

Document Title: Description	Function Group: 000	Information Type: Service Information	Date: 2014/5/12
Profile: WLO, L180E [GB]			

Description

The L180E is a four-wheel drive wheel loader with articulated frame steering.

The L180E has a six-cylinder, direct-injected, four-stroke, turbocharged diesel engine of type D12C.

The hydraulic transmission, HTE220, is hydromechanical with all gear wheels in constant mesh.

Between the engine and transmission, there is a single-stage hydraulic torque converter.

Front and rear axles have fully floating drive axles with planetary gears in the hubs. The front axle is equipped with a differential lock.

The parking and service brakes of the machine are wet multi-disc brakes. The parking brake is positioned on the output shaft in the hydraulic transmission and the service brakes are built into each wheel hub.

The steering system is hydrostatic with a variable load-sensing axial piston pump and two hydraulic cylinders (steering cylinders).

Hydraulic system, see Section 9.

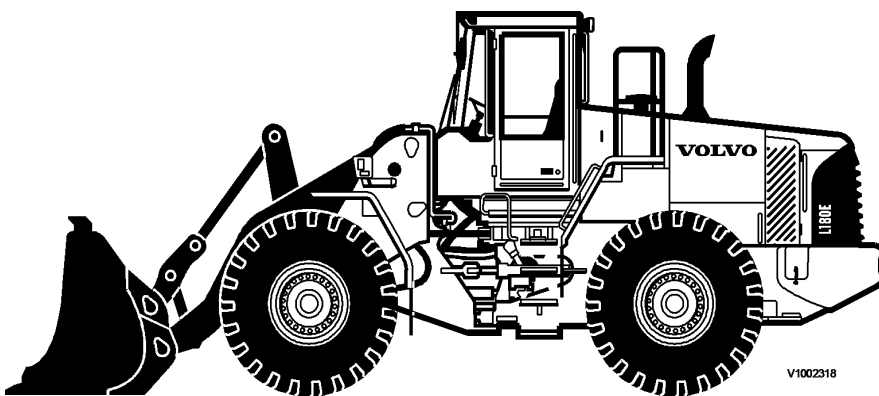


Figure 1
L180E wheel loader

Figure 1

Entering/leaving the machine

- Always wear a hard hat, protective goggles, gloves, work shoes and other safety items that your work requires.
- Avoid standing in front of or behind the machine when the engine is running.
- Always use a rubber window scraper or brush with a long handle when cleaning the outside of the windows in order to avoid unnecessary climbing on the machine.
- When servicing the machine, i.e. changing light bulbs, a ladder may be needed.
- Make sure that stepping surfaces, service areas, handles and slip-protection are clean and free from oil, diesel fuel, dirt and ice and that they're replaced if they are defective or missing.
- Check at regular intervals that all slip-protection is firmly attached. If not, these shall be attached or replaced.
- Always face the machine and use the steps and handrails when entering or leaving the machine. Use two hands and one foot, or two feet and one hand. Do not jump!

Before operating

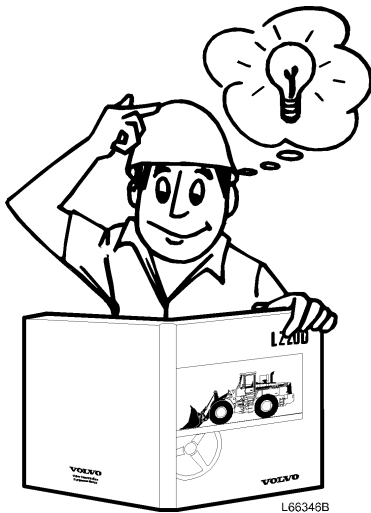


Figure 2

Read the Operator's Manual, plates and instructions before you operate the machine.

- Read the Operator's manual before you operate the machine! Follow the instructions for operating and perform the indicated recommended actions before operating.
Some important rules below:
- Perform a control light test before starting the engine by turning the ignition key to position I, see Operator's Manual.
- Perform all safety checks prescribed in the Operator's manual.



