

# Fuel System

## Section 5C - Common Rail and Fuel Lines

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## Common Rail Repair and Service

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

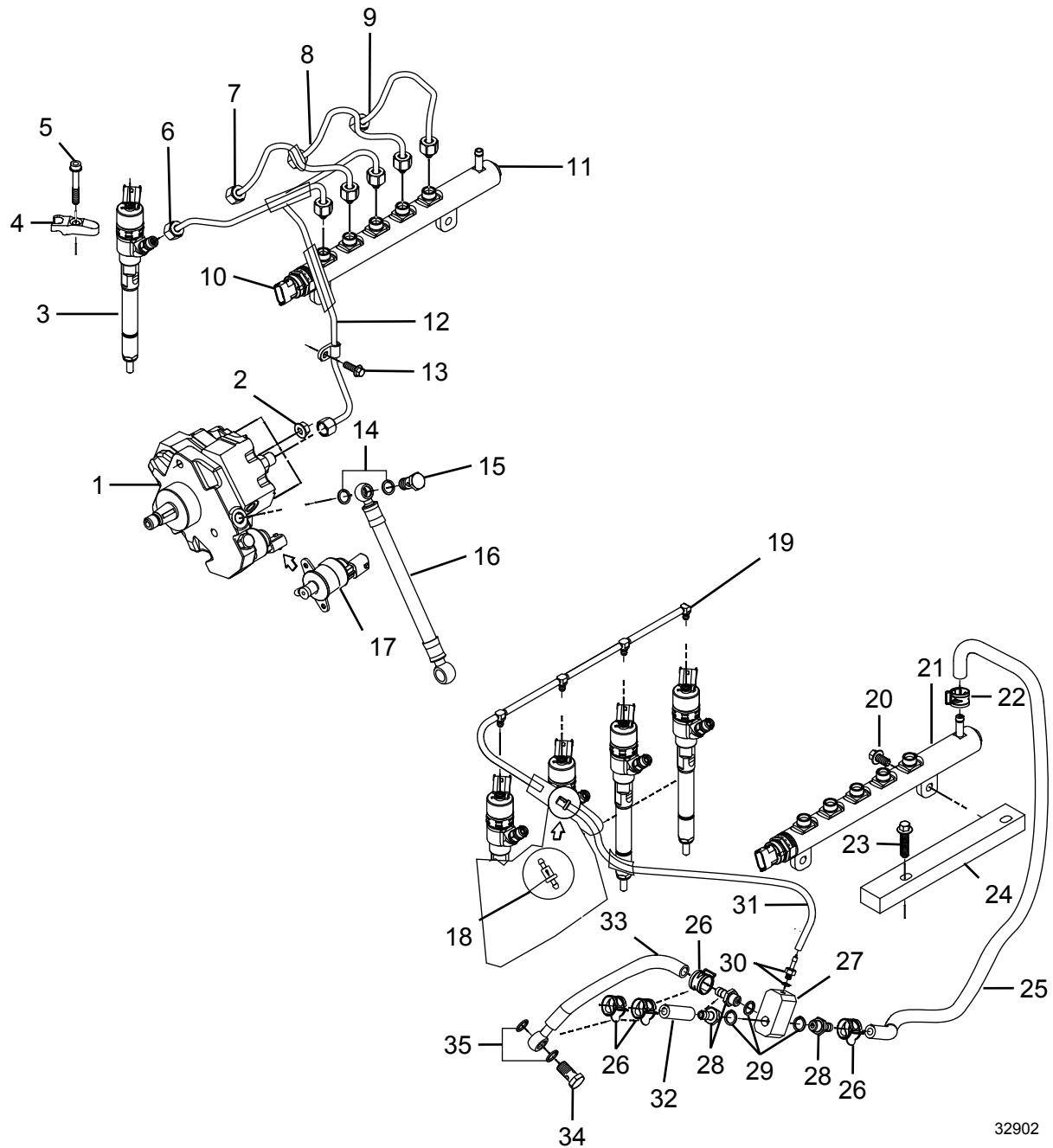
The high pressure fuel pump, common rail, and injectors must be sent to an authorized Bosch Service Center.

When shipping an injection pump to a service center for adjustments or repairs, the fuel return line hollow bolt must accompany the unit. The hollow bolt incorporates a sized orifice for proper pressure that is matched to the pump. The pump cannot be properly adjusted without the matched orifice.

