


Fuel System

Section 5B - Fuel Filter Assembly

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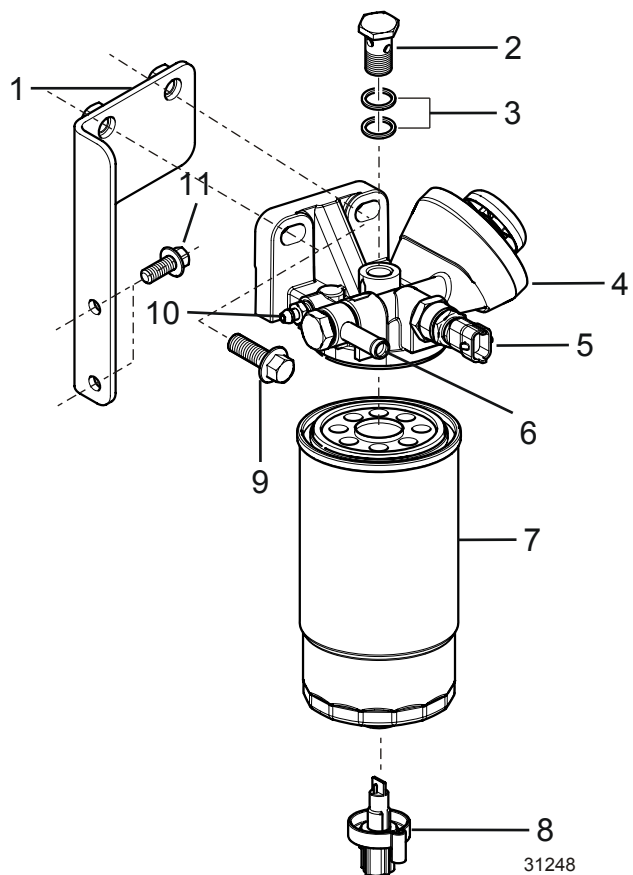
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Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
 80	SAE Engine Oil 30W	Water-separating fuel filter sealing ring	Obtain Locally

Notes:

Exploded View—Fuel Filter Assembly



Exploded View—Fuel Filter Assembly

Ref. No.	Qty.	Description	Torque		
			Nm	lb-in.	lb-ft
1	1	Fuel filter bracket			
2	1	Hollow bolt	27.5	–	20
3	2	Sealing washer			
4	1	Fuel filter base and primer assembly			
5	1	Engine fuel temperature sensor	18	159	–
6	1	Fuel inlet fitting	17	148	–
7	1	Water-separating fuel filter assembly			
8	1	Water in fuel (WIF) sensor	2.5	22	–
9	2	Bolt, fuel filter base	24.5	–	18
10	1	Bleed screw			
11	2	Bolt, fuel filter bracket	24.5	–	18

Water-Separating Fuel Filter

WARNING

Fuel is flammable and explosive. Ensure the key switch is off and the lanyard is positioned so that the engine cannot start. Do not smoke or allow sources of spark or open flame in the area while servicing. Keep the work area well ventilated and avoid prolonged exposure to vapors. Always check for leaks before attempting to start the engine and wipe up any spilled fuel immediately.

NOTICE

Water entering the fuel injection system will cause corrosion and rusting of the injectors and other components, disabling the fuel injection system. Check daily for water in the water-separating fuel filter and have the engine inspected immediately if there is evidence of water in the fuel system.

IMPORTANT: Use a suitable container to collect fuel. Immediately clean up any spills. Dispose of fuel in accordance with all applicable local, federal, and international regulations.

The engine-mounted water-separating fuel filter is equipped with a water-in-fuel (WIF) sensor to alert the operator when water contamination is present.

IMPORTANT: Drain or replace the remote-mounted primary filter (such as a Racor® filter) at the specified service intervals, or whenever water is detected in the engine-mounted fuel filter.

Depending on the instrument action package, a water in fuel condition may be reported in one of the following ways:

- A fault code may be displayed on a system viewer.
- The audio warning system may sound.

