

UNIQUE SERVICE PROCEDURES

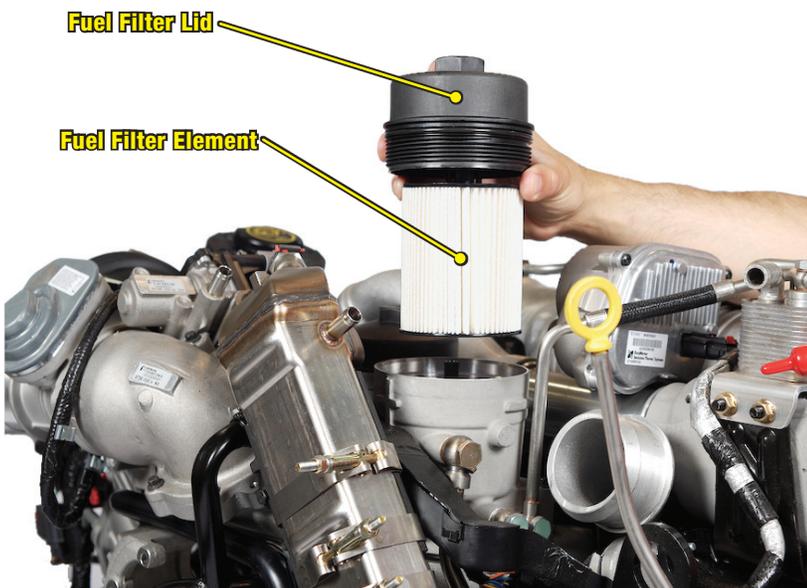


Oil Filter: Replacement

- First loosen the oil filter cap which will open the oil filter drain and allow the oil from the filter housing to drain into the crankcase.
- Drain the oil from the oil pan.
- After all of the oil has drained from the oil pan remove the oil filter and discard it in the appropriate location.
- Install the new oil filter element and tighten the oil filter cap to the recommended torque. This will close the oil filter drain.
- Refill crankcase with the correct volume of recommended oil.

Note: The oil filter snaps into the oil filter lid.

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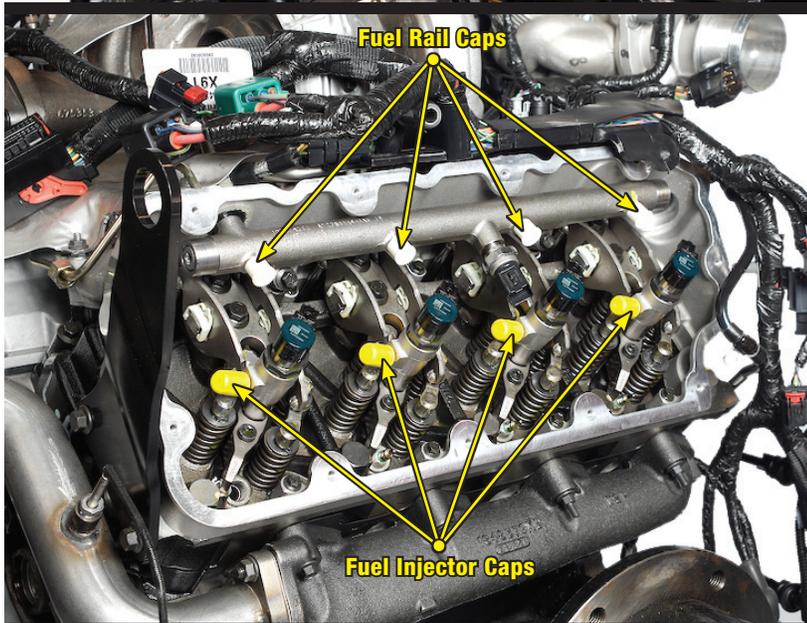
Fuel Filter: Replacement

NOTE: Use proper cleanliness practices while servicing the fuel system, do not let any dirt get into the housing!

- Clean all dirt and debris from the engine mounted fuel filter lid thoroughly. Make sure your hands and any tools involved are clean also!
- Remove the fuel filter lid and lift the filter element out of the housing and discard in the appropriate location.
- To avoid fuel spills, use a suction gun or similar device to remove the remaining fuel from the fuel filter housing.
- Install the new filter and tighten the fuel filter lid to the specified torque.

NOTE: Before starting the vehicle, turn the key to the on position for 30 seconds, then key off. Do this 6 times to ensure the fuel filter housing is full of fuel before starting the vehicle.

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Fuel System Service Cleanliness: Fuel Injectors, Fuel Rail

NOTE: Use proper cleanliness practices while servicing the fuel system!

