Express Plus

DC Fast Charging Platform

Operation and Maintenance Guide

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for Express Plus that shall be followed during installation, operation and maintenance of the unit.

WARNING:

1. **Read and follow all warnings and instructions before servicing, installing, or operating the ChargePoint® product.** Install and operate only as instructed. Failure to do so may lead to death, injury, or property damage, and will void the Limited Warranty.
2. **Only use licensed professionals to install your ChargePoint product and adhere to all national and local building codes and standards.** Before installing the ChargePoint product, consult with a licensed contractor, such as a licensed electrician, and use a trained installation expert to ensure compliance with local building and electrical codes and standards, climate conditions, safety standards, and all applicable codes and ordinances. Inspect the product for proper installation before use.
3. **Always ground the ChargePoint product.** Failure to ground the product can lead to risk of electrocution or fire. The product must be connected to a grounded, metal, permanent wiring system, or an equipment grounding conductor shall be run with circuit conductors and connected to the equipment grounding terminal or lead on the Electric Vehicle Supply Equipment (EVSE). Connections to the EVSE shall comply with all applicable codes and ordinances.

4. **Install the ChargePoint product using a ChargePoint-approved method.** Failure to install on a surface that can support the full weight of the product can result in death, personal injury, or property damage. Inspect the product for proper installation before use.
5. **The product is not suitable for use in Class 1 hazardous locations, such as near flammable, explosive, or combustible vapors or gases.**
6. **Supervise children near this device.**
7. **Do not put fingers into the electric vehicle connector, or touch fingers to charging rails.**
8. **Do not use this product if any cable is frayed, has broken insulation, or shows any other signs of damage.**
9. **Do not use this product if the enclosure or the electric vehicle connector is broken, cracked, open, or shows any other signs of damage.**
10. **Wire and wire terminal information are provided in the ChargePoint product Site Design Guide and Installation Guide.**
11. **Torques for installation of wire terminals are provided in the ChargePoint product Installation Guide.**
12. **The ChargePoint product maximum operating temperature is 50 °C (122 °F).**

IMPORTANT: Under no circumstances will compliance with the information in a ChargePoint guide such as this one relieve the user of the responsibility to comply with all applicable codes and safety standards. This document describes approved procedures. If it is not possible to perform the procedures as indicated, contact ChargePoint. **ChargePoint is not responsible for any damages that may result from custom installations or procedures not described in this document or that fail to adhere to ChargePoint recommendations.**

Manufacturer

Chargepoint Network (NL) B.V.–Hoogoorddreef 56E–NL-1101BE Amsterdam–Netherland

Product Disposal

To comply with Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), devices marked with this symbol may not be disposed of as part of unsorted domestic waste inside the European Union. Enquire with local authorities regarding proper disposal. Product materials are recyclable as marked.

Document Accuracy

The specifications and other information in this document were verified to be accurate and complete at the time of its publication. However, due to ongoing product improvement, this information is subject to change at any time without prior notice. For the latest information, see our documentation online at chargepoint.com/guides.

Copyright and Trademarks

Symbols

This guide and product use the following symbols:

DANGER: Risk of electric shock

WARNING: Risk of personal harm or death

CAUTION: Risk of equipment or property damage

IMPORTANT: Crucial step for installation success

Read the manual for instructions

 Ground/protective earth

Illustrations Used in This Document

The illustrations used in this document are for demonstration purposes only and may not be an exact representation of the product. However, unless otherwise specified, the underlying instructions are accurate for the product.

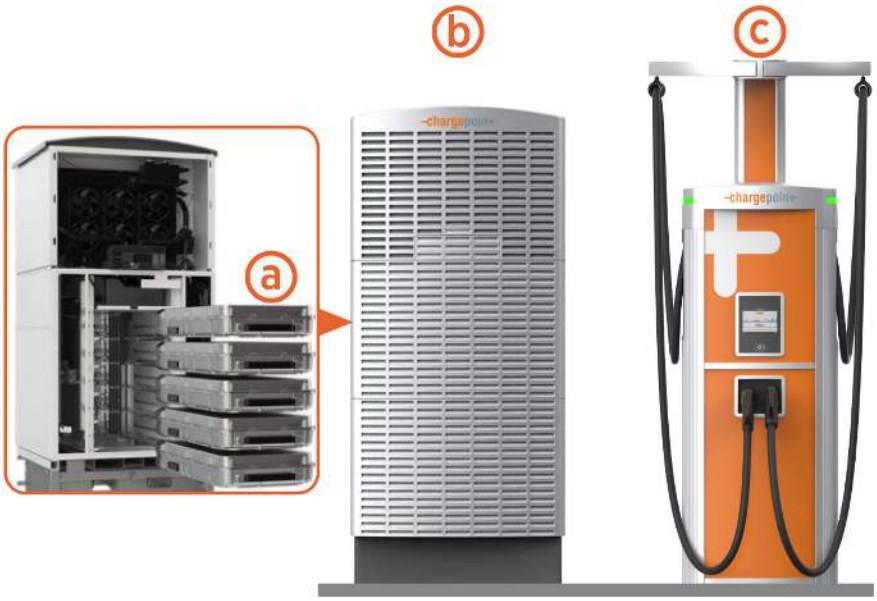
Contents

Introduction 1

This guide describes how to operate and maintain the ChargePoint ® Express Plus DC fast charging platform.

Express Plus Components

Express Plus is a scalable DC fast charging platform. It consists of three components: Power Module, Power Block, and Power Link.



- **(a)** Power Module is the power conversion component. It converts the upstream AC power into DC power to output up to 40 kW of power.
- **(b)** Power Block contains Power Modules. It can accommodate up to five Power Modules and has two DC outputs, capable of delivering up to 200 kW of power.
- **(c)** Power Link is the charger. It receives DC power from Power Blocks. A Power Link can accommodate up to two charging cables to charge two electric vehicles simultaneously.

For full specifications and certifications, refer to the *Express Plus Datasheet* at chargepoint.com/guides.

Eichrecht Compliance

The Express Plus Power Link 2000 station is Eichrecht compliant. Therefore, it is allowed to invoice for the amount of energy measured in this station.

It is equipped with up to two ports and measures energy with the integrated ChargePoint PLIM2000 meter.

The maximum power is 500 kW per port.

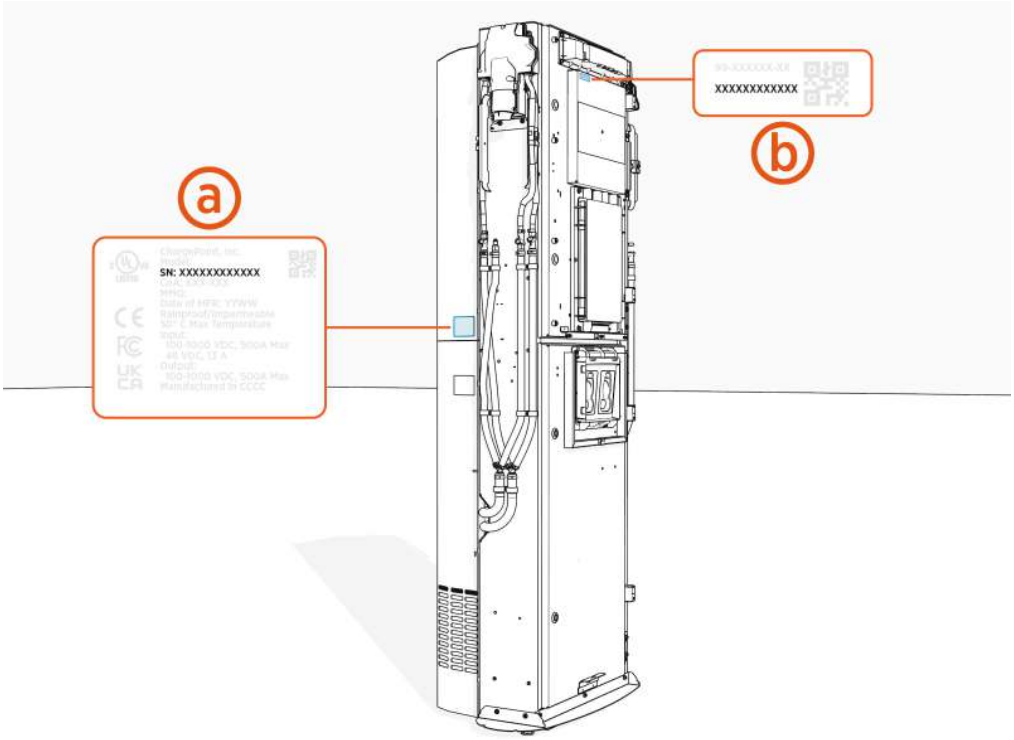
Station receipts appear on the display after charging sessions and can be retrieved from the ChargePoint driver portal.

The type label is located on the backplate on the left side (front view).

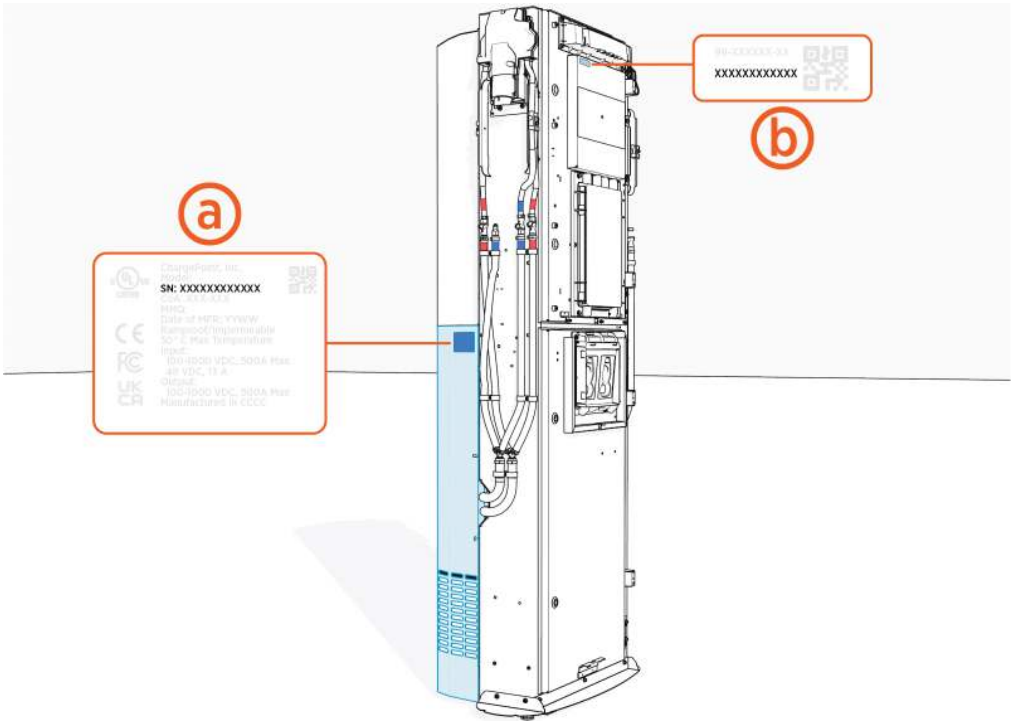
Serial Number Location

On the Station

The serial number (SN) located on the Eichrecht label on the rear upper cover **(a)** matches with the SN on Power Link 2000 at the top front **(b)**.



