pressure **M3** is correct.

Description	Unit	Value
Switching pressure **M3**	bar	$120^{\pm 5}$

Measurement	Diagnosis	Malfunction
Resistance is less than 50 Ω	Short between CAN HIGH and CAN LOW.	Yes
Resistance of $120^{\pm 10}$ Ω	There is a break in the CAN line, a $120^{\pm 10}$ Ω resistor is defective or the $120^{\pm 10}$ Ω resistor in the last CAN node is missing.	Yes

Tab. 60: Diagnosis

Measuring the resistance between the CAN line and earth

A short circuit to earth in a CAN line can cause a severe malfunction of the machine. A short circuit to earth can be detected by following measurement.

Make sure that the machine is in maintenance position 1.

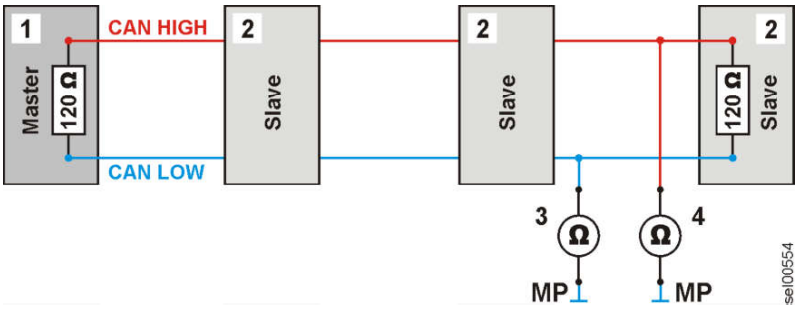

Fig. 207: Measuring the resistance between the CAN line and earth

1 Central control unit (Master4)
2 CAN node
3 Multimeter between CAN LOW and earth
4 Multimeter between CAN HIGH and earth
MP Earth

▶ Connect the multimeter to earth.

▶ Connect the multimeter to CAN HIGH or CAN LOW.

▶ Set the multimeter to ohm metering.

▶ Measure the resistance.

Measurement	Diagnosis	Malfunction
Resistance of approx. $2.2^{\pm 0.3}$ kΩ	There is no direct connection to earth. This value is arises from the electrical resistance.	No
Resistance is less than 50 Ω	The CAN line is connected to earth.	Yes

Tab. 61: Diagnosis

Measuring the voltage on the CAN line

The following faults can be detected by measuring the voltage on the CAN line:
– A break in the CAN line.
– The failure of the central control unit to communicate with the CAN nodes.
– The CAN line is in contact with the machine voltage.
– The CAN line is connected to earth.

Fig. 220: Display with exit button

▶ Press *exit* button.

▶ Press *exit* button.
  ▷ The software is uploaded again from the central control unit (Master4). This process can take several minutes.
  ▷ If the standard screen reappears after uploading, the procedure has been performed successfully.

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040.1.2.1 Overview of the fuel system

Valid for: L580-1495/31403-;

1.1 Layout

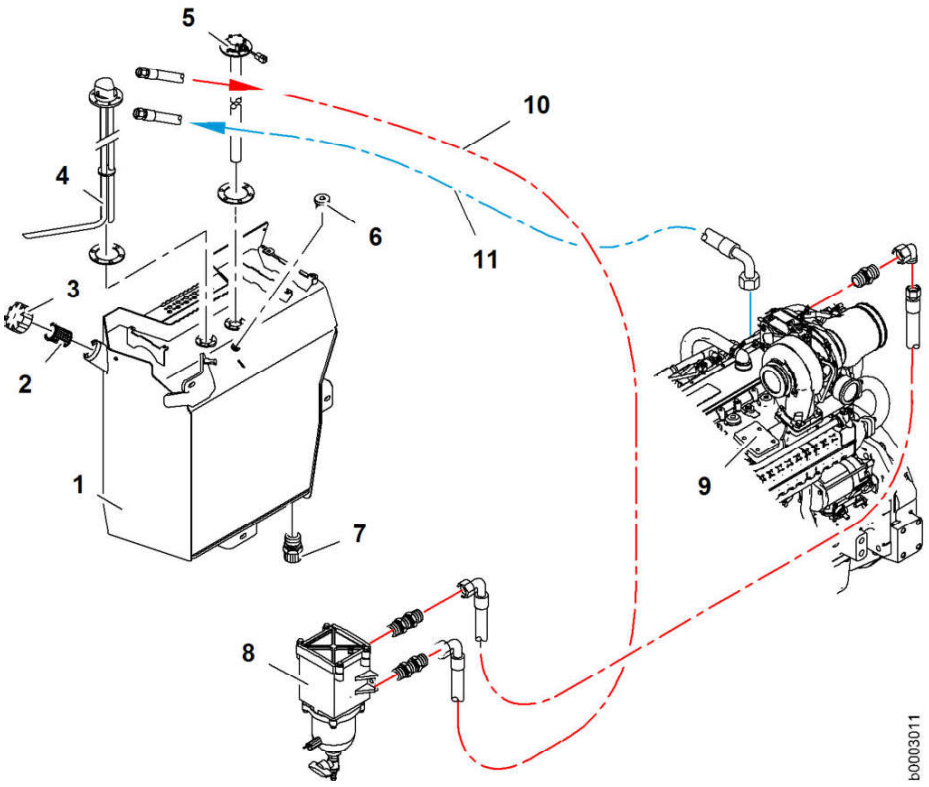

Fig. 226: Fuel system

1	Fuel tank	**7**	Drain valve
2	Filler strainer	**8**	Fuel pre-filter
3	Tank filler cap	**9**	Diesel engine
4	Distributor connection	**10**	Fuel supply
5	Fuel level sensor	**11**	Fuel return
6	Screw plug		

The fuel tank is located behind the right-hand cab access.

2.1 Basic function

The fuel pre-delivery pump in the engine draws the fuel through the distributor connection **4** and the fuel pre-filter (centrifugal filter) **8**.

The fuel pre-delivery pump delivers the fuel through fine filters to the high-pressure fuel pump.

The excess fuel flows back through a return line into the fuel tank **1**.

The fuel level sensor **5** measures the level in the fuel tank.

Fuel can be drained from the fuel tank with the drain valve **7**.

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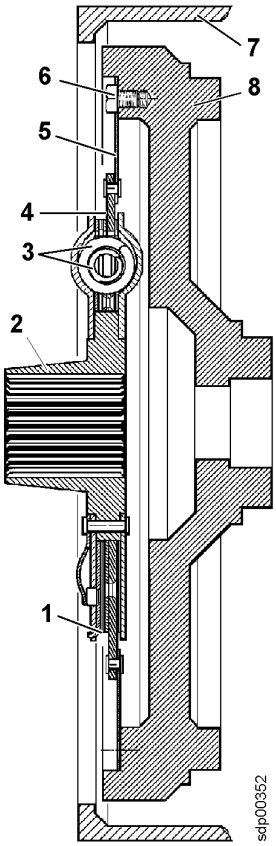

Fig. 237: Main components of the torsion absorber

1	Clutch torsion absorber	**5**	Shim
2	Hub	**6**	Fastening bolt
3	Compression springs	**7**	Flywheel housing
4	Shim	**8**	Flywheel

The shim **5** is bolted on to the flywheel **8** of the engine. The hub **2** is axially guided by circular shims **4** riveted onto it.

The hub **2** can move radially on the shim **4**. The ring-shaped compression springs **3** form an elastic joint, transmitting the torque between the shim **5** and hub **2**. The drive shaft of the splitter box is connected to the hub **2** with the spline shaft teeth.

2.1 Function

The clutch forms an elastic joint and absorbs the torque peaks between the engine and driven splitter box.

The compression springs **3** absorb the load fluctuations and torque surges on the engine crankshaft. This means far less torsional vibration from the crankshaft is transmitted to the splitter box.

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The fan gear pump draws up oil from the hydraulic tank and pumps it to the fan gear motor. The oil then flows from the fan gear motor to the leak oil connections on the travel motors. The oil cools both travel motors.

050.2.3 Fan gear motor

Valid for: L580-1495/31403-;

1 Layout

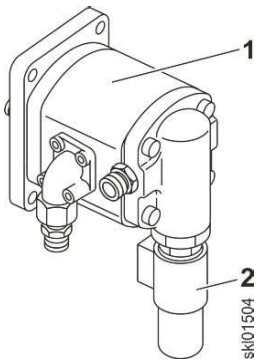

Fig. 244: Fan gear motor

1	Gear motor	**2**	Proportional pressure relief valve Y13

The fan gear motor is rigidly connected to the fan blade.