- Always use fuel system caps when servicing the fuel injectors or replacing fuel lines.
- Do not have the fuel system open to the elements any longer than is necessary to perform the job at hand.
- Tool # 310-158 (fuel caps)

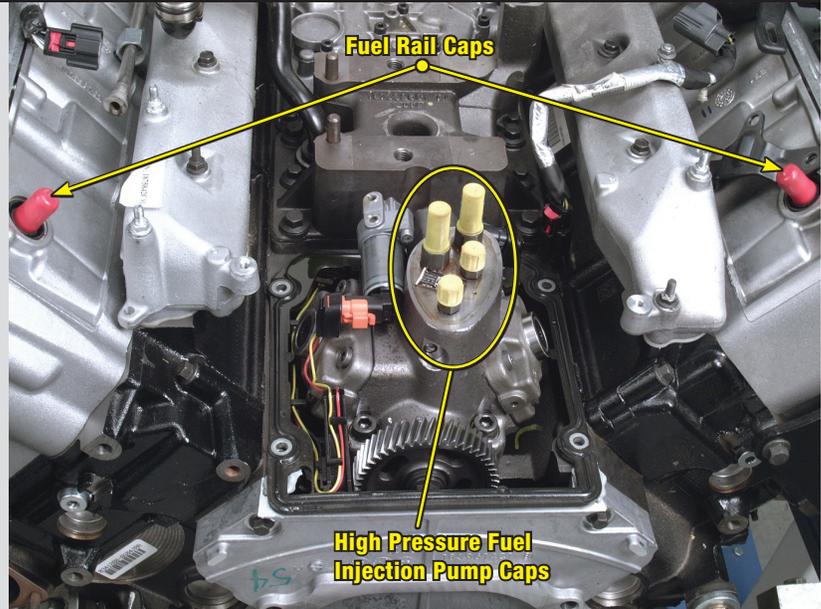
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Fuel System Service Cleanliness: High Pressure Fuel Injection Pump

NOTE: Use proper cleanliness practices while servicing the fuel system!

- Always use fuel system caps when servicing the high pressure fuel injection pump.
- Do not have the fuel system open to the elements any longer than is necessary to perform the job at hand.
- Tool # 310-158 (fuel caps)



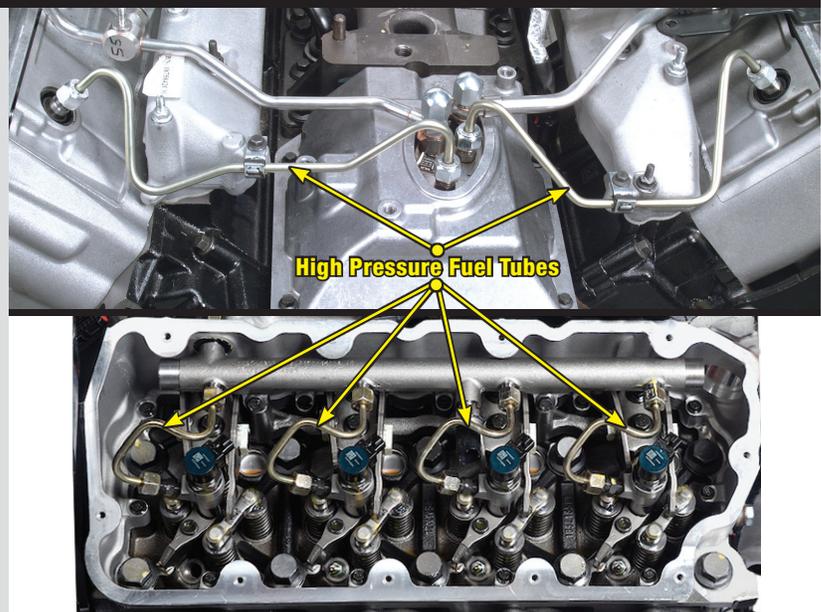
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Fuel System Service: High Pressure Fuel Tubes

NOTE: Use proper cleanliness practices while servicing the fuel system!

- High pressure fuel supply tubes must always be replaced once loosened. Never re-use a high pressure tube once it has been loosened under any circumstances!

NOTE: Always use the fuel injector connector disconnect tool (tool # 310-157) whenever disconnecting the fuel injector electrical connector. Failure to use this tool can damage the connector.