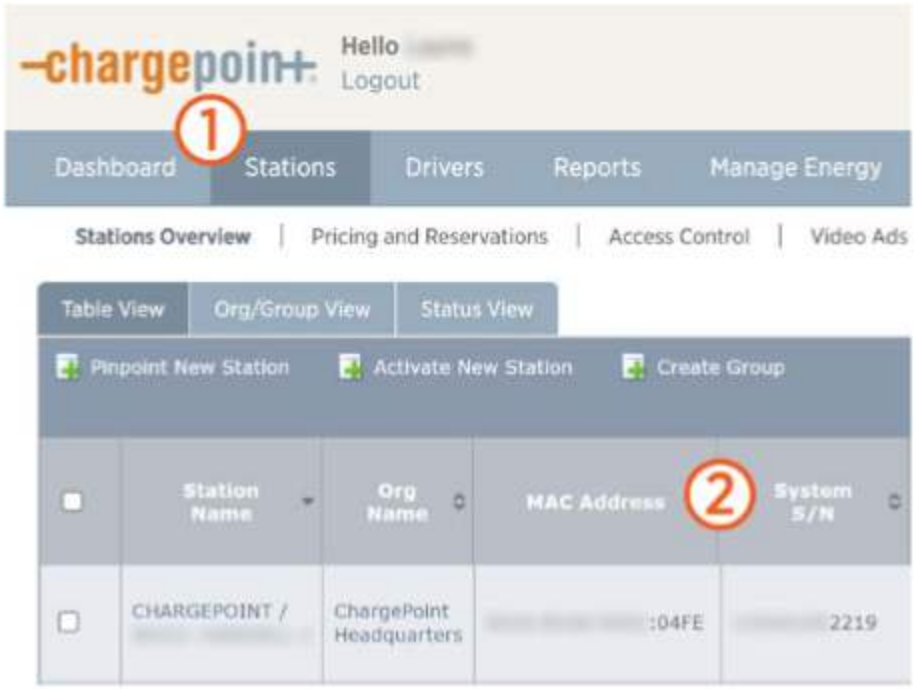
Note: Some older Power Link 2000s may have the Eichrecht label on the rear lower cover, as shown below.



To find the serial number of an Eichrecht-compliant Power Link 2000 charging station, visit Eichrecht Type Label.

From the ChargePoint Cloud Dashboard

1. Log in to ChargePoint and select **Stations**.
2. Find the MAC address and serial number (System S/N) next to the station name in the **Stations Overview** table.



Express Plus Guides

Access ChargePoint documents at chargepoint.com/guides.

Document	Content	Primary Audiences
Datasheet	Full station specifications	Site designer, installer, and station owner
Site Design Guide	Civil, mechanical, and electrical guidelines to scope and construct the site	Site designer or engineer of record
Concrete Mounting Template Guide	Instructions to embed the charging station template in a concrete pad with anchor bolts and conduit placement	Site construction contractor
Construction Signoff Form	Checklists used by contractors to ensure the site is correctly completed and ready for product installation	Site construction contractor

Document	Content	Primary Audiences
Installation Guide	Anchoring, wiring, and powering on	Installer
Operation and Maintenance Guide	Operation and preventive maintenance information	Station owner, facility manager, and technician
Service Guide	Component replacement procedures, including optional components	Service technician
Declaration of Conformity	Statement of conformity with directives	Purchasers and public

Questions

For assistance, go to chargepoint.com/support and find your region's technical support number.

Operation 2

Power Operation

- Power on: Express Plus is powered on by the installation team at the site's electrical panel, immediately after completing installation.
- Power off: Express Plus does not need to be powered off except during maintenance or service. Refer to the *Power Block* and/or *Power Link Service Guide* to power off and de-energize one or both Express Plus components.

Status Lights

See the Express Plus illustration for light locations.

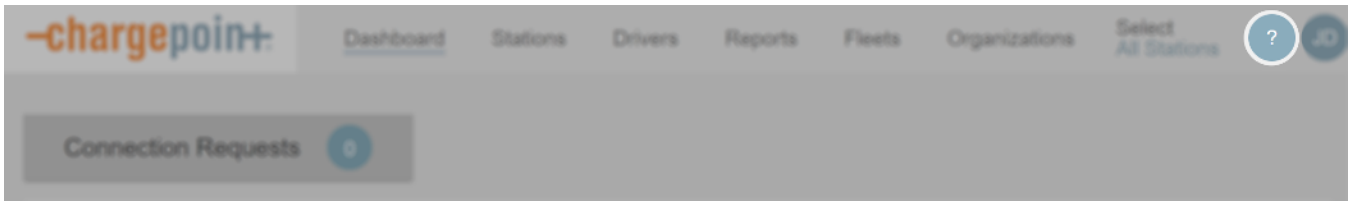
Color	Power Link	Power Block
Green	Unplugged (available and ready to charge)	All connected Power Links are unplugged.
Blue, pulsing	Plugged in, charging	At least one connected Power Link is plugged in and charging.
Blue	Plugged in, not charging, and charging complete	At least one connected Power Link is plugged in and not charging.
Orange	Port is reserved via Waitlist feature	Not applicable
Yellow, blinking	Port reserved via Waitlist feature is blocked	Not applicable
Yellow	Reduced charging rate	
White	Offline	
Red	Fault (see View Station and Diagnostics Information)	

ChargePoint Cloud Dashboard

ChargePoint Cloud Dashboard lets you set up, configure, view station and diagnostics information, generate reports, and manage many features of Express Plus. This applies to all Power Link 2000 stations (non-Eichrecht-compliant and Eichrecht-compliant). The ChargePoint Cloud Dashboard was not part of the conformity assessment procedure for Eichrecht.

You can log in to ChargePoint Cloud Dashboard at na.chargepoint.com or eu.chargepoint.com using the login credentials created when setting up the station network manager account.

After logging in, go to (Help) > **Videos and Manuals** to see the video tutorials and user guides.



Set Up and Configure Station Features

You can do one or more of the following:

- Set up pricing and billing for charging
- Control who can access the stations
- Display a message on station
- Create waitlist policy for charging when stations are full
- Set up valet
- Set up station groups
- Grant station rights to other organization
- Set up web services API
- Set up and manage your fleet

View Station and Diagnostics Information

1. Log in to the ChargePoint Cloud Dashboard at na.chargepoint.com or eu.chargepoint.com.
2. Select **Stations**.
3. Select the station name to view the station specific information.

   Apply filters to filter out the station you are looking for.
4. Select **Status/Actions** tab > **Component Diagnostics** to view the diagnostics information.
5. Alternatively, select the **Diagnostics** tab.

IMPORTANT: If a red status alert appears, contact ChargePoint immediately at chargepoint.com/support. A yellow status alert provides you with information; unless functionality appears affected, typically no action is required.

Generate Reports

The **Reports** tab lets you access a variety of reporting features:

- Reports by data type (such as Analytics, Financial, Logs).
- Duration slider (by day, week, month, year) below the chart.
- Advanced filters (such as station name, organization) at the bottom tab.
- Detailed data view when you hover over a report graph.

Reports on Alerts

You can view the station error codes and alerts from the ChargePoint Cloud Dashboard and export that information to a report.

1. Log in to the ChargePoint Cloud Dashboard.
2. Go to **Reports** > **Alarms**.
3. Choose **Most Recent Only**, **Current Alarms**, **Historical Alarms**, or **All Alarms** from the dropdown menu.
4. Apply filters from the bottom tab.
5. Use the checkboxes on the left to choose specific data.
6. Export as a CSV file by choosing either **Visible Columns** or **All Columns** from the dropdown menu.

Maintenance 3

Express Plus needs minimal preventive maintenance over its lifetime. ChargePoint's network connection monitors for system health and sends an alert when corrective maintenance might be required (see View Station and Diagnostics Information).

IMPORTANT:

- Follow local code and refer to the site lockout/tagout procedure and Service Guide to power off and de-energize Express Plus.
- If you find any damages, excessive wear, part impairment, or improper functioning, contact ChargePoint for assistance and replacement parts.
- Use only ChargePoint authorized parts and refer to the Service Guide for part replacement instructions.

CAUTION: Warranty Limitation

- If the charging station is not installed, commissioned, or serviced by a ChargePoint certified installer or technician using a ChargePoint-approved method, it is excluded from all ChargePoint and other warranties and ChargePoint is not responsible.
- You must be a licensed electrician and complete the training at chargepoint.com/installers to become ChargePoint certified and to access the ChargePoint web or app-based installer tools.

Site Manager's Responsibilities

The site or facility manager has a few duties for general site maintenance:

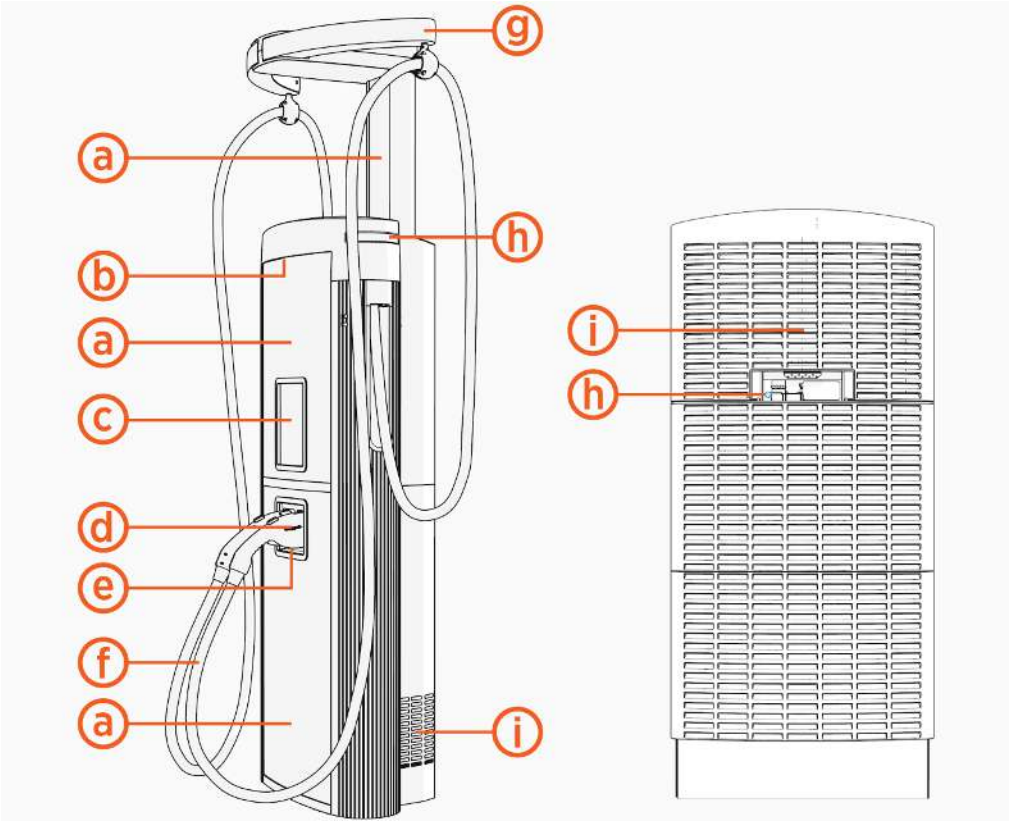
- Establish site lockout/tagout procedure per local code and in compliance with the *Service Guide*.
- Maintain an up-to-date copy of the site's as-built and single line diagram (SLD) that includes the naming of all control elements (circuit breakers, fuses, overcurrent devices, and disconnect switches). Documentation to include but not be limited to the localizations, permanent panel schedules, and means or methods required to de-energize the charging station.
- To ensure proper ventilation, make sure nothing is blocking each station's exterior vents, including any snow buildup (remove if present).
- Regularly clean each station's exterior with a damp and lint-free cloth to prevent the accumulation of debris, dust, or dirt. Perform this maintenance more frequently in high pollution environments.

CAUTION: Do not pressure wash the station. Water pressure can damage the station.

- Check each station (including the charging cable and connector) monthly for vandalism and any signs of wear or damage.

Preventive Maintenance

ChargePoint, or a ChargePoint certified technician, should perform maintenance checks at the intervals listed below.



Part	Every		Action C = Check, R = Replace
	1 year	5 year	
(a) Vinyls	C		Check if these are vandalized, faded, or peeling off.
(b) Area light	C		Check if it is functioning.
(c) Display cover	C		Check for the accumulation of dust, scratches, or cracks
(d) Connector	C		Check for the accumulation of debris, dust, or dirt; for excessive wear or signs of damage; and if the connector contact pins and latch are intact.
(e) Holster	C		
(f) Charging cable	C		Check for cracks or signs of damage.
(g) Cable management kit (CMK)	C		Check if the charging cable fully extends and retracts.

