HYUNDAI Technical Service Bulletin

GROUP	NUMBER
ENGINE ELECTRICAL	19-EE-003H
DATE	MODEL
APRIL, 2019	Sonata Hybrid (YF HEV/LF HEV), Sonata Plug-In (LF PHEV), Ioniq Hybrid/Plug-In (AE HEV/PHEV), Nexo (FE)

SUBJECT: HYBRID/PLUG-IN/FUEL CELL LITHIUM BATTERY REPLACEMENT PROCEDURES

Description:

The following summarizes the service procedures for Lithium Battery replacement:

IMPORTANT

Do not disconnect or remove the 12V or High Voltage battery before the Battery Management System (BMS) DTC Analysis and Data Analysis screens are collected by GDS.

Section	Content					
Α.	Dealer uses GDS to collect the following:					
	BMS DTC Analysis.					
	BMS Data Analysis.					
В.	Dealer calls Techline to open a case.	5				
	 Dealer sends BMS Data Analysis capture file(s) to Techline repository or email. 					
C.	If it qualifies, Techline approves Dealer's Lithium Battery replacement, and a Lithium Battery is shipped to the Dealer. Techline will call back with confirmation of the shipment estimated time of arrival.					
D.	Once the replacement battery is on hand, dealer removes and replaces the battery.					
E.	 After replacement confirm the vehicle can go into Ready mode without warning lights on. 	6				
	• (For YF HEV only: Perform BMS Update per TSB 18-HC-003).					
	Clear DTC by GDS and make sure no battery related DTC return.					
	• Perform SOC Calibration by GDS within the BMS software management.					
F.	F. • Secure the removed used Lithium Battery core in the shipping box from the replacement battery.					
	 Dealer Parts Dept. requests battery return by KBI of the used battery core per TSB 19-EE-001. 					

 2011-2015MY Sonata Hybrid (YF HEV)
 2016MY~ Sonata Hybrid (LF HEV)
 2016MY~ Sonata Plug-In Hybrid (LF PHEV)
 2017MY~ Ioniq Hybrid (AE HEV)
(High Voltage Battery and 12V Battery)
 2017MY~ Ioniq Plug-In Hybrid (AE PHEV)
 2019MY Nexo (FE) (High Voltage Battery and 12V Battery)

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
Sonata Hybrid (YF HEV)	37510R1H	BATTERY PACK ASSY (MAIN HIGH VOLTAGE BATTERY)		37511-*****		
	37510RQ0	DIAGNOSTIC TOOL OPERATION				
Sonata Hybrid (LF HEV)	37510R2H	BATTERY PACK ASSY (MAIN HIGH VOLTAGE BATTERY)		37510-*****		
	37510RQ0	DIAGNOSTIC TOOL OPERATION				
Sonata Plug-In	37510R2H	BATTERY PACK ASSY (MAIN HIGH VOLTAGE BATTERY)				
Hybrid (LF PHEV)	37510RA1	PLUG IN HEV (MAIN)		37503-****		
	37510RQ0	DIAGNOSTIC TOOL OPERATION				
Sonata Hybrid (YF HEV)37510R1H 37510RQ0BATTERY PACK ASSY (MAIN HIGH VOLTAGE BATTERY)Sonata Hybrid (LF HEV)37510RQ0DIAGNOSTIC TOOL OPERATIONSonata Hybrid (LF HEV)37510RQ0DIAGNOSTIC TOOL OPERATIONSonata Plug-In Hybrid (LF PHEV)37510R2HBATTERY PACK ASSY (MAIN HIGH VOLTAGE BATTERY)Sonata Plug-In Hybrid (LF PHEV)37510R2HBATTERY PACK ASSY (MAIN HIGH VOLTAGE BATTERY)Sonata Plug-In Hybrid (LF PHEV)37510R2HBATTERY PACK ASSY (MAIN HIGH VOLTAGE BATTERY)Ioniq Hybrid (AE HEV)37510R00DIAGNOSTIC TOOL OPERATIONIoniq Hybrid (AE HEV)37510R00HIGH VOLTAGE BATTER PACK ASSYIoniq Hybrid (AE HEV)37513R00BATTERY MANAGEMEN SYSTEM BMSIoniq Plug-In Hybrid (AE PHEV)37503R1HHIGH VOLTAGE HIGH VOLTAGE BATTERY SYSTEM ASS (PHEV)Ioniq Plug-In Hybrid (AE PHEV)37510R00DIAGNOSTIC TOOL OPERATIONNexo (FE) High Voltage Battery37510R00DIAGNOSTIC TOOL OPERATIONNexo (FE) High Voltage Battery37510R00HIGH VOLTAGE BATTER PACK ASSY	37510R00		Refer to WebLTS	37501-*****	I3A	ZZ3
		OPERATION	for current LTS Time			223
	37513R00	SYSTEM BMS		37507-****		
	OPERATION					
Hybrid	37503R1H	BATTERY SYSTEM ASSY		37503-*****		
(AE PHEV)	37503RQ0					
	37510R00	HIGH VOLTAGE BATTERY PACK ASSY		37510-*****		
	37510RQ0	OPERATION		57510-		
	37513R00	BATTERY MANAGEMENT SYSTEM BMS		37507-*****		
12 v Battery	37513RQ0					

*****Refer to the part number of the battery ordered for the vehicle or the Parts Catalog for the full part number to be entered in the claim for Causal Part.