WARNING

Never operate the machine if you are tired or under the influence of alcohol, medicine or other drugs.

- Before starting the engine indoors, make sure that the extraction capacity of the ventilation system is sufficient. The machine is equipped with a diesel engine and the exhausts may be hazardous to your health. Make sure that ventilation is sufficient, and avoid running the engine indoors for longer than necessary where ventilation is insufficient.
- Read all plates and instructions on the machine and in the Operator's manual before you operate or perform service on the machine. Each one of these contains important information regarding safety, handling and service.
- Use the seat belt during all operation.
- Always sit in the operator's seat when you start the engine.
- The machine must be fully functional before it's put into operation, that is, all defects that may cause eventual accidents must have been repaired.
- Never operate the machine for long periods without ventilation, or with a completely closed cab without the fan on (to avoid lack of oxygen).
- Only step and stand on surfaces with slip-protected treads and hold on to the available handles and handrails.

Hip-type seatbelt

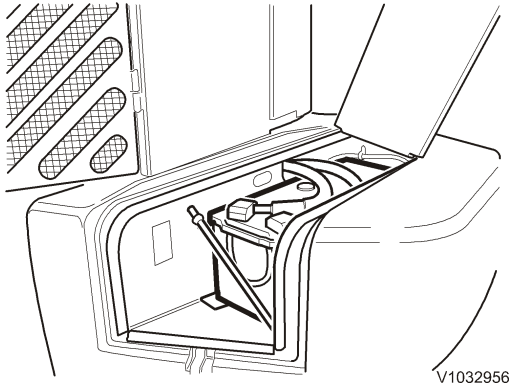


Figure 5
Battery box, left side (principle illustration)

! WARNING

Open the expansion tank cap slowly and carefully. The cooling system operates at high pressure and hot coolant may rush out and cause severe burns.

Cooling system, checking level

7. Level check

Fill coolant in the expansion tank.

NOTE!

Use genuine Volvo coolant.

The coolant level shall be between max. and min.

Filling

1. The engine shall be run warm and the temperature control shall be set to "warm".
2. Let the engine cool down.
3. Fill coolant up to the max. marking on the expansion tank.
4. Run the engine warm and top up so that the cooling system is completely filled and bled free from air.

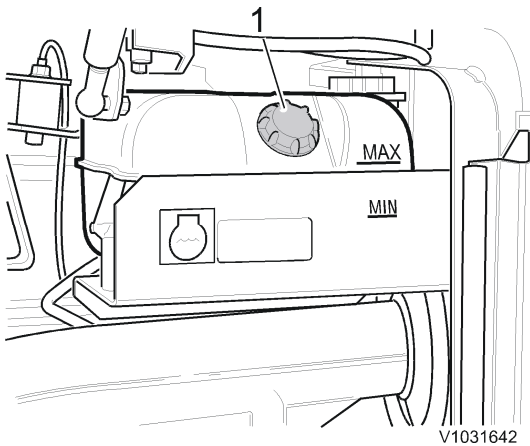


Figure 6
Coolant level

1. Cap

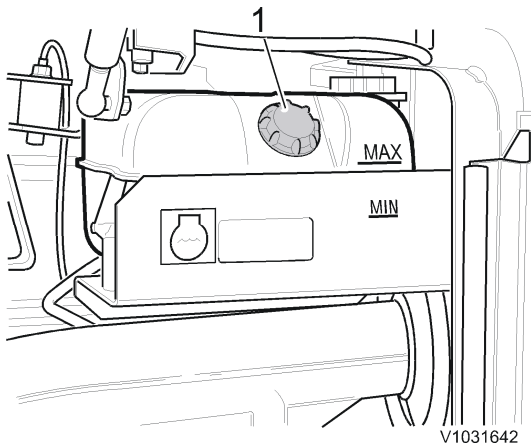


Figure 23
Coolant level

1. Cap

29. Freezing point, check

Check the freezing point with a glycol tester at the expansion tank. The glycol tester's value should show approx. $-38\text{ }^{\circ}\text{C}$ ($-36\text{ }^{\circ}\text{F}$).

