en **Service manual**

Wheel loader

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010 Introduction

Contents

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010.1.3.7 Slinger

Responsibility

Slinger is responsible for following:
- Wear personal protective equipment.
- Choose correct and undamaged slinging gear.
- Correctly attach slinging gear to load or lifting accessory.
- Correctly remove slinging gear from load or lifting accessory.
- Grant approval for movement or accompaniment.

Requirement

The slinger has following qualification and skills:
- Has completed the legally specified minimum age.
- Physically and mentally capable of slinging loads:
  - Satisfactory eyesight
  - Satisfactory hearing ability
  - Quick reactions
  - Is able to estimate distance, height and gaps.
- The slinger has following skills:
  - Is able to estimate mass distribution and load distribution.
  - Is able to operate radio units.
  - Is able to give clear instructions on radio units.
  - Is able to guide a load.
- Has the necessary authorisation for attaching loads.
- The slinger has the necessary education (theoretical and practical) for the following:
  - Selecting the suitable slinging gear
  - Attaching slinging gear
  - Securing to prevent unintended disengaging of slinging gear
  - Avoiding damage to slinging gear
  - Spotting
  - Applying all necessary signal signs
- 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.

010.1.3.8 Spotter

Responsibility

The spotter is responsible for the following:
- Wear personal protective equipment.
- Forward signals from slinger to operator.
- If the spotter is the only person for this purpose: Give instructions to operator.
- The spotter must be in the field of view of operator or have voice contact with the operator.

Requirement

The spotter has following qualification and skills:
- Has completed the legally specified minimum age.
- Physically and mentally capable of spotting and providing signals:
  - Satisfactory eyesight
  - Satisfactory hearing ability

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010.1.7 Safe maintenance

010.1.7.1 Spare parts

Danger to life

Incorrect spare parts

- Use original spare parts.
- Make sure that the spare parts meet the technical requirements specified by the manufacturer.
- After replacing parts, tighten loosened screw connections with prescribed tightening torque.
- Find prescribed tightening torque in supplied documentation.
- If the tightening torque is not prescribed by the supplied documentation: Find prescribed tightening torque in Liebherr factory standard.
- If the tightening torque is not prescribed by the Liebherr factory standard: Find tightening torque in valid DIN standard, EN standard or ISO standard.

010.1.7.2 Heavy parts

Danger to life

Incorrect handling

- Exclusively use machine for load-lifting with sufficient loading capacity.
- Exclusively use suitable and functioning lifting accessories with sufficient loading capacity.
- Make sure there are no persons underneath raised loads.
- Exclusively task qualified and experienced persons with the attaching of loads.
- Exclusively task qualified and experienced persons with the directing of operators.
- Make sure that the spotter can be seen by the operator.
- Make sure that spotter and operator are in voice contact if necessary.

Injury

Incorrect protective equipment

- Put on gloves when handling wire ropes.

010.1.7.3 Regular checks

Danger to life

Incorrect performance of checks

- Make sure that safety checks are performed regularly on the machine.
- Make sure that all checks are performed by suitable, competent and authorised persons.
- Adhere to national regulations.

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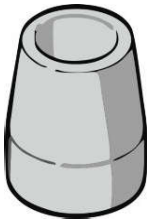
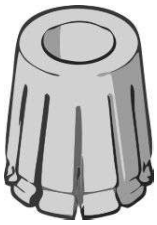
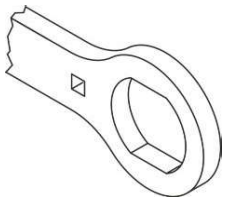
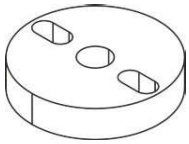
010.2.6 Special tools for log pusher cylinders

Designation	Item code	Remark	Fig.
Mounting sleeve 110 mm	9170509	For fitting the seals	
Expansion sleeve 110 mm	9170511	For fitting the seals	
Piston nut wrench 42/56 mm	9921132	For fitting the piston nut	

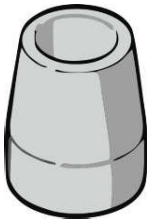
Tab. 9: Special tools for log pusher cylinders

010.2.7 Special tools for steering wheel

Designation	Item code	Remark	Fig.
Extractor for steering wheel	10430204	For steering wheel removal	

Tab. 10: Special tools for steering wheel

010.2.8 Special tools for steering cylinders

Designation	Item code	Remark	Fig.
Mounting sleeve 90 mm	9227161	For fitting the seals	

Standards	Description
DIN 34800 (11/2016)	Bolts and screws with external hexalobular driving feature with small flange
VDI 2230 Sheet 1 (02/2003)	Systematic calculation of highly stressed bolted joints - Joints with one cylindrical bolt
LH 10215295-002 (06/2015)	LN 252-8 Corrosion protection for inexpensive standard parts (C parts) salt spray mist test > 480 hours
LH 10021432-010 (06/2015)	Delivery specification for steel fasteners with zinc flake coating (FIZn)

Tab. 25: Other applicable documents

010.3.1.3 Modifications and descriptions

The prestressing forces and tightening torques listed in the table are taken from VDI Standard 2230 of February 2003.

Assembly prestressing forces F_M and tightening torques M_A at 90% utilisation of the yield point for shank bolts with metric standard or fine threads as per DIN ISO 262 (and DIN ISO 965-2); head dimensions of hex head screws as per DIN EN ISO 4014 to 4018, bolts with external hex head as per DIN 34800 and cylinder-head bolts as per DIN EN ISO 4762 and “medium” bore as per DIN EN 20273.

Remarks:
- Tightening torques given on drawings or in documents from the Liebherr service documentation always take precedence over the works standards, and must be observed.
- For important bolt connections, angle control tightening may be advantageous. If so, required tightening torques (joining torque, rotary angle) must be calculated individually by customer service of manufacturing factory of machine.
- When tightening in aluminium with or without using a helicoil, and with weld nuts, values in class 8.8 must be used. However, tightening torques given on drawings or in documents from Liebherr service documentation are binding, take precedence and must be observed.

010.3.1.4 Tightening torques

Note

If torques are specified in Liebherr construction drawings or documents from the Liebherr service documentation, then these should take precedence.

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– Seal the complete machine (diesel engine, hydraulic components, main frame, containers, running gear, axles, oscillating axle frame, work equipment etc.) with Waxoyl 120-4 preservation wax. (Amount of corrosion protection agent: with one litre of Waxoyl, a preservation area of approx. 5 m^2 can be treated)

The following points must be observed when putting on the corrosion inhibiting wax:
– Keep to the drying time of 3 hours.
– Ambient temperature is at least 15 °C.
– Use protective equipment (breathing protection, protective goggles, extraction, etc.).
– The solvents used in the corrosion inhibiting wax are inflammable! (Avoid smoking and open flames).
– Resistance to cold down to a temperature of -40 °C.
– **Check the machine every month and apply preservation agents if required.**

010.4.3.3 Out of service for longer than 12 months

Carry out all tasks as described in the section on putting the machine out of service for up to 12 months.

Also required is:
– **If it is planned to put a machine out of service for longer than 12 months, then the diesel engine manufacturer's customer service must be contacted.**
– Seal air tight all openings like air filters, exhaust pipes, ventilation openings on units and so on. The fuel tank's ventilation and bleeder filters (if available) must stay open for safety reasons.
– Rub talcum powder into the sealing rubber of the containers and driver's cab, and seal the doors. If there is no operator's cab, cover the operator's platform in a suitable manner. Cover the driver seat and control panel using suitable materials.

010.4.4 Putting back into service

010.4.4.1 After being out of service for 2 months

– Remove dehumidification capsule from the electronics box.
– Check fill levels and lubricate machines according to the operating instructions.
– Install batteries and clean and grease battery connections.
– Open exhaust outlet.
– Remove corrosion inhibiting grease.
– Let out water from the fuel tank or condensation from the diesel engine prefilter (see operating instructions).
– Clean the corrosion inhibiting wax off the ball joints, hinges, bare parts and exposed piston rods.
– Put the machine back into service according to the operating instructions.
– Before work with the machine, check all functions of the machine and immediately rectify any defects. Carry out a comprehensive visual inspection on the machine.
– 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.

Observe any extra guidelines for special construction equipment or local conditions.

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020.2 Drive group

020.2.1 Diesel engine

Valid for: L580-1414;

Fig. 80: Characteristic output/torque

1 Torque curve
2 Output curve
3 Torque in Nm
4 Engine speed in min^{-1}
5 Output in kW

Description	Unit	Value
Engine model		D936 A7
Number of cylinders		6
Firing order		1-5-3-6-2-4
Piston displacement	l	10.5
Cylinder bore	mm	122
Stroke	mm	150
Rated power as per ISO 9249	kW	250
Maximum torque at 1000 min^{-1}	Nm	1965
Inlet valve clearance (cold)	mm	0.3
Outlet valve clearance (cold)	mm	0.4
Direction of rotation, looking at flywheel		Anticlockwise
Coolant thermostat at start of opening	°C	82
Coolant thermostat fully open	°C	92
Longitudinal/traverse inclinability	°	45 / 45
Injection system		Common rail
Liebherr Common Rail Injector	bar	2000
Control		LIDEC 2
Starter operating voltage	V	24

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Description	Unit	Value
Tightening torque of piston nut	Nm	250 ±25

020.6.4 Steering damper hydro accumulator

Valid for: L580-1414;

Description	Unit	Value
Volume	l	0.16
Gas-side oil filling	cm^3	30
Weight	kg	1.1

020.6.5 Emergency steering pump

Valid for: L580-1414;

Description	Unit	Value
Displacement per turn	cm^3	11
Maximum displacement	l/min	33
Maximum operating pressure	bar	50
Weight	kg	11.7

020.6.6 Emergency steering pressure switch B3

Valid for: L580-1414;

Description	Unit	Value
Type		Normally open
Type		Electronic normally open switch
Switching pressure	bar	16 ±2
Connecting thread	mm	M12x1.5
Tightening torque	Nm	25

020.6.7 Emergency steering check pressure switch B3a

Valid for: L580-1414;

Description	Unit	Value
Type		Normally open
Type		Electronic normally open switch
Switching pressure	bar	16 ±2

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020.10.4 Rear axle

Valid for: L580-1414/48475-;

Description	Unit	Value
Type		MT-L3115II
Self-locking differential level	%	45
Flange size	mm	2314
Overall transmission		24.71
Number of brake plates per wheel hub		6
Brake plate lining		Sintered
Weight	kg	1740

020.10.5 Drive shaft between diesel engine and transmission

Valid for: L580-1414;

Description	Unit	Value
Minimum length	mm	1485
Maximum length	mm	1595
Weight	kg	30.8

020.10.6 Drive shaft between transmission and front axle

Valid for: L580-1414;

Description	Unit	Value
Minimum length	mm	1500
Maximum length	mm	1610
Weight	kg	61.8

020.10.7 Drive shaft between transmission and rear axle

Valid for: L580-1414;

Description	Unit	Value
Minimum length	mm	545
Maximum length	mm	655
Weight	kg	26.7

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030 Maintenance

Contents

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Customer:.....Machine type:.....Serial no.:.....Operating hours:.....Date:.....

Maintenance / inspection after service hours								Tasks to be performed		
On handover	All 8-10 h	All 50 h	All 500 h	All 1000 h	All 2000 h	Other intervals	Additional labelling	**By maintenance staff** ■ Once-only activity ● Repeat interval ✦ If necessary ❄ Annually before the winter **By authorised specialist staff** ☐ Once-only activity ❍ Repeat interval ✧ If necessary **Additional labelling** Assistance required Have this task carried out exclusively by a certified electrician	Confirm tasks	See page
Overall machine										
☐	●	●	●	❍	❍			Check that machine is in proper condition.		030-35
	●	●	●	❍	❍			Remove loose parts, dirt, ice and snow from machine.		030-37
☐				❍	❍			Adjust the machine according to the testing and adjustment check-list.		
Drive group										
☐	●	●	●	❍	❍			Checking diesel engine oil level.		030-46
					❍			**If Liebherr engine oil 5W30 or Liebherr engine oil 5W30 low ash is used:** Diesel engine: change engine oil (at least every 2 years).		030-49
				❍	❍			**If Liebherr engine oil 10W40 or Liebherr engine oil 10W40 low ash is used:** Diesel engine: change the engine oil (at least once a year).		030-49
			❍	❍	❍			**If engine oil as per minimum requirement specification LH-00-ENG3A or LH-00-ENG3A LA is used:** change the diesel engine oil (at least once a year).		030-49
			❍	❍	❍	✧		**If diesel engine without emission-type approval:** Diesel engine: change oil (at least once a year or according to engine oil quality and difficulty factors).		030-49
						✧		Change the engine oil filter (with every oil change).		030-52
			●	❍	❍			Check diesel engine belt drive.		030-53
						❍5000 h		Change diesel engine belt drive.		030-54
				❍	❍			Check the fastening of the engine control units and the sensor cable connections.		030-55
						❍4000 h		Check the engine valve clearance.		030-56
						✧		Change the engine oil separator filter insert (with every oil change).		030-58
						❍10000 h		Change the engine heating flange.		030-58
☐			●	❍	❍			Drain the condensate and sediment from the fuel tank.		030-59
		●	●	❍	❍			Drain off condensate from the fuel pre-filter.		030-60
				❍	❍			Change the fuel pre-filter insert.		030-61
				❍	❍			Change the fuel fine filter element.		030-64
				❍	❍			Diesel exhaust fluid tank: check ventilation.		030-67

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Ambient temperature	Designation
-20 °C to 45 °C	Liebherr engine oil 10W-40 low ash

Tab. 45: Other approved engine oils

For machines with a diesel particulate filter, the low ash engine oil must be used.

030.3.7.3 Minimum quality requirement

Specification	
Without diesel particulate filter	LH-00-ENG3A
	ACEA E4, API CH-4, API CI-4
With diesel particulate filter	LH-00-ENG3A LA
	ACEA E6, API CJ-4

Tab. 46: Minimum requirement for engine oils

When using engine oils from other manufacturers, information on the oil change intervals must be obtained from the manufacturer or supplier.

030.3.7.4 Changing intervals

Engine oil	Changing interval
Liebherr engine oil 5W-30, Liebherr engine oil 5W-30 low ash	2000 h
Liebherr engine oil 10W-40, Liebherr engine oil 10W-40 low ash	1000 h
Engine oil from third-party manufacturers that meets the minimum requirements (For more information see: Minimum quality requirement, page 030-21)	500 h

Tab. 47: Changing intervals

When using engine oils from other manufacturers, information on the oil change intervals must be obtained from the manufacturer or supplier.

030.3.7.5 Complicating factors

Complicating factors have an effect on the intervals at which the engine oil is changed.

Adjust engine oil change interval accordingly.

Complicating factors include:
- Frequent cold-starts
- Environmental effects (ambient temperature, high air humidity)

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Note
The engine bonnet encounters an obstruction when opening or closing and is stopped due to overload.
The engine bonnet can only be opened or closed in the opposite direction to the overload.

- ▶ Press button **1**.
- ▶ Remove obstruction.

Manual emergency operation of the engine bonnet

NOTICE
Overload!
Damage to the drive system.

- ▶ Turn off the battery main switch.
- ▶ Only carry out emergency actuation manually.

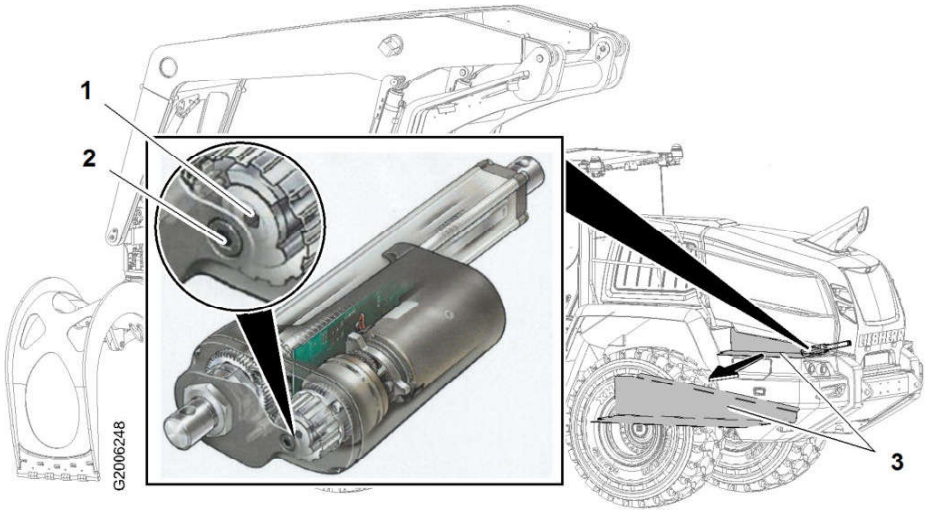

Fig. 89: Manual emergency operation of the engine bonnet

1 Drive gear
2 Screw plug
3 Battery compartment cover

- ▶ Remove the battery compartment cover **3**.
  ▷ The provides access to the emergency actuation mechanism.
- ▶ Unscrew the screw plug **2**.
- ▶ Turn the drive gear **1** by hand with an Allen key.
  ▷ The engine bonnet opens.

Note

Torque for emergency operation: 6 to 8 Nm

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▶ Always identify subsequent samples for the same machine with an identical sample description.
  ▷ This ensures that the analysed values are logged on the printed laboratory reports. This makes it easier to identify trends. Only by studying tends is it possible to clearly identify changes of state caused by contamination, wear, ageing and mixing with other service fluids.

▶ Send the sample in the oil-proof plastic bag provided.
  ▷ The self-adhesive seal ensures that the bag is firmly closed. The sample information form is protected in a separate plastic pocket on the outside.

Assessing the analysis results

There is no single element or measured value that in itself necessitates a warning or a recommendation to change the oil. It depends on the overall analysis of the oil sample, from the zinc content to the purity class.

For bio hydraulic oils:
If the zinc content in the oil exceeds 300 mg/kg and other critical values are exceeded, the zinc may saponify and block the filter systems. The system may fail completely.

Purity class:

Contamination of the hydraulic fluid directly affects the lifetime of the components. Therefore, the following minimum purity classes are required for Liebherr earth-moving machines:
– ISO 4406 purity class: 21/17/14
– NAS 1638 purity class: 8

If the values are slightly below these, they may be improved by using special filters systems (such as stationary filters) in consultation with the manufacturer. If subsequent trend analyses do not show an improvement, there is no option but to change the oil. Note that not only the oil in the hydraulic tank has to be drained, but also as much oil as possible from the units and cylinders.

Taking oil samples

Samples can be taken from the following fluids:
– Hydraulic oil from the hydraulic system
– Engine oil from the diesel engine
– Lubricating oil from the axles
– Lubricating oil from the splitter box
– Lubricating oil from the transmission
– Coolant from the cooling circuit

Make sure that the following requirements are fulfilled:
❑ The machine is on firm and level ground.
❑ A suitable collecting pan for the flushing oil is available.
❑ You have an analysis set ready.

DANGER
Unauthorised starting up of the machine!
Risk of fatal injury.

▶ Secured the machine against being started unauthorisedly.

Diesel engine

The engine oil sample is taken via the dipstick tube with the hand pump.

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▷ The remaining engine oil drains out.

▶ Screw in the drain plug.

Diesel engine: changing oil filter

After every oil change, oil filter has to be replaced.

▶ Change oil filter.

Diesel engine: topping up oil

▶ Open the cap on the filler pipe.

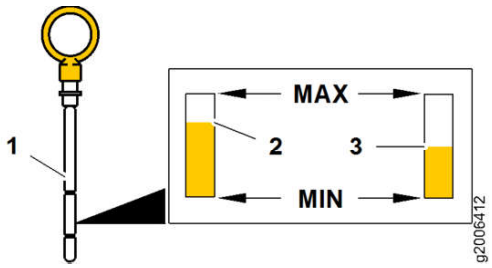

Fig. 104: Topping up oil

1 Dipstick
2 Oil level with diesel engine cold
3 Oil level with diesel engine warmed up
MIN Minimum oil level
MAX Maximum oil level

When topping up the oil, the oil level must be in the top third between the **MIN** and **MAX** markings. When the diesel engine starts, the oil is distributed. The oil level goes down.

▶ Top up with fresh oil via the filler pipe to the upper third of the oil level indicator.

▶ Clean the cap, place it on the filler pipe and tighten it.

▶ Start diesel engine.
▷ Oil is distributed in diesel engine.
▷ The oil level goes down.

▶ Check the oil level.
▷ The *engine oil pressure* symbol must not light up.

▶ Turn off diesel engine.

▶ After 2 or 3 minutes, check whether oil level on dipstick **1** is between **MIN**and **MAX** markings.

If the oil level is not between the **MIN** and **MAX** markings:
▶ Correct oil level.

The oil level sensor must be tested after every oil change.

▶ Check the oil level on the display.

If the oil level on the display is not between 0% and 100%.
▶ Check the oil level sensor. Replace if necessary.

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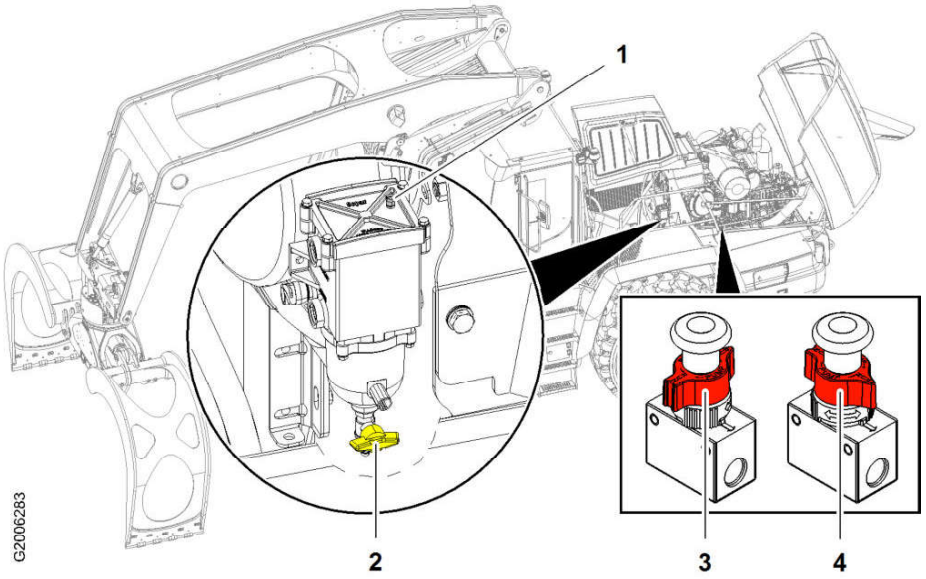

Fig. 114: Draining off condensate from the fuel pre-filter

1	Bleeder screw	**3**	Hand pump in the *PUMP* position
2	Drain valve	**4**	Hand pump in the *RUN* position

Note
To prevent condensate flowing back into the fuel tank:

▶ Put the hand pump in the *PUMP* position.

▶ Place a receptacle under the fuel pre-filter.

▶ Put the hand pump in the *PUMP* position **3**.

▶ Open the bleeder screw **1**.

▶ Open the drain valve **2** until clean fuel flows out.

When clean fuel flows out:

▶ Close the drain valve **2**.

▶ Close the bleeder screw **1** with a tightening torque of 6 Nm.

▶ Put the hand pump in the *RUN* position **4**.

030.4.4.12 Changing the fuel pre-filter insert

Valid for: L580-1414;

Make sure that the following requirements are fulfilled:
- ❑ The machine is in the maintenance position.
- ❑ Diesel engine has cooled down.
- ❑ The service access is open.

Make sure that the following tool is ready.
- ❑ Receptacle

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Cleaning the main element

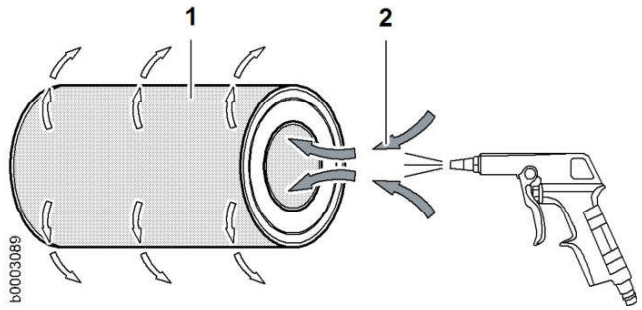

Fig. 123: Cleaning the main element

1 Main element **2** Compressed air

NOTICE
Incorrect cleaning!
Damage to the main element.

- ▶ Use compressed air at low pressure.
- ▶ Clean the main element with clean, oil-free compressed air.
- ▶ Do not knock out the main element.

- ▶ Clean the main element **1** from the inside out with compressed air **2**.

Cleaning the service cover and filter housing

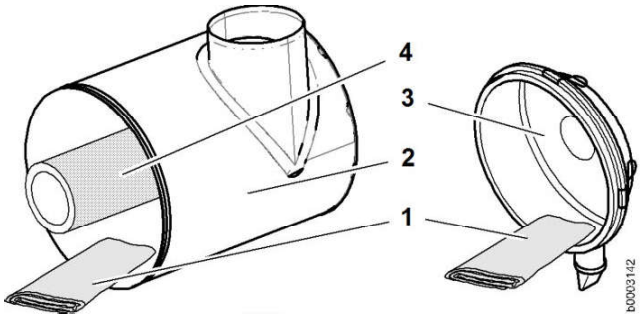

Fig. 124: Cleaning the service cover and filter housing

1 Cloth
2 Filter housing
3 Service cover
4 Safety element

NOTICE
Incorrect cleaning!
Damage to the engine.

- ▶ Clean the filter housing with compressed air.
- ▶ Wipe the filter housing with a clean cloth.

- ▶ Clean the inside of the filter housing **2** and the service cover **3** with a cloth **1**.

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- ▶ Check the diesel exhaust fluid lines for leaks and damage.
- ▶ Check that the electric lines and components of the exhaust system are not loose or damaged.
- ▶ Start the diesel engine.

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 the seals and clips for leaks and escaping gas.
- ▶ Turn off the diesel engine.

030.4.4.21 Checking the diesel engine for leaks, contamination and damage

Valid for: L580-1414;

Make sure that the following requirements are fulfilled:
- ❑ The machine is in the maintenance position.
- ❑ The service access is open.
- ❑ The diesel engine has cooled down.

WARNING
Damaged components!
Risk of injury.

- ▶ Replace damaged components.
- ▶ Contact Liebherr customer service.

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▷ Freezing point too high.
▷ Amount of pure anti-freeze and corrosion protection agent to top up = 6,5 l.

Example 2:

▶ Identified freezing point = -58 °C.

▶ Total capacity of the cooling system = 60 l.
▷ Freezing point too low.
▷ Amount of pure water to top up = 6.5 l.

Correcting the anti-freeze and corrosion protection agent concentration

▶ Place a receptacle under the machine.

▶ Unscrew the cap of the drain valve **3** (see: fig. 140, page 030-88) .

▶ Screw the drain hose onto the drain valve **3** (see: fig. 140, page 030-88) .
▷ Coolant flows out.

▶ Drain off as much coolant as the amount to be topped up.

▶ Unscrew the drain hose from the drain valve **3** (see: fig. 140, page 030-88) .

▶ Screw the cap onto the drain valve **3** (see: fig. 140, page 030-88) .

NOTICE
Non-approved coolant!
Damage to the engine and cooling system.

▶ Only use coolant that meets the Liebherr specifications.

▶ Do not mix coolants with and without silicates.

▶ Top up the equalising reservoir with the correct amount of pure anti-freeze and corrosion protection agent or pure water.

▶ Close the cap **1** (see: fig. 140, page 030-88) of the equalising reservoir **2** (see: fig. 140, page 030-88) .

▶ Start diesel engine.

▶ Set heating to maximum temperature and blower speed.

▶ Run machine for five minutes at upper diesel engine speed.
▷ Coolant is circulated.

▶ Turn off diesel engine.

▶ Wait until diesel engine has cooled down.

CAUTION
Hot. pressurised liquid!
Beware of burns.

▶ Let the engine cool down.

▶ Carefully open the cap **1** (see: fig. 140, page 030-88) of the equalising reservoir **2** (see: fig. 140, page 030-88) .

▶ Check the concentration of anti-freeze and corrosion protection agent and correct it if necessary.

▶ Close the cap **1** (see: fig. 140, page 030-88) of the equalising reservoir **2** (see: fig. 140, page 030-88) .

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▷ The tank preload pressure is released.

▶ Place a receptacle under the machine.

▶ Unscrew the cap from the drain valve **3**.

▶ Screw the drain hose onto the drain valve **3**.
▷ Condensate and sediment drain off.

▶ Let the condensate and sediment drain into the receptacle.

When clean hydraulic oil comes out:

▶ Unscrew the drain hose from the drain valve **3**.

▶ Screw the cap onto the drain valve **3**.

▶ Tighten the breather filter **1**.

▶ Pull out the plug **2** and keep it in a safe place.
▷ The breather filter is protected from accidental opening.

▶ Check the oil level in the hydraulic tank.

