en **Service manual**

Wheel loader

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Manufacturer: Liebherr-Werk Bischofshofen GmbH
Valid for: L 586-1761

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010.1.4.2 Roll over protective structure (ROPS)

Danger to life

Damaged falling object protective structures

- Do not put machine into service with damaged falling object protective structures.
- Do not put machine into service with deformed falling object protective structures.
- Do not use falling object protective structures with structural changes.
- Do not use repaired falling object protective structures.
- Do not perform welding on falling object protective structures.
- Do not cut or saw falling object protective structures.
- Do not drill falling object protective structures.

Exceeding of total weight

- Make sure that total weight of machine (see identification plate) is not exceeded.
- Make sure that the machine does not exceed the total weight with heavy working tools.
- Make sure that the machine does not exceed the total weight after changing the working attachment.
- Make sure that the machine does not exceed the total weight with add-ons or after retrofitting.

010.1.4.3 Falling object protective structures (FOPS)

Danger to life

Damaged falling object protective structures

- Do not put machine into service with damaged falling object protective structures.
- Do not put machine into service with deformed falling object protective structures.
- Do not use falling object protective structures with structural changes.
- Do not use repaired falling object protective structures.
- Do not perform welding on falling object protective structures.
- Do not cut or saw falling object protective structures.
- Do not drill falling object protective structures.

010.1.5 Emergency equipment on the machine

010.1.5.1 Emergency exit (standard)

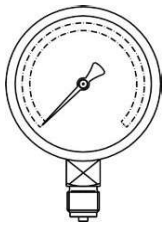
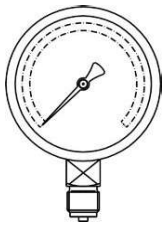
Danger to life

Incorrect labelling

- Make sure that all information signs are present.
- Make sure that all information signs are legible.

010.2 Special tools for maintenance and repair work

010.2.1 Special tools, general

Designation	Item code	Remark	Fig.
Refractometer	11830573	For checking acid density of batteries, antifreeze concentration in coolant and diesel exhaust fluid	
24 volt vacuum pump	7408148	For preventing loss of oil when working on hydraulic system	
Testing and filling device for hydro accumulators, with case	8460226	For testing and filling hydro accumulators	
Pressure gauge (40 bar), class 1.0	7361288	For testing hydraulic pressure	
Pressure gauge (250 bar), class 1.0	7361285	For testing hydraulic pressure	

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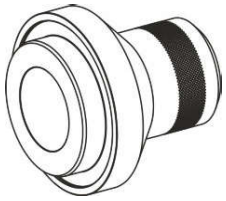
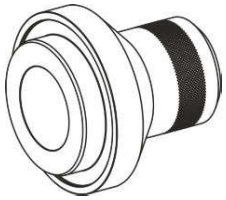
010.2.10 Special tools for front axle

Designation	Item code	Remark	Fig.
Positioning tool	12244602	For mounting the bevel gear shaft seal ring	

Tab. 13: Special tools for front axle

010.2.11 Special tools for rear axle

Designation	Item code	Remark	Fig.
Positioning tool	12244602	For mounting bevel gear shaft seal ring	

Tab. 14: Special tools for rear axle

010.2.12 Special tools for the air conditioning system

Designation	Item code	Remarks	Fig
Valve insert remover	11834779	For changing valve inserts in the filling port of air conditioning hoses.	
Valve insert in air conditioning hose filling port	11834778	For replacing defective valve inserts. Set of 10	
Vacuum pump	7027552	For evacuating the air conditioning system	

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 33	8.8	370	1550	M 33	8.8	370	1800
	10.9	550	2250		10.9	540	2600
	12.9	640	2600		12.9	630	3100
M 33 x 1.5	8.8	430	1650	M 33 x 1.5	8.8	420	1950
	10.9	630	2450		10.9	620	2900
	12.9	740	2800		12.9	730	3400
M 33 x 2	8.8	420	1600	M 33 x 2	8.8	410	1900
	10.9	610	2400		10.9	600	2800
	12.9	720	2800		12.9	700	3300
M 36	8.8	440	1950	M 36	8.8	430	2300
	10.9	650	2900		10.9	630	3400
	12.9	760	3400		12.9	740	3900
M 36 x 1.5	8.8	520	2150	M 36 x 1.5	8.8	510	2600
	10.9	760	3200		10.9	750	3800
	12.9	890	3700		12.9	870	4400
M 36 x 3	8.8	470	2050	M 36 x 3	8.8	460	2400
	10.9	690	3000		10.9	680	3500
	12.9	810	3500		12.9	790	4100
M 39	8.8	530	2500	M 39	8.8	520	3000
	10.9	770	3700		10.9	760	4400
	12.9	910	4400		12.9	890	5100
M 39 x 1.5	8.8	610	2800	M 39 x 1.5	8.8	600	3300
	10.9	900	4000		10.9	880	4800
	12.9	1050	4700		12.9	1030	5600
M 39 x 3	8.8	560	2600	M 39 x 3	8.8	550	3100
	10.9	820	3900		10.9	810	4500
	12.9	960	4500		12.9	940	5300

Tab. 21: Bolt prestressing forces and tightening torques

*The tightening torques for flZn bolts <M10 are non-binding because no fixed friction coefficient window is defined in the LH10215295 standard. According to the

020.3 Cooling system

020.3.1 Fan pump

Valid for: L586-1761;

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

020.3.2 Fan motor

Valid for: L586-1761;

Description	Unit	Value
Type		External gear motor
Displacement per turn	cm^3	22.5
Direction of rotation		Anticlockwise
Pressure relief	bar	220
Weight	kg	6.68

020.3.3 Hydraulic oil temperature sensor B8

Valid for: L586-1761;

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

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020.8 Electrical system

020.8.1 Central control unit (Master5-Premium)

Valid for: L586-1761;

Description	Unit	Value
Protection class (with plug connected)		IP65
Power supply (logic unit)	VDC	7.0 – 36.0
Rated voltage	VDC	24
Operating temperature	°C	-40 to +60
Weight	kg	2

020.8.2 Input module

Valid for: L586-1761;

Description	Unit	Value
Protection class (with plug connected)		IP6K9K
Power supply (logic unit)		See sticker on module
Rated voltage	VDC	24
Operating temperature	°C	-40 to +85
Operation at ambient air pressure	mbar	500 to 1100
Weight	kg	1.77
Module connector tightening torque	Nm	3

020.8.3 Output module

Valid for: L586-1761;

Description	Unit	Value
Protection class (with plug connected)		IP6K9K
Power supply (logic unit)		See sticker on module
Rated voltage	VDC	24
Operating temperature	°C	-40 to +85
Operation at ambient air pressure	mbar	500 to 1100
Weight	kg	1.77
Module connector tightening torque	Nm	3

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020.13 Operator's cab, heating and air conditioning

Valid for: L586-1761;

020.13.1.1 Air conditioning compressor

Description	Unit	Value
Manufacturer		Sanden
Refrigerant oil (PAG oil)		ZXL 100 PG

020.13.2 Air conditioning pressure switch

Valid for: L586-1761;

Description	Unit	Value
Low pressure OFF	bar	$2^{\pm 0,2}$
Low pressure ON	bar	$2.1^{\pm 0,3}$
High pressure OFF	bar	$27^{\pm 2}$
High pressure ON	bar	$20^{\pm 3}$
Increase fan speed OFF	bar	$14^{\pm 1,2}$
Increase fan speed ON	bar	$17^{\pm 1,2}$

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030.2 Filling quantities and lubrication chart

Specifications in the quantity column:
- The values stated for the filling quantities in the table are only guidelines.
- The dipstick and level markings are always mandatory.
- Each time the oil is replaced or topped up, check the level in the unit in question.

Valid for: L586-1761;

030.2.1 Lubricant filling quantity

Valid for: L586-1761;

Designation	Quantity
Diesel engine (with filter change)	42 l
Hydraulic system: system content	210 l
Hydraulic system: tank capacity (exchange amount)	95 l
Splitter box	1.2 l
Transmission	55 l
Front axle	60 l
Rear axle	60 l

Tab. 30: Lubricant filling quantity

030.2.2 Fuel and operating fluid filling quantity

Valid for: L586-1761;

Designation	Quantity
Fuel tank	500 l
Diesel exhaust fluid tank	67.5 l
Cooling system (system content)	73 l
Windscreen washer system	5.3 l
Air conditioning refrigerant	$1.25^{+0.02}$ kg
CO_2 equivalent	1.79 t
Refrigerant oil for air conditioning compressor	210 cm^3

Tab. 31: Fuel and operating fluid filling quantity

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030.3.14 Windscreen washer fluid

Valid for: L586-1761;

030.3.14.1 Liebherr recommendation

Liebherr recommends standard windscreen washer fluid with anti-freeze.

030.3.14.2 Minimum quality requirement

Use mixture of water and denatured alcohol.

030.3.15 Refrigerant oil for air conditioning compressor

Valid for: L586-1761;

030.3.15.1 Liebherr recommendation

Designation
ZXL 100 PG (PAG Oil)

Tab. 56: Liebherr recommendation

Position	Component	Check
3	Working attachment	Check working attachment for loose bolts, damage and wear.
4	Diesel exhaust fluid tank	Check SCR system for leaks and damage.
5	Underside of engine compartment	Open cover plates on underside of diesel engine. Check underside of engine compartment for damage, loose bolts and leaks.
6	Underside of wheel loader	Check underside of wheel loader for loose bolts, leaks and damage. Check transmission for leaks and damage.
7	Cab access	Check fluid level in windscreen washer tank and central lubrication system (option).
8	Cooling system	Check cooling system for loose bolts, leaks and damage.
9	Diesel engine	Check SCR system for loose bolts and clips. Check SCR system for damage. Check SCR system for leaks.
10	Operator's cab	Check mirrors and other visual aids for damage. Check indicators and control elements for damage. Check service codes. Check function of installed cameras (reversing camera etc.).
11	Wheel wedges	Check chock for damage. Check function of chock.

Tab. 58: Checking machine is in proper condition

030.4.3.2 Removing loose parts, dirt, ice and snow from machine

Valid for: L586-1761;

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

Note
Ensure safe machine operation.

▶ Remove any loose parts, coarse dirt, mud, ice, snow etc.

▶ Carefully clean machine with a high-pressure cleaner.
▷ (For more information see: Cleaning machine, page 030-35)

030.4.3.3 Cleaning machine

Valid for: L586-1761;

Thoroughly clean the machine of all dirt and deposits in the following situations:
– After completing each job
– Before maintenance work
– Before repairs

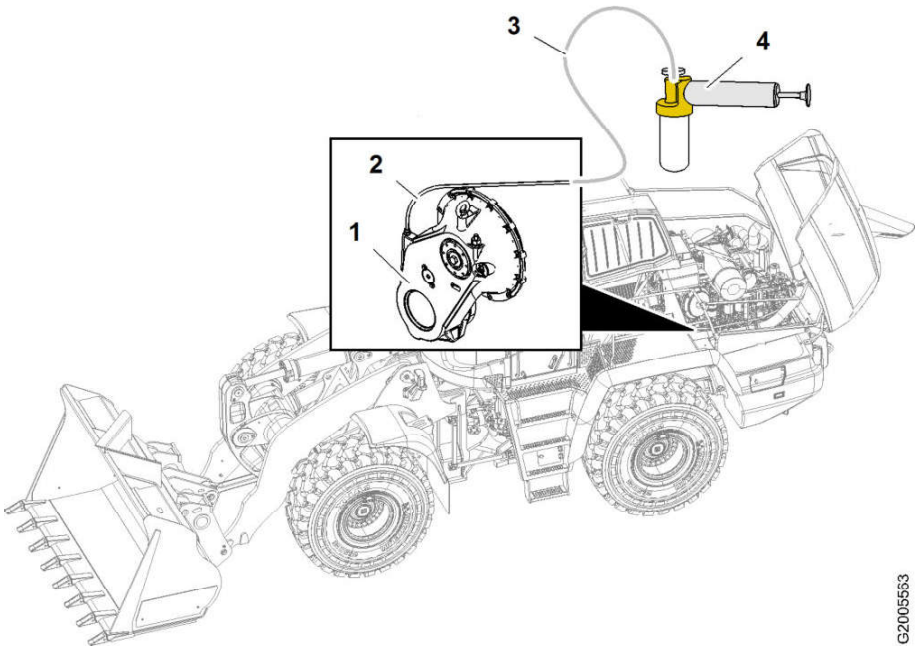

Fig. 97: Sampling point on the splitter box

1	Splitter box	**3**	Sampling hose
2	Dipstick tube	**4**	Hand pump

▶ Start the engine and wait 3 minutes.
▷ The oil is circulated.

▶ Put machine in maintenance position 1.

WARNING
Hot components!
Risk of injury.

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

▶ Take out dipstick.

▶ Insert the sampling hose **3** to 5 cm below the oil level.

▶ Fill the sample container using the hand pump **4**.

▶ Remove the sampling hose.

▶ Put the dipstick back in again.

Coolant circuit

The coolant sample is taken from the coolant equalising reservoir using a hand pump.

▶ Remove oil traces on diesel engine.

▶ Start diesel engine and check oil pressure.
▷ *Engine oil pressure* symbol must not light up.

▶ Turn off diesel engine.

WARNING
Hot components!
Injury.

▶ Do not touch components of exhaust system and diesel engine.

▶ Check that oil filter is leak-tight.

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

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

030.4.4.4 Checking diesel engine belt drive

Valid for: L586-1761;

Make sure that following requirements are met:
❑ Machine is in maintenance position 1.
❑ Service access is open.
❑ The diesel engine and exhaust system have cooled down.

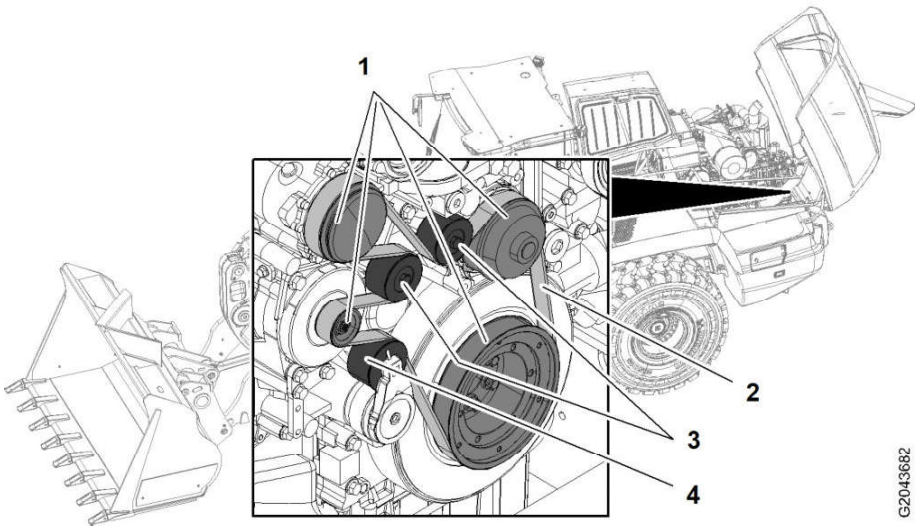

Fig. 107: Checking diesel engine belt drive

1	Pulleys	**3**	Deflector roller
2	V-ribbed-belt	**4**	Tensioning device

Following damage could occur on V-ribbed belt:
– Broken ribs
– Lumps of rubber on belt
– Accumulated dirt or grit
– Ribs coming loose from belt
– Cracks across back
– Cracks across several ribs

- ▶ Install new fuel pre-filter **6**.
- ▶ Check the seal **4** and replace it if necessary.
- ▶ Check that cover **2** is clean, put it on again and tighten screws **3** crosswise and evenly.
- ▶ Close drain valve **7**.
- ▶ Tighten the bleeder screw **1** with a torque of 6 Nm.
- ▶ Put hand pump in the *RUN* position **9**.
- ▶ Bleed the fuel system.

Bleeding fuel system

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

Make sure that following requirements are met:
❑ Machine is in maintenance position 1.
❑ Service access is open.
❑ Diesel engine has cooled down.

Make sure that following tool is ready.
❑ Receptacle

WARNING
Highly flammable consumables!
Beware of burns.

- ▶ Avoid naked lights and fire.

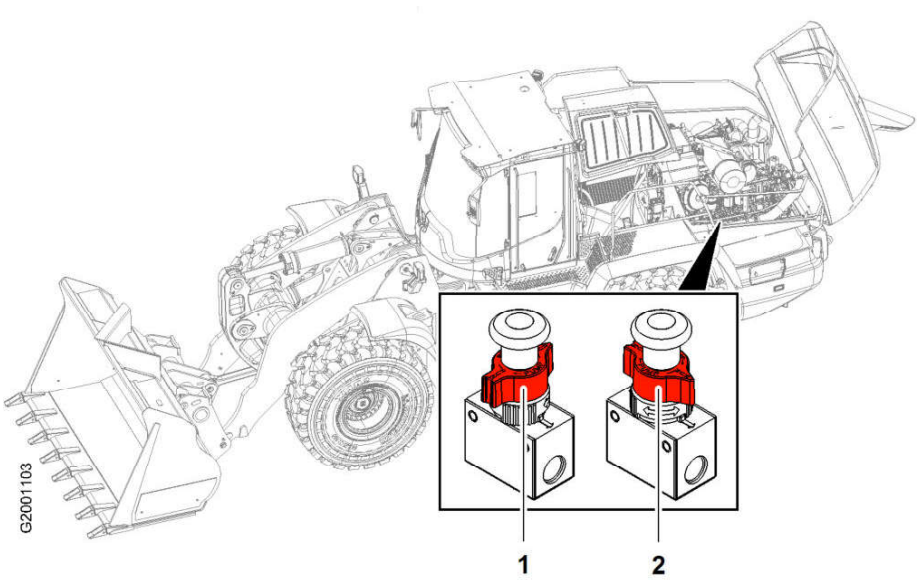

Fig. 117: Bleeding fuel system

1 Hand pump in the *PUMP* position **2** Hand pump in the *RUN* position

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.
- ❑ Suitable protective equipment is used.

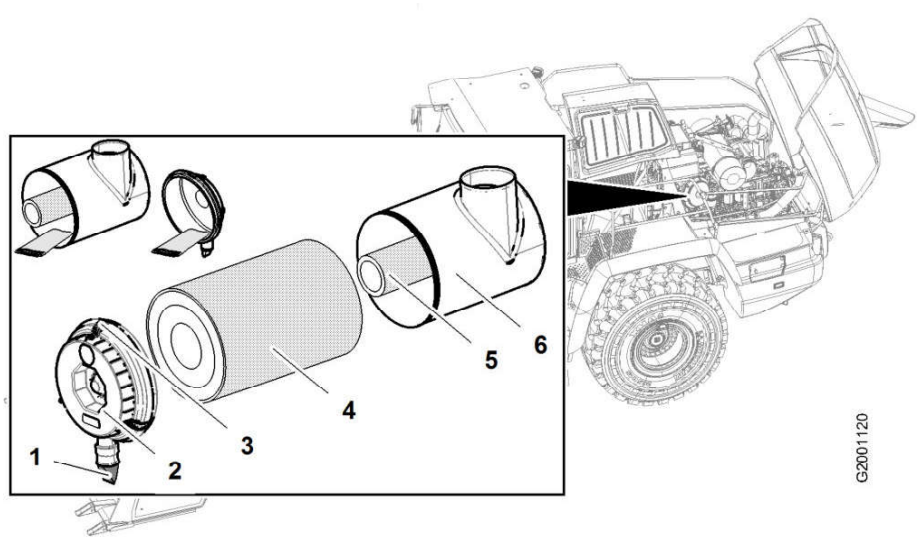

Fig. 127: Air filter: Changing the safety element

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

- ▶ Release the fixing clips **3** on the service cover **2**.
- ▶ Take off the service cover **2**.
- ▶ Remove the main element **4**.
- ▶ Clean the service cover **2** and the filter housing **6** with a clean cloth.
- ▶ Remove the safety element **5**.
- ▶ Lightly oil the sealing faces of the new safety element **5** and the main element **4**.
- ▶ Install the new safety element **5** and the main element **4**.
- ▶ Put the service cover **2**, with the dust discharge valve **1** facing down, on the filter housing **6**.
- ▶ Close the fixing clips **3**.

030.4.4.18 Dust protection for alternator (option): cleaning or replacing filter element

Valid for: L586-1761;

Make sure that following preconditions are met::
- ❑ Machine is in maintenance position 1.
- ❑ Service access is open.
- ❑ Diesel engine has cooled down.
- ❑ Suitable protective equipment is used.

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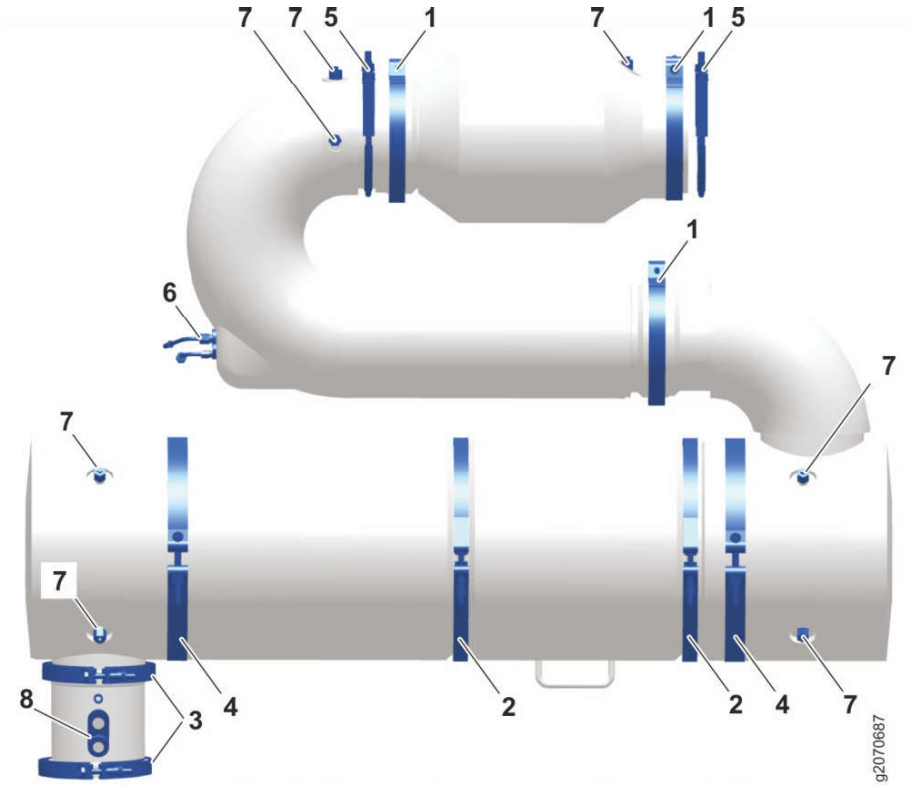

Fig. 139: Diesel engine: check profile clamps.

1	Profile clip	**5**	Bolt clamp
2	Profile clip	**6**	Diesel exhaust fluid injector
3	Profile clip	**7**	Temperature sensor, pressure sensor, differential pressure line, screw connection
4	Hinge strap bracket	**8**	NO_x sensor, NH_3 sensor

▶ Check components are tight.

If component is loose:

▶ Tighten component with tightening torque according to table.