Draining

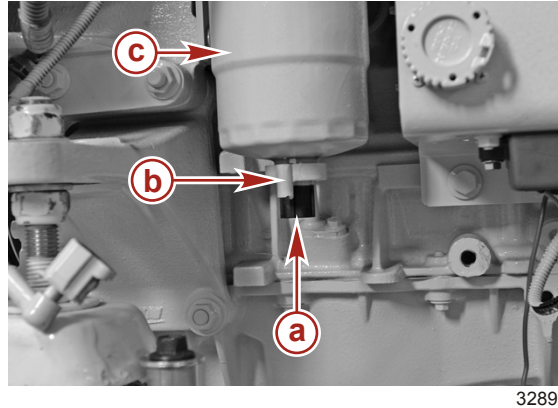
The engine-mounted water-separating fuel filter can be drained of water and small dirt particles by opening the drain cap on the bottom of the filter.

NOTE: To ensure complete draining in warm weather, drain the filter before starting daily operations. In cold weather, where there is a possibility that the condensed water will freeze, drain the filter shortly after the end of daily operations.

NOTE: Place a suitable container under the fuel filter drain cap to catch contaminated fuel or water. Dispose of properly.

1. Place a container under the drain cap on the filter.

2. Open the drain by turning the drain cap counterclockwise (as viewed from the bottom of the filter) until fuel starts draining. Do not remove the drain cap.



Typical water-separating fuel filter

- a** - WIF sensor wire connection
- b** - Drain cap
- c** - Filter

3. Drain until the fuel appears clear.
4. Close the drain cap by turning it clockwise. Tighten securely.
5. Fill the fuel filter. See **Filling**.

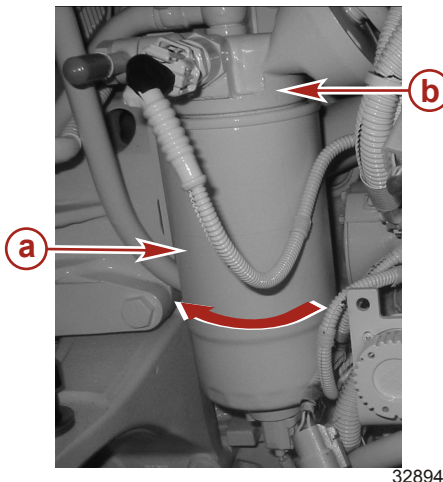
Replacing

⚠ WARNING

Performing service or maintenance without first disconnecting the battery can cause product damage, personal injury, or death due to fire, explosion, electrical shock, or unexpected engine starting. Always disconnect the battery cables from the battery before maintaining, servicing, installing, or removing engine or drive components.

IMPORTANT: The fuel filter element cannot be cleaned and reused. It must be replaced.

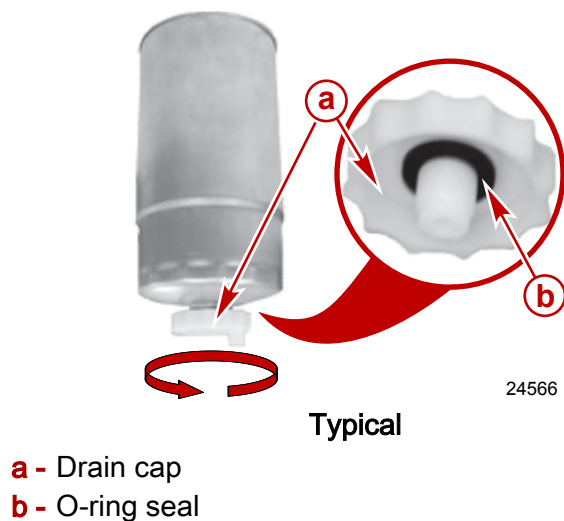
1. Disconnect both battery cables from the battery.
2. Disconnect the WIF sensor wires, if equipped.
3. Remove the water-separating fuel filter and sealing ring from the fuel filter base. Do not use a filter wrench.



