

Part 573 Safety Recall Report

21V-311

Manufacturer Name : Arcimoto Inc**Submission Date :** JUL 22, 2021**NHTSA Recall No. :** 21V-311**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 : 303

Estimated percentage with defect : 100 %

Vehicle Information :

Vehicle 1 : 2019-2021 Arcimoto FUV

Vehicle Type : MOTORCYCLES

Body Style : OTHER

Power Train : HYBRID ELECTRIC

Descriptive Information : Affects fifty-seven (57) MY2019 T-FUV, one-hundred twenty-six (126) MY2020 T-FUV, and sixty-five (65) MY2021 T-FUV produced from 09/19/2019 through to 04/26/2021.

Production Dates : SEP 19, 2019 - JUN 28, 2021

VIN Range 1 : Begin : 7F7ATR312KER00000	End : 7F7ATR317KER00056	<input type="checkbox"/> Not sequential
VIN Range 2 : Begin : 7F7ATR312LER00001	End : 7F7ATR310LER00126	<input type="checkbox"/> Not sequential
VIN Range 3 : Begin : 7F7ATR310MER00001	End : 7F7ATR314MER00048	<input type="checkbox"/> Not sequential
VIN Range 4 : Begin : 7F7ATR312MER00050	End : 7F7ATR313MER00056	<input type="checkbox"/> Not sequential
VIN Range 5 : Begin : 7F7ATR319MER00059	End : 7F7ATR317MER00061	<input type="checkbox"/> Not sequential
VIN Range 6 : Begin : 7F7ATR310MER00063	End : 7F7ATR31XMER00068	<input type="checkbox"/> Not sequential
VIN Range 7 : Begin : 7F7ATR318MER00070	End : 7F7ATR318MER00070	<input type="checkbox"/> Not sequential
VIN Range 8 : Begin : 7F7ATR31XMER00104	End : 7F7ATR31XMER00104	<input type="checkbox"/> Not sequential
VIN Range 9 : Begin : 7F7ATR319MER00109	End : 7F7ATR319MER00109	<input type="checkbox"/> Not sequential
VIN Range 10 : Begin : 7F7ATR317MER00111	End : 7F7ATR314MER00115	<input type="checkbox"/> Not sequential
VIN Range 11 : Begin : 7F7ATR318MER00117	End : 7F7ATR311MER00119	<input type="checkbox"/> Not sequential
VIN Range 12 : Begin : 7F7ATR311MER00122	End : 7F7ATR311MER00122	<input type="checkbox"/> Not sequential
VIN Range 13 : Begin : 7F7ATR310MER00127	End : 7F7ATR310MER00127	<input type="checkbox"/> Not sequential
VIN Range 14 : Begin : 7F7ATR314MER00129	End : 7F7ATR316MER00133	<input type="checkbox"/> Not sequential

Vehicle 2 : 2021-2021 Arcimoto Rapid Responder

Vehicle Type : MOTORCYCLES

Body Style : OTHER

Power Train : HYBRID ELECTRIC

Descriptive Information : Affects one (1) MY2021 E-Rapid Responder produced from 03/15/2021 through to 03/15/2021

Production Dates : MAR 15, 2021 - MAR 15, 2021

VIN Range 1 : Begin : 7F7AER318MER00001 End : 7F7AER318MER00001 Not sequential

Vehicle 3 : 2020-2021 Arcimoto Roadster

Vehicle Type :

Body Style :

Power Train : NR

Descriptive Information : Affects four (4) MY2020 R-Roadster, two (2) MY2021 R-Roadster, produced from 11/30/2020 through to 02/18/2021.

Production Dates : NOV 30, 2020 - FEB 18, 2021

VIN Range 1 : Begin : 7F7ARR314LER00001 End : 7F7ARR31XLER00004 Not sequential

VIN Range 2 : Begin : 7F7ARR312MER00001 End : 7F7ARR314MER00002 Not sequential

Vehicle 4 : 2020-2021 Arcimoto Deliverator-1

Vehicle Type : MOTORCYCLES

Body Style : OTHER

Power Train : HYBRID ELECTRIC

Descriptive Information : Affects six (6) MY2020 D-Deliverator-1, produced from 01/30/2020 through to 10/19/2020

Production Dates : JAN 30, 2020 - OCT 19, 2020

VIN Range 1 : Begin : 7F7ADR316LER00001 End : 7F7ADR315LER00006 Not sequential

Vehicle 5 : 2021-2021 Arcimoto Deliverator-1

Vehicle Type : MOTORCYCLES

Body Style : OTHER

Power Train : HYBRID ELECTRIC

Descriptive Information : Affects two (2) MY2021 Deliverator-1

Production Dates : JAN 01, 2021 - JUN 28, 2021

VIN Range 1 : Begin : 7F7ADR315MER00010 End : 7F7ADR317MER00011 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 : 003222 VCU, ECOTRONS, ES1274A

Component Description : VCU, ECOTRONS, ES1274A

Component Part Number : 003222

Component Name 2 : 004085 Inverter, SME, AC-X1, CAN programming inter

Component Description : Inverter, SME, AC-X1, CAN programming interface

Component Part Number : 004085

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 Sept. 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 Oct. 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 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 was a software/ firmware update from the inverter supplier to fix the timeout faults by addressing (a) and (b) above. The Eng. and Q&RA Depts. presented research and analysis findings to Arcimoto executives on 11/12/19, who subsequently decided on 11/14/19 to validate findings from the Eng. and Q&RA Dept. and NHTSA was notified. After consulting NHTSA in late 2020, the first phase was determined to be a stand-alone recall 19V834, and the second phase was agreed to be this recall, for a software upgrade to the original 19V834 recall. Validation of prototype firmware remedy was performed from late 2020 to Mar. 2021, the final production version of the firmware was approved in May 2021 and implemented in June. However, there was a bug discovered in the new software shortly after implementing the fix into service vehicles. This has resulted in the second phase of the recall being paused until a new remedy is available. The new software will be a robust solution that will eliminate the software behavior rather than mitigate the current problem.

Description of Remedy :

Description of Remedy Program : Owners will be notified by mail twice 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. Phase Two of the remedy program is a software upgrade that expands upon the code changes of the original 19V834 recall (first phase) by preventing the traction contactor opening fault response related to the subject message timeout, specifically: software/ firmware will be tolerant to a certain amount of missing frames, this will prevent the timing out between inverters and prevent the loss of traction power moving forward.

Identify How/When Recall Condition was Corrected in Production : Phase One: Per stand-alone recall 19V834, inverter programming on vehicles in production was updated with the new profile starting October 25, 2019.
Phase Two: After consulting with NHTSA, all inverter programming on vehicles in production need to eliminate the timeouts, not mitigate the timeouts with the one wheel limp home mode option.

Recall Schedule :

Description of Recall Schedule : Arcimoto does not intend to send any dealer or distributor notifications, as it has neither dealers nor distributors at this time.
Planned Dealer Notification Date : JUL 22, 2021 - JUL 29, 2021
Planned Owner Notification Date : JUL 22, 2021 - JUL 29, 2021

* NR - Not Reported