



Service Bulletin

Bulletin No.: 20-NA-032

Date: February, 2020

INFORMATION

Subject: 2020 Buick Encore GX New Model Features

Brand:	Model:	Model Year:		VIN:		Engine:	Transmission:
		From:	To:	From:	To:		
Buick	Encore GX	2020		—		1.3L (L3T) Turbocharged Engine or 1.2L (LIH) Turbocharged Engine	Hydra-Matic 9T45 (M3F) or VT40 (MRG) Automatic

Involved Countries and Regions	North America, Korea
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Overview



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2020 Buick Encore GX

Bulletin Purpose

The purpose of this bulletin is to introduce the 2020 Buick Encore GX. The bulletin will provide an overview to help the Service Department Personnel become familiar with the engine, transmission, brake system and some of the other vehicle systems.

Overview

The 2020 Buick Encore GX is a crossover Sport Utility Vehicle (SUV) that is designed, developed, and manufactured globally and sold to a worldwide market. The Buick Encore GX introduces a pair of new, fuel

efficient, three-cylinder engines: a 1.2L and a 1.3L. Both engines are turbocharged and incorporate spark-ignited direct injection technology. An offset crankshaft reduces noise, vibration, and harshness, and meets worldwide emission standards.

The Encore GX also is more powerful and has a longer wheelbase than the smaller Encore. In addition, the Encore GX is packed with new technologies, such as Android Auto, Apple CarPlay, and new active safety features. The Buick Encore GX also includes keyless access and push-button start. Some up-level trims also offer a hands-free power liftgate as well.

The front-wheel drive models come equipped with a Continuously Variable Transmission (CVT). The all-wheel drive models feature a Hydra-Matic 9-speed automatic transmission with a selectable one-way clutch.

Additional features and amenities include:

- Standard Low Speed Forward Automatic Braking, Forward Collision Alert, Front Pedestrian Braking, Following Distance Indicator, and Lane Keep Assist with Lane Departure Warning
- 3.5-inch diagonal monochromatic display driver information center in the gauge cluster (standard)
- 4.2-inch diagonal multi-color driver information center in the gauge cluster (optional)
- Premium features including heated front seats and a heated and leather-wrapped steering wheel
- 40/60 split-folding rear seat is standard on all models
- available dual-pane power sunroof on some models that spans both seating rows, offering the feeling of an open-air ride

Brakes

Overview

The Buick Encore GX models feature four-wheel disc brakes with vented front and rear rotors. All Buick Encore GX models incorporate an electro-hydraulic brake boost assist braking system, an Antilock Braking System (ABS), a brake pad lining wear sensor system, and an electronic parking brake.



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The brake system control module interprets and converts driver input and then provides a corresponding hydraulic pressure output to activate the brake system according to the driver's demand.

The brake pedal multiplies the driver input force and transfers it by the pedal pushrod to the hydraulic brake master cylinder. In an event of no electrical energy or a failure condition, the driver's input is mechanically converted to a hydraulic pressure output.



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Brake System Components

- All Buick Encore GX vehicles are equipped with front disc brakes with pad wear sensors. Floating single-piston calipers mount in brackets with guide pins. The front brake system also includes the electric parking brake motors.
- The Buick Encore GX is equipped with rear disc brakes also include pad wear sensors. The calipers are floating single-piston design mount in brackets with guide pins.
- Brake fluid transfers hydraulic pressure from the master cylinder to the brake stopping components at the vehicle's wheels. It is important to use brake fluid with the specific properties recommended by GM. Always use DOT 4 brake fluid when servicing the brake system on the Buick Encore GX.

Electro-Hydraulic Brake Booster

The Buick Encore GX is equipped with an electro-hydraulic brake booster, which provides a lighter weight component that provides more assistance to the driver. The brake booster unit designed to operate together with an electronic stability control module normally responsible for ABS, traction control, and stability control. The master cylinder and brake booster unit consists of a master cylinder reservoir, an electronic brake system control module, pedal coupling unit/pushrod, and the brake master cylinder with integrated brake pressure modulator valve.

Electro-Hydraulic Brake Booster Brake Lining Wear Sensor System

All Buick Encore GX models feature a brake lining wear sensor system that estimates the remaining life of the front and rear brake pads. The brake pad life is displayed in the driver information center, along with a percentage and distance for each axle when the feature is active.

When the brake control system determines the brake pads need replacement, a message displays in the driver information center, which may include the remaining mileage, and actively reminds the driver to take action on each ignition cycle. If the feature malfunctions, the driver information center may display a fault message.

The brake system control module has one analog input for the left front brake pad wear sensor and one analog input for the right rear brake pad wear sensor. It supplies voltage to the brake pad wear sensors, diagnoses any issues with the power supply, and signals if a failure is detected in the supply voltage system.

The lining wear sensor system can be disabled. This may be necessary if aftermarket brake pads without wear sensors are installed. Disable the wear sensor system by accessing the driver information center features with the right side control buttons on the steering wheel, and selecting DISABLE. When the system is turned off, the front and rear brake pad life percentages will not display.

After replacing the brake pads, perform the brake pad life monitor reset procedure. Reset the brake pad life system and turn off the pad wear message as follows:

- Display the brake pad life on the driver information center.
- Press and hold the check mark or use the thumb-wheel to select front or rear pads.
- Select YES on the confirmation message, repeat for pads on the other axle if replacement was performed.

Brake System Control Module Features

The Buick Encore GX includes the following features:

- engine torque steer control
- brake drying/cleaning
- hill start assist
- driveline damping
- extended hold hill start assist

Brake Assist Features

The electro-hydraulic brake booster in the Buick Encore GX enables additional brake pressure and brake system features over conventional brake apply systems. They include but not limited to the features listed below.

Panic Brake Assist

This feature enhances braking performance when a panic brake situation is determined. Panic brake assist detects the driver's intent to stop the vehicle as quickly as possible, and determines that the driver has not applied sufficient brake pressure to do so. The panic brake assist feature will then actively apply brake pressure to maximum pressure, thus activating the ABS system and stopping the vehicle as quickly as possible.

Hydraulic Fade Compensation

Hydraulic faded compensation is based on a calculated temperature estimate of the brake rotor and disc brake pad, in addition to driver applied master cylinder pressure, and vehicle deceleration rate. The Hydraulic fade compensation will increase brake system pressure above the driver applied brake pressure when the brake system determines a severe brake fade condition.

The goal of providing additional brake system pressure is to reduce stopping distance during a high deceleration event. In addition, the driver may also experience fading brakes while using low or medium brake pedal force application. However, hydraulic fade compensation only activates during high brake pedal force applications.

Rear Brake Boost

The rear brake boost function provides rear hydraulic brake assist to ensure all four wheels achieve maximum braking during an ABS event. When vehicle load is heavily rear axle biased, the rear brakes may not utilize all of the available road adhesion. The hydraulic rear brake boost then provides additional pressure to the rear brakes when the front brake's ABS is activated and the rear wheels have low slip.

Engine



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1.3L (L3T) Engine Overview

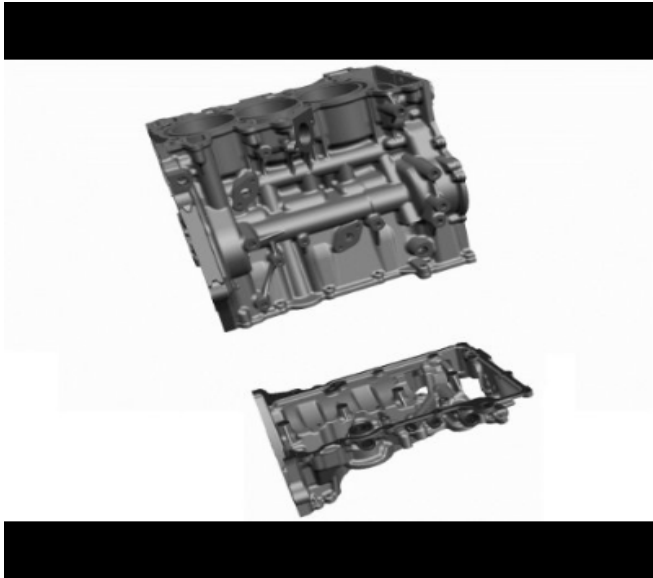
The 2020 Buick Encore GX will feature the turbocharged 1.3L (L3T) engine as standard equipment on all-wheel-drive versions and available on front-wheel-drive vehicles in some markets.

It is an advanced, power-dense, inline three-cylinder, 86 kW (115 HP) per liter engine. It is built off the new cylinder set strategy engine architecture, optimizing efficiency and performance.

Engine Specifications

Some of the mechanical features of the 1.3L (L3T), inline 3-cylinder engine include torque of 236 Nm (174 lb·ft) and 115 kW (155 HP). Refer to below for all specifications.