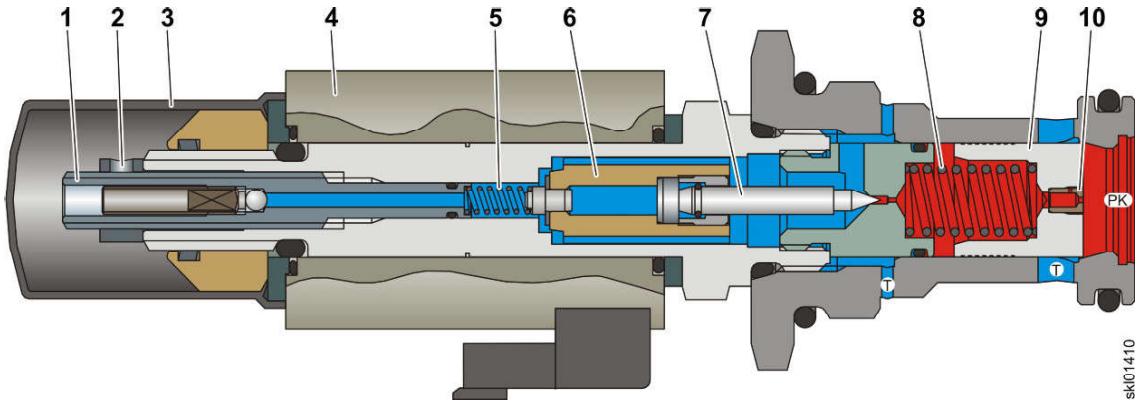

Fig. 245: Sectional view of the proportional pressure relief valve

1	Adjusting screw	**5**	Secondary spring	**9**	Primary piston
2	Counter nut	**6**	Stay	**10**	Restrictor
3	Protective cap	**7**	Secondary piston		
4	Proportional solenoid Y13	**8**	Primary spring		

2	Travel pump	**9**	Ride control hydro accumulator unit (optional)	**P**	Working hydraulics high pressure test connection
3	Working hydraulics pump	**10**	Control valve block	**M1**	Working hydraulics pump return pressure test connection
4	Solenoid valve block	**11**	Compact brake valve (housing preheating)	**G**	Replenishing pressure test connection
5	Working hydraulics lockout solenoid valve Y14	**12**	Left lift cylinder	**MX**	Test connection for hydro accumulator ride control load pressure
6	Pilot control hydro accumulator	**13**	Right lift cylinder		
7	Pilot control unit		Tilt cylinder		

The working hydraulics consist of the following components:

- Hydraulic tank (For more information see: 080.1.1 Overview of the hydraulic tank, page 080-2)
- Working hydraulics pump (For more information see: 060.2 Working hydraulics pump, page 060-7)
- Control valve block (For more information see: 060.3 Z kinematics control valve block, page 060-11)
- Pilot control (For more information see: 060.4.1 Overview of the pilot control unit, page 060-14)
- Ride control (optional) (For more information see: 060.5.1 Overview of the ride control system, page 060-22)
- Lift cylinder
- Tilt cylinder

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17 Secondary pressure relief valve for raising lift arms
18 Strainer
19 Flow regulating valve
20 LS pressure cut-off valve
38 Pilot control unit connection 3
38 Pilot control unit connection 4
LS Working hydraulics load sensing pressure
P Working hydraulics high pressure

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2 Function

When driving on uneven ground, especially with loaded buckets, the machine is subjected to bouncing and pitching vibrations. These vibrations are cushioned by the ride control system.

Ride control is only active when the following conditions are fulfilled:
– Ride control is switched on (with the *ride control* button).
– The travel speed is at least 9 km/h.

When the ride control is activated, the stabilisation module connects the ring side of the lift cylinder to the hydraulic tank. This allows the lift arms to move up freely.

The stabilisation module also connects the piston side of the lift cylinder to the ride control hydro accumulator. The ride control hydro accumulator cushions the vibrations which occur when driving.

060.5.2 Stabilisation module

Valid for: L580-1495/31403-;

1 Layout

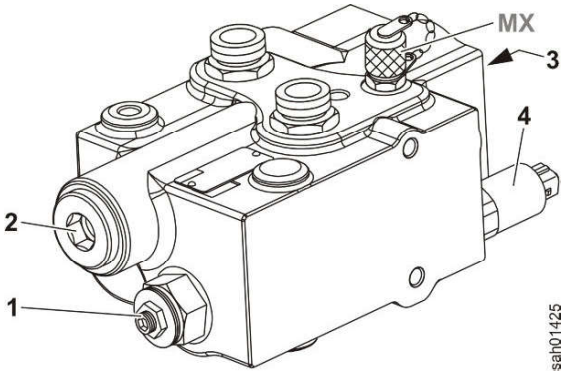

Fig. 271: Stabilisation module

1 Safety valve
2 Ride control valve spool
3 Hydro accumulator relief valve
4 Ride control solenoid valve Y20
MX Test connection for hydro accumulator ride control load pressure

The stabilisation module is fitted in the front section behind the control valve block.

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3	Return strainer	**31a**	Reverse travel direction solenoid Y3	**63**	Separator
4	Bypass valve	**31b**	Forward travel direction solenoid Y2	**64**	Hydraulic oil contamination sensor B65
5	Return suction filter	**35**	Engine	**65**	**Collector pipe**
6	Pre-tension valve	**36**	Travel pump high pressure sensor B45	**66**	Bypass valve 1.5 bar
7	Replenishing valve	**37**	Solenoid valve block	**67**	0.2 bar check valve
8	Strainer	**38**	Supply hydro accumulator	**68**	Servostat return flow
9	Working hydraulics pump suction port	**40**	**Travel motor 1**	**69**	Fan gear pump
10	Drain valve	**41**	Axial piston pump	**70**	Brake system gear pump
11	Hydraulic oil temperature sensor B8	**42**	Check valve	**71**	Travel motor scavenging gear pump
12	Steering pump suction port	**43**	Check valve	**72**	In-line filter 80 µm
13	Emergency steering pump suction port	**44**	Proportional valve and control piston YEP1	**75**	**Fan gear motor**
14	Brake system gear pump suction port	**45**	Servo piston	**76**	Gear motor
15	Bypass valve 2.5 bar	**46**	Discharge valve	**77**	Proportional pressure relief valve
16	Working hydraulics pump and steering pump leak oil	**47**	Orifice	**78**	Restrictor
17	Solenoid valve block return flow and pilot control unit	**48**	Pressure relief valve	**79**	Primary piston
18	Compact brake valve return flow	**49**	Check valve	**80**	Secondary piston with proportional solenoid Y13
19	Control valve block return flow	**50**	**Travel motor 2**	**81**	Hydraulic oil cooler
20	**Travel pump**	**51**	Axial piston pump	**82**	Transmission heat exchanger
21	Replenishing pump	**52**	Check valve	**X1**	Forward travel direction servo pressure
22	Shuttle valve	**53**	Check valve	**X2**	Reverse travel direction servo pressure
23	Pressure cut-off valve	**54**	Proportional valve and control piston YEP2	**MA**	Reverse travel direction high pressure
24	Control pressure proportional valve Y15	**55**	Servo piston	**MB**	Forward travel direction high pressure
25	Restrictor 1.8 mm	**56**	Discharge valve	**G**	Replenishing pressure
26	Reverse high pressure relief valve	**57**	Orifice	**M1**	Travel motor 1 servo pressure
27	Forward high pressure relief valve	**58**	Pressure relief valve	**M2**	Travel motor 2 servo pressure
28	Replenishing pressure relief valve	**59**	Check valve	**PK**	Cooling system high pressure
29	Servo cylinder	**60**	Orifice Ø 4.2 mm		

The travel hydraulics is a closed circuit. This means that after leaving the consumers (travel motors), the oil flows directly back to the pump (travel pump).

The travel hydraulics function hydrostatically. The travel pump **20** converts the rotary movement of the engine **35** into a piston stroke movement (axial piston pump). The piston stroke pumps the oil. The travel motors **40** and **50** also use a piston stroke movement to convert the flow of oil into a rotary movement (axial piston motor). There is no slip with this kind of drive.

Leakage in the rotary groups and discharge from the travel motors mean that oil constantly flows out of the closed circuit. This oil is collected in the collector

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To increase the speed, the central control unit moves both variable displacement motors to a smaller angle.

The switching range is reached at 6 km/h. The central control unit starts moving the variable displacement motor **1** towards the minimum angle. At the same time the central control unit starts moving the variable displacement motor **2** towards an angle of 23°.

At 7.5 km/h, the first switching point **S1** is reached. The variable displacement motor **1** is at the minimum angle of 0°. This relieves clutch 1 in the transmission. The central control unit opens clutch 1. The variable displacement motor **2** is at an angle of 23°.

Travel speed 7.5 km/h to 17 km/h (2nd gear)

In second gear, only travel motor 2 is active. Travel motor 1 remains disengaged.

To increase the speed, the central control unit moves the variable displacement motor **2** to a smaller angle.

Shortly before a speed of 17 km/h, the second switching point **S2** is reached. The central control unit re-engages travel motor 1 via clutch 3 and starts to move the variable displacement motor **1** to a larger angle. The central control unit also starts moving the variable displacement motor **2** towards the minimum angle.

Travel speed above 17 km/h (3rd gear)

After the speed exceeds 17 km/h, the third switching point **S3** is reached. The variable displacement motor **2** is at the minimum angle of 0°. This relieves clutch 2. The central control unit opens clutch 2. The variable displacement motor **1** is at the maximum angle of 25°.

After that, only travel motor 1 is active. Travel motor 2 remains disengaged.

To increase the speed above 23 km/h, the central control unit moves the variable displacement motor **1** to a smaller angle.

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2 Basic function

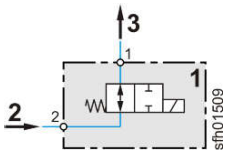

Fig. 297: Hydraulic diagram of the discharge cut-off solenoid valve

1 Discharged oil from the travel motors
2 Discharge cut-off solenoid valve Y69
3 Collector pipe

When the central control unit energises the discharge cut-off solenoid valve, it separates the discharge of the two travel motors from the collector pipe. This deactivates the discharge function.

2.2 Deactivating discharge

The discharge cut-off solenoid valve is energised and the discharge thus separated in the following conditions:
– Change of travel direction
– Transmission shifting
– Overspeed (machine in engine braking mode)
– Heavy braking

In these conditions a sudden change from high pressure to low pressure can occur in the travel motors. This change means that the discharge valve in the travel motors also has to switch.

If there is a sudden change between high and low pressure and the discharge valve switches too slowly, the closed circuit can lose a large quantity of oil through the discharge. This causes a pressure drop that can temporarily lift up the control lenses in the travel motors. This damages the travel motors in the long run.

Shutting off the discharge reduces this loss of oil and the resulting pressure drop.

