TECH TIPS

Subaru Service and Technical Support Line Newsletter

Articles Contained in this Issue

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20 SUBARU STRONG HYBRID ELECTRIC VEHICLE

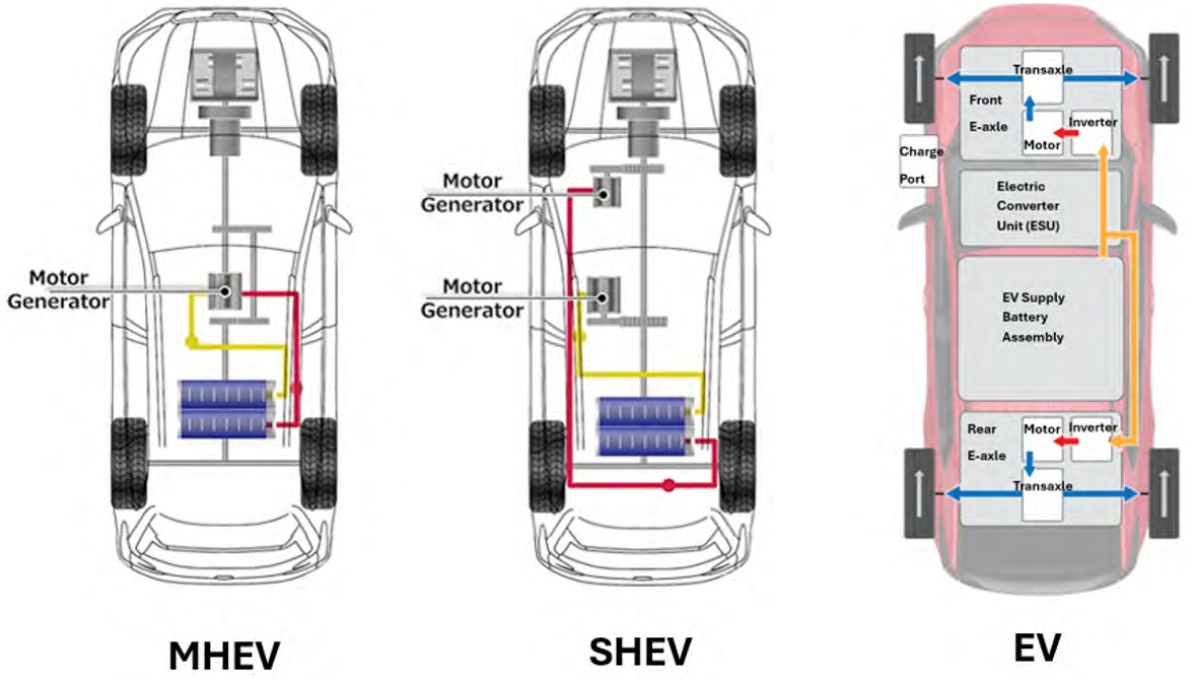
We are excited for the arrival of the Subaru SHEV platform! The release of the 2025 Forester SHEV brings with it a new powertrain layout and efficiency better than any Subaru prior. As with any new product, there will be many things to learn to be sure we understand how the vehicle is designed to operate. Without a basic understanding of how something should operate, it will be difficult to diagnose and repair a concern or even to know if a condition is abnormal. Resources like the owner's manual, TSB's, TRB's and other training materials are an excellent source for this kind of information. If you are unsure about how something should function and can't find published material regarding that system, comparing operation against a like vehicle can be beneficial. In this Special Edition Techtip we are going to highlight some characteristics of vehicle operation that are normal.

Safety is a priority when working on any vehicle, and this is especially true when working on HEV or EV vehicles due to the increased shock risk. These vehicles should only be serviced and repaired by qualified technicians. Be sure to follow all safety protocol based on the service manual, training, and industry practices.

20 PHEV-SHEV-BEV

The automotive industry is full of acronyms, and it is important to know what they mean. So, what do the acronyms MHEV, SHEV, PHEV and BEV stand for? And more importantly, what does this mean for vehicle operation?

