

The Bolt EV Charges Ahead in the Electric Vehicle Market



As the first long-range, affordable electric vehicle (EV) from an established automaker, the new Chevrolet Bolt EV is charged with bringing electrical propulsion to a whole new range of consumers.

With a fully-charged high voltage battery, the Bolt EV offers an EPA-estimated 238 miles (383 km) of electric range, which is five times the amount needed for the average daily commute of 40 miles (64 km).

The Bolt EV is a front-wheel-drive, five passenger, four door hatchback available in LT and Premier trim levels. It features a sleek, low profile thanks to an innovative high voltage battery cell arrangement that provides a flat floor while maximizing interior space.

The centrally located battery pack provides an optimal center of gravity for excellent ride and handling. At approximately 3,569 pounds (1,619 kg), the Bolt EV is light for a car with such a large battery pack. It comes standard with 240 volt and 120 volt charging capability.

100% Electric Propulsion

The propulsion of the Bolt EV is achieved by a fully automatic, variable-speed, electric drive transmission. The permanent-magnet synchronous AC electric motor provides 200 horsepower and 266 lb.-ft. of torque. The electric motor, drawing

CONTENTS

The Bolt EV Charges Ahead in the Electric Vehicle Market	1
Bolt EV Propulsion System	4
Charging the Bolt EV	5
Bolt EV Reprogramming	6

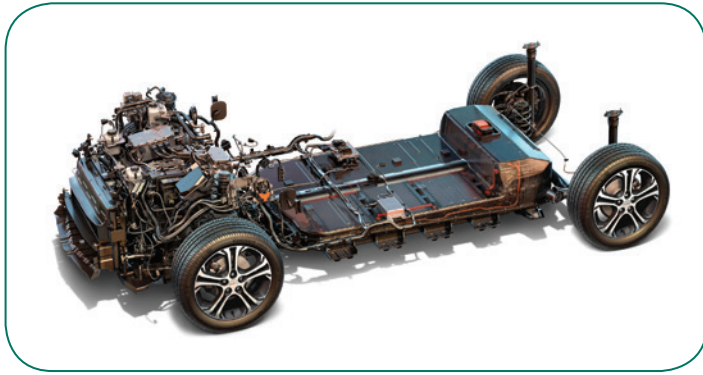


Customer Care and Aftersales

The Bolt EV Charges Ahead in the Electric Vehicle Market – continued from page 1

power from the 60-kWh battery pack, is capable of launching the car from 0 to 60 mph (97 km/h) in approximately 6.5 seconds, according to GM testing.

The 60-kWh nickel-lithium-ion high voltage battery assembly, which is removed and installed from underneath the vehicle, is protected by a lightweight steel frame integrated into the body structure.



Bolt EV propulsion is achieved with an electric drive transmission and a 60-kWh battery pack.

Vehicle Range

The Bolt EV displays three range numbers on the digital instrument cluster: a maximum, minimum, and a prominent best estimate based on the individual's driving style and accessory usage, including climate control settings, headlights and audio use along with ambient conditions.

The range varies based on several factors:

- Driving techniques such as speed and acceleration. The exponential effects of aerodynamic drag means that the faster the Bolt EV is driven, the faster the battery will drain.
- The terrain the vehicle encounters, such as hilly areas or long steep grades in mountainous areas.
- Ambient temperature.
- Use of the HVAC system for heating and air conditioning in order to maintain cabin temperature and passenger comfort.
- Use of the audio system.

Charging Corridors

The United States Department of Transportation has announced it is establishing 48 charging corridors or routes covering nearly 25,000 miles in 35 states. Along these routes, drivers will be able to expect a charging station every 50 miles. The new charging stations, which will serve as the basis for a national network, will be identified by signs similar to those used to alert drivers to gas stations, lodging and food.

Natural Resources Canada (NRCan) also has announced an initiative to support the installation of a number of vehicle fast-charging units along key transportation corridors within Canada. British Columbia, Ontario and Québec have announced plans to setup local charging networks within their respective provinces.

One-Pedal Driving Operation

One-pedal driving uses the highest available level of regenerative braking, which captures otherwise lost energy from deceleration and sends it back to the high voltage battery pack, to allow the driver to slow the vehicle by simply lifting off the accelerator pedal. Regenerative brakes does not eliminate the need to use the brake pedal altogether.

The amount of regenerative braking can be initiated by the driver using the Regen on Demand paddle on the back of the steering wheel. Shifting the transmission to the L position further increases the level of regenerative braking.

