

Service Bulletin

File in Section:

Bulletin No.:

n No.: 17-NA-376 Date: November, 2017

INFORMATION

Subject: 2018 Buick Regal New Model Features

Brand:	Model:	Model Year:		VIN:		Engino	Trenemiesien
		From:	To:	From:	To:	Engine:	Transmission:
Buick	Sportback TourX Regal GS	2018	2018	All	All	Gasoline, 4 Cylinder, L4, 2.0L, SIDI, DOHC, VVT, DCVCP, Turbocharged and Stop/Start — RPO LTG Gasoline, 6 Cylinder, V6, 3.6L, DI, DOHC, VVT, AFM and Stop/ Start — RPO LGX	9T50 Automatic 9-Speed GEN 1 Transmission — RPO M3D (2.0L Turbo Sportback with FWD) Aisin AF50-8 Automatic 8- Speed Transmission — RPO MRC (2.0L Turbo Sportback and TourX with AWD) 9T60 Automatic 9-Speed, GEN 1 Transmission — RPO M3T (3.6L Regal GS with AWD)

RegionUnited States, Puerto Rico and U.S. Virgin Islands (Sportback, TourX and Regal GS),
Canada (Sportback and Regal GS)

Overview

Bulletin Purpose

This is a special bulletin to introduce the 2018 Regal GS, Sportback, and TourX models. The purpose of this bulletin is to help the Service Department Personnel become familiar with some of the vehicle's new features and capabilities, the available Training Courses and to describe some of the action they will need to take to service these vehicles.

Trim Levels (United States)

The Sportback is available in the following trim levels:

- Regal 1SV (FWD)
- Preferred 1SB (FWD)
- Preferred II 1SC (FWD/AWD)
- Essence 1SL (FWD/AWD)
- Regal GS 1SX (AWD)

Trim Levels (United States)

The TourX is available in the following trim levels:

- TourX 1SV (AWD)
- Preferred 1SB (AWD)
- Essence 1SL (AWD)

Trim Levels (Canada)

The Sportback is available in the following trim levels:

- Preferred II 1SC (FWD)
- Essence 1SL (AWD)
- Regal GS 1SX (AWD)

Overview — Regal GS



Regal GS

The Regal GS is the car for commutes that are anything but common. As Buick's most dramatic expression of design and dynamics, the GS is distinguished by sportier front and rear fascias, side skirts and a rear spoiler. This all-new model balances key characteristics to provide customers excellent driving performance every day and in every season. The Regal GS advances the nameplate with a new 3.6L V-6 with 310 horsepower (231 kW) — 51 horsepower (38 kW) more than the previous engine and 282 lb-ft (383 Nm) of torque that features direct injection, cylinder deactivation and advanced Stop/Start technology, a more refined 9T60 automatic 9-speed transmission, Intelligent AWD technology and the added functionality and style of a five-door sportback design with seating for up to 5 passengers. It has GS-specific, AGR-certified, performance seats that are heated, cooled and massaging with adjustable seat and seat-back bolsters as well as thigh support. The sport flat-bottom steering wheel accompanies metal accelerator and brake pedals. The second-generation Continuous Damping Control (CDC) suspension is capable of 500 adjustments per second and has

Interactive Drive Control so the suspension and other settings can be adjusted using three programmable drive modes, which are Touring, Sport and GS. The standard 19-inch wheels surround performance brakes with Brembo front calipers providing confident stopping power. A full-color head-up display is available with the optional Driver Confidence II package. Push-button start, remote keyless entry and 10 airbags are standard. New to the 2018 Regal GS is the standard Pedestrian Impact Detection System and its primary function is to provide supplemental protection to vulnerable road users involved in vehicle impacts. The Regal GS offers a connected infotainment experience with an 8-inch (203 mm) diagonal color touchscreen infotainment system with enhanced capabilities and an 8-inch (203 mm) frameless color diagonal reconfigurable instrument cluster as standard equipment. Apple CarPlay[™] and Android[™] Auto compatibility both come standard. Every Regal GS comes equipped with an OnStar® 4G LTE Wi-Fi hotspot. AT&T data plan purchase required after limited data trial period.

Overview — Sportback



Sportback

The Sportback is a five-door hatchback with a long gracefully sloping backlight, with seating for up to 5 passengers with the ability to accommodate more cargo and having the utility of a traditional hatchback or wagon. The Sportback weighs around 200 pounds (91 kg) less than its predecessor, is stiffer and rides on a longer wheelbase. With the split-folding second row seats in place it provides 31.5 cubic feet (892 liters) of cargo space and with the rear seats folded down it provides 60.7 cubic feet (1,719 L) of cargo space.

- The Sportback equipped with FWD is powered by a 2.0 liter turbocharged four-cylinder engine with 250 horsepower (187 kW) and 260 lb-ft (353 Nm) of torque with direct injection, advanced start/stop technology and a more refined 9T50 automatic 9-speed transmission.
- The Sportback equipped with Intelligent AWD technology is powered by a 2.0 liter turbocharged four-cylinder engine with 250 horsepower (187 kW) and 295 lb-ft (400 Nm) of torque with direct injection, advanced start/stop technology and an Aisin AF50-8 automatic 8-speed transmission.

The available Driver Confidence I package adds popular active safety features including Lane Change Alert with Side Blind Zone Alert, Rear Cross Traffic Alert and Rear Park Assist. A more advanced Driver Confidence II package adds Front Pedestrian Braking, Lane Keep Assist with Lane Departure Warning, Forward Collision Alert and Adaptive Cruise Control with Forward Automatic Braking.

Standard equipment on every Sportback includes push-button start, remote keyless entry, Hill Start Assist, 10 air bags, universal home remote and heated side mirrors. New to the Sportback is the Pedestrian Impact Detection System and its primary function is to provide supplemental protection to vulnerable road users involved in vehicle impacts. Equipped with the standard 7-inch (178 mm) frameless diagonal color touchscreen infotainment system, it also has an available 8-inch (203 mm) frameless diagonal color touchscreen infotainment system with enhanced capabilities, both systems with Apple CarPlay[™] and Android[™] Auto compatibility. An uplevel Bose[®] audio system is available. Every Sportback comes equipped with an OnStar 4G LTE Wi-Fi hotspot. AT&T data plan purchase required after limited data trial period.

Overview — TourX



TourX

The TourX is a crossover with the drive dynamics of a car and the versatility of an SUV with seating for up to 5 passengers. The TourX rides higher than its Sportback counterpart, enabling greater ground clearance and capability. It has a rugged exterior appearance, standard roof rails and interior amenities. The winged grille is flanked by standard LED daytime running lights and available LED headlights that are thinner and more landscaped to enhance the low, wide appearance of the front end. The hands-free power liftgate has a Buick tri-shield logo lamp that illuminates the ground beneath the sensor and is standard on upper trim levels. It is powered by a 2.0 liter turbocharged four-cylinder engine with 250 horsepower (187 kW) and 295 lb-ft (400 Nm) of torque with advanced Stop/Start technology. Power is routed to the ground via a standard eight-speed automatic transmission and Intelligent AWD technology with active twin clutch for greater control on any surface. Standard equipment on every 2018 TourX includes intelligent AWD with active twin clutch, push-button start and remote keyless entry, Hill Start Assist, 10 airbags, universal home remote and heated side mirrors. New to the 2018 TourX is the Pedestrian Impact Detection System and its primary function is to provide supplemental protection to vulnerable road users involved in vehicle impacts. A 7-inch (178 mm) frameless diagonal color touchscreen infotainment system with Apple CarPlay™ and Android[™] Auto compatibility is standard on TourX and Preferred trims, while an 8-inch (203 mm) frameless

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diagonal color touchscreen infotainment system with enhanced capabilities is standard on the Essence trim with available embedded navigation optional. Bose® premium audio with an innovative subwoofer mounted in the spare tire well is also standard with active noise cancellation. Every TourX also comes equipped with an OnStar 4G LTE Wi-Fi hotspot. AT&T data plan purchase required after limited data trial period.

TourX Storage



TourX has a functional 73.5 cu.ft (2,081 liters) of cargo area with the rear seat folded down.

Brakes

These vehicles are equipped with a Bosch ABS 9.0 brake system and low-drag four-wheel disc brakes. The electronic brake control module (EBCM) and the brake pressure modulator valve are serviced separately. The brake pressure modulator valve uses a four circuit configuration to control hydraulic pressure to each wheel independently. Vehicles built with option RPO FX3 will feature stability enhancement.

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

- Antilock Brake System: When wheel slip is detected during a brake application, an Antilock Brake System (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, however, increase hydraulic pressure above the amount which is transmitted by the master cylinder during braking.
- **Pressure Hold:** The EBCM closes the inlet valve and keeps the outlet valve closed in order to isolate the system when wheel slip occurs. This holds the pressure steady on the brake so that the hydraulic pressure does not increase or decrease.
- **Pressure Decrease:** The EBCM decreases the pressure to individual wheels during a deceleration when wheel slip occurs. The inlet valve is closed and the outlet valve is opened. The excess fluid is stored in the accumulator until the return pump can return the fluid to the master cylinder. The EBCM decreases the pressure to individual wheels during a deceleration when wheel slip occurs. The inlet valve is closed and the outlet valve is opened. The excess fluid is stored in the accumulator until the return pump can return the fluid to the master cylinder. The EBCM decreases the pressure to individual wheels during a deceleration when wheel slip occurs. The inlet valve is closed and the outlet valve is opened. The excess fluid is stored in the accumulator until the return pump can return the fluid to the master cylinder.
- **Pressure Increase:** The EBCM increases the pressure to individual wheels during a deceleration in order to reduce the speed of the wheel. The inlet valve is opened and the outlet valve is closed. The increased pressure is delivered from the master cylinder.
- **Brake Assist:** The Brake Assist function is designed to support the driver 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 brake pressure to a specific maximum.

- Electronic Brake Distribution: The electronic brake distribution function is designed to support the driver in emergency braking situations. The electronic brake distribution is a control system that enhances the hydraulic proportioning function of the mechanical proportioning valve in the base brake system. The electronic brake distribution control system is part of the operation software in the EBCM. The electronic brake distribution uses active control with existing ABS in order to regulate the vehicle's rear brake pressure.
- Electronic Stability Control RPO FX3: The Electronic Stability Control (ESC) adds an additional level of vehicle control to the EBCM. Yaw rate is the rate of rotation about the vehicles vertical axis. The electronic 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. If the yaw error becomes too large, the EBCM attempts to correct the vehicles yaw rate motion by applying differential braking to the appropriate wheel. The amount of differential braking applied to the left or right front wheel is based on both the yaw rate error and side slip rate error.
- Hill Start Assist: When stopped on a hill, the Hill Start Assist (HSA) feature prevents the vehicle from rolling before driving off, whether facing uphill or downhill by holding the brake pressure during the transition between when the driver releases the brake pedal and starts to accelerate. The EBCM calculates the brake pressure, which is needed to hold the vehicle on an incline or grade greater than 5% and locks that pressure for up to two seconds by commanding the appropriate solenoid valves ON and OFF when the brake pedal is released. The stop lamps will stay illuminated during the HSA operation even though the brake pedal is released. This is considered normal operation.
- **Traction Control:** When drive wheel slip is noted, 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. The ECM reduces torque to the drive wheels by retarding spark timing and turning OFF fuel injectors.

Engine 2.0L L4 Turbocharged — RPO LTG



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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.

Engine Component Description and Operation

- **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 torgue 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 180°F (100°C), 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 (122 cubic inches)
- Bore x Stroke : 86 mm (3.39 inches) x 86 mm (3.39 inches)
- Compression Ratio: 9.5:1
- Firing Order: 1-3-4-2
- Horsepower: 250 Horsepower (186 kW) @ 5,400 rpm (FWD) (GM Estimate)
- Horsepower: 250 Horsepower (186 kW) @ 5,500 rpm (AWD) (GM Estimate)
- Torque: 260 lb ft (353 Nm) @ 2,000 to 5,200 rpm (FWD) (GM Estimate)
- Torque: 295 lb ft (400 Nm) @ 3,000 to 4,000 rpm (AWD) (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 3.6L V-6 — RPO LGX

Overview

The 3.6L V-6 engine — RPO LGX, is a new benchmark for efficiency, refinement and durability. The clean-sheet engine redesign represents the fourth generation of GM's acclaimed DOHC V6 engine family and incorporates Active Fuel Management (AFM), Stop/Start technology, Direct Injection (DI) and Continuously Variable Valve Timing (VVT) to enhance fuel economy.



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3.6L V6 Engine

Engine Component Description and Operation

• Active Fuel Management System: The Active Fuel Management (AFM) system consists of the camshafts, valves, the switching roller finger followers (SRFF), also known as the valve switching rocker arm, the dual feed hydraulic lash adjusters and the oil control valve (OCV) which is also known as the valve rocker arm oil control valve.

Depending on engine RPM, the ECM sends a signal to the OCV commanding it either **ON** or **OFF**.

With the AFM system **ON**, the OCV directs oil to the dual feed hydraulic lash adjuster unlatching the switching roller finger followers creating zero lift and not allowing the valves to open on cylinders two and five and AFM is active at this time.

With the AFM system **OFF**, the OCV is not active and oil is not directed to the dual feed hydraulic lash adjuster. The switching roller finger followers operate as normal rocker arms and AFM is inactive at this time.

- Camshaft Drive System: The camshaft drive system consists of two timing drive chains driven by the crankshaft which drives the respective cylinder head's intake and exhaust camshaft position actuators. Cushioned actuator chain sprockets have been added contributing to guieter engine operation. The timing drive chains use moveable timing drive chain guides and a hydraulic-actuated tensioner. The tensioner minimizes timing drive chain noise and provides accurate valve action by keeping slack out of the timing drive chains and continuously adjusting for timing drive chain wear. The tensioner incorporates a plunger that adjusts out with wear allowing only a minimal amount of backlash. The tensioners are sealed to the head or block using a rubber coated steel gasket. The gasket traps an adequate oil reserve to ensure quiet start-up.
 - **Camshaft Position Actuator System:** The engine incorporates a camshaft position actuator for each intake and exhaust camshaft. Camshaft phasing changes valve timing as engine operating conditions vary. Dual camshaft phasing allows the further optimization of performance, fuel economy and emissions without compromising overall engine response and driveability. Variable valve timing also contributes to a reduction in exhaust emissions. It optimizes exhaust and inlet valve overlap and eliminates the need for an exhaust gas recirculation (EGR) system.

The camshaft position actuator is a hydraulic vane-type actuator that changes the camshaft lobe timing relative to the camshaft drive sprocket. Engine oil is directed by a camshaft position actuator oil control valve to the appropriate passages in the camshaft position actuator. Oil acting on the vane in the camshaft position actuator rotates the camshaft relative to the sprocket. At idle, both camshafts are at the default or "home" position. At this position, the exhaust camshaft is fully advanced and the intake is fully retarded to minimize valve overlap for smooth idle. In addition, this engine has intermediate park technology, which incorporates an intermediate-lock intake variable valve timing cam phaser, allowing the cams to be parked at the most favorable position for cold starting. Under other engine operating conditions, the camshaft position actuator is controlled by the engine control module (ECM) to deliver optimal intake and exhaust valve timing for performance, driveability and fuel economy. The camshaft position actuator incorporates an integral trigger wheel, which is sensed by the camshaft position sensor mounted in the front cover, to accurately determine the position of each camshaft. The exhaust camshaft position actuator has a different internal configuration than the intake camshaft position actuator since the exhaust camshaft position actuator phases in the opposite direction relative to the inlet camshaft position actuator.

The camshaft position actuator oil control valve (OCV) directs oil from the oil feed in the head to the appropriate camshaft position actuator oil passages. There is one OCV for each camshaft position actuator. The OCV is sealed and mounted to the front cover. The ported end of the OCV is inserted into the cylinder head with a sliding fit. A filter screen protects each OCV oil port from any contamination in the oil supply.

- **Cooling System:** This engine has a targeted cooling system which sends coolant simultaneously to each water jacket in the heads and block. This new, parallel-flow design maximizes heat extraction in the area of the upper deck, intake and exhaust valve bridges in the heads and integrated exhaust manifold with a minimal amount of coolant. The result is more even and consistent cooling, which enhances performance, and faster engine warm up, which improves cold-start efficiency and reduces emissions.
- **Connecting Rods and Pistons:** The connecting rods are sinter-forged with a high copper content and have press-in-place piston pin bushings. The connecting rods and rod cap are aligned by dowel pins retained in the cap. The cast aluminum pistons incorporate a polymer-coated skirt to reduce friction. The pistons are unique to the LGX both for compression ratio and combustion efficiency. The piston uses two low tension compression rings and one multi-piece oil control ring.
- **Crankshaft:** The crankshaft is a hardened, forged steel design with 4 main bearings. Crankshaft thrust is controlled by the upper portion of the number 3 main bearing. The crankshaft position reluctor wheel is pressed onto the rear of the crankshaft in front of the rear main journal. A micro encapsulated adhesive is used on the reluctor wheel to aid retention. This crankshaft is internally balanced.

- **Cylinder Block:** Sand cast aluminum (319) with cast in iron bore liners. The stronger, stiffer aluminum block has increased structure in the bulkheads for superior rigidity.
- Cylinder Heads: The cylinder heads are a two piece design consisting of a head and a camshaft carrier which are cast aluminum with powdered metal valve seat inserts and valve guides. The two piece design allows for the Active Fuel Management (AFM) System. The cylinder heads also feature integrated exhaust manifolds; the exhaust manifolds are incorporated into the head casting. Two intake valves and two exhaust valves are actuated by roller finger followers pivoting on a stationary hydraulic lash adjuster (SHLA). In the LGX engine, the valves and seats are constructed with specialized materials and coatings, and the exhaust valves are sodium filled for robustness. The cylinder heads also feature a "high-tumble" port design, and are sealed with LGX specific head gaskets. The head gaskets are also specific to the LH and RH sides.

Separate exhaust and intake camshafts are supported by bearings machined into the camshaft carrier. The front camshaft bearing cap is used as a thrust control surface for each camshaft. Each spark plug is shielded by a tube that is pressed into the cylinder head. Each spark plug ignition coil is also mounted through the spark plug tube. The LGX engine uses specific spark plugs and a different spark plug gap from other HFV6 engines. The engine coolant temperature (ECT) sensor is mounted in the thermostat housing near the flywheel end of the engine. With direct injection, the high pressure injectors are located in machined bores below the intake ports. A stainless steel, high pressure fuel rail is attached to the intake side of the head. The LGX engine has unique higher-flow injectors and fuel pump. The cylinder head has a larger bore for the new larger diameter fuel pump follower that operates the higher-flow pump. The fuel injectors are retained to the fuel rail in a new "twist-lock" retention scheme that does not require special tools for service.

Oiling System: The LGX engine contains a dual-pressure control and variable-displacement vane pump that enhances efficiency by optimizing oil pressure as a function of engine speed. The oil pump is located beneath the cylinder block inside the oil pan, contributing to the engines smoother and quieter operation. The oiling system components differ depending on the engine being in a transverse or longitudinal orientation. The LGX has unique oil pans depending on orientation, with the pans being separated into an upper (traditional aluminum) and lower (stamped steel) pan. This configuration helps with noise and mass concerns. It also affords some serviceability improvements through not needing to remove the entire upper pan for some service procedures; the procedures can be performed through removing the lower pan. The LGX oil pans contain oil level

switches as do nearly all HFV6 applications. The oil level switch is normally open and closes at oil levels above minimum requirements.

- **Right and Left Bank Designation:** Right hand (RH) and left hand (LH) designation throughout the engine mechanical section are viewed from the rear, flywheel side, of the engine or from inside the vehicle. These banks are also referred to as Bank 1 (RH) and Bank 2 (LH).
- Vacuum Pump: The engine utilizes a mechanical vacuum pump to provide a vacuum source for the braking system. The vacuum pump is integrated into the oil pump assembly located in the oil pan. Both vacuum pump and oil pump are part of a common assembly, referred to as a tandem pump. Neither pump is serviceable individually. If either the oil pump or vacuum pump are defective, replace the entire tandem pump assembly.

Engine Specifications

- **Displacement:** 3.6L (222 cubic inches)
- Bore x Stroke : 3.74 inches (95 mm) x 3.377 inches (85.8 mm)
- Compression Ratio: 11.5:1
- Horsepower: 310 horsepower (231 kW) @ 6,800 rpm (GM Estimate)
- Maximum Engine Speed: 7,200 rpm
- Torque: 282 lb ft (383 Nm) @ 5,200 rpm (GM Estimate)
- Valves: 2 intake and 2 exhaust valves per cylinder
- Recommended Fuel: Regular unleaded

Engine Oil — dexos®



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

Viscosity Grade

Use ACDelco® dexos1® SAE 5W-30 viscosity grade engine oil. In an area of extreme cold, where the temperature falls below -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 extremely low 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 System

Overview

Notice: With the Stop/Start system, when the ignition is ON, the tachometer indicates the vehicle status. When the tachometer needle is pointing to AUTO STOP, the engine is OFF but the vehicle is ON and can move. The engine could AutoStart at any time. When the tachometer needle points to OFF, the vehicle is OFF. The Stop/Start System is automatically activated each time the ignition is turned ON.

The Stop/Start System — RPO KL9 is used to improve fuel efficiency in Stop/Start driving. The vehicle automatically shuts down the engine in appropriate conditions at a traffic light, for example, resulting in zero tail pipe emissions and saving fuel which otherwise is used idling the engine when stationary. The engine instantly restarts when the driver is ready to move away, As soon as the driver prepares to move away (by releasing the brake pedal and/or depressing the accelerator pedal), the engine will start; it only takes the system around 0.3 seconds to start the engine. To support the increased number of engine starts, the starter motor is upgraded with a high performance electric motor and a stronger pinion engagement mechanism with reduced noise levels.

Along with the upgraded starter motor, advanced battery technology is required to ensure the vehicles battery can handle the frequent charge and discharge cycles common with Stop/Start operation. There is an intelligent battery sensor connected to the battery which continually monitors the battery charge and healthy state. The engine control module (ECM) uses this information from the intelligent battery sensor to determine if the battery charge and health is sufficient for an Stop/Start condition.

The Stop/Start system can reduce fuel consumption and carbon dioxide (CO2) emissions by up to 5% in mixed driving conditions. In an urban environment and in heavy traffic with frequent stops the savings may increase to as much as 10%.

There are also sophisticated controls in place to help ensure the Stop/Start System does not compromise the needs of either the driver or vehicle. For the engine to shutdown, the vehicle must be moving at less than 3 mph (5 km/h), the gear selector lever in **D**, and the brake pedal depressed. To restart, the driver simply releases the brake pedal and the enhanced starter motor engages the engine. When the engine has been shut down by the Stop/Start System, a control indicator will be illuminated in the Driver Information Center (DIC). When the engine is restarted, the control indicator in the DIC turns OFF.

Engine Will Not AutoStop

Some parameters may not be available in all vehicles.

In order to ensure neither the needs of the driver or the vehicle are compromised, the engine *will not AutoStop* if the following conditions are met:

- The ambient (outside) temperature and the engine coolant temperature (ECT) correlation do not meet specified values.
- The ambient temperature is colder than 14°F (-10°C).
- The battery temperature is colder than 32°F (0°C) or warmer than 131°F (55°C).
- The HVAC system demand is high.
- The HVAC system has been set to Defrost.
- The 12V battery state of charge is low.
- The Battery Sensor Module Learn procedure has not been completed. Refer to Battery Sensor Module Learn in SI.

Engine Will AutoStart

Some parameters may not be available in all vehicles. The engine *will AutoStart* if the following conditions are met:

- Driver removes pressure from the brake pedal or depresses the accelerator pedal while the vehicle is in D (Drive).
- The battery state of charge is less than 73%. This varies with state of health.
- The battery voltage is less than 11V.
- An A/C compressor request from the HVAC system. (A/C or Defrost mode request).
- · The vehicle speed increases.
- Brake booster vacuum is less than 6 psi (40 kPa).
- The ECT is warmer than 257°F (125°C).
- The HVAC system Economy mode has been turned OFF by the driver.

Notice: If the AutoStart crank time exceeds 2 seconds it will be necessary to press the ENGINE START/STOP button with the brake pedal applied. When the engine begins cranking, let go of the button.

• The AutoStop time has exceeded 2 minutes.

Engine Will AutoStop

Some parameters may not be available in all vehicles. The engine *will AutoStop* if the following conditions are met:

- The initial minimum vehicle speed during the drive cycle must be 12 mph (19 km/h) or more. Subsequent AutoStop minimum speed may vary from 1 to 6 mph (2 to 10 km/h), depending on the vehicle.
- The ambient temperature and the ECT correlation meets the specified values.
- The ambient temperature and transmission fluid temperature (TFT) correlation meets the specified values.
- The brake pedal is depressed more than a specified value, which is approximately 27%.
- The accelerator pedal is in the learned minimum throttle position.
- Brake booster vacuum is more than 7 psi (45 kPa).
- The transmission range selector is in **D** (Drive).
- Vehicle speed is less than 3 mph (5 km/h).
- Engine speed is less than 1,500 rpm.
- The ECT is less than 248°F (120°C).
- The HVAC system does not receive any A/C compressor requests. (No A/C or Defrost mode requests).
- The battery voltage is more than 12V.
- The battery state of charge is more than 75%. This varies with state of health.

Instrument Cluster

Instrument Cluster — RPO UHS



4894075

Regal GS Instrument Cluster

This instrument cluster is a multifunction module that provides the vehicle operator with information such as vehicle speed and engine RPM using analog gauges. Oil pressure, battery voltage, fuel level, and coolant temperature can also be displayed using an interactive LCD display. The instrument cluster is highly reconfigurable, with four different themes available for selection. The instrument cluster also provides the operator with operational warnings and message through various indicators and the driver information center. Because the instrument cluster is an LCD display, driver information center elements are located in various zones of the display, depending on how the instrument cluster is configured.

Instrument Cluster — RPO UDC

This instrument cluster is a multifunction module that provides the vehicle operator with information that is critical to vehicle operation, such as vehicle speed, engine RPM, oil pressure, battery voltage, fuel level, and coolant temperature, using analog gauges. The instrument cluster also provides the operator with operational warnings and message through various indicators and the driver information center. The driver information center (DIC) is a one color multifunction display that is located in the instrument cluster. The driver information center has several screens that can be scrolled through by twisting the trip reset stem.

Instrument Cluster — RPO UDD

This instrument cluster is a multifunction module that provides the vehicle operator with information that is critical to vehicle operation, such as vehicle speed, engine RPM, oil pressure, battery voltage, fuel level, and coolant temperature, using analog gauges. The instrument cluster also provides the operator with operational warnings and message through various indicators and the driver information center. The driver information center is a full color multifunction display that is located in the instrument cluster. The driver information center is also tightly integrated with the vehicle's infotainment system and is highly reconfigurable.

OnStar® with 4G LTE with Wi-Fi Hotspot Integration

Notice: OnStar® services cannot work unless the vehicle is in a location where OnStar® has an agreement with a wireless service provider for service in that area. The wireless service provider must also have coverage, network capacity, reception, and technology compatible with OnStar® services.

With OnStar® 4G LTE and the available Wi-Fi Hotspot, 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.

To retrieve the SSID and password for the hotspot, press the OnStar® Voice Command button on the overhead console or rearview mirror, wait for the prompt, and then say "Wi-Fi Settings." The information will be displayed on the screen.

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

QuietTuning[™] Technologies



QuietTuning[™] is a Buick pioneered process to reduce, block and absorb noise and vibration to create a quiet cabin. Buick QuietTuning[™] features enhancements with ultradissipative materials and Active Noise Cancellation (standard on V6 and AWD models) as follows:

- 1. ABSORB: These technologies absorb sound.
 - 1.1. Engine Compartment Acoustic Absorbers
 - 1.2. Interior Trim Acoustic Absorbers
 - 1.3. High Performance Dissipative Acoustic System (included on V6 and AWD models) (Active Noise Cancellation — RPO NKC)
 - 1.4. Door System Acoustic Absorber
- 2. Block: These technologies block sound.
 - 2.1. Acoustic Laminated Windshield
 - 2.2. Acoustic Laminated Front Side Glass
 - 2.3. Body Cavity Sealing Baffles
- Reduce: This technology reduces sound.
 3.1. Liquid Apply Sound Deadener
- Enhanced sealing on hatch door on all Sportback AWD models
- Acoustic rear wheelhouse textile liners
- Dash mat with increased insulation properties
- An acoustically tuned exhaust system that reduces the level of engine noise



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 Continental ContiSilent 235/50R18, P245/45R18 or 245/40R19 tires are manufactured with quiet foam within the tires. The 2018 Regal is General Motors first application of the technology.

Active Noise Cancellation

Active Noise Cancellation utilizes an amplifier and a computer with 3 or 4 strategically placed microphones (3 in Regal GS and Sportback AWD and 4 in the TourX) in the vehicle headliner. The system detects undesirable "booming" frequencies from the engine and then directs undistinguishable counteracting sound waves through the speakers to cancel out the noise.

Radio

Frameless 8-Inch Diagonal Color Touchscreen Radio with Enhanced Capabilities



4892272

Frameless 8-Inch Radio in a Regal GS

- IntelliLink® Radio RPO IO5 is an Infotainment System with Uplevel HMI and Enhanced Connectivity (8-inch - 203 mm, Diagonal Color Touchscreen)
- IntelliLink® Radio RPO IO6 is an Infotainment System with Uplevel HMI, Enhanced Connectivity and Embedded Navigation (8-inch - 203 mm, Diagonal Color Touchscreen with Navigation)
- IntelliLink® Radio RPO IOB is an Infotainment System with Midlevel HMI and Midlevel Connectivity (7-inch - 178 mm, Diagonal Color Touchscreen)

The infotainment technology in the Regal models is the latest edition of Buick IntelliLink® which is displayed in a new, frameless 7-inch (178 mm) or frameless 8-inch (203 mm) — RPO IO5 or frameless 8-inch (203 mm) — RPO IO6 diagonal color touchscreen infotainment system with — RPO IO5 and — RPO IO6 having enhanced capabilities and is located at the center of an ergonomically optimized instrument panel. It was designed with fewer buttons and controls for more intuitive use. IntelliLink® allows you to play your

favorite music, access smartphone contacts, get directions, and more just by using your voice. Phone integration with IntelliLink® is via Apple® CarPlay™ and Android™ Auto using a compatible smartphone. The features allow occupants to use select smartphone apps through the touchcsreen interface. Many features can be controlled via voice commands through a button on the steering wheel, helping the driver to keep their eyes on the road and hands on the wheel.

Bluetooth® — Overview

The Bluetooth® capable system can interact with many smartphones providing the following capabilities:

- · Place and receive hands-free calls
- Transmit hands-free data
- Play audio streaming files

Vehicles with a Bluetooth® system can use a Bluetooth® capable cell phone with a Hands-Free Profile to make and receive phone calls. The infotainment system is used to control the system. The system can be used while ON or in ACC/ACCESSORY. Not all phones support all functions and not all phones work with the Bluetooth® system. For more information about compatible phones, Go to: *http:// amtotalconnect.com/*

In Canada, Go to: gmtotalconnect.ca (English) or connexiontotalegm.ca (French)

Portable Audio Devices

The infotainment system can play music by connecting an auxiliary device to the USB port. The USB port(s) are in the center console, and use the USB 2.0 standard. The USB port can play both lower and upper case .mp3, .wma, .ogg, and .wav files stored on a USB storage device.

The following are USB supported devices:

- USB Flash Drives
- iPods®/iPhones®
- Portable USB Hard Drives

USB Supported File and Folder Structure

The infotainment system supports:

- FAT16
- FAT32
- exFAT

Connecting a USB Storage Device or an iPod $\ensuremath{\mathbb{R}}$ or iPhone $\ensuremath{\mathbb{R}}$

Not all iPods® and USB drives are compatible with the USB port. Make sure the iPod® has the latest firmware from Apple for proper operation. iPod® firmware can be updated using the latest iTunes® application. Go to: *www.apple.com/itunes*

- To connect a USB storage device, connect the device to the USB port.
- To connect an iPod® or an iPhone®, connect one end of the device's cable to the iPod® or to the iPhone® and the other end to the USB port.

Safety — Airbag System

Airbag Readiness Light

This light illuminates and stays **ON** 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** and then **OFF**, have it repaired immediately.

Airbag Locations

All vehicle airbags have the word AIRBAG on the trim or on a label near the deployment opening. The 10 airbags are located in the following positions:

- Frontal airbag for the driver.
- Frontal airbag for the front outboard passenger.
- Knee airbag for the driver.
- Knee airbag for the front outboard passenger.
- Seat-mounted side impact airbag for the driver (mounted in the side of the seatback closest to the door).
- Seat-mounted side impact airbag for the front outboard passenger (mounted in the side of the seatback closest to the door).
- Seat-mounted side impact airbags for the second row outboard passengers (mounted in the side of the seatback closest to the door).
- Roof-rail airbag for the driver and for the second row passenger seated directly behind the driver.
- Roof-rail airbag for the front outboard passenger and the second row passenger seated directly behind the front outboard passenger.

Safety — Driving/Parking Assistance Systems

If equipped, these systems can help to avoid a crash or reduce crash damage.

Adaptive Cruise Control: Adaptive Cruise Control (ACC) allows the driver to select the cruise control set speed and following gap. The following gap is the following time between your vehicle and a vehicle detected directly ahead in your path, moving in the same direction. If a vehicle is detected in your path, ACC can speed up the vehicle or apply limited, moderate braking to maintain the selected following gap. If the Traction Control System (TCS) or StabiliTrak® electronic stability control system activates while ACC is engaged, ACC may automatically disengage. If the driver wants to disengage ACC, apply the brake. If a vehicle is not detected in your path, ACC works like regular cruise control. Turning **OFF** the TCS or StabiliTrak® system will disengage the cruise control.

- 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 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. FCA also illuminates 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. FCA warnings will not occur unless the FCA system detects a vehicle ahead.



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When a vehicle is detected, the vehicle ahead indicator will display green. Vehicles may not be detected on curves, highway exit ramps, hills or due to poor visibility, or if a vehicle ahead is partially blocked by pedestrians or other objects. FCA will not detect another vehicle ahead until it is completely in the driving lane.



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When your vehicle approaches another vehicle too rapidly, the red collision alert symbol will flash on the windshield. Also eight rapid high-pitch beeps will sound from the front. When this Collision Alert occurs, the brake system may prepare for driver braking to occur more rapidly which can cause a brief, mild deceleration. Continue to apply the brake pedal as needed.



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• Front Pedestrian Braking: If equipped, the FPB system may help avoid or reduce the harm caused by front-end crashes with nearby pedestrians when driving in a forward gear. FPB displays an amber pedestrian indicator, when a nearby pedestrian is detected directly ahead. When approaching a detected pedestrian too quickly, FPB provides a red flashing alert on the windshield and rapidly beeps. FPB can provide a boost to braking or automatically brake the vehicle. This system includes Intelligent Brake Assist (IBA), and the Forward Automatic Braking

(FAB) system may also respond to pedestrians. The FPB system can detect and alert to pedestrians in a forward gear at speeds between 5 mph (8 km/h) and 50 mph (80 km/h). During daytime driving, the system detects pedestrians up to a distance of approximately 131 ft (40 m). *During nighttime driving, system performance is very limited.*

- 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. The LCA warning display will light up in the corresponding outside side mirror and will flash if the turn signal is **ON**.
- 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 help avoid crashes due to unintentional lane departures. It may assist 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 an LDW system alert as the lane marking is crossed. The LKA system will not assist or provide an LDW alert if it detects that you are actively steering. Override LKA by turning the steering wheel. LKA uses a camera to detect lane markings between 37 mph (60 km/h) and 112 mph (180 km/h).



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• **Parking Assist:** With Rear Park Assist (RPA), and if equipped with Front Park Assist (FPA), as the vehicle moves at speeds of less than 5 mph (8 km/h) the sensors on the bumpers may detect objects up to 6 ft (1.8 m) behind the vehicle and 4 ft (1.2 m) in front of the vehicle within a zone 10 in (25 cm) high off the ground and below bumper level. The Parking Assist system does not detect children, pedestrians, bicyclists, animals, or objects located below the bumper or that are too close or too far from the vehicle. The Instrument Cluster may have a parking assist display with bars that show "distance to object" and object location information for the Parking Assist system. As the object gets closer, more bars light up and the bars change color from yellow to amber to red. When an object is first detected in the rear, one beep will be heard from the rear. When an object is very close, which is less than 2 ft (0.6 m) in the vehicle rear, or less than 1 ft (0.3 m) in the vehicle front, five beeps will sound from the front or rear depending on object location. Beeps for FPA are higher pitched than for RPA.

