



Mid-October 2019, Volume 21, No. 20





New SVG Graphics in Service Information

see page 8



Cover BDU Electrical Connectors Before Removing Coolant Hoses

see page 10

2020 Bolt EV Battery Updates Add to Electric Range2
Incorrect Fuses in Instrument Panel Fuse Block
Inspecting the Diesel Fuel System for Contamination4
New EL-52545 TPMS and RF Tool Identifies Key Fobs` 6
Enabling or Disabling Passive Unlocking
Steering Wheel Oscillation Conditions12



# **2020 Bolt EV** Battery Updates Add to Electric Range



Starting with model year 2020, the Bolt EV will offer an EPA-estimated 259 miles (417 km) of range on a full charge, a 21-mile (34 km) increase over previous model years. With the increased range, the 2020 Bolt EV will appeal to even more customers by allowing them to travel farther between charging sessions.

The new high voltage battery pack capacity is 66 kWh, up from 60 kWh in previous model years. Proprietary improvements in both cell design and manufacturing contribute to the increased capacity. SAE Level 3 DC fast charge rates are also improved for 2020, especially in cold weather, reducing the amount of time spent at a charging station.



## HIGH VOLTAGE BATTERY PACK SERVICE

The full battery pack and all five battery sections will be available to service at the launch of the 2020 Bolt EV through the GM Battery Service Center (GM BSC) in the U.S. and York ESC in Canada. The new battery pack and sections will appear the same physically on the outside. However, the new N2.2 chemistry for 2020 is NOT compatible with the previous N2.1 chemistry for 2017-2019 Bolt EV models. **TIP:** Be sure to confirm the correct part number for the repair before ordering and installing the battery pack. Refer to Bulletin #19-NA-194 for ordering battery packs and #18-NA-236 for ordering battery sections.

## **EV RANGE**

With the increased EPA label range comes the potential for more customer questions about EV range variation. As with all GM plug-in vehicles, the displayed EV range is an honest estimate based on driving techniques and terrain, ambient temperatures and climate control settings, and battery factors.

When a lower EV range is displayed on the Bolt EV instrument cluster, some customers may lose some confidence in the storage capacity of their vehicle's battery. GM backs every battery pack with the Bolt EV Electric and Hybrid Warranty. In North America, if the battery pack loses more than 40% of its capacity during the 8-year or 100,000-mile/160,000 km (whichever comes first) EV warranty period, the battery pack may be replaced for the customer.

Check out Bulletin #19-NA-210 for highlights about new tools, service procedures, and diagnostic aids for understanding why the range estimate is lower than expected on the Bolt EV, and



Less than EPA-estimated range with a full charge



whether a battery pack repair will increase the EV range. Some of these diagnostic aids are available for certain Volt, Spark EV, and CT6 PHEV vehicles as well. Search for "Reduced EV Range" in the appropriate Service Information for more information about factors that affect EV range.

A new data screen in GDS2 is available under the Hybrid/EV Powertrain Control Module 2 entitled Energy Usage History. Some of the new information available includes the battery capacity in Amp-Hours and the energy impact score from several factors, such as outside temperature, cabin climate, and driving technique.

Share the energy usage data with customers to help better their understanding of why the EV range estimate may be lower than expected. The goal is to increase customer confidence and minimize concerns due to the fluctuations observed in the EV range estimate.

### **ACTION CENTER**

A Technical Assistance Center (TAC) Action Center has been established for product feedback on the 2020 Bolt EV propulsion system to help ensure a successful introduction. Report any propulsion or charging issues that warrant prompt and immediate attention, not just concerns requiring technical assistance.

The gathering of information is critical for quick resolution to any propulsion-related concerns. The Action Center is connected directly to TAC and Product Engineering to address any technical concerns.

To report a concern, create a TAC Case using the Dealer Case Management (DCM) system (U.S.). The concern will be answered by a Bolt EV specialist. In Canada, contact the Canada TAC.

