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Title: Onboard Charger (OBC) AC circuit short (overcurrent) causing Level 2 AC charger failures or damage

Applies To: eCE Bus and eMV

CHANGE LOG

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

05/14/2024 - Initial Article
05/31/2024 Updated Link to diagnostics

DESCRIPTION

EV vehicle Onboard Charger(s) (OBC) AC circuit overcurrent causing Level 2 AC charger failures or damage.

SYMPTOMS

- Level 2 AC charger overcurrent protection (circuit breakers) trip when charging initiates.
- Charger gun and/ or vehicle charge port AC L1, L2 terminal fretting/arcing or damage.
- AC charge rates do not match the expected AC charger output.
- Intermittent or incomplete charging.

Possible Diagnostic Trouble Codes:

Note: These faults are not necessarily present when this overcurrent condition exists.

DTC	Description
90- SPN 523550 FMI 1	AC Charger Supply Voltage #3: Data Valid But Below Normal Operational Range - Most Severe
90- SPN 523550 FMI 4	AC Charger Supply Voltage Error: Voltage Below Normal, Or Shorted To Low Source
90- SPN 523550 FMI 17	AC Charger Supply Voltage #1: Data Valid But Below Normal Operating Range - Least Severe
90- SPN 523550 FMI 18	AC Charger Supply Voltage #2: Data Valid But Below Normal Operating Range - Moderately Severe

Conditions, Customer Observations or Concerns:

1. A complaint is received that a level 2 AC charger when connected to a specific EV vehicle is tripping the land-based charger overcurrent protection (circuit breakers).
    - If this condition is verified, discontinue charging this vehicle until an inspection and diagnostics are performed by a qualified EV technician.
2. Intermittent AC level 2 charging sessions on a specific vehicle.
    - Example: The charger is only charging at 4 kW when the level 2 charger is rated at 19 kW.
    - Example: Moving the charge gun while charging causes the charge session to end.
3. Noticeable damage to either the level 2 charge gun terminals or the vehicle charge port terminals. See the examples below.
    - If damage is noticed on the charge gun terminals, discontinue using this charger until it is inspected by a qualified technician. Continued use of a damaged charger gun can damage vehicle charge port terminals and cause intermittent or incomplete charging.
    - If damage is noticed on the vehicle charge port terminals as shown, discontinue charging this vehicle and contact qualified EV dealer for further diagnostics.

INSPECTION:

WARNING:

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

WARNING:

To prevent personal injury or death, NEVER insert tools, fingers or other devices in the vehicle charge port or land based charger gun. Visually inpect only.

1. Visually inspect the charger gun terminals for damage as shown in Figure 1 and 2.
2. If any damage is noted , discontinue charging vehicles with this charger.
3. Document the damage and contact the charger supplier to schedule charger repairs.

Note: Do not continue to use a damaged charge gun on other vehicles as it can cause damage to the vehicle charge port terminals.

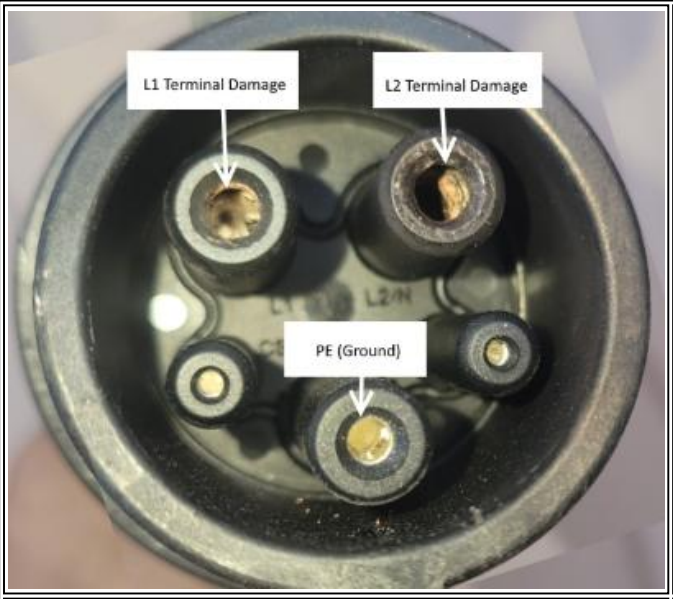

Figure 1: Charger Gun Terminal Damage

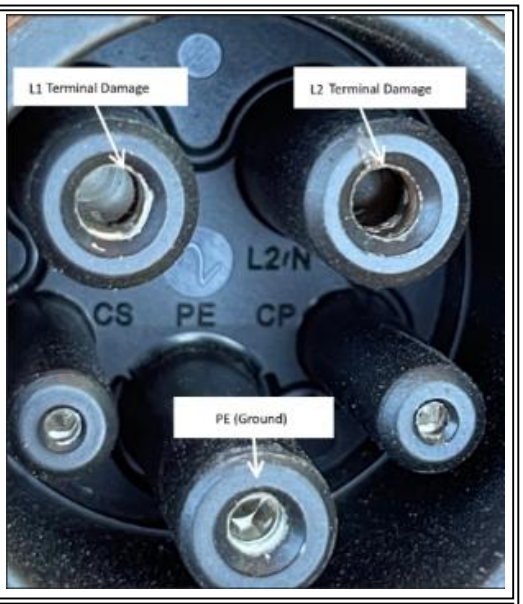

Figure 2: Charger Gun Terminal Damage

5. Visually inspect the vehicle charge port for damaged terminals.
6. Note any damage and discontinue charging this vehicle .
7. Contact a qualified EV dealer for scheduling vehicle inspection, diagnostics and repairs.

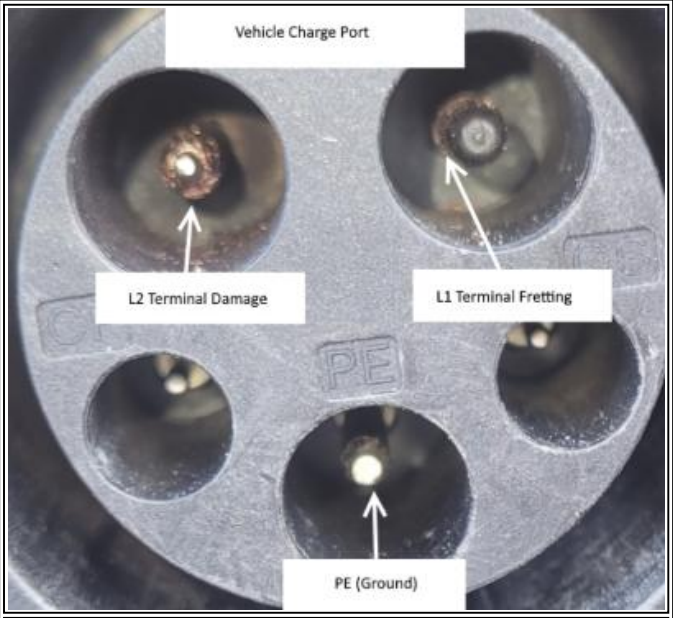

Figure 3: EV Vehicle Charge Port Damage

OTHER RESOURCES

OBC Insulation and Short Testing with Worksheets

Helpful: 6

Not Helpful: 0

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