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090 Steering system

Contents

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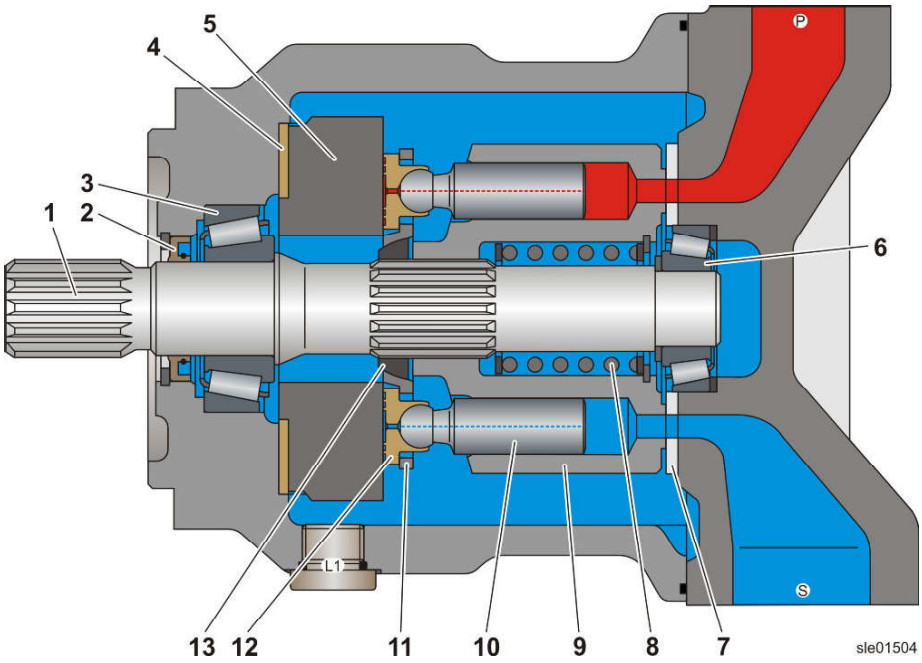

Fig. 311: Sectional view of rotary group

1	Drive shaft	**8**	Compression spring
2	Shaft seal ring	**9**	Rotary group cylinder
3	Tapered roller bearing	**10**	Piston
4	Bearing shell	**11**	Return plate
5	Swivel plate bearing	**12**	Glide shoe
6	Tapered roller bearing	**13**	Return ball
7	Control plate		

2 Function

The emergency steering supplies the servostat with oil for a brief time if the working hydraulics pump fails. As the emergency steering pump works electrically with power from the vehicle battery, the emergency steering is still able to work even when the engine is not running.

When the emergency steering is activated, the emergency steering pump draws oil from the hydraulic tank and pumps it to the valve block. The oil then flows from the valve block to the servostat.

090.6.2 Emergency steering pump

Valid for: L580-1495/31403-;

1 Layout

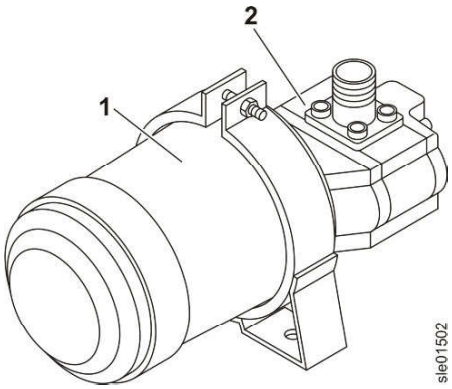

Fig. 325: Emergency steering pump

1	Electric motor M8	**2**	Gear pump with pressure relief valve

The emergency steering pump is fitted in the frame of the rear section.

The emergency steering pump consists of an electric motor **1** and a gear pump **2** with integrated pressure relief valve.

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3 Rear axle
4 Disc brake
5 Front axle
6 Solenoid valve block
7 Compact brake valve
10 Control valve block (housing preheating)
11 Parking brake hydro accumulator
12 Brake system gear pump
13 Front axle service brake hydro accumulator
13 Rear axle service brake hydro accumulator
M4 Front axle brake pressure test connection
M5 Rear axle brake pressure test connection
M6 Parking brake test connection

The following components are part of the brake systems:
– Service brake
– Parking brake
– Overspeed protection

The following components are part of the service brake and the parking brake: (For more information see: 100.2 Service brake and parking brake, page 100-6)
– Hydraulic tank
– Brake system gear pump
– Compact brake valve

In addition, the following components are part of the service brake: (For more information see: 100.3.1 Overview of the service brake, page 100-15)
– Service brake hydro accumulator
– Brake light pressure switch
– Accumulator charge pressure switch
– Wet disc brakes (axles)

In addition, the following components are part of the parking brake: (For more information see: 100.4.1 Overview of the parking brake, page 100-22)
– Disc brake
– Parking brake hydro accumulator

The following components are part of the overspeed protection system: (For more information see: 100.5.1 Overview of the overspeed protection system, page 100-28)
– Overspeed protection solenoid valve
– Travel pump
– Wet disc brake (rear axle)

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If the pedal is pushed down further, the oil pressure also increases in the brake circuits because increased oil pressure is required to push the pressure regulator pistons against the pressure regulator spring again.

2.6 Parking brake

When the parking brake solenoid valve Y10 is energised, oil flows from the parking brake hydro accumulator to the disc brake. The parking brake disengages.

2.7 Brake light

The brake light is switched on by the brake light pressure switch B12 in the 2nd brake circuit. (For more information see: 100.3.3 Brake light pressure switch , page 100-19)

2.7.1 *Brake system accumulator pressure* symbol field

The brake system accumulator pressure symbol field is activated by the accumulator charge pressure switch B19. (For more information see: 100.3.4 Accumulator charge pressure switch, page 100-20)

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2 Function

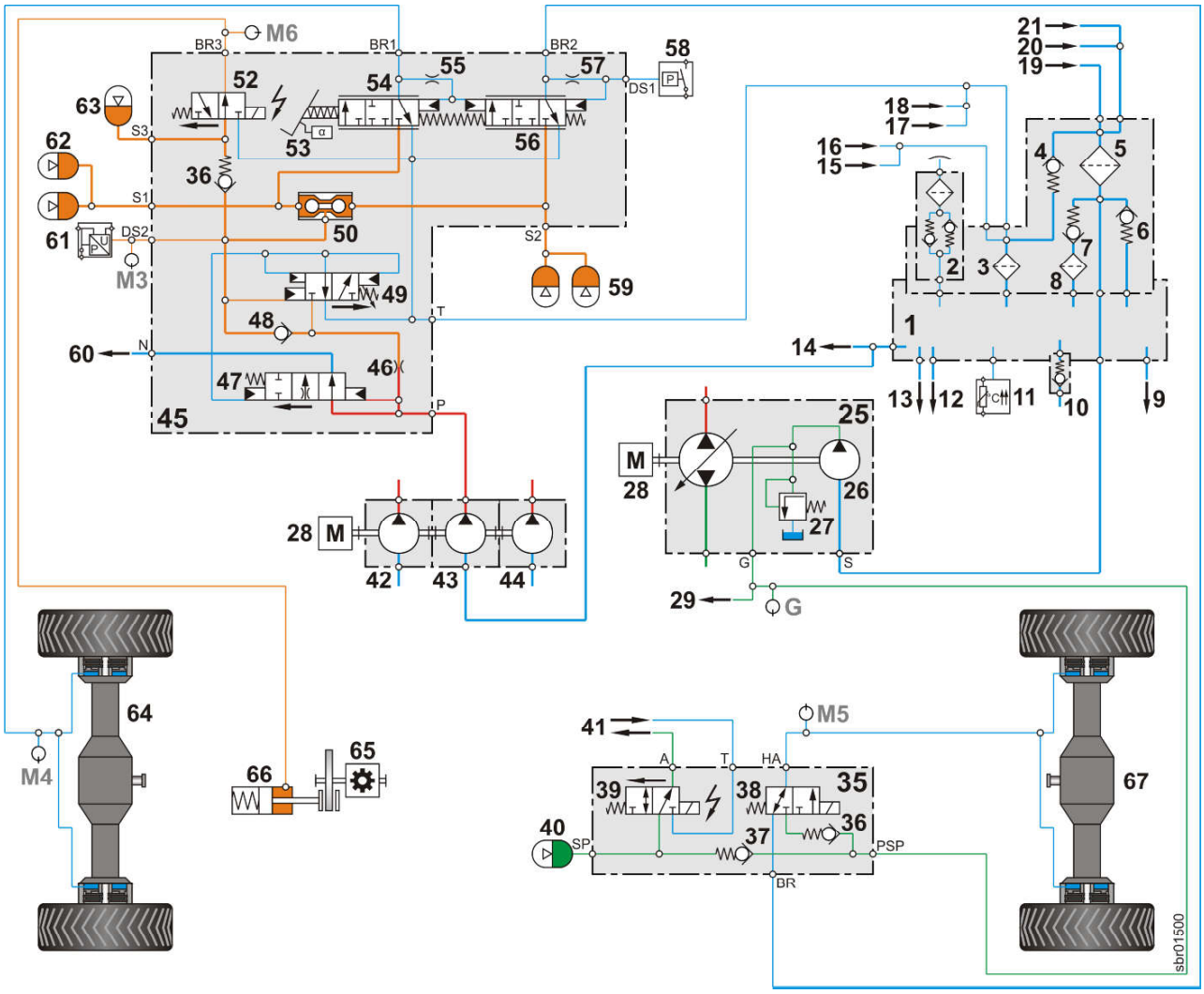

Fig. 358: Hydraulic diagram of the brake system

1	**Hydraulic tank**	**26**	Replenishing pump	**53**	Inching angle sensor R1
2	Breather filter	**27**	Replenishing pressure relief valve	**54**	Pressure regulator piston for 1st brake circuit
3	Return strainer	**28**	Engine	**55**	Restrictor
4	Bypass valve	**29**	Travel motor supply	**56**	Pressure regulator piston for 2nd brake circuit
5	Return and suction filter	**35**	**Solenoid valve block**	**57**	Restrictor
6	Pre-tension valve	**36**	Check valve	**58**	Brake light pressure switch B12
7	Replenishing valve	**37**	Check valve	**59**	Rear axle hydro accumulator
8	Strainer	**38**	Overspeed protection solenoid valve Y16	**60**	Control valve block (housing preheating)
9	Working hydraulics pump suction port	**39**	Working hydraulics lockout solenoid valve Y14	**61**	Accumulator charge pressure switch B19
10	Drain valve	**40**	Pilot control hydro accumulator	**62**	Front axle hydro accumulator
11	Hydraulic oil temperature sensor B8	**41**	Pilot control	**63**	Parking brake hydro accumulator

See next page for continuation of the image legend

110 Electrical system

Contents

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The brake lights are controlled by the brake light pressure switch B12.

