5.3 Wiring

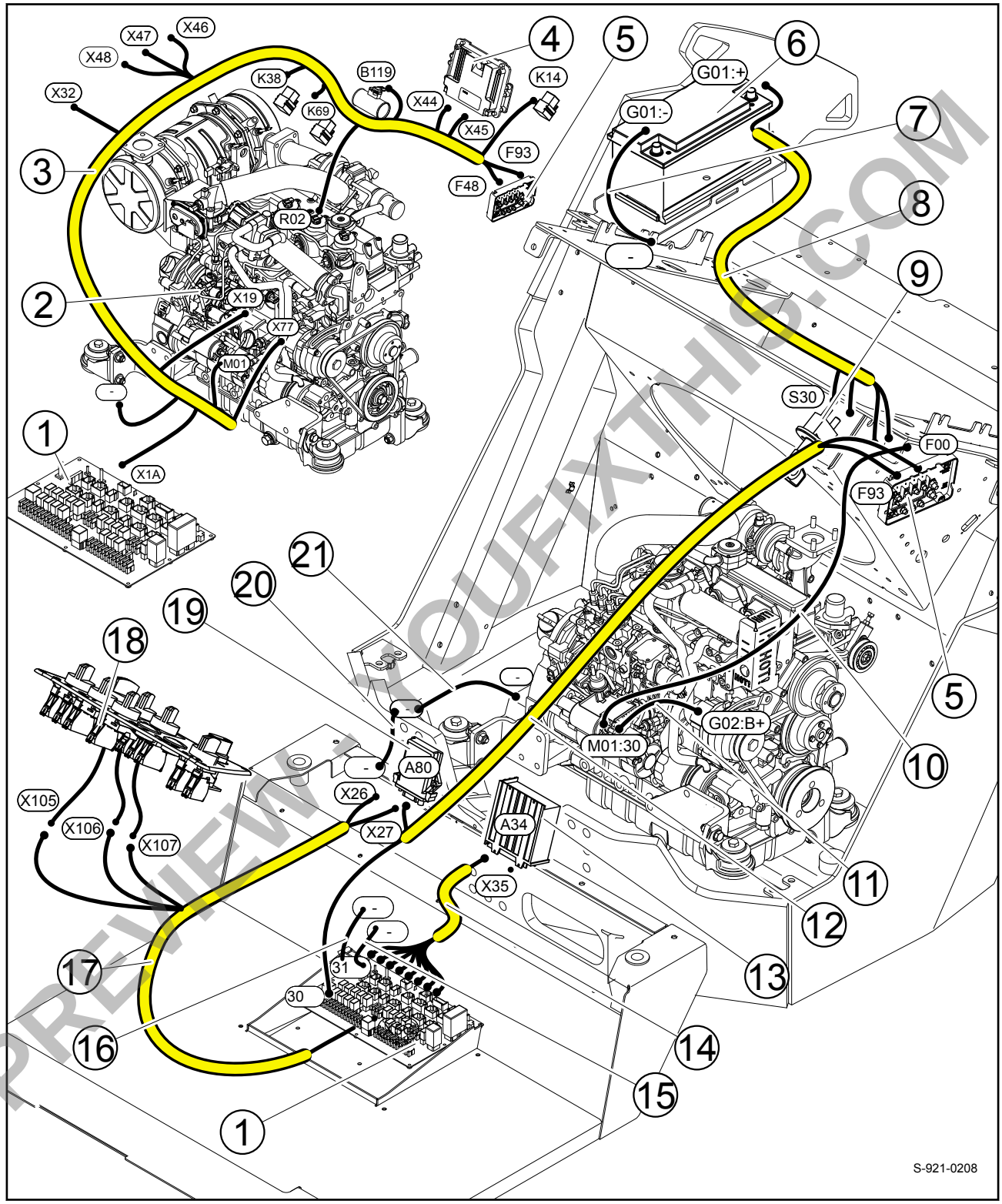


Fig. 78

1 Power board
2 Diesel engine

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7.1 Overview of hydraulics

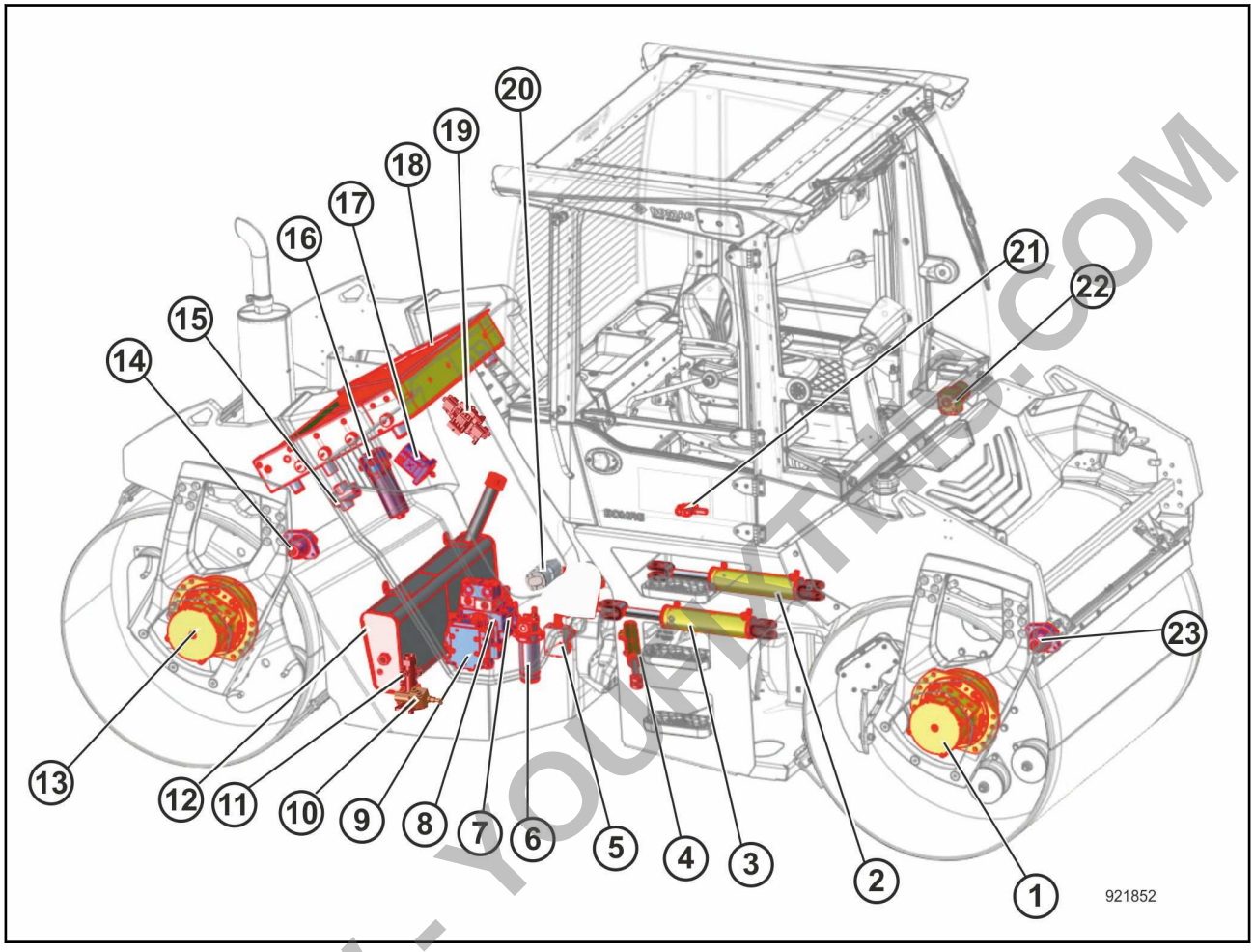


Fig. 278

1 Front travel motor
2 Steering cylinder, left
3 Steering cylinder, right
4 Crabwalk cylinder
5 Solenoid valve for brake, Y04
6 Charge circuit filter
7 Travel pump
8 Vibration pump for front drum
9 Vibration pump for rear drum
10 Solenoid valve for travel speed range selection, Y197 (not used in BW 161)
11 Manifold block for return flows
12 Hydraulic oil tank
13 Rear travel motor
14 Rear vibration motor
15 Thermostat
16 Return line filter
17 Fan motor
18 Hydraulic oil cooler
19 Solenoid valve for crabwalk, solenoid valve for edge compression unit and solenoid valve for chip spreader[optional equipment]
20 Tandem gear pump, steering, charge and fan pump

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6.11.2 Checks prior to start up

6.11.2.1 Checking the engine oil level

NOTICE!

Danger of engine damage!

– If the engine is warm, shut it down and check the oil level after five minutes. With a cold engine the oil level can be checked immediately.

– Use only oil of the permitted specification
↳ *Chapter 2.1.1 „Engine oil“ on page 62*.

During the regeneration process, part of the fuel may mix with the engine oil. This increases the amount of engine oil.

NOTICE!

Danger of engine damage!

