



Shop Manual MT 26/31

Part no 512967

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Moxey articulated dump trucks are manufactured by MOXY ENGINEERING AS, Elnesvågen, Norway.

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Removal of engine assembly

NOTE!

Place the dump truck on level ground and apply parking brake

Apply articulation lock.

Turn off main switch in battery case.

Raise the dump body and lock it with the safety support.

Raise the tiltable cab and lock it with the safety support

Drain engine coolant

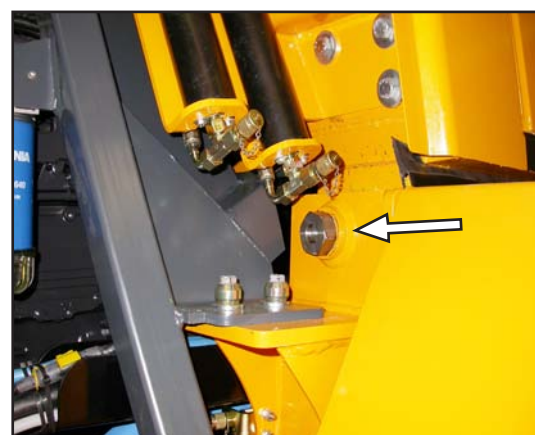
Look in OPERATION & MAINTENANCE MANUAL chapter 2 for instructions.



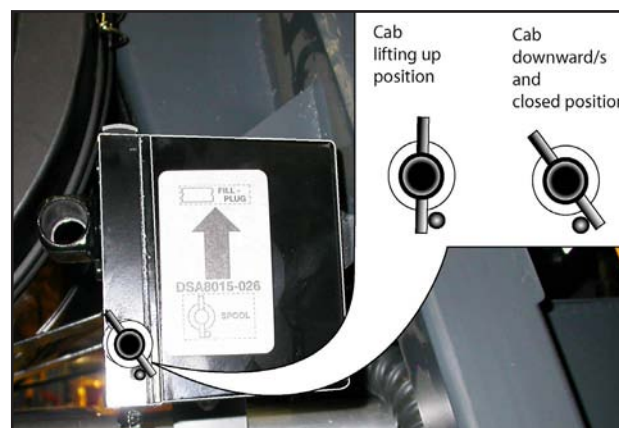
Place wheel chocks to the front wheel

Take away the cab bolt, left and right hand side.

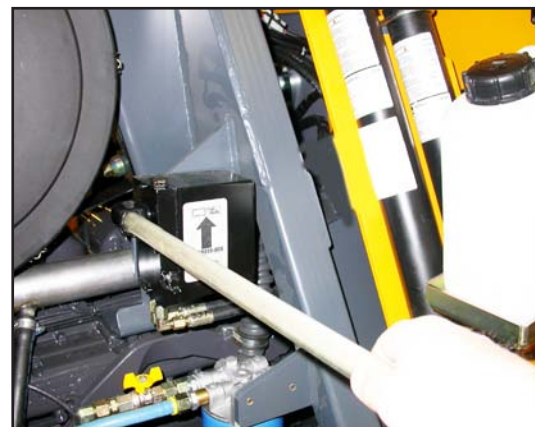
Nv 46 mm



Turn the direction valve on the pump in lifting up position.



With the handle, pump and raise the cab.



Left side:

1

Disassemble the cab pump unit from the air filter stand.

2

Remove the water hose from the pipe socket.

3

Remove the fuel hoses (3 pcs) and

4

Disassemble screws from filter stand bracket



Disconnect the brake hose from the magnetic valve.

(Left side behind the cab bracket)



Right side:

1

Unscrew the hose clamps and remove the pipe bend, filter - turbo

2

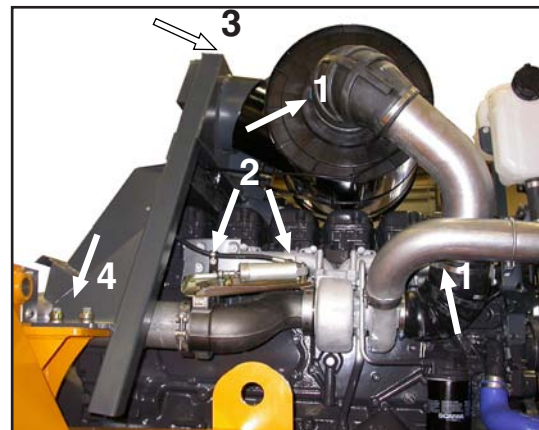
Disconnect the oil hose from engine brake cylinder and bracket disassemble the other end at left side on the magnetic valve

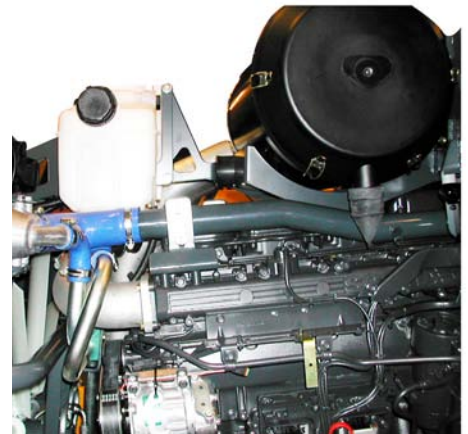
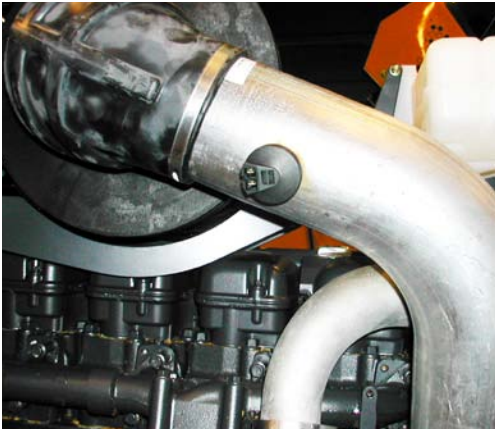
3

Hook up the filter stand in lifting device.

4

Screw off the fastening bolt for filter stand, left and right hand side

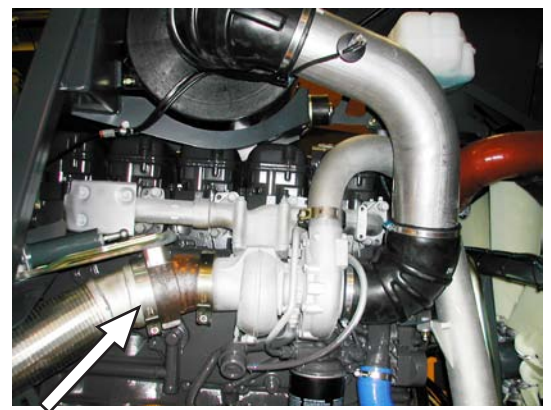




Disassemble the cable to the Air filter sensor.

Disassemble the clamps for the wiring on the filter stand

Disconnect the exhaust pipe from the turbo pipe bend.



Slack the transmission belt.

Disassemble the ground wiring.

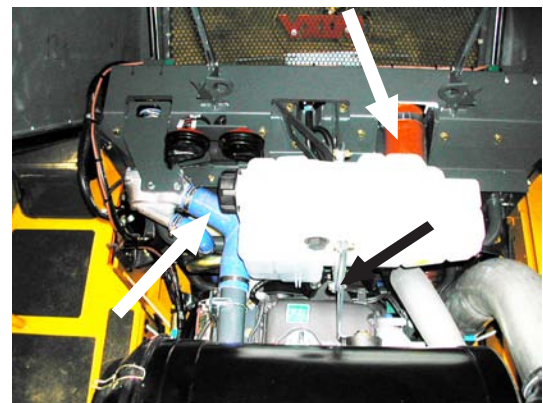
Detach the Air Cond. compressor with the hoses on, from the engine. Check that all of the clamps are undone.

Place the Air condition compressor on the left while the engine is dismount.

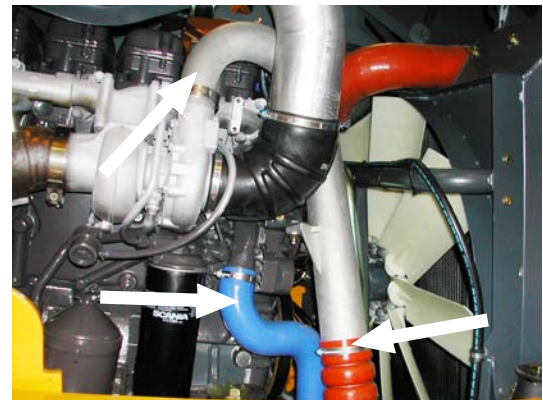


Disconnect the hose from the thermostathousing, the pipe between the air cooler and the engine air inlet.

Disconnect bracket for the air pipe and bracket between engine and fan rack



Disconnect the outlet pipe bend from turbo, and the inlet water hose from the transmission cooler.