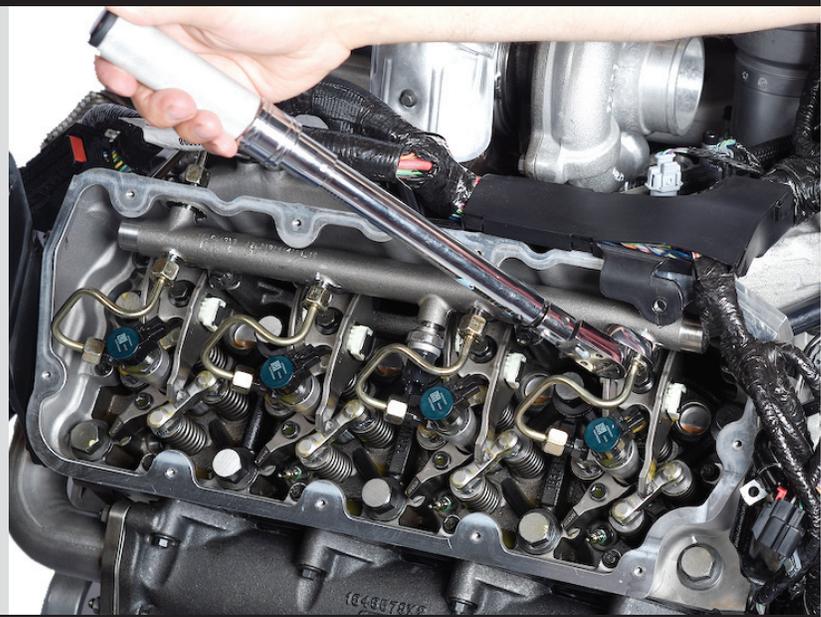
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Fuel System Service: High Pressure Fuel Tube Service

NOTE: Use proper cleanliness practices while servicing the fuel system!

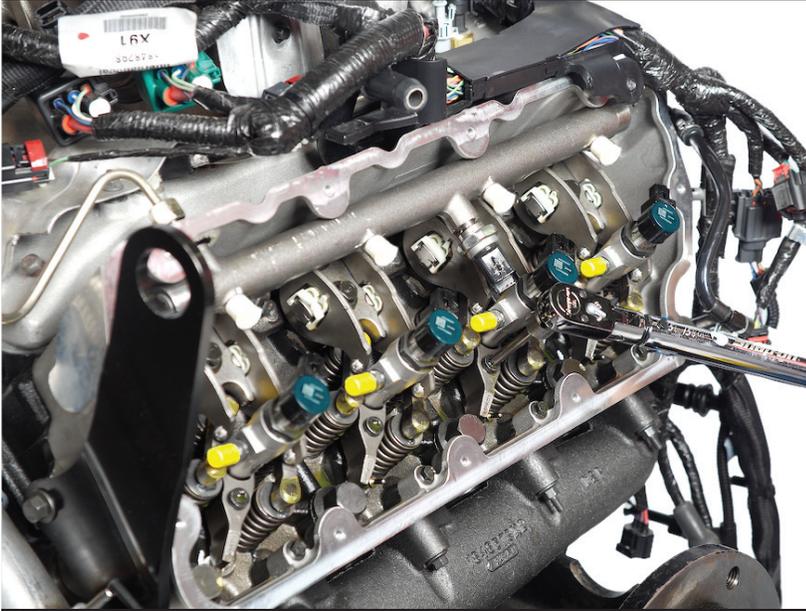
NOTE: Follow the proper service procedures while servicing the fuel system and always use the correct torque!

- Proper torque is crucial with the 6.4L Power Stroke® Diesel's high pressure fuel system.
- When replacing high pressure fuel tubes, always follow the correct procedure for installation and torque.



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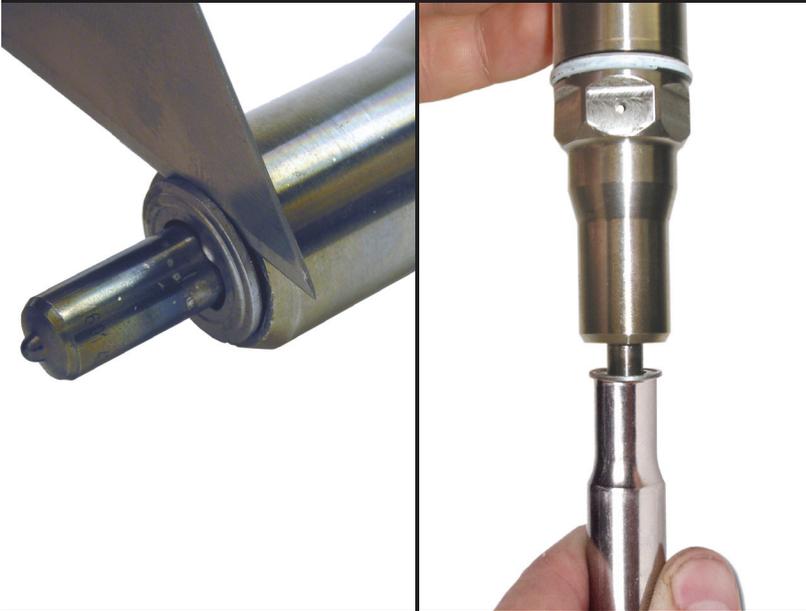
Fuel System Service: Fuel Injector Service

NOTE: Use proper cleanliness practices while servicing the fuel system!