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

Notes:

## Exploded View—Common Rail, Fuel Manifold, and Fuel Lines



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## Exploded View—Common Rail, Fuel Manifold, and Fuel Lines

Ref. No.	Qty.	Description	Torque		
			Nm	lb-in.	lb-ft
1	1	High pressure fuel pump			
2	3	High pressure fuel pump mounting nut	24.5	–	18
3	4	Fuel injector			
4	4	Fuel injector clamp			
5	4	Fuel injector clamp screw	30	–	22
6	1	High pressure fuel line, Injector 1	See <b>High Pressure Fuel Lines</b> of this section.		
7	1	High pressure fuel line, Injector 2	See <b>High Pressure Fuel Lines</b> of this section.		
8	1	High pressure fuel line, Injector 3	See <b>High Pressure Fuel Lines</b> of this section.		
9	1	High pressure fuel line, Injector 4	See <b>High Pressure Fuel Lines</b> of this section.		
10	1	Rail fuel pressure sensor	35	–	26
11	1	Common rail			
12	1	High pressure fuel supply line	See <b>High Pressure Fuel Lines</b> of this section.		
13	1	Fuel line clamp screw	14.7	130	–
14	2	Sealing washer			
15	1	Hollow bolt	27.5	–	20
16	1	Fuel line			
17	1	Regulating valve			
18	1	Pressure valve			
19	1	Injector return line			
20	2	Common rail mounting screw	33	–	24
21	1	Common fuel rail			
22	1	Clamp			
23	2	Common rail mounting bracket screw	33	–	24
24	1	Common rail mounting bracket			
25	1	Common rail pressure relief return line			
26	4	Clamp			
27	1	Fuel manifold			
28	3	Fuel line adaptor	10.8	96	–
29	3	Sealing washers			
30	1	Fuel line adaptor	8	71	–
31	1	Injector fuel return line			
32	1	Fuel hose			
33	1	Fuel			
34	1	Hollow bolt	27.5	–	20
35	2	Sealing washer			

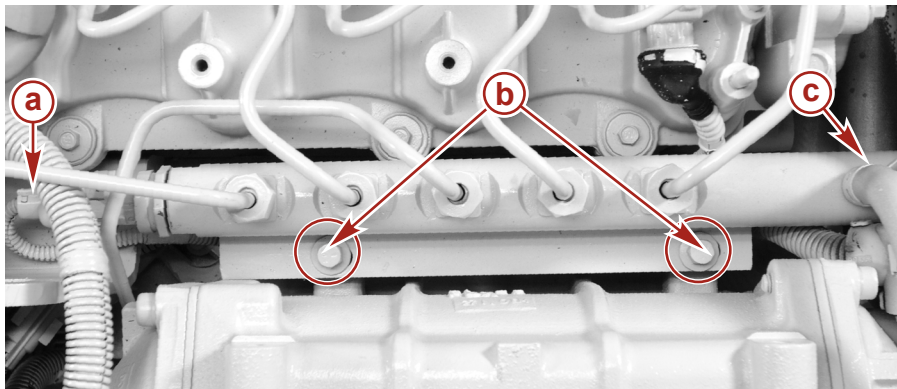
# Common Rail

## 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.

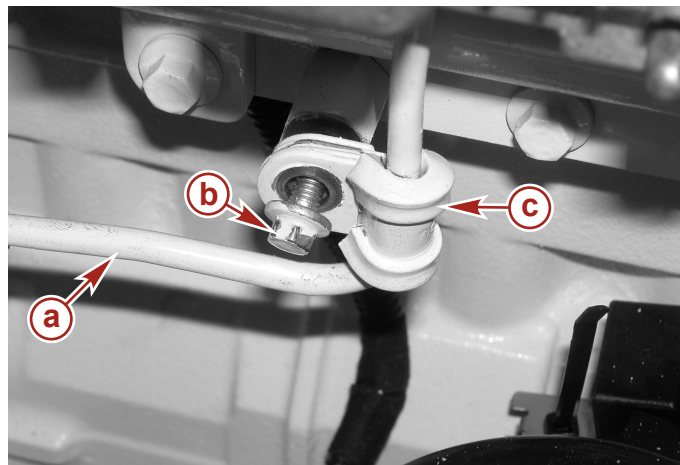
1. Allow the engine to cool.
2. Disconnect the common rail pressure sensor electrical connector.



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- a** - Common rail pressure sensor
- b** - Common rail bracket screws
- c** - Common rail pressure relief fuel line

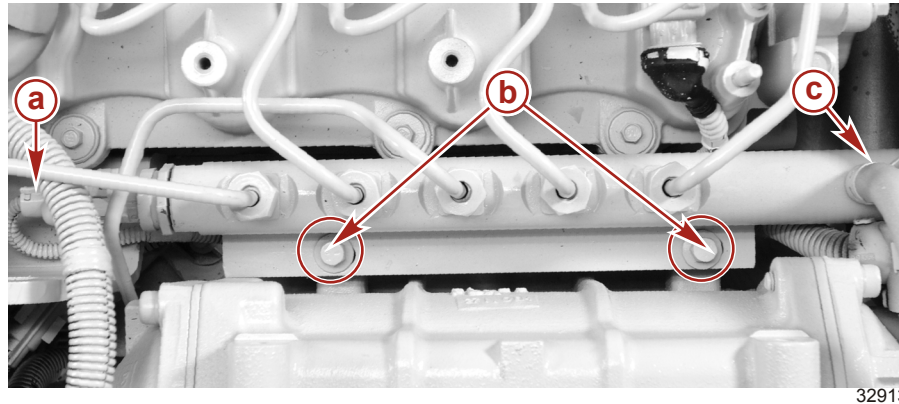
3. Loosen the clamp and remove the common rail pressure relief fuel line.
4. Loosen but do not remove the common rail bracket mounting screws.
5. Remove the fuel pump high pressure fuel supply line clamp



