VOLVO

Construction Equipment

Service Information

Document Title: **Engine D9B, description and operation**	Function Group: **200**	Information Type: **Service Information**	Date: **2014/12/24**
Profile: **GRD, G970 [GB]**			

Engine D9B, description and operation

D9B - tier 3 compliant

The D9B engine configuration consists of a four stroke, straight six cylinder, turbocharged, direct injected diesel engine with charge air cooling and wet, replaceable cylinder liners.

The engine has an overhead camshaft and unit injectors, which are centered above the pistons and controlled by the camshaft and a control unit (E-ECU).

The D9 uses V-ACT (Volvo Advanced Combustion Technology). The V-ACT D9B engine features a flexible high pressure fuel injection with dual solenoid injectors and optimized air handling with a fixed geometry turbocharger. Electronically controlled IEGR (Internal Exhaust Gas Recirculation) reduces NO_X formation and lowers emissions without the need for exhaust after treatment. Volvo's latest engine management system, EMS2 is used to control all engine electronic functions.

The cylinders are numbered consecutively beginning at the pulley end. Engine rotational direction is counterclockwise as seen from the flywheel end.

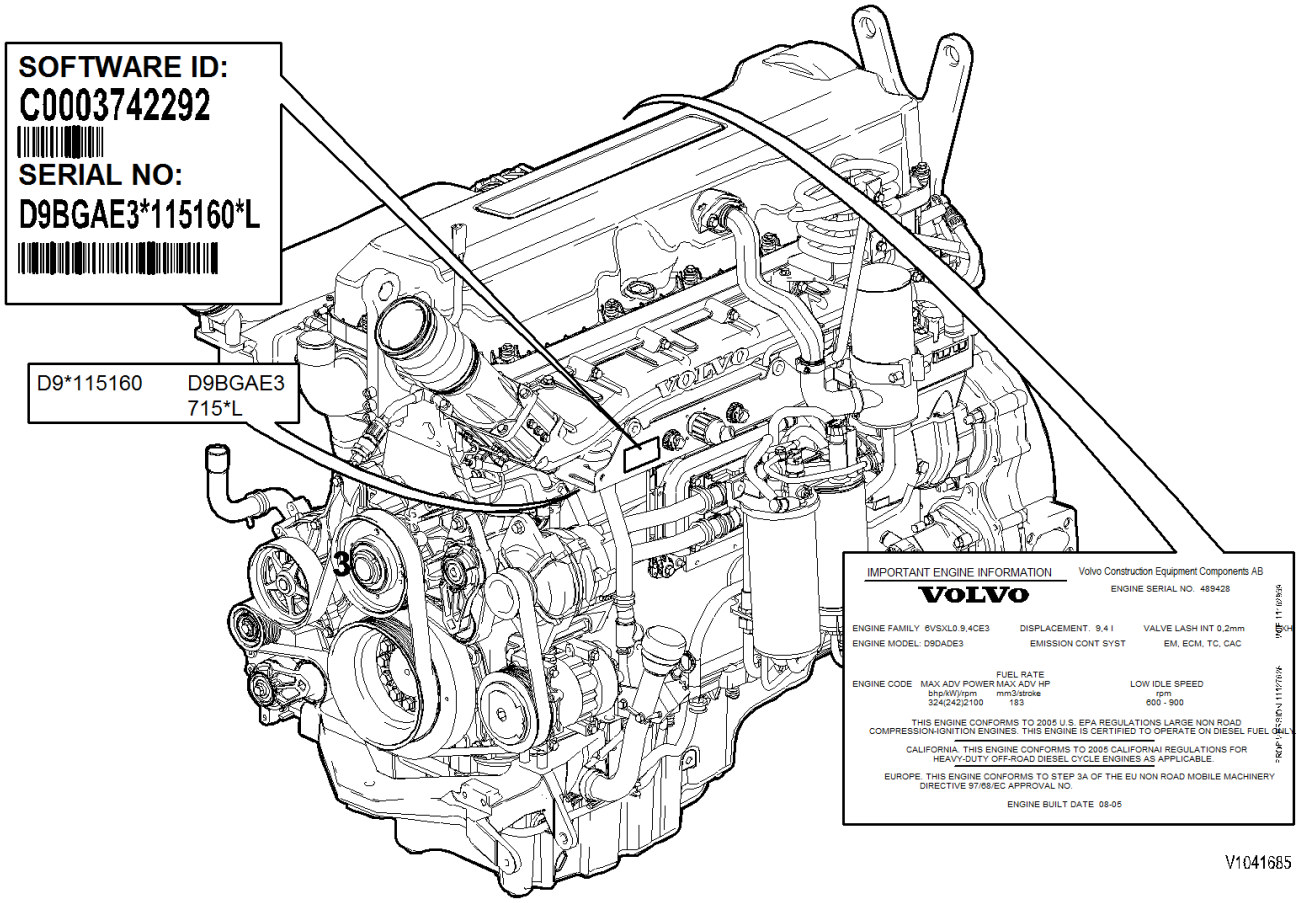

Figure 1
D9B

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Service Information

Document Title:	Function Group:	Information Type:	Date:
VCADS Pro, MID 128, programming E-ECU	**200**	**Service Information**	**2014/12/24**
Profile: **GRD, G970 [GB]**			

VCADS Pro, MID 128, programming E-ECU

Op nbr 200-009

MID 128, E-ECU for D9

1.
   - Turn on battery disconnect switch.
   - Start up the computer.
   - Connect VCADS Pro computer to the data link port in the machine.
   - Create a new job card.
   - Perform the operations no 28423-2 MID 128 ECU, programming.
   - Save performed work.
   - Shut down the computer and disconnect the adapter cable from data link port.
