File in Section: 06 - Engine
Bulletin No.: 06-06-01-007G
Date: August, 2012

Service Bulletin

INFORMATION

Subject: **Information On Identifying Duramax™ Diesel Overpower Engine Breakdown or Non-Function Due to Aftermarket Power-Up Devices vs. Non Overpower Engine Non-Function of Pistons, Cylinders, Valvetrain Components, DTC P003A or P111D Set**

Models: **2001–2013 Chevrolet Silverado**
2003–2009 Chevrolet Kodiak
2006–2013 Chevrolet Express
2001–2013 GMC Sierra
2003–2009 GMC TopKick
2006–2013 GMC Savana
Equipped With Duramax™ Turbocharged Diesel Engine RPO LB7, LBZ, LLY, LML, LMM, or LGH

Attention: **Please, always refer to the GM Policy and Procedures Manual — Article: 1.2.2.12 for the latest GM Policy and Procedures Information.**

This bulletin is being revised to add the 2011, 2012 and 2013 Model years, to BOLD the "Caution" statement, add the LML and LGH engine specifications information to the Duramax™ Powertrain Horsepower / Torque Ratings section, update the names of the GM Representatives, add information regarding DTC P111D, and add an Attention statement to advise the Service Department Personnel that they must always refer to the GM Service Policy and Procedures Manual Article: 1.2.2.12 for the latest GM Policy and Procedures Information. Please discard Corporate Bulletin Number 06-06-01-007F (Section 06 – Engine/Propulsion System).

Caution: Customers should be informed if a hard part failure is observed in the engine, transmission, transfer case and/or other driveline components, it is likely that powertrain components were weakened to the point of premature failure, while subjected to the higher stresses from Aftermarket Power-Up Devices. Failures associated with the installation of Aftermarket Power-Up Devices, which have been verified, are not covered under the terms of the New Vehicle Warranty. In the majority of these cases, the District Manager Aftersales (DMA), in Canada, the District Manager Customer Care and Service Process (DM - CCSP) should be contacted and the remaining portion of the powertrain portion of the New Vehicle Warranty blocked.

GM has adopted a policy that prevents any UNAUTHORIZED dealer warranty claim submissions to any remaining warranty coverage.

General Motors Position On Aftermarket Power-Up Devices

Important: General Motors does not support or endorse the use of devices or modifications that, when installed, increase the engine horsepower and torque.

Important: For further information on aftermarket Power-Up Kits, refer to February 2006 Emerging Issues Course Number 10206.02D. In Canada, information on aftermarket Power-Up Kits is covered in the April 2006 TAC TALK program.

Aftermarket power-up devices are non-approved by General Motors. These devices are usually piggy-backed in the main engine harness or remain connected to the diagnostic connector to upload the calibration to the ECM. Recent warranty reviews of returned engines show engine breakdown or non-function due to power-up devices that are utilized for increased horsepower and torque. The following

information will assist technicians in identifying overpower engine breakdown or non-function due to aftermarket power-up devices vs. non overpower engine breakdown or non-function.

Non-GM parts can alter the design of the vehicle. GM dealers need to be aware of the quality of parts being installed on vehicles. If failure occurs as a result of installation of sub-par parts, warranty coverage may be denied.

Installed Power-Up Kit

Aftermarket power-up kits have become a very popular add on for performance-minded customers. These devices can add horsepower and torque and can add additional stress to the engine. These aftermarket calibrations take the Duramax™ powertrain outside of its design torque and horsepower rating. They do this by altering air/fuel ratios and injector timing, resulting in excessive cylinder pressure and temperature. When these calibrated parameters are altered, it will upset the design balance and can lead to a reduction of engine life expectancy.

Installed Power-Up Kit

- Once installed, the calibration may mask itself with the factory original calibration ID and may remain the same. Refer to the latest version of Corporate Bulletin Number #08-06-04-006 - Information on Identifying Non-GM Calibration Usage for LMM Duramax™ Diesel Engine.
- A Tech 2® will not positively enable you to identify the use of a power-up device.
- Some companies that offer power-up devices claim increases of 150 or more horsepower and 300 or more lb/ft pounds of torque.
- A vehicle that is used to the power-up device potential 100% of the time will see earlier engine wear and breakdown.
- A vehicle that takes advantage of additional power, but on a less frequent basis, may not see prema break="2"ture engine wear and breakdown until later in the engine's life.
- A vehicle not pushed to its limits of the power-up device often may not encounter premature wear and breakdown until after the engine is out of warranty.