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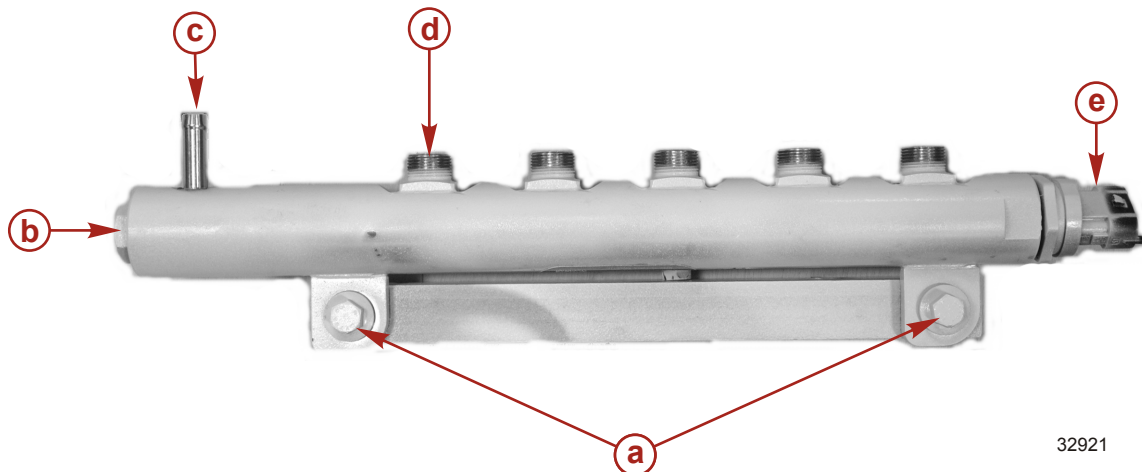
- a** - Fuel pump high pressure fuel supply line
- b** - Screw
- c** - Clamp

6. Remove the high pressure fuel lines. See **Section 5C—High Pressure Fuel Lines**.
7. Disconnect the common rail pressure sensor connector.
8. Remove the common rail bracket mounting screws and remove the common rail and bracket from the engine.



- a** - Common rail pressure sensor
- b** - Common rail bracket screws
- c** - Common rail pressure relief fuel line

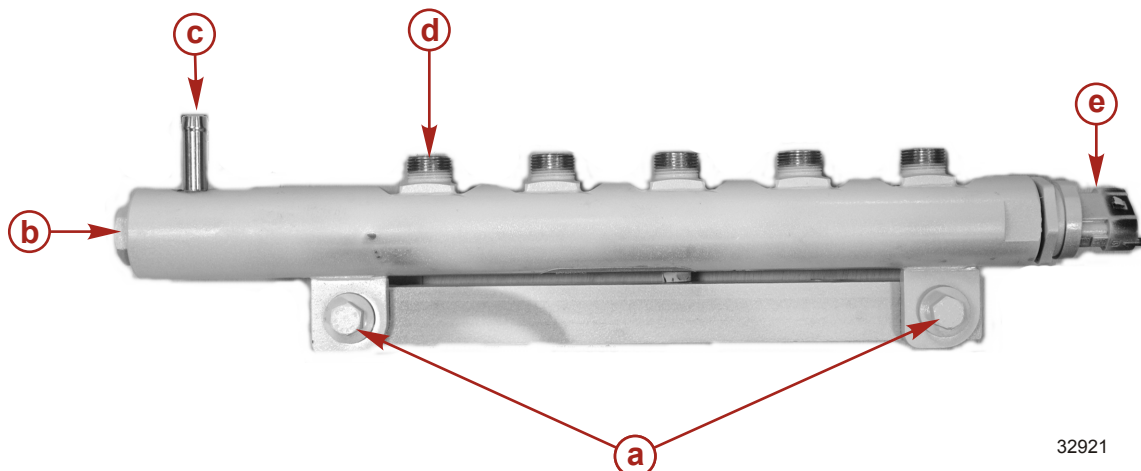
9. If replacing the common fuel rail:
  - a. Remove the common rail pressure sensor and washer.
  - b. Remove the screws attaching the common rail to the bracket.



- a** - Common rail bracket screws
- b** - Pressure relief valve (service with the fuel rail)
- c** - Pressure relief fuel return hose fitting
- d** - Fuel line fitting
- e** - Common rail pressure sensor