030.4.6.3 Change the return filter insert in the hydraulic tank.

Valid for: L580-1414;

Make sure that the following requirements are fulfilled:
❑ The machine is cold.
❑ The machine is in the maintenance position.
❑ The service access is open.

Make sure that the following tools are ready:
❑ Torque wrench

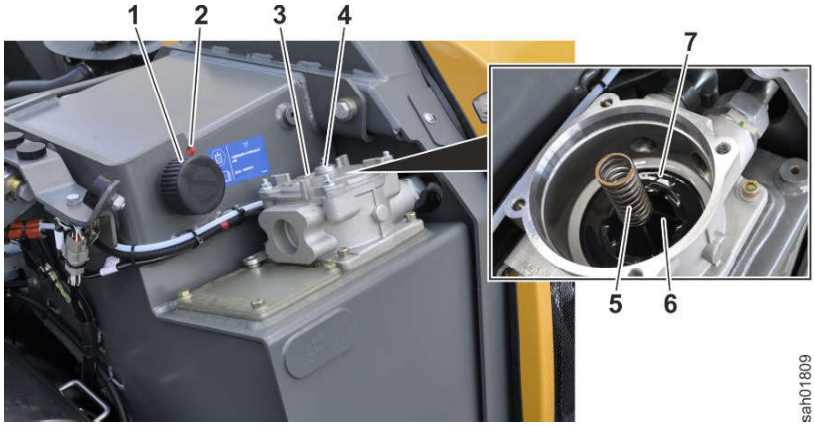

Fig. 151: Changing the return filter insert in the hydraulic tank

1	Breather filter	**5**	Compression spring
2	Connector	**6**	Element retainer
3	Filter cover	**7**	Filter insert
4	Screw plug		

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

▶ Unscrew the breather filter **1** by two turns.
▷ The tank preload pressure is released.

▶ Unscrew the plug **4**.
▷ The oil level in the filter housing sinks.

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▶ Unscrew the plug **1** on the left wheel hub of the front axle.

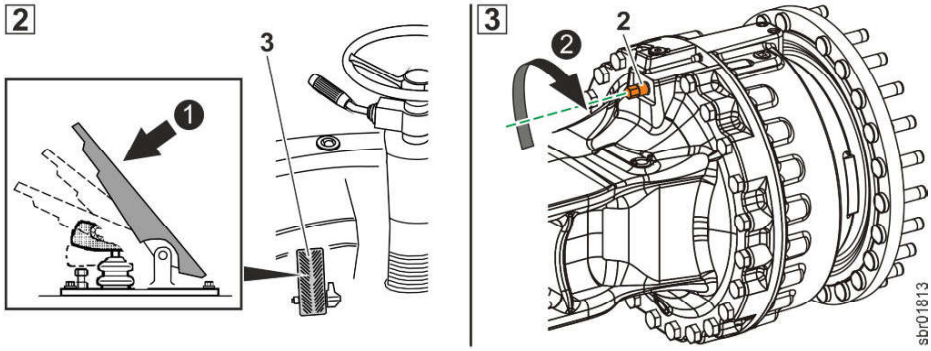

Fig. 163: Checking the front axle brake discs for wear

2 Micrometer **3** Inching brake pedal

▶ Have somebody fully depress and hold down the brake pedal.
▷ The brake discs are in the end position.

▶ Screw in the micrometer **2** by hand as far as it will go (maximum tightening torque 0.5 Nm).

▶ Mark the position of the micrometer **2**.

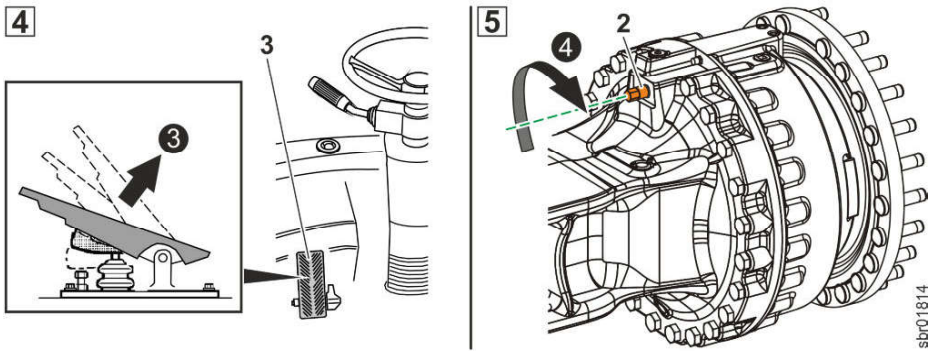

Fig. 164: Checking the front axle brake discs for wear

2 Micrometer **3** Inching brake pedal

▶ Release the service brake.

▶ Screw in the micrometer **2** as far as it will go and tighten it to 10 Nm.
▷ The brake discs are in the initial position.

▶ Release the micrometer **2** and unscrew it exactly to the marked position.

▶ Screw in the micrometer **2** again by hand as far as it will go (maximum tightening torque 0.5 Nm). Count the number of turns while doing this.

Note

One a turn corresponds to a gap of 1.5 mm.

WARNING
The working headlights can become hot!
Burns, fire.

▶ Observe the minimum interval of 1 m to persons and material.

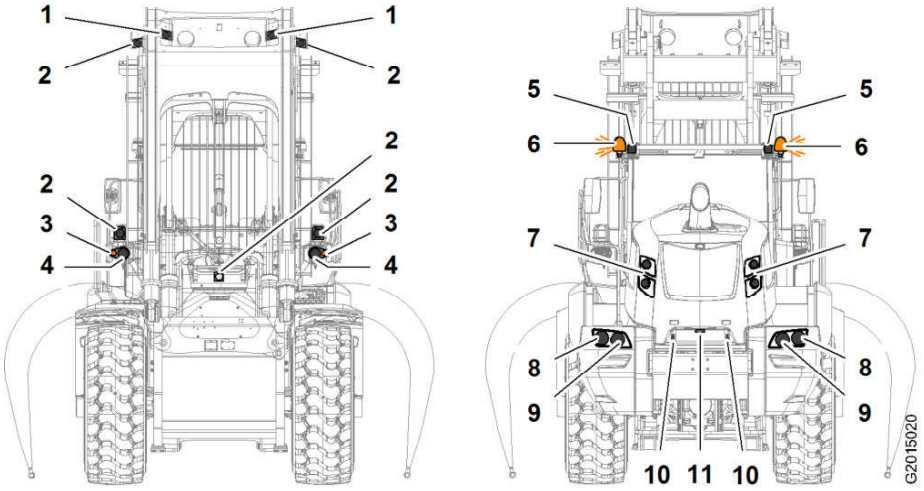

Fig. 172: Lighting

1 Front working headlights
2 Front working headlights (optional)
3 Front indicator light
4 Driving headlights
5 Rear working headlight (optional)
6 Flashing beacon (optional)
7 Engine bonnet working headlight
8 Brake light, tail light, rear indicator
9 Reversing light
10 Flash (optional)
11 License plate light (optional)

▶ Turn on all the lights.

▶ Check all the lights work properly.

When you are checking the brake light:
▶ Press the inching brake pedal.

To check the reversing light:

▶ Start the machine.

▶ Release the parking brake.

▶ Select reverse travel direction.

▶ Test the reversing light.

If lights have to be adjusted or defective bulbs replaced:
▶ Contact Liebherr customer service.

To test the horn:

▶ Activate the horn using the button on the steering column switch.

030.4.9.2 Checking the battery fluid levels and terminals

Valid for: L580-1414;

The batteries are housed in the ballast weight and can be accessed by opening the ballast cover.

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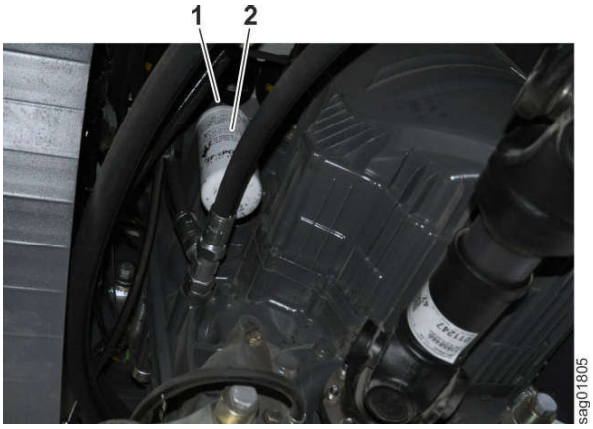

Fig. 180: Changing the transmission hydrostat oil filter

1 Filter bracket **2** Hydrostat oil filter

- ▶ Unscrew the hydrostat oil filter **2**.
- ▶ Clean the sealing face of the filter bracket **1** with a clean cloth.
- ▶ Apply a thin film of oil to both sides of the sealing rings of the new hydrostat oil filter **2**.
- ▶ Screw on the new hydrostat oil filter **2** until the sealing ring touches the filter bracket **2**.
- ▶ Tighten hydrostat oil filter **2** a quarter to half a turn by hand.
- ▶ Start diesel engine and let it run for two minutes at low idling speed.
  ▷ Oil is circulated.
- ▶ Turn off diesel engine and take out ignition key.
- ▶ Check that hydrostat oil filter **2** is leak-tight.

030.4.11 Axles and drive shafts

030.4.11.1 Changing the axle oil

Valid for: L580-1414;

Make sure that the following requirements are fulfilled:
- ❑ The oil is at operating temperature.
- ❑ The machine is in the maintenance position.

Make sure that the following tools are ready:
- ❑ Two receptacles (each 56 l)
- ❑ Torque wrench

Make sure that the following consumables are ready:
- ❑ Axle oil according to the table of lubricants. (For more information see: 030.2.1 Recommended lubricants, page 030-15)

Note
Information on the oil specification:

- ▶ See “Lubricants and fuels: Axle lubricants”.

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Opening passfix bearing

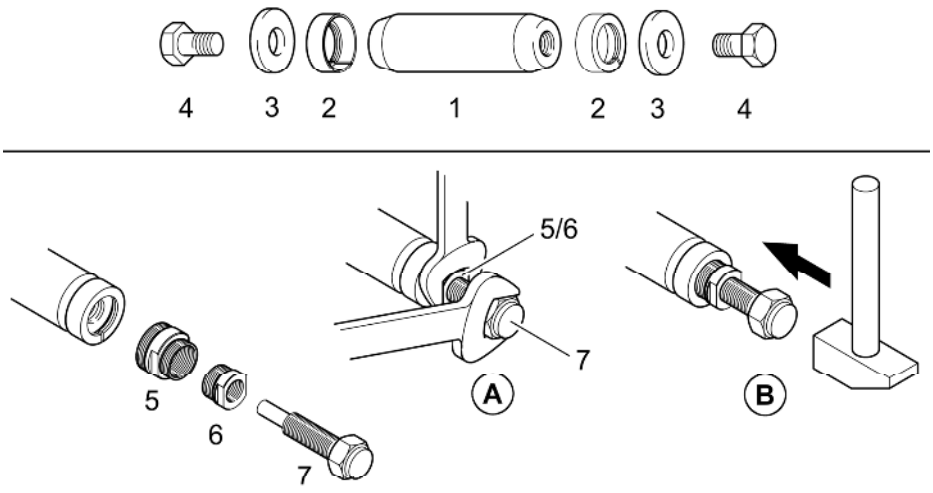


Fig. 192: Opening passfix bearing

1	Pin	**5**	Adapter
2	Clamping bush	**6**	Extractor
3	Spring washer	**7**	Puller screw
4	Tensioning bolt		

- ▶ Remove puller screw **4** and spring washer **3** on both sides.
- ▶ Depending on the size of the clamping bush **2**, screw extractor **6** with or without adapter **5** in clamping bush **2**.
- ▶ Screw in puller screw **7** as far as it will go.
- ▶ Tighten puller screw **7** while counter-holding the extractor **6** with a suitable spanner until bolt **1** and clamping bush **2** are under significant tension **(A)**.
- ▶ Hit puller screw **7** with hammer **(B)**.
  ▷ Clamping bush **2** releases.

If you cannot remove clamping bush **2**:

- ▶ Tighten puller screw **7** more tightly.
- ▶ Hit puller screw **7** again with hammer **(B)**.
- ▶ Repeat procedure on opposite side.
- ▶ Remove clamping bushes **2** on both sides.

Assembling passfix bearings

NOTICE
Improper assembly!
Loose screw connections on passfix bearings.

- ▶ Allow thread locker to cure for 8 hours at 20 °C, for example in a workshop.
- ▶ Do not move working tool during curing of thread locker.

- ▶ Ensure that holes are free of grease in the area of clamping bushes **2** and tensioning bolts **4**.
- ▶ Align bolts **1** centred in bearing.

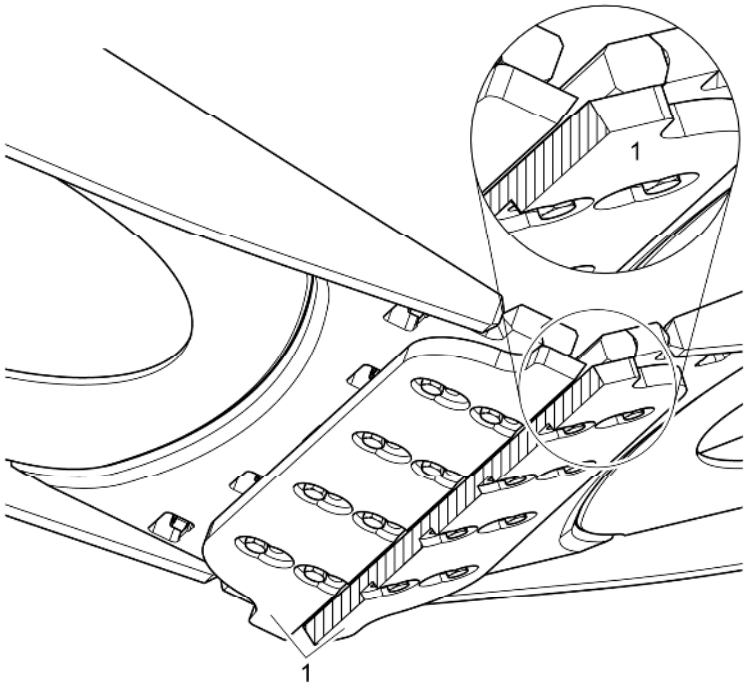


*Fig. 202: Undercut blade in **installation position 2***

1 Undercut blade

▶ Move undercut blade **1** by one hole to **installation position 2**.

▶ Attach undercut blades **1**.

▶ Coat fastening bolts **2** and fastening bolts **3** with thread lock.

▶ Insert and tighten fastening bolts **2** and fastening bolts **3**.

Undercut blade in installation position 2 worn down to fastening bolts

Make sure that the following special tools are to hand:
❑ Loctite 648 thread locker

▶ Check the condition and function of the driver's safety belt.

▶ Replace damaged parts.

030.4.14.4 Testing the windscreen washer system

Valid for: L580-1414;

Make sure that following requirements are met:
❑ 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 windscreen washer system.
▷ Windscreen washer fluid is sprayed onto the front windscreen.
▷ The wiper is switched on.

To check the rear windscreen washer system:

▶ Activate windscreen washer system.
▷ Windscreen washer fluid is sprayed onto the rear window.
▷ The wiper is switched on.

030.4.14.5 Filling windscreen washer fluid in the windscreen washer system

Valid for: L580-1414;

The reservoir is fitted below the left cab access.

Make sure that the following requirements are fulfilled:
❑ The machine is in the maintenance position.
❑ The service access is open.

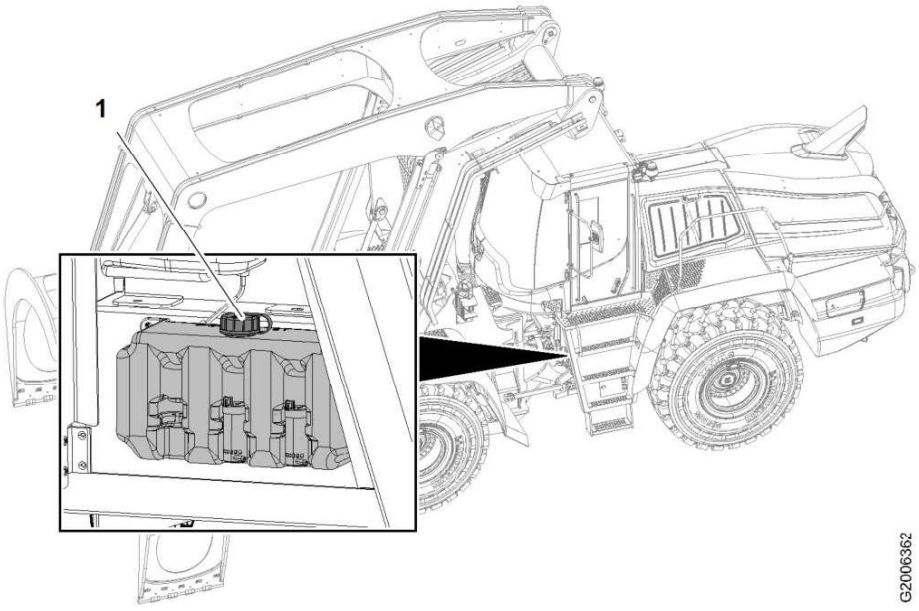
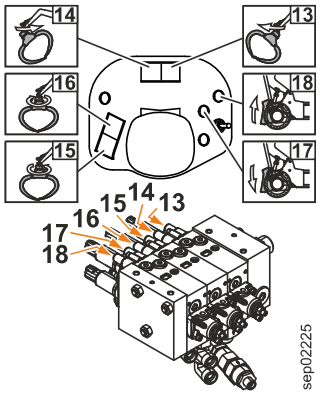
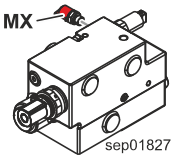
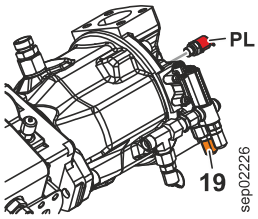
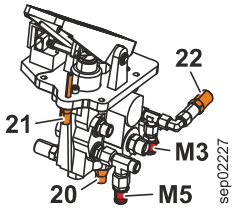
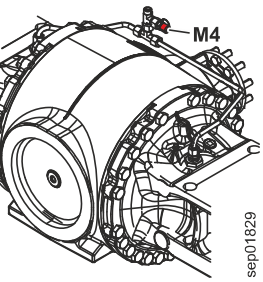


Fig. 215: Filling windscreen washer fluid in the windscreen washer system

1 Cap

The filling quantity is approximately 3.5 l.

▶ Open the cap **1** on the reservoir.

3. Hydraulic adjustment procedures									
Test / adjustment	**1000 h**	**2000 h**	**Unit**	**Required value**	**Measured**	**Adjusted**	**Adjusting point**	**Test point**	**Figure**
Additional control block LS pressure relief valves									
Opening pressure for swinging grabber forward		○	bar	250±5			13	PA	
Opening pressure for swinging grabber back		○	bar	250±5			14	PA	
Opening pressure for turning grabber left C)	◊	◊	bar	120±5			15	PA	
Opening pressure for turning grabber right C)	◊	◊	bar	120±5			16	PA	
Opening pressure for lowering lug pusher (option)		○	bar	100±5			17	PA	
Opening pressure for lifting lug pusher (option)		○	bar	160±5			18	PA	
Stabilisation module cut-out function									
Cut-out pressure when charging		○	bar	150±10				MX	
Steering system									
Steering pump: LS-pressure cut-off valve									
High pressure at full load		○	bar	240±5			19	PL/	
Brake system									
Compact brake valve hydro accumulator charging function									
Cut-in pressure	○	○	bar	175±10			20	M3	
Cut-out pressure	○	○	bar	210±10			20	M3	
Service brake pressure									
Brake pressure in 1st brake circuit (front axle)	○	○	bar	95±5			21	M4	
Brake pressure in 2nd brake circuit (rear axle)	○	○	bar	95±5			21	M5	
Service brake hydro accumulator capacity									
Residual pressure in 1st brake circuit (front axle) hydro accumulators after braking 9 times, starting at 165 bar	○	○	bar	>80				M4	
Residual pressure in 2nd brake circuit (rear axle) hydro accumulators after braking 9 times, starting at 165 bar	○	○	bar	>80				M5	
Brake accumulator pressure sensor B19: deviation									
Deviation between pressure gauge and sensor	○	○	bar	<5			22	M3	

Tab. 80: Hydraulic adjustment procedures

▶ Start diesel engine.

▶ Connect Sculi diagnostic software to machine.

▶ In variables editor, select ***Check cooling system*** folder.

To deactivate reversible fan drive (option):

▶ Press *Activate/deactivate fan reversal* button on display (see operator's manual for more information).

or

Set variable ***CXFanReverse*** to ***0***.

Maximum operating pressure

▶ Force variable ***IRFanHydTempSens*** to 0 ohms.
  ▷ This simulates a failure of hydraulic oil temperature sensor.
  ▷ Central control unit energises fan speed proportional solenoid with minimum current.

Note
Variable ***IRFanHydTempSens*** is automatically reset to its original value when ignition is switched **off**.

▶ If necessary, force value to 0 ohms when repeating test.

▶ Completely depress and hold accelerator pedal.

▶ While doing so, check whether high pressure **PK** corresponds to specified value.

Description	Unit	Value
High pressure **PK**	bar	170 $^{\pm 10}$

If required value is not reached:

▶ Click variable ***CRFCFanCurrMin*** and press *space bar*.
  ▷ Line is coloured pink.
  ▷ A gradual approach towards the required value is possible.

Note
To gradually approach the required value:

▶ Cursor *up/down*: last digit of the value +/- 1

▶ Cursor *left/right*: last digit of the value +/- 5

▶ Page *up/down* button: last digit of the value +/- 10

▶ Gradually adjust value of variable ***CRFCFanCurrMin*** with pedals pressed all way down until required value is reached.

If required value is reached:

▶ Unforce variable ***IRFanHydTempSens***.

▶ Check pressure relief when proportional solenoid fails.

Pressure relief when proportional solenoid fails

▶ Force variable ***QRFanValve*** to 0 mA.
  ▷ This simulates a failure of fan speed proportional solenoid.

Note
To adjust flow regulator:

- ▶ Turning adjusting screw clockwise increases differential pressure.
- ▶ Turning adjusting screw anticlockwise reduces differential pressure.

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

If required value is reached:
- ▶ Turn off diesel engine and take out ignition key.
  - ▷ Variable ***MXSLHAFAutoLiftDnEnable*** is reset to ***0***.
- ▶ Disconnect differential pressure gauge from high pressure test connection **PL**.
- ▶ Disconnect differential pressure gauge from load sensing signal test connection **LSL**.

030.6.5.5 Working pump: power regulator

Valid for: L580-1414;

Note
The power regulator does not normally need to be adjusted.

- ▶ The power regulator only needs to be checked and adjusted if the working pump or important parts of it have been replaced or the performance of the working hydraulics is insufficient.

Make sure that following requirements are fulfilled:
- ❑ Hydraulic oil is at operating temperature.
- ❑ Machine is in maintenance position for adjustment procedures.
- ❑ Service access is open.

Make sure that following tools are ready:
- ❑ Two pressure gauges (600 bar)

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Symbol	Designation	Unit	Value
	High pressure **PA** during turn grabber left **3** function	bar	120 ±5
	High pressure **PA** during turn grabber right **4** function	bar	120 ±5

Tab. 87: Setting values

If a required value is not reached:
- ▶ Turn off the diesel engine and take out the ignition key.
- ▶ Turn the adjusting screw of the corresponding LS pressure relief valve.

Note
To adjust the LS pressure relief valves:
- ▶ Turn the adjusting screw clockwise to increase the high pressure.
- ▶ Turn the adjusting screw anticlockwise to reduce the high pressure.

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

When all the values are correct:
- ▶ Turn off the diesel engine and take out the ignition key.
- ▶ Reconnect the hydraulic lines to the rotary unit.
- ▶ Disconnect the pressure gauge from the high pressure test connection **PA**.

030.6.5.10 Stabilisation module cut-out function

Valid for: L580-1414;

Make sure that the following requirements are fulfilled:
- ❑ The hydraulic oil is at operating temperature.
- ❑ The machine is in the maintenance position for adjustment procedures.

Make sure that the following tools are ready:
- ❑ Pressure gauge (250 bar)

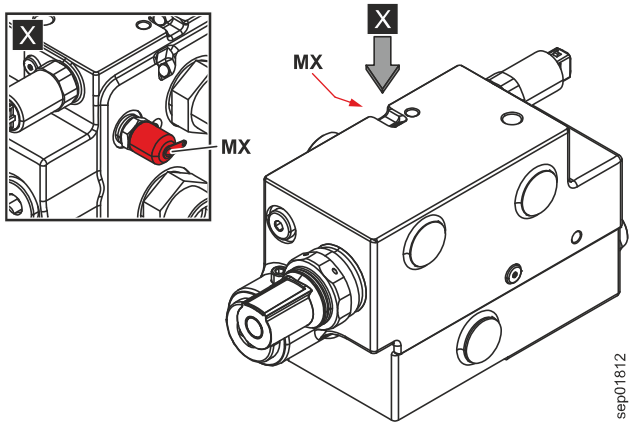

Fig. 235: Stabilisation module cut-out function

MX Ride control hydro accumulator charge pressure test connection

- ▶ Within 20 seconds, **use steering wheel** to steer machine all the way left and then all the way right.
- ▶ Each time the limit position is reached, move the machine and continue steering. When doing so, do not exceed a travel speed of 5 km/h.
  ▷ The stroke limit damping of steering is overcome.
- ▶ Wait until the variable ***MXJSSteerAngleAdjStart*** returns to ***0***.
  ▷ Calibration is completed.
- ▶ Check whether calibration has been successful.

Checking whether calibration is successful

- ▶ Steer machine as far left and as far right as it will go.
- ▶ Move the machine to the respective limit positions and continue steering.
  ▷ The stroke limit damping of steering is overcome.

Note

The variable ***PRSIJSSteeringAngle*** can only display values between -100% and +100%. This means the variable must not reach its required value until the moment the limit position is reached!

- ▶ When the left limit position is reached, check whether the variable ***PRSIJS-SteeringAngle*** reaches the value $-100^{+0.5}$%.
- ▶ When the right limit position is reached, check whether the variable ***PRSIJS-SteeringAngle*** reaches the value $100^{-0.5}$%.

If a required value is not reached:
- ▶ Repeat calibration.

030.6.7.2 Control block for joystick steering (option): calibration

Valid for: L580-1414;

Always calibrate joystick steering if one of following components is replaced:
- Angle sensor for articulation angle B67
- Control valve block or parts of control valve block for joystick steering
- Joystick or joystick module A29
- Central control unit A15
- Output module A17b

Make sure that following requirements are met:
- ❑ Hydraulic oil is at operating temperature.
- ❑ Angle sensor for articulation angle is calibrated.
- ❑ Machine is in maintenance position for adjustment procedures.

Make sure that following tools are ready:
- ❑ Laptop with Sculi diagnostic software

Preparations

- ▶ Start diesel engine.
- ▶ Connect Sculi diagnostic software to machine.
- ▶ In variables editor, select ***Joystick steering*** folder.

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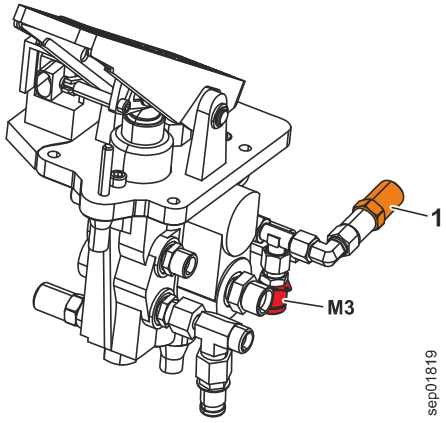

Fig. 251: Brake accumulator pressure sensor: measurement

1 Brake accumulator pressure sensor

M3 Service brake accumulator pressure test connection

▶ Connect a pressure gauge (250 bar) to the brake accumulator pressure test connection **M3** on the compact brake valve.
▷ The pressure gauge **M3** shows the brake accumulator pressure.

▶ Start the diesel engine.
▷ The brake accumulator pressure **M3** increases to the cut-out pressure and then gradually falls again.

▶ Connect the Sculi diagnostic software to the machine.

▶ In the variables editor, select the ***Brake system*** folder.
▷ The variable ***PRSIMBrakePressure*** shows the brake accumulator pressure.

▶ Check how far the value of the ***MDdrPmPressHV*** variable deviates from the value displayed by the high pressure gauge **M3**.

Description	Unit	Value
Maximum deviation	bar	5

If the deviation is too great:

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

▶ Inspect the brake accumulator pressure sensor **1** for damage and replace if necessary.

▶ Repeat the test.

If the deviation is within the permitted range:

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

▶ Disconnect the pressure gauge from the brake accumulator pressure test connection **M3**.

030.6.9 Electrical system

030.6.9.1 Central control unit (Master4) Creating a Servicefile

Valid for: L580-1414;

The service file is a folder where files relevant to the servicing of the machine are kept.

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030.6.9.4 Resetting the central control unit (Master4)

Valid for: L580-1414;

The central control unit (Master4) may only be reset if it no longer functions or software updates are no longer possible.