Thanks to Lane Rezek and Joe Ciagala

## Incorrect Fuses in Instrument Panel Fuse Block

The Automatic Engine Stop/Start system (RPO KL9) may be inoperative on some 2019-2020 Silverado 1500 and Sierra 1500 models. DTCs P3055 (DC/DC Converter Output Voltage 1 Performance) and P3056 (DC/DC Converter Output Voltage 2 Performance) may be set in the Engine Control Module.

The inoperative Stop/Start functionality may be caused by fuses F51DR and/or F52DR in the X51R right instrument panel fuse block when they should not be installed. With these fuses installed, it creates additional load for the Power Supply Transformer, which pulls down the output voltage.



Fuses F51DR and/or F52DR in the X51R right instrument panel fuse block

Inspect for a fuse in the F51DR and the F52DR locations of the X51R right instrument panel fuse block. Vehicles equipped with Automatic Engine Stop/Start system should not have any fuses in these two locations. If both locations are empty, then follow normal diagnostics in the appropriate Service Information.

Thanks to Paul Radzwilowicz

# **Inspecting the Diesel Fuel System for Contamination**

Water and other contaminates in diesel fuel will create drivability concerns and a loss of engine power. If water and/or debris is present in the fuel system, the fuel cannot cool and lubricate the components properly, which may lead to overheating, rust, corrosion and, ultimately, component failure. Water and debris can enter the fuel system in several ways, either through a contaminated refueling source, plugged venting or through longterm condensation in the fuel tanks of the vehicle.

If fuel system contamination is present on 2017-2020 Silverado 2500/3500, Sierra 2500/3500; 2019-2020 Silverado 4500HD/5500HD/6500HD; and 2020 Silverado 1500 and Sierra 1500 models equipped with the 6.6L V8 Duramax diesel engine (RPO L5P, L5D) or 3.0L I6 Duramax diesel engine (RPO LM2), diagnostics will often lead to removing the fuel/water filter to inspect for contamination. In these cases, use care when removing the fuel/water filter and do not reinstall the fuel/water filter into the housing until the fuel/water separator reservoir has been cleaned.



Check for contamination in the fuel/water filter.

If the fuel/water filter is removed from the fuel/water separator reservoir incorrectly, any debris in the fuel may fall into the reservoir and get pumped back into the fuel system, leading to the same engine performance concerns.

**TIP:** Do not replace any fuel system components if contamination has been found. Flush the fuel system first. Once the system has been flushed, continue with the diagnostics in the appropriate Service Information.

## FUEL/WATER FILTER OPERATION

The fuel/water filter assembly consists of a fuel filter/water separator, fuel heater, fuel temperature sensor, and a water in fuel sensor. The filter is designed to remove water as well as any particles/ debris from the fuel system.



When fuel/water enters the filter, it travels through the paper filter element (A), which traps particles/debris that were in the fuel that may damage the fuel injection system. Any trapped particles should remain on the outside of the filter. The fuel then travels through the water separator (B), which pulls the water out. The

water collects in the bottom of the fuel/ water separator reservoir (C). There is a drain in the reservoir. The filtered fuel is returned to the fuel system.

If a new filter is installed without cleaning the fuel/ water separator reservoir, any debris that may be in the reservoir may limit the performance of the filter and water separator as well as lead to contaminated fuel re-entering the fuel injection system.



C. Fuel/water separator reservoir

## FUEL/WATER FILTER REMOVAL

The fuel/water filter must be removed correctly to prevent debris from entering the fuel/ water separator reservoir.

When removing the filter from the housing, use care to not separate the filter from the fuel/water separator reservoir.

To separate the filter from the fuel/water separator reservoir, place the filter downward in a clean, dry drain pan and pull the filter down.

If the filter is facing upward, any debris left on the sides of the filter may escape past the O-ring seal during removal and settle in the fuel/water



Do not separate the filter from the fuel/water separator reservoir when removing the filter from the housing.

separator reservoir. Once reinstalled to the housing, the water/ debris left in the water/fuel separator reservoir will flow past the filter and directly in to the fuel injection system when the engine is started.

