en **Service manual**

Wheel loader

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Manufacturer: Liebherr-Werk Bischofshofen GmbH
Valid for: L 566-1758

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010 Introduction

Contents

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  - Is able to estimate distance, height and gaps.
- The refrigeration technician has completed training that complies with the country-specific laws, standards and guidelines.
- The refrigeration technician has following skills:
  - Is able to assess work correctly.
  - Is able to recognise dangers.
  - Is able to take safety measures.
- Has knowledge and experience of the relevant field of activity.
- Knows the relevant national standards.
- Has the necessary authorisation for maintenance and repair of machine.
- Knows the machine and the hazards.
- Knows all procedures and precautions for maintenance.
- Has knowledge of handling special tools for maintenance and repair.
- 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.

010.1.3.7 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.

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Environmental pollution

– When working in following areas, adhere to laws, regulations and rules applicable at place of use:
  • Areas at risk of water (for example bodies of water)
  • Sound-sensitive areas
  • Emission-sensitive areas

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.

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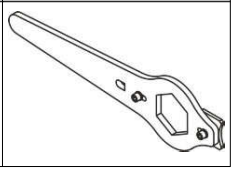
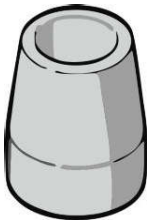
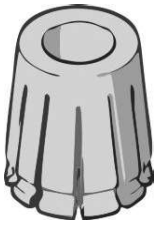
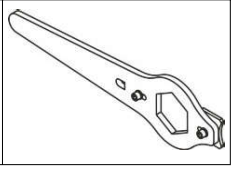
Designation	Item code	Remark	Fig.
Piston wrench 90 mm	9600418	For fitting the piston	

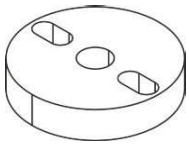
Tab. 9: Special tools for lift cylinders with industrial lift arms

010.2.6 Special tools for tilt cylinders with industrial lift arms

Designation	Item code	Remark	Fig.
Mounting sleeve 170 mm	9107931	For fitting the seals	
Expansion sleeve 170 mm	9110412	For fitting the seals	
Piston wrench 110 mm	9600928	For fitting the piston	

Tab. 10: Special tools for tilt cylinders with industrial lift arms

010.2.7 Special tools for steering wheel

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

Tab. 11: Special tools for steering wheel

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Metric standard threads and fine threads				Metric standard threads and fine threads			
At least one element of the bolted joint (bolts, washers, nuts etc.) with the following surface: flZn = zinc flake coating (LH standard 10021432, LH standard 10215295 flZnnc-480h-L valid ≥M6)				All elements of the bolted joint (bolts, washers, nuts etc.) with the following surface: Black oxide or phosphated Galvanised (LH standard 10215295 Fe// ZnNi(12)5//Cn//T2)			
Minimum total coefficient of friction μ_G= 0.09				Minimum total coefficient of friction μ_G= 0.11			
Thread	Strength class	Assembly prestressing forces F_M in kN	Tightening torques M_A in Nm	Thread	Strength class	Assembly prestressing forces F_M in kN	Tightening torques M_A in Nm
M 7	8.8	15.3	13.9*	M 7	8.8	15.0	16.1
	10.9	22.5	20.4*		10.9	22.0	23.6
	12.9	26	23.9*		12.9	26	28
M 8	8.8	19.3	20.6*	M 8	8.8	18.9	23.8
	10.9	28	30*		10.9	28	35
	12.9	33	35*		12.9	32	41
M 8 x 1	8.8	21.0	21.7*	M 8 x 1	8.8	20.5	25
	10.9	31	32*		10.9	30	37
	12.9	36	37*		12.9	35	43
M 9 x 1	8.8	27	31*	M 9 x 1	8.8	27	36
	10.9	40	46*		10.9	39	53
	12.9	47	53*		12.9	46	62
M 10	8.8	31	40	M 10	8.8	30	47
	10.9	45	59		10.9	44	68
	12.9	53	69		12.9	52	80
M 10 x 1	8.8	35	44	M 10 x 1	8.8	34	51
	10.9	51	64		10.9	50	75
	12.9	60	75		12.9	59	88
M 10 x 1.25	8.8	33	42	M 10 x 1.25	8.8	32	49
	10.9	48	62		10.9	47	72
	12.9	56	72		12.9	55	84
M 12	8.8	45	69	M 12	8.8	44	80
	10.9	66	102		10.9	64	118
	12.9	77	119		12.9	75	140
M 12 x 1.25	8.8	50	74	M 12 x 1.25	8.8	49	86
	10.9	73	109		10.9	71	125
	12.9	85	125		12.9	84	150
M 12 x 1.5	8.8	47	72	M 12 x 1.5	8.8	46	83
	10.9	69	105		10.9	68	122
	12.9	81	123		12.9	79	145

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010.5 Preservation guidelines for the SCR system

010.5.1 Putting out of service for longer than 2 months

The SCR system can be put out of service for more than 2 months under the following conditions:
- To prevent urea crystals from accumulating, the SCR system must be checked for leaks and damage.
- Electric or hydraulic connections must not be disconnected.

010.5.2 Starting up after being out of service for longer than 2 months

Before starting up after being out of service for more than 2 months, the following tasks must be carried out:
- Check the SCR system for visible damage.
- Check the electrical and hydraulic lines of the SCR system for damage.
- Check the electrical and hydraulic connections of the SCR system for damage.
- Check the quality of the diesel exhaust fluid (item code for analysis kit: 11698484). If the quality of the diesel exhaust fluid no longer meets the specifications, it must be drained.
- Before operating the diesel exhaust fluid pump, the diesel exhaust fluid tank must be filled to the maximum.

Once the above tasks have been carried out, the function of the SCR system must be tested.

This test is done using the LIDIA engine diagnostic software. The test must be carried out with the engine running.

Test the following functions of the SCR system with the engine running:
- Test the air circuit.
- Test the diesel exhaust fluid circuit.
- Test the blowing out function.

Once these tests have been carried out and no faults have been found, the SCR system can be started up.

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	Designation	Unit	Value	
	Turning radius over bucket outer edge	mm	7410	7440
	Breakout force (SAE)	kN	200	185
	Tipping load when straight	kg	17100	16650
	Tipping load when fully articulated (ISO 14397-1)	kg	15000	14550
	Operating weight	kg	24800	24950

Tab. 25: Complete machine with loading bucket (industrial lift arms)

A) Industrial lift arms with parallel guidance including quick coupler
B) Earth bucket with short, straight base for quick coupler
C) Welded tooth holder with plug-in teeth
D) In practice, the bucket capacity can be around 10% greater than as calculated using the ISO 7546 standard. The bucket filling level depends on the type of material.

020.1.3 Working attachment: light material bucket

Valid for: L566-1758;

Values stated refer to machine:

- In standard version
- With 26.5R25 L3 tyres (For more information see: 020.10.7 Tyres, page 020-36)
- Including all lubricants
- With a full fuel tank
- With ROPS/FOPS cab and operator
- On level and stable ground

Note
Tyres and working attachments affect operating weight and tipping load.

▶ Note the information about the tyres and working attachment.

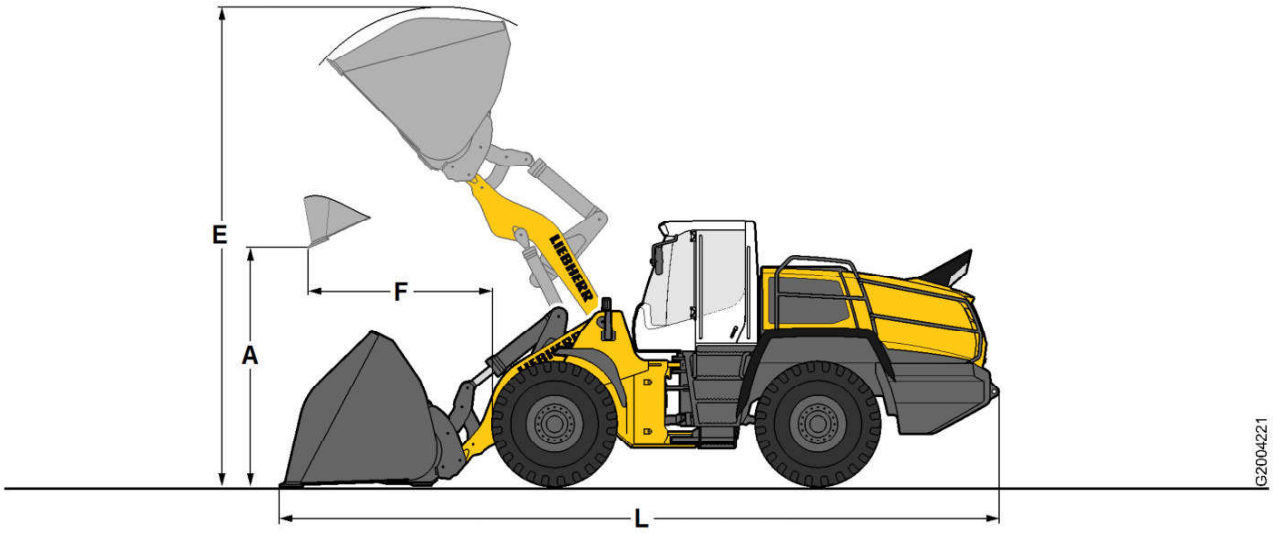

Fig. 79: Working attachment: light material bucket

020.4 Working hydraulics

020.4.1 Working pump

Valid for: L566-1758;

Description	Unit	Value
Type		Axial piston pump with swash plate variable displacement
Type		A11VO130LRS
Direction of rotation		Anticlockwise
Maximum displacement per turn	cm^3	130
Maximum displacement	l/min	300
Weight	kg	75

020.4.2 Control valve block for Z kinematics

Valid for: L566-1758;

Description	Unit	Value
Type		M6-1441-30/2M6-22 W
Maximum flow rate for lifting function (per outlet)	l/min	280
Maximum flow rate for lowering function (per outlet)	l/min	200
Maximum flow rate for tilt-in function	l/min	200
Maximum flow rate for tilt-out function	l/min	180
Maximum flow rate for 3rd function A3 (optional)	l/min	170
Maximum flow rate for 3rd function B3 (optional)	l/min	300
Maximum flow rate for 4th function A4 (optional)	l/min	170
Maximum flow rate for 4th function B4 (optional)	l/min	300
Weight (excluding additional spool valve)	kg	59

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020.7.5 Brake accumulator pressure sensor B19

Valid for: L566-1758;

Description	Unit	Value
Measuring range	bar	0 to 600
Signal output	mA	4 to 20
Supply voltage	VDC	8 – 30
Rated temperature range	°C	-25 to +85
Tightening torque	Nm	20

020.7.6 Parking brake hydro accumulator

Valid for: L566-1758;

Description	Unit	Value
Volume	l	0.32
Nitrogen filling pressure at 20 °C	bar	80 $^{+2/-1}$
Weight	kg	1.3

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Size and tread code	Change in operating weight	Width across tyres	Change in height	Tyre pressure		
				FA A)	RA B)	p - max. C)
	kg	mm	mm	bar	bar	bar
...						
...						
...						

Tab. 32: Special tyres

A) Front axle
B) Rear axle
C) Maximum tyre pressure

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
					❍	✦		Air filter system: Clean the safety element (after replacing the main element three times, or every year at the latest).		030-75
						✦		Dust protection for alternator (option): clean or replace filter element.		030-76
☐		●	●	❍	❍			Splitter box: Check the oil level.		030-79
				❍	❍			Splitter box: Change the oil.		030-80
			■	❍	❍			Check that the diesel engine intake and exhaust system is in good condition and not loose or leaking.		030-82
		●	●	❍	❍			Check the diesel engine for leaks, contamination and damage.		030-84
☐				❍	❍			Diesel engine: check profile clamps.		030-85
						❍5000 h		Clean the diesel particulate filter module.		030-87
					❍			Change the compressed air dryer.		030-90
					❍			Check the compressed air system.		030-91
Cooling system										
	●	●	●	❍	❍			Cooling system: Check the coolant level.		030-92
					❍	❄		Coolant: checking antifreeze and corrosion protection agent concentration.		030-93
						✦		Clean the cooling system.		030-100
						❍6000 h		Change coolant in cooling system (at least every 4 years).		030-101
Hydraulic components										
☐	●	●	●	❍	❍			Hydraulic tank: Check the oil level.		030-104
				❍	❍			Drain off condensate and sediment from the hydraulic tank.		030-106
				❍	❍			Change the return filter insert in the hydraulic tank.		030-107
					❍			Change the hydraulic tank breather filter.		030-108
						✧		Hydraulic tank: analyse the oil (For more information see: Oil analysis, page 030-23)		030-109
						✧		Change. the oil in the hydraulic tank (For more information see: Oil change, page 030-23)		030-110
Steering system										
☐	●	●	●	❍	❍			Steering: Check the function.		030-114
☐		●	●	❍	❍			Steering cylinders: Lubricate the bearings.		030-114

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Ambient temperature	Designation
From -25 °C to 45 °C	Liebherr Hydraulic Plus

Tab. 49: Recommendation for hydraulic oils

030.3.9.2 Minimum quality requirement

Specification
EMT LH-00-Minimum-HYE

Tab. 50: Minimum quality requirement

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

030.3.9.3 Oil analysis

	Hydraulic oil	Interval
Normal use (oil analysis optional)	**Mineral oil**	
	Liebherr Hydraulic HVI	First after 1000 h, then every 1000 h, at least once a year
Bio use (oil analysis prescribed)	**Biodegradable**	
	Liebherr Hydraulic Plus	First after 1000 h, then every 1000 h, at least once a year

Tab. 51: Oil analysis

030.3.9.4 Oil change

Hydraulic oil	Without oil analysis	With oil analysis[30)]
Mineral oil		
Liebherr Hydraulic HVI	Every 3000 h	Every 6000 h
Biodegradable		
Liebherr Hydraulic Plus	Every 4000 h	Every 8000 h

Tab. 52: Oil change

[29)] PAO = polyalphaolefin

[30)] If the result of the oil analysis is positive, the oil can continue being used. If the result of the oil analysis is negative, the oil must be changed.

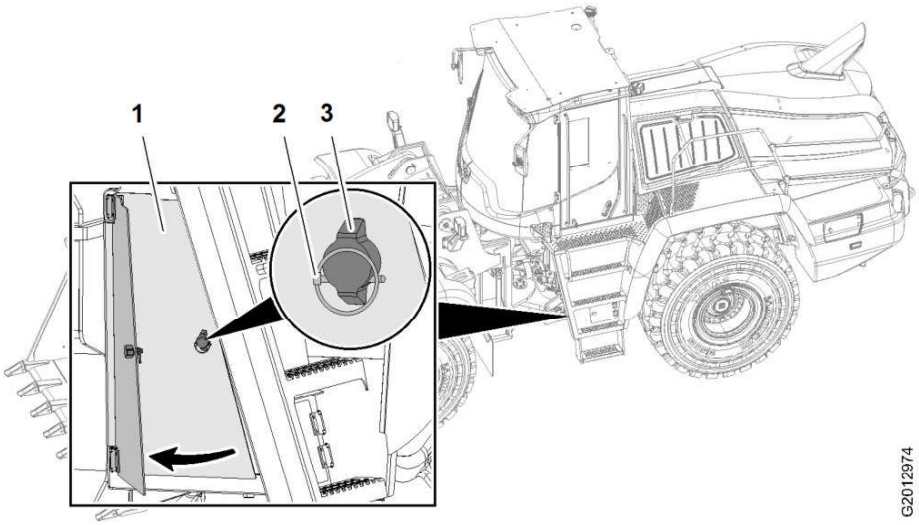

Fig. 91: Service cover in the left of the cab access

1 Service cover
2 Cotter pin
3 Locking mechanism

To open the service cover:

- ▶ Remove cotter pin **2**.
- ▶ Open lock **3**.
- ▶ Open service cover **1**.

NOTICE
Service cover open!
Risk of damage to the machine.

- ▶ Before starting up the machine: Close the service cover and secure it with the cotter pin.

To close the service cover:

- ▶ Close service cover **1**.
- ▶ Close lock **3** and secure it with the cotter pin **2**.

030.4.2.3 Turning off the battery main switch

Valid for: L566-1758;

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

Read the descriptions of the maintenance tasks to find out whether the battery main switch must be turned on or off.

Turn on the battery main switch after completing these maintenance tasks.

Make sure that following requirements are met:
❑ Diesel engine is switched off.

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Quantity	Description	Item code
1	1 m test line	7002437
1	Hand pump with sampling hose	8145666

Tab. 64: Tools required

Oil analysis kits

Liebherr recommends having the oil analyses carried out by Oelcheck.

Oelcheck offers various methods of analysis for a wide range of components and units. Liebherr has chosen two methods analysis that are specially adapted to the particular requirements of our systems and components.

	Green lid: petroleum, coolant	Yellow lid: bio oil
Single analysis kit	8145660	7026 817
6-sample analysis kit	7018 368	7026 088
12-sample analysis kit	7018 369	

Tab. 65: Available analysis kits

The analysis kits with the green lid can be used for hydraulic systems filled with mineral oil, diesel engines, transmission and lubricating grease.

The analysis kits with the yellow lid may only be used for bio hydraulic oils. The difference in the scope of the analysis is that the water content of all bio oils has to be tested using the comparatively expensive Karl Fischer method. However, this test method is essential for a precise diagnosis of bio oils.

If other test laboratories are used, the oil analyses must at least include the following data:

Test methods	Measured items
Atomic emission spectroscopy (AES)	Metal debris, additives, contaminants, iron, chrome, tin, aluminium, nickel, copper, lead, molybdenum, silver, silicon, potassium, magnesium, boron, zinc, phosphorus, barium
Infrared spectroscopy (FT-IR)	Oil condition and pollution, oil oxidation, glycol, water, nitration, fuel, soot
Viscosity	Test at 40 °C and 100 °C, viscosity index, note on lubricity and mixing
Analex PQ index	Magnetic abrasion (information on quantity of magnetisable iron debris in oil > 5 µm)

Tab. 66: Test methods

Sending oil samples

▶ Label the sample container with the barcode (the red laboratory number on the sample information form).
  ▷ This ensures that the form with the sample information is allocated to the correct sample.

▶ Carefully complete sample information form.

Diesel engine: draining oil

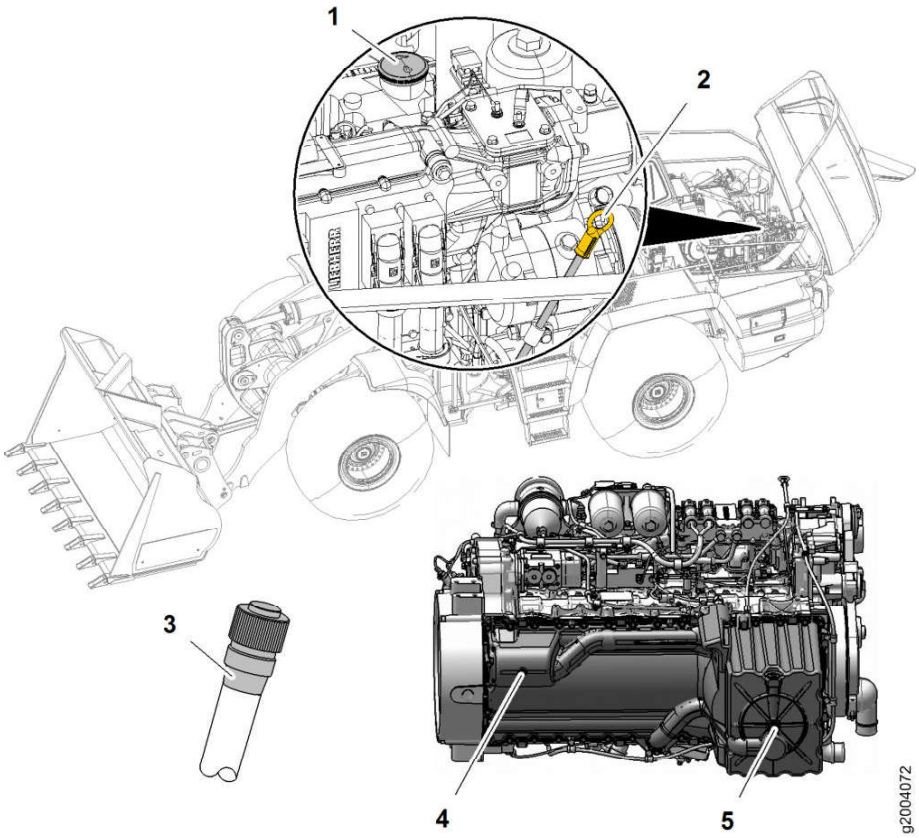

Fig. 107: Changing oil

1 Filler pipe
2 Dipstick
3 Drain hose
4 Drain plug
5 Drain valve

CAUTION
Hot fluids!
Burns.

▶ Avoid skin contact with fluids.

▶ Open filler pipe **1**.
▷ Oil drains faster.

▶ Unscrew sealing cap on the drain valve on the bottom of the oil pan.

▶ Screw drain hose **3** onto drain valve.

▶ Drain off oil into receptacle.

▶ Unscrew drain hose.

▶ Unscrew cap of drain valve.

There is a recess on the bottom of the oil pan. This recess can only be drained using the drain plug **4**.

▶ Unscrew drain plug.

WARNING
Highly flammable consumables!
Beware of burns.

▶ Avoid naked lights and fire.

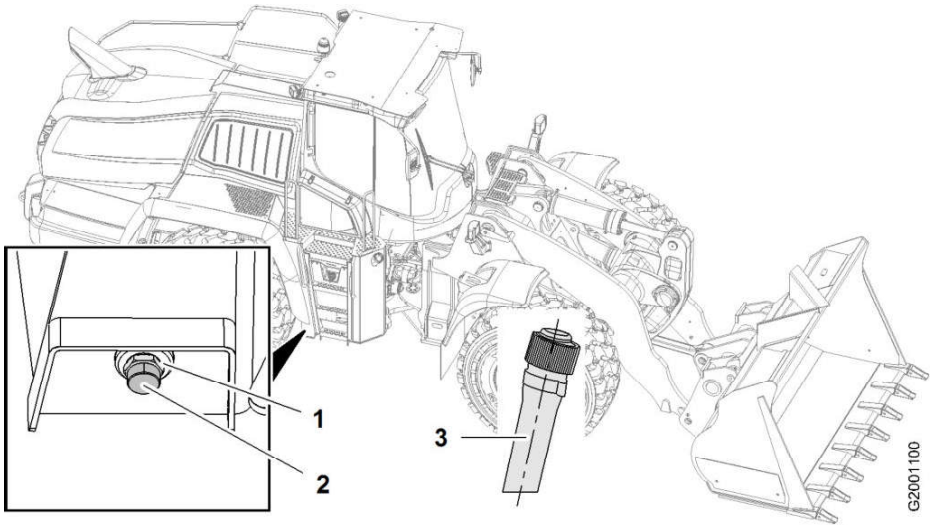

Fig. 117: Fuel tank: Draining off condensate and sediment

1 Drain valve
2 Cap
3 Drain hose

▶ Place a receptacle under the fuel tank.

▶ Unscrew the cap **2** of the drain valve **1**.

▶ Screw the drain hose **3** onto the drain valve **1**.
▷ Condensate and sediment drain off.

▶ Drain the condensation and sediment into a suitable receptacle until clean fuel begins to flow.

▶ Unscrew the drain hose **3**.

▶ Screw the cap **2** onto the drain valve **1** and tighten it.

030.4.4.11 Fuel pre-filter: Draining off condensate

Valid for: L566-1758;

When the water level probe in the fuel pre-filter is activated (the service code is displayed), the water collector tank must be drained.

Make sure that the following requirements are fulfilled:
❑ The machine is in maintenance position 1.
❑ The service access is open.
❑ You have a suitable receptacle ready.
❑ The engine has cooled down.

WARNING
Highly flammable consumables!
Beware of burns.

▶ Avoid naked lights and fire.

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Removing the main element

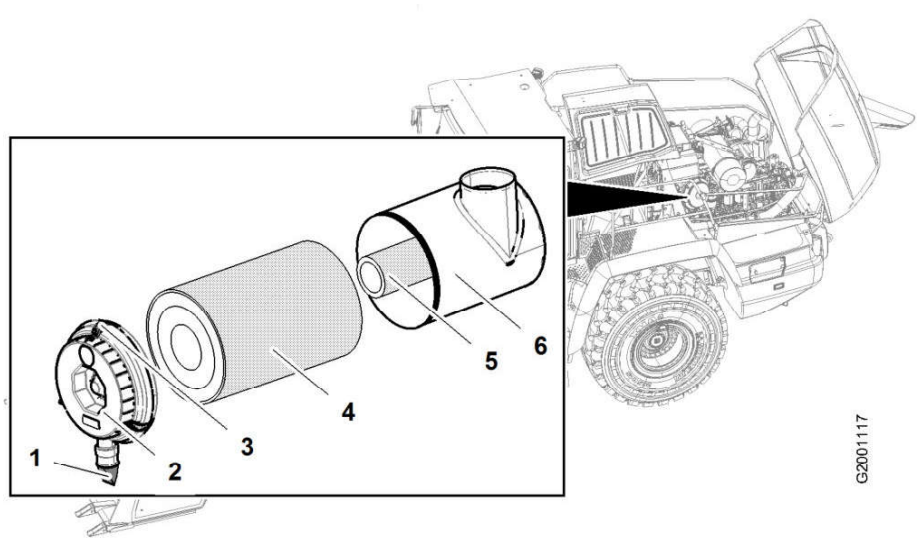

Fig. 126: Removing the main element

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

NOTICE
Always carry out maintenance correctly.
Damage to the engine.

▶ Always replace damaged filter elements.

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

▶ Take off the service cover **2**.

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

If the main element is damaged:
▶ Change the damaged filter element.

If the main element is not damaged:
▶ Clean the main element.

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Checking the intake system

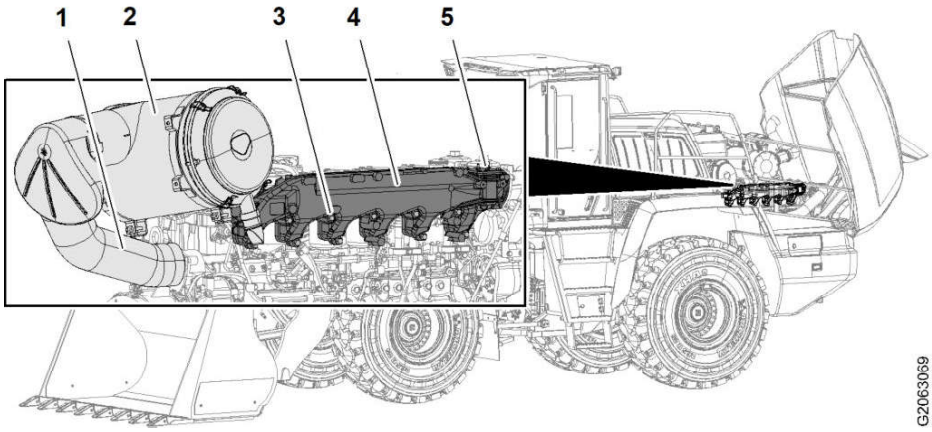

Fig. 139: Checking the intake system

1 Air intake hose
2 Air filter house
3 Screw
4 Air intake pipe
5 Heater flange

- ▶ Check that air intake hose **1** is not damaged and is firmly seated.
- ▶ Check air intake hose **1** for cracks and porosity.
- ▶ Check that fastening clips on air intake hose **1** fit tightly.
- ▶ Check that air filter housing **2** is not damaged and is firmly seated.
- ▶ Check that air intake pipe **4** is not damaged and screws **3** are tight.

If you find any damage:

- ▶ Do not operate diesel engine.
- ▶ Have damaged components replaced by Liebherr customer service.

