TECH LINK

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All New Buick Encore GX Arrives

The all-new 2020 Buick Encore GX is a crossover sport utility vehicle designed and manufactured globally and sold worldwide. It slots in the Buick lineup between the smaller Encore and larger Envision and Enclave models.

The Encore GX features two new, fuel efficient, turbocharged 3-cylinder engines, making it more powerful than the smaller Encore. Front-wheel drive models are equipped with a continuously variable transmission (CVT) while all-wheel drive models feature a Hydra-Matic 9-speed automatic transmission with a selectable one-way clutch.

In addition, it's packed with new technologies and new active safety features. These six safety features are standard on all trim levels:

- Forward Collision Alert
- Automatic Emergency Braking
- Front Pedestrian Braking
- Lane Keep Assist with Lane Departure Warning
- Following Distance Indicator
- IntelliBeam headlamps with automatically adjusting high/low beams

POWERTRAINS

The 2020 Buick Encore GX front wheel drive model features the turbocharged 1.2L inline 3-cylinder engine (RPO LIH) paired with the VT40 continuously variable transmission (RPO MRG). The new engine produces 137 horsepower and 166 lb.-ft. of torque.

All-wheel drive models of the Encore GX feature the turbocharged 1.3L engine (RPO L3T). It is an advanced, power-dense, inline three-cylinder generating 155 horsepower and 174 lb.-ft. of torque, equating to 115 horsepower per liter engine. It is built off the new cylinder set strategy (CSS) engine architecture, optimizing efficiency and performance.

ALL-WHEEL DRIVE

The driveline in the Encore GX uses either a front-wheel drive 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.

Encore GX with AWD

The AWD configuration adds an active transfer case that splits power between the two-piece rear propeller shaft and the front wheel driveshafts. The one-speed 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.

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.

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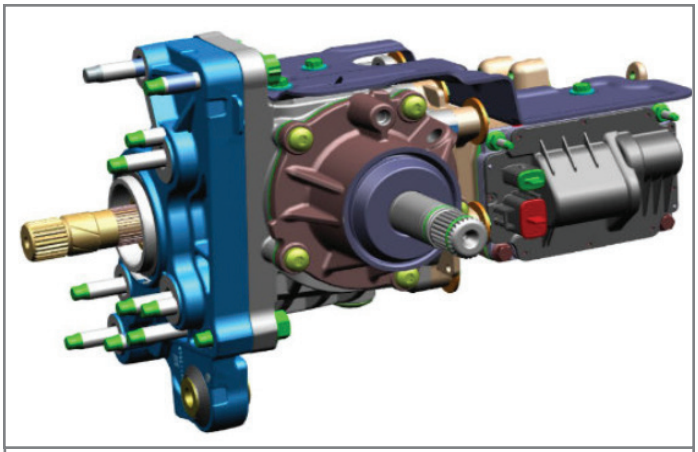


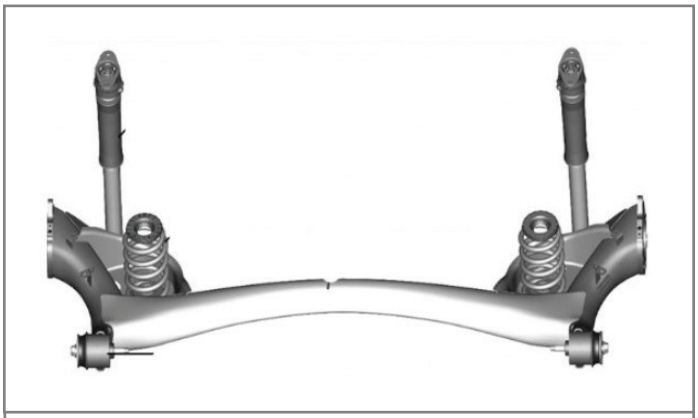
Transfer case

CHASSIS FEATURES

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

Adjusting the front camber may be necessary if the wheel alignment is out of specification. This is accomplished using 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.

The rear suspension features a semi-independent twist-beam axle with coil springs, shock absorbers, and integral trailing arms. Rear suspension angles are non-adjustable.