   - Turn off battery disconnect switch.

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Service Information

Document Title: **Engine, removing**	Function Group: **210**	Information Type: **Service Information**	Date: **2014/12/24**
Profile: **GRD, G970 [GB]**			

Engine, removing

Op nbr 210-070

9998547 Lifting tool

Lifting strap 2m, qty. 2

Puller

Engine, removal - D9 models G970, G976 and G990

1. Place the machine in the 191 Service position.

   WARNING

   Do not disconnect or loosen connections for the air conditioning unit (AC). Risk of gas leakage.

2. Remove the hydraulic oil tank covers and engine side doors. Refer to 821 Engine hood, removing.

3. Remove the engine lower side panel on both sides of the machine. On the right side of the machine, drain the washer bottle. Tag and disconnect the hoses. Remove the washer bottle with the lower side panel.

V1039698

Figure 1
Washer bottle and lower side panel

WARNING

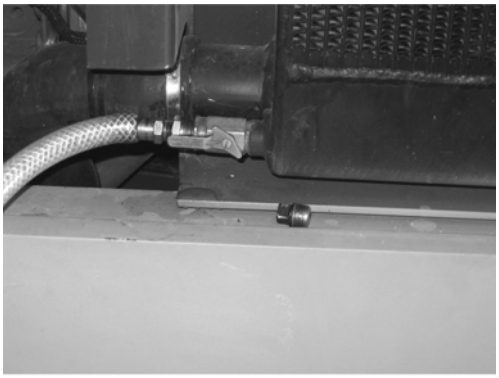
Open the expansion tank cap slowly and carefully. The cooling system operates at high pressure and hot coolant may rush out and cause severe burns.

4. Remove the expansion tank pressure cap. Add a 3/8" nipple to the draining valve.
   NOTE!
   Be sure that the valve does not turn.

NOTICE

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

5. Connect a drain hose to the nipple. Drain the engine coolant into a suitable container. Refer to 260 Cooling system, volume (Models G930 - G940).



V1039700

Figure 2
Draining the engine coolant

WARNING

Hot oil and hot engine coolant can cause severe burns!

6. Drain the engine oil. Refer to 210 Engine D7, volume.

WARNING

Only use lifting devices with adequate capacity.

7. Attach a safe lifting device to the engine hood assembly. Refer to 821 Engine hood, removing.
   NOTE!
   Be sure to seal all charge air tubes as soon as they are removed from the machine.