- **Engine Type:** Inline three-cylinder
- **Displacement:** 1.35L (82 CID)
- **Bore x Stroke:** 79 mm x 91.2 mm (3.11 in x 3.59 in)
- **Block Material:** Aluminum
- **Cylinder Head Material:** Aluminum
- **Compression Ratio:** 10:1
- **Firing Order:** 1–2–3
- **Horsepower (@5000 RPM):** 115 kW (155 HP)
- **Torque (@4000 RPM):** 236 Nm (174 lb ft)



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Engine Block

The aluminum alloy engine cylinder block is made by high pressure die casting with three cast-in-place iron cylinder liners. There are four crankshaft bearings. A lower structural extension forms the lower portion of the crankcase to promote cylinder block rigidity and reduce engine noise and vibration.

Cylinder Head

The cylinder head is a dual overhead camshaft design made of cast aluminum alloy. Each combustion chamber contains four valves and is designed for increased swirl efficiency of the incoming air charge to maximize gasoline combustion efficiency. The exhaust manifold is integrated into the cylinder head. The fuel injectors are located under the intake ports.

Balance Shaft Assembly

The single balance shaft is internal to the engine block. The oil pump is attached to the lower structural extension of the engine block. The balance shaft and oil pump are driven by the balance shaft chain. The engine oil pump supplies pressure to the hydraulic tensioner, which provides the chain's tension. This design promotes the maximum effectiveness of the balance shaft system and further reduces engine noise and vibration.

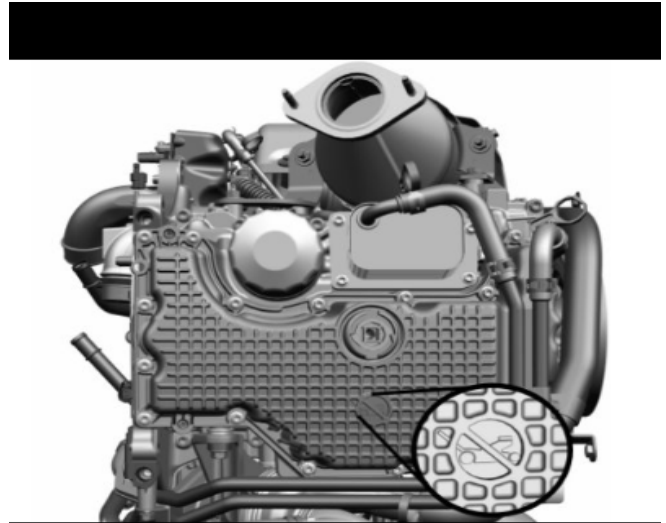
Crankshaft

The crankshaft is made of forged micro alloy steel. Six counterweights have been scalloped for mass reduction and precision engine balance. A harmonic balancer controls torsional vibration.

Pistons and Connecting Rods

The cast aluminum pistons in the new 1.3L (L3T) engine are a lightweight and low-friction design with a recessed top and a barrel-shaped, graphite-coated skirt. Its cast iron top ring provides added strength. The pistons use two compression rings and one oil control ring assembly. The chromium steel pins are designed to be full-floating and must be serviced with the pistons

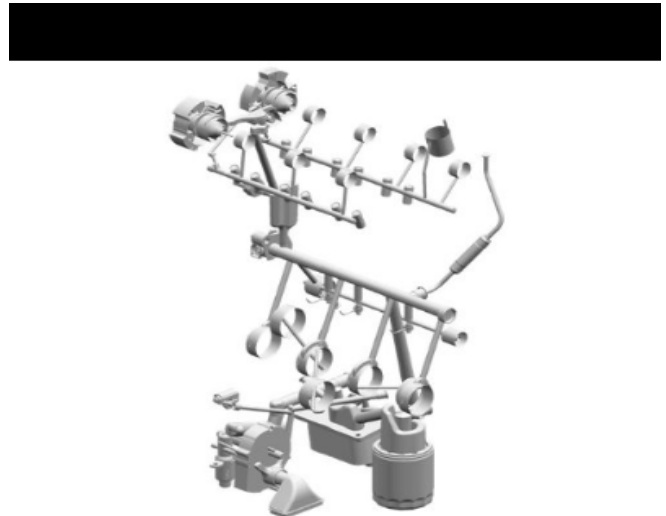
as an assembly. The powdered metal connecting rods are fractured at the connecting rod journal and machined for proper clearance.



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Lower Oil Pan

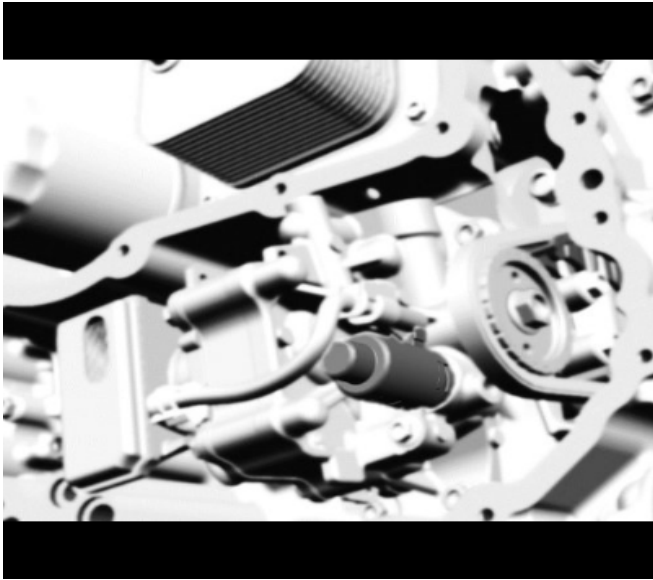
The lower oil pan is made of plastic and is attached at the engine block lower structural extension. The oil pan must not be used for lifting the engine as noted by the icon on the pan. These oil pans are equipped with M5 jackscrews for easy removal. Once properly cleaned, the oil pan is reusable.



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Lubrication System

The lubrication system includes a continuously variable oil pump, an oil filter bypass valve, and an oil heat exchanger.



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Oil Pump and Oil Control Valve

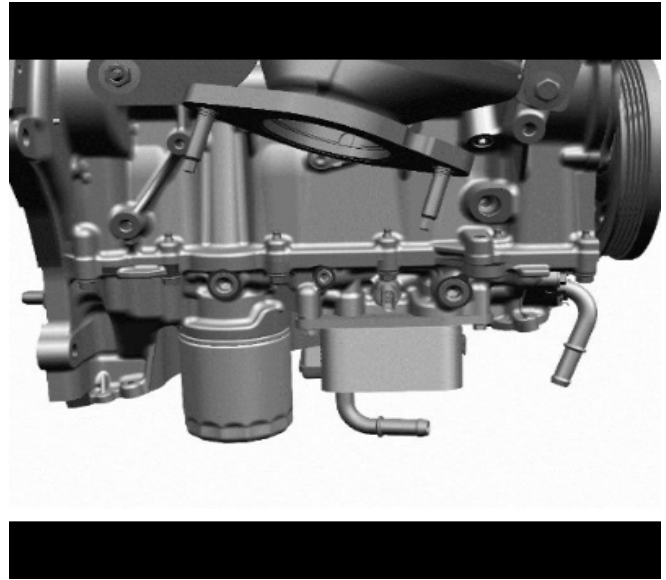
The continuously variable oil pump has an oil control valve that controls the oil flow to the oil pump, thereby controlling the oil pressure in the main gallery. The oil control valve is controlled by the engine control module.



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Oil Filter Bypass Valve

The lubrication system also includes an oil filter bypass valve located inside the filter thread nipple. This bypass valve is used to continue providing oil to the engine in the event the oil filter becomes plugged.



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Oil Heat Exchanger

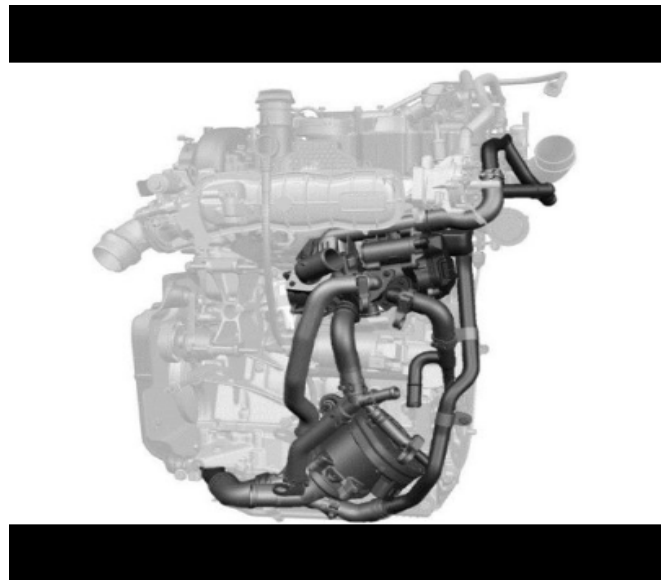
The oil cooler heat exchanger is mounted to the lower right side of the engine and is used to heat or cool engine oil.

Camshafts Actuator System

The camshaft actuator system on the cylinder set strategy engine is much like the camshaft actuator systems found on other GM engines. This system enables the engine control module to change camshaft timing while the engine is running. The intake and exhaust camshaft position actuator assemblies vary the camshaft position in response to directional changes in oil pressure. Modifying camshaft timing under varying engine load provides better power, fuel economy, and lower emissions.

