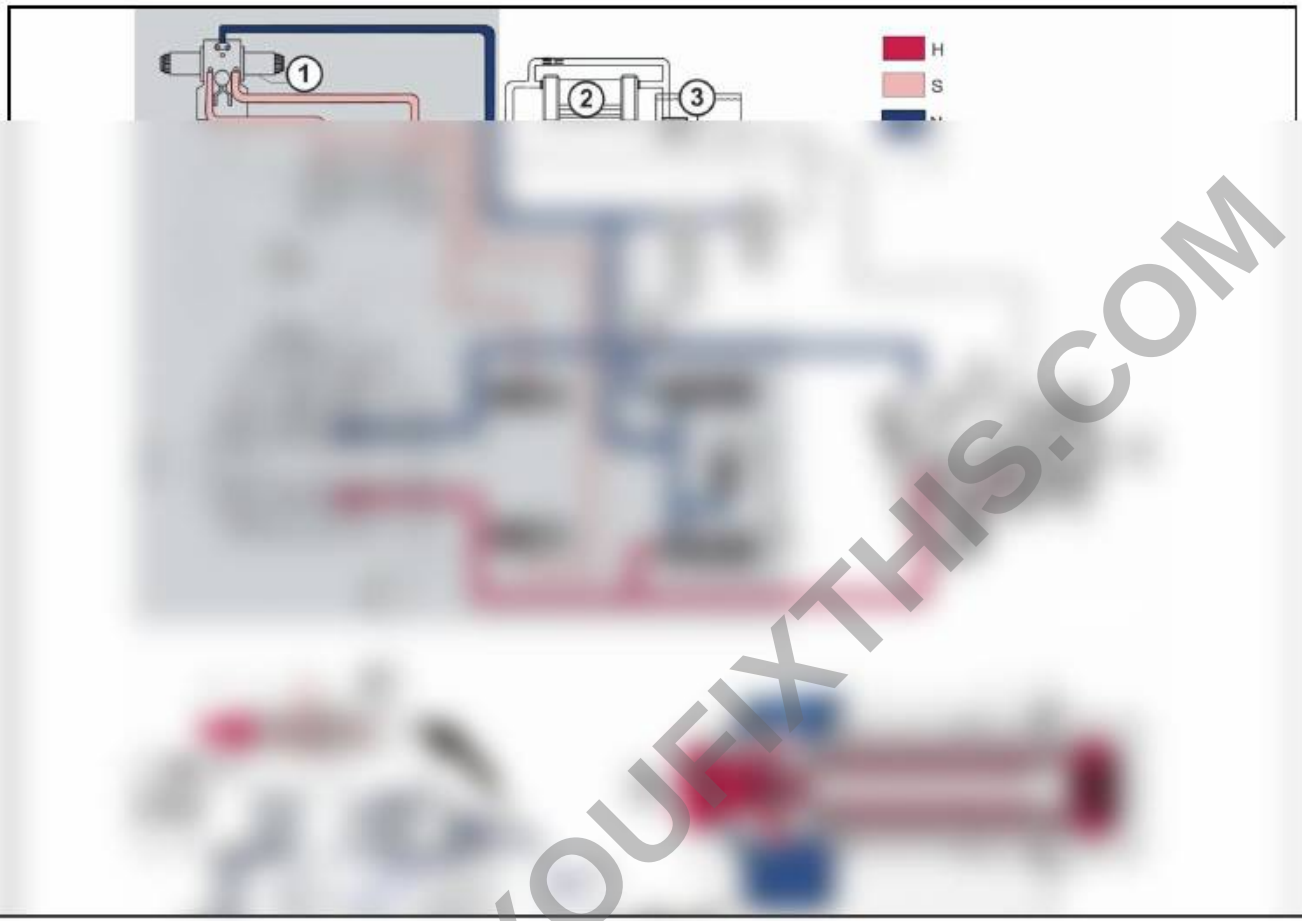


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BMF 2500 CS
- Machine Failure-Codes chart