MacPherson strut front suspension

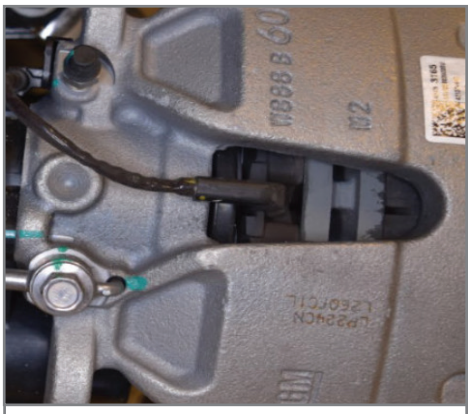
All Encore GX models also are equipped with front and rear disc brakes with pad wear sensors. Floating single-piston calipers mount in brackets with guide pins. The front brake system also includes the electric parking brake motors.

TIP: 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 Encore GX.

The brake lining wear sensor system estimates the remaining life of the front and rear brake pads, which displays a percentage and distance for each axle when the feature is active in the Driver Information Center (DIC). When the brake control system determines the brake pads need replacement, a message displays in the DIC.

Front and rear disc brakes feature pad wear sensors.

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.



Brake pad sensor connection

The lining wear sensor system can be disabled, which may be necessary if aftermarket brake pads without wear sensors are installed. Disable the wear sensor system by accessing the DIC features with the 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: Display the brake pad life on the DIC, select front or rear pads, and then select Yes on the confirmation message. Repeat the reset procedure for pads on the other axle if replacement was performed.

HEAD-UP DISPLAY

The Head-Up Display (HUD) projects an image on a retractable, transparent screen on top of the instrument panel. The image location and brightness are adjustable using the HUD switch on the left side of the instrument panel. The HUD switch is a multiplexed switch that controls the Head-Up Display based on driver inputs. The switch is made up of a resistor ladder and four switches: ON/OFF, Dim +/-, Up/Down, and Page.

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All-New Buick Encore GX Arrives

Head-Up Display

The information displayed on the HUD is received from other modules via serial data. The driver can select from several different display configurations using the Info switch. The HUD screen also can be raised/lowered using the Info switch.

DRIVER ASSISTANCE FEATURES

Available driver awareness and driver assistance packages offer advanced safety technology such as lane departure warnings, blind zone alerts, collision alerts, and rear cross traffic alerts as well as a rear vision camera and pedestrian impact detection. Some of these features can be turned on/off using the switches on the center console.

Driver assistance system controls

Rear Cross Traffic Alert – The system 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.

Side Blind Zone Alert – The system detects and reports vehicles or other moving objects of interest on either side of the vehicle. The system alerts the driver with a visual display on the outside mirrors.

Lane Departure Warning – The camera-based lane detection system warns the driver of un-signaled 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 system operates at speeds of 37 mph (60 km/h) or greater.

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

Forward Collision Alert – The system sends a warning to the driver when there is a potential collision risk using 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.

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

HANDS-FREE POWER LIFTGATE

The available power liftgate features hands-free liftgate operation. The system uses a motion sensor located under the left rear bumper fascia and, if equipped, an optional logo projector. Kicking your foot straight up under the sensor area near the projected logo will activate the liftgate.

Hand-free liftgate with projected logo

For additional information on the all-new 2020 Encore GX, refer to Bulletin #20-NA-032.

Thanks to Frank Jakubiec and Matt Bunting

Servicing Check Engine Light Conditions on 2020 models

GM requires that technicians document the causal Diagnostic Trouble Code (DTC) that leads them to a vehicle warranty repair. The DTC is to be documented in the "Cause Comments" section of the repair order (job card), along with any other diagnostic results. The cause comments from the technician are uploaded with the warranty transaction to GM and help quality engineers understand what repairs are being performed to vehicles and why.

For the 2020 model year, documenting the correct causal DTC and clearly identifying it on the repair order is increasingly important as the DTC will help a dealership's service team identify proper warranty coverage on the following models:

- 2020 Chevrolet Corvette
- 2020 Cadillac CT4
- 2020 Cadillac CT5

The new Corvette, CT4 and CT5 operate on GM's Next Generation Digital Vehicle Platform. With the new architecture, there are several vehicle components that are referred to as mixed-use parts, which means they control both emissions-related and non-emissions-related features on the vehicle. Therefore, depending on the malfunction of that part, warranty coverage may be emissions warranty related, or it may not.

Several vehicle components may be mixed-use parts that control both emissions-related and non-emissions-related systems.

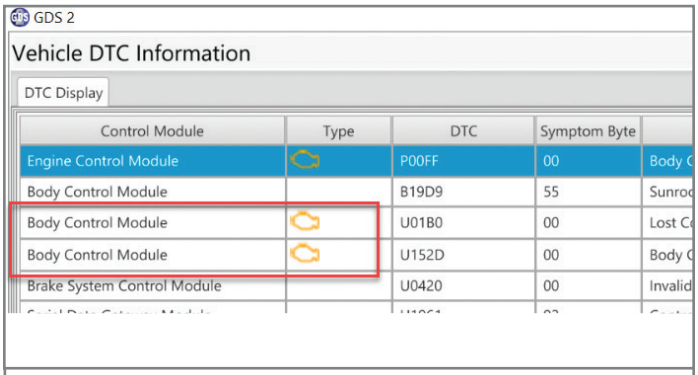
Mixed-use components on 2020 Corvette, CT4, CT5 include:

- Body Control Module
- Blower Motor
- Heating and Air Conditioning User Interface Control
- Transmission Control
- Ride Control Switch
- Battery Monitor Module / Intelligent Battery Sensor
- Vehicle Stability Control System Switch
- Evaporator Air Temperature Sensor
- Programmable Temperature Value Actuator

VALIDATING AND DIAGNOSING A CHECK ENGINE LIGHT

No Check Engine Light — If there is NOT a check engine light illuminated when the vehicle pulls into the service department, there is no need to do anything differently to help your service team identify warranty coverage. If one of these components is affecting vehicle emissions, it will illuminate the check engine light.

Check Engine Light On — Perform a normal DTC scan. When viewing the DTC Display screen, a new yellow Malfunction Indicator Light (MIL) symbol may be seen next to select DTCs.



A new yellow MIL symbol identifies emission-related DTCs.

After running the DTC scan, follow the diagnostic steps listed in the appropriate Service Information to determine the causal DTC, and document it on the repair order as you normally would.

NEW REQUIREMENT FOR 2020 MODEL YEAR

If the causal DTC was emissions related, identified by the MIL symbol next to the code, document it as part of the repair by printing out the Vehicle DTC Display screen and attaching it to the repair order as an easy method of verification.

Knowing the causal DTC, along with if the MIL indicator appeared next to it in GDS, will help warranty administrators to properly submit the warranty claim. For future claims beyond the Bumper-to-Bumper Warranty (or Canada's Base Warranty), the causal DTC will also be critical in determining warranty coverage on the repair.

Thanks to Patti Marino

New 3-Cylinder Engines Drive Buick Encore GX

The all-new 2020 Buick Encore GX features two new, fuel efficient, turbocharged 3-cylinder engines mated to either a continuously variable transmission (CVT) or a Hydra-Matic 9-speed automatic transmission.

1.2L TURBO ENGINE

The turbocharged 1.2L inline 3-cylinder engine (RPO LIH) is standard on front-wheel drive models. It's paired with the VT40 continuously variable transmission (RPO MRG). The engine produces 137 horsepower and 166 lb.-ft. of torque.

1.2L turbo engine (LIH)

The cylinder head is a dual overhead camshaft design made of cast aluminum alloy. Its combustion chamber contains four valves per cylinder.

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 150,000 miles (240,000 km) or 15 years.

The 1.2L engine features an aluminum alloy cylinder 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.

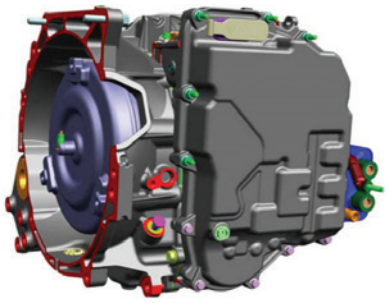
The cast aluminum pistons are a lightweight and low-friction design with a recessed top and a barrel-shaped, graphite-coated skirt. The pistons use two compression rings and one oil control ring assembly. The chromium steel pins are designed to be full-floating and must be serviced with the pistons as an assembly.

