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Coding Information

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Title: Electric Vehicle State of Charge Calibration

Applies To: All Electric Vehicles

CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

04/23/2025 - Initial Article Release.

DESCRIPTION

This document will walk the user through correcting the battery State of Charge (SOC) calibration.

It has been found on some electric vehicles that the SOC calibration can become incorrect over time. Often times this is from the vehicle sitting a long period without use or charging the batteries. This will result in the SOC value on the cluster becoming inaccurate compared to the SOC value in the battery packs. This may also result in a low value for the vehicle range estimate on the EGC.

SYMPTOMS

- Estimated range remaining displayed on the cluster is low for the given remaining SOC.
- SOC decreases significantly faster than expected while operating the vehicle.

DTC/Light	Description
N/A	N/A

SPECIAL TOOLS / SOFTWARE

Tool Description	Tool Number
Service Diagnostic Solutions (SDS)	
Electric Vehicle "Y" Adaptor Cable	08-801-01
Nexiq USB 2 or Nexiq USB 3	

Electric Vehicle "Y" Adaptor Cable 08-801-01 **must** be used when diagnosing and recording signals with SDS. The EV Y adapter cable can only be used with the NEXIQ USB2 or NEXIQ USB3 adapter.

SERVICE PARTS INFORMATION

Kit Description	Part number	Qty. Required	Notes

	No. Open a technical service case file and share the battery health report on the case.
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Step	Action	Decision
3	DIAGNOSTIC: Using the battery health report, review the battery pack voltage and SOC values from the 6 or 9 high voltage batteries. Are the SOC values with 5% of each other highest to lowest?	Yes. Continue to step 4.
		No. Open a technical service case file and share the battery health report on the case.

Step	Action	Decision
4	DIAGNOSTIC: <ul style="list-style-type: none"> Review the battery pack SOC values. Average the battery pack SOC values (sum of all values, then divide by the count of numbers that were added). Round to the nearest whole number and record the value. Next review the "Display SOC%" value. Is the average battery pack SOC value within 10% of the "Display SOC%" value?	Yes. No change is needed.
		No. Continue to step 5.

Step	Action	Decision
5	DIAGNOSTIC: Review the average battery pack SOC value. Please select from the following:	0-19% SOC. Open a case file and share the battery health report on the case.
		20-55% SOC. Continue to step 6.
		56-70% SOC. Drive or Charge the vehicle to achieve a SOC value of 20-55% or 71-100%.
		71-100% SOC. Continue to step 6.

Step	Action	Decision
6	DIAGNOSTIC: Change the State of Charge values in the BMS. See instructions below. (Link to Repair Steps) It is recommended to confirm the battery pack average SOC value compared to the "Display SOC%" when at both the lower range, 20-55%, and again at the upper range, 90-100%. Please select from the following:	SOC was at or below 55%. Charge to 100%, restart at step 1 to confirm the readings.
		SOC was at or above 56%. Drive/discharge to achieve approximately 40%, restart at step 1 to confirm the readings.

WARMING THE HIGH VOLTAGE BATTERIES

If the high voltage batteries are below 50°F then it will be difficult to have confidence in evaluating the readings or having confidence after a change is made. There are three ways to warm up the batteries.

- If the batteries are at a high state of charge it is recommended to drive the vehicle for the purpose of warming the batteries.
- If the batteries are at a lower state of charge it is recommended to charge the vehicle for the purpose of warming the batteries. Note that charging with a level 2 (AC) charger is preferred in this case as the slower charge rate will give the batteries more time to warm up.
- Parking indoors overnight is another option as the batteries will warm naturally.

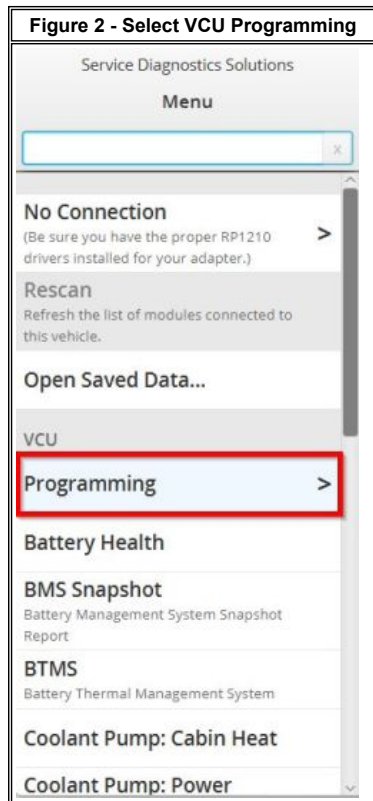
When driving or charging is completed it is recommended to park indoors if possible to avoid losing the increased temperature of the high voltage batteries.

[\(Return to Diagnostics step 1\)](#)

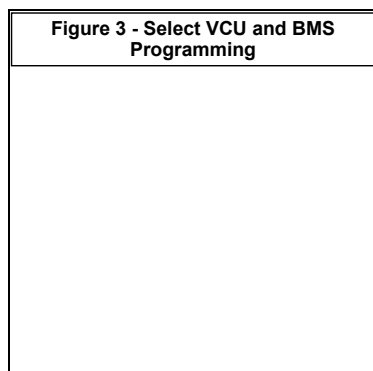
REPAIR STEPS

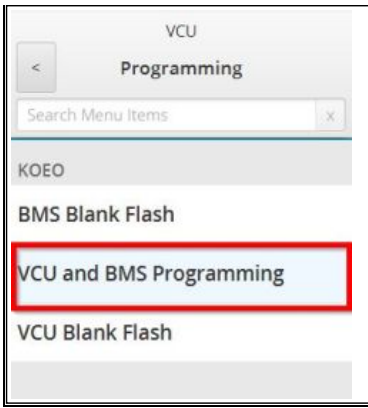
SDS BMS state of charge parameter change instructions

- 1) Open SDS and connect to the vehicle. No need for a health report at this time.
- 2) On the left side menu select VCU Programming.

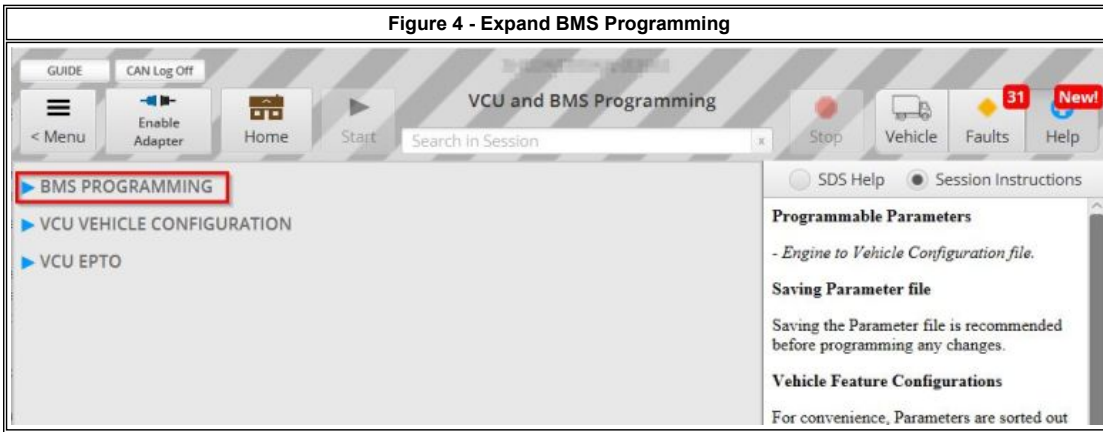


- 3) Select VCU and BMS Programming

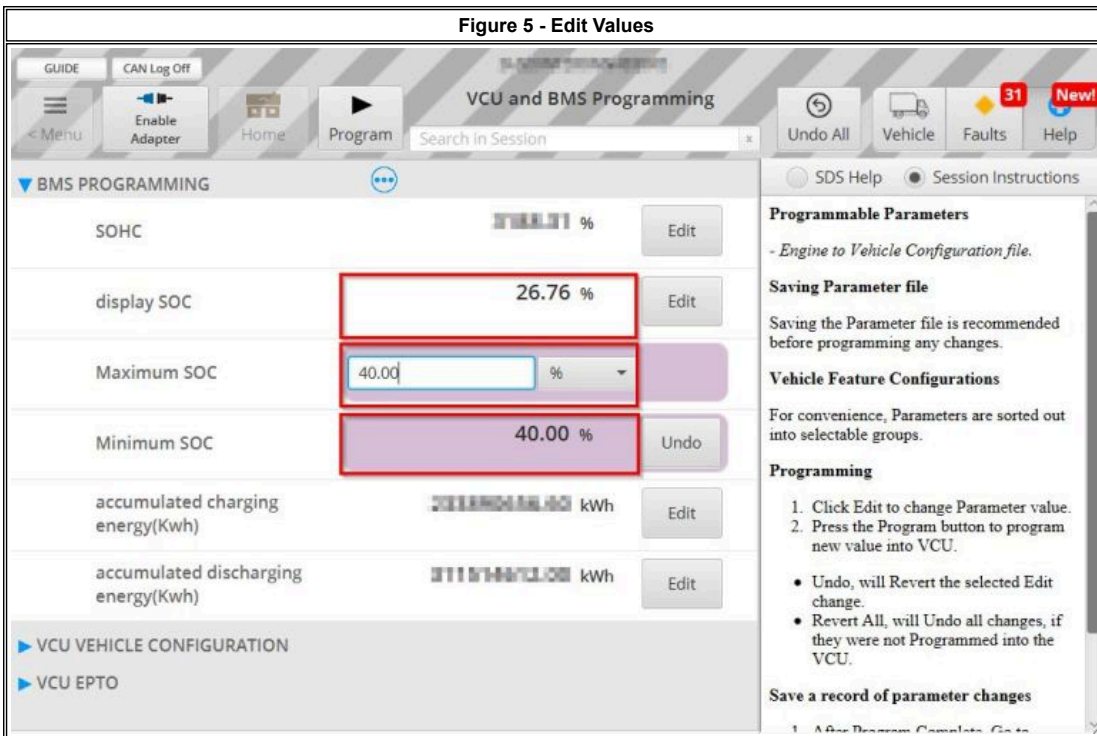




4) Expand BMS Programming



5) Edit Display SOC, Maximum SOC, and Minimum SOC to the average battery pack SOC value identified in step 4. In the example below a parameter that has not been edited yet will be white in color and once edited will be shaded light purple in color. Set all three values to the same number as you identified in step 4.



6) Then select the Program button at the top of the screen to program in the new values. Follow the onscreen prompts to complete the programming.

Figure 6 - Program Values

The screenshot displays the 'VCU and BMS Programming' interface. At the top, there is a navigation bar with buttons for 'GUIDE', 'CAN Log Off', 'Home', and 'Program' (highlighted with a red box). A search bar labeled 'Search in Session' is also present. Below the navigation bar, the 'BMS PROGRAMMING' section is expanded, showing a list of parameters:

Parameter	Value	Action
SOHC	100.00 %	Edit
display SOC	40.00 %	Undo
Maximum SOC	40.00 %	Undo
Minimum SOC	40.00 %	Undo
accumulated charging energy(Kwh)	134872045.00 kWh	Edit
accumulated discharging energy(Kwh)	184783944.00 kWh	Edit

Below the BMS programming section, there are links for 'VCU VEHICLE CONFIGURATION' and 'VCU EPTO'. On the right side, a help panel titled 'Programmable Parameters' provides instructions on how to use the interface, including steps for editing values and using the 'Program' button.

7) Return to Diagnostics step 6. ([Link to Diagnostics step 6](#))

OTHER RESOURCES

SDS user guide. [4328790](#)
EV resource center. [RC0900002](#)
SRT homepage [Link](#)
Master Service Information [Link](#)

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