Checking the exhaust system

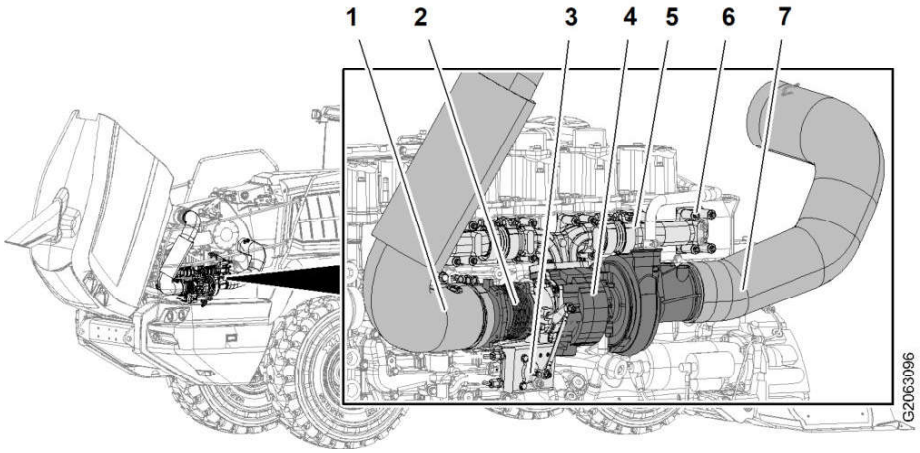

Fig. 140: Checking the exhaust system

1 Exhaust pipe
2 Exhaust port
5 Exhaust manifold
6 Screw

See next page for continuation of the image legend

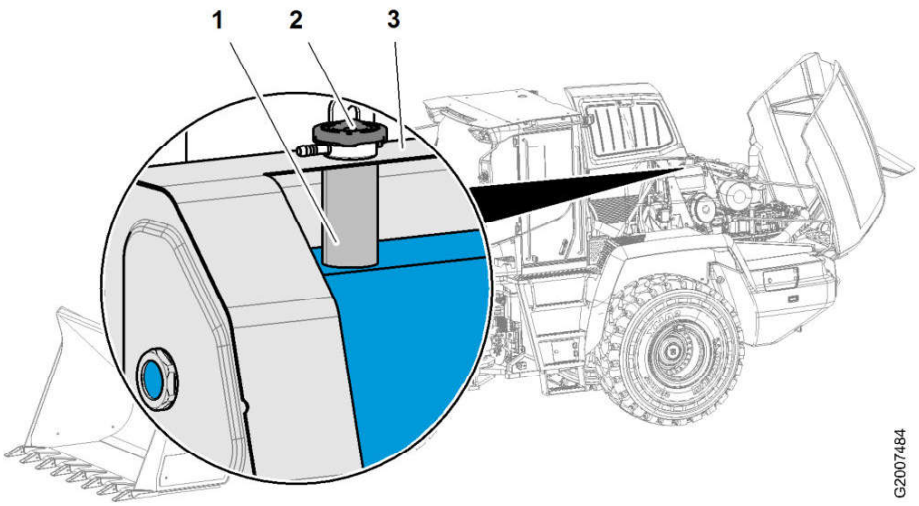

Fig. 148: Checking the coolant level

1 Filler neck
2 Cover
3 Equalising reservoir

CAUTION
Hot. pressurised liquid!
Beware of burns.

▶ Let the engine cool down.

▶ Carefully open the cap **2** of the equalising reservoir **3**.

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 coolant to the bottom of the filler neck **1**. (For more information see: 030.3.8 Coolant, page 030-22)

▶ Close the cover **2**.

030.4.5.2 Coolant: checking anti-freeze and corrosion protection agent concentration

Valid for: L566-1758;

Checking antifreeze and corrosion inhibitor concentration

The machine is delivered factory-filled with antifreeze and corrosion inhibitor.

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Filling coolant

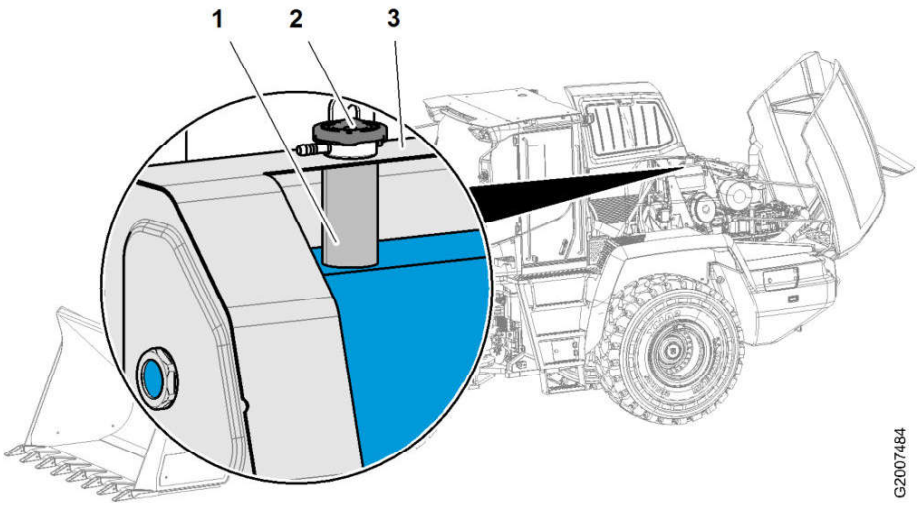

Fig. 156: Filling coolant

1 Filler pipe
2 Cap
3 Coolant equalising reservoir

- ▶ Top up coolant to the bottom of the filler pipe **1** in the coolant equalising reservoir **3**.
- ▶ Close the cap **2** of the coolant equalizing reservoir **3**.
- ▶ 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 cap **2** of coolant equalizing reservoir **3**.
- ▶ Check that the coolant level is up to the bottom of the filler pipe **1**.
- ▶ If the coolant level is too low: Top up coolant to the bottom of the filler pipe **1** in the coolant equalising reservoir **3**.
- ▶ Close the cap **2** of the coolant equalizing reservoir **3**.

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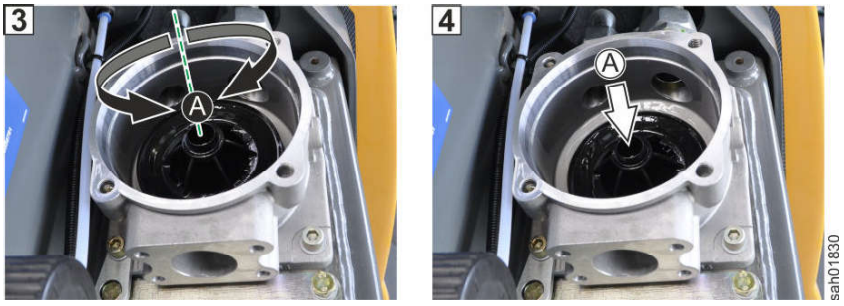

Fig. 167: Putting in the filter insert

NOTICE
No filter effect in the filling position!
Damage to the hydraulic system.

▶ Make sure the filter insert is put in correctly.

▶ Turn the filter insert until it latches.

▶ Put on the compression spring and filter cover.

▶ Tighten the nuts on the filter cover to 25 $^{+5}$ Nm.

▶ Screw in the plug.

▶ Tighten the breather filter.

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

▶ Check the oil level.

Checking the oil level

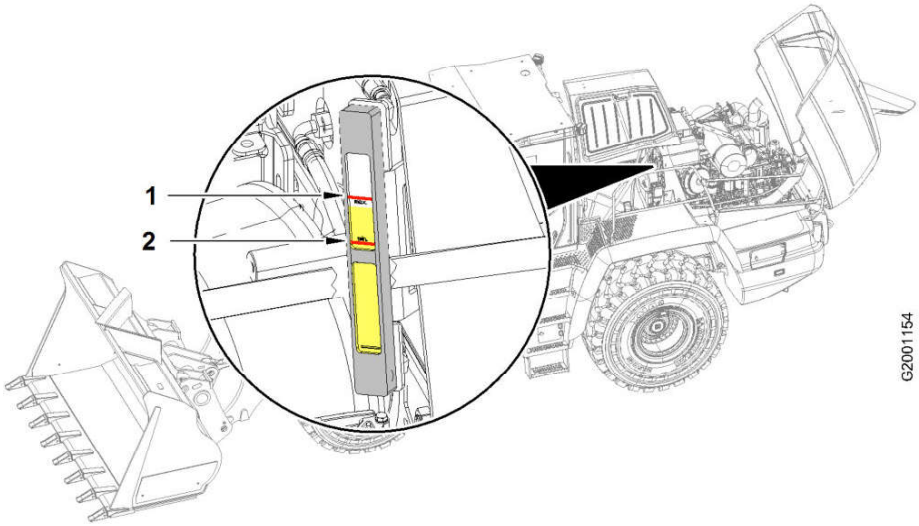

Fig. 168: Checking the oil level

1 Maximum oil level **2** Minimum oil level

▶ Start the engine.

- ▶ Connect the Sculi diagnostic software to the machine.
- ▶ In the variables editor, select the ***Brake system*** folder.

WARNING
Beware of machine rolling away!
Accidents.

- ▶ Make sure the machine is parked on level ground.
- ▶ Use wheel wedges to secure the machine against rolling away.

WARNING
Inadvertently engaging the parking brake!
Crushing injuries.

- ▶ Make sure no-one can enter the operator's cab.
- ▶ Make sure that the main switch cannot be operated.

- ▶ Force the variable ***QRPBValve*** to the maximum value ***65535***.
  ▷ The parking brake opens.
- ▶ Unscrew the protective cap.
- ▶ Unscrew the counter nut **5**.
- ▶ Tighten the adjusting screw **4** until the two brake shoes **1** touch the brake disc **2**.
- ▶ Loosen the adjusting screw **4** by half a turn.

Note

Half a turn approximately corresponds to a gap of 1.2 mm.

- ▶ Close the parking brake and open it again by unforcing the variable ***QRPBValve*** and then forcing it to the maximum value of ***65535***.
- ▶ Check that the gap **s2** corresponds to the required value.

Description	Unit	Value
Gap **s2**	mm	1.0 $^{+2.0}$

If the value is not correct:
- ▶ Adjust the gap.

If the value is correct:
- ▶ Hold the adjusting screw **4** and tighten the counter nut **5** to 90 Nm.
- ▶ Twice close the parking brake and open it again by unforcing the variable ***QRPBValve*** and then forcing it to the maximum value of ***65535***.
- ▶ Check that the gap **s2** corresponds to the required value.

If the value is not correct:
- ▶ Adjust the gap.

If the value is correct:
- ▶ Screw on the protective cap by hand. Make sure that the O-ring is in place.
- ▶ Switch off ignition.
  ▷ The variable ***QRPBValve*** is unforced.

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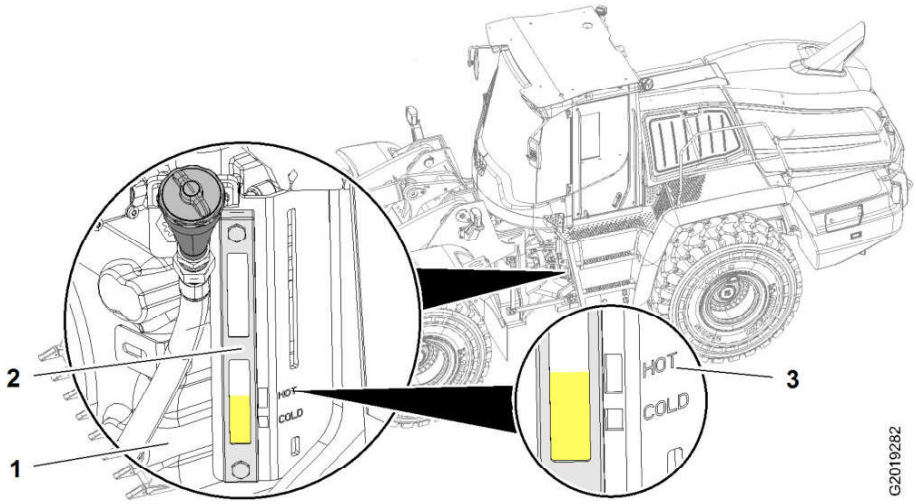

Fig. 188: Checking the oil level when the gear oil is at operating temperature

1 Transmission
2 Oil sight glass
3 HOT range

▶ Put machine into service and operate until the gear oil temperature reaches 60 °C.

▶ Let the machine run at idling speed for 2 minutes.

▶ Engage parking brake.

▶ Engage the articulation lock.

▶ Check the oil level in the oil sight glass **2**.
▷ The oil level must be in the HOT range **3**.

If the oil level is below the HOT range **3**:

▶ Turn off the diesel engine.

▶ Top up the oil. (For more information see: Topping up the oil, page 030-133)

▶ Release the articulation lock.

Troubleshooting

If the oil level is above the HOT range or if leakages are detected on the transmission:

▶ Contact Liebherr customer service.

Topping up the oil

Make sure that the following requirements are fulfilled:

❑ The machine is in maintenance position 1.
❑ The machine is level.

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Extension: checking articulation play

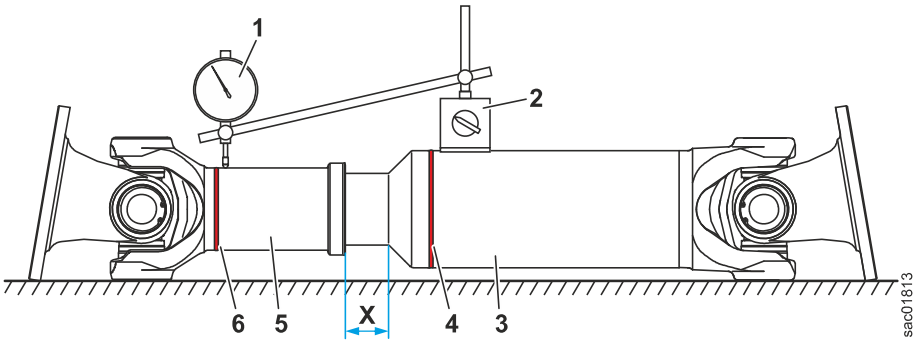

Fig. 197: Extension: checking articulation play

1 Gauge
2 Dial gauge holder
3 Drive shaft tube
4 Weld seam
5 Protective cover
6 Weld seam
X Extension length

▶ Remove drive shaft (for more information, see removal and installation instructions).

▶ Using forks, place drive shaft on a firm, level surface.

▶ Pull drive shaft out to length **X** = 45 mm.

▶ Secure dial gauge holder **2** next to weld seam **4** on drive shaft tube **3**.

▶ Place dial gauge **1** next to weld seam **6** on protective cover **5** and set to 0.

▶ Lift drive shaft at centre of gravity.
▷ Dial gauge **1** shows articulation play.

▶ Check that the articulation play is below the maximum.

Description	Unit	Value
Maximum articulation play	mm	0.17

If required value is not reached:
▶ Replace drive shaft.

030.4.11.3 Checking the tyre pressure

Valid for: L566-1758;

Make sure that following requirements are met:
❑ Machine is in maintenance position 1.
❑ You have the recommended tyre pressures from the manufacturer or dealer at hand.

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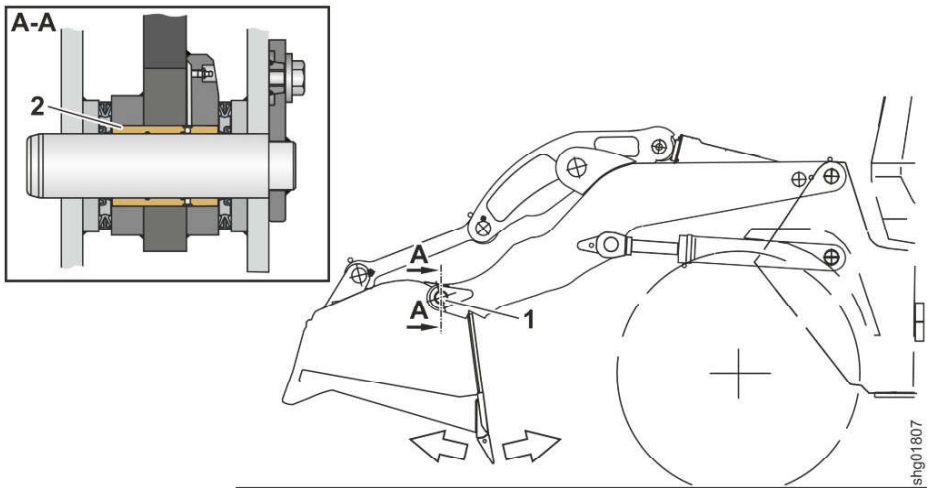

Fig. 209: Lift arms: checking bucket bearing bushings

1 Bucket bearing (2x) **2** Bucket bearing bushing (2x)

- ▶ Deactivate stroke limit damping (option).
- ▶ Raise lift arms so far that bucket can be fully tilted out.
- ▶ Tilt bucket out.
- ▶ Tilt bucket in and out with short, fast movements.
- ▶ When doing so, listen out for noises and play in bucket bearing bushes **2**.

If there are noises or play in bucket bearing bushes **2**:

- ▶ Check lubrication of bucket bearing bushes **2**.
- ▶ Replace bucket bearing bushes **2**.

030.4.13.4 Checking the lift arm bucket stops

Valid for: L566-1758;

Note

This maintenance item is only for Z kinematics.

Make sure that the following requirements are fulfilled:

- ❑ The machine is secured against rolling away.

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▶ 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: L566-1758;

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 Windscreen washer system: filling windscreen washer fluid

Valid for: L566-1758;

The reservoir is fitted below the left cab access.

Make sure that following requirements are fulfilled:
❑ Machine is in maintenance position 1.
❑ Service access is open.

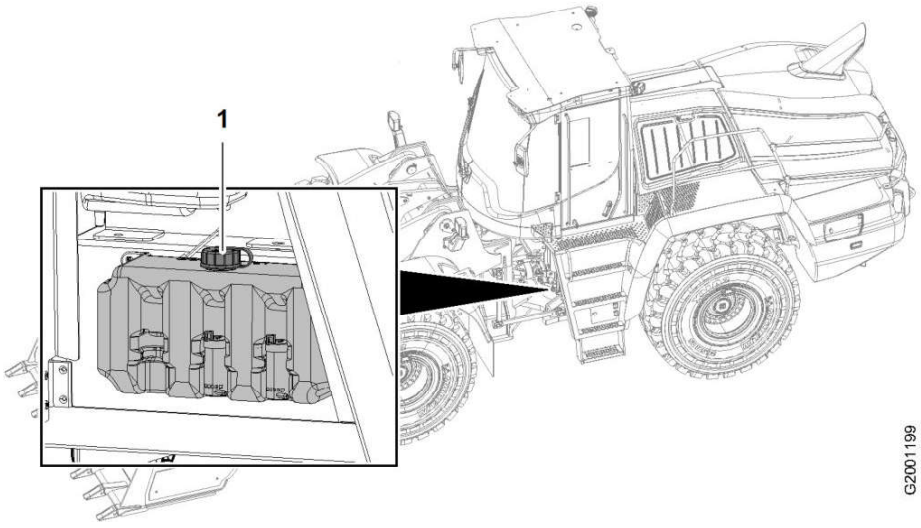


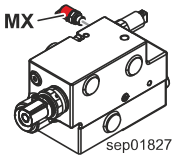
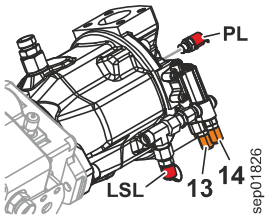
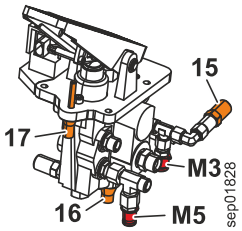
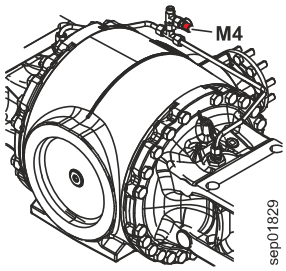
Fig. 220: Windscreen washer system: filling windscreen washer fluid

1 Cover

The filling quantity is approximately 3.5 l.

▶ Open cover **1** on the reservoir.

▶ Top up with standard windscreen washer fluid as necessary.

3. Hydraulic adjustment procedures									
Test / adjustment	**1000 h**	**2000 h**	**Unit**	**Required value**	**Measured**	**Adjusted**	**Adjusting point**	**Test point**	**Figure**
Industrial lift arms control valve block (option): LS-pressure cut-off									
High pressure at full load		○	bar	380±5			12	PA	
Stabilisation module cut-out function									
Cut-out pressure when charging		○	bar	120+60/-10				MX	
Steering system									
Steering pump: LS-pressure cut-off valve									
High pressure at full load		○	bar	210±5			13	PL	
Steering pump: flow regulator (differential pressure)									
Differential pressure ΔP at low idling speed	◊	○	bar	23±1			14	PL/ LSL	
Brake system									
Brake accumulator pressure sensor B19: deviation									
Deviation between pressure gauge and sensor	○	○	bar	<5			15	M3	
Compact brake valve hydro accumulator charging function									
Cut-in pressure	○	○	bar	175±10			16	M3	
Cut-out pressure	○	○	bar	210±10			16	M3	
Service brake pressure									
Brake pressure in 1st brake circuit (front axle)	○	○	bar	95±5			17	M4	
Brake pressure in 2nd brake circuit (rear axle)	○	○	bar	95±5			17	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	

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▶ Select the “Snapshot” function.

Note
The name of the service file contains information that is important for automatic processing of the data.

▶ Do not change the file name.

▶ Save the file.

030.6.4 Cooling system

030.6.4.1 Fan speed proportional solenoid valve

Valid for: L566-1758;

Note
Fan speed proportional solenoid valve does not normally need to be adjusted.

▶ Exclusively check and adjust fan speed proportional solenoid valve if performance of cooling system is insufficient, for troubleshooting or if fan motor or parts of it have been replaced.

Make sure that following requirements are met:
- ❑ Cooling system is cleaned.
- ❑ Hydraulic oil is at operating temperature.
- ❑ Machine is in maintenance position for adjustment procedures.
- ❑ Service mode is activated.
- ❑ Service access is open.

Make sure that following tools are ready:
- ❑ Laptop with Sculi diagnostic software
- ❑ Pressure gauge (250 bar)

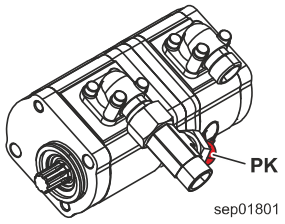

Fig. 232: Fan speed proportional solenoid valve

PK Cooling system high pressure test connection

Preparations

NOTICE
Pressure peak when automatically switching on the reversible fan drive!
Damage to the fan motor.

▶ Make sure the reversible fan drive is deactivated.

Manual calibration of proportional solenoids for 3rd and 4th functions (option)

Note
Calibration of the 3rd and 4th functions is not necessary for normal operation.

▶ Exclusively calibrate 3rd and 4th functions if there are problems actuating the working attachment.

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

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

▶ Start the diesel engine.

▶ Connect the Sculi diagnostic software to the machine.

▶ In the variables editor, select the ***Working hydraulics*** folder.

▶ Select the ***Calibrate angle proportional solenoids*** sub-folder.
▷ The variable ***QRCntrlCirc3a*** shows the current at the proportional solenoid for 3rd function A3.
▷ The variable ***QRCntrlCirc3b*** shows the current at the proportional solenoid for 3rd function B3.
▷ The variable ***QRCntrlCirc4a*** shows the current at the proportional solenoid for 4th function A4.
▷ The variable ***QRCntrlCirc4b*** shows the current at the proportional solenoid for 4th function B4.

▶ Make sure that the parking brake is activated.

▶ Raise the lift arms half way.

▶ Tilt the bucket half way in.

▶ Click the variable ***QRCntrlCirc3a*** and press the *space bar*.
▷ The line is coloured pink.
▷ The variable is forced. 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*: last digit of the value +/- 10

▶ Increase the value of the variable ***QRCntrlCirc3a*** until you notice a slight movement of the corresponding working attachment.

▶ When the movement starts, read the variable ***QRCntrlCirc3a***.

▶ Enter the value you read in the variable ***CRCC3aCurrMoveBegin***.

▶ Unforce the variable ***QRCntrlCirc3a***.

▶ Repeat the process for 3rd function B3 with the variable ***QRCntrlCirc3b***. Enter the value you read in the variable ***CRCC3bCurrMoveBegin***.

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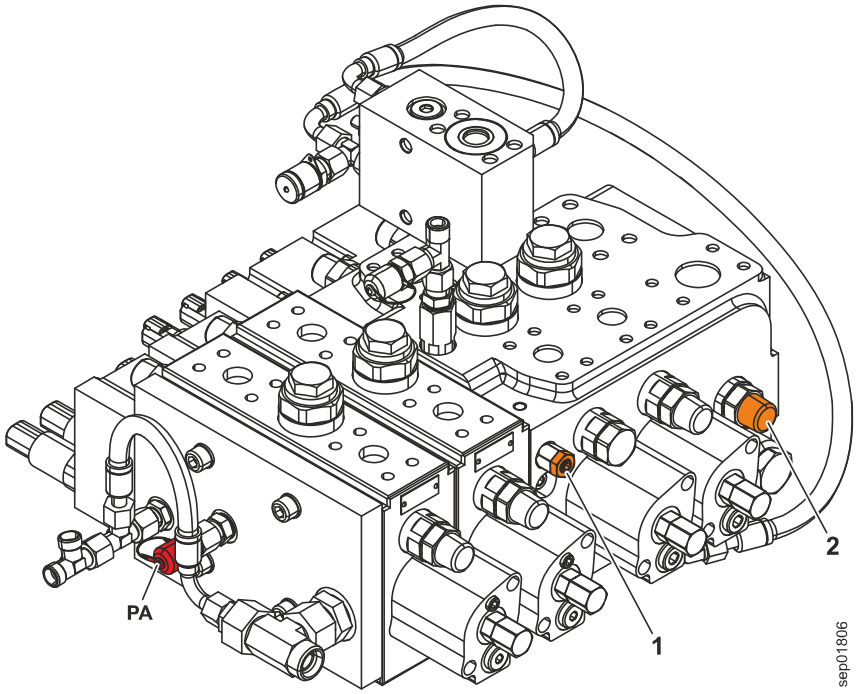

Fig. 241: Z-bar kinematics control valve block: primary pressure relief valve

1 LS-pressure cut-off

2 Primary pressure relief valve

PA Working pump high pressure test connection

Preparations

- ▶ Connect a pressure gauge (600 bar) to high pressure test connection **PA** on control valve block.
- ▶ Turn adjusting screw on LS-pressure cut-off valve **1** by exactly one turn clockwise.
  - ▷ Opening pressure of LS-pressure cut-off valve is above opening pressure of primary pressure relief valve.

Checking and adjusting

- ▶ Start diesel engine.
- ▶ Raise lift arms as far as they will go.
- ▶ Fully activate lifting function at low idling speed.
- ▶ While doing so, check whether high pressure **PA** corresponds to specified value.

Description	Unit	Value
High pressure **PA**	bar	390 $^{\pm 5}$

If required value is not reached:

- ▶ Set bucket down on ground on its teeth or cutting edge.
- ▶ Turn off diesel engine and take out ignition key.
- ▶ Turn adjusting screw of primary pressure relief valve **2**.

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▶ Check and top up nitrogen filling of ride control hydro accumulators **3**. (For more information see: Hydro accumulator: checking and topping up nitrogen filling, page 030-213)

▶ Tighten relief valve **2** with tightening torque 3.5 Nm.

▶ Tighten screw plug **1** to a tightening torque of 7 Nm.