The machine is delivered with a coolant mixture of 50% glycol and 50% water for optimal cooling and corrosion characteristics. That is why the same coolant mixture shall be filled, regardless of ambient temperature conditions.

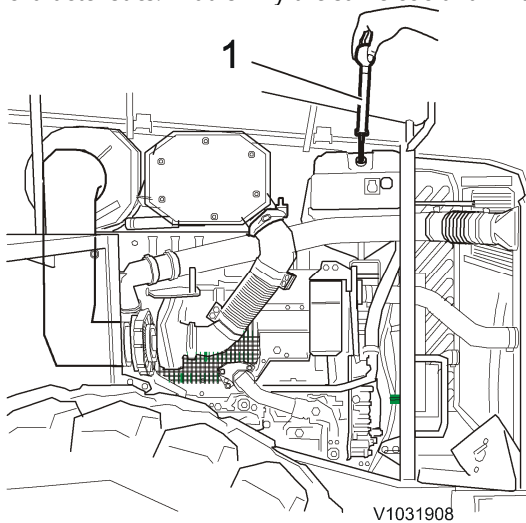


Figure 24
Coolant check

1. Glycol tester

Leakage

30. Check that all visible gaskets are intact and that they are not exposed to leakage.

Pipes and hoses

31. Check that all pipes and hoses are intact and not deformed.

Air cleaner, changing

32. Secondary filter

Document Title: Unit injector, Delphi, description	Function Group: 237	Information Type: Service Information	Date: 2014/5/13
Profile: WLO, L180E [GB]			

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Unit injector, Delphi, description

Unit injectors, tolerance classification

The unit injectors are manufactured with tolerance classification. Each unit injector is marked with a code (1) on top of the electric connection.

When replacing one or more of the unit injectors, the new codes must be programmed for the cylinder where a unit injector has been replaced. This is done through parameter programming using the service tool VCADS Pro.

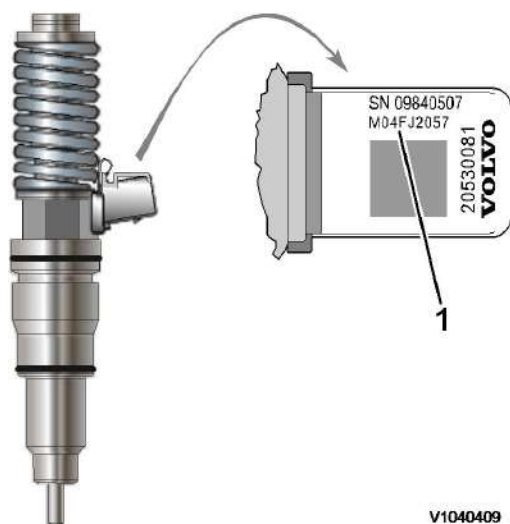


Figure 1

Tolerance classification, unit injectors

1. Position, code

The unit injector consists of three main parts:

1. **Pump part**, which contains cylinder and piston, corresponding to the pump element in an injection pump.
2. **Valve housing**, with an electro-magnetically controlled fuel valve.
3. **Injector part**, with injector sleeve, injector needle and spring.

- Transmission oil temperature
- Hydraulic oil temperature
- Coolant temperature, engine
- Front axle oil temperature
- Rear axle oil temperature

In case of malfunction of request for brake pressure charging, request is considered to exist.

Request is not considered in case the following signals are incorrect:

- Request for pressure test
- Request sound test
- Request for auxiliary brake
- Request for brake pressure charging
- Request for increased pressure for attachment locking
- Request for increased fan rpm at AC

Axle oil cooling fault indicates that the equipment has not been installed.

In case of malfunction of setting of rpm range (A , B) the rpm range is set to C (max. cooling).

In case of malfunction of fan speed in question, the control is adjusted according to cooling need from respective unit without feedback to the current fan speed.

[1]Increased fan rpm is activated at increased pressure in the AC system to increase air flow through the condenser when cooling fan adjustment does not call for cooling.

