

Document Title: Engine, removing	Function Group: 210	Information Type: Service Information	Date: 2014/3/20
Profile: BHL, BL70 [GB]			

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Engine, removing

Op nbr 210-070

[885530 Rotation tool](#)

Lifting chains, min. 1000 kg (2200 lb)
two chain tensions



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

NOTICE

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

NOTE!

In general, all cable ties that secure hoses and electrical cables must be removed. All disconnected hoses and open connections must be plugged.

1. Place the machine in Service position 1, see [191 Service positions](#).
2. Disconnect the main battery switch.
3. Remove the battery/batteries, see [310 Battery, changing](#).
4. Drain the coolant, see [173 Coolant, change](#).
5. Drain the transmission oil, see [173 Transmission, changing oil](#).
6. Disassemble the engine hood, see [821 Engine hood, removal](#).
7. Loosen the retaining clamp of the exhaust pipe (2). Remove the exhaust pipe together with it's sealing.

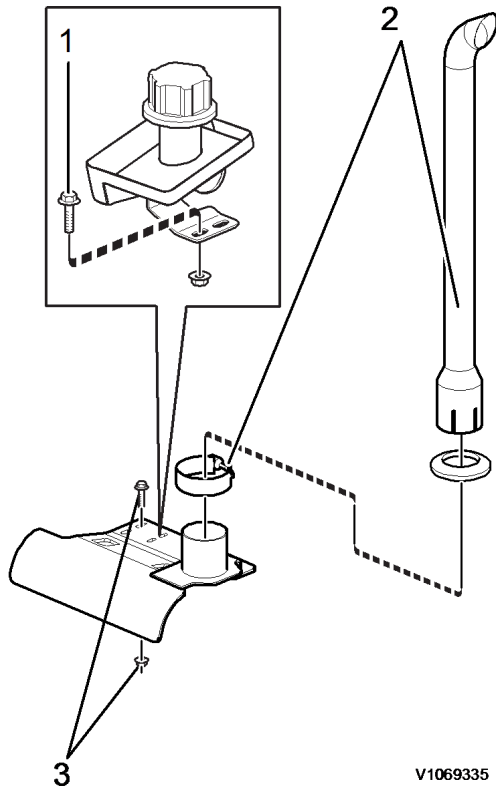


Figure 1
exhaust assembly, disassembly

1. retaining screws filler neck assembly
2. exhaust pipe with retaining clamp
3. retaining screws exhaust assembly bracket

8. Loosen and remove the retaining screws (1) of the oil filler neck assembly.
9. Loosen the retaining screws and disconnect the flexible exhaust tube from the turbocharger.



10.

The parts are heavy. Take appropriate safety cautions when handling them.

Use a slop to attach the exhaust assembly to a suitable lifting device.

11. Loosen and remove the retaining screws (3) of the exhaust assembly bracket.
12. Remove the exhaust assembly from the machine.
13. Loosen the retaining clamps (4, 5) from the upper radiator hose (1) and remove the hose.

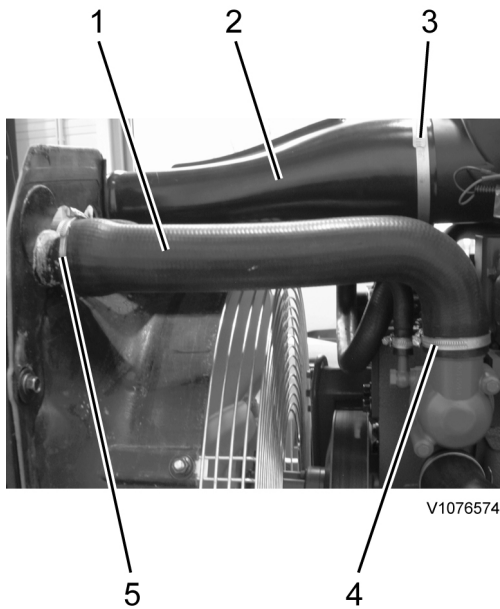


Figure 2
radiator hose and air inlet, disassembly

1. upper radiator hose
2. air inlet
3. retaining clamp
4. retaining clamp
5. retaining clamp

14. Loosen the retaining clamp (3) from the air inlet (2) and remove it from the air filter assembly.
15. Loosen and remove the hoses (4, 5) connecting the expansion tank (3) with the coolant pump (6).

NOTE!

Loosen the retaining clamps on the pump side, so the hoses can be removed with the tank.

