



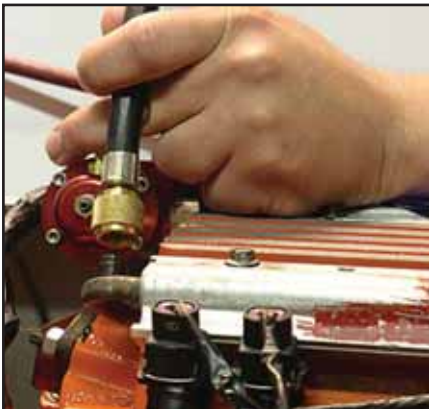
# GENERAL MOTORS

## Adjusting Fuel Pressure on GM's Electronic Fuel Injection

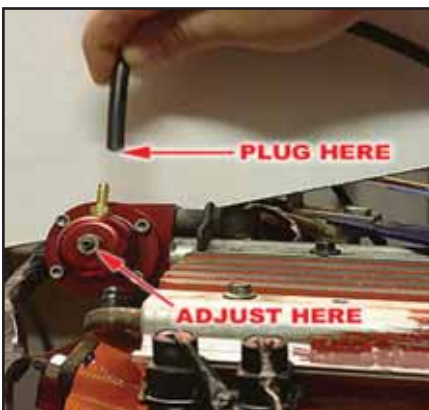
By adjusting the fuel pressure a GM fuel injected engine, you are looking for maximum power from your new high performance engine and this will take some trial and error to achieve.

In order to make the adjustment you will need the following tools: A fuel pressure gauge that will screw onto your Schrader Valve on your fuel rail and a small wrench to turn the screw on the regulator.

Step #1 - You will need to screw the fuel pressure gauge onto the Schrader Valve that is located on your fuel rail, (Figure 1, below) make sure that it is tight to avoid any leaks and or fires. Once the gauge is installed turn the ignition key to the on position and check for leaks at the Schrader Valve.



**Figure 1** Screw the fuel pressure gauge onto the Schrader Valve located on the fuel rail.



**Figure 2** Plug the rubber vacuum line so it does not leak while making adjustments.

Step #2 - Start the engine and let the idle level off and then disconnect the vacuum line that goes to the regulator (Figure 2, below), make sure that you plug the rubber vacuum line so it does not leak vacuum while you are making the adjustment, (you only care about the fuel pressure reading with the vacuum line disconnected at idle).

Step #3 - Take the reading and make the adjustment to 46 lbs.

Step #4 - You will need to drive the vehicle and take notes as to how it is performing. Golen recommends driving it for a little while so you know exactly how the engine and vehicle react. Once you are familiar with the engine's performance adjust the fuel pressure up 2 lbs. at a time, taking notes as to the performance gain or loss and finally end your adjustment at max power.

—From *Golen Engine Service*

## Cylinder Sleeve Replacement for 2002-2006 GM Ecotec Engines

This information is an update to previously published information on cylinder sleeve replacement for 2002-2006 GM Ecotec 2.0L, 2.2L and 2.4L 4-cylinder engines. The new procedure has been developed to replace the cylinder bore sleeve when the engine is in or out of the vehicle.

A cylinder sleeve removal/installation tool (p/n EN45680-850) is required for this procedure.

Do not chill or heat the cylinder bore sleeve or the cylinder block when removing or installing a new cylinder bore sleeve. Chilling or heating the cylinder bore sleeve or cylinder block will cause damage and will not aid the removal or installation of the new cylinder bore sleeve.

Do not damage the crankshaft connecting rod journals or relocator ring or engine damage will result.

### Removal:

- 1) Remove cylinder head, oil pan, piston and connecting rod and bearings.
- 2) Inspect condition of the piston
- 3) Rotate the crankshaft so that the counterweight is to the right side and the

connecting rod journal is to the left side and not in alignment with the cylinder bore.