Document Title: ATTENTION! Reduced Computer Function (J1939)	Function Group: 302	Information Type: Service Information	Date: 2014/5/12
Profile: WLO, L180E [GB]			

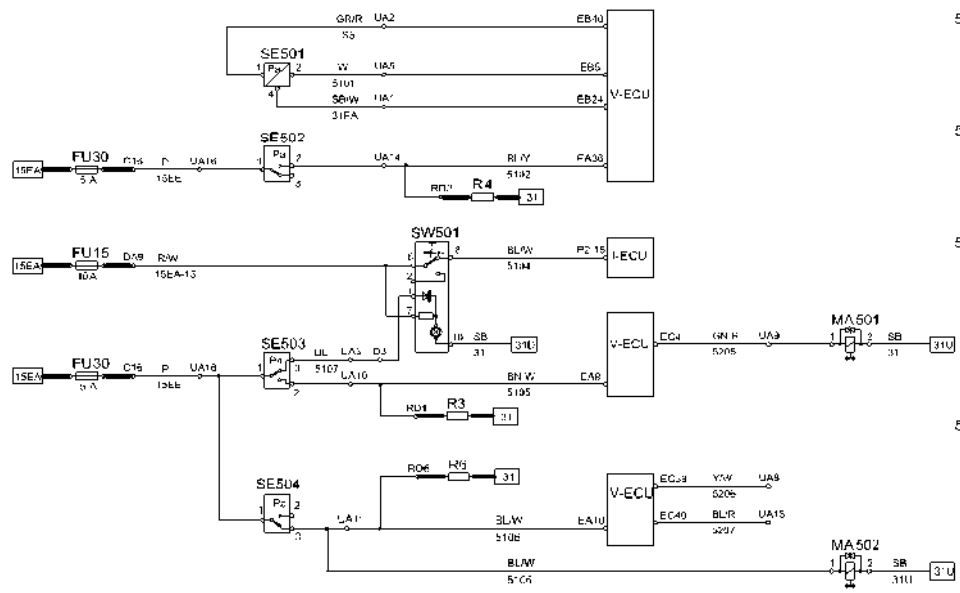
ATTENTION! Reduced Computer Function (J1939)

Component: SAE J1939 Control bus (CAN-bus)	
Function	The control bus is connected to all control units. The system's control signals are sent on the control bus.
References	<ul style="list-style-type: none"> ○ 301 Reduced computer communication ○ 370 Wiring diagram 24 etc.
Tools	<ul style="list-style-type: none"> ○ 302 Multimeter 981 2519 ○ 302 Multi-pin breaker box 999 8699 ○ 302 Extension cable 999 0062 ○ 302 Adapter cable 951 1355 alt. ○ 302 Adapter cable 999 8505
<p>IA, service socket for service display unit IB, service socket for VCADS Pro service tool</p>	

Malfunction detection conditions
Data bus CAN/J1939 or J1708/J1587 not working.

Type of error/malfunction	Symptom	Possible cause
	<ul style="list-style-type: none"> ○ Error message ○ Red central warning ○ Function Safety mode ○ The machine can only be operated in 1st and 2nd gear on both travel 	<ul style="list-style-type: none"> ○ Data bus open circuit. ○ Data bus short-circuit to voltage or ground. ○ Data bus internal short-circuit in cable harness.

SCH15B



5 010

5 020

5 045

5 050

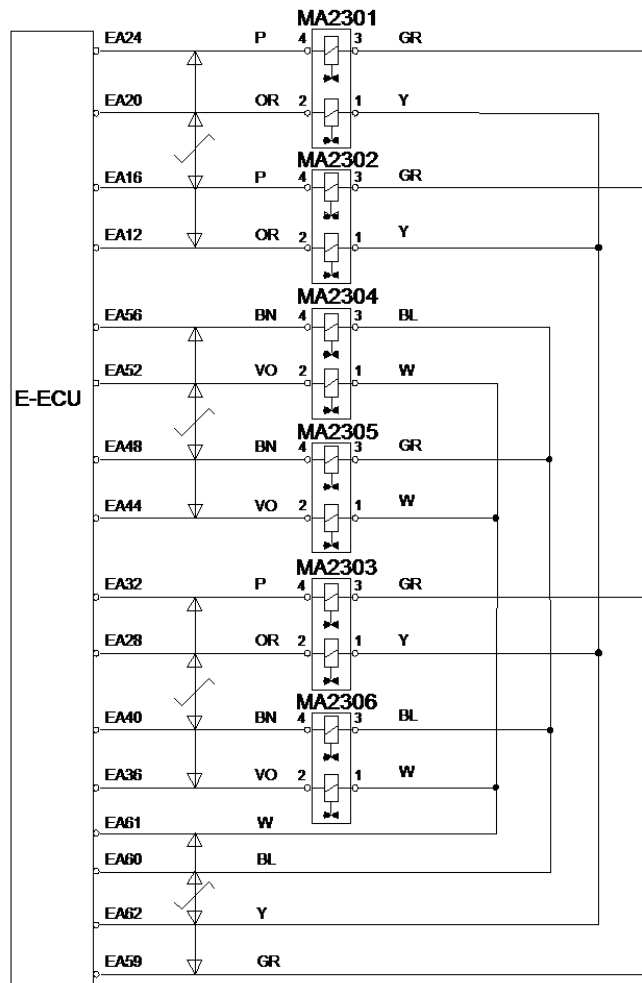


Figure 2

Document Title: Service display unit, electrical control output signals 2	Function Group: 387	Information Type: Service Information	Date: 2014/5/14
Profile: WLO, L180E [GB]			

Service display unit, electrical control output signals 2

Electrical control output signals 2 shows the current status of certain output signals from the vehicle control unit (V-ECU).

EL ON/OFF OUT 2	cl = *
V19:	xyxyxy xyxyxy
V25:	xy

In the display, **xy** represents different pins in connector EC. Connector EC is connected to the vehicle control unit (V-ECU).

The pins are presented in numerical order from left to right and grouped in the following rows:

V 19: position V19-V24 (connector pins EC26-EC39)

V 25: position V25 (connector pin EC41)

The value of **x** may be either 1 (24 V) or 0 (0 V) , depending on whether the output signal is activated or not activated.

The value of **y** is explained according to the table below.

Value (y)	Explanation
glossy	Normal and fully-functional circuit
o	Break in circuit
s	Short circuit in circuit
m	Malfunction/error detected in last operating cycle/ignition switch activation
M	Malfunction/error detected in earlier operating cycle/operating cycles

Resetting of memory functions m and M completed by pressing * button.

Signal description

Pos. (xy)	Value (x)	Explanation	Condition	Connect or pin	Wiring diagram
V19		Gearshifting solenoid SC (2nd gear), status		EC26	11
	0	Not activated			
	1	Activated	- gear selector in position F2 or R2		
V20		Gearshifting solenoid SF (3rd gear), status		EC28	
	0	Not activated			
	1	Activated	- gear selector in position F3 or R3		
V21		Gearshifting solenoid SE (4th gear), status		EC33	
	0	Not activated			
	1	Activated	- gear selector in position F4 or R4		
V22	-	-	-	-	-
V23	-	-	-	-	-
V24	-	-	-	-	-
V25	-	-	-	-	-

- The P-brake switch is moved to RELEASE P-brake position for at least 0.2 seconds with the diesel engine running and the gears in neutral.
- Diesel engine >1600 rpm and gear (F/R) engaged.

NOTE!

In all other cases, the parking brake is **applied**.

WARNING
Applied
Parking brake

Applied parking brake, diesel engine running and direction gear engaged results in the following:

- - Control lamp parking brake lit
- - Red central warning lamp
- - Warning on the display panel
- - Buzzer sounds

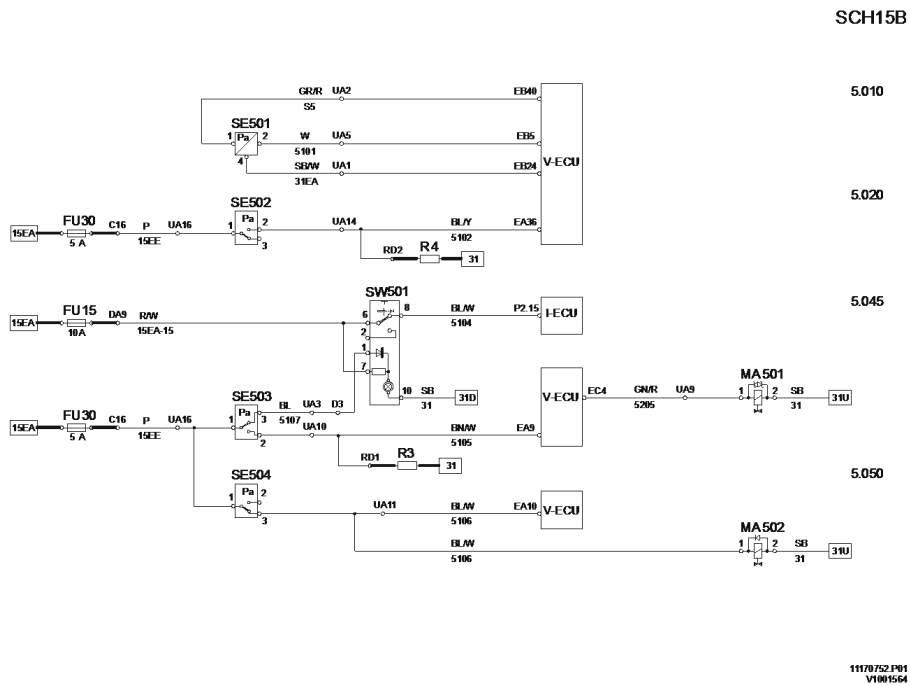
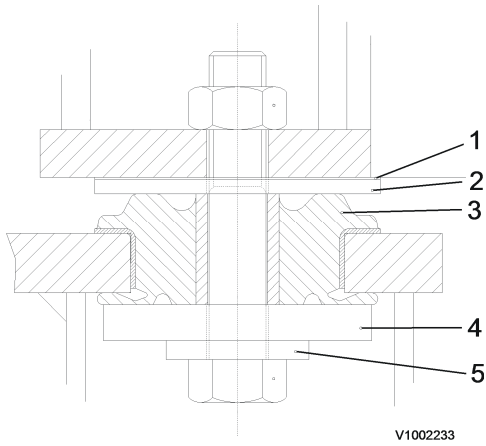


Figure 3



V1002233

Figure 2
Cab rubber pad (principle illustration)

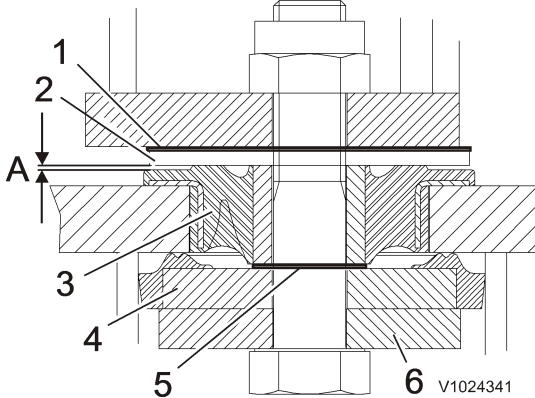
1. Adjusting shim
2. Thrust washer
3. Vibration damper
4. Thrust washer
5. Washer

3. Lift the cab into place. Cab's weight: **approx. 800 kg (1764 lbs)**.
Fit thrust washer (4) and washer together with each bolt.

4. Tighten the bolts.
Tightening torque, rear mount-frame: **400-450 Nm (295-332 lbf ft)**

Tightening torque, front mount-frame: **400-450Nm (295-332 lbf ft)**
L220E

5. Place a washer (2) and any adjusting shims (1) on each cab member.



V1024341

Figure 3
Cab rubber pad (principle illustration)

1. Adjusting shim
2. Washer
- A. Air gap
3. Mount
4. Plate
5. Adjusting shim. Thickness approx. 1 mm (0.040 in)

NOTICE

The shims must be put on the same cab mounting element from which they were removed in order not to

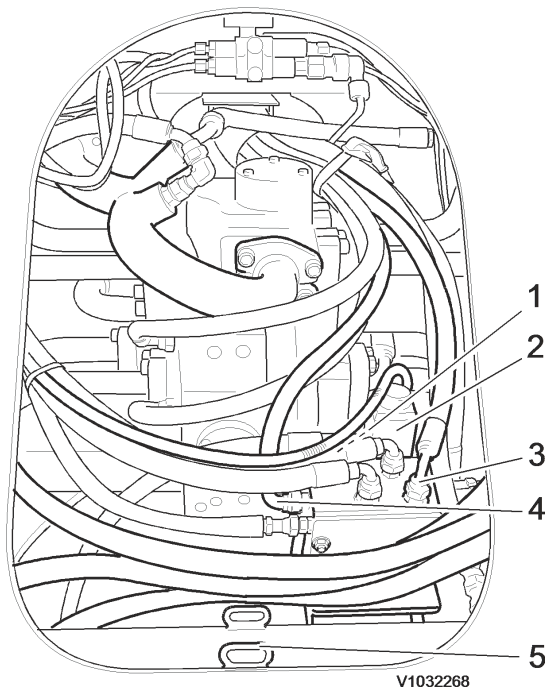


Figure 6

1. MA946, MA947
2. MA407
3. Hose
4. Hose
5. Bracket for strap, lower hoses

10. Disconnect the hoses from the return oil pipe. Plug the hoses and the connections on the pipe. Disconnect the return oil pipe from the control valve.
11. Disconnect all hoses from the control valve.
Install protective plugs in the hoses and their connections on the control valve.
12. Disconnect all pipes from the control valve. Install protective plugs.
Tie up the pipes to the tilting cylinder as far as possible using straps or similar.
13. Attach a sling around the tilting cylinder. Connect a ratchet block.

NOTE!

The sling should be as short as possible in order to "hug" the tilting cylinder.

Connect a shackle M12 to the eye on the control valve.

Attach slings in the lugs on the lifting cylinders. Connect a shackle M20 and a ratchet block to the slings.

Connect both ratchet blocks to the shackle on the control valve.

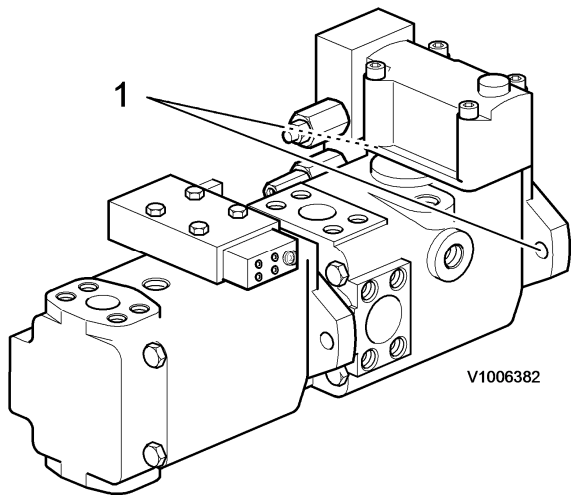


Figure 3

1. Attaching bolts

8. Place a sling around the pumps and connect to the ratchet block.

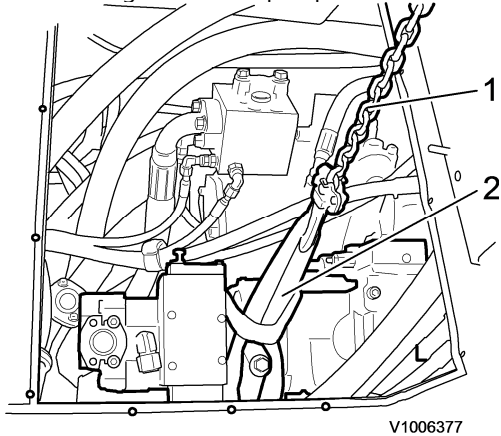


Figure 4
Lifting pumps

1. Ratchet block 750 kg (1650 lb)
2. Sling 1 m (3 ft)

9. Lift the pumps with the ratchet block up through the cab floor. Make sure that the intermediate shaft remains in the transmission. Weight of pumps: **100 kg (220 lb)**

10. Check the splines on the intermediate shaft with regard to damage and wear.

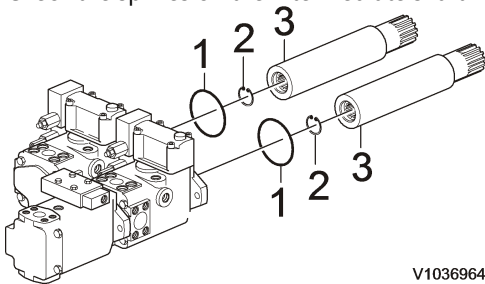

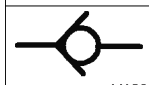


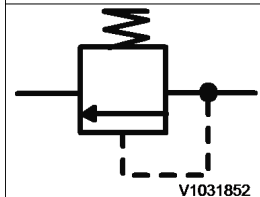
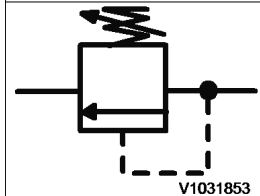
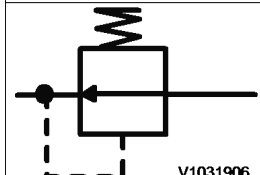
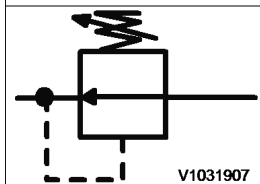
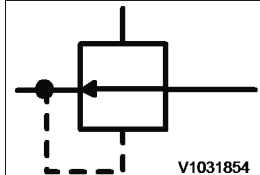
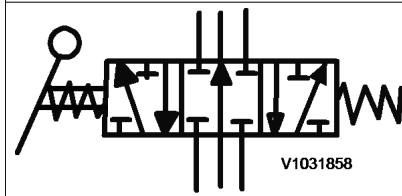




Figure 5

1. O-ring
2. Lock ring

 <p style="text-align: center;">V1031847</p>	<p>Double-acting cylinder with single piston rod (The piston end is called plus side and the piston rod end is called minus side)</p>
<p>Valves</p>	
 <p style="text-align: center;">V1031849</p>	<p>Non-return valve which requires very low opening pressure</p>
 <p style="text-align: center;">V1031850</p>	<p>Non-return valve which requires a certain opening pressure</p>
 <p style="text-align: center;">V1031851</p>	<p>Shuttle valve</p>
 <p style="text-align: center;">V1031852</p>	<p>Pressure-limiting valve</p>
 <p style="text-align: center;">V1031853</p>	<p>Pressure-limiting valve with adjustable opening pressure</p>
 <p style="text-align: center;">V1031906</p>	<p>Pressure-reducing valve</p>
 <p style="text-align: center;">V1031907</p>	<p>Pressure-reducing valve with adjustable closing pressure</p>
 <p style="text-align: center;">V1031854</p>	<p>Pressure-reducing valve, pressure controlled</p>
 <p style="text-align: center;">V1031858</p>	<p>Three-position valve, lever-controlled and spring-centred</p>
 <p style="text-align: center;">V1031848</p>	<p>Lines parallel with the long sides of the valve symbol show that the valve can take up any position between its end positions (stepless movement)</p>
 <p style="text-align: center;">V1031929</p>	<p>Shut-off valve / Breather valve</p>

Application

The symbols in a diagram show connections, flow paths and function of the components in the system, but does not show