Camshaft Position Sensors

There are two camshaft position sensors, providing feedback to the engine control module. These sensors are integrated into the camshaft cover.



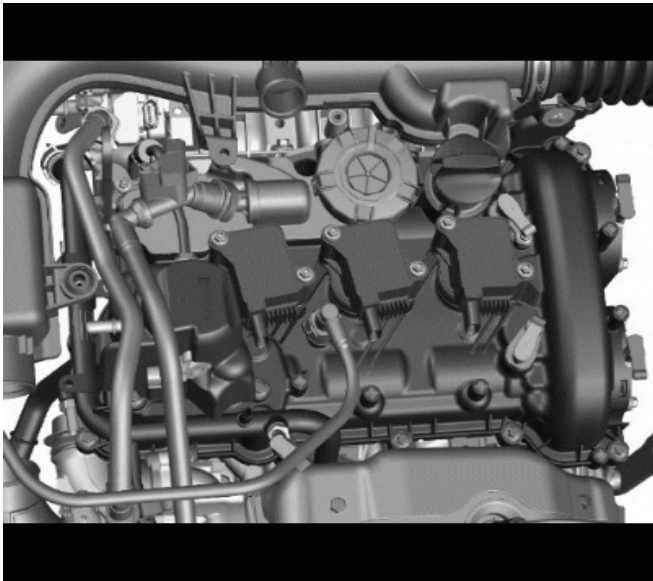
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Active Thermal Management Cooling System

The cooling system on the cylinder set strategy engine is completely new and different. A new system called active thermal management is now used to control the coolant temperature. This system helps the engine and transmission warm up faster and achieve its optimal temperature, improving performance and efficiency. Active thermal management sends heat where it is needed to reduce friction and heat the passenger compartment. Likewise, this system cools the engine and transmission when necessary for high power operation.

Crankcase Ventilation System

The crankcase ventilation system incorporates a pre-separator in the left side of the engine block below the coolant control valve. As crankcase gasses enter the pre-separator, oil separates and drains back to the oil pan through two oil drain channels in the block. The blow by flows internally from the pre-separator through block and head into the fine separator.



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Ignition System

The ignition system of the 1.3L (L3T) engine is a coil per plug system featuring 14 mm spark plugs that are installed seven degrees offset in the cylinder head. During installation, it is important to take care to avoid damaging the spark plug and cylinder head threads. The camshaft position sensors are located on the camshaft cover, and the crankshaft position sensor is located on the left rear of the engine with the target wheel attached to the rear of the crankshaft. Two knock sensors are located on the intake side of the engine.

Fuel Injection System

The 1.3L (L3T) engine is equipped with a direct injection system and consists of three direct injection fuel injectors that mount in the side of the cylinder head below the intake ports. The injector tip size is now 6 mm, so it requires a new seal installer and sizer.

The high pressure fuel pump mounts to the rear of the cylinder head and is driven by a hydraulic roller lifter, which is in turn driven by the intake camshaft. The fuel system is capable of producing 35 MPa (5076 PSI).

Evaporative Emission Purge Pump

The 2020 Buick Encore GX is equipped with an evaporative emission purge pump located on the left rear of the engine. This pump is necessary because the purge capacity is reduced by technologies that improve fuel economy. The purge pump is required to increase the purge volumes to meet Low Emission Vehicle 3 Evaporative Emission requirements. This pump has an integral pressure sensor and is controlled by the engine control module.

Turbocharger

The L3T engine uses a turbocharger which has been optimized to reduce turbo lag and give the engine more immediate throttle response, capable of a maximum boost of 1.5 bar (22 PSI). The engine control module controls the turbocharger wastegate and bypass valves.



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1.2L (LIH) Engine Overview

The 2020 Buick Encore GX front wheel drive will feature the turbocharged 1.2L (LIH) engine paired with the continuously variable transmission. It features a turbo sized for the engine that produces good low-end torque and high engine performance. An oil lubricated wet timing belt reduces friction versus a timing chain or dry belt.

Engine Specifications

Some of the mechanical features of the 1.2L (LIH), inline 3-cylinder engine include torque of 225 Nm (166 lb·ft) and 102 kW (137 HP). Refer to the table below for all specifications.

- **Engine Type:** Inline three-cylinder
- **Displacement:** 1.2L (73 CID)
- **Bore x Stroke:** 75 mm x 90.5 mm (2.953 in x 3.563 in)
- **Block Material:** Aluminum

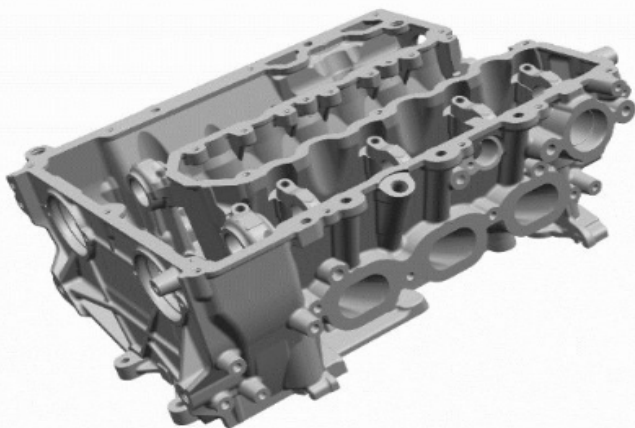
- **Cylinder Head Material:** Aluminum
- **Compression Ratio:** 10:1
- **Firing Order:** 1–2–3
- **Horsepower (@5000 RPM):** 102 kW (137 HP)
- **Torque (@4000 RPM):** 225 Nm (166 lb ft)



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Engine Block

The aluminum alloy engine cylinder block is made by high pressure die casting with three cast-in-place iron cylinder liners. Of the four crankshaft bearings, the thrust bearing is located on the third bearing from the front of the engine. A lower structural extension forms the lower portion of the crankcase to promote cylinder block rigidity and reduce engine noise and vibration.



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Cylinder Head

The cylinder head is a dual overhead camshaft design made of cast aluminum alloy. Its combustion chamber contains four valves per cylinder and is designed for increased swirl efficiency of the incoming air charge to

maximize gasoline combustion efficiency. The exhaust manifold is integrated into the cylinder head. The fuel injectors are located between the camshafts, near the spark plugs.



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Balance Shaft Assembly

The balance shaft is gear driven off the crankshaft at the front of the engine. The balance shaft drive the oil pump using a belt.

Crankshaft

The crankshaft is made of forged micro alloy steel. Four counterweights provide precision engine balance. A harmonic balancer controls torsional vibration.

The crankshaft is offset from the cylinder centerline to help reduce resistance between the piston and the cylinder during the combustion stroke. This improves fuel economy.

Pistons and Connecting Rods

The cast aluminum pistons are a lightweight and low-friction design with a recessed top and a barrel-shaped, graphite-coated skirt. The pistons use two compression rings and one oil control ring assembly. The chromium steel pins are designed to be full-floating and must be serviced with the pistons as an assembly. The powdered metal connecting rods are fractured at the connecting rod journal and machined for proper clearance.

Oil Cooler

The oil cooler heat exchanger is mounted to the lower left side of the engine, on the coolant pump housing, and is used to cool the engine oil.

Camshafts

The engine has two camshafts, one for the intake valves and another one for the exhaust valves. The camshafts are driven using a Belt-in-Oil system. This system reduces noise and friction compared to timing chains and dry belt systems. Both the timing belt and the oil drive belt have a change interval of 240,000 km (150,000 miles) or 15 years.

Timing Belt System

The camshaft actuator system on 1.2L (LIH) engine is much like the camshaft actuator systems found on other GM engines. This system enables the engine control module to change camshaft timing while the engine is running. The intake and exhaust camshaft position actuator assemblies vary the camshaft position in response to directional changes in oil pressure.

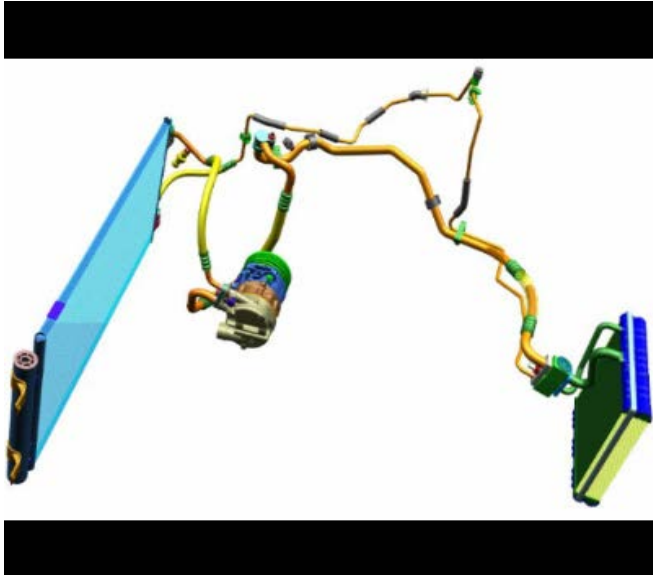
Camshaft Position Sensors

There are two camshaft position sensors on the camshafts and are used by the ECM to detect which cylinder is on the compression stroke and control the camshaft actuator system. A malfunction in a camshaft position sensor will cause the ECM to command the camshaft actuators to a parked position and may cause a longer than normal crank time.

