

## FUEL SUPPLY SYSTEM

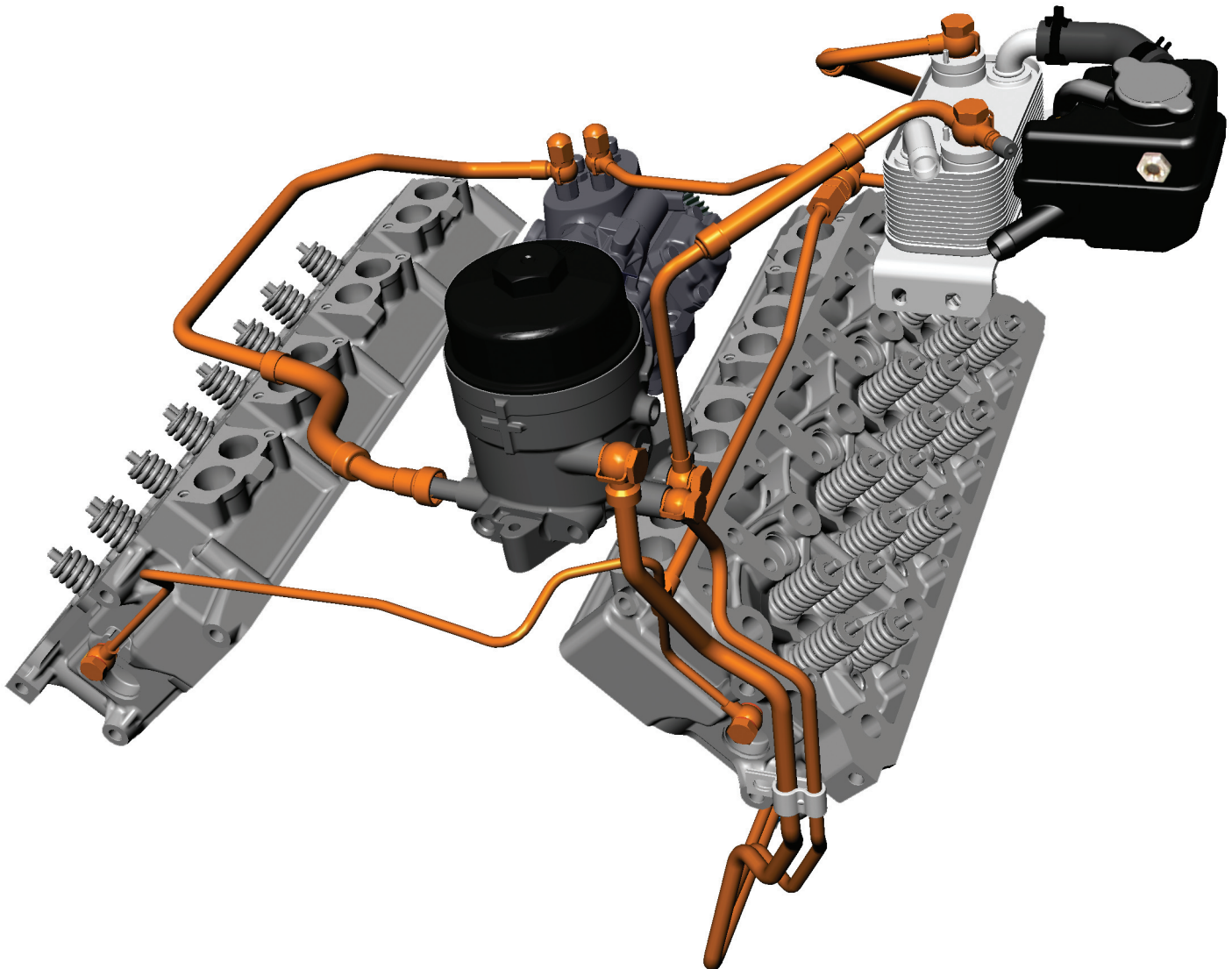
### Fuel Supply System Features

- The fuel supply system uses a new Horizontal Fuel Conditioning Module (HFCM). The HFCM filters fuel, separates water, senses water, and recirculates warm fuel through the pump during cool fuel conditions.
- The 6.4L Power Stroke® Diesel also uses 2 fuel filters and a stand alone fuel cooler system.