(h) Status lights	C		Check for proper functioning (see Status Lights)
(i) Airflow vents	C		Check for the accumulation of debris, dust, or dirt.
Refer to the Service Guide to locate the following parts and their service instructions.			
Fans	C		Check for the accumulation of dust.
Coolant (if present)	C	R	Check the level and top up if it is below the minimum level.
Mounting anchors		C	Check for the correct torque.
Bus bar lug nuts		C	

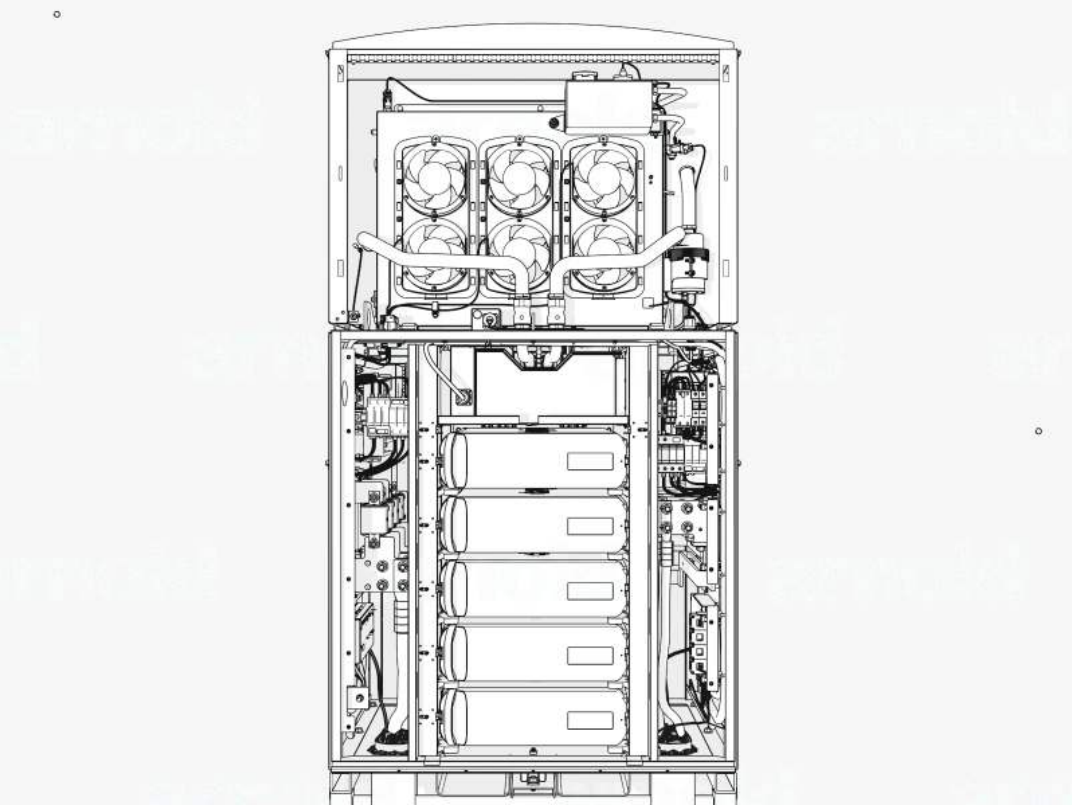
Power Block Troubleshooting 4

This section is aimed to help Industrial Support Engineers, field technicians, and the Commissioning team in identifying problems and performing initial debug of problems related to Power Block.

The troubleshooting steps for the following components' faults are included in this section:

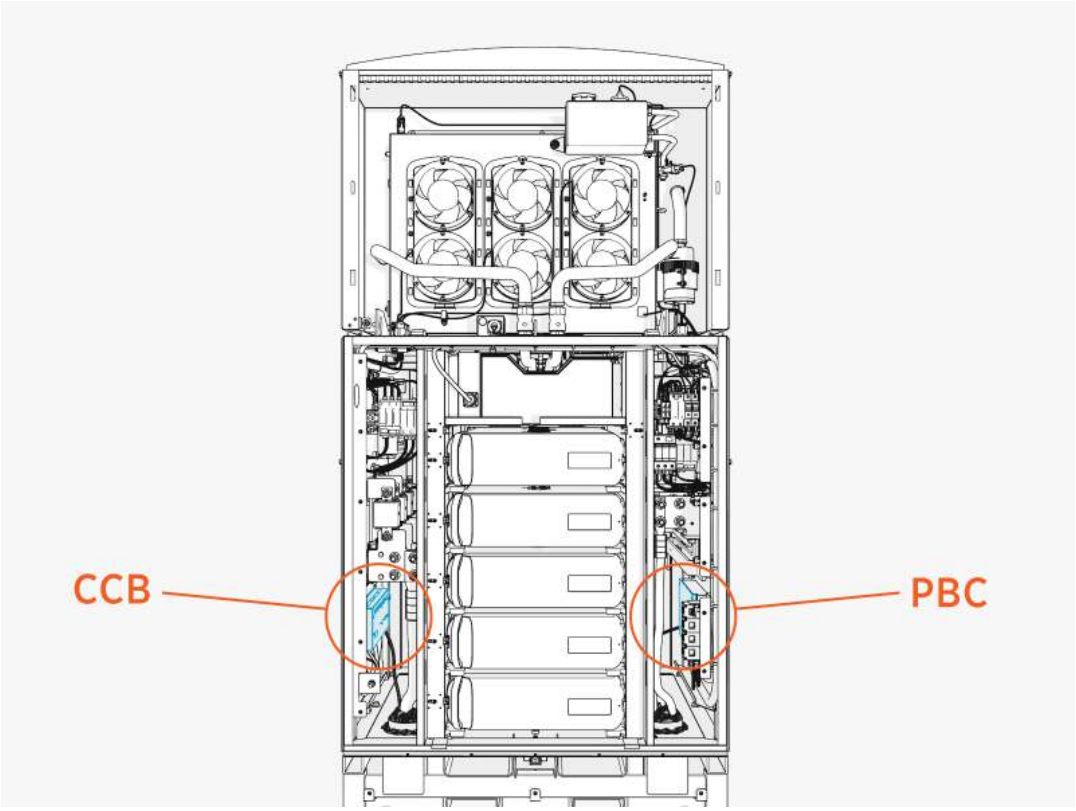
- Power Block controller (PBC)
- Auxiliary power supply (AUX PS)
- Cooling controller board (CCB)

Front View for Locating the Boards for Power Block

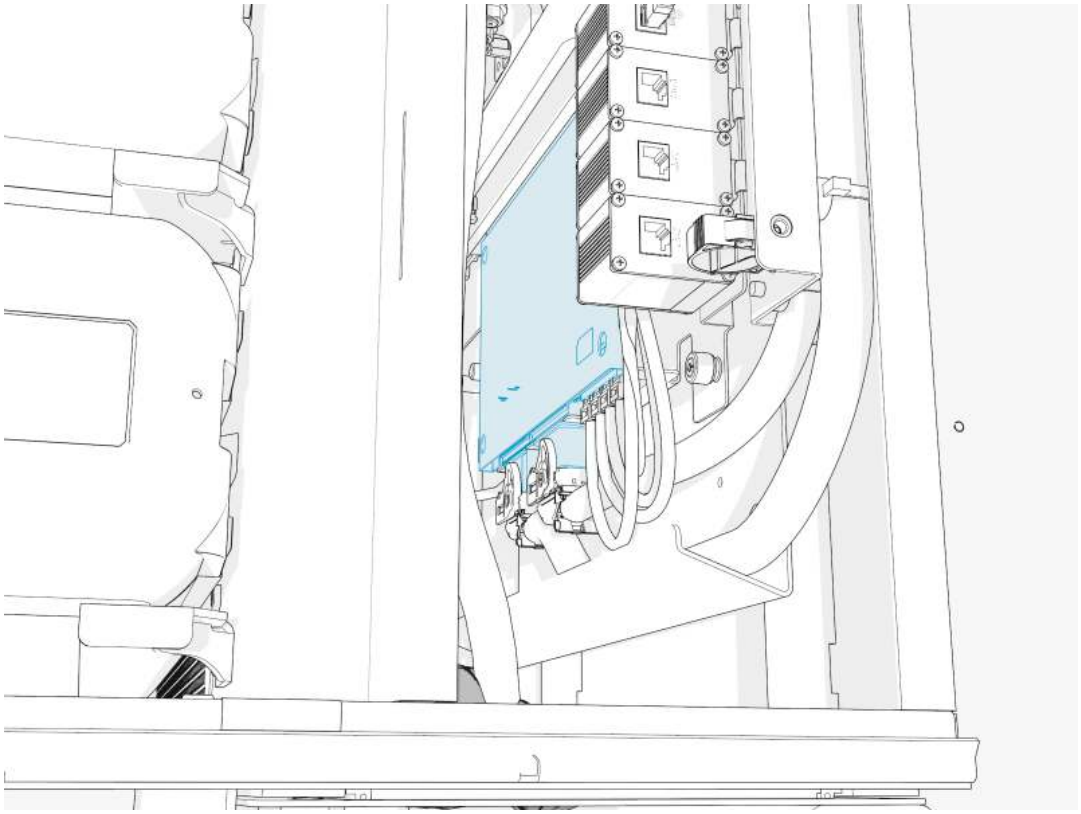


PBC Faults Board Location

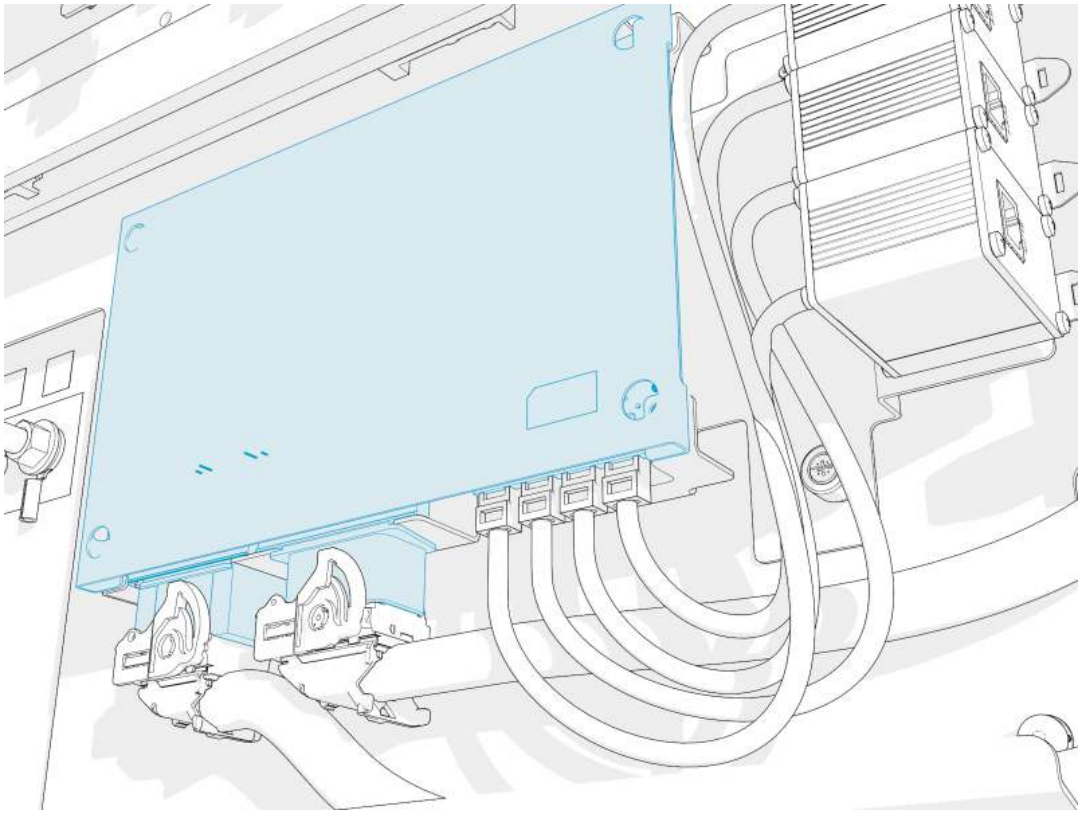
Front View for Locating the Boards for PBC and CCB Faults



