en **Service manual**

Wheel loader

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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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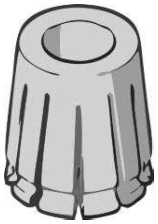
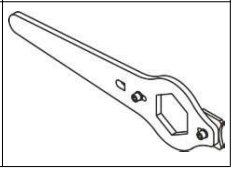
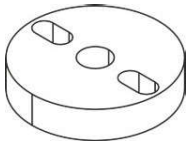
Designation	Item code	Remark	Fig.
Expansion sleeve 180 mm	9110413	For fitting seals	
Piston wrench 110 mm	9600928	Only up to serial no. 53475: for assembly of piston	

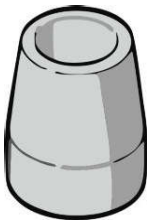
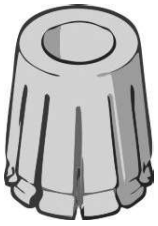
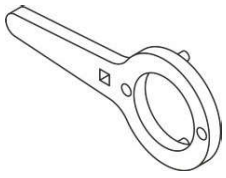
Tab. 9: Special tools for tilt cylinders with industrial lift arms

010.2.7 Special tools for steering wheel

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

Tab. 10: Special tools for steering wheel

010.2.8 Special tools for steering cylinders

Designation	Item code	Remark	Fig.
Mounting sleeve 90 mm	9227161	For fitting the seals	
Expansion sleeve 90 mm	9227162	For fitting the seals	
Piston wrench 60/10 mm	9131362	For fitting the piston	

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

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	
C	Maximum bucket base height	mm	4145	4145
D	Maximum bucket pivot point height	mm	4490	4490
E	Maximum bucket top height	mm	6265	6330
F	Reach at maximum lifting height and 45° tilt-out angle	mm	1290	1230
G	Digging depth	mm	100	100
H	Height above operator's cab	mm	3590	3590
I	Height above exhaust	mm	3200	3200
J	Ground clearance	mm	465	465
K	Wheelbase	mm	3710	3710
L	Overall length	mm	9545	9650
	Turning radius over bucket outer edge	mm	7560	7590
	Breakout force (SAE)	kN	200	185
	Tipping load when straight	kg	20150	19700
	Tipping load when fully articulated (ISO 14397-1)	kg	17750	17300
	Operating weight	kg	28050	28200

Tab. 26: 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: L580-1464;

Values stated refer to machine:

- In standard version
- With 26.5R25 L3 tyres (For more information see: 020.10.6 Tyres, page 020-38)
- 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 information about tyres and working attachment.

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020.3 Cooling system

020.3.1 Fan pump

Valid for: L580-1464;

Description	Unit	Value
Type		External gear pump
Displacement per turn	cm^3	14
Direction of rotation		Anticlockwise

020.3.2 Fan motor

Valid for: L580-1464;

Description	Unit	Value
Type		External gear motor
Displacement per turn	cm^3	19
Direction of rotation		Anticlockwise
Pressure relief	bar	220
Weight	kg	6.82

020.3.3 Hydraulic oil temperature sensor B8

Valid for: L580-1464;

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

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Description	Unit	Value
Connecting thread	mm	M12x1.5
Tightening torque	Nm	25

020.6.8 Joystick steering control valve block

Valid for: L580-1464/0-54742;

Description	Unit	Value
Type		P-05 P357
Pressure reducing valves for pilot control pressure	bar	25 $^{+5}$
Maximum flow rate through main control valve	l/min	150
Maximum flow rate through emergency control valve	l/min	40
Resistance of solenoid for safety circuit Y74	ohms	48.7
Power consumption of solenoid for safety circuit Y74	W	12
Control current for proportional control solenoids for steering Y70, Y71, Y72, Y73	mA	0 to 750
Resistance of proportional control solenoids for steering Y70, Y71, Y72, Y73	ohms	20.8
Output signal of position sensors	mA	4 to 20
Weight	kg	20.5

020.6.9 Joystick steering control valve block

Valid for: L580-1464/54743-;

Description	Unit	Value
Type		S-01 P357
Pressure reducing valves for pilot control pressure	bar	25 $^{+5}$
Maximum flow rate through main control valve	l/min	150
Maximum flow rate through emergency control valve	l/min	70
Resistance of solenoid for safety circuit Y74	ohms	48.7
Power consumption of solenoid for safety circuit Y74	W	12
Control current for proportional control solenoids for steering Y70, Y71, Y72, Y73	mA	0 to 750
Resistance of proportional control solenoids for steering Y70, Y71, Y72, Y73	ohms	20.8

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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
Bridgestone 26.5R25 VSNT	L4	+576	2960	+47	5.00	3.50	6.50
Bridgestone 750/65R25 VTS	L3	+86	3070	-39	5.00	3.50	5.00
Continental 26.5R25 EM-Master	L4	+528	2930	+48	5.00	3.75	6.50
Ecomega 26.5R25 M5DT	L5	+1180	2910	+63	5.50	4.50	6.50
Goodyear 26.5R25 GP-4D	L4	+436	2980	+26	5.00	3.50	5.00
Goodyear 26.5R25 RL-4K	L4	+776	2990	+63	5.00	3.50	6.50
Goodyear 26.5R25 RL-5K	L5	+1244	2990	+63	5.00	3.50	6.50
Goodyear 26.5R25 RL-5S	L5	+1460	2990	+63	5.00	3.50	6.50
Goodyear 26.5R25 RT-3B	L3	+324	2980	+26	5.00	3.50	6.50
Goodyear 26.5R25 RT-5D	L5	+1008	2990	+63	5.00	3.50	6.50
Goodyear 26.5R25 TL-3A+	L3	+348	2980	+30	5.00	3.50	5.00
Goodyear 750/65R25 TL-3A+	L3	+40	3100	-26	5.00	3.50	5.00
Michelin 26.5R25 XHA2	L3	0	2960	0	4.00	3.00	5.50
Michelin 26.5R25 XLD D2A	L5	+696	2970	+38	4.00	3.00	5.50
Michelin 26.5R25 XMINE PRO	L5	+1188	3010	+58	4.00	3.00	7.00
Michelin 26.5R25 XKA	L3	+464	3000	+11	4.00	3.00	6.50
Michelin 26.5R25 XTXL	L4	+488	2970	+23	4.80	3.50	8.00
Michelin 750/65R25 XLD65	L3T	-116	3060	-57	4.50	3.30	5.50

Tab. 31: Approved tyres for standard uses

A) Recommended tyre pressures on the front axle (for machine with standard equipment and cold tyres)
B) Recommended tyre pressures on the rear axle (for machine with standard equipment and cold tyres)
C) Maximum tyre pressure

020.10.6.2 Tyres for timber work

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
Bridgestone 26.5R25 VJT	L3	+160	2970	+14	5.00	3.70	5.00
Bridgestone 26.5R25 VLTS	L4	+420	2970	+44	5.00	3.50	5.00
Bridgestone 26.5R25 VSDL	L5	+1290	2970	+57	5.60	3.50	6.50
Bridgestone 26.5R25 VSDT	L5	+1038	2970	+50	5.60	3.50	6.50
Bridgestone 26.5R25 VSMS	L5	+1599	2960	+70	5.60	3.50	6.50
Bridgestone 26.5R25 VSNT	L4	+576	2960	+47	5.60	3.50	6.50
Continental 26.5R25 EM-Master	L4	+528	2930	+48	5.30	4.00	6.50

030 Maintenance

Contents

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030.1 Maintenance and inspection schedule

General information

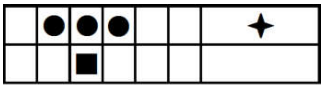
Shorten maintenance intervals depending on conditions of use, for example:
- Dust-intensive use
- Oil quality
- Fuel quality

Ensure that lubricants, liquids and replaced parts are disposed of safely and in an environmentally friendly manner. Comply with applicable country-specific guidelines and applicable laws in country of use.

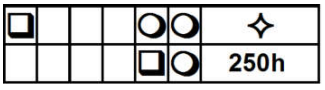
Service packs in spare parts catalogue contain spare parts required for maintenance activities.

The following abbreviations are used in this section:
- h = operating hours

Various symbols (solid or empty circles, boxes and stars) are used to indicate the maintenance tasks, which fall into two main types.

 G2010460	**The symbols have the following meanings:** Table with solid circle, box or star Responsibility for carrying out the maintenance work lies with the machine operator or his maintenance staff. Maintenance interval: every 10, 50 and 500 service hours (h), and at unscheduled times.

Tab. 34: Machine operator

 G2010467	**The symbols have the following meanings:** Table with empty circle, box or star, or service hours (h) The maintenance and inspection work must be performed or supervised by authorised engineers from Liebherr or its authorised dealers. Maintenance interval: on delivery and every 1000, 2000, 3000 service hours (h), and at unscheduled times.

Tab. 35: Authorised specialist staff

You will find a list of the spare parts needed for maintenance and inspection work in the service package of the spare parts list.

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030.3.5.3 Minimum quality requirement

Specification
LH-00-FUEL

Tab. 43: Minimum quality requirement

030.3.6 Diesel exhaust fluid

Valid for: L580-1464;

030.3.6.1 Liebherr recommendation

Designation
AdBlue® in Europe
DEF (Diesel exhaust fluid) in the USA
AUS 32 (aqueous urea solution)

Tab. 44: Liebherr recommendation

030.3.6.2 Minimum quality requirement

Specification
DIN 70 070
ISO 22241
LH-00-UREA

Tab. 45: Minimum quality requirement

030.3.7 Engine oils

Valid for: L580-1464;

030.3.7.1 Liebherr recommendation

Ambient temperature	Designation
-30 °C to 35 °C	Liebherr engine oil 5W-30
-30 °C to 35 °C	Liebherr engine oil 5W-30 low ash

Tab. 46: Recommendation for engine oils

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

030.3.7.2 Other approved engine oils

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

▶ Take out the ignition key.

▶ Turn off the battery main switch.

030.4.2.2 Opening the service hatches

Valid for: L580-1464;

Opening and closing the engine bonnet

When the engine bonnet is open, you can access the following units:
- Diesel engine
- Splitter box
- Hydraulic tank
- Coolant equalising reservoir
- Air filter

Make sure that following requirements are fulfilled:
- ❑ There is sufficient clearance for opening and closing.
- ❑ Ice, snow and dirt have been removed.
- ❑ The wind speed is less than 40 km/h.

WARNING
Hot components!
Risk of injury.

▶ Do not open the service hatch until the engine has cooled down.

WARNING
Rotating parts!
Risk of injury.

▶ Only open the service hatch when the engine is shut down.

WARNING
Persons in the danger area!
Risk of injury.

▶ Make sure there is nobody in the danger area.

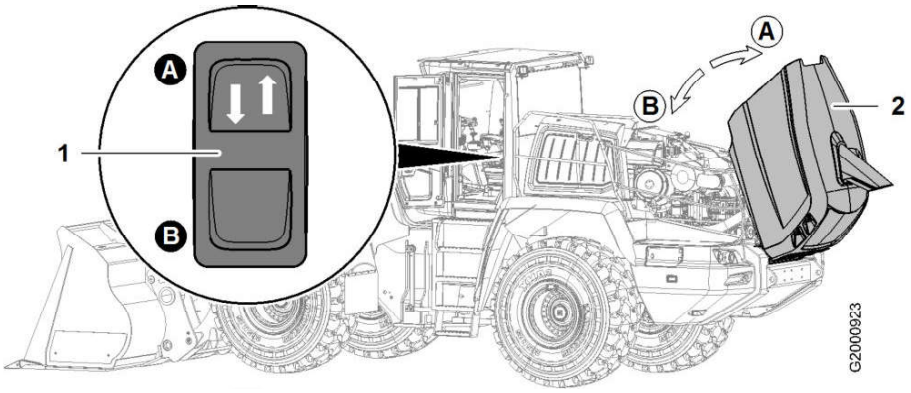

Fig. 94: Opening and closing the engine bonnet

1 *Engine bonnet* button **2** Engine bonnet

To open engine bonnet:

After cleaning

- ▶ Remove all masking and covers over openings and components.
- ▶ Check all fuel lines, engine oil lines and hydraulic lines (for leaks, loose connections, abrasion and damage).
- ▶ Repair any defects immediately.
- ▶ To displace any water that has penetrated: Lubricate all bearings and pin connections again.
- ▶ If necessary, renew the corrosion protection on components and surfaces.

If the engine has been cleaned:

- ▶ Let the engine warm up at idling speed.
  - ▷ This allows the engine to dry better.

Cleaning the interior of the cab

Note

Only clean the interior equipment of the cab with warm water, without any cleaning additives.

- ▶ Wipe surfaces with a soft, damp cloth.

Cleaning the front windscreen of the cab

The front windscreen only needs to be cleaned after working in very dirty environments.

Make sure that the following requirements are fulfilled:
- ❑ The machine is in maintenance position 1.
- ❑ The cab door is closed.

WARNING
Access to the front windscreen!
Risk of injury.

- ▶ Use the footplates and handrails provided.

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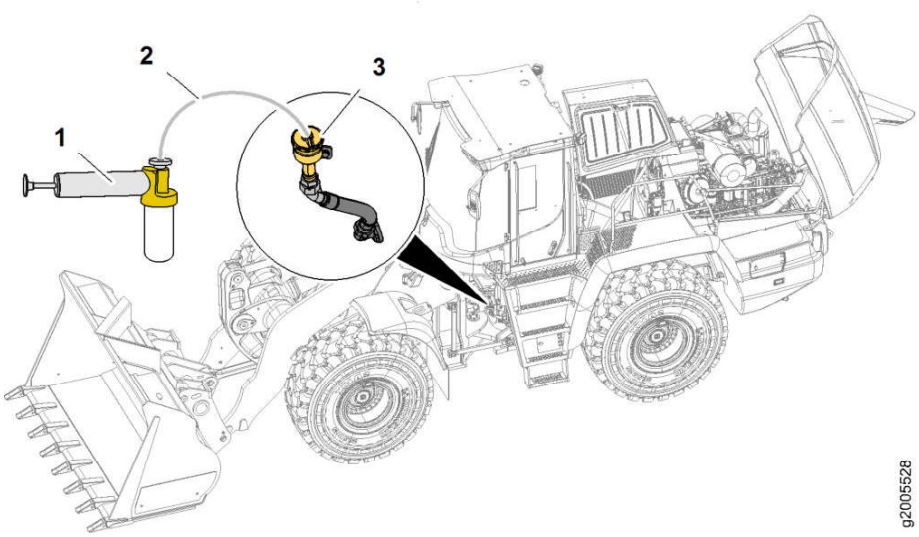

Fig. 110: Sampling point on the transmission

1 Hand pump
2 Sampling hose
3 Filling tube

▶ Start the engine.

▶ Drive the machine for 3 minutes at 15 km/h.
▷ The oil is circulated.

▶ Put the machine in maintenance position 1.

CAUTION
Hot fluid!
Burns.

▶ Do not touch hot fluids.

▶ Open the cap on the filling tube **3**.

▶ Insert the sampling hose **2** in the filling tube to 5 cm below the oil level.

▶ Fill the sample container using the hand pump **1**.

▶ Close the cap on the filling tube.

Axles

The oil sample from the axles is taken from the differential housing using a hand pump.

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WARNING
Rotating parts!
Risk of injury.

▶ Do not touch rotating parts of the engine.

▶ Check V-ribbed-belt **1**, deflection rollers **5** and tensioning device **2** for correct function (noise, wobble).

▶ Turn off diesel engine.

030.4.4.6 Engine: Checking the fastening of the engine control units ad the sensor cable connections

Valid for: L580-1464;

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

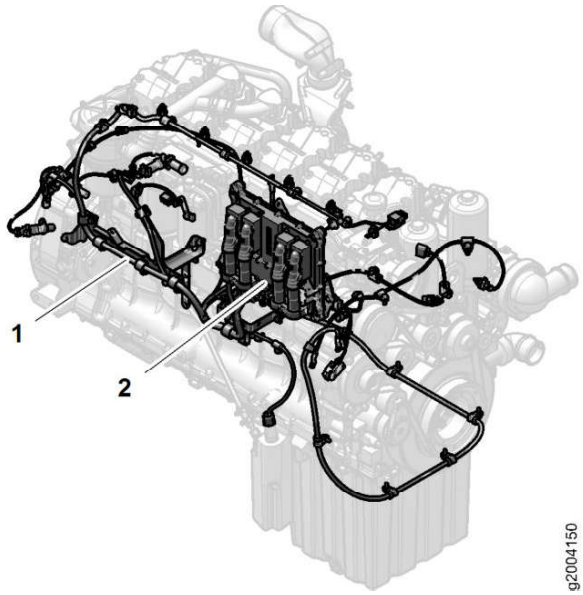

Fig. 120: Engine: Checking the fastening of the engine control units ad the sensor cable connections

1 Wiring harness and sensors **2** Engine control unit

▶ Check that the engine control unit **2** is not damaged and is firmly seated.

▶ Check that the engine control unit bearing is not damaged and is firmly seated.

▶ Check that all the sensors, actuators, plugs and cable connections are properly seated and in good condition.

▶ Check that none of the cables and wiring harnesses are damaged, rub or not properly fastened.

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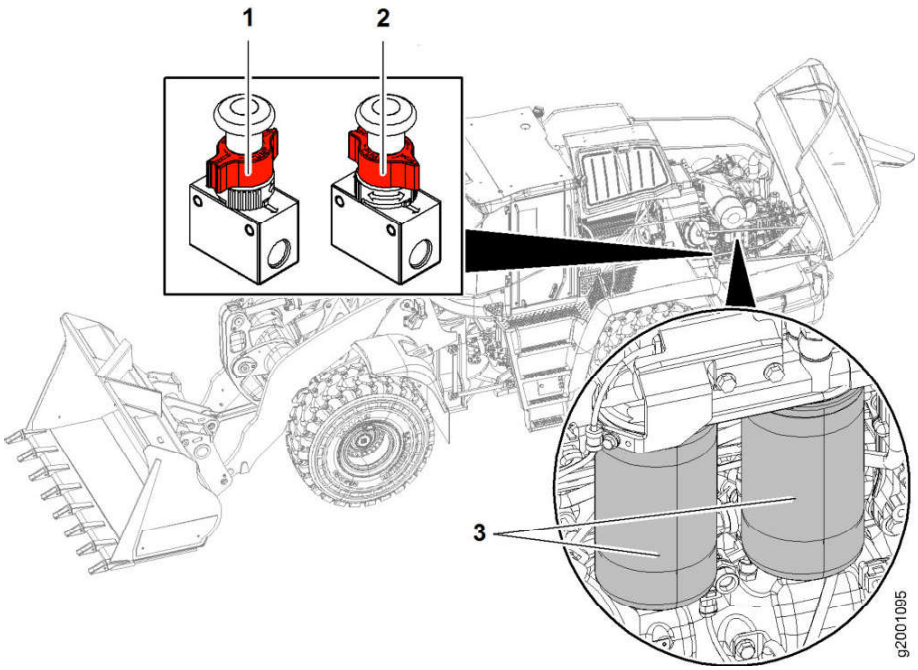

Fig. 129: Changing fuel fine filter element

1 Hand pump in the *PUMP* position
2 Hand pump in the *RUN* position
3 Fuel fine filter

▶ Place a receptacle under fuel fine filter.

▶ Carefully clean the fuel fine filter **4** and the area around it.

▶ Put hand pump in the *PUMP* position **1**.

▶ Unscrew fuel fine filter **3**.

▶ Clean filter base. Tighten the thread adapter.

▶ Lubricate sealing ring of new filter cartridge with clean fuel.

NOTICE
Dirt in fuel system!
Damage to common rail system.

▶ Ensure that no impurities and dirt enters fuel system.

▶ Do not fill fuel fine filter with fuel.

▶ Screw on filter cartridge until sealing ring lies flat against filter head.

▶ Tighten filter cartridge half a turn by hand.

▶ Put hand pump in the *RUN* **2** position.

▶ Bleed the fuel system.

Bleeding the fuel system

Bleeding the fuel system is necessary after:
– Changing the fuel filter
– Emptying the fuel tank

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

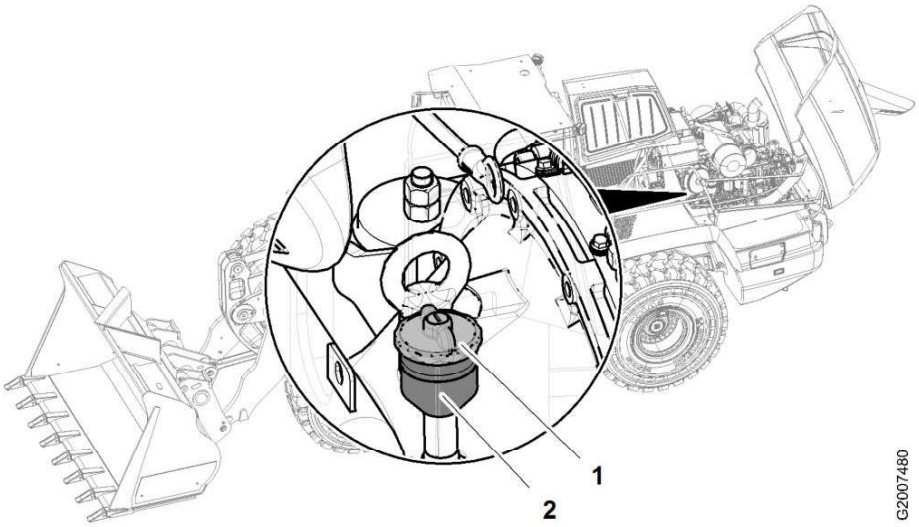

Fig. 140: Checking the oil level

1 Cap **2** Filling tube

▶ Take the cap **1** off the filler pipe **2**.

NOTICE
Non-approved oil!
Damage.

▶ Only use oil that meets the Liebherr specifications.

▶ Top up the appropriate amount of splitter box oil via the filler pipe. (For more information see: 030.3.12 Splitter box oil, page 030-26)

▶ Clean the cap **1**, place it on the filler pipe **2** and tighten it.

030.4.4.19 Splitter box: Changing the oil

Valid for: L580-1464;

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

Make sure that the following consumables are ready:
- ❑ Oil according to the lubricant table. (For more information see: 030.2.1 Recommended lubricants, page 030-16)

NOTICE
Non-approved oil!
Damage.

▶ Only use oil that meets the Liebherr specifications.

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030.4.4.24 Checking the compressed air system

Valid for: L580-1464;

Make sure that the following requirements are fulfilled:
- ❑ The machine is in maintenance position 1.
- ❑ The engine has cooled down.
- ❑ The service hatches are open.

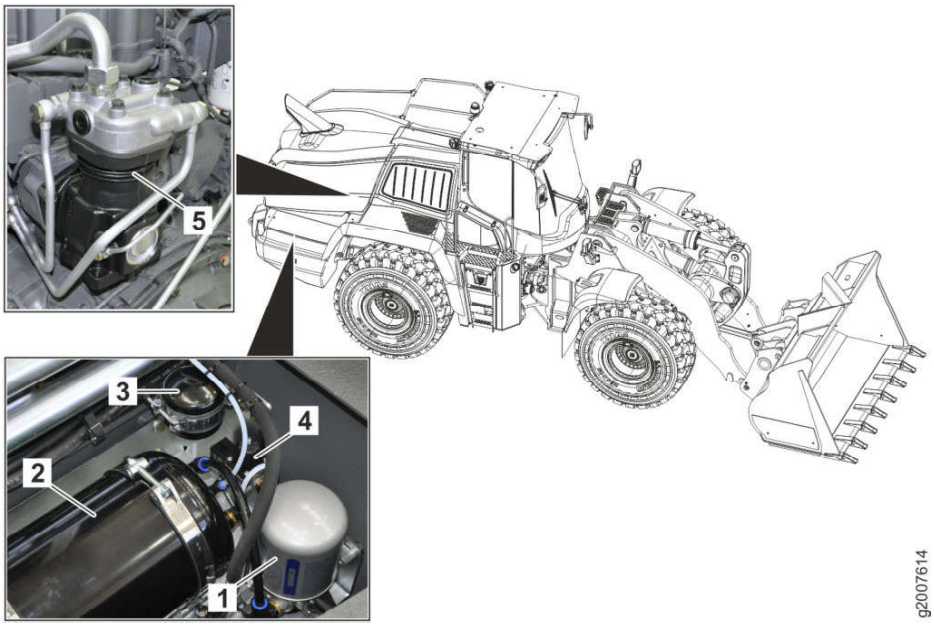

Fig. 149: Checking the compressed air system

1	Air dryer	**4**	SCR system air supply valve
2	Compressed air accumulator	**5**	Compressor
3	Regeneration accumulator		

▶ Remove the right ballast weight.

▶ Check the air dryer **1** for damage and leaks.

▶ Check the compressed air accumulator **2** for damage and leaks.

▶ Check the regeneration accumulator **3** for damage and leaks.

▶ Check the SCR system air supply valve **4** for damage and leaks.

▶ Check the lines and connections of the compressed air system in the right ballast weight for damage and leaks.

▶ Put the cover of the right ballast weight back on.

▶ Check the compressor **5** for damage and leaks.

▶ Check the lines and connections of the compressed air system for damage and leaks.

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NOTICE
Always carry out cleaning correctly
Damage to the cooling system.

▶ Do not use hard objects or excessive water pressure.

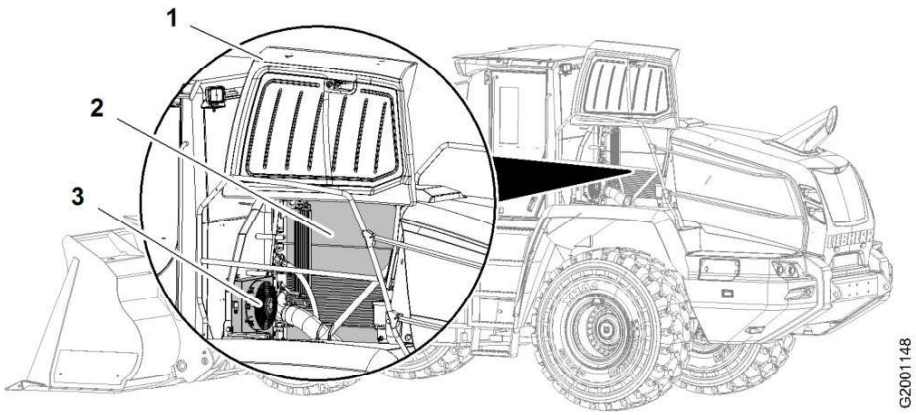

Fig. 157: Cleaning the cooling system

1 Cooler hood
2 Cooler unit
3 Condenser unit

▶ Open the cooler hood **1**.

▶ Clean the cooler units **2** with a high-pressure cleaner or compressed air.

▶ Clean the condenser unit **3** with compressed air.

▶ Close the cooler hood **1**.

030.4.5.4 Changing coolant in cooling system

Valid for: L580-1464;

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

Make sure that following tools are ready:
❑ Drain hose
❑ Receptacle (80 l)

Make sure that following consumables are ready:
❑ Coolant as specified in table. (For more information see: 030.2.2 Recommended operating fluids, page 030-17)

Note
Information on coolant specification:

▶ See “Lubricants and fuels: Engine coolants”. (For more information see: 030.3.10 Coolant, page 030-24)

NOTICE
Incorrectly mixed coolants!
Damage to the cooling system.

▶ Do not mix coolants.

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Draining the oil

WARNING
Hot components and fluids!
Beware of burns.

▶ Avoid skin contact with hot components and fluids.

