# Service Bulletin

File in Section: -
Bulletin No.: 17-NA-254
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# INFORMATION

**Subject: 2018 GMC Terrain New Model Features**

| Brand: | Model: | Model Year: | | VIN: | | Engine: | Transmission: |
|---|---|---|---|---|---|---|---|
| | | From: | To: | From: | To: | | |
| GMC | Terrain | 2018 | 2018 | All | All | Gasoline, 4 Cylinder, L4, 1.5L, DI, DOHC, VVT, Turbocharged — RPO LYX | Hydra-Matic™ 9T45, Automatic, 9-Speed, GEN 1, RPO M3U (ATSS Capable) (AWD or FWD) |
| | | | | | | Gasoline, 4 Cylinder, L4, 2.0L, DI, DOHC, VVT, DCVCP, Turbocharged — RPO LTG | Hydra-Matic™ 9T50, Automatic, 9-Speed, GEN 1 — RPO M3H (ATSS Capable) (AWD or FWD) |
| | | | | | | Diesel, 4 Cylinder, L4, 1.6L, DI, UREA, CRI, DOHC, VGT Turbocharged — RPO LH7 | Hydra-Matic™ 6T45, Automatic, 6-Speed — RPO MHG (ATSS Capable) (AWD or FWD) |

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|---|---|
| **Involved Countries or Regions** | **UNITED STATES, CANADA, MEXICO, BAHRAIN, IRAQ, JORDAN, KUWAIT, LEBANON, OMAN, QATAR, SAUDI ARABIA, U. A. E., YEMEN** |

## Overview

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*GMC Terrain Denali*

### Bulletin Purpose

This is a special bulletin to introduce the 2018 GMC Terrain. The purpose of this bulletin is to help the Service Department Personnel become familiar with some of the vehicle's new features, special tools and available training and to describe some of the action they will need to take to service this vehicle.

### Overview

**Note:** Available trim levels, equipment content and powertrains may differ in Canada. Refer to the GM Canada vehicle order guide.

The all-new 2018 Terrain is sized and designed to meet the needs of the compact SUV customer. It is a five-passenger, four-door, front-wheel-drive (FWD) vehicle, with available all-wheel-drive (AWD). The 2018 Terrain will be available in SL, SLE, SLT and Denali models. Customers will immediately notice its tailored and precisely sculpted design. Although its exterior is sleeker in both styling and size and overall length has been reduced, (mostly from the front overhang), the next-generation Terrain will offer comparable occupancy room but with more comfort and convenience, additional technologies and enhanced cargo-carrying functionality. Terrain's optimized body uses increased application of high-strength steels, along with welded and structurally bonded joints for safety and mass efficiency. Extensive topology work helped create optimal solutions for durability, stiffness, noise and vibration, safety and vehicle dynamics.

### Exterior

The new Terrain's bold modern design exterior signals the next chapter of GMC's design ethos, evolving the brand's signature cues with stronger, sharper and more sculpted elements such as the grille and lighting features. Its shape was refined in the wind tunnel to help ensure the distinctive profile cuts through the air with optimal efficiency and quiet. Elevating GMC's new design, the all-new Terrain Denali will feature its signature chrome grille along with Denali-specific accents including body-color fascias and lower trim, plus chrome roof rails, door handles, side mirror caps and body-side molding. Additionally, LED headlamps and 19-inch ultra-bright machined aluminum wheels are standard on Denali. All other models feature signature LED daytime running lamps and tail lamps. SL, SLE and SLT trims feature Xenon HID lamps, while Denali models are equipped with very sophisticated LED bi-function projector lens technology. The C-shaped LED light pipe surrounds the lamp, and is standard on all models, along with the GMC logo.

### Interior

Like the exterior, the new Terrain's interior makes a statement and serves as a fundamental component of the vehicle's heightened emphasis on refinement and functionality. A significantly enhanced GMC infotainment system, making its GMC debut on Terrain, comes standard with a 7-inch diagonal color touch-screen display (or 8-inch diagonal color touch-screen depending on the Trim Level) and offers downloadable in-vehicle apps via Shop, a connected navigation experience and Apply CarPlay™ and Android Auto™ compatibility. Elements such as authentic aluminum trim, soft-touch materials on the instrument panel and doors and standard active noise cancellation are premium features seamlessly integrated into the interior design for a luxurious customer experience. The Terrain Denali heightens the GMC experience throughout with a unique trim tint color and Denali-specific logos and piping on the front seats. An expanded center console with pass-through storage underneath and side-by-side cupholders adds to the Terrain's functionality. A new fold-flat front passenger seat and flat-folding rear seats help Terrain offer greater versatility for stowing longer items and make it easier to load cargo. There are also new under-floor compartments in the cargo area for more secure storage.

### IntelliLink™

The all new Terrain will debut the next generation of GMC IntelliLink™, which comes with either a 7-inch (178 mm) or an 8-inch (203 mm) diagonal high-resolution color touch-screen, and their functionality varies based on screen size.

### Turbocharged Propulsion Choices

A range of three turbocharged engines, including an all-new 1.6L turbo-diesel, provides more choices when it comes to performance, efficiency and capability. The 1.5L and 2.0L turbocharged gas engines are matched with two unique nine-speed automatic transmissions, with the 2.0L turbo engine offering stronger acceleration, trailering capability and a higher degree of performance than its 1.5L counterpart. Fuel-saving stop/start technology is standard on all three. GMC's new Electronic Precision Shift enables more storage room in the center console by replacing the conventional transmission shifter with electronically controlled gear selection consisting of intuitive push buttons and pull triggers. The Terrain comes standard

with GMC's driver-controllable Traction Select system, which has choices for different driving conditions. Elements such as the throttle responses are optimized for the selected driving mode. AWD models include a FWD mode that disconnects the AWD system to minimize drag and optimize fuel economy, while the AWD mode offers all the benefits of an active AWD system.

**Safety Technologies**

An expanded range of available active safety technologies is designed to enhance driver awareness and even help make it easier to park and maneuver in low-speed situations. The features include radar and camera based adaptive technologies that can provide alerts to potential crash threats, allowing the driver to react and make changes to potentially avoid them including Lane Keep Assist (LKA), Low-Speed Forward Automatic Braking (FAB), Rear Seat Reminder, Teen Driver and Surround Vision, which provides customers an unobstructed ***birds eye view*** around their vehicle at low speeds. For additional information, refer to the sections titled: Safety — Driving/Parking Assistance Systems, Surround Vision and Teen Driver in this Bulletin.

**Vehicle Highlights**

Some of the vehicle highlights are:

- Terrain is approximately 340 pounds (154 kg) lighter than the current model, which is approximately a 10 percent reduction in weight, improving handling performance and fuel efficiency.
- Bose® 7-speaker system produces premium sound throughout the entirety of Denali's spacious cabin.
- Capless fuel fill system (gasoline only) offers convenience and prevents scratching that results from a tethered fuel cap dangling across the vehicle's paint.
- Dual rack and pinion electric power steering (EPS).
- Electronically controlled Aero Shutters in upper and lower grilles.
- Four link independent rear suspension.
- Four-wheel disc brakes with ABS and ESC with Duralife™ rotors and low-drag calipers.
- Fuel-saving Stop/Start technology is standard with all three engines.
- IntelliBeam™ headlamps are also new, offering automatic high-beam control.
- MacPherson strut front suspension with side-loaded modules, specifically tuned coil springs and a direct-acting stabilizer bar.
- The AWD system comes standard with a switchable ON-OFF feature that enhances efficiency by disconnecting from the rear axle when AWD is not needed.

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- The unique kneeling rear seat enables a flat rear load floor and up to 63.3 cubic feet (1,792 liters) of maximum cargo space. The front passenger seat also folds down, freeing up a total of 80.7 (2,285 liters) cubic feet of cargo space when the front passenger and rear seats are both folded; 17.4 cubic feet (493 liters) front passenger seat folded + 63.3 cubic feet (1,792 liters) with the second-row seat folded.
- Significantly improved turning circle. The all-new Terrain will have a turning diameter of 37.4 feet (11.4 meters) when equipped with 17-inch tires, 38.4 feet (11.7 meters) when equipped with 18-inch tires and 41.7 feet (12.7 meters) when equipped with 19-inch tires. All measurements are a significant improvement, about 10 percent with the 17-inch tire over the current model.
- 17, 18 or 19-inch aluminum wheels depending on the model and selected equipment.

## Airbag System

**Airbag System**

Airbags are designed to supplement the protection provided by seat belts. Even though today's airbags are also designed to help reduce the risk of injury from the force of an inflating airbag, all airbags must inflate very quickly to do their job. Everyone in the vehicle should wear a seat belt properly, whether or not there is an airbag for that person. All vehicle airbags have the word AIRBAG on the trim or on a label near the deployment opening. The airbags are located in the following positions:

– Frontal airbag for the driver.
– Frontal airbag for the front outboard passenger.
– Seat-mounted side impact airbag for the driver.
– Seat-mounted side impact airbag for the front outboard passenger.

– Roof-rail airbag for the driver and the passenger seated directly behind the driver.
– Roof-rail airbag for the front outboard passenger and the passenger seated directly behind the front outboard passenger.

**Airbag Readiness Light**

The Airbag Readiness Light displays if there is an electrical problem with the airbag system. The system check includes the airbag sensors, passenger sensing system, the pretensioners, the airbag modules, the wiring, and the crash sensing and diagnostic module (SDM). The airbag readiness light turns **ON** for several seconds when the vehicle is started. If the light does not turn **ON**, have it repaired immediately.

## Brakes

**Brakes — Description and Operation**

All models have standard four-wheel disc brakes with Duralife™ brake rotors. The vehicle is equipped with a Continental Teves Mk100 with ABS, traction control, electronic stability control and a hydraulic brake system with diagonal brake circuit split. The electronic brake control module (EBCM) controls the system functions and detects failures. The EBCM and the brake pressure modulator are serviced separately. The brake pressure modulator uses a four circuit configuration to control hydraulic pressure to each wheel independently. Brake enhancements include a new brake-apply system and low-drag calipers. A revised brake pedal system complements the brakes with improved feelings of firmness and smoothness. There is very little pedal travel before the brakes start to apply.

Depending on equipment, the following vehicle performance enhancement systems are provided:

- **Antilock Brake System:** When wheel slip is detected during a brake application, an ABS event occurs. During ABS braking, hydraulic pressure in the individual wheel circuits is controlled to prevent any wheel from slipping. A separate hydraulic line and specific solenoid valves are provided for each wheel. The ABS can decrease, hold, or increase hydraulic pressure to each wheel. The ABS does not increase hydraulic pressure above the amount which is transmitted by the master cylinder during braking.
- **Brake Cleaning:** This feature automatically cleans the disc brakes by using the scraping and heat created from applied brake pressure to the brake pads. This helps to improve the brake system response time, especially in wet road conditions.
- **Dynamic Rear Proportioning:** The Dynamic Rear Proportioning is a control system that replaces the mechanical proportioning valve. Under certain driving conditions the EBCM will reduce the rear wheel brake pressure by commanding the appropriate solenoid valves ON and OFF.
- **Electric Park Brake:** An electric park brake comes standard on all trims. It takes the guesswork out of parking on an incline because it eliminates the need for the driver to determine how much to press the pedal foot brake on a steep incline. Simply set the park brake at the flick of a button and accelerate to release, which makes hill starts a breeze. The overall braking system is about 15 pounds (6.8 kg) lighter than the one on the current model, thanks, in part, to a new electric park brake. By making the electric park brake standard, engineers were able to eliminate linkage and cables. This eliminates the cable drag inside the sheath and the related possible brake drag, which can have a positive impact on fuel economy. The new electric park brake system has fewer moving components helping to improve reliability and decrease maintenance costs.
- **Electronic Brake Force Distribution (EBD):** Optimizes control of rear brake pressure on all road surfaces and under all vehicle loading conditions.
- **Electronic Stability Control:** Electronic Stability Control (ESC) provides added stability during aggressive maneuvers. Yaw rate is the rate of rotation about the vehicle's vertical axis. The stability control is activated when the EBCM determines that the desired yaw rate does not match the actual yaw rate as measured by the yaw rate sensor. The difference between the desired yaw rate and the actual yaw rate is the yaw rate error, which is a measurement of over steer or under steer. When a yaw rate error is detected, the EBCM attempts to correct the vehicle's yaw motion by applying brake pressure to one or more of the wheels. The amount of brake pressure which is applied varies, depending on the correction required. The engine torque may be reduced also, if it is necessary to slow the vehicle while maintaining stability. Stability control can be manually disabled or enabled by pressing and holding the traction control switch for five seconds.
- **Fading Brake Support:** In long, hard braking, such as on a lengthy mountainous descent, there is a risk of brake fade. This feature uses the hydraulics to gradually build brake pressure, maintaining brake pedal feel.
- **Hill Hold Start Assist:** The Hill Hold Start Assist allows the driver to launch the vehicle without a roll back while moving the foot from the brake pedal to the accelerator pedal. The EBCM calculates the brake pressure, which is needed to hold the vehicle on an incline and locks that pressure for a certain time by commanding the appropriate solenoid valves ON and OFF when the brake pedal is released. Hill Hold Start Assist is activated when the EBCM determines that the driver wishes to move the vehicle up-hill, either backwards or forwards.
- **Hydraulic Brake Assist:** The Hydraulic Brake Assist function is designed to assist the driver in stopping or decreasing vehicle speed in emergency braking situations. The EBCM receives inputs from the brake pressure sensor. When the EBCM senses an emergency braking situation, it will actively increase the hydraulic brake pressure to a specific maximum by turning the pump motor ON.

- **Intelligent Brake Assist:** The Intelligent Brake Assist function is designed to provide limited braking to help prevent front and rear low speed collisions. The EBCM receives inputs from the brake pedal position sensor, wheel speed sensors, short range radar and ultrasonic sensors to detect a collision. When the EBCM senses a possible collision, it will actively increase the hydraulic brake pressure to apply the brakes.
- **Low-Drag Calipers:** In a conventional disc brake system, there is always slight contact between brake pads and the rotor, even when the brakes are released. This creates rotational resistance on the rotor, known as ***brake drag***, which negatively affects fuel economy and can cause uneven rotor wear that results in vibrations felt by the driver when braking. Low-drag calipers incorporate specially designed components to ensure that the pad-to-rotor gap is precisely maintained, and that reduced slide forces are kept throughout the life of the vehicle, contributing to improved fuel economy.
- **Optimized Hydraulic Braking System:** On turbocharged equipped engines, the EBCM monitors the vacuum in the brake booster with a vacuum sensor and controls a brake booster vacuum pump depending on vacuum sensor input. It also has a hydraulic brake boost feature which supplements the brake system to maintain consistent brake performance under conditions of low brake booster vacuum. Low brake booster vacuum conditions can include initial start up after the vehicle has been parked for several hours, very frequent brake stops, or high altitude driving. The hydraulic brake boost system activates only during a brake apply under low vacuum conditions. In this case the EBCM will actively increase and control the hydraulic brake pressure by turning the pump motor ON and the appropriate solenoid valves ON and OFF. When hydraulic brake boost is active, a series of rapid pulsations is felt in the brake pedal.
- **Panic Brake Assist:** Detects attempted panic braking and provides brake pressure in addition to what's provided by the conventional brake system.
- **Traction Control:** When drive wheel slip is detected, the EBCM will enter traction control mode. First, the EBCM requests the engine control module (ECM) to reduce the amount of torque to the drive wheels via a serial data message. The ECM reduces torque to the drive wheels and reports the amount of delivered torque. If the engine torque reduction does not reduce drive wheel slip, the EBCM will actively apply the brakes on the slipping drive wheel. During traction control braking, hydraulic pressure in each drive wheel circuit is controlled to prevent the drive wheels from slipping. The EBCM commands the pump motor and appropriate solenoid valves **ON** and **OFF** to apply brake pressure to the slipping wheel. Traction control can be manually disabled or enabled by pressing the traction control switch.

**Duralife™ Brake Rotors**

The vehicle is equipped with Duralife™ Ferritic Nitro-Carburized brake rotors and low drag brake calipers. Application of the Ferritic Nitro-Carburizing (FNC) technology involves an additional manufacturing process that heats the rotors at 1,040°F (560°C) for up to 24 hours in a giant oven. Inside the nitrogen-rich atmosphere, nitrogen atoms bond to the surface of the steel rotor, hardening and strengthening the rotor. This unique surface treatment, equivalent to one-tenth the width of a human hair, creates sufficient friction and allows for effective braking performance while providing corrosion protection and allowing the brake rotor to wear much slower. Over time, the buildup of rust can also lead to brake pedal and/or steering wheel shudder. GM is the only company that has found a way to effectively treat brake rotors using FNC technology.

## Electric Power Steering

**Electric Power Steering (EPS)**

All models feature a standard electric-variable power-assist steering system that helps save fuel by drawing energy only when the steering effort is applied. The EPS system complements Terrain's balance of responsiveness and comfort, with a light and direct feel. The EPS system also incorporates Lead-Pull Compensation, which automatically adjusts the steering angle to account for factors like crowned roads or high crosswinds, which can typically cause the driver to turn the steering wheel slightly to maintain a straight path. Without the driver's knowledge, sensors detect the steering correction and adjust the torque applied to the steering system to relieve the effort on the driver, helping to maintain smooth, straight driving with less input. Included is Active Return Assist, which helps the driver return the steering wheel after a turn and Motor Control Software Algorithms that allow smooth performance on the highway by filtering out road vibrations.

Additional EPS advantages over a hydraulic system include:

- Excellent response and on-center characteristics.
- Power is used only when the vehicle is actually turning, as opposed to a constantly running hydraulic power steering pump, which positively impacts fuel economy.
- Variable-effort steering increases the level of power assistance during low-speed maneuvers, such as parking, and decreases the level of power assistance at higher speeds.
- No need for a pump, eliminates fluid leaks and the need to check the power steering fluid level.
- Noise reduction, because there is no pump or fluid flowing through hoses and valves.

## Electronic Precision Shift

### Shifting Using EPS


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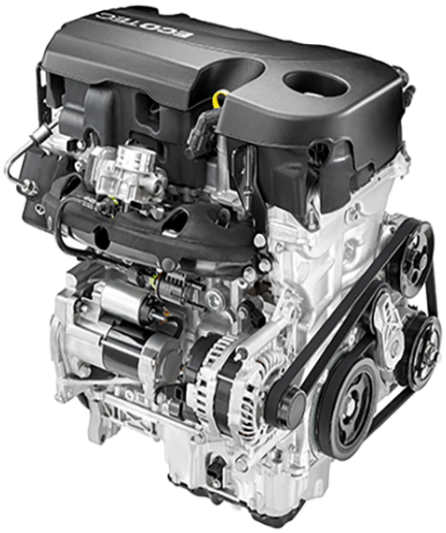
At the bottom of the center stack is the new Electronic Precision Shift (EPS), a row of buttons and switches replacing a traditional shift lever or steering-column-mounted stalk for controlling the nine-speed automatic transmission. Park (**P**), Neutral (**N**), and Low (**L**) are all selected by pushing buttons, while Reverse (**R**) and Drive (**D**) are engaged by pulling up on switches that resemble some power window controls. The engineering idea for EPS was to create more storage space in the center console. The new shifting system differs from other nontraditional gear selectors in that it differentiates movements for selecting the **P** and **N** positions—which are engaged with the push of a button—and those that put the vehicle in motion, such as **R** and **D**, which require pulling up on the switch. The **L** range is an exception, engaged by pressing a button. Above and below **L** are Plus (**+**) and Minus (**−**) sign buttons for selecting among the nine gear ratios.

## Electronic Vehicle Control Features

- **Engine Drag Control:** Prevents the wheels in motion from locking on slippery surfaces under the influence of engine braking, which can happen if the driver releases the accelerator abruptly. The braking effect of the engine may cause the wheels to skid and to temporarily lose traction, making the vehicle unstable. In such situations, engine drag control maintains directional stability and helps boost safety.
- **Engine Stop/Start Pressure Hold:** This feature builds on Stop/Start technology by applying brake pressure as the brake pedal is released and the engine is in the process of restarting.
- **Hill Start Assist with Automatic Vehicle Hold:** With Hill Start Assist (HSA), the brakes can hold for up to four seconds, depending on road grade, when the driver takes his/her foot off the brake pedal. This prevents rollback for a more confident takeoff on hilly roads or terrain. New is the addition of Automatic Vehicle Hold (AVH). With AVH, the brakes can hold for up to five minutes before going into the extended hold feature, at which point the electric park brake gets applied.
- **Power Hop Mitigation:** Power hop mitigation protects the driveline and engine mounts during a Traction Control event by reducing/transferring engine torque to the slipping wheel and applying brake pressure.
- **StabiliTrak® Electronic Stability Control System:** StabiliTrak® is standard on all models and works with the ABS four-wheel disc brake system and four-channel individual wheel circuits to provide more precise and controlled ABS stops, greater traction and excellent cornering stability.
- **Steering Torque Overlay:** This feature adds or subtracts torque to the steering system to help the driver stay in control of the vehicle during a slip control (braking) event; i.e., it feels easier to counter steer to correct the slip control event and feels harder to steer into the slip control event. Steering torque does not move the steering wheel without driver input.
- **Torque Vectoring by Brakes:** A StabiliTrak® based feature that enhances vehicle agility by precisely applying the brake on the inside drive axle wheel. It may also increase engine torque above what the driver requests to accelerate the outside drive axle wheel as the vehicle is turning near the handling limit of the vehicle.
- **Trailer Sway Control:** Uses the StabiliTrak® Electronic Stability Control System to detect trailer instability and apply differential braking to dampen out trailer oscillation and instability.

## Engine — 1.5L Turbocharged Gasoline — RPO LYX



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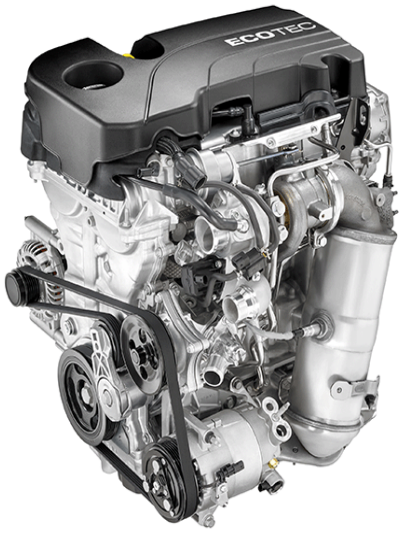
**Typical View of the 1.5L Turbocharged Engine (Starter Side)**

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**Typical View of the 1.5L Turbocharged Engine (Turbocharger Side)**

**Overview**

GM's versatile and technologically advanced Ecotec family of engines expands in the Terrain with a new 1.5L turbocharged, power-dense version. The engine's wide rpm range for maximum torque, helps it deliver a better driving experience and increased performance. The new 1.5L Turbo engine was tested under GM's strict regimen, one of the toughest sets of standards in the industry, which includes a battery of round-the-clock performance and durability trials. The 1.5-liter shares architecture with other Ecotec engines, but gets its own unique cam timing (later intake valve closure) and an improved turbocharger to boost performance and economy. It has an aluminum cylinder block and head, which helps reduce the vehicle's overall mass. Technologies such as Central Direct Fuel Injection and Continuously Variable Valve Timing (VVT) bring an optimal balance of strong performance and low fuel consumption. The trailering capability when equipped with this engine is 1,500 lbs (680 kg).

**Engine and Fuel Components**

- **Camshaft/Camshaft Drive:** Two camshafts are used, one for all intake valves, the other for all exhaust valves. The camshafts are assembled with steel lobes. The engine design uses a chain to drive the dual overhead camshafts (DOHC). The chain is an inverted tooth or silent design with a 6.35 mm pitch to ensure quiet operation and is hydraulically tensioned to be maintenance-free. The tensioner has a ratchet mechanism to reduce chain movement during engine starts to eliminate noise. The lightweight plastic/composite chain guides have a unique grooved face design to reduce friction. Both the crank sprocket and cam sprockets are hardened to prevent wear even with extended oil change intervals.
- **Camshaft Cover:** The camshaft cover has a steel crankcase ventilation baffling incorporated. The camshaft cover has mounting locations for the ignition system.
- **Central Direct Fuel Injection:** The engine is equipped with a central direct injection system. The fuel system consists of 4 separate direct injection (DI) fuel injectors, one high pressure fuel rail, and a high pressure fuel feed pipe that connects the high pressure fuel pump to the fuel rail. The injectors are each seated into their individual bores in the cylinder head with two combustion seals that provide sealing. The high pressure fuel pump mounts to the rear of the cylinder head and is driven by the intake camshaft. Motion is transmitted to the pump from a tri-lobe on the rear of the camshaft through a hydraulic roller lifter.
- **Crankshaft:** The crankshaft is forged micro alloy steel. It is supported in 5 main journals with main bearings which have oil clearance for lubricating. The thrust bearing is located in the 4th position which controls proper crankshaft axial end play. The crankshaft is also comprised of 8 counterweights that have been scalloped for mass reduction and topped for precise engine balance. A harmonic balancer is used to control torsional vibration.
- **Cylinder Block:** The cylinder block is constructed of aluminum alloy by high-pressure die casting with 4 cast-in-place iron cylinder liners arranged in-line. The block has 5 crankshaft bearings with the thrust bearing located on the second bearing from the rear of the engine. The cylinder block incorporates a bedplate design that forms an upper and lower crankcase. This design promotes cylinder block rigidity and reduced noise and vibration.
- **Cylinder Head:** The cylinder head is DOHC type with 2 camshafts that open 4 valves per cylinder using hydraulic valve lash adjusters. The camshaft sprocket wheels are installed in front of the camshafts. The cylinder head is made of cast aluminum alloy for better strength in hardness and light weight. The combustion chamber of the cylinder head is designed to increase the squish

and swirl efficiency, which maximizes the combustion process. The exhaust manifold is integrated into the cylinder head.

- **Continuously Variable Valve Timing:** Continuously Variable Valve Timing (VVT) brings an optimal balance of strong performance and low fuel consumption. Aluminum cam phasers enable variable timing for the opening and closing of the inlet and exhaust valves, optimizing fuel consumption and performance under a wide variety of engine load conditions.
- **Ignition System:** The ignition system is coil-on-plug.
- **Intake Manifold:** The intake manifold is made of composite plastic. The intake manifold incorporates a distribution and control system for positive crankcase ventilation (PCV) gases.
- **Integrated Exhaust Manifold:** The exhaust manifold is integrated in the DOHC cylinder head. The single-piece design results in quicker engine warm-up, which contributes to better emissions performance and enhances durability by eliminating the need for gasket sealing around the exhaust ports, as well as offering an underhood packaging advantage.
- **Math-Modeled Combustion System:** The Math-modeled combustion system used one-dimensional and three-dimensional math-based models in order to refine the parameters of the combustion system design. This process determined the optimal 6-degree injector angle, as well as the shape of the chamber itself and the complementing piston dish, which is shaped to help direct the fuel spray for a more complete burn of the mixture.
- **Oil Pump:** The oil pump is a crankshaft driven oil pump integrated in the pump module. The oil pump draws engine oil from the oil pan and feeds it under pressure to the various parts of the engine. An oil strainer is mounted before the inlet of the oil pump to remove impurities which could clog or damage the oil pump or other engine components. When the crankshaft rotates, the oil pump driven gear rotates. This causes the space between the gears to constantly open and narrow, pulling oil in from the oil pan when the space opens and pumping the oil out to the engine as it narrows. At high engine speeds, the oil pump supplies a much higher amount of oil than required for lubrication of the engine. The oil pressure regulator prevents too much oil from entering the engine lubrication passages.
- **Piston and Connecting Rod:** The pistons are cast aluminum. The pistons use 2 compression rings and 1 oil control ring assembly. The piston is a low friction, lightweight design with a recessed top and barrel shaped skirt. The piston pins are chromium steel and are a full-floating design. The connecting rods are powdered metal. The connecting rods are fractured at the connecting rod journal and then machined for the proper clearance. All applications use a piston with a graphite coated skirt. The piston and pin are to be serviced as an assembly.
- **Turbocharger:** The turbocharger consists of a turbine and compressor on a common shaft. The shaft bearing is constructed for very high rotation speeds and is lubricated by engine oil. The turbocharger is water cooled for improved durability. The turbine wheel is driven by exhaust emissions. The compressor wheel compresses the intake air. A wastegate bypass valve regulates the charging pressures as needed.
- **Upper Oil Pan:** The oil pan is a structural aluminum oil pan with transmission attachment. It includes the oil suction pipe which is connected with the oil pump. The oil pan is attached at the lower crankcase.
- **Valves:** There are 2 intake and 2 exhaust valves per cylinder. Positive valve stem seals are used on all valves.
- **Valve Lash Adjusters:** The valve train uses a roller finger follower actuated by a hydraulic lash adjuster. The roller finger follower greatly reduces friction and noise.

**Engine Specifications**

- **Displacement:** 1.5L (92 cubic inches)
- **Bore x Stroke:** 74mm x 86.6mm
- **Compression Ratio:** 10.0:1
- **Firing Order:** 1-3-4-2
- **Horsepower:** 170 Horsepower (127 kW) @ 5,600 RPM (GM Estimate)
- **Torque:** 203 lb-ft (275 Nm) @ 1,800-4,200 RPM (GM Estimate)
- **Valves:** 2 intake and 2 exhaust valves per cylinder
- **Valve Lash Adjusters:** Roller finger follower acted on by a hydraulic lash adjuster
- **Recommended Fuel:** Regular unleaded gasoline rated 87 octane or higher

## Engine — 2.0L Turbocharged Gasoline — RPO LTG


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**Typical View of the 2.0L Turbocharged Engine**

### Overview

Performance from GM's Ecotec family of engines continues to advance with the 2.0L Turbocharged — RPO LTG, which is based on a generation of large displacement four cylinder engines which are designed for greater efficiency. The turbocharger generates up to 20 pounds (138 kPa) of boost and its twin-scroll design helps optimize the usable power from the engine, virtually eliminating turbo lag and helping deliver a broad power band. It also gives the engine the rapid throttle responsiveness associated with a higher displacement naturally aspirated high performance engine. Electronically controlled turbocharger supporting components including the wastegate and bypass valve, help optimize performance and efficiency. The trailering capability when equipped with this engine is 3,500 lbs (1,588 kg).

### Engine and Fuel Components

- **Cam-Driven High Pressure Fuel Pump:** A high pressure, cam-driven fuel pump provides the higher fuel pressure required by the direct injection system. The engine mounted fuel pump is augmented by a conventional electrically operated supply pump in the fuel tank. The fuel delivery system features a high-pressure stainless steel feed line and a pressure regulated fuel rail without a conventional fuel return line from the engine to the tank. Fuel pressure varies from about 750 psi (5,171 kPa) at idle to 2,250 psi (15,513 kPa) at wide open throttle (WOT).
- **Cylinder Block:** The sand-cast aluminum 319T7 cylinder block is a superior refinement of previous Ecotec engine block castings. It is dimensionally similar with previous Ecotec turbo block variants, while providing improved structural support, as well as enabling greater control of noise, vibration and harshness. The main bearing bulkheads, which support the crank bearings, as well as the cylinder bore walls have been significantly strengthened to support increased engine loads. Refinements to the oil distribution system enable improved oil flow throughout the engine and an expansion of the coolant jacket, along with the use of cast-in-place bore liners, allows more precise bore roundness and improves the block's ability to dissipate heat.
- **Cylinder Head — Rotocast Aluminum with Sodium Filled Exhaust Valves:** The Ecotec 2.0L turbo's A356T6 aluminum cylinder head is cast using a Rotocast process for high strength, reduced machining and improved port flow. The head is also designed specifically for direct injection. The 2.0L turbo head has unique injector mounting locations below the ports. Apart from injector installation, the head has conventional port and combustion chamber designs, both are optimized for direct injection and high boost pressure. The head uses stainless steel intake valves that are nitrided for improved durability and undercut to improve flow and reduce weight. The exhaust valves have sodium-filled stems that promote valve cooling. At normal engine operating temperatures, the sodium inside the valve stem fuses and becomes liquid. The liquid sodium improves conductivity, promoting heat transfer away from the valve face and valve guide to the cooler end of the stem, where it more readily dissipates. This helps maintain a lower, more uniform valve temperature, reducing wear on the valve guide for better alignment and a consistent seal between the valve seat and valve face over the life of the engine. The exhaust manifold is mounted to the cylinder head and is made of cast stainless steel. It is extremely durable and delivers exceptional airflow qualities.
- **DOHC with Continuously Variable Valve Timing:** Overhead cams are the most direct, efficient means of operating the valves, while four valves per cylinder increase airflow in and out of the engine. This arrangement is integrated on the lightweight aluminum cylinder head. Continuously variable valve timing optimizes the engine's turbocharging system by adjusting valve timing at lower rpm for improved turbo response and greater torque delivery. Both the intake and exhaust cams have hydraulically operated vane-type phasers that are managed by a solenoid and directed by the engine control module (ECM). The phasers turn the camshaft relative to the drive sprocket, allowing intake and exhaust valve timing to be adjusted independently. Cam phasing changes the timing of valve operation as conditions such as rpm and engine load vary. This provides an outstanding balance of smooth torque delivery over a broad rpm range, high specific output and improves fuel consumption.

- **Ignition System:** The ignition system is coil-on-plug.
- **Rotating Assembly:** The crankshaft is made of drop forged steel with induction heat-treated fillets and cross-drilled chamfered oil passages for racing grade lubrication characteristics. Forged powdered metal connecting rods incorporate a larger, forged I-beam cross section for added strength in this turbocharged application. The pistons in the 2.0L turbo are lightweight cast aluminum, which reduces reciprocating mass inside the engine. This enhances efficiency and the feeling of performance as the rpm increases. The tops of the pistons have a dish shape that deflects injected fuel. Each piston has its own directed jet that sprays oil toward its skirt, coating its underside and the cylinder wall with an additional layer of lubricant. The extra lubrication cools the pistons, reduces both friction and operational noise and bolsters engine durability.
- **Side Direct Fuel Injection:** Side direct fuel injection moves the point where fuel feeds into an engine cylinder closer to the point where it ignites, enabling greater combustion efficiency. It fosters a more complete burn of the fuel in the air-fuel mixture, and operates at a lower temperature than conventional port injection. This allows the mixture to be leaner (less fuel and more air), so less fuel is required to produce the equivalent horsepower of a conventional, port-injection fuel system. Direct injection also delivers reduced emissions, particularly cold-start emissions, by about 25 percent. The higher compression ratio with direct injection is possible because of a cooling effect as the injected fuel vaporizes in the combustion chamber, which reduces the charge temperature to lessen the likelihood of spark knock. The direct injection fuel injectors have been developed to withstand the greater heat and pressure inside the combustion chamber, and feature multiple outlets for best injection control.
- **Two Stage Variable Displacement Oil Pump:** The variable flow oiling system helps maximize fuel efficiency. Rather than the linear operation of a conventional fixed flow pump, it is accomplished with a crankshaft driven oil pump that matches the oil supply to the engine load. The engine's variable flow pump changes its capacity based on the engine's demand for oil. This prevents using energy to pump oil that is not required for proper engine operation. An engine oil cooler helps maintain optimum oil temperatures. It has a heat exchanger incorporated into the oil filter housing. Coolant to the heat exchanger is provided by the engine's coolant circuit. The design optimizes oil cooling with a minimal pressure loss. During the cold starting, the system also enables faster heating of the engine oil for an earlier reduction of internal engine friction.
- **Twin-Scroll Turbocharger:** An advanced, electronically controlled turbocharger with a unique twin-scroll design is used to increase power in the engine. Each of the two scrolls on the turbine is fed by a separate exhaust passage, one from cylinders one and four, the other from cylinders two and three and virtually eliminates turbo lag at low engine speeds, giving the engine immediate throttle response associated with a naturally aspirated high-performance engine. The turbocharger generates a maximum boost of approximately 20 psi (138 kPa). Because direct injection cools the intake process it allows the engine to safely operate at higher boost and a relatively higher compression (9.5:1) ratio than a conventional turbo engine, increasing both output and efficiency.
  - **Air-to-Air Charge Air Cooler:** The turbocharger intake system is supported by an air-to-air charge air cooler system, which uses fresh air drawn through a heat exchanger to reduce the temperature of the hot compressed air exiting the turbo compressor, prior to delivery to the engine combustion system. Inlet air temperature can be reduced by up to 100°C (180°F), which enhances performance. This is due to the higher density of oxygen in the cooled air, which promotes optimal combustion. The charge air cooler is connected to the turbocharger and to the throttle body by flexible ductwork that requires the use of special high torque fastening clamps. In order to prevent any type of air leak when servicing the ductwork, the tightening specifications, cleanliness and proper positioning of the clamps is critical, and must be strictly adhered to.
  - **Cam-Driven Vacuum Pump:** A cam-driven vacuum pump ensures the availability of vacuum under all conditions, especially under boost, when the engine produces the opposite of vacuum. The pump is mounted at the rear of the cylinder head and is driven by the exhaust camshaft.

**Engine Specifications**

- **Displacement:** 2.0L (1998cc) — (122 cubic inches)
- **Bore x Stroke :** 86mm (3.39 inches) x 86mm (3.39 inches)
- **Compression Ratio:** 9.5:1
- **Firing Order:** 1-3-4-2
- **Horsepower:** 252 Horsepower (188 kW) @ 5,500 rpm (GM Estimate)
- **Torque:** 260 lb ft (353 Nm) @ 2,000 rpm (GM Estimate)
- **Maximum Engine Speed:** 7,000 rpm
- **Valves:** 2 intake and 2 exhaust valves per cylinder
- **Valve Lifters:** Hydraulic roller finger follower
- **Recommended Fuel:** Premium unleaded
- **Emissions controls:** Evaporative system, Catalytic converters (close coupled and underfloor) and Positive Crankcase Ventilation (PCV)

## Engine Oil — dexos1® — Gasoline Engines

3512027

3511747

Ask for and use engine oils that meet the dexos® specification. Engine oils that have been approved by GM as meeting the dexos1® specification are marked with either of the approved logos as shown. For additional information, visit this General Motors website: **http://www.gmdexos.com**

### Viscosity Grade

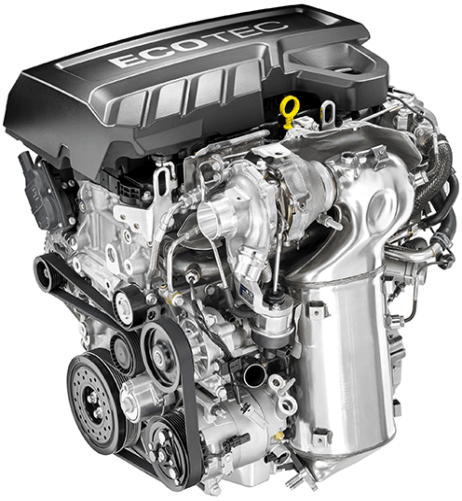
**1.5L — Gasoline Engine — RPO LYX:** Use ACDelco® dexos1® SAE 0W-20 viscosity grade engine oil.

**2.0L — Gasoline Engine — RPO LTG :** Use ACDelco® dexos1® SAE 5W-30 viscosity grade engine oil. In an area of extreme cold, where the temperature is less than −20°F (−29°C), use SAE 0W-30 viscosity grade engine oil. An oil of this viscosity grade will provide easier cold starting for the engine at these colder temperatures.

### Engine Oil Life System

The vehicle features GM's engine oil life system, which better protects engines by recommending oil changes based on a computer software algorithm using actual engine operating conditions and can save the vehicle owner money by avoiding unnecessary oil changes.

## Engine — 1.6L Turbocharged Diesel — RPO LH7

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**Typical View of the 1.6L Turbocharged Diesel Engine**

### Overview

The all-new 2018 Terrain after the initial launch, will offer a 1.6L — RPO LH7 turbocharged diesel engine that is efficient, very quiet and fun to drive. The engine was designed by GM engineers from the ground up to meet global requirements, leveraging the corporation's technical resources throughout the world. As such, every part on the engine, down to excruciating details were also designed with quiet running operation in mind. It is barely noticeable that it is a diesel, even at idle. This diesel engine provides more low-speed torque than its gas counterparts making the vehicle feel very lively from a stop. The 1.6L turbocharged diesel engine has undergone grueling testing, including being subjected to extreme ambient and engine operating temperatures. Extensive time was devoted to developing the engine cold start calibration to ensure it functions optimally no matter the weather, allowing the vehicle to start at a wide range of altitudes and environmental ambient temperatures. The trailering capability of the vehicle when equipped with this engine is 1,500 lbs (680 kg).

**Engine and Fuel Components**

- **Camshaft:** Two camshafts are used, one for all intake valves, one for all exhaust valves. The camshafts are cast iron. The camshafts are driven by a cam to cam gear. The exhaust camshaft has a split gear.
- **Cylinder Block:** The cylinder block is light weight aluminium and the cap inserts are a nodular cast iron. The block has 5 crankshaft bearings with the thrust bearing located on the third bearing from the front of the engine.
- **Cylinder Head:** The cylinder head is made of cast aluminum alloy for better strength and light weight. The cylinder head is a dual over head camshaft (DOHC) type having 2 camshafts that open 4 valves per cylinder with roller finger followers and valve bridges. The cam follower is of the hydraulic type and does not require adjustment for valve clearance. The combustion chamber is designed to increase squish and swirl efficiency, maximizing the combustion process.
- **Crankshaft:** The crankshaft is a forged steel crankshaft with 4 counterweights. It is supported in 5 main journals with main bearings which have oil clearance for lubricating. The 3rd bearing of the 5 main bearings is the thrust bearing and controls the crankshaft axial end play. A crankshaft balancer is used to control torsional vibration.
- **Diesel Exhaust Fluid System:** NOx emissions are controlled via a Selective Catalytic Reduction (SCR) aftertreatment system that uses urea-based diesel exhaust fluid (DEF), which is housed in a 4.9-gallon (18.5 L) tank. It needs to be replenished about every 7,500 miles (12,070 km), the same as the vehicle's recommended oil change interval during typical operation. An information graphic on the Driver Information Center displays **OK** until the DEF reaches a predetermined amount of remaining life expectancy, at which point the remaining DEF life is displayed in percentages, enabling the driver to plan their DEF fluid refill with plenty of notice. The DEF fill point is located in the fuel-filler door for optimal convenience. Electrically heated lines feed the DEF to the SCR system to ensure adequate delivery in cold weather.
- **ECU:** GM-developed engine control unit and software for more robust engine calibration, quicker engine response, improved accuracy, quieter engine operation and precision of overall engine control.
- **Fuel System — Brushless Fuel Pump Motor** The turbocharged diesel engine will feature a brushless fuel pump motor to improve the life of the fuel system. Brushed motor fuel pumps create heat due to the brushes rubbing against a commutator. This rubbing wears away both the brushes and the commutator, making the fuel pump a wear item similar to brake pads and rotors. The pumping and pressurizing of fuel also generates additional heat. Brushless motors do not suffer from the friction and wear found on a brushed motor and they generate less heat. That's because nothing touches outside of a few bearings and it uses a controller to determine speed and output. The controller has the ability to lower output when less pressure is needed and to increase output when more pressure is needed. This results in a significantly reduced fuel temperature.
- **Ignition System:** Compression ignition.
- **Intake Manifold:** The intake manifold is made of a composite material for increased strength and reduced weight.
- **Oil Pan:** The oil pan includes the oil suction pipe, which is connected with the oil pump. The oil pan is attached at the lower crankcase.
- **Oil Pump:** The oil pump is a variable displacement type.
- **Piston:** Aluminum pistons with shallow-dish bowl profile.
- **Recommended Fuel (U.S.):** Diesel fuel with ultra low sulfur content (15 ppm, maximum) is required. For best results use No. 2-D diesel fuel year-round because it is blended for seasonal temperature differences, both above and below freezing conditions.

  **Biodiesel:** Blends up to B5 must meet ASTM D975 (Grades No. 2-D or No. 1-D S15 Ultra Low Sulfur Diesel). Blends containing more than 5% and up to 20% biodiesel must meet ASTM specification D7467. For additional information visit ***www.bq-9000.org*** for a list of certified marketers.
- **Recommended Fuel (Canada):** Diesel fuel with ultra low sulfur content (15 ppm, maximum) is required. Use diesel fuel that meets the CAN/CGSB-3.517 specification in Canada. For best results use Ultra Low Sulfur Type B Diesel. This fuel is blended for seasonal changes.

  **Biodiesel:** Biodiesel blends that meet the CAN/CGSB-3.522 specifications up to 20% (B20) can be used. Avoid the use of biodiesel blends above 20%, as they may damage the engine and fuel system. For additional information visit ***http://www.nrcan.gc.ca/energy/alternative-fuels/fuel-facts/biodiesel/3515***
- **Recommended Fuel (Mexico):** Use diesel fuel specification NOM-086 Pemex UBA, which meets the Ultra Low Sulfur Diesel fuel requirement of 15 ppm sulfur maximum. This fuel is not available in all regions of Mexico.
- **Variable Geometry Turbocharger:** A variable geometry turbocharger (VGT) is used on the engine. VGTs have a minimal amount of lag, have a low boost threshold, and are very efficient at higher engine speeds. VGTs do not require a wastegate.

**Engine Specifications**

- **Displacement:** 1.6L (1,600 cc)
- **Bore x Stroke :** 79.70 mm (3.137 inches) x 80.10 mm (3.153 inches)
- **Compression Ratio:** 16.0:1

- **Firing Order:** 1-3-4-2
- **Horsepower:** 137 Horsepower (102 kW) @ 3,750 rpm (GM Estimate)
- **Torque:** 240 lb ft (325 Nm) @ 2,000 rpm (GM Estimate)
- **Maximum Engine Speed:** 5,000 rpm
- **Valves:** 2 intake and 2 exhaust valves per cylinder

## Engine Oil — dexos2® — Diesel Engine


4665318

Ask for and use engine oils that meet the dexos® specification. Engine oils that have been approved by GM as meeting the dexos2® specification are marked with an approved logo as shown. For additional information, visit this General Motors website: **http://www.gmdexos.com**

### Viscosity Grade

**1.6L Diesel Engine — RPO LH7:** Use ACDelco® dexos2® SAE 5W-30 viscosity grade engine oil. In an area of extreme cold, where the temperature is less than −20°F (−29°C), use SAE 0W-40 viscosity grade engine oil. An oil of this viscosity grade will provide easier cold starting for the engine at these colder temperatures.