NOTE: Follow the proper service procedures while servicing the fuel system and always use the correct torque!

- Proper torque is crucial with the 6.4L Power Stroke® Diesel's high pressure fuel system.
- When replacing fuel injectors, always follow the correct procedure for installation and torque.
- Always use proper protective fuel system caps whenever a tube is removed.
- Avoid cleaning parts near fuel system components.
- Tool # 310-158 (fuel caps)

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Fuel System Service: Removing and Installing Injector Gasket

NOTE: Use proper cleanliness practices while servicing the fuel system!

- To remove the gasket, use a razor blade to get between the gasket and injector body, then slowly work the gasket off.
- To install the new gasket, use a 9mm 12 point deep well socket and press the gasket on by hand making sure it is fully seated.
- Make sure the gasket is installed correctly. The raised portion of the gasket should be facing away from the injector body.

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Fuel System Service: Fuel Injector Lubrication

NOTE: Use proper cleanliness practices while servicing the fuel system!

- Always replace the O-ring and the steel gasket at the tip of the injector when reinstalling an injector. New injectors come with these items already installed.
- Always lightly lubricate the new O-ring with clean engine oil prior to assembly.

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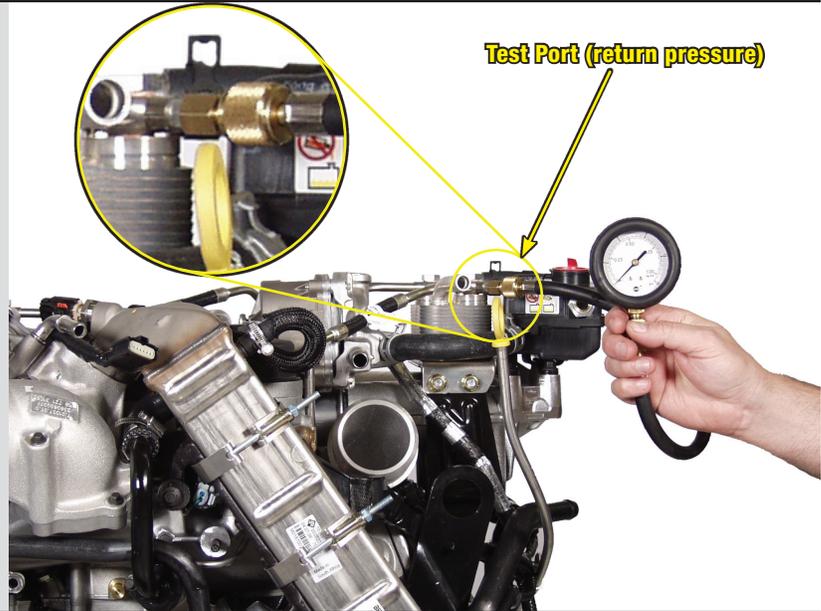
UNIQUE SERVICE PROCEDURES

Checking Fuel Pressure

NOTE: Use proper cleanliness practices while servicing the fuel system!

- There is a fuel return pressure test valve (schraeder) located on the front of the fuel cooler on the left side of the engine.
- Proper fuel pressure is very important. Too much or too little pressure could be detrimental.
- Follow the proper procedure for checking fuel pressure and make sure the correct specification for supply pressure is achieved.