## Installation

1. If previously removed, attach the common rail to the bracket.

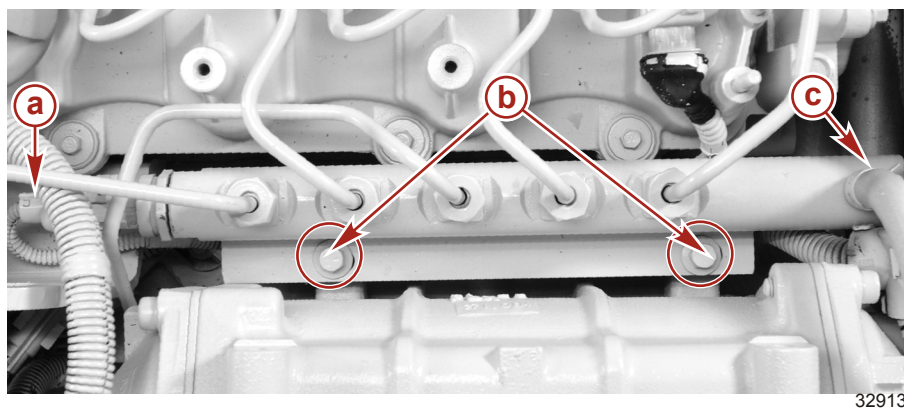


- a** - Common rail bracket screws
- b** - Pressure relief valve (service with the fuel rail)
- c** - Pressure relief fuel return hose fitting
- d** - Fuel line fitting
- e** - Common rail pressure sensor

2. If previously removed, tighten the common rail to bracket screws to specification.

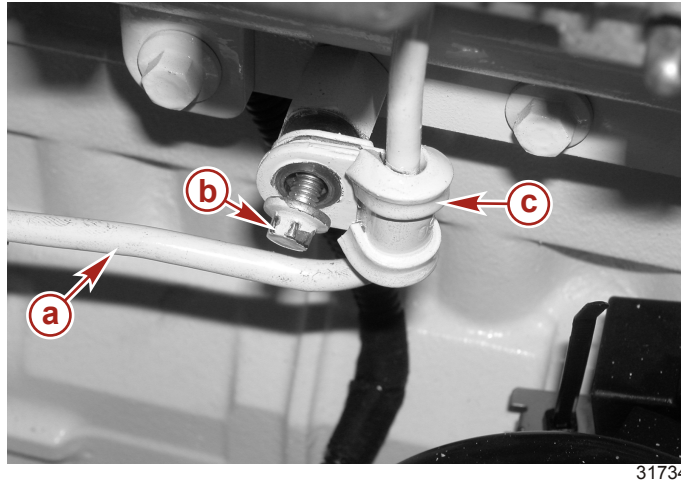
Description	Nm	lb-in.	lb-ft
Common rail bracket screws	33	–	24

3. Install the common rail and bracket. Only hand tighten the bracket mounting screws.



- a** - Common rail pressure sensor
- b** - Common rail bracket screws
- c** - Common rail pressure relief fuel line

4. Install the high pressure fuel line clamp. Hand tighten only. See **Section 5C—High Pressure Fuel Lines**.



- a** - Fuel pump high pressure fuel supply line  
**b** - Screw  
**c** - Clamp

5. Install the high pressure fuel lines. See **Section 5C—High Pressure Fuel Lines**.  
 6. Tighten the high pressure fuel line clamp to specification.

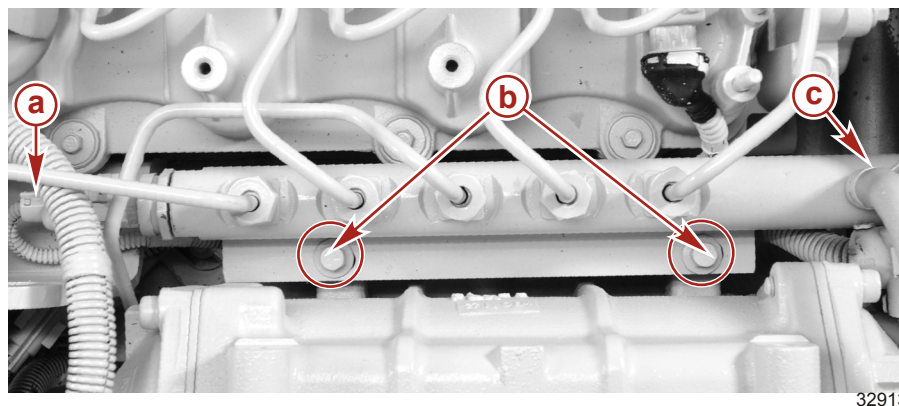
Description	Nm	lb-in.	lb-ft
High pressure fuel line clamp	14.7	130	–

**IMPORTANT: Do not overtighten the common rail mounting screws.**

7. Tighten the common rail and bracket mounting screws to specification.

Description	Nm	lb-in.	lb-ft
Common rail and bracket mounting screw	33	–	24

8. Connect the common rail pressure sensor electrical connector.



- a** - Common rail pressure sensor  
**b** - Common rail bracket screws  
**c** - Common rail pressure relief fuel line