To prevent the warranty from becoming invalid when you open the central control unit, the following conditions must be met:
- None of the components of the central control unit may be damaged.
- No impurities may get inside the central control unit.
- When closing the cover, make sure the seal is seated correctly.
- The tightening torque of the screws on the cover is 10 Nm.

Make sure that the machine is in maintenance position 1.

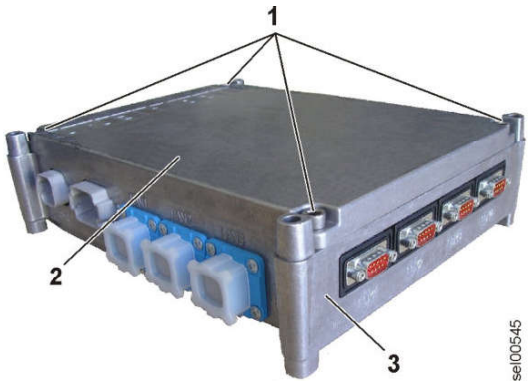

Fig. 265: Removing the cover

1 Screws
2 Cover
3 Central control unit

▶ Undo all four screws **1** on the cover **2**.

▶ Remove the cover from the central control unit **3**.

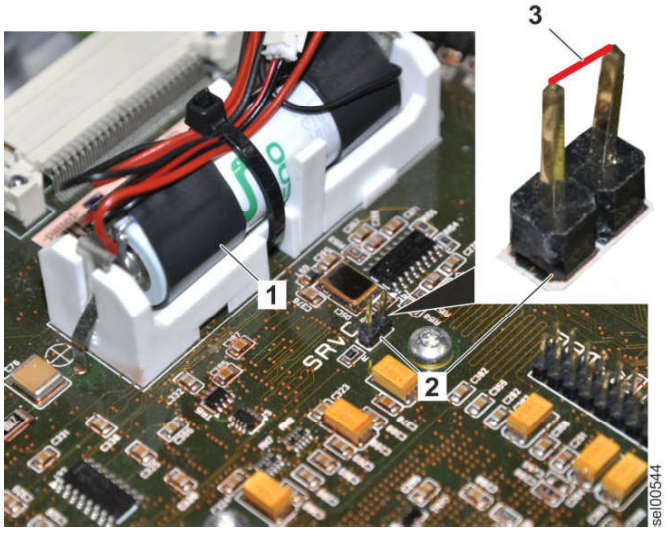

Fig. 266: Central control unit - Performing a reset

1 Back-up battery
2 Pins
3 Electrical lead

If a service code appears:

▶ Calibration has failed. Turn off the engine and wait until the central control unit has shut down.

▶ Proceed as specified in the service code table.

Service code	Cause	Remedy
50D6	Gear oil temperature too low. Parking brake released.	Make sure that all the requirements are fulfilled. Start the calibration again.
50CA (1st attempt)	The gear oil temperature fell below the minimum during the calibration. The parking brake was opened during the calibration. A function was activated during the calibration. Faulty hydrostat calibration.	Make sure that all the requirements are fulfilled. Start the calibration again. Do not operate any functions during calibration.
50CA (2nd attempt)	Faulty hydrostat calibration.	Contact the technical customer service department.

Tab. 97: Service code table

If no service code appears:

▶ Calibration was successful. Turn off the engine and wait until the central control unit has shut down.
  ▷ Calibration data is sent to the central control unit.

Note

Calibration is not completed until the engine is turned off and the central control unit is completely shut down!

▶ Calibrate the clutch.

Automatic clutch calibration

▶ Start the diesel engine.

▶ Set the variable ***MXTCUStartClutchCalib*** to ***1***.
  ▷ Calibration takes place automatically.
  ▷ The *calibration active* symbol field **1** in the display lights up.

▶ Wait until the variable ***MXTCUStartClutchCalib*** returns to ***0***.
  ▷ Calibration is completed.
  ▷ The *calibration completed* symbol field **2** in the display lights up.

If a service code appears:

▶ Calibration has failed. Turn off the engine and wait until the central control unit has shut down.

▶ Proceed as specified in the service code table.

Service code	Cause	Remedy
50D5	Gear oil temperature too low. Parking brake released.	Make sure that all the requirements are fulfilled. Start the calibration again.

The transmission software can be downloaded from the Liebherr customer service documentation.

Note
Version of machine software must be compatible with version of transmission software.

▶ Ensure that appropriate version of machine software is installed when transmission software is updated.

Machine software	Transmission software
Version 013 or higher	Version 3.2

Tab. 103: Configuration of machine software / transmission software

Software update of the transmission control unit

Make sure that following requirements are fulfilled:
❑ Machine is in maintenance position 1.
❑ Machine software: version 13 or higher is installed.

Make sure that following tools are ready:
❑ A blank flash card (item code: 10223095)
❑ A flash card reader (item code: 11000491)

Fig. 279: Software in the Liebherr customer service documentation

1 Software overview **2** Example for transmission software

The transmission software can be downloaded from the Liebherr service documentation.

Liebherr service documentation contains an overview **1** of machine types and corresponding software.

Transmission software in Liebherr service documentation is a compressed file. The file must be extracted and saved on the flash card.

▶ Select the Run command to save the transmission software on a blank flash card.

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Fig. 290: Display with Touch Panel button

▶ Press *touch panel* button.

Fig. 291: Display with enter button

▶ Press *enter* button.

					Description
D	93	6	A7	04	Diesel engine type designation
				04	Exhaust treatment system: SCR (selective catalytic reduction)

Tab. 104: Description of the type designation

2.3 Rotary group

The 6-cylinder engines have a 7-fold bearing steel crankshaft with induction-hardened running surfaces. A torsional vibration damper is attached to the crankshaft on the fan side.

The following are also fitted:
- Forge-pressed, diagonally divided connecting rod
- Rotary group bearings as lead-bronze, 3-layer plain bearings or sputter bearings
- Steel-alloy three-ring pistons with ring carriers and combustion modules in the piston head
- Replaceable, wet cylinder liners

2.4 Crankcase

The crankcase consists of a piece of alloyed cast iron. 4-valve, individual cylinder heads with a swirl-generating port and replaceable valve seat rings and valve guides are fitted.

The flywheel housing, front unit carrier and oil pan on the underside close the diesel engine.

2.5 Lubrication

The oil is filtered by two replaceable cartridge filters in the main flow.

A gear pump provides pressure-feed lubrication to the following components:
- Crankshaft bearing
- Connecting bearing
- Camshaft bearing
- Piston pin bush
- Rocker arm

The following auxiliary units are connected to the diesel engine lubricating oil circuit:
- Water pump
- Turbocharger
- Power take-off units
- Fuel feed pump

The oil cooler is integrated in the coolant flow.

2.6 Cooling

Cooling is performed by a thermostatically controlled fluid cooler and a coolant pump. Each cylinder unit is supplied individually by distribution channels cast in the crankcase.

The pistons are cooled by a cooling channel from the lubricating oil circuit of the diesel engine.

2.7 Injection system

The quantity-controlled high-pressure pump is fed by a flange-mounted predelivery pump.

Supply line diagnostics			
Check	**Preconditions**	**Measurement**	**Required value**
Lines shorted to earth	Ignition OFF	Measure resistance from pin 2 and pin 3 to earth.	More than 10 kΩ
	Plug connection disconnected		

Tab. 119: Supply line diagnostics

Sensor diagnostics			
Check	**Preconditions**	**Measurement**	**Required value**
Short circuit between individual pins on sensor	Ignition OFF	Measure resistance between pins 1, 2, and 3 on sensor.	More than 10 kΩ
	Plug connection disconnected		
Output signal voltage with ignition ON	Ignition ON	Measure voltage between pins 1 and 2.	$0.5^{\pm 0.2}$ V
	Diesel engine OFF		
Output signal voltage when idling	Ignition ON	Measure voltage between pins 1 and 2.	Voltage at lower idling speed: $3.3^{\pm 0.2}$ V
	Diesel engine ON		

Tab. 120: Sensor diagnostics

1.4 Charge air temperature sensor B707

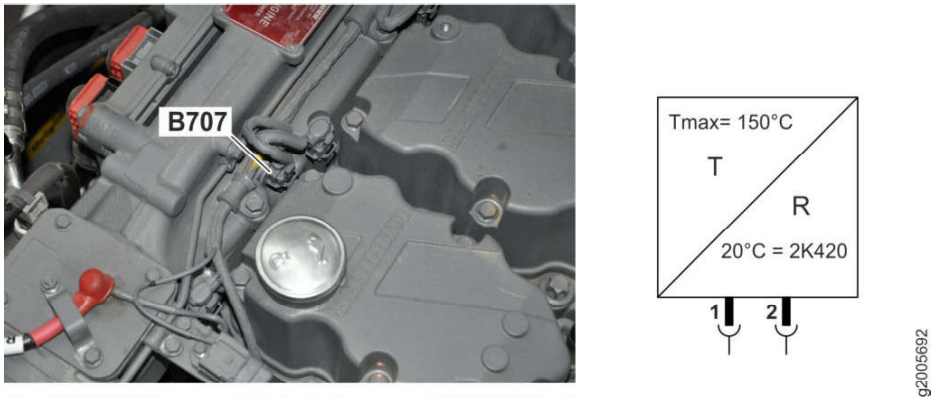

Fig. 311: Charge air temperature sensor

Charge air pressure sensor **B707** is installed in air intake pipe.

Charge air temperature is measured using an NTC resistor.

if sensor fails, a substitute value of -100 °C is displayed. If sensor fails, engine control unit uses a computational model to continue running diesel engine.

Pin	Function
1	Ground
2	Output signal (0 to 14 kΩ)

Tab. 121: Plug assignment

The fuel cooler **9** cools the returning fuel. The fuel temperature must not exceed 60 °C.

2.2 Diagram of the fuel system on the diesel engine

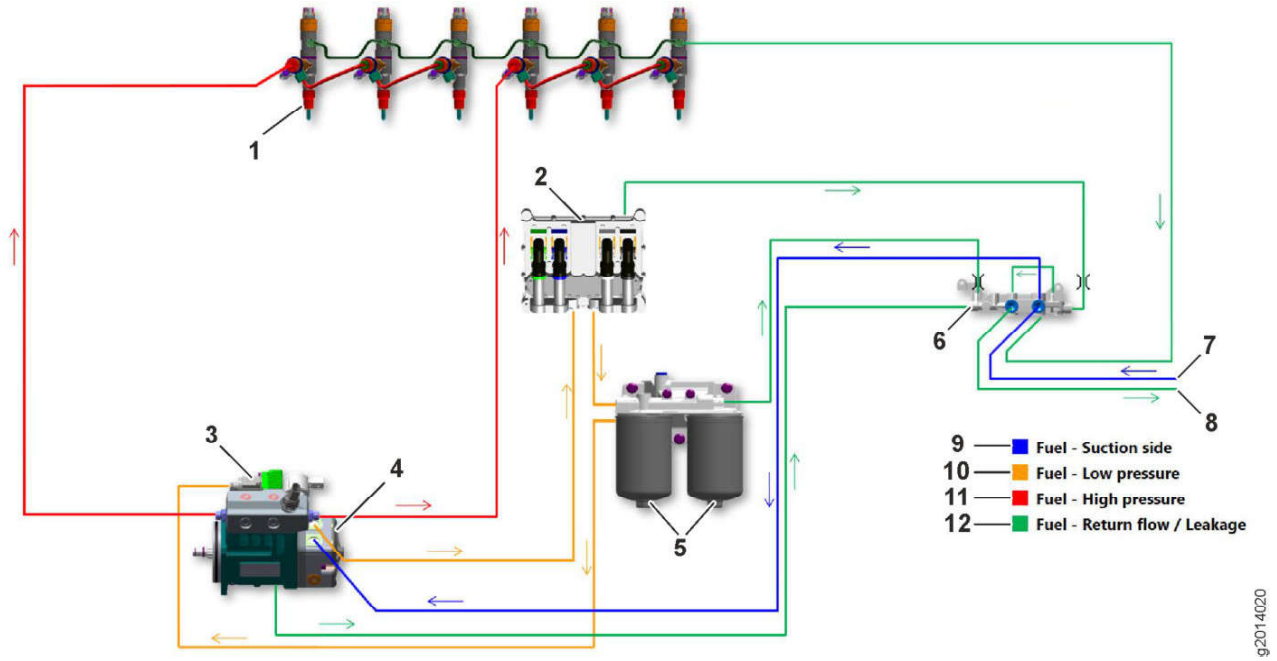

Fig. 318: Diagram of the fuel system on the diesel engine

1	Injection nozzles	**5**	Fuel fine filter	**9**	Fuel suction side
2	Engine control unit	**6**	Distributor rail	**10**	Fuel low pressure
3	High-pressure fuel pump	**7**	Fuel from the fuel tank	**11**	Fuel high pressure
4	Fuel pre-delivery pump	**8**	Return line to fuel tank	**12**	Fuel return (leakage)

The fuel pre-delivery pump **4** draws up fuel via the fuel **5** and the distributor rail **6**.

The fuel high pressure pump **3** delivers the fuel to the injector nozzles **1**.

The fuel is injected through the injection nozzle **1** to the combustion chamber.

The fuel injection is regulated by the engine control unit **2**.

Unused fuel flows back through the fuel return (leakage) line **12** to the fuel tank.

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To prevent the diesel exhaust fluid crystallising in the pipes or the diesel exhaust fluid nozzle when the diesel engine is not running, these components are blown out with compressed air when the diesel engine is shut down.

2.3 How the exhaust gas treatment system works

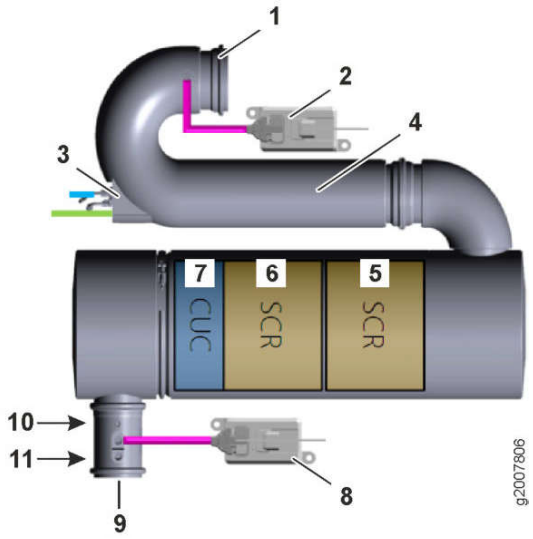

Fig. 328: How the exhaust gas treatment system works

1	Exhaust from diesel engine	**7**	Slip catalyst
2	NO_x sensor in front of the SCR catalytic converter B726	**8**	NO_x sensor behind the SCR catalytic converter B727
3	Diesel exhaust fluid nozzle	**9**	Exhaust gas after treatment
4	Mixing section	**10**	Exhaust temperature sensor at the outlet of the SCR catalytic converter B772
5	Front section of the SCR catalytic converter	**11**	NH_3 sensor B783
6	Rear section of the SCR catalytic converter		

The exhaust gas is treated using selective catalytic reduction (SCR).

Diesel exhaust fluid is injected into the exhaust from the diesel engine **1**. This mixture flows into the mixing section. The exhaust and the urea solution are thoroughly mixed in the mixing section.

At sufficiently high exhaust temperatures (around 170 °C), chemical reactions commence. The diesel exhaust fluid is converted to ammonia (NH_3) and carbon dioxide (CO_2).

The ammonia (NH_3) thus created reacts in the rear section of the SCR catalytic converter **6** at sufficiently high temperatures with the nitrogen oxide (NO_x) in the exhaust gas. NO_x and NH_3 are converted to N_2 and H_2O.

The slip catalyst **7** converts excess ammonia back to nitrogen (N_2) and water (H_2O). This presents unpleasant smells from excess ammonia.

The ammonia content in the exhaust is measured by the NH_3 sensor **11**.

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From the diesel oxidation catalyst, the exhaust flows into the mixing section **12**. In the mixing section, diesel exhaust fluid is injected into the exhaust gas. The water in the diesel exhaust fluid evaporates. The high exhaust temperature converts the urea into ammonia (NH_3).

The mixture of exhaust gas and ammonia is delivered to the filter module.

Filter module is a combination of and SCR catalytic converter and a diesel particulate filter. The filter module consists of a material that initiates selective catalytic NO_x reduction and filters the soot particles from the exhaust gas.

The soot particles from the exhaust gas remain in the filter module. The diesel oxidation catalyst increases the exhaust temperature. This high exhaust temperature burns the soot particles. The filter module is passively regenerated.

If the soot particle load exceeds a predetermined value, the diesel engine performs an active regeneration. The exhaust gas temperature of the diesel engine is thereby increased by a thermal management system (injection control, position of the exhaust throttle valve, etc.). Active regeneration can be suppressed or manually started with the buttons in the display.

Burning the soot particles leaves ash residue. Therefore, the filter module must be cleaned every 4500 hours according to the maintenance and inspection schedule. If no cleaning of filter module is carried out up to 6000 h, the performance of diesel engine is reduced by 25%.

The slip catalyst (CUC) **15** converts surplus ammonia (NH_3) back to nitrogen (N_2) and water (H_2O). This prevents harmful emissions (toxic vapours, ammonia odour).

2.2 Representation of load condition

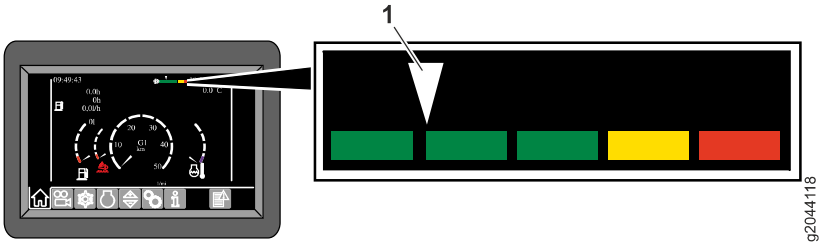

Fig. 341: Display of load condition

The load condition of filter module is indicated on the display in form of an indicator **1** with coloured bars.

The represented load condition depends on following factors:
– Determined amount of soot particles in grams per litre (g/L)
– Time since last manual regeneration

The factor with the higher load condition is shown.

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040.3 Splitter box

Valid for: L580-1414;

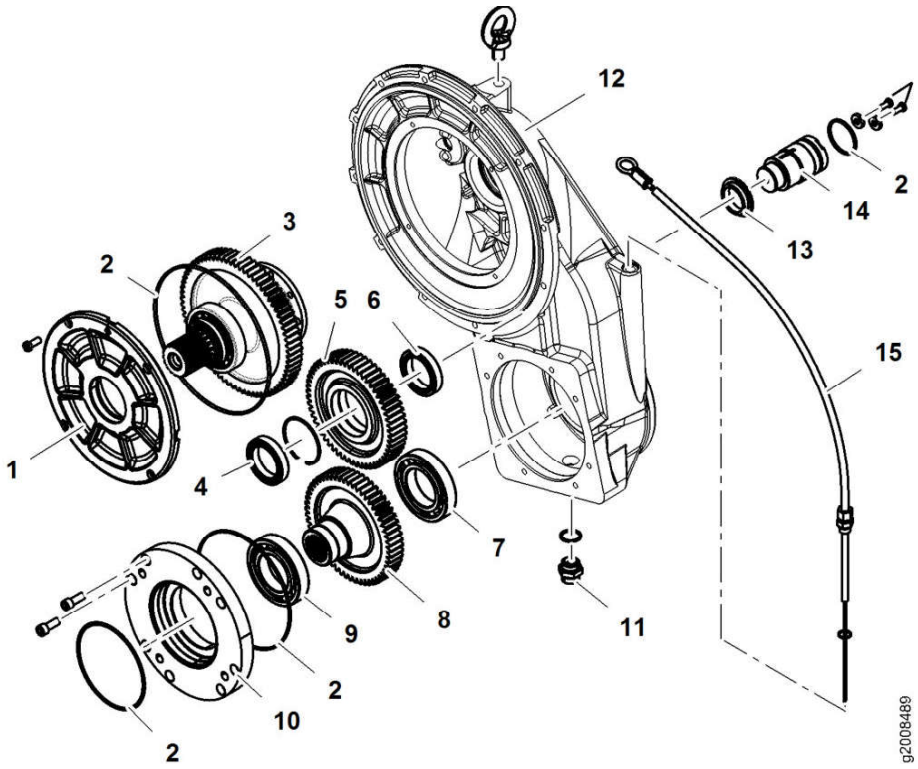

Fig. 351: Splitter box

1	Bearing cover	**9**	Cylindrical roller bearing
2	O-ring	**10**	Bearing flange
3	Drive shaft	**11**	Drain plug
4	Cylindrical roller bearing	**12**	Housing
5	Intermediate gearwheel	**13**	Shim
6	Cylindrical roller bearing	**14**	Axle for intermediate gearwheel
7	Deep groove ball bearing	**15**	Dipstick
8	Spur gear		

The splitter box is flange-mounted on the flywheel housing of the engine.

2.1 Function

The splitter box is driven directly by the engine flywheel via an elastic coupling.

The splitter box is a single-stage spur gear system.

The splitter box transmits and distributes the engine output torque to the hydraulic pumps for the steering hydraulics and the working hydraulics:

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2	Fan speed proportional solenoid valve	**5**	Leak oil to hydraulic tank
3	Oil supply via fan pump	**6**	Output shaft

BMK	Function
Y13	Fan speed proportional solenoid

Tab. 148: Equipment codes

Fan motor is on right side of vehicle behind fan blade.

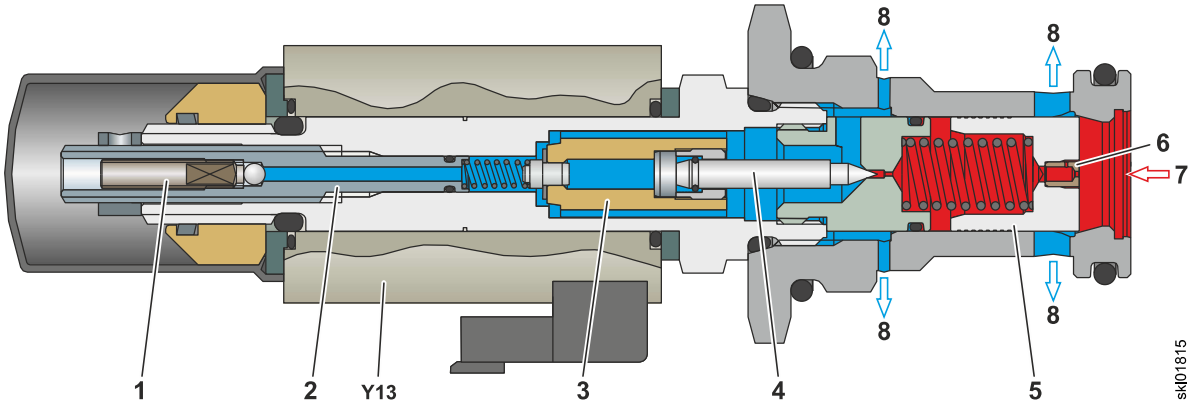

Fig. 358: Sectional view of fan speed proportional solenoid valve

1	Bleeder screw	**4**	Secondary piston	**7**	Oil supply via fan pump
2	Adjusting screw for secondary piston	**5**	Primary piston	**8**	Return flow to collector pipe
3	Stay	**6**	Throttle		

BMK	Function
Y13	Fan speed proportional solenoid

Tab. 149: Equipment codes

2 Function

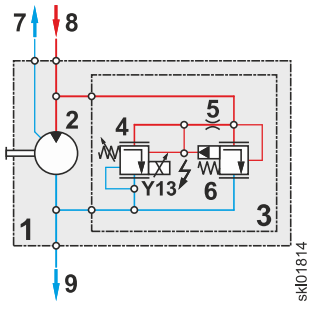

Fig. 359: Hydraulic diagram of fan motor

1	**Fan motor**	**6**	Primary piston
2	Gear motor	**7**	Leak oil to hydraulic tank
3	**Fan speed proportional solenoid valve**	**8**	Oil supply via fan pump

See next page for continuation of the image legend

8 Outlet valve 0.65 bar
9 Inlet valve 0.03 bar
10 Leak oil strainer 100 µm
11 Steel tank
12 Sight glass for hydraulic oil level
20 Return flow from control valve block
21 Diesel engine
22 Fan pump
23 Brake pump
24 Oil supply for compact brake valve
40 **Collector pipe**
41 Preload valve for steering cylinder replenishing function 5 bar
42 Bypass valve for hydraulic oil cooler 1.5 bar
43 Hydraulic oil cooler

Name	Test point
PK	Cooling system high pressure

Tab. 158: Test points

BMK	Function	BMK	Function	BMK	Function
B8	Hydraulic oil temperature sensor	**Y13**	Fan speed proportional solenoid	**Y50**	Fan reversal solenoid

Tab. 159: Equipment codes

Fan pump **22** draws oil from hydraulic tank **1** and pumps it to fan reversal valve block **30**. From there, oil continues to fan motor **34** and drives it. Oil returning from fan motor **34** also passes through fan reversal valve block **30**.

Fan speed proportional solenoid valve **31** controls fan speed by directing oil past fan motor **34**. The more oil that flows through bypass, the lower output speed.

When fan reversal is activated, central control unit energises fan reversal solenoid valve **33**. This reverses inflow and outflow of fan motor **34** and fan motor rotates in opposite direction.

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35 Throttle
36 Regulating lever
37 Power regulator
38 Dummy piston
39 Flow regulator
40 **Valve block for steering system**
41 Check valve
42 Check valve (not working)
43 Load sensing signal from servostat
44 Shuttle valve
45 **Priority valve**
46 Priority valve
47 Throttle check valve
48 Throttle
49 Throttle for load sensing signal
50 Check valve
51 Connection to pressure switch for emergency steering and oil supply from emergency steering pump
52 Steering system oil supply
55 **Pilot control valve block**
56 Pilot pressure solenoid valve
57 Servo pressure relief valve
58 Pilot control hydro accumulator
59 Oil supply from hydro accumulator for 1st brake circuit
60 Compact brake valve return flow
65 **Main control block**
66 Primary pressure relief valve
109 Strainer
110 Throttle 0.8 mm
111 Pressure balance for swivel arm cylinder
112 Swivel arm forward secondary pressure relief valve
113 Swivel arm back secondary pressure relief valve
114 End section
115 Orifice 1.0 mm
116 Return flow of stroke limit damping pressure relief valves
117 Return flow from compact brake valve (spool valve block housing preheating)
120 **Grabber with downholder (option)**
121 Grabber cylinder with stroke limit damping
122 Preload valve 50 bar (option)
123 Downholder cylinder (option)
124 Downholder cylinder (option)
125 **Control valve block for downholder (option)**
126 Unlockable check valve
127 Pressure relief valve 160 bar
128 Check valve
129 Strainer
130 Orifice 0.5 mm
131 Lowering brake valve 350 bar
132 Flow divider
133 Limit switch for activating downholder (option)
134 Rotary bushing
135 **Start-up valve**
136 Throttle for start-up speed
180 Proportional solenoid valve for swinging grabber back
181 Proportional solenoid valve for swinging grabber forward
182 Shuttle valve
183 Pressure balance for oscillating cylinder
184 LS pressure relief valve for swinging grabber back
185 LS pressure relief valve for swinging grabber forward
186 Secondary pressure relief valve for swinging grabber back
187 Secondary pressure relief valve for swinging grabber forward
188 **Control valve block section for rotary unit motors**
189 Spool valve for rotary unit motors
190 Proportional solenoid valve for turning grabber right
191 Proportional solenoid valve for turning grabber left
192 Shuttle valve
193 Pressure balance for rotary unit motors
194 LS pressure relief valve for turning grabber right
195 LS pressure relief valve for turning grabber left
196 Dummy piston
197 Dummy piston
198 **Control block section for log pusher cylinder**
199 Spool valve for log pusher cylinder
200 Proportional solenoid valve for lifting log pusher (black/white control)
201 Proportional solenoid valve for lowering log pusher (black/white control)
202 Shuttle valve
203 Pressure balance for log pusher cylinder
204 LS pressure relief valve for raising log pusher
205 LS pressure relief valve for lowering log pusher

See next page for continuation of the image legend

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2.5 Pressure protection

The working pump is protected by LS pressure cut-off valve in control valve block.