Duramax™ Powertrain Horsepower / Torque Ratings

The following horsepower and torque increase over the past years required new internal components to accommodate the increase.

- LB7 — 300 hp with 520 ft/lb of torque for model years 2000–2004
- LLY — 310 hp with 605 ft/lb of torque for model years 2004–2008
- LBZ — 360 hp with 650 ft/lb of torque for model year 2006–2008
- LMM — 365 hp with 660 ft/lb of torque for model year 2007–2009
- LGH — Express and Savana with 260 hp (194 kW) @ 3100 RPM, 525 lb-ft. (712 Nm) @ 1600 RPM
- LGH — Sierra HD and Silverado HD 335 hp (250kW) @ 3100 RPM, 685 lb-ft. (929 Nm) @ 1600 RPM
- LML — Sierra HD and Silverado HD 397 hp (294kW) @ 3000 RPM, 765 lb-ft. (1037 Nm) @ 1600 RPM

LBZ Improvements

To reliably achieve an increase in 50 horsepower with 45 ft/lb torque, the Duramax ™ diesel had to be revised in many areas. A few of the revisions on the 2006 LBZ were:

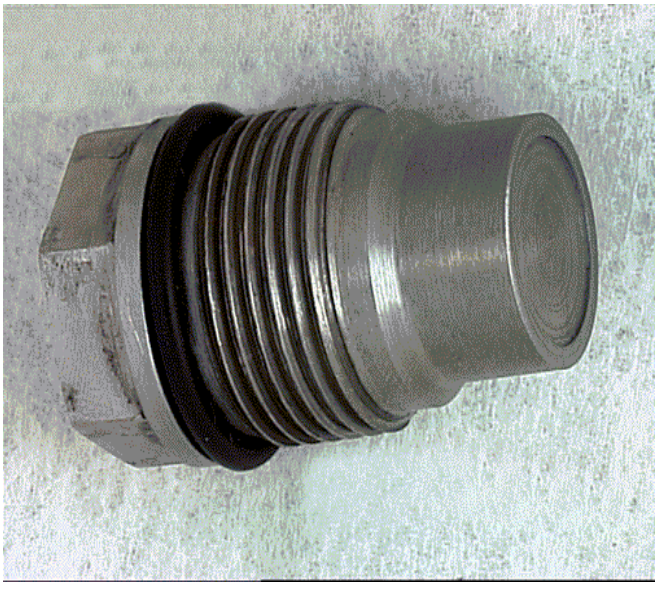
- New pistons with a revised compression ratio.
- Wrist pins that are larger in diameter.
- Connecting rods with added material to increase the I section strength.
- Engine block and machining changes
- Cylinder heads

Duramax™ Life Expectancy

The Duramax™ 6.6L V8 Turbo Diesel Engine is sold with a warranty of 100,000 miles/160,000 kilometers. The Duramax™ has been tested to survive upwards of 200,000 miles/320,000 kilometers. The Duramax™ powertrain is designed for reliability, peak horsepower and torque within its design limits. When a customer installs a power-up device, it drastically reduces the mileage ratings.

Important: Cylinder Wall Spotting (commonly referred to leopard spots) is from the induction hardening process of the top 1/3 of the cylinder wall. This is normal for the Duramax ™ Diesel.

Identifying Fuel Related Aftermarket Power-Up Devices



2159724

Aftermarket companies have developed a performance pressure relief fuel valve for Duramax™ diesel engines. Refer to above graphic illustration. The performance pressure relief fuel valve attaches to the fuel rail in place of the OEM valve and will not allow any fuel return to the tank, giving 100% of the fuel to be available for additional engine performance. This may cause additional fuel related driveability concerns and may set the following DTCs:

- DTC P1093 Fuel Rail Pressure (FRP) Low During Power Enrichment
- DTC P0087 Fuel Rail Pressure (FRP) Too Low

2160302

Aftermarket companies have developed a replacement performance/economy fuel injector nozzle. Refer to above illustration. The performance/economy fuel injector nozzles replace the OEM fuel injector nozzles. The aftermarket companies claim increased horsepower, improved fuel atomization, lower exhaust gas temperatures and increase fuel economy. This may cause additional fuel related driveability concerns and may cause internal engine damage to the pistons and fuel injector nozzles.

