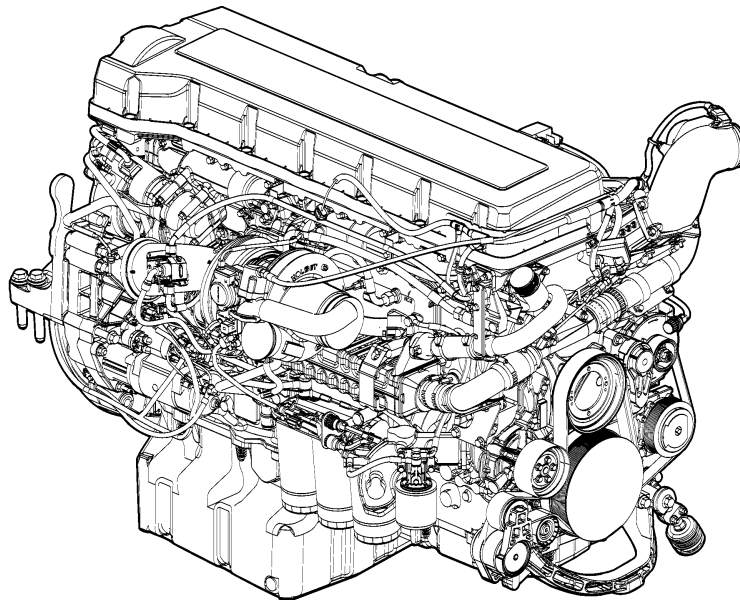


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Engine Stiffening Frame Replacement D16F

Engine Stiffening Frame, Replacement



W2005772

This information covers the replacement procedure for the engine stiffening frame on the Volvo D16F engine.

Contents

- “Stiffening Frame, Replacement” page 2

Note: Information is subject to change without notice. Illustrations are used for reference only and can differ slightly from the actual vehicle being serviced. However, key components addressed in this information are represented as accurately as possible.

Service Procedures

2129-03-02-01

Stiffening Frame, Replacement

You must read and understand the precautions and guidelines in Service Information, group 20, "General Safety Practices, Engine" before performing this procedure. If you are not properly trained and certified in this procedure, ask your supervisor for training before you perform it.

Removal

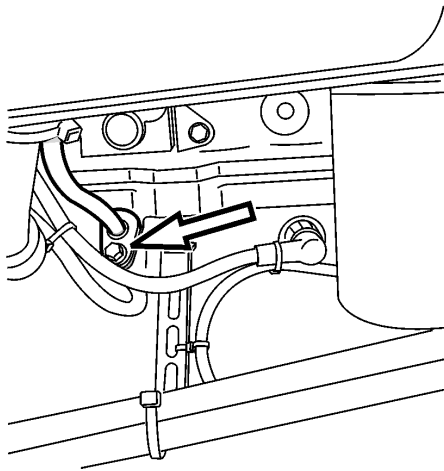
- 1**
Apply the parking brake and place the shift lever in neutral.

- 2**
Remove all cables from ground (negative) battery terminals to prevent personal injury from electrical shock.

- 3**
Using a hydraulic jack, lift the front axle until the front wheels are off the ground. Position jackstands of suitable capacity under the frame so that the axle can hang free.

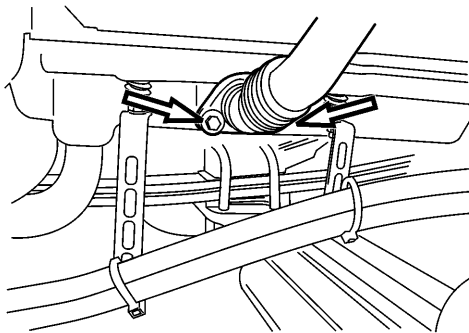
- 4**
Place a suitable container under the oil pan. Remove the oil drain plug and allow the oil to drain from the engine. Then, reinstall the drain plug.
Note: Use only hand tools when removing the drain plug. Do not use air tools to service the drain plug.

