

CERTAIN 2021-2022 MUSTANG MACH-E VEHICLES AND 2022 E-TRANSIT — HIGH VOLTAGE BATTERY ARRAY REPLACEMENT

SERVICE PROCEDURE OVERVIEW






The vehicles included in this Field Service Action (FSA) have been identified as receiving a High Voltage Battery Module (HVBM) replacement using a service kit that included an incorrect Thermal Interface Material (TIM) template. For all vehicles included in this FSA, the type of HVBM that requires replacement is known and is listed in the supplied VIN tables. For the majority of vehicles, the HVBM numeric location is also known, and will be listed. For some vehicles, the HVBM numeric location is unknown. In these cases, the supplied serial numbers that the vehicle was built with will be listed in the tables and will be used to determine what HVBM requires replacement by process of elimination. All the serial numbers listed in these tables are factory installed HVBMs and DO NOT require replacement. The HVBM locations shown in Figure 4, on Page 5, correlate to the HVBM pairs that are listed in the VIN tables. Use the VIN tables and Figure 4 to determine what HVBM needs to be replaced.

The software update that is applied during this FSA improves the battery functionality at a lower state of health and improves the Ford Diagnostic and Repair System (FDRS) Battery State of Health function. If contacting the Special Service Support Center (SSSC) to request High Voltage (HV) battery replacement, a screen shot/picture of the “Battery State of Health” value must be provided.



SERVICE PROCEDURE

IMPORTANT! The STST Competency 10 certification requirement for USA market only will be enforced starting with repair orders opened on or after April 1, 2024. FSA repairs will reject if the repairing technician is not certified in STST Competency 10 FSA. See EFC14251 for more details.

-  **WARNING:** Service of the high voltage system on this vehicle is restricted to qualified personnel. The required qualifications vary by region. Always observe local laws and legislative directives regarding electric vehicle service. Failure to follow this instruction may result in serious personal injury or death.
-  **WARNING:** To prevent the risk of high-voltage shock, always follow precisely all warnings and service instructions, including instructions to depower the system. The high-voltage system utilizes approximately 450 volts DC, provided through high-voltage cables to its components and modules. The high-voltage cables and wiring are identified by orange harness tape or orange wire covering. All high-voltage components are marked with high-voltage warning labels with a high-voltage symbol. Failure to follow these instructions may result in serious personal injury or death.
-  **WARNING:** Never install the service disconnect plug when a high-voltage service cover is removed. Always install the cover prior to connecting the service disconnect plug. The cover prevents inadvertent contact with the high voltage which is present at several points under the cover. Failure to follow these instructions may result in serious personal injury or death.
-  **WARNING:** Disconnect the 12 V battery before servicing the direct current to alternating current (DC-AC) inverter or alternating current (AC) powerpoint to prevent the risk of high voltage shock. Failure to follow this instruction may result in serious personal injury.
-  **WARNING:** Any fluid or gel found within the high voltage battery tray is to be treated as battery acid and requires safety glasses and rubber gloves prior to clean up.

IMPORTANT! This Field Service Action (FSA), must be performed by a certified BEV technician.

NOTE: If you do not have the special service tools referenced in the Workshop Manual to perform the Field Service Action repair, please contact 1-800-ROTUNDA and choose option 3 to place an order.

NOTE: It is recommended to discharge the vehicle battery down to 25%-30% before beginning any of the following work. Allow the vehicle to run with all the accessories running if at full charge. If unable to discharge the battery, each *new* module can take up to 7 hours each to charge, and up to 14 hours per array.

NOTE: With the high voltage battery removed, if the 12V battery is reconnected the vehicle will remain in Emergency Mode until the brake is pressed.

NOTE: If you become locked out of the vehicle, there is an access plug within the rear bumper.



NOTE: Make sure that the FDRS release level is at 41.5.2 or higher.

NOTE: If the FDRS cannot communicate with the Battery Energy Control Module (BECM) contact the technical assistance center (TAC) for diagnostic support.

1. Using FDRS, update the BECM software to the latest level.
2. Using FDRS, select BECM Battery Health, click **Download** and then select **RUN**. See Figure 1.