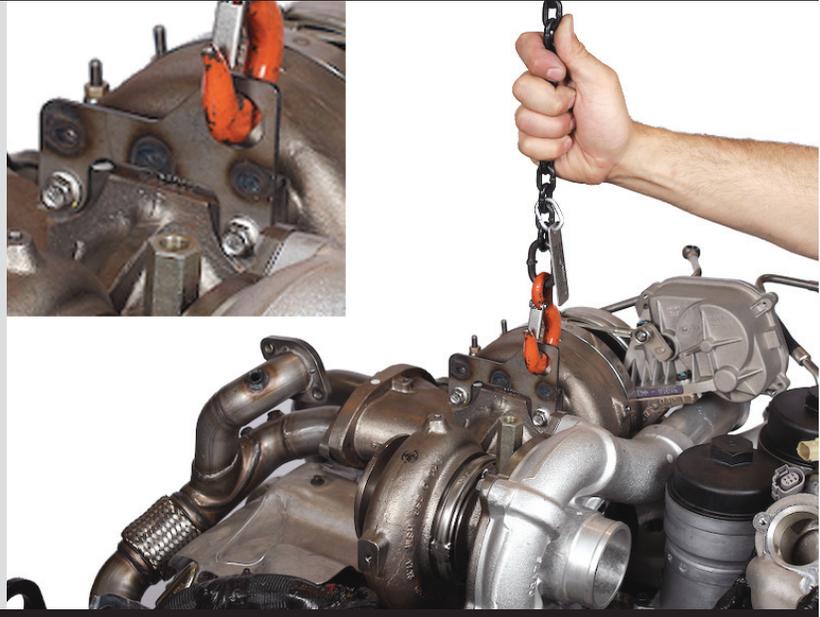
NOTE: Supply pressure needs to be checked at the horizontal fuel conditioning module (HFCM) outlet.



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Turbocharger Lifting Bracket

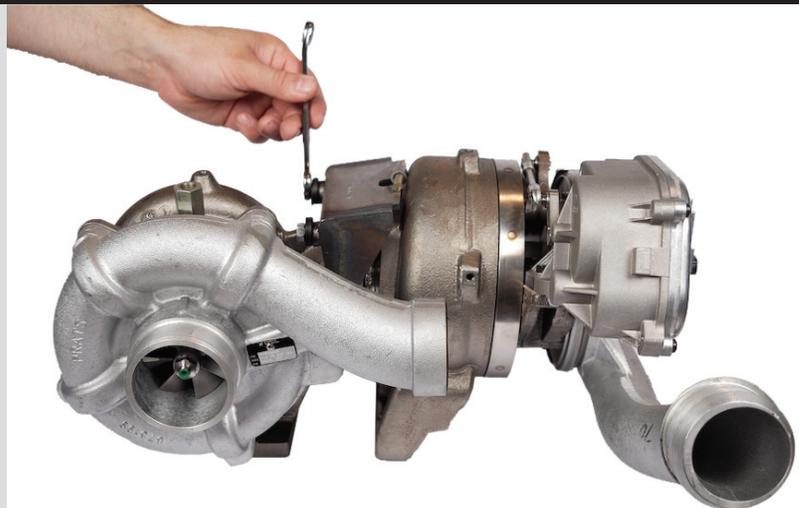
- Anytime removal or installation of the turbocharger is performed, always use the turbocharger lifting bracket to ensure proper engagement and disengagement of the turbocharger drain tubes.
- The tool is designed to balance the turbochargers and hold the two turbine housings in alignment.
- Tool # 303-1266



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Turbocharger Assembly Tool

- The series sequential turbocharger is comprised of two turbochargers, low pressure turbocharger and high pressure turbocharger. When assembling these two turbochargers together, always use the turbocharger assembly tool shown at right.
- Tool # 303-1269
- Follow the proper assembly procedure.
- The turbocharger assembly tool is necessary to ensure that proper alignment/engagement of the two turbochargers is achieved.



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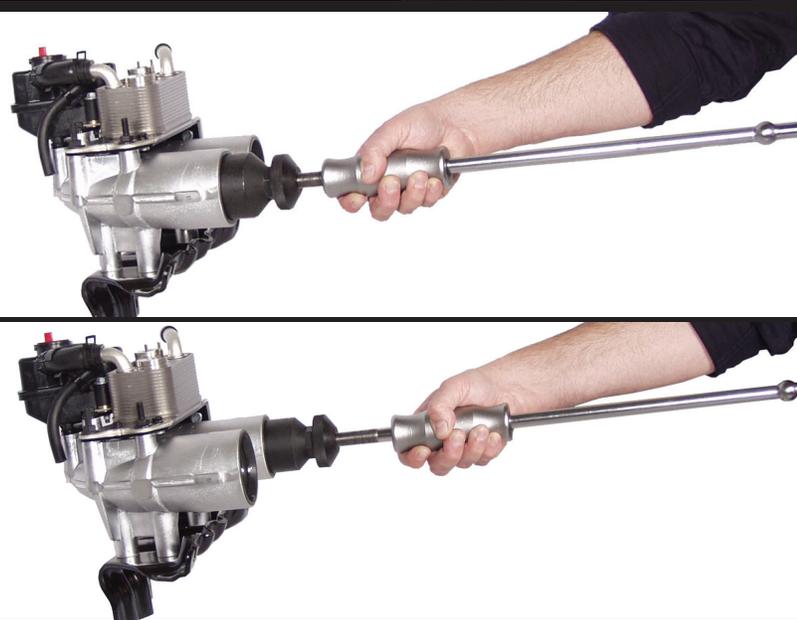