Evaporative Emission Purge Pump

The 1.2L (LIH) engine is equipped with an evaporative emission purge pump located on the left front of the engine. This pump is necessary because the purge capacity is reduced by technologies that improve fuel economy. The purge pump is required to increase the purge volumes to meet Low Emission Vehicle 3 Evaporative Emission requirements. This pump has an integral pressure sensor and is controlled by the engine control module.

HVAC



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Heating and A/C Overview

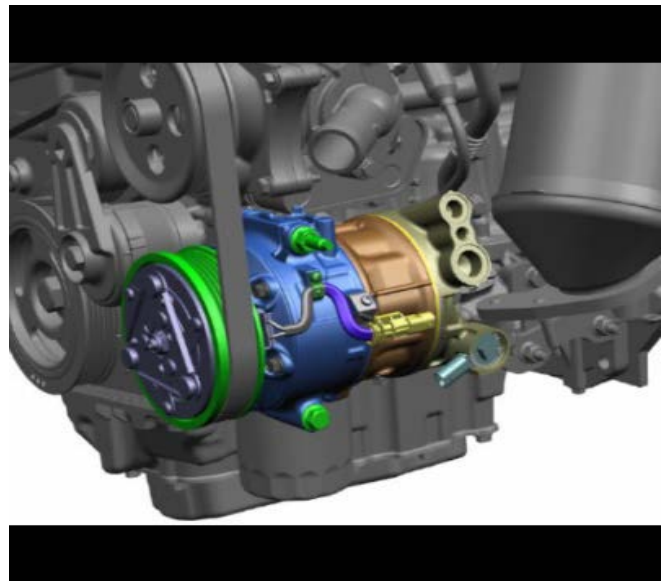
The climate control system regulates the temperature inside the vehicle cabin. The vehicle uses a dual zone automatic climate control system that can operate either manually or automatically. Depending on region and optional content, the climate control system provides heat only or both heat and air conditioning. The Heating, Ventilation, and Air Conditioning (HVAC) system may also incorporate an air filtration feature.

The refrigerant system consists of the following components:

- Compressor
- Condenser
- Receiver/Dehydrator
- Thermostatic Expansion Valve
- Evaporator Core
- Refrigerant Lines
- High and Low Side Charge Ports

The vehicle Air Conditioning (A/C) system uses R-134a or R1234yf refrigerant and a fixed displacement, cycling clutch compressor.

Within the refrigerant system, refrigerant travels from the compressor to the condenser. The cooling fan cools the refrigerant. The condenser contains a receiver/dehydrator within the left side of the condenser. In this system, the refrigerant filter or desiccant element within the receiver/dehydrator is serviced separately from the condenser assembly.



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A/C Operation and Compressor Control

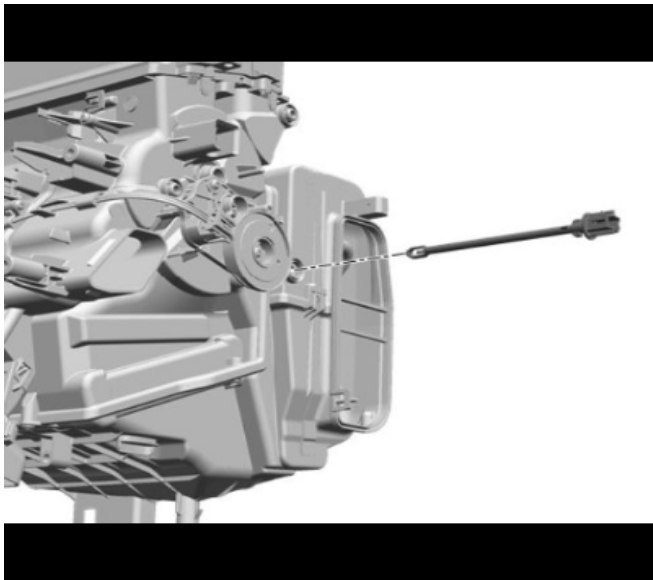
To operate the A/C system, the driver presses the A/C request switch located on the HVAC control faceplate. The HVAC control faceplate sends a message to the HVAC control module over a dedicated Local Interconnect Network (LIN). The HVAC module then relays the signal over the General Motors Local Area Network (GMLAN) to the Engine Control Module (ECM) to request A/C compressor operation.

When the ECM receives an A/C ON request, the ECM monitors the refrigerant pressure sensor, throttle position sensor, Engine Coolant Temperature (ECT) sensor, and engine speed. If all operating criteria are within preset limits, the ECM engages the compressor clutch by providing ground to the A/C clutch relay. The ECM cycles the compressor on and off, depending upon the refrigerant pressure sensor readings.

The following conditions must be met in order to activate the A/C compressor:

- Battery voltage is between 9–18 V
- Engine coolant temperature is less than 120°C (248°F)
- Engine speed is greater than 600 RPM
- Engine speed is less than 6200 RPM
- A/C high side pressure is between 220-3100 kPa (32-450 PSI)
- Throttle position is less than 95%
- Evaporator temperature is greater than 3°C (38°F)
- ECM does not detect an excessive torque load
- ECM does not detect insufficient idle quality
- Outside air temperature is greater than 3°C (38°F)
- Blower motor ON

The HVAC control module uses the evaporator temperature sensor to monitor the evaporator temperature when the A/C system is operating. If the HVAC control module detects that the evaporator temperature is less than 3°C (38°F), the A/C compressor is turned off to prevent the evaporator from freezing.



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Temperature Sensors

Automatic HVAC control systems use several temperature sensors:

- inside air temperature sensor
- left and right upper outlet duct air temperature sensor
- left and right lower outlet duct air temperature sensor
- windshield moisture and temperature sensor

The sensors monitor the temperature in the ducts and is used by the HVAC control module to adjust the delivery temperature from the duct.

The windshield moisture and temperature sensor measures the relative humidity on the passenger compartment side of the windshield. Warm, humid air traveling across a cool windshield could allow the water in the air to condense and collect on the inside of the windshield as fog. By measuring in-car humidity, air temperature, and windshield temperature, the HVAC control module can proactively engage the A/C and send drier, less humid air across the windshield to prevent fog from forming. This action automatically defogs the windshield.

The windshield moisture and temperature sensor is in an optimal location at the base of the inside rearview mirror. This location ensures that it is placed in the airstream produced by the windshield defroster vents. The windshield moisture and temperature sensor includes the relative humidity sensor, humidity sensing element temperature sensor, and windshield temperature sensor.

The moisture sensor is a plate capacitor that changes its ability to store an electric charge in proportion to the amount of moisture in the surrounding air. The moisture sensor contains conductive plates separated by dielectric plates. The dielectric plates are made of a material that changes its electrical properties in the presence of moisture. The change in electrical properties changes the ratio of the charge of the capacitor. The humidity sensor electronics change the capacitance measured across the capacitor to a voltage signal that is proportional to humidity.

Body Systems

Overview

The 2020 Buick Encore GX body systems include many premium features. This section covers the exterior lighting, steering wheel controls, hands-free power liftgate, adaptive cruise control, power windows, wireless charging, 110-volt power outlets, power seats, power sunroof, rear camera washer, and moisture sensitive windshield wipers.

Exterior Lighting

The 2020 Encore GX includes either halogen headlamps or brighter Light Emitting Diode (LED) headlamps, LED daytime running lamps, and fog lamps.



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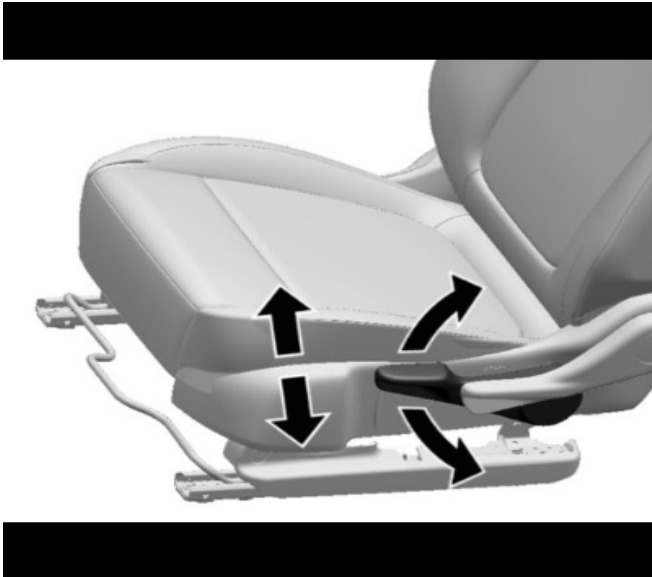
1. Low/High Beams
2. Turn/Park Lamps
3. Fog Lamps

The standard rear tail lamps use incandescent bulbs, while the center high-mounted stop lamp, license plate, and backup lamps uses LED bulbs. The up-level models incorporate tail lamp LED technology.