MHEV stands for 'Mild Hybrid Electric Vehicle'. MHEV's typically have smaller batteries than any other EV and use the electric motor to assist the internal combustion engine (ICE). The 2014-16 Crosstrek Hybrid is a MHEV. SHEV stands for 'Series Hybrid Electric Vehicle'. SHEV's have larger, more powerful batteries than MHEV's. SHEV's have two electric motors and prioritize using the electric motor to propel the vehicle instead of the ICE. The 2025 Forester Hybrid is a SHEV. PHEV stands for 'Plugin Hybrid Electric Vehicle'. PHEV's can charge the battery using an external power source. PHEV's are also a type of SHEV. The 2019-22 Crosstrek Hybrid is a PHEV. BEV stands for 'Battery Electric Vehicle'. BEV's do not have an ICE and use only energy from the battery to propel the vehicle. The Solterra is a BEV.



Something else to consider is some of the names used for components may vary depending on the model. For instance, the component that converts energy from the high voltage battery may have different terminology. For both Hybrid Crosstrek models, this component is called the Inverter or Inverter with converter assembly. For Solterra, this component is called the Electric Converter Unit (ESU). For the SHEV, this component is called the Power Control Unit.

09 CHANGES TO THE FUEL SYSTEM

Re-fueling the 2025 Forester SHEV is a little different than most other models. In order to re-fuel the Forester SHEV, the fuel door release switch must be pressed first. When the fuel door release switch is pressed, a component called the 'Electric Vent Solenoid' will activate. The purpose of this solenoid is to relieve pressure in the fuel tank. This is needed because the EVAP system is not able to purge accumulated gasoline vapors when the internal combustion engine (ICE) is not operating. The rest of the EVAP components used and operation of these components is similar when compared to a non-hybrid counterpart. The electric vent solenoid was first utilized on the 2019-22 MY Crosstrek Hybrid.

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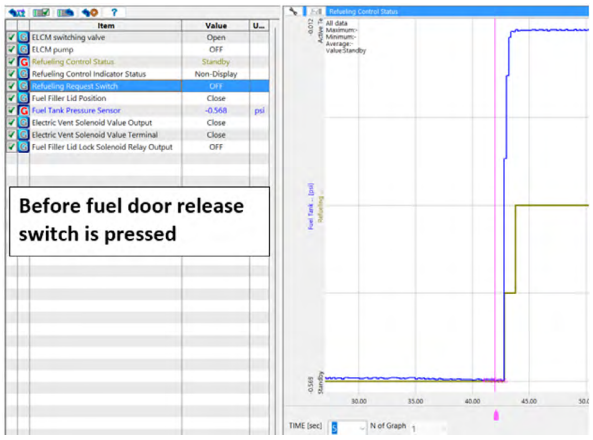
09 CHANGES TO THE FUEL SYSTEM (CONTINUED)

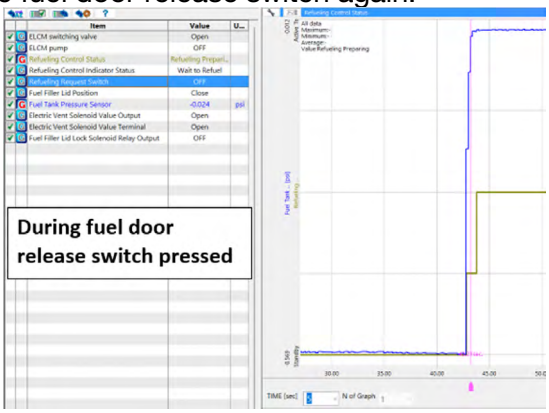
EVAP pressure equalization, between the atmosphere and fuel tank pressure, and solenoid operation can be heard and is considered normal operation. Due to the pressure adjustment the fuel door may take 10 seconds to open.

