



# Technical Journal

TITLE:

**Plug-in hybrid electric vehicle high voltage battery repairs**

<b>REF NO:</b> TJ 34295.5.0	<b>ISSUING DEPARTMENT:</b> Technical Service	<b>CAR MARKET:</b> United States and Canada	
<b>PARTNER:</b> 3 US 7510 Volvo Car USA		<b>ISSUE DATE:</b> 2020-06-24	<b>STATUS DATE:</b> 2020-07-13
<b>FUNC GROUP:</b> 3113	<b>FUNC DESC:</b> Battery, high voltage	Page 1 of 9	

“Right first time in Time”

## Attachment

File Name	File Size
HVB - Cell_Voltage_Overview [Read-Only].pdf	1.1132 MB
TJ-34295.pdf	0.1735 MB

## Vehicle Type

Type	Eng	Eng Desc	Sales	Body	Gear	Steer	Model Year	Plant	Chassis range	Struc Week Range
224	BK						2019-2099		-	201917-999952
224	BR	B1FPHEV					2019-2099		-	201917-999952
225	BK						2019-2099		-	201917-999952
238	BC	B1BPHEV					2017-2018		-	201717-201817
238	BR	B1FPHEV					2018-2099		-	201717-999952
246	BK	B1LPHEV					2020-9952		-	201917-999952
246	BR	B1FPHEV					2018-9952		-	201717-999952
256	BC	B1BPHEV					2016-2017		-	201546-201717
256	BK	B1LPHEV					2020-9952		-	201917-999952
256	BR	B1FPHEV					2018-9952		-	201717-999952

## CSC Customer Symptom Codes

Code	Description
2V	Technician information/Software/Vehicle communication/Not for warranty use



## VST Operation Number

## DTC Diagnostic Trouble Codes

Rows beginning with \* are modified

Note! If using a printed copy of this Technical Journal, first check for the latest online version.

## DESCRIPTION:

This TJ is a guide of what kind of repairs that could be done instead of complete HV battery replacement.

Parts, methods & tools are now available to repair almost all faults within the High Voltage Battery.

## SERVICE:

With any HVB (High Voltage Battery), you must be **certified to carry out HVB repairs to the correct competence**. Always repair the battery according to the methods in VIDA. When performing any measurements, it is important that the AA batteries in the measuring tool are above 75% charge minimum. This is confirmed when you turn the meter on, briefly displaying a value. Before you start measuring it is good to check how the tool displays short to ground and open loop.

In the event that a complete battery is to be replaced, the battery being installed may not have the same cell chemistry as the battery being removed.

A unique SP (Software Product) may be necessary, see attachment "TJ-34295.pdf".

The SP (Software Product) changes the Variant Attribute in the vehicle to match that to the replacement battery.

\* The information of what battery is installed in the vehicle could be found in VIDA, Vehicle details, Variant attribute and search for VDN code CK0.

**Cell Module:** This part is most often used when one cell is defective. The most common cell defects are seen as one cell having a lower Open Circuit Voltage (OCV) and State of Charge (SoC) than all other cells. Normal SOC deviation is less than 5%, more than 10% is a fault. The cell module is delivered complete with temperature sensors and a Cell Voltage and Temperature Node. Examples is attached in "HVB - Cell Voltage Overview"

\* Cell modules are available for the following variants:

- MY 2018-2019 SPA P30
- MY 2020-2021 SPA P34

Note that cell module replacement is also the recommended repair for:

- MY 2016-2017 SPA where the original P27 battery has been previously replaced with a P30 battery.

Cell module replacement are not available for:

- MY 2016-2017 SPA P27 battery

**Service Kit:** This kit is helpful to have on hand when replacing a cell module in the event that a cable, clip or seal is damaged during the repair.



\* **Coolant level:** After repair or reassemble of the cooling system it is important to refill and bleeding the high voltage coolant circuit correctly according to VIDA. It take some time for the cooling system to stabilize. After thoroughly road testing the vehicle, the coolant level should be visually checked once more.

**CVTN (Cell Voltage and Temperature Node):** This part is used when there is a DTC (Diagnostic Trouble Code) confirming an internal fault. It is also used when there is a measurement error, for example, several adjacent cells show incorrect cell voltage. Examples is attached in “HVB - Cell Voltage Overview”

**Fuses:** These are used when a Diagnostic Trouble Code is set for an open fuse. The root cause for the open fuse needs to be fault traced and corrected before replacing the fuse.

**Coolant Temperature Sensor:** This part is used when the temperature sensor does not read accurately. Check the accuracy by allowing the car to soak for several hours, preferable overnight. The signal can then be checked for an offset by comparing it to other sensors in the car. Use a VIDA Diagnostic Sequence or choose a selection of temperature sensors from various nodes in the vehicle.

