

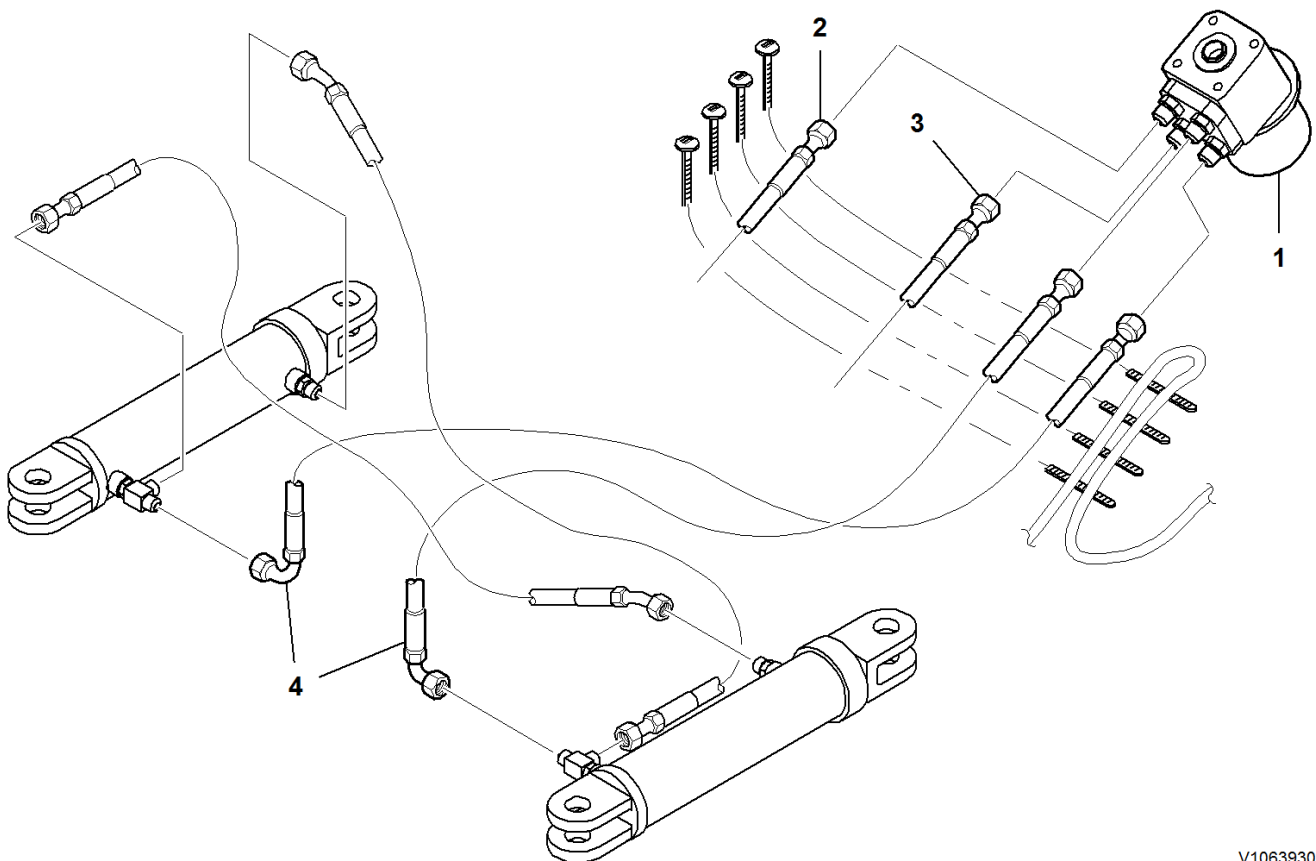
Document Title: Steering description	Function Group: system, 640	Information Type: Service Information	Date: 2015/9/10
Profile: COS, SD116DX [GB]			

Steering system, description

The steering system in the machine consists of a steering wheel, two steering cylinders, a steering control unit and a steering pump.

