TECHlink
GM
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A Monthly Publication for GM Dealership Service Professionals

Supercharged!

GM's Supercharged Vehicles

Devices for delivering air into an engine at pressures higher than atmospheric fall into two major groups – mechanically driven (superchargers) and exhaust gas driven (turbochargers). GM's supercharged engines have historically incorporated the Helical Roots type supercharger produced by Eaton Corporation.

Current

Ecotec L4
- Saturn ION Red Line
- Chevrolet Cobalt SS Supercharged

Northstar V8
- Cadillac STS-V
- Cadillac XLR-V

3.8L V6
- Pontiac Grand Prix

Non-current

Pontiac Bonneville
Buick Park Avenue Ultra
Buick Regal GS
Buick Riviera

WHY SUPERCHARGING?

Airflow Volume (Throughput) – An internal combustion engine functions as an air pump. The engine pulls air in on the intake stroke and pushes it out after combustion on the exhaust stroke. The amount of air being pumped through the engine is referred to as air throughput, and it can be measured as a volume.

Pressure – In a naturally-aspirated (non-supercharged) engine, air throughput depends on atmospheric pressure filling the partial vacuum created when each piston moves down on its intake stroke.

Temperature – Cooler air results in more oxygen in a given volume of air (density) and is also a key factor in prevention of detonation and the resulting need for spark retard.

Mass Per Volume (Density) – Cooler air is denser than warmer air, with more oxygen in a given volume of air. The oxygen contributes to the amount of fuel the engine can burn, and so, power the engine can produce. When heated by combustion, denser air expands more than warmer less-dense air, contributing to greater cylinder pressure.

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TECHlink GM

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GM Service and Parts Operations

Recreational Vehicle and Trailer Towing Update

This information applies to the 2007 Saturn Outlook and GMC Acadia and the 2008 Buick Enclave. It supplements the June 2007 *TechLink* article. New material is shown in blue type.

Towing with Vehicles with Trailer Provisions (RPO V92)

The following procedure may need to be performed to the backup lamp circuit if the backup lamp function is required for towing. Perform this procedure only if the customer requires this feature to tow.

Disconnect the X7 connector from the BCM and remove terminal pin 3 (dark blue wire, 38 circuit). Re-connect the X7 connector.

Splice this wire into the wire at BCM connector X6, pin 2 (light green wire, 24 circuit).

Recreational Vehicle Towing (Dinghy Towing)

Before starting, do the following steps:

- Secure to tow vehicle.
- Ignition OFF.
- Set parking brake.
- Ignition to ACCESSORY.
- Shift transmission to NEUTRAL (N).
- To prevent the battery from draining while the vehicle is being towed, remove the 50 amp BATT1 fuse in the underhood bussed electrical center (not necessary to disconnect battery cable).
- Release parking brake.

At destination, do the following steps

- Set parking brake.
- Re-install the 50 amp BATT1 fuse in the underhood bussed electrical center.
- Ignition OFF

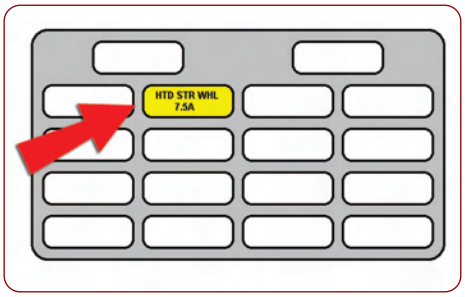
– *Thanks to Gary McAdam, Jeff Langhart and Jeremy Richardson*

Heated Steering Wheel

For 2008, the XLR has a heated steering wheel. A fuse has been added to the fuse block below the passenger foot area.

TIP: The owner manual will not be updated to include this information until 2009.

– *Thanks to Brad Thacher*



Water Leak in Trunk

On a 2004-07 Saab 9-3 Convertible, water may collect in the spare wheel well area, due to heavy rain or using a carwash. Water can collect in the area of the hinge plate, then flow through the hinge plate flange into the trunk compartment.

Reseal the seam in the hinge plate area, under the tonneau cover just above the rear wheel wells. On both sides, remove the grey foam tape covering the large hole at rear of plate. Apply sealer p/n 90 273 919 (13585R Teroson or a locally sourced equivalent) along the hinge plate flange seam.

TIP: It may be necessary to reposition the hydraulic lines to fully access the seam.

When the sealer cures, install new grey foam tape cover p/n 12 794 960.

– *Thanks to Jeff Gorenflo*


Apply sealer

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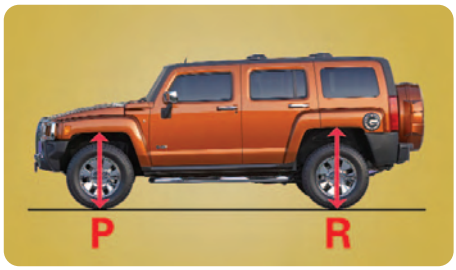
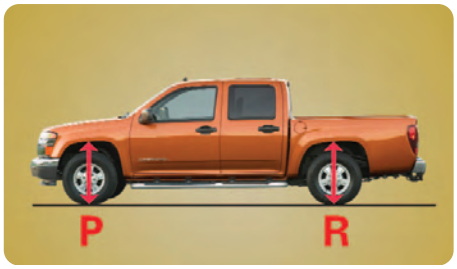
Ride Height

This information applies to 2007 Chevrolet Colorado, GMC Canyon and HUMMER H3 built before VIN break-point 78231039.

Some customers may comment that the vehicle appears to lean on one side. In most cases, the left front of the vehicle sits lower than the right front.

The rear leaf spring bushings or shackles may become loaded when the rear leaf spring shackle nuts are secured.





Measure the fender wheel opening heights, front and rear, to quantify vehicle lean. Fender wheel opening heights are related to, but distinct from, trim height (Z and D height). The front wheel-opening height is known as P height, and the rear wheel-opening height is know as R height. The P and R heights are not set at the factory, nor is a specification given for them. However, they are the most direct and repeatable measurement of what a customer would see if the vehicle is leaning.

Perform the following steps before measuring the fender wheel opening heights:

- Make sure the vehicle is on a level surface, such as an alignment rack.
- Set the tire pressures to the pressure shown on the certification label. Refer to Label - Vehicle Certification in General Information in SI.
- Check the fuel level. Add additional weight if necessary to simulate a full tank.
- To ensure proper weight distribution, make sure the rear storage compartment and/or truck bed is empty.
- Close the doors and hood.

P Height and R Height Measurements

P height and R height are measured the same way. They are the distance from the ground to the highest point on the wheel opening, going through the center of the wheel. Record the measurements on the repair order.

If the difference from left to right for P and R height is 10mm (0.39 in.) or less, no repairs are suggested as the vehicle is within specification. If the difference exceeds 10mm (0.39 in.) for either measurement, relax the rear spring shackles/bushings following the procedure below.

Relaxing Spring Shackles/Bushings

1. Raise and support the vehicle on the alignment rack.
2. Measure the P height (front wheel-opening height). Compare the left front measurement to the right front measurement.
3. Measure the R height (rear wheel-opening height). Compare the left rear measurement to the right rear measurement.
4. Loosen the two left rear leaf spring shackle nuts.
5. Loosen the two right rear leaf spring shackle nuts.

Rear shackle nuts

TIP: You may need an assistant to help jounce the rear bumper.

6. Jounce the rear bumper three complete cycles to help exercise the chassis.

IMPORTANT: Don't tighten the shackle nuts until the vehicle is sitting on the ground.

7. Tighten the two left rear leaf spring shackle nuts to 85N.m (63 lb. ft.).
8. Tighten the two right rear leaf spring shackle nuts to 85N.m (63 lb. ft.).
9. Verify that the lean condition is fixed.
10. If the condition still exists, perform the trim height inspection. Refer to Trim Height Inspection in SI for further diagnosis.

– *Thanks to Dan Oden*

Coolant Leak

This information applies to 2005-07 Escalade, Suburban, Tahoe and Yukon models with Auxiliary Heater (RPO C36). Some customers may comment on a coolant leak at the rear of the vehicle. Refer to bulletin 07-01-37-002 for details.

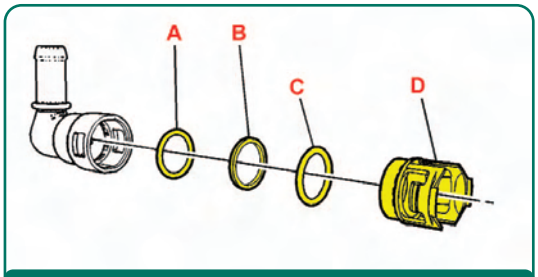
This condition may be due to the auxiliary heater hose quick connection leaking, or the retaining clip is broken.

Install an auxiliary heater inlet and outlet quick connector retainer kit. Do not replace the entire auxiliary heater hose line set.

Part Number	Description	Quantity
19130031	Retainer Kit, Auxiliary Heater Inlet & Outlet Hose Connector	1 per hose

The retainer kit components include:

A First O-ring
B Mid-spacer
C Second O-ring
D Retaining clip
and an instruction sheet



Retainer kit

Refer to the Auxiliary Heater Inlet and Outlet Hose Connector Retainer and Seal Replacement procedure in SI for more information on how to install this service kit (document 1887838).

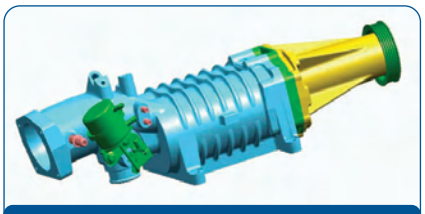
TIP: The part number in the table is available, but in the parts catalog it is not presently associated with any of the affected vehicles.

– *Thanks to Dave Roland*

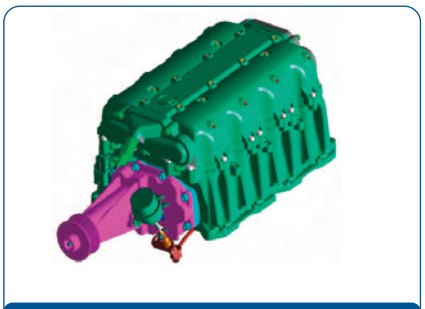
Supercharged! – continued from page 1

Add A Supercharger

Pressure – The supercharger increases engine power by forcing extra air into the engine. The intercooler (Charge Air Cooler) cools air after being compressed. The additional dense air (compressed and cooled) coupled with fuel in the correct mixture produces the additional power.



Ecotec installation



Northstar installation

Fuel throughput – The amount of power an engine can produce is proportional to the amount of fuel consumed. Fuel and air must be mixed in the proper proportion, so with more air throughput, and more fuel throughput, more power can be generated.

HOW THE SUPERCHARGER WORKS

The supercharger transfers more air into the intake manifold (boost) than the engine could pump on its own. So, more power can be created than in a comparable naturally-aspirated engine.

The supercharger drive belt is connected directly to the crankshaft and allows linear airflow delivery, meaning the supercharger displaces essentially the same volume of air per each rotor revolution, regardless of engine rpm. This increases engine torque across the entire operating range. Because the supercharger is always increasing air pressure/density in the intake manifold any time the engine crankshaft is turning, throttle response is immediate.

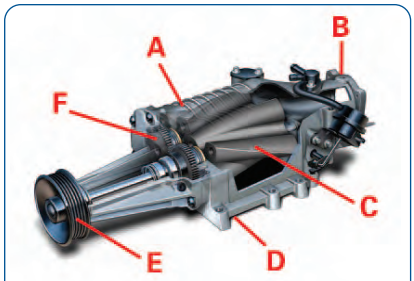
The increased throughput of air and fuel allows more power to be produced with an engine of smaller displacement. This improves fuel economy when not under load, because the engine is consuming less fuel/air mixture because of the smaller engine size.

Supercharger Operation

Two tri-lobed rotors are contained in a rotor housing. Air enters the housing through the inlet. It is trapped between the rotating rotor lobes and the housing. As the rotors turn, air is moved toward the supercharger outlet and into the engine's intake manifold.

A drive shaft attaches the pulley to one rotor. In some applications, an isolator coupling is used between the pulley shaft and the driven rotor. A set of gears transfers drive to the second rotor. The gears and bearings are sealed in a housing containing lubricant.

Each precision-machined rotor has three lobes which are twisted around the rotor axis, much like a shallow screw thread. This is called an involute profile with a 60° twist.

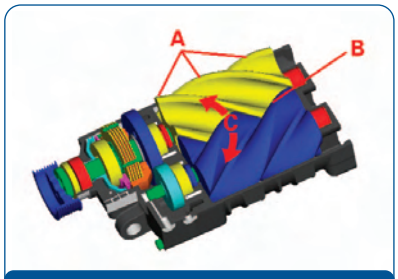


Supercharger components
A Housing B Inlet C Rotors
D Outlet E Drive pulley F Gears

The rotors run in opposite directions (counter-rotating), with the lobes meshed together.

Air is simply displaced (moved from one side of the rotors to the other). The displaced air becomes compressed when it stacks up downstream of the supercharger, because the supercharger displaces more air than the engine can consume.

Due to the involute design of the rotor lobes, the modified Roots supercharger operates with lower noise than other types of superchargers.



Supercharger rotors
A Lobes B Meshed together
C Counter-rotating

Intercooler

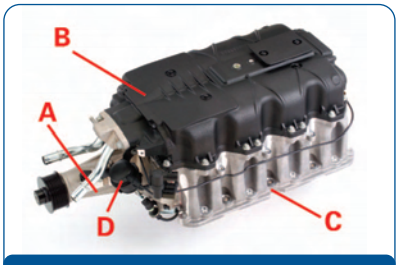
Compressing air causes its temperature to rise, reducing its density. So it's necessary to remove heat from the compressed air before it enters the engine.

An air-to-water intercooler, mounted between the supercharger outlet and the intake manifold, takes heat from the air passing through it and absorbs it into the coolant.

TIP: The intercooler has its own cooling system, with its own radiator, separate from the engine. An electrically powered pump circulates coolant through the intercooler and its radiator.

Air Path

GM North American supercharger applications use an upstream throttle body. Air flows through the air filter, to the mass airflow sensor, through the throttle body, and into the supercharger.



Intercooler and intake manifold
A Supercharger B Intercooler
C Intake manifold D Bypass valve

TIP: On the Cadillac engine, air moves upward from the supercharger outlet, through the intercooler, then downward into the intake manifold on each bank of the engine.

Excess air, between the supercharger and the intercooler, is allowed to return to the supercharger inlet by way of a bypass valve.

There are several advantages to the upstream throttle body. Both packaging and control are simplified, a smaller bypass is needed, and supercharger pulsations are better contained at part throttle.

Bypass Valve

Typically, a supercharged engine is under boost only 5-10% of the time. The rest of the time, the bypass valve allows excess air to be diverted back to the inlet of the supercharger and recirculated. This ensures that the airflow measured by the mass airflow sensor reflects the amount of air actually being consumed by the engine.

Using a bypass valve helps improve fuel economy. Under boost, the backpressure makes it harder to turn the rotors, so power is drawn from the engine crankshaft. In bypass mode, the only parasitic loss is the approximately one-half horsepower needed to overcome the frictional losses of the supercharger bearings and shaft seals.

A second key benefit of the bypass valve is the reduction of noise during unloaded conditions (idle and cruising). Under high

vacuum low load conditions, if not bypassed, the pumping pulses result in supercharger gear rattle.

The bypass valve is operated by a vacuum/pressure actuator. Inlet vacuum and manifold pressure are used to open and close the bypass valve as needed.

ENGINE DESIGN CHANGES

A supercharged engine has design requirements that are different from the naturally-aspirated engine.

Compression Ratio

Typically, a supercharged engine requires a lower compression ratio. And a smaller displacement is typically used, to improve fuel efficiency.

Naturally Aspirated Northstar V8	Supercharged Northstar V8
compression ratio 10.5:1	compression ratio 9.0:1
4.6L displacement	4.4L displacement
93mm bore x 84mm stroke	91mm bore x 84mm stroke
~ 300 HP	~ 445 HP

Accessory Drive

The supercharger has typically both the largest belt-driven spinning mass and the highest drive load. So, supercharger drive design is critical to system performance, controlling noise and long life.

Crank Train

The crankshaft nose, front bearing and drive pulley joint must be assessed for power transmission and oscillating force levels.

Rotating and Reciprocating

Because engine loading is significantly higher, piston assemblies, rings, rods and bearings are often upgraded.

Valvetrain

Valves and seat materials must be assessed for additional thermal and mechanical loads. Provisions are made to transfer heat away from the valve head area.

PCV

PCV systems must be re-plumbed to use a check valve to prevent back flow under manifold boosted conditions

Vacuum

A vacuum source may be needed for vacuum assisted brakes and other vehicle systems.

Ignition System

Higher energy is needed to create a spark adequate to ignite a high pre-combustion cylinder pressure (boosted) mixture. Upgraded ignition is likely required, along with a different spark plug heat range.

SUPERCHARGER ATTRIBUTES and QUALITIES

Whine

TIP: Whine noise is typical of all superchargers and is not a reason to replace the supercharger or other components.

Supercharger whine, inherent to the Roots design, results from six pulses per engine revolution. (2:1 drive ratio x 3 lobes). Air induction system structure and acoustic resonators are designed to minimize whine.

TIP: Whine is the noise character desired by many performance lovers.

Whistle

A whistle noise is generated by tooth contact of the spur gears between the rotors. For instance, a low level whistle may occur at 2300-2800 RPM at 80% load driving up a very long grade. Although most of these conditions are addressed by sound path isolation to the passenger compartment, some can still be heard by a very critical ear.

Supercharger Rattle (Growl)

Supercharger growl may be heard at low speed or idle, with the engine under light load.

Minuscule crankshaft speed variations, influenced by the torque converter, transmission, drive shaft, differential, and tires, are transmitted through the flexible drive belt to the supercharger. Operating in very thin air, the rotors oscillate and cause the load to alternate from the drive to driven sides of the gear teeth. (Even precision parts have operating clearances.) The entire supercharger drive system is tuned to minimize this noise.

Internal Isolator

On some current GM products, the supercharger incorporates an internal isolator between the pulley and the rotor shaft, which has two functions. The first is to minimize a knocking sound when the engine is turned off and the mass of the supercharger rotor set is suddenly jerked to a stop. And second, the isolator is tuned to minimize the normal engine firing pulses passed on to the supercharger rotor drive gears. It is active only in an unloaded condition (low engine speed point where boost is not requested).

If the engine or one of the components in the driveline is not operating to design intent, the isolator may make a harsh intermittent rattle sound that often goes through cycles as the engine speed or other conditions change slightly.

TIP: This noise is an attention-getter, but it's uncommon for it to be the fault of the supercharger.

Supercharger Rattle When Transmission Reverse is Selected

On 2006-08 XLR-V and STS-V, a rattle noise in the supercharger might occur at idle with the transmission in reverse. The bypass valve closes under this condition, resulting in the supercharger working against a vacuum with no bypass to balance the pressure, coupled with the isolator operating at the limit of its designed range. The noise is low level but may be noticed with the hood open. This is normal and will not be corrected by any mechanical repair or component change.

SERVICE and TOOLS

Service to the supercharger itself is limited to the bypass circuit. Special procedures and required tools are explained in SI.

From model year 2002, GM superchargers need no lube oil maintenance.

DIAGNOSTIC TIPS

When diagnosing any suspected supercharger trouble, familiarize yourself with the Attributes and Qualities above.

Like generators, power steering pumps, valvetrain drives and other powertrain systems, the supercharger has a characteristic low level noise. The unit and its surroundings are designed with care to avoid objectionable noises. Some noises may be heard only with the hood raised.

Verify that both the engine and vehicle systems are in good operating condition

The supercharger is a speaker for anything causing a rotational input disturbance. This includes fuel, other air delivery or measurement problems, ignition, sensors. Perform all system related diagnostics before focusing on the supercharger unit.

TIP: Disconnecting the supercharger drive belt and running the engine is NOT PROOF that the supercharger is the problem.

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Supercharged! – continued from page 5

Check for Vacuum Leaks

A very common problem is a vacuum leak, especially following service R&R work. Take care to ensure that all joints from the intake valve to the air cleaner element surface are sealed. Diagnostic codes can be set for Intake Air Flow Rationality and Fuel Trim when the intake system has even the slightest leak.

Break-in

In Roots superchargers of 2004 and later, an abradable coating is used to yield the best sealing after the unit is fully broken-in. There is initially a slight interference fit by design. The coating wears-in during the first 400 miles. Until it does, the added torque needed to turn the unit causes the isolator to operate out of the targeted design range. Typically, some level of rattle noise exists on new vehicles with zero miles.

This article has been condensed from a much longer explanation, which you can read on the *TechLink* website. Click on the Reference Guide tab and scroll down to Supercharged.

– *Thanks to Grant Brady, Frank Tornambe and Jack Woodward*

Lane Departure Warning System

2008 Cadillac DTS and STS and Buick Lucerne may be equipped with a Lane Departure Warning (LDW) system.

CAUTION: The LDW does not steer the vehicle and is only an aid to help stay in the driving lane. The LDW may not:

- Provide enough time to avoid a lane change collision.
- Be loud enough to hear the warning beeps.
- Work properly under bad weather conditions or if the windshield is not kept clean.
- Detect lane markings and will not detect road edges.
- Warn that the vehicle is crossing a lane marking if the system does not detect the lane marking.

LDW will indicate the system is working whenever it detects either the left or right lane marking. So if the driver departs on the side of the lane that LDW is not detecting, LDW will not give warning.

If vehicle position is not carefully maintained within the lane, vehicle damage, injury, or death could occur. Even with LDW, the driver must always keep attention on the road and maintain proper vehicle position within the lane. Always keep the windshield clean and do not use LDW in bad weather conditions.

When a detected lane marking is crossed, the LDW symbol will flash and three beeps will sound. LDW will not warn if the turn signal is on or if the driver makes a sharp maneuver. Before making a lane change, the driver must check the vehicle's mirrors, glance over their shoulder for vehicles and hazards, and start the turn signal before changing lanes.

How the System Works

LDW uses a camera located between the inside rearview mirror and the windshield to detect the lane markings.

To turn LDW on and off, press the LDW control located by the exterior headlamp control. An indicator on the control lights to indicate that LDW is on.

When the vehicle is started, the LDW symbol, located in the instrument panel cluster, briefly comes on to indicate that the light is operational.

LDW operates only at speeds of 35 mph (56 km) or greater. If LDW is turned on when traveling at these speeds, the LDW symbol will appear green if the system detects a left or right lane marking. The symbol will change to amber and flash and three beeps will sound if a detected lane marking is crossed without using the turn signal.

Lane Departure symbol

If the LDW symbol does not appear, LDW is not currently operating and will not provide warning.

The volume of the warning chime can be adjusted using DIC Vehicle Customization.

When the System Does Not Seem To Work Properly

The LDW symbol will not appear when the system is having difficulty seeing the lines on the road or if the view of the camera on the windshield is blocked with mud, dirt, snow, ice, or slush, if the windshield is damaged, or when weather limits visibility, such as while driving in fog, rain, or snow conditions. This is normal operation. The vehicle does not need service. LDW warnings may occasionally occur due to tar marks, shadows, cracks in the road, or other road imperfections. This is normal system operation. The vehicle does not need service.

LDW Messages in DIC

SERVICE LANE DEPARTURE SYSTEM: This message may appear in the DIC to indicate that LDW is not working properly. If this message remains on after continued driving, the system needs service..

LANE DEPARTURE SYSTEM UNAVAILABLE: This message may appear in the DIC if LDW does not activate due to a temporary condition.

– *Thanks to Chris Graham*

Limited Slip Axle Additive

A recent bulletin for the 2004-07 Cadillac XLR and 2005-07 Chevrolet Corvette explains how to address a customer concern about a clunk and/or chatter type noise from the rear of the vehicle while making turns. Refer to bulletin 07-04-20-002 (SI document 1961528) for details.

Here is an important highlight from the bulletin about Limited-Slip Axle Additive p/n 1052358 (992694 in Canada).

TIP: Before adding the limited-slip axle additive, the bottle MUST be shaken vigorously for at least 1 minute to mix the additive thoroughly, then immediately poured into the differential.

– *Thanks to Brad Thacher and Art Spong*

Passenger Presence System

There was an article in the April issue of *TechLink* explaining the Passenger Sensing System on the Grand Prix, Malibu, Aura, Ion, LaCrosse/Allure, G6 and Vue.

This article now provides some tips on the Passenger Presence System on these additional vehicles:

- Cobalt/Pursuit/G5
- Corvette/XLR
- HHR
- H3
- Rainier/TrailBlazer/Envoy
- Terraza/Montana/Uplander
- Rendezvous
- Colorado/Canyon

How the System Works

The main function of the Passenger Presence System (PPS) is to determine whether to turn the right front passenger airbag ON or OFF, based on the occupant's size and weight. There are three components that make up the PPS. These are the module, fluid filled sensing mat with pressure sensor, and belt tension sensor (BTS). The module and sensing mat are part of the seat, while the BTS is part of the passenger belt retractor system or buckle, depending on the vehicle.

When an occupant is in the passenger seat, pressure is applied to the sensor mat. The sensor mat changes the pressure signal into an electrical signal that the module reads. The module also reads belt tension from the BTS and will offset the signal from the sensor mat if belt tension is high enough. If any of these three components or wiring to these components fails, the PPS will set a PPS DTC.

For additional information, a streaming video from the GM Training website is available. Click Web Video Library from the main menu, then Technical, and then do a key word search on Occupant. The course, 22048.40V – Occupant Safety Systems, is at the top of the list. You can also call 1.800.393.4831 to order a copy of this video.

Flashing Codes and Re-Zeroing Process

The Diagnostic Trouble Code (DTC) information for the PPS can be retrieved with the Tech 2 tool and displayed through the passenger airbag status display.

Passenger airbag status display

This system displays only SDM DTC B0081 or B0092 on the Tech 2. To access PPS diagnostic codes, follow the SI instructions for flashing DTCs.

The Tech 2 command sequence takes a total of 10 seconds to transmit, during which the status display will change its illumination intensity level according to the pattern defined for that sequence.

If the PPS receives the command successfully, it will command both telltales to full illumination for 1 second, then turn them off for another second.

Then it will display the most significant digit of the DTC by commanding the OFF telltale to flash a number of times, representing the digit.

After the most significant digit has been displayed, the system will display the least significant digit by flashing the ON telltale.

Digit	Most	Least
Code	2	3
Telltale	OFF	ON

For example, DTC 23 will flash the OFF telltale 2 times then, then the ON telltale 3 times.

If the DTC is active (the condition that created the fault is still present), the code will be displayed two consecutive times.

If the DTC is a history code (the fault condition is no longer present), the code will be displayed only once.

The system will display all active codes first, then the history codes.

The DTCs are defined as follows:

DTC No.	Description	Possible Cause
23	BTS Fault	1. Seat wiring harness problem 2. Belt tension sensor failure
24	Low Voltage Fault	1. Vehicle voltage drop below 9 volts at one time
33	Active Switch Fault	1. Active switch problem (if equipped) 2. Active switch wiring harness problem
63	Re-zeroing Fault	At the time the re-zeroing attempt was made: 1. The seat was not empty 2. Other active DTCs present in the system
64	System Malfunction Fault	1. Communication error 2. Wiring harness problem to pressure sensor
65	System Fault	1. Wiring harness problem 2. ECU component problem

Generally, if the PPS has history codes only and no active codes are currently set, there is no need to replace the system. The history codes still need to be cleared through the Tech 2 tool, and appropriate electrical tests and visual inspections must be conducted in order to ensure that there is no intermittent problem.

After installing a PPS service kit, the system needs to be re-zeroed using the Tech 2 tool. This will update the empty seat reference values stored in the ECU and ensure proper system performance.

After the PPS recognizes the re-zeroing command, there are two scenarios:

1. If the system classifies the current seat condition as Empty, it will update the reference values. After 20 seconds, cycle the ignition OFF to ON. Then do one of the following:
   a. Sit in the passenger seat and verify that the telltale changes from OFF to ON with an adult occupant. If the telltale does not change, follow the SI instructions for flashing DTCs.
   b. Follow the SI instructions for flashing DTCs and verify no DTCs exist. If DTCs exist, follow proper repair procedures.
2. If the system detects that the seat is not empty or a DTC condition exists, it will command both telltales to alternately illuminate from OFF to full illumination at 1 second intervals for 5 seconds.

In addition, a DTC 63 will set to indicate that the re-zeroing process has failed.

IMPORTANT:

1. If the system fails to re-zero, verify the passenger seat is empty and no active DTCs exist. Then resend the zero command and follow the instruction above at least three times.
2. During the re-zeroing process, the seat must be empty of all objects and the clearance specified in SI must be observed.

IMPORTANT: Replace the parts as a set. Cushion, sensing mat and module must not be separated, because they were calibrated as a kit.

– *Thanks to Esther Anderson and Tim Arnold*

Car Issues – Fix It Right the First Time

Model Year(s)	Vehicle Line(s) / Condition	Do This	Don't Do This	Reference Information / Bulletin
2003-06	CTS – Squeak/creak noise in front end at slow speeds while braking or turning	Install new insulating spacer & rate washer	Don't replace entire control arm	06-03-08-008
2003-06	ION – No crank or no start, codes set	Codes set – replace ignition switch. Service part installed – install new BCM	Don't replace BCM unless ignition switch previously replaced	04-08-45-005C
2006	HHR and Cobalt – A/C does not cool, noise from engine compartment and/or IP	Check refrigerant charge, replace A/C lines	Don't change A/C compressor	06-01-38-004B
2003-07	VUE, Equinox, Torrent – Ignition lock cylinder sticks or binds	Clean ignition cylinder lock and housing	Don't replace ignition cylinder lock and key	06-02-35-016
2006-07	DTS, Lucerne – Components available for servicing mirror	Replace mirror component	Don't replace mirror assembly	06-08-64-022
2006-07	Lucerne – Poor headliner fit in rear	Repair headliner	Don't replace headliner	PIC4189
2005-07	STS with Navigation Radio (RPO YQ4) – Numerous operating conditions	Reflash radio	Don't replace radio	05-08-126-001A
2002-07	ION, VUE, Equinox, Torrent, G5, Pursuit (Canada), Cobalt – Front bottom seat cover loose	Repair seat cover	Don't replace seat cover	06-08-50-005A
2006-07	Lucerne – Noise when making turns at slow speeds	Align I-shaft to steering column	Don't replace intermediate shaft or steering gear	06-02-35-009D

Truck Issues – Fix It Right the First Time

Model Year(s)	Vehicle Line(s) / Condition	Do This	Don't Do This	Reference Information / Bulletin
2002-07	RPO LL8 engine – Misfire, SES light, codes set	Inspect for build-up on spark plug boot, replace AIP seal	Don't return vehicle without replacing AIP seal	06-06-04-048
2007	Escalade, Yukon, Tahoe, Suburban – Clips available only with pipe bundle	Replace clip, O-rings and spacer	Don't replace heater pipe bundle	07-01-37-002
2006-07	Rainier, TrailBlazer, Envoy, 9-7X – Shift indicator does not show correct gear	Readjust shift cable	Don't replace shift cable, P/N switch, or shift assembly	PIT4108A 06-07-30-029
2005-07	TrailBlazer, Envoy, Rainier, 9-7X – Headliner drops down and comes loose around sunroof opening	Repair headliner	Don't replace headliner	06-08-110-003A
2002-07	Rainier, TrailBlazer, Envoy, Bravada – Steering gear squeak or fluid leak at pinion seal	Install steering gear stub shaft bearing kit	Don't replace steering gear	04-02-32-001A
2007	Full-size utility – Third row seat squeak in tumble position	Position escutcheon, install foam flock tape	Don't replace seat adjuster	07-08-50-004

Powertrain – Fix It Right the First Time

Model Year(s)	Vehicle Line(s) / Condition	Do This	Don't Do This	Reference Information / Bulletin
2002-06	Rendezvous, Terraza, Venture, Uplander, Silhouette, Aztek, Montana, RELAY – Moan or groan from RDM during turning maneuvers	Perform refill procedure	Don't replace RDM if it passes tests in SI	06-04-114-001
2007	VUE Hybrid – DTC P0A4B	Install engine wiring harness jumper	Don't replace SGCM or MGU	07-06-03-004
2006-07	GEN IV V8 Engines – Oil leak at oil pressure switch on active fuel management engines	Repair oil leak at oil pressure switch	Don't replace oil pressure switch or VLOM assembly	PIP3998A 07-06-01-004

Know-How Broadcasts for September

10207.09D Emerging Issues	September 13, 2007	9:30 AM and 12:30 PM Eastern Time
New Model Features	For Web NMF courses, log on to the GM Training Website (www.gmtraining.com). Select Service Know-How/TechAssists from the menu, then choose New Model Features for a selection of courses.	

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– Thanks to Tracy Rozman