The 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.

CVT TRANSMISSION

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

- 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



VT40 CVT

The four-element torque converter contains a pump, a turbine, a pressure plate splined to the turbine, and a stator assembly.

The transmission fluid pump is a binary vane type, which effectively allows for two pumps in the packaging size of one. The design of the pump provides for ideal oil routing to the controls system, with the pump located in the valve body itself.

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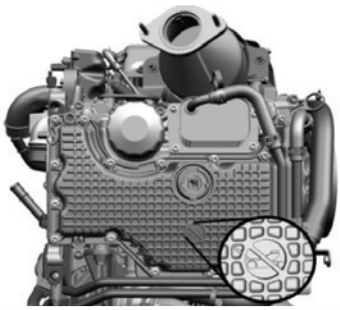
1.3L TURBO ENGINE

All-wheel drive models of the Encore GX feature the turbocharged 1.3L inline 3-cylinder engine (RPO L3T). The engine also is optional on some front-wheel drive models. Built using the new cylinder set strategy (CSS) engine architecture, it delivers 155 horsepower and 174 lb.-ft. of torque.

1.3L turbo engine (L3T)

It features many of the same structural elements of the new 1.2L engine, including an aluminum alloy engine block and cylinder head as well as cast aluminum pistons.

The lubrication system includes a continuously variable oil pump, an oil filter bypass valve, and an oil heat exchanger, which is mounted to the lower right side of the engine. 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 jack-screws for easy removal. Once properly cleaned, the oil pan is reusable.



Lower oil pan with icon indicating not to use pan for lifting the engine.

The camshaft actuator system on the cylinder set strategy engine is much like the camshaft actuator systems found on other GM engines. The system enables the Engine Control Module (ECM) 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, providing enhanced power and efficiency. There are two camshaft position sensors, integrated into the camshaft cover, that send feedback to the ECM.

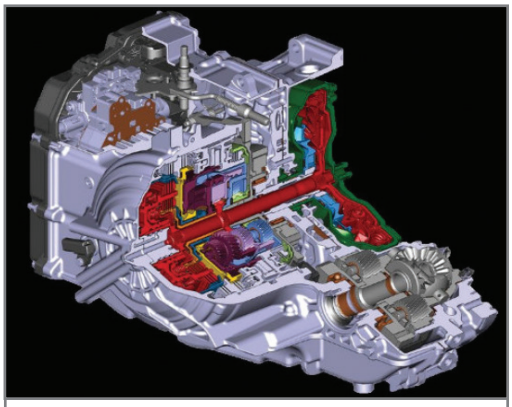
Active thermal management system

The cooling system on the cylinder set strategy engine is called active thermal management and is used to control the coolant temperature. The system helps the engine and transmission warm up in order to reach its optimal temperature more quickly. Likewise, this system cools the engine and transmission when necessary for high power operation.

9-SPEED AUTOMATIC TRANSMISSION

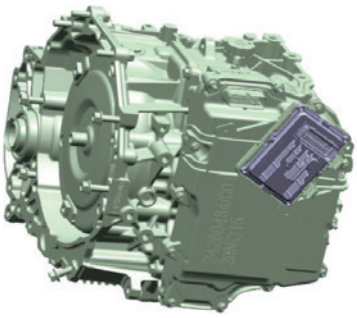
The Hydra-Matic 9T45 transmission is a fully automatic, 9-speed, transverse-mounted, electronically-controlled transmission. It consists primarily of a 4-element torque converter, a compound planetary gear set, friction and mechanical clutch assemblies, and a hydraulic pressurization and control system. The multiple disc clutches combine with the selectable one-way clutch to deliver ten different gear ratios — nine forward and one reverse.

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.



9T45 automatic transmission

The Transmission Control Module (TCM) is a stand-alone unit mounted to the front of the transmission. 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. The TCM adjusts the pressure commands to the various control solenoids to maintain the originally calibrated shift timing.



The TCM is mounted to the front of the transmission.

For additional information on the all-new 2020 Encore GX, refer to Bulletin #20-NA-032.