EGR Valve Removal

- Removing the EGR valve must be performed using the proper EGR valve removal tool.
- This tool is comprised of numerous pieces that must be put together around the EGR valve.
- Once the removal tool is assembled on the valve, the valve can be slowly pulled from its housing.
- Tool # 303-1267

NOTE: Pay close attention that the removal tool is installed and used correctly while removing the valve or damage can occur to the EGR valve and/or tool.

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Crossover Tube Seal Removal

- Crossover tube seal removal requires the use of special service tools; slide hammer, seal removal tools.
- There is a different size removal tool for each opening of the crossover tube.
- Tool # 303-1264

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Crossover Tube Seal Installation

- When installing new seals into the turbocharger crossover tube, always use the appropriate installation tools.
- The seals for each passage are two (2) different sizes. Make sure you use the correct sized seal installation tool for each sized seal.

NOTE: Make sure you have the crossover tube mounted securely to assure proper seal installation.

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UNIQUE SERVICE PROCEDURES

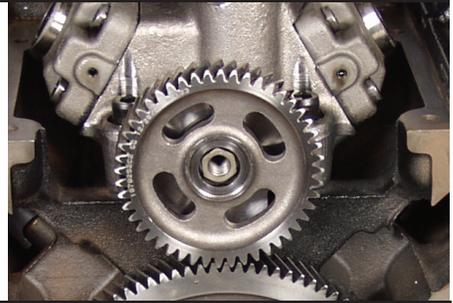
High Pressure Fuel Injection Pump: Gear Service

NOTE: Use proper cleanliness practices while servicing the fuel system!

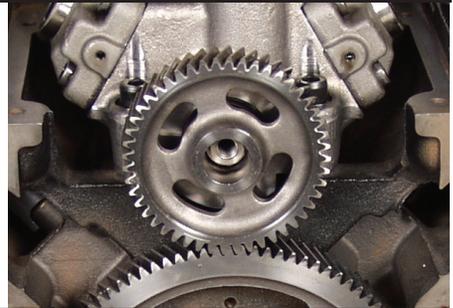
NOTE: Severe engine damage can occur if installed incorrectly!

- It is possible to tighten the gear on the high pressure fuel injection pump with the gear backwards. The gear and shaft both have a taper that needs to match.
- If you tighten the gear with it backwards the tapers will not be aligned but the bolt will start providing a means of tightening.
- Please pay special attention to insure that the gear is installed correctly with the tapers on both the gear and the high pressure fuel injection pump shaft aligned.

Correct



Incorrect



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Cutting T-Joints: Rear Cover

- The T joint is where the bedplate gasket is bonded to the rear cover. This bond must be cut prior to removing the rear cover.
- After you loosen all of the bolts you can slide a cutting tool between the block/bedplate and the rear cover to sever the bonding compound.

NOTE: Failure to cut the T joint will stretch the bedplate gasket and result in an oil leak!

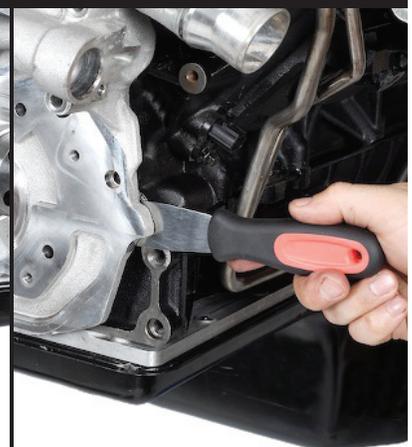


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Cutting T-Joints: Front Cover