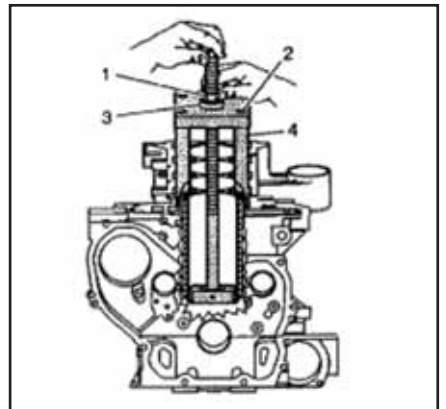
4) Install cylinder bore sleeve puller (p/n EN 45680-852) through the cylinder bore (Figure 3, below). You must ensure that the shoe is flat against the bottom of the cylinder bore liner or damage to the cylinder bore liner puller will result.

5) Align the shoe (1) of the puller to the bottom of the cylinder bore sleeve (2), (Figure 4, below).

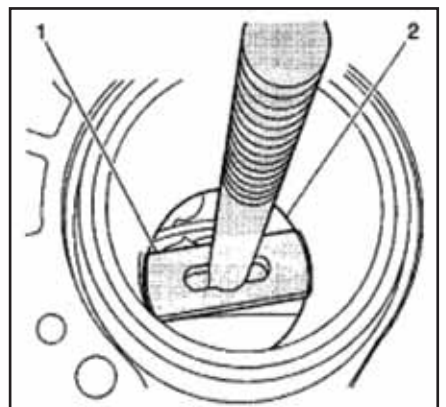
6) Hold threaded shaft of the puller upward in order to retain the shoe alignment to the bottom of the cylinder bore sleeve.

7) Install the fixture (item 4 in Figure 4), EN 456850-851 onto the threaded shaft of the puller (EN 456850-9852) and engine block.