Oil flow to the steering cylinders is distributed through the steering control unit. The steering control unit is located at the underside of the front of the operator's platform. The steering control unit is an open centred unit with an open connection between the pump and the hydraulic oil tank in the neutral position. In open centre steering systems, pumps with fixed displacement are used.

Internally, the steering control unit contains a main relief valve, cylinder port shock valves and anti cavitation valves. These valves are all preset and cannot be adjusted externally. If a problem is diagnosed in the steering control unit, it must be replaced. Turning the steering wheel directs oil from port P to either port R or port L, depending on whether the steering wheel is turned right or left. Oil flows to the steering cylinders returning to the opposite port of the steering control unit, which is exited from port R or port L. The control unit will direct the oil out of port T to the hydraulic oil tank.



V1063930

Figure 1
Steering system

1. Steering control unit, (orbital)
2. Line to steering return filter (and tank)
3. Line from steering pump
4. Lines to/from steering cylinders

The steering pump is located at the front of the rear frame under the operators platform, (accessible by placing the operators platform in the forward tilt position). The steering pump is a fixed displacement gear pump. Oil is drawn into the steering pump from the hydraulic oil tank and from there, flows out to the steering control unit.

Document Title: Steering system, symptom troubleshooting	Function Group: 640	Information Type: Service Information	Date: 2015/9/10
Profile: COS, SD116DX [GB]			

Steering system, symptom troubleshooting

NOTE!

Possible causes for each symptom are numbered in order of most likely occurrence.

Symptom	Possible cause
No steering	<ol style="list-style-type: none"> 1. Hydraulic oil level in reservoir (low) 2. System relief pressure 3. Broken cylinder 4. Cylinder bypass 5. Contaminated system 6. Drive coupling
Hard to steer	<ol style="list-style-type: none"> 1. Hydraulic oil level in reservoir (low) 2. System pressure check 3. Steering pump 4. Contaminated system 5. Cylinder bypass 6. Broken cylinder
Off and On again	<ol style="list-style-type: none"> 1. Hydraulic oil level in reservoir (low) 2. Air in system 3. Contaminated system
Wander or drift	<ol style="list-style-type: none"> 1. Hydraulic oil level in reservoir (low) 2. Air in system 3. Contaminated system 4. Control valve
Steering slip (intermittent)	<ol style="list-style-type: none"> 1. Hydraulic oil level in reservoir (low) 2. Air in system 3. System pressure check 4. Cylinder bypass 5. Control valve 6. Contaminated system

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Hello dear friend!

Thank you very much for reading.

