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Coding Information

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Title: Electric Vehicle High Voltage Battery Diagnostics

Applies To: IC Bus® Electric CE Series & International® eMV™ Series

CHANGE LOG

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

08/04/2026 - Updated link to 3-string battery detail form
12/02/2025 - Modified instructions for diagnostics / replacements
11/07/2023 - Provided link to SDS EV Battery Health Report Session Instructions
04/21/2023 - Initial Article Release

DESCRIPTION

This document will guide the user through diagnosing a failed high-voltage battery when there is a suspected concern indicated by symptom or fault code.

SYMPTOMS

Diagnostic Trouble Codes & Dashboard Indicator Lights:

DTC/Light	Description
SPN 8100 FMI 2	HVESS State of Charge Status : Data Erratic, Intermittent Or Incorrect
SPN 5923 FMI 4	HVESS Lowest Cell Voltage : Voltage Below Normal, Or Shorted To Low Source
SPN 5923 FMI 17	HVESS Lowest Cell Voltage : Data Valid But Below Normal Operating Range – Least Severe Level
SPN 5924 FMI 2	HVESS Cell Voltage Differential Status : Data Erratic, Intermittent Or Incorrect

Customer Observations or Concerns:

Vehicle may derate or experience a shut down requiring a vehicle tow
Decreased driving range
Malfunction Indicator Lamp (MIL)
Power Limitation Indicator Lamp (PLIL - Turtle Light)
Red Stop Lamp (RSL)



SPECIAL TOOLS / SOFTWARE

Tool Description	Tool Number	Comments	Instructions
EZ-Tech® or EST	N/A	w/Service Diagnostics Solutions (SDS) Software	Version 1.6.18 or higher
NEXIQ USB Link 2 or 3	NQ124032 / 121052		
Electric Vehicle "Y" Adapter Cable	08-801-01	Works w/USB-LINK 2 or 3	
12v Battery Charger	PSC550CC	55 Amp	
Digital Multimeter	Fluke 1587	Category 3	
High Voltage PPE	N/A		
HV Battery Adapter Plate	08-529-04		
HV Battery Mount Adapter Bracket	08-529-03		
Lift Assembly	08-529-01		
HV Battery Cap Kit	08-529-05		

SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required	Notes
BATTERY, HIGH VOLT RENEWED	5013171R91	1	as diagnosed
BATTERY , HIGH VOLTAGE	4207165C91	1	as diagnosed

NOTE:

Tech service will place High-Voltage Battery order as diagnosed, dealer will not be required to order.

NOTE:

Do not damage packaging of the new HV Battery. This packaging will be used to send back the failed HV Battery. Refer to G-Letters within other resources for HV battery returns

DIAGNOSTIC STEPS

WARNING! To prevent personal injury and / or death, or damage to property, park vehicle on hard flat surface, turn the engine off, set the parking brake, and install wheel chocks to prevent the vehicle from moving in both directions.

WARNING! To prevent personal injury and / or death, always wear safe eye protection when performing vehicle maintenance.

WARNING! To prevent personal injury and / or death, or damage to property, keep flames or sparks away from vehicle and do not smoke while servicing the vehicle's batteries. Batteries expel explosive gases.

WARNING! To prevent personal injury and / or death, NEVER service a high voltage vehicle without completing high-voltage safety training. Before working on vehicle, read and obey all High-Voltage Safety and Lock-Out Tag-Out procedures and information.

WARNING! To prevent personal injury and / or death, wear and use approved high-voltage Personal Protective Equipment (PPE) when near a high-voltage electric vehicle. Inspect PPE before use. Do not use gloves or other PPE with expired dates, holes, cracks, or damage. NEVER touch energized orange highvoltage cables or high-voltage components without wearing approved highvoltage PPE.

WARNING! To prevent personal injury and / or death, read all information in the Safety Information and High-Voltage Safety sections of the service manual.

WARNING! To prevent personal injury and / or death, or damage to property, remove the ground cable from the negative terminal of the battery box before disconnecting any electrical components. Always connect the ground cable last.

Step	Action	Decision
1	DIAGNOSTIC: Is there a suspected concern indicated by symptom or fault code for the high-voltage battery(s)?	Yes. Perform detailed battery health report, refer to IK4300027 - SDS EV Battery Health Session Instructions . Open technical service case file and attach detailed battery health report to case file. Proceed to step 2. No. Please refer to diagnostics of any non-related active faults, or end diagnostics if no symptom/faults present.

Step	Action	Possible Decisions
2	DIAGNOSTIC: Follow next steps provided within the technical service case file. Next steps may vary based on analysis of the detailed battery health report. NOTE: <u>DO NOT</u> proceed with any charging or discharging sessions without tech service guidance.	1. Charge, discharge, and test drive of vehicle 2. State of Charge (SOC) calibration 3. High-voltage battery(s) replacement

	If the high-voltage battery(s) require replacement, record/document voltages and serial #s on the proper battery detail form and attach to case file. 2-String Battery Detail Form 3-String Battery Detail Form Follow proper voltage measurement steps below. 4. Return vehicle back to service
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REPAIR STEPS

WARNING! To prevent personal injury and / or death, or damage to property, park vehicle on hard flat surface, turn the engine off, set the parking brake, and install wheel chocks to prevent the vehicle from moving in both directions.

WARNING! To prevent personal injury and / or death, always wear safe eye protection when performing vehicle maintenance.

WARNING! To prevent personal injury and / or death, or damage to property, keep flames or sparks away from vehicle and do not smoke while servicing the vehicle's batteries. Batteries expel explosive gases.

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WARNING! To prevent personal injury and / or death, read all information in the Safety Information and High-Voltage Safety sections of the service manual.

High-Voltage Battery Detail Form Instructions

1. Perform high-voltage isolation level 3; refer to the proper section within the [service manual](#)
2. Wearing and using approved high-voltage Personal Protective Equipment (PPE), use a category III digital multimeter to measure the voltage of the high-voltage battery. Place the positive multimeter probe on the high-voltage positive contact slot (1) and the negative meter probe on the high-voltage negative contact (2).



Figure 1: HV Battery Voltage Measurement

Item 1: High-Voltage Positive Contact Slot

Item 2: High-Voltage Negative Contact Slot

3. Record readings along with the serials #s of the high-voltage battery(s) on the proper battery detail form.
4. Submit the battery detail form on the case file and wait for next steps.

High-Voltage Battery Replacement

1. Perform high-voltage isolation level 3; refer to the proper section within the [service manual](#)
2. Do not remove HV Battery(s) until the following voltage measurements are completed
 - Check voltage measurement of new HV Battery(s)
 - Re-measure each pack within the string of the identified Battery(s) to be replaced.
 - New battery must be within 0.300V (300mV) of each pack within the string.
 - **If battery is not within spec, please notify tech service before proceeding**
3. Follow proper [service manual](#) for removal and installation of HV Battery(s)
4. After replacement, please perform another detailed battery health report and attach to case file
5. Road test vehicle
6. Please follow [Failed EV Battery Return Program - WIL2300001](#), to return battery(s)

WARRANTY INFORMATION

Warranty Claim Coding:

Refer to the [Warranty Coding Manual](#) for Group and Noun Codes.

Standard Repair Times:

Refer to the [SRT Manual](#) for Repair Times

OTHER RESOURCES

[Master Service Information Site](#)

[Failed EV Battery Return Program - WIL2300001](#)

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Feedback Information

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