030.6.6 Hydraulic components

030.6.6.1 Hydro accumulator: checking and topping up nitrogen filling

Valid for: L566-1758;

Make sure that following tools are ready:
❑ Testing and filling device for hydro accumulator
❑ Leak spray

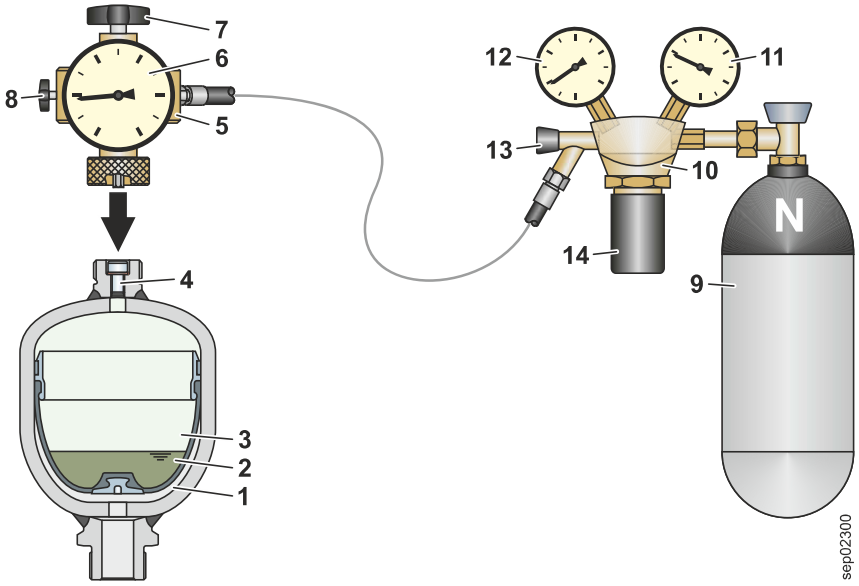

Fig. 248: Hydro accumulator: checking and topping up nitrogen filling

1	Oil side of hydraulic accumulator	**8**	Drain valve
2	Oil filling on nitrogen side (option)	**9**	Nitrogen cylinder
3	Nitrogen side of hydraulic accumulator	**10**	Pressure reducer
4	Screw plug	**11**	Cylinder pressure gauge
5	Testing and filling device	**12**	Outlet pressure gauge
6	Filling pressure gauge	**13**	Pressure reducer outlet valve
7	Handwheel for screw plug	**14**	Pressure control valve

▶ Permanently connect hydro accumulator with hydraulic tank or atmosphere (for example, via relief valve).

If oil side of hydro accumulator cannot be permanently connected with hydraulic tank or atmosphere:

▶ Depressurise and remove hydro accumulator.

▶ Unscrew protective cap of hydro accumulator.

▶ Place hydro accumulator so that screw plug **4** points up.
▷ Oil filling on nitrogen side **2** does not flow out.

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Manual calibration of position sensor of emergency spool valve

Note

Before calibration of position sensor of emergency spool valve, calibrate position sensor of main spool valve!

- ▶ Engage articulation lock (for further information see: operator's manual). If necessary, deactivate service mode and then reactivate it.
- ▶ Fold up left armrest and then fold back down.
  - ▷ Joystick steering is deactivated.
- ▶ Set variable ***MXJSEmergVlvPosAdjStart*** to ***1***.
  - ▷ Calibration function is active for 8 seconds.

WARNING
Accidental steering movements!
Injury.

- ▶ Make sure that articulation lock is engaged.

- ▶ With joystick steering deactivated and within 8 seconds, move **joystick** all the way left and right.
- ▶ Wait until the variable ***MXJSEmergVlvPosAdjStart*** returns to ***0***.
  - ▷ Calibration is completed.
- ▶ Disengage articulation lock (for further information see: operator's manual).

Automatic calibration of proportional solenoids for main spool valve and emergency spool valve

Note

Before calibration of proportional solenoids of emergency spool valve, calibrate position sensor of main spool valve!

- ▶ Make sure that the articulation lock is disengaged.
- ▶ Start diesel engine.
- ▶ Move lift arms into transport position.
- ▶ Fold up left armrest.
  - ▷ Joystick steering is deactivated.

WARNING
Automatic machine movements!
Injury.

- ▶ Make sure there is nobody in danger area around machine.

- ▶ Set variable ***MXJSSteerValveAdjMvBg*** to ***1***.
  - ▷ Calibration takes place automatically.
  - ▷ The machine automatically performs from minimal steering movements.
  - ▷ The calibration can be cancelled by steering with the steering joystick or starting up.
- ▶ Wait until the variable ***MXJSSteerValveAdjMvBg*** returns to ***0***.

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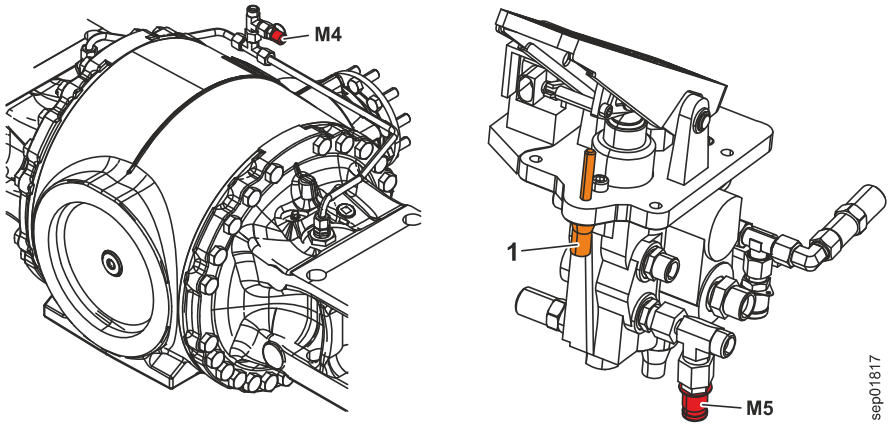

Fig. 263: Service brake pressure

1 Stop bolt

M4 Brake pressure test connection for 1st brake circuit

M5 Brake pressure test connection for 2nd brake circuit

▶ Connect a pressure gauge (250 bar) to the 1st brake circuit pressure test connection **M4** on the front axle.

▶ Connect a pressure gauge (250 bar) to the 2nd brake circuit pressure test connection **M5** on the compact brake valve.

▶ Start the diesel engine.

▶ Press the compact brake valve down as far as it will go and hold it there.

▶ Check that the brake pressure in both brake circuits has the required value.

Description	Unit	Value
Brake pressure in 1st brake circuit **M4** (front axle)	bar	95 $^{\pm 5}$
Brake pressure in 2nd brake circuit **M5** (rear axle)	bar	95 $^{\pm 5}$

If the required values are not reached:

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

▶ Adjust the stop screw **1**.

▶ Repeat the procedure and adjustment until the required values are attained.

If the required values are reached:

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

▶ Disconnect the pressure gauge from the 1st brake circuit pressure test connection **M4**.

▶ Disconnect the pressure gauge from the 2nd brake circuit pressure test connection **M5**.

030.6.8.4 Service brake hydro accumulator capacity

Valid for: L566-1758;

Make sure that the following requirements are met:

❑ Hydraulic oil is at operating temperature.

❑ Machine is in maintenance position for adjustment procedures.

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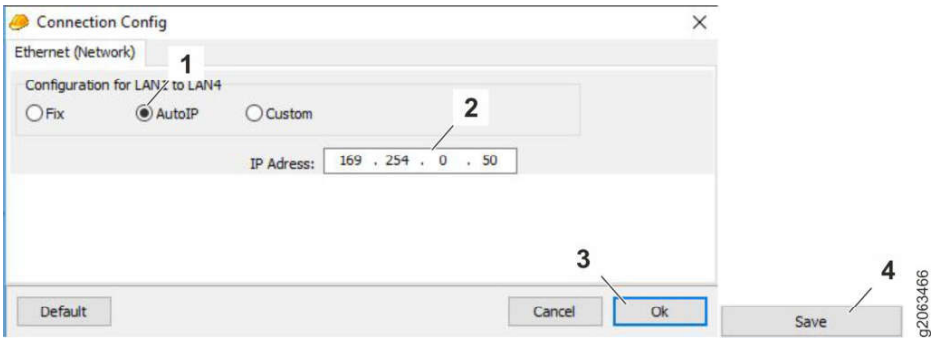

Fig. 278: Connection settings

1 "AutoIP" checkbox
2 IP address
3 "OK" function
4 "Speichern" function

▶ Make sure that "AutoIP" checkbox **1** is selected.

▶ Make sure that IP address **2** is set: 169.254.0.50

▶ Select "OK" function **3**.

▶ Select "Speichern" function **4**.
▷ Connection settings are checked.

Creating "Master 5 Ethernet" address

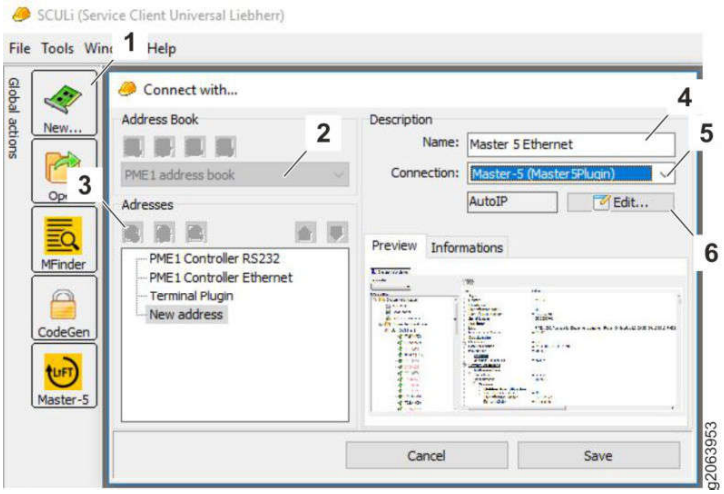

Fig. 279: Creating "Master 5 Ethernet" address

1 "New" function
2 "PME1 address book" address book
3 "New address" function
4 Designation of new address
5 Connection "Master-5 (Master 5Plugin)"
6 "Edit" function

▶ Run Sculi diagnostic software.

▶ Select "New" function **1**.

▶ Select "PME1 address book" address book **2**.

▶ Select "New address" function **3**.

▶ Name new address book: Master5 – Ethernet

▶ Select "Master-5 (Master 5Plugin)" connection **5**.

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Service code	Cause	Remedy
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 requirements are fulfilled: Start calibration again. Do not operate any functions during calibration.
50CA (2nd attempt)	Faulty hydrostat calibration.	Contact technical customer service department.

Tab. 86: 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 diesel engine.

▶ Set the variable ***MXTCUStartClutchCalibRev*** to ***1***.
  ▷ The calibration is carried out automatically (duration up to 15 minutes).
  ▷ The *calibration active* symbol field **1** in the display lights up.

Note

If the calibration does not start (symbol field *calibration active* is not lit):

▶ Perform basis calibration. (For more information see: Gearbox: basic calibration, page 030-249)

▶ Wait until the variable ***MXTCUStartClutchCalibRev*** 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 requirements are fulfilled: Start calibration again.

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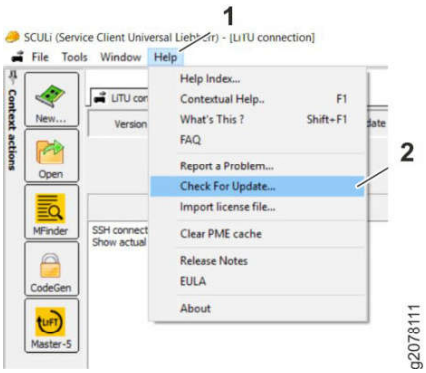

Fig. 295: Checking software version of SCULi diagnostic software

1 "Help" function **2** "Check for update" function

▶ Select "Help" **1** function.

▶ Select "Check for update" function **2** and perform software update of diagnostic software if necessary.

Updating software of LiDAT module

▶ Make sure that the latest software version of the SCULi diagnostic software is installed.

▶ Connect to the LiDAT module. (For more information see: LiDAT: connecting to LiDAT module, page 030-260)

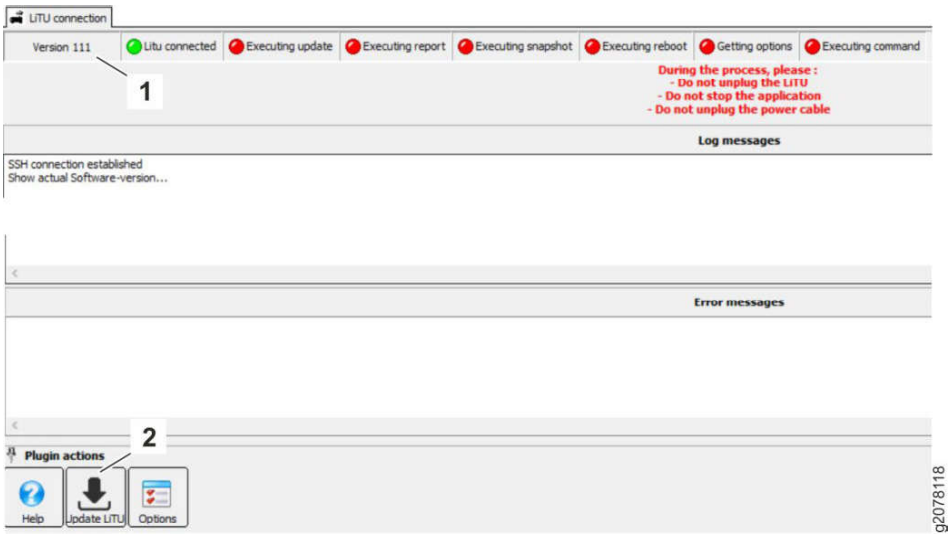

Fig. 296: Software update

1 Current software version **2** "Software update" function

The current software version can be found at the position **1**.

▶ Select "Software update" function **2**.

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- ▶ Select “Load Design” function **3**.
- ▶ Select prepared folder “Designs”.
- ▶ Select and open machine-specific design data.
  - ▷ Design data are loaded.

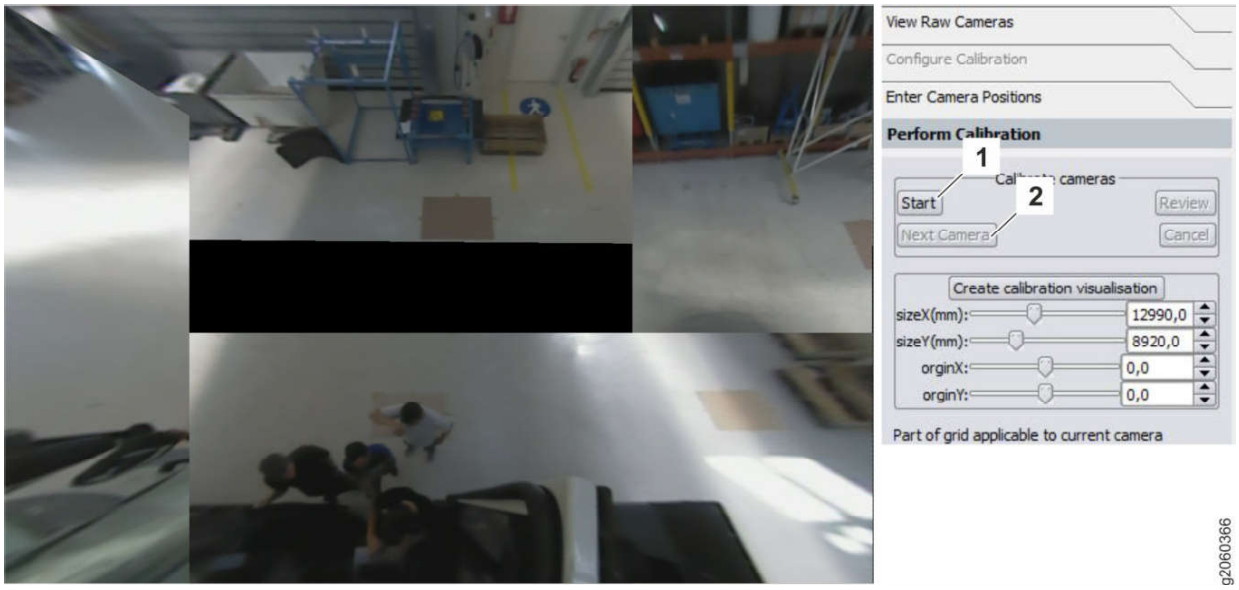

Fig. 312: Starting calibration

1 “Start” function **2** “Next Camera” function

- ▶ Select “Start” function **1**.

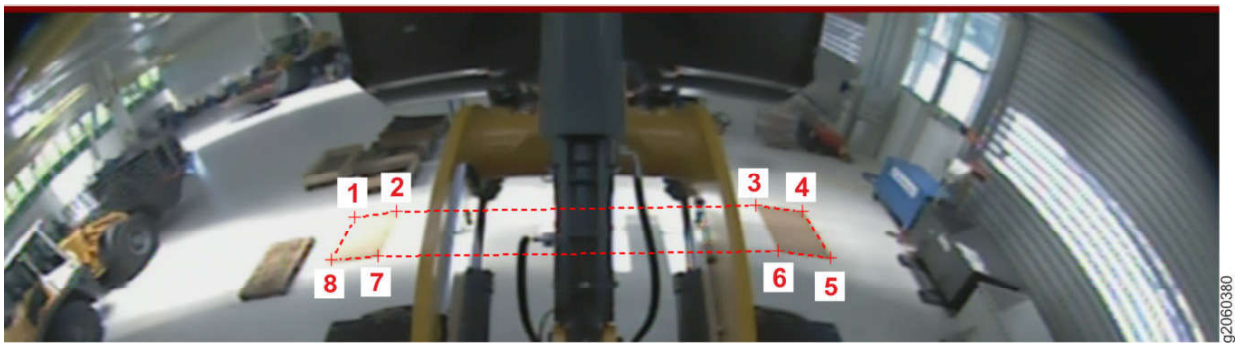

Fig. 313: Front camera

- ▶ Mark corner points of mats.
  - ▷ Observe order according to graphic.
  - ▷ Mark corner points from left to right.
  - ▷ Marks can be moved by clicking again.
  - ▷ Use “ALT” button to enlarge image at position of mouse cursor.
- ▶ Select “Next Camera” function.

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040.1 Engine

040.1.1 Diesel engine overview

Valid for: L566-1758;

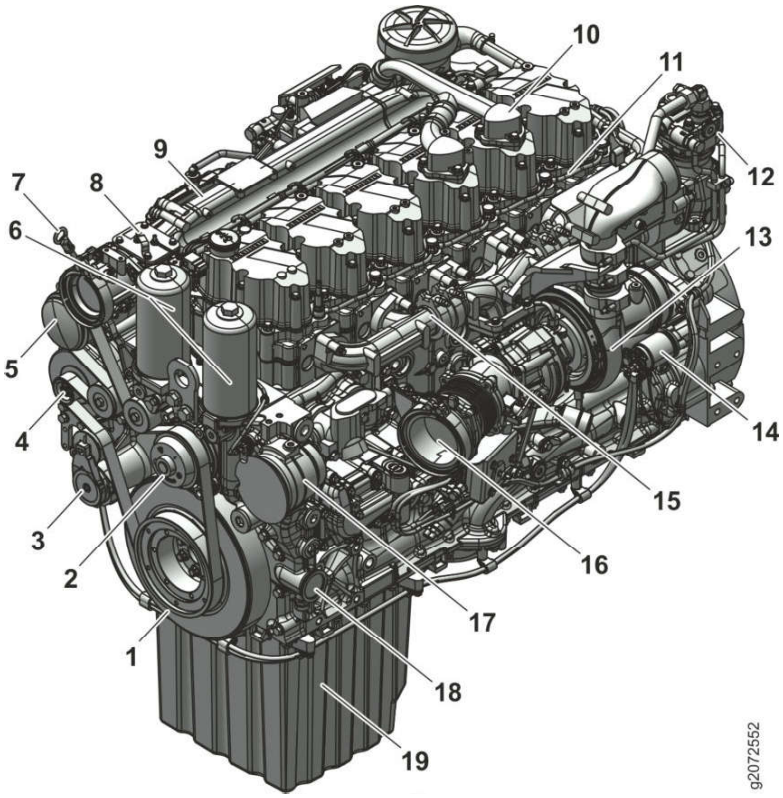

Fig. 324: Diesel engine overview

1	Torsional vibration damper	**11**	Bleeder line
2	Water pump	**12**	Compressor
3	Tensioning device	**13**	Turbocharger
4	Alternator	**14**	Starter
5	Air conditioning compressor	**15**	Exhaust pipe
6	Oil filter	**16**	Exhaust port
7	Dipstick	**17**	Thermostat housing
8	Heating flange	**18**	Coolant from radiator
9	Air intake pipe	**19**	Oil pan
10	Crankcase bleeding line		

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After heatsink **5**, engine oil continues to flow to oil filters.

At low ambient temperatures, the viscosity of the engine oil changes. The engine oil gets thicker. This increases the pressure in the lubrication system. The bypass valve for oil cooler **4** opens starting from a pressure of 3 bar. As a result, the engine oil does not flow through the heatsink **5**. The cooling effect is eliminated, the operating temperature of engine oil is reached faster.

Specifications of bypass valve for oil cooler	
Opening pressure	3 bar

Tab. 95: Specifications of bypass valve for oil cooler

1.3 Cold start valve

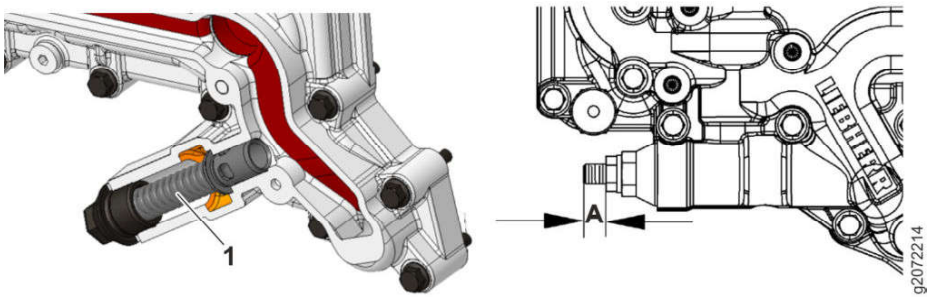

Fig. 335: Cold start valve

1 Cold start valve **A** Adjustment dimension

At low ambient temperatures, the viscosity of the engine oil changes. The engine oil gets thicker. This can cause pressure peaks in the lubrication circuit when the diesel engine starts.

The cold start valve **1** protects the lubrication circuit from excess oil pressure. If the oil pressure exceeds the set value, engine oil will be drained via the cold start valve **1** into the oil pan. The pressure drops.

Specifications for cold start valve	
Opening pressure	9 bar
Adjustment dimension **A**	13 $^{\pm 0.5}$ mm

Tab. 96: Specifications for cold start valve

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040.1.6.2 Vacuum switch

Valid for: L566-1758;

1.1 Layout

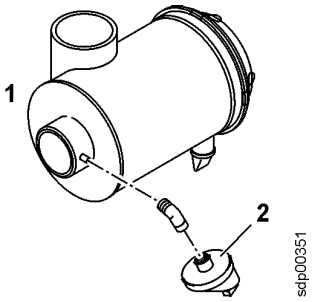

Fig. 345: Layout of vacuum switch

The vacuum switch **2** is fitted on the air filter **1**.

2.1 Function

The vacuum switch **2** monitors the pressure ratio between the turbocharger and air filter **1**.

When the filters are dirty (excessive vacuum detected), the switch triggers the air filter contamination symbol field in the display unit.

When there is neutral pressure, the vacuum switch is closed and opens when the vacuum reaches 50 mbar. If there is already an interruption with the ignition ON, this is recognised as a fault (cable rupture). If the vacuum switch opens during operation or the line is interrupted, this signifies the air filter is contaminated.

040.1.7 Exhaust system

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040.1.7.2 Exhaust gas treatment (stage IV / tier 4f): overview

Valid for: L566-1758;

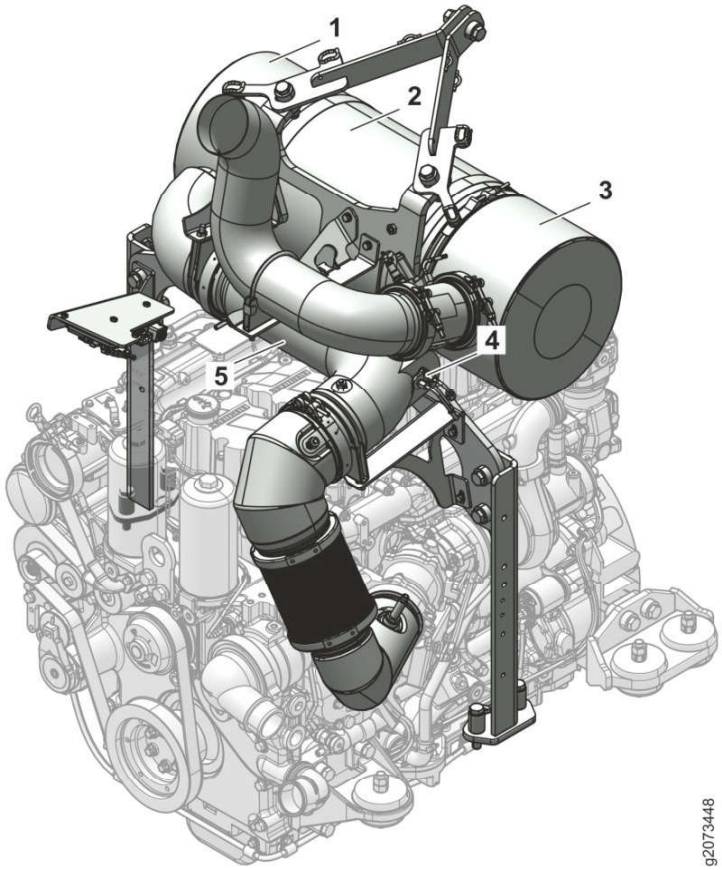

Fig. 353: Overview of exhaust gas treatment system

1 Input module
2 SCR catalytic converter
3 Output module
4 Diesel exhaust fluid nozzle
5 Mixing section

2.1 Basic function

The statutory emissions standards (stage IV, Tier 4f) are fulfilled using a pure SCR strategy.

The engine management system is set so that high combustion temperatures can be reached. This reduces the particulate emissions of the engine. This means that a diesel particulate filter is not required in order to meet the missions standards.

High combustion temperatures have the drawback that NO_x emissions are higher. NO_x are nitrogen oxides, the output of which is regulated by emissions standards.

To reduce NO_x emissions, an SCR system is used.

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1.2 NH_3 sensor

Fig. 365: NH_3 sensor

1 NH_3 sensor **2** NH_3 sensor controller B783

The NH_3 sensor **1** measures the ammonia content in the exhaust at the outlet of the SCR catalytic converter.

If the NH_3 sensor fails, a substitute value of 0 ppm is assumed. A power reduction is activated.

1.3 Differential pressure sensor

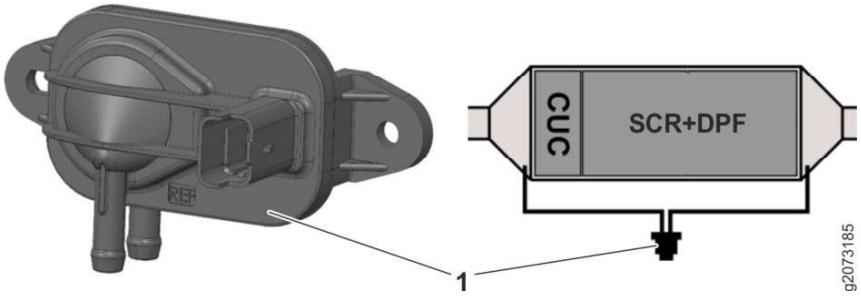

Fig. 366: Differential pressure sensor

1 Differential pressure sensor B722

The differential pressure sensor B722 **1** is only installed in machines with diesel particulate filter (DPF).

The differential pressure sensor is used to calculate the soot load of the diesel particulate filter. The soot load is calculated from the pressure difference between the input of the DPF and the output of the DPF.

The differential pressure sensor outputs a voltage signal between 0.5 V and 4.5 V. This corresponds to a measuring range of 0 bar to 0.3 bar.

040.1.8 Compressed air system

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050 Cooling system

Contents

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4 Secondary piston
5 Throttle
9 Return flow to collector pipe

BMK	Function
Y13	Fan speed proportional solenoid

Tab. 110: Equipment codes

The fan motor drives the fan blade.