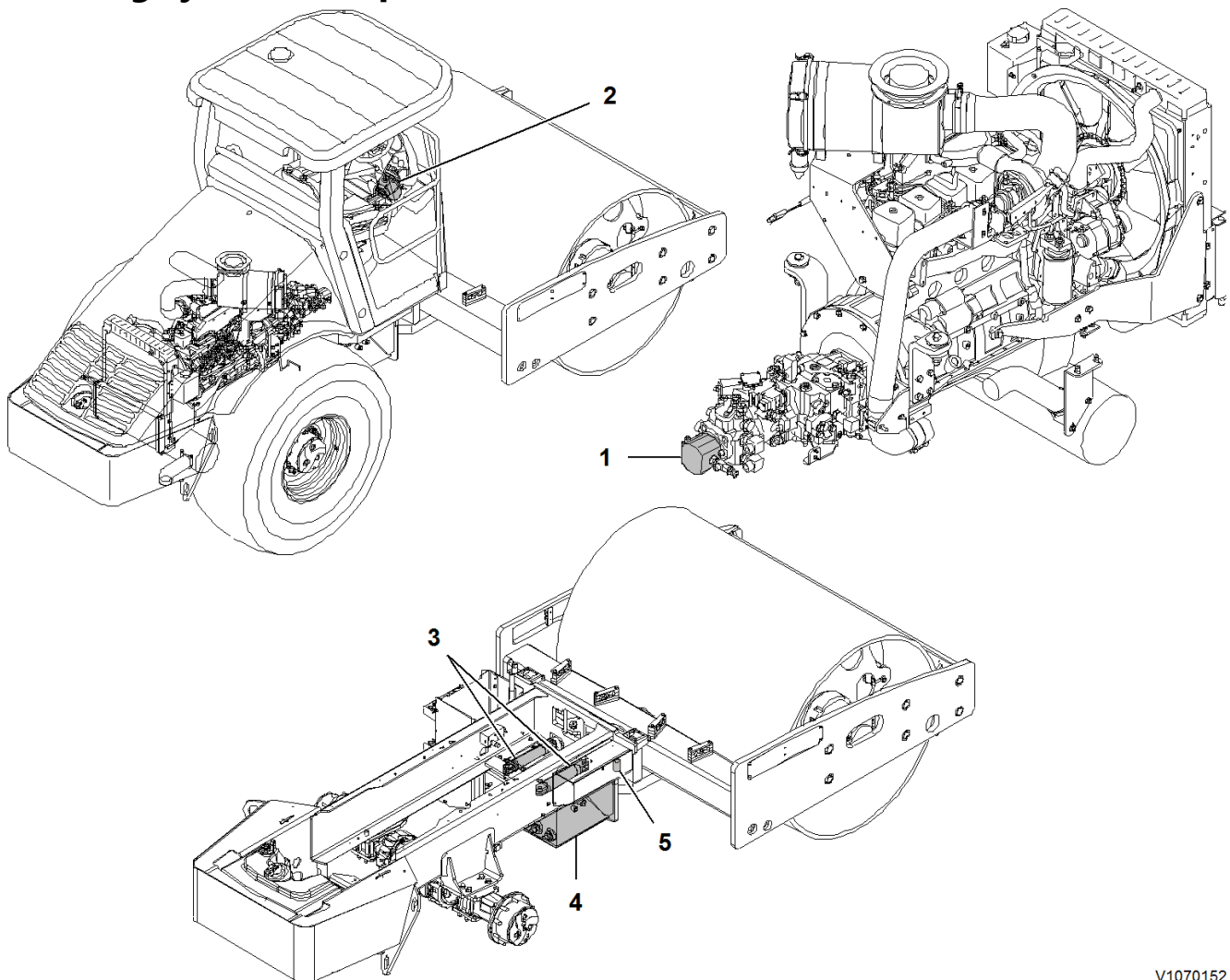
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Document Title: Steering system, component location	Function Group: 640	Information Type: Service Information	Date: 2015/9/10
Profile: COS, SD116DX [GB]			

Steering system, component location



V1070152

Figure 1
Steering system, components

1. Steering pump
2. Steering valve, (orbital motor)
3. Steering cylinders
4. Hydraulic tank
5. Return filter

Document Title: Adjustable steering column, replacing	Function Group: 641	Information Type: Service Information	Date: 2015/9/10
Profile: COS, SD116DX [GB]			

Adjustable steering column, replacing

Op nbr 641-021

Puller

Removing

1. Place the machine in the Service Position. Refer to [191 Service position 1](#).
2. Remove the horn cap at the steering wheel. Disconnect the wiring harness at the horn.

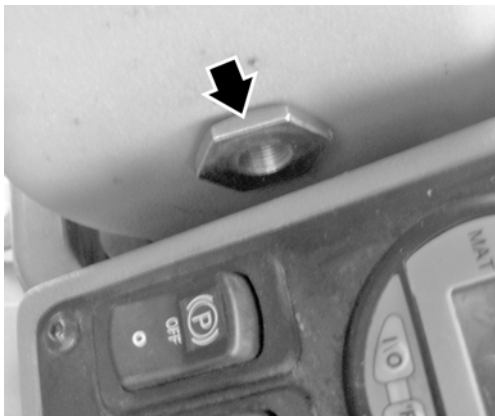


Figure 1
Steering column components

1. Horn
2. Steering wheel
3. Steering column lights
4. Ignition switch (opposite side)
5. Adjustable steering column
6. Adjustment lever
7. Instrument control panel
8. Control panel cover screws
9. Pedestal (cover)
10. Pedestal cover screws

