



Preliminary Information

PIC6285C Diagnostic Aid for DTCs P1AEE and P1AEF, Control Module Hybrid/EV Battery System Voltage High Voltage (Over-Voltage)

Product Investigation Review Required

Models

Brand:	Model:	Model Years:	VIN:		Engine:	Transmissions:
			from	to		
Chevrolet	Volt	2016 - 2019	All	All	All	All

Involved Region or Country	North America, China
Condition	Diagnostic Aid for DTCs P1AEE and P1AEF, Control Module Hybrid/EV Battery System Voltage High Voltage (Over-Voltage)
Cause	<p>This document is intended to help diagnose the reason P1AEE and P1AEF set in the vehicle. When these DTCs set, the control system forces the propulsion system to become inactive, the READY light will extinguish, and the Malfunction Indicator Lamp (MIL) will illuminate.</p> <p>These diagnostics set within milliseconds of the high voltage system voltage being over its voltage operating limit. It is the function of the Motor Control Modules to detect the over-voltage condition, but it is very <i>unlikely</i> that replacing the T6 Drive Motor Generator Control Module will be the correct repair. Looking at the freeze frame data captured by the Hybrid Powertrain Control Module (1), Hybrid Powertrain Control Module 2, and the Drive Motor Generator Control Modules 1 and 2, is critical to continuing with the diagnosis.</p> <p>The diagnostics are known to set due to one of four categories. Using the freeze frame data will help determine which course of action is needed for the repair. View the freeze frame information for each module individually. To do this in GDS2, use Module Diagnostics / Diagnostic Trouble Codes (DTC) / Freeze Frame/Failure Records for each module with codes.</p>

Correction:

Category 1: P1AEE and P1AEF were caused by a loss of isolation condition in the vehicle

Find the following parameters in the HPCM freeze frame:

Auxiliary Transmission Fluid pump motor Negative supply Isolation Voltage

Auxiliary Transmission Fluid pump motor Positive supply Isolation Voltage

Auxiliary Transmission Fluid Pump Motor Negative Supply Isolation Voltage	0.00	V	Hybrid Powertrain Control Module
Auxiliary Transmission Fluid Pump Motor Positive Supply Isolation Voltage	-257.32	V	Hybrid Powertrain Control Module

If one of these parameters is 0 volts in the freeze frame, then it is likely the vehicle has a loss of isolation condition.

If accompanied by DTCs P1AF0/P1AF2/P1E22 or P0C01/P0C04, then the loss of isolation will be located within the transmission, usually due to debris in the motor stators from a failed internal component.

Without the accompanying DTCs, the loss of isolation could be anywhere within the high voltage system, but the transmission is still suspect.

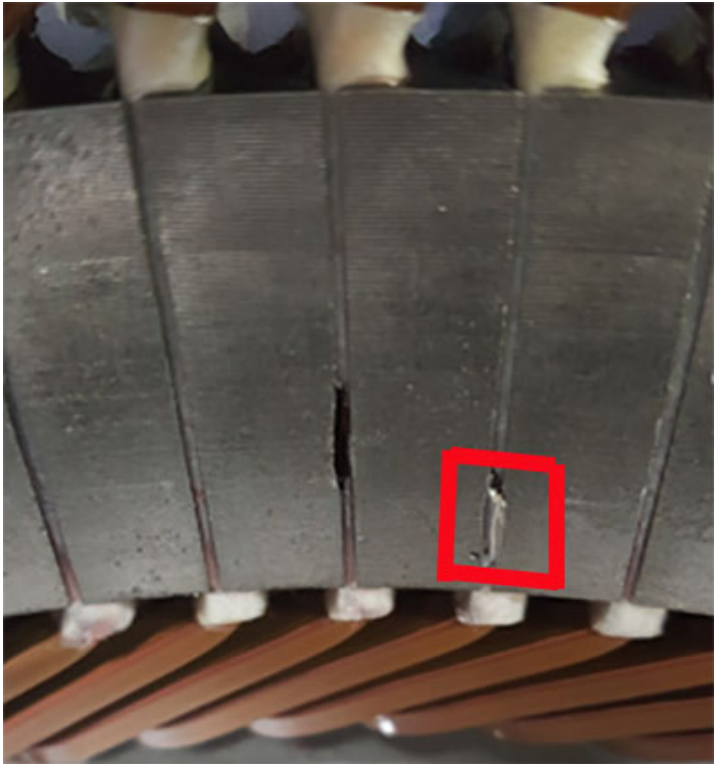
Use the *Loss of Isolation on the High Voltage Main Bus* procedure in SI to help pinpoint which subsystem is causing the loss of isolation.

Using the vehicle data to help determine the loss of isolation is preferred to troubleshooting with an insulation multi-meter due to the intermittent nature of most failures.

Note: Any loss of isolation will not self-heal and needs to be repaired for vehicle safety. Clearing codes without repair is not an acceptable remedy of this category due to the vehicle hazards created by P1AEE and P1AEF.