9. Attach and clamp the common rail pressure relief fuel line.



# High Pressure Fuel Lines

## Removal

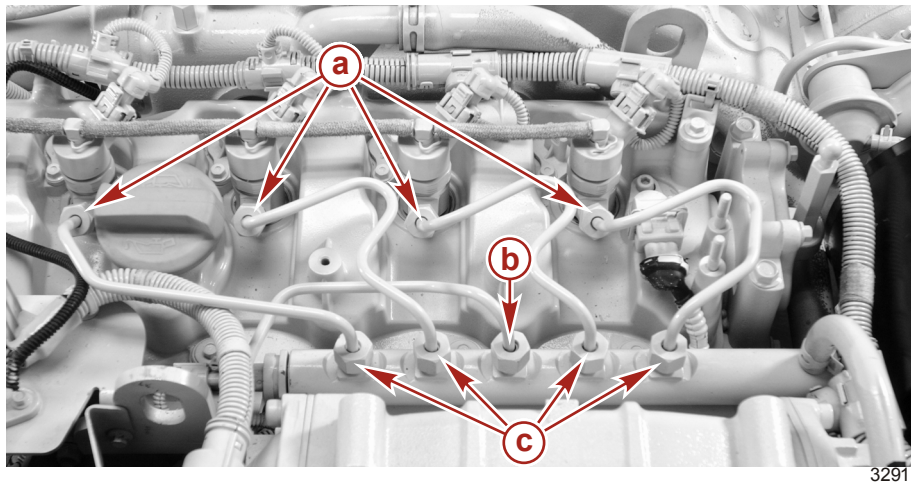
### ⚠ CAUTION

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. Allow the engine to cool.
2. Use a clean shop towel to shroud the injector sleeve nuts prevent fuel spraying. Immediately clean up and spilled fuel.

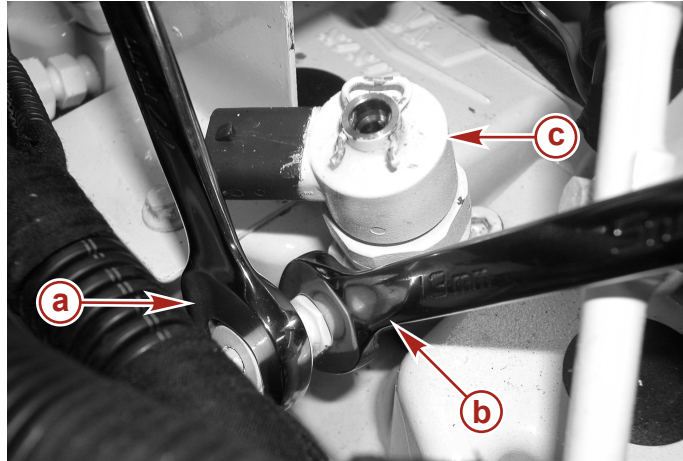
**IMPORTANT:** Counterhold each injector fuel inlet on the injectors with a second wrench when loosening the high pressure fuel line sleeve nuts.

3. Loosen the high pressure fuel line sleeve nuts on the common rail.



- a** - Fuel line injector sleeve nuts
- b** - High pressure fuel supply line
- c** - Fuel line sleeve nuts

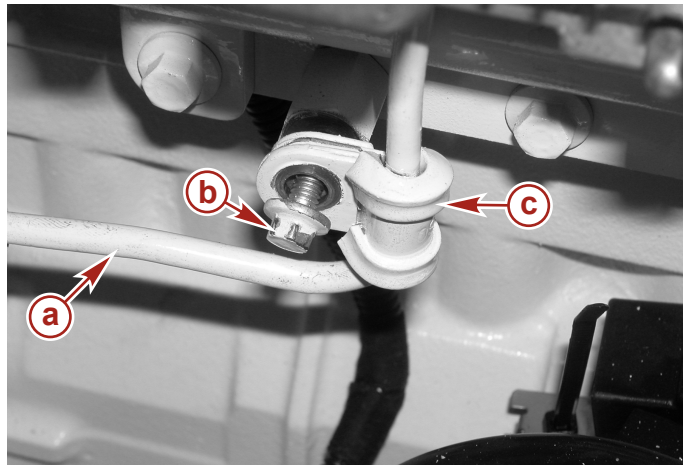
4. Counter-hold the injector fuel fitting and loosen the high pressure fuel line sleeve nuts at the fuel injectors.



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- a** - Fuel line sleeve nut
- b** - Injector fitting
- c** - Fuel injector

5. Remove the screw from the clamp anchoring the fuel pump high pressure fuel line.

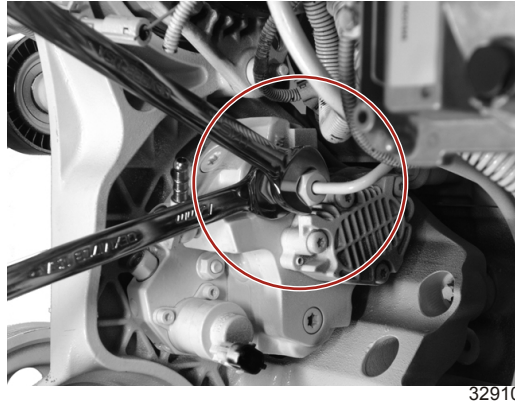


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- a** - Fuel pump high pressure fuel line
- b** - Screw
- c** - Clamp

