

Document Title: <b>General information to note when working on the hydraulic system</b>	Function Group: <b>900</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## General information to note when working on the hydraulic system

### NOTE!

Precautionary measures to protect against possible risk of accident, injury or death.

Special notes for better implementation of operating, control and adjustment procedures and maintenance work.

The assemblies for power transmission, hydraulic adjustment motor, dropbox and axles should only be repaired in workshops which fulfil the following conditions and have the following equipment:

- trained staff
- prescribed tools and test instruments such as test bench, crack tester, special tools
- Genuine spare parts

All work must be carried out with maximum care and conscientiousness.

The safety regulations must be noted and observed.

The regulations of the professional trade association concerned must be noted.

### NOTE!

Before working on the hydraulic system, the lifting frame and hydraulic equipment must be supported mechanically with suitable means to prevent accidental lowering. The entire hydraulic system must be depressurized.

One important condition is absolute cleanliness in removal and installation of components to be replaced or repaired.

Prevent dirt and other contaminants from entering the system.

- Clean bolts, filler caps and their surroundings before removal, so that no dirt can penetrate.
- Before removing hoses, pipes and similar, turn off the engine and depressurize systems.
- During repair, seal all openings with clean plugs and caps. Remember to remove plugs and caps before installing.
- Do not wipe hydraulic components with lint cloth.
- When adding hydraulic oil to the tank, the oil must be added through a filter as even new oil in sealed containers does not meet the requirements imposed on clean hydraulic oil.
- Grease must **not** be used as an anti-seize compound when assembling hydraulic components; use hydraulic oil.
- If burrs and abraded particles are found in the hydraulic oil tank, flush and clean all circuits.

For repairs, always fit **genuine spare parts**.

Before removal, mark components to facilitate reassembly.

For installation, always use new seals. Self-locking nuts must also be replaced.

In all repair work, only use suitable tools and make adjustments only using the prescribed measuring tools.

In principle, when fitting new components check the settings, i.e. the diesel engine and new components must be matched to each other.

- Check pressures and speeds (rpms).
- Check screw fittings and flanges for leaks.
- Check oil level in hydraulic oil tank and top up if necessary.

### NOTE!

Only use hydraulic oil of the prescribed specification in the Operating Media table of the Operator's manual.

Document Title: <b>Cleanliness when working on hydraulic components</b>	Function Group: <b>900</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## **Cleanliness when working on hydraulic components**



**Hot hydraulic oil and hydraulic oil under pressure may result in severe personal injuries**

**It is very important to keep the hydraulic system free from impurities as these can cause abnormal wear and can lead to expensive malfunctions. Extreme cleanliness should be observed when handling hydraulic components and hydraulic oil.**

**NOTE!**

A vacuum pump should be used during work on the hydraulic system.

Document Title: <b>Hydraulic oil, storage and handling</b>	Function Group: <b>900</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## **Hydraulic oil, storage and handling**

- Hydraulic oil should be stored in tightly sealed tanks or barrels.
- Only containers used for transporting hydraulic oil should be used for this purpose.
- Oil should be stored under cover or in temperature-controlled premises. If oil is stored outdoors, the barrels should be stored horizontally so that water cannot enter and the barrel markings are not eradicated.
- Oil must not be stored at temperatures exceeding 60 °C (140 °F), or be exposed to direct sunlight or freezing temperatures.

Document Title: <b>Hydraulic system, repair of hydraulic components in workshop</b>	Function Group: <b>900</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## **Hydraulic system, repair of hydraulic components in workshop**

- Always wear clean coveralls and be strict about personal cleanliness.
- Work on hydraulic components should be performed separate from other work in a so-called "clean room". The room must have good ventilation and the floor must be coated with a binding material. Machining, grinding and similar work is not allowed in the "clean room".
- The workplace must be equipped with thoroughly cleaned tools and suitable containers for cleaning hydraulic components.
- Containers for cleaning hydraulic components must not be used for other cleaning. The containers must be cleaned frequently and filled with new fluid. The containers must be equipped with a removable grating on the bottom, which separates the component from any sludge on the bottom.
- Always clean components that are going to be handled in the "clean room". If an alkaline detergent is used, it should contain anti-corrosion agent.
- Always plan work on the hydraulic system so that it can be completed without any longer interruptions.
- When cleaning during repairing – use dry and clean compressed air for drying, do not use cotton waste or rags.
- Always plug a component when work is completed, use clean plastic plugs of the correct dimensions, and pack the component.
- When cleaning in the "clean room" – use methods which do not stir up dust or dirt.

Document Title: <b>Hydraulic components, storage and transport</b>	Function Group: <b>900</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## **Hydraulic components, storage and transport**

- All hydraulic components must be stored in plastic bags or film and they must be plugged. The packaging must not be opened before the component is to be used.
- Service vehicles should be equipped with an interior which facilitates good order and cleanliness.
- Each service vehicle should carry a roll of plastic film, plastic plugs of the most common sizes and plastic containers for components. Plugs and film should be of the disposable type.

Document Title: <b>Troubleshooting chart</b>	Function Group: <b>900</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## Troubleshooting chart

Malfunction/Error	Possible malfunction cause	Malfunction elimination
Hydraulic functions of raise, tilt, lock, cannot be performed	Oil level in hydraulic oil tank too low. Pressure lines faulty or line connections leaking. Line connections incorrect. Delivery volume of working hydraulics pump too low.	Add hydraulic oil and bleed system if necessary. Check pressure lines for condition and connections for leaks, replace or tighten connections if necessary. Test line connections for correct connection. Test delivery volume of working hydraulics pump, replace if necessary.
Power loss in working hydraulics.	Oil level in hydraulic oil tank too low. Pressure lines faulty or line connections leaking. Pressure lines crushed or twisted. Working pressure too low. Primary pressure limiting valve dirty or faulty. Inner leakage of working hydraulics pump too great. Suction–return filter in hydraulic oil tank dirty.	Add hydraulic oil and bleed system. Check pressure lines for condition and connections for leaks, replace or tighten connections if necessary. Check line routing, route correctly or change. Test working pressure, if necessary adjust on primary pressure limiting valve. Test inner leakage of working hydraulics pump, change if necessary. Check filter element, replace if necessary.
Working hydraulics work too slow and system becomes too hot.	<b>NOTE:</b> For malfunction cause and elimination, see all points under "Hydraulic functions of raise, tilt, lock, cannot be performed" and "Power loss in working hydraulics". Suction line from hydraulic oil tank to working hydraulics pump leaking. Incorrect oil in hydraulic oil tank. Seals or O–rings on working cylinders leaking.	Check suction lines and connections on hydraulic oil tank and working hydraulics oil pump, tighten connections or replace hose if necessary. Drain oil from the hydraulic oil tank, flush the system and add hydraulic oil of the prescribed specification according to the table of operating media. Check for inner and outer leaks on working cylinders, if necessary replace seals and O–rings.
Lifting frame lowers with control valve in neutral position.	Seals or O–rings on lifting cylinders leaking. Lifting cylinders or piston rods damaged. Secondary limiting valve dirty or seal faulty. Secondary limiting valve damaged. Control valve leaking.	Check for inner and outer leaks on lifting cylinders, if necessary replace seals and O–rings. Test lifting cylinders, if necessary replace fully. Test secondary limiting valve, change if necessary. Test control valve. if necessary replace
Bucket tilts out or back with control valve in neutral position.	Seals or O–rings on tilt cylinders leaking. Tilt cylinders or piston rods damaged. Secondary limiting valves with feed valve dirty or seal faulty. Secondary limiting valves with feed valve damaged. Control valve leaking.	Check for inner and outer leaks on tilt cylinders, if necessary replace seals and O–rings. Test tilt cylinders, replace fully if necessary. Test secondary limiting valves with feed valve, clean and replace O–ring if necessary. Test control valve. if necessary replace
Lifting frame lowers slightly first on fine control "raise".	Non-return valve (load-holding valves) "raise/lower" faulty or seat damaged.	Check non-return valve and valve seat, if necessary replace non-return valve
Bucket first tilts slightly	Non-return valve (load-holding valves)	Check non-return valve and valve seat, if

forward on fine control "tilt back".	"tilt back/out" faulty or seat damaged.	necessary replace non-return valve
Control valve leaking on outside.	Oil level in hydraulic oil tank too low. Return filter dirty. Lines chafing. Working hydraulics pump draws in air, or there is air in the system. Pressure lines faulty or crushed. Working hydraulics pump faulty.	Add hydraulic oil and bleed system if necessary. Check return filter, replace filter element if necessary. Route lines properly and attach, or replace. Eliminate leaks and bleed system. Check pressure lines for condition and connections for leaks, replace or tighten connections if necessary. Check suction line, replace if necessary. Test working hydraulics pump, replace if necessary.
Abnormal noise from working hydraulics pump or in the hydraulic system.	Oil level in hydraulic oil tank too low Suction return filter dirty Lines chafing Working hydraulics pump draws in air, or there is air in the system Pressure line faulty or line connections leaking. Suction line faulty or crushed, working hydraulics pump faulty.	Add hydraulic oil and bleed system if necessary Check suction/return filter, replace filter element if necessary Route lines properly and attach, or replace Eliminate leaks and bleed system Check pressure lines for condition and connections for leaks, replace or tighten connections if necessary Check suction line, replace if necessary Test working hydraulics pump, replace if necessary

Document Title: <b>Vacuum pump, connection</b>	Function Group: <b>900</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

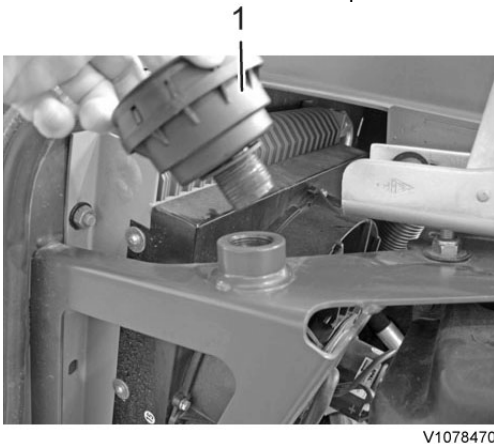
## Vacuum pump, connection

Op nbr 900-005

[14360000 Vacuum pump / 24V](#)

[9809685 Cable](#)

1. Place the machine in the service position and open the engine hood.

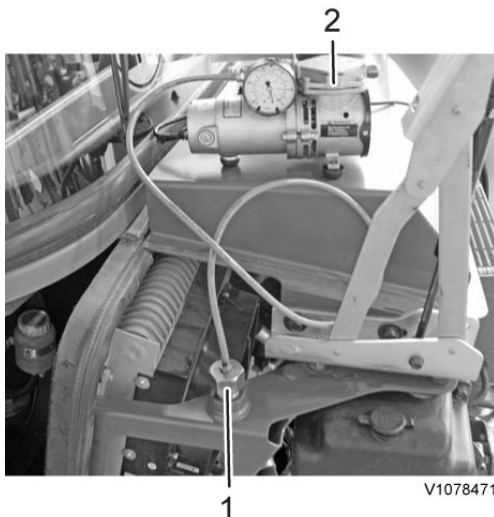


**Figure 1**

2. Unscrew bleed valve (1).
3. Screw in adapter (1) and install connection of vacuum pump (2).

**NOTE!**

If it is not possible to provide power with the battery disconnect switch, use cable 9809685.



**Figure 2**



4. Switch on the vacuum pump. There is now a partial vacuum in the hydraulic oil tank so that certain operations can be performed on the hydraulic system without having to drain hydraulic oil.

**NOTE!**

Never allow the vacuum pump to run unattended. Loss of power could cause malfunction.

**Remove**

5. Turn off the vacuum pump and remove it.
6. Unscrew the adapter and screw on the bleed valve.
7. Test machine operation.

Document Title: <b>Hydraulic description</b>	system, <b>910</b>	Function Group:	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>				

## Hydraulic system, description

The hydraulic system on the machine consists of the steering, driving and working hydraulics. The oil circuit is thermostatically regulated, with integrated cooling system. The mechanically controlled double-action control valve consists of three sections.

The gear pump which is flanged to the through drive of the hydrostatic pump supplies oil to the working hydraulics.

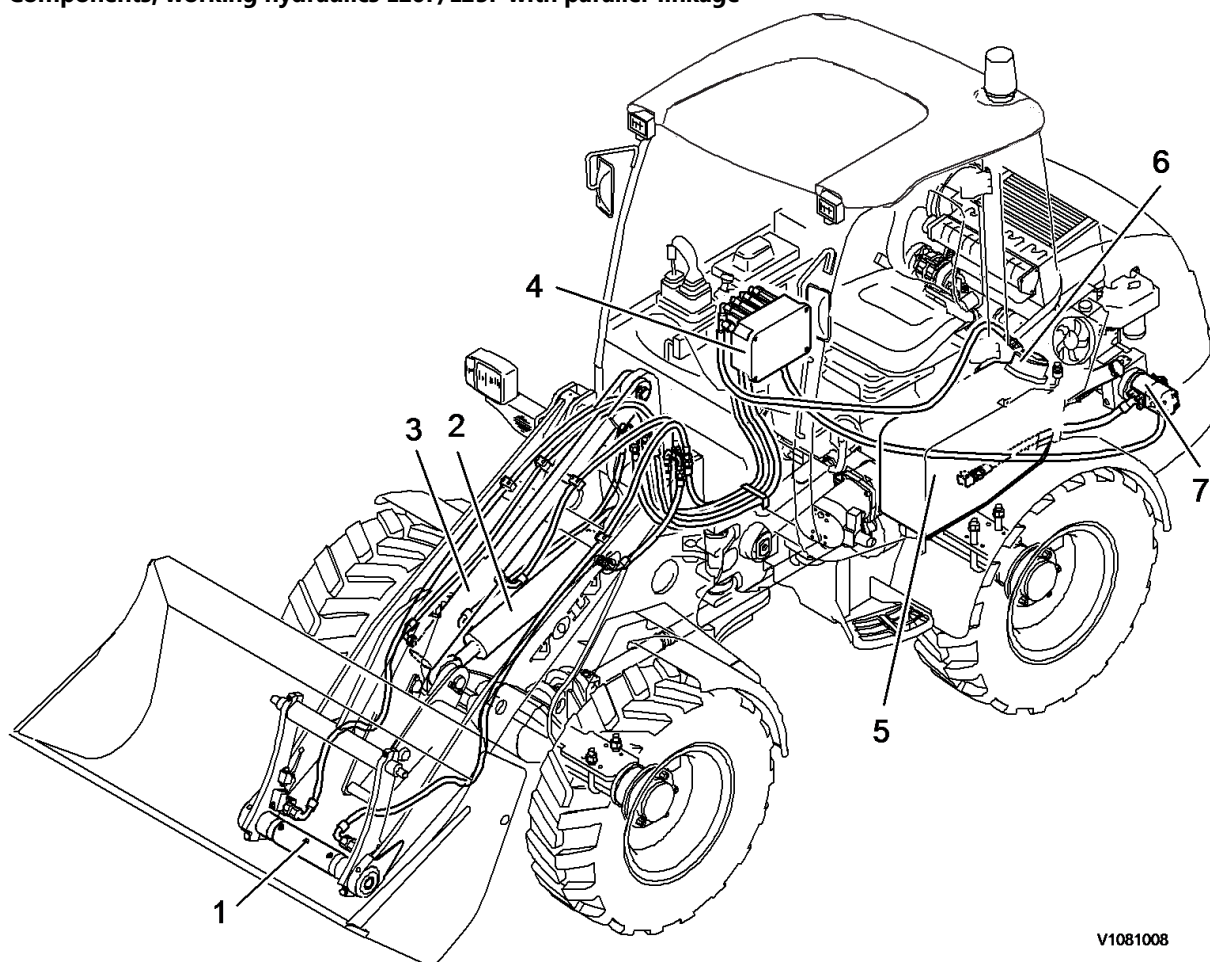
The hydraulic oil tank is common to the steering, driving and working hydraulic system. The hydraulic tank contains a combined suction and return filter. It is vented through a bleed and ventilation filter.

Document Title: <b>Working hydraulic system, component position</b>	Function Group: <b>910</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

[Go back to Index Page](#)

## Working hydraulic system, component position

Components, working hydraulics L20F/L25F with parallel-linkage



**Figure 1**  
**Components, working hydraulics L20F/L25F with parallel-linkage**

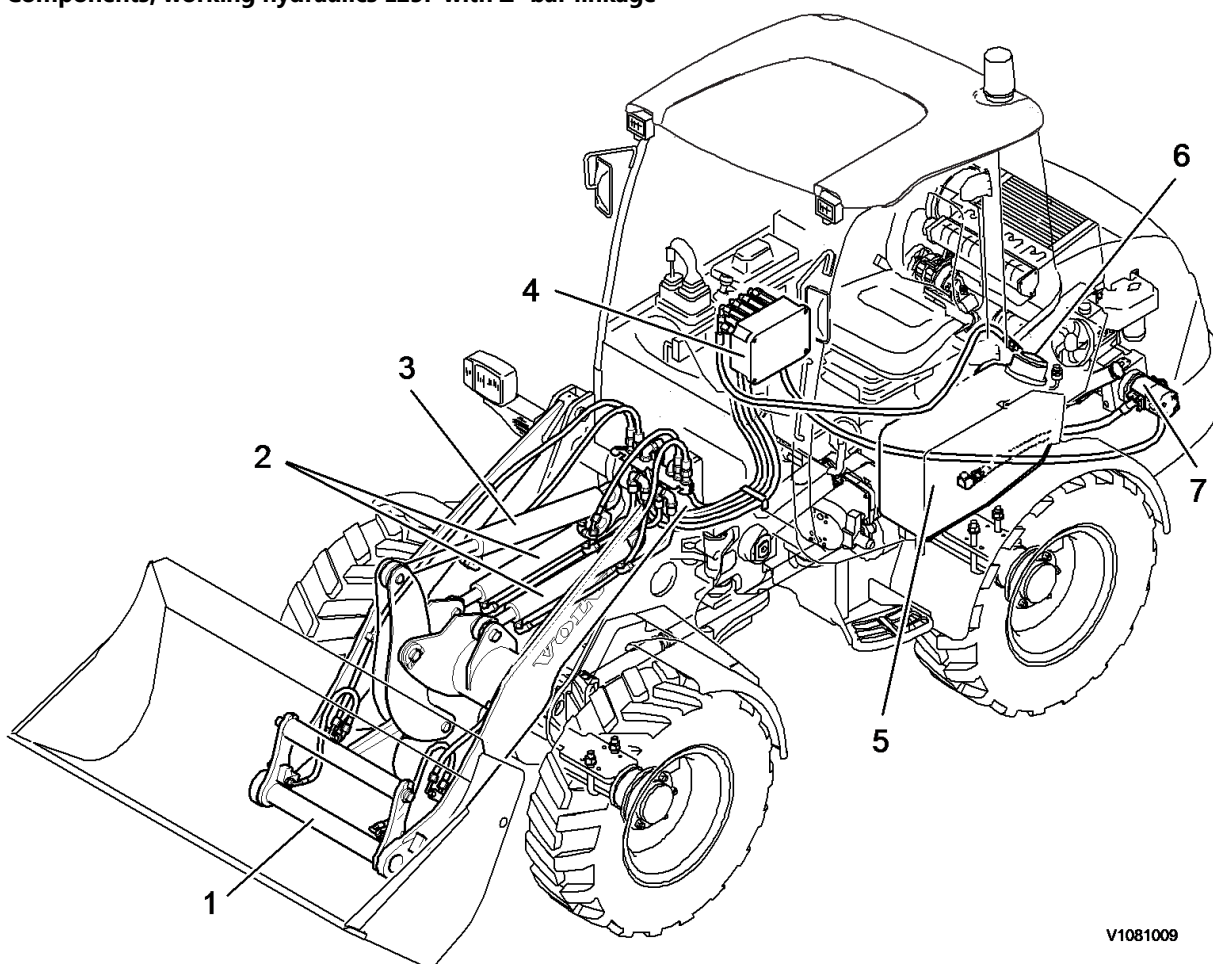
1. Locking cylinder, attachment bracket
2. Lifting cylinder
3. Tilt cylinder
4. Control valve
5. Hydraulic oil tank
6. Suction/return filter
7. Working hydraulics pump