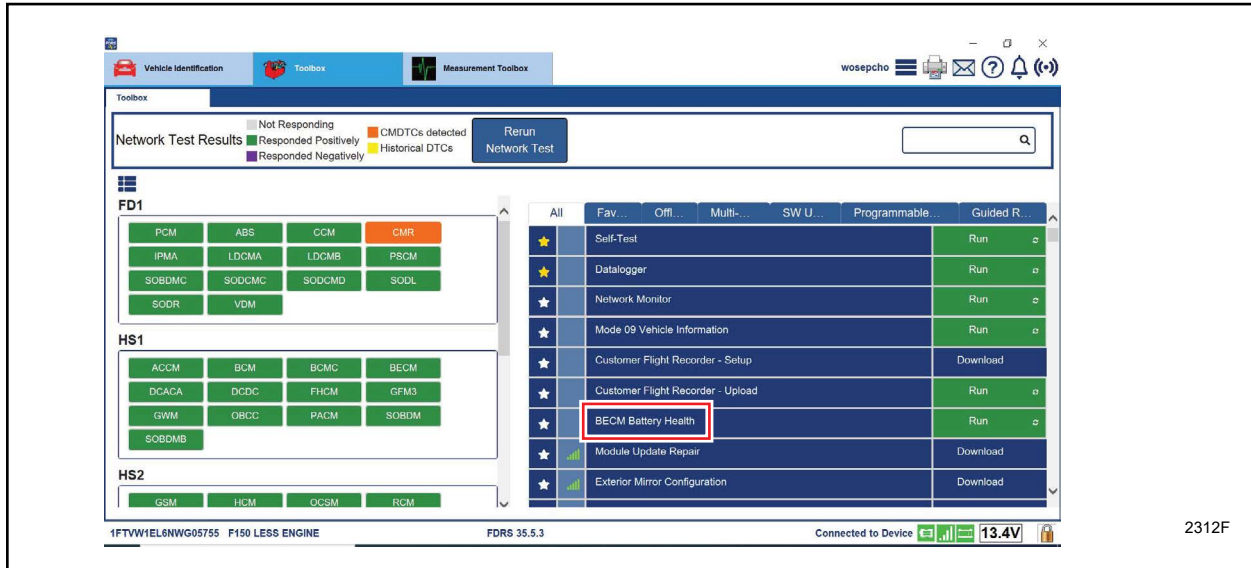


FIGURE 1

3. Follow the on-screen prompts. Capture and record the FDRS Generated Target Voltage Code. See Figure 2.

NOTE: This code **MUST** be recorded before continuing to the next step.

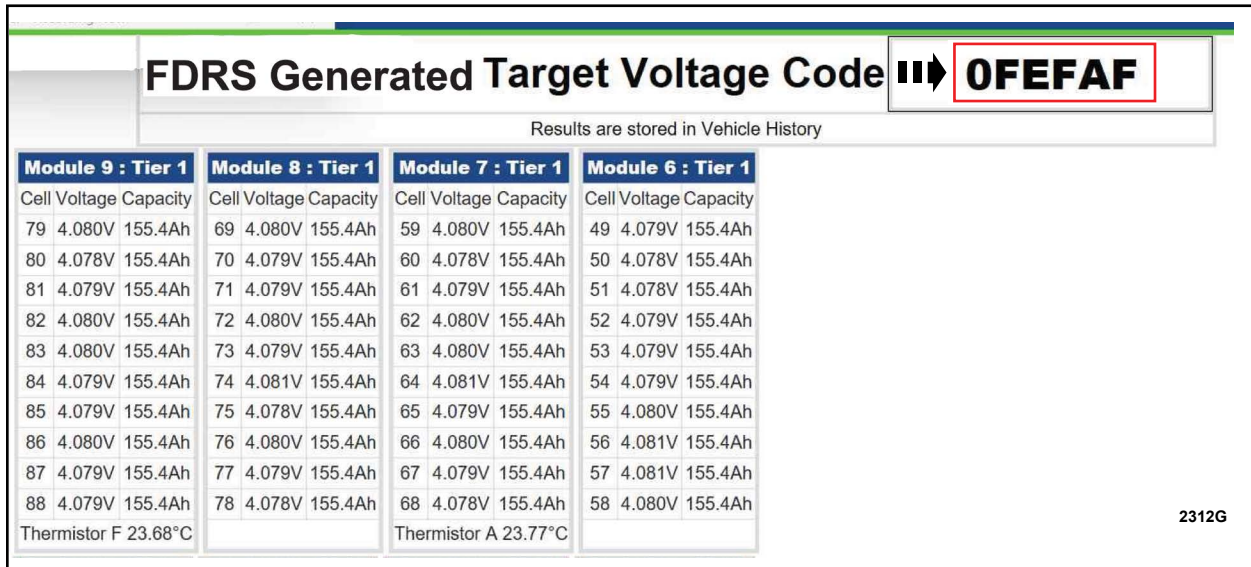


FIGURE 2



4. On the same screen where the FDRS Generated Target Voltage Code is found, locate and record the battery healthy percentage shown on the screen. See Figure 3.