6. Retain the clamp and screw.

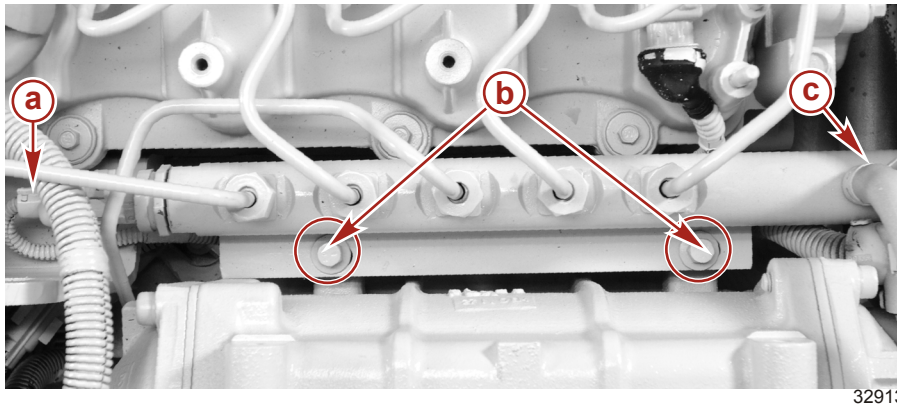
- Counter hold the adapter and loosen the fuel line sleeve nut on the fuel pump high pressure fuel line.



- Remove the fuel pump high pressure fuel line.
- Discard any high pressure fuel lines that are removed.

## Installation

- Check that the fuel pump and injectors are seated properly and tightened to specification.
- If the common rail was previously installed, loosen – but do not remove – the common rail and common rail bracket screws.*

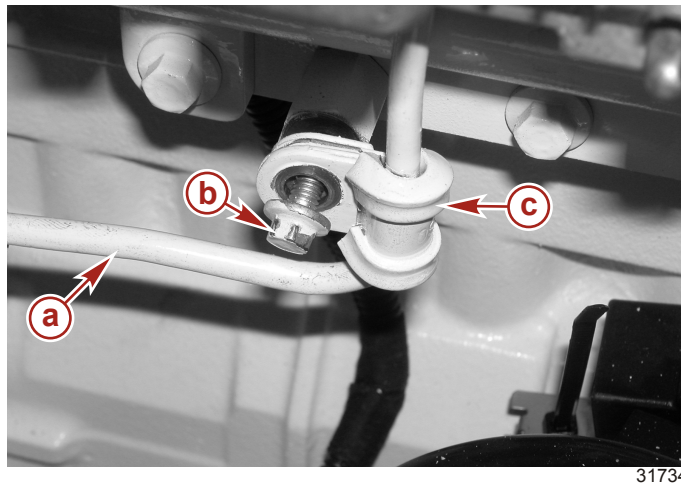


- a** - Rail fuel pressure sensor connector
- b** - Common rail mounting screws
- c** - Hose clamp

- Install the the fuel pump high pressure fuel line and hand tighten the sleeve nuts.

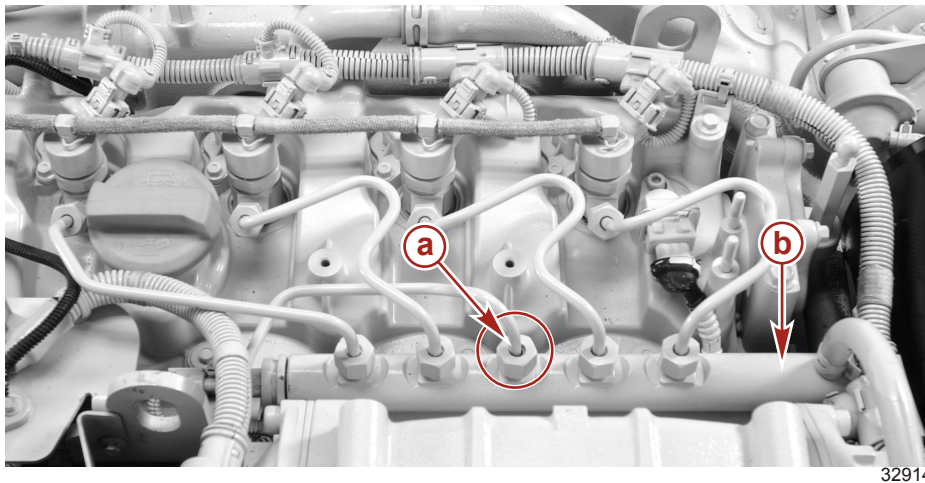


4. Install the clamp on the fuel pump high pressure line.



- a** - Fuel pump high pressure line
- b** - Screw
- c** - Clamp

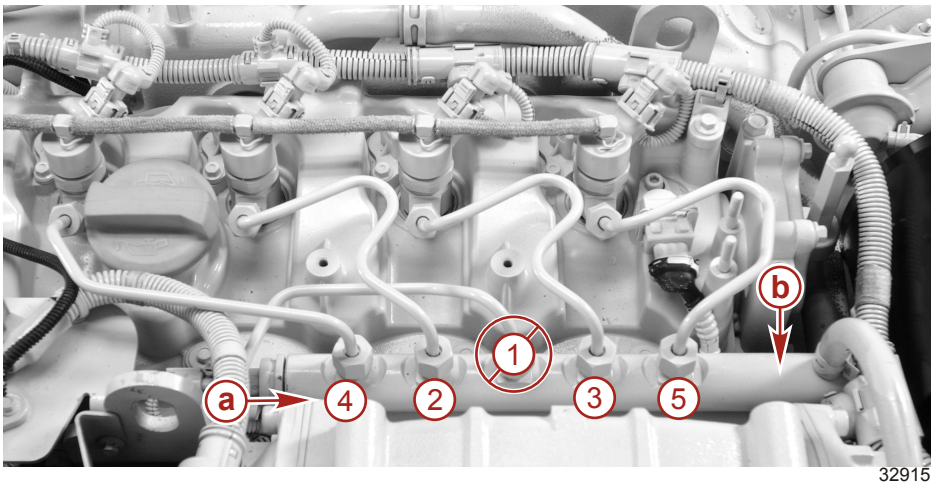
5. Install the injector fuel lines and hand tighten the sleeve nuts.
6. Install the clamp screw and hand tighten.
7. Torque the #3 fuel line on the common rail.