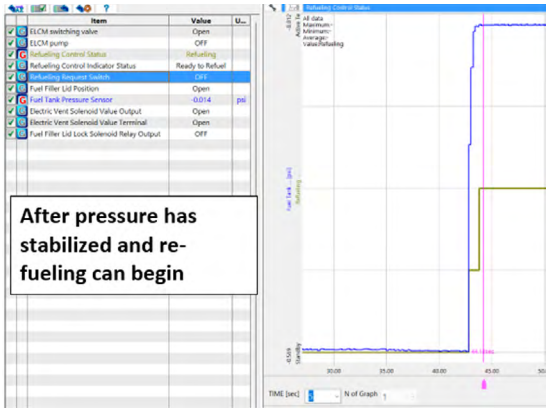
Note: The fuel door will not open under the following conditions:

- While the vehicle is driving
- When the select lever is not in the “P” position
- When there is a malfunction in the fuel system

Complete fueling within 30 minutes after pressing the fuel door release switch. After 30 minutes the vehicle auto stop function activates and fuel cannot be added to the tank. If this occurs, press the fuel door release switch again.





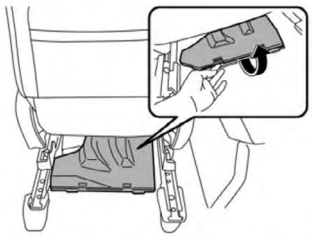


15 HYBRID JACK INFORMATION

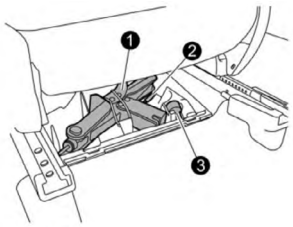
The 2025 Forester SHEV does not come equipped with a jack to lift the vehicle. However, the owner’s manual states that a jack can be ordered. The jack can also be stowed under the driver’s front seat. If a customer would like to purchase a jack, please use these part numbers:

No.	Part Number	Description
1	97032SL000	Jack
2	97034SL000	Label Jack
3	97063FL000	Band Jack

Under the left side front seat



Open the cover of the maintenance tool-box located under the left front seat and remove it from between the seat rails.



1 Jack
2 Jack handle
3 Wheel nut wrench

Take out the jack, jack handle, and wheel nut wrench one at a time.

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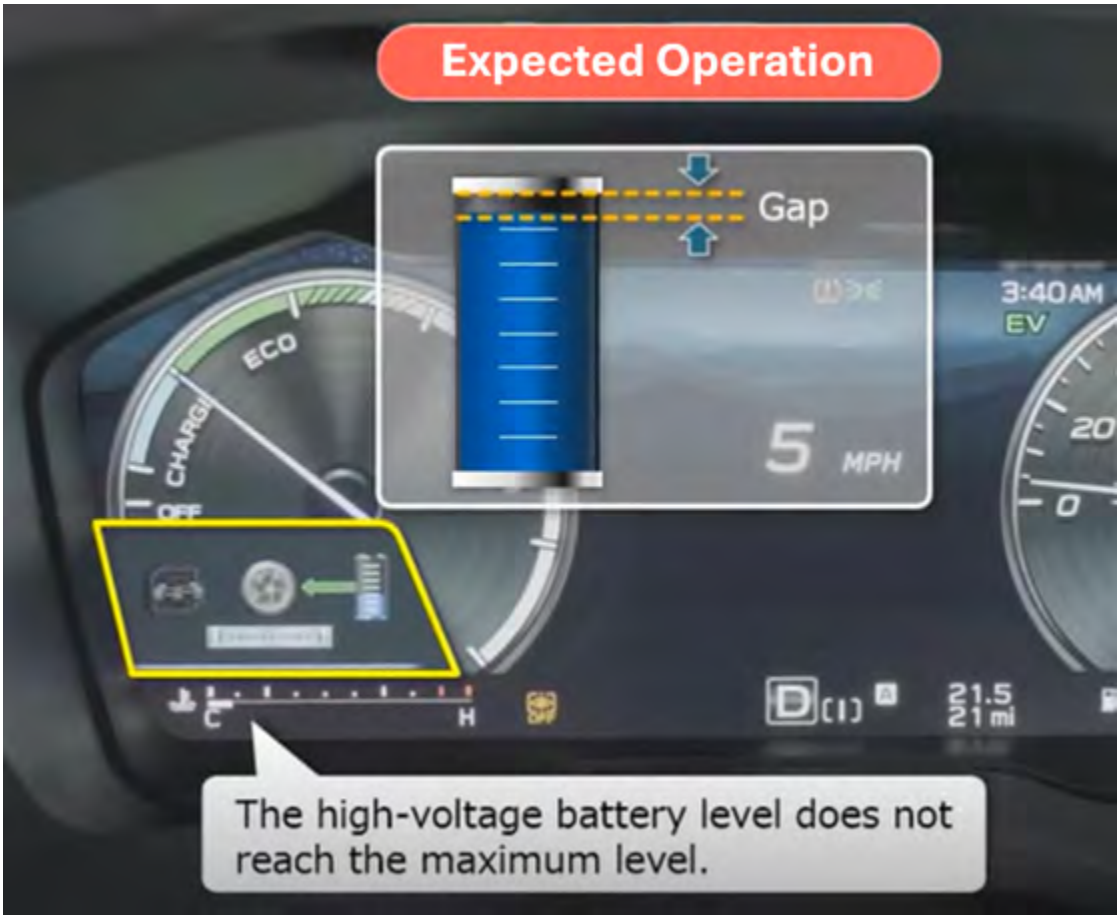
20 HIGH VOLTAGE BATTERY DOESN'T DISPLAY FULL CHARGE