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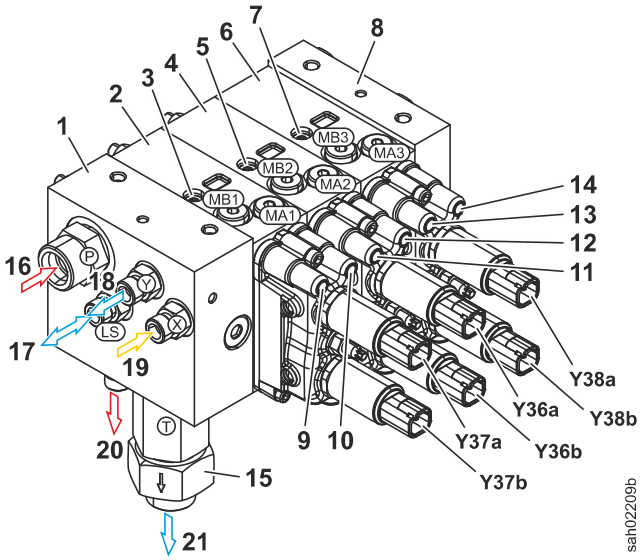

Fig. 383: Additional control block (from rear right)

1 End section
2 Control block section for oscillating cylinder
3 Shuttle valve
4 Control block section for rotary unit motors
5 Shuttle valve
6 Control block section for log pusher cylinder
7 Shuttle valve
8 End section
9 LS pressure relief valve for swinging grabber forward
10 LS pressure relief valve for swinging grabber back
11 LS pressure relief valve for turning grabber left
12 LS pressure relief valve for turning grabber right
13 LS pressure relief valve for lowering log pusher
14 LS pressure relief valve for raising log pusher
15 Preload valve 15 bar
16 Oil supply from working pump and steering pump (via main spool valve)
17 Load sensing signal to load sensing pressure replication valve
18 Control oil return flow to pilot control valve block (via main control block)
19 Control oil from pilot control valve block (via main control block)
20 Oil supply for load sensing pressure replication valve
21 Return flow to return filter (via main control block)

BMK	Function	BMK	Function	BMK	Function
Y36a	Proportional solenoid for turning grabber right	**Y37a**	Proportional solenoid for swinging grabber back	**Y38a**	Proportional solenoid for lifting log pusher (black/white control)
Y36b	Proportional solenoid for turning grabber left	**Y37b**	Proportional solenoid for swinging grabber forward	**Y38b**	Proportional solenoid for lowering log pusher (black/white control)

Tab. 175: Equipment codes

The additional control block is installed in front section behind maintenance cover.

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8 Left boom cylinder **16** Ride control solenoid valve

Ride control system is a hydraulic spring system for lift arms.

Driving over uneven surfaces sets machine into an oscillating motion (oscillating vertical and pitching motion). For ride control, stabilisation module **10** connects ring side of boom cylinder to hydraulic tank **6** via control valve block **1** so that lift arms can move freely upwards. At same time, stabilisation module **10** connects piston side of boom cylinder to ride control hydro accumulators **20** , **21** , **22** and **23**. The nitrogen filling in hydro accumulators for ride control cushions shocks.

2.2 Speed-dependent activation

The ride control is activated or deactivated by central control unit depending on travel direction and travel speed (for further information, refer to operator's manual). Travel speeds can be set using Sculi diagnostic software.

Variable	Meaning
CRWERideCtrlSpd-ForwOn	Travel speed for activation during forward travel
CRWERideCtrlSpd-ForwOff	Travel speed for deactivation during forward travel
CRWERideCtrlSpd-BackwOn	Travel speed for activation during reverse travel
CRWERideCtrlSpd-BackwOff	Travel speed for deactivation during reverse travel
CDWERideCtrlDelay4On	Activation delay (applies for forward travel and reverse travel)

Tab. 183: Speed-dependent activation

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060.9.2 Working hydraulics angle sensors

Valid for: L580-1414;

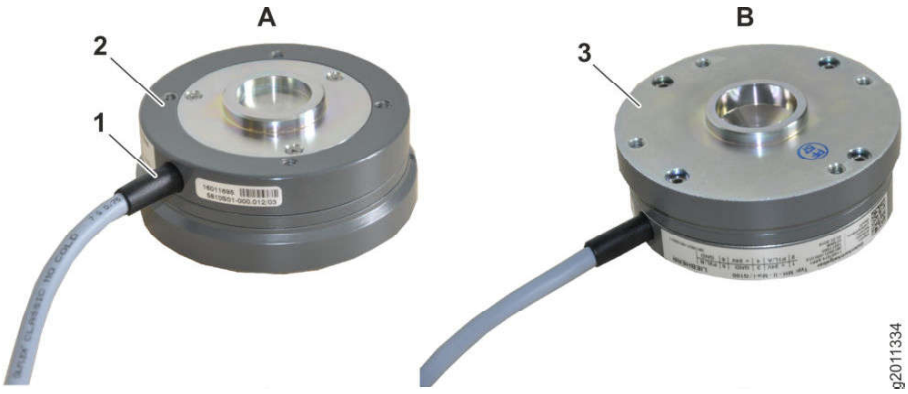

Fig. 395: Working hydraulics angle sensors

1 Connecting cable

2 Housing with integrated electronics

3 Connecting plate

A View of housing with integrated electronics

B View of the connecting housing

The angle sensors of the working hydraulics are mounted on the swivel arms (swivel arm angle sensor B61) and the boom (boom angle sensor B60).

Both of the angle sensors are of the same type and can be swapped with each other.

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5 Hydraulic tank drain valve
6 Working pump suction port drain valve
7 Diesel engine
8 Working pump
9 Steering pump
10 Valve block for steering system
11 Priority valve
12 Check valve
13 Shuttle valve
14 Emergency steering pump
15 Check valve
16 Pilot control valve block
17 Pilot control hydro accumulator
18 Fan pump
19 Brake pump
20 In-line filter 80 µm
21 Compact brake valve
22 Parking brake hydro accumulator
23 Hydro accumulator for service brake (2nd brake circuit)
24 Hydro accumulator for service brake (1st brake circuit)
25 Hydro accumulator for service brake (2nd brake circuit)
26 Hydro accumulator for service brake (1st brake circuit)
27 Front axle with 1st service brake circuit
28 Orifice
29 Parking brake (disc brake)
30 Rear axle with 2nd service brake circuit
31 Main control valve block
32 Spool valve for grabber cylinder
33 Boom cylinder main spool valve
43 Rotary bushing
45 Grabber with downholder (option)
46 Grabber cylinder with stroke limit damping
47 Preload valve 50 bar (option)
48 Downholder cylinder (option)
49 Downholder cylinder (option)
50 Control valve block for downholder (option)
51 Limit switch for activating downholder (option)
52 Start-up valve
53 Rotary unit motor 2
54 Rotary unit motor 1
55 Left boom cylinder
56 Right boom cylinder
57 Swivel arm forward replenishing valve
58 Left swivel arm cylinder
59 Right swivel arm cylinder
60 Stabilization module
61 Hydro accumulator block
62 Ride control hydro accumulator
63 Ride control hydro accumulator
64 Ride control hydro accumulator
65 Ride control hydro accumulator
66 3-way ball cock for filling the grabber stabiliser
70 Valve block for grabber stabiliser
71 Throttle check valve 2.0 mm
72 Hydro accumulator for grabber stabiliser
73 Left stabilisation cylinder
74 Throttle check valve 2.0 mm
75 Hydro accumulator for grabber stabiliser
85 End section
86 Preload valve 15 bar
87 Oscillating cylinder (longitudinal swinging)
88 Replenishing valve for swinging grabber forward
89 Log pusher cylinder (option)
90 Load sensing pressure replication valve
91 Check valve
92 Servostat
93 Steering stabilisation valve block
94 Steering damper hydro accumulator
95 Steering damper hydro accumulator
96 Left steering cylinder with stroke limit damping
97 Pressure relief valve for stroke limit damping
98 Right steering cylinder with stroke limit damping
99 Pressure relief valve for stroke limit damping
100 Fan motor
101 Fan speed proportional solenoid valve
102 Collector pipe
103 Temperature valve for gear oil cooler bypass
104 Hydraulic oil cooler
105 Gear oil cooler
106 Transmission housing
107 Hydrostat oil filter
108 Drain valve on transmission housing
109 Sight glass for gear oil level
110 Duct plate
111 Transmission valve block
112 Filter head
113 Gear oil cooler

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2.2 Pressure equalisation

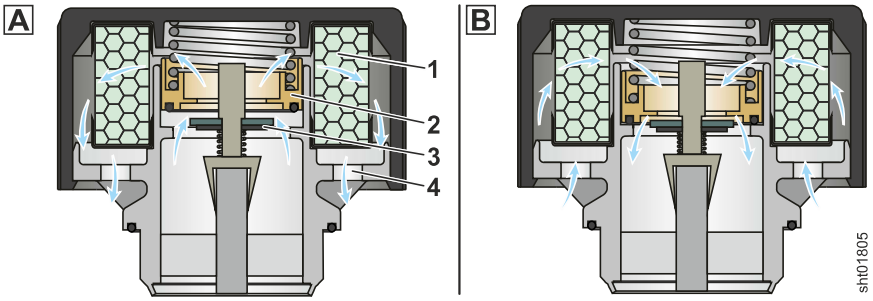

Fig. 411: Breather filter under excess pressure and with insufficient pressure

1	Fine filter	**3**	Inlet valve 0.03 bar
2	Outlet valve 0.65 bar	**4**	Opening

2.2.1 Excess pressure in the steel tank

Excess pressure in the steel tank can be caused by increased oil temperature or by the hydraulic cylinders retracting.

At a certain excess pressure, the outlet valve **2** opens. Air can then escape via the fine filter **1** and the opening **4** to the outside.

2.2.2 Insufficient pressure in the steel tank

Insufficient pressure in the steel tank can be caused by decreasing oil temperature or by the hydraulic cylinders extending.

Once the pressure falls below a certain level, the inlet valve **3** opens. Air can then flow into the steel tank via the opening **4** and the fine filter **1**.

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2 Function

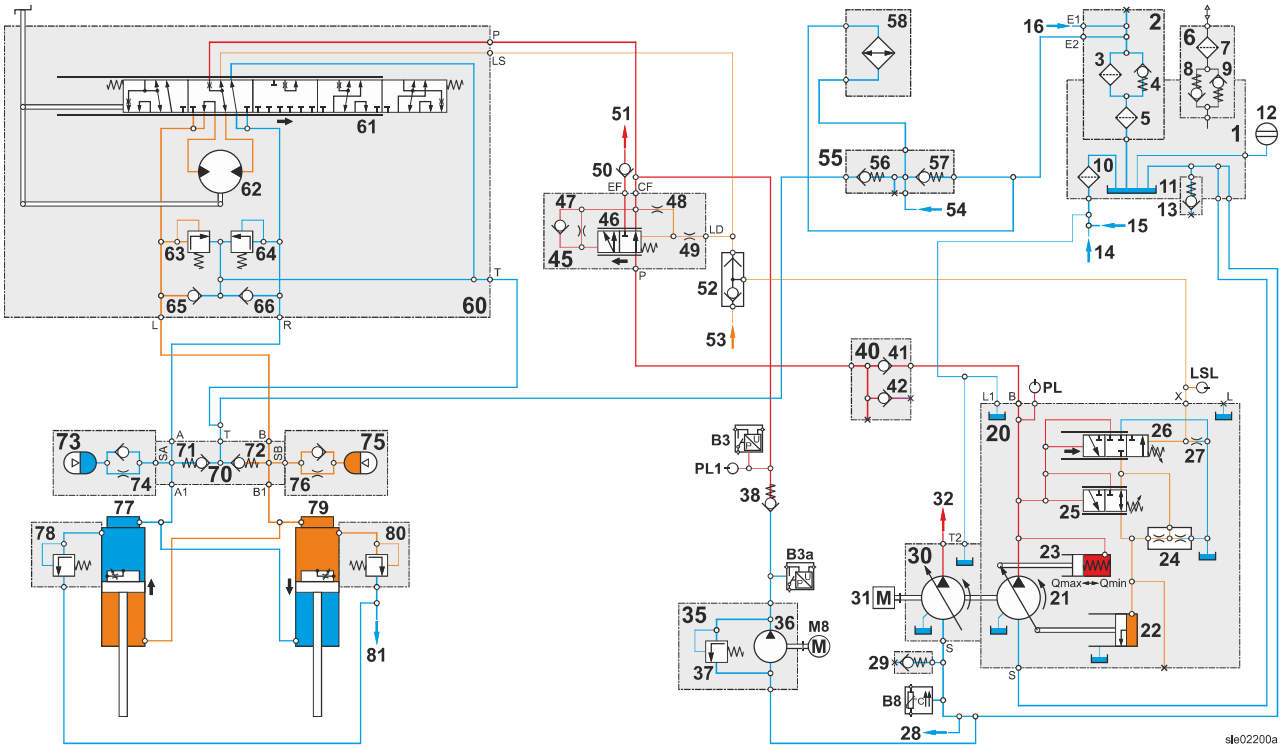

Fig. 415: Hydraulic diagram of the steering system (steering to the left)

1 **Hydraulic tank**
2 **Return filter**
3 Main filter element 10 µm
4 Bypass valve 2.5 bar
5 Strainer mesh 100 µm
6 **Breather filter**
7 Fine filter
8 Outlet valve 0.65 bar
9 Inlet valve 0.03 bar
10 Leak oil strainer 100 µm
11 Steel tank
12 Sight glass for hydraulic oil level
13 Hydraulic tank drain valve
14 Fan motor leak oil
15 Return flow from compact brake valve and pilot control
27 Throttle
28 Fan pump and brake pump suction port
29 Working pump suction port drain valve
30 **Working pump**
31 Diesel engine
32 Oil supply for control valve block
35 **Emergency steering pump**
36 Gear pump
37 Pressure relief valve
38 Check valve
40 **Valve block for steering system**
41 Check valve
42 Check valve (not working)
45 **Priority valve**
46 Priority valve
55 **Collector pipe**
56 Preload valve for steering cylinder replenishing function 5 bar
57 Bypass valve for hydraulic oil cooler 1.5 bar
58 Hydraulic oil cooler
60 **Servostat**
61 Valve spool
62 Metering pump
63 Secondary pressure relief valve for steering to left
64 Secondary pressure relief valve for steering to right
65 Replenishing valve for steering to left
66 Replenishing valve for steering to the right
70 **Steering stabilisation valve block**
71 Replenishing valve for steering stabilisation 0.5 bar
72 Replenishing valve for steering stabilisation 0.5 bar
73 **Steering damper hydro accumulator**

See next page for continuation of the image legend

LBH/12200852/16/211-20190801_085602/en

090.5 Servostat

Valid for: L580-1414;

1 Layout

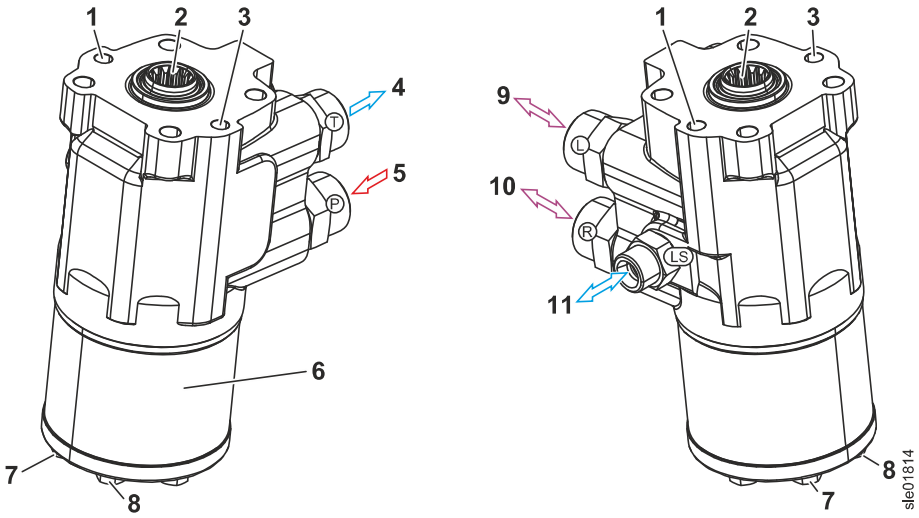

Fig. 426: Servostat (from front left and from front right)

1	Secondary pressure relief valve for steering to left	**7**	Feeder valve for steering to left
2	Connection for steering wheel shaft	**8**	Feeder valve for steering to the right
3	Secondary pressure relief valve for steering to right	**9**	Connection for steering to left
4	Return flow to collector pipe	**10**	Connection for steering to the right
5	Oil supply from steering pump	**11**	Load sensing signal to working hydraulics pump
6	Metering pump		

Servostat is bolted underneath cab floor.

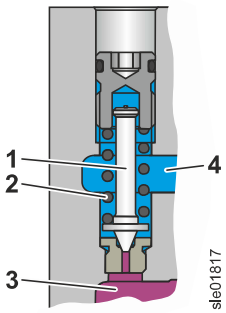

Fig. 427: Secondary pressure relief valve: secondary pressure relief valve

1	Secondary pressure relief valve	**3**	Connection to steering cylinder
2	Compression spring	**4**	Connection to tank port

LBH/12200852/16/211-20190801_085602/en

2 Function

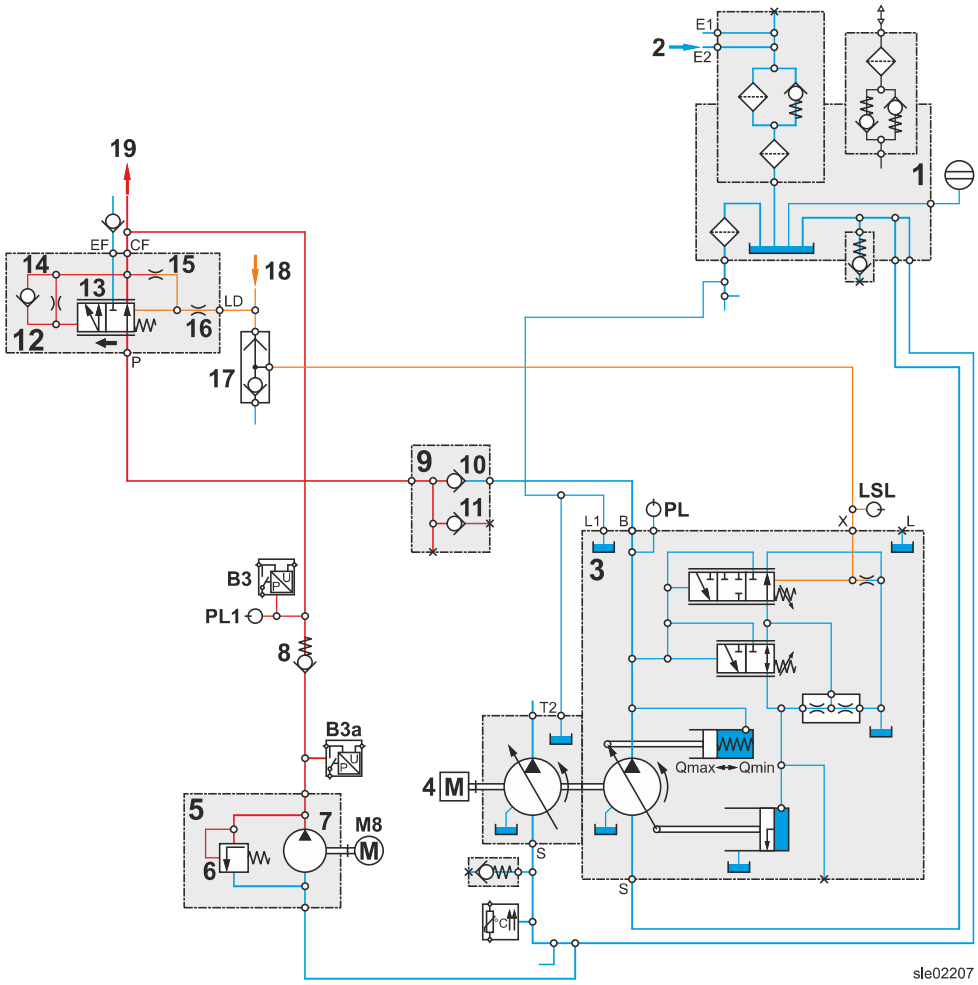

Fig. 439: Emergency steering: hydraulic diagram (emergency steering active)

1	Hydraulic tank	**11**	Check valve (not working)
2	Return flow from hydraulic oil cooler	**12**	**Priority valve**
3	**Steering pump**	**13**	Priority valve
4	Diesel engine	**14**	Throttle check valve
5	**Emergency steering pump**	**15**	Throttle
6	Gear pump	**16**	Throttle for load sensing signal
7	Pressure relief valve	**17**	Shuttle valve
8	Check valve	**18**	Load sensing signal from servo-stat
9	**Valve block for steering system**	**19**	Oil supply to servostat
10	Check valve		

Name	Test point	Name	Test point
PL	Steering pump high pressure	**PL1**	High pressure for steering pump or emergency steering pump

Tab. 211: Test points

090.8 Joystick steering

090.8.1 Overview of joystick steering

Valid for: L580-1414/0-50692;

This equipment is optional.

Version: control block for joystick steering generation 1 and hydro accumulator for steering damping with external throttle check valve.

1 Layout

The joystick steering consists of following components:
- Hydraulic tank (For more information see: 080.3.1 Overview of hydraulic tank, page 080-10)
- Steering pump (For more information see: 090.3 Steering pump, page 090-11)
- Priority valve (For more information see: 090.4 Priority valve, page 090-17)
- Servostat (For more information see: 090.5 Servostat, page 090-19)
- Joystick steering control valve block (For more information see: 090.8.3 Joystick steering control block, page 090-46)
- Steering cylinder (For more information see: 090.6.1 Steering cylinder, page 090-22)
- Steering stabilisation valve block (For more information see: 090.6.2 Steering stabilisation valve block, page 090-25)
- Emergency steering (For more information see: 090.7.1 Emergency steering overview, page 090-28)
- Hydraulic oil cooler

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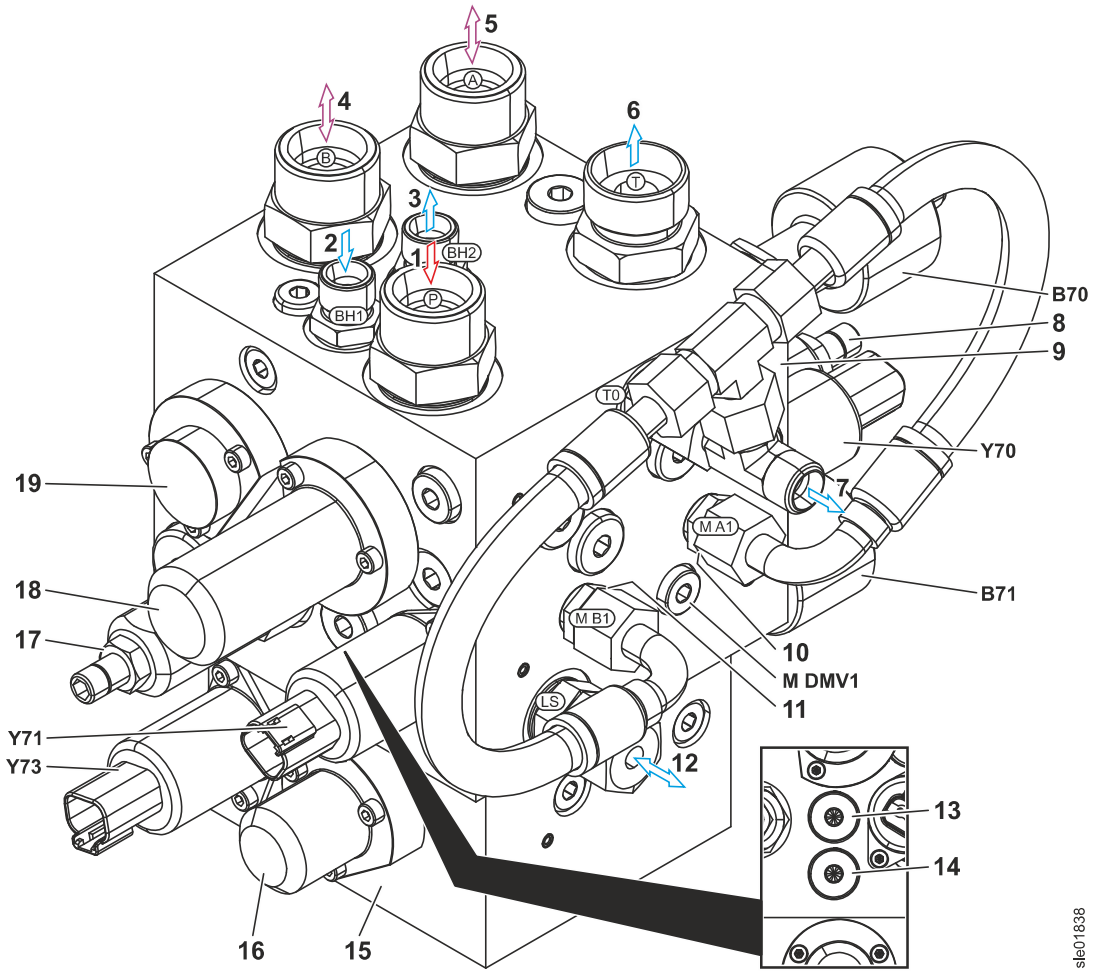

Fig. 453: Control valve block for joystick steering (from rear right)

1	Oil supply from steering pump	**8**	Servo pressure reducing valve for main spool valve	**15**	Control block section for emergency steering function
2	Return flow from compact brake valve (housing preheating)	**9**	Joystick steering control block	**16**	Emergency spool valve
3	Return flow to control valve block (housing preheating)	**10**	Orifice 0.8 mm	**17**	Servo pressure reducing valve for emergency spool valve
4	Connection for steering to the right	**11**	Orifice 0.8 mm	**18**	Main spool valve
5	Connection for steering to left	**12**	Load sensing signal to working hydraulics pump	**19**	Cut-off valve for main spool valve
6	Return flow to collector pipe	**13**	Servo oil strainer for emergency spool valve		
7	Return flow to leak oil strainer (via pilot control valve block)	**14**	Servo oil strainer for main spool valve		

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BMK	Function	BMK	Function	BMK	Function
K1	Joystick steering terminal 15 relay	**K5a**	Emergency mode solenoid valve relay	**K7a**	Relay for 2in1 steering (option)
K2	Relay for activation following successful function test	**K5b**	Emergency mode solenoid valve relay	**K7b**	Relay for 2in1 steering (option)
K3	Relay for analogue outputs of emergency steering valve	**K6a**	Emergency steering circuit power supply relay		

Tab. 231: Equipment codes

Relay **K1** supplies joystick steering with voltage via terminal 15.

The joystick steering functions are powered via the fuses **F**.

The analogue outputs of emergency steering valves on joystick module A29 are powered by relay **K3** and relay **K2** Relay **K2** is activated by relay **K4**. Relay **K2** remains activated by means of a self latching circuit if there is no signal from relay **K4**.

Relay **K4** has several functions.
- When the joystick steering is switched on, the function of emergency steering circuit is tested. Power is supplied for this to the analogue outputs for the emergency steering valves via the relay **K4** and the output module A17b.
- If the functional test of emergency steering circuit has been successfully completed, the relay **K4** is energized again for a short period. This activates the latching via the relay **K2**.

If the functional test was not successful, the power supply for the analogue outputs of the emergency steering valves is switched off via the output module A17b. A service code is displayed.

Relay **K6a** and relay **K6b** ensure that the analogue outputs for the emergency steering valves are not supplied with voltage when the on-road travel switch s19b is active. If on-road travel switch S19b is activated **after** the joystick steering has been switched on, the power supply remains for the analogue outputs of emergency steering valves via relays **K2** and **K3**.

Relay **K5a** and relay **K5b** interrupt the power supply for the solenoid valve for safety circuit Y74 if the on-road travel switch S19b is activated. The circuit has two relays for safety reasons.