Interior Systems

Manual Seat Adjuster

To adjust the forward and backward movement of a manual seat:



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1. Pull the handle at the front of the seat.
2. Slide the seat to the desired position and release the handle.
3. Try to move the seat back and forth to be sure its locked in place.

Power Seats

The front power seats system consist of the following components:

- Seat Adjuster Switch
- Seat Horizontal Motor
- Seat Front Vertical Motor (If equipped)
- Seat Rear Vertical Motor
- Seat Recline Motor



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If equipped with memory seats, the following additional components are included:

- Seat Memory Control Module
- Seat Memory Switch

Memory seats allow the seat to return to a learned position. This may be set to be either a supervised/manual operation or linked to the keyfob and performed automatically when the vehicle is started.

Auto memory and seat exit may be turned on in the vehicle settings. When enabled, an auto memory position may be learned for RKE transmitters 1 or 2; transmitters 3–8 may not be used for this feature.

40/60 Split-Folding Rear Seat

All 2020 Buck Encore GX models include a standard 40/60 split-folding rear seat. The larger, 60% portion of the seat is located on the passenger side of the vehicle. The feature provides a larger cargo load area on the folded passenger side seat and still maintains the provision for a rear-seating passenger on the driver's side.

Power Door Locks

The Buick Encore GX is equipped with power door locks. The power door locks are controlled by the BCM. The BCM provides a power door lock command to the door lock actuators within the door latches whenever it receives an input signal from one of the following sources:

- power door lock switches (located on the driver and passenger doors)
- keyless entry lock or unlock command

- passive keyless entry
- door lock cylinder switch unlock actuation
- delayed locking command
- automatic door lock command

The door locks also feature lockout prevention, which prevents the doors from locking if the transmitter is in the vehicle.

The doors may be unlocked using the power door lock switches, the unlock button on the keyless entry transmitter, or by approaching the vehicle with the passive keyless entry transmitter and pressing the button on the door handle. Low frequency transmitting antennas located in the front door handles and the liftgate send a challenge to the key fob to determine if it is within the 1 meter range to allow the vehicle to unlock.

The doors may be manually unlocked from inside the vehicle by pulling on the inside door handle. The first pull of the handle unlocks the door and the second pull of the door handle opens the door.



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Mobile Device Wireless Charging

The mobile device wireless charging system detects and establishes communications with the mobile device to confirm its compatibility and delivers charging power via a wireless interface. The wireless charging system is able to deliver up to 15 watts of power.

The wireless charger incorporates a charging coil located in the center of the charging surface. The mobile device also has a charging coil, typically near the center of the device. In order for the charging process to proceed, place the mobile device on the charging pad and line up both coils.

The wireless charging system does not enter a charging state if any of the following conditions occurs:

- communication is not established with a compatible device
- a non-compatible device is detected

- metallic foreign objects are detected on the charging pad
- the charger temperature exceeds 85°C (185°F)



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110V/120V Power Outlet Receptacles

The accessory DC/AC power inverter module converts 12V DC battery power to 100–120 volts of AC power. The accessory DC/AC power inverter module provides up to 150 watts of power. The power outlet is located at the rear of the center console.

The power outlet receptacle incorporates an indicator light, which illuminates when it is in use. The light illuminates when the ignition is on, equipment requiring less than 150 watts is plugged into the outlet, and system faults are not detected. The accessory DC/AC power inverter module also features a protection circuit that turns OFF power to the receptacle when a device draws more than 150 watts of power. To reset the circuit, remove the plug and connect the plug or turn the retained accessory power off and then back on.

Power Liftgate

The power liftgate is equipped on some models, and its system consists of the following components:

- Liftgate Control Module
- Liftgate Position Sensor (Part of the power assist actuator)
- Interior Liftgate Rotary Switch
- Liftgate Handle Switch
- Liftgate Power Assist Actuator
- Liftgate Latch Assembly
- Liftgate Switches/Operation
- Object Detection Sensors (Pinch Guards)
- Hands Free Liftgate Hands Free Sensor Control Module
- Keyless Entry Transmitter
- Remote Control Door Lock Receiver
- Upper and Lower Liftgate Hands Free Sensors

The power liftgate is operated by pressing the power liftgate switch, using the hands-free sensor, or by pressing the liftgate button on the keyless entry transmitter (key fob.) The following steps allow the liftgate to open:

1. The switch contacts close.
2. The signal circuit voltage goes low.
3. The liftgate control module determines if conditions are met for power liftgate operation.

Alternatively, the liftgate may be manually operated by pressing the liftgate latch release button, located on the exterior of the liftgate.



5501118

Some vehicles come equipped with hands-free liftgate operation. This system uses a motion sensor located under the left rear bumper fascia, and if equipped, an optional logo projector. Waving your foot under the sensor area near the projected logo will cause the liftgate to open.



5501242

Optional Sunroof Features

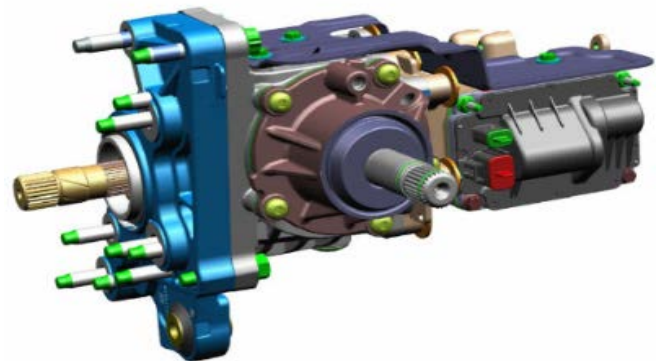
The power sunroof and sunshade system consists of a moving glass panel and a second stationary panel for rear skylight behind the moving panel. There is also an optional power sunroof sunshade, which covers both glass panels. The front panel tilts to the vent position or can fully open with one-touch power express-open and express-close switches located in the overhead console.

The power sunroof system operates only with the ignition turned to the RUN or ACCESSORY position. This allows for retained accessory power control of the sunroof and sunshade through the BCM. When the ignition switch is turned to off, the sunroof and sunshade will continue to operate until any door is opened or when the retained accessory power times out.

Driveline/Axle

Overview

The driveline in the 2020 Buick Encore GX uses either a Front-Wheel Drive (FWD) or an All-Wheel Drive (AWD) configuration. Both configurations use a transverse mounted engine and transmission to transfer power through the front wheel driveshafts to the front wheels. The AWD configuration adds an active transfer case after the transmission that splits the power between the two-piece rear propeller shaft and the front wheel driveshafts.



5501120

Transfer Case

The AWD 2020 Buick Encore GX features a one-speed transfer case. The transfer case bolts to an adapter plate on the right side of the transmission. The housing, bearings, and gears are not serviceable. Internal damage to the unit requires replacement of the assembly.

Propeller Shafts

The propeller shaft is tubular-shaped with Constant Velocity (CV) joints at both ends, and transmits power from the transfer case output shaft to the rear differential.

A center bearing assembly in the rear propeller shaft supports the propeller shaft connection point and helps isolate the vehicle from vibration. A CV joint connects the two pieces.

Differentials

The AWD system has a driver-selectable disconnect and has a single-clutch rear drive unit. The rear drive unit design allows for independent and balanced torque distribution between the front and rear wheels in an up to 50-50 split under certain driving conditions. The rear drive axle has an extended torque tube that allows a shorter 2-piece driveshaft.

Wheel Driveshafts

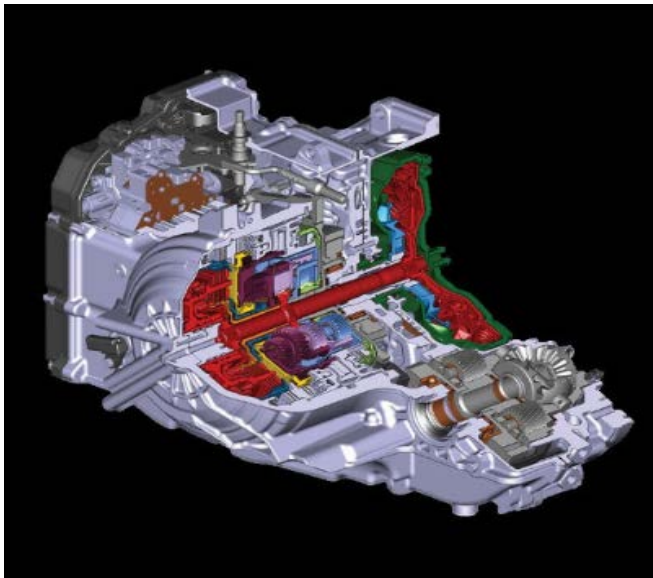
The wheel driveshaft inner joints use a tripod CV-joints design. This type of joint allows a large range of working angles with inward and outward movement to compensate for ride height changes caused by normal vehicle suspension movement.

CV joints at the outer ends of the driveshafts are Rzeppa-style joints designed to permit larger working angles. All of the joints are covered with thermoplastic boots with stainless steel clamps that retain joint lubricating grease and prevent dirt and debris from entering the joint, causing accelerated wear.

Transmission

Overview

The 2020 Buick Encore GX offers two automatic transmissions including Hydra-Matic 9T45 (M3F), and the VT40 (MRG). The 9T45 transmission is a GM-developed 9-speed automatic transmission.