- 5**
If necessary, remove and/or position out-of-way any chassis components blocking access to the bottom of the engine and the oil pan.
Note: On some vehicles, the steering tie rod may have to be removed to gain clearance for removal of the oil pan.



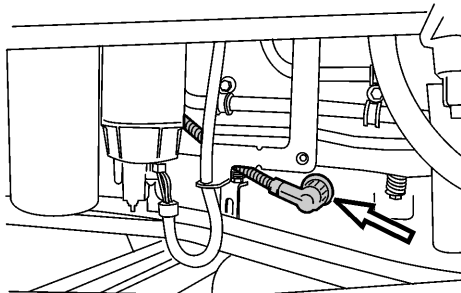
W2005086

6
Pull the dipstick partially out of the dipstick tube. Remove the dipstick tube fastener and tube from the oil pan. Remove the O-ring from the tube and discard.



W2004884

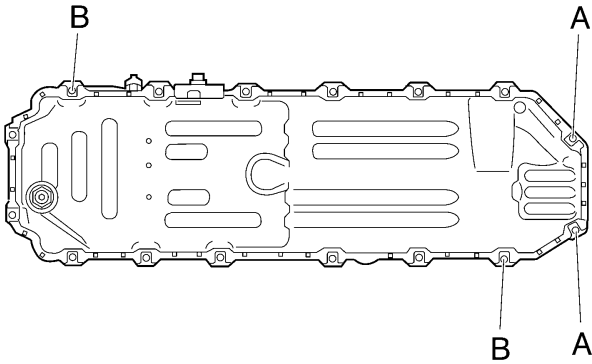
7
Remove the oil fill tube fasteners and remove the tube from the oil pan. Remove the O-ring from the tube and discard.



W2004876

8
Disconnect the oil level/temperature sensor connector.

- 9**
Remove the two oil pan bolts marked A. Loosen, but do not remove the two bolts marked B. Remove the remaining bolts.

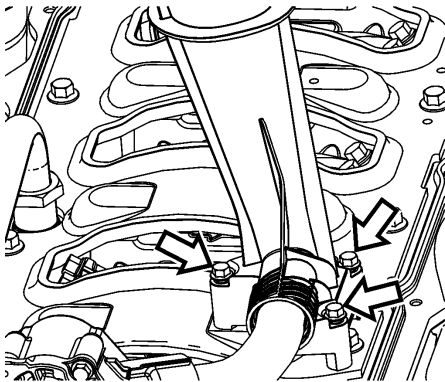


W2005226

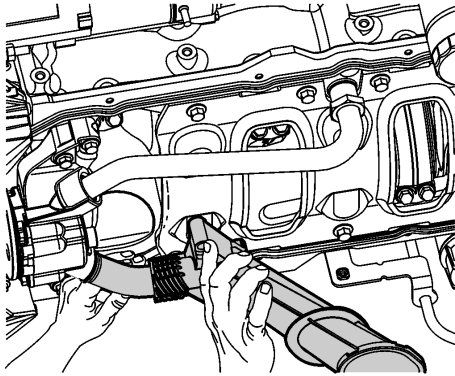
- 10**
With the help of an assistant, support the oil pan and remove the two bolts marked B.

- 11**
Carefully lower the oil pan to avoid damage to the oil pickup (suction) pipe, strainer and oil pump gear. Inspect the oil pan gasket for damage. The gasket can be reused if it is in good condition.

- 12**
Remove the fasteners securing the oil pickup (suction) pipe and strainer to the stiffening frame.



