FASS Diesel Fuel Systems

Technical Support Manual

DESIGNED, MACHINED & ASSEMBLED IN THE USA

FASS DIESEL FUEL SYSTEMS® / ENGINEERED EXCELLENCE

Table Of Contents

www.fassride.com
(866) 769.3747

Fuel Filter Service Intervals

FASS DRP/DMAX

- In-line filter 4,000-6,000 miles*
- Refer to vehicle owners manual for factory fuel filter.

FASS FA Series

- In-line filter 4,000-6,000 miles*
- Refer to vehicle owners manual for factory fuel filter.

FASS Platinum Series

- In-line fuel filter 4,000-6,000 miles*
- Spin on fuel filter/water separator 15,000-25,000 miles*

Fass Titanium Series

- Water separator 25,000-30,000 miles*
- Fuel filter 25,000-30,000 miles*

FASS Heavy Duty Series

- Water separator 50,000 miles*
- Fuel filter 50,000 miles*

Intervals will depend on quality of fuel being used. FASS always recommends a fuel pressure gauge to monitor fuel filter life.

Bucket Test

1. Remove FASS suction line from vehicles fuel tank.
2. Remove FASS return line from vehicles fuel fill tube or FASS bulk head fitting.
3. Leave line feeding engine hooked up.
4. Place each line in the same 5-gallon bucket test with about 4 gallons of fuel.
5. Prime FASS
6. Start truck

Priming FASS

1. Be sure to put a lubricant on both filter O-rings before installing them. (Diesel fuel is not adequate)

2.If water separator is supplied with small sealing O-ring, be sure to install this on the filter nipple that the water separator threads on to.

3.Tighten water separator ¾ turns after gasket makes contact.

4. Install fuel filter until gasket makes contact, then loosen fuel filter 1 turn or enough to break the seal.

5. Key the pump on.

a. 1989-1998 Dodge Cummins – Turn the key to the run position (pump will run until key is shut off)

b. 1998.5-2009 Dodge Cummins – Turn key to the run position and then bump the starter (just enough to get the engine to spin over) this will trigger the pump to run for about 30 seconds.

c. 2010-present Ram- If the starter is bumped on these trucks the truck will continue to try and start or shut off after a certain amount of time. The best way is to pull the relay and jump from terminal 30 to terminal 87, this will make the pump run constantly. Once unit is primed remove jumper wire and re-install relay.

d. 1999-2007 Ford Powerstroke – Turn key to the run position, this will trigger the pump to run for 30-60 seconds.

e. 2008-2010 Ford Powerstroke – Turn key to the run position, this will trigger the pump to run for 30-60 seconds.

f. 2011-2016 Ford Powerstroke – Turn key to the run position, this will trigger the pump to run until the key is shut off.

g. 2001-2016 Chevrolet/GM Duramax – Turn key to the run position, this will trigger the pump to run until the key is shut off.

6. Once the pump running, listen for it to change tone or bog down. Once it has tighten the fuel filter.

7. Start the vehicle.

Bleeding Injectors

NOTE: On some vehicle, the injectors may need to be primed if the fuel lines have drained or have been left disconnected for an extended amount of time. Some fuel injection systems can be bled but NEVER BLEED A COMMON RAIL FUEL INJECTION SYSTEM. Common rail injection systems are self-bleeding.

1989-1998 Dodge Cummins:

· Once FASS is primed loosen the first 3 injector lines that are located on the passenger side of cylinder head. Loosen just enough to break the seal.
· Crank the truck over, remembering to let starter cool off.
· Once vehicle is running on its own, begin to tighten injector lines and the vehicles idle with smooth out.

1998.5-2002 Dodge Cummins:

· Once FASS is primed loosen number 1,2 and 4 injector lines on the driver side of the cylinder head. Loosen just enough to break the seal.
· Crank the truck over, remembering to let starter cool off.
· Once vehicle is running on its own, begin to tighten injector lines and the vehicles idle with smooth out.

All other applications NOT listed above:

· Once FASS is primed, crank the truck over. Remember to let the starter cool off. Different vehicles will take longer to purge the air out than others.

Excessive FASS Pressure

•Excessive FASS pressure can be caused by a restriction from the "R" port of the FASS, be sure the return hose is free flowing with no kinks.

Low FASS Pressure

•Check for a restriction on the suction side of the FASS, this can be caused by multiple things. Damaged or kinked suction line, clogged water separator, restriction inside of fuel tank like the fuel tank module.

Misc. Electrical Diagnostics

• Electrical diagnostics

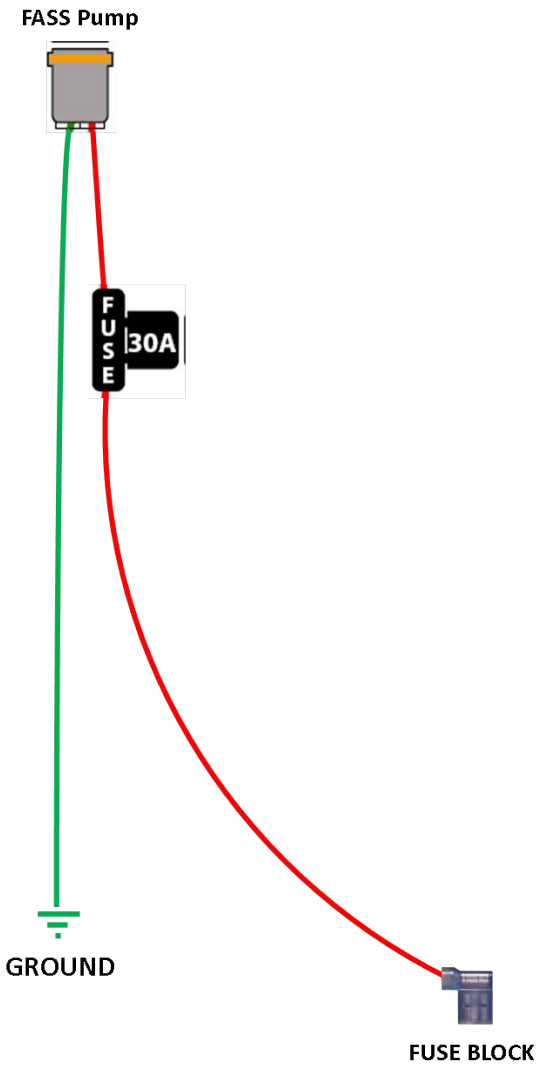
There are a few very important things to remember when it comes to automotive electrical diagnostics..

1. Always ensure you have a good, clean ground connection. Dirty grounds can cause high amp draw and poor performance.
2. Always ensure you have a good B+ connection, dirty connections are unacceptable and may cause poor performance.
3. Always ensure FASS key on/pump run power source has a good connection and voltage feed.