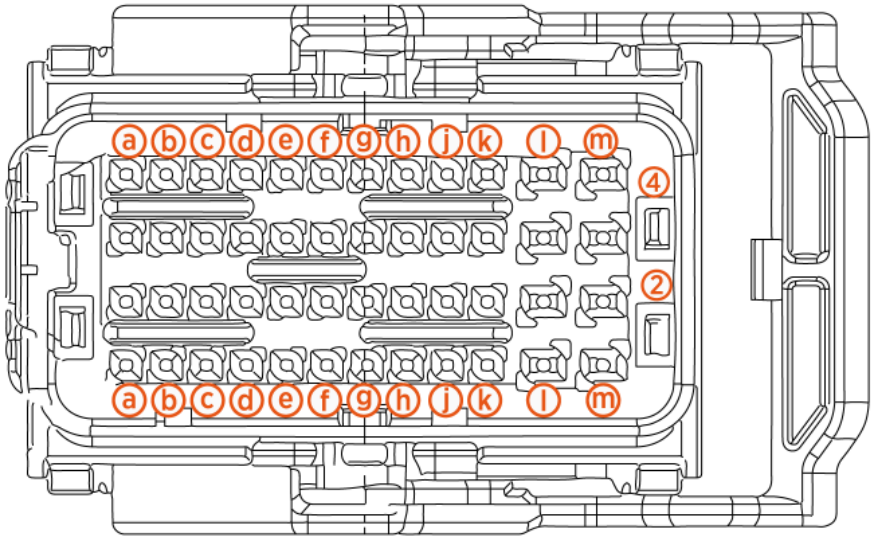
PBC Faults Board Location



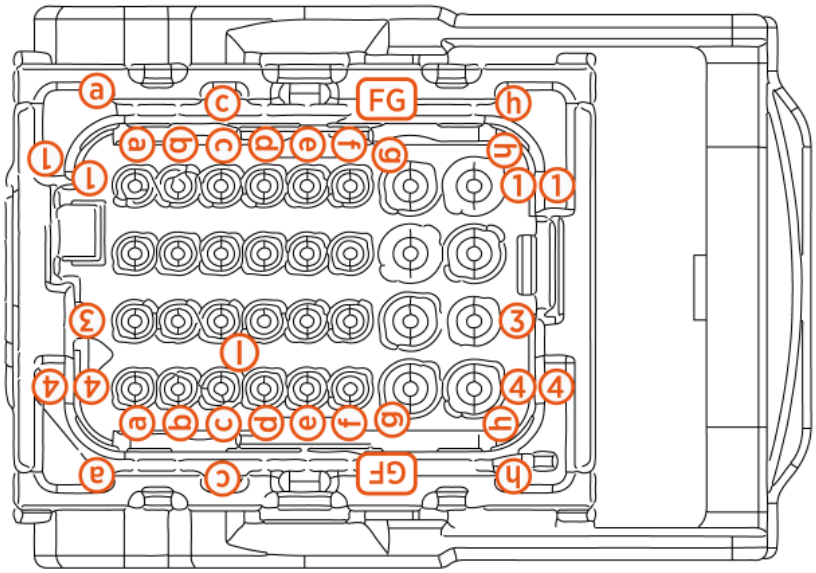
PBC Faults Cable Location



PBC-J108



PBC-J109



PBC Faults

PBC_FAN1_OVERCURRENT

Category	Fault Source	Fault Type	Criticality
Cooling	Dry zone fan bank 1	Hardware	Major

Fault Description

Fan 1 current consumption more than 4 A for 100 ms. Fan 1 is disabled and Power Block is set to derate to 50% of maximum available power.

Possible Causes

- Short between wires due to a slice or a cut in insulation
- Obstruction to fan fins

- Internal fan failure
- Connector broken leading to a short

Troubleshooting

1. Confirm if connectors going to PBC and also to the fans are seated fully.
2. Look for wiring continuity between PBC connector and Fan 1 connector.
    a. Measure continuity between M3 (Fan_PWR) and M4 (Fan_Ret) on P108 connector going to PBC.
3. If there is a short detected between PWR and RET line, then replace the harness.
4. If no short is measured, then replace the Dry zone fans to fix the issue.
5. Contact ChargePoint if the issue still persists.

PBC_FAN2_OVERCURRENT

Category	Fault Source	Fault Type	Criticality
Cooling	Dry zone fan bank 2	Hardware	Major

Fault Description

Fan 1 current consumption more than 4 A for 100 ms. Fan 1 is disabled and Power Block is set to derate to 50% of maximum available power.

Possible Causes

- Short between wires due to a slice or a cut in insulation
- Obstruction to fan fins
- Internal fan failure
- Connector broken leading to a short

Troubleshooting

1. Confirm if connectors going to PBC and also to the fans are seated fully.
2. Look for wiring continuity between PBC connector and Fan 1 connector.
    a. Measure continuity between M1 (Fan_PWR) and M2 (Fan_Ret) on P108 connector going to PBC.
3. If there is a short detected between PWR and RET line, then replace the harness.
4. If no short is measured, then replace the Dry zone fans to fix the issue.
5. Contact ChargePoint if the issue still persists.

PBC_FAN1_OPENCIRCUIT_DETECTED

Category	Fault Source	Fault Type	Criticality
Cooling	Dry zone fan bank 1	Hardware	Major

Fault Description

Fan 1 current consumption less than 0.3 A per 100 s. Fan 1 is disabled and Power Block is operational and will derate if Power Modules report overheating.

Possible Causes

- Break in PWR or GND wires feeding the PBC
- Connector not seated fully

Troubleshooting

1. Confirm if connectors going to PBC and also to the fans are seated fully.
2. Look for wiring continuity between PBC connector and Fan 1 connector.
3. If no short is measured, then replace the Dry zone fans to fix the issue.
    a. Measure between M3 (Fan_PWR) on P108 connector (going PBC) to Pin 1 on P148 (going to DRY-HEX.
    b. Measure between M4 (Fan_Ret) on P108 connector (going to PBC) and Pin 7 on P148 (going to DRY-HEX).

    If continuity test in steps (a) and (b) passes, then replace DRY-HEX for resolution. If steps (a) or (b) fail, then replace the harness.
4. If the issue still persists after replacing DRY-HEX, then contact ChargePoint if the issue still persists.

PBC_FAN1_SPEED_MISMATCH

Category	Fault Source	Fault Type	Criticality
Cooling	Dry zone fan bank 1	Hardware/Software	Major

Fault Description

Fan 1 not running at desired speed. 20% difference between commanded speed and speed feedback.

Power Block is operational and will derate if Power Modules overheat.

Possible Causes

- Fan is not receiving responding to speed commands

Troubleshooting

1. If Power Block operates without derating, then no change is necessary.
2. If Power Block is derating, then contact ChargePoint for further steps.

PBC_FAN2_OPENCIRCUIT_DETECTED

Category	Fault Source	Fault Type	Criticality
Cooling	Dry zone fan bank 2	Hardware	Major

Fault Description

Fan 2 current consumption less than 0.3 A for 10 s.

Power Block is operational and will derate if Power Modules report overheating.

Possible Causes

- Break in PWR or GND wires feeding the PBC
- Connector not seated fully

Troubleshooting

1. Confirm if connectors going to PBC and also to fans are seated fully.
2. Look for wiring continuity between the PBC connector and the Fan 2 connector.
    a. Measure between M1 (Fan_PWR) on P1 connector (going to PBC) to Pin 6 on P148 (going to DRY-HEX).
    b. Measure between M2 (Fan_Ret) on P1 connector (going to PBC) and Pin 2 on P148 (going to DRY-HEX).
    c. Measure continuity between Fan_PWR and Fan_Ret.
3. If continuity test in steps (a) and (b) passes, then replace DRY-HEX for resolution. If steps ()a or (b) fail, then replace the harness.
4. If issue persists after replacing DRY-HEX, then contact ChargePoint for further steps.

PBC_FAN2_SPEED_MISMATCH

Category	Fault Source	Fault Type	Criticality
Cooling	Dry zone fan bank 2	Hardware/Software	Minor

Fault Description

Fan 2 not running at desired speed. 20% difference between commanded speed and speed feedback.

Power Block is operational and will derate if Power Modules overheat.

Possible Causes

- Fan not receiving or responding to speed commands

Troubleshooting

1. If Power Block operates without derating, then no change is necessary.
2. If Power Block is derating, then contact ChargePoint for further steps.

RTD_DRYZONE_AMB_DISCONNECTED

Category	Fault Source	Fault Type	Criticality
Sensor	Dry zone RTD	Hardware	Major

Fault Description

Dry zone RTD disconnected.

Fault shown when the Dry zone RTD temperature goes above 100 °C for 10 s.

Power Block is allowed to run without any derate, unless power modules report higher temperatures and trigger derate.

Possible Causes

- Break in RTD feedback wire
- Not properly seated PBC connector P108

Troubleshooting

1. Reseat connector P148 and confirm if it fixes the issue.
2. Measure continuity between Pin J3 (T1_OUT) on P108 (going to PBC) and Pin 1 on P149. Also between Pin J4 (T1_RET) on P108 (going to PBC) and Pin 2 on P148.
3. If no continuity, then issue might be a break in the feedback wire.
4. Measure resistance across between Pin J3 and Pin J4 on P108.
5. Contact ChargePoint if the issue persists.

RTD_DRYZONE_AMB_SHORTED

Category	Fault Source	Fault Type	Criticality
Sensor	Dry zone RTD	Hardware	Major

Fault Description

Dry zone RTD Shorted.

If the temperature is reading -40° C for more than 10 s.

Power Block is allowed to run without any derate, unless Power Modules report higher temperatures and trigger the derate.

Possible Causes

- Short in RTD feedback wire
- Slice or cut in wire shorting to GND

Troubleshooting

1. Reseat connector P148 and confirm if it fixes the issue.
2. Measure continuity between Pin J3 (T1_OUT) on P108 (going to PBC) and Pin 1 on P149. Also between Pin J4 (T1_RET) on P108 (going to PBC) and Pin 2 on P148.
3. If there is a short detected, then replace the harness to fix the issue.
4. Measure resistance across between Pin J3 and Pin J4 on P108 to measure zero (if shorted).
5. Contact ChargePoint if the issue persists.

PB_AC-IN_SURGE_OPEN

Category	Fault Source	Fault Type	Criticality
Sensor	Surge Arrestor	Hardware	Critical

Fault Description

AC-IN surge suppressor cartridge is open or failed. Fault reported every 1 s.

Possible surge event if this happens on a unit installed in the field and was operational for some time.

Might be faulty hardware or wiring if it is seen in a brand new install.

Possible Causes

- Feedback wire compromised
- Real surge event in the field

Troubleshooting

1. Do a visual inspection of the surge cartridge - if RED then it's bad - replace the surge arrestor to fix the issue. Investigate if there was an actual surge event and inspect rest of the surge arrestors. If GREEN then it's good, continue to Step 2.
2. To confirm the feedback wiring is good, measure continuity from Pin H4 (SURGE_NC_TRIP2) on P108 (going to PBC) to ACSRG1 (SURGE_NC_TRIP2) underneath the AC surge arrestor cartridge. Also, continuity between J1 (SURGE_NC_TRIP1) on P108 (going to PBC) and ACSRG2 (underneath the surge arrestor).
3. If wiring is confirmed good, then replace the failed surge cartridges.

PB_DC-IN_SURGE_OPEN

Category	Fault Source	Fault Type	Criticality
Sensor	Surge Arrestor	Hardware	Critical

Fault Description

DC-IN surge suppressor cartridge is open/failed. Fault reported every 1 s.

Possible surge event if this happens on a unit installed in the field and was operational for some time.

Might be faulty hardware or wiring if it is seen in a brand new install.