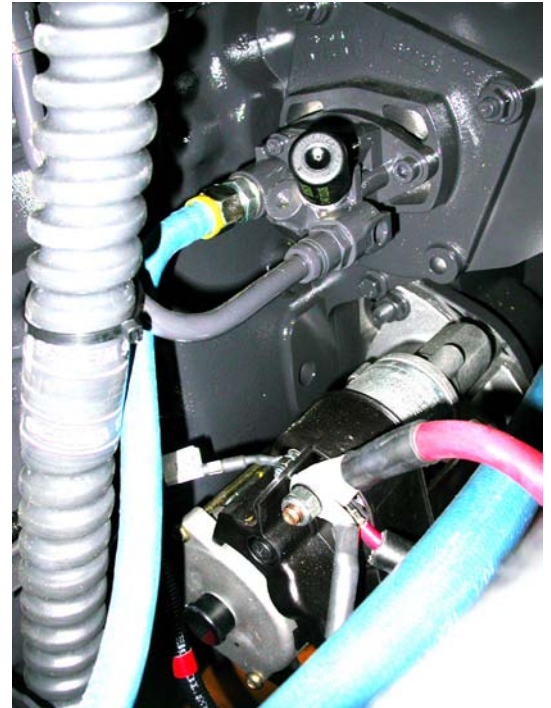
Disconnect the retur hose. (Engine - ekspansionstank)

(Quick release coupling)

(Front of the engine, view from the right hand side)



Disconnect the cables between starter motor and the frame



Disconnect the contact on the dynamo.



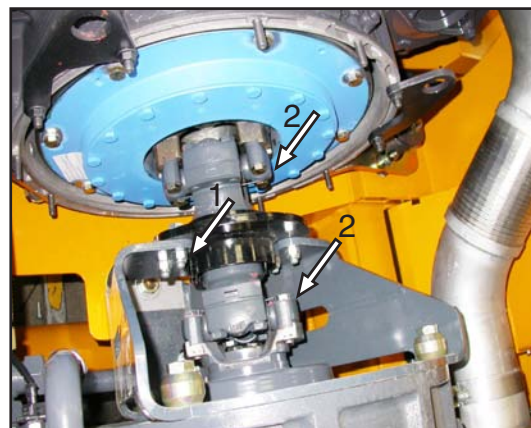
Remove the cover and disconnect the electrical contact from the engine ECU -S6 control unit



Drive shaft

Remove safety atcher.

Remove driveshaft between transmission and engine coupling,



1

Disassemble screw for the ground cable (2 pcs)

2

Left and right hand side, disassemble 3 screws on the engine mounting bracket.



1

Disassemble the hose clamp bracket.

2

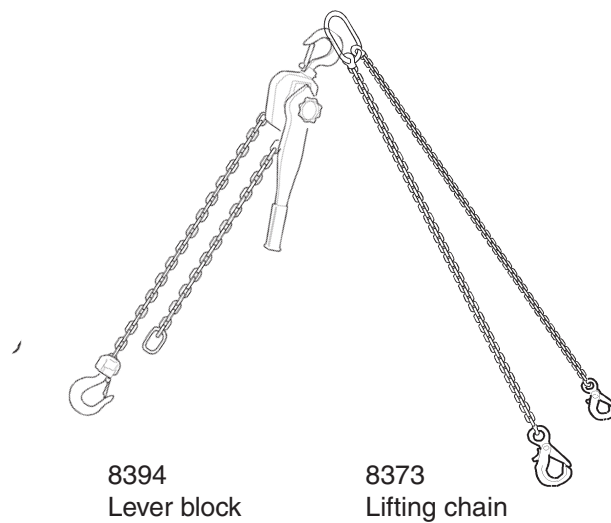
Unscrew the engine bracket bolt left and right hand side.



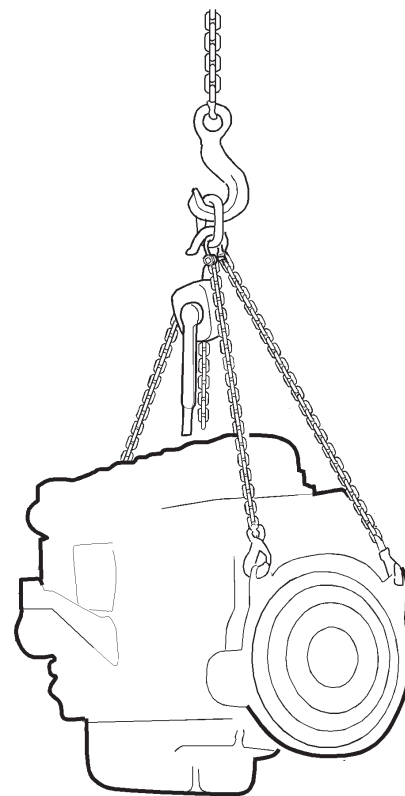
Lifting the engine

Note:

The engine lifting eyes are designed for lifting the engine only, not the engine together with its ancillary equipment (alternator, gearbox etc.) or fram



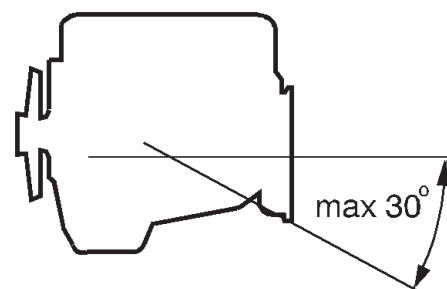
- Fasten the lifting chain 8373 to the rear lifting eyes.
- Fasten the lever block 8394 to the front lifting eye.



With attention, lift the engine out from the frame

Note:

The lifting eyes are sized to cope with a maximum angle of 30°.



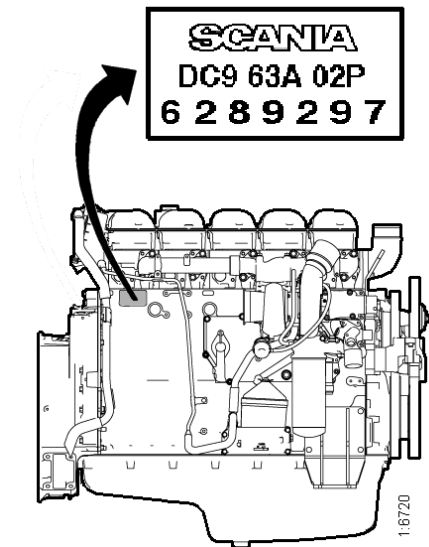
Engine identification

The engine designation indicates, in the form of a code, the type of engine, its size and applications, etc.

The type designation and engine serial number are indicated on a type plate affixed to the right-hand side of the engine.

The engine number is also stamped on the engine block immediately above the type plate.

Refer to the illustration.



Type

DC Supercharged diesel engine with air-cooled charge air cooler.

Displacement in whole dm³

Performance and certification code

Indicates, together with the application code, the normal gross engine output.

The actual output setting of the engine is indicated on the engine card.

Application

A For general industrial use

Variant 01-99

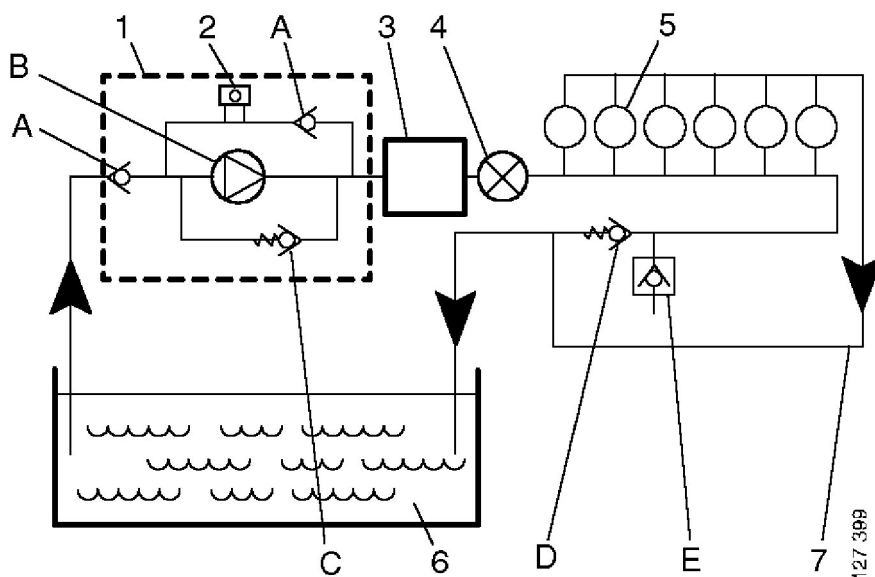
Type of regulator

P EMS engine management system with PDE and S6

Fuel system

Schematic diagram of the fuel system

- 1 Feed pump
- 2 Hand pump
- 3 EMS control unit
- 4 Fuel filter
- 5 Cylinders
- 6 Fuel tank
- 7 Return line for excess fuel
- A Check valve
- B Gear pump (feed pump)
- C Safety valve
- D Pressure relief valve
- E Drain nipple

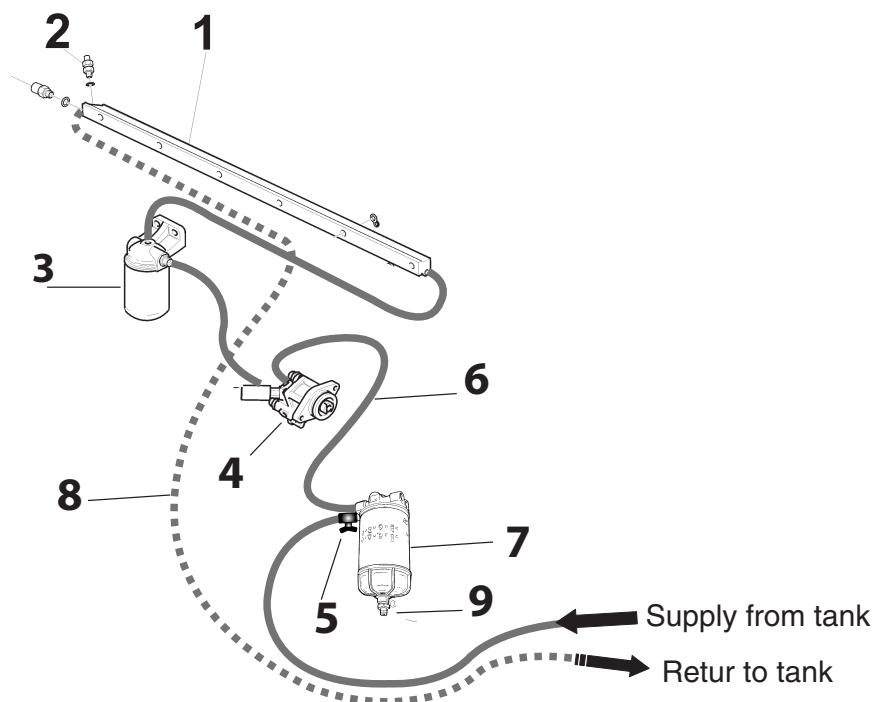


Overflow valve

The purpose of the overflow valve is to limit the pressure in the fuel system and continuously vent it. The overflow valve ensures that the fuel circulates round the system and that there is always fuel in the injection pump for cooling, lubrication and injection.

Opening pressure is **0.6 - 0.8 bar**.
Working pressure is approx. **1 bar**.

- 1 Fuel rail
- 2 Pressure relief valv
- 3 Fuel filter
- 4 Feed pump / hand pump
- 5 Shut-off cock
- 6 Oil hose water filter - feedpump
- 7 Water separating prefilter
- 8 Retur line
- 9 Drain valve

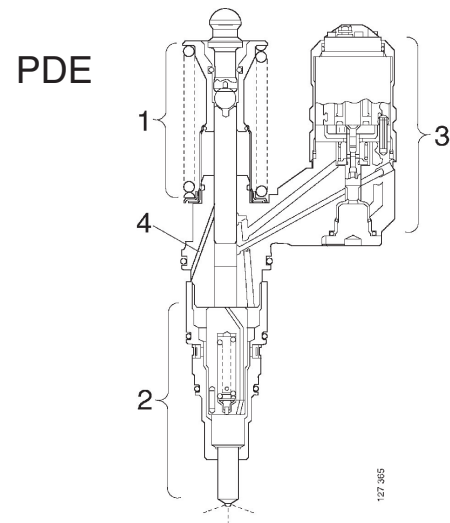


General

Apart from fuel lines and a fuel tank, a PDE (Pumpe-Düse-Einheit) fuel system with unit injectors consists of the following items:

- a feed pump
- a hand pump
- a fuel filter
- one fuel rail.
- a pressure relief valve
- One PDE type unit injector per cylinder.

The fuel system also includes an electronic control system. The control system includes an electronic control unit, the unit injector solenoid valves and sensors.



FUEL

Diesel fuel oil

The composition of the diesel fuel oil has a great influence on the functioning and the service life of the engine and the injection system.

The engine output and exhaust emissions are also dependent on the fuel quality.

The diesel fuel must meet European standard EN 590.

The table below shows the requirements for some of the most important properties:

Property	Requirement
Viscosity at 40°C	2.0 - 4.5 mm ² /s (cSt)
Density at 15°C	0.82 - 0.86 kg/dm ³
Sulphur (concentration by mass)	max. 0.3%
Ignitability (CET rating)	min. 49
Flashpoint	56°C

Environmentally favourable fuels (low sulphur fuels)

There are three classes of so called environmentally favourable fuels (SS15 54 35).

Class 1 is sulphur-free and class 2 is low in sulphur. Compared with class 3 (normal fuel), these fuels are less dense and this reduces engine power output.

Fuel filter

Design

Fuel filter are of single-mounted type. The filter screw on to a retainer which is bolted to the engine.

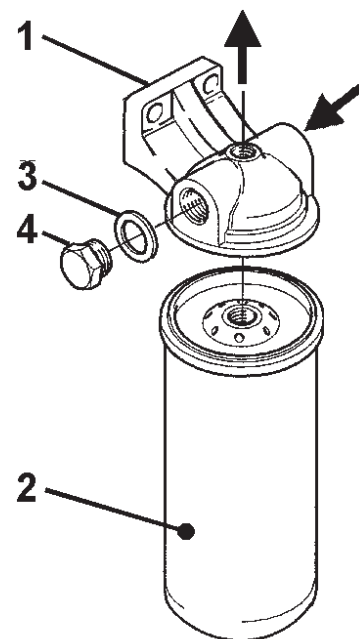
The filter consists of a metal container with a folded paper element. The filter cannot be dismantled but must be changed as a complete unit.

The fuel filter has no bleed screw and is bled by undoing plug 4 in the free inlet passage.

Function

Fuel is pumped into the inlet by the fuel pump. It then continues through passages in the filter retainer to the upper part of the filter, down through the filter or filters and on to the outlet passage. From there, the fuel is piped to the injection pump.

- 1. Filter retainer
- 2. Filter
- 3. Gasket
- 4. Plug



Fuel filter, constituent parts

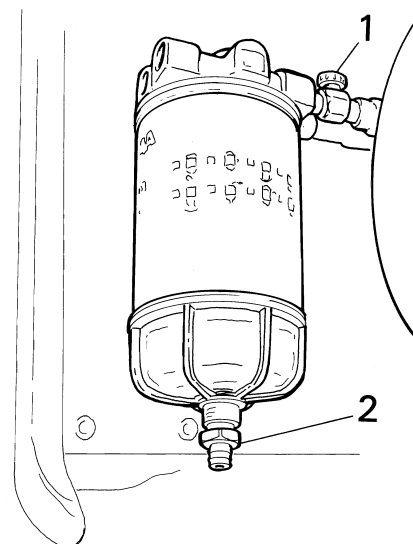
Water separating prefilter

Note:

Close the shut-off cock when renewing the filter.

The same intervals between changes apply as for those for an ordinary fuel filter.

- 1 Shut-off cock
- 2 Drain valve



Temperature dependence of diesel fuel

At temperatures lower than those specified for the diesel fuel, paraffin wax may precipitate from the fuel and block filters and pipes. The engine can then lose power or stop. The diesel fuel is adapted for use in the specific climate of each country. If a vehicle or an engine is to be operated in a temperature zone with lower temperature than normal, first identify the temperature properties of the fuel concerned.

The properties of the fuel when cold can be improved by adopting one of the following measures before the temperature drops:

- If the fuel concerned cannot cope with the expected temperatures, and diesel fuel is not available with the correct temperature properties, we recommend that an electric fuel heater is installed **as a preventative measure**.

- The low temperature properties of diesel fuel may be improved by adding kerosene **as a preventative measure**. A maximum of 20% may be added. When refuelling, the kerosene should be added first, so that it mixes thoroughly with the diesel fuel.

Note:

It is prohibited to use kerosene in engine fuel in some countries.

- To prevent water in the fuel from freezing and forming ice, a maximum of 0.5-2% alcohol (isopropanol) may be added.

Drain fuel tanks and drain or change fuel filters regularly.



Warning

It is not permitted to mix kerosene with diesel fuel that is already adapted for the climate concerned. This can damage the PDE injectors. All use of paraffin other than kerosene is forbidden, as it causes engine damage.

! Important

It is not permissible to mix petrol with diesel fuel. In the long term, petrol may cause wear to the PDE injectors and it may also cause damage to the **engine**.

Feed pump

The feed pump 1 draws fuel from the fuel tank and forces it through the fuel filter 3 and into the fuel rail 4.

On the feed pump there is a hand pump 2.
The hand pump is used to vent air from the fuel system.

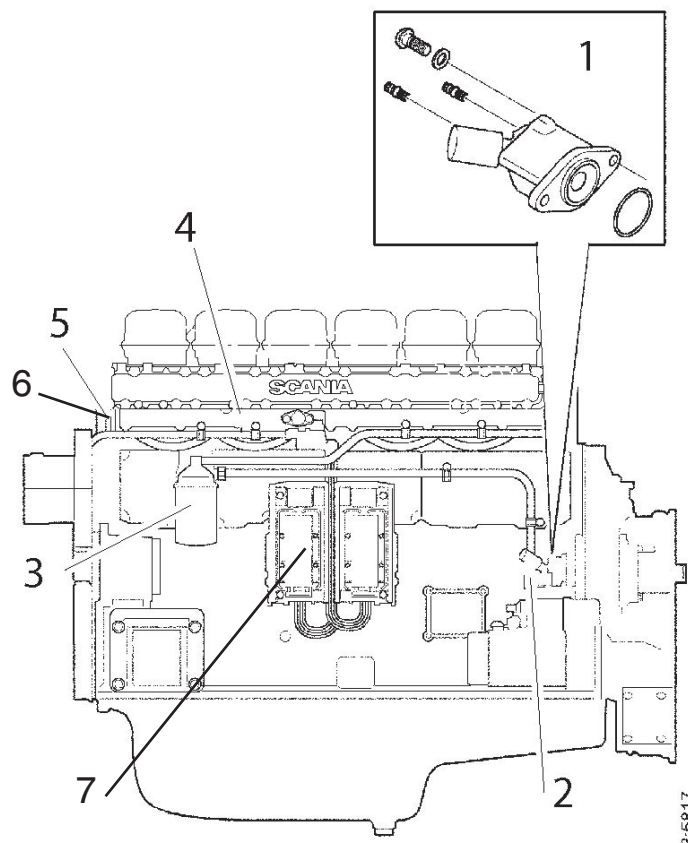
On the fuel rail there is a pressure relief valve 5.
The pressure relief valve constantly regulates the fuel pressure. When the pressure is too high, the pressure relief valve opens, so that the excess fuel is returned to the fuel tank.

The fuel rail distributes the fuel to the unit injectors in each cylinder head.

The ECU control unit determines when the unit injectors must inject fuel into the cylinders.

Feed pump renewal

- 1
Clean the outside of the feed pump.
Remove the suction and pressure lines from the feed pump.
Fit protective plugs.
- 2
Unscrew the bolts and remove the feed pump.
- 3
Place a new O-ring onto the feed pump and lubricate with O-ring grease.
- 4
Fit the feed pump.
- 5
Connect the suction and pressure pipes.
- 6
Bleed the fuel system; refer to *Bleeding the fuel system*.
- 7
Start the engine and check for leaks.



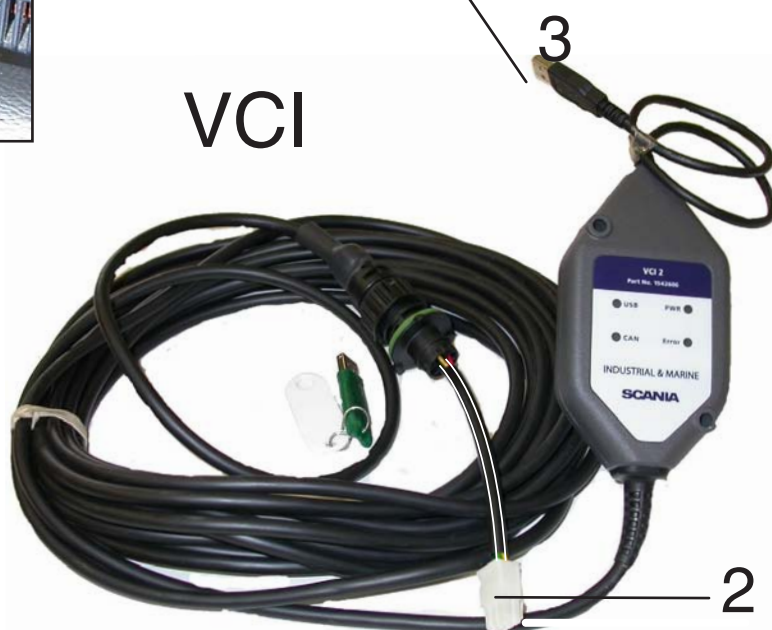
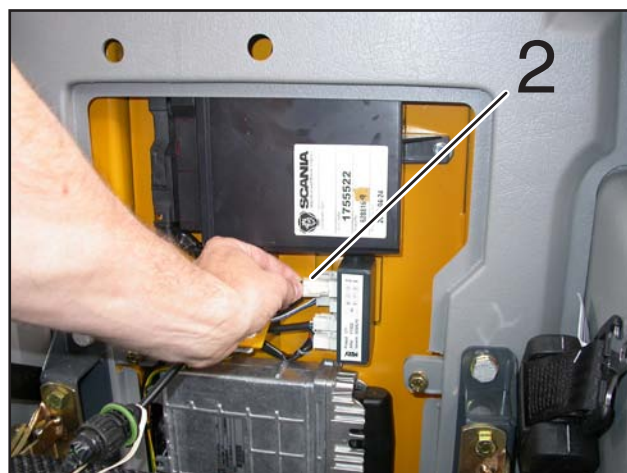
- 1 Feed pump
- 2 Hand pump
- 3 Fuel filter
- 4 Fuel rail
- 5 Pressure relief valve
- 6 Bleeder nipple
- 7 ECU control unit

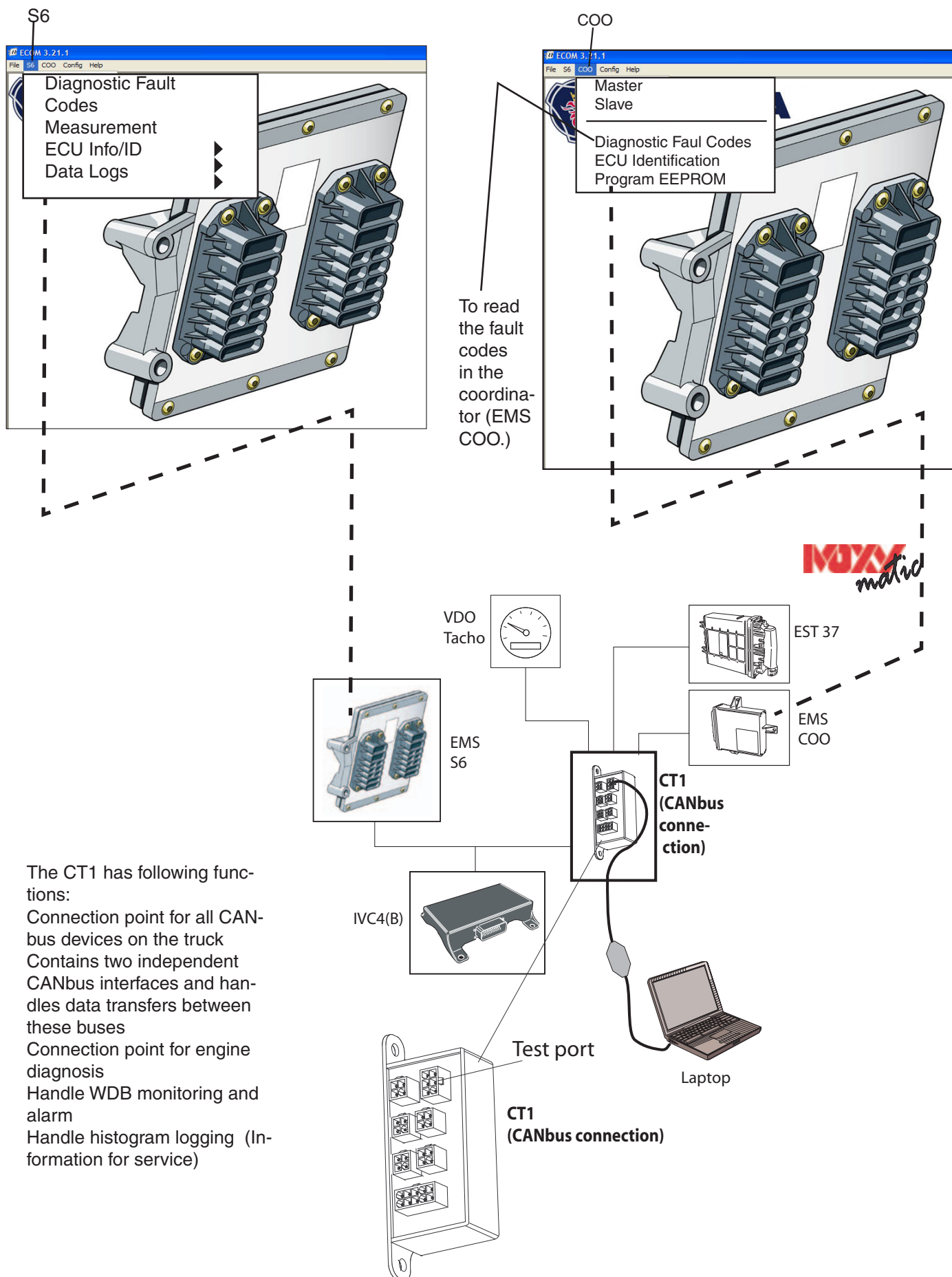
Diagnostic prosedure

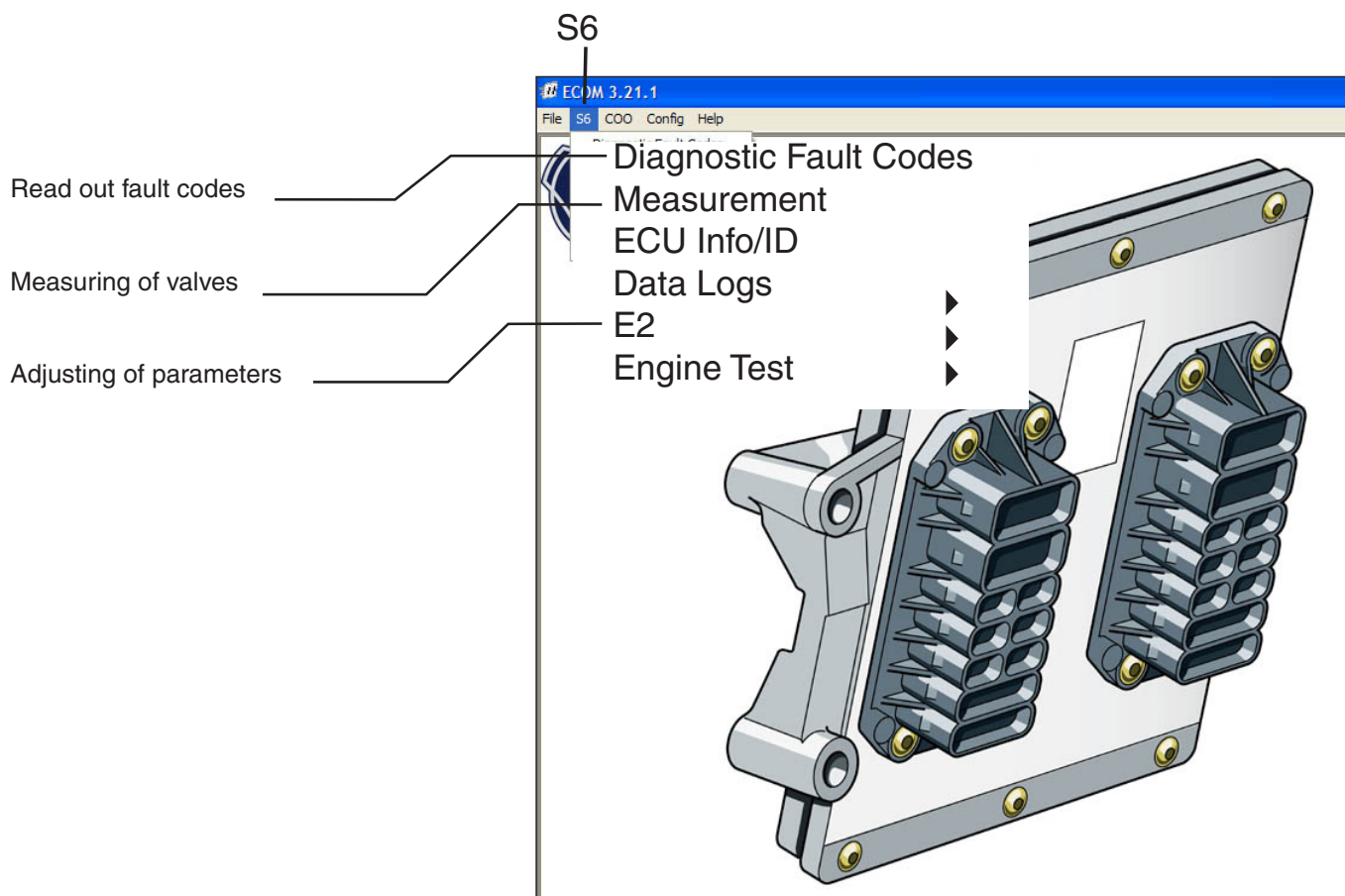
Use of diagnostic kit, machine

Install the VCI (ECOM programming unit)
Moxy No.513376

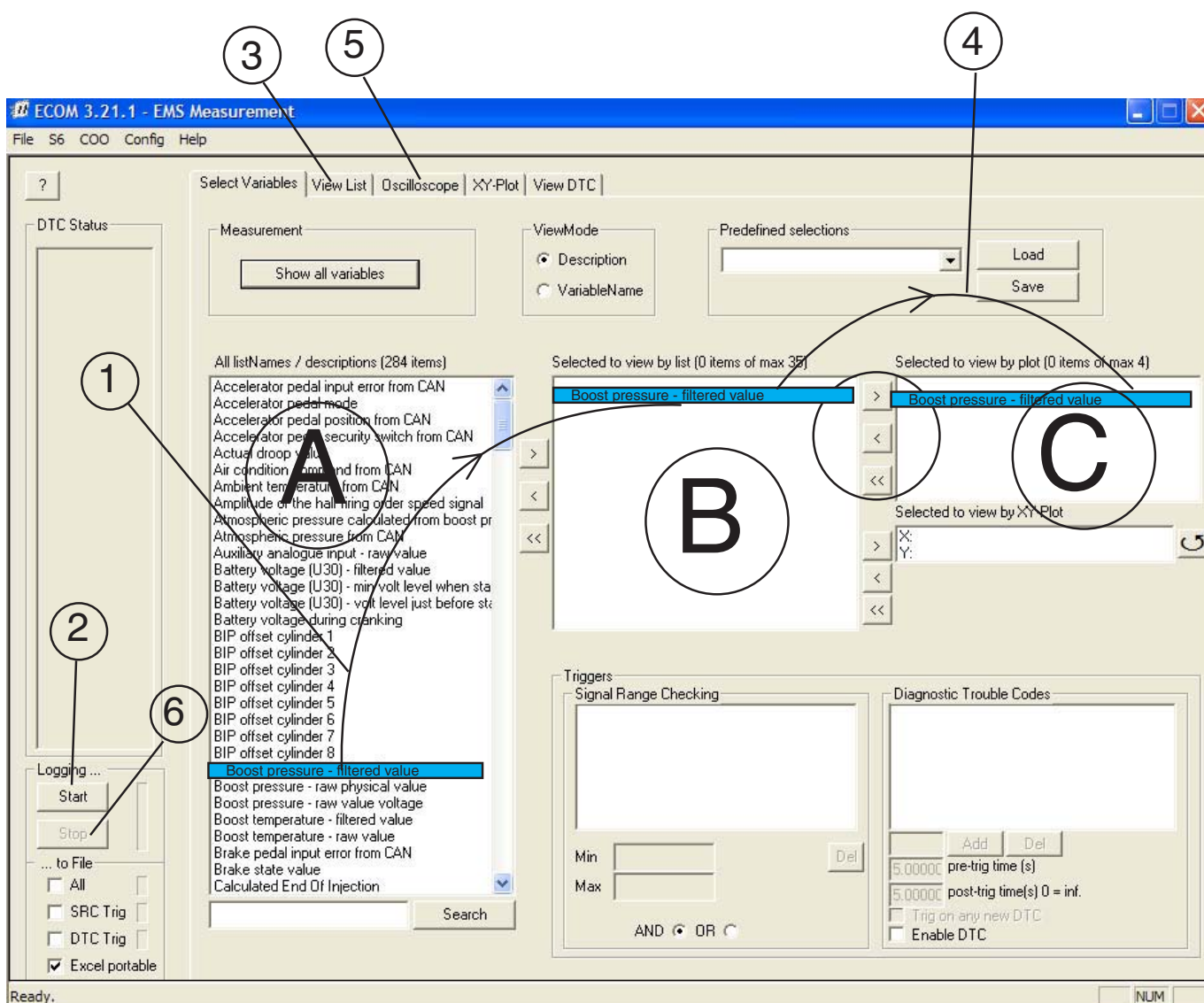
1. Switch on the laptop.
2. Connect the cabel end (1) to the CT1 unit
3. Connect the USB plug (2) to the Laptop
4. Put in the USB key
5. Switch on the ignition key (If read the setting parameters)
6. Start the engine. (If controlling of the parameters)
7. Start on Laptop the engine ECOM program







Measurement



1. Move text line from the A section to B
2. Start the logging by the start button
3. Select "View the list" to watch the values or -
4. Move text line to section C
5. select the "Oscilloscope" to view the graphical diagram
6. Stop logging to select new variable

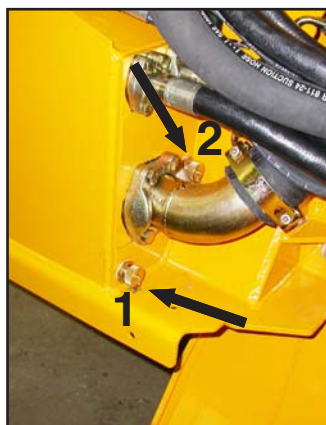
Drain both hydraulic oil reservoirs, see chapter 7 maintenance - 2000 hour service in the Operating & Maintenance Manual.

- 1 Main reservoir
- 2 Emergency steering reservoir

(Oil capacity approx. 190-200 l.)

NOTE:

See in the hydraulic chapter about the filling procedure.



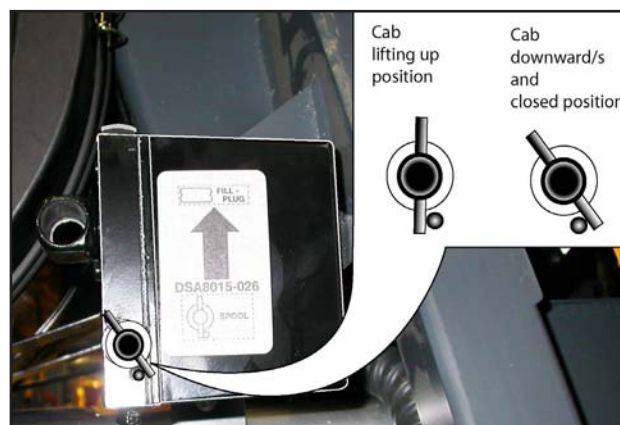
Tilting the cab:

Open the bonnet and take away the cab bolt, left and right hand side.

Nv 46 mm



Turn the direction valve on the pump in lifting up position.

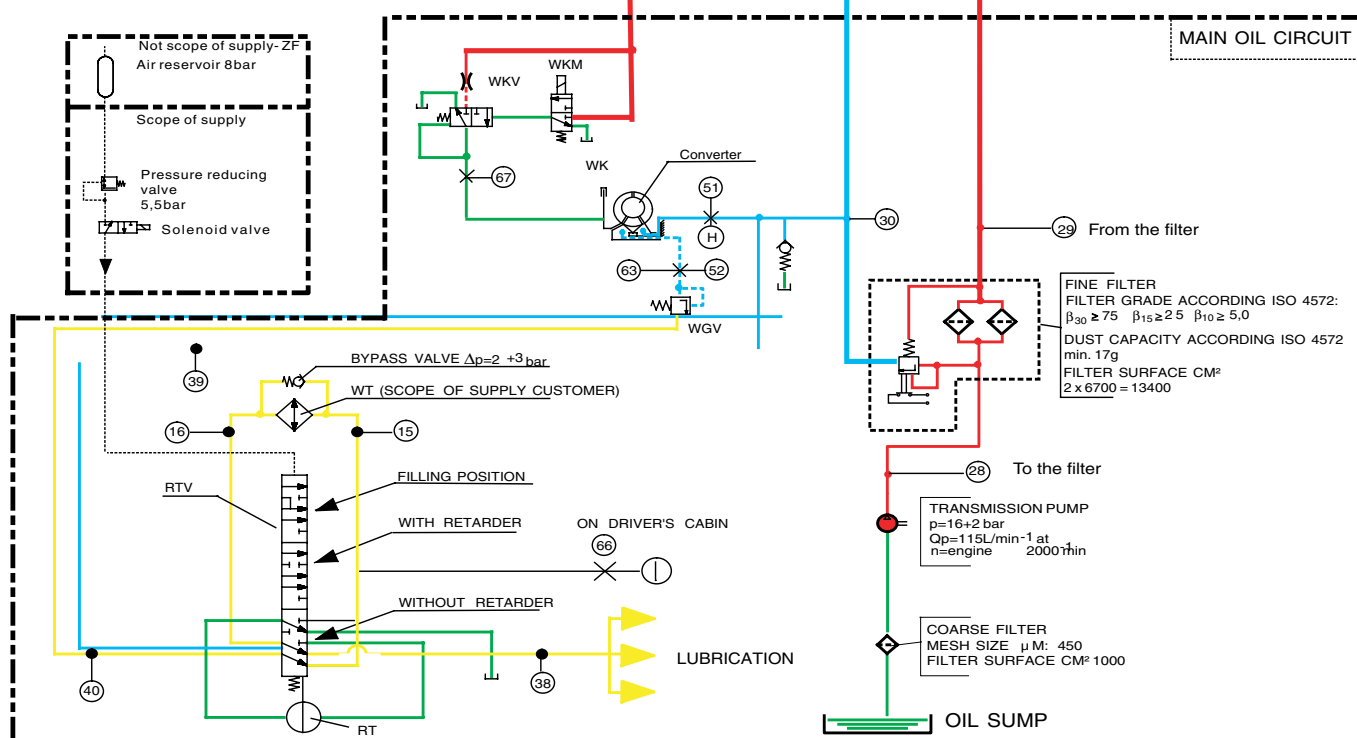


With the handle, pump and raise the cab.

When lower the cab, turn the direction valve to the down position and with the handle lower the cab.



- = Main pressure
- - - = Regulated main pressure
- = Pilot pressure
- = Converter input pressure
- - - = Converter output pressure
- = Lubrication
- = Return into the sump



Oil O-rings and piston bearing surfaces.
Uniformly insert K2-piston until contact is obtained.



Pay attention to the installation position of the piston, see figure!



Figure 279

Introduce intermediate plate and compression spring.



Figure 280

Lay guide ring with the chamfer (arrow) showing upwards over the compression spring and line up snap ring.

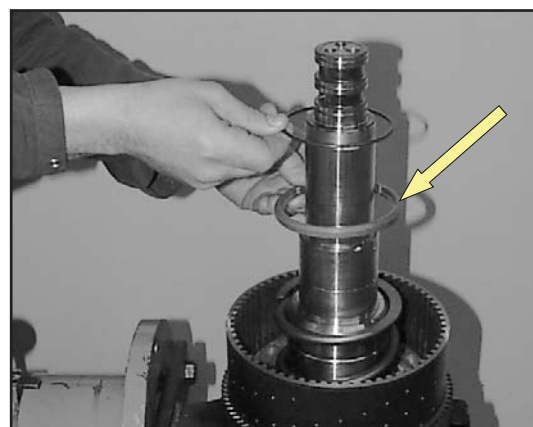


Figure 281

Lift plate carrier out of the clamping ring (S).

Pre-load compression spring by means of special device (S) and squeeze snap ring into the annular groove of the plate carrier (arrow), see Figure 282!

(S) Pressure piece

504211



Analogously install purge valve, piston and compression spring on the opposite side (KR-clutch) (see Figure 277-282)!

Now, lift plate carrier with the KR-side showing downwards into the clamping ring (S) and fix it.

Tilt plate carrier by 180°.

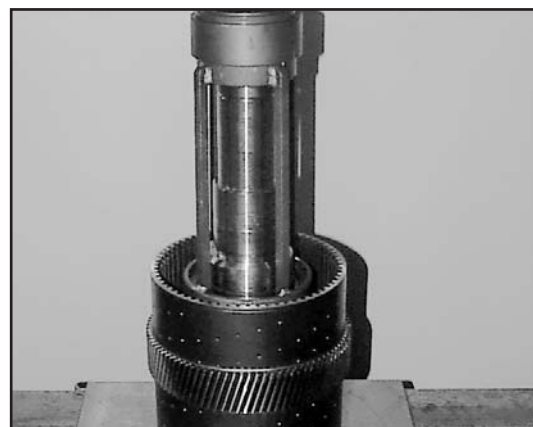


Figure 282

Park brake pressure control / adjusting

Secure the wheel with blocks.
 Stop the engine and check the function:
 Turn of the main circuit switch.
 The park brake is now activated.

NOTE

The park brake switch is now in off-position.

Start the engine, activate and deactivate the park brake with the switch.

Connect the manometer and read the pressure on the manometer when the brake switch are in off position.

Correct value is 135 bar

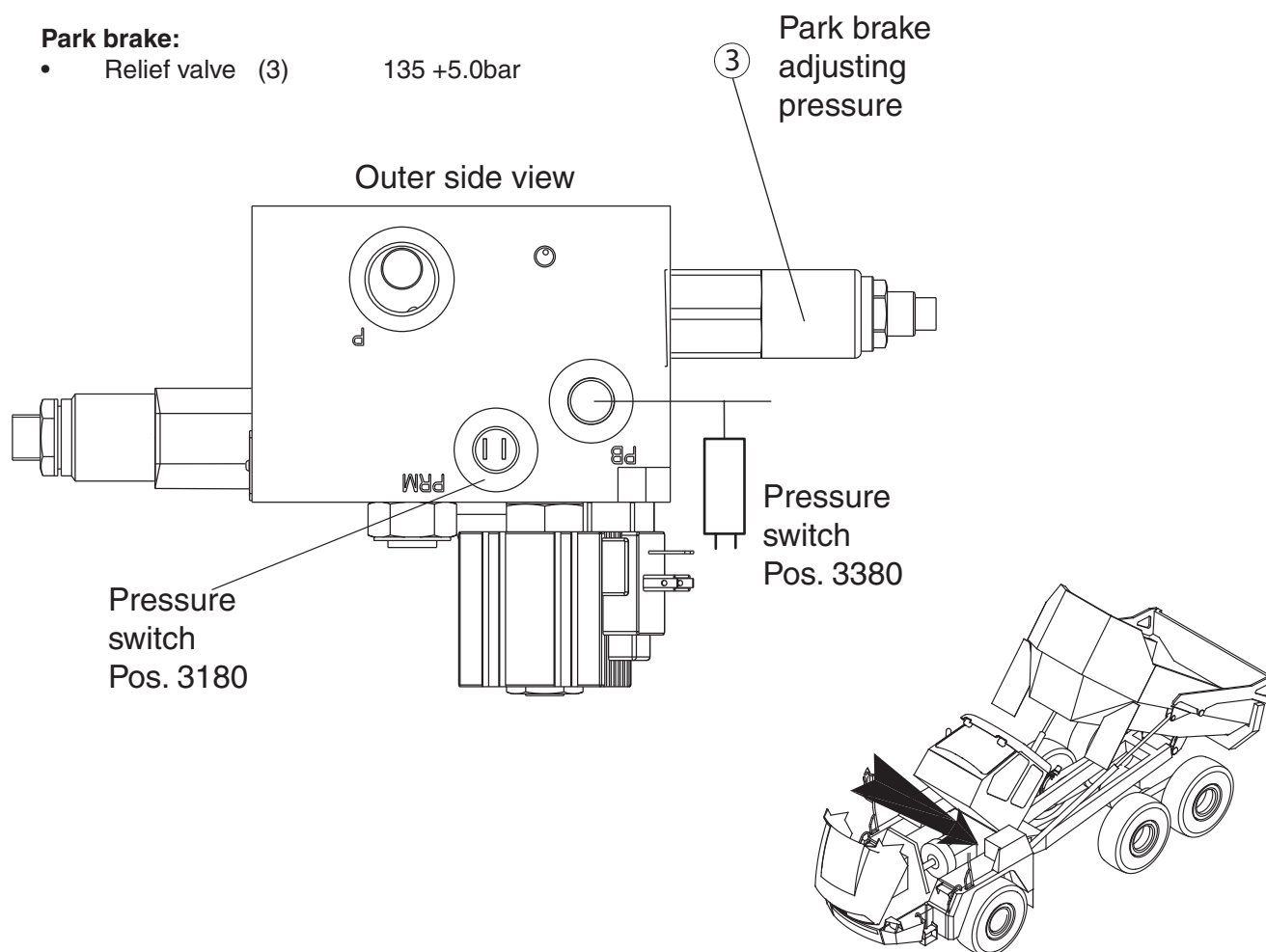
If lower, adjust on the accumulator valve park brake adjusting pressure (135 +5.0 bar) (3)

The warning light coming on when pressure is lower than 110 bar.



Park brake:

- Relief valve (3) 135 +5.0bar



Transmission:

156 Main connector for transmission.

Data for the Proportional valves in the shift control unit:
Measure point:

Connector pos 156

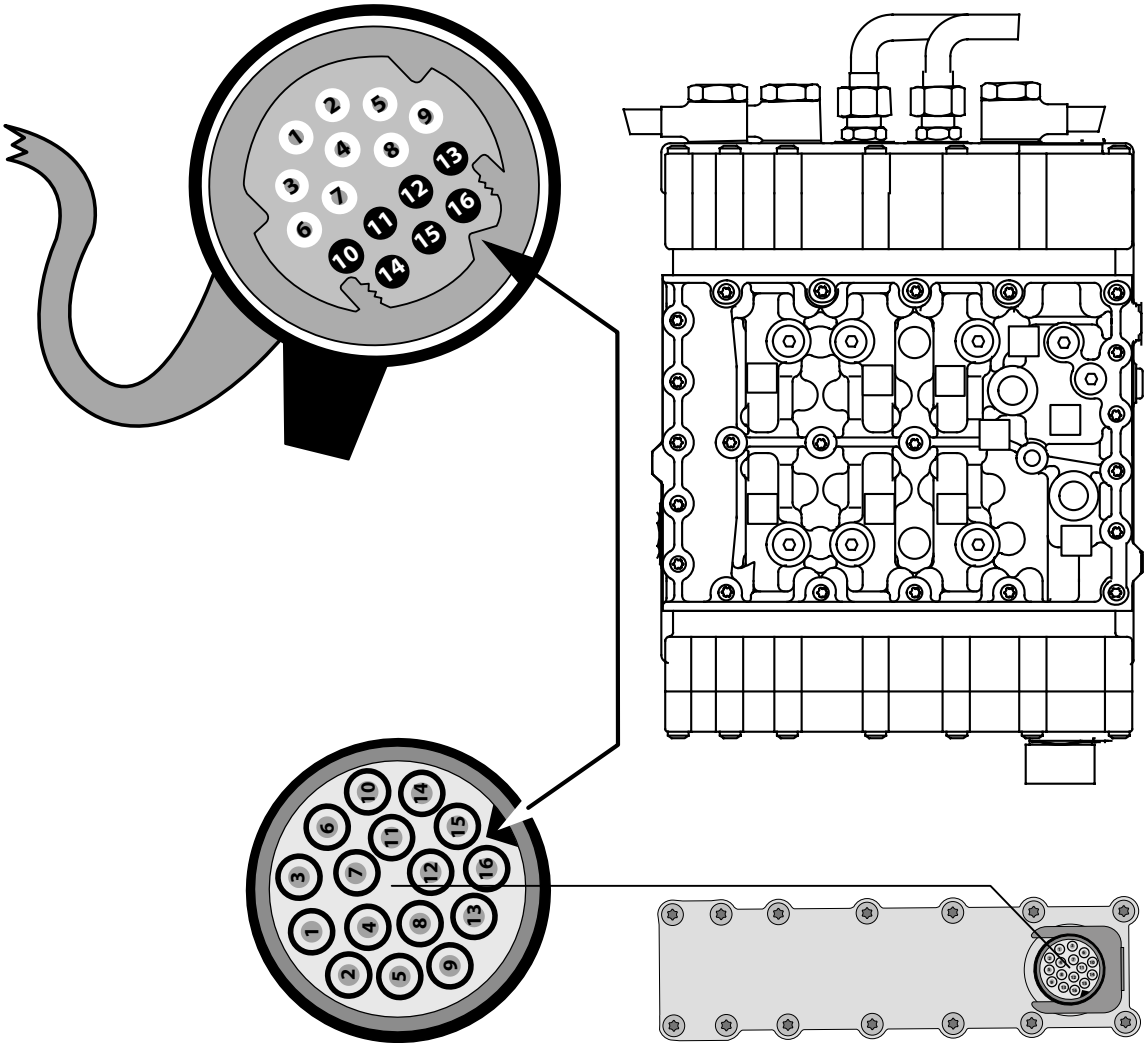
Resistance:	19Ω 10 % at 20 °C
Current:	100 to 500 mA
Pressure range:	0,8 bar to 8,3 bar

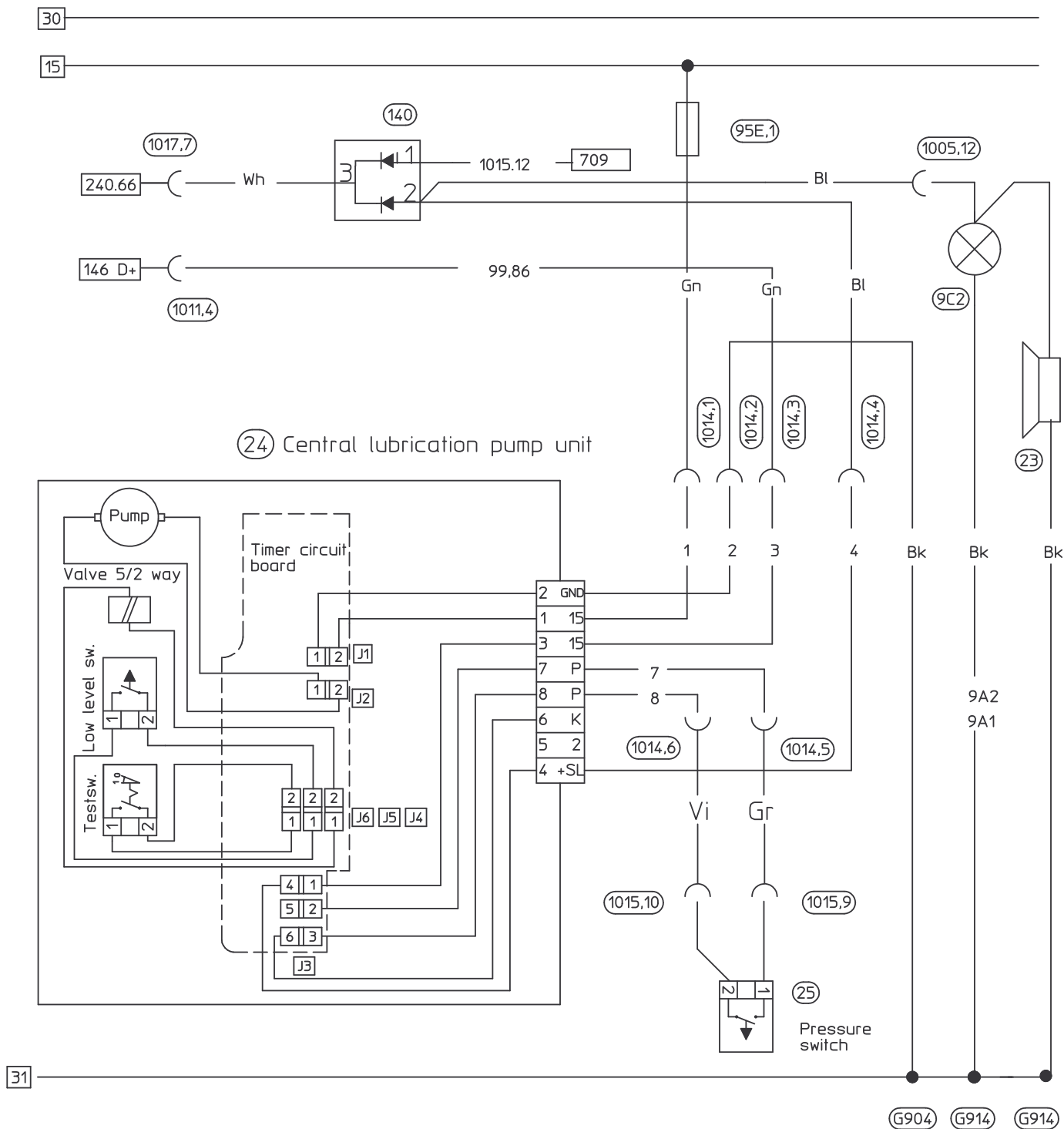
Operating unit	Connect with	Wiring to
Valve Y1	Pos 7 and 1	240 No. 10
Valve Y2	Pos 7 and 2	240 No. 56
Valve Y3	Pos 7 and 3	240 No. 32
Valve Y4	Pos 7 and 4	240 No. 55
Valve Y5	Pos 7 and 5	240 No. 09
Valve Y6	Pos 7 and 6	240 No. 51
Supply peripherals switchable 1	Pos 1 - 7	618 No. 01
Input resistance/temperature sensor 1	Pos 8	240 No. 39
Input resistance/temperature sensor 2	Pos 9	1017 No. 05

Sensor, sump temperature

Restance:
Measure point:

1 kΩ to 1,5 kΩ
Connector pos 156 between 8 and 9



Circuit 28 Central lubrication, Groeneveld

7.3.1 Articulation Bearing

To measure the wear on the articulation bearing, place the truck on level ground, with front and rear frame in line. For axial measurement place a dial indicator on the articulation bearing as shown in figure 7.10. Open the bonnet and the lift the front wagon in the lifting points with 800 kp. Read the dial indicator. Acceptable value max. 1.0 mm.

For radial measurement, place the dial indicator as shown in figure 7.11. Using a floor jack, lift the rear wagon in the articulation hinge with approx. 2000 kp. Read the dial indicator. Acceptable value max. 1.0 mm.

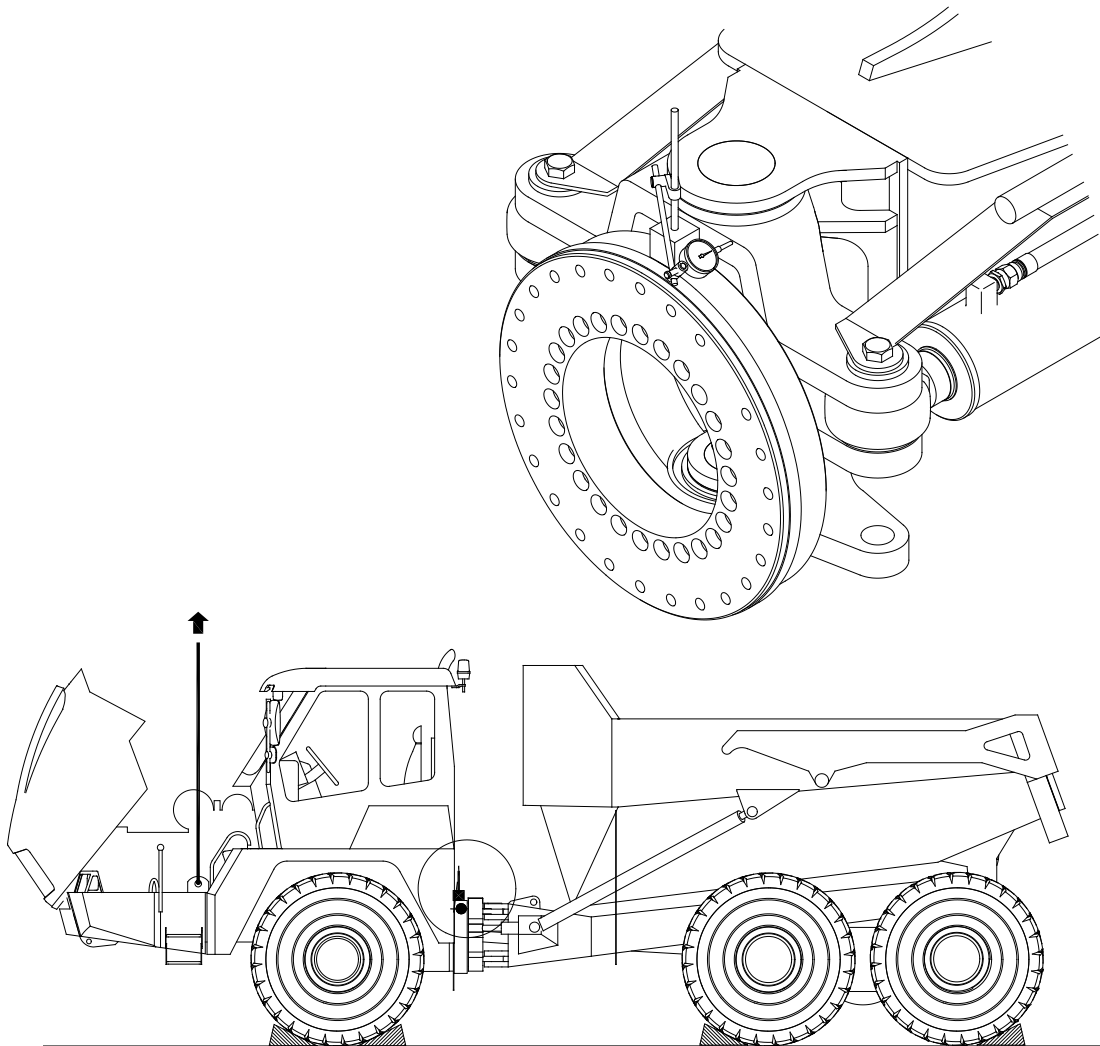


Fig 7.10 Articulation Hinges System Vertical Check

9.3 Cab Hydraulic Tilting Unit

The hydraulic tilting unit makes tilting of cab safe and easy, by means of a manual hydraulic pump and cylinder.

Removal

Thoroughly clean the cab tilting unit and the area around for accumulated dirt.

Tilt the cab and place on safety stand. (Ref. Operation & Maintenance Manual 2.20)

Cylinder

Remove the nuts from the bolts securing the hydraulic cylinder. Use the manual pump to adjust the cylinder to a position where the bolts easily can be removed.

Unscrew the nuts securing the bolts.

Place a container below to catch any hydraulic oil spilt during removal.

Disconnect the two hydraulic hoses. Remove the bolts, and remove the cylinder.

Pump

Place a container below to catch any hydraulic oil spilt during removal. Disconnect the two hydraulic hoses.

Unscrew the two bolts securing the pump to the bracket and remove pump.

To remove the hydraulic hoses remove securing strips and clamps, and pull out.

Installation

Position the pump in the mounting bracket, and secure with two bolts.

Route and strap the hoses as when removed, and connect them to the pump.

Secure front end of cylinder to the front frame, and connect the hoses.

Fill pump with oil. (Ref. Operation & Maintenance Manual 6), and bleed the system.

Check that the movement of the cylinder is according to marking (Up/Down)

Adjust cylinder length to align with the cab bracket, install bolt and nut and tighten.

Control

Check that all parts are located as before removal.

Rise the cab to remove safety stand, and lower to normal position.

(Ref. Operation & Maintenance Manual 2.20)

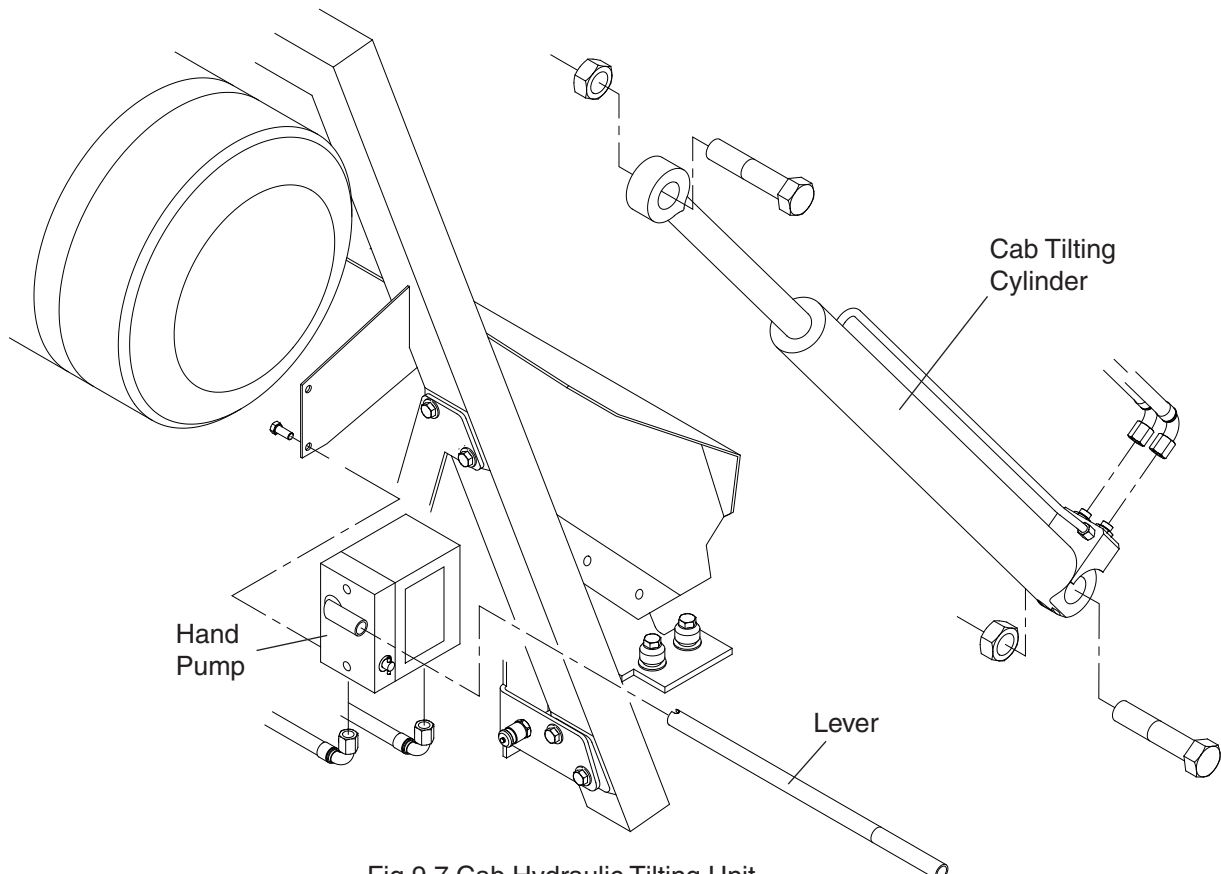


Fig 9.7 Cab Hydraulic Tilting Unit

Technical Data, continuation

Electrical connection VDC

Observe the safety instructions (page 6) and the technical data (pages 37 and 38)!

- Make sure of the connection and the type of construction of your P223, 233.
- Connect the electrical wires according to the following electrical connecting diagrams.



6001a02

NOTE

For connection of the low-level control observe the respective connection diagrams and contact protective measures (see fig. 37, page 22).