The reversing lights are operated via an output on the output module A17b.

The tail lights and marker lights are controlled via terminal 58.

Functions on the steering-column switch S3			
BMK	**Function**	**BMK**	**Function**
H56	Left high beam	H15	Front left direction indicator
H57	Right high beam	H16	Front right direction indicator
H54	Left low beam	H17	Rear left direction indicator
H55	Right low beam	H18	Rear left direction indicator

Tab. 77: Functions on the steering-column switch S3

Functions on switches on the cab ceiling		
BMK	**Function**	**Switch**
E10	Front left working headlight	P7
E11	Front right working headlight	P7
E12	Rear left cab roof working headlight	S8
E13	Rear right cab roof working headlight	S8
	Hazard warning system	S4

Tab. 78: Functions on switches on the cab ceiling

Functions on the reversing headlight output on module A17b			
BMK	**Function**	**BMK**	**Function**
E1b	Left reversing light	H52	Left reversing light
E5b	Right reversing light	H53	Right reversing light

Tab. 79: Functions on the reversing headlight output on module A17b

Functions on terminal 58			
BMK	**Function**	**BMK**	**Function**
E6	Left tail light	H50	Front left marker light / parking light
E7	Right tail light	H51	Front right marker light / parking light

Tab. 80: Functions on terminal 58

Functions on the brake light pressure switch B12			
BMK	**Function**	**BMK**	**Function**
H20	Left brake light	H21	Right brake light

Tab. 81: Functions on the brake light pressure switch B12

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BMK	SYSTEM	PLACE	FUNCTION	SHEET
-K5a.X	=K	+K1	PLUG INTERVAL WINDSCREEN WIPER FRONT	/22.C7
-K9	=K	+K2	BEACONLIGHT	/27.B2
-K01	=K	+K2	IGNITION STARTER SWITCH BYPASS	/15.B2
-K02	=K	+K2	STARTER SOLENOID	/15.B6
-K10	=K	+K2	MIRROR-/REAR WINDOW HEATER	/27.C6
-K11	=H	+H4	EMERGENCY STEERING PUMP	/19.C2
-K12	=K	+K2	RADIO; ELECTRICAL SOCKET 12V	/28.B4
-K22	=K	+K2	HAZARD WARNING LIGHT KI.15	/21.C2
-K22a	=K	+K2	HAZARD WARNING LIGHTS MG	/21.C3
-K22b	=K	+K2	HAZARD WARNING LIGHTS MG	/21.C4
-K25 *	=K	+K2	HAZARD WARNING LIGHTS USA	/21.C5
-K26 *	=K	+K2	HAZARD WARNING LIGHTS USA	/21.C7
-K31A	=K	+K2	WORKING PROJECTOR FRONT LEFT	/24.B4
-K31B	=K	+K2	WORKING PROJECTOR FRONT RIGHT	/24.B7
-K32A	=K	+K2	WORKING PROJECTOR REAR LEFT	/25.B4
-K32B	=K	+K2	WORKING PROJECTOR REAR RIGHT	/25.B7
-K33A	=K	+K2	WORKING PROJECTOR CAB ROOF REAR LEFT	/26.B3
-K33B	=K	+K2	WORKING PROJECTOR CAB ROOF REAR RIGHT	/26.B6
-K215	=K	+K	AUXILIARY HEATER	/47.D4
-K215a	=K	+K	AUXILIARY HEATER	/47.D5
-K227 *	=K2	+K2:RH	DIESEL PREHEATING	/44.C4
-K231	=K	+K	QUICK-CHANGE DEVICE	/43.C3
-K232	=K	+K	QUICK-CHANGE DEVICE	/43.D7
-K233	=K	+K	QUICK-CHANGE DEVICE	/43.C2
-K241	=K	+A4	RELAY BREMSDRUCKSCHALTER	/45.B7
-K242	=K	+K2	CONDENSER FAN	/46.C6
-K243	=K	+K2	RELAY AUXILIARY HEATER	/48.B4
-K244	=K	+K2	CONDENSER FAN	/46.C8
-K245	=K	+K2	CONDENSER FAN	/46.C5
-K300a	=K	+K2	RELAY FUEL PREHEATING	/50.C5
-K300b	=K	+K2	RELAY DIESEL PREHEATING	/50.C6
-K301a	=K	+K2	RELAY FAN AUXILIARY HEATER	/49.C5
-K301b	=K	+K2	RELAY FAN AUXILIARY HEATER	/49.C6
-KI.15.X	=K	+K2	CONNECTION KI.15 A4	/15.B2
-KI. 15.Xc	=K	+K	QUICK-CHANGE DEVICE	/43.A2
-KL.30	=K	+K.	CLAMP 30 CAB	/49.E4

BMK	SYSTEM	PLACE	FUNCTION	SHEET
-KL.30	=K	+K	AUXILIARY HEATER	/47.F5
-KI.30.X	=K	+K2	CONNECTION KI.30 A4	/15.C2
-KI.30.X2*	=K	+K2	CONNECTION KI.30 A4	/16.C3
-KI.30.Xa *	=K	+K2	DIESEL PREHEATING	/44.C3
-KI.30.Xa1	=K	+K2	KI.30 DIESEL PREHEATING -40°	/50.B3
-L2	=K	+K2	LED F2	/20.C6
-L3	=K	+K2	LED F3	/20.C6
-L4	=K	+K2	LED F4	/20.C4
-L5	=K	+K2	LED F5	/20.C4
-L6	=K	+K2	LED F6	/17.D6
-L7	=K	+K2	LED F7	/17.D7
-L8	=K	+K2	LED F8	/15.B8
-L8A	=K	+K2	LED F8A	/15.B7
-L9	=K	+K2	LED F9	/38.B5
-L07B	=K	+K2	LED F07B	/21.D1
-L10	=K	+K2	LED F10	/29.D3
-L11	=K	+K2	LED F11	/42.E1
-L13	=K	+K2	LED F13	/46.B1
-L15	=K	+K2	LED F15	/38.B4
-L16	=K	+K2	LED F16	/15.B6
-L18	=K	+K2	LED F18	/23.B1
-L19	=K	+K2	LED F19	/46.B2
-L20	=K	+K2	LED F20	/22.C5
-L21	=K	+K2	LED F21	/20.C3
-L22	=K	+K2	LED F22	/45.B6
-L24	=K	+K2	LED F24	/55.B2
-L25	=K	+K2	LED F25	/27.C2
-L26	=K	+K2	LED F26	/51.B3
-L27	=K	+K2	LED F27	/17.D8
-L29	=K	+K2	LED F29	/15.C3
-L30	=K	+K2	LED F30	/28.B2
-L31A	=K	+K2	LED F31A	/24.B3
-L31B	=K	+K2	LED F31B	/24.B6
-L32A	=K	+K2	LED F32A	/25.B3
-L32B	=K	+K2	LED F32B	/25.B6
-L33A	=K	+K2	LED F33A	/26.B2

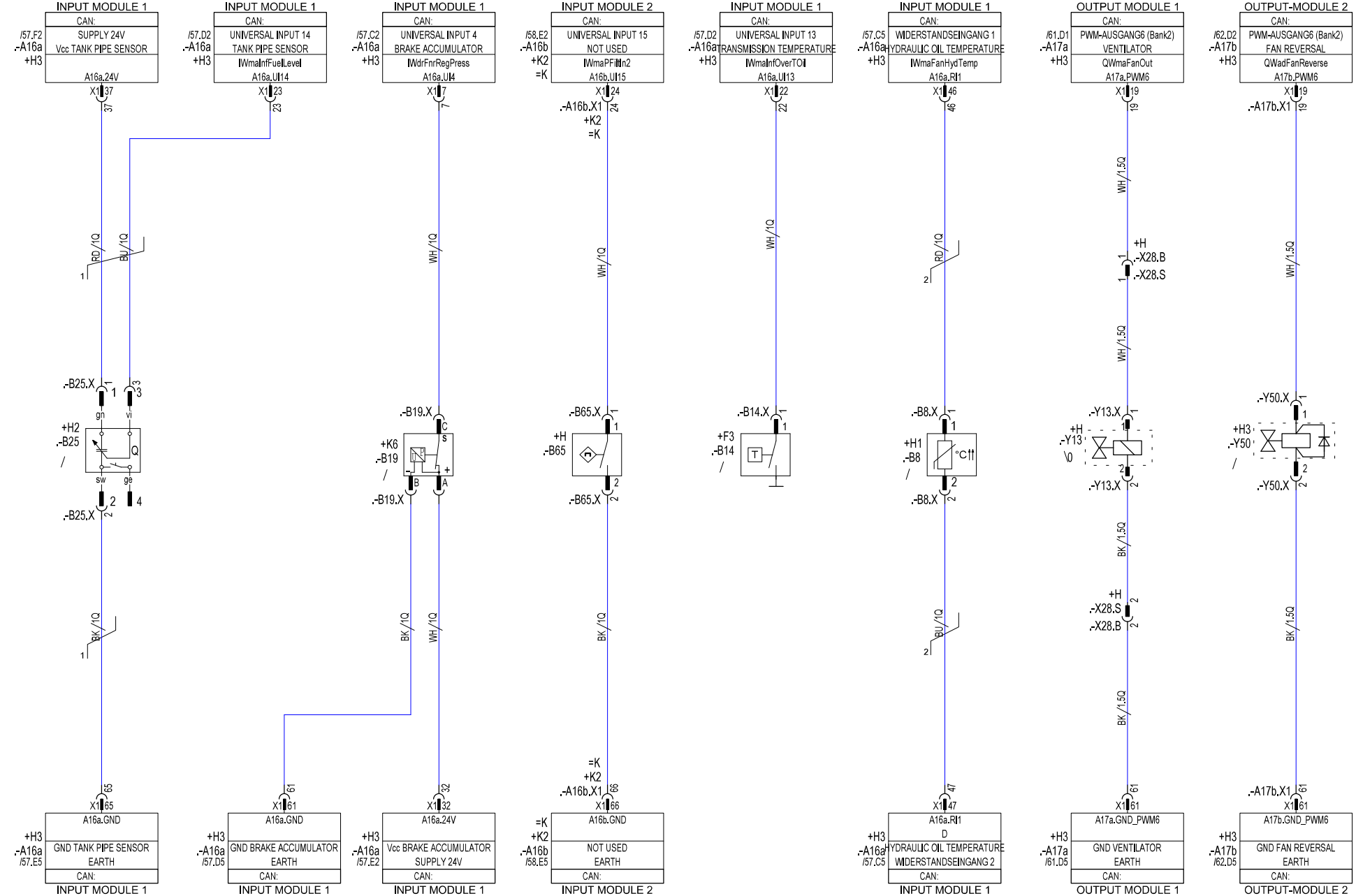
PROJECT: B L580 Mit Schalter Neu - 05.03.2016 Generator Neu
ARTICLE CODE: 93024141
DRAWING NUMBER: 1412 90100 01 00
DRAWING INDEX: 002