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 Lithium Battery.
 - > If BMS DTC does not apply to a potential battery problem, this TSB doesn't 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: Q Hybrid../2017/G 1.6 GDI. HOME OT P_ == Data Analysis Recorded Data Data Capture Con (142) State of Charge of Battery(BMS) 55.5 1 BMS Main Relay ON Status NO BMS Controllable State NO BMS Warning NO BMS Fault BMS Weld Flag NO NO BMS Service Lamp Battery DC Current 0.0 A Battery DC Voltage 238.3 V Battery Max Temperature 36 'C E Battery Min Temperature 36 'C Battery Module 1 Temperature 36 °C Battery Module 2 Temperature 36 'C Battery Inlet Temperature 29 'C Max Cell Voltage 3.72 21 Max Cell Voltage No No Min Cell Voltage 3.70 V Min Cell Voltage No 15 No Fan Status 0 step 2 Data Capture Save The saved file can be checked by 'Recorded Data' menu.
 Be careful when you remove GDS application because the data on SD card
 is removed as well. 10 Million Parameter Save Condition Engine OFF(IG ON) Engine Idle(Cold) Engine Idle(Warm) Engine Load(Cold) Engine Load(Warm) · File Name IONIQ Hybrid(AE HEV)_BMS_Engine OFF(IG ON)_190408-094614 e Comments (8/300 BMS data

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

Save

GDS does not have an SD card: -

Capture first page of Data Analysis by either:

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

ff HOME OffLine		d/2017/G 1.6 GDI anagement System	VCI 🛲	🕑 [+:
P₄ ma	Data	•	o 🔳	
< Stop	Graph	Selective Display	Actuation T	est >
Sensor Nar	ne(142)	Value	Unit	Link U
State of Charge of Battery(BM	IS)	55.5	5 %	
BMS Main Relay ON Status		NC) -	
BMS Controllable State		NC) -	
BMS Warning		NC	- (
BMS Fault		NC) -	
BMS Weld Flag		NC) -	
BMS Service Lamp		NC) -	
Battery DC Current		0.0	A	
Battery DC Voltage		238.3	s v	
Battery Max Temperature		36	5 'C	
Battery Min Temperature		36	5 'C	
Battery Module 1 Temperature		36	o 'C	
Battery Module 2 Temperature		30	5 °C	
Battery Inlet Temperature		25	o''C	
Max Cell Voltage		3.72	2 V	
Max Cell Voltage No.		23	No.	
Min Cell Voltage		3.70	v	
Min Cell Voltage No.		16	i No.	
Fan Status		() step	

- 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.

HOME OffLine		/2017/G 1.6 GDI agement System	VCI 🕿		200
P_ ==	Data /	Analysis		0	
< Recorded Data	Data Capture				>
Sensor Nar	ne(142)	Value	Unit	1	Link Up
Fan Status		0	step		
Fan Feedback Frequency		0	Hz		
Auxiliary Battery Voltage		13.2	v		
Accumulative Charge Current		1577.4	Ah		
Accumulative Discharge Curr	ent	1575.5	Ah		
Accumulative Charge Power		364.5	kWh		
Accumulative Discharge Pow	er	349.1	kWh		
Accumulative Operating Time		538699	Sec		
MCU Ready		YES	-		
MCU Main Relay Off Request		NO	-		
MCU Controllable		NO			
MCU(GCU) Ready		YES			
MCU(GCU) Main Relay Off Re	quest	NO			
MCU(GCU) Controllable		NO	-		
HCU Ready		YES			
HCU Engine Start Signal		NO			
Inverter Capacitor Voltage		0	v		
Drive Motor Speed		0	RPM		
Actual Generator(HSG) Speed		0	RPM		

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

SUBJECT: HYBRID/PLUG-IN/FUEL CELL LITHIUM BATTERY REPLACEMENT PROCEDURES

- B-1. Contact Techline at **1-800-325-6604** to open a Techline Case to request approval of a Lithium Battery replacement. Note the Techline case number assigned.
- B-2. Upload the following to the Techline Repository or email to: <u>hmatechlinefax@hmausa.com</u>:
 - BMS Data Analysis Data Capture file(s).

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:

					tail Search	VIN Sear		Site Require	ments L	inks Page	Help Logout
HYUNDRI NEW POSSIBILITIES.			Service Information	Technical Ti	raining	Diagno	ostic Tools	Tools	& Equi	pment	My Page
			т	echline Procedures	Trainin	g (TACS)	Tech Info	Techline	iETM	Downloads	TechNet
Techline Procedures	Search Text	01/01/1990 - 04/09/2019 Search Reset									
Bulletin No.	Date		Subject								Views
	03/19/2019	GDS / Repository File Upload With No SD Card									54
	03/19/2019	GDS / Repository File Upload With SD Card									32
-	99/19/2 <mark>010</mark>	MTC Meet ubs Mideo: Meet amplemently fium Bigs at 8.466 ing Assembly (Down Level Part)									25
	03/06/2019	CAN PRE-DIAGNOSIS WORKSHEET #53 (19 ADA) C-CAN									54
	03/06/2019	CAN PRE-DIAGNOSIS WORKSHEET #52 (19 AD) C-CAN									19
	03/05/2019	CAN PRE-DIAGNOSIS WORKSHEET #14 (17-18 DH) C-CAN									35
	01/23/2019	CAN PRE-DIAGNOSIS WORKSHEET #51 (19 OS EV) P-CAN									121
	01/23/2019	CAN PRE-DIAGNOSIS WORKSHEET #50 (19 OS EV) C-CAN									48
	01/23/2019	CAN PRE-DIAGNOSIS WORKSHEET #49 (18-19 OS) P-CAN									28
	01/23/2019	CAN PRE-DIAGNOSIS WORKSHEET #48 (18-19 OS) C-CAN									47
	12/17/2018	CAN PRE-DIAGNOSIS WORKSHEET #45 (17-18 G80) P-CAN									104
	10/15/2018	CAN PRE-DIAGNOSIS WORKSHEET #10 (13-17 GD) C-CAN									211
	10/08/2018	CAN PRE-DIAGNOSIS WORKSHEET #15 (17-18 G90) C-CAN									119
	08/09/2018	WTC YouTube Video: Outside Power Mirror Actuator R&R									105
	08/08/2018	CAN PRE-DIAGNOSIS WORKSHEET #8 (11-16 UD/MD) C-CAN									221
	08/02/2018	CAN PRE-DIAGNOSIS WORKSHEET #40 (17-18 AE HEV) P-CAN									97
	07/25/2018	CAN PRE-DIAGNOSIS WORKSHEET #13 (11-16 VI) C-CAN									198
	07/06/2018	CAN PRE-DIAGNOSIS WORKSHEET #42 (16-17 LF-HEV) P-CAN									140
	06/18/2018	CAN PRE-DIAGNOSIS WORKSHEET #20 (17-18 AE HEV) C-CAN									136
	05/10/2018	CAN PRE-DIAGNOSIS WORKSHEET #32 (16-18 LF-HEV) C-CAN									210
											-

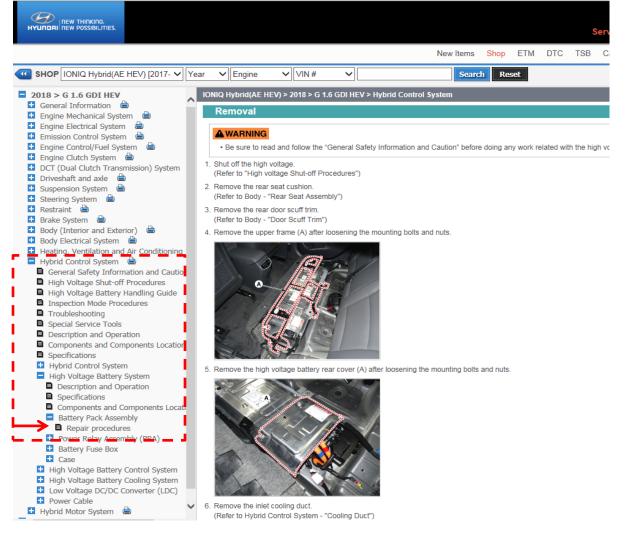
C. Once Techline approval is received, the Lithium Battery will be shipped out to the Dealer. Shipping can take 2-5 days depending on location since the Lithium Battery can only be shipped by Hazmat ground transportation.

Dealer will be contacted by Techline to confirm whether the battery was shipped and provide an estimated time of arrival (ETA).

D. After the Lithium Battery is on hand at Dealer, remove the battery from the vehicle per the specific shop manual instructions for each model.

Begin by removing the service plug from the battery and wait 5+ minutes for inverter discharge.

Shop Manual Example - Ioniq HEV: High Voltage Battery System – Repair Procedures:



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

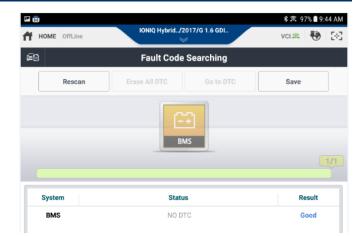


E-2. For 2011-2015 Sonata Hybrid (YF HEV) battery replacement only: Perform BMS Update per TSB 18-HC-003.

SUBJECT: HYBRID/PLUG-IN/FUEL CELL LITHIUM BATTERY REPLACEMENT PROCEDURES

E-3. Check All Fault Search DTC and clear DTC. Make sure no BMS battery related DTC returns.

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



- E-4. Perform the **SOC Calibration** found in the S/W Management , High Voltage Battery System section of GDS.
- HEV Battery System
 System Identification
 System Identification
 Isolation Breakdown Detection function
 SOC Calibration
 12V Battery SOC Correction Function
 Inspection of 12V Battery Status
- F. Place the original used Lithium Battery core in the shipping box in a similar manner as was received for the replacement battery.

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