Position	Component	Tightening torque
1	Clip	23 $^{\pm 2}$ Nm
2	Clip	18 $^{+2/-1}$ Nm
3	Clip	23 $^{\pm 2}$ Nm
4	Hinge strap bracket	21 $^{\pm 1}$ Nm
5	Bolt clamp	23 $^{\pm 2}$ Nm
6	Diesel exhaust fluid injector	5 $^{\pm 0.5}$ Nm
7	Temperature sensor, pressure sensor, differential pressure line, screw connection	35 $^{\pm 5}$ Nm
8	NO_x sensor, NH_3 sensor	50 $^{\pm 10}$ Nm

Tab. 63: Tightening torques

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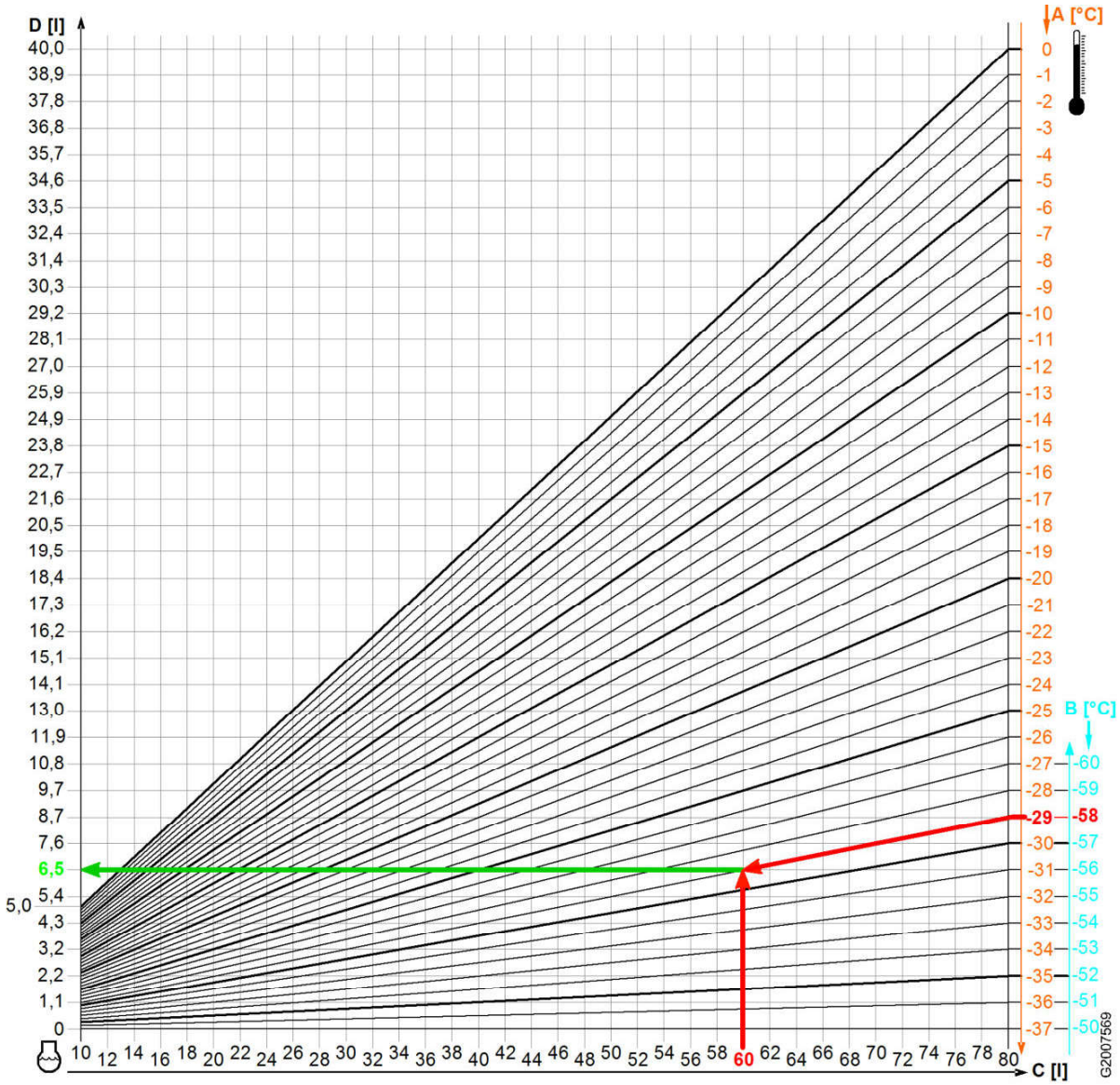

Fig. 147: Coolant diagram

A Freezing point - orange scale: top up with pure antifreeze and corrosion inhibitor

B Freezing point - blue scale: top up with pure water

C Total capacity of the cooling system

D Amount to top up

▶ Enter identified freezing point on the orange scale **A** or the blue scale **B**.

▶ Enter the total capacity of the cooling system **C**.

▶ From where the two lines cross, follow a horizontal line to read off the amount to top up **D**.

Example 1:

▶ Identified freezing point = -29 °C.

▶ Total capacity of the cooling system = 60 l.
▷ Freezing point too high.
▷ Amount of pure antifreeze and corrosion inhibitor to top up = 6,5 l.

▶ Screw in the breather filter **2**.

▶ Remove the plug **1** for protection against unauthorised opening, and keep it in a safe place.

030.4.6.2 Draining off condensate and sediment from the hydraulic tank

Valid for: L586-1761;

Make sure that the following requirements are fulfilled:
❑ The machine has not been started for at least an hour.
❑ The machine is in maintenance position 1.
❑ The service hatches are open.

Make sure that the following tools are ready:
❑ Drain hose
❑ Receptacle

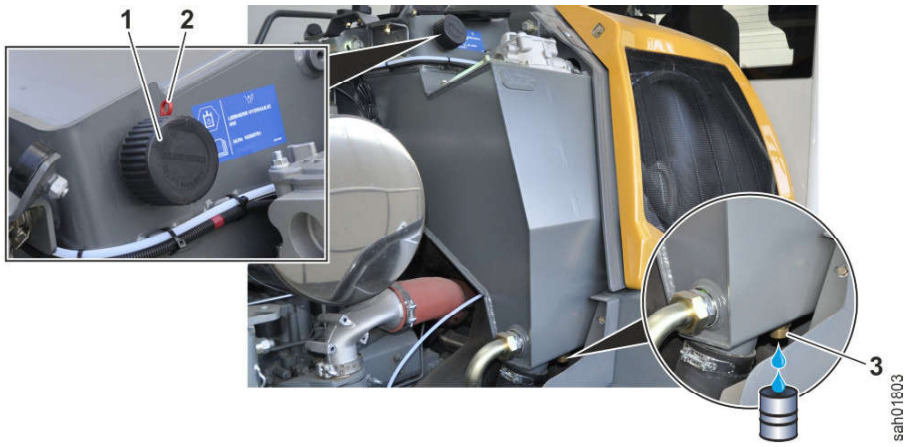

Fig. 156: Draining off condensate and sediment from the hydraulic tank

1 Breather filter
2 Connector
3 Hydraulic tank drain valve

Note
To completely drain the condensate and sediment, the impurities must settle on the bottom of the hydraulic tank.

▶ Do not start the machine for at least an hour.

▶ 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.

▶ Place a receptacle under the machine.

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

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

▶ Let the condensate and sediment drain into the receptacle.

When clean hydraulic oil comes out:
▶ Unscrew the drain hose from the drain valve **3**.

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

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Checking the front axle brake discs for wear

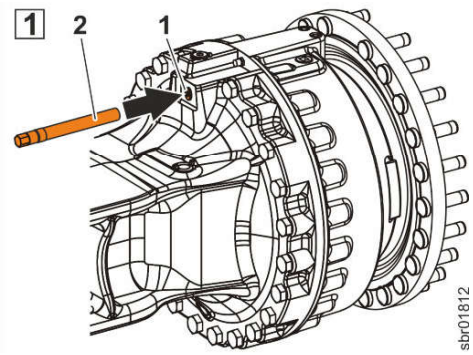

Fig. 168: Checking the front axle brake discs for wear

1 Screw plug **2** Micrometer

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

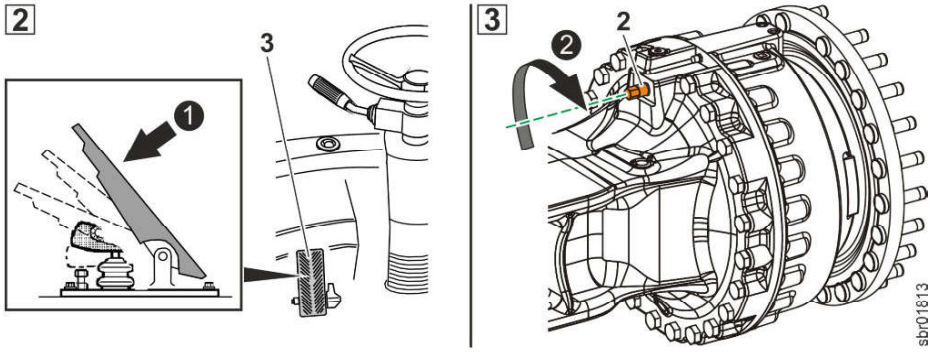

Fig. 169: Checking the front axle brake discs for wear

2 Micrometer **3** Inching brake pedal

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

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

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

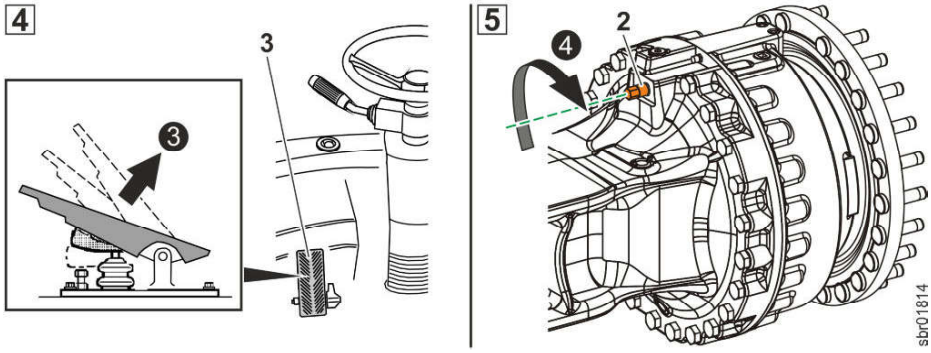

Fig. 170: Checking the front axle brake discs for wear

2 Micrometer **3** Inching brake pedal

2 Front working headlights
3 Marker light (optional)
4 Front indicator light
5 Driving headlights
6 Front section working headlight (optional)
8 Engine bonnet working headlight
9 Brake light, tail light, rear indicator
10 Reversing light
11 Flash (optional)
12 License plate light (optional)

▶ Turn on all the lights.

▶ Check all the lights work properly.

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

To check the reversing light:

▶ Start the machine.

▶ Release the parking brake.

▶ Select reverse travel direction.

▶ Test the reversing light.

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

To test the horn:

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

030.4.9.2 Batteries: Checking the acid level and terminals

Valid for: L586-1761;

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

The batteries must always be in perfect condition in order for the machine to work reliably.

Make sure that the following requirements are fulfilled:
❑ The machine is in maintenance position 1.
❑ The battery main switch is off.
❑ The battery main switch key has been taken out.
❑ The ballast cover is open.

Make sure that the following tools are ready:
❑ Safety glasses
❑ Acid-resistant gloves
❑ Terminal brush
❑ Refractometer (item code: 11830573)
❑ Battery plug tool (item code: 11839123)

Make sure that the following equipment is ready:
❑ Distilled or demineralised water (DIN 43530)

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Topping up oil

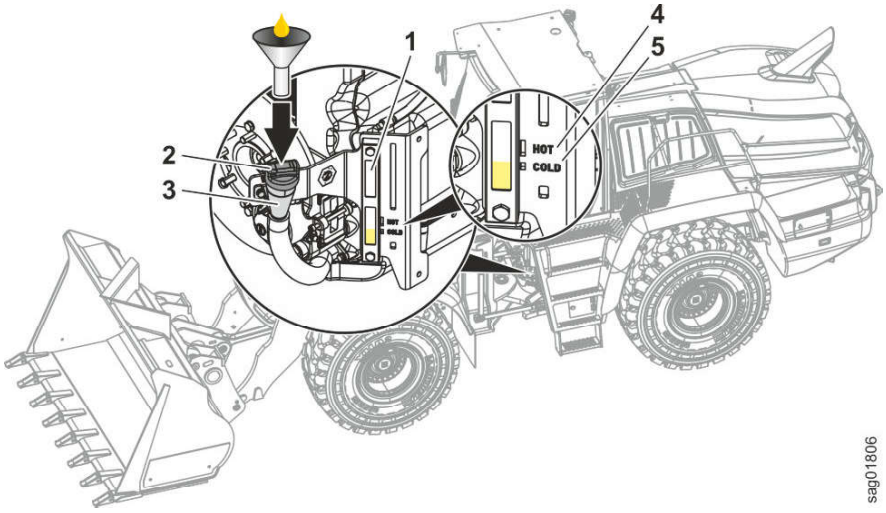

Fig. 189: Topping up oil and checking oil level

1	Oil sight glass	**4**	HOT range
2	Cap	**5**	COLD range
3	Filling tube		

- ▶ Top up oil through filling tube **3** until oil reaches top of COLD **5** range.
- ▶ Close cap **2**.
- ▶ Start diesel engine and let it run for two minutes at low idling speed.
  ▷ Oil is circulated.

WARNING
Unintended movement of machine!
Injury.

- ▶ Make sure that parking brake is activated.
- ▶ Make sure there is nobody in operator's cab.

NOTICE
Oil level indicator will not show right value if machine is on a slope!
Incorrect oil level indicated.

- ▶ Make sure machine is parked on completely level ground when checking oil level.

- ▶ With diesel engine running, check whether oil level is in COLD range **5**.

If oil level is too low:
- ▶ Turn off diesel engine and take out ignition key.
- ▶ Top up oil.

If oil level is too high:
- ▶ Turn off diesel engine and take out ignition key.
- ▶ Drain oil.

If oil level is correct:
- ▶ Bring gear oil up to operating temperature. (For more information see: Gear oil operating temperature, page 030-173)

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030.4.12.3 Right cab access: Lubricating moving parts with penetrating oil

Valid for: L586-1761;

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

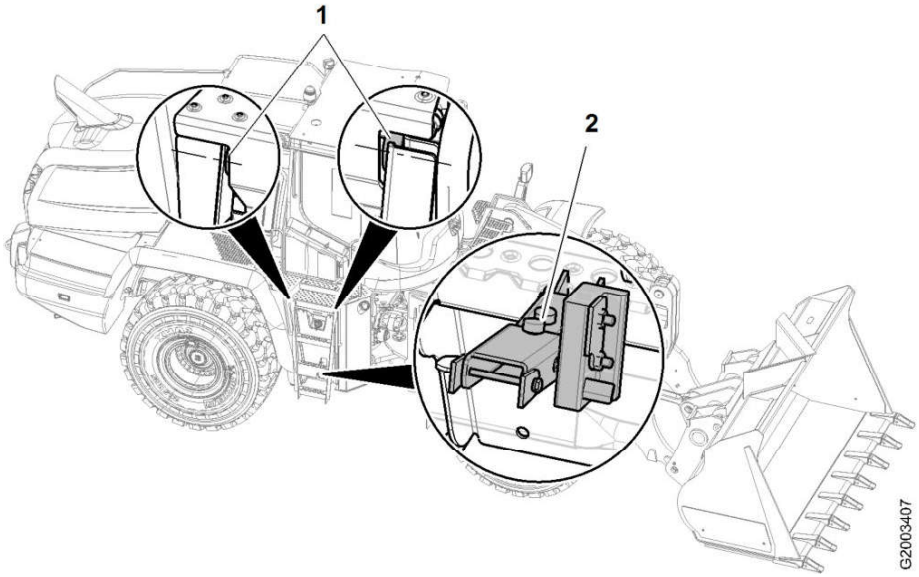

Fig. 200: Right cab access: Lubricating moving parts with penetrating oil

1 Sliding bearing **2** Locking mechanism

▶ Lubricate the sliding bearing **1** and locking mechanism **2** with Ballistol spray (item code 10025514).

▶ (For more information see: Right cab access, page 030-30)

030.4.12.4 Service hatches: cleaning and maintaining seals

Valid for: L586-1761;

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

LBH/12252628/03/211-20200327_070249/en

Cleaning the recirculated air filter

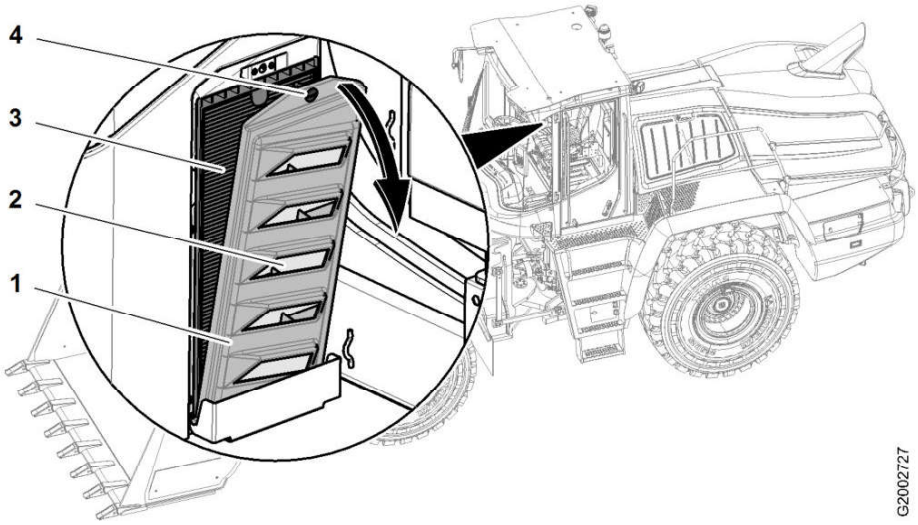

Fig. 210: Cleaning the recirculated air filter

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

▶ Unscrew the knurled 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 clean it (by blowing it out or washing it).

▶ Take out the recirculated air filter **3** and clean it (blow it out).

▶ Put in the clean recirculated air filter **3**.

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

▶ Screw in the knurled screw **4**.
▷ The filter cartridge **1** is locked.

030.4.14.2 Operator's cab: changing fresh air filter and recirculated air filters

Valid for: L586-1761;

Make sure that following requirements are fulfilled:
❑ Machine is in maintenance position 1.
❑ The right cab access is extended.
❑ Suitable protective equipment is used.

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2. Calibrations									
Test / adjustment	**1000 h**	**2000 h**	**Unit**	**Required value**	**Measured**	**Adjusted**	**Adjusting point**	**Test point**	**Figure**
Working hydraulics									
Multi-lever control (option): calibration									
Manual lever calibration		○							
Calibrating working hydraulics angle sensors									
Manual calibration of lift arm position angle sensor		○							
Manual calibration of bucket position angle sensor		○							
Proportional solenoids in control valve block: calibration									
Automatic calibration of proportional solenoids for lifting and tilting		○							
Manual calibration of proportional solenoids for 3rd function (option)	◊	◊							
Manual calibration of proportional solenoids for 4th function (option)	◊	◊							
Steering system									
Joystick for joystick steering (option): calibration									
Automatic calibration of joystick		○							
Angle sensor for articulation angle (option): calibration									
Machine with steering wheel steering:									
Machine without steering wheel steering:									
Manual calibration of articulation angle sensor		○							
Control block for joystick steering (option): calibration									
Automatic calibration of position sensor of main spool valve		○							
Manual calibration of position sensor of emergency spool valve (using steering joystick)		○							
Automatic calibration of proportional solenoids for main spool valve and emergency spool valve		○							

Manual calibration of travelling pedal

▶ Set the ***MXThrottlePdlStartAdjust*** variable to ***1***.
▷ The calibration function is active for 8 seconds.

▶ Fully depress the travelling pedal within 8 seconds and then release it.

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

▶ Check that the calibration was successful.

Checking whether calibration is successful

▶ Check whether the value of the ***PRMaAnThrottlePdlRequest*** variable corresponds to the required value when the travelling pedal is not pressed and when it is fully depressed.

Description	Unit	Value
Variable with the travelling pedal not pressed	%	0
Variable with the travelling pedal fully depressed	%	100

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

If the required values are reached:
▶ Calibration was successful. Calibrate the inching function.

Manual calibration of the inching function

▶ Set the ***MXInchPdlStartAdjust*** variable to ***1***.
▷ The calibration function is active for 8 seconds.

▶ Fully depress the inching brake pedal within 8 seconds and then release it.

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

▶ Check that the calibration was successful.

Checking whether calibration is successful

▶ Check whether the value of the ***PRMaAnInchPdlRequest*** variable corresponds to the required value when the inching brake pedal is not pressed and when it is fully depressed.

Description	Unit	Value
Variable with inching brake pedal not pressed	%	100
Variable with inching brake pedal fully depressed	%	0

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

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

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Automatic calibration of the proportional solenoids for lifting and tilting

Make sure that the following requirements are fulfilled:
- ❑ The hydraulic oil is at operating temperature.
- ❑ The machine is parked on level ground.

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.

▶ Make sure that the parking brake is activated.

▶ Raise the lift arms half way.

▶ Tilt the bucket half way in.

▶ Set the variable ***MXSWEEHStartValveAdjust*** to ***1***.
- ▷ Calibration takes place automatically.
- ▷ During the calibration there may be very slight movements of the lift arms.

Note
If the control lever is moved, the calibration is stopped!

▶ Do not move the control lever during calibration.

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

If a service code appears during the 1st attempt:

▶ Calibration has failed. Repeat the calibration.

If a service code appears during the 2nd attempt:

▶ Calibration has failed again. Carry out manual calibration of the proportional solenoids for lifting and tilting.

▶ 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

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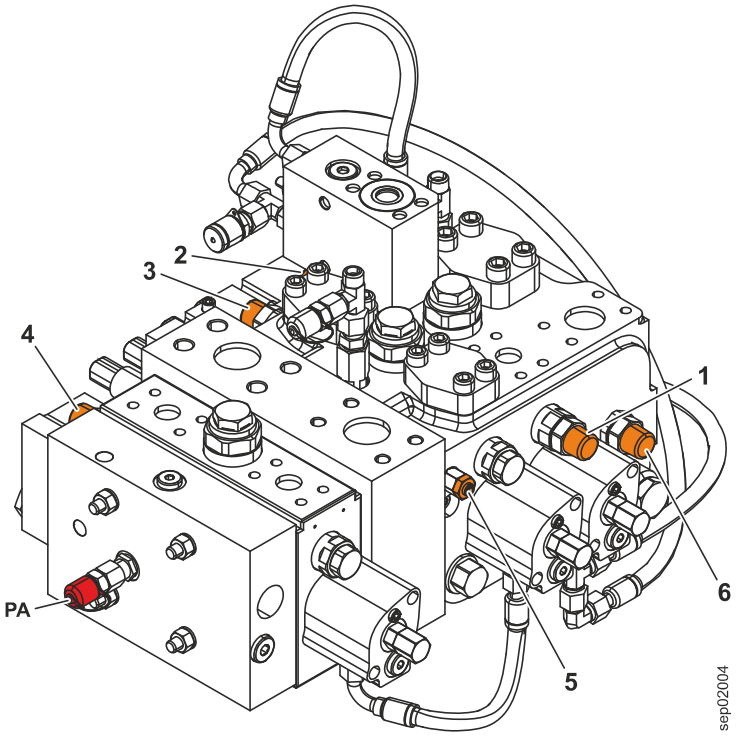

Fig. 234: Control valve block: secondary pressure relief valves

1 Secondary pressure relief valve for tilting out
2 Secondary pressure relief valve for tilting in
3 Secondary pressure relief valve for lifting (main spool)
4 Secondary pressure relief valve for lifting (additional spool)
5 LS-pressure cut-off
6 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 **6** 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 **5** by exactly one turn clockwise.
▷ Opening pressure of LS-pressure cut-off valve is above opening pressure of secondary pressure relief valves.

Checking and adjusting

▶ Start diesel engine.

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Fig. 241: Moist surfaces, no visible oil leak

▶ Document the damage and observe whether the condition deteriorates.

If the condition deteriorates:
▶ Replace the hydraulic lines.

