

	<b>Regulatory Recall Remedy Method-Sheet</b>		<b>RRM0015</b>
	<b>21V191 Contactors Excess Resistance May Cause Battery Shutdown</b>		Rev: 0
Author: LC,MM,PZ	PO: Dir GRC	Appr: Dir GRC	Date: 04/12/2021

## 1 PURPOSE

Safety Recall Remedy Instructions: Contactors

## 2 AFFECTED VEHICLES

Model Year	Model	VIN Range (last 8 digits)
2019	FUV Evergreen	KER00000 - KER00056
2020	FUV Evergreen	LER00001 - LER00007
2020	FUV Evergreen	LER00009 - LER00091
2020	FUV Evergreen	LER00096 - LER00096

## 3 BACKGROUND

The electronic drivers in some HV contactors may malfunction, causing these contactors to have a higher contact resistance than intended, potentially resulting in overheating. If HV contactors overheat, this can lead to either a blown fuse or opening of the contactors by the BMS, including the traction contactor opening, both of which will lead to unexpected battery shutdown and immediate loss of traction-power, which would make the vehicle more difficult to control and increase the likelihood of a crash.

## 4 OWNER NOTIFICATION

Owners of affected vehicles will be sent a notification of this campaign.

## 5 CORRECTIVE ACTION

A trained Arcimoto Service Technician will remedy the defective parts by replacing the HV contactors.

## 6 PARTS INFORMATION

<ul style="list-style-type: none"> <li>• <a href="#">Panel - Left Lower Dash (002982)</a></li> <li>• <a href="#">Panel - Right Lower Dash (002983)</a></li> <li>• <a href="#">Handlebar Assy (002109)</a></li> <li>• <a href="#">Panel - Left Dash Collar (002970)</a></li> <li>• <a href="#">Panel - Right Dash Collar (002971)</a></li> <li>• <a href="#">Display Assy (004612)</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Battery Electronics Assy (003524)</a></li> <li>• <a href="#">Harness - BMS (002309)</a></li> <li>• <a href="#">Busbar - Mid-Pack (003024)</a></li> <li>• <a href="#">Battery Bay Assy (003196)</a></li> <li>• <a href="#">Battery Electronics Assy V2 (004947)</a></li> </ul>
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<ul style="list-style-type: none"> <li>● <a href="#">Dash Center Panel Assy (004975)</a></li> <li>● <a href="#">Seat Base (004140)</a></li> <li>● <a href="#">Seat Back (004141)</a></li> <li>● <a href="#">Cargo Box Assy (003158)</a></li> <li>● <a href="#">Rear Left Side Panel (002998)</a></li> <li>● <a href="#">Rear Right Side Panel (002999)</a></li> <li>● <a href="#">Rear Center Panel Assy (003000)</a></li> <li>● <a href="#">Rear Wheel Liner Panel (003001)</a></li> <li>● <a href="#">Chassis Lid (003144)</a></li> <li>● <a href="#">Backbone Assembly (003105)</a></li> <li>● <a href="#">B-Return Harness (003739)</a></li> </ul>	<ul style="list-style-type: none"> <li>● <a href="#">Busbar - Contactor to Battery (004910)</a></li> <li>● <a href="#">Backbone Assembly (003105)</a></li> <li>● <a href="#">Rear Large Access Plate (004906)</a></li> <li>● <a href="#">Busbar - Contactor to Battery (004910)</a></li> <li>● <a href="#">B-Return Harness V2 (004956)</a></li> <li>● <a href="#">Busbar Heatsink (004950)</a></li> <li>● <a href="#">FUSE, 400A, 300V (004955)</a></li> </ul>
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**Note:** The first ten vehicles serviced for this recall will use (new) Battery Electronics Assy V2 ([004947](#)) parts. After that, all vehicles serviced for this recall will use (refurbished) “004947-R” Battery Electronics Assy V2 parts.

## 7 RELATED DOCUMENTS AND RESOURCES

- [Battery Electronics Assy V2 \(004947\)](#)
- [Backbone Assembly \(003105\)](#)

## 8 SAFETY REQUIREMENTS

### 8.1 Required Training

Arc-Flash Safety Training

### 8.2 Required Protective Gear

Full PPE, category 2, 8 Cal/cm2 (Suit, Gloves and Helmet) for use by the technician working directly on the vehicle

6-foot non-conductive pole or rod, for use by Spotter if necessary

## 9 SERVICE PROCEDURE

9.1 Remove the Left Lower Dash Panel ([002982](#)) and the Right Lower Dash Panel ([002983](#)).

9.2 Remove HV Power From the FUV:

9.2.1 Press the red button on the 12V Circuit Breaker to flip the yellow RESET lever down to the OFF position. The 12V Circuit Breaker is accessed via the right-side access port.

9.2.2 On each of the (RED and YELLOW) Power Output Connectors, press the locking tab down, and gently pull to unplug the Power Output Connectors. The Power Output Connectors are accessed via the left-side service port.

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- 9.3 Remove the Handlebar Assy ([002109](#)).
- 9.4 Remove the Left Dash Collar Panel ([002970](#)) and the Right Dash Collar Panel ([002971](#)).
- 9.5 Remove the Display Assy ([004612](#)).
- 9.6 Remove the Center Dash Panel Assy ([004975](#)).
- 9.7 Remove the Front and Rear Seat Bases ([004140](#)).
- 9.8 Remove the Front Seat Back ([004141](#)).
- 9.9 Remove the Cargo Box Assy ([003158](#)), if equipped.
- 9.10 Remove the Rear Left Side Panel ([002998](#)) and the Rear Right Side Panel ([002999](#)).
- 9.11 Remove the Rear Center Panel Assy ([003000](#)).
- 9.12 Remove the Rear Wheel Liner Panel ([003001](#)).
- 9.13 Safely elevate the front of the vehicle and set on jack stands.
- 9.14 Disconnect the three connectors on top of the Battery Electronics Assy ([003524](#)):
  - 9.14.1 Disconnect the orange 2-pin connector (HV Accessory Bulkhead Connector Harness ([003361](#))).
  - 9.14.2 Disconnect the blue 18-pin connector (Backbone Harness ([003343](#))).
  - 9.14.3 Disconnect the two-position Powerlok 300 Connector Assy ([003360](#)).
- 9.15 Remove the 22 hex flange bolts (M6-1.0 X 12) that secure the Chassis Lid to the Backbone Assy. **Do not remove the Chassis Lid until Arc-Protection is deployed (see 16).**
- 9.16 Remove the eight socket head cap screws (SHCS, M5-0.8 X 10 ZN) and washers (M5) that secure the BatteryElectronics Assy to the Chassis Lid.
- 9.17 **At this point, the technician working on the vehicle must put on full Arc-Protection gear (PPE, category 2, 8Cal/cm2 Suit, Gloves and Helmet) before proceeding.**
- 9.18 **Position the Spotter, equipped with a 6-foot non-conductive pole or rod, approximately six feet away from the vehicle. The Spotter must be positioned such that they can clearly observe the technician and intervene in case of an emergency before proceeding.**
- 9.19 Remove the Chassis Lid ([003144](#)).
- 9.20 Remove the two 4-40 X 1/8" security screws, then disconnect the BMS Connector on the Front Battery Module.

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- 9.21 Remove the two 4-40 X 1/8" security screws, then disconnect the BMS Connector on the Rear Battery Module.
- 9.22 Remove the Mid-Pack Busbar ([003024](#)) which connects the Front and Rear Battery Modules (located in the center of the Battery Bay):
  - 9.22.1 Remove the black plastic safety cap from the rear (-) terminal on the Front Battery Module.
  - 9.22.2 Remove the red plastic safety cap from the front (+) terminal on the Rear Battery Module.
  - 9.22.3 Remove the eight socket head cap screws (SHCS, M4-0.7 X 16) and washers (4.3 ID/ 9 OD / 1.0 thick, BellevilleSpring), that secure the Mid-Pack Busbar ([003024](#)) to the Front and Rear Battery Modules, and remove the Mid-Pack Busbar.
  - 9.22.4 Replace the Safety Caps.
- 9.23 Disconnect the BMS Harness ([002309](#)) from the Battery Electronics Assy.
- 9.24 Remove the BMS Harness and set it aside.
- 9.25 Disconnect the Mid-Pack Busbar ([003024](#)) that connects the Front Battery Module to the Battery Electronics Assy:
  - 9.25.1 Remove the red plastic safety cap from the front (+) terminal on the Front Battery Module.
  - 9.25.2 Remove the four socket head cap screws (SHCS, M4-0.7 X 16) and washers (4.3 ID/ 9 OD / 1.0 thick, BellevilleSpring) that secure the Mid-Pack Busbar ([003024](#)) to the positive terminal on the Front Battery Module.
  - 9.25.3 Replace the Safety Cap.
- 9.26 Unclip the four cable ties that secure the B-Return Harness to the Front and Rear Battery Modules.
- 9.27 Disconnect the B-Return Harness ([003739](#)) from the Battery Electronics Assy:
  - 9.27.1 Remove the four screws (SHCS, M4-0.7 X 16) and washers (4.3 ID/ 9 OD / 1.0 thick, Belleville Spring) that secure the B-Cable to Battery Electronics Busbar ([003787](#)) to the front-end terminal on the B-Return Harness.
  - 9.27.2 Move the B-Return Harness away from the Battery Electronics Assy.
- 9.28 Remove the FCG Connector on the Backbone Harness ([003343](#)) from the Quick Connect Tab on the front left of the Battery Bay.

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- 9.29 Pull the Backbone Harness and the BMS Harness up and out of the Battery Bay, to provide slack to allow removal of the Battery Electronics Assy.
- 9.30 From beneath the vehicle, remove the six hex flange bolts (M6-1.0 X 12) that secure the Battery Electronics Assy ([003524](#)) to the Battery Bay Assy ([003196](#)).
- 9.31 Gently lift the Battery Electronics Assy out of the Battery Bay Assy, taking care not to damage the wiring and connectors.
- 9.32 Remove the Backbone Harness ([003343](#)) from the Battery Electronics Assy:
- 9.32.1 Slide the red plastic Slide-Clip off of the blue BFJ connector.
- 9.32.2 Push the blue BFJ connector through the connection plate, and remove the Backbone Harness.
- 9.32.3 Move the Backbone Harness BFJ out of the way, but leave it installed in the Battery Bay because it will be used in the new Battery Electronics Assy V2 (see step 9.35).
- 9.33 Disconnect all connectors from the Battery Electronics Assy, and set the Battery Electronics Assy aside.
- 9.34 Remove the Backbone Harness from the (new) Battery Electronics Assy V2 ([004947](#)):
- 9.34.1 Slide the red plastic Slide-Clip off of the blue BFJ connector.
- 9.34.2 Push the blue BFJ connector down and through the connection plate, and remove the Backbone Harness.
- 9.35 Install the Backbone Harness that was removed from the original Battery Electronics Assy (see step 28) into the new Battery Electronics Assy V2:
- 9.35.1 Insert the blue BFJ connector on the Backbone Harness from underneath the connection plate on the Battery Electronics Assy V2.
- 9.35.2 Slide the red plastic Slide-Clip onto the BFJ connector to secure it to the connection plate.
- 9.36 Install a new Battery Electronics Assy V2 ([004947](#)):
- Note:** The first ten vehicles serviced for this recall will use (new) Battery Electronics Assy V2 ([004947](#)) parts. After that, all vehicles serviced for this recall will use (refurbished) “004947-R” Battery Electronics Assy V2 parts.
- 9.36.1 Reconnect all connectors to the Battery Electronics Assy V2.
- 9.36.2 Insert the Battery Electronics Assy V2 into position at the front of the Battery Bay Assy. Ensure that the straight horizontal Busbar ([003024](#)) extending from the Battery

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Electronics Assy V2 is properly aligned with the front (+) terminal on the Front Battery Module.

9.36.3 Use six hex flange bolts (M6-1.0 X 12) to secure the Battery Electronics Assy V2 to the Battery Bay Assy. Use new fasteners and torque all bolts to 8 FT-LBS, and apply torque seal.

9.36.4 Attach the Contactor to Battery Busbar ([004910](#)) to the front (+) terminal on the Front Battery Module. Use new fasteners (four screws (SHCS, M4-0.7 X 16) and washers (4.3 ID/ 9 OD / 1.0 thick, Belleville Spring). Torque all screws to 25 IN-LBS, and apply torque seal.

9.37 Remove the busbar that connects the Rear Battery Module to the Rear (Negative Terminal) Contactor Assy ([003742](#)):

Note: This busbar is an assembly of three component busbars ([003729](#), [003730](#) and [003024](#)). Leave this busbar assembly intact, and remove it as one piece.

9.37.1 Remove the black plastic safety cap from the rear (-) terminal on the Rear Battery Module.

9.37.2 Remove the four socket head cap screws (SHCS, M4-0.7 X 16) and washers (4.3 ID/ 9 OD / 1.0 thick, Belleville Spring) that secure the busbar to the negative terminal on the Rear Battery Module.

9.37.3 Remove the bolt that secures the busbar to the Rear Contactor Assy.

9.37.4 Remove the busbar and set aside.

9.38 Remove the B-Return Harness ([003739](#)):

9.38.1 Remove the bolt that secures the B-Return Harness to the Rear Contactor Assy.

9.38.2 Pull the B-Return Harness (with Busbar - Rear Contactor to Fuse ([003731](#)) and 400A Fuse ([004955](#)) attached) out of the Battery Bay, and set aside.

9.39 Remove the Rear (Negative Terminal) Contactor Assy ([003742](#)):

9.39.1 Remove both socket head cap screws (SHCS, M5-0.8 X 20) that secure the Rear Contactor Assy to the Battery Bay.

9.39.2 Pull the Rear Contactor Assy out of the Battery Bay and set aside.

9.40 Install the new B-Return Harness V2 ([004956](#)), pre-assembled with Heatsink Busbar ([004950](#)) and 400A Fuse ([004955](#)):

Note: Before installing the new B-Return Harness V2 ([004956](#)), visually check the crimp orientation of the rear 5/16" cable-lug terminal. Ensure that the crimp

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orientation of the rear cable-lug terminal is perpendicular (not parallel) to the surface of the cable-lug terminal.

If the crimp orientation on the new B-Return Harness V2 ([004956](#)) is incorrect, the cable must be refurbished before it can be used.

9.40.1 Route the front end of the B-Return Harness V2 through the Access Port at the rear of the Backbone Assy, to the Battery Electronics Assy V2 (at the front)

9.40.2 Attach the front connector of the B-Return Harness V2 to the B-Cable to Battery Electronics Busbar ([003787](#)) extending from the Battery Electronics Assy V2. Use new fasteners (four socket head cap screws (SHCS, M4-0.7 X16) and washers (4.3 ID/ 9 OD / 1.0 thick, Belleville Spring). Torque all screws to 25 IN-LBS, and apply torque seal.

9.40.3 Install four Cable Ties ([002259](#)) at the four Cable Tie Mounts ([003757](#)) to secure the B-Return Harness to the Front and Rear Battery Modules.

9.41 Install the new Rear (Negative Terminal) Contactor Assy ([003742](#)):

9.41.1 Insert the new Rear Contactor Assy into position through the Access Port at the rear of the Backbone Assy. The raised notch on the top surface of the Contactor should face to the rear.

9.41.2 Use two socket head cap screws (SHCS, M5-0.8 X 20) to secure the new Rear Contactor Assy to the Battery Bay. Use new fasteners and torque both screws to 25-30 IN-LBS, and apply torque seal.

9.42 Install the busbar that connects the Rear Contactor Assy to the Rear Battery Module:

9.42.1 Attach the top of the busbar to the negative terminal on the Rear Battery Module. Use new fasteners (four screws (SHCS, M4-0.7 X 16) and washers (4.3 ID/ 9 OD / 1.0 thick, Belleville Spring). Torque all screws to 25 IN-LBS, and apply torque seal.

9.42.2 Use the nut supplied with the contactor, and washer (8.4 ID/ 18 OD / 2.0 thick, Belleville Spring) to secure the bottom of the busbar to the left-side post on the Rear Contactor Assy. Torque nut to 7.5 FT-LBS, and apply torque seal.

9.42.3 Replace the black plastic safety cap on the rear (-) terminal on the Rear Battery Module.

9.43 Attach the Heatsink Busbar (attached to the B-Return Harness V2 ([004956](#))) to the Rear Contactor Assy:

9.43.1 Position the Heatsink so that the fins face to the front.

9.43.2 Use the nut supplied with the contactor, and washer (8.4 ID/ 18 OD / 2.0 thick, Belleville Spring) to secure the bottom of the busbar to the right-side post on the Rear Contactor Assy. Torque nut to 7.5 FT-LBS, and apply torque seal.



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- 9.44 Replace the Rear Large Access Plate ([004906](#)), and secure it with silicone bead and four hex flange bolts (M6-1.0 X12). Torque bolts to 8 FT-LBS, and then apply torque seal.
- 9.45 Tuck the harnesses in the Battery Bay between the left side of the Battery Modules and the wall of the Battery Bay.
- 9.46 Re-install the Mid-Pack Busbar ([003024](#)). Use new fasteners (four socket head cap screws (SHCS, M4-0.7 X 16) and washers (4.3 ID/ 9 OD / 1.0 thick, Belleville Spring). Torque all screws to 25 IN-LBS, and apply torque seal.
- 9.47 Re-connect the BMS Harness ([002309](#)) in the following order:
  - 9.47.1 First, connect the BMS Connector on the Rear Battery Module, and secure the connector with two 4-40 X 1/8" security screws.
  - 9.47.2 Next, connect the BMS Connector on the Front Battery Module, and secure the connector with two 4-40 X 1/8" security screws.
  - 9.47.3 Re-connect the front end connectors in the Battery Electronics Assy.
- 9.48 Reinstall the Chassis Lid ([003144](#)) on the Backbone Assy ([003105](#)). Use 22 hex flange bolts (M6-1.0 X 12). Torque all bolts to 8 FT-LBS, and apply torque seal.
- 9.49 Reinstall the Rear Wheel Liner Panel ([003001](#)).
- 9.50 Reinstall the Rear Center Panel Assy ([003000](#)).
- 9.51 Reinstall the Rear Left Side Panel ([002998](#)) and the Rear Right Side Panel ([002999](#)).
- 9.52 Reinstall the Cargo Box Assy ([003158](#)), if equipped.
- 9.53 Reinstall the Front Seat Back ([004141](#)).
- 9.54 Reinstall the Front and Rear Seat Bases ([004140](#)).
- 9.55 Reinstall the Center Dash Panel Assy ([004975](#)).
- 9.56 Reinstall the Display Assy ([004612](#)).
- 9.57 Reinstall the Left Dash Collar Panel ([002970](#)) and the Right Dash Collar Panel ([002971](#)).
- 9.58 Reinstall the Handlebar Assy ([002109](#)).
- 9.59 Restore HV power to the FUV:
- 9.60 Reinstall the Left Lower Dash Panel ([002982](#)) and the Right Lower Dash Panel ([002983](#)).
- 9.61 Safely lower the FUV.



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## 10 REVISION HISTORY

Function	Role	Name	Signature	Date
Author	Tech'l Content Writer	Larry C	<insert name>	04/12/2021
Author	GRC Paralegal	Matt M	<insert name>	04/12/2021
Author	Dir GRC	Pete Z	<insert name>	04/12/2021
PO	Dir GRC	Pete Z	<insert name>	04/12/2021
Approver	Dir GRC	Pete Z	<insert name>	04/12/2021
Checker	RCP	Matt M	<insert name>	04/12/2021

Revision		Reason for change;
#	Date Issued	Summary of change from prior Revision
0	04/12/2021	Initial Issue Safety Recall Remedy Instructions: Contactors NHTSA recall ID has changed from 20V717 to 21V191