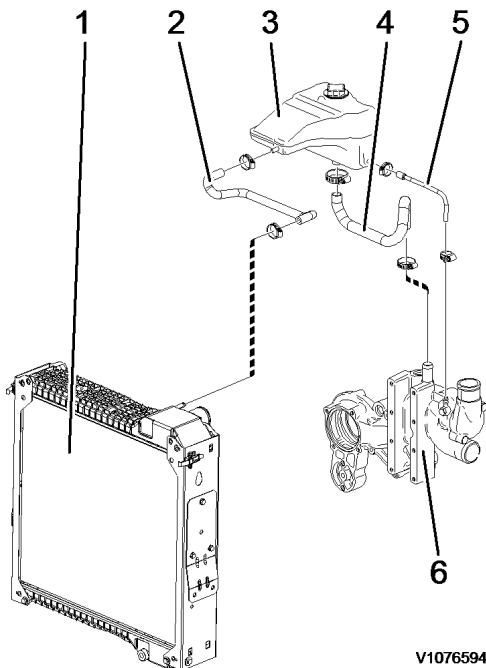


Figure 3
radiator with attached parts

1. radiator
2. hose

- 3. expansion tank
- 4. hose
- 5. hose
- 6. coolant pump

16. Loosen and remove the hose (2) connecting the expansion tank (3) to the radiator (1).

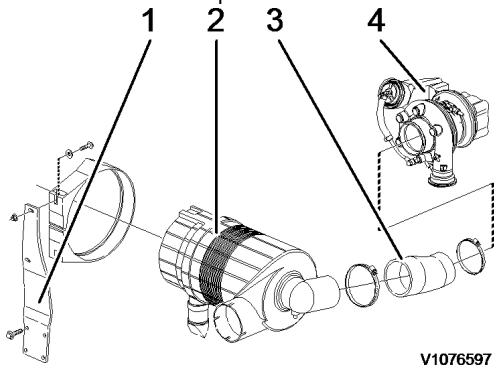
NOTE!

Loosen the retaining clamp on the radiator side, so the hose can be removed with the tank.

17. Loosen the retaining screws connecting the expansion tank's attachment bracket to the machine frame.

18. Remove the expansion tank with the attachment bracket.

19. Disconnect the two pressure sensor connectors from the air filter (2).



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Figure 4
air filter, disassembly

- 1. attachment bracket
- 2. air filter
- 3. hose
- 4. turbocharger

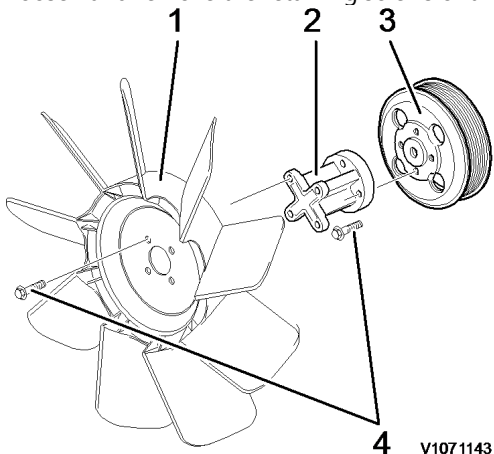
20. Loosen the retaining clamp connecting the air filter hose (3) to the turbocharger (4).

21. Remove the hose from the turbocharger.

22. Loosen and remove the retaining screws connecting the air filter to the engine (4 pcs).

23. Remove the complete air filter assembly.

24. Loosen and remove the retaining screws of the fan guard.



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Figure 5
fan, disassembly

1. fan
2. fan adapter
3. V-belt pulley
4. retaining screws

25. Remove the fan guard.

26. Loosen and remove the retaining screws (4) of the fan (1).

27. Slightly turn the fan, to remove it from the fan adapter (2).

NOTE!

Leave the fan inside the fan shroud.

28. Loosen and remove the retaining screws (4) together with the fan adapter.

29. Loosen and remove the retaining screws of the fan shroud.

30. Remove the fan shroud together with the fan.

31. Disassemble the transmission oil filler pipe from the engine.

32. Remove the coolant pump (1) connection of the lower coolant hose (2).

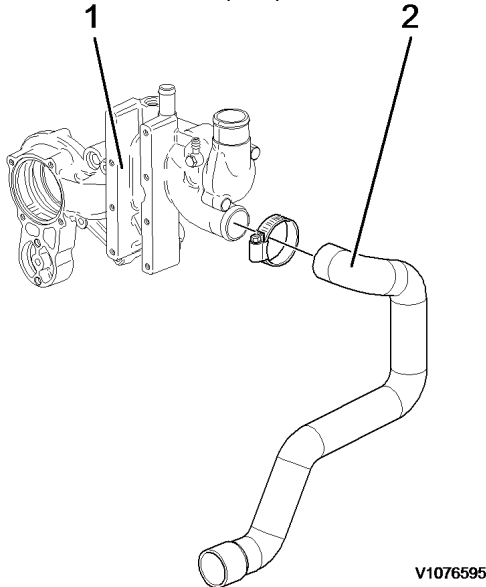


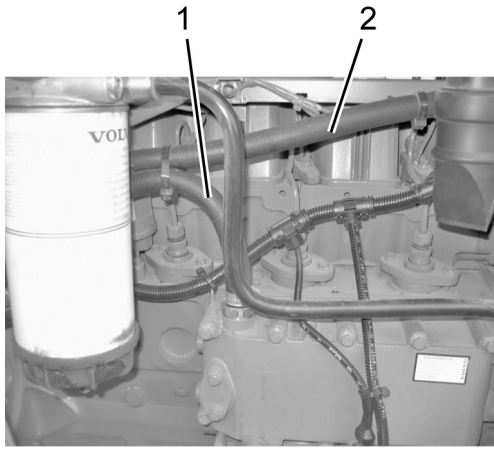
Figure 6
coolant hose, disassembly

1. coolant pump
2. lower coolant hose

33. Remove the two battery connection cables from the starter motor.

34. Remove all electrical connectors and cables from the engine. Make notes to which component the connectors and cables have to be attached.

35. Loosen the hose (1) from the engine oil cooler.

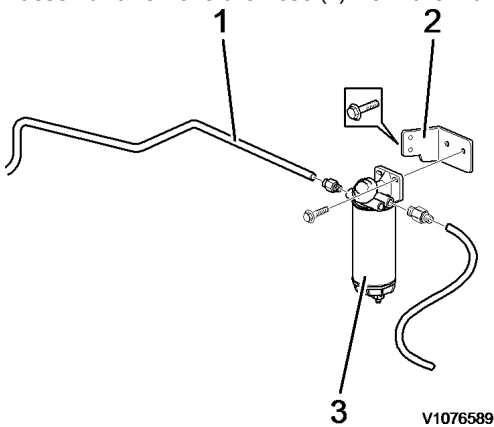


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Figure 7
hoses, disassembly

1. hose to engine oil cooler
2. hose to coolant pump

36. Loosen the hose (2) from the coolant pump.
37. Loosen and remove the hose (1) from the main fuel filter (3).



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Figure 8
main fuel filter, disassembly

1. hose (tank connection)
2. attachment bracket
3. fuel filter

38. Loosen and remove the fuel filter from the attachment bracket (2). Fasten the filter to the engine (cable tie).
39. Loosen and remove the filter's attachment bracket from the machine.
40. Loosen the adjusting nuts (1) of the throttle cable.

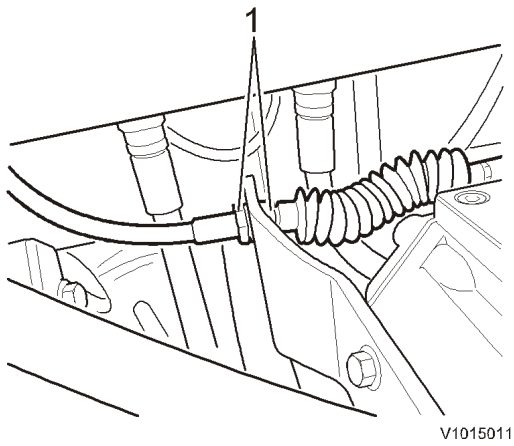


Figure 9
throttle cable, disassembly

1. adjusting nuts

41. Loosen and remove the retaining nut. Remove the throttle cable from the lever (1).

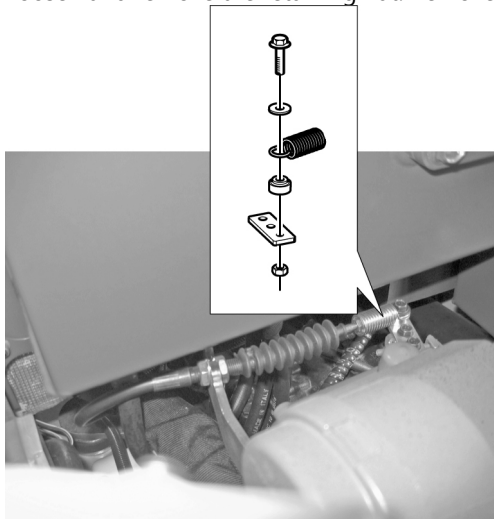
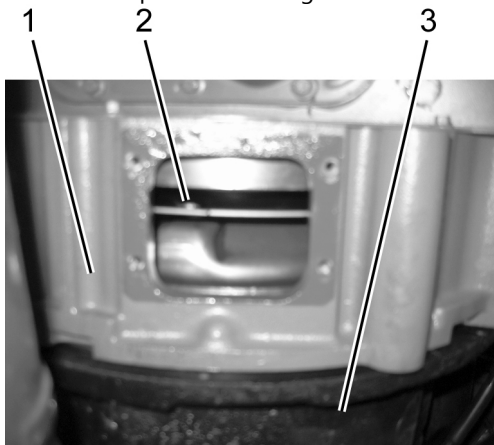


Figure 10
throttle cable, disassembly

1. accelerator lever

42. Secure all disconnected hoses and cables, so they can't be caught when removing the engine.
43. Remove the plate on the engine to access the screws connecting engine to turbocharger.



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Figure 11
engine, retaining screws torque converter

1. engine
 2. retaining screws, torque converter
 3. transmission
44. Loosen the connection screws from engine to torque converter (4 pcs). To turn the engine and screws in the right position, use special tool.
Special tool:
885530 Rotation tool



WARNING

45. **The parts are heavy. Take appropriate safety precautions.**
Place a suitable support under transmission and hydraulic pump to avoid overturning when engine is disconnected.
46. Attach the engine with a suitable chain and two chain tensions to a crane. The chain tensions are used to align the engine while removing from machine.



V1076510

1

Figure 12
engine, attached to lifting device

1. Additional lifting eye must be attached for the 2nd chain tension

Engine weight (dry):

520 kg (1146.2 lb)

47. Loosen the connection screws from engine to transmission.
48. Loosen the connection screws from the engine to the engine mounts (3) (on the left and right of the machine front).

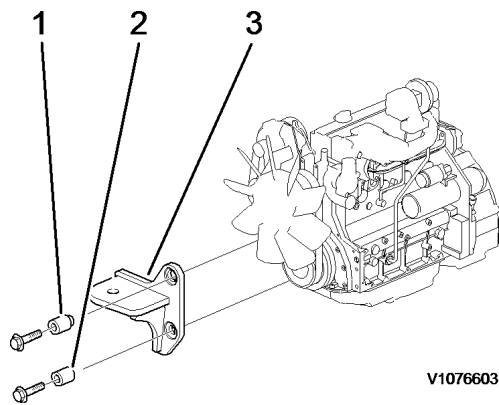


Figure 13
engine mounts, disassembly

- 1. spacer
- 2. spacer
- 3. engine mounting

49. Disassemble the engine mounts from the frame.

NOTE!

Take care not to loose the spacers.



50.

Risk of crushing injuries

Use the crane and the chain tensions to remove the engine from the transmission shaft.



51.

Heavy lift. Make sure that everybody stands well back from the engine when it is lifted.

Carefully lift the engine out of the machine and place the engine on suitable stable surface.

NOTE!

Take care not to catch any hoses or cables when removing.

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Engine, installation

Op nbr 21072-1

[14360000 Vacuum pump](#)

[Lifting chains, min 1000 kg \(220 lb\)](#)

NOTE!

In general, all strip clamps that have been removed must be replaced.

1. Install the gearbox, see **Gearbox, installation in Section 4.**
2. Transfer the bracket to the engine.
3. Transfer the hose connections.
Transfer the electrical cables.
Transfer the front right and left engine mounting.
Tightening torque: **140 ± 15 Nm (103 ± 11 lbf ft)**
4. Connect a lifting chain between the lifting eyes and to a lifting device.
Carefully lift and balance the engine-gearbox unit when the unit is lifted into the machine.

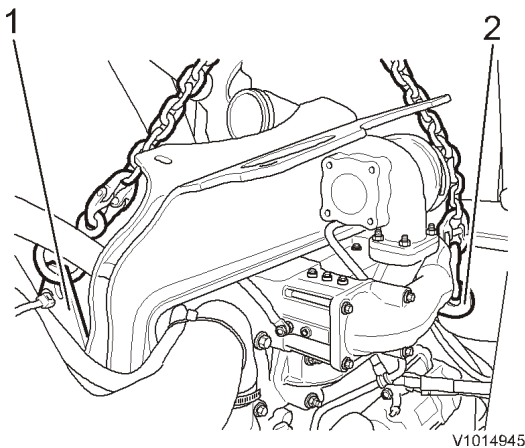
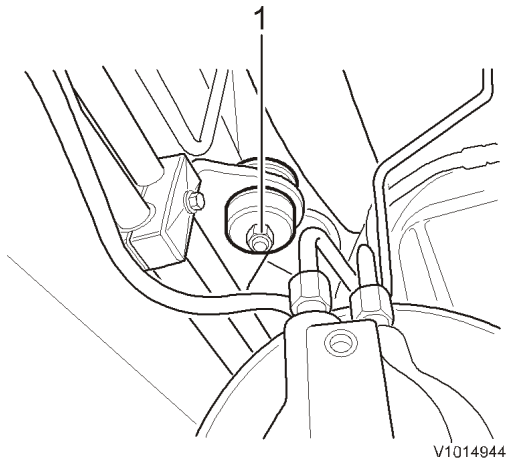


Figure 1

1. Lifting eye
2. Lifting eye

5. Remove the rubber cushion from the mounting bracket for the gearbox, and lower the gearbox onto the mounting bracket.
Place a jack under the gearbox and lift it up and install the rubber cushion and the washer on the mounting bracket. Lower the gearbox and install the attaching screws 1 on both sides.
Tightening torque: **173 ± 15 Nm (127 ± 11 lbf ft)**

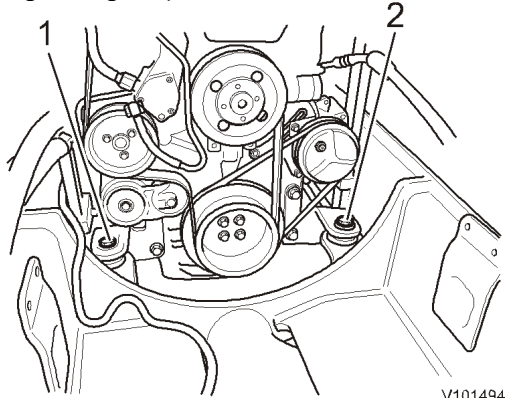


V1014944

Figure 2

1. Screw

6. Install the attaching screws for the engine.
Tightening torque: **173 ± 15 Nm (127 ± 11 lbf ft)**

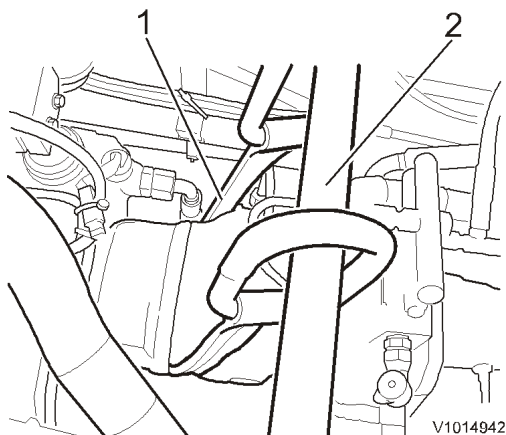


V1014943

Figure 3

1. Attaching screw
2. Attaching screw

7. Apply some grease to the o-ring and place it on the working pump.
Move the working pump carefully into the gearbox.
Remove the strap and the pinchbar.



V1014942

Figure 4

1. Strap
2. Pinchbar

8. Install the screws (2 screws) gearbox unit–working pump.

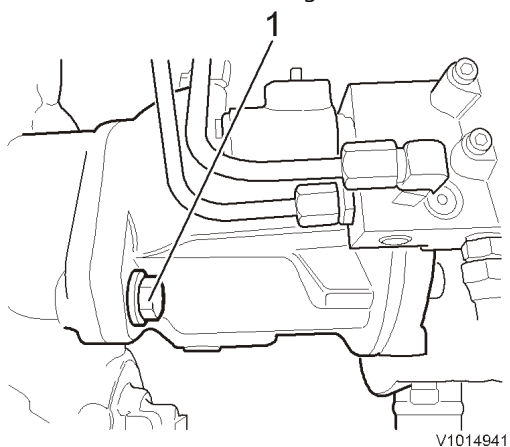


Figure 5

1. Screw

9. Connect the connector to the work pump.

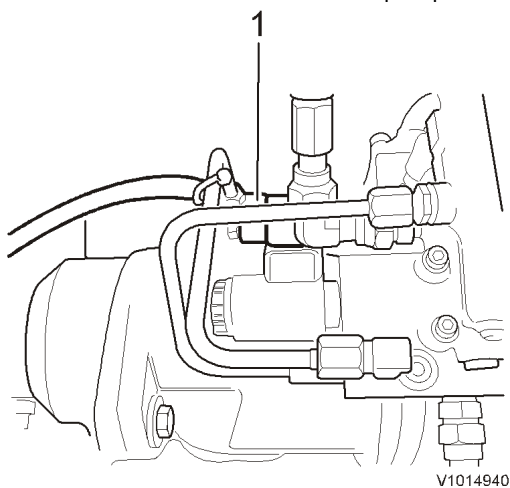
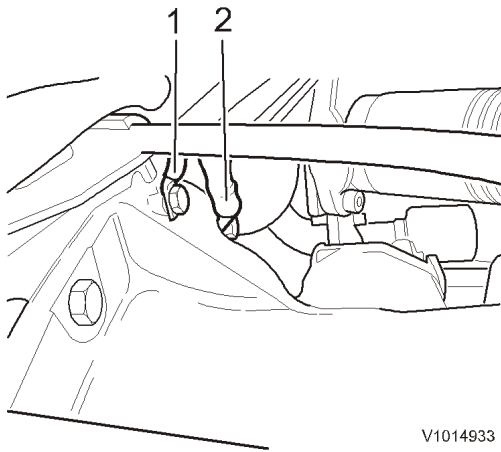


Figure 6

1. Connector

10. Connect the ground cables to the gearbox.

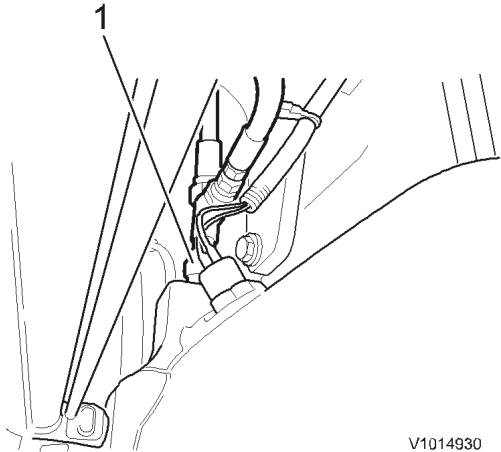


V1014933

Figure 7

- 1. Ground cable
- 2. Ground cable

11. Connect the hose to the gearbox.

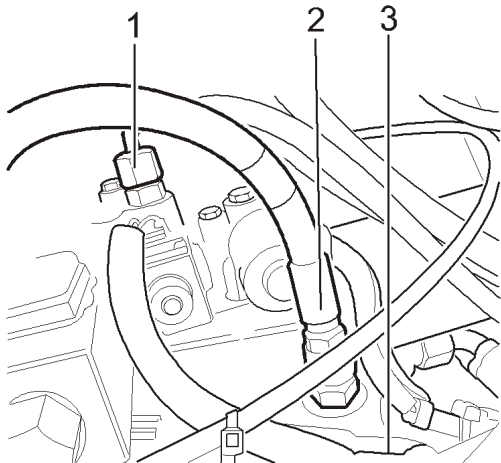


V1014930

Figure 8

- 1. Hose

12. Connect the hoses to the gearbox.



V1014926

Figure 9

1. Hose
2. Hose
3. Hose (hidden)

13. Connect the hoses to the gearbox.

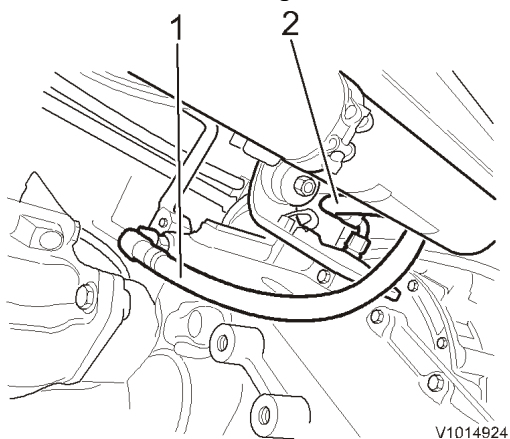


Figure 10

1. Hose
2. Hose

14. Install the shift lever.

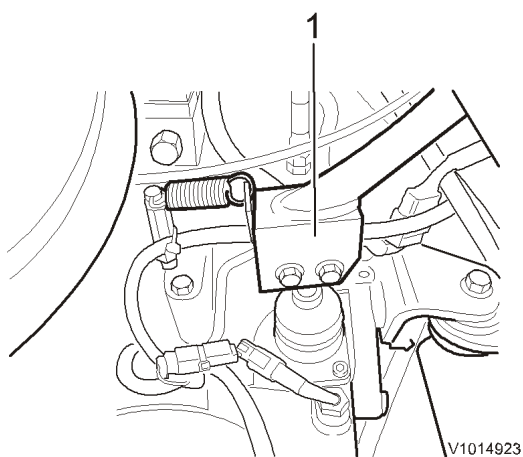


Figure 11

1. Shift lever

15. Install the plate.

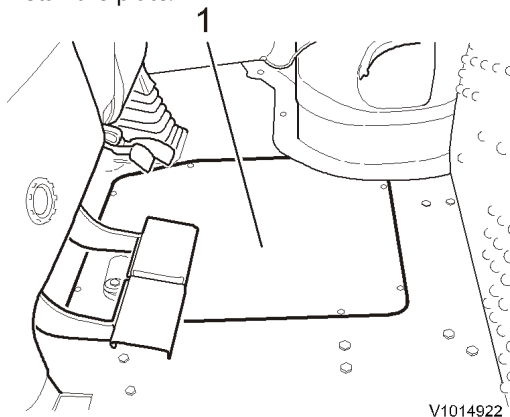


Figure 12

1. Plate

16. Place rubber mat on the floor and install the seat.

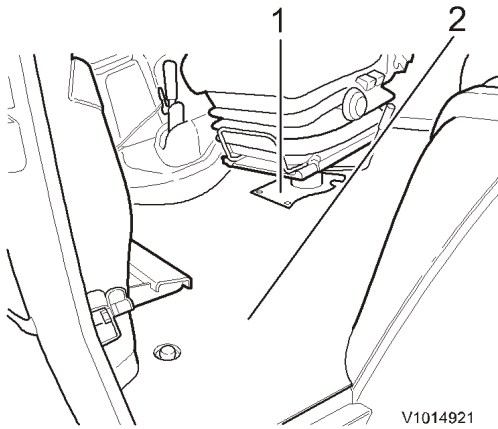


Figure 13

1. Seat
2. Rubber mat

17. Connect the rear propeller shaft 1 to the gearbox.
Tightening torque: **31–41 Nm (23–30 lbf ft)**

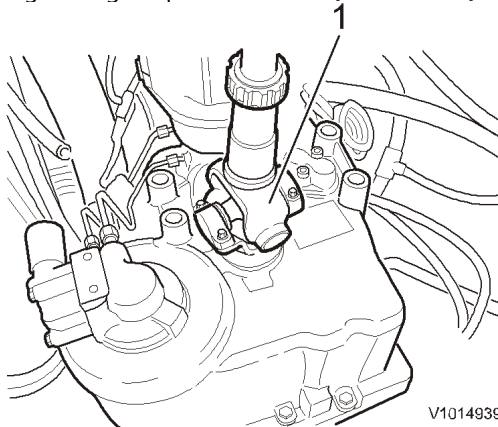


Figure 14

1. Propeller shaft

18. Connect the front propeller shaft 1 to the gearbox unit.
Tightening torque: **31–41 Nm (23–30 lbf ft)**

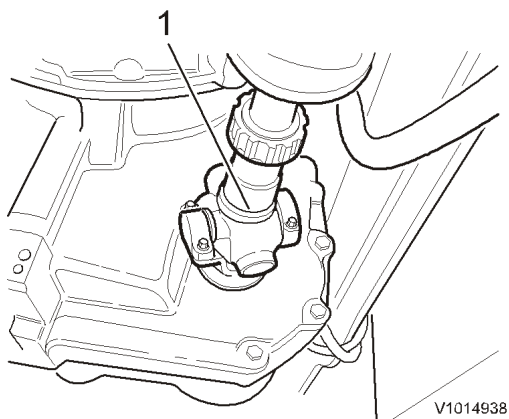


Figure 15

1. Propeller shaft

19. Connect the electrical cables to the starter motor.

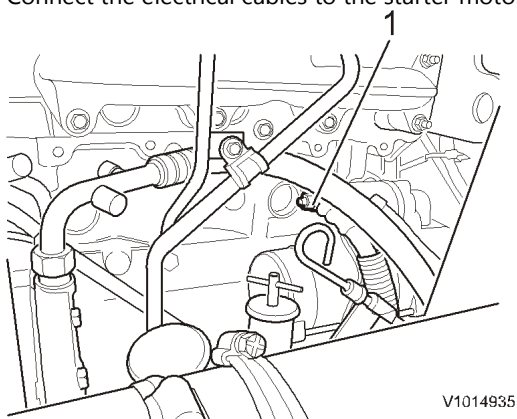


Figure 16

1. Electrical cable

20. Install the throttle control cable and tighten the nuts.

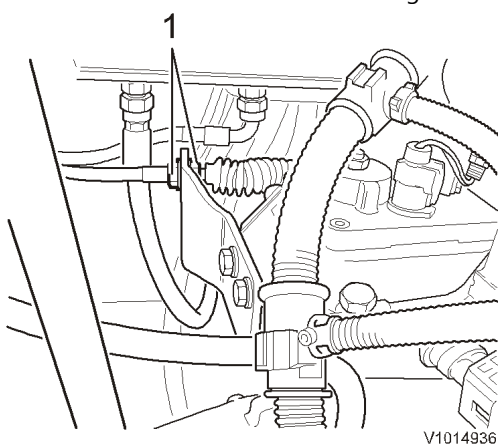


Figure 17

1. Nut

21. Connect the fuel filter to the hydraulic tank.
Connect the fuel hoses to the fuel filter.

22. Connect the hoses (2 hoses, one hidden) to the engine and fit the fuel filter/pump on the hydraulic tank.

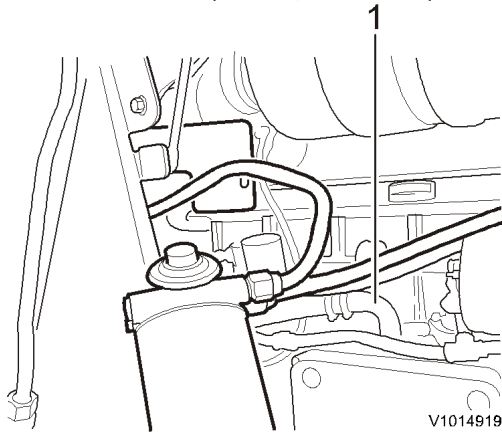


Figure 18

1. Hoses

23. Connect the hose to the engine.

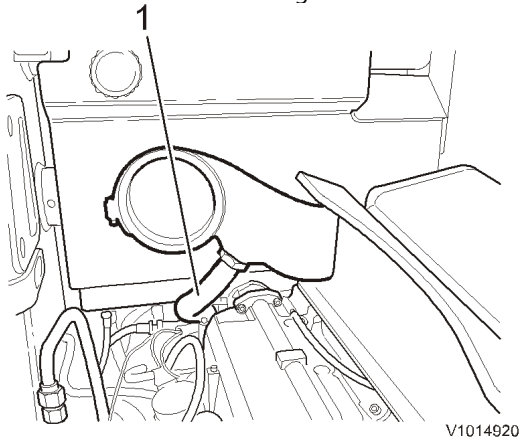


Figure 19

1. Hose

24. Install the bracket with the screws (3 pcs). Install the air cleaner with the screws. Tighten the hose clamp.

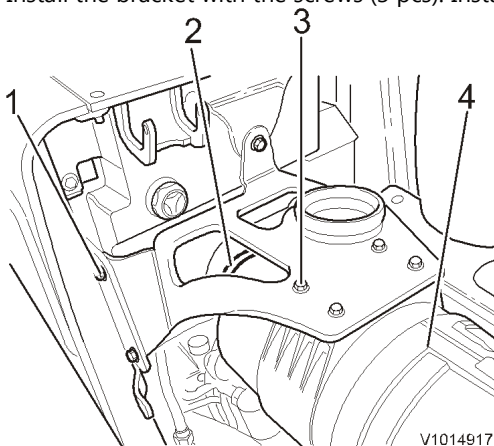


Figure 20

1. Screws

2. Hose clamp
3. Screws
4. Air cleaner

25. Install the silencer and the nuts for the turbocharger.
Install the attaching screws (4 attaching screws, 2 underneath).