Document Title: <b>Working hydraulic system, component position</b>	Function Group: <b>910</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

[Go back to Index Page](#)

## Working hydraulic system, component position

Components, working hydraulics L25F with Z- bar linkage



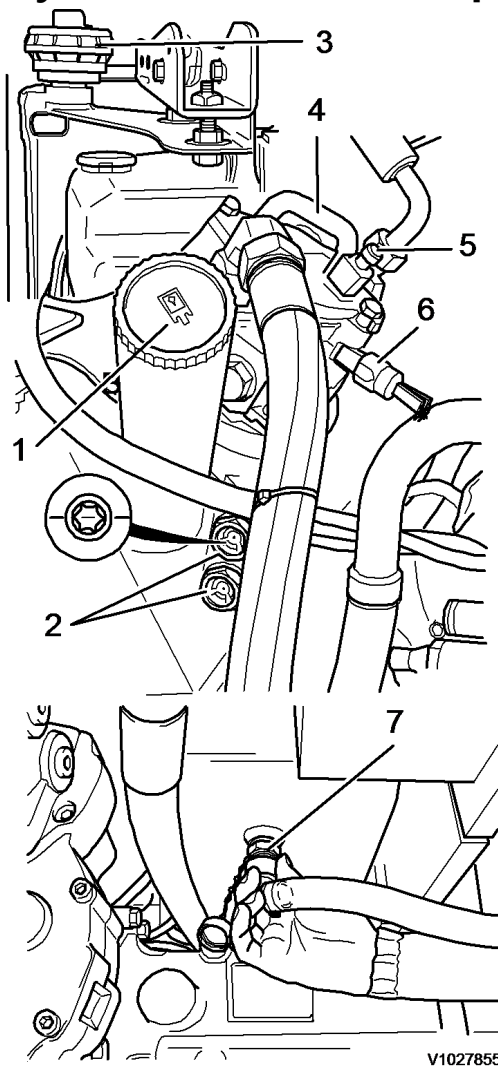
V1081009

**Figure 1**  
**Components, working hydraulics L25F with Z- bar linkage**

1. Locking cylinder, attachment bracket
2. Lifting cylinder
3. Tilt cylinder
4. Control valve
5. Hydraulic oil tank
6. Suction/return filter
7. Working hydraulics pump

Document Title: <b>Hydraulic oil tank, description</b>	Function Group: <b>911</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## Hydraulic oil tank, description



V1027855

**Figure 1**

1. Filler neck, hydraulic oil tank
2. Oil level sight gauge
3. Bleed and ventilation filter
4. Suction and return filter
5. Bleed valve
6. Control switch
7. Oil drain valve

The steering/driving and working hydraulics are supplied from the hydraulic oil tank.

The oil level is read via the oil sight glass. With the load bracket lowered, the lower sight glass must be full and no oil must be visible at the upper sight glass. As the oil temperature rises, the oil level may rise to the middle of the upper sight glass.

Venting takes place via the bleed and ventilation filter.

The suction and return filter has a control switch which serves to indicate soiling. If the check lamp "hydraulic oil filter" on the instrument panel lights, the filter element must be changed.

Document Title: <b>Hydraulic oil tank, removing</b>	Function Group: <b>911</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## Hydraulic oil tank, removing

Op nbr 911-036

### **! WARNING**

Hot liquids and machine parts can cause burns. Allow the machine to cool before beginning any work.

### **NOTICE**

Any work on the hydraulic system requires great demands on cleanliness. Even very small particles can cause damage or clog up the system. Therefore, wipe areas in question clean before any work is carried out.

1. Place the machine in service position.
2. Switch off the engine and keep operating the multifunction lever until the hydraulic system has been depressurized.
3. Turn OFF the battery disconnect switch.
4. Unscrew the cap from the hydraulic oil tank drain valve (1). Connect a drain hose to the drain valve. Collect hydraulic oil in a suitable container.

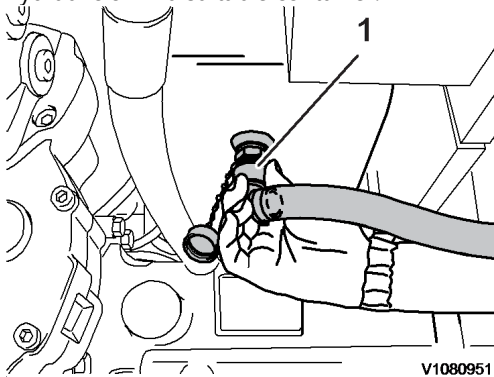


Figure 1

### **NOTICE**

Always handle oils and other environmentally hazardous fluids in an environmentally safe manner.

5. Unscrew the drain hose and screw the cap onto the drain valve.

### **! WARNING**

The work involves handling heavy components - failure to stay alert may result in severe crushing injuries.

6. Remove the bonnet; see [821 Engine hood, removing](#).
7. Remove the right-hand and left-hand side panel of the cab.
8. Unscrew the cab roof lock screws and screw in the lifting eyes (1). Hoist the cab with a crane hoist.

## NOTICE

Use a safe lifting device with the proper rated capacity for the job.

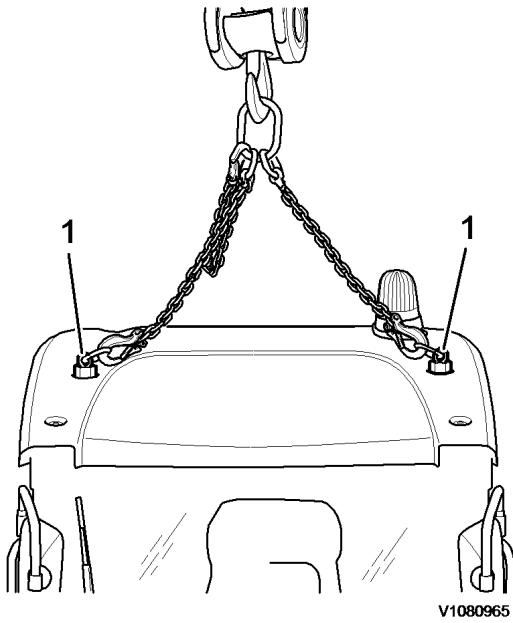


Figure 2

9. Unscrew the front and rear cab attaching bolts.

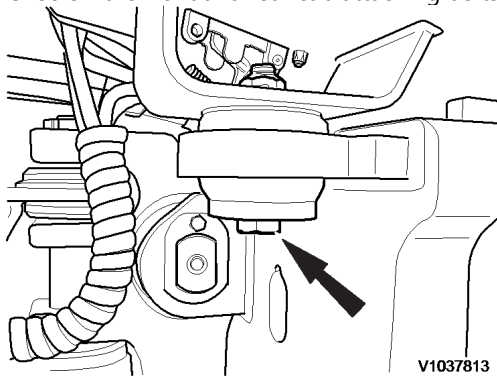


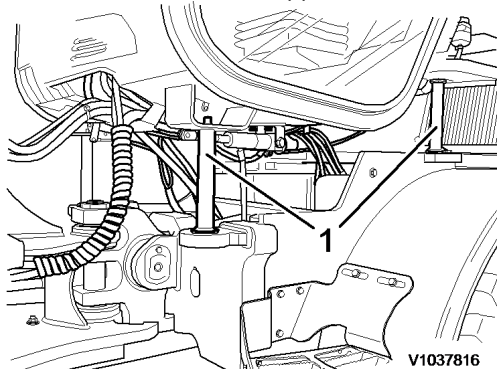
Figure 3

10. Slowly raise the cab and remove the rubber bushing.

### NOTE!

When raising the cab, make sure that no hoses or cables are ripped off. Detach if necessary.

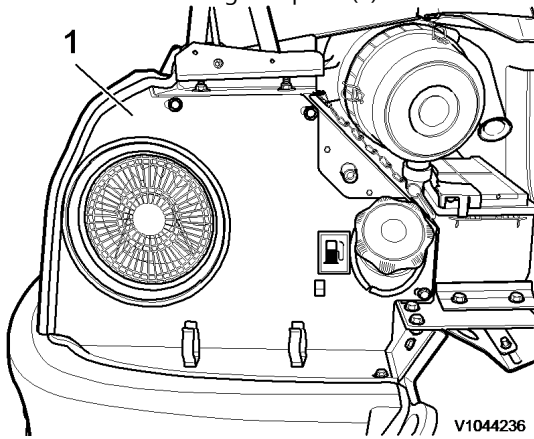
11. Rest the cab on the cab supports (1). [080 E-tool Cab support](#).





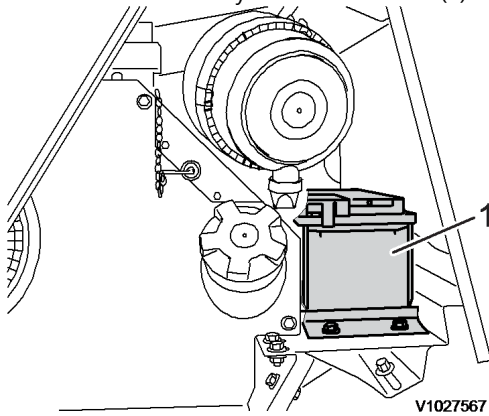
**Figure 4**

12. Remove the air flow guide plate (1).



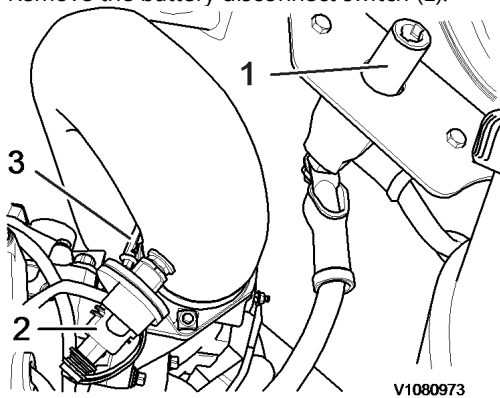
**Figure 5**

13. Disconnect the battery connection cable (1) and remove the battery.



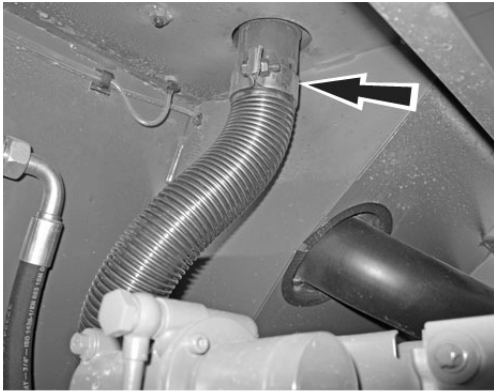
**Figure 6**

14. Remove the battery disconnect switch (1).



**Figure 7**

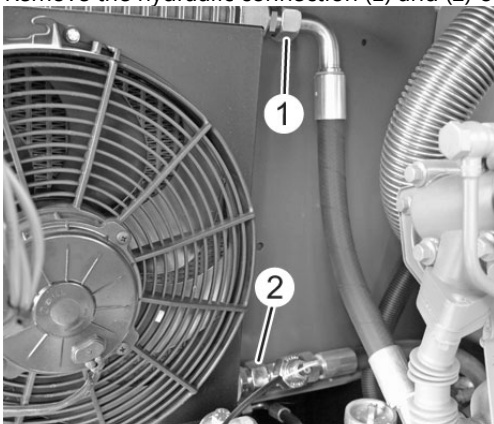
15. Detach the connection cable (2) from the air filter control switch. Release the clamp (3) and detach the induction hose at the air inlet pipe.
16. Remove the flexi exhaust pipe from the silencer.



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**Figure 8**

17. Remove the hydraulic connection (1) and (2) on the radiator.



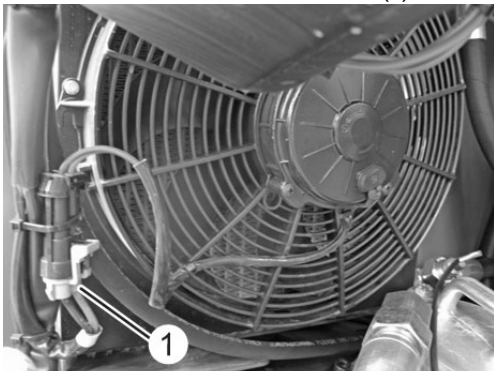
V1080974

**Figure 9**

### **NOTICE**

**When a hose has been disconnected, plug both the hose and the connection immediately. The hoses should be marked for correct connection.**

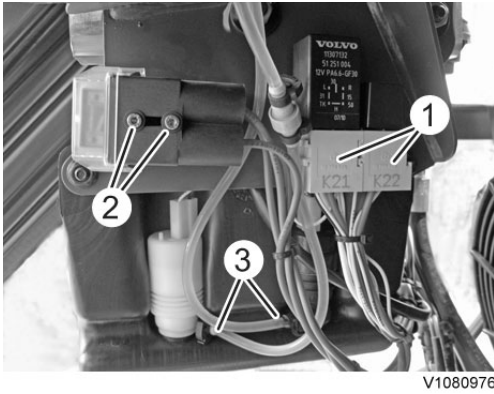
18. Disconnect the electrical connector (1) from the cooling fan.



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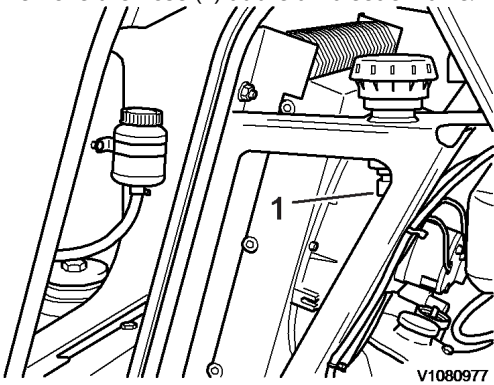
**Figure 10**

19. Disconnect the electrical connector (1) of relays K21 and K22.



**Figure 11**

20. Unscrew the bolts (2) and remove the fuse socket.
21. Undo the clamps and detach the washer fluid hoses (3).
22. Remove the hose (1) at the air bleeder valve.

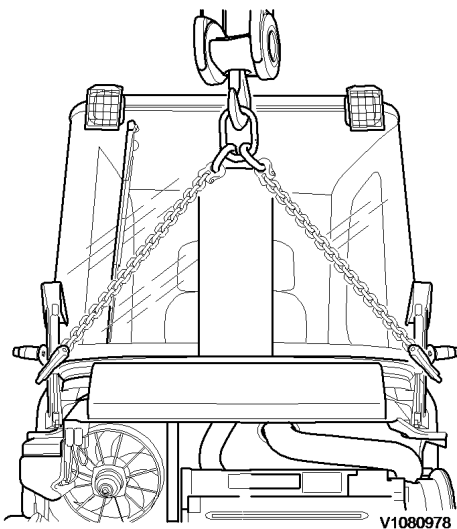


**Figure 12**

23. Suspend the bonnet support from a crane using suitable hoisting equipment.

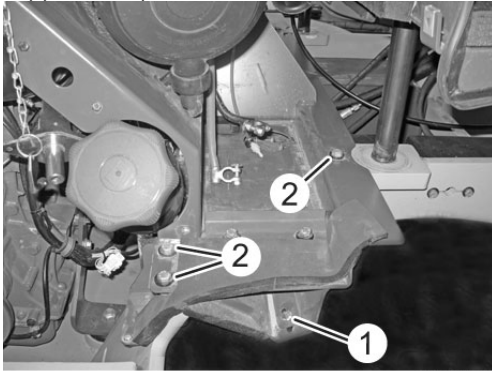
**NOTICE**

**Use a safe lifting device with the proper rated capacity for the job.**



**Figure 13**

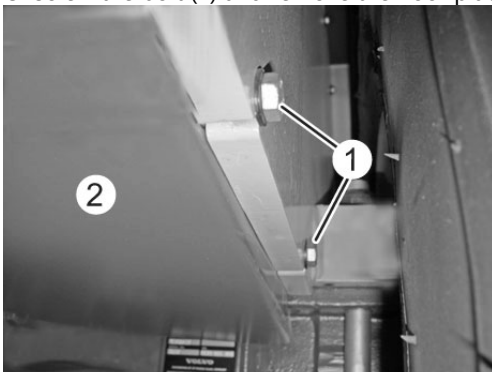
24. Remove the right-hand and left-hand wing attachment (1) and bonnet support attachment (2). Raise the bonnet support and place it on a suitable surface.



V1080979

**Figure 14**

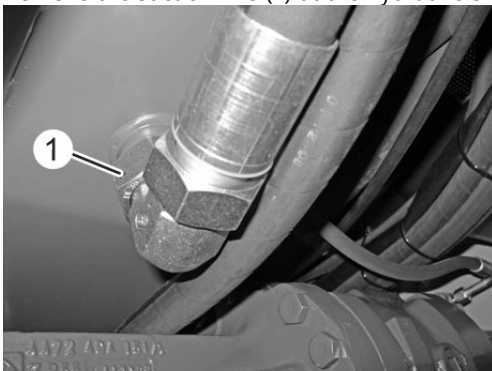
25. Unscrew the bolt (1) and remove the floor plate (2).



V1080980

**Figure 15**

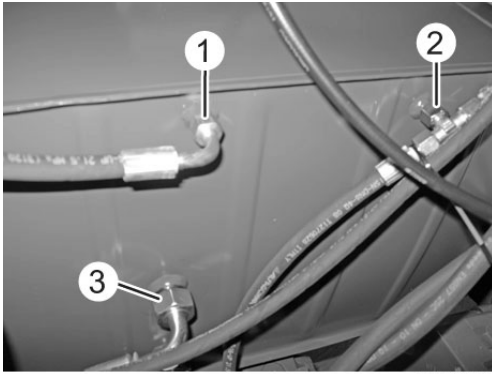
26. Remove the suction line (1) at the hydraulic oil tank.