MACHINE TYPE
LIDOS UNIT

MACHINE SERIAL NUMBER
XXXXX

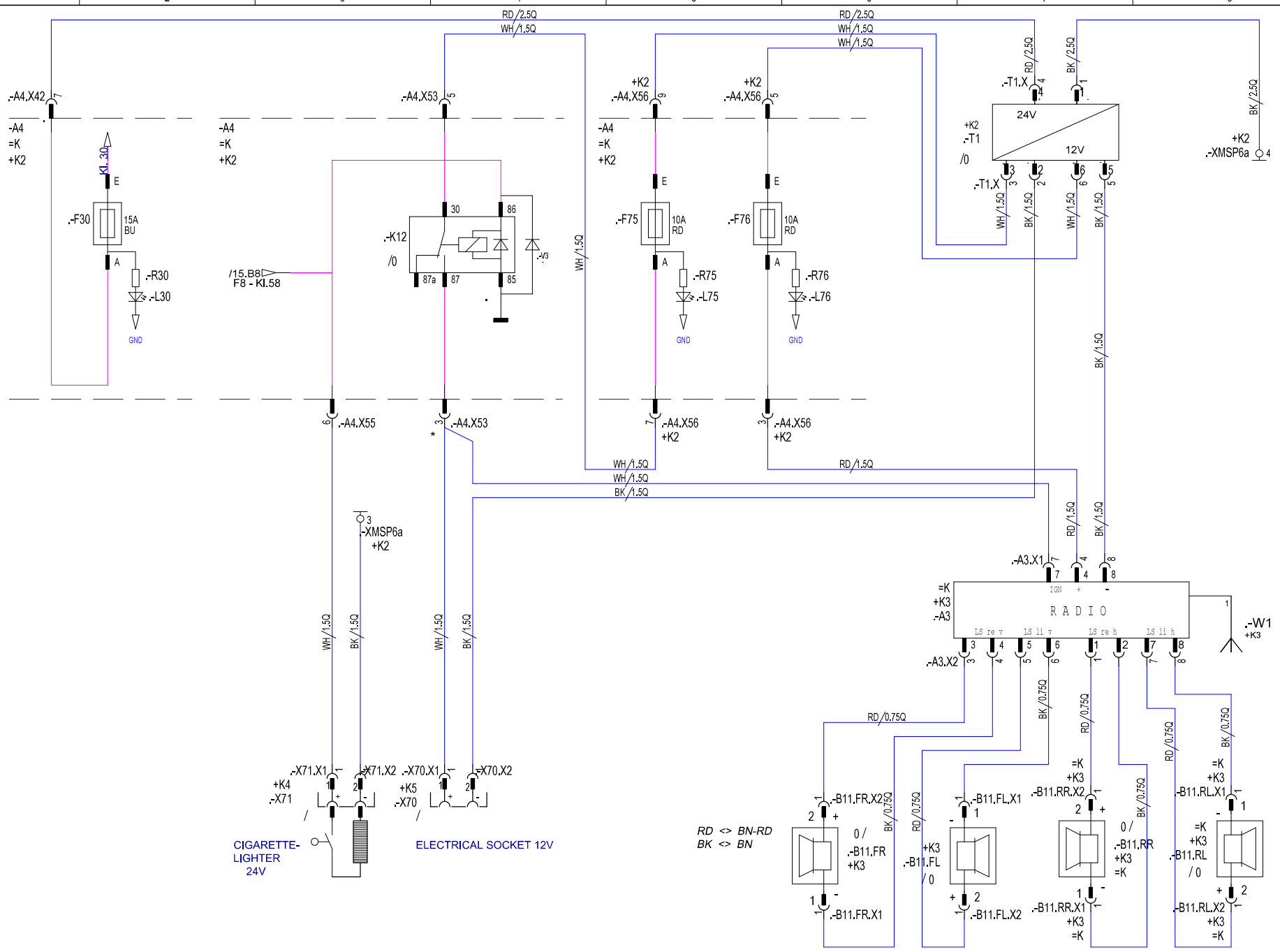
LIEBHERR
FACTORY

BMK-INDEX
E-SCHEMA



PROJECT: B L580 Mit Schalter Neu - 05.03.2016 Generator Neu
ARTICLE CODE: 93024141
DRAWING INDEX: 002
DRAWING NUMBER: 1412 90100 01 00

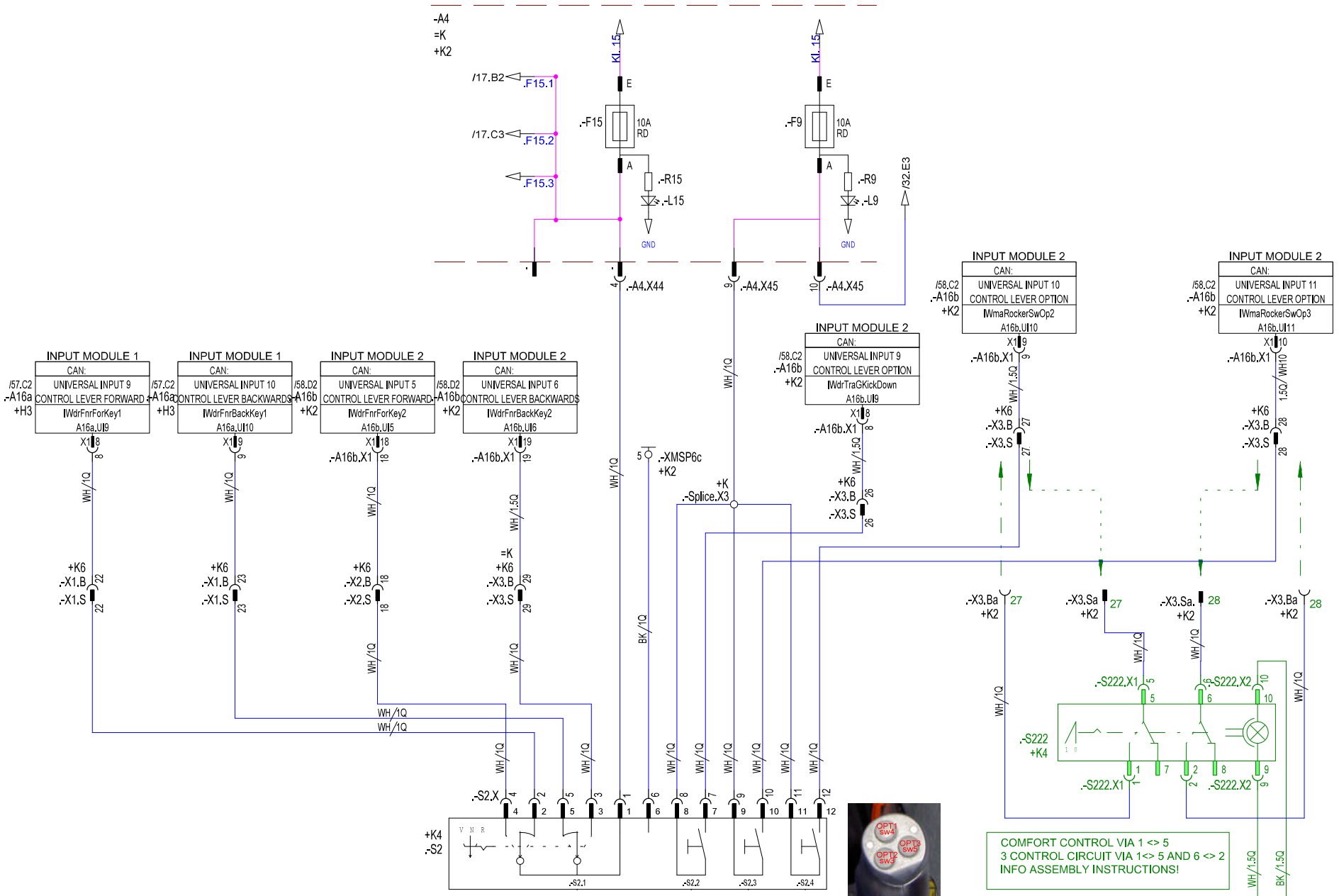
MACHINE TYPE	MACHINE SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY	TANK PIPE SENSOR ; TRANSMISSION- / HYDRAULIC OIL TEMPERATURE ; E-SCHEMA	SHEET: 18 FROM: 66
				CREATION DATE: 18.05.2017 15:46



PROJECT: B L580 Mit Schalter Neu - 05.03.2016 Generator Neu
DRAWING NUMBER: 1412 90100 01 00
ARTICLE CODE: 93024141
DRAWING INDEX: 002

MACHINE TYPE	MACHINE SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY	CIGARETTE LIGHTER ; ELECTRICAL SOCKET 12V ; RADIO ; E-SCHEMA	SHEET: 28 FROM: 66
				CREATION DATE: 18.05.2017 15:46

PROJECT: B L580 Mit Schalter Neu - 05.03.2016 Generator Neu
DRAWING NUMBER: 1412 90100 01 00
ARTICLE CODE: 93024141
DRAWING INDEX: 002



LH CONTROL LEVER V-N-R AND OPTIONS

MACHINE TYPE	MACHINE SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY	LH-CONTROL LEVER E-SCHEMA	SHEET: 38 FROM: 66
				CREATION DATE: 18.05.2017 15:46

PROJECT: B L580 Mit Schalter Neu - 05.03.2016 Generator Neu
DRAWING NUMBER: 1412 90100 01 00
ARTICLE CODE: 93024141
DRAWING INDEX: 002

!!! NONE Steckergehäuse erforderlich !!!