- Rear Cross Traffic Alert: Rear Cross Traffic Alert (RCTA) displays a red warning triangle with a left or right pointing arrow on the infotainment 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 side, depending on the direction of the detected vehicle.
- Rear Vision Camera: If equipped, the Rear Vision Camera (RVC), RPA, FPA, and RCTA may help the driver park or avoid objects. When the vehicle is shifted into **R** (Reverse), the 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).
- 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.

Safety — Head-Up Display

Warning: If the HUD image is too bright or too high in your field of view, it may take more time to see things you need to see when it is dark outside. Be sure to keep the HUD image dim and placed low in your field of view.

If equipped with Head-Up Display (HUD), some information concerning the operation of the vehicle is projected onto the windshield. The information is projected through the HUD lens on the driver side of the instrument panel and focused out toward the front of the vehicle. The HUD information can be displayed in various languages. The speedometer reading and other numerical values can be displayed in either English or metric units. The language selection is changed through vehicle personalization and the units of measurement are changed through the instrument cluster. The HUD control buttons are to the left of the steering wheel. The windshield is part of the HUD system. If the windshield needs to be replaced, be sure to get one that is designed for HUD or the HUD image may look out of focus.

The HUD may display some of the following vehicle information and vehicle messages or alerts:

- Speed
- Tachometer
- Audio
- Phone
- Navigation
- Collision Alert
- Cruise Control
- Lane Departure
- Low Fuel

Safety — Pedestrian Impact Detection System

Description and Operation



The vehicles are equipped with a Pedestrian Impact Protection System (PIDS) which is designed to lift the rear part of the hood when a pedestrian is detected during a frontal impact within the approximate calibrated speed range. When the vehicle is involved in a frontal impact with an object or a pedestrian, sensors in the front bumper determine the force applied by the object to the front bumper. When the frontal impact speed is approximately between 15 mph (25 km/h) and 31 mph (50 km/h), PIDS lifts the rear part of the hood to help reduce pedestrian head injuries. There's a pressure-sensitive strip in the foam just under the outer bumper fascia skin that is tuned to differentiate a human pedestrian from animals and other obstacles. Upon identifying the pedestrian, within 40 milliseconds, it fires two pyrotechnic charges that elevate the rear edge of the hood. Lifting the rear part of the hood creates more clearance between the hood and the hard components in the engine compartment. In addition, the front bumper of the vehicle was designed to help reduce the injury to a pedestrian's legs. The pedestrian protection system is designed to lift the hood only once. It can be temporarily reset in order to be safely driven home, but must be reset (repaired) at the dealer.

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The pedestrian protection system may not activate under the following conditions:

- The pedestrian impact is outside the range of the sensors located on the front bumper.
- The sensors on the front bumper are damaged.

Notice: Clear any ice or snow from the hood before driving to ensure proper system operation.

- The path of the lifting hood is blocked by snow or ice.
- Winter fronts, grille covers, or other aftermarket equipment is attached to the bumper.
- Vehicle speed at impact is less than 15 mph (25 km/h) or greater than 31 mph (50 km/h).
- · The vehicle impacts a small object.

For other frontal impacts or vehicle speeds, the airbags may also deploy.

PIDS Deployment

Warning: Do not drive the vehicle when the hood is raised. Operating the vehicle with the hood raised can obstruct your view and may cause a collision resulting in damage to the vehicle, damage to other property, personal injury, or even death.

Caution: After the pedestrian protection system has deployed, see your dealer for service. The hood assembly including hinges, latch, and actuators must be replaced.

After PIDS has deployed, the hood will remain in the raised position and the driver's view will be reduced by the raised hood. If a towing service is not available, the hood may be repositioned temporarily. See > Owner Manual > Seats and Restraints > Pedestrian Protection System > Temporary Hood Repair.

Steering

The vehicle is equipped with a rack and dual pinion Electric Power Steering (EPS) system which reduces the amount of effort needed to steer the vehicle utilizing the power steering control module to control the power steering motor to maneuver the steering gear. The power steering control module also uses a combination of the torque sensor, motor rotational sensor, battery voltage circuit and GMLAN serial data circuit to perform the system functions. The power steering control module monitors vehicle speed and engine speed from the engine control module via the GMLAN serial data circuit to determine the amount of steering assist needed to steer the vehicle. At low speeds more assist is provided for easy turning during parking maneuvers. At higher speeds less assist is provided for improved road feel and directional stability.

The EPS system consists of the following components:

- Power steering control module.
- Power steering motor.
- · Power steering motor rotational sensor.
- Torque sensor.
- Steering gear (rack and dual pinion).

Suspension

Front Suspension

The front suspension absorbs the impact of the tires travelling over irregular road surfaces and dissipates this energy throughout the suspension system. This process isolates the vehicle occupants from the road surface. The rate at which the suspension dissipates the energy and the amount of energy that is absorbed is how the suspension defines the vehicles ride characteristics. Ride characteristics are designed into the suspension system and are not adjustable. The suspension system must allow for the vertical movement of the tire and wheel assembly as the vehicle travels over irregular road surfaces while maintaining the tire's horizontal relationship to the road. The front suspension uses a stabilizer shaft. The stabilizer shaft connects the left and right lower control arm assemblies through the stabilizer link and stabilizer shaft insulators. This shaft controls the amount of independent movement of the suspension when the vehicle turns. Limiting the independent movement defines the vehicle's handling characteristics when turning.

The front suspension performs the following functions:

- Isolate the driver from irregularities in the road surface.
- Define the ride and handling characteristics of the vehicle.

Rear Suspension

The rear suspension is an independent link type. Rear suspension adjustment is achieved through adjustable toe links and lower control arms. The rear coil springs are retained between the body and the lower control arm. Rubber insulators isolate the coil spring at both top and bottom. The rear suspension consists of two shock absorbers attached to the lower control arms and the reinforced body areas.

The rear suspension performs the following functions:

- Maintains the relationship of the rear axle to the body.
- Controls the torque reaction on acceleration and braking.

Electronic Suspension Control System

The electronic suspension control system uses the suspension control module to separately control each shock absorber actuator in order to control the damping force of each of the four shock absorbers, keeping the vehicle body as calm as possible. Changes of the damping forces can be accomplished within milliseconds. Suspension characteristics can be changed at any time by activating the Sport mode or Tour mode. The system provides an enhanced ride and comfort level over the widest possible range of operating conditions.