### Fuel Supply System Features

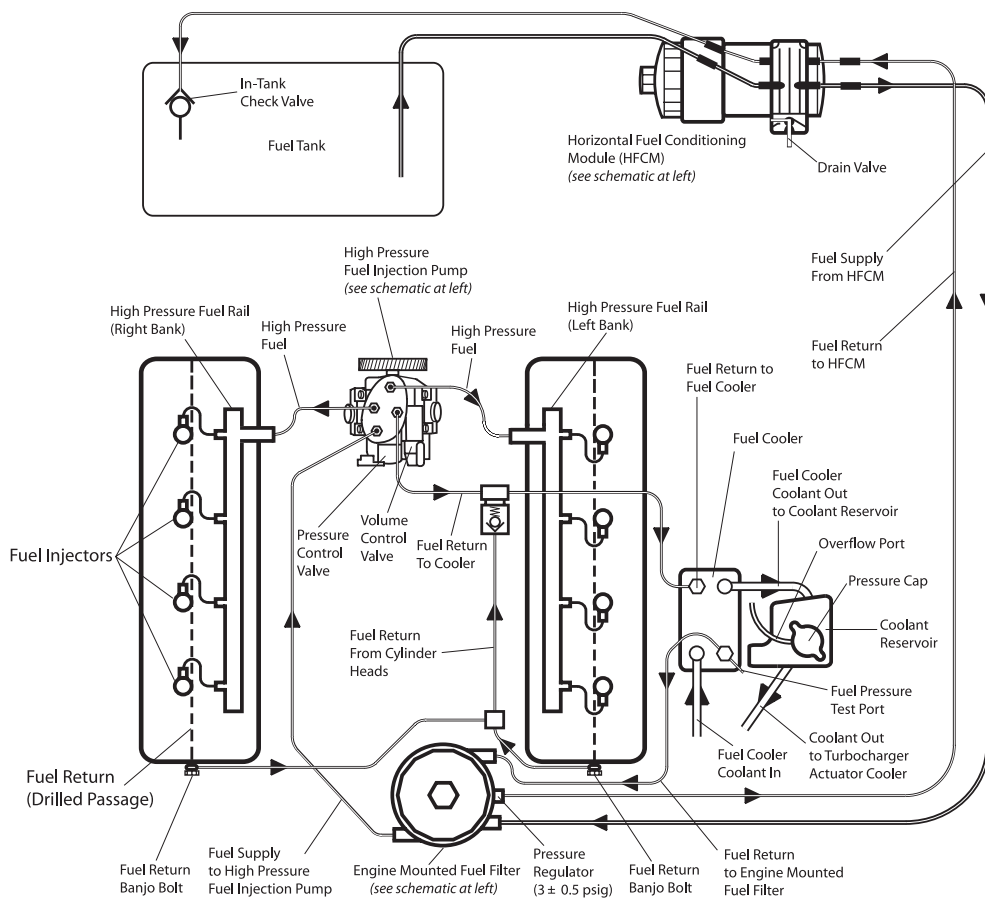
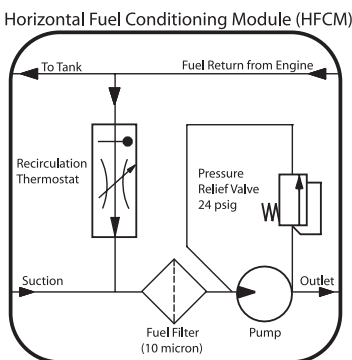
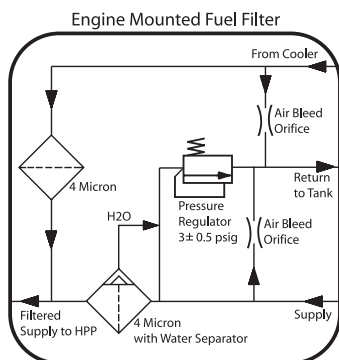
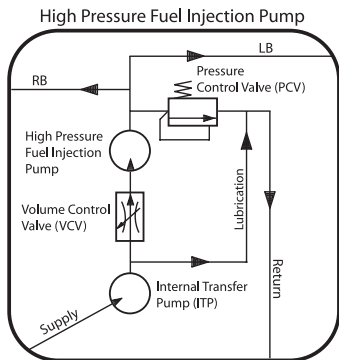
- Horizontal Fuel Conditioning Module (HFCM)
- (1) Chassis Mounted 10 Micron Fuel Filter
- (1) Engine Mounted 4 Micron Fuel Filter
- Water Separator
- Fuel Cooler