Identifying Overpower Engine Premature Wear and Breakdown

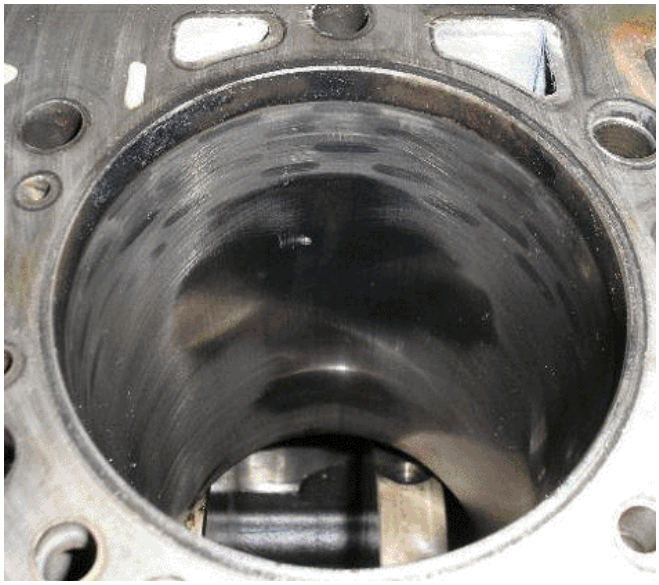
When premature wear and breakdown is encountered due to an aftermarket power-up device, it has some very specific characteristics to the internal engine components. The following list will assist in identifying these characteristics as you tear down the engine.

1771277

- Pistons will be cracked in the lip area, or a hole in the pistons.

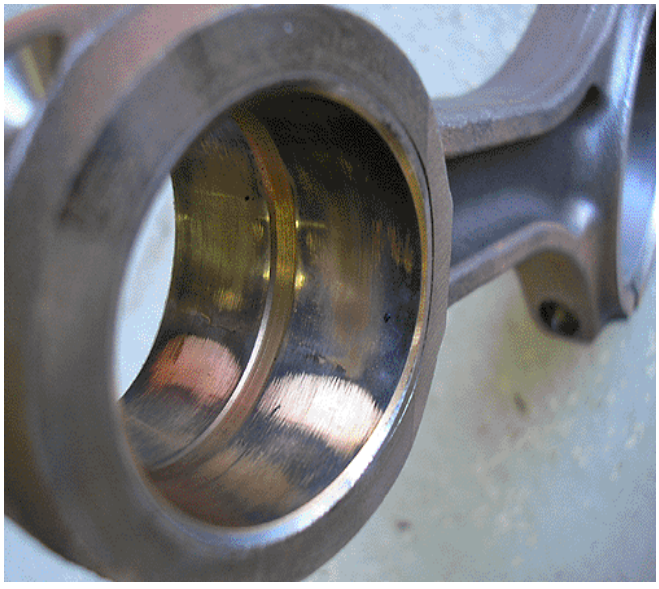
1771279

- Pistons can also be melted on the lip of the combustion bowl, or the top of the pistons can be melted.



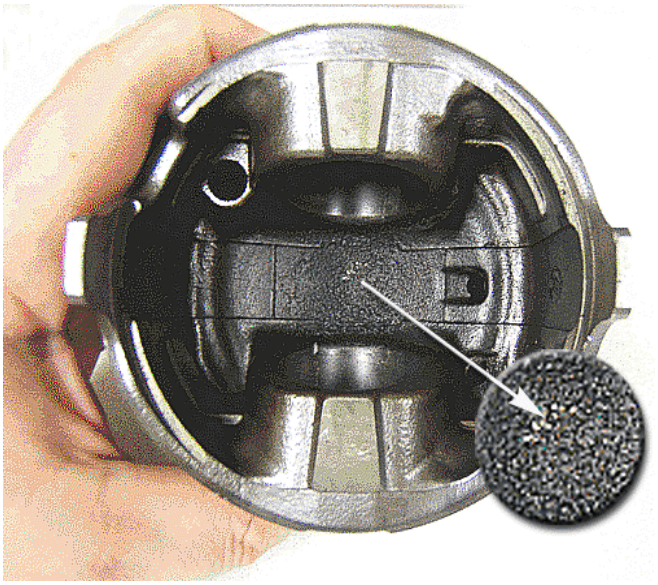
1771281

- Crosshatch will be polished off the cylinder wall in the major thrust face of cylinder below ring belt travel.