2.2 Fan speed proportional solenoid valve

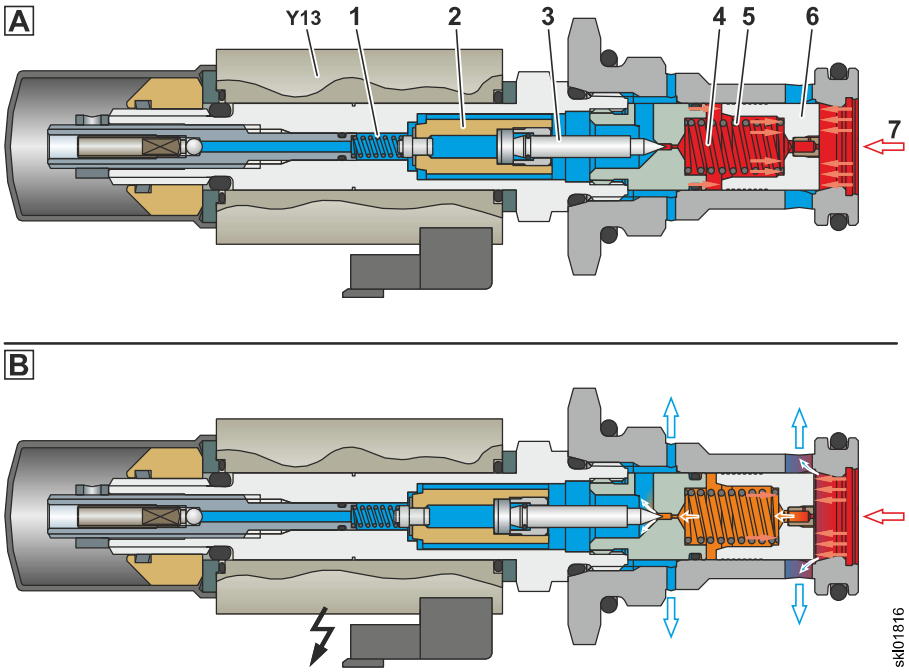

Fig. 384: Fan speed proportional solenoid valve de-energised / fan speed proportional solenoid valve energised

1 Compression spring for secondary piston
2 Stay
3 Secondary piston
4 Pressure chamber
5 Compression spring for primary piston
6 Primary piston
7 Oil supply via fan pump

BMK	Function
Y13	Fan speed proportional solenoid

Tab. 111: Equipment codes

Fan speed proportional solenoid valve regulates fan speed by directing oil past gear motor. The more oil that flows through bypass, the lower output speed.

Central control unit energises fan speed proportional solenoid **Y13**. Resulting magnetic force pushes stay **2** against spring force of compression spring **1**. This opens secondary piston **3** and allows hydraulic oil to flow out of pressure chamber **4**. Pressure of fan pump **7** can then move primary piston **6** and some of

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050.5.2 Fan reversal valve block

Valid for: L566-1758;

1 Layout

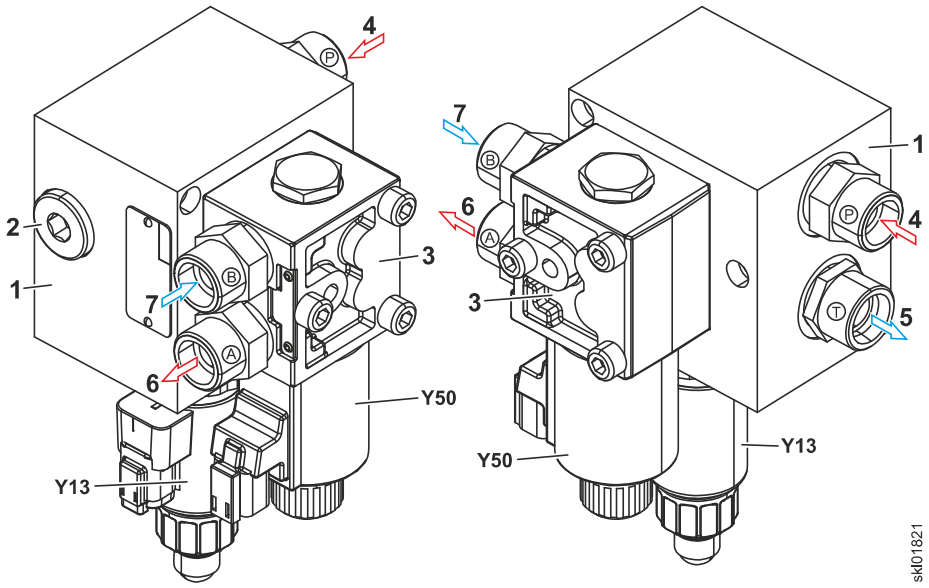

Fig. 390: Fan reversal valve block (from front left and from rear right)

1 Fan reversal valve block
2 Check valve
3 Solenoid valve for fan reversal
4 Oil supply via fan pump
5 Return flow to collector pipe
6 Connection for fan motor (high pressure when fan reversal deactivated)
7 Connection for fan motor (high pressure when fan reversal activated)

BMK	Function	BMK	Function
Y13	Fan speed proportional solenoid	**Y50**	Fan reversal solenoid

Tab. 120: Equipment codes

The fan reversal valve block is mounted on the right-hand side of the vehicle in the rear section below the cooler unit.

2 Function

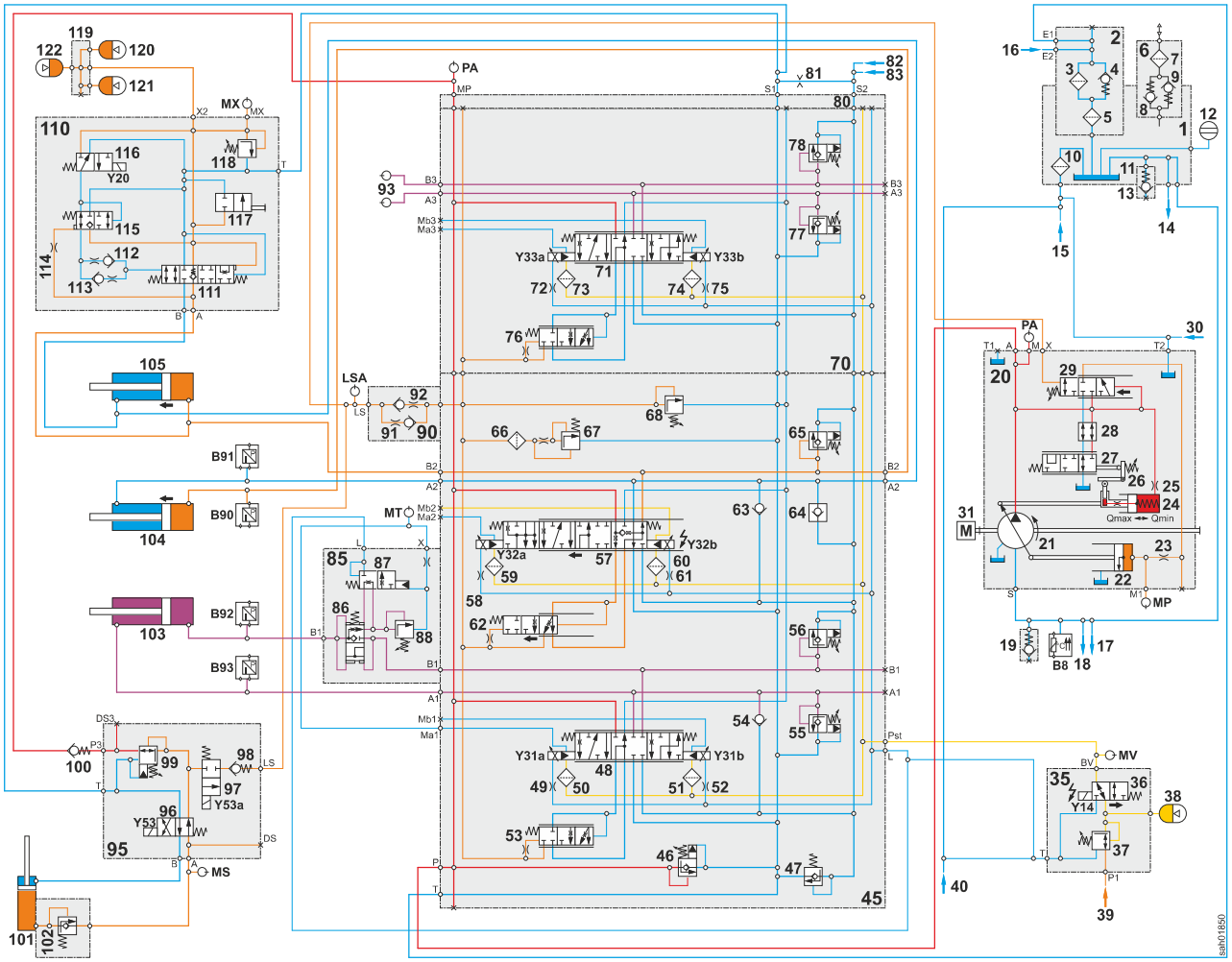

Fig. 395: Diagram of Z-bar kinematics working hydraulics (lift function actuated)

1	**Hydraulic tank**	**40**	Compact brake valve return flow	**82**	Return flow from compact brake valve (control valve block housing preheating)
2	**Return filter**	**45**	**Control block for Z-bar kinematics**	**83**	Return flow of stroke limit damping pressure relief valves
3	Main filter element 10 µm	**46**	Primary pressure relief valve	**85**	**Anti-drift valve**
4	Bypass valve 2.5 bar	**47**	Preload valve for 2nd tank duct	**86**	Seat valve
5	Strainer mesh 100 µm	**48**	Tilt cylinder spool valve	**87**	Release valve
6	**Breather filter**	**49**	Throttle 1.0 mm	**88**	Pressure relief valve
7	Fine filter	**50**	Strainer	**90**	**Throttle check valve**
8	Outlet valve 0.65 bar	**51**	Strainer	**91**	Throttle 1.2 mm
9	Inlet valve 0.03 bar	**52**	Throttle 1.0 mm	**92**	Throttle 0.6 mm
10	Leak oil strainer 100 µm	**53**	Tilt cylinder pressure balance	**93**	Quick coupler for 3rd function (option)
11	Steel tank	**54**	Replenishing valve for tilting out	**95**	**Valve block for quick coupler (option)**

See next page for continuation of the image legend

2 Function

2.1 Basic function

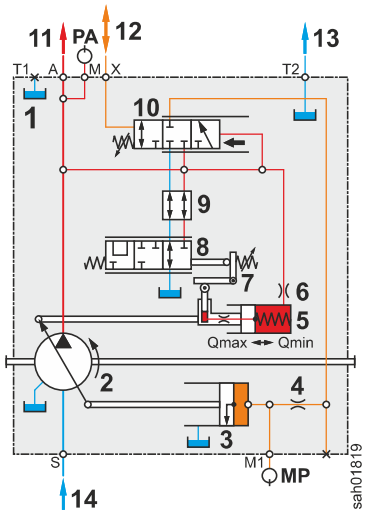

Fig. 400: Hydraulic diagram of the working pump (diesel engine is running)

1	**Working pump**	**8**	Power regulator
2	Axial piston rotary group	**9**	Dummy piston
3	Return piston	**10**	Flow regulator
4	Throttle	**11**	Oil supply for control valve block
5	Positioning piston	**12**	Load sensing signal from control valve block
6	Throttle	**13**	Leak oil to leak oil strainer
7	Regulating lever	**14**	Suction port from hydraulic tank

Name	Test point	Name	Test point
MP	Working pump return pressure	**PA**	Working pump high pressure

Tab. 135: Test points

Working pump draws up oil from hydraulic tank **14** and pumps it to control valve block **11**.

Displacement of working pump depends on engine speed and swivel plate angle. Working pump is regulated via load sensing signal from control valve block **12**.

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1 Control block
2 Primary pressure relief valve
3 Preload valve for 2nd tank duct
4 Tilt cylinder spool valve
5 Throttle 1.0 mm
6 Strainer
7 Strainer
8 Throttle 1.0 mm
9 Tilt cylinder pressure balance
10 Replenishing valve for tilting out
11 Secondary pressure relief valve for tilting out
12 Secondary pressure relief valve for tilting in
13 Lift cylinder spool valve
14 Throttle 0.8 mm
15 Strainer
16 Strainer
17 Throttle 0.8 mm
18 Lift cylinder pressure balance
19 Feeder valve for lowering
20 Feeder valve for lowering
21 Secondary pressure relief valve for lifting
22 Strainer
23 Flow regulating valve
24 LS-pressure cut-off
25 Control valve block section for 3rd function (option)
26 Spool valve for 3rd function (option)
27 Throttle 1.0 mm
28 Strainer
29 Strainer
30 Throttle 1.0 mm
31 Pressure balance for 3rd function
32 Secondary pressure relief valve for 3rd function A3
33 Secondary pressure relief valve for 3rd function B3
35 Control valve block section for 4th function (option)
36 Spool valve for 4th function (option)
37 Throttle 1.0 mm
38 Strainer
39 Strainer
40 Throttle 1.0 mm
41 Pressure balance for 4th function
42 Secondary pressure relief valve for 4th function A4
43 Secondary pressure relief valve for 4th function B4
45 End section
46 Orifice 1.0 mm
50 Anti-drift valve
51 Seat valve
52 Release valve
53 Pressure relief valve
55 Throttle check valve
56 Throttle 1.2 mm
57 Throttle 0.6 mm
60 Return flow from return filter
61 Oil supply from working pump
62 Connection to ring side of tilt cylinder
63 Connection to piston side of tilt cylinder
64 Connection to ring side of lift cylinder (left lift cylinder)
65 Connection to piston side of right lift cylinder and stabilization module
66 Load sensing signal for working pump
67 Connection for 3rd function A3
68 Connection for 3rd function B3
69 Connection for 3rd function A4
70 Connection for 3rd function B4
71 Return flow from stabilization module
72 Return flow from compact brake valve (control valve block housing preheating)
73 Return flow of stroke limit damping pressure relief valves
74 Connection to piston side of lift cylinder (left lift cylinder)
75 Connection to ring side of right lift cylinder and stabilization module
76 Control oil from pilot control valve block
77 Return flow to pilot control valve block

Name	Test point	Name	Test point
LSA	Load sensing signal for working pump	**PA**	Working pump high pressure
MT	Servo pressure for tilt-out function		

Tab. 139: Test points

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BMK	Function	BMK	Function	BMK	Function
Y31a	Proportional solenoid for tilting out	**Y32b**	Proportional solenoid for lifting	**Y34a**	Proportional solenoid for 4th function A4 (option)
Y31b	Proportional solenoid for tilting in	**Y33a**	Proportional solenoid for 3rd function A3 (option)	**Y34b**	Proportional solenoid for 4th function B4 (option)
Y32a	Proportional solenoid for lowering	**Y33b**	Proportional solenoid for 3rd function B3 (option)		

Tab. 145: Equipment codes

Functions correspond to those of control valve block for Z-bar kinematics. (For more information see: 060.4.2 Function, page 060-28)

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The positions of the lift arms and bucket are identified by the lift arm position angle sensor **B61** and the bucket position angle sensor **B60**. The signals from these angle sensors are read by the control lever CAN module **A26**. The control lever CAN module sends this information via the CAN line **CAN 2** to the central control unit.

The current travel speed and travel direction of the machine are sent by the transmission control unit (TCU) **A25** to the central control unit. The transmission takes place over the CAN line **CAN 4** via a J1939 protocol.

The ride control solenoid **Y20** is activated by the central control unit via the output module **A17a**.

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2.2 Pipe break protection for ride control

Because pipe break protection system cuts off lift cylinder piston side when working hydraulics are actuated, pipe break protection must be opened to operate ride control. Solenoid for release of ride control **Y200** together with solenoid for ride control are energized for this purpose **Y20**. The ride control release solenoid valve **59** then opens the pipe break protection valves **62** and **72** with pressure from the pilot control valve block **1**.

2.2.1 Variable for pipe break protection

If a pipe break protection is installed, variable ***CXEHLFDGeoCondition*** must be set to ***0***. As a result, operating mode “Ride control activated with working attachment tilted in” is deactivated (for more information see: operator's manual).

This is necessary because with active ride control, pipe break protection is unlocked. With operating mode “Ride control activated with working attachment tilted in”, ride control can also be activated with stationary machine when a person is present under lift arms.

060.9.2 Valve block for pipe break protection

Valid for: L566-1758;

1 Layout

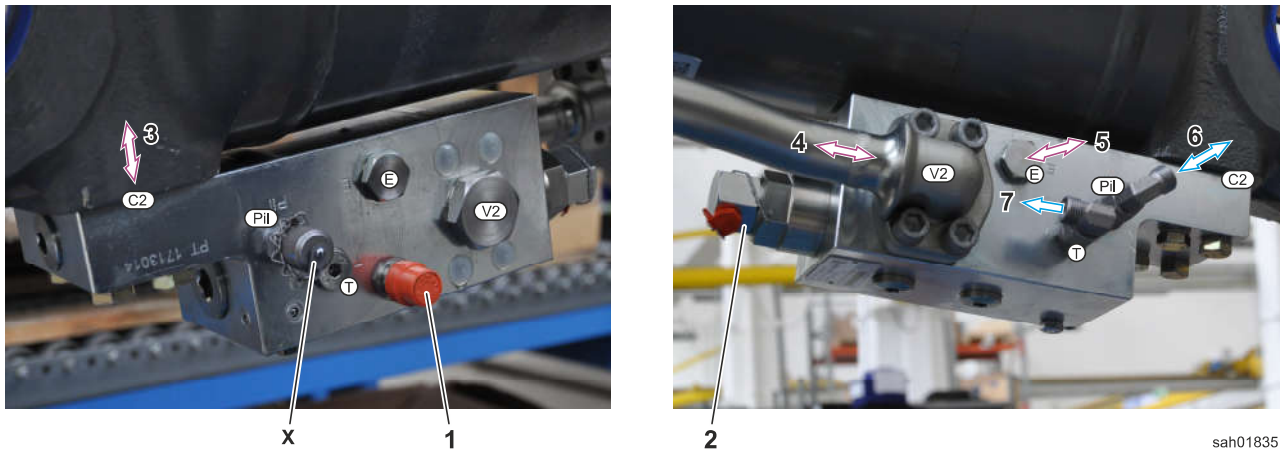

Fig. 425: Valve block for pipe break protection

1	Safety valve	**4**	Oil supply through control valve block	**7**	Return flow to leak oil strainer
2	Pipe break protection valve	**5**	Connection to other valve block for pipe break protection (lift cylinder only)		
3	Connection for hydraulic cylinder	**6**	Servo pressure from control valve block		

Name	Test point
X	Venting connection

Tab. 167: Test points

LBH/12252624/03/211-20200326_145803/en

BMK	Function
B8	Hydraulic oil temperature sensor

Tab. 173: Equipment codes

Hydraulic tank stores hydraulic oil for following systems:
- Fan drive
- Working hydraulics
- Steering system
- Brake system

Integrated filter unit and leak oil strainer clean hydraulic oil.

Breather filter compensates pressure fluctuations and maintains a slight preload pressure in hydraulic tank.

080.2.2 Steel tank

Valid for: L566-1758;

1 Layout

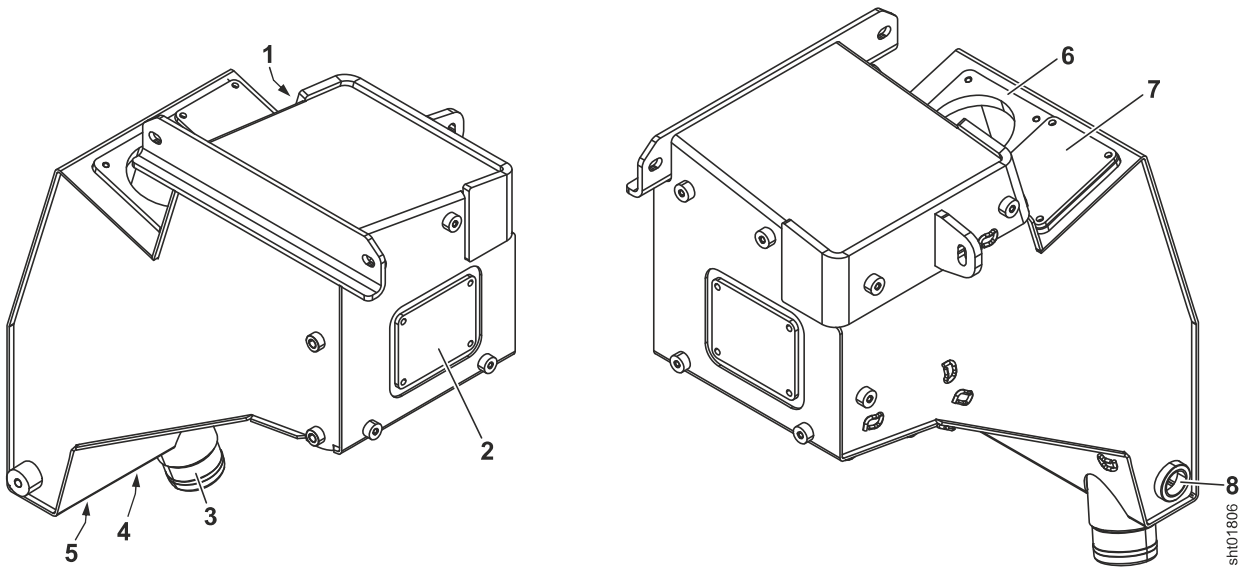

Fig. 431: Steel tank (from front left and from rear right)

1 Port for breather filter
2 Maintenance hatch
3 Suction port for working pump, emergency steering pump, fan pump and brake pump
4 Port for drain valve
5 Port for leak oil strainer
6 Port for return filter
7 Maintenance hatch
8 Steering pump suction port

The steel tank is made of welded steel plates.

The steel tank contains the suction ports for the hydraulic pumps.

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8 Working pump

9 Valve block for steering system

17 Left steering cylinder with stroke limit damping

18 Right steering cylinder with stroke limit damping

25 Pressure relief valve for stroke limit damping

26 Pressure relief valve for stroke limit damping

Name	Test point	Name	Test point	Name	Test point
LSL	Load sensing signal for steering pump (option)	**PL/**	Steering pump high pressure	**PL1**	High pressure for steering pump or emergency steering pump

Tab. 176: Test points

BMK	Function	BMK	Function
B3	Emergency steering pressure switch	**B8**	Hydraulic oil temperature sensor
B3a	Emergency steering check pressure switch	**M8**	Electric motor for emergency steering pump

Tab. 177: Equipment codes

The steering system consists of the following components:
- Hydraulic tank (For more information see: 080.2.1 Overview of hydraulic tank, page 080-5)
- Steering pump (For more information see: 090.2 Steering pump, page 090-8)
- Servostat (For more information see: 090.3 Servostat, page 090-14)
- Steering cylinder (For more information see: 090.4.1 Steering cylinder, page 090-17)
- Steering stabilisation valve block (For more information see: 090.4.2 Steering stabilisation valve block, page 090-20)
- Emergency steering (For more information see: 090.5.1 Emergency steering overview, page 090-23)
- Hydraulic oil cooler

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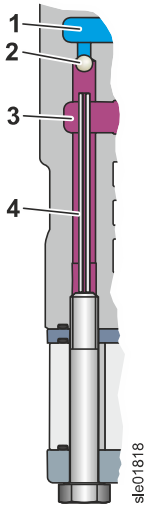

Fig. 453: Replenishing valve: sectional view

1	Connection to tank port	**3**	Connection to steering cylinder
2	Check valve	**4**	Pin

2 Function

2.1 Basic function

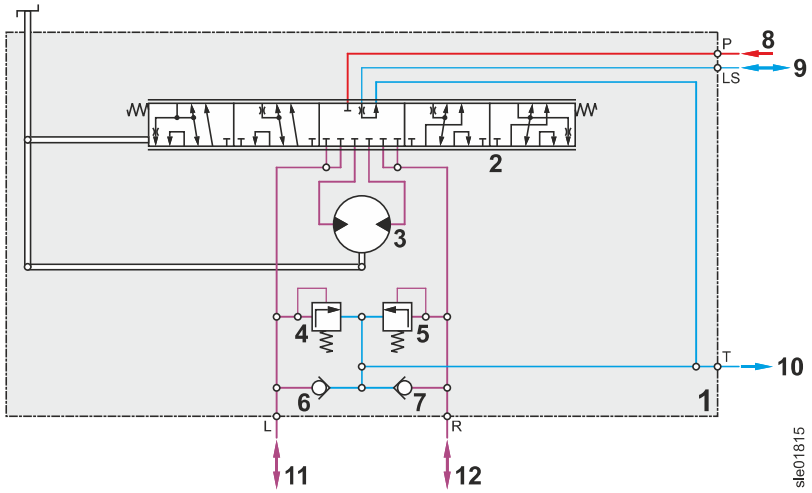

Fig. 454: Servostat: hydraulic diagram (diesel engine is running)

1	**Servostat**	**7**	Feeder valve for steering to left
2	Valve spool	**8**	Oil supply from steering pump
3	Metering pump	**9**	Load sensing signal to working hydraulics pump
4	Secondary pressure relief valve for steering to left	**10**	Return flow to collector pipe
5	Secondary pressure relief valve for steering to right	**11**	Connection for steering to left
6	Feeder valve for steering to left	**12**	Connection for steering to the right

Steering pump **8** supplies oil to servostat **1**. When steering wheel is turned, valve spool **2** directs oil to metering pump **3**. The amount of oil directed depends on how

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

Tab. 185: Test points

BMK	Function	BMK	Function	BMK	Function
B3	Emergency steering pressure switch	B3a	Emergency steering check pressure switch	M8	Electric motor for emergency steering pump

Tab. 186: Equipment codes

Emergency steering system supplies steering system with oil for a short time if steering pump fails.

To do so, emergency steering pump **6** draws oil from hydraulic tank **1** and pumps it through steering system valve block **9** to servostat **12**.

090.5.2 Emergency steering pump

Valid for: L566-1758;

1 Layout

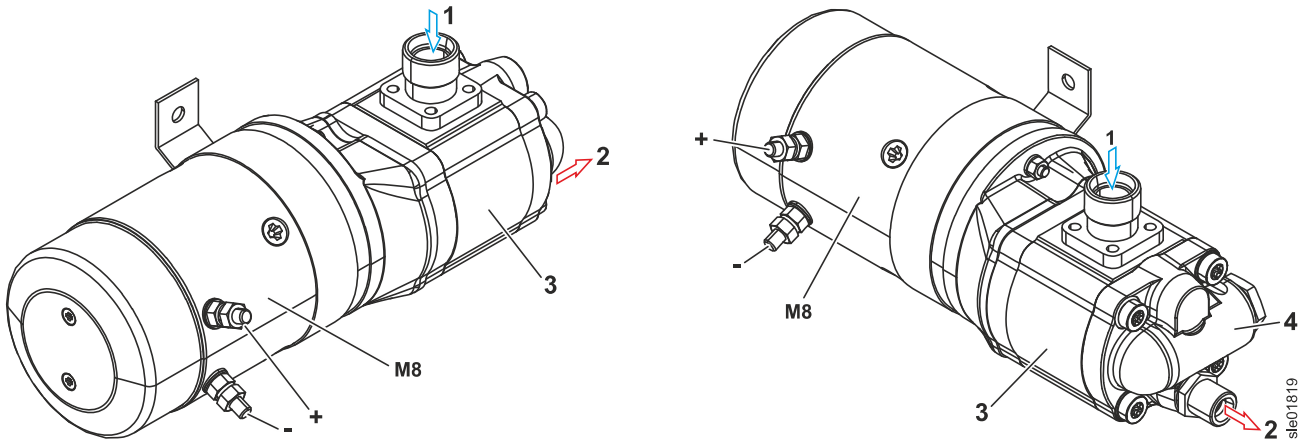

Fig. 466: Emergency steering pump (from front left and from front right)

1 Suction port from hydraulic tank
2 Oil supply to servostat
3 Gear pump
4 Pressure relief valve

BMK	Function
M8	Electric motor for emergency steering pump

Tab. 187: Equipment codes

Emergency steering pump is mounted in frame of rear section level with right ballast weight.

Emergency steering pump consists of a gear pump **3** with a pressure relief valve **4** and electric motor **M8**.