Medium damage to the hydraulic lines

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

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

Fig. 242: Cracks or cuts up to the steel fabric or steel fabric exposed due to damage to the outer jacket

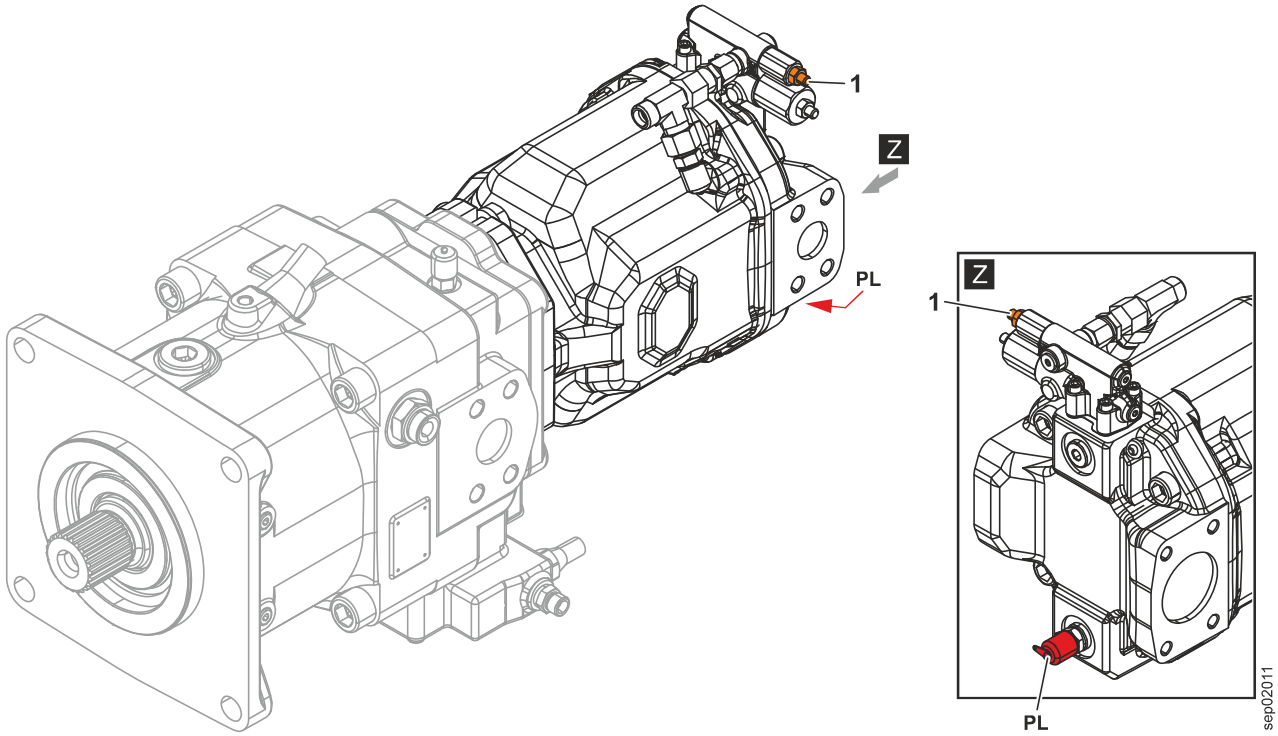

Fig. 248: Steering pump flow regulator (standby pressure)

1 Flow regulator

PL Steering pump high pressure test connection

- ▶ Connect a pressure gauge (40 bar) to high pressure test connection **PL** on steering pump.
- ▶ Start diesel engine.
- ▶ Allow diesel engine to run at low idling speed.
  - ▷ Standby pressure can be checked at high pressure test connection **PL**.
- ▶ Check that standby pressure **PL** is correct.

Description	Unit	Value
Standby pressure **PL**	bar	25 $^{\pm 2}$

If required value is not reached:

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

Note
To adjust flow regulator:

- ▶ Turn adjusting screw clockwise to reduce standby pressure.
- ▶ Turning adjusting screw anti-clockwise increases standby pressure.

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

If required value is reached:

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

▷ Service file is created.
▷ Service file with current date **4** is displayed in list of service files **2**.

▶ Select corresponding service file from list of available service files **2**.
▷ Corresponding service file is marked.

▶ Select “Export MDDB” function **3**.

▶ Save service file.
▷ Service file is created in form of a zip file.

Troubleshooting
If no service file is displayed with current date **4**:

▶ Close Sculi diagnostic software.

▶ Switch off ignition. Wait until all LEDs on the central control unit have gone out. Switch on ignition.

▶ Repeat creation of service file.

030.6.9.2 Central control unit (Master5): software update

Valid for: L586-1761;

Machine software is transferred in form of a MSB file (Machine Software Bundle) to central control unit (Master5).

Each MSB file contains machine-specific serial number. As a result, a MSB file can only be transferred to the central control unit (Master5) of machine with corresponding serial number.

MSB file is created via the “MSB Online Tool”.

An Internet connection is required for the “MSB Online Tool”.

Internet address “MSB Online Tool”: **https://www.lidat.liebherr.com/MsbOnline**

Creating MSB file

Make sure following requirements are met:
❑ Internet connection is available.
❑ Corresponding permissions for the “MSB Online Tool” are available.

▶ Open “MSB Online Tool”.

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Overview of CAN addresses (valid for Master5 software item code 12467218)		
Address	**CAN module**	**CAN line**
IA16 (45)	Analogue universal inputs, input module A16a	1
IF02 (53)	Frequency measurement inputs, input module A16a	1
IR02 (81)	Resistance measurement inputs, input module A16a	1
OA16 (22)	Analogue universal outputs, output module A17a	1
OD04 (14)	Digital outputs, output module A17a	1
SFTY (6)	Safety function, output module A17a	1
IF02 (50)	Frequency measurement inputs, output module A17a	1
KTSX (105)	Sensor for fuel level B25	1
MOA (92)	Engine control unit	1
MOD2 (93)		1
AGN (94)		1
AE16 (95)		1
IA16 (47)	Analogue universal outputs, input module (optional)	1
IF02 (55)	Frequency measurement inputs, input module (optional)	1
IR02 (83)	Resistance measurement inputs, input module (optional)	1
OA16 (23)	Analogue power outputs, output module (not used)	1
OD04 (15)	Digital outputs, output module (optional)	1
SFTY (7)	Safety function, output module (optional)	1
IF02 (51)	Frequency measurement inputs, output module (optional)	1
WGHT (108)	Weighing module (optional)	1
IA16 (48)	Analogue universal outputs, input module (optional)	1
IF02 (56)	Frequency measurement inputs, input module (optional)	1
IR02 (84)	Resistance measurement inputs, input module (optional)	1
IA16 (47)	Analogue universal inputs, input module A16b	2
IF02 (55)	Frequency measurement inputs, input module A16b	2
IR02 (83)	Resistance measurement inputs, input module A16b	2
IA16 (45)	Analogue universal inputs, input module A16L	2
IF02 (53)	Frequency measurement inputs, input module A16L	2
IR02 (81)	Resistance measurement inputs, input module A16L	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

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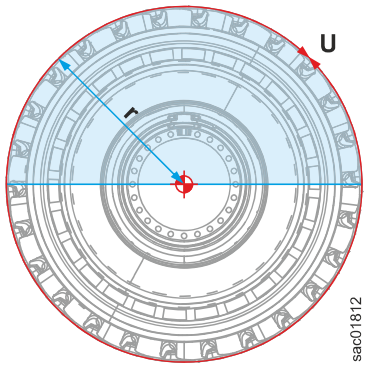

Fig. 279: Tyres: setting radius

r Radius **U** Circumference

Note
Tyre deformation due to weight of machine!
Incorrect measurement when measuring the radius.

- ▶ Measure the circumference if possible.
- ▶ When measuring the radius directly, only measure in the highlighted area.

- ▶ Measurecircumference **U** of a tyre on the front axle and calculate the radius **r**: r = U / (2 * π)

or

Measure the radius **r** of a tyre directly at the front axle (centre of the axle to centre of the running surface).

- ▶ Switch on the ignition.
- ▶ Connect the Sculi diagnostic software to the machine.
- ▶ Enter the radius **r** in metres in the variable ***CRSDCMachWheelRadius***.

030.6.12 Working attachment

030.6.12.1 Valve block for quick coupler (option): Pressure reducing valve

Valid for: L586-1761;

This equipment is optional.

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 (600 bar)

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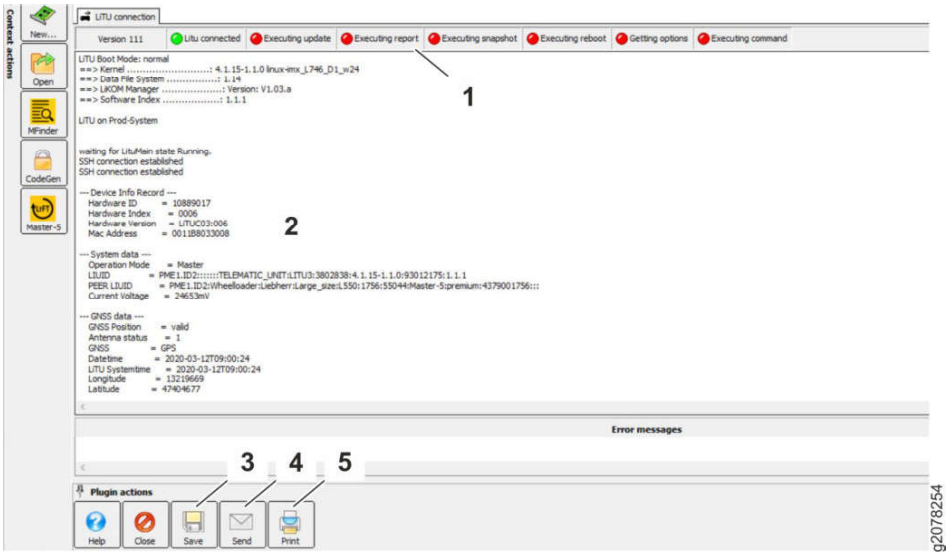

Fig. 292: Saving, sending, printing report

1 “Executing Report” display
2 Window
3 “Save” function
4 “Send” function
5 “Print” function

▶ Check whether report was successfully created.
  ▷ “Executing Report” **1** display turns steady red.
  ▷ Window **2** displays data.
  ▷ “Save” **3**, , “send” **4** and “print” **5** functions can be selected.

▶ “Save” **3** report locally.

or

“Send” **4** report as email.

or

“Print” **5** report.

Creating snapshot

▶ Connect to the LiDAT module. (For more information see: LiDAT: connecting to LiDAT module, page 030-249)

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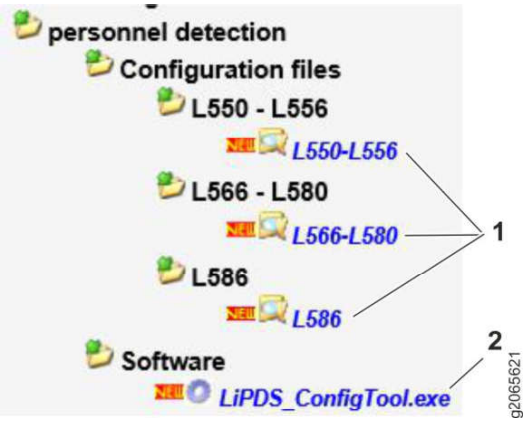

Fig. 310: Preparatory tasks

1 Configuration files **2** LiPDS_ConfigTool software

Configuration files are machine-group specific. Select corresponding machine group.

Configuration files consist of two individual files. Save both files on laptop.

▶ Save corresponding configuration files **1** on laptop.

▶ Install LiPDS_ConfigTool **2** software on laptop.

▶ Transmit configuration files. (For more information see: Transmitting configuration files, page 030-265)

Transmitting configuration files

Make sure that following requirements are met:
❑ Machine is in maintenance position 1.
❑ Preparations have been performed.

Make sure that following tools are ready:
❑ Standard USB stick (formatted)

Fig. 311: LiPDS_ConfigTool

▶ Start LiPDS_ConfigTool software.

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The exhaust throttle valve acts as an engine brake under the following conditions:
– When the machine is in engine braking mode (negative torque).
– When the diesel engine exceeds a defined speed threshold.

040.1.2 Electrical components of diesel engine

Valid for: L586-1761;

1 Layout

Note

The BMK codes used refer to the electrical diagram of the diesel engine.

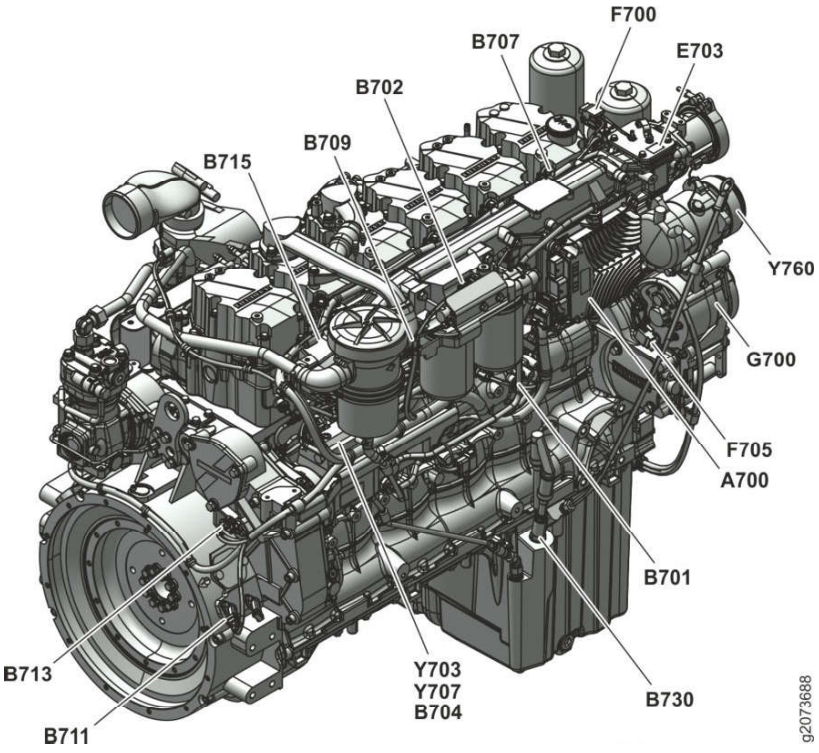

Fig. 319: Electrical components of diesel engine

Position	Component	Position	Component
A700	Engine control unit	**B730**	Engine oil level sensor
B701	Oil pressure sensor	**E703**	Heating flange
B702	Fuel pressure sensor	**F700**	Heater flange response fuse
B704	Rail pressure sensor	**F705**	Fuse for signal B+
B707	Charge air temperature sensor	**G700**	Alternator
B709	Fuel temperature sensor	**Y703**	High pressure pump VCV
B711	Engine speed sensor	**Y707**	High pressure pump PCV
B713	Camshaft speed sensor	**Y760**	Compressor coupling

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

2.2 Diagram of the fuel system on the diesel engine

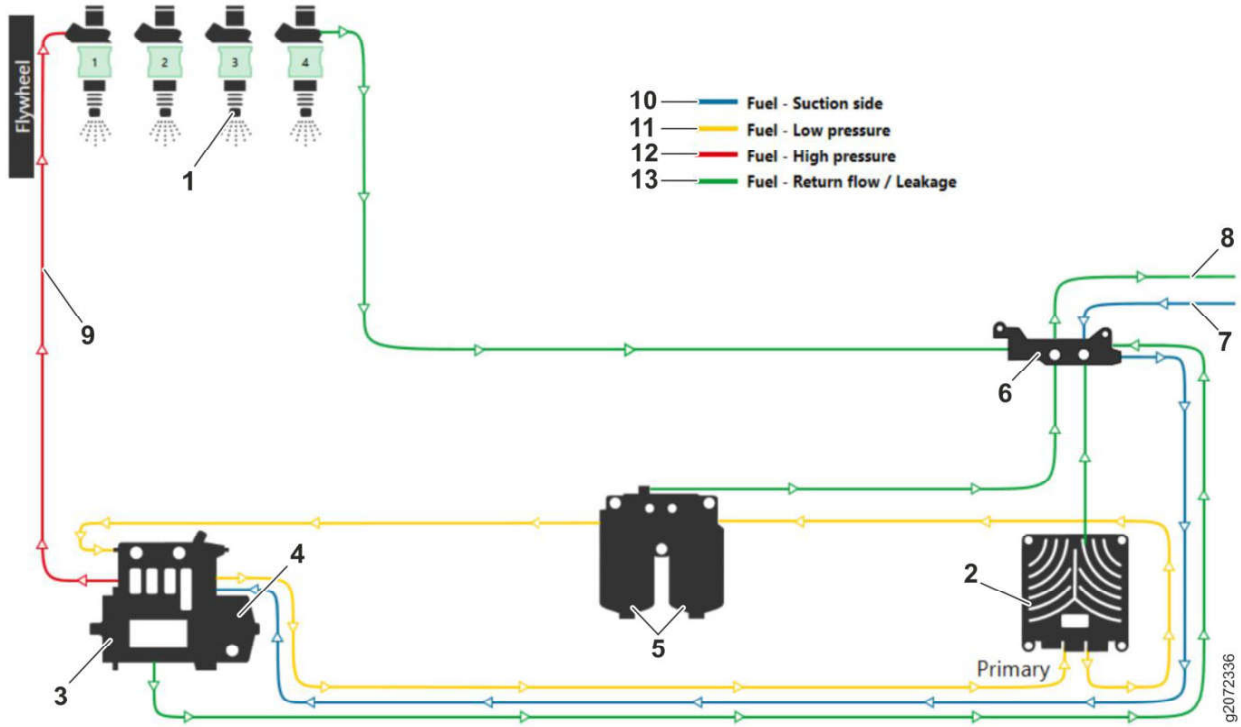

Fig. 330: Diagram of the fuel system on the diesel engine

1	Injection nozzles	**6**	Distributor rail	**11**	Fuel low pressure
2	Engine control unit (ECU)	**7**	Fuel from the fuel tank	**12**	Fuel high pressure
3	High-pressure fuel pump	**8**	Return line to fuel tank	**13**	Fuel return (leakage)
4	Fuel pre-delivery pump	**9**	High-pressure line (common rail)		
5	Fuel fine filter	**10**	Fuel suction side		

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

The fuel pre-delivery pump **4** delivers the fuel via the engine control unit (ECU) **2** to the fuel fine filters **5**.

The fuel goes from the fuel fine filter **5** to the high-pressure fuel pump **3**.

The high-pressure fuel pump **3** delivers the fuel under high pressure to the high-pressure line (common rail) **9**. The high-pressure line (common rail) **9** distributes the fuel to the injection nozzles **1**.

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

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

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

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2.3 Function

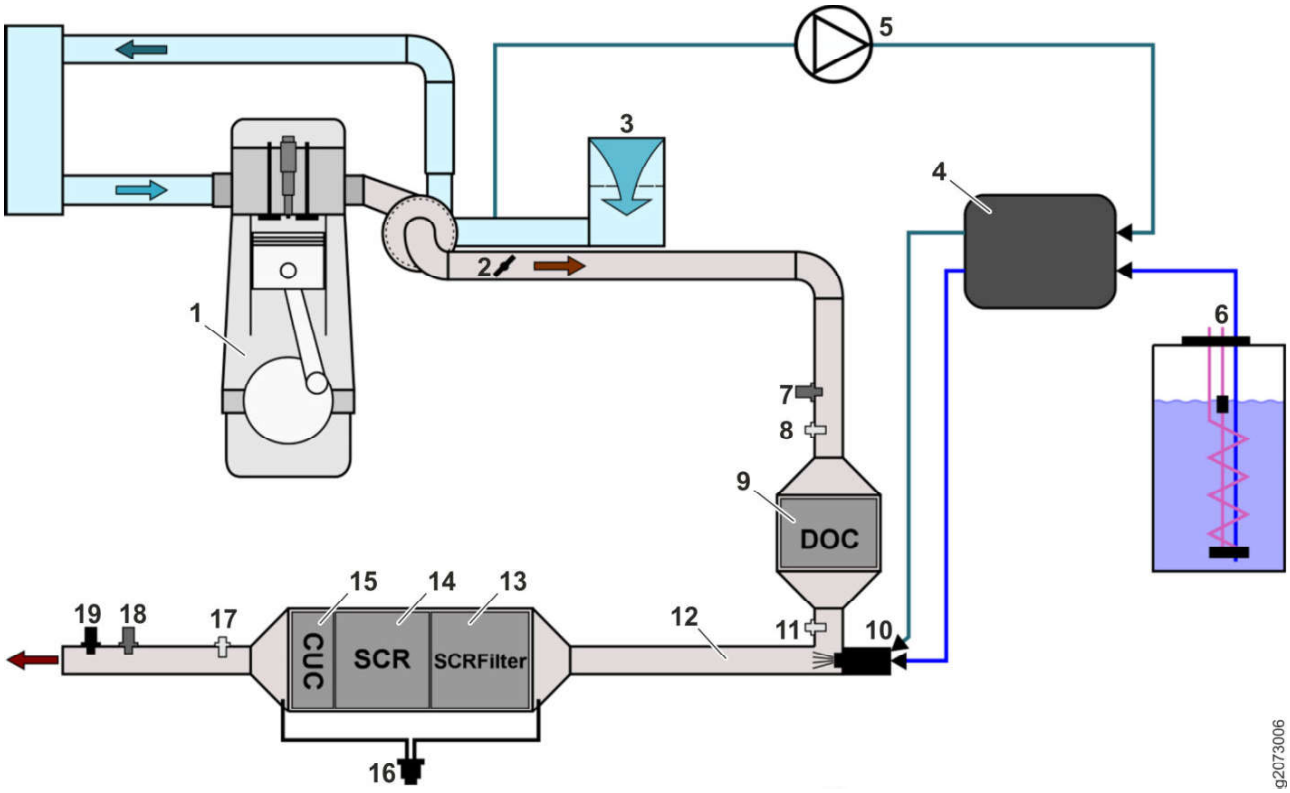

Fig. 339: Function

1	Diesel engine	**8**	Temperature sensor at DOC inlet B723	**15**	Slip catalyst (CUC)
2	Exhaust throttle valve	**9**	Diesel oxidation catalyst (DOC)	**16**	Differential pressure sensor B722
3	Air filter	**10**	Diesel exhaust fluid nozzle	**17**	Temperature sensor at outlet of SCR catalytic converter B772
4	Metering unit	**11**	Temperature sensor at intake of SCR catalytic converter B771	**18**	NO_x sensor at outlet of the SCR catalytic converter B727
5	Air from the compressed air system	**12**	Mixing section	**19**	NH_3 sensor B783
6	Diesel exhaust fluid tank	**13**	Filter module (SCR + DPF)		
7	NO_x sensor in front of the DOC B771a	**14**	SCR catalytic converter (SCR)		

Exhaust gas treatment is achieved by selective catalytic reduction (SCR) and a diesel particulate filter (DPF).

The exhaust gas from the diesel engine flows through the throttle valve **2** to the diesel oxidation catalyst (DOC) **9**.

The diesel oxidation catalyst (DOC) **9** consists of a substrate with an oxidation coating. The diesel oxidation catalyst increases the NO_2 share in the exhaust gas. This improves the regeneration of the filter module **13**. During the active regeneration, fuel (HC) is injected into the exhaust line. This triggers an exothermal reaction in the DOC. The exhaust temperature rises up to 540 °C.

2.5 Diesel exhaust fluid injection

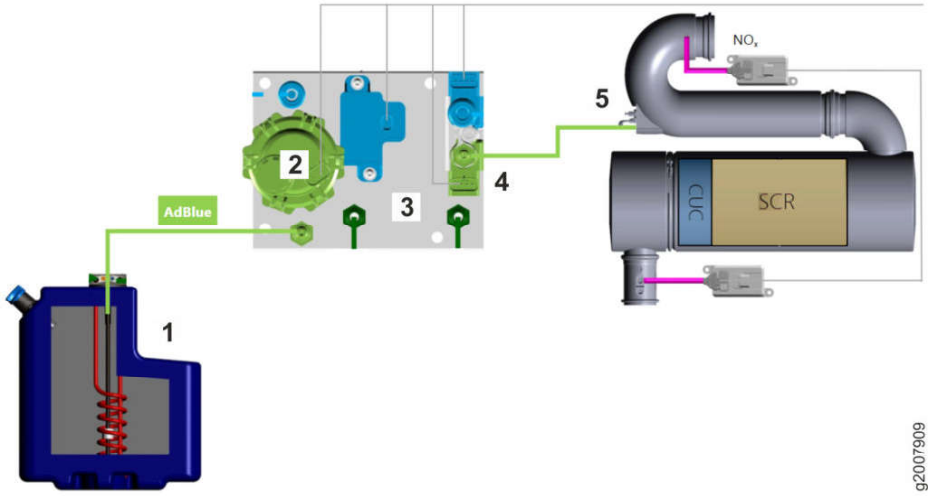

Fig. 348: Diesel exhaust fluid injection

1	Diesel exhaust fluid tank	**4**	Diesel exhaust fluid pressure and temperature sensor A776.4
2	Diesel exhaust fluid pump	**5**	Diesel exhaust fluid nozzle
3	Metering unit		

The diesel exhaust fluid pump **2** draws up diesel exhaust fluid from the diesel exhaust fluid tank **1**.