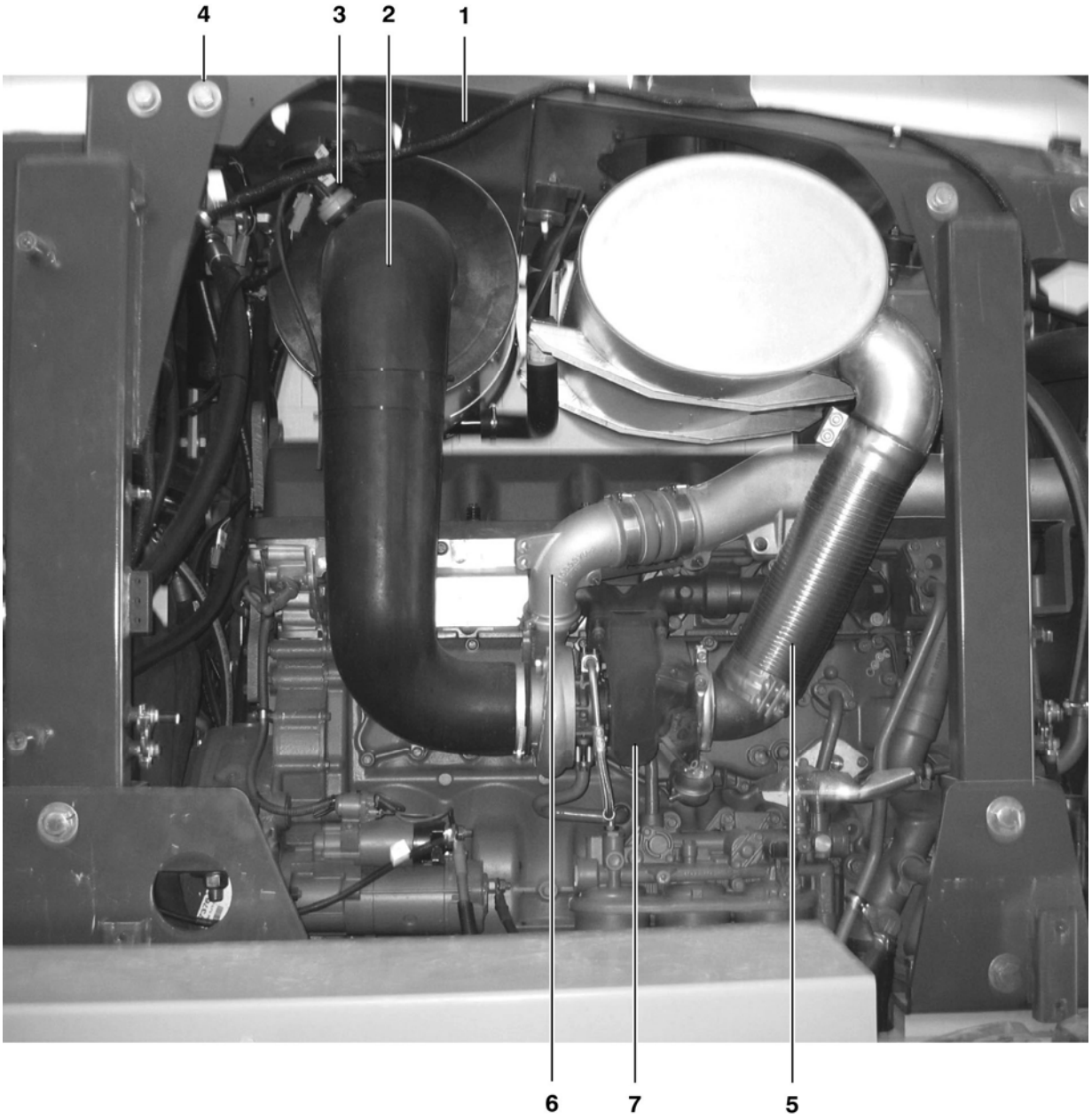


Figure 3
Left side of engine

1. Wiring harness
2. Air intake tube
3. Air temperature restriction indicator
4. Bolt
5. Exhaust pipe
6. Charge air tube
7. Turbocharger

Left side

8.
- Disconnect the air intake tube at the turbocharger
- Disconnect the wiring harness from the engine hood assembly.
- Disconnect the exhaust pipe at the turbocharger
- Disconnect the air temperature restriction indicator
- Disconnect the coolant lines from the expansion tank.
- Remove the bolts attaching the engine hood to the engine support frame legs. Refer to 821 Engine hood, removing

NOTE!
Be sure to seal all charge air tubes as soon as they are removed from the machine.