The electronic suspension control system consists of the following major components:

- The suspension control module.
- Three body vertical acceleration sensors.
- Two front wheel vertical acceleration sensors.
- Four shock absorber actuators, which are integrated within the shock absorbers.

The suspension control module controls the damping forces using information from the following:

- Vehicle speed
- · Steering wheel position
- Engine torque
- Brake pressure
- · Body and front wheels vertical acceleration

The suspension control module evaluates these inputs in order to separately control the shock absorbers, providing an enhanced ride and comfort level over the widest possible range of operating conditions.

Transmission — Aisin AF50-8 Automatic 8-Speed Transmission AWD

Aisin AF50-8 Automatic 8-Speed Transmission



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The Aisin AF50-8 used on the 2.0L Turbo Sportback with AWD and TourX with AWD is a compact, lightweight, next-generation electronically controlled 8-speed automatic transmission that employs a ravigneaux-type planetary gear. It employs a high-precision clutch hydraulic control system for smooth, highly responsive gear shift feel.

Driver Shift Control

Driver Shift Control (DSC) allows you to shift an automatic transmission similar to a manual transmission. While using the DSC feature, the vehicle will have firmer, quicker shifting. This can be used for sport driving or when climbing or descending hills, to stay in gear longer, or to downshift for more power or engine braking. The transmission will only allow you to shift into gears appropriate for the vehicle speed and engine revolutions per minute (rpm). While in the DSC mode, the transmission will automatically downshift when the vehicle comes to a stop.

To use the DSC feature:

- Move the shift lever to the left from D (Drive) into the side gate marked with (+) and (-).
- 2. Move the shift lever forward to upshift or rearward to downshift.

Transmission — 9T50 and 9T60 Automatic 9-Speed Transmissions



4674586

View of the 9T50 Automatic 9-Speed Transmission (FWD) — RPO M3D

The 9T50 and 9T60 used on the 2.0L Sportback FWD and 3.6L Regal GS AWD respectively, are fully automatic, 9-speed, transverse mounted, electronic-controlled transmissions. 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. 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 planetary gear sets provide the 9 forward gear ratios and reverse. Changing gear ratios is fully automatic and is accomplished through the use of a transmission control module (TCM). The TCM receives and monitors various electronic sensor inputs and uses this information to shift the transmission at the optimum time. The TCM commands shift solenoids and variable bleed pressure control solenoids to control shift timing and feel. The TCM also controls the apply and release of the torque converter clutch which allows the engine to deliver the maximum fuel efficiency without sacrificing vehicle performance. All the solenoids, are packaged into a self-contained control valve solenoid body assembly. The hydraulic system primarily consists of a chain driven pump, a control valve body assembly and case. The pump maintains the working pressures needed to stroke the clutch pistons that apply or release the friction components. These friction components, when applied or released, support the automatic shifting qualities of the transmission. The friction components used in this transmission consist of 7 multiple disc clutches. The multiple disc clutches combine with one away clutch to deliver 10 different gear ratios, 9 forward and one reverse, through the gear sets. The gear sets then transfer torque through the transfer drive gear, transfer driven gear and differential assembly.

Transmission — Electronic Shift Lock Release System

Electronic Shift Lock Release System



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These vehicles are equipped with an electronic shift lock release system. Make sure the shift lever is fully engaged in **P** before attempting to start the engine. When the ignition is **ON** the brake pedal must first be fully applied and *then* the shift lever button must be pressed before shifting from **P**. If you cannot shift out of **P**, ease pressure on the shift lever, then push the shift lever all the way into **P** as you maintain brake pedal application. Then press the shift lever button and move the shift lever into another gear. If the brake pedal is not applied, the control indicator will be **ON**. If the shift lever is not in **P** when the ignition is turned **OFF**, the control indicator and **P** will flash.

AWD System with Active Twin Clutch

AWD System with Active Twin Clutch



The AWD system with Active Twin Clutch (1) delivers greater handling, stability and driver confidence by preemptively and *electronically* splitting the torque as needed between the rear wheels using twin clutches (2) to provide additional traction, stability and control versus a 50/50 split in a single clutch system.

It provides the following benefits:

- Enhanced traction, stability and performance during vehicle acceleration and cornering during dry normal conditions.
- Optimal handling and improved traction in wet/ snowy/icy conditions.
- Improved vehicle response when road traction is not uniform, such as when the right side of the vehicle is on ice and the left side is on dry pavement.

- Active Twin Clutch with active torque bias has increased capability to add stability across all driving conditions.
- A fuel economy benefit is realized by not pushing torque when it is not needed.

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 2018 Buick Regal New Model Features	#10318.09W 2018 Buick Regal Sportback and Tour X New Model Launch		
Engine Gasoline, 4 Cylinder, L4, 2.0L, SIDI, DOHC, VVT, DCVCP, Turbocharged and Stop/Start — RPO LTG Gasoline, 6 Cylinder, V6, 3.6L, DI, DOHC, VVT — RPO LGX Engine Auto Stop/Start Technology	#16440.17D Engines: New and Updates for RPOs LCV, LTG, LL0 #16440.20D — Engines: New and Updates for RPOs LF4, LGX, LGW, L3A, LV7, LE2 and LWN (United States Only) #16040.31W — 12V Stop/Start (United States and Canada)		
Transmission 9T50 Automatic 9-Speed GEN 1 Transmission — RPO M3D (2.0L Turbo Sportback with FWD) 9T60 Automatic 9-Speed, GEN 1 Transmission — RPO M3T (Regal GS with AWD) Aisin AF50-8 8-Speed Automatic Transmision — RPO MRC	 #17440.16D (VCT) — Transmissions: New and Updates for Aisin AF50-8, 8L45/8L90 Automatic Transmissions (United States Only) #17440.17D Transmissions: New and Updates for 9T50 and 10R90 & ETRS for Aisin AF-50 Automatic Transmissions 		
Safety Systems Forward Collision Alert / Lane Departure Warning and Rear Vision Camera	#22048.42W1-W3 GM Safety Systems 1-3 (United States and Canada)		

Version Information

Version	1
Modified	Released November 22, 2017

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