



## 1999-2003 Ford 7.3L Diesel Fuel Bowl Rebuild Instructions

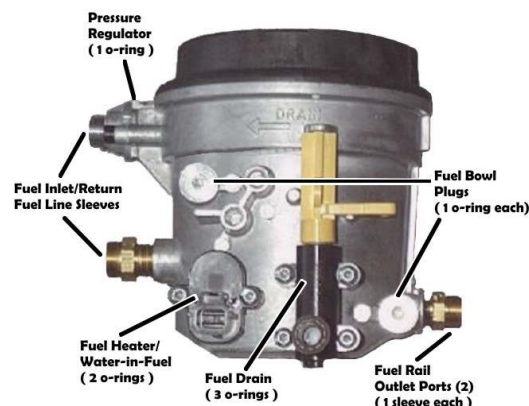
**(DieselOrings.com Kit # 7-003)** Begin by draining the fuel bowl by attaching a 3 ft piece of 3/8" hose to the drain tube that is located under the engine on the passenger's side, towards the front of the block. Place the open end of the hose in a catch can and open the yellow handle valve until the flow of fuel stops.

Remove the lid from the fuel bowl and remove the fuel filter; replace the lid on the bowl. To remove the fuel bowl from the engine compartment, remove the two 1/4" fuel lines from the passenger's side of the fuel bowl; remove the 5/16" return line from the fuel bowl pressure relief valve (FPR) and the 3/8" fuel inlet line. **DO NOT ATTEMPT TO TIGHTEN THE FPR COMPRESSION FITTING AT THIS TIME. Only turn it towards the loosening direction.** Pull the drain tube off of the drain valve that is attached with a short piece of hose.

There is only one electrical connection on the fuel bowl and it is the bowl heater/water-in-fuel sensor connector on the back side of the bowl. Release the locking clip and pull the connector toward the rear of the engine block. The fuel bowl is attached to the HPOP reservoir with two bolts, remove these bolts and the bowl will come out of the compartment.



The fuel bowl is attached to the HPOP reservoir with two bolts. It is not necessary to completely remove these bolts, just back them out to the last thread and leave them resting in the reservoir. Once the bolts are unscrewed from the fuel bowl, the bowl can be lifted from the valley.



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With the fuel bowl on the workbench, you can begin to disassemble the components from the main canister.



**Remove the Fuel Pressure Relief Valve (FPR):** Use a #25 torx bit and begin unscrewing the two bolts that hold the FPR housing to the canister. Unscrew the bolts evenly on both sides just a few turns at a time to allow the housing to and not bind on one of the bolts due to the pressure of the spring forcing the housing outward. Remove the housing, o-ring, spring and brass relief valve poppit.

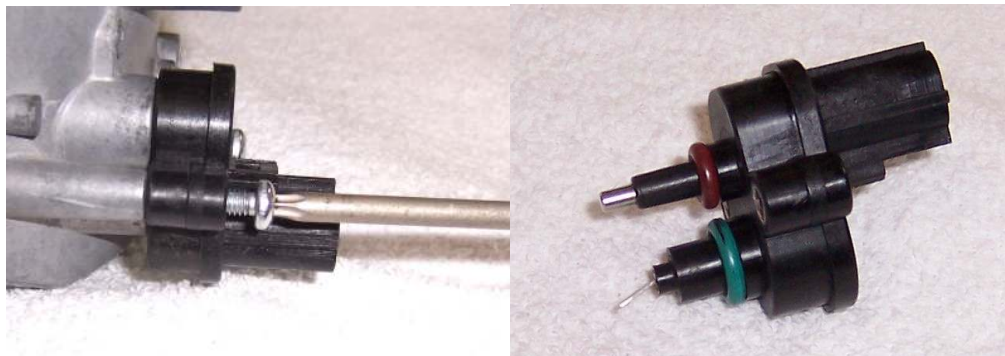


**Remove the FPR seat guide bushing:** From the inside of the fuel bowl, push the bushing out of the fuel bowl using a small ¼" deep socket or other blunt tool that will not damage the interior surface of the guide bushing. Remove the o-ring from the bushing and discard.

**WARNING:** The Fuel Pressure Relief poppit and seat are not part of the fuel bowl rebuild kit and is a separate Ford OEM part and is offered by DieselOrings.com



**Disconnect the Fuel Bowl heater electrical connector inside the fuel bowl:** Pull the heater spade connector from the electrical connector from inside the canister. It may be easier to use a pair of needle nose pliers to reach this connector.



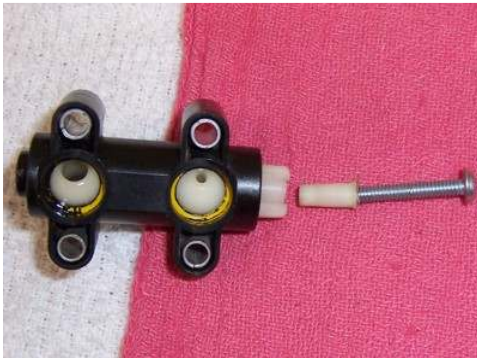
**Remove the Fuel heater / Water in fuel Sensor:** Use a #20 torx bit to remove the two screws securing the sensor to the canister. Pull the sensor from the bowl and the two o-rings will stay attached to the sensor.

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**Remove the Fuel Drain Valve:** Use a #20 torx bit to remove the four screws that hold the drain valve to the bowl. If you have the original o-rings installed in the valve, you will notice that the PTFE coating that Ford has applied to the drain o-rings has separated from the o-rings and has adhered to the valve body, shaft balls and fuel bowl caused by the ULSD. **NOTE: The stem is a 3 part assembly so if it comes apart as you remove it, just push the 2 main pieces back into the center sleeve section.**

To disassemble the fuel drain shaft from the drain valve body first remove the small tube that is found at the very top of the valve stem. This can be removed by using a pick tool or use an 8x32 machine screw, threaded lightly into the opening at the top and pulling it out.



Below this small tapered tube is a **plastic check ball**. **Be careful not to loose this ball during the cleaning process.** Use a pick tool to remove the o-rings from the valve body. Rotate the drain valve 180° so you can see the flat side of the shaft's balls through the o-ring openings. When in proper alignment, the stem can be pulled from the body. Remove the o-ring at the top of the valve stem.

It will be necessary to clean the PTFE residue from the valve body, valve stem and the fuel bowl to keep the new o-rings from being contaminated and leaking in the future.



The best way to clean up the residue is to use a clean rag with a small amount of lacquer thinner. This seems to be able to cut through the PTFE easily. Wash out the valve body to remove any remaining PTFE chips or dirt that has infiltrated the fuel drain valve.

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Remove the port plugs from the fuel bowl using a 3/16" hex Allen wrench. Remove and discard the old o-rings.



## Removing the Fuel Bowl Heater and filter check valve assembly:

Use a #20 torx bit to remove the two screws holding the heater element in place. Below the check valve tower assembly there is a spring that will try to push the tower from the fuel bowl pocket that it is seated in. Use care when removing the two screws that holds the heater in place so the check valve does not fly apart. Keep downward pressure on the top of the check valve tower when removing the heater assembly. Set the heater element off to the side and carefully remove the check valve tower by pulling it straight out of the fuel bowl. Tension from the o-ring seal on the tower will be the only thing holding the check valve tower in place once the fuel heater has been removed. Disassemble the check valve assembly noting the orientation of all the parts as pictured.

**NOTE:** The first picture below shows the check valve tower assembled, the second shows the internal parts without the spring



**Fuel Filter Check Valve Assembly:** The check valve is made up of 5 parts, the valve body, plunger, rod, valve seat and spring. Use a small diameter rod, a pencil will work and push the plunger, rod and seat out of the valve body. There is one o-ring on the valve seat and another on the base of the valve body that inserts into the base of the fuel bowl. With a pick tool, remove the old o-rings and dispose of them.

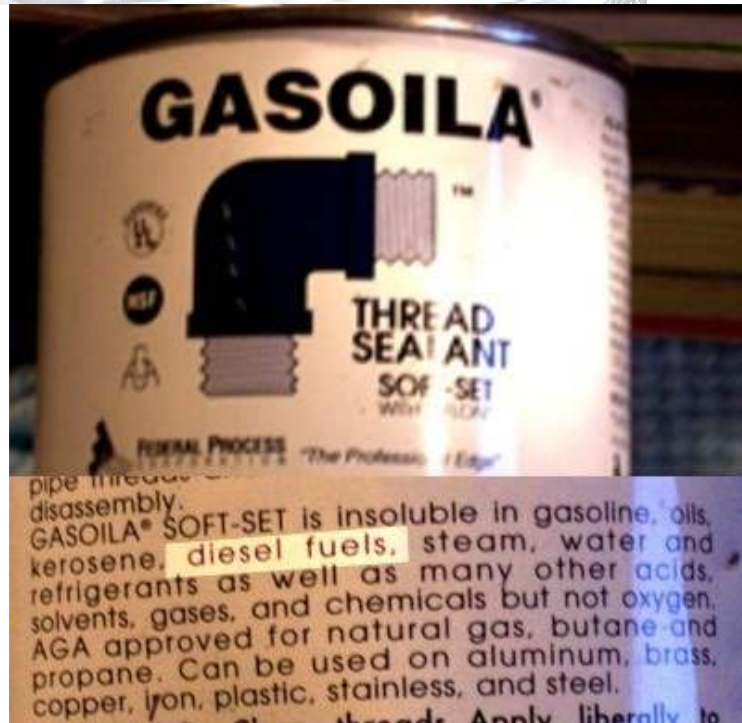
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After thoroughly cleaning the interior and exterior of the fuel bowl, this is what you should have. Optionally, you can remove the fuel inlet and outlet fittings and clean them. The large 3/8" inlet fitting threads are 1/4" NPT and the small outlet threads are 1/8" NPT. Use the appropriate taps and clean the remaining thread sealant from the bowl threads but **DO NOT** remove any of the bowl metal with the tap, only the old thread sealant. Blow out all of the ports and openings with high pressure compressed air. Reseal the inlet and outlet threads with a liquid thread sealant that is rated for diesel fuel. Tighten these fittings to 60 – 65 lb-in. **Do not use Teflon tape** as small pieces of tape can roll and get into the fittings plus Teflon tape can cause the fittings to crack the fragile fuel bowl. These very small shreds of tape could travel through the fuel rails and get into the injectors and cause the injector not to work properly.



This is the thread sealant that I recommend for all of the fuel and oil fittings on the 7.3L Diesel. It is a Teflon based thread sealant rated for gasoline, oils, kerosene, diesel fuels, steam, water and refrigerants and can be used on brass, aluminum, iron and steel. It is perfect for our automotive uses and is available in a 2oz tube from DieselOrings.com.



**Thread sealant is NOT used on o-rings or straight cut threads. It should only be used on tapered pipe threads like what is found on the fuel bowl where the brass fittings are screwed into the fuel bowl.**

**Reassembly:**

**Filter Check Valve o-rings:** Lubricate both o-rings with a small amount of diesel fuel and install on the valve body and check seat. Reassemble the check valve in the same order that it was disassembled and install the spring onto the check valve seat. **Use O-ring #7 and #8**



Assembled check valve tower

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Insert the check valve assembly into the chamber in the bottom of the fuel bowl and place the fuel bowl heater element over the valve body.



Fasten the heater element with two #20 torx screws to the fuel bowl base.

Check the operation of the check valve by pushing down on the plunger through the hole at the top of the check valve body. It should move up and down with moderate force.



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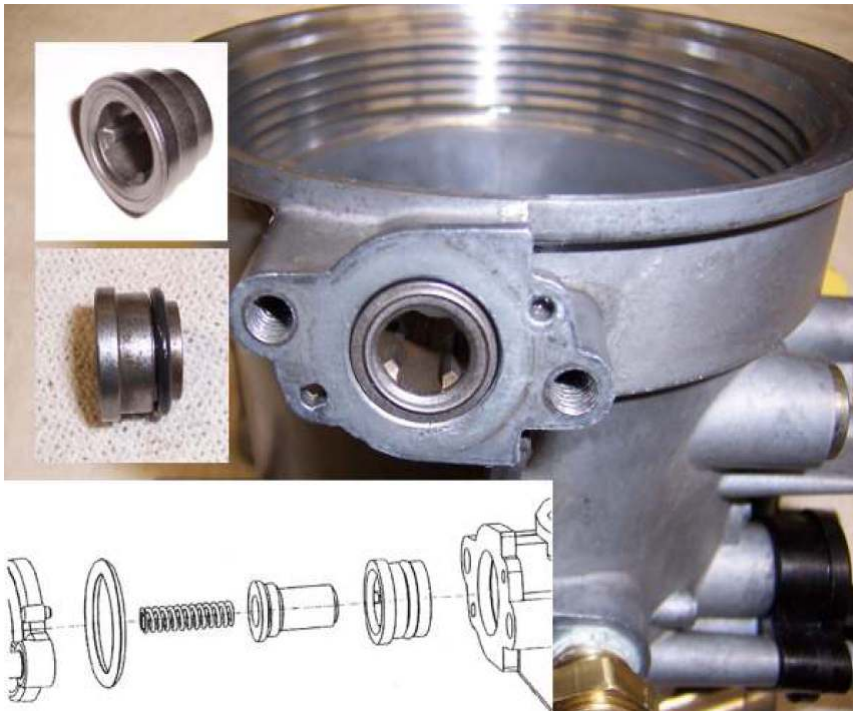
Lubricate the new o-rings with a small amount of diesel fuel. Place the o-rings on the sensor so they touch the back shoulder of the sensor. Insert the sensor into the fuel bowl and secure with the 2 #20 torx screws. Reconnect the heater electrical spade clip to the spade tip on the sensor. **Use O-ring #2 and #4**



## Fuel Pressure Relief Valve:

### IMPORTANT STEP:

Prior to installation of the FPR housing it is necessary to clean the cast threads of this part since any contamination can cause the compression fitting to bind and snap the threads from the housing. Use a bench grinder with a wire wheel brush to smooth off any burrs or other foreign matter from the threads. **PLEASE SEE TIGHTENING DIRECTIONS FOR THIS COMPRESSION FITTING ON PAGE 10.**



Using **O-ring #6**, lubricate the o-ring with light machine oil or motor oil and install it on the FPR poppet guide as shown in the picture. Insert the guide into the fuel bowl housing until the face of the bushing is even with the outside milled surface of the fuel bowl.

**NOTE: THE SEAT ON THE BRASS REGULATOR POPPET IS NOT AN O-RING AND IS NOT CONTAINED IN THIS KIT.** If your regulator is damaged, the parts in the lower left of this picture are only contained in a Ford FPR rebuild kit. The kit contains a new spring, poppet, poppet guide and poppet seat (regulator seat) and can be purchased separately from **DieselOrings.com** (Part # 7-028).

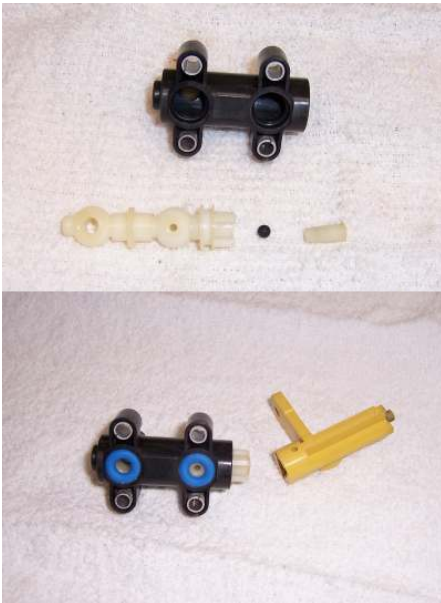


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Install the new FPR o-ring (**O-ring #1**) on the housing. Place the relief valve poppet in the fuel bowl opening and insert the spring into the brass poppet. Place the FPR housing over the spring and with one hand, collapse the spring with the housing until the housing touches the fuel bowl and fasten the housing with the 2 #25 black torx screws. **It is CRITICAL that the spring is centered in the FPR housing when reassembled because if it catches on one of the internal ribs the pressure in the fuel bowl can increase to over 100PSI.**



## Fuel Drain Valve:



Once all the PTFE residue and dirt has been cleaned from the valve, roll the new o-ring over the top of the drain stem (**O-ring #6**) and lube the o-ring with light machine oil or motor oil to allow it to be inserted into the valve body. Align all of the flat sides of the stem shaft and insert the stem into the valve body. It will take a small amount of pressure to snap the new o-ring in place so the stem is fully seated in the valve body. Do this by placing the valve upright on the work bench, place the yellow handle on the stem of the valve and with the palm of your hand and push the yellow valve handle down until you feel the top o-ring snap into place in the valve body. Drop the plastic ball into the top of the valve stem and secure with the small tapered tube. Lubricate the 2 drain valve o-rings (**O-rings #5**) with a small amount of diesel fuel and press them into the valve body openings.

Place the yellow stem handle on the drain valve and rotate so the handle is pointing away from the 2 drain valve o-rings. Secure the drain valve to the fuel bowl with 4 #20 torx screws making sure that the valve is secured tightly to the fuel bowl to prevent the possibility of it leaking (22 lbs-in).

## Fuel Bowl Port Plugs:

Install the new o-rings on the fuel bowl plugs, lubricate with a small amount of diesel fuel and reinstall in the fuel ports. Tighten using a 3/16" Allen wrench.



**Reinstall Fuel Bowl:**

Place the fuel bowl back on the engine and secure in place to the HPOP reservoir. Use new Viton fuel line sleeves on the fuel inlet (**sleeve #3**), fuel rail lines (**sleeves # 1**) and the pressure relief valve (**sleeve #2**). Tighten the brass compression nuts until the nut touches the brass fitting. There should not be any gap between the compression nut and the brass fitting for proper fitment.

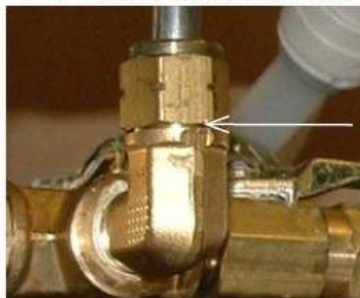
Reconnect the electrical connector for the fuel bowl heater/water-in-fuel sensor. Install a new fuel filter according to the filter manufacture’s instructions. Make sure the fuel drain valve is **CLOSED**. Cycle the fuel pump while watching the fuel bowl for leaks. After three cycles start the engine and check for leaks once again.

**Fuel line sleeves – Fuel Inlet, Return and Cylinder Head Fuel Rail lines**

1. Remove the line from the fuel bowl fittings. You will find that the sleeves have become hard, dry and cracked.
2. To remove the old sleeves, use a small screwdriver and/or pick tool to dig the old sleeve from the compression nut.
3. Use a commercially available brake cleaner to flush out the remnants of the old sleeve from the nut.
4. Lubricate the new sleeve with light oil or diesel fuel and push it over the flared end of the fuel line.
5. Push the fuel line into the fitting until it stops. While making sure that the tubing stays fully inserted into the fitting, tighten the nut to the fittings.
6. The nut on a Vibra-Lok fitting must be tightened until it contacts the body of the fitting.

**WARNING** This does not apply to the compression on the **FPR valve**. These are aluminum cast threads and the compression fitting should only be tightened to the point where you can feel the sleeve being compressed.

**Incorrect Installation**

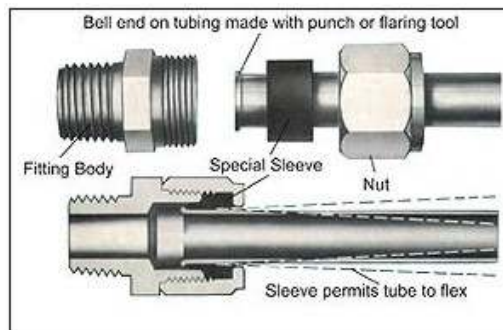


Gap between fittings

**Correct Installation**



Fitting contacts body





**NOTES:**