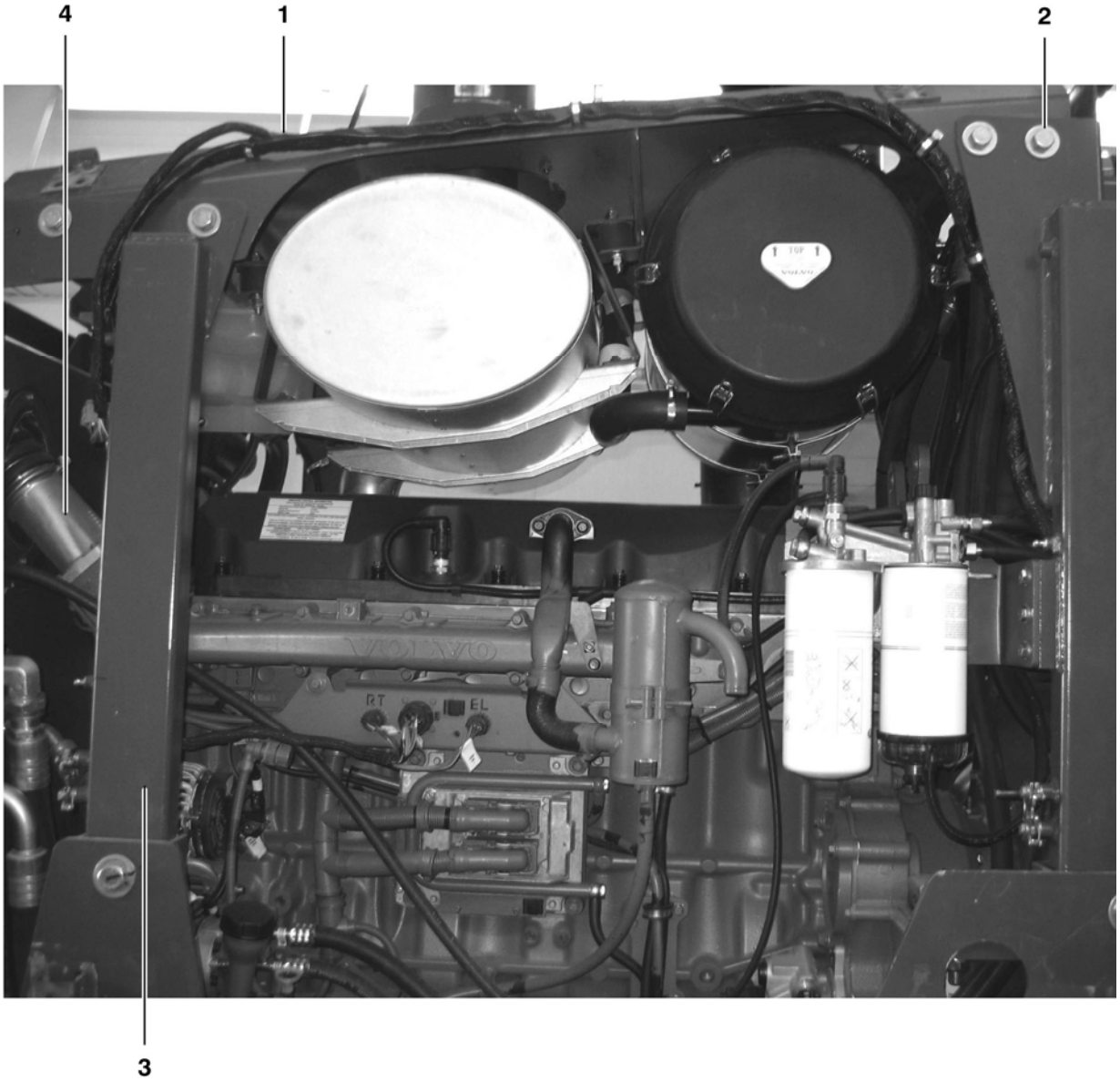


Figure 4
Right side of engine

1. Wiring harness
2. Bolt
3. Right rear engine support leg
4. Adapter - preheater to charge air cooler

Right side

9.
- Disconnect the wiring harness from the engine hood assembly.
- Remove the bolts retaining the engine hood assembly to the engine support frame legs
- Disconnect the wiring harness from the rear engine support frame leg.
- Remove the right rear engine support frame leg
- Remove the right rear motor mount to frame bolts
- Disconnect the alternator wiring harnesses
- Disconnect the wiring harnesses at the air conditioner, if equipped with air conditioning
- Remove the adapter connecting the preheater to the charge air cooler
- Relieve the tension from the accessory drive belt. Remove the belt from the alternator and air conditioning

compressor

- Remove the mounting bolts from the air conditioning compressor to the mounting bracket

  NOTE!

  Pay attention to hose routing, particularly in the right rear corner of the machine. It will be helpful in the 210 Engine, installing procedure.

  NOTE!

  Do not discharge the air conditioning compressor. Set the air conditioning compressor to the side without opening the system.

- Remove the alternator

  NOTE!

  Use a suitable container to collect any fuel that may leak out.

  NOTE!

  Clearly identify all hoses and connections prior to disconnecting them.