Examples of debris causing stator problems:





Category 2: P1AEE and P1AEF were caused by the high voltage contactors opening unexpectedly

Find the following parameters in the HPCM freeze frame:
Auxiliary Transmission Fluid pump motor Negative supply Isolation Voltage
Auxiliary Transmission Fluid pump motor Positive supply Isolation Voltage

Auxiliary Transmission Fluid Pump Motor Negative Supply Isolation Voltage	167.29	V	Hybrid Powertrain Control Module
Auxiliary Transmission Fluid Pump Motor Positive Supply Isolation Voltage	302.79	V	Hybrid Powertrain Control Module

If the value for Negative Supply Isolation Voltage in the freeze frame is within 40 volts of 165v, then the high voltage contactors in the battery opened unexpectedly while the vehicle was driving.

The vehicle may also have a P0AA1 and P0AA4 set for this category. If the HPCM2 also stored DTC P0A0C at the same time as P1AEE and P1AEF, then follow published Service Information for P0A0C first.

The HPCM2 has direct control of the contactors. Issues with the HPCM2 or wiring could lead to P1AEE and P1AEF.

Inspect circuits 3961 and 3959 for contactor control as well as B+ 5240 and ground circuit 2050 (G302).

Any compromise in these circuits may cause the contactors to open unexpectedly.

If no trouble is found, replace the K114B HPCM2 module for a possible internal fault with contactor control.

Example of connector X357 with stone impingement and corrosion on wiring:



Example of loose ground G302:



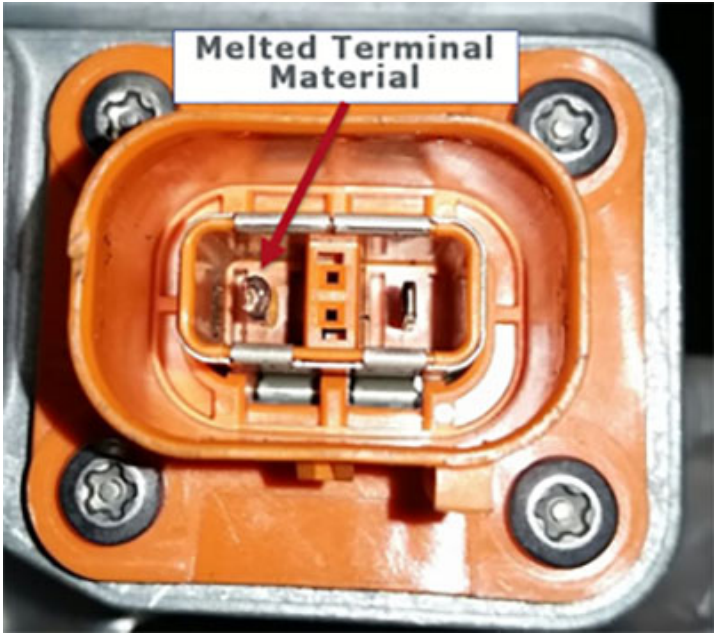
Category 3: P1AEE and P1AEF caused by a loose or intermittent orange high voltage cable connection

Find the following parameters in the HPCM freeze frame:
Auxiliary Transmission Fluid pump motor Negative supply Isolation Voltage
Auxiliary Transmission Fluid pump motor Positive supply Isolation Voltage

Auxiliary Transmission Fluid Pump Motor Negative Supply Isolation Voltage	394.42	V	Hybrid Powertrain Control Module
Auxiliary Transmission Fluid Pump Motor Positive Supply Isolation Voltage	1.65	V	Hybrid Powertrain Control Module

This is expected to be a less common category for P1AEE and P1AEF. If one of the parameters is near but not equal to zero, properly inspect each of the orange high voltage connectors on the vehicle for a loose connection on the high voltage bus.

Example of a loose connector X2 at the K10 Coolant Heater Control Module:





Category 4: P1AEE and P1AEF caused by a contactor timing issue

Find the following parameters in the HPCM freeze frame:

Auxiliary Transmission Fluid pump motor Negative supply Isolation Voltage

Auxiliary Transmission Fluid pump motor Positive supply Isolation Voltage

Auxiliary Transmission Fluid Pump Motor Negative Supply Isolation Voltage	92.08	V	Hybrid Powertrain Control Module
Auxiliary Transmission Fluid Pump Motor Positive Supply Isolation Voltage	-311.73	V	Hybrid Powertrain Control Module

If the customer complaint was a failure to start one time, compare the freeze frame data with the values above.

If the Engine Run Time parameter is equal to zero, and both voltages are within 20 volts of the values above, then this condition is a charger control issue.

This rare condition is mostly seen in the winter months during a remote start while the car is plugged in.

P1AEE and P1AEF will be the only codes in the HPCM for this condition.

The hardware on the vehicle is not suspect at this time. Letting the control modules sleep will allow the vehicle to attempt another crank event.

For this category only, the codes may be cleared and the vehicle released to the customer because no vehicle safety hazard exists for this category.

If needed, explain to the customer how to let the vehicle sleep in order to try another crank attempt.

This is done by pushing the power button briefly without pressing the brake pedal, and exiting the car for about one minute.

Warranty Information

Labor Operation	Description	Labor Time
Category 1 - 3	Use the labor operation for the repair performed	Use published labor operation time
Category 4	5019989 - Hybrid Electronics - Customer Concern Not Duplicated	Use published labor operation time

Version History

Version	4
Modified	06/06/2017 - Created 10/11/2017 - Updated to add table information to Correction Section 10/01/2018 Updated to added model year 2019 02/08/2018 - Updated wording in Category 4.



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