5501202

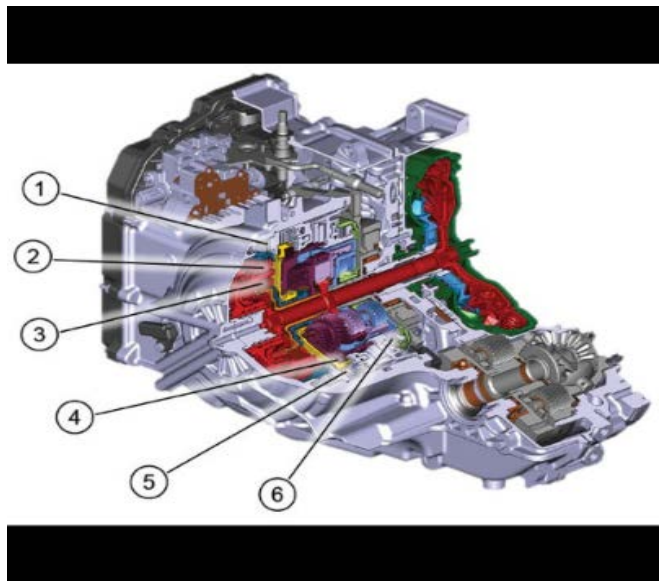
Hydra-Matic 9T45 (M3F) Automatic Transmission

The Hydra-Matic 9T45 is a fully automatic, 9-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.

The planetary gear sets provide the nine forward gear ratios and reverse. Changing gear ratios is fully automatic and is accomplished with a Transmission Control Module (TCM).

Selectable One-Way Clutch

The selectable 1 way clutch is part of the 1-reverse and 1-2-3-4-5-6 clutch housing. The selectable one-way clutch has two modes of operation. In the released mode, it will hold in one direction and free-wheel in the other direction. In the applied mode, it holds in both directions.



5501203

1. 3-8 Clutch Assembly
2. 5-7-R Clutch Assembly
3. 6-7-8-9 Clutch Assembly
4. 4th Clutch Assembly
5. 2-9 Clutch Assembly
6. 1-2-3-4-5-6 Clutch Assembly

Clutches

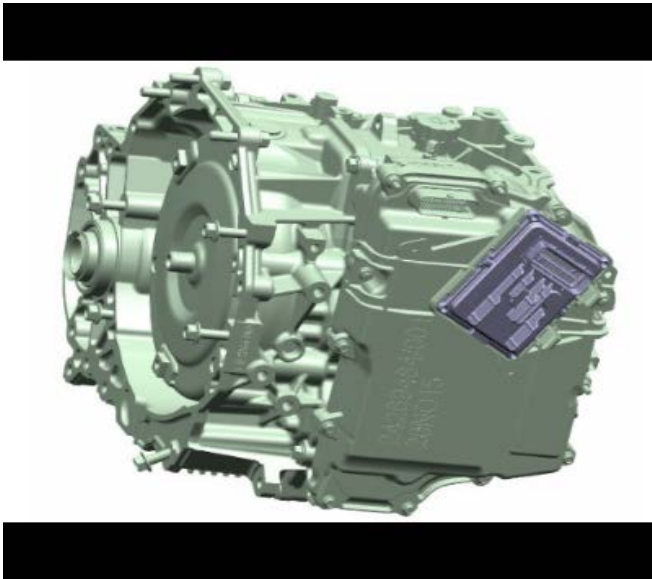
The friction components used in this transmission consist of six multiple disc clutches. The multiple disc clutches combine with one selectable one way clutch to deliver ten different gear ratios—nine forward and one reverse.



5501204

Accumulator

The automatic transmission auxiliary fluid accumulator supplies transmission fluid line pressure to the appropriate clutches for an auto start event. Attached to the accumulator is a normally closed ON / OFF solenoid. When the ignition is ON, the TCM supplies 12V to the accumulator solenoid. To complete the circuit, the TCM supplies a control circuit to the accumulator solenoid. When the Engine Control Module (ECM) requests an auto start event, a serial data message is sent to the TCM to command the solenoid ON. This allows captured pressurized fluid to exit the accumulator to apply the clutches for a first gear start.

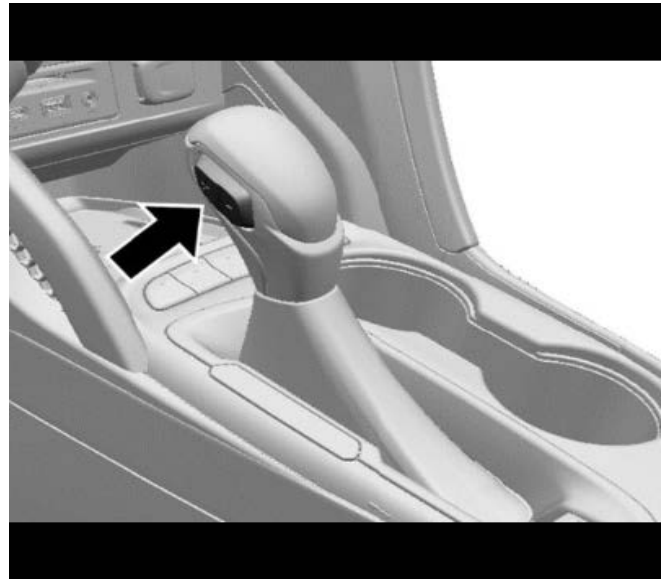


5501205

Transmission Control Module

The TCM for the 9T45 is a standalone unit mounted to the front of the transmission.

The TCM receives and monitors various electronic sensor inputs and communicates with other modules, including the ECM. This information is used to shift the transmission at the optimum time.



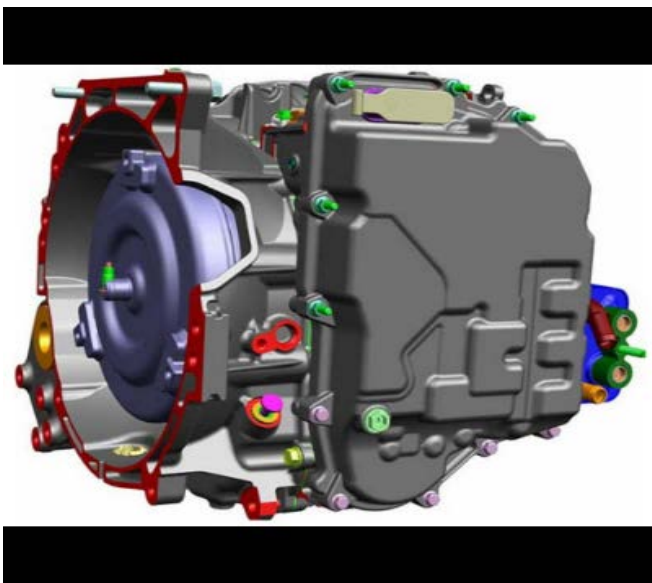
5501207

Manual Mode

Manual mode, also referred to as electronic range select mode, allows the driver to choose the top gear limit of the transmission, and the vehicle's speed. This is particularly useful while driving downhill or towing a trailer. Moving the gear selector from the Drive (D) position to the Low (L) position places the transmission in manual mode. Pressing the "+" or "-" increases or decreases the top gear limit of the transmission.

Transmission Adaptive Functions

The 9T45 9-speed transmission uses a line pressure control system during upshifts to compensate for new transmission build variation and the normal wear of transmission components. New transmission-to-transmission variation and normal wear of the apply components can, over time, cause shift time to be longer or shorter than desired. In order to compensate for these changes, the TCM adjusts the pressure commands to the various control solenoids, to maintain the originally calibrated shift timing. The automatic adjusting process is referred to as adaptive learning and it is used to ensure consistent shift feel and increased transmission durability. The TCM monitors the Input Shaft Speed sensor (ISS) sensor, and the Output Shaft Speed sensor (OSS) Sensor during commanded shifts to determine if a shift is occurring too fast (harsh) or too slow (soft) and adjusts the corresponding PC solenoid signal to maintain the set shift feel.



5501208

Hydra-Matic VT40 (MRG) Automatic Transmission

The VT40 is a fully automatic single mode continuously variable, front-wheel drive transmission. The transmission consists primarily of:

- a four-element torque converter
- one planetary gear set
- an electronic hydraulic pressurization and control system
- a variable drive and driven pulley assembly
- variable drive chain
- two friction clutches
- a differential assembly

The transmission can be operated in any one of the five different positions shown on the shift quadrant.

- **Park (P)** — The Park position enables the engine to be started while preventing the vehicle from rolling either forward or backward. For safety reasons, the vehicle parking brake should be used in addition to the transmission "PARK" position.
- **Reverse (R)** — The REVERSE position enables the vehicle to be operated in a rearward direction.
- **Neutral (N)** — The NEUTRAL position enables the engine to start and operate without driving the vehicle.
- **Drive (D)** — DRIVE range should be used for all normal driving conditions for maximum efficiency and fuel economy. DRIVE range allows the transmission to operate in the full range of variable ratios. The DRIVE position allows low to high ratios without any limitations and torque converter clutch apply.
- **Low (L)** — This position can be selected at any vehicle speed. If the transmission is in DRIVE, it will immediately change the ratio to low when vehicle speed is below approximately 56 km/h (35 MPH). This is particularly beneficial for maintaining maximum engine braking when descending steep

grades. With LOW range selected, the variable drive and driven pulleys will not be allowed to achieve high ratios.