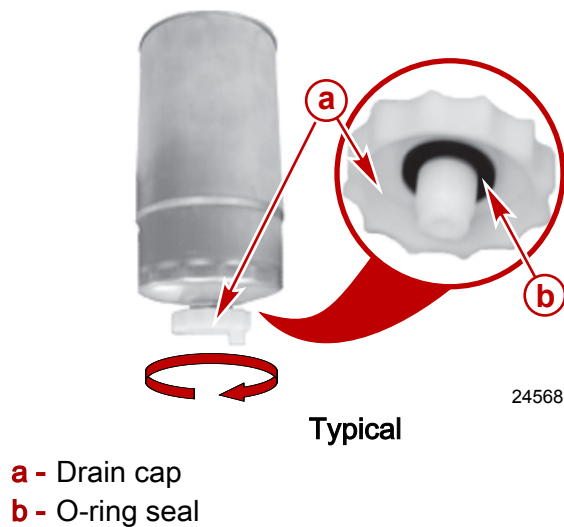
Water-separating fuel filter removal

NOTE: It may be necessary to keep the existing drain cap and use it on the new filter. Be sure to replace the O-ring on the drain cap.

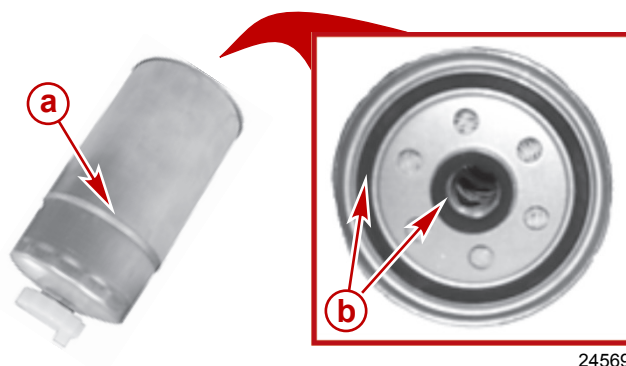
4. Remove the drain cap and O-ring seal from the bottom of the existing fuel filter. Note the position of the O-ring seal.



5. Discard the used filter and O-ring seal as defined by local authorities.
6. Install the O-ring and drain cap on the new water-separating fuel filter.



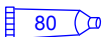
7. Lubricate the fuel filter seals.



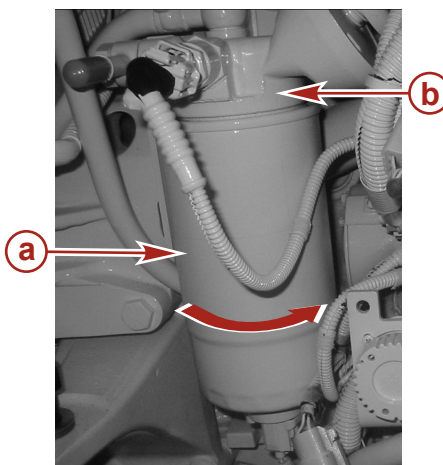
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Typical

- a** - Water-separating fuel filter
b - Seals

Tube Ref No.	Description	Where Used	Part No.
 80	SAE Engine Oil 30W	Water-separating fuel filter sealing ring	Obtain Locally

8. Align the filter to the filter base. Turn the filter by hand to secure the filter to the bracket. Do not use a filter wrench.



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Installation

9. Securely tightened the drain cap.
10. Connect the WIF sensor wires, if equipped.
11. Fill the water-separating fuel filter with fuel. See **Filling**.
12. Check the filter and drain cap for fuel leaks.
13. Connect the battery cables.
14. Start and operate the engine. Check the filter connection for fuel leaks. If leaks exist, recheck filter installation. If leaks continue, stop the engine immediately and contact your Cummins MerCruiser Diesel Authorized Repair Facility.