3. Using a suitable puller, remove the steering wheel from the steering column.

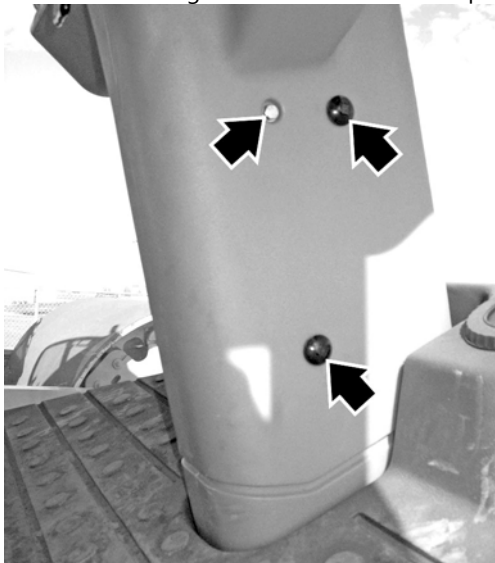
4. Remove the two lock nuts at the sides of the steering column to remove the steering column cover.



V1067310

Figure 2
Lock nut at the side of the steering column cover

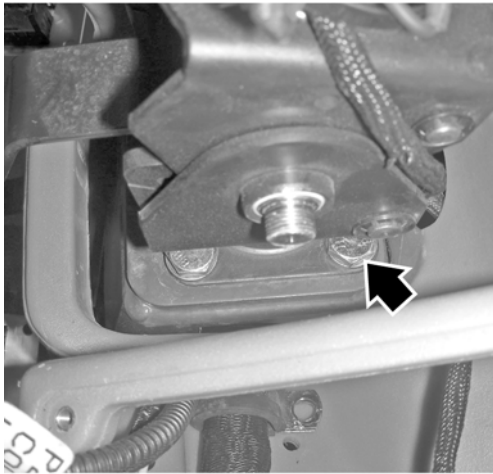
5. Remove the screws from the instrument control panel cover.
6. Disconnect the wiring harness connectors for the steering column lights.
7. Disconnect the ignition switch wiring harness. Remove the steering column covers from the steering column.
8. Remove the hexagon screws that retain the pedestal cover to the steering column and pedestal.



V1069488

Figure 3
Pedestal cover and mounting screws

9. Disconnect the wiring harness for the horn at the steering column.
10. Remove the hexagon screws that retain the steering column to the top of the pedestal. Remove the steering column from the pedestal.



V1067522

Figure 4
Steering column hexagon screws at the pedestal

Installing

11. Position the steering column at the pedestal by lining up the splined end of the steering column shaft at the steering control unit. Reinstall the hexagon screws that retain the steering column to the pedestal. Torque to specification. Refer to [030 Critical mounting torques](#).
12. Reinstall the hexagon screws that retain the pedestal cover to the steering column and pedestal.
13. Connect the wiring harness for the horn at the steering column.
14. Connect the starter wiring harness. Reinstall the steering column cover over the top of the steering column and pedestal.
15. Reinstall the two lock nuts at the sides of the steering column cover.
16. Connect the wiring harness connectors for the steering column lights.
17. Reinstall the screws at the instrument panel cover.
18. Reinstall the steering wheel at the steering column.
19. Reinstall the wiring harness for the horn. Reinstall the horn cap.
20. Test the steering column tilt function. Start the machine and check for proper operation of the steering functions and verify proper operation of the horn and steering column lights.
21. Place the machine back in service.

Document Title: Steering pressure, checking and adjusting	Function Group: 645	Information Type: Service Information	Date: 2015/9/10
Profile: COS, SD116DX [GB]			

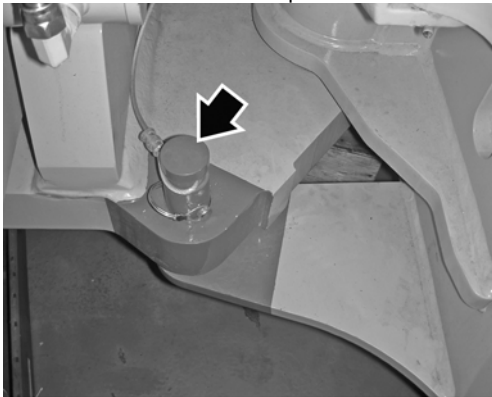
Steering pressure, checking and adjusting