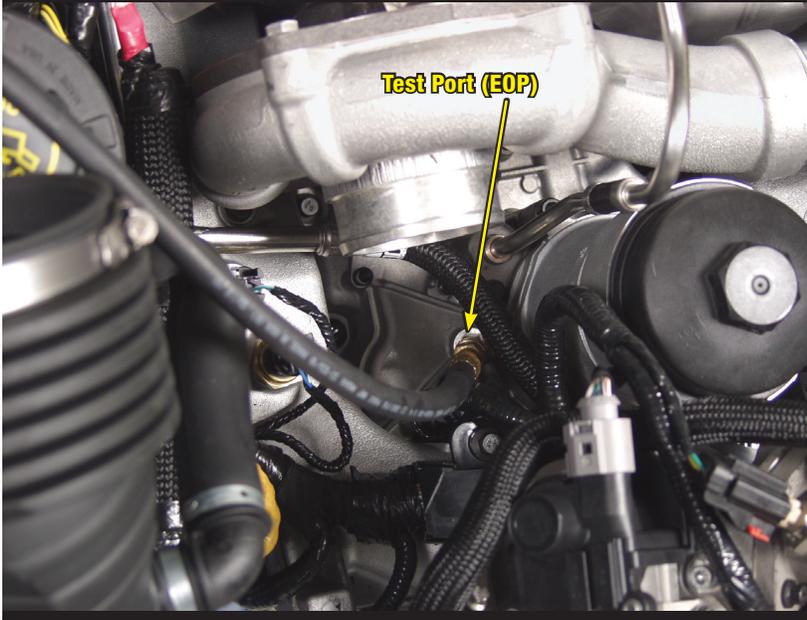
- The T joint is where the bedplate gasket is bonded to the front cover. This bond must be cut prior to removing the front cover.
- After you loosen all of the bolts you can slide a cutting tool between the block/bedplate and the front cover to sever the bonding compound.

NOTE: Failure to cut the T joint will stretch the bedplate gasket and result in an oil leak!



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Checking Oil Pressure

- Remove the engine oil pressure sensor (EOP) from the oil cooler.
- Install an adapter fitting into the port where the EOP was and install an approved oil pressure gauge.
- Follow the proper service procedures for checking oil pressure.
- The thread size for the opening is 7/16 - 20.

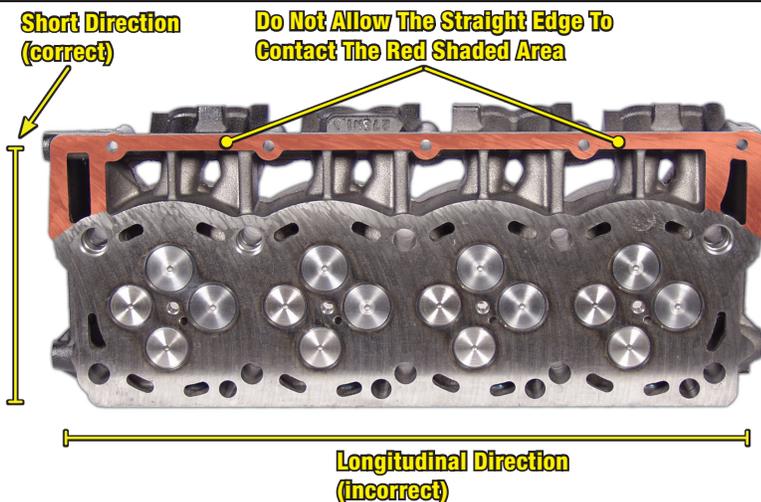
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Checking Cylinder Head Flatness

- Checking cylinder head flatness for the 6.4L engine is carryover from the late 6.0L procedure.
- Check flatness across the short direction (perpendicular to the longitudinal) of the head.
- Use a straight edge that is calibrated by the manufacturer to be flat within 0.0002 in. per running foot length.
- Set the 0.002" feeler gauge on each measurement point (refer to the service procedure graphic in the Ford workshop manual) with the straight edge perpendicular to the longitudinal and not across the area that contains the smaller head bolt holes. Set the straight edge on top of the feeler gauge.
- Use a firm steady force to properly hold the straight edge on top of the feeler gauge. Pull lightly on the feeler gauge.
- The head is locally out of flat, and needs replaced if the 0.002" feeler gauge is loose and easily slides out from under the straight edge.

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Checking Cylinder Head Flatness: Straight Edge Placement

- Never lay the straight edge across the area shaded in red.
- Do not check flatness in the longitudinal direction. Check flatness in the short (perpendicular to longitudinal) direction only.

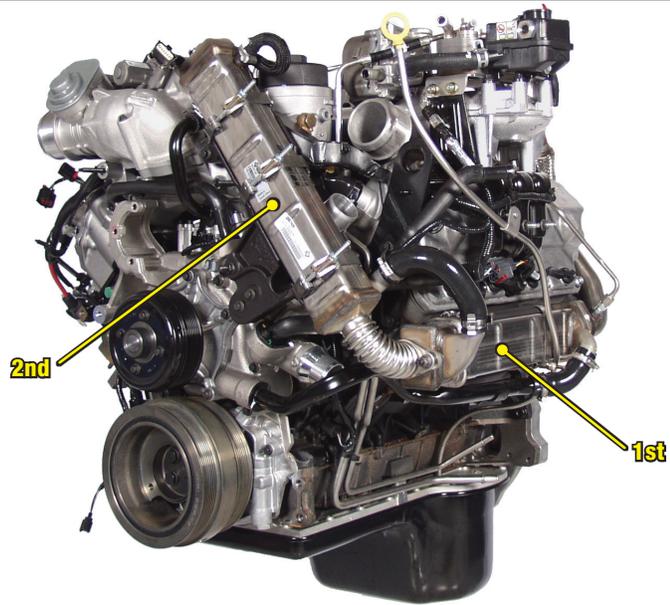
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UNIQUE SERVICE PROCEDURES