Filling

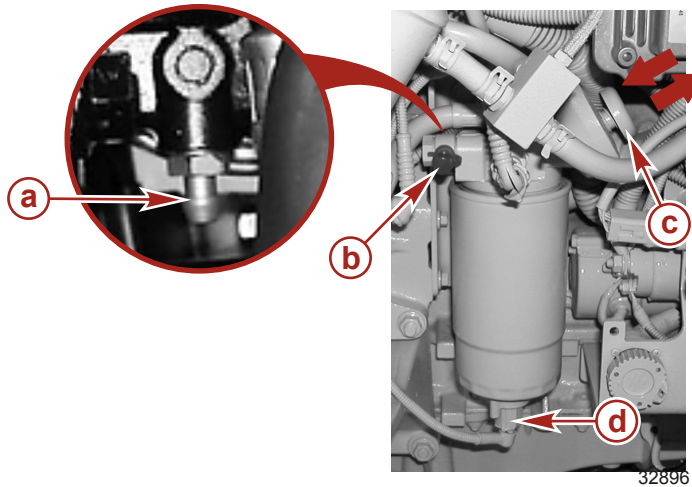
A primer plunger is located on the fuel filter bracket and is used to:

- Refill the fuel filter when draining or changing the filter.
- Refill the fuel system on the engine if the system was run dry.

- Prime the fuel system if the engine has not been run for an extended period.

IMPORTANT: Only fill the fuel filter with the hand pump and primer plunger to ensure that unfiltered fuel does not get into the fuel system.

1. Loosen the air vent (bleed) screw on the fuel filter bracket.



- a** - Air vent screw
- b** - Fuel inlet
- c** - Primer plunger
- d** - WIF and drain

2. Move the primer plunger up and down repeatedly. The filter is full when an air-free stream of fuel flows from the air vent screw.
3. Securely tighten the air vent screw.

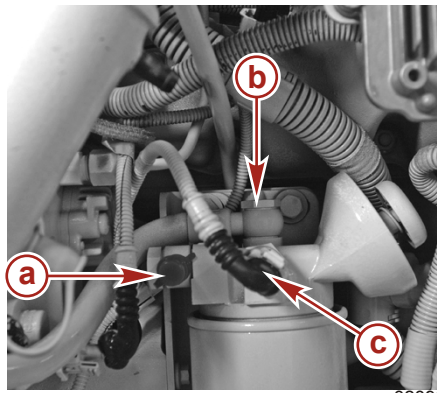
Fuel Filter Base Assembly

Removal

1. Disconnect and plug the fuel tank inlet line or close the fuel supply valve, if equipped.
2. Drain and remove the water-separating fuel filter. See **Section 5B—Water-Separating Fuel Filter**.

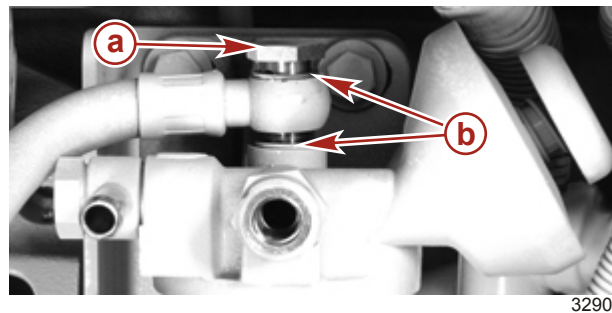
NOTE: If the fuel filter assembly is to be replaced, remove the engine fuel temperature (EFT) sensor. Refer to **Section 5F—Engine Fuel Temperature (EFT) Sensor**.

3. Disconnect the engine fuel temperature (EFT) sensor harness connector.



- a** - Fuel inlet adaptor
- b** - Fuel outlet fitting
- c** - EFT connector

4. Disconnect the fuel inlet line from the fuel inlet adaptor.
5. Remove the hollow bolt and sealing washers from the fuel outlet fitting. Discard the sealing washers.

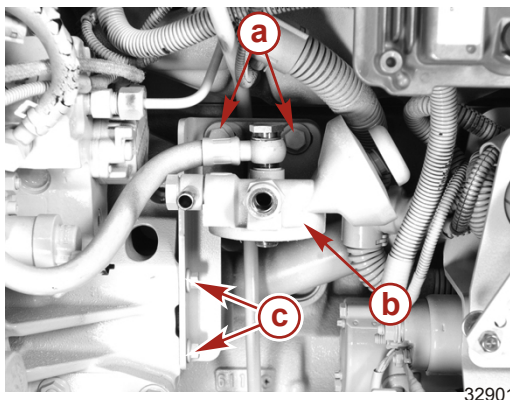


- a** - Hollow bolt
- b** - Sealing washers

NOTE: If the fuel filter assembly is to be replaced, remove the fuel inlet adaptor from the fuel filter assembly.