Op nbr

[11666051 Pressure gauge](#)

Container

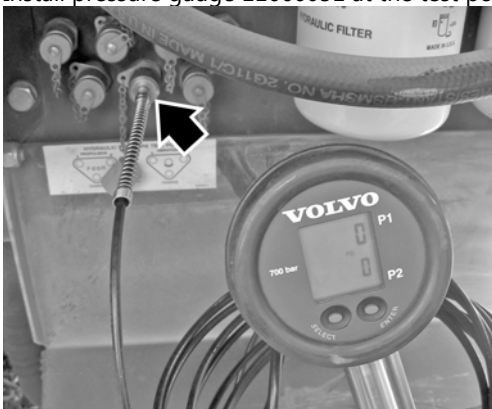
1. Place the machine in the Service Position. Refer to [191 Service position 1](#).
2. Install the articulation lock pin at the frame.



V1067894

Figure 1
Articulation lock pin installed

3. Install pressure gauge 11666051 at the test port location at the right side of the machine.



V1068522

Figure 2
Pressure gauge and test port location at the right side of the machine

4. Start the machine and turn the steering wheel to check for maximum relief pressure. Check the reading at the pressure gauge. The reading should approximately be 175 bar (2540 psi).

5. If the maximum relief pressure is low, the steering control unit must be replaced. Refer to [6457 Steering control unit, removing](#) and [6457 Steering control unit, installing](#).
6. Disconnect the pressure gauge at the test port.
7. Remove the articulation lock pin.
8. Place the machine back in service.

Document Title: Steering cylinder, removing	Function Group:	Information Type: Service Information	Date: 2015/9/10
Profile: COS, SD116DX [GB]			

Steering cylinder, removing

Op nbr 645-004

1. Place the machine in the service position. Refer to [191 Service position 1](#).

NOTE!

Before shutting down the machine, operate the steering to fully extend the cylinder on the side that is to be replaced for greater access at the frame joint.

2. Place a suitable oil collection container below the work area.
Tag and remove the cylinder hose from the rod end of the cylinder barrel, and immediately cap and plug the connections.

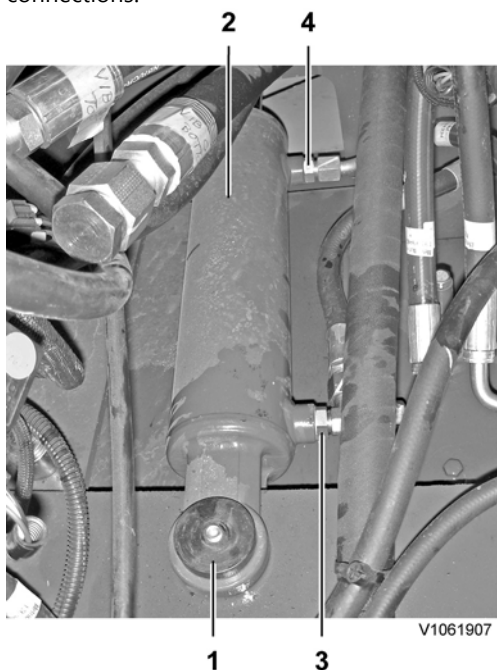


Figure 1
Steering cylinder, mounting and hoses

1. Cylinder mounting pin, base end
2. Cylinder barrel
3. Hose connection, base end fittings
4. Hose connection, rod end fittings

NOTICE

It is very important to keep the hydraulic system free from any impurities, as these can cause abnormal wear and may lead to expensive downtime. Greatest possible cleanliness should be maintained during all handling of hydraulic components and hydraulic oil.

Remove the hydraulic fitting from the cylinder barrel and plug the open port.

3. Remove the spring pin and the cylinder clevis mount pin at the rod end to disconnect the cylinder from the frame pivot joint.

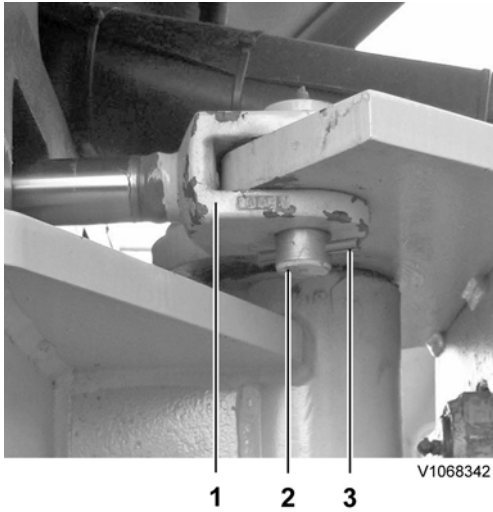


Figure 2
Steering cylinder mounting, rod end

1. Cylinder clevis, rod end
 2. Cylinder mounting, clevis pin
 3. Spring pin
4. Place the operator's station in the tilt position. Refer to [810 Operator's platform, raising](#).
 5. Tag and disconnect the hydraulic hoses from the base end of the cylinder barrel.

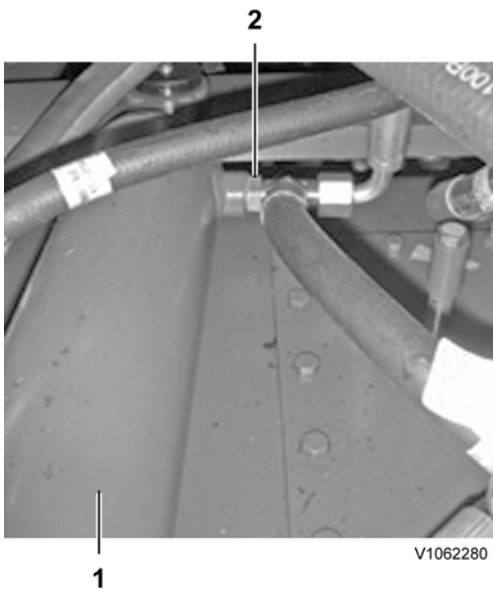


Figure 3
Cylinder fittings, base end

1. Cylinder barrel
2. Hose connection, base end fittings

Immediately plug and cap the hose and cylinder connections.
Remove the tee fitting from the cylinder barrel.

6. Remove the spring pin and clevis mounting pin from the cylinder barrel base end.
7. Remove the cylinder from the machine by pulling it out through the opening in the frame plate.



Figure 4
Cylinder removing from frame opening

1. Cylinder barrel
2. Frame plate, opening for cylinder

Weight of steering cylinder: 16 kg (35 lb)

Document Title: Steering cylinder, installing	Function Group:	Information Type: Service Information	Date: 2015/9/10
Profile: COS, SD116DX [GB]			

Steering cylinder, installing

Op nbr 645-005

1. Place the cylinder into the machine in the proper orientation through the opening in the frame plate.



Figure 1
Cylinder installation

1. Cylinder barrel
2. Frame plate opening for cylinder

NOTE!

Ensure the ports in the cylinder barrel are turned in the proper orientation for connecting the hydraulic hoses.

Weight of steering cylinder: 16 kg (35 lb)

2. Install the tee fitting into the base end port of the cylinder barrel
Attach the hoses to the tee fitting in the proper orientation and hand tighten the connections.

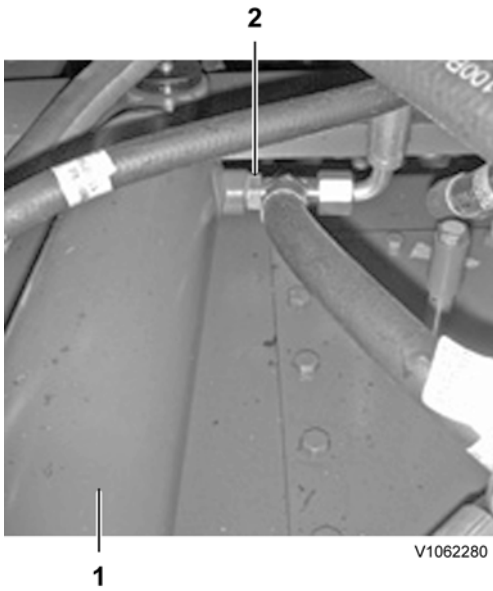


Figure 2
Cylinder barrel, hydraulic hose connections

1. Cylinder barrel
 2. Hydraulic connection to cylinder barrel (base end port)
3. Install the cylinder mounting pin at the base end and secure with the spring pin.

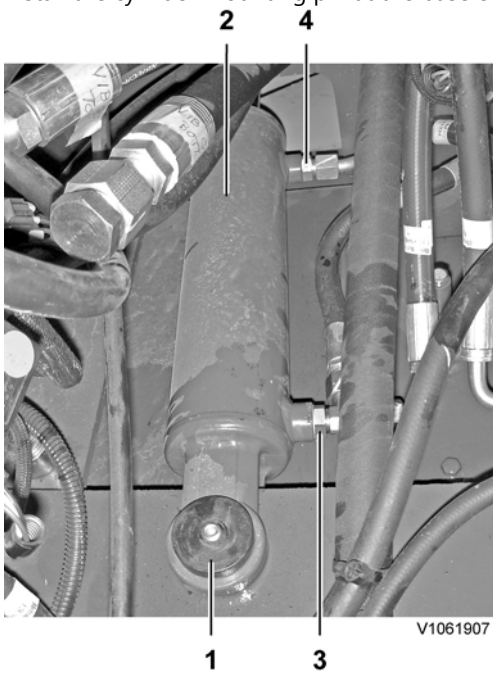


Figure 3
Cylinder base, clevis pin installed

1. Cylinder mounting pin, base end
 2. Cylinder barrel
 3. Hose connection, base end fittings
 4. Hose connection, rod end fittings
4. Tighten the hose connections to the tee fitting.
5. Extend the cylinder rod and install the rod end clevis and mounting pin to the articulation steering plate. Secure with the spring pin.

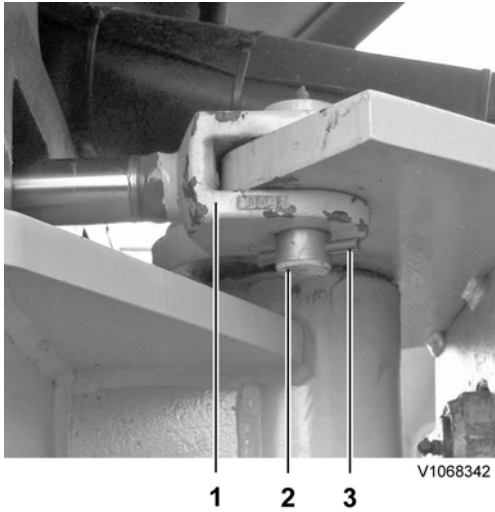


Figure 4
Steering cylinder mounting, rod end

1. Cylinder clevis, rod end
 2. Cylinder mounting, clevis pin
 3. Spring pin
6. Install the hydraulic fitting into the rod end port of the cylinder barrel.
Reconnect the hydraulic hose to the rod end cylinder fitting in the correct orientation and tighten the connection.
 7. Lower the operator's station. Refer to [810 Operator's platform, lowering](#).
 8. Start the machine and verify proper operation of the steering system and inspect for leaks.
 9. Place the machine back in service.