Error Message	Number	Save	Possible Cause	Effect	Quit	Remedy
Steer Lever	0x8002	yes	steering signal redundancy error (direction: direction: left about 0,5V..right about 4,5V) pin141 does not fit with opposite signal at pin redundancy input pin231	stering set to middle, limp home 4m/min	no	make a new joystick calibration with BODAS-service
Volt.after P central switch off	0x8003	yes	voltage after proportional central switch >4V when central switch is off	no driving possible	no	backward feeding of proportional central switch due to a wiring harness failure
Volt.after D central switch off	0x8004	yes	voltage after digital central switch >4V when central switch is off	no driving possible	no	backward feeding of digital central switch due to a wiring harness failure
Volt.Sensor 5V low	0x8005	yes	5V sensor voltage <4,5V	no driving possible	active error will be deleted if error condition is not true	check sensor voltage pin 219 and cables, sensors, potentiometers
Volt.Sensor 5V high	0x8006	yes	5V sensor voltage >5,5V	no driving possible	active error will be deleted if error condition is not true	check sensor voltage pin 219 and cables, sensors, potentiometers
SYS check	0x8007	yes	internal fault of RC36-20/30	no driving possible	no	turn ignition key off, wait 2s and then turn on again
Brake release	0x8008	yes	solenoid brake faulty short circuit / broken solenoid or cable	manually pumping of brake pressure necessary, then driving with limp home 4m/min possible	active error will be deleted if error condition is not true and joystick neutral	check cable, pin131
Pump left forwd.	0x8009	yes	solenoid pump left forward faulty short circuit / broken solenoid or cable	no forward driving possible after 0,8s	active error will be deleted if error condition is not true and joystick neutral	check cable, pin156

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ENVIRONMENT!

Diesel fuel is an environmentally hazardous substance!

- Always keep diesel fuel in proper containers.
- Immediately bind spilled diesel fuel with an oil-binding agent and dispose of properly.
- Dispose of diesel fuel and fuel filters according to regulations.

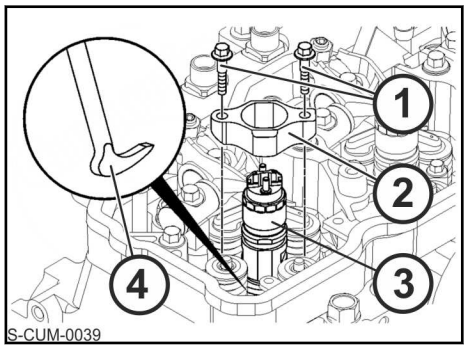


Fig. 134

1. Remove the screws (1) ↳ Fig. 134 and bracket (2).
2. Use the pry bar (4) to remove the injector (3).
3. Once the injector has been removed, make sure that the sealing ring has also been removed.

   ⇨ If the sealing ring is not on the injector, remove the sealing ring from the injector bore.

NOTICE!

If the injector has two sealing rings, this may cause fuel losses and a drop in engine power.

Cleaning and checking for reusability

1. Check the injector ↳ *Chapter 4.2.6 „Checking the injector“ on page 275*.

Installing the injector

Special tool:

- Oil spray can
- Press fitting sleeve
- Torque wrench 1-12 Nm
- Torque wrench 10-50 Nm
- Torque wrench 20-200 Nm
- Vernier calliper (972 029 78)

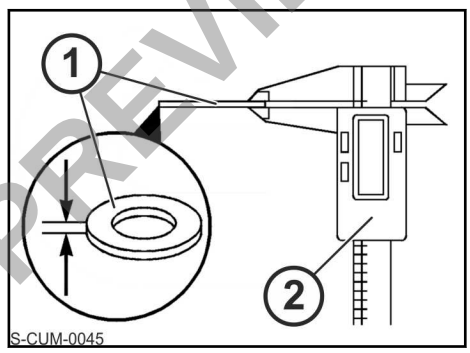


Fig. 135

1. Measure the removed sealing ring (1) ↳ Fig. 135. Make sure that the thickness of the sealing ring is the correct size.

   ⇨ **Nominal value: 1.5 mm!**
2. If it is not up to the nominal value, replace the sealing ring.

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Tightening torques for screws with metric unified thread

Screw dimension	Tightening torques Nm (Coefficient of friction μ tot. = 0.14)		
	8.8	10.9	12.9

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- When using steam cleaning equipment cover control unit, cable plugs, all other electrical connections and the generator beforehand and do not expose these items to the direct steam jet.
- Electrical plug connections must be plugged in during jet cleaning.
- Remove loose parts (e.g. paint scales that may have come off during assembly work) with an industrial vacuum cleaner or any means of extraction.
- Vacuum cleaning equipment must generally be used for cleaning when the fuel system is open.
- Perform work on the fuel system only in a clean environment (no dust, no grinding or welding work). Avoid draughts (dust). The workshop floor must be cleaned at regular intervals. No brake or power test stand should be present or operated in the same room.
- Air movements, which could swirl up dust, such as brake repairs or starting of engines, must be strictly avoided.
- For work, such as the removal and assembly of defective components on the Common Rail System, it is highly recommended to cordon off a dedicated area in the workshop. This area must be spatially separated from other areas (which are used for general vehicle repairs, like brake repairs)
- No general machine tools should be operated in this room.
- Periodic cleaning of this workshop area is obligatory, draughts, ventilation system and heating blowers must be minimized.
- Engine compartment area where dirt particles could come loose, should be covered with new, clean foil.
- Working means and tools must be cleaned before being used for work. Use only tools without damaged chromium coating, or tools without chromium coating.