5501210

Torque Converter

The four-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 transmit power smoothly 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.

Automatic Transmission Fluid Pump and Auxiliary Fluid Pump

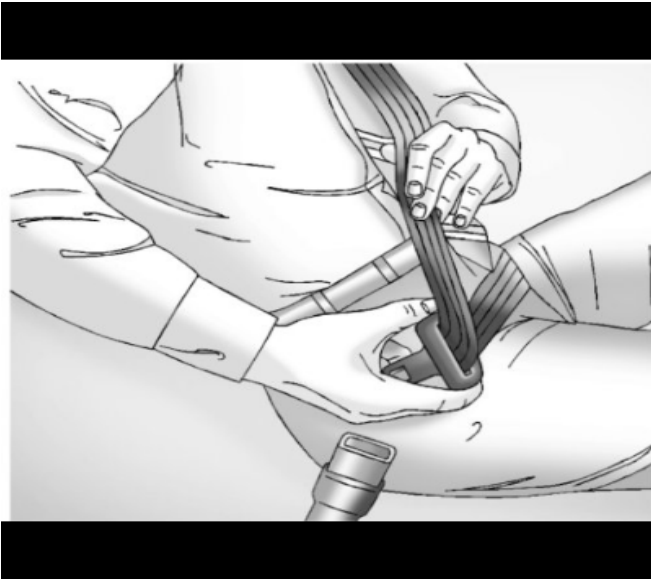
The transmission fluid pump is a binary vane type, which effectively allows for two pumps in the packaging size of one. This design and packaging strategy not only enables low parasitic losses and optimum priming capability, but also provides for ideal oil routing to the controls system, with the pump located in the valve body itself.

Safety and Security

Overview

A strong vehicle structure, combined with several advanced safety features, ensures that the 2020 Buick Encore GX provides a safe driving experience. Occupant protection features include Supplemental Inflatable Restraint (SIR) system airbags, dual-mode seatbelts, and seatbelt pretensioners. To help secure child safety seats, the Encore GX is equipped with both the international standard for child restraint seats (ISOFIX), lower anchors, and top tether features.

Available driver awareness and driver assistance packages also offer additional advanced safety technology such as lane departure warnings, blind zone alerts, collision alerts, and rear cross traffic alert, rear vision camera, and pedestrian impact detection.



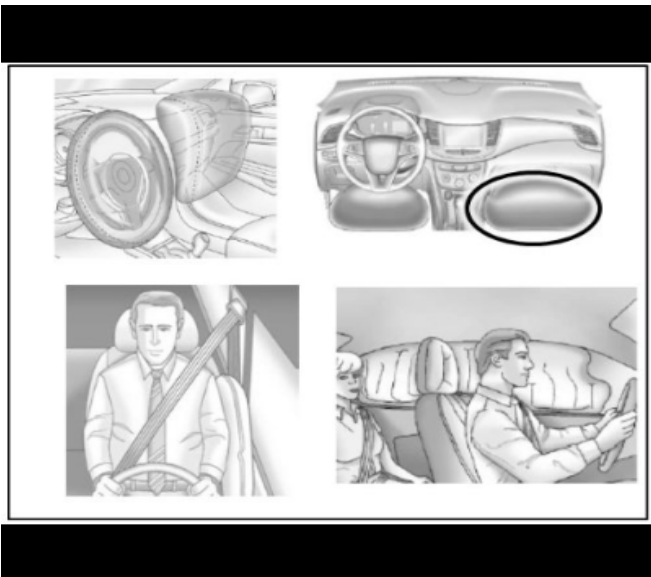
5501193

Seat Belts

The front seat of the Encore GX features three-point lap and shoulder seat belts with height adjustable upper anchors for maximum comfort. The front seat belt pretensioners remove the slack in the event of a collision.

In the rear of the vehicle, each outer position and the center position feature a three-point seat belt, which are not height adjustable.

All front and rear passenger seat belt retractors incorporate an automatic locking feature for child seat installation.



5501194

Supplemental Inflatable Restraint (SIR) System

Solid vehicle structure, coupled with SIR system components, helps maximize protection for vehicle occupants in the event of a collision. The SIR system supplements the protection offered by the seat belts

and include up to 10 frontal and side impact air bags, as well as the SDM, seat belt pretensioners (anchor and retractor), and impact sensors.

Inflatable Restraint Sensing and Diagnostic Module

The SDM is the control center for the SIR system and contains both internal sensors as well as external impact sensors. In the event of a collision, the SDM compares the signals from these sensors to a value stored in its memory. When the generated signals exceed the stored value, the SDM will cause current to flow through the appropriate deployment loops in order to deploy the air bags.

Supplemental Inflatable Restraint Impact Sensors

The SIR system contains either five or six impact sensors, depending on the market. The impact sensors are inputs to the SDM. The sensors for the SIR system are in the following locations:

- front center of engine compartment or on the radiator support on the left and right sides
- inside the front doors (right and left)
- under the trim panel at the base of the C pillars (right and left)

Dual-Stage Frontal Air Bags

The two-stage steering wheel and passenger instrument panel air bags vary the amount of restraint to the occupant according to the collision severity and passenger seat position. For moderate frontal collisions, the air bags partially deploy (stage 1 of air bag deployment). For more severe frontal collisions, the air bags fully deploy (stage 2 of air bag deployment).

Driver and Passenger Roof Rail Air Bags

Roof rail side-curtain air bags provide head and neck protection to front and rear seat occupants, in the event of a side impact or vehicle rollover. The air bags are located along the roofline, above the doors.



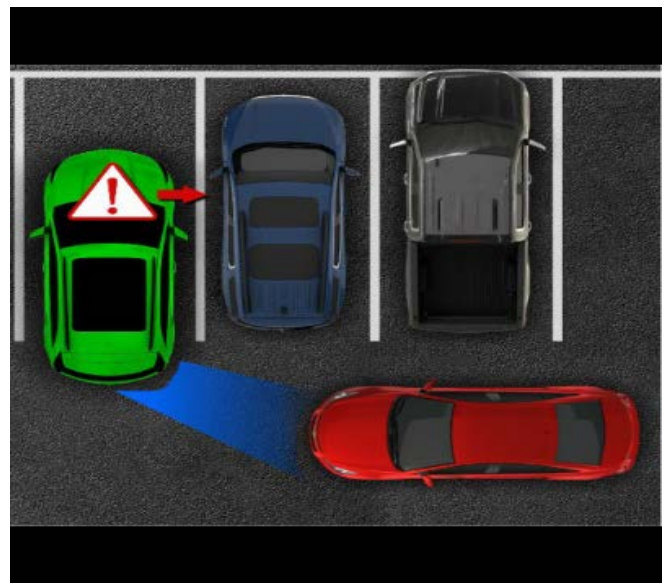
5501195

Passenger Presence Detection System and Passenger Air Bag Indicator

The passenger presence detection system detects the presence of a front passenger seat occupant. The passenger presence system consists of a passenger presence module, silicone filled sensor pad, passenger seat belt tension sensor, wiring harness, and passenger air bag on/off indicators.



5501198



5501199

Rear Cross Traffic Alert

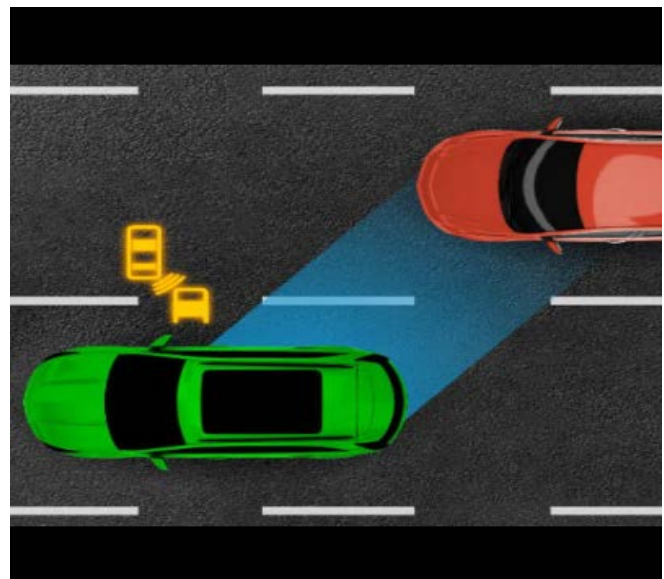
The rear cross traffic alert uses radar sensors to warn the driver of approaching cross traffic when backing out of a parking spot. This system uses the same side radar sensors that are used for the side blind zone alert. The system helps give drivers more time to react to obstacles that may be difficult to see in the side mirror.

Automatic Parking Assist with Braking

Automatic parking assist with braking is an optional feature on the Buick Encore GX that allows the vehicle to search for and steer the vehicle into parallel and perpendicular parking spots. This system adds four side sensors: two in the sides of the front fascia and two in the sides of the rear fascia.

Pedestrian Collision Mitigation Braking

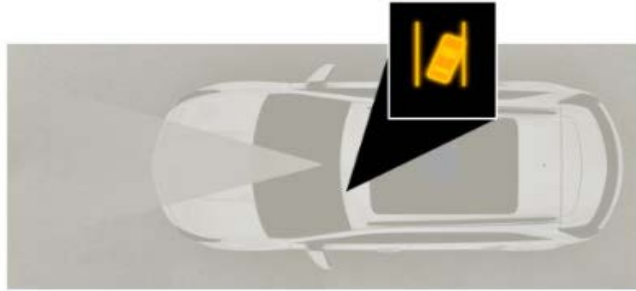
Pedestrian collision mitigation braking is a subsystem feature of the forward automatic braking system. This goal of this feature is to reduce the likelihood of collisions or the impact speed with pedestrians while traveling in the forward direction.



5501200

Side Blind Zone

The side blind zone alert system detects and reports vehicles or other moving objects of interest on either side of the vehicle. The system is designed to alert the driver, with a visual display placed on the side view mirror, to the presence of objects of interest that may not be visible in the inside rear view mirror and outside rearview mirrors. The outside rear view mirrors contain an icon that is backlit with high intensity, amber-colored LEDs located on the mirror surface. The display brightness adapts to day / night conditions.



5501201

Lane Departure Warning / Lane Keep Assist

The lane departure warning system is a camera-based lane detection system that warns the driver of un-signalized lane changes. The system uses the front view camera, identifies traffic lane markings, and provides audible alerts if the vehicle begins to drift out of the lane without the turn signal activated.

The lane departure warning system operates at speeds of 60 km/h (37 MPH) or greater.

Front View Camera Module

The front view camera is located behind the windshield, near the rear view mirror. Looking out at the road ahead, it detects visual cues, such as lane markings and vehicles directly ahead, within a distance of approximately 60 m (197 ft.). The frontview camera communicates with the instrument cluster via serial data to illuminate the appropriate amber or green vehicle ahead indicator, collision alert indicators. The frontview camera also communicates via serial data with the infotainment system to request audible alerts.

Forward Collision Alert

The forward collision alert system sends a warning to the driver when there is a potential collision risk. The system uses the forward view camera to detect vehicles directly ahead. When equipped with adaptive cruise control, the forward collision alert uses the front long-range radar module and two front short-range radar modules in addition to the forward view camera.

Parking Assist System

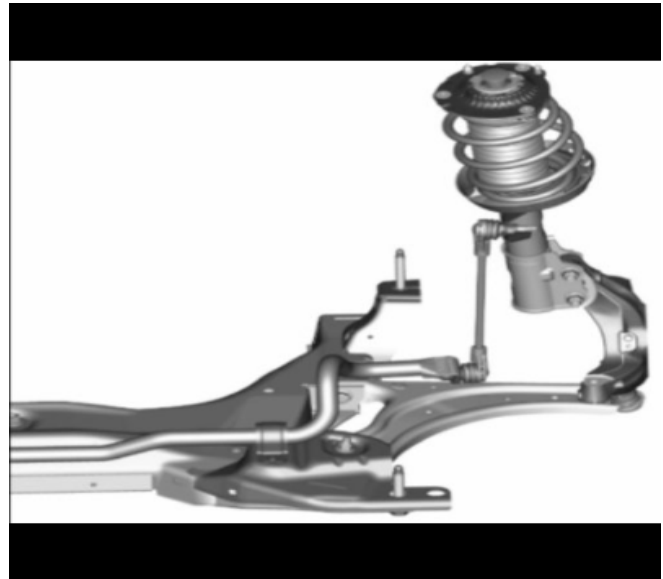
Front and rear parking assist system identifies and notifies the driver of an object in the vehicle's path when moving in a forward or reverse direction at speeds less than 8 km/h / (5 MPH). Eight sensors determine the distance and location of the object: four in the rear bumper and four in the front bumper. The parking assist system notifies the driver of an object in the vehicle's path using an audible beep signal through the infotainment system.

Suspension

Overview

The Buick Encore GX features robust front and rear frames, a MacPherson strut front suspension, and a semi-independent twist-beam rear suspension.

Due to a variety of chassis components on All-Wheel Drive (AWD) models, traction select is a switchable feature that enables the driver to switch between drivelines to optimize fuel economy under varying driving conditions to improve traction.



5501190

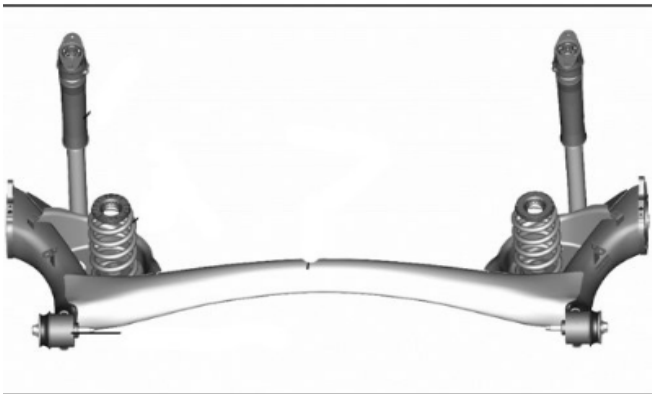
Front Suspension

The front suspension uses strut assemblies to support vehicle weight and dampen suspension oscillations.

The lower part of each front aluminum steering knuckle connects to the control arm assembly with a ball joint. The upper part of each steering knuckle attaches to the shock absorber and strut assembly, which attaches to the body structure.

Front Camber Adjustment

Adjusting the front camber may be necessary if the wheel alignment is out of specification. This is accomplished by placing a service bolt in place of the upper strut to steering knuckle bolt. The new bolt is 2 mm smaller in diameter to allow for adjustment. Do not file the strut holes to attempt to make an adjustment.



5501191

Semi-Independent Twist Beam Rear Suspension

The rear suspension features a semi-independent twist-beam axle with coil springs, shock absorbers, and integral trailing arms. The twist-beam offers such advantages as minimum space requirements, low weight, and consistent camber control. The beam's twisting characteristics provide exceptional driving stability, as well as agile, on-center steering. Rear suspension angles are non-adjustable.

Watt's Link Stabilizer

The all-wheel drive vehicles are equipped with a rear stabilizer system called a Watt's link.

The rear suspension uses a Watt's linkage as a performance enhancement. Watt's linkage prevents relative sideways motion between the axle and body of the vehicle. Watt's linkage approximates a vertical straight-line motion more closely and does so while locating the center of the axle.

Tire Pressure Monitoring System with Tire Fill Alert

The tire pressure monitoring system warns the driver when a significant loss or gain of tire pressure occurs in any of the four tires. The driver can choose to display individual tire pressures and their locations on the driver information center. The tire pressure monitoring system also features a tire fill alert. The standard tire fill alerts the driver if tire pressure any of the four tires drops to 25 percent or more below the recommended cold inflation pressure by activating a warning indicator.

Steering

Overview



5501123

The 2020 Buick Encore GX features an electric power steering system. This system reduces driver steering effort and increases driver comfort, especially during low speed maneuvers. The steering gear converts steering wheel rotation into side-to-side movements. Tie rods transfer this force to the steering knuckles and front wheels, which turn the vehicle right or left based on driver inputs.

Electric Power Steering System

The electric power steering system reduces the amount of effort needed to steer the vehicle by using the power steering control module to control the 12 volt power steering motor that maneuvers the steering gear. The power steering control module uses input from the torque sensor, motor rotational sensor, battery voltage circuit, and General Motors Local Area Network (GMLAN) serial data circuit to determine the level of motor assist. Vehicle speed and engine run status are also used to adjust the amount of steering assist needed. 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.



5501122

Steering Wheel and Column

The steering wheel features a three-spoke design with a thick rim section for enhanced grip and feel. The steering wheel also has a strategically placed raised areas at the 10 o'clock and 2 o'clock positions that provide comfort in those hand positions. On the steering wheel itself, there are controls for the driver information center, infotainment system and, and cruise control.

Heated Steering Wheel

The heated steering wheel system consists of a steering wheel containing a heating element, a heated steering wheel switch, and a steering wheel heating module. The heated steering wheel includes a non-serviceable heating element and temperature sensor located in the rim of the steering wheel. The heated steering wheel on/off switch is located on the left side of the steering wheel. The steering wheel heat module is located on the front side of the steering wheel center hub.

Training Courses

Training Courses — Description and Number

Description	Course Name and Number
The 2020 Buick Encore GX Introduction course introduces you to the newest addition to Buick's SUV portfolio, sharing key features and benefits of the 2020 Buick Encore GX and highlighting the competitive landscape.	B40EC.L20W1 2020 Buick Encore GX Introduction (U.S.)
This New Model Features course provides an awareness of the unique and new technology related to the 2020 Buick Encore GX.	10320.13W 2020 Buick Encore GX New Model Features

Version Information

Version	1
Modified	Released February 10, 2020

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