

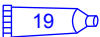
Fuel System

Section 5E - High Pressure Fuel Pump

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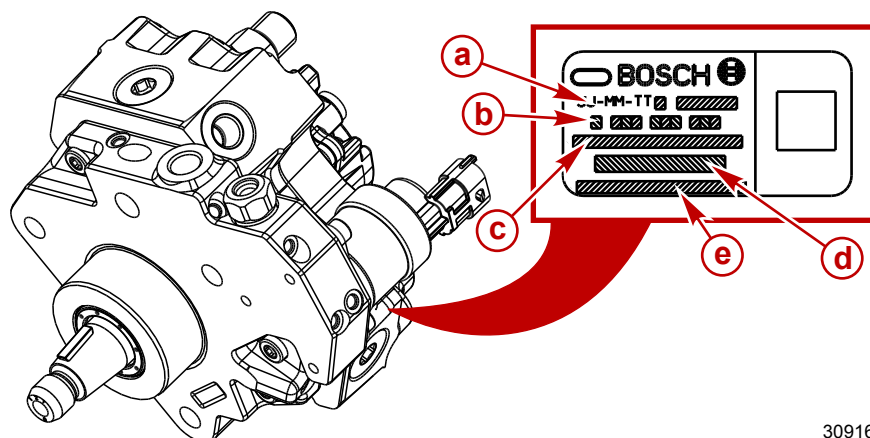
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Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 19	Perfect Seal	Fuel pump gasket	92-34227 1

High Pressure Fuel Pump Identification

The identification tag is located on the fuel pump housing below the fuel pump actuator.



a - Manufacturing date
b - Bosch part number
c - Pump type

d - Customer order number
e - Country of origin

Specifications

Description	
Manufacturer	Robert Bosch Corporation
Type of injection pump	Single plunger Type UI
Manufacturer's identification number	A 413 020 415
Fuel system pressure	1350 bar (19580 PSI)
Delivery begins	Electronically controlled
Governor type	Electronically controlled

Fuel Pump Repair and Service

The Robert Bosch Corporation has a worldwide network of authorized Bosch Service Centers to service their products.

The fuel return line adaptor and hollow bolt must accompany any high pressure injection pump shipped to a service center for adjustments or repairs. The hollow bolt incorporates a calibrated sized orifice. The pump cannot be adjusted properly without this matched orifice calibration.

Contact the Bosch distributor nearest you for the location of an authorized Bosch Service Center.

Notes:



Exploded View—High Pressure Fuel Pump

Ref. No.	Qty.	Description	Torque		
			Nm	lb-in.	lb-ft
1	1	Fuel pump actuator	–	–	–
2	3	Screw	10	88.5	–
3	3	Flange nut	27.5	–	20
4	3	Stud	–	–	–
5	1	Fuel pump gear	–	–	–
6	1	Gasket	–	–	–
7	1	Fuel pump gear nut	86.3	–	64
8	1	High pressure fuel pump	–	–	–
9	1	Fuel pump assembly	–	–	–
10	1	Common rail fuel supply line	20.5	181	–
11	1	Clamp	–	–	–
12	1	Common rail fuel line screw	14.7	130	–
13	1	Overflow adaptor	–	–	–
14	4	Sealing washer	–	–	–
15	2	Hollow bolt	27.5	–	20
16	1	Clamp	1.5	13	–
17	1	Overflow fuel line	–	–	–
18	1	Fuel inlet line	–	–	–

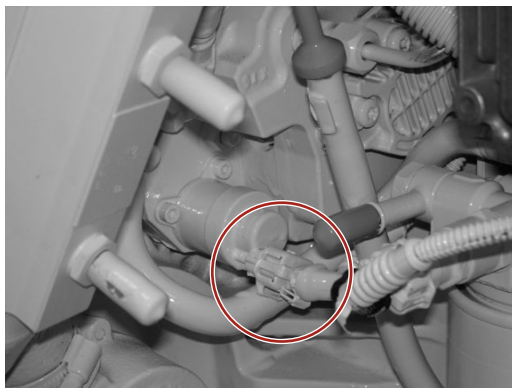
High Pressure Fuel Pump

Removal

⚠ CAUTION

Failure to release pressure from the fuel system will result in fuel spraying out, which can cause a fire or explosion. Allow the engine to cool completely and release all fuel pressure before servicing any part of the fuel system. Always protect eyes and skin from pressurized fuel and vapors.

