HYUNDAI Technical Service Bulletin	GROUP **ENGINE ELECTRICAL**	NUMBER **20-EE-001H**
	DATE **March, 2020**	MODEL **Kona Electric (OS EV)** **Ioniq Electric (AE EV)**
SUBJECT: ELECTRIC VEHICLE (EV) BATTERY REPLACEMENT PROCEDURES		

This TSB revises 19-EE-002. It explains that there are now 2 different types of coolant.

A Tool Acknowledgment Form must be completed and sent in for Techline battery approval.

IMPORTANT

- **Carefully follow all steps of this TSB. The required special tools and TSB procedures are very important for safe handling of a large heavy EV battery.**
- **Do not disconnect or remove the 12V or EV battery before the Battery Management System (BMS) DTC Analysis and Data Analysis screens are collected by the GDS.**
- **The removed EV battery must be carefully handled to avoid physical damage per the procedures of this TSB.**

Description: The following summarizes the procedure for EV battery replacement:

Section	Content	Pages
A.	Dealer uses GDS to collect BMS DTC Analysis and BMS Data Analysis.	4
B.	Dealer calls Techline to establish a case for EV battery replacement. Both of the following must be sent to Techline Email or Repository: • EV Battery Replacement Required Special Tools Acknowledgement form. • BMS Data Analysis screen capture file(s).	5
C.	Techline approves EV battery replacement case and an EV battery will be shipped to Dealer. Techline will call back to confirm arrival estimate (ETA).	5
D.	For first time EV Battery replacement cases, the EV Battery Special Tools will be shipped to Dealer from Bosch and billed one time to Dealer.	5
E.	Dealer Technician performs the required online EV Battery Replacement Training Module before battery arrives. Technician will receive training credit.	5
F.	Once the required special tools and the replacement EV battery are on hand, Dealer can remove and replace the EV battery.	6-11
G.	Confirm the vehicle can go into Ready mode without warning lights on. Clear DTC by GDS and make sure no battery related DTC restore. Perform SOC Calibration by GDS.	11
H.	Kona and 2020MY+ Ioniq: Fill the P/E coolant reservoir and bleed by GDS.	12
I.	Dealer test drives the vehicle. Check that it takes a level-1 or level-2 charge.	13
J.	Secure the removed battery to the shipping box from the replacement battery. Make sure the battery coolant inlet and outlet nipples are plugged. Install the battery box cover securely.	13
K.	Dealer Parts Dept. requests battery return by KBI of the used battery core per TSB 19-EE-001.	13

Applicable Vehicles:	• 2017MY+ Ioniq Electric (AE EV) • 2019MY+ Kona Electric (OS EV)

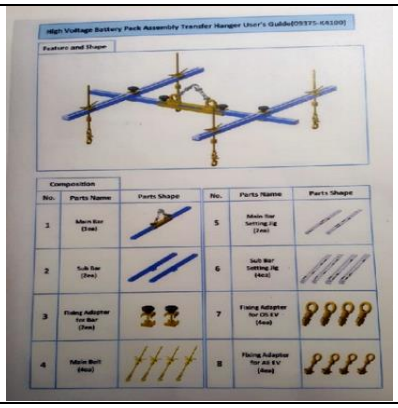
Circulate To: Service Manager, Warranty Manager, Service Advisors, Technicians, Fleet Repair

Warranty Information:

Model	Op Code	Operation	Op Time	Causal Part	Nature Code	Cause Code
Kona Electric (OS EV)	37510R00 37510RQ0	HIGH VOLTAGE BATTERY PACK ASSY DIAGNOSTIC TOOL OPERATION	Refer to WebLTS	37501-XXXXX	I3A	ZZ3
Ioniq Electric (AE EV)	37503R00 37510RQ0	HIGH VOLTAGE BATTERY SYSTEM ASSY DIAGNOSTIC TOOL OPERATION	Refer to WebLTS	37501-XXXXX	I3A	ZZ3

EV Battery Required Special Tools Information:

- The following special tools are required for the safe, secure, efficient lifting of large heavy EV battery (~1000lbs). Proper tools are required to avoid damage to the EV battery.
- Both tools will be shipped from Bosch to any Dealer at their first EV battery replacement service as a required special tool.

PART NAME / (Part Number)	DIAGRAM	REMARK
Propulsion System Lift Table (P/N: HMA52200-A)		Shipped from Bosch Allows for safe and efficient EV battery replacement. Engine hoist can fit under it to raise an EV battery from the table. Multi-Use air/hydraulic operated lift rated at 1760 lbs capacity can lift 21.5 to 70 inches high. Multiple uses include EV Battery, Engine/Transaxle, Fuel Tank, Cradles, Suspensions, and Chassis systems.
High Voltage Battery Lifting Fixture (P/N: 09375-K4100)		Shipped from Bosch

NOTE: The following page must be completed by the Service Manager and sent to Techline along with the GDS Data Analysis from the Battery BMS System.

EV Battery Replacement Required Special Tools Acknowledgment

EV battery replacement requires a special lift table and a high voltage battery lift fixture to safely remove and replace the EV battery.