V1080982

**Figure 16**

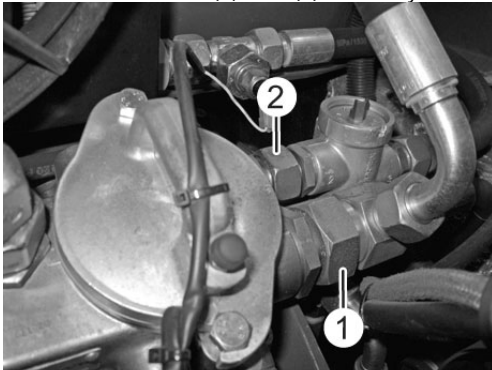
27. Remove the vent line (1), control line (2) and return line (3) from the hydraulic oil tank.



V1080981

**Figure 17**

28. Remove return line (1) and (2) at the hydraulic oil filter.



V1080983

**Figure 18**

29. Unscrew the attaching bolts from the hydraulic oil tank. Suspend the hydraulic oil tank from a crane using suitable hoisting equipment. Slowly raise it and set it on a suitable surface.

**NOTE!**

Hydraulic oil tank, weight approx. 19 kg (42 lb).



V1080984

**Figure 19**

Document Title: <b>Hydraulic oil tank, installing</b>	Function Group: <b>911</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## Hydraulic oil tank, installing

Op nbr 911-037

### **WARNING**

The work involves handling heavy components - failure to stay alert may result in severe crushing injuries.

1. Position the hydraulic oil tank in the frame using hoisting equipment and screw into place.

**NOTE!**

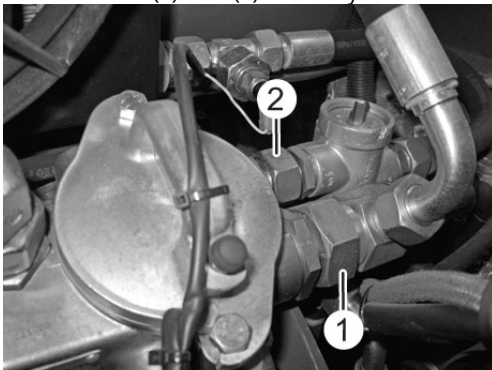
Hydraulic oil tank, weight approx. 19 kg (42 lb).



V1080984

**Figure 1**

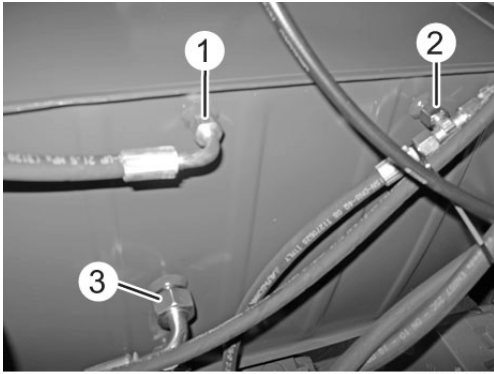
2. Fit return line (1) and (2) at the hydraulic oil filter.



V1080983

**Figure 2**

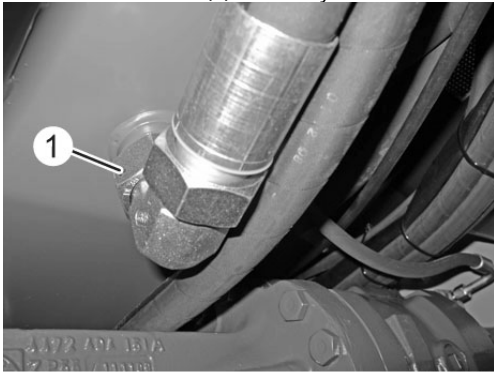
3. Fit the vent line (1), control line (2) and return line (3) from the hydraulic oil tank.



V1080981

**Figure 3**

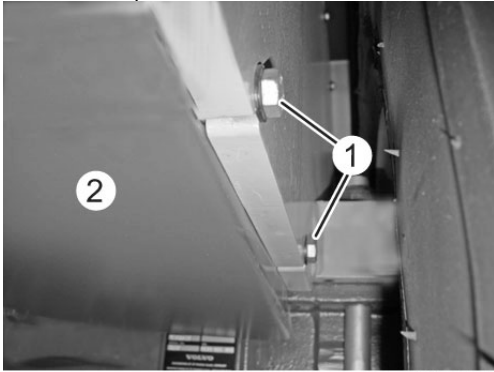
4. Fit the suction line (1) at the hydraulic oil tank.



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**Figure 4**

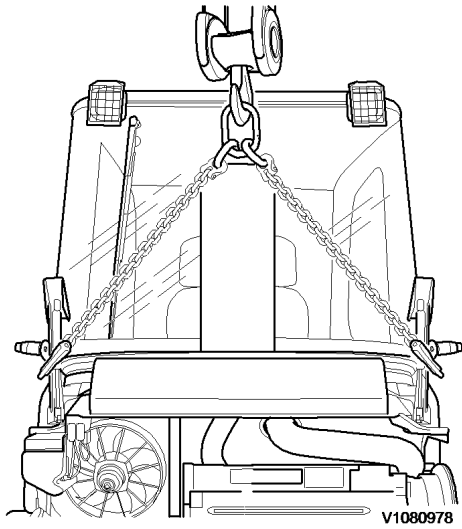
5. Fit the floor plate (2) and fasten it with the bolts (1).



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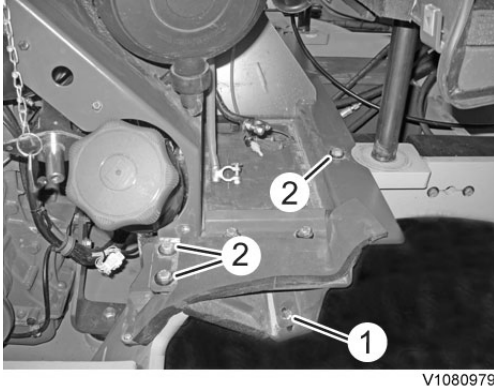
**Figure 5**

6. Position the bonnet support using hoisting equipment.



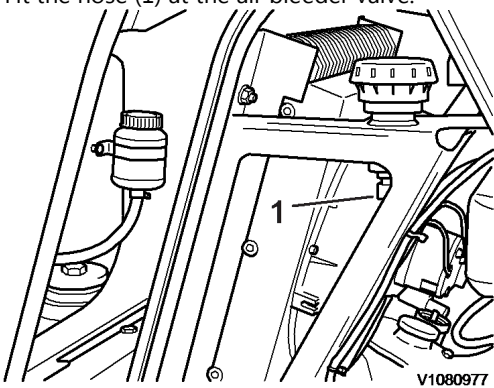
**Figure 6**

7. Fit the right-hand and left-hand wing attachment (1) and bonnet support attachment (2).



**Figure 7**

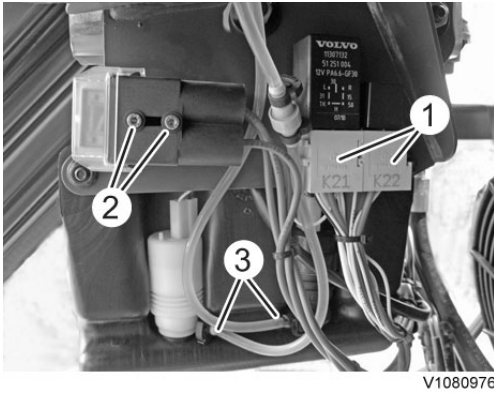
8. Remove the lifting equipment.
9. Fit the hose (1) at the air bleeder valve.



**Figure 8**

10. Connect the electrical connector (1) of relays K21 and K22.

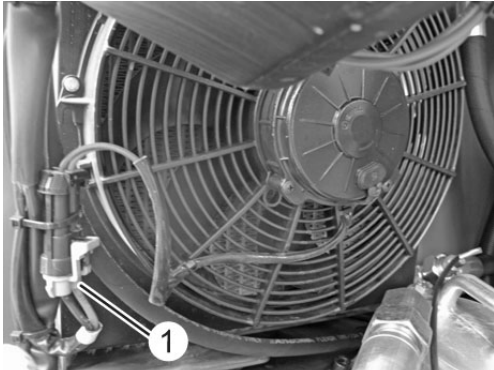




V1080976

**Figure 9**

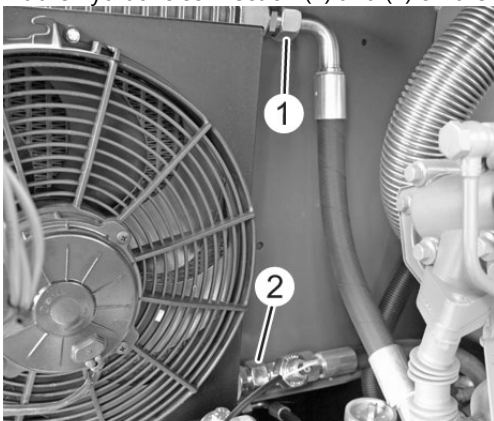
11. Secure the fuse socket with the bolt (2).
12. Fit the washer fluid hoses (3).
13. Connect the electrical connector (1) of the cooling fan.



V1080975

**Figure 10**

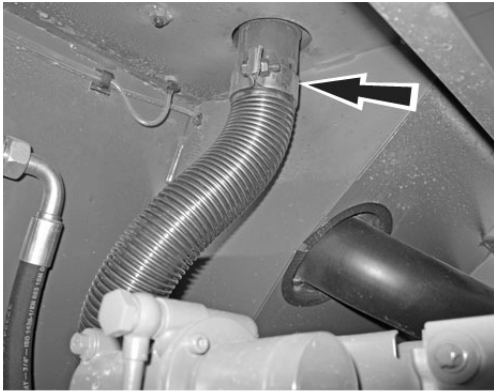
14. Fit the hydraulic connection (1) and (2) on the radiator.



V1080974

**Figure 11**

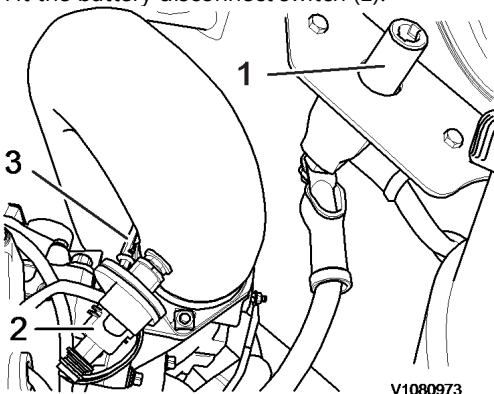
15. Fit the flexi exhaust pipe to the silencer.



V1038860

**Figure 12**

16. Fit the battery disconnect switch (1).

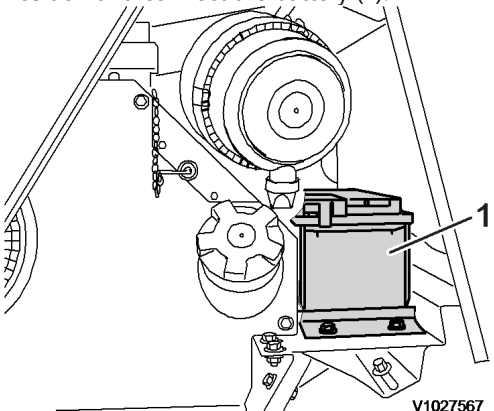


V1080973

**Figure 13**

17. Fit the induction hose to the air inlet pipe and fasten with a clamp (3). Connect the connection cable (2) to the air filter control switch.

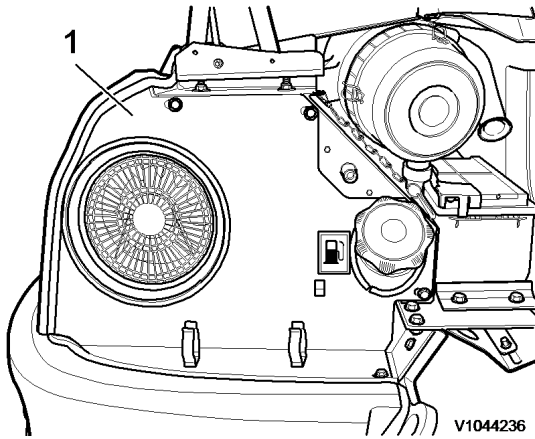
18. Position and connect the battery (1).



V1027567

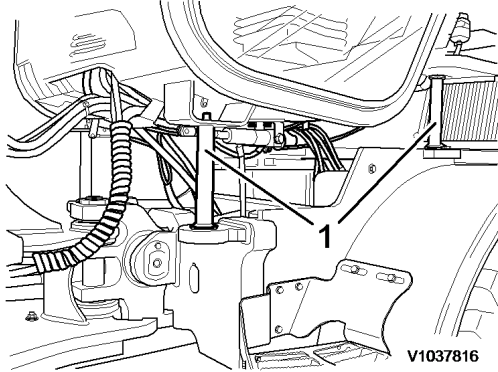
**Figure 14**

19. Fit the air flow guide plate (1).



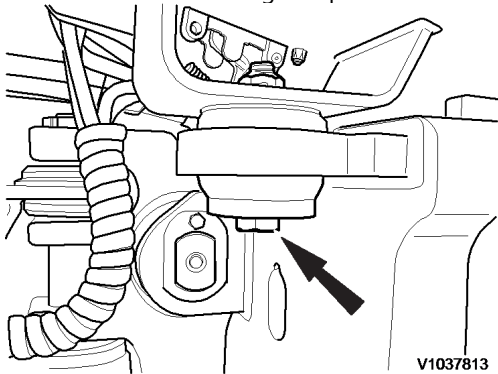
**Figure 15**

20. Slowly raise the cab and remove the cab supports (1).



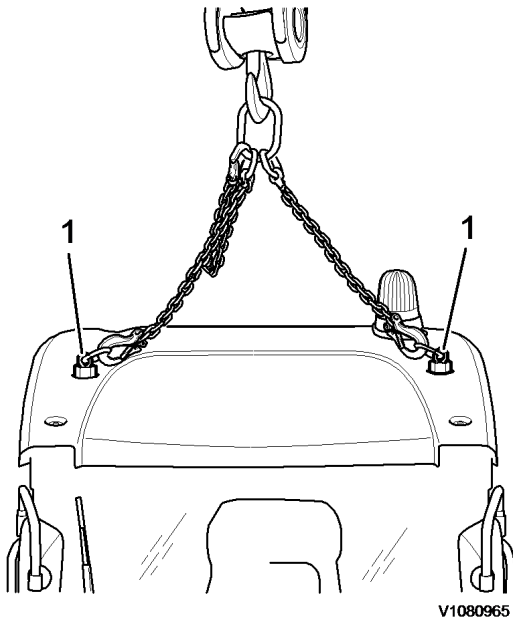
**Figure 16**

21. Insert the rubber bushing and put the cab into position.



**Figure 17**

22. Screw in and fasten the front and rear cab attaching bolts. Tightening torque **200 Nm (148 lbf ft)**.
23. Remove the lifting equipment (1) and fit the lock screws to the cab roof.



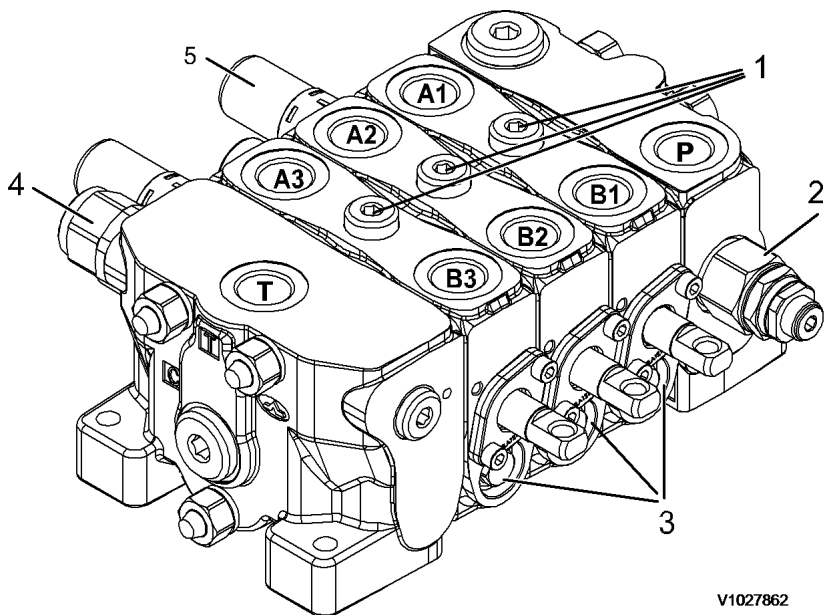
**Figure 18**

24. Fit the right-hand and left-hand side panel of the cab.
25. Install the bonnet, see [821 Engine hood, installing](#).
26. Fill the hydraulic oil. See [173 Hydraulic system, changing oil](#).
27. Carry out trial run, check for leaks.

Document Title: <b>Main control valve, description</b>	Function Group: <b>912</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## Main control valve, description

The control valve is behind the right service hatch. It consists of three sections with closed centre and in neutral position allows no oil to pass. The control valve contains three sliders for lift, tilt functions and additional hydraulics.



V1027862

**Figure 1**  
**Main control valve**

1	Load holding valve
2	Primary limiting valve (adjustable)
3	Secondary limiting valve
4	Anticavitation valve
5	Magnet, additional hydraulics
P	Pressure connection, working hydraulics pump
T	Return connection hydraulic oil tank
A1	Locking cylinder connection "unlock"
B1	Locking cylinder connection "lock"
A2	Tilt cylinder connection, piston head side "tilt out"
B2	Tilt cylinder connection, piston rod side "tilt back"
A3	Lifting cylinder connection, piston head side "lower"
B3	Lifting cylinder connection, piston rod side "raise"

Document Title: <b>Secondary pressure limiting valve, checking and adjusting</b>	Function Group: <b>912</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

[Go back to Index Page](#)

## Secondary pressure limiting valve, checking and adjusting

Test secondary limiting valve L20F/L25F with parallel-linkage

Op nbr 912-172

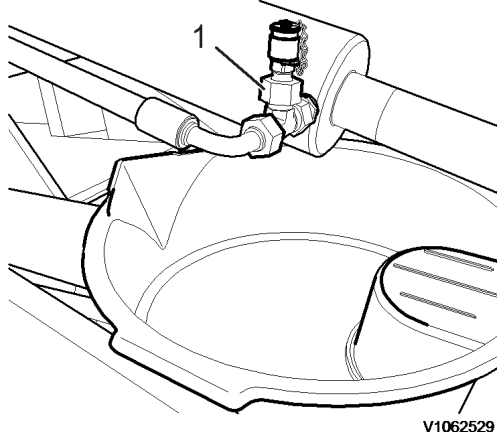
[88830055 Pressure checking set](#)

### NOTE!

For this test, the engine and hydraulic system must have reached operating temperature.