MACHINE TYPE: LIDOS UNIT
MACHINE SERIAL NUMBER: XXXXX
LIEBHERR FACTORY
AUXILIARY HEATER DBW 2010
E-SCHEMA
SHEET: 48 FROM: 66
CREATION DATE: 18.05.2017 15:46

PROJECT: B L580 Mit Schalter Neu - 05.03.2016 Generator Neu
ARTICLE CODE: 93024141
DRAWING NUMBER: 1412 90100 01 00
DRAWING INDEX: 002

INPUT MODULE 2 ; ON- AND OUTLETS

+K2 .-A16b
Modul Nr.:
Modulname: PME1_EINGANGSMODUL

Phys. Adr.	Blatt	EA	Beschreibung	Stecker	Pin	Phys. Adr.	Blatt	EA	Beschreibung	Stecker	Pin
A16b.24V			NOT USED	0	1	A16b.24V			NOT USED	0	41
A16b.24V_logic	/33.E1		SUPPLY LOGICAL PART	0	2	A16b			NOT USED	0	42
A16b.GND			NOT USED	0	3	A16b.CAN_Low	/31.B5		CAN LOW > CAN NOT USED	0	43
A16b.UI1			NOT USED	0	4	A16b.CAN_Low	/31.B3		CAN LOW	0	44
A16b.UI2	/20.A7		HIGH BEAM	0	5	A16b.GND			NOT USED	0	45
A16b.UI3	/21.A8		INDICATOR SIGNAL	0	6	A16b.RI1			NOT USED	0	46
A16b.UI4			PRESSURE CLUTCH 2+1	0	7	A16b.RI1			NOT USED	0	47
A16b.UI9	/38.C5		CONTROL LEVER OPTION	0	8	A16b.RI2			NOT USED	0	48
A16b.UI10	/38.B6		CONTROL LEVER OPTION	0	9	A16b.RI2			NOT USED	0	49
A16b.UI11	/38.B8		CONTROL LEVER OPTION	0	10	A16b.5V			NOT USED	0	50
A16b.UI12			BUZZER	0	11	A16b.5V			NOT USED	0	51
A16b.GND			NOT USED	0	12	A16b.5V			NOT USED	0	52
A16b			NOT USED	0	13	A16b.5V			NOT USED	0	53
A16b.24V			NOT USED	0	14	A16b.GND			NOT USED	0	54
A16b.24V			NOT USED	0	15	A16b.FI1	/52.A8		rpm HYDRAULIC MOTOR 2	0	55
A16b.GND_logic	/33.E2		GND LOGICAL PART	0	16	A16b.FI2	/53.F7		DISTRIBUTOR	0	56
A16b.GND			NOT USED	0	17	A16b.CAN_High	/31.B6		CAN HIGH > CAN NOT USED	0	57
A16b.UI5	/38.C3		CONTROL LEVER FORWARD	0	18	A16b.CAN_High	/31.B4		CAN HIGH	0	58
A16b.UI6	/38.C3		CONTROL LEVER BACKWARDS	0	19	A16b.GND	/53.F8		GND DISTRIBUTOR	0	59
A16b.UI7	/39.A3		INCH PEDAL	0	20	A16b.GND	/53.F5		GND LEVEL	0	60
A16b.UI8	/39.A7		SPEED-PEDAL	0	21	A16b.GND			NOT USED	0	61
A16b.UI13	/53.F4		LEVEL	0	22	A16b.GND	/39.F3		GND INCH PEDAL	0	62
A16b.UI14	/43.C8		NOT USED	0	23	A16b.GND	/39.F7		GND SPEED-PEDAL	0	63
A16b.UI15	/18.A4		NOT USED	0	24	A16b.GND			NOT USED	0	64
A16b.UI16			SENSOR 1 JOY.	0	25	A16b.GND			NOT USED	0	65
A16b.GND			NOT USED	0	26	A16b.GND	/18.F4		NOT USED	0	66
A16b			NOT USED	0	27	A16b.GND			SIGNAL JOYSTICK STEERING	0	67
A16b.24V			NOT USED	0	28	A16b.GND			NOT USED	0	68
A16b.CAN_Res			CAN END > PIN 43	0	29	A16b.GND_FI1	/52.F8		rpm HYDRAULIC MOTOR 1	0	69
A16b.24V	/33.E3		SUPPLY 24V	0	30	A16b.GND_FI2			NOT USED	0	70
A16b.GND	/33.E4		SUPPLY EARTH	0	31						
A16b.24V	/53.A7		DISTRIBUTOR	0	32						
A16b.24V	/53.A4		LEVEL	0	33						
A16b.24V	/39.A4		Vcc INCH PEDAL	0	34						
A16b.24V	/39.A8		Vcc SPEED-PEDAL	0	35						
A16b.24V			Vcc SENSOR 1	0	36						
A16b.24V			PRESSURE CLUTCH 2+1	0	37						
A16b.24V			NOT USED	0	38						
A16b.24V			NOT USED	0	39						
A16b.GND			NOT USED	0	40						

MACHINE TYPE	MACHINE SERIAL NUMBER		GENERAL OUTLAY INPUT MODULE 2	SHEET: 58	FROM: 66
LIDOS UNIT	XXXXX	LIEBHERR FACTORY	E-SCHEMA	CREATION DATE:	18.05.2017 15:46

BMK	Component	CAN line	CAN address
A17b	Output module 2	2	21 (13, 49, 5)
A17c	Output module 3 (optional)	2	23 (15, 51, 7)
A16d	Output module 4 (optional)		48
A19	Optional keypad	3	94
A700	Engine control unit	4	J1939 protocol
CAN 1	CAN line 1	1	
CAN 2	CAN line 2	2	
CAN 3	CAN line 3	3	
CAN 4	CAN line 4	4	
X60a	Diagnostic plug	4	

Tab. 85: Components

The input and output modules are mounted on the left under the cab access.

The engine control unit **A700** is mounted on the engine.

The diagnostic plug **X60** is fitted on the rear wall of the driver's cab.

The central control unit (Master4) **A15** is mounted behind the rear wall cover.

The display **A13** is mounted inside the driver's cab, within the field of vision.

The control unit **A11** and the option keypad are mounted on the control panel.

2 Function

2.1 Basic function

The central control unit (Master4) **A15** electronically controls the machine.

The central control unit is connected via the CAN lines with the CAN nodes. All the CAN nodes of a CAN line are connected in series.

A 120 Ω resistor forms the end of every CAN line. This resistance is primarily integrated in the CAN nodes and can be activated by bridging an electric connection (bridge).

Every CAN node has its own CAN address. The system is able to identify the individual components through this address. The addresses are preset and must normally only be changed if the input modules or the output modules are exchanged.

The CAN addresses can be called up in the Sculi diagnostic software with the *INFO* button.

For more information see: Addressing CAN modules (For more information see: Addressing the CAN module and checking the system information, page 030-199)

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2.3 Input module addresses

Module	Address	Function
Input module	IA16	Analogue universal measurement inputs
	IF02	Frequency measurement inputs
	IR02	Resistance measurement inputs

Tab. 91: Input module addresses

The CAN modules are addressed using the Sculi diagnostic software. (For more information see: Addressing the CAN module and checking the system information, page 030-199)

110.5.3.3 Output modules

Valid for: L580-1495/31403-;

(For more information see: 020.9.3 Output module, page 020-26)

1 Layout

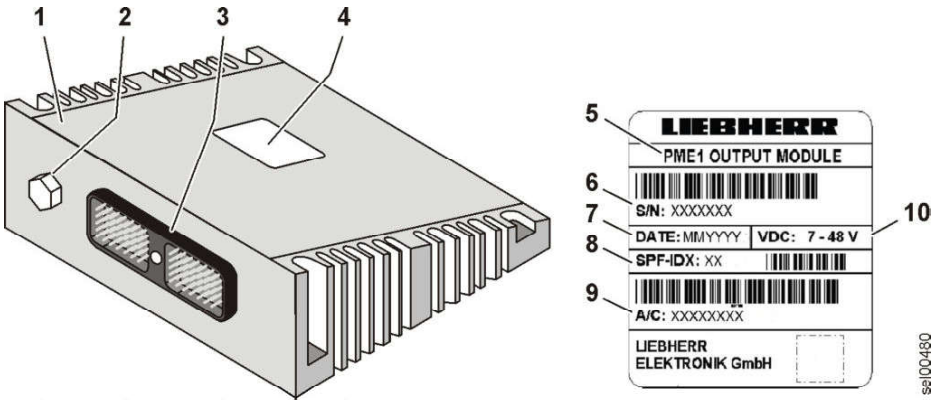

Fig. 395: Output module with type plate

1	Housing made of die-cast aluminium	**6**	Serial number
2	Goretex membrane	**7**	Date of manufacture
3	Connector	**8**	Specification index
4	Type plate	**9**	Article code
5	Device designation	**10**	Voltage range

Output modules consist of various electronic components, fitted in a die-cast aluminium housing. Depending on the device type, up to 4 output modules can be installed.

