en **Service manual**

Wheel loader

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Manufacturer: Liebherr-Werk Bischofshofen GmbH
Valid for: L 580-1760

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010 Introduction

Contents

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  - Is able to estimate distance, height and gaps.
- The refrigeration technician has completed training that complies with the country-specific laws, standards and guidelines.
- The refrigeration technician has following skills:
  - Is able to assess work correctly.
  - Is able to recognise dangers.
  - Is able to take safety measures.
- Has knowledge and experience of the relevant field of activity.
- Knows the relevant national standards.
- Has the necessary authorisation for maintenance and repair of machine.
- Knows the machine and the hazards.
- Knows all procedures and precautions for maintenance.
- Has knowledge of handling special tools for maintenance and repair.
- Is not under any physical or mental impairment that limits one of the prescribed requirements.
- Is not under the influence of alcohol.
- Is not under the influence of drugs.

010.1.3.7 Slinger

Responsibility

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

Requirement

The slinger has following qualification and skills:
- Has completed the legally specified minimum age.
- Physically and mentally capable of slinging loads:
  - Satisfactory eyesight
  - Satisfactory hearing ability
  - Quick reactions
  - Is able to estimate distance, height and gaps.
- The slinger has following skills:
  - Is able to estimate mass distribution and load distribution.
  - Is able to operate radio units.
  - Is able to give clear instructions on radio units.
  - Is able to guide a load.
- Has the necessary authorisation for attaching loads.
- The slinger has the necessary education (theoretical and practical) for the following:
  - Selecting the suitable slinging gear
  - Attaching slinging gear
  - Securing to prevent unintended disengaging of slinging gear
  - Avoiding damage to slinging gear
  - Spotting
  - Applying all necessary signal signs
- Is not under any physical or mental impairment that limits one of the prescribed requirements.
- Is not under the influence of alcohol.
- Is not under the influence of drugs.

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Environmental pollution

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

010.1.7 Safe maintenance

010.1.7.1 Spare parts

Danger to life

Incorrect spare parts

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

010.1.7.2 Heavy parts

Danger to life

Incorrect handling

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

Injury

Incorrect protective equipment

– Put on gloves when handling wire ropes.

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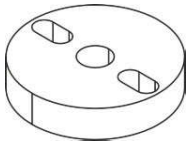
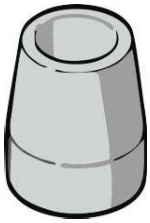
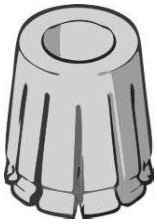
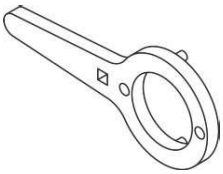
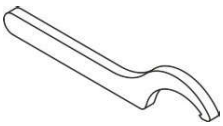
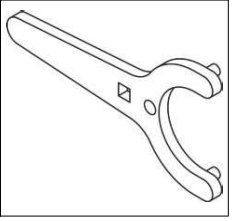
010.2.7 Special tools for steering wheel

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

Tab. 10: Special tools for steering wheel

010.2.8 Special tools for steering cylinders

Designation	Item code	Remark	Fig.
Mounting sleeve 90 mm	9227161	For fitting the seals	
Expansion sleeve 90 mm	9227162	For fitting the seals	
Piston wrench 60/10 mm	9131362	For fitting the piston	
Spanner for piston nut (hook wrench DIN 1810)	12211049	For fitting the piston nut	
Piston rod bearing wrench 76/9 mm	0541665	For fitting the piston rod bearing	

Tab. 11: Special tools for steering cylinders

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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 14	8.8	61	110	M 14	8.8	60	125
	10.9	90	160		10.9	88	185
	12.9	105	190		12.9	103	220
M 14 x 1.5	8.8	67	117	M 14 x 1.5	8.8	66	135
	10.9	99	170		10.9	96	200
	12.9	115	200		12.9	113	235
M 16	8.8	84	170	M 16	8.8	82	195
	10.9	123	250		10.9	120	290
	12.9	145	290		12.9	140	340
M 16 x 1.5	8.8	91	175	M 16 x 1.5	8.8	89	205
	10.9	135	260		10.9	130	300
	12.9	155	300		12.9	150	360
M 18	8.8	102	235	M 18	8.8	100	270
	10.9	150	350		10.9	145	400
	12.9	175	410		12.9	170	470
M 18 x 1.5	8.8	117	260	M 18 x 1.5	8.8	115	300
	10.9	175	380		10.9	170	440
	12.9	200	440		12.9	200	520
M 18 x 2	8.8	110	245	M 18 x 2	8.8	107	290
	10.9	160	360		10.9	160	420
	12.9	190	420		12.9	185	490
M 20	8.8	130	330	M 20	8.8	130	380
	10.9	190	490		10.9	190	560
	12.9	225	570		12.9	220	660
M 20 x 1.5	8.8	150	350	M 20 x 1.5	8.8	145	420
	10.9	215	520		10.9	215	610
	12.9	250	610		12.9	250	720
M 22	8.8	165	450	M 22	8.8	160	520
	10.9	240	660		10.9	235	770
	12.9	280	770		12.9	270	900

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020 Technical data

Contents

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- With 26.5R25 L3 tyres
- Including all lubricants
- With a full fuel tank
- With ROPS/FOPS cab and operator
- On level and stable ground

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

▶ Note information about tyres and working attachment.

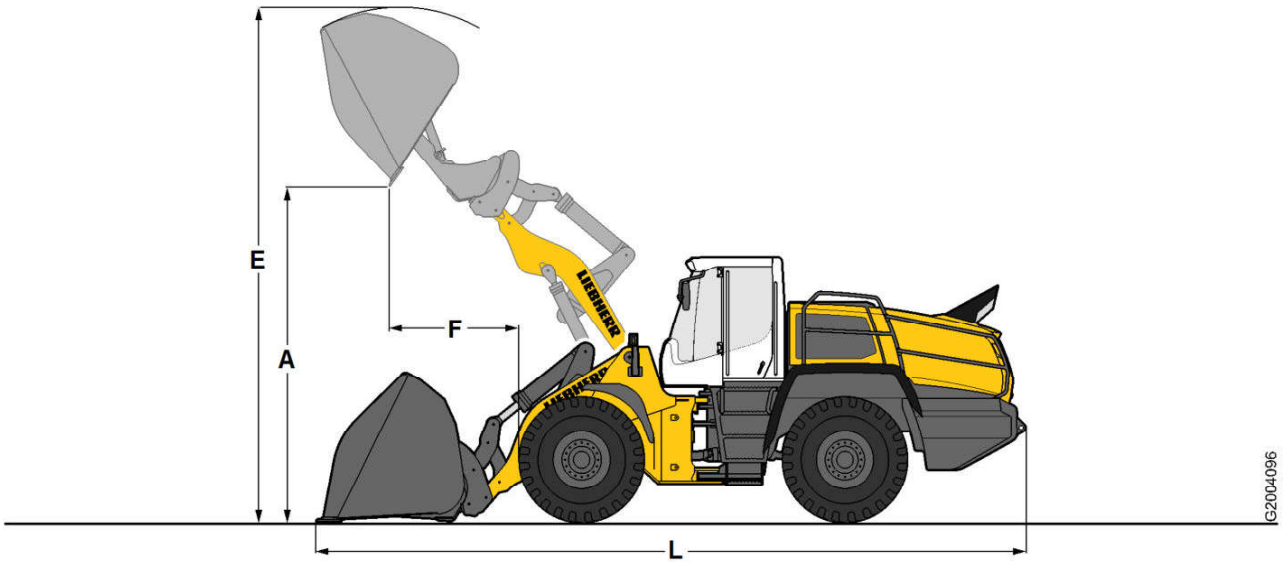

Fig. 80: Working attachment: high dump bucket

	Designation	Unit	Value	
	Hydraulic quick coupler		Yes	Yes
	Load geometry		A)	A)
	Lift arm length		B)	B)
	Cutting tool		C)	C)
	Bucket capacity	m^3	7.0	13.0
	Bucket width	mm	3200	4000
	Specific material weight	t/m^3	1.0	0.45
A	Dump height at maximum lifting height	mm	4970	4780
E	Maximum height above bucket top	mm	7420	7650
F	Reach at maximum lifting height	mm	2040	2060
L	Overall length	mm	10060	10300
	Tipping load when straight	kg	17800	17100
	Tipping load when fully articulated (ISO 14397-1)	kg	15500	14800
	Operating weight	kg	29100	30100

Tab. 27: Working attachment: high dump bucket

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020.4.6 Stabilisation module

Valid for: L580-1760;

Description	Unit	Value
Type		RSM16B3X/EXA
Weight	kg	14.63

020.4.7 Ride control hydro accumulator

Valid for: L580-1760;

Description	Unit	Value
Number		3
Volume	l	2
Gas-side oil filling	cm^3	350
Weight	kg	8

020.4.8 Z-bar kinematics lift cylinder

Valid for: L580-1760;

Description	Unit	Value
Piston diameter	mm	160
Piston rod diameter	mm	90
Minimum installation length	mm	1360
Stroke length	mm	830
Weight	kg	110
Tightening torque of piston rod bearing	Nm	610 $^{\pm 60}$

020.4.9 Z-bar kinematics tilt cylinder

Valid for: L580-1760;

Description	Unit	Value
Piston diameter	mm	180
Piston rod diameter	mm	95
Minimum installation length	mm	1140
Stroke length	mm	600
Weight	kg	238
Tightening torque of piston rod bearing	Nm	1050

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020.9 Gearbox

020.9.1 Transmission

Valid for: L580-1760;

Description	Unit	Value
Type		XP-S (CP 290)
Travel range clutches		2
Gear pump type		Internal gear pump
Hydrostat rotary group type		Axial piston rotary group with inclined-axis variable displacement
Maximum rotary group displacement per turn	cm^3	233
Weight	kg	790

020.9.2 Filter bypass switch B85

Valid for: L580-1760;

Description	Unit	Value
Type		Normally open
Switch		Mechanical (actuated/unactuated)
Built-in measuring resistor	ohms	500
Measuring resistance in actuated state (filter clean)	ohms	500
Measuring resistance in unactuated state (filter dirty)		Broken circuit

020.9.3 Proportional solenoid for gear shifting Y1, Y2, Y3, Y4, Y5, Y6

Valid for: L580-1760;

Description	Unit	Value
Minimum shift pressure	bar	0
Maximum shift pressure	bar	8.3
Power supply	V	24
Coil resistance at 20 °C	ohms	11.1
Number of pins		2

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020.14 Lubrication system

020.14.1 Central lubrication system (Liebherr)

Valid for: L580-1760;

020.14.1.1 Central lubrication pump

Description	Unit	Value
Delivery per stroke	mm^3	120
Pumped medium		Grease up to NLGI class 2
Maximum operating pressure	bar	280
Operating temperature	°C	min. -35 max. +70
Supply voltage	V	24
Protection class		IP 65
Factory-set cycle time 75%	minutes	45
Factory-set cycle time 100%	minutes	30
Factory-set cycle time 125%	minutes	20

020.14.1.2 Progressive distributor

MX-F

Description	Unit	Value
Maximum operating pressure at inlet	bar	300
Temperature range	°C	min. -35 max. +100
Pumped medium		Grease up to NLGI class 2

MX-F 25

Description	Unit	Value
Flow per outlet	mm^3	25
Flow per element	mm^3	50
Piston diameter	mm	3

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030.3 Lubricants and fuels

030.3.1 General information on lubricants and fuels

030.3.1.1 General questions

For general questions on lubricants and fuels, please contact the Liebherr Lubricant Hotline by e-mail.

Liebherr Lubricant Hotline (e-mail): lubricants@liebherr.com

030.3.1.2 Safety data sheets

Safety data sheets for lubricants and fuels are available online via the Liebherr lubricant portal.

Liebherr lubricant portal: lubricants.liebherr.com

030.3.1.3 Technical data sheets

Technical data sheets for lubricants and fuels are available online via the Liebherr lubricant portal.

Registration is required to access the technical data sheets.

Liebherr lubricant portal: lubricants.liebherr.com

030.3.1.4 Specific Liebherr standards

Specific Liebherr standards for lubricants and fuels are available via the technical customer service of the respective manufacturer.

030.3.2 General information on changing lubricants and fuels

The values stated for filling quantities in the lubricant table and fuels table are only guidelines. After every oil change or refill, check the corresponding level.

NOTICE
Improper change of lubricants and fuels!
Damage to machine.

▶ Observe manufacturer's instructions for lubricants and fuels.

NOTICE
Contamination due to dirt!
Damage to machine.

▶ Clean filler plugs, filler caps and drain plugs, including their environment, before opening.

When inspecting and changing lubricants and fuels, consider following, among other things:
- Local environmental guidelines.
- Specifications according to operator's manual.
- Avoid naked lights and fire.

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030.4 Maintenance tasks

All work must be carried out by **specialist technicians** or under their supervision and responsibility.

Specialists technicians are people who:
- Have the requisite training and experience in operating and servicing earth-moving machinery
- Are familiar with the statutory accident prevention regulations and national guidelines
- Are able to judge whether earthmoving machinery is safe to operate
- Can carry out the required work without endangering themselves or others

030.4.1 Safety precautions

Valid for: L580-1760;

Observe the relevant **safety instructions** when carrying out all maintenance, inspection or repair work. Local health and safety regulations, accident prevention regulations and national laws must be observed.

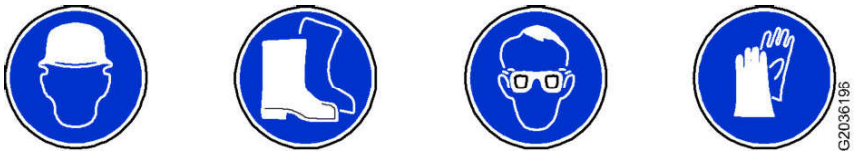

Fig. 84: Safety precautions

Make sure that following requirements are met:
- ❑ Suitable protective equipment is present.
- ❑ The driver and maintenance staff are in visual contact.

Protective equipment must be worn for some tasks:
- Hard hat
- Safety footwear
- Safety glasses
- Protective gloves

WARNING
Persons in the danger area!
Risk of injury.

▶ Make sure there is nobody in the danger area.

▶ Wear appropriate working clothing.

▶ Always maintain visual contact with the maintenance staff.

030.4.2 Preparatory tasks for maintenance

Before performing the various maintenance tasks, move the machine to the maintenance position unless otherwise explicitly specified in the description.

The various maintenance tasks include:
- Lubricating the lift arms and attachment
- Checking the oil level in the engine, transmission, axles, hydraulic tank, etc.

NOTICE
Beware of corrosive materials and working environments.
Risk of damage to the machine.

▶ Clean the machine thoroughly after completing the work.

Regular cleaning prevents dirt and foreign particles from getting into the machine.

Clean the machine immediately after the following work:
– Working in salty environments (for example contact with road salt, or by the sea)
– Working with alkaline or acidic substances
– Working with corrosive materials (such as lime compounds or cement)

NOTICE
Always carry out cleaning correctly
Risk of damage to the machine.

▶ Only clean electrical systems, cables and wiring harnesses with low-pressure equipment.

▶ Only clean soundproofing material with low-pressure equipment.

▶ When new (or after respraying), do not clean the machine with a high-pressure cleaner for two months.

▶ Observe the operating manual of the high-pressure cleaner.

NOTICE
Incorrect cleaning!
Damage to cameras and sensors.

▶ Only clean components with low pressure or damp, soft cloth.

CAUTION
High-pressure jet!
Risk of injury.

▶ Wear protective clothing and safety glasses.

Cleaning the outside of the machine

Before cleaning

Make sure the following preconditions are met:
❑ Machine is in maintenance position 2.

Before washing with water or with a high-pressure cleaner, carry out the following tasks in order to prevent water from getting inside.

▶ Lubricate all bearings and pin connections.

▶ Clean oil, fuel and maintenance products from all connections and bolts.

If components behind openings have to be prevented from water getting in:

▶ Cover or mask the openings.

Components particularly at risk are:
– Electric motors
– Control units
– Electrical components

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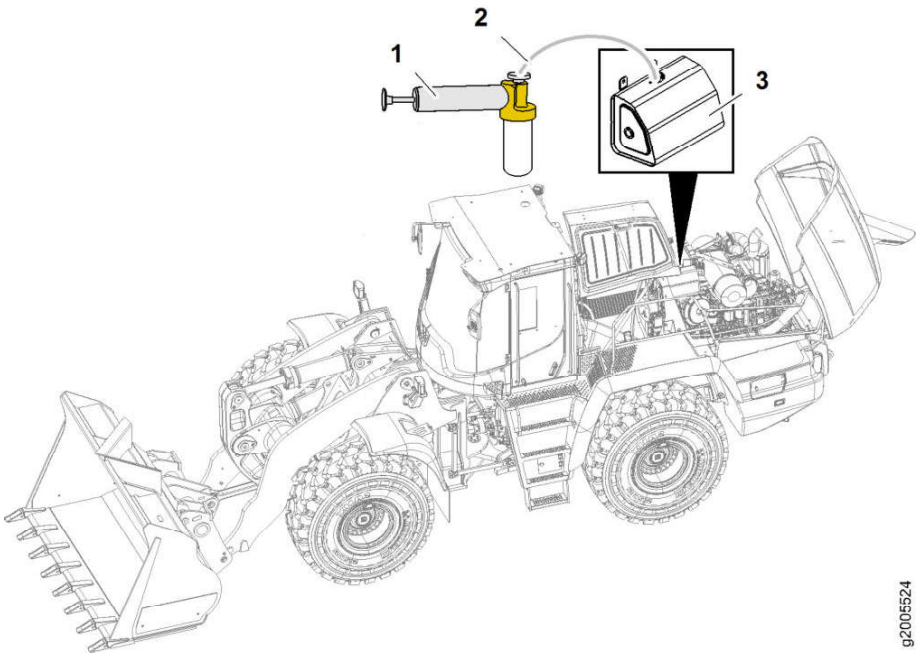

Fig. 101: Sampling point for coolant

1 Hand pump
2 Sampling hose
3 Coolant equalising reservoir

▶ Start diesel engine.

▶ Turn heating to maximum temperature and wait for three minutes.
▷ The coolant is circulated.

▶ Put the machine in maintenance position 1.

CAUTION
Hot, pressurised fluid!
Beware of burns.

▶ The coolant temperature must not exceed 45 °C.

▶ Wear protective clothing and safety glasses.

▶ Carefully open the cap.

▶ Carefully open the cap on the coolant equalising reservoir **3**.

▶ Insert the sampling hose **2** and take a coolant sample.

▶ Close the cap.

Transmission

The oil sample is taken via the oil filling tube on the transmission using a hand pump.

▶ Check that belt pulleys **1**, deflection rollers **3** and tension device **4** are in good order.

If you find any damage:

▶ Renew damaged components.

030.4.4.5 Changing diesel engine belt drive

Valid for: L580-1760;

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

Make sure that following tools are ready:
❑ 1/2" ratchet
❑ Loctite 243 thread lock (included in service package)

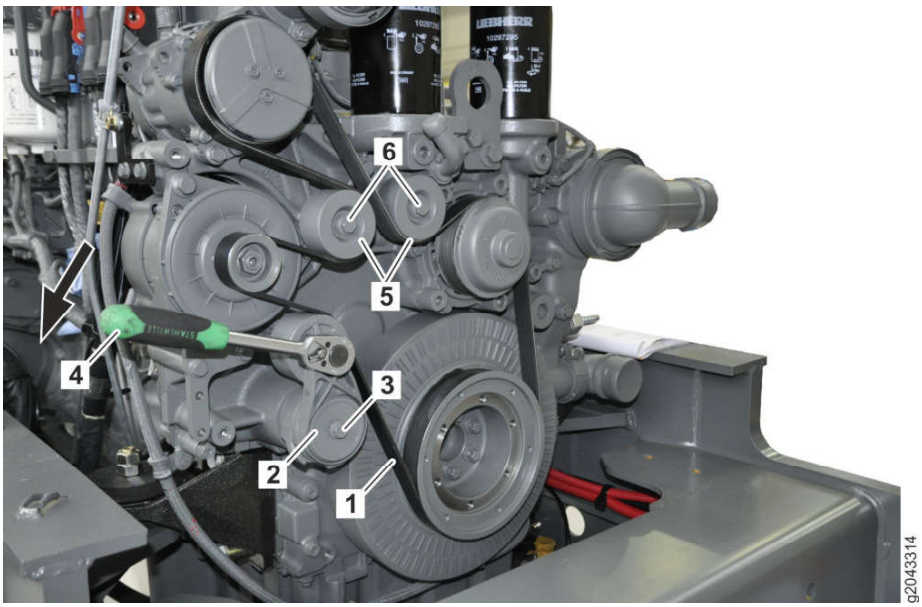

Fig. 111: Changing V-ribbed belt

1	V-ribbed-belt	**4**	Ratchet
2	Tensioning device	**5**	Deflection rollers
3	Hex head screw for tensioning device	**6**	Hex head screws for deflection rollers

▶ Pull back tensioning device **2** with the ratchet **4** against the spring force as far as it will go.

▶ Take off V-ribbed belt **1**.

▶ Loosen hex head screw for tensioning device **3**.

▶ Wet new hex head screw **3** with thread lock.

▶ Secure new tensioning device **2** with hex head screw **3**.

▶ Loosen hex head screws for deflection rollers **6**.

▶ Wet new hex head screws **6** with thread lock.

▶ Secure new deflection rollers **5** with hex head screws **6**.

▶ Put on new V-ribbed-belt **1** with tensioning device **2** moved back.

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CAUTION
Pressurised fluids that are irritants to the skin!
Risk of injury.

▶ Wear safety gloves and goggles.

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

▶ Operate hand pump until you feel strong resistance.

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

▶ Start diesel engine.

Troubleshooting
If machine will not start after approx. 20 sec.:

▶ Wait one minute and repeat starting process.

Once you have repeated this three times:
▶ Repeat bleeding process.

Note

▶ Low-pressure circuit of the diesel engine is bled via permanently installed restrictor ports. No other measures are necessary.

030.4.4.13 Changing fuel fine filter element

Valid for: L580-1760;

Make sure that following requirements are met:
❑ Machine is in maintenance position 1.
❑ Service access is open.
❑ You have a suitable receptacle ready.
❑ 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.

CAUTION
Pressurised fluids that are irritants to the skin!
Risk of injury.

▶ Wear safety gloves and goggles.

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❑ The engine has cooled down.

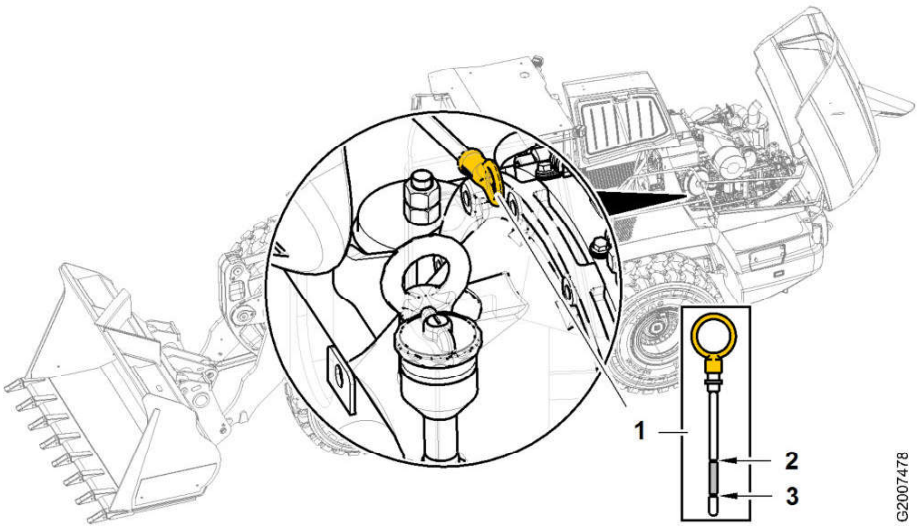

Fig. 131: Checking the oil level

1 Dipstick
2 Maximum oil level
3 Minimum oil level

▶ Pull out the dipstick **1**, wipe it clean, and re-insert it.

▶ Pull out the dipstick **1** once again and read off the oil level.
▷ The oil level on the dipstick **1** must be between the maximum **2** and minimum **3**.

If the oil level is below the minimum **3**:
▶ Top up the oil. (For more information see: Topping up the oil, page 030-77)

Troubleshooting
If the oil is above the maximum level **2**:

▶ Contact Liebherr customer service.

Topping up the oil

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

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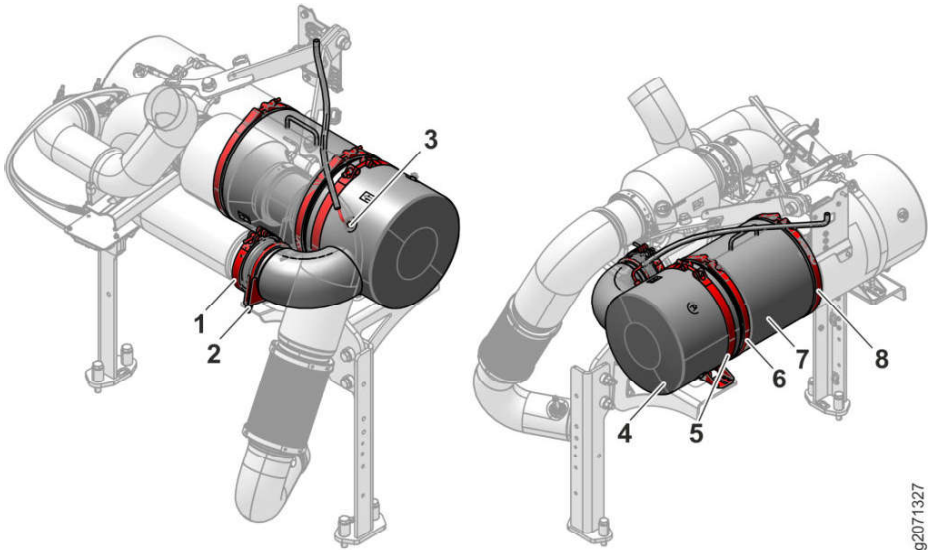

Fig. 140: Changing filter module

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

- ▶ Clean seal surfaces.
- ▶ Install new or cleaned filter module **7** with profile clip **8** including seal.
- ▶ Install output module **4** to filter module **7** with profile clip **6** including seal.
- ▶ Install profile clip **1** including seal.
- ▶ Tighten profile clip **8**. Tightening torque: 18 $^{+2/-1}$ Nm
- ▶ Tighten profile clip **6**. Tightening torque: 18 $^{+2/-1}$ Nm
- ▶ Tighten profile clip **1**. Tightening torque: 23 $^{\pm 2}$ Nm
- ▶ Tighten hinge strap bracket **5**. Tightening torque: 21 $^{\pm 1}$ Nm
- ▶ Tighten bolt clamp **2**. 23 $^{\pm 2}$ Nm
- ▶ Attach differential pressure line **3**.
- ▶ Start diesel engine and bring up to operating temperature.
  - ▷ Coolant temperature above 60 °C
- ▶ Turn off diesel engine.
- ▶ Let diesel engine and exhaust system cool down.
- ▶ Check tightening torques of profile clips.
- ▶ Check tightening torque of bolt clip **2**.
- ▶ Check tightening torque of hinge strap bracket **5**.
- ▶ Check components of exhaust gas treatment for leaks.

Confirming cleaning of filter module

After replacing the filter module, it is necessary to reset the maintenance interval in the engine control unit.

- ▶ Confirm cleaning of filter module with the diagnostic software of diesel engine.

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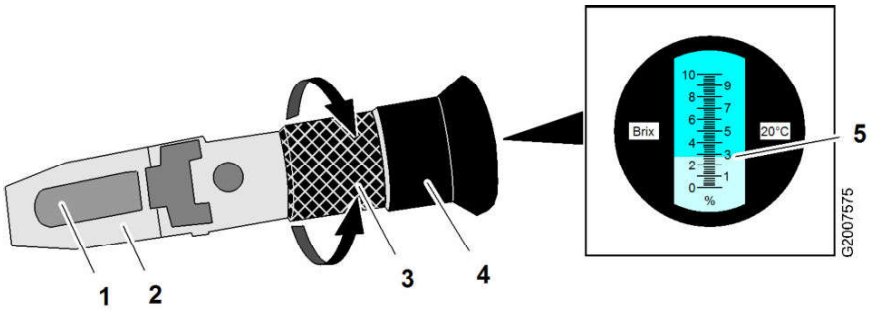

Fig. 148: Checking the corrosion inhibitor concentration

1 Prism
2 Cover
3 Adjusting ring
4 Eyepiece
5 Dividing line

▶ Carefully clean the prism **1** and cover **2** of the refractometer.

▶ Place one or two drops of coolant on the prism **1**.

▶ Close the cover **2**.
▷ The fluid spreads out.

▶ Look through the eyepiece **4** against a light background and focus the scale using the adjusting ring **3**.

▶ Read Brix value on dividing line **5**.

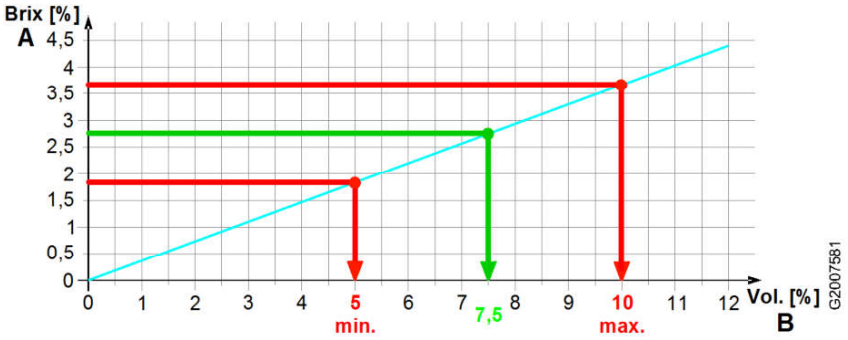

Fig. 149: Converting Brix value to corrosion inhibitor concentration

A Brix-value
B Corrosion inhibitor concentration

▶ Convert Brix value **A** on diagram to corrosion inhibitor concentration **B**.

▶ Check whether the corrosion inhibitor concentration is correct.

Description	Unit	Value
Corrosion inhibitor concentration	%	7.5 ±2.5

If required value is reached:

▶ Close the cap **1** (see: fig. 147, page 030-96) of the equalising reservoir **2** (see: fig. 147, page 030-96) .

If required value is not reached:

▶ Correct the corrosion inhibitor concentration.

Correcting the corrosion inhibitor concentration

▶ Place a receptacle under the machine.

▶ Unscrew the breather filter **1**.

Note
The breather filter cannot be cleaned.

▶ Dispose of the old breather filter.

▶ Screw on the new breather filter and tighten it.

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

030.4.6.5 Hydraulic tank: analysing the oil

Valid for: L580-1760;

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

Make sure that the following tools are ready:
❑ Analysis kit
❑ Test line
❑ Receptacle

Note
General information on the oil analysis:

▶ See “Complete machine: Oil analysis”. (For more information see: Oil analyses, page 030-42)

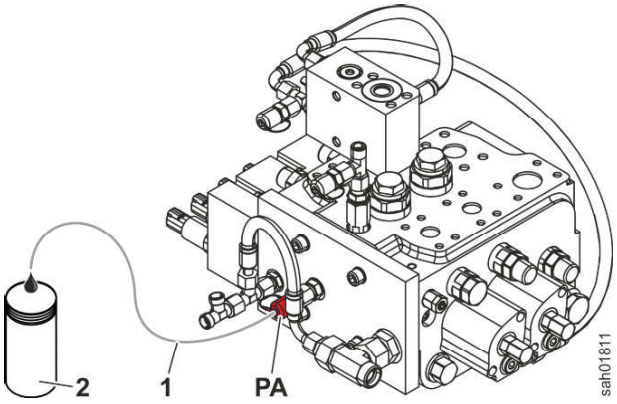

Fig. 159: Hydraulic tank: analysing the oil

1 Test line

2 Sample container

PA Working pump high pressure test connection

▶ Start the diesel engine.

▶ Move the working hydraulics for one minute at lower idling speed.
▷ The hydraulic oil is circulated.

▶ Park the machine on level ground.

▶ Tip out the bucket completely.

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

▶ Engage parking brake.

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WARNING
Uneven wear between the left and right wheel hubs.
Accidents.

▶ Always carry out the inspection on both wheel hubs.

▶ Repeat the check on the right wheel hub of the front axle.

▶ Check the rear axle brake discs for wear.

Checking the rear axle brake discs for wear

▶ The procedure is the same as for the front axle.

030.4.8.3 Checking the gap and wear on the parking brake linings

Valid for: L580-1760;

Make sure that the following requirements are fulfilled:
❑ The machine is cold.
❑ 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

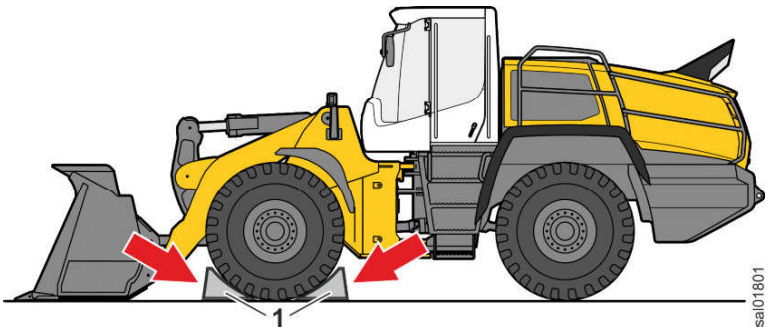

Fig. 171: Using chocks to secure the machine against rolling away

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.

WARNING
Corrosive acid!
Risk of injury.

- ▶ Avoid skin contact with battery acid.
- ▶ Wear safety glasses and protective gloves.

- ▶ Wipe the battery with a clean cloth.
- ▶ Clean the terminals and clamps with a special terminal brush.

To ensure a good connection:
- ▶ Check that the connectors are well fastened to the terminals. Tighten them if necessary.
- ▶ Smear the terminals and clamps with acid-proof grease (such as Vaseline).

At very high temperatures, the acid level in the individual cells can drop due to different rates of evaporation.

- ▶ Open the plug of each battery cell. Check the acid level.
  - ▷ The acid level must be 10 mm above the plates.

If the acid level is too low:
- ▶ Top up with distilled water to 10 mm above the plates.

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. 69: 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: L580-1760;

Changing the travel direction rocker switch

Note

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

- ▶ Park machine on ground that is level and smooth.
- ▶ Lower lift arms.
- ▶ Lay bucket flat on ground.
- ▶ Engage parking brake.

WARNING
Unintended movement of machine!
Injury.

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

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

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

- ▶ With diesel engine running, check whether oil level is in HOT range **4**.

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

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

If oil level is correct:
- ▶ Turn off diesel engine and take out ignition key.
- ▶ Check that gear oil filters do not leak.
- ▶ Perform service calibration.

Performing service calibration

After finishing maintenance tasks:
- ▶ Perform a hydrostat calibration and a clutch calibration. (For more information see: Gearbox: service calibration, page 030-251)

030.4.10.3 Change the transmission hydrostat oil filter.

Valid for: L580-1760;

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

Make sure that following tools are ready:
- ❑ Receptacle
- ❑ Strap wrench or filter wrench

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030.4.12.4 Right cab access: Lubricating moving parts with penetrating oil

Valid for: L580-1760;

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

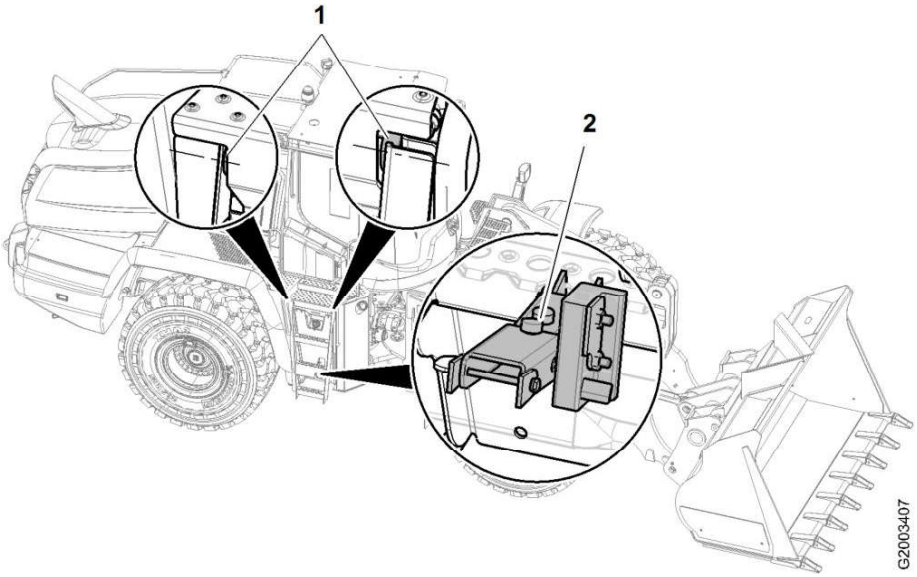

Fig. 201: Right cab access: Lubricating moving parts with penetrating oil

1 Sliding bearing **2** Locking mechanism

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

▶ (For more information see: Right cab access, page 030-31)

030.4.12.5 Service hatches: Cleaning and maintaining the seals

Valid for: L580-1760;

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

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▶ Grease the lubrication points **1**.

▶ Put the cap on the grease fitting.

Testing quick coupler

Make sure that following requirements are met:
- ❑ The diesel engine has started.
- ❑ The lift arms have been lowered.
- ❑ The working attachment is tilted in.

WARNING
Persons in the danger area!
Risk of injury.

▶ Make sure there is nobody in the danger area.

▶ Unlock quick coupler and lock it again.
  ▷ This prevents the locking pins from jamming and prevents the quick coupler from being released.

▶ For safety reasons, check that the quick coupler is locked again.

030.4.13.7 High dump bucket: Lubricating the bearing

Valid for: L580-1760;

Note

▶ For detailed information on maintenance of non-Liebherr attachments, see the manufacturer's instructions.

030.4.14 Operator's cab, heating and air conditioning

030.4.14.1 Operator's cab: cleaning the fresh and recirculated air filters

Valid for: L580-1760;

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

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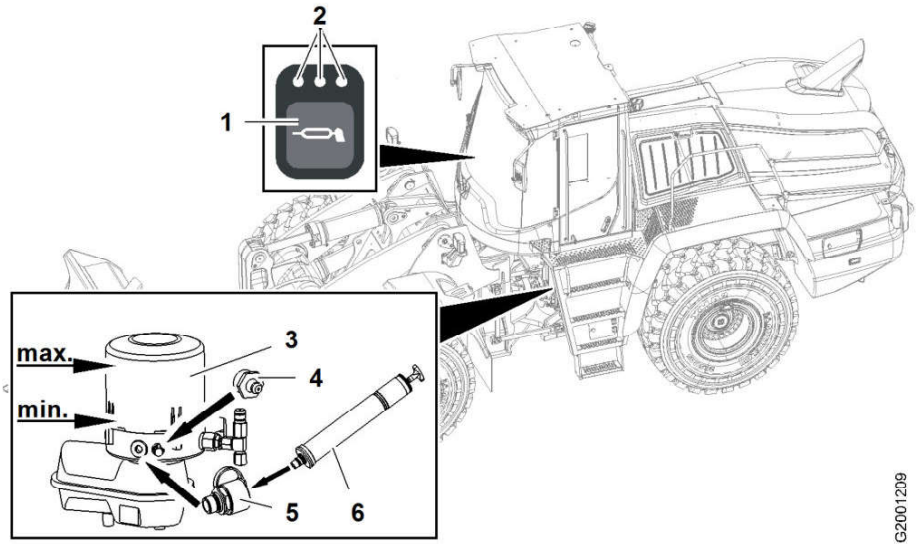

Fig. 221: Checking the level in the grease reservoir of the central lubrication system

1	*Central lubrication system* key	**4**	Grease fitting
2	LEDs	**5**	Filling coupling (fast filling)
3	Grease reservoir	**6**	Fast filling pump

▶ Visually check the level in the grease reservoir **3**.
  ▷ It must be within the minimum and maximum lubricant levels.
  ▷ If the amount of grease in the grease reservoir is too low, all the LEDs **2** on the *central lubrication system* button **1** light up.

Note
Mixing of lubricant greases!
Malfunction in central lubrication system.

▶ Ensure proper miscibility of lubricant greases.

▶ If necessary, contact **Liebherr Lubricant Hotline**.

NOTICE
Dirty grease reservoir!
Damage to the central lubrication system.

▶ Pay attention to cleanliness when filling the grease reservoir.

To fill the grease reservoir:
▶ Fill the grease reservoir via the grease fitting **4**.
or

For rapid filling, connect the fast filling pump **6** to the filling coupling **5**.

030.4.15.2 Central lubrication system: Checking the pipes, hoses and lubrication points for leaks and damage

Valid for: L580-1760;

This equipment is optional.

Make sure that following tools are ready:
- ❑ Laptop with Sculi diagnostic software
- ❑ Security seals and caps
- ❑ Special tools according to list

Activate service mode

Note
Certain functions can negatively influence result of testing and adjustments!

▶ Activate service mode before starting testing and adjustments.

▶ Switch on ignition.

▶ Connect Sculi diagnostic software to machine.

▶ Set variable ***RDServiceMode*** to ***1***.
Following functions are switched off:
- ▷ Reversible fan drive
- ▷ Stroke limit damping
- ▷ Check joystick steering

After completing testing and adjustment:

▶ Set variable ***RDServiceMode*** to ***0***.

Maintenance position for adjustment procedure

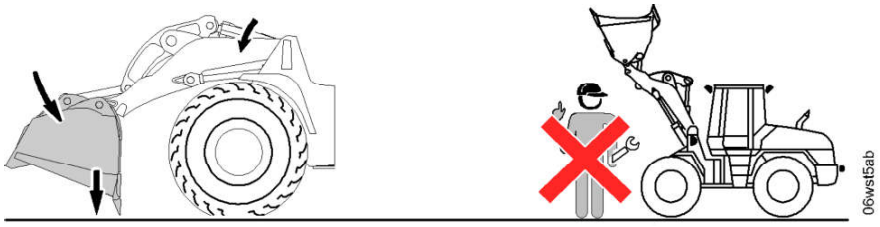

Fig. 224: Maintenance position for adjustment procedure

▶ Park machine on level ground.

▶ Tilt bucket all way out.

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

▶ Engage parking brake.

▶ Turn off diesel engine.

▶ Take out ignition key.

▶ Ensure that another person cannot start operating machine.

Special tools

Special tools		
Number	**Description**	**Item code**
1	USB dongle Sculi, service authorisation	10489591
1	Ethernet data lead for connecting to Sculi diagnostic software (1.5 m)	10225579

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If the value is correct for all the levers:
▶ Calibration was successful. Switch off the ignition.

030.6.5.2 Calibrating working hydraulics angle sensors

Valid for: L580-1760;

Always calibrate working hydraulics angle sensors if one of following components is replaced:
– Angle sensor for lift arm position B61
– Angle sensor for bucket position B60
– Control lever A26 or control unit of multi-lever control (option)
– Input module A16M (option)

Make sure that following requirements are met:
❑ The machine is parked on level ground.
❑ Service mode is activated.

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

Preparations

▶ Start diesel engine.

▶ Connect Sculi diagnostic software to machine.

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

▶ Select ***Calibrate angle sensor*** sub-folder.

▶ Make sure that parking brake is activated.

Manual calibration of lift arm position angle sensor

▶ Tilt bucket half way in.

▶ Lower lift arms as far as they will go.

▶ Set variable ***MXSIWEStartLiftAngleAdj*** to ***1***.
▷ Calibration function is active for 20 seconds.

Note
Hitting upper limit position too fast!
Incorrect calibration.

▶ Reduce lift speed before reaching upper limit position.

▶ Raise lift arms to upper limit position within 20 seconds.

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

▶ Check that calibration was successful.

Checking whether calibration is successful

▶ Lower lift arms slightly and them raise them to upper limit position again.

Note

Variable ***PRSIWE_Length_LiftCylPercent*** can only display values between 0% and 100%. This means variable must not reach its required value until moment limit position is reached!

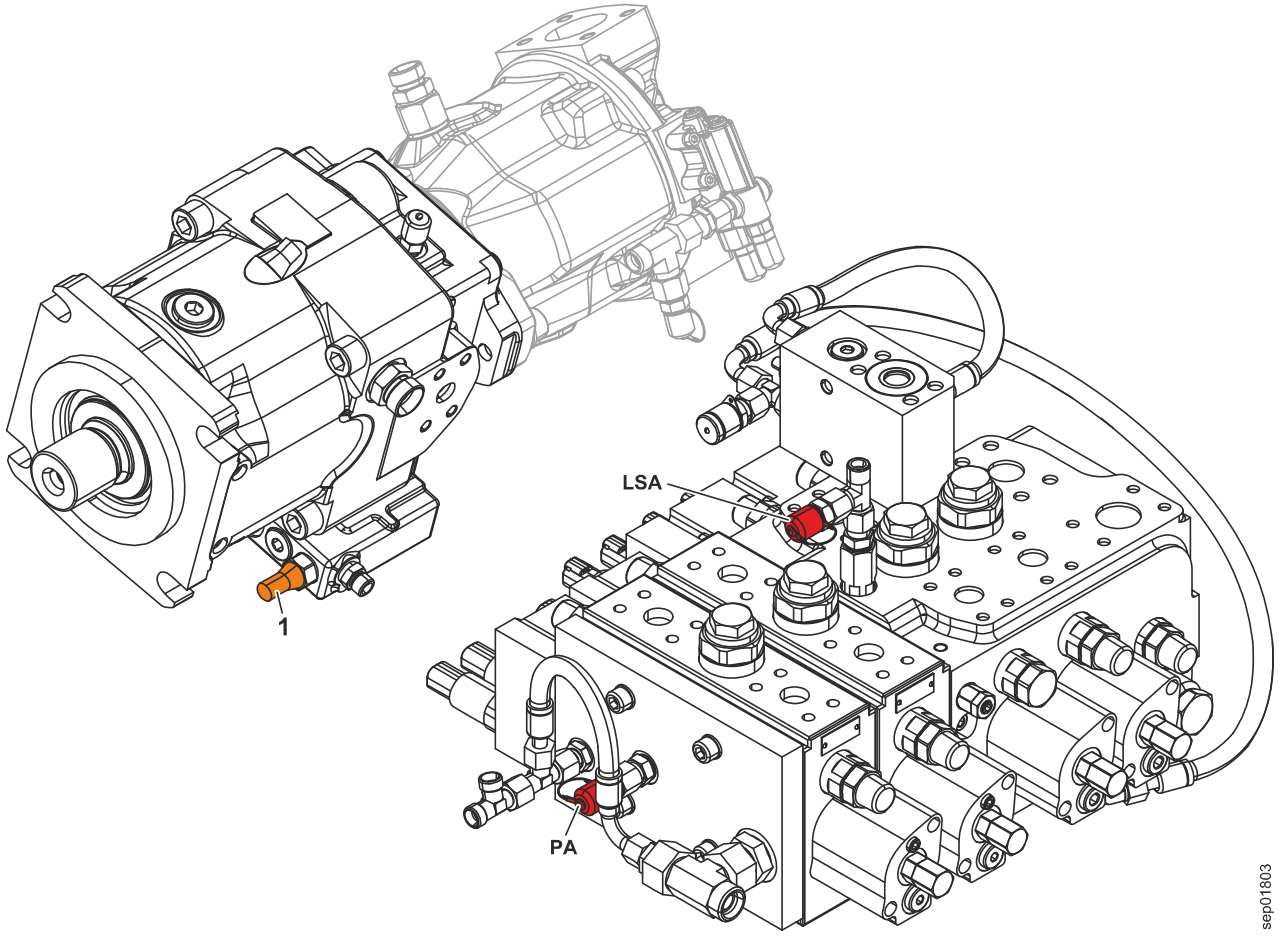

Fig. 235: Working pump flow regulator (differential pressure)

1 Flow regulator

PA Working pump high pressure test connection

LSA Working pump load sensing signal test connection

▶ Connect a differential pressure gauge (600 bar) to high pressure test connection **PA** on control valve block.

or

Connect a pressure gauge (600 bar) to high pressure test connection **PA** on control valve block.

▶ Connect differential pressure gauge (600 bar) to load sensing signal test connection **LSA** on control valve block.

or

Connect pressure gauge (600 bar) to load sensing signal test connection **LSA** on the control valve block.

▶ Start diesel engine.

▶ Increase engine speed to 1500 min^{-1}.

▶ At same time, fully activate lowering function and hold it in float position.

▶ Check that differential pressure ΔP between high pressure **PA** and load sensing signal **LSA** corresponds to required value.

Description	Unit	Value
Differential pressure ΔP	bar	22 $^{\pm 2}$

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	225 $^{\pm 5}$
High pressure **PA** during tilt in **2** function	bar	425 $^{\pm 5}$
High pressure **PA** during lift **3** function	bar	425 $^{\pm 5}$
High pressure **PA** during 3rd function A3 (option) **4**	bar	255 $^{\pm 5}$
High pressure **PA** during 3rd function B3 (option) **5**	bar	255 $^{\pm 5}$
High pressure **PA** during 4th function A4 (option) **6**	bar	255 $^{\pm 5}$
High pressure **PA** during 4th function B4 (option) **7**	bar	255 $^{\pm 5}$

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.

▶ 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 the adjusting screw on the primary pressure relief valve **9** by exactly one turn anticlockwise.

▶ Turn adjusting screw on LS-pressure cut-off valve **8** by exactly one turn anticlockwise.

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▶ 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. 249: 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: L580-1760;

Make sure that following requirements 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)

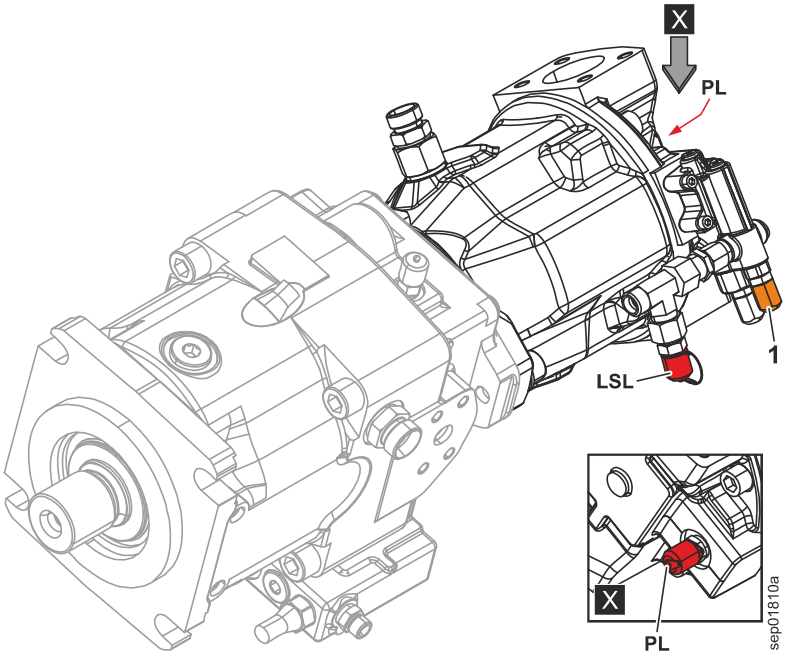

Fig. 255: Steering pump: flow regulator (differential pressure)

1 Flow regulator

LSL Steering pump load sensing signal test connection

PL Steering pump high pressure 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.

▶ Check that differential pressure ΔP between high pressure **PL** and load sensing signal **LSL** corresponds to required value.

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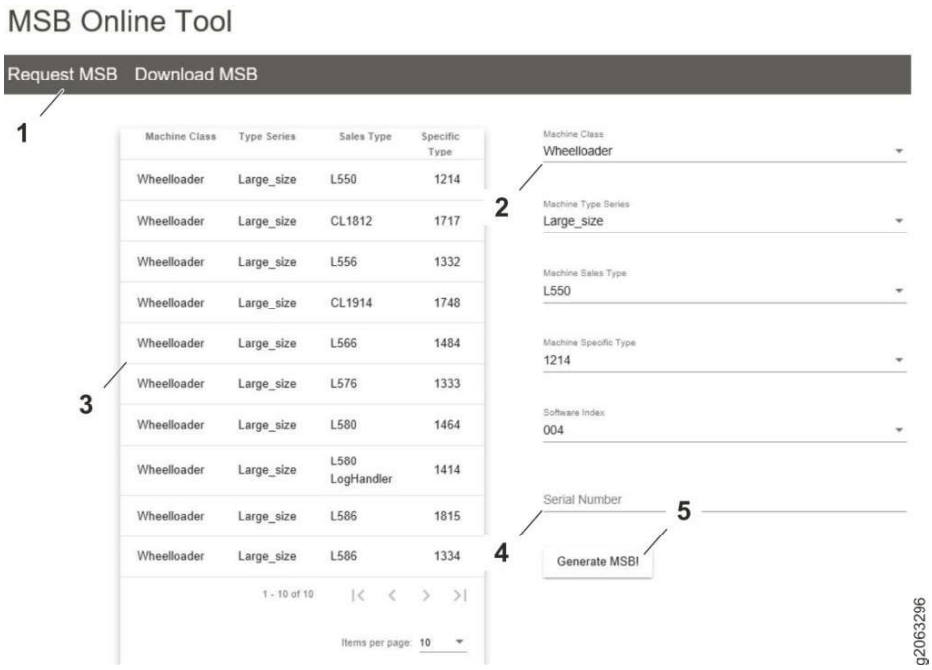

Fig. 264: Creating MSB file

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. 83: Addressing CAN modules

▶ Switch on ignition.

▶ Start the Sculi diagnostic software and connect it to the machine.

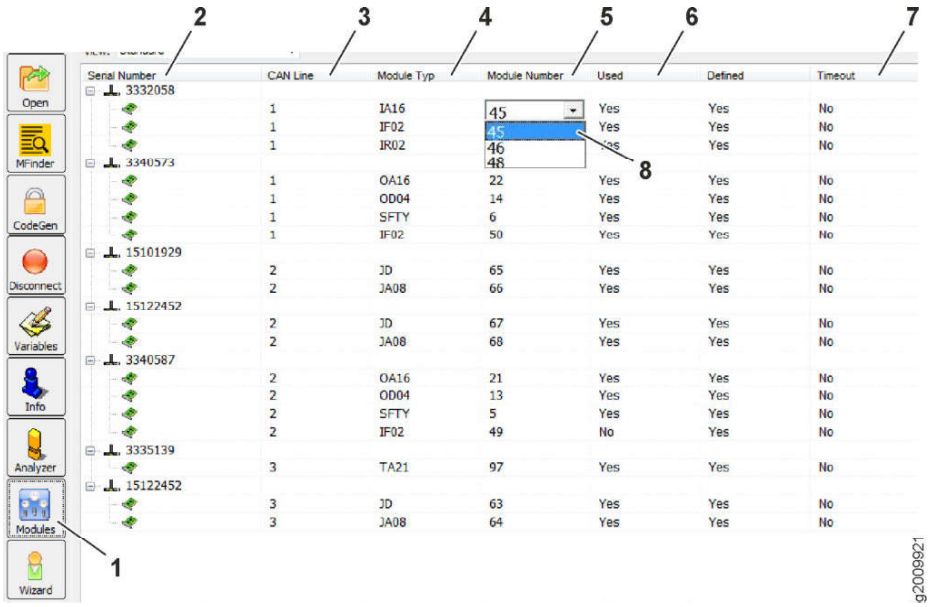

Fig. 281: Module editor in Sculi

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

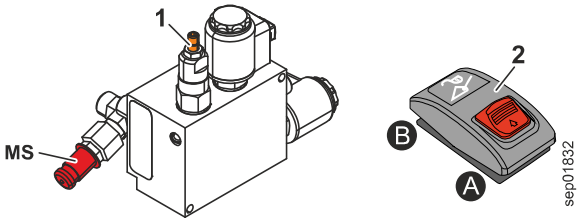

Fig. 286:

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: L580-1760;

Make sure that following requirements are met:

❑ Machine is in maintenance position for adjustment procedures.

Make sure that following tools are ready:

❑ Laptop with Sculi diagnostic software

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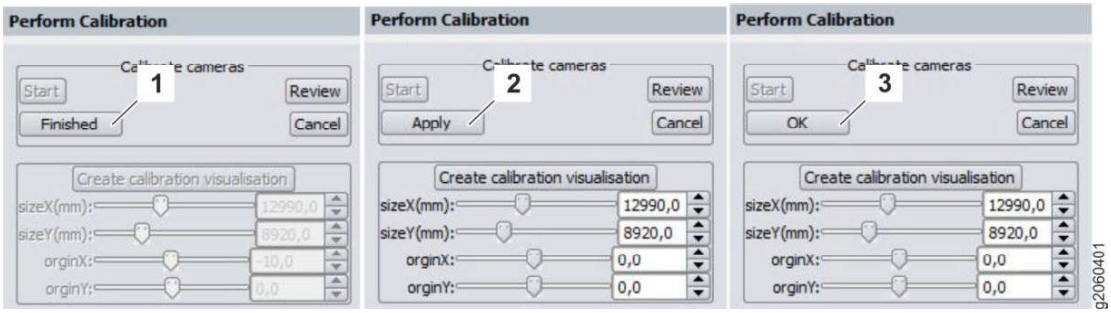

Fig. 301: Completing calibration

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

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

Fig. 302: 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: L580-1760;

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

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					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. 90: 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

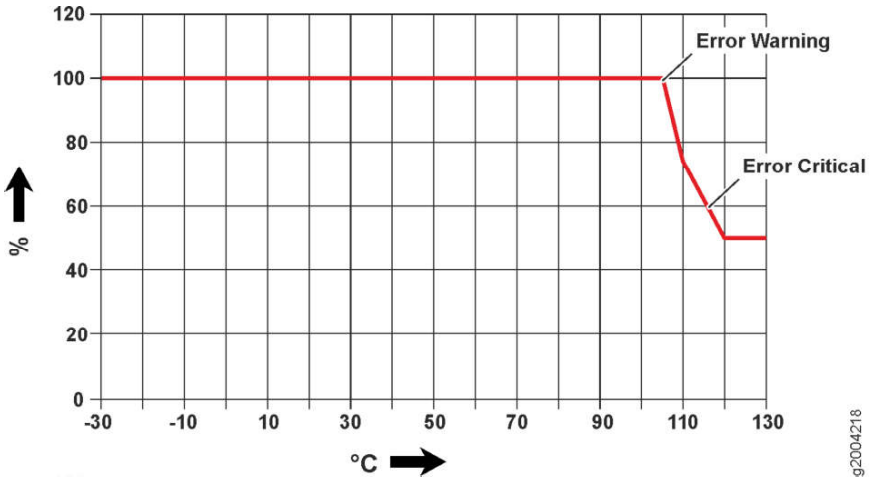

Fig. 310: Power reduction for excessive coolant temperature

% Engine torque in per cent

°C Coolant temperature in degrees Celsius

1.5 Crankcase bleeding line

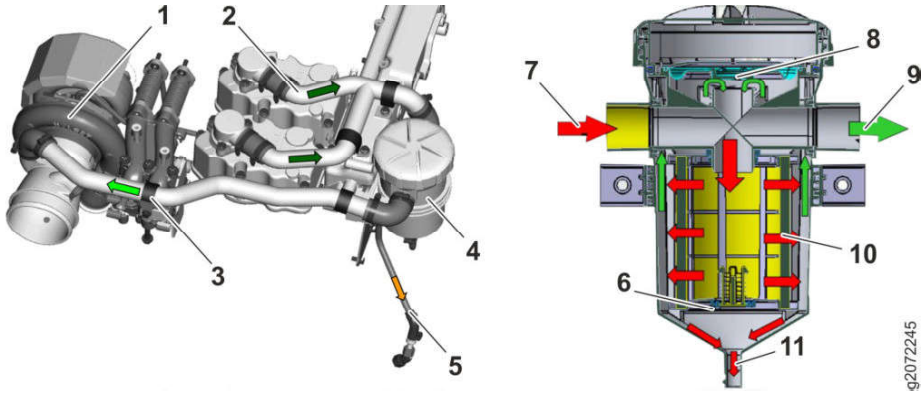

Fig. 321: Crankcase bleeding line

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

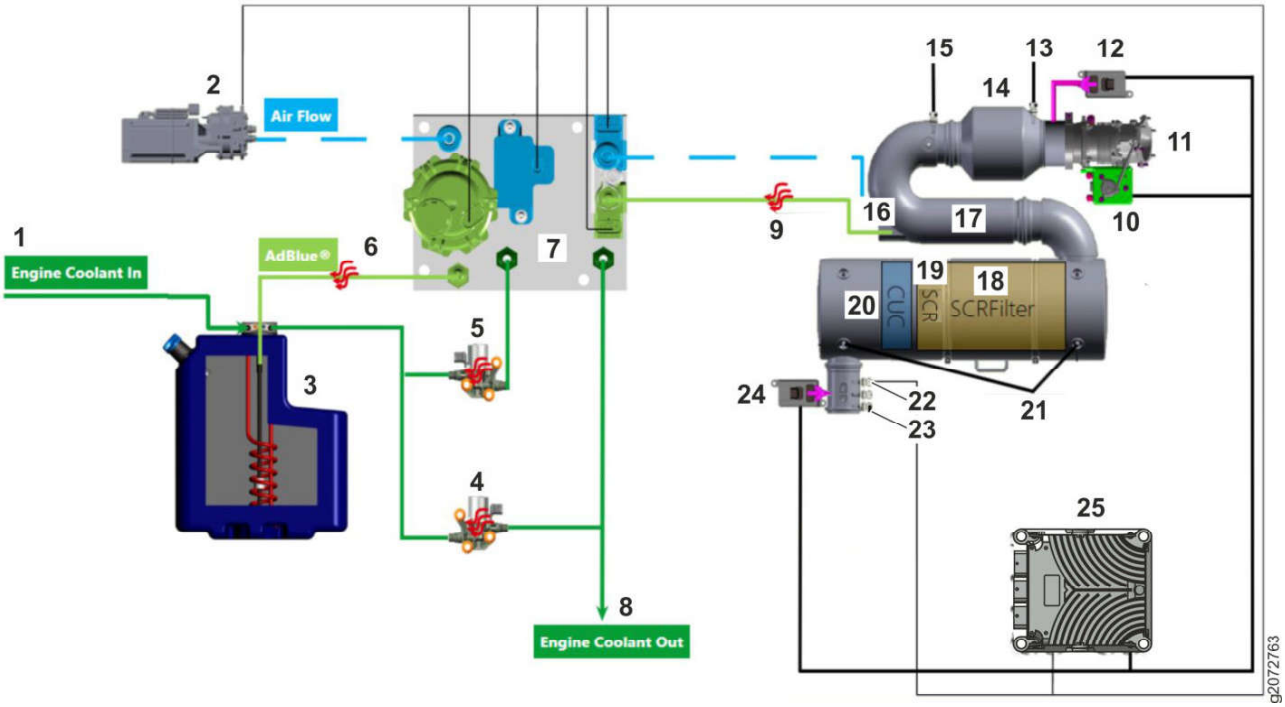

Fig. 331: Layout of the exhaust gas treatment system

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.

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

2.3 How the exhaust gas treatment system works

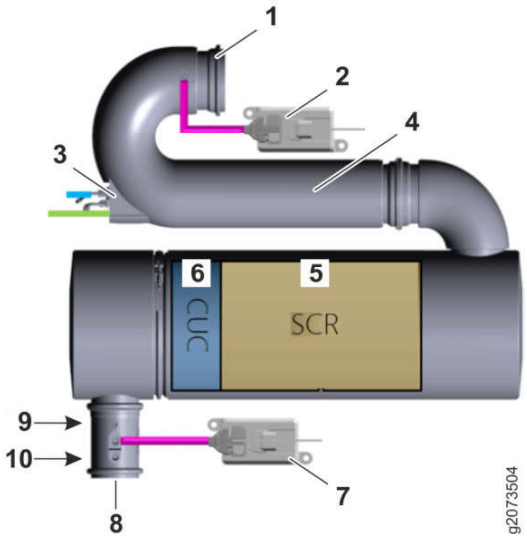

Fig. 339: How the exhaust gas treatment system works

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.

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2.1 Function

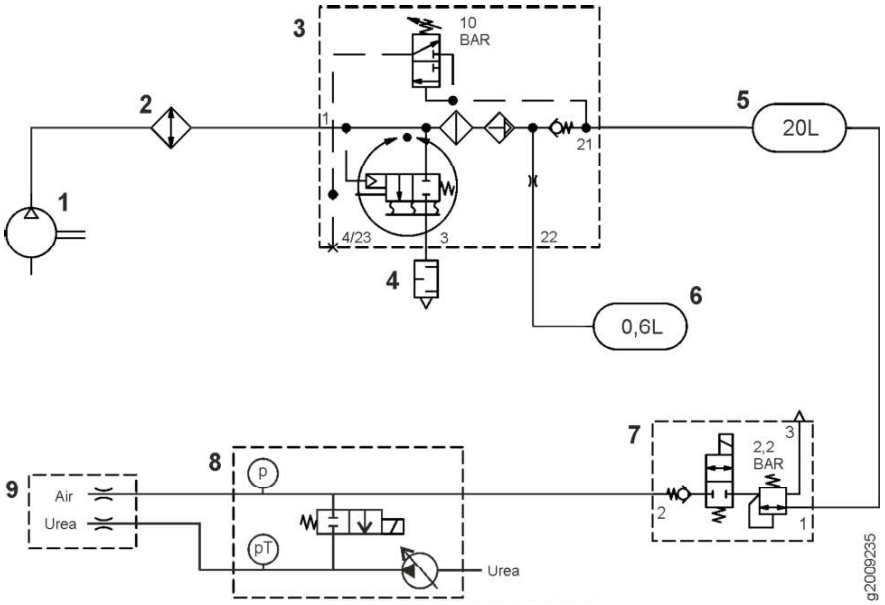

Fig. 352: Diagram of the compressed air system

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

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050.3 Cooling system electronics

050.3.1 Overview of electrical controls of cooling system

Valid for: L580-1760;

1 Layout

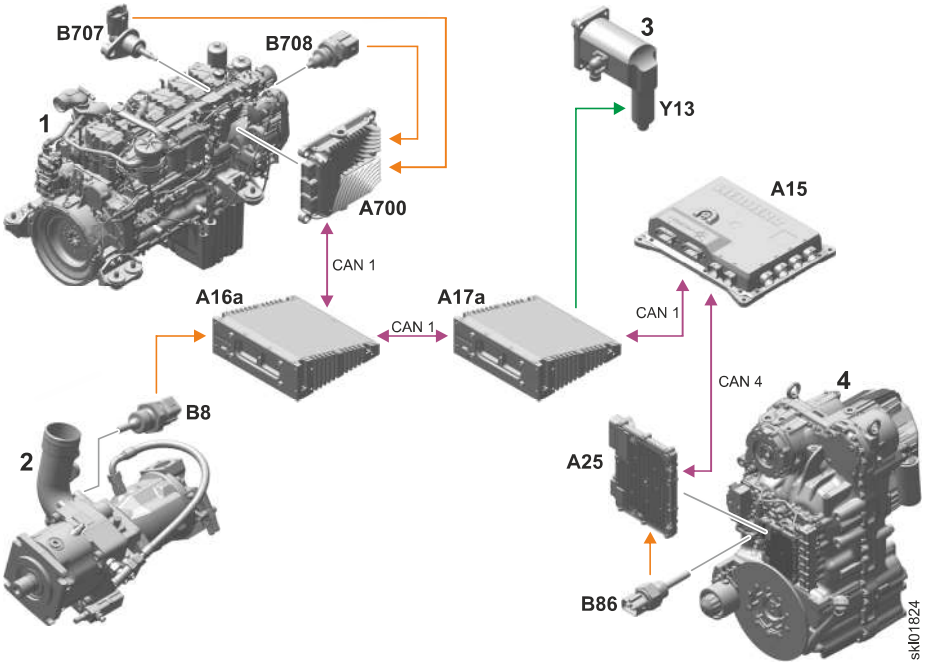

Fig. 369: Overview of electrical controls of cooling system

1	Diesel engine	**3**	Fan motor
2	Suction line of working pump	**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. 112: Equipment codes

2 Function

2.1 Basic function

Fan speed is controlled by central control unit.

060 Working hydraulics

Contents

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2 Function

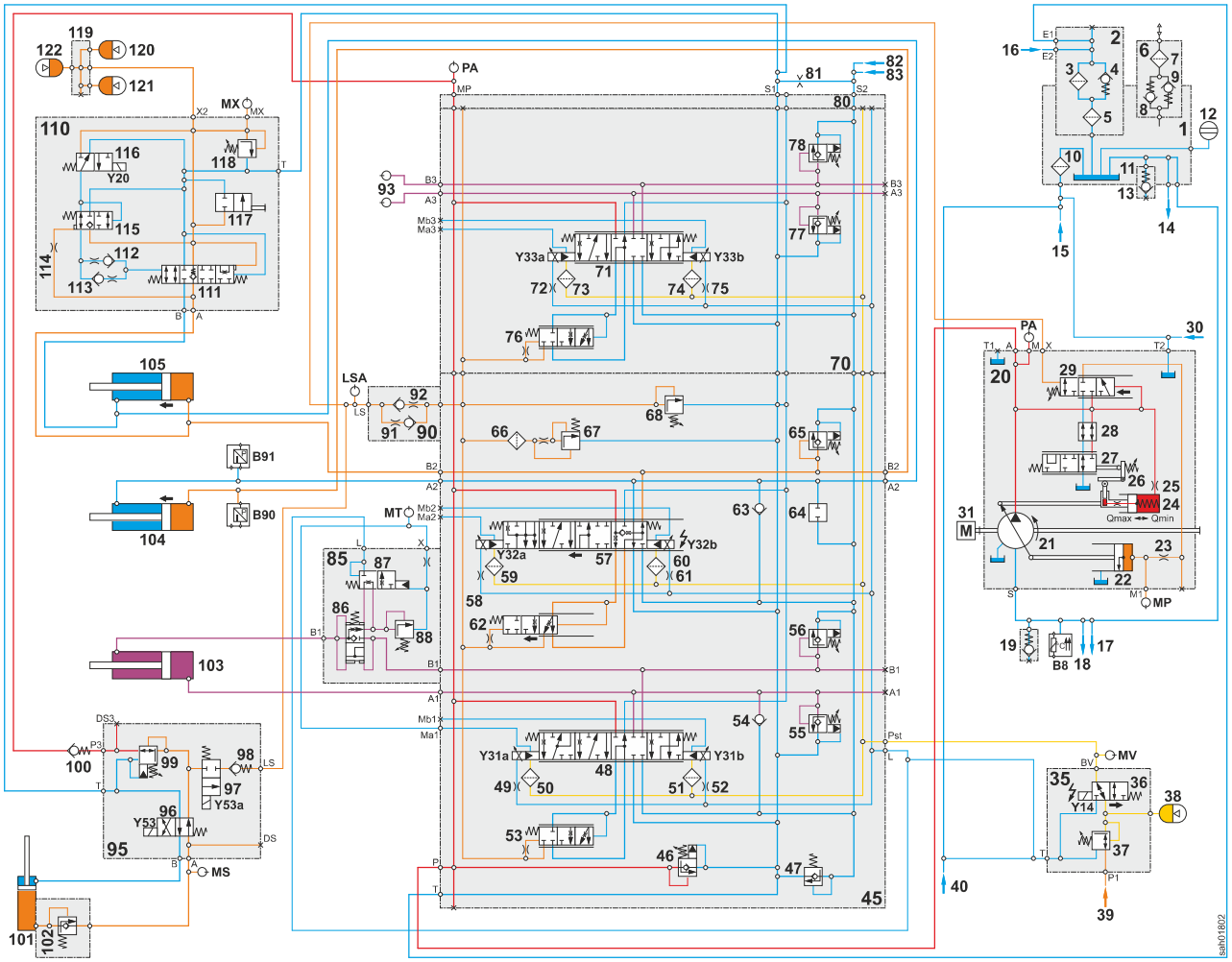

Fig. 380: Diagram of working hydraulics for industrial lift arms (lift function actuated)

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

See next page for continuation of the image legend

2.5 Pressure protection

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

060.5 Control valve block for industrial lift arms

Valid for: L580-1760;

This equipment is optional.

1 Layout

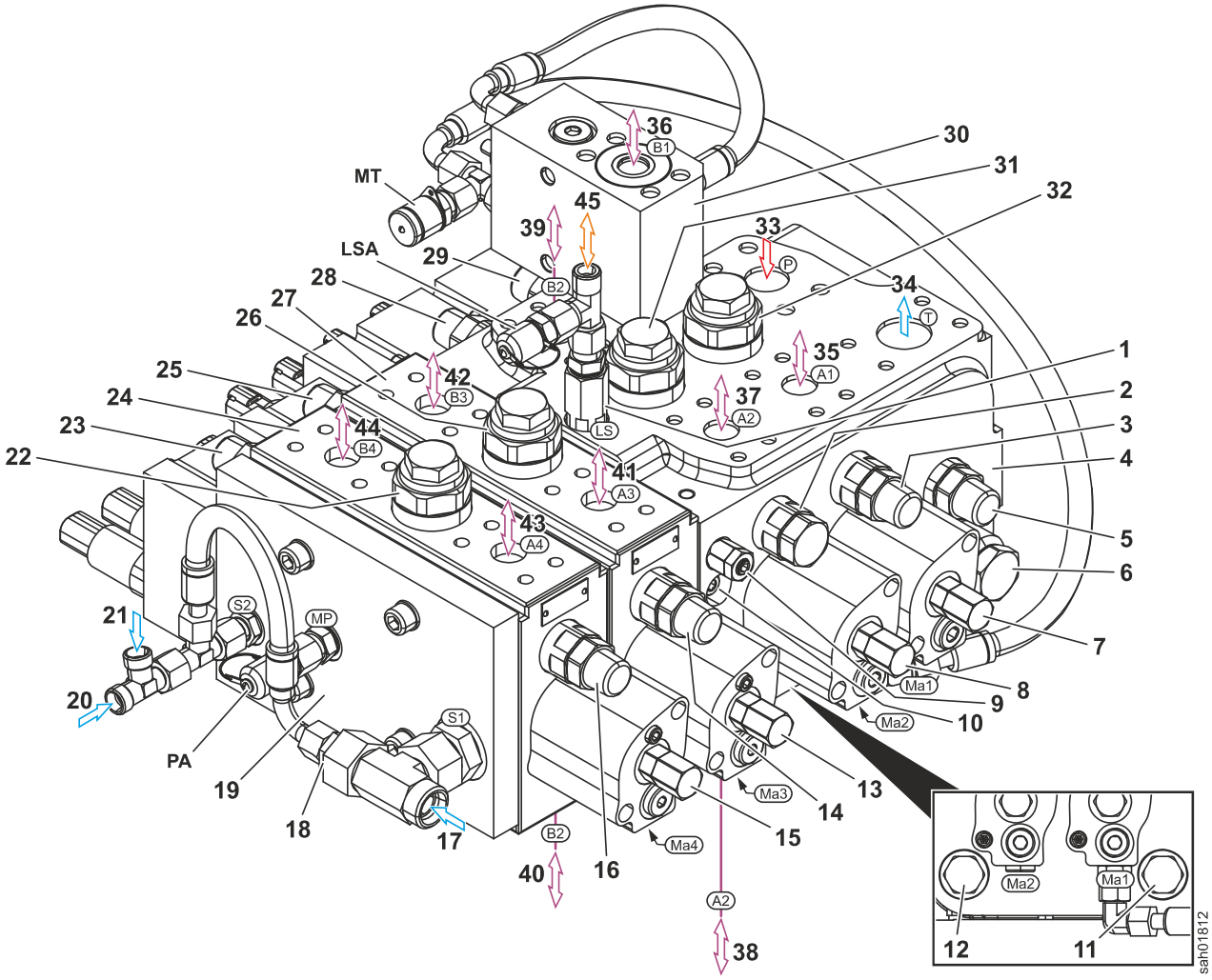

Fig. 392: Control valve block for industrial lift arms (from front left)

1	Throttle check valve	**16**	Secondary pressure relief valve for 4th function A4	**31**	Lift cylinder pressure balance
2	Dummy piston	**17**	Return flow from stabilization module	**32**	Tilt cylinder pressure balance
3	Secondary pressure relief valve for tilting out	**18**	Orifice 1.0 mm	**33**	Oil supply from working pump
4	Control block	**19**	End section	**34**	Return flow from return filter
5	Primary pressure relief valve	**20**	Return flow from compact brake valve (control valve block housing preheating)	**35**	Connection to piston side of tilt cylinder

See next page for continuation of the image legend

2 Function

2.1 Basic function

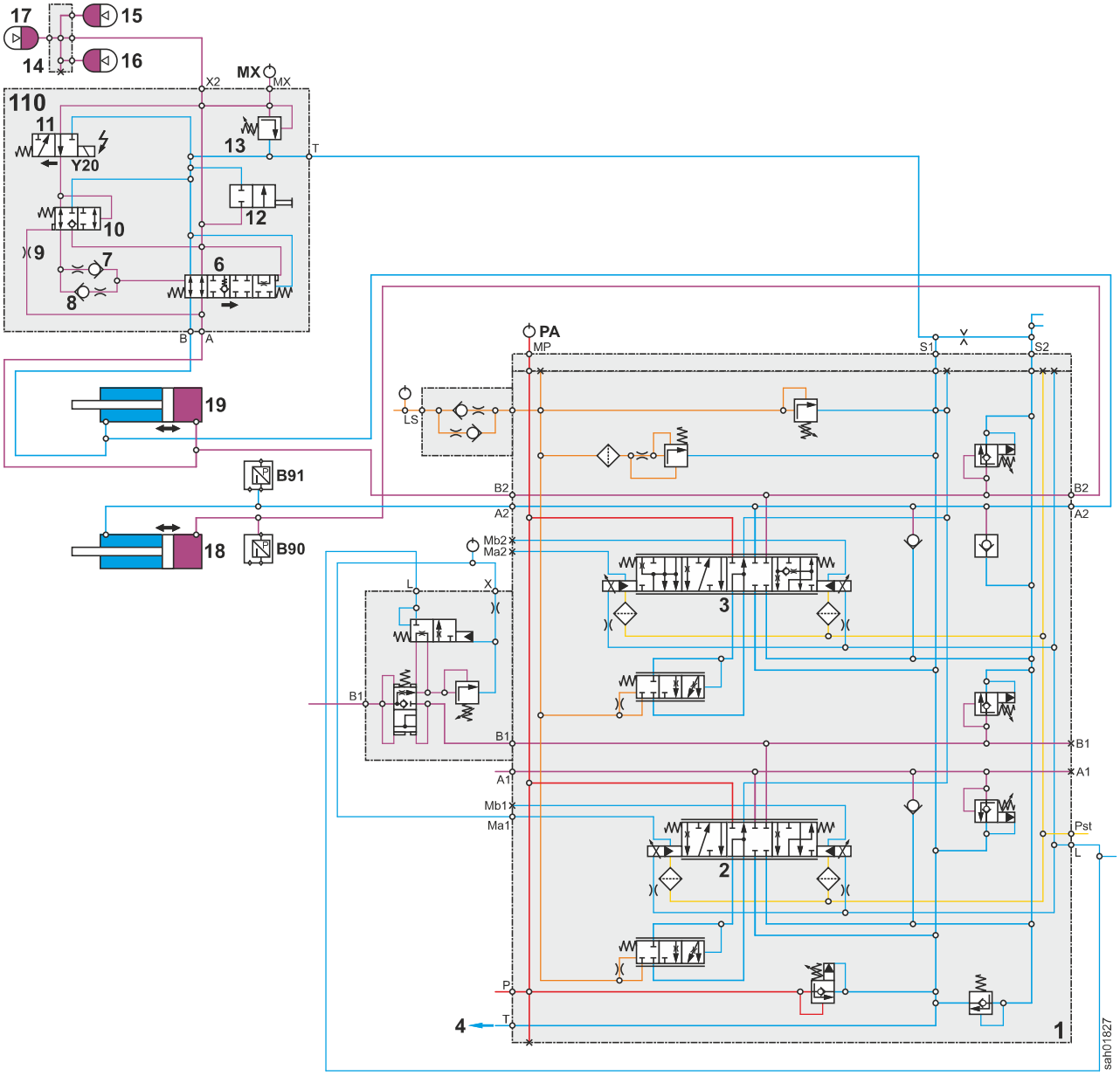

Fig. 398: Hydraulic diagram of ride control (ride control active)

1	**Control block**	**8**	Throttle 0.3 mm	**15**	Ride control hydro accumulator
2	Tilt cylinder spool valve	**9**	Throttle 0.6 mm	**16**	Ride control hydro accumulator
3	Spool valve for lift cylinder	**10**	Release valve	**17**	Ride control hydro accumulator
4	Return flow from return filter	**11**	Ride control solenoid valve	**18**	Left lift cylinder
5	**Stabilisation module**	**12**	Hydro accumulator relief valve	**19**	Right lift cylinder
6	Ride control valve spool	**13**	Safety valve		

See next page for continuation of the image legend

2.1 Measuring range

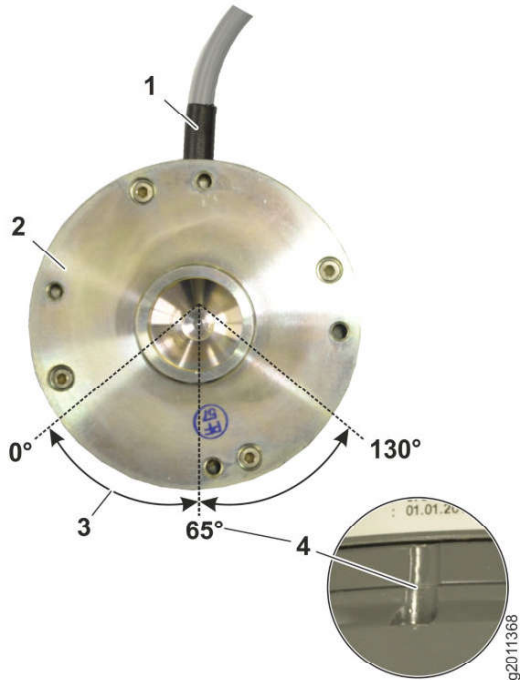

Fig. 404: Measuring range

1	Connecting cable	**3**	Measuring range
2	Connecting plate	**4**	Zero position at 65°

The angle sensor has a measuring range of 130°.

The zero position of measuring range **4** is at 65°. The zero position is marked by a recess on the housing and on the connecting housing.

The measuring range extends 65° to the left and right of zero position.

2.2 Measuring principle

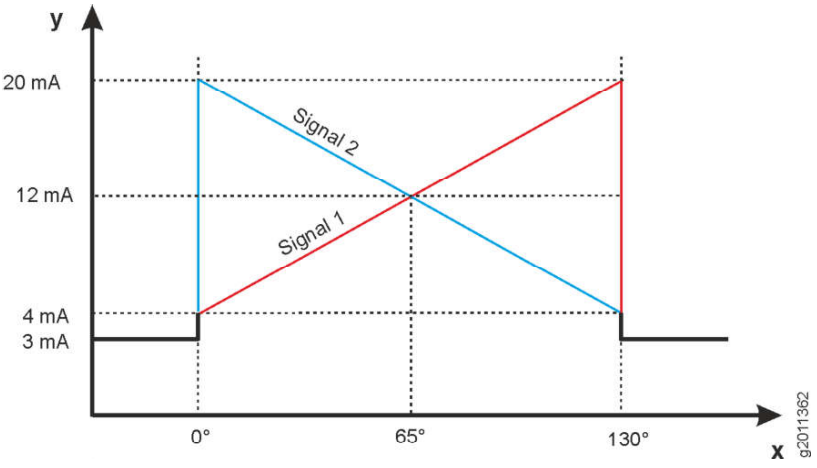

Fig. 405: Measuring principle

x	Measuring range in degrees	**y**	Output current in milliamperes

3 Breather filter
4 Sight glass for hydraulic oil level
5 Hydraulic tank drain valve
6 Working pump suction port drain valve
7 Steering pump
8 Working pump
9 Diesel engine
10 Pilot control valve block
11 Pilot control hydro accumulator
12 Control block for Z-bar kinematics
13 Control valve block section for 3rd function (option)
14 End section
15 Orifice 1.0 mm
16 Throttle check valve
17 Anti-drift valve
18 Check valve
19 Valve block for quick coupler (option)
20 Preload valve 15 bar
21 Hydraulic cylinder for locking quick coupler (option)
22 Tilt cylinder
23 Left lift cylinder
24 Right lift cylinder
27 Ride control hydro accumulator
28 Ride control hydro accumulator
29 Ride control hydro accumulator
30 Quick coupler for 3rd function (option)
31 Fan pump
32 Brake pump
33 Compact brake valve
34 Parking brake hydro accumulator
35 Hydro accumulator for service brake (2nd brake circuit)
36 Hydro accumulator for service brake (1st brake circuit)
37 Hydro accumulator for service brake (2nd brake circuit)
38 Hydro accumulator for service brake (1st brake circuit)
39 Front axle with 1st service brake circuit
40 Orifice
41 Parking brake
42 Rear axle with 2nd service brake circuit
43 In-line filter 80 µm
44 Emergency steering pump
45 Valve block for steering system
46 Servostat
47 Steering stabilisation valve block
48 Steering damper hydro accumulator
51 Pressure relief valve for stroke limit damping
52 Right steering cylinder with stroke limit damping
53 Pressure relief valve for stroke limit damping
54 Fan motor
55 Fan speed proportional solenoid valve
56 Collector pipe
57 Temperature valve for gear oil cooler bypass
58 Hydraulic oil cooler
59 Gear oil cooler
60 Transmission housing
61 Hydrostat oil filter
62 Drain valve on transmission housing
63 Sight glass for gear oil level
64 Duct plate
65 Transmission valve block
66 Filter head
67 Gear oil filter
68 Gear oil filter
69 Hydrostat module
70 Double yoke
71 Vent valve

Name	Test point	Name	Test point	Name	Test point
LSA	Load sensing signal for working pump	**MKV**	Clutch shift pressure for forward travel direction (KV)	**MV**	Servo pressure
LSL	Load sensing signal for steering pump (option)	**MO1**	Switching pressure for 1st optional connection	**MX**	Ride control hydro accumulator charge pressure
M3	Service brake accumulator pressure	**MO2**	Switching pressure for 2nd optional connection	**PA**[A)]	Working pump high pressure
M4	Brake pressure in 1st brake circuit (front axle)	**MP**	Working pump return pressure	**PA**[B)]	Working pump high pressure
M5	Brake pressure in 2nd brake circuit (rear axle)	**MPS**	Lubricating pressure behind radiator	**PK**	Cooling system high pressure
MK1	Clutch 1 shift pressure (K1)	**MS**	Quick coupler closing pressure	**PL/**	Steering pump high pressure

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090 Steering system

Contents

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2 Function

2.1 Basic function

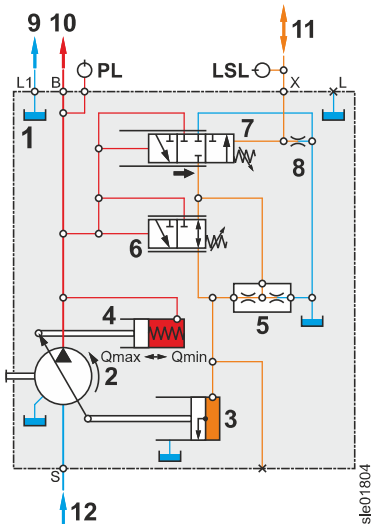

Fig. 430: Hydraulic diagram of steering pump (diesel engine running)

1	**Steering pump**	**7**	Flow regulator
2	Axial piston rotary group	**8**	Throttle
3	Return piston	**9**	Leak oil to leak oil strainer
4	Positioning piston	**10**	Oil supply to servostat
5	Throttle	**11**	Load sensing signal from servostat
6	LS-pressure cut-off	**12**	Suction port from hydraulic tank

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

Tab. 179: Test points

Steering pump draws oil from hydraulic tank and pumps it through valve block to steering system. From there, oil then flows to servostat.

Displacement of steering pump depends on engine speed and swivel plate angle. Steering pump is regulated via load sensing signal from servostat.

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5 Throttle check valve 2.0 mm
6 Servostat connection for steering to right
11 Port for piston side of right steering cylinder
12 Port for piston side of left steering cylinder

2.2 Preventing cavitation

The steering stabilisation replenishing valves **2** and **3** prevent cavitation in the steering cylinders and thus increase stability when the machine is steered wile moving.

2.3 Attenuating pressure peaks

Sudden steering movements or external influences on the machine can cause pressure peaks in the steering cylinders. These pressure peaks are attenuated by the steering damping hydro accumulators **4** and **9**.

Hydro accumulator for steering damping **4** and **9** with integrated throttle check valve improve steering behaviour.

090.4.3 Valve block for steering stabilisation (without steering wheel steering)

Valid for: L580-1760;

This equipment is optional.

1 Layout

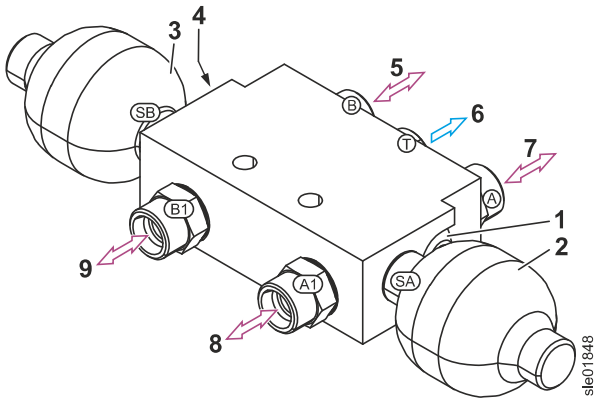

Fig. 445: Steering stabilisation valve block (from front left)

1 Secondary pressure relief valve for steering to right
2 Steering damper hydro accumulator
3 Secondary pressure relief valve for steering to left
4 Steering damper hydro accumulator
5 Servostat port
6 Return flow to collector pipe
7 Servostat port
8 Port for piston side of left steering cylinder
9 Port for piston side of right steering cylinder

Steering stabilisation valve block is mounted on rear section near articulated joint.

2.2.1 Function of the on-road travel switch S19

Stricter safety regulations apply for on-road travel. The emergency steering must also function in case of a failure of the central control unit.

In normal mode, the emergency sting relay K16 is activated by the output **87**. The output **87** is activated when the central control unit emits a signal to the input **Y** am on the control relay for emergency steering K14 to activate the emergency steering pump.

To ensure the emergency steering function if the central control unit fails, the *on-road travel* switch S19 must be active.

If the *on-road travel* S19 is active, the emergency steering relay K16 is switched. However, there is no voltage at the switching contact.

When a voltage signal is generated via the output **87a** of the relay for emergency steering K14, the emergency steering pump power relay K11 switches on and the emergency steering pump is activated. This output is active when the pressure switch for emergency steering B3 switches.

This ensures that if the central control unit fails, the emergency steering pump can still be switched on.

2.3 Emergency steering function with optional automatic engine shutdown (option)

If the automatic engine shut down is activated, the diesel engine runs for a defined time at idling speed. This causes the steering pressure to drop, and the emergency steering pump would normally be activated.

To prevent this, the central control unit A15 monitors activation of the emergency steering pump.

If the steering pressure drops, the central control unit checks whether automatic engine shutdown is active. If it is, no signal is sent to the input **Y** of the emergency steering control relay K14. The emergency steering pump is not activated.

This prevents the emergency steering pump from being activated unnecessarily.

If the *on-road travel* switch is active, a signal is sent via the pin 55 (frequency input 1) of the output module A17a to the central control unit. This signal deactivated automatic engine shutdown during on-road travel.

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7 Fine filter
8 Outlet valve 0.65 bar
9 Inlet valve 0.03 bar
10 Leak oil strainer 100 µm
11 Steel tank
12 Sight glass for hydraulic oil level
13 Hydraulic tank drain valve
14 Fan motor leak oil
15 Return flow from compact brake valve and pilot control
16 Return flow from control valve block
20 **Steering pump**
21 Axial piston rotary group
22 Return piston
23 Positioning piston
24 Throttle
25 LS-pressure cut-off
26 Flow regulator
27 Throttle
28 Fan pump and brake pump suction port
37 Pressure relief valve
40 **Valve block for steering system**
41 Check valve
42 Check valve
45 **Joystick steering control block**
46 Servo oil strainer for main spool valve
47 Pressure reducing valve for main spool valve
48 Servo oil strainer for emergency spool valve
49 Pressure reducing valve for emergency spool valve
50 Shuttle valve 1
51 Shuttle valve 2
52 Check valve
53 Solenoid valve for safety circuit
54 Proportional solenoid valve for steering left (main spool valve)
55 Throttle check valve
56 Orifice 0.7 mm
57 Proportional solenoid valve for steering right (main spool valve)
58 Throttle check valve
59 Orifice 0.7 mm
70 Return line from fan motor
75 **Collector pipe**
76 Preload valve for steering cylinder replenishing function 5 bar
77 Bypass valve for hydraulic oil cooler 1.5 bar
78 Hydraulic oil cooler
80 **Steering stabilisation valve block**
81 Secondary pressure relief valve for steering to right
82 Secondary pressure relief valve for steering to left
83 **Steering damper hydro accumulator**
84 Throttle check valve 2.0 mm
85 **Steering damper hydro accumulator**
86 Throttle check valve 2.0 mm
87 Left steering cylinder with stroke limit damping
88 Pressure relief valve for stroke limit damping
89 Right steering cylinder with stroke limit damping
90 Pressure relief valve for stroke limit damping
91 Return flow to control valve block (housing preheating)

Name	Test point	Name	Test point	Name	Test point
M A1	Servo pressure for steering to left (main spool valve)	**M B2**	Servo pressure for steering to right (emergency spool valve)	**PL1**	High pressure for steering pump or emergency steering pump
M B1	Servo pressure for steering to right (main spool valve)	**LSL**	Load sensing signal for steering pump		
M A2	Servo pressure for steering to left (emergency spool valve)	**PL/**	Steering pump high pressure		

Tab. 191: Test points

BMK	Function	BMK	Function	BMK	Function
B3	Emergency steering pressure switch	**B71**	Emergency spool valve position sensor	**Y72**	Proportional solenoid for steering to left (emergency spool valve)

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

Tab. 200: Equipment codes

In normal mode, proportional control solenoid for steering left (main spool valve) **Y70** and proportional control solenoid for steering right (main spool valve) **Y71** are controlled by output module **A17b**.

Position of main spool valve **5** is monitored by main spool valve position sensor **B70**. Signal from main spool position sensor **B70** is received by joystick module **A29** and forwarded to central control unit **A15**.

In normal mode, safety circuit solenoid valve **Y74** is activated via output module **A17b**.

2.2 Joystick steering function in emergency mode

Joystick steering operates under following conditions in emergency mode:
- Failure of central control unit A15.
- Failure of output module A17b.
- Critical error (line break, etc.) on CAN line 2.
- Implausible value of position sensor of main spool valve B70.

A critical error on CAN line 3 does not necessarily result in joystick steering in emergency mode.

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100 Brake system

Contents

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2 Function

2.1 Basic function

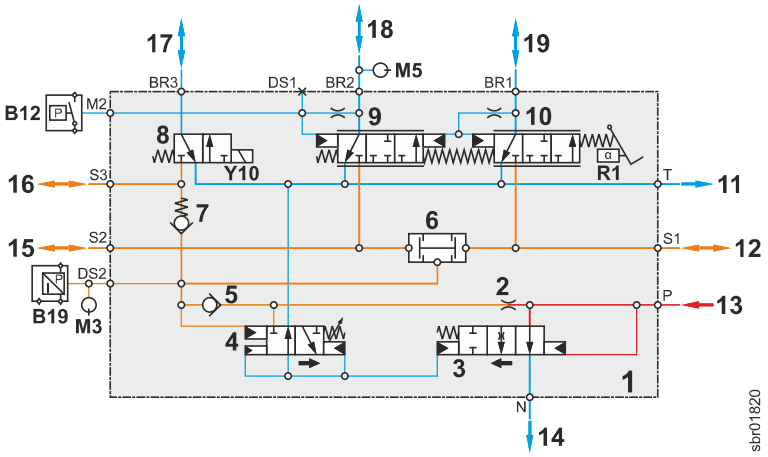


Fig. 480: Hydraulic diagram of compact brake valve

1	**Compact brake valve**	**11**	Return flow to leak oil strainer
2	Inlet restrictor	**12**	Port for hydro accumulator for service brake (1st brake circuit)
3	Accumulator charge valve	**13**	Oil supply from brake pump
4	Pilot valve	**14**	Return flow to control valve block (housing preheating)
5	Inlet check valve	**15**	Port for service brake hydro accumulator (2nd brake circuit)
6	Inverted shuttle valve	**16**	Connection for hydro accumulator for parking brake
7	Check valve for parking brake	**17**	Port for parking brake
8	Parking brake solenoid valve	**18**	Port for 2nd brake circuit (rear axle)
9	Pressure regulator piston for 2nd brake circuit	**19**	Port for 1st brake circuit (front axle)
10	Pressure regulator piston for 1st brake circuit		

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

Tab. 215: Test points

BMK	Function	BMK	Function
B12	Brake light pressure switch	**R1**	Inching function angle sensor
B19	Brake accumulator pressure sensor	**Y10**	Parking brake solenoid

Tab. 216: Equipment codes

Following functions are controlled via compact brake valve:
- Charging hydro accumulators
- Inching function

Position	Function	Position	Function
B785	Intake air sensor	Y14	Working hydraulics lockout solenoid valve

Tab. 217: Components

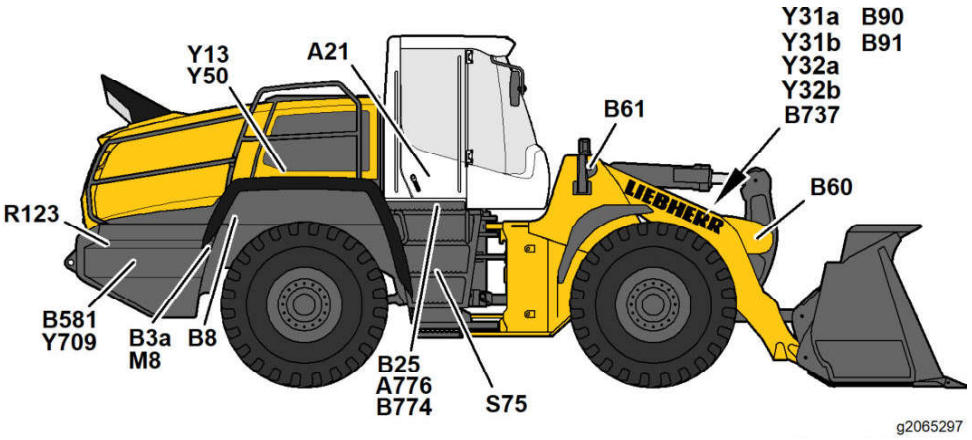


Fig. 487: Machine view from right

Position	Function	Position	Function
A21	Air conditioning controller	B774	Sampling module
A776	Metering unit	M8	Emergency steering pump
B3a	Emergency steering pump check pressure switch	R123	Diesel engine terminating resistor (CAN line 2)
B8	Hydraulic oil temperature sensor	S75	Tank pipe switch
B25	Fuel level sensor	Y13	Fan speed proportional solenoid
B60	Angle sensor for float position	Y31a	Proportional solenoid for tilting out
B61	Angle sensor for lift arm position	Y31b	Proportional solenoid for tilting in
B90	Pressure sensor for weighing device (piston side)	Y32a	Proportional solenoid for lowering
B91	Pressure sensor for weighing device (ring side)	Y32b	Proportional solenoid for lifting
B581	Air dryer	Y50	Fan reversal solenoid
B737	Ambient air temperature sensor		

Tab. 218: Components

LBH/12252626/01/211-20191218_152521/en

EQUIPMENT CODE SYSTEM LOCATION IDENTITY

- EQUIPMENT CODE

-M1 STARTER EQUIPMENT CODE

= SYSTEM

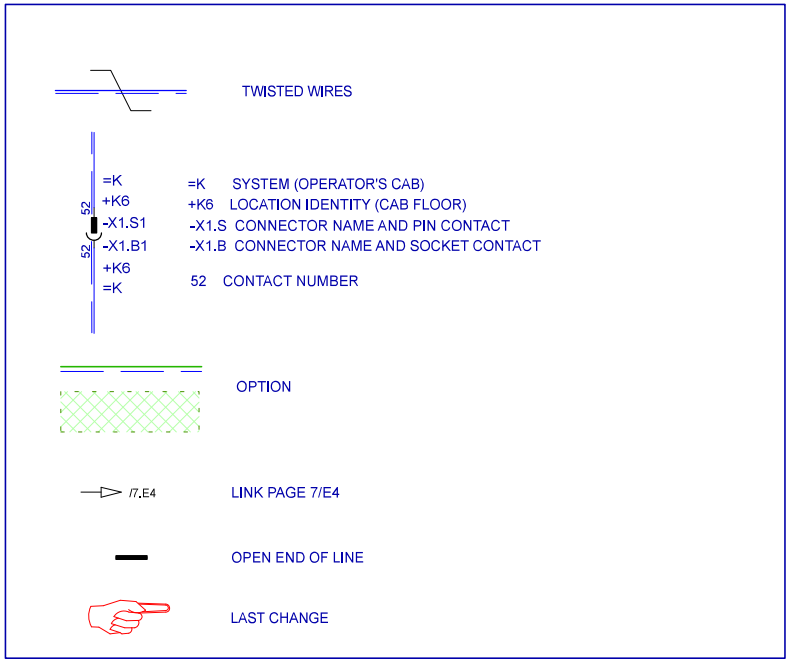
=A4 FUSE BOARD
=A4b FUSE BOARD (OPTION)
=B BALLAST
=F TRAVEL DRIVE
=H REAR SECTION
=K OPERATOR'S CAB
=M DIESEL ENGINE
=V FRONT SECTION

+ LOCATION IDENTITY

+B BALLAST
+B1 BALLAST LEFT
+B2 BALLAST RIGHT

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

+H REAR SECTION
+H1 REAR SECTION ENGINE BONNET
+H2 REAR SECTION UNDER OPERATOR'S CAB RIGHT
+H3 REAR SECTION UNDER OPERATOR'S CAB LEFT
+H4 REAR SECTION RIGHT
+H5 REAR SECTION LEFT



+K OPERATOR'S CAB
+K1 OPERATOR'S CAB FRONT MIDDLE
+K2 CAB REAR WALL
+K3 CAB ROOF
+K4 OPERATOR'S CAB RIGHT SIDE
+K5 OPERATOR'S CAB LEFT SIDE
+K6 CAB FLOOR

+M DIESEL ENGINE (MACHINE SIDE)
+M1 DIESEL ENGINE SIDE

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

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	SYSTEM LOCATION IDENTITY ELECTRICAL SCHEMATIC;	PAGE 5 OF
				CREATION DATE 09.10.2019 15:49

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-R9A	=K	+K2	RESISTOR EXCITATION	/27.B6
-R9B	=K	+K2	RESISTOR EXCITATION	/27.B6
-R10	=M	+M	FUEL PREHEATING ELEMENT	/106.E8
-R10.X	=M	+M	CONNECTOR FUEL PREHEATING ELEMENT	/106.E7
-R12	=K	+K2	REAR WINDOW HEATER	/35.E6
-R12.X1	=K	+K2	CONNECTOR REAR WINDOW HEATER	/35.E6
-R12.X2	=K	+K2	CONNECTOR REAR WINDOW HEATER	/35.E6
-R120	=K	+K	CAN TERMINATOR	/39.F5
-R120*	=K	+K	RESISTOR	/151.E6
-R121	=K	+K.	CAN TERMINATOR	/133.E4
-R121	=K	+K	TERMINATING RESISTOR	/140.F5
-R121*	=K	+K..	CAN TERMINATOR	/144.D4
-R122	=K	+K	TERMINATING RESISTOR	/148.F4
-R123	=H	+H	TERMINATING RESISTOR	/54.E4
-R123.X1	=H	+H	SPLICE	/54.E4
-R123.X2	=H	+H	SPLICE	/54.E4
-R124	=K	+K	RESISTOR	/124.C7
-R200	=K	+K	RESISTOR	/113.D4
-R218	=K	+K2	RESISTOR	/112.C6
-R220	=K	+K	RESISTOR EXCITATION	/101.C4
-R615	=K	+K	PERSONNEL DETECTION	/121.C2
-R616	=K	+K	PERSONNEL DETECTION	/121.C3
-R700	=H	+H	RESISTOR LED	/56.C7
-R700.X	=H	+H	CONNECTOR RESISTOR	/56.C7
-R701	=M	+M	HEATER FLANGE	/24.E7
-S1	=K	+K	STARTING SWITCH	/24.A3
-S1.L	=K	+K	STARTING SWITCH	/150.A3
-S1.L.X1	=K	+K	CONNECTOR STARTING SWITCH	/150.A3
-S1.L.X2	=K	+K	CONNECTOR STARTING SWITCH	/150.B3
-S1.L.X4	=K	+K	CONNECTOR STARTING SWITCH	/150.A3
-S1.M	=K	+K	MULTI-LEVER CONTROL STARTING SWITCH	/139.A3
-S1.M.X1	=K	+K	CONNECTOR MULTI-LEVER CONTROL STARTING SWITCH	/139.A3
-S1.M.X2	=K	+K	CONNECTOR MULTI-LEVER CONTROL STARTING SWITCH	/139.B4
-S1.M.X4	=K	+K	CONNECTOR MULTI-LEVER CONTROL STARTING SWITCH	/139.A3
-S1.X1	=K	+K	CONNECTOR STARTING SWITCH	/24.A3
-S1.X2	=K	+K	CONNECTOR STARTING SWITCH	/24.B4

BMK	SYSTEM	LOCATION	FUNCTION	PAGE
-S1.X4	=K	+K	CONNECTOR STARTING SWITCH	/24.A4
-S2c.1	=K	+K	MULTI-LEVER CONTROL TRAVEL DIRECTION SWITCH	/138.E5
-S2c.1.X	=K	+K	CONNECTOR MULTI-LEVER CONTROL TRAVEL DIRECTION SWITCH	/138.E5
-S2d.1	=K	+K	LogHandler TRAVEL DIRECTION SWITCH	/154.E7
-S2d.1.X	=K	+K	CONNECTOR LogHandler TRAVEL DIRECTION SWITCH	/154.E7
-S2e	=K	+K	TRAVEL DIRECTION SWITCH JOYSTICK STEERING	/99.C16
-S3	=K	+K1	STEERING COLUMN SWITCH	/29.A7
-S3.X1	=K	+K1	CONNECTOR STEERING COLUMN SWITCH	/33.E3
-S3.X2	=K	+K1	CONNECTOR STEERING COLUMN SWITCH	/33.E3
-S4	=K	+K	HAZARD WARNING SYSTEM	/30.B1
-S4.X	=K	+K	CONNECTOR HAZARD WARNING SYSTEM	/30.B1
-S6	=K	+K	PARKING LIGHT AND LOW BEAM SWITCH	/29.A2
-S6.X	=K	+K	CONNECTOR PARKING LIGHT AND LOW BEAM SWITCH	/29.B2
-S7	=K	+K	FRONT WORKING HEADLIGHTS SWITCH	/31.B2
-S7.X	=K	+K	CONNECTOR FRONT WORKING HEADLIGHTS SWITCH	/31.B2
-S8	=K	+K	REAR WORKING HEADLIGHTS SWITCH	/32.D1
-S8a	=K	+K	REAR WORKING HEADLIGHTS SWITCH	/32.D2
-S8a.X	=K	+K	CONNECTOR REAR WORKING HEADLIGHTS SWITCH	/32.D2
-S9a	=K	+K	FLASHING BEACON SWITCH	/35.C2
-S9a.X	=K	+K	CONNECTOR FLASHING BEACON SWITCH	/35.C3
-S13	=K	+K	REAR WINDOW WASHER SYSTEM SWITCH	/34.B3
-S13.X	=K	+K	CONNECTOR REAR WINDOW WASHER SYSTEM SWITCH	/34.B3
-S15	=B	+B	BATTERY MAIN SWITCH	/24.E4
-S15.X	=B	+B	CONNECTOR BATTERY MAIN SWITCH	/24.E4
-S17	=K	+K	2in1 STEERING SWITCH	/97.A8
-S17.X	=K	+K	CONNECTOR 2in1 STEERING SWITCH	/97.B7
-S19b	=K	+K	SWITCH ROAD TRAVEL	/26.C1
-S19b.X	=K	+K	CONNECTOR SWITCH ROAD TRAVEL	/26.C2
-S23	=K	+K3	QUICK COUPLER BUTTON	/100.B4
-S23.X	=K	+K3	CONNECTOR QUICK COUPLER BUTTON	/100.B4
-S43	=K	+K	REVERSING ALARM BUTTON	/84.B2
-S43.X	=K	+K	CONNECTOR REVERSING ALARM BUTTON	/84.B3
-S46	=K	+K	REAR WINDOW AND MIRROR HEATER SWITCH	/35.A8
-S46.X	=K	+K	CONNECTOR REAR WINDOW AND MIRROR HEATER SWITCH	/35.A8
-S71	=K	+K	JOYSTICK STEERING SWITCH ACTIVATION	/94.D7
-S71.X	=K	+K	CONNECTOR JOYSTICK STEERING SWITCH ACTIVATION	/94.D6

ITEM CODE 12466553 DRAWING INDEX 000

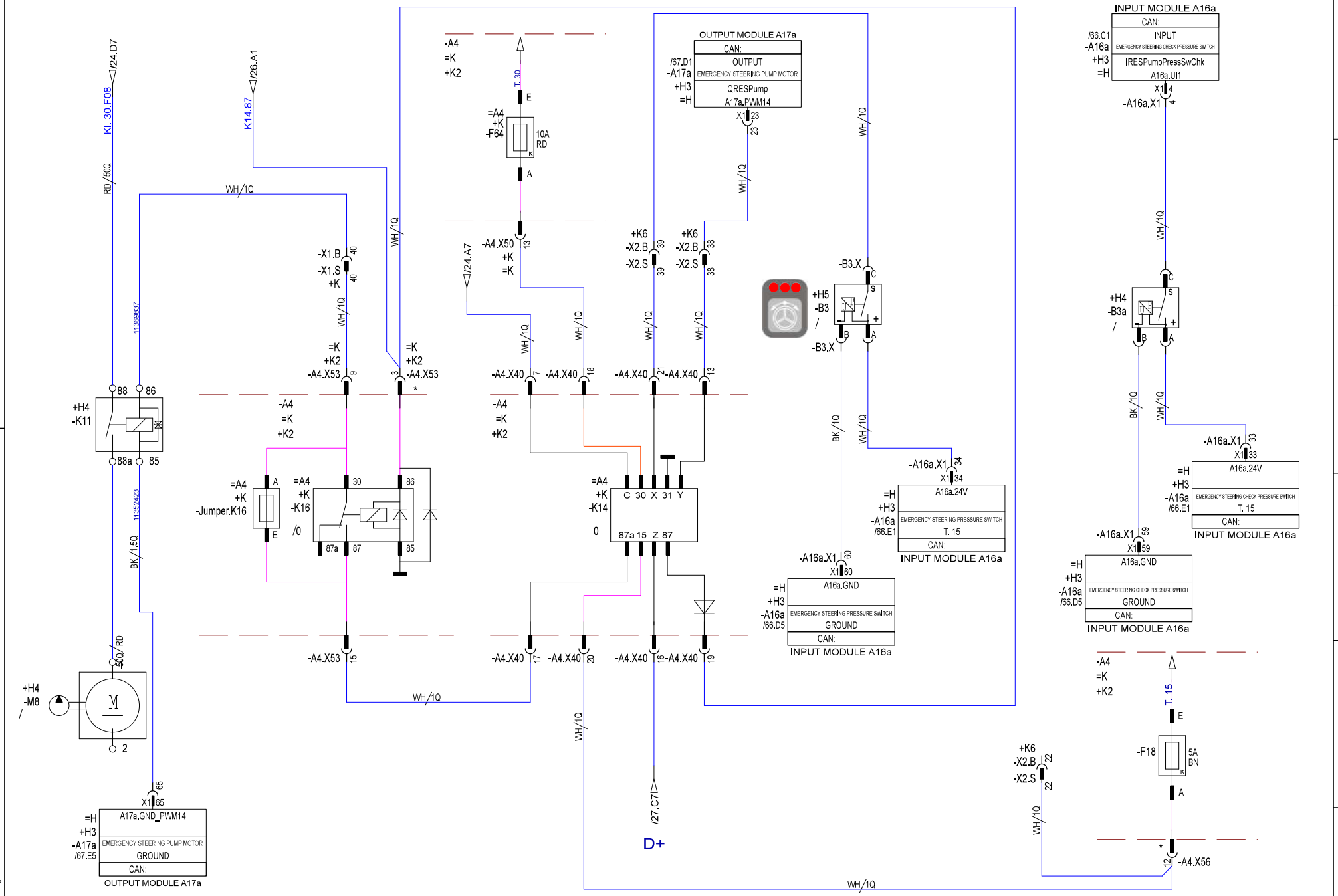
PROJECT GG_4_EVO DRAWING NUMBER 1333 90100 02 00

MACHINE TYPE
LIDOS Gerät

SERIAL NUMBER
XXXXX

LIEBHERR
FACTORY LBH

BMK-INDEX
ELECTRICAL SCHEMATIC;



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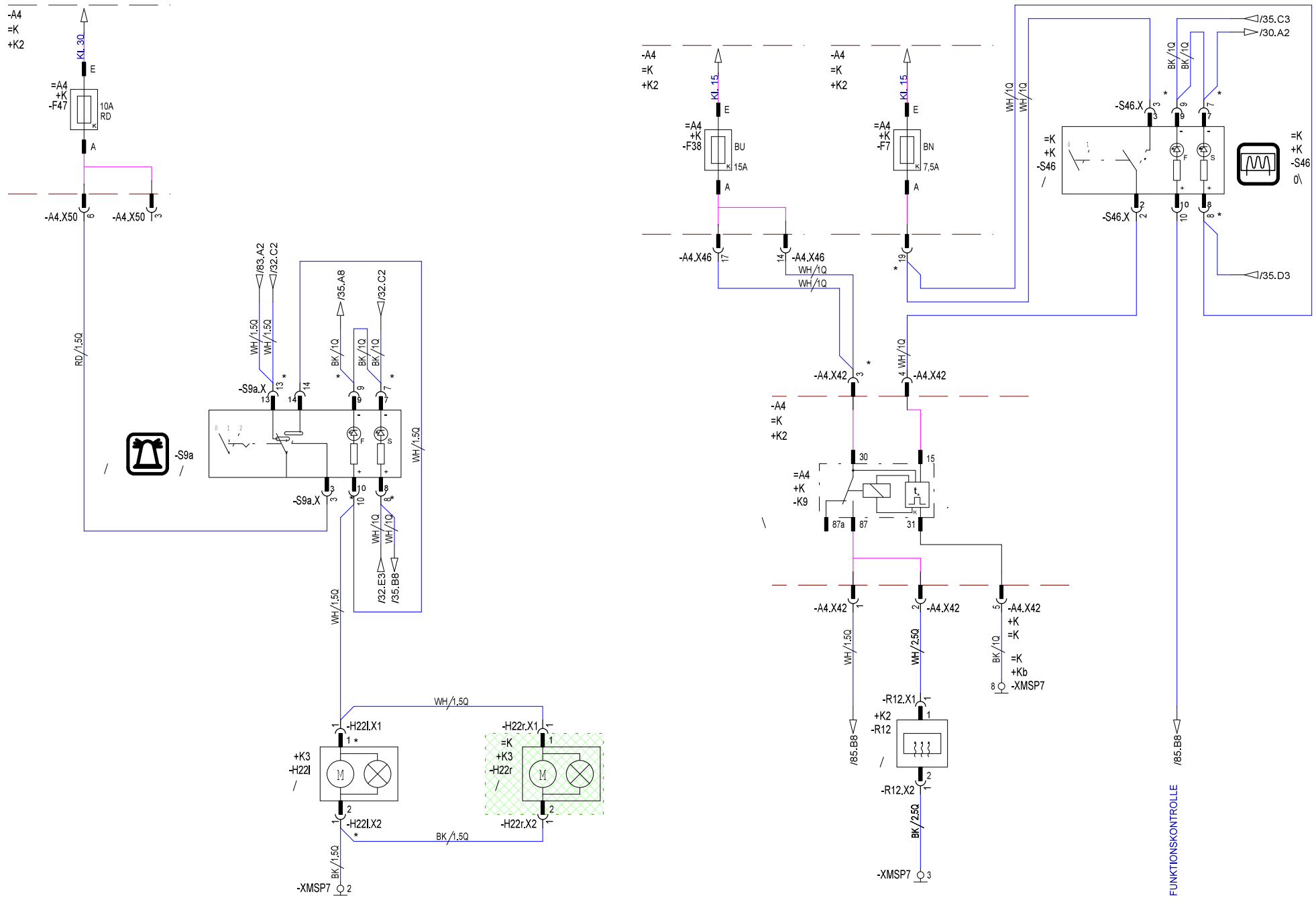
PROJECT	GG_4_EVO
DRAWING NUMBER	1333 90100 02 00
ITEM CODE	12466553
DRAWING INDEX	000

MACHINE TYPE LIDOS Gerät	SERIAL NUMBER XXXXX	LIEBHERR FACTORY LBH	EMERGENCY STEERING PUMP, EMERGENCY STEERING PRESSURE SWITCH ELECTRICAL SCHEMATIC;	PAGE 25 OF CREATION DATE 09.10.2019 15:49



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DRAWING NUMBER 1333 90100 02 00
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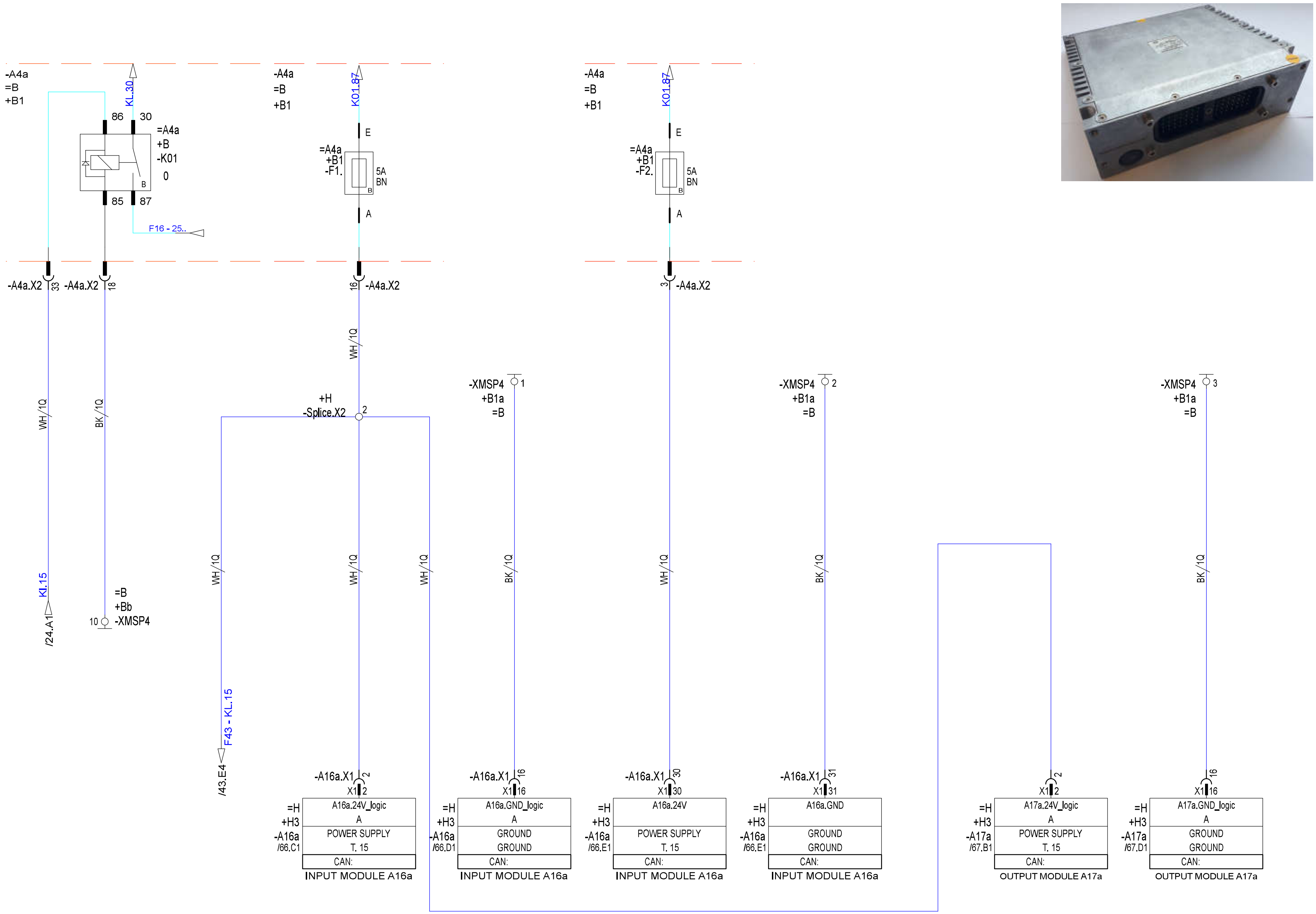
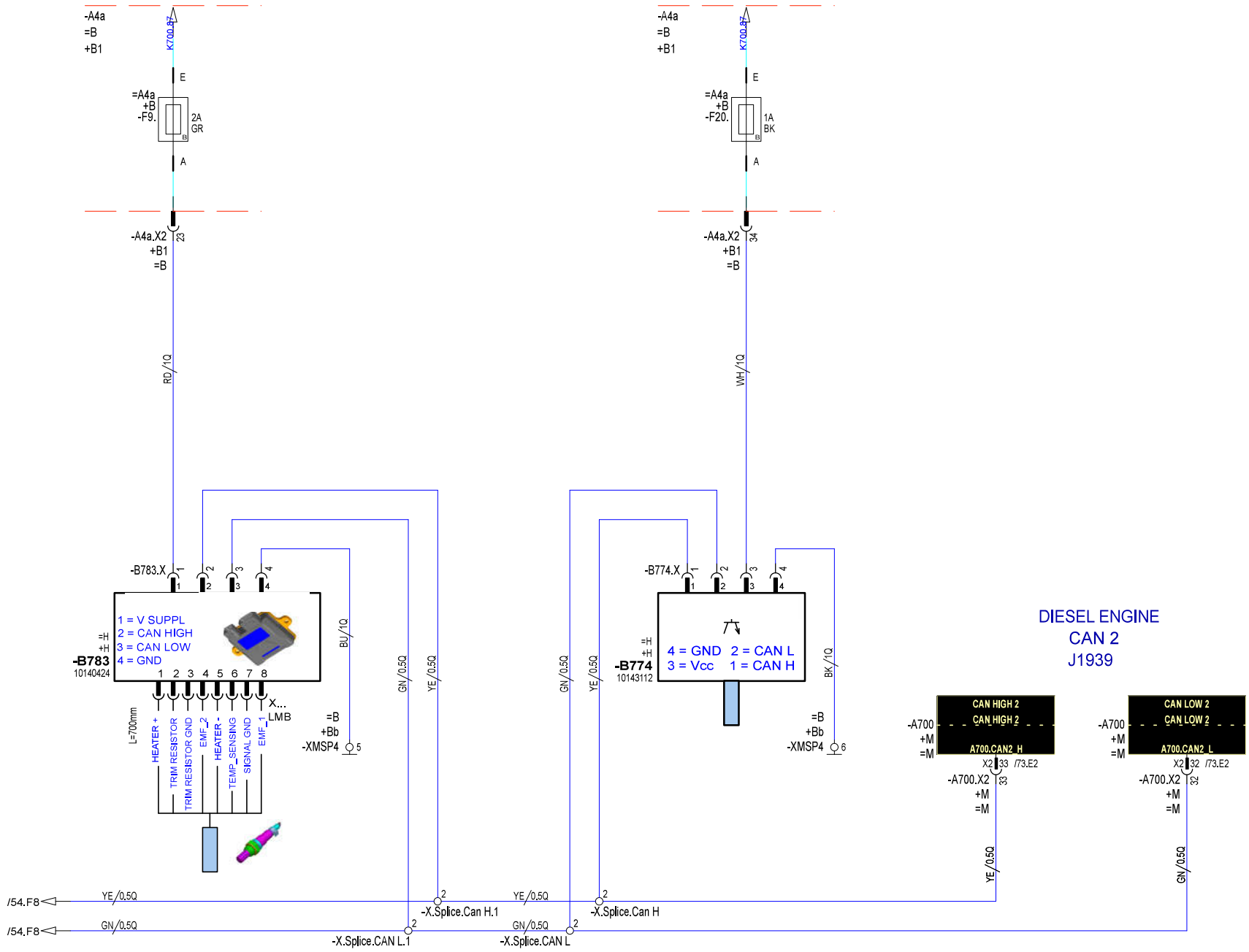
MACHINE TYPE	SERIAL NUMBER			
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	BEACON, REAR WINDOW HEATER ELECTRICAL SCHEMATIC;	PAGE 35 OF
				CREATION DATE 09.10.2019 15:49



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

MACHINE TYPE	SERIAL NUMBER			PAGE 45 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	POWER SUPPLY INPUT MODULE 1, OUTPUT MODULE 1 ELECTRICAL SCHEMATIC;	CREATION DATE 09.10.2019 15:49



MACHINE TYPE	SERIAL NUMBER			
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	ACTUATORS SENSORS ENGINE CONTROL UNIT ELECTRICAL SCHEMATIC;	PAGE 55 OF
				CREATION DATE 09.10.2019 15:49

=K -A15.M5 Modul Nr.: MASTER5-PREMIUM
+K Modulname:

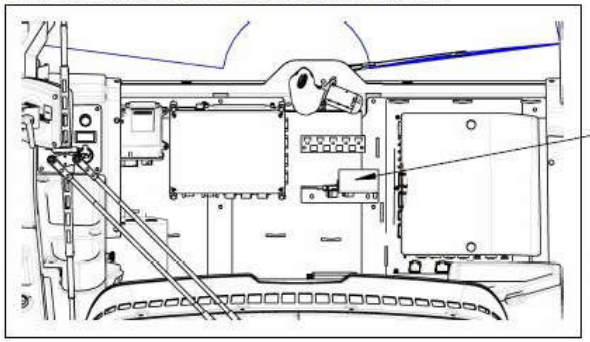
Phys. Adr.	Blatt	EA	Beschreibung	Stecker	Pin
A15.M5.KL30	/48.D5		POWER SUPPLY	0	1
A15.M5.LAN 1-4			POWER SUPPLY LAN 2/4	0	2
A15.M5.CAN1H	/38.A5		CAN HIGH 1	0	3
A15.M5.CAN2H	/40.A8		CAN HIGH 2	0	4
A15.M5.CAN3H	/39.A8		CAN HIGH 3	0	5
A15.M5.CAN4H	/38.A6		CAN HIGH 4	0	6
A15.M5.CAN4L	/38.A7		CAN LOW 4	0	7
A15.M5.CAN3L	/39.A8		CAN LOW 3	0	8
A15.M5.CAN2L	/40.A7		CAN LOW 2	0	9
A15.M5.CAN1L	/38.A4		CAN LOW 1	0	10
A15.M5.DIGINO	/48.D6		DIGITAL INPUT 1	0	11
A15.M5.GND	/48.D5		GROUND	0	12
A15.M5.KL30			DIGITAL OUTPUT 1	0	1
A15.M5.LAN 1-4			DIGITAL INPUT 2	0	2
A15.M5.CAN1H	/123.A4		CAN HIGH 5	0	3
A15.M5.CAN2H			CAN HIGH 6	0	4
A15.M5.CAN3H			CAN HIGH 7	0	5
A15.M5.CAN4H			CAN HIGH 8	0	6
A15.M5.CAN4L			CAN LOW 8	0	7
A15.M5.CAN3L			CAN LOW 7	0	8
A15.M5.CAN2L			CAN LOW 6	0	9
A15.M5.CAN1L	/123.A5		CAN LOW 5	0	10
A15.M5.DIGINO	/113.A2		DIGITAL INPUT 3	0	11
A15.M5.GND			DIGITAL OUTPUT 2	0	12

PROJECT: GG_4_EVO
DRAWING NUMBER: 1333 90100 02 00
ITEM CODE: 12466563
䢽: 000

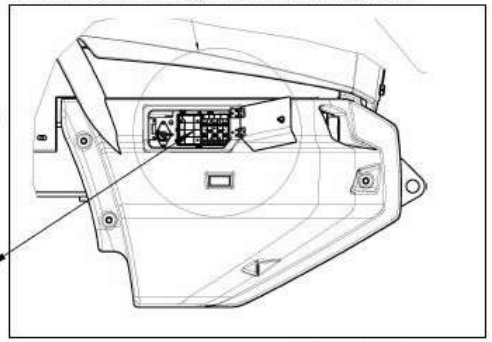
A4 HAUPT PLATINE / MAIN BEDPLATE

X4.3A	RESERVE RESERVE	X3	JUMPER BLINKER JUMPER FLASHER	F43-10A	RADIO KL. 30 RADIO KL. 30	F68-5A	BEGRENZUNGSLICHT RECHTS PROFILE LIGHT RIGHT	F76-10A	USB LADEDOSE USB POWER
X5.3A	JUMPER GENERATOR JUMPER GENERATOR	X2-10A	JUMPER BLINKER JUMPER FLASHER	F42-10A	RADIO; 12V STECKDOSE RADIO; ELECTRICAL SOCKET 12V	F55-5A	BEGRENZUNGSLICHT LINKS PROFILE LIGHT LEFT	F74-15A	FAHRERSITZ ZIGARETTENANZÜNDER DRIVER SEAT; CIGARETTE LIGHTER
		X1-10A	JUMPER BLINKER JUMPER FLASHER	F41-15A	FAHRLICHT DRIVING LIGHT	F64-7,5A	FAHRLICHT LINKS DRIVING LIGHT LEFT	F73-7,5A	FAHRLICHT RECHTS DRIVING LIGHT RIGHT
				F40-10A	BLINKFUNKTION FLASH FUNKTION	F63-7,5A	FERNLICHT LINKS HIGH BEAM LEFT	F72-7,5A	FERNLICHT RECHTS HIGH BEAM RIGHT
F13-15A	KONDENSATORLÜFTER CONDENSER FAN	F29-10A	KEHRMASCHINE ROAD SWEEPER	F39-10A	SPIEGELVERSTELLUNG MIRROR ADJUSTMENT	F32B-10A	ARBEITSSCHEINWERFER HINTEN WORKING PROJECTOR REAR	F71-7,5A	ZÜNDSTARTSCHALTERUMGEHUNG IGNITION STARTER SWITCH BYPASS
F12-15A	SCHEIBENWISCHER VORNE / HUPE WIPER FRONT / HORN	F26-10A	LOGIK HEIZ - KLIMAANLAGE LOGIC A/C CONTROL	F38-20A	HECKSCHEIBEN&SPEIGELHEIZUNG REAR WINDOW & MIRROR HEATER	F32A-10A	ARBEITSSCHEINWERFER HINTEN WORKING PROJECTOR REAR	F70-10A	BEGRENZUNGSLICHT PROFILE LIGHT
F11-3A	LITU KL. 15 LITU KL. 15	F24-5A	KRAFTSTOFFNIVEAUGEBER FUEL LEVEL SENSOR	F37-10A	HAUPTTASTATUR; DIAGNOSE CVT MAIN KEYPAD; DIAGNOSTIGS CVT	F31B-10A	ARBEITSSCHEINWERFER VORNE WORKING PROJECTOR FRONT	F88-15A	ARBEITSSCHEINWERFER KABINE WORKING PROJECTOR CABINE
F10-10A	DREHWINKELGEBER HUBGERÜST LIFT- & BUCKET ANGEL SENSOR	F23-5A	ZUSATZMODUL INPUT 1 ADDITONAL MODUL INPUT 1	F36-10A	VORSTEUERGEBER; INPUT M + L ROCKER; INPUT MODUL M + L	F31A-10A	ARBEITSSCHEINWERFER VORNE WORKING PROJECTOR FRONT	F88-15A	ARBEITSSCHEINWERFER KABINE WORKING PROJECTOR CABINE
F8-10A	HUPENBETÄTIGUNG ÜBER TASTER LIFT END OPERATION PUSH BUTTON	F22-5A	ZUSATZMODUL OUTPUT 1 ADDITONAL MODUL OUTPUT 1	F35-5A	INPUT MODUL M + L INPUT MODUL M + L	F62-10A	INNENBELEUCHUTNG INDOOR LIGHTING	F87-15A	RESERVE RESERVE
F8-15A	KONDENSATORLÜFTER CONDENSER FAN	F21-10A	RÜCKFAHRWARNER OPTISCH BACK UP ALARM VISUAL	F34-5A	WEGFAHRSPERRE; GEBER KL.15 IMMOBILIZER; ROCKER KL.15	F61-10A	HAUBENÖFFNUNG; DIAGNOSE CVT ENGINE HOOD; DIAGNOSTICS CVT	F86-10A	SCR LUFTTROCKNER SCR AIR DRIER
F7-7,5A	SCHALTERBELEUCHTUNG; S46 SCHWITCH LIGHT; S46	F20-10A	RÜCKFAHRWARNER AKUSTISCH BACK ALARM	F33-5A	BREMSLICHT BRAKE LIGHT	F60-5A	VORWAHLUHR ZUSATZHEIZUNG PRESELECTOR CLOCK AUXILIARY HEATER	F86-15A	SPANNUNGSWANDLER VOLTAGE CONVERTER
F6-15A	DIESELVORWÄRMUNG FUEL PREHEATING	F19-10A	MASTER KL.15 MASTER KL.15	F32-5A	ANZEIGEEINHEIT; LH KAMERA DISPLAY UNIT; LH CAMERA	F48-10A	MASTER KL.30 MASTER KL.30	F84-10A	Voo K14 NOTLENKPUMPE Voo K14 EMERGENCY STEERING
F5-15A	HYDAC ECU KL. 15 HYDAC ECU KL. 15	F18-5A	GREIFER LOG HANDLER; KL.15 K14 GRAB LOG HANDLER; KL.15 K14	F31-10A	SCHEIBENWISCHER HINTEN WIPER REAR	F48-5A	WEGFAHRSPERRE; LITU KL. 30 IMMOBILIZER; LITU KL. 30	F83-20A	ZUSATZHEIZUNG AUXILARY HEATER
F4-5A	HYDAC ECU LOGIC HYDAC ECU LOGIC	F17-10A	ZUSATZMODUL OUTPUT 1 ADDITONAL MODUL OUTPUT 1	F30-10A	ZUSATZMODUL OUTPUT 1 ADDITONAL MODUL OUTPUT 1	F47-10A	RUNDUMKENNLEUCHTE WARNING BEACON	F82-20A	HEIZ - KLIMAANLGE A/C CONTROL
F3-10A	RESERVE RESERVE	F16-7,5A	ZUSATZMODUL INPUT 1 ADDITONAL MODUL INPUT 1	F29-10A	ZUSATZMODUL OUTPUT 1 ADDITONAL MODUL OUTPUT 1	F46-10A	MOTOR DIAGNOSE DIAGNOSE ENGINE	F81-5A	HYDAC ECU KL. 30 HYDAC ECU KL. 30
F2-10A	E - HAUPTSCHALTER KL. 15 ELECTRIC MAIN SWITCH KL. 15	F15-10A	STRASSENFAHRT SCHALTER NACHLAUFAUTOMATIK ROAD TRAVEL SWITCH; AUTOMATIC RUN-OUT	F28-10A	ZUSATZMODUL OUTPUT 1 ADDITONAL MODUL OUTPUT 1	F45-10A	CLAAS DIAGNOSE & TELEMETRIE CLAAS DIAGNOSIS & TELEMETRY	F80-3A	REIFENDRUCKSYSTEM KL. 30 TYRE PRESSURE SYSTEM KL. 30
F1-3A	REIFENDRUCKSYSTEM KL. 15 TYRE PRESSURE SYSTEM KL. 15	F14-5A	TASTENBLOCK 2 KEYPAD BLOCK 2	F27-25A	RESERVE RESERVE	F44-10A	E - HAUPTSCHALTER KL. 30 ELECTRIC MAIN SWITCH KL. 30	F58-25A	RESERVE RESERVE
								F58-25A	RESERVE RESERVE
								F57-20A	HAUBENÖFFNUNG ENGINE HOOD

A4b JOYSTICKLENKUNG / JOYSTICK STEERING

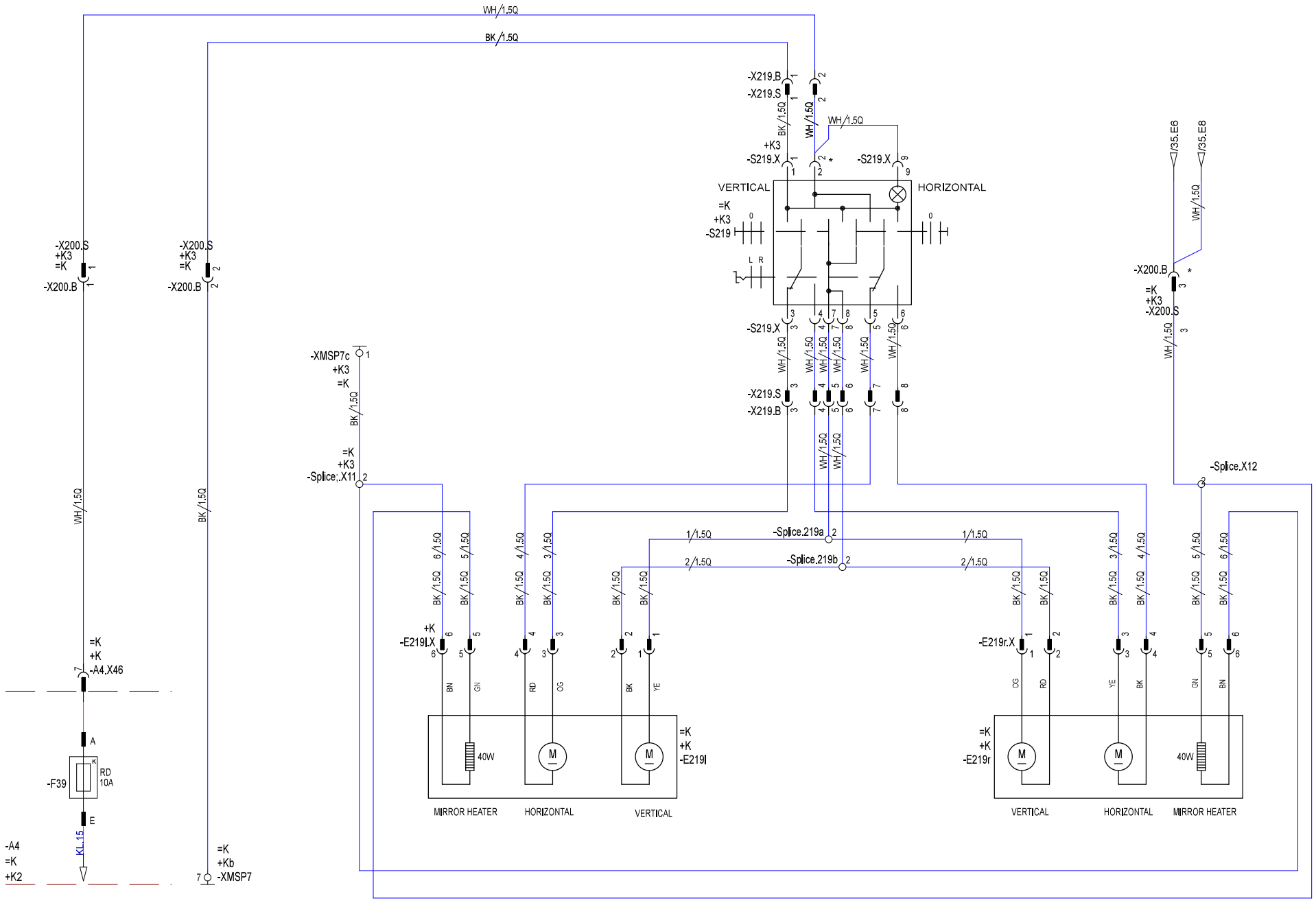


A4a SICHERUNGSELEMENT / FUSE ELEMENT



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

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 EXTERIOR MIRROR ADJUSTMENT ELECTRIC ELECTRICAL SCHEMATIC;

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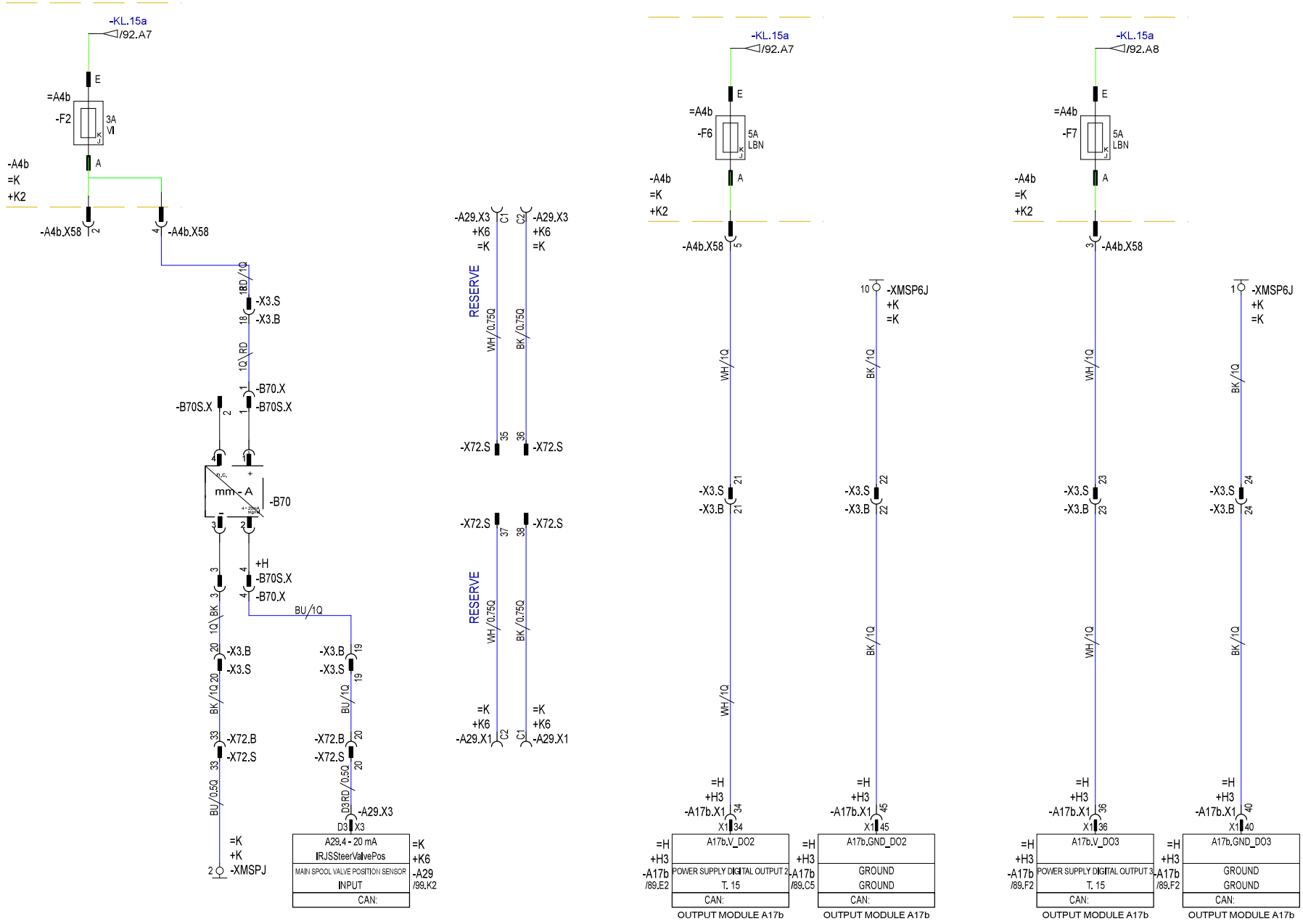
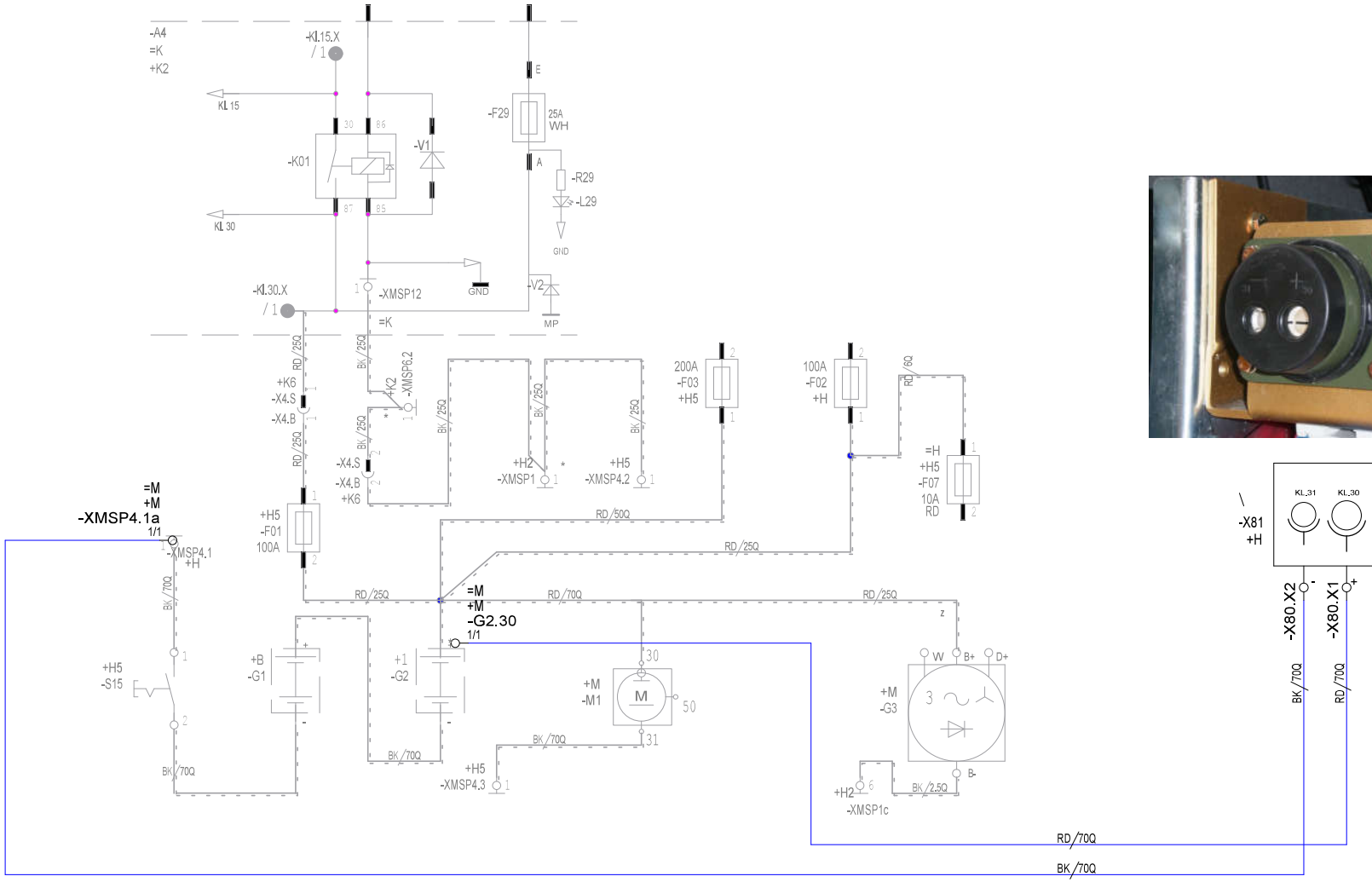
CREATION DATE 09.10.2019 15:49

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

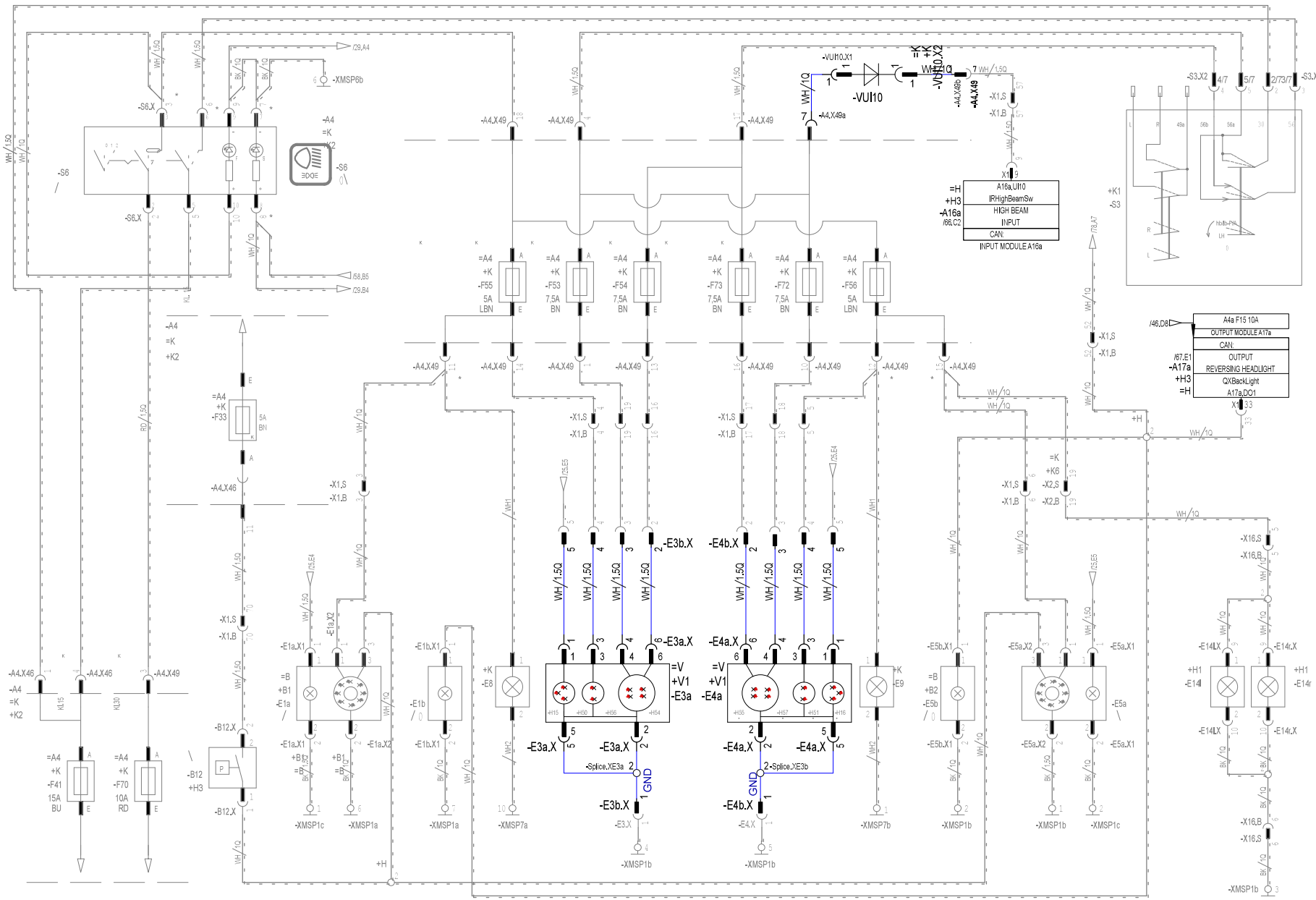


MACHINE TYPE	SERIAL NUMBER			PAGE 95 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	OPTION SENSORS JOYSTICK STEERING ELECTRICAL SCHEMATIC;	CREATION DATE 09.10.2019 15:49

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

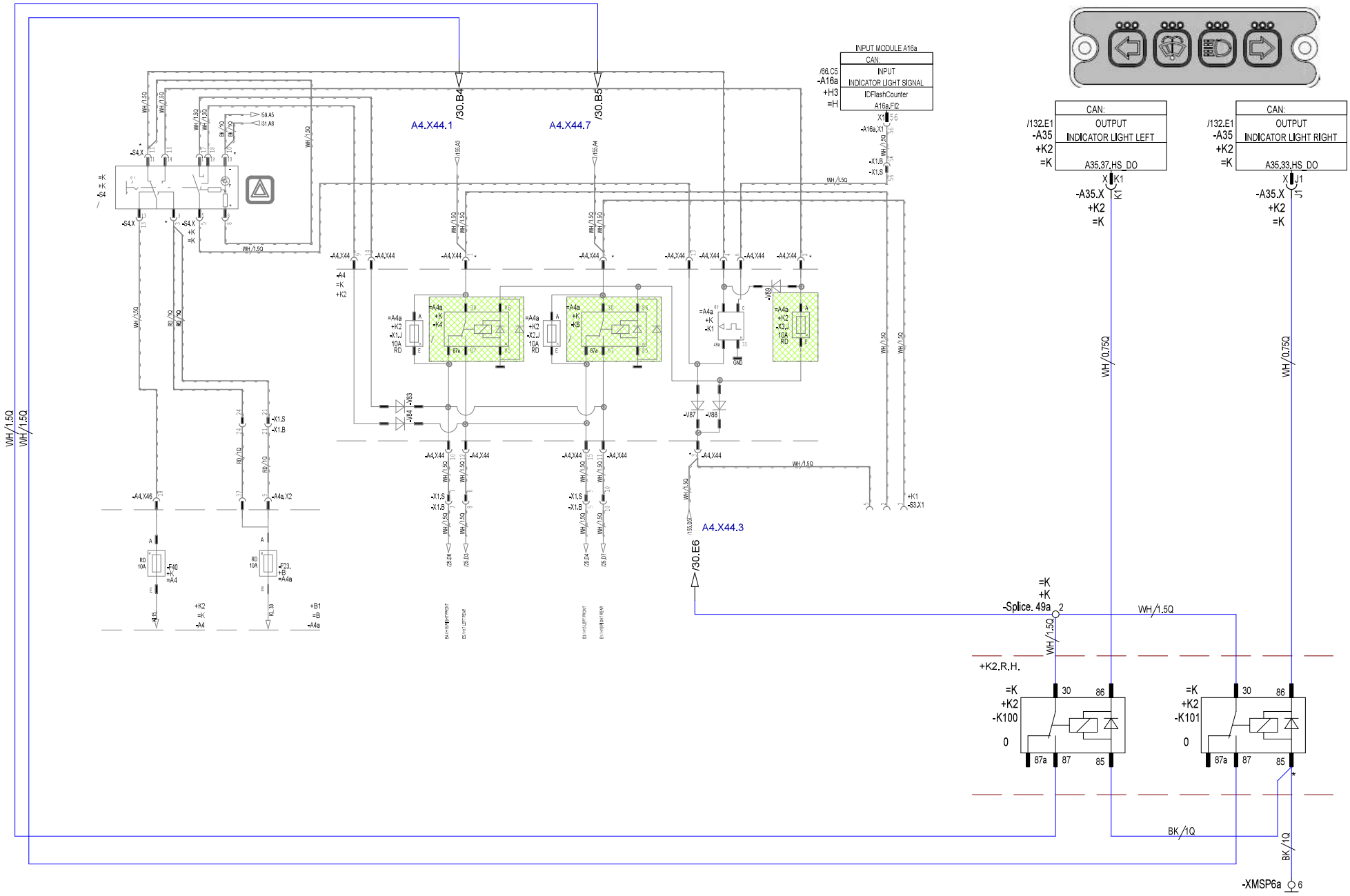


MACHINE TYPE	SERIAL NUMBER			PAGE 105 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	OPTION JUMP CABLE ELECTRICAL SCHEMATIC;	CREATION DATE 09.10.2019 15:49