You may receive a customer concern that the high voltage battery state of charge (SOC) rarely or never displays a full charge. This is considered normal.

Some key points to highlight:

- The remaining amount of the high voltage battery state of charge is automatically controlled to improve fuel efficiency, it increases or decreases depending on the driving conditions.
- It is not unusual that the maximum battery state of charge (SOC) may not be reached except on consecutive downhill roads.
- If the vehicle is not used for a long time, the high voltage battery will discharge on its own (self-discharge) and reduce the remaining high voltage battery level.
- To maintain the high voltage battery in good condition, drive the vehicle at least once every 2 to 3 months for at least 30 minutes or 10 miles. Without proper battery maintenance the battery life may be shortened.
- Even if there is a sufficient amount of electricity remaining in the high voltage battery, EV driving may be cancelled, and both the gasoline engine and the electric motor are used depending on the situation.



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20 HV BATTERY WON'T CHARGE IN NEUTRAL

An important operational characteristic to be aware of is that the high voltage battery will not charge while the transmission is in neutral. Generally, this should not be a concern. However, if the high voltage battery state of charge (SOC) is low and there is a high electrical load, this could discharge the 12-volt battery and affect vehicle operation. The Forester SHEV does not have an alternator and uses the high voltage battery and DC/DC converter to charge the 12-volt battery. Using an automated carwash typically requires the select lever to be placed in neutral. Although extremely unlikely, this is a scenario that could cause this concern. If a customer presents a vehicle with a discharged 12v battery concern that cannot be duplicated, be sure to interview the customer about this vehicle characteristic.

If a customer reports this has occurred, be sure to review the control operation history in the hybrid powertrain control module for more information. Information about control operation history for this system can be found in the service manual here: Diagnostics> Hybrid Powertrain Control (Diagnostics)> Work Support> List.

If the vehicle is left in "N position," the battery level may decrease, potentially making the vehicle unable to drive.

If the vehicle is left in neutral for an extended period of time especially when vehicle is under high electrical load, the following messages may occur.

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20 AUTO VEHICLE SHUT DOWN AND WHAT IT MEANS TO 'IDLE' IN A HYBRID

A somewhat new function to the Subaru lineup is called 'Automatic Vehicle Shut Down'. This feature can be found on models other than the Forester SHEV. Automatic vehicle shut down will turn off the ignition switch if the select lever is in park for 30 minutes. If the customer is not aware of this function, they may leave the vehicle on for an extended period of time intending to operate the heat or air conditioning and return to find the vehicle has powered down. This function can be disabled but will be enabled when the key is cycled. If you receive a customer concern that the vehicle shut off by itself, be sure to interview the customer about this function. Keep in mind that idling in a hybrid vehicle is different than an internal combustion engine (ICE) vehicle idling because there is no audible noise while the vehicle is in EV mode.