Inspect the fuel/water separator reservoir and the filter for heavy debris. If heavy debris is found in the filter, clean the fuel/ water separator reservoir and continue with the fuel system flushing procedure.

If no signs of debris are found, clean the fuel/ water separator reservoir, install a new filter and refer to the appropriate Service Information to continue diagnosis.

TIP: Some models may have a fuel filter life monitor. Reset the system after installing a new filter using a scan tool or the Driver Information Center controls in the vehicle.



Pull the filter down when removing the filter from the fuel/water separator reservoir.

## FUEL SYSTEM FLUSHING

With the fuel filter installed, disconnect the chassis-side fuel feed hose from the engine-side fuel feed pipe and place the end of the chassisside fuel feed hose into a clean container. Run the fuel pump to clean any debris left in the fuel lines. Also clean the fuel/water separator reservoir and install a new fuel filter.

Next, disconnect the chassis-side fuel return hose from the engine-side return pipe. Install a clear line between the fuel supply hose and the fuel return hose and run the fuel pump until the fuel runs clear in the line.

Reconnect the chassisside fuel feed hose to the engine-side fuel feed pipe. Connect a clear line in series at the fuel return hose to the engine return pipe and run the fuel pump until the fuel runs clear in the line. Reconnect all fuel lines and test for any DTCs or any fuel symptoms.

For additional information, refer to the latest version of Bulletin #18-NA-361.

Thanks to Larry Yaw



If the filter if facing upward when removing the filter, debris may settle in the reservoir.



Fuel filter life monitor on the Driver Information Center



Run the fuel pump until the fuel runs clear in the line between the fuel supply hose and the fuel return hose.



Run the fuel pump until the fuel runs clear in the line between the fuel return hose and the engine return pipe.

## New EL-52545 TPMS IDENTIFIES KEY FOBS



EL-52545 TPMS and RF tool

The new EL-52545 TPMS and RF tool, which will be shipped as an essential tool to all GM dealerships in the 4th quarter of 2019, is designed to help with diagnosis and repair of systems that rely on radio communications, such as Tire Pressure Monitoring, Keyless Entry (Key Fob Active Functions), Passive Entry and Pushbutton Start.

It features a new communication protocol for TPM systems and Remote Keyless Entry systems that takes advantage of the new Next Generation Digital Vehicle Platform electrical architecture coming on the 2020 Corvette, CT5 and CT4. It's also backward compatible with electrical architectures on 2008 and later GM models.

The EL-52545 TPMS and RF tool package includes:

- TPMS Module
- USB Cable
- RJ45 Cable
- Power Adapter
- OBD II Module
- Hand Strap

## **KEY FOB DIAGNOSIS**

The EL-52545 tool offers several unique features for use when diagnosing a Remote Keyless Entry system issue.

The tool can be used to:

- Read the 8-digit VIN from the key-integrated fob or standalone key, along with additional data
- Monitor and display the frequency and signal strength for key fob output
- Monitor and display the signal strength for the Passive Entry/ Passive Start system signals from the vehicle to the key fob

## **KEY FOB SIGNAL DETECTION**

Warranty data shows that about 37% of returned key fobs do not match the VIN on the warranty claim, often due to an accidental mix up with other key fobs during transportation, at the dealership or by the customer.

The Signal Detect function of the EL-52545 tool can be used to display the key fob identification — including the last eight digits of the VIN — associated with the fob, the fob data and the fob part number along with the



ability to check the fob frequency and signal strength. With the capability to identify the key fob, it will be much easier to quickly diagnose a customer concern of "this fob doesn't work on my vehicle."

To determine the VIN associated with a key fob, select the Signal Detect function on the EL-52545 tool. From the Fob/Key ID screen, the tool will instruct to place the fob on the small pocket on the back of the tool and press OK. The last eight digits of the VIN and the fob part number will be displayed on the tool. If the VIN matches the vehicle, continue with system diagnosis.

The EL-52545 tool also can be used when diagnosing a Passive Entry or Passive Start condition. To test the active capability of the key fob, select RF Auto Detect and hold the key fob in front of the



tool. Press a key fob button and the tool will determine the Radio Frequency (RF) signal strength and frequency.

To test the ability of the key fob to respond to a signal from the vehicle, select Signal Detect and then Key Fob Status. With the key fob in front of the tool, press the touch pad on the vehicle door. The tool will display if there is a reply to the vehicle signal from the key fob, indicating if the key fob is communicating with the vehicle.

## **MORE DETAILS**

For more information about the functionality of the EL-52545 tool, check out an earlier TechLink article covering its TPMS features.

To view a video covering some of the RF features of the EL52545 tool, look for the September 2019 edition of the GM Service Know-How Emerging Issues seminar, 10219.09V, on the GM Center of Learning website.

Thanks to Bob Wittmann



Key Fob Status

# **Enabling or Disabling Passive Unlocking**

The passive door unlocking feature, which uses the button on a door handle to unlock many 2019-2020 GM models, can be enabled and disabled using the Remote Keyless Entry transmit-

In addition, on some 2020 models, the passive door unlocking function can be changed in the Settings menu on the infotainment screen.



Passive door un-

locking is now widely available throughout the GM lineup. Refer to Bulletin #18-NA-279 for a complete list of models.

The passive door unlocking feature uses the door handle switch signal circuits to provide inputs to the keyless entry control

a door handle button is pressed. The keyless entry control module provides a 12 V signal to each exterior door handle

switch via the



Settings > Vehicle > Remote Lock, Unlock Start > Passive Door Unlock

door handle switch signal circuits. When a door handle button is pressed, the switch closes and the voltage signal within the signal circuit is pulled to ground. The keyless entry control module will detect the voltage drop and a low frequency antenna will transmit a challenge to the key fob, which must be within three feet of the door. If the challenge is met, the key fob will respond and the keyless entry control module will send a serial data message

#### CONTINUED ON PAGE 8

# **New SVG Graphics**

## **IN SERVICE INFORMATION**

The Service Information (SI) now features new Scalable Vector Graphics (SVG) in some of the new SI documents and bulletins. Simply put, this means the new graphics and images in SI can be



New SVG graphic with toolbar

searched and compressed for better accessibility and can be edited. SVG graphics feature a new toolbar that provides a variety of ways to view the images as well as highlight aspects of them. SVG graphics don't require any special plug-in viewers, so they can be viewed on any modern web browser. Plus, the SVG functionality allows schematics to be viewed on a tablet or smartphone.

Previously, SI featured TIF and CGM graphics, which meant that special viewers needed to be downloaded using Internet Explorer (IE).

## **GRAPHICS TOOLBAR**

When viewing a document in SI, all graphics and images have a magnifying glass icon next to the graphic. The graphic toolbar is available after clicking the magnifying glass, which enlarges the graphic.

Toolbar functions enable users to enlarge a graphic, zoom in or out, rotate a graphic, fit the image to the height or width of the

CONTINUED ON PAGE 9

## **Enabling or Disabling Passive Unlocking**

to the Body Control Module to command the door or doors to be

The passive door unlocking feature can be cycled between

If the passive door unlocking feature is disabled, the doors will not remain locked when pressing the tailgate release, and the turn

### **PASSIVE UNLOCKING ENABLE**

vehicle off, press and hold the Lock and Unlock buttons on the key fob for three seconds. The turn signals will flash four times to

time to unlock all doors, depending on

### **PASSIVE UNLOCKING** DISABLE

the vehicle off, press and hold the Lock and Unlock buttons on the key fob for four times to indicate that passive un-

With passive unlocking disabled, the doors will remain locked when pressing the button on the door handle.

strate to customers how the system can be enabled and disabled so they are aware of how it operates for future use.