6. If necessary, remove the fuel inlet line adaptor hollow bolt. Discard the sealing washers.

- Remove the fuel filter base mounting screws and remove the base from the fuel filter bracket.



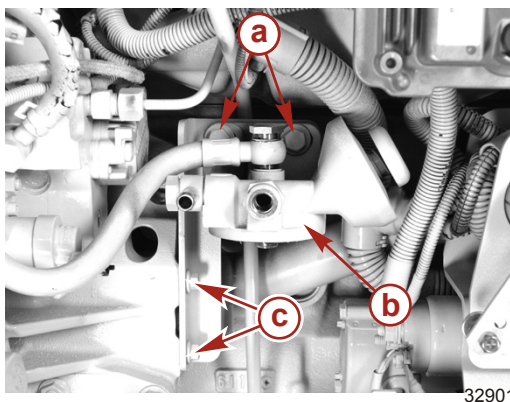
- a** - Mounting screws
- b** - Fuel filter base
- c** - Fuel filter base and screws

Cleaning and Inspection

- Clean and inspect the fuel filter sealing surface.
- Clean and inspect the EFT sensor electrical connector.
- Clean and inspect the fuel inlet adaptor fitting.
- Clean and inspect the fuel outlet fitting.

Installation

- Install the fuel filter base to the bracket using the mounting screws.



- a** - Mounting screws
- b** - Fuel filter base
- c** - Fuel filter base bracket and screws

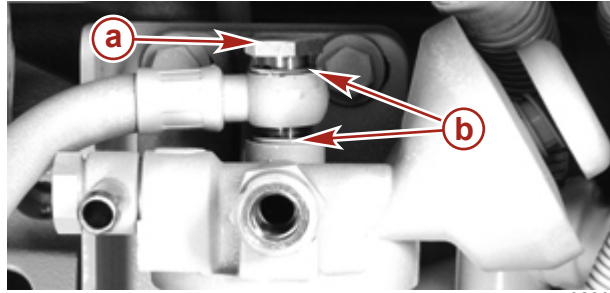
- Torque the fuel filter base mounting screws.

Description	Nm	lb-in.	lb-ft
Fuel filter base mounting screw	24.5	–	18

- If replacing the fuel filter base, install new sealing washers on the fuel inlet adapter hollow bolt and install.
- Torque the fuel inlet adapter hollow bolt .

Description	Nm	lb-in.	lb-ft
Fuel inlet line hollow bolt	27.5	–	20

5. Install new sealing washers on the hollow bolt and install the fuel outlet line.



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- a** - Hollow bolt
b - Sealing washers

6. Torque the fuel outlet line hollow bolt.

Description	Nm	lb-in.	lb-ft
Fuel outlet line hollow bolt	27.5	–	20

7. Install the clamp on the fuel inlet line and connect the line to the fuel inlet adapter. Tighten the clamp securely.
8. Connect the EFT sensor harness connector.
9. Install a new water-separating fuel filter. See **Water-Separating Fuel Filter** in this section.
10. Unplug and connect the fuel tank inlet line or open the fuel supply valve, if equipped.

Purging Air From The Fuel System

IMPORTANT: The injection pump and fuel injectors have very close tolerances, and require absolute cleanliness during service procedures. Minute particles of dirt or small amounts of water can cause the fuel injection system to malfunction.

The process of draining and replacing the water-separating fuel filter, including purging a new filter of air, is the only process that requires air to be purged from the system. The design of the common rail fuel system prevents any need to purge air from the high pressure fuel pump itself.

Water In Fuel (WIF) Warning System

The audio warning system and system display will warn the operator when the filter is full, indicating the need to drain the water and sediment from the drain cap.

A WIF probe in the fuel filter drain cap activates the warning system when water in the fuel surrounds the probe's electrodes and closes its circuit.