8) As shown in Figure 4, install the bear-



**Figure 3** Install cylinder bore sleeve puller (p/n EN 45680-852).



**Figure 4** Align the shoe (1) of the puller to the bottom of the cylinder bore sleeve (2).

# REPLACEMENT PARTS FOR 6.6L DURAMAX

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Part Number	Description	Application Data	Notes
CB-1805H	Con. Rod Bearing Set	2001-2005	Performance Set
CB-1805HX	Con. Rod Bearing Set	2001-2005	Performance Set
CB-1805P	Con. Rod Bearing Set	2001-2005	OE# 97250338
CB-1810P	Con. Rod Bearing Set	2001-2005	.002" O/S O.D.
MS-2218H	Main Bearing Set	2001-2005	Performance Set
MS-2218HX	Main Bearing Set	2001-2005	Performance Set
MS-2218P	Main Bearing Set	2001-2005	Std. References 97250336 Blue (5)/97250411 Black(5)/97250412 Brown(5)
SH-1999S	Cam Bearing Set	2001-2005	OE# 37239516(4) + 97239518(1)
TW-610S	Thrust Washer Sets	2001-2005	OE# 97219325(1) + 97219327(2)
223-3659	Bushing, Piston Pin	2001-2005	OE# 97219318
224-3451	Piston	2001-2004, Model LB7	Left bank, 17.5:1 CR; OE# 97226117
224-3452	Piston	2001-2004, Model LB7	Right bank, 17.5:1 CR; OE# 97226116
41909	Engine Ring Set	2001-2005, VIN 1, Model LB7 & LLY	OE# 97250331(8)
HS54580*	Gasket Kit, Cylinder Head Set	2001-2004, VIN 1	Order head gaskets separately; OE# 97729798
HS54580A*	Gasket Kit, Cylinder Head Set	2004-20074, VIN 2, 6 & D,	Order head gaskets separately; OE# 98403365 /98434773
CS54580*	Gasket Set, Lower	2001-20074, VIN 2, 3, 6 & D	OE# 97729796
54580	Gasket, Cylinder Head	2001-20074, VIN 1, 2, 6 & D	MLS, Right hand, .95MM Thick, Grade A; OE# 98045055
54581	Gasket, Cylinder Head	2001-20074, VIN 1, 2, 6 & D	MLS, Right hand, 1.00MM Thick, Grade B; OE# 98045056
54582	Gasket, Cylinder Head	2001-20074, VIN 1, 2, 6 & D	MLS, Right hand, 1.05MM Thick, Grade C; OE# 98045057
54583	Gasket, Cylinder Head	2001-20074, VIN 1, 2, 6 & D	MLS, Left hand, .95MM Thick, Grade A; OE# 98045058
54584	Gasket, Cylinder Head	2001-20074, VIN 1, 2, 6 & D	MLS, Left hand, 1.00MM Thick, Grade B; OE# 98045059
54585	Gasket, Cylinder Head	2001-20074, VIN 1, 2, 6 & D	MLS, Left hand, 1.05MM Thick, Grade C; OE# 98045060
54597	Gasket, Cylinder Head	2001-20074, VIN 1, 2, 6 & D	Wave-Stopper, Left Hand, 1.05MM Thick, Grade C, For 106MM Overbore; OE# 98040130
54598	Gasket, Cylinder Head	2001-20074, VIN 1, 2, 6 & D	Wave-Stopper, Right Hand, 1.05MM Thick, Grade C, For 106MM Overbore; OE# 68040128
GS33504	Bolt Set, Cylinder Head	2001-20074, VIN 1, 2, 6 & D	18 per box, 2 boxes required per engine; OE# 97310851
VS50434	Gasket Set, Rocker Cover	2001-20074, VIN 1, 2, 6 & D	Steel, one set required per engine; OE# 97321295
VS50438	Gasket Set, Valve Cover	2001-2004, VIN 1	Includes valve cover grommets, silicone, one set required per engine; OE# 97188896(2) + 97213862(24)
VS50439	Gasket Set, Valve Cover	2004-20074, VIN 2, 6 & D	includes valve cover grommets, silicone, one set required per engine; OE# 97312341(2) + 97315638(28)
B45974	Valve Stem Seal	2001-20074, VIN 1, 2, 6 & D	Intake and Exhaust; OE# 97212994
MS19402	Gasket Set, Intake Manifold	2001-2005, VIN 1 & 2,	MLS, Contains Plenum seal, Silverado & Sierra, includes sealant, Silicone; OE# 97251963(2) + Sealant
MS19403	Gasket Set, Intake Manifold	06-07, VIN 2, 6 & D	Contains Plenum seal, includes sealant, Silicone; OE# 97363570(2) + Sealant
MIS19402	Intake Manifold Set	2001-2005, VIN 1 & 2	Turbocharger and exhaust gaskets not included, includes sealant; OE# 97251963(2) + 97306568(1) + 97302368(1) + 97729991(2) + Sealant
MS19398	Gasket Set, Exhaust Manifold	2001-20074, VIN 1, 2, 6 & D	MLS; OE# 98002804(2)
OS32284	Gasket Set, Oil Pan	2001-20074, VIN 1, 2, 6 & D	Includes lower pan gasket, drain gasket and silicone; OE# 97227589(1) + 97329637(1) + Sealant
JV1691	Seal Set, Crankshaft Rear	2001-20074, VIN 1, 2, 6 & D	Includes Seal, Sealant for rear cover; OE# 97209342 + Sealant
JV5079*	Seal Set, Front Cover	2001-20074, VIN 1, 2 & 6,	Includes front cover sealant, oil pressure relief valve O rings; OE# 97209341(1) + 94011695(2) + Sealant
211-4264	Valve, Intake	2001-2005	OE# 97225507
211-4265	Valve, Exhaust	2001-2005	OE# 37225508
215-4350	Push Rod	2001-2005	OE# 97240416
601-2114	Pump, Lube	2001-2004	OE# 97188652

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ing (3) and the nut (1); tighten. Use the correct fastener in the correct location. Replacement fasteners must be the correct part for that application. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener.

9) Install and tighten the four attaching bolts (2) into the cylinder head boltholes of the block. Use four old cylinder head bolts for the attaching bolts.