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5	Intermediate flange	**14**	Oil filter
6	Rear axle cardan shaft flange	**15**	Control valve block
7	Transmission gear pump suction pipe	**K1**	Clutch 1
8	Output shaft	**K2**	Clutch 2
9	Front axle cardan shaft flange	**K3**	Clutch 3

The transmission is supported elastically in the rear section. The two travel motors are directly attached via an intermediate flange to the transmission housing **1** and connected to the drive shafts.

The clutches **K1**, **K2** and **K3** are hydraulically actuated. The solenoid valves for shifting the gears are integrated in the control valve block **15**.

The cardan shafts to the front and rear axles are attached to the output shaft **8**.

2 Function

2.1 Basic function

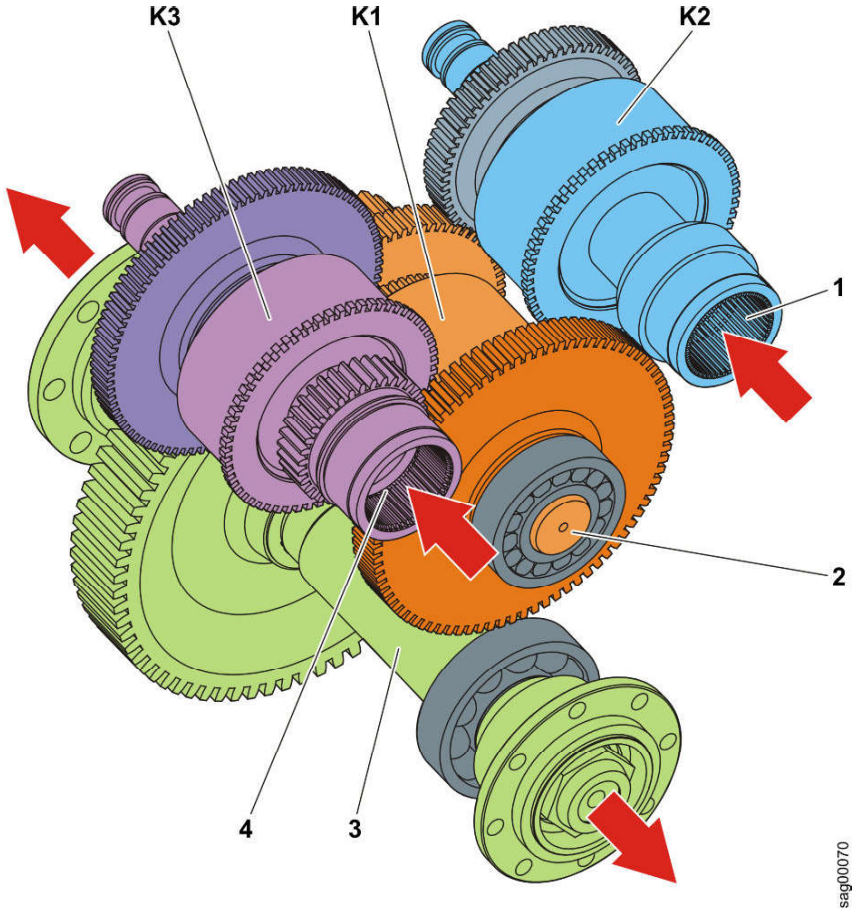

Fig. 400: Basic function of mechanical transmission

1	Travel motor 2 drive shaft	**K1**	Clutch 1
2	Intermediate shaft	**K2**	Clutch 2
3	Output shaft	**K3**	Clutch 3
4	Travel motor 1 drive shaft		

The output shaft **11** transfers the drive torque and drive speed of the travel motors to the front and rear axles.

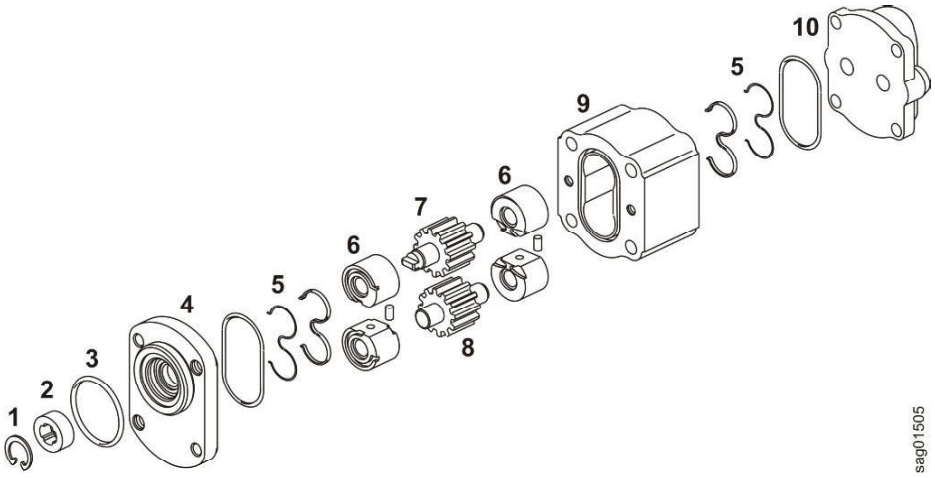

Fig. 410: Exploded view of the transmission gear pump

1	Snap ring	**6**	Bearing bushings
2	Connector piece	**7**	Drive gear
3	O-ring	**8**	Gearwheel
4	Flange	**9**	Pump housing
5	Seals	**10**	Pump cover

2 Function

The transmission gear pump draws up oil from the sump of the transmission and pumps it to the control valve block. The oil from the transmission gear pump is used for engaging the clutches and for lubricating the bearings and clutches.

The pressure relief valve in the control valve block protects the transmission gear pump from excess pressure.

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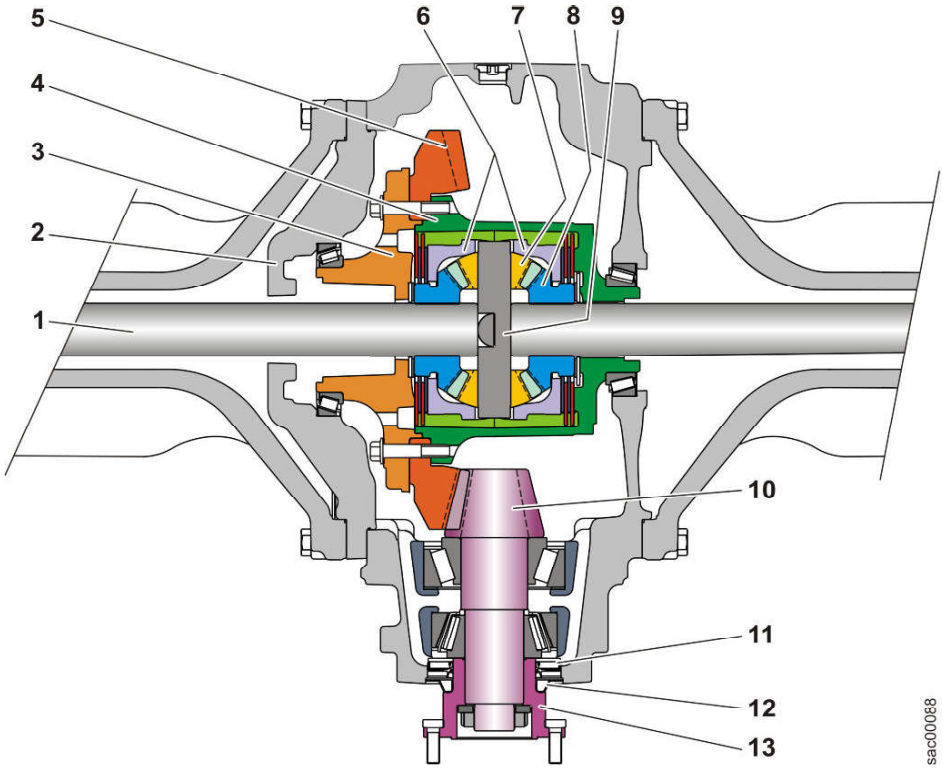

Fig. 420: Layout of the differential

1	Half shaft	**8**	Axle tapered gear
2	Axle shaft housing	**9**	Compensation axle
3	Housing cover	**10**	Axle input shaft (bevel gear)
4	Differential housing	**11**	Shaft seal ring
5	Crown wheel	**12**	Dust protection ring
6	Thrust rings	**13**	Input flange
7	Compensation tapered gear		

150 Working attachment

Contents

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160.1 Overview of the cab, heating and air conditioning unit

Valid for: L580-1495/31403-;