• Testing FASS trigger wire

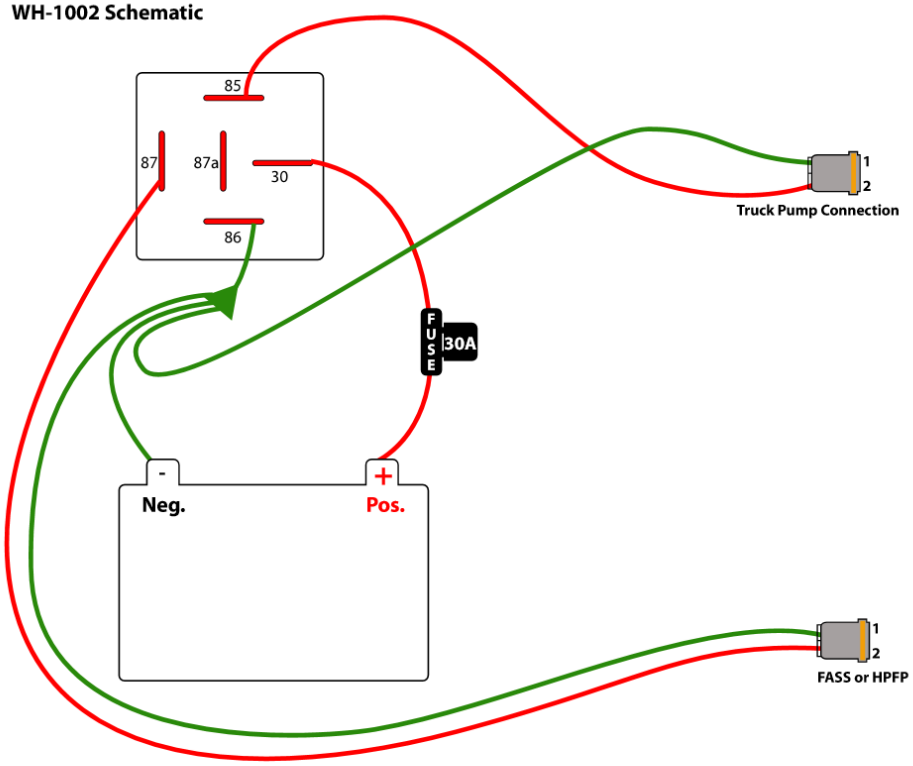
For the FASS to properly power on, the trigger wire must receive 12v. To test this, turn the key to the run position (bump the starter on Dodge models) and check the trigger wire with a test light. If you have power, this circuit is functioning properly.

WH-1001 Wiring Diagram

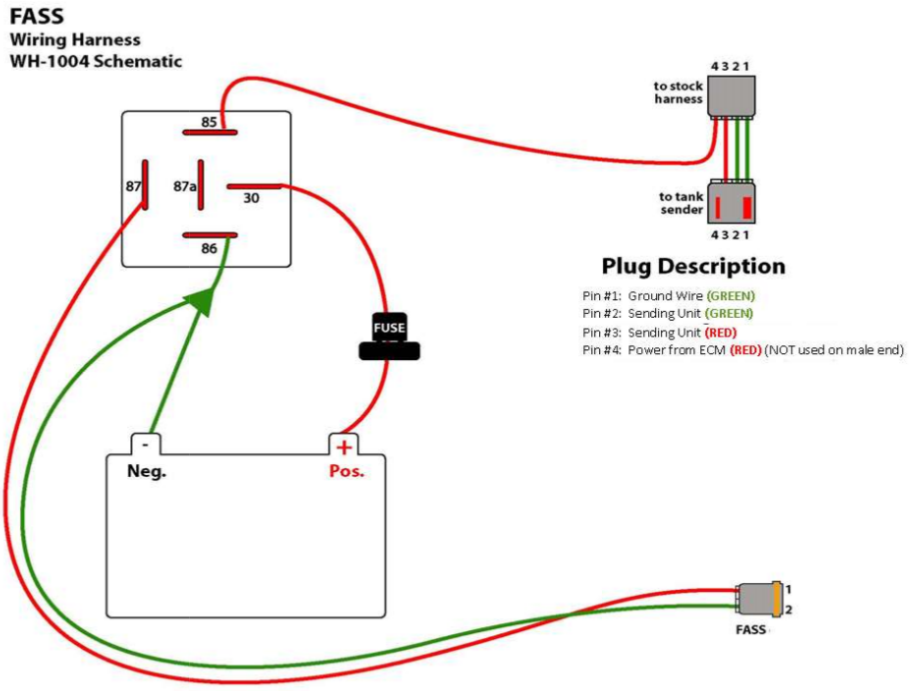


WH-1002 Wiring Diagram

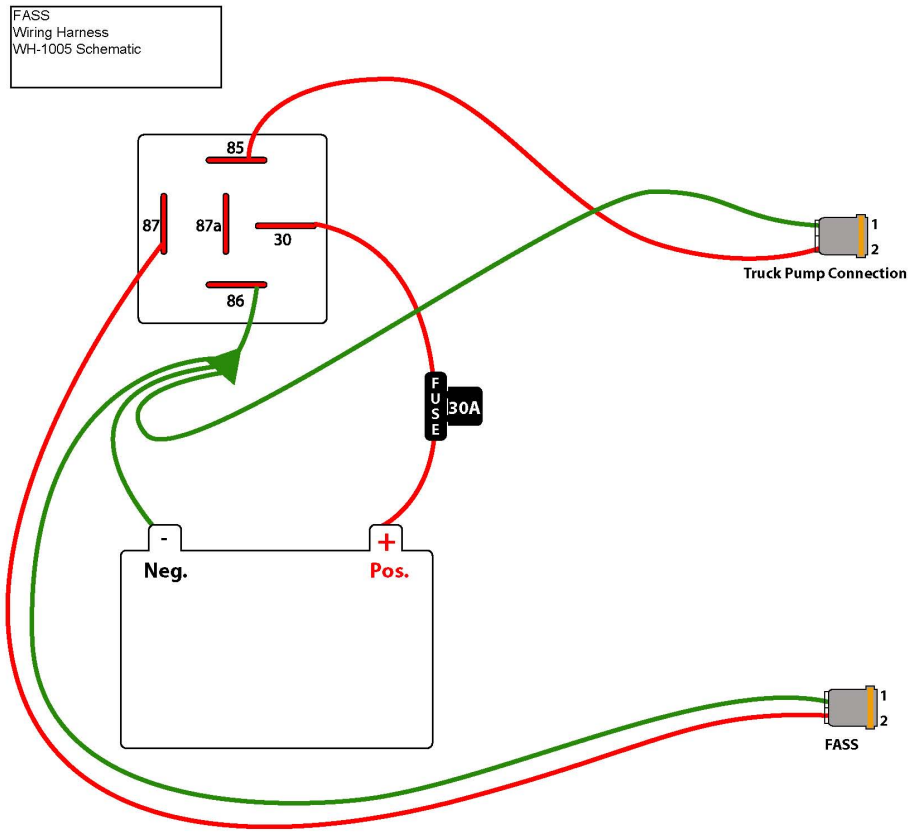
FASS / HPFP
Wiring Harness
WH-1002 Schematic



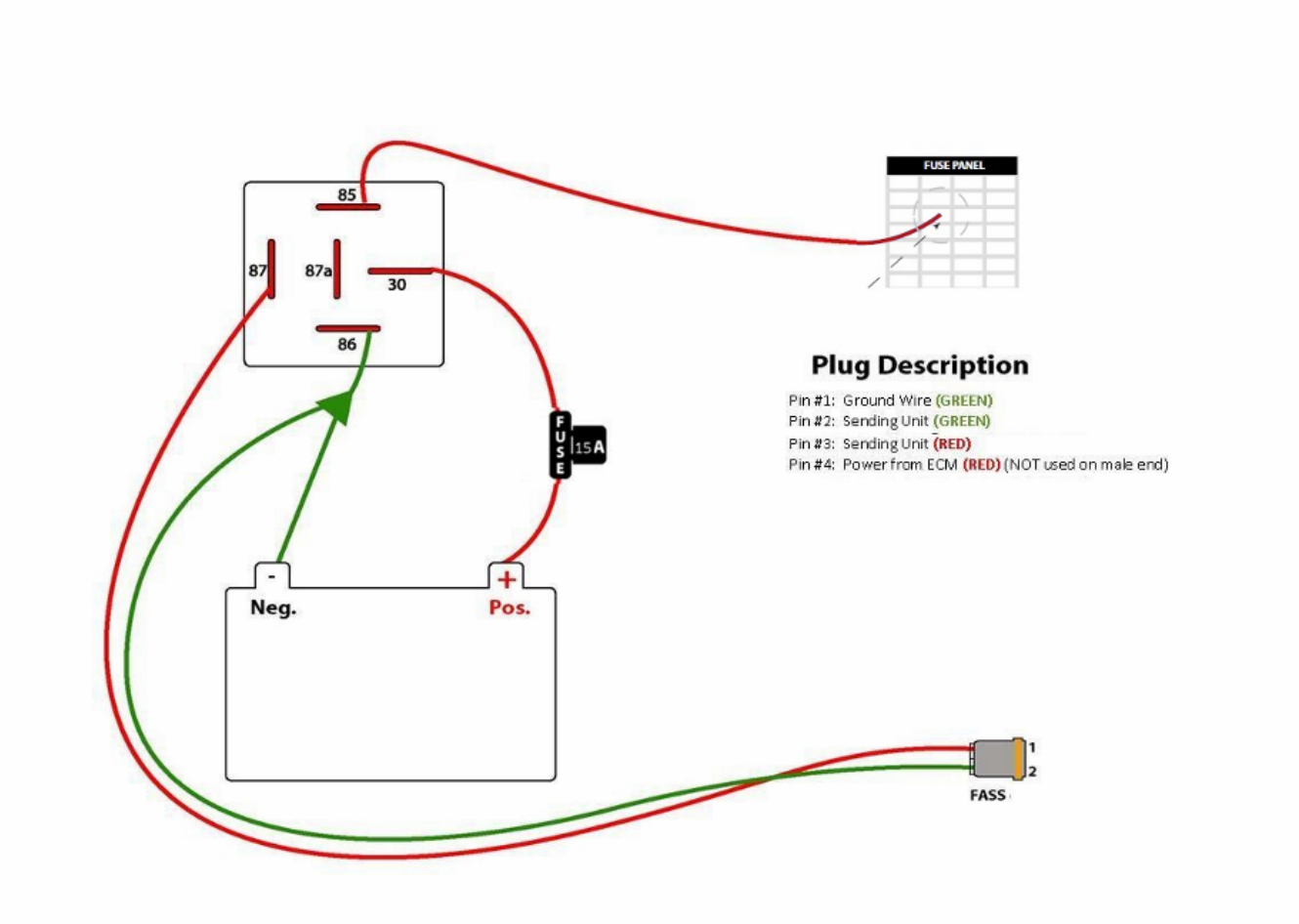
WH-1004 Wiring Diagram



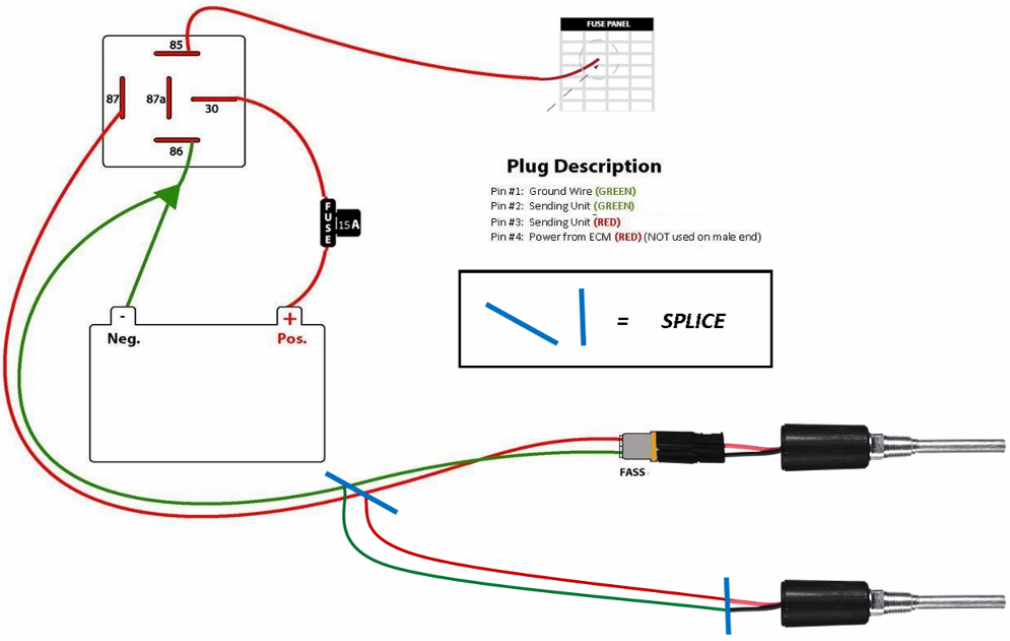
WH-1005 Wiring Diagram



WH-1006 Wiring Diagram



Electric Heater Wiring Diagram



1989-1993 Dodge 12v Cummins

•These applications come equipped with a "VE" fuel injection pump, this is a mechanically controlled rotary style pump. These pumps are known for their excellent reliability and outstanding fuel economy.

1994-1998 Dodge 12v Cummins

•Between 1994-1998 these trucks came equipped with the legendary Bosch P7100 mechanical fuel injection pump, these trucks ranged in HP from 160-215 depending on which version P7100 pump they were equipped with. The HP level can be determined from the Cummins engine tag. The Bosch P7100 pump is best known as the "P-Pump", they are known for their legendary reliability and high HP output potential.

1994-1998 Dodge 12v Cummins

• Symptom: FASS exhibits low fuel pressure and or little to no return flow from "R" port.
After all other FASS related tests have been performed and the FASS has been eliminated from the problem's source, it is common for the OEM overflow valve to fail.

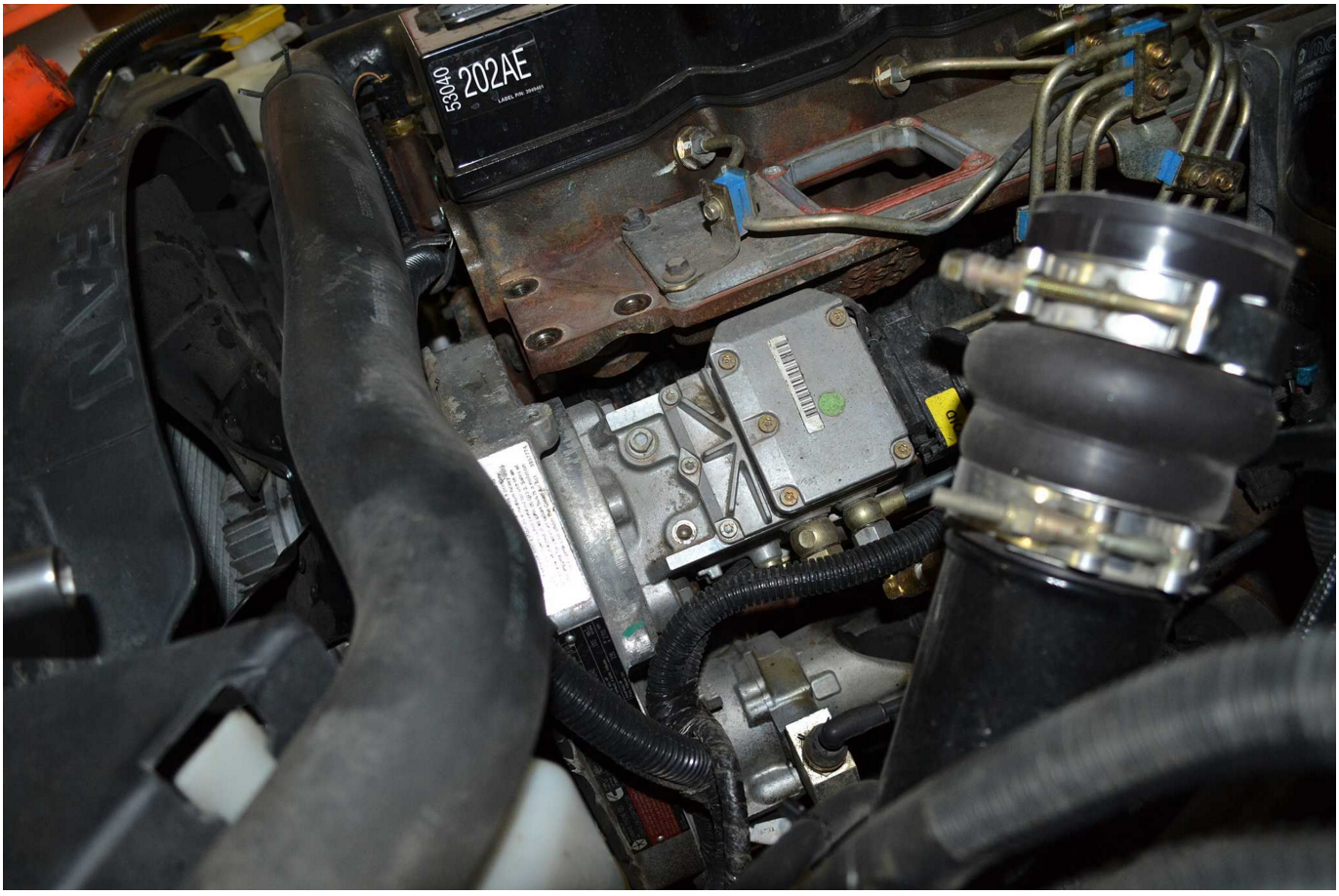
• Possible cause: Failed overflow valve.
From the factory, the P7100 fuel injection pump is equipped with an 'overflow valve'. This valve regulates the pressure for the OEM lift pump, if this valve fails or becomes weak, the FASS may have lower fuel pressure and will not return fuel from the "R" port of the FASS.

• Resolution: Overflow valve replacement.

Many companies offer an aftermarket overflow valve designed for aftermarket lift pumps like a FASS, Tork Tek being one of those companies who make a very high-quality product. Image can be seen below. OEM overflow valve will need to be removed, replaced, and discarded. Most aftermarket overflow valves are not equipped with a spring/ball and have no internal parts that can fail. Customer may need to select the appropriate pressure rated overflow valve for their application. Once the overflow valve has been replaced, FASS pressure will need to be rechecked and FASS return flow verified.

1998.5-2002 Dodge 24v Cummins

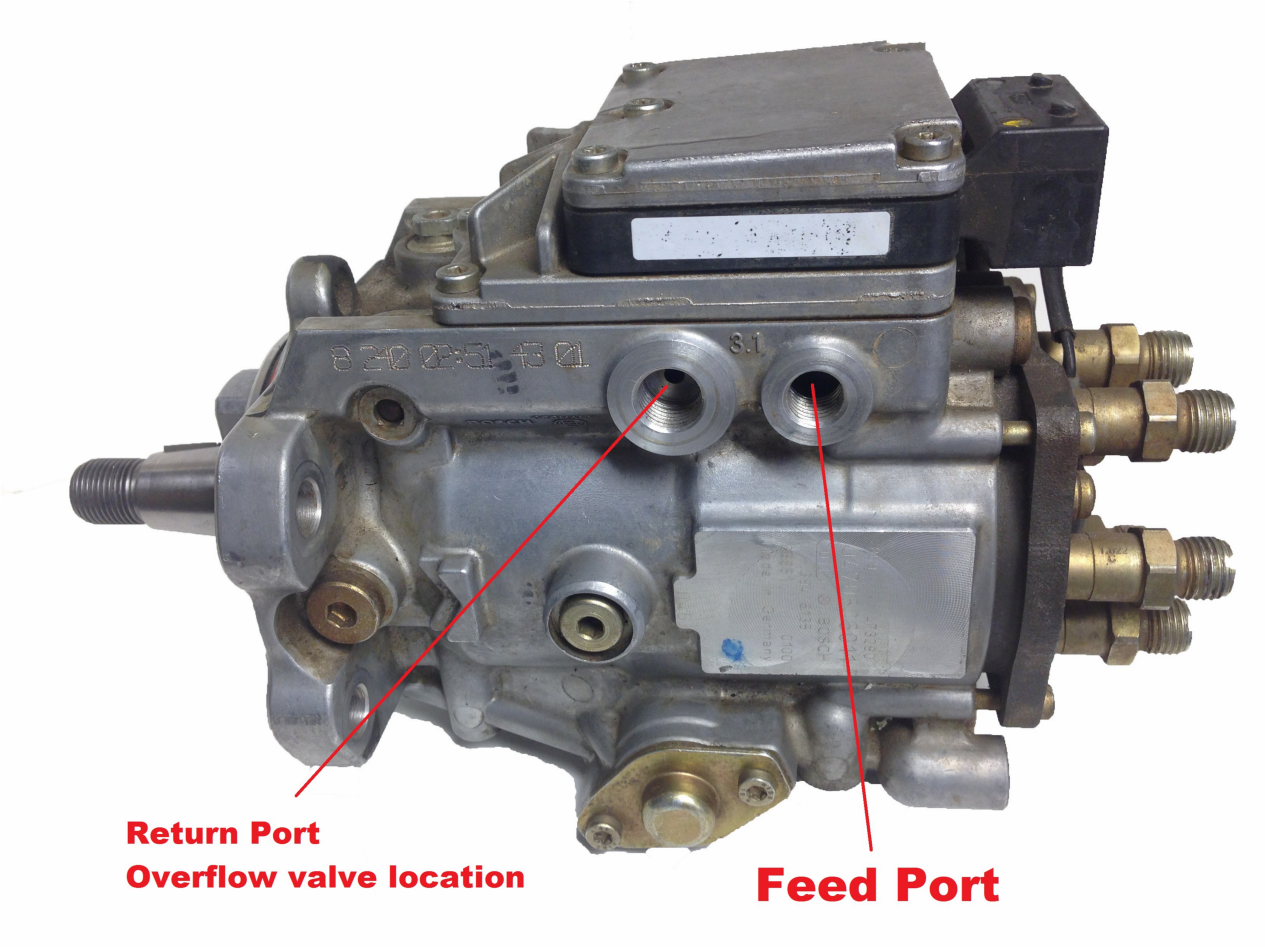
•The 1998.5-2002 model year trucks came equipped with a VP44 rotary style fuel injection pump, these pumps are controlled electronically. The OEM lift pumps that came equipped on these trucks are known to fail and cause fuel starvation to the injection pump thus causing premature failure.



1998.5-2002 Dodge 24v Cummins

•Please refer to the image below for the VP44 feed and return ports:

The feed port is the rearmost port while the return port is the foremost port, the FASS connects to the feed port.



1998.5-2002 Dodge 24v Cummins

• ECM electrical issues:

• Symptom: FASS will not power on, relay is not being triggered.
After all other FASS related tests have been performed and the FASS has been eliminated from the problems source, it is common for the Cummins engine ECM to have an issue/fail.

• Possible cause: Failed Cummins ECM lift pump circuit.
The circuit from the Cummins ECM that triggers the factory lift pump is known to fail, this will also cause the FASS to be inoperable once installed.

• Resolution: Bypass Cummins ECM lift pump circuit to a key-on-engine-running 12v source.

1998.5-2002 Dodge 24v Cummins

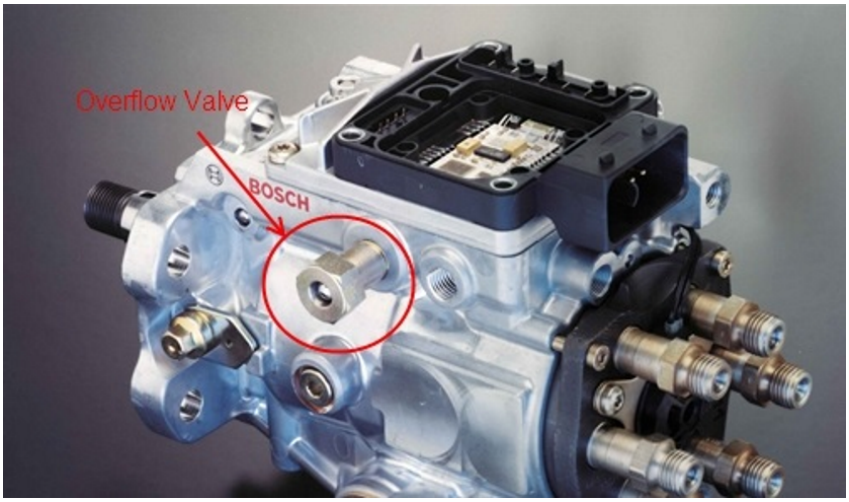
•Low pressure due to failed overflow valve:

• Symptom: FASS exhibits low fuel pressure and or little to no return flow from "R" port. After all other FASS related tests have been performed and the FASS has been eliminated from the problem's source, it is common for the OEM overflow valve to fail.

• Possible cause: Failed overflow valve.
From the factory, the VP44 fuel injection pump is equipped with an 'overflow valve'. This valve regulates the pressure for the OEM lift pump, if this valve fails or becomes weak, the FASS may have lower fuel pressure and will not return fuel from the "R" port of the FASS.

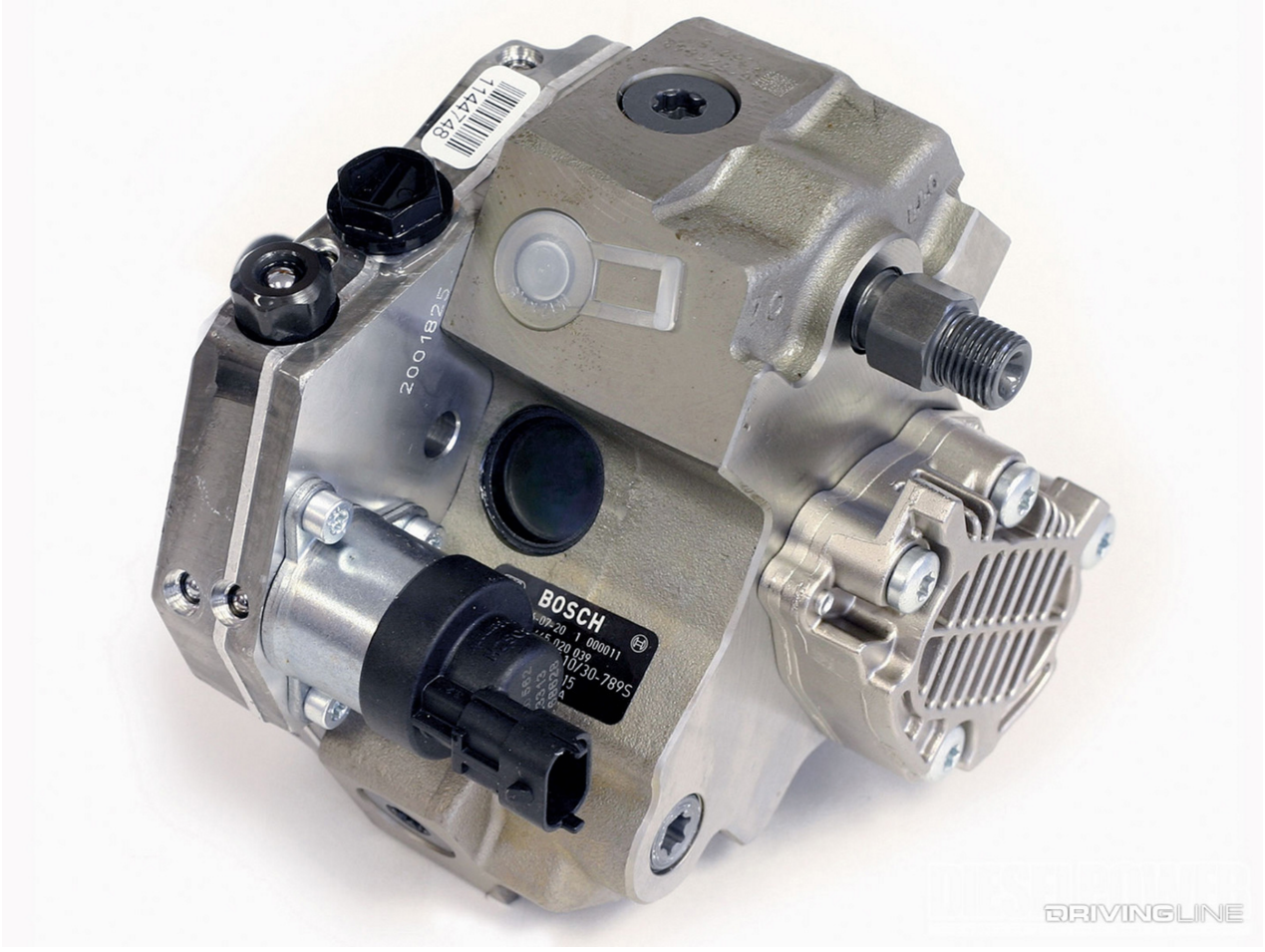
• Resolution: Overflow valve replacement.

Many companies offer an aftermarket overflow valve designed for aftermarket lift pumps like a FASS, Tork Tek being one of those companies who make a very high-quality product. Image can be seen below. OEM overflow valve will need to be removed, replaced, and discarded. Most aftermarket overflow valves are not equipped with a spring/ball and have no internal parts that can fail. Customer may need to select the appropriate pressure rated overflow valve for their application. Once the overflow valve has been replaced, FASS pressure will need to be rechecked and FASS return flow verified.



2003-2004 Dodge 5.9L Common Rail Cummins

• 2003-2007 Cummins 5.9s are equipped with a high pressure common rail fuel injection system manufactured by Bosch, a CP3 injection pump feeds a common fuel rail with up to 25,000 psi to feed the fuel injectors. The fuel injectors are electronically actuated, these are also manufactured by Bosch. These trucks can be upgraded to have 2 or more CP3s to supply large-aftermarket fuel injectors.



2003-2004 Dodge 5.9L Common Rail Cummins

• Excessive FASS cavitation:

• If bucket test has been performed and the FASS has been verified for proper operation, the vehicle could have a failed or restrictive fuel tank module.

• Symptom: FASS has excessive cavitation.

Once bucket test has been performed and the FASS has been verified as operating correctly, the 2003-2004 model year is known to be restrictive on the suction side.

• Cause: Failed or restrictive fuel tank module.

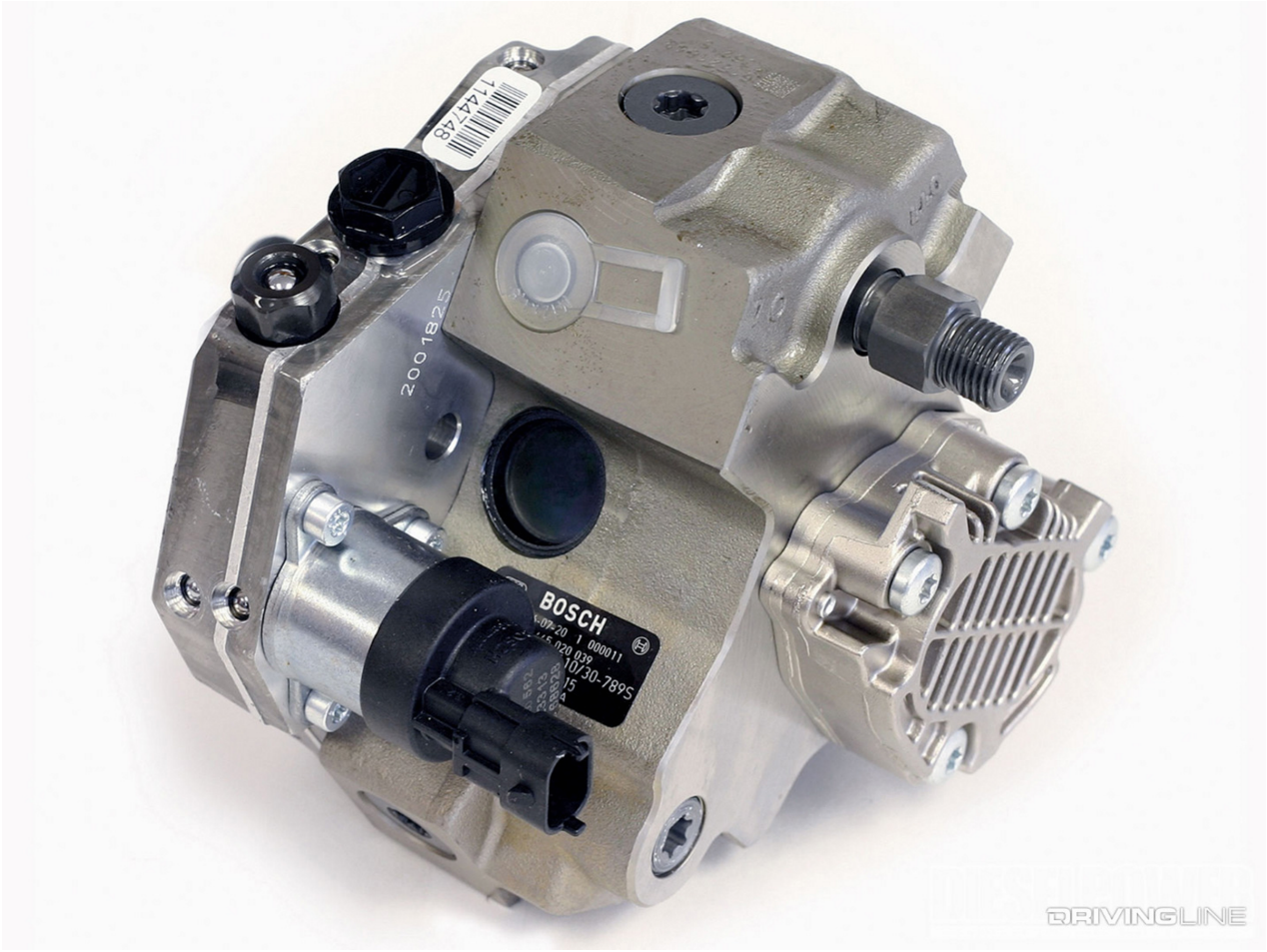
The fuel tank module, sometimes called a sending unit is known to cause issues with the FASS on the 2003-2004 model year trucks. The suction port may become restricted causing the FASS have extreme cavitation.

• Resolution: Install a FASS pickup assembly.

The best way to resolve this issue is install a FASS aftermarket pickup assembly such as the STK-5500, STK-5500B, STK-5500BO, STK-1002, and STK-1003. Please refer to appropriate documentation on each of the listed units for correct sales.

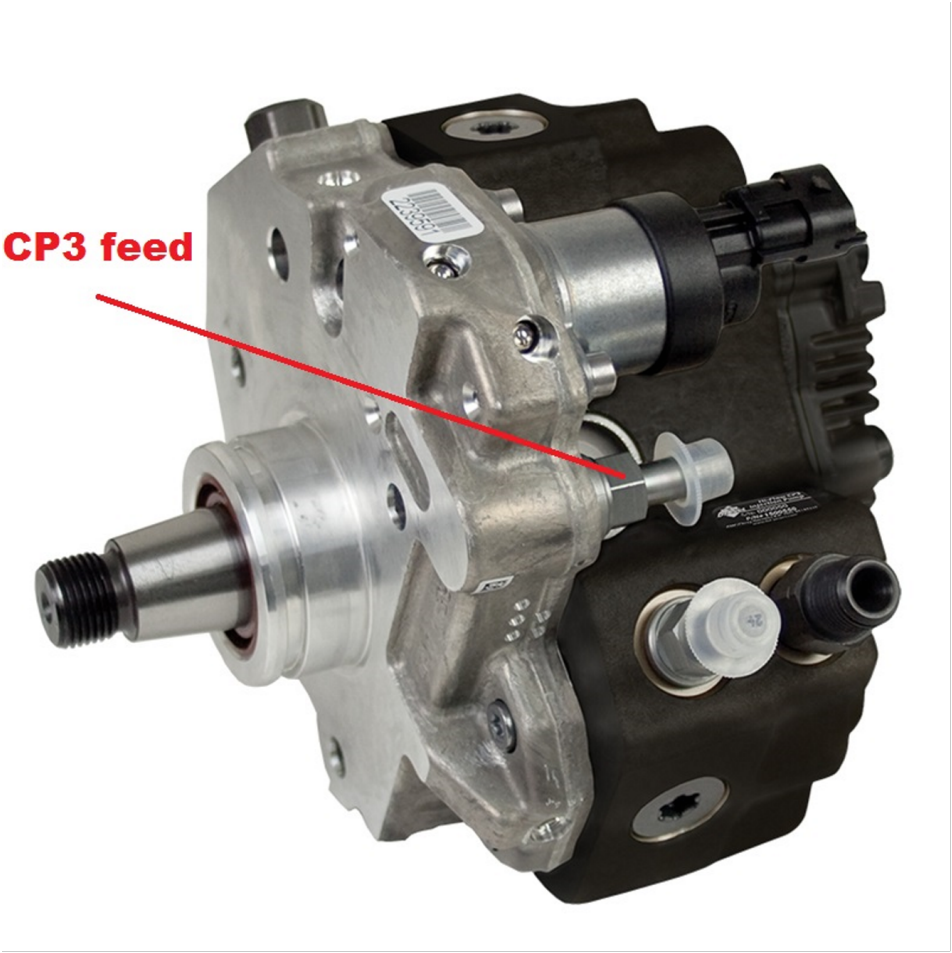
2005-2007 Dodge 5.9L Common Rail Cummins

2003-2007 Cummins 5.9s are equipped with a high pressure common rail fuel injection system manufactured by Bosch, a CP3 injection pump feeds a common fuel rail with up to 25,000 psi to feed the fuel injectors. The fuel injectors are electronically actuated, these are also manufactured by Bosch. These trucks can be upgraded to have 2 or more CP3s to supply large-aftermarket fuel injectors.



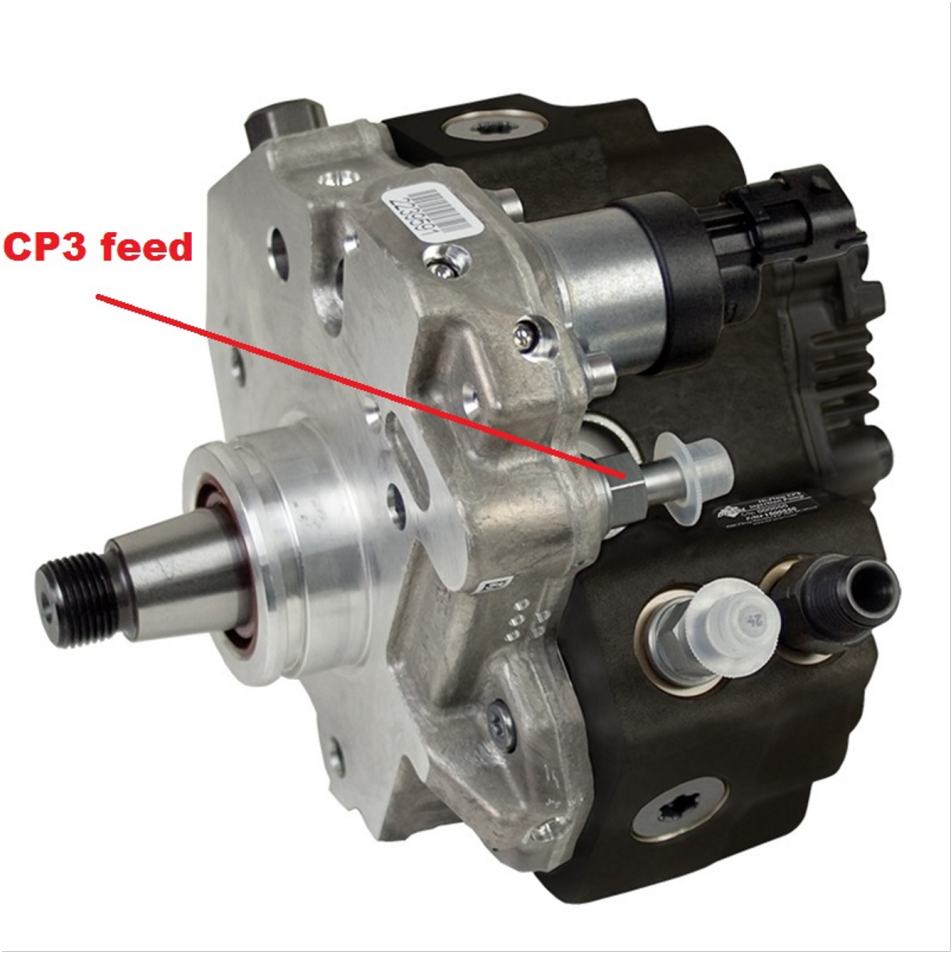
2007.5-2009 Dodge 6.7L Common Rail Cummins

• 2007.5-2017 Cummins 6.7s are equipped with a high pressure common rail fuel injection system manufactured by Bosch, a CP3 injection pump feeds a common fuel rail with up to 25,000 psi to feed the fuel injectors. The fuel injectors are electronically actuated, these are also manufactured by Bosch. These trucks can be upgraded to have 2 or more CP3s to supply large-aftermarket fuel injectors. *Please note CP3 fuel feed connection differs from 5.9L model engines.*



2010-2017 Dodge 6.7L Common Rail Cummins

2007.5-2017 Cummins 6.7s are equipped with a high pressure common rail fuel injection system manufactured by Bosch, a CP3 injection pump feeds a common fuel rail with up to 25,000 psi to feed the fuel injectors. The fuel injectors are electronically actuated, these are also manufactured by Bosch. These trucks can be upgraded to have 2 or more CP3s to supply large-aftermarket fuel injectors. *Please note CP3 fuel feed connection differs from 5.9L model engines.*



2010-2012 Dodge 6.7L Cummins Fuel Filter Location

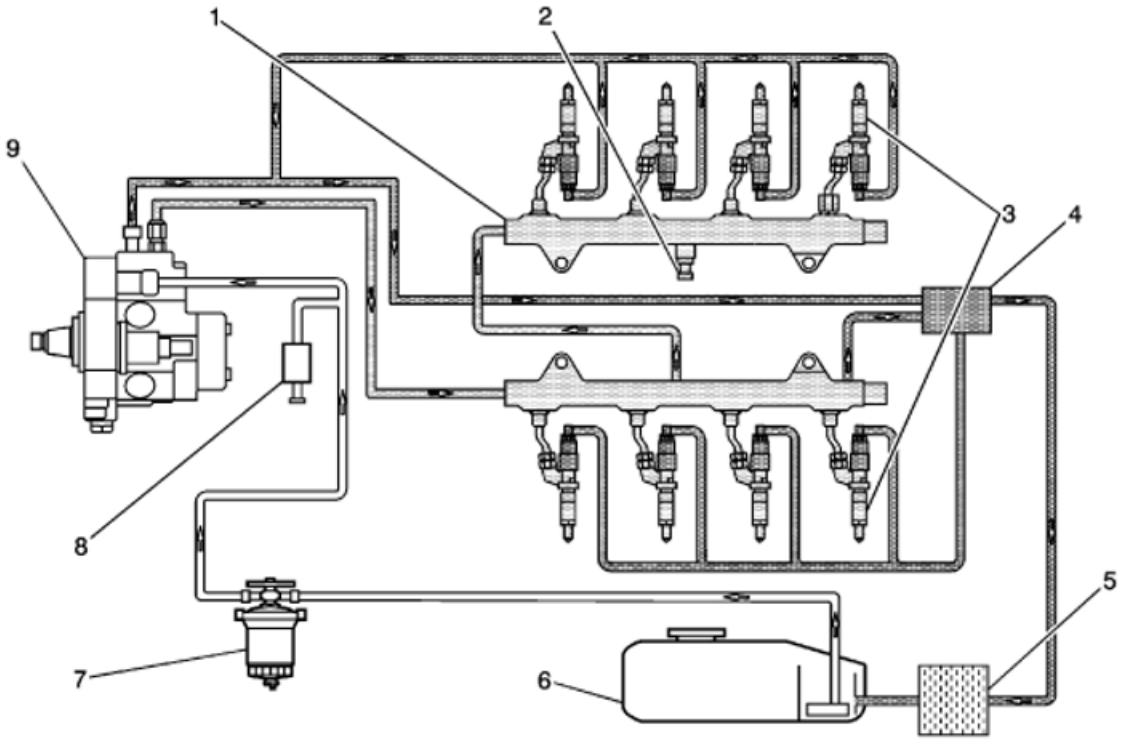
- On 2010-2012 model year trucks, the fuel filter is located beneath the intake manifold.

2013-2017 Dodge 6.7L Cummins Fuel Filter Location

- On 2010-2012 model year trucks, the fuel filter is above the rear differential.

2001-2016 Chevy/GMC 6.6L Duramax

• ALL MODEL YEAR CHEVY DURAMAX ENGINES ARE EQUIPPED WITH A COMMON RAIL FUEL INJECTION SYSTEM, COMMOM RAIL FUEL INJECTION SYSTEMS DO NOT NEED TO BE BLED. *Please refer to image below for Duramax fuel system image.*



1 - Fuel Rail
2 - Fuel Pressure Sensor
3 - Fuel Injectors
4 - Fuel Return Junction Block
5 - Fuel Cooler
6 - Fuel Tank
7 - Fuel Filter/Heater Element Housing
8 - First Start Fuel Bleeder Valve
9 - Fuel Injection Pump

• Note: Not all Duramax models are equipped with fuel coolers.

2001-2016 Chevy/GMC 6.6L Duramax

•Engine "loping" at idle after FASS installation.

•Symptom: When engine is running, at idle, truck exhibits a "loping" idle condition. This could be mistaken as a misfire.

•Possible cause: Excessive lift pump/FASS pressure.

•Resolution: Perform bucket test with a pressure gauge installed in the "G" port, verify FASS pressure is running within the specified threshold. If FASS displays excessive pressure, check the MRT/spring/check-ball assembly. Repair/replace as necessary.

2001-2016 Chevy/GMC 6.6L Duramax

• Excessive FASS cavitation.

• Symptom: FASS is excessively loud, seems to be cavitating. Customer might be complaining of a "grinding" type sound.

• Possible cause: The OEM fuel tank module/sending unit could have a restriction. This will cause the FASS to create more vacuum on the suction side and loudly cavitate.

• Diagnosis: Perform bucket test and verify FASS is working as designed.

• Resolution: Install a FASS pickup assembly.

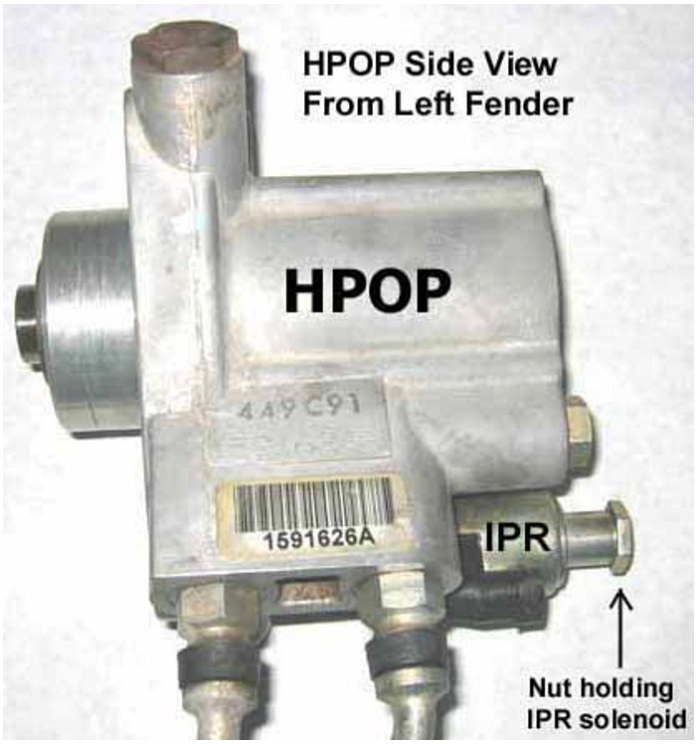
The best way to resolve this issue is install a FASS aftermarket pickup assembly suck as the STK-5500, STK-5500B, STK-5500BO, STK-1002, and STK-1003. Please refer to appropriate documentation on each of the listed units for correct sales.

2015-2016 Chevy/GMC 6.6L Duramax

•The 2015-2016 Duramax model trucks are equipped with a unique in-tank sending unit. These sending units (pickups) are exceptionally restrictive and a FASS cannot pull fuel through them properly due to the increased flow over OEM. This is why the T C12 kits were specifically designed for these trucks. Please refer to kit documentation for appropriate sales.

1999-2003 Ford 7.3L Powerstroke

• These applications are equipped with a Heui fuel injection system, Instead of a conventional injection pump, HEUI systems use a high-pressure oil pump. Unlike conventional injection pumps, the high-pressure oil pump does not create pressure. It creates a volume of oil for the injectors to use. The injection pressure regulator (controlled by the PCM) is responsible for creating injection pressures in a range of 450 to 3,000 psi on 7.3L engines. Fuel is supplied to the fuel injectors around 55-60 PSI from the lift pump or FASS.

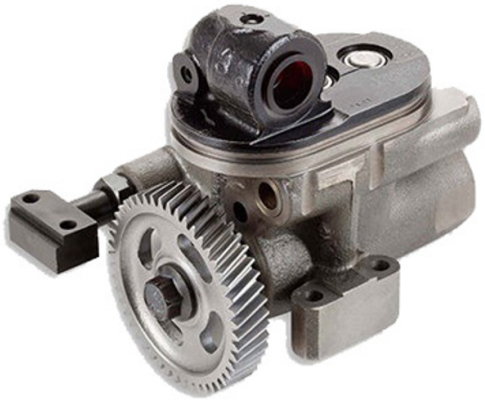


Bosch high pressure oil pump, also known as a HPOP from a 7.3 Powerstroke.

7.3 Powerstroke fuel injector.

2003-2007 Ford 6.0L Powerstroke

These applications are equipped with a Heui fuel injection system, Instead of a conventional injection pump, HEUI systems use a high-pressure oil pump. Unlike conventional injection pumps, the high-pressure oil pump does not create pressure. It creates a volume of oil for the injectors to use. The injection pressure regulator (controlled by the PCM) is responsible for creating injection pressures in a range of 450 to 3,500 psi on 6.0L engines. Fuel is supplied to the fuel injectors around 55-60 PSI from the lift pump or FASS.



6.0L high pressure oil pump, also known as HPOP. This unit is located beneath the turbocharger.

6.0L fuel injector.

1999-2007 Ford 7.3L/6.0L Powerstroke

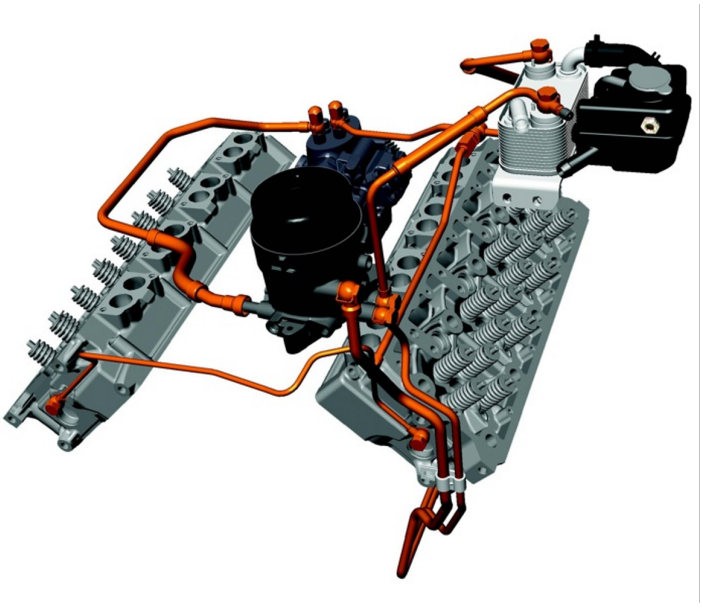
• FASS installation on trucks equipped with a regulated return style fuel system upgrade.

• FASS pressure must be set 5 PSI higher than the regulated return system to function properly. To do this, crimp off the engine supply line (key on engine off) and measure FASS pressure. Once FASS pressure is verified, set the regulated return pressure about 5 PSI below FASS pressure.

2008-2010 Ford 6.4L Powerstroke

The 2008-2010 Ford trucks equipped with the 6.4L Powerstroke were the first ford diesels equipped with a Common Rail fuel injection system. Fuel is supplied from the lift pump at approximately 10 PSI to the high pressure injection pump.

6.4L Powerstroke high pressure injection pump.



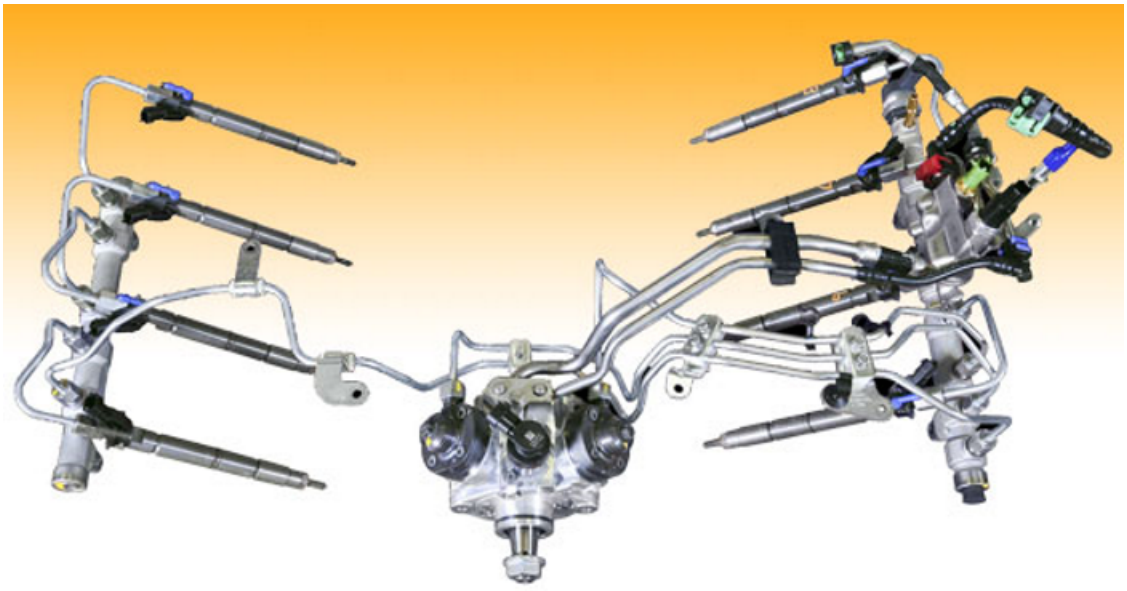
6.4L Powerstroke fuel system illustration.

6.4L Powerstroke fuel injector and injector line.

2011-2016 Ford 6.7L Powerstroke

The 6.7L Powerstroke is equipped with a Common Rail fuel injection system.

6.7L Powerstroke fuel injection pump.



6.7L Powerstroke fuel injection system.