Possible Causes

- Feedback wire compromised
- Real surge event in the field

Troubleshooting

1. Do a visual inspection of surge cartridge - if RED then bad, if GREEN then good.
2. To confirm the feedback wiring is good, measure continuity from Pin K2 (SURGE_COM_TRIP1) on P108 (going to PBC) to DCINSRG2 (underneath the DC-in surge arrestor cartridge). Also, continuity between G3 (SURGE_NC_TRIP1) on P108 (going to PBC) and DCINSRG2 (underneath the surge arrestor).
3. If the wiring is confirmed good, then replace the failed surge cartridges.

PB_DC-OUT-A_SURGE_OPEN

Category	Fault Source	Fault Type	Criticality
Sensor	Surge Arrestor	Hardware	Critical

Fault Description

DC bus bar A surge suppressor cartridge is open or failed. Fault reported every 1 s.

Possible surge event if this happens on a unit installed in the field and was operational for some time.

Might be faulty hardware or wiring if it is seen in a brand new install.

Possible Causes

- Feedback wire compromised
- Real surge event in the field

Troubleshooting

1. Do visual inspection of surge cartridge if RED then it's bad - replace the surge arrestor to fix the issue. Investigate if there was an actual surge event and inspect rest of the surge arrestors. If GREEN then it's good, continue to Step 2.
2. To confirm the feedback wiring is good, measure continuity from Pin K1 (SURGE_COM_TRIP4) on P108 (going to PBC) to DCASRG1 (underneath the DC-out-B surge arrestor cartridge). Also, continuity between L1 (SURGE_NC_TRIP4) on P108 (going to PBC) and DCASRG2 (underneath the surge arrestor).
3. If wiring is confirmed good, then replace the failed surge cartridges.

PB_DC-OUT-B_SURGE_OPEN

Category	Fault Source	Fault Type	Criticality
Sensor	Surge Arrestor	Hardware	Critical

Fault Description

DC bus bar B surge suppressor cartridge is open or failed. Fault reported every 1 s.

Possible surge event if this happens on a unit installed in the field and was operational for some time.

Might be faulty hardware or wiring if it is seen in a brand new install.

Possible Causes

- Feedback wire compromised
- Real surge event in the field

Troubleshooting

1. Do a visual inspection of surge cartridge - if RED then it's bad - replace the surge arrestor to fix the issue. Investigate if there was an actual surge event and inspect rest of the surge arrestors. If GREEN then it's good, continue to Step 2.
2. To confirm the feedback wiring is good, measure continuity from Pin L4 (SURGE_COM_TRIP3) on P108 (going to PBC) to DCBSRG1 (underneath the DC-Out-B surge arrestor cartridge). Also, measure continuity between K4 (SURGE_NC_TRIP3) on P108 (going to PBC) and DCBSRG2 (underneath the surge arrestor).
3. If wiring is confirmed good, then replace the failed surge cartridges.

PB_48V-EXT_SURGE_OPEN

Category	Fault Source	Fault Type	Criticality
Sensor	Surge Arrestor	Hardware	Critical

Fault Description

48V_EXT surge suppressor cartridge is open or failed.

Possible surge event if this happens on a unit installed in the field and was operational for some time.

Might be faulty hardware or wiring if it is seen in a brand new install.

Possible Causes

- Feedback wire compromised
- Real surge event in the field

Troubleshooting

1. Do a visual inspection of the surge cartridge - if RED then it's bad, if GREEN then it's good.
2. To confirm the feedback wiring is good, measure continuity from Pin H3 (SURGE_COM_TRIP5) on P108 (going to PBC) to LVSRG1 (underneath the LV Surge arrestor cartridge). Also, measure continuity between E4 (SURGE_NC_TRIP5) on P108 (going to PBC) and LVSRG2 (underneath the LV surge arrestor cartridge)
3. If wiring is confirmed good, then replace the failed surge cartridges.

PB_AC-IN_THERMAL_SW

Category	Fault Source	Fault Type	Criticality
Sensor	Thermal Switch	Hardware	Critical

Fault Description

Thermal switches on AC-IN terminals are open. Power Block is derated to 50% operation.

If the thermal switches open in derated condition or 3 times within 24 hours, then PBC shall lockout the Power Block.

Possible Causes

- Feedback wire compromised
- The thermal swich might be not making good contact with the bus bar

Troubleshooting

1. To confirm the feedback wiring is good, measure continuity from Pin K3 (THER_SW1_RET) on P108 (going to PBC) to L1IN (ACIN TSWITCH - A15). Also, measure continuity between L3 (THER_SW1) on P108 (going to PBC) and L3OUT(ACIN TSWITCH - A15)
2. If the wiring is confirmed good, then locate the thermal switch and confirm the seating on the bus bar. Also make sure the connectors on the switch are not loose. If everything seems good, then reach out to ChargePoint.
3. If the continuity issue is located, then we might have to replace the harness after locating the exact point of break. Contact ChargePoint.

PB_DC-IN_THERMAL_SW

Category	Fault Source	Fault Type	Criticality
Sensor	Thermal Switch	Hardware	Critical

Fault Description

Thermal switches on DC-IN terminals are open. Power Block is derated to 50% operation.

If the thermal switches open in derated condition or 3 times within 24 hours, then PBC shall lockout the Power Block.

Possible Causes

- Feedback wire compromised
- The thermal switch might not be making good contact with the bus bar

Troubleshooting

1. To confirm the feedback wiring is good, measure continuity from Pin L2 (THER_SW2) on P108 (going to PBC) to P47 (DCIN). Also, measure continuity between H2 (THER_SW2_RET) on P108 (going to PBC) and P51 (DCIN TSWITCH).
2. If the wiring is confirmed good, then locate the thermal switch and confirm the seating on the bus bar. Also make sure the connectors on the switch are not lose. If everything seems good, then reach out to reach out to ChargePoint.
3. If the continuity issue is located, then we might have to replace the harness after locating the exact point of break. Contact ChargePoint.

PB_DC-OUT-A_THERMAL_SW

Category	Fault Source	Fault Type	Criticality
Sensor	Thermal Switch	Hardware	Critical

Fault Description

Thermal switches on DC_OUT-A terminals are open. Power Block is derated to 50% operation.

If the thermal switches open in derated condition or 3 times within 24 hours, then PBC shall lockout the Power Block.

Possible Causes

- Feedback wire compromised
- The thermal switch might be not making good contact with the bus bar

Troubleshooting

1. To confirm the feedback wiring is good, measure continuity from Pin C3 (THER_SW3_RET) on P108 (going to PBC) to J42 (DC_OUT-A). Also, measure continuity between C4 (THER_SW3) on P108 (going to PBC) and P43 (DC_OUT-A).
2. If wiring is confirmed good, then locate the thermal switch and confirm the seating on the bus bar. Also make sure the connectors on the switch are not lose. If everything seems good, then reach out to ChargePoint for further steps.
3. If the continuity issue is located, then we might have to replace the harness after locating the exact point of break. Contact ChargePoint for further steps.

PB_DC-OUT-B_THERMAL_SW

Category	Fault Source	Fault Type	Criticality
Sensor	Thermal Switch	Hardware	Critical

Fault Description

Thermal switches on DC_OUT-B terminals are open. Power Block is derated to 50% operation.

If the thermal switches open in derated condition or 3 times within 24 hours, then PBC shall lockout the Power Block.

Possible Causes

- Feedback wire compromised
- The thermal swich might be not making good contact with the bus bar

Troubleshooting

1. To confirm the feedback wiring is good, measure continuity from Pin D4 (THER_SW4_RET) on P108 (going to PBC) to J45 (DC_OUT-B). Also, measure continuity between E1 (THER_SW4) on P108 (going to PBC) and P44 (DC_OUT-B).
2. If wiring is confirmed good, then locate the thermal switch and confirm the seating on the bus bar. Also make sure the connectors on the switch are not loose. If everything seem good, then reach out to ChargePoint for further steps.
3. If the continuity issue is located, then we might have to replace the harness after locating the exact point of break. Contact ChargePoint for further steps.

PB_DRYZONE_DOOR_OPEN

Category	Fault Source	Fault Type	Criticality
Sensor	Reed Switch	Hardware	Emergency

Fault Description

Dry zone door is open. PBC shuts down the Power Block in controlled manner (if happened during a session). PBC also commands to open the shunt trip breaker through Aux PS.

Possible Causes

- Door is open
- Reed sensor feedback is compromised
- Sensor is misaligned with magnet or missing from its position

Troubleshooting

1. Confirm if the Wetzone Front door is open.
2. Look for the magnet and the sensor on the Wetzone door (Front Top door). Confirm the presence of both and that they are aligned with each other on closing the door. It need not touch each other but, as long as they are in the vicinity - 15 mm.
3. Measuring continuity of the feedback wire from Reed1 Pin SP19 (Sensor wire on Main Door - covering Power Modules) going to Reed1 - Pin C4 on P198-109 on PBC. Also, continuity between SEP20 (on the sensor) and REED1_RET - Pin D4 on P198-109.
4. If there is no continuity, then the feedback wire/harness is broken. Contact ChargePoint if the issue persists.
5. If continuity is good, then use an external magnet and place it around the sensor. Check if the sensor feedback on chassis-shell changes when the magnet is around the sensor. If the feedback changes, then the sensor is bad and needs replacement.

PB_WETZONE_FRONT_DOOR_OPEN

Category	Fault Source	Fault Type	Criticality
Sensor	Reed Switch	Hardware	Emergency

Fault Description

Wet zone door is open. PBC shuts down the Power Block in controlled manner (if happened during a session). PBC also commands to open the shunt trip breaker through Aux PS.

Possible Causes

- Door is open
- Reed sensor feedback is compromised
- Sensor is misaligned with magnet or missing from its position

Troubleshooting

1. Confirm if the Dry zone is open.
2. Look for the magnet and the sensor on the Dry zone door. Confirm the presence of both and that they are aligned with each other on closing the door. It need not touch each other but, as long as they are in the vicinity.
3. Measuring continuity of the feedback wire from Reed2 Pin SP21 (Sensor wire covering Wetzone) going to Reed2 - Pin B2 on P198-109 on PBC. Also, continuity between SEP22 (on the sensor) and REED1_RET - Pin B3 on P198-109.

   If there is no continuity, then the feedback wire/harness is broken.
4. If continuity is good, then use an external magnet and place it around the sensor. Check if the sensor feedback on chassis-shell changes when magnet is around the sensor. If the feedback changes, then sensor is bad and needs replacement.

PB_WETZONE_BACK_DOOR_OPEN_Shutdown

Category	Fault Source	Fault Type	Criticality
Sensor	Reed Switch	Hardware	Emergency

Fault Description

Wet zone door is open. PBC shuts down the Power Block in controlled manner (if happened during a session). PBC also commands to open the shunt trip breaker through Aux PS.

Possible Causes

- Door is open
- Reed sensor feedback is compromised
- Sensor is misaligned with the magnet or missing from its position

Troubleshooting

1. Confirm if the Wetzone Back door is open.
2. Look for the magnet and the sensor on the Wetzone door (Back Top door). Confirm the presence of both and that they are aligned with each other on closing the door. It need not touch each other but as long as they are in the vicinity.
3. Measuring continuity of the feedback wire from Reed3 (Sensor wire covering AUXPS) going to Reed3- Pin F3 on P108 on PBC. Also, continuity between Reed3_Ret and REED3_RET - Pin G1 on P108.

   If there is no continuity, then the feedback wire/harness is broken.
4. If continuity is good, then use an external magnet and place it around the sensor. Check if the sensor feedback on chassis-shell changes when magnet is around the sensor. If the feedback changes, then sensor is bad and needs replacement.

PB_TILT_EXCEEDED_Shutdown

Category	Fault Source	Fault Type	Criticality
Sensor	Tilt Sensor	Hardware/Software	Emergency

Fault Description

Power Block tilted due to seismic effect or vehicle hitting the Power Block. The tilt angle should exceed 30 degrees for system shutdown.

PBC shuts down the Power Block in controlled manner. PBC also commands to open the shunt trip breaker through AUX PS.