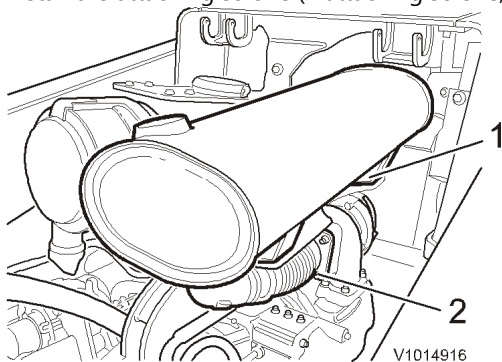


Figure 21

1. Attaching screws
2. Nuts

26. Install the fan.

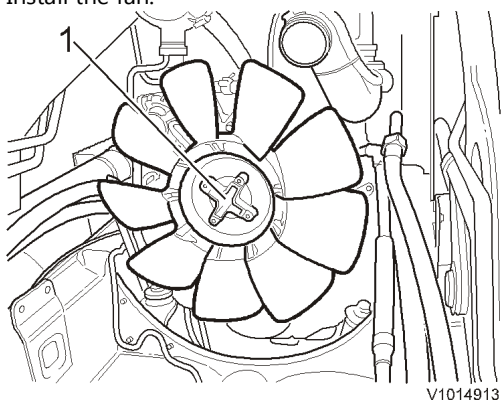


Figure 22

1. Fan

27. Install the radiator casing and the fan guard.

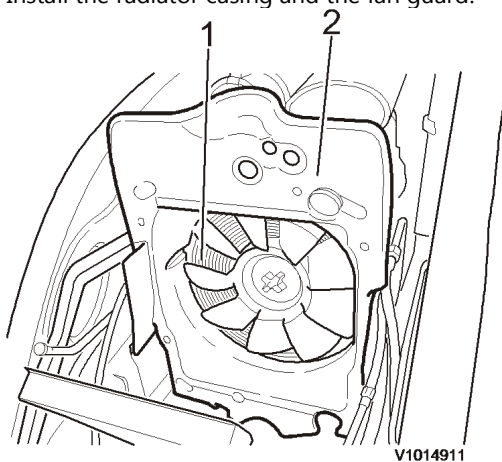


Figure 23

1. Fan guard
2. Radiator casting

28. Lift in the hydraulic oil cooler/radiator and install the screws on both sides.

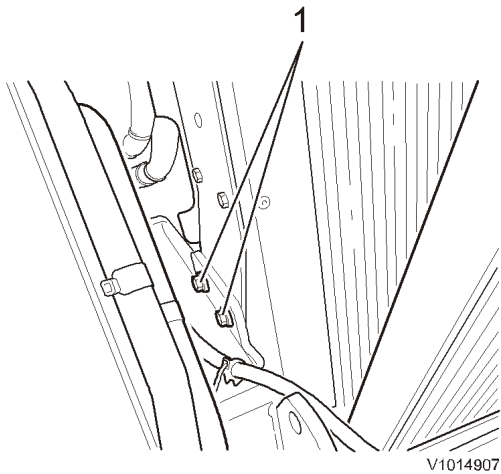


Figure 24

1. Screw

29. Install the screws radiator and radiator casing (4 screws). Connect the radiator hoses and the lower hose (hidden).

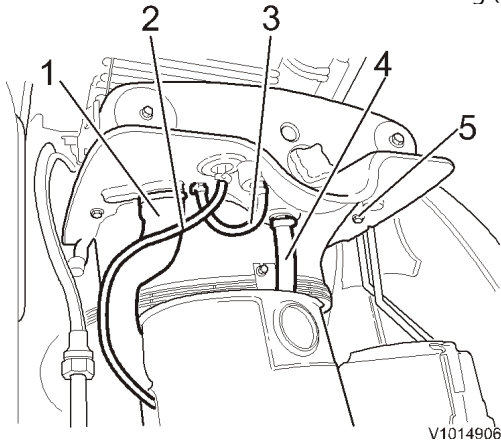


Figure 25

1. Hose
2. Hose
3. Hose
4. Hose
5. Screws

30. Connect the ground cable and turn on the electric power with the battery disconnect switch.

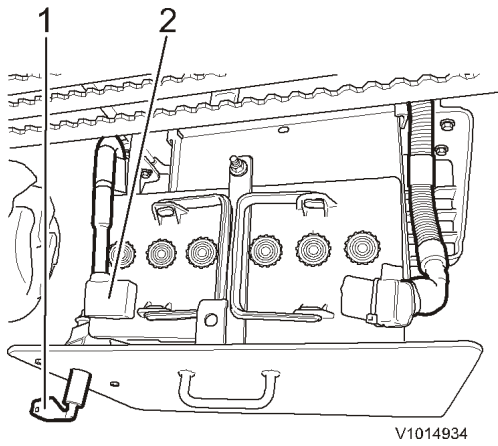


Figure 26

1. Battery disconnect switch
2. Ground cable

31. Connect the vacuum pump, see **Vacuum pump, connection in section 9**.
32. Lock the hydraulic oil cooler with the locking device. Connect the hoses (4 hoses) to the hydraulic oil cooler.

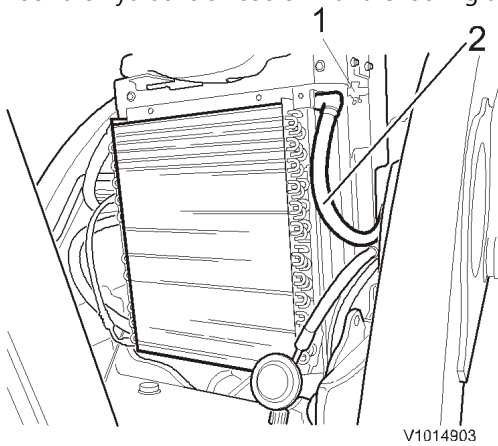
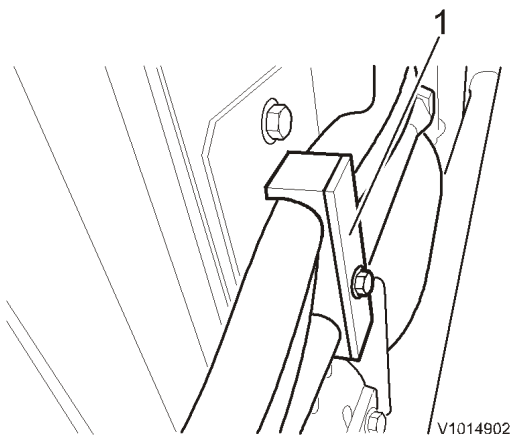


Figure 27

1. Locking device
2. Hoses

33. Turn off the vacuum pump.
34. Install the clamps on both sides on the cooler.



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