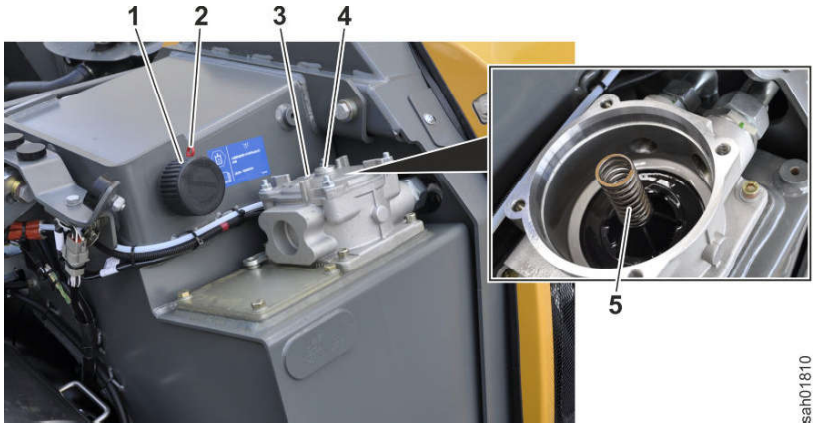

Fig. 167: Draining the oil

1	Breather filter	**4**	Plug
2	Connector	**5**	Compression spring
3	Filter cover		

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

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

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

▶ Unscrew the nuts from the filter cover **3**.

▶ Take off the filter cover **3** and the compression spring **5**.

▶ Place a receptacle under the machine.

Note
To completely flush all condensate and dirt out of the hydraulic tank:

▶ Let out the oil via the drain valve on the hydraulic tank.

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Check the gap

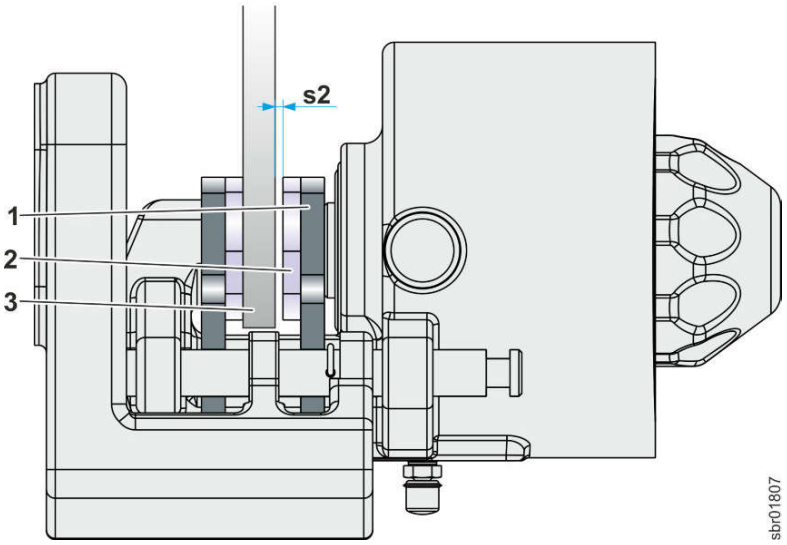

Fig. 180: Check the gap

1	Brake shoe	**3**	Brake disc
2	Brake lining	**s2**	Gap

- ▶ Start the diesel engine and let it run for 30 seconds at low idling speed.
  - ▷ The parking brake hydro accumulator is filled.
  - ▷ The parking brake can be operated when the diesel engine is off.
- ▶ Turn off the diesel engine.
- ▶ Switch on the ignition.
- ▶ 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.
- ▶ Check that the gap **s2** corresponds to the required value.

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

Fig. 188: Button cover and buttons

1 Button cover
2 Screws
3 Buttons

▶ Loosen the screws **2**.

Note

▶ To remove the button cover **1** more easily, push together the two grips of the control lever.

▶ Note that the buttons **3** are different sizes.

▶ Take off the button cover **1**.

Fig. 189: Fitting the button cover

4 Anti-twist lock

▶ Fit the buttons **3** in the new cover **1**.

▶ Fit the button cover on the control lever. Pay attention to the anti-twist lock **4**.

Note
To stop the buttons **3** from falling out of the cover **4** during assembly:

▶ Gently press the three buttons from outside to hold them in place.

▶ Tighten the screws **2** to 0.5 Nm.

NOTICE
Incorrectly mixed axle oils!
Damage to the axles.

▶ No not mix axle oils.

Draining the oil

WARNING
Hot. pressurised liquid!
Beware of burns.

▶ Carefully unscrew the filling plug.

▶ Wear safety glasses.

▶ Avoid skin contact with fluids.

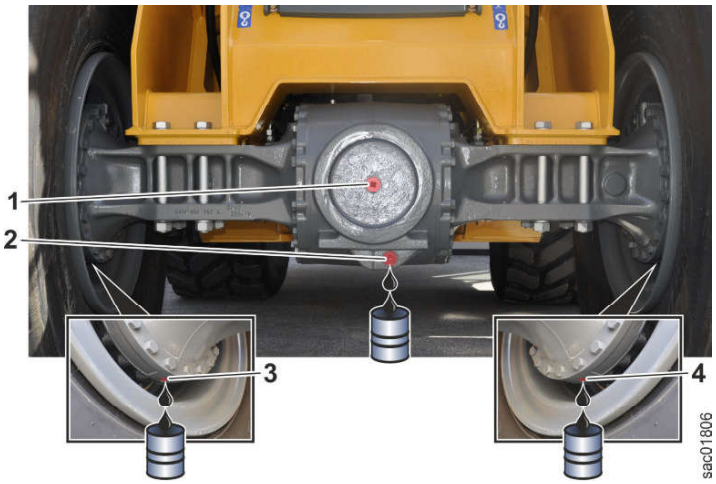

Fig. 198: Draining the oil

1	Filling plug	**3**	Right wheel hub drain plug
2	Main housing drain plug	**4**	Left wheel hub drain plug

Note
Filling plugs and drain plugs with 1/2" square socket!

▶ Unscrew the filling plugs and drain plugs using a 1/2" ratchet without a socket attached.

▶ Carefully open the filling plugs **1** on the main housing **1** of both axles.

▶ Check that the oil level is up to the bottom of the opening.

▶ If the oil level is too low: Check the axle for leaks.

▶ If the oil level is too high (oil comes out of the opening): Check the axle for brake defects (oil coming from the brake system in the axle).

▶ Place a receptacle under the front axle.

▶ Carefully unscrew the drain plugs on the main housing **2** and on the wheel hubs **3** and **4** of the front axle.
▷ Oil drains off.

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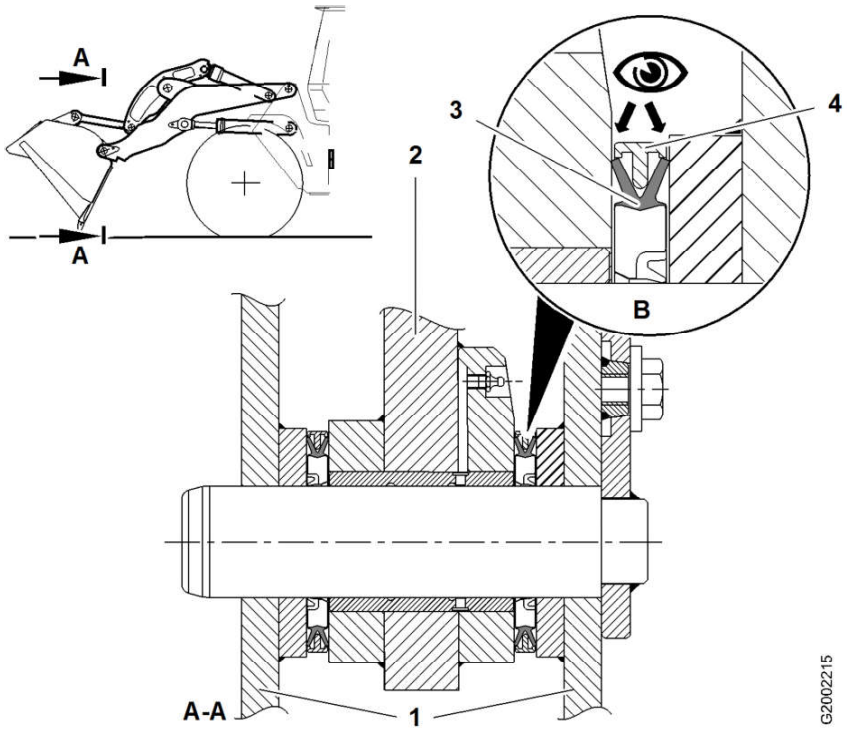

Fig. 210: Lift arms: Checking the bucket bearing seals

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

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

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

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

Note
Replace the bucket bearing seals!

▶ Contact Liebherr customer service.

030.4.13.3 Checking the lift arm bucket bearing bushings

Valid for: L580-1464;

Make sure that the following requirements are fulfilled:
❑ The machine is secured against rolling away.

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Changing the recirculated air filter

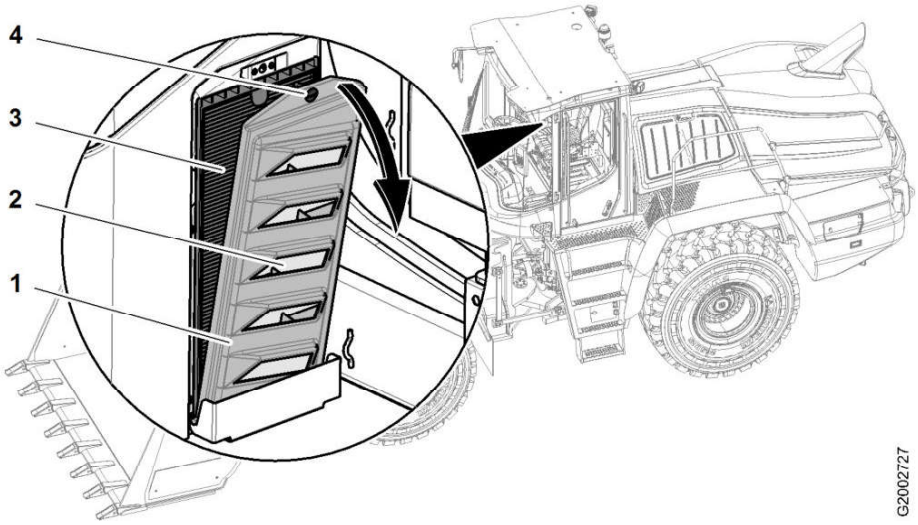


Fig. 220: Cleaning the recirculated air filter

1	Filter cartridge	**3**	Recirculated air filter
2	Pre-filter	**4**	Screw

▶ Undo the screw **4**.
▷ The filter cartridge **1** is unlocked.

▶ Move the filter cartridge **1** forward and take it out.

▶ Take the pre-filter **2** out of the filter cartridge **1** and dispose of it.

▶ Take out the recirculated air filter **3** and dispose of it.

▶ Put in a new recirculated air filter **3**.

▶ Put a new pre-filter **2** into the filter cartridge **1** and fit them.

▶ Tighten the screw **4**.
▷ The filter cartridge **1** is locked.

030.4.14.3 Safety belt: Checking the condition and function

Valid for: L580-1464;

Make sure that the following requirements are fulfilled:
❑ The machine is in maintenance position 1.

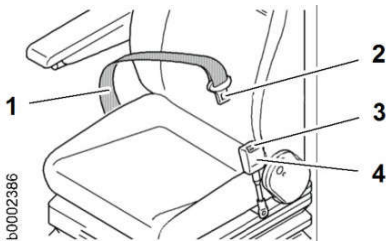
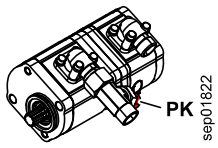
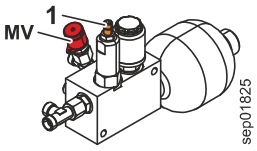
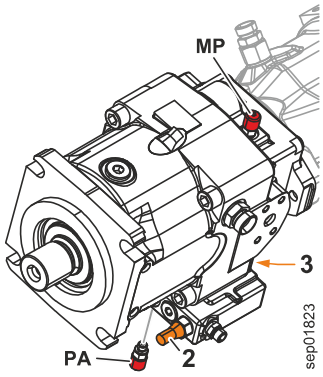
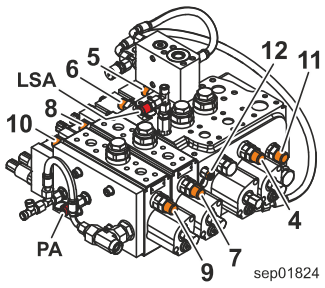


Fig. 221: Safety belt: Checking the condition and function

1	Strap	**3**	Unlock button
2	Lug	**4**	Belt lock

3. Hydraulic adjustment procedures									
Test / adjustment	**1000 h**	**2000 h**	**Unit**	**Required value**	**Measured**	**Adjusted**	**Adjusting point**	**Test point**	**Figure**
Cooling system									
Fan speed proportional solenoid valve									
Maximum operating pressure	◊	◊	bar	$170^{\pm 10}$				PK	
Pressure relief when proportional solenoid fails	◊	◊	bar	$220^{\pm 20}$				PK	
Working hydraulics									
Pilot control valve block: pressure reducing valve									
Servo pressure	○	○	bar	$33^{\pm 2}$			1	MV	
Working pump: flow regulator (standby pressure)									
High pressure at low idling speed	◊	◊	bar	$25^{\pm 2}$			2	PA	
Working pump flow regulator (differential pressure)									
Differential pressure ΔP at 1500 min^{-1} diesel engine speed and float position	◊	◊	bar	$22^{\pm 2}$			2	PA/ LSA	
Working pump: power regulator									
Start of regulation	◊	◊	bar	$180^{\pm 10}$			3	PA/ MP	
Z-bar kinematics control valve block: secondary pressure relief valves									
Opening pressure for tilting out A)		○	bar	$405^{\pm 5}$			4	PA	
Opening pressure for tilting in A)		○	bar	$405^{\pm 5}$			5	PA	
Opening pressure for lifting A)		○	bar	$425^{\pm 5}$			6	PA	
Opening pressure for 3rd function A3 (option)		○	bar	$255^{\pm 5}$			7	PA	
Opening pressure for 3rd function B3 (option)		○	bar	$255^{\pm 5}$			8	PA	
Opening pressure for 4th function A4 (option)		○	bar	$255^{\pm 5}$			9	PA	
Opening pressure for 4th function B4 (option)		○	bar	$255^{\pm 5}$			10	PA	
Z-bar kinematics control valve block: primary pressure relief valve									
Opening pressure B)		○	bar	$390^{\pm 5}$			11	PA	
Z-bar kinematics control valve block: LS-pressure cut-off									
High pressure at full load		○	bar	$380^{\pm 5}$			12	PA	

If the required values are reached:
▶ Calibration was successful. Switch off ignition.

030.6.3.2 Reading the diesel engine service files

Valid for: L580-1464;

Service files are data that is required for diagnosing diesel engine problems and for handling warranty claims.

The service file of the Liebherr diesel engine is saved in HTML format. The file name must not be changed.

After replacing an diesel engine component, the diesel engine service file must be sent to the following e-mail address:
lbh.maschinenfeedback@liebherr.com

Only the serial number of the machine must be included in the subject line of the e-mail.

Make sure that the following requirements are fulfilled:
❑ The machine is in maintenance position 1.
❑ The service access is open.

Make sure that the following tools are ready:
❑ Diagnostic cable (CAN-Fox) (item code: 11482727)
❑ LiDIA USB dongle (item code: 11494535)

▶ Connect the LiDIA diagnostics software with the diesel engine.

Fig. 231: “Diagnosis” function

▶ Select “Diagnosis” function.
▷ The diagnostics software looks for an ECU to connect to.

Fig. 232: Engine control unit

▶ Select the engine control unit.

▶ The diagnostics software connects to the engine control unit.

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▶ Contact the technical customer service department.

If no service code appears:
▶ Calibration was successful. Turn off the diesel engine.

Manual calibration of the proportional solenoids for lifting and tilting

Note
Manual calibration for lifting and tilting is not necessary when the machine is working properly.

▶ Only carry out manual calibration for lifting and tilting if automatic calibration fails.

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

Make sure that the following tools are ready:
❑ 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 ***QREHLiftValveUp*** shows the current at the proportional solenoid for lifting.
▷ The variable ***QREHLiftValveDn*** shows the current at the proportional solenoid for lowering.
▷ The variable ***QREHLiftBucketValveUp*** shows the current at the proportional solenoid for tilting in.
▷ The variable ***QREHLiftBucketValveDn*** shows the current at the proportional solenoid for tilting out.

▶ Make sure that the parking brake is activated.

▶ Raise the lift arms half way.

▶ Tilt the bucket half way in.

▶ Click the variable ***QREHLiftValveUp*** 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 ***QREHLiftValveUp*** until you notice a slight movement of the lifting function.

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

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

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3 Secondary pressure relief valve for lifting
4 Secondary pressure relief valve for 3rd function A3 (option)
5 Secondary pressure relief valve for 3rd function B3 (option)
8 LS-pressure cut-off
9 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 primary pressure relief valve **9** by exactly one turn clockwise.
  - ▷ Opening pressure of primary pressure relief valve is higher than that of secondary pressure relief valves.
- ▶ Turn adjusting screw on LS-pressure cut-off valve **8** by exactly one turn clockwise.
  - ▷ Opening pressure of LS-pressure cut-off valve is above opening pressure of secondary pressure relief valves.
- ▶ Make sure that critical functions are deactivated. (For more information see: Deactivate critical functions, page 030-176)

Checking and adjusting

- ▶ Start diesel engine.

NOTICE
There is no secondary pressure relief valve for lowering function.
Irreparable damage to working pump.

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

- ▶ At low idling speed, activate in succession lifting, tilting out and tilting in functions, as well as optional additional functions, as far as they will go and then operate fully.
- ▶ While doing so, check whether high pressure **PA** corresponds to specified value.

Description	Unit	Value
High pressure **PA** during tilt out **1** function	bar	405 ±5
High pressure **PA** during tilt in **2** function	bar	405 ±5
High pressure **PA** during lift **3** function	bar	425 ±5
High pressure **PA** during 3rd function A3 (option) **4**	bar	255 ±5
High pressure **PA** during 3rd function B3 (option) **5**	bar	255 ±5
High pressure **PA** during 4th function A4 (option) **6**	bar	255 ±5
High pressure **PA** during 4th function B4 (option) **7**	bar	255 ±5

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Note
To adjust LS-pressure cut-off:

- ▶ Turn adjusting screw clockwise to increase high pressure.
- ▶ Turn adjusting screw anticlockwise to reduce high pressure.

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

If required value is reached:
- ▶ Set bucket down on ground on its teeth or cutting edge.
- ▶ Turn off diesel engine and take out ignition key.
- ▶ Disconnect pressure gauge from high pressure test connection **PA**.

030.6.5.14 Stabilisation module cut-out function

Valid for: L580-1464;

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

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

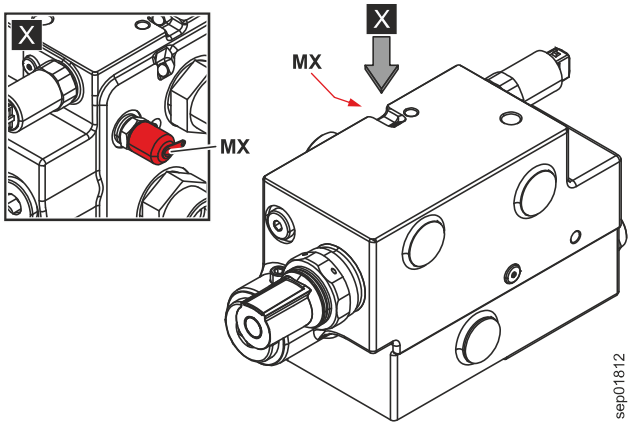

Fig. 248: Stabilisation module cut-out function

MX Ride control hydro accumulator charge pressure test connection

- ▶ Connect a pressure gauge (250 bar) to the hydro accumulator charge pressure test connection **MX** on the stabilisation module.
- ▶ Start the diesel engine.
- ▶ Make sure that ride control is switched off.
- ▶ Raise the lift arms as far as they will go.
- ▶ Fully activate the lifting function at low idling speed.
  - ▷ The pressure shown on the gauge increases until it reaches the hydro accumulator charge pressure and then drops again.
- ▶ Check that the **highest** value shown corresponds to the hydro accumulator charge pressure **MX**.

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

030.6.7.3 Control block for joystick steering (option): calibration

Valid for: L580-1464;

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

Make sure that following requirements are met:
❑ Hydraulic oil is at operating temperature.
❑ Angle sensor for articulation angle is calibrated. (For more information see: Angle sensor for articulation angle (option): calibration, page 030-219)
❑ Machine is in maintenance position for adjustment procedures.

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

Preparations

▶ Start diesel engine.

▶ Connect Sculi diagnostic software to machine.

▶ In the variables editor, select the ***Joystick steering*** folder.

Automatic calibration of position sensor of main spool valve

▶ Make sure that joystick steering is **not** activated (*joystick steering* switch in position *0*; for more information see: operator's manual).

▶ Set the variable ***MXJSSteerVlvPosAdjStart*** to ***1***.
▷ Calibration takes place automatically.

▶ Wait until the variable ***MXJSSteerVlvPosAdjStart*** returns to ***0***.
▷ Calibration is completed.

▶ Repeat calibration again.

▶ Carry out manual calibration of the position sensor of the emergency spool valve.

Manual calibration of the position sensor of the emergency spool valve

Note

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

▶ Turn off diesel engine.

▶ Engage the articulation lock.

▶ Start diesel engine.

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▷ Variable ***IRJSEmergValvePos*** indicates input signal of position sensor of emergency spool valve **B71**.

▶ Change distance **X** of position sensor to control block until input signal matches specified value.

Description	Unit	Value
Input signal	µA	12000 $^{\pm 250}$

▶ Tighten locknut to a tightening torque of 20 Nm.

▶ Check again that input signal matches specified value. If necessary, correct installation location.

▶ Start diesel engine.

▶ Check function of joystick steering.

030.6.8 Brake system

030.6.8.1 Compact brake valve hydro accumulator charging function

Valid for: L580-1464;

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

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

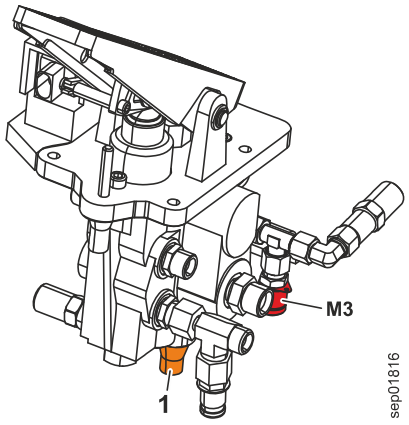

Fig. 264: Compact brake valve hydro accumulator charging function

1 Pilot valve

M3 Service brake accumulator pressure test connection

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

▶ Start the diesel engine.

▶ Wait 10 seconds.
▷ The hydro accumulators for the service brake are full.

▶ **Slowly** press the compact brake valve all the way down a number of times until the brake accumulator pressure **M3** has fallen to the cut-in pressure.

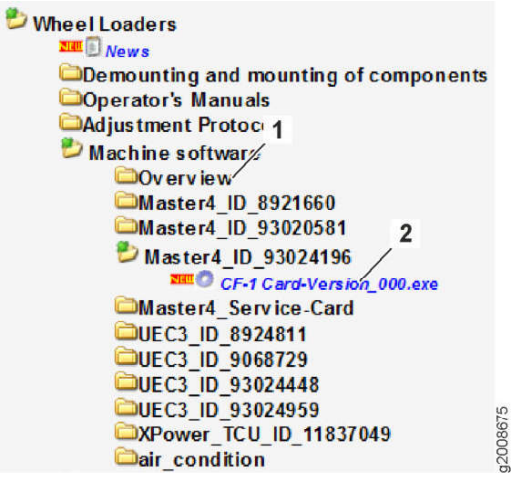

Fig. 277: Software in the Liebherr service documentation

1 Software overview **2** Example for software

The software can be downloaded from the Liebherr service documentation.

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

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

▶ Select the “Run” command to save the software on a formatted memory card.
  ▷ The compressed file is extracted.
  ▷ The software is saved in form of individual files on the memory card.

To ensure that no LiDAT files are lost when updating the software, following files must be transferred from the existing card in the central control unit (slot CF1) to the new memory card:

▶ Copy the folder “lidat.buf” from the existing memory card to the new one.

▶ Copy the file “lidat_cnf.xml” from the existing memory card to the new one.

Updating software

Fig. 278: Slots CF1 and CF2 on the central control unit

1 LED 1 **CF1** Slot CF1
2 LED 2 **CF2** Slot CF2

▶ Put memory card with the software update and the LiDAT files into the slot CF1.

▶ Switch on battery main switch.

▶ Switch on ignition.
  ▷ The software update begins.
  ▷ The software update can take up to 15 minutes.

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Overview of CAN addresses (valid for Master4 ID 93024196)		
Address	**CAN module**	**CAN line**
IR02 (84)	Resistance measurement inputs, input module (not used)	1
IA16 (46)	Analogue universal inputs, input module A16b	2
IF02 (54)	Frequency measurement inputs, input module A16b	2
IR02 (82)	Resistance measurement inputs, input module A16b	2
IA16 (45)	Analogue universal outputs, input module (not used)	2
IF02 (53)	Frequency measurement inputs, input module (not used)	2
IR02 (81)	Resistance measurement inputs, input module (not used)	2
JD (65)	Control lever	2
JA08 (66)		2
JD (67)	Module for joystick steering	2
JA08 (68)		2
IA16 (48)	Analogue universal inputs, input module A16M	2
IF02 (56)	Frequency measurement inputs, input module A16M	2
IR02 (84)	Resistance measurement inputs, input module A16M	2
IA16 (47)	Analogue universal outputs, input module (not used)	2
IF02 (55)	Frequency measurement inputs, input module (not used)	2
IR02 (83)	Resistance measurement inputs, input module (not used)	2
OA16 (21)	Analogue universal outputs, output module A17a	2
OD04 (13)	Digital outputs, output module A17a	2
SFTY (5)	Safety function, output module A17a	2
IF02 (49)	Frequency measurement inputs, output module A17a	2
TA06 (93)	Not used	3
TA06 (94)	Not used	3
TA21 (97)	Control unit	3
CC01 (106)	Air conditioning controller	3
JD (63)	Module for joystick steering	3
JA08 (64)		3
IMMO (107)	Immobiliser	3

Tab. 97

- ▶ Switch on the ignition.
- ▶ Start the Sculi diagnostic software and connect it to the machine.

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▷ Electronic control function is activated.

▶ Switch off the machine.

Analysing oscilloscope recording

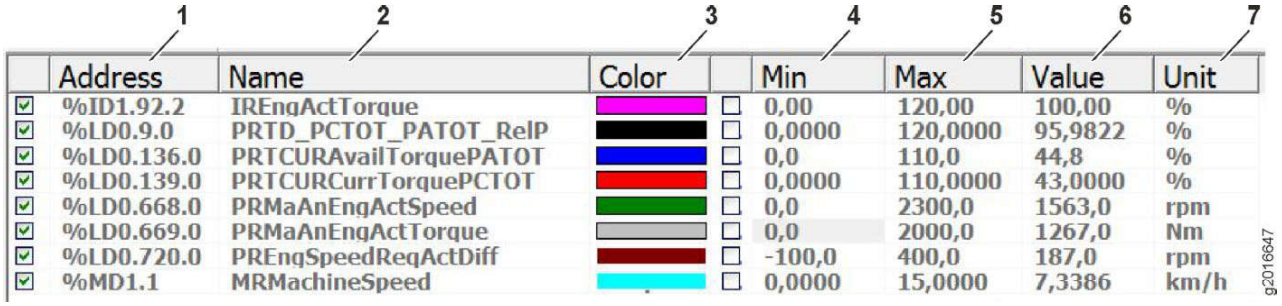

Fig. 293: Oscilloscope settings

1	Address	**4**	Minimum value	**7**	Unit
2	Variable name	**5**	Maximum value		
3	Colour	**6**	Value		

▶ To be able to analyse the oscilloscope recording, the settings have to be selected as shown in the illustration above. The colour, the minimum value and maximum value can be changed by pressing the “F2” button.