► Thanks to Bob Wittman



Lock and Unlock buttons to enable/ disable the passive unlocking system.



window, print the graphic as well as perform some edit functions. Select the black right arrow icon to expand the toolbar for access to the editing functions. Any edited graphics can be saved to your desktop or printed.

**TIP:** When printing in SI, use the SVG print icon in the toolbar. Do not right click your mouse and select the print function to print a graphic.

### **TOOLBAR FUNCTIONALITY**



Selecting the Question Mark button on the toolbar will display the SVG View Tool Toolbar Functionality pop-up, providing helpful information about each tool.

Click each toolbar icon to see a quick tip that indicates its function. Be sure to scroll down in the pop-up screen to view the complete description and operation of each tool.

Toolbar functions include:

**Hyperlink Navigation** – switch into hyperlink navigation mode and left-click to execute link

**Interactive Zoom** – left-click and hold to display magnifying glass zoom rectangle area

**Pan** – interactively shift the visible part of the image within the view window

**Rotate** – rotate the image –90°/+90° (counterclockwise or clockwise)

Fit All - scale image to entirely fit into view window

Fit to Height - scale height of image to fit into view window

Fit to Width - scale width of image to fit into view window

Highlight Hotspots - highlight all hotspots in the image

Show/Hide Red Liner - hide or show red line toolbar and edits

Draw Line – draw a red line

Draw Text - add text to image

Draw Ellipse – draw an ellipse

Draw Rectangle - draw a rectangle

Draw Freehand – draw a line freehand

Draw Highlight – highlight a hotspot/link

Edit Object - edit or move current edit mark or object

Rotate Object - rotate a current edit mark or object

If you have any questions or concerns with the new graphics or toolbar, use the SI feedback link (Mail icon) at the top of any SI document.

Thanks to Heather Ball and Lou Winters

**Zoom In** – zoom in by 10%

Zoom Out - zoom out by 10%

**Magnify Area** – magnifying glass rectangle zooms in by 50%



## **Cover BDU Electrical Connectors Before Removing Coolant Hoses**

The Drive Motor Battery, or high voltage hybrid/EV battery, on 2011-2019 Volt models is cooled or heated in order to maintain a proper temperature that aids system performance and longevity. The energy storage system cooling system uses a 12 V hybrid/EV battery pack coolant pump, a refrigerant/coolant heat exchanger (chiller) and the electric A/C compressor motor control module assembly to cool



down the high voltage hybrid/EV battery. There is also a high voltage heater inside the hybrid/EV battery to heat the coolant entering the hybrid/EV battery when needed. The hybrid/EV battery pack cooling system circulates a pre-mixed DEX-COOL solution, which is a 50/50 mixture of DEX-COOL coolant and de-ionized water. Any time the high voltage battery pack is removed from the vehicle, extra caution must be used so that coolant does not enter any of the electrical connections.

The Drive Motor Battery Replacement procedure in the appropriate Service Information instructs to install smoke test adapters (smoke plugs) or equivalent on the electrical connectors of the BDU before removing the coolant hoses

that go into the battery pack. If the smoke plugs are not used, there is the possibility that any coolant from the hoses may splash onto the connectors and cause corrosion, quickly leading to an electrical concern. In most cases, DTC P1EC3 (Hybrid/ **EV Battery Pack** Heater Transis-



EL-50812 Battery Leak Test Kit

tor Control Circuit) will be set in the Hybrid Powertrain Control Module 2 (HPCM2) if the connectors become corroded.



Smoke plug installed on connector.



## **Cover BDU Electrical Connectors Before Removing Coolant Hoses**

### SMOKE PLUGS FOR GEN 1 AND GEN 2

On 2011-2015 Volt models (Generation 1), use the EL-50812 Battery Leak Test Kit, which includes low voltage connector plugs and high voltage connector plugs specific to Gen 1 models.