For your first EV battery order, the following essential tools will be shipped to your dealership and billed through the Bosch Special Service Tool program:

- Propulsion System Lift Table (P/N: HMA52200-A) $4,395.00*
- High Voltage Battery Lifting Fixture (P/N: 09375-K4100) $920.00*

The cost of the tools does **NOT** include shipping and applicable taxes.
*Price is subject to change.

The undersigned acknowledges receipt of this notice and understands that the dealer will be billed for these tools upon an initial order of an EV battery.

Dealer Name: _____

Dealer Code:_____

Dealer Service Manager:

Print Name:_____

Signature:_____

VIN:_____

If your Dealership already has the tools or an equivalent compatible lift table suitable for EV batteries, please contact your District Parts & Service Manager to approve and complete this section.
The High Voltage Battery Lifting Fixture must be ordered if Dealer does not have this tool as it is particular for Hyundai EV batteries.

I certify that the above mentioned dealer has an equivalent lift table suitable for use with Hyundai EV models.

Manager, District Parts & Service

Print Name:_____

Signature:_____

Service Procedure:

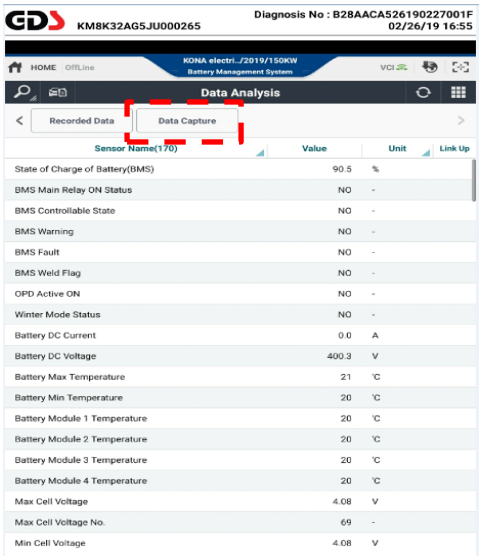
A-1. Perform the GDS **All Fault Search** function to review all stored DTC(s).
***BMS DTC Search Result*:**

- Review for any BMS system DTC stored. Verify in the shop manual if any have a possible cause of EV battery.
- If BMS DTC does not apply to a potential EV battery problem, this TSB does not apply.

A-2. Capture all data from the GDS **BMS Data Analysis** function as follows:

(Preferred) GDS has an SD card:

Use the GDS **Data Capture** function that can be found by scrolling to the right at the top of the GDS screen:

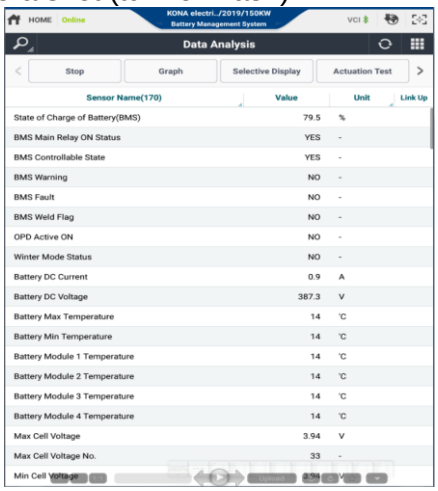


Selecting the **Save** button creates a PDF file of the multiple pages of all the data of the BMS Data Analysis.

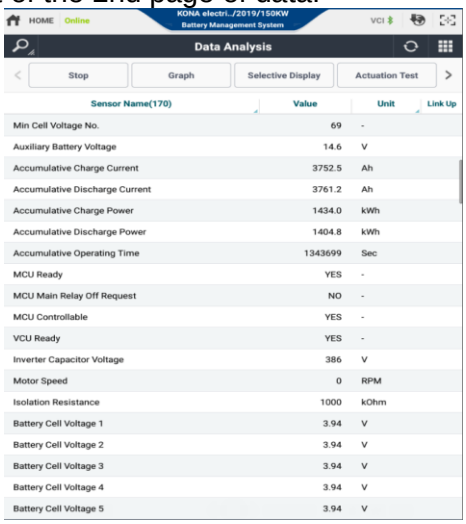
GDS does not have an SD card:

Capture the first page of Data Analysis, either by:

- Manual tablet screenshot (press LOCK and HOME buttons together).
- Camera shot (turn off flash).



- Note the parameter at the bottom of the screen and manually scroll down until that parameter shows at the top of the screen.
- Capture a manual tablet screenshot or camera shot of the 2nd page of data.



- Continue the above steps page by page until all Data Analysis pages are captured & saved.