090.6 Joystick steering

090.6.1 Joystick steering: overview (combined with steering wheel steering)

Valid for: L566-1758;

This equipment is optional.

1 Layout

Joystick steering consists of following components:
- Hydraulic tank (For more information see: 080.2.1 Overview of hydraulic tank, page 080-5)
- Steering pump (For more information see: 090.2 Steering pump, page 090-8)
- Servostat (For more information see: 090.3 Servostat, page 090-14)
- Joystick steering control valve block (For more information see: 090.6.3 Joystick steering control block, page 090-42)
- Steering cylinder (For more information see: 090.4.1 Steering cylinder, page 090-17)
- Steering stabilisation valve block (For more information see: 090.4.3 Valve block for steering stabilisation (without steering wheel steering), page 090-21)
- Emergency steering (see: fig. 464, page 090-23)
- Hydraulic oil cooler

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5 Throttle check valve
6 Return flow to collector pipe
7 Oil supply from steering pump
12 Load sensing signal to working hydraulics pump
13 Servo oil strainer for main spool valve
14 Emergency spool valve
19 Shuttle valve 2

Name	Test point
M A1	Servo pressure for steering to the left (main spool valve) A)

Tab. 198: Test points

A) Thread M10x1

BMK	Function	BMK	Function	BMK	Function
B70	Main spool valve position sensor	**Y70**	Proportional solenoid for steering to the left (main spool valve)	**Y73**	Proportional solenoid for steering to the right (emergency spool valve)
B71	Emergency spool valve position sensor	**Y71**	Proportional solenoid for steering to the left (spool valve for emergency steering function)		

Tab. 199: Equipment codes

The joystick steering control valve block is mounted in the vehicle frame on the left side of the vehicle, just in front of the rear axle.

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090.6.4.2 Joystick with position tracking

Valid for: L566-1758;

1.1 Layout

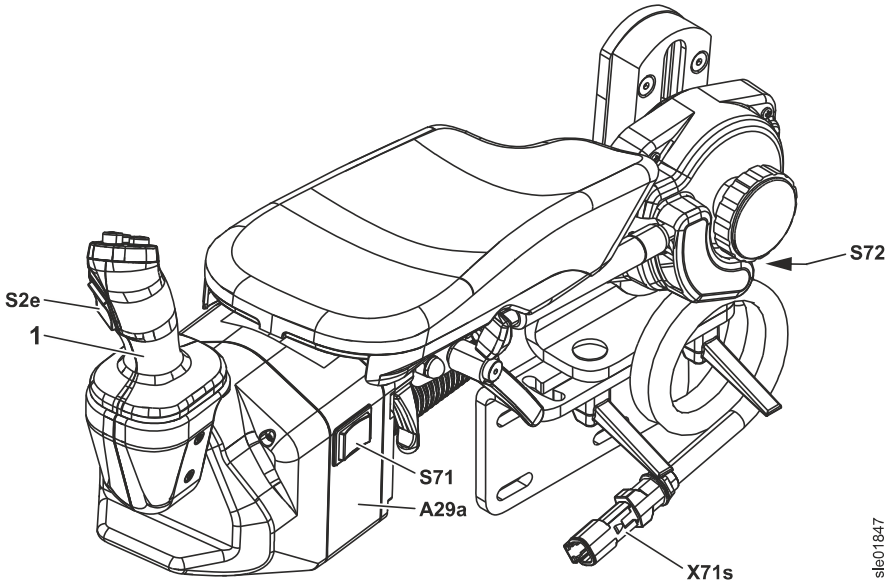

Fig. 485: Joystick with position tracking

1 Joystick

BMK	Function	BMK	Function
A29a	Joystick electronics	**S72**	Joystick steering switch (armrest)
S2e	Travel direction switch *joystick*	**X71s**	Plug connection for joystick
S71[A)]	Joystick steering switch		

Tab. 206: Equipment codes

A) Does not apply to joystick steering without steering wheel steering

Joystick with position tracking is located on left armrest.

2 Function

2.1 Basic function

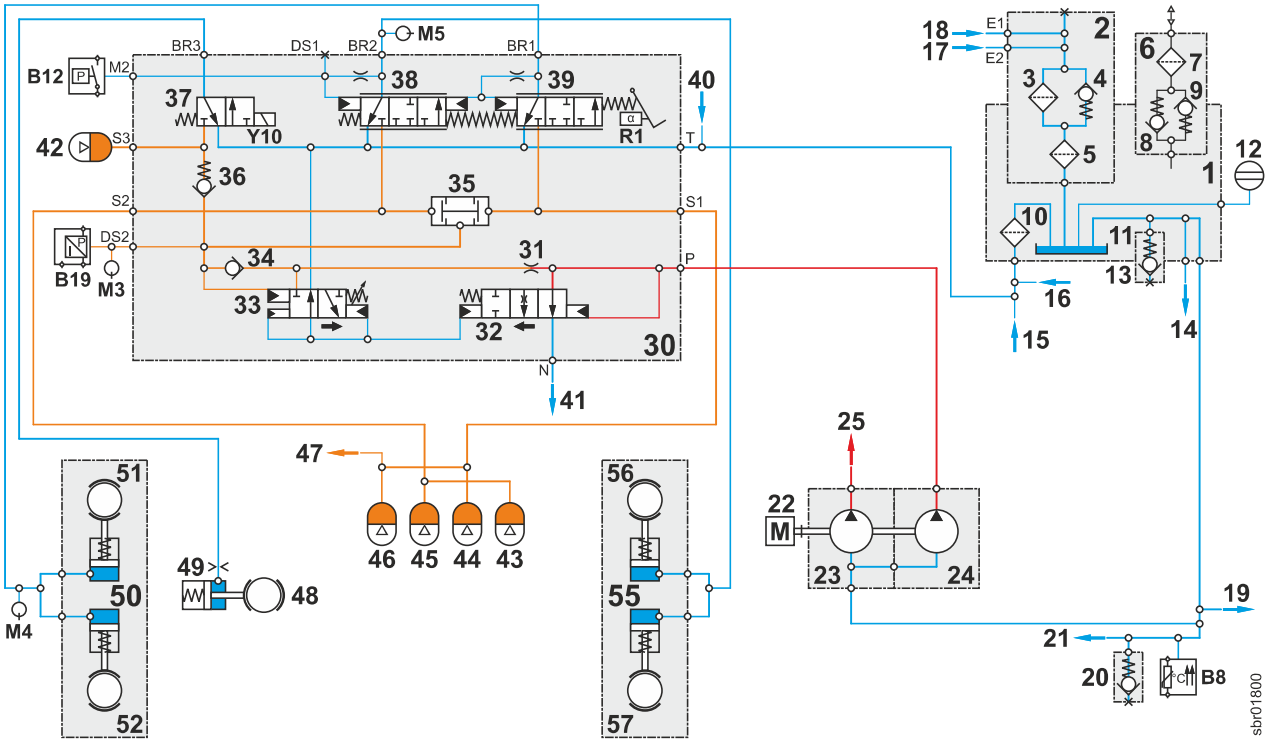

Fig. 491: Hydraulic diagram of brake system (parking brake activated)

1	**Hydraulic tank**	18	Return flow from control valve block	39	Pressure regulator piston for 1st brake circuit
2	**Return filter**	19	Emergency steering pump suction port	40	Return flow from pilot control
3	Main filter element 10 µm	20	Working pump suction port drain valve	41	Return flow to control valve block (housing preheating)
4	Bypass valve 2.5 bar	21	Working pump suction port	42	Parking brake hydro accumulator
5	Strainer mesh 100 µm	22	Diesel engine	43	Hydro accumulator for service brake (2nd brake circuit)
6	**Breather filter**	23	Fan pump	44	Hydro accumulator for service brake (1st brake circuit)
7	Fine filter	25	Brake pump	45	Hydro accumulator for service brake (2nd brake circuit)
8	Outlet valve 0.65 bar	25	Fan motor oil supply	46	Hydro accumulator for service brake (1st brake circuit)
9	Inlet valve 0.03 bar	30	**Compact brake valve**	47	Oil supply for pilot control
10	Leak oil strainer 100 µm	31	Inlet restrictor	48	Parking brake (disc brake)
11	Steel tank	32	Accumulator charge valve	49	Orifice
12	Sight glass for hydraulic oil level	33	Pilot valve	50	**Front axle**
13	Hydraulic tank drain valve	34	Inlet check valve	51	Service brake, 1st brake circuit (wet disc brake)
14	Steering pump suction port	35	Inverted shuttle valve	52	Service brake, 1st brake circuit (wet disc brake)
15	Fan motor leak oil	36	Check valve for parking brake	55	**Rear axle**

See next page for continuation of the image legend

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At same time, oil flows through connecting ducts **8** and **12** to readjusting springs. When oil pressure in brake circuits is high enough, oil pressure and return springs push pressure regulating pistons back against pressure regulating spring **14**. Connection to hydro accumulators is interrupted again. This maintains a steady braking pressure in brake circuits as long as pedal position remains unchanged.

If inching brake pedal **1** is pushed down further, oil pressure also increases in brake circuits and higher oil pressure is required to push pressure regulator pistons back against pressure regulator spring **14**.

2.6 Parking brake

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

2.7 Brake light pressure switch

Pressure switch for brake light B12 in 2nd brake circuit switches on brake light at a brake pressure of $5^{\pm 0.5}$ bar.

2.7.1 Brake accumulator pressure sensor

Brake accumulator pressure sensor B19 measures pressure in hydro accumulator of service brake and sends this to central control unit. If pressure falls below a set value, *brake accumulator pressure too low* symbol appears in display.

In service brake, brake pressure constantly increases up to cut-out pressure and then slowly and steadily falls back to cut-in pressure. If value that central control unit receives from brake accumulator pressure sensor is not plausible or not constant for a certain time, central control unit detects a faulty sensor and generates a service code.

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110.3 Circuit diagrams

Valid for: L566-1758;

The circuit diagrams for the electrical system show the functional sequences for the entire machine, including optional attachments. Options in the circuit diagrams are shown in green. All components and connectors are correctly labelled and shown with the appropriate symbol so that they can be clearly identified. The key contains an additional list of the components with their designations.

The wiring diagrams can also be called up in the spare parts programme LIDOS under electrical system assemblies. These can be opened in an e3v format via the info button next to assembly circuit diagram.

The circuit diagrams are divided up as follows:
- Overview chart
- Contents
- Key
- BMK list
- Circuit diagrams
- Component overviews

The circuit diagrams contain links that can be activated with a mouse click.

1.1.1 Abbreviations

Abbreviation	Designation
SH	Service hours
EP	Electroproportional
WH	Wiring harness
LED	LED
LFD	Liebherr ride control system
SV	Solenoid valve
PWM	Pulse width modulation (proportional output)
PSV	Proportional solenoid valve
BMK	Equipment code

Tab. 224: Abbreviations

1.1.2 Designation of components with “-”

The designations of the components and connectors are always shown with “-”, e.g.:

Description	Component designation
-A10	Display

Tab. 225: Example of component designation

1.1.3 Location code with “+”

Location codes are always shown with “+”. The location code shows where the component is situated in the machine.

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-B93.X	=V	+V3	CONNECTOR PRESSURE SENSOR TILT CYLINDER RING SIDE	/109.D8
-B581	=B	+B	HEATING, AIR DRYER	/52.D8
-B581.X	=B	+B	CONNECTOR AIR DRYER	/52.D8
-B710	=M	+M	FUEL PRE-FILTER WATER SENSOR	/50.D8
-B710.X	=M	+M	CONNECTOR FUEL PRE-FILTER WATER SENSOR	/50.C8
-B722	=M	+M	SCR-F DIFEFRENTIAL PRESSURE SENSOR	/50.C7
-B722.X	=M	+M	CONNECTOR SCR-F DIFEFRENTIAL PRESSURE SENSOR	/50.C7
-B723	=M	+M	DOC INLET TEMPERATURE SENSOR	/50.C4
-B723.X	=M	+M	CONNECTOR DOC INLET TEMPERATURE SENSOR	/50.C4
-B726	=H	+H	SCR CATALYTIC CONVERTER INLET NOX SENSOR	/54.D5
-B726.X	=H	+H	CONNECTOR SCR CATALYTIC CONVERTER INLET NOX SENSOR	/54.D5
-B727	=H	+H	SCR CATALYTIC CONVERTER OUTLET NOX SENSOR	/54.D6
-B727.X	=H	+H	CONNECTOR SCR CATALYTIC CONVERTER OUTLET NOX SENSOR	/54.D6
-B730.X	=M	+M	CONNECTOR ENGINE OIL PRESSURE	/56.D3
-B737	=K	+K	AMBIENT TEMPERATURE SENSOR	/50.C5
-B737.X	=K	+K	CONNECTOR AMBIENT TEMPERATURE SENSOR	/50.C5
-B771	=M	+M	SCR CATALYTIC CONVERTER INLET TEMPERATURE SENSOR	/50.C1
-B771.SCR-F	=H	+H	DOC OUTLET TEMPERATURE SENSOR	/50.C3
-B771.SCR-F.X	=H	+H	CONNECTOR DOC OUTLET TEMPERATURE SENSOR	/50.C3
-B771.X	=M	+M	CONNECTOR SCR CATALYTIC CONVERTER INLET TEMPERATURE SENSOR	/50.C1
-B771a.X	=H	+H	CONNECTOR DOC OUTLET TEMPERATURE SENSOR	/50.B3
-B772	=M	+M	SCR CATALYTIC CONVERTER OUTLET TEMPERATURE SENSOR	/50.C2
-B772.X	=M	+M	CONNECTOR SCR CATALYTIC CONVERTER OUTLET TEMPERATURE SENSOR	/50.C2
-B774	=H	+H	DIESEL EXHAUST FLUID TANK	/55.D5
-B774.X	=H	+H	CONNECTOR DIESEL EXHAUST FLUID TANK	/55.D5
-B783	=H	+H	NH3 SENSOR	/55.D2
-B783.X	=H	+H	CONNECTOR NH3 SENSOR	/55.D2
-CAN 2 + 3.X.B	=K	+K	CONNECTOR CAN	/39.B8
-CAN 2 + 3.X.S	=K	+K	CONNECTOR CAN	/39.B8
-CAN5.1.B	=K	+K	CONNECTOR CAN	/123.C4
-CAN5.1.S	=K	+K	CONNECTOR CAN	/123.C4
-E1	=B	+B1	TAIL LIGHT LEFT	/29.E3
-E1.X	=B	+B1	CONNECTOR TAIL LIGHT LEFT	/29.E3
-E2	=K	+K	INTERIOR ILLUMINATION	/27.E2
-E2.X1	=K	+K	CONNECTOR INTERIOR ILLUMINATION	/27.D2
-E2.X2	=K	+K	CONNECTOR INTERIOR ILLUMINATION	/27.D2

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-E2.X3	=K	+K	CONNECTOR INTERIOR ILLUMINATION	/27.E2
-E2.X4	=K	+K	CONNECTOR INTERIOR ILLUMINATION	/27.E2
-E3	=V	+V1	DRIVING HEADLIGHT LEFT	/29.E5
-E3.X	=V	+V1	CONNECTOR DRIVING HEADLIGHT LEFT	/29.E4
-E3.Xa	=V	+V	CONNECTOR ADAPTER CABLE	/116.D3
-E3.Xb	=V	+V	CONNECTOR ADAPTER CABLE	/116.E3
-E3a	=V	+V1	LED DRIVING HEADLIGHT RIGHT	/115.D4
-E3a.X	=V	+V1	CONNECTOR LED DRIVING HEADLIGHT RIGHT	/115.E5
-E3b.X	=V	+V1	CONNECTOR LED DRIVING HEADLIGHT RIGHT	/115.E5
-E4	=V	+V1	DRIVING HEADLIGHT RIGHT	/29.E6
-E4.X	=V	+V1	CONNECTOR DRIVING HEADLIGHT RIGHT	/29.E5
-E4.Xa	=V	+V	CONNECTOR ADAPTER CABLE	/116.D6
-E4.Xb	=V	+V	CONNECTOR ADAPTER CABLE	/116.E6
-E4a	=V	+V1	LED DRIVING HEADLIGHT LEFT	/115.D6
-E4a.X	=V	+V1	CONNECTOR LED DRIVING HEADLIGHT LEFT	/115.E6
-E4b.X	=V	+V1	CONNECTOR LED DRIVING HEADLIGHT LEFT	/115.E5
-E5	=B	+B2	TAIL LIGHT RIGHT	/29.E7
-E5.X	=B	+B2	CONNECTOR TAIL LIGHT RIGHT	/29.E7
-E8	=K	+K	MARKER LIGHT LEFT	/29.E4
-E9	=K	+K	MARKER LIGHT RIGHT	/29.E6
-E10	=K	+K3	WORKING HEADLIGHT FRONT LEFT	/31.D4
-E10.X	=K	+K	CONNECTOR WORKING HEADLIGHT FRONT LEFT	/31.D4
-E10a	=K	+K3	WORKING HEADLIGHT FRONT LEFT	/31.D4
-E10a..X	=K	+K	CONNECTOR WORKING HEADLIGHT FRONT LEFT	/31.D4
-E10b	=V	+V	WORKING HEADLIGHT FRONT LEFT	/82.D5
-E10b.X	=V	+V	CONNECTOR WORKING HEADLIGHT FRONT LEFT	/82.D5
-E11	=K	+K3	WORKING HEADLIGHT FRONT RIGHT	/31.D6
-E11.X	=K	+K	CONNECTOR WORKING HEADLIGHT FRONT RIGHT	/31.D6
-E11a	=K	+K3	WORKING HEADLIGHT FRONT RIGHT	/31.D7
-E11a.X	=K	+K	CONNECTOR WORKING HEADLIGHT FRONT RIGHT	/31.D7
-E11b	=V	+V	WORKING HEADLIGHT FRONT RIGHT	/82.D7
-E11b.X	=V	+V	CONNECTOR WORKING HEADLIGHT FRONT RIGHT	/82.D7
-E12	=K	+K3	WORKING HEADLIGHT REAR LEFT	/81.D3
-E12.b	=K	+K3	WORKING HEADLIGHT REAR LEFT	/81.D4
-E12.b.X	=K	+K3	CONNECTOR WORKING HEADLIGHT REAR LEFT	/81.D4
-E12.X	=K	+K3	CONNECTOR WORKING HEADLIGHT REAR LEFT	/81.E3

ITEM CODE 12466553 DRAWING INDEX 000

PROJECT GG_4_EVO DRAWING NUMBER 1333 90100 02 00

MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

BMK-INDEX
ELECTRICAL SCHEMATIC;

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-V103	=K	+K	BLOCKING DIODE	/101.D1
-V103	=K	+K2	FREE-WHEELING DIODE	/84.C7
-V104	=K	+K2	FREE-WHEELING DIODE	/59.B5
-V200	=A4	+K	BLOCKING DIODE	/100.C5
-V200	=K	+K	BLOCKING DIODE RECEIVING UNIT / CONTROL UNIT	/113.C6
-V200.X	=K	+K	CONNECTOR BLOCKING DIODE	/113.C6
-V201	=A4	+K	BLOCKING DIODE	/100.C5
-V202	=A4	+K	BLOCKING DIODE	/100.C6
-V203	=A4	+K	BLOCKING DIODE	/100.D8
-VUI10	=K	+K	BLOCKING DIODE	/115.A6
-VUI10.	=K	+K	BLOCKING DIODE	/29.A6
-VUI10.X1	=K	+K	CONNECTOR BLOCKING DIODE	/115.A6
-VUI10.X2	=K	+K	CONNECTOR BLOCKING DIODE	/115.A6
-W1	=K	+K3	ANTENNA	/36.D5
-X-E29.B	=K	+K	CONNECTOR CAB FLOOR	/104.C5
-X-E29.S	=K	+K	CONNECTOR CAB FLOOR	/104.C5
-X1.B	=K	+K	CONNECTOR CAB FLOOR	/32.D4
-X1.B.25a	=K	+K	CONNECTOR CAB FLOOR	/33.B3
-X1.B.2b	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/101.F4
-X1.B.43a	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/101.A2
-X1.B.a.20 + 15	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/102.C4
-X1.B.S.43	=K	+K	CONNECTOR EMERGENCY ACTUATION OF PARKING BRAKE	/103.E2
-X1.J	=A4a	+K2	JUMPER HAZARD WARNING SYSTEM	/30.C4
-X1.S	=K	+K	CONNECTOR CAB FLOOR	/32.C4
-X1.S.25a	=K	+K	CONNECTOR CAB FLOOR	/33.A3
-X1.S.2a	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/101.F4
-X1.S.43.	=K	+K	CONNECTOR EMERGENCY ACTUATION OF PARKING BRAKE	/103.C3
-X1.S.43b	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/101.D1
-X1.S.43b.	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/101.D1
-X1.S.43c	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/101.E1
-X1.S.a.15	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/102.D4
-X1.S.a.20	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/102.D4
-X2.9&10 CLAAS	=K	+K	CONNECTOR DIAGNOSTIC PLUG ENGINE CONTROL UNIT	/61.C6
-X2.9&10 CLAAS.S	=K	+K	CONNECTOR CLAAS DIAGNOSIS	/123.C1
-X2.B	=K	+K6	CONNECTOR CAB FLOOR	/58.C6
-X2.B.65	=K	+K	CONNECTOR CAB FLOOR	/108.E7

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-X2.B.67b	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/101.C8
-X2.J	=A4a	+K2	JUMPER HAZARD WARNING SYSTEM	/30.C5
-X2.S	=K	+K6	CONNECTOR CAB FLOOR	/58.C6
-X2.S.67a	=K	+K	CONNECTOR AUTOMATIC DELAYED ENGINE STOP	/101.B8
-X3.B	=K	+K	CONNECTOR CAB FLOOR	/95.D7
-X3.J	=A4a	+K2	JUMPER HAZARD WARNING SYSTEM	/30.C7
-X3.S	=K	+K	CONNECTOR CAB FLOOR	/95.D7
-X4.J	=A4	+K	JUMPER RESERVE	/27.B6
-X5.J	=A4	+K2	JUMPER	/27.B6
-X5a**.B	=K6	+23	CONNECTOR CAB REAR WALL	/154.A8
-X5a**.B	=K6	+25	CONNECTOR CAB REAR WALL	/154.D6
-X5a**.B	=K6	+17	CONNECTOR CAB REAR WALL	/154.B5
-X5a**.B	=K6	+18	CONNECTOR CAB REAR WALL	/154.B6
-X5a**.B	=K6	+19	CONNECTOR CAB REAR WALL	/154.B7
-X5a**.B	=K6	+20	CONNECTOR CAB REAR WALL	/154.B8
-X5a**.S	=K	+K6	CONNECTOR CAB REAR WALL	/150.B3
-X5a*.S	=K	+K6	CONNECTOR CAB REAR WALL	/139.A2
-X5a.B	=K	+K6	CONNECTOR CAB REAR WALL	/40.D2
-X5a.B.23-	=K	+K	CONNECTOR RESERVE	/113.C3
-X5a.S	=K	+K6	CONNECTOR CAB REAR WALL	/40.D2
-X16.B	=H	+H	CONNECTOR ENGINE BONNET	/32.D4
-X16.S	=H	+H	CONNECTOR ENGINE BONNET	/32.D4
-X16a.B	=K	+K	CONNECTOR VISIBLE REVERSING ALARM	/83.D7
-X16b.S	=K	+K	CONNECTOR VISIBLE REVERSING ALARM	/83.D3
-X17.B	=K	+K	CONNECTOR 2in1 STEERING	/97.C8
-X17.S	=K	+K	CONNECTOR 2in1 STEERING	/97.C8
-X19B	=K	+K2	CONNECTOR JOYSTICK STEERING	/26.B5
-X19B.	=K	+K2	CONNECTOR JOYSTICK STEERING	/97.B7
-X19S	=K	+K2	CONNECTOR JOYSTICK STEERING	/96.B5
-X26.B	=K	+K	CONNECTOR FUSE BOARD	/81.D3
-X26.S	=K	+K	CONNECTOR FUSE BOARD	/81.E3
-X26a.S	=K	+K3	CONNECTOR FUSE BOARD	/81.E4
-X27.B	=K	+K	CONNECTOR FUSE BOARD	/81.D4
-X27.S	=K	+K	CONNECTOR FUSE BOARD	/81.D4
-X28.B	=H	+H	CONNECTOR FANS SPEED PROPORTIONAL SOLENOID VALVE	/47.B6
-X28.B	=K	+K	CONNECTOR FUSE BOARD	/81.D6

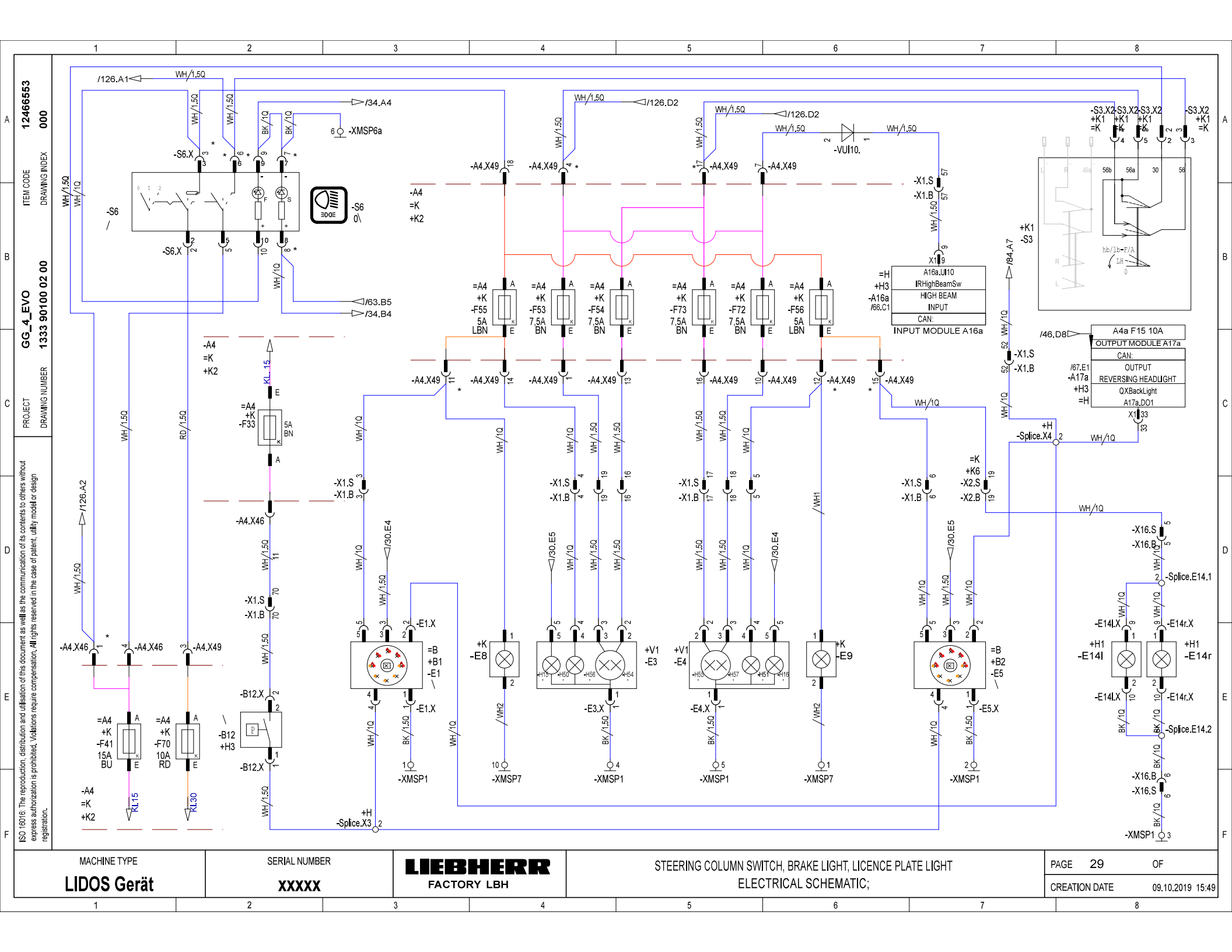
ITEM CODE 12466553
DRAWING INDEX 000
PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00

MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

BMK-INDEX
ELECTRICAL SCHEMATIC;



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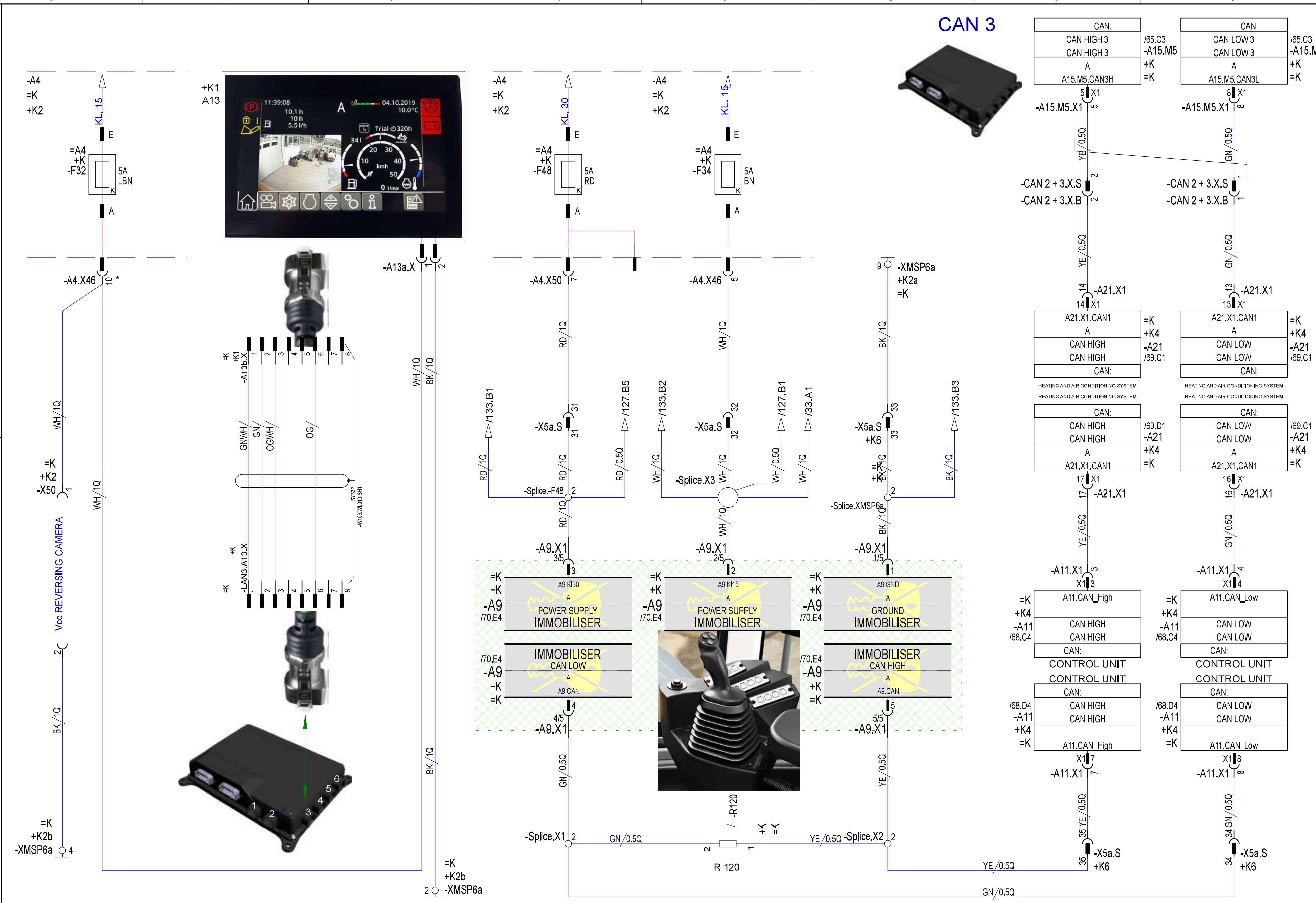
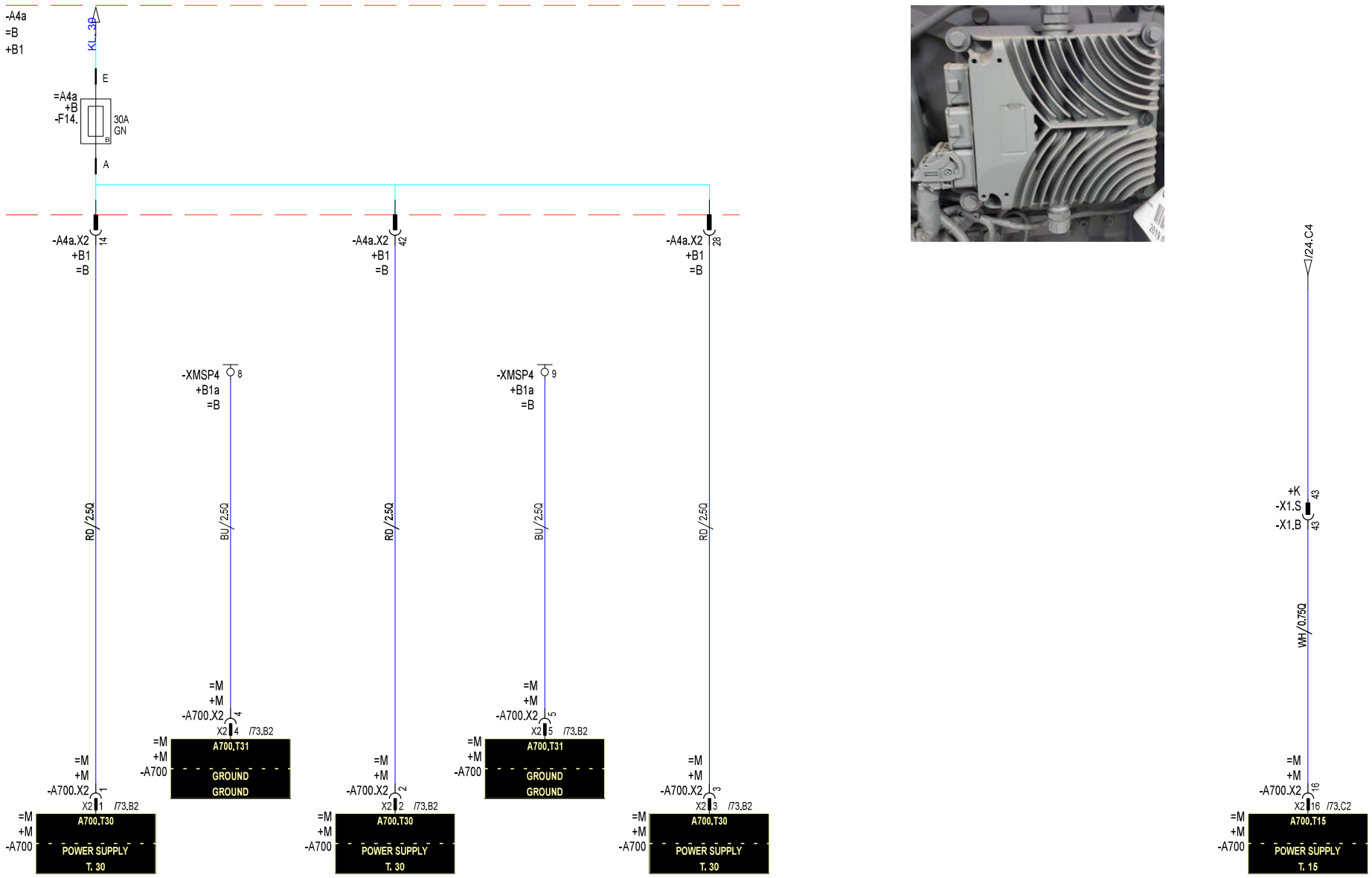
PROJECT	GG_4_EVO
DRAWING NUMBER	1333 90100 02 00
ITEM CODE	12466553
DRAWING INDEX	000

MACHINE TYPE	SERIAL NUMBER	LIEBHERR FACTORY LBH	STEERING COLUMN SWITCH, BRAKE LIGHT, LICENCE PLATE LIGHT ELECTRICAL SCHEMATIC;
LIDOS Gerät	XXXXX		PAGE 29 OF
			CREATION DATE 09.10.2019 15:49

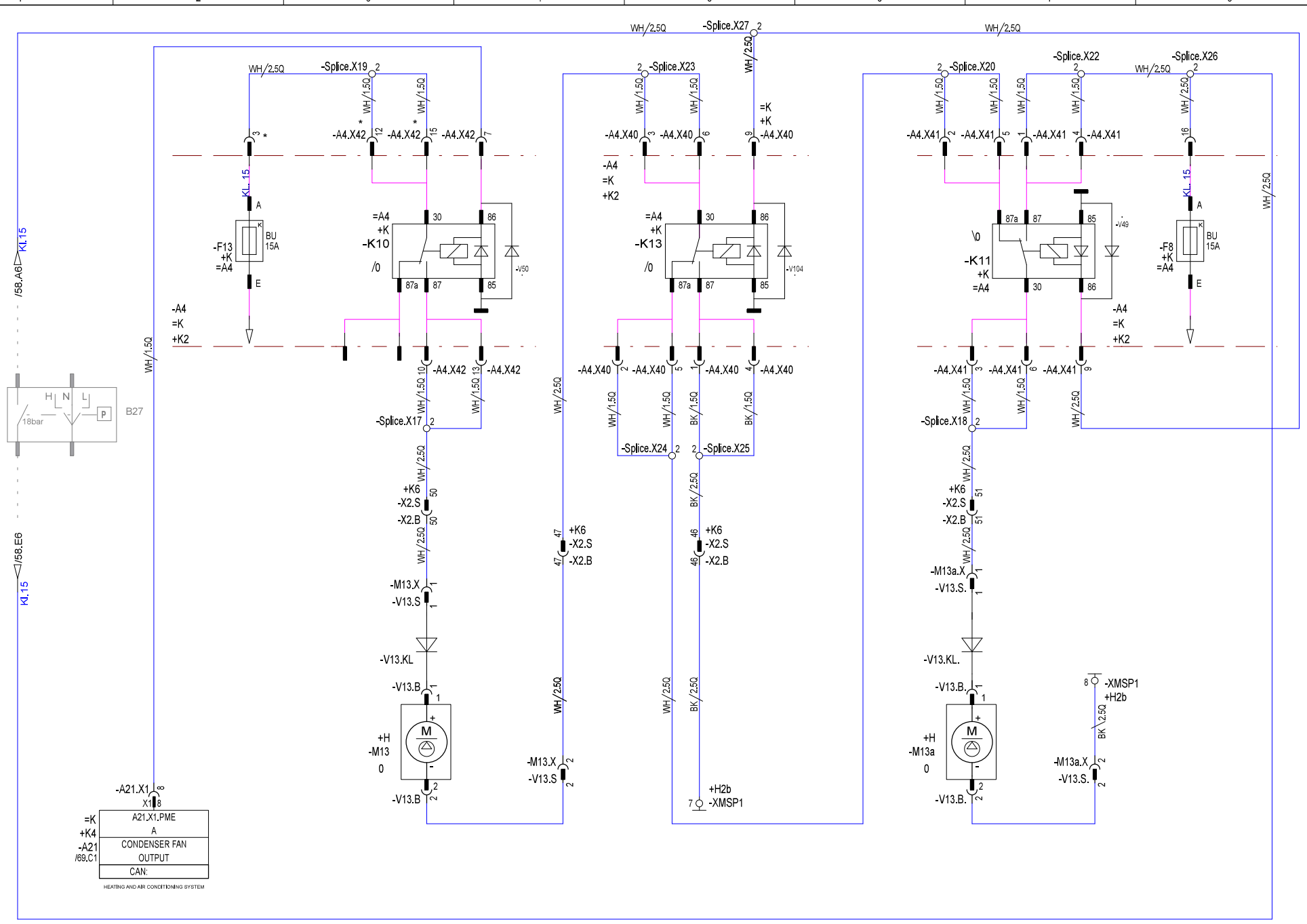


MACHINE TYPE	SERIAL NUMBER			PAGE 39 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	DISPLAY CAN 3 ELECTRICAL SCHEMATIC;	CREATION DATE 09.10.2019 15:49

ITEM CODE	12466553
DRAWING INDEX	000
PROJECT	GG_4_EVO
DRAWING NUMBER	1333 90100 02 00



MACHINE TYPE	SERIAL NUMBER			
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	POWER SUPPLY ENGINE CONTROL UNIT ELECTRICAL SCHEMATIC;	PAGE 49 OF CREATION DATE 09.10.2019 15:49



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PROJECT	GG_4_EVO
DRAWING NUMBER	1333 90100 02 00
ITEM CODE	12466553
DRAWING INDEX	000

MACHINE TYPE	SERIAL NUMBER		CONDENSER FAN	PAGE 59 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	ELECTRICAL SCHEMATIC;	CREATION DATE 09.10.2019 15:49

-A21 Modul Nr.:
+K4 Modulname: HEIZ-KLIMA

Phys. Adr.	Blatt	EA	Beschreibung	Stecker	Pin
A21.X1.KI30	/58.E2		POWER SUPPLY	0	1
A21.X1.GND	/58.E2		GROUND	0	2
A21.X1.KI15	/58.E4		POWER SUPPLY	0	3
A21.X1.PME	/104.A6		AUXILIARY HEATER	0	4
A21.X1.PME	/58.A5		HIGH PRESSURE AND LOW PRESSURE	0	5
A21.X1.PME			AIR CONDITIONING PRESSURE SWITCH	0	6
A21.X1.PME				0	7
A21.X1.PME	/59.F1		CONDENSER FAN	0	8
A21.X1.PME	/27.E3		DOOR CONTACT SWITCH	0	9
A21.X1.PME	/58.A6		AIR-CONDITIONING COMPRESSOR MAGNETIC COUPLING	0	10
A21.X1.PME				0	11
A21.X1.PME				0	12
A21.X1.CAN1	/39.C8		CAN LOW	0	13
A21.X1.CAN1	/39.C8		CAN HIGH	0	14
A21.X1.CAN1			CAN TERMINATOR	0	15
A21.X1.CAN1	/39.C8		CAN LOW	0	16
A21.X1.CAN1	/39.C8		CAN HIGH	0	17
A21.X1.PME	/58.E3		GROUND	0	18
A21.X1.PME	/58.E3		POWER SUPPLY	0	19
A21.X1.PME			PROTECTIVE VENTILATION SYSTEM	0	20
A21.X1.PME			PROTECTIVE VENTILATION SYSTEM	0	21
A21.X1.PME				0	22
A21.X1.PME				0	23
A21.X1.PME				0	24
A21.X1.PME				0	25
A21.X1.PME				0	26
A21.X1.PME				0	27
A21.X1.PME				0	28
A21.X1.PME				0	29
				0	30
				0	31
				0	32
				0	33
				0	34
				0	35
				0	36
				0	37
				0	38
				0	39
				0	40

F7-5A	ADDITIONAL MODULE OUTPUT 1 DO3 ZUSATZMODUL OUTPUT 1	STEER WHEEL ANGLE 2 Vcc LATCHING LENKRAD WINKEL 2 Vcc SELBSTHALTUNG	F13-5A
F6-5A	ADDITIONAL MODULE OUTPUT 1 DO2 ZUSATZMODUL OUTPUT 1	Vcc ARMREST ACTIVE Vcc ARMLEHNE AKTIV	F12-3A
F5-5A	ADDITIONAL MODULE OUTPUT 1 DO1 ZUSATZMODUL OUTPUT 1	STEER ANGLE 2 KNICKWINKEL SENSOR 2	F11-3A
F4-5A	STEER WHEEL ANGLE 1 LENKRAD WINKEL 1	EMERGEN VALVE POSITION FEEDBACK NOTBETRIEB LAGERÜCKMELDUNG	F10-3A
F3-3A	STEER ANGLE 1 KNICKWINKEL SENSOR1	EMERGEN VALVE Vcc LOGIC NOTBETRIEB Vcc LOGIK	F9-5A
F2-3A	STEER VALVE POSITION FEEDBACK HAUPTKREIS LAGERÜCKMELDUNG	JUMPER n.c. JUMPER n.c.	X1-JP
F1-5A	STEER VALVE Vcc LOGIC HAUPTKREIS Vcc LOGIK		

LBH ID 11419535
ZNG 1464 6739 3 01 00 001

OVERVIEW FUSE STICKER A4b
ELECTRICAL SCHEMATIC;

LIEBHERR
FACTORY LBH

SERIAL NUMBER
XXXXX

MACHINE TYPE
LIDOS Gerät

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PROJECT	DRAWING NUMBER	ITEM CODE	DRAWING INDEX
GG_4_EVO	1333 90100 02 00	12466553	000

=H -A17b Modul Nr.:
+H3 Modulname:

ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN
A17b.24V_B1	/88.D5		POWER SUPPLY BANK 1	0	1
A17b.24V_logic	/88.D4		POWER SUPPLY	0	2
A17b.GND	/88.D5		GROUND	0	3
A17b.PWM1	/98.A1		JOYSTICK STEERING MAIN VALVE B	0	4
A17b.PWM2	/156.A1		TURN GRABBER RIGHT PROPORTIONAL SOLENOID VALVE	0	5
A17b.PWM3	/156.A2		TURN GRABBER LEFT PROPORTIONAL SOLENOID VALVE	0	6
A17b.PWM4	/156.A3		GRABBER BACK PROPORTIONAL SOLENOID	0	7
A17b.PWM9	/156.A4		GRABBER FORWARD PROPORTIONAL SOLENOID	0	8
A17b.PWM10	/156.A7		OSCILLATING CYLINDER LOCKOUT SOLENOID VALVE	0	9
A17b.PWM11	/42.A7		4TH FUNCTION A PROPORTIONAL SOLENOID VALVE	0	10
A17b.PWM12	/42.A8		4TH FUNCTION B PROPORTIONAL SOLENOID VALVE	0	11
A17b.GND	/88.D5		GROUND	0	12
A17b.24V_logic				0	13
A17b.24V_B3	/88.D6		POWER SUPPLY BANK 3	0	14
A17b.24V_B2	/88.D5		POWER SUPPLY BANK 2	0	15
A17b.GND_logic	/88.D4		GROUND	0	16
A17b.GND	/88.D6		GROUND	0	17
A17b.PWM5	/111.F6		DIMMABLE WORKING HEADLIGHT RIGHT	0	18
A17b.PWM6	/111.F5		DIMMABLE WORKING HEADLIGHT RIGHT	0	19
A17b.PWM7	/156.A5		RAISE LOG PUSHER SOLENOID VALVE	0	20
A17b.PWM8	/156.A6		LOWER LOG PUSHER SOLENOID VALVE	0	21
A17b.PWM13	/111.F8		DIMMABLE WORKING HEADLIGHT LEFT	0	22
A17b.PWM14	/111.F7		DIMMABLE WORKING HEADLIGHT LEFT	0	23
A17b.PWM15	/112.A5		DIMMABLE WORKING HEADLIGHT MIDDLE	0	24
A17b.PWM16	/98.A3		JOYSTICK STEERING MAIN VALVE A	0	25
A17b.GND	/88.D7		GROUND	0	26
A17b.GND_logic				0	27
A17b.24V_B4	/88.D7		POWER SUPPLY BANK 4	0	28
A17b.CAN_Res	/87.C6		CAN TERMINATOR	0	29
A17b.24V				0	30
A17b.GND_DO1	/96.D2		JOYSTICK STEERING SAFETY CIRCUIT SOLENOID VALVE	0	31
A17b.V_DO1	/98.F5		POWER SUPPLY DIGITAL OUTPUT 1	0	32
A17b.DO1	/96.A4		JOYSTICK STEERING SAFETY CIRCUIT SOLENOID VALVE	0	33
A17b.V_DO2	/95.F5		POWER SUPPLY DIGITAL OUTPUT 2	0	34
A17b.DO2	/96.A5		RELAY POWER SUPPLY EMERGENCY STEERING CIRCUIT	0	35
A17b.V_DO3	/95.F7		POWER SUPPLY DIGITAL OUTPUT 3	0	36
A17b.DO3	/96.A3		JOYSTICK STEERING SWITCHING RELAY	0	37
A17b				0	38
A17b.DO4				0	39
A17b.GND_DO3	/95.F8		GROUND	0	40

ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN
A17b.24V				0	41
A17b.24V				0	42
A17b.CAN_Low	/87.C5		CAN LOW	0	43
A17b	/87.C5		CAN LOW	0	44
A17b.GND_DO2	/95.F6		GROUND	0	45
A17b.GND_PWM1	/98.F1		JOYSTICK STEERING MAIN VALVE B	0	46
A17b.GND_PWM2	/156.F1		TURN GRABBER RIGHT PROPORTIONAL SOLENOID VALVE	0	47
A17b.GND_PWM3	/156.F2		TURN GRABBER LEFT PROPORTIONAL SOLENOID VALVE	0	48
A17b.GND_PWM4	/156.F3		GRABBER BACK PROPORTIONAL SOLENOID	0	49
A17b.GND_PWM9	/156.F4		GRABBER FORWARD PROPORTIONAL SOLENOID	0	50
A17b.GND_PWM10	/156.F7		OSCILLATING CYLINDER LOCKOUT SOLENOID VALVE	0	51
A17b.GND_PWM11	/42.F7		4TH FUNCTION A PROPORTIONAL SOLENOID VALVE	0	52
A17b.GND_PWM12	/42.F8		4TH FUNCTION B PROPORTIONAL SOLENOID VALVE	0	53
A17b.GND_DO4				0	54
A17b.FI1	/111.E2		LIGHTING CONTROL	0	55
A17b.FI2				0	56
A17b.CAN_High	/87.C4		CAN HIGH	0	57
A17b.CAN_High	/87.C4		CAN HIGH	0	58
A17b.GND				0	59
A17b.GND_PWM5	/112.F7		DIMMABLE WORKING HEADLIGHT MIDDLE	0	60
A17b.GND_PWM6				0	61
A17b.GND_PWM7	/156.F5		RAISE LOG PUSHER SOLENOID VALVE	0	62
A17b.GND_PWM8	/156.F6		LOWER LOG PUSHER SOLENOID VALVE	0	63
A17b.GND_PWM13				0	64
A17b.GND_PWM14				0	65
A17b.GND_PWM15				0	66
A17b.GNDPWM16	/98.F3		JOYSTICK STEERING MAIN VALVE A	0	67
A17b.GND				0	68
A17b.GND_FI1				0	69
A17b.GND_FI2				0	70

MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

OPTION OUTPUT MODULE A17b
ELECTRICAL SCHEMATIC;

X1GREY

=K +K6 -A29 Modul Nr.: Modulname:

Phys. Adr.	Blatt	EA	Beschreibung		Stecker	Pin
A29.V-BATT S					X1	H1
A29.GND S					X1	H2
A29.GND PWM3	4/66,F8		GROUND	GROUND	X1	H3
A29.PWM 3	/66,A7		JOYSTICK STEERING EMERGENCY VALVE A	OUTPUT	X1	H4
A29.V-BATT	/62,F3		POWER SUPPLY	T.15	X1	G1
A29.GND	/62,F4		GROUND	GROUND	X1	G2
A29.V-BATT PWM	/94,B1		POWER SUPPLY	OUTPUTS	X1	G3
A29.PWM 4 NOT	/66,A8		JOYSTICK STEERING EMERGENCY VALVE B	OUTPUT	X1	G4
A29.CAN-L 1	/91,C4		CAN LOW 2	CAN LOW 2	X1	F1
A29.CAN-L 1	/91,D4		CAN LOW 2	CAN LOW 2	X1	F2
A29.CAN-H1	/91,C5		CAN HIGH 2	CAN HIGH 2	X1	F3
A29.CAN-H1	/91,D5		CAN HIGH 2	CAN HIGH 2	X1	F4
A29.CAN 1 Ende					X1	E1
A29.4 - 20 mA					X1	E2
A29.4 - 20 mA	/93,F6		EHERGENCY SPOOL VALVE POSITION SENSOR	INPUT	X1	E3
A29.4 - 20 mA					X1	E4
A29.0 - 5V					X1	D1
A29.4 - 20 mA			STEERING WHEEL ANGLE SENSOR	SIGNAL 1	X1	D2
A29.4 - 20 mA			JOYSTICK STEERING PRESSURE SENSOR	INPUT	X1	D3
A29.4 - 20 mA	/93,F1		ARTICULATED JOINT ANGLE SENSOR	SIGNAL 1	X1	D4
A29.0 - 5V			RESERVE		X1	C1
A29.0 - 5V			RESERVE		X1	C2
A29.0 - 5V					X1	C3
A29.0 - 5V					X1	C4
A29.DI1.A	/94,F7		SWITCH JOYSTICK STEERING	SIGNAL 1	X1	B1
A29.DI3.A	/94,F1		LATCHING	DIAGNOSIS	X1	B2
A29.DI5					X1	B3
A29.DI7					X1	B4
A29.GND	/94,B1		GROUND	GROUND	X1	A1
A29.DI2.A	/94,A6		JOYSTICK STEERING SWITCH ACTIVATION	SIGNAL 1	X1	A2
A29.DI4					X1	A3
A29.DI6					X1	A4
A29.CAN HIGH C					X2	A4
A29.CAN HIGH B					X2	A3
A29.CAN HIGH A					X2	A2
A29.CAN SHIELD					X2	A1
A29.CAN LOW C					X2	B4
A29.CAN LOW B					X2	B3
A29.CAN LOW A					X2	B2
A29.GND_DO3					X2	B1
A29.TXP					X2	C4

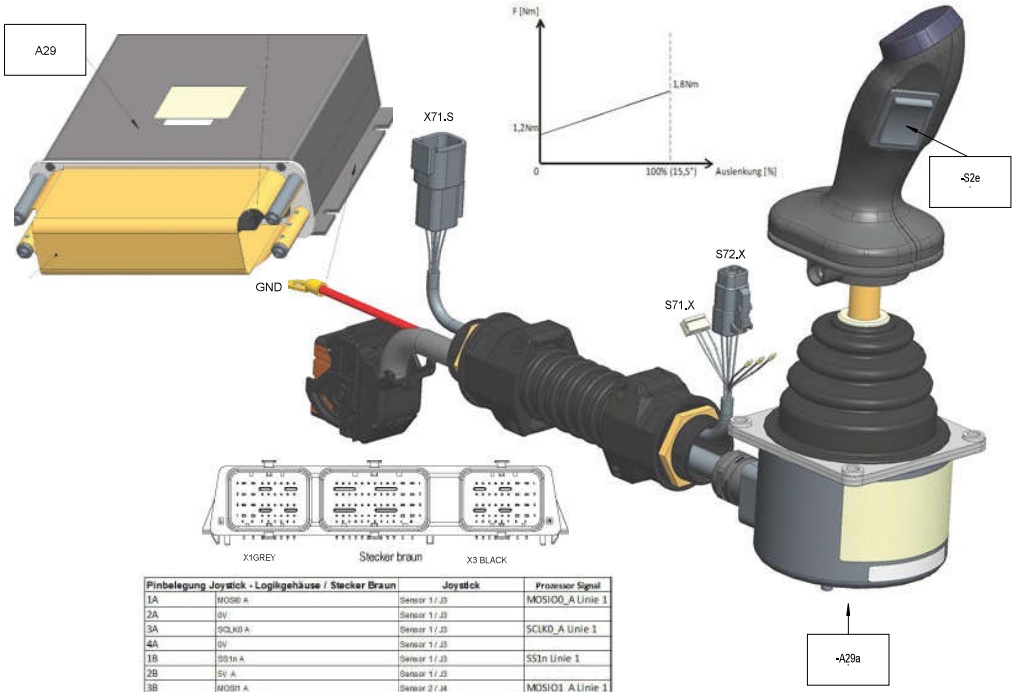
Phys. Adr.	Blatt	EA	Beschreibung		Stecker	Pin
A29.RXP					X2	C3
A29.LIN					X2	C2
A29.RTP					X2	C1
A29.GND_DO2					X2	D4
A29.GND_PWM1					X2	D3
A29.GND_PWM2					X2	D2
A29.RTN					X2	D1
A29.FI1					X2	E4
A29.FI.GND					X2	E3
A29.FI3					X2	E2
A29.					X2	E1
A29.FI2					X2	F4
A29.FI.GND					X2	F3
A29.FI4					X2	F2
A29.RDN					X2	F1
A29.OUT 0					X2	G4
A29.DIGITAL GND					X2	G3