1. Disconnect the battery cables.
2. Drain the seawater section of the cooling system. Refer to **Section 6A–Draining the Seawater System**.
3. Remove the seawater hoses between the seawater pump, oil cooler, and fuel cooler. Refer to **Section 6A** for procedures.
4. Disconnect the fuel pump actuator electrical connector from the fuel pump.

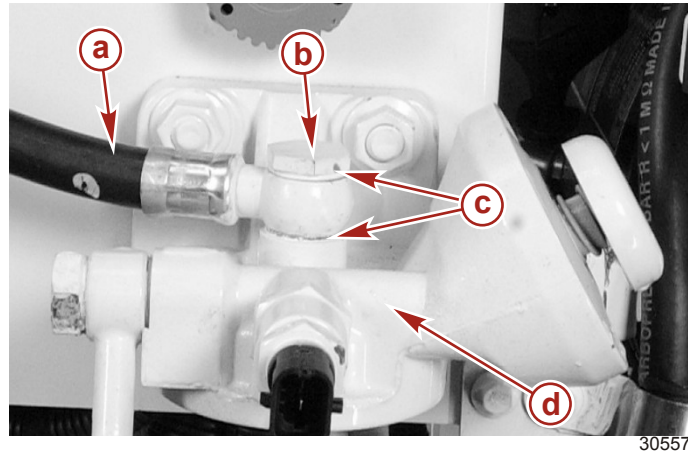


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Fuel pump actuator electrical connector

IMPORTANT: The fuel fitting hollow bolts are calibrated for each individual high pressure fuel pump and must be retained and installed in their original locations.

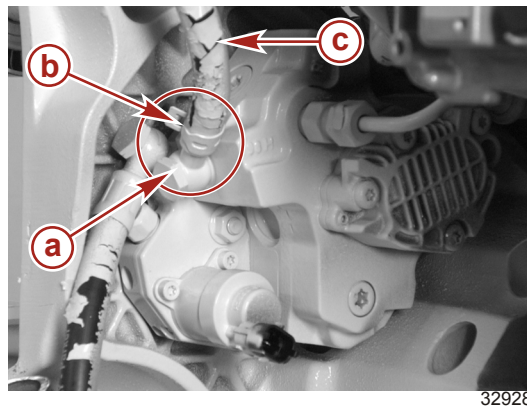
5. Remove the hollow bolt from the fuel pump inlet line at the fuel filter assembly. Discard the sealing washers.



- a** - Fuel pump inlet line
- b** - Hollow bolt
- c** - Sealing washers
- d** - Fuel filter assembly

NOTE: If the Discard the hollow bolt sealing washers.

6. Disconnect the fuel pump return line from the adapter.

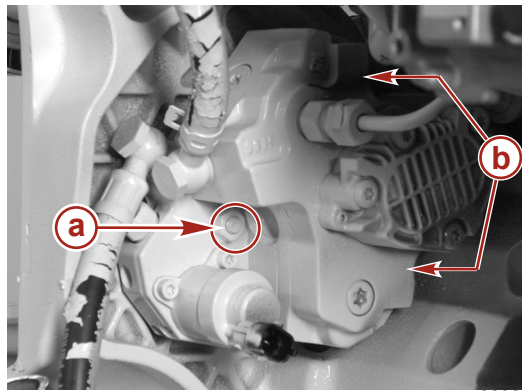


- a** - Adapter
- b** - Clamp
- c** - Fuel pump return line

IMPORTANT: High pressure fuel lines must be replaced if they are removed.

7. Remove the high pressure common rail fuel line. Refer to **Section 5C–Common Rail and Fuel Lines** for removal procedures.