EV Cooling System

The Bolt EV is equipped with three fully-independent cooling systems that are designed to cool the power electronic components, cool and heat the high voltage battery, and provide heat to the passenger compartment. The battery pack has an integrated, liquid-cooling tray circulating 1.82 gallons (6.9 liters) of DEXCOOL™ coolant to keep the high voltage battery cool as well as a separate heating element for warm-ups in colder climates.

Located within the battery pack is a Battery Energy Control Module that monitors the temperature, current and voltage of the 96 battery cell groups. Diagnostics and system status are communicated from the Battery Energy Control Module to the Hybrid/EV Powertrain Control Module 2.

A/C System

The high voltage electric A/C compressor is a self-contained high voltage inverter, electric motor, and direct coupled compressor. The electric A/C compressor has the ability to run and provide cooling performance while the vehicle is not running. The electronic climate control module and the Vehicle Integration Control Module (VICM) will command the electric A/C compressor to a speed necessary to maintain a desired cooling level rather than cycle the electric A/C compressor on and off.

The electric A/C Compressor uses Polyolester (POE) refrigerant oil. Use only approved GM POE oil no more than two hours after removal from its sealed moisture proof packaging.



Bolt EV features a color touchscreen and color digital instrument cluster that provide details on energy use and charging.

continued on page 3

The Bolt EV Charges Ahead in the Electric Vehicle Market – continued from page 2

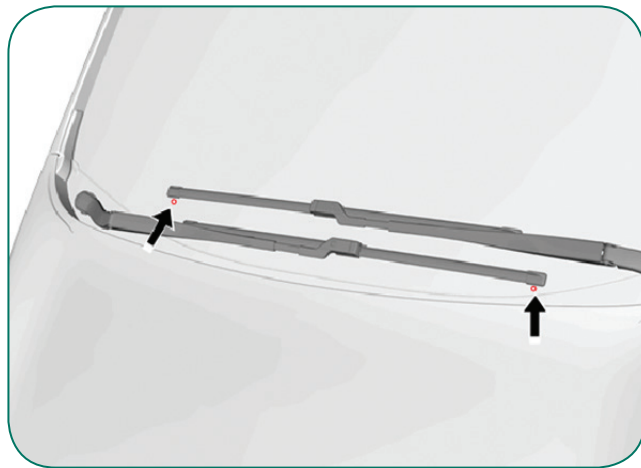
Color Digital Displays

The cabin of the Bolt EV features a 10.2-inch (259 mm) color touchscreen mounted in the center of the instrument panel and a 8.0-inch (203 mm) color digital gauge cluster. Both displays provide operating information and system settings, such as the battery charge level, range estimation, charge settings and climate controls.

Windshield Wipers

The windshield wiper motor module controls the up and down wiper arm movement using a reversing motor and an internal position sensor. The sensor keeps track of the gear wheel position. When the controller determines that the wiper arms are at a position to reverse direction, it reverses the motor supply voltage.

There is a wiper motor for each arm. The left and right motors allow the system to operate each wiper blade independently.



Align the wiper blades to the correct marks.

When replacing or adjusting a windshield wiper arm, position the wiper arms correctly by installing the wiper arm at the lower blackout of the windshield and the wiper arm blades to the correct marks.

Pedestrian Safety Signal

The vehicle is equipped with an automatic sound generator. The sound is automatically generated at speeds of less than 14 mph (23 km/h) to indicate the vehicle's presence to pedestrians.

An available Front Pedestrian Braking system also is offered that can detect when approaching a pedestrian too quickly and provide a boost to braking or automatically brake the vehicle. The system can detect and alert to pedestrians in a forward gear at speeds between 5 mph (8 km/h) and 50 mph (80 km/h).

🙏 Thanks to Sherman Dixon and Chuck Wieseckel

Special Tools

The following new tools were released for the 2017 Bolt EV:

Tool Number	Description
EL-52010	Extension Harness (Drive Unit)
EL-51102	Battery Pack, Lift Bar Tilter (Battery Service)
EL-51102-10	Lateral Bars and Shackles (2 each) (Battery Service)
EL-51102-20	Eye-Nuts Kit, Washers, Bolts (6 qty) (Battery Service)
EL-51102-40	Lifting Straps (2 qty) (Battery Service)
EL-51102-50	Lift Straps (4 qty) (Battery Service)
EL-52014	Low Voltage Test Harness (Battery Diagnostics)
EL-52015	Smoke Leak Test Adapter (Battery Internal Service)
EL-52016-1	Battery Pack Cooling Test Adapter (1 of 2) (Battery Diagnostics)
EL-52016-2A	Battery Pack Cooling Test Adapter (2 of 2) (Battery Diagnostics)
EL-48264-100	Battery Section Lifting Adapters (w/ EL-48264-A) (Battery Internal Service)
EL-48571-61	Cable, Pinout Box Adapter (Battery Internal Service)
EL-48571-62	Cable, Pinout Box Adapter (Battery Internal Service)
EL-48571-63	Cable, Pinout Box Adapter (Battery Internal Service)
EL-50332-325	Low Voltage Control Cable (Battery Service)
DT-52009	Adapter, Drive Unit Holding Fixture (Drive Unit Internal Service)
DT-52011	Remover / Installer, Rotor (Drive Unit Internal Service)
DT-52012	Remover / Installer, Stator (Drive Unit Internal Service)
DT-52017	Vent Hose Pipe Installer (Drive Unit)
GE-52200	Propulsion Lift Table (Battery Service)
EL-51866-4025	Level II 240v Charger (PowerMax 2) (Battery Service)
EL-52240c	DC Fast Charger (Battery Service) – rolled out in phases
EL-50332-350	Software, Omega PHEV / Bolt EV Update (Battery Service)

Bolt EV Propulsion System

The propulsion of the Bolt EV is achieved by an electric drive transmission that transfers the energy from the high voltage battery pack to the front drive wheels.



Drive Motor Battery System

The high voltage battery is designed to last for the life of the car and is covered by an 8-year/100,000-mile (160,000 km) warranty. The high voltage battery assembly is removed and installed from underneath the vehicle. The battery pack is protected by a lightweight steel frame integrated into the body structure.

The Battery Energy Control Module, a current sensor, and the high voltage contactors are located within the hybrid/EV battery assembly. The Hybrid/EV Powertrain Control Module 2 is mounted within the passenger compartment, beneath the right front seat.

Battery Construction



The high voltage battery assembly contains 288 individual nickel-lithium-ion cells.

The hybrid/EV high voltage battery weighs approximately 946 lbs. (429 kg) and contains 288 individual nickel-lithium-ion cells. Three cells are welded together in parallel in a cell group. There are a total of 96 cell groups in the hybrid/EV battery assembly that are electrically connected in series. Each individual cell group is rated at 3.5 volts, for a nominal system voltage of 344 volts of direct current (DC).

Because the high voltage battery was engineered specifically for the Bolt's arduous duty cycle, the 288 prismatic cells have greater nickel content and, therefore, will run slightly warmer than those in the Chevrolet Volt or the Chevrolet Spark EV.

The hybrid/EV battery pack contains a total of 6 battery temperature sensors mounted to certain battery cell modules. The hybrid/EV battery pack also contains a coolant inlet temperature sensor.

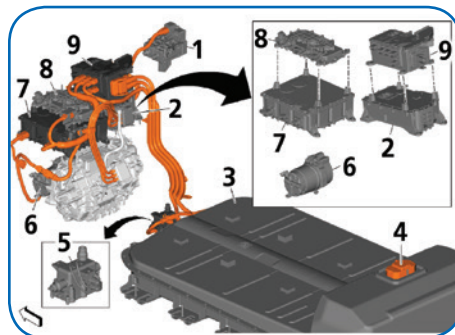
Located within the high voltage hybrid/EV battery pack is the K16 Battery Energy Control Module which monitors the temperature, current and voltage of the 96 battery cell groups. The voltage sense lines are attached to each individual cell group.

Diagnostics and system status are communicated from the Battery Energy Control Module to the K114B Hybrid/EV Powertrain Control Module 2

The battery pack will be serviceable by certified GM dealerships when necessary. Some of the battery pack's accessory components are located under the hood for easier access.

TIP: The hybrid/EV high voltage battery will be on TAC Restriction and Exchange during the vehicle launch period. Batteries will be distributed by an Electronic Service Center.

System Components



The Hybrid/EV high voltage battery assembly consists of the following components.

1. K10 Coolant Heater Control Module.
Service Part Name: Heater Coolant Heater.
2. T6 Power Inverter Module.
Service Part Name: Drive Motor Power Inverter Module.
3. Hybrid/EV Battery Assembly.
Service Part Name: High Voltage Battery.
4. S15 Manual Service Disconnect.
Service Part Name: Drive Motor Battery High Voltage Manual Disconnect Lever.
5. E54 Hybrid/EV Battery Pack Coolant Heater.
Service Part Name: High Voltage Battery Heater.
6. G1 A/C Compressor.
Service Part Name: Air Conditioning and Drive Motor Battery Cooling Compressor.
7. T18 Battery Charger.

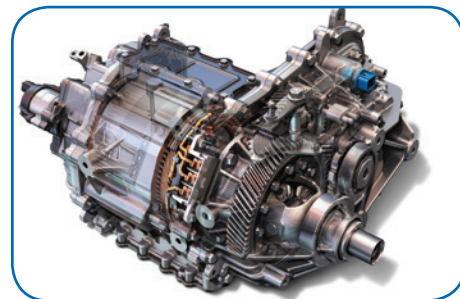
Service Part Name: Drive Motor Battery Charger.

8. K1 14V Power Module.
Service Part Name: Accessory DC Power Control Module.

9. T24 Battery Charger-DC.

Service Part Name: High Voltage Battery Disconnect Control Module Assembly.

Electric Drive Transmission



Electric drive transmission assembly

The electronically-controlled, fully automatic transmission consists primarily of a 150kW drive motor, a differential/offset gear set, a high voltage electric auxiliary transmission fluid pump and housing, and two axles.

The differential/offset gear set provides the fixed forward and reverse ratio. Changing speed and torque is fully automatic and is accomplished through the use of a drive motor generator power inverter control module located under the hood. The drive motor generator power inverter control module receives and monitors various electronic sensor inputs and uses this information to vary the torque output to the drive axles based on throttle position.

The lubrication system uses an electric auxiliary fluid pump motor assembly located outside of the transmission for lubrication of rotating components. The transmission fluid pump operates under low pressure and will only run when out of Park or Neutral and vehicle speed is detected.

Gear position is selected using the Electronic Precision Shift (EPS) system, which is also used on the new Buick LaCrosse and Cadillac XT5. The shift-by-wire systems sends electronic signals to the drive unit to select the drive mode. The selected gear position illuminates in red on top of the shift lever. After shifting, the lever returns to the center position.

TIP: The transmission will not stay in Neutral for an extended period. It will automatically shift into Park.

🙏 Thanks to Sherman Dixon and Chuck Wieseckel

Charging the Bolt EV

There are three different charging levels that can be used to charge the Bolt EV.

- AC Level 1 is plugging in to a typical 120V/12 amp home outlet using the provided portable charge cord. It will charge the vehicle at a rate of 4 EV miles per hour of charging using the 12 amp setting. The 8 amp charge limit should be used until a qualified electrician inspects the electrical circuitry of the home, or if the electrical circuit or outlet capacity being used is not known.



DC Fast Charging port (orange cover removed)

- AC Level 2 is plugging in to a 240V/32 amp outlet using an available charging station, which will charge the vehicle at a rate of 25 EV miles per hour of charging.
- DC Fast Charging stations are available in many public areas. Using the SAE Combo connector will charge the vehicle to approximately 80 percent of capacity in about 60 minutes. The DC Fast Charging port is optional on U.S. models and standard on Canadian models.

Charging Status Indicator

The charging status indicator on top of the instrument panel quickly identifies if the vehicle is charging.

Single Tone and Flashing Indicator – The vehicle is plugged in and the battery is charging. The number of flashes indicate the current percentage of battery charge:

- 1 Flash: 0–25% Charged
- 2 Flashes: 25–50% Charged
- 3 Flashes: 50–75% Charged
- 4 Flashes: 75–99% Charged
- Solid Light: 100% Charged



Green charging status indicator on the instrument panel.

Slow (long pulse)

Flashing Green Indicator with Double Tone – The vehicle is plugged in; battery charging is delayed.

Solid Green Indicator – The vehicle is plugged in and the battery is fully charged.

Solid Yellow Indicator – The vehicle is plugged in; not charging.

No Light – The vehicle is not plugged in or there is an issue with the charger or outlet.

The charging system may run fans and pumps that result in sounds from the vehicle when it is turned off. Additional unexpected clicking sounds may be caused by the electrical devices used while charging.

Charge Mode and Charge Limit

The Charging screens on the infotainment display show the Charge Mode and Charge Limit status. The vehicle has three programmable charge modes: Immediately, Delayed based on departure time, and Delayed based on electric rates and departure time. There are two available Charge Limits: the 8 amp setting and 12 amp setting.:



Select the Energy screen button to view the charging options.

Location-Based Charging

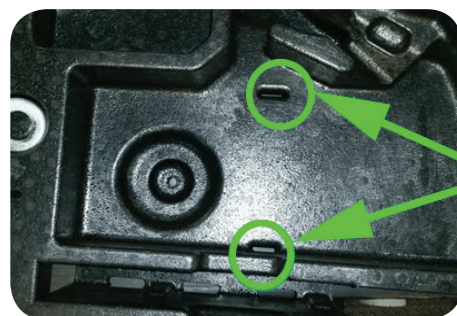
The Bolt EV's charge settings can be programmed for when the vehicle is at home or away. Using the GPS signal in the car, it can identify when it is home and will activate the charge settings according to the customized preset charging times. Charging can even be delayed until utility rates are at their lowest off-peak prices, which is usually at night. When away from the home location, the Bolt EV will charge immediately when plugged in.

To set the home location, go to the Energy Home screen and select Energy Settings > Location-Based Charging. Next, select On and Update Home Location. Add the required information to set the current vehicle location as the Home location.

Charge Cord Strap Installation

During PDI, a Velcro strap included in the trunk bag should be installed to the charge cord storage compartment. The strap is used to retain the portable charge cord when not in use.

Insert the strap through the two holes on either side of the charge cord storage compartment. Use the strap to secure the portable charge cord



Insert the strap through the two holes.



Secure the charge cord.

🙏 Thanks to Sherman Dixon and Chuck Wiesseckel

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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@5by5dzn.com

Fax number:

1-248-729-4704

Write to:

TechLink
PO Box 500
Troy, MI 48007-0500

GM TechLink on the Web:

GM GlobalConnect

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Bolt EV Reprogramming

Several precautions should be taken before reprogramming various control modules on the 2017 Bolt EV.

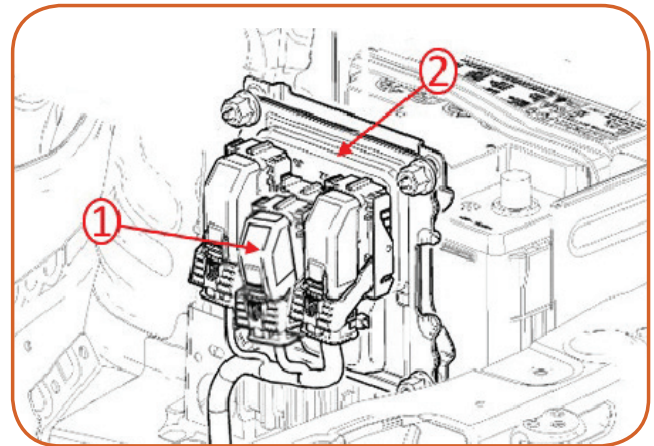
TIP: Verify the battery voltage is more than 12.6 volts but less than 15.5 volts before proceeding with reprogramming. The 12V battery must be fully charged before reprogramming. Use the Midtronics® PSC 550 Battery Maintainer (EL-49642) to maintain a battery voltage of 12.6-15.5 volts.

Body Control Module

When reprogramming the K9 Body Control Module (BCM), begin with the vehicle in the Power Off mode. The Service Programming System (SPS) will power mode the vehicle.

Engine Control Module

Before reprogramming the K20 Engine Control Module (ECM), it's necessary to disconnect the X2 connector from the ECM, located underhood. If the X2 connector is not disconnected, it will cause the ECM to reset during the reprogramming procedure and the re-flash will fail.



1. X2 connector 2. ECM

Also turn off the ignition before disconnecting or connecting any connectors to the ECM in order to prevent internal ECM damage.

Hybrid Powertrain Control Module

Before programming the K114A Hybrid Powertrain Control Module, verify the 12V battery is fully charged and the hood is closed. Programming with the hood open could result in a no-start condition. If a no-start condition occurs, close the hood and refer to the Service Information regarding "Clear Secured High Voltage DTCs." Normal operation should return after the hood is closed.

The Hybrid Powertrain Control Module also should be programmed in the Power Off mode with the brake pedal applied. The brake pedal apply keeps the BCM awake throughout the programming event.

Hybrid Powertrain Control Module 2

Do not program the K114B Hybrid Powertrain Control Module 2 with the drive motor battery (high voltage battery) charger cable connected to the vehicle. Charging while programming may result in damage to the High Voltage Battery Disconnect Relays.

Power Line Communication Module

The K190 Power Line Communication Module communicates with a DC Fast Charging station. Do not program the Power Line Communication Module with the drive motor battery (high voltage battery) charger cable connected to the vehicle. Charging the drive motor battery while programming may result in damage to the DC charging contactors.

🙏 Thanks to Chuck Wieseckel and Steve Falko