

Service Insights

FOR INDEPENDENT SERVICE CENTERS

ACDelco

Genuine **GM** | **Parts**

January–March 2010

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GM PERFORMANCE PARTS

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Product Update

GOING **FAST,** GOING **GREEN**

Now, with the expanding lineup of E-ROD crate engines, so named for their efficiency, environmental consciousness and emissions-compliance, enthusiasts will be able to power up in an environmentally responsible way and fully enjoy the fruits of their labor.

On the outside, the '55 Chevy looked little different from all the other painstakingly restored classics of the same iconic vintage. Even under the hood, the LS3 6.2L V-8 engine resembled the kind that restorers commonly use to bring vehicle performance into the modern era.

But this Chevy, on display in the GM Performance Parts (GMPP) booth at last November's SEMA (Specialty Equipment Manufacturers Association) show in Las Vegas, actually represented the next frontier in "resto-modding," the wedding of modern engine technology to classic vehicle restoration.



GM Performance Parts E-ROD emissions compliant engines deliver speed and power with reduced emissions.

That's because its engine was the first generation of



a revolutionary new line of E-ROD high-performance engines engineered by GMPP to slash emissions, improve fuel-efficiency and become both more environmentally friendly and street legal in the process.

The classic Chevy on display marked the official unveiling of the E-ROD line, GMPP's response to the challenge restorers and performance enthusiasts face when they want to take to the road in their creations. As more states follow California's lead in blocking the licensing of "specially constructed vehicles" that are not emissions compliant, many restored vehicles can be consigned to the garage.

All it takes is an E-ROD crate engine system, which in addition to the base LS engine, includes components to make it emissions-legal. They include catalytic converters; an engine wiring harness; an engine control module with emissions-legal calibration; exhaust manifolds; oxygen sensors and sensor bosses; a fuel tank evaporative emissions canister; an air filter; mass airflow sensor and sensor boss; and an accelerator pedal. On top of the kit, builders also must source a transmission and other application-specific components related to fuel, air induction, exhaust and front-end drive systems.



Product Update (cont'd.)

Once properly installed, an E-ROD crate engine system will turn virtually any classic project into a powerful, "clean" car that rivals the modern performance and emissions profile of contemporary GM muscle cars. The kit, designed in close cooperation with the California Air Resources Board and SEMA to ensure emissions compliance, is easily installed into most applications.

"All of the emissions hardware is included in the LS controller kit that GMPP engineers developed based on the LS3, and adapted to work in a kit car or truck application," says Dr. Jamie Meyer, GMPP product marketing manager. "ISCs and speed shops used to doing restorations will find the E-ROD crate engine system to be an easy swap in most applications."

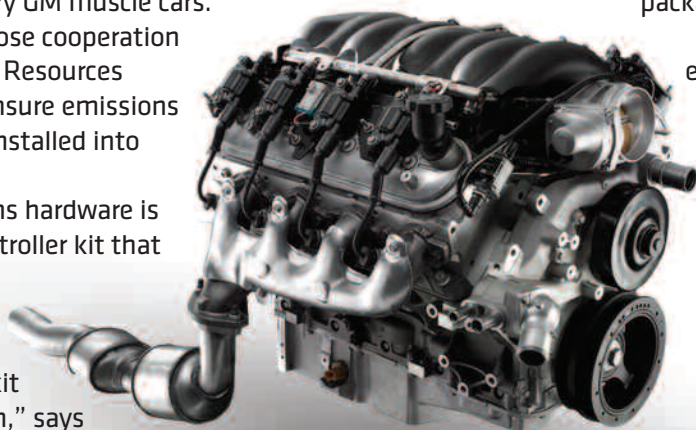
Once installed, Meyer says, an E-ROD crate engine will deliver significantly more power than the vehicle's original engine without anywhere near the emissions. In the '55 on display, for instance, the E-ROD LS3's 430 horsepower rating is 160 percent over this model's original stock small block V-8 power.

The E-ROD line-up that is planned includes the addition of the LS327 5.3L, and the Corvette Z06 LS7 engine package midyear and finally a 6.2L supercharged package in 2011.

Regardless of the power profile, each E-ROD crate engine promises to expand the definition of performance to also mean environmental friendliness, better gas mileage and true road-readiness.

"Whether it's the enthusiast who wants to live and demonstrate a greener lifestyle or the one who simply wants to get his car legally titled, the E-ROD crate engine system will reduce a vehicle's carbon footprint without sacrificing true performance," he says.

To locate, price, or purchase an E-ROD, contact your GM dealer or call the GM Performance Parts customer assistance center at 1-800-450-4150. Or, visit www.gmperformanceparts.com.



Dr. Jamie Meyer, GMPP product marketing manager with the E-ROD at SEMA



Why install aftermarket when you can get OE quality at the same price?

Simply give us your aftermarket supplier quote and we'll match or beat it on select GM Engines and Transaxles.

Call your GM Dealer for details.



Genuine GM Advantages...

- **GREAT PRICING**
- **POWERFUL WARRANTY**
3 years / 100,000 miles* for GM OE Powertrain.
- **NO-HASSLE CORE RETURN**
Contact your GM Dealer for details.
- **INSTALLATION SUPPORT**
Call 1-866-OE-PARTS (1-866-637-2787).

*Whichever comes first—from date and mileage of installation by an authorized GM Dealer or a qualified service center. For over-the-counter sales, warranty begins on the date and mileage of retail sale. Contact your GM Dealer for details.

Repair Industry News & Updates

GM asserts its custom solutions bona fides at 2009 SEMA

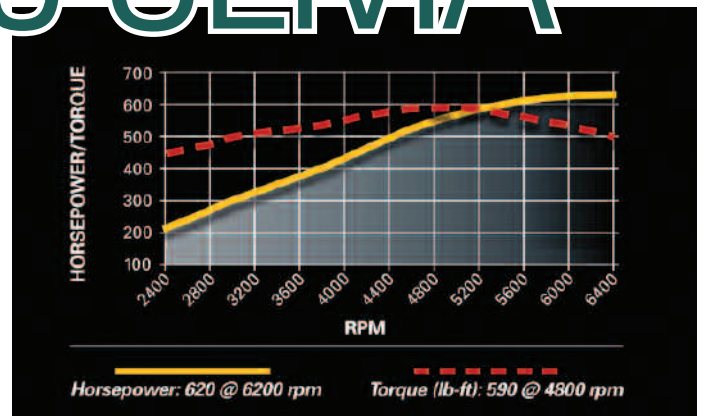
Showing that it's a force to be reckoned with in the dynamic specialty automotive market, GM Powertrain and Genuine GM Parts unveiled a host of products, parts and concepts at last November's Specialty Equipment Manufacturers Association (SEMA) show.

From souped-up GM classics to new performance engines to environmentally friendly powertrain solutions, GM demonstrated a clear commitment to helping restorers and performance enthusiasts express themselves through their vehicles in new and exciting ways.

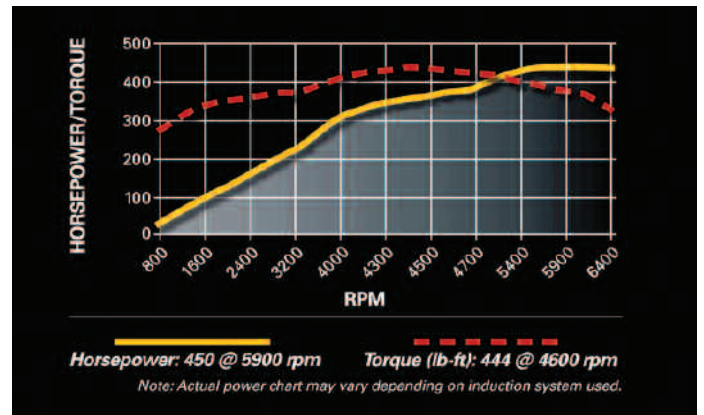
Demonstrating that its new stock Chevrolet Camaro, as hot as it is, is only a starting point, GM paraded five Camaro concept cars. Each was lavishly accessorized to the designer's vision with a varied mix of readily available Genuine GM Parts and Powertrain components.

Vehicles like the twin-turbocharged V-6 built for Jay Leno, the current stock and future accessory-indulgent Camaro Chroma and the sophisticated, tailored-looking Camaro Dusk showed just what can be done with an

continued on page 7 after TECHConnect



LSX 454 Dyno Chart



LSX 376 Dyno Chart

"Chroma" Camaro



"Dusk" Camaro



"Synergy" Camaro



Brake Rotor Service

The key steps during disc brake service include determining rotor refinishing or replacement, properly cleaning all brake components (including items such as hub, rotor, and wheel mating surfaces), properly refinishing the rotor (if applicable), and properly reassembling the brake assembly using the proper tools and torque specification.

Here are some tips to ensure a successful brake service and prevent vibration and brake noise. Always refer to the appropriate Service Information or latest bulletins for specific procedures. GM bulletin #00-05-22-002L is a good resource that updates and centralizes all of GM's standard brake service procedures.



Rotor Refinishing

When it's determined that a rotor must be refinished, use a brake micrometer to measure the rotor. Multiple measure points should be taken and the lowest measurement recorded. Reference the Minimum Thickness specification stamped on the backside of the rotor and the Discard specification in the Service Information before refinishing the rotor. Do not refinish new rotors or remove any special coating that may be applied on some ACDelco replacement brake rotors.



Check the Minimum Thickness specification

Clean all of the mating surfaces between the hub, rotor and wheel. Cleaning all mating surfaces and making them free of corrosion, burrs and other debris is critical and must be performed whether using an on-car or bench lathe refinishing procedure.

Prior to making the cut when refinishing, install the recommended clip-on style disc silencer supplied with the lathe. Using the silencer will help prevent chatter from occurring during the cut.

After completing the refinish, sand both sides of the rotor for approximately one minute per side using 130-150 grit sandpaper to obtain a non-directional

finish. Wash the rotor with mild soap and water or wipe it clean with ACDelco brake parts cleaner, part number 10-6012. Thoroughly cleaning the rotor will prevent the possible transfer of finite metal dust left as a by-product of machining to the pad material, reducing the chance for squeaks or other noises to occur.

Do not clean the rotor with a brake cleaner solvent-based product.

Preventing Pulsation

Any time a brake rotor is refinished, measuring lateral runout (LRO) will help to prevent pulsation and customer come-backs. Pulsation is caused by brake rotor thickness variation, which is usually the result of excessive LRO or brake rotor corrosion.

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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

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Brake Rotor Service – continued from page 1

Lateral runout is a measurement of the waviness of the rotor face. The GM specification for excessive LRO is more than 0.050 mm (0.002 in.). Excessive LRO occurs to a rotor when the brakes are not applied. When the vehicle is being driven, any high spot on the rotor rubs the brake pad once per revolution. Eventually, the high spot is worn down, resulting in a thin spot on the rotor (rotor thickness variation) and pulsation that is transferred through the brake pedal when the brakes are applied.

Rotor corrosion is another form of thickness variation. In cases where rotor corrosion is cosmetic, refinishing the rotor is unnecessary. More extensive corrosion may be the result of a build up, mostly on the rotor material surface, caused by a combination of corrosion, pad material and heat. In some instances, cleaning up this type of corrosion may require more rotor material to be removed than typical refinishing.

When measuring LRO, rotate and locate the point on the rotor where the lowest dial indicator reading is indicated. Set the dial indicator to zero. Rotate the rotor from the low point and locate the point with the highest dial indicator reading (the high spot).

In addition, index-mark the rotor and a wheel stud so that it is in the same position as it was prior to service.

If LRO is excessive, use Brake Align® correction plates or refer to the appropriate Service Information to correct the lateral runout.



Measure LRO using a dial indicator.

Installation Tips

Reinstall the rotors on both sides of the vehicle following these steps:

- Reinstall the calipers and pads. Use a thin film of ACDelco high temperature silicone grease, part number 10-4019, on caliper sides, rubber components and disc pad shims, which will allow the shims to withstand normal brake pad movement without damage and help dampen vibration.
- Pump the brakes to pressurize the calipers
- Remove the lug nuts/conical washers (if installed for refinishing the rotors on the vehicle).
- Install and properly torque the wheels

It is critical to use the proper tools (torque stick or torque wrench) to torque the wheels to specification as referenced in the Service Information.

– Thanks to Mike Militello and Mike DeSander



Torque the wheels to specification using a calibrated torque wrench or torque stick.

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ACDelco service tips are intended for use by professional technicians, not a “do-it-yourselfer.” They are written to inform those technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions and know-how to do a job properly and safely. If a condition is described, it cannot be assumed that the information applies to all vehicles or that all vehicles will have that condition.

All materials and programs described in this magazine are subject to change. Submission of materials implies the right to edit and publish. Inclusion in the publication is not necessarily an endorsement of the individual or the company.

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Brake Rotor Coating

A gray coating may be found on replacement ACDelco brake rotors. The rotors are coated with a zinc organic protective spray to prevent the rotors from rusting before they go into service.

The coating should not be removed and will wear off with normal brake usage. The coating does not hinder brake performance.

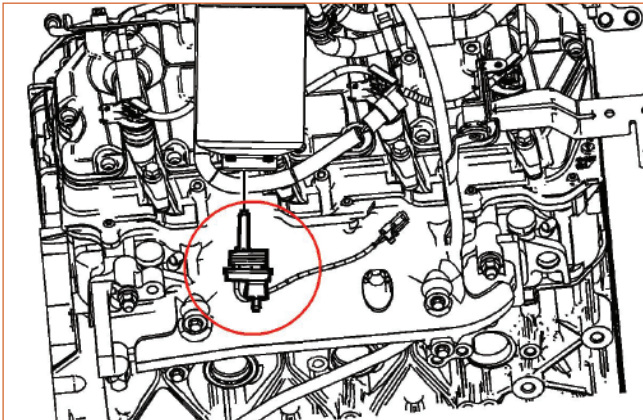
Details on Diesel Fuel

Water in diesel fuel is a contaminant that can cause damage to the fuel system. Water in fuel can take two forms: coarse water droplets that drop out of suspension and can be filtered out or emulsified water particles suspended in the fuel, which can pass through some filters.

Proper fuel filter servicing and the use of clean diesel fuel that is free of water or contaminants are critical for the longevity of fuel system components of a modern direct injected diesel engine. Adherence to the fuel filter change interval will help to ensure that the diesel fuel system will be protected from contaminants and that the engine will continue to operate as designed. Purchasing fuel from a high volume fuel retailer increases the chances that the fuel is fresh and of good quality.

Water in Fuel Sensor

The Water in Fuel Sensor on the GM Duramax diesel engine can be tested after removing it from the fuel filter assembly. A good sensor will have continuity when the float is manually raised. Use a DVOM to check for continuity. The float can be tested by placing it in water and in clean diesel fuel. A good float will float in water and sink in diesel fuel.



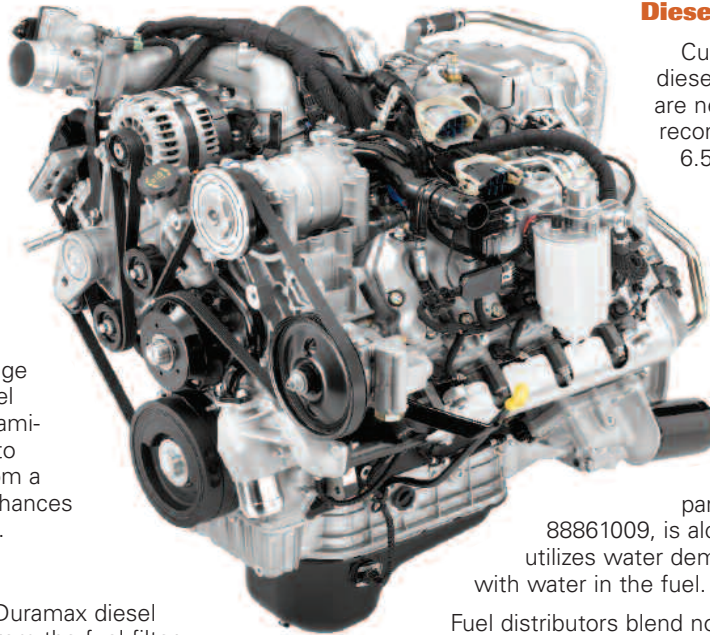
Water in Fuel Sensor

Contaminants

If water is present in diesel fuel, fungi and other microorganisms can survive and multiply, especially in warmer climates. The fungi can be present in any part of the fuel handling system. These fungi grow into long strings and will form large globules. The growths appear slimy and are usually black, green or brown. Fungi use the fuel as their main energy supply and need only trace amounts of water and minerals.

The most common symptom of fuel contamination is fuel filter plugging, however, various metal fuel system components also can corrode. If fungi have caused fuel system contamination, flush the fuel system, replace the fuel filter and refill the tank with clean diesel fuel.

If a customer desires to use a biocide after flushing the fuel system, it should not contain alcohol or other water emulsifiers.



Diesel Fuel Additives

Customer use of diesel fuel additives are neither required nor recommended for the 6.5L diesel and 6.6L Duramax diesel engines. Alcohol-based additives permit water to pass the fuel filter and water separator, causing damage to the fuel system. GM Diesel Fuel Conditioner, part number 88861009, is alcohol-free and utilizes water demulsifiers to cope with water in the fuel.

Fuel distributors blend no. 1 and no. 2 diesel fuels for seasonal requirements in a particular region. No other blending of fuels is recommended. If a customer desires to use a winter fuel additive to prevent fuel waxing or icing during extreme cold snaps, the winter fuel additive must not contain alcohol or other water emulsifiers that may compromise the water removal effectiveness of the fuel filtering system.

The use of additives such as a cetane improver to enhance engine performance or a lubricity additive to aid in the longevity of fuel system components are not fixes for poor quality or contaminated fuel. If such additives are used, they must not contain alcohol or other water emulsifiers.

Biodiesel

Diesel fuel containing greater than five percent biodiesel (B5) or the use of unmodified bio-oils blended into diesel fuel at any concentration may damage the diesel fuel system and engine.

Waxing

Diesel fuel gelling or waxing (also called cloud point) at low temperatures may result if the fuel is not blended properly for the temperatures being experienced. Further, biodiesel begins to wax at temperatures of 10 to 20 degrees higher than no. 2 winter blend fuel.

A below freezing hard start/no start condition may be caused by fuel waxing or fuel contamination. Fuel waxing may also restrict the amount of fuel flow through the fuel filter. A high fuel system vacuum reading will be found if the system is checked when the fuel is cold and waxing.

The use of engine block heaters in extreme cold temperatures may alleviate some fuel waxing concerns.

Refer to the appropriate Service Information for additional information about diagnosing the effects of contaminants in diesel fuel and testing for the presence of contaminants, including fungi, water, gasoline, and biodiesel in amounts larger than five percent.

– Thanks to Bill Carnevale

Electrical Intermittents and Terminal Crimping

Electrical intermittents can be a source of frustration when repairing a vehicle. Some circuits in vehicles are not only susceptible to an intermittent condition, but high resistance also may cause erratic operation or set DTCs. An often overlooked possibility in the diagnosis of electrical intermittent conditions is the quality of the terminal crimps.

When diagnosing any type of electrical condition, inspect the integrity of all related wiring harness connectors and terminals. Poor connections may lead to numerous types of intermittent conditions, such as miscellaneous DTCs, driveability conditions, hard or no start conditions, incorrect gauge readings, illuminated MILs and inoperative control module conditions.

Once the circuit that connects the components in question has been isolated, perform a visual and physical inspection of the wiring harness connectors for integrity. Many times, repairs may be made by simply disconnecting and reconnecting the connectors.

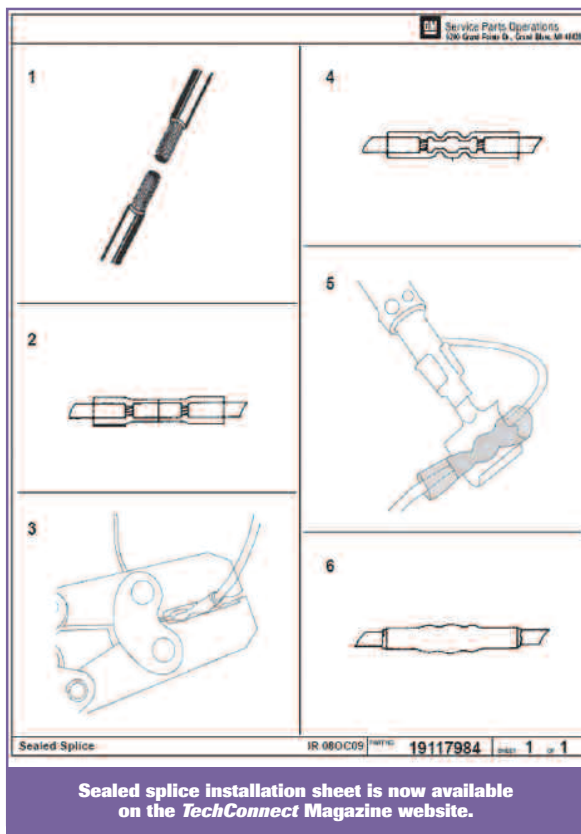
A pull test of the terminals should be performed after any wiring harness connector or terminal repairs. Insert only the proper size terminal test tool into the terminal to determine if the terminal is making good contact, or whether the terminal has been damaged and needs to be replaced. It's critical to use the right tool when testing. Most terminals in current module connectors (ECM, BCM, EBTCM) are small 0.64 mm sq. terminals and can be damaged by probing with the wrong tool.

In many cases, once the electrical integrity of the wiring harness is verified, the associated module or component becomes suspect. However, it is possible for a harness that tests as electrically conductive to be the source of an intermittent condition. The electrical harness should have the terminal pins re-crimped before replacing a module or component that tests OK.

The correct crimping tool is required to consistently provide secure electrical conditions.

For additional information on the proper crimping procedure, an updated sealed splice installation sheet is available on the *TechConnect* Magazine website. Click the Troubleshooting PDF Job Aids link under Resources on the right side of the page to print out the installation sheet PDF.

– Thanks to Tina Levi and Mike DeSander



Fluke 87-5 Multimeter AC and DC Settings

Imagine a vehicle with a no start condition and a dead battery. Measuring the amperage of a control module using a Fluke DMM (digital multimeter) in AC mode shows a reading of only 25 mA, but in DC mode, a reading of 335 mA reveals the continuous draw that would drain the battery. This type of scenario shows the importance of checking the multimeter's default settings before testing.



Fluke 87 multimeter

Versions 1-4 of the Fluke 87 multimeter defaults to reading DC amperage when set on the amperage or milliamp scale. The new Fluke 87-5 meter (version 5), when set on the amperage or milliamp scale, will default to reading AC current.

If a diagnostic test step is requesting a DC amperage reading to be taken and the meter is set on the AC amperage setting, the meter will display 0 amperage (or close to 0 amperage). This will cause an inaccurate test result that can cause the test to pass or fail when it shouldn't.

To avoid an incorrect test result when testing amperage, always check the multimeter's display to make sure it is either on the AC or DC setting. Use the unmarked blue or yellow button (depending on the version of multimeter being used) on the top left of the multimeter to select between the AC and DC readings.

– Thanks to David Nowak



The TSS Q&A provides answers to common questions received by the ACDelco Customer Support Center.

Q: How do I download material from ACDelco Advantage that I have added to My Cart?

A: To download the items in your cart:

- Complete the order process by clicking Begin Checkout from your cart
- You will see an Order ID number that confirms your request was received
- Visit your Order History where you will see your order
- After a few minutes a Download link will appear that allows you to download your order or email it to recipients of your choice

Q: Where can I order ACDelco calendars for the new year?

A: 2010 ACDelco calendars can be ordered by calling 1-877-845-3773, or online at acdelcomerchandise.com. To order online:

1. Log in to your acdelcomerchandise.com account
2. Select 2009 Holiday link on the left side of the page
3. Select from the calendar options

If you are a new user and want to create an account on acdelcomerchandise.com:

1. Click Create an Account
2. Select your Registration Type from the drop-down menu
3. Fill out the required information

Q: How can I order ACDelco multi-point inspection forms?

A: To purchase ACDelco multi-point inspection forms, call the ACDelco estore at 1-866-700-0001 and request item #AM-FM-0065-09.

Q: How do I get in touch with my new ACDelco representative?

A: ACDelco has enhanced their sales representative positions by ensuring all field representatives have a more technical service background. Many field representatives are still servicing TSS accounts and the new ACDelco staff is well equipped to support our TSS customers. If you have any questions, please contact the ACDelco CSC at 1-800-825-5886, prompt #0.

2010 TSS Program Enhancements

In 2010, the Total Service Support (TSS) program will feature several enhancements designed to increase the rewards and benefits of participating in the program, including new opportunities in training, promotions and exclusively yours (EY) Rewards points.

The TSS program continues to offer ways to help TSS accounts build their business with the support of ACDelco, such as with the Consumer Assurance Program, Customer Satisfaction Index (CSI) Program and ACDelco advertising. In addition, there are a variety of money-saving discounts available to TSS participants, including discounts on GM vehicles, Bosch® diagnostic tools, SPX® tools and equipment, uniforms, GM Service Information and ASE certification.

The changes for 2010 include opening the instructor-led training courses to all levels, increasing the use of the acdelco.com locator service, and increasing the payout through the EY Rewards program. Here are some of the details:

Red Level (Less than \$12,000 in annual purchases) – Limited access to free instructor-led training.

White Level (\$12,000 – \$35,999 in annual purchases) – Expansion to more accounts to provide increased access to the acdelco.com locator service and additional free instructor-led training. New accounts enter the program at the White level.

Blue Level (\$36,000 or more in annual purchases) – Unlimited access to free instructor-led training and acdelco.com preferred locator listing position.

The exclusively yours Rewards program also has increased the opportunities for monthly payouts. The minimum amount for earning a percentage back (based on monthly purchases) has been reduced. Plus, a new level of 5% back for top performers has been added for 2010.

– Thanks to Steve Sheldon

Readers' Rides

Two of the latest additions to the *TechConnect* Readers' Rides gallery are built for speed. Read all about the transformations and view more photos at *TechConnect* Magazine Online. To get a closer look at the cars of fellow TSS shop owners and technicians, go to www.acdelcotechconnect.com and click the *TechConnect* Magazine Online tab.

To submit photos of your car or truck (include your name, TSS service center, location and a few technical details about your vehicle):

1. Go to the *TechConnect* Magazine Online website by clicking the *TechConnect* Magazine tab on www.acdelcotechconnect.com
2. Click the Contact Us link
3. Send an email with photos attached to technical editor Mark Spencer

– Thanks to Mike DeSander



2007 Chevy SSR Top Sportsman Drag Truck, Mark Hicks, Maas Radiator, Inc., Bloomington, Ind.



1994 Mazda Miata, Dan Pedroza, JC Automotive Specialist, Round Rock, Texas

Wheel Speed Sensor Diagnosis

When anti-lock brakes (ABS) first became common equipment on new vehicles well over two decades ago, it featured a “passive” variable-reluctance wheel speed sensor. Later, the “active” magneto-resistive sensor was introduced, which improved performance by providing a more precise wheel speed reading at very low speeds.

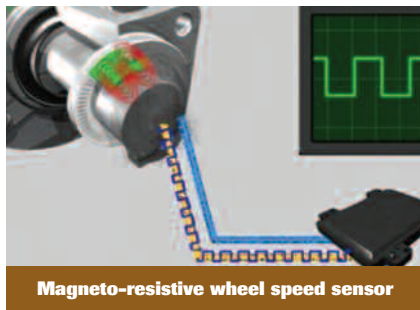
The role and importance of an accurate wheel speed reading has continued to grow with the increased popularity of electronic controls for automatic transmissions, traction control, tire pressure monitoring and other vehicle systems.

Operation

While the appearance of active and passive wheel speed sensors is similar, operation is not.

The operation of the variable-reluctance sensor uses a small internal magnet and coil of wire to generate a signal to the Electronic Brake Control Module (EBCM). Operation involves a gear-shaped tone wheel that rotates near the sensor on each wheel. As the tone wheel rotates, a magnetic field fluctuates around the sensor and induces AC voltage into the internal coil windings. AC voltage is sent to the EBCM, which interprets the voltage and frequency as a wheel speed signal input.

This type of sensor requires that the tone wheel rotate fast enough in order to generate a usable signal. As wheel rotation slows, the signal strength decreases, resulting in a weak signal at very low speeds.



To combat this weakness in signal strength at low speeds, the magneto-resistive wheel speed sensor was designed. It uses a tone wheel and a permanent magnet like the variable-reluctance sensor, along with a two-wire connection that consists of a supply circuit and signal circuit connected to the wheel speed sensor. To power the sensor, the EBCM provides 12 volts on the supply circuit.

As a toothed ring passes by the wheel speed sensor, changes in the electromagnetic field cause the wheel speed sensor to produce a DC voltage signal. It is a digital high/low toggle rather than an analog voltage like with a passive sensor.

The sensor is able to detect the first edge of the next tooth on the tone ring immediately after powering on. The EBCM uses the frequency of the DC signal to calculate the wheel speed.

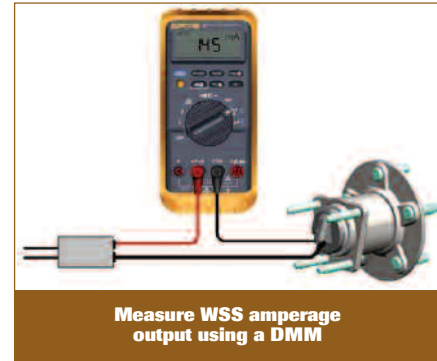
Diagnosis

If DTCs or diagnosis procedures indicate a wheel speed sensor failure, visually inspect the sensors, related wiring and connections for problems.

A variable-reluctance wheel speed sensor can be checked by measuring its resistance with a digital multimeter (DMM). If the sensor resistance is out of specification, it will not produce an accurate signal to the EBCM. To verify sensor

outputs, also compare them using an oscilloscope or AC volt meter.

To measure the output of the magneto-resistive wheel speed sensor, start by testing the 12-volt reference circuit from the EBCM.



Also, DC amperage can be measured across the wheel speed sensor. Slowly turn the wheel and watch the DMM. Amperage should fluctuate from high to low.

The digital signal generated by the magneto-resistive sensor also can be viewed using an oscilloscope. Connect the leads as you would for a DMM. A good wheel speed sensor scope waveform should have sharp square corners on the DC signal circuit to the EBCM.


Remember, the EBCM sends a 12-volt reference signal to each wheel speed sensor. As the wheel spins, the wheel speed sensor produces a square wave DC signal voltage. The wheel speed sensor increases the signal frequency as the wheel speed increases, but does not increase the signal amplitude.

Poor connections and broken wires are some of the leading causes of wheel speed sensor-related failures. Other common causes of wheel speed sensor malfunction are water intrusion and corrosion in the connector to the sensor and damage to the tone ring.

For more information on wheel speed sensor diagnosis, visit www.acdelcotechconnect.com and click the Training tab. Log in to the ACDelco Learning Management System to view TechAssist S-BK05-01.01TAS – Active/Hall Wheel Speed Sensor Operation.


– Thanks to Mike Militello and Mike DeSander

ASE Spring 2010 Testing

The
OFFICIAL

PRACTICE TESTS
Info at
www.ase.com/testprep

Registration Deadline:
March 31, 2010

Test Dates:
May 6, 11, 13, 2010



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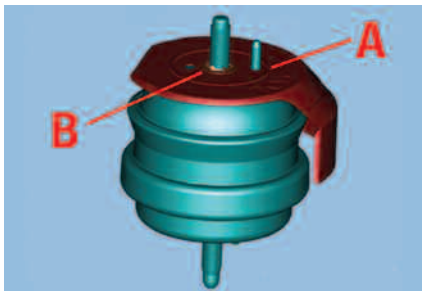
The following technical tips provide repair information about specific conditions on a variety of vehicles. If you have a tough or unusual repair, the **TSS Technical Assistance Hot Line** can help. Call **1-800-825-5886, prompt #2**, to speak with a technical expert with the latest OEM information.

Engine Mount Replacement

2004-2007 Cadillac CTS with 3.6L (LY7) or 2.8L (LP1) engine

When replacing the engine mounts for any reason, follow these steps to prepare and install the new mount.

The new part does not include the exhaust heat shield which must be re-used.

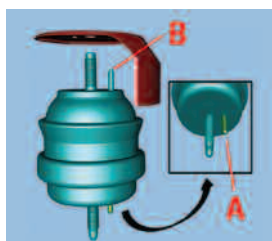


Original mount
A. Hole location of alignment pin
B. Retaining spring nut

Follow the appropriate Engine Mount Replacement procedure in SI to remove the old mount from the vehicle.

Once the mount is removed, mark the hole location of the alignment pin on the mount heat shield.

Using a suitable tool, remove the retaining spring nut from the top of the mount heat shield and discard the old mount.



Replacement mount
A. Lower locating pin
B. Top alignment pin

Prepare the replacement mount

by cutting the lower locating pin off using a die grinder and cutting wheel.

Align the marked hole on the heat shield with the top alignment pin on the replacement mount.

Follow the appropriate Engine Mount Replacement procedure in the Service

Information to install the new mount with heat shield into the vehicle.

Verify that the heat shield is properly located on the mount.

A retaining spring nut is not required.

Ignition Lock Cylinder

2008-2009 Cadillac CTS (built prior to VIN breakpoint 90163371), 2005-2009 Chevrolet Cobalt (built prior to April 14, 2009), 2006-2009 Chevrolet HHR and Pontiac Solstice (built prior to April 14, 2009), 2007-2009 Chevrolet Equinox (built prior to July 2008), 2007-2009 Pontiac G5 (built prior to April 14, 2009) and Pontiac Torrent (built prior to July 2008), 2006-2009 Saturn SKY (built prior to April 24, 2009) — with an automatic transmission only

Technicians may experience some difficulty installing the new style ignition lock cylinder on these models.

Before installing the new cylinder, carefully inspect the housing for debris or damage from the old lock cylinder.

No tools are required for installing the new lock cylinder. When installing into the housing, ensure that the lock cylinder is fully seated to ensure it latches into position.

Do not use the old style lock cylinder that is still used on a manual transmission-equipped vehicle on a vehicle with an automatic transmission; the original binding condition will likely return.

Refer to GM bulletin #09-02-35-005A for additional information.

Aluminum Heater Core and Radiator Replacement

2005 and prior GM passenger cars and light-duty trucks

It may be necessary to replace an aluminum heater core, radiator or water pump due to erosion, corrosion or insufficient inhibitor levels in the coolant. A coolant check should be performed when replacing these components in order to verify proper coolant effectiveness.

Verify coolant concentration using a refractometer. A 50% coolant/water

solution ensures proper freeze and corrosion protection. The refractometer uses a minimal amount of coolant that can be taken from the coolant reservoir, radiator or engine block. If the concentration is below 50%, the cooling system should be flushed.

In addition, verify that no electrolysis is present in the cooling system using a digital voltmeter. The electrolysis test can be performed before or after system repairs. Electrolysis is often an intermittent condition that occurs when a device or accessory that is mounted to the radiator is energized. This type of current could be caused by a poorly grounded cooling fan or other accessory and can be verified by watching the voltmeter while turning on/off various accessories or engaging the starter motor.

Follow the flushing procedures outlined in the Service Information for vehicles using DEX-COOL® coolant and for vehicles using conventional silicate coolant.

Do not mix the OEM orange colored DEX-COOL coolant with green colored conventional coolant. Some GM vehicles, such as the 2004-2005 Chevrolet Aveo use a blue colored conventional coolant.

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

Training UPDATE

How to Take ACDelco Training

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

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

Training Locations

ACDelco offers numerous hands-on Instructor-Led Training (ILT) courses at many convenient locations around the country. Following are the ACDelco training locations.

ACDelco Instructor-Led Training Locations

North Central Region Training Locations

	City	State
Bismarck State College	Bismarck	ND
Cincinnati State Community College	Cincinnati	OH
Columbus Automotive Distributors Warehouse	Columbus	OH
Cuyahoga Community College	Parma	OH
Delta College	Saginaw	MI
Des Moines Area Community College	Ankeny	IA
Dunwoody College of Technology	Minneapolis	MN
Fox Valley Technical College	Appleton	WI
New GM Training Center	Glendale Heights	IL
GM Training Center	Warren	MI
Grand Rapids Community College	Grand Rapids	MI
Ivy Technical State College	Indianapolis	IN
Michigan Technical Education Center	Traverse City	MI
Minnesota State Community & Technical College	Moorhead	MN
Sinclair Community College	Dayton	OH
South East Technical Institute	Sioux Falls	SD
Stark State College	North Canton	OH
Waukesha County Technical College	Pewaukee	WI

Northeast Region Training Locations

CNY Autotech Training Center	Syracuse	NY
Community College of Allegheny County West Hills Center	Oakdale	PA
GM Training Center	Ardsley	NY
Lakes Region Community College	Laconia	NH
Mass Bay Community College	Ashland	MA
Monroe Community College	Rochester	NY
Northampton Community College	Bethlehem	PA
The Community College of Baltimore County	Baltimore	MD

South Central Region Training Locations

Austin Community College	Austin	TX
Del Mar College W. Campus	Corpus Christi	TX
GM Training Center	Garland	TX
Hinds Community College Career Center	Raymond	MS
Iowa Western Community College	Council Bluffs	IA
Johnson County Community College	Overland Park	KS

ACDelco Instructor-Led Training Locations

South Central Region Training Locations continued

	City	State
Longview Community College	Lee's Summit	MO
North Harris College	Houston	TX
Ozarks Technical Community College	Springfield	MO
Pulaski Technical College	Little Rock	AR
San Jacinto College	Pasadena	TX
South Texas Community College CAAT Center	McAllen	TX
Southwest Tennessee Community College	Memphis	TN
St. Louis Training Center	St. Louis	MO
St. Philips College	San Antonio	TX
Tarrant County College	Fort Worth	TX
Tulsa Tech Lemley Campus	Tulsa	OK
Wichita Area Technical College	Wichita	KS
West Texas Training Center	San Angelo	TX

Southeast Region Training Locations

Albany Technical College	Albany	GA
Central Kentucky Technical College	Lexington	KY
Central Piedmont Comm College	Matthews	NC
Florida Comm College at Jacksonville	Downtown	
Forsyth Technical Community College	Winston Salem	NC
GM Training Center	Alpharetta	GA
Ivy Tech Community College	Evansville	IN
J.F. Drake State Technical College	Huntsville	AL
J. Sargeant Reynolds Community College	Goochland	VA
Lawson State Community College	Bessemer	AL
Nashville State Community College	Nashville	TN
Sarasota County Technical Institute	Sarasota	FL
Seminole Community College	Sanford	FL
Sheridan Technical College	Hollywood	FL
Trenholm State Technical College	Montgomery	AL
Wayne Community College	Goldsboro	NC

Western Region Training Locations

American River College	Sacramento	CA
Arapahoe Community College	Littleton	CO
Central New Mexico Community College	Albuquerque	NM
College of Southern Idaho	Twin Falls	ID
Community College of Southern Nevada	N. Las Vegas	NV
Cuyamaca College	San Diego	CA
Denver Training Center	Denver	CO
Fresno City College	Fresno	CA
Glendale Community College	Glendale	AZ
GM Training Center	Burbank	CA
Las Positas Community College	Livermore	CA
Leeward Community College	Pearl City	HI
MSU – Billings College of Technology	Billings	MT
Portland Community College	Portland	OR
Renton Technical College	Renton	WA
Shoreline Community College	Seattle	WA
Truckee Meadows Community College	Reno	NV
University of Alaska	Anchorage	AK
Weber State University	Ogden	UT

The Technical Side

continued from ServiceInsights page 6

artistic flair and ready access to GM Parts and accessories. The five Camaros on display were selected from a field of 132 proposals sent in by leading custom vehicle makers.

“The best shops in the world came there with their best blend of redesign and powertrain upgrade ideas,” says Dr. Jamie Meyer, GM Performance Parts marketing manager.

Joining the Camaros in the lavish GM display at SEMA were a customized 2010 Grand Sport Corvette and an off-road ready “Raptor Fighter” Chevrolet Silverado outfitted with an LS7 crate engine.

Not to be overshadowed, GM Performance Parts showed off its two new powerful crate engines, the LSX 454 and the LSX 376, both built on the famed LSX Bowtie Block.

“Those are boost-ready LSX crate engines that are drawing a lot of interest,” Meyer says.

But the biggest GM news to come out of SEMA had to be GMPP’s new E-ROD crate engine system. Showcased there in a classic 1955 Chevy, the new emissions-friendly, yet powerful LS engine is envisioned as the answer to restorers’ challenge of doing a “resto-mod” project that can also be street-legal.

“The E-ROD was the big story coming out of SEMA,” Meyer says. “There were 300 members of the press at the rollout and we were able to formally introduce this to some local classic car clubs. We think the E-ROD is going to revolutionize how the big custom car builders go to market in the future.”

Hybrid Systems Education

Techs Get up to speed fast with GM Powertrain Clinics.

With more likely to be on the road in coming years, turning away hybrids out of fear, lack of knowledge or unwillingness to learn isn’t a good growth strategy. At the same time, being too cavalier about the unique challenges they pose is simply foolish.

When a hybrid electric vehicle enters your garage, what’s your first reaction? Panic? Concern? Or, is it “ho-hum.”?

Actually, neither one is entirely appropriate for the typical ISC today.

Hybrids, with their complex electrical systems co-existing with internal combustion engines, command respect from both a personal safety and service and repair integrity standpoint.

A good way to begin striking the right balance is to get educated, and one great way to do that is via GM Powertrain’s Hybrid Technology clinic. Sponsored by many GM Powertrain dealers and led by seasoned experts, the clinic provides an overview of current hybrid vehicle technology, with a strong emphasis on the knowledge needed to safely and competently provide basic vehicle service.

In the clinic, which runs two-plus hours, technicians learn not only the essential basics of the various hybrid technologies, but also practical information such as the



“Grand Sport” Corvette on display in the GM Exhibit at SEMA



The Technical Side (cont'd.)

nature of the safety risks and methods of safely disabling systems.

Trainer Rick Carroll says, "one major goal is to dial back some of the confusion and myths that have taken hold."

"I want to dispel a lot of the misinformation that techs are getting about safely working on hybrids. There are all kinds of rumors and misinformation out there, so techs want to know how to work on these vehicles without getting hurt."

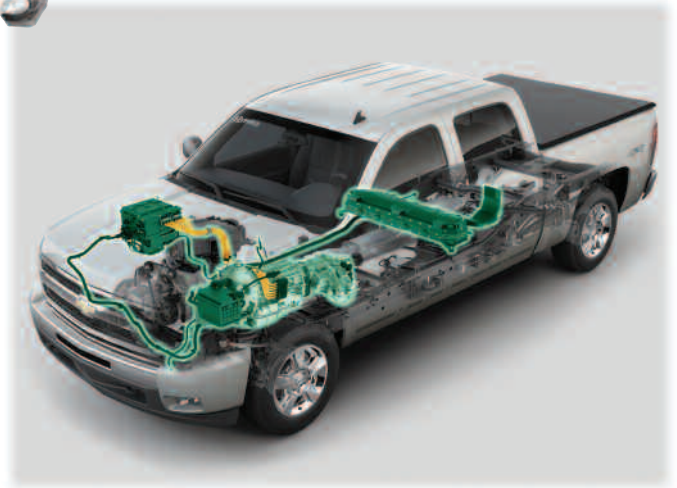
"Hybrids do have their quirks, however, and techs need to understand that the complex technology can produce some surprises," says another trainer, Bill Wheaton.

"We discuss some of the unusual occurrences, like a car pulled from a lake that started up as it was being towed, and an incident in which a collision repairer was tasked to take dents out of a battery box – that's a no-no. There's all



kinds of electricity in there," he says.

While the number of hybrids on U.S. roads today is pegged at 1.25 million – 2.3 percent of all vehicles – that number could triple by 2015, by some estimates. **For additional information on Hybrid Training and other technical training clinics, contact your GM Dealer or log on to www.gmtechinfo.com.**



Jay Leno Camaro at SEMA.

During the annual SEMA Convention, the popularity of a new car can be easily judged by the number of 'tuner' versions used by various companies to showcase their latest products; and the Camaro was the runaway hit this year, with countless examples displaying everything from mild styling accessories to wild performance modifications.

Concept car squeezes 425-hp out of the 3.6L V-6.

But one that stood out from the rest was a **race-ready, twin-turbocharged V-6** Camaro concept car built for talk show host and auto enthusiast Jay Leno on display at the GM exhibit.

Powered by a twin-turbocharged version of the 3.6L direct injected V-6 that is standard in



2010 GM 3.6L V-6 VVT DI (LLT) for the Camaro LS and LT

Camaro LS and LT models, Leno's Camaro blends high performance with surprising efficiency in a racing-ready package. A pair of Turbonetics T-3 turbochargers blows through a custom air-to-air intercooler, force-feeding the engine about seven pounds of boost and lifting its horsepower level to about 425. That's about 40 percent greater than stock and in normal driving (when the turbochargers aren't making boost), there's virtually no penalty in fuel economy over the non-turbocharged 3.6L engine.

Jay Leno Camaro



Repair Procedure for the 2010 Camaro with the 3.6L V-6

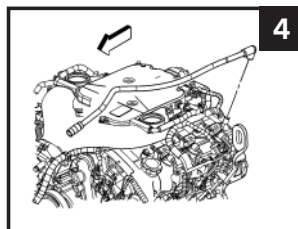
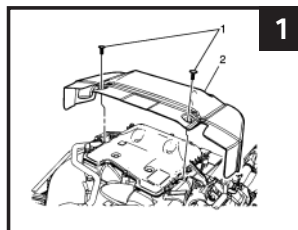
Even though the 2010 Chevy Camaro is a new vehicle, extensive service and repair information resources are a click away at www.gmtechinfo.com – *Electronic Service Information*. Technicians and shop owners can log on to the site to gain access to subscription services for service procedures and repair 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*.

This example of replacement procedures for the **Positive Crankcase Ventilation Hose/Pipe/Tube** for the 3.6L V-6 are shown here.

Positive Crankcase Ventilation Hose/Pipe/Tube Replacement

Removal Procedure

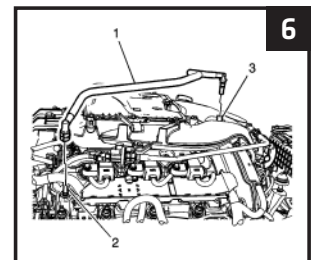
- 1** Remove the intake manifold cover. Refer to *Intake Manifold Cover Replacement – Rear*
- 2** Remove the two intake manifold insulator retaining pins (1).
- 3** Remove the intake manifold insulator (2).
- 4** Remove the positive crankcase ventilation



(PCV) fresh air tube from the left camshaft cover.

- 5** Remove the PCV fresh air tube from the air inlet.

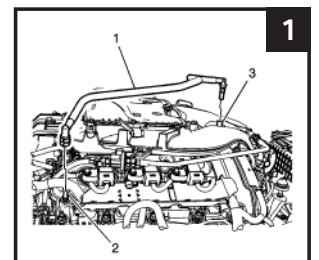
- 6** Remove the PCV dirty air tube (1) from the right camshaft cover (2).



- 7** Remove the PCV dirty air tube (1) from the intake manifold (3).

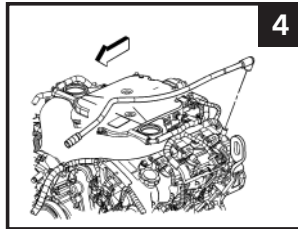
Installation Procedure

- 1** Install the PCV dirty air tube (1) to the intake manifold (3).
- 2** Install the PCV dirty air tube (1) to the right camshaft cover (2).
- 3** Install the PCV fresh air tube to the air inlet.



The Technical Side (cont'd.)

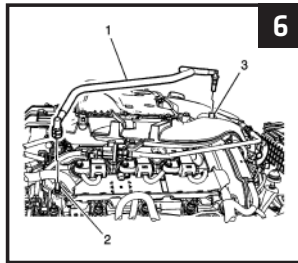
4 Install the PCV fresh air tube to the left camshaft cover.



5 Install the intake manifold insulator (2).

6 Install the two intake manifold insulator retaining pins (1).

7 Install the intake manifold cover. Refer to *Intake Manifold Cover Replacement – Rear*



This example of replacement procedures for the **Positive Crankcase Ventilation Hose/Pipe/Tube** for the 3.6L V-6 found in the 2010 Chevy Camaro 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.

WE'VE GOT ALL THE PARTS YOU NEED!

If you're doing a powertrain or other mechanical repair procedure, remember that we've got all the related parts you need – alternators, starters, belts, hoses, batteries, plugs, wiring, maintenance parts – whatever you need

No More Gentle Giant Shop owner gives HUMMER a Diesel makeover.

“When I saw it come in I knew it was the one,” he says. “He didn’t have the resources to fix it, so I offered him \$5,000 for the truck and he took it.”

Reed, owner of Lafayette Collision Center, in Lafayette, La., was suddenly the proud owner of a five-year-old truck with a substantially damaged front end. But despite his shop’s ample collision repair skills, he wasn’t at all interested in putting it back together.

Instead, he wanted it for what it could do for a close friend that had become too demanding, a little sluggish and, frankly, in need of a facelift. Yes, Reed’s stock 2004

Like a patient on a waiting list for a life-saving organ, Darren Reed perked up when the wrecked Chevy 2500 HD pickup came into his repair shop. And his eyes lit up and the wheels began turning when he learned the owner’s insurance on the vehicle had lapsed.

Hummer H2, as powerful and imposing as it looked, was getting to be a burden.

What it needed, Reed figured, was what the Chevy pickup had: a Duramax Diesel 6600 V8 with an Allison Heavy Duty 5-speed transmission and selectable 2wd/4wd transfer case. Reed had heard about such conversions, and had even looked into hiring the project out to conversion specialists.

But with pros asking upwards of \$40,000, and unwilling to share any information with a

Business of Repairs

do-it-yourselfer on some of the trickier parts of the process, Reed knew he'd have to find a donor vehicle and do the work himself.

And that's what he did. Six weeks after buying the Chevy pickup, removing its engine, transmission and transfer case, and painstakingly transplanting it in the Hummer, Reed essentially had himself a tank with the personality of a race car and the environmental consciousness of a hybrid.

"I'm getting 20 miles per gallon now, compared with 13 to 15 before, and its diesel engine has a lot more power in comparison to the old Hummer gas engine," he says. "It's not fast from the stop, but once you get going it pins you to your seat like a racecar. The stock Hummer doesn't have that kind of power."

It's a good thing that Reed is getting a kick out of his new hot-rod Hummer, one of a rare breed of conversions he's discovered exists only in certain pockets around the

country. The conversion job, one he tackled after hours and on weekends, was a challenging one, though not too daunting for someone who knows the basics.

Still, tasks like making a new transmission and shift cable mount, changing out fuel lines, making an upper tie bar, installing the radiator and fashioning a new harness proved tedious and time-consuming.

"The painstaking part was the wiring; it makes my head hurt just thinking about it," he says. "Once you start digging into that it took a lot of focus and concentration. One mess up with that and you've got trouble."

Instead, what Reed ended up with is "trouble" of a different sort. A reinvigorated Hummer H2 that stalks the streets of Lafayette, itching for an opportunity to show that there's power and performance under a veneer of toughness.

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Genuine  | **Parts**