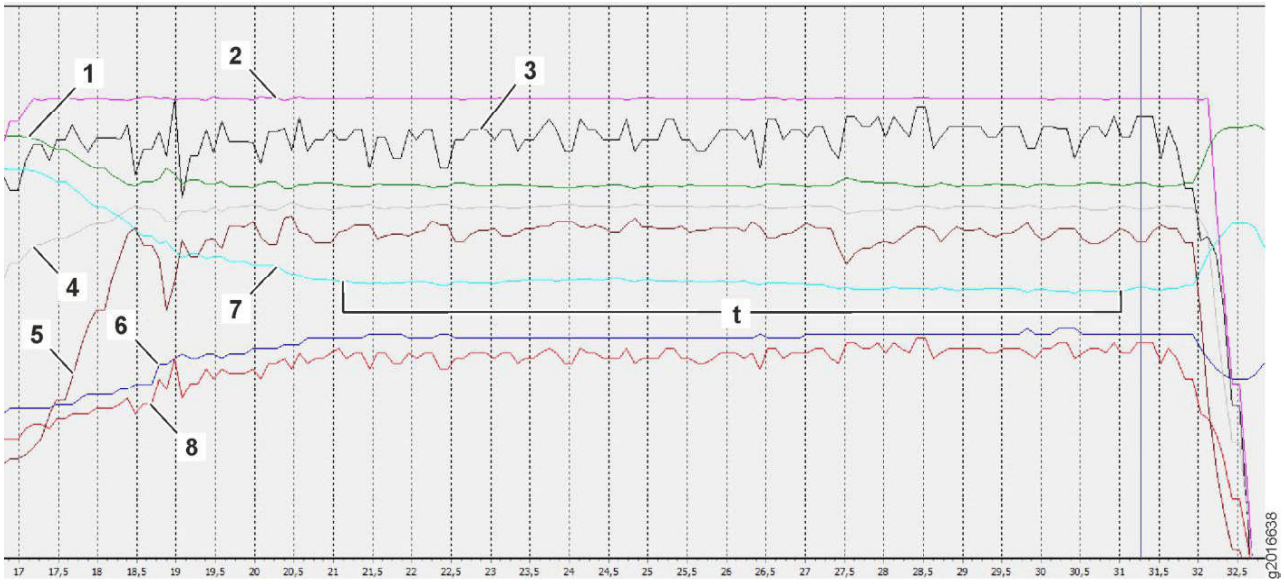

Fig. 294: Oscilloscope recording from a machine when new

Position	Variable	Function
1	***PRMaAnEngActSpeed***	This trace shows the diesel engine speed.
2	***IREngActTorque***	This trace shows the torque of the diesel engine in percent.
3	***PRTD_PCTOT_PATOT_RelP***	This trace shows the difference between the calculated torque and the actual torque delivered. That difference is shown as a percentage of the calculated torque.
4	***PRMaAnEngActTorque***	This trace shows the current torque of the diesel engine.

- ▶ To find the bucket length **Y**, measure the distance between the bucket tip **1** and the bucket pivot point **2** or **3** with the bucket base lying flat on the ground.
- ▶ Enter the bucket length **Y** for attachment 1 in the variable ***CREHBuckBottom-Length1***.
- ▶ Enter the bucket length **Y** for attachment 2 in the variable ***CREHBuckBottom-Length2***.

030.6.13 Operator's cab, heating and air conditioning

030.6.13.1 Checking the pressure and temperature conditions of the air conditioning unit

Valid for: L580-1464;

Use this test to check or demonstrate that the air conditioning unit is functioning correctly.

Make sure the following preconditions are met:
- ❑ The machine is in maintenance position 1.
- ❑ A pressure gauge strip and temperature meter are available.

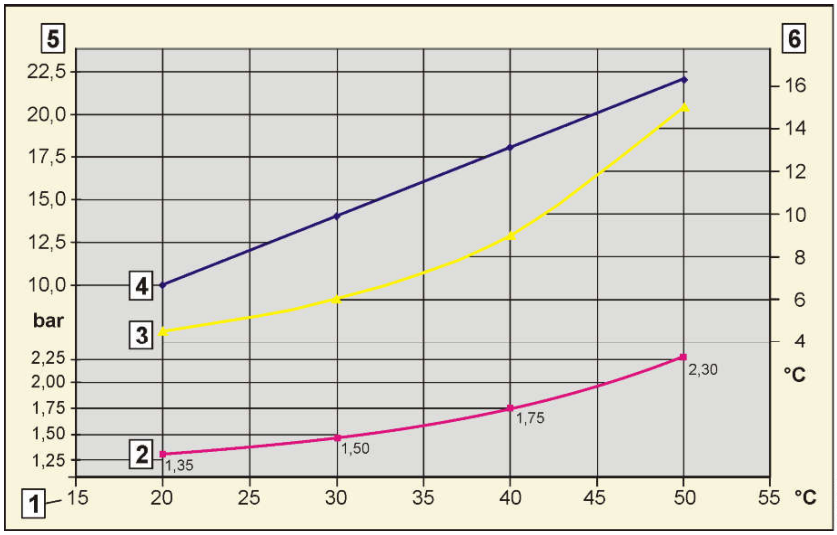

Fig. 302: Temperature/pressure diagram for air conditioning unit

1	Ambient temperature in °C	**4**	High pressure range depending on the ambient temperature
2	Low pressure range depending on the ambient temperature	**5**	High and low pressure in bar
3	Outlet temperature depending on the ambient temperature	**6**	Outlet temperature in °C

- ▶ Connect the pressure gauge strip to the quick couplings.
- ▶ Start the engine.
- ▶ Switch on the air conditioning unit (maximum cooling).
- ▶ Set the heater fan to maximum.
- ▶ Allow the air conditioning compressor to run for 3 to 5 minutes.
- ▶ Measure the outflow temperature at the left driver-level nozzle.

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Fig. 317: Checking connection status

1 Connection status

Connection status is displayed on bottom right.

▶ Check connection status **1**.
  ▷ Connection status **1** is online.

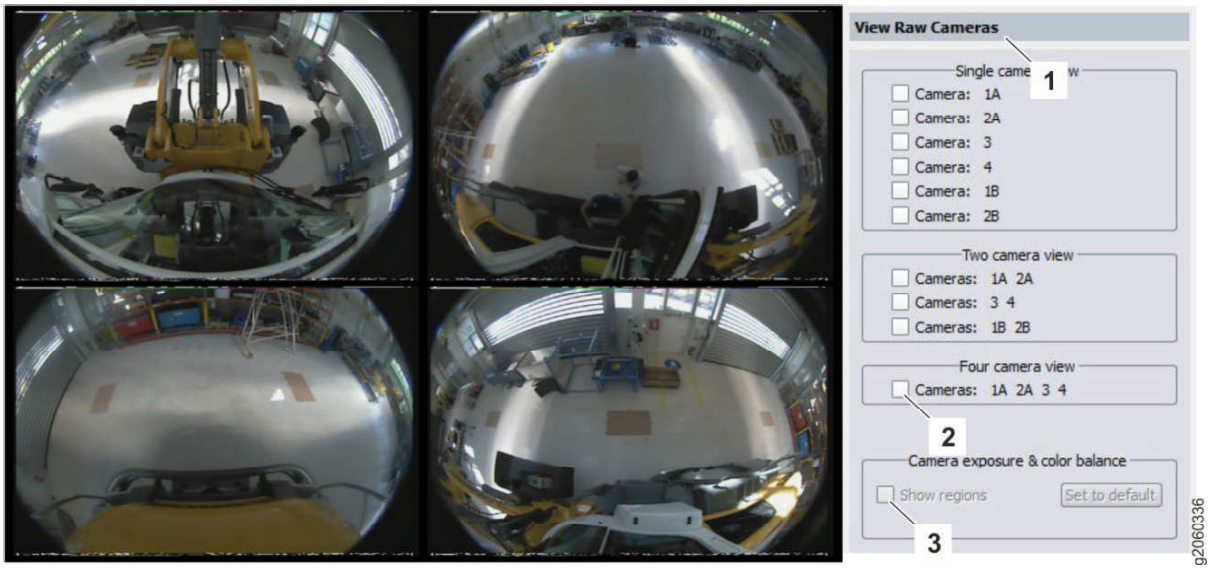

Fig. 318: Checking machine alignment

1 “View Raw Cameras” tab **2** “Four camera view” function **3** “Show regions” function

▶ Select the “View Raw Cameras” tab **1**.

▶ Select the “Four camera view” function **2**.

▶ Check that all mats are completely visible.
  ▷ Three mats are visible left and right.
  ▷ Two mats are visible front and rear.

If not all mats are completely visible.

▶ Adjust position of machine within mats accordingly.

If all mats are completely visible.

▶ Select “Show regions” function **3**.
  ▷ Green rectangles appear in camera images.

040 Drive group

Contents

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installed in the plug **X724** on the diesel engine. Terminating resistor **R123** is installed in the rear section bear the ballast weight in the wiring harness.

Components of the CAN system are powered via fuses from the fuse board A4a.

CAN line 3 is used for diagnosis via the diesel engine diagnostic plug **X60a**. The diesel engine can only be diagnosed using the LiDIA software.

040.1.3 Sensors on diesel engine

Valid for: L580-1464;

1.1 Charge air pressure sensor B703

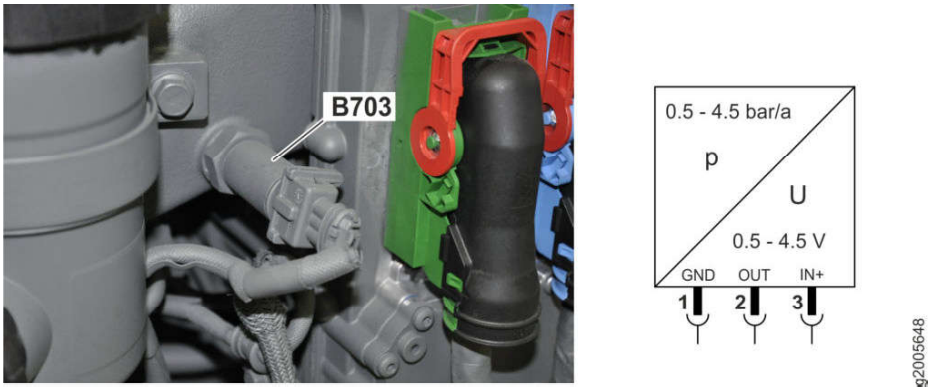

Fig. 340: Charge air pressure sensor

Charge air pressure sensor **B703** is installed in air intake pipe.

Charge air pressure is sent to engine control unit in form of a voltage signal.

if sensor fails, a substitute value of 5 bar is displayed. If sensor fails, engine control unit uses a computational model to continue running diesel engine.

Pin	Function
Pin 1	Ground
Pin 2	Output signal (0.5 to 4.5 V)
Pin 3	Power supply (5 V)

Tab. 112: Plug assignment

Charge air pressure	Output voltage
0.5 bar/a	0.5 V
1.5 bar/a	1.5 V
2.5 bar/a	2.5 V
3.5 bar/a	3.5 V
4.5 bar/a	4.5 V

Tab. 113: Output voltage

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Pin	Function
3	Power supply (5 V)

Tab. 137: Plug assignment

Rail pressure	Output voltage
0.0 bar/g	0.5 V
200 bar/g	0.78 V
800 bar/g	1.62 V
1200 bar/g	2.18 V
1600 bar/g	2.74 V
1800 bar/g	3.02 V
2400 bar/g	3.86 V
2850 bar/g	4.5 V

Tab. 138: Output voltage

1.7.1.1 Measured values for diagnostics

Supply line diagnostics			
Check	**Preconditions**	**Measurement**	**Required value**
Sensor power supply	Ignition ON	Measure voltage between pins 2 and 3 on line.	$5^{\pm 0,2}$ V
	Diesel engine OFF		
	Plug connection disconnected		
Lines shorted to earth	Ignition OFF	Measure resistance from pin 1 and pin 3 to earth.	More than 50 kΩ
	Plug connection disconnected		

Tab. 139: Supply line diagnostics

Sensor diagnostics			
Check	**Preconditions**	**Measurement**	**Required value**
Output signal voltage at lower idling speed	Diesel engine ON	Measure voltage between pins 2 and 3.	$1.7^{\pm 0,2}$ V

Tab. 140: Sensor diagnostics

040.1.6.1 Air filter

Valid for: L580-1464;

1 Layout

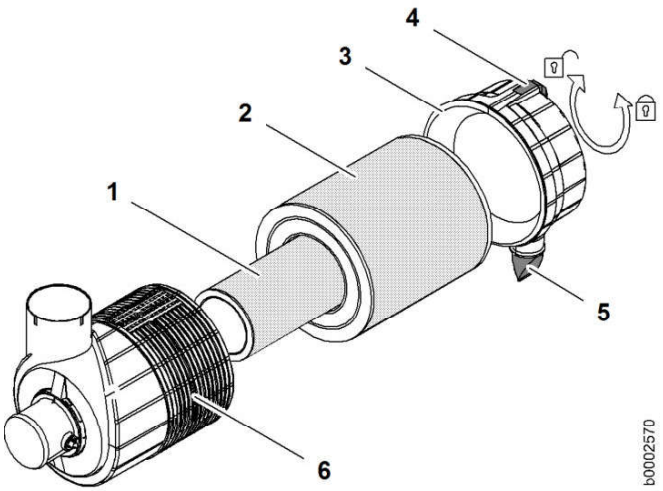

Fig. 356: Layout of air filter

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

2 Function

The main element **2** and the safety element **1** must be regularly replaced (see the maintenance and inspection schedule).

The safety element **1** is used as a back-up if the main element **2** is damaged.

The safety element **1** must be replaced after the main element is replaced three times, or as necessary.

The dust discharge valve **5** is used for automatically emptying the dust from the service cover **3**.

The tangential arrangement of the intake port sets the intake air into rotation, where centrifugal force throws the larger dust particles are against the housing wall and the flow of intake air deposits them in the service cap **3**.

At idling speed, the collected dust particles in the service cover **3** are blown outside via the dust discharge valve **5** by the pulsations of the intake air.

The service cover **3** must be fitted so that the dust discharge valve **5** points downwards.

When the engine is running (lower idle speed), you should clearly feel air pulsating at the dust discharge valve **5**.

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040.1.7.3 Sampling module

Valid for: L580-1464;

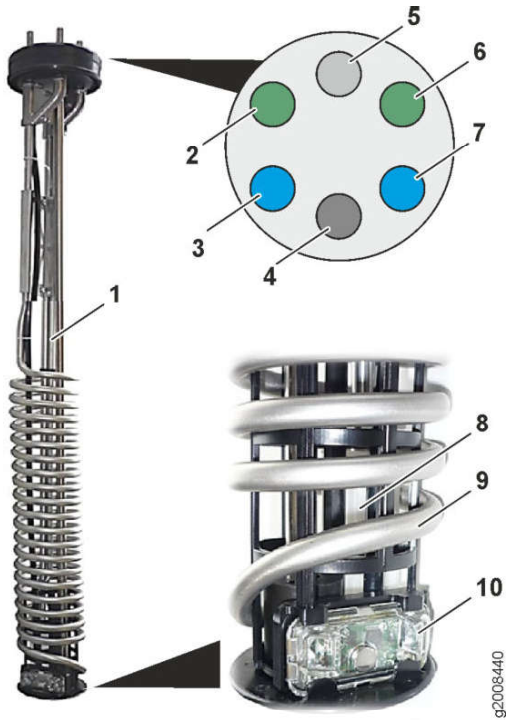

Fig. 368: Sampling module

1	Sampling module B774	**6**	Coolant to the diesel exhaust fluid tank
2	Coolant from the diesel exhaust fluid tank	**7**	Diesel exhaust fluid from the diesel exhaust fluid tank
3	Diesel exhaust fluid to the diesel exhaust fluid tank	**8**	Diesel exhaust fluid level sensor
4	Bleeder	**9**	Heating line
5	Electrical connection for sampling module B774	**10**	Diesel engine fluid quality sensor

The sampling module **1** for diesel engine fluid is integrated in the diesel exhaust fluid tank.

2.1 Function

Diesel exhaust fluid is taken from the tank via the sampling module **1**.

The sampling module is heated with coolant from the engine. This means that diesel exhaust fluid can be sampled from the tank even at very low temperatures.

The sampling module is connected via CAN bus to the engine control unit.

The sampling module carries out the following measurements:
- Diesel exhaust fluid temperature (via an NTC resistor, measuring range: -40 °C to 125 °C)
- Diesel exhaust fluid level in the tank (measured using a reed contact)
- Diesel exhaust fluid quality (optical sensor, measuring range: 5% to 62.5%)

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040.1.8.3 Air dryer

Valid for: L580-1464;

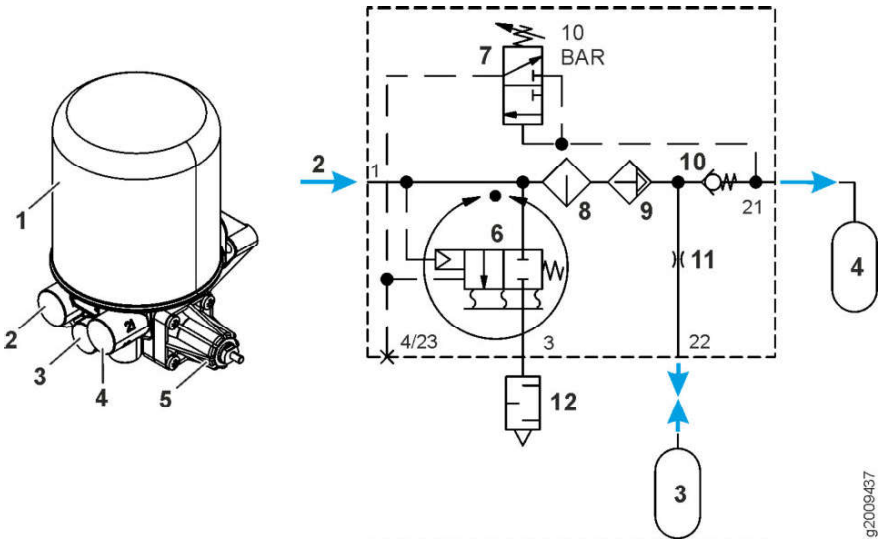

Fig. 379: Air dryer

1	Filter cartridge	**7**	Pressure controller
2	Compressed air from the compressor	**8**	Fine filter
3	Regeneration accumulator	**9**	Granulate filter
4	Compressed air accumulator	**10**	Check valve
5	Pressure controller adjusting screw	**11**	Restrictor port
6	Drain valve	**12**	Silencer

The air dryer is installed in the right ballast weight.

2.1 Function

The outside air drawn in by the compressor always contains a certain amount of moisture. This moisture can damage the compressed air system. Therefore, an air dryer is fitted behind the compressor. The air dryer reduces the humidity in the compressed air system.

Compressed air flows from the compressor **2** to the air dryer. The compressed air flows through the fine filter **8** and the granulate filter **9**. The granulate in the filter removes moisture from the compressed air.

The dried air flows through the check valve **10** to the compressed air accumulator **4**. At the same time, compressed air flows through restrictor port **11** to the regeneration accumulator **3**.

The pressure controller **7** is set to 10 bar. If the pressure behind the check valve rises above 10 bar, the pressure controller cuts in. This actuates the drain valve **6**.

When the drain valve **6** is actuated, compressed air from the compressor escapes through the silencer **12** to the outside. This lowers the pressure at the check valve **10**. The check valve closes.

The drop in pressure in front of the heck valve causes dry air from the regeneration accumulator **3** to flow through the restrictor port **11** via the filters **9** and **8** through the drain valve **6** and the silencer **12** to the outside.

2 Return flow from control valve block
3 Return filter
4 Breather filter
5 Sight glass for hydraulic oil level
7 Brake pump
8 Oil supply for compact brake valve
9 Working pump suction port
10 Working pump suction port drain valve
12 Fan motor
13 Collector pipe
14 Return flow from servostat
15 Hydraulic oil cooler

Name	Test point
PK	Cooling system high pressure

Tab. 143: Test points

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

Tab. 144: Equipment codes

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If temperature exceeds any of following specified values, current to proportional valve drops:

Specified values			
Specified value for temperature		**Current to proportional solenoid (variable)**	**System pressure (variable)**
Hydraulic oil	73 °C	850 mA to 320 mA	10 bar to 170$^{\pm 10}$ bar
Coolant	92 °C		
Charge air	50 °C		
Gear oil	73 °C		

Tab. 156: Specified values

Fan speed can be affected by external factors (altitude, dirt contamination etc.).

System pressure is dependent on current to proportional solenoid and speed of diesel engine.

2.3 Control characteristics when limits are exceeded

If any of four temperature readings exceeds a predefined limit, current applied to fan speed proportional solenoid is reduced to minimum current (standard setting: 320 mA).

Thresholds			
Temperature limits		**Current to proportional solenoid**	**System pressure (at engine speed of 1750 min^{-1})**
Hydraulic oil	88 °C	Minimum current (standard setting: 320 mA)	170$^{\pm 10}$ bar
Coolant	99 °C		
Charge air	80 °C		
Gear oil	88 °C		

Tab. 157: Thresholds

If a limit is exceeded, it has following effects:
- Current applied to proportional solenoid is reduced to minimum level.
- A warning sound goes off.
- A service code is displayed.
- In respect of coolant and charge air, power output of diesel engine is also reduced.
- In respect of transmission, emergency mode is activated.

2.4 Sensor failure

If temperature sensor for hydraulic oil B8 or temperature sensor for gear oil B86 fails, proportional solenoid for fan speed is powered with minimum current (default value: 320 mA).

Minimum current can also be adjusted by means of variable ***CRFCFanCurrMin*** in Sculi diagnostic software.

4 Return flow from hydraulic oil cooler
5 Sight glass for hydraulic oil level
6 Emergency steering pump suction port
7 Fan pump and brake pump suction port
8 Hydraulic tank drain valve
12 Pilot control hydro accumulator
13 Pilot control valve block
14 Compact brake valve return flow
15 Stabilization module
16 Left lift cylinder
20 Anti-drift valve
21 Right lift cylinder
22 Tilt cylinder

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

Tab. 165: Test points

A) Test point on control valve block

BMK	Function	BMK	Function
B90	Pressure sensor for weighing device (piston side) (from serial number 54428)	**Y14**	Solenoid for servo pressure
B91	Pressure sensor for weighing device (ring side) (from serial number 54428)	**Y20**	Solenoid for ride control

Tab. 166: Equipment codes

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BMK	Function	BMK	Function	BMK	Function
B8	Hydraulic oil temperature sensor	**Y31a**	Proportional solenoid for tilting out	**Y33b**	Proportional solenoid for 3rd function B3 (option)
B90	Pressure sensor for weighing device (piston side) (from serial number 54428)	**Y31b**	Proportional solenoid for tilting in	**Y53**	Solenoid for opening quick coupler (option)
B91	Pressure sensor for weighing device (ring side) (from serial number 54428)	**Y32a**	Proportional solenoid for lowering	**Y53a**	Quick coupler load sensing signal solenoid (option)
Y14	Solenoid for servo pressure	**Y32b**	Proportional solenoid for lifting		
Y20	Solenoid for ride control	**Y33a**	Proportional solenoid for 3rd function A3 (option)		

Tab. 174: Equipment codes

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

Working pump **20** draws up oil from hydraulic tank **1** and pumps it to control valve block **45**. Control valve block **45** directs oil via spools to consumers.

Spool valves are electro-hydraulically actuated. To do this, oil is diverted from service brake hydro accumulators **39**. Pilot control pressure reducing valve **37** reduces pressure of this oil to servo pressure.

When working attachment is actuated, proportional solenoid valves for individual functions are energised. Proportional solenoid valves reduce servo pressure once more, depending on current, and direct servo oil to spool valves. Servo oil pushes spool valves against force of return springs. Oil flows from working pump **20** to consumers via openings that spools have accordingly released.

Pressure balances generate a load sensing signal which regulates working pump **20**.

Tilt function has an anti-drift valve **85**. Anti-drift valve separates tilt cylinder ring side from control valve block **45** when tilt function is not actuated. This prevents bucket from being tilted out accidentally due to leakage in spools **48**.

Ride control function absorbs vibrations that occur when driving with a loaded working attachment. Stabilization module **110** connects lift cylinder ring side to hydraulic tank **1** and lift cylinder piston side to ride control hydro accumulators.