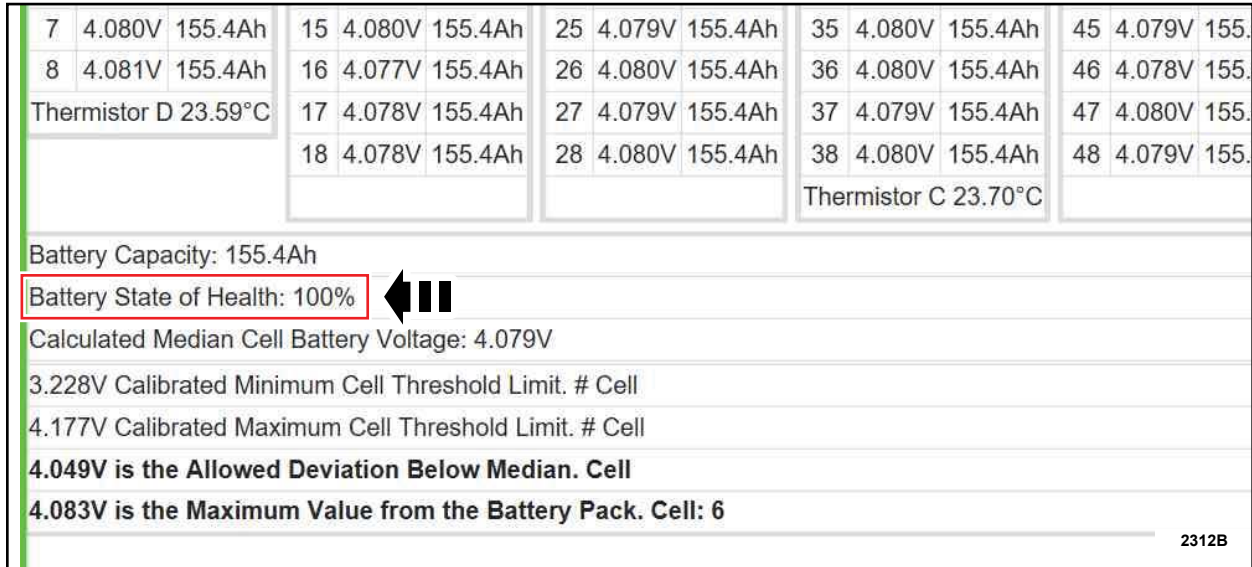


FIGURE 3

5. Is the battery state of health 85% or greater?

Yes - Proceed to Step 6.

No - To place an order for a HV Battery, use the online HVBATT system. Refer to EFC 15213, High Voltage Battery and Array Order and Return Process Change, for additional details.

NOTE: It is recommended to discharge the vehicle battery down to 25%-30% before beginning any of the following work. Allow the vehicle to run with all the accessories running if at full charge. If unable to discharge the battery, each *new* module can take up to 7 hours each to charge, and up to 14 hours per array.

6. Using the supplied VIN tables and the VIN table descriptions listed below, verify what type of HVBM requires replacement. More than one type of HVBM may be required. Once the HVBM type has been identified, place the order for the HVBM using the online HVBATT system. Refer to EFC 15213, High Voltage Battery and Array Order and Return Process Change, for additional details. Proceed to Step 7.

NOTE: For VINs in tables 1-3, the type of HVBM required will be listed and should be ordered prior to disassembling the HV Battery. If the VIN is located in table 4, the HV Battery will need to be disassembled and the HVBM's inspected prior to placing any orders.



NOTE: The HVBM's are replaced in pairs, so the HVBM's are listed as pairs in the VIN table that correlate to their locations in the HV battery shown in Figure 4.

NOTE: Figure 4 shows the HVBM configuration with lettered values that correlate directly to the HVBM's in the VIN tables. If the table lists FF, it is referencing the pair of HVBM's labeled F in Figure 4.