Possible Causes

- Actual emergency event
- Miscalibrated sensor
- PBC tilted (due to improper installation)

Troubleshooting

1. Visual inspection should confirm if this is an actual emergency event.
2. If the visual inspection confirms if this is a wrongly reported tilt fault, it might be a non-calibrated/miscalibrated tilt sensor.
3. Inspect if PBC is seated correctly. If tilted and not touching the chassis, then reseat and confirm if the issue goes away.
4. Contact ChargePoint for further debugging the issue.

PBC_OVERTEMP_Warning

Category	Fault Source	Fault Type	Criticality
Sensor	Temperature Sensor	Hardware/Software	Major

Fault Description

PBC will report OverTEMP if PBC_PROCESSOR or PBC_BOARD_TEMP exceeds 100 °C for 10 s. The fault will clear on its own if both the temps are below 100 °C for 10 s.

Possible Causes

- High dry-zone ambient temperature due to improper cooling
- Miscalibrated sensor

Troubleshooting

1. Possible that dry-zone cooling is not circulating the air, thus resulting in over temp around the PBC board. Confirm from logs if the fans and pumps are running fine and also if other FRUs are reporting temperature related faults.
2. Compare with the ambient temperature and max. delta T of +15 °C. Replace the PBC if the difference between calculated versus observed is higher.
3. Contact ChargePoint if this seems to be a spuriously reported over temperature warning.

PBC_48V_LOGIC_SUPPLY_LOSS_Shutdown

Category	Fault Source	Fault Type	Criticality
	Voltage	Hardware	Critical

Fault Description

PBC reports this fault if the voltage drops below 40 V for more than 100 ms. PBC shuts down the Power Block in controlled manner (if happened during a session). PBC stores the snapshot of the failure.

Power Block is disabled if this event occurs 3 times within 24 hours.

Possible Causes

- Issues with incoming 480 V
- AUXPS failure
- Harness failure

Troubleshooting

1. Check if the AUXPS reports any faults. Confirm if the 48 V is seen on the AUXPS (in logs). If AUXPS is still outputting 48 V on its PBC channel, then jump to step 2. If AUXPS reports 48 V failure on PBC channel, then jump to step 3. Power down the system before proceeding to next steps.
2. If 48 V is still seen on the PBC channel (on AUXPS), then there might be a break in the harness/wire carrying 48 V. Measure the continuity between Pin B6 on P195-01 (on AUXPS) and Pin A4 on P198-109 (on PBC). Also measure the continuity from Pin A6 on P195-01 (on AUXPS) and Pin A2 on P198-109 (on PBC). If there is a break in continuity, then we need to replace the harness.
3. If the continuity in harness seems good and AUXPS does report 48 V dropping in the logs, then this might be related to incoming 480 V. Measure the incoming power quality to confirm if the incoming voltage is in +/- 10% of 480 V. Install Power Quality Monitor to confirm issues with 480 V. If any issues were found, then rectify them on the incoming side and then confirm if 48 V is back on the PBC channel.
4. If 480 V looks good, continuity tests confirm good harness but, 48 V is not coming through to PBC, then replace AUXPS.
5. If 480 V looks good, continuity tests confirm good harness and we can measure 48 V across pins G1 and H1 on P198-109 (on PBC), then replace PBC.

Loss_of_Comms_AuxPS

Category	Fault Source	Fault Type	Criticality
Communication	CAN Comms	Hardware/Software	Critical

Fault Description

This fault is reported if CAN communication is lost between AUX PS and PBC. CAN heartbeat signal is monitored every 1 s and this fault is reported when 5 heartbeat signals are lost. PBC will terminate any ongoing session and then disable the Power Block.

Possible Causes

- AUXPS failure
- CAN Harness failure
- PBC failure

Troubleshooting

1. If AUXPS fails, then we might lose CAN communication. Confirm from the logs if there are any AUXPS failures/faults reported. If yes, then replace AUXPS and confirm if CAN comms are back.
2. If AUXPS is confirmed good, then we might have an issue with the harness carrying CAN data. Measure continuity between:

3. If no short is measured, then replace the Dry zone fans to fix the issue.
    a. Pin C3 on P198-109 (on PBC) and Pin 5 on P195-10 ---- looks at CANH.
    b. Pin D3 on P198-109 (on PBC) and Pin 2 on P195-10 ---- looks at CANL.
    c. Pin E3 on P198-109 (on PBC) and Pin 6 on P195-10 ---- looks at CAN_GND.
    d. Measure resistance across Pin 1 and Pin 4 on P195-10 - ideally should measure 120 Ω.

    If any of the above tests fail, then replace the harness.
4. If continuity is good and AUXPS is confirmed good as well, then replacing PBC might resolve the issue. Contact ChargePoint for further steps.

Loss_of_Comms_CCB

Category	Fault Source	Fault Type	Criticality
Communication	CAN Comms	Hardware/Software	Critical

Fault Description

This fault is reported if CAN communication is lost between AUXPS and PBC. CAN heartbeat signal is monitored every 1 s and this fault is reported when 5 heartbeat signals are lost. PBC will terminate any ongoing session and then disable the Power Block.

Possible Causes

- CCB failure
- CAN Harness failure
- PBC failure

Troubleshooting

1. If CCB fails, then we might lose CAN communication. Confirm from the logs if there are any CCB failures/faults reported. If yes, then replace CCB and confirm if CAN comms are back.
2. If CCB is confirmed good, then we might have an issue with the harness carrying CAN data. Measure continuity between:
    a. Pin C3 on P198-109 (on PBC) and Pin 6 on P7 (of CCB) ---- looks at CANH.
    b. Pin D3 on P198-109 (on PBC) and Pin 7 on P7 (of CCB) ---- looks at CANL.
    c. Pin E3 on P198-109 (on PBC) and Pin 8 on P7 (of CCB) ---- looks at CAN_GND.
    d. Measure resistance across Pin 10 and Pin 5 on P7 (on CCB) - ideally should measure 120Ω.

    If any of the above tests fail, then replace the harness.

3. If continuity is good and CCB is confirmed good as well, then contact ChargePoint for further debugging.

Loss_of_Comms_PM

Category	Fault Source	Fault Type	Criticality
Communication	CAN Comms	Hardware	Critical

Fault Description

This fault is reports if CAN communication is lost between one or more Power Modules and PBC. CAN heartbeat signal is monitored every 1 s and this fault is reported when 1 heartbeat signal is lost. PBC will terminate any ongoing session and then disable the Power Block.

Possible Causes

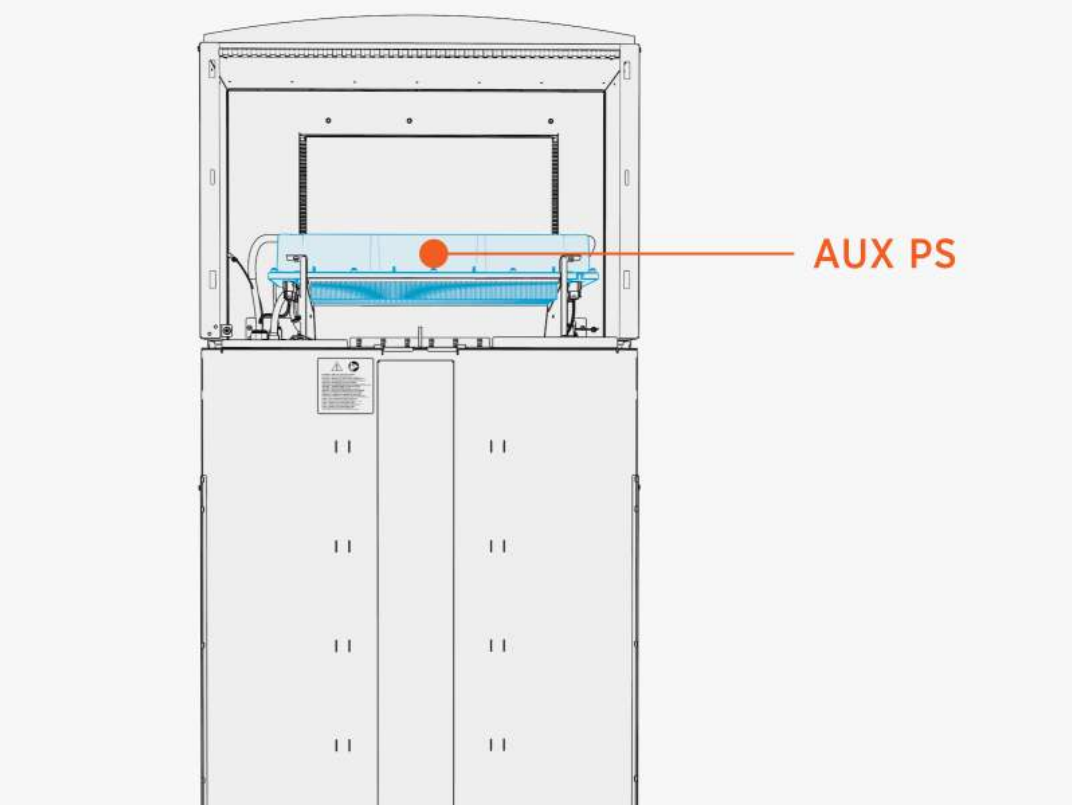
- Power Module failure
- CAN harness failure
- PBC failure

Troubleshooting

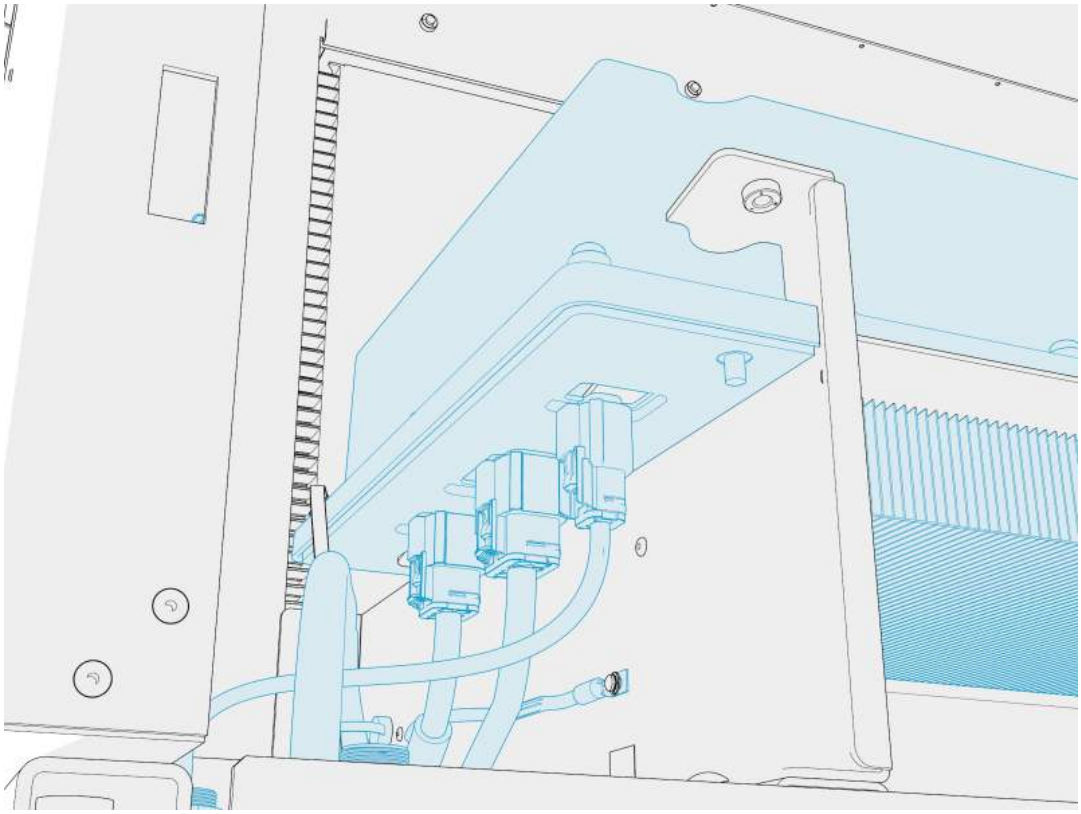
1. Power down the system and check if the module is fully seated and making proper connection to the mod-mate on the Power Block side.
2. Confirm from logs or NOS if there are any active critical faults on the Power Modules. If yes, then it is possible that the Power Modules have failed and need to be replaced. Replace the appropriate module and confirm if CAN communication comes back on that slot.
3. If there are no active faults on the Power Module, visually inspect if any of the pins on the data connector are damaged. If any damage is found, then replace the module to resolve the issue.
4. If all the above inspections do not show any obvious issues, then it could be the data connector on the mod-mate side that might have failed. Contact ChargePoint for further resolution steps.