- a** - Fuel line 3
- b** - Common rail

Description	Nm	lb-in.	lb-ft
Fuel pump high pressure fuel line at common rail	19	168	—

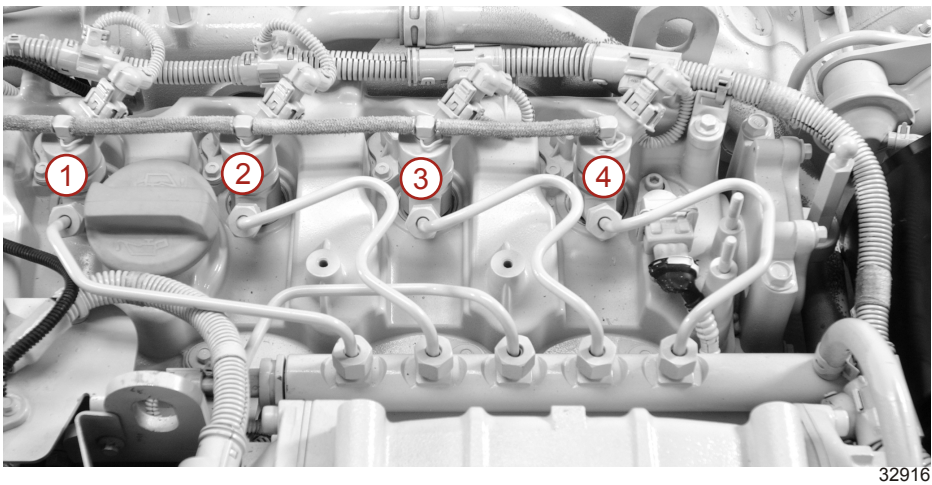
8. Torque the remaining fuel line sleeve nuts at the common rail in the following order.



**a** - Torque sequence                      **b** - Common rail

Description	Nm	lb-in.	lb-ft
Injector fuel line sleeve nut at common rail	19	168	–

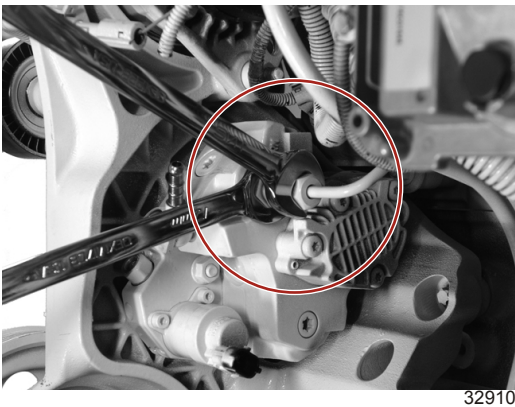
9. Torque the injector fuel line sleeve nuts at the injectors in the following order.



Injector line sleeve nut torque sequence

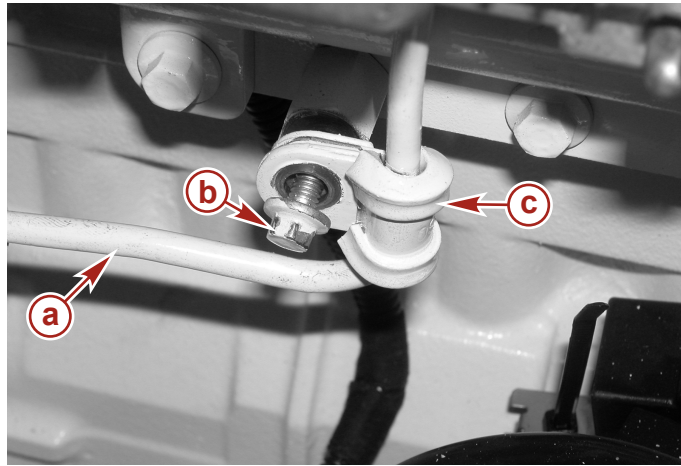
Description	Nm	lb-in.	lb-ft
Injector fuel line sleeve nut at injector	27	–	20

10. Torque the fuel pump high pressure line sleeve nut at the fuel pump.



Description	Nm	lb-in.	lb-ft
Fuel pump high pressure line sleeve nut at fuel pump	20	177	–

11. Torque the fuel pump high pressure line clamp screw.



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- a** - Fuel pump high pressure line
- b** - Screw
- c** - Clamp

Description	Nm	lb-in.	lb-ft
Fuel pump high pressure line clamp screw	14.7	130	–

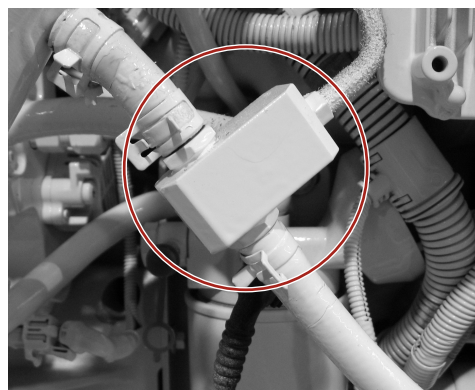
12. Torque the common rail and bracket mounting screws.