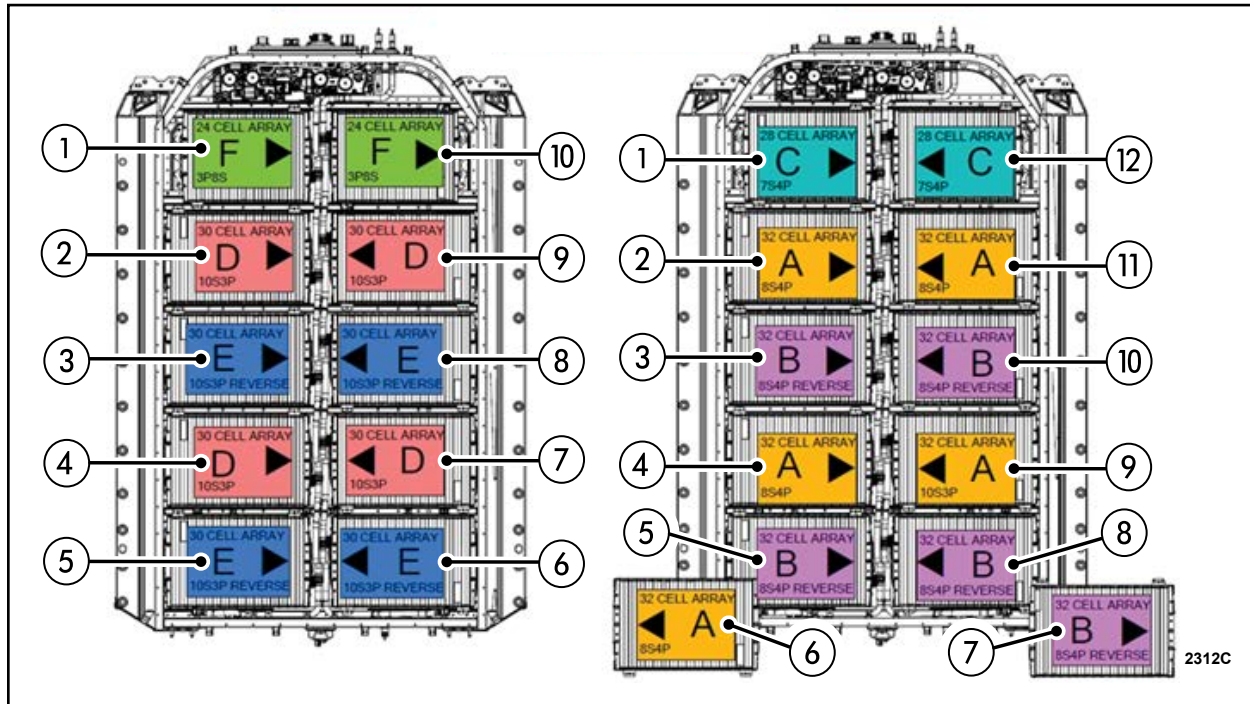


FIGURE 4



VIN Table 1

VINs in this table have the type of HVBM pair that is required and the numeric locations listed. Reference figure 4 to verify the location and type of HVBM that requires replacement.

VIN Table 2

For VINs in this table, the type of HVBM pair is known but the location is unknown. The installed HVBMs will need to have their serial numbers compared to what is listed on the VIN table to verify which location of the HVBM pair requires replacement.

- Referencing Figure 4, locate the serial numbers on the installed HVBMs in the HV battery and compare them with the serial numbers listed in the VIN Table.
- HVBM serial numbers that match what is listed in the table are factory installed and DO NOT require replacement.
- A serial number on an installed HVBM that DOES NOT match a serial number in the VIN table is a service assembly that requires replacement.

NOTE: The serial number is located on the top side of the HVBM near the sense lead connectors and should be accessible without removing the HVBM (see Figure 5). Accessing the rear BB pair serial numbers will likely require the removal of the AB pair HVBMs.

VIN Table 3

For VINs in this table, there is more than one HVBM pair that requires replacement, and one or more of the locations is unknown. The types of HVBM pairs are known. The installed HVBMs will need to have their serial numbers compared to what is listed on the VIN table to verify which location of the HVBM pair requires replacement.

- Referencing Figure 4, locate the serial numbers on the installed HVBMs in the HV battery and compare them with the serial numbers listed in the VIN Table.
- HVBM serial numbers that match what is listed in the table are factory installed and DO NOT require replacement.
- A serial number on an installed HVBM that DOES NOT match a serial number in the VIN table is a service assembly that requires replacement.

NOTE: The serial number is located on the top side of the HVBM near the sense lead connectors and should be accessible without removing the HVBM (see Figure 5). Accessing the rear BB pair serial numbers will likely require the removal of the AB pair HVBMs.

NOTE: Some VINs in this table will require up to three HVBM to be replaced. If you cannot identify all HVBM that needs to be replaced, contact the SSSC for further assistance. Include clear photos of the Serial Numbers of the modules you are inspecting.



VIN Table 4

VINs in this table do not have serial numbers listed and will require the Julian date codes on the listed HVBM to be inspected to find the outlier. VINs in this table will require the HV battery to be disassembled and the HVBM inspected to determine what type of HVBM is needed prior to placing any orders.

- Referencing Figures 4 and 5, locate the Julian dates on the installed HVBM and compare them with the other HVBM Julian dates to verify what pair is the outlier. If the table states UNKNOWN, then all the HVBM Julian dates will need to be inspected to find the outlier.
- The HVBM the vehicle was built with will have Julian date codes that are typically within a month of each other. The service assembly that was installed will have a Julian date code that is not close and later than the rest of the HVBM.
- If you cannot identify the HVBM that needs to be replaced, contact the SSSC for further assistance. Include clear photos of the Julian date codes of the modules you are inspecting.

NOTE: The Julian date is part of the serial number and is located on the top side of the HVBM near the sense lead connectors and should be accessible without removing the HVBM (see Figure 5). Accessing the rear BB pair serial numbers will likely require the removal of the AB pair HVBM.

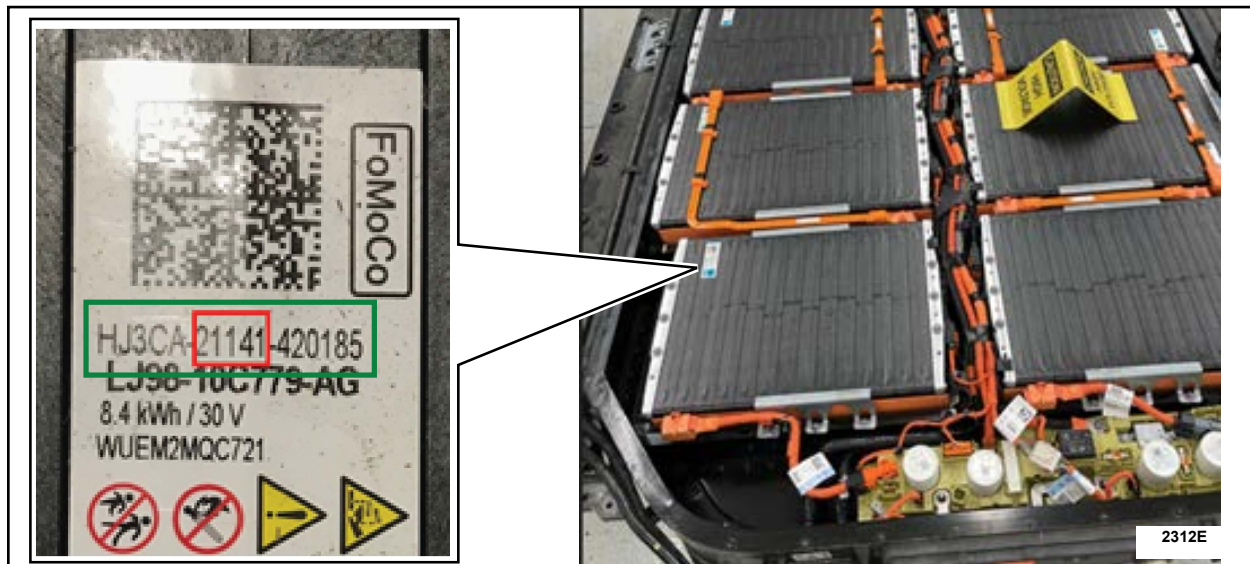


FIGURE 5

NOTE: Shown in Figure 5 is the HVBM serial number tag. The GREEN box contains the complete HVBM serial number, and the RED BOX contains the Julian date code. In this example, the HVBM was built on the 141st day of 2021 (21141) which is May 21, 2021.



7. Remove the HV Battery and cover. Referencing the VIN Table attachments and VIN table descriptions above, inspect the HV battery modules to verify what modules require replacement. Replace the HVBM(s). Follow the procedures in Workshop Manual (WSM) Section 414-03A. This completes this Field Service Action (FSA).

IMPORTANT NOTE: Federal law prohibits selling motor vehicle parts or components that are under safety, compliance, or emissions recall. Unless a part is requested to be returned to Ford, all parts replaced under this FSA must be scrapped in accordance with all applicable local, state and federal environmental protection and hazardous material regulations. Refer to the Parts Retention, Return, & Scrapping section of the FSA dealer bulletin for further information.