### Test tilt cylinder, piston rod side

1. Bring machine to service position and release pressure on hydraulic system.



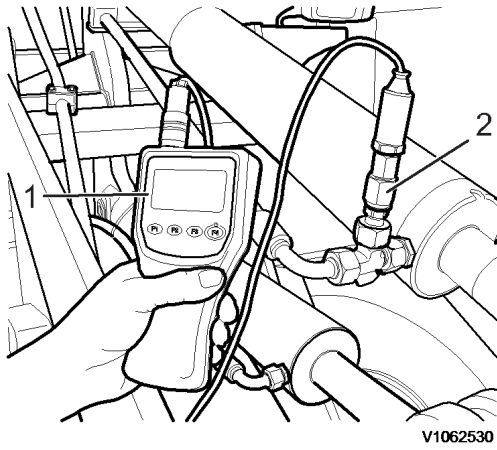
**Figure 1**

2. Fit pressure check connection (1) in hydraulic line piston rod side.

### NOTE!

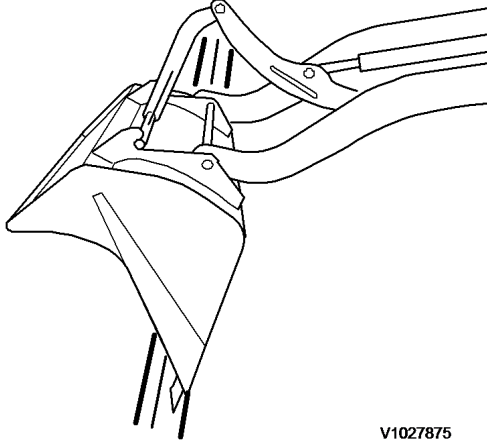
Place suitable catchment container below to catch escaping oil.

3. Connect pressure gauge (1) to pressure check connection (2).



**Figure 2**

4. Start engine and raise boom (approx. 1 metre), do not extend tilt cylinder fully.



**Figure 3**

5. With the front edge of the bucket against a resistance, select "Gear 1". Slowly raise engine speed until the piston rod extends.

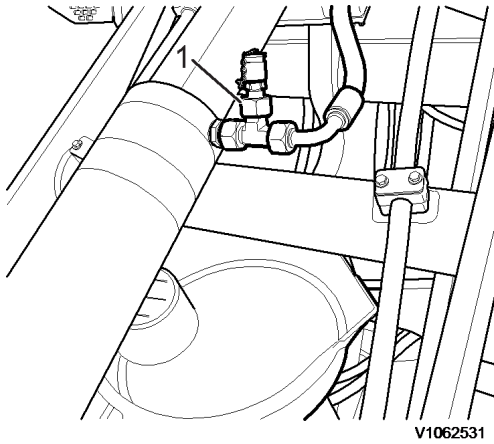
6. Read display on pressure gauge. For nominal value see [030 Hydraulic system, specification](#)

**NOTE!**

If the specified nominal value is not reached, change the secondary limiting valve.

**Test tilt cylinder, piston head side**

7. Bring machine to service position and release pressure on hydraulic system.
8. Fit pressure check connection (1) in hydraulic line piston head side.



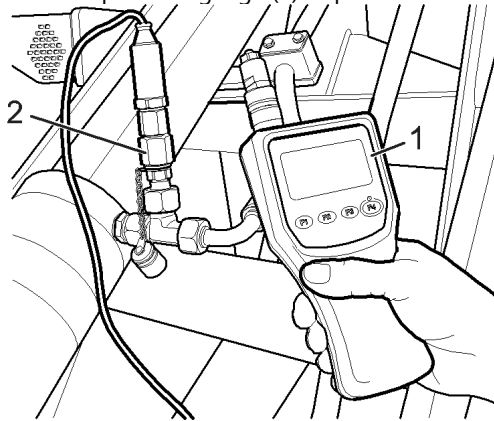
V1062531

**Figure 4**

**NOTE!**

Place suitable catchment container below to catch escaping oil.

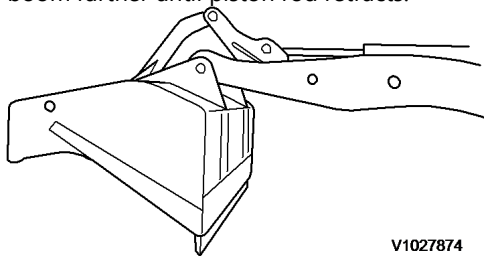
9. Connect pressure gauge (1) to pressure check connection (2).



V1062532

**Figure 5**

10. Start engine and run at low idle speed. Raise boom (approx. 1 metre), extend tilt cylinder to end position. Raise boom further until piston rod retracts.



V1027874

**Figure 6**

11. Read display on pressure gauge. For nominal value see [030 Hydraulic system, specification](#)

**NOTE!**

The secondary limiting valves are not adjustable and must be replaced if the specified nominal value is not achieved.



Document Title: <b>Secondary pressure limiting valve, checking and adjusting</b>	Function Group: <b>912</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

[Go back to Index Page](#)

## Secondary pressure limiting valve, checking and adjusting

Check secondary limiting valve, L25F with Z- bar linkage

Op nbr 912-172

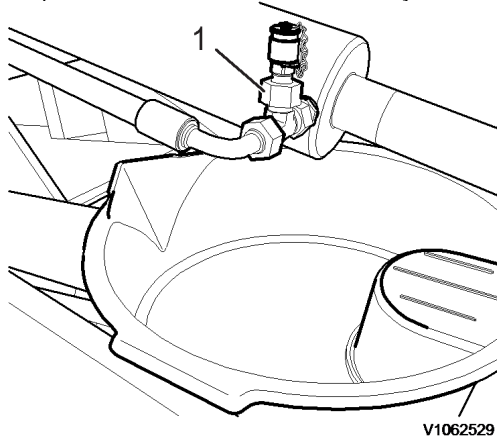
[88830055 Pressure checking set](#)

### NOTE!

For this test, the engine and hydraulic system must have reached operating temperature.

### Test tilt cylinder, piston rod side

1. Bring machine to service position and release pressure on hydraulic system.
2. Fit pressure check connection (1) in hydraulic line piston rod side.

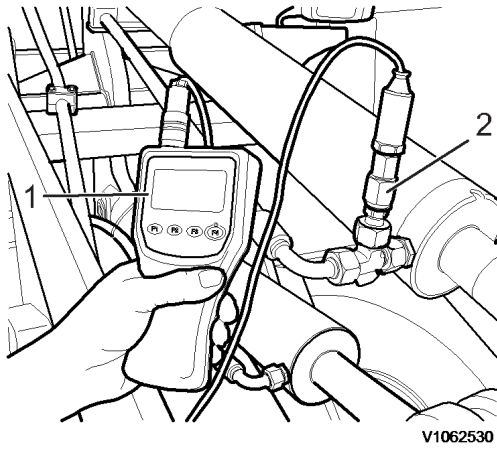


**Figure 1**

### NOTE!

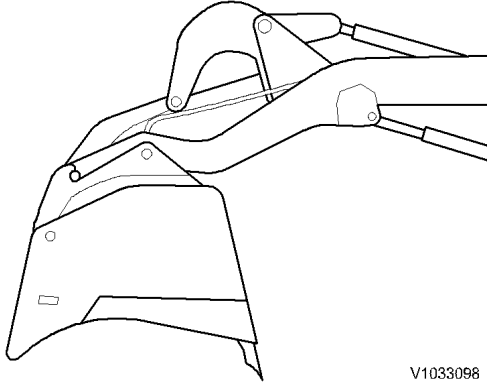
Place suitable catchment container below to catch escaping oil.

3. Connect pressure gauge (1) to pressure check connection (2).



**Figure 2**

4. Start engine and run at low idle speed. Raise boom (approx. 1 metre), retract tilt cylinder to end position. Raise boom further until piston rod extends.



**Figure 3**

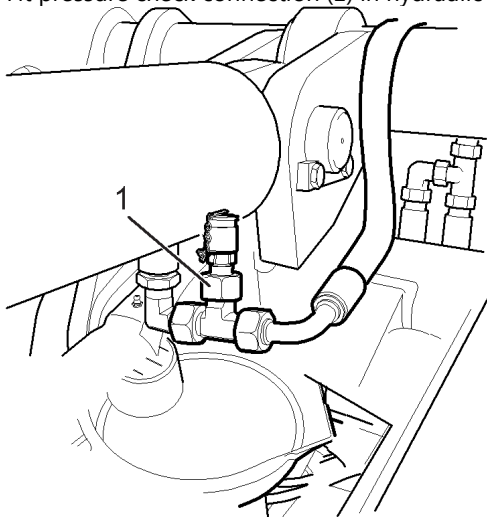
5. Read display on pressure gauge. For nominal value see [030 Hydraulic system, specification](#)

**NOTE!**

If the specified nominal value is not reached, change the secondary limiting valve.

**Test tilt cylinder, piston head side**

6. Bring machine to service position and release pressure on hydraulic system.
7. Fit pressure check connection (1) in hydraulic line piston head side.



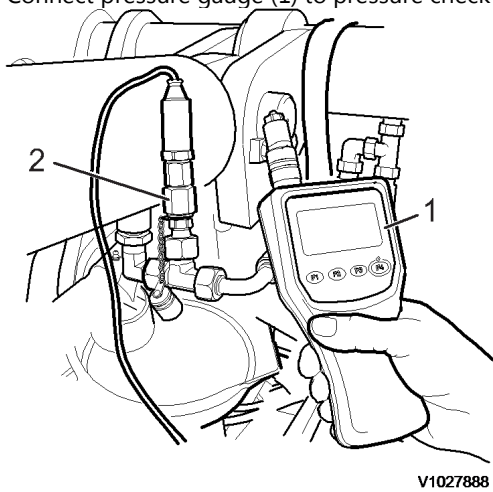
V1062534

**Figure 4**

**NOTE!**

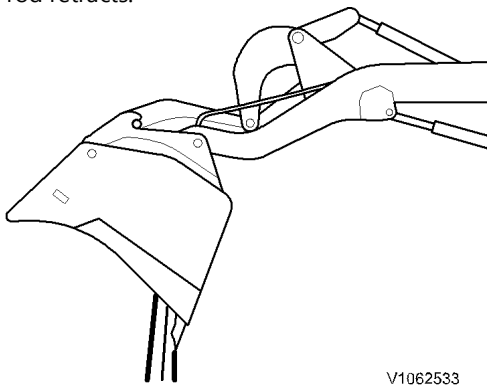
Place suitable catchment container below to catch escaping oil.

8. Connect pressure gauge (1) to pressure check connection (2).



**Figure 5**

9. Start engine and raise boom (approx. 1 metre), do not retract tilt cylinder fully.
10. With the front edge of the bucket against a resistance, select "Gear 1". Slowly raise engine speed until the piston rod retracts.



**Figure 6**

11. Read display on pressure gauge. For nominal value see [030 Hydraulic system specification](#)

**NOTE!**

The secondary limiting valves are not adjustable and must be replaced if the specified nominal value is not achieved.

Document Title: <b>Primary pressure limiting valve, checking and adjusting</b>	Function Group: <b>912</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

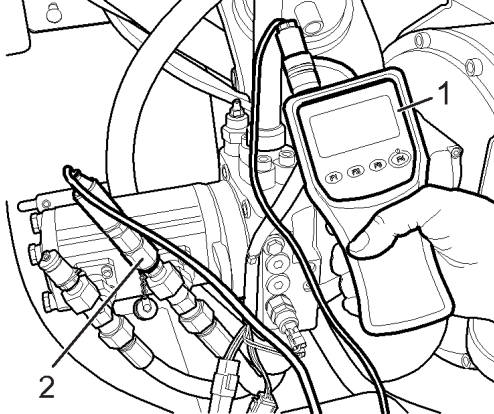
## Primary pressure limiting valve, checking and adjusting

Op nbr 912-173

[88830055 Pressure checking set](#)

### Inspection item

1. Start engine and bring hydraulic oil to an operating temperature of around **60° (140°F)**.
2. Connect pressure gauge (1) to pressure check connection (2) on working hydraulics pump.



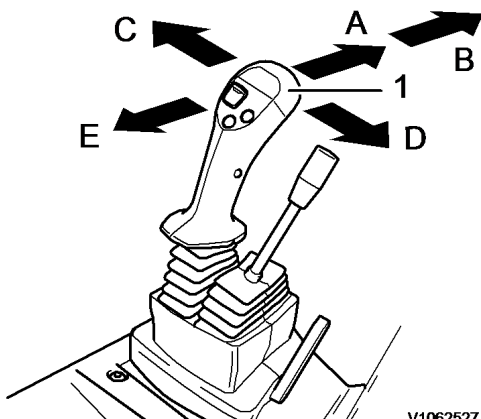
V1027871

**Figure 1**

3. Set engine speed to > **1500 rpm (25 r/s)**.
4. Move multifunction lever (1) to "lower" until resistance can be felt.

**NOTE!**

Do not move multifunction lever into float position.



V1062527

**Figure 2**  
**Multifunction lever**

- A. Lower
- B. Float position (engageable)
- C. Tilt back
- D. Roll out
- E. Raise

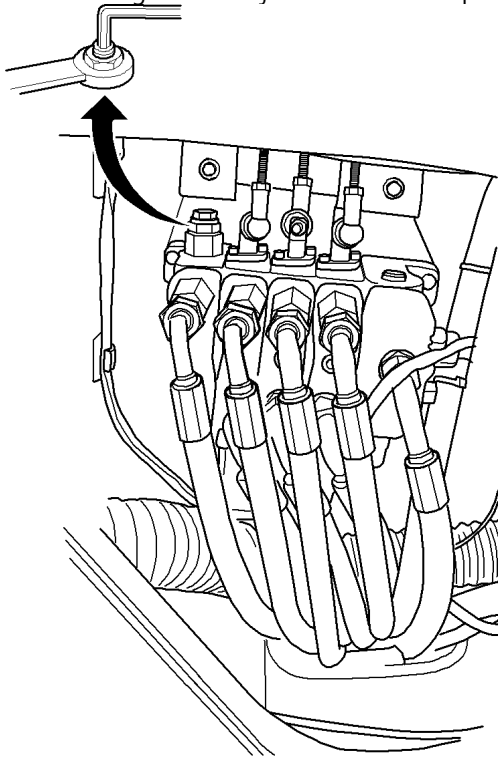
5. Read display on pressure gauge. For nominal value see [030 Hydraulic system, specification](#).

**NOTE!**

If the specified nominal value is not reached, set pressure at primary pressure limiter.

**Adjust**

6. Open right service hatch.
7. Release flange nut of adjustment screw on primary pressure limiter.

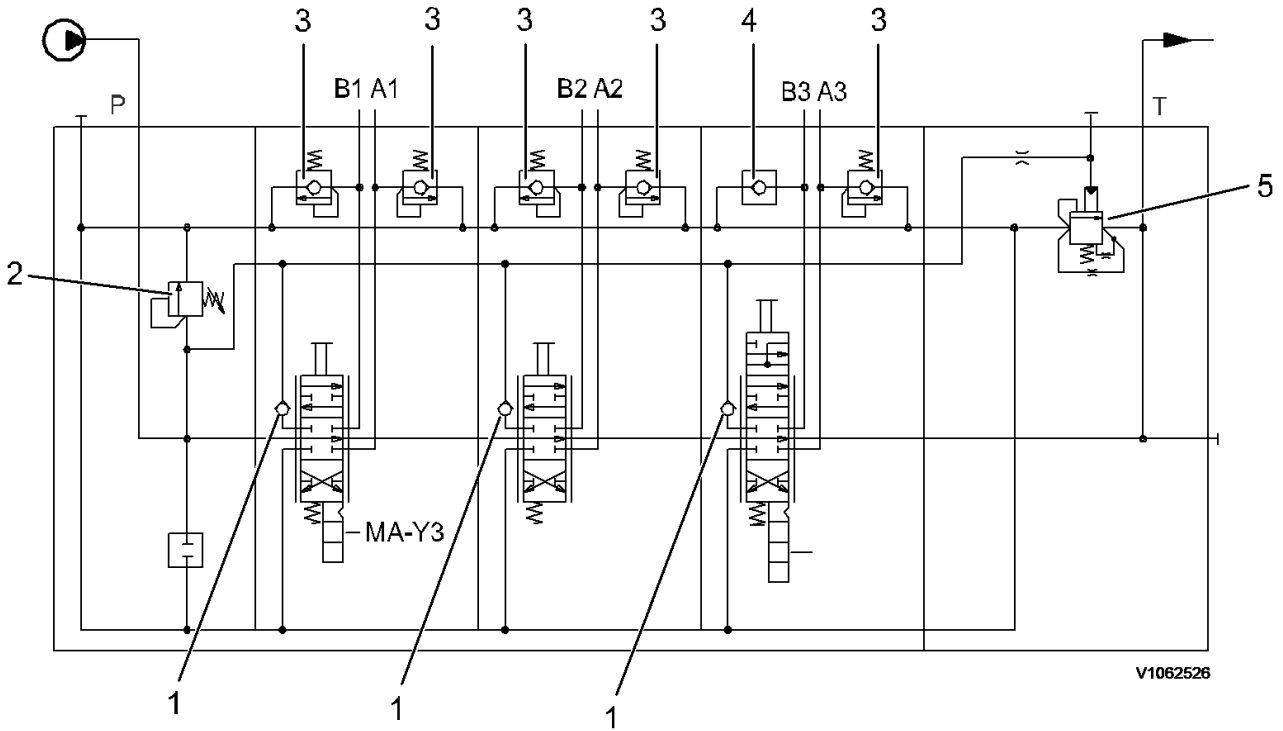


**Figure 3**

8. Turn adjustment screw to left or right until the nominal value is shown on the pressure gauge.  
Turn to right: increase pressure  
Turn to left: reduce pressure
9. Tighten flange nut with tightening torque of **22 Nm (16 lbf ft)**.

Document Title: <b>Hydraulic diagram, control valve</b>	Function Group: <b>912</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

**Hydraulic diagram, control valve**



**Figure 1**  
**Hydraulic diagram, control valve**

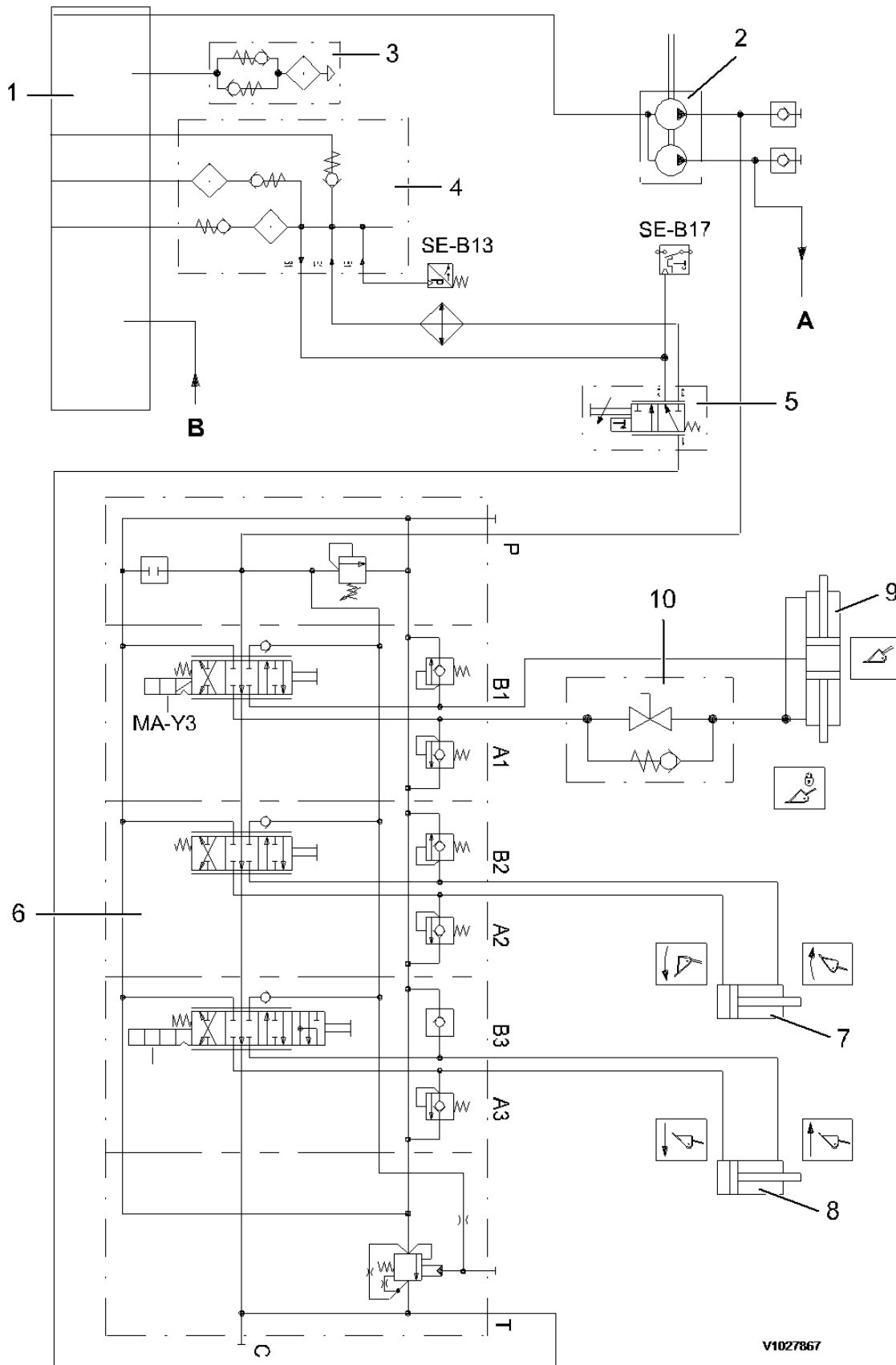
- 1. Load holding valve
- 2. Primary limiting valve
- 3. Secondary limiting valve
- 4. Anti-cavitation valves
- 5. Anticavitation valve

Document Title: <b>Hydraulic diagram working hydraulics</b>	Function Group: <b>912</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

[Go back to Index Page](#)

## **Hydraulic diagram working hydraulics**

**Circuit diagram, working hydraulics L20F/L25F with parallel-linkage**



**Figure 1**  
**Circuit diagram, working hydraulics L20F/L25F with parallel-linkage**

1. Hydraulic oil tank
2. Working hydraulics pump (double pump)
3. Bleed and ventilation filter



4. Suction and return filter
5. Thermostat
6. Control valve
7. Tilt cylinder
8. Lifting cylinder
9. Locking cylinder (attachment bracket)
10. Shut-off valve

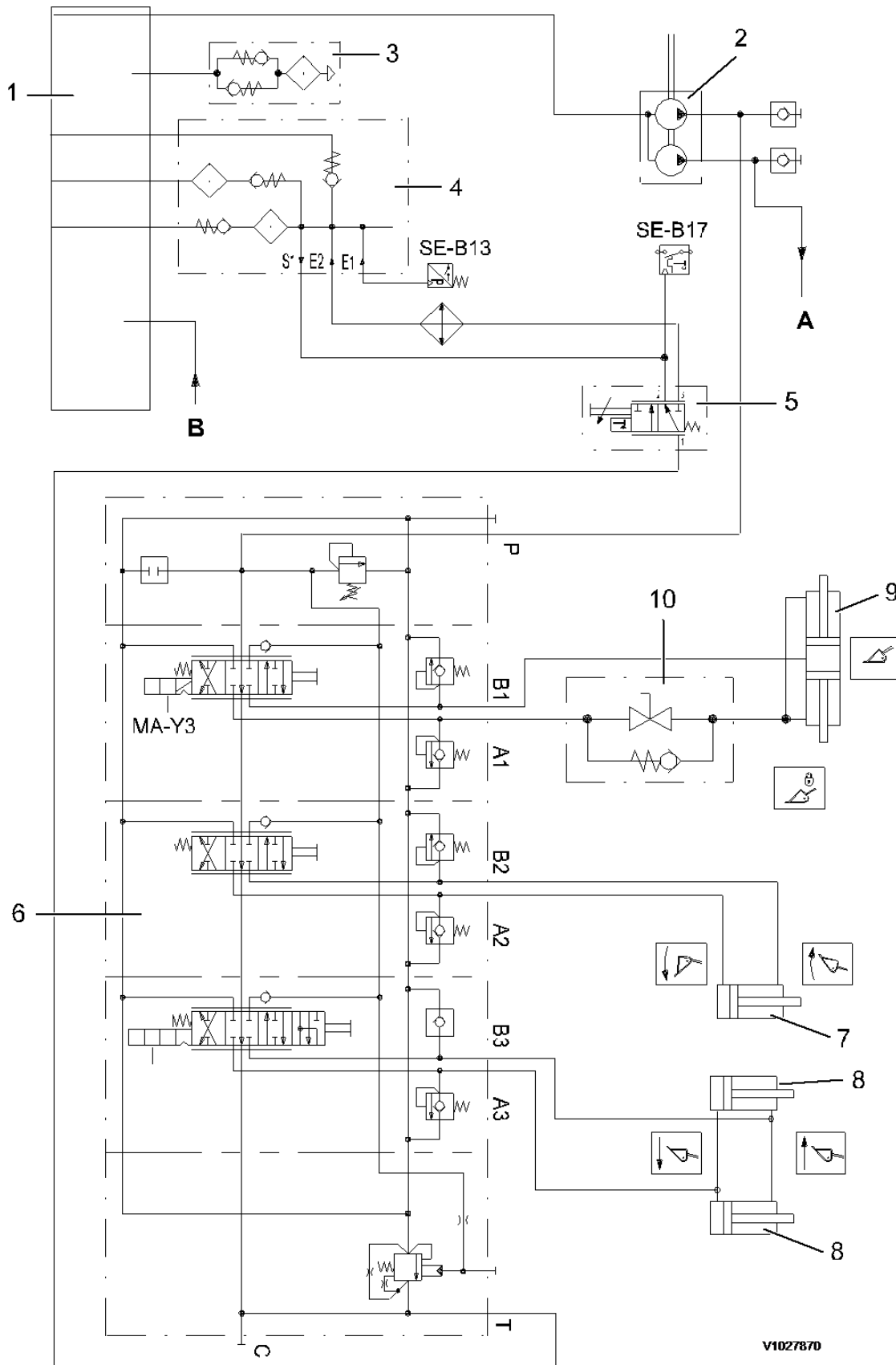
- A. to Orbitrol
- B. from inching valve/differential lock

Document Title: <b>Hydraulic diagram working hydraulics</b>	Function Group: <b>912</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

[Go back to Index Page](#)

## **Hydraulic diagram working hydraulics**

**Circuit diagram, working hydraulics L25F with Z- bar linkage**



V1027870

**Figure 1**  
**Circuit diagram, working hydraulics L25F with Z- bar linkage**

1. Hydraulic oil tank
2. Working hydraulics pump (double pump)
3. Bleed and ventilation filter

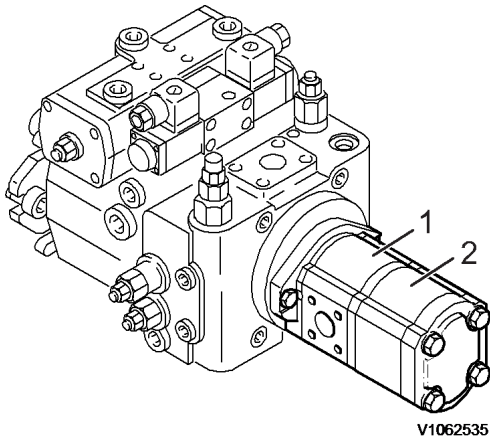
4. Suction and return filter
5. Thermostat
6. Control valve
7. Tilt cylinder
8. Lifting cylinder
9. Locking cylinder (attachment bracket)
10. Shut-off valve

- A. to Orbitrol
- B. from inching valve/differential lock

Document Title: <b>Hydraulic description</b>	pumps, <b>913</b>	Function Group:	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>				

## Hydraulic pumps, description

The gear pump is a double pump. Pump part 1 supplies the working hydraulics and pump part 2 the steering hydraulics. The double pump is flanged to the through drive on the hydrostatic pump.



**Figure 1**

Document Title: <b>Boom Suspension System, description</b>	Function Group: <b>916</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

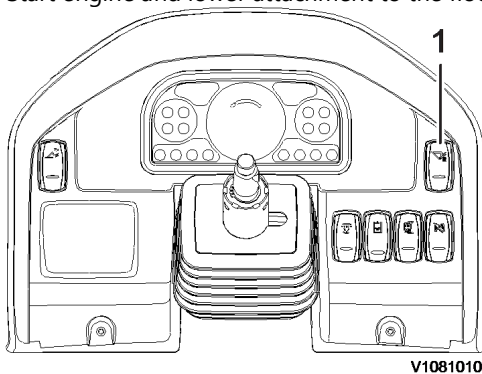
## Boom Suspension System, description

To improve driving comfort and reduce the mechanical stress on the frame, drive train and boom, a boom suspension system (BSS) is available as an optional accessory.

The boom suspension system (BSS) works only above a factory-set drive speed and lift height of the boom. Below this drive speed and lifting height, the boom suspension shuts off. In principle this function can only be preselected with the engine running.

### Activating the boom suspension system

- Start engine and lower attachment to the floor.



**Figure 1**

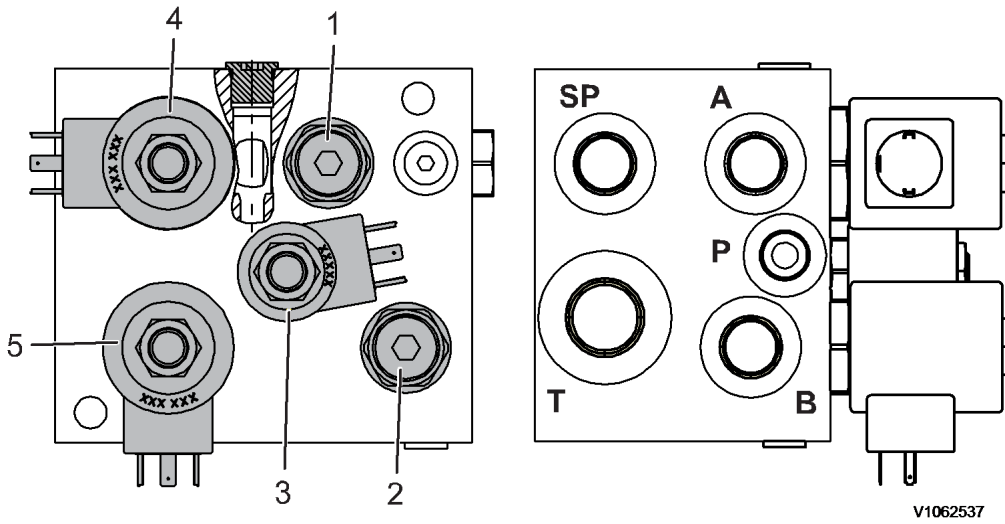
- Activate switch (1), check light in switch comes on = boom suspension system activated.
- The boom suspension system is switched off when the switch (1) is re-activated or after the motor is switched off.

**NOTE!**

The boom suspension system may not be activated during driving. For precise working with attachments, the boom suspension system must be disconnected.

### Valve block and accumulators for boom suspension system

The valve block and accumulators are in the front frame. The accumulators are precharged with 20 bar (290 psi) nitrogen and are filled via the accumulator charge valve (3). The switch-over valve (1) limits the accumulator charge pressure to max. 100 bar (1450 psi). If after the charging process, the boom is in the transport position (lift height inductive emitter) and the machine runs at set speed, the connection between the lifting cylinder head side (Y15) and accumulators or lifting cylinder rod side (Y16) to the tank is opened. The bucket load now lies on the accumulators and the rod side can draw in fluid from the tank.

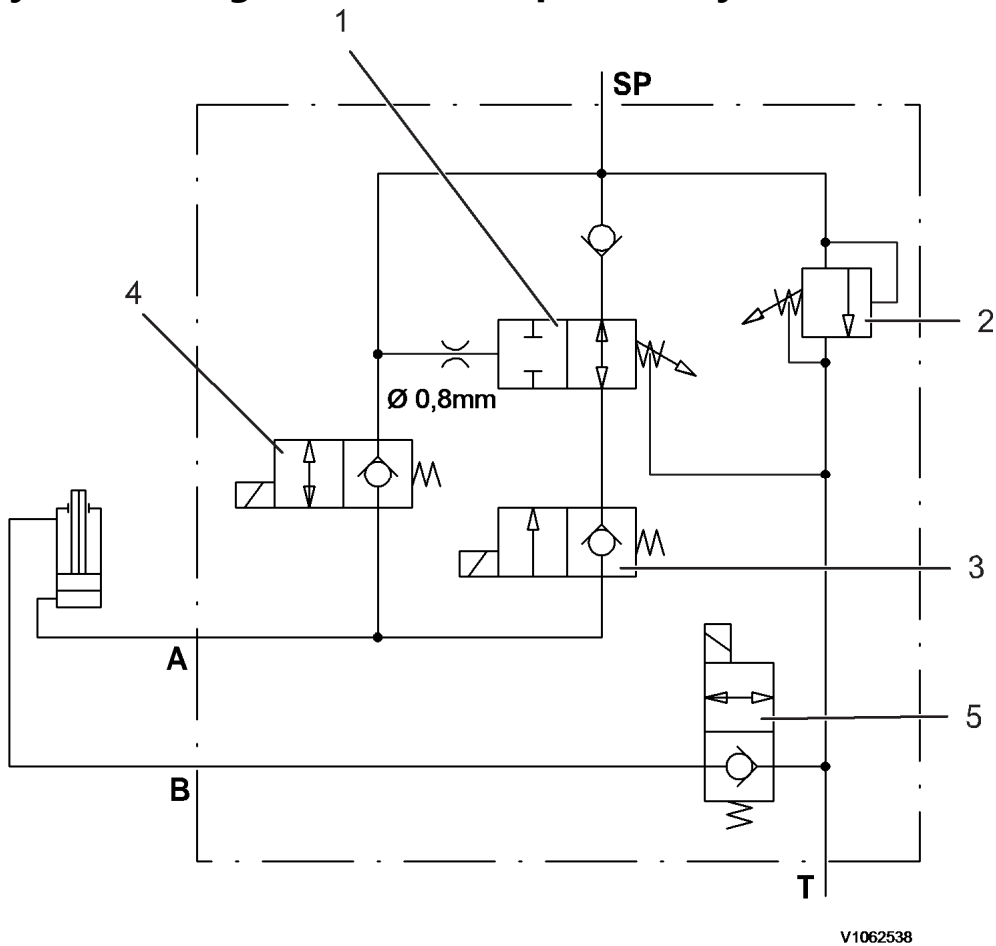


**Figure 2**  
**Valve block, boom suspension system**

1	Shift valve
2	Safety valve
3	Accumulator charge valve (Y14)
4	Head connection valve (Y15)
5	Rod compensation valve (Y16)
A	Head side connection
B	Rod side connection
P	Pump connection
T	Tank connection
SP	Accumulator connection

Document Title: <b>Hydraulic diagram, Boom Suspension System</b>	Function Group: <b>916</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

**Hydraulic diagram, Boom Suspension System**



**Figure 1**  
**Hydraulic circuit diagram, boom suspension system**

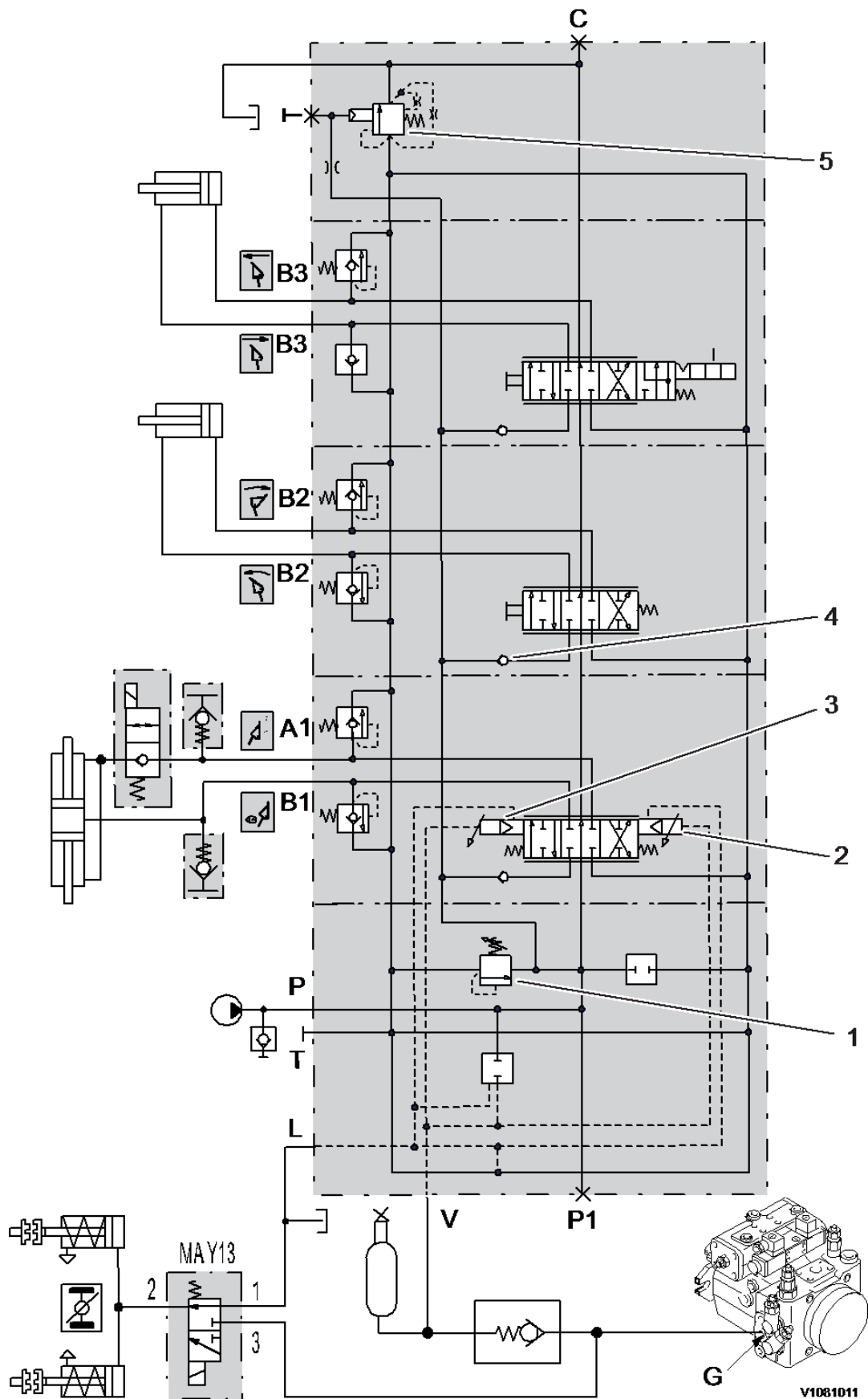
1	Shift valve
2	Safety valve
3	Accumulator charge valve (Y14)
4	Head connection valve (Y15)
5	Rod compensation valve (Y16)
A	Head side connection
B	Rod side connection
T	Tank connection
SP	Accumulator connection



Document Title: <b>Hydraulic diagram with option components</b>	Function Group: <b>916</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## **Hydraulic diagram with option components**

**Hydraulic diagram, control valve 3rd circuit proportional**



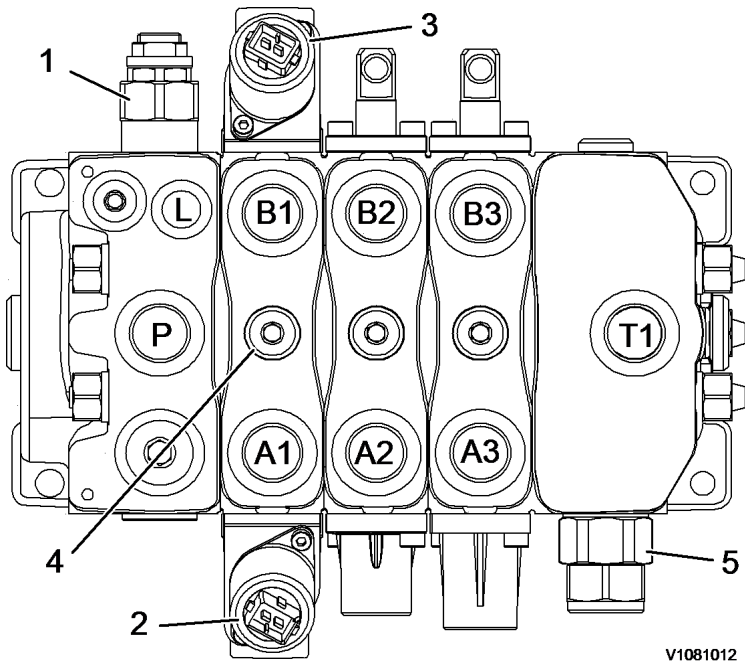
**Figure 1**  
**Hydraulic diagram, control valve 3rd circuit proportional**

1. Primary limiting valve (adjustable)
2. PWM-valve 9106 (-)

- 3. PWM-valve 9105 (+)
- 4. Load-holding valve
- 5. Pressure build-up valve

**Valve block**

The PWM valve is controlled via SE-9147 in the multi-function lever.



V1081012

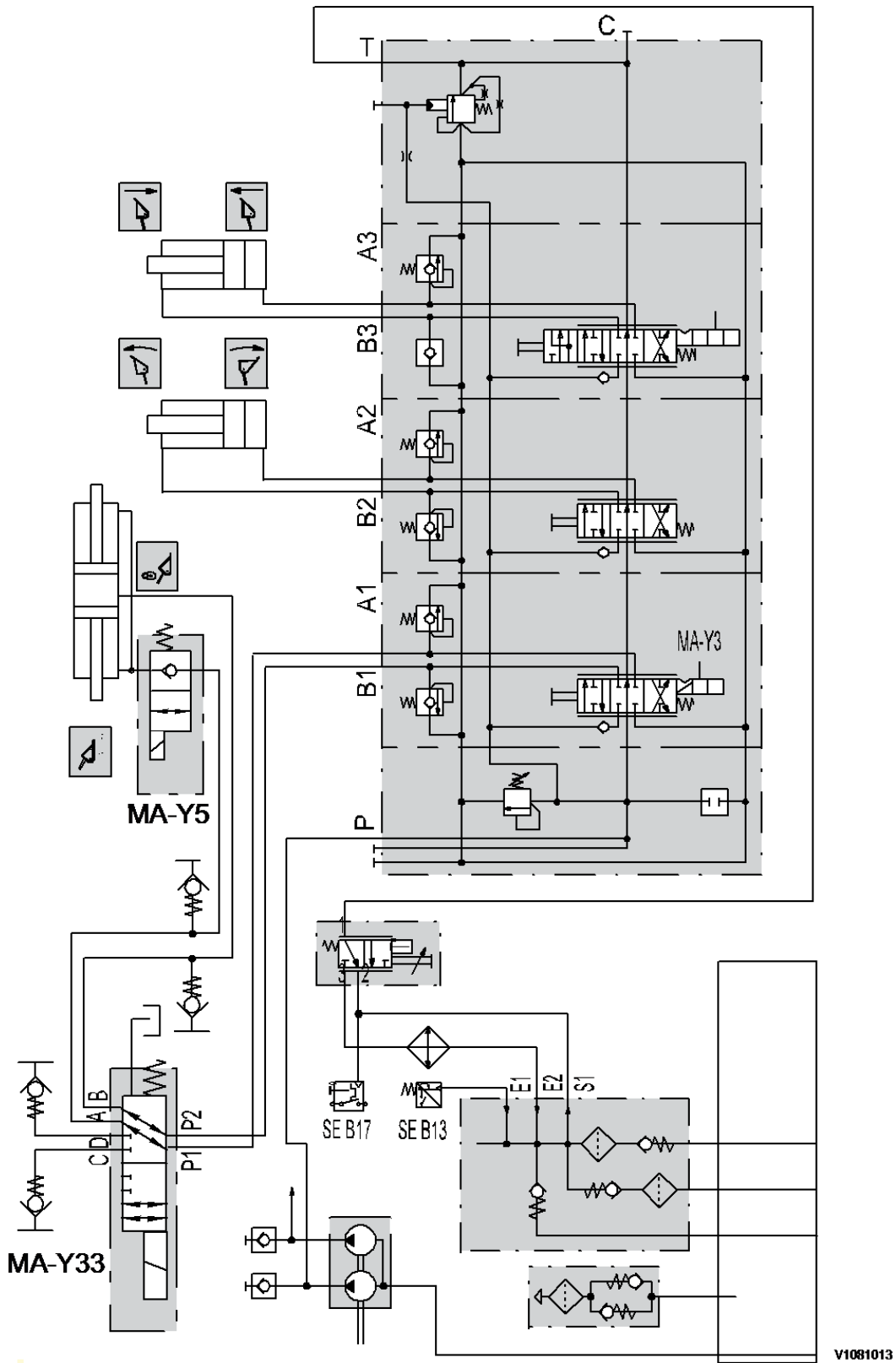
**Figure 2**

1	Primary limiting valve (adjustable)
2	PWM-valve 9106 (-)
3	PWM-valve 9106 (+)
4	Load-holding valve
5	Pressure build-up valve
P	Pressure connection, working hydraulics pump
T	Return connection hydraulic oil tank
L	Leak oil / return flow connection, PWM valves
A1	Locking cylinder connection "unlock"
B1	Locking cylinder connection "lock"
A2	Tilt cylinder connection, piston head side "tilt out"
B2	Tilt cylinder connection, piston rod side "tilt back"
A3	Lifting cylinder connection, piston head side "lower"
B3	Lifting cylinder connection, piston rod side "raise"

Document Title: <b>Hydraulic diagram with option components</b>	Function Group: <b>916</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## **Hydraulic diagram with option components**

**Hydraulic diagram, 4th hydraulic function switchable from 3rd function**

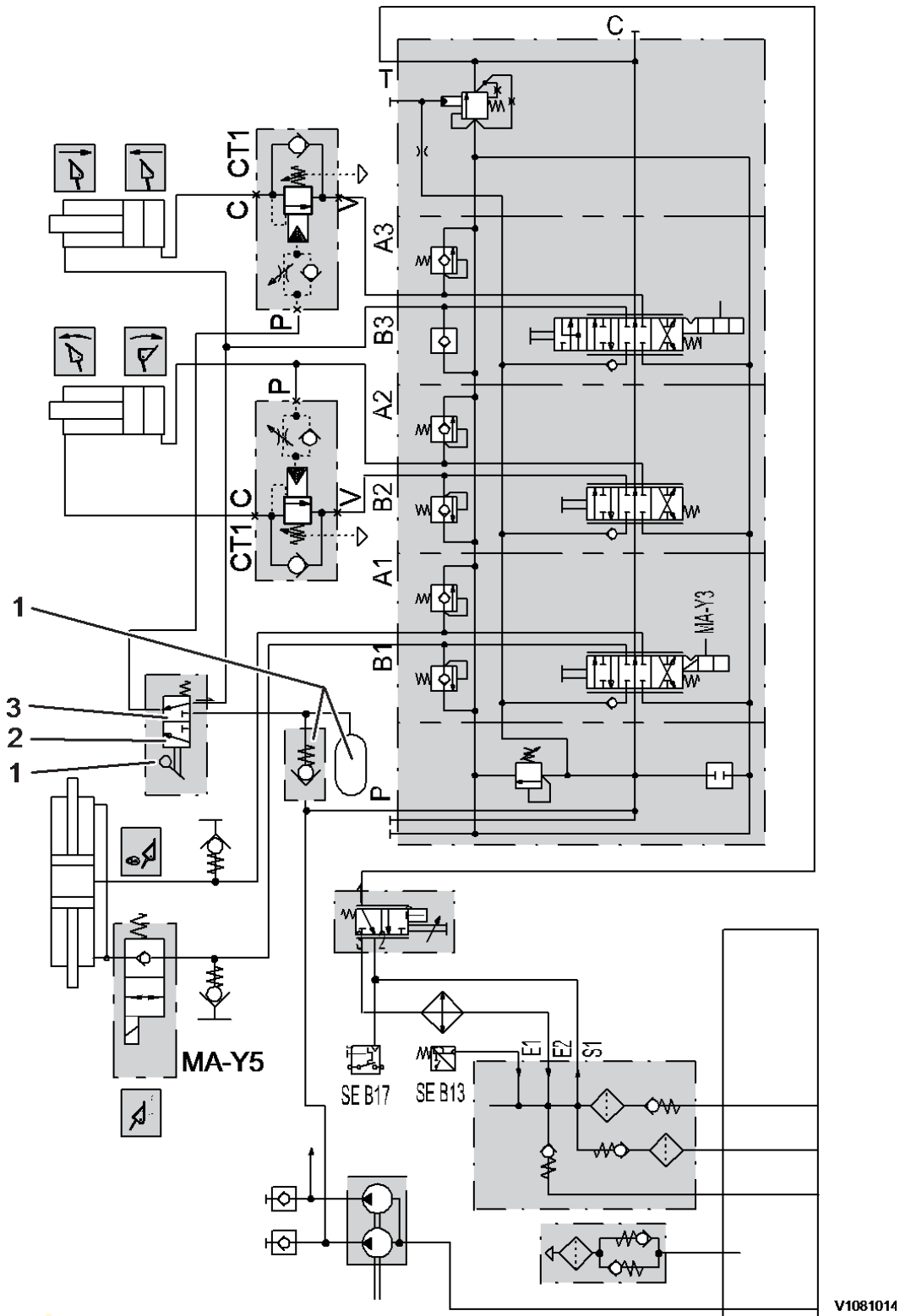


**Figure 1**  
**Hydraulic diagram, 4th hydraulic function switchable from 3rd function**

Document Title: <b>Hydraulic diagram with option components</b>	Function Group: <b>916</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## **Hydraulic diagram with option components**

**Hydraulic diagram, automatic shut-off valve for lift and tilt function**



V1081014

**Figure 1**  
**Hydraulic diagram, automatic shut-off valve for lift and tilt function**

1. Only with load fork operation option
2. Bucket operation position
3. Load fork operation position

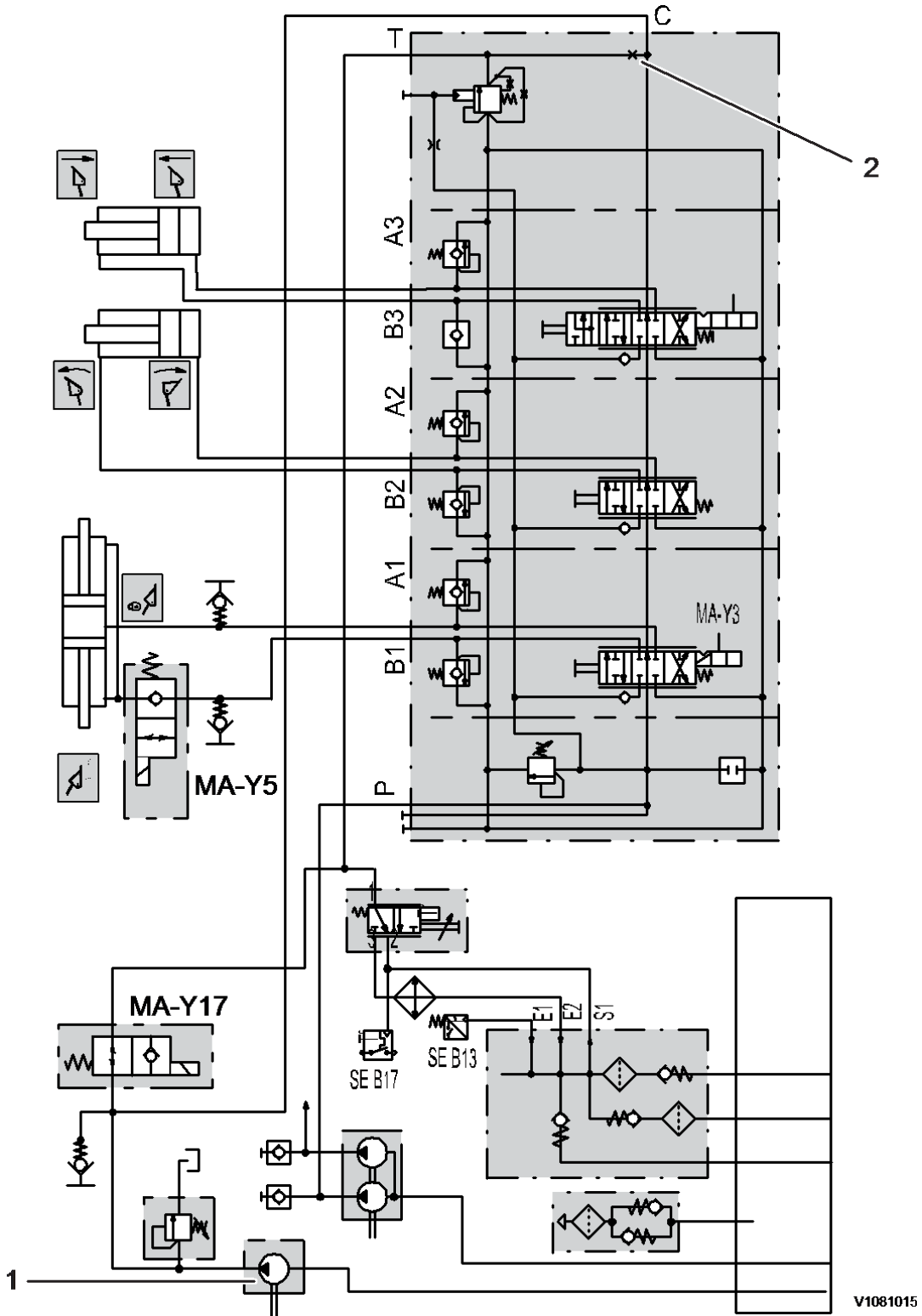
Document Title: <b>Hydraulic diagram with option components</b>	Function Group: <b>916</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## **Hydraulic diagram with option components**

### **Hydraulic diagram, auxiliary pump 45 l/min (12 US gpm)**

The auxiliary pump is driven via the diesel engine's power take-off. A plug is also fitted in the valve block.