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# FUEL FLOW



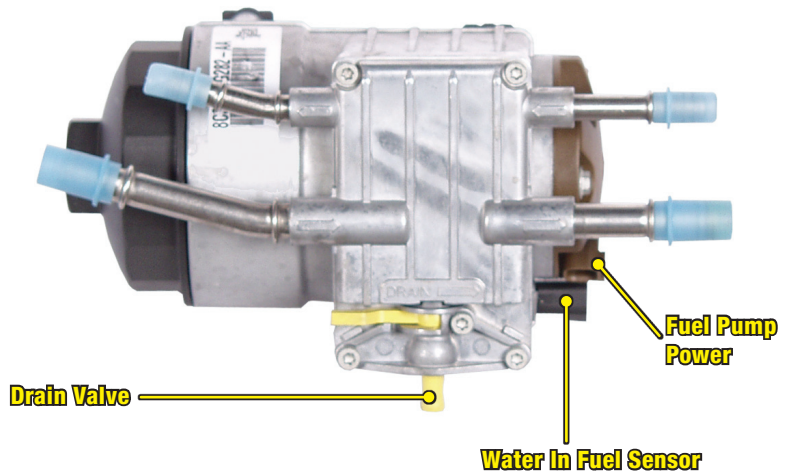
## Engine Fuel Flow

- The fuel pump, located in the Horizontal Fuel Conditioning Module (HFCM), draws fuel from the fuel tank and through a 10 micron fuel filter.
- The HFCM contains the fuel pump, filter, water separator, water in fuel switch, fuel drain, and diesel thermo recirculation valve (DTRM).
- The DTRM controls the flow of fuel returned from the engine mounted filter through the HFCM. If the fuel being drawn from the fuel tank is cooler than a specified temperature then return fuel from the engine is recirculated into the inlet of the pump.
- After the fuel is conditioned by the HFCM, the clean pressurized fuel is sent to the engine mounted fuel filter assembly where particles larger than 4 micron are filtered out of the fuel.
- The engine mounted fuel filter assembly also regulates fuel pressure by releasing excess pressure via a return fuel line back to the HFCM. The engine mounted fuel filter also contains air bleed orifices to remove air and return it to the tank.
- After the fuel is filtered it is routed to the Internal Transfer Pump (ITP).
- The ITP is located inside the high pressure fuel injection pump and is used to increase the fuel pressure supplied to the high pressure fuel injection pump's three (3) internal pistons.
- After the fuel is pressurized it is routed to the high pressure fuel rails and to the fuel injectors via high pressure fuel supply tubes.
- A Pressure Control Valve (PCV) located in the outlet side of the high pressure fuel injection pump controls the fuel pressure by dumping excess fuel into the fuel return line.
- A Fuel Rail Pressure (FRP) sensor located in the right side fuel rail monitors the fuel pressure.
- Return fuel from the injectors is routed through a drilled passage from each cylinder head where it is then united with return fuel from the high pressure fuel injection pump before being sent to the fuel cooler and back to the engine mounted fuel filter.

