Part 573 Safety Recall Report 19V-834

Manufacturer Name : Arcimoto Inc
Submission Date : OCT 28, 2020
NHTSA Recall No. : 19V-834
Manufacturer Recall No. : NR

Manufacturer Information :

Manufacturer Name : Arcimoto Inc
Address : 2034 W. 2nd Ave
Eugene OR 97402
Company phone : 5416836293

Population :

Number of potentially involved : 18
Estimated percentage with defect : 100 %

Vehicle Information :

Vehicle 1 : 2019-2019 Arcimoto FUV
Vehicle Type : MOTORCYCLES
Body Style : OTHER
Power Train : HYBRID ELECTRIC
Descriptive Information : Affects first eighteen MY2019 vehicles produced through to 10/24/2019.
Production Dates : SEP 19, 2019 - OCT 24, 2019
VIN Range 1 : Begin : 7F7ATR312KER00000 End : 7F7ATR318KER00017 ☐ Not sequential

Description of Defect :

Description of the Defect : Due to an unintended software behavior, communication between inverters may time out.

FMVSS 1 : NR
FMVSS 2 : NR

Description of the Safety Risk : If a specific inverter message times out, this will lead to the traction contactor opening, 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.

Description of the Cause : (1) During use, cumulative CAN communication generated by Inverter2 exceeds short-term memory storage capability prior to being sent to Inverter1, resulting in missing frames of communication intended to be sent from Inverter2 to Inverter1.
(2) Software/ firmware on vehicles subject to this recall are (a) intolerant to any missing frames, and (b) not allowed to disable Inverter2 so as to drive only with Inverter1, resulting in triggering a blocking fault and Inverter1 losing communication with Inverter2.
(3) Lost communication between inverters will never be sent or received during the programmed allowed time period, resulting in the message timing

	out and traction contactor opening.
Identification of Any Warning that can Occur :	None.

Involved Components :

Component Name 1 :	NR
Component Description :	NR
Component Part Number :	NR

Supplier Identification :

Component Manufacturer

Name :	Dana Inc. (formerly SME Group)
Address :	Via della Tecnica, Z.I. 40 Arzignano (VI) Foreign States 36071
Country :	Italy

Chronology :

In late September 2019, Arcimoto received a verbal complaint regarding a vehicle that unexpectedly shut off, but was recoverable by cycling the ignition. Arcimoto immediately began researching the failure mode, identified vehicles affected, and was able to reproduce the fault as a function of inverter messages timing-out. It was determined motor inverters and software/ firmware were the sources of the failure mode, specifically (a) intolerant to any missing frames, (b) not allowed to disable a non-communicative inverter, and (c) low short-term memory storage capability. In mid October 2019 with the inverter supplier's preliminary support, a two-phase solution was initiated. The first phase modified both the frequency of these messages and the time-out period for these messages (a new "profile") and subsequently the time-out has not been reported or observed. The second phase was intended to be implemented as the permanent corrective action, which is a software/ firmware update from the inverter supplier to fix the timeout faults by addressing (a) and (b) above. The Engineering and Q&RA Departments presented research and analysis findings to Arcimoto executives on November 12, 2019, who subsequently decided on November 14, 2019 to validate findings of Safety issue from Engineering and Q&RA Departments, and notify NHTSA of a Safety Recall.
After consulting NHTSA, the first phase was determined to be a stand-alone recall, which is this recall 19V834, and the second phase was agreed to be a separate future recall, for a software upgrade to this original recall.

Description of Remedy :

Description of Remedy Program :	Owners will be notified by mail and instructed to contact Arcimoto to schedule a service appointment to have their inverter software/ firmware reprogrammed. There will be no charge to vehicle owners for this service. To the best of our knowledge, no owners have incurred any costs resulting from this defect.
How Remedy Component Differs from Recalled Component :	Arcimoto intends to implement a two-phase remedy program to robustly address the issue of inverter communication timing out. Phase One of the remedy program, already implemented on production vehicles, changes the inverter profile parameters by reducing the message-send frequency and reducing the time-out period for these messages. These two parameter changes are intended to eliminate a scenario where an inverter registers that no message has been received in a timely fashion and thus triggers the programmed fault response of opening the traction contactor and subsequent inverter shut down. After consulting NHTSA, this first phase was determined to be a stand-alone recall, which is this recall 19V834, and the second phase was agreed to be a separate future recall, for a software upgrade to this original recall.
Identify How/When Recall Condition was Corrected in Production :	Phase One: Inverter programming on vehicles in production was updated with the new profile starting October 25, 2019. Phase Two: After consulting NHTSA, the second phase was agreed to be a separate future recall, for a software upgrade to this original recall.

Recall Schedule :

Description of Recall Schedule :	Manufacturer does not have Dealers.
Planned Dealer Notification Date :	NR - NR
Planned Owner Notification Date :	JAN 20, 2020 - JAN 31, 2020

* NR - Not Reported