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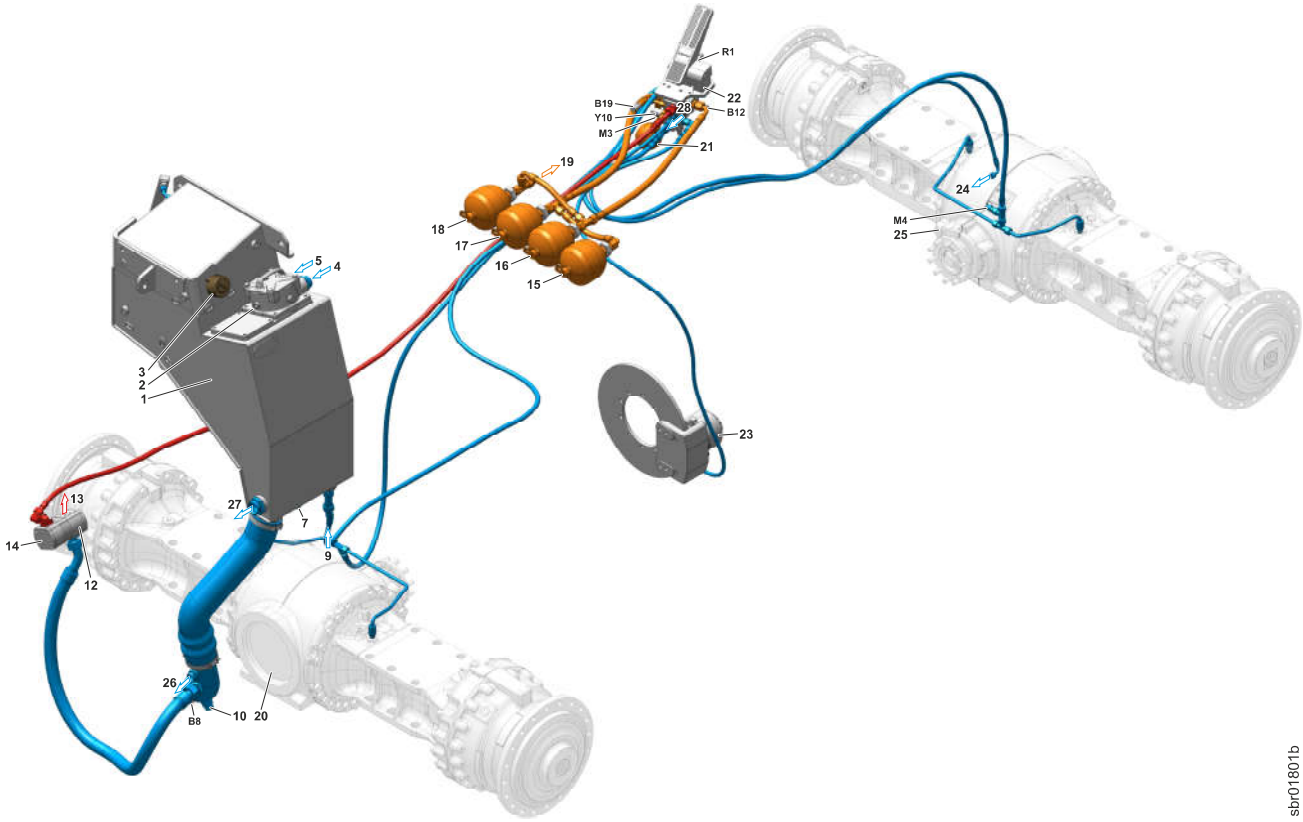
7 Hydraulic tank drain valve
8 Leak oil from steering pump and working pump
9 Fan motor leak oil
16 Hydro accumulator for service brake (1st brake circuit)
17 Hydro accumulator for service brake (2nd brake circuit)
18 Hydro accumulator for service brake (1st brake circuit)
25 Front axle with service brake for 1st brake circuit

Name	Test point	Name	Test point	Name	Test point
M3	Service brake accumulator pressure	**M4**	Brake pressure in 1st brake circuit (front axle)	**M5**	Brake pressure in 2nd brake circuit (rear axle)

Tab. 236: Test points

BMK	Function	BMK	Function
B8	Hydraulic oil temperature sensor	**B19**	Brake accumulator pressure sensor
B12	Brake light pressure switch	**R1**	Inching function angle sensor

Tab. 237: Equipment codes



sbr01801b

Fig. 463: Brake system (parking brake activated) (from rear right)

1 Hydraulic tank
2 Return filter
3 Breather filter
4 Return flow from control valve block
13 Fan motor oil supply
14 Brake pump
15 Hydro accumulator for service brake (2nd brake circuit)
16 Hydro accumulator for service brake (1st brake circuit)
22 Compact brake valve
23 Parking brake
24 Return flow to control valve block (housing preheating)
25 Front axle with service brake for 1st brake circuit

See next page for continuation of the image legend

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2.3.1 Hydro accumulators are fully charged

When hydro accumulators are charged up to cut-out pressure, system pressure pushes piston **3** and pilot valve **10** against regulating spring **1**.

Pilot valve **10** separates accumulator charge valve **8** from system pressure and connects it to return line to leak oil strainer **11**. This means oil from brake pump **12** pushes accumulator charge valve **8** against compression spring **9**. Oil from brake pump **12** flows to control valve block housing preheating **13**.

2.3.2 Hydro accumulators are being charged

Via piston **3**, brake system pressure acts on pilot valve **10**. If system pressure drops to cut-in pressure, regulating spring **1** pushes pilot valve **10** against system pressure.

Pilot valve **10** connects accumulator charge valve **8** to system pressure. This results in accumulator charge valve **8** being closed by system pressure and compression spring **9**.

Oil from brake pump **12** flows via inverted shuttle valve **4** and parking brake check valve **7** to hydro accumulator.

2.4 Inching function

Inching function angle sensor R1 is connected to inching brake pedal. In first two thirds of pedal movement, only inching function is operated.

Inching function angle sensor R1 is a two-channel sensor. It issues two mixed current signals between 6 mA and 18 mA.

When inching, central control unit reduces target speed and tractive force. Machine is slowed down by engine braking effect.

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Position	Function	Position	Function
B737	Ambient air temperature sensor	Y50	Fan reversal solenoid (optional)
B774	Sampling module	Y709	Exhaust gas treatment air supply solenoid
M8	Emergency steering pump		

Tab. 247: Components

2.1 Fuse boards

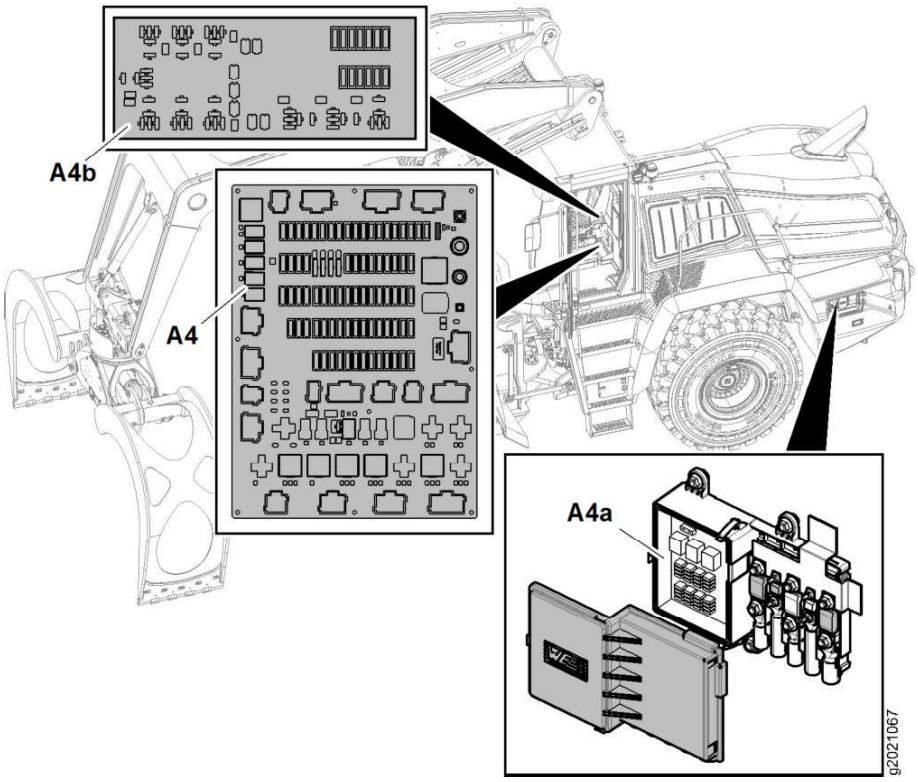

Fig. 478: Fuse boards

The fuse boards **A4** and **A4b** are mounted on the rear wall of the operator's cab.

The fuse board **A4b** is only installed if the machine is equipped with joystick steering.

The fuse board **A4a** is installed in the left ballast weight.

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TYPE / COUNTING NUMBER, SYSTEM, LOCATION CODE

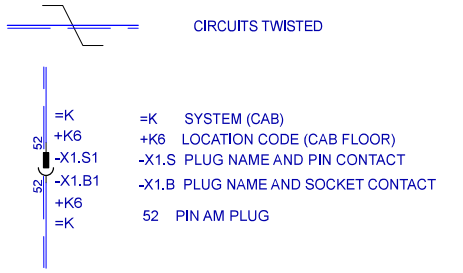
- TYPE / COUNTING NUMBER

-M1 ENGINE START ; OPERATING SUPPLY CODE

= SYSTEM

=B BALLAST
=F TRAVEL DRIVE
=H HIND CARRIAGE
=K CAB
=M ENGINE
=V FRONT SECTION

STANDARD WIRE WH 1,5mm²



+LOCATION CODE

+B BALLAST
+B1 BALLAST LEFT
+B2 BALLAST RIGHT

+F TRAVEL DRIVE
+F1 FRONT AXLE
+F2 REAR AXLE
+F3 TRANSMISSION

+H HIND CARRIAGE
+H1 HIND CARRIAGE REAR HATCH
+H2 HIND CARRIAGE UNTER CAB RIGHT
+H3 HIND CARRIAGE UNTER CAB LEFT
+H4 HIND CARRIAGE RIGHT
+H5 HIND CARRIAGE LEFT

+K CAB
+K1 CAB FITTINGS
+K2 CAB REAR PANEL
+K2.RH CAB REAR PANEL RELAY RACK
+K3 CAB ROOF
+K4 CAB FITTINGS SIDE COVER RIGHT REAR
+K5 CAB FITTINGS SIDE COVER LEFT REAR
+K6 CAB FLOOR

+M ENGINE

+V FRONT SECTION
+V1 FRONT SECTION
+V2 LIFT ARM
+V3 TILT CYLINDER

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-R9B	=K	+K2	EXCITATION GG6	/28.B6
-R10	=M	+M	DIESEL PREHEATING	/62.E7
-R10.X	=M	+M	PLUG DIESEL PREHEATING	/62.E7
-R12	=K	+K2	REAR WINDOW HEATER	/36.E6
-R12.X1	=K	+K2	CONNECTOR R12.X1	/36.E6
-R12.X2	=K	+K2	CONNECTOR R12.X2	/36.E6
-R120	=K	+K	MATCHING RESISTOR	/40.F5
-R121	=K	+K	MATCHING RESISTOR	/136.F5
-R122	=K	+K	MATCHING RESISTOR	/140.F4
-R123	=H	+H	MATCHING RESISTOR CAN BUS 2	/55.C3
-R123	=K	+K	MATCHING RESISTOR	/112.C5
-R123.X1	=H	+H	SPLICE R123	/55.C3
-R123.X2	=H	+H	SPLICE R123	/55.C3
-R218	=K	+K2:RH	LIGHTING CONTROL	/117.C6
-R220	=K	+K	AUTOMATIC RUN-OUT	/103.C4
-R615	=K	+K	REAR AREA MONITORING	/125.C2
-R616	=K	+K	REAR AREA MONITORING	/125.C3
-R700	=H	+H	RESISTANCE LIGHT EMITTING DIODE	/57.C6
-R700.X	=H	+H	CONNECTOR R700	/57.C6
-R701	=M	+M	HEATER FLANGE	/24.E7
-S1	=K	+K	IGNITION LOCK	/24.A3
-S1.L	=K	+K	CONNECTOR S1L	/142.A3
-S1.L.X1	=K	+K	CONNECTOR S1.L	/142.A3
-S1.L.X2	=K	+K	CONNECTOR S1.L	/142.B3
-S1.L.X4	=K	+K	CONNECTOR S1.L	/142.A3
-S1.M	=K	+K	IGNITION LOCK S1.M	/135.A3
-S1.M.X1	=K	+K	CONNECTOR S1.M	/135.A3
-S1.M.X2	=K	+K	CONNECTOR S1.M	/135.B4
-S1.M.X4	=K	+K	CONNECTOR S1.M	/135.A3
-S1.X1	=K	+K	CONNECTOR S1	/24.A3
-S1.X2	=K	+K	CONNECTOR S1	/24.B4
-S1.X4	=K	+K	CONNECTOR S1	/24.A4
-S2c.1	=K	+K	V-N-R AND OPTIONS	/133.E4
-S2c.1.X1	=K	+K	CONNECTOR S2c	/133.E5
-S2c.1.X2	=K	+K	PLUG S2c	/133.E5
-S2c.2	=K	+K	OPTIONS	/133.E7

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-S2c.2.X	=K	+K	PLUG S2c	/133.E7
-S2c.3	=K	+K	OPTIONS	/41.E3
-S2c.3.X	=K	+K	PLUG S2c	/41.E3
-S2d.1	=K	+K	V-N-R LOG HANDLER	/144.E7
-S2d.1.X	=K	+K	CONNECTOR S2d	/144.E7
-S2d.2	=K	+K	OPTIONS S2d	/144.E3
-S2d.2.X	=K	+K	CONNECTOR S2d	/144.E3
-S2e	=K	+K	V-N-R JOYSTICK STEERING	/100.C16
-S3	=K	+K1	STEERING COLUMN SWITCH	/30.A7
-S3.X1	=K	+K1	PLUGSTEERING COLUMN SWITCH	/34.E3
-S3.X2	=K	+K1	PLUGSTEERING COLUMN SWITCH	/34.E3
-S4	=K	+K	HAZARD WARNING LIGHTS	/31.B1
-S4.X	=K	+K	CONNECTOR S4	/31.B1
-S6	=K	+K	LOW BEAM / DRIVING LIGHT	/30.A2
-S6.X	=K	+K	CONNECTOR S6	/30.B2
-S7	=K	+K	WORKING PROJECTOR FRONT	/32.B2
-S7.X	=K	+K	CONNECTOR S7	/32.B2
-S8	=K	+K	WORKING PROJECTOR REAR	/33.D2
-S8.X	=K	+K	CONNECTOR S8	/33.E2
-S8a	=K	+K	WORKING PROJECTOR REAR OPTIONAL	/33.D3
-S8a.X	=K	+K	CONNECTOR S8	/33.D2
-S9	=K	+K	BEACONLIGHT	/36.C2
-S9.X	=K	+K	CONNECTOR S9	/36.C2
-S9a	=K	+K	BEACONLIGHT OPTIONAL	/36.C4
-S9a.X	=K	+K	S9a CONNECTOR	/36.C3
-S13	=K	+K	WINDSCREEN WASHER BACK	/35.B3
-S13.X	=K	+K	CONNECTOR S13	/35.B3
-S15	=B	+B	MASTER SWITCH	/24.E4
-S15.X	=B	+B	PLUG S15	/24.D4
-S17	=K	+K	GEROTOR STEERING	/98.A8
-S17.X	=K	+K	CONNECTOR S17	/98.B7
-S19b	=K	+K	ON-ROAD TRAVEL SWITCH	/27.C1
-S19b.X	=K	+K	CONNECTOR S19b	/27.C2
-S23	=K	+K3	QUICK-CHANGE DEVICE	/101.B4
-S23.X	=K	+K3	PLUG S23	/101.B4
-S43	=K	+K	BACK-UP ALARM ACOUSTIC OPTIONAL	/84.B2

PROJECT Stufe 4 GG_23.11.18 E_Hauptschalter
ITEM CODE 12418288
DRAWING INDEX 105
DRAWING NUMBER 1333 90100 01 00

MACHINE TYPE
LIDOS UNIT

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

BMK-INDEX
E PLAN

PROJECT 12418288 ITEM CODE
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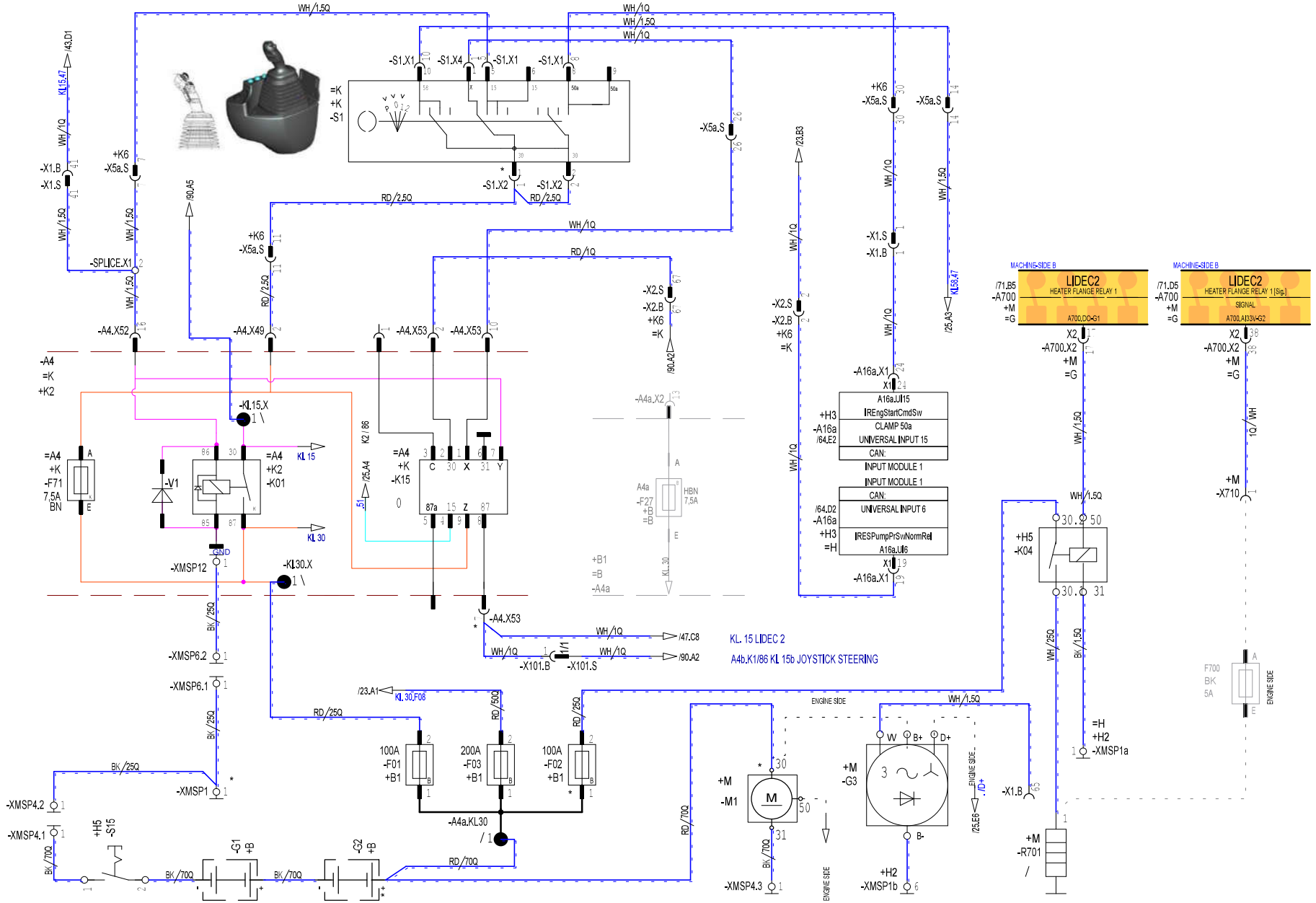

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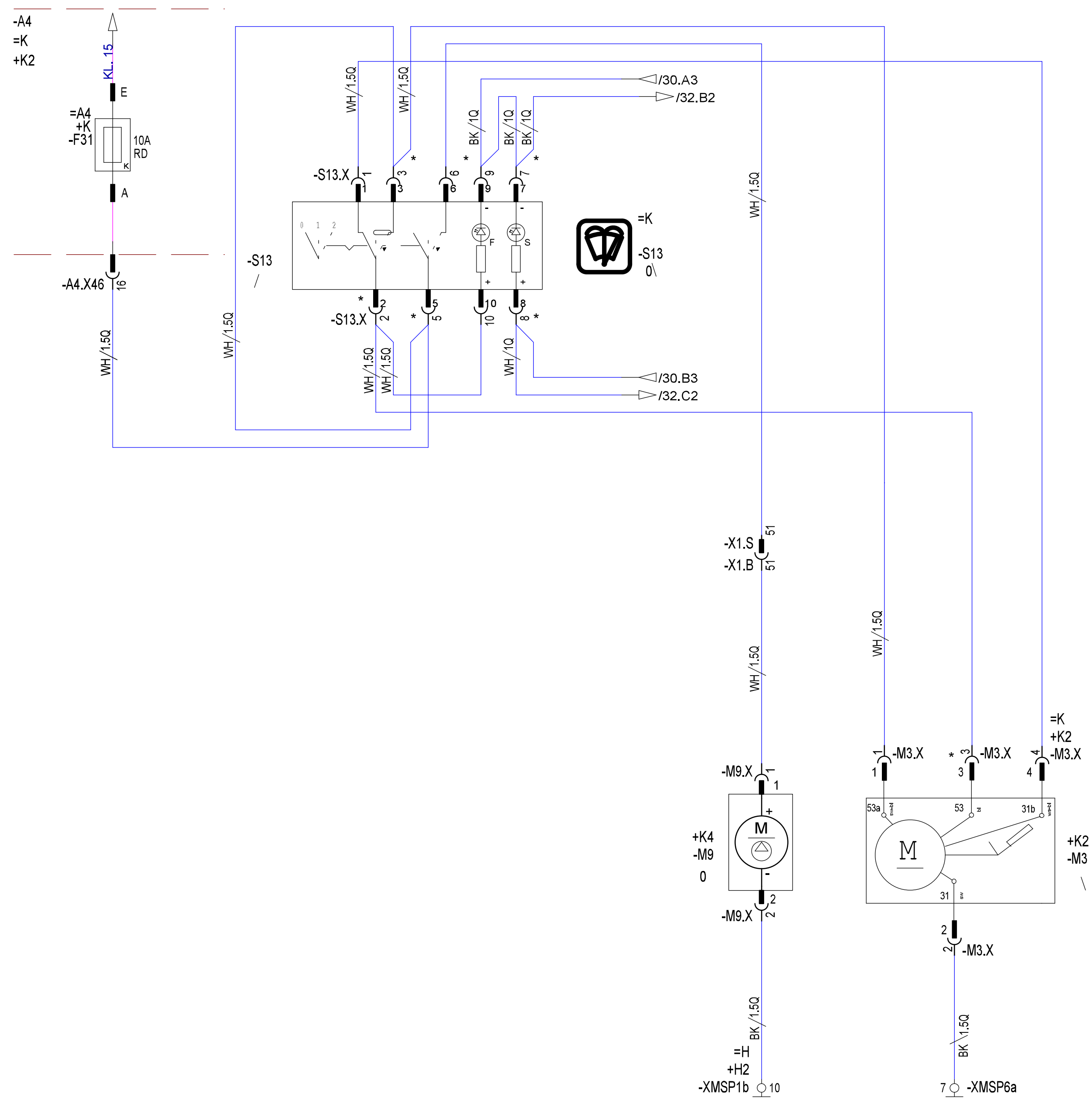

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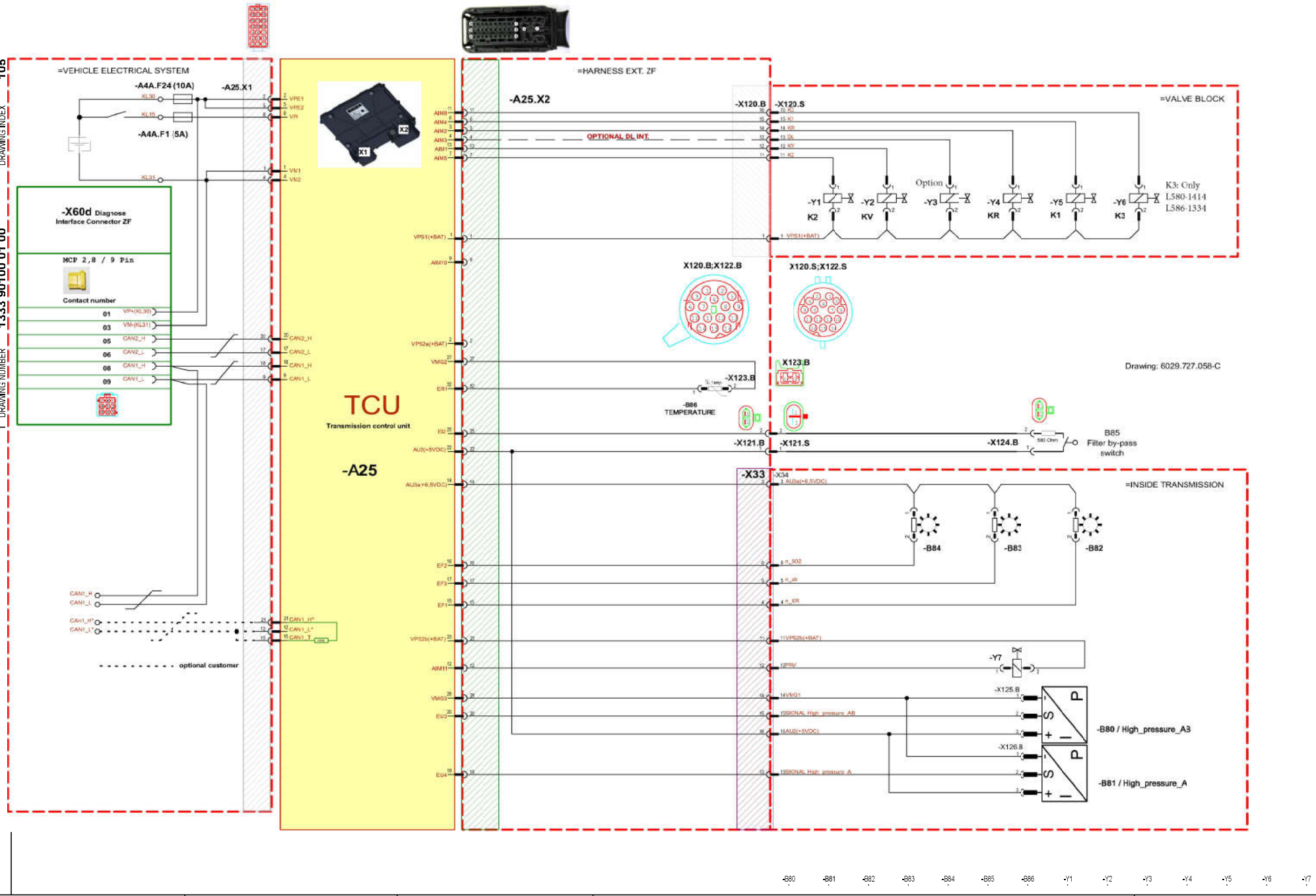
ITEM CODE: 12418288
DRAWING NUMBER: 1333 90100 01 00
DRAWING INDEX: 105



PROJECT
DRAWING NUMBER 1333 90100 01 00
Stufe 4 GG_23.11.18 E_Hauptschalter
ITEM CODE 12418288
DRAWING INDEX 105

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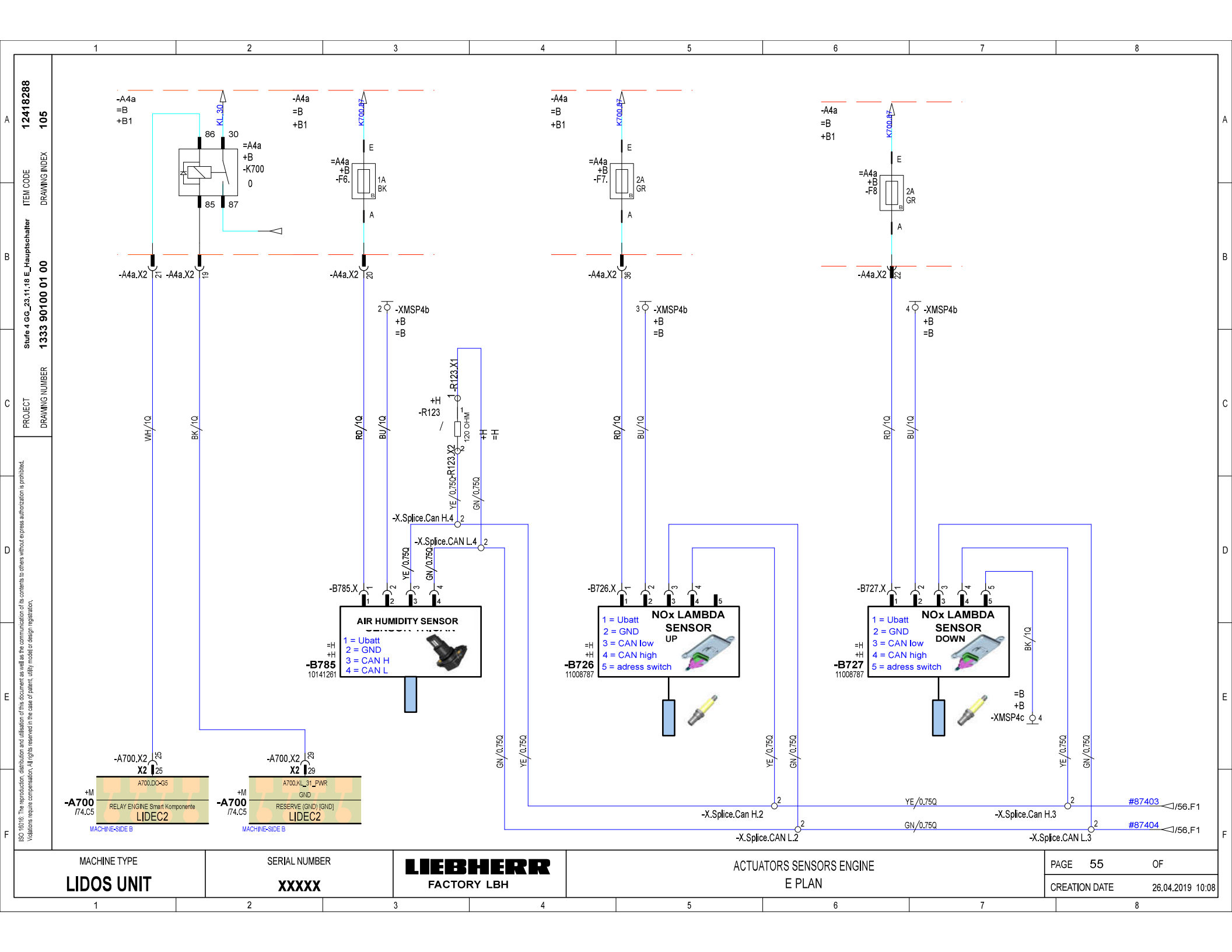