AUX PS Faults Board Location

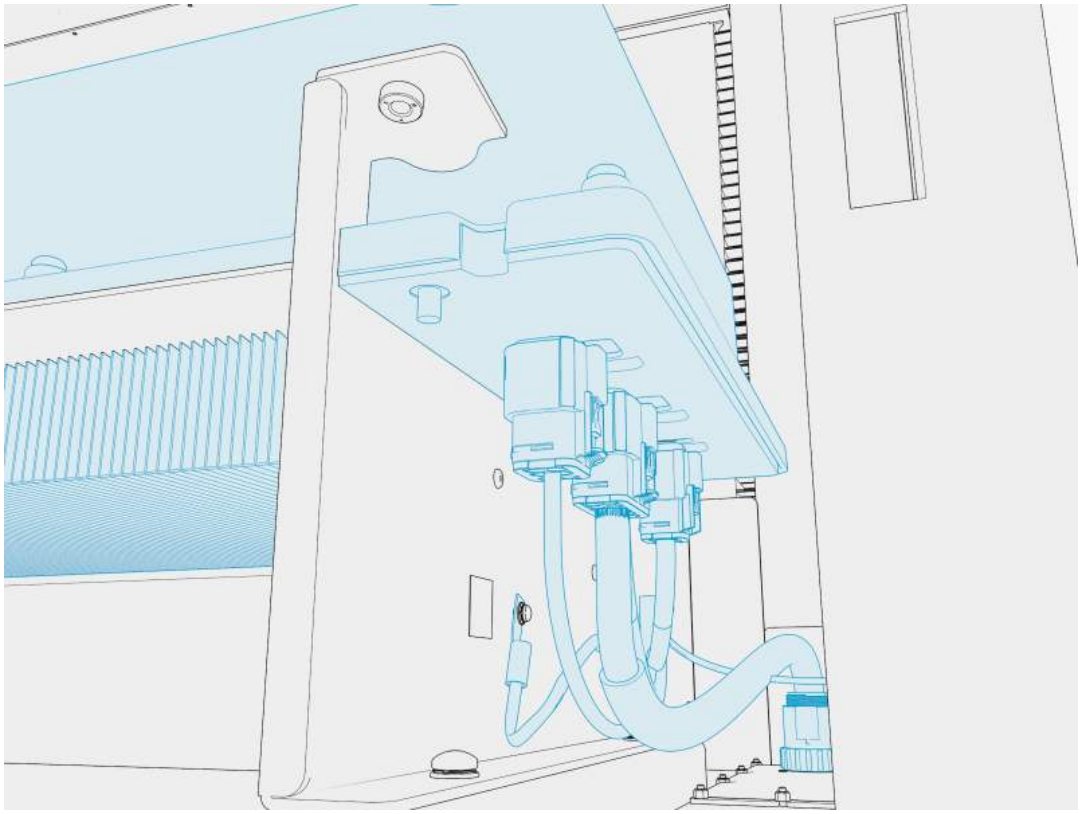
Rear View for Locating the Boards for AUX PS Faults



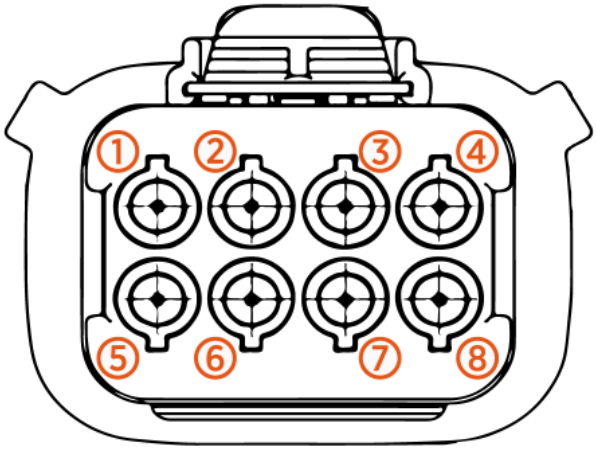
AUX PS Faults Cable Location (Front View)



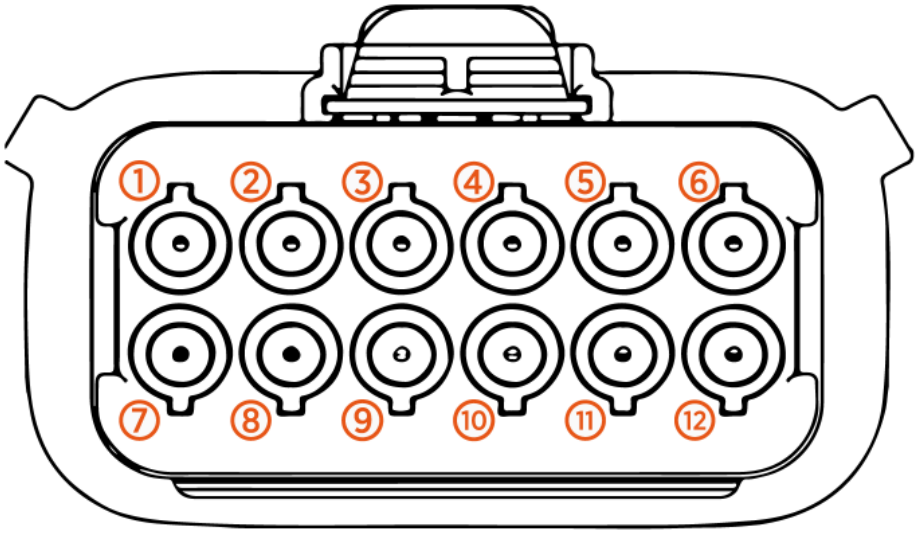
AUX PS Faults Cable Location (Rear View)



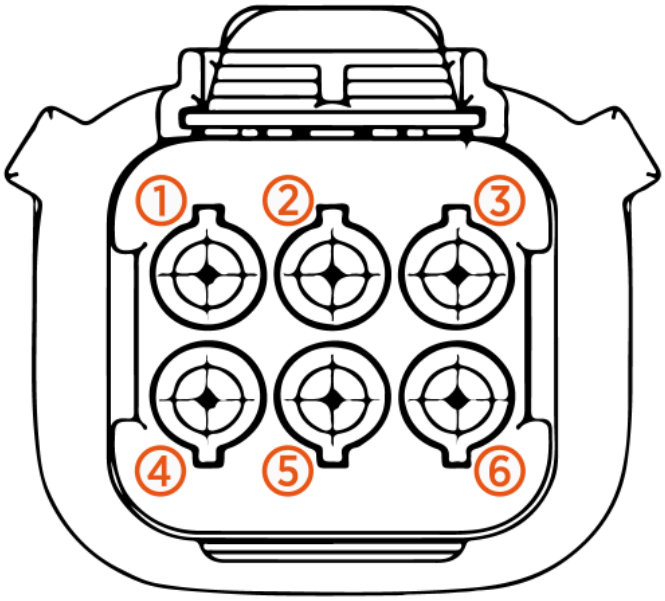
AUXPS-P190-01



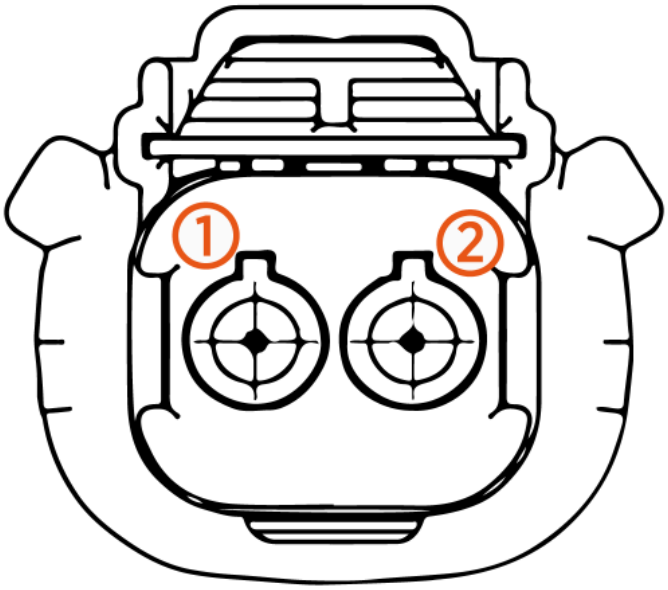
AUXPS-P195-01



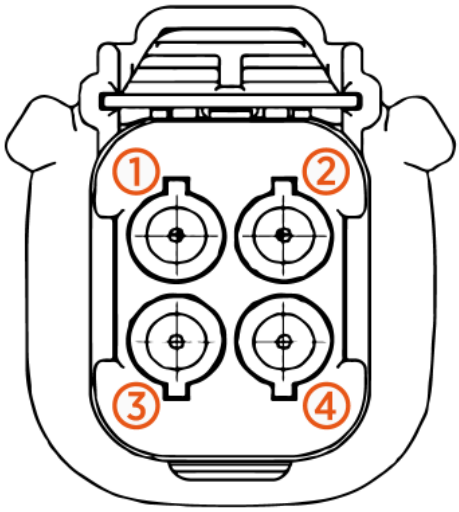
AUXPS-195-10



AUXPS-P190-06



AUXPS-P195-07



AUX PS Faults

48V_OVERVOLTAGE_Fault_Shutdown

Category	Fault Source	Fault Type	Criticality
-	AUX Power Supply	Hardware	Critical

Fault Description

Fault is declared when Auxiliary Power Supply (AUX PS) output voltage (max. of all 3 channels) is >60 V for 30 ms. The fault is cleared if the value is ≤57 V. The fault clears after the reboot, but the fault status is retained within non-volatile memory.

Fault message is sent to PBC as emergency CAN message, including the conditions that triggered the fault. Any ongoing session will be stopped gracefully. Fault information is saved as snapshot on Aux Power Supply. Load switches in Aux supply are disabled and shunt trip is triggered immediately.

Possible Causes

- Possible high 480 V line
- Internal AUX PS circuitry fault

Troubleshooting

1. Inspect the incoming 480 V* and confirm if it is within expected range (+10%).

   * For Europe, 400 V+ 10%.

2. If yes, then replace AUX PS to resolve the issue.
3. Contact ChargePoint if the issue persists.

48V_OVERVOLTAGE_Warning

Category	Fault Source	Fault Type	Criticality
-	AUX Power Supply	Hardware	Major

Fault Description

Warning message shown if any of the three AUX PS channels ≥55 V for 30 ms.

The lower threshold is 52 V for the warning to clear.

Possible Causes

- Internal AUX PS circuitry fault

Troubleshooting

1. Reach out to ChargePoint for further debugging of AUX PS if the issue persists three times in 24 hours.

48V_UNDERVOLTAGE_Warning

Category	Fault Source	Fault Type	Criticality
-	AUX Power Supply	Hardware	Major

Fault Description

Warning message shown if any of the three AUX PS channels <38 V for 60 s.

Possible Causes

- Internal AUX PS circuitry fault

Troubleshooting

1. Reach out to ChargePoint for further debugging of AUX PS if the issue persists three times in 24 hours.

48V_PBC_OVERLOAD_Warning

Category	Fault Source	Fault Type	Criticality
-	AUX Power Supply	Hardware	Major

Fault Description

This warning message is seen when the PBC output current is >1 A for 10 s.

The fault clears if the current <1 A for more than 3 seconds.

The fault snapshot is saved on AUX PS and no other action is taken.