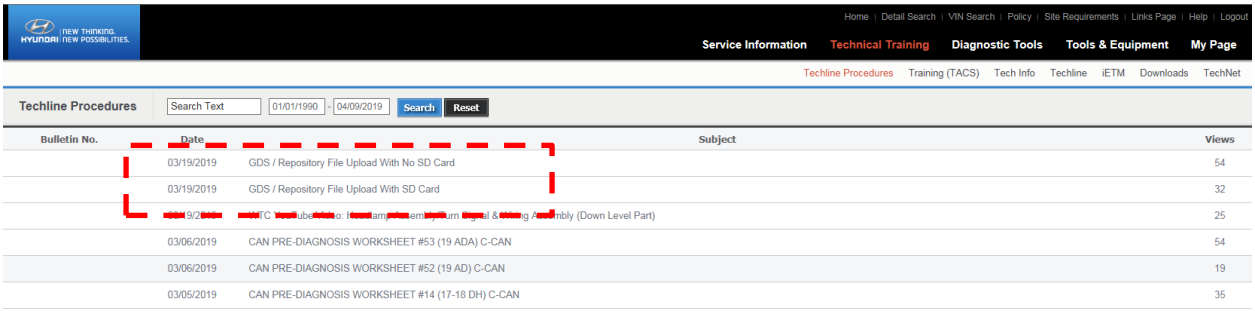
B-1. Contact Techline at **1-800-325-6604** to establish a Techline Case to request approval of an EV battery replacement. Note the Techline case number assigned.

B-2. Upload the following to the Techline Repository or email to: hmatechlinefax@hmausa.com:

- BMS Data Analysis Data Capture file(s).
- EV Battery Required Special Tools Acknowledgment form completed by Dealer Service Manager.

NOTE: Be sure to include Dealer Number, VIN and Techline Case# in the subject line of each Techline Repository or email submission, so Techline can match to your case.

General Instructions on how to Upload to Techline Repository are found at Technical Training – Techline Procedures:



C. Techline reviews the required BMS data and EV Battery Special Tools Acknowledgment Form to ensure the case qualifies for approval of an EV battery replacement.

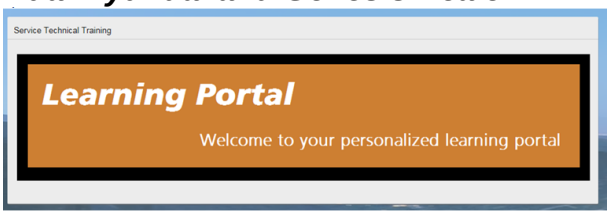
Once Techline approves, an EV Battery will be shipped out by Mobis to the Dealer. Shipping can take 2-7 days depending on location since EV battery can only be shipped by Hazmat ground transportation. Techline will confirm the estimated time of arrival (ETA).

D. Required Tools on page-2 will ship out from Bosch (Applicable to Dealer cases of first time EV battery replacement).

E. Perform the EV Battery Replacement Online Training Module on the “Hyundai Technical Training” Learning Portal (if a Hyundai only Dealer) or, on the “Learning Portal” (if a dual Hyundai and Genesis Dealer). The course will provide Technician training credit.

Hyundai Dealer:

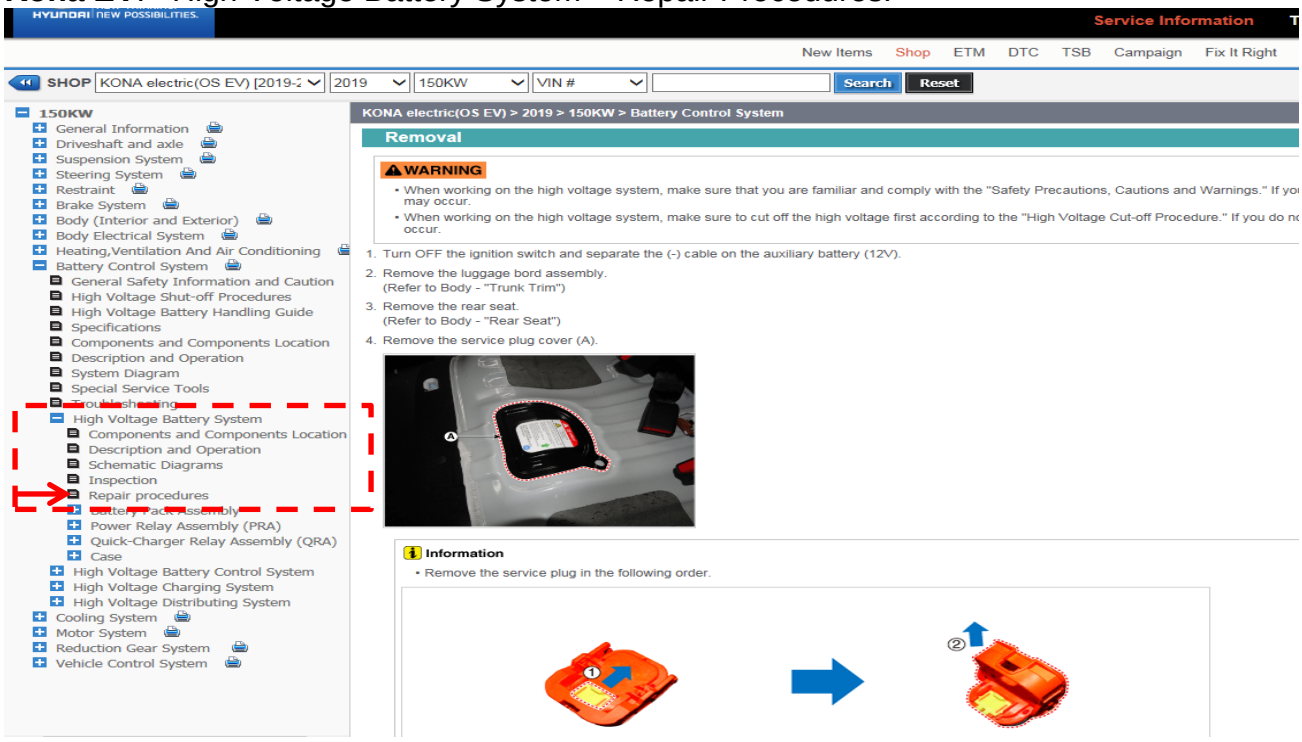
Dual Hyundai and Genesis Dealer:



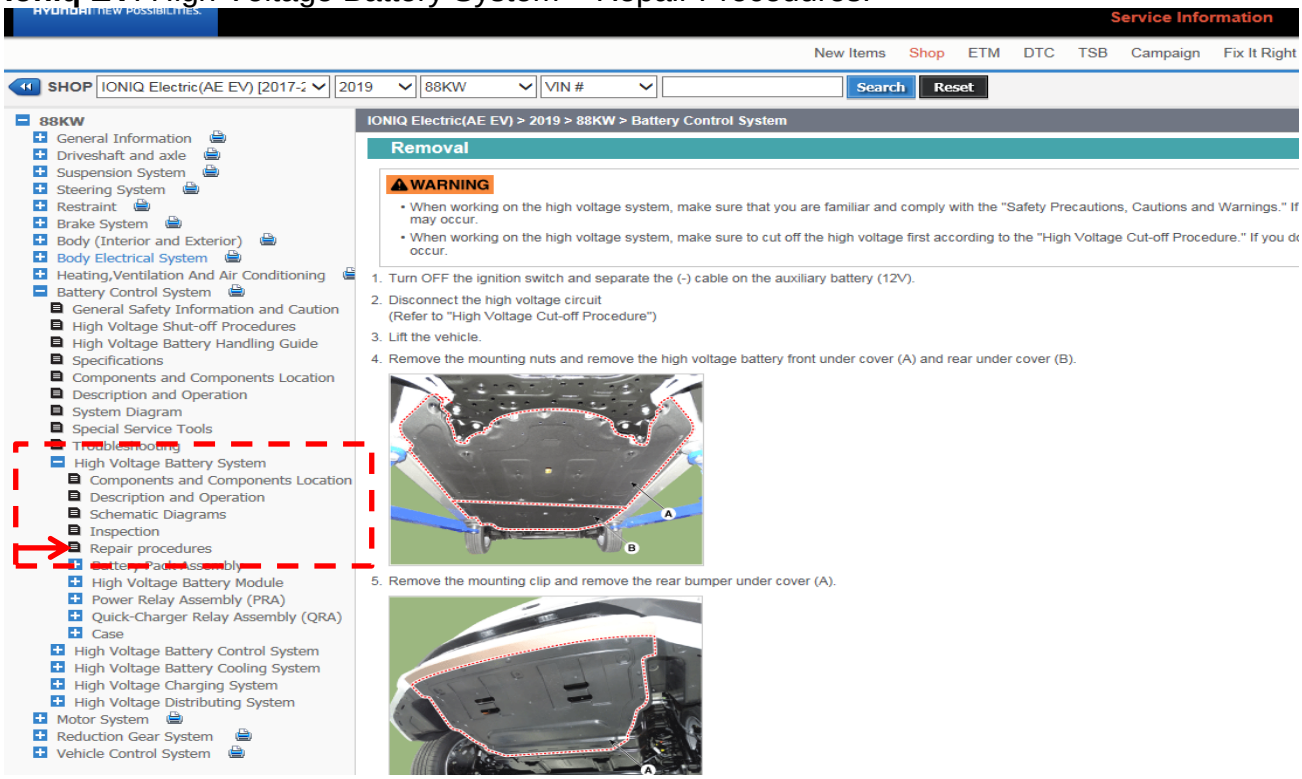
F-1. After the EV battery and special tools are on hand, remove the EV battery from the vehicle per the specific shop manual instructions for each model and place the battery on the lift table. Begin by removing the service plug from the battery and wait 5+ minutes for inverter discharge.

Refer to the **Battery Removal Tips** on the next page.

Kona EV: High Voltage Battery System – Repair Procedures:



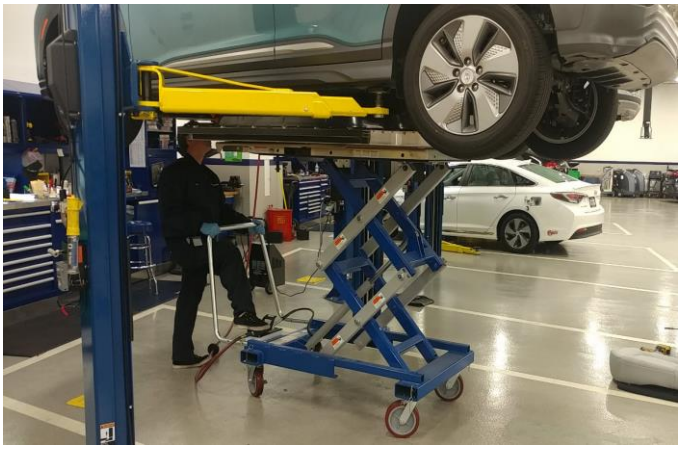
Ioniq EV: High Voltage Battery System – Repair Procedures:



F-2. **Battery Removal Tips:**

- You must use the SST P/N: HMA52200-A Propulsion System Lift Table as shown in the Required Tools section.

