ServiceInsights

FOR INDEPENDENT SERVICE CENTERS

Genuine GM Parts | ACDelco

Oct – Dec 2010

NEW CHEVROLET VOLT

Extended-range electric vehicle makes its debut.

More on the Volt Inside . . .

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Volt's new Global Compact Vehicle Architecture shared with the Chevrolet Cruze – page 8.

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Genuine GM | Parts

GENUINE GM PARTS...
Good for you, good for your customers.

ENGINEERING
Each GM Powertrain component incorporates the very latest engineering technology.

POWERFUL WARRANTY
3 years / 100,000 miles* for GM OE Powertrain. 1 year / 12,000 miles* for Genuine GM Parts and ACDelco Powertrain Components. The installing independent service center may perform the warranty repairs. Warranties reside with the vehicle, not the owner, so vehicles can be sold with an added value of warranty.

INSTALLATION SUPPORT
GM, Ford and Chrysler makes it 3X easier for you to receive product, warranty, availability and purchase information, as well as technical support – 1-866-OE-PARTS (1-866-637-2787).

NO-HASSLE CORE RETURN

*Whichever comes first—from date and mileage of installation by an authorized GM Dealer or qualified service center. For over-the-counter sales, warranty begins on the date and mileage of retail sale. Labor not covered for powertrain component warranty installation. Contact your participating Genuine GM Parts or ACDelco powertrain parts source for details.

The right part.
The right fit.
The right price.

GM Parts Product Update

Rounding Out overPOWER

Hundreds of Genuine GM Parts now more affordably priced.

Getting great deals on Genuine GM Parts doesn't mean just having to buy a big-ticket engine or transmission. They're also available on a growing group of parts used in everyday powertrain repair jobs.

In addition to making some 200 GM Engine and 400 GM Transmission part numbers purchased through GM dealers more affordable, overPOWER is adding more than 500 powertrain "component" parts to the program.

These "engine and transmission component parts" span four distinct categories selected for their volume and level of aftermarket competition: pulleys / tensioners / balancers; intake manifolds and gaskets; engine oil cooler lines; and 4-wheel drive actuator motors.

By using these value-priced parts, Independent Service Centers (ISCs) are able to improve the quality of a heavy repair job without breaking the bank. "This provides an OE option at a price that's competitive with aftermarket parts that are often just reverse-engineered," says Keith Loch, product specialist, GM Engines and Transmission Components. "With gasket and manifold repair jobs, for instance, where labor is the biggest expense, it can pay to go with higher-quality parts that may be priced only a few dollars more."

By positioning these component parts to "be in the ballpark" with pricing of non-OE aftermarket parts, GM is hoping to give more ISCs a chance to experience the unique value proposition that Genuine GM Parts can offer: easier to install, less likely to result in customer returns and now more price-competitive.

"We took overPOWER national in January and we now have almost 300 dealers involved," Loch says. "We look for more dealers to join in and for dealer efforts to use the program with ISC customers to continue growing."

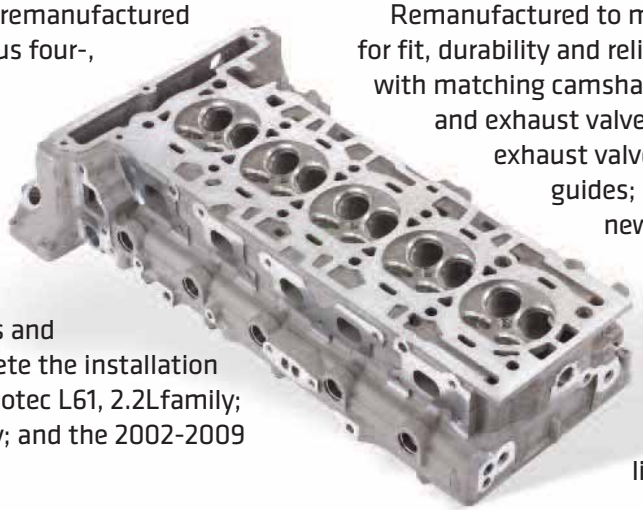
GM Introduces Remanufactured Cylinder Head Assemblies

Applications for Ecotec 2.2L, 3.5L and 4.2L inlines available.

GM Parts has unveiled a line of remanufactured cylinder head assemblies for various four-, five- and six-cylinder GM engines.

They will provide Independent Service Centers (ISCs) an economical alternative to traditional repairs, allowing them to be less costly and more quickly completed.

Remanufactured cylinder heads and associated parts needed to complete the installation are available for the 2000-2007 Ecotec L61, 2.2Lfamily; the 2004-2006 L52, 3.5L, I5 family; and the 2002-2009 LL8, 4.2L, I6 collections.



Remanufactured to meet or exceed OEM specifications for fit, durability and reliability, the cylinder heads come with matching camshaft retaining caps; new intake and exhaust valves; new or machined intake and exhaust valve seats; standard size valve guides; new valve guide oil seals; and new valve springs.

Cylinder head installation kits to complete the repairs are available from your GM Dealer.

The remanufactured cylinder heads carry GM Parts' 12-month/12,000-mile limited warranty.

Repair Industry News & Updates

Amidst Volt Excitement, GM Trains Eye on Safety

Emergency responders targeted with electrical safety, extrication guidelines.

At the same time GM has been generating excitement about the Volt, it also has been hard at work spreading vital information about the vehicle among first responders.

As GM readies its debut of the revolutionary plug-in electric hybrid Chevrolet Volt this fall, the company is focused not only on first adopters, but first responders as well.

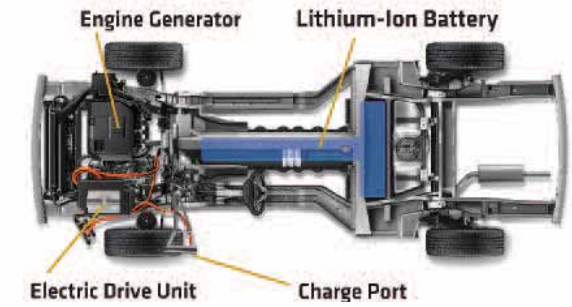
The same electric propulsion technology and advanced structural design that places the Volt on the automotive leading edge poses a learning curve challenge to emergency personnel responding to any crash involving the vehicle.

Because of its complex electrical system capable of generating high voltage, and a structural steel frame comprised mostly of high-strength steel (HSS), emergency first responders looking to quickly and safely extricate passengers must approach the Volt with far more care, precision and knowledge than they do with any other vehicle. Failure to follow proper procedures can result in not only a critical loss of time in freeing occupants, but possibly injury and even death.

In late September, GM, assisted by its training partner, Raytheon, unveiled a Volt First Responder Guide. The comprehensive guide, patterned after those that have been produced for other GM hybrid vehicles that must also be handled with extreme care in crash situations, is now posted on the First Responder Resource page of the GM Service Technical College Web site, **www.gmstc.com/FirstResponder.aspx.**

The guide is a detailed, fully illustrated primer

covering metal cutting techniques and tools; identification of key electrical components; and methods of safely disabling the electrical system. It is designed not as a training manual, but as a ready resource for first responders, covering information essential to their safety and that of vehicle occupants.



Chevrolet Volt

As the Volt debuts in select markets this fall, GM is bringing those guidelines to life in a series of hands-on first responder outreach workshops. Patterned after a live Volt extrication demonstration by the Chicago Fire Department at the 2010 Fire-Rescue International Conference in Chicago in August, the workshops will show the precise steps, techniques and tools required to disable the vehicle's electrical system, cut battery cables, stabilize the vehicle and efficiently cut through steel. Additional local workshops will begin to roll out with the car later this year in Detroit, Los Angeles, San Francisco and Washington, D.C.

Repair Industry News & Updates (cont'd.)

GM Powertrain Talks Up Technology, Support at Rebuilder Show

At September's Automatic Transmission Rebuilders Association (ATRA) show, industry members got an inside look – literally – at what's headed their way in terms of GM Powertrain transmission technology.

Using real cutaways, GM Powertrain showcased the two-mode hybrid transmission for the GMC Yukon, Cadillac Escalade and Chevrolet Tahoe and 6-speed rear- and front-wheel drive transmissions, two product lines repairers and rebuilders will see in coming years as more vehicles are paired with 6-speeds.

GM Two-Mode Hybrid Transmission

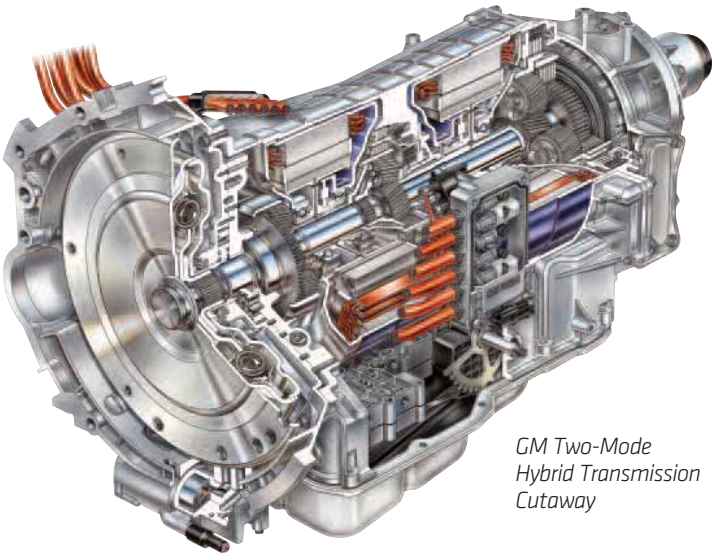
In addition, many of the attendees at the show, staged at the San Antonio, Texas Convention Center, learned more about yet another new transmission that makes its debut this fall with the unveiling of the Chevrolet Volt plug-in electric vehicle. Detailed information about the Volt's automatic transmission, which incorporates revolutionary electric motor-based technology, was a big point of interest at the GM Powertrain booth.

"The industry won't be seeing these new transmissions for some time, but they were a real draw," says Chris Thomas, product development manager for transmissions, GM Customer Care and Aftersales. "The old three- and four-speed transmissions are steadily going away and giving way to transmissions that are much more complex and electro-mechanical based. Just like we've been there with support for the traditional technology, our message is we'll be there with parts and service for factory authorized remanufactured units and component parts for repairs of these new-generation products."

But GM Powertrain didn't focus entirely on new technology at ATRA. Representatives of Marketing, Product Development, Product Engineering and Sales also talked up the product, technical support, pricing and warranty advantages that come with present-generation GM remanufactured transmissions and transfer cases and component parts for repairing those units.

A special emphasis was on GM's overPOWER program, which gives GM dealers the ability to sell GM engines and transmissions at prices that are more competitive with aftermarket, non-OE products. As shops move more toward diagnostics and total assembly replacement, and away from rebuilding, GM Powertrain is orienting itself to meet this demand.

"Our general message is, hey, we're more competitive than ever and we expect to be able to continue to chip away at the aftermarket competition," Thomas says.



GM Two-Mode Hybrid Transmission Cutaway

"Whether it's our 3-year, fully-transferable 100,000-mile warranty; live, U.S.-based technical support for installations and repairs (1-866-637-2787); plug-and-play installation; and constant updating of remanufactured products, GM Powertrain offers an entire package of products and support services that are unrivaled in our industry," Thomas concluded.

September & October | 2010

ACDelco

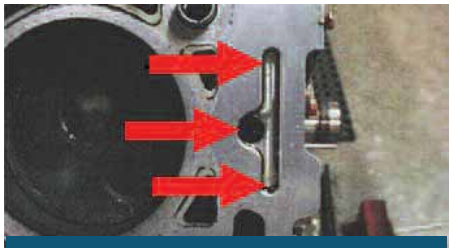
TechConnect

Engine Protection Depends on the Right Oil Filter

Many things can cause engine damage, but one easy way to help prevent engine damage is through regular engine oil and filter changes using the right oil and filter specified in the latest ACDelco parts information. The use of aftermarket oil filters that do not meet the manufacturer's performance specifications on vehicles can result in engine damage due to problems such as oil filter gasket leaks, improperly sealing filter media, failed anti-drainback valves that block oil flow and internal filter failure that transfers filter debris throughout the engine.

Some engine damage also may be due to an incorrect or improperly installed oil filter. The wrong oil filter application may not be able to stand up to the extended oil change intervals of modern engines.

One of the best ways to avoid expensive engine damage because of oil filter quality concerns is to use an ACDelco Original Equipment Service (OES) oil filter. ACDelco oil filters are designed to meet manufacturers' specifications for modern GM powertrains that have higher engine oil pressures, increased engine oil flow rates and extended oil change intervals.



Filter media material may plug the 2 mm block lubrication passage hole, creating aeration in the exhaust lifter oil galley.

Modern Engines

World-class engines like the GM 3.6L VVT direct-injected V6 engine use higher engine oil pressures and increased engine oil flow rates that help to optimize engine performance, economy and emissions, but also make it critical to have proper oil pressure, flow and filtering.

Insufficient oil flow and a lack of lubrication can result in a ticking noise in the valve train. If the noise is in the engine block deck (intake or exhaust lifters area), engine oil filter media or other foreign material may be obstructing the oil galley lubrication hole.

Foreign material obstruction also can lead an engine knock condition due to low oil pressure or oil starvation. Possible sources for foreign material include silicone rubber from the engine oil filter anti-drainback valve assembly (located under the filter media and above the

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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

Engine Protection

– continued from page 1

screw on the filter base). Any deteriorated silicone rubber may find its way into the oil lubrication galley in both blocks and crankshaft lubrication holes.

Foreign material blocking oil flow to the main and rod bearings.

Some engines, including the GM Ecotec 4-cylinder engine family (2.0L, 2.2L, and 2.4L), use a cartridge oil filter where only the filter element is replaced. With a cartridge oil filter, the filter cap contains an O-ring that does not require replacement. A possible oil leak may result if an aftermarket oil filter is installed with the new O-ring that comes with the filter. In some cases, the new O-ring is not an OES design and may develop a flat side, leading to a potential oil leak.

The ACDelco OES oil filter cap O-ring is designed for the life of the engine and will not develop a flat side because of normal compression during sealing. ACDelco part number PF458G includes a cap and cartridge filter. During installation, insert the filter in the cap before installing in the engine.

The O-ring on an ACDelco OES oil filter cap will not compress and develop a flat side. (Service reminder: Insert the filter in the cap before installing in the engine.)

For more information about how some non-OES oil filters can fail and lead to engine damage, refer to GM bulletin #10-06-01-003 and ACDelco bulletin #10D-121.

If engine damage is suspected and the vehicle is still covered under the manufacturer's warranty, the owner should return to a dealership for further diagnosis.

Designed-in Quality

Engine oil must withstand extreme punishment. The proper oil filter efficiently filters particles out of the oil to keep it clean and flowing through the engine. ACDelco oil filters meet or exceed GM specifications, using patented cellulose media that traps particles below 10 microns, one-third the width of a human hair.

In addition to excellent filter capacity, efficiency, flow management and durability, ACDelco oil filters provide:

- Tight seals that prevent unfiltered oil from entering the engine
- Anti-drainback valves that retain oil in the filter to help reduce prime-times and quickly lubricate the engine during start-up
- By-pass valves that help keep the engine from becoming oil-starved during cold weather starts
- Filtration media with more paper pleats than other popular aftermarket filters to provide more capacity

Regular engine oil and filter changes, following the vehicle's maintenance schedule or oil life monitoring system, using ACDelco filters that meet manufacturers' specifications will help protect the engine from premature wear and assure quality filtration performance.

Check the most recent parts information to ensure the correct part number oil filter is installed during an oil change. Do not rely on physical dimensions. Some aftermarket oil filters may share the outside dimensions of ACDelco OES filters. Though they look the same, the filters may not meet the proper specifications and requirements for the engine application.

– Thanks to Brad Brunken

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ACDelco TechConnect is published bi-monthly and online for 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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Electrical Ground Repairs

Corroded or stripped electrical ground connections can cause a loss of module communication and other electrical system malfunctions, leading to unnecessary repairs and parts replacement. The electrical system relies on a secure, corrosion-free ground connection in order to function properly, so any damaged ground connections must be repaired to provide a good mounting point with a low resistance ground path and prevent future corrosion.

Welded M6 stud and nut

During diagnosis of an electrical condition, which can have widely varying symptoms, test all control module grounds and system ground circuits. The control module may have multiple ground circuits. Other system components also may have separate grounds.

Inspect the grounds for clean and tight connections at the grounding point. Also inspect the connections at the components and in splice packs, if applicable. Ensure that the circuit can carry the current necessary to operate the component.

If it's determined that the ground connection is at fault, a recently released GM bulletin covering electrical ground connection repairs may help. Refer to GM bulletin #10-08-45-001 for ground connection repair and installation instructions.

The bulletin outlines ground repair procedures using one of the following replacement fasteners with a conductive finish:

- Welded M6 stud and nut
- Welded M6 nut and bolt
- Welded M8 nut and bolt

The rivet stud forms a collar on the rear side to prevent rotation in the hole.

Before installing a new fastener in the current ground location or at a new mounting location, remove any grease from the repair area using a residue-free solvent.

After drilling the mounting hole (for a new location), remove any paint and primer from the area until bare metal is visible.

Install the appropriate new fastener and check that it is securely fastened without any detectable movement.

The M6 rivet stud will form a collar on the rear side to prevent rotation in the hole.

Cover the stud threads with protective material and refinish the repair area using an anti-corrosion primer.

Installed M6 stud, washer and nut

The surrounding area must be properly finished prior to the installation of the ground wire terminal and conductive nut to maintain a secure, stable and corrosion-free electrical ground.

Thoroughly clean the stud threads using a residue-free solvent. Once dry, apply dielectric lubricant to the threads to reduce the possibility of fretting.

Fretting corrosion is a build-up of insulating, oxidized wear debris than can form when there is a small motion between electrical contacts, causing electrical resistance across the connection.

Remove any corrosion or contamination on the electrical ground wire terminal. Install the terminal, tighten the conductive nut to the proper torque and verify system operation.

Refer to the bulletin for a list of part numbers for the replacement fasteners and special tools.

– Thanks to Dave Peacy

Wheel Changing Procedures

One area of concern while removing and installing tire/wheel assemblies is corrosion on the mating surfaces of the wheel to the hub on the vehicle. Excessive corrosion, dirt, rust or debris built up on these surfaces can mimic a properly tightened wheel in the service stall. Once the vehicle is driven, the debris may loosen, resulting in clearance at the mating surface of the wheel and an under-torqued condition.

Before installing a wheel, remove any buildup on the wheel mounting surface around the base of the studs and the hub and brake drum or brake disc mounting surface.

Remove any corrosion from the wheel mounting surface.

If corrosion is found, remove the debris with a die grinder equipped with a fine sanding pad, wire brush or cleaning disc. Just remove enough material to assure a clean, smooth mating surface.

Do not use penetrating oils, grease or other lubricants on wheel studs to aid in removal or installation. Always use a suitable cleaner/solvent to remove these lubricants prior to installing the wheel and tire assemblies. Lubricants left on the wheel studs may cause improper readings of wheel nut torque. Always install wheels to clean, dry wheel studs ONLY.

Beginning with 2011 model year vehicles, GM recommends putting a light coating of grease on the inner surface of the wheel pilot hole to prevent wheel seizure to the axle or bearing hub. Refer to Bulletin #06-03-10-010A for more information.

Always inspect the wheel studs and lug nuts for signs of damage from cross-threading or abuse. Never force wheel nuts down the stud. Lug nuts that are damaged may not retain properly, yet give the impression of fully tightening.

Always start wheel nuts by hand and be certain that all wheel nut threads have been engaged BEFORE tightening the nut.

If the vehicle has directional tread tires, verify the directional arrow on the outboard side of the tire is pointing in the direction of forward rotation.

Improper wheel nut tightening can lead to brake pulsation and rotor damage. In order to avoid additional brake repairs, evenly tighten the wheel nuts to the proper torque specification as shown for each vehicle in the appropriate Service Information. Always observe the proper wheel nut tightening sequence in order to avoid trapping the wheel on the wheel stud threads or clamping the wheel slightly off center, resulting in vibration.

– Thanks to Mike DeSander

AFIT Adapter for Direct Injection Engines and Duramax Diesels

Two new Active Fuel Injector Tester (AFIT) adapters have been developed to connect to all current GM Spark Ignited Direct Injection (SIDI) engines and 2001-2010 Duramax Diesel engines.

The AFIT adapter, called the Drive and Measurement Unit (DMU), is available for SIDI engines and diesel engines at a discount through the TSS program. Visit www.gmdesolutions.com/equipment for more information.

AFIT SIDI adapter kit

Adapter sets have been put together for service centers that repair mainly gasoline engines or diesel engines. Both SIDI adapter and diesel adapter sets are available separately, along with SIDI and diesel adapter cable sets. A shop that repairs mostly gasoline engines, for example, could purchase the SIDI adapter first and then purchase the diesel cable later to also have diesel coverage.

Part Number	Tool/Adapter
642-CH-47976	Active Fuel Injector Tester
642-CH-47976-500	SIDI Diagnostic Adapter Set
642-CH-47976-505	Diesel Cable Adapter Set (used with 642-CH-47976-500 to cover SIDI and diesel engines)
642-CH-49796-510	Diesel Diagnostic Adapter Set
642-CH-47976-508	SIDI Cable Adapter Set (used with 642-CH-47976-510 to cover diesel and SIDI engines)
All adapters require the use of the AFIT unit.	

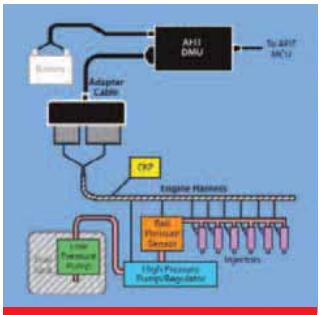
The AFIT/DMU can be used to diagnose essentially all fuel system-related conditions, but is especially useful for concerns such as crank, no-start; hard start; misfire codes; injector wiring codes; bank lean/rich codes; and power loss.

The AFIT can perform multiple fuel system tests, such as an injector coil test, fuel pump pressure leak-down test and injector balance test, without removing the injectors, helping to reduce diagnostic time. It uses a microprocessor and software program to completely automate testing procedures and eliminates variations in test results due to individual testing methods or changing fuel properties.

The Need for a New Adapter

New SIDI engine technology represents a significant departure in the way fuel is controlled and injected into the cylinders of the engine. This technology has many benefits in improved performance, economy, and emissions. However, diagnosis of the system presents new challenges. Fuel pressures are much higher and the components are new and typically less accessible on SIDI systems compared to port injection engines. The new systems are dramatically different; technician familiarity and experience working on port injection systems does not apply to diagnosing SIDI systems except in a very general way.

This tool automates the process and provides accurate, reliable information about all the elements of the fuel injection system. Current Service Information requires manual calculation and interpretation of the results to reach a diagnosis. The AFIT and DMU perform all the measurements and calculations automatically, giving an accurate diagnosis.



No fuel system disassembly is required.

The AFIT tool with the DMU Adapter tests all the components of the fuel injection system. From start to finish, testing, on average, takes less than 10 minutes. The test routine is completely prompted in the same way the AFIT tool does for port injection fuel systems.

A number of diagnostic codes and many symptoms that do not set codes can be caused by a number of engine components. One of the values of the tool is to confirm the operation of the fuel system.

How the AFIT/DMU Works on SIDI Fuel Systems

Using one of two mating cables, the DMU connects to the vehicle battery, the AFIT main unit, and to the vehicle ECM engine harness connector. The tester prompts the technician for the proper cable when the vehicle is selected on the AFIT main unit.

When prompted, the technician cranks the engine on the AFIT. The tool stops the cranking, and after each crank, one of the vehicle's injectors is tested.

The fuel pumps (high and low pressure), starting system, and regulator also are tested for proper operation. When the test is complete, the results are displayed on the AFIT main unit in a format that is similar to the result screens for a port injection vehicle.

SIDI systems use fuel pressures in excess of 1000 PSI provided by the engine-driven fuel pump. The fuel injectors are mounted so they inject fuel directly into the cylinders. Although they look different, they still rely on fuel pumps and regulators delivering the right pressures and injectors flowing the proper fuel amounts each cycle.

While cranking the engine, the tool measures battery voltage and cranking RPM and compares those results to specifications for the vehicle. The tool determines high-pressure pump characteristics by measuring the fuel pressure developed at various engine speeds during each crank and comparing the results to the expected Pressure vs. RPM built into the tool's database. In addition, it verifies the low-pressure pump is delivering proper pressure to the high-pressure pump.

The tool also performs a high-pressure leak-down test to determine if the system can maintain proper pressure and is not leaking.

When all the injector tests are completed, the results are displayed on the AFIT main unit screen in both graphical and

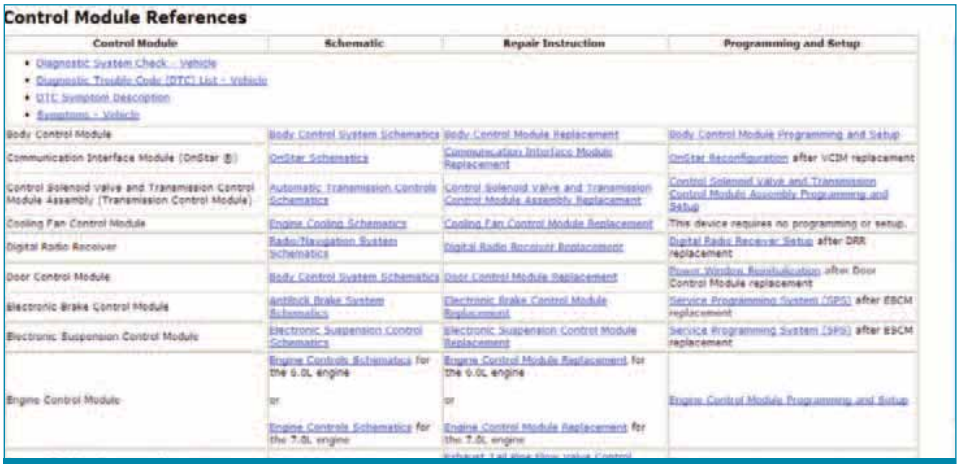
continued on page 5

Control Module Programming and Setup Procedures

Every time a control module is programmed or replaced, there are different setup procedures to follow to ensure that the control module and related components operate properly. All of these setup and initialization procedures, as well as critical information to ensure proper programming, are covered in the appropriate Service Information for the vehicle being repaired.

In GM Service Information, the Control Module References table includes links to all information related to the programming of a control module, including:

- Control module/scan tool information
- Schematics
- Repair instructions
- Programming and setup information



Check the Service Information before setting up a control module.

Setup Procedures

Once programming is completed successfully, it's critical to perform the necessary post-programming setup procedures.

For example, when programming the Transfer Case Shift Control Module (TCCM), it's necessary to perform the Transfer Case High/Low Clutch Reset procedure. From the Control Module References table, there is a link to the setup procedures and the Transfer Case High/Low Clutch Reset procedure, which lists the steps to perform the reset procedure using a scan tool or the transfer case shift control switch.

For some control modules, there may be only one opportunity to set up the module correctly. Be sure that all correct vehicle options are selected during module setup. Some options only appear during the initial module setup procedure. If the control module is set up incorrectly, it may be necessary to replace the module.

Proper Programming

To ensure proper programming, here are just a few of the items that should be checked before beginning the programming procedure:

- Always verify a valid reason for reprogramming. For GM vehicles, available calibrations can be viewed online at tis2web.service.gm.com/tis2web. A control module should not be reprogrammed simply because there are updated calibrations available.
- Nominal battery voltage should be 12.5 to 13.5 volts. This can be checked in most vehicles by connecting a scan tool and viewing the data display for the module. Look for the 'battery voltage' or 'ignition 1' signal to verify good voltage levels.
- Due to the time requirements of programming a control module, connect an approved charger (such as the Midtronics PSC-550 or PSC-330) or a fully charged 12V jumper or booster pack disconnected from the AC power supply to maintain system voltage. Do not connect a standard battery charger.
- The ignition switch must be in the On position, with the engine off. Do not change the position of the ignition switch during the programming procedure unless instructed to. Avoid programming interruptions of any kind, such as opening vehicle doors or depressing the brake pedal. It is also a good practice to make sure no other applications are active or running on the PC.
- DTCs may set during programming. Clear DTCs after programming is complete.

If error codes appear during programming, do NOT assume that the control module cannot be programmed. There are certain events that can interrupt programming. In most cases, a second attempt at programming will be successful. For complete programming information, click the SPS link on the Control Module Reference table in the Service Information.

– Thanks to Bob Stewart and Mike Waszczenko

AFIT Adapter

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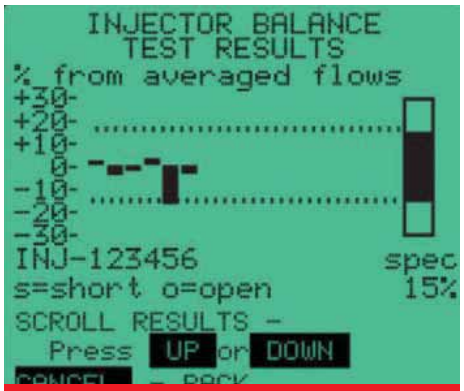


The AFIT main unit screen provides test results.

numeric form along with vehicle specific good/bad tolerances for the injectors. The results can also be uploaded to the AFIT Upload Utility installed on the shop PC.

The tool can help technicians pinpoint the causal component in the fuel system that requires repair as well as eliminate the fuel system as the cause of a driveability condition.

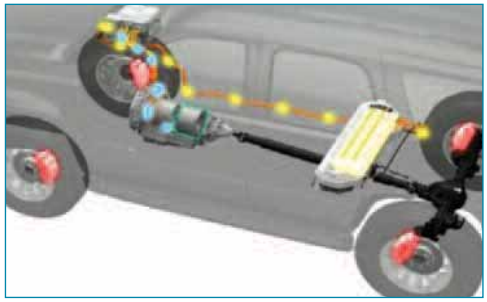
– Thanks to Mike Cable and Tedd Magana

New Brake Seminars: Hybrid Technology to Basic Diagnosis

ACDelco's commitment to providing top quality technical training continues with the release of five all-new modular brakes seminars that cover the newest technologies of automotive braking applications. Designed to be offered as one-hour "Lunch-and-Learn" training events, they can be delivered as one-hour stand-alone courses or combined to provide advanced training for your shop.

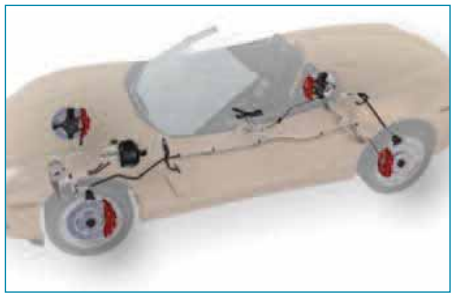
Hybrid Regenerative Brake Systems S-BK05-04.01SEM

What exactly is regenerative braking? How does a hybrid vehicle control module determine how much hydraulic brake force and regenerative brake force should be used to slow or stop a vehicle? How different are service procedures for hybrid vehicle braking systems compared to conventional ABS?



These questions and others about GM, Ford and Toyota regenerative brake systems are answered. In addition, details are provided about high voltage components, identification labels and Personal Protective Equipment. As an added feature, innovative technology (such as a power generating shock absorber) and other possible future technologies are highlighted.

Traction Control and Stability Enhancement Systems S-BK05.02.02SEM



Modern traction control systems and the various strategies used for traction control intervention, such as corrective fuel management, throttle closure, brake application and spark table modification, are discussed as well as the traction control switch, the brake temperature algorithm and brake pedal position sensor inputs.

Operation and diagnosis of stability enhancement system components, including the longitudinal accelerometer, steering wheel position sensor, yaw rate sensor and lateral accelerometer sensor, also are discussed.

Specific service procedures highlight the brake pedal position sensor calibration, zero point calibration and yaw rate reference table resetting.

Antilock Brake Systems S-BK05-03.01SEM

Antilock brake systems (ABS), both integral and non-integral, and typical components of antilock brake systems are discussed in this seminar.

ABS sensor inputs, such as active and passive wheel speed sensors, brake pedal position sensors, steering angle sensors and yaw rate/lateral accelerometer sensors, along with applicable diagnostic procedures are key elements of this seminar. ABS subsystems and their operation, including bi-state engine mount systems, dynamic rear proportioning, engine drag control, variable effort steering and vehicle stability enhancement systems, also are reviewed.

Foundation Brakes S-BK05-05.01SEM

This informative seminar begins with the physics of braking and how it applies to replacement component parts along with what D3EA certification means to both the customer and technician installing the parts.

A modern braking system is comprised of several subsystems, such as the power assist, apply, hydraulic, warning lamp, balance control and wheel brakes systems, and this seminar provides an in-depth discussion of each of these subsystems.

Single and dual-diaphragm power boosters are topics that are also discussed along with hydraulic booster systems that use power steering pump pressure to increase hydraulic pressure within the master cylinder. DOT 3, 4 and 5 hydraulic brake fluid properties and applications are additional elements of this seminar. Hydraulic circuits and components also are reviewed as well as valuable brake system service tips.

Brake Noise Diagnosis and Service S-BK05-06.01SEM

The first step to customer satisfaction is identifying the customer's concern successfully. To assist with this critical process, this seminar provides a Brake System Description Questionnaire as an additional support tool, enabling a technician to ask pertinent questions for effective diagnosis.

How to perform a thorough pre-road test inspection and an effective road test are described in detail. Diagnosis information includes checking pedal travel as well as specific disc and drum brake checks. In addition, diagnostic tips are provided for evaluating brake booster operation and noise concerns.

Learn More

In addition to the new brake system seminars, ACDelco offers 24/7, on-demand, online, Web-based courses that can be completed at any time. These online courses complement the instructor-led, hands-on courses that remain the core of ACDelco training. To review the latest training courses available, log in to the ACDelco Learning Management System (LMS) at www.acdelcotraining.com.

Take the opportunity to expand your technical knowledge, contact your local ACDelco distributor to learn when ACDelco seminars have been scheduled in your area.

– 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.*

SIDI Fuel Line Service

GM Ecotec 4-cylinder engine family (2007-2010 RPO LNF, 2009-2011 RPO LDK, 2010-2011 RPO LAF, and 2011 RPO LHU) and GM High Feature V6 engine family (2008-2011 RPO LLT, 2010-2011 RPO LF1, and 2011 RPO LFW), with a Spark Ignited Direct Injection (SIDI) fuel system

When servicing a fuel line on a Spark Ignited Direct Injection (SIDI) fuel system on the Ecotec 4-cylinder engine family and High Feature V6 engine family, the fuel pipe must always be replaced when it incorporates a tube nut fitting.

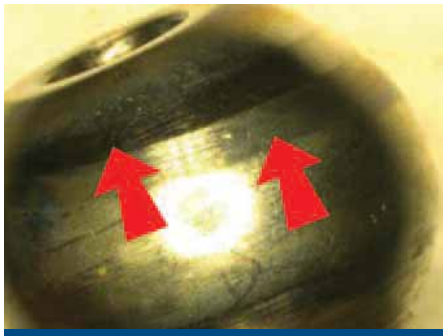
Tube nut fitting

If a tube nut fitting is loosened for a fuel system repair, the line must be replaced because, after the tube nut is torqued the first time, the sealing surface on the ball end of the pipe becomes modified in a way that will not seal properly again. The ball end of the pipe is a softer material than the mating surface and, once pressure is applied from torquing the tube nut, it deforms to form a good seal.

It can be determined that a fuel pipe has been previously installed by viewing the ball end of the pipe. After the tube nut fitting has been torqued once and re-installed, the sealing surface of the ball end will show dual sealing bands, indicating that the pipe has been previously installed.

If a pipe has been removed only once, it will only show one sealing band. Because of the deformation that takes place on the first tightening, the material may not seal properly the second time, which is why the fuel pipe must be replaced.

New fuel pipes are ready to use right out of the package. A blue or transparent dry lube may be noticed on the ball



Dual sealing bands indicate the fuel line has been torqued once and re-installed.

ends of the pipe. Do not wipe off this lube. It aids in achieving proper torque and sealing at the ball end fitting of the pipe.

Any time the fuel system is serviced, be sure to properly inspect, clean and torque the fuel pipe mating surfaces. Also, some fuel pipes have specific torque sequences that must be followed to ensure a good seal.

Remote Keyless Entry Operation

1997-2010 GM passenger cars and trucks

To prevent battery drain, the Remote Keyless Entry (RKE) transmitter will lock up if any button or buttons are depressed longer than 30 seconds. The transmitter will unlock if another button is depressed.

When unlocking the vehicle, if all doors are not unlocked after the second press of the unlock button, it may be due to the time delay needed by the system to recognize the second press of the unlock button. In order to unlock all doors, press the unlock button once, pause 1-2 seconds and press the unlock button the second time. There needs to be a pause between button presses so that the receiver can properly process the signal from the transmitter.

For many 2006 and later GM models, the trunk release button requires a press and hold before the trunk lid will release.

Squeak Noise on Brake Apply

2004-2007 Buick Rainer; 2008 Buick Enclave; 2004-2010 Chevrolet Colorado, Chevrolet TrailBlazer models, GMC Canyon, GMC Envoy models; 2005-2009 Saab 9-7X; 2007-2008 GMC Acadia, Saturn OUTLOOK; 2008-2009 Chevrolet Malibu, Saturn AURA, Pontiac G6

A squeak noise may be heard when the brake pedal is slowly applied with the engine on or off. It also may occur when the brake pedal is released. The noise may be isolated to the master cylinder area.

To correct this condition, remove as much of the old brake fluid from the master cylinder as possible and refill with new DOT 3 brake fluid, P/N 88862806. Start the vehicle and fully cycle the brake pedal until the noise diminishes to allow the new fluid to enter the system.

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 – 1-866-833-5567
Wiper Blades – 1-800-810-7096

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 enroll in a Virtual Classroom Training (VCT) course, click the Enrollment link or the Virtual Classroom Training Courses link.
- 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 Schedule

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

Current Instructor-Led Training

ACDelco's Instructor-Led Training (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. Click the Schedule link on the LMS Menu to search the latest training schedule for courses held in your area.

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-AC07-06.01ILT	Toyota HVAC
S-AC07-07.01ILT	Chrysler HVAC
S-BK05-01.01ILT	Braking Systems
S-EL06-04.02ILT	Network Communication Diagnosis
S-EL06-10.02ILT	Electrical Power Management
S-EL06-11.01ILT	Automotive Electrical Circuit Diagnosis and Repair
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 Drivability Diagnostics
S-EP08-20.01ILT	Toyota Engine Performance
S-EP08-21.01ILT	Chrysler Engine Performance
S-EP08-81.01ILT	Duramax 6600: Diesel Engine Performance
S-EP08-81.02ILT	Duramax Diesel Operation and Diagnosis
S-SS04-01.01ILT	Vibration Correction Diagnostics
S-ST10-01.01ILT	Supplemental Restraint Systems

ACDelco Introduces All Makes Aftermarket Window Regulators Line

Currently, over five million window regulators are replaced each year during service or collision repairs. To help meet demand in this growing market, ACDelco has introduced a new full line of all makes window regulators (Line 11) to complement the Original Equipment (OE) window regulators line (Line 18) for GM vehicles.

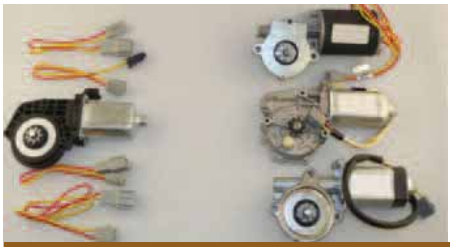
The new line includes assemblies, motors, regulators and other parts and is designed and built to meet or exceed OE performance. It's backed by ACDelco's 12 month/12,000 mile warranty.

All-New Motors

The window regulators feature all-new, not remanufactured, high torque motors. In addition to extensive testing for RPM, rotational direction, amperage and torque, the motors must pass:

- Durability testing that consists of thousands of up/down motions
- Heat testing at 160 degrees
- Cold testing at -20 degrees and water immersion tests where the motors must continue to run while frozen

Easy Installation



Other window regulators (left) may not be as easy to install as ACDelco's direct fit components (right).

All of the ACDelco window regulators are exact fit components with the proper mounting holes, hardware and mounting brackets.

All of the correct connectors also are provided, instead of several multi-use connectors, so there is no confusion or modifications necessary during installation.

Smart Numbering System

The window regulators line numbering system makes it easy to identify each part.

11A1 "A" identifies an assembly (regulator and motor)

11R1 "R" identifies a regulator only

11M1 "M" identifies a motor only

11P1 "P" identifies the part as "parts" (gear set, lock actuator, switch)

Contact your ACDelco Parts supplier to learn more about ACDelco's new line of aftermarket window regulators and other quality door system components.

– Thanks to Kevin Smith

TS-PU-0017-10

www.genuinegmparts.com

GM Parts Web site set for repurposing and expansion

A GM Parts Web site that was previously a portal for information relating solely to GM Collision Parts, will now expand to incorporate information vital to service centers that work with mechanical parts that come under the Genuine GM Parts Powertrain umbrella. The major additional focus will be on providing technical resources and information for GM Engines, Transmissions, Transfer Cases and Components.

The Web site **www.genuinegmparts.com** is being repurposed and redesigned to be a more complete resource for those who purchase and install Genuine GM Parts – both collision and/or powertrain.

"Our goal with the redesign is to improve the user experience for our collision repair target audience and also enhance the site by adding GM Powertrain-related information," says Cindy Schafer, digital marketing manager on the GM Parts wholesale marketing team. "The site has been devoted to collision, but we've now broadened it to entail powertrain and at the same time we've improved the look, the content and navigation tools."

Virtually anything relating to GM Collision or Powertrain Parts that is of notable interest to Independent Service Centers (ISCs) and Independent Body Shops (IBSs) will eventually be available at the improved site. The content will be heavily geared toward information that repairers need to help them perform high-quality repair jobs on GM vehicles.

"Our aim in providing both product and marketing information will be to help repairers learn more about the GM products they're ordering before they order them," says Schafer.

New resources and features will encompass everything from specific product technical and warranty information, official position statements and product marketing materials to dealer locators, training videos and links to other related Web sites. A search function will also be added to allow users to quickly find their way to the information they need. Additionally, there will be direct links to other sites, such as ACDelco and GM Performance Parts, as well as other resources in the form of newsletters and literature.

The new site will be unveiled in two stages. The first phase, a soft launch, incorporated a redesigned home page and new site navigation features, and coincided with the opening of the NACE (International Autobody

Congress & Exposition) in early October. Then, in December, the new GM Powertrain-related components of the site will be added as the new site is officially launched.

"We want to be able to better engage with independent shops comprising our wholesale parts channel, and give them the ability to find everything they need while at one site. We believe our new Web presence for Genuine GM Collision and Powertrain Parts will accomplish that and more," Schafer says.

High-Strength Steel a Key Component

GM's new Global Compact Vehicle Architecture debuts in Volt, Cruze.

With the curtain now rising on two of GM's big bets for the future – the Chevrolet Volt and the Chevrolet Cruze – the groundbreaking nature of their rollouts are drawing attention.

The Volt, of course, stands out as the first plug-in electric vehicle. And the 2010 Cruze affirms Chevrolet's commitment to building refined, fuel-efficient vehicles.

Less publicized, though, is the fact that both are the first to be built off of GM's new Global Compact Vehicle Architecture. The new design platform was conceived to offer a more flexible, globally competitive and cost-effective template for making vehicles.

2011 Chevrolet Volt

2010 Chevrolet Cruze

While the new platform spans a range of critical design elements, it incorporates structural features certain to be of interest to collision repairers and service providers.

Front and center at the GM Collision Parts booth at the International Autobody Congress & Exposition (NACE) in Las Vegas in early October, the vehicles' key structural features revolve around the use of advanced high-strength steels (HSS) and designs that give essential structures the ability to both protect and be easily repaired or replaced.

In both vehicles, variants of ultra high-strength steel (UHSS) and dual-phase steel are used in differing amounts and locations in critical center pillars, header panels, floor reinforcements and structural components to limit the crush zone and protect the passenger compartment in the event of a crash.

2011 Chevrolet Volt Body Structure

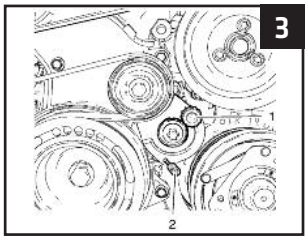
Although the design of the Volt and Cruze structure is similar, the Volt uses different variants of advanced high-strength steel in structural components that surround the passenger compartment and the front and rear impact zones. The Volt employs steels classified with a different yield strength than the Cruze structure.

With both vehicles' construction, the critical implication for body shops is to ensure positive identification of the type of steel being repaired or replaced. Extra care should always be taken when repairing and welding advanced high-strength steels, and that's particularly true when the steel is present in structural components. The presence of advanced HSS in impact zones may determine the repair or replacement guidelines utilized.

Chevrolet Cruze Accessory Drive Belt Replacement

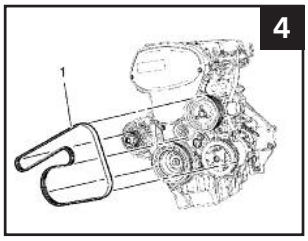
Even though the 2010 Chevrolet Cruze is a new vehicle, extensive service and repair information resources are a click away at **www.gmtechinfo.com** – *Electronic Service Information.* Technicians and shop owners can log on to the site to gain access to subscription services for service procedures and repair manuals. A complete Service Manual is accessible 24/7 through a subscription to the site. Free collision repair procedures will soon be available by going to **www.genuinegmparts.com** and clicking on *GM Technical Repair Information.*

Removal Procedure



1 Raise and suitably support the vehicle.

2 Remove the front compartment splash shield. Refer to the *Front Compartment Splash Shield Replacement in SI.*



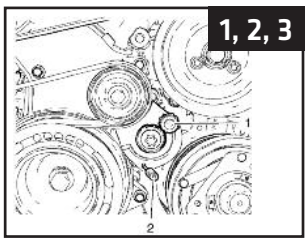
3 Release tension to the drive belt tensioner by rotating counterclockwise (1) and lock with EN-6349 (2).

4 Remove the drive belt (1).

Install Procedure

Important: *The crankshaft balancer and A/C compressor may or may not have a yellow paint mark on the outermost groove.*

Install the drive belt (1). When installing the belt around the crankshaft balancer and A/C compressor, ensure that the belt is installed on the REARMOST grooves, leaving the front groove exposed (shown above).



1 Release tension to the tensioner by rotating counterclockwise (1).

Note: *Allow the tensioner to slide back slowly.*

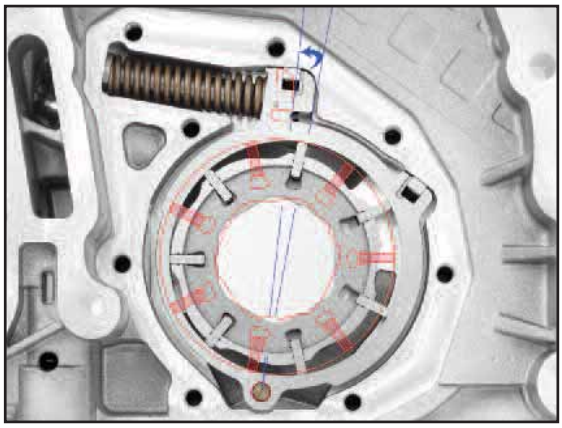
2 Remove EN-6349 (2).

3 Apply tension to the tensioner clockwise (1).

4 Install the front compartment splash shield. Refer to the *Front Compartment Splash Shield Replacement in SI.*

Variable Displacement Oil Pump helps Chevrolet Cruze conserve fuel.

A standard feature in the new Chevrolet Cruze's Ecotec 1.4L turbocharged engine is the variable displacement oil pump that reduces the displacement during engine warm up and high speed conditions. As a consequence, the engine has to work less versus a conventional pump and ultimately saves fuel.



The volume of oil from the pump varies with rpm by changing the pump's displacement through a pivoting control chamber mechanism and sliding vanes. A fixed displacement pump would typically bypass the extra oil internally.

Variable Displacement Oil Pump

"By lowering the volume of oil we reduce the amount of energy, or torque, required to pump the oil, without taking necessary lubrication away from the engine," said Mike Katerberg, assistant chief engineer for the 1.4L. "Reducing the torque demand reduces fuel consumption. It's a simple, durable, maintenance-free design that we have used in our transmissions for years and more recently in our hybrid vehicles."

The Ecotec 1.4L turbo is standard on Eco, LT and LTZ models and helps the Cruze Eco, with a standard 6-speed transmission, achieve an expected segment-leading estimated 40 mpg on the highway.

Texas Restorer

uses a full toolbox, including GM Powertrain, to fulfill customer dreams

Every so often, Adrian Britton of Ramsey's Rods and Restorations in Ft. Worth, Texas is reminded that the classic vehicle restoration business is about more than powertrains and paint jobs. At its deepest level, it's really about people – their memories, dreams and, yes, fantasies, some most personal.

Restoration work on a jet-black 1957 Chevrolet Nomad with an attitude was nearing the stage where it was time to talk about the interior. "Bucket seats, right?" Britton asked the client, in not so many words. Well, not quite. "No," was the customer's reply, Britton says. "I want bench seats so my lady can sit next to me."

Britton instinctively knew how important that request was to the customer and making sure customers are happy is always at the top of the list.

Ramsey's customers are a select group of no more than about a dozen a year lucky enough to get slotted in a shop that's produced its share of award-winners, including a 1955 Bel Air Sport Coupe named "Best Modern Restoration" and displayed by GM in 2005.

To the untrained eye, what the 31-year-old company does to restore classics and build custom rods in fine detail might indeed look like sleight of hand. But it's really just the product of professionals who share owner Stephen Ramsey's passion for automotive classics, notably "Tri-Fives" – 1955-1957 Chevrolets – and have the know-how and supplier contacts to execute both true-to-history restorations and "resto-mod" jobs for demanding customers.

All of that and more came into play with the '57 Nomad project. Representative of many of the projects it takes on – limited in number annually because the company refuses to "stack up projects like cordwood" for quality control purposes, says Britton – the resto-mod job brought a classic back to life with a modern twist. The Nomad job wasn't constrained by price as much as creativity, and it demanded patience and painstaking attention to detail to bring it to fruition.

Britton, left, and lead tech, Kevin Penhaker, with a shop specialty, a 1950s-era Chevrolet Nomad.

The restored 1957 Chevrolet Nomad used a GM Performance Parts LS3 crate engine and a 4L65E transmission.

"The owner found the Nomad stored in a barn and although in pretty good condition, it still needed a lot of work," Britton says. "We faced a big challenge in restoring the original fit and finish and also in mating current technology to an old body style."

But thanks to Genuine GM Parts, the project wasn't as formidable as it could have been. Working closely with its longtime local GM dealer, Britton was able to work through various powertrain options and eventually arrive at a solution that far exceeded original expectations.

"The owner liked the idea of putting modern technology into an old beauty, and we originally talked about a 350/290 crate engine, but that was going to require some special motor mounts," he says. "What we went with was something even better: a LS3 Corvette engine that our dealer was able to arrange to pull right off of the assembly line. I think at the time it was the first LS3 that didn't go into a Corvette."

While mating an LS3 and a GM Powertrain 4L65E, along with a Currie 12-bolt rear-end, to a 50-year old vehicle frame was no picnic, it was typical of the GM Powertrain solutions that Britton values for their relative ease of installation, performance and warranty protection.

"Rather than spending tens of thousands of dollars to build custom motors that don't have a good warranty, I can go to my GM dealer and get a product that's the right fit for my performance-minded application without breaking the customer's budget," he says.

After 11 months of work, more than three dozen consultations with GM Powertrain, a six-figure price tag that encompassed $15,000 in body work and paint, $8,000 for an interior and $3,200 just for a custom radiator, Ramsey's Rods produced a flawless rendition of a 1957 Nomad.

Well, nearly flawless. Shortly after taking delivery, the owner had a problem. The transmission was a bit jerky, creating shifts that were, well, sort of rough on the occupants. Britton got the car back, made a few adjustments to the RPM shift point and the problem was solved. He was sure he had really fixed it when he had a later encounter.

"At a car show a few months later I happened to run into the owner's girlfriend," Britton says. "She came up to tell me that the car now shifts really nice."

Mission accomplished.

Genuine GM | Parts

We're one stop. For your shop. Genuine GM Parts Engines and Transmissions. Plus, all the associated parts you need.

CLIP AND PLACE BY YOUR TELEPHONE

Give us a call for all of your Genuine GM Parts needs – all at one convenient location.

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