EGR Cooler Service

- Servicing the EGR coolers must be performed in the proper order.
- The coolers must first be installed loosely in the order shown, then torqued in the proper sequence as shown in the Ford workshop manual.
- Proper assembly is crucial due to the extreme temperature changes within the EGR coolers. Temperature changes of 800 deg F are possible.

NOTE: All bolts, nuts, clamps, and cooler brackets must be replaced if the coolers are removed

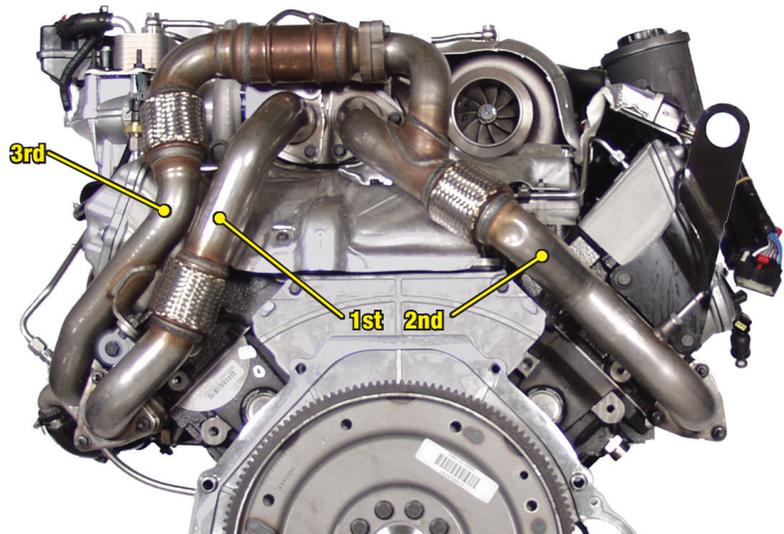


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Exhaust Up-Pipe Service

- Assembly of the exhaust up-pipes and EGR cooler supply pipe must be performed in the proper order.
- The pipes must first be installed loosely in the order shown, then torqued in the proper sequence as shows in the Ford workshop manual.

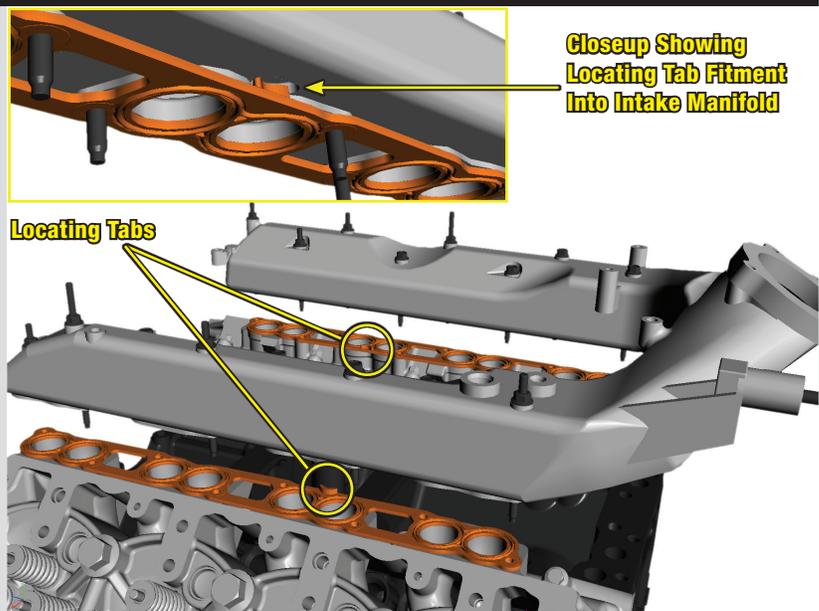
NOTE: Failure to follow the assembly steps can result in exhaust leaks.



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Intake Manifold And Gaskets

- When reinstalling the intake manifold, the locating tabs on the intake manifold gasket should face up and toward the center of the engine.



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