# FUEL SUPPLY SYSTEM

## HFCM (Horizontal Fuel Conditioning Module)

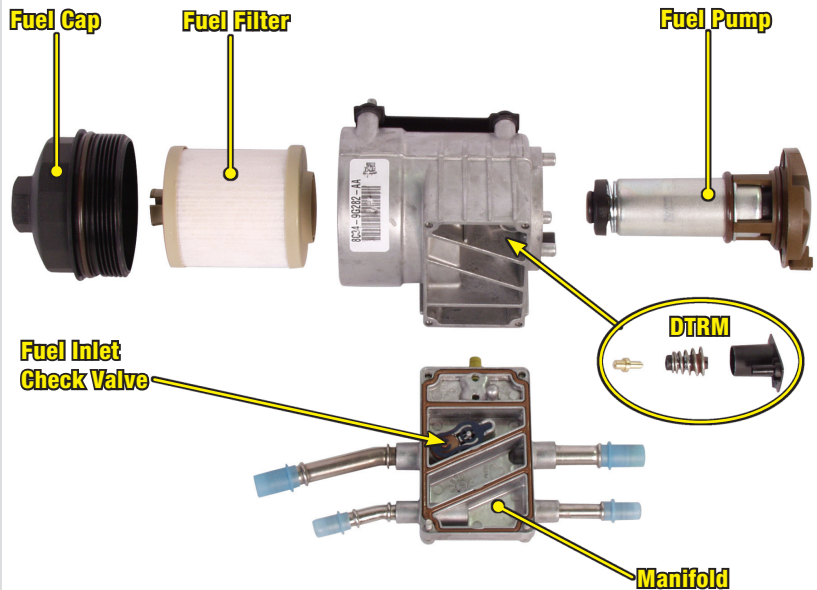
- The HFCM is mounted to the frame rail on the drivers side.
- The HFCM is a single module that performs multiple tasks. It separates water from the fuel, senses when water is present in the fuel, filters particulates from the fuel, and creates the fuel flow needed to supply fuel to the engine mounted fuel filter.
- A DTRM (Diesel Thermo Recirculation Module) is also part of the HFCM. It recirculates fuel that returns from the engine mounted fuel filter back into the fuel filter instead of back to the tank.



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## HFCM Components

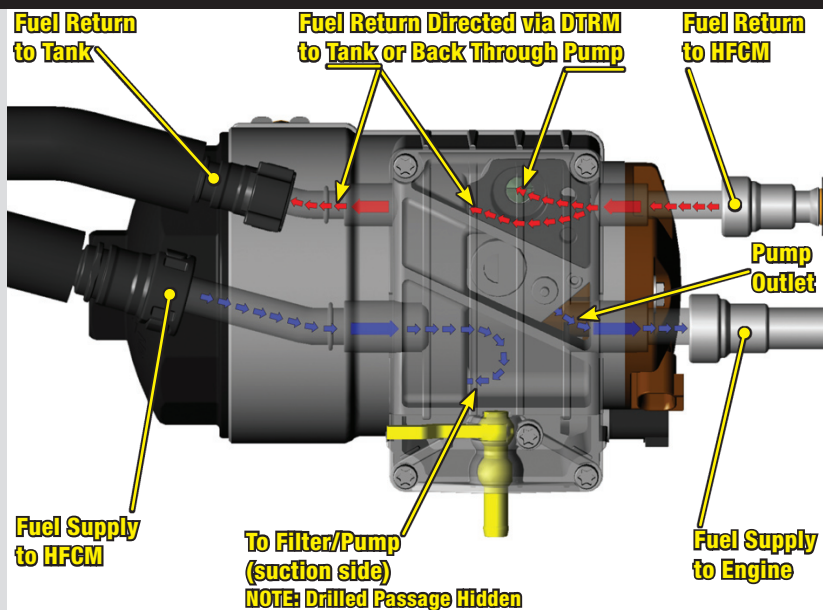
- The HFCM is composed of six (6) main components:
  - Housing
  - Fuel Filter (10 micron)
  - Fuel Cap
  - Electric Fuel Pump
  - Manifold (contains the fuel inlet check valve)
  - Diesel Thermo Recirculation Module (DTRM) is also part of the HFCM. It recirculates fuel that returns from the engine mounted fuel filter back into the fuel filter instead of back to the tank.