– If the engine oil level is above the “MAX”-mark, the engine oil must be changed immediately.

Protective equipment: ■ Protective gloves

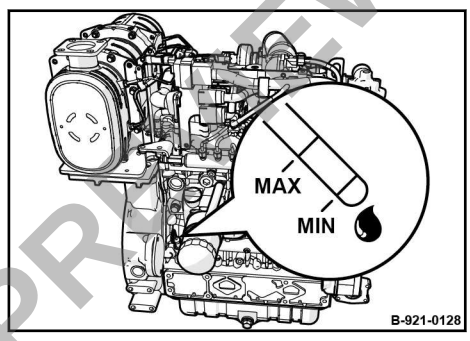


Fig. 230

1. Pull the dipstick out, wipe it off with a lint-free, clean cloth and reinsert it to the end stop.
2. Pull the dipstick out again.
   ⇨ The oil level must be between the “MIN” and “MAX” marks.
3. For topping up, clean the area around the filler opening.
4. Unscrew the cap and fill in engine oil up to the “MAX” mark.
5. Push the dipstick in.
6. Close the cap.

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8 Description of fault codes on the BMESX control

8.1 Overview

Fault code	Description of fault
0000 – 0999	General faults / warnings / machine tests
1000 – 1999	Fault in travel system
2000 – 2499	Fault in electric steering system
3000 – 3999	Faults in work functions (vibration, chip spreader, edge cutter or spraying system)
4000 – 4999	Fault in measuring systems
5000 – 5499	Fault diesel engine
5500 – 5999	Fault hydraulic system
6000 – 6999	Fault in exhaust gas aftertreatment system
7000 – 7499	Input of machine codes
7500 – 7899	Input of codes for measuring technology
7900 – 7999	Operating hours, load spectrum, etc.
8000 – 8999	Severe software error [1]
9000 – 9999	Faults of external IO-nodes on one of the CAN-buses (joystick, data collector, Display, BLM Module, engine control units, etc.)

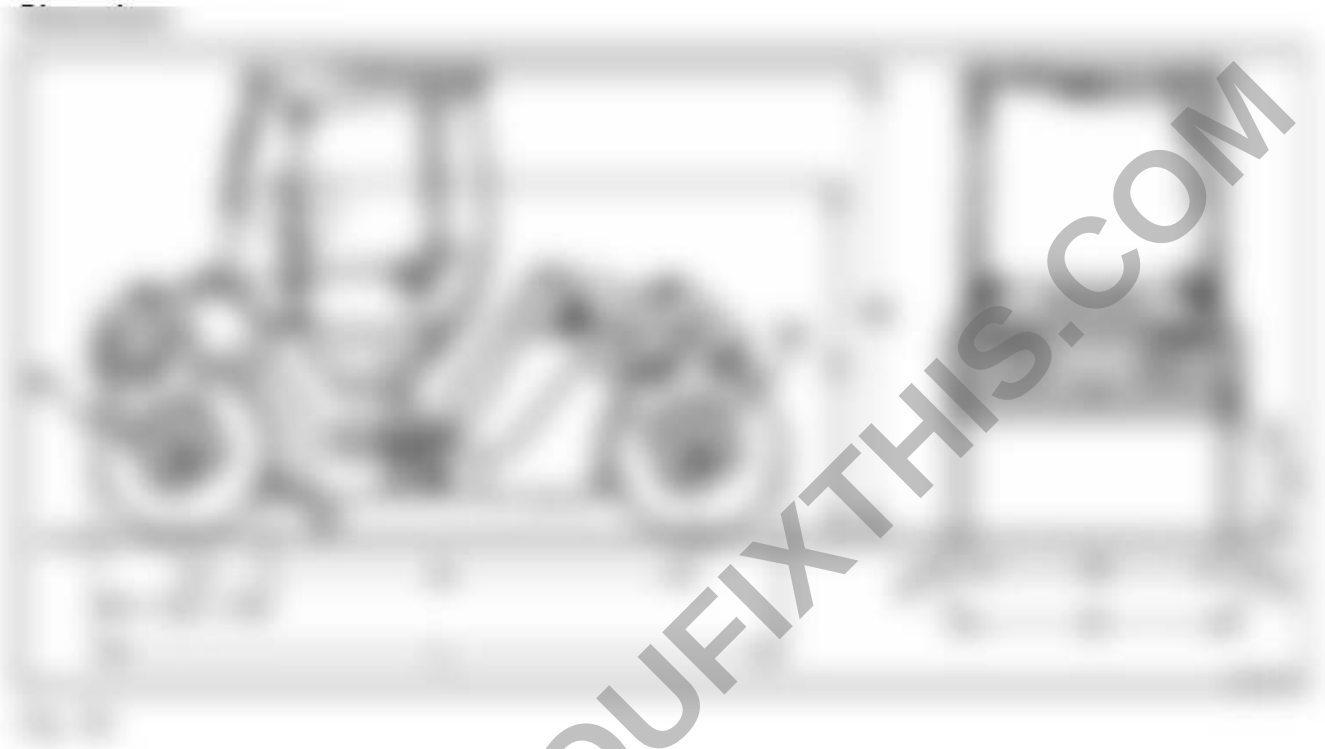
[1] These faults are only broken down partly hereunder!

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3.1 Technical data BW 161 AD-5

3.1.1 Technical data



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Tightening torques for screws treated with anti-seizure paste OKS 240 (copper paste)

Screw dimension	Tightening torques Nm		
	8.8	10.9	12.9
M16	169	240	287
M16 x 1.5	180	255	307
M18	232	330	392
M18 x 1.5	260	373	444
M20	330	463	557
M20 x 1.5	369	502	620
M22	448	628	754
M22 x 1.5	495	691	847
M24	569	800	960
M24 x 2	624	879	1036
M27	840	1184	1520
M27 x 2	918	1263	1536
M30	1136	1608	1920
M30 x 2	1255	1804	2156
$^3/_4$″ - 10 UNC	276	388	464
$^3/_4$″ - 16 UNC	308	432	520

Anti-seizure paste (copper paste) is used for the assembly of screw connections, which are exposed to high temperatures and corrosive effects. Prevents seizure and corrosion.

Tightening torques for wheel nuts (fine thread)

Thread diameter	Tightening torques Nm (Coefficient of friction μ tot. = 0.14)
	10.9
M12 x 1.5	100
M14 x 1.5	150
M18 x 1.5	300 - 350
M20 x 1.5	400 - 500
M22 x 1.5	500 - 600

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4.3.1 Pump overview

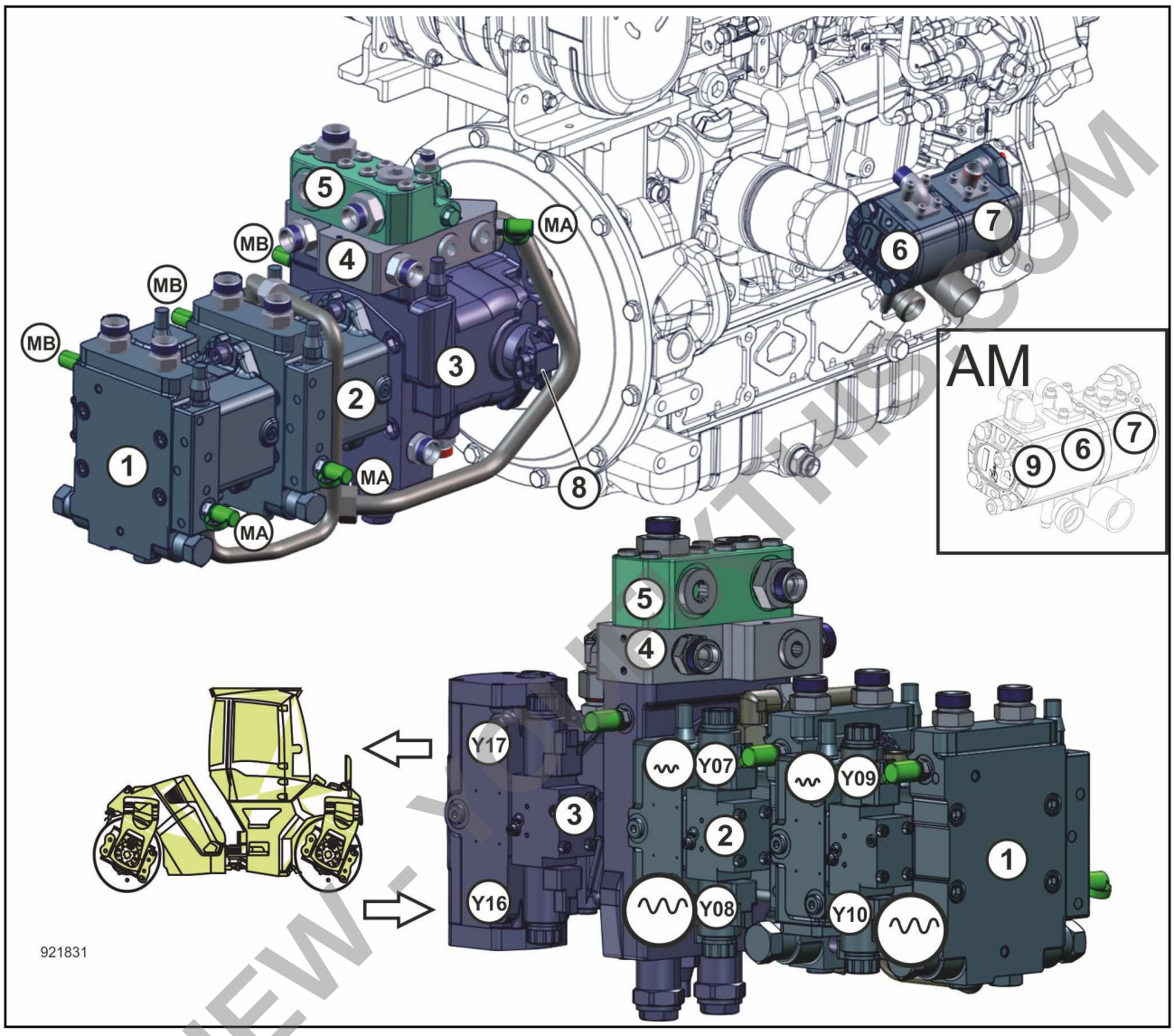


Fig. 62

1 Vibration pump for rear drum, A10VG 28 EP
2 Vibration pump for front drum, A10VG 28 EP
3 Travel pump, A4VG 71 EP
4 Distributor block
5 Flushing valve, 4l/min
6 Fan pump, 8 cm^3/rev
7 Steering/charge pump, 16 cm^3/rev
8 Pressure sensor in travel pump, not used in this machine
9 Vario pump, 2.6 cm^3/rev (only with Asphalt Manager)
Y Solenoid valves approx. 6 Ω

Measure pressures in high idle speed.

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5.4 CAN BUS overview

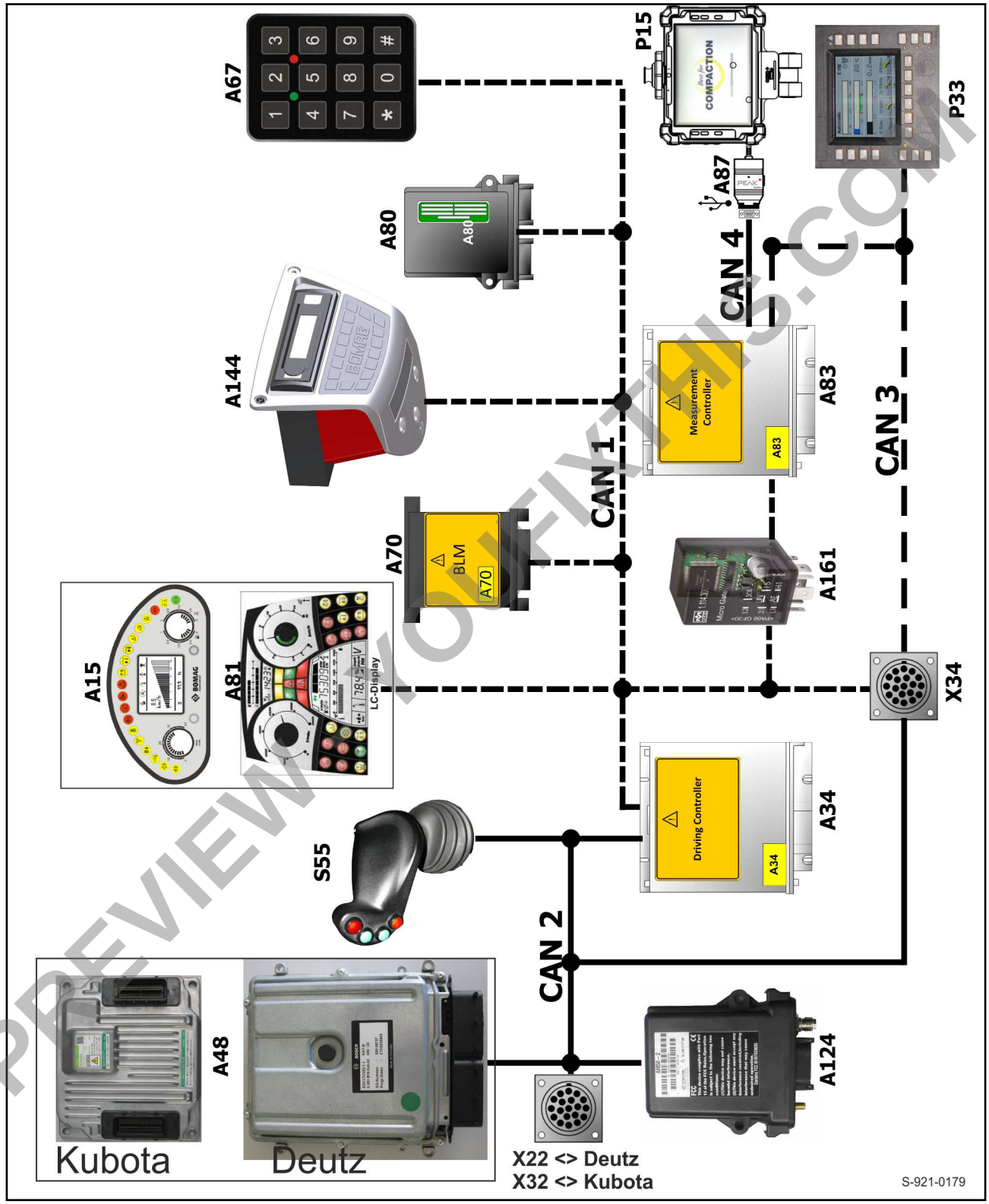


Fig. 91: CAN bus

A15 Instrument cluster

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Assembly

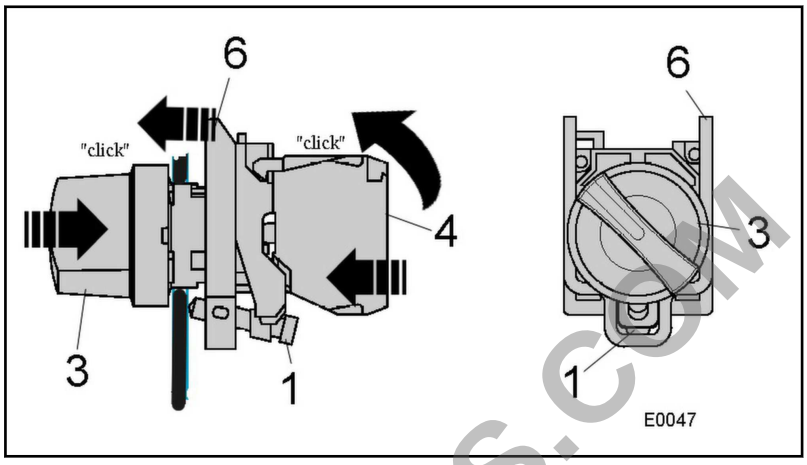


Fig. 169: Assembly

1. Insert the front element (3) into the bore in the control panel.

2. Clip the fastening adapter (6) onto the front element (3).

Watch the marks on front element and fastening flange.

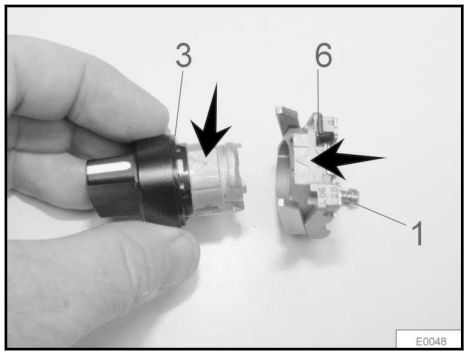


Fig. 170: Observe the marks.

3. Tighten the screw (1) with a tightening torque of 0.6 Nm.

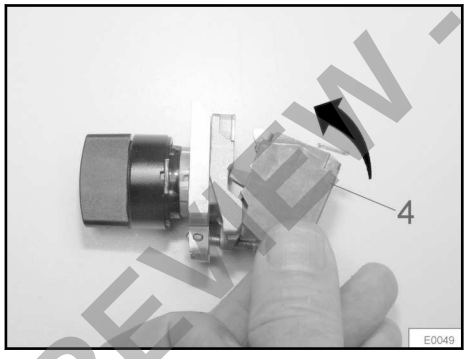


Fig. 171: Install the switch block

4. Clip on the switch block (4).

Hook in the switch block at the bottom first.

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3. Check the condition and tight fit of all fuel lines and hose clamps.
4. If fuel lines or hose clamps are found to be damaged, the corresponding parts must be immediately repaired or replaced by authorized service personnel.

NOTICE!

Danger of engine damage!

– After work on the fuel system bleed the system, perform a test run and check for leaks.

6.11.3.2 Checking, cleaning the water separator

The service intervals for the water separator depend on the water content in the fuel and can therefore not be determined precisely.

After taking the engine into operation you should check the filter bowl for signs of water and dirt initially every day, later as required.

If a too high quantity is drained off, the filter needs to be bled.

Protective equipment:
- Working clothes
- Protective gloves

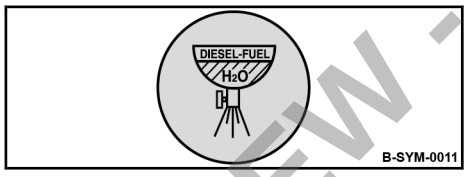


Fig. 233

1. If the “water in fuel” warning light lights up when starting or during operation, drain the water from the fuel pre-filter immediately.
2. Park the machine in secured condition ↳ *Chapter 1.3.4 „Parking the machine in secured condition“ on page 59*.

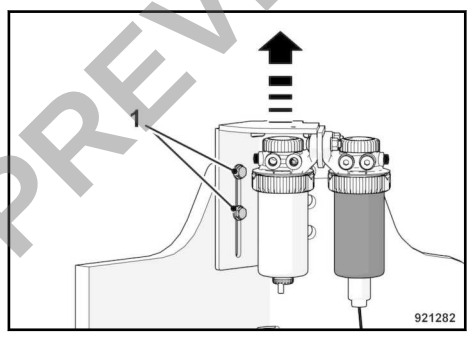


Fig. 234

3. Slightly loosen the fastening screws (1) and pull the bracket carefully up.
4. Retighten the fastening screws.

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NOTICE!

Parking brake

Each time the parking brake has been used a safety or emergency brake, one must check whether it still works correctly.

It is a multi-disc brake which is closed when depressurised. The spring exerts pressure on the piston which presses both the fixed and movable discs together and thus blocks the shaft.

The brake is completely open when a releasing pressure of 12 bar is applied.

Mechanical brake releasing device

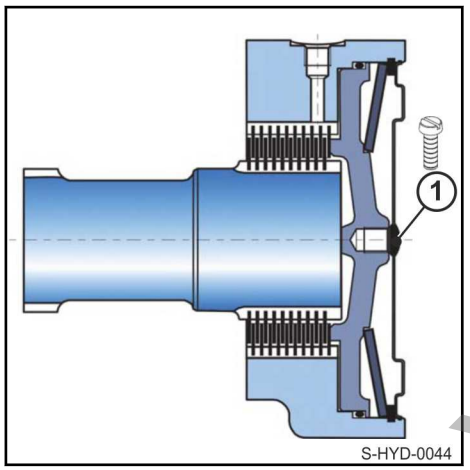


Fig. 302

1 Brake releasing screw

Tightening torque

MS05 ***42 Nm****, screw M12*

MSE05 ***47 Nm****, screw M12*

MS/MSE11, 18 ***140 Nm****, screw M16*

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Measure pressures in high idle speed.

Travel pump

	Forward travel	Backward travel
Current on coil	Y16	Y17
Control chamber	X1	X2
Pressure on port	B 450 bar	A 450 bar

Front vibration pump

	High amplitude	Low amplitude
Current on coil	Y07	Y08
Control chamber	X1	X2
Pressure on port	B MB, start-up pressure approx. 380 bar, operating pressure 100 to 120 bar	A MA, start-up pressure approx. 380 bar, operating pressure 100 to 120 bar

Rear vibration pump

	High amplitude	Low amplitude
Current on coil	Y09	Y10
Control chamber	X1	X2
Pressure on port	B MB, start-up pressure approx. 380 bar, operating pressure 100 to 120 bar	A MA, start-up pressure approx. 380 bar, operating pressure 100 to 120 bar

Flushing valve

The flushing valve is used to discharge heat from the hydraulic circuit.

When the travel circuit is switched on, a pressure difference will be generated between the two sides (A & B) of the closed circuit. The higher pressure moves the valve spool of the flushing valve against the neutral setting spring, so that oil can flow out of the low pressure side.

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11. Move the travel lever approx. 1/3 of the max. shift to forward travel.
12. After approx. 1 to 2 minutes shut down the diesel engine for a minute.

⇨

This waiting time is necessary to allow air bubbles to escape through the leak oil return line.

13. After a waiting time of approx. 1 minute keep repeating this procedure, until the indicated charge pressure drops directly to zero when shutting down the diesel engine.

7.12.11 Bleeding the vibration circuit

1. Install a pressure test hose to the charge pressure test port.
2. Install a pressure test hose each to the high pressure test ports.

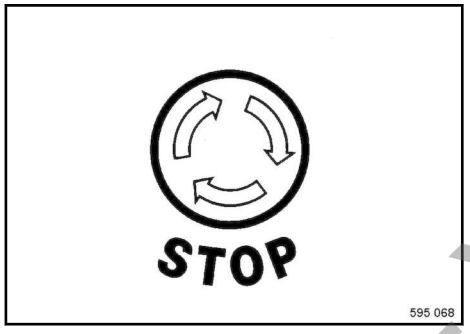


Fig. 441

WARNING!
The engine must not start.

4. Actuate the emergency stop switch.

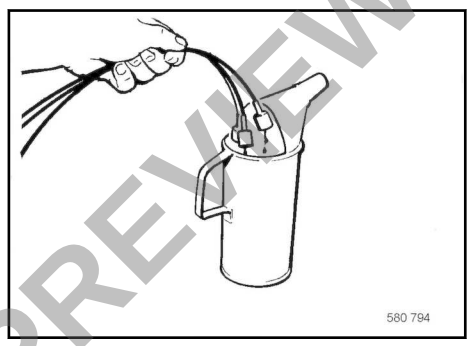


Fig. 442

5. Hold the open ends of the pressure test hoses into a container.
6. Operate the starter motor for approx. 30 seconds. Wait one minute and repeat this procedure, until oil starts to run out of the pressure test hoses.
7. Remove the pressure test hoses.

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Delivery process

Once the magnetic coupling of the refrigerant compressor (1) has caused the frictional connection, the shaft of the refrigerant compressor (4) will drive the swash plate (9) via the driver disc (8). The revolving slanted swash plate (9) causes a stroke movement of the 7 pistons (10), which are evenly distributed along the circumference.

The pistons (10) are thereby actuated by slipper pads (11).

During the suction stroke gaseous refrigerant flows through the suction valve (A) into the corresponding cylinder. When the stroke of the piston (10) is reversed, it compresses the gaseous refrigerant, until the pressure inside the cylinder becomes so high, that the pressure valve (B) opens and allows the refrigerant to flow through the compressor outlet and thus into the refrigerant circuit.

The refrigerant compressor (1) has integrated chambers both on the suction and on the pressure side, which have the function to dampen resonances, which are generated by suction and compression.

Displacement control

The refrigerant compressor (1) is designed in such a way, that already has sufficient flow rate to keep up the refrigerant circuit, even at a slow vehicle speed and low engine speed.

Since the flow rate of the refrigerant compressor (1) rises with increasing engine and travel speed, the flow rate needs to be reduced or regulated.

This is to avoid that the refrigerant compressor (1) unnecessarily uses engine power.

The flow rate is controlled by switching the magnetic coupling on and off.

Safety contgrol of the refrigerant compressor (1)

To prevent the ribbed V-belt jumping off in case of a mechanical defect of the refrigerant compressor (1), the magnetic coupling will disengage automatically.

In case of a mechanical defect the refrigerant compressor (1) will be harder to turn or may even block completely. The heat created on the friction surface of the V-belt (2) blows a meting fuse (3) in the magnetic coil (6). This interrupts the power supply to the magnetic coil (6) and releases the frictional connection.

Service valves

The service valves are installed directly on the compressor. These are used to e.g. evacuate and fill the system.

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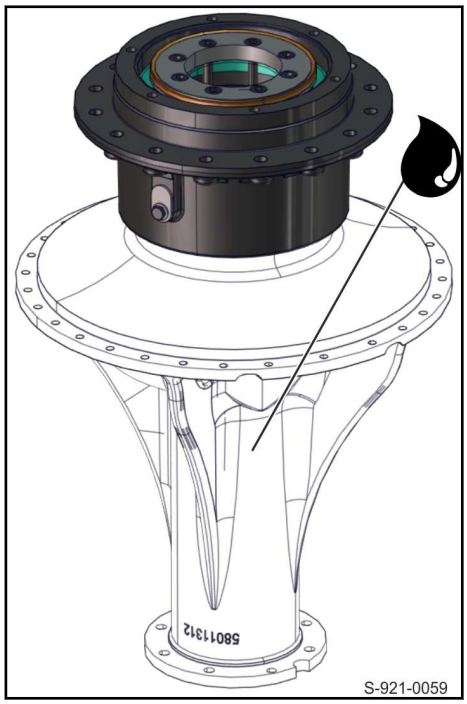


Fig. 583

5. Apply some oil to the bearing seat area.

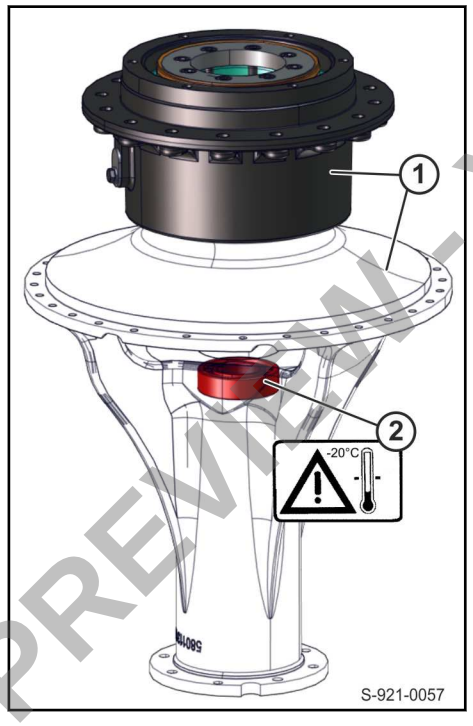


Fig. 584: Travel bearings pre-assembled

6. Press cylinder roller bearing (2) into the housing against the end stop.

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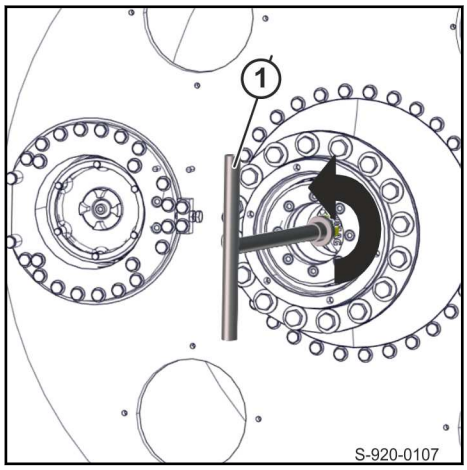


Fig. 695

1 BOMAG part number: 00721573

4. Attach the tool (1) ↳ Fig. 695 to the ring gear on the drive shaft.

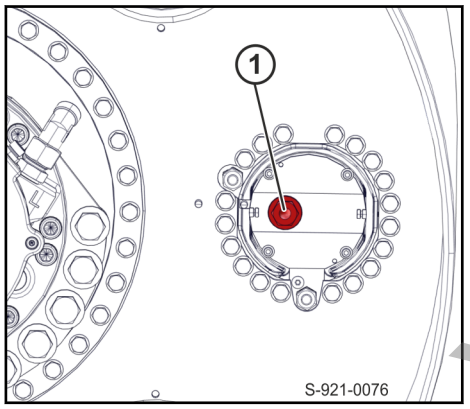


Fig. 696

5. Unscrew the magnetic plugs (1) ↳ Fig. 696 on both drum sides.

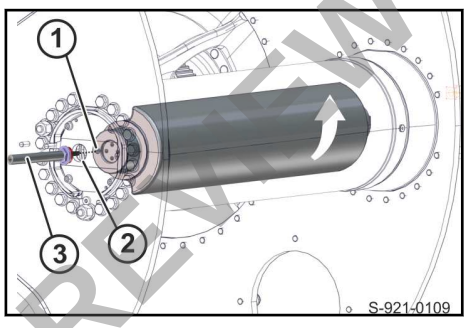


Fig. 697: Fixating the exciter shafts

3 BOMAG part number: 00721574

6.

Fixate both exciter shafts.

Turn the exciter shafts with the tool (1) ↳ Fig. 697, until the bore (1, exciter shaft) is in line with one of the tapped bore (2, cover).

7. Turn the tool (3) into the tapped bore (2).

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12.3 Final function tests and checks

NOTICE!

Make sure that all screws have been tightened with the specified torque.

After the cabin assembly the following tests must be performed to assure that all cables and lines are correctly connected.

1. Insert the ignition key and turn clockwise to position "1".
2. Operate the switches fpr headlights, direction indicators and interior light to check their function.

If the function of the windscreen washer system is reversed, the two washing water hoses must be interchanged.

3. Operate the switches for front and rear windscreen washer system and check their correct function.
4. Start the engine.
5. Switch the air conditioning on by the switch. After a five minute operation the cabin must become noticeably cooler.
6. Switch the air heater on by the switch. After a five minute operation the cabin must become noticeably warmer.

NOTICE!

The machine must not be operated if the seat contact switch is not functioning correctly.

7. Function of the seat contact switch.
8. Check the adjustment of the doors, re-adjust if necessary

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In order to examine the electric/electronic part of an electronic system it is recommended to check the incoming sensor information and outgoing command values on a control unit. This requires profound knowledge of system and components.

Consideration, if the error log has not recorded a fault

- What could be the cause of the complaint?
- Which measuring possibilities are available?

Localizing faults

Line or component?

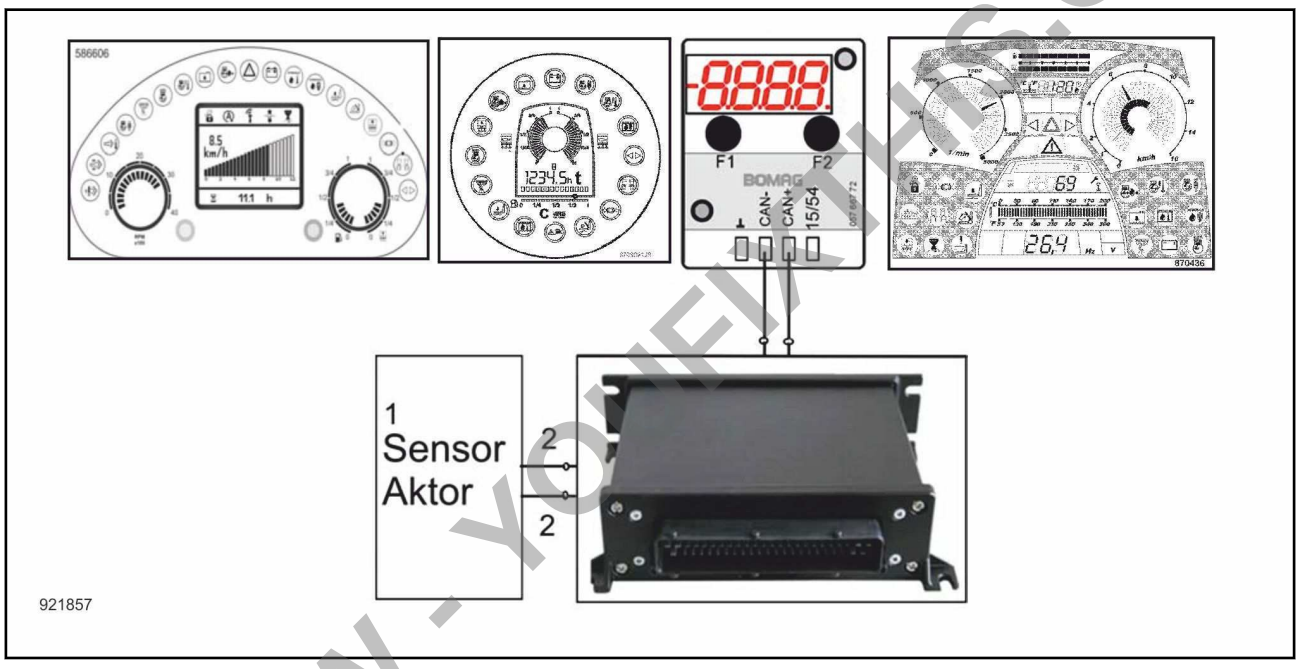


Fig. 860

- In most cases the fault message does not clarify whether the fault is in the sensor or actor, or in one of the connecting lines (2) between control unit and the mentioned component (1). For this purpose it makes sense to check the component and the connecting lines between control unit and component separately.
- Checking the voltage supply for the control unit
- Checking the sensor lines
- Checking the actor lines

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2179	Sensor 2 software error	X35:18, X35:19	Software parameter fault, software update may be required.	2
2180	Hardware initializing error	X35:18, X35:19	Initialization fault	2

FaultLocation Input steering angle sensor left, B271

FCode	FaultDescription	Terminal	Possible Cause	Diag	Reac
2191	Hardware initializing error	X35:29	ESX hardware defect, hardware replacement may be necessary Initialization fault		2
2192	Supply connection Connection of sensor/switch faultyThe voltage applied to the input is outside the specified range (see signal description).	X35:29	Line breakage in current path No voltage supply (+Ub Pot 15 or 30)	2110	2
2193	Ground Connection of sensor/switch faultyThe voltage applied to the input is outside the specified range (see signal description).	X35:29	Line breakage in current path	2110	2
2198	Informative code - The teach function for the steering angles has not yet been successfully performed. (see adjustment instructions)	X35:29	Informative code - Follow the adjustment instructions		1

FaultLocation Steering direction monitoring

FCode	FaultDescription	Terminal	Possible Cause	Diag	Reac
2200	The front left hand output is triggered, however, the drums steers to the right or does not steer at all.	System	Sensors not correctly installed or not adjusted Pin 18 and 19 mixed up by mistake Pin 40 and 41 mixed up by mistake	2133	2
2201	The front right hand output is triggered, however, the drums steers to the right or does not steer at all.	System	Sensors not correctly installed or not adjusted Pin 18 and 19 mixed up by mistake Pin 40 and 41 mixed up by mistake	2133	2

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FCode	FaultDescription	Terminal	Possible Cause	Diag	Reac
9269	Fault: CAN node monitoring bus 1, missing messages were recognized, check CAN connection and voltage supply to the node	System	Line breakage in current path Faults on CAN line Cabin without cabin module		1
9270	Fault: CAN node monitoring bus 1, missing messages were recognized, check CAN connection and voltage supply to the node	System	Line breakage in current path Faults on CAN line		1
9271	Fault: CAN node monitoring bus 1, missing messages were recognized, check CAN connection and voltage supply to the node	System	Line breakage in current path Faults on CAN line		1
9272	Fault: CAN node monitoring bus 1, missing messages were recognized, check CAN connection and voltage supply to the node	System	Line breakage in current path Faults on CAN line		1
9273	Fault: CAN node monitoring bus 1, missing messages were recognized, check CAN connection and voltage supply to the node	System	Line breakage in current path Faults on CAN line		1
9290	Fault: CAN node monitoring bus 2, missing messages were recognized, check CAN connection and voltage supply to the node	System	Line breakage in current path Faults on CAN line		1
9310	Hardware initializing error	System			1
9311	Hardware initializing error	System			1
9312	Hardware initializing error	System			1
9400	Communication fault with engine control unit	System			3
9503	Fault: CAN node monitoring bus 1, internal software fault in node	System			3

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Cause	Possible effect	Remedy
Leak gas (air)	high hot gas temperature, low measured supercooling, low cooling power	renew filling
Restriction between compressor and condenser	high hot gas temperature, low cooling power	Check lines and valves

Suction pressure too high (1), high pressure too low to normal (2)

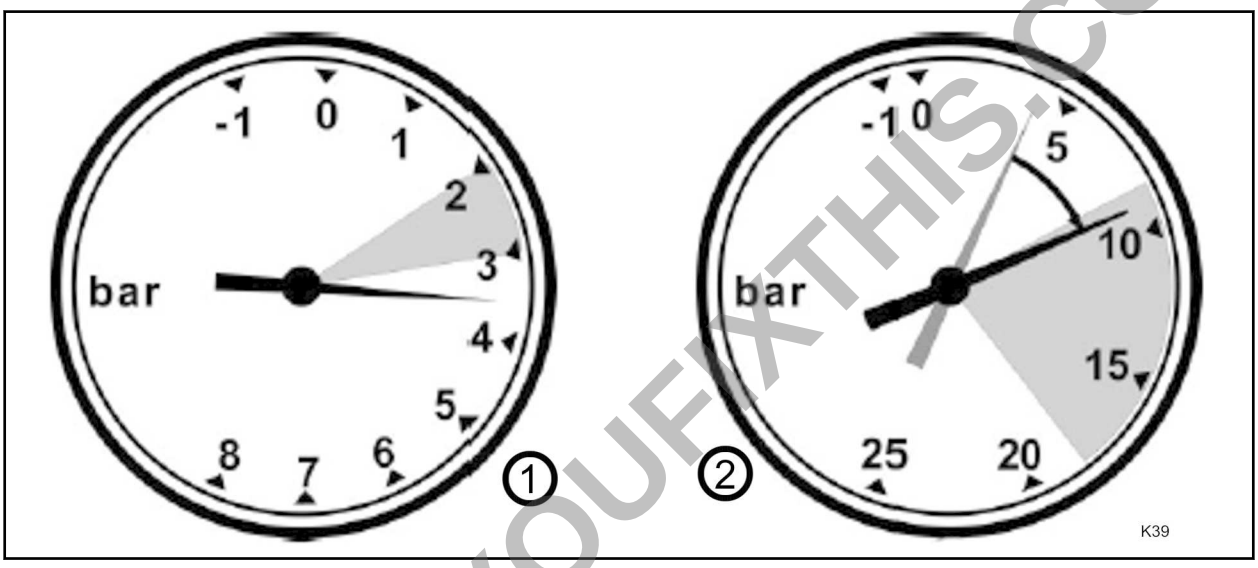
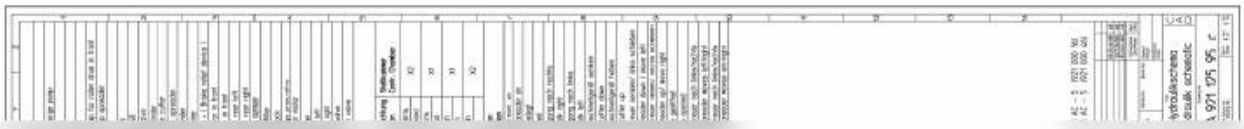


Fig. 871

Cause	Possible effect	Remedy
Compressor defective	Cooling power too low	Replace the compressor

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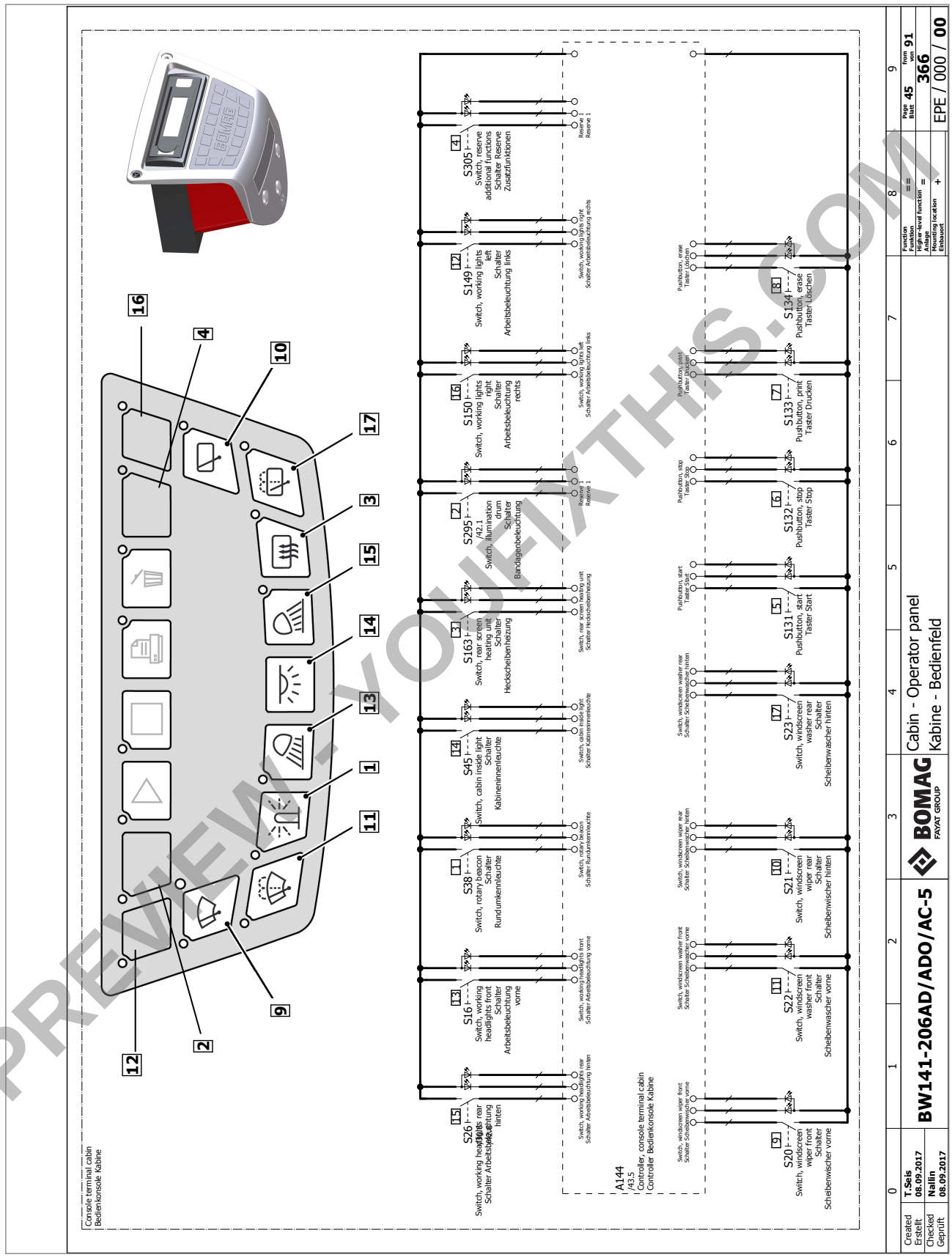
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