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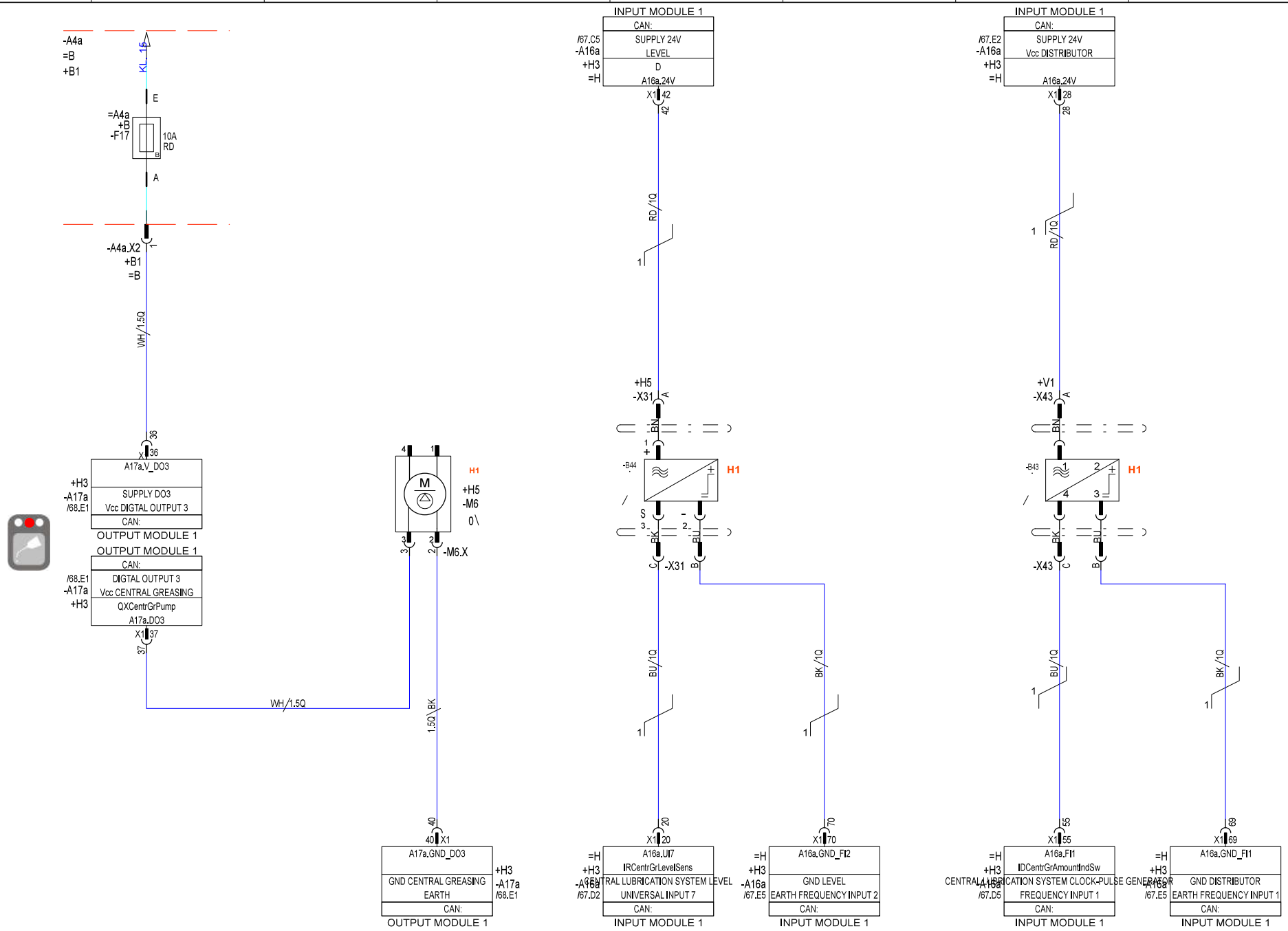

PROJECT Stufe 4 GG_23.11.18 E_Hauptschalter ITEM CODE 12418288
DRAWING NUMBER 1333 90100 01 00 DRAWING INDEX 105

MACHINE TYPE	SERIAL NUMBER			PAGE 65 OF
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PROJECT: DRAWING NUMBER: 1333 90100 01 00 | ARTICLE CODE: 12418288 | DRAWING INDEX: 105

TEXT: BLACK RAL 9005
BASE: WHITE RAL 9002

MATERIAL: ADHESIVE FOIL nach DELIVERY INSTRUCTION

DELIVERY INSTRUCTION 10020148

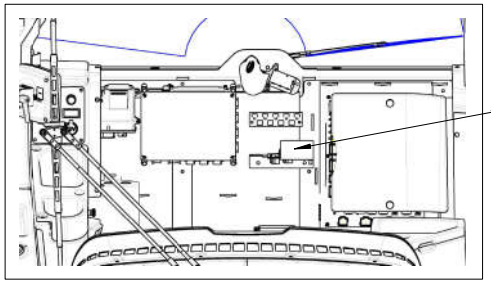
DIMENSIONS: 260mm mal 150mm

A4 MAIN BEDPLATE / MAIN BEDPLATE

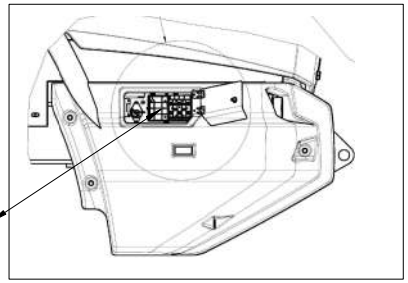
		F43-10A RADIO KL. 30 RADIO KL. 30	F56-5A PROFILE LIGHT RIGHT PROFILE LIGHT RIGHT	F75-5A USB LADEDOSE USB CHARGER
X4.3A RESERVE RESERVE	X3 JUMPER INDICATOR JUMPER FLASHER	F42-10A RADIO; 12V ELECTRICAL SOCKET RADIO; ELECTRICAL SOCKET 12V	F55-5A PROFILE LIGHT LEFT PROFILE LIGHT LEFT	F74-15A DRIVER'S SEAT CIGARETTE LIGHTER DRIVER SEAT; CIGARETTE LIGHTER
X5.3A JUMPER GENERATOR JUMPER GENERATOR	X2-10A JUMPER INDICATOR JUMPER FLASHER	F41-15A DRIVING LIGHT DRIVING LIGHT	F54-7,5A DRIVING LIGHT LEFT DRIVING LIGHT LEFT	F73-7,5A DRIVING LIGHT RIGHT DRIVING LIGHT RIGHT
	X1-10A JUMPER INDICATOR JUMPER FLASHER	F40-10A FLASH FUNCTION FLASH FUNCTION	F53-7,5A HIGH BEAM LEFT HIGH BEAM LEFT	F72-7,5A HIGH BEAM RIGHT HIGH BEAM RIGHT
F13-15A CONDENSER FAN CONDENSER FAN	F26-10A SWEEPING MACHINE ROAD SWEEPER	F39-10A MIRROR ADJUSTMENT MIRROR ADJUSTMENT	F52B-10A WORKING PROJECTOR REAR WORKING PROJECTOR REAR	F71-7,5A IGNITION STARTER SWITCH BYPASS IGNITION ENGINE START SWITCH BYPASS
F12-15A WINDSCREEN WIPER FRONT / HORN WIPER FRONT / HOOTER	F25-10A LOGIC HEAT - AIR CONDITIONING SYSTEM LOGIC A/C CONTROL	F38-20A REAR WINDOWS&SPIEGELHEIZUNG REAR WINDOW & MIRROR HEATER	F52A-10A WORKING PROJECTOR REAR WORKING PROJECTOR REAR	F70-10A PROFILE LIGHT PROFILE LIGHT
F11-3A LITU KL. 15 LITU KL. 15	F24-5A KRAFTSTOFFNIVEAUGEBER FUEL LEVEL SENSOR	F37-10A MAIN KEYPAD; DIAGNOSIS CVT MAIN KEYPAD; DIAGNOSTIGS CVT	F31B-10A WORKING PROJECTOR FRONT WORKING PROJECTOR FRONT	F69-15A WORKING PROJECTOR CAB WORKING PROJECTOR CABINE
F10-10A ANGLE SENSOR LIFT ARM LIFT- & BUCKET ANGEL SENSOR	F23-5A ADDITIONAL MODULE INPUT 1 ADDITONAL MODULE INPUT 1	F36-10A PILOT CONTROL SENSOR; INPUT M + L ROCKER; INPUT MODULE M + L	F31A-10A WORKING PROJECTOR FRONT WORKING PROJECTOR FRONT	F68-15A WORKING PROJECTOR CAB WORKING PROJECTOR CABINE
F9-10A HORN OPERATION VIA PUSH-BUTTON SWITCH LIFT END OPERATION PUSH BUTTON	F22-5A ADDITIONAL MODULE OUTPUT 1 ADDITONAL MODULE OUTPUT 1	F35-5A INPUT MODULE M + L INPUT MODULE M + L	F52-10A INNENBELEUCHUTNG; REMOTE KEY INDOOR LIGHTING; REMOTE KEY	F67-15A RESERVE RESERVE
F8-15A CONDENSER FAN CONDENSER FAN	F21-10A RÜCKFAHRWARNER OPTICAL BACK UP ALARM VISUAL	F34-5A IMMOBILISER; SENSOR KL.15 IMMOBILIZER; ROCKER KL.15	F51-10A HOOD OPENING; DIAGNOSIS CVT ENGINE HOOD; DIAGNOSTICS CVT	F66-10A SCR AIR DRIER SCR AIR DRIER
F7-7,5A SWITCH LIGHTING; S46 SCHWITCH LIGHT; S46	F20-10A RÜCKFAHRWARNER ACOUSTIC BACK ALARM	F33-5A STOP LIGHT BRAKE LIGHT	F50-5A PRESELECTOR CLOCK AUXILIARY HEATER PRESELECTOR CLOCK AUXILIARY HEATER	F65-15A VOLTAGE CONVERTER VOLTAGE CONVERTER
F6-15A FUEL PREHEATING FUEL PREHEATING	F19-10A MASTER KL.15 MASTER KL.15	F32-5A DISPLAY UNIT; LH CAMERA DISPLAY UNIT; LH CAMERA	F49-10A MASTER KL.30 MASTER KL.30	F64-10A Vcc K14 EMERGENCY STEERING PUMP Vcc K14 EMERGENCY STEERING
F5-15A HYDAC ECU KL. 15 HYDAC ECU KL. 15	F18-5A GRAB LOG HANDLER; KL.15 K14 GRAB LOG HANDLER; KL.15 K14	F31-10A WINDSCREEN WIPER REAR WIPER REAR	F48-10A IMMOBILISER; LITU KL. 30 IMMOBILIZER; LITU KL. 30	F63-20A AUXILIARY HEATER AUXILARY HEATER
F4-5A HYDAC ECU LOGIC HYDAC ECU LOGIC	F17-10A ADDITIONAL MODULE OUTPUT 1 ADDITONAL MODULE OUTPUT 1	F30-10A ADDITIONAL MODULE OUTPUT 1 ADDITONAL MODULE OUTPUT 1	F47-10A BEACONLIGHT WARNING BEACON	F62-20A HEAT - KLIMAANLGE A/C CONTROL
F3-10A RESERVE RESERVE	F16-7,5A ADDITIONAL MODULE INPUT 1 ADDITONAL MODULE INPUT 1	F29-10A ADDITIONAL MODULE OUTPUT 1 ADDITONAL MODULE OUTPUT 1	F46-10A ENGINE DIAGNOSIS DIAGNOSIS ENGINE	F61-5A HYDAC ECU KL. 30 HYDAC ECU KL. 30
F2-10A E - MASTER SWITCH KL. 15 ELECTRIC MAIN SWITCH KL. 15	F15-10A ROAD TRAVEL SWITCH AUTOMATIC RUN-OUT ROAD TRAVEL SWITCH; AUTOMATIC RUN-OUT	F28-10A ADDITIONAL MODULE OUTPUT 1 ADDITONAL MODULE OUTPUT 1	F45-10A CLAAS DIAGNOSIS & TELEMETRIE CLAAS DIAGNOSIS & TELEMETRY	F60-3A REIFENDRUCKSYSTEM KL. 30 TYRE PRESSURE SYSTEM KL. 30
F1-3A REIFENDRUCKSYSTEM KL. 15 TYRE PRESSURE SYSTEM KL. 15	F14-5A TASTENBLOCK 2 KEYPAD BLOCK 2	F27-25A RESERVE RESERVE	F44-10A ELECTRONICS MASTER SWITCH ELECTRONICS MASTER SWITCH	F59-25A RESERVE RESERVE
				F58-25A RESERVE RESERVE
				F57-20A HOOD OPENING ENGINE HOOD

260.00

A4b JOYSTICK STEERING / JOYSTICK STEERING



A4a FUSE ELEMENT / FUSE ELEMENT



Ident.-Nr. 93030664
Zeich-Nr. 1464 67390 01 00 005

260.00

IDENTNUMMER FOLIE
ID 93030664
ZNG 1464 67390 01 00 004

MACHINE TYPE	MACHINE SERIAL NUMBER				
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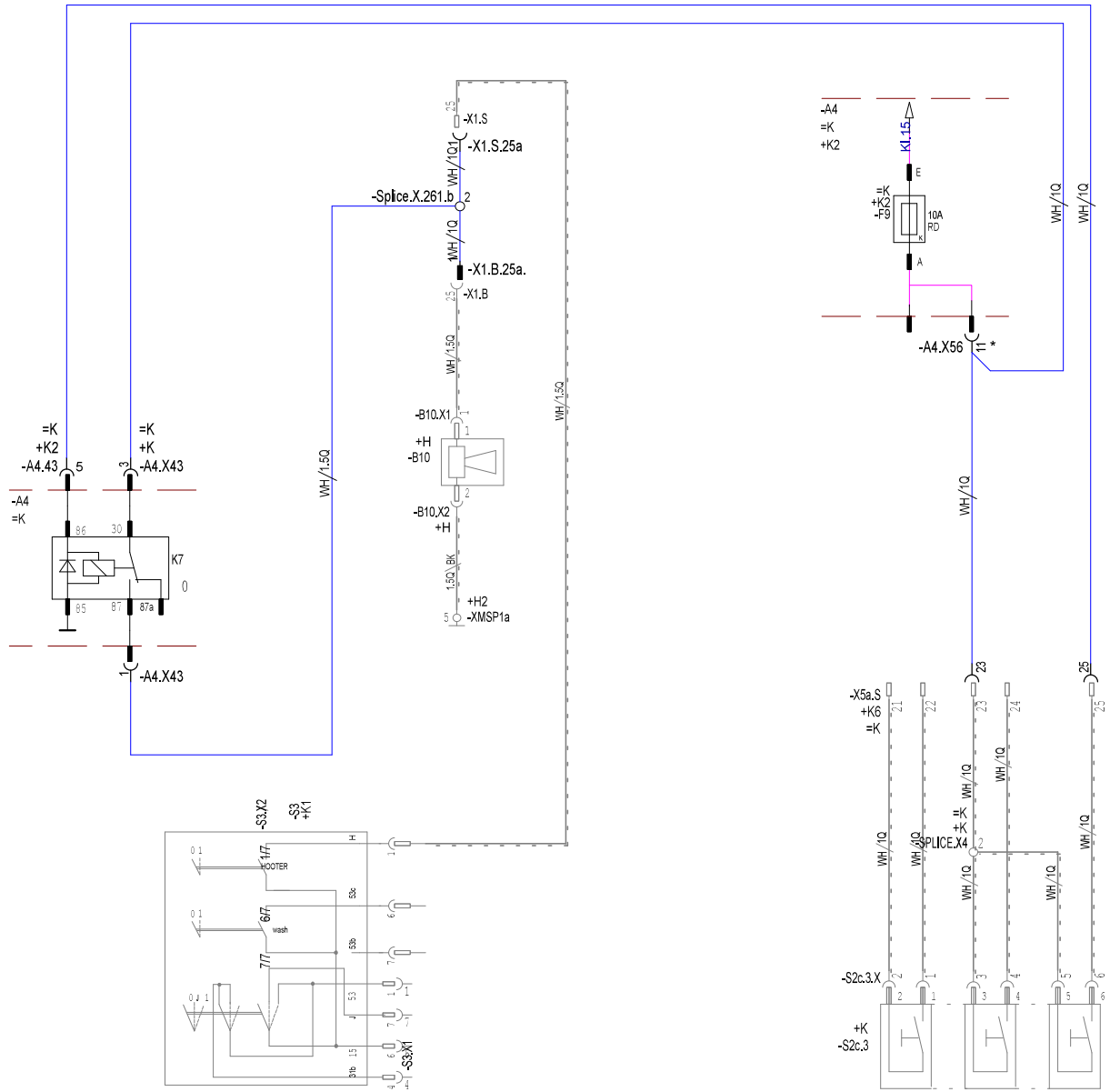
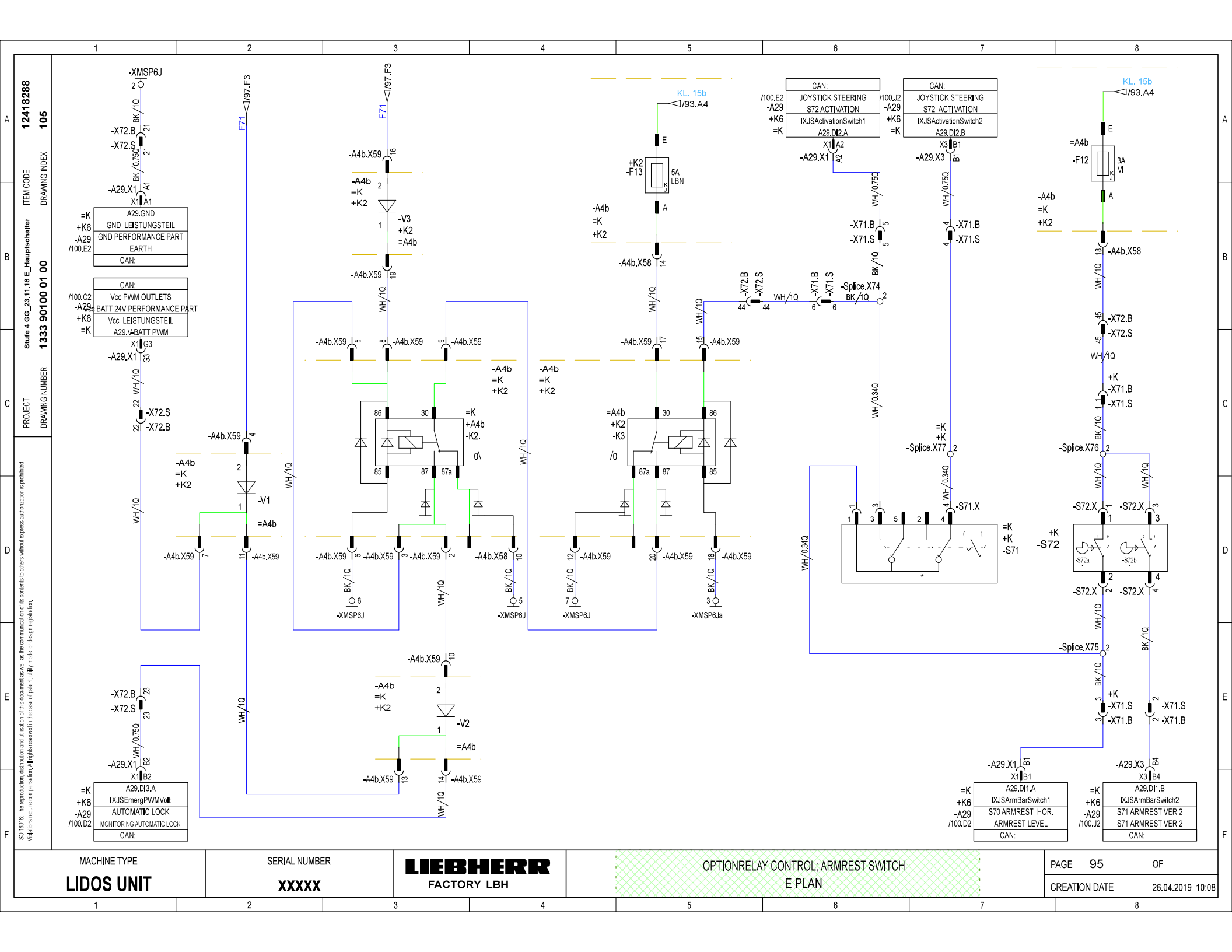
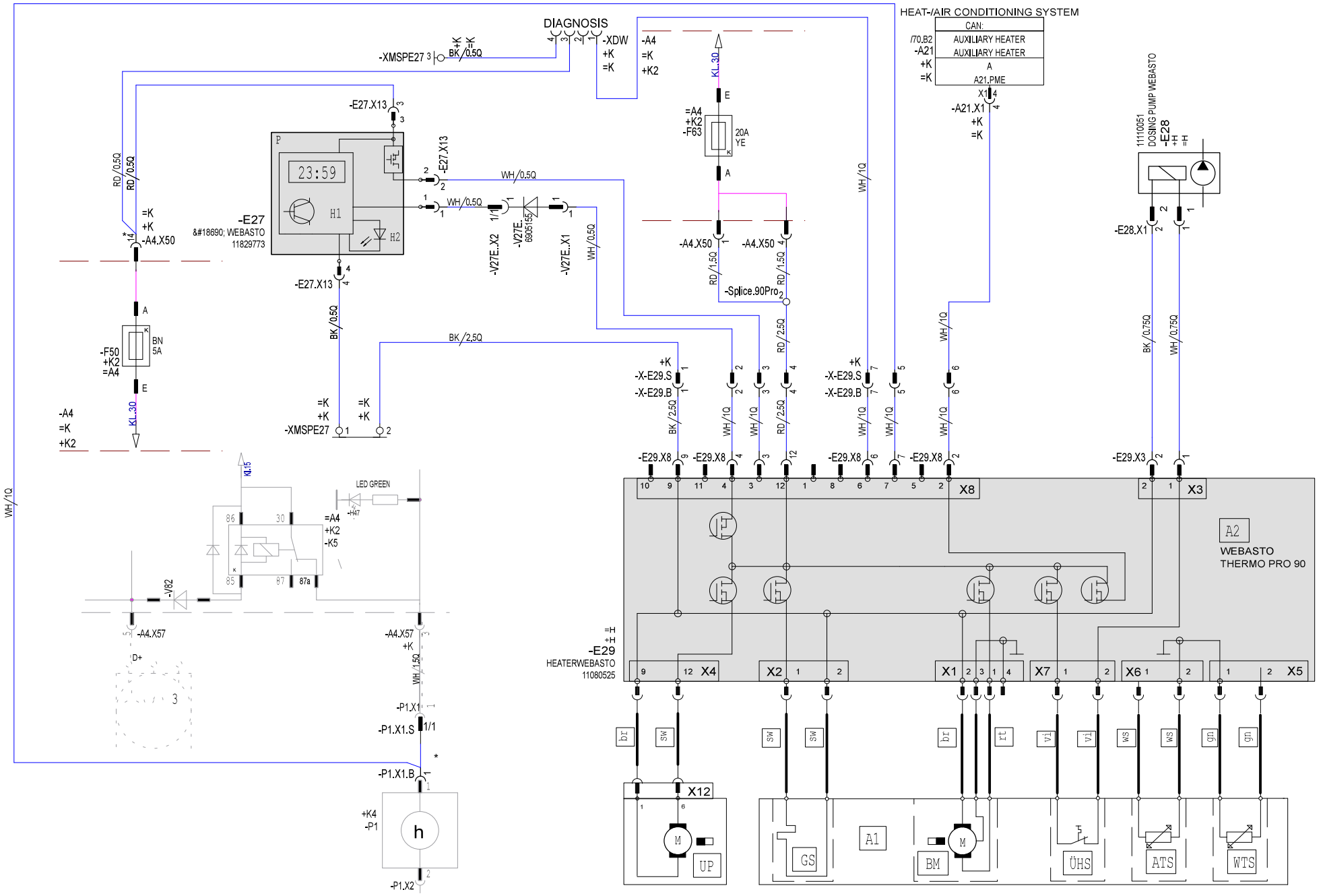


MACHINE TYPE	SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	OPTION HORN OPERATION VIA ADDITIONAL KEY E PLAN	PAGE 85 OF
				CREATION DATE 26.04.2019 10:08



PROJECT: Stufe 4 GG_23.11.18 E_Hauptschalter | ITEM CODE: 12418288 | DRAWING INDEX: 105
DRAWING NUMBER: 1333 90100 01 00

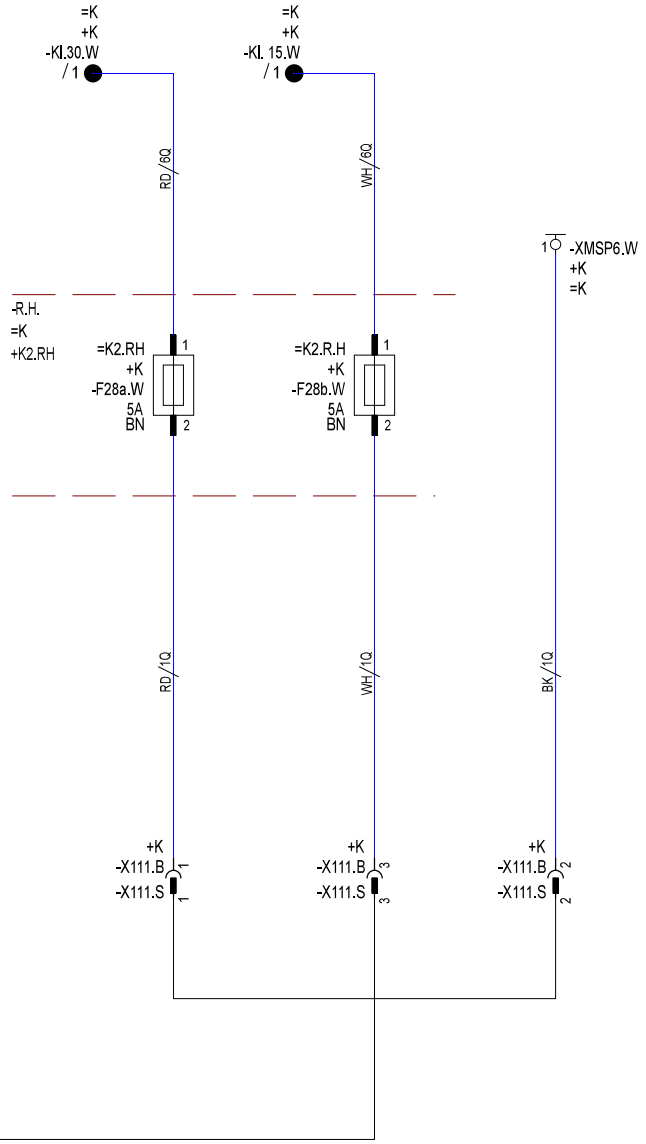
MACHINE TYPE	SERIAL NUMBER			PAGE 95 OF
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	OPTIONRELAY CONTROL; ARMREST SWITCH E PLAN	CREATION DATE 26.04.2019 10:08



PROJECT
DRAWING NUMBER 1333 90100 01 00
Stufe 4 GG_23.11.18 E_Hauptschalter
ITEM CODE 12418288
DRAWING INDEX 105