  Place a piece of cardboard on the table top of 1/8 inch thickness minimum.



All Kona EV and 2020MY+ Ioniq only:

- When disconnecting the coolant hoses from the Kona EV battery, clamp the hoses carefully from the vehicle side to avoid losing coolant from the reservoir.

- Catch the coolant that drains and discard it.

- Attach a short spare coolant hose (from your shop supply) to one side of the pair of coolant nipples from the battery.

  Blow out all the coolant from the battery from the other coolant nipple using shop air as shown.

- Loop and attach the spare coolant hose to both coolant nipples from the battery.

  NOTE: Clamp the hose at both nipples to prevent coolant from draining during handling and shipping of the battery.

F-3. **Exchanging Battery from the Vehicle with the Service Battery:**

a) When the EV battery is received in the shipping box use a fork lift (with extenders if available) or pallet jack to carefully lift and transport the battery to the work site.

NOTE: ***There are 2 different styles of boxes, each is opened in different ways:***

OEM Box:

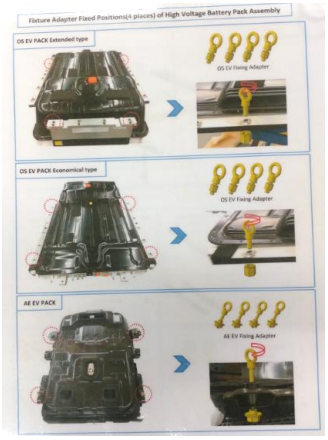
- OEM EV battery box will have a top cover that is secured by nails or screws.
- Nails will need to be pried up or screws removed to be able to remove the cover.

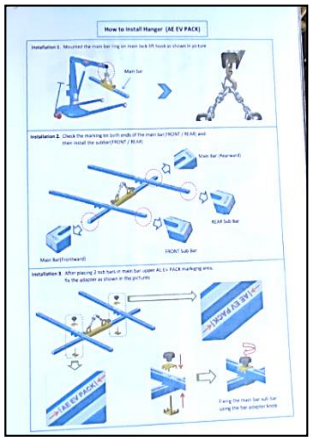
Refurbished EV Battery Box*:*

- Refurbished EV battery box has a full cover assembly with integrated side panels.
- It includes clips at the bottom to secure the cover to the bottom crate containing the battery. These clips will need to be removed and saved for attaching back.
- Flip up the full cover assembly as shown.
- Remove the straps securing the battery in place.

b) Assemble the High Voltage Battery Lifting Fixture SST P/N: 09375-K4100 to the EV battery as per the instructions provided with the kit depending on model and type of battery.

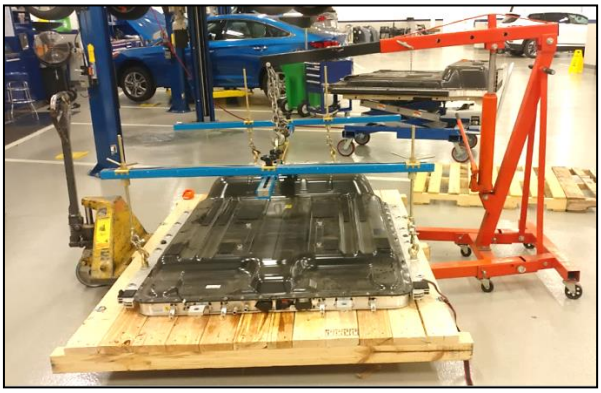
NOTE: For Kona EV battery, use the (OS EV PACK Extended Type) instructions. Do not follow instructions for the Economical Pack.



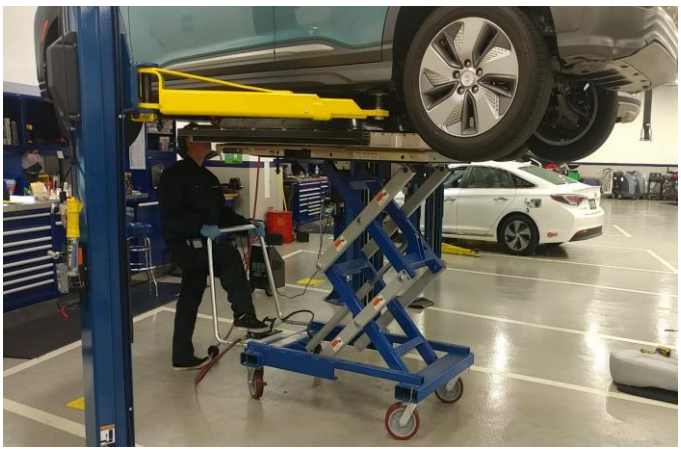


The following instructions depend on whether a ***Fork Lift*** (preferred) or an ***Engine Hoist*** is used:

	Fork Lift Instructions:	***Engine Hoist Instructions:***
c)	Use a fork lift with chains and the Lifting Fixture Kit to raise up the replacement battery: 	Use a pallet jack on one side to raise the crate to make it possible to fit an Engine Hoist in place on the other side to lift up the battery. 
d)	Move the replacement EV battery and carefully place it on the shop floor as a temporary resting point. Remove the Lifting Fixture Kit from the battery. 	Move the replacement battery with the Engine Hoist to a spare shop lift or other suitable raised surface that would allow for the Engine Hoist to roll under to receive the battery. This will be a temporary resting point. Remove the Lifting Fixture Kit from the battery. 

	Fork Lift Instructions:	***Engine Hoist Instructions:***
e)	After the EV battery was removed from the vehicle, install the Lifting Fixture Kit to be able to raise it from the Lift Table by Fork Lift. 	After the EV battery was removed from the vehicle, install the Lifting Fixture Kit to be able to raise it from the Lift Table by Engine Hoist. 
f)	Move the EV battery from the vehicle to the shipping crate and carefully lower it in place so it is centered on the crate. 	Move the EV battery from the vehicle to the shipping crate and carefully lower it in place so it is centered on the crate. 
g)	Transfer the Lifting Fixture Kit back to install on the replacement battery. Raise the replacement battery from its temporary resting point and place it onto the Lift Table. 	Transfer the Lifting Fixture Kit back to install on the replacement battery. Raise the replacement battery from its temporary resting point (of step-d) and place it onto the Lift Table. 

F-3. Install the replacement battery to the vehicle in reverse of the shop manual removal instructions.

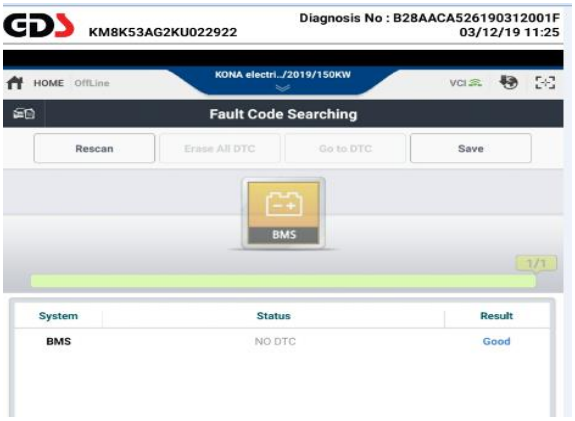


G-1. After installation is complete, check that the vehicle will go into READY mode and there are no warning lights on.

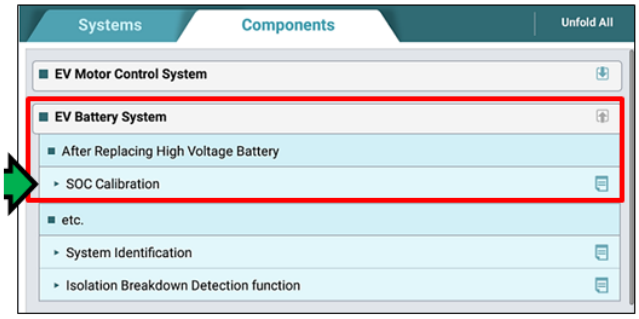
NOTE: (For Kona only). The Powertrain Electronics (P/E) coolant has not been filled yet, so a low cooling warning light might occur, but that will be taken care of at step H.

G-2. Check All Fault Search DTC and clear DTC. Make sure no BMS battery related DTC restores.

See example of a BMS screen with no DTC, confirming that proper battery installation had occurred.



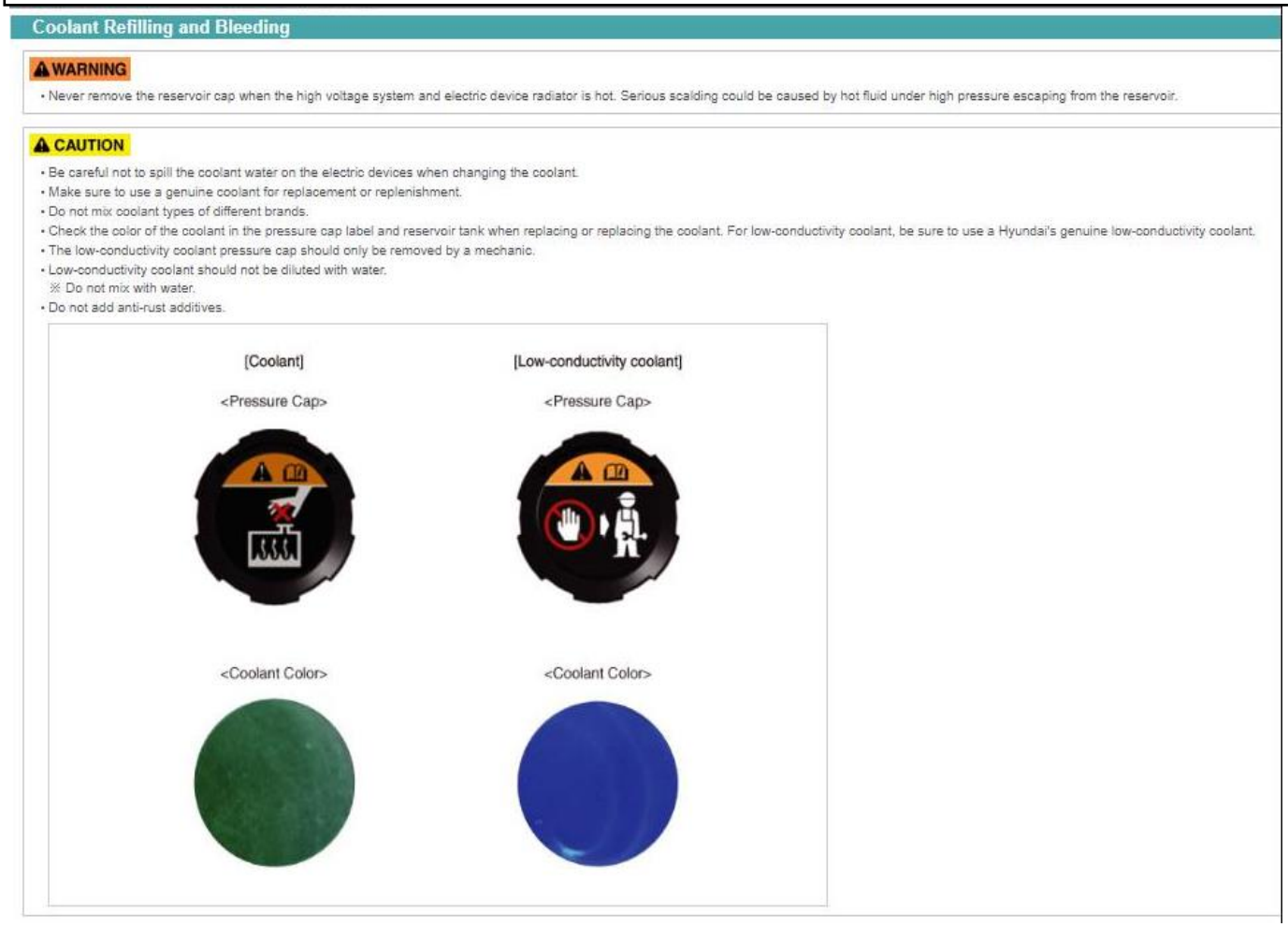
G-3. Perform the **SOC Calibration** found in the S/W Management, EV Battery System section of GDS.



Section H applies to all Kona EV and 2020+ Ioniq EV which has a battery with coolant:

NOTICE

There are 2 types of Coolant as identified by color. The correct coolant must be identified and you cannot mix coolant between the 2 types. The blue coolant is a special low conductivity coolant and is not to be mixed with water, unlike the regular green coolant.



Coolant Refilling and Bleeding

WARNING

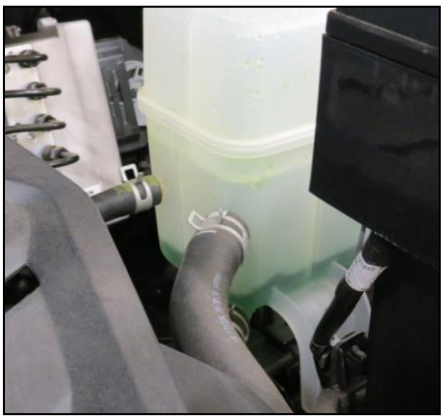
- Never remove the reservoir cap when the high voltage system and electric device radiator is hot. Serious scalding could be caused by hot fluid under high pressure escaping from the reservoir.

CAUTION

- Be careful not to spill the coolant water on the electric devices when changing the coolant.
- Make sure to use a genuine coolant for replacement or replenishment.
- Do not mix coolant types of different brands.
- Check the color of the coolant in the pressure cap label and reservoir tank when replacing or replacing the coolant. For low-conductivity coolant, be sure to use a Hyundai's genuine low-conductivity coolant.
- The low-conductivity coolant pressure cap should only be removed by a mechanic.
- Low-conductivity coolant should not be diluted with water.
  ※ Do not mix with water.
- Do not add anti-rust additives.

H-1. Fill the P/E cooling system reservoir to the MAX full mark with the following depending on the type of coolant found in the vehicle:

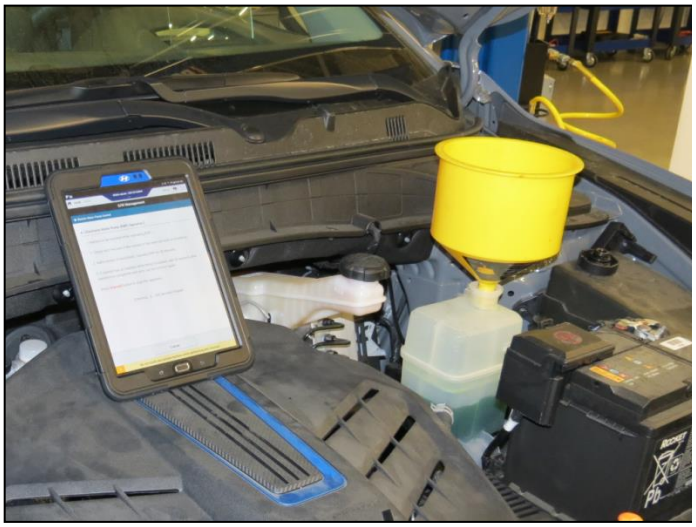
Coolant Color	Part Number	Comment
Green	regular coolant	50/50 mix with water
Blue	Use only Hyundai P/N 00232-19091	Do not mix with water

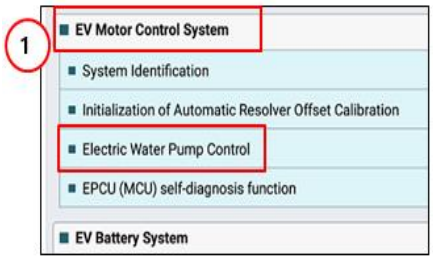


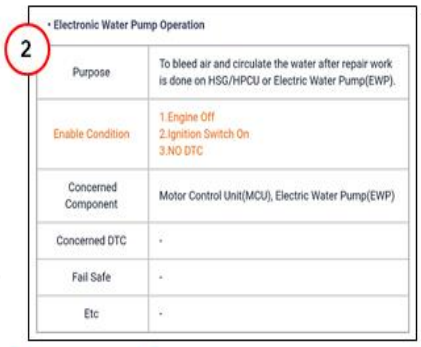
H-2. Using GDS with Ignition ON, perform the P/E cooling system air bleeding procedure.

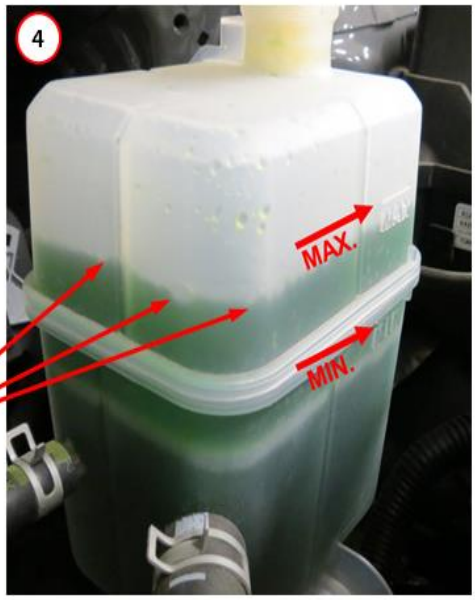
This will take about 30 minutes.

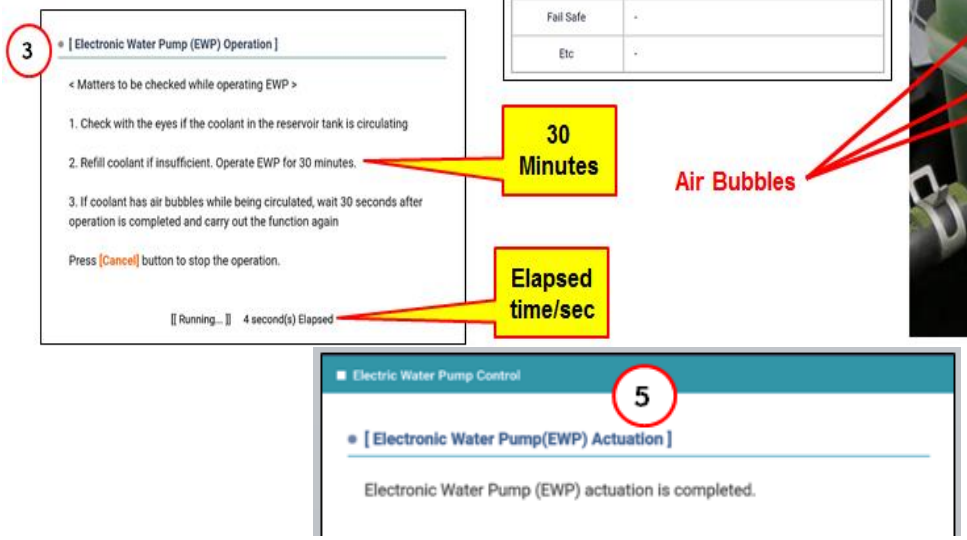
As the air is purged, recheck and add coolant as necessary.











I-1. Perform a test drive for at least 2-3 miles and make sure vehicle is OK.

I-2. Confirm the battery will take charge from a Level-2 charger (faster) or the Level-1 charger that came with the vehicle.

Recommended to keep the vehicle on a Level-2 charger until customer picks up the vehicle, so it can be delivered at the highest possible charge.

J-1. Secure the used EV battery tightly in place with the provided straps onto the crate to minimize any movement during shipping.

J-2. For Kona EV only, ensure there will be no coolant leaking out of the battery onto the shipping crate.

Use a spare coolant hose from your shop to loop and clamp over the 2 coolant nipples.

J-3. Place the cover on the battery shipping box and make sure it is secured firmly in place to prevent the cover from dislodging during the return shipping. Secure any clips if they came with the box originally.

K. Dealer Parts Dept. must follow TSB 19-EE-001H-1 to schedule pickup by KBI of the used battery core as soon as possible. KBI will provide specific instructions.