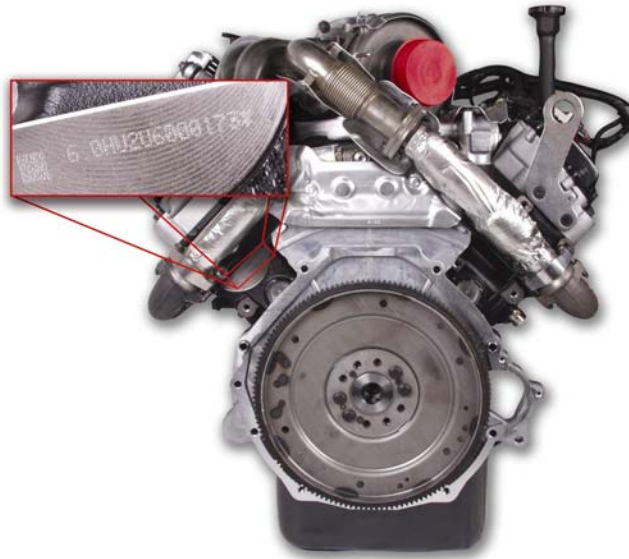




INSTALLER/FLEET TRAINING

**Engine Component Locations
Engine Description and Location
Lubrication System Low Pressure
Lubrication High Pressure
Fuel Charging and Control
Turbocharger
Glow Plug System
Air Intake and Distribution
Charge Air Cooler
Electronic Engine Controls
Fuel Conditioning Module**

Engine Serial Number



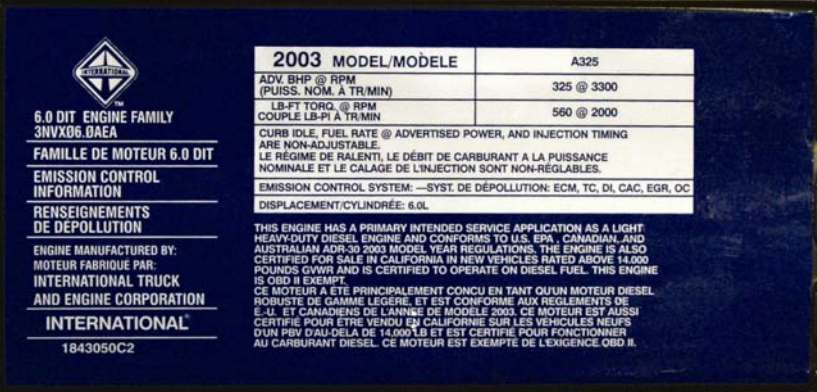
6

Serial Number/FICM Calibration Number



7

Emissions Label



2003 MODEL/MOÈLE A325

ADV. BHP @ RPM (PUISS. NOM. A TR/MIN)	325 @ 3300
LB-FT TORQ. @ RPM COUPLE LB-PI A TR/MIN	560 @ 2000

CURB IDLE, FUEL RATE @ ADVERTISED POWER, AND INJECTION TIMING ARE NON-ADJUSTABLE.
LE RÉGIME DE RALENTI, LE DÉBIT DE CARBURANT A LA PUISSANCE NOMINALE ET LE CALAGE DE L'INJECTION SONT NON-RÉGLABLES.

EMISSION CONTROL SYSTEM: —SYST. DE DÉPOLLUTION: ECM, TC, DI, CAC, EGR, OC
DISPLACEMENT/CYLINDRÉE: 6.0L

THIS ENGINE HAS A PRIMARY INTENDED SERVICE APPLICATION AS A LIGHT HEAVY-DUTY DIESEL ENGINE AND CONFORMS TO U.S. EPA, CANADIAN, AND AUSTRALIAN ADR30 2003 MODEL YEAR REGULATIONS. THE ENGINE IS ALSO CERTIFIED FOR SALE IN CALIFORNIA IN NEW VEHICLES RATED ABOVE 14,000 POUNDS GVWR AND IS CERTIFIED TO OPERATE ON DIESEL FUEL. THIS ENGINE IS OBD II EXEMPT.
CE MOTEUR A ÉTÉ PRINCIPALEMENT CONÇU EN TANT QU'UN MOTEUR DIESEL ROBUSTE DE GAMME LÉGÈRE, ET EST CONFORME AUX RÈGLEMENTS DE E.U. ET CANADIENS DE L'ANNÉE DE MODÈLE 2003. CE MOTEUR EST AUSSI CERTIFIÉ POUR ÊTRE VENDU EN CALIFORNIE SUR LES VÉHICULES NEUFS D'UN P.V. D'AU-DELÀ DE 14,000 LB ET EST CERTIFIÉ POUR FONCTIONNER AU CARBURANT DIESEL. CE MOTEUR EST EXEMPTÉ DE L'EXIGENCE OBD II.

6.0 DIT ENGINE FAMILY
3NVX06.0A6A

FAMILLE DE MOTEUR 6.0 DIT

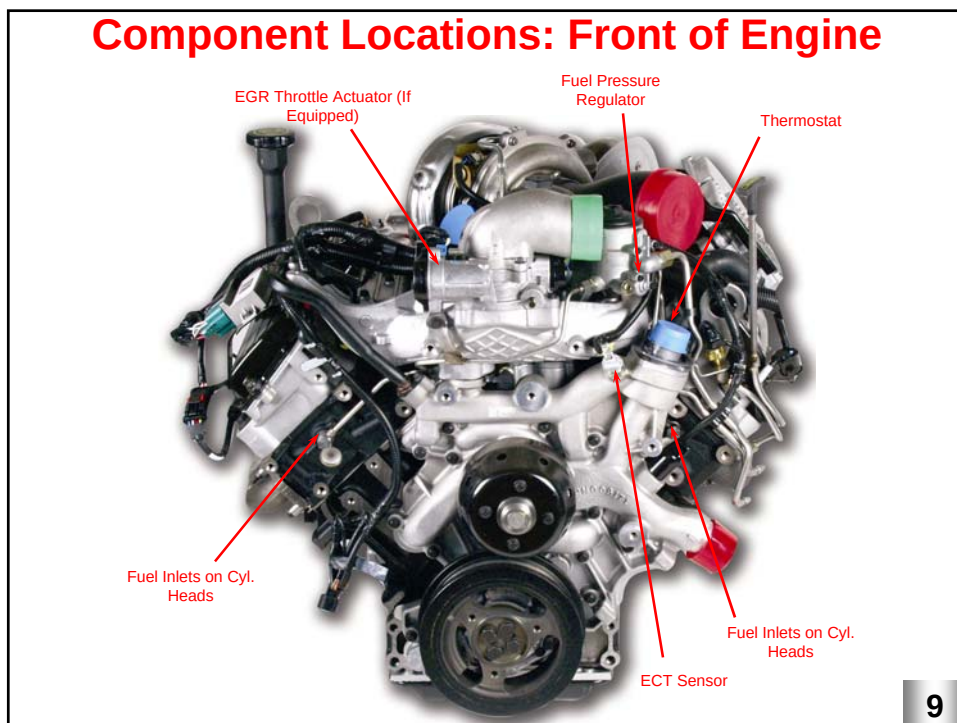
EMISSION CONTROL INFORMATION

RENSEIGNEMENTS DE DÉPOLLUTION

ENGINE MANUFACTURED BY:
MOTEUR FABRIQUÉ PAR:
INTERNATIONAL TRUCK AND ENGINE CORPORATION
INTERNATIONAL
1843050C2

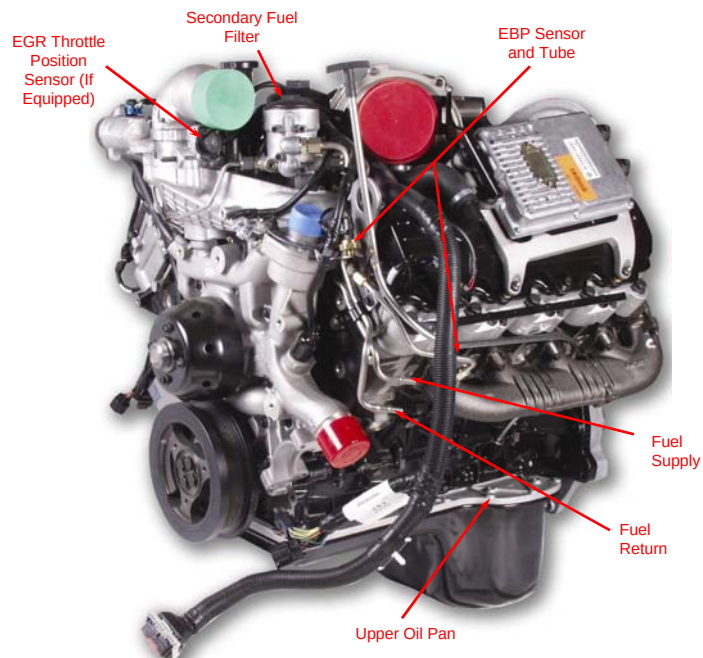
8

Component Locations: Front of Engine



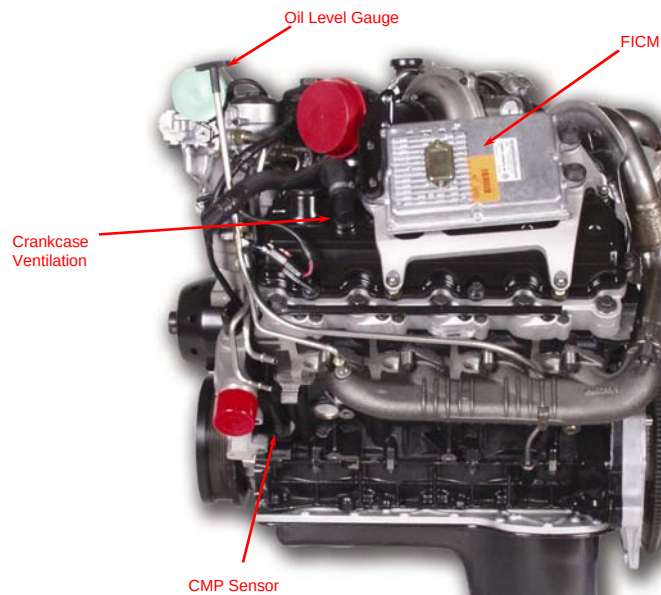
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Component Locations: Left Front of Engine



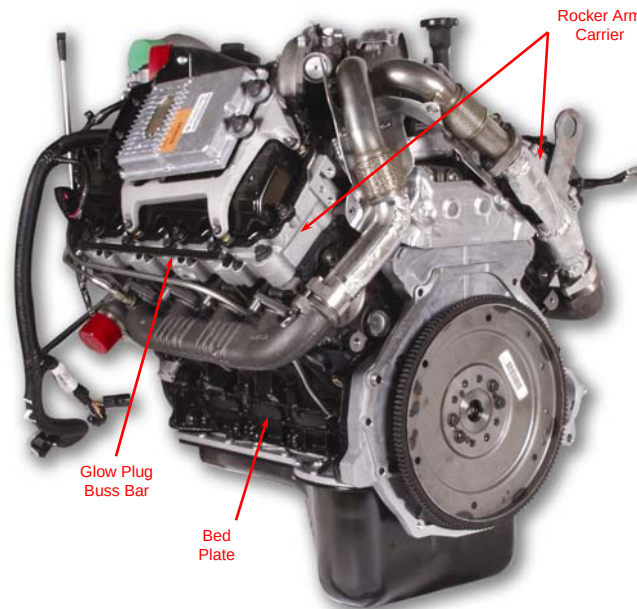
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Component Locations: Left of Engine



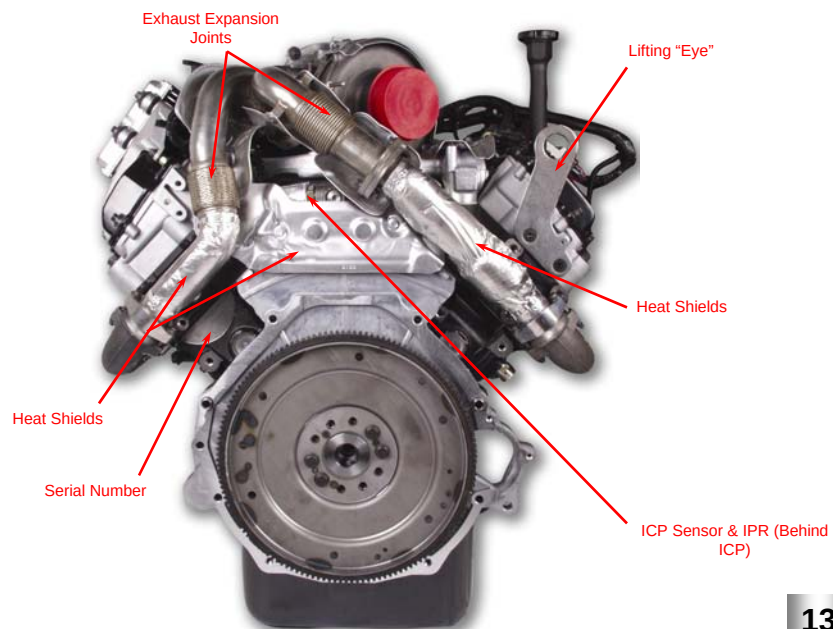
11

Component Locations: Left Rear of Engine



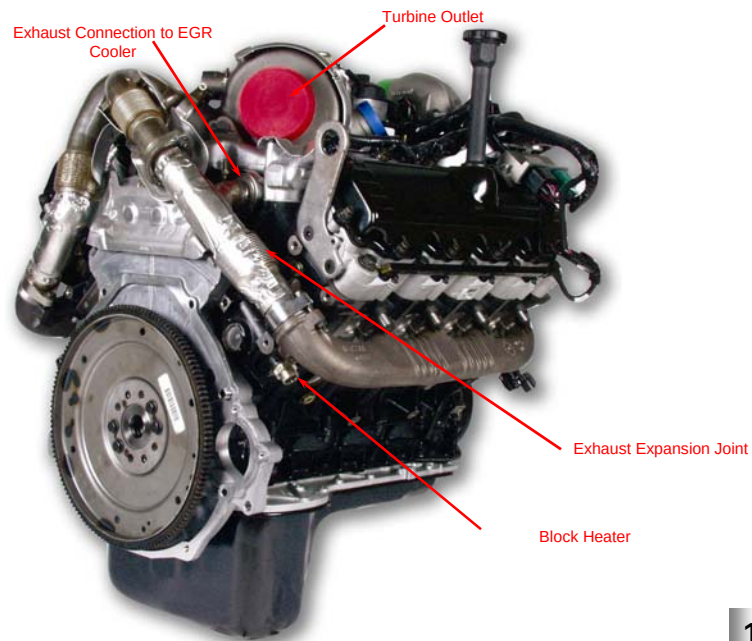
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Component Locations: Rear of Engine

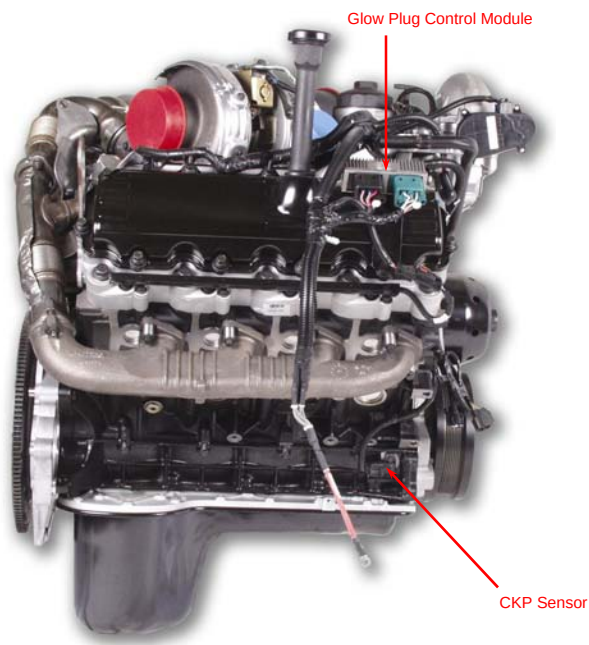


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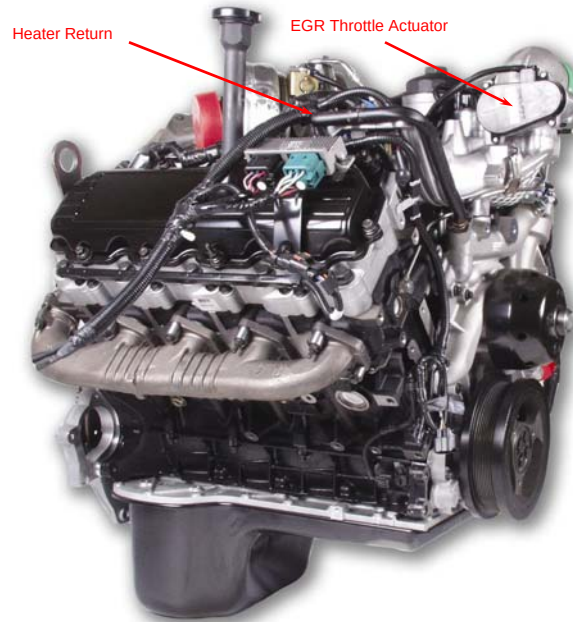
Component Locations: Right Rear of Engine



Component Locations: Right Side of Engine

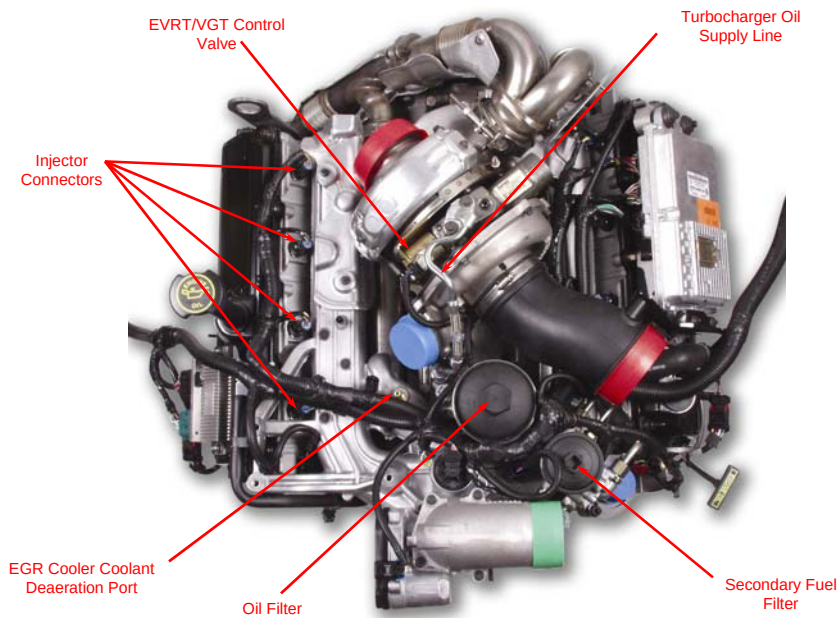


Component Locations: Right Front of Engine



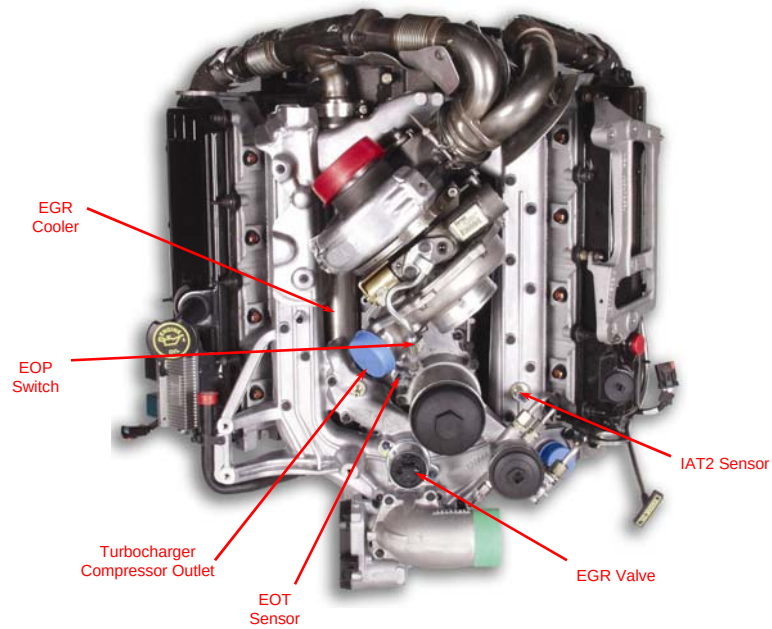
16

Component Locations: Top of Engine



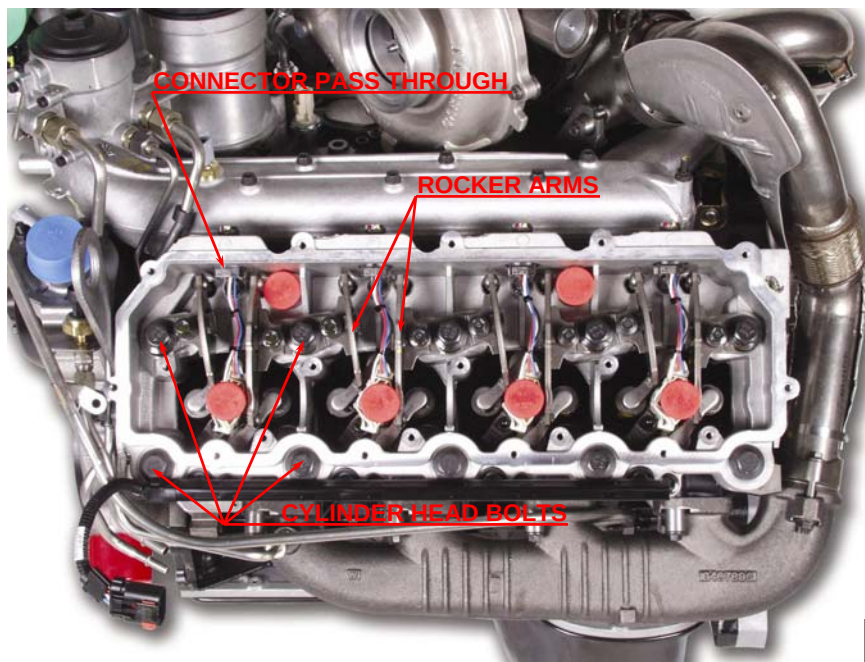
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Component Locations: Top of Engine



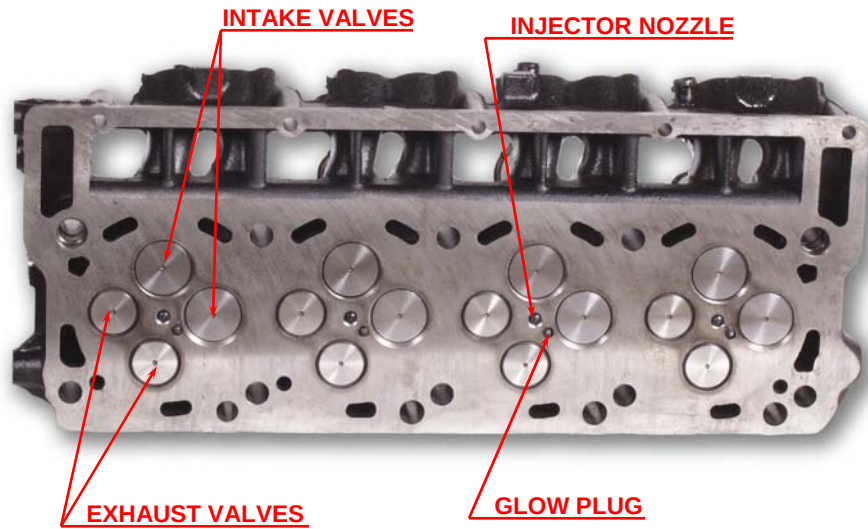
18

Rocker Carrier



19

Cylinder Head



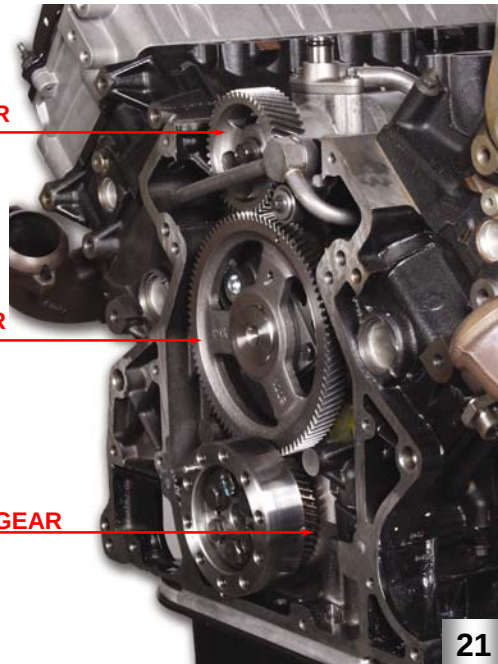
20

Rear Geartrain

HIGH PRESSURE PUMP GEAR

CAMSHAFT GEAR

CRANKSHAFT GEAR



21

DESCRIPTION AND OPERATION

Engine

Engine Description

The 6.0L diesel engine is:

- a four-cycle turbocharged V-8 with overhead valves.
- 6.0 liter (365 cubic inch) displacement.
- separated into two banks, the right bank numbered 1, 3, 5, 7 and the left bank numbered 2, 4, 6, 8.
- rated at 325 horsepower and 560 lb-ft torque

The cylinder block has been designed to withstand the loads of diesel operations by using:

- a two-piece crankcase.
- internal piston cooling oil jets.
- a forged steel crankshaft.
- powdered metal, fractured connecting rods.

The piston is:

- made of an aluminum alloy.
- fitted with an upper keystone compression ring.
- fitted with a lower rectangular compression ring.
- fitted with oil control rings.

The piston pins are:

- a free-floating type permitting the piston pin to move/float freely in the piston pin bore.
- retained in the piston-by-piston pin retainers.

The camshaft is:

- supported by five insert-type camshaft bearings.
- of the roller camshaft design.
- driven by the crankshaft through the use of the crankshaft gear and the camshaft gear.

The hydraulic valve tappets:

- minimize engine noise.
- maintain zero valve lash.
- incorporate camshaft follower guides.
- incorporate a roller follower design that reduces camshaft wear.

The cylinder heads are designed:

- to incorporate electrohydraulic fuel injectors.
- to locate the fuel injectors in the center of the combustion chambers between the rocker arms.
- with external high-pressure oil galleries.

The glow plug system is:

- designed to preheat the cylinders for faster cold weather starts and smoke reduction.
- controlled by the powertrain control module (PCM).
- mounted directly into the cylinder heads.

The optional block heater is:

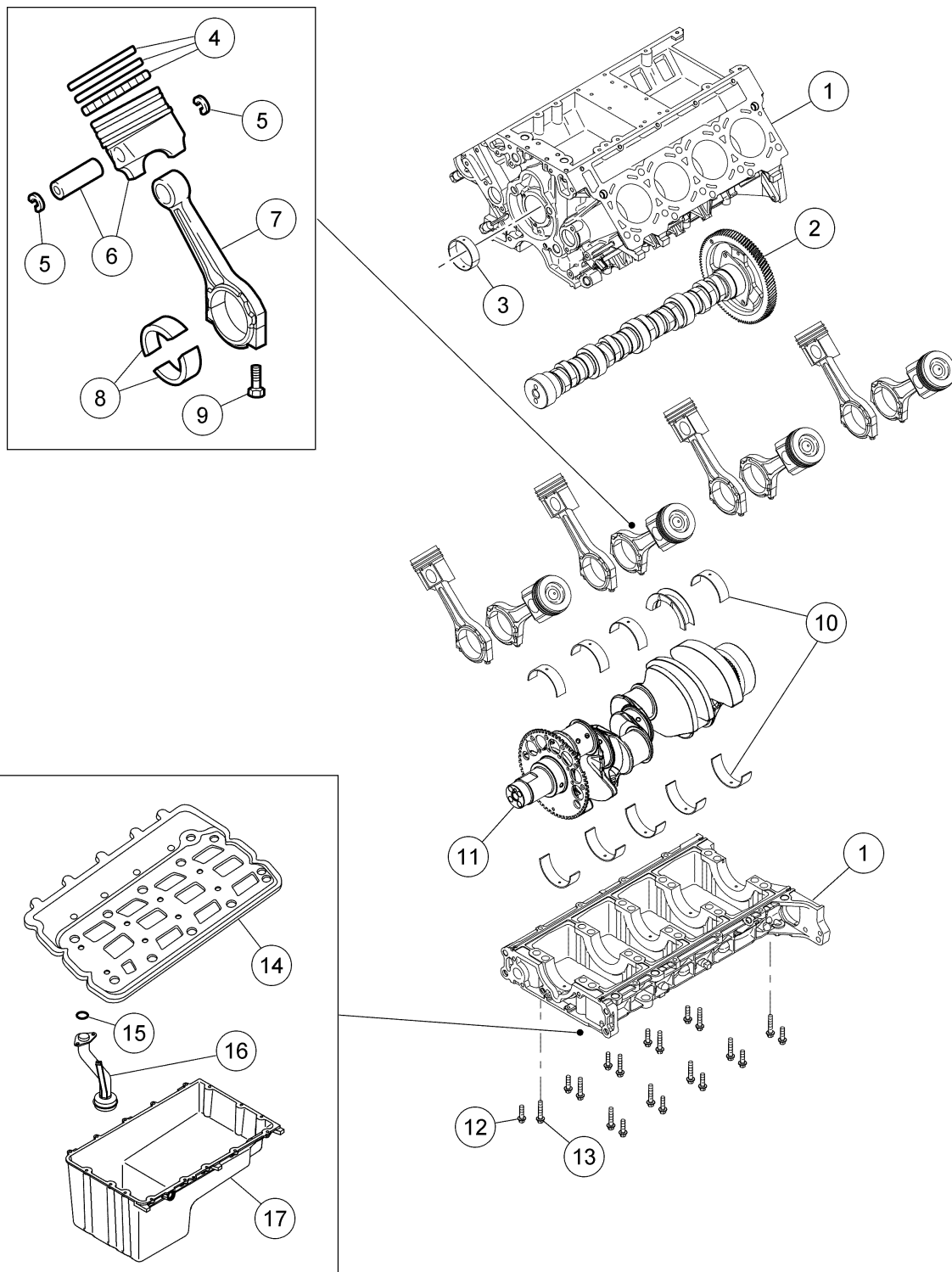
- designed to heat the engine coolant and oil for improved cold weather starts.
- located near the starter.
- powered by a 120 volt external power source.
- replaceable, but not repairable.

The fuel injection system used on the engine:

- is controlled by the powertrain control module (PCM).
- utilizes a frame mounted electric fuel pump.
- circulates fuel through a combination fuel filter, fuel heater and water separator assembly.
- uses eight electrohydraulic fuel injectors.

The engine lubrication system:

- is divided into two systems: the low-pressure system lubricates the engine, the high-pressure system actuates the fuel injectors.
- is cooled by an engine oil cooler.
- utilizes an oil pressure sensor and an oil pressure regulator.

DESCRIPTION AND OPERATION (Continued)**6.0L Crankshaft, Camshaft and Piston**

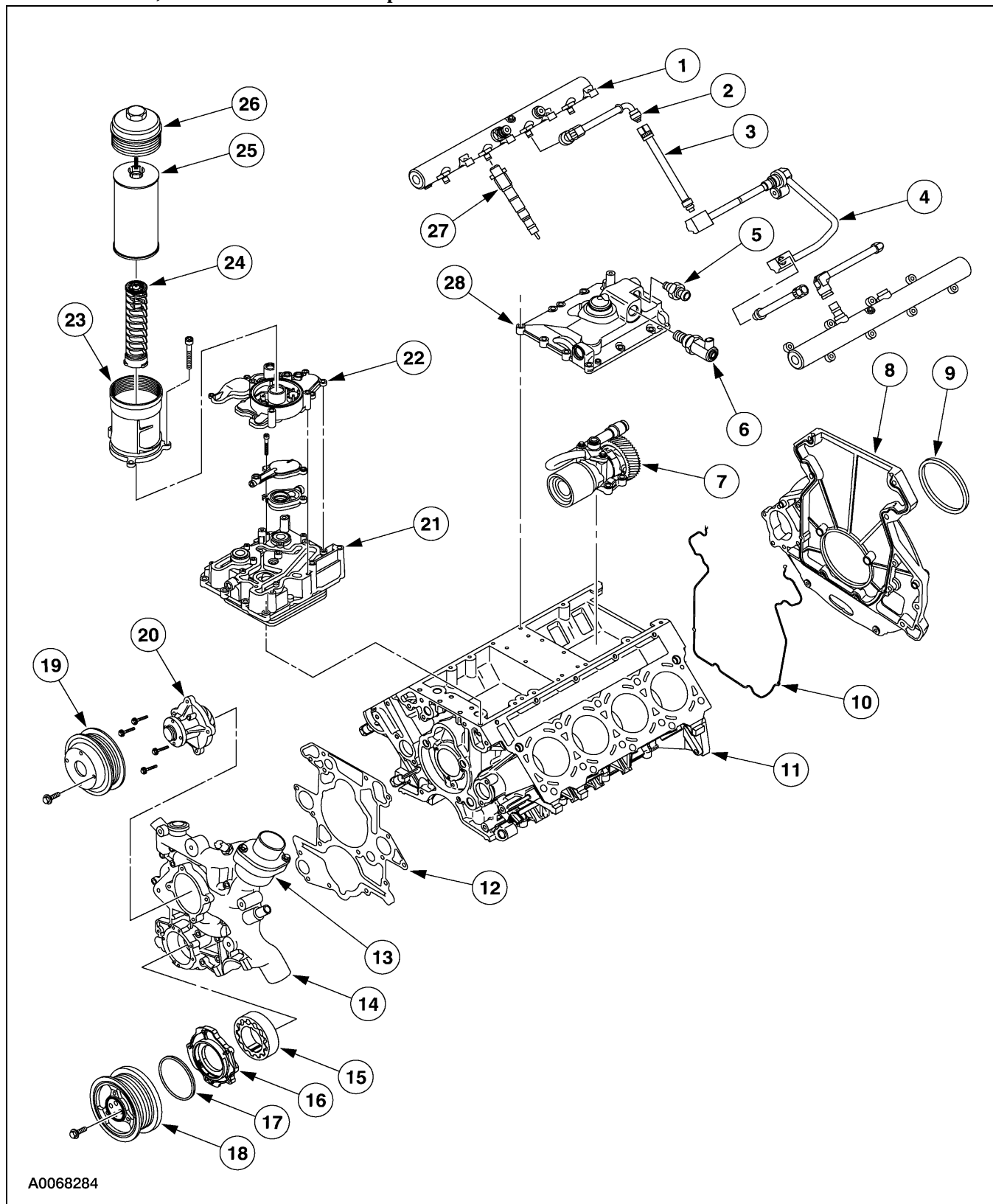
A0067744

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
1	6010	Cylinder block assembly
2	6250	Camshaft assembly
3	6A251	Camshaft bearing kit
4	6148	Piston ring kit
5	6140	Piston pin retaining ring
6	6102	Piston pin and piston
7	6200	Connecting rod and cap assembly
8	6B237	Connecting rod bearing kit
9	6214	Connecting rod bolt
10	6333	Crankshaft bearing kit

(Continued)

Item	Part Number	Description
11	6303	Crankshaft assembly
12	6345	Main bearing bolt, M14 x 2 x 114.5
13	6345	Main bearing bolt, M14 x 2 x 127.5
14	6675	Upper oil pan assembly
15	6626	Oil pump cover-to-inlet tube flange
16	6622	Oil pump screen cover and tube
17	6676	Lower oil pan assembly

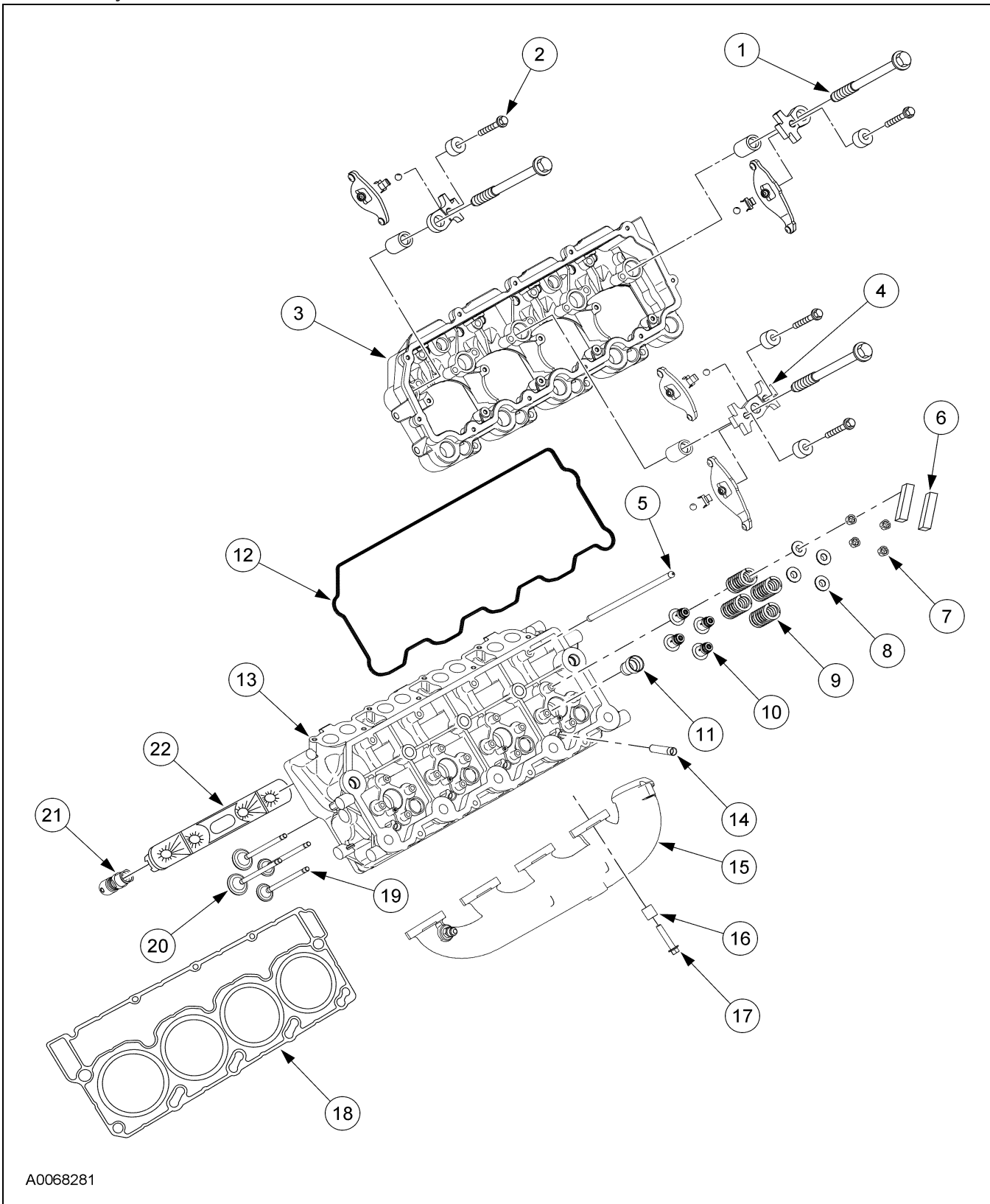
DESCRIPTION AND OPERATION (Continued)**6.0L Front Cover, Rear Cover and Oil Components**

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
1	9D280	Fuel injector fuel supply manifold assembly
2	9324	Fuel tube connector hose
3	9A332	Fuel stand pipe tube
4	9J332	Rear engine tube assembly
5	9F838	Fuel injector timing sensor assembly
6	9C968	Fuel pressure regulator assembly
7	9A543	Fuel injector pump assembly
8	6L080	Engine rear cover assembly
9	6701	Crankshaft rear oil seal assembly
10	6D083	Engine rear cover gasket
11	6010	Cylinder block assembly
12	6020	Cylinder front cover gasket
13	8575	Water thermostat assembly
14	6019	Cylinder front cover assembly

(Continued)

Item	Part Number	Description
15	6608	Oil pump drive rotor and shaft assembly
16	6616	Oil pump body
17	6700	Crankcase front oil seal
18	6316	Crankshaft vibration damper assembly
19	8509	Water pump pulley assembly
20	8501	Water pump assembly
21	6A638	Crankcase oil cooler cover
22	6881	Oil filter adapter assembly
23	6L625	Engine oil filter and adapter assembly
24	6718	Oil filter outlet tube assembly
25	6714	Oil filter assembly
26	6C631	Oil filter and cap assembly
27	9E527	Fuel injector nozzle assembly
28	6095	Fuel pump cover

DESCRIPTION AND OPERATION (Continued)**6.0L Front Cylinder Head and Rocker Arm Carrier**

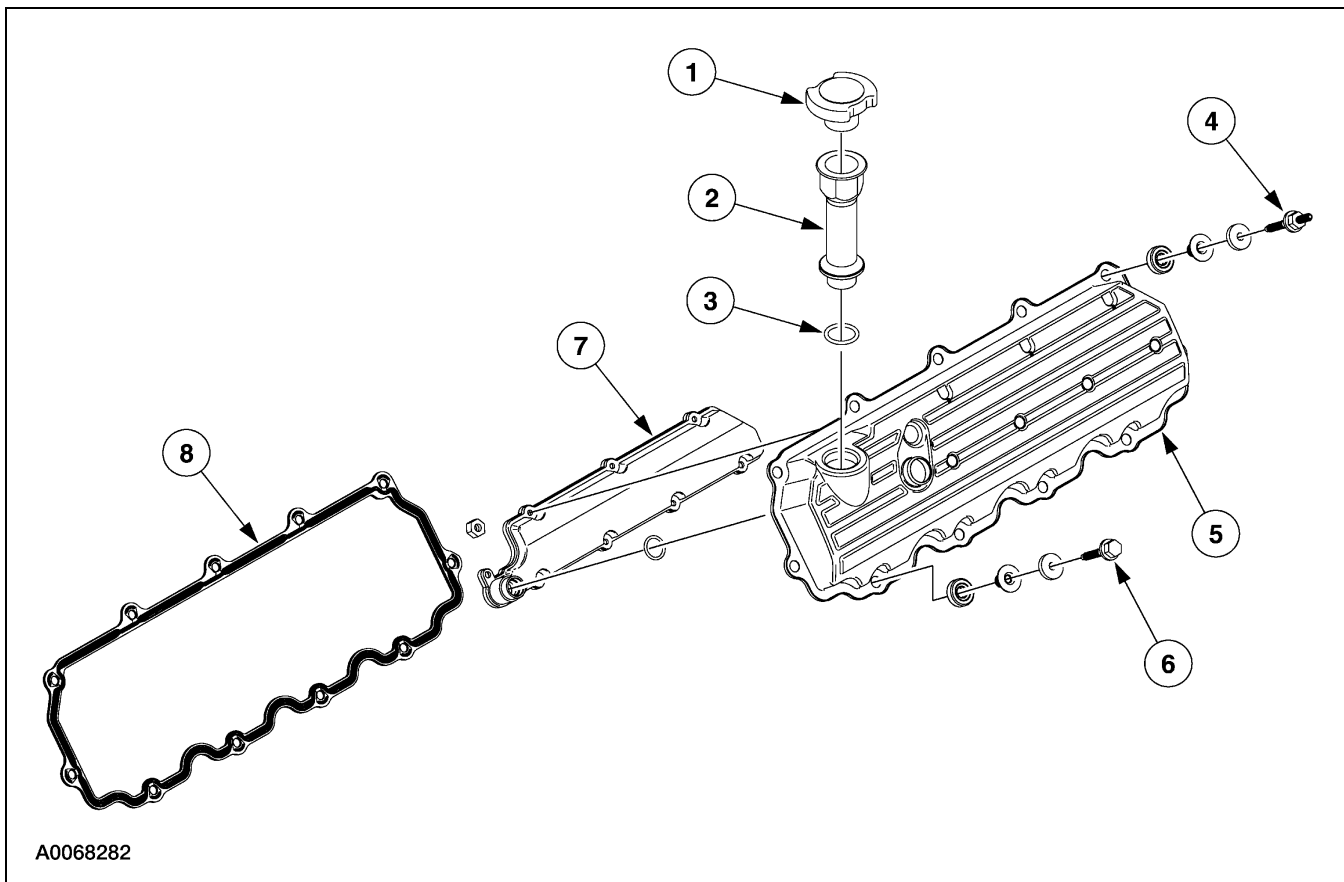
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DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
1	6065	Cylinder head bolt
2	6A527	Valve rocker arm shaft support bolt
3	6C288	Engine rocker arm carrier
4	6A585	Valve rocker arm fulcrum assembly
5	6565	Valve push rod assembly
6	6C541	Valve rocker bridge
7	6518	Valve spring retainer key
8	6514	Valve spring retainer
9	6513	Valve spring
10	6571	Valve stem seal
11	9F538	Fuel injector nozzle sleeve

(Continued)

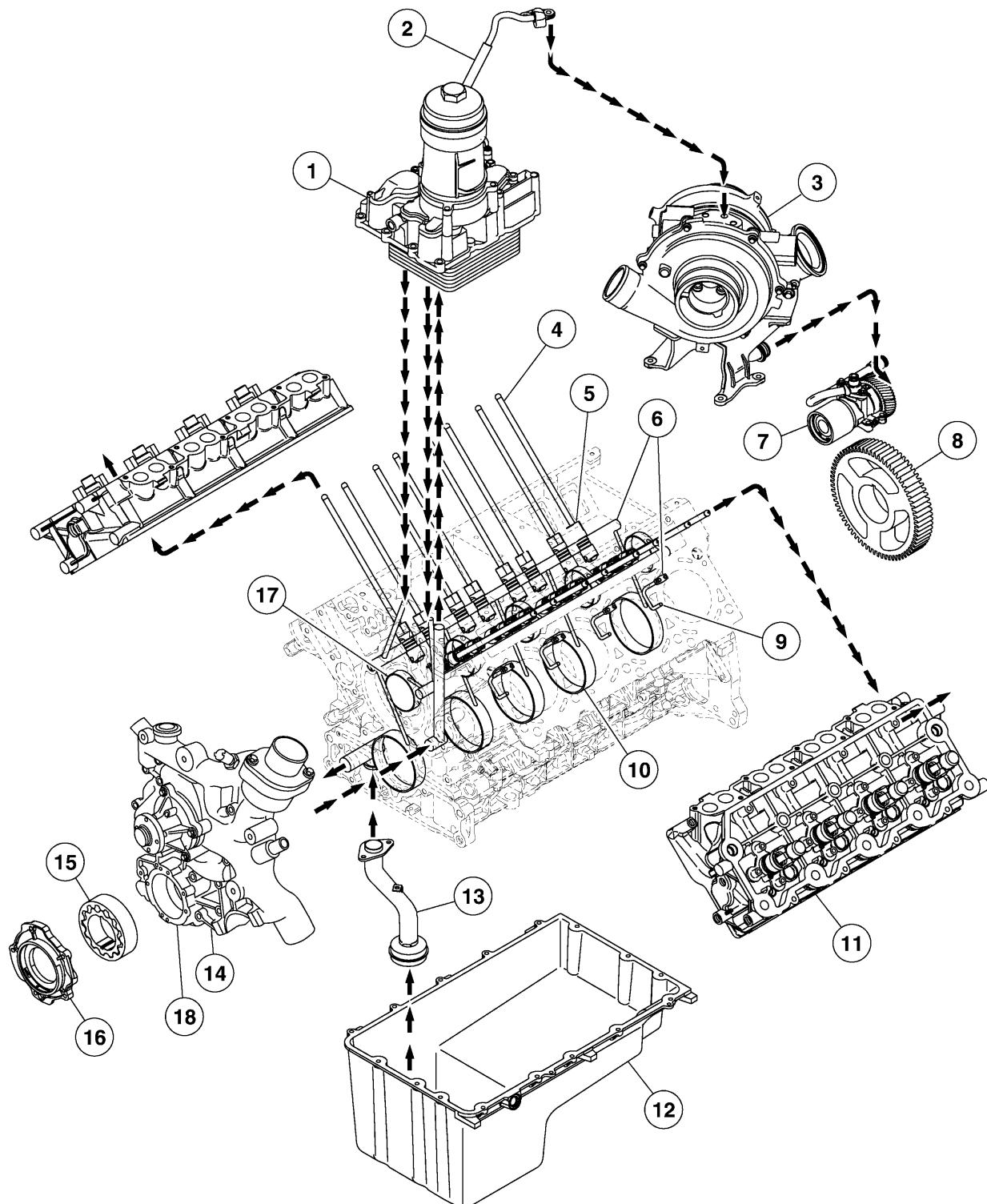
Item	Part Number	Description
12	6584	Valve rocker arm cover gasket
13	6049	Cylinder head assembly
14	9F538	Glow plug sleeve
15	9431	Exhaust manifold
16	9A461	Exhaust manifold-to-cylinder head spacer
17	W300013	Exhaust flange bolt
18	6051	Cylinder head gasket
19	6505	Exhaust valve
20	6507	Intake valve
21	6500	Valve tappet assembly
22	6C329	Crankcase cam guide

6.0L Valve Cover

Item	Part Number	Description
1	6766	Oil fill cap assembly
2	6763	Oil fill extension assembly
3	6769	O-ring
4	W300035	Valve cover stud assembly

(Continued)

Item	Part Number	Description
5	6A505	Valve cover assembly (LH)
6	W300034	Valve cover bolt
7	6A665	Crankcase breather
8	6584	Rocker arm cover gasket

DESCRIPTION AND OPERATION (Continued)**Lubrication System — Low-Pressure****Low-Pressure Oil Flow**

A0068283

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
1	6A638	Oil cooler
2	9G440	Turbocharger oil supply tube
3	6K682	Turbocharger
4	6565	Push rod
5	6500	Valve tappet
6	—	Main lube oil galleries (part of 6010)
7	9A543	High pressure oil pump
8	—	Camshaft gear (part of 6250)
9	6C327	Piston cooling jet
10	6333	Main bearings
11	6049	Cylinder head
12	6676	Lower oil pan
13	6622	Oil pickup tube
14	6019	Front cover assembly
15	6608	Gerotor assembly
16	6616	Gerotor housing cover
17	6A251	Camshaft bushing
18	6B678	Oil pressure regulator valve assembly

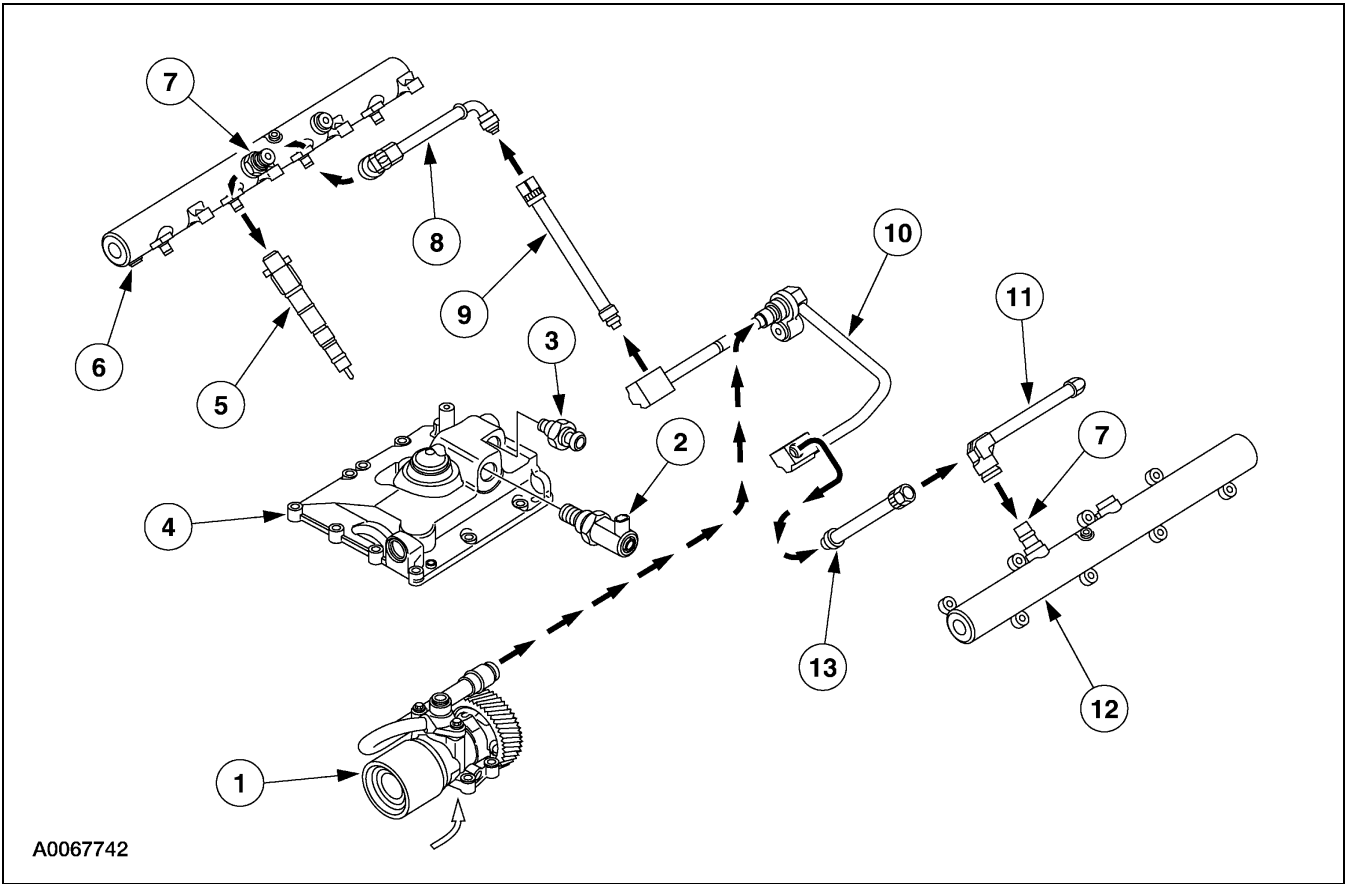
The lubrication system is pressure regulated, cooled, and full flow filtered. In addition to providing engine lubrication, it supplies oil to the high pressure oil system to control fuel delivery in the fuel injectors.

The following sequence describes lube oil flow through the major oil system components:

1. Oil pan (sump).
2. Oil pick-up tube and screen.
3. The low pressure oil pump is a gerotor type contained in the front cover. The gerotor assembly consists of an outer and an inner gear. The inner gear is driven by the crankshaft. The pump inlet and outlet passages are through ports in the front cover.
 - Oil pressure regulator (bypass) controls lube oil pressure via a spring loaded plunger relieving oil back to the inlet of the pump once operating pressure has exceeded 517 kPa (75 psi).
4. The oil cooler cover receives oil from the oil pump and cools it in the oil cooler, which is located underneath the oil cooler housing.
 - The cooler bypass valves open in the event that the oil cooler base and/or cooler becomes restricted.
5. The oil filter housing contains a paper type element. Unfiltered oil flows up and around the outside of the filter and then down through the center standpipe.
 - The oil filter bypass allows oil to pass directly to the main oil gallery should the filter become restricted.
6. Turbocharger and drive gears.
 - Cooled and filtered oil supplied from the oil cooler base lubricates the turbocharger bearings and provides hydraulic pressure for the Electronic Variable Response Turbocharger (EVRT) control valve. Oil drains from the turbocharger through a drain tube back to the high pressure hydraulic pump cover.
7. Main galleries. Cooled and filtered oil supplied from the oil cooler base fills the main galleries to distribute oil to the following components via passages machined within the crankcase.
 - 1 Hydraulic cam followers.
 - 2 Camshaft main journals.
 - 3 Crankshaft main journals.
 - 4 Connecting rod bearings receive pressurized oil from the main bearings via drilled passages within the crankshaft.
 - 5 Rocker arms receive their lube oil from the hydraulic cam followers via the push rods. Oil drains back to the sump through holes located in the cylinder head.
 - 6 Piston cooling tubes.
8. High pressure hydraulic pump oil reservoir.
 - This reservoir (below oil cooler) has a constant supply of oil for the pressure hydraulic oil pump. It has an approximate capacity of 0.9 L (0.95 qt.).

DESCRIPTION AND OPERATION (Continued)

Lubrication System — High-Pressure
High-Pressure Oil Flow



Item	Part Number	Description
1	9A543	Fuel injector pump assembly
2	9C968	Fuel pressure regulator assembly
3	9F838	Fuel injector timing sensor assembly
4	6095	Fuel pump cover
5	9E527	Fuel injectors (8 req'd)
6	9D280	Fuel injection fuel supply manifold assembly (right side)
7	—	Oil rail fitting with check valve (part of 9D280)
8	9324	Fuel tube connector hose (right side)
9	9A332	Fuel stand pipe tube (right side)
10	9J332	Rear engine tube assembly
11	9324	Fuel tube connector hose (left side)

(Continued)

Item	Part Number	Description
12	9D280	Fuel injection fuel supply manifold assembly (left side)
13	9A332	Fuel stand pipe tube (left side)

The high pressure oil system is composed of two subsystems:

- Injection Control Pressure (ICP) system
- Fuel injector assembly

The hydraulic force necessary to inject fuel into the combustion chamber is provided by the ICP system. The fuel injectors on the engine are hydraulically actuated and electronically controlled.

The ICP system is composed of the following components:

- Oil reservoir
- Hydraulic pump assembly (high-pressure)
- Hydraulic pump cover
- High-pressure tubes and hoses

DESCRIPTION AND OPERATION (Continued)

- High-pressure rail assemblies
- Injection Control Pressure (ICP) sensor
- Injection Pressure Regulator (IPR) valve
- Check valves

The high-pressure hydraulic pump receives engine lube oil from a reservoir cast into the vee of the crankcase. This reservoir makes available a constant supply of engine oil from the pump. This reservoir is constantly refilled by the low-pressure lube oil system with filtered oil from a passage in the oil cooler housing.

The high-pressure hydraulic pump is mounted at the rear of the crankcase and is driven by the camshaft gear. Oil is drawn from the oil reservoir through a 150 micron screen and into a passage to the pump inlet port. High-pressure oil from the pump is distributed to the injectors through a series of pipes and hoses.

The high-pressure discharge tube is mounted to the pump and serves to connect the oil flow from the high-pressure hydraulic pump to the rear engine tube assembly. This tube assembly divides oil flow into two pipes or branches, one for each side of the engine. Rigid pipes thread into each branch and direct oil up into the rocker carrier of each cylinder head. Flexible hoses with quick disconnect ends connect the ridge pipes to check valves, which are mounted on each of the oil rails assemblies. Oil from the rails enter the injectors through O-ring sealed ports at the top of each injector. When the injector opening coil is energized, high-pressure oil is used to push fuel into the combustion chamber. After injection is complete, the oil inside the injector is vented through the top portion of the injector and allowed to drain back to the oil sump.

DESCRIPTION AND OPERATION

Fuel Charging and Controls

Fuel System

The fuel system used on the 6.0L direct injection (DI) turbo diesel engine is controlled by the powertrain control module (PCM).

The fuel system components consist of:

- electric fuel pump.
- high-pressure oil pump.
- fuel filters.
- injection pressure regulator valve.
- injection control pressure (ICP) sensor.
- fuel pressure regulator.
- water in fuel switch/fuel heater thermostat.

Fuel to be supplied to the combustion chambers passes through the fuel conditioning module into the secondary fuel filter then to the cylinder head galleries, then through the electrohydraulic injectors.

Excess fuel not used by the engine bypasses the secondary fuel filter, flows through the fuel pressure regulator assembly, and returns to the fuel conditioning module.

Fuel Pump

The fuel pump is mounted in the fuel conditioning module mounted on the left hand frame rail. For additional information, refer to Section 310-01.

Fuel Injectors

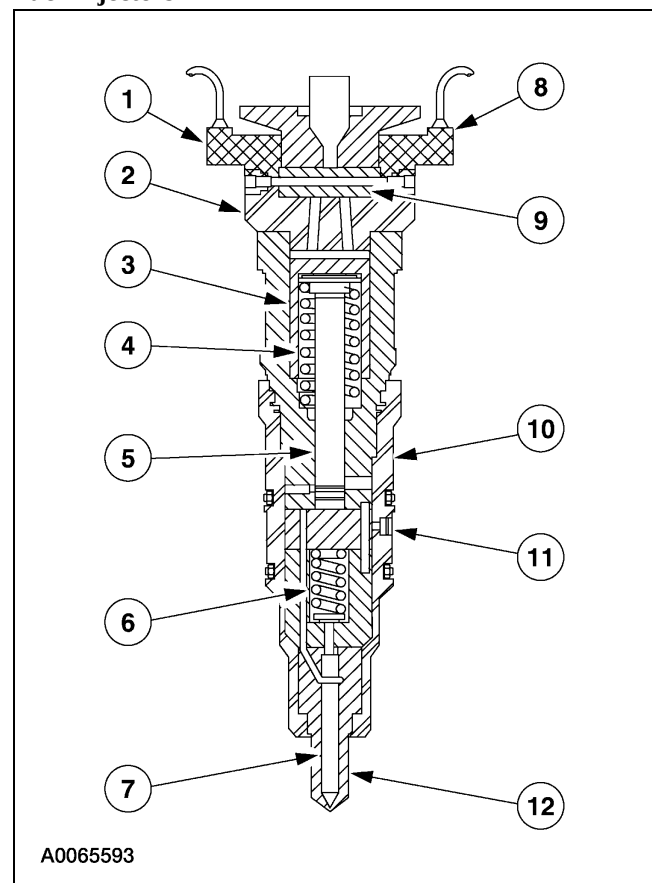
⚠ CAUTION: Do not attempt to put battery voltage to the fuel injector or damage to the fuel injector will occur.

⚠ CAUTION: To prevent engine damage, do not use air tools to remove the fuel injectors. The clip that extracts the injector can dislodge and fall into the drain hole.

The engine uses an electrohydraulic injector as part of its fuel system. This PCM-controlled injector uses high-pressure lube oil to provide the necessary force to inject fuel into the combustion chamber at pressures up to 144 mPa (21,000 psi) at rated horsepower.

The injectors fits into a sleeved bore machined into the cylinder head. The injector bore intersects with a machined fuel passage that runs the length of the head. Each injector has two O-rings around the outer body, one above the fuel passage, and one below. A fuel inlet port between the O-rings allows fuel under pressure to enter the pressure amplification area of the injector. High-pressure engine oil enters the injector through the top. The high-pressure oil rail assembly is mounted on top of the fuel injector.

Fuel Injectors



Item	Part Number	Description
1	—	Closing coil (Part of 9E527)
2	—	Control valve body (Part of 9E527)
3	—	Intensifier piston (Part of 9E527)
4	—	Piston return spring (Part of 9E527)
5	—	Plunger (Part of 9E527)
6	—	Valve opening pressure spring (Part of 9E527)

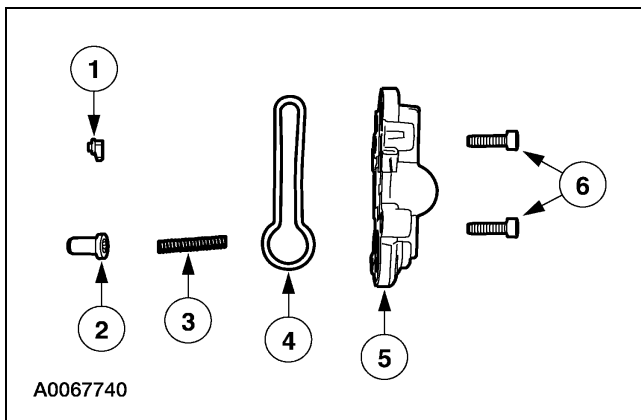
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DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
7	—	Needle (Part of 9E527)
8	—	Opening coil (Part of 9E527)
9	—	Spool valve (Part of 9E527)
10	—	Casnut (Part of 9E527)
11	—	Fuel strainer (Part of 9E527)
12	—	Nozzle assembly (Part of 9E527)

Fuel Pressure Regulator

Fuel pressure in the cylinder head fuel galleries is maintained by a fuel pressure regulator. The fixed orifice is an air bleed. It is the highest point in the fuel system. It allows the air behind the fuel pressure regulator to be vented to the fuel tank rather than be ingested in the fuel galleries. The fuel pressure regulator contains a spring-loaded poppet valve, which opens to allow excess fuel to return to the fuel conditioning module. Once back to the fuel conditioning module, the fuel is sent back to the fuel tank or to the engine, if the fuel conditioning module is in recirculation mode.



Item	Part Number	Description
1	—	Fixed orifice
2	—	Poppet valve and O-ring

(Continued)

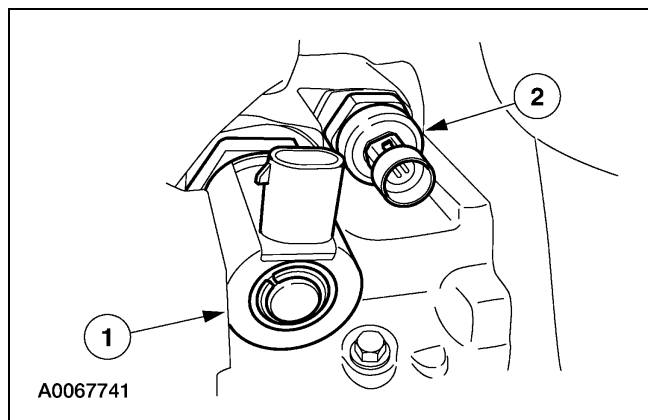
Item	Part Number	Description
3	—	Spring
4	—	O-ring
5	—	Cover
6	—	Screw, Torx M5 (4 req'd)

Oil Pressure Regulator

Fuel injection pressure is controlled by the injection control pressure (ICP) system. The ICP system consists of the following:

- injection control pressure (ICP) sensor located in the high pressure pump cover.
- injection pressure regulator valve located in the high pressure pump cover.
- powertrain control module

NOTE: The injection pressure regulator valve and injection control pressure (ICP) sensor are located under the turbocharger up pipe.

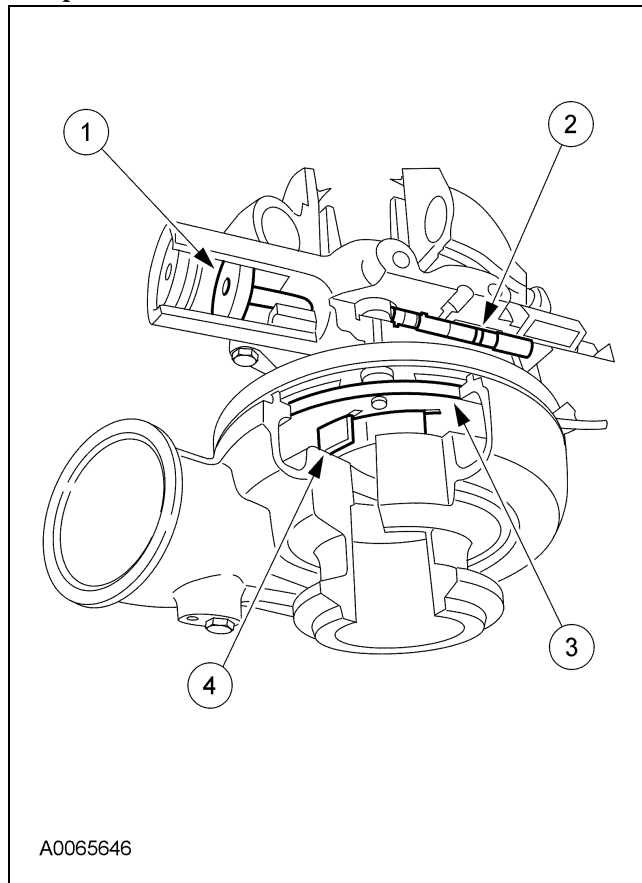


Item	Part Number	Description
1	9C968	Injection pressure regulator valve
2	9F838	Injection control pressure (ICP) sensor

DESCRIPTION AND OPERATION

Turbocharger

Component Location



Item	Part Number	Description
1	—	Actuator (part of 6K682)
2	—	Control valve (part of 6K682)
3	—	Unison ring (part of 6K682)
4	—	Vanes (part of 6K682)

The turbocharger is an exhaust-driven centrifugal air compressor. Its purpose is to increase power output by supplying compressed air to the engine. The internal components are oil and air cooled. Engine oil is circulated through the housing, which acts as a heat barrier between the “hot” turbine and the “cold” compressor. Bearings are sleeve type and are lubricated by engine oil. Oil is pumped directly from the oil filter base, then circulated to the turbocharger housing and returned to the sump through an oil drain in the turbocharger center housing.

The electronic turbocharger variable vane hydraulic control valve utilizes the powertrain control module (PCM) to control intake manifold pressure. The turbocharger uses a set of moveable vanes in the turbine housing to change the flow of the exhaust gases throughout the turbocharger. These vanes can be positioned to change the angle or direction and the velocity of flow to the turbine wheel, depending upon the conditions in which the engine is operated. As power demands increase, exhaust gas velocity increases in direct relation, as does intake manifold boost pressure. Conversely, as the flow of exhaust gas diminishes, intake manifold boost pressure is also reduced at the same rate.

Vanes mounted around the internal circumference of the turbine housing are connected to a unison ring. The unison ring links all the vanes together and when the unison ring moves, all the vanes move. The unison ring is moved by exposing either side of an actuator piston to pressurized engine oil. Oil flow to the appropriate side of the piston is regulated by the turbocharger variable control valve whose winding is part of a pulse width modulated (PWM) circuit regulated by the powertrain control module (PCM). An increase in duty cycle of the PWM circuit will route oil through the turbocharger variable control valve in a way that will cause piston movement that increases manifold pressure (BOOST). Decreasing the pulse width will direct oil such that the manifold pressure (BOOST) will be decreased. Turbocharger control is a closed-loop system using the exhaust pressure (EP) sensor to provide feedback to the PCM. In response to engine speed, engine load, manifold pressure and barometric pressure, the PCM provides a duty cycle to the turbocharger variable control valve to cause it to match manifold pressure (BOOST) to the requirements of the engine.

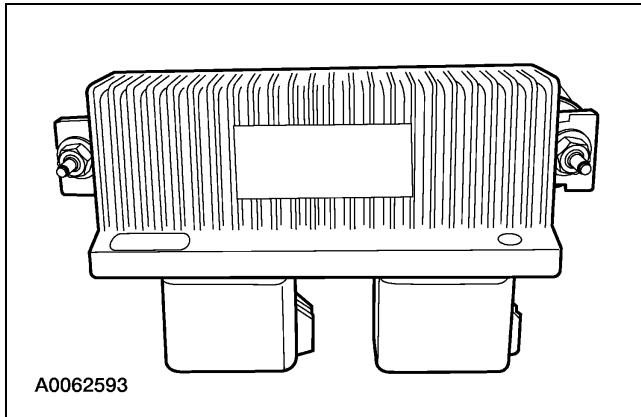
DESCRIPTION AND OPERATION (Continued)

Expanding exhaust gases drive the turbine shaft assembly to speeds over 100,000 rpm. Filtered air entering the compressing side of the turbocharger is compressed and delivered through a charge air cooler (CAC). The very hot compressed air is cooled, then continues on to fill the intake manifold at a pressure higher than atmospheric pressure. Because considerably more air is forced into the intake manifold, the results are increased power, fuel efficiency and the ability to maintain power at higher altitudes.

DESCRIPTION AND OPERATION

Glow Plug System

Glow Plug Control Module



The 6.0L diesel engine uses a glow plug system that preheats air in the combustion chamber to improve cold engine starting.

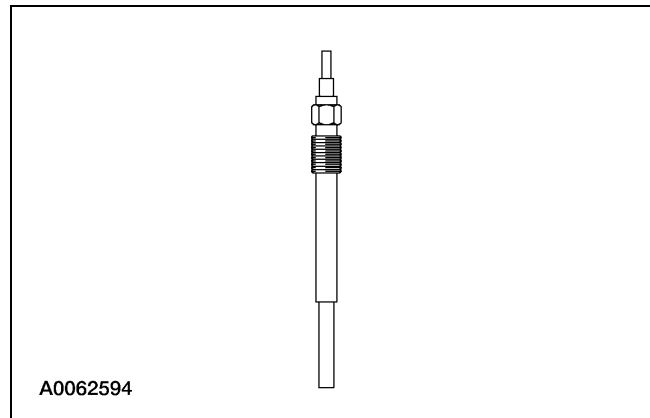
The system consists of:

- glow plugs (12A342).
- glow plug control module (12B533).
- powertrain control module (PCM) (12A650).
- engine oil temperature (EOT) sensor.
- barometric pressure sensor (BARO sensor) (12A644).

The glow plug monitor system is part of the On-Board Diagnostics II (OBD II) System.

The glow plug system is electronically controlled by the powertrain control module. If the oil temperature is below 55°C (131°F) the powertrain control module will energize the glow plugs immediately after the key is placed in the ON position. Then, depending on the readings from the engine oil temperature (EOT) sensor and the barometric pressure (BARO) sensor, the powertrain control module determines how long the glow plugs will be on.

Glow Plugs — PCM-Controlled



The glow plugs are located in the cylinder heads (6049), under the glow plug buss bar (14B112).

The glow plugs are self-regulating. If the engine oil temperature is above 55°C (131°F), the powertrain control module will bulb-check the WAIT TO START lamp but not energize the glow plug relay.

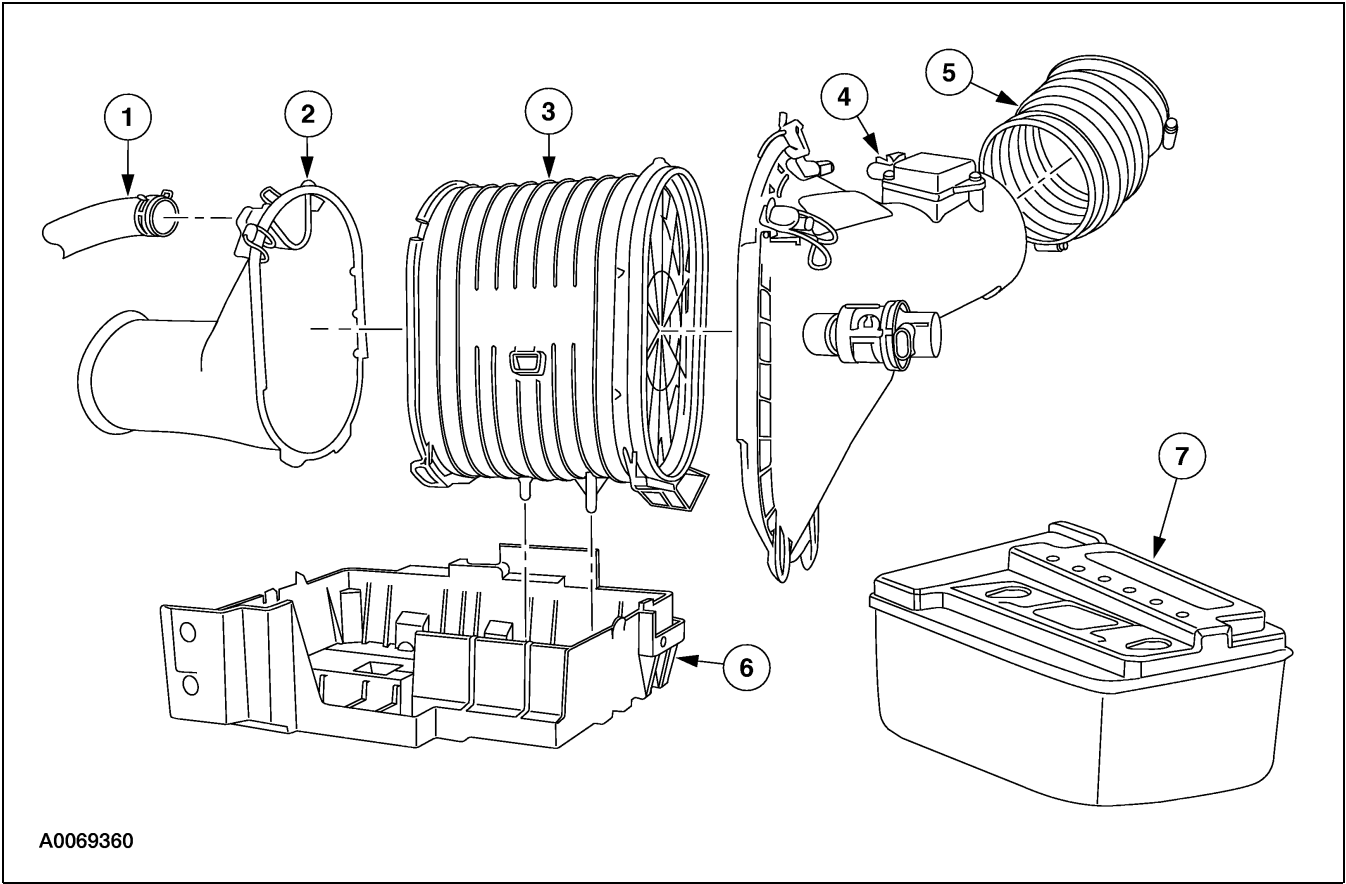
The glow plug ON time varies from 0-120 seconds depending on battery voltage, engine oil temperature and barometric pressure.

The glow plug control monitor (GPCM) system is designed to find failed glow plugs or failed wiring in the glow plug system.

DESCRIPTION AND OPERATION

Intake Air Distribution and Filtering —
6.0L Diesel

Air Intake Components — 6.0L Diesel Engine



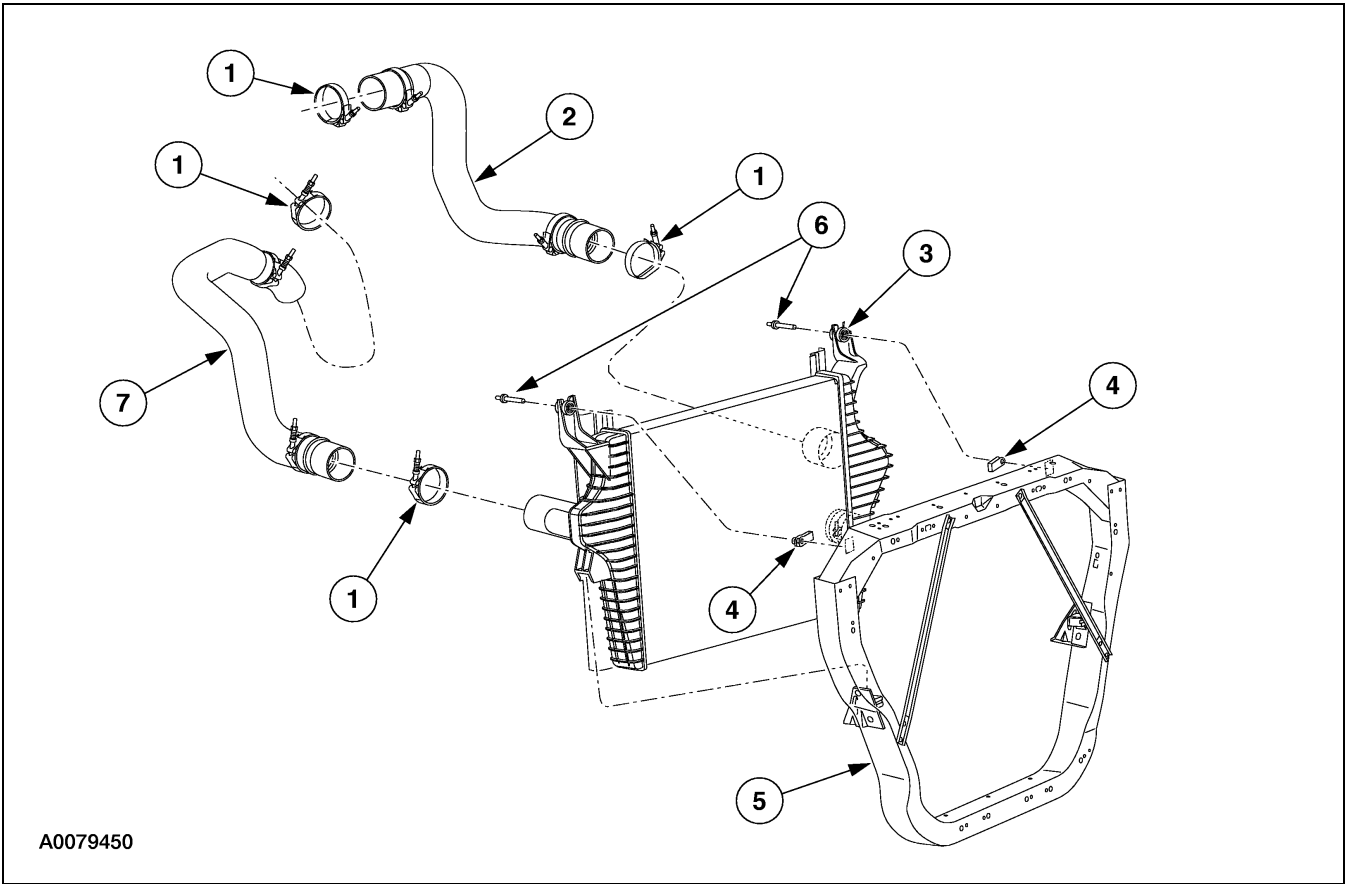
Item	Part Number	Description
1	9B660	Auxiliary hose
2	9F823	Inlet tube
3	9601	Power core filter element
4	9643	Outlet tube

(Continued)

Item	Part Number	Description
5	9R504	Clean air tube
6	10B711	Battery tray and air cleaner assembly
7	10B717	Battery cover

DESCRIPTION AND OPERATION (Continued)

Charge Air Cooler and Components — 6.0L Diesel Engine



Item	Part Number	Description
1	6K786	Clamps (8 req'd)
2	6C646	Charge air cooler duct (outlet, cool air)
3	6K775	Charge air cooler
4	W520823-S426	J-nut

(Continued)

Item	Part Number	Description
5	8A168	Radiator lower support
6	W705033-S301	Stud bolts
7	6C646	Charge air cooler duct (inlet, hot air)

DESCRIPTION AND OPERATION

Electronic Engine Controls

The electronic engine controls consist of:

- camshaft position (CMP) sensor
 - powertrain control module (PCM)
 - fuel injector control module (FICM)
 - engine coolant temperature (ECT) sensor
 - manifold absolute pressure (MAP) sensor
 - intake air temperature (IAT) sensor
 - accelerator pedal position (APP) sensor
 - engine oil temperature (EOT) sensor
-

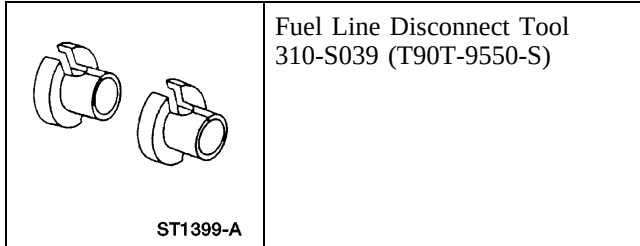
- exhaust back pressure (EBP) sensor
- crankshaft position (CKP) sensor
- engine oil pressure (EOP) sensor
- barometric pressure (BARO) sensor
- turbocharger variable vane hydraulic control valve

For additional component description and operation, refer to the [Powertrain Control/Emissions Diagnosis \(PC/ED\) manual](#).

REMOVAL AND INSTALLATION

Fuel Conditioning Module — 6.0L Diesel

Special Tool(s)

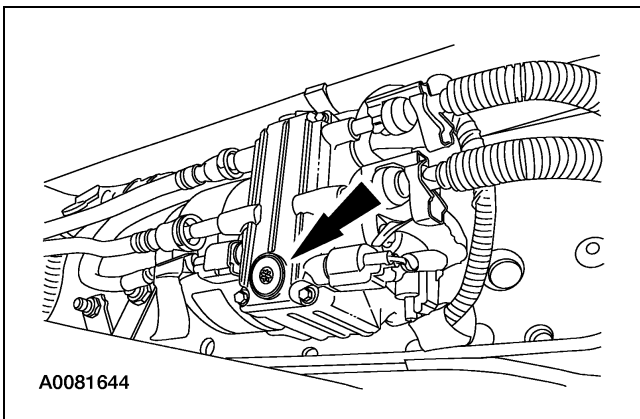


Removal and Installation

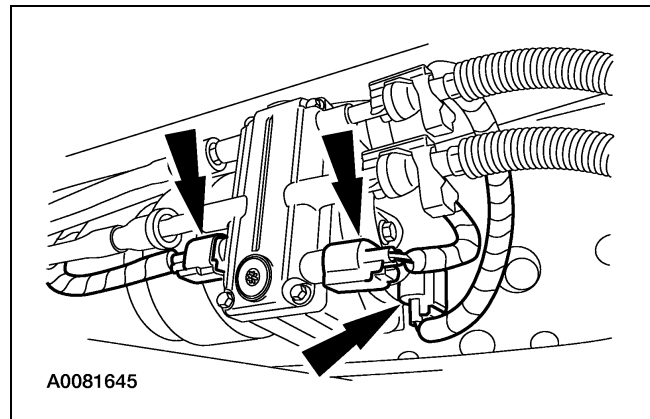
1.  **WARNING: Smoking or open flame of any type must not be present when working near fuel or fuel vapor.**

Disconnect both battery ground cables. For additional information, refer to Section 414-01.

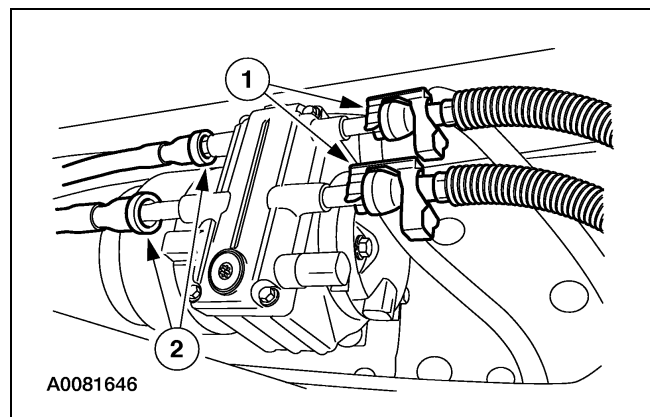
2. Raise and support the vehicle. For additional information, refer to Section 100-02.
3. Open the fuel/water separator drain valve to release the fuel pressure.



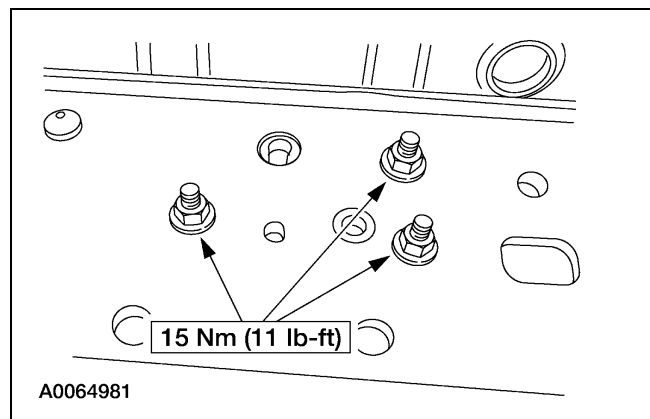
4. Disconnect the electrical connectors.
 - Disconnect the fuel pump electrical connector.
 - Disconnect the fuel warmer electrical connector.
 - Disconnect the water-in-fuel electrical connector.



5. Disconnect the fuel hoses.
 - 1 Remove the fuel hose retaining clips and discard. Disconnect the fuel hoses from the fuel pump.
 - 2 Press in the retaining clips and release the fuel hoses.



6. Remove the mounting nuts and the fuel conditioning module.



7. To install, reverse the removal procedure.