General Service Bulletin (GSB):	HV Battery Charging Process for FHEV Vehicles
GSB Overview:	This bulletin outlines the process for requesting and utilizing a high voltage (HV) battery charger for recovering a discharged FHEV high voltage battery.
NOTE: This information is not intended to replace or supersede any warranty, parts and service policy, Work Shop Manual (WSM) procedures or technical training or wiring diagram information.	

When is a HV Battery Charger Needed?

Full Hybrid (FHEV) powertrains may exhibit a no crank condition if a crank no start condition has resulted in a low HV battery state of charge (SOC). If this occurs, the HV battery may set diagnostic trouble codes (DTC) P0A7D:00 and/or P0B25:00 and require recharging.

This bulletin along with the published Workshop Manual (WSM) diagnostic procedures will assist the service technician to determine when a rental HV Charger can be used to recharge the HV battery.

HV Battery Charging Process for FHEV Vehicles

Summary

In order to recover a discharged High Voltage (HV) battery, dealerships may request a rental charger. The process includes following the prior approval process and submitting an on-line bailment form. Once it is confirmed the HV charger is required, Midtronics will ship a charger directly to the dealer. The dealer will pay a rental fee and shipping charges.

Confirm Charger Is Required

The dealer is to complete all normal diagnostic steps provided in the Workshop Manual (WSM). When WSM indicates the HV battery requires charging, following the technical information in this bulletin will ensure the information required for requesting a HV charger rental. The prior approval process will prevent both unnecessary charging attempts and unnecessary HV battery replacements. Record the measurements described in the Technical Information below. Then, from the PTS website, at the bottom of the OASIS report, select the "request hotline assistance" link to initiate a Technical Assistance Center contact. The Technical Assistance Center will direct the dealer to complete the **Off Board HEV High Voltage Battery Charger** Bailment Form. The dealer will submit the form. Ford engineering will promptly review the request and begin processing. The dealer will be contacted directly if any additional information or alternative instructions need to be provided.

Payment

Helm Inc. will bill the dealer a flat rental fee along with 2 way shipping charges.

Charger Shipment

Midtronics Inc. will prepare the **GRX-5100** HV charger and ship it to the dealer. The charger will arrive ready to use with all required instructions and accessories. There is also a training video available for 2013 and newer vehicles.

Technical Information

Before Requesting GRX-5100

Prior to initiating a Technical Assistance Center contact, please review the information and record any information as indicated:

2009-2012 Escape/Mariner FHEV

A discharged HV battery voltage PID **(V_PACK)** will read between 120 and 290V. If voltage is above 290V and an engine no crank condition exists, the Battery Control Module (BCM) may be preventing engine

crank by transmitting a 0% state of charge (SOC) message on the network. SOC commanded to 0% can be confirmed by reviewing the **(BSOC)** PID in the BCM.

HV battery voltage higher than 290V with a 0% SOC reading indicates low voltage is not preventing cranking and there is another fault which must be corrected before cranking will resume. Follow normal diagnosis for the forced 0% SOC prior to addressing the no crank.

If the conditions above indicate the battery can be charged, order the GRX-5100 by completing the prior approval process for HV battery. The form is available on the Professional Technician Society (PTS) Website.

Voltage readings **less than** 120 volts indicate HV battery replacement is the only option.

Module	PID	Result
TBCM/BCM	**V_PACK**	
TBCM/BCM	**BSOC**	
DTCs retrieved		

2009-2012 Fusion/Milan/MKZ FHEV

A discharged HV battery voltage PID **(BATPACKVOLT)** will read between 104 and 290 volts. If voltage is above 290V and an engine no crank condition exists, the Battery Energy Control Module (BECM) may be preventing engine crank by transmitting a 0% state of charge (SOC) message on the network. SOC commanded to 0% can be confirmed by reviewing the **Batt_Char (SOC)** PID in the BECM. HV battery voltage higher than 290V with a 0% SOC reading indicates low voltage is not preventing cranking and there is another fault which must be corrected before cranking will resume.

If the conditions above indicate the battery can be charged, order the GRX-5100 by completing the prior approval process for HV battery. The form is available on the Professional Technician Society (PTS) Website.

Voltage readings **less than** 104 volts indicate HV battery replacement is the only option.

Module	PID	Result
BECM	**BAT_PACK_VOLT**	
BECM	**Batt_Char(SOC)**	
DTCs retrieved		

HV Battery Charging Process for HEV Vehicles

2013 and Newer FHEV Vehicles

A. If a BECM on-demand self- test returned P0B24 or P0C30 with the no crank symptom, the BECM must be replaced prior to any further no crank repairs.

B. With a BECM not reporting P0B24 or P0C30, Confirm the following conditions exist:
   a. **HEV_BAT_VAR_V** PID is less than 2.5 volts
   b. **HEVBAT_MIN_V** PID is greater than 1.3 volts
   c. **BAT_PACK_VOLT** PID is between 125 volts and 275 volts
   d. **BATT_ CHAR (SOC)** PID is 5% or less (this is the SOC or state of charge reading). An SOC greater than 5% will typically still crank the engine.

   NOTE: PIDs listed above that are outside of the listed specification may indicate the HV battery cannot be recovered by charging. However, if this situation exists, the Technical Assistance Center will first recommend a new BECM be installed to rule out incorrect internal HV battery analysis that would lead to unnecessary HV battery replacement.

   If the conditions above indicate the battery can be charged, order the GRX-5100 by completing the prior approval process for HV battery. The form is available on the Professional Technician Society (PTS) Website.

Module	PID	Result
BECM	**HEV_BAT_VAR_V**	
BECM	**HEVBAT_MIN_V**	
BECM	**BAT_PACK_VOLT**	
BECM	**BATT_ CHAR (SOC)**	
DTCs retrieved		

GRX-5100 Usage

The charger will be installed into the High Voltage system following the instructions provided with the GRX-5100. Running a charge cycle will return the battery to approximately 50% state of charge (SOC). A 50% state of charge will provide approximately (40) 15 second cranking attempts.

Submitting a Claim

When the HV charger rental is within the warranty terms, dealer may submit rental, associated labor, and shipping costs as a warranty claim.

- Claim the rental fee
- Claim the shipping charges
- Claim SLTS Operation 12651D44

Repair and warranty coverage for the vehicle component which resulted in the discharged HV battery is treated separately from the HV charger rental, and must be on a separate line on the repair order. Refer to the Warranty and Policy Manual and One Warranty Solution (OWS) Manual for more information.

Troubleshooting

If you experience any concerns with the GRX-5100, please contact Midtronics Inc. at:
1-630-323-2800 (USA)
+1 1-866-592-8052 (Canada)