Thanks to Frank Jakubiec and Matt Bunting

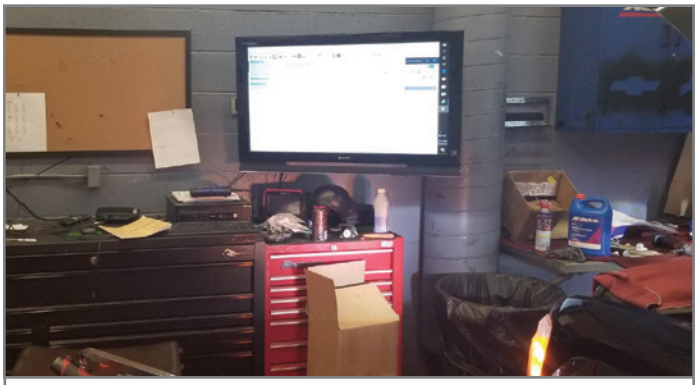
Technicians Go Big

TO GET MULTI-PANEL VIEWS IN TECHLINE CONNECT

Techline Connect (TLC) is GM's latest tool to bring diagnostic information and vehicle data to technicians in one easy-to-use application. With all the information that is available through TLC, the challenge for technicians may be how to view it all.

The Techline Connect application has a single sign-on for access to nine applications, seamlessly integrating Service Information (SI), a scan tool (GDS2), the Service Programming System (SPS), and other applications with vehicle-specific information. All information and applications are available on a technician-friendly dashboard with an intuitive interface that also automatically displays Investigate Vehicle History (IVH) information, Field Actions, and Warranty History when connected to a vehicle.

So, the question becomes how much information to view at once and how. The Panel Management feature of TLC gives technicians the ability to view up to four screens and multiple applications at the same time with various window configurations.



Larger monitors make it easier to view information.

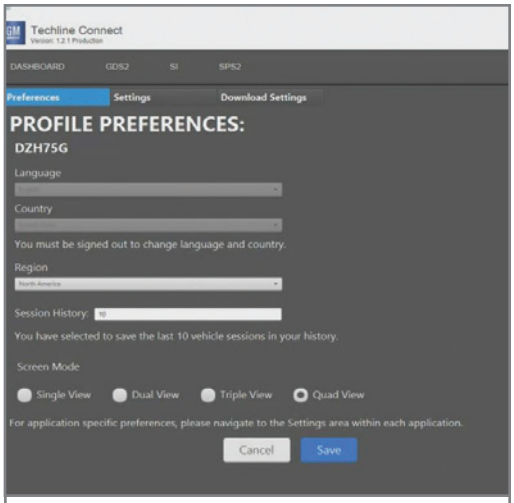
Several technicians at GM dealerships around the country have added larger monitors to their service bay in order to take advantage of the enhanced access that TLC provides.

The big monitors make it easy to view multiple panels as well as all the details in specific data and illustrations. Plus, with their larger size and, in some cases, wall-mounted adjustability, the displayed information can be seen from a farther distance, making it easier to refer to while repairs are being made.

PANEL MANAGEMENT TIPS

In TLC, multiple screens and applications can be viewed at the same time with various window configurations.

Open a New Panel – A new panel can be opened by right clicking a link and selecting "Open in new page."



Change the screen mode under Profile Preferences.

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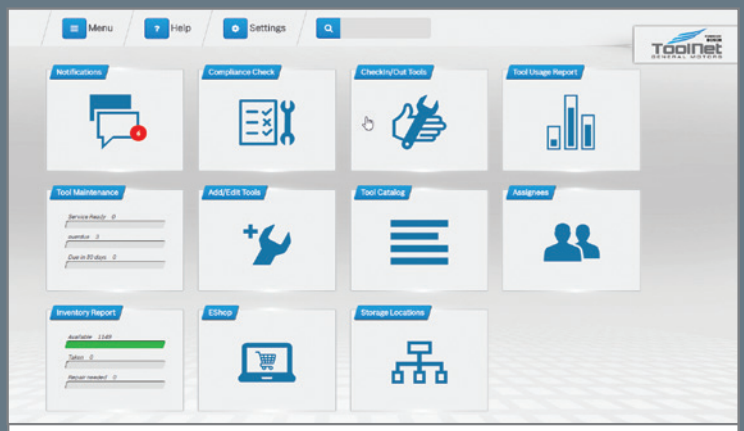
New GM ToolNet Release Date Announced

GM ToolNet, the new asset management application to help GM dealerships in organizing and managing their special service tools inventory, will be launched April 14, 2020. Developed by Bosch Corporation, the new application will replace the current gmtoolorg.service-solutions.com application for all U.S. and Canadian dealerships.