1 Layout

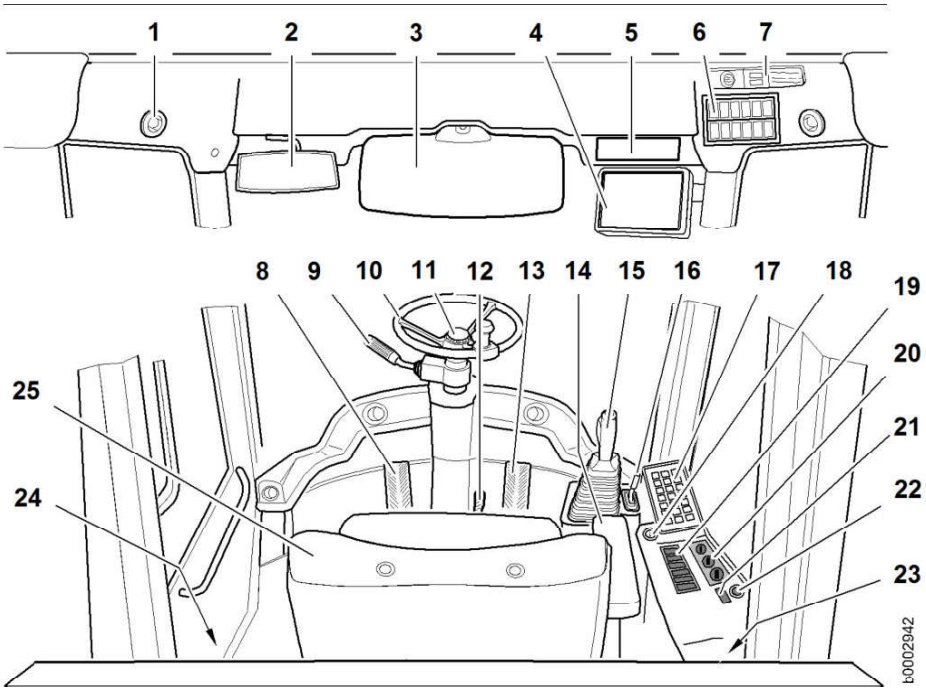

Fig. 434: Driver's cab

1	Heating, ventilation, air-conditioning outlet nozzles	**14**	Adjustable arm rest
2	Interior mirror	**15**	Control lever
3	Sun visor	**16**	Additional control lever (optional)
4	Display	**17**	Control unit
5	Radio compartment	**18**	Starter switch
6	Switch panel	**19**	Switch panel
7	Interior lighting	**20**	"Heater/ventilation/air-conditioning" control unit
8	Inch/brake pedal	**21**	Operating hour meter (optional)
9	Steering column switch	**22**	Cigarette lighter socket
10	Steering wheel	**23**	Diagnostic plug
11	Steering wheel hub for *steering wheel height adjustment* (optional)	**24**	Fuse box
12	*Steering wheel adjustment* lever	**25**	Driver's seat
13	Accelerator pedal		

2.1 Basic function

The driver's cab is mounted on a flexible bearing on the rear section.

The driver's cab is equipped as standard with an air conditioning unit. O

The entry to the cab is via the access and the door on the left.

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160.3 Heating, ventilation, air conditioning

160.3.1 Overview of the heating, ventilation and air conditioning system

Valid for: L580-1495/31403-;

1 Layout

The driver's cab is equipped as standard with an air conditioning unit.

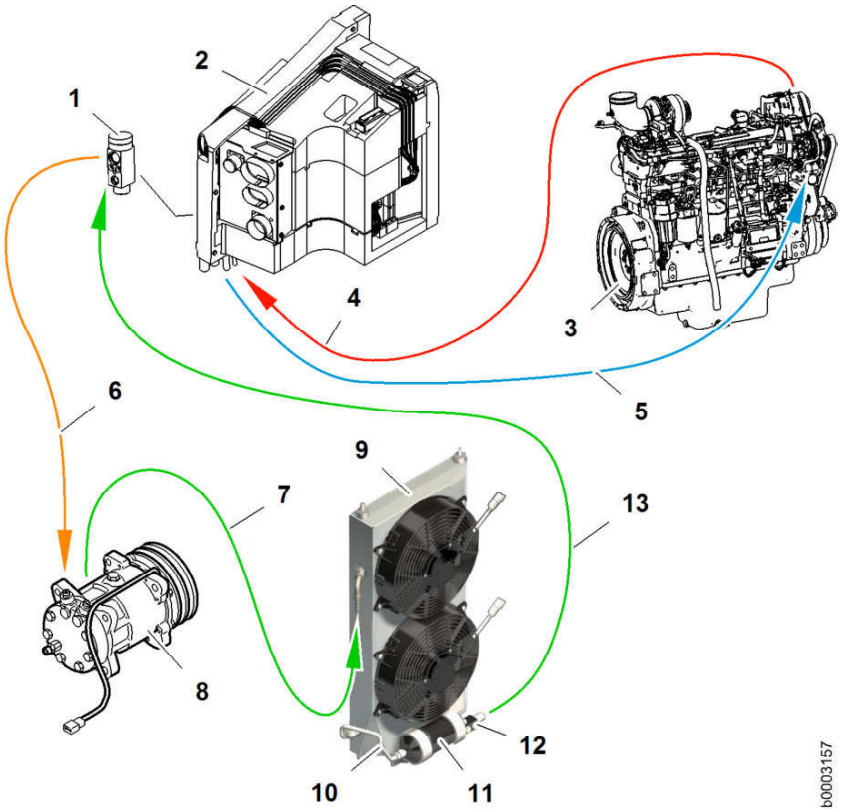

Fig. 443: Overview of the heating, ventilation and air conditioning system

1	Expansion valve	**8**	Air conditioning compressor
2	Heating and air conditioning unit	**9**	Condenser
3	Engine	**10**	High pressure line from the condenser
4	Coolant forward flow from the engine	**11**	Dryer
5	Coolant return flow from the heating and air conditioning unit	**12**	Air conditioning pressure switch
6	Low pressure line from the expansion valve	**13**	High pressure line from the dryer and collector unit
7	High pressure line from the air conditioning compressor		

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2.2 Monitoring high and low pressure

The high and low pressure monitor pressure switch **A** at pins **3** and **4** protects the air conditioning circuit from pressure that is too high or too low.

Monitoring low pressure:

If the pressure falls below $1.5^{\pm 0,5}$ bar, the pressure switch opens. The power supply to the condenser fan (M13) and the magnetic coupling (Y22) is interrupted.

If the pressure rises above $3.5^{\pm 0,5}$ 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.

Monitoring high pressure:

If the pressure rises above $26^{\pm 2}$ bar, the pressure switch opens. The power supply to the condenser fan (M13) and the magnetic coupling (Y22) is interrupted.

If the pressure falls below $18^{\pm 1,5}$ bar once more, the pressure switch is reset and the contact is closed once again.

Excess pressure may be caused by:
- Air in the air conditioning circuit
- Too much refrigerant in the air conditioning circuit
- Insufficient cooling at the condenser (dirt, defective fan control)
- The filter in the dryer is dirty or saturated.
- The expansion valve may be iced up (too much moisture in the refrigerant) or dirty (blocked).
- etc.

2.3 Activation of the condenser second fan

If the pressure in the air conditioning circuit rises above $19^{\pm 1}$ bar, the air conditioning unit requires additional cooling. This is provided by switching on the second condenser fan.

The condenser fan cut-in pressure switch **B** is fitted between the pins **1** and **2**. The condenser fan (M13a) is activated via the relay (K245).

If the pressure rises above $19^{\pm 1}$ bar, the pressure switch closes. The condenser fan (M13a) is activated via the relay (K245).

If the pressure falls below $15^{\pm 1}$ bar, the pressure switch is reset. The contact is open again and the condenser fan (M13a) is switched off.

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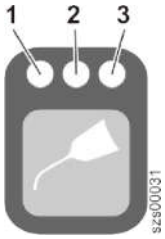

2.5 Non-scheduled lubrication intensity (cycle settings)

You can use the *central lubrication system* button to make the following settings:
- Setting the lubrication intensity (75%, 100%, 125%)
- Non-scheduled lubrication

The LEDs indicate the following conditions when the ignition is switched on:
- LED 1 lights up: 75% lubrication intensity set (for light duty)
- LED 2 lights up: 100% lubrication intensity set (for medium duty)
- LED 3 lights up: 125% lubrication intensity set (for heavy duty)
- LED 1 or 2 or 3 flashes: lubrication cycle in progress
- LEDs 1 + 2 + 3 lights up: grease has reached low level
- LEDs 1 + 2 + 3 flash and service code: system fault

2.6 Setting the lubrication intensity

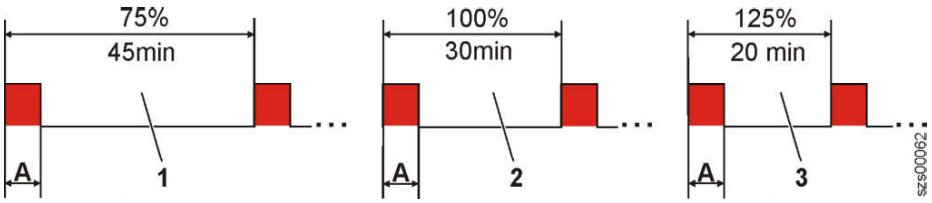

Fig. 466: Lubrication processes

A Lubrication cycle (strokes)
1 Lubrication for light duty
2 Lubrication for medium duty
3 Lubrication for heavy duty

Press and hold the *central lubrication system* button (>2 s) to switch to setting mode.

Each time you press the button, the mode changes to the next one up and after the highest mode switches back to the first (i.e. 75% - 100% - 125% - 75% - ... etc.)

The cycle time for medium-duty operation (mode 2) can be altered in the Sculi diagnostic software using the ***CWadCGrTimeMode2*** parameter.

During the lubrication cycle **A** the number of set strokes are performed. The shorter the pauses between the lubrication cycles, the more grease is supplied to the lubrication points.

2.7 Non-scheduled lubrication

Briefly press the *central lubrication system* button (<2 s) to trigger a non-scheduled lubrication at any time. The ignition must be switched on but the parking brake can be engaged (lubrication and cycle time according to setting)

The pump motor switches off after the set number of strokes and the cycle time begins again.

2.8 System fault (stroke error)

The strokes are tested with a specified time.

Each executed stroke resets this time. If no stroke is performed in this time, LEDs 1 + 2 + 3 flash and the service code E2017 appears.

2.9 Grease level in reservoir too low

If the grease level in the reservoir is too low, all the LEDs on the *central lubrication system* button light up until the grease is topped up.

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