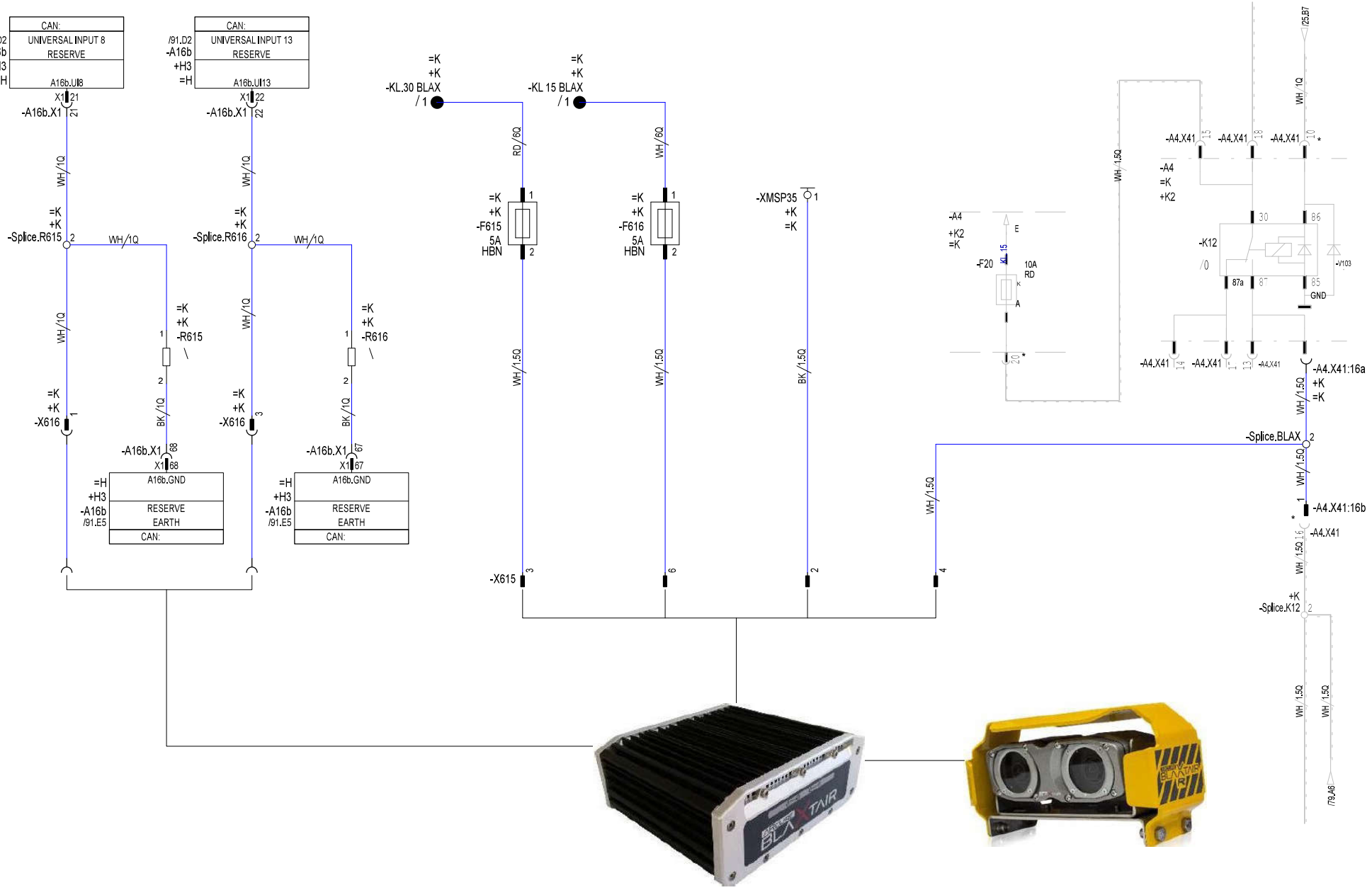
MACHINE TYPE	SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	OPTION AUXILIARY HEATER THERMO 90 PRO E PLAN	PAGE 105 OF CREATION DATE 26.04.2019 10:08

PROJECT: Stufe 4 GG_23.11.18 E_Hauptschalter | ITEM CODE: 12418288
DRAWING NUMBER: 1333 90100 01 00 | DRAWING INDEX: 105



MACHINE TYPE	SERIAL NUMBER			PAGE 115 OF
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	OPTION PREPARATION WEIGHING DEVICE E PLAN	CREATION DATE 26.04.2019 10:08

PROJECT Stufe 4 GG_23.11.18 E_Hauptschalter
DRAWING NUMBER 1333 90100 01 00
ITEM CODE 12418288
DRAWING INDEX 105



L550/1214 STEP 4 FACELIFT DOWN Snr.: 54427; L556/1332 STEP 4 FACELIFT DOWN Snr.: 54432;; L566/1484 STEP 4 FACELIFT DOWN Snr.: 54428; L576/1333 STEP 4 FACELIFT DOWN Snr.: 54430; L580/1464 STEP 4 FACELIFT DOWN Snr.: 54471; L586/1334 STEP 4 FACELIFT DOWN Snr.: 54472

MACHINE TYPE	SERIAL NUMBER			PAGE 125 OF
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	OPTION BLAXTAIR RÜCKFAHRWARNSYSTEM E PLAN	CREATION DATE 26.04.2019 10:08

ITEM CODE	12418288
DRAWING INDEX	105
PROJECT	Stufe 4 GG_23.11.18 E_Hauptschalter
DRAWING NUMBER	1333 90100 01 00

MACHINE TYPE	SERIAL NUMBER			PAGE	135	OF
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	VERSION 1 MULTI-LEVER CONTROL IGNITION LOCK E PLAN	CREATION DATE	26.04.2019 10:08	

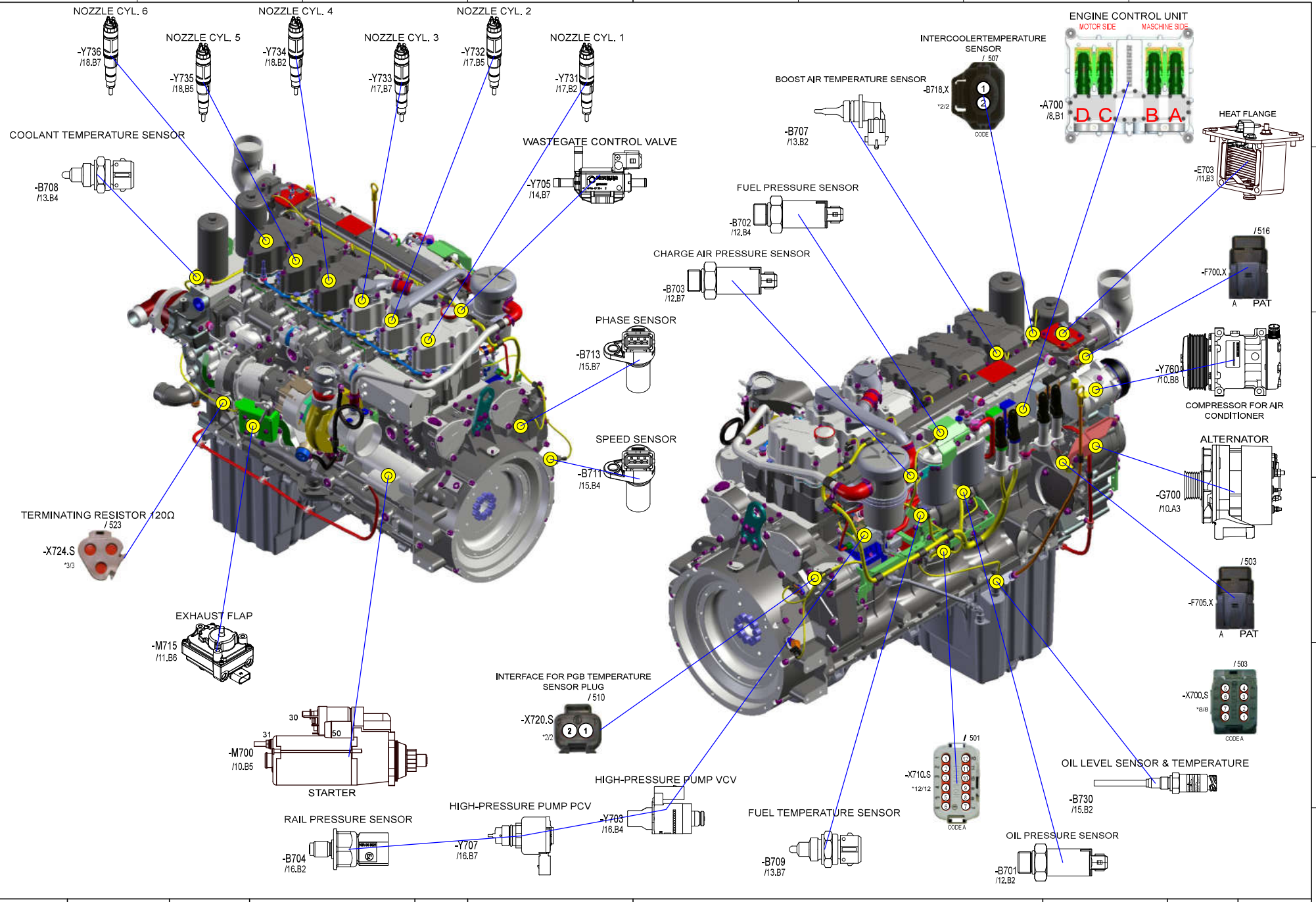
INPUT MODULE L ON- AND OUTLETS

=K	-A16L	Modul Nr.:	
+K2		Modulname:	PME1_EINGANGSMODUL

Phys. Adr.	Blatt	EA	Beschreibung	Stecker	Pin	Phys. Adr.	Blatt	EA	Beschreibung	Stecker	Pin
A16L.24V			RESERVE	0	1	A16L.24V			RESERVE	0	41
A16L.24V_logic	/139.D1		SUPPLY LOGICAL PART	0	2	A16L			RESERVE	0	42
A16L.GND			RESERVE	0	3	A16L.CAN_Low	/139.E7		CAN LOW > CAN RESERVE	0	43
A16L.UI1	/143.F7		SWIVEL ARM SIGNAL 1	0	4	A16L.CAN_Low	/139.D7		CAN LOW	0	44
A16L.UI2	/143.C5		LOG PUSHER HOISTING	0	5	A16L.GND			RESERVE	0	45
A16L.UI3	/143.E4		GRAB SWING SIGNAL 1	0	6	A16L.RI1			RESERVE	0	46
A16L.UI4	/147.E3		RESERVE	0	7	A16L.RI1			RESERVE	0	47
A16L.UI9	/144.A4		RESERVE	0	8	A16L.RI2			RESERVE	0	48
A16L.UI10	/143.E5		GRAB SWING SIGNAL 2	0	9	A16L.RI2			RESERVE	0	49
A16L.UI11	/144.A5		LOG HANDLER FNR FORWARD NO	0	10	A16L.5V	/143.F1		Vcc OSCILLATING CYLINDER TILT	0	50
A16L.UI12	/144.A6		LOG HANDLER FNR BACKWARDS NC	0	11	A16L.5V	/143.F4		Vcc SWIVEL ARM TILT	0	51
A16L.GND			RESERVE	0	12	A16L.5V	/143.E3		VCC GRAB SWING	0	52
A16L			RESERVE	0	13	A16L.5V			RESERVE	0	53
A16L.24V			RESERVE	0	14	A16L.GND			RESERVE	0	54
A16L.24V			RESERVE	0	15	A16L.FI1			rpm HYDRAULIC MOTOR 2	0	55
A16L.GND_logic	/139.D1		GND LOGICAL PART	0	16	A16L.FI2			DISTRIBUTOR	0	56
A16L.GND			RESERVE	0	17	A16L.CAN_High	/139.E8		CAN HIGH > CAN RESERVE	0	57
A16L.UI5	/144.A5		LOG HANDLER FNR FORWARD NC	0	18	A16L.CAN_High	/139.D8		CAN HIGH	0	58
A16L.UI6	/144.A7		LOG HANDLER FNR BACKWARDS NO	0	19	A16L.GND	/143.F2		GND OSCILLATING CYLINDER TILT	0	59
A16L.UI7	/143.F3		OSCILLATING CYLINDER SIGNAL 1	0	20	A16L.GND	/143.F5		GND SWIVEL ARM TILT	0	60
A16L.UI8	/143.E8		TRANSPORT POSITION	0	21	A16L.GND	/143.E3		GND GRAB SWING	0	61
A16L.UI13	/143.C6		LOG PUSHER LOWERING	0	22	A16L.GND			GND ANGLE SENSOR	0	62
A16L.UI14	/143.F6		SWIVEL ARM SIGNAL 2	0	23	A16L.GND			GND RESERVE	0	63
A16L.UI15	/143.F3		OSCILLATING CYLINDER SIGNAL 2	0	24	A16L.GND			RESERVE	0	64
A16L.UI16	/143.C8		OSCILLATING CYLINDER LOCK	0	25	A16L.GND			RESERVE	0	65
A16L.GND			RESERVE	0	26	A16L.GND			RESERVE	0	66
A16L			RESERVE	0	27	A16L.GND			RESERVE	0	67
A16L.24V			RESERVE	0	28	A16L.GND			RESERVE	0	68
A16L.CAN_Res	/139.E6		CAN END > PIN 43	0	29	A16L.GND_FI1			RESERVE	0	69
A16L.24V	/139.D3		SUPPLY 24V	0	30	A16L.GND_FI2			RESERVE	0	70
A16L.GND	/139.D3		SUPPLY EARTH	0	31						
A16L.24V	/144.A8		Vcc F-N-R	0	32						
A16L.24V	/143.E7		Vcc SWIVEL ARM ON	0	33						
A16L.24V	/143.C4		Vcc LOG PUSHER HOISTING	0	34						
A16L.24V	/143.C6		Vcc LOG PUSHER LOWERING	0	35						
A16L.24V	/143.C7		Vcc OSCILLATING CYLINDER LOCK	0	36						
A16L.24V			RESERVE	0	37						
A16L.24V			RESERVE	0	38						
A16L.24V			RESERVE	0	39						
A16L.GND			RESERVE	0	40						

PROJECT 1333 90100 01 00 Stufe 4 GG_23.11.18 E_Hauptschalter
DRAWING NUMBER ITEM CODE 12418288
DRAWING INDEX 105

MACHINE TYPE	SERIAL NUMBER		VERSION 2 INPUT MODULE L GENERAL OUTLAY	PAGE 145 OF
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	E PLAN	CREATION DATE 26.04.2019 10:08



TYPE MOTOR_SPL

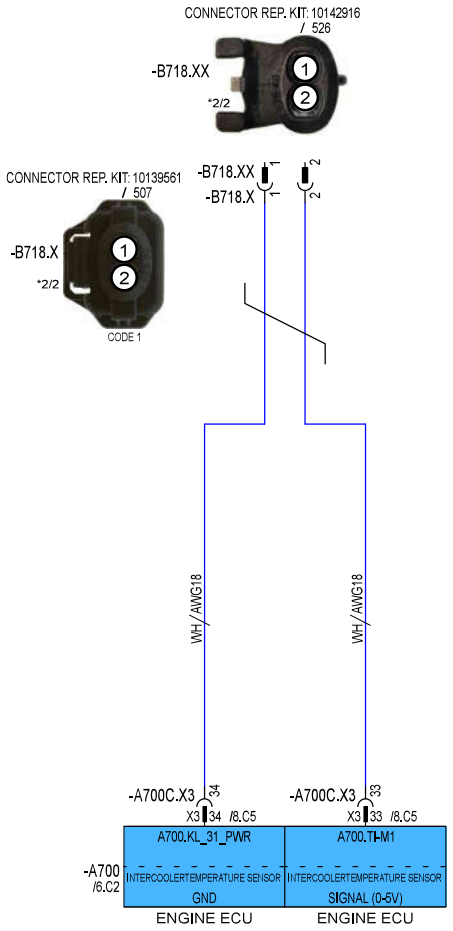
PROJECT: 10139858

REPLACEMENT FOR	MARKED	lmbovs0	LIEBHERR	A3	DESIGNATION	DESCRIPTION	ARTICLE CODE 10139857	SYSTEM =M	LOCATION +M
0	DATE	25.07.2016 12:14	FACTORY LMB		ELECTRICAL WIRING DIAGRAM	INSTALLATION PLACE ELECTRIC COMPONENTS ON ENGINE	DRAWING NUMBER 96 002 9307 90	INDEX 003	SHEET 4 FROM 19
CONFIDENTIAL	CHECKED	lmbbua0							
	TECHNICAL REFEREE								

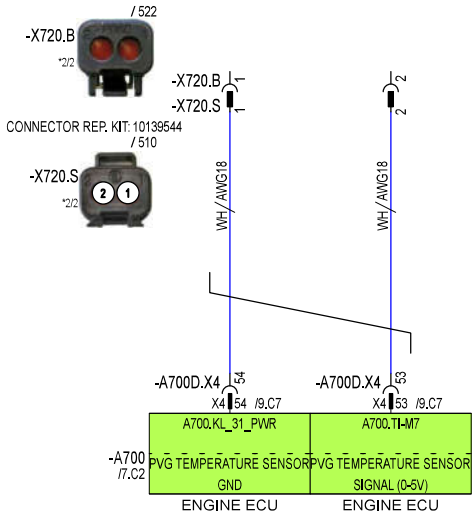
TYPE MOTOR_SPL

PROJECT: 10139858

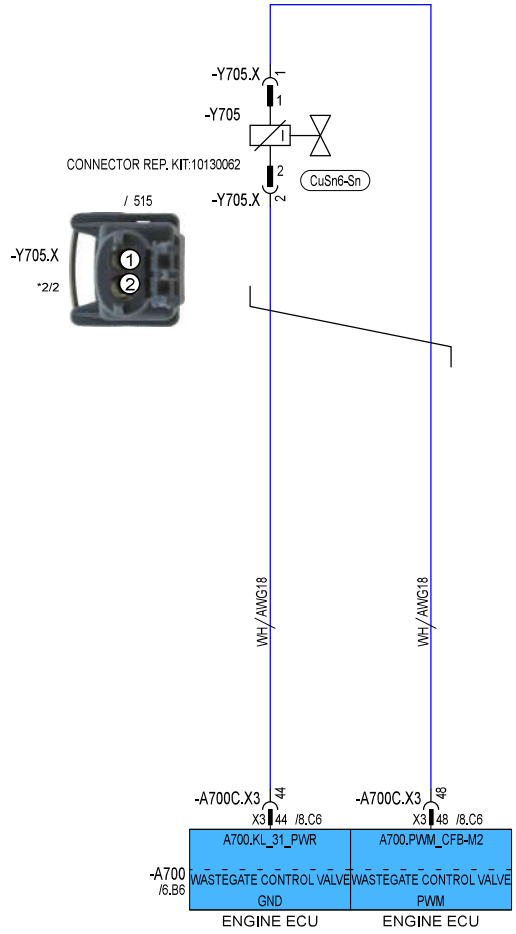
INTERCOOLERTEMPERATURE SENSOR



PGB TEMPERATURE SENSOR



WASTEGATE CONTROL VALVE



	REPLACEMENT FOR	MARKED	lmbovs0	LIEBHERR FACTORY LMB	A3	DESIGNATION: ELECTRICAL WIRING DIAGRAM	DESCRIPTION: INTERCOOLERTEMPERATURE SENSOR, PGB TEMPERATURE SENSOR, WASTEGATE CONTROL VALVE	ARTICLE CODE: 10139857	SYSTEM: =M / LOCATION: +M
	0	DATE	25.07.2016 12:14					DRAWING NUMBER: 96 002 9307 90 / INDEX: 003	SHEET 14 FROM 19
CONFIDENTIAL		CHECKED	lmbbua0						
		TECHNICAL REFEREE							

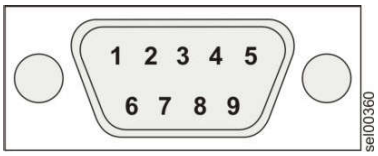


Fig. 487: Connector COM4.X

1 Reception signal level (DCD)
2 Reception data (RXD)
3 Transmission data (TXD)
4 Terminal ready for operation (DTR)
5 Earth (GND)
6 Ready for operation (DSR)
7 Switch on transmitter unit (RTS)
8 Ready to transmit (CTS)
9 Incoming call (RI)

2 Function

2.1 Basic function

Central control unit (Master4) controls and monitors all electronic components that are connected to it.

All the input and output data is processed in cycles according to the following schedule:
– Collecting all input data from the electronic components
– Putting the input data into the application software
– Calculating the output data
– Sending the output data to the connected electronic components. Commands that are received are converted into actions.

The central control unit (Master4) is responsible for the following functions:
– Controlling display
– Controlling CAN bus modules
– Controlling the control units
– Controlling the travel hydraulics
– Controlling the working hydraulics
– Controlling the ride control system
– Controlling the fan system
– Controlling emergency steering pump (if installed)
– Transmission controller
– Brake system controller
– Saving service codes
– Data input and output via diagnostic plug
– Actuating heating and air conditioning controller
– Controlling various options

LBH/12200852/16/211-20190801_085602/en

110.5 Electrical components of the driver's cab

110.5.1 Electrical components of the cab General overview

Valid for: L580-1414;

1 Layout

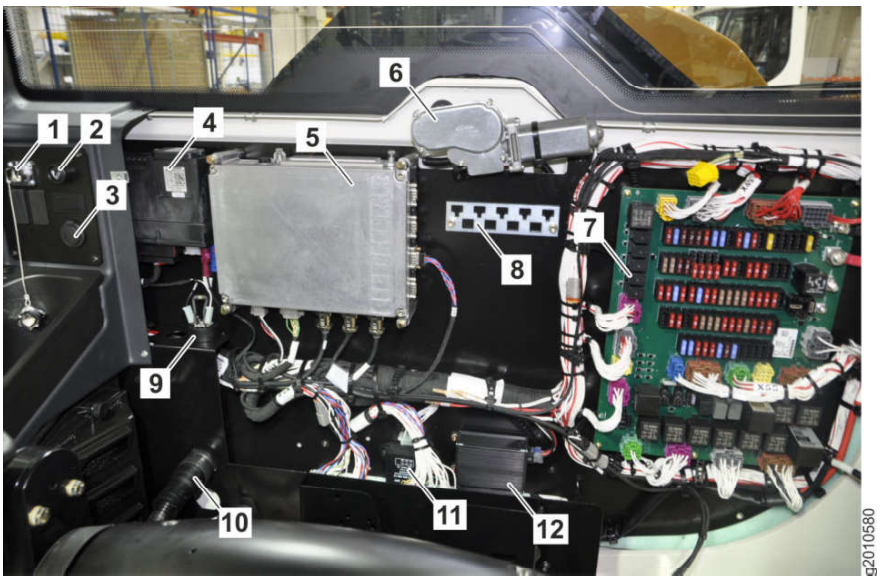


Fig. 498: Electrical components of the cab General overview

1	Diagnostic plug X60b	**7**	Fuse and relay board A4
2	Cigarette lighter X71	**8**	Slot for optional fuses
3	12 V socket X70	**9**	Buzzer H40
4	LiDAT module A30	**10**	Plug connection for control lever X5a
5	Control unit (Master4) A15	**11**	Interval relay for windscreen wiper K18
6	Rear windscreen wiper motor M3	**12**	Voltage transformer T1

The components of the electrical/electronic system are mounted on the rear wall of the cab.

2.1 Function

The voltage transformer supplies the radio A3 and the socket X70 with 12 V.

The central control unit A15 controls the machine. (For more information see: 110.4.2 Central control unit (Master4), page 110-13)

The warning buzzer H40 is active as soon as a malfunction occurs.

Data from the central control unit can be obtained via the diagnostic plug X60b.

The LiTU radio module is installed as standard. The LiTU radio module is only active if the LiDAT option is installed in the machine.

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110.7 Rear area monitoring with camera

110.7.1 Rear area monitoring with camera: General overview

Valid for: L580-1414;

1 Layout

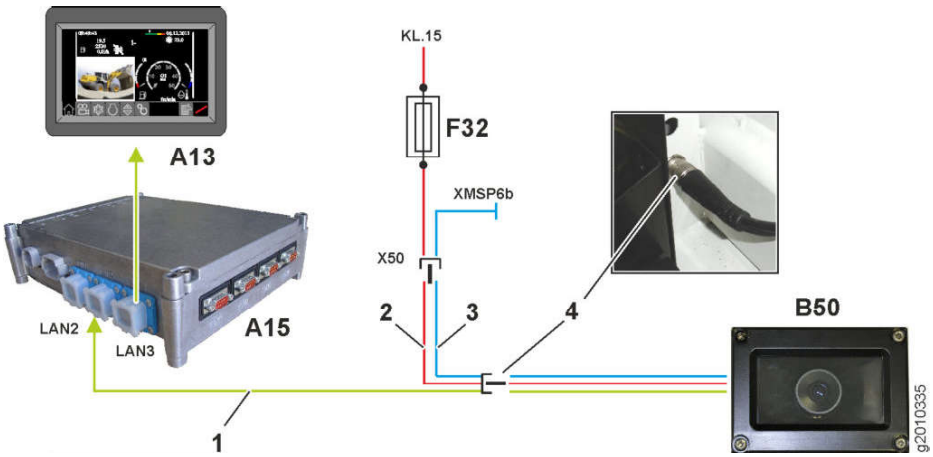

Fig. 508: Rear area monitoring with camera

Position	Function	Position	Function
1	Ethernet connection	A13	Display
2	Power supply	A15	Central control unit (Master4)
3	Weight	B50	Reversing camera
4	Plug connection for reversing camera.	F32	Fuse (5 A)

Tab. 266: Components

The reversing camera **B50** is fitted to the rear of the machine.

The central control unit (Master4) **A15** and the fuse **F32** are located in the cab on the rear wall.

The plug connector for the reversing camera **4** is on the left, behind the driver's seat.

2 Function

The reversing camera **B50** is connected via Ethernet to the central control unit (Master4) **A15**. The digital image data is sent to the central control unit using this cable connection.

The central control unit sends the image data received to the display via the Ethernet connection LAN3.

The reversing camera is powered via the fuse **F32**.

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2.3 Hydrostat and planetary carrier

2.3.1 Machine at a standstill, travel direction selected

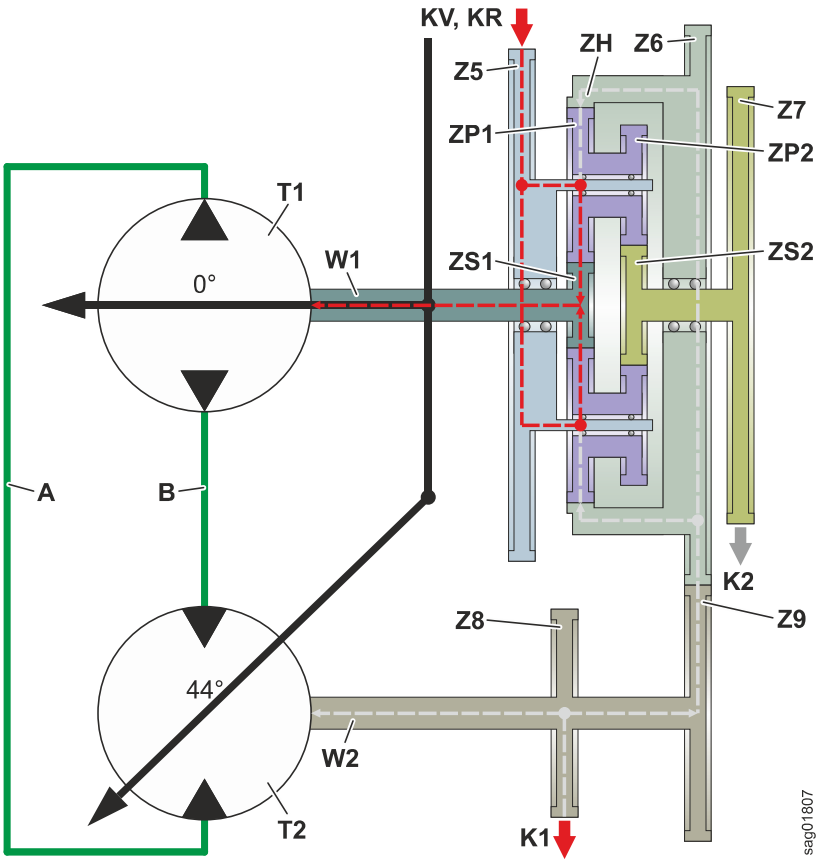

Fig. 514: Machine at a standstill, travel direction selected

Name	Description	Name	Description	Name	Description
A	Duct A	**ZS2**	Sun gear 2	**Z9**	Gearwheel 9
B	Duct B	**ZP1**	Planetary gear 1	**KV**	Forward travel direction clutch
T1	Rotary group 1	**ZP2**	Planetary gear 2	**KR**	Reverse travel direction clutch
T2	Rotary group 2	**ZH**	Ring gear	**K1**	Clutch 1
W1	Shaft 1	**Z6**	Gearwheel 6	**K2**	Clutch 2
W2	Shaft 2	**Z7**	Gearwheel 7		
ZS1	Sun gear 1	**Z8**	Gearwheel 8		

Tab. 274: Key

The clutch **K1** is closed. The ring gear **ZH** is connected via the gearwheel **Z8** and the clutch **K1** to the output. This means that when the machine is at a standstill, so is the ring gear **ZH**.

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BMK	Function	BMK	Function	BMK	Function
B80	Pressure sensor for duct AB	**Y1**	Proportional solenoid for clutch 2 (K2)	**Y5**	Proportional solenoid for clutch 1 (K1)
B81	Pressure sensor for duct A	**Y2**	Proportional solenoid for forward travel direction clutch (KV)	**Y6**	Proportional solenoid for clutch 3 (K3)
B85	Filter bypass switch	**Y3**	Proportional solenoid for optional connection	**Y7**	Proportional solenoid for position control
B86	Gear oil temperature sensor	**Y4**	Proportional solenoid for reverse travel direction clutch (KR)		

Tab. 280: Equipment codes

The transmission hydraulics perform following tasks:
- Shifting clutches
- Transmitting power to hydrostat module
- Lubricating transmission

The gear pump **2** draws oil from hydraulic tank and pumps it to gear oil filters in filter head **40**.

If gear oil filters are clogged, filter bypass valve **41** opens. This ensures lubrication even if gear oil filters are clogged.