ToolNet menu options

GM ToolNet must be accessed through GlobalConnect. It will include a variety of management features that enhance efficiency and productivity, including: Tool Check-In/Out, Tool Maintenance Scheduling, Storage Location Customization, User Management, and Tool Usage Reporting.

Tool-related data for dealerships that are actively using the current application will be transferred to each dealership's new ToolNet account. Any new tool data (new tools added) entered after January 31, 2020 will not be transferred during this period. Data after this date will need to be re-entered into the ToolNet account.

Dealerships that are not using the current application should perform an inventory of the dealership's special tools. The tool data can be uploaded later. The data upload process will be available on the ToolNet application.

Additional information about the new ToolNet application will be released prior to the April launch date.

▶ **Thanks to Rick Jackson and Kevin Damm**

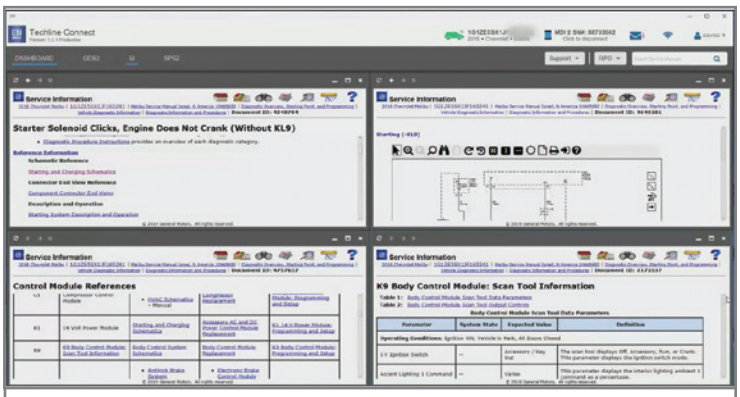
View Up to Four Panels – One to four panels can be viewed. Under Profile Preferences, select a screen mode: Single View, Dual View, Triple View, or Quad View.

Drop In Documents or Applications – With the maximum number of panels currently in use, right click an additional link and select "Open in new page" and then select the desired panel.

Move Panels – Click and drag the top of a panel to move it to a new location.

Change the Panel Size – Click and grab the border of a panel to resize the window.

Full-Size Panel – Any panel can be view full screen by selecting the screen icon at the top-right of the panel. Click the X to close it.



Drag the top of a panel to move it to a new location.

Any questions about Techline Connect can be directed to the Techline Customer Support Center (TCSC) at 1-800-828-6860 (English) or 1-800-503-3222 (French) or via email at TLC.Support@gm.com.

▶ Thanks to Wade Hanna

New Software Release for GE-50300-A A/C Machine Updates Leak Testing Feature

New updated software for the GE-50300-A R1234yf A/C Machine is now available to be downloaded through the Special Tools and Software Updates app in GM GlobalConnect. The software release is available for no charge to GM dealerships.

TIP: The software release applies only to GE-50300-A machines. Non -A A/C machines cannot be updated. Do not attempt to load the updated software on a GE-50300 machine

Features of the updated software include:

- Allowing the machine to proceed with the 15% initial charge for leak testing regardless if the vehicle fails the vacuum decay test.
- Removing the feature that forced recovery of the 15% initial charge, rebalanced the scale and then proceeded to charge the full 100% amount. To save time, the machine now holds the 15% charge in the vehicle and injects the other 85% to fill to 100%.
- Retaining the 30-minute initial vacuum time default but changing the minimum time that can be entered from 1 minute to 10 minutes. The additional time allowance ensures sufficient vacuum time for removal of moisture from the vehicle system.

DOWNLOAD THE SOFTWARE

After selecting the Special Tools and Software Updates app in GM GlobalConnect and accessing the gmtoolsandequipment.com website, go to Software Downloads and select the software link R1234yf A/C Machine Software Update (GE-50300-300 V1.9 Jan_2020) for the GE-50300-A R1234yf A/C Machine.