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6 Preload valve for 2nd tank duct
7 Spool lift limitation for tilting in
8 Spool lift limitation for lifting
9 LS-pressure cut-off
10 Flow control valve with strainer
11 Replenishing valve for tilting out
12 Feeder valve for lowering
13 Spool lift limitation for 3rd function B3
14 Secondary pressure relief valve for 3rd function A3
15 Spool lift limitation for 4th function B4
21 Return flow of stroke limit damping pressure relief valves
22 Pressure balance for 4th function
23 Secondary pressure relief valve for 4th function B4
24 Control valve block section for 4th function (option)
25 Secondary pressure relief valve for 3rd function B3
26 Pressure balance for 3rd function
27 Control valve block section for 3rd function (option)
28 Secondary pressure relief valve for lifting
29 Secondary pressure relief valve for tilting in
30 Anti-drift valve
36 Connection to piston side of tilt cylinder
37 Connection to ring side of lift cylinder (left lift cylinder)
38 Connection to ring side of right lift cylinder and stabilization module
39 Connection to piston side of right lift cylinder and stabilization module
40 Connection to piston side of lift cylinder (left lift cylinder)
41 Connection of 3rd function A3 (option)
42 Connection of 3rd function B3 (option)
43 Connection of 4th function A4 (option)
44 Connection of 4th function B4 (option)
45 Load sensing signal for working pump

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. 179: Test points

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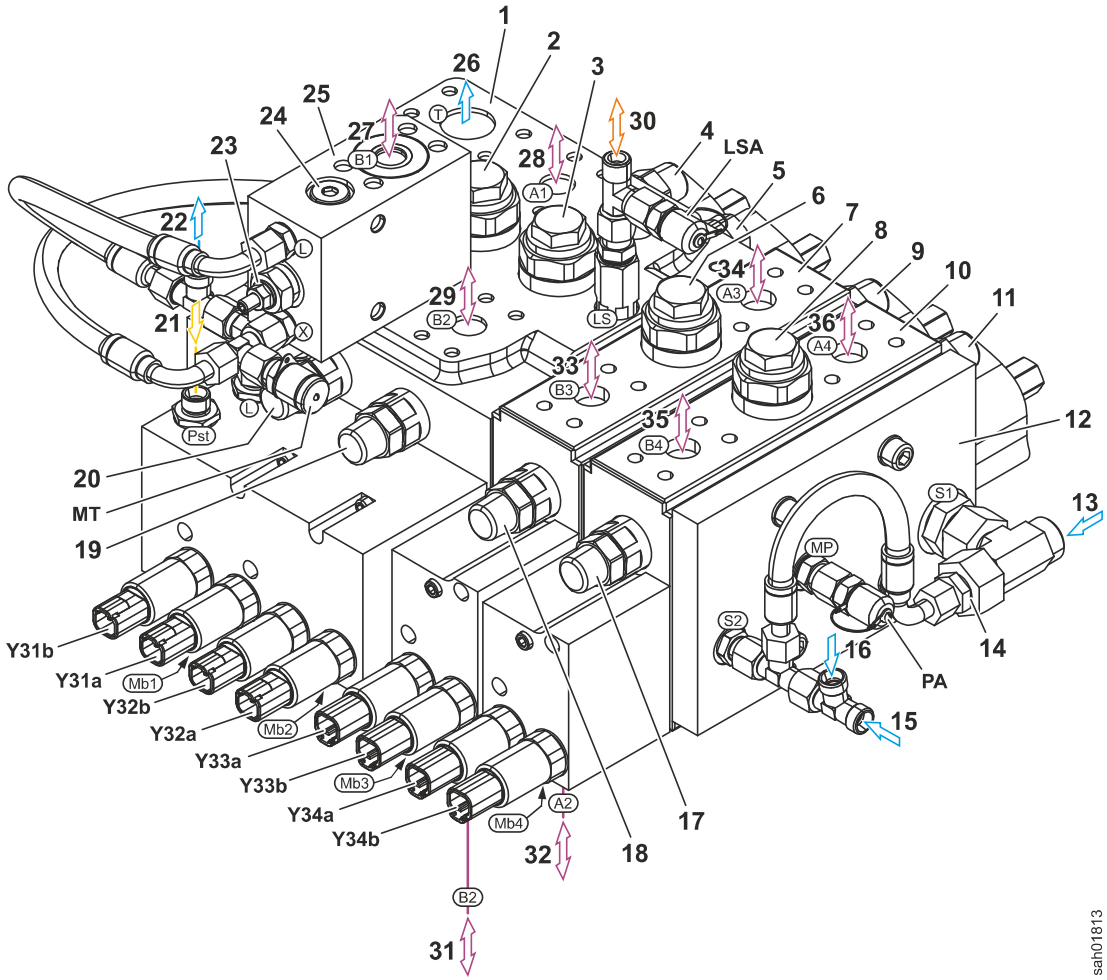


Fig. 418: Control valve block for industrial lift arms (from front right)

1	Control block	**13**	Return flow from stabilization module	**25**	Anti-drift valve
2	Tilt cylinder pressure balance	**14**	Orifice 1.0 mm	**26**	Return flow from return filter
3	Lift cylinder pressure balance	**15**	Return flow from compact brake valve (control valve block housing preheating)	**27**	Connection to ring side of tilt cylinder
4	Secondary pressure relief valve for tilting out	**16**	Return flow of stroke limit damping pressure relief valves	**28**	Connection to piston side of tilt cylinder
5	Dummy piston	**17**	Secondary pressure relief valve for 4th function B4	**29**	Connection to piston side of right lift cylinder and stabilization module
6	Pressure balance for 3rd function	**18**	Secondary pressure relief valve for 3rd function B3	**30**	Load sensing signal for working pump
7	Control valve block section for 3rd function (option)	**19**	Secondary pressure relief valve for lifting	**31**	Connection to piston side of lift cylinder (left lift cylinder)
8	Pressure balance for 4th function	**20**	Secondary pressure relief valve for tilting in	**32**	Connection to ring side of right lift cylinder and stabilization module
9	Secondary pressure relief valve for 3rd function A3	**21**	Control oil from pilot control valve block	**33**	Connection of 3rd function A3 (option)

See next page for continuation of the image legend

060.7.2 Stabilisation module

Valid for: L580-1464;

1 Layout

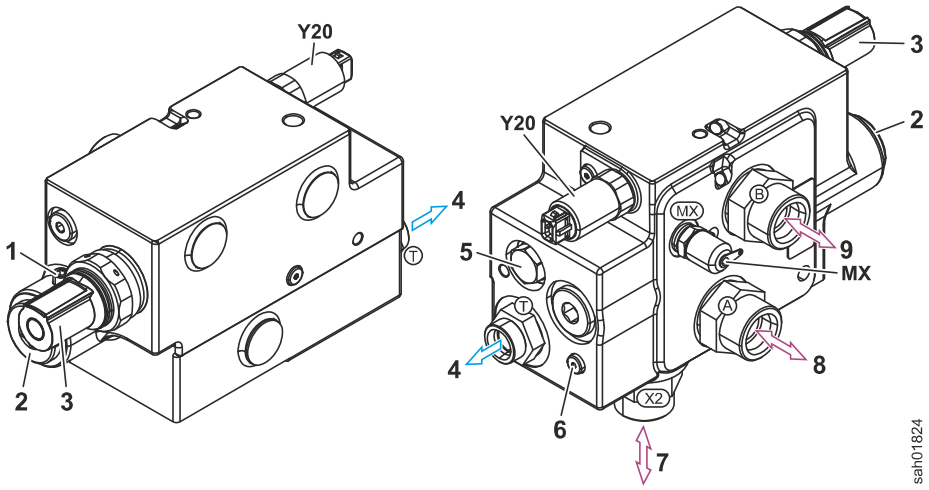


Fig. 424: Stabilisation module (from front left and from rear right)

1	Bleeder screw	**6**	Hydro accumulator relief valve
2	Ride control valve spool	**7**	Ride control hydro accumulator connection
3	Safety valve	**8**	Connection to piston side of lift cylinder
4	Return flow to control valve block	**9**	Connection to ring side of lift cylinder
5	Release valve		

Name	Test point
MX	Ride control hydro accumulator charge pressure

Tab. 198: Test points

BMK	Function
Y20	Solenoid for ride control

Tab. 199: Equipment codes

Stabilisation module is fitted on left in front section.

060.9 Pipe break protection

060.9.1 Pipe break protection: overview

Valid for: L580-1464;

This equipment is optional.

1 Layout

Pipe break protection consists of following components:
- One valve block for pipe break protection on each hydraulic cylinder of working hydraulics (For more information see: 060.9.2 Valve block for pipe break protection, page 060-56)
- Ride control release solenoid valve (For more information see: 060.9.3 Ride control release solenoid valve, page 060-57)

LBH/11835201/19/211-20190801_083826/en

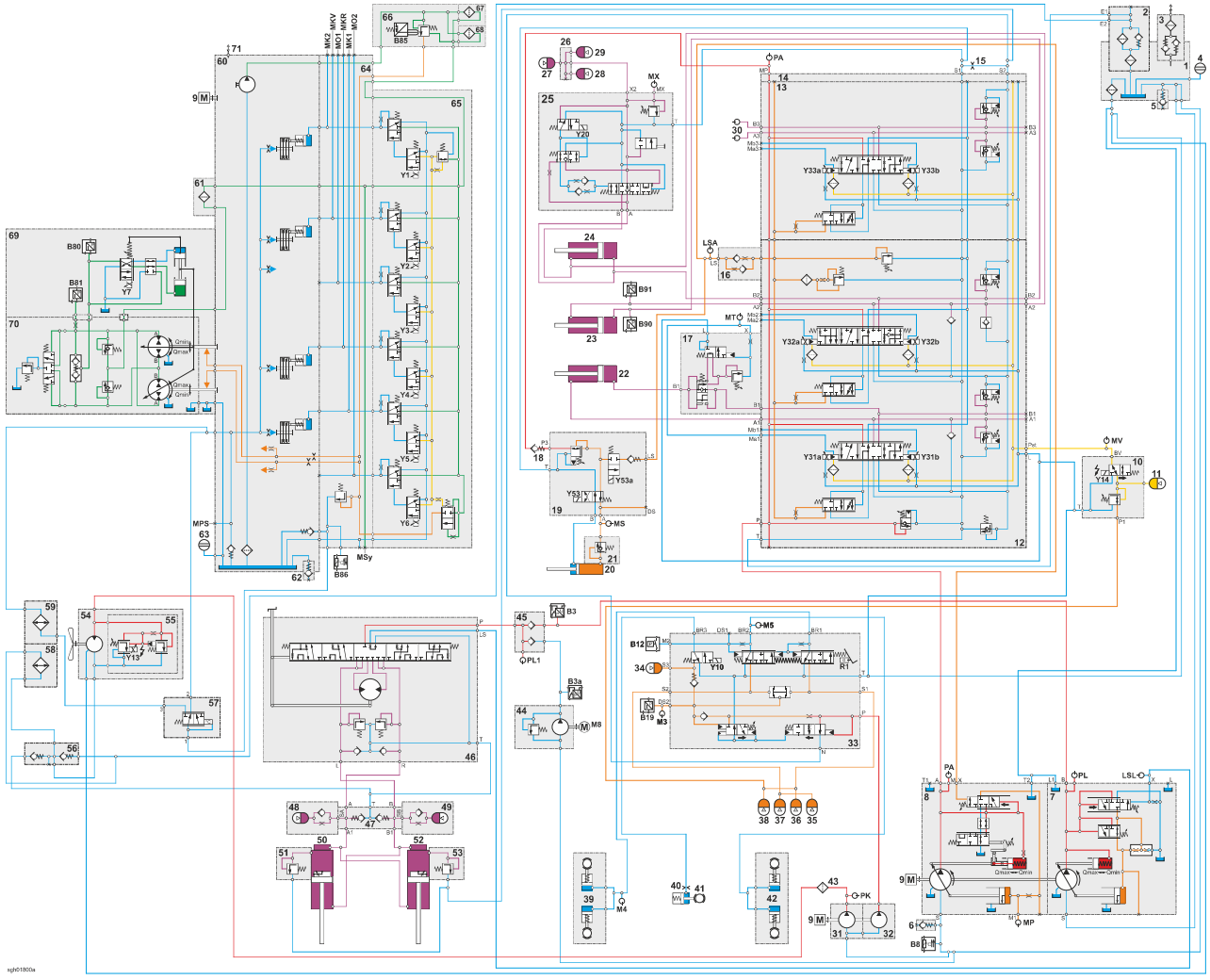
080.2 Hydraulic system: overview

Valid for: L580-1464/50693-;

1 Layout

The hydraulic system consists of following assemblies:
- Hydraulic tank
- Hydraulic cooling control system
- Working hydraulics
- Steering system
- Brake system
- Hydraulic transmission control system

2 Function



LBH/11835201/19/211-20190801_083826/en

Fig. 437: Diagram of hydraulic system (diesel engine is running)

1 Hydraulic tank

25 Stabilization module

49 Steering damper hydro accumulator

See next page for continuation of the image legend

2.2 Pressure equalisation

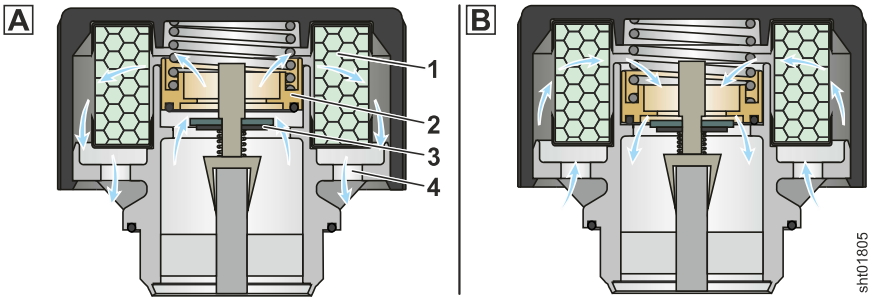


Fig. 448: Breather filter under excess pressure and with insufficient pressure

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

2.2.1 Excess pressure in the steel tank

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

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

2.2.2 Insufficient pressure in the steel tank

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

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

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

Tab. 222: 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. 223: Equipment codes

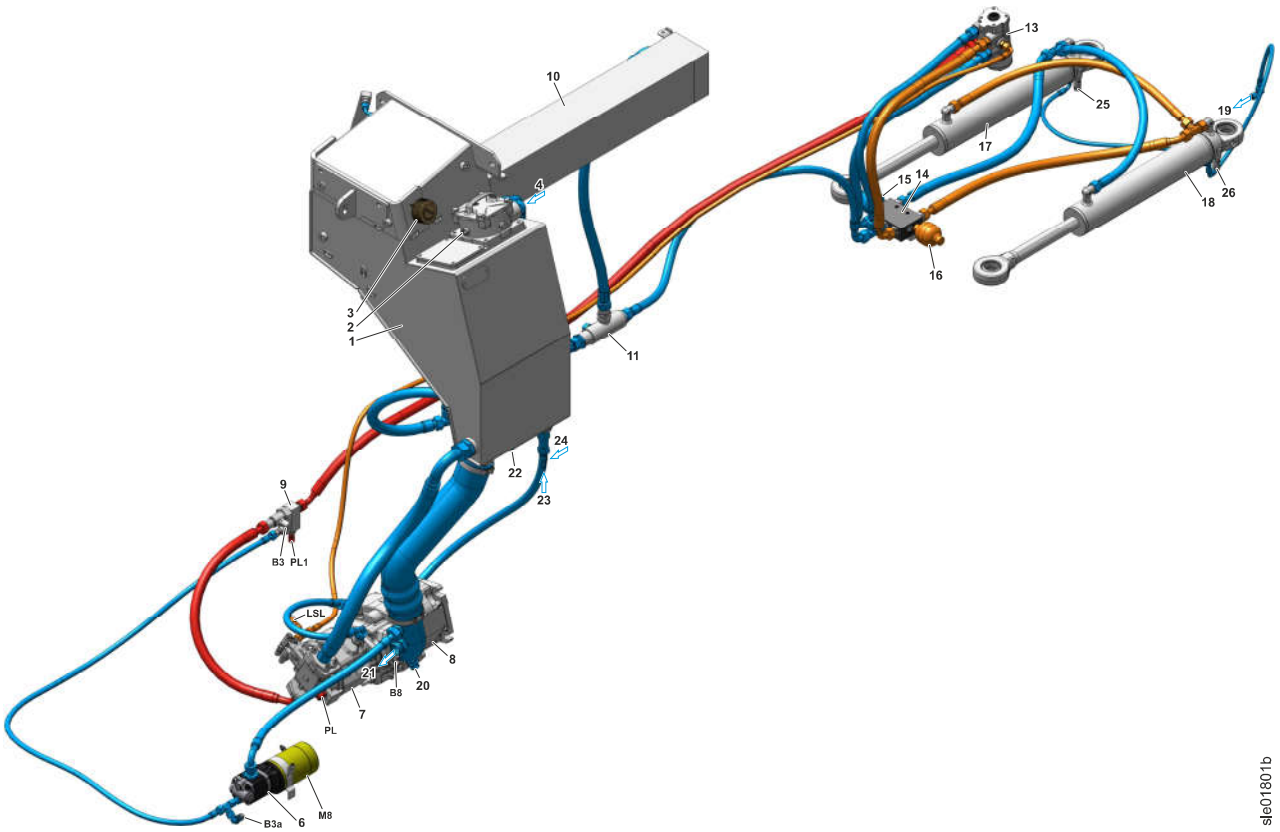

Fig. 453: Steering system (steering to left) (from rear right)

1	Hydraulic tank	**10**	Hydraulic oil cooler	**19**	Return flow from pressure relief valves to control valve block
2	Return filter	**11**	Collector pipe	**20**	Working pump suction port drain valve
3	Breather filter	**13**	Servostat	**21**	Fan pump and brake pump suction port
4	Return flow from control valve block	**14**	Steering stabilization valve block	**22**	Hydraulic tank drain valve
6	Emergency steering pump	**15**	Steering damper hydro accumulator	**23**	Fan motor leak oil
7	Steering pump	**16**	Steering damper hydro accumulator	**24**	Return flow from compact brake valve and pilot control

See next page for continuation of the image legend

090.4 Servostat

Valid for: L580-1464;

1 Layout

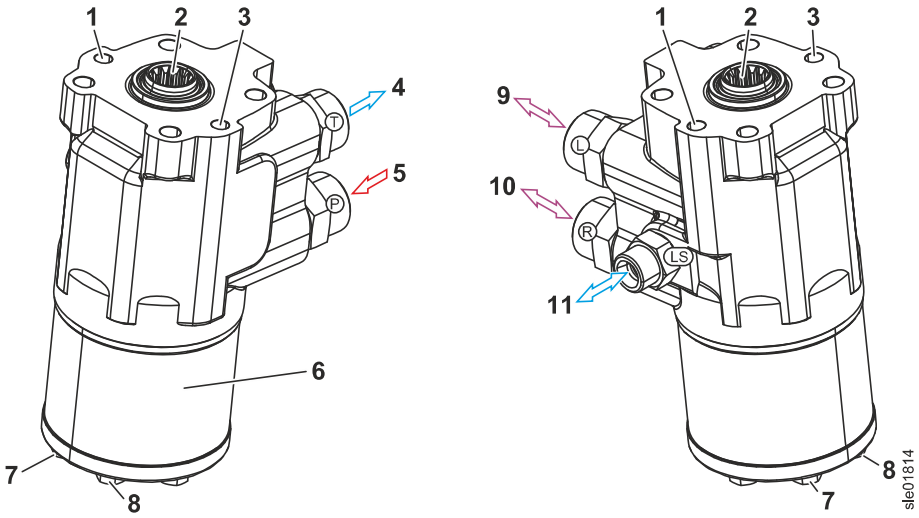

Fig. 463: Servostat (from front left and from front right)

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

Servostat is bolted underneath cab floor.

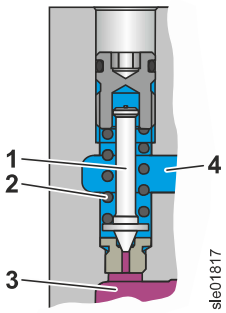

Fig. 464: Secondary pressure relief valve: secondary pressure relief valve

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

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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. 232: Equipment codes

Emergency steering system consists of following components:
- Hydraulic tank (For more information see: 080.3.1 Overview of hydraulic tank, page 080-8)
- Emergency steering pump (For more information see: 090.6.2 Emergency steering pump, page 090-30)
- Valve block for steering system
- Electrical controls (For more information see: Overview of electrical controls of emergency steering system, page 090-32)

2 Function

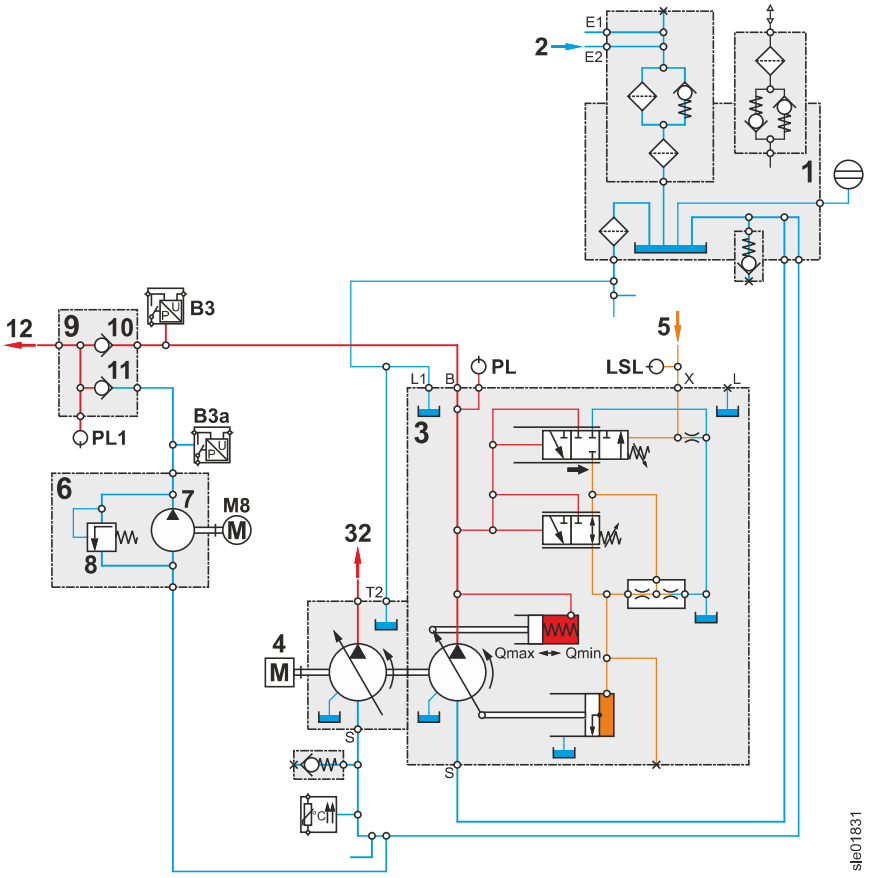

Fig. 477: Emergency steering: hydraulic diagram (emergency steering active)

1	Hydraulic tank	**7**	Gear pump
2	Return flow from hydraulic oil cooler	**8**	Pressure relief valve
3	**Steering pump**	**9**	**Valve block for steering system**
4	Diesel engine	**10**	Check valve
5	Load sensing signal from servostat	**11**	Check valve
6	**Emergency steering pump**	**12**	Oil supply to servostat

090.7 Joystick steering

090.7.1 Overview of joystick steering

Valid for: L580-1464/0-50692;

This equipment is optional.

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

1 Layout

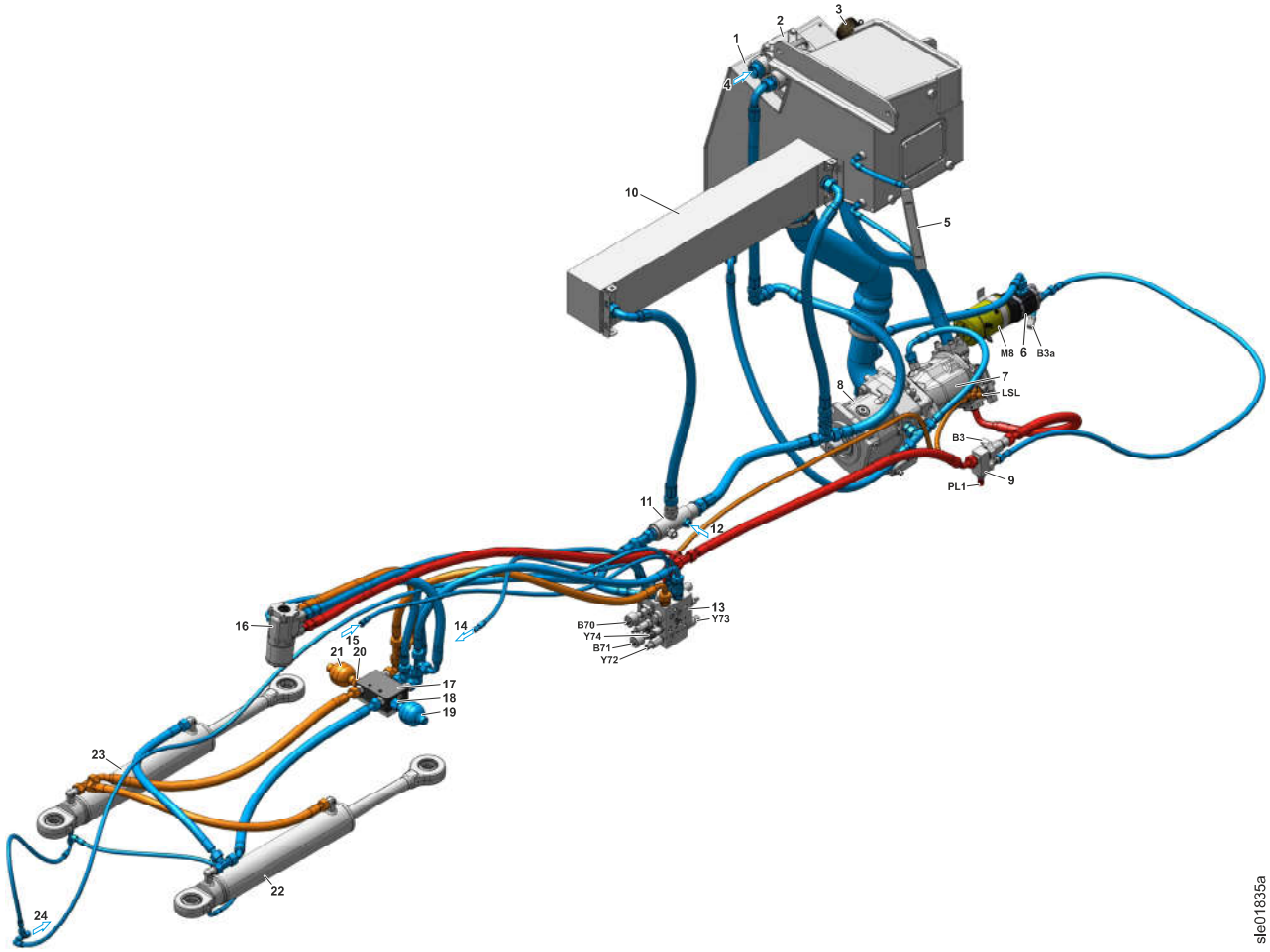

Fig. 488: Joystick steering system (steering to left) (from front left)

1	Hydraulic tank	**9**	Valve block for steering system	**17**	Steering stabilisation valve block
2	Return filter	**10**	Hydraulic oil cooler	**18**	Throttle check valve 2.0 mm (only with joystick steering)
3	Breather filter	**11**	Collector pipe	**19**	Steering damper hydro accumulator

See next page for continuation of the image legend

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

Tab. 248: Test points

BMK	Function	BMK	Function	BMK	Function
B3	Emergency steering pressure switch	**M8**	Electric motor for emergency steering pump	**Y73**	Proportional solenoid for steering to the right (emergency spool valve)
B3a	Emergency steering check pressure switch	**Y70**	Proportional solenoid for steering to the left (main spool valve)		
B8	Hydraulic oil temperature sensor	**Y71**	Proportional solenoid for steering to the left (spool valve for emergency steering function)		

Tab. 249: Equipment codes

The joystick steering consists of following components:
- Hydraulic tank (For more information see: 080.3.1 Overview of hydraulic tank, page 080-8)
- Steering pump (For more information see: 090.3 Steering pump, page 090-13)
- Servostat (For more information see: 090.4 Servostat, page 090-19)
- Joystick steering control valve block (For more information see: 090.7.4 Joystick steering control block, page 090-56)
- Steering cylinder (For more information see: 090.5.1 Steering cylinder, page 090-22)
- Steering stabilisation valve block (For more information see: 090.5.3 Steering stabilisation valve block, page 090-26)
- Emergency steering (For more information see: 090.6.1 Emergency steering overview, page 090-28)
- Hydraulic oil cooler

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Name	Test point
M DMV1	Pressure to servo pressure reducing valve for main spool valve A)

Tab. 256: 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)	**Y74**	Solenoid for safety circuit

Tab. 257: 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.

2 Function

2.1 Basic function

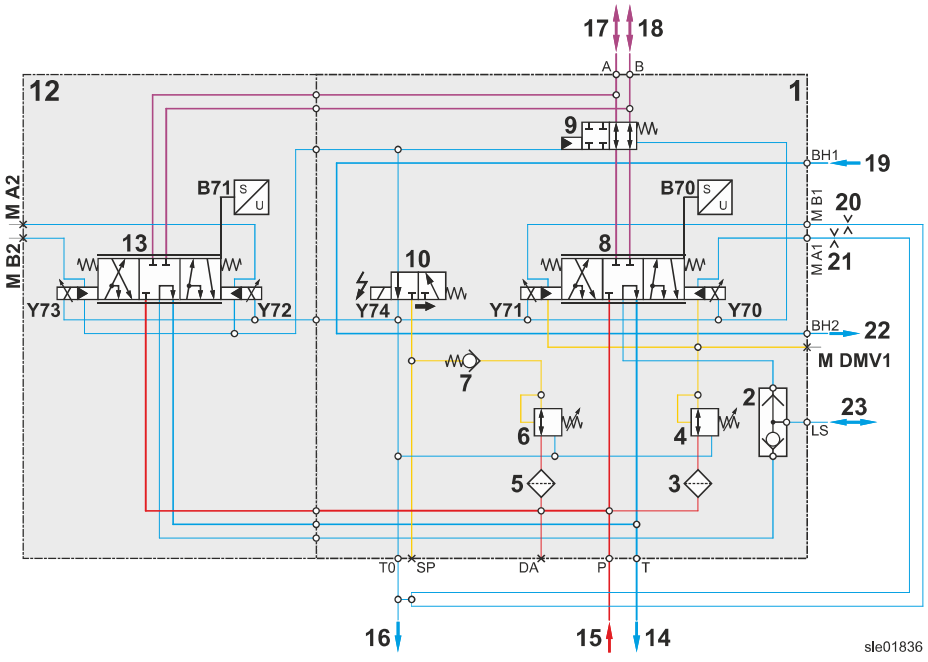


Fig. 497: Hydraulic diagram of joystick steering control valve block (joystick steering activated)

1 **Joystick steering control block**
2 Shuttle valve
13 Emergency spool valve
14 Return flow to collector pipe

See next page for continuation of the image legend

2 Function

2.1 Joystick steering function in normal mode

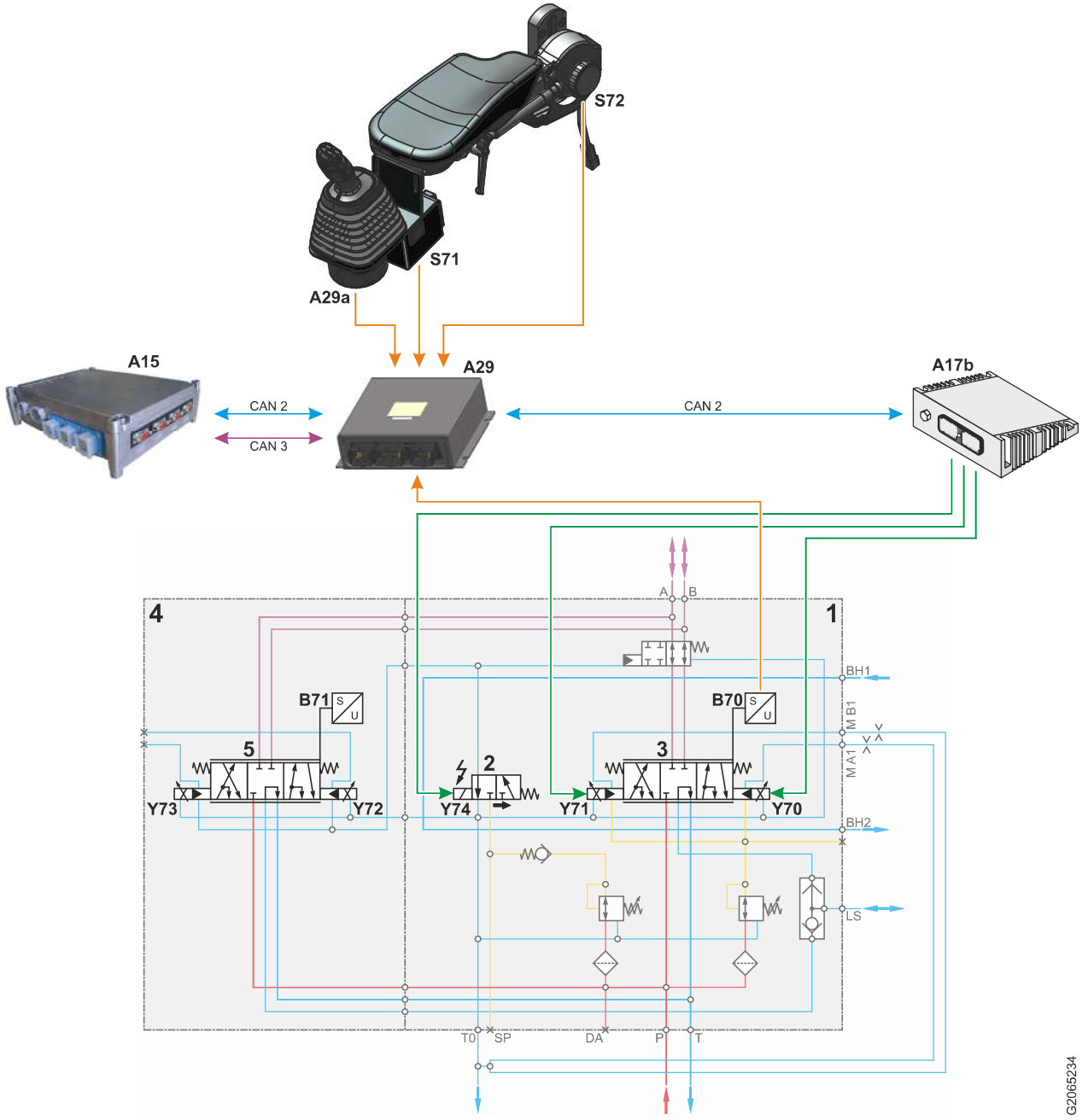


Fig. 502: Joystick steering function in normal mode

1	**Joystick steering control block**	3	Main spool valve	5	Emergency spool valve
2	Solenoid valve for safety circuit	4	**Control block section for emergency steering function**		

BMK	Function	BMK	Function	BMK	Function
A15	Central control unit (Master4)	**B71**	Emergency spool valve position sensor	**Y72**	Proportional solenoid for steering to the left (emergency spool valve)
A17b	Output module A17b	**S71**	Joystick steering switch	**Y73**	Proportional solenoid for steering to the right (emergency spool valve)
A29	Joystick module	**S72**	Joystick steering switch (armrest)	**Y74**	Solenoid valve for safety circuit
A29a	Joystick electronics	**Y70**	Proportional solenoid for steering to the left (main spool valve)		
B70	Main spool valve position sensor	**Y71**	Proportional solenoid for steering to the left (spool valve for emergency steering function)		

Tab. 272: Equipment codes

In emergency mode, joystick steering is directly controlled via the joystick module **A29**.

The safety circuit solenoid valve **Y74** is not energised. Control takes place using the emergency spool valve **7**. The oil flow though the main spool valve **5** is cut off.

The proportional control solenoid for steering to the right (emergency spool valve) **Y72** and the proportional control solenoid for steering to the left (emergency spool valve) **Y73** are directly energised by the joystick module **A29**.

The emergency spool valve positions sensor **B71** monitors the position of emergency spool valve **7**. This signal is received by the joystick module **A29**.

2.3 Function of joystick steering relay board A4b

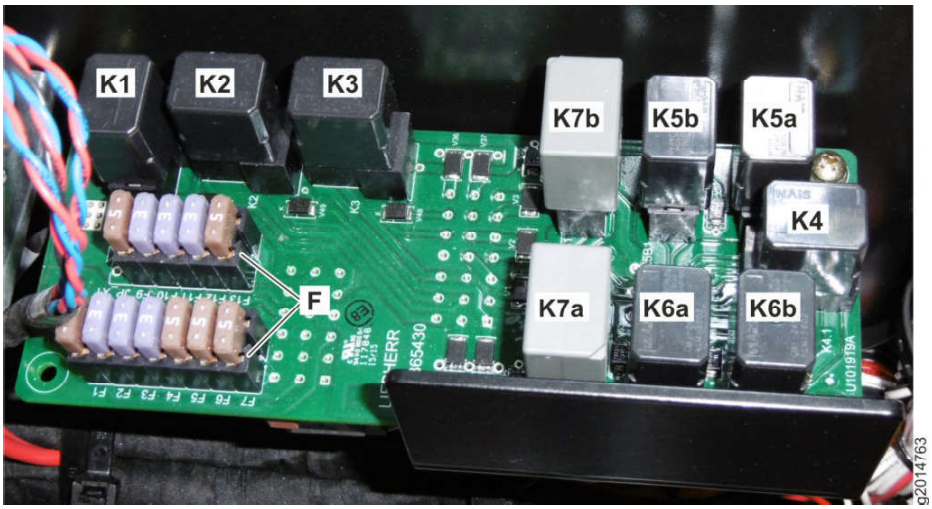


Fig. 508: Function of joystick steering relay board A4b

2 Function

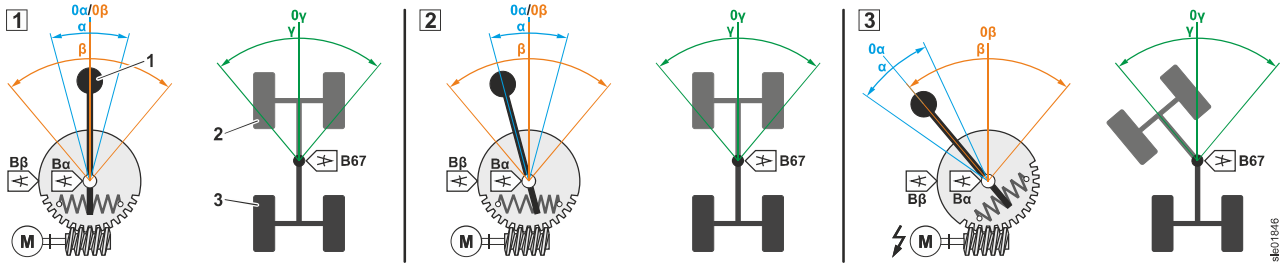


Fig. 514: Joystick with position tracking: function

1 Joystick
2 Front section
3 Rear section

α Steering angle
0α Zero point of steering angle
β Tracking angle

0β Zero point of tracking angle
γ Articulation angle
0γ Zero point of articulation angle

BMK	Function	BMK	Function
Bα	Angle sensor for steering angle	**B67**	Articulation angle sensor
Bβ	Angle sensor for tracking angle	**M**	Servo motor

Tab. 279: Equipment codes

If operator performs a steering movement, they move joystick **1** within steering angle **α**. This movement is detected by angle sensor for steering angle **Bα** and passed on to control system.

Control system turns machine. Angle sensor for articulation angle **B67** reports steering movement back to control system.

Control system then adapts zero of steering angle **0α** to articulation angle **γ**. To this end, servo motor **M** changes zero point of steering angle **0α** within tracking angle **β**.

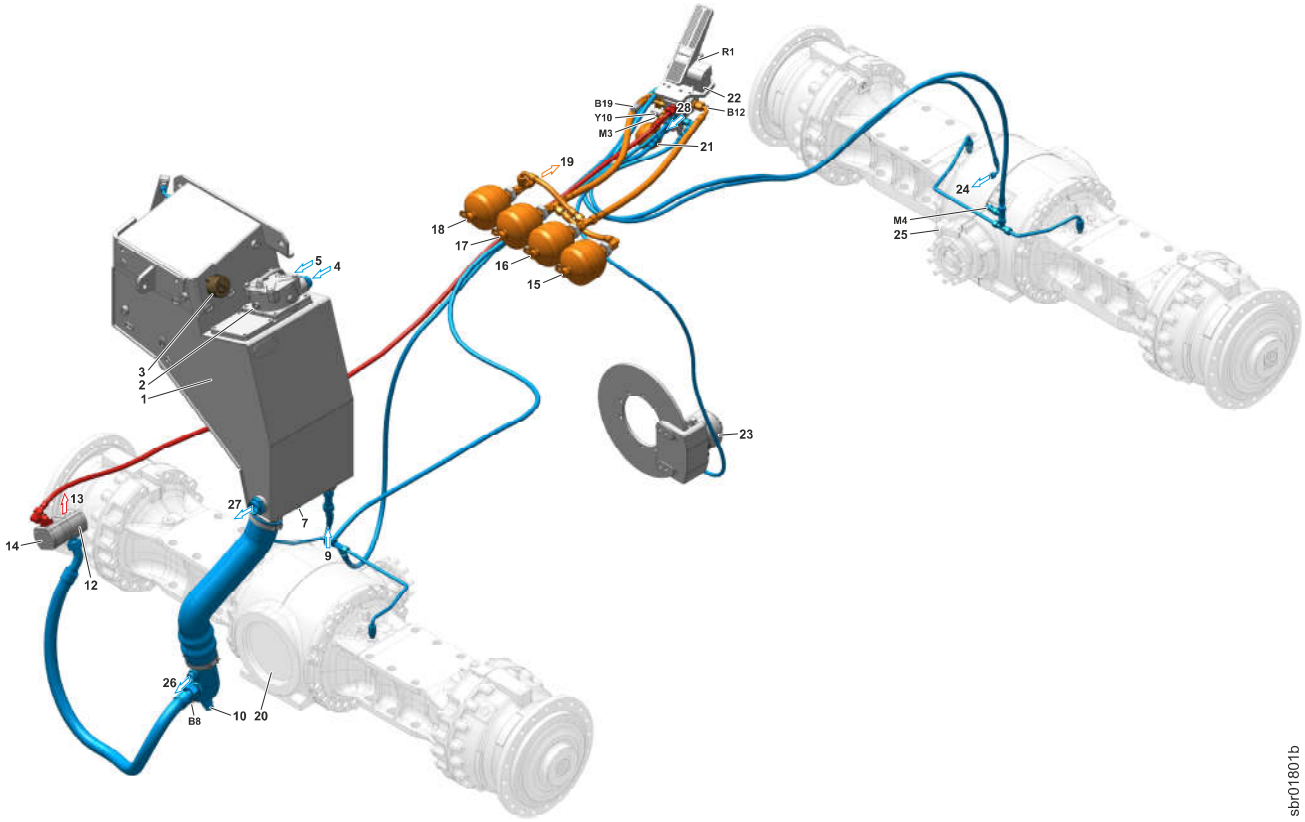
7 Hydraulic tank drain valve
8 Leak oil from steering pump and working pump
9 Fan motor leak oil
16 Hydro accumulator for service brake (1st brake circuit)
17 Hydro accumulator for service brake (2nd brake circuit)
18 Hydro accumulator for service brake (1st brake circuit)
25 Front axle with service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

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

Tab. 284: Test points

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

Tab. 285: Equipment codes



sbr01801b

Fig. 519: Brake system (parking brake activated) (from rear right)

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

See next page for continuation of the image legend

2.3.1 Hydro accumulators are fully charged

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

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

2.3.2 Hydro accumulators are being charged

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

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

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

2.4 Inching function

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

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

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

LBH/11835201/19/211-20190801_083826/en

2.1 Fuse boards

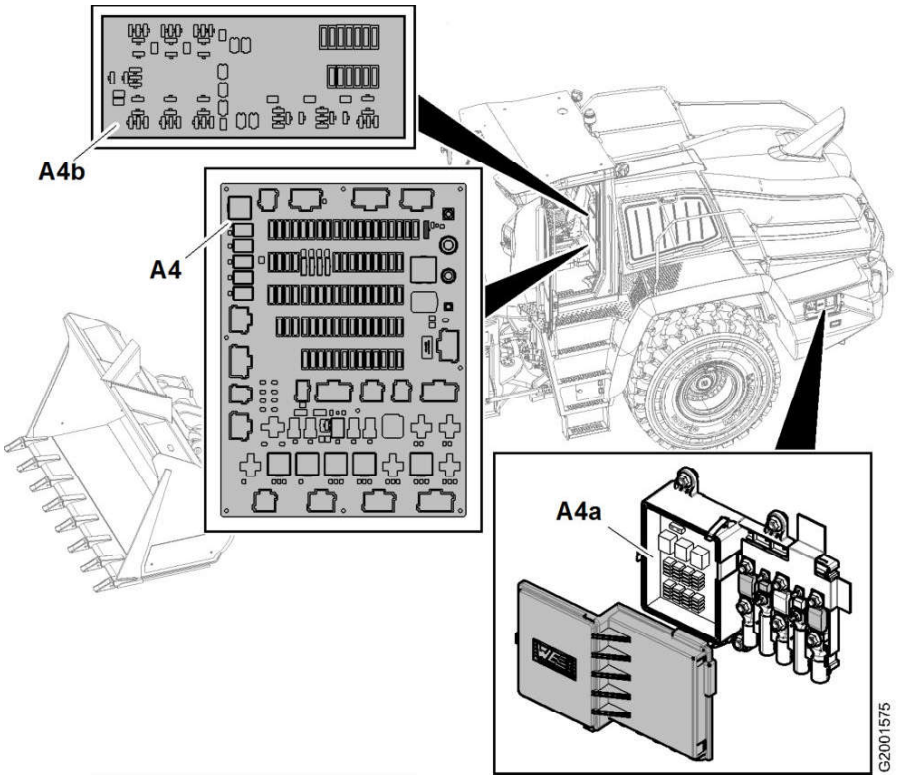


Fig. 534: Fuse boards

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

Fuse board **A4b** is only installed if machine is equipped with joystick steering.

Fuse board **A4a** is installed in left ballast weight.

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

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-F53	=A4	+K	LOW BEAM/DRIVING LIGHT	/30.B4
-F54	=A4	+K	LOW BEAM/DRIVING LIGHT	/30.B5
-F55	=A4	+K	PROFILE LIGHT-/IDENTIFICATION-/CONTEUR LIGHT	/30.B4
-F56	=A4	+K	PROFILE LIGHT-/IDENTIFICATION-/CONTEUR LIGHT	/30.B6
-F57	=A4	+K	HOOD	/64.A2
-F62	=A4	+K	AIR CONDITIONING SYSTEM	/59.A3
-F63	=A4	+K2	AUXILIARY HEATER	/105.A5
-F64	=A4	+K	Vcc K14 EMERGENCY STEERING PUMP	/26.A4
-F65	=A4	+K	VOLTAGE CONVERTER (RADIO)	/37.A2
-F66	=A4	+K2	SCR AIR DRIER	/53.A6
-F68	=A4	+K	WORKING PROJECTOR REAR AM CAB ROOF	/81.B2
-F69	=A4	+K	WORKING PROJECTOR REAR AM CAB ROOF	/81.B5
-F70	=A4	+K	PROFILE LIGHT-/IDENTIFICATION-/CONTEUR LIGHT	/30.E2
-F71	=A4	+K	IGNITION STARTER SWITCH BYPASS	/24.C1
-F72	=A4	+K	LOW BEAM/DRIVING LIGHT	/30.B5
-F73	=A4	+K	LOW BEAM/DRIVING LIGHT	/30.B5
-F74	=A4	+K	COMPRESSOR SEAT	/28.B4
-F75	=A4	+K	USB LADEDOSE	/28.B4
-F208	=RH.	+K2	DIESEL PREHEATING	/62.B6
-F218	=K	+K2.RH	LIGHTING CONTROL E18, E18a	/117.B6
-F238	=RH	+K2	QUICK-CHANGE DEVICE	/101.B2
-F255	=K	+K	ELECTRICAL SOCKET 24V	/87.B7
-F263	=RH.	+K2	SEAT BELT	/109.B3
-F263a	=RH.	+K	SEAT BELT	/109.C1
-F275	=K	+K.RH	REVERSING OBSTACLE DETECTOR	/84.D4
-F276	=RH.	+K2.	VOLTAGE CONVERTER RADIO	/108.A5
-F277	=RH	+K2.R.H.	KL. 15 RADIO	/108.C5
-F278	=RH	+K2.R.H	KL. 30 RADIO	/108.C5
-F301	=K	+K2	FUSE WARNING LIGHT	/127.B3
-F500	=RH.	+K2	REFUELLING PUMP	/87.B1
-F501	=RH.	+K2	REFUELLING PUMP	/87.B5
-F503	=K	+K	DISPLAY SKY VIEW	/124.A2
-F504	=K	+K	CONNECTOR ELECTRONICS SKY VIEW	/124.A4
-F610	=K	+K	ADDITIONAL MODULE OUTPUT 2	/122.B2
-F611	=K	+K	ADDITIONAL MODULE OUTPUT 2	/122.B3
-F612	=K	+K	ADDITIONAL MODULE OUTPUT 2	/122.B4

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-F613	=K	+K	ADDITIONAL MODULE OUTPUT 2	/122.B5
-F614	=K	+K	ADDITIONAL MODULE OUTPUT 2	/122.B5
-F615	=K	+K	REAR AREA MONITORING	/125.B4
-F616	=K	+K	REAR AREA MONITORING	/125.B4
-G1	=B	+B	BATTERY	/24.F2
-G2	=B	+B	BATTERY	/24.F3
-G2.30	=M	+M	KL. 30 ENGINE START	/107.D3
-G3	=M	+M	ALTERNATOR	/24.E6
-H15	=B	+B	LED MASTER SWITCH STATUS	/24.E5
-H15	=V	+V1	BLINKER LEFT 24V - 21W ORANGE	/30.E4
-H15.X	=B	+B	PLUG H15	/24.E5
-H16	=V	+V1	BLINKER RIGHT 24V - 21W	/30.E6
-H22b	=H	+H	BEACONLIGHT AT REAR	/83.E7
-H22b.X	=H	+H	CONNECTOR H22b	/83.E7
-H22l	=K	+K3	BEACONLIGHT	/36.E2
-H22l.X1	=K	+K	PLUG H22l	/36.E2
-H22l.X1.B	=K	+K	CONNECTOR -H22l.X1.B	/149.E6
-H22l.X1.S	=K	+K	CONNECTOR -H22l.X1.S	/149.D6
-H22l.X2	=K	+K3	PLUG H22l	/36.E2
-H22l.X2.B	=K	+K	CONNECTOR -H22l.X1.B	/149.E6
-H22l.X2.S	=K	+K	CONNECTOR -H22l.X1.S	/149.E6
-H22r	=K	+K3	BEACONLIGHT	/36.E3
-H22r.X1	=K	+K3	CONNECTOR H22r	/36.E3
-H22r.X1.B	=K	+K	CONNECTOR -H22r.X1.B	/149.E7
-H22r.X1.S	=K	+K	CONNECTOR -H22r.X1.S	/149.D7
-H22r.X2	=K	+K3	PLUG H22r	/36.E3
-H22r.X2.B	=K	+K	CONNECTOR -H22r.X1.B	/149.E7
-H22r.X2.S	=K	+K	CONNECTOR -H22r.X1.S	/149.E7
-H23	=K	+K	VERSION BEACONLIGHT	/109.E2
-H23.X1	=K	+K	CONNECTOR H23	/109.E2
-H23.X2	=K	+K	CONNECTOR H23	/109.E2
-H40	=K	+K2	BUZZER	/49.C3
-H40.X1	=K	+K2	PLUG BUZZER	/49.C3
-H40.X2	=K	+K2	PLUG BUZZER	/49.D3
-H47	=K	+K2	CHARGE CONTROL	/28.B8
-H50	=V	+V1	PROFILE LIGHT/PARKING LIGHT LEFT FRONT 24V - 4W	/30.E4

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

MACHINE TYPE
LIDOS UNIT

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

BMK-INDEX
E PLAN

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-XMSP26	=K	+K	EARTH SENSOR GRIP	/41.A1
-XMSP32	=K	+K	GEROTOR STEERING	/98.E7
-XMSP32.	=K.	+K	DISPLAY 2; GRAB CAMERA	/151.C3
-XMSP33	=K	+K	WORKING BASKET	/123.A3
-XMSP34	=K	+K	EARTH LIGHTING CONTROL	/117.B6
-XMSP35	=K	+K	EARTH	/125.B5
-XMSPE27	=K	+K	AUXILIARY HEATER	/105.C3
-XMSPJ	=K	+K	EARTH JOYSTICK STEERING	/94.F1
-XMSPLB	=K	+K	MASS GROUPING BLOCK CAB REAR WALL	/148.F3
-XMSPW1	=K	+K	EARTH ANTENNA	/37.D8
-XMSPZMO2	=K	+K	ADDITIONAL MODULE OUTPUT 2	/122.E2
-Y1	=H	+H	PWM FOR CLUTCH 2 (K2)	/45.F7
-Y2	=H	+H	PWM FOR CLUTCH TRAVELLING DIRECTION FORWARD (KV)	/45.F7
-Y3	=H	+H	PWM FOR CLUTCH 3 (K3)	/45.F7
-Y4	=H	+H	PWM FOR CLUTCH TRAVELLING DIRECTION BACKWARDS (KR)	/45.F8
-Y5	=H	+H	PWM FOR CLUTCH 1 (K1)	/45.F8
-Y6	=H	+H	PWM FOR OPTIONAL CONNECTION	/45.F8
-Y7	=H	+H	PWM FOR PROPORTIONAL CONTROL	/45.F8
-Y10	=H	+K6	PARKING BRAKE	/44.C2
-Y10.JPT	=H	+K6	PLUG PARKING BRAKE	/44.C2
-Y10.JPT.S	=H	+H	PARKING BRAKE EMERGENCY OPERATION	/106.C8
-Y10.JPT_1	=H	+K6	PARKING BRAKE EMERGENCY OPERATION	/106.C8
-Y13	=H	+H	FAN MOTORINTERCOOLER	/48.C6
-Y13.X	=H	+H	PLUG FAN MOTOR	/48.C6
-Y14	=H	+H	WORKING HYDRAULICS LOCKOUT	/42.C1
-Y14.DT	=H	+H	CONNECTOR Y14	/42.C1
-Y20	=V	+V1	RIDE CONTROL	/42.C3
-Y20.JPT	=V	+V1	PLUG Y20	/42.C3
-Y22	=M	+M	AIR CONDITIONING COMPRESSOR	/59.E6
-Y31a	=V	+V1	TILT OUT	/43.C2
-Y31a.X	=V	+V1	PLUG Y31a	/43.C2
-Y31b	=V	+V1	TILT IN	/43.C2
-Y31b.X	=V	+V1	PLUG Y31b	/43.C2
-Y32a	=V	+V1	LOWERING	/43.C3
-Y32a.X	=V	+V1	PLUG Y32a	/43.C3
-Y32b	=V	+V1	HOISTING	/43.C4

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-Y32b.X	=V	+V1	PLUG Y32b	/43.D4
-Y33a	=V	+V	OPTIONAL EQUIPMENT 1	/43.C5
-Y33a.X	=V	+V	PLUG Y33a	/43.C5
-Y33b	=V	+V	OPTIONAL EQUIPMENT 1	/43.C6
-Y33b.X	=V	+V	PLUG Y33b	/43.C6
-Y34a	=V	+V	OPTIONAL EQUIPMENT 2	/43.C7
-Y34a.X	=V	+V	PLUG Y34a	/43.C7
-Y34b	=V	+V	OPTIONAL EQUIPMENT 2	/43.C8
-Y34b.X	=V	+V	PLUG Y34b	/43.C8
-Y36a	=V	+V	GRAB SWING R	/146.C2
-Y36a.X	=V	+V	CONNECTOR Y36a	/146.C2
-Y36b	=V	+V	GRABS SWING L	/146.C2
-Y36b.X	=V	+V	CONNECTOR Y36b	/146.C2
-Y37a	=V	+V	OSCILLATING CYLINDER H. TILT	/146.C3
-Y37a.X	=V	+V	CONNECTOR Y37a	/146.C3
-Y37b	=V	+V	OSCILLATING CYLINDER V. TILT	/146.C4
-Y37b.X	=V	+V	CONNECTOR Y37b	/146.C4
-Y38a	=V	+V	SWIVEL ARM H. TILT	/146.C5
-Y38a.X	=V	+V	CONNECTOR Y38a	/146.C5
-Y38b	=V	+V	SWIVEL ARM V.TILT	/146.C6
-Y38b.X	=V	+V	CONNECTOR Y38b	/146.C6
-Y39	=V	+V	OSCILLATING CYLINDER LOCKOUT	/146.C8
-Y39.X	=V	+V	CONNECTOR Y39	/146.C8
-Y50	=H	+H	FAN REVERSAL	/48.C8
-Y50.X	=H	+H	CONNECTOR Y50	/48.C8
-Y53	=-V	+V	QUICK-CHANGE DEVICE	/101.E3
-Y53.X	=-V	+V	PLUG QUICK-CHANGE DEVICE	/101.E3
-Y53a	=V	+V	QUICK-CHANGE DEVICE	/101.E6
-Y53a.X	=V	+V	PLUG QUICK-CHANGE DEVICE	/101.E6
-Y63	=H	+H	GEROTOR STEERING	/98.D8
-Y63.X	=H	+H	CONNECTOR	/98.D8
-Y65	=V	+V	PIPE BREAK SAFETY DEVICE WORKING BASKET	/123.C6
-Y65.X	=V	+V	PLUG	/123.C6
-Y66	=V	+V	SHUT OFF VALVE WORKING BASKET	/123.C7
-Y66.X	=V	+V	PLUG	/123.C7
-Y67	=V	+V	LS PRESSURE CONTROLLER WORKING BASKET	/123.C8