The diesel exhaust fluid is directed via the metering unit **3** to the diesel exhaust fluid nozzle **5**.

The diesel exhaust fluid temperature sensor **4** measures the pressure and the temperature of the fluid in the metering unit.

In the nozzle, the diesel exhaust fluid is mixed with compressed air. This makes the spray finer and distributes it more evenly through the mixing section.

2.6 Exhaust throttle valve

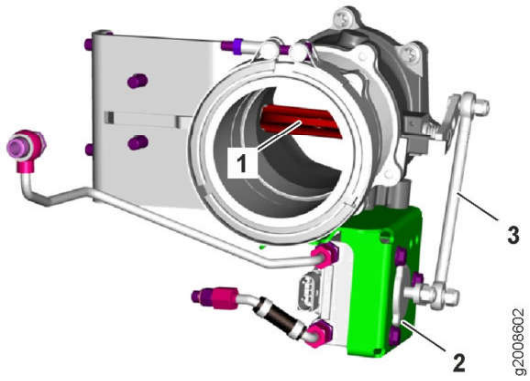

Fig. 349: Exhaust throttle valve

1	Exhaust throttle valve	**3**	Linkage
2	Servo motor M715		

The exhaust throttle valve is mainly used for thermal management of the engine.

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040.1.8.3 Air dryer

Valid for: L586-1761;

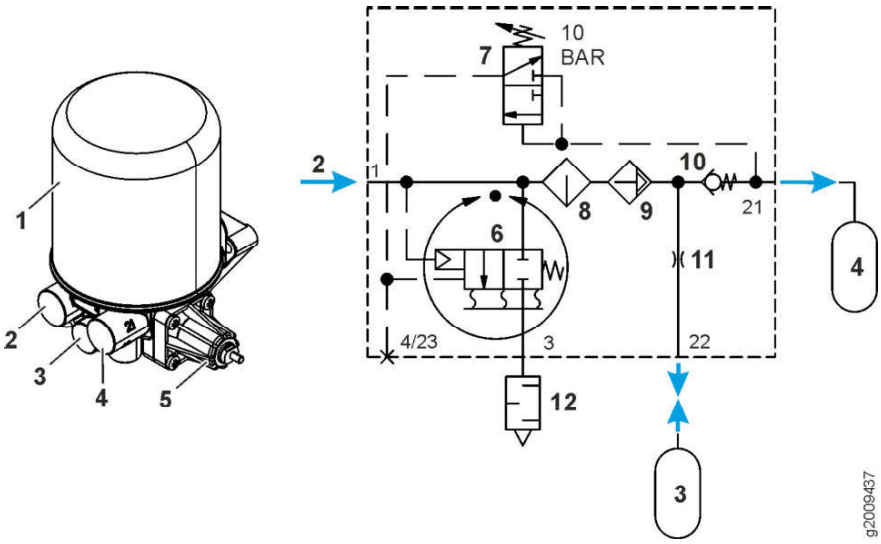

Fig. 361: Air dryer

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
6 Fan pump
8 Oil supply for compact brake valve
9 Working pump suction port
10 Working pump suction port drain valve
11 In-line filter 80 µm
12 Fan motor
14 Compact brake valve return flow
15 Return flow from servostat
16 Hydraulic oil cooler

Name	Test point
PK	Cooling system high pressure

Tab. 95: Test points

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

Tab. 96: Equipment codes

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Thresholds			
Temperature limits		**Current to proportional solenoid**	**System pressure (at engine speed of 1750 min^{-1})**
Hydraulic oil	88 °C	Minimum current (standard setting: 600 mA)	$100^{\pm 10}$ bar
Coolant	99 °C		
Charge air	80 °C		
Gear oil	88 °C		

Tab. 109: Thresholds

If a limit is exceeded, it has following effects:
- Current applied to fan speed proportional solenoid **Y13** is reduced to minimum level.
- A warning sound goes off.
- A service code is displayed.
- For the coolant and charge air, power output of diesel engine is also reduced.
- For the 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 **Y13** is energised with minimum current (default value: 600 mA).

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

Description	Current at proportional solenoid (standard setting)	System pressure
Sensor failure **B8** or **B86**	600 mA	$100^{\pm 10}$ bar

Tab. 110: Sensor failure

If temperature sensor for air intake **B707** or temperature sensor for coolant **B708** fails, a substitute value is used. Control of fan speed is performed using remaining sensors.

Description	Substitute value in case of sensor failure
Temperature sensor for charge air **B707**	-100 °C
Temperature sensor for coolant **B708**	-100 °C

Tab. 111: Sensor failure

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Name	Test point	Name	Test point	Name	Test point
MT	Servo pressure for tilt-out function	**PA**[A)]	Working pump high pressure		

Tab. 117: Test points

A) Test point on working pump
B) Test point on control valve block

BMK	Function	BMK	Function	BMK	Function
B8	Hydraulic oil temperature sensor	**B91**	Pressure sensor for lift cylinder ring side	**B93**	Pressure sensor for tilt cylinder ring side
B90	Pressure sensor for lift cylinder piston side	**B92**	Pressure sensor for tilt cylinder piston side		

Tab. 118: Equipment codes

Working hydraulics consist of following components:
- Hydraulic tank (For more information see: 080.2.1 Overview of hydraulic tank, page 080-6)
- Working pump (For more information see: 060.2 Working pump, page 060-7)
- Control block (For more information see: 060.3 Control block for Z-bar kinematics, page 060-15)
- Pilot control (For more information see: 060.4.1 Pilot control valve block, page 060-24)
- Ride control (For more information see: 060.5.1 Overview of ride control system, page 060-26)
- Lift cylinder
- Tilt cylinder

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2.4 Power regulator

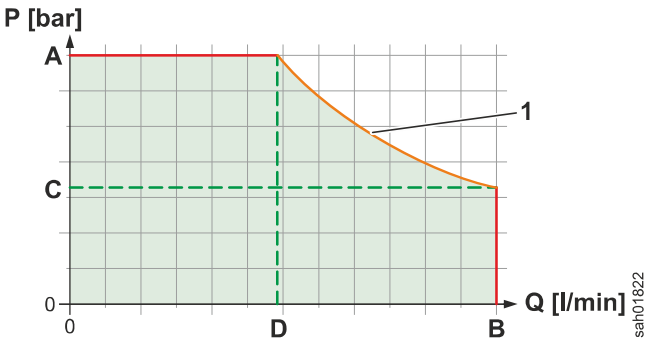

Fig. 391: Power regulator characteristic

P Pump pressure in bar
Q Flow rate in litres per minute
1 Output curve (hyperbola)
A LS-pressure cut-off
B Maximum flow rate
C Maximum pressure at maximum flow rate
D Maximum flow rate with pressure cut-off activated

Power regulator prevents a certain drive power from being exceeded. Power regulator restricts drive power along an output curve **1** of flow rate x high pressure. Output curve **1** is a shape of a hyperbola (hyperbolic control).

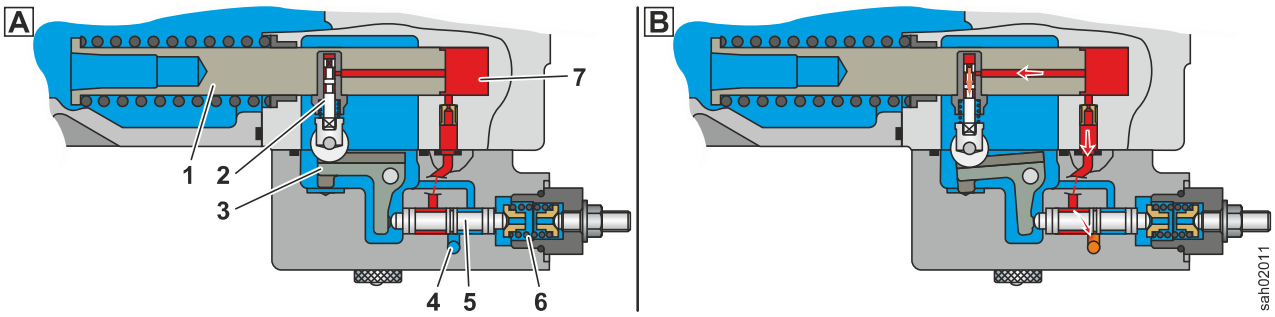

Fig. 392: Power regulator inactive / power regulator active (at maximum swivel angle)

1 Positioning piston
2 Piston with roller
3 Regulating lever
4 Connection to flow regulator
5 Power regulator
6 Regulating spring
7 Connection to operating pressure

The operating pressure **7** acts via ring face of piston **2** on regulating lever **3** and thus moves power regulator **5** against regulating spring **6**. During this process, torque with which regulating lever **3** acts on power regulator **5** increases as angle of axial tapered piston rotary group increases. When axial tapered piston rotary group is at a large angle (= greater flow rate), less pressure is required to exert same force on power regulator **5** than when axial tapered piston rotary group is at a narrow angle.

When set drive power is exceeded, regulating lever **3** is moved so far out that power regulator **5** connects flow regulator **4** to operating pressure **7** on all connections. Flow regulator **4** therefore always connects return piston to operating pressure **7**, regardless of its position. This moves rotary group to a smaller angle and drive power taken off is reduced.

Tilt out and lowering functions also have additional replenishing valves **10** and **19**.

Feeder valves prevent cavitation during rapid working movements by allowing oil to flow from tank side to consumers. Cavitation can occur, for instance, when lifting arms are rapidly lowered. As lifting arms are lowered under their own weight, no load is created. Consequently, working hardly moves out and delivers too little oil.

2.10 Preload valve for 2nd tank duct

There are two tank channels running through control valve block **1**. Tank duct 1 is connected to hydraulic tank **67**. Tank duct 2 is connected to tank duct 1 by preload valve for 2nd tank duct **3**. This valve has a preload pressure of 8 bar to 10.8 bar in 2nd tank duct. This means that if cavitation occurs, oil flows more quickly to consumers via replenishing valves.

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060.6 Electronics of the working hydraulics

060.6.1 Overview of electrical controls the working hydraulics

Valid for: L586-1761;

1 Layout

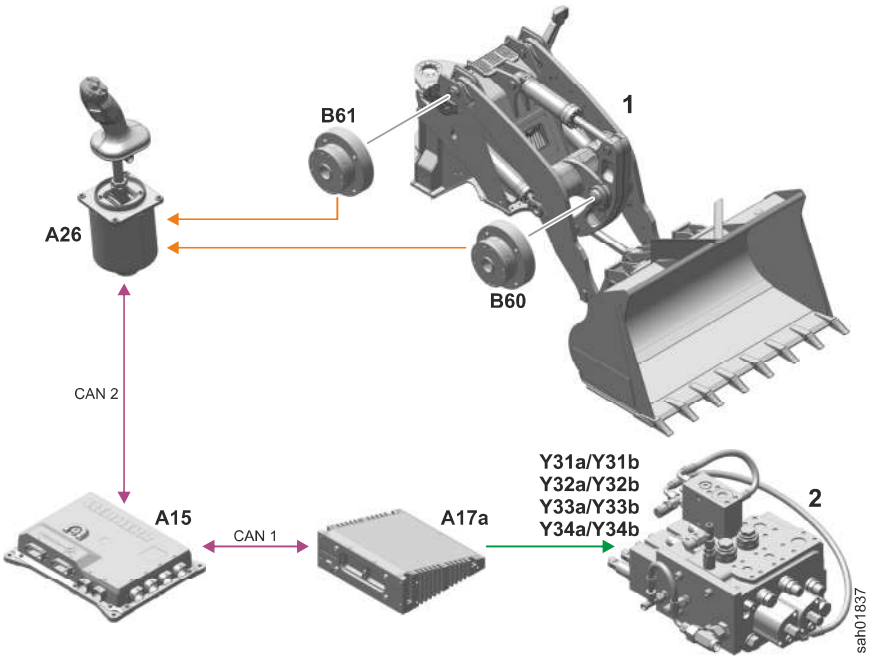

Fig. 402: Overview of electrical controls the working hydraulics

1 Lift arms **2** Control block

BMK	Function	BMK	Function
A15	Central control unit	**Y32a**	Proportional solenoid for lowering
A17a	Output module A17a	**Y32b**	Proportional solenoid for lifting
A26	CAN module for control lever	**Y33a**	Proportional solenoid for 3rd function A3
B60	Angle sensor for bucket position	**Y33b**	Proportional solenoid for 3rd function B3
B61	Angle sensor for lift arm position	**Y34a**	Proportional solenoid for 4th function A4
Y31a	Proportional solenoid for tilting out	**Y34b**	Proportional solenoid for 4th function B3
Y31b	Proportional solenoid for tilting in		

Tab. 142: Equipment codes

1 Layout

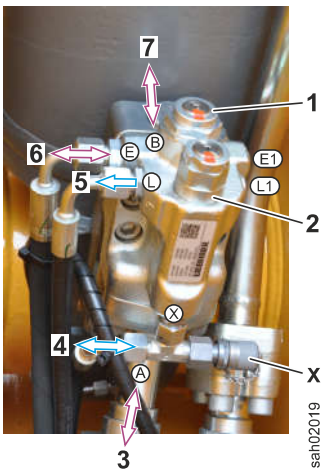

Fig. 409: Pipe break protection valve block (lift cylinder)

1	Safety valve and pipe break protection valve	**5**	Return flow to leak oil strainer
2	Pilot control valve	**6**	Connection to other valve block for pipe break protection
3	Oil supply through control valve block	**7**	Connection for lift cylinder piston side
4	Pilot control valve for lowering (control block)		

Name	Test point
X	Venting connection

Tab. 149: Test points

One valve block for pipe break protection is installed on each lift cylinder.

2 Function

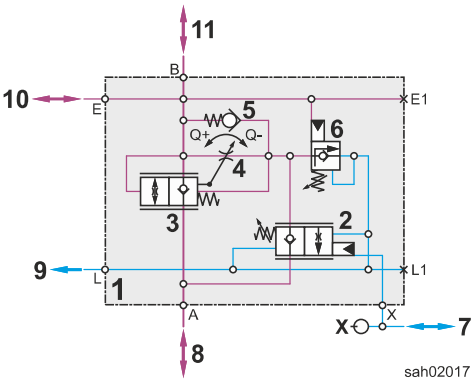

Fig. 410: Valve block for pipe break protection: hydraulic diagram

1	**Valve block for pipe break protection**	**7**	Pilot control valve for lowering (control block)

See next page for continuation of the image legend

BMK	Function
B8	Hydraulic oil temperature sensor

Tab. 155: Equipment codes

Hydraulic tank is fitted behind cooling system.

Hydraulic tank consists of following components:
- Steel tank (For more information see: 080.2.2 Steel tank, page 080-8)
- Return filter (For more information see: 080.2.3 Return filter, page 080-10)
- Breather filter (For more information see: 080.2.5 Breather filter, page 080-11)
- Leak oil strainer (For more information see: 080.2.4 Leak oil strainer, page 080-11)
- Drain valves
- Hydraulic oil temperature sensor B8 (For more information see: 050.3.2 Hydraulic oil temperature sensor, page 050-16)

2 Function

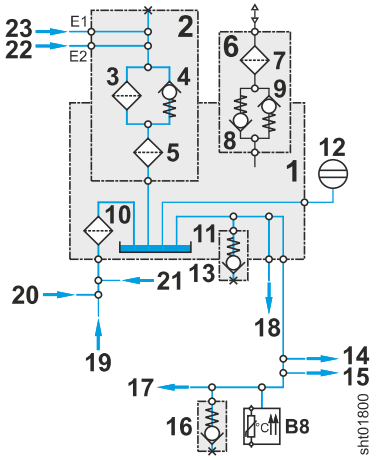

Fig. 416: Hydraulic tank diagram

1	**Hydraulic tank**
2	**Return filter**
3	Main filter element 10 µm
4	Bypass valve 2.5 bar
5	Strainer mesh 100 µm
6	**Breather filter**
7	Fine filter
8	Outlet valve 0.65 bar
9	Inlet valve 0.03 bar
10	Leak oil strainer 100 µm
11	Steel tank
12	Sight glass for hydraulic oil level
13	Hydraulic tank drain valve
14	Emergency steering pump suction port
15	Fan pump and brake pump suction port
16	Working pump suction port drain valve
17	Working pump suction port
18	Steering pump suction port
19	Fan motor leak oil
20	Return flow from compact brake valve and pilot control
21	Leak oil from steering pump and working pump
22	Return flow from hydraulic oil cooler
23	Return flow from control valve block

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090.1 Steering system overview

Valid for: L586-1761;

1 Layout

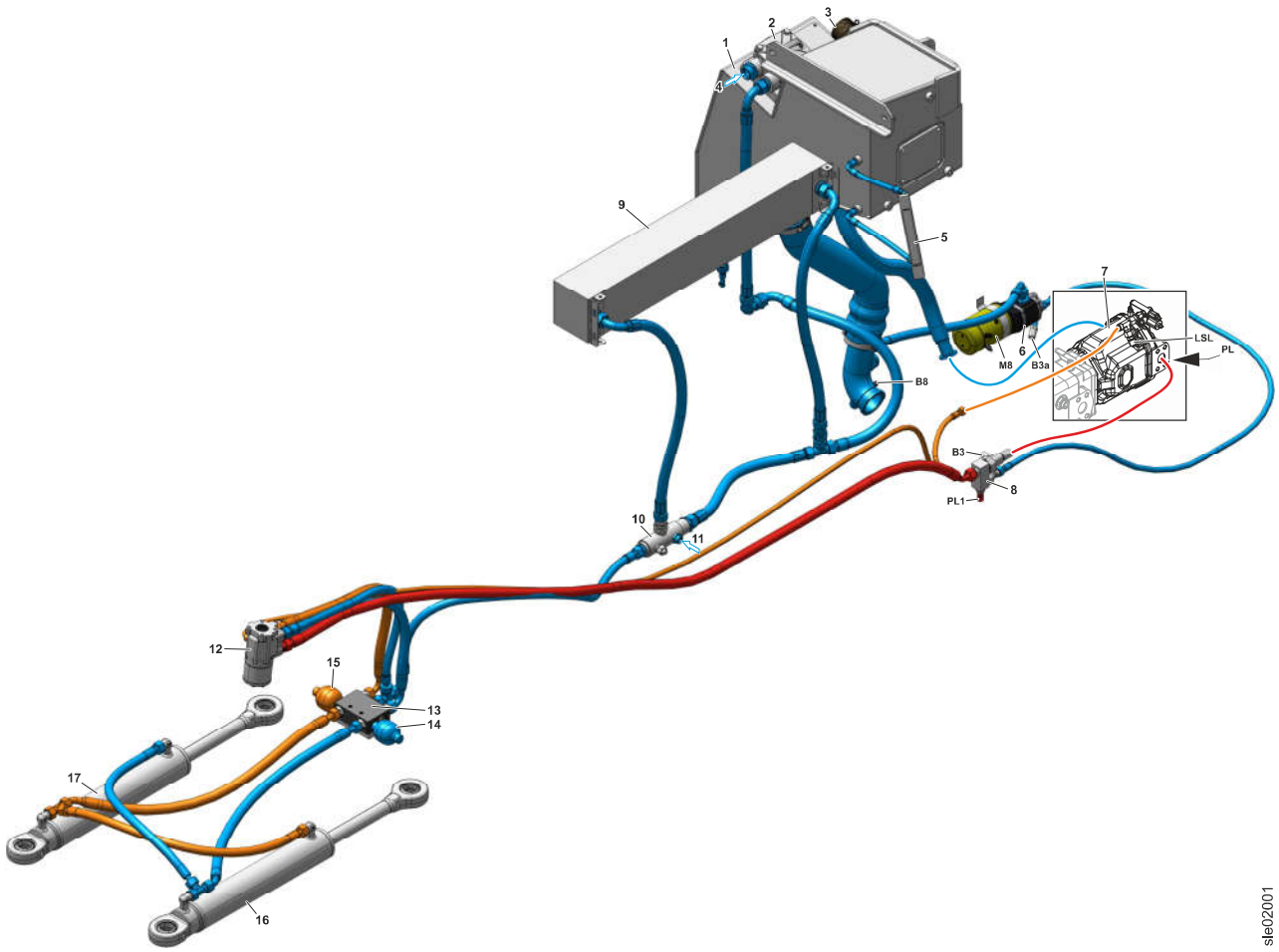

Fig. 426: Steering system (steering to left)

1	Hydraulic tank	**7**	Steering pump	**13**	Steering stabilisation valve block
2	Return filter	**8**	Valve block for steering system	**14**	Steering damper hydro accumulator
3	Breather filter	**9**	Hydraulic oil cooler	**15**	Steering damper hydro accumulator
4	Return flow from control valve block	**10**	Collector pipe	**16**	Left steering cylinder with stroke limit damping
5	Sight glass for hydraulic oil level	**11**	Return line from fan motor	**17**	Right steering cylinder with stroke limit damping
6	Emergency steering pump	**12**	Servostat		

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090.3 Servostat

Valid for: L586-1761;

1 Layout

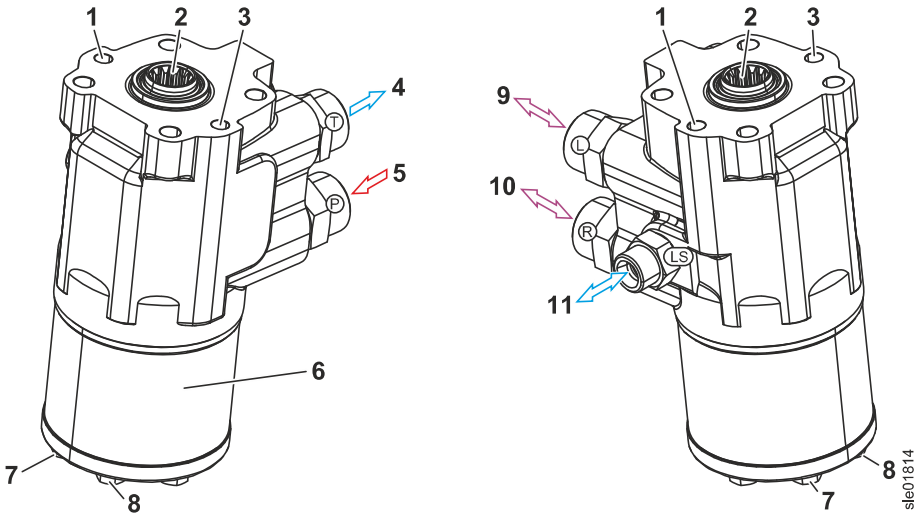

Fig. 436: Servostat (from front left and from front right)

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.