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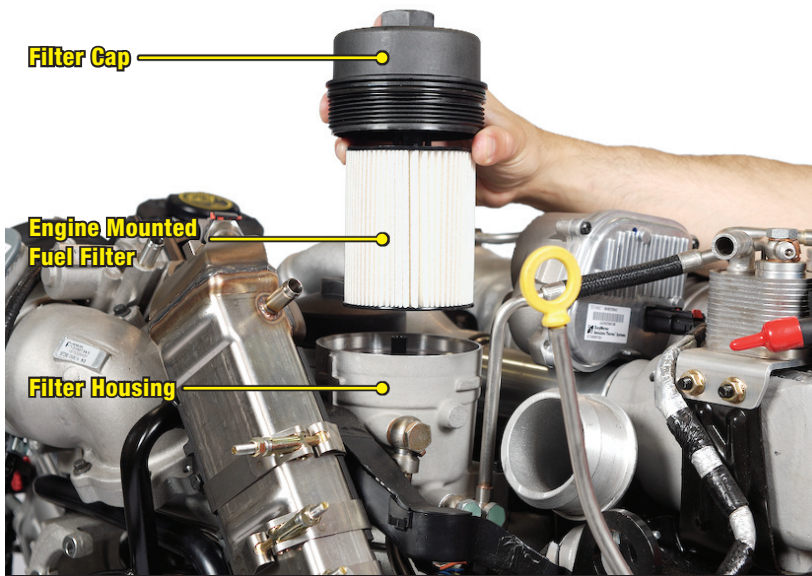
## HFCM Fuel Flow

- Fuel is drawn into the HFCM from the fuel tank via a supply line.
- Fuel enters the filter housing via a one-way check valve.
- Once in the filter housing, water is separated from the fuel. If large amounts of water are found in the fuel, a sensor in the separator warns the operator of this condition by illuminating a light on the dash.
- Fuel is then drawn through the 10 micron fuel filter and into the fuel pump.
- Conditioned pressurized fuel is then supplied to the engine mounted fuel filter via a fuel supply line. The pump has an internal regulator that limits fuel pressure to 24psi.
- Fuel returning from the pressure regulator on the engine mounted fuel filter comes into the HFCM and a DTRM either allows the fuel to return to the tank or returns it to the unfiltered side of the fuel filter in the HFCM. The DTRM starts to open (recirculating fuel back into the pump) at 80°F (27°C) and is fully open at 50°F (10°C).



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## Engine Mounted Fuel Filter

- An engine mounted fuel filter is mounted to the intake manifold.
- The engine mounted fuel filter is a 4 micron cartridge style filter.
- It also incorporates a fuel pressure regulator (in the standpipe) and an air bleed. Fuel from the regulator is returned to the HFCM.

**NOTE:** Please exercise extreme cleanliness when servicing the fuel filter.

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**Fuel Pressure Regulator Located Inside Standpipe Assembly**