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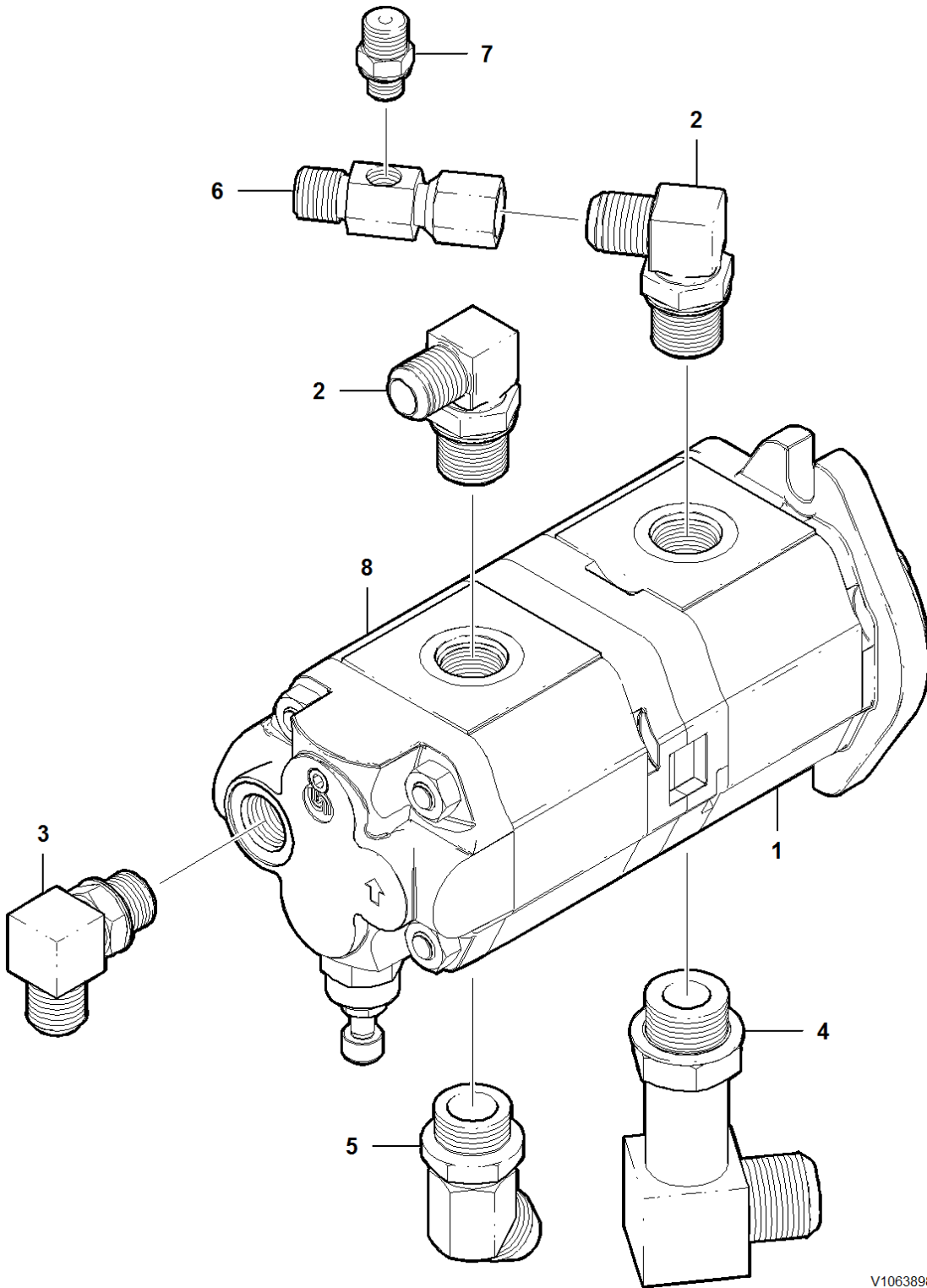
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Document Title: Steering pump, description	Function Group:	Information Type: Service Information	Date: 2015/9/10
Profile: COS, SD116DX [GB]			

Steering pump, description

The steering pump is located directly beneath the operator's platform. It is a fixed displacement gear pump that is mounted to the rear of the vibration pump. Oil is drawn into the pump from the hydraulic oil tank and from there, flows out to the steering control unit.



V1063898

Figure 1
Steering pump and components

- 1. Steering pump
- 2. Elbow fitting
- 3. Elbow fitting
- 4. Elbow fitting
- 5. Fitting
- 6. Fitting
- 7. Fitting
- 8. Blade pump (optional)

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