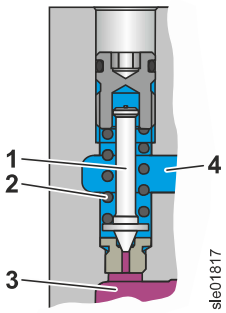

Fig. 437: Secondary pressure relief valve: secondary pressure relief valve

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

090.5.2 Emergency steering pump

Valid for: L586-1761;

1 Layout

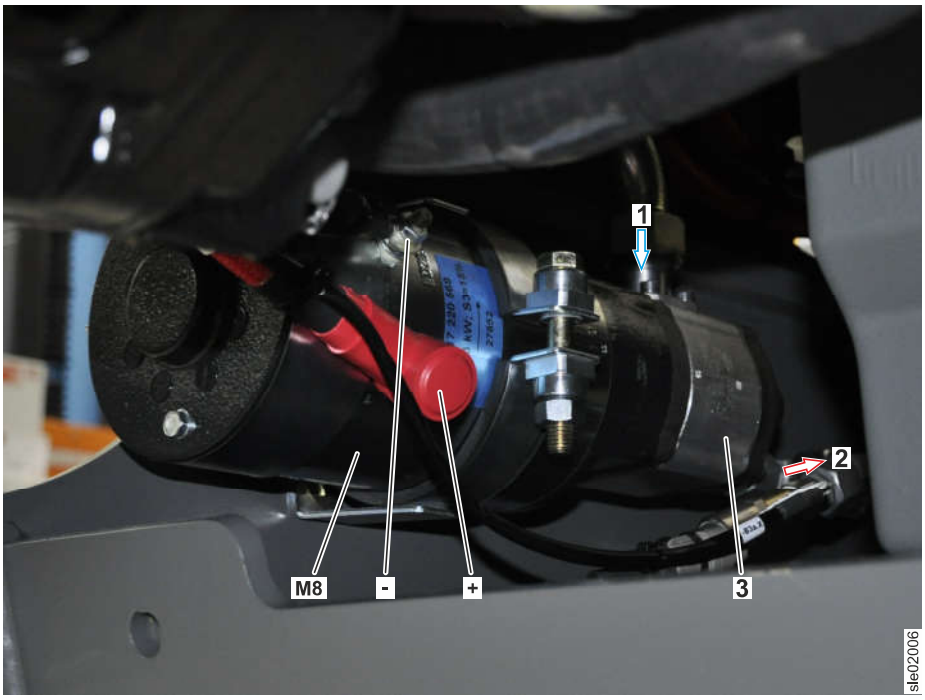

Fig. 449: Emergency steering pump (from front left)

1 Suction port from hydraulic tank **2** Oil supply to servostat **3** Gear pump

BMK	Function
M8	Electric motor for emergency steering pump

Tab. 166: Equipment codes

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

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

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090.6 Joystick steering

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

Valid for: L586-1761;

This equipment is optional.

1 Layout

Joystick steering consists of following components:
- Hydraulic tank (For more information see: 080.2.1 Overview of hydraulic tank, page 080-6)
- Steering pump (For more information see: 090.2 Steering pump, page 090-7)
- Servostat (For more information see: 090.3 Servostat, page 090-13)
- Joystick steering control valve block (For more information see: 090.6.3 Joystick steering control valve block, page 090-40)
- Steering cylinder (For more information see: 090.4.1 Steering cylinder, page 090-16)
- Steering stabilisation valve block (For more information see: 090.4.2 Steering stabilisation valve block, page 090-17)
- Emergency steering (For more information see: 090.5.1 Emergency steering overview, page 090-21)
- Hydraulic oil cooler

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

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

Tab. 177: Test points

A) Thread M10x1

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

Tab. 178: 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.

090.6.4.2 Joystick with position tracking

Valid for: L586-1761;

1.1 Layout

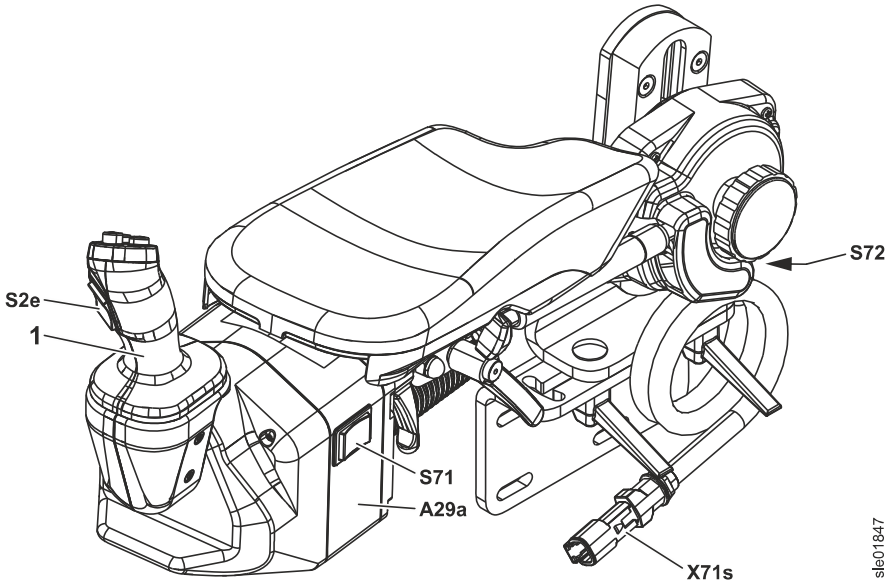

Fig. 467: Joystick with position tracking

1 Joystick

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

Tab. 185: Equipment codes

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

Joystick with position tracking is located on left armrest.

2 Function

2.1 Basic function

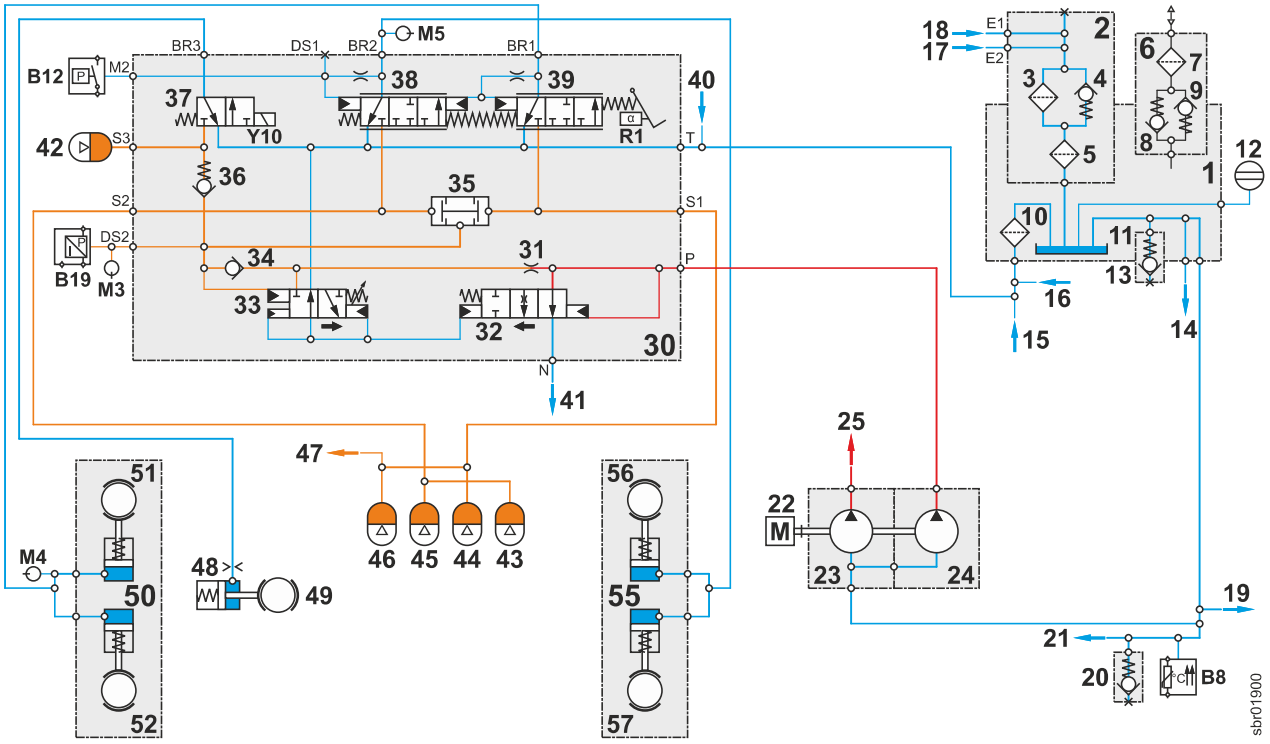

Fig. 473: Hydraulic diagram of brake system (parking brake activated)

1	**Hydraulic tank**	18	Return flow from control valve block	39	Pressure regulator piston for 1st brake circuit
2	**Return filter**	19	Emergency steering pump suction port	40	Return flow from pilot control
3	Main filter element 10 µm	20	Working pump suction port drain valve	41	Return flow to collector pipe
4	Bypass valve 2.5 bar	21	Working pump suction port	42	Parking brake hydro accumulator
5	Strainer mesh 100 µm	22	Diesel engine	43	Hydro accumulator for service brake (2nd brake circuit)
6	**Breather filter**	23	Fan pump	44	Hydro accumulator for service brake (1st brake circuit)
7	Fine filter	24	Brake pump	45	Hydro accumulator for service brake (2nd brake circuit)
8	Outlet valve 0.65 bar	25	Fan motor oil supply	46	Hydro accumulator for service brake (1st brake circuit)
9	Inlet valve 0.03 bar	30	**Compact brake valve**	47	Oil supply for pilot control
10	Leak oil strainer 100 µm	31	Inlet restrictor	48	Orifice
11	Steel tank	32	Accumulator charge valve	49	Parking brake (disc brake)
12	Sight glass for hydraulic oil level	33	Pilot valve	50	**Front axle**
13	Hydraulic tank drain valve	34	Inlet check valve	51	Service brake, 1st brake circuit (wet disc brake)
14	Steering pump suction port	35	Inverted shuttle valve	52	Service brake, 1st brake circuit (wet disc brake)
15	Fan motor leak oil	36	Check valve for parking brake	55	**Rear axle**

See next page for continuation of the image legend

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

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

2.6 Parking brake

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

2.7 Brake light pressure switch

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

2.7.1 Brake accumulator pressure sensor

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

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

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110.3 Circuit diagrams

Valid for: L586-1761;

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

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

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

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

1.1.1 Abbreviations

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

Tab. 203: Abbreviations

1.1.2 Designation of components with “-”

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

Description	Component designation
-A10	Display

Tab. 204: Example of component designation

1.1.3 Location code with “+”

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

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

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

ITEM CODE 12466553 DRAWING INDEX 000

PROJECT GG_4_EVO DRAWING NUMBER 1333 90100 02 00

MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

BMK-INDEX
ELECTRICAL SCHEMATIC;

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

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

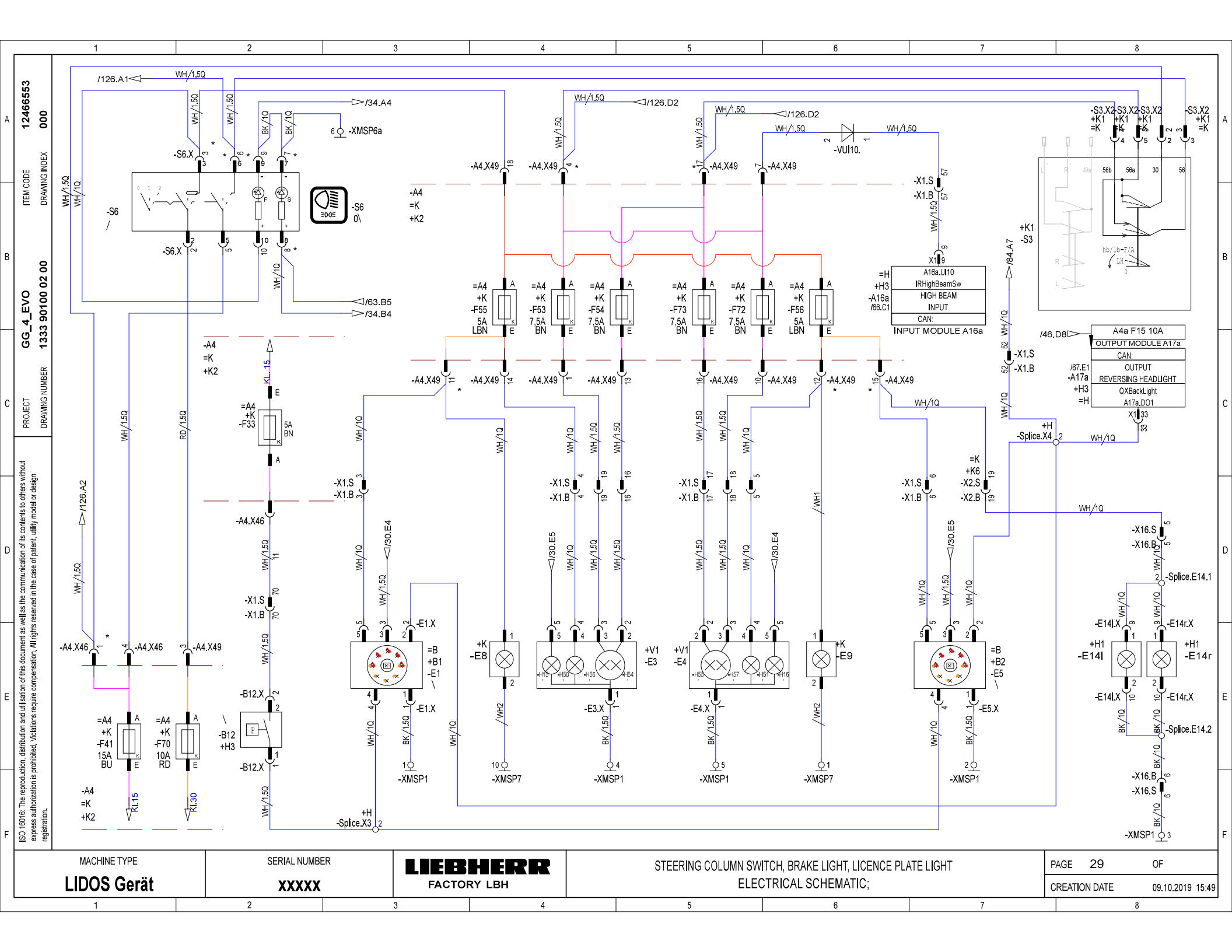
ITEM CODE 12466553
DRAWING INDEX 000
PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00

MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

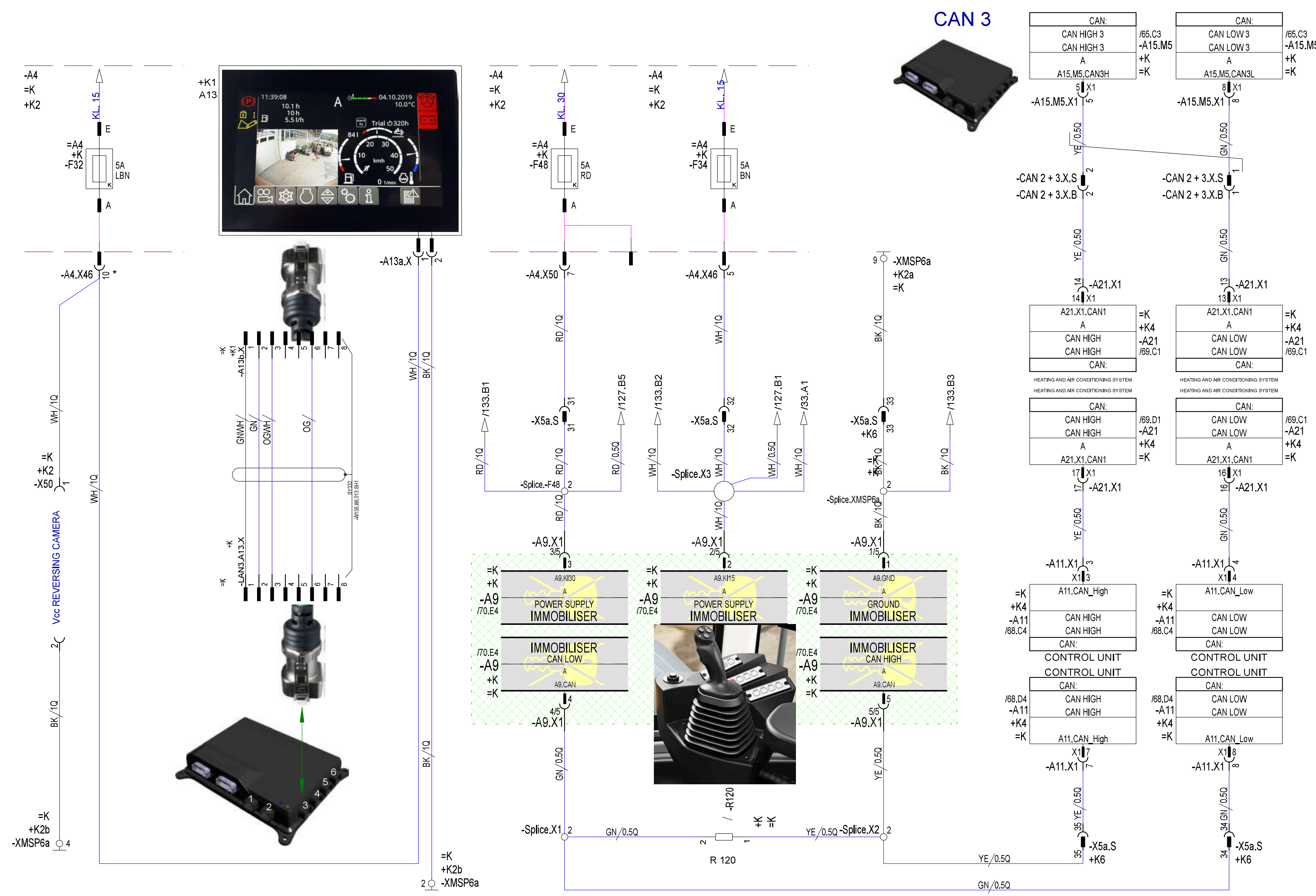
LIEBHERR
FACTORY LBH

BMK-INDEX
ELECTRICAL SCHEMATIC;



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

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



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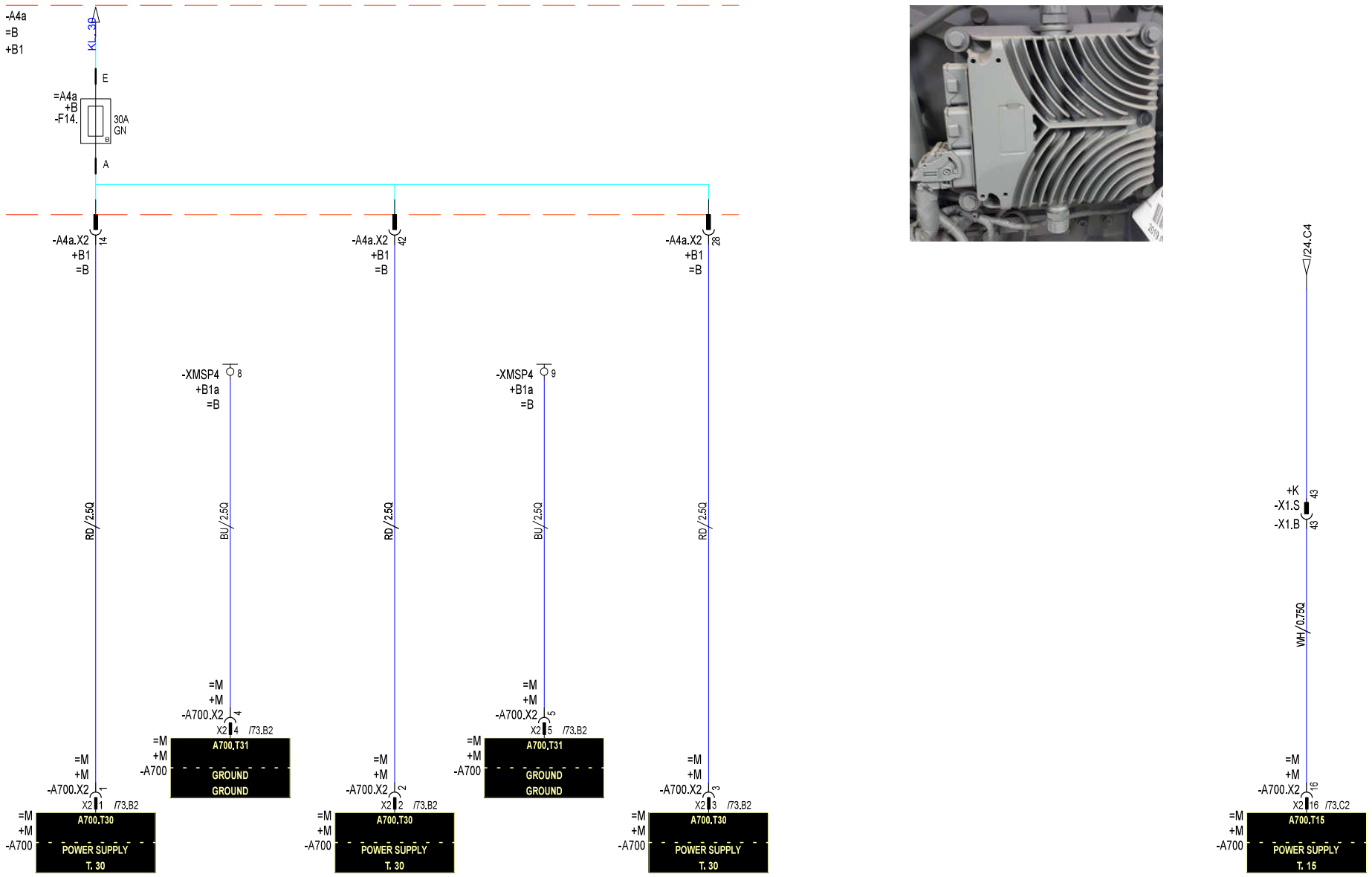
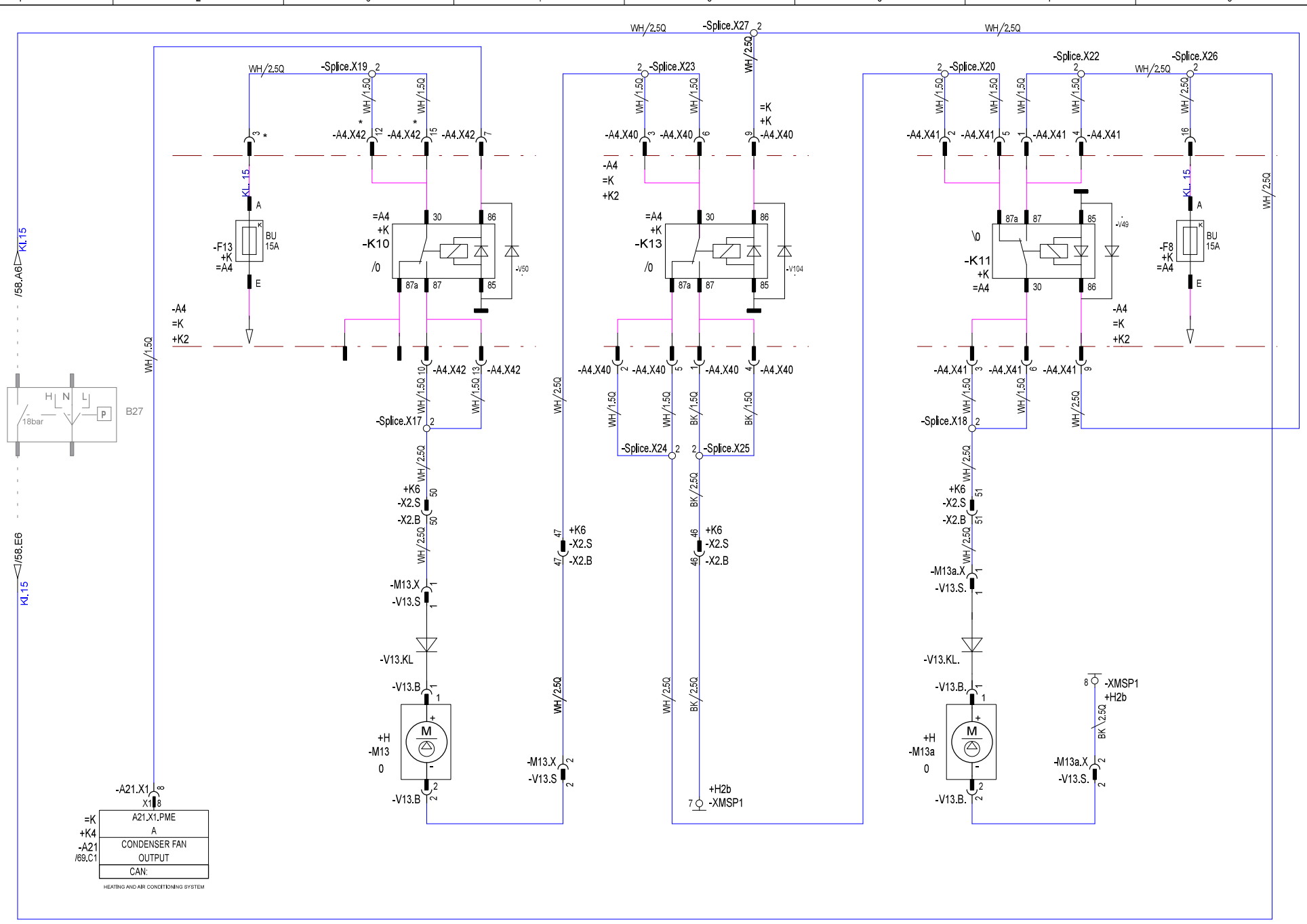
ITEM CODE	12466553
DRAWING INDEX	000
PROJECT	GG_4_EVO
DRAWING NUMBER	1333 90100 02 00

