

New GMC HUMMER EV Pickup



An All-Electric Supertruck



Ultium Battery System Powers the GMC HUMMER EV Pickup

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NEW GMC HUMMER EV Pickup

AN ALL-ELECTRIC SUPERTRUCK

As the first GM truck designed around an electric vehicle (EV) propulsion system, the all-new 2022 GMC HUMMER EV Edition 1 Pickup offers some unique performance capabilities, including impressive on- and off-road features, 1,000 horsepower (GM estimate), a range of 329 miles (529 km) on a full charge¹ (GM estimate) and zero tailpipe emissions.

The HUMMER EV Edition 1 Pickup features:

- An Ultium 24-module battery system
- Three-motor Ultium Drive system
- High-performance driving modes, including
 - Watts to Freedom² – enables peak horsepower and torque, propelling the truck from 0–60 mph in approximately 3 seconds
 - CrabWalk² – allows diagonal movement by turning all four wheels in the same direction in unison. Limited to low speeds.
 - Extract Mode² – raises the vehicle nearly 6 inches (15 cm) to travel over a variety of obstacles. Limited to low speeds. (Late availability. 2022 Edition 1 Pickup models will require a no-charge software update.)
- 800-volt, 350-kilowatt DC fast charging capability.³
- Super Cruise driver assistance technology for compatible roads.
- Infinity Roof with Modular Sky Panels –removable roof panels and front I-Bar, which can be stored in the vehicle.

ULTIUM BATTERY SYSTEM

The all-new Ultium battery system features a proprietary new cell chemistry, smart modules with wireless Battery Management Systems and advanced thermal management that maintains balance within the truck's battery cell groups for optimal performance and battery longevity.

The two layers of battery cell modules combine to produce the HUMMER EV's battery pack. The pack uses a flexible, high-voltage architecture that enables 800-volt DC fast charging.



Infinity Roof with Modular Sky Panels and I-Bar removed.

MODULAR ARCHITECTURE

The GMC HUMMER EV Pickup's architecture and Ultium batteries were simultaneously engineered, allowing the propulsion system to act as part of the vehicle's structure. The large-scale, high-energy Ultium battery cells are laid out horizontally in modules and mounted beneath the passenger compartment, optimizing weight distribution and providing a low center of gravity to enhance overall handling.

The battery modules are contained within battery pack enclosures that have stiffening ribs to increase torsional rigidity. The added torsional rigidity contributes to a more solid structure overall

Two high-strength, structural shear plates connect the battery pack lower enclosure to the front- and rear-suspension cradles for enhanced strength and stiffness. The shear plates are essentially structural lattice shells that enclose and protect the battery as

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Ultium battery system

DRIVE UNITS

The drive units of the HUMMER EV were engineered to enable a high-travel suspension system required for off-roading and torque vectoring, a technology that can vary the torque to each wheel for improved handling and stability. The single-motor front drive unit (RPO S8L) is capable of 270kW. The dual-motor rear drive unit (RPO P79) is capable of 492kW peak output.



The drive units were engineered to enable a high-travel suspension system.



The battery cells are contained within battery pack enclosures that have stiffening ribs to increase torsional rigidity.

The front drive unit features a fully automatic, variable speed front-wheel-drive transaxle with an electronic locker and park lock actuator. The single-motor front drive unit has a 13.3:1 fixed gear ratio and an electronic lockable differential, capable of delivering up to 100 percent of the motor torque to one wheel, in case traction is lost on the opposite wheel. All four wheels can be fully synchronized for true e4WD propulsion.

The rear drive unit is a fully automatic, variable speed rear-wheel-drive unit with electronic torque vectoring. Two rear motors contained in one Ultium Drive unit independently power the rear wheels through a fixed gear ratio of 10.5:1, with the capability of varying torque output to each wheel to optimize traction in off-road driving and highway-driving conditions. Motor output also can be synchronized to simulate a locking differential.

All three drive motors are identical, with each producing roughly 380 lb.-ft. of torque. Full torque is available from just above zero vehicle speed to roughly 35 mph (56 km/h). When multiplied through front- and rear-drive unit gear ratios, more than 11,500 lb.-ft. of torque is available at the wheels.

IN-VEHICLE TECHNOLOGY

Inside the HUMMER EV are a number of advanced technologies. There are two large displays: a 13.4-inch (34 cm) diagonal color touchscreen that is part of the GMC infotainment system and a 12.3-inch (31 cm) diagonal color Driver Information Center



Lower shear plate

well as connect the front and rear chassis. In addition to its structural purpose, the lower shear plate acts as an aerodynamic underbody panel, while the upper shear plate enables a smooth, continuous floor panel for an uninterrupted passenger compartment space.

display/instrument cluster. Some functions can be activated by voice command, while smartphone-like swipe functionality within the infotainment system makes scrolling and feature selection simple. Feature selection in the Driver Information Center is performed using the steering wheel controls.



HUMMER EV interior

The infotainment system comes with Google built-in, which is Android-based and offers several popular Google apps and services, including Google Assistant, Google Maps and Google Play.⁴ Some features require a Connected Services subscription and a Google account. A Google account is not required, but one will provide a more personalized experience. Wireless projection through Android Auto or Apple CarPlay compatibility also is available.

To create a new profile for the vehicle, it is recommended to use the Setup Wizard, which will walk the customer through the steps of setting up the infotainment system and personalizing various features. The vehicle must be in Park. Up to seven user profiles can be stored in the vehicle, not including the guest profile.

By signing in to a Google account, personalized features of certain apps, such as Google maps, can be accessed in the vehicle. In addition, a customer's GM account, which is a separate account from Google, will allow access to other vehicle services, such as the myGMC mobile app.⁵

The infotainment system also features three fundamental in-vehicle information centers:

- Energy Assist – Monitors energy use, sets up charging schedules, battery temperature conditioning and more.
- Off-Road Widgets – Displays information related to the HUMMER EV's selectable capabilities and performance readouts in off-road driving scenarios — everything from the ride height



Energy Assist display

and eLocker engagement to compass headings, pitch/roll status and more.

- ProGrade Trailering App – Based on the trailering app developed for GMC's full-size trucks, the widget includes trailer profiles, a trailer light test, pre-departure checklists and more.⁶

DRIVER ASSISTANCE FEATURES

The HUMMER EV Edition 1 Pickup includes the following standard driver assistance technologies:⁷

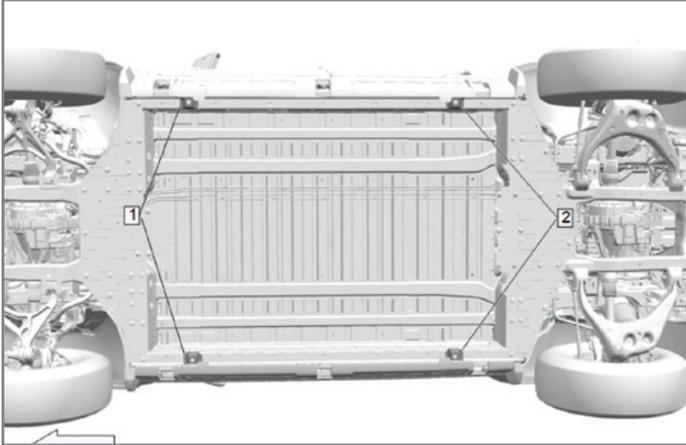
- Super Cruise and Adaptive Cruise Control
- IntelliBeam automatic headlamps
- Forward Collision Alert, Enhanced Automatic Emergency Braking, Front Pedestrian Alert and Following Distance Indicator
- Front and Rear Park Assist
- Enhanced Automatic Parking Assist
- HD Surround Vision
- Reverse Automatic Braking and Rear Cross Traffic Alert
- Lane Keep Assist with Lane Departure Warning
- Lane Change Alert with Side Blind Zone Alert and Trailer Side Blind Zone Alert
- Rear Camera Mirror
- Safety Alert Seat

LIFTING THE VEHICLE

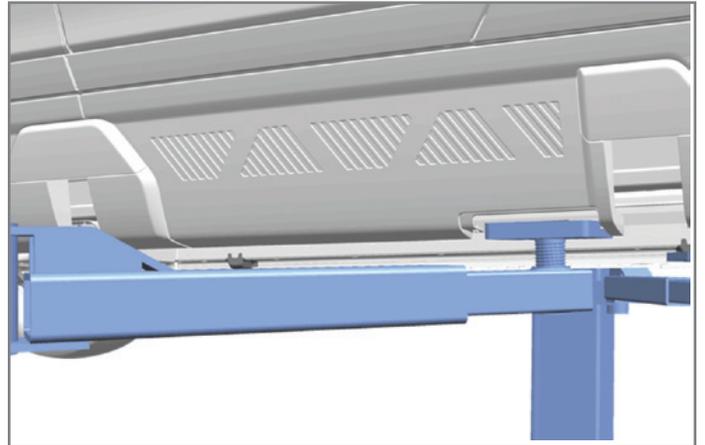
When lifting the vehicle, specific lift points are recommended on the front frame and rear frame. Verify that all the lifting equipment meets weight standards and is in good working order and that all of the vehicle loads are equally distributed and secure. During hoisting, do not damage the battery pack or the underbody.

Place the front hoist lift pad on the front underbody lift points. The front hoist pads must not contact the rocker panels, front fenders, or the bottom of the high-voltage battery.

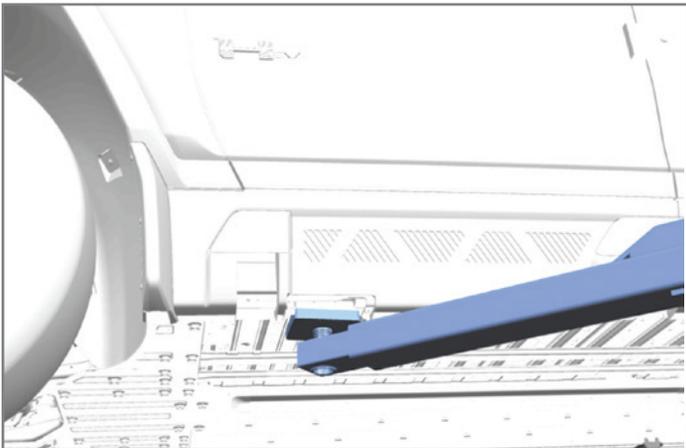
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1. Front frame contact points
2. Rear frame contact points



Position the rear hoist pads on the rear underbody lift points.



Place the front hoist lift pad on the front underbody lift points.

Position the rear hoist pads on the rear underbody lift points. The rear hoist pads must not contact the body rocker panels or bottom of the high-voltage battery.

TIP: A floor jack is not approved for the HUMMER EV. The use of jack stands may cause damage to the underbody, lower control arms or the cradle frames.

REQUIRED TRAINING

The HUMMER EV is an all-new EV that is new to GMC dealership technicians. To help technicians gain the needed knowledge and skills to service the HUMMER EV, multiple system-based courses that provide general EV knowledge as well as multiple HUMMER EV-specific training courses are available through the GM Center of Learning. All courses in the STS Hybrid/EV Learning path must be completed before a technician is qualified to work on the HUMMER EV.

For additional information about the new GMC HUMMER EV, refer to Bulletin #21-NA-295.

► Thanks to Mark Shearer and David Rainey

1 Actual range will vary based on several factors, including temperature, terrain, battery age, loading, use and maintenance.

2 Read the vehicle Owner's Manual for important feature limitations and information.

3 Actual charge times will vary based on battery starting state of charge, battery condition, output of charger, vehicle settings and outside temperature. Requires public 800-volt DC fast charger.

4 Google built-in services are subject to limitations and availability may vary by vehicle, infotainment system and location. Select service plan required. Certain Google actions and functionality may require account linking. User terms and privacy statements apply. Google, Google Play, and Google Maps are trademarks of Google LLC.

5 The myGMC app is available on select Apple and Android devices. Service availability, features and functionality vary by vehicle, device and data plan. Device data connection required. Visit onstar.com for more details.

6 App functionality and features vary with vehicle equipment and trim level. Data connection may be required. Some features require active service plan and working electrical system. User terms and limitations apply.

7 Safety or driver-assistance features are not a substitute for the driver's responsibility to operate the vehicle in a safe manner. The driver should remain attentive to traffic, surroundings and road conditions at all times. Visibility, weather and road conditions may affect feature performance. Refer to the vehicle Owner's Manual for important feature limitations and information.

Ultium Battery System



POWERS THE GMC HUMMER EV PICKUP

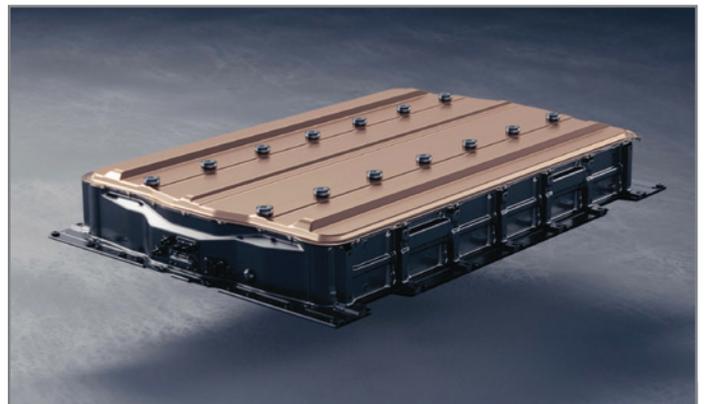
The all-new 2022 GMC HUMMER EV Edition 1 Pickup is powered by an Ultium 24-module battery system that boasts a GM-estimated 1,000 horsepower and a combined axle torque of 11,500 lb.-ft. while providing a range of 329 miles (529 km) on a full charge.¹ The Ultium architecture provides the framework to integrate a number of advanced technologies that make the HUMMER EV a true supertruck.

BATTERY ARCHITECTURE

The Ultium high-voltage battery pack on the HUMMER EV Edition 1 Pickup features large-format, pouch-style lithium-ion cells, which can be stacked vertically or horizontally inside the battery pack, depending on packaging requirements. The large-scale, high-energy Ultium battery cells are stacked vertically in two layers and mounted beneath the passenger compartment in the HUMMER EV Pickup.

The unique nickel, cobalt, manganese, aluminum (NCMA) cell chemistry of the Ultium batteries use 70% less cobalt than GM's previous generation of EVs, resulting in some of the lowest cobalt — a rare and costly material — content of any large-format pouch cells. The cells are configured in three parallel strings of eight. The cell groups are electrically joined in series to form the Cell Module Assembly (CMA), also known as a high-voltage battery section.

The pack contains 24 CMAs. Each CMA is identical, although uniquely serialized, and contains a non-serviceable K112 EV



The battery system contains 24 Cell Module Assemblies.

Battery Interface Control Module with a wireless transmitter/receiver. These smart modules monitor temperature, current and voltage to maintain balance within the truck's battery cell groups for optimal performance and battery longevity.

Each K112 EV Battery Interface Control Module communicates wirelessly with the K291 EV Battery Pack Communication Module, which is also located within the battery pack. The K291 EV Battery Pack Communication Module in turn communicates with the vehicle-mounted K16A Battery Energy Control Module (BECM) via wired communication circuits. The K16A BECM is the host controller for all battery diagnostics and system status.

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The Ultium batteries are cooled and heated with a 50/50 mixture of DEX-COOL coolant and de-ionized water. Each CMA and the A28EV Battery Disconnect Relay assembly contain internal coolant passages. A refrigerant/coolant heat exchanger (chiller) and the G1HV Air Conditioning with Motor Compressor cools down the high-voltage battery.

CHARGING CAPABILITIES

The two layers of battery cell modules combine to produce a pack with approximately 200 kWh of available energy. The CMAs in each layer are configured in series, essentially operating like two battery packs in one assembly. The total voltage per layer is about 400V.

Under normal operating conditions, these two layers operate electrically in parallel with each other. If conditions allow, the high voltage contactors can be configured so that each layer is wired in series to facilitate 800V charging. As a result, the flexible, high-voltage architecture enables 800-volt DC fast charging using the industry's fastest 350-kilowatt DC fast chargers available at public locations.²

The charging system also is designed to support legacy 400-volt charging infrastructure, without the need for a converter box or other accessories, allowing the HUMMER EV to use a variety of charging stations. The vehicle's charging hardware is complemented by in-vehicle and available smartphone apps that help customers find available charging locations while also preconditioning the battery to the proper temperature for the most efficient charging session.

CHARGING LEVELS

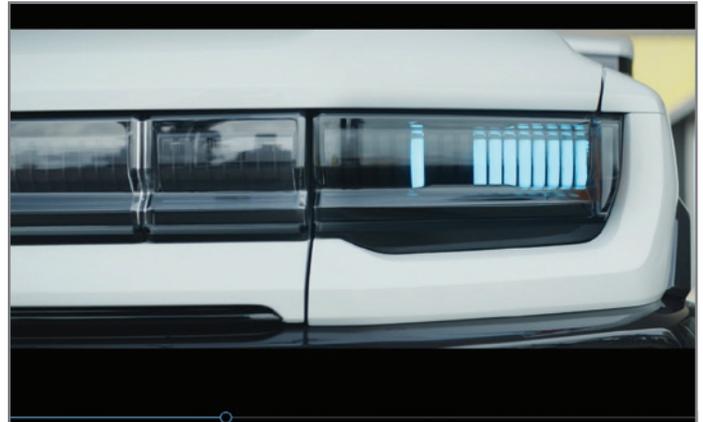
The dual-level charge cord, provided with the vehicle, includes two types of household electrical plugs: a standard 120V receptacle for Level 1 charging and a 220–240V receptacle for Level 2 charging. Level 2 charging using a 240V NEMA 14-50 outlet (40 amp breaker) provides approximately 10 miles (16 km) per hour of charge.²

Level 2 charging using an optional Level 2 240V (60 amp breaker) home charging station or a public station provides approximately 16 miles (26 km) per hour of charge.²

Level 3 fast charging, or DC Fast Charging, (up to 800V/350kW) uses DC current supplied directly to the drive motor battery. Fast charging capability provides approximately 100 miles (160 km) in 12 minutes (peak charging). Level 3 chargers are typically found only in a commercial/public location.²

REGEN ON DEMAND

With Regen on Demand and One-Pedal Driving — both driver-controlled braking features — the kinetic energy of the truck's



Battery charge level is indicated by the vehicle's state-of-the-art lighting.

forward momentum can be converted into electricity to be stored in the Hybrid/EV Battery Pack, further optimizing the driving range.

While pulling the steering wheel paddle, Regen on Demand can slow the vehicle to a full stop without pressing the brake pedal. Similarly, One-Pedal Driving can slow the vehicle to a full stop using the accelerator pedal to provide very fine control. One-Pedal Driving can be configured with multiple levels to match the driver's preference.



Regen on Demand paddle

For more information about the new GMC HUMMER EV, refer to Bulletin #21-NA-295.

► Thanks to Mark Shearer and David Rainey

1 Actual range will vary based on several factors, including temperature, terrain, battery age, loading, use and maintenance.

2 Actual charge times will vary based on battery starting state of charge, battery condition, output of charger, vehicle settings and outside temperature.

New LPO Accessory Labor Operations Cover Calibration Programming

have been developed for installing PDI Dealer-Installed Factory Invoiced Options (LPO) that require calibration programming. Technicians should refer to the appropriate accessory installation instructions in Service Information to determine when programming is needed. When installing LPO Accessories that require calibration programming, technicians must document the SPS warranty claim code on the job card (repair order). The claim for the installation of LPO Accessories cannot be submitted without the proper warranty claim code.



Some LPO Accessories require calibration programming.

TIP: Published labor time allowances remain unchanged and continue to include labor time to complete the calibration programming event as part of the installation of the LPO Accessory.

APPLICABLE ACCESSORIES

The new labor codes, effective April 1, 2022, will be published separately in the applicable Labor Time Guide under General Information > Pre-Delivery Inspection (PDI). The new labor codes apply to the following LPO Accessories:

- Fog Lamps
- Front Grille
- Wireless Charging
- Remote Start
- Illuminated Interior Trim
- Rear Vision Camera
- Trailering Hook-up
- Keyless Entry

A notation has been added to the Labor Time Guide, 0590032 PDI – Dealer Installed – Factory Invoiced Options, to identify the LPO Accessories that involve a calibration.

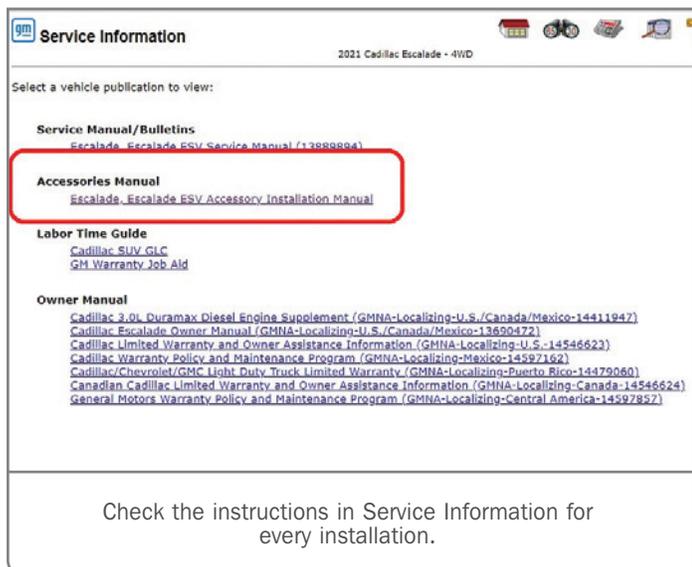
ALWAYS CHECK THE INSTALLATION INSTRUCTIONS

Before installing LPO Accessories, always refer to the installation instructions in the appropriate Service Information. Check the insert in the accessory packaging as well for additional information, including programming requirements.

In Service Information, build the appropriate vehicle, or enter the VIN, and select the Accessories Manual publication to view the installation instructions. Be sure to select the correct category and document for the specific LPO Accessory being installed.

Accessing the instructions every time an accessory is installed ensures that the most up-to-date procedures for a specific accessory are being used. Some similar accessories have different

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Check the instructions in Service Information for every installation.

installation instructions. There are several front grille variations, for example, that require calibration programming, while other variations do not require programming. To help in finding the correct instructions, most GM Accessories come with a single-page sheet that includes the Instruction ID Part Number, which is searchable in the Service Information Accessories Manual. Other accessories, such as IBP, may come with instructions included.

CONTACT TCSC BEFORE PROGRAMMING

For the appropriate accessory calibration for the specific VIN, the Techline Customer Support Center (TCSC) must be contacted before attempting to perform programming via SPS. The VIN as well as the Authorization Code, which is included in the accessory packaging, are required by TCSC in order to provide the accessory calibration.

Attempting to program before contacting TCSC will result in SPS not delivering the correct calibration to the vehicle. A "Same Calibration" warning may appear on the SPS summary screen.



Refer to the installation instructions for any programming procedures.

WARRANTY CLAIM CODE

After programming, document the warranty claim code on the job card, which must be included with the claim submission. The new unique labor codes help ensure the necessary calibrations have been programmed for the applicable LPO Accessories.

It's critical for proper safety, emissions, and/or system performance of the LPO Accessories that the correct calibrations are programmed. For example, Front Accessory Grilles may require calibration programming for proper functionality and safety compliance. While other accessories may require ECM reprogramming for compliance with federal and state/provincial emissions laws. Failure to complete the required programming at the time of accessory installation could result in regulatory enforcement and fines.

For additional information, refer to Bulletin #22-NA-053 and GlobalConnect message GCU5-9-12718 (in Canada, GCCA-9-4394).

► Thanks to Patti Marino and Scott Lewiston

DTC P06DD Set after Engine Oil Change

Solenoid Valve Performance) may set during the first engine start up immediately following an engine oil and filter change on some 2019-2022 Silverado and Sierra models and 2020-2022 CT4 models equipped with the 2.7L engine (RPO L3B) and some 2020-2022 Encore GX and 2021-2022 Trailblazer models equipped with the 1.3L engine (RPO L3T).

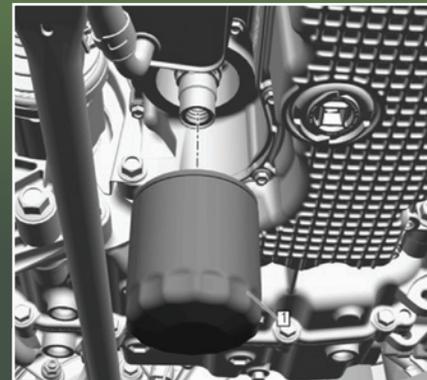
If an oil change was recently performed, clear the DTC using GDS and verify the code does not return.

The DTC P06DD setting is likely due to the oil filter not being pre-primed with engine oil before installation, causing low or no oil pressure on initial start-up.

If the vehicle has DTC P06DD in history, question the customer as to when the engine oil and filter was last changed. If the oil and filter was recently changed, clear the code and verify it does not return. The condition may have been induced if the engine oil and filter was recently changed at another repair facility.

For more information, refer to #PIP5844.

► Thanks to Robert Halas

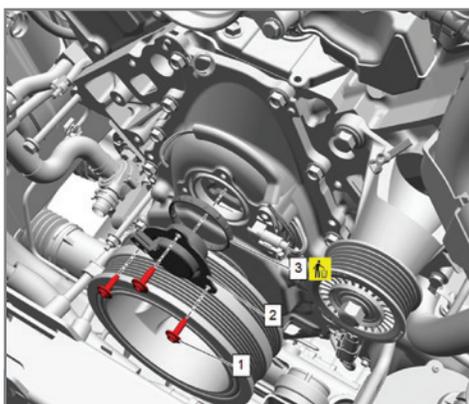


Pre-prime the filter with engine oil before installation.

Engine-Related Shudder Concerns

A shudder or surge may be felt when driving at a steady speed on some 2014-2022 Corvette, Silverado, Sierra; 2015-2022 Tahoe, Suburban, Yukon, Escalade; 2016-2022 Camaro; 2020-2022 Silverado HD, Sierra HD; 2021-2022 Express, Savana; and 2022 CT5 models equipped with the 4.3L engine (RPO LV3), 5.3L engine (RPO L82, L83, L84), 6.2L engine (RPO LT1, LT2, LT4, L86, L87) or 6.6L engine (RPO L8T). The shudder condition may be caused by the camshaft actuator magnet sticking.

Before making any repairs, determine that the condition is engine related and is not caused by the transmission. Monitor the Camshaft Position Variance data parameter in GDS2 while duplicating the shudder condition. The target variance is 0 degrees, but a variance up to 3-4 degrees may occur on a properly functioning system. Any variance exceeding 3-4 degrees may potentially cause



Camshaft actuator magnet (#2)

a noticeable shudder or surge condition.

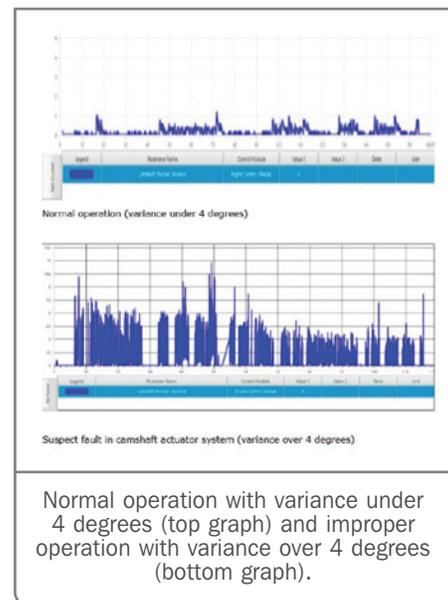
Following are line graph examples from GDS2 of the camshaft actuator system showing normal operation (variance under 4 degrees) and improper operation.

If the concern is isolated to the camshaft actuator system, replace the camshaft actuator magnet and evaluate system operation.

Refer to Camshaft Position Actuator Magnet Replacement in the appropriate Service Information.

For more information and part numbers, refer to Bulletin #22-NA-080.

► Thanks to Bryan Salisbury



Replace Oil Cooler Components after Connecting Rod or Crankshaft Main Bearing Damage

If a gasoline engine is being replaced on a 2000-2022 GM passenger car or truck due to a connecting rod or crankshaft main bearing failure, there are several guidelines to follow to ensure proper operation of the new service engine.

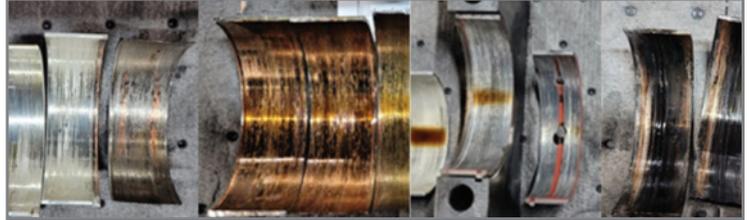
If an engine experiences failure due to a damage from a connecting rod or crankshaft main bearing, it is necessary to replace the oil cooler, oil cooler lines and oil tank, if equipped. Debris from a damaged rod or main bearing will be sent directly through the oil galleries and components that are in the lubrication circuit.

Since the complex oil gallery passages make thorough and complete component cleaning difficult, oil cooler, oil cooler line and oil tank replacement is required. Reinstallation of an oil cooler and/or cooler line that were removed from an engine with rod and/or bearing failure debris may result in the transfer of any remaining debris into the new service engine, which may then lead to possible damage or failure of the new service engine long block.

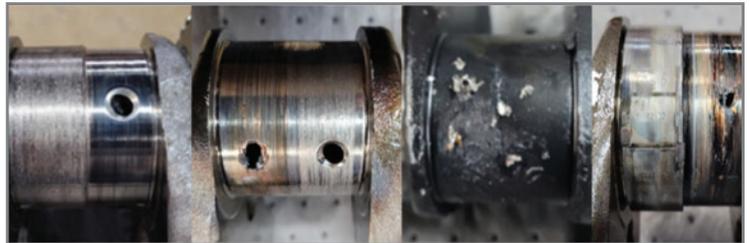
TIP: Some service engines come with the oil cooler and/or oil cooler lines already attached to the new service engine. In this case, replacement of these components is not necessary.

For more information, refer to Bulletin #22-NA-074.

► Thanks to Bryan Salisbury



Bearing damage that requires replacement of the oil cooler, lines and oil tank.



Connecting rod damage that requires replacement of the oil cooler, lines and oil tank.



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