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JUL–SEP 2012

2013 Malibu… Much More Than Meets the Eye

Active Air Shutters Help Improve Fuel Economy

Open at low speeds

Closed at higher speeds

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GM RepairInsights Headquarters
2604 N.E. Industrial Dr., #230
N. Kansas City, MO 64117
Email: dealersupport@proactgroup.com
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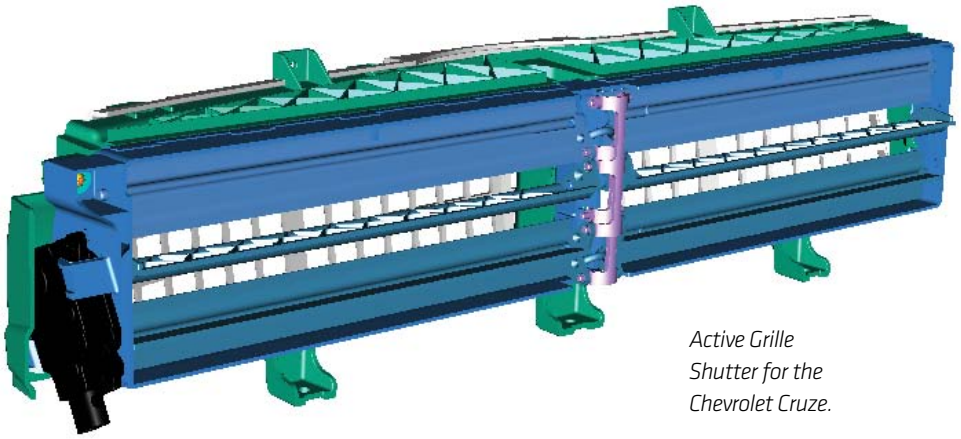
How Smart is Your Front Grille?

GM Helps Improve Fuel Economy with Active Grille Shutters

Active grille shutters have been around for many years, but only recently have they become quite popular. Our energy-conscious society is always looking for ways to save money, and active air shutters do just that – they enhance aerodynamic performance by redirecting airflow around the front of the vehicle and down the sides, rather than through it. And as a result, consumers can experience better gas mileage, and spend less money at the pump.



Active Grille Shutter for the Chevrolet Cruze.

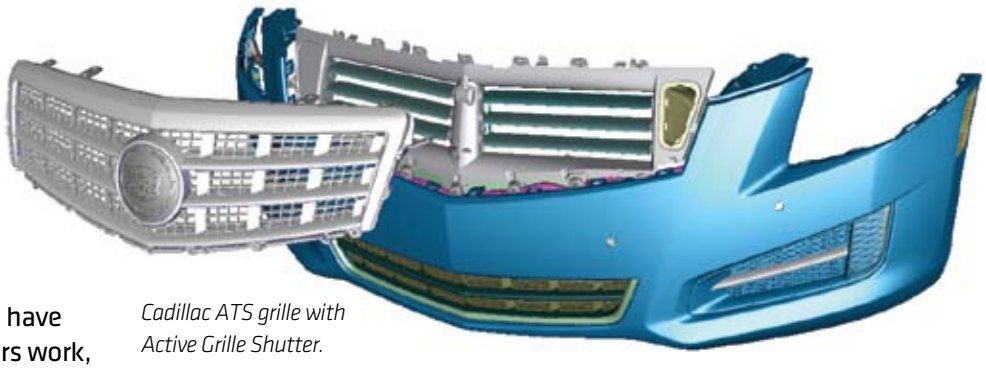
Front-end repairs have always been pretty straightforward. Install a new fascia, grille, headlight or two and a bumper bar and you're back in business. Increasingly, the front end of today's vehicle is equipped with many sensors; they can reduce your cars speed *(active cruise control)* or complete a circuit to start your vehicle (hood ajar indicator in hood latch) and now they can improve fuel economy via Active Grille Shutters.

On a small, but growing number of vehicles equipped with efficiency-enhancing active shutter technology integrated into the nose, repairs become more interesting. Collision repairers facing work on shutter-equipped vehicles, like the 2013 Chevrolet Malibu *(see repair instructions on Page 9 this issue)* and Cadillac ATS and the 2012 Chevrolet Cruze Eco and Buick LaCrosse with eAssist, must have a general understanding of how the shutters work, how to test them and how to replace them correctly. Since they're designed to open and close automatically to deliver greater fuel efficiency, and are integrated to the vehicle's electronics and sensor system, technicians must be certain vehicles are returned to the customer with shutters fully intact and operational.

Diagnostics, wire repairs and purchase and installation of electromechanical assemblies that interface with onboard computer systems all might have to precede final front-end repairs. This is nothing new to GM's Service Technicians, however. Diagnostics will immediately pull certain codes that can be referenced in GM's Service Bulletins.

Shutters are Motor-Operated

Designed like interconnected window blinds, active grille shutter assemblies are located behind the upper and/or lower grille openings. A typical shutter assembly consists of a motor-operated actuator mounted in a tailored frame which is located behind the grille opening and controls the volume of air entering the engine compartment. Via three wires, it interacts with the vehicle's fuel pump control module to set shutter positioning based on variables like vehicle speed, coolant temperature, fan state, refrigerant system pressure, A/C compressor state and ambient temperature.



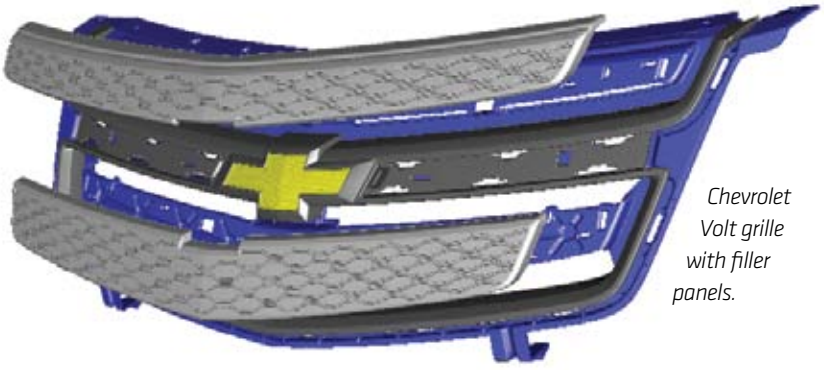
Cadillac ATS grille with Active Grille Shutter.

The design of the grille on vehicles equipped with an active shutter assembly dictates where the shutter system may live. For example the new Cadillac ATS generates most of its cooling from the large grille opening above the bumper bar so its active shutters are mounted behind the upper grille.

The 2013 Chevrolet Malibu with option VRI *(active shutters)* are located below the bumper bar as the lower grille takes in most of the cooling air.

In some vehicles, the grille openings are partially closed off, and in others, such as the Chevrolet Volt, it sports a traditional grille for aesthetics but cooling the engine

GM OE Service Parts Updates (cont'd.)



Chevrolet Volt grille with filler panels.

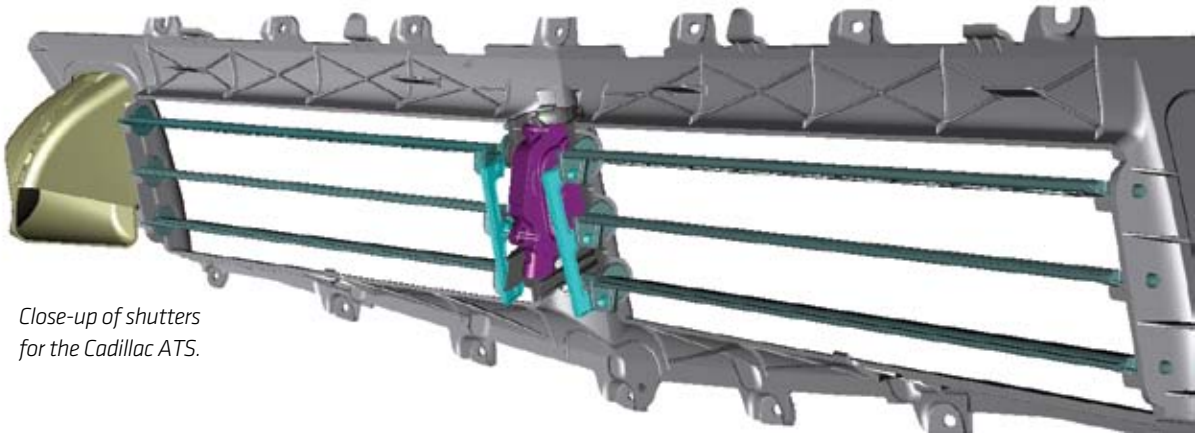
compartment with external air is not necessary so there is a filler panel to mask or close-out grille openings.

Regardless of the design, when cooling and A/C loads are low the actuator closes the shutters, reducing vehicle drag to improve fuel economy. However, when conditions dictate the need for more airflow for cooling, the shutters open. Open or closed, when working properly the shutters help to maximize a vehicle's overall efficiency and boost fuel economy.

Based on the design of the shutter assembly, GM is moving toward replacement of the shutters as a complete assembly. This strategy of complete assembly replacement helps GM Engineers diagnose the parts that are returned in warranty with more accuracy. Calibration of the new shutter assembly is not necessary. Align and install the new shutter assembly to the fascia, plug the actuator into the wire harness connector and cycle the ignition. The shutter assembly will cycle closed and open to "find itself" once a certain vehicle speed and ambient temperature is reached.

If shutters do not function, and a visual inspection indicates no obstructions, verify the shutter actuator opens and closes the louvers using a scan tool. A diagnostic trouble code (DTC) is stored as current for the first key cycle after three attempts are made to cycle the louvers. On the next key cycle the louvers will be commanded to move again. If the commanded louver position cannot be achieved after three more attempts DTC P059F will be set. Electronic Service Information (ESI) should then be reviewed for detailed diagnostic and repair steps.

"Active shutters will be on a number of new models through 2016 and beyond," says Tricia Price, GM engineer for Active Aero Shutters. "And the way in which they are integrated to the vehicle will make them even more transparent to the customer. This technology is certainly not going away any time soon."



Close-up of shutters for the Cadillac ATS.

Upcoming Automotive Industry Events

Now is the time to plan to attend premier automotive industry events happening this Fall. In addition to exhibits, associations sponsoring the events offer a multitude of workshops and seminars. Registration is required, so consider making your plans early.

October 10 – 13, 2012:
Automotive Service and Repair Week (NACE & CARS), New Orleans, LA

www.naceexpo.com

October 30 – November 2, 2012:
Automotive Aftermarket Product Expo (AAPEX), Las Vegas, NV

www.aapexshow.com

October 30 – November 2, 2012:
Special Equipment Market Association (SEMA), Las Vegas, NV

www.semashow.com

ASE Certification Testing Dates Now Open

The non-profit National Institute for Automotive Service Excellence (ASE) works to improve the quality of vehicle repair and service by testing and certifying automotive professionals. Today, more than 350,000 professionals hold ASE certifications, and work in every part of the automotive service industry.

In addition to Collision Repair and Refinish, ASE offers certification tests in Cars & Light Trucks, Medium-Heavy Truck, Truck Equipment, School & Transit Buses and Auto & Truck Parts. Registration is now open for testing dates through the remainder of 2012.

National Institute for AUTOMOTIVE SERVICE EXCELLENCE

Summer 2012 Tests

Registration is open through Aug. 21 and testing is July 1 – Aug. 31

Fall 2012 Tests

Registration is open Sept. 1 – Nov. 21 and testing is Oct. 1 – Nov. 30

For more information and to register online, visit **www.myASE.com**

2013 Malibu

New Model Provides Advanced Technologies, Ride Performance and Fuel-Efficient Powertrains

In North America, the Malibu comes in LS, LT and LTZ trim levels, along with the Malibu Eco, which uses fuel-saving eAssist™ technology to enable EPA-estimated fuel economy of 25 city / 37 highway, for the best fuel economy of any non-hybrid midsize sedan.

An all-new, fuel-efficient and powerful Ecotec 2.5L four-cylinder engine and next-generation six-speed transmission combination leads Malibu's powertrain lineup. It's rated at 197 horsepower (147 kW) and 191 lb.-ft. of torque (259 Nm). A new Ecotec 2.0L turbo, rated at 259 horsepower (193 kW) and 260 lb.-ft. of torque (353 Nm), debuts this fall.

Malibu's Exterior Designed to Stand Out

The exterior design of the all-new Malibu carries DNA from its sister vehicles, the Camaro and Corvette, to bring a sporty sensibility to the family sedan segment. A wider stance, broad shoulders and an integrated rear spoiler bring a new athleticism to Malibu and give it a more aggressive appearance.

Malibu also has electronically controlled and integrated active aero shutters to improve aerodynamics and enhance fuel economy without sacrificing the exterior design. They automatically close airflow through the lower grille opening when air intake is least needed, improving aerodynamic performance and enhancing fuel efficiency. The shutters are standard on Eco and LS models, as well as the 3LT trim.

All-new Ecotec Powertrains

The 2013 Malibu features a lineup of fuel-efficient and powerful four-cylinder Ecotec engines that complements its European-inspired driving characteristics.

An all-new Ecotec 2.5L dual overhead cam, four-cylinder engine with direct injection leads Malibu's engine lineup in North America. New features include enhanced authority continuously variable valve timing, variable-displacement oil pump and electronic thermostat that save fuel, while delivering V-6-like performance. It is rated at an SAE-certified 197 horsepower (147 kW) and 191 lb.-ft. of torque (259 Nm).

The 2.5L engine has more standard torque than any midsize car with a four-cylinder engine, and more base horsepower than the new Toyota Camry and the Ford Fusion.

The 2.5L is mated to a Hydra-Matic 6T40 six-speed automatic with features designed to enhance powertrain efficiency.

Driving Experience

Contributing to the Malibu's ride and handling characteristics is a solid body structure as stiff as any in the global midsize sedan market, allowing for precise turning and dynamic vehicle control. Chassis control technologies include four-channel anti-lock brakes, full-function traction control, four-corner electronic stability control, electronic brake force distribution, brake assist system, corner brake control, hydraulic brake fade assist and drag torque control.

Even though the 2013 Chevrolet Malibu is a new vehicle, extensive service and repair information resources are a click away at **www.gmtechinfo.com** –*Electronic Service Information.* Technicians and shop owners can log on to the site to gain access to subscription services for service procedures and repair manuals.

A complete Service Manual is accessible 24/7 through a subscription to the site. Free collision repair procedures are also available by going to **www.genuinegmparts.com.**

Active Grille Air Shutter Description and Operation

The active grille air shutter actuator closes louvers at the front bumper to enhance vehicle aerodynamics in driving situations where cooling and A/C loads are relatively low and high levels of front end airflow are not required. If high levels of airflow are required the active grille air shutter actuator opens the louvers. The control signal from the fuel pump control module, ignition and ground circuits enable the active grille air shutter actuator to operate.

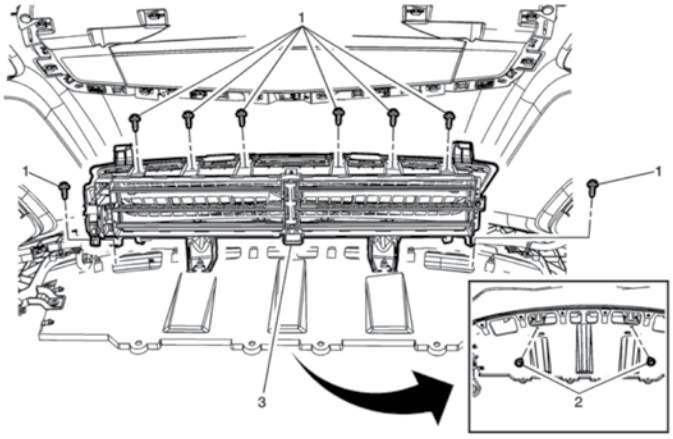
The single active grille air shutter system consists of an individual motor operated mechanism hinged behind the vehicle front grille for controlling the amount of air entering the engine compartment. It includes three wires, ground, power and pulse width modulated signal to the actuator. The fuel pump control module determines shutter state based on various vehicle conditions such as vehicle speed, coolant temperature, fan state, refrigerant system pressure, A/C compressor state and ambient temperature. The pulsed signal controlling the shutter mechanism will be able to control the shutter to close/open positions.

The actuator is powered by an ignition circuit that is active when the key is in the RUN position. The vehicle may have to be driven for up to 13 minutes at speeds greater than 41 kph (25 mph) before the shutter begins to move. If low ambient temperature is detected, the shutter will remain in the closed position.

Front Bumper Fascia Air Deflector Replacement

Preliminary Procedure

Remove the front bumper fascia energy upper absorber.
Refer to *Front Bumper Fascia Energy Upper Absorber Replacement.*



1 Front Bumper Fascia Air Deflector Bolt (Qty: 8)

Caution: *Refer to Fastener Caution.*

Tighten 2 N·m (18 lb in)

2 Front Bumper Fascia Air Deflector Nut (Qty: 2)
Tighten 2 N·m (18 lb in)

3 Front Bumper Fascia Air Deflector

Procedure

Disconnect the electrical connector from the actuator.

This example of **Front Bumper Fascia Air Deflector Replacement for the 2013 Chevrolet Malibu** 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.

Performance Redefined

California Resto-Mod Shop Pitches 'Green' Alongside Horsepower and Torque


LS3 E-ROD Engine

Over the course of 25 years, Darryl Nance's D&P Classic Chevy restoration and custom build business (www.dpchevy.com) has been with Chevrolet Performance (www.chevroletperformance.com) and its succession of groundbreaking innovations every step of the way.

Little wonder, then, that the owner of the Huntington Beach, Calif., shop is a big fan of the emissions-compliant, fuel-efficient LS3 E-ROD engine. It doesn't hurt, of course, that Nance was on the leading edge of that technology. Several years ago, working closely with GM, D&P installed the prototype for what would become the E-ROD emissions-compliant performance engine in an LS7-powered 1969 Chevrolet Camaro.

"Certified for use in powertrain modifications in pre-1996 model year vehicles in the state, the E-ROD is the best engine replacement choice for customers who want to re-power a GM vehicle they can legally drive in California," says Nance.

But even outside the Golden State, he says, the E-ROD deserves a hard look from resto-modders wanting to give restored classics a more fully updated powertrain.

"By some estimates the number of vehicles out there that in the 1970s and 1980s were built with and still have lower compression, smog-laden engines is around a million," Nance continued. "With a lot of younger hobbyists getting into this, they want these restored vehicles to run like modern-day cars, which of course are much cleaner than these classics were originally."

Although the E-ROD is pricier than a standard Chevrolet Performance LS3 crate engine, it's a cost more enthusiasts who want "green" credentials along with power and performance, might be willing to bear, Nance says. As more states and municipalities follow California's lead on clean air rules, such cleaner-burning engines might be required in older-vehicle restorations.


1984 Chevrolet El Camino

Nance's rebuilding experience tells him more clients are willing to listen to the E-ROD pitch. A recent example is how an owner of a 1984 Chevrolet El Camino was sold on the engine package.

"This El Camino came in with a gutless stock 305 V-8 that at 205 hp was horrible in terms of power," Nance says. "It was a local guy who approached us thinking that the car was worth putting some money into and was interested in a fuel-injected engine. We explained the E-ROD and all the issues about emissions compliance and the need to not just buy any motor and drop it in. In the end, he was sold."

In the three years since the E-ROD was introduced, D&P has been one of the biggest E-ROD installers in the state. With a number of installs and reworks under his belt, Nance has had plenty of hands-on learning with the E-ROD. And the experience has taught him that an E-ROD installation is a breeze for a skilled performance engine installer. Even though it incorporates accessories like twin catalytic converters and other special emissions components that require some tinkering, it's ultimately no more challenging than a standard LS-series engine.

"Compared to a carbureted 350 there's a lot more going on, but there's really not much difference in installing a regular LS3 and the E-ROD version," he says. "It comes with a kit full of components that have to be properly installed to make the engine emissions compliant, but it's not that much harder."

"The primary obstacle with installing the E-ROD or any LS engine in an older vehicle," he says, "is engine compartment space. Some require special modifications so a solid understanding of fuel systems issues is very important."

"In the El Camino project we ran into a few challenges like fitment of the exhaust manifold so it would clear the frame, and we had to install motor mounts and address oil pan-clearance issues using a special hot-rod pan kit," he says. "But once we got the mount, pan, exhaust and pulley system issues addressed, the E-ROD installation pretty much fell in line with how we have to do other GM V-8 engine installs."

Not only did it vault the customer several decades into the future in terms of power and performance, but the E-ROD delivered better fuel economy and lower emissions, all supported by the unbeatable GM Powertrain warranty. For Nance, it was just another in a long line of transformational Chevrolet Performance engine projects.

When complete, Nance says, the E-ROD "looked like it was born in there. It was the perfect application to suit the Camino."

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