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.

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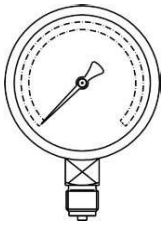
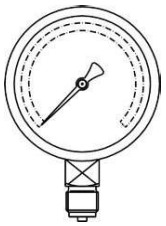
010.2 Special tools for maintenance and repair work

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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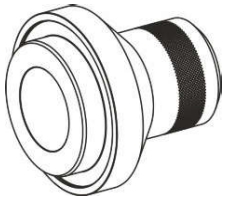
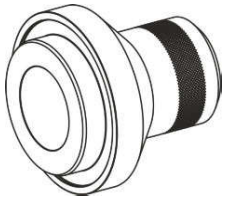
010.2.10 Special tools for front axle

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	

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Metric standard threads and fine threads				Metric standard threads and fine threads			
At least one element of the bolted joint (bolts, washers, nuts etc.) with the following surface: flZn = zinc flake coating (LH standard 10021432, LH standard 10215295 flZnnc-480h-L valid ≥M6)				All elements of the bolted joint (bolts, washers, nuts etc.) with the following surface: Black oxide or phosphated Galvanised (LH standard 10215295 Fe// ZnNi(12)5//Cn//T2)			
Minimum total coefficient of friction μ_G= 0.09				Minimum total coefficient of friction μ_G= 0.11			
Thread	Strength class	Assembly prestressing forces F_M in kN	Tightening torques M_A in Nm	Thread	Strength class	Assembly prestressing forces F_M in kN	Tightening torques M_A in Nm
M 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

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 the following requirements are met:
❑ 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

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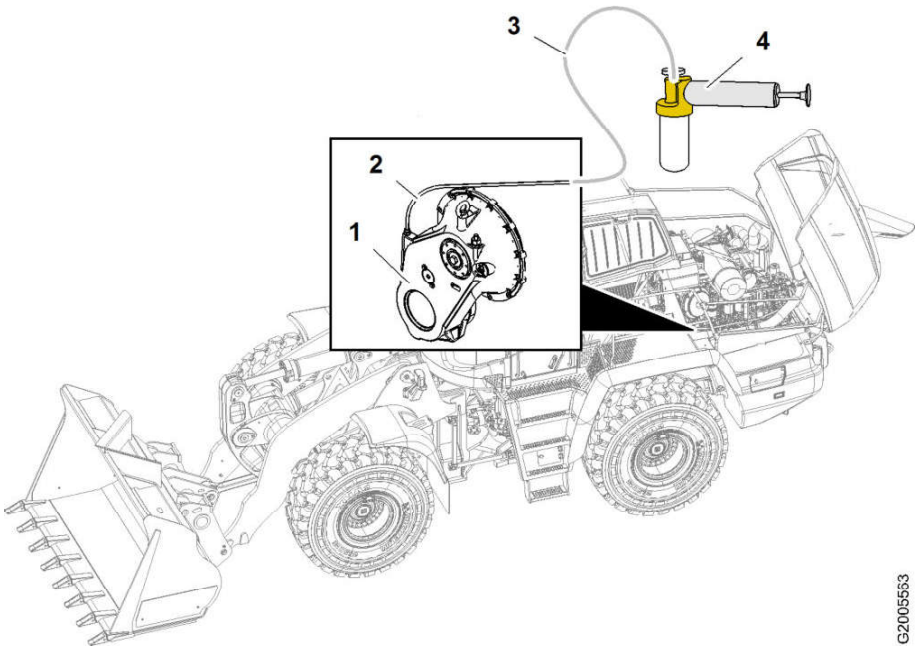

Fig. 97: Sampling point on the splitter box

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.

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▷ *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.

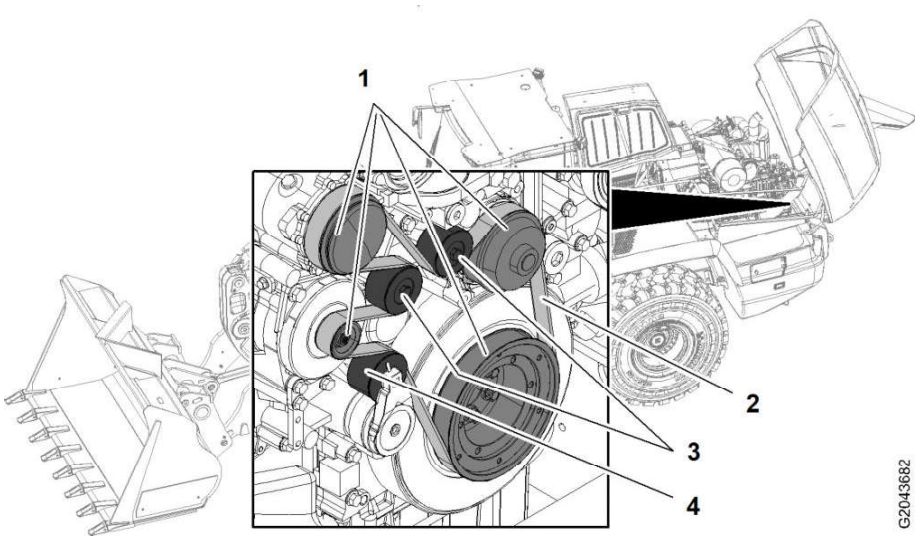

Fig. 107: Checking diesel engine belt drive

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

▶ Check V-ribbed belt **2** for damage.

- ▶ 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.

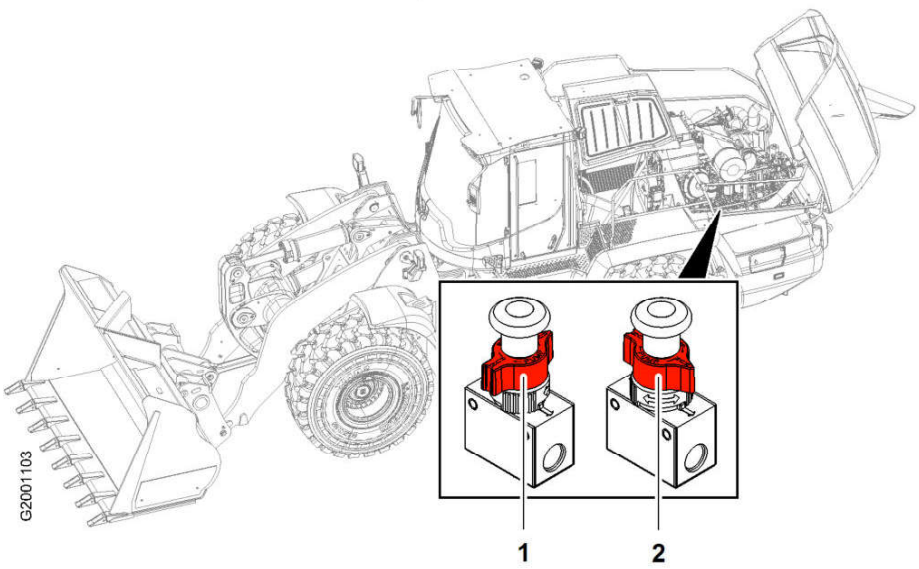

Fig. 117: Bleeding fuel system

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.

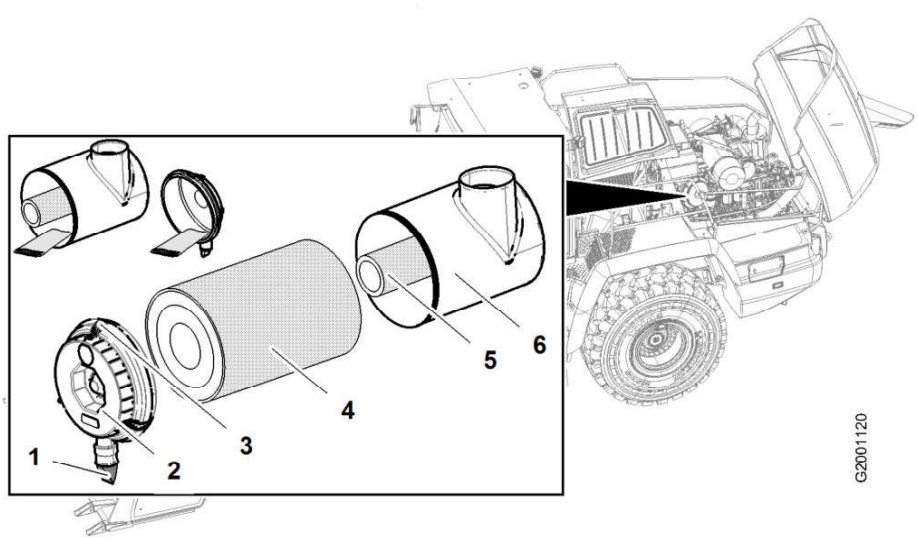

Fig. 127: Air filter: Changing the safety element

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 Splitter box: Checking the oil level

Valid for: L586-1761;

The dipstick and the oil filler pipe are located in the engine compartment beside the air filter. Access is from above the engine on the left-hand side.

Checking the oil level

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

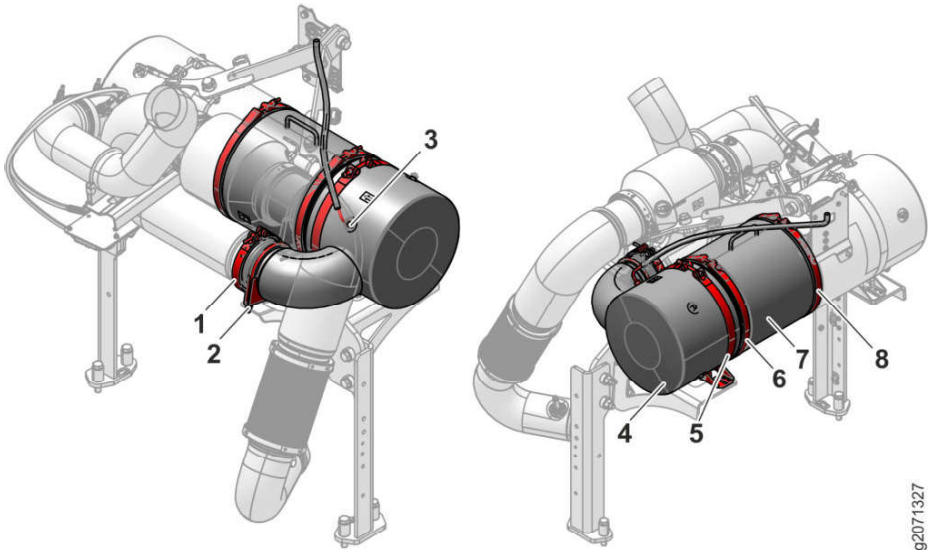

Fig. 136: Changing filter module

1	Profile clip	**5**	Hinge strap bracket
2	Bolt clamp	**6**	Profile clip
3	Differential pressure line	**7**	Filter module
4	Output module	**8**	Profile clip

- ▶ Secure filter module **7** against falling down with a securing element (wooden block, sling, support).
- ▶ Release profile clip **1**.
- ▶ Release bolt clamp **2**.
- ▶ Release differential pressure line **3**.
- ▶ Release hinge strap bracket **5**.
- ▶ Release profile clip **6**.
- ▶ Remove output module **4**.
- ▶ Release profile clip **8**.
- ▶ Take out filter module **7**.

Installing filter module

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

Make sure that following components are ready:
- ❑ New or cleaned filter module.
- ❑ New seals and profile clips.

Note

- ▶ Replace profile clips and seals with new parts after each release.

Checking the corrosion inhibitor concentration

In exceptional circumstances, the machine can be filled with corrosion inhibitor without antifreeze.

Note
Corrosion inhibitor without antifreeze may only be used in exceptional cases.

- ▶ Only use corrosion inhibitor without anti-freeze when no approved antifreeze and corrosion agent is available and the ambient temperature is above freezing all year round.
- ▶ If in doubt, contact the technical customer service department.

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

Make sure that following tools are ready:
- ❑ Refractometer with Brix scale
- ❑ Drain hose
- ❑ Receptacle

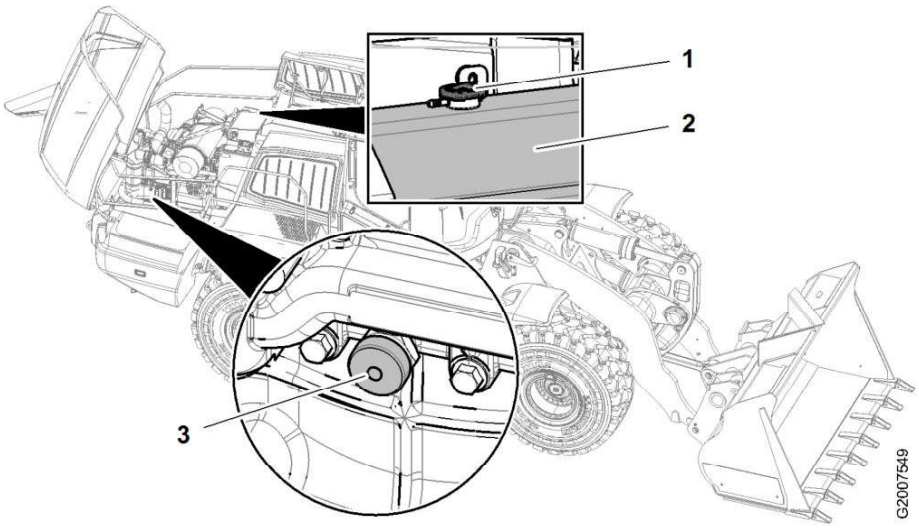

Fig. 144: Checking the corrosion inhibitor concentration

1 Cap
2 Equalising reservoir
3 Drain valve

CAUTION
Hot. pressurised liquid!
Beware of burns.

- ▶ Let the engine cool down.

- ▶ Open the cap **1** of the equalising reservoir **2**.

Checking the corrosion inhibitor concentration

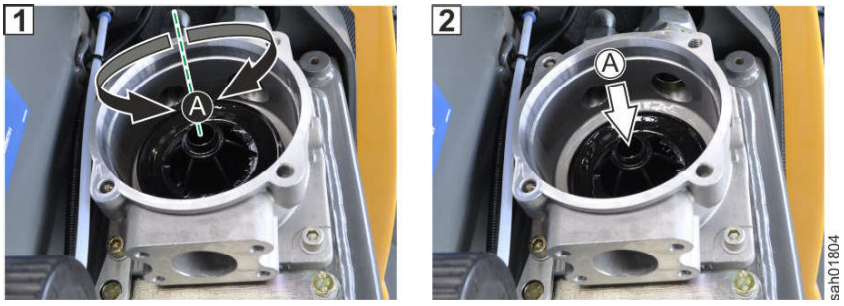

Fig. 154: Putting in the filter insert

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

▶ Make sure the filter insert is put in correctly.

▶ Turn the filter insert until it latches.

▶ Put on the compression spring and filter cover.

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

▶ Screw in the plug.

▶ Tighten the breather filter.

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

030.4.6.4 Changing the hydraulic tank breather filter

Valid for: L586-1761;

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

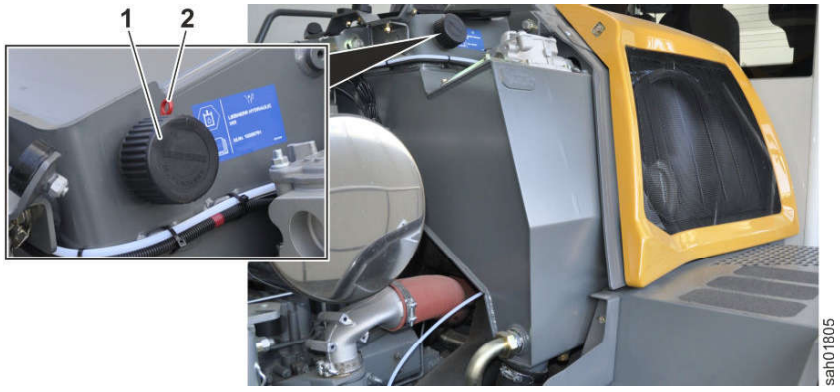

Fig. 155: Changing the hydraulic tank breather filter

1 Breather filter **2** Connector

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

❑ The machine is parked on level ground.

Make sure that the following tools are ready:
❑ Feeler gauge
❑ Laptop with Sculi diagnostic software
❑ Torque wrench

Preparations

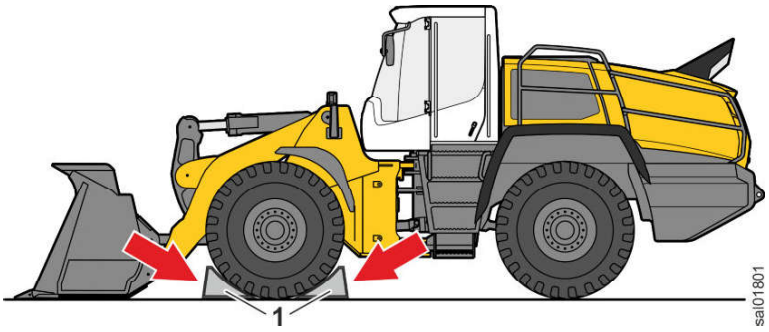

Fig. 167: Using chocks to secure the machine against rolling away

1 Chock

▶ Start the diesel engine.

▶ Turn the steering wheel far left as it will go.
▷ The parking brake is now accessible.

▶ Lay the bucket flat on the ground.

▶ Turn off the diesel engine.

▶ Use chocks **1** to secure the machine against rolling away.

Checking the wear on the brake linings

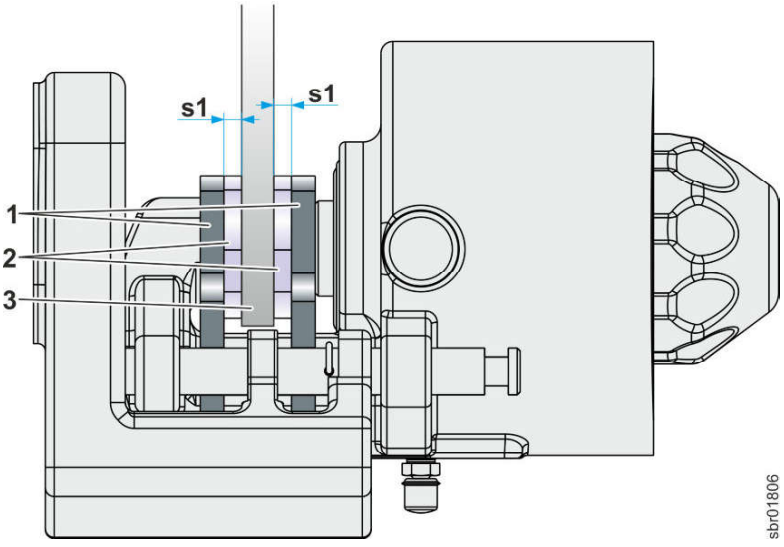

Fig. 168: Checking the wear on the brake linings

1 Brake shoe
2 Brake lining
3 Brake disc
s1 Thickness of the brake lining

Checking the charge level

▶ Check the charge level with a refractometer.

Charge levels				
Acid density at 27 °C (kg/l)	**Charge level**	**Battery voltage**	**Voltage per cell**	**Remark**
1.28 to 1.26	100%	Over 12.60	Over 2.10	Battery OK
1.25 to 1.24	75%	12.54 to 12.40	2.10 to 2.07	
1.24 to 1.18	50%	12.40 to 12.18	2.07 to 2.03	Charge the battery
1.18 >	25%	12.18 >	2.03 >	Battery not OK

Tab. 64: Table of charge levels

If the acid density is below 1.24 kg/l:
▶ Charge the batteries.

If the acid density is below 1.18 kg/l:
▶ Replace the batteries.

030.4.9.3 Control lever: Change the travel direction switch rocker and cap.

Valid for: L586-1761;

Changing the travel direction rocker switch

Note

If joystick steering is installed, the rocker that is used most often must be changed.

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

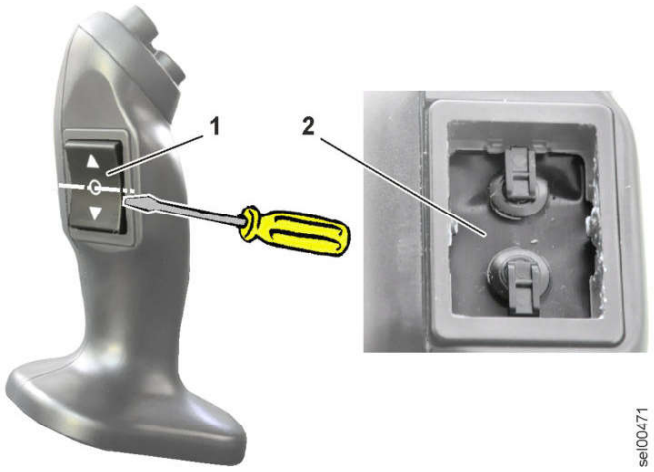

Fig. 176: Changing the travel direction rocker switch

1 Rocker **2** Seal

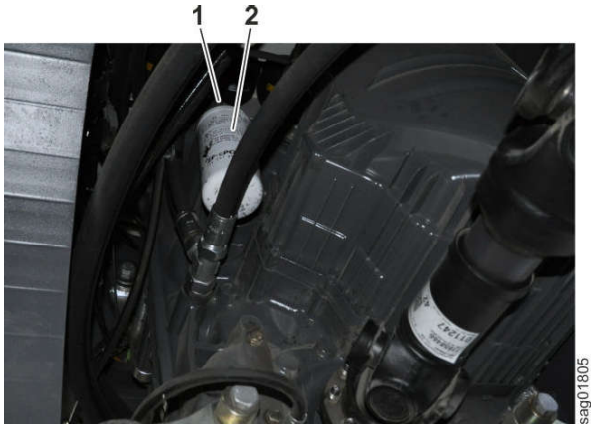

Fig. 186: Changing the transmission hydrostat oil filter

1 Filter bracket **2** Hydrostat oil filter

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

030.4.11 Axles and drive shafts

030.4.11.1 Axles Changing the oil

Valid for: L586-1761;

Make sure that the following requirements are fulfilled:
- ❑ The oil is at operating temperature.
- ❑ The machine is in maintenance position 2.

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

Make sure that the following consumables are ready:
- ❑ Axle oil according to the table of lubricants.

Note
Information on the oil specification:

- ▶ See the section on lubricants and fuels:“ Lubricating oils for axles”.

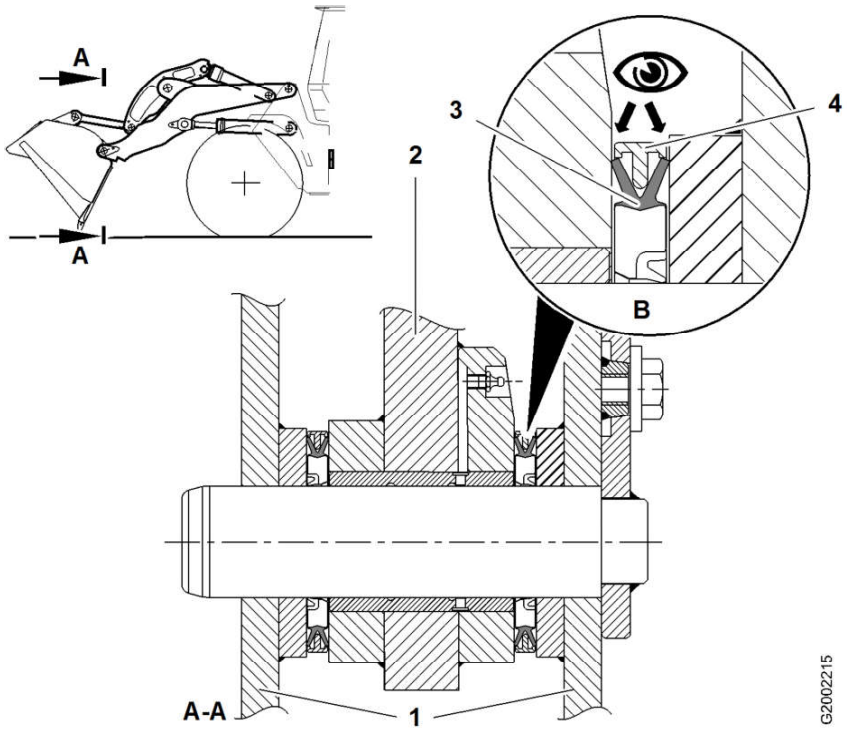

Fig. 198: Lift arms: Checking the bucket bearing seals

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

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

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

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

Note
Replace the bucket bearing seals!

▶ Contact Liebherr customer service.

030.4.13.2 Checking the lift arm bucket bearing bushings

Valid for: L586-1761;

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

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Changing the recirculated air filter

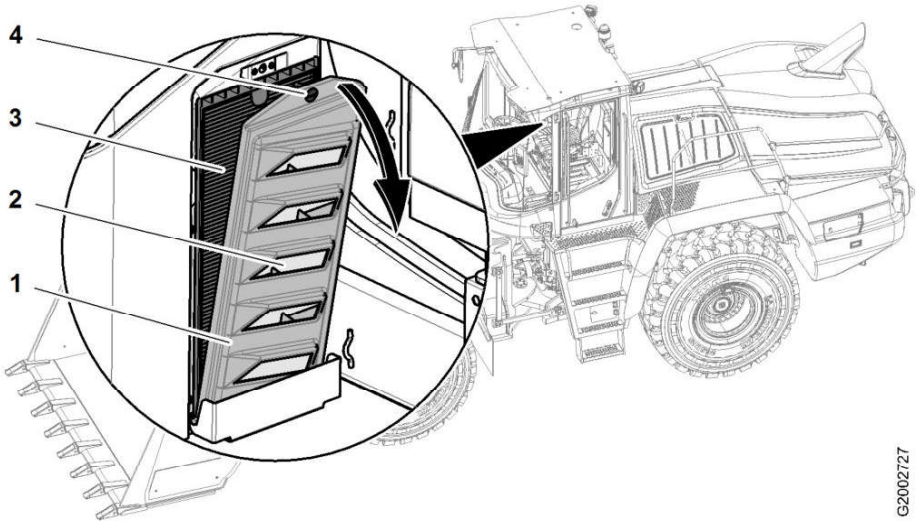


Fig. 208: Cleaning the recirculated air filter

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

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

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

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

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

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

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

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

030.4.14.3 Safety belt: Checking the condition and function

Valid for: L586-1761;

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

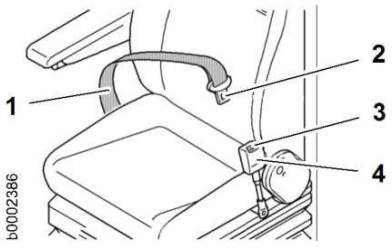


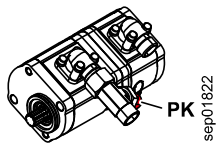
Fig. 209: Safety belt: Checking the condition and function

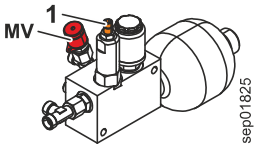
1	Strap	**3**	Unlock button
2	Lug	**4**	Belt lock

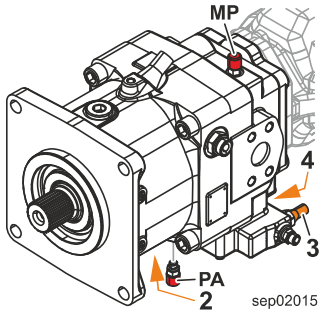
2. Calibrations									
Test / adjustment	**1000 h**	**2000 h**	**Unit**	**Required value**	**Measured**	**Adjusted**	**Adjusting point**	**Test point**	**Figure**
Drive group									
Pedals: calibration									
Manual calibration of accelerator pedal		○							
Manual calibration of inching function		○							

Tab. 69: Calibrations

3. Hydraulic adjustment procedures									
Test / adjustment	**1000 h**	**2000 h**	**Unit**	**Required value**	**Measured**	**Adjusted**	**Adjusting point**	**Test point**	**Figure**
Cooling system									
Fan speed proportional solenoid valve									
Maximum operating pressure	◊	◊	bar	$100^{\pm 10}$				PK	
Pressure relief when proportional solenoid fails	◊	◊	bar	$220^{\pm 20}$				PK	
Working hydraulics									
Pilot control valve block: pressure reducing valve									
Servo pressure	○	○	bar	$33^{\pm 2}$			1	MV	
Working pump: adjusting screw for Q_{min} (standby pressure)									
High pressure at low idling speed	◊	◊	bar	$34^{\pm 2}$			2	PA	
Working pump flow regulator (differential pressure)									
Differential pressure ΔP at 1500 min^{-1} diesel engine speed and float position	◊	◊	bar	$23^{\pm 2}$			3	PA/ LSA	
Working pump: power regulator									
Start of regulation	◊	◊	bar	$180^{\pm 10}$			4	PA/ MP	







030.6.3.2 Reading the diesel engine service files

Valid for: L586-1761;

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

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

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

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

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

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

▶ Connect the LiDIA diagnostics software with the diesel engine.

Fig. 219: “Diagnosis” function

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

Fig. 220: Engine control unit

▶ Select the engine control unit.

▶ The diagnostics software connects to the engine control unit.

Fig. 221: “Snapshot” function

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- ▶ Start the diesel engine.
- ▶ Connect the Sculi diagnostic software to the machine.
- ▶ In the variables editor, select the ***Working hydraulics*** folder.
- ▶ Select the ***Calibrate angle proportional solenoids*** sub-folder.
  - ▷ The variable ***QREHLiftValveUp*** shows the current at the proportional solenoid for lifting.
  - ▷ The variable ***QREHLiftValveDn*** shows the current at the proportional solenoid for lowering.
  - ▷ The variable ***QREHLiftBucketValveUp*** shows the current at the proportional solenoid for tilting in.
  - ▷ The variable ***QREHLiftBucketValveDn*** shows the current at the proportional solenoid for tilting out.
- ▶ Make sure that the parking brake is activated.
- ▶ Raise the lift arms half way.
- ▶ Tilt the bucket half way in.
- ▶ Click the variable ***QREHLiftValveUp*** and press the *space bar*.
  - ▷ The line is coloured pink.
  - ▷ The variable is forced. A gradual approach towards the required value is possible.

Note
To gradually approach the required value:

- ▶ Cursor *up/down*: last digit of the value +/- 1
- ▶ Cursor *left/right*: last digit of the value +/- 5
- ▶ Page *up/down*: last digit of the value +/- 10

- ▶ Increase the value of the variable ***QREHLiftValveUp*** until you notice a slight movement of the lifting function.
- ▶ When the movement starts, read the variable ***QREHLiftValveUp***.
- ▶ Enter the value you read in the variable ***CREHLiftUpCurrMoveBegin***.
- ▶ Unforce the variable ***QREHLiftValveUp***.
- ▶ Repeat the process for the lowering function with the variable ***QREHLiftValveDn***. Enter the value you read in the variable ***CREHLiftDnCurrMoveBegin***.
- ▶ Repeat the process for the tilt-in function with the variable ***QREHBucketValveUp***. Enter the value you read in the variable ***CREHBucketUpCurrMoveBegin***.
- ▶ Repeat the process for the tilt-out function with the variable ***QREHBucketValveDn***. Enter the value you read in the variable ***CREHBucketDnCurrMoveBegin***.

Once all the functions have been calibrated:

- ▶ Turn off the diesel engine.

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

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

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

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

Description	Unit	Value
High pressure **PA** during tilt out **1** function	bar	400 ±5
High pressure **PA** during tilt in **2** function	bar	400 ±5
High pressure **PA** during lifting **3** (main spool valve)	bar	400 ±5
High pressure **PA** during lifting **4** (additional spool valve)	bar	400 ±5
High pressure **PA** for additional function A3 (option)	bar	255 ±5
High pressure **PA** for additional function B4 (option)	bar	255 ±5

If a required value is not reached:

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

▶ Turn off diesel engine and take out ignition key.

▶ Turn adjusting screw of corresponding secondary pressure relief valve.

Note
To adjust secondary pressure relief valves:

▶ Turn adjusting screw clockwise to increase high pressure.

▶ Turn adjusting screw anticlockwise to reduce high pressure.

Note
High pressure during lifting:
Function has two secondary pressure relief valves (main spool valve and additional spool valve). The pressure gauge always shows value of secondary pressure relief valve with lower setting.

▶ If there is a deviation from specified value, adjust both secondary pressure relief valves alternately until required value is reached.

▶ Repeat check and adjustment until required value is reached.

When all required values are reached:

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

▶ Turn off diesel engine and take out ignition key.

▶ Turn adjusting screw on primary pressure relief valve **6** by exactly one turn anticlockwise.

▶ Document the damage and observe whether the condition deteriorates.

If the condition deteriorates:
▶ Replace hydraulic lines immediately.

If the condition does not deteriorate:
▶ Replace the hydraulic line within the next 250 operating hours.

Moist surfaces, slight oil leak visible

Moist spots can be seen on the surface. Slight oil leak or small oil drops are visible. As long as you do not observe a severe oil leak, it is classified as medium damage.

Fig. 239: Moist surfaces, slight oil leak visible

▶ Document the damage and observe whether the condition deteriorates.

If the condition deteriorates:
▶ Replace hydraulic lines immediately.

If the condition does not deteriorate:
▶ Replace the hydraulic line within the next 250 operating hours.

Severe damage to the hydraulic lines

DANGER
Hydraulic oil discharged under high pressure!
Fatal injury.

▶ Do not operate the machine.

Visible oil leak

Oil leaks from the hydraulic line. Leaking oil is classified as severe damage.

030.6.7.7 Steering pump: flow regulator (differential pressure)

Valid for: L586-1761;

Make sure the following preconditions are met:
- ❑ Hydraulic oil is at operating temperature.
- ❑ Machine is in maintenance position for adjustment procedures.
- ❑ Service mode is activated.
- ❑ Service access is open.

Make sure that following tools are ready:
- ❑ Differential pressure measuring set (60 bar) **or** two pressure gauges (40 bar)

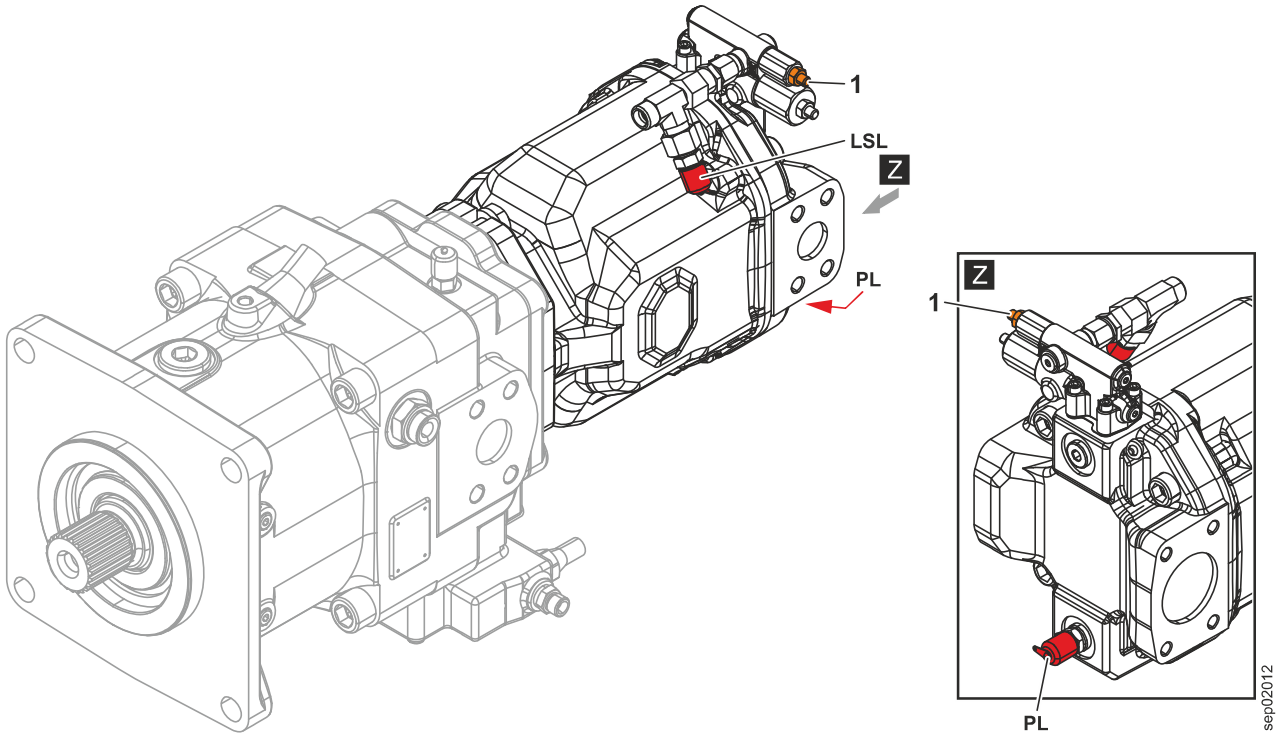

Fig. 245: Steering pump: flow regulator (differential pressure)

1 Flow regulator

PL Steering pump high pressure test connection

LSL Steering pump load sensing signal test connection

NOTICE
High pressure of steering pump above maximum pressure of pressure gauges!
Irreparable damage to the pressure gauges.

▶ Do not operate steering.

▶ Connect a differential pressure measuring device or pressure gauge to load sensing signal test connection **LSL** on steering pump.

▶ Connect a differential pressure measuring device or pressure gauge to high pressure test connection **PL** on steering pump.

▶ Start diesel engine.

▶ Allow diesel engine to run at low idling speed.

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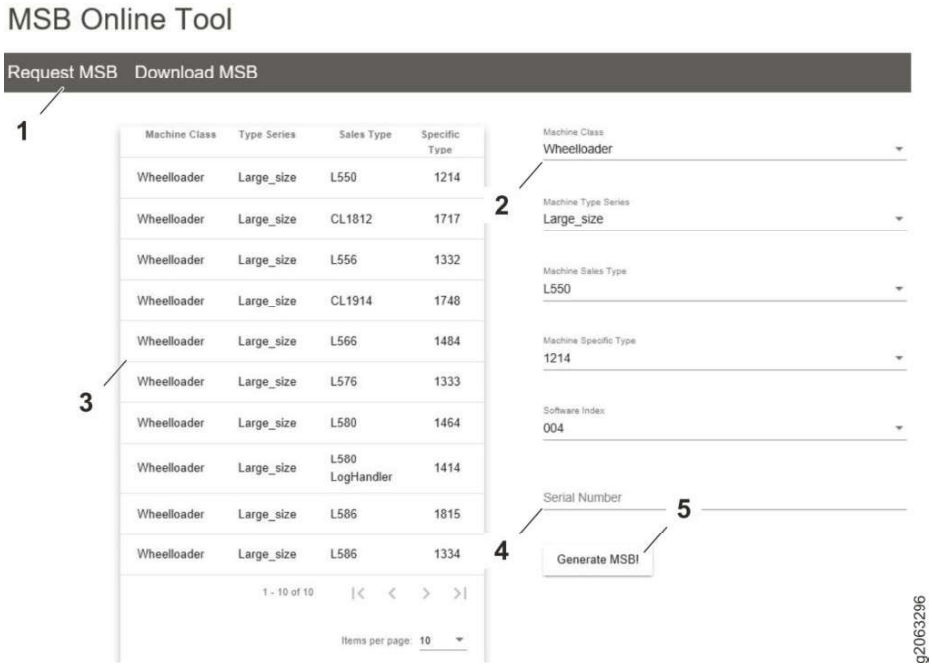

Fig. 254: Creating MSB file

1 “Request MSB” function
2 Type of machine
3 List of machine types
4 Machine serial number
5 “Generate MSB file” function

▶ Select “Request MSB” function **1**.

▶ Select type of machine **2**.
▷ A list displays the selectable machine types.

▶ Select machine type from the list of machine types **3**.

Note

The MSB file is machine-specific.

The entered serial number must correspond to the serial number of machine.

▶ Enter machine serial number **4**.

▶ Select “Generate MSB file” function **5**.
▷ MSB file is generated.
▷ An e-mail informs the user when the generation of the MSB file is completed.

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Overview of CAN addresses (valid for Master5 software item code 12467218)		
Address	**CAN module**	**CAN line**
IR02 (84)	Resistance measurement inputs, input module A16M	2
IA16 (46)	Analogue universal outputs, input module (optional)	2
IF02 (54)	Frequency measurement inputs, input module (optional)	2
IR02 (82)	Resistance measurement inputs, input module (optional)	2
OA16 (21)	Analogue universal outputs, output module A17a	2
OD04 (13)	Digital outputs, output module A17a	2
SFTY (5)	Safety function, output module A17a	2
IF02 (49)	Frequency measurement inputs, output module A17a	2
TA21 (97)	Control unit	3
CC01 (106)	Air conditioning controller	3
JD (63)	Module for joystick steering	3
JA08 (64)		3
IMMO (107)	Immobilizer	3

Tab. 78: Addressing CAN modules

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

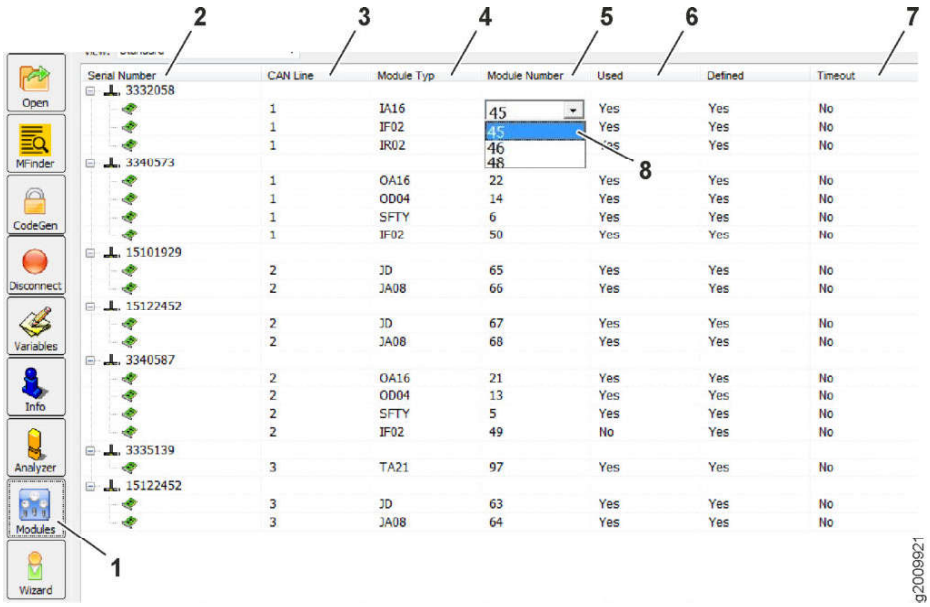

Fig. 271: Module editor in Sculi

1 “Module editor ”function
2 Serial number of connected modules
3 CAN line connecting the module to the central control unit
4 Module identification
5 Set address of the module
6 Indicates whether the module is used
7 Indicates whether the module is active
8 Drop-down window

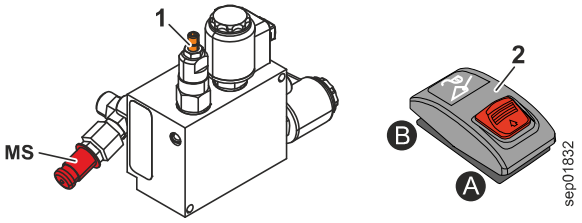

Fig. 276:

1 Pressure reducing valve for quick coupler

MS Quick coupler closing pressure test connection

▶ Connect a pressure gauge (600 bar) to the quick coupler closing pressure test connection **MS** on the quick coupler valve block.

▶ Start diesel engine.

▶ At lower idling speed, push *quick coupler* button to position **B** and hold it there.

▶ When doing so, check whether the quick coupler closing pressure **MS** corresponds to the required value.

Description	Unit	Value
Quick coupler closing pressure **MS**	bar	250 $^{\pm 10}$

If the required value is not reached:

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

▶ Turn the adjusting screw of the pressure reducing valve **1**.

Note

To adjust the pressure reducing valve:

▶ Turning the adjusting screw clockwise increases the pressure.

▶ Turning the adjusting screw anticlockwise reduces the pressure.

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

If the required value is reached:

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

▶ Remove the pressure gauge from the quick coupler closing pressure test connection **MS**.

030.6.12.2 Parameters for lift arm geometry

Valid for: L586-1761;

Make sure that following tools are ready:

❑ Laptop with Sculi diagnostic software

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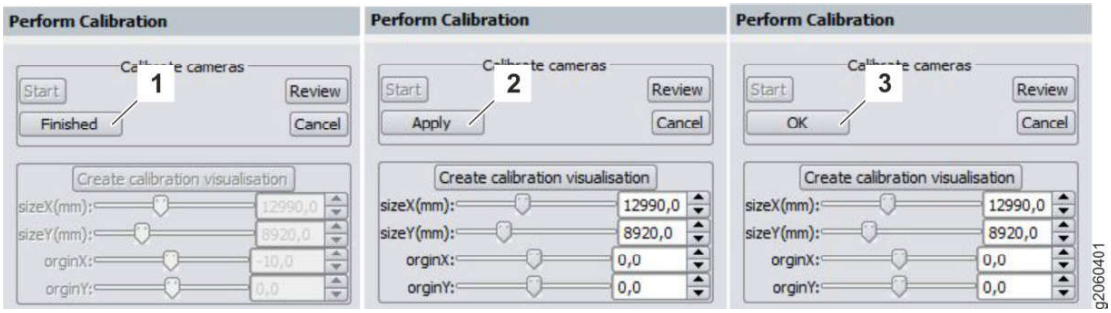

Fig. 291: Completing calibration

1 “Finished” function **2** “Apply” function **3** “OK” function

- ▶ Select “Finished” function **1**.
- ▶ Select “Apply” function **2**.
- ▶ Select “OK” function **3**.

Fig. 292: Transmitting calibration to control electronics Skyview 360°

1 “Save” function **2** “Yes” function **3** “OK” function

- ▶ Select “Save” function **1**.
- ▶ Save camera data.
- ▶ Select “Yes” function **2**.
- ▶ Select “OK” function **3**.
  - ▷ Data are transmitted to control electronics for Skyview 360°.

If data were successfully transferred:

- ▶ Check for correct representation of camera image on display for Skyview 360°.
- ▶ Start Powerbroker.
  - ▷ Settings for IP address are reset.

030.6.14.2 Personnel detection: transmitting configuration files

Valid for: L586-1761;

If personnel detection control electronics are renewed or replaced, correct configuration files must be transferred to new control electronics.

Configuration files consist of two individual files and are machine-group specific.

Configuration files are transferred to the personnel detection control electronics using a commercially available USB stick.

Software LiPDS_ConfigTool is used for transmitting configuration files to USB stick.

Preparatory tasks

Configuration files and software for transferring configuration files are available via Liebherr service documentation.

File path: General – Personnel detection

					Description
D	93	6	A7	XX	Diesel engine type designation
				20	Without emission-type approval
				23	Emission stage: tier 3 – stage IIIA With exhaust gas recirculation
				24	Emission stage: tier 4f – stage IV Exhaust treatment system: SCR system
				25	Emission stage: stage V Exhaust treatment system: SCR system and diesel particulate filter

Tab. 85: Description of the type designation

2.3 Cooling

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

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

2.4 Electronic diesel control

The electronic diesel control (EDC) regulates the engine speed and start of injection. The EDC consists primarily of sensors, the injection system and engine control unit.

Equipment on the diesel engine and vehicle side is connected to the engine control unit using wiring harnesses.

2.5 Power reductions

2.5.1 Power reduction for excessive coolant temperature

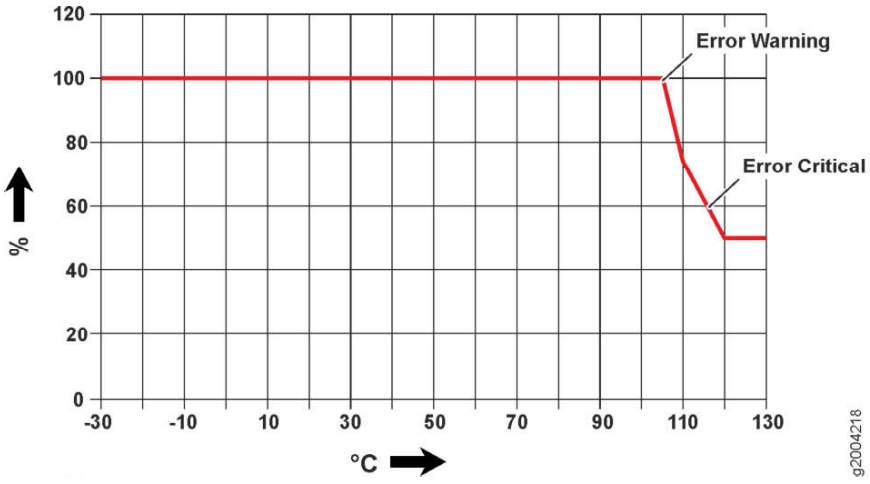

Fig. 300: Power reduction for excessive coolant temperature

% Engine torque in per cent

°C Coolant temperature in degrees Celsius

1.5 Crankcase bleeding line

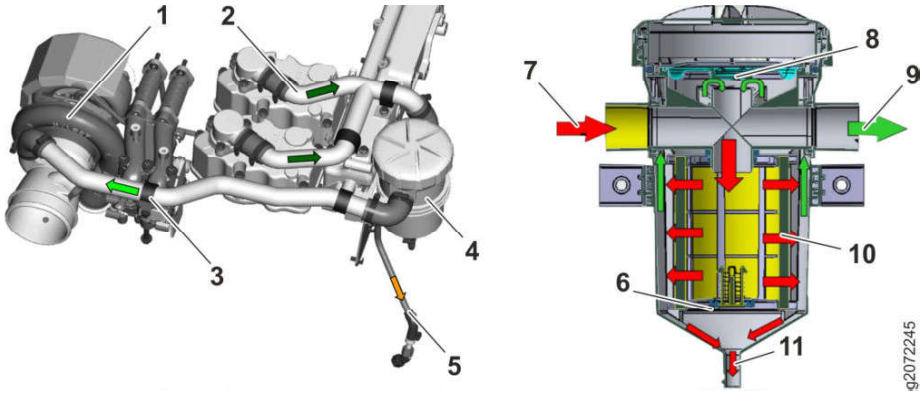

Fig. 311: Crankcase bleeding line

1	Turbocharger	**7**	Entry from crankcase gas
2	Crankcase gas from diesel engine	**8**	Pressure control valve
3	Filtered air from filter	**9**	Outflow from crankcase gas
4	Filter housing	**10**	Flow through filter from inside to outside
5	Line to oil pan	**11**	Discharge to oil pan
6	Bypass valve from fibre separator		

During combustion, an overpressure is generated in the crankcase. During combustion, a portion of the combustion gases flows from the combustion chamber over the area between the piston or piston rings and cylinder into the crankcase. If these blow-by gases are not removed, the pressure in the crankcase increases greatly depending on the speed. This has a negative impact on the lubrication and sealing system of the diesel engine. The diesel engine would leak.

Crankcase ventilation reduces this overpressure.

Due to the negative pressure from the turbocharger **1**, the crankcase gas from the diesel engine **2** is extracted via the filter. The engine oil is separated in the filter element and flows over the discharge **11** and the line **5** back to the oil pan.

The line to the oil pan **5** has a check valve. This ensures that no gases can flow from the lubrication side into the crankcase ventilation.

The filter cartridge of the crankcase ventilation must be replaced regularly. See maintenance and inspection schedule.

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During passive regeneration, the DOC increases the amount of NO_2 in the exhaust gas. As a result, soot particles are burned in the DPF starting from 260 °C.

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.

2.2 Layout of the exhaust gas treatment system

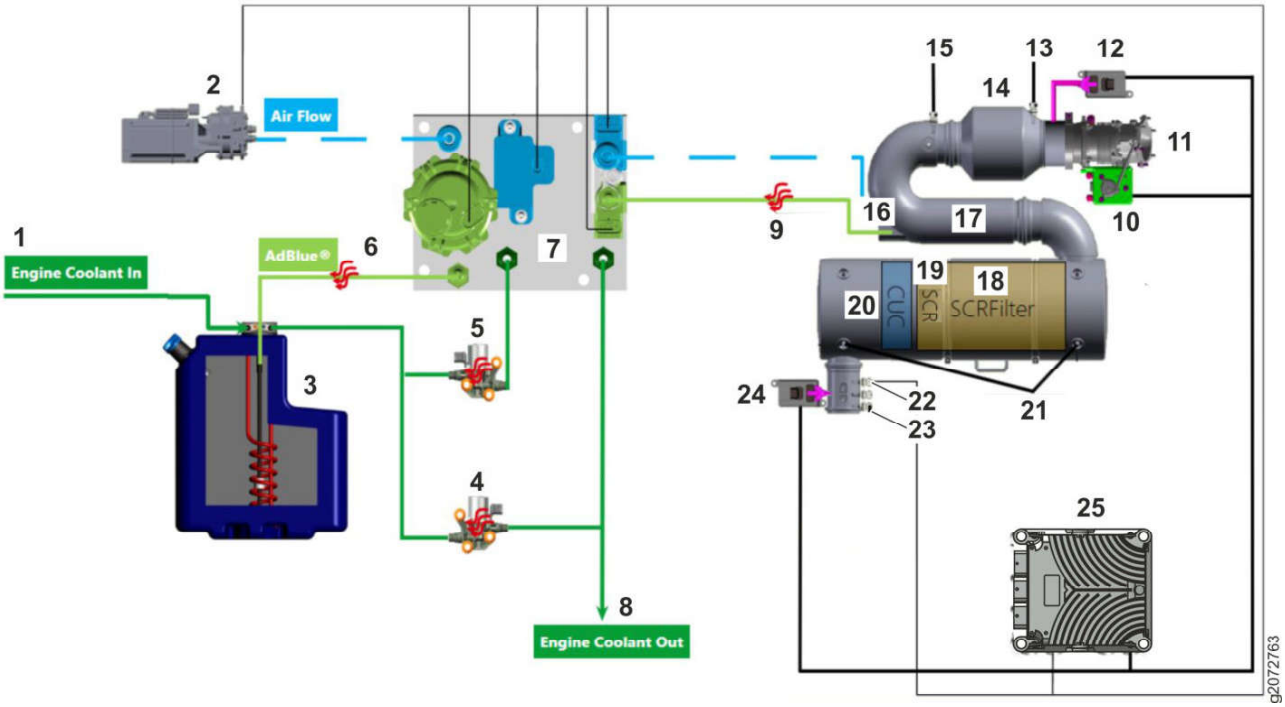

Fig. 321: Layout of the exhaust gas treatment system

1	Coolant from the diesel engine	**10**	Exhaust throttle valve M715	**19**	SCR catalytic converter
2	SCR system air supply valve	**11**	Exhaust from diesel engine	**20**	Slip catalyst
3	Diesel exhaust fluid tank	**12**	NO_x sensor at DOC intake B726	**21**	Differential pressure sensor B722
4	Solenoid valve for coolant to diesel exhaust fluid tank Y770	**13**	Temperature sensor at DOC inlet B723	**22**	Temperature sensor at outlet of SCR catalytic converter B772
5	Solenoid valve for coolant to metering unit Y774	**14**	Diesel oxidation catalyst (DOC)	**23**	NH_3 sensor B783
6	Heated diesel exhaust fluid line from diesel exhaust fluid tank	**15**	Temperature sensor at intake of SCR catalytic converter B771	**24**	NO_x sensor at outlet of the SCR catalytic converter B727
7	Metering unit	**16**	Diesel exhaust fluid nozzle	**25**	Engine control unit (ECU)
8	Coolant to the diesel engine	**17**	Mixing section		
9	Heated diesel exhaust fluid line from metering unit	**18**	Filter module (SCRFilter)		

The air supply valve of the SCR system **2** provides compressed air.

The metering unit **7** removes diesel exhaust fluid from diesel exhaust fluid tank **3**. The metering unit **7** regulates the amount of diesel exhaust fluid and compressed air supply to be injected into the SCR system.

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

2.3 How the exhaust gas treatment system works

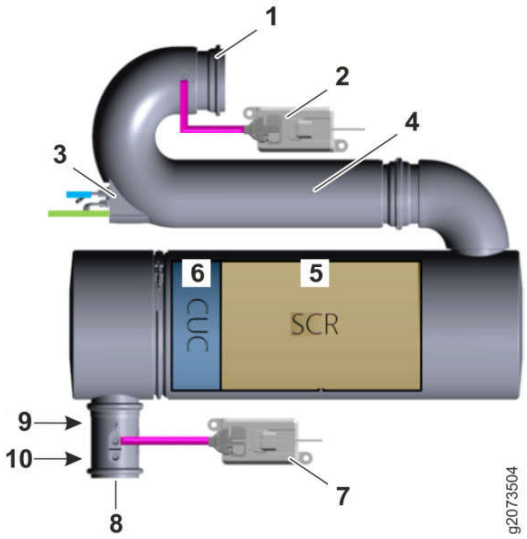

Fig. 329: How the exhaust gas treatment system works

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

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

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

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

The ammonia (NH_3) thus created reacts in the SCR catalytic converter **5** at sufficiently high temperatures with the nitrogen oxide (NO_X) in the exhaust gas. NO_X and NH_3 are converted to N_2 and H_2O.

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

The NH_3 sensor **11** measures the ammonia content in the exhaust gas.

LBH/12252628/01/211-20191218_155739/en

2.1 Function

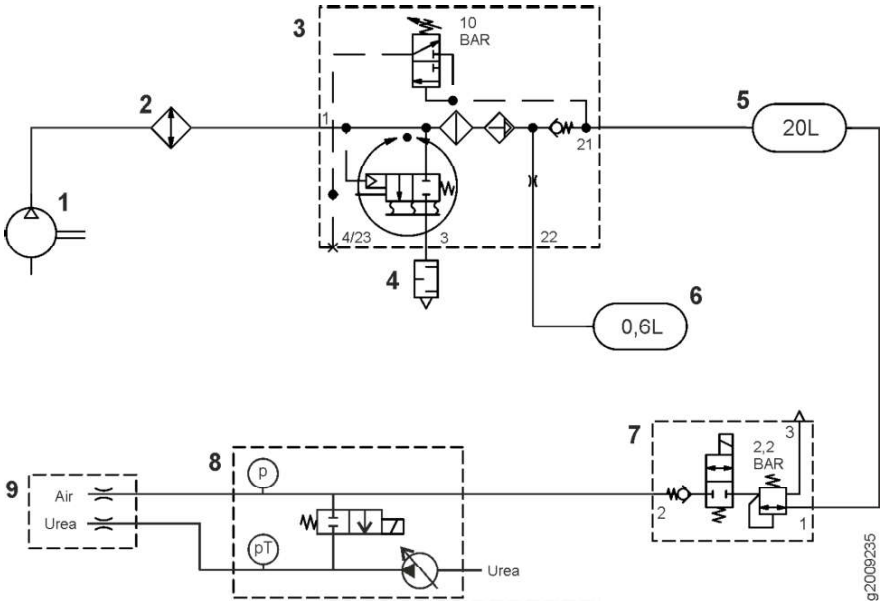

Fig. 342: Diagram of the compressed air system

1 Compressor
2 Cooling line
3 Air dryer
4 Silencer
5 Compressed air accumulator
6 Regeneration accumulator
7 SCR system air supply valve
8 Metering unit
9 Diesel exhaust fluid nozzle

The compressor **1** draws in air through the air filter of the diesel engine. The air is compressed and goes through the cooling line **2** to the air dryer **3**.

The cooling line **2** passes through the cooler mount. This cooled the compressed air. The compressed air continues on to the air dryer **3**.

The air dryer **3** removes moisture from the compressed air using a granulate filter. The dehumidified air carries on to the compressed air accumulator **5**.

If the pressure in the air dryer **3** rises above 10 bar, the connection to the compressed air accumulator is interrupted. At the same time, the drain valve is opened. Air from the regeneration accumulator **6** then blows the moisture out of the granulate filter. This humid air escapes through the silencer **4** to the outside. (For more information see: Air dryer, page 040-47)

The SCR system air supply valve **7** allows air to come from the compressed air accumulator **5**.

The SCR system air supply valve **7** acts as a switching valve and a pressure reducing valve. The pressure is reduced to 2.2 bar. If necessary, compressed air is released to the metering unit **8**. (For more information see: SCR system air supply valve, page 040-48)

The compressed air continues through the metering unit **8** to the diesel exhaust fluid nozzle **9**.

In the nozzle **9**, compressed air and diesel exhaust fluid are mixed and injected into the exhaust treatment system.

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050.2 Cooling system hydraulics

LBH/12252628/01/211-20191218_155739/en

050.3 Cooling system electronics

050.3.1 Overview of electrical controls of cooling system

Valid for: L586-1761;

1 Layout

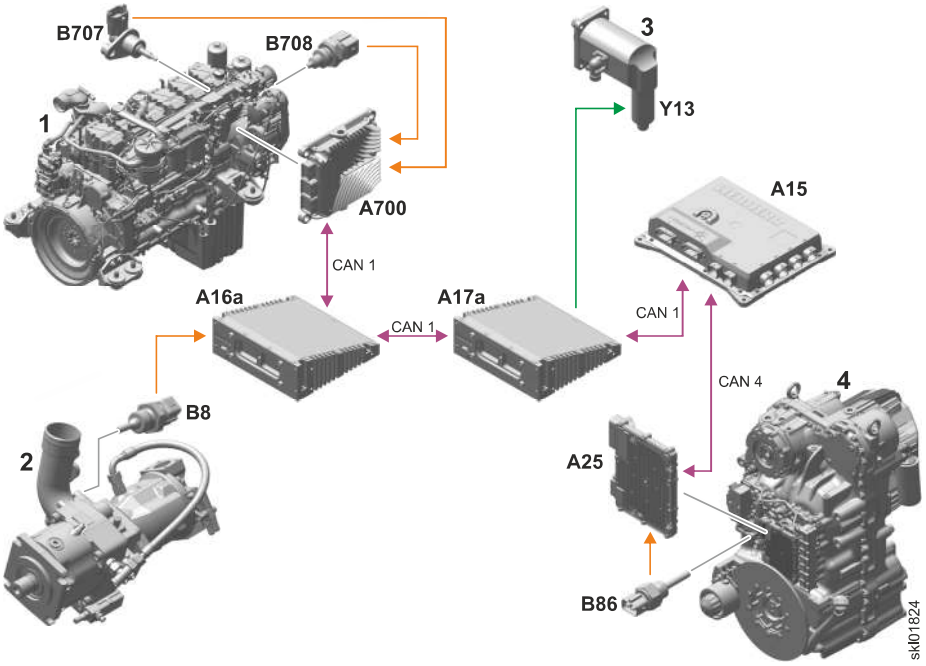

Fig. 359: Overview of electrical controls of cooling system

1 Diesel engine
2 Suction line of working pump
3 Fan motor
4 Transmission

BMK	Function	BMK	Function
A15	Central control unit	**B8**	Hydraulic oil temperature sensor
A16a	Input module A16a	**B86**	Gear oil temperature sensor
A17a	Output module A17a	**B707**	Temperature sensor for charge air
A25	Transmission control unit (TCU)	**B708**	Temperature sensor for coolant
A700	Engine control unit (ECU)	**Y13**	Fan speed proportional solenoid

Tab. 107: Equipment codes

2 Function

2.1 Basic function

Fan speed is controlled by central control unit.

060 Working hydraulics

Contents

LBH/12252628/01/211-20191218_155739/en

2.2 Swivel plate angle

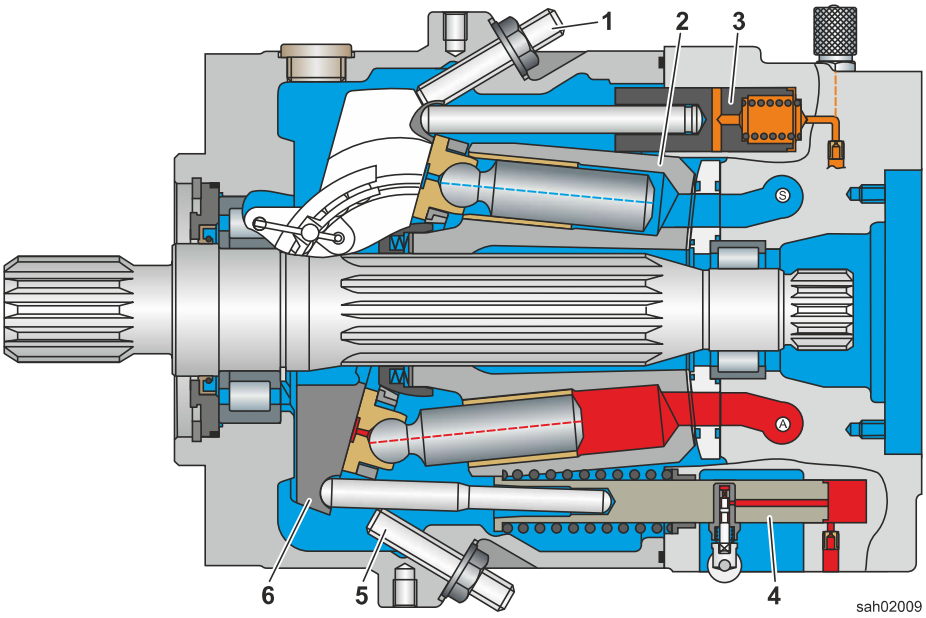

Fig. 372: Swivel plate angle

1	Adjusting screw for Q_{max}	**4**	Positioning piston
2	Axial piston rotary group	**5**	Adjusting screw for Q_{min}
3	Return piston	**6**	Swivel plate

Positioning piston **4** moves axial piston rotary group **2** to a greater swivel plate angle. Operating pressure of working pump acts on positioning piston **4**. At a greater angle, working pump delivers more oil. Maximum angle can be set using adjusting screw for Q_{max} **1**.

Return piston **3** moves axial piston rotary group **2** back to a smaller swivel plate angle. Return force is controlled by flow regulator. At a smaller angle, working pump delivers less oil. Minimum angle can be set using adjusting screw for Q_{min} **5**.

Because effective surface of return piston **3** is greater than that of positioning piston **4** rotary group moves to a smaller angle when operating pressure acts on both of them.

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BMK	Function	BMK	Function
Y31b	Proportional solenoid for tilting in	**Y32b**	Proportional solenoid for lifting

Tab. 129: Equipment codes

Control valve block **1** is supplied with fluid by working pump **66** and directs it to consumers. Spools are electro-hydraulically actuated.

Pilot control pressure reducing valve **75** supplies control valve block **1** with pilot control fluid for that purpose. When working attachment is actuated, proportional solenoid valves for individual functions are energised. Proportional solenoid valves reduce servo pressure once more, depending on current, and direct servo oil to spool valves. Servo oil pushes spools against force of readjusting springs. Oil flows from working pump **66** to consumers via openings that spools have accordingly released.

2.2 Pressure balance flow distribution independent of load pressure (LUDV)

Pressure balances have two functions:
- Generating a load-sensing signal **65** that is used to regulate working pump.
- Distributing flow volume between consumers.

When a function is activated, entire oil flow for consumer flows through relevant pressure balance. In process, pressure compensator generates a load-sensing signal **65** that is fed back to working pump.

This load-sensing signal affects not only working pump but also other pressure balances in control valve block. Load-sensing pressure of system **65** acts against working pressure at each pressure compensator. Therefore, load sensing pressure can partially close pressure balance against force of working pressure and restrict oil flow to consumer. Flow volume is distributed to consumers as required.

2.3 Spool valves for lifting cylinder: oil supply for lifting cylinder

Due to their large volume, lift cylinders require a large quantity of oil. Accordingly, lift cylinders are supplied with oil via two spool valves: main spool valve **13** and additional spool valve **46**. During lifting or lowering main spool **13** is actuated. From there control oil flows to additional spool **46**. Both spools have an own pressure balance and an own secondary pressure relief valve.

Furthermore, both spool valves have a pressure balance bypass: if lifting and tilt in functions are actuated simultaneously, lifting function is heavily restricted by LUDV system. Oil is diverted past pressure balances via check valve in pressure balance bypass in spools for lift cylinders and flows directly to hoist cylinder piston side. This makes lifting function relatively faster when multiple movements are performed simultaneously.

2.4 Spool valves for lift cylinders: float position

In float position function, lift cylinder ring side is connected to lift cylinder piston side and hydraulic tank **67**. As a result, lifting arms are resting under their own weight and can move freely up and down.

The lift cylinder main spool **13** has a fourth position for float position function. If control lever is pushed forwards beyond point of resistance, current applied to proportional solenoid valve for lowering **Y32a** is increased to a level at which main spool **13** is moved into this fourth position.

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charge pressure (cut-out pressure) is reached, pressure in ride control hydro accumulators pushes ride control valve spool **2** against spring force of readjusting spring, thereby disconnecting lifting cylinder piston side **7** from hydro accumulators.

If maximum charge pressure is exceeded, pressure moves ride control valve spool **2** one position further. That allows oil to flow out of ride control hydro accumulators back to hydraulic tank **9**.

2.3 Ride control activated

To activate ride control, central control unit energises ride control solenoid valve **4**. That pressurises ride control valve spool **2**.

Pressure pushes ride control valve spool **2** against force of return spring. The ride control valve spool **2** thus connects lift cylinder piston side **7** to ride control hydro accumulators and lift cylinder ring side **8** to hydraulic tank **9**.

060.5.3 Electric ride control unit

Valid for: L586-1761;

1 Layout

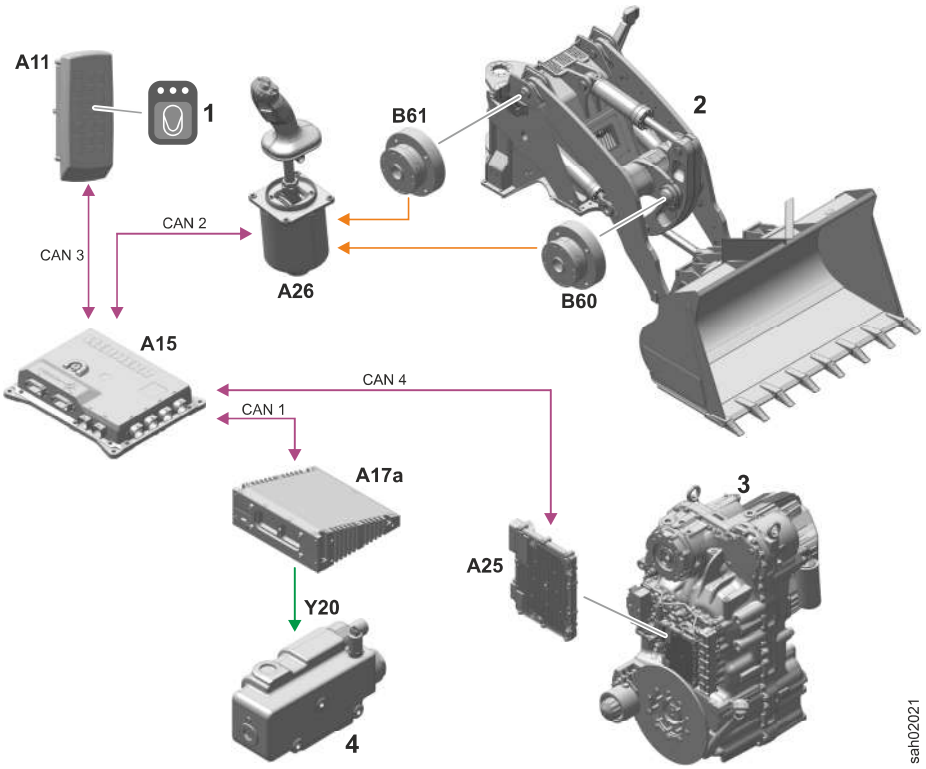

Fig. 384: Electric ride control unit

1 *Ride control* key
2 Lift arms
3 Transmission
4 Stabilization module

BMK	Function	BMK	Function
A11	Control unit	**A26**	CAN module for control lever
A15	Central control unit	**B60**	Angle sensor for bucket position

BMK	Function	BMK	Function	BMK	Function
Y14	Solenoid for servo pressure	**Y31b**	Proportional solenoid for tilting in	**Y200**	Solenoid for release of ride control (option)

Tab. 145: Equipment codes

If a pipe breaks, pipe break protection system prevents lift arms from falling and bucket from tipping in an uncontrolled manner. To do this, pipe break protection system separates piston side from control valve block.

2.2 Pipe break protection for ride control

Because pipe break protection system cuts off lift cylinder piston side when working hydraulics are actuated, pipe break protection must be opened to operate ride control. Solenoid for release of ride control **Y200** together with solenoid for ride control are energized for this purpose **Y20**. The ride control release solenoid valve **60** then opens pilot control valves **76** and **86** with pressure from pilot control valve block **1**.

2.2.1 Variable for pipe break protection

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

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

060.7.2 Pipe break protection valve block (lift cylinder)

Valid for: L586-1761;

1 Layout

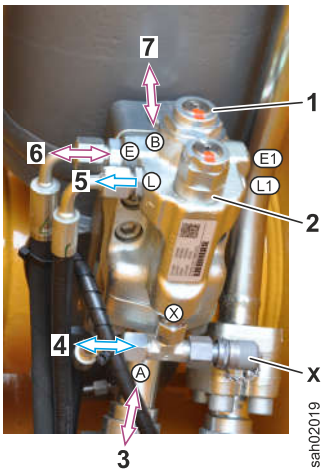

Fig. 391: Pipe break protection valve block (lift cylinder)

1 Safety valve and pipe break protection valve

5 Return flow to leak oil strainer

See next page for continuation of the image legend

BMK	Function	BMK	Function	BMK	Function
B3	Emergency steering pressure switch	**B91**	Pressure sensor for weighing device (ring side)	**Y10**	Parking brake solenoid
B3a	Emergency steering check pressure switch	**M8**	Electric motor for emergency steering pump	**Y13**	Fan speed proportional solenoid
B8	Hydraulic oil temperature sensor	**R1**	Inching function angle sensor	**Y14**	Solenoid for servo pressure
B12	Brake light pressure switch	**Y1**	Proportional solenoid for clutch 2 (K2)	**Y20**	Solenoid for ride control
B19	Brake accumulator pressure sensor	**Y2**	Proportional solenoid for forward travel direction clutch (KV)	**Y31a**	Proportional solenoid for tilting out
B80	Pressure sensor for duct AB	**Y3**	Proportional solenoid for optional connection	**Y31b**	Proportional solenoid for tilting in
B81	Pressure sensor for duct A	**Y4**	Proportional solenoid for reverse travel direction clutch (KR)	**Y32a**	Proportional solenoid for lowering
B85	Filter bypass switch	**Y5**	Proportional solenoid for clutch 1 (K1)	**Y32b**	Proportional solenoid for lifting
B86	Gear oil temperature sensor	**Y6**	Proportional solenoid for clutch 3 (K3)	**Y33a**	Proportional solenoid for additional function A4
B90	Pressure sensor for weighing device (piston side)	**Y7**	Proportional solenoid for position control	**Y33b**	Proportional solenoid for additional function B4

Tab. 151: Equipment codes

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090 Steering system

Contents

LBH/12252628/01/211-20191218_155739/en

2.2 Swivel plate angle

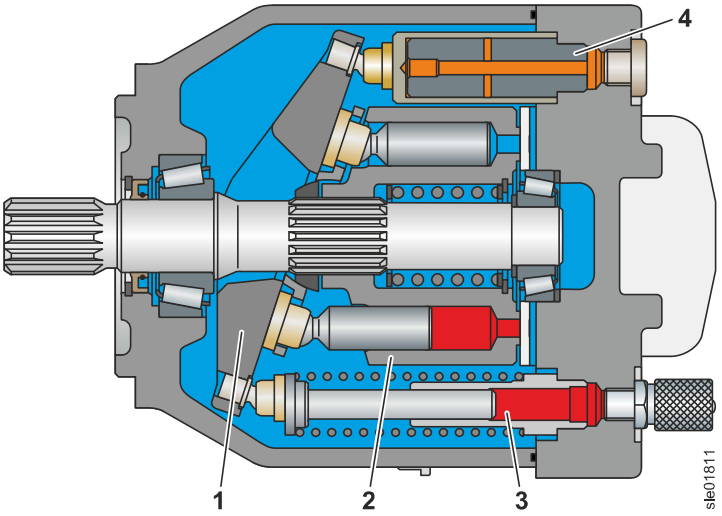

Fig. 415: Swivel plate angle

1	Swivel plate	**3**	Positioning piston
2	Axial piston rotary group	**4**	Return piston

Positioning piston **3** moves axial piston rotary group **2** to a greater swivel plate angle. Operating pressure of steering pump acts on positioning piston **3**. At a greater angle, steering pump delivers more oil.

Return piston **4** moves axial piston rotary group **2** back to a smaller swivel plate angle. Return force is controlled by flow regulator. At a smaller angle, steering pump delivers less oil.

Because effective surface of return piston **4** is greater than that of positioning piston **3** rotary group moves to a smaller angle when operating pressure acts on both of them.

2.3 Flow regulator

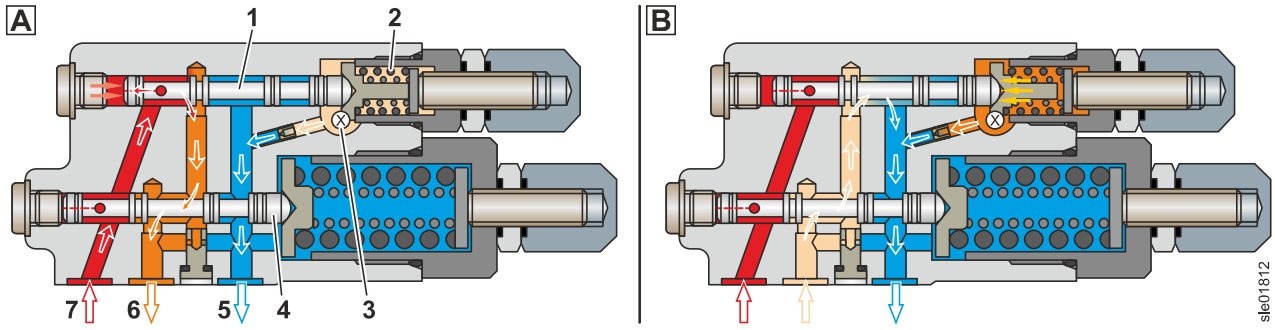

Fig. 416: Consumers not requesting oil / consumers requesting oil

1	Flow regulator	**4**	LS-pressure cut-off	**7**	Connection to operating pressure
2	Regulating spring	**5**	Connection to pump housing (leak oil)		
3	Load sensing signal from servostat	**6**	Connection to return piston		

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090.5 Emergency steering

090.5.1 Emergency steering overview

Valid for: L586-1761;

1 Layout

Emergency steering system consists of following components:
- Hydraulic tank (For more information see: 080.2.1 Overview of hydraulic tank, page 080-6)
- Emergency steering pump (For more information see: 090.5.2 Emergency steering pump, page 090-23)
- Valve block for steering system
- Electrical controls

2 Function

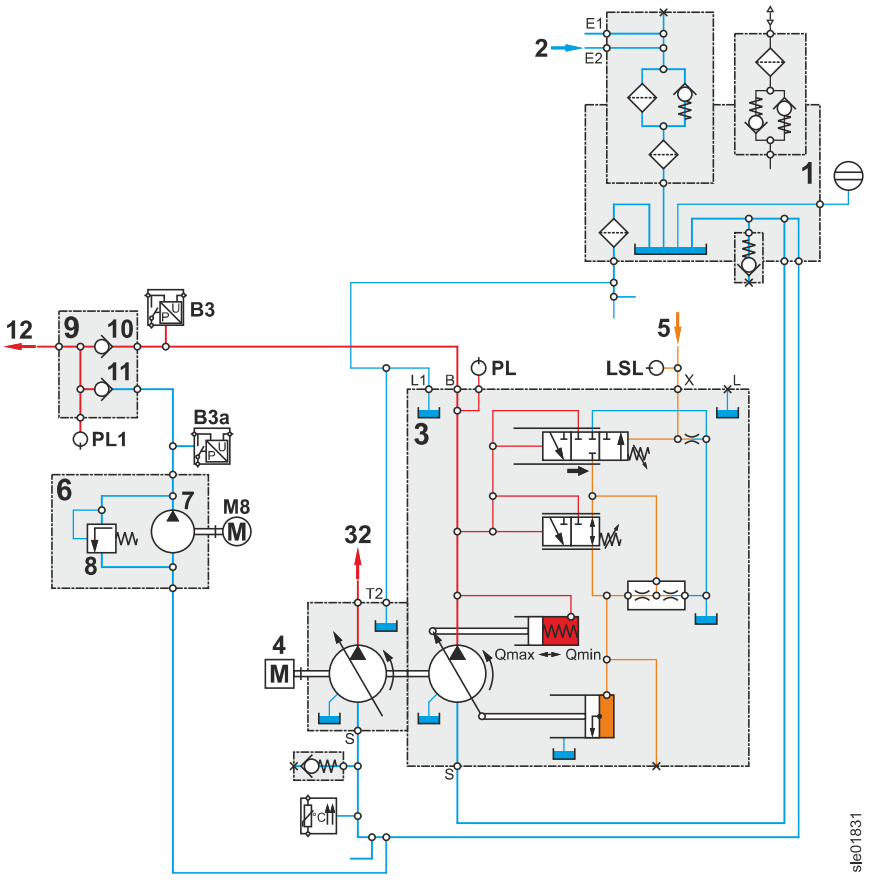

Fig. 430: Emergency steering: hydraulic diagram (emergency steering active)

1	Hydraulic tank	**7**	Gear pump
2	Return flow from hydraulic oil cooler	**8**	Pressure relief valve
3	**Steering pump**	**9**	**Valve block for steering system**

See next page for continuation of the image legend

090.5.3.3 Emergency steering check pressure switch

Valid for: L586-1761;

1 Layout

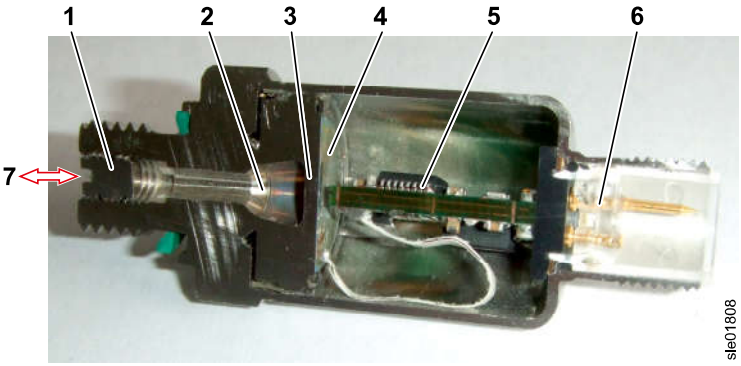

Fig. 438: Emergency steering check pressure switch: sectional view

1	Throttle	**5**	Electronics
2	Pressure chamber	**6**	3-pin plug connection
3	Metal surface	**7**	Service brake hydro accumulator
4	Thin-film sensor		

The emergency steering check pressure switch B3a is mounted on the emergency steering pump.

The emergency steering check pressure switch is normally open.

2 Function

2.1 Basic function

The oil flows via the throttle **1** to the pressure chamber **2**. Pressure peaks are absorbed by the throttle **1**.

The curvature of the metal surface **3** causes the resistance of the thin-film sensor **4** to change. When a specific resistance is reached, the electronics **5** close the electrical contact.

2.2 Monitoring emergency steering pump pressure

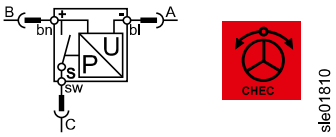

Fig. 439: Pressure switch for emergency steering check: equivalent diagram and symbol field Emergency steering CHECK failed

The emergency steering check pressure switch B3a monitors the emergency steering pump pressure.

After starting diesel engine, the emergency steering system tests itself. The emergency steering pump is activated for a few seconds and the *emergency steering CHECK failed* symbol field lights up in the display. If the emergency steering pump generates enough pressure, the electronics in the emergency steering check pressure switch close the contact and the central control unit registers that the emer-

1 Layout

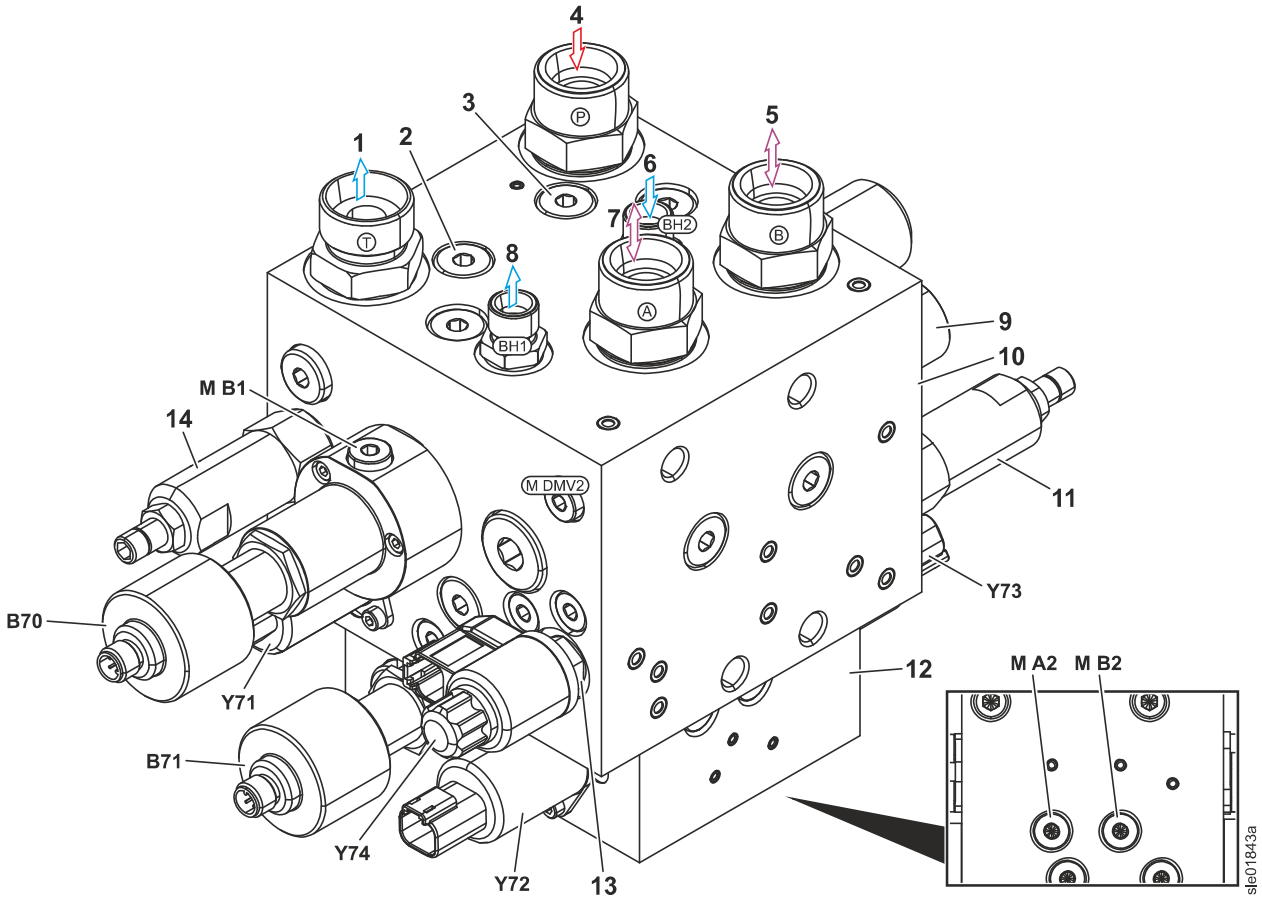

Fig. 442: Control valve block for joystick steering (from front left)

1	Return flow to collector pipe	**6**	Return flow from compact brake valve (housing preheating)	**11**	Pressure reducing valve for emergency spool valve
2	Throttle check valve	**7**	Connection for steering to left	**12**	Control block section for emergency steering function
3	Throttle check valve	**8**	Return flow to collector pipe	**13**	Check valve
4	Oil supply from steering pump	**9**	Cut-off valve for main spool valve	**14**	Pressure reducing valve for main spool valve
5	Connection for steering to the right	**10**	Joystick steering control valve block		

Name	Test point	Name	Test point
M B1	Servo pressure for steering to the right (main spool valve) A)	**M B2**	Servo pressure for steering to the right (emergency spool valve) A)
M A2	Servo pressure for steering to the left (emergency spool valve) A)		

Tab. 172: Test points

BMK	Function	BMK	Function	BMK	Function
A29	Joystick module	**S72**	Joystick steering switch (armrest)	**Y74**	Solenoid valve for safety circuit
A29a	Joystick electronics	**Y70**	Proportional solenoid for steering to left (main spool valve)		
B70	Main spool valve position sensor	**Y71**	Proportional solenoid for steering to left (spool valve for emergency steering function)		

Tab. 180: Equipment codes

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

Safety circuit solenoid valve **Y74** is not energised. Control takes place using emergency spool valve **7**. Oil flow though main spool valve **5** is cut off.

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

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

2.3 Failure of position control

Central control unit monitors position control of joystick. In event of a fault, central control unit switches off power supply for position control. As a result, joystick no longer adjusts its position to articulation angle. However, steering function itself is still fully available.

2.4 Function of joystick steering relay board A4b

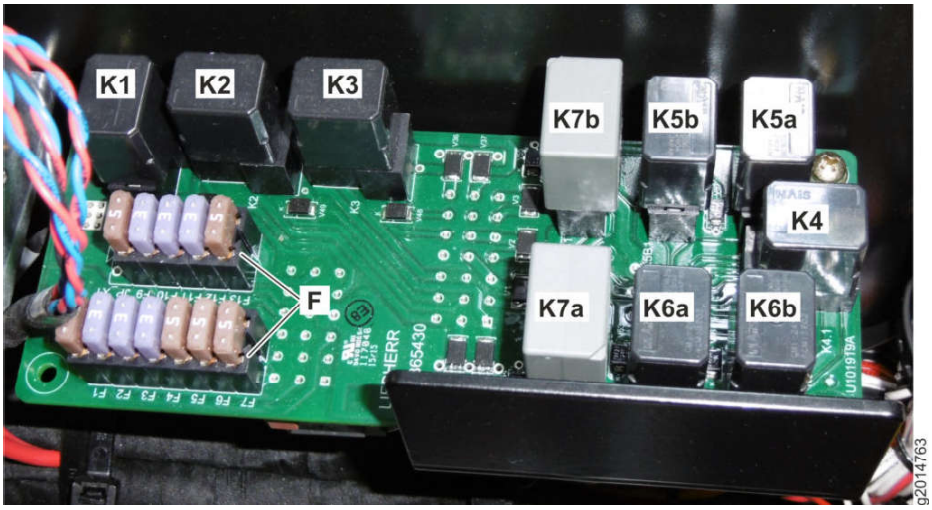

Fig. 448: Function of joystick steering relay board A4b

8 Leak oil from steering pump and working pump

16 Hydro accumulator for service brake (1st brake circuit)

24 Front axle with service brake for 1st brake circuit

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

Tab. 186: Test points

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

Tab. 187: Equipment codes

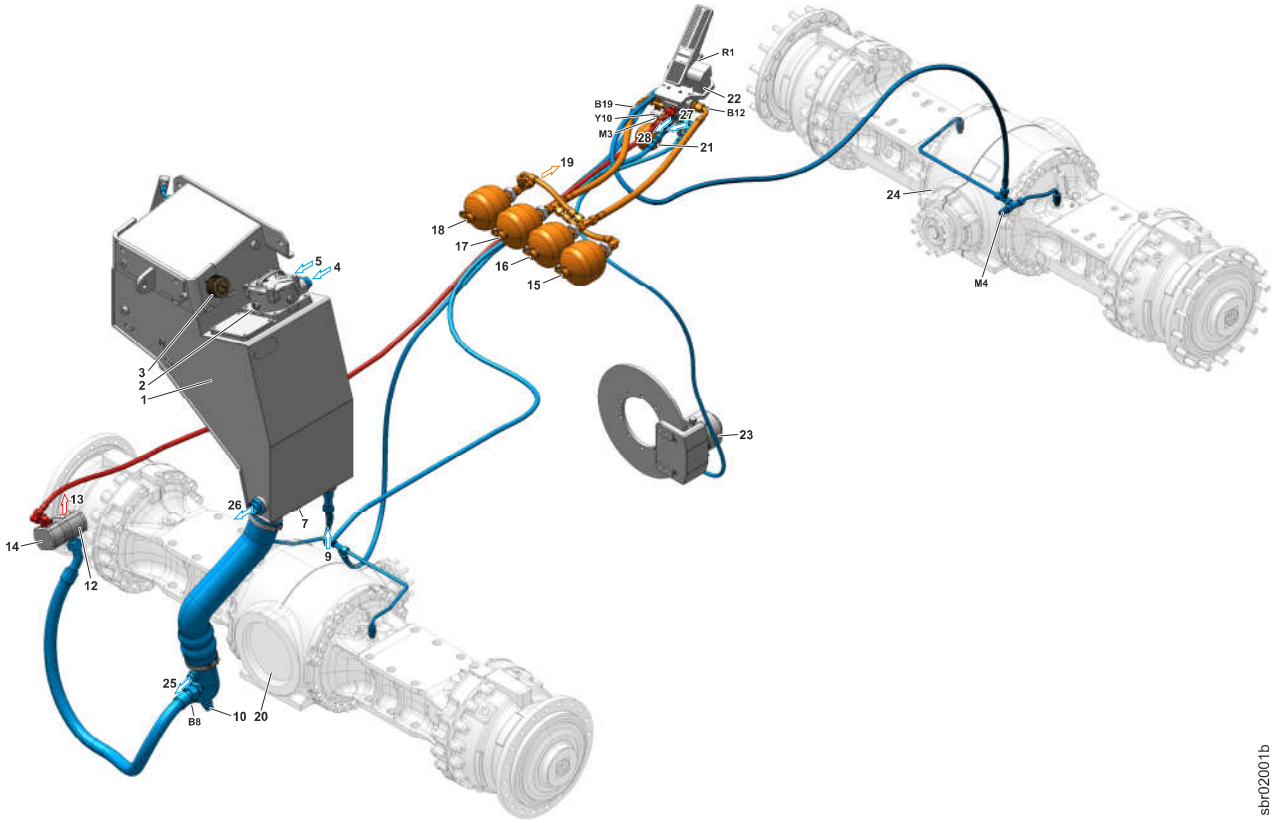

Fig. 454: Brake system (parking brake activated) (from rear right)

1 Hydraulic tank
2 Return filter
3 Breather filter
4 Return flow from control valve block
5 Return flow from hydraulic oil cooler
7 Hydraulic tank drain valve
13 Fan motor oil supply
14 Brake pump
15 Hydro accumulator for service brake (2nd brake circuit)
16 Hydro accumulator for service brake (1st brake circuit)
17 Hydro accumulator for service brake (2nd brake circuit)
18 Hydro accumulator for service brake (1st brake circuit)
22 Compact brake valve
23 Parking brake
24 Front axle with service brake for 1st brake circuit
25 Emergency steering pump suction port
26 Steering pump suction port
27 Return flow from pilot control

See next page for continuation of the image legend

2.3.1 Hydro accumulators are fully charged

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

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

2.3.2 Hydro accumulators are being charged

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

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

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

2.4 Inching function

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

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

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

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2.2 Grounding points

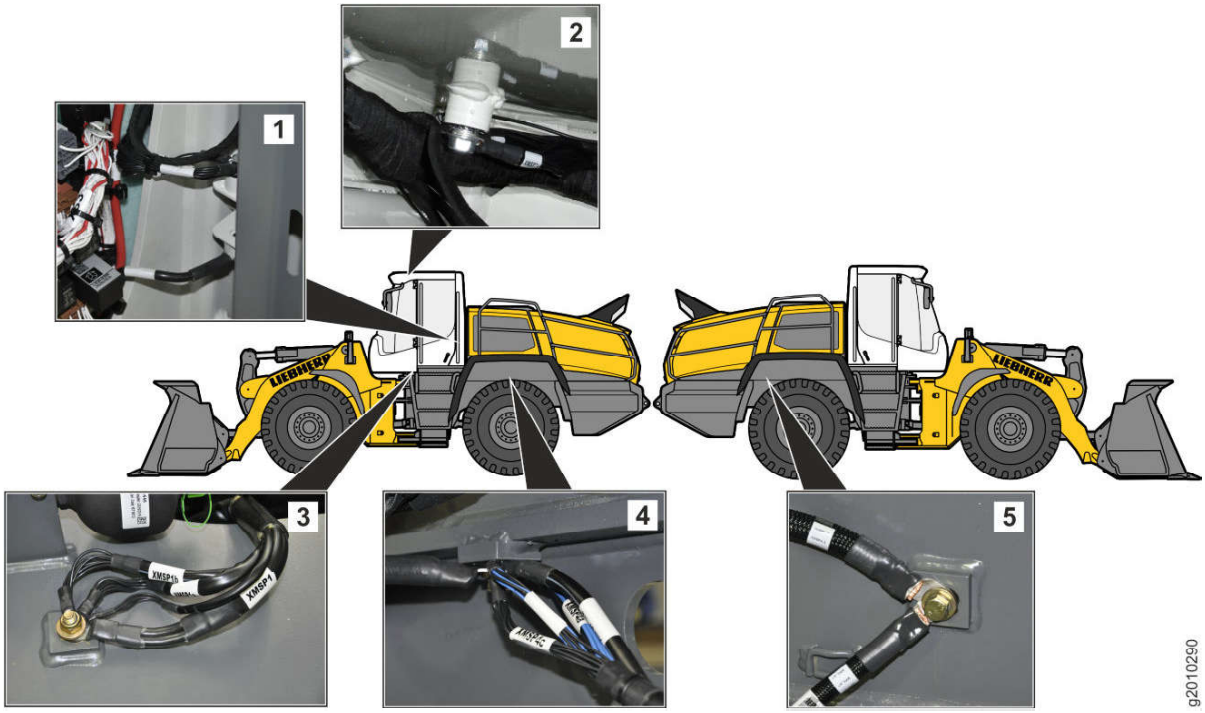


Fig. 470: Grounding points

Position	BMK	Installation location
1	XMSP6, XMSP6a, XMSP6b, XMSP6i, XMSP6Ja, XMSP6.1, XMSP6.2	In left of operator's cab on rear wall.
2	XMSP7a, XMSP7b	In front left of operator's cab under roof liner.
3	XMSP1, XMSP1a, XMSP1b	On front left of rear section.
4	XMSP4a, XMSP4b, XMSP4c, XMSP4.2	On rear left of rear section.
5	MP_4.3, MP_5	On rear right of rear section.

Tab. 198: Grounding points

LBH/12252628/01/211-20191218_155739/en

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

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-A17a.X1	=H	+H3	CONNECTOR OUTPUT MODULE 1	/46.D3
-A17b	=H	+H3	OUTPUT MODULE A17b	/89.B1
-A17b.X1	=H	+H3	CONNECTOR ADDITIONAL CONTROLLER OUTPUT MODULE 1	/42.B7
-A17c	=H	+H3	OUTPUT MODULE; A17c	/117.B1
-A17c.X1	=H	+H3	CONNECTOR COMPACT MODULE 1	/118.C3
-A21	=K	+K4	HEATING AND AIR CONDITIONING SYSTEM	/69.A3
-A21.X1	=K	+K4	CONNECTOR HEATING AND AIR CONDITIONING SYSTEM	/58.B5
-A25	=F	+F3	TRANSMISSION	/72.F1
-A25.X1	=F	+F3	CONNECTOR TRANSMISSION	/43.C4
-A26	=K	+K4	CONTROL LEVER CAN MODULE	/70.B3
-A26*	=K	+K4	LogHandler CONTROL LEVER CAN MODULE	/147.D3
-A26*.X	=K	+K4	CONNECTOR LogHandler CONTROL LEVER CAN MODULE	/147.D3
-A26.X	=K	+K4	CONNECTOR CONTROL LEVER CAN MODULE	/41.E8
-A29	=K	+K6	CENTRAL CONTROL UNIT JOYSTICK STEERING	/99.B1
-A29.X1	=K	+K6	CONNECTOR CENTRAL CONTROL UNIT JOYSTICK STEERING	/94.E7
-A29.X3	=K	+K6	CONNECTOR CENTRAL CONTROL UNIT JOYSTICK STEERING	/94.E8
-A29a	=K	+K	JOYSTICK STEERING	/99.G15
-A30	=K	+K2	LiDAT MODULE	/71.B1
-A30.X	=K	+K	CONNECTOR LiDAT MODULE	/62.D3
-A30.X1	=K	+K2	CONNECTOR LiDAT MODULE	/62.E1
-A30a.X	=K	+K2	CONNECTOR CLAAS DIAGNOSIS	/123.D4
-A35	=K	+K2	ADDITIONAL CONTROLLER	/132.B1
-A35.X	=K	+K2	CONNECTOR ADDITIONAL CONTROLLER	/124.E8
-A36	=K	+K4	KEYPAD 1	/129.C4
-A36.L	=K	+K	KEYPAD 1 LogHandler	/152.C1
-A36.L.X	=K	+K	CONNECTOR KEYPAD 1 LogHandler	/151.B7
-A36.M	=K	+K	KEYPAD 1	/143.A2
-A36.M.X	=K	+K	CONNECTOR KEYPAD 1	/141.D1
-A36.X	=K	+K4	CONNECTOR KEYPAD 1	/128.E8
-A37	=K	+K4	KEYPAD 2	/130.C4
-A37.L	=K	+K	KEYPAD 2 LogHandler	/152.C5
-A37.L.X	=K	+K	CONNECTOR KEYPAD 2 LogHandler	/151.D8
-A37.M	=K	+K	KEYPAD 2	/143.E2
-A37.M.X	=K	+K	CONNECTOR KEYPAD 2	/141.D3
-A37.S4.OUT.X1	=K	+K2	CONNECTOR	/33.B6
-A37.S4.OUT.X3	=K	+K2	CONNECTOR	/33.B6

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-A37.X	=K	+K4	CONNECTOR KEYPAD 2	/128.C8
-A38	=K	+K4	KEYPAD 3	/131.C4
-A38.M	=K	+K	KEYPAD 3	/143.E8
-A38.M.X	=K	+K	CONNECTOR KEYPAD 3	/141.D5
-A38.X	=K	+K4	CONNECTOR KEYPAD 3	/128.B8
-A40	=K	+K2	IMMOBILISER	/133.C5
-A40.M	=K	+K2	IMMOBILISER	/144.C5
-A40.M.X1	=K	+K2	CONNECTOR IMMOBILISER	/144.E4
-A40.X1	=K	+K2	CONNECTOR IMMOBILISER	/133.E4
-A41	=K	+K	CONNECTOR DISPLAY TYRE PRESSURE SENSOR	/123.E6
-A41.X1.B	=K	+K	CONNECTOR DISPLAY TYRE PRESSURE SENSOR	/123.E6
-A41.X2.B	=K	+K	CONNECTOR DISPLAY TYRE PRESSURE SENSOR	/123.E7
-A200	=K	+K	RECEIVING UNIT / CONTROL UNIT	/113.D5
-A200.X	=K	+K	CONNECTOR RECEIVING UNIT / CONTROL UNIT	/113.E5
-A700	=M	+M	ENGINE CONTROL UNIT	/73.A1
-A700.X2	=M	+M	CONNECTOR ENGINE CONTROL UNIT	/49.E2
-A700.X3	=M	+M	CONNECTOR ENGINE CONTROL UNIT	/53.A8
-A709	=M	+M	SOLENOID VALVE, AIR SUPPLY, SCR SYSTEM	/51.D7
-A709X.B	=M	+M	CONNECTOR SOLENOID VALVE, AIR SUPPLY, SCR SYSTEM	/51.D7
-A776.1	=H	+H	DIESEL EXHAUST FLUID PUMP	/53.D1
-A776.1.X	=H	+H	CONNECTOR DIESEL EXHAUST FLUID PUMP	/53.D1
-A776.2	=H	+H	AIR CHANGEOVER VALVE	/53.D3
-A776.2.X	=H	+H	CONNECTOR AIR CHANGEOVER VALVE	/53.D3
-A776.3	=H	+H	AIR PRESSURE SENSOR	/53.D5
-A776.3.X	=H	+H	CONNECTOR AIR PRESSURE SENSOR	/53.D5
-A776.4	=H	+H	DIESEL EXHAUST FLUID PRESSURE AND TEMPERATURE SENSOR	/53.D7
-A776.4.X	=H	+H	CONNECTOR DIESEL EXHAUST FLUID PRESSURE AND TEMPERATURE SENSOR	/53.D7
-B3	=H	+H5	EMERGENCY STEERING PRESSURE SWITCH	/25.B6
-B3.X	=H	+H5	CONNECTOR EMERGENCY STEERING PRESSURE SWITCH	/25.C6
-B3a	=H	+H4	EMERGENCY STEERING CHECK PRESSURE SWITCH	/25.B8
-B3a.X	=H	+H4	CONNECTOR EMERGENCY STEERING CHECK PRESSURE SWITCH	/25.C8
-B4	=H	+H	AIR FILTER CONTAMINATION	/56.C6
-B4.X	=H	+H	CONNECTOR AIR FILTER CONTAMINATION	/56.C6
-B8	=H	+H1	HYDRAULIC OIL TEMPERATURE SENSOR	/47.C5
-B8.X	=H	+H1	CONNECTOR HYDRAULIC OIL TEMPERATURE SENSOR	/47.C5
-B10	=H	+H	HORN	/33.C3

MACHINE TYPE	SERIAL NUMBER		BMK-INDEX	PAGE 7	OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	ELECTRICAL SCHEMATIC;	CREATION DATE	09.10.2019 15:49

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-Splice.CAN5	=K*	+K	SPLICE	/141.D6
-Splice.CAN5	=K	+K	SPLICE	/133.E4
-Splice.CAN5	=K	+K..	SPLICE	/144.D4
-Splice.CLAAS-1	=K	+K	SPLICE	/123.D1
-Splice.CLAAS-2	=K	+K	SPLICE	/123.D2
-Splice.CLAAS-3	=K	+K	SPLICE	/123.D2
-Splice.CLAAS-4	=K	+K	SPLICE	/123.D2
-Splice.E14.1	=H	+H	SPLICE	/29.D8
-Splice.E14.2	=H	+H	SPLICE	/29.E8
-SPLICE.E18.X1	=V	+V	SPLICE	/112.C8
-Splice.F5	=K	+K	SPLICE	/124.C4
-Splice.F12	=K	+K	SPLICE	/126.B5
-Splice.F15.H	=B	+B	SPLICE	/24.D5
-Splice.F36	=K	+K	SPLICE	/40.D2
-Splice.F36.	=K	+K	SPLICE	/135.D3
-Splice.F57	=K	+K	SPLICE	/63.C2
-Splice.F66	=K	+K	SPLICE	/52.C6
-Splice.K7	=K	+K	SPLICE	/33.C1
-Splice.K12	=K	+K	SPLICE	/84.D7
-Splice.K15.H.G	=B	+B	SPLICE	/24.D3
-Splice.K17	=K	+K	SPLICE	/52.E6
-Splice.M4	=K	+K	SPLICE	/33.B8
-Splice.M7	=K	+K	SPLICE	/108.E6
-Splice.R615	=H	+H	SPLICE	/121.B1
-Splice.R616	=H	+H	SPLICE	/121.B2
-Splice.V15	=K	+K2	SPLICE	/24.B7
-Splice.V200	=K	+K	SPLICE	/114.F2
-Splice.Vcc_VNH	=K	+K	SPLICE	/154.B8
-Splice.X1	=.K.	+K.	SPLICE	/39.F4
-Splice.X1	=K	+K	SPLICE	/24.B2
-Splice.X1	=V	+V2	SPLICE	/41.B5
-Splice.X1.M	=K	+K	SPLICE	/140.F4
-Splice.X1LB	=K	+K	SPLICE	/157.C4
-Splice.X2	=.K.	+K.	SPLICE	/39.F6
-Splice.X2	=H	+H	SPLICE	/45.C3
-Splice.X2.M	=K	+K	SPLICE	/140.F6

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-Splice.X2LB	=V	+V	SPLICE	/157.C5
-Splice.X3	=H	+H	SPLICE	/29.F3
-Splice.X3	=K	+K	SPLICE	/39.D5
-Splice.X3.M	=K	+K	SPLICE	/140.D5
-Splice.X3LB	=V	+V	SPLICE	/157.D5
-Splice.X4	=H	+H	SPLICE	/29.C7
-Splice.X4LB	=V	+V	SPLICE	/157.C7
-Splice.X5	=H	+H	SPLICE	/46.C2
-Splice.X5	=K	+K	SPLICE	/147.C2
-Splice.X5LB	=V	+V	SPLICE	/157.D7
-Splice.X6	=H	+H	SPLICE	/51.C1
-Splice.X6	=K	+K	SPLICE	/147.E2
-Splice.X7	=H	+H	SPLICE	/51.B7
-Splice.X9	=H	+H	SPLICE	/56.C1
-Splice.X9	=K	+K	SPLICE	/33.A7
-Splice.X11	=H	+H	SPLICE	/46.C6
-Splice.X12	=K	+K3	SPLICE	/85.D8
-Splice.X15	=K	+K	SPLICE	/36.C3
-Splice.X17	=K	+K	SPLICE	/59.C3
-Splice.X18	=K	+K	SPLICE	/59.C7
-Splice.X19	=K	+K	SPLICE	/59.A3
-Splice.X20	=K	+K	SPLICE	/59.A6
-Splice.X21	=K	+K	SPLICE	/81.A7
-Splice.X22	=K	+K	SPLICE	/59.A7
-Splice.X23	=K	+K	SPLICE	/59.A5
-Splice.X24	=K	+K	SPLICE	/59.C5
-Splice.X25	=K	+K	SPLICE	/59.C5
-Splice.X26	=K	+K	SPLICE	/59.A8
-Splice.X27	=K	+K	SPLICE	/59.A5
-Splice.X47.2	=K	+K	SPLICE	/82.C6
-Splice.X47.5	=K	+K	SPLICE	/82.C4
-SPLICE.X60.1	=K	+K	SPLICE	/61.C5
-SPLICE.X60.2	=K	+K	SPLICE	/61.C5
-Splice.X60e.C	=K	+K	SPLICE	/124.C7
-Splice.X60e.D	=K	+K	SPLICE	/124.C6
-Splice.X74	=K	+K	SPLICE	/94.B6

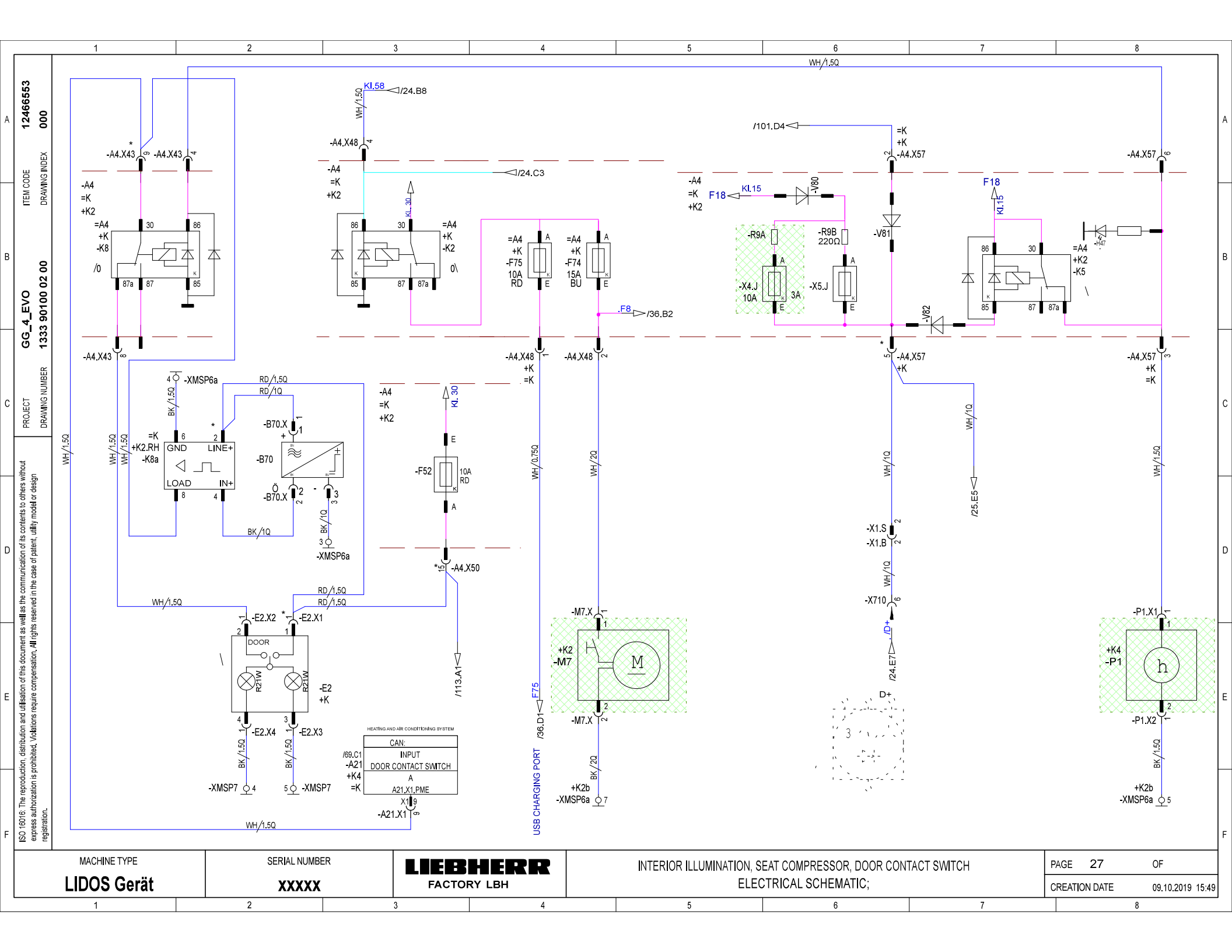
ITEM CODE 12466553
DRAWING INDEX 000
PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00

MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

BMK-INDEX
ELECTRICAL SCHEMATIC;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DRAWING INDEX 000
PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00
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WH/1.5Q
KI.58 /24.B8
-A4.X48
-A4.X43
-A4 =K +K2
/24.C3
KI. 30
=A4 +K -K8 /0
=A4 +K -K2 0\
=A4 +K -F75 10A RD
=A4 +K -F74 15A BU
.F8 /36.B2
/101.D4
=K +K -A4.X57
F18 KI.15 -V80
-V81
-R9A
-R9B 220Ω
-X4.J 10A 3A
-X5.J
-V82
=A4 +K2 -K5
-A4.X57
-A4.X48 +K =K
-A4.X57 +K
-XMSP6a
RD/1.5Q
RD/1Q
BK/1.5Q
=K +K2.RH -K8a
GND LINE+ LOAD IN+
-B70.X
-B70
BK/1Q
WH/1.5Q
-A4 =K +K2
-F52 10A RD
-A4.X50
RD/1.5Q
-E2.X2
-E2.X1
DOOR
R21W
-E2 +K
-E2.X4
-E2.X3
-XMSP7
/113.A1
HEATING AND AIR CONDITIONING SYSTEM
CAN:
INPUT
DOOR CONTACT SWITCH
A
A21.X1.PME
/69.C1 -A21 +K4 =K
-A21.X1
WH/0.75Q
WH/2Q
F75
/36.D1
USB CHARGING PORT
-M7.X
+K2 -M7
BK/2Q
+K2b -XMSP6a
WH/1Q
/25.E5
-X1.S -X1.B
-X710
/D+
/24.E7
D+
-P1.X1
+K4 -P1
-P1.X2
BK/1.5Q
+K2b -XMSP6a
MACHINE TYPE
LIDOS Gerät
SERIAL NUMBER
XXXXX
LIEBHERR
FACTORY LBH
INTERIOR ILLUMINATION, SEAT COMPRESSOR, DOOR CONTACT SWITCH
ELECTRICAL SCHEMATIC;
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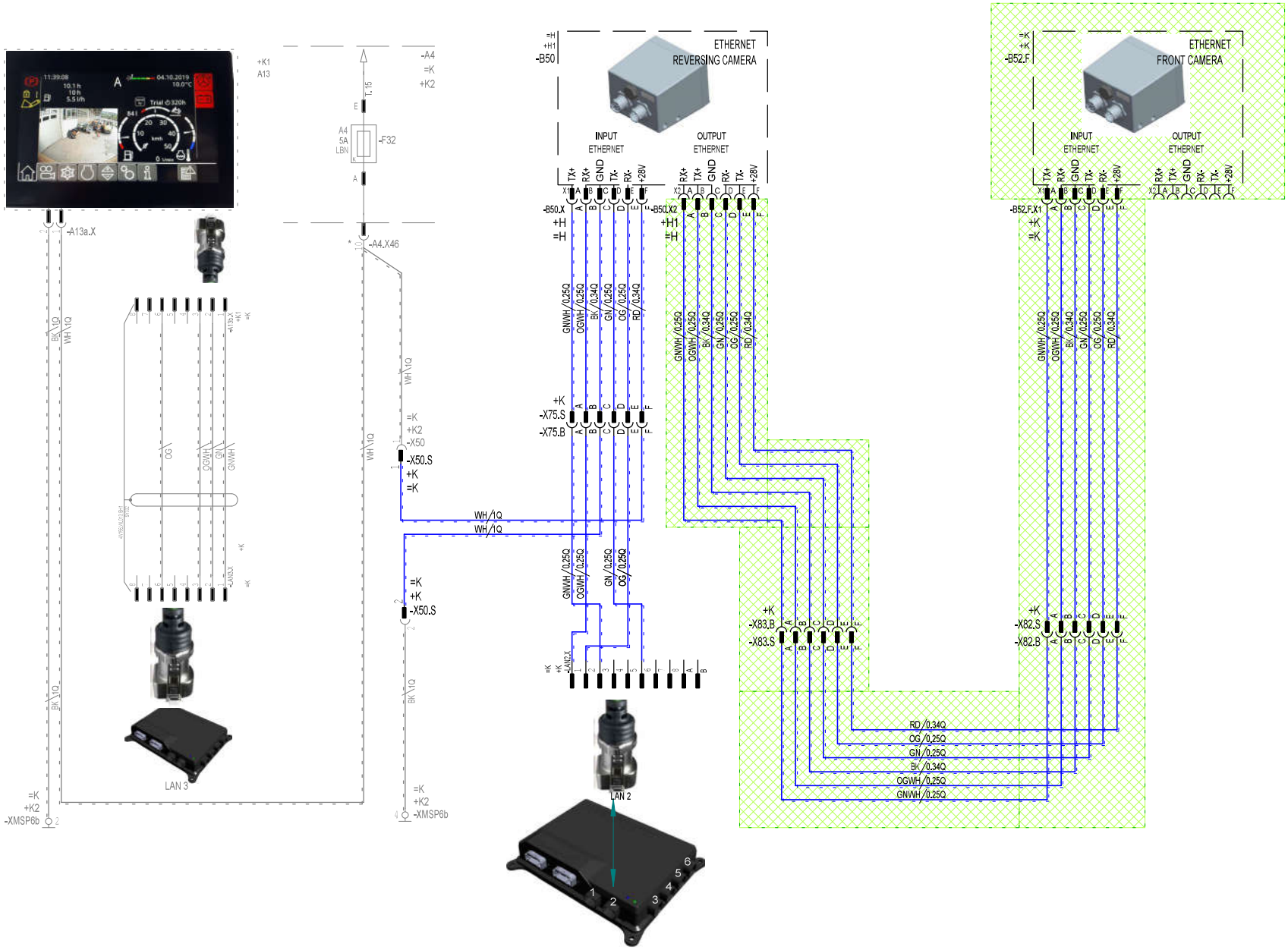
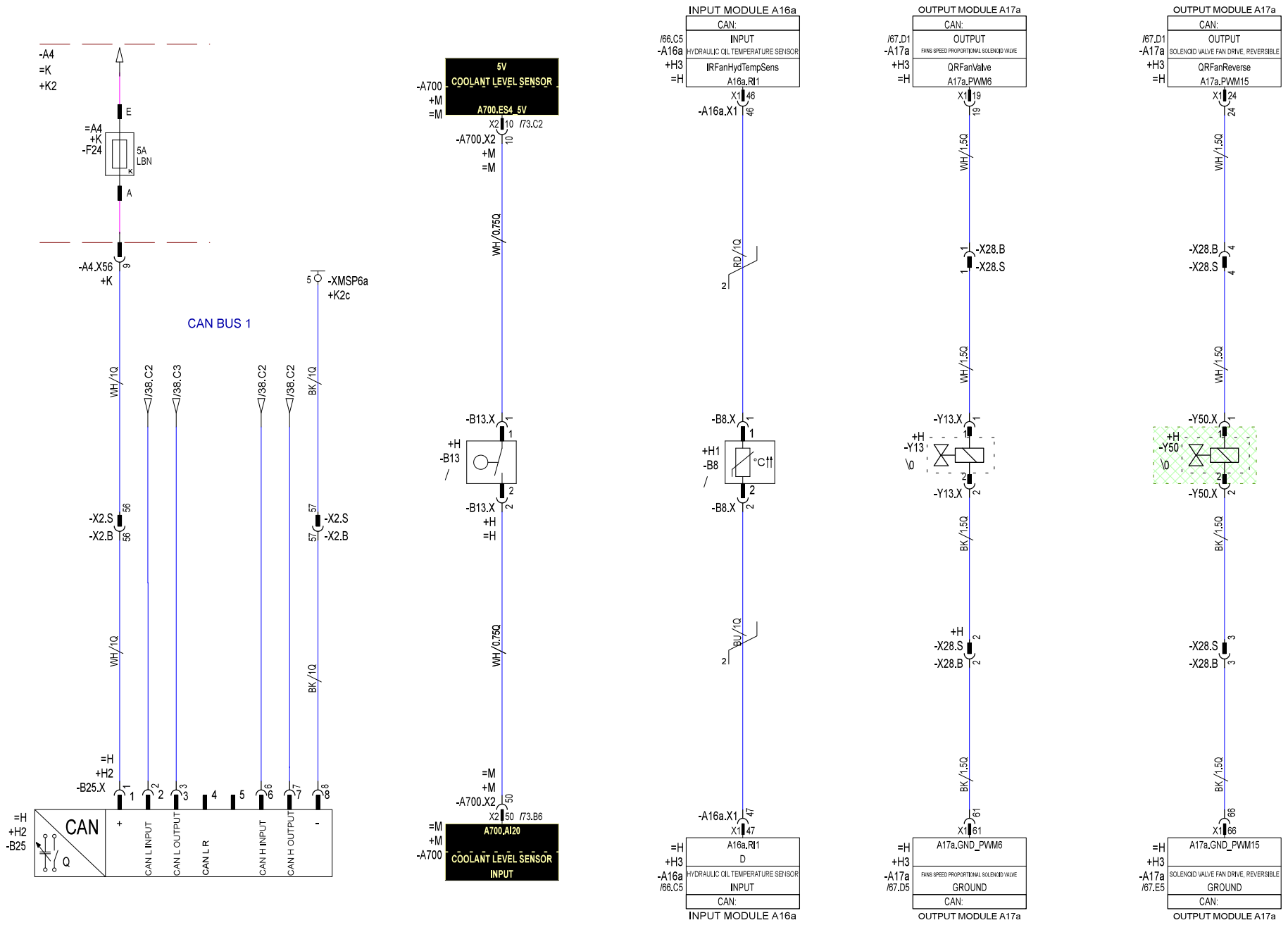
ITEM CODE	12466553
DRAWING INDEX	000
PROJECT	GG_4_EVO
DRAWING NUMBER	1333 90100 02 00



MACHINE TYPE	SERIAL NUMBER		REVERSING CAMERA; FRONT CAMERA	PAGE 37 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	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	HYDRAULIC OIL TEMPERATURE SENSOR ELECTRICAL SCHEMATIC;	PAGE 47 OF
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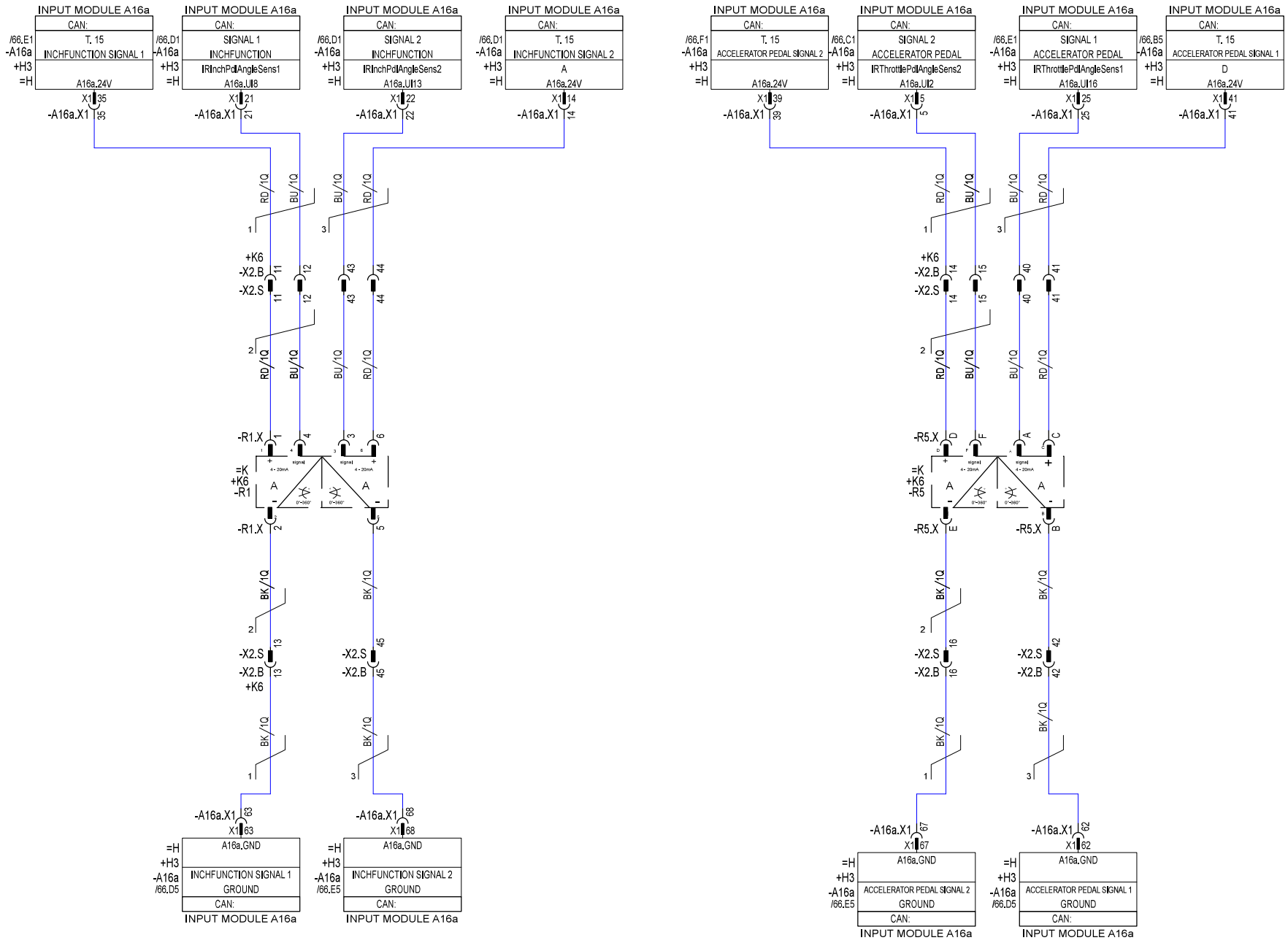


PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00
ITEM CODE 12466553
DRAWING INDEX 000

MACHINE TYPE	SERIAL NUMBER			
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	ANGLE SENSORS ELECTRICAL SCHEMATIC;	PAGE 57 OF
				CREATION DATE 09.10.2019 15:49

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

=H -A17a Modul Nr.:
+H3 Modulname:

ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN
A17a.24V_B1	/46.E1		POWER SUPPLY BANK 1	0	1
A17a.24V_logic	/45.F7		POWER SUPPLY	0	2
A17a.GND	/46.E1		GROUND	0	3
A17a.PWM1	/43.A2		PARKING BRAKE SOLENOID VALVE	0	4
A17a.PWM2	/42.A2		TILT-OUT PROPORTIONAL SOLENOID VALVE	0	5
A17a.PWM3	/42.A2		TILT-IN PROPORTIONAL SOLENOID VALVE	0	6
A17a.PWM4	/42.A4		LIFTING PROPORTIONAL SOLENOID VALVE	0	7
A17a.PWM9	/41.A1		WORKING HYDRAULICS PILOT PRESSURE SOLENOID VALVE	0	8
A17a.PWM10	/42.A4		LOWERING PROPORTIONAL SOLENOID VALVE	0	9
A17a.PWM11	/42.A5		3RD FUNCTION A PROPORTIONAL SOLENOID VALVE	0	10
A17a.PWM12	/42.A6		3RD FUNCTION B PROPORTIONAL SOLENOID VALVE	0	11
A17a.GND	/46.E5		GROUND	0	12
A17a.24V_logic				0	13
A17a.24V_B3	/46.E5		POWER SUPPLY BANK 3	0	14
A17a.24V_B2	/46.D3		POWER SUPPLY BANK 2	0	15
A17a.GND_logic	/45.F7		GROUND	0	16
A17a.GND	/46.D3		GROUND	0	17
A17a.PWM5				0	18
A17a.PWM6	/47.A6		FANS SPEED PROPORTIONAL SOLENOID VALVE	0	19
A17a.PWM7	/48.A3		WARNING BUZZER	0	20
A17a.PWM8	/41.A2		RIDE CONTROL SOLENOID VALVE	0	21
A17a.PWM13				0	22
A17a.PWM14	/25.A5		EMERGENCY STEERING PUMP MOTOR	0	23
A17a.PWM15	/47.A7		SOLENOID VALVE FAN DRIVE, REVERSIBLE	0	24
A17a.PWM16				0	25
A17a.GND	/46.D6		GROUND	0	26
A17a.GND_logic				0	27
A17a.24V_B4	/46.D6		POWER SUPPLY BANK 4	0	28
A17a.CAN_Res				0	29
A17a.24V				0	30
A17a.GND_DO1				0	31
A17a.V_DO1	/46.D8		POWER SUPPLY DIGITAL OUTPUT 1	0	32
A17a.DO1	/29.C8		REVERSING HEADLIGHT	0	33
A17a.V_DO2	/46.C5		POWER SUPPLY DIGITAL OUTPUT 2	0	34
A17a.DO2	/46.D5		POWER SUPPLY BANK 3	0	35
A17a.V_DO3	/64.D1		POWER SUPPLY DIGITAL OUTPUT 3	0	36
A17a.DO3	/64.D1		CENTRAL LUBRICATION SYSTEM MOTOR	0	37
A17a.V_DO4	/46.C1		POWER SUPPLY DIGITAL OUTPUT 4	0	38
A17a.DO4	/46.D1		POWER SUPPLY BANK 1	0	39
A17a.GND_DO3	/64.F4		CENTRAL LUBRICATION SYSTEM MOTOR	0	40

ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN
A17a.24V				0	41
A17a.24V				0	42
A17a.CAN_Low	/38.D4		CAN LOW	0	43
A17a.CAN_Low	/38.C4		CAN LOW	0	44
A17a.GND_DO2				0	45
A17a.GND_PWM1	/43.F2		PARKING BRAKE SOLENOID VALVE	0	46
A17a.GND_PWM2	/42.F1		TILT-OUT PROPORTIONAL SOLENOID VALVE	0	47
A17a.GND_PWM3	/42.F2		TILT-IN PROPORTIONAL SOLENOID VALVE	0	48
A17a.GND_PWM4	/42.F4		LIFTING PROPORTIONAL SOLENOID VALVE	0	49
A17a.GND_PWM9	/41.F1		WORKING HYDRAULICS PILOT PRESSURE SOLENOID VALVE	0	50
A17a.GND_PWM10	/42.F3		LOWERING PROPORTIONAL SOLENOID VALVE	0	51
A17a.GND_PWM11	/42.F5		3RD FUNCTION A PROPORTIONAL SOLENOID VALVE	0	52
A17a.GND_PWM12	/42.F6		3RD FUNCTION B PROPORTIONAL SOLENOID VALVE	0	53
A17a.GND_DO4				0	54
A17a.FI1	/26.A2		ROAD TRAVEL SWITCH	0	55
A17a.FI2	/24.E3		BATTERY MAIN SWITCH	0	56
A17a.CAN_High	/38.D5		CAN HIGH	0	57
A17a.CAN_High	/38.C5		CAN HIGH	0	58
A17a.GND				0	59
A17a.GND_PWM5				0	60
A17a.GND_PWM6	/47.F6		FANS SPEED PROPORTIONAL SOLENOID VALVE	0	61
A17a.GND_PWM7	/48.F3		WARNING BUZZER	0	62
A17a.GND_PWM8	/41.F2		RIDE CONTROL SOLENOID VALVE	0	63
A17a.GND_PWM13				0	64
A17a.GND_PWM14	/25.F1		EMERGENCY STEERING PUMP MOTOR	0	65
A17a.GND_PWM15	/47.F7		SOLENOID VALVE FAN DRIVE, REVERSIBLE	0	66
A17a.GNDPWM16				0	67
A17a.GND				0	68
A17a.GND_FI1				0	69
A17a.GND_FI2				0	70

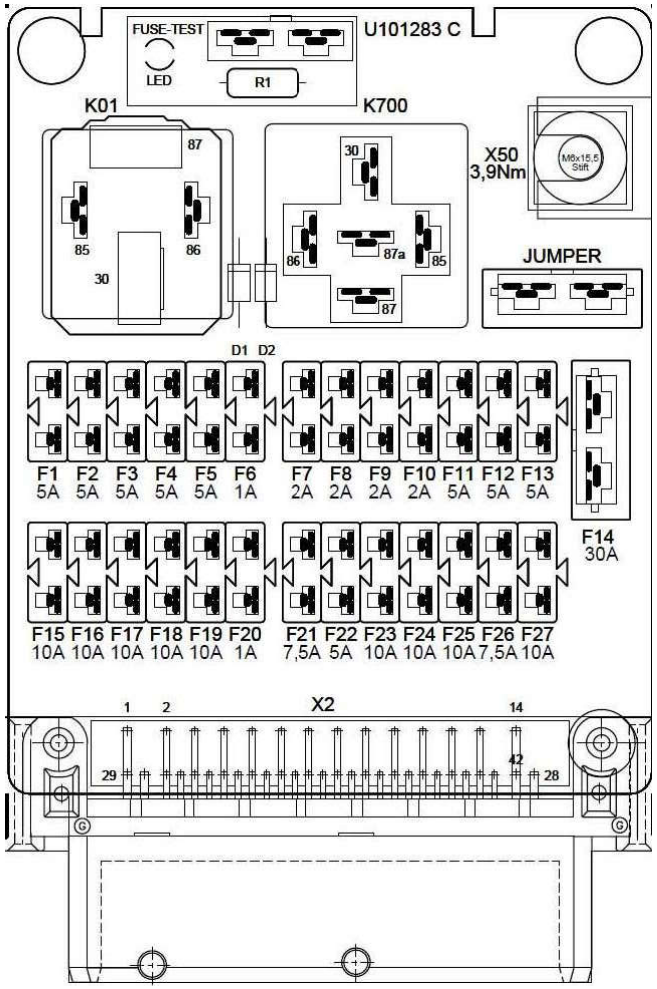
MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

OVERVIEW OUTPUT MODULE A17a
ELECTRICAL SCHEMATIC;

A4a	LBH ID 93030665 ZNG 1464 67391 01 00 003	SICHERUNGSTESTER FUSE - TEST	
F1-5A	INPUT&OUTPUT MODUL 1 INPUT&OUTPUT MODUL 1	F15-10A	OUTPUT MODUL 1 DO1 OUTPUT MODUL 1 DO1
F2-5A	INPUT MODUL 1 INPUT MODUL 1	F16-10A	OUTPUT MODUL 1 DO2 OUTPUT MODUL 1 DO2
F3-5A	RESERVE RESERVE	F17-10A	OUTPUT MODUL 1 DO3 OUTPUT MODUL 1 DO3
F4-5A	OUTPUT MODUL 1 BK2 OUTPUT MODUL 1 BK2	F18-10A	OUTPUT MODUL 1 DO4 OUTPUT MODUL 1 DO4
F5-5A	SCHALTER AUFSTIEG SWITCH ASCENT	F19-10A	OUTPUT MODUL 1 BK4 OUTPUT MODUL 1 BK4
F6-1A *	B785 HUMIDITITY SENSOR B785 HUMIDITITY SENSOR	F20-1A	A774 AdBlue TANK A774 AdBlue TANK
F7-2A	B726 NOX SENSOR UP B726 NOX SENSOR UP	F21-7,5A	M715 BREMSKLAPPE 1 M715 Exhaust Flap Actuator 1
F8-2A	B727 NOX SENSOR DOWN B727 NOX SENSOR DOWN	F22-5A	B730 ÖLNIVEAUGEBER B730 OIL LEVEL SENSOR
F9-2A	B783 NH3 SENSOR B783 NH3 SENSOR	F23-10A	WARNBLINKFUNKTION HAZARD WARNING SYSTEM
F10-2A *	LIDEC PS2 LIDEC PS2	F24-10A	GETRIEBE KL.30 TRANSMISSION KL.30
F11-5A *	WASSERVENTILE Y770, Y774 WATER VALVE Y770, Y774	F25-10A	SCHLAUCHHEIZUNG E770, E771 SCR LINEHEAT G1+2
F12-5A	RESERVE RESERVE	F26-10A	A709 SCR LUFTPUMPE A709 SCR AIR PUMP
F13-5A *	DIAGNOSE MOTOR DIAGNOSTIC ENGINE	F27-7,5A	K15/30 SICHERHEITSKREIS K15/30 SAVETY CIRCUIT
F14-30A	LIDEC PS1 / ECU3 LIDEC PS1 / ECU3	JUMPER	NICHT IN VERWENDUNG NOT USED
*	NICHT IN VERWENDUNG BEI STUFE 5 NOT IN USE AT STAGE 5		



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	OVERVIEW FUSE STICKER A4a ELECTRICAL SCHEMATIC;	PAGE 77 OF CREATION DATE 09.10.2019 15:49

PROJECT GG_4_EVO
DRAWING NUMBER 1333 90100 02 00
ITEM CODE 12466553
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CAN 2

-XC2.S. A — GN /0.75Q — X1 44 — INPUT MODULE A16b
-XC2.S. C — YE /0.75Q — X1 58 — INPUT MODULE A16b
-XC2.B +H3 C — YE /0.75Q — -A17b.X1 57 — OUTPUT MODULE A17b
-XC2.B A — GN /0.75Q — -A17b.X1 43 — OUTPUT MODULE A17b
-XC2.B B — WH /0.75Q — -A17b.X1 29 — OUTPUT MODULE A17b
-XC.END3 — A WH /0.75Q — B — C

INPUT MODULE A16b
CAN:
/90.E2 -A16b +H3 =H — CAN TERMINATOR / CAN TERMINATOR
/90.C5 -A16b +H3 =H — CAN LOW / CAN LOW / D / A16b.CAN_Low
/90.D5 -A16b +H3 =H — CAN HIGH / CAN HIGH / A16b.CAN_High
A16b.CAN_Low
A16b.CAN_High
A16b.CAN_Res

OUTPUT MODULE A17b
CAN:
=H +H3 -A17b /89.D5 — A17b.CAN_High — CAN HIGH / CAN HIGH
=H +H3 -A17b /89.C5 — A17b.CAN_Low — D — CAN LOW / CAN LOW
=H +H3 -A17b /89.E2 — A17b.CAN_Res — CAN TERMINATOR / CAN TERMINATOR

-XC2.S — -X2.B -X2.S +K6 =K
-XC2.B* — -X2.B -X2.S +K6 =K

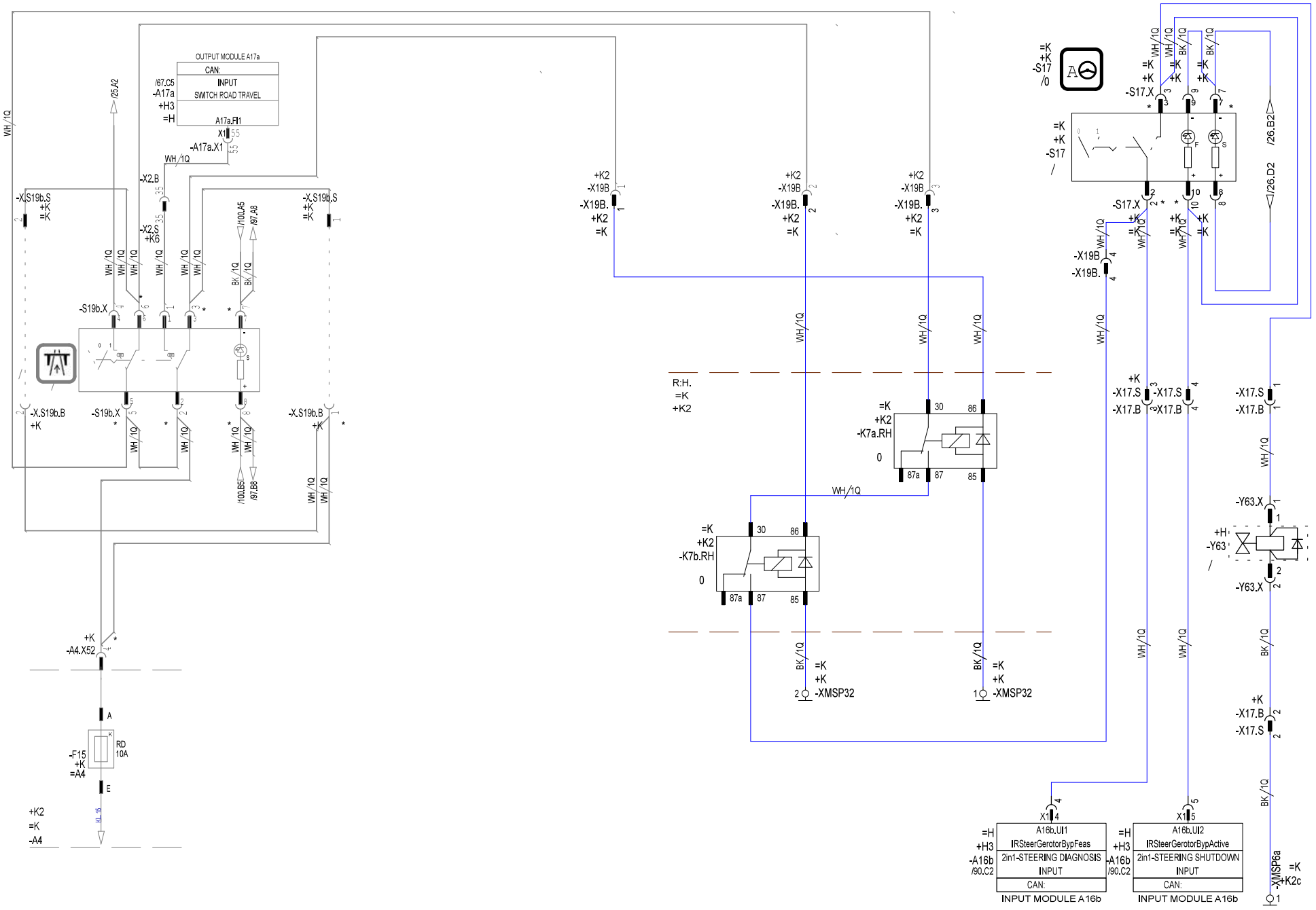
CONTROL LEVER CAN MODULE
/70.C4 -A26 +K4 =K — CAN TERMINATOR
-A26 +K4 =K — CAN LOW A
-A26 +K4 =K — CAN HIGH A

CAN:
/65.C3 -A15.M5 +K =K — CAN LOW 2 / CAN LOW 2 / A / A15.M5.CAN2L
/65.B3 -A15.M5 +K =K — CAN HIGH 2 / CAN HIGH 2 / A / A15.M5.CAN2H

-A15.M5.X1 — -CAN 2 + 3.X.S — -CAN 2 + 3.X.B — -X5a.S — =K +K4 -A26.X

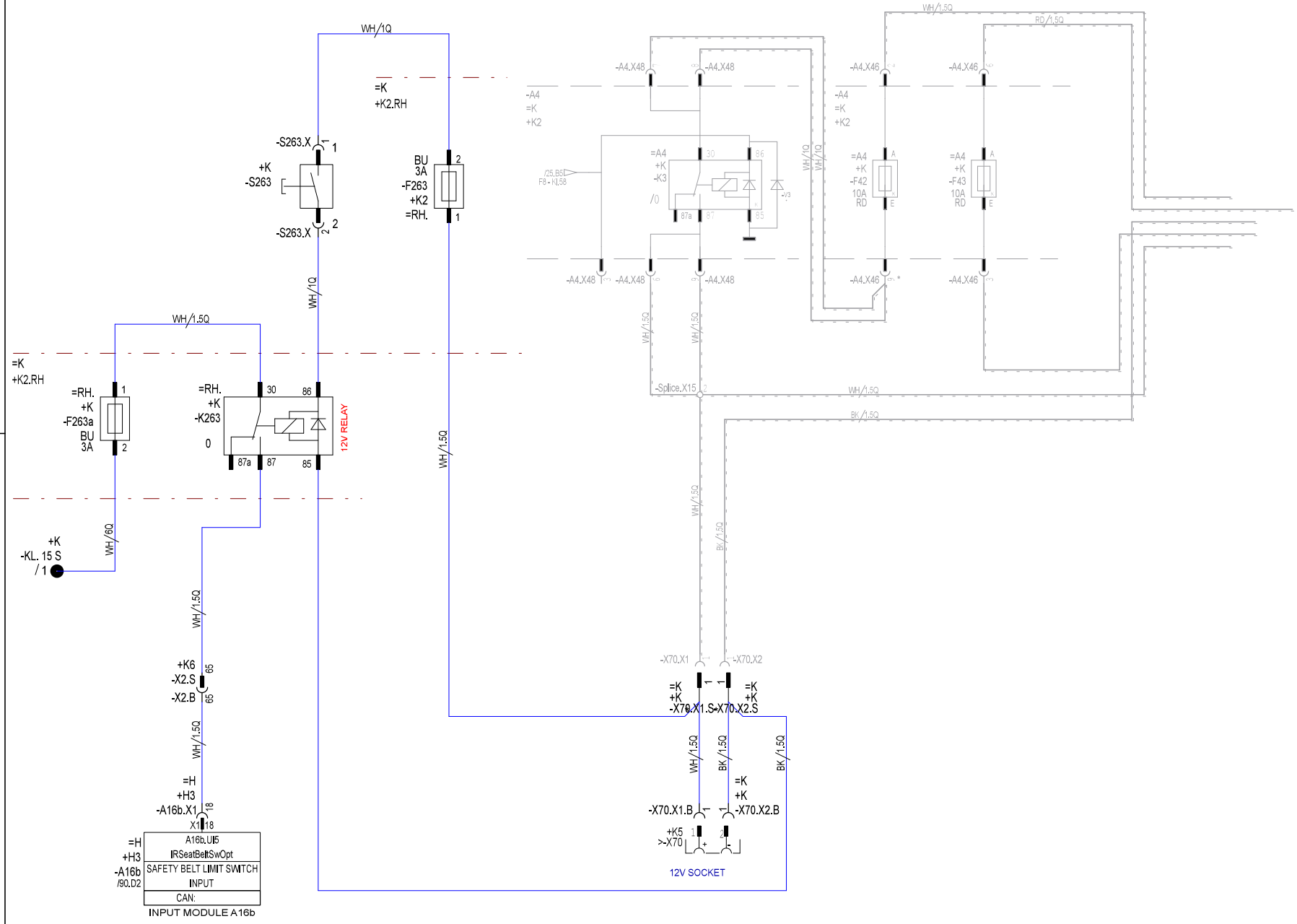
-A26.X +K4 =K — -X5a.S

MACHINE TYPE	SERIAL NUMBER			
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	OPTION CAN 2 INPUT MODULE A16b; OUTPUT MODULE A17b ELECTRICAL SCHEMATIC;	PAGE 87 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	OPTION 2in1 STEERING SWITCH ELECTRICAL SCHEMATIC;	PAGE 97 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	OPTION SAFETY BELT LIMIT SWITCH ELECTRICAL SCHEMATIC;	PAGE 107 OF
				CREATION DATE 09.10.2019 15:49

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

=H -A17c Modul Nr.:
+H3 Modulname:

ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN	ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN
A17c.24V_B1	/118.D2		POWER SUPPLY BANK 1	0	1	A17c.24V				0	41
A17c.24V_logic	/118.D1		POWER SUPPLY	0	2	A17c.24V				0	42
A17c.GND	/118.D2		GROUND	0	3	A17c.CAN_Low	/118.D7		CAN LOW	0	43
A17c.PWM1	/119.A6		SOLENOID VALVE PIPE BREAK PROTECTION	0	4	A17c	/118.D7		CAN LOW	0	44
A17c.PWM2	/119.A7		WORKING BASKET LOCKING VALVE	0	5	A17c.GND_DO2				0	45
A17c.PWM3	/119.A8		WORKING BASKET LOAD SENSING PRESSURE REDUCTION	0	6	A17c.GND_PWM1	/119.F6		SOLENOID VALVE PIPE BREAK PROTECTION	0	46
A17c.PWM4				0	7	A17c.GND_PWM2	/119.F7		WORKING BASKET LOCKING VALVE	0	47
A17c.PWM9				0	8	A17c.GND_PWM3	/119.F8		WORKING BASKET LOAD SENSING PRESSURE REDUCTION	0	48
A17c.PWM10				0	9	A17c.GND_PWM4				0	49
A17c.PWM11				0	10	A17c.GND_PWM9				0	50
A17c.PWM12				0	11	A17c.GND_PWM10				0	51
A17c.GND	/118.D3		GROUND	0	12	A17c.GND_PWM11				0	52
A17c.24V_logic				0	13	A17c.GND_PWM12				0	53
A17c.24V_B3	/118.D4		POWER SUPPLY BANK 3	0	14	A17c.GND_DO4				0	54
A17c.24V_B2	/118.D3		POWER SUPPLY BANK 2	0	15	A17c.FI1	/119.D5		WORKING BASKET	0	55
A17c.GND_logic	/118.D1		GROUND	0	16	A17c.FI2	/119.D4			0	56
A17c.GND	/118.D4		GROUND	0	17	A17c.CAN_High	/118.D8		CAN HIGH	0	57
A17c.PWM5				0	18	A17c.CAN_High	/118.D8		CAN HIGH	0	58
A17c.PWM6				0	19	A17c.GND				0	59
A17c.PWM7				0	20	A17c.GND_PWM5				0	60
A17c.PWM8				0	21	A17c.GND_PWM6				0	61
A17c.PWM13				0	22	A17c.GND_PWM7				0	62
A17c.PWM14				0	23	A17c.GND_PWM8				0	63
A17c.PWM15				0	24	A17c.GND_PWM13				0	64
A17c.PWM16				0	25	A17c.GND_PWM14				0	65
A17c.GND	/118.D5		GROUND	0	26	A17c.GND_PWM15				0	66
A17c.GND_logic				0	27	A17c.GNDPWM16				0	67
A17c.24V_B4	/118.D5		POWER SUPPLY BANK 4	0	28	A17c.GND				0	68
A17c.CAN_Res	/118.D6		CAN TERMINATOR	0	29	A17c.GND_FI1				0	69
A17c.24V				0	30	A17c.GND_FI2				0	70
A17c.GND_DO1				0	31						
A17c.V_DO1				0	32						
A17c.DO1				0	33						
A17c.V_DO2				0	34						
A17c.DO2				0	35						
A17c.V_DO3				0	36						
A17c.DO3				0	37						
A17c				0	38						
A17c.DO4				0	39						
A17c.GND_DO3				0	40						

MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

OPTION OUTPUT MODULE A17c
ELECTRICAL SCHEMATIC;

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CREATION DATE 09.10.2019 15:49

F34 X5a.S.32
SPLICE. X3

/39.C5
WH/0.5Q
=K
+K4
-A37.X
5
X 5
=K
+K4
-A37
/130.D5
A37.5
BUTTON-OPERATED HORN
T. 15
CAN:
KEYPAD 2

A26.X.20
SPLICE.
X5a.S.5

/33.C1
WH/0.5Q
=K
+K4
-A37.X
11
X 11
=K
+K4
-A37
/130.E5
A37.11
BUTTON-OPERATED HORN
OUTPUT
CAN:
KEYPAD 2

MANUAL WIPE

/124.C2
WH/1.5Q
=K
+K6
-X5a.B
21
-X5a.S
21
+K6
=K
WH/0.5Q
=K
+K4
-A37.X
6
X 6
=K
+K4
-A37
/130.D5
A37.6
MANUAL WIPE
T. 15
CAN:
KEYPAD 2

/33.C6
WH/1.5Q
=K
+K6
-X5a.B
22
22
WH/0.5Q
=K
+K4
-A37.X
12
X 12
=K
+K4
-A37
/130.E5
A37.12
MANUAL WIPE
OUTPUT
CAN:
KEYPAD 2

F48 X5a.S.31
-SPLICE.-F48

/39.C4
RD/0.5Q
=K
+K4
-A38.X
5
X 5
=K
+K4
-A38
/131.D5
A38.5
S3_IN
INPUT
CAN:
KEYPAD 3

n.c.

-X5a.B
25
25
WH/0.5Q
=K
+K4
-A38.X
11
X 11
=K
+K4
-A38
/131.E5
A38.11
S3_OUT
OUTPUT
CAN:
KEYPAD 3

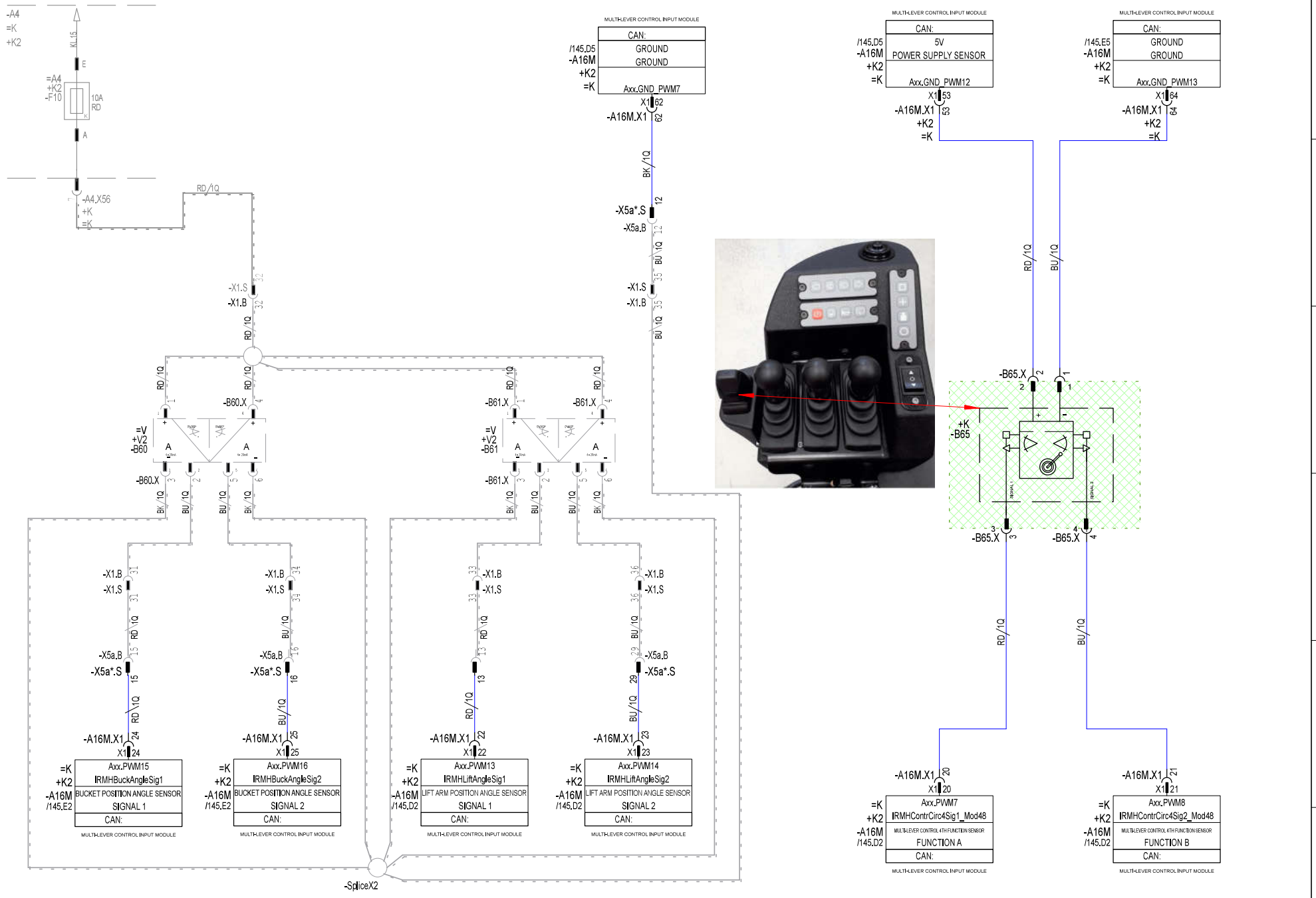
-X100 > A3 > RADIO MUTE SWITCH

/36.E8
BK/0.5Q
=K
+K2
-A35.X
A1
X A1
=K
+K2
-A35
/132.B1
A35.1.LS_DO
RADIO MUTE SWITCH
OUTPUT
CAN:

RESERVE

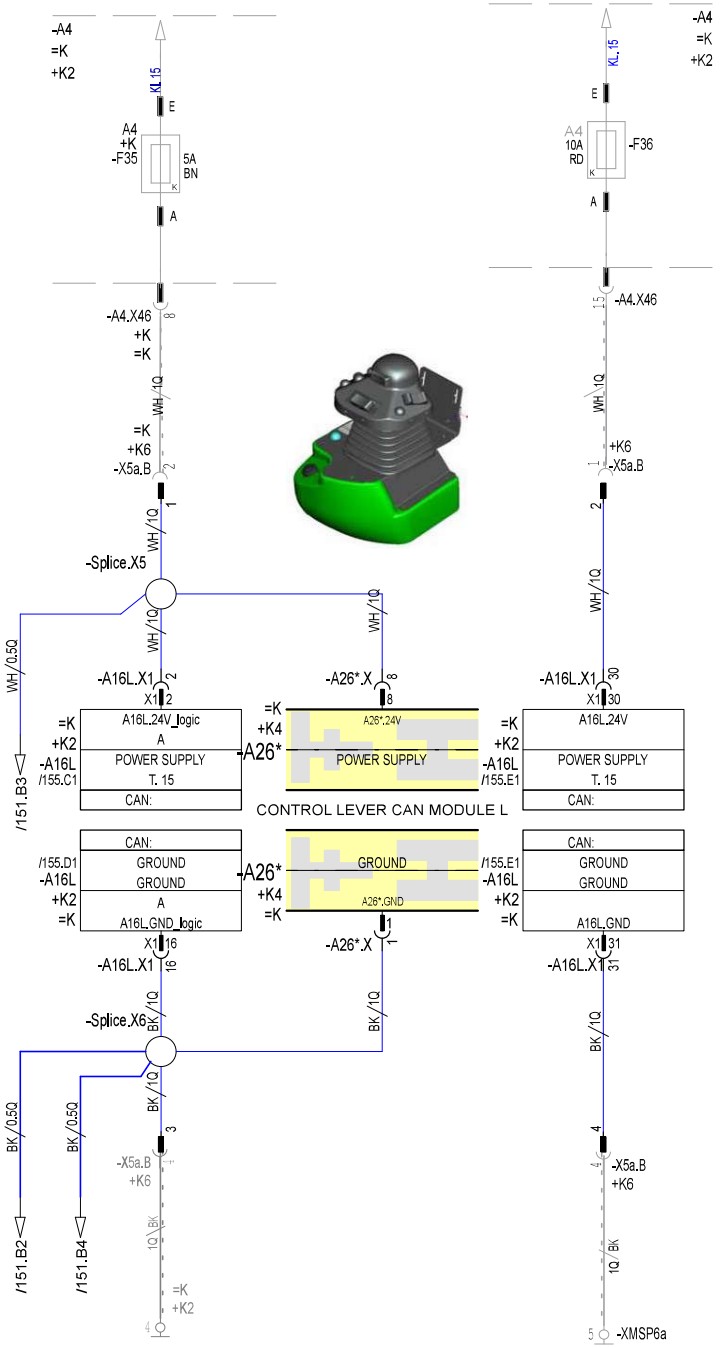
MACHINE TYPE	SERIAL NUMBER			
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	MANUAL WIPE, HORN, RADIO RADIO MUTE SWITCH ELECTRICAL SCHEMATIC;	PAGE 127 OF
				CREATION DATE 09.10.2019 15:49

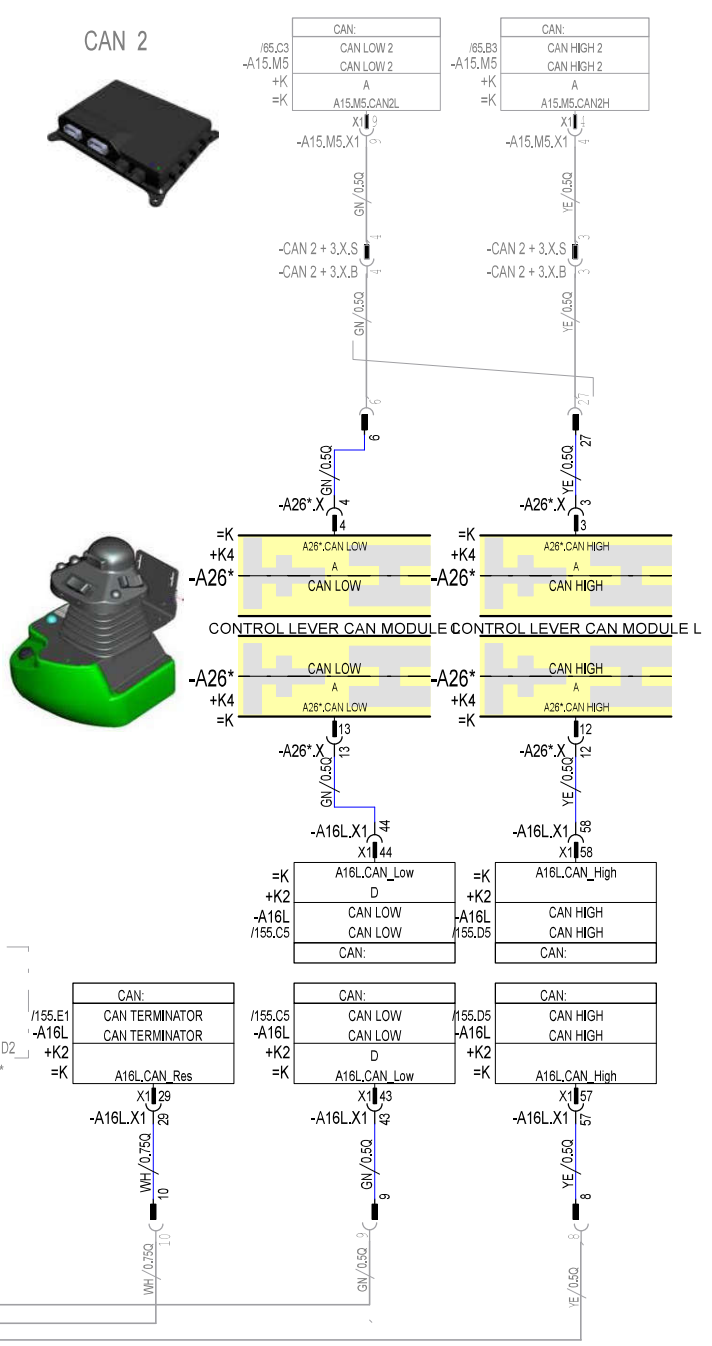
ITEM CODE	12466553
DRAWING INDEX	000
PROJECT	GG_4_EVO
DRAWING NUMBER	1333 90100 02 00



MACHINE TYPE	SERIAL NUMBER		VERSION 1 MULTI-LEVER CONTROL	PAGE 137 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	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





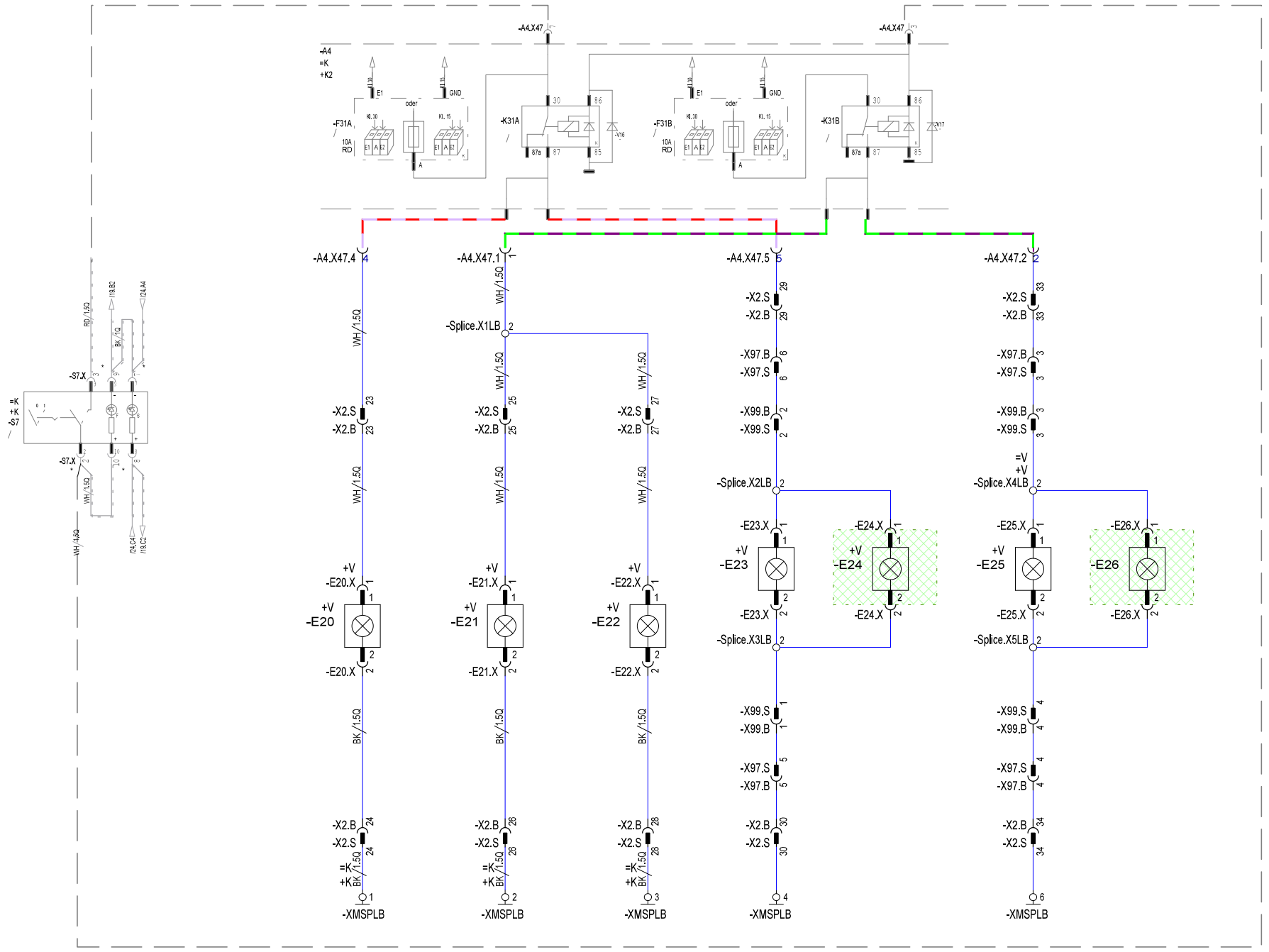
MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

VERSION 2 LogHandler INPUT MODULE
ELECTRICAL SCHEMATIC;

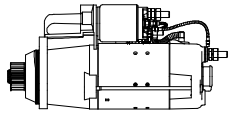
PAGE 147 OF
CREATION DATE 09.10.2019 15:49

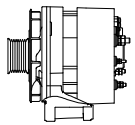


MACHINE TYPE	SERIAL NUMBER			
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	VERSION 2 LogHandler LIGHTING ELECTRICAL SCHEMATIC;	PAGE 157 OF
				CREATION DATE 09.10.2019 15:49

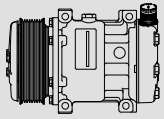
TYPE MOTOR_SPL

PROJECT: 11392210





OPTIONAL CONNECTION CUSTOMER



-Y760

1

-NI

COMPRESSOR FOR AIR CONDITIONER

-M700

30 50 M 31

7,8kW

STARTER

BK /35mm²

-XMSP701 1

RD /35mm²

-G700

D+ W G - 3~ B+ B-

LETRIKA 140A

ALTERNATOR

RD /1.00mm²

WH /1.00mm²

5 A

-F705

REPAIR KIT: 10138874

-F705.X

A PAT

-F705.X

PAT

-F705 OR 5 A

A

-F705.X

A

RD /1.00mm²

-XM707 *

-XM703 *

WH /1.50mm²

RD /0.75mm²

WH /1.00mm²

WH /0.75mm²

3

X1 3 /7.A2

Axx.DOHS1

Strtr1

STARTER_50

ACTUATION

-A700

MOTOR ECU

33

X1 33 /7.D2

Axx.AI1

Alt 1

ALTERNATOR 1 B+

SIGNAL (0-5V)

-A700

MOTOR ECU

123

/9.C4

46

X1 46 /7.F2

Axx.AI4

Alt 1

ALTERNATOR 1 D+

SIGNAL (0-5V)

-A700

MOTOR ECU

REPLACEMENT FOR	MARKED	lmbbag1	LIEBHERR	A3	DESIGNATION	DESCRIPTION	ARTICLE CODE	SYSTEM	LOCATION
0	DATE	13.12.2017 09:59			ELECTRICAL WIRING DIAGRAM	STARTER, ALTERNATOR, COMPRESSOR FOR AIR CONDITIONER	11392207	=M	+M
CONFIDENTIAL	CHECKED	lmbbua0	FACTORY LMB				DRAWING NUMBER 96 006 9309 90	INDEX 000	SHEET 8 FROM 16
	TECHNICAL REFEREE								

110.4 Electronic control unit

110.4.1 General overview of electronic control system

Valid for: L586-1761;

1 Layout

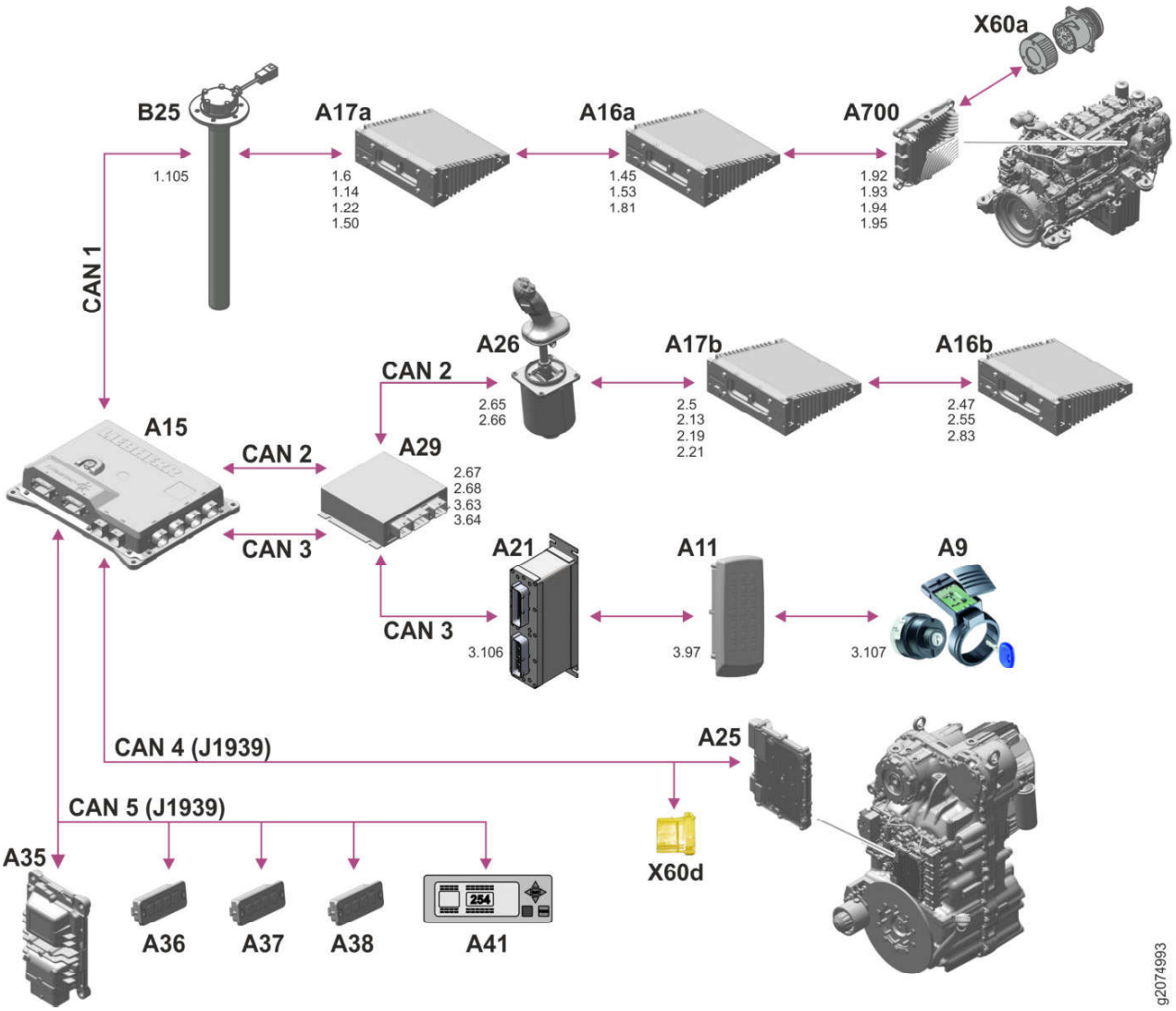


Fig. 473: General overview of electronic control system

BMK	Component	CAN line	CAN address
A9	Immobiliser (option)	3	107
A11	Control unit	3	97
A15	Central control unit (Master5-Premium)		

1 Layout

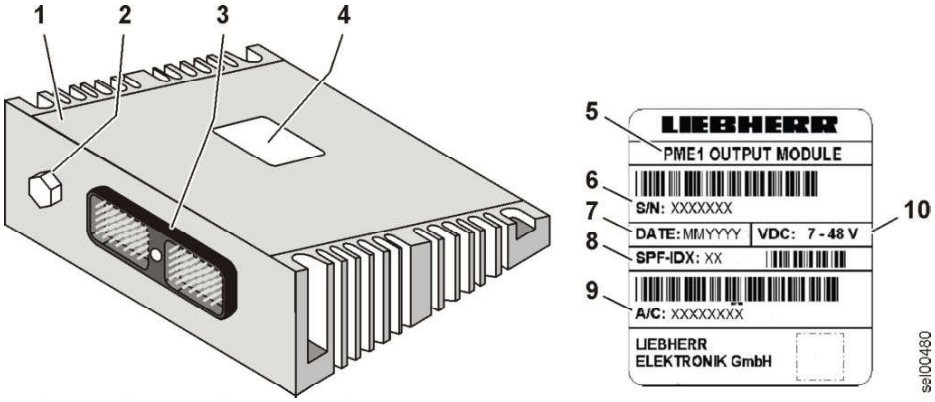


Fig. 482: Output module with type plate

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

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

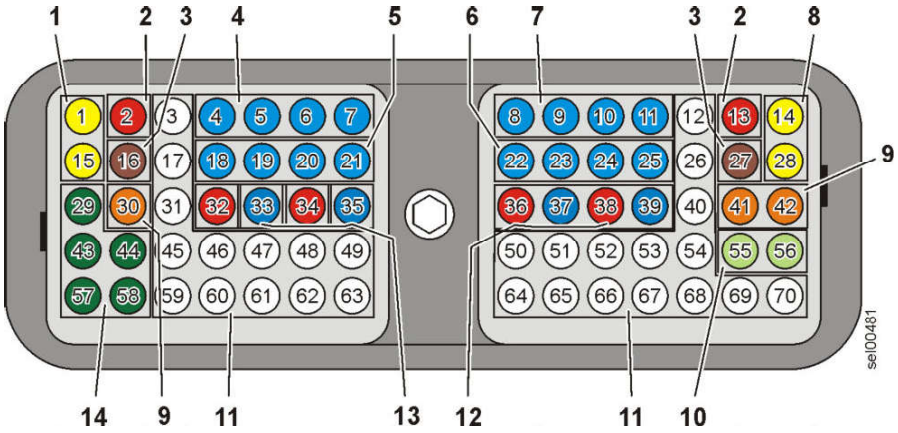


Fig. 483: Plug assignment of output modules

1	Power supply for bank 1 and 2	**8**	Power supply for bank 3 and 4
2	Power supply for logic	**9**	Encoder supply voltage 24 V
3	Earth for logic	**10**	Frequency measurement inputs
4	Power outputs 1.3 A, bank 1	**11**	Common earth
5	Power outputs 1.3 A, bank 2	**12**	Power supply 8 A, switching output
6	Power outputs 1.3 A, bank 4	**13**	8 A, switching output
7	Power outputs 1.3 A, bank 3	**14**	CAN interface

2 Function

The output module is part of the control system and is linked to the central control unit via a CAN bus interface. The central control unit can specify the current from the outputs via the CAN bus. The module regulates what currents are required

120 Gearbox

Contents

LBH/12252628/01/211-20191218_155739/en

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

Tab. 225: Key

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

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

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

2.3.3 Machine moving and accelerating (clutch K1 closed)

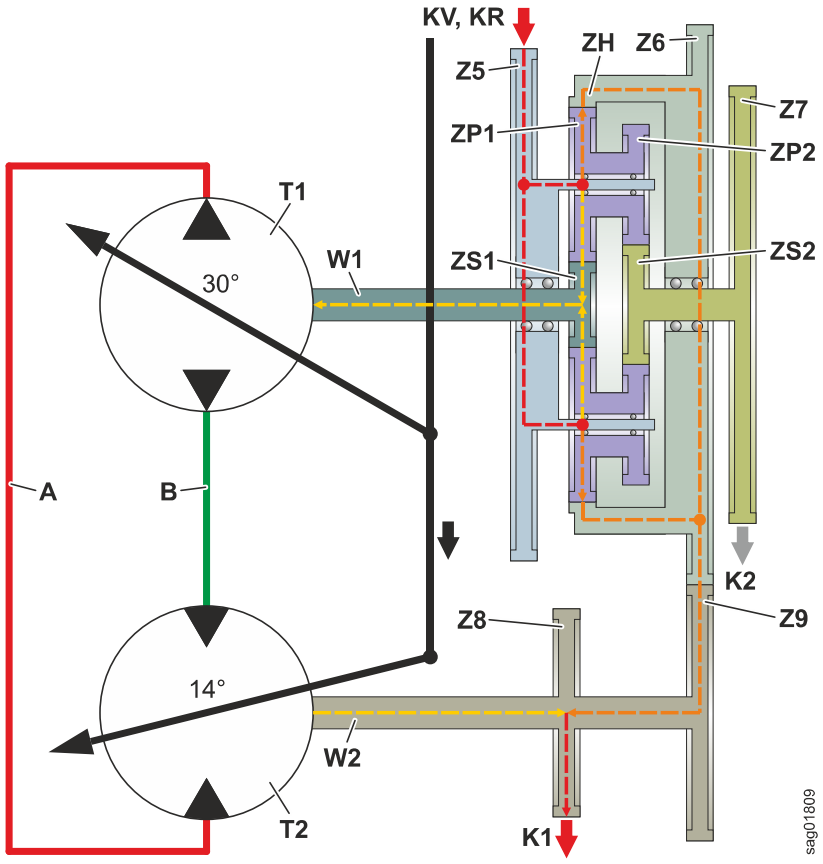


Fig. 496: Machine moving and accelerating (clutch K1 closed)

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

120.2.3 Transmission control valve block

Valid for: L586-1761;

1 Layout

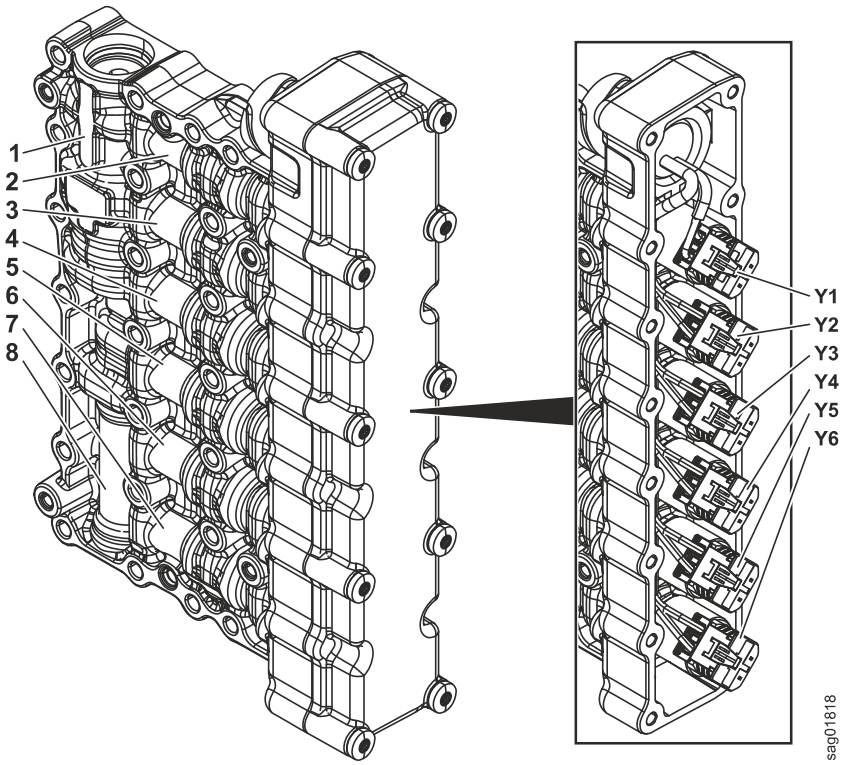


Fig. 502: Transmission control valve block (from front left)

1 Main pressure valve 20 bar
2 Secondary spool for clutch 2 (K2)
3 Secondary spool for forward travel direction clutch (KV)
4 Secondary spool for optional connection
5 Secondary spool for reverse travel direction clutch (KR)
6 Secondary spool for clutch 1 (K1)
7 Secondary spool for clutch 3 (K3)
8 Pressure reducing valve 9 bar

BMK	Function	BMK	Function	BMK	Function
Y1	Proportional solenoid for clutch 2 (K2)	**Y3**	Proportional solenoid for optional connection	**Y5**	Proportional solenoid for clutch 1 (K1)
Y2	Proportional solenoid for forward travel direction clutch (KV)	**Y4**	Proportional solenoid for reverse travel direction clutch (KR)	**Y6**	Proportional solenoid for clutch 3 (K3)

Tab. 231: Equipment codes

The transmission control valve block is bolted to front of transmission.

LBH/12252628/01/211-20191218_155739/en

120.3.3 Gear shifting proportional solenoid

Valid for: L586-1761;

1.1 Layout

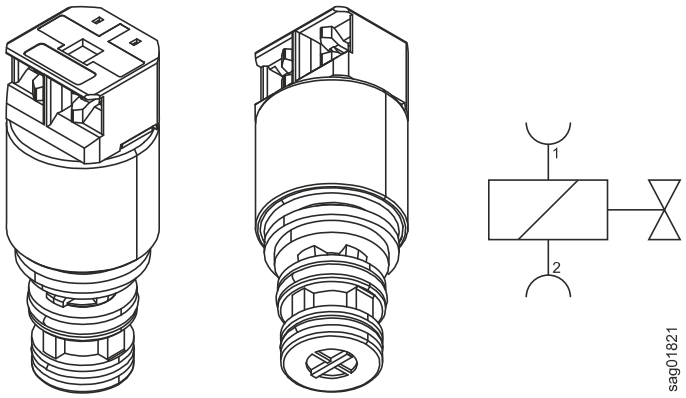


Fig. 510: Gear shifting proportional solenoid

BMK	Function
Y1	Proportional solenoid for clutch 2 (K2)
Y2	Proportional solenoid for forward travel direction clutch (KV)
Y3	Proportional solenoid for 1st optional connection
Y4	Proportional solenoid for reverse travel direction clutch (KR)
Y5	Proportional solenoid for clutch 1 (K1)
Y6	Proportional solenoid for clutch 3 (K3)

Tab. 240: Equipment codes

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

2.1 Function

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

LBH/12252628/01/211-20191218_155739/en

2.2 Self-locking differential

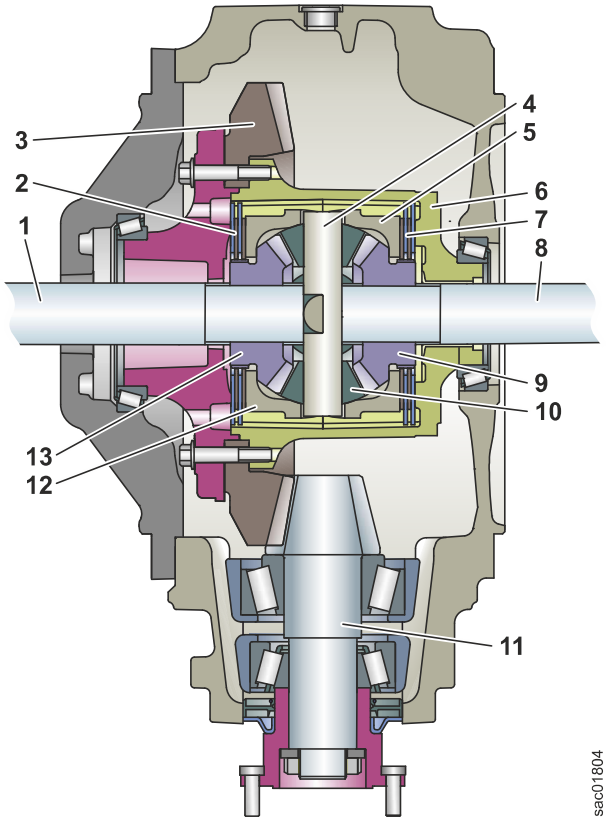


Fig. 519: Self-locking differential

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

2.2.1 Speed balance

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

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

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

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

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

140.1.2 Articulation lock

Valid for: L586-1761;

1 Layout

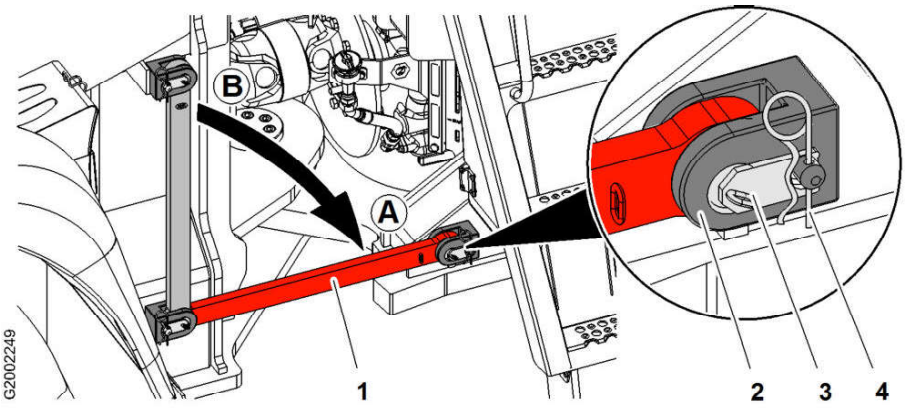

Fig. 526: Engaging the articulation lock

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

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

2 Function

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

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

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2.3.1 Opening solenoid valve for quick coupler

Solenoid valve for quick coupler **2** determines which side of hydraulic cylinder for quick coupler locking is pressurised. In order to open quick coupler, solenoid valve for quick coupler **2** is energized.

150.2.3 Quick coupler electrics

150.2.3.1 Quick coupler electric control unit

Valid for: L586-1761;

1 Basic function

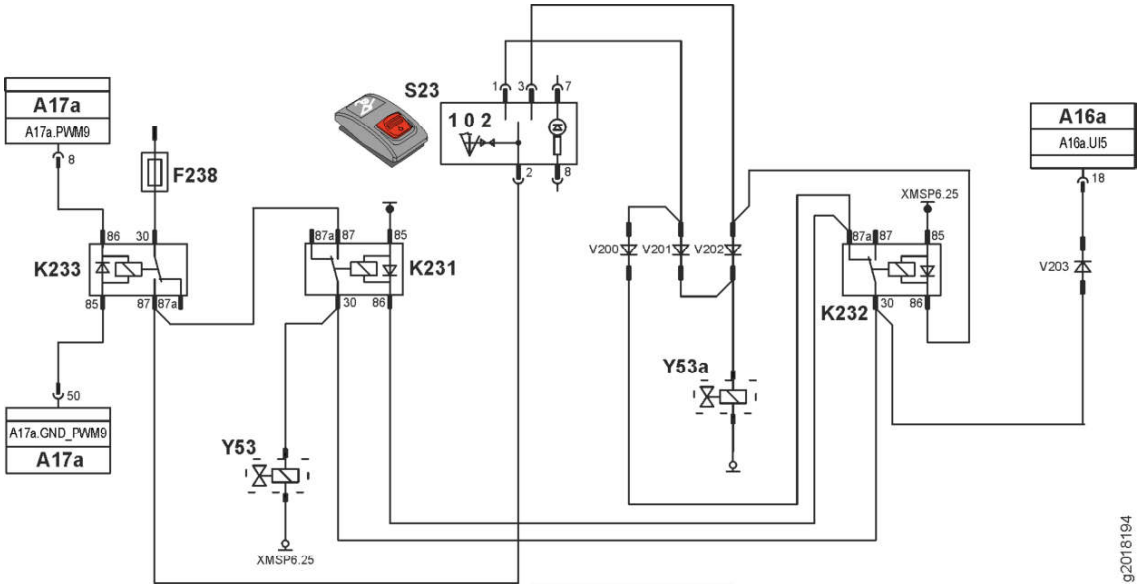

Fig. 533: Quick coupler electric control unit

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

Tab. 257: Items

The quick coupler is unlocked and locked using the *quick coupler* button **S23**.

The electronic control unit is powered via the quick coupler fuse **F238**.

The quick coupler solenoid valve **Y53** is controlled by the quick coupler unlocking relay **K231**.

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2.1 Basic function

The cab is equipped with a hot water heater and an air conditioning unit as standard.

2.2 Hot water heating function

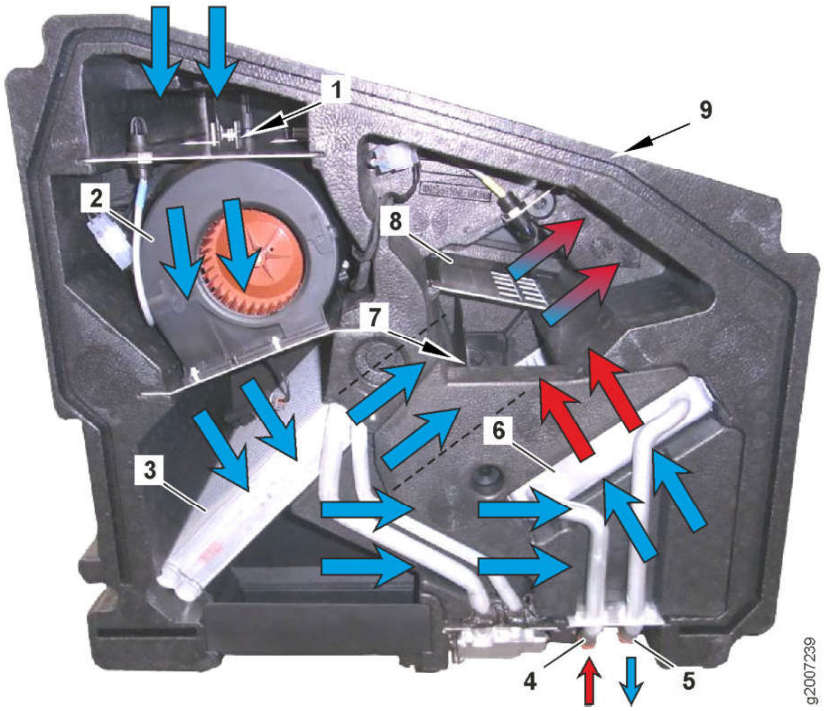

Fig. 540: Hot water heating function

1	Fresh air flap	**6**	Heat exchanger
2	Blower	**7**	Cooling/heating mixer flap
3	Evaporator	**8**	Mixer plate
4	Cooling water forward flow	**9**	Air distributor flap
5	Cooling water return flow		

The blower **2** draws in ambient air. The air drawn in is forced through the evaporator **3** to the heat exchanger **6**.

The heat exchanger is heated by hot coolant from the engine.

The air is heated as it flows through the heat exchanger. The heated air is distributed through the flap **9** to the cab.

The outlet temperature is regulated using the cooling/heating mixer flap **7**. The outlet temperature depends on the mixing ratio between ambient air coming directly from the evaporator and ambient air that has been heated by the heat exchanger.

The air flow is controlled by the various speeds of the blower.

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160.3.3 Air conditioning controller

Valid for: L586-1761;

1 Layout

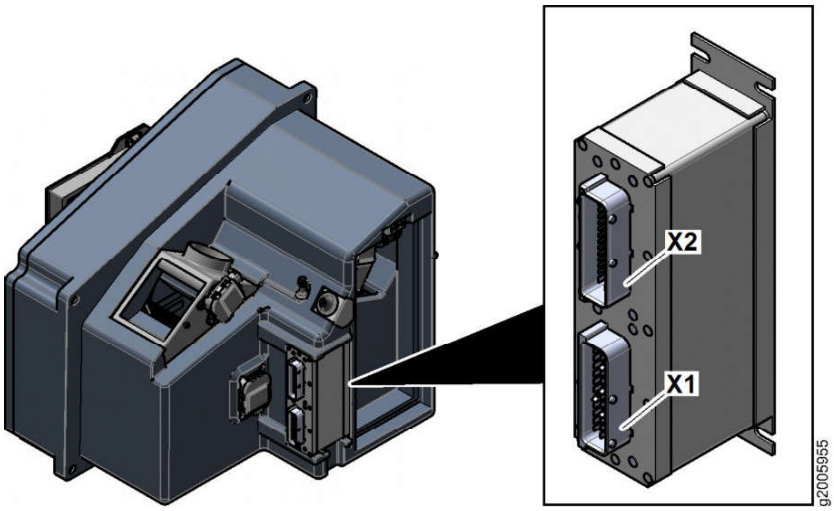

Fig. 549: Air conditioning controller A21

X1 Connector A21.X1 **X2** Connector A21.X2

Air conditioning controller is installed heating and air conditioning unit.

2 Function

Air conditioning controller A21 is connected via CAN bus to central control unit.

Air conditioning controller is responsible for controlling heating and air conditioning unit.

Air conditioning controller processes data from sensors and controls servo motors.

2.1.1 Connector A21.X1

This plug connects air conditioning controller to vehicle components (such as central control unit, air conditioning compressor and condenser fan).

Pin	Function	Pin	Function
1	Terminal 30	16	CAN_Low OUT
2	Ground	17	CAN_High OUT
3	Terminal 15	18	Ground
4	Auxiliary heater	19	Terminal 30
5	Signal from air conditioning pressure switch B27	20	Spare
6	Spare signal from air conditioning pressure switch	21	Spare
7	Spare	22	Spare
8	Condenser fan M13	23	Spare
9	Door contact S70	24	Spare
10	Condenser coupling Y22	25	Spare

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With the parallel circuit, 24 volts are present at each condenser fan. The fans run at high speed.

Condenser fan operation in serial circuit (low speed):

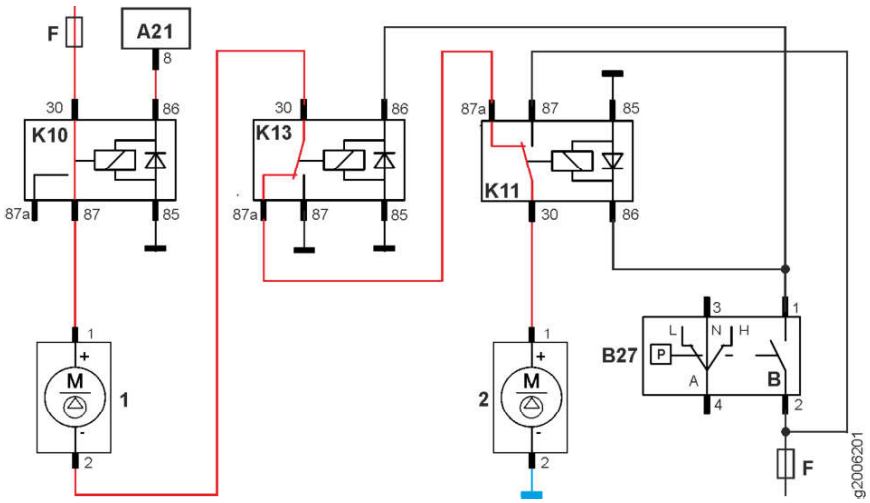


Fig. 555: Condenser fan operation in serial circuit (low speed)

B	Pressure switch for increasing the fan speed	**K10**	Relay
B27	Air conditioning pressure switch	**1**	Condenser fan M13
A21	Air conditioning controller	**2**	Condenser fan M13a

The pressure switch for increasing the fan speed **B** is open.

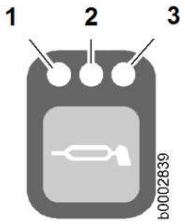
The relay **K10** is activated via an output on the air conditioning controller **A21**.

The relay **K10** powers the condenser fan M13 **1** and then the condenser fan M13a **2**.

In the series circuit, the applied voltage (24 V) is distributed equally (12 V each) to the two condenser fans.

The two condenser fans run at low speed.

Condenser fan operation in parallel circuit (high speed):



2.5 Non-scheduled lubrication intensity (cycle settings)

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

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

2.6 Setting the lubrication intensity

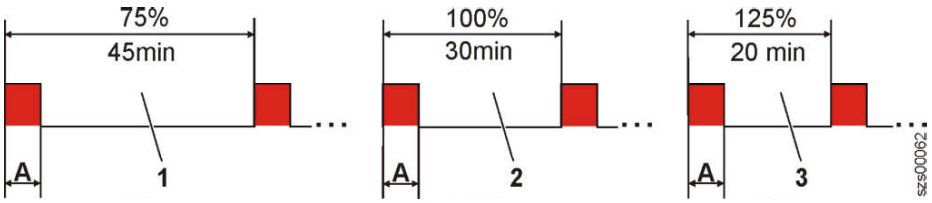


Fig. 565: Lubrication processes

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

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

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

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

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

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

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2 Function

2.1 Basic function

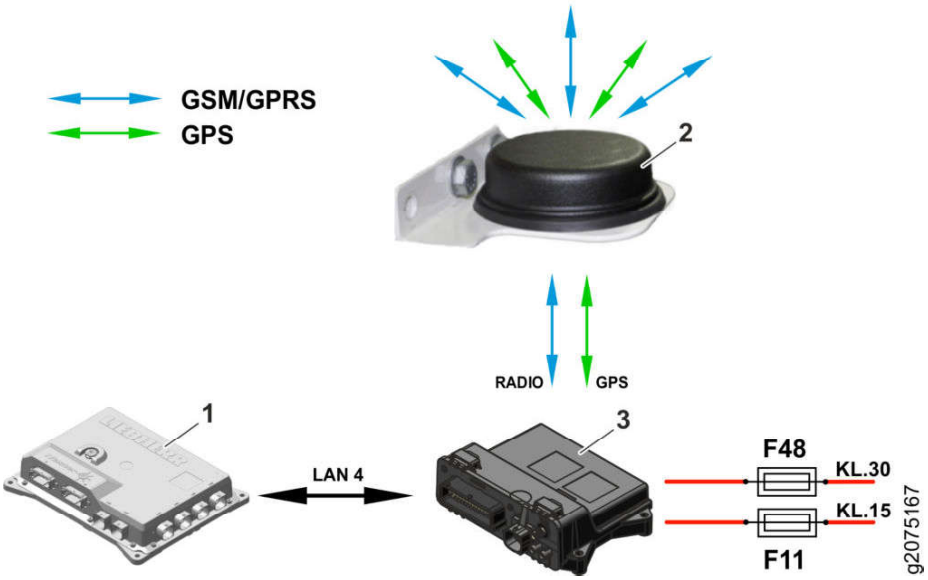

Fig. 574: Function

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

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

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

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

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

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190.3 Remote control for door lock

Valid for: L586-1761;

1 Layout

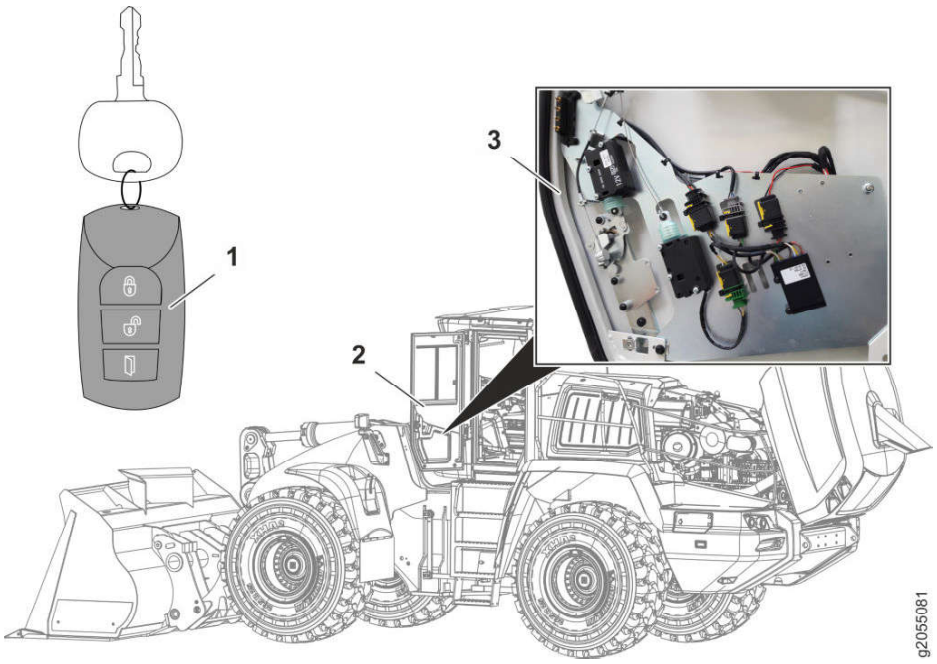

Fig. 594: Remote control for door lock

1 Remote control for door lock
2 Cab door
3 Electrical components

With remote control for door lock **1**, cab door **2** can be locked, unlocked and opened. See operating manual for more information.

Electrical components for controlling door latch and the door lock are installed behind interior trim of cab door.

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Pin assignment of A35.X			
Pin	**Function**	**Pin**	**Function**
F4	Analogue input (with pull-down resistor)	M4	Ground

Tab. 274: Plug assignment