10) Tighten bolts to 11 ft.lbs. (15 Nm).

11) Rotate the nut clockwise in order to remove the cylinder bore liner. Be cautious not to damage cylinder block surface.

12) Remove EN 45680-851 fixture, EN 45680-852 cylinder bore sleeve puller, and the cylinder bore sleeve from the engine block.

13) Inspect the cylinder bore in the cylinder block for cracks or damage. If cracked or damaged, replace the cylinder block.

*Installation procedures are detailed on EngineBuilderMag.com in a Tech Center posting.*

## Updated Torque Specs for 1999-2003 GEN III Vortec Engines

A new exhaust manifold bolt and torque specification was introduced to the GM GEN III Vortec small block V8 engine beginning with the 2004 model year. When servicing GEN III Vortec small block exhaust manifolds, the exhaust manifold bolts should always be replaced.

- Use GM p/n 11518860 Exhaust Manifold Bolt. Apply a .200" wide bead of high temperature threadlocker to the threads of the exhaust manifold bolts before installing;

- Apply p/n 12345493 (U.S.) – GM High Temperature, High Strength Threadlocker;

- Apply p/n 10953488 (Canada) – GM High Temperature, High Strength Threadlocker.

Tightening the exhaust manifold bolts should be done with two passes. First tight-

en the two center bolts on the exhaust manifold. Then tighten the rest of the bolts, alternating from side to side, while working towards the outside bolts.

Refer to the following torque sequence when installing exhaust manifold bolts:

- First pass: tighten to 89 in.lbs. (10 Nm);

- Second pass: tighten to 15 ft.lbs. (20 Nm).

## Rear Crankshaft Oil Leaks for 2005-2007 GM 4.2L Engines

This leak from the rear of crankshaft is due to porosity problems in the crankshaft. GM offers the following solution to the problem.

Verify the leak by looking at the end of the crankshaft. If oil is present in the bore (where the torque converter nose engages the crankshaft), a special service procedure should be performed. If the bore is dry, or oil appears to be from the seal area, perform normal oil leak analysis. A service cup plug has been developed to stop leakage that may occur in this area and can be ordered through GM's Warranty Parts Center under

Model Year	Time Sert Kit
1994-1999	J 42385-500
2000-2003	J 42385-2000
2004-2005	J 42385-2030 Head J 42385-2000 Main

### Torque Specifications:

#### 1993-1999 Head Bolt Torque

- First pass - 30 ft.lbs. (40 Nm)
- Second pass - 70 degrees
- Third pass - 60 degrees
- Fourth pass - 60 degrees (190 total)

#### 2000-2003 Head Bolt Torque

- First pass - 30 ft.lbs. (40 Nm)
- Second pass - 70 degrees
- Third pass - 60 degrees
- Fourth pass - 45 degrees (175 total)

*Note: Late in MY2002, cylinder head bolt holes in block were revised. Thread start height was raised 7 mm, bolt hole depth was reduced 7mm.*

**Figure 5** Time Sert tools to repair cylinder head bolt holes in 1995-2005 4.6L Northstar.

p/n WPC-340.

Clean the crankshaft flange bore area with brake cleaner or equivalent. Thoroughly dry the area and examine the bore surface for irregularities. If the bore surface needs additional cleaning, use sand paper or equivalent and clean as necessary. Once the crankshaft bore is clean and smooth, apply a thin bead of Loctite™ 620 completely around the inside of the crankshaft flange bore.

General Motors offers a tool to aid the installation. If the tool is not available through local dealership, an aftermarket equivalent is acceptable.

Position the crankshaft service cup plug into the crankshaft flange bore with the service cup plug, dish side outward (Figure 2). Note: Do not use the impact socket with hammer to drive the service cup plug into place. Damage to the crankshaft thrust bearing may occur.

Assemble arbor, forcing screw, attaching bolts and socket. Install the tool press assembly to the end of the crankshaft flange and position the socket and service cup plug into the bore of the crankshaft flange. Be sure you have the proper tool set up before pressing the cup plug into the end of the crankshaft.

The forcing screw will fit inside an 18 mm or 19 mm end of the impact style socket with the 1/2" drive side of the socket facing the service cup plug. The forcing screw should bottom on the 15 mm step inside the socket.

Hand tighten forcing screw into the socket, making sure that it is centered on the service cup plug. Mark forcing screw and arbor for reference, then tighten forcing screw two complete turns and an additional 90 degrees or 1/4 turn more.

When completed, remove installation tool assembly and confirm the installation depth of the service cup plug. Place a straight edge across the center of the crankshaft flange as the measurement point. Measure from the straight edge to the center of the installed cup plug. The depth of the installed cup plug should be 16-17 mm (.630"-.670").

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## 1994-2005 GM Northstar 4.6L Engine Head Bolt Thread Repairs

When disassembling the GM Northstar 4.6L engine, all head bolt threads should be thoroughly inspected as they are removed. If there is any section of the aluminum block thread left on the bolt, that bolt hole will need to be repaired using a Time Sert or equivalent repair procedure.

Typically, not all the cylinder head bolt holes will be in need of repair. The recommendation is to perform thread repair on damaged bolt holes and adjacent holes. As the clamp load is relieved from one hole (threads pulling), the adjacent hole's thread load will increase and may become damaged during reassembly.

There have been some reports of Time Serts pulling out of the block a short time after this repair has been performed. The manufacturer of the insert also makes a larger size insert, which should not be used for repairs. As a result of the increased O.D. of this insert, it's possible that when installing this larger sert that it will break out in the water jacket, causing a coolant leak.

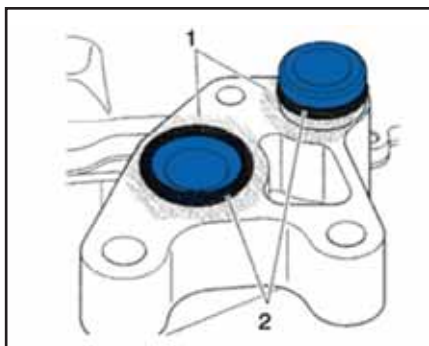
The most likely reason that a Time Sert pulls out after installation is the use of incorrect J tools for application. If the incorrect tool is used, installation of the Time Sert could be either too deep in the hole or not deep enough. The following chart (**Figure 5**, page 4) lists the correct tools to use for specific model years.

## Servicing Oil Cooler Leak on 2001-2004 GM 6.6L Diesel Engines

According to a technical bulletin on the JASPER Engines & Transmissions Web site, some engine specialists have reported an oil cooler leak on 2001-2004 GM 6.6L VIN 1 & 2 Duramax diesel engines used in pickup truck models.

The leak is caused by minor imperfections in the engine block machine surfaces at the oil cooler interface that may allow engine oil seepage past the oil cooler O-rings. To cure this problem, GM offers the following information:

1) Inspect for other oil leaks that may



**Figure 6** Install new O-rings (2) to the oil cooler on 6.6L Duramax diesel engine.

be perceived as an oil cooler leak. An oil leak from one of the main bearing cap side bolts may appear to be coming from the oil cooler.

2) If the oil cooler is leaking oil, remove the oil cooler from the engine.

Use care to remove only the five bolts that hold the oil cooler to the engine block.

3) Remove the O-rings from the oil cooler and discard them.

4) Clean the mating surfaces of the engine block and the oil cooler.

5) Install new O-rings (2) to the oil cooler (**Figure 6**, left).

6) Apply sealant (p/n 97720043) to the oil cooler. Do not apply sealant to the O-ring grooves on the oil cooler.

7) Install the oil cooler to the engine block. Torque five oil cooler assembly bolts to 18 ft.lbs.

8) Allow the vehicle to sit for eight hours at room temperature to allow the sealant to fully cure before initial startup.

– From JASPER Engines & Transmissions **TSG**



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