**Figure 1**  
**Hydraulic diagram, auxiliary pump 45 l/min (12 US gpm)**

- 1. Auxiliary pump
- 2. Plug

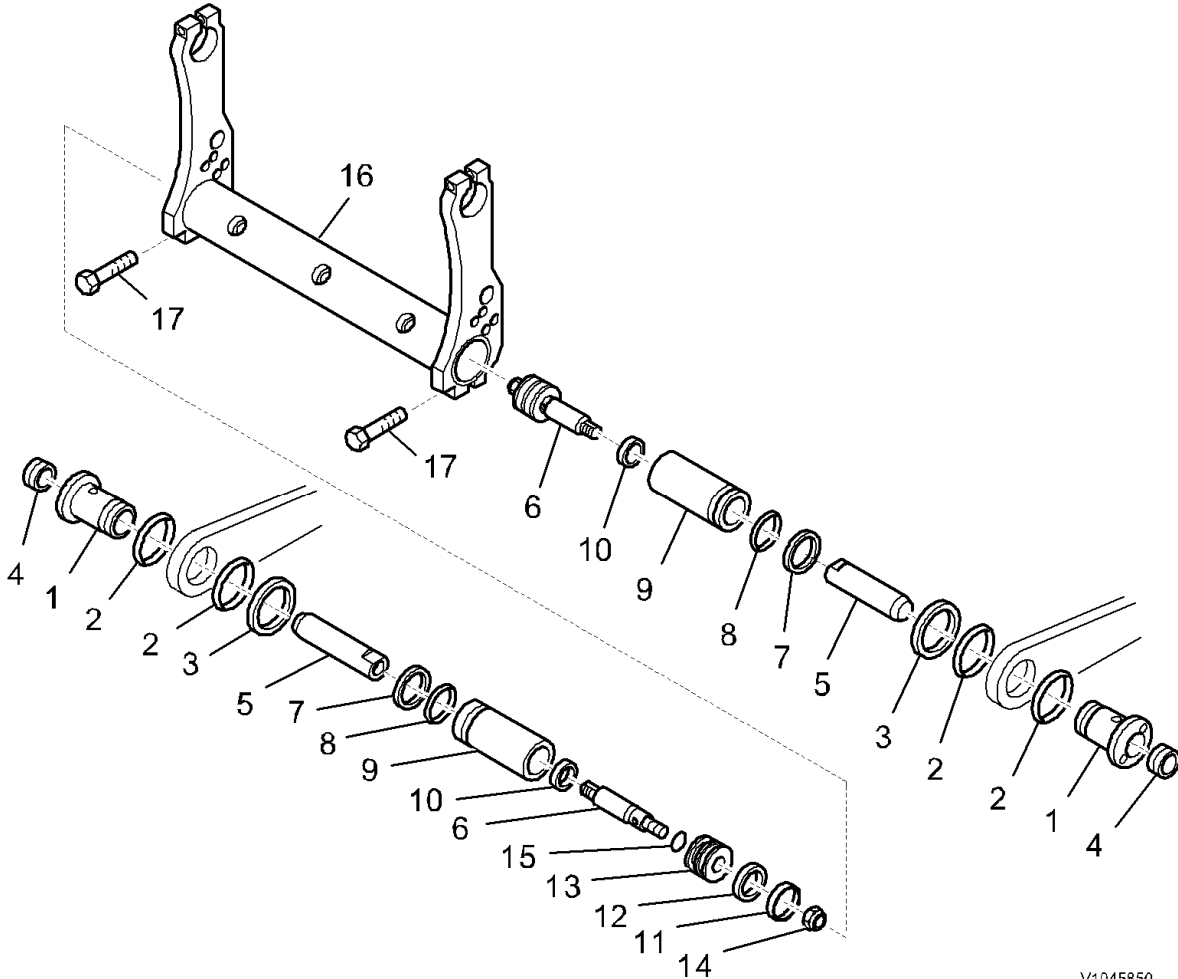
Document Title: <b>Hydraulic attachment bracket description</b>	Function Group: <b>924</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## **Hydraulic attachment bracket (quickfit), description**

The machine is fitted with a hydraulic tool attachment as standard. The hydraulic components of the tool attachment lie inside the lower cross member, protected from external influences. The locking bolts disappear completely into the tool attachment on unlocking. In locked state, they are covered by the bearing elements of the attachment.

Document Title: <b>Lock cylinder</b>	Function Group: <b>924</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

**Lock cylinder**



V1045850

**Figure 1**

- 1. Sleeve
- 2. O-ring
- 3. Washer
- 4. Scraper
- 5. Bolt
- 6. Piston rod
- 7. Support ring
- 8. O-ring
- 9. Bushing
- 10. Groove ring
- 11. Piston guide band
- 12. Sealing ring
- 13. Piston
- 14. Lock nut

15. O-ring
16. Member
17. Screw

Document Title: <b>Implement attachment, repacking hydraulic cylinder</b>	Function Group: <b>924</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

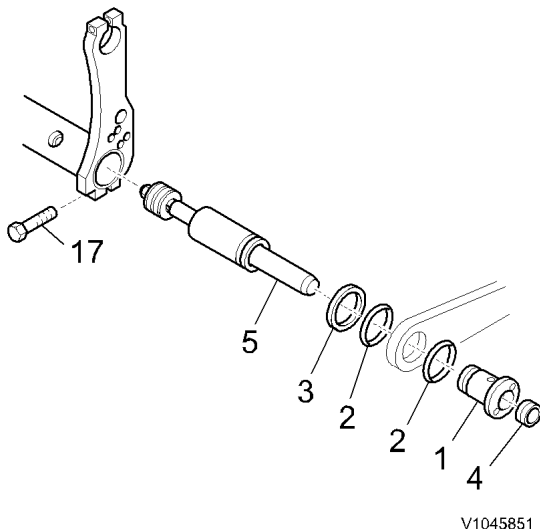
## Implement attachment, repacking removed hydraulic cylinder

Op nbr 945-056

[2915096 Protecting sleeve](#)

### NOTE!

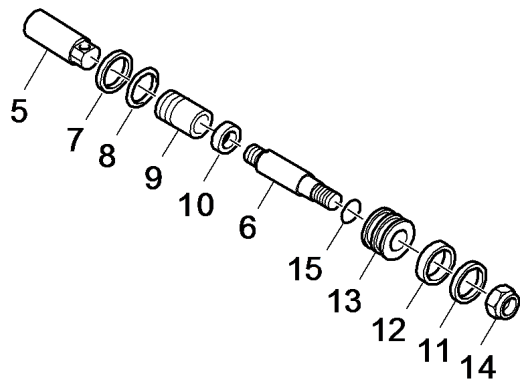
The protective sleeve (fitting aid) is required if the tool attachment is still mounted on the lifting frame.



**Figure 1**

### Removal (per side)

1. Loosen screw (17).
2. Unscrew sleeve (1) with two-hole nut driver.
3. Remove sleeve with O-ring (2) and washer (3).
4. Remove scraper (4) from sleeve.
5. Remove bolt (5) complete with piston rod.
6. Remove the support ring (7) and the O-ring (8) from the bush (9).



V1045935

**Figure 2**

7. Remove the piston strip guide (11) and sealing ring (12) from the piston (13).
8. Clamp piston rod fully, vertically in the vice and unscrew bolts (5).
9. Remove bush (9) from piston rod (6).
10. Remove grooved ring (10) from bush (9).
11. Unscrew lock nut (14) and remove piston (13) with O-ring (15).

**NOTE!**

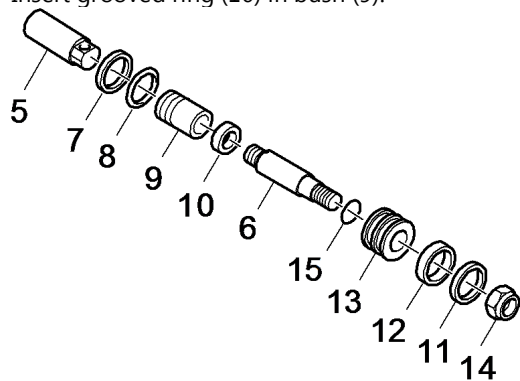
Clean parts in cleaning fluid and then dry.

**NOTE!**

In principle replace all seals and rubber parts.

**Installation (per side)**

12. Insert grooved ring (10) in bush (9).



V1045935

**Figure 3**

13. Place protective sleeve (2915096) on piston rod (6).
14. Press bush (9) over protective sleeve on piston rod (6).
15. Remove protective sleeve.
16. Screw piston rod (6) into the bolts (5) with Loctite 275 and tighten with a torque of **250 Nm (184 lbf ft)**.

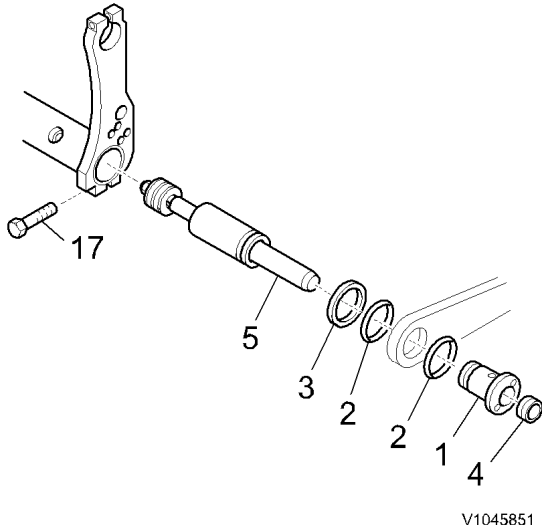
**NOTE!**

Setting time min 12 hours.

17. Place O-ring (8) and support ring (7) in the grooves of the bush (9).
18. Push O-ring (15) and piston (13) on the piston rod (6).
19. Screw on lock nut (14) and tighten with a torque of **330 Nm (243 lbf ft)**.
20. Place sealing ring (12) and piston strip guide (11) in the grooves of the piston (13).

**NOTE!**

Glue piston strip guide with Loctite 496 on the ends.



V1045851

**Figure 4**

21. Push protective sleeve (2915096) in the carrier and insert bolts with piston rod in the carrier.
22. Remove protective sleeve.
23. Insert scraper (4) in the sleeve (1).
24. Screw in sleeve (1) with washer (3) and O-ring (2) and tighten play-free with a two-hole nut driver, then turn back half a turn.
25. Tighten bolt (17) with a tightening torque of **310 Nm (229 lbf ft)**.

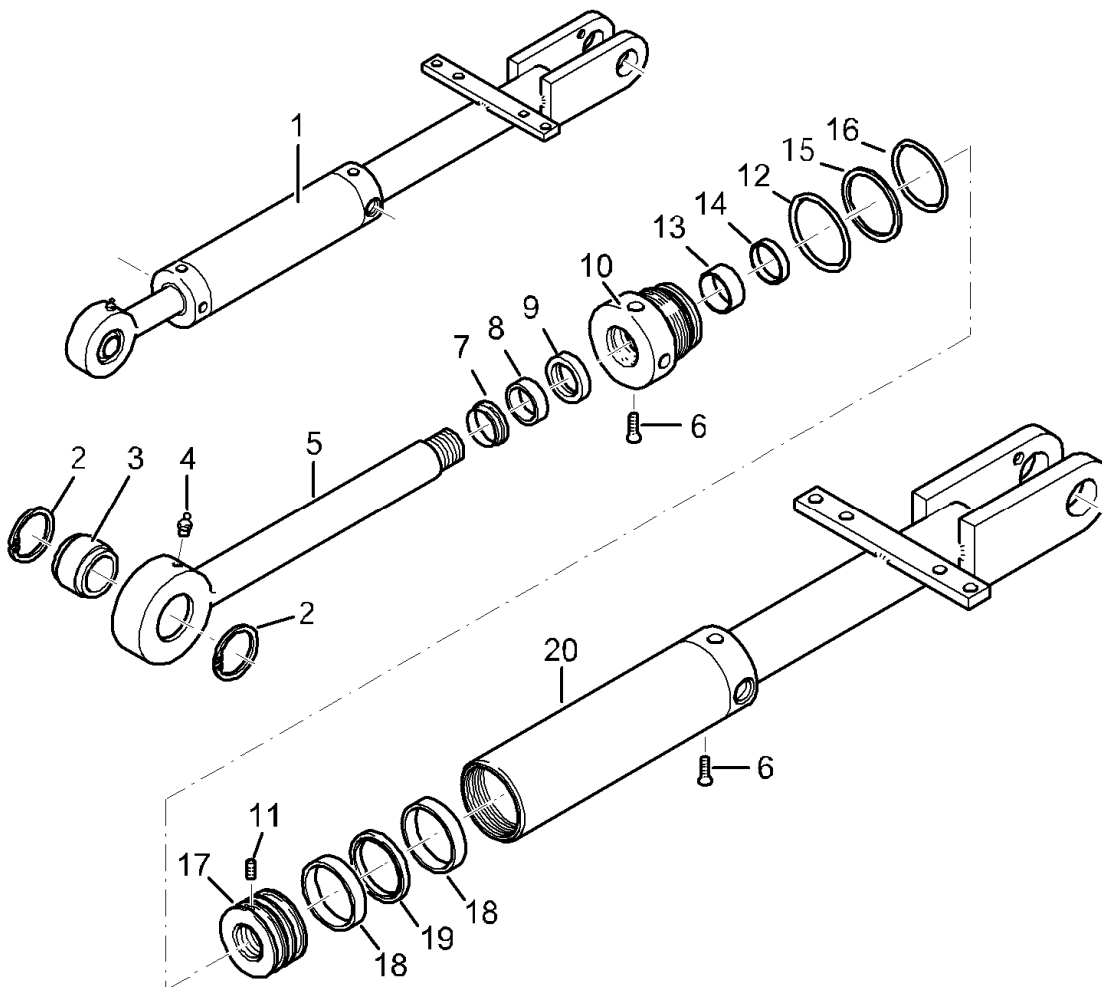
Document Title: <b>Tilting and lifting cylinders</b>	Function Group: <b>945</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

[Go back to Index Page](#)

## Tilting and lifting cylinders

### L20F/L25F with parallel-linkage

<b>Tilt cylinder: 1 pc. double-acting</b>	
Piston rod diameter	50 mm (1.97 in)
Inside diameter	100 mm (3.94 in)
Stroke	400 mm (15.75 in)



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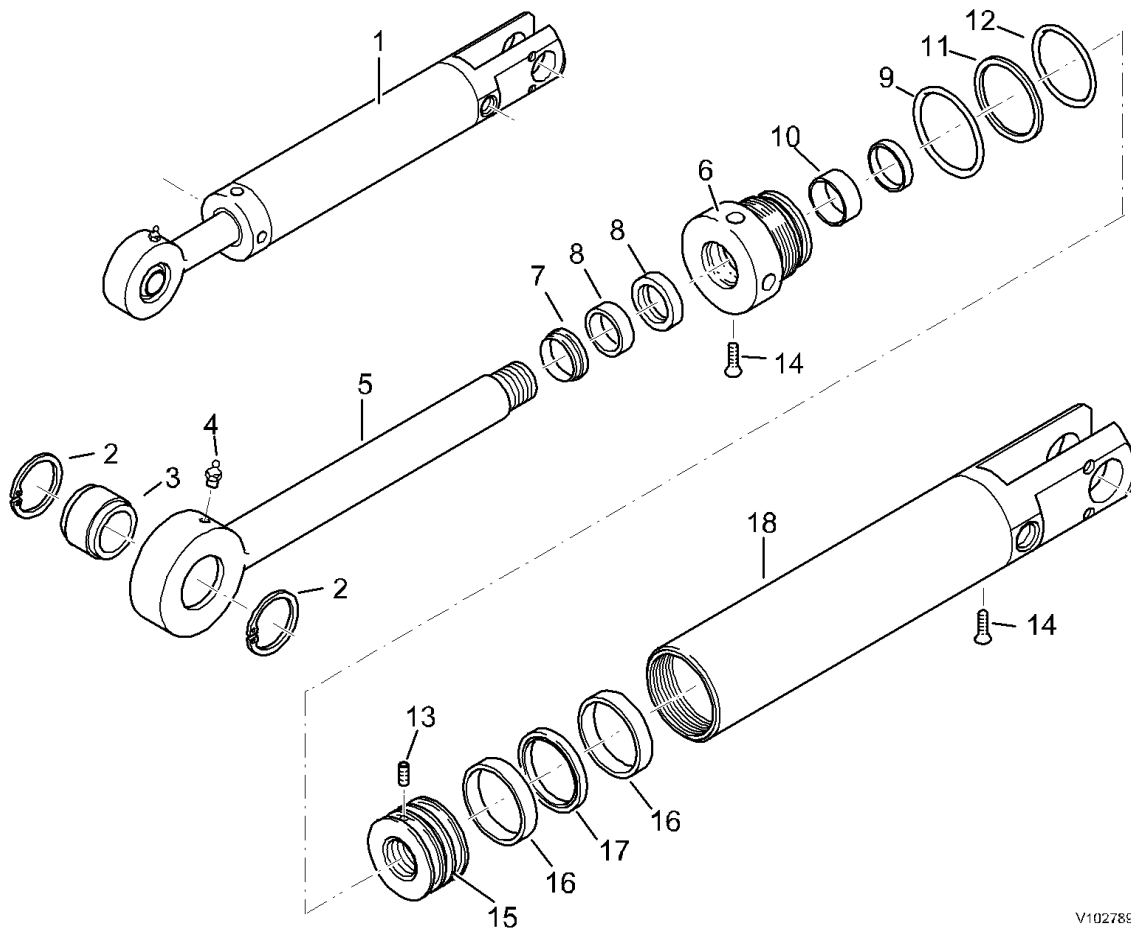
**Figure 1**  
**Tilt cylinder L20F/L25F with parallel-linkage**

- |                 |               |
|-----------------|---------------|
| 1 Tilt cylinder | 11 Plug       |
| 2 Circlip       | 12 O-ring     |
| 3 Link bearing  | 13 Guide ring |



- |                  |                 |
|------------------|-----------------|
| 4 Grease nipple  | 14 Support ring |
| 5 Piston rod     | 15 Support ring |
| 6 Lock screw     | 16 O-ring       |
| 7 Scraper ring   | 17 Piston       |
| 8 Guide ring     | 18 Guide ring   |
| 9 Groove ring    | 19 Piston seal  |
| 10 Guide bushing | 20 Housing      |

<b>Lifting cylinder: 1 pc. double-acting</b>	
Piston rod diameter	50 mm (1.97 in)
Inside diameter	100 mm (3.94 in)
Stroke	603 mm (23.74 in)



V1027894

**Figure 2**  
**Lifting cylinder L20F/L25F with parallel-linkage**

- |                    |                 |
|--------------------|-----------------|
| 1 Lifting cylinder | 10 Guide ring   |
| 2 Circlip          | 11 Support ring |
| 3 Link bearing     | 12 O-ring       |
| 4 Grease nipple    | 13 Plug         |
| 5 Piston rod       | 14 Lock screw   |
| 6 Guide bushing    | 15 Piston       |
| 7 Scraper ring     | 16 Guide ring   |
| 8 Groove ring      | 17 Piston seal  |
| 9 O-ring           | 18 Housing      |