- Disconnect the fuel lines at the fuel cooler ECU, pump outlet connection, the secondary filter return line connection and the wiring harness at the filter head. Cut all cable ties

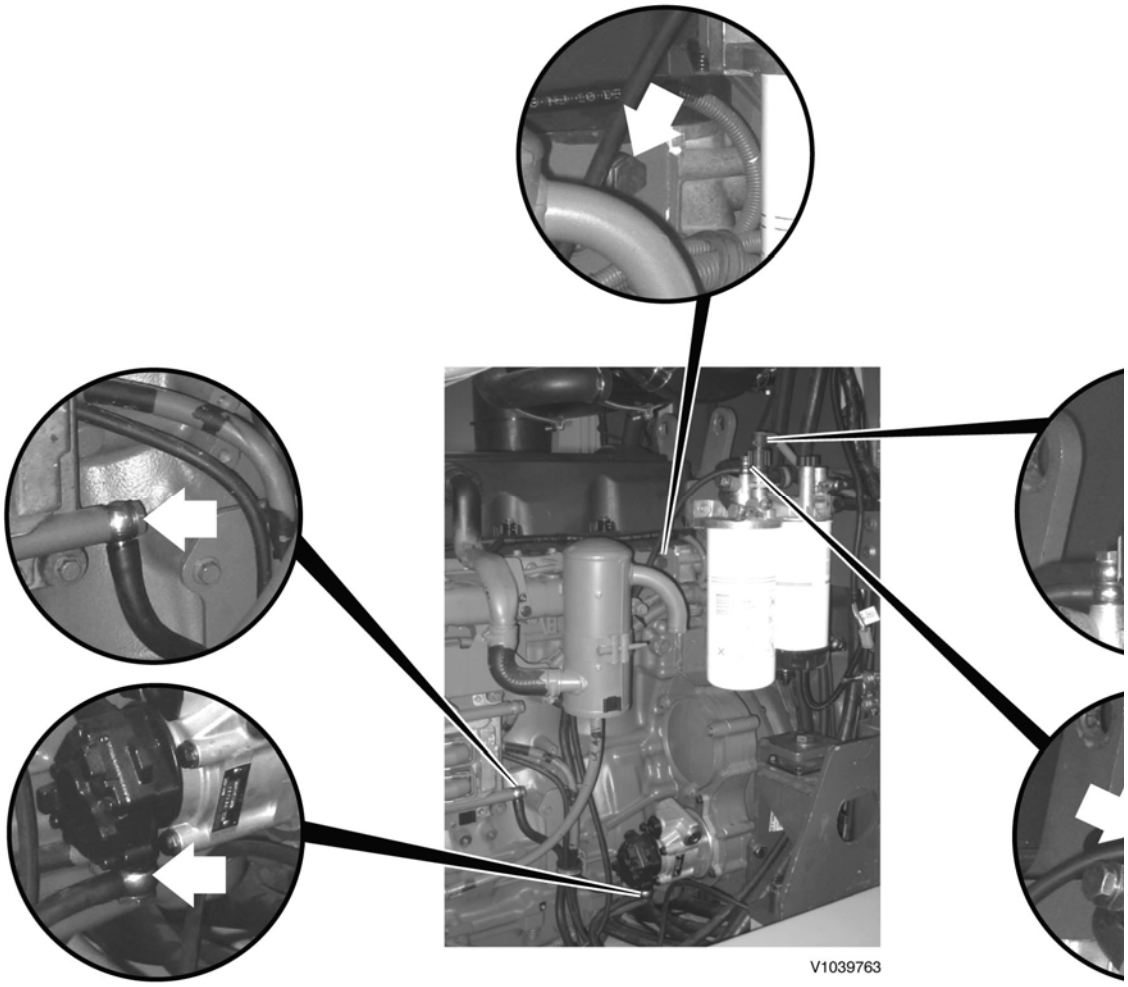


Figure 5
Fuel line connections

10. Remove the left rear engine support leg mounting bolts. Disconnect the wiring harness clamps from the leg. Cut all cable ties. Remove the leg form the machine.

11. Disconnect the wiring harness to the starter. Cut all cable ties.

12. Remove the mounting bolts securing the charge air tube to the engine. Remove the clamps on both ends of the

charge air tube. Remove the charge air tube.

13. Loosen the clamps and disconnect the two heater coolant hoses. Disconnect the upper and lower radiator hoses.

WARNING

Only use lifting devices with adequate capacity.