**BDU (Battery Distribution Unit):** This part is most often used when a Diagnostic Trouble Code is set for one or more stuck contactor(s). It can also be used when a diagnostic trouble code is set for the current sensor. A stuck contactor can be confirmed by following Vida and using the measurement tool.

**BECM (battery energy control module):** This part is most often used when a Diagnostic Trouble Code is set for an internal fault or the unit does not communicate on the CAN bus. When a battery energy control module becomes non-responsive during a software download, it is often not necessary to replace it. It can usually be recovered using VIDA Software Advanced Test. If the battery energy control module cannot be recovered using VIDA, create a Vehicle Report, Support Needed.

**Circuit board:** This part is most often used when there is an intermittent or permanent open in one of the circuits, such as the power, ground, CAN, interlock or Supplemental Restraint System Airbag system (SRS). In most cases however, the actual fault is in the vehicle wiring outside of the battery itself.

**Gasket:** It is not necessary to replace the gasket each time the battery is opened, but it is necessary to perform the leakage test in VIDA after a repair.

**\*Isolation test:**

It is not necessary to perform an isolation test for all hybrid issues.

It is necessary when specifically instructed to do so according to the fault tracing or repair method.

When performing measurements, it is important that the AA batteries in the tool are above 75% charge.

This is confirmed when you turn the meter on, briefly displaying a value.

Before you start measuring familiar yourself on how the tool displays short and open circuits.



## **VEHICLE REPORT:**

Yes, please submit a Vehicle Report if the service solution described in this TJ has no effect. Use concern area "Vehicle Report" and sub concern area "Support not needed", use function group 3113.

**In the event that a complete battery or cell module is to be replaced, a vehicle report marked Support Needed is required before ordering the battery or module.**

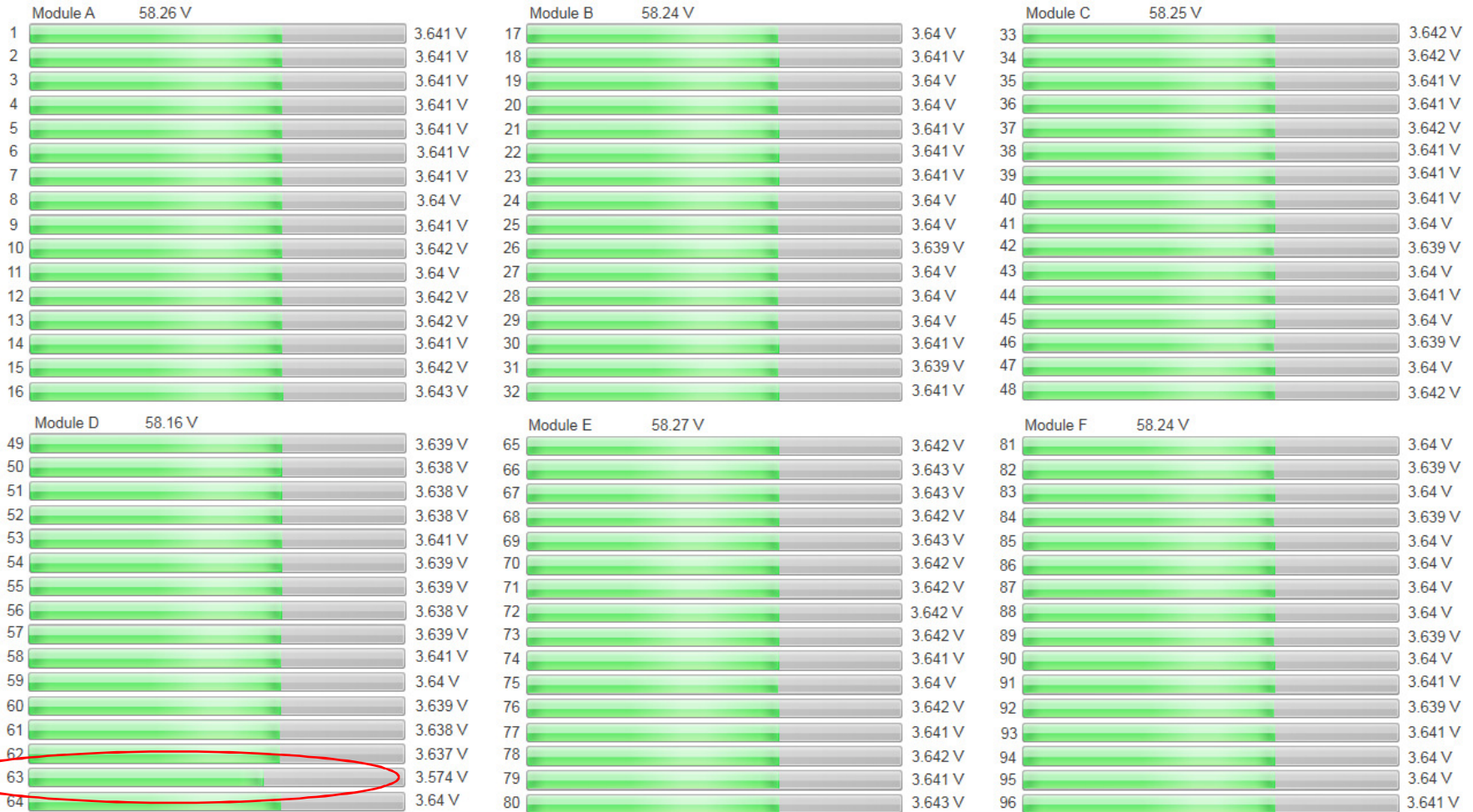
**To view TJ attachments continue to next page. This TJ has two attachments.**

High Voltage battery





# Example of Cell Fault



**BECM - Cell delta voltage**  
69 mV

**BECM - Cell module delta voltage**  
113 mV

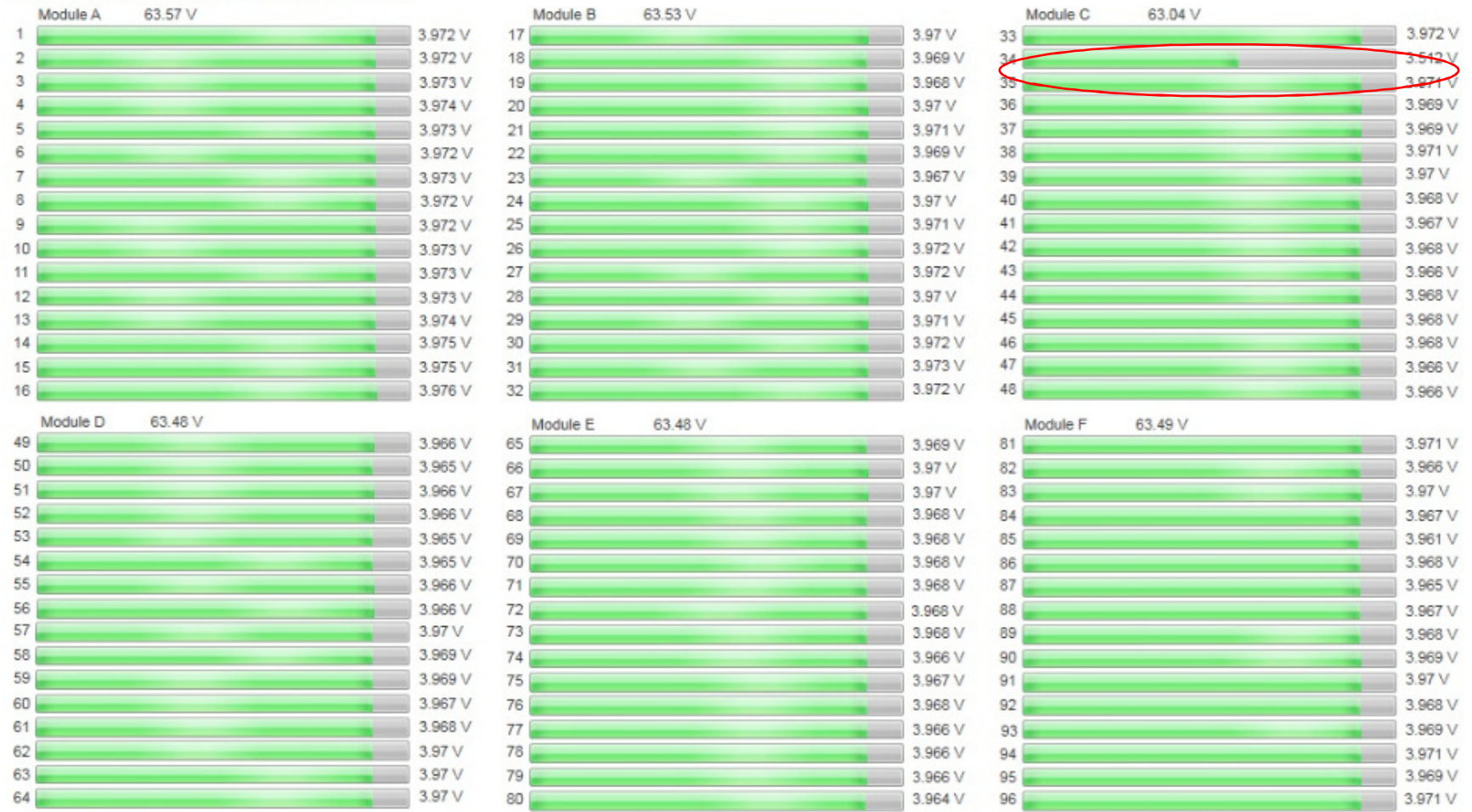
**BECM - Sum of all cell voltages**  
349.42 V

<<

Close

# Example of Cell Fault

## High voltage battery, cell voltage overview



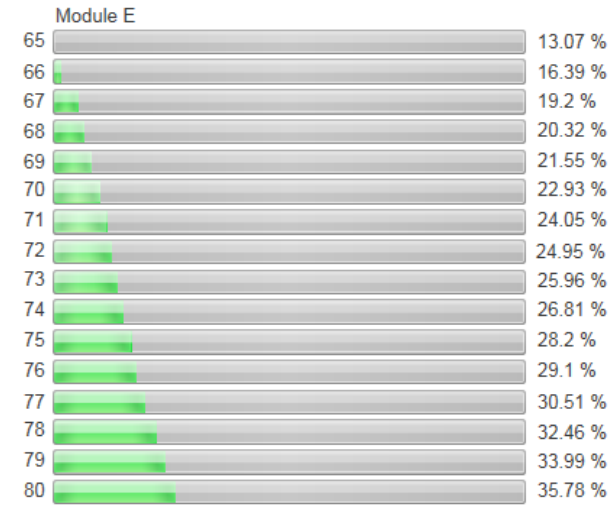
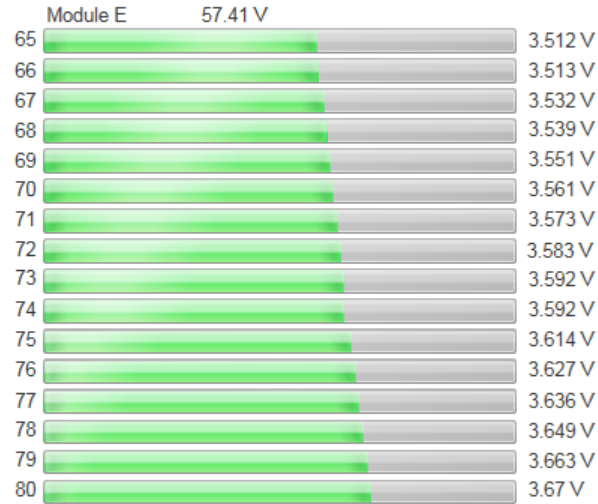
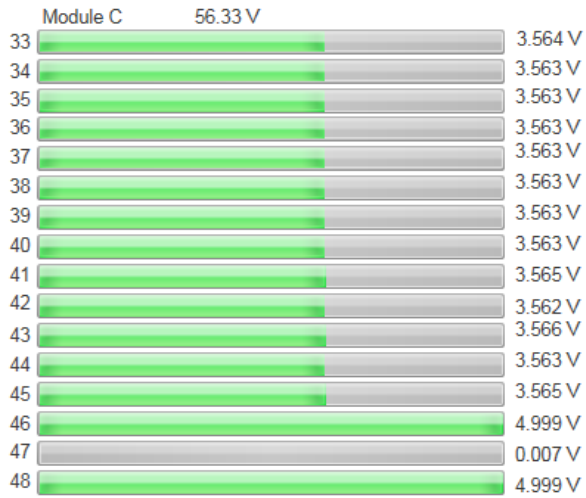
BECM - Cell delta voltage  
464 mV

BECM - Cell module delta voltage  
533 mV

BECM - Sum of all cell voltages  
380.59 V

<< Close

## Examples of CVTN faults





Type	Model Year	Replacement battery part numbers: 31473177 31491834	Replacement battery part numbers: 31499073, 32201334, 32202978 32208415, 32223588, 32263256	Replacement battery part numbers: 31673714 32263448
<b>XC90</b> (256)	<b>2016</b>	Software Product 32278420 Valid for Structure Week 15w26-17w16	Software Product 32263126 Valid for Structure Week 15w26-19w16	Software Product 32263128 (Valid 15w26-)
	<b>2017</b>			
	<b>2018</b>			
	<b>2019</b>	Not Supported		
	<b>2020</b>			
<b>XC60</b> (246)	<b>2018</b>	Not Supported	Software Product 32263126 Valid for Structure Week 15w26-19w16	Software Product 32263128 (Valid 15w26-)
	<b>2019</b>			
	<b>2020</b>		Not Supported	
<b>S90</b> (238)	<b>2018</b>	Not Supported	Software Product 32263132 Valid for Structure Week 15w26-19w16	Software Product 32263134 (Valid 15w26-)
	<b>2019</b>			
	<b>2020</b>		Not Supported	
<b>S/V60</b> (224/225)	<b>2019</b>	Not Supported	Software Product 32290007	Software Product 32290008
	<b>2020</b>		Not Supported	