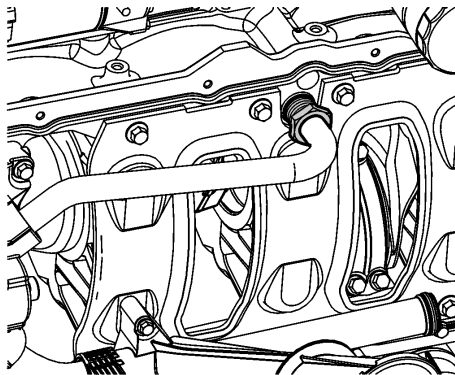
W2004952



W2004957

13

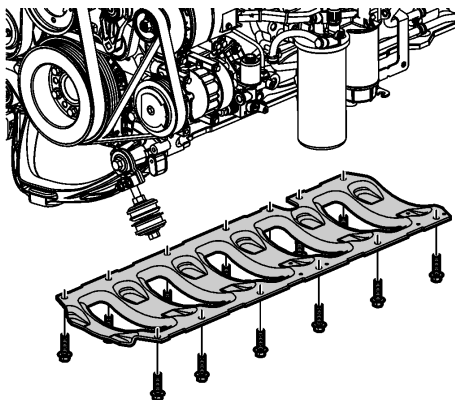
Carefully pull back on the pickup pipe to remove it from the pump housing.



W2004958

14

Loosen the coupling nut securing the oil pump outlet (pressure) pipe at the cylinder block. Carefully pull back on the outlet pipe to remove it from the pump housing and remove the pipe from the engine.



W2005149

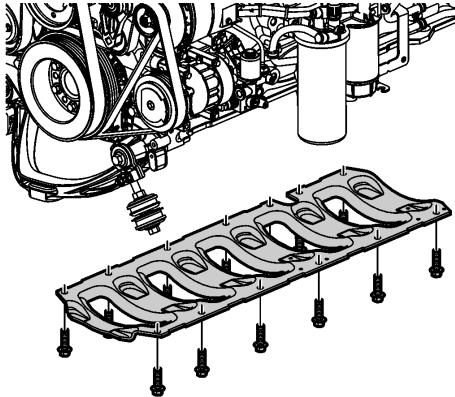
15

Remove the O-rings from the oil pump pickup and outlet pipes and discard.

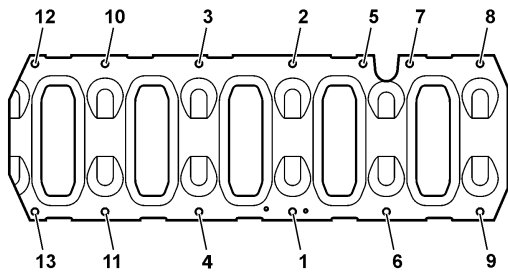
16

With the help of an assistant, remove the engine stiffening frame mounting bolts and remove the frame from the engine.

Installation



W2005149



T2020549

1

With the help of an assistant, carefully place the engine stiffening frame in position against the cylinder block. Install the mounting bolts, hand tight.

2

Using a torque wrench, tighten the stiffening frame mounting bolts in two steps following the sequence shown:

- Step 1 — 65 ± 5 Nm (48 ± 4 ft-lb)
- Step 2 — $90^\circ \pm 5^\circ$ angle

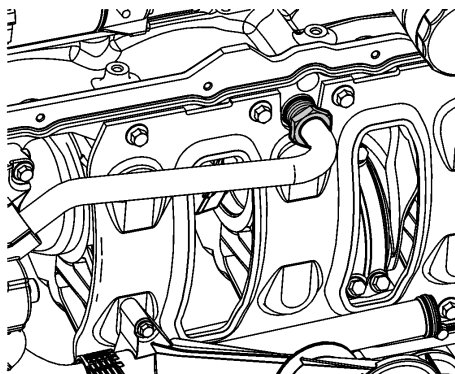
65 ± 5 Nm (48 ± 4 ft-lb) plus $90^\circ \pm 5^\circ$ angle

3

Lubricate new O-rings with clean engine oil and install the O-rings on the pump ends of the outlet (pressure) and inlet (suction) pipes.

4

Insert the oil outlet pipe with new O-ring into the oil pump housing using care to properly seat the pipe and O-ring. Loosely install the coupling nut to secure the pipe to the cylinder block.

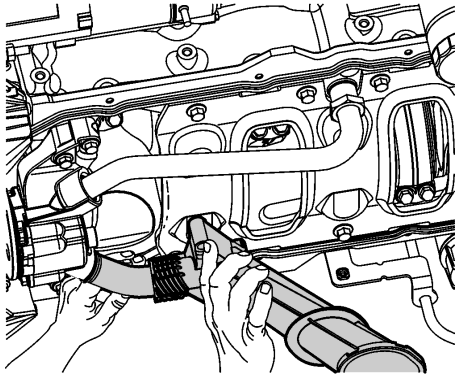


W2004958

5

Tighten the outlet pipe coupling nut at the cylinder block until it bottoms out at approximately 10 Nm (7.4 ft-lb). Then, tighten the coupling nut to a final torque of 201 ± 20 Nm (148 ± 15 ft-lb).

201 ± 20 Nm (148 ± 15 ft-lb)



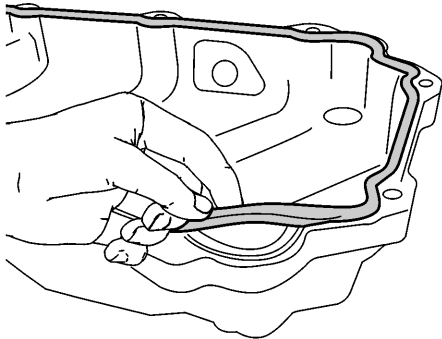
W2004957

6
Install the oil pickup (suction) pipe and strainer using care to properly seat the pipe and O-ring in the oil pump housing.

7
Install the fasteners to secure the oil pickup pipe and strainer to the stiffening frame. Tighten the fasteners to 24 ± 3 Nm (18 ± 2 ft-lb).

24 ± 3 Nm (18 ± 2 ft-lb)

8
Inspect the rubber oil pan gasket for damage and replace it if necessary. Clean the oil pan and cylinder block flanges. Make sure the gasket is properly aligned and seated in the oil pan groove.

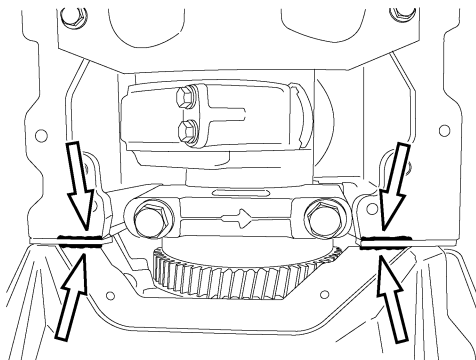


W2004878

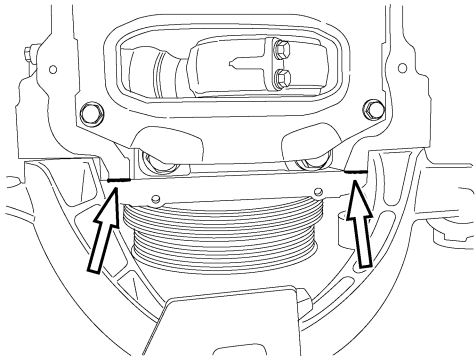
9
Apply a two mm (0.079 inch) bead of Volvo sealant to the seams between the flywheel housing and the timing gear mounting plate and between the plate and the cylinder block.

Note: Make sure the cylinder block flange, timing gear mounting plate and flywheel housing are all flush, to prevent leaking.

Note: The cover must be installed within 20 minutes of having applied the sealant.



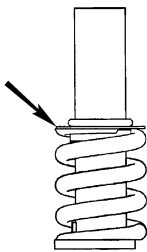
W2006078



W2006079

10
Apply a two mm (0.079 inch) bead of Volvo sealant to the seams between the front seal cover and the cylinder block.

Note: Make sure the cylinder block flange and front cover flange are flush, to prevent leaking.



T2017887

11
Position the spring assembly on the oil pan bolts so that the washer faces the oil pan end of the assembly.

12
With the help of an assistant and within 20 minutes of sealant application, position the oil pan against the cylinder block and install the mounting bolts marked B, hand tight. Loosely install the remaining bolts, including those marked A which should be installed last.



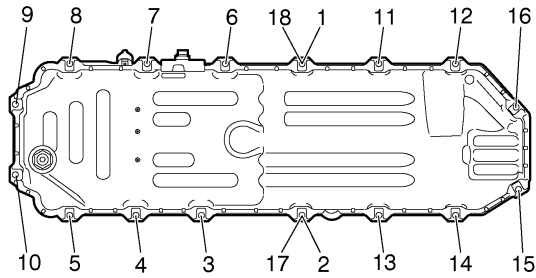
CAUTION

Use care to prevent damage to the oil pickup/strainer and outlet pipes when placing the oil pan in position.

13

Press the pan rearward as far as possible and then tighten the bolts to 24 ± 4 Nm (18 ± 3 ft-lb) following the numbered sequence shown.

24 ± 4 Nm (18 ± 3 ft-lb)



W2005985

14

Install the oil drain plug if not already done and tighten to 60 ± 10 Nm (44 ± 7 ft-lb).

Note: Do not use a copper washer with the oil drain plug. This could cause the drain plug to loosen and leak oil. Use only the steel drain plug washer.



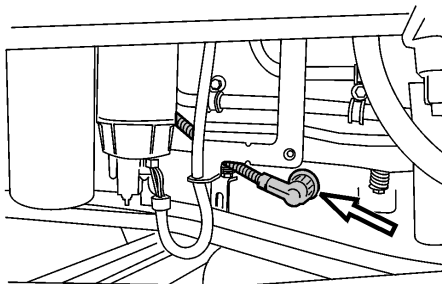
CAUTION

Do not use air tools when installing the oil drain plug. Overtorquing could occur which can cause oil pan and drain plug thread stripping.

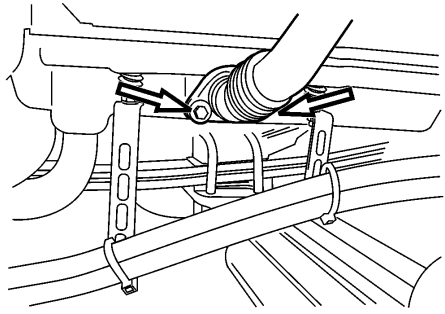
60 ± 10 Nm (44 ± 7 ft-lb)

15

Connect the wiring harness to the oil level/temperature sensor.



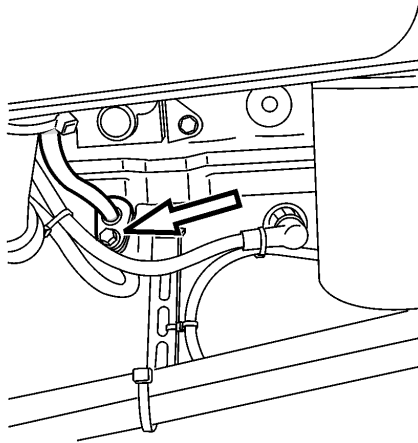
W2004876



W2004884

16

Install a new O-ring on the oil fill tube and place the tube in position on the oil pan. Install the oil fill tube fasteners and tighten to secure.



W2005086

17

Install a new O-ring on the dipstick tube. Place the dipstick tube in position on the oil pan, install the fastener and tighten to secure. Install the dipstick.

18

Install and/or reposition any chassis components that were removed to provide access to the bottom of the engine and the oil pan.

19

Using a hydraulic jack, raise the front axle and remove the jackstands. Lower the vehicle and remove the hydraulic jack.

20

Fill the engine with the specified amount of approved engine oil.

21

Install all previously removed cables to the ground (negative) battery terminals.

22

Start the engine, check for leaks and proper operation. After shutdown, replenish fluids as necessary.