Select the Software Update Installation Instructions to download an instruction sheet in a PDF file. Read the instructions completely before downloading the Software Update zip file.

Contact Bosch Automotive Service Solutions Technical Support at 1-800 GM TOOLS (1-800-468-6657) with any questions about the software update and installation.

Select the software link R1234yf A/C Machine Software Update

Thanks to Rick Jackson

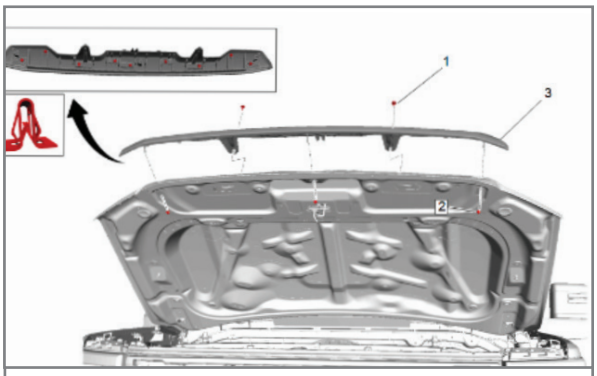
Wind Noise from the Front of the Vehicle

The 2020 Sierra 2500HD/3500HD may have a whistling sound coming from the front of the vehicle while driving. The intermittent sound is most commonly heard when the vehicle is traveling 50 mph (80 km/h) or higher and is also affected by the strength of crosswinds.

The cause of the whistling sound may be air turbulence under the front edge of the hood. If this condition is found, replace the hood front edge weatherstrip and molding with updated service parts.

In order to remove the hood front molding, the hood ornamentation vent also must be removed. Refer to Hood Front Molding Replacement in the appropriate Service Information.

Refer to Bulletin #20-NA-035 for additional information and part numbers.

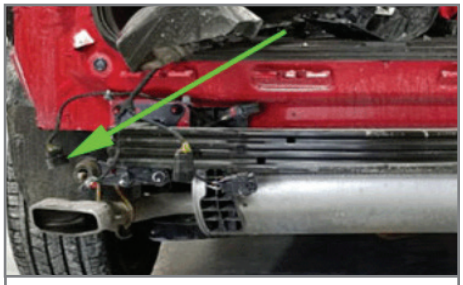


Hood front molding

▶ Thanks to Kevin Minor

Water Intrusion at Rear Electrical Connector

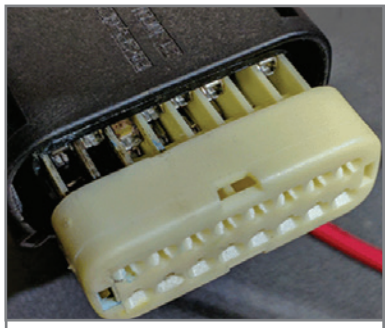
A Service Park Assist message may be displayed on the Driver Information Center or the power liftgate may not be operating on some 2017-2020 Acadia and 2019-2020 Blazer models.


X400 connector

The hands-free liftgate brand logo projection below the rear of the vehicle also may be inoperative. DTCs B323A, B323B, B0958, B0959, B0960, and B0961 may be set.

These conditions may be the result of water intrusion in the X400 connector located behind the rear bumper cover on the left side of the vehicle. Inspect the X400 connector for evidence of moisture.

If there is not any obvious damage from water found in the terminals, it may be necessary to remove the TPA to be able to view inside the connector for moisture.


Remove the TPA to be able to view inside the connector.

If water intrusion or corrosion is found, replace all affected terminals on the body side with terminated leads and replace the rear fascia wiring harness.

Ensure that the connector is securely attached to the locating stud and is mounted in a horizontal position.

▶ Thanks to Jim Miller

TECH LINK

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Publisher:
John Meade
GM Customer Care and Aftersales

Editor:
Lisa G. Scott
GM Customer Care and Aftersales

Technical Editor:
Mark Spencer
mspencer@gpstrategies.com

Production Manager:
Marie Meredith

Creative Design:
5by5 Design LLC
dkelly@5by5dzign.com

Write to:
TechLink
PO Box 500, Troy, MI 48007-0500

GM TechLink on the Web:
GM GlobalConnect