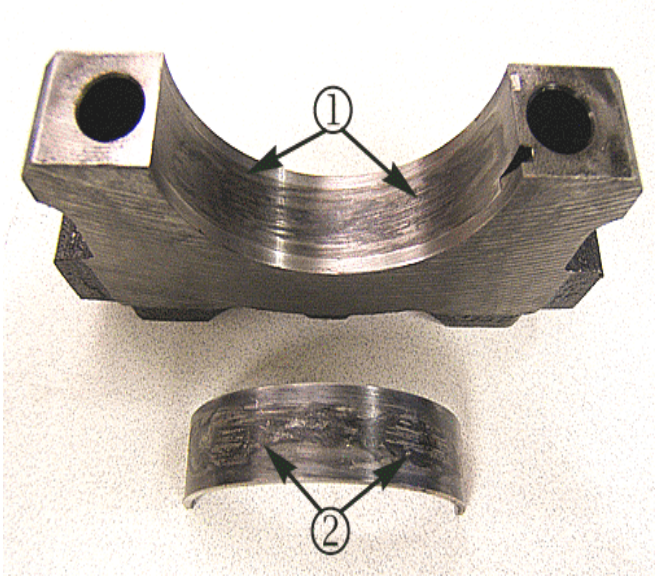
1806909

- Piston pin bore will show signs of scoring, the wrist pins will be discolored, and can have oil coking on them. The connecting rod bushing surface will have accelerated wear. The above illustration shows a connecting rod bushing.



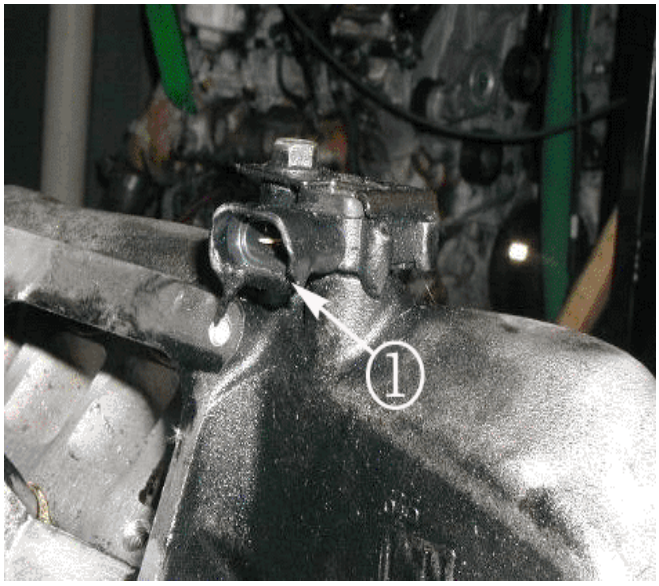
1797823

- Oil coking on the underside of the piston between the wrist pin bosses.



1797824

- Signs of bearing fretting will also be noticed on the connecting rod and main bearing caps. Refer to the above illustration for fretting of main bearing cap 1 and back side of connection rod bearing 2.



1771284

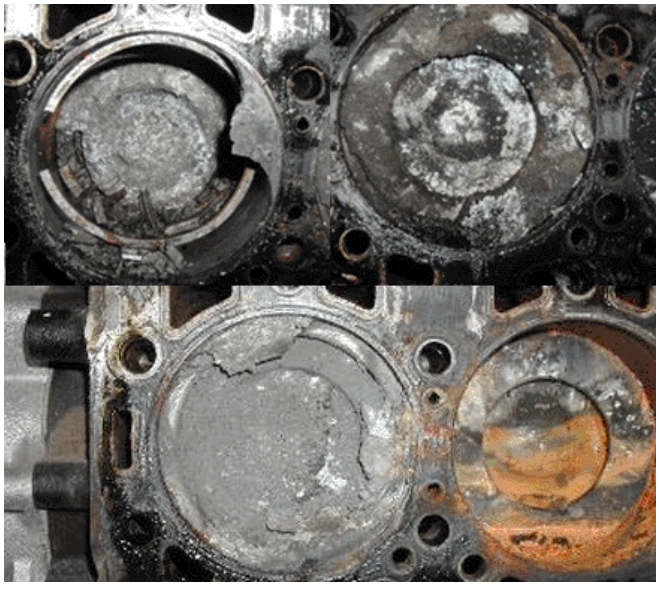
- Excessive heat in engine compartment caused by overpower device. Refer to above illustration (1).

Non Overpower Engine Premature Wear and Breakdown

The following pictures show results of overheat, overspeed, low/no oil pressure or injector breakdown and how they differ from aftermarket power-up device premature wear and breakdown.

Engine Overheat

Overheat can be caused by a loss of coolant or a general cooling system failure. Some of the indicators of overheat are:



1771289

- Melted pistons.
- Head gasket breakdown or non-function.
- Warped cylinder heads.
- Crankshaft and connecting rod discolored.

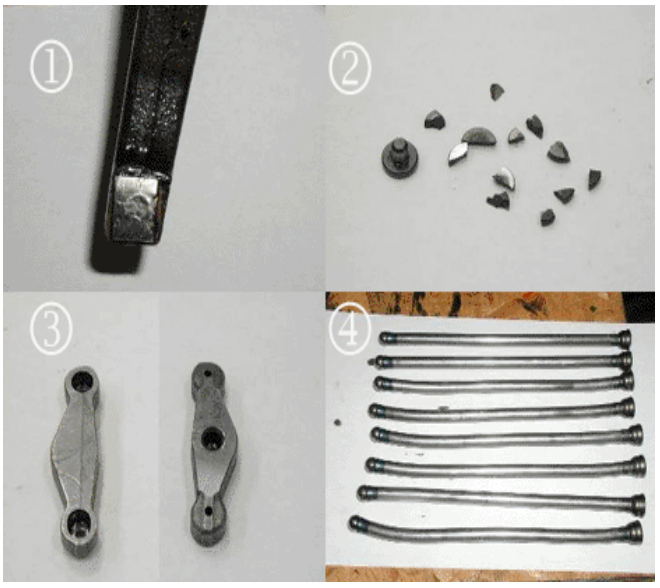
Engine Overspeed Causes

If an engine has been run faster than design capability (redline), and has caused damage as a result, it may be a result of one of the following conditions:

- Leaking or failed turbocharger (TC) oil seals.
- Oil evident in the intake runners and compressor side of the TC.
- Starting fluid use or alternative fuel added to the engine such as ether.

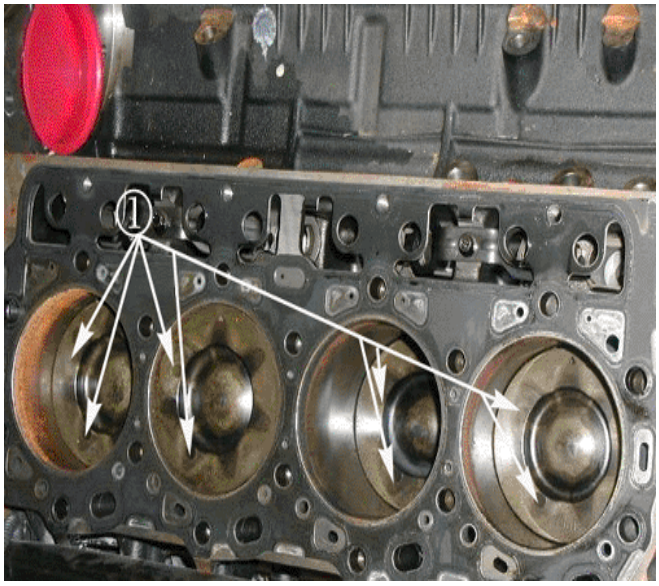
Engine Overspeed Results

The following are indicators that an overspeed event took place:



1771285

- Valve train damage.
- Pushrods that are bent (4).
- Broken valve bridge buttons after cylinder head removal (2).
  - Rocker arm tip damage (1).
  - Dry or rusted cylinders from the use of ether, propane or nitrous oxide.

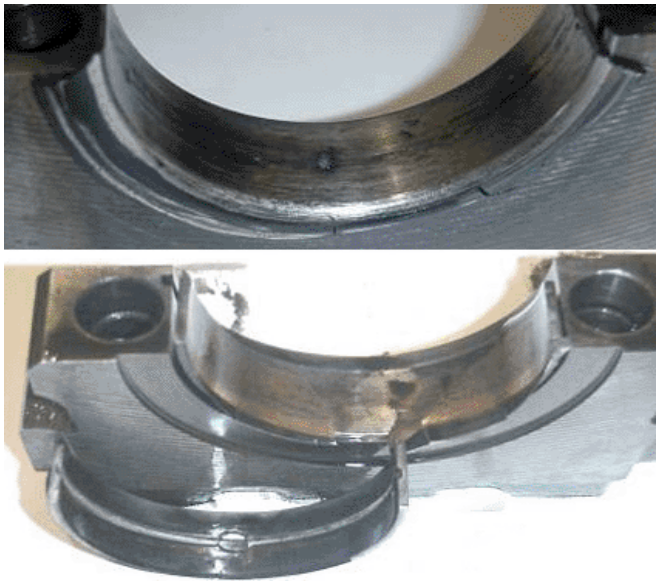


1771287

- Piston to valve contact.
- Cam gear pin shear.

Lack of Oil Pressure

Lack of lubrication causes rapid bearing wear or bearing to seize.



1771291

Bearing failure. Spun main bearings.

Engine Premature Wear and Breakdown Due to Improper Function of Fuel Injector

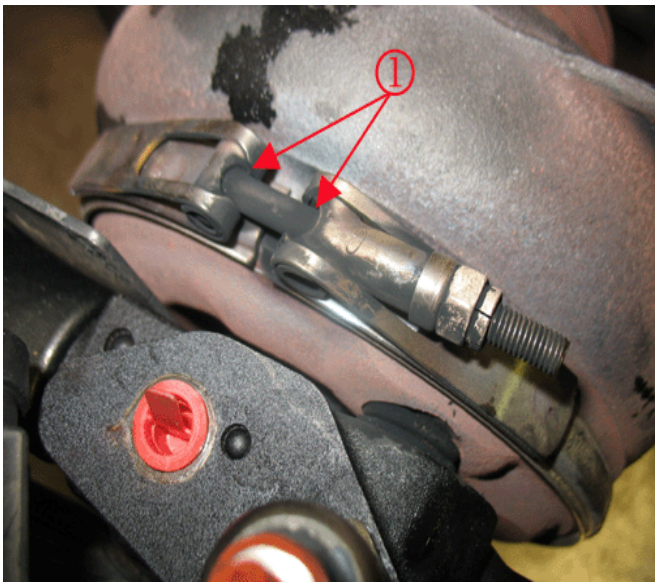
A fuel injector may fracture a piston or melt a piston but the damage will be limited to that cylinder only and all other pistons and cylinder walls are OK. In some cases hydraulic lock will occur on the suspected cylinder with an over-fueling fuel injector. Hydraulic lock on the suspected cylinder will cause a bent connecting rod. This can be verified with piston protrusion measurements.

Turbocharger DTC P003A Set

Notice: **Any other turbocharger position sensor DTC may also indicate the presence of a Power-Up Kit.**

General Motors has identified a turbocharger (TC) failure mode involving Power-Up Kits that causes soot leakage and DTC P003A to be set. The Power-Up Kits create an over temperature condition from the increased exhaust gas temperatures that results in a permanent and excessive turbine housing distortion at the TC case halves.

1. A technician may observe one or more of the following conditions:
   - DTC P003A being set as Current or in History.
   - An unusual odor emanating from the TC due to an overtemperature condition.
   - Soot leaking and accumulating at the V-band clamp that secures the TC case halves together.
   - Limited or unresponsive travel when Commanding the TC Vane Pos. Ctrl. Solenoid ON and OFF with a scan tool.



2336334

2. If DTC P003A is found as Current or in History, **OR** there is evidence of soot leakage (1) in the area of the V-band clamp (1), then technicians **MUST** verify if the engine control module (ECM) has a Power-Up Kit aftermarket calibration installed or an aftermarket hardware device has been installed.

   Refer to the latest version of Corporate Bulletin Number #08-06-04-006 for the calibration verification information and procedures.

2011-2012 Chevrolet or GMC Trucks With DTC P111D Set

Notice: **DO NOT replace the MAF sensor or ECM when only DTC P111D is found on a 2012 Model Year Duramax equipped vehicle.**

The Service Department Personnel may encounter a customer concern of the SES light being illuminated, with a DTC P111D: Intake Air Temperature (IAT) Sensor 1 – Fuel Temperature Sensor 2 Correlation found.

DTC P111D is utilized in 2011 for both the GMT600 G Vans and GMT900 C/K Trucks with RPO codes LGH and LML.

In the 2012 model year P111D is only valid on the GMT600 vans.

The GMT900 C/K trucks no longer have a Fuel Temperature Sensor 2. P111D should not set on any 2012 GMT900 Trucks.

Recommendation/Instructions

Do not attempt repairs for P111D if found on a 2012 GMT900 C/K Truck. The condition may be caused by a calibration mismatch.

If a dealer encounters a P111D on a 2012 truck, engineering has requested the ECM calibrations be sent in for verification using the latest version of Corporate Bulletin Number #08-06-04-006.

The dealer will receive an e-mail reply to advise if the calibrations are correct for the vehicle.

1. To evaluate the condition the dealer should follow the steps below:
   - 1.1. If a calibration mismatch has been found check GWM to see if the ECM has been replaced.
   - 1.2. If there has been an ECM replacement ensure the correct part number was installed.
   - 1.3. Dealers should not exchange or swap an ECM from a 2011 to a 2012 model year. The memory will be incorrect and may induce a P111D to set.
2. If the correct ECM has been installed and there is a calibration mismatch, reprogram the ECM with the current (2012 model year) TIS2WEB calibrations.

How to Handle a Suspect Engine Failure Due to a Power-Up Device

Dealers should not automatically decline warranty assistance on engine failures due to the fact that a power-up device or modification is evident or suspected. The technician must identify that the failure is due to a power-up device by teardown analysis and diagnosis of the engine components. The following steps should be taken if an engine failure occurs and it is suspected that the modification or addition of a power-up device maybe the cause of the engine failure. If unclear of this process or direction feel free to contact your District Manager Aftersales (DMA) (in Canada, the District Manager Customer Care and Service Process (DM-CCSP)).

1. The technician should use proper engine diagnostics to lead him/her to the failed engine components. The Aftermarket Power-Up Kit Check List should be followed and if it is determined that at least three of the Aftermarket Power-Up Kit Check List items match the engine component failures then it can be decided that the failure is not a warrantable claim.
2. Engine failures that meet at least three criteria of the Aftermarket Power-Up Kit Check List are considered failures that are not manufacturer's defects in workmanship or materials.
3. The dealership should contact the PQC, open a case to review the findings and make the final decision on warranty coverage. The District Manager Aftersales (DMA), in Canada, the District Manager - Customer Care and Service Process (DM - CCSP) should be notified of the PQC decision.
4. Denied claims should be documented as follows:
   - 4.1. The Aftermarket Power-Up Kit Check List completed with the technicians detailed written findings of the diagnosis on the repair order and retained in the repair order file.
   - 4.2. Photographs of the failed parts should be retained in the repair order file.
5. The customer should be advised that the failure of their engine was not due to a manufacturer's defect in workmanship or materials and therefore the warranty claim is denied on this failure.

Aftermarket Power-Up Kit Check List

Important: Print and use this aftermarket power-up kit check list when performing an engine disassembly investigation of overpower engine breakdown or non-function. Retain a copy of this checklist and photographs of the failed parts in the repair order file.

Engine Component Inspection Area	Engine Component	Visual Damage Results "YES"	Visual Damage Results "NO"
1	Piston Cracked Parallel to Wrist Pin	____	____
	Piston Cracked in Lip Area	____	____
	Hole in Piston Connecting Top of Piston to Oil Cooling Channel	____	____
2	Melted Pistons	____	____
	Lip of Combustion Bowl Melted	____	____
	Top of Piston Melted / Missing	____	____
3	Cross Hatching Polished Off Cylinder Wall	____	____
	Cylinder Wall Missing Crosshatch on Major Thrust Face of Cylinder, Below Ring Belt Travel	____	____
4	Scoring in Upper Piston Pin Boss / Black Discoloration / Oil Coking	____	____
	Wrist Pin Wear	____	____
	Rod Bushing Surface Worn and Discolored	____	____
5	Carbon Coking / Discoloration to Underside of Piston	____	____
	Carbon Coking / Discoloration to Underside of Piston Between Piston Pin Bosses	____	____
6	Accelerated Rod / Main Bearing Wear	____	____
	Fretting on Backside of Bearing	____	____
	Bearing Surface Distressed	____	____

Note: When using this checklist, refer to the graphics in the sections of this bulletin titled: **Identifying Overpower Engine Premature Wear and Breakdown and Non Overpower Engine Premature Wear and Breakdown.**