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



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



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

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

-A21
+K4

Modul Nr.:
Modulname: HEIZ-KLIMA

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

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

LBH ID 11419535
ZNG 1464 6739 3 01 00 001

OVERVIEW FUSE STICKER A4b
ELECTRICAL SCHEMATIC;

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MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

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

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

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

ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN	ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN
A17b.24V_B1	/88.D5		POWER SUPPLY BANK 1	0	1	A17b.24V				0	41
A17b.24V_logic	/88.D4		POWER SUPPLY	0	2	A17b.24V				0	42
A17b.GND	/88.D5		GROUND	0	3	A17b.CAN_Low	/87.C5		CAN LOW	0	43
A17b.PWM1	/98.A1		JOYSTICK STEERING MAIN VALVE B	0	4	A17b	/87.C5		CAN LOW	0	44
A17b.PWM2	/156.A1		TURN GRABBER RIGHT PROPORTIONAL SOLENOID VALVE	0	5	A17b.GND_DO2	/95.F6		GROUND	0	45
A17b.PWM3	/156.A2		TURN GRABBER LEFT PROPORTIONAL SOLENOID VALVE	0	6	A17b.GND_PWM1	/98.F1		JOYSTICK STEERING MAIN VALVE B	0	46
A17b.PWM4	/156.A3		GRABBER BACK PROPORTIONAL SOLENOID	0	7	A17b.GND_PWM2	/156.F1		TURN GRABBER RIGHT PROPORTIONAL SOLENOID VALVE	0	47
A17b.PWM9	/156.A4		GRABBER FORWARD PROPORTIONAL SOLENOID	0	8	A17b.GND_PWM3	/156.F2		TURN GRABBER LEFT PROPORTIONAL SOLENOID VALVE	0	48
A17b.PWM10	/156.A7		OSCILLATING CYLINDER LOCKOUT SOLENOID VALVE	0	9	A17b.GND_PWM4	/156.F3		GRABBER BACK PROPORTIONAL SOLENOID	0	49
A17b.PWM11	/42.A7		4TH FUNCTION A PROPORTIONAL SOLENOID VALVE	0	10	A17b.GND_PWM9	/156.F4		GRABBER FORWARD PROPORTIONAL SOLENOID	0	50
A17b.PWM12	/42.A8		4TH FUNCTION B PROPORTIONAL SOLENOID VALVE	0	11	A17b.GND_PWM10	/156.F7		OSCILLATING CYLINDER LOCKOUT SOLENOID VALVE	0	51
A17b.GND	/88.D5		GROUND	0	12	A17b.GND_PWM11	/42.F7		4TH FUNCTION A PROPORTIONAL SOLENOID VALVE	0	52
A17b.24V_logic				0	13	A17b.GND_PWM12	/42.F8		4TH FUNCTION B PROPORTIONAL SOLENOID VALVE	0	53
A17b.24V_B3	/88.D6		POWER SUPPLY BANK 3	0	14	A17b.GND_DO4				0	54
A17b.24V_B2	/88.D5		POWER SUPPLY BANK 2	0	15	A17b.FI1	/111.E2		LIGHTING CONTROL	0	55
A17b.GND_logic	/88.D4		GROUND	0	16	A17b.FI2				0	56
A17b.GND	/88.D6		GROUND	0	17	A17b.CAN_High	/87.C4		CAN HIGH	0	57
A17b.PWM5	/111.F6		DIMMABLE WORKING HEADLIGHT RIGHT	0	18	A17b.CAN_High	/87.C4		CAN HIGH	0	58
A17b.PWM6	/111.F5		DIMMABLE WORKING HEADLIGHT RIGHT	0	19	A17b.GND				0	59
A17b.PWM7	/156.A5		RAISE LOG PUSHER SOLENOID VALVE	0	20	A17b.GND_PWM5	/112.F7		DIMMABLE WORKING HEADLIGHT MIDDLE	0	60
A17b.PWM8	/156.A6		LOWER LOG PUSHER SOLENOID VALVE	0	21	A17b.GND_PWM6				0	61
A17b.PWM13	/111.F8		DIMMABLE WORKING HEADLIGHT LEFT	0	22	A17b.GND_PWM7	/156.F5		RAISE LOG PUSHER SOLENOID VALVE	0	62
A17b.PWM14	/111.F7		DIMMABLE WORKING HEADLIGHT LEFT	0	23	A17b.GND_PWM8	/156.F6		LOWER LOG PUSHER SOLENOID VALVE	0	63
A17b.PWM15	/112.A5		DIMMABLE WORKING HEADLIGHT MIDDLE	0	24	A17b.GND_PWM13				0	64
A17b.PWM16	/98.A3		JOYSTICK STEERING MAIN VALVE A	0	25	A17b.GND_PWM14				0	65
A17b.GND	/88.D7		GROUND	0	26	A17b.GND_PWM15				0	66
A17b.GND_logic				0	27	A17b.GNDPWM16	/98.F3		JOYSTICK STEERING MAIN VALVE A	0	67
A17b.24V_B4	/88.D7		POWER SUPPLY BANK 4	0	28	A17b.GND				0	68
A17b.CAN_Res	/87.C6		CAN TERMINATOR	0	29	A17b.GND_FI1				0	69
A17b.24V				0	30	A17b.GND_FI2				0	70
A17b.GND_DO1	/96.D2		JOYSTICK STEERING SAFETY CIRCUIT SOLENOID VALVE	0	31						
A17b.V_DO1	/98.F5		POWER SUPPLY DIGITAL OUTPUT 1	0	32						
A17b.DO1	/96.A4		JOYSTICK STEERING SAFETY CIRCUIT SOLENOID VALVE	0	33						
A17b.V_DO2	/95.F5		POWER SUPPLY DIGITAL OUTPUT 2	0	34						
A17b.DO2	/96.A5		RELAY POWER SUPPLY EMERGENCY STEERING CIRCUIT	0	35						
A17b.V_DO3	/95.F7		POWER SUPPLY DIGITAL OUTPUT 3	0	36						
A17b.DO3	/96.A3		JOYSTICK STEERING SWITCHING RELAY	0	37						
A17b				0	38						
A17b.DO4				0	39						
A17b.GND_DO3	/95.F8		GROUND	0	40						

MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

OPTION OUTPUT MODULE A17b
ELECTRICAL SCHEMATIC;

X1GREY

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

Phys. Adr.	Blatt	EA	Beschreibung		Stecker	Pin
A29.V-BATT S					X1	H1
A29.GND S					X1	H2
A29.GND PWM3 +	4/98.F8		GROUND	GROUND	X1	H3
A29.PWM 3	/98.A7		JOYSTICK STEERING EMERGENCY VALVE A	OUTPUT	X1	H4
A29.V-BATT	/92.F3		POWER SUPPLY	T. 15	X1	G1
A29.GND	/92.F4		GROUND	GROUND	X1	G2
A29.V-BATT PWM	/94.B1		POWER SUPPLY	OUTPUTS	X1	G3
A29.PWM 4 NOT	/98.A8		JOYSTICK STEERING EMERGENCY VALVE B	OUTPUT	X1	G4
A29.CAN-L 1	/91.C4		CAN LOW 2	CAN LOW 2	X1	F1
A29.CAN-L 1	/91.D4		CAN LOW 2	CAN LOW 2	X1	F2
A29.CAN-H1	/91.C5		CAN HIGH 2	CAN HIGH 2	X1	F3
A29.CAN-H1	/91.D5		CAN HIGH 2	CAN HIGH 2	X1	F4
A29.CAN 1 Ende					X1	E1
A29.4 - 20 mA					X1	E2
A29.4 - 20 mA					X1	E3
A29.4 - 20 mA	/93.F8		EMERGENCY SPOOL VALVE POSITION SENSOR	INPUT	X1	E4
A29.0 ~ 5V					X1	D1
A29.4 - 20 mA			STEERING WHEEL ANGLE SENSOR	SIGNAL 1	X1	D2
A29.4 - 20 mA			JOYSTICK STEERING PRESSURE SENSOR	INPUT	X1	D3
A29.4 - 20 mA	/93.F1		ARTICULATED JOINT ANGLE SENSOR	SIGNAL 1	X1	D4
A29.0 ~ 5V			RESERVE		X1	C1
A29.0 ~ 5V			RESERVE		X1	C2
A29.0 ~ 5V					X1	C3
A29.0 ~ 5V					X1	C4
A29.DI1.A	/94.F7		SWITCH JOYSTICK STEERING	SIGNAL 1	X1	B1
A29.DI3.A	/94.F1		LATCHING	DIAGNOSIS	X1	B2
A29.DI5					X1	B3
A29.DI7					X1	B4
A29.GND	/94.B1		GROUND	GROUND	X1	A1
A29.DI2.A	/94.A6		JOYSTICK STEERING SWITCH ACTIVATION	SIGNAL 1	X1	A2
A29.DI4					X1	A3
A29.DI6					X1	A4
A29.CAN HIGH C					X2	A4
A29.CAN HIGH B					X2	A3
A29.CAN HIGH A					X2	A2
A29.CAN SHIELD					X2	A1
A29.CAN LOW C					X2	B4
A29.CAN LOW B					X2	B3
A29.CAN LOW A					X2	B2
A29.GND_DO3					X2	B1
A29.TXP					X2	C4

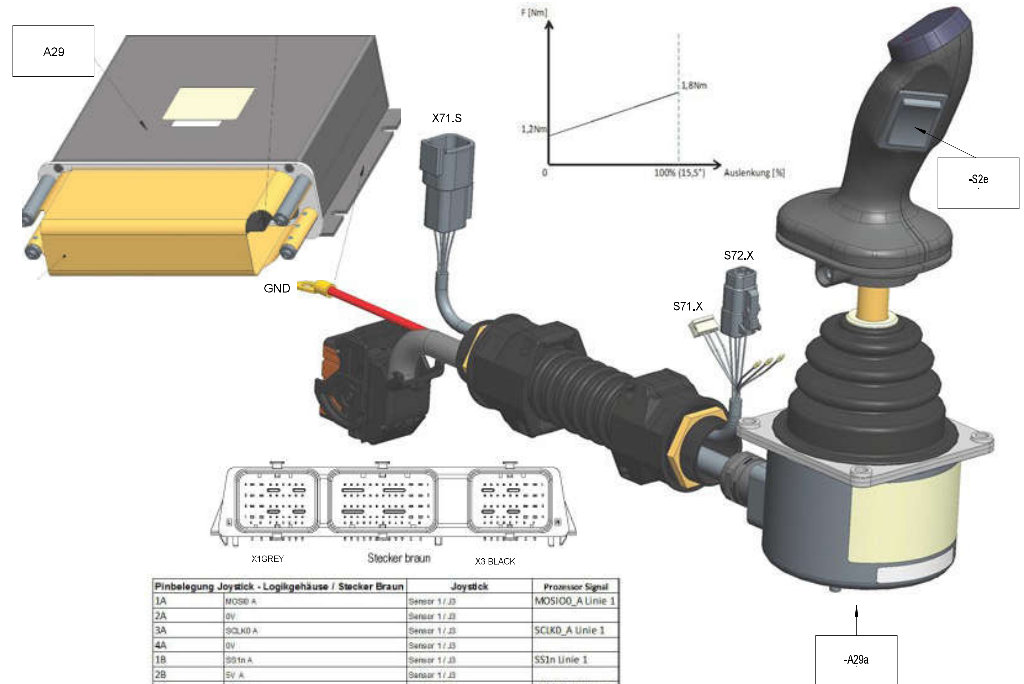
Phys. Adr.	Blatt	EA	Beschreibung	Stecker	Pin
A29.RXP				X2	C3
A29.LIN				X2	C2
A29.RI1P				X2	C1
A29.GND_DO2				X2	D4
A29.GND_PWM1				X2	D3
A29.GND_PWM2				X2	D2
A29.RI1N				X2	D1
A29.FI1				X2	E4
A29.FI GND				X2	E3
A29.FI3				X2	E2
A29.				X2	E1
A29.FI2				X2	F4
A29.FI GND				X2	F3
A29.FI4				X2	F2
A29.RI2N				X2	F1
A29.OUT 0				X2	G4
A29.DIGITAL GND				X2	G3

X3 BLACK

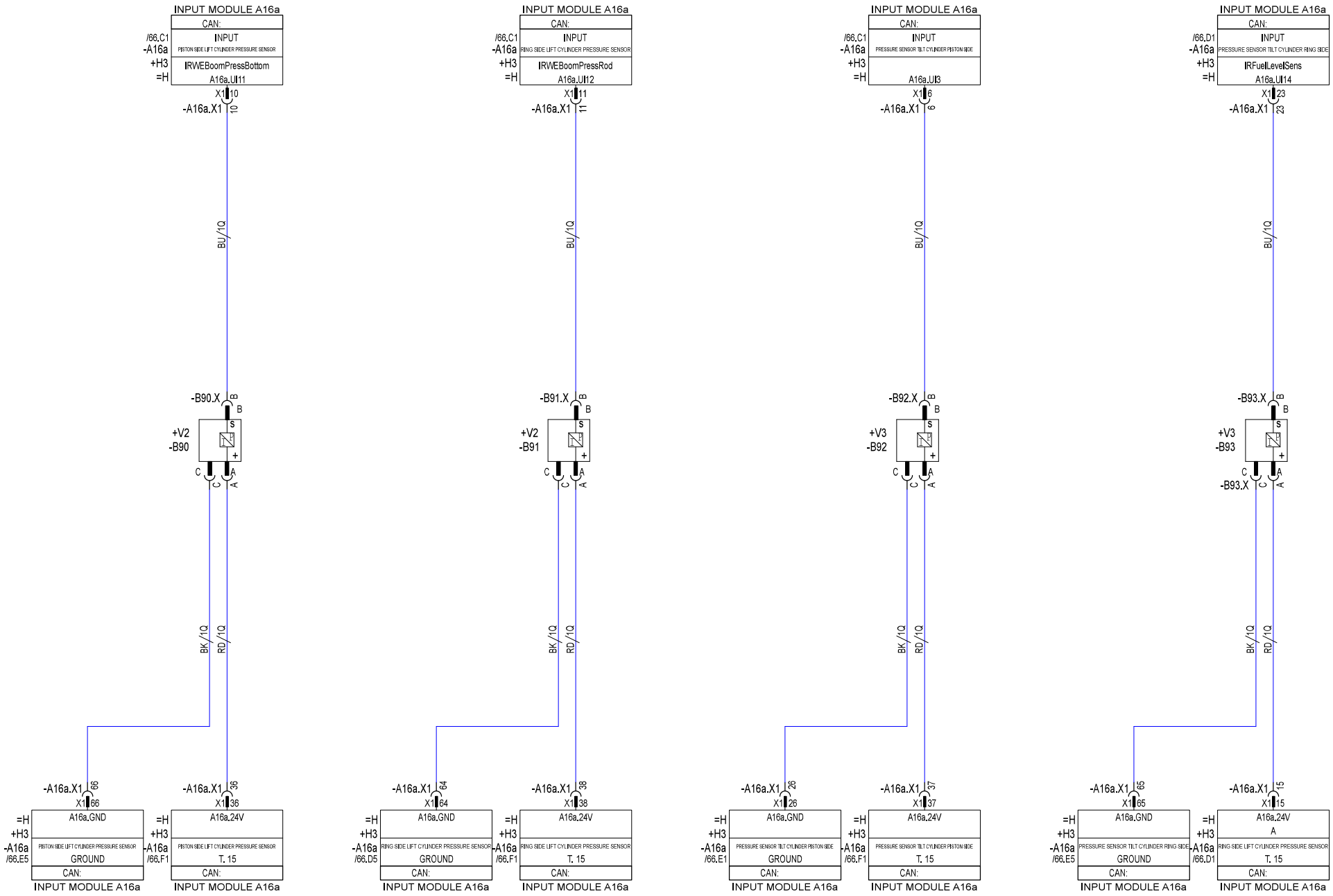
=K +K6 -A29 Modul Nr.: Modulname:

Phys. Adr.	Blatt	EA	Beschreibung		Stecker	Pin
A29.OUT 1					X2	G2
A29.RI3					X2	G1
A29.5V					X2	H4
A29.Vers GND					X2	H3
A29.5V					X2	H2
A29.RI GND					X2	H1
A29.AI 1					X2	J4
A29.AI 2					X2	J3
A29.AI 3					X2	J2
A29.RI4					X2	J1
A29.AI 5					X2	K4
A29.AI 6					X2	K3
A29.AI 7					X2	K2
A29.AI 4					X2	K1
A29.AI 9					X2	L4
A29.AI 10					X2	L3
A29.AI 11					X2	L2
A29.AI 8					X2	L1
A29.DIGITAL GND					X2	M4
A29.DIGITAL GND					X2	M3
A29.DIGITAL GND					X2	M2
A29.AI 12					X2	M1
A29.DI.7.B	/96.F6		JOYSTICK STEERING SAFETY CIRCUIT SOLENOID VALVE	DIAGNOSIS	X3	A4
A29.DI6.B					X3	A3
A29.DI5.B					X3	A2
A29.PWM 1	/93.F3		GROUND	GROUND	X3	A1
A29.DI1.B	/94.F8		JOYSTICK STEERING ARMREST SWITCH	SIGNAL 2	X3	B4
A29.DI4.B					X3	B3
A29.DI3.B	/96.F4		SHUTDOWN	DIAGNOSIS	X3	B2
A29.DI2.B	/94.A6		JOYSTICK STEERING SWITCH ACTIVATION	SIGNAL 2	X3	B1
A29.DI5.B					X3	C4
A29.DI4.B					X3	C3
A29.DI2.B			RESERVE		X3	C2
A29.DI1.B			RESERVE		X3	C1
A29.4 - 20 mA			JOYSTICK STEERING LOAD SENSING PRESSURE SENSOR	INPUT	X3	D4
A29.4 - 20 mA	/95.F3		MAIN SPOOL VALVE POSITION SENSOR	INPUT	X3	D3
A29.4 - 20 mA			STEERING WHEEL ANGLE SENSOR	SIGNAL 2	X3	D2
A29.0 ~ 5V					X3	D1
A29.4 - 20 mA					X3	E4
A29.4 - 20 mA	/93.F2		ARTICULATED JOINT ANGLE SENSOR	SIGNAL 2	X3	E3
A29.4 - 20 mA					X3	E2

Phys. Adr.	Blatt	EA	Beschreibung		Stecker	Pin
A29.CAN 2 Ende					X3	E1
A29.CAN-H 2	/91.C5		CAN HIGH 3	CAN HIGH 3	X3	F4
A29.CAN-H 2	/91.D5		CAN HIGH 3	CAN HIGH 3	X3	F3
A29.CAN-L 2	/91.D6		CAN LOW 3	CAN LOW 3	X3	F2
A29.CAN-L 2	/91.C6		CAN LOW 3	CAN LOW 3	X3	F1
A29.PWM 2					X3	G4
A29.V-BATT PWM	/93.E4		POWER SUPPLY	OUTPUTS	X3	G3
A29.GND	/92.F7		GROUND	GROUND	X3	G2
A29.V-BATT	/92.F6		POWER SUPPLY	T. 15	X3	G1
A29.GND					X3	H4
A29.GND PWM1 + 2					X3	H3
A29.GND - S					X3	H2
A29.V-BATT S					X3	H1



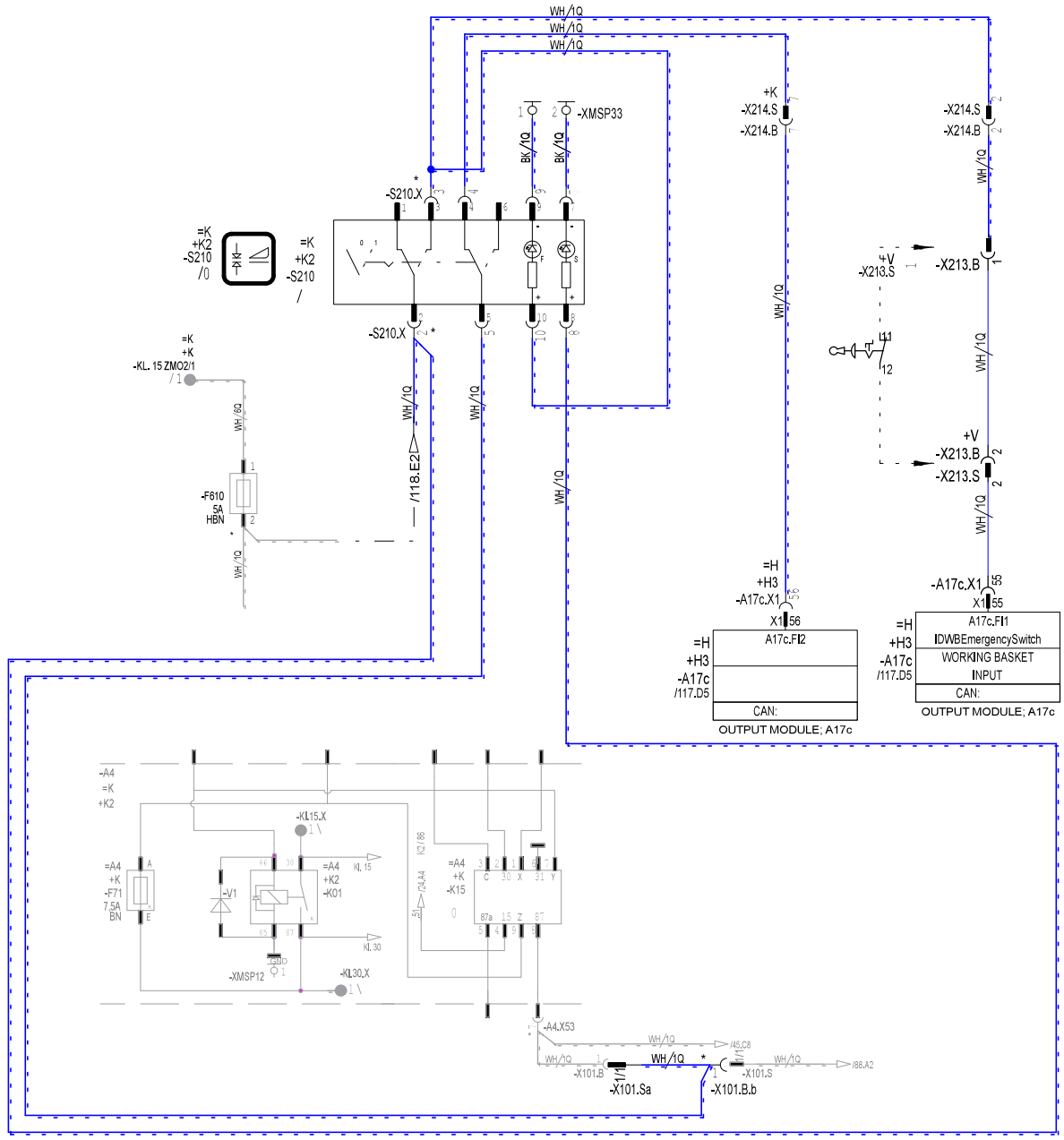
Pinbelegung Joystick - Logikgehäuse / Stecker Braun		Joystick	Prozessor Signal
1A	MOSI0 A	Sensor 1 / J3	MOSIO0_A Linie 1
2A	0V	Sensor 1 / J3	
3A	SCLK0 A	Sensor 1 / J3	SCLK0_A Linie 1
4A	0V	Sensor 1 / J3	
1B	SS1n A	Sensor 1 / J3	SS1n Linie 1
2B	5V A	Sensor 1 / J3	
3B	MOSI1 A	Sensor 2 / J4	MOSIO1_A Linie 1
4B	0V	Sensor 2 / J4	
1C	SCLK1 A	Sensor 2 / J4	SCLK1_A Linie 1
2C	0V	Sensor 2 / J4	
3C	SS3n A	Sensor 2 / J4	SS3n Linie 1
4C	5V A	Sensor 2 / J4	
1D	MOSI0 B	Sensor 1 / J3	MOSIO0_A Linie 2
2D	0V	Sensor 1 / J3	
3D	SCLK0 B	Sensor 1 / J3	SCLK0_A Linie 2
4D	0V	Sensor 1 / J3	
1E	SS1n B	Sensor 1 / J3	SS1n Linie 2
2E	5V B	Sensor 1 / J3	
3E	MOSI1 B	Sensor 2 / J4	MOSIO1_A Linie 2
4E	0V	Sensor 2 / J4	
1F	SCLK1 B	Sensor 2 / J4	SCLK1_A Linie 2
2F	0V	Sensor 2 / J4	
3F	SS3n B	Sensor 2 / J4	SS3n Linie 1
4F	5V B	Sensor 2 / J4	
1G	V+ kap	kap. Sensor A	
4G	I_in	kap. Sensor A	XAIN 6 A/B Linie 1
1K	5V B Taste		
4K	Taste 1	J2 B (Logikplatine)	Digin4 A/B Linie 2
3K	Taste 2	J2 B (Logikplatine)	Digin5 A/B Linie 2
2K	Taste 3	J2 B (Logikplatine)	Digin6 A/B Linie 2
3J	FNR rückwärts, Signal 1 (FNR3, Öffner Unten)	J2 A (Logikplatine)	Digin6 A/B Linie 1
1J	FNR vorwärts, Signal 1 (FNR1, Öffner Oben)	J2 A (Logikplatine)	Digin4 A/B Linie 1
4J	FNR rückwärts, Signal 2 (FNR4, Schließer Unten)	J2 A (Logikplatine)	Digin7 A/B Linie 1
2J	FNR vorwärts, Signal 2 (FNR2, Schließer Oben)	J2 A (Logikplatine)	Digin5 A/B Linie 1
1H	5V A Taste		
4H u. 4M	PWM1_B	Versorgung Magnetpulverbremse	[illegible]
3H u. 3M	PWM2_B	Reserve	[illegible]
2G	0V	0V Magnetpulverbremse	
3G	0V		
2H u. 2M	Hupentaste	Präferenz nicht verdrahtet	Digin9 A/B Linie 2
1L	Speisung 24V Hupe	Präferenz nicht verdrahtet	
1M	Ausgang Hupe	Präferenz nicht verdrahtet	
2L	Digitaleingang 9.A, max 48 V, intern	Präferenz nicht verdrahtet	Digin9 A/B Linie 1
3L	Digitaleingang 8.B, max 48 V, intern	Präferenz nicht verdrahtet	Digin8 A/B Linie 2
4L	Digitaleingang 8.A, max 48 V, intern	Präferenz nicht verdrahtet	Digin8 A/B Linie 1

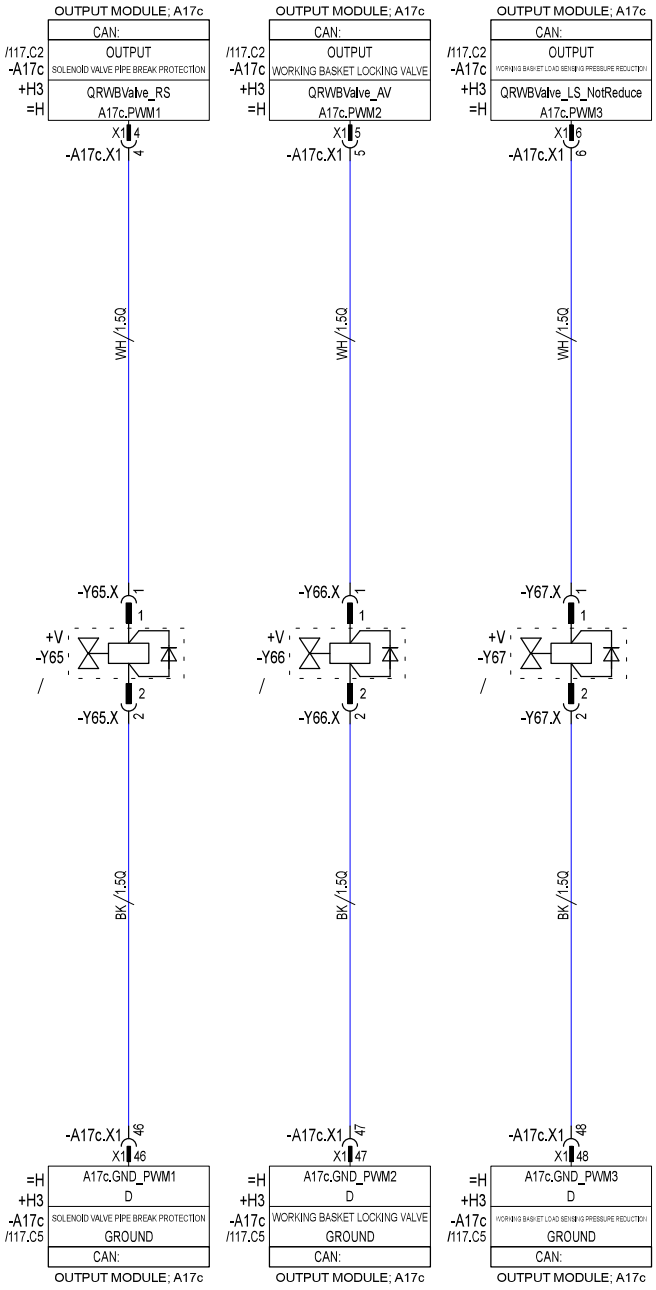


PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00
ITEM CODE 12466553
DRAWING INDEX 000

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

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

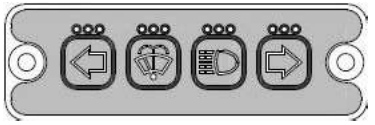




MACHINE TYPE	SERIAL NUMBER		
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	OPTION WORKING BASKET ELECTRICAL SCHEMATIC;

PAGE 119 OF
CREATION DATE 09.10.2019 15:49

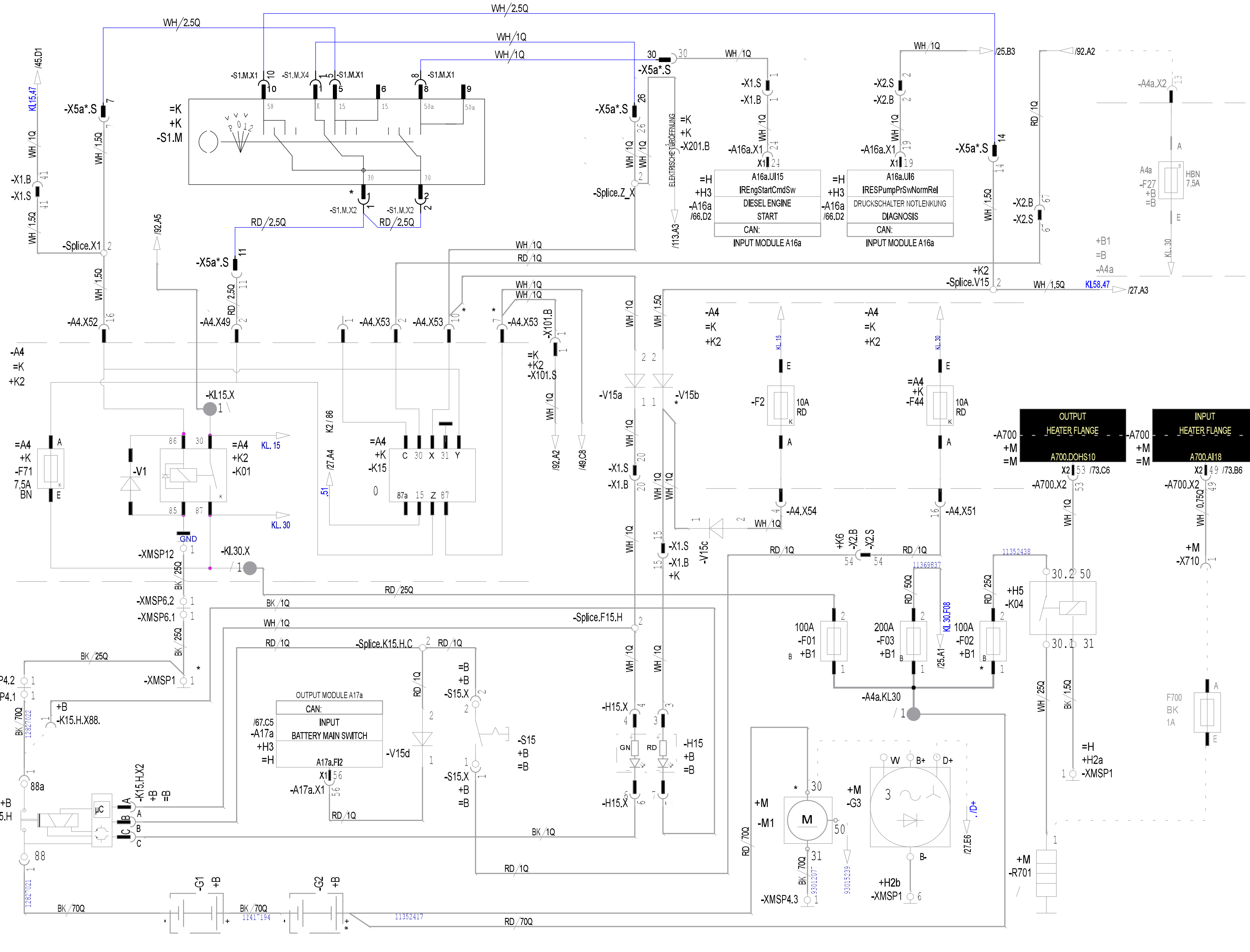
KEYPAD 1



=K
+K4
-A36

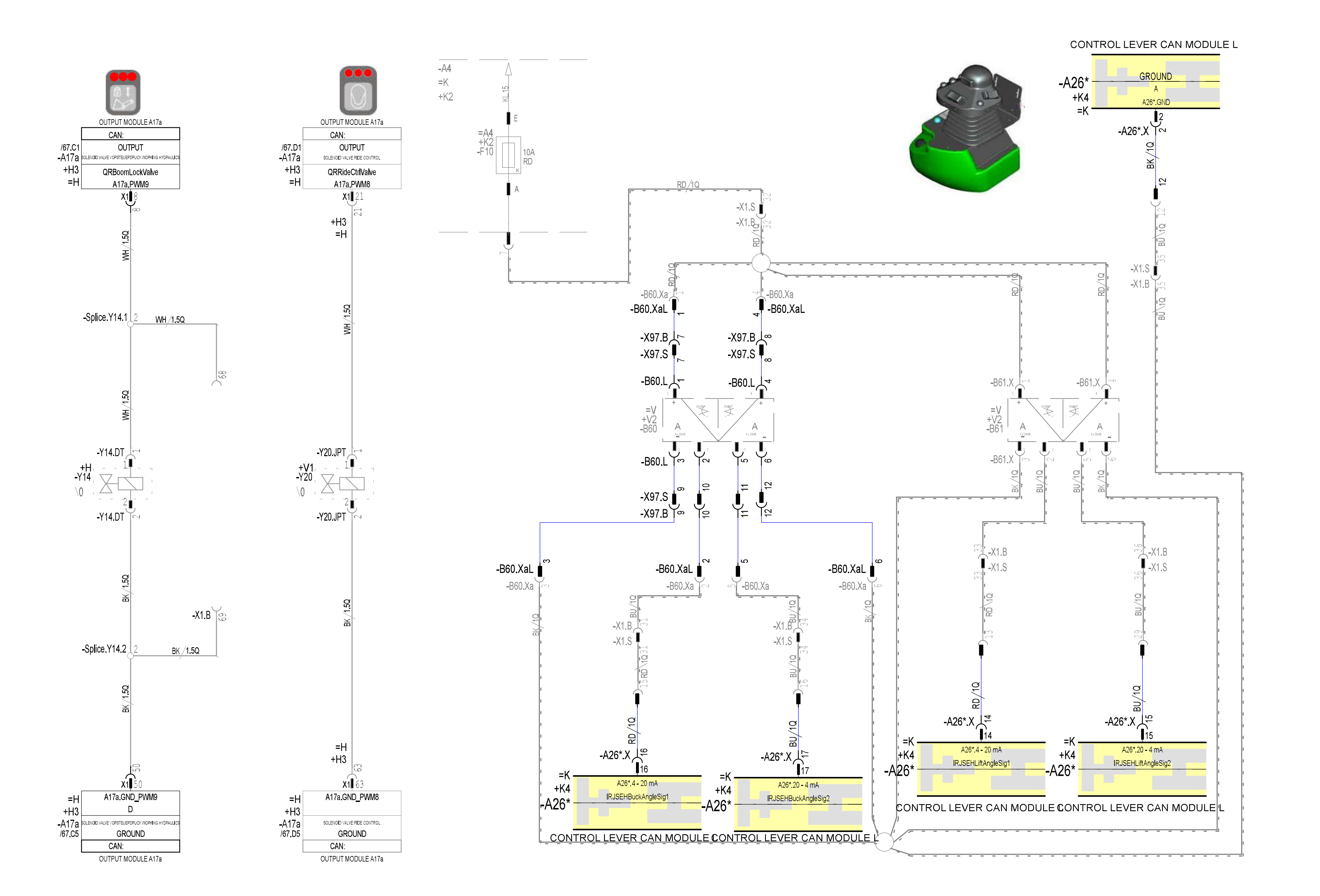
ADDRESS	TYPE	PAGE	DESCRIPTION		CONNECTOR	PIN
A36.1		/128.E8	CAN LOW	CAN LOW	X	1
A36.2		/128.E7	CAN HIGH	CAN HIGH	X	2
A36.3			CAN TERMINATOR	CAN TERMINATOR	X	3
A36.4			GROUND	GROUND	X	4
A36.5			S3_IN	INPUT	X	5
A36.6			S4_IN	INPUT	X	6
A36.7			CAN LOW	CAN LOW	X	7
A36.8			CAN HIGH	CAN HIGH	X	8
A36.9		/128.D1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

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



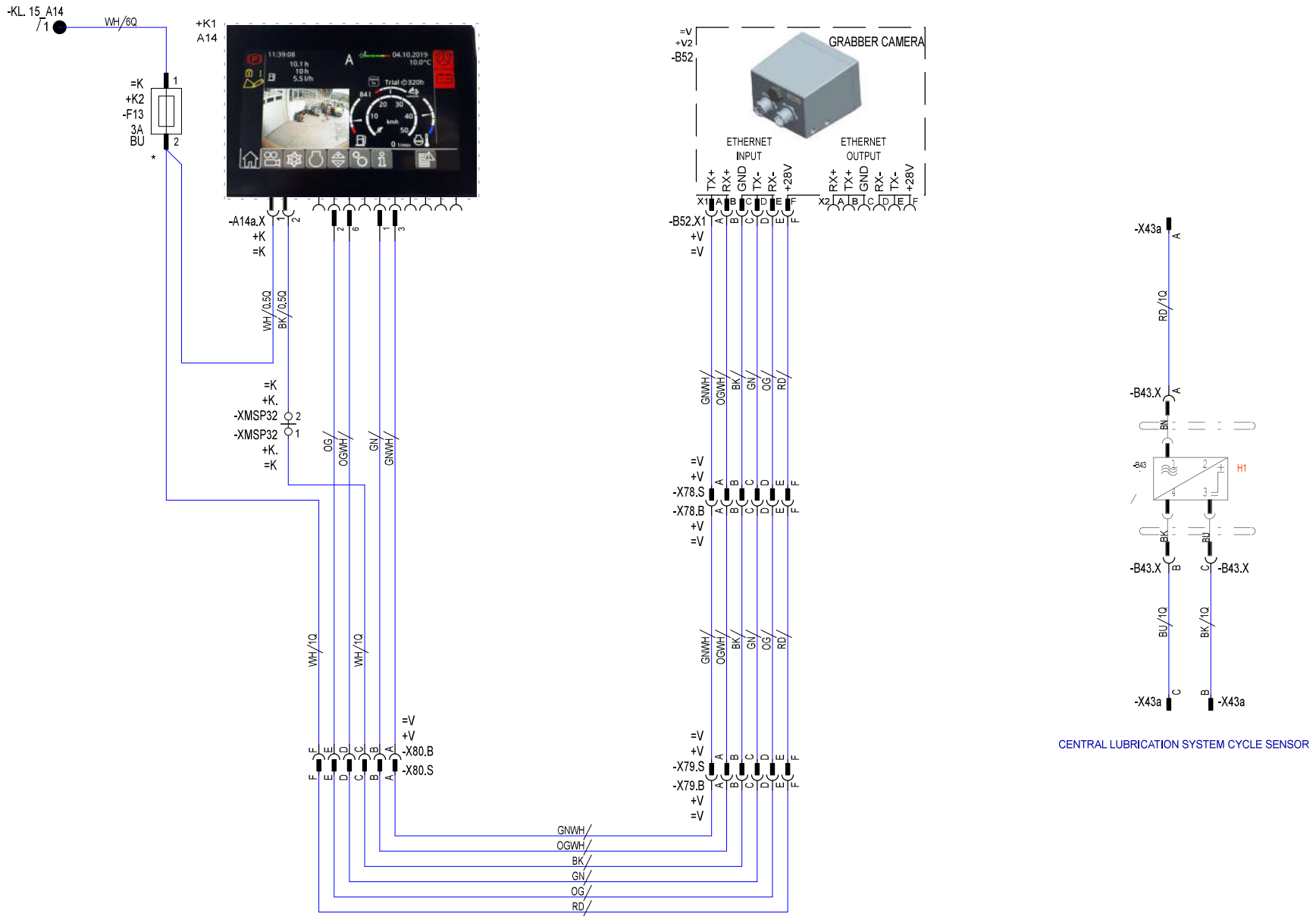
MACHINE TYPE	SERIAL NUMBER			PAGE 139 OF
LIDOS Gerät	**XXXXX**	**LIEBHERR** FACTORY LBH	VERSION 1 MULTI-LEVER CONTROL STARTING SWITCH ELECTRICAL SCHEMATIC;	CREATION DATE 09.10.2019 15:49

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



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

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

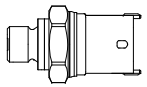


CENTRAL LUBRICATION SYSTEM CYCLE SENSOR

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

TYPE MOTOR_SPL

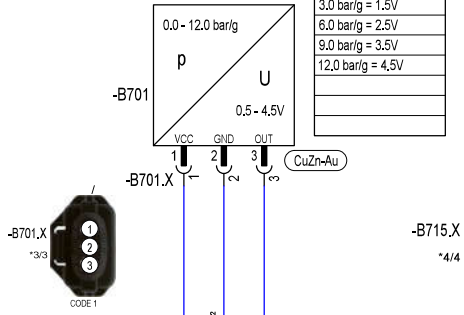
PROJECT: 11392210

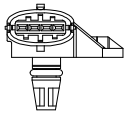


OIL PRESSURE SENSOR

REPAIR KIT: 11428910

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

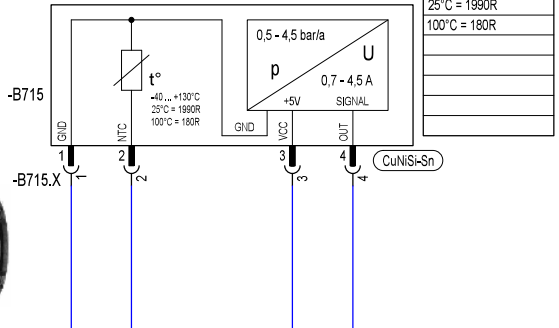


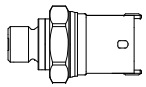


CHARGE AIR TEMPERATURE & PRESSURE

REPAIR KIT: 11357960

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

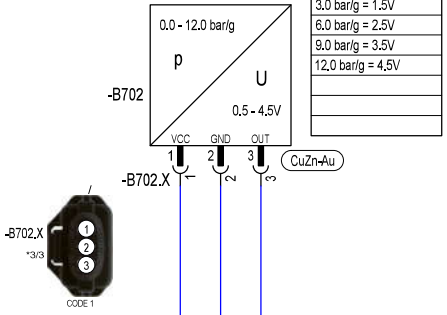




FUEL PRESSURE SENSOR

REPAIR KIT: 11428910

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



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

2 Function

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

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

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

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

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

For more information see the section on addressing the CAN modules. (For more information see: Addressing CAN module and checking system information, page 030-234)

110.4.2 Central control unit (Master5-Premium)

Valid for: L586-1761;

1 Function

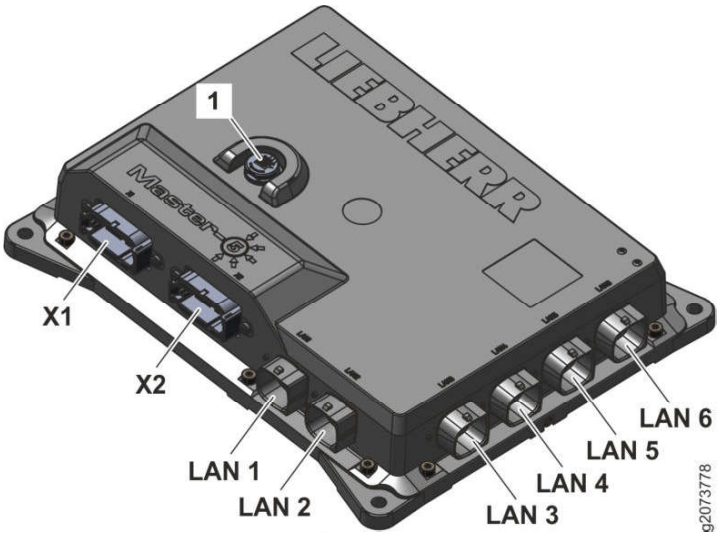


Fig. 492: Central control unit (Master5-Premium)

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

Tab. 207: Items

LBH/12252628/03/211-20200327_070249/en

110.5 Electrical components of the driver's cab

110.5.1 Fuse and relay boards

Valid for: L586-1761;

1 Fuse and relay board A4

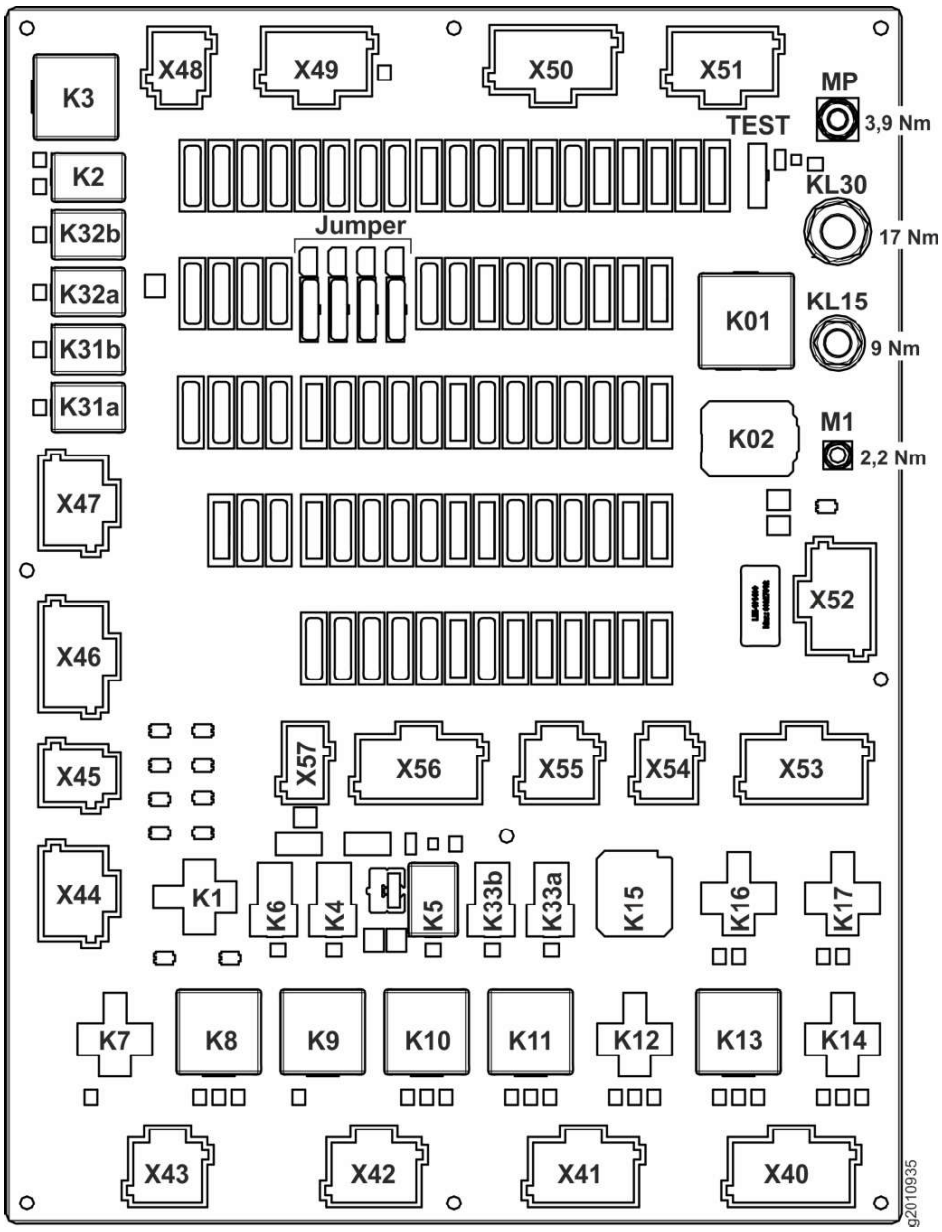


Fig. 502: Fuse and relay board

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

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

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

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

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

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

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

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

Tab. 221: Operating statuses

LBH/12252628/03/211-20200327_070249/en

2.3 Hydrostat and planetary carrier

2.3.1 Machine at a standstill, travel direction selected

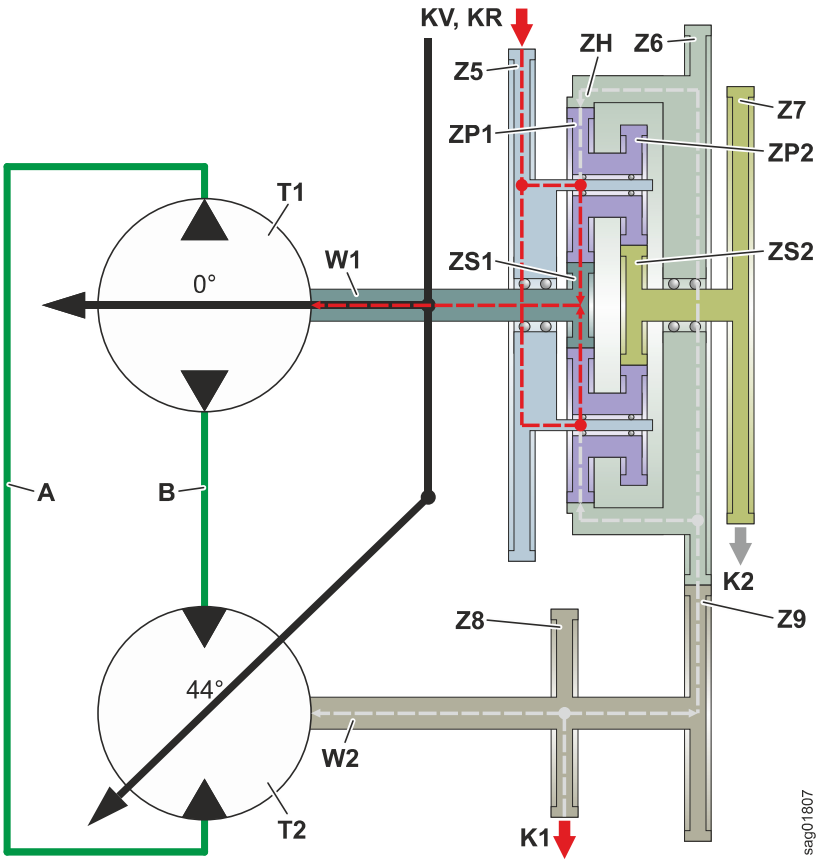


Fig. 517: Machine at a standstill, travel direction selected

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

Tab. 230: Key

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

LBH/12252628/03/211-20200327_070249/en

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

Tab. 236: Equipment codes

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

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

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

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

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

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

2.2 Proportional solenoid valves for couplings

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

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

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

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120.3 Transmission electronics

120.3.1 Overview of electrical control system of transmission

Valid for: L586-1761;

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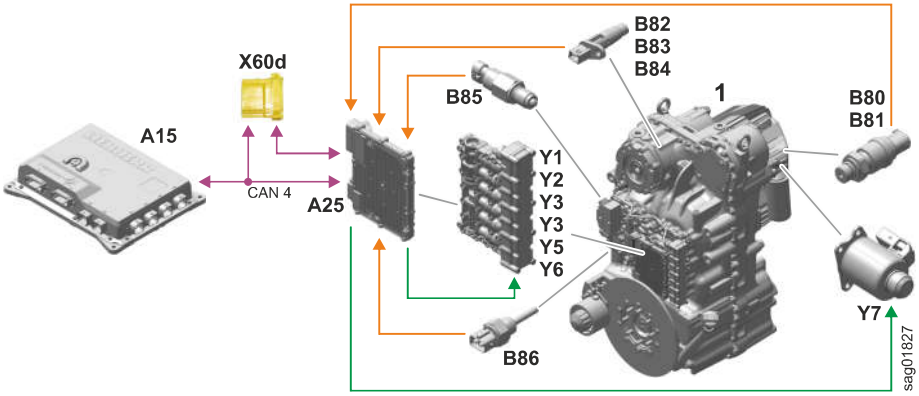

Fig. 531: Diagram

1 Transmission

BMK	Function	BMK	Function
A15	Central control unit	**X60d**	Diagnostic connector for transmission (not used)
A25	Transmission control unit (TCU)	**Y1**	Proportional solenoid for clutch 2 (K2)
B80	Pressure sensor for duct AB	**Y2**	Proportional solenoid for forward travel direction clutch (KV)
B81	Pressure sensor for duct A	**Y3**	Proportional solenoid for 1st optional connection
B82	Speed sensor for sun gear 2	**Y4**	Proportional solenoid for reverse travel direction clutch (KR)
B83	Output speed sensor	**Y5**	Proportional solenoid for clutch 1 (K1)
B84	Speed sensor for reverse travel direction clutch	**Y6**	Proportional solenoid for 2nd optional connection
B85	Filter bypass switch	**Y7**	Proportional solenoid for position control
B86	Gear oil temperature sensor		

Tab. 244: Equipment codes

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

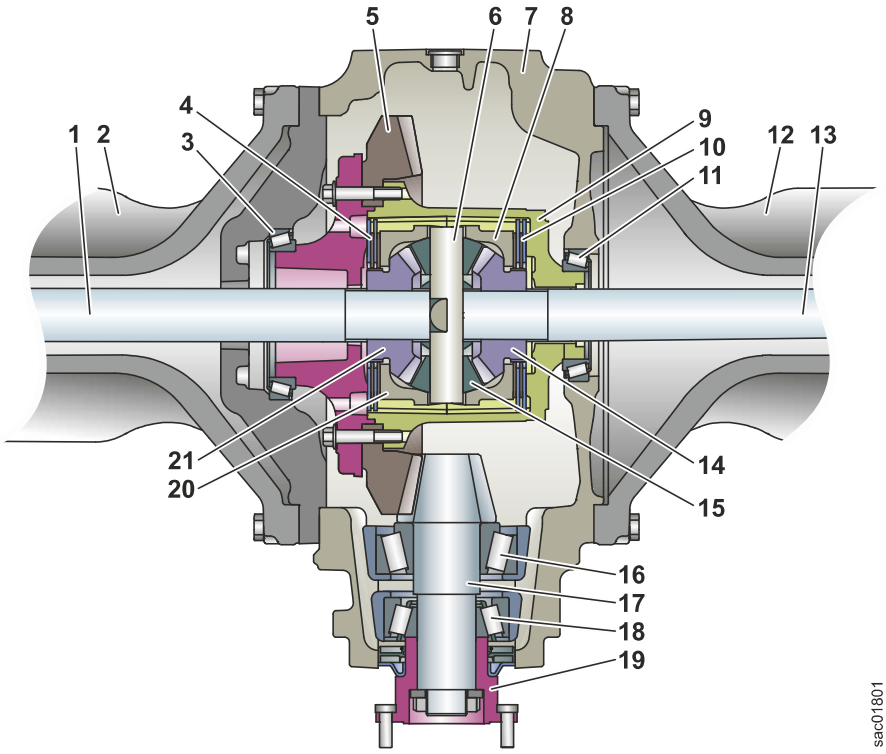

Fig. 540: Central housing with self-locking differential: sectional view

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

140 Steel parts of the basic machine

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150.2.2 Quick coupler hydraulics

150.2.2.1 Overview of quick coupler hydraulics

Valid for: L586-1761;

1 Layout

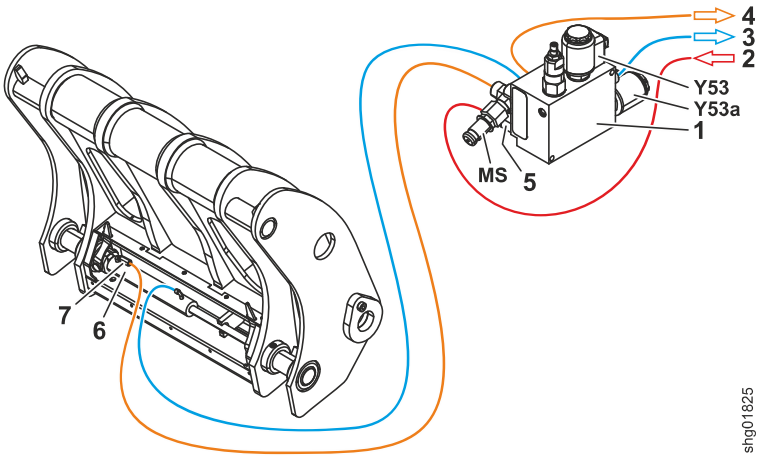

Fig. 555: Overview of quick coupler hydraulics (from front left)

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 Check valve
6 Quick coupler locking hydraulic cylinder
7 Preload valve 15 bar

Name	Test point
MS	Quick coupler closing pressure

Tab. 257: Test points

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

Tab. 258: Equipment codes

Quick coupler hydraulics consist of following components:
– Valve block for quick coupler (For more information see: Valve block for quick coupler, page 150-7)
– Quick coupler locking hydraulic cylinder

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Entry to operator's cab is via cab access and door on left.

2.2 Strength according to ROPS/FOPS

Operator's cab is a safety cab which is tested and approved in accordance with ROPS/FOPS.

ROPS (roll over protective structure) refers to mechanical rigidity in event of vehicle falling over.

FOPS (falling object protective structure) refers to rigidity of cab on event of objects falling onto it.

For more information on ROPS/FOPS regulations: (For more information see: Roll over protective structure (ROPS), page 010-13) (For more information see: Falling object protective structures (FOPS), page 010-13)

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Malfunction	Cause	Remedy
Not enough cooling	Not enough refrigerant in the air conditioning circuit	Correct the refrigerant level
	Air in the air conditioning circuit	Evacuate and refill the air conditioning unit
	Expansion valve blocked	Check the expansion valve
	Condenser blocked	Check the condenser
	Valve plates in the air conditioning compressor are defective	Check the valve plates

Tab. 269: Air conditioning: Troubleshooting

160.3.2 Heating and air conditioning unit

The refrigerant expands. The expansion reduces the pressure energy in the refrigerant and quickly cools the evaporator.

The evaporator **10** is exposed to hot air from the cab and transfers the heat to the refrigerant. This thermal exchange cools the cab air and heats the refrigerant.

The heated refrigerant evaporates and turns to gas. This change of state requires additional energy from the (warm) evaporator, which further reduces the temperature.

The warmed, gaseous refrigerant is drawn in by the air conditioning compressor **1** again.

160.4.2 Air conditioning compressor

Valid for: L586-1761;

1 Layout

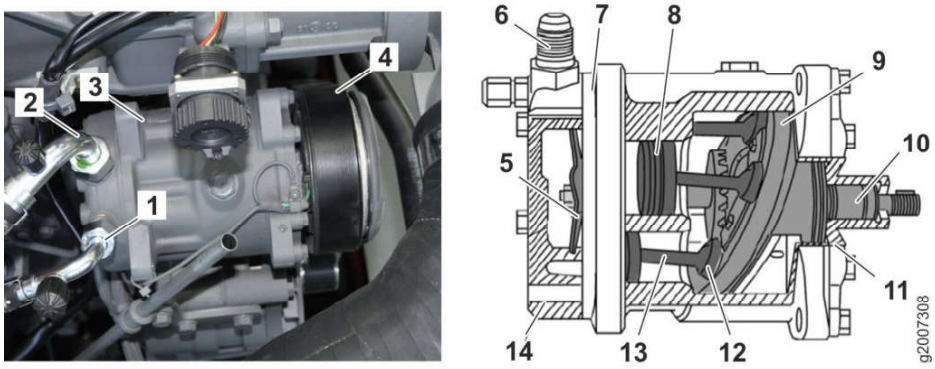

Fig. 579: Sectional view of air conditioning compressor

1	Outlet port	**8**	Piston
2	Intake port	**9**	Swash plate
3	Housing	**10**	Shaft with axial face seal
4	Compressor coupling Y22 with pulley	**11**	Cover with guide hub
5	Intake and discharge valve	**12**	Bearing
6	Screw connection	**13**	Connecting rod
7	Valve plate		

The air conditioning compressor with magnetic coupling is attached to the engine and driven by a V-ribbed-belt.

2 Function

The air conditioning compressor acts as a pump, drawing in refrigerant in a gaseous condition from the evaporator, compressing it and delivering it to the condenser.

Note

To prevent the axial face seal of the shaft **10** from drying out, the air conditioning compressor should be started up once a month, even when it is cold outside.

2.1 Overall system

The electrically powered central lubrication pump delivers the grease to the main progressive distributor and distributes it to the secondary progressive distributors. Each secondary progressive distributor delivers the grease to its lubrication points. The central control unit (Master4) controls the set lubrication and pause times of the central lubrication pump.

2.2 Progressive lubrication

The automatic central lubrication system is a progressive system. It lubricates progressively. That means the lubrication points are lubricated in succession.

2.3 Diagram of Liebherr automatic central lubrication system

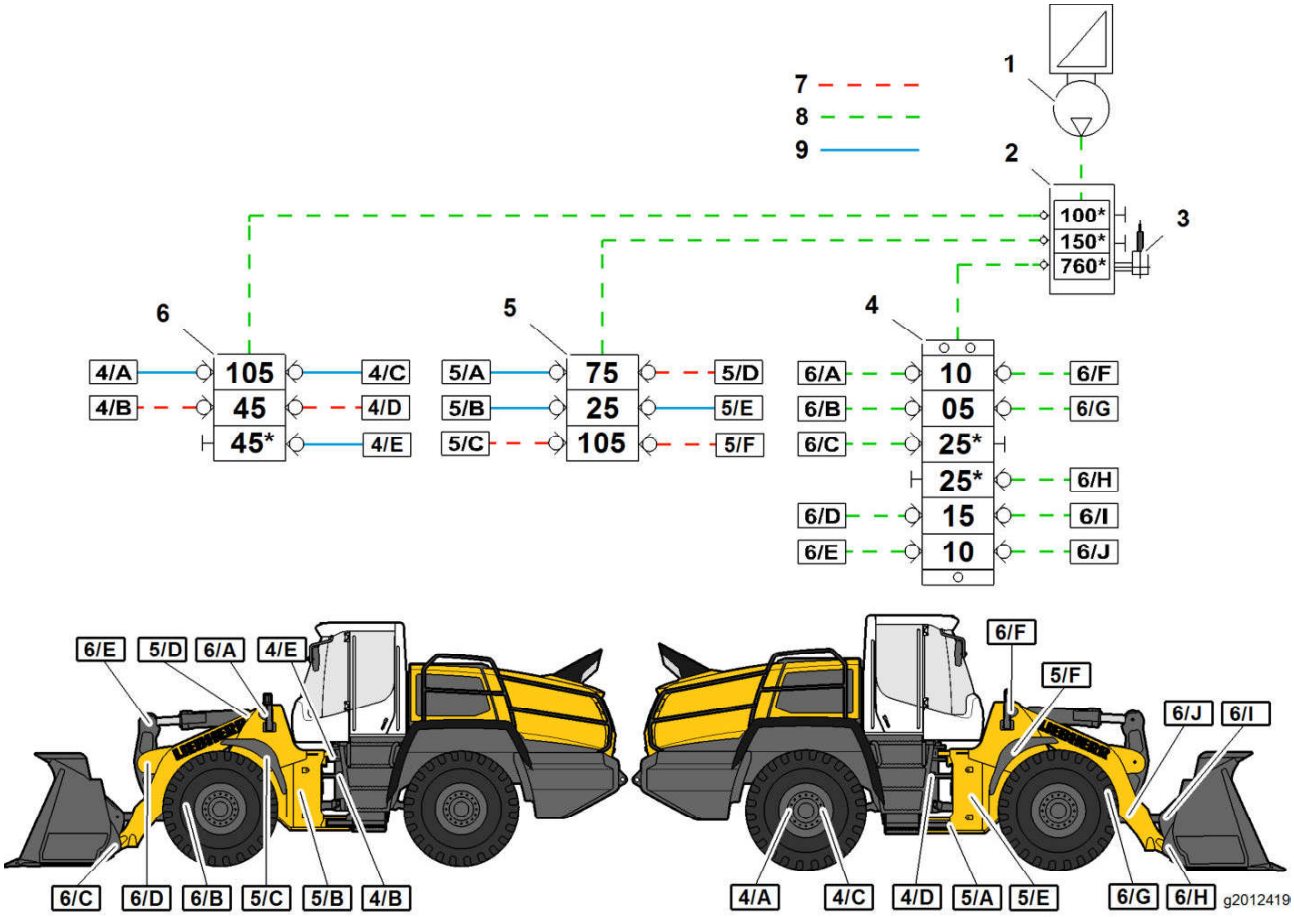

Fig. 586: Diagram of the central lubrication system with overview of lubrication points (Z-kinematics)

1	Central lubrication pump	**4**	Secondary progressive distributor 6	**7**	High pressure hose (NW4)
2	Main progressive distributor	**5**	Secondary progressive distributor 5	**8**	High pressure hose (NW6)
3	Pulse generator	**6**	Secondary progressive distributor 4	**9**	Polyamide pipe

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

The distributors must always be installed in a horizontal position.

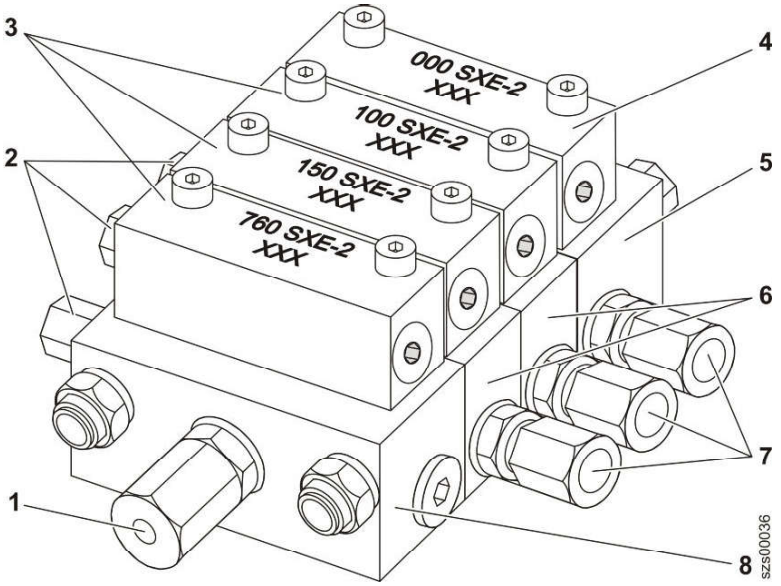

Fig. 598: Progressive distributor

1	Grease intake	**5**	Basic end element
2	Outlets to lubrication points and distributors	**6**	Basic middle element
3	Metering elements	**7**	Outlets to lubrication points and distributors
4	Dummy element	**8**	Basic initial element

The progressive distributor consists of a number of distributor plates connected together by tie rods with washers and nuts. The metering elements are fasten to the basic elements with hex socket screws. The individual elements are sealed with O-rings.

2 Function

2.1 Basic function

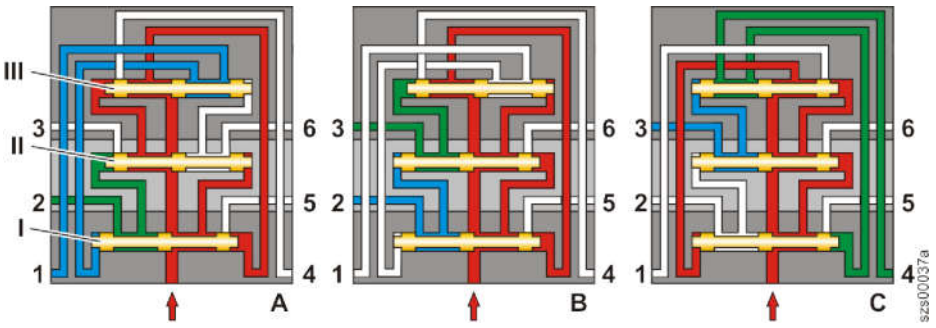

Fig. 599: Piston settings for the progressive distributor SXE-2

A-C	Piston positions	**1-6**	Grease channel outlets
I-III	Piston		

The LiDAT module is equipped with an internal rechargeable battery **1**. The battery is charged using the battery voltage when terminal 30 is activated (battery main switch ON).

The charge status of the battery is monitored internally. If the battery is fully charged or damaged, the charging process is stopped.

1.5 Status display with indicator lamp (LED)

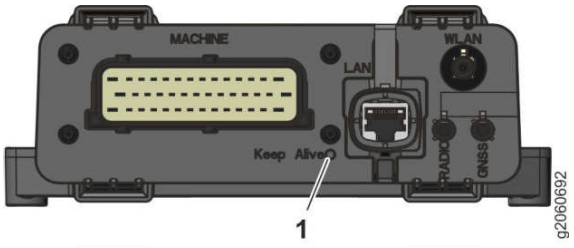

Fig. 607: Status display with indicator lamp (LED)

1 Indicator lamp (LED)

Indicator lamp (LED) **1** signals operating status of LiDAT module.

Colour	Code	Status
Green	Flashes, 1 second on, 1 second off	OK, application runs on terminal 30.
Green	Flashes, 1 second on, 10 second off	OK, application runs on internal rechargeable battery (optional).
Green	Steady light	Starts or shuts down.
White	Steady light	Application is restored or an update is performed.
Yellow	Steady light	There are non-critical errors.
Yellow	Flashes, 1 second on, 1 second off	No W-LAN reception (optional).
Red	Flashes, 1 second on, 1 second off	Critical error
Blue	Flashes, 1 second on, 1 second off	No GNSS reception.
Magenta	Flashes, 1 second on, 1 second off	No GSM reception.

Tab. 277: Status display with indicator lamp (LED)

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2.2 Remote control

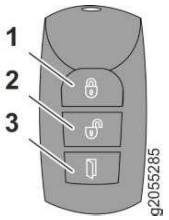

Fig. 625: Remote control

1 *Lock* button
2 *Unlock* button
3 *Unlock and open* button

Remote control sends encrypted signals to receiving unit and control unit.

Remote control is powered by a replaceable button battery inside case.

Remote control and receiving unit and control unit are programmed at factory before delivery. Programming is performed using a programming code. Programming code is enclosed on a label of remote control on delivery.

If a remote control is defective or lost, a new remote control can be requested from factory. Programming is performed using corresponding programming code.

If programming code is lost, a new programming code must be requested. If a new programming code is needed, remote control and receiving unit and control unit must be reprogrammed.

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