TECH LINK

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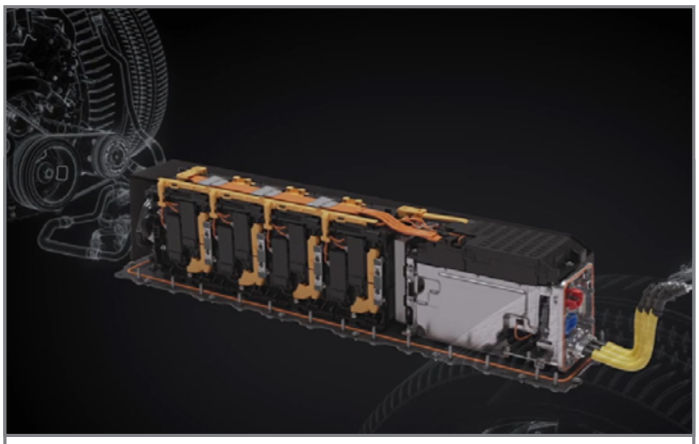
Corvette E-Ray

Delivers Electrified AWD Performance

The new 2024 Corvette E-Ray pairs two separate propulsion systems to provide naturally aspirated V8 power with electrified responsiveness powered by eAWD (All-Wheel Drive), delivering all-weather capabilities with impressive performance.

Corvette E-Ray Delivers Electrified AWD Performance

There is no plug-in charging for the E-Ray's high-voltage battery system. It's charged via regenerative energy from coasting and braking, as well as during normal driving.



The high-voltage battery system features a 1.9 kWh lithium-ion battery pack.

The A4 Hybrid/Electric Vehicle Battery Pack contains all the components necessary to operate the hybrid system with the exception of the front-drive electric drive unit.

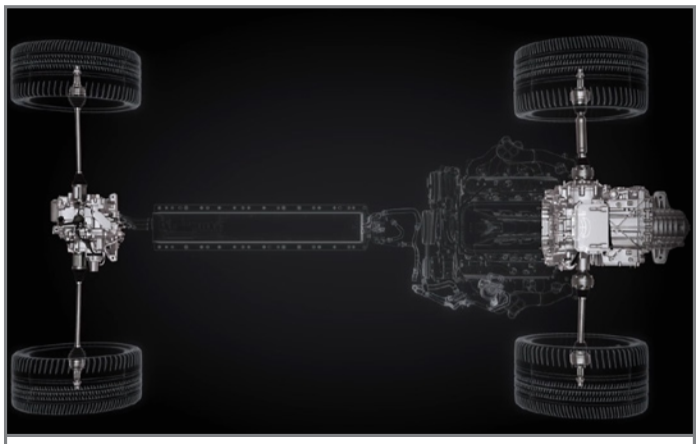
The K16 Battery Energy Control Module (BECM) controls and monitors the high-voltage battery cells. The K107 Drive Motor Control Module, often referred to as the drive motor generator power inverter module, converts high-voltage direct current (DC) electrical energy to 3-phase alternating current (AC) electrical energy. The K107 Drive Motor Control Module operates the T12EF Front Electric Drive Transmission Module. The T12EF drive motor provides motive force to the front wheels.

When the vehicle is operating in an EV mode (Stealth or Shuttle mode), the K1 14V Power Module converts high-voltage direct current (DC) to low-voltage (12V) DC for accessory electrical operation and to charge the 12V lithium-ion battery.

Two cooling systems are utilized for the hybrid/EV components. One system connects to the front of the A4 battery pack and provides thermal management for the power electronic devices. The second system connects to the rear of the A4 battery pack and provides thermal management for the high-voltage battery cells.

ELECTRIFIED PROPULSION

The Corvette E-Ray's electric drive unit over the front axle is compact, preserving space in the front storage compartment. It consists primarily of an 120kW drive motor, a differential carrier, output carrier, automatic transmission fluid pump, automatic transmission scavenging pump, clutch pawl, drive motor disconnect clutch actuator, and one axle shaft. The differential/output gear set provides the fixed forward and reverse ratio. Changing speed and torque is fully automatic and is accomplished through the drive motor generator power inverter control module, located inside the battery pack. The drive motor generator power inverter control module receives and monitors various electronic sensor inputs and uses this information to vary the torque output to the drive axles based on throttle position.



The electric drive unit is positioned over the front axle.

E-Ray's standard Active Fuel Management system uses the electric motor to extend 4-cylinder operation in various driving scenarios. The amount of electric assist is tailored within each of the E-Ray's six driver-selectable modes: Tour, Sport, Track, Weather, My Mode and Z-Mode. Drivers can also select the Charge+ feature to maximize the battery's state of charge.

The E-Ray Performance App on the infotainment system provides the driver with technical insights into how the propulsion system is operating. There are three primary display layouts: Gauges (displays dynamic power output), Dyno (graph of power/torque) and Data (electrical system performance and efficiency).

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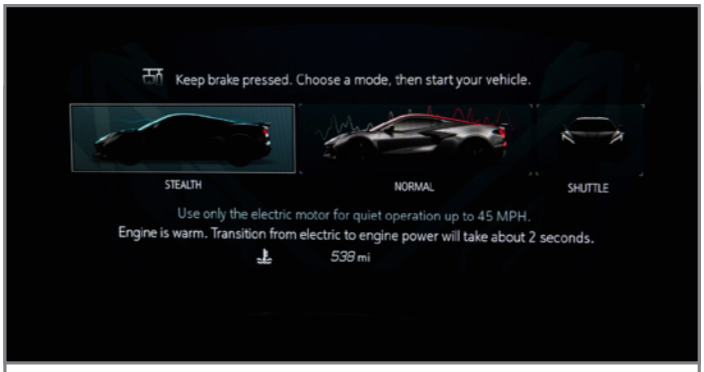
EV DRIVE MODES

The Corvette E-Ray's electrified propulsion system can provide limited all-electric propulsion at the driver's discretion upon startup. There are two driver-initiated electric modes — Stealth mode and Shuttle mode — that enable the car to travel under electric propulsion in certain conditions.

Performance app displayed on the infotainment screen.

Stealth mode enables all-electric driving, when selected at start-up, for a period of time before the engine turns on for normal driving. It is designed for quietly exiting a neighborhood with a maximum speed of 45 mph (72 km/h). The engine automatically engages if the vehicle's speed exceeds the limit, additional torque is requested by the driver by quickly depressing the accelerator pedal, or the E-Ray's battery pack is depleted. The Stealth Drive Mode Capability Gauge on the instrument cluster indicates when the engine will start. Stealth mode can only be activated once per ignition cycle.



EV modes are displayed before starting the engine.

The following conditions must be met to enable Stealth mode:

- Doors closed, seat belt buckled and brake applied.
- Outside air temperature greater than 50°F (10°C) as determined by the vehicle.
- High-voltage battery greater than 28% displayed state of charge.
- 12v battery greater than 65% state of charge; this parameter is not displayed in the vehicle.
- 12v battery temperature greater than 41°F (5°C); this parameter is not displayed in the vehicle.
- Parked on a grade less than 12%.
- Fuel level greater than 8%.

Stealth Drive Mode Capability Gauge on the instrument cluster

Shuttle mode provides the ability to propel the vehicle at very low speeds using only electric power. It is not intended for public roads and deactivates if vehicle speed exceeds 15 mph (24 km/h). Only vehicle speed, the battery gauge and electric power gauge are displayed on the instrument cluster.

The following conditions must be met to enable Shuttle mode:

- Doors closed and brake applied.
- Outside air temperature greater than 14°F (-10°C) as determined by the vehicle.
- High-voltage battery greater than 30% displayed state of charge.
- Parked on a grade less than 12%.

TIP: Climate controls are disabled when in an EV drive mode. The engine will start automatically if the climate controls are turned on or if the driver's seat belt is unbuckled. The heated/ventilated seats and heated steering wheel are enabled in the EV drive modes.

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Use Correct Labor Code for Tire Valve Stem Repairs

A damaged valve stem is a common cause of a tire leak. The valve stem may have been damaged by normal wear and tear from road conditions or impacts or from improper valve stem installation where the stem isn't full seated into the wheel.

If there is damage to a tire valve stem that requires valve stem replacement, also inspect the Tire Pressure Monitor (TPM) sensor for damage if the vehicle was driven on an underinflated or deflated tire and check the sensor porthole for any debris.

Tire valve stem damage

LABOR CODES

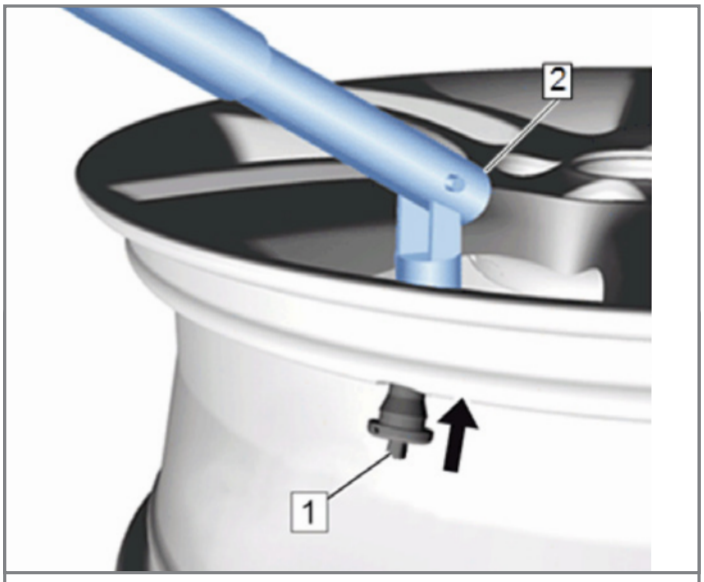
When the tire valve stem is replaced, be sure to use the correct labor code — 8060680 Tire Valve Stem Replacement.

Do not use labor code 8050190 Tire Pressure Indicator Sensor Replacement for leaks at the tire valve stem or for unseated valve stem repairs. Labor code 8050190 Tire Pressure Indicator Sensor Replacement should be used only for replacing the TPM sensor.

TIRE REPAIRS

Keep in mind the following tips when performing tire repairs.

- When removing the tire valve stem, if the stem will not pull through the rim, cut the inner seal off the stem and then pull the stem through the rim using a valve stem removal tool.
- When installing the tire valve stem, ensure the tire valve stem installation tool is fully engaged with the stem threads. Pull the valve stem through in a parallel direction to the valve hole on the wheel to help ensure proper seating.
- The valve stem should be fully seated on the rim. The rim hole edge has to be completely in the notch of the valve stem. The valve stem and the rim holes must be concentric.
- If a GM-approved tire sealant was used in the tire, remove the sealant residue from the TPM sensor using mild dish soap, clean water and shop cloths. If it cannot be confirmed that the tire sealant was a GM approved product, replace the TPM sensor.
- Use care not to scratch or damage the clear coating on aluminum wheels with any tire changing equipment. Scratching the clear coating may cause the aluminum wheel to corrode or the clear coating to peel from the wheel.



Pull the valve stem (#1) through the valve hole using a tire valve stem installation tool (#2).

For additional information, refer to Tires and Wheels in the appropriate Service Information.

▶ Thanks to Dave MacGillis

Insufficient Dual Tank Fuel Transfer

Some 2024 Silverado 3500 HD and Sierra 3500 HD models equipped with the 6.6L Duramax Diesel engine (RPO L5P) may have a fuel gauge that drops to empty and an inoperative fuel transfer pump.

During diagnosis, the Engine Control Module (ECM) may show a fuel level percentage higher than empty. For example, it may show a 72.2% fuel level with 45.5 gallons remaining, but the IPC data may show a considerably lower number, such as 9%. The fuel level condition may be caused by insufficient fuel transfer with the dual fuel tank transfer system not transferring fuel properly from the rear tank to the front tank.

FUEL TRANSFER INLET PORT

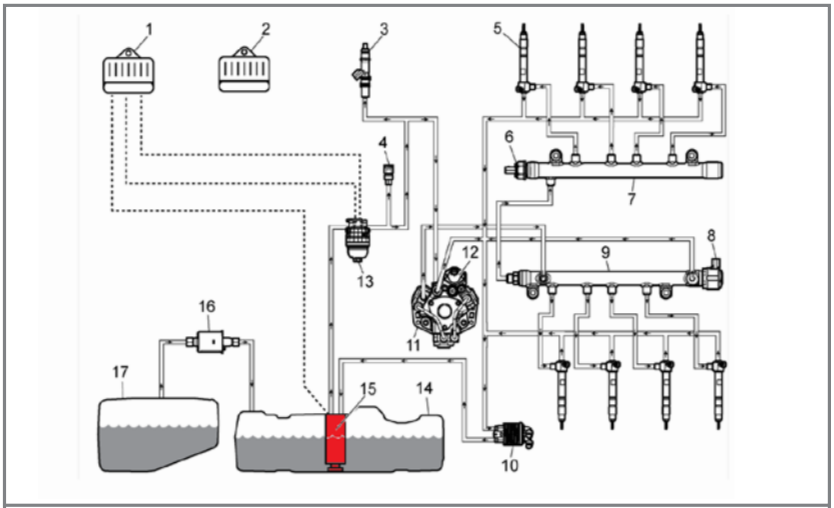
The poor fuel transfer from the rear tank to the front tank may be due to a blockage in the fuel transfer inlet port at the A7 Front Fuel Tank Sender Assembly inside the fuel tank. The assembly may have an internal check valve within the inlet port blocking the fuel from entering the front tank. If it is found that the A7 Front Fuel Tank Sender Assembly fuel transfer inlet port is blocked, it should be replaced.

Before installing the new A7 Front Fuel Tank Sender Assembly, inspect it to make sure there isn't any blockage. Use very low air pressure (below 5 PSI) to determine if the fuel inlet port is blocked or flowing freely.

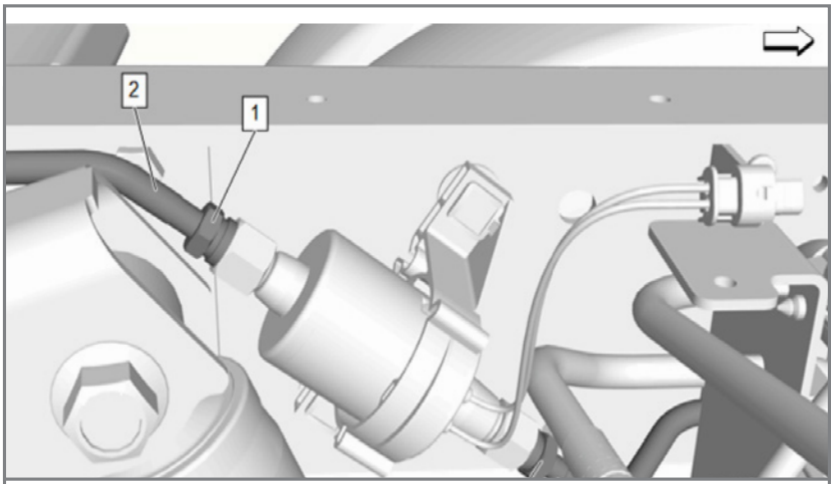
FUEL TRANSFER SYSTEM DIAGNOSIS

When performing basic testing of the fuel transfer system:

- Verify that the fuel transfer pump will run electrically by using the scan tool to command the pump on. This test does not confirm that the transfer pump is pumping fuel.
- Use the scan tool to monitor the front tank and rear tank fuel level voltages. Proper fuel level sensor voltages for either tank level sensor are 0.7 volts = full tank and 2.5 volts = empty.
- To determine if fuel is being transferred from the rear tank to the front tank, monitor the fuel level sensor voltages while commanding on, or jumper power and ground to the fuel transfer pump. The fuel level should decrease (voltage increases) in the rear tank and the fuel level should increase (voltage decreases) in the front tank.



A7 Front Fuel Tank Sender Assembly inside the fuel tank (#15)



Fuel transfer pump

For more details on fuel transfer pump diagnosis, refer to #PIT6159.

▶ **Thanks to Jim Will**

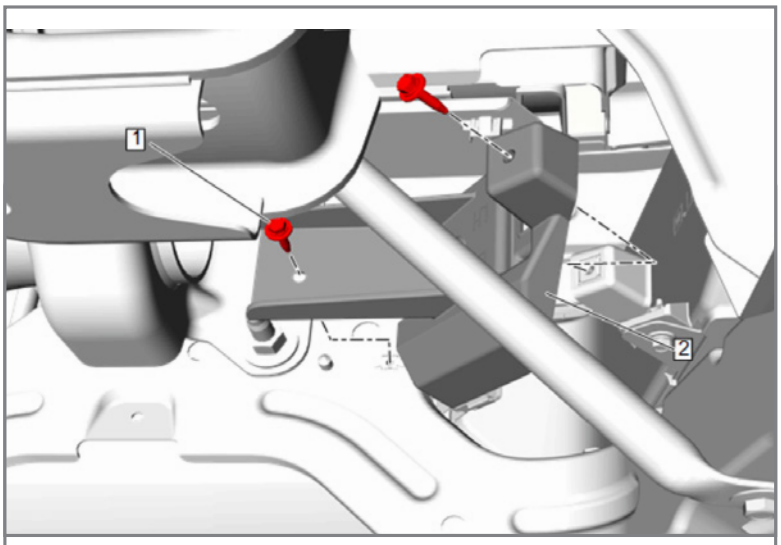
Side Detection System Unavailable

A Side Detection System Temporarily Unavailable message may be displayed on the instrument cluster of some 2024 Silverado 2500 HD/3500 HD and Sierra 2500HD/3500 HD trucks. There also may be false alerts or the system may operate erratically or not at all. These conditions may be caused by a decal attached to the radar-emitting side of one or both of the Side Obstacle Detection Modules

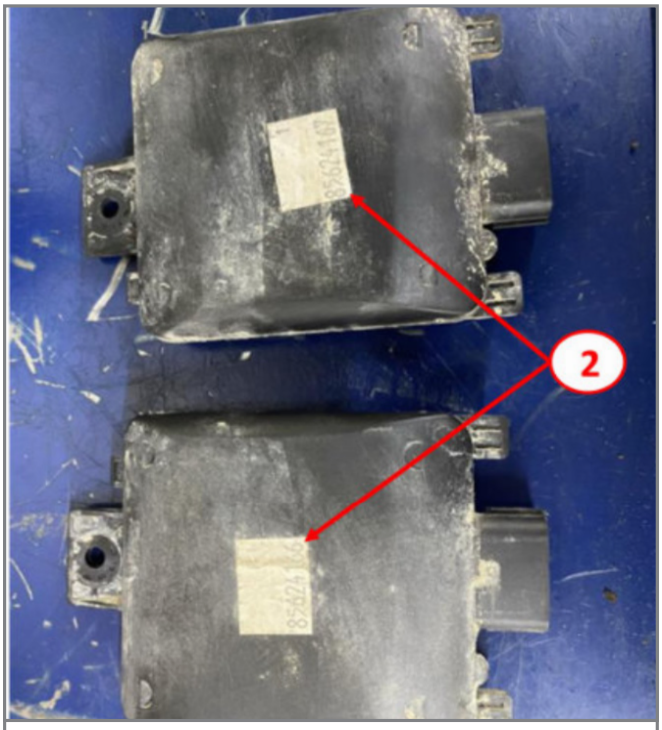
The supplier-installed part label that is attached to the non-radar emitting side of the module is not an issue and does not cause any interference or blockage of the radar.

Any decals or stickers that are attached to the radar-emitting side of the Side Obstacle Detection Module can cause interference or blockage of the radar and must be removed. The Side Obstacle Detection Modules are attached to the rear bumper impact bar brackets. Once the decal is removed from the module and the vehicle is driven, the Side Obstacle Detection Modules will automatically learn the blockage has been removed and return to normal operation.

Refer to #PIT6161B for more information.



Side Obstacle Detection Module



Improper decal attached to the radar-emitting side of the Side Obstacle Detection Modules..

Supplier-installed part labels

Thanks to Jim Will

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To activate an EV drive mode, the engine must be off.

- Buckle the seat belt and apply the brake pedal.
- Rotate the Driver Mode Control knob on the center console to highlight the Shuttle, Stealth or Normal mode on the instrument cluster.
- Press the Engine Start/Stop button and shift to Drive to enter the selected EV drive mode. An indicator will display on the instrument cluster.

Refer to #PIC6542 for additional information.

QUICK BATTERY CHARGE

The Charge+ feature can quickly maximize the high-voltage battery state of charge using engine power, which is useful for maximum performance at a track event or to activate Stealth mode. View the Hybrid Battery info tile for state of charge status. Optimal charging occurs at speeds above 35 mph. The Charge+ button is located on the side of the center console.

The Charge+ feature should not be used longer than needed since it draws on engine power to help recharge the battery quickly, rather than charging efficiently through brake or coast regen. When the high-voltage battery is full, no additional regen energy of any type can be captured. When the Charge+ feature is turned off, the high-voltage battery automatically seeks a normal state of charge between 50% – 80%.

Charge+ and Auto Stop buttons on the side of the center console.

AUTO ENGINE STOP/START

The fuel-saving Engine Stop/Start system automatically turns off the engine, referred to as an Auto Stop, when the brake pedal is applied and the vehicle is at a complete stop, if certain operating conditions are met. When the brake pedal is released or the accelerator pedal is pressed, the engine will restart. Drivers can turn the system on or off by pressing the Auto Stop button on the side of the center console. The button indicator illuminates when the system is on. The system is enabled each time the vehicle is started. The Engine Stop/Start system is not active in manual transmission mode.

For additional information on the Corvette E-Ray, refer to the appropriate Service Information.

▶ Thanks to Lane Rezek

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