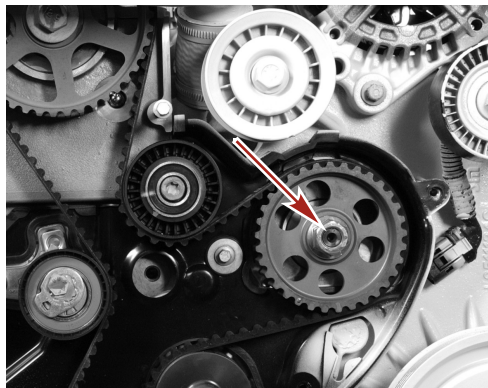
8. Remove the three injection pump flange nuts.



a - Flange nut

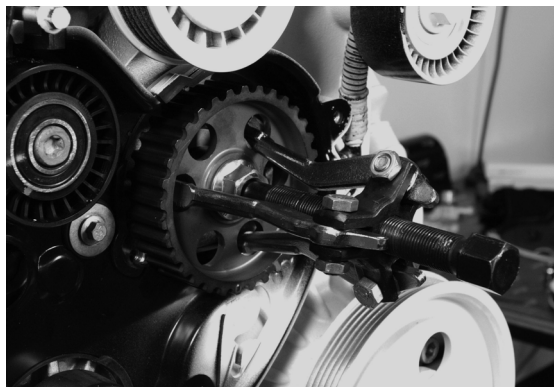
b - Flange nuts (Two on block side of pump)

9. Remove the engine timing cover. See **Section 3A—Timing cover**.
10. Remove the timing belt. See **Section 3A—Timing belt**.
11. Loosen the high pressure fuel pump pulley nut.



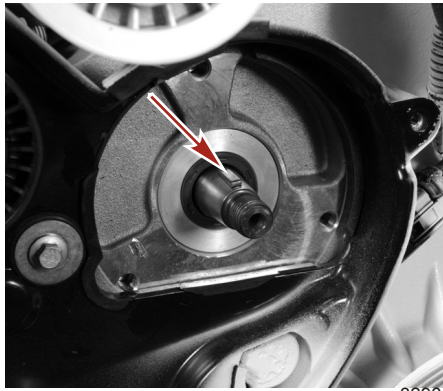
High pressure fuel pump pulley nut

12. Using a suitable three-jaw puller, remove the high pressure fuel pump pulley from the pump shaft.



Pulley removal

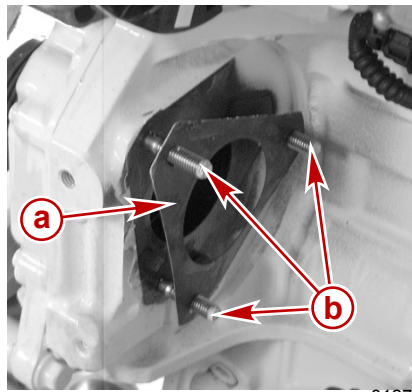
13. Remove and retain the woodruff key from the fuel pump shaft.



Woodruff key

14. Carefully remove the pump and set it aside.

15. Remove and discard the fuel pump gasket.

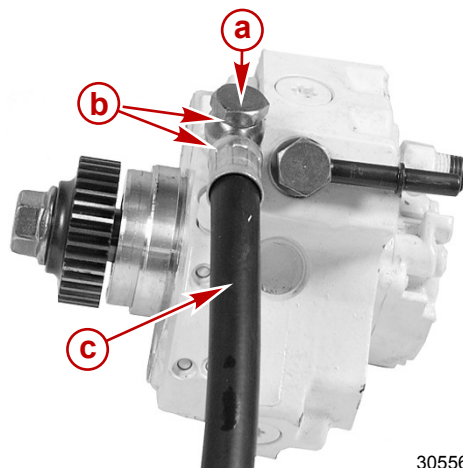


a - Fuel pump gasket

b - Fuel pump mounting studs

IMPORTANT: The fuel fitting hollow bolts are calibrated for each individual high pressure fuel pump and must be retained and installed in their original locations.

16. Remove the hollow bolt from the fuel pump inlet line. Discard the sealing washers.



a - Hollow bolt

b - Sealing washers

c - Fuel pump inlet line

IMPORTANT: Leave the battery cables disconnected and attach a notice to the ignition switch to alert others that the engine should not be disturbed.