After gear oil filters, oil flows to transmission control valve block **25** and to hydrostat module **45**.

The transmission control valve block **25** shifts clutches hydraulically. Oil that is not required for clutches flows on to lubricate bearings. For bearing lubrication, lubricating pressure valve **24** in duct plate **23** reduces pressure. The oil that flows out during this returns via gear oil cooler **66** to oil sump.

The hydrostat module **45** transmits some of power hydraulically. To do this, two axial piston rotary groups in hydrostat module **45** operate in a closed circuit.

2.2 Proportional solenoid valves for couplings

For all couplings, same proportional solenoid valves are installed. For some, proportional solenoids are switched to black and white.

Following proportional solenoids are switched proportionally:
- Proportional solenoid for forward travel direction coupling **Y2**
- Proportional solenoid for reverse travel direction coupling **Y4**

Following proportional solenoids are switched black/white:
- Proportional solenoid for coupling 1 **Y5**
- Proportional solenoid for coupling 2 **Y1**
- Proportional solenoid for coupling 3 **Y6**

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120.3 Transmission electronics

120.3.1 Overview of the electrical control system of the transmission

Valid for: L580-1414;

1.1 Function

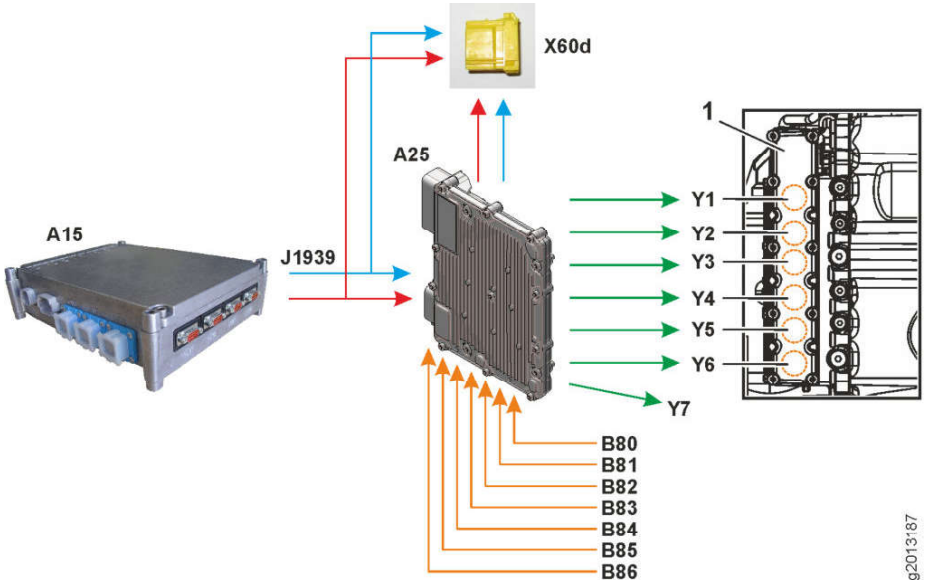

Fig. 528: Diagram

Position	Description	Position	Description
1	Valve block	B86	Gear oil temperature sensor
A15	Central control unit	X60d	Diagnostic connector for transmission (not used)
A25	Transmission control unit (TCU)	Y1	Proportional solenoid for clutch 2 (K2)
B80	Pressure sensor for duct AB	Y2	Proportional solenoid for forward travel direction clutch (KV)
B81	Pressure sensor for duct A	Y3	Proportional control solenoid for 1st optional connection (not used)
B82	Speed sensor for sun gear 2	Y4	Proportional solenoid for reverse travel direction clutch (KR)
B83	Output speed sensor	Y5	Proportional solenoid for clutch 1 (K1)
B84	Speed sensor for reverse travel direction clutch	Y6	Proportional control solenoid for clutch 3 (K3) (only on L580-1414 and L586-1334)

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The self-locking differential is integrated in the central housing. The wheel hubs contain the den service brake for the 1st brake circuit. The service brake is a wet disc brake.

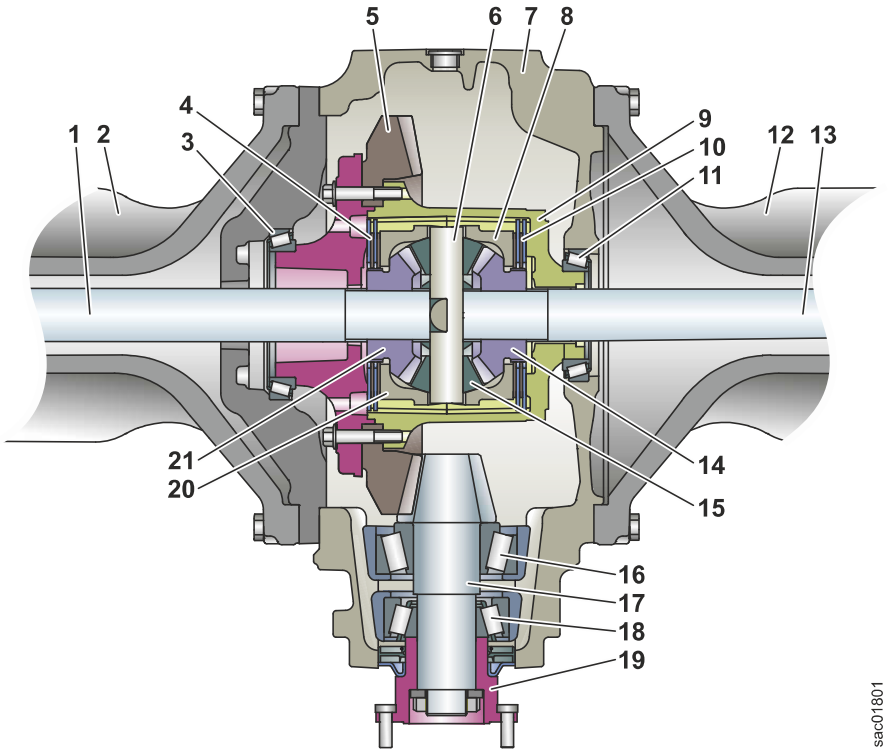

Fig. 537: Central housing with self-locking differential: sectional view

1	Left half shaft	**12**	Right trumpet arm
2	Left trumpet arm	**13**	Right half shaft
3	Tapered roller bearing	**14**	Tight axle tapered gear
4	Locking discs for left wheel	**15**	Compensation tapered gear
5	Crown wheel	**16**	Tapered roller bearing
6	Compensation axle	**17**	Axle input shaft (tapered gear)
7	Main housing	**18**	Tapered roller bearing
8	Right thrust ring	**19**	Transmission drive flange
9	Differential housing	**20**	Left thrust ring
10	Locking discs for right wheel	**21**	Left axle tapered gear
11	Tapered roller bearing		

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140 Steel parts of the basic machine

Contents

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150.1 Lift arms for LogHandler

150.1.1 LogHandler lift arms

Valid for: L580-1414;

1 Layout

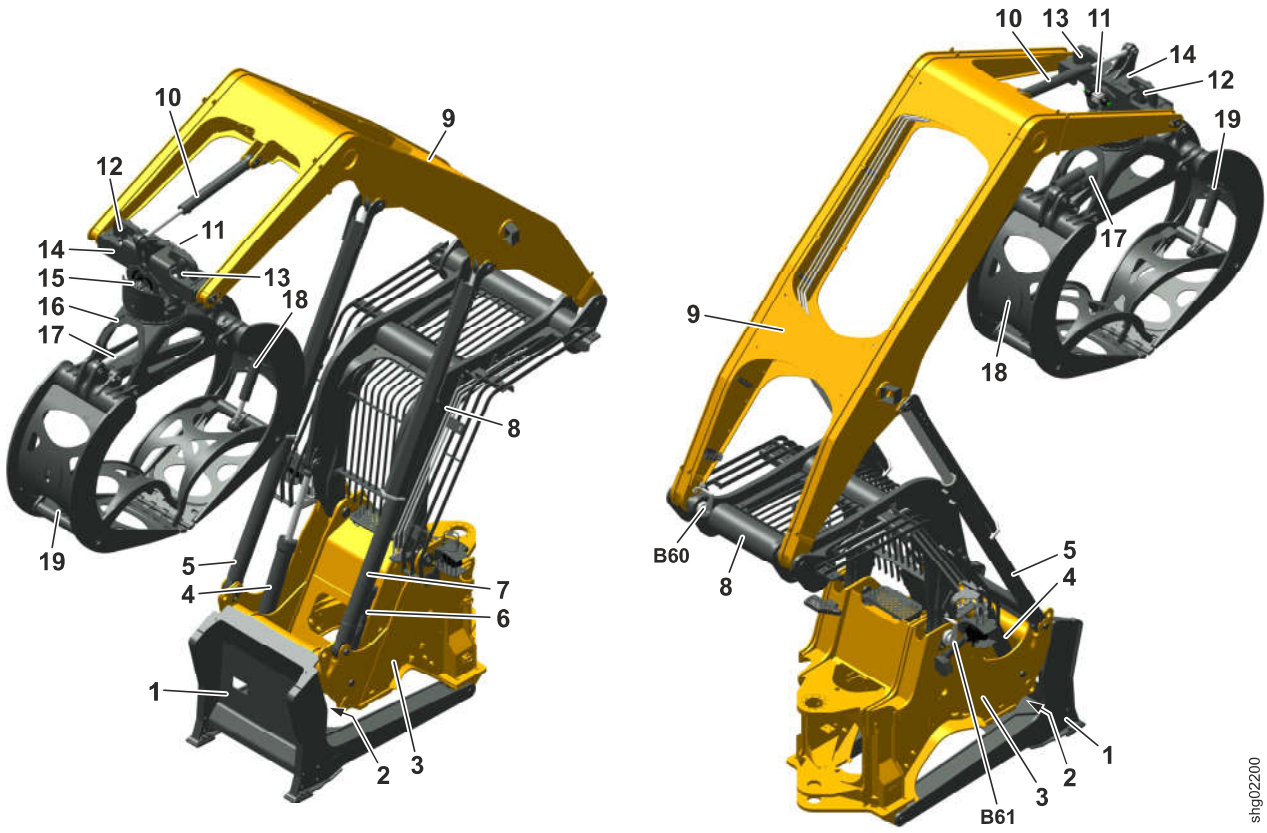

Fig. 550: LogHandler lift arms

1	Log pusher (option)	**8**	Swivel arm	**15**	Rotary unit
2	Log pusher cylinder (option)	**9**	Boom	**16**	Grabber with downholder (option)
3	Front section	**10**	Oscillating cylinder	**17**	Grabber cylinder with stroke limit damping
4	Right swivel arm cylinder	**11**	Grabber stabilisation valve block (lateral swinging)	**18**	Downholder cylinder (option)
5	Right boom cylinder	**12**	Right stabilisation cylinder	**19**	Downholder cylinder (option)
6	Left swivel arm cylinder	**13**	Left stabilisation cylinder		
7	Left boom cylinder	**14**	Grabber suspension		

BMK	Function	BMK	Function
B60	Boom angle sensor	**B61**	Swivel arm angle sensor

Tab. 304: Equipment codes

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– Limit switch for activating downholder (option)
– Downholder cylinder (option)

2 Function

2.1 Basic function

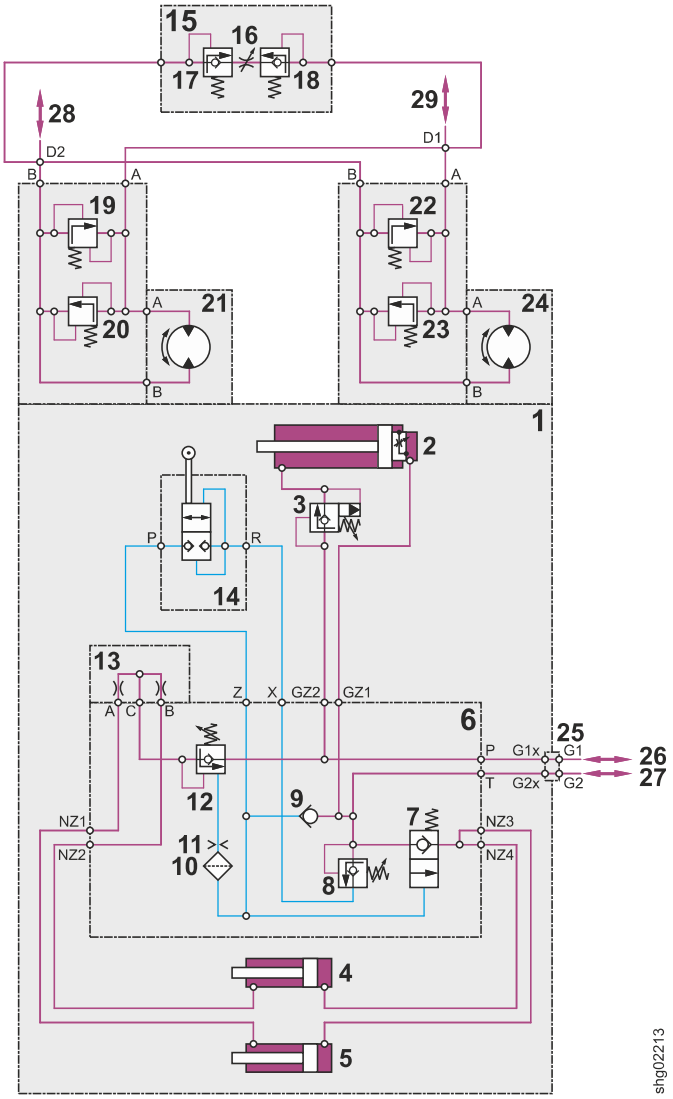

Fig. 558: Grabber: hydraulic schematic

1	**Grabber with downholder (option)**	**16**	Throttle for start-up speed
2	Grabber cylinder with stroke limit damping	**17**	Pressure relief valve for rotating left
3	Preload valve 50 bar (option)	**18**	Pressure relief valve for rotating right
4	Downholder cylinder (option)	**19**	Pressure relief valve for rotating left (rotary unit motor 2)
5	Downholder cylinder (option)	**20**	Pressure relief valve for rotating right (rotary unit motor 2)

See next page for continuation of the image legend

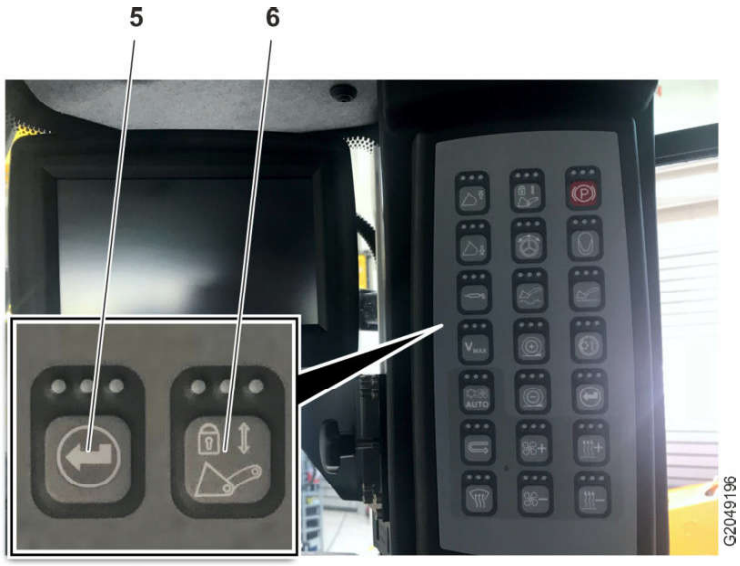

Fig. 570: Deactivating the hydraulic lock

5 Confirmation key **6** Hydraulic lock key

▶ Press keys **5** and **6** at same time for 10 seconds.
  ▷ The **service code M208C** goes out.
  ▷ All hydraulic functions are activated.

The machine is ready for assembly.

3. Final tasks

▶ Attaching boom. (For more information see: 150.3.2 Installation of the boom, page 150-23)

▶ Attach grabber. (For more information see: 150.3.4 Installation of the grabber, page 150-42)

▶ Check and adjust working hydraulics and working attachment according to adjustment procedure (see “Maintenance”, “Adjustment checklist” in service manual). (see: tab. 77, page 030-168)

150.3.2 Installation of the boom

Valid for: L580-1414;

Tool		Unit	Value
	Spanner	mm	12, 18, 24, 36, 41
	Allen key	mm	8
	Wire cutter		
	Loctite		241
	Slinging gear	kg	> 2900
	Receptacle		
	Assistants		

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Tool		Unit	Value
	Bolted joints		20S, 28L
	Wire cutter		
	Pen		
	Receptacle		
	Slinging gear	kg	> 2900
	Assistants		
	Plastic mallet		

Tab. 313: Overview of the tools required for the removal

Make sure that following special tools and operating materials are ready:
- ❑ Lifting device and slinging gear with a load capacity of at least 2900 kg
- ❑ Assistance is available.
- ❑ Loctite 241
- ❑ Vacuum pump
- ❑ Receptacle

1. Preparatory tasks

Make sure that following requirements are fulfilled:
- ❑ Machine is in the maintenance position.
- ❑ Grabber has been removed.

2. Stripping boom

Tool		Unit	Value
	Spanner	mm	12, 18, 36, 41
	Allen key	mm	8
	Bolted joints		20S, 28L
	Wire cutter		
	Pen		
	Receptacle		

Tab. 314: Required tools

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Make sure that the following special tools and operating materials are ready:
- ❑ Lifting device and slinging gear with a load capacity of at least 3500 kg
- ❑ Receptacle
- ❑ At least 2 spacers (71x140x1, item code: 9233217)
- ❑ Assistance is available.
- ❑ Vacuum pump

Note

For first installation after delivery of machine, small parts (screws, spacers, bolts, etc.) are enclosed in a box.

1. Preparatory tasks

Make sure that following requirements are fulfilled:
- ❑ Machine is in the maintenance position.

2. Installing the grabber

Note

Assistance is required to attach the component.!

Tool		Unit	Value
	Assistants		
	Spanner	mm	24
	Plastic mallet		
	Slinging gear	kg	> 3500

Tab. 317: Required tools

WARNING
Working attachment falling over!
Risk of injury.

▶ Make sure the working attachment is secured against falling over or rolling away.

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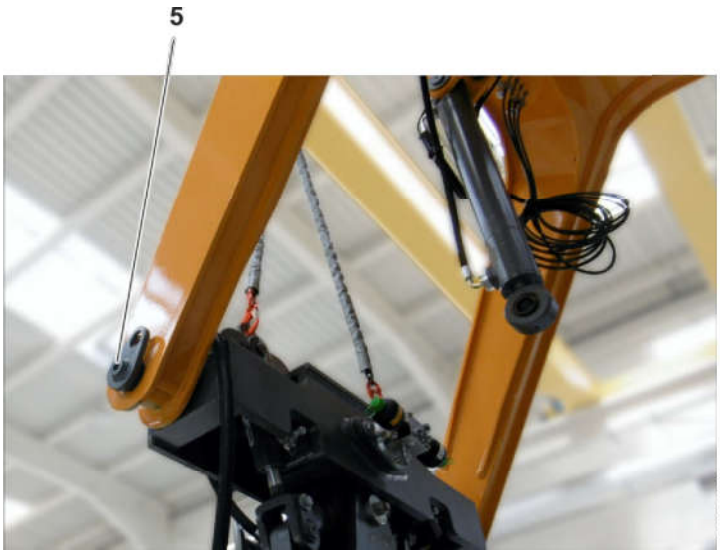

Fig. 608: Removing pin

5 Pin (2x)

WARNING
Beware of falling loads!
Injury.

▶ Never stand or work under suspended loads.

▶ Remove pin **5** [].

▶ Remove grabber and deposit in a safe location.

The grabber has been removed.

150.3.6 Preparation for transportation

Valid for: L580-1414;

Tool		Unit	Value
	Spanner	mm	18, 19, 24
	Allen key	mm	8

Tab. 322: Overview of tools required in preparation for transportation

Make sure that the following special tools and operating materials are ready:
❑ RSGU clip (2x), item code 7619427

1. Preparatory tasks

Make sure that following requirements are fulfilled:
❑ Machine is parked on level ground.
❑ Grabber has been removed.
❑ Boom is removed.

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2.2 Function test

When the ignition is turned on, all the LEDs light up for the duration of the test.

If there is a fault or failure in a module (CAN bus module) the LEDs remain lit after the test (safety-critical condition). In this case, the system cannot be started.

2.3 Plug assignment

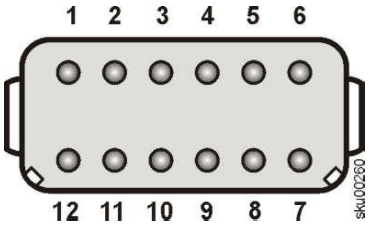

Fig. 615: Plug A11/X1

1	Supply voltage +24 V	**7**	CAN bus CAN High 2
2	Earth	**8**	CAN bus CAN Low 2
3	CAN bus CAN High 1	**9**	Terminating resistor
4	CAN bus CAN Low 1	**10**	Unassigned
5	Unassigned	**11**	Unassigned
6	Unassigned	**12**	Unassigned

160.2.2 Touch screen display

Valid for: L580-1414;

1 Layout

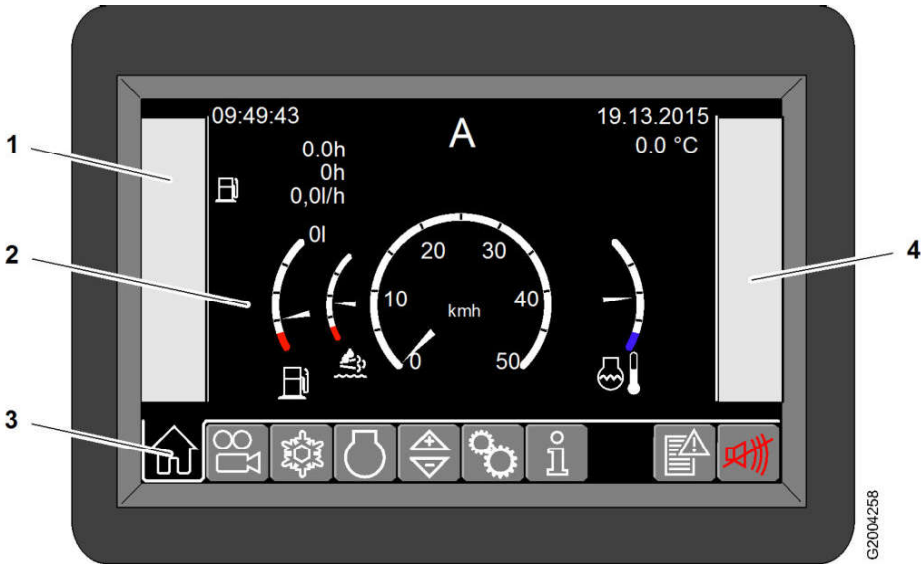

Fig. 616: Display

1	Status bar	**3**	Menu bar
2	Menu	**4**	Warning bar

The display A13a (touch screen monitor) is mounted in the front right of the cab.

2.4 Air distribution in the cab

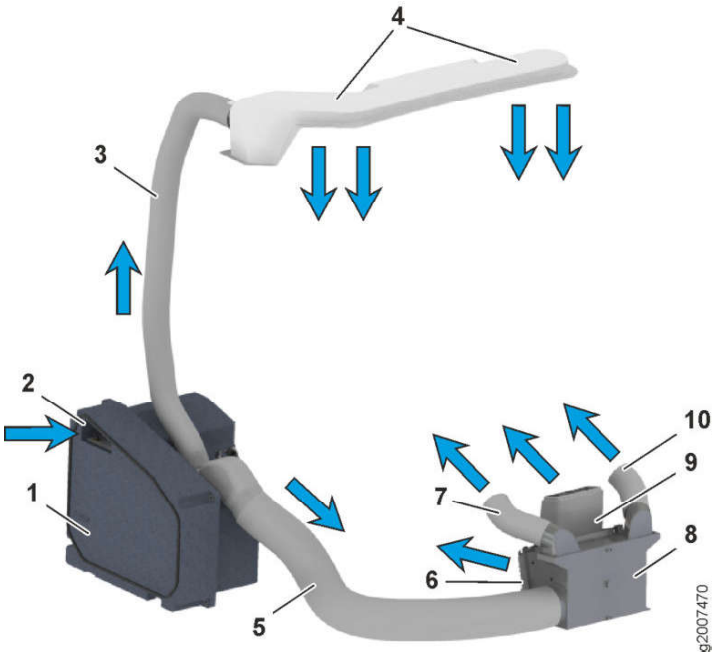

Fig. 627: Air distribution in the cab

1	Heating and air conditioning unit	**6**	Foot-level nozzles
2	Fresh air inlet	**7**	Body-level nozzle
3	Air pipe to head-level nozzles	**8**	Air distributor box
4	Head-level nozzles	**9**	Defrost nozzle
5	Air pipe to mid-level nozzles	**10**	Body-level nozzle

The air drawn in by the blower is heated or cooled and distributed through the outlet nozzles into the interior of the cab.

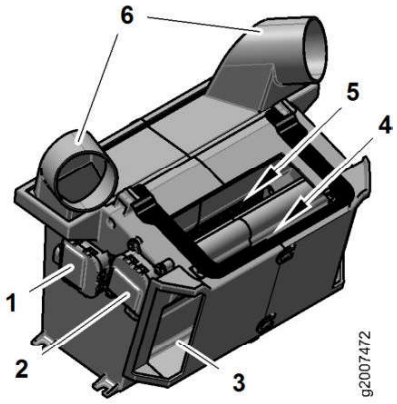

Fig. 628: Air distributor box

1	Servo motor for mid-level M16	**4**	Defrost / foot level flap
2	Servo motor for defrost / foot level M15	**5**	Body-level flap
3	Foot-level nozzles	**6**	Body-level nozzles

The defrost / foot level servo motor **2** uses the defrost / foot level flap **4** to regulate the air flow between the foot level and the windscreen.

Pin	Function	Pin	Function
19	Potentiometer for air distributor flap (supply)	40	Inside temperature sensor B40 (earth)
20	Potentiometer for air distributor flap M17 (earth)	41	Discharge temperature sensor B41 (earth)
21	Potentiometer for air distributor flap M17 (feedback)	42	Fan M5 (earth)

Tab. 330: Connector A21.X2

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170 Lubrication system

Contents

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2.7 Vent valve

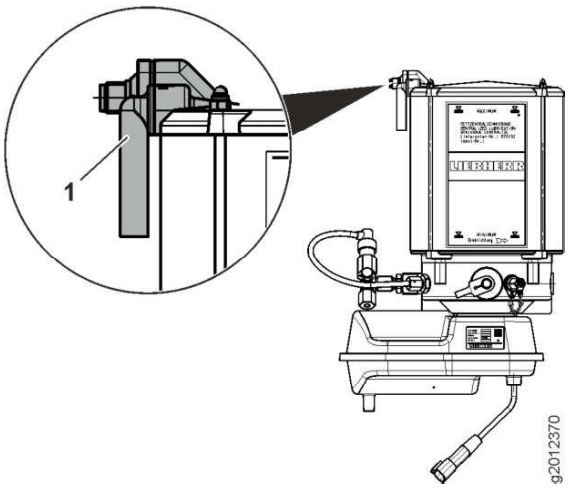

Fig. 651: Vent valve

1 Vent valve

Pumping the grease out of the reservoir to the lubrication system causes a vacuum in the grease reservoir. This vacuum is equalised via the vent valve **1**.

Air from outside is drawn in through the vent valve **1** to the grease reservoir.

If this air supply is blocked by overfilling of the grease reservoir or by a clogged vent valve, the central lubrication system can be damaged.

2.8 Non-scheduled lubrication

Briefly press the *central lubrication system* key (<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.

2.9 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, the system is stopped, LEDs 1 + 2 + 3 flash and the service code E2017 appears.

2.10 Grease level in reservoir too low

If the grease level in the reservoir is too low, all the LEDs on the *central lubrication system* key light up and a service code is displayed. When the grease has been refilled, the LEDs go out.

170.1.3 Progressive distributor MX-F

Valid for: L580-1414;

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.

2.2 Basic function

The central control unit A15 transmits all machine data to the LiDAT module A30.

The LiDAT module identifies the position of the machine via satellite connections.

The LiDAT module sends the machine data and the position data via a telecommunication connection to the data transfer service provider. The data transfer service provider sends the data via a secure VPN internet connection to the Liebherr LiDAT server.

Depending on their authorisation, customers and Liebherr authorised dealers can access the data on the Liebherr LiDAT server.

A data interface for customer applications allows the machine data to be integrated in internal IT systems.

Depending on their authorisation, customers and Liebherr authorised dealers can request the following data from the Liebherr LiDAT server:
- Position data
- Operating hours
- Use data (machine status at each time: off, idling, operation etc.)
- Service interval information (warnings, confirmations)
- Equipment deployment planning
- Equipment rental
- Equipment management
- Monitoring the geographic deployment area
- Monitoring the operating times
- Reporting critical operating conditions
- All machine data which is provided by the central control unit (e.g.: fuel consumption, service codes, sensor data etc.).

Remote diagnosis and LiDAT teleservice are also possible.

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