Description	Nm	lb-in.	lb-ft
Common rail and bracket mounting screw	33	–	24

## Fuel Manifold

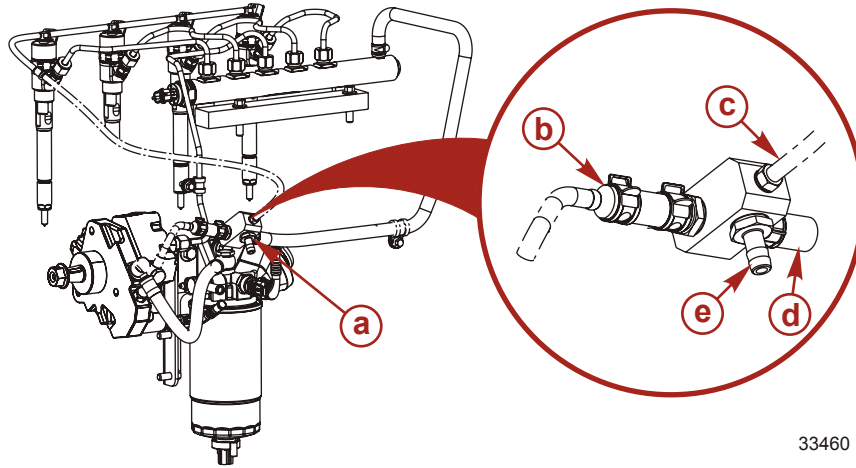
### Removal

1. Relieve fuel system pressure.
2. Disconnect the fuel manifold fuel lines.



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Initial production fuel manifold



Product improvement fuel manifold

- a** - Fuel manifold
- b** - High pressure fuel pump return line
- c** - Injector fuel return line
- d** - Common rail pressure relief fuel line
- e** - Fuel tank return line

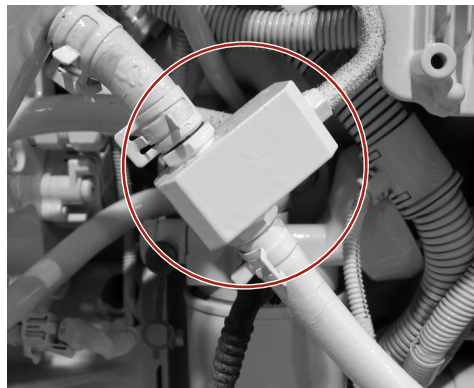
3. Remove the fuel manifold.

## Cleaning and Inspection

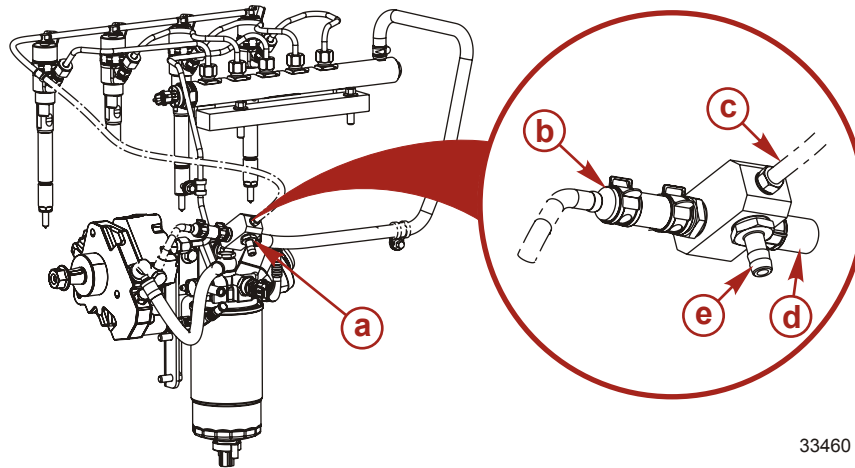
1. Clean the fuel manifold with warm soapy water.
2. Dry the manifold and its orifices with compressed air.
3. Inspect the manifold for any damage. Replace if necessary.

## Installation

1. Install the fuel manifold.
2. Connect the fuel lines to the fuel manifold.



Early production fuel manifold



**Product improvement fuel manifold**

- a** - Fuel manifold
- b** - High pressure fuel pump return line
- c** - Injector fuel return line
- d** - Common rail pressure relief fuel line
- e** - Fuel tank return line

3. Start the engine and check for fuel leaks.

## Notes: