ServiceInsights

FOR INDEPENDENT SERVICE CENTERS

Genuine GM Parts | ACDelco

OCT–DEC 2011

ALSO IN THIS ISSUE

THE ALL-NEW 2012 SONIC ARRIVES

U.S.A-built Chevy Sonic with turbo-charged Ecotec and 6-speed manual delivers exciting performance.

More on the Sonic inside, including service procedures.

More resources at www.genuinegmparts.com

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Genuine GM | Parts

GM ServiceInsights Online

More Genuine GM Parts resources and links.

Download this issue and past issues of GM ServiceInsights magazine at…

www.gmserviceinsights.com

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Compliments of your GM dealer.

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Genuine GM | Parts

OE Service Quality at Competitive Prices.

Now, we're making it easier than ever to get competitive pricing on an expanding list of Genuine GM Parts and ACDelco Powertrain Parts your shop needs for everyday repair jobs.

OE Service quality at pricing you'll like . . . why trust your business – or reputation – to anything else?

QUALIFYING POWERTRAIN COMPONENTS . . .

- > PULLEYS / TENSIONERS / BALANCERS
- > 4-WHEEL DRIVE ACTUATOR MOTORS
- > ENGINE OIL COOLER LINES
- > INTAKE MANIFOLDS & GASKETS
- > GENUINE GM PARTS ENGINE & TRANSMISSION ASSEMBLIES
- > CYLINDER HEADS
- > TURBO CHARGERS & SUPERCHARGERS
- > OE CLUTCH KITS

PULLEYS & TENSIONERS

Symptoms:
- Often damaged from attempts to remove without the proper puller
- Debris can cause the belt to run off the pulley

HARMONIC BALANCERS

Symptoms:
- Noise or vibration when out-of-balance
- Debris can cause damage to neoprene or coatings

4WD ACTUATOR MOTORS

Symptoms:
- Encoder sensor failure
- Wiring/Electrical failure

ENGINE OIL COOLER LINES

Symptoms:
- Fitting or seal failure
- Debris contamination

INTAKE MANIFOLDS

Symptoms:
- Coolant passage leaks
- Warpage/loss of seal

INTAKE MANIFOLD GASKETS

Symptoms:
- Coolant leaks
- Seal failure

Contact your participating dealer for a competitive quote.

More resources at
www.genuinegmparts.com

GM DEBUTS NEW LINE OF REMAN ACTUATOR MOTORS.

A broad range of Chevrolet, GMC and Cadillac 4-wheel drive pickups and SUVs can now be outfitted with remanufactured actuator/encoder motors. All boast the GM assurance of quality.

The remanufactured units, introduced and continuing to roll out this year, also offer lower prices.

"We've benchmarked the competition and determined that we can more than compete with aftermarket units at very competitive prices," says Keith Loch, GM Engines and Transmissions product specialist with GM Customer Care and Aftersales.

The actuator line, which was launched earlier this year with one application that is being followed by two more, are validated by GM engineers and can even be used in vehicles still under warranty.

"These reman units are not reverse engineered, and they can come with enhancements that address any failure modes or technical service bulletins that turn up later," Loch says. "Aftermarket products can't say that."

"Sales typically skyrocket in November as the first snowfalls bring out the plows and commercial applications and owners discover the motors need replacing," Loch says. "Now may be a good time to stock up."

Three new reman actuator motor applications cover millions of popular 4WD vehicles.

For Tahoes and Silverados, 2003-2007

Part number 19125571, the first to be introduced, has applications in 4-wheel drive full-size pickups and SUVs like Chevrolet Tahoes and Silverados spanning the 2003-2007 model years.

For Tahoes, Silverados and Yukons with 4L80 transmissions, 2003-2007

Part number 19125578 is for heavy-duty applications in model years 2003-2007. Tahoes, Silverados and Yukons with 4L80 transmissions are typical makes/models.

For mid-size pickups and SUVs, 1992-2005

Part number 19125573 is designed for mid-size pickups and SUVs made from 1992-2005.

Repair Industry News & Updates

With A Few Mouse Clicks...

MORE relief for the daily parts hunt now in sight.

As OEConnection and Snap-On Business Solutions continue to roll-out their new "RepairLink with MORE" online parts ordering system, Independent Service Centers (ISCs) across the country are discovering how easy it can be to identify, locate and order original equipment parts.

The RepairLink with MORE (Mechanical Original Replacement Equipment) web-based platform brings OE parts suppliers, including Genuine GM Parts, their dealer networks and ISCs together in an unprecedented collaborative effort to facilitate parts ordering.

The service, available at no cost to an ISC, has been conceived as a time-saving replacement for the standard OE parts ordering process. By using a resource-laden online system, time consuming phone calls, faxes and emails can be kept to a minimum.

"Instead of ISCs having to call their dealer to see if they have a part and the dealer faxing parts illustrations back, all of it can be done online through RepairLink with MORE," says Seth Galvarro, OEConnection product manager, Mechanical Team. "Many shops have been ordering non-OE aftermarket parts in this fashion, so they're accustomed to it. Since we're multi-OEM, shops don't have to learn a separate system for each OE parts supplier."

With RepairLink with MORE enabled on their shop computer system, ISCs gain access to a host of information in participating OEM parts catalogs. Once connected, an ISC can enter a VIN or YMM and begin searching for parts utilizing a keyword search or a category search. When parts are identified, detailed illustrations showing parts and complete parts assembly drawings help ensure that orders are correct and complete.

After determining which parts are needed, ISCs can search a dealer's inventory for availability and pricing. The parts can be saved to a shopping cart or ordered online directly from the dealer, which will invoice and bill accordingly. Once the dealer has the information, orders are filled and deliveries are scheduled. ISCs can monitor the status of their orders after placing them and can freely communicate with dealers via notes and image attachments through the system.

To get started on using RepairLink with MORE, ISCs can log on to **www.moreoemparts.com**. A key part of the registration process involves selecting preferred OE dealer partners.

OEConnection

With MORE, you now have fast, easy access to original equipment parts-catalog information and online ordering.

repairlink with MORE PARTS MECHANICAL ORIGINAL REPLACEMENT EQUIPMENT

Repair Industry News & Updates (cont'd.)

To participate, a dealer must be part of the RepairLink with MORE network. ISCs then must select a preferred dealer for each OEM they select. The online system will be set up to funnel orders to that preferred dealer. With the preferred-dealer link established, ISCs will be able to see pricing and availability their dealers offer.

"By the end of 2011, RepairLink with MORE will be available in all major markets," says Galvarro. "As the only multi-makes online ordering solution for OE mechanical parts, it offers yet another compelling reason for ISCs to choose OE parts over aftermarket substitutes. So far, ISCs have shown considerable interest in the service and many have become more firmly convinced of the superiority of OE parts," he concluded.

"The feedback has been that many love having immediate access to parts catalogs and dealer pricing so they can do a customer repair quote on the fly," he says. "They're finding OEM parts are more competitively priced than they imagined; they just never bothered to quote them because they didn't want to wait on the phone or for faxed parts illustrations."

For more information
Visit MOREOEMPARTS.COM
Or call 866.401.4610

Industry Exposition Run-Down

Fall is "Show Time" for the automotive industry in Las Vegas, Nev.

ATRA – October 27–31

The GM Powertrain exhibit at the ATRA (Automatic Transmission Rebuilders Association) show is in Las Vegas Oct. 27–31. The event is staged alongside the Automotive Parts Remanufacturers Association (APRA) expo. For information visit **http://members.atra.com/**.

SEMA Show – November 1–4

GM is exhibiting at booth number 23743 at the 2011 SEMA (Specialty Equipment Market Association) Show held at the Las Vegas Convention Center Nov. 1-4. Visit **www.semashow.com** for more information.

AAPEX – November 1–3

ACDelco is exhibiting at booth number 4838 at the 2011 AAPEX (Automotive Aftermarket Products Expo) event held Nov. 1–3 at the Sands Expo Center in Las Vegas. For information on this event, visit **www.aapexshow.com.**

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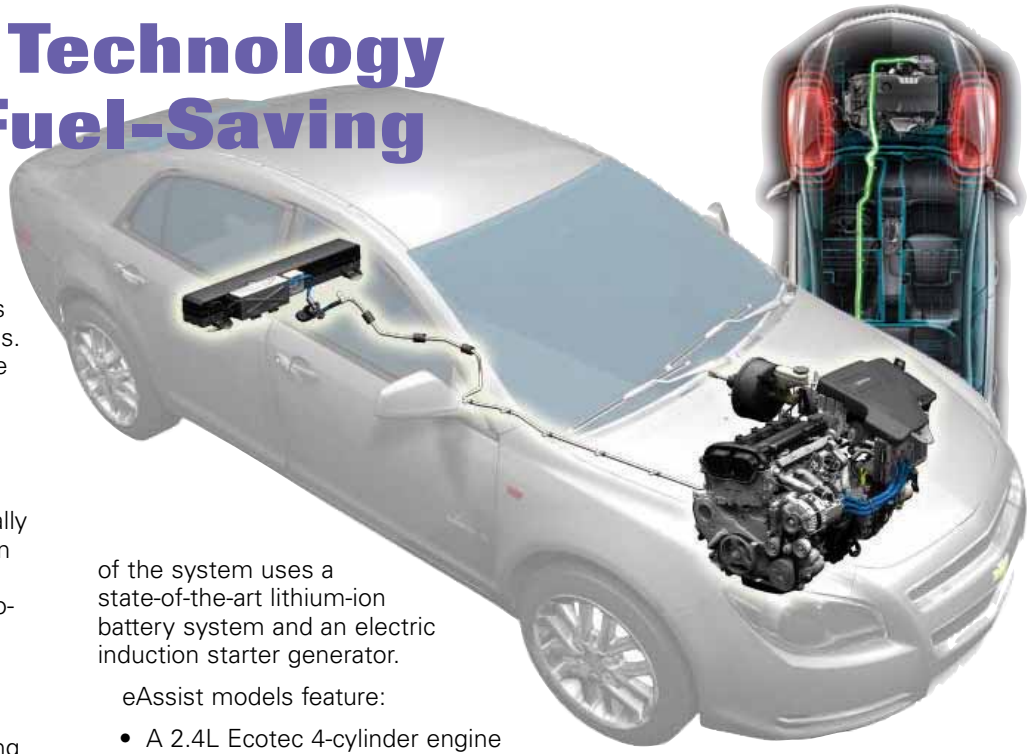
ACDelco
TechConnect

Start/Stop Technology Aids New Fuel-Saving Systems



Step on the brake pedal, come to a complete stop, and the engine turns off, saving fuel and reducing emissions. Release the brake pedal and press the accelerator pedal, the engine starts again. It all happens seamlessly without interruption of any accessory operations.

A start/stop system that automatically turns off and restarts the engine when the vehicle is stopped can deliver a substantial improvement in fuel economy by simply reducing the amount of time the engine idles. Many vehicles with a start/stop system are not full hybrid electric vehicles that have the added cost and complexity of powering a vehicle completely on battery power. These fuel-saving systems are becoming more commonplace on new vehicles, such as the new 2012 Buick LaCrosse, which will have start/stop technology as a standard feature on the base model.

Starter generator

New eAssist System

In addition to the 2012 Lacrosse, the 2012 Buick Regal also will offer a start/stop system. The new GM system is called eAssist™. The 2012 LaCrosse and Regal offer impressive 25% fuel economy gains over the 2011 models without eAssist. The start/stop feature of the system uses a state-of-the-art lithium-ion battery system and an electric induction starter generator.

eAssist models feature:

- A 2.4L Ecotec 4-cylinder engine mated to a Hydra-Matic 6T40 automatic transmission
- A starter generator, or drive motor, mounted to the front of the engine in place of the alternator
- An air-cooled generator control module comprised of the eAssist powertrain control module, 14 volt power module and drive motor control module
- A hybrid/EV battery pack that stores 115V DC in two lithium-ion battery sections
- Lightweight 17-inch alloy wheels and tires with lower rolling resistance
- Regenerative braking, which provides up to 15 kW of electricity to charge the high-voltage battery
- A driver-selectable, fuel economy-optimizing eco mode for the air conditioning system, which enables more frequent and longer-duration engine Auto Stop periods

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ON THE WEB

- www.acdelcotechconnect.com, click the *TechConnect* Magazine link, or
- Log in to the ACDelco LMS, click the Resources link

Start/Stop Technology –

continued from page 1

The liquid-cooled electric induction starter generator is a three phase AC induction machine that serves as a 115-volt AC generator and is used to provide engine power assist as well as to start the engine when in Auto Stop mode. As a generator, it provides up to 15 kW of AC power to the drive motor control module. As a motor, the starter generator provides up to 11 kW of electric power assistance and engine starting. The starter generator is connected to the crankshaft pulley using a specially designed serpentine belt and drive belt tensioner

The eAssist generator control and battery module assembly contains the high-voltage lithium-ion battery pack, the integrated power inverter and 14V power module. It is located in the forward area of the trunk compartment and weighs about 65 pounds (29 kg). An electric fan cools the generator control and battery module, drawing air from a vent located in the package tray, behind the rear seat.

An auxiliary, electric-driven transmission oil pump has been added to keep the transmission fluid flowing and clutches applied when the engine shuts down during an Auto Stop.

Auto Stop

While driving, when the brake is applied and the vehicle comes to a complete stop, the engine will turn off, depending on operating conditions. This is referred to as an Auto Stop (the tachometer gauge will read AUTO STOP). The engine restarts immediately when the brake pedal is released or the accelerator pedal is applied. The maximum Auto Stop time is two minutes under ideal conditions.

There are several conditions that may cause the engine to remain running or restart when the vehicle is stopped. These include:

- The engine, transmission or high-voltage battery has not reached operating temperature
- The outside temperature is less the –4°F (–20°C)
- The shift lever is in any gear other than Drive (D)
- The high-voltage battery state-of-charge is low
- The climate control system requires the engine to run based on the climate control or defog setting. Using the eco air conditioning mode will result in more frequent and longer Auto Stops
- The Malfunction Indicator Lamp (MIL) is illuminated

To view the parameter for an Auto Start, review the scan tool Hybrid Data list available in the engine control module. This list contains parameters that are directly related to the Auto Start/Stop feature. Look for Eng Auto Start Reason. This parameter will list the last command that caused the Auto Start feature to engage.

Electric Boost

The eAssist system also uses power stored in the 115V lithium-ion battery to provide an electrical boost in various driving scenarios.

The high-voltage battery system is designed to provide power assistance to the internal combustion engine, rather than store energy for all-electric propulsion. While in fuel shut-off mode, the induction motor-generator unit continues spinning along with the engine to provide regenerative braking, torque smoothing and immediate take-off power when the driver presses on the accelerator. Then, as the vehicle comes to a stop, the induction motor-generator unit spins the engine, bringing it to a smooth stop – properly positioned for an immediate restart when the driver releases the brake pedal or applies the accelerator pedal.

Power Electronics

The power electronics provide three basic functions.

When the system is in the motoring mode, the power electronics invert the hybrid electrical power from direct current (DC) to 3-phase alternating current (AC), which is then passed on to run the generator with starter as a motor. This provides quick engine auto-starts, torque smoothing, and electric power assist as needed.

When the system is generating electricity for subsequent high-voltage battery storage, the power electronics rectify the 3-phase AC electrical power input to a DC electrical power output.

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ACDelco TechConnect

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ACDelco TechConnect is published for automotive technicians to provide timely service information, increase knowledge and improve the performance of the service center.

ACDelco 360 represents our mission to look at our businesses at every possible angle to provide value and assistance to our distributors and their customers as well as offer a full circle of support with programs, tools, training and marketing focused on enhancing and growing our partnership successfully.

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– Log in to the ACDelco LMS, click the Resources link

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Start/Stop Technology – continued from page 2

In this mode, the energy required to drive the engine may come from either gasoline when accelerating or the kinetic energy of the moving vehicle when decelerating with the fuel cut off.

Finally, whether motoring or generating, the power electronics convert the hybrid battery DC electrical input to a low voltage electrical output that is used to provide both vehicle accessory power and to keep the 12V battery charged.

A/C Operation

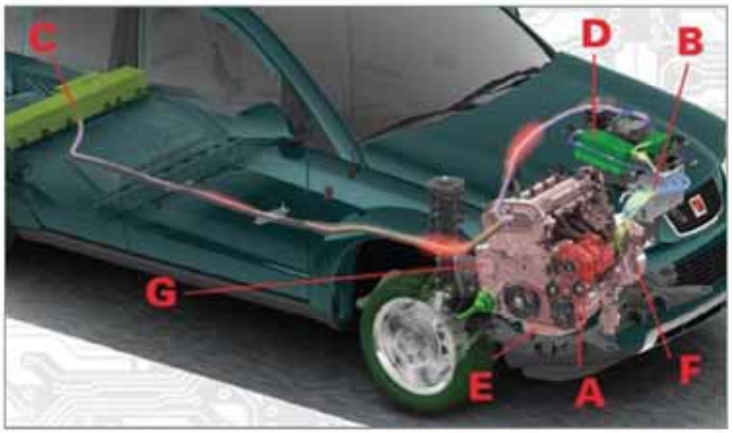
The air conditioning controls permit the driver to select between eco and normal operating modes.

Eco mode allows the engine to enter Auto Stop mode more often and for a longer duration. When this happens, the A/C compressor also stops, which may allow cabin temperature to rise, but fuel economy is maximized. To maintain cabin comfort in the eco mode, the recirculation button can be activated.

First Generation

Earlier GM vehicles to use a start/stop system to improve fuel economy were the Saturn VUE Green Line Hybrid, Saturn AURA Green Line Hybrid and Chevrolet Malibu Hybrid models.

The Saturn VUE Green Line Hybrid, the first to debut the system, uses a 2.4-Liter Ecotec engine, a modified 4T45E automatic transmission, and a starter generator assembly. The system also provides electric power assist while driving or during acceleration when needed. The system automatically maintains accessory functionality and passenger comfort when the engine is stopped.



The major components of the Saturn VUE Green Line Hybrid include:

A. A starter generator (3-phase, 65 Nm stall torque, 3kW continuous power) hard-mounted to the engine with a dual-tensioner assembly that combines a hydraulic tensioner and friction-based rotary tensioner on a common, pivoting arm, which ensures sufficient tension is available in both motoring and generating modes.

B. Generator control module with an inverter and power converter that controls the generator and provides 12V vehicle accessory power

C. A 36V advanced, nickel metal hydride (NiMH) hybrid battery pack capable of delivering and receiving more than 10kW of peak power

D. An engine control module with sophisticated Hybrid Supervisory Software to manage both engine and hybri system operation

E. An engine accessory drive with dual tensioner assembl and 7-rib Aramid cord belt that enables reliable transfer of torque for both motoring and generating

F. 4T45-E electronically-controlled transmission that includes an auxiliary oil pump and unique hybrid control to ensure seamless hybrid operation.

G. 2.4L 4-cylinder VVT Ecotec engine

Safety Considerations

High-voltage hybrid systems produce voltages higher than a conventional 12V system, and even small currents can be dangerous.

All intermediate-voltage circuits are identified with blue wiring conduits.

Safety precautions are described in appropriate Service Information. Become familiar with these precautions and always observe them.

Some important safety practices:

- Remove or cover belt buckle
- Wear safety glasses
- Wear rubber-soled shoes
- It is recommended to wear class 0 isolation gloves (leather outside, rubber inside), which are rated up to 1000V
- Know where the components are located in the hybrid system and follow all precautions

Class 0 isolation gloves

ACDelco Training

ACDelco offers a number of advanced technology training courses, including Web-based Training (WBT), Instructor-led Training (ILT) and seminars (SEM). Available ACDelco hybrid system training courses include:

- High Voltage System Safety, S-EL06-42.01WBT
- Advanced Technology Vehicle Power Electronics, S-EL06-55.01WBT
- Hybrid Technology, S-EL06-41.01SEM
- Hybrid Aftermarket Service, S-EL06-42.01SEM
- Hybrid Technology and Service, S-EL06-12.01ILT

– *Thanks to Steve Bunce, Paul Ghanam, Mike Pontello and Irina Novikova*

First Responders Information

Information on GM vehicles with alternative powertrains, including models with the latest eAssist system, the Volt, and other hybrid models, is available to first responders and other emergency rescue personnel through the GM Service Technical College at www.gmstc.com.

ACDelco service centers may want to point out how to find this valuable information online, which emergency vehicle fleet customers may find helpful in their training efforts.

The website information provides details about the design and operation of GM vehicles with alternative powertrains, which may affect how first responders perform in an emergency situation.

Each supported vehicle or system on the website includes a First Responder Guide and/or a Quick Reference Sheet. This information is intended to help first responders apply existing knowledge of how to remove passengers safely when responding to a GM vehicle involved in an emergency situation.

Information reviewed may include:

- Vehicle identification to determine if high voltage circuitry exists in the vehicle
- High voltage circuit disabling procedures to avoid personal injury in an emergency situation
- High voltage labels that identify potential electrical hazards
- Cable cut labels to disable the low voltage system that provides energy to enable the high voltage system
- High voltage cable location
- High strength steel location
- First responder considerations regarding fire and water immersion
- Vehicle "Do Not Cut" zones


2012 Buick LaCrosse and
2012 Buick Regal eAssist Vehicles
Quick Reference Sheet

The information is available free of charge and can be downloaded from the website or printed in order to be displayed in a classroom.

– Thanks to Greg St. Aubin

New Online Technical Product Service Videos

Looking for technical information about the diagnosis and service of brakes, drive belts, starters, alternators and other ACDelco parts? Check out the latest technical product service videos available on www.acdelcotechconnect.com.

Video topics covered include:

- Brake pads and rotors
- Steering system service, including pulley removal and installation, bleeding, and flushing as well as steering pump diagnosis
- Accessory drive belts, including belt slip diagnostics
- Starters and alternators
- Powertrain components, including 4L60E transmission upgrades and 4WD actuator motor service

Each of the videos offers a variety of diagnostic tips and service insights along with helpful information about ACDelco products.

Scan the QR code with your smartphone for a list of available Technical Product Service Aids.

New technical product service videos are available on www.acdelcotechconnect.com

To view the videos, go to www.acdelcotechconnect.com and click Product Information > Technical Product Service Aids.

– Thanks to Rick Balabon

VIN Cards Available on ACDelcoTechConnect.com

GM Vehicle Identification Number (VIN) cards for all GM vehicles are available on the ACDelco TechConnect website as well as in the GM Service Information (SI).

VIN card information is available from the current model year back to 1972.

ACDelco TechConnect

On the web, VIN information is available without a password, account or login requirements via the ACDelco TechConnect website. Customers, government agencies, independent repair facilities, and any other outside body that requires GM VIN decoding information should use this method of access.

To access GM VIN information on the web, go to www.acdelcotechconnect.com and click the link on the left side of the page labeled GM VIN Information. Click the desired model year from the displayed list.

Service Information

To access the VIN decoding information in the GM Service Information, build a vehicle with division, make, and model year information, select the Service Manual, and then go to General Information > General Information subsection > Introduction > Vehicle, Engine and Transmission ID and VIN Location, Derivative and Usage.

– Thanks to Mike Golinski

Take the Diagnostic Skills Challenge on the ACDelco LMS

The ACDelco Diagnostic Challenge simulations give technicians a chance to prove their skills against one another by putting their ability to diagnose and repair a vehicle to the test.

The simulations, available on the ACDelco Learning Management System (LMS) — go to www.acdelcotechconnect.com and click the Training tab — are designed to duplicate the diagnostic process in the service center, testing technicians to use their diagnostic skills to efficiently diagnose and repair the given condition using all of the provided tools, parts and Service Information. Technicians compete against one another with the top scores posted online.

Currently, there are four simulations available:

- S-AC07-01.01SIM — HVAC System Diagnostic Challenge
- S-BK05-01.01SIM — Brake System Diagnostic Challenge
- S-EL06-01.01SIM — Electrical System Diagnostic Challenge
- S-EP08-01.01SIM — Engine Performance Diagnostic Challenge

Choose Wisely

Just as in the real world, the simulated workstation is dependent on the technician's ability to diagnose the condition and complete the repair. The simulation allows the user to freely navigate anywhere on the screen during diagnosis. As you progress through the simulation, you need to think of the next steps to be taken, just as you would when working on a vehicle in the shop.

Each simulation provides virtual tools to help in diagnosis.

The virtual tools that are available to help in the diagnostic and repair process are the same as you would find in a shop environment. The tabs on the simulation screen provide access to Service Information, the work order, a variety of tools (including a scan tool, digital multimeter, refrigerant pressure gauge set and others) and the parts counter where parts can be ordered for a particular repair.

Just as the appropriate tools and paths are provided within the simulation, other tools and paths that are not part of the optimum path for the given scenario also are provided.

Because the simulations are not training components, minimal or no feedback is given when an incorrect selection is made. However, if a technician strays too far from the Strategy Based Diagnosis path or attempts to install a replacement part without properly diagnosing the condition, a message offering suggestions may appear.

Scoreboard

A technician's overall score is based upon the amount of time it takes to complete the simulation while following the optimum path. The optimum path is the shortest path to efficiently and quickly diagnose and complete the repair, as dictated by following the Strategy Based Diagnosis process. Technicians can retake the simulation as many times as they would like in order to improve their score.

Top scores are posted on the ACDelco LMS

Each simulation begins with one hundred points. One point is deducted for each choice or selection that is not part of the optimum path. In addition, after a predetermined amount of time, one point is deducted for each minute that passes. At the end of the simulation, a series of questions are presented and one point is deducted for each incorrect selection. Points are not deducted for using the Help tab or for obtaining information on how to navigate within the simulation or Strategy Based Diagnosis process. Upon completing the simulation, the overall score will appear.

Technicians that score in the the top five for each simulation will have their score, shop name and location posted to the Simulation Scoreboard on the LMS. To view the top scores, click on the View the Simulation Scoreboard link on the LMS training Home page.

Try One

The diagnostic simulations are accessible via the catalog search function on the ACDelco LMS by selecting "Simulation" on the Course Delivery Type drop-down menu. The simulations also can be accessed by clicking the Simulations link under Technical Training on the Home page.

– Thanks to Greg St. Aubin

TECH tips

The following technical tips provide repair information about specific conditions on a variety of vehicles. If you have a tough or unusual service repair, the ***TSS Technical Assistance Hot Line*** *can help. Call* ***1-800-825-5886, prompt #2****, to speak with a technical expert with the latest OEM information.*

Chromed Aluminum Wheel Damage

2012 and earlier GM cars and trucks

Chemical staining of chrome wheels in most cases results from acid-based cleaners. These stains on chrome wheels — frequently milky, black, or greenish in appearance — result from using cleaning solutions that contain acids. Soap and water is usually sufficient to clean wheels.

Wheel cleaners that are safe for chromed wheels do NOT contain the following:

- Ammonium Bifluoride (fluoride source for dissolution of chrome)
- Hydrofluoric Acid (directly dissolves chrome)
- Hydrochloric Acid (directly dissolves chrome)
- Sodium Dodecylbenzenesulfonic Acid
- Sulfamic Acid
- Phosphoric Acid
- Hydroxyacetic Acid

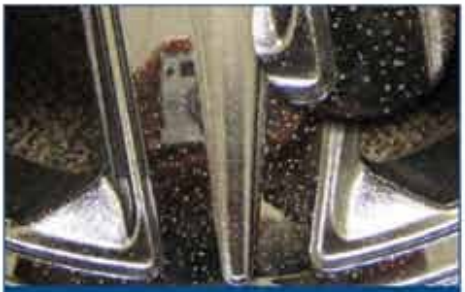
Also keep in mind that many wheel cleaner instructions advise to take care to avoid contact with painted surfaces. Many vehicles have painted brake calipers. Acidic wheel cleaners may damage the paint on the brake calipers.

Any wheel cleaner must be thoroughly rinsed off the wheel with clean, clear water. Special care must be taken to rinse under the hub cap, balance weights, wheel nuts, lug nut caps, between the wheel cladding and off the back side of the wheel.

Staining or finish disturbance also may result from road chemicals, such as calcium chloride used for dust control of unpaved roads. The staining will look like small pitting and will usually be on the leading edges of each wheel spoke. If a vehicle must be operated under such conditions, the chrome wheels should be washed with mild soap and water and thoroughly rinsed as soon as conveniently possible.

Contact with applied road chemicals is corrosive to the wheel finish and may cause damage if the wheels are not kept clean.

Another type of finish disturbance results from prolonged exposure to brake dust and the resulting penetration of the dust through the chrome. As brakes are applied, hot particles of brake material are thrown off and tend to be forced through the leading edge of the wheel spoke windows by airflow. These hot particles embed themselves in the chrome layer and create a small pit. If the material is allowed to sit on the wheel while it is exposed to moisture or salt, it will corrode the wheel beneath the chrome, leaving a pit or small blister in the chrome.



Pitted wheel damage from road chemicals.

Heavy brake dust build-up should be removed from wheels by using a chrome cleaner and polish.

After cleaning, the wheel should be waxed to help protect it from brake dust and reduce adhesion of any brake dust that gets on the wheel surface.

It's vital to keep the wheels clean and free of prolonged exposure to brake dust build-up in order to maintain a quality wheel appearance.

Passenger Presence System Indicator On Due to Electronic Devices

2009-2012 Cadillac CTS, Chevrolet Impala, GMC Acadia; 2010-2012 Cadillac SRX, Chevrolet Equinox, GMC Terrain; 2009-2010 Chevrolet Cobalt (excluding SS), Saturn OUTLOOK; 2009-2011 HHR (excluding SS); 2010 Saturn VUE; and 2012 Chevrolet Sonic

When certain electronic devices, such as computers, MP3 players, cell phones, a scan tool, etc., are placed on the front passenger seat, the front passenger airbag indicator may illuminate. The seat belt reminder light/chime may also be activated.

This is due to the fact that some electronic devices placed on the front passenger seat may interfere with the electric field generated by the Passenger Presence System (PPS) system, causing it to enable (turn On) the passenger airbag and turn on the safety belt reminder light and chime — even though the seat is not occupied. The electronic device does not necessarily need to be turned on to cause this condition. Several Diagnostic Trouble Codes also may set, depending on the vehicle. If the electronic device is removed from the front passenger seat, the DTC will go into history.

If this happens, all Sensing and Diagnostic Module (SDM) and PPS DTCs should be cleared using a scan tool. If the DTC is still current, follow the service procedure in the GM Service Information for that DTC.

Never rest the diagnostic scan tool or components on the passenger front seat or touch the passenger front seat while the diagnostic scan tool is in contact with your body. This may cause the SIR lamp to illuminate while holding the diagnostic scan tool because your body can transfer the electronic "noise" to the sensor mat in the passenger front seat.

Advise customers to avoid placing the electronic device on the front passenger seat in the future.

Diagnostic Assistance

For free technical diagnostic assistance and product information regarding specific ACDelco products, contact these toll-free information hotlines staffed by ASE-certified technicians:

Brakes – 1-888-701-6169 (prompt #1)
Chassis – 1-888-701-6169 (prompt #2)
Clutches – 1-888-725-8625
Lift Supports – 1-800-790-5438
Shocks – 1-877-466-7752
Starters and Alternators – 1-800-228-9672
Steering (Pumps, Rack and Pinion, Gears) – 1-866-833-5567
Wiper Blades – 1-800-810-7096

TECH tips

*The following technical tips provide repair information about specific conditions on a variety of vehicles. If you have a tough or unusual service repair, the **TSS Diagnostic Hotline** can help. Call **1-800-825-5886, prompt #2**, to speak with a technical expert with the latest OEM information.*

Manual Transmission Service Tips

When performing service on a manual transmission, keep in mind the following tips regarding transmission operation.

Auxiliary Fluid Cooler

When the manual transmission is equipped with an external auxiliary fluid cooler, a cooler flushing and flow test should be performed after servicing the transmission for a hard part failure. A plugged or restricted cooler can cause a repeat failure as a result of elevated operating temperatures due to insufficient flow.

Also, if the transmission flow/flush machine has Dexron VI in it, remember that Dexron VI is not compatible with manual transmissions. It will be necessary to thoroughly drain the oil cooler and lines before reinstalling them to the transmission.

Synchronizers

When performing synchronizer repairs on a manual transmission, the following components associated with the gear being serviced should also be replaced:

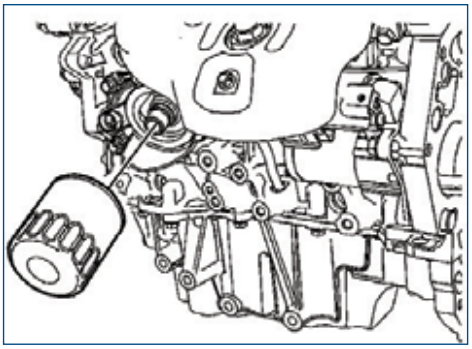
- Synchronizer components
- Blocking ring
- Speed Gear
- Shift Fork Inserts

Replacing these components reduces the likelihood of a repeat failure or a future noise issue due to damaged components being returned to service.

Replacement Oil Filter

2011 Chevrolet Equinox and GM Terrain equipped with 3.0L engine (RPO LFW); 2011 Buick Enclave, Buick LaCrosse, Chevrolet Traverse and GMC Acadia equipped with 3.6L engine (RPO LLT)

GM recommends service replacement oil filter PF63 (P/N 89017525) in order to provide more filter media for additional filtration and strength. This is a new filter replacement for high-feature V6 applications, changing from PG48. The replacement oil filter (PF63) is longer than the OEM production filter.



ACDelco oil filters are designed to meet the manufacturer's specifications for modern GM powertrains that have higher engine oil pressures, increased oil flow rates and extended oil change intervals in both cold and warm operating conditions.

It may be difficult to remove the longer replacement oil filter (PF63) without bottoming the filter end cap wrench on the auxiliary cooling fan housing on Terrain and Equinox models. It may be necessary to remove the oil filter end cap wrench after loosening the filter, yet prior to un-threading the filter from the engine adapter.

The PF63 filter should be installed and hand tightened. Then if additional torque is needed, install the filter end cap wrench and torque to specification.

Diesel Engine Ticking Noise

2001-2011 Chevrolet Silverado and GMC Sierra; 2006-2011 Chevrolet Express and GMC Savana; 2003-2009 Chevrolet Kodiak C4500/C5500 Series and GMC TopKick C4500/C5500 Series; equipped with the Duramax diesel engine (RPOs LBZ, LB7, LGH, LLY, LML, LMM)

Some diesel engines may exhibit a random ticking noise that is most audible on an engine with a coolant temperature of 158°F (70°C) or higher and from idle to approximately 1500 rpm. The noise usually is most noticeable at the rear of the driver's side front wheel well. A ticking noise also may be heard inside the vehicle at idle such as when sitting at a drive-through window.

All 6600 Duramax diesel engines have this condition; however, some are more audible than others. Engine build variation from engine to engine contributes to differences in perceived volume. All Duramax engines are manufactured to very close tolerances to meet durability and reliability standards.

This ticking noise is caused by the relationship of the engine cylinder block, crankshaft journals, bearing inserts and the oil film. This relationship may allow a vibration that resonates through the cylinder block and may be heard as an irregular metallic ticking noise.

This condition has been present in diesel engines produced by many manufacturers for the last 20 or more years. The overall noise reduction in engines produced today makes this noise seem new when, in fact, it was masked by other noises in the past. Testing and engine teardowns with this condition reveal no condition that would affect reliability or durability of this engine.

This noise is a normal operating characteristic of the engine. It has no short- or long-term effects on the engine. Replacing the engine or internal components for this noise will not reduce or eliminate the noise.

Product Information

For free technical assistance and product information regarding specific ACDelco products, contact these toll-free information hotlines staffed by ASE-certified technicians:

Brakes – 1-888-701-6169 (prompt #1)
Chassis – 1-888-701-6169 (prompt #2)
Clutches – 1-888-725-8625
Lift Supports – 1-800-790-5438
Shocks – 1-877-466-7752
Starters and Alternators – 1-800-228-9672
Steering (Pumps, Rack and Pinion, Gears) – 1-866-833-5567
Wiper Blades – 1-800-810-7096

Training UPDATE

How to Take ACDelco Training

Go to www.acdelcotechconnect.com and click the Training tab to log in to the ACDelco Learning Management System (LMS).

- To enroll in an **Instructor-Led Training (ILT)** course, click the Enrollment link or the Instructor-Led Courses link to view the catalog and select a specific course.
- To enroll in a **Virtual Classroom Training (VCT)** course, click the Enrollment link or the Virtual Classroom Training Courses link to view the catalog and select a specific course.
- To launch a **Web-Based Training (WBT)** course, click the Web-Based Courses link to view the catalog and select a specific course.
- To launch a **TechAssist (TAS)** course, click the TechAssists link to view the catalog and select a specific course.
- To launch a **Simulation (SIM)**, click the Simulations link to view the catalog and select a diagnostic challenge simulation.

Training Spotlight

S-AC07-01.01VCT — HVAC System: Components and Lubricants

This VCT course emphasizes diagnostic and repair skills for the air conditioning system, including the compressor, condenser, metering device, evaporator, accumulator and receiver-drier. Various lubricants and electrical components also are reviewed.

S-AC07-02.01VCT – HVAC System: Operation and Service Hints

This VCT course covers air conditioning system operation, such as changes to the state of refrigerant, pressure and temperature, safety procedures, and diagnostic procedures

Training Schedule

To search for currently scheduled courses, click the Schedule link. Select search terms from the dropdown menus and click the Submit button.

Current Virtual Classroom Training

The following VCT courses are currently being scheduled:

Course Number	Course Name
S-FN00-01.01VCT-R	How to Use VCT – Recorded
S-AC07-01.01VCT	HVAC System: Components and Lubricants
S-AC07-02.01VCT	HVAC System: Operation and Service Hints
S-AC07-03.01VCT	HVAC System: Flushing, Recovery and Diagnostics
S-AC07-04.01VCT	HVAC System: Engine Cooling, Controls and Communication
S-EL06-01.01VCT	Electrical Circuit Function and Diagnosis
S-EL06-02.01VCT	Testing Electrical Signal and Control Circuits
S-EL06-03.01VCT	Serial Data Communication Networks
S-EL06-04.01VCT	Communication Network Diagnosis
S-EM01-01.01VCT	Camshaft Position Actuator Systems
S-EM01-02.01VCT	Active Fuel Management Operation
S-EM01-03.01VCT	Active Fuel Management Diagnosis

Recorded versions of these courses are also available on the training website.

New Virtual Classroom Training

The following VCT courses are currently being scheduled:

Course Number	Course Name
October New Releases	
S-EP08-01.01VCT	6.6L Duramax: Engine Diagnosis
S-EP08-02.01VCT	6.6L Duramax: LMM Diesel Engine
S-EP08-03.01VCT	6.6L Duramax: LGH and LML Diesel Engines
November New Releases	
S-EL06-06.01VCT	GM Hybrid System Safety and Components
S-EL06-07.01VCT	GM Hybrid System Diagnosis and Repair

Current Instructor-Led Training

ACDelco's ILT courses provide hands-on instruction on the latest automotive systems. The following ILT courses are currently being held at training center locations around the country:

Course Number	Course Name
S-AC07-02.01ILT	Automotive Air Conditioning: Advanced Refrigerant System Diagnostics
S-AC07-03.01ILT	HVAC Control System Operation and Diagnostics
S-BK05-01.01ILT	Braking Systems
S-BK05-02.01ILT	ABS Operation and Diagnosis
S-EL06-04.02ILT	Network Communication Diagnosis
S-EL06-10.02ILT	Electrical Power Management
S-EL06-11.02ILT	Enhanced Automotive Circuit Diagnosis
S-EL06-12.01ILT	Hybrid Technology and Service
S-EL06-13.01ILT	Body Electrical: Global Diagnostics
S-EL06-14.01ILT	Advanced Body Control System Electrical Diagnostics
S-EP08-02.01ILT	Engine Performance: Computer Controls and Ignition System Diagnostics
S-EP08-03.01ILT	Engine Performance: Air Induction and Fuel System Diagnostics
S-EP08-04.01ILT	Engine Performance: Fault Monitoring and Emission System Diagnostics
S-EP08-05.01ILT	Engine Performance: Advanced Driveability Diagnostics
S-EP08-81.02ILT	Duramax Diesel Operation and Diagnosis
S-SS04-01.01ILT	Vibration Correction Diagnostics
S-ST10-01.01ILT	Supplemental Restraint Systems

Repair Industry News & Updates (cont'd.)

AAPEX Show . . . from page 6

ACDelco's exhibit at AAPEX offers attendees a glimpse of its 84,000 parts spanning 37 product categories.

Representatives will be on hand to talk about everything from brakes and shocks to belts and hoses to engine and transmission parts.

"We're looking forward to getting back to AAPEX to spend some great one-on-one time with our distributors and suppliers," says Curt Collins, associate marketing manager. "Our overarching message is going to be that we're more than a parts company, that we provide a lot of information, training and support beyond the parts in the box, and that we're part of something bigger, and more powerful."

In addition to displays of selected parts, the booth also offers kiosks where visitors can learn about training, eBusiness and the new ACDelco illustrated eCatalog featuring GM applications.

Indy Pace Car On-Hand at AAPEX

Visitors to ACDelco's booth at the 2011 AAPEX show in Las Vegas will be able to get up close and personal with the Camaro convertible pace car for the 2011 Indy 500.

ALL-NEW 2012 SONIC

Youthful, aggressive design is backed by available turbocharged performance and agile ride, handling.

The all-new "built in the U.S.A." Sonic is offered in two body styles: a stylish four-door sedan and a sporty five-door. Each delivers class-leading rear-seat roominess and cargo space.

Sonic's Efficient Powertrains

Sonic models are powered by efficient, power-dense, small-displacement engines, including the Ecotec 1.4L turbo and the Ecotec 1.8L – the same engines used in the new Chevrolet Cruze. Three transmissions are available: a five-speed manual or a six-speed automatic with the 1.8L and a six-speed manual with the 1.4L turbo.

1.4L I-4 Ecotec Turbo delivers 138 HP

The Ecotec 1.4L turbo's power ratings are estimated at 138 horsepower (103 kW) and 148 lb.-ft. of torque (200 Nm) between 1,850 rpm and 4,900 rpm. The wide rpm range for the maximum torque – a specific trait of turbocharged engines – helps the engine deliver a better driving experience and performance. Premium design elements give the engine world-class smoothness and durability.

Six-speed FWD manual transmission for the turbo-charged Sonic

The naturally aspirated Ecotec 1.8L engine has many of the same features of the Ecotec 1.4L turbo. Its two-stage variable intake manifold allows approximately 90 percent of peak torque to be available from 2,400 rpm to 6,500 rpm. It is estimated at 135 horsepower (101 kW), along with 123 lb.-ft. of torque (167 Nm) at 3,800 rpm.

Engineered for Agile, Athletic Ride and Handling

All models feature a MacPherson strut front suspension with coil springs and stabilizer bar, and a semi-independent, torsion beam axle-mount compound link-type rear suspension – featuring a robust, tubular V-shape beam – with gas-charged shocks. The front and rear tracks are identical at 59.4 inches (1,509 mm), for well-planted stability and excellent balance.

Even though the 2012 Chevrolet Sonic is a new vehicle, extensive service and repair information resources are a click away at **www.gmtechinfo.com –***Electronic Service Information.* Technicians and shop owners can log on to the site to gain access to subscription services for service procedures and repair manuals. A complete Service Manual is accessible 24/7 through a subscription to the site.

Free collision repair procedures are also available by going to **www.genuinegmparts.com.**

2012 Sonic 1.4L I-4 Ecotec Drive Belt Replacement

Special Tools Needed

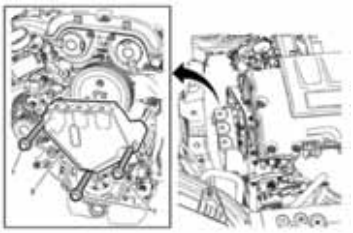
- *EN-48488* Holding Wrench
- *EN-955* Locking Pin

Removal Procedure

1 Remove the right front wheelhouse liner extension. Refer to *Front Wheelhouse Liner Inner Front Extension Replacement.*

2 Install the engine support fixture. Refer to *Engine Support Fixture.*

Engine Mount Bracket Replacement – Right Side



Preliminary Procedures

1. Remove the engine mount. Refer to *Engine Mount Replacement – Right Side.*
2. Remove the front wheelhouse front liner if necessary. Refer to *Front Wheelhouse Liner Replacement.*

Engine Mount Bracket Fastener (Qty: 3)

Caution: *This component uses torque-to-yield bolts. When servicing this component do not reuse the bolts, New torque-to-yield bolts must be installed. Reusing used torque-to-yield bolts will not provide proper bolt torque and clamp load. Failure to install NEW torque-to-yield bolts may lead to engine damage.*

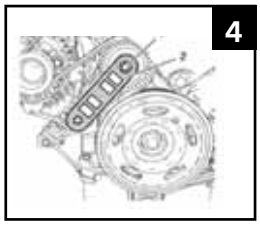
Caution: *Refer to Fastener Caution.*

Procedure

Raise and lower the engine as needed to access the bolts. (1)

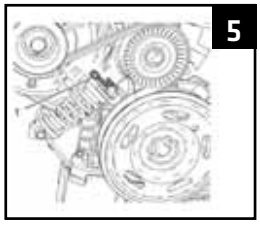
Tighten 62 N·m (46 lb ft)
Engine Mount Bracket (2)

3 Remove the engine mount bracket. Refer to *Engine Mount Bracket Replacement – Right Side.*



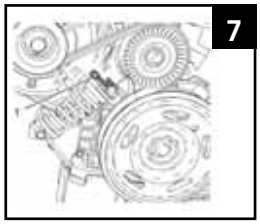
4 Install *EN-48488* holding wrench (2) to the drive belt tensioner (1).

5 Move the drive belt tensioner clockwise until the drive belt tensioner can be fixed with *EN-955* locking pin (1).



6 Remove the EN-48488 holding wrench.

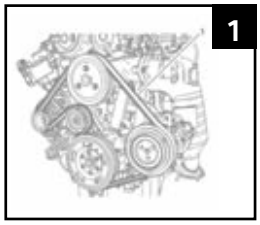
7 Remove the drive belt (1).



Installation Procedure

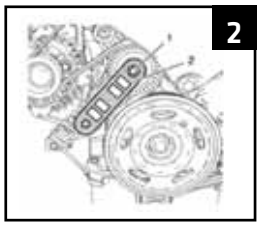
1 Install the drive belt (1).

2 Install the *EN-48488* holding wrench (2) to the drive belt tensioner (1).



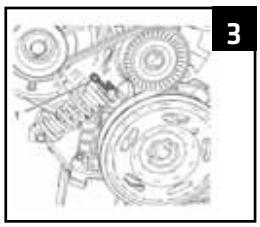
3 Move the drive belt tensioner clockwise until EN-955 locking pin (1) can be removed.

4 Allow the tensioner to slide back slowly.



5 Remove the *EN-48488* holding wrench.

6 Install the engine mount bracket. Refer to *Engine Mount Bracket Replacement – Right Side.*



7 Install the right front wheelhouse liner extension. Refer to *Front Wheelhouse Liner Inner Front Extension Replacement.*

8 Remove the engine support fixture. Refer to *Engine Support Fixture.*

This example of Drive Belt Replacement for the **1.4L I-4 Ecotec Engine in the 2012 Sonic** is just one of many found in the Service Repair Manual. By following the proper repair procedures, technicians can ensure that each vehicle maintains its solid performance and uncompromised safety features for the life of the vehicle.

Kansas restorer's projects often share common GM Powertrain solutions.

GM PERFORMANCE PARTS

GM Performance Parts engines and components are a port in the storm for Suburban Rod & Custom Classics.

When virtually every project that comes into the Merriam, Kan. shop is a prospective "adventure," owner Jim Plekowski values the certainty that GM Powertrain products offer.

"We know exactly what we're getting with GM Performance Parts (GMPP) engines and it's usually something that's pretty easy to install," says Plekowski. "With other aftermarket engines, many parts end up not fitting. We have to stand behind everything we install, and with the GMPP products and the warranty there are usually no big surprises or unknowns."

Regardless of the make or project scope, GMPP engines and transmissions find their way into the vast majority of Suburban's restoration/modernization projects, says Shelly Plekowski, Jim's wife and business partner. Popular engines for the company's customers include the Ramjet 350, the ZZ4 350 and the ZZ 572, all reliably supplied through Plekowski's longtime local GMPP dealer.

"The 350 crate engine is the most popular, easiest-to-retrofit engine that can go into just about any vehicle," she says. "But 502 and 572s, both carbureted and fuel-injected are popular choices, too."

GMPP engines and transmissions have gone into all manner of "resto-mod" projects Plekowski has handled since 1998, when Suburban stopped doing collision repair work and went full bore into restorations.

GM Performance Parts offers the Ram Jet 350 which combines the classic look of the original mechanical-type injection system with the dependability and optimized performance of contemporary port fuel injection. The GMPP crate engine warranty is 2 years / 50,000 miles.

With years of experience building street rods on the side, Jim Plekowski had seen his share of performance engine builders and non-OE engines. Turning his attention to full-service custom restoration and modernization, he wanted to focus more on design and custom fabrication and less on core powertrain matters. That's where the GM product portfolio delivers.

> *"It's difficult these days to find machinists to work on engines, and it seems no one wants to stand behind what they build. If you have an issue, like overheating problems, which are common, that relate to machine work that may not have been done properly, you get into the blame game where the builder blames the installer."*
>
> *"As an aftermarket installer working with engines, you can't stand behind all the different components. But if you go with GM, the full GM warranty simplifies all of that for you. And in the long run, those products save you money because they're easier to install. Compared to aftermarket products, everything fits and we don't have to worry about sending things back."*
>
> Jim Plekowski, Suburban Rod & Custom Classics

Relying almost entirely on GM for core powertrain solutions has given the Plekowskis the leeway to savor the other enjoyable aspects of custom resto-mod work. Their wide-ranging portfolio includes a 1957 Chevy with a ZZ 572; a 1939 Ford "Coast to Coast" roadster with a RamJet 350; a 1935 Packard with a 502; and a 1969 Chevelle convertible with a 350.

The latter project is a prime example of the satisfaction they get from making dreams come true for customers, often with the help of GM products. That 1969 Chevelle was turned over to them by the wife of a deployed soldier. Looking

Suburban Rod and Custom Classics finished this 1957 Chevy with a GMPP ZZ 572. It features 620 horsepower and 650 lb.-ft. of torque

ahead to his return from Afghanistan, she wanted to surprise him with some restoration work on the car, which he'd held onto for 20 years as little more than an undriveable frame.

"We got the car and boxes full of parts, did a lot of body work and got it fixed up to where it was a huge surprise for him when he got back," Shelly says. "Then he brought it back to us, and we did more work, which included putting in a GMPP 350 and transmission."

Three years after it came to them, the car is back in one of Suburban's bays, awaiting finishing touches on upholstery and some other odds and ends. When complete, the project will be another source of great memories, not just for the owner, but for the Plekowskis.

"It's easy to get caught up in the excitement of these projects," Shelly says. "We're proud of the work we do and we have fun doing it, but the most fun is seeing the satisfaction on the faces of our customers when they pick up their restored vehicle."

For more information on GM Performance Parts, go to **www.gmperformanceparts.com.**

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