X3 BLACK

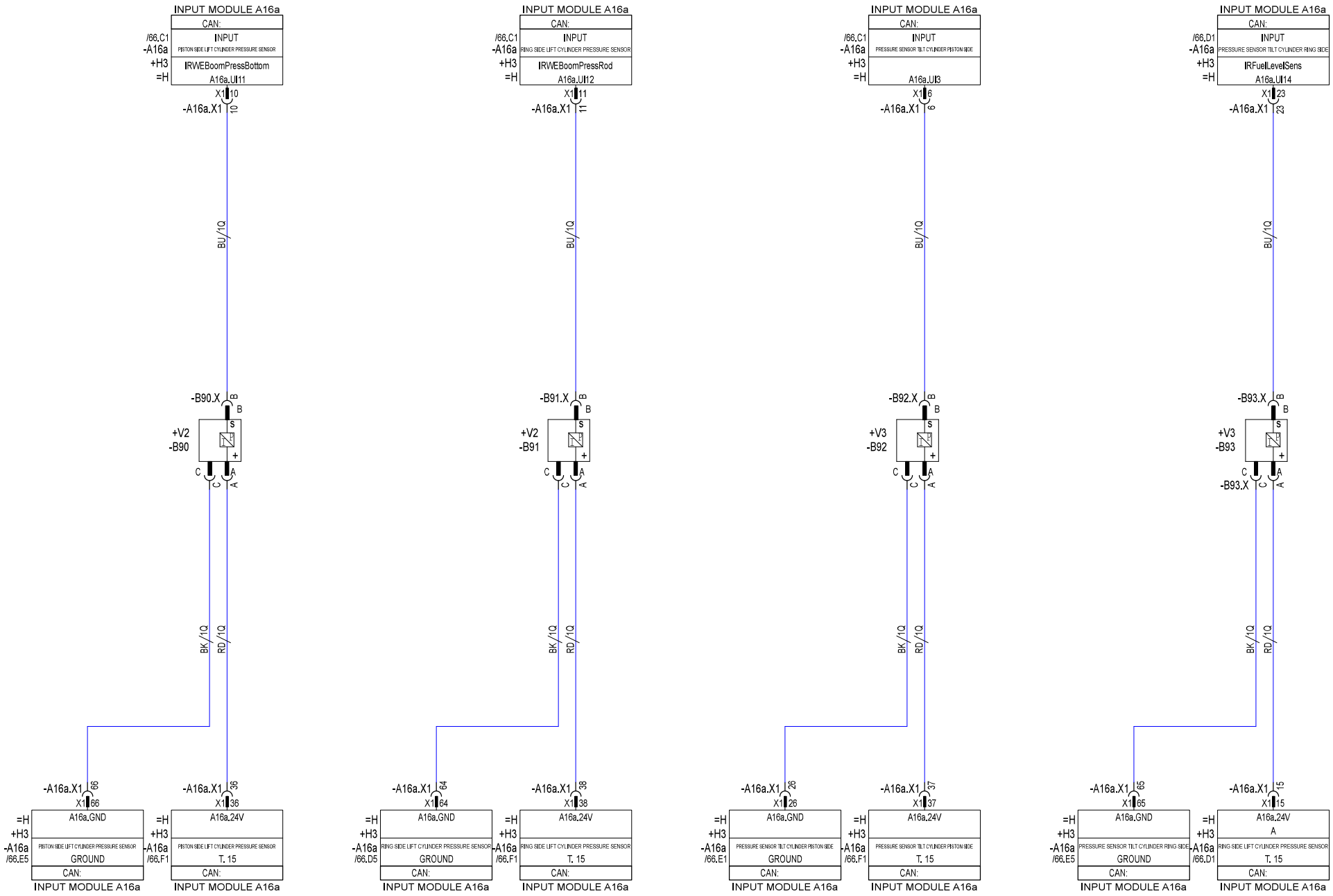
=K +K6 -A29 Modul Nr.: Modulname:

Phys. Adr.	Blatt	EA	Beschreibung		Stecker	Pin
A29.OUT 1					X2	G3
A29.RI3					X2	G4
A29.5V					X2	H4
A29.Vers GND					X2	H3
A29.5V					X2	H2
A29.RI GND					X2	H1
A29.AI 1					X2	J4
A29.AI 2					X2	J3
A29.AI 3					X2	J2
A29.RI4					X2	J1
A29.AI 5					X2	K4
A29.AI 6					X2	K3
A29.AI 7					X2	K2
A29.AI 8					X2	K1
A29.AI 9					X2	L4
A29.AI 10					X2	L3
A29.AI 11					X2	L2
A29.AI 8					X2	L1
A29.DIGITAL GND					X2	M4
A29.DIGITAL GND					X2	M3
A29.DIGITAL GND					X2	M2
A29.AI 12					X2	M1
A29.DI7.B	/96,F6		JOYSTICK STEERING SAFETY CIRCUIT SOLENOID VALVE	DIAGNOSIS	X3	A4
A29.DI6.B					X3	A3
A29.DI5.B					X3	A2
A29.PWM 1	/93,F3		GROUND	GROUND	X3	A1
A29.DI1.B	/94,F8		JOYSTICK STEERING ARMREST SWITCH	SIGNAL 2	X3	B4
A29.DI4.B					X3	B3
A29.DI3.B	/96,F4		SHUTDOWN	DIAGNOSIS	X3	B2
A29.DI2.B	/94,A6		JOYSTICK STEERING SWITCH ACTIVATION	SIGNAL 2	X3	B1
A29.DI5.B					X3	C4
A29.DI4.B					X3	C3
A29.DI2.B			RESERVE		X3	C2
A29.DI1.B			RESERVE		X3	C1
A29.4 - 20 mA			JOYSTICK STEERING LOAD SENSING PRESSURE SENSOR	INPUT	X3	D4
A29.4 - 20 mA	/95,F3		MAIN SPOOL VALVE POSITION SENSOR	INPUT	X3	D3
A29.4 - 20 mA			STEERING WHEEL ANGLE SENSOR	SIGNAL 2	X3	D2
A29.0 - 5V					X3	D1
A29.4 - 20 mA					X3	E4
A29.4 - 20 mA	/93,F2		ARTICULATED JOINT ANGLE SENSOR	SIGNAL 2	X3	E3
A29.4 - 20 mA					X3	E2

Phys. Adr.	Blatt	EA	Beschreibung		Stecker	Pin
A29.CAN 2 Ende					X3	E1
A29.CAN-H 2	/91,C5		CAN HIGH 3	CAN HIGH 3	X3	F4
A29.CAN-H 2	/91,D5		CAN HIGH 3	CAN HIGH 3	X3	F3
A29.CAN-L 2	/91,D6		CAN LOW 3	CAN LOW 3	X3	F2
A29.CAN-L 2	/91,C6		CAN LOW 3	CAN LOW 3	X3	F1
A29.PWM 2					X3	G4
A29.V-BATT PWM	/93,E4		POWER SUPPLY	OUTPUTS	X3	G3
A29.GND	/62,F7		GROUND	GROUND	X3	G2
A29.V-BATT	/62,F6		POWER SUPPLY	T.15	X3	G1
A29.GND					X3	H4
A29.GND PWM1 + 2					X3	H3
A29.GND - S					X3	H2
A29.V-BATT S					X3	H1



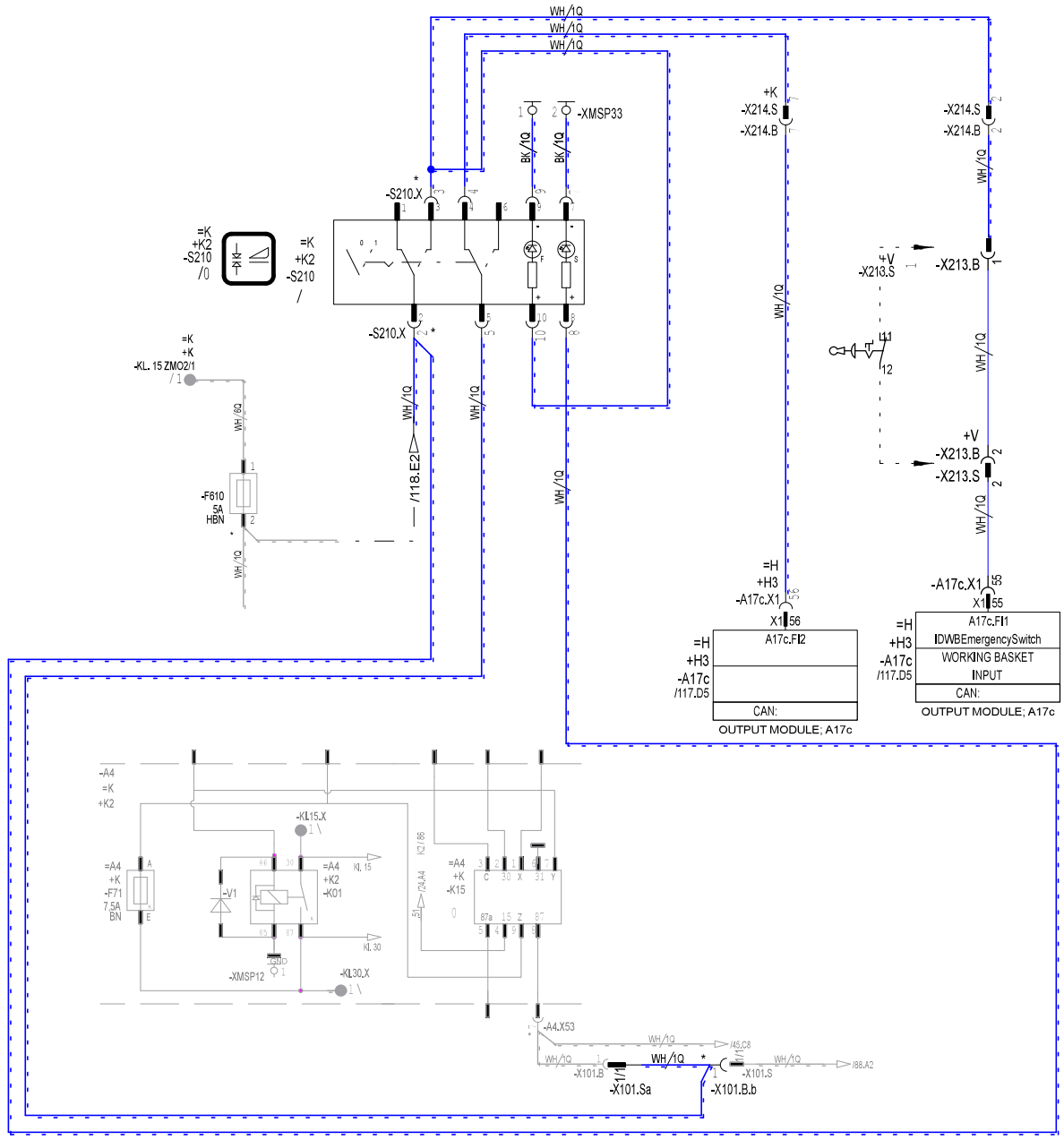
Pinbelegung Joystick - Logikgehäuse / Stecker Braun		Joystick	Prozessor Signal
1A	MOSI0 A	Sensor 1 / J3	MOSI0_A Linie 1
2A	0V	Sensor 1 / J3	
3A	SCLK0 A	Sensor 1 / J3	SCLK0_A Linie 1
4A	0V	Sensor 1 / J3	
1B	SS1n A	Sensor 1 / J3	SS1n Linie 1
2B	5V A	Sensor 1 / J3	
3B	MOSI1 A	Sensor 2 / J4	MOSIO1_A Linie 1
4B	0V	Sensor 2 / J4	
1C	SCLK1 A	Sensor 2 / J4	SCLK1_A Linie 1
2C	0V	Sensor 2 / J4	
3C	SS3n A	Sensor 2 / J4	SS3n Linie 1
4C	5V A	Sensor 2 / J4	
1D	MOSI0 B	Sensor 1 / J3	MOSIO0_A Linie 2
2D	0V	Sensor 1 / J3	
3D	SCLK0 B	Sensor 1 / J3	SCLK0_A Linie 2
4D	0V	Sensor 1 / J3	
1E	SS1n B	Sensor 1 / J3	SS1n Linie 2
2E	5V B	Sensor 1 / J3	
3E	MOSI1 B	Sensor 2 / J4	MOSIO1_A Linie 2
4E	0V	Sensor 2 / J4	
1F	SCLK1 B	Sensor 2 / J4	SCLK1_A Linie 2
2F	0V	Sensor 2 / J4	
3F	SS3n B	Sensor 2 / J4	SS3n Linie 1
4F	5V B	Sensor 2 / J4	
1G	V + kap	kap. Sensor A	
4G	I_in	kap. Sensor A	XAIN 6 A/B Linie 1
1K	5V B Taste		
4K	Taste 1	J2 B (Logikplatine)	Digin4 A/B Linie 2
3K	Taste 2	J2 B (Logikplatine)	Digin5 A/B Linie 2
2K	Taste 3	J2 B (Logikplatine)	Digin6 A/B Linie 2
3J	FNR rückw.arts. Signal 1 (FNR1, Öffner Unten)	J2 A (Logikplatine)	Digin6 A/B Linie 1
1J	FNR vorw.arts. Signal 1 (FNR1, Öffner Oben)	J2 A (Logikplatine)	Digin4 A/B Linie 1
4J	FNR rückw.arts. Signal 2 (FNR4, Schließer Unten)	J2 A (Logikplatine)	Digin7 A/B Linie 1
2J	FNR vorw.arts. Signal 2 (FNR2, Schließer Oben)	J2 A (Logikplatine)	Digin5 A/B Linie 1
1H	5V A Taste		
4Hu. 4M	PWR1_B	Versorgung Magnetpuls-elektrik	PWMout 1 Linie1
3Hu. 3M	PWM2_B	Reserve	PWMout 2 Linie2
2G	0V	0V Magnetpuls-elektrik	
3G	0V		
2Hu. 2M	Hupentaste	PWM wird nicht verdrahtet	Digin9 A/B Linie 2
1L	Speisung 24V Hupe	PWM wird nicht verdrahtet	
1M	Ausgang Hupe	PWM wird nicht verdrahtet	
2L	Digitaleingang 5.A, max 48 V, Intern	PWM wird nicht verdrahtet	Digin9 A/B Linie 1
3L	Digitaleingang 8.B, max 48 V, Intern	PWM wird nicht verdrahtet	Digin8 A/B Linie 2
4L	Digitaleingang 8.A, max 48 V, Intern	PWM wird nicht verdrahtet	Digin8 A/B Linie 1



PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00
ITEM CODE 12466553
DRAWING INDEX 000

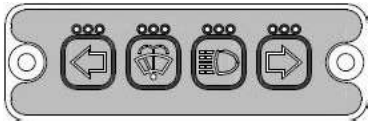
MACHINE TYPE	SERIAL NUMBER			PAGE 109 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	OPTION WEIGHING DEVICE LIEBHERR ELECTRICAL SCHEMATIC;	CREATION DATE 09.10.2019 15:49

PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00
ITEM CODE 12466553
DRAWING INDEX 000



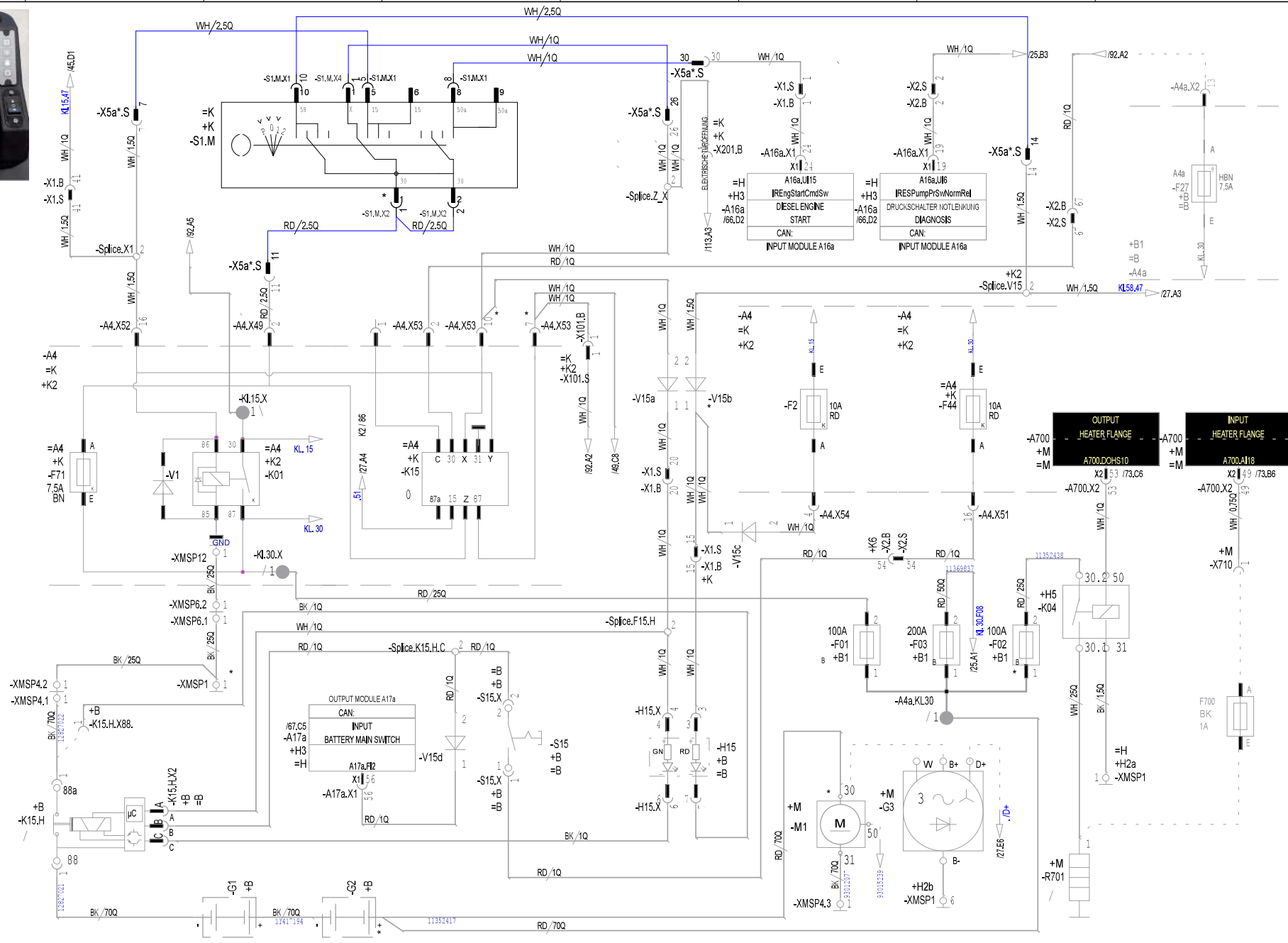
MACHINE TYPE	SERIAL NUMBER			
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	OPTION WORKING BASKET ELECTRICAL SCHEMATIC;	PAGE 119 OF
				CREATION DATE 09.10.2019 15:49

KEYPAD 1



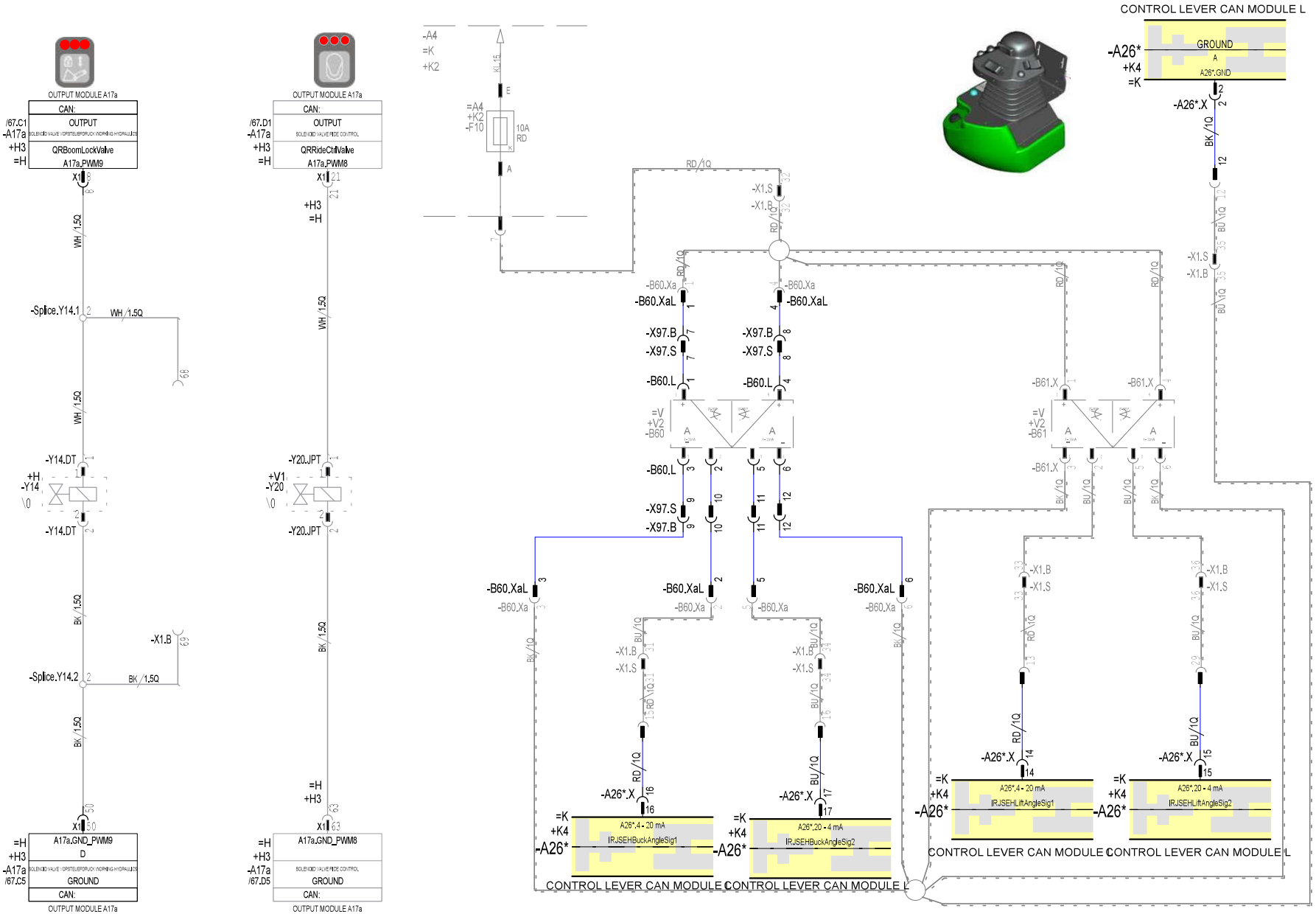
=K
+K4
-A36

ADDRESS	TYPE	PAGE	DESCRIPTION		CONNECTOR	PIN
A36.1		/128.E8	CAN LOW	CAN LOW	X	1
A36.2		/128.E7	CAN HIGH	CAN HIGH	X	2
A36.3			CAN TERMINATOR	CAN TERMINATOR	X	3
A36.4			GROUND	GROUND	X	4
A36.5			S3_IN	INPUT	X	5
A36.6			S4_IN	INPUT	X	6
A36.7			CAN LOW	CAN LOW	X	7
A36.8			CAN HIGH	CAN HIGH	X	8
A36.9		/128.D1	GROUND	GROUND	X	9
A36.10		/128.D2	POWER SUPPLY	T. 15	X	10
A36.11			S3_OUT	OUTPUT	X	11
A36.12			S4_OUT	OUTPUT	X	12



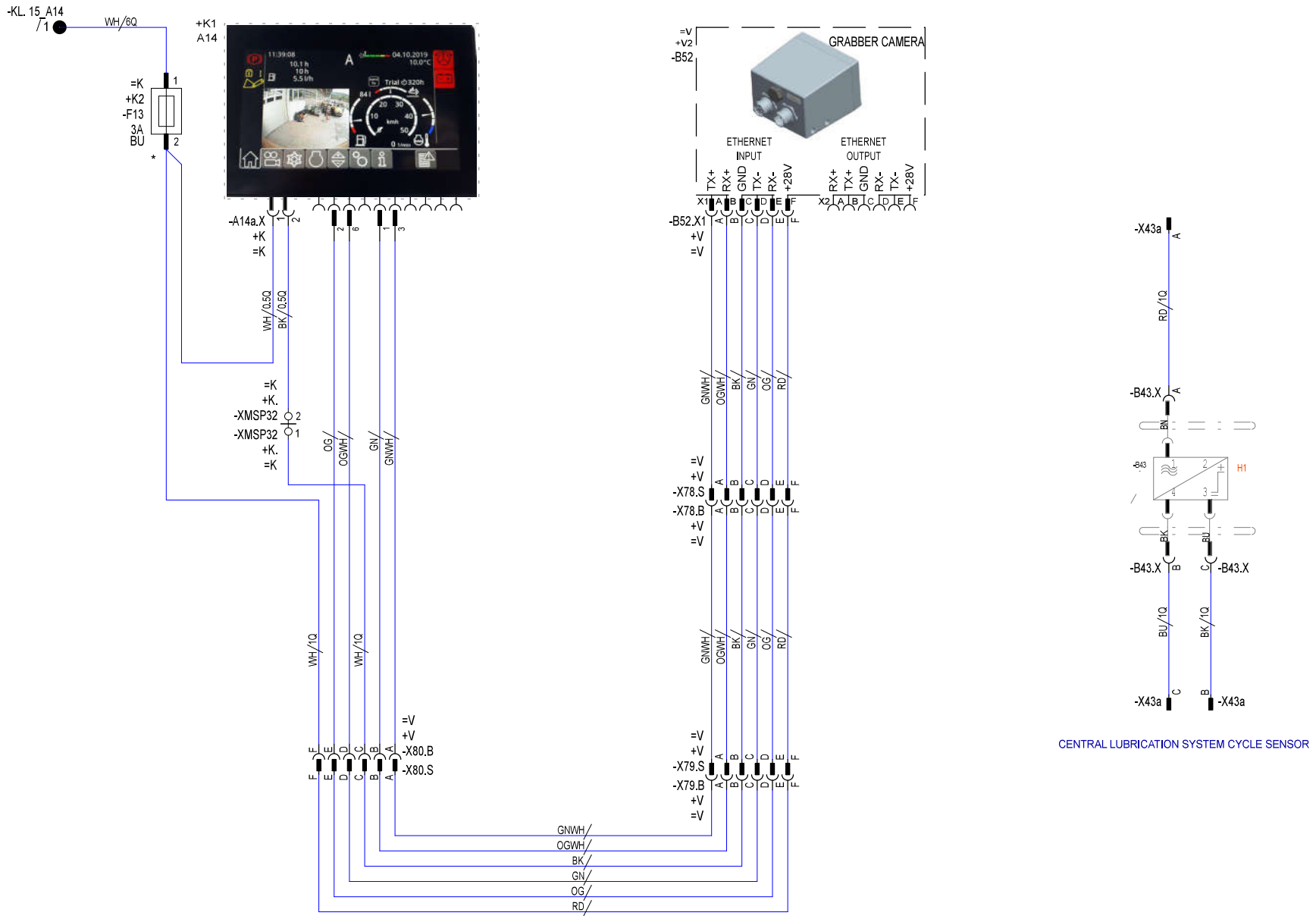
PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00
ITEM CODE 12466553
DRAWING INDEX 000

MACHINE TYPE	SERIAL NUMBER			
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	VERSION 1 MULTI-LEVER CONTROL STARTING SWITCH ELECTRICAL SCHEMATIC;	PAGE 139 OF
				CREATION DATE 09.10.2019 15:49



ITEM CODE 12466553
DRAWING INDEX 000
PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00

MACHINE TYPE	SERIAL NUMBER		VERSION 2 LogHandler	PAGE 149 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	ELECTRICAL SCHEMATIC;	CREATION DATE 09.10.2019 15:49



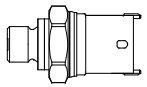
CENTRAL LUBRICATION SYSTEM CYCLE SENSOR

PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00
ITEM CODE 12466553
DRAWING INDEX 000

MACHINE TYPE	SERIAL NUMBER			
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	OPTION GRABBER CAMERA LogHandler CENTRAL LUBRICATION SYSTEM ELECTRICAL SCHEMATIC;	PAGE 159 OF
				CREATION DATE 09.10.2019 15:49

TYPE MOTOR_SPL

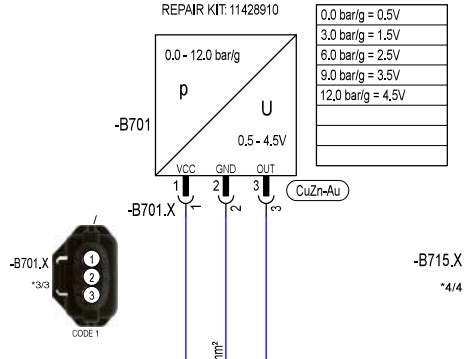
PROJECT: 11392210

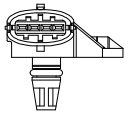


OIL PRESSURE SENSOR

REPAIR KIT: 11428910

0.0 bar/g = 0.5V
3.0 bar/g = 1.5V
6.0 bar/g = 2.5V
9.0 bar/g = 3.5V
12.0 bar/g = 4.5V

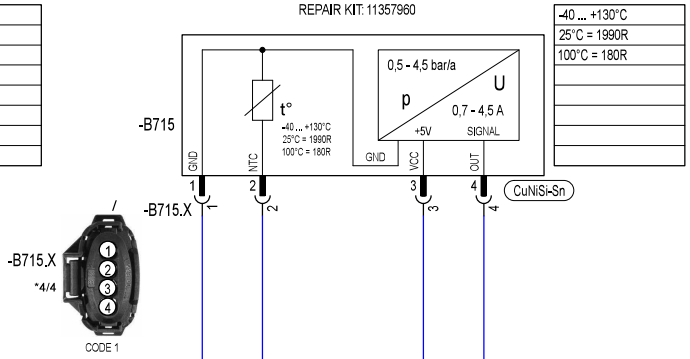


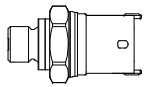


CHARGE AIR TEMPERATURE & PRESSURE

REPAIR KIT: 11357960

-40 ... +130°C
25°C = 1990R
100°C = 180R

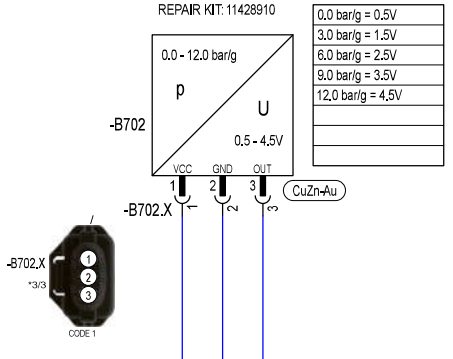




FUEL PRESSURE SENSOR

REPAIR KIT: 11428910

0.0 bar/g = 0.5V
3.0 bar/g = 1.5V
6.0 bar/g = 2.5V
9.0 bar/g = 3.5V
12,0 bar/g = 4.5V



REPLACEMENT FOR	MARKED	lmbbag1	LIEBHERR FACTORY LMB	A3	DESIGNATION: ELECTRICAL WIRING DIAGRAM	DESCRIPTION: OIL PRESSURE SENSOR, CHARGE AIR TEMPERATURE & PRESSURE, FUEL PRESSURE SENSOR	ARTICLE CODE: 11392207	SYSTEM: =M	LOCATION: +M
0	DATE	13.12.2017 09:59					DRAWING NUMBER: 96 006 9309 90	INDEX: 000	SHEET 10 FROM 16
CONFIDENTIAL	CHECKED	lmbbua0							
	TECHNICAL REFEREE								

2 Function

The machine is electronically controlled by the central control unit (Master5-Premium) **A15**.

The central control unit is connected via the CAN lines to the CAN devices.

At the end of each CAN line there is a 120 Ω resistor. That resistor is normally integrated in the CAN devices and can be activated by plugging in an electrical connector (jumper).

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

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

For more information see the section on addressing the CAN modules. (For more information see: Addressing CAN module and checking system information, page 030-245)

110.4.2 Central control unit (Master5-Premium)

Valid for: L566-1758;

1 Function

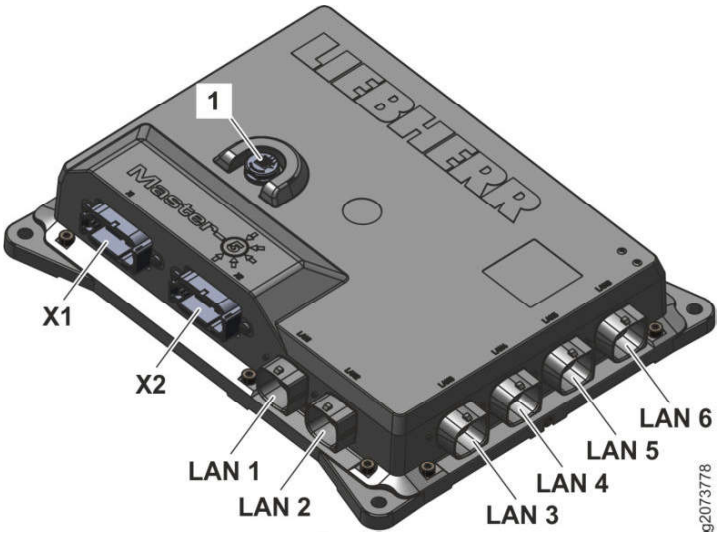


Fig. 510: Central control unit (Master5-Premium)

Position	Function	Position	Function
1	Ventilation membrane	**LAN 3**	LAN interface
X1	Plug connector (12-pin)	**LAN 4**	LAN interface
X2	Plug connector (12-pin)	**LAN 5**	LAN interface
LAN 1	LAN interface	**LAN 6**	LAN interface
LAN 2	LAN interface		

Tab. 228: Items

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110.5 Electrical components of the driver's cab

110.5.1 Fuse and relay boards

Valid for: L566-1758;

1 Fuse and relay board A4

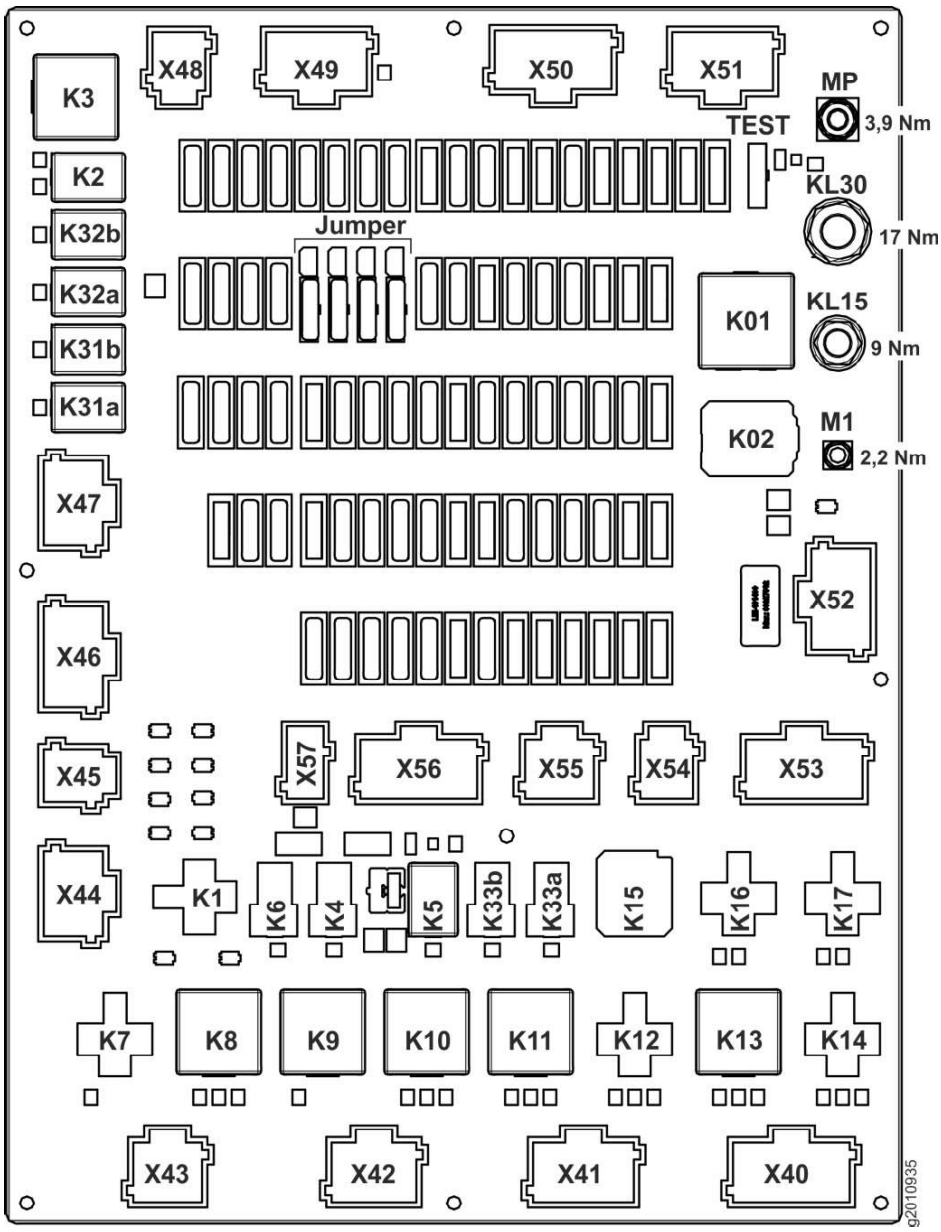

Fig. 520: Fuse and relay board

The fuse and relay board A4 is mounted on the rear wall of the operator's cab.

The fuse and relay board carries and connects the electrical components.

Signal from battery main switch **S15** is also read from output module **A17a**. If battery main switch **S15** is turned off when diesel engine is running, a service code appears on display and a warning sound is issued.

LEDs **H15** indicate status of electric battery main switch.

Green LED lights up when following conditions are met:
– Battery main switch **ON**
– Start switch in position **0**

Green LED flashes when following conditions are met:
– Battery main switch **OFF**
– Start switch in position **0**
– Switch-off delay (5 minutes) is active

Red LED lights up when following conditions are met:
– Battery main switch **ON**
– Start switch in position **I**

Battery main switch (S15)	Start switch (S1)	LED (H15)	Description
OFF	**0** position	No display	No power supply at relay for electric battery main switch **K15.H**.
			Power supply of machine is interrupted.
ON	**0** position	Green	Relay for electric battery main switch **K15.H** is supplied with voltage via start switch **S1**.
			Voltage from battery main switch **S15** is present at control input of battery main switch.
			Switching contact at relay for electric battery main switch **K15.H** is closed.
			Machine is supplied with voltage.
ON	Position **I**	Red	Relay for electric battery main switch **K15.H** is not supplied with voltage via start switch **S1**.
			Voltage from battery main switch **S15** is present at control input of battery main switch.
			Switching contact at relay for electric battery main switch **K15.H** remains closed.
			Machine is supplied with voltage.
OFF	**0** position	Flashing green	Relay for electric battery main switch **K15.H** is supplied with voltage via start switch **S1**.
			Voltage from battery main switch **S15** is not present at control input of battery main switch.
			Switch-off delay (5 minutes) is active
			Machine is supplied with voltage.

Tab. 242: Operating statuses

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2.3 Hydrostat and planetary carrier

2.3.1 Machine at a standstill, travel direction selected

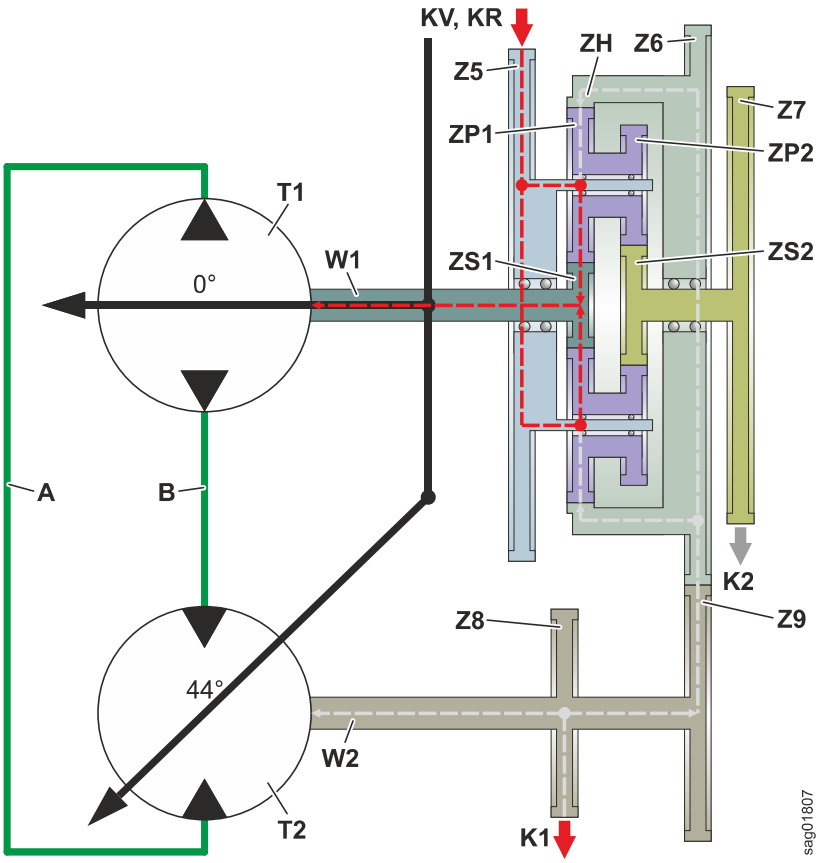

Fig. 535: Machine at a standstill, travel direction selected

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. 251: 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 2nd optional connection
B85	Filter bypass switch	**Y3**	Proportional solenoid for 1st optional connection	**Y7**	Proportional solenoid for position control
B86	Gear oil temperature sensor	**Y4**	Proportional solenoid for reverse travel direction clutch (KR)		

Tab. 257: Equipment codes

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**.

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 **23** in duct plate **22** reduces pressure. Oil that flows out during this returns via gear oil cooler **66** to oil sump.

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**

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120.3 Transmission electronics

120.3.1 Overview of electrical control system of transmission

Valid for: L566-1758;

1

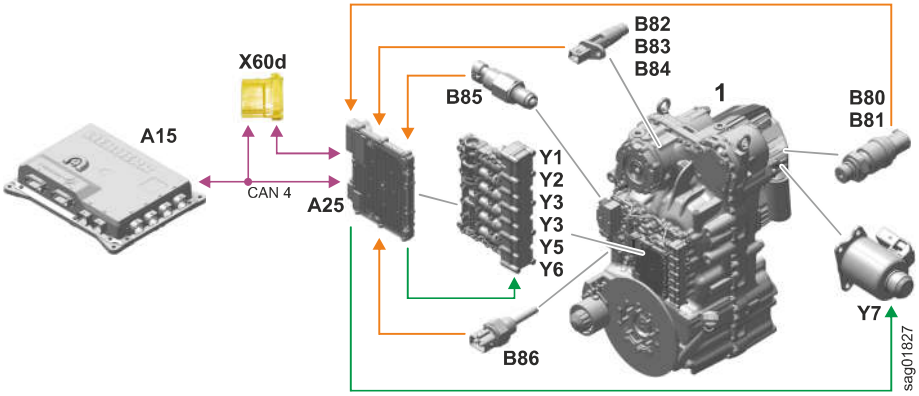

Fig. 549: Diagram

1 Transmission

BMK	Function	BMK	Function
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 solenoid for 1st optional connection
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 solenoid for 2nd optional connection
B85	Filter bypass switch	**Y7**	Proportional solenoid for position control
B86	Gear oil temperature sensor		

Tab. 265: Equipment codes

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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.

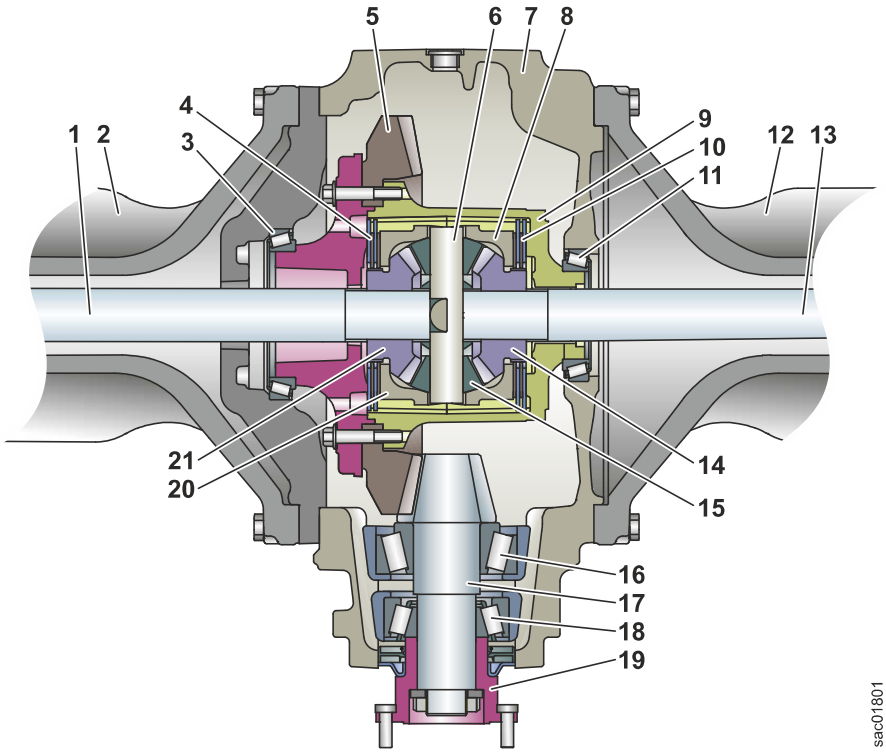

Fig. 558: Central housing with self-locking differential: sectional view

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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BMK	Function	BMK	Function
B60	Angle sensor for bucket position	**B61**	Angle sensor for lift arm position

Tab. 276: Equipment codes

The moving parts of the lift rams are connected to each other with lubricated sliding bearings.

The bucket bearing **3** is also sealed against dirt.

2 Function

Advantages of the industrial lift arms:
- High torque in the top lift arm position, therefore suitable for heavy attachments.
- Almost parallel movement throughout the lifting range. Therefore, no unintentional tilting in or out of the attachment.

Drawbacks of the industrial lift arms:
- Heavier than Z kinematics, therefore lower tipping load.
- Less breakout force than Z kinematics.
- More moving parts, so requires more maintenance.

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160 Operator's cab, heating and air conditioning

Contents

LBH/12252624/03/211-20200326_145803/en

2.4 Air distribution in the cab

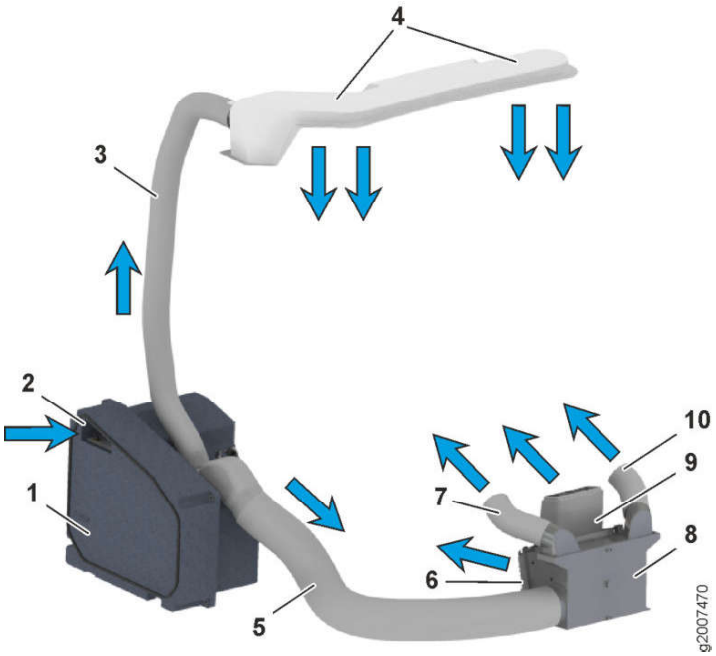


Fig. 589: Air distribution in the cab

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.

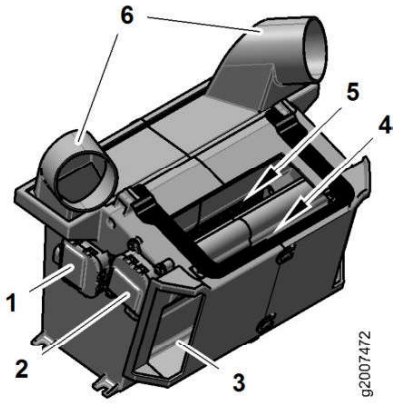


Fig. 590: Air distributor box

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)

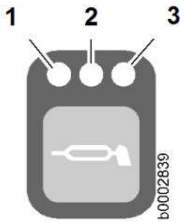
Tab. 294: Connector A21.X2

LBH/12252624/03/211-20200326_145803/en

170 Lubrication system

Contents

LBH/12252624/03/211-20200326_145803/en



2.5 Non-scheduled lubrication intensity (cycle settings)

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

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

2.6 Setting the lubrication intensity

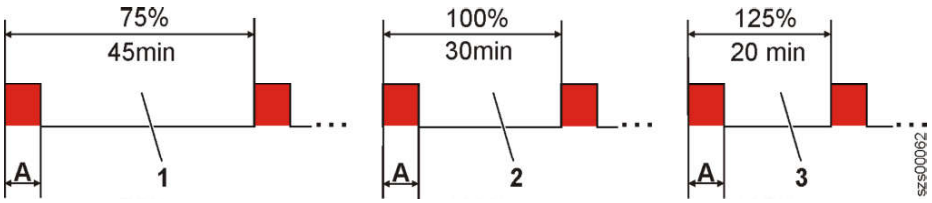


Fig. 614: Lubrication processes

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

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

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

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

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

The number of lubricating cycles and the associated default values can be seen in the Sculi diagnostic software using the variable ***CDCentrGrPulsesPerCycle***.

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2 Function

2.1 Basic function

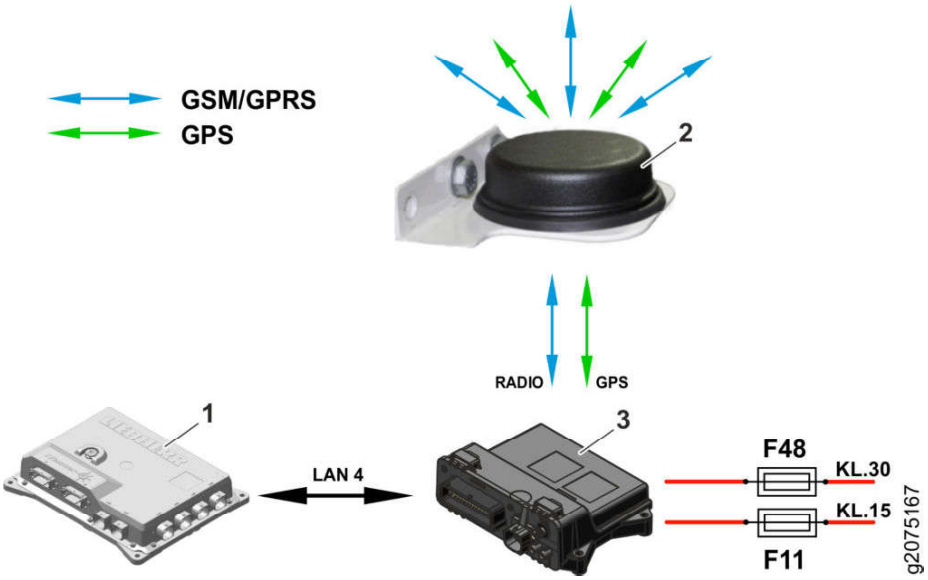

Fig. 623: Function

1 Central control unit
2 Antenna
3 LiDAT module
F11 Fuse F11 terminal 15
F48 Fuse F48 terminal 30

The central control unit **1** transmits machine data via the LAN interface (LAN4) to the LiDAT module **3**. The LiDAT module is powered via fuses **F11** and **F48**.

LiDAT module is connected to the antenna **2** via 2 antenna cables.

Antenna is used to send and receive position data and transmit data.

The following functions can be checked on the display:
– Cable connection between central control unit and LiDAT module.
– Availability of position data.

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2.5 Settings and calibrations

Normally, settings and calibrations are performed at factory. At factory, a csd file with design data is created for every machine.

Machine-specific design data can be accessed via Liebherr service documentation as csd files.

Settings and calibrations take place via ASL Configuration Tool diagnostic software.

To ensure proper representation of overall image, design data is saved on control electronics for Skyview 360°. Design data contains following information:
- Positions of individual cameras on machine
- Calibration of camera image
- Graphics of screen representation

Positions of individual cameras on machine are stored on control electronics via a coordinate system (X-axis, Y-axis, Z-axis). These data are needed to correctly calculate overall picture. Positions are set with the ASL Configuration Tool diagnostic software.

Calibration of camera image takes place over a predefined grid in field of view of cameras. Calibration is performed with diagnostic software ASL Configuration Tool.
(For more information see: Skyview 360°: calibration, page 030-268)

Graphics of screen display include representation of machine in centre of display and boundary lines.

2.6 Diagnostic software

Diagnosis, settings and calibrations take place through the ASL Configuration Tool diagnostic software.

Diagnostic software can be accessed via Liebherr service documentation as exe file.

To connect diagnostic software with control electronics for Skyview 360°, additional .exe file Powerbroker is required. This file is used to set correct IP address.

The ASL Configuration Tool diagnostic software is available with “Installer” and “Design” permission levels.

With “Installer” permission levels, you can perform following activities:
- Diagnosis
- Setting of camera positions
- Calibration of camera images
- Loading design data (csd data)
- Loading camera data (csc data)

With “Design” permission levels, you can perform following activities:
- Activities of permission levels “Installer”
- Changing design settings
- Software update on control electronics for Skyview 360°

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Parking light, low beam switch **S6** is present at input E3 of additional controller **A35**.

If the low beam is switched off, the key on keypad 1 **A36/A36.M** can only be used to activate the headlight flasher.

2.7 Activation

If the steering-column switch is omitted, the variable ***CXNoSteerColummnSw*** must be set to ***1***.

190.6.2 Additional controller (HY-TTC-30S)

Valid for: L566-1758;

1 Layout

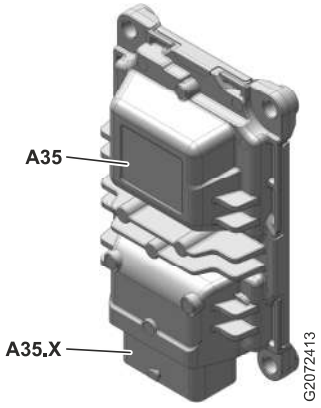

Fig. 652: Additional controller (HY-TTC-30S)

BMK	Function	BMK	Function
A35	Additional controller	**A35.X**	Plug connection for additional controller

Tab. 304: Equipment codes

2.1 Function

The additional controller **A35** is a programmable control module for processing sensor data and for controlling actuators.

Aluminium pressure housing protects against mechanical stress and against electromagnetic interference.

The additional controller **A35** communicates with the central control unit via CAN line 5.

LBH/12252624/03/211-20200326_145803/en