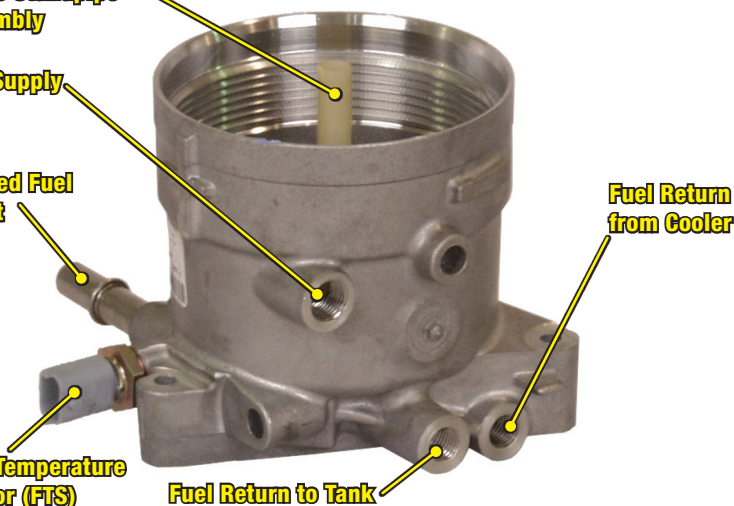
**Fuel Supply**

**Filtered Fuel Outlet**

**Fuel Temperature Sensor (FTS)**

**Fuel Return to Tank**

**Fuel Return from Cooler**

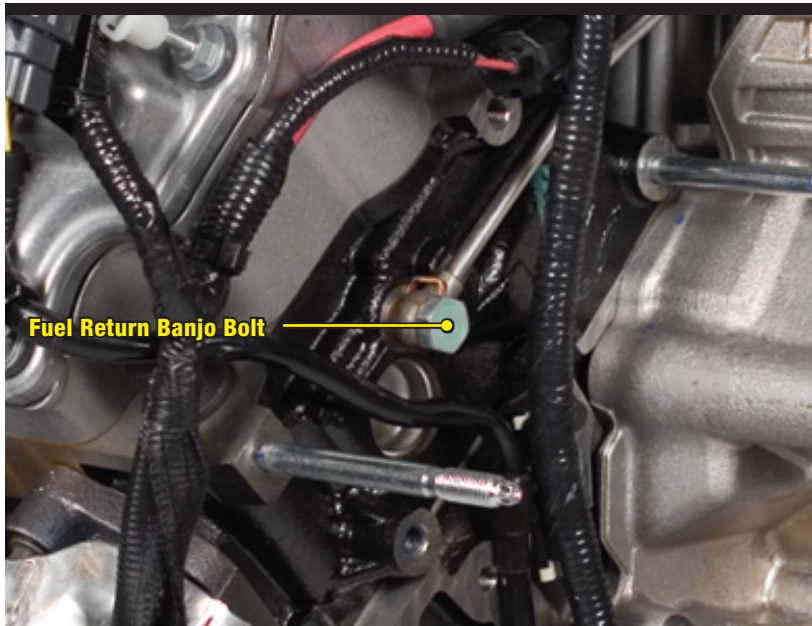


## Fuel Pressure Regulator

- The fuel pressure regulator is located inside the engine mounted fuel filter housing in the standpipe.
- It regulates fuel pressure by routing unfiltered fuel from the filter housing to the HFCM via a spring loaded poppet style valve.
- The cracking pressure (pressure at which the valve begins to open) of the valve is 2psi +/- 0.5psi. Actual fuel pressure may be above or below this specification.
- The regulated pressure of the valve is 3psi +/- 0.5psi. Actual fuel pressure may be above or below this specification.

**NOTE:** The fuel pressure regulator is NOT serviceable separate from the housing! If the regulator needs to be replaced, then the entire housing must be replaced.

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## Fuel Return Banjo Fittings

- The fuel return lines (located on the front of each cylinder head) utilize a banjo bolt to route the return fuel back to the fuel system.

**NOTE:** The 6.0L Power Stroke® Diesel utilized a banjo bolt with a check valve inside. Do not interchange the 6.0L banjo bolt with the 6.4L banjo bolt.

**NOTE:** The 6.4L Power Stroke Diesel uses an open banjo bolt with no check valve. The check valves are no longer needed since the drilled passages in the cylinder heads are now utilized as fuel return passages.

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