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

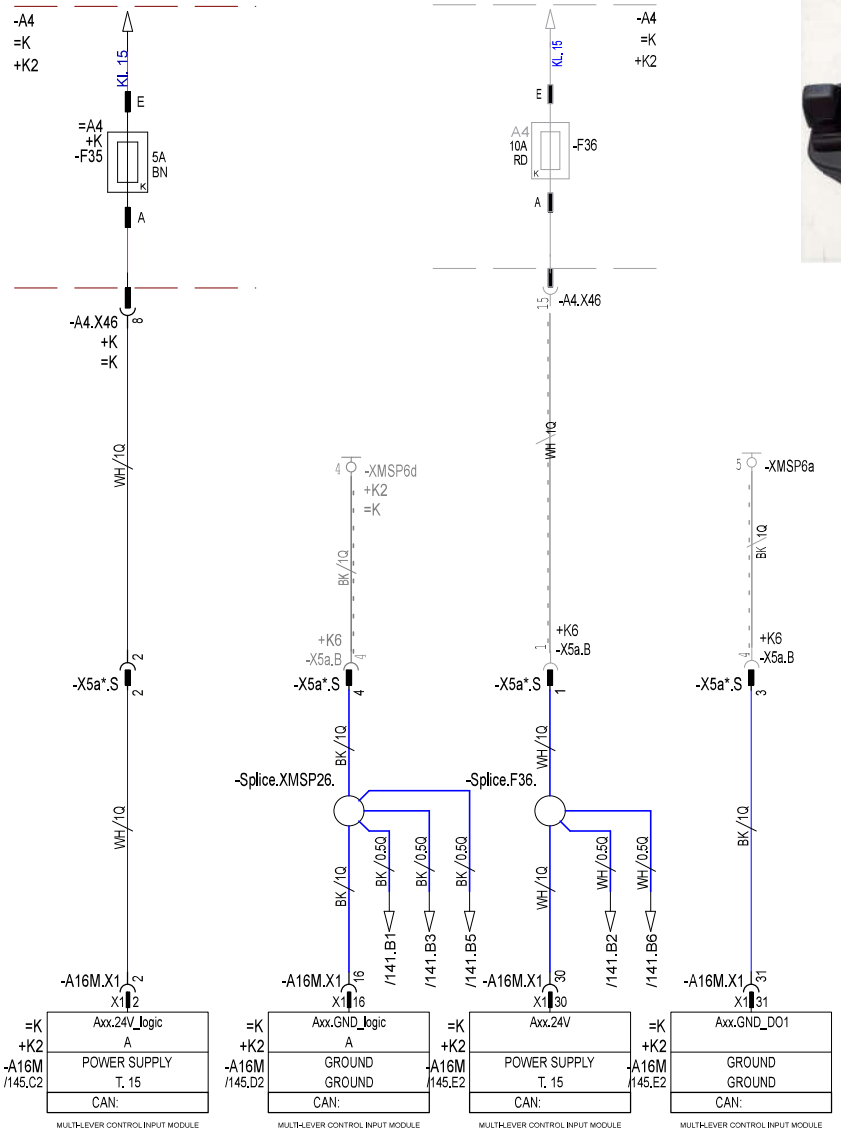
MACHINE TYPE	SERIAL NUMBER		OPTION LED DRIVING HEADLIGHT	PAGE 115 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	ELECTRICAL SCHEMATIC;	CREATION DATE 09.10.2019 15:49

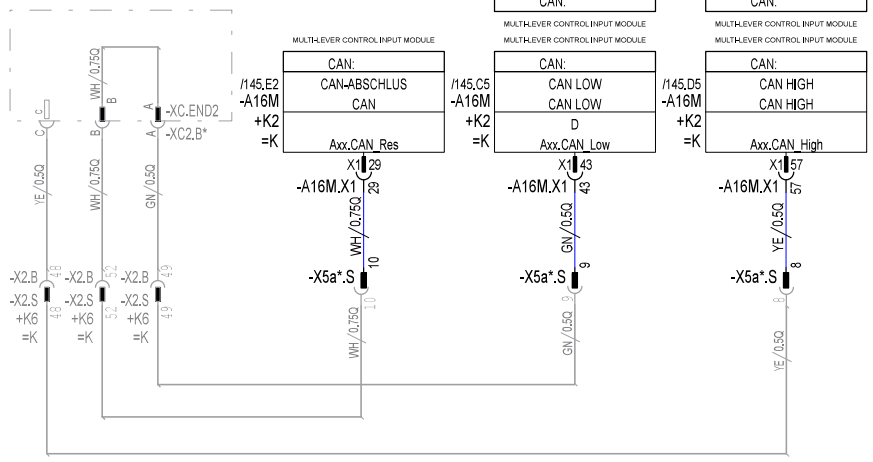


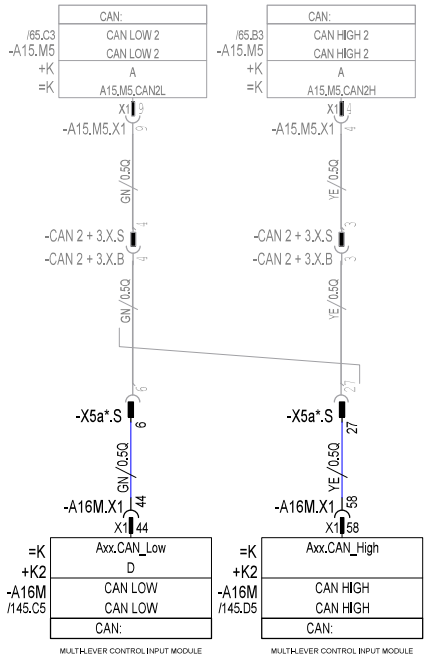
ITEM CODE	12466553
DRAWING INDEX	000
PROJECT	GG_4_EVO
DRAWING NUMBER	1333 90100 02 00

MACHINE TYPE **LIDOS Gerät**	SERIAL NUMBER **XXXXX**	**LIEBHERR** FACTORY LBH	INDICATOR LIGHT SIGNAL BUTTON ELECTRICAL SCHEMATIC;	PAGE 125 OF CREATION DATE 09.10.2019 15:49

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







=K -A16M Modul Nr.:
+K2 Modulname:

ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN	ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN
Axx.24V_B1				0	1	Axx.24V				0	41
Axx.24V_logic	/135.F1		POWER SUPPLY	0	2	Axx.24V				0	42
Axx.GND				0	3	Axx.CAN_Low	/135.D7		CAN LOW	0	43
Axx.PWM1	/136.F1		MULTI-LEVER CONTROL LIFT AND LOWER SENSOR	0	4	Axx.CAN_Low	/135.C7		CAN LOW	0	44
Axx.PWM2	/136.F2		MULTI-LEVER CONTROL LIFT AND LOWER SENSOR	0	5	Axx.GND_DO2				0	45
Axx.PWM3	/136.F4		MULTI-LEVER CONTROL TILT IN AND OUT SENSOR	0	6	Axx.GND_PWM1				0	46
Axx.PWM4	/136.F5		MULTI-LEVER CONTROL TILT IN AND OUT SENSOR	0	7	Axx.GND_PWM2				0	47
Axx.PWM9	/136.F7		MULTI-LEVER CONTROL 3RD FUNCTION SENSOR	0	8	Axx.GND_PWM3				0	48
Axx.PWM10	/136.F8		MULTI-LEVER CONTROL 3RD FUNCTION SENSOR	0	9	Axx.GND_PWM4				0	49
Axx.PWM11	/138.A3		MULTI-LEVER CONTROL TRAVEL DIRECTION SWITCH FORWARD NO	0	10	Axx.GND_PWM9	/136.A1		POWER SUPPLY SENSOR	0	50
Axx.PWM12	/138.A5		MULTI-LEVER CONTROL TRAVEL DIRECTION SWITCH REVERSE NC	0	11	Axx.GND_PWM10	/136.A4		POWER SUPPLY SENSOR	0	51
Axx.GND				0	12	Axx.GND_PWM11	/136.A7		POWER SUPPLY SENSOR	0	52
Axx.24V_logic				0	13	Axx.GND_PWM12	/137.A6		POWER SUPPLY SENSOR	0	53
Axx.24V_B3				0	14	Axx.GND_DO4				0	54
Axx.24V_B2				0	15	Axx.FI1			BUTTON KICK-DOWN	0	55
Axx.GND_logic	/135.F2		GROUND	0	16	Axx.FI2			BUTTON BUCKET RETURN-TO-DIG	0	56
Axx.GND				0	17	Axx.CAN_High	/135.D8		CAN HIGH	0	57
Axx.PWM5	/138.A4		MULTI-LEVER CONTROL TRAVEL DIRECTION SWITCH FORWARD NC	0	18	Axx.CAN_High	/135.C8		CAN HIGH	0	58
Axx.PWM6	/138.A5		MULTI-LEVER CONTROL TRAVEL DIRECTION SWITCH REVERSE NO	0	19	Axx.GND	/136.A2		GROUND	0	59
Axx.PWM7	/137.F6		MULTI-LEVER CONTROL 4TH FUNCTION SENSOR	0	20	Axx.GND_PWM5	/136.A5		GROUND	0	60
Axx.PWM8	/137.F7		MULTI-LEVER CONTROL 4TH FUNCTION SENSOR	0	21	Axx.GND_PWM6	/136.A8		GROUND	0	61
Axx.PWM13	/137.F3		LIFT ARM POSITION ANGLE SENSOR	0	22	Axx.GND_PWM7	/137.A4		GROUND	0	62
Axx.PWM14	/137.F4		LIFT ARM POSITION ANGLE SENSOR	0	23	Axx.GND_PWM8				0	63
Axx.PWM15	/137.F1		BUCKET POSITION ANGLE SENSOR	0	24	Axx.GND_PWM13	/137.A7		GROUND	0	64
Axx.PWM16	/137.F2		BUCKET POSITION ANGLE SENSOR	0	25	Axx.GND_PWM14				0	65
Axx.GND				0	26	Axx.GND_PWM15				0	66
Axx.GND_logic				0	27	Axx.GNDPWM16				0	67
Axx.24V_B4				0	28	Axx.GND				0	68
Axx.CAN_Res	/135.D6		CAN	0	29	Axx.GND_FI1				0	69
Axx.24V	/135.F3		POWER SUPPLY	0	30	Axx.GND_FI2				0	70
Axx.GND_DO1	/135.F4		GROUND	0	31						
Axx.V_DO1	/138.A6		POWER SUPPLY SENSOR	0	32						
Axx.DO1			POWER SUPPLY SENSOR	0	33						
Axx.V_DO2			POWER SUPPLY SENSOR	0	34						
Axx.DO2			POWER SUPPLY SENSOR	0	35						
Axx.V_DO3				0	36						
Axx.DO3				0	37						
Axx.V_DO4				0	38						
Axx.DO4				0	39						
Axx.GND_DO3				0	40						

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

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

ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN
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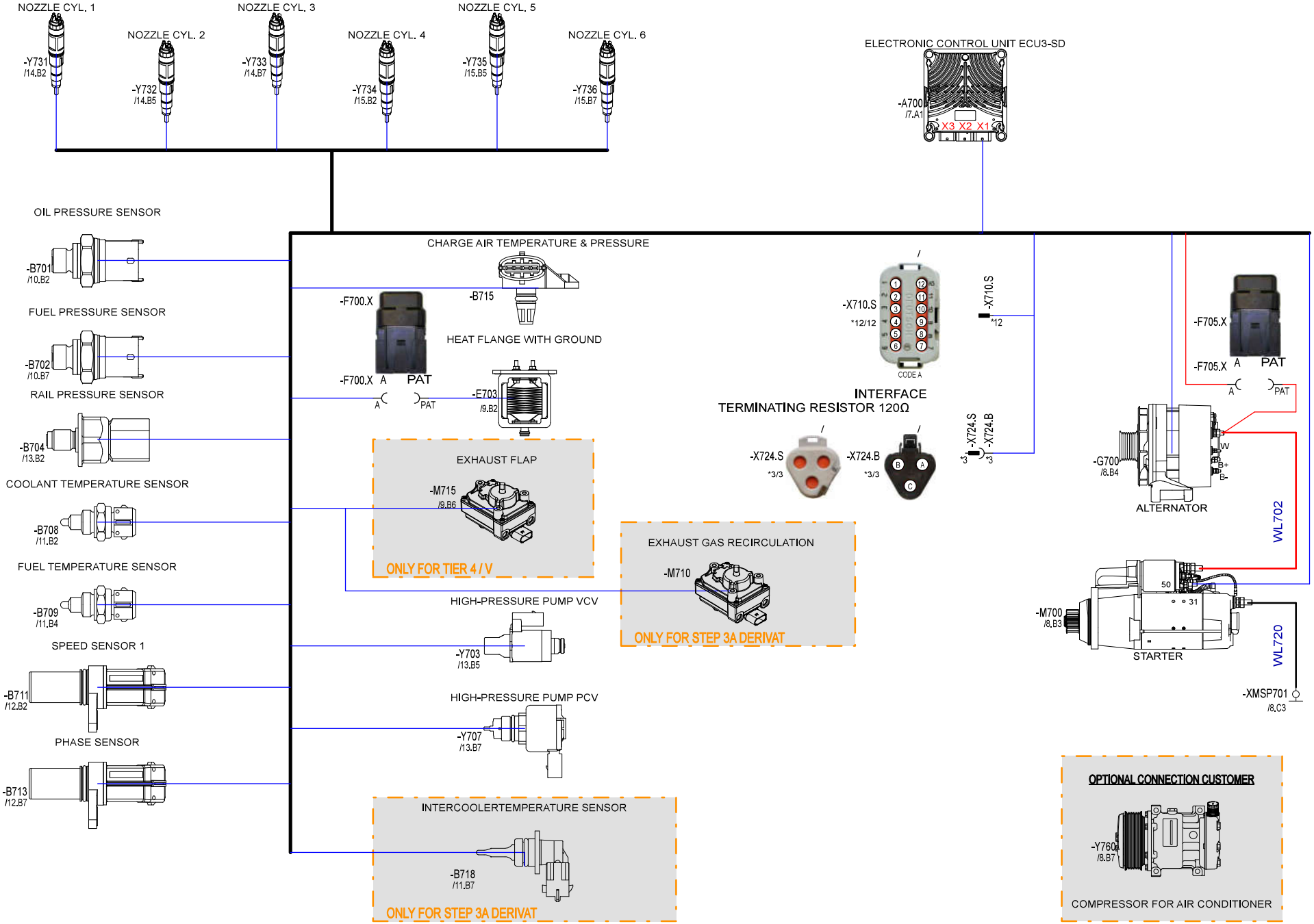
A16L.24V_logic	/147.D1		POWER SUPPLY	0	2
A16L.GND				0	3
A16L.UI1	/153.F7		CONTROL LEVER LogHandler SWIVEL ARM	0	4
A16L.UI2	/153.C5		CONTROL LEVER LogHandler LOG PUSHER LIFT	0	5
A16L.UI3	/153.E4		CONTROL LEVER LogHandler &#20724	0	6
A16L.UI4				0	7
A16L.UI9				0	8
A16L.UI10	/153.E5		CONTROL LEVER LogHandler	0	9
A16L.UI11	/154.A5		SWITCH TRAVEL DIRECTION LogHandler FORWARD NO	0	10
A16L.UI12	/154.A7		SWITCH TRAVEL DIRECTION LogHandler REVERSE NC	0	11
A16L.GND				0	12
A16L				0	13
A16L.24V				0	14
A16L.24V				0	15
A16L.GND_logic	/147.D1		GROUND	0	16
A16L.GND				0	17
A16L.UI5	/154.A6		SWITCH TRAVEL DIRECTION LogHandler FORWARD NC	0	18
A16L.UI6	/154.A7		SWITCH TRAVEL DIRECTION LogHandler REVERSE NO	0	19
A16L.UI7	/153.F3		CONTROL LEVER LogHandler OSCILLATING CYLINDER	0	20
A16L.UI8	/153.E8		CONTROL LEVER LogHandler TRANSPORT POSITION	0	21
A16L.UI13	/153.C6		CONTROL LEVER LogHandler LOG PUSHER LOWER	0	22
A16L.UI14	/153.F6		CONTROL LEVER LogHandler SWIVEL ARM	0	23
A16L.UI15	/153.F3		CONTROL LEVER LogHandler OSCILLATING CYLINDER	0	24
A16L.UI16	/153.C8		CONTROL LEVER LogHandler OSCILLATING CYLINDER LOCKOUT	0	25
A16L.GND				0	26
A16L				0	27
A16L.24V				0	28
A16L.CAN_Res	/147.E6		CAN TERMINATOR	0	29
A16L.24V	/147.D3		POWER SUPPLY	0	30
A16L.GND	/147.D3		GROUND	0	31
A16L.24V				0	32
A16L.24V	/153.E7		CONTROL LEVER LogHandler SWIVEL ARM SIGNAL 1	0	33
A16L.24V	/153.C4		CONTROL LEVER LogHandler LOG PUSHER LIFT	0	34
A16L.24V	/153.C6		CONTROL LEVER LogHandler LOG PUSHER LOWER	0	35
A16L.24V	/153.C7		CONTROL LEVER LogHandler OSCILLATING CYLINDER LOCKOUT	0	36
A16L.24V				0	37
A16L.24V				0	38
A16L.24V				0	39
A16L.GND				0	40

ADDRESS	PAGE	EA	DESCRIPTION	CONNECTOR	PIN
A16L.24V				0	41
A16L				0	42
A16L.CAN_Low	/147.E7		CAN LOW	0	43
A16L.CAN_Low	/147.D7		CAN LOW	0	44
A16L.GND				0	45
A16L.RI1				0	46
A16L.RI1				0	47
A16L.RI2				0	48
A16L.RI2				0	49
A16L.5V	/153.F1		CONTROL LEVER LogHandler OSCILLATING CYLINDER TILT	0	50
A16L.5V	/153.F4		CONTROL LEVER LogHandler SWIVEL ARM TILT	0	51
A16L.5V	/153.E3		CONTROL LEVER LogHandler GABBER	0	52
A16L.5V				0	53
A16L.GND				0	54
A16L.FI1				0	55
A16L.FI2				0	56
A16L.CAN_High	/147.E7		CAN HIGH	0	57
A16L.CAN_High	/147.D7		CAN HIGH	0	58
A16L.GND	/153.F2		CONTROL LEVER LogHandler OSCILLATING CYLINDER TILT	0	59
A16L.GND	/153.F5		CONTROL LEVER LogHandler SWIVEL ARM TILT	0	60
A16L.GND	/153.E3		CONTROL LEVER LogHandler	0	61
A16L.GND				0	62
A16L.GND				0	63
A16L.GND				0	64
A16L.GND				0	65
A16L.GND				0	66
A16L.GND				0	67
A16L.GND				0	68
A16L.GND_FI1				0	69
A16L.GND_FI2				0	70

MACHINE TYPE	SERIAL NUMBER			PAGE 155 OF
LIDOS Gerät	XXXXX	LIEBHERR FACTORY LBH	VERSION 2 INPUT MODULE OVERVIEW ELECTRICAL SCHEMATIC;	CREATION DATE 09.10.2019 15:49



TYPE MOTOR_SPL

PROJECT: 11392210

REPLACEMENT FOR	MARKED	lmbbag1
0	DATE	13.12.2017 09:59
CONFIDENTIAL	CHECKED	lmbbua0
	TECHNICAL REFEREE	

LIEBHERR
FACTORY LMB

A3

DESIGNATION
ELECTRICAL WIRING DIAGRAM

DESCRIPTION
ENGINE OVERVIEW

ARTICLE CODE 11392207		SYSTEM =M	LOCATION +M
DRAWING NUMBER 96 006 9309 90	INDEX 000	SHEET 6	FROM 16

TYPE MOTOR_SPL

PROJECT: 11392210

BMK	SYSTEM	LOCATION	SHEET	FUNCTION
-A700	=M	+M	/6.A1	ENGINE CONTROL UNIT
-A700.X1	=M	+M	/7.E2	
-B701	=M	+M	/9.B2	OIL PRESSURE SENSOR
-B701.X	=M	+M	/9.B2	
-B702	=M	+M	/9.B7	FUEL PRESSURE SENSOR
-B702.X	=M	+M	/9.B7	
-B704	=M	+M	/12.B2	RAIL PRESSURE SENSOR
-B704.X	=M	+M	/12.B2	
-B708	=M	+M	/10.B2	COOLANT TEMPERATURE SENSOR
-B708.X	=M	+M	/10.B2	
-B709	=M	+M	/10.B5	FUEL TEMPERATURE SENSOR
-B709.X	=M	+M	/10.B5	
-B711	=M	+M	/11.B2	SPEED SENSOR 1
-B711.X	=M	+M	/11.B2	
-B713	=M	+M	/11.B7	PHASE SENSOR
-B713.X	=M	+M	/11.B7	
-B715	=M	+M	/9.B4	CHARGE AIR PRESSURE SENSOR & TEMPERATURE SENSOR
-B715.X	=M	+M	/9.B4	
-B718.X	=M	+M	/10.B7	
-E703	=M	+M	/8.B2	HEAT FLANGE WITH GROUND
-F700	=M	+M	/8.B4	FUSE
-F700.X	=M	+M	/8.B4	FUSE PLUG BASE
-F705	=M	+M	/7.C4	FUSE
-F705.X	=M	+M	/7.D4	FUSE PLUG BASE
-G700	=M	+M	/7.B4	ALTERNATOR
-M700	=M	+M	/7.B3	STARTER
-M715	=M	+M	/8.B6	EXHAUST FLAP
-M715.X	=M	+M	/8.B6	
-X710.S	=M	+M	/8.E4	INTERFACE
-X724.B	=M	+M	/8.B7	
-X724.S	=M	+M	/8.B7	TERMINATING RESISTOR 120Ω
-XM701	=M	+M	/10.D4	ULTRASONIC SPLICE CONNECTIONS
-XM702	=M	+M	/9.D2	ULTRASONIC SPLICE CONNECTIONS
-XM703	=M	+M	/7.D5	ULTRASONIC SPLICE CONNECTIONS
-XM705	=M	+M	/8.C6	ULTRASONIC SPLICE CONNECTIONS
-XM706	=M	+M	/8.D6	ULTRASONIC SPLICE CONNECTIONS

BMK	SYSTEM	LOCATION	SHEET	FUNCTION
-XM707	=M	+M	/7.D4	ULTRASONIC SPLICE CONNECTIONS
-XMSP701	=M	+M	/7.C3	GROUND SCREW STARTER
-Y703	=M	+M	/12.B5	HIGH-PRESSURE PUMP VCV
-Y703.X	=M	+M	/12.B5	
-Y707	=M	+M	/12.B7	HIGH-PRESSURE PUMP PCV
-Y707.X	=M	+M	/12.B7	
-Y731	=M	+M	/13.B2	NOZZLE CYL. 1
-Y731.X	=M	+M	/13.C2	
-Y732	=M	+M	/13.B5	NOZZLE CYL. 2
-Y732.X	=M	+M	/13.C5	
-Y733	=M	+M	/13.B7	NOZZLE CYL. 3
-Y733.X	=M	+M	/13.C7	
-Y734	=M	+M	/14.B2	NOZZLE CYL. 4
-Y734.X	=M	+M	/14.C2	
-Y735	=M	+M	/14.B5	NOZZLE CYL. 5
-Y735.X	=M	+M	/14.C5	
-Y736	=M	+M	/14.B7	NOZZLE CYL. 6
-Y736.X	=M	+M	/14.C7	
-Y760	=M	+M	/7.B7	COMPRESSOR FOR AIR CONDITIONER

REPLACEMENT FOR	MARKED	lmbbag1
0	DATE	13.12.2017 09:59
CONFIDENTIAL	CHECKED	
	TECHNICAL REFEREE	

LIEBHERR
FACTORY LMB

A3

DESIGNATION
ELECTRICAL WIRING DIAGRAM

DESCRIPTION
BMK-INDEX

ARTICLE CODE		SYSTEM	LOCATION
11392207		=M	+M
DRAWING NUMBER	INDEX	SHEET 16	FROM 16
96 006 9309 90	000	ARTICLE CODE 11392207	VERSION 13.12.2017 09:59

110.4.3.2 Input modules

Valid for: L580-1760;

(For more information see: 020.8.2 Input module, page 020-29)

1 Layout

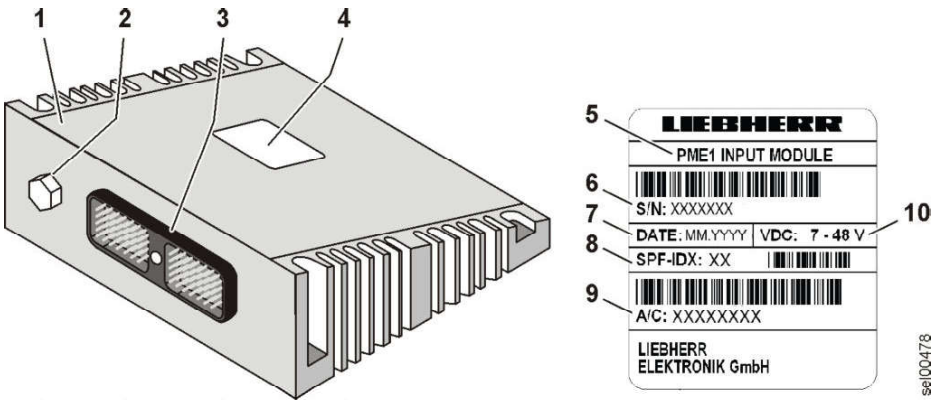


Fig. 499: Input module with type plate

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

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

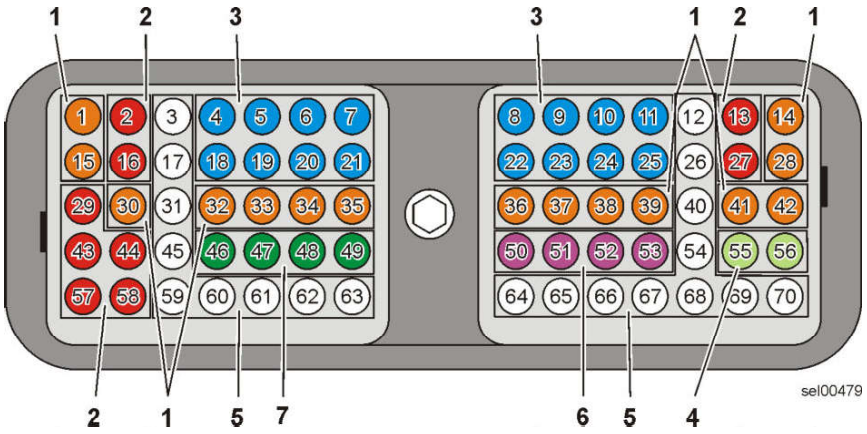


Fig. 500: Plug assignment of input modules

1	Supply voltage for sensors 24 V	**5**	Earth
2	CAN interface with logic supply	**6**	Supply voltage for sensors 5 V
3	Analogue universal measurement inputs	**7**	Resistance measurement inputs
4	Frequency measurement inputs		

LBH/12252626/01/211-20191218_152521/en

2.2 Relay for electric battery main switch

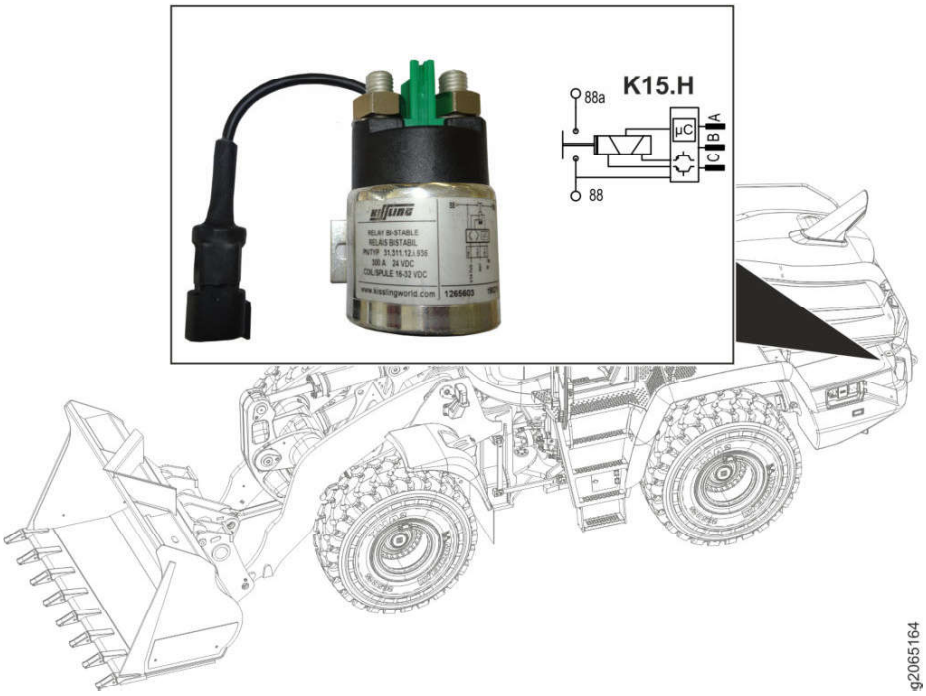


Fig. 508: Relay for electric battery main switch

Relay for electric battery main switch **K15.H** is fitted in left ballast weight.

Relay has drop-in coil and drop-out coil with permanent-magnetic retention. A pulse on respective coil causes relay to drop in or drop out. End positions are maintained with permanent magnetics without using energy.

Power supply takes place via pin **A**. An internal bridge is used as ground supply.

Relay has an electric switch-off delay of five minutes.

Plug assignment		
Pin	**Function**	**Description**
A	Power supply	Power supply of terminal 30 via connection **X** on starting switch.
B	Control input	Control signal from battery main switch **S15**.
C	Control output	Control output (ground switching) to activate green LEDs for battery main switch. Activation can take place as continuous signal or flashing signal.

Tab. 237: Plug assignment

LBH/12252626/01/211-20191218_152521/en

2.3 Hydrostat and planetary carrier

2.3.1 Machine at a standstill, travel direction selected

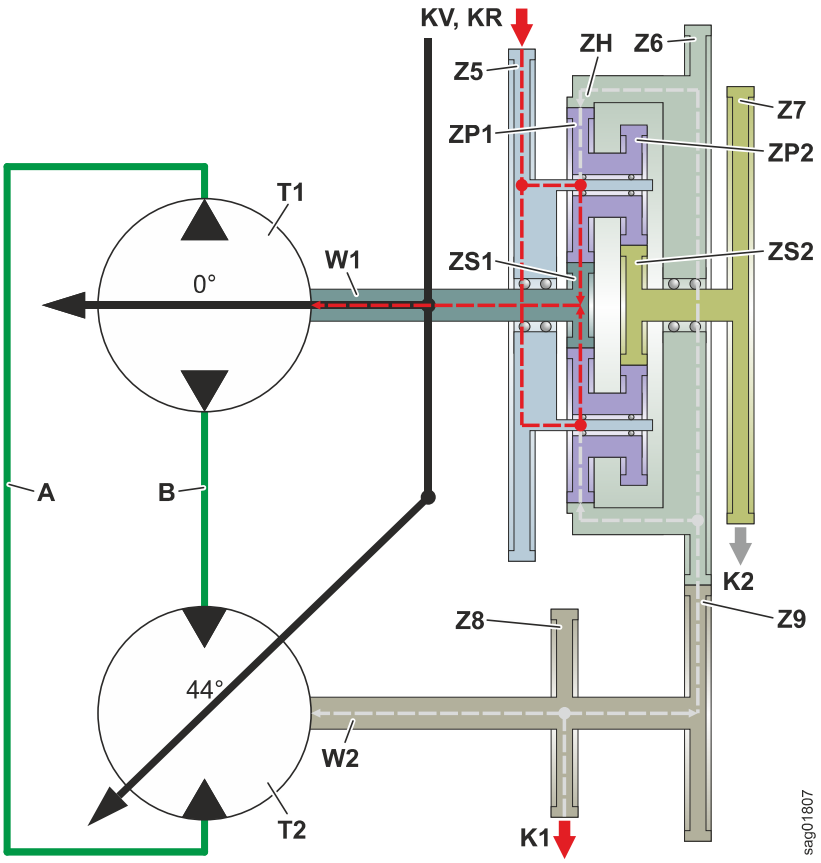


Fig. 513: Machine at a standstill, travel direction selected

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

Tab. 245: Key

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

LBH/12252626/01/211-20191218_152521/en

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

Tab. 251: Equipment codes

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

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

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

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

Transmission control valve block **25** shifts clutches hydraulically. Oil that is not required for clutches flows on to lubricate bearings. For bearing lubrication, lubricating pressure valve **23** in duct plate **22** reduces pressure. Oil that flows out during this returns via gear oil cooler **66** to oil sump.

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

2.2 Proportional solenoid valves for couplings

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

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

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

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120.3 Transmission electronics

120.3.1 Overview of electrical control system of transmission

Valid for: L580-1760;

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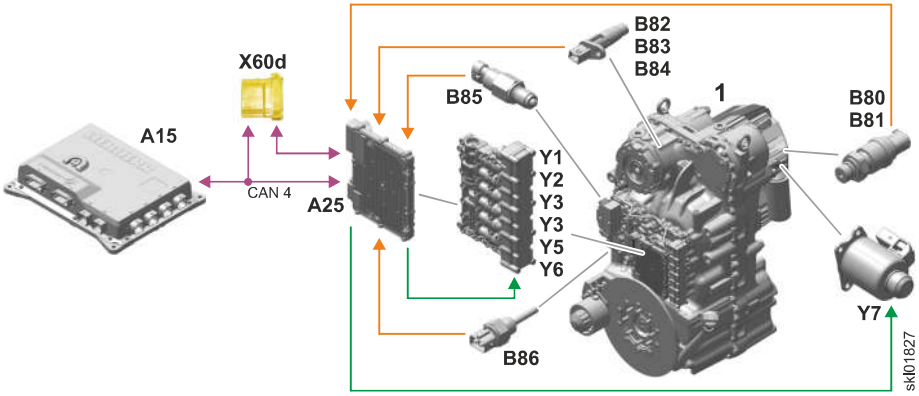

Fig. 527: Diagram

1 Transmission

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

Tab. 259: Equipment codes

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

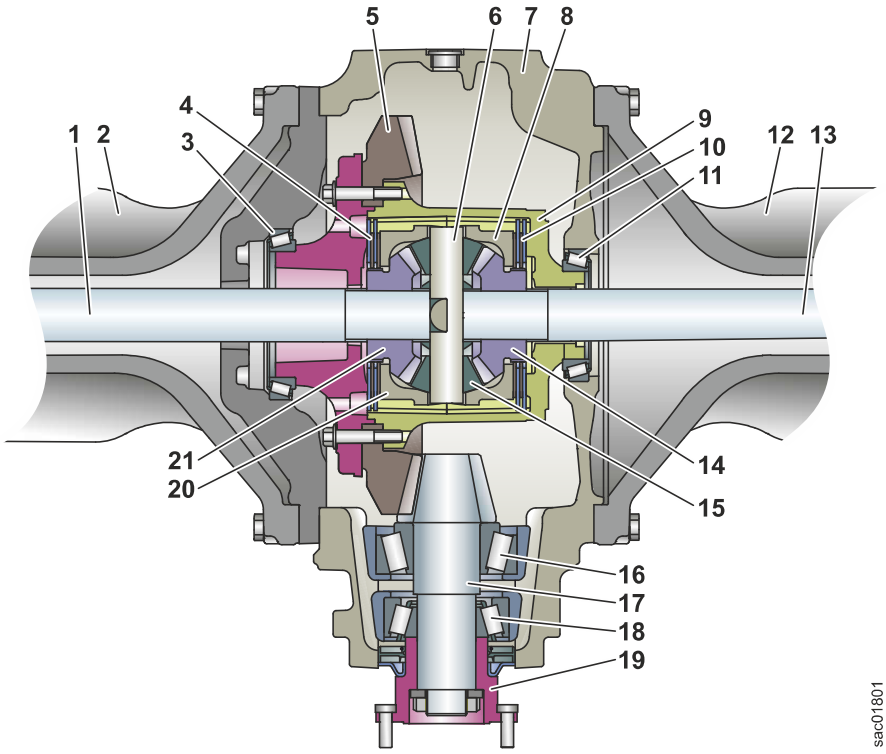

Fig. 536: Central housing with self-locking differential: sectional view

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

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140 Steel parts of the basic machine

Contents

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150.3.2 Quick coupler hydraulics

150.3.2.1 Overview of quick coupler hydraulics

Valid for: L580-1760;

1 Layout

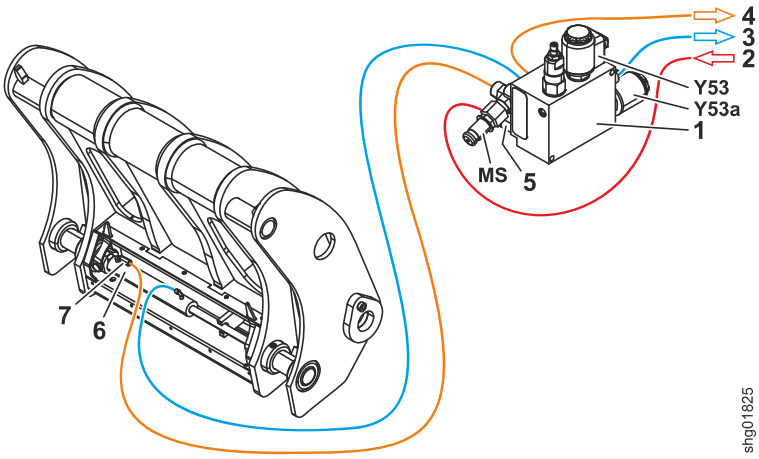

Fig. 549: Overview of quick coupler hydraulics (from front left)

1 Valve block for quick coupler
2 Oil supply from working pump (via control valve block)
3 Return flow to control valve block
4 Load sensing signal for working pump (via control valve block)
5 Check valve
6 Quick coupler locking hydraulic cylinder
7 Preload valve 15 bar

Name	Test point
MS	Quick coupler closing pressure

Tab. 271: Test points

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

Tab. 272: Equipment codes

Quick coupler hydraulics consist of following components:
– Valve block for quick coupler (For more information see: Valve block for quick coupler, page 150-9)
– Quick coupler locking hydraulic cylinder

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

2.2 Strength according to ROPS/FOPS

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

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

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

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

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

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

2.1 Function

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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160.4.3 Condenser

Valid for: L580-1760;

1 Layout

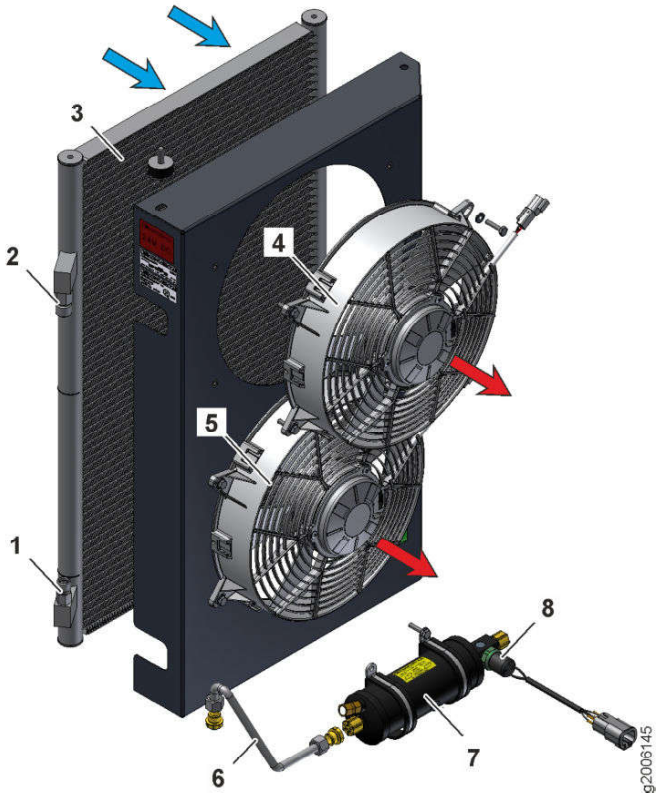

Fig. 572: Condenser unit components

1	Line to dryer	**5**	Condenser fan M13
2	Line from air conditioning compressor	**6**	Connecting line
3	Condenser	**7**	Dryer
4	Condenser fan M13a	**8**	Air conditioning pressure switch B27

The condenser is part of the cooling system.

2 Function

When the air conditioning compressor compresses the refrigerant, the refrigerant is heated up.

The forced-ventilated condenser cools the refrigerant. This turns the gaseous refrigerant into liquid.

The liquid refrigerant passes through the connecting line **6** to the dryer **7**.

Cooling takes place through the air that is drawn in through the condenser by the condenser fans M13 **5** and M13a **4**.

When the air conditioning unit is switched on, both condenser fans run at half speed.

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2.5 Liebherr automatic central lubrication system: industrial lift arms diagram

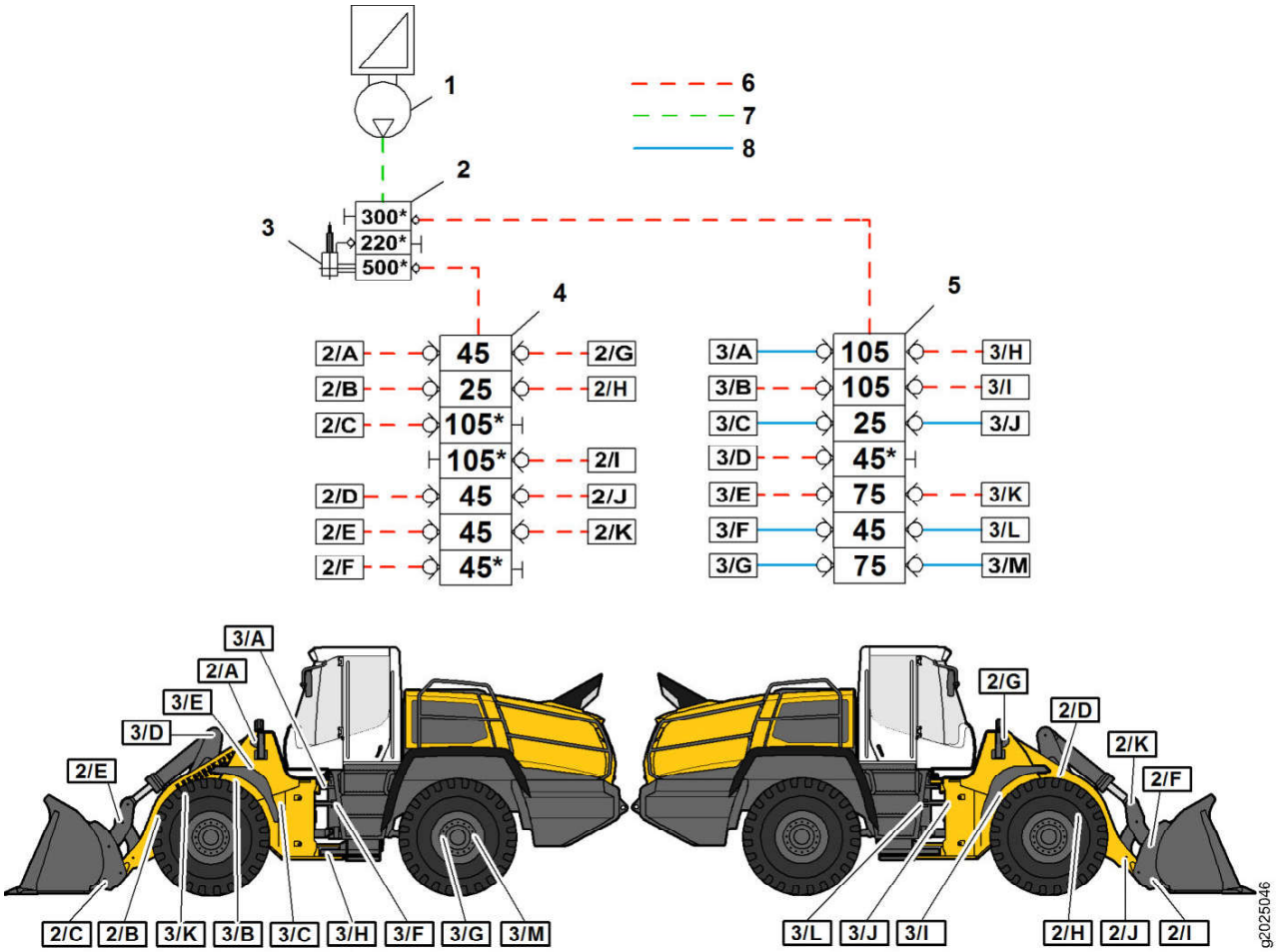

Fig. 580: Diagram of the central lubrication system with overview of lubrication points (industrial lift arms)

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

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

The distributors must always be installed in a horizontal position.

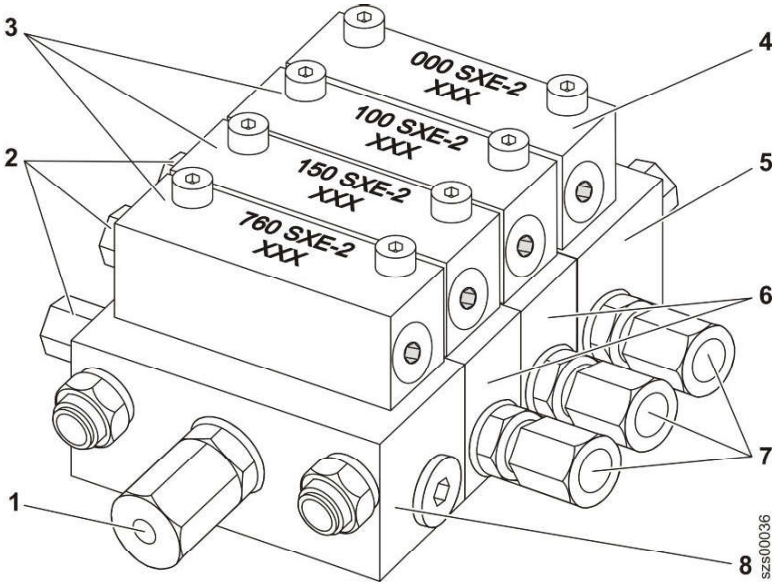

Fig. 592: Progressive distributor

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

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

2 Function

2.1 Basic function

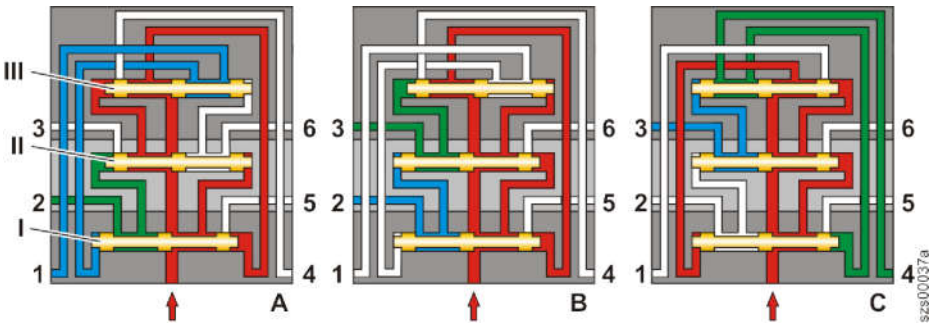

Fig. 593: Piston settings for the progressive distributor SXE-2

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

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

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

1.5 Status display with indicator lamp (LED)

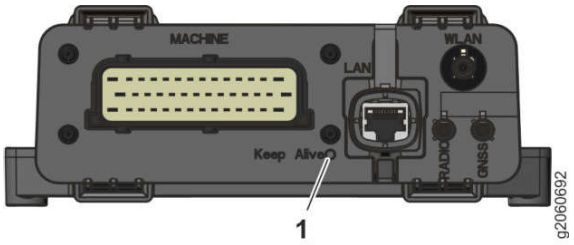

Fig. 601: Status display with indicator lamp (LED)

1 Indicator lamp (LED)

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

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

Tab. 291: Status display with indicator lamp (LED)

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1.1.1 Control electronics for personnel detection

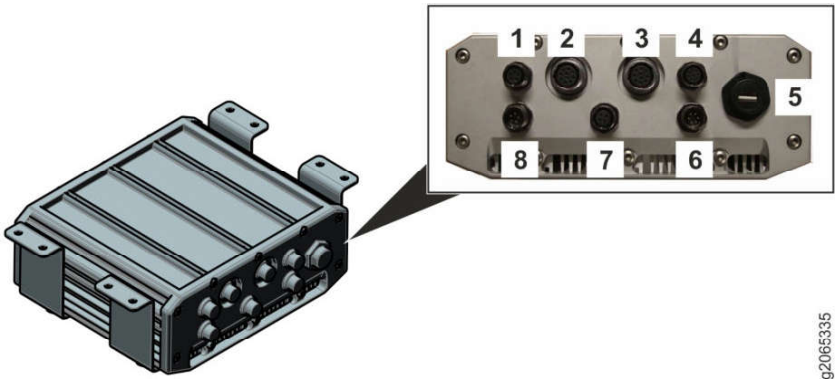

Fig. 620: Control electronics for personnel detection

1	Connection (RS232)	**5**	USB port for diagnostics
2	Connection for sensor 2 (not used)	**6**	Connection for power supply
3	Connection for sensor 1	**7**	Connection for digital outputs
4	Connection for display (VGA +sound)	**8**	Ethernet connection (MR180 I/F)

Control electronics for personnel detection is installed under operator's cab. Control electronics is protected from dirt and mechanical damage by a mud guard.

Control electronics is supplied with power via connection **6**.

Sensor for personnel detection is connected to connection **3**.

Control electronics are connected with input module A16b via connection for digital outputs **7**.

Area in which persons or obstacles are detected (detection area) is defined by configuration files.

If personnel detection control electronics are renewed or replaced, correct configuration files must be transferred to new control electronics. (For more information see: Personnel detection: transmitting configuration files, page 030-267)

1.1.2 Sensor for personnel detection

Fig. 621: Sensor for personnel detection

NOTICE
Improper interruption of connection between sensor and control electronics!
Damage to control electronics.

▶ Before disconnecting: switch ignition off.

Sensor for person detection is installed to rear of machine.

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Symbol in the display	Meaning	Cause	Remedy
	Central lubrication system warning	Central lubrication system: grease reservoir level low	Top up the central lubrication system
	Malfunction in the central lubrication system	Central lubrication system: grease reservoir empty	Fill the central lubrication system, check the service code
	Service notification	Machine due for servicing	Performing service according to maintenance and inspection schedule
	Air filter contamination	Air filter is dirty	Check service code, change or clean air filter, check air intake system
	Joystick steering malfunction	Joystick steering is not working	Calibrate the joystick steering according to the adjustment checklist, troubleshoot the joystick steering
	Joystick steering malfunction (only when no steering wheel is installed.)	Emergency mode for joystick steering activated	Travel speed of the machine is limited to 8 km/h, check service code, troubleshoot joystick steering
	Working hydraulics lockout safety shutdown	Fault on the machine	Check service code, troubleshoot working hydraulics
	Diesel engine power reduction	Diesel engine malfunction	Check service code, troubleshoot diesel engine and exhaust gas treatment

Tab. 297: Warning symbols

200.1.2 SCR system warning symbols

A warning tone sounds for every change to the status of the SCR system.

Symbol in the display	SCR system status	Limitation
	Diesel exhaust fluid filling level below 10% or SCR system malfunction	None
	Diesel exhaust fluid filling level below 5% or SCR system malfunction	Power reduction to 80%
	Diesel exhaust fluid filling level below 2.5% or SCR system malfunction	Power reduction to 20%
	Diesel exhaust fluid tank empty or SCR system malfunction	Power reduction to 20%

Tab. 298: SCR system warning symbols