On 2016-2019 Volt models (Generation 2), use the High Voltage Battery Smoke Test Adapters from the EL-51753 Battery Leak Test Kit, which are high voltage connector plugs specific to Gen 2 models, and the low voltage connector plugs from the EL-50812 Battery Leak Test Kit.



## **CORRECT PROCEDURE**

**TIP:** Prior to servicing any High Voltage component or connection, always perform the High Voltage Disabling procedure. Personal Protection Equipment (PPE) and proper procedures must be followed.

Behind the underbody air deflectors, there are two electrical connectors at the front of the Drive Motor Battery.



Two coolant ports next to the two connectors

After disconnecting the electrical connectors, cover the connectors using the proper smoke test adapters (smoke plugs) or equivalent. The smoke plugs will prevent any coolant from contaminating the electrical connectors



Connector with corroded terminal due to contact with coolant.

when the coolant ports are disconnected.

Do not remove the Driver Motor Battery cooler outlet or inlet hoses without first installing the smoke plugs on the electrical connectors. Coolant that splashes onto the connectors will cause corrosion.

Thanks to Dave Rainey

# Steering Wheel Oscillation Conditions

Some 2020 Silverado 2500HD/3500HD and Sierra 2500HD/3500HD models may have a steering wheel oscillation, vibration or shake condition at speeds of 50–80 mph (80–129 km/h). It may be possible high road force, out of balance tire and wheel assemblies, or a steering gear calibration that is not optimized that may be causing the steering wheel oscillation condition.

To correct this condition, first road test the vehicle with the PicoScope from the CH-51450 Oscilloscope Diagnostic Kit to determine the source of the vibration.

Mount the PicoScope vibration sensor to the driver's seat track and perform a road test at 50–80 mph (80–129 km/h) on a smooth road. Drive the vehicle a minimum of 10 minutes to warm up the tires prior to measuring seat track vibration.

## **ROAD FORCE BALANCE CORRECTION**

If the T1 Y-axis is consistently more than 25 mg, service all wheel and tire assemblies following the latest version of Bulletin #10-03-10-001. When mounting the wheels to the tire and wheel balancer equipment, make sure the assembly is held tightly centered in order to get a correct measurement. Use the proper adapters to maintain a centered assembly.

**TIP:** Before measuring tires on GM-approved



Use the proper adapter to center the tire and wheel assembly.

tire force variation measurement equipment, the vehicle must be driven a minimum of 15 miles (24 km) to ensure removal of any flat-spotting.

Road force balance the assemblies. It is recommended to get the road force values to less than 30 lbs. on the front tires and less than 45 lbs. on the rear tires.

## **UPDATE CALIBRATION**

If the T1 Y-axis is consistently under 25 mg and steering wheel oscillation is persistent (after correcting the wheel and tire assembly, if needed), update the K43 Power Steering Control Module with the latest steering gear calibration. Record the SPS Warranty Claim Code on the job card for warranty transaction submission.

**TIP:** The steering wheel must be centered and all lead/pull conditions must be corrected prior to updating the Power Steering Control Module.

After reprogramming, perform a Learned Value Reset using GDS 2 to clear out all adaptive data from the Power Steering Control Module.

Perform a road test again at 50–80 mph (80–129 km/h) on a smooth road to confirm the steering wheel oscillation has been reduced.

For additional information, refer to Bulletin #19-NA-240.

Thanks to Kevin Minor



GM TechLink is published for all GM retail technicians and service consultants to provide timely information to help increase knowledge about GM products and improve the performance of the service department. 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

General Motors service tips are intended for use by professional technicians, not a "do-it-yourselfer." They are written to inform those technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions and know-how to do a job properly and safely. If a condition is described, do not assume that the information applies to your vehicle or that your vehicle will have that condition. See a General Motors dealer servicing your brand of General Motors vehicle for information on whether your vehicle may benefit from the information. Inclusion in this publication is not necessarily an endorsement of the individual or the company. Copyright© 2019 General Motors. All rights reserved.