14. Use an appropriate lifting strap and attach it to the rear cooling module. Before removing the mounting bolts, take up the slack in the lifting strap, in order to support the cooling module. **Weight 363 kg (800 lbs)**

15. Remove the four mounting bolts from the cooling module. Cut the plastic ties that hold the hydraulic hoses in place in order to gain enough slack to lift the cooling module.

16. Carefully raise the cooling module and move it to the rear of the machine; enough to give clearance between the engine and the cooling module. Rest the cooling module securely on the fuel tank.
NOTE!
Pay attention when lowering the cooling module on top of the fuel tank. Avoid pinching the hoses to the fuel sender and the hydraulic hoses to the coolers.

NOTE!
It may be necessary to remove the fuel cap or place blocking under the back of the cooling module in order to prevent resting the cooling module on the fuel fill spout.

17. Remove the engine clutch drain.

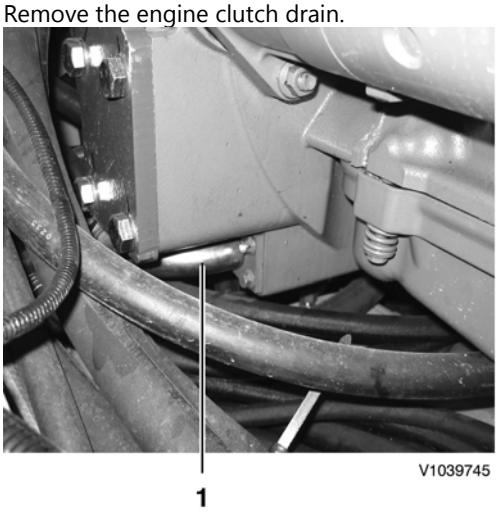


Figure 6

1. Engine clutch drain

18. Install devices to support the pump drive prior to engine removal. Mount the support devices using the flange bolt on both sides of the pump drive.

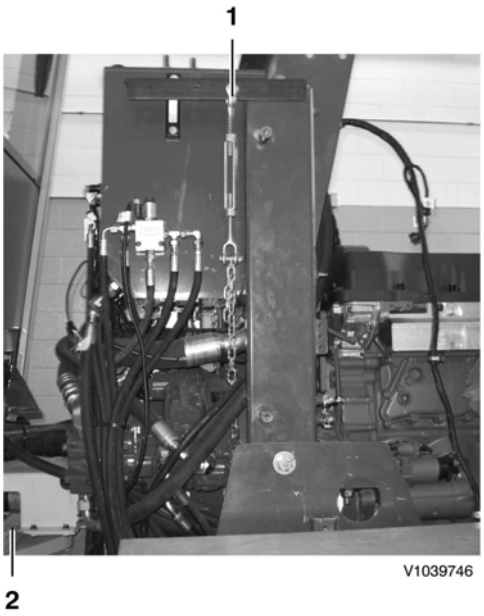


Figure 7

1. Support device
2. Wooden block

NOTE!
It is not necessary to remove the upper driveshaft or the protective cover.

19. Place wooden blocking under the upper driveshaft to prevent it from falling.

WARNING
Only use lifting devices with adequate capacity.

20. Attach a safe lifting device to the engine. Use toll number 9998547.**Engine weight 1089 kg (2400 lbs)**

21. Remove the bolts from under the rear engine mount.

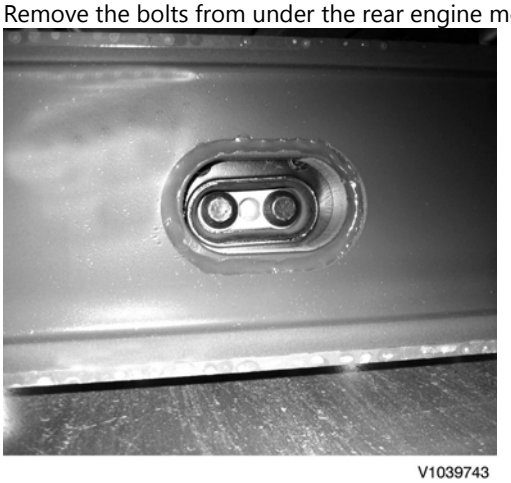


Figure 8
Rear engine mount bolts from underneath the machine

22. Remove the bolts at the left rear engine support cross member bracket. Allow the support bracket to roll out of the way once the weight is taken off of it.

23. Remove the bolts retaining the pump drive to the engine. Be sure to remove the top bolt last.

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