AUTOMATIC VEHICLE SHUT DOWN FUNCTION

This vehicle has a function to automatically stop the hybrid system if it is left in the following state for about 30 minutes while the hybrid system is running.

- The select lever is in the "P" position.
- The vehicle is stopped.

If the hybrid system stops automatically, the ignition switch turns to the "OFF" position.

How to deactivate the Automatic Vehicle Shut Down function

The Automatic Vehicle Shut Down function can be temporarily disabled using the center information display settings. For details, refer to "Settings icon (Car settings)" ☞P226.

If you disable the Automatic Vehicle Shut Down function, it will not work and the hybrid system will continue to run.

The Automatic Vehicle Shut Down function will be enabled the next time you turn the ignition switch to the "OFF" position and restart the hybrid system.

20 SPORT MODE DISABLES EV OPERATION

In the owner's manual in the "Hybrid System" chapter, listed are many of the conditions that will prevent EV mode. This means the internal combustion engine (ICE) will run. We also wanted to point out that using Sport mode or manual mode will also cause the ICE to stay running. If a customer presents a vehicle with a concern that the ICE was running continuously, be sure to interview the customer about this condition.

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20 SPORT MODE DISABLES EV OPERATION (CONTINUED)

15 WIRELESS CHARGER OPERATION-AM RADIO STATIC

AM Radio Noise During SHEV Operation and Wireless Phone Charging

Electromagnetic interference (EMI) is an electronic system disturbance caused by an electromagnetic interaction with an external source. EMI can cause electronics to operate poorly, malfunction, or stop working altogether. It can arise due to both natural and human-made sources. In this instance this is witnessed during hybrid system operation and wireless phone charging and there is no guarantee that interference will not occur.

The hybrid system generates weak natural frequencies while operating. As a result, the AM radio may experience static. This occurs under specific conditions such as starting and stopping, driving at very low speeds (around 2MPH), and high-torque driving like rapid acceleration.

Similar noise can occur during wireless phone charging. You may be able to reduce the noise by changing the wireless charging frequency. This can be done by pressing and holding the power switch to turn on the system. After a certain amount of time, the indicator light will flash orange twice to indicate the frequency switch.

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Wireless Charging and Quick Charge -

CAUTION - The wireless power receiver can affect some implanted or other electrical medical devices. If you use a cardiac pacemaker, ventricular pacing pulse generator, cardioverter-defibrillator, or a similar device, consult with your physician before using the wireless charger.

The wireless charger quick charge function was introduced with 2024 Impreza and Crosstrek and is now equipped on the 2025 Forester.

To change modes, while in normal mode press the power switch three times to change to the quick-charging mode. The indicator light will change from orange to alternating green and orange when the wireless charger switches to the quick-charging mode. Quick charge mode ends when charging is complete. See the owner manual for compatible devices.

Some things to note: If the phone is not properly aligned with the charging coil or if the access key is not detected the wireless charger will not charge. To prevent discharging the 12V battery, do not use the wireless charger for long periods of time when the hybrid system is stopped. Lastly do not charge a device in dusty conditions.

Indicator light patterns

Indicator light	Interpretation
Off	The wireless charger is turned off
Green (illuminated)	Standby (ready for charging)*1
	Charging is complete*2
Orange (illuminated)	A mobile device is in the charging area (a mobile device is being detected)
	Charging
Green and orange illuminate alternately	Quick charging is in progress

***1:** No power is output for charging when the wireless charger is in standby mode. Even if metal objects are placed on the charging tray in this state, they will not overheat.

***2:** For some mobile devices, the indicator light remains orange even after charging is complete.