Possible Causes

- Internal AUX PS circuitry fault

Troubleshooting

1. Reach out to ChargePoint for further debugging of AUX PS if the issue persists three times in 24 hours.

48V_CC_OVERLOAD_Warning

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Major

Fault Description

This warning message is seen when CCB output current is >30 A for 10 s.

The fault clears if the current <30 A for more than 3 seconds. The system is derated accordingly till the warning stays.

The fault snapshot is saved on AUX PS and no other action is taken.

Possible Causes

- Internal AUX PS circuitry fault
- Some obstruction to the fan or pump maybe

Troubleshooting

1. Reach out to ChargePoint for further debugging of AUX PS if the issue persists three times in 24 hours.

48V_EXT_OVERLOAD_Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

This warning message is seen when EXT output current is >27 A for 10 s.

The fault clears if the current <27 A for more than 3 seconds.

Any ongoing session will be stopped and the fault snapshot is saved on AUX PS and no other action is taken.

Possible Causes

- Possible fluctuations on the 480 V line
- Internal AUX PS circuitry fault

Troubleshooting

1. Inspect the incoming 480 V if the warning is seen regularly.
2. Reach out to ChargePoint for further debugging of AUX PS if the issue persists three times in 24 hours.

48V_EXT_PG_STATUS_LOST_Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

This fault is noted when EXT_PG (Power Good) signal transitions from 1 to 0, indicating that something went wrong on the 48V_EXT line. Fault can be cleared from PBC or rebooting system (PBC, if possible).

This fault will stop any ongoing session and PBC will try to reset the 48V_EXT. PBC also stores the snapshot of the failure and reports failure to NOS. System will be locked if the fault is seen 3 times within 24 hours.

Possible Causes

- Possible fluctuations on the 480 V line
- Internal AUX PS circuitry fault

Troubleshooting

1. Inspect the incoming 480 V if the warning is seen regularly.
2. Reach out to ChargePoint for further debugging of AUX PS if the issue persists three times in 24 hours.

48V_PBC_PG_STATUS_LOST_Warning

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Major

Fault Description

This fault is noted when PBC_PG (Power Good) signal transitions from 1 to 0, indicating that something went wrong on the PBC 48 V line. Fault can be cleared by rebooting system.

This fault will stop any ongoing session. System will be locked if the fault is seen 3 times within 24 hours.

Possible Causes

- Internal AUX PS circuitry fault

Troubleshooting

1. Inspect the incoming 480 V if the warning is seen regularly.
2. Reach out to ChargePoint for further debugging of AUX PS if the issue persists three times in 24 hours.

48V_CC_PG_STATUS_LOST_Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Major

Fault Description

This fault is noted when CC_PG (Power Good) signal transitions from 1 to 0, indicating that something went wrong on the CC 48 V line. Fault can be cleared by rebooting system.

This fault will stop any ongoing session. System will be locked if the fault is seen 3 times within 24 hours.

Possible Causes

- Possible fluctuations on the 480 V line
- Internal AUX PS circuitry fault

Troubleshooting

1. Reach out to ChargePoint for further debugging of AUX PS if the issue persists three times in 24 hours.

Shorted_MOSFET_CC _Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

This fault indicates 48 V CC load switch MOSFET failed due to short circuit. This is reported if the fault exists for 10 s (1 s sampling time). Snapshot of the failure along with operating conditions are stored on PBC and reported to NOS. The ongoing charging session is derated to 50%.

The self test to determine if the fault is real is performed and if TRUE, the system is disabled until serviced.

Possible Causes

- Internal AUX PS circuitry

Troubleshooting

1. Replace AUX PS

Shorted MOSFET PBC_Warning

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

This fault indicates 48 V PBC load switch MOSFET failed due to short circuit. This is reported if the fault exist for 10 s (1 s sampling time). Snapshot of the failure along with operating conditions are stored on PBC and reported to NOS.

The self test to determine if the fault is real is performed and if TRUE, the system is disabled till serviced.

Possible Causes

- Internal AUX PS circuitry

Troubleshooting

1. Replace AUX PS

Shorted MOSFET EXT_Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

This fault indicates 48 V PBC load switch MOSFET failed due to short circuit. This is reported if the fault exists for 10 s (1 s sampling time). Snapshot of the failure along with operating conditions are stored on PBC and reported to NOS.

The ongoing session will continue as long as 48V_EXT current draw is <15 A. If it is >15 A, then the session is stopped and the system is disabled.

The self test to determine if the fault is real is performed and if TRUE, the system is disabled till serviced.

Possible Causes

- Internal AUX PS circuitry

Troubleshooting

1. Replace AUX PS

48V_EXT_HW_Overcurrent_Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

This fault is triggered when current consumption on EXT channel exceeds 28 A. This also changes the EXT_PG signal to LOW.

Any ongoing session will be stopped and Power Link will be disabled (as 48 V is not present anymore). PBC stores the fault snapshot. PBC tried to enable 48V_EXT_OUT after 30 s of session stop. If the issue is noted 3 times in 24 hours, then system is disbaled till service.

Possible Causes

- Internal AUX PS circuitry

Troubleshooting

1. Replace AUX PS.

48V_PBC_HW_Overcurrent_Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

This fault is triggered when the current consumption on the PBC channel exceeds 2 A. This also changes the PBC_PG signal to LOW.

Any ongoing session will be stopped (as 48 V is not present anymore). AUX PS stores the fault snapshot. AUX PS tries to re-enable 48V_PBC power after 10 s (3 attempts made - 60 s interval). System locked out if unable to reenable.

Possible Causes

- Internal AUX PS circuitry

Troubleshooting

1. Replace AUX PS

48V_CC_HW_Overcurrent_Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

This fault is triggered when current consumption on CC channel exceeds 28 A. This also changes the CC_PG signal to LOW.

Any ongoing session will be stopped (as 48 V is not present anymore). AUX PS stores the fault snapshot. AUX PS tries to re-enable 48V_CC power after 10 s (3 attempts made - 60 s interval). System locked out if unable to reenable.

Possible Causes

- Internal AUX PS circuitry

Troubleshooting

1. Replace AUX PS

Aux_PS_Overtemp_Warning

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Major

Fault Description

Fault declared when TEMP0 or TEMP1 from AUX PS is above 80° C for 10 s. The fault is cleared if this value is <80° C for 3 s. PBC tracks and reports both these temps.

PBC confirms if this fault is true and then derates the PB output to 50%. PBC stores the fault and snapshot - reports to NOS.

PB is disabled if the error is seen 3 times within 24 hours.

Possible Causes

- Internal AUX PS circuitry

Troubleshooting

1. Replace AUX PS

Aux_PS_Overtemp_Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

Fault declared when TEMP0 or TEMP1 from AUX PS is above 90° C for 10 s. The fault is cleared if this value is <90° C for 3 s. PBC tracks and reports both these temps.

After 30 s, the load switch to 48 V CC and EXT is disabled.

PBC stores the fault and snapshot - reports to NOS.

PB is disabled if the error is seen 3 times within 24 hours.

Possible Causes

- Internal AUX PS circuitry

Troubleshooting

1. Replace AUX PS

LLC_Current_Imbalance_Warning

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Major

Fault Description

Monitor the current being supplied by each of the three LLC outputs, if there is a discrepancy exceeding

Fault set threshold of 2 A for 10 s. Fault clears if the difference is less than 1.5 A for 3 s.

Fault is reported to PBC every 1 s and also stores the snapshot from failure. Allow the Power Block operation if the sum of PBC_I_OUT, CC_I_OUT and EXT_I_OUT is less than 40 A.

Derate the Power Block to 50% if the sum PBC_I_OUT, CC_I_OUT and EXT_I_OUT is greater than 40 A.

PBC shall communicate to NOS and update the error messages and error cycle count.

Disable the Power Block if error persists for more than 48 hours, requiring maintenance of Aux PS.

Possible Causes

- Imbalance in input 3 phase voltage
- Internal AUX PS circuitry

Troubleshooting

1. Inspect 3-phase voltage for any imbalance.
2. Replace AUX PS.

Aux_PS_Fan_Failed_Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

Fault is declared if the AUX PS FAN speed RPM is 20% away from expected range for more than 10 s. It is cleared if the FAN speed RPM is in the expected range for 3 s. Fault is reported to PBC every 1 s and also stores the snapshot from failure. Power Block is disabled if this error is seen 3 times in 24 hours.

Possible Causes

- Internal AUX PS circuitry

Troubleshooting

1. Replace AUX PS

Fan_Overcurrent_Shutdown

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Critical

Fault Description

Fan load switch overcurrent fault. nFLT signal from Fan load switch is monitored and trigger a fault when nFLT signal goes “LOW”.

Disable the Aux PS Fan nEN_FAN after detecting fan overcurrent fault. Fault is reported to PBC every 1 s and also stores the snapshot from failure. Power Block is disabled if this error is seen 3 times in 24 hours.

Possible Causes

- Internal AUX PS circuitry

Troubleshooting

1. Replace AUX PS

Relative_Humidity_Warning

Category	Fault Source	Fault Type	Criticality
48 V signal	AUX Power Supply	Hardware	Major

Fault Description

Fault is reported if relative humidity exceeds 80% for more than 10 s. It will clear if it is less than 80% for 3 s. Fault is reported to PBC every 1 s and also stores the snapshot from failure.

Possible Causes

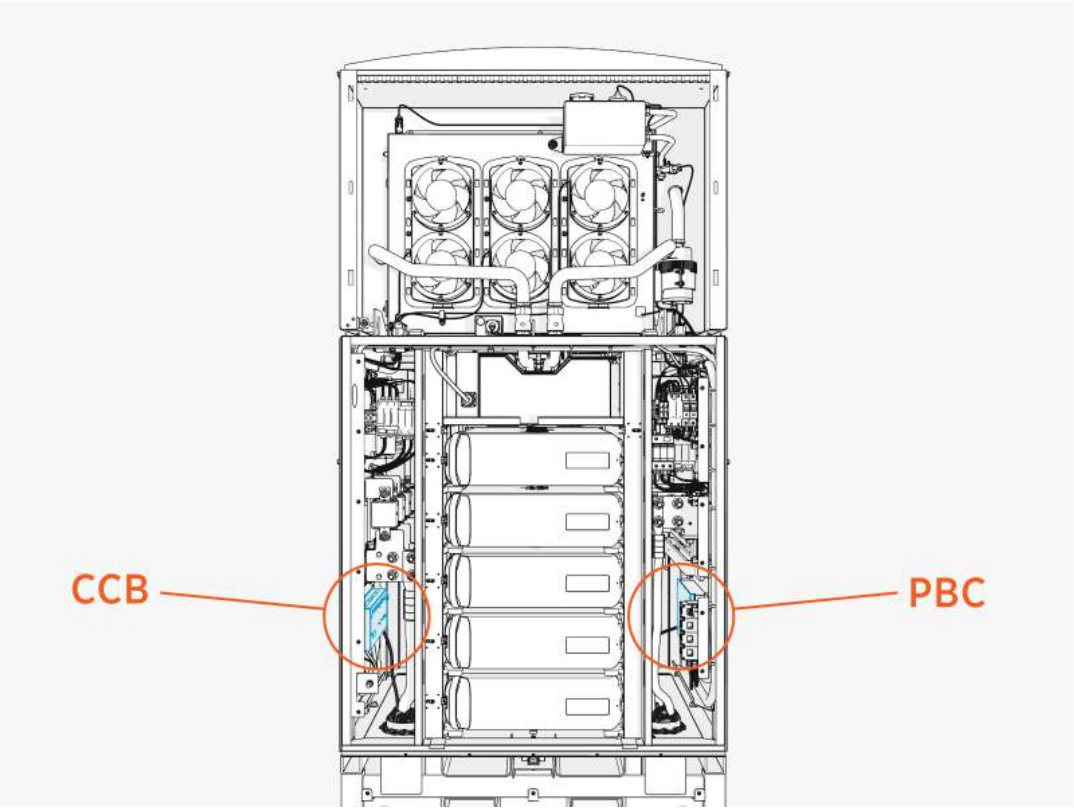
- Internal AUX PS circuitry
- Actual high humidity event

Troubleshooting