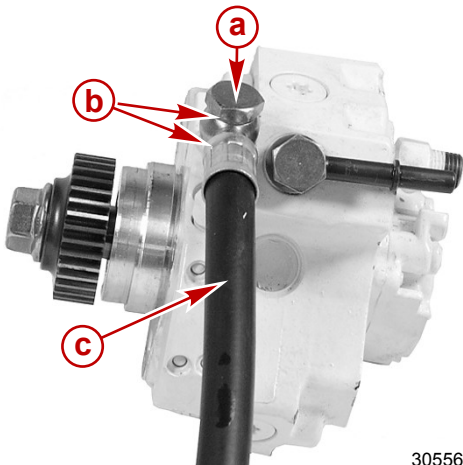
Cleaning and Inspection

- 1. Clean any remaining gasket material off of the fuel pump and timing cover mating surfaces.
- 2. Inspect the condition of the fuel pump pulley and woodruff key for any damage. Replace if necessary.

Installation

IMPORTANT: Hollow bolts are calibrated and must remain with the pump in their original location.

- 1. Using new sealing washers on the hollow bolt, install the fuel pump inlet line.

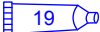


- a - Hollow bolt
- b - Sealing washers
- c - Fuel pump inlet line

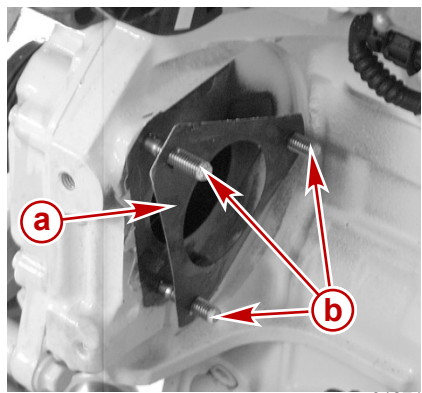
- 2. Tighten the fuel pump inlet line hollow bolt to specification.

Description	Nm	lb-in.	lb-ft
Fuel pump inlet line hollow bolt	16.7	147	–

- 3. Remove any injection pump backlash by rotating the shaft **counterclockwise** (when facing the pump) until you feel resistance.
- 4. Apply sealant to the new injection pump gasket.

Tube Ref No.	Description	Where Used	Part No.
 19	Perfect Seal	Fuel pump gasket	92-34227 1

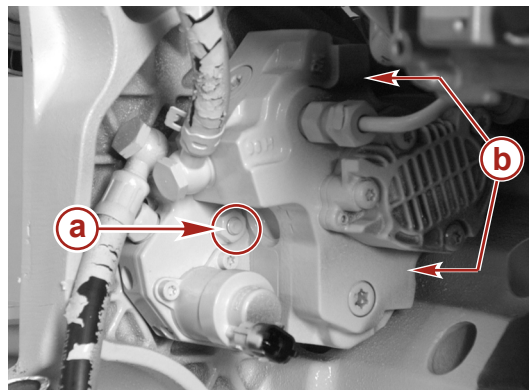
5. Install the new fuel pump gasket on the three fuel pump mounting studs.



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- a** - Fuel pump gasket
- b** - Fuel pump mounting studs

6. Install the fuel pump onto the fuel pump mounting studs.
7. Install the fuel pump flange nuts.



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- a** - Flange nut
- b** - Flange nuts (Two on block side of pump)

8. Torque the fuel pump flange nuts.

Description	Nm	lb-in.	lb-ft
Fuel pump flange nut	27.5	–	20

9. Position the fuel pump shaft woodruff key.



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Woodruff key

10. Install the fuel pump pulley and hand tighten the pulley nut.

11. Tighten the fuel pump pulley nut to specification.

Description	Nm	lb-in.	lb-ft
Fuel pump pulley nut	86.3	–	64

12. Install the timing belt. See **Section 3A—Timing belt**.

13. Install the engine timing cover. See **Section 3A—Timing cover**.

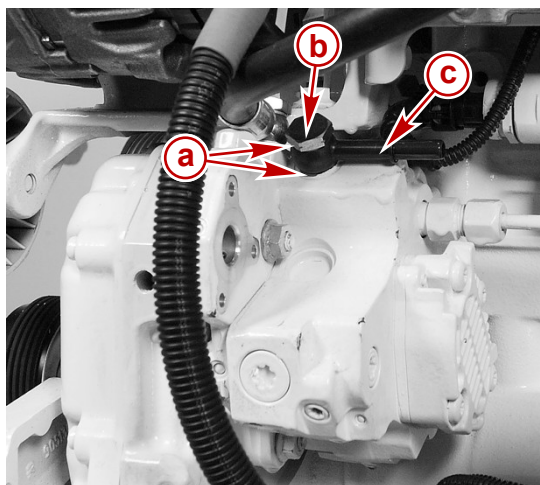
IMPORTANT: Do not bend fuel injector pipes. Bending can release metal flakes inside the pipes, causing injectors or fuel pump to malfunction.

14. Install the serpentine drive and power-assisted steering belts. See **Section 1B—Maintenance**

15. Install the high pressure common rail fuel supply line. Refer to **Section 5C—Common Rail and Fuel Lines** for installation procedures..

IMPORTANT: Hollow bolts are calibrated and must remain with the pump in their original locations.

16. If necessary, install the fuel pump return line adapter using new sealing washers on the hollow bolt.



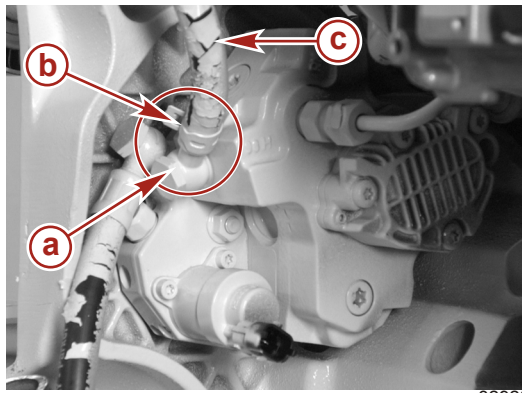
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- a** - Sealing washers
- b** - Hollow bolt
- c** - Fuel pump return line adapter

17. Tighten the fuel pump return line hollow bolt to specification.

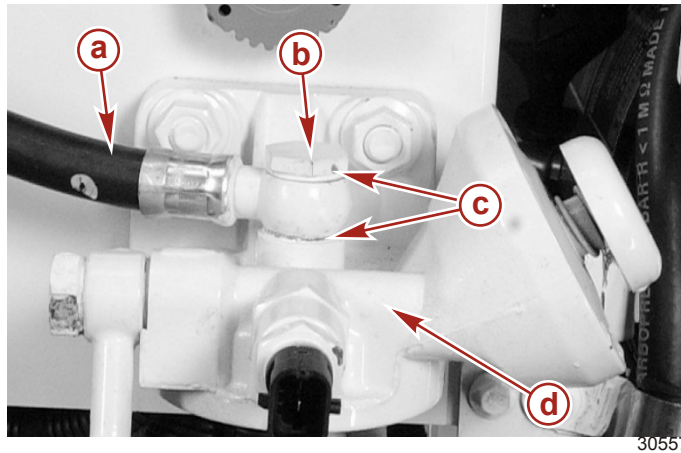
Description	Nm	lb-in.	lb-ft
Fuel pump return line hollow bolt	16.7	147	–

18. Install the fuel pump return line and tighten the clamp securely.



- a** - Adapter
- b** - Clamp
- c** - Fuel pump return line

19. Using new sealing washers on the hollow bolt, install the fuel pump inlet line at the fuel filter assembly.



- a** - Fuel pump inlet line
- b** - Hollow bolt
- c** - Sealing washers
- d** - Fuel filter assembly

20. Tighten the fuel pump inlet line hollow bolt to specification.

Description	Nm	lb-in.	lb-ft
Fuel pump inlet line hollow bolt	16.7	147	—

21. Install the fuel pump actuator and connect the wiring harness.

22. Install the seawater hoses between the seawater pump, the oil cooler, and the fuel cooler. Refer to **Section 6A—Cooling System** for procedures.

23. Connect the battery cables.

24. Check for fuel leaks when first starting the engine.

Notes: