

*TROUBLE
SHOOTING
MANUAL*

BY:

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Thank you for your cooperation and business!!

The primary reason for this trouble shooting guide is to solve the situation/problem. DPP will never take the position that we produce perfect products. However we will only release products of very high quality! With that being said we have found that the performance of the FASS Fuel System and the FASS HPFP (stand alone fuel pump) can be greatly affected, negatively or positively, by surrounding conditions. This trouble shooting guide is a resource to find these outside conditions. As we learn more we will revise this guide.

Flow of the FASS Fuel System

Fuel flows from the fuel tank of the vehicle to the FASS entering the suction port of the FASS labeled with the letter "T". The fuel enters the FASS and is immediately screened by the 144 micron stainless steel wire mesh in the water separator before it travels to the fuel pump. From the tank up to the fuel pump the fuel is under a vacuum. Once the fuel enters the fuel pump it is placed under pressure. Now the fuel travels through the fuel filter. There is **"NO WAY"** for the fuel to exit the FASS Fuel System without having traveled through the fuel filter and water separator. Once the fuel enters the fuel filter it will travel one of two ways, to the engine or back to the fuel tank. The pressure regulator, located in the port labeled with the letter "R", is what will govern the fuel pressure and the path of the fuel.

5 Gallon Bucket Test

REASON:

The reasoning behind the 5 gallon bucket test, referred to throughout this guide, is because we have discovered many defects in the stock pick up modules of the diesel pick up trucks, even with BRAND NEW modules. For the most part they work great, but we have encountered many different types of problems/restrictions. There is a very fine mesh in this module that pre-screens the fuel before the fuel enters the suction line. This mesh can become very restricted with debris, even if it worked perfect at first. We have had quite a few customers develop a bacteria problem which can and will become very restrictive. This restriction can cause the fuel not to flow properly to the suction tube. Just for your information, the sulfur in the fuel is what can kill these bacteria but as emission requirements get stronger the main chemical that keeps getting reduced is sulfur. So the bacteria is going to become more of a problem. Some customers have found cracks in the stock pick up tube causing the fuel system to lose prime when the vehicle is shut off. Restrictions in the pick up module if great enough can cause a fuel system to lose prime.

Performing the 5 gallon bucket test simply isolates the FASS pump. The only 2 items that could be affecting the FASS pump when sucking out of the bucket would be the water separator, the pre-screen and the suction line. If the suction line has a major

restriction it could also affect how the FASS pump performs. There are many situations/problems that the 5 gallon bucket test could help solve. The 5 gallon bucket test has helped solve/isolate the following problems but not limited too:

5 Gallon Bucket Test - Continued

Low fuel pressure.

Lower fuel pressures with different fuel levels in fuel tank.

Inconsistent fuel pressure.

Looses fuel pressure altogether.

Hard Starts.

Loosing prime.

Noisy fuel pump.

Not priming properly.

Fuel pump sounds like it turns on & off.

etc.

The 5 gallon bucket test is simply getting a 5 gallon bucket of fuel and placing the suction line of the FASS pump into it. If it is the FASS Fuel System go ahead and place the return line into this same bucket. The reason for this is, if you just have the suction in the bucket, the bucket will be emptied fairly quickly. After you have performed these steps it may be necessary to re-prime the fuel system. Of course the vehicle cannot travel while performing this test.

Section 1: Fuel Filter/Water Separator – Service Intervals

1a. Recommended Service Life of the Fuel Filter

NOTE: *The information in this section is only a recommendation for the fuel filter and water separator with our name on them. There are many variables that can and will determine that the filter and water separator be serviced/changed at different intervals than what we recommend.*

Changing the Fuel Filter on the **FASS 150** series fuel system.

- A. We recommend that the fuel filter be changed when the fuel pressure to the engines fuel pump or injection pump reaches less than about 5 – 7psi or 30,000 miles, which ever comes first. (NOTE: Your engine may be different for the minimum requirement for fuel pressure)
- B. We offer an indicator light which will indicate 7psi or less by turning a light on, part # IL-1001.
- C. We really recommend a gauge or the indicator light, if neither one is in place the typical filter life is about 30,000 miles.

1b. Recommended Service Life of the Water Separator

We recommend that the Water Separator on the **FASS 150** series fuel system be serviced or changed every 30,000 miles or when needed.

- A. The water separator can be serviced by simply removing it and pouring the contents out. pour a cleaning solvent into the separator while sloshing the separator around. Pour the solvent out, repeat as many times as necessary.

We recommend that the Water Separator on the **FASS HPFP** be serviced or changed every 15,000 miles or when needed.

- A. The water separator can be serviced by simply removing it and pouring the contents out, then pouring a cleaning solvent into the separator while sloshing it around. Try to drain out in the opposite direction as the correct flow.

Section 2: Priming Issues

2a. Priming after a Filter Change – FASS 150 series

The fuel filter and water separator can be installed on the FASS System empty. Follow these steps for priming (These procedures are also in the owner's manual):

Install new filters (Torque specs are in the owner's manual).

Turn the FASS pump on.

Allow it to run for about 30 – 60 seconds. The tone of the motor should change after the fuel travels through the water separator then to the fuel pump.

NOTE: On the Dodge Cummins (24 valve) it will be necessary to bump the starter; it may be necessary to bump the starter more than once. If it is necessary to bump the starter more than once do so before the pump shuts off.

If the unit does not prime after 30 – 60 seconds of continuous operation loosen the fuel filter, not the water separator, while the pump is running. As soon as the fuel filter is loosened air will be released, you should hear this. Soon after that the sound of the pump will change, that is fuel traveling through and loading the pump. As soon as the pump changes tone immediately tighten the fuel filter.

2b. Will Not Prime – FASS 150 series

Plenty of fuel? How much?

Following the proper procedures? (Listed in the previous steps)

Fuel pump operating?

Loosen the fuel filter, remove the water separator and turn the FASS pump on. Now place your thumb over the water separator nipple. Can you feel suction? If yes go on to step E, if no review the "Service Topic" File No. 2005-001, dated 4-28-05.

Condition of Water Separator?

Make sure suction line is free of any obstruction and sharp bends.

Perform the "5 gallon bucket test. Remember to follow the proper priming procedures.

2c. Looses Prime – FASS 150 series

What is the fuel pressure of the FASS at the unit and at the injection pump or fuel pump? If it has good pressure, at the FASS pump, it is not loosing prime.

NOTE: If good pressure is present at the FASS and this is on a 24 valve Dodge Cummins application please review Section 6a.

Section 2: Priming Issues - Continued

Inspect FASS and fuel lines for obvious leaks. (If the unit leaks then the leak could be causing a break in vacuum allowing the fuel to drain back to the fuel tank) Make sure what appears to be a leak is not coming from another source.

Make sure the suction line is in good operating condition.

Perform the “5 gallon bucket test”. After it is primed and the truck has been started shut everything off and allow the vehicle to sit. Allow the vehicle to sit the same amount of time as it did too loose prime originally. If it starts properly there is a problem with the suction of the vehicle. If it does not start properly go to the next step, again what is the fuel pressure?

This step is only to be performed if you have the proper fuel line to do so, (you cannot perform this test if you have steel braided fuel lines)! Perform the “5 gallon bucket test”, again. Immediately after shutting the vehicle off, start the FASS pump again and allow it to run. With the proper type of locking pliers crimp off the fuel line supplying the injection pump or engines fuel pump with fuel from the FASS pump. Crimp this line as close as possible to the injection pump or engines fuel pump. Once this is completed, turn the FASS pump off. Allow the vehicle to sit the same amount of time as when it did too loose prime originally.

After the vehicle has set for the proper amount of time turn the FASS pump on. What is the fuel pressure? Good fuel pressures; go to the next step, low fuel pressure review Section 5. If after reviewing Section 5 the problem has not been resolved call your dealer.

With the FASS pump operating, removing the locking pliers and start the engine. If the engine starts fine that indicates that the fuel system is loosing prime due to a break in vacuum upstream of the FASS pump. If this is the case it is usually a check valve in the engines fuel system not seating properly. Which allows fuel to drain back to the fuel tank.

Section 3: Electric Motor

3a. Fuel Pump Sounds Like it Turns On & Off

With the engine off and the FASS pump running *listen carefully*. The fuel pump will probably have a louder pitch and then get real quite. It will repeat this for however long you listen but the noises will not be very consistent in the amount of time that they are quite vs. louder. This is due to air in the fuel cavitating in the fuel pump, this is normal. Air in fuel is not consistent and this condition will worsen as the fuel becomes hotter, lower and more agitated (from traveling). Another condition that creates more air/vapor is restriction on the fuel before it reaches the fuel pump.

3b. Fuel Pump Stops

Check the fuse. While replacing the fuse, even if there appears to be a good fuse, it is a good idea to remove and install the fuse several times. This will scratch and clean the surface. Before installing the fuse the final time apply dielectric grease into the fuse holder, this will help prevent corrosion.

Make sure there is proper power to the motor and a good ground. Check first on the fuel pump side of the male and female electrical connection. If there is not the proper power and ground try the opposite side. If that has the same result go to the source. Is there a relay in this harness? **Grounding to the frame is not a good ground!** If there is proper power and ground to the motor go to the next step.

Lightly tap on the end of the motor. **Tap** hard enough to slightly jolt it but not break anything. The object of **tapping** on the motor is to see if the brushes are sticking. If the pump starts after tapping refer to “Service Topic” File No. 2005-002 dated 4-28-05. It would be a good idea to review this “Service Topic” and see if it applies or could just help prevent future problems. If this is not the problem go to the next step.

Check the brushes. New brushes are 3/4” in length. If the brushes are less than 3/16” they need to be replaced. An improper ground (high resistance) can cause premature wear of the brushes, this is explained in the “Service Topic”, File No. 2005-002.

If after performing these steps the problem has not been resolved call your dealer.

Section 3: Electric Motor - Continued

3c. **Fuel Pump is Humming But Not Running** – (Probably blowing fuses)

NOTE: This usually happens when debris is caught in the gears of the fuel pump, this is the reason for the separator before the fuel pump. This usually happens when the fuel pump is first put on. *Every fuel pump is tested before it is shipped from DPP!! The fuel pump will not leave our facility unless it tests 100% correctly!!*

A. To fix this problem on the FASS 150 series follow this step:

Loosen very little, there is an O-ring in this assembly, 3 of the 4 horizontal bolts in the upside down “T” block traveling to the fuel pump. With the fuel pump now running, ***slowly***, start to torque these 3 bolts, using a criss-cross pattern, to **110 inch pounds**.

To fix this problem on the FASS HPFP follow this step:

Depending on the mounting configuration of the pump there may be 4 nuts that have to be removed and 3 nuts loosened or there may be 3 bolts that must be loosened. What must be accomplished is that the base (this is the base with the fuel ports) attached to the motor base must be loosened.

Loosen very little, there is an O-ring in this assembly, 3 of the 4 nuts/bolts holding the bases together. With the fuel pump now running slowly start to torque these 3 nuts/bolts, using a criss-cross pattern, to **110 inch pounds**.

3d. **Fuel Pump is Noisy**

A. Restrictions on fuel creates vapor (air), this vapor then enters the gear of the fuel pump, this is when cavitation occurs and can be quiet noisy. If there is enough cavitation it can sound like a failing bearing. This is a good time to perform the 5 gallon bucket test. If the noise is eliminated when testing from the bucket the restriction/problem is in the fuel tank. If it doesn't stop make sure there is no obstruction in the fuel line and pre-filter/water separator. If the problem still occurs call your dealer.

Section 4: Electrical

4a. Blowing Fuse

While replacing the fuse it is a good idea to remove and install the fuse several times. This will scratch and clean the surface. Before installing the fuse the final time apply di-electric grease into the fuse holder, this will help prevent corrosion.

Check for a short.

Grounding to the frame is considered a poor ground! We have ran into many problems grounding to the frame.

Section 5: Fuel Pressure

5a Running Out of Fuel/Looses Fuel Pressure

How much fuel is in the tank? Remember gauges can go bad!

Is it the stock pick up module or is it an after-market pick-up tube? If an after-market pick-up tube, how far is it from the bottom of the fuel tank? We have had good results with about a 3/16" gap between the bottom of the pick-up tube and the bottom of the fuel tank.

Quality/condition of fuel pressure gauge.

Quality/condition of fuel filter/water separator.

Is the fuel pump operating?

Is the fuel pressure taken at the FASS in the port marked with the letter "G" (for gauge) or up stream. If it is up stream there can be a restriction (flapper valve) in the fuel line or some obstruction. What is the fuel pressure at the FASS?

Refer to Sections 2 & 3.

NOTE: The 5 gallon bucket test can be very helpful in this situation.

Section 6: Starting

6a. Hard Starts

Usually the FASS only encounters hard starts on the 1998.5 – 2002 Dodge Cummins with the VP44 injection pump. If this occurs it is usually on a VP44 with high mileage, and/or a VP44 that has been subjected to around 5psi of fuel pressure or less. It is more likely to occur when the weather is warmer/hot.

Explanation of Diaphragm: The diaphragm in the VP44 is designed to move about .5mm with proper fuel pressure (about 7psi min.). When the VP44 is subject to about 5psi or less the diaphragm can move up to 2mm, an increase in movement of 4 times more than what it was designed to move. With this type of movement the diaphragm will eventually develop stress cracks thru out the body of the diaphragm. One job of this diaphragm is to separate low fuel pressure and high fuel pressure in the housing of the VP44, when the cracks are present this separation does not occur. This will lead to hard starts even with a stock OEM lift pump!!

Here is a simple test:

Note: Not all failed pumps with broken diaphragms will start with low to no supply fuel. Sometimes the diaphragm is so broken that charging pressure is not able to build to a level that allows the pump to deliver fuel.

Try starting the vehicle without waiting for the fuel pump to cycle. Meaning when you turn the key to the on position immediately engage starter.

Or:

Unplug the FASS pump or remove the fuse so the FASS pump does not operate. Note: If the engine operates without fuel pressure for a period of time the **VP44 will be destroyed**. Understanding this condition, start the truck. ***If the truck starts shut it off immediately!!!!*** This test just indicated that the better/increased fuel pressure from the FASS pump is overriding the thinner diaphragm and/or cracked o'rings surrounding the diaphragm in the VP44. There are four solutions to this:

Repair the VP44. VP44's were manufactured with a thinner diaphragm which can and will cause hard starts with hot weather and or higher fuel pressures. Thicker diaphragm's for the VP44 were released around 2003 for correcting this situation. Remember it doesn't matter if the VP44 has the thinner or thicker diaphragm, if the VP44 has been subjected to a

failing transfer pump (lower

Section 6:

Starting

6a. Hard Starts - Continued

fuel pressure) or a failed transfer pump it will lead to this problem. The damage was done by the failing or failed lift pump before the FASS was installed.

Lower the fuel pressure from the FASS system. Early FASS Fuel System units for the 24 Valve Dodge (Serial # 1378) came out with the PS-1001 spring, usually around 10 – 11psi. Later units (Serial # 1379) came out with the PS-1002 spring, usually around 16psi. The cost for the spring is only \$7.50.

Most customers prefer the higher pressure from the PS-1002 spring. If this is the case we recommend an oil pressure switch (Honeywell Hobbs part# 78143) on the ground side. This is done by placing the oil pressure switch in the oil gallery (on top of the oil filter). Then disconnect the ground from the ECM and (if it has it) the ground to the battery from the FASS wires. The ground wire is then connected to the oil pressure switch. This will delay the FASS pump until the engine has 3 – 4 pounds of oil pressure.

WE DO NOT RECOMMEND THIS SOLUTION!! Place a manual on – off switch in the cab, this way you can turn the pump on after the engine starts.

6b. Cold Weather Starts

The FASS pump has excellent results for cold weather starts due to the pure brute strength of the fuel pump. (Note: I have started my truck at 17° below 0 with no additives.)