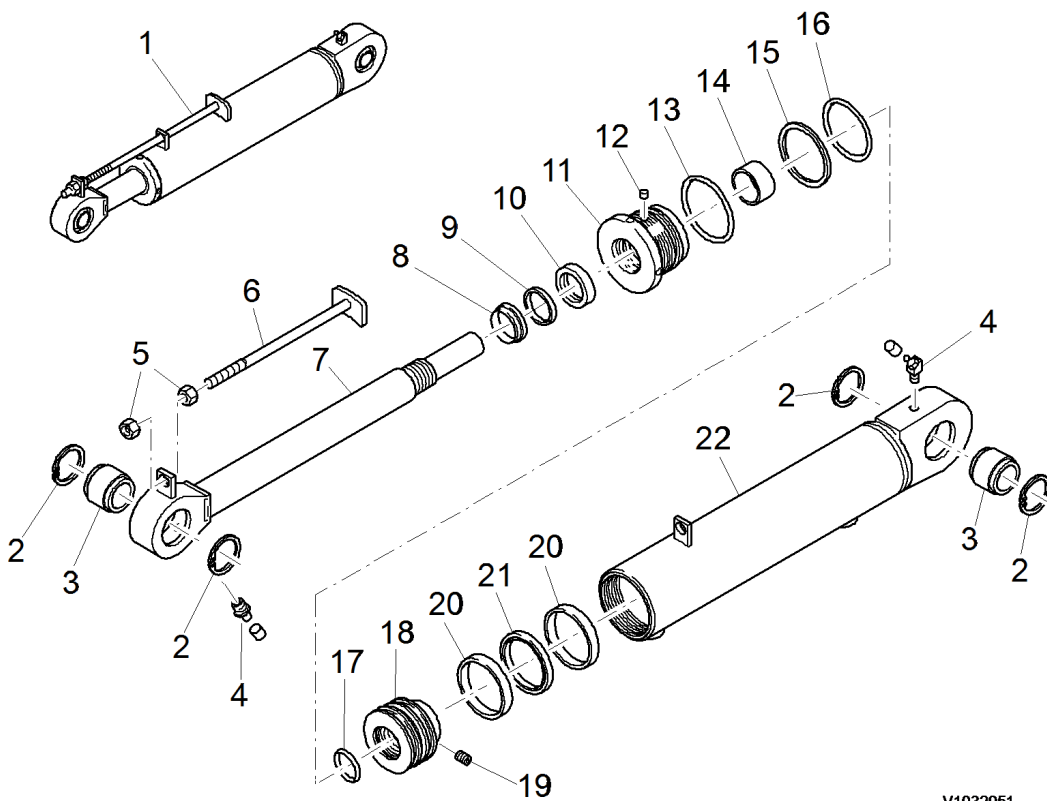
Document Title: <b>Tilting and lifting cylinders</b>	Function Group: <b>945</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

[Go back to Index Page](#)

## Tilting and lifting cylinders

### L25F with Z- bar linkage

<b>Tilt cylinder: 1 pc. double-acting</b>	
Piston rod diameter	50 mm (1.97 in)
Inside diameter	100 mm (3.94 in)
Stroke	530 mm (20.87 in)



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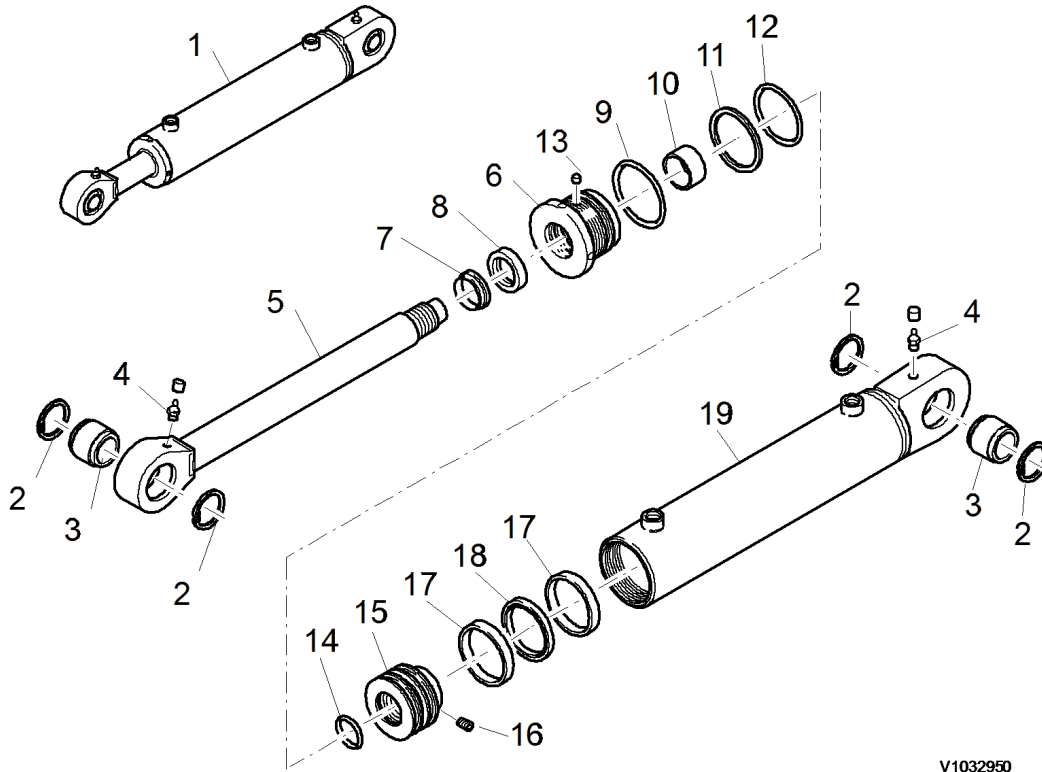
**Figure 1**  
**Tilt cylinder L25F with Z- bar linkage**

- |                 |                 |
|-----------------|-----------------|
| 1 Tilt cylinder | 12 Plug         |
| 2 Circlip       | 13 O-ring       |
| 3 Link bearing  | 14 Guide ring   |
| 4 Grease nipple | 15 Support ring |
| 5 Nut           | 16 O-ring       |
| 6 Indicator bar | 17 O-ring       |
| 7 Piston rod    | 18 Piston       |
| 8 Scraper ring  | 19 Pin          |

- 9 Guide ring
- 10 Groove ring
- 11 Guide bushing

- 20 Guide ring
- 21 Piston seal
- 22 Housing

<b>Lifting cylinder: 2 pc. double-acting</b>	
Piston rod diameter	45 mm (1.77 in)
Inside diameter	80 mm (3.15 in)
Stroke	552 mm (21.73 in)



V1032950

**Figure 2**  
**Lifting cylinder L25F with Z- bar linkage**

- 1 Lifting cylinder
- 2 Circlip
- 3 Link bearing
- 4 Grease nipple
- 5 Piston rod
- 6 Guide bushing
- 7 Scraper ring
- 8 Groove ring
- 9 O-ring
- 10 Guide ring

- 11 Support ring
- 12 O-ring
- 13 Plug
- 14 O-ring
- 15 Piston
- 16 Pin
- 17 Guide ring
- 18 Piston seal
- 19 Housing

Document Title: <b>Lift cylinder, replacing</b>	Function Group: <b>945</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## Lift cylinder, replacing

Op nbr 945-004

1. Bring machine to service position and release pressure on hydraulic system.
2. Switch off the battery connection switch.

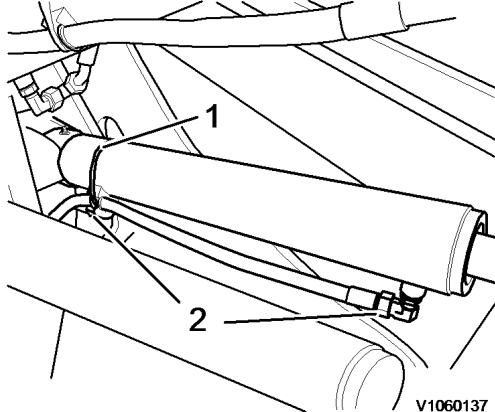


**WARNING**

The work involves handling heavy components - failure to stay alert may result in severe crushing injuries.

### Removing

3. Remove hose clamp (1) on lifting cylinder.



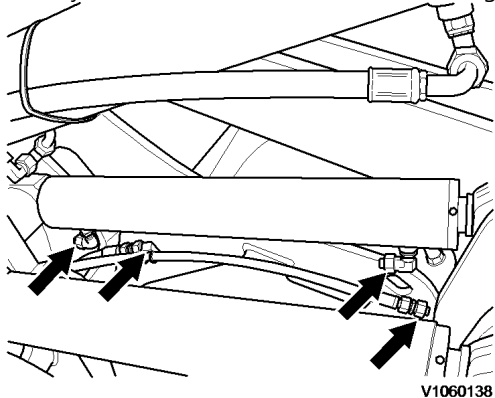
**Figure 1**

4. Remove hydraulic hose (2) on piston rod / piston head side.

**NOTE!**

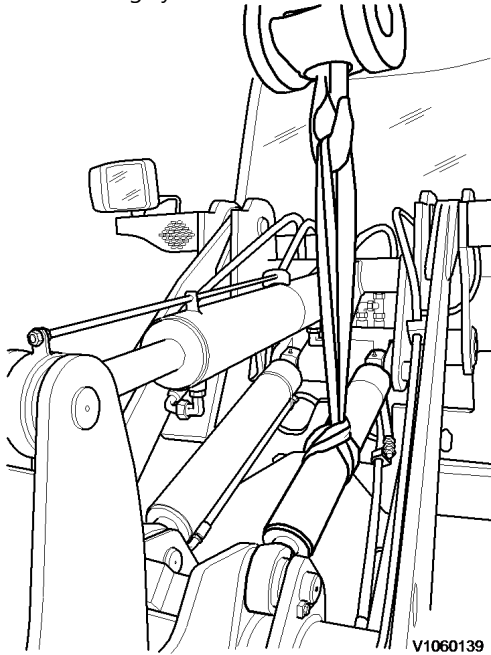
Place suitable catchment container below to catch escaping oil.

5. Seal hydraulic hoses and connections to lifting cylinder (arrows) with stoppers.



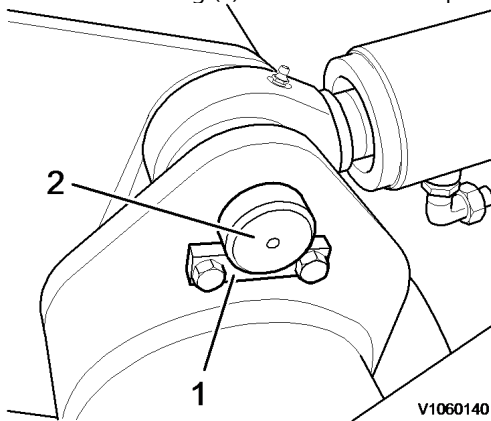
**Figure 2**

6. Attach lifting cylinder to crane with suitable lifting gear.



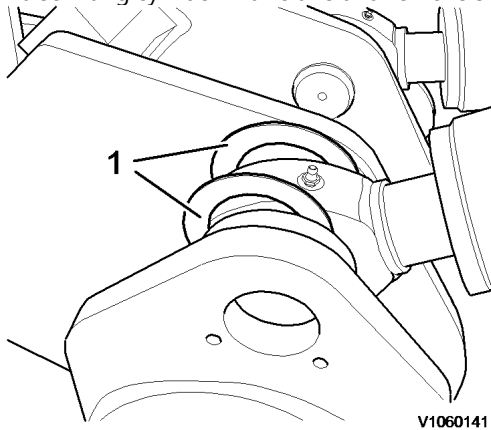
**Figure 3**

7. Remove bolt fixing (1) on the boom crosspiece and withdraw bolts (2).



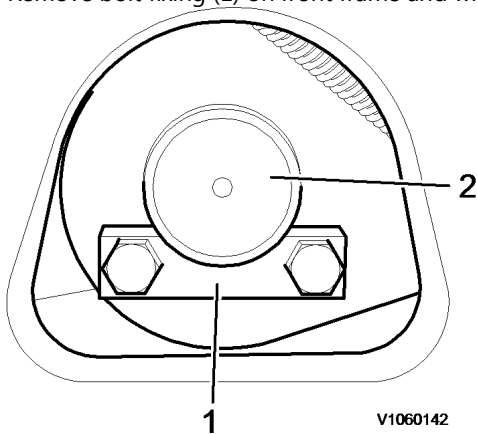
**Figure 4**

8. Raise lifting cylinder with crane and remove shims (1) on both sides.



**Figure 5**

9. Remove bolt fixing (1) on front frame and withdraw bolt (2).



**Figure 6**

10. Lift out lifting cylinder and remove shims on both sides. Deposit lifting cylinder on a suitable base.

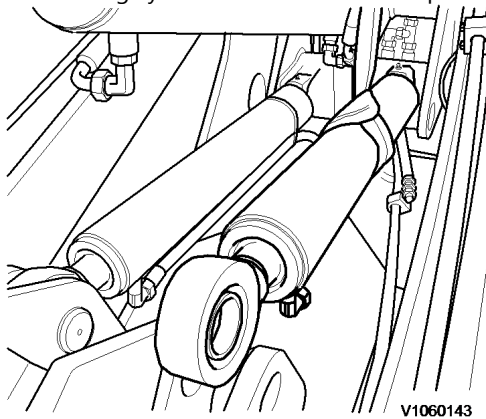
**NOTE!**

Weight of lifting cylinder on machine L20B, SN 170 and L25B, SN 175 approx. 40.5 Kg ( 89 lb).

Weight of lifting cylinder on machine L25B, SN 176 approx. 31 Kg (68 lb).

**Installing**

11. Clean removed bolts and bearing point on lifting cylinder.
12. Raise lifting cylinder with crane and adapt to bearing position on front frame.



**Figure 7**

**NOTE!**

Compensate for existing play with shims on both sides.

13. Lightly grease bolts and insert in bearing points. Fit bolt fixing.
14. Fit lifting cylinder into bearing point (boom cross piece).  
**NOTE!**  
Compensate for existing play with shims on both sides.
15. Lightly grease bolts and insert in bearing points. Fit bolt fixing.
16. Remove stoppers from hydraulic hoses and connections to lifting cylinder.

17. Fit hydraulic hoses on piston rod / piston head side.
18. Fit hose clamp on lifting cylinder.
19. Degrease bearing points on lifting cylinder.

Document Title: <b>Tilt cylinder, replacing</b>	Function Group: <b>945</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/8 0</b>
Profile: <b>CWL, L25F [GB]</b>			

## Tilt cylinder, replacing

Op nbr 945-008

1. Bring machine to service position and release pressure on hydraulic system.
2. Switch off the battery connection switch.

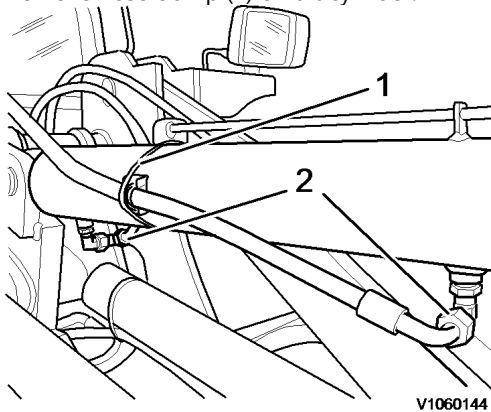


### **WARNING**

The work involves handling heavy components - failure to stay alert may result in severe crushing injuries.

### Removing

3. Remove hose clamp (1) on tilt cylinder.



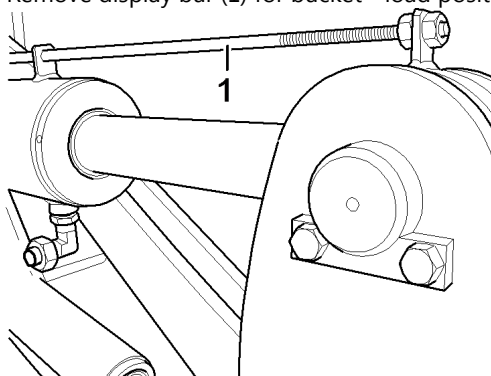
**Figure 1**

4. Remove hydraulic hose (2) on piston rod / piston head side.

#### **NOTE!**

Place suitable catchment container below to catch escaping oil.

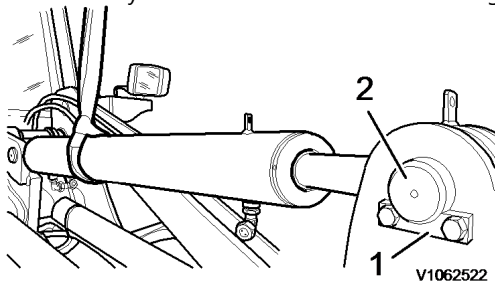
5. Seal hydraulic hoses and connections to tilt cylinder (arrows) with stoppers.
6. Remove display bar (1) for bucket - load position.





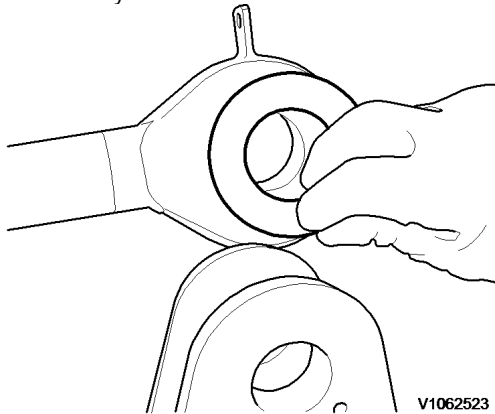
**Figure 2**

7. Attach tilt cylinder to crane with suitable lifting gear.



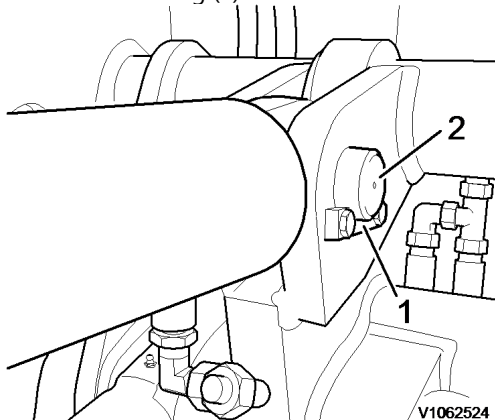
**Figure 3**

8. Remove bolt fixing (1) on tilt arm and drive out bolt (2) with suitable tool.
9. Raise tilt cylinder with crane and remove shims (1) on both sides.



**Figure 4**

10. Remove bolt fixing (1) on front frame and drive out bolt (2) with suitable tool.



**Figure 5**

11. Lift out tilt cylinder and remove shims on both sides. Deposit tilt cylinder on a suitable base.

**NOTE!**

Weight of tilt cylinder on machine L20B, SN 170 and L25B, SN 175 approx. 57.5 Kg (127 lb).

Weight of tilt cylinder on machine L25B, SN 176 approx. 43.5 Kg (96 lb).

## Installing

12. Clean removed bolts and bearing point on tilt cylinder.
13. Raise tilt cylinder with crane and adapt to bearing position on front frame.  
**NOTE!**  
Compensate for existing play with shims on both sides.
14. Lightly grease bolts and insert in bearing points. Fit bolt fixing.
15. Fit tilt cylinder into bearing point on tilt arm.  
**NOTE!**  
Compensate for existing play with shims on both sides.
16. Lightly grease bolts and insert in bearing points. Fit bolt fixing.
17. Remove stoppers from hydraulic hoses and connections to tilt cylinder.
18. Fit hydraulic hoses on piston rod / piston head side.
19. Fit hose clamp on tilt cylinder.
20. Fit display bar for bucket - load position.
21. Degrease bearing points on tilt cylinder.

Many thanks for your purchase.  
Happy every day.