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

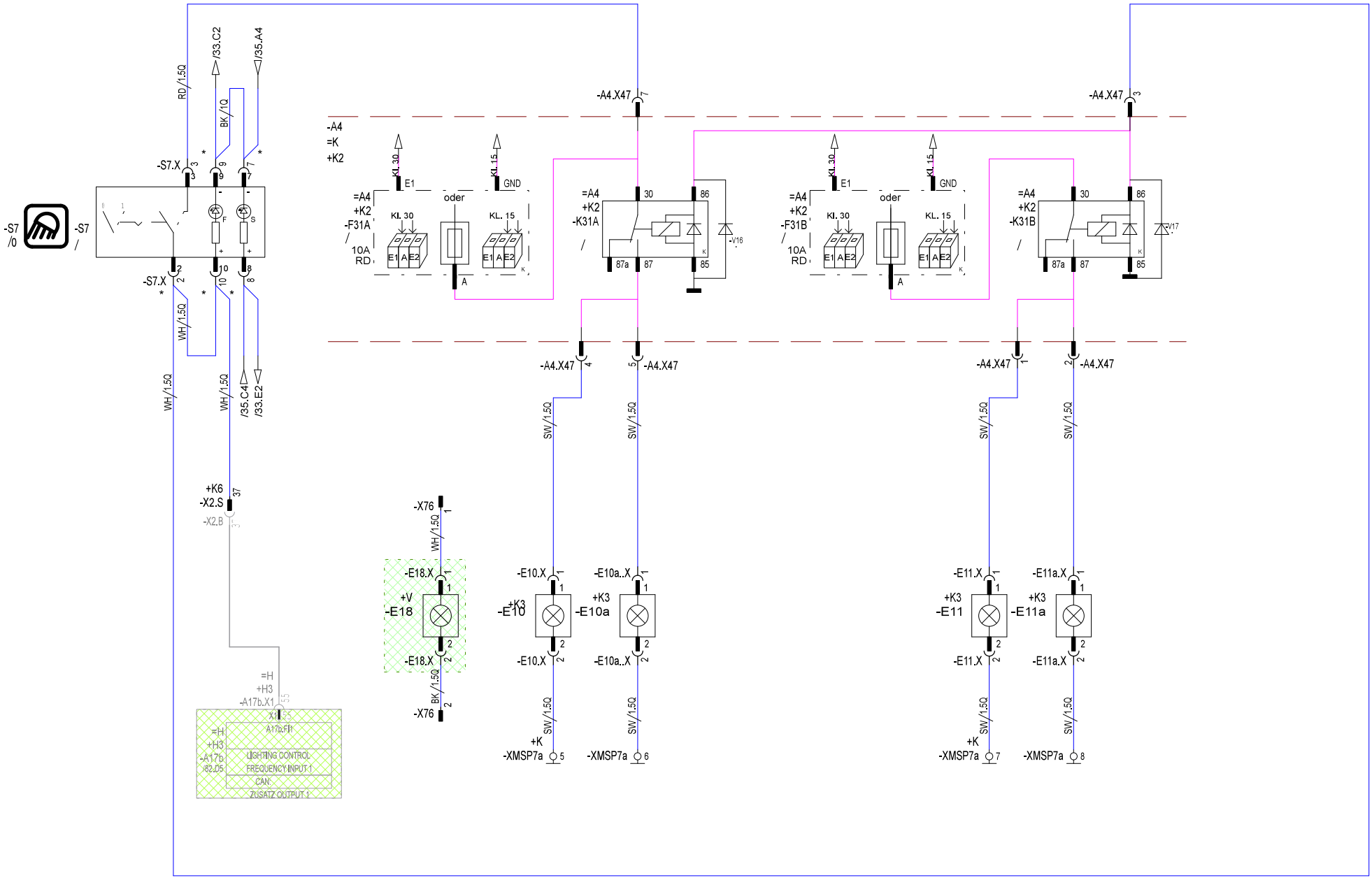
MACHINE TYPE
LIDOS UNIT

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

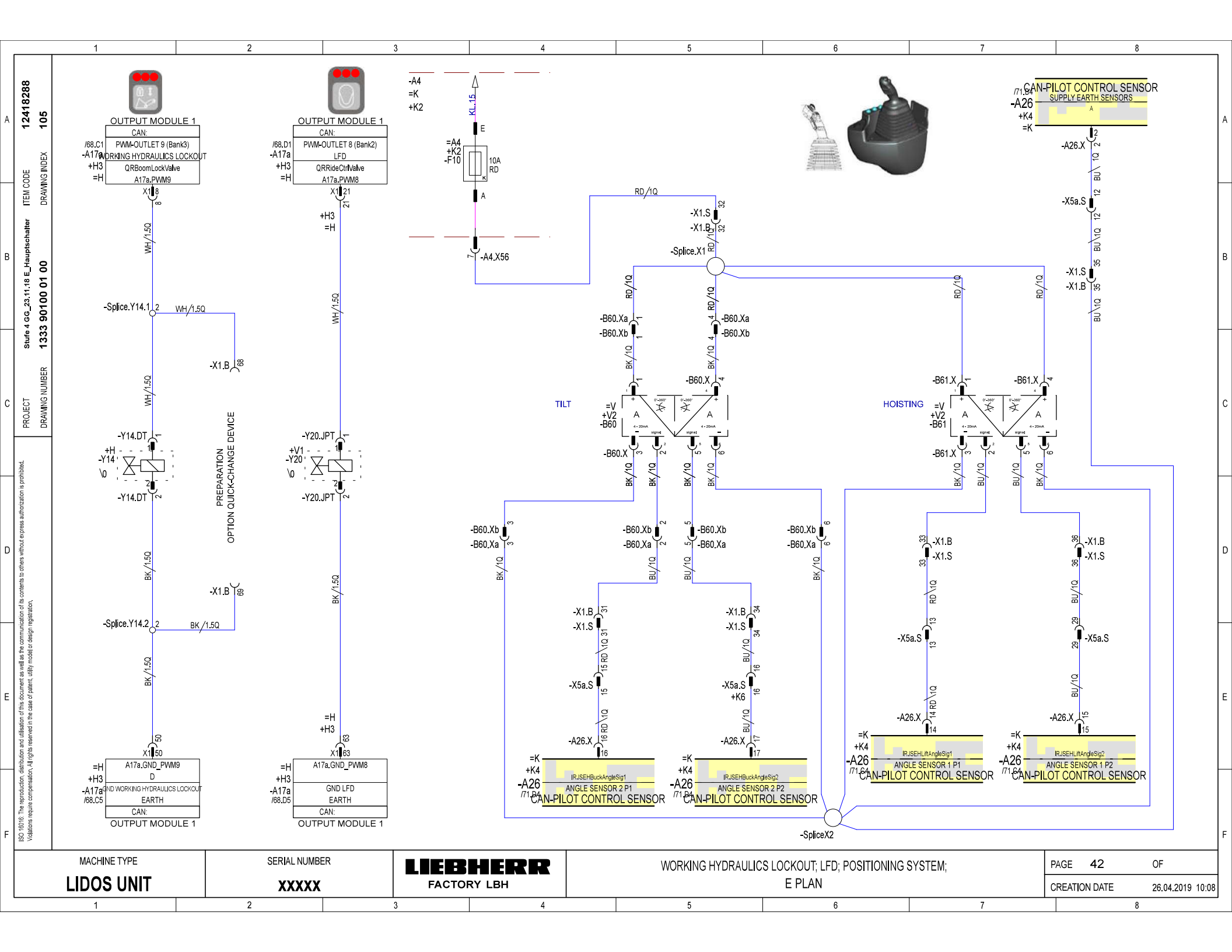
BMK-INDEX
E PLAN

WORKING PROJECTOR FRONT



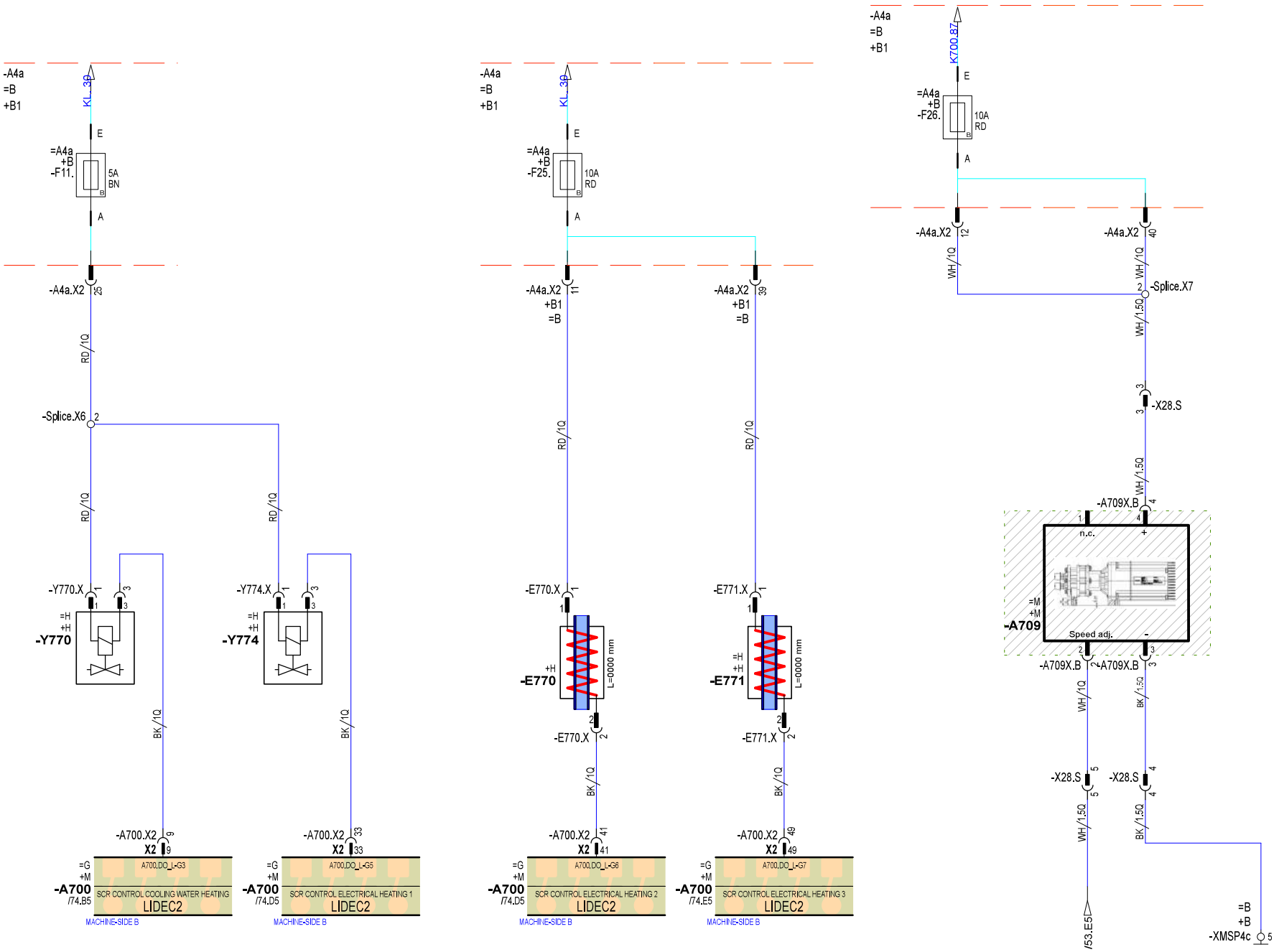
PROJECT
DRAWING NUMBER 1333 90100 01 00 Stufe 4 GG_23.11.18 E_Hauptschalter
ITEM CODE 12418288
DRAWING INDEX 105

MACHINE TYPE	SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	WORKING PROJECTOR FRONT CAB E PLAN	PAGE 32 OF CREATION DATE 26.04.2019 10:08



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

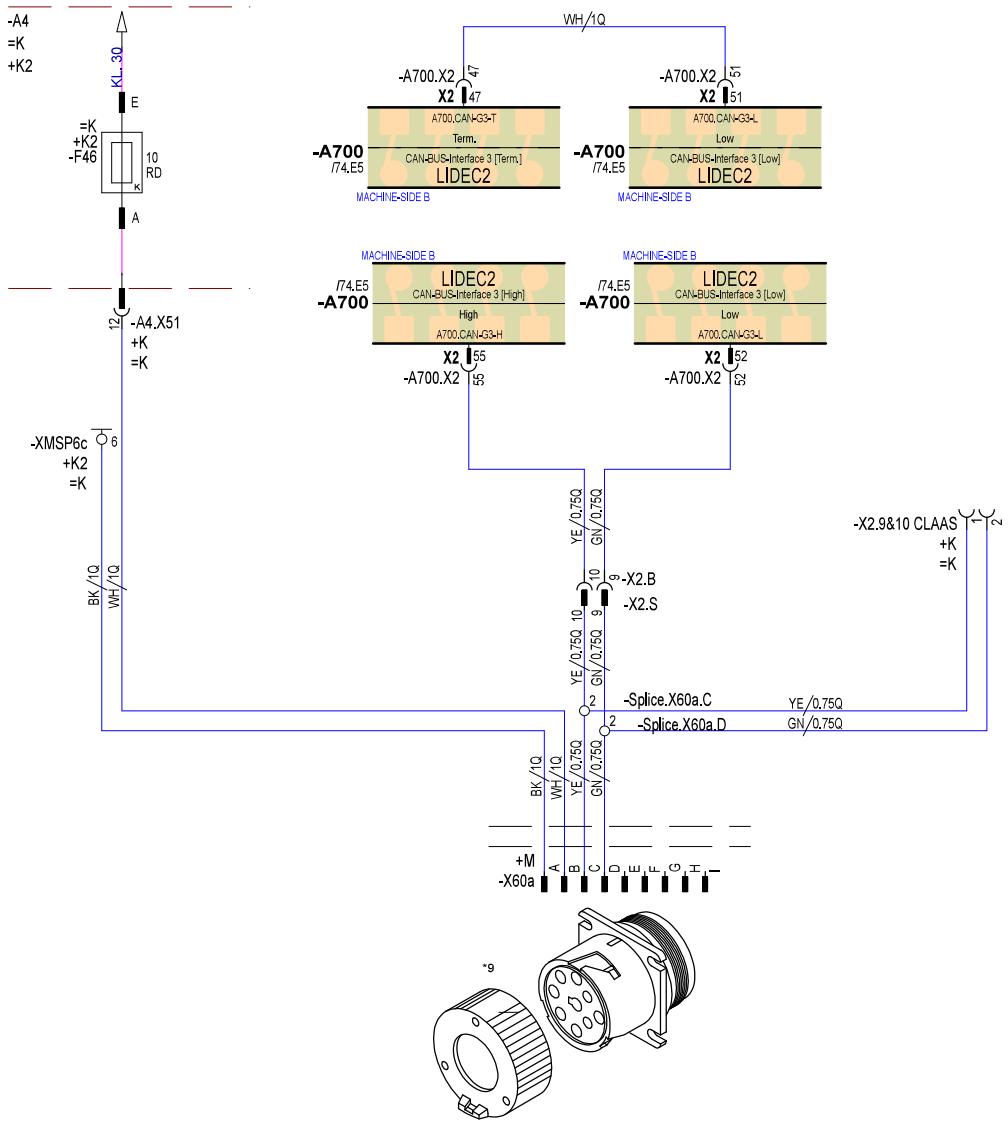
MACHINE TYPE	SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	WORKING HYDRAULICS LOCKOUT; LFD; POSITIONING SYSTEM; E PLAN	PAGE 42 OF
				CREATION DATE 26.04.2019 10:08



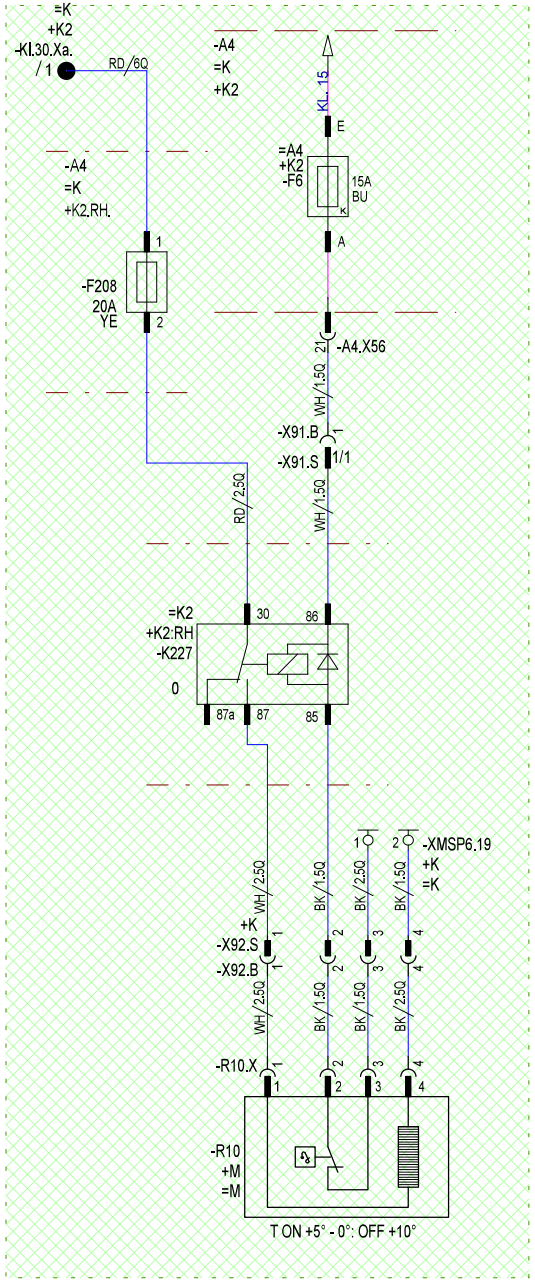
PROJECT: Stufe 4 GG_23.11.18 E_Hauptschalter
DRAWING NUMBER: 1333 90100 01 00
ITEM CODE: 12418288
DRAWING INDEX: 105

MACHINE TYPE	SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	SUPPLY SCR HOSE HEATING; SCR WATER VALVES E PLAN	PAGE 52 OF CREATION DATE 26.04.2019 10:08

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



DIAGNOSTIC PLUG
DIESEL ENGINE



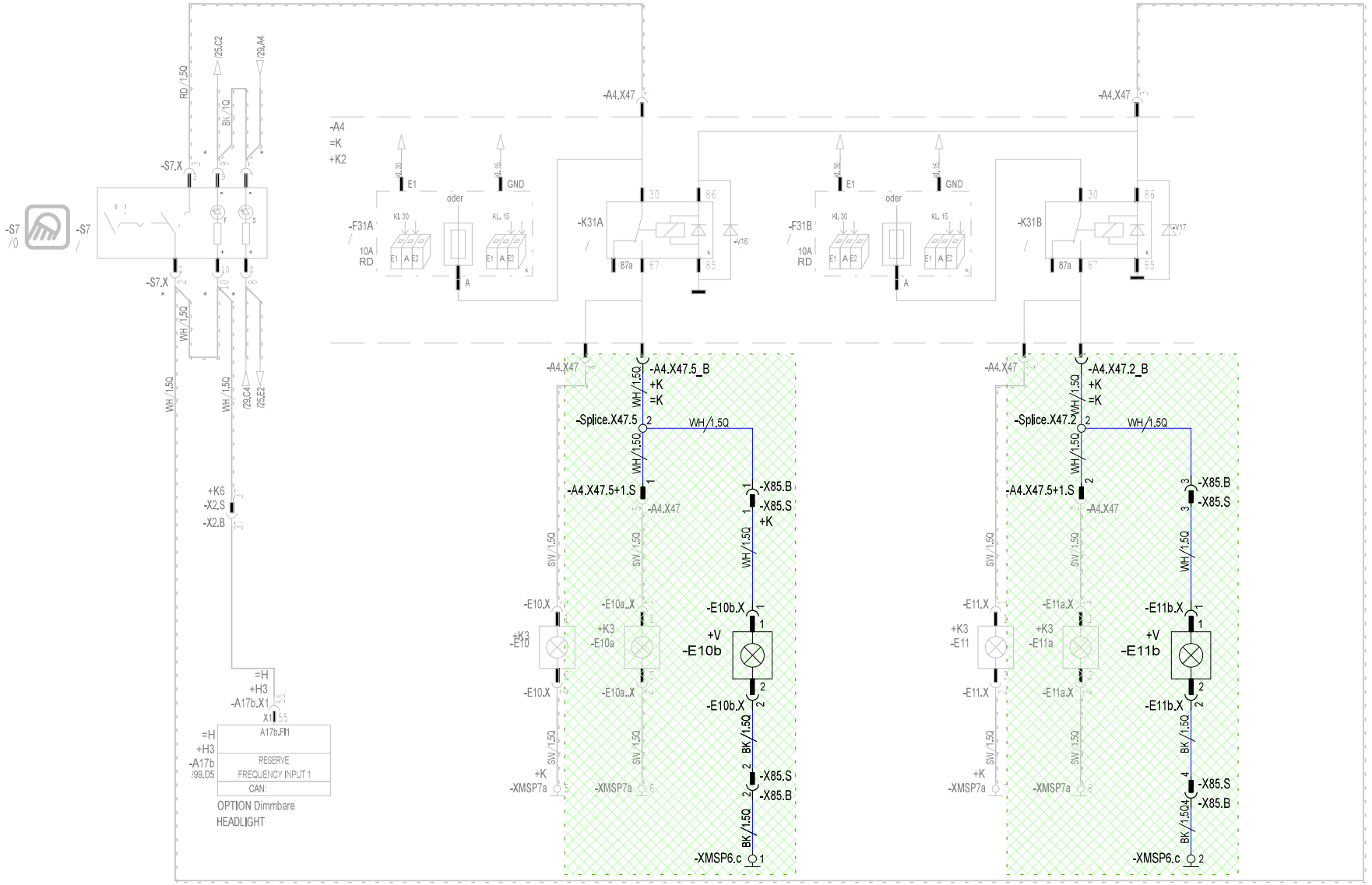
L550/1214 STEP 4 FACELIFT DOWN Snr.: 54427; L556/1332 STEP 4 FACELIFT DOWN Snr.: 54432;; L566/1484 STEP 4 FACELIFT DOWN Snr.: 54428; L576/1333 STEP 4 FACELIFT DOWN Snr.: 54430; L580/1464 STEP 4 FACELIFT DOWN Snr.: 54471; L586/1334 STEP 4 FACELIFT DOWN Snr.: 5447

MACHINE TYPE	SERIAL NUMBER			PAGE 62 OF
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	DIAGNOSTIC PLUG MOTOR CONTROL E PLAN	CREATION DATE 26.04.2019 10:08

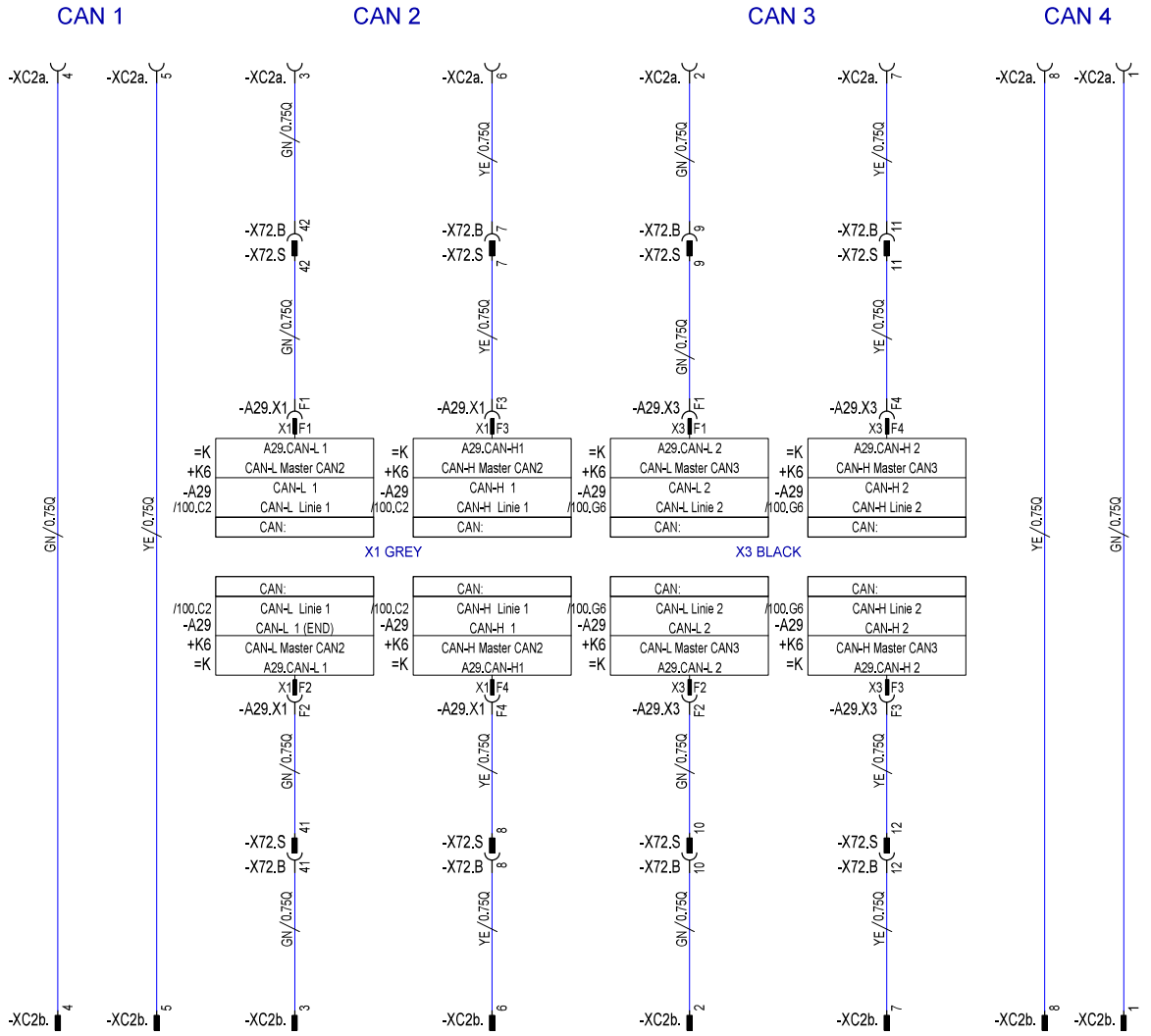
=K -A30 Modul Nr.:
+K2 Modulname: LITU_GRUNDGERÄT

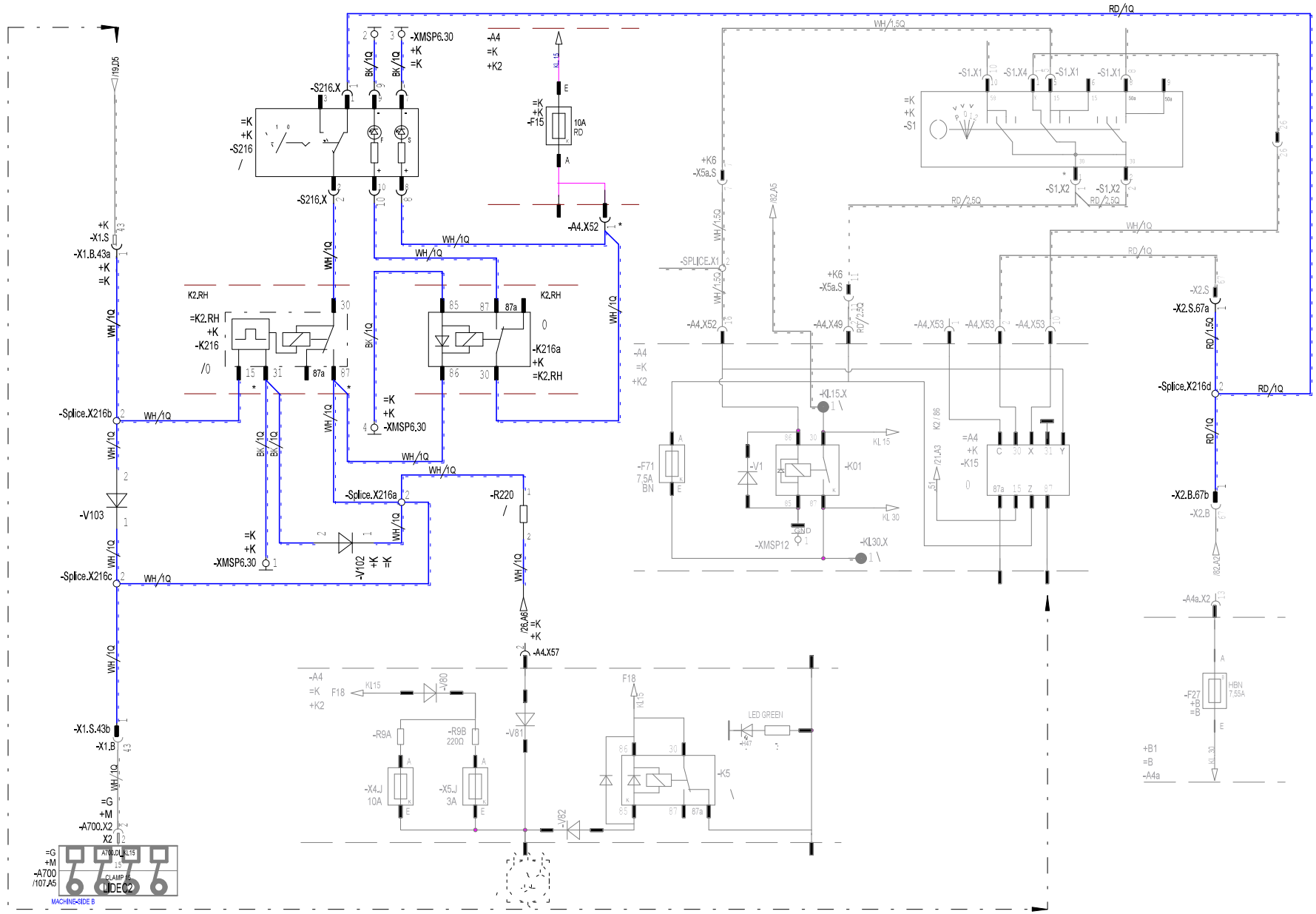
Phys. Adr.	Blatt	EA	Beschreibung		Stecker	Pin	Phys. Adr.	Blatt	EA	Beschreibung		Stecker	Pin
A30.1			Vers. FROM SAT MODULE	VSAT (IN)		1	A30.25			CAN Low 1	CANL1		25
A30.2			KI15 FOR SAT MODULE	IGN_OUT (KL15)		2	A30.26			CAN Low 2	CANL2		26
A30.3			RESERVE	-		3	A30.27			RESERVE	-		27
A30.4			RESERVE	-		4	A30.28	/63.E2		VOLTAGE SUPPLY KL30	V_IN (KL30)		28
A30.5	/63.F4		DCD SIGNAL	DCD-0		5	A30.29			Allgemeine EARTH	GND		29
A30.6	/63.F3		DTR SIGNAL	DTR-0		6	A30.30			TXT SAT MODULE	TXD-3		30
A30.7			NOT verwendet	-		7	A30.31			CTS SAT MODULE	CTS-3		31
A30.8	/63.F6		EARTH	GND		8	A30.32			TXT Powermanagement	TXD-5		32
A30.9			SPEED DIESEL ENGINE	F_IN		9	A30.33	/63.F5		TXT SIGNAL	TXD-0		33
A30.10			EARTH	GND		10	A30.34	/63.F7		CTS SIGNAL	CTS-0		34
A30.11			RESERVE	-		11	A30.35			DIGITAL INPUT 1	DIN1		35
A30.12			CAN END	CAN_TERM		12	A30.36			EARTH	GND		36
A30.13	/63.E1		INPUT KL.15	IGN_IN (KL15)		13	A30.37			Analogeingang 1	AIN1		37
A30.14			Schaltausgang 3A	D_OUT		14	A30.38			EARTH	GND		38
A30.15			OUTLET KL.30	V_OUT (KL30)		15	A30.39			CAN High 1	CANH1		39
A30.16			RXD SAT MODULE	RXD-3		16	A30.40			CAN High 2	CANH2		40
A30.17			RTS SAT MODULE	RTS-3		17	A30.41			EARTH	GND		41
A30.18			RXT Powermanagement	RXD-5		18	A30.42	/63.E2		EARTH	GND		42
A30.19	/63.F5		RXD SIGNAL	RXD-0		19							
A30.20	/63.F8		RTS SIGNAL	RTS-0		20							
A30.21			DIGITAL INPUT 2	DIN2		21							
A30.22			EARTH	GND		22							
A30.23			Analogeingang 2	AIN2		23							
A30.24			EARTH	GND		24							

WORKING PROJECTOR FRONT



MACHINE TYPE	SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	OPTION WORKING PROJECTOR a. LAMP HOLDER E PLAN	PAGE 82 OF
				CREATION DATE 26.04.2019 10:08





TO SERIAL NUMBER:.....

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

MACHINE TYPE	SERIAL NUMBER			PAGE 102 OF
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	OPTION AUTOMATIC RUN-OUT E PLAN	CREATION DATE 26.04.2019 10:08

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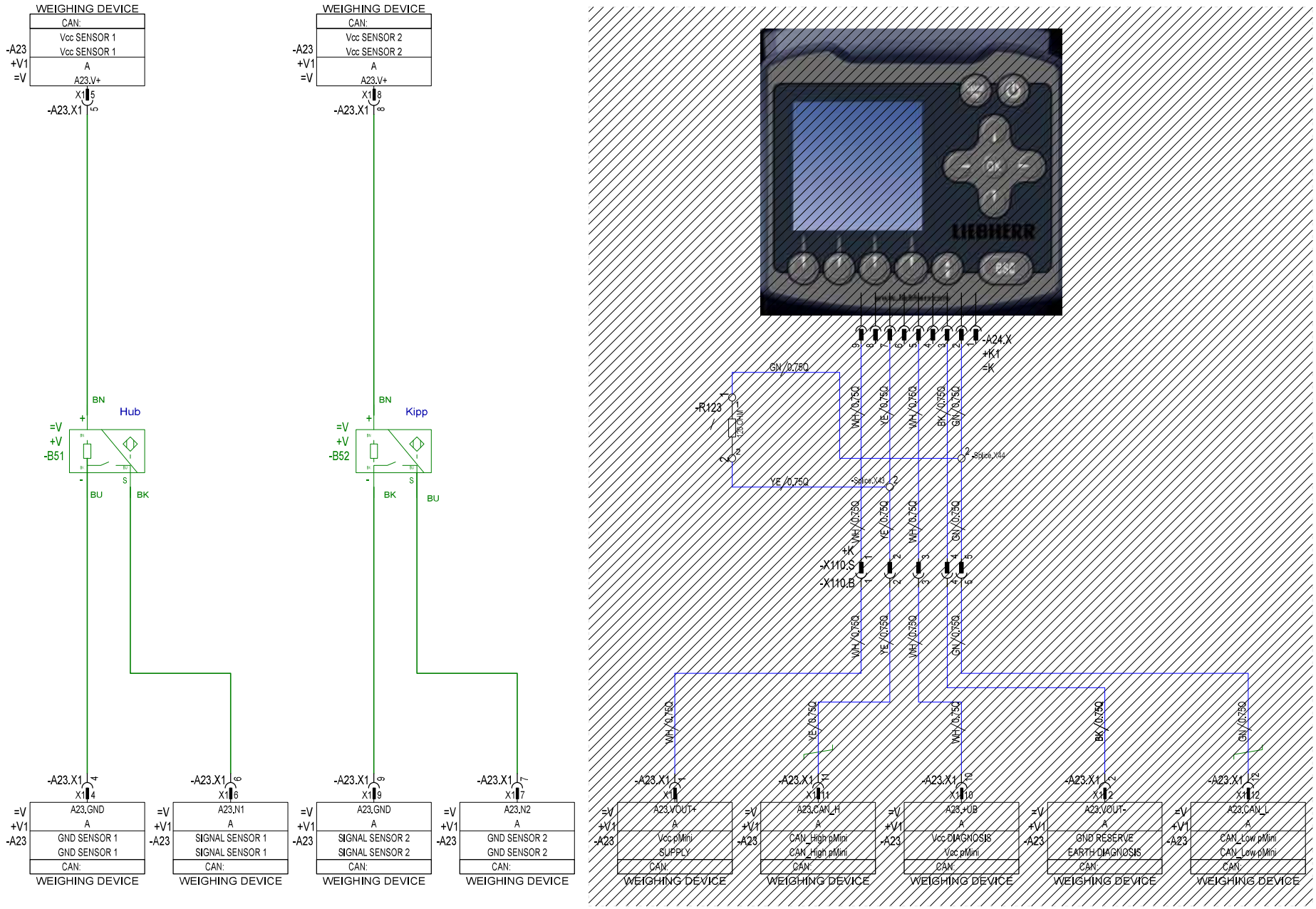
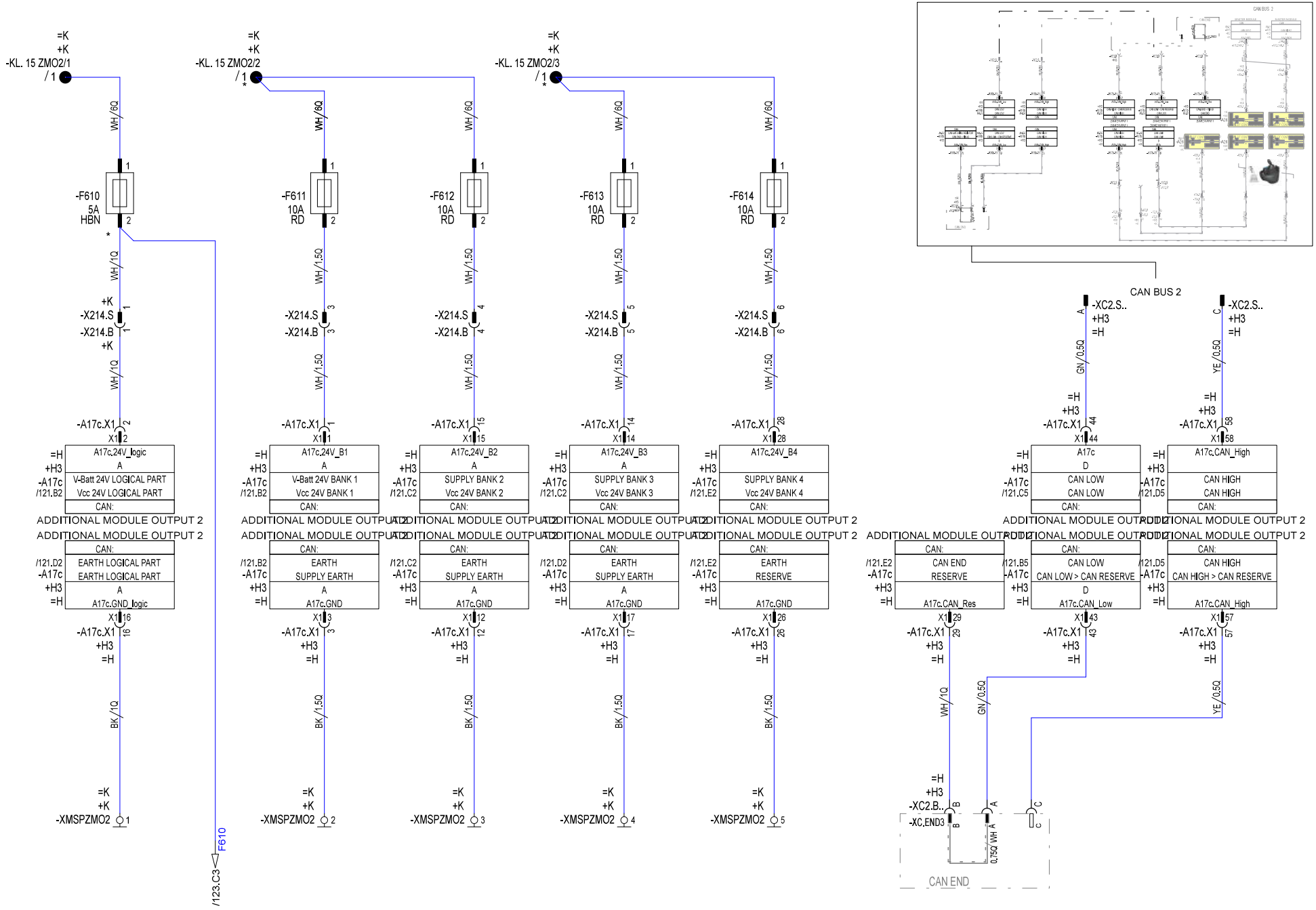
ITEM CODE 105
DRAWING INDEX
Stufe 4 GG_23.11.18 E_Hauptschalter
DRAWING NUMBER 1333 90100 01 00

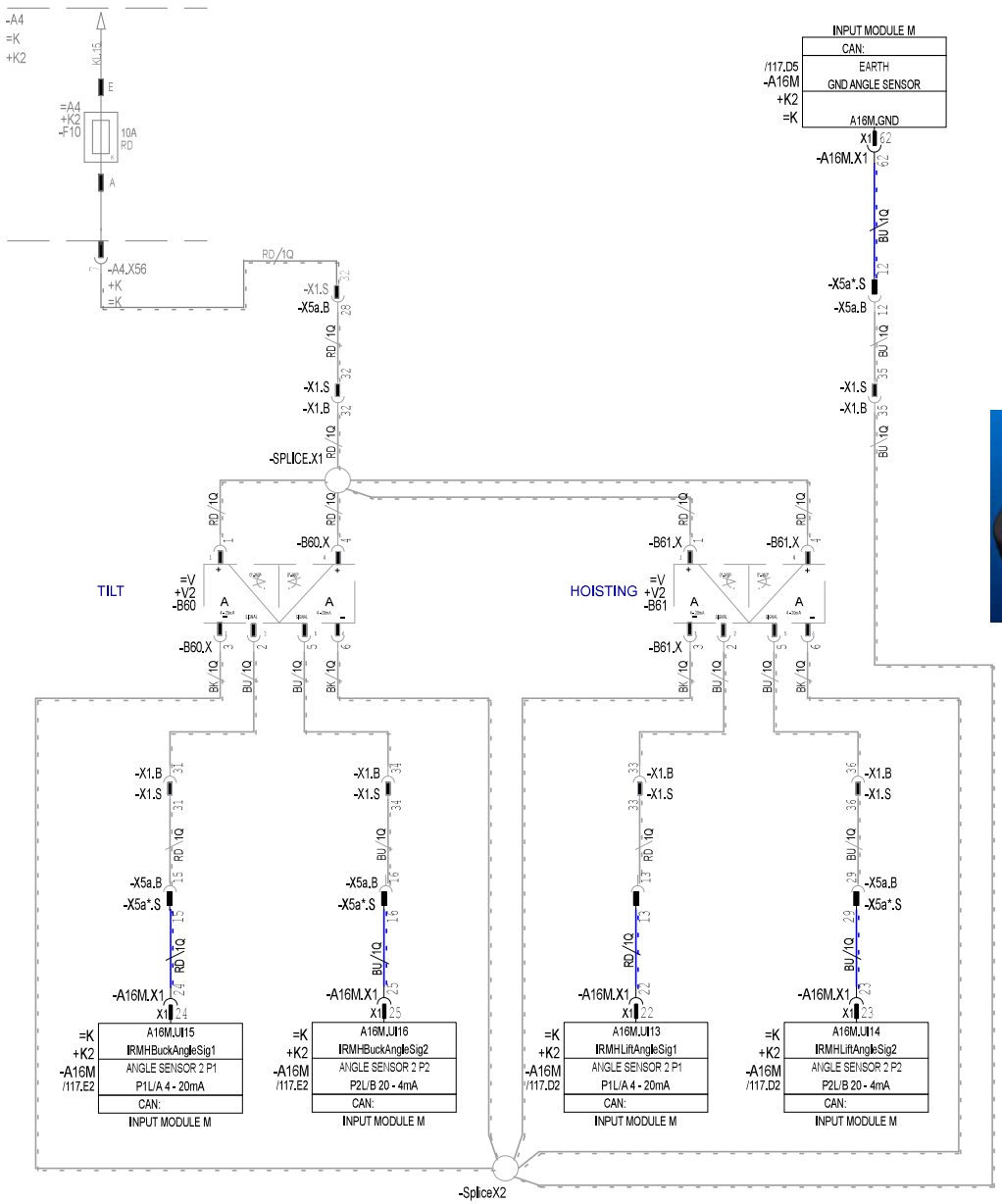


MACHINE TYPE	SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	OPTION WEIGHING DEVICE LIEBHERR E PLAN	PAGE 112 OF
				CREATION DATE 26.04.2019 10:08



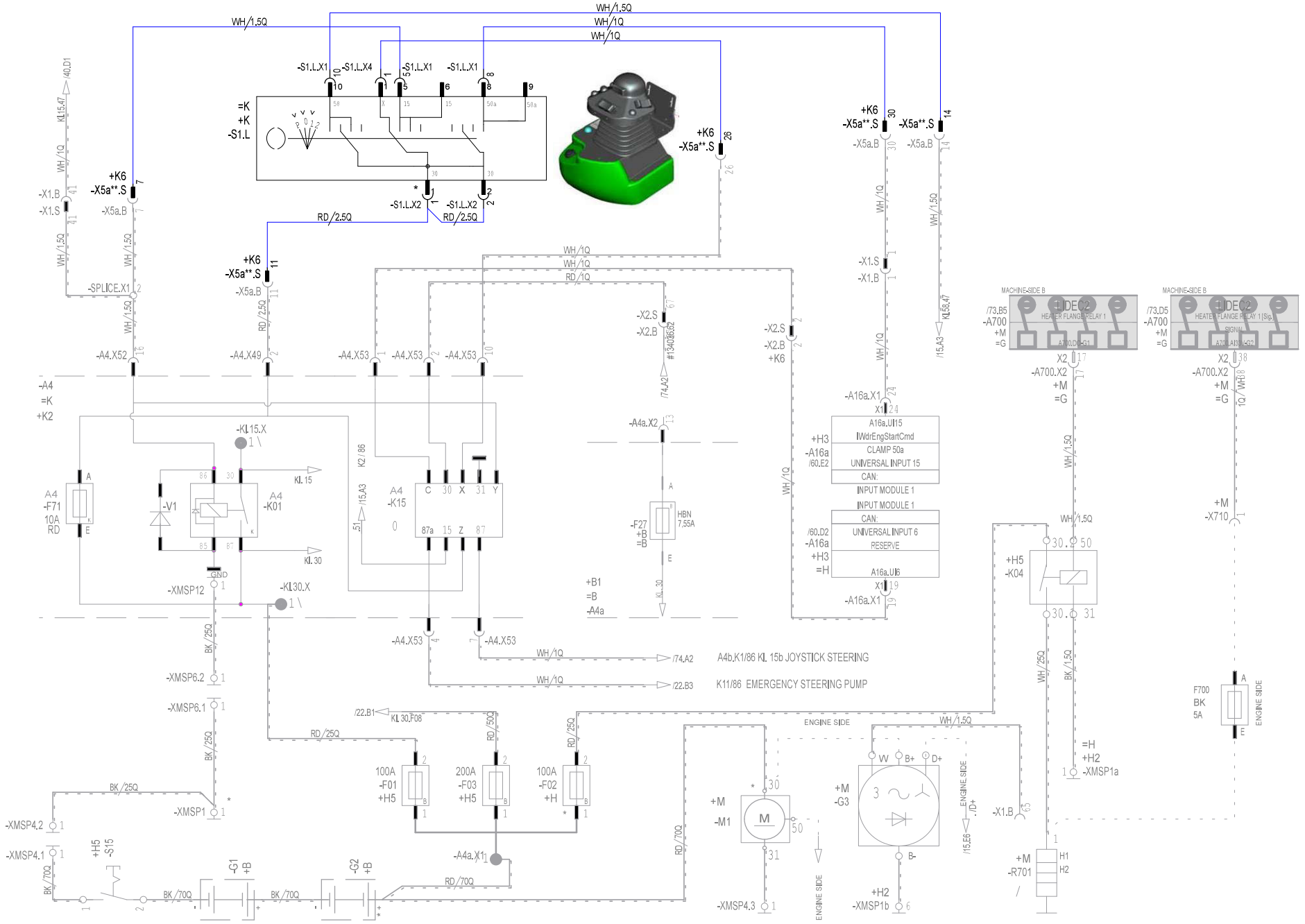
MACHINE TYPE	SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	OPTION Vcc ADDITIONAL MODULE OUTPUT 2 E PLAN	PAGE 122 OF CREATION DATE 26.04.2019 10:08

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



TO SERIAL NUMBER:.....

MACHINE TYPE	SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	VERSION 1 MULTI-LEVER CONTROL 4. CONTROL CIRCUIT; E PLAN	PAGE 132 OF
				CREATION DATE 26.04.2019 10:08



PROJECT 12418288 ITEM CODE 105 DRAWING INDEX

Stufe 4 GG_23.11.18 E_Hauptschalter

DRAWING NUMBER 1333 90100 01 00

MACHINE TYPE	SERIAL NUMBER			
LIDOS UNIT	XXXXX	LIEBHERR FACTORY LBH	VERSION 2 LOG HANDLER IGNITION LOCK E PLAN	PAGE 142 OF
				CREATION DATE 26.04.2019 10:08

TYPE
MOTOR_SPL

PROJECT: 10139858

ELECTRICAL WIRING DIAGRAM
10139857
ENGINE
D936 A7-04
ENGINE ELECTRICS
10139858
SPS 10139856

REPLACEMENT FOR	MARKED	lmbovs0	LIEBHERR	A3	DESIGNATION	DESCRIPTION	ARTICLE CODE		SYSTEM	LOCATION
0	DATE	25.07.2016 12:14	FACTORY LMB		ELECTRICAL WIRING DIAGRAM	ELECTRICAL WIRING DIAGRAM	10139857		=M	+M
CONFIDENTIAL	CHECKED	lmbbua0					DRAWING NUMBER	INDEX	SHEET 1	FROM 19
	TECHNICAL REFEREE						96 002 9307 90	003	ARTICLE CODE 10139857 VERSION 03_1 25.07.2016 12:14	

TYPE MOTOR_SPL

PROJECT: 10139858

HEAT FLANGE

-E703 U=24V P=1,9kW ±10%

EXHAUST FLAP

CONNECTOR REP. KIT: 10137043

ECU Label:

-M715 CAN VBAT GND LOW HIGH

TERMINATING RESISTOR 120 Ohm

CONNECTOR REP. KIT: 10140640 / 523

-X724.S *3/3

R 120 Ohm

-X724.S -X724.B -Au

CONNECTOR REP. KIT: 10137042 / 517

-X724.B *3/3

CONNECTOR REP. KIT: 10138874 / 516

-F700.X A PAT

5 A -F700 / 525

-F700.X PAT

-F700 OR 5 A

-F700.X A

WH/AWG18

WH/1Q

-M715.X *4/4 / 502

CODE A

WH/1Q WH/1Q GN/0.5Q YE/0.5Q

YE/0.5Q GN/0.5Q

-XM704 -XM705 -XM706 -XM703 -XM702

.12P-4 /15.C1

.12P-5 /10.D4

.12P-6 /10.F6

CONNECTOR REP. KIT: 10139933 / 501

-X710.S *12/12

CODE A

-X710.S

-X710.B -OBW

CONNECTOR REP. KIT: 10146195 /

-X710.B *12/12

CODE A

GN/0.5Q YE/0.5Q

-A700C.X3 4 X3 4 /8.C2

-A700C.X3 8 X3 8 /8.C2

-A700 /6.E2

A700.CAN-M2-L CAN-BUS INTERFACE 2 MOTOR SIDE LOW

A700.CAN-M2-H CAN-BUS INTERFACE 2 MOTOR SIDE HIGH

ENGINE ECU CAN:

ENGINE ECU CAN:

REPLACEMENT FOR	MARKED	lmbovs0	LIEBHERR FACTORY LMB	A3	DESIGNATION: ELECTRICAL WIRING DIAGRAM	DESCRIPTION: INTERFACE CAN ACTUATOR, HEAT FLANGE, EXHAUST FLAP, TERMINATING RESISTOR 120 Ohm	ARTICLE CODE 10139857	SYSTEM =M / LOCATION +M
0	DATE	25.07.2016 12:14					DRAWING NUMBER 96 002 9307 90 / INDEX 003	SHEET 11 FROM 19
CONFIDENTIAL	CHECKED	lmbbua0						
	TECHNICAL REFEREE							

BMK	Component	CAN line	CAN address
A9	Immobiliser (option)	3	107
A11	Control unit	3	97
A15	Central control unit (Master4)		
A16a	Input module	1	45 (53, 81)
A16b	Input module (option)	2	47 (55, 83)
A17a	Output module	1	22 (14, 6, 50)
A17b	Output module (option)	2	21 (13, 5, 19)
A21	Heater/AC controller	3	106
A23	Weighing module (option)	1	108
A25	Transmission control unit	4	J1939
A26	Control lever	2	65, 66
A29	Joystick module (option)	2 and 3	67, 68, 63, 64
A700	Engine control unit	1	92, 93, 94, 95
CAN 1	CAN line 1	1	
CAN 2	CAN line 2	2	
CAN 3	CAN line 3	3	
CAN 4	CAN line 4	4	
X60a	Diesel engine diagnostic plug	1	
X60d	Transmission diagnostic plug	4	

Tab. 304: Components

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

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

The weighing module **A23** is located in the front section of the machine.

The immobiliser **A9** is fitted to the starting switch.

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

The heater/AC controller **A21** is located in the heating and air conditioning unit.

The control unit **A11** is mounted on the control panel.

The control lever **A26** is mounted to the right of the operator's seat.

The joystick module **A29** is installed under the operator's seat.

The diesel engine diagnostic plug **X60a** is installed on the diesel engine.

The transmission diagnostic plug **X60d** is installed on the transmission.

2 Function

The machine is electronically controlled by the central control unit (Master4) **A15**.

The central control unit is connected via the CAN lines to the CAN devices. All CAN devices on a CAN line are connected in series.

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).

LBH/11835201/19/211-20190801_083826/en

– Resistances can be measured to an accuracy of ±0.5%.
– Resistance measurement is designed for sensor types PT1000 and Ni1000.

Frequency inputs:
– The module has 2 inputs for frequency measurement (10-70 kHz).

2.3 Input module addresses

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

Tab. 310: Input module addresses

The CAN modules are addressed using the Sculi diagnostic software.

110.5.3.3 Output modules

Valid for: L580-1464;

(For more information see: 020.8.3 Output module, page 020-33)

1 Layout

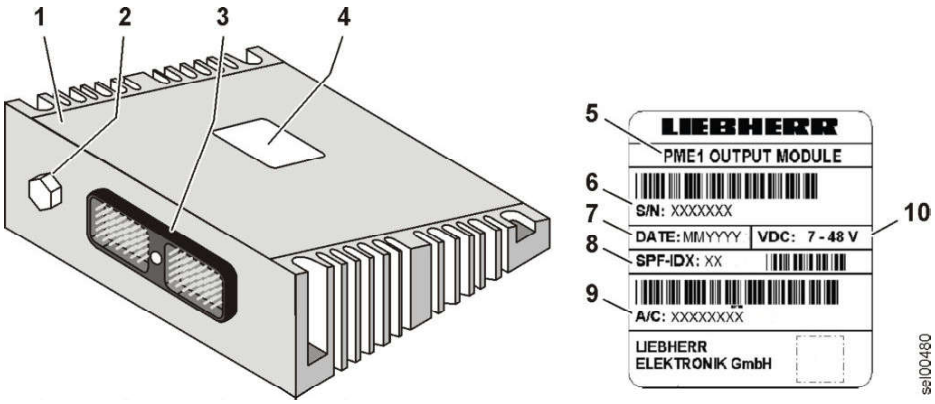


Fig. 556: Output module with type plate

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

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

LBH/11835201/19/211-20190801_083826/en

110.6.4 Door contact switch (inductive sensor)

Valid for: L580-1464/46489-;

1 Layout

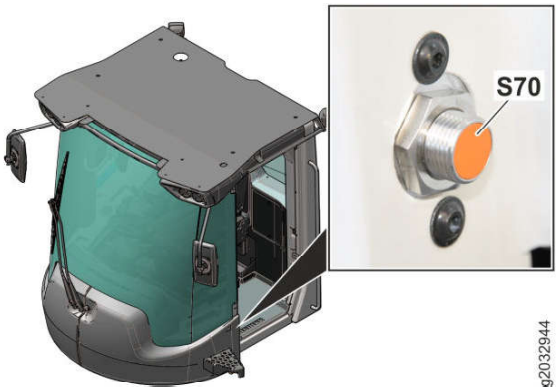


Fig. 565: Door contact switch

The door contact switch **S70** is installed in the door frame.

2 Function

The door contact switch **S70** activates the interior lighting E2 via the relay K8.

The door contact switch **S70** is an inductive sensor.

Condition for activating the interior lighting E2 via the door contact switch **S70**:
- The cab door is open.
- Turn the ignition on.
- The switch for the interior lighting E2 is in the “Activate via door contact switch” position.

The air conditioning control unit A21 reads the signal from the door contact switch **S70**. With manual air conditioning, the signal from the door contact switch does not affect the air conditioning.

With automatic air conditioning, the air conditioning control unit reduces the fan speed to a minimum when the cab door is open.

LBH/11835201/19/211-20190801_083826/en

120 Gearbox

Contents

LBH/11835201/19/211-20190801_083826/en

Name	Description	Name	Description	Name	Description
W2	Shaft 2	**Z7**	Gearwheel 7		
ZS1	Sun gear 1	**Z8**	Gearwheel 8		

Tab. 329: Key

To start the machine moving, the double yoke drive both rotary groups simultaneously. The pump **T1** swivels out, while the motor **T2** swivels in.

As a result, the pump **T1** delivers oil through the duct **A** to drive the motor **T2**. Because the pump **T1** is only at a small angle and the motor **T2** is almost at the maximum angle, a very high output torque is transmitted to the closed clutch **K1**. The machine moves purely under hydraulic power with maximum tractive force.

As soon as the machine starts moving, the ring gear **ZH** also starts turning. The ring gear **ZH** turns in the same direction as the gearwheel **Z5**. This reduces the speed transmitted to the sun gear **ZS1** and thus also the speed of the pump **T1** in relation to the engine speed. Some of the power is then transferred mechanically via the ring gear **ZH** and the two gearwheels **Z6** and **Z9** to the clutch **K1**.

2.3.3 Machine moving and accelerating (clutch K1 closed)

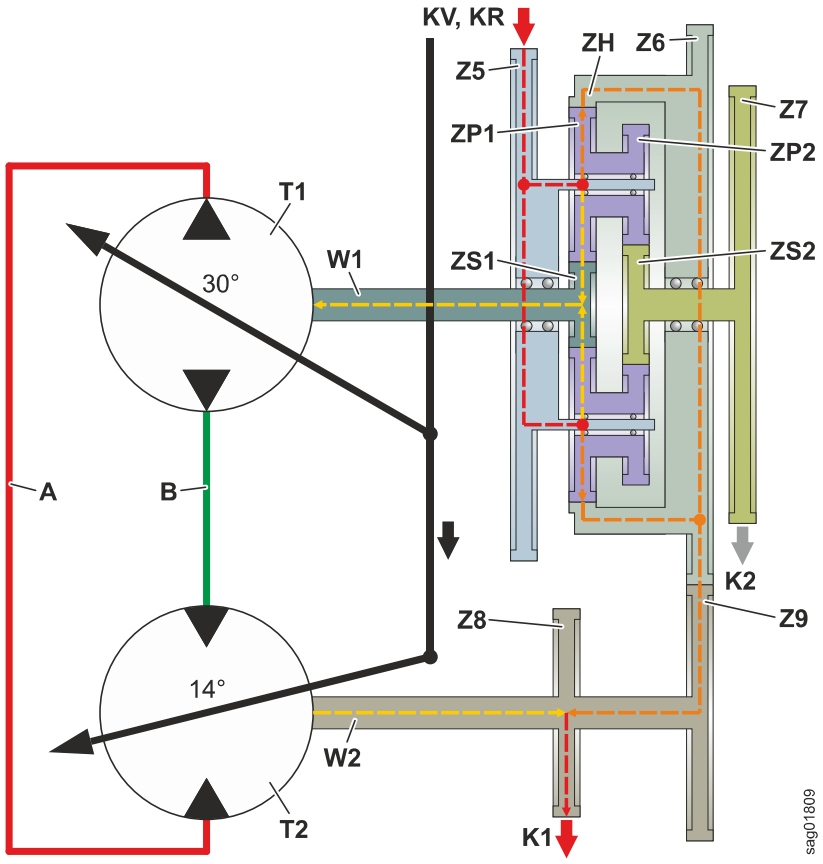


Fig. 579: Machine moving and accelerating (clutch K1 closed)

Name	Description	Name	Description	Name	Description
A	Duct A	**ZS2**	Sun gear 2	**Z9**	Gearwheel 9

120.2.3 Transmission control valve block

Valid for: L580-1464;

1 Layout

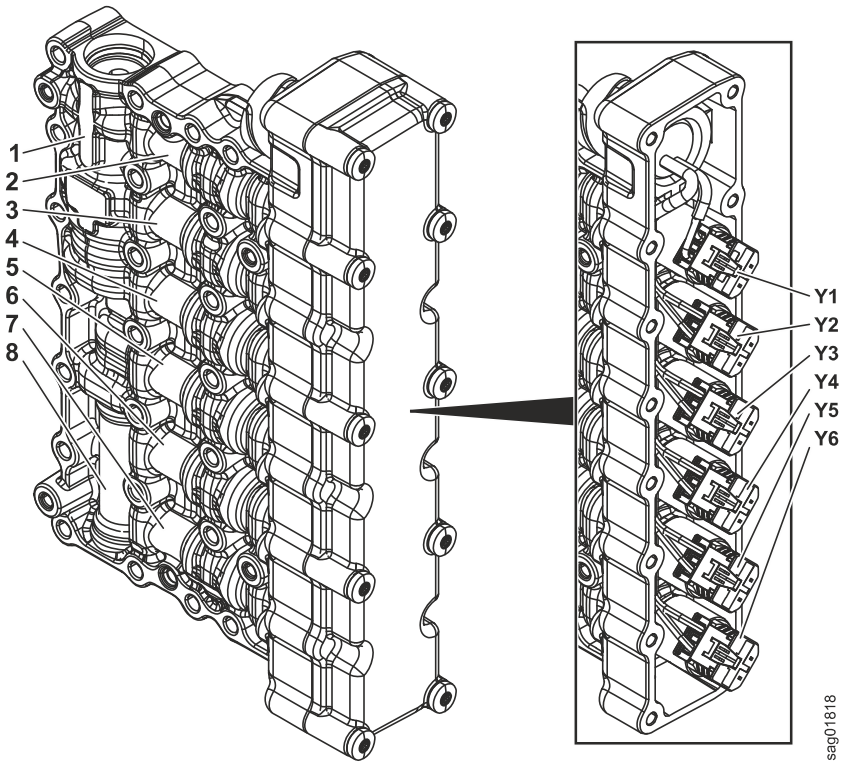


Fig. 585: Transmission control valve block (from front left)

1 Main pressure valve 20 bar
2 Secondary spool for clutch 2 (K2)
3 Secondary spool for forward travel direction clutch (KV)
4 Secondary spool valve for 1st optional connection
5 Secondary spool for reverse travel direction clutch (KR)
6 Secondary spool for clutch 1 (K1)
7 Secondary spool valve for 2nd optional connection
8 Pressure reducing valve 9 bar

BMK	Function	BMK	Function	BMK	Function
Y1	Proportional solenoid for clutch 2 (K2)	**Y3**	Proportional solenoid for 1st optional connection	**Y5**	Proportional solenoid for clutch 1 (K1)
Y2	Proportional solenoid for forward travel direction clutch (KV)	**Y4**	Proportional solenoid for reverse travel direction clutch (KR)	**Y6**	Proportional solenoid for 2nd optional connection

Tab. 335: Equipment codes

Transmission control valve block is bolted to front of transmission.

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Technical data	
Description	**Value**
Mode of operation	Mechanical switch (actuated or not actuated)
Built-in measuring resistor	500 ohms
Reading when filter not dirty	500 ohms
Reading when filter dirty	Broken circuit

Tab. 344: Technical data

120.3.3 Gear shift proportional control solenoids

Valid for: L580-1464;

1.1 Layout

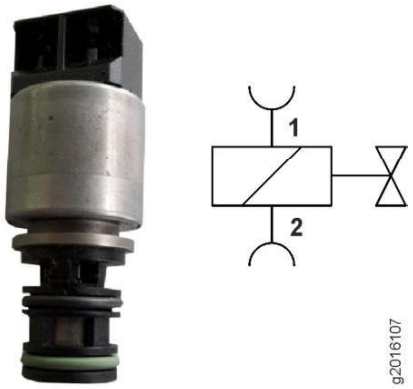

Fig. 593: Proportional control solenoids

The gear shift proportional control solenoids are fitted in the valve block.

2.1 Function

The gear shift proportional control solenoids are used to operate the clutches.

The gear shift proportional control solenoids control a pressure range of 0 bar to 8.3 bar.

Application	
Description	**Function**
Y1	Proportional solenoid for clutch 2 (K2)
Y2	Proportional solenoid for forward travel direction clutch (KV)
Y3	Proportional control solenoid for 1st optional connection (not used)
Y4	Proportional solenoid for reverse travel direction clutch (KR)
Y5	Proportional solenoid for clutch 1 (K1)
Y6	Proportional control solenoid for clutch 3 (K3) (only on L580-1414 and L586-1334)

Tab. 345: Application

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2.2 Self-locking differential

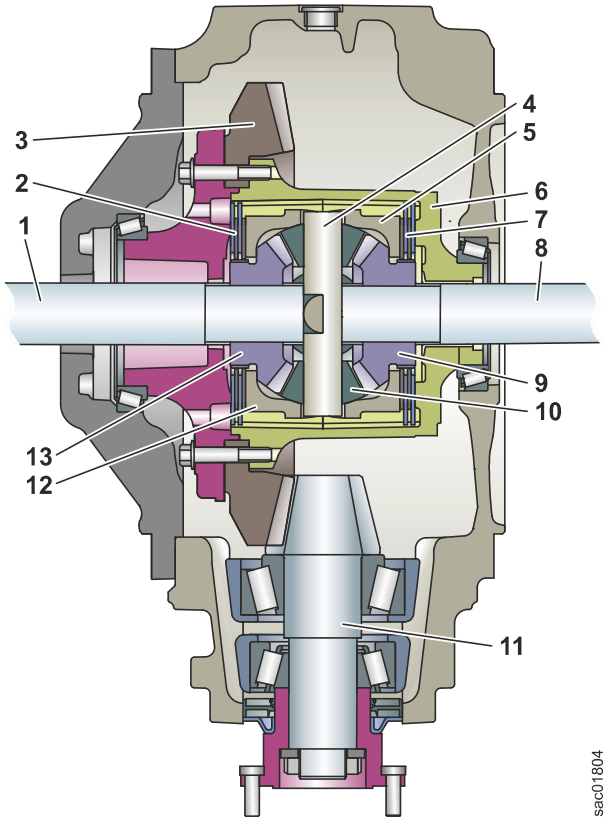

Fig. 602: Self-locking differential

1	Left half shaft	**8**	Right half shaft
2	Locking discs for left wheel	**9**	Tight axle tapered gear
3	Crown wheel	**10**	Compensation tapered gear
4	Compensation axle	**11**	Axle input shaft (tapered gear)
5	Right thrust ring	**12**	Left thrust ring
6	Differential housing	**13**	Left axle tapered gear
7	Locking discs for right wheel		

2.2.1 Speed balance

When cornering, the wheel on the inside of the bend covers less distance than the wheel on the outside. This means that the inside wheel turns at a lower speed than the outer wheel.

The axle input shaft **11** drives the crown wheel **3**. This is rigidly connected to the differential housing **6**. Along with the differential housing **6**, two compensation axles **4** and therefore four compensation tapered gears **10** rotate around the half shafts **1** and **8** The axle tapered gears **9** and **13** are driven by the compensation tapered gears **10**.

The compensation tapered gears **10** do not turn as long as the wheels are turning at the same speed.

If one wheel turns faster than the other, this is compensated by the compensation tapered gears **10** rotating around the compensation axles **4**. The half shaft of the inside wheel turns slower and the half shaft of the outside wheel turns faster than the crown wheel **3** by the same amount. The speed of the axle input shaft **11** remains the same.

The radial seals **8** protect the bearings from dirt.

140.1.2 Articulation lock

Valid for: L580-1464;

1 Layout

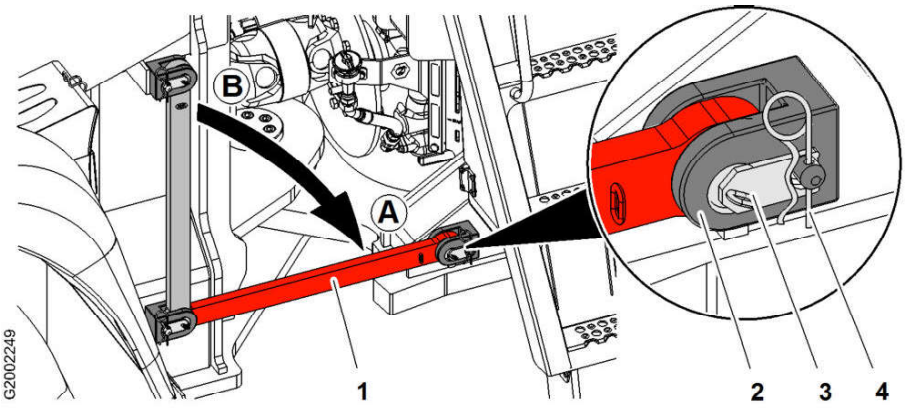

Fig. 609: Engaging the articulation lock

1	Locking bar	**3**	Pin
2	Bracket	**4**	Split pin

The articulation bearing is fitted between the front and rear sections.

2 Function

The articulation lock creates a rigid connection between the front and rear sections. Steering is no longer possible.

This means the steering is blocked, for example, when transporting the machine or for maintenance.

150.3.2 Quick coupler hydraulics

150.3.2.1 Overview of the quick coupler hydraulics

Valid for: L580-1464/0-45466;

1 Layout

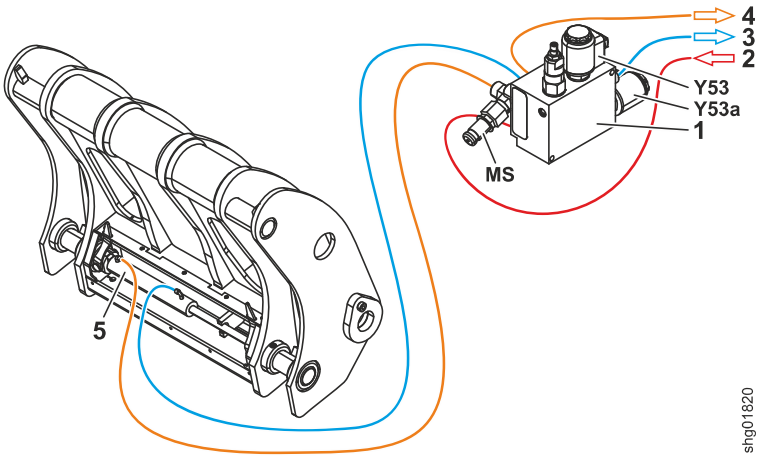

Fig. 616: Overview of the quick coupler hydraulics (from front left)

1 Valve block for quick coupler
2 Oil supply from working pump (via control valve block)
3 Return flow to control valve block
4 Load sensing signal for working pump (via control valve block)
5 Hydraulic cylinder for locking quick coupler

Name	Test point
MS	Quick coupler closing pressure

Tab. 362: Test points

BMK	Function	BMK	Function
Y53	Solenoid for opening quick coupler	**Y53a**	Quick coupler load sensing signal solenoid

Tab. 363: Equipment codes

The quick coupler hydraulics consist of the following components:
– Valve block for quick coupler (For more information see: Valve block for quick coupler, page 150-13)
– Hydraulic cylinder for locking quick coupler

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The quick coupler load sensing signal solenoid valve **Y53a** generates a load sensing signal. The load sensing signal causes the working hydraulics pump to swing out. This provides sufficient pressure for the hydraulic cylinder to retract.

The quick coupler unlocking relay **Y53** is supplies voltage to the quick coupler solenoid valve **K231**. This directs hydraulic oil to the ring side of the hydraulic cylinder. The hydraulic cylinder retracts. At the same time, a signal is sent via the input module **A16a** to the central control unit. This signal causes the central control unit to activate the warning tone.

The latching function relay **K232** ensures that the quick coupler solenoid valve **Y53** and the signal to the central control unit remain active even when the *quick coupler* button **S23** is released.

The quick coupler load sensing signal solenoid valve **Y53a** is only active when the *quick coupler* **S23** button is actuated.

1.3 Locking the quick coupler

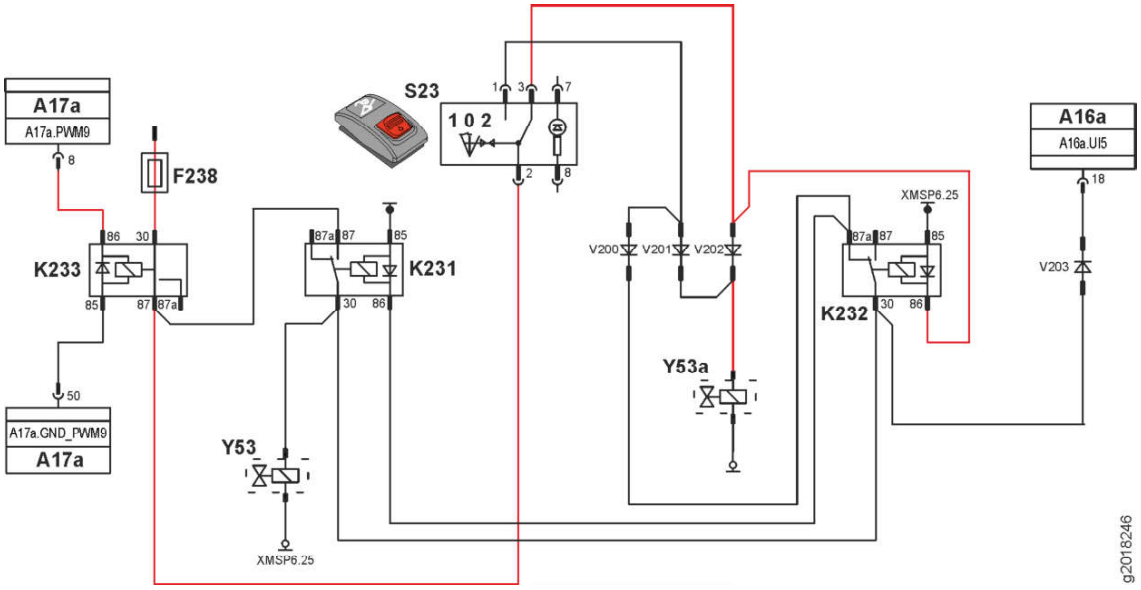

Fig. 626: Button S23 in quick coupler locking position

Position	Description	Position	Description
A16a	Input module A16a	K233	Safety shutdown relay
A17a	Output module A17a	S23	*Quick coupler* button
F238	Quick coupler fuse	Y53	Quick coupler solenoid valve
K231	Quick coupler opening relay	Y53a	Quick coupler load sensing signal solenoid valve
K232	Latching function relay		

Tab. 380: Items

When the *quick coupler* button **S23** is in position **2**, the quick coupler is locked.

The *quick coupler* **S23** button supplies the latching function relay **K232** and the quick coupler load sensing signal solenoid valve **Y53a** with voltage.

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The buttons for additional functions are located on the side of the control lever.

2 Function

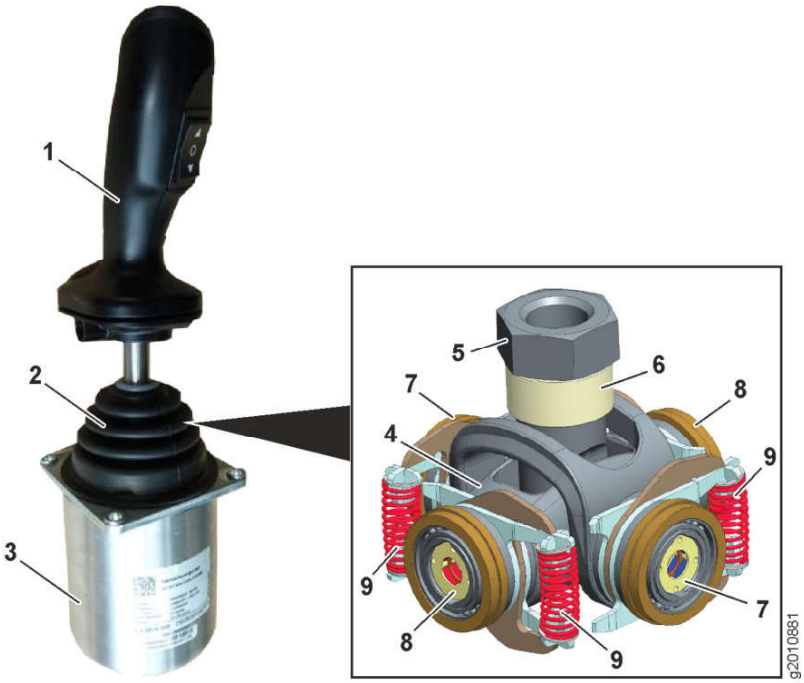

Fig. 632: Function of the control lever

1	Control lever handle	**6**	Stop socket
2	Universal joint	**7**	Angle sensor for the tilt function
3	CAN module for control lever A26	**8**	Angle sensor for the lifting and lowering functions
4	Universal joint	**9**	Return springs
5	Handle holder		

The control lever consists of the handle **1**, the universal joint **4** and the CAN module **3**.

The handle of the control lever contains the travel direction switch and the buttons for additional functions.

The signals from the travel direction switch and the additional function buttons are read by the CAN module of the control lever.

The handle of the control lever is screwed onto the universal joint.

The angle sensors for the tilt function **7** and the angle sensors for the lifting and lowering functions **8** are attached to the axles of the universal joint. These sensors measure the inclination of the control lever.

The universal joint has an action point in all four directions (additional spring force). If this action point is exceeded for more than 0.3 seconds, the kick-out function in that direction is activated.

The control lever CAN module reads and evaluates the signals from the angle sensors, the travel direction switch and the buttons.

This data is sent via a CAN line to the central control unit.

The control lever does not need to be calibrated.

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1 Outside temperature sensor B39
2 Blower
3 Anti-icing sensor B38
4 Evaporator
5 Refrigerant forward flow
6 Condensate trap
7 Expansion valve
8 Refrigerant return flow
9 Heat exchanger
10 Coolant forward flow
11 Coolant return flow
12 Cooling/heating mixer flap
13 Mixer plate
14 Outlet temperature sensor B41
15 Outlet hood
16 Servo motor for head/front level M17
17 Cable harness outlet
18 Servo motor for mixer flap M18
19 Air conditioning controller A21
20 Inside temperature sensor B40
21 Servo motor for recirculated air/ fresh air flap M14

The heating and air conditioning unit is installed on the right on the operator's cab.

2.1 Function

The outside temperature sensor **1** measures the temperature of the fresh air drawn in from outside.

The anti-icing sensor **3** measures the temperature on the evaporator. The evaporator temperature is measured to prevent the evaporator from icing up. If the temperature falls below -1 °C, the compressor coupling is switched off.

The outlet temperature sensor **14** measures the temperature in the mixing chamber. The temperature in the mixing chamber corresponds to the outlet temperature into the operator's cab.

The blower **2** draws in fresh air from outside. The fresh air drawn in is pumped through the condenser and if necessary the heat exchanger via the air pipes into the operator's cab.

The accumulated condensate is collected in the trap **6**. The collected condensate is then discharged via a hose on the bottom of the heating and air conditioning unit.

The refrigerant is evaporated in the evaporator **4**. This extracts heat from the surroundings and the evaporator is cooled.

The expansion valve **7** injects refrigerant into the evaporator.

Hot coolant from the diesel engine passes through the heat exchanger **9**. This warms up the heat exchanger. If air is passed through the heat exchanger, it is heated up. The hot air is directed into the operator's cab. This heats the operator's cab.

The cooling/heating mixer flap **12** regulates cooling and heating. In heating mode, the air passes through the heat exchanger. In cooling mode, the path through the heat exchanger is shut off. The air passes directly from the evaporator to the mixing chamber.

The servo motor for the head/front-level flap **16** controls the distribution of air between the head are and the front area .

The servo motor for the mixer flap **18** controls the position of the flap to switch between heating and cooling.

The air conditioning controller **19** processes data from the sensors and controls the servo motors.

The cab air temperature sensor **20** measures the temperature in the operator's cab.

The servo motor for the fresh air flap **21** controls the amount of fresh air in the air drawn in.