### Engine Oil Life System

The vehicle features GM's engine oil life system, which better protects engines by recommending oil changes based on a computer software algorithm using actual engine operating conditions and can save the vehicle owner money by avoiding unnecessary oil changes.

## Engine — Stop/Start Technology

### Overview

All three engines come with standard fuel-saving stop/start technology, which shuts down the engine in certain conditions to reduce fuel consumption. There are no buttons to push or procedures to learn. The technology automatically shuts down the engine when the vehicle comes to a stop under certain driving conditions, such as at a stoplight. The engine automatically restarts when the driver takes their foot off the brake. An advanced algorithm determines when driving conditions are optimal for shut-off. The system monitors vehicle speed, climate control system operation and other conditions to determine whether it is efficient to shut **OFF** the engine. In some cases, such as heavy stop-and go traffic, the engine will not shut down. The engine-stop function is not indefinite. The engine automatically restarts after approximately two minutes if the driver hasn't removed their foot from the brake pedal. The technology also reduces emissions.

Unique components used with stop/start technology include:

- A tandem-solenoid starter that enables the engine to restart quicker and more smoothly, even if the engine hasn't come to a complete stop.
- A unique DC-DC module that maintains voltage during a stop/start event to avoid lighting fluctuations and potential resets/noise in the audio/infotainment system.
- An electronically controlled accumulator retains the transmission fluid pressure to keep the clutches engaged for immediate takeoff when the driver removes their foot from the brake pedal.
- Torque-reaction engine mounts that dampen the vibrations associated with a restart, helping to deliver smooth, nearly imperceptible performance.

## HVAC

The HVAC system has a more simplified control head and the front vents have been repositioned to better distribute airflow to the front seat occupants. Rear vents have been added for the back seat passengers. There is a brushless motor to make the HVAC system operation noticeably quieter.

## Instrument Cluster — Driver Information Center

4843409

The Driver Information Center (DIC) displays are shown in the center of the instrument cluster in the Info app. The DIC displays show the status of many of the vehicle's systems.

## OnStar® with 4G LTE and Wi-Fi

With OnStar® 4G LTE and Wi-Fi, up to seven devices such as smartphones, tablets and laptops can be connected to high-speed Internet through the vehicle's built-in Wi-Fi hotspot. The built-in 4G LTE Wi-Fi® hotspot has a 3GB/3-month trial (may not be available in all countries); whichever comes first and comes standard on all models, (high-speed internet may not be available in all areas). The powerful OnStar® connection also enables improved access to existing OnStar® safety and security services, including the ability to transmit voice and data simultaneously. That means OnStar® advisors can run a diagnostic check without ever leaving the call, making customer interactions quicker and more seamless. It's the most comprehensive in-vehicle safety and connectivity system available. For assistance, press the blue OnStar® button or call 1-888-4-ONSTAR (1-888-466-7827).

## Radio — GMC IntelliLink™


4843519

The all new Terrain will debut the next generation of GMC IntelliLink™, which comes with either a 7-inch (178 mm) or an 8-inch (203 mm) diagonal high-resolution color touch-screen, and their functionality varies based on screen size. GMC IntelliLink™ systems will feature compatibility with Apple CarPlay™ and Android Auto™, and is standard on all Models, which allow certified smartphone content and apps to be displayed and accessed on the vehicle's center stack touch-screen display. More importantly, this means GMC IntelliLink™ can remain relevant and current for the entire life cycle of the vehicle, since content is leveraged from the smartphone industry rather than being embedded in the vehicle's radio. In addition, GMC IntelliLink™ with an 8-inch diagonal touch-screen will also offer the ability to download in-vehicle apps to the touch-screen via Shop. Available wireless charging allows customers to use their smartphone without worrying about battery life or cord management. Standard Teen Driver technology lets parents manage certain vehicle settings to encourage safer driving by their teenager.

### Key Benefits

Key benefits of the next generation IntelliLink™ system include:

- Personalized, cloud-based user profile.
- Easier access to most commonly used features with shortcuts and "Porch Split-Screen" view.
- Connected and non-connected experience.
- Enhanced smartphone-like navigation interface with real-time traffic and real-time points of interest.
- Integrated OnStar® experience.

**Key Features**

Key features of this next generation IntelliLink™ system include:

- Icon-based home screen that is customizable and easy to use/read, with an App Tray featuring shortcuts to popular functions.
- "Porch Split-Screen" view option offers access to most commonly used features without having to return to the home screen.
- In-vehicle apps allowing customers to download apps based on their interests.
- Enhanced voice recognition offering both embedded and pass-through options.
- Apple CarPlay™/Android Auto™ compatibility, a simple and smart way to use certain smartphone apps and functions while keeping focus on the road.
- Teen Driver lets customers program one or more key fobs with settings that encourage safer driving habits. Refer to the section titled: Teen Driver in this Bulletin.
- Advanced, embedded Navigation (if equipped) offering a smartphone-like experience enhanced by connectivity:

  Real-time traffic data.

  Real-time points of interest (POI) search.

  Map updates.
- Over-the-air updates making software updates possible without the customer returning to the dealership.
- Integrated OnStar® application allows customers to access account information and purchase services seamlessly.
- Improved user interface for OnStar® Turn-by-Turn Navigation with route preview, lane guidance and destination details.

**IntelliLink™ Variants**

Terrain will offer three levels of IntelliLink™ functionality making it a versatile system that serves the full bandwidth of customer needs.

- LOW — RPO IOR. Standard on SL and SLE.

  7-inch color touch-screen.

  Apple CarPlay™/Android Auto™ compatible.

  Cloud services and Shop NOT included.
- MID — RPO IOS/IOU. Available on SLE and Standard on SLT. With available Navigation.

  8-inch color touch-screen.

  Apple CarPlay™/Android Auto™ compatible.

  90 days of Cloud services.

  In-vehicle apps via Shop.

  2X the processing power vs. LOW.
- HIGH — RPO IOT. Standard on Denali. With standard Navigation.

  8-inch color touch-screen.

  Apple CarPlay™/Android Auto™ compatible.

  3 years of Cloud services.

  In-vehicle apps via Shop.

  4X the processing power vs. LOW.

**Navigation**

A significantly upgraded, embedded navigation experience is a key pillar of the new IntelliLink™ system. Not only is the experience enhanced with a fresh look and feel, but leveraging a data connection (via OnStar® 4G LTE or a brought-in device) gives customers access to the latest destination information – including up-to-date points of interest, live traffic information, fuel prices, parking information and more. An easy-to-use destination entry feature provides relevant search results with simpler input methods, either via voice recognition or on screen.

Highlights of the embedded Navigation system include:

- Advanced Destination Entry: The system offers one-shot input of specific destination, intersection, point of interest or category (which means the customer can input an address, e.g., 123 Main St., without first typing the city and street name as separate inputs), similar to a smartphone's map app. Plus, destination entry is enhanced by a combination of cloud-based and embedded data that provide relevant, up-to-date location information and auto-complete.

  A list of points of interest (POI) is populated based on the customer's recent searches, most popular locations in the area, etc., to add relevance.
- Progress Bar: An on-screen progress bar provides an at-a-glance look at the estimated time of arrival and distance remaining. Traffic problems will also appear within the bar (requires OnStar® connectivity).
- Easy Route Cancel: Customers can cancel a route in progress with one easy tap using the on-screen Cancel icon, without having to search for the option within a menu.
- Predictive Navigation: Over time, the system may learn the customer's preferred routes and destination, offering predictive alerts, such as traffic on their typical route home.
- Parking Assistance: Parking options and costs may appear on the map as the customer approaches a certain destination (requires OnStar® connectivity).
- Gas Station Assistance: Local fuel prices may appear on the map when approaching gas stations (requires OnStar® connectivity).

**Shop (In-Vehicle Apps)**

Standard on Mid and High.

Terrain will now offer the customer the ability to download new apps to the infotainment system via Shop, helping to keep them entertained and informed throughout their ownership cycle.

Customers can press the SHOP icon on the home screen to view a list of apps available for them to download. The apps have been carefully curated in order to provide a safe and seamless in-vehicle experience. As such, only select apps will be available to customers.

To download apps, the IntelliLink system must be connected to a Wi-Fi hotspot, either through the vehicles' embedded 4G LTE connection or via a mobile hotspot on the customer's brought-in device. After the apps have been downloaded, they will appear as icons on the vehicle's home screen.

Though the apps available in SHOP will vary by vehicle and region, Terrain is expected to launch with the following apps available for download:

- Audio Books: A premium audio book delivery service that provides easy access to more than 100,000 audio books.
- Glympse: Let's customers share their real-time location and estimated time of arrival temporarily with friends and family.
- iHeartRadio: Allows customers to stream live radio stations, custom stations and listen to podcasts with an interface optimized for the vehicle.
- Pandora: A personalized radio service that allows customers to stream music to their vehicle (Not available in Canada).

  With the introduction of SHOP, Pandora will no longer be offered as a native app on systems equipped with IntelliLink™ with the 8-inch diagonal screen. Customers can instead choose to download the app from SHOP or use it in the Apple CarPlay™/Android Auto™ environment.
- The Weather Channel: Helps customers plan their drive with accurate weather forecasts and radar maps in their current location and for their destination.
- OnStar® At YourService: Helps customers discover value in the places they go with special offers and deals.

## Rear Seat Reminder


4845340

New to the 2018 Terrain is the Rear Seat Reminder. The Rear Seat Reminder system works by monitoring the operation of the rear doors. The feature is intended to activate when the rear door is ***opened and closed*** within 10 minutes before the vehicle is started or if the rear door is ***opened and closed*** while the vehicle is running. Under these circumstances, the next time the vehicle is turned **OFF** after a door activation, the vehicle will sound five audible chimes and display a message in the Driver Information Center that states: ***Rear Seat Reminder Look in Rear Seat*** .

## Safety — Driving/Parking Assistance Systems

If equipped, these systems ***may*** help the driver to park and/or to avoid other vehicles, objects, pedestrians and animals.

- **Cruise Control:** The cruise control lets the vehicle maintain a speed of about 25 mph (40 km/h) or more without keeping your foot on the accelerator. Cruise control does not work at speeds of less than 25 mph (40 km/h).
- **Forward Automatic Braking:** If the vehicle has FCA, it also has Forward Automatic Braking (FAB), which includes Intelligent Brake Assist (IBA). When the system detects a vehicle ahead in your path that is traveling in the same direction that you may be about to crash into, it can provide a boost to braking or automatically brake the vehicle. This can help avoid or lessen the severity of crashes when driving in a forward gear. Depending on the situation, the vehicle may automatically brake moderately or hard. This forward automatic braking can only occur if a vehicle is detected. This is shown by the FCA vehicle ahead indicator being illuminated.
- **Forward Collision Alert:** The Forward Collision Alert (FCA) system may help to avoid or reduce the harm caused by front-end crashes. When approaching a vehicle ahead too quickly, FCA provides a red flashing alert on the windshield and rapidly beeps or pulses the driver seat. FCA also lights an amber visual alert if following another vehicle much too closely. FCA detects vehicles within a distance of approximately 197 ft (60 m) and operates at speeds above 25 mph (40 km/h). If the vehicle has Adaptive Cruise Control (ACC), it can detect vehicles to distances of approximately 360 ft (110 m) and operates at all speeds.
- **Lane Change Alert:** The Lane Change Alert (LCA) system provides outside side mirror alerts to help the driver avoid crashing into a moving vehicle detected in their side blind spot (or zone) or a vehicle that is rapidly approaching their blind spot during a lane change maneuver.
- **Lane Departure Warning:** Lane Departure Warning (LDW) may help avoid crashes due to unintentional lane departures. It may provide a warning if the vehicle is crossing a detected lane marking without using a turn signal in the lane departure direction. This system is part of the Lane Keep Assist (LKA) system.
- **Lane Keep Assist:** Lane Keep Assist (LKA) may assist the driver by gently turning the steering wheel if the vehicle approaches a detected lane

marking without using a turn signal in that direction. It may also provide a Lane Departure Warning (LDW) system alert as the lane marking is crossed. The LKA system will not assist or provide an LDW alert if it detects that the driver is actively steering.

- **Rear Cross Traffic Alert:** Rear Cross Traffic Alert (RCTA) displays a red warning triangle with a left or right pointing arrow on the RVC screen to warn of traffic coming from the left or right. This system detects objects coming from up to 65 ft (20 m) from the left or right side of the vehicle. When an object is detected, either three beeps sound from the left or right or three Safety Alert Seat pulses occur on the left or right side, depending on the direction of the detected vehicle. Use caution while backing up when towing a trailer, as the RCTA detection zones that extend out from the back of the vehicle do not move further back when a trailer is towed.
- **Rear Parking Assist:** Rear Parking Assist (RPA) uses sensors on the rear bumper to assist with parking and avoiding objects while in **R** (Reverse). It operates at speeds less than 5 mph (8 km/h). RPA may display a warning triangle on the Rear Vision Camera screen and a graphic on the instrument cluster to provide the object distance. In addition, multiple beeps or seat pulses may occur if very close to an object.
- **Rear Vision Camera:** When the vehicle is shifted into **R**, the Rear Vision Camera (RVC) displays an image of the area behind the vehicle in the infotainment display. The previous screen displays when the vehicle is shifted out of **R** after a short delay. To return to the previous screen sooner, press a button on the infotainment display, shift into **P** (Park), or reach a vehicle speed of 5 mph (8 km/h). Select Guidance Lines on the camera screen to enable or disable the guidance lines.

4845415

- **Safety Alert Seat:** The Safety Alert Seat provides a vibration in the driver's seat bottom cushion to alert the driver of a number of concerns. There are two motors providing the vibration and are located on the left and right sides of the seat cushion. Depending on the alert, either the left, right, or both motors (shown) will vibrate.
- **Side Blind Zone Alert:** The Side Blind Zone Alert (SBZA) system is a lane changing aid that assists drivers with avoiding crashes that occur with moving vehicles in the SBZA (or spot) areas. When the vehicle is in a forward gear, the left or right side mirror display will light up if a moving vehicle is detected in that blind zone. If the turn signal is activated and a vehicle is also detected on the same side, the display will flash as an extra warning not to change lanes. This system is part of the LCA system.

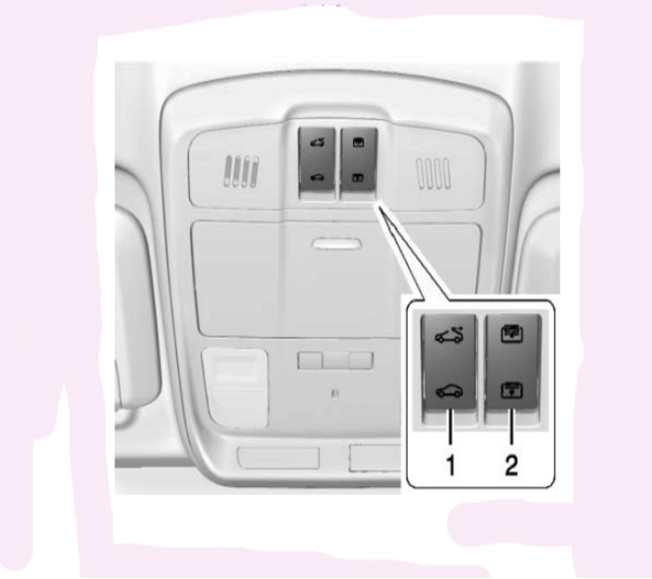
## Sunroof

**Panoramic Sunroof with Power Sunshade**

4666148

If equipped, the panoramic sunroof only operates when the ignition is in ACC/ACCESSORY or ON/RUN, or when Retained Accessory Power (RAP) is active. When the sunroof is opened, an air deflector will automatically raise. The air deflector will retract when the sunroof is closed.

### Sunroof — Sunshade Operation

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**To Open/Close (Manual Mode) the sunroof or sunshade, perform the following:**

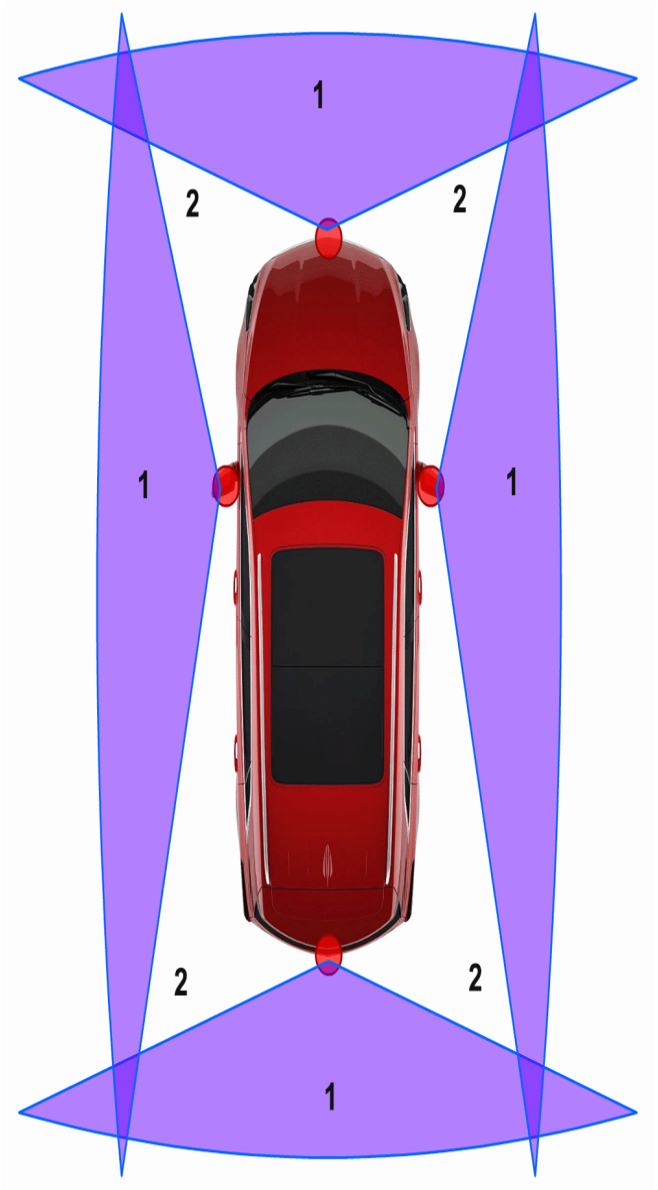
- **Sunroof Switch:** To open the sunroof, press and hold (1) until the sunroof reaches the desired position. Press and hold (1) to close it.
- **Sunshade Switch:** To open the sunshade, press and hold (2) until the sunshade reaches the desired position. Press and hold (2) to close it.

## Surround Vision

### Surround Vision

***Notice:*** **The Surround Vision cameras have blind spots and will not display all objects near the corners of the vehicle. Folding side mirrors that are out of position will not display the Surround Vision view correctly.**

New for the 2018 Terrain is Surround Vision, a technology that provides a literal look at the vehicle's perimeter. The system uses strategically located cameras on all sides of the vehicle to provide a 360-degree ***bird's eye*** view of the vehicle, helping drivers quickly view the surrounding area at a glance, for more confident maneuvering when reversing, parking or trailering. Surround Vision displays this image of the area surrounding the vehicle, along with the front or rear camera views in the center stack. Terrain models not equipped with Surround Vision have a standard rear vision camera (RVC) system.

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1 ***Areas displayed by Surround Vision.***
2 ***Areas not displayed by Surround Vision.***

## Teen Driver

### Teen Driver Feature

The Teen Driver technology, which is standard equipment on most of the 2017 and 2018 GMC lineup, is a feature that helps guide teens to develop safe driving habits. Teen Driver allows GMC owners to program the equipped vehicle key fob to activate the system. The system is designed to encourage good driving habits while behind the wheel, along with providing feedback on their driving performance through an industry-first report card. Teen Driver reinforces safe driving habits, like seat belt use and watching your speed. Teen Driver also makes sure that active safety features if equipped on the vehicle are always turned ON so that they can help alert a teen to avoid a crash or lessen its severity. Once activated, a

vehicle operated with a Teen Driver key fob can limit certain vehicle features and prevent certain safety systems from being switched OFF. An in-vehicle report card can provide details into distance driven, maximum speed, number of over speed warnings, and other driving events, providing parents with useful information for coaching their new driver.

### Teen Driver System Capabilities

Operating a vehicle with a key fob that has been registered with Teen Driver ensures the following parameters:

- A message displays in the Driver Information Center, alerting that Teen Driver is active.
- The audio system is muted when the driver or front passenger safety belts are unfastened.
- Report Card data accumulates with each trip.

Parents can use a custom PIN to enable additional features, including:

- Set a speed warning which is programmable between 40 to 75 mph (64 to 121 km/h).
- Set an audio volume limit.
- Set a speed limiter 85 mph (137 km/h) maximum if equipped.

### How to Use Teen Driver

A PIN is required to register keys or key fobs, change Teen Driver Settings, or access/delete Report Card data.

Perform the following:


4845722

- When the vehicle is in **P**, select: Teen Driver from the vehicle settings menu in the infotainment screen.
- Create a four-digit PIN code, or enter the PIN if one has already been created.
- Select: Key Registration and follow the on-screen prompts. If the vehicle is equipped with passive entry, place the key fob in the transmitter pocket.
- Once a Teen Driver key or fob has been registered, you can configure the settings and view an on-screen report card. Some settings are non-configurable, meaning that if Teen Driver is enabled, these settings will always be active while others can be customized or turned ON/OFF.

### Reset Teen Driver Key PIN

If the PIN has been lost the only way to clear a Teen Key or Fob is to follow the Body Control Module (BCM) Configuration/Reset Functions Reset Teen Driver Key PIN procedure in the scan tool.

## Traction Select System


4845797

### Traction Select System

The Terrain is engineered to meet the challenges drivers face every day. Advanced technology such as the Traction Select system allows the driver to switch between drive modes to make real-time adjustments based on those changing driving situations, various road surfaces and unexpected conditions.

Front Wheel Drive (FWD) models feature the following modes:

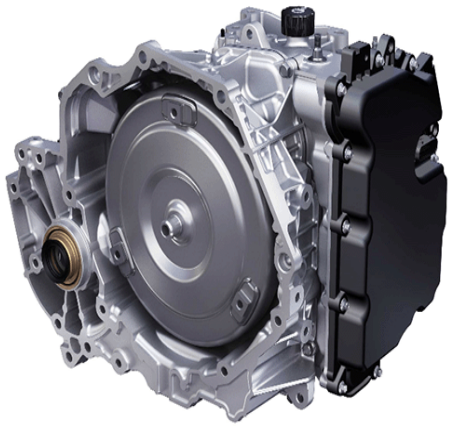
– Normal/Tour: Optimized for everyday driving conditions.
– Snow: Lessens chance of wheel slippage in low traction driving conditions.
– Tow/Haul: Enhances trailering performance by providing trailer sway control.

All-Wheel Drive (AWD) models feature the following modes:

– FWD: Improves fuel economy in normal/everyday driving conditions by mechanically disconnecting the rear axle and eliminating the drag it causes.
– AWD: Actively sends power to the front and rear wheels to maximize traction on dry, wet or snow/ice-covered roads.
– Off-Road: Adjusts AWD system, traction control and stability control to improve traction and driving dynamics on dirt, gravel and sand.
– Tow/Haul: Enhances trailering performance by providing trailer sway control and automatically engages AWD to improve traction on boat ramps or gravel roads.

## Transmissions

**HydraMatic™ 6T45 Automatic 6-Speed with Start/Stop — RPO MHG**



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The HydraMatic™ 6T45 is a fully automatic, 6-speed, transverse mounted, electronic-controlled transmission. It consists primarily of a 4-element torque converter, a compound planetary gear set, friction and mechanical clutch assemblies, and a hydraulic pressurization and control system. There are 2 variants of the transmission, based on torque capacity. Architecture is common between the variants, and component differences are primarily related to size. The 4-element torque converter contains a pump, a turbine, a pressure plate splined to the turbine, and a stator assembly. The torque converter acts as a fluid coupling to smoothly transmit power from the engine to the transmission. It also hydraulically provides additional torque multiplication when required. The pressure plate, when applied, provides a mechanical direct drive coupling of the engine to the transmission.

This transmission is used with the 1.6L diesel engine.

**HydraMatic™ 9T45/50 Automatic 9-Speed — RPO M3U/M3H**

4674586

The HydraMatic™ 9T45 and 9T50 are fully automatic, 9-speed, transverse mounted, electronic-controlled transmissions. Consisting primarily of a 4-element torque converter, a compound planetary gear set, friction and mechanical clutch assemblies, and a hydraulic pressurization and control system. The 4-element torque converter contains a pump, a turbine, a pressure plate splined to the turbine, and a stator assembly. The torque converter acts as a fluid coupling to smoothly transmit power from the engine to the transmission. It also hydraulically provides additional torque multiplication when required. The pressure plate, when applied, provides a mechanical direct drive coupling of the engine to the transmission.

The 9T45 transmission is used with the 1.5L gas engine — RPO M3U.

The 9T50 transmission is used with the 2.0L gas engine — RPO M3H.

## Special Tools

The following new tools were released for the 2018 Terrain:

### Special Tools — Tool Number and Description

| Tool Number | Description |
|---|---|
| DT-51983 | Installer, Case Side PTU Seal |
| DT-52000 | Installer, Cover Side PTU Seal |
| CH-52075 | Fuel Pump Lock Ring |
| **1.6L Diesel Tools — RPO LH7** | |
| KM-523-1 | Handle (Used with EN-51144) |
| EN-49979-100 | Adapters, Crankshaft Holder |
| EN-50509 | Fixing Tool, Cam Sprocket |
| EN-51140 | Crankshaft Fixing Tool |
| EN-51141 | Intermediate Drive Gear Fixing Tool |
| EN-51142 | Oil pump Sprocket Holder |
| EN-51143 | Camshaft Fixing Tool |
| EN-51144 | Crank Seal Installer, Front |
| EN-51144-100 | Crank Seal Installer Adapter |
| EN-51145 | Crank Seal Installer, Rear |
| EN-51146-1-3 | Slide Hammer (Used with EN-51187) |
| EN-51187 | Injector Remover |
| EN-51188 | Camshaft Sprocket Support |

## Training Courses

The majority of the systems found on this vehicle are taught in GM's core curriculum from a conceptual theory and operation perspective. The North American technical training core curriculum structure is system based.

To access **all** of the available training courses in the United States, visit the following website: ***www.centerlearning.com***

In Canada, Go to ***GM GlobalConnect and select Centre of Learning***

### Training Course Name or System — Course Number and Description

| Course Name or System | Course Number and Description |
|---|---|
| **New Model Feature**<br>2018 New Model Features | #10318.02W — 2018 Chevrolet Equinox/GMC Terrain New Model Launch |
| **Engines** | #16440.12D — Engines: New and Updates for L5P, LH7 and LGZ (United States Only)<br>#16440.17D-V — Engines: New and Updates for LCV, LTG and LL0 (United States Only)<br>#16043.16H Ecotec Generation 2 Overhaul and Repair - Certification (Canada Only) |
| **Transmissions** | #17440.12D — Transmissions: New & Updates: HydraMatic™ 6T40/45 (United States Only)<br>#17036.01V – 6T40/45 Unit Repair (Canada Only)<br>#17440.12D — Transmissions: New and Updates HydraMatic™ 6T40/45 (United States Only) |

## Training Course Name or System — Course Number and Description (cont'd)

| Course Name or System | Course Number and Description |
|---|---|
| | #17440.17D — Transmissions: New and Updates for HydraMatic™ 9T50 and 10R90 and Aisin AF-50 Automatic Transmissions (United States Only) |
| **Infotainment** | #19047.20W1-3 Entertainment Systems 1-3<br>#10217.03W – 2017 SKH Seminar March Emerging Issues (United States Only) |
| **Safety Systems** Forward Collision Alert / Lane Departure Warning and Rear Vision Camera | #22048.42W1-W3 — GM Safety Systems 1-3 (United States and Canada) |
| **Safety Systems** Surround Vision | #22048.42W2-R2 — Safety Systems 2 |

## Version Information

| | |
|---|---|
| **Version** | 1 |
| **Modified** | |

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