Notes and measures to be applied during work in the fuel system

- Wear clean working clothes.
- Use only lint-free cleaning cloths for work in the fuel system.
- Remove loose parts (e.g. paint scales that may have come off during assembly work) with an industrial vacuum cleaner or any means of extraction. Vacuum cleaning equipment must generally be used for cleaning when the fuel system is open.
- Working means and tools must be cleaned before being used for work. Use only tools without damaged chromium coating, or tools without chromium coating.
- Do not use any previously used cleaning or testing fluids for cleaning.
- The use of compressed air for cleaning is prohibited when the fuel system is open.
- Work on disassembled components must only be carried out at a specially furnished work place.
- When removing or assembling components you should not use any materials from which particles or fibres could flake off (cardboard, wood, towels).
- Dismantled parts must only be wiped off with clean, lint-free cloths if required. No dirt particles must be wiped into the components.

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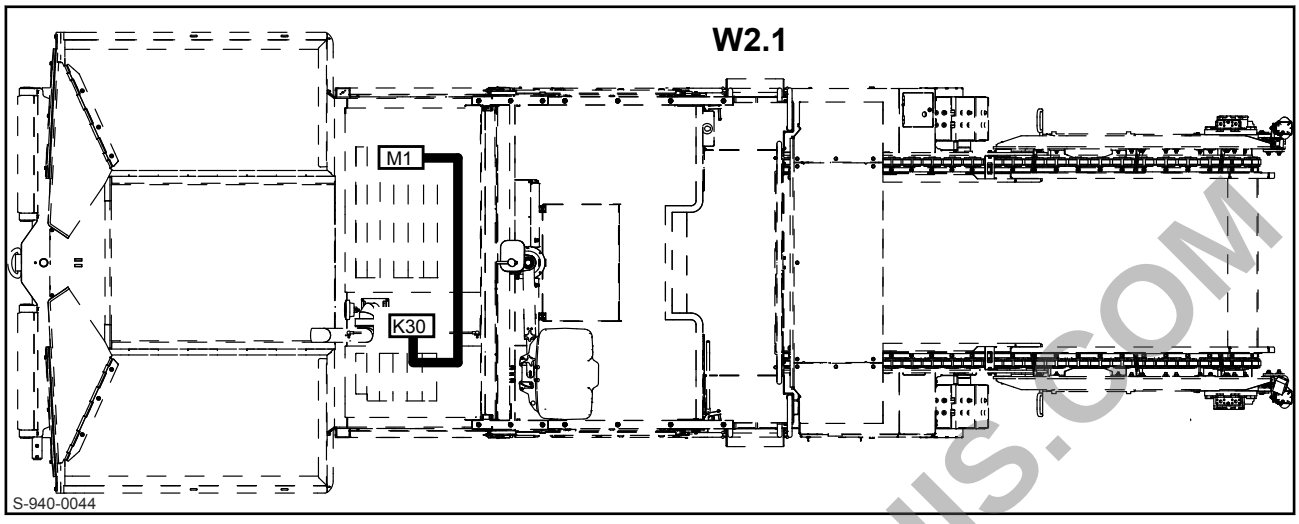


Fig. 41

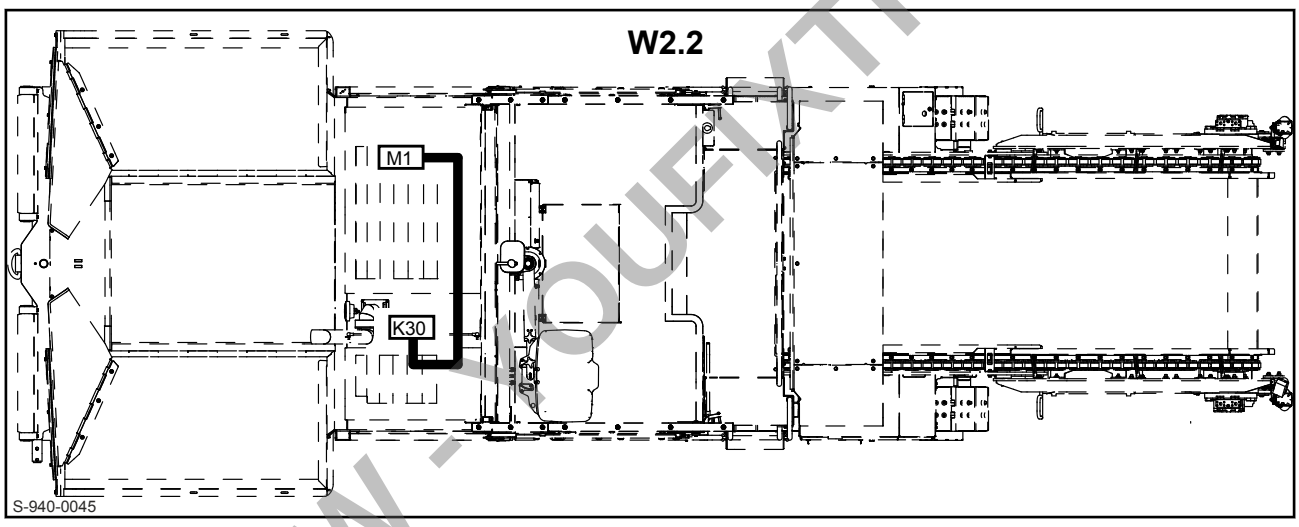


Fig. 42

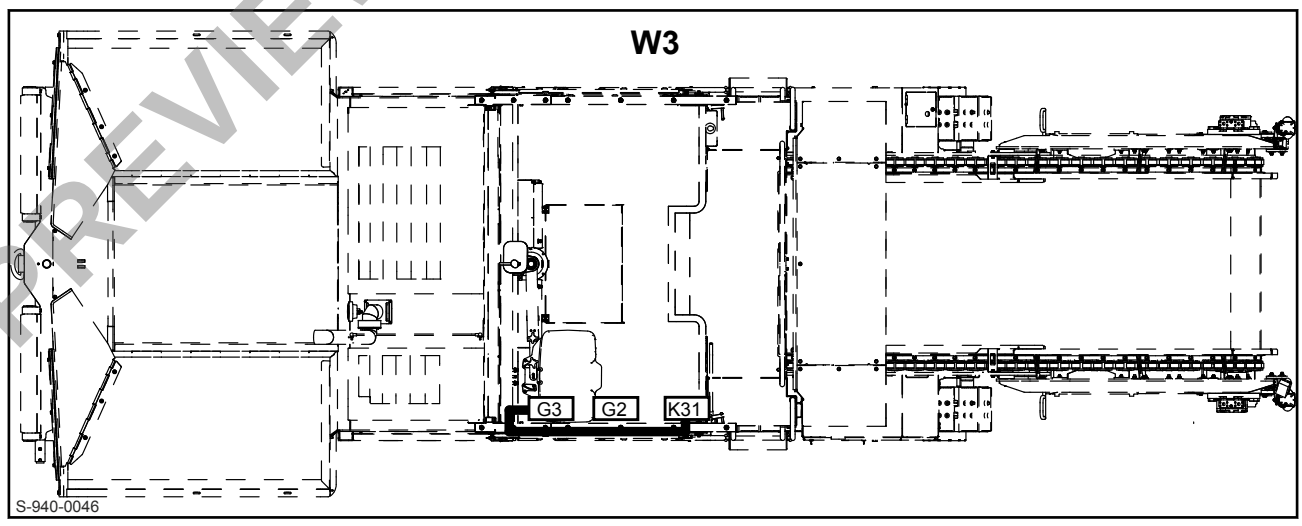


Fig. 43

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BMF 2500 CS
- Machine Failure-Codes chart

Error Message	Number	Save	Possible Cause	Effect	Quit	Remedy
Traction lower	0x80D2	yes	solenoid traction lower faulty short circuit / broken solenoid or cable	active error will be deleted if error condition is not true and joystick neutral	check cable, pin187	
Emulsion sensor	0x80D3	yes	emulsion level sensor fault		active error will be deleted if error condition is not true	check cable, pin218 full: 0Ohm, 10,2mA, 5V empty 180Ohm, 7,48mA, 3,66V
Sensor Length Belt	0x80D4	yes	belt length sensor fault		active error will be deleted if error condition is not true	check pin 135 0,5V..4,5V
Sensor Material Belt Sonic	0x80D5	yes	belt material sensor fault (Sonic)	switched to manually	active error will be deleted if error condition is not true	check pin 217 2V..8V
Joystick Drive Lever	0x80D6	yes	joystick redundancy error (direction: backward about 0,5V..forward about 4,5V) pin135 does not fit with opposite signal at pin redundancy input pin134	no driving possible	no	**Type 704SW only: additional joystick on driver seat armrest** make a new joystick calibration with BODAS-service
Joystick Scroller	0x80D7	yes	joystick scroller error probably middle position not calibrated (direction: decrease belt speed about 0,5V..increase belt speed about 4,5V) pin211	no driving possible	no	**Type 704SW only: additional joystick on driver seat armrest** make a new joystick scroller calibration with BODAS-service
swing belt	0x80D8	yes	not used			
Belt hight sensor	0x80D9	yes	belt hight sensor fault	no use of hight control not possible	active error will be deleted if error condition is not true	check pin 144 0,5V..4,5V
warning_reserved_154	0x80DA					
warning_reserved_155	0x80DB					

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BMF 2500 CS
- Diesel Engine Failure-Codes chart

Fault Code	SPN	FMI	Lamp	SPN Description	Cumins Description	QSB 6.7	QSL 9	QSX 15
483	1349	3	Amber	Engine Injector Metering Rail 2 Pressure	Injector Metering Rail 2 Pressure Sensor Circuit - Voltage above normal, or shorted to high source			x
484	1349	4	Amber	Engine Injector Metering Rail 2 Pressure	Injector Metering Rail 2 Pressure Sensor Circuit - Voltage below normal, or shorted to low source			x
487	626	18	Amber	Engine Start Enable Device 1	Start Enable Device 1 Canister Empty (Ether Injection) - Data Valid But Below Normal Operating Range			
489	191	18	Amber	Transmission Output Shaft Speed	Transmission Output Shaft Speed - Data Valid But Below Normal Operating Range - Moderately Severe Level	x	x	x
497	1377	2	Amber	Engine Synchronization Switch	Multiple Unit Synchronization Switch - Data erratic, intermittent or incorrect			x
515	3514	3	Amber	Sensor supply voltage 6	Sensor Supply 6 Circuit - Voltage above normal, or shorted to high source	x	x	x
516	3514	4	Amber	Sensor supply voltage 6	Sensor Supply 6 Circuit - Voltage below normal, or shorted to low source	x	x	x
523	611	2	Amber	System Diagnostic Code #1	Auxiliary Intermediate (PTO) Speed Switch Validation - Data erratic, intermittent or incorrect	x	x	x
527	702	3	Amber	Auxiliary I/O #02	Auxiliary Input/Output 2 Circuit - Voltage above normal, or shorted to high source	x	x	x
528	93	2	Amber	Engine Net Brake Torque	Auxiliary Alternate Torque Validation Switch - Data erratic, intermittent or incorrect	x	x	x

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BMF 2500 CS
- Diesel Engine Failure-Codes chart

Fault Code	SPN	FMI	Lamp	SPN Description	Cumins Description	QSB 6.7	QSL 9	QSX 15
3572	4334	4	Amber	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Voltage below normal, or shorted to low source	X	X	X
3574	4334	18	Amber	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data Valid But Below Normal Operating Range	X	X	X
3575	4334	16	Amber	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data Valid But Above Normal Operating Range	X	X	X
3577	4376	3	Amber	Aftertreatment 1 Diesel Exhaust Fluid Return Valve	Aftertreatment Diesel Exhaust Fluid Return Valve - Voltage above normal, or shorted to high source	X	X	X
3578	4376	4	Amber	Aftertreatment 1 Diesel Exhaust Fluid Return Valve	Aftertreatment Diesel Exhaust Fluid Return Valve - Voltage below normal, or shorted to low source	X	X	X
3582	4364	18	Amber	Aftertreatment 1 SCR Conversion Efficiency	Aftertreatment SCR Catalyst Conversion Efficiency - Data Valid But Below Normal Operating Range - Moderately Severe Level	X	X	X
3583	5031	10	Amber	Aftertreatment 1 Outlet Gas NOx Sensor Heater Ratio	Aftertreatment 1 Outlet NOx Sensor Heater - Abnormal rate of change	X	X	X
3596	4334	2	Amber	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data erratic, intermittent or incorrect	X	X	X

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4.1.3 Engine oil system

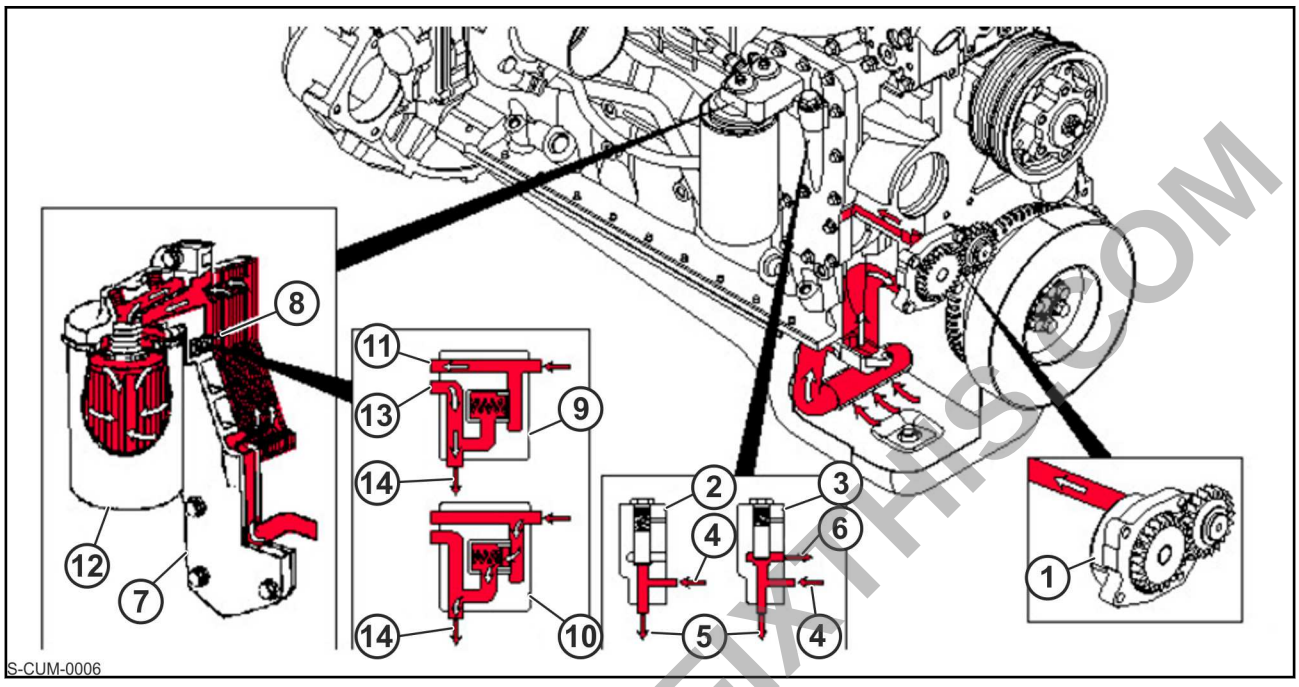


Fig. 96

1 Engine oil pump
2 Pressure control valve closed
3 Pressure control valve open
4 from engine oil pump
5 to engine oil cooler
6 to oil sump
7 Engine oil cooler
8 Filter bypass valve
9 Filter bypass valve closed
10 Filter bypass valve open
11 to engine oil filter
12 Main flow oil filter
13 from engine oil filter
14 to main oil channel

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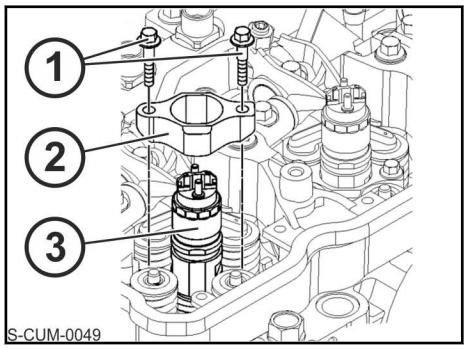


Fig. 139

13. Install the bracket (2) ↳ Fig. 139 and screws (1). Do not tighten the screws yet!
14. Tighten the union nut (3) ↳ Fig. 138 of the injector feed pipe with a provisional tightening torque.
    ⇨ **<u>Provisional</u> tightening torque: 15 Nm!**

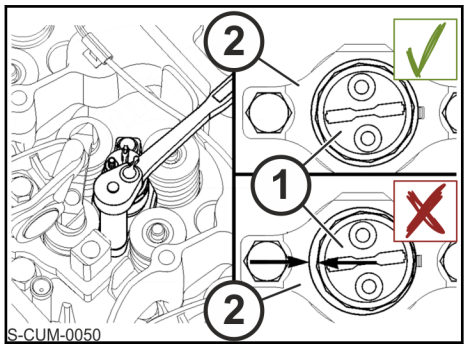


Fig. 140

15. Tighten the screws of the bracket (2) ↳ Fig. 140 evenly. Tighten each screw alternately just 90° and then continue with the next screw.
    ⇨ This ensures that the injector will not tilt. The bracket (2) is correctly mounted, when the distance between bracket and injector (1) is identical on all sides.
16. Tighten the screws of the bracket (2).
    ⇨ **Tightening torque: 8 Nm!**

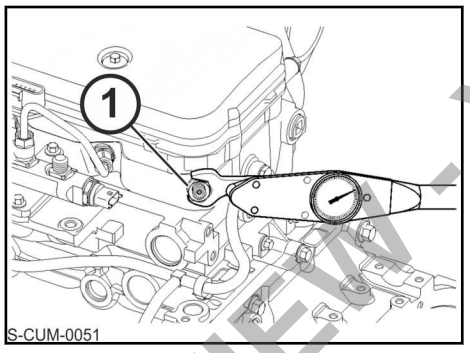


Fig. 141

17. Tighten the union nut (1) ↳ Fig. 141 of the injector feed pipe.
    ⇨ **Tightening torque: 55 Nm!**

Concluding work

1. Mount the valve cover gasket ↳ *Chapter 4.2.11 „Valve cover gasket removal/installation“ on page 284*.
2. Mount the valve cover ↳ *Chapter 4.2.13 „Valve cover removal/installation“ on page 288*.
3. Install the injector feed pipe ↳ *Chapter 4.2.9 „Injector feed pipe removal/installation“ on page 281*.
4. Install the injector supply line ↳ *„Installing the injector supply line“ on page 279*.

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Fault description	Cause	Remedy
	The fuel pre-heater is faulty (if present)	■ Check the fuel pre-heater and replace if necessary
	Fuel leaking out of the fuel supply connection (between the injection nozzles)	■ Measure the fuel quantity of the drain line ■ Check the fuel line connecting part and the injection nozzle for nicks and damage, which could lead to a fuel leak
	Wrong adjustment washer for the injection nozzle	■ Disassemble the injection nozzles and check the thickness of the injection nozzle sealing washers (contact the Service Department)
	The injection nozzle(s) does (do) not work correctly	■ Perform trouble shooting to identify the defective injection nozzle(s) – Replace the injection nozzle(s) if required
	The injection nozzle(s) is (are) not correct	■ Check the part-number of the injection nozzle(s) – Replace the injection nozzle(s) if required
	The fuel type used is not the correct one for the application or the fuel is of poor quality	■ Supply the engine with high quality fuel from a reliable source ■ Check whether fuel additives and the correct fuel quality has always been used ■ See operating and maintenance instructions
	The turbocharger is not correct	■ Check the part number of the turbocharger – Replace the turbocharger, if required
	The play in the turbocharger does not comply with the specification	■ Inspect the turbocharger visually ■ Check the radial clearance and end float of the bearing – If necessary repair or replace the turbocharger
	The fuel pump does not work correctly	■ Check the fuel pump outlet pressure with the electronic maintenance tool ■ Compare the nominal value for fuel feed pressure with the pressure that is measured during engine operation – Replace the fuel pump at your earliest convenience
	The vibration damper is damaged or loose	■ Check the vibration damper
	The flywheel housing is not correctly aligned	■ Check the alignment of the flywheel housing ■ Consult the service department
	Internal engine damage	■ Analyse oil and filter to identify areas, in which the fault is suspected ■ Consult the service department

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Description

1. The pumps *[P3]* and *[P4]* ↳ Fig. 203 draw hydraulic oil from the hydraulic oil tank (1) from ports *[S3]* and *[S4]* and deliver it through the ports *[A]* to the distributor blocks (3).
2. The pump *[P5]* also draws hydraulic oil from the tank (port *[S2]*), bust delivers it first of all to the ball valves (4).
3. Depending on the position of the ball valves hydraulic oil will flow through the quick coupling (5) to the slewable conveyor belt *(optional equipment)* or also to the distributor blocks.

   ⇨ If the ball valves are **closed** (slewable conveyor belt not installed), the hydraulic oil will flow to the distributor blocks. If the ball valves are **open** (slewable conveyor belt connected), the pump *[P5]* will supply the drive motor of the slewable conveyor belt.
4. The distributor blocks direct the hydraulic oil on to the motors *[M1]* and *[M2]*, which drive the conveyor belt.

   ⇨ The return flow of the hydraulic oil take place vice versa.
5. Leak oil from the pumps flows through the ports *[TS3]*, *[TS4]* and *[TS5]* to the thermostat manifold block on the hydraulic oil tank ↳ *Chapter 5.2.2 „Hydraulic oil tank“ on page 325*.

   ⇨ Losses are compensated by an internal charge pump.
6. The flushing valve (2) makes sure that a defined amount of hydraulic oil is flushed out of the system. This cleans and cools the system (hot hydraulic oil is flushed out). These losses are also replaced by clean, cooled hydraulic oil.

   ⇨ The flushed out hydraulic oil is directed back to the port *[TS6]*, together with the leak oil from the two motors (*[M1]* and *[M2]*), as well as the leak oil from the motor of the slewable conveyor belt (if installed).

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6.3.2 Repair

6.3.2.1 Assembly - conveyor belt, slewable

Preparing the machine

Special tool: ■ Lifting tackle

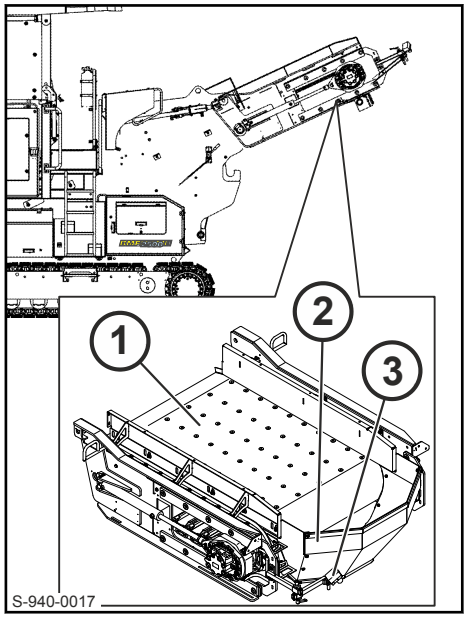


Fig. 225

1 Conveyor belt, short
2 Chute
3 Ultrasonic sensor

1. Lift the short conveyor belt (1) ↳ Fig. 225 to its maximum height. (height adjustment for conveyor belt is optional equipment)
2. Park the machine in secured condition.
3. Disassemble the ultrasonic sensor (3) from the short conveyor belt (1)
4. Disassemble the chute (2) from the short conveyor belt.
   ↳ *Chapter 6.3.2.3 „Disassembly - chute“ on page 395*

Preparing the slewing belt

The slewing belt is provided with four lifting points (1) and (2) ↳ Fig. 226 for lifting the slewing belt

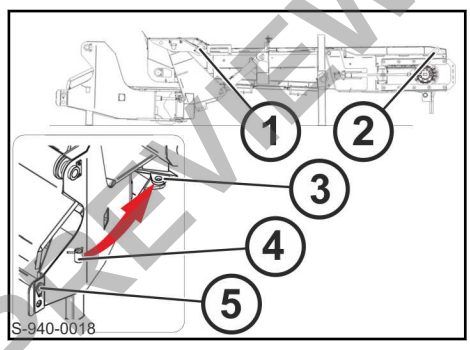


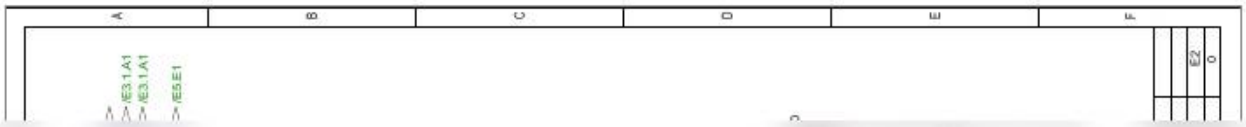
Fig. 226

1. Insert the locking bolt (4) on the swivel arm (3).
2. Disassemble the bolts (5) on both sides.
3. Make sure that the lifting tackle has been approved for the weight of the slewing belt.
   ⇨ **Weight of the slewing belt: 4.5 t**
4. Fasten the lifting tackle on the lifting points (1) and (2).
   ⇨ Fasten the chain on the rear lifting point (2) slightly shorter, so that the rear end of the slewing belt will be slightly higher when lifted.
5. Clean the slewing belt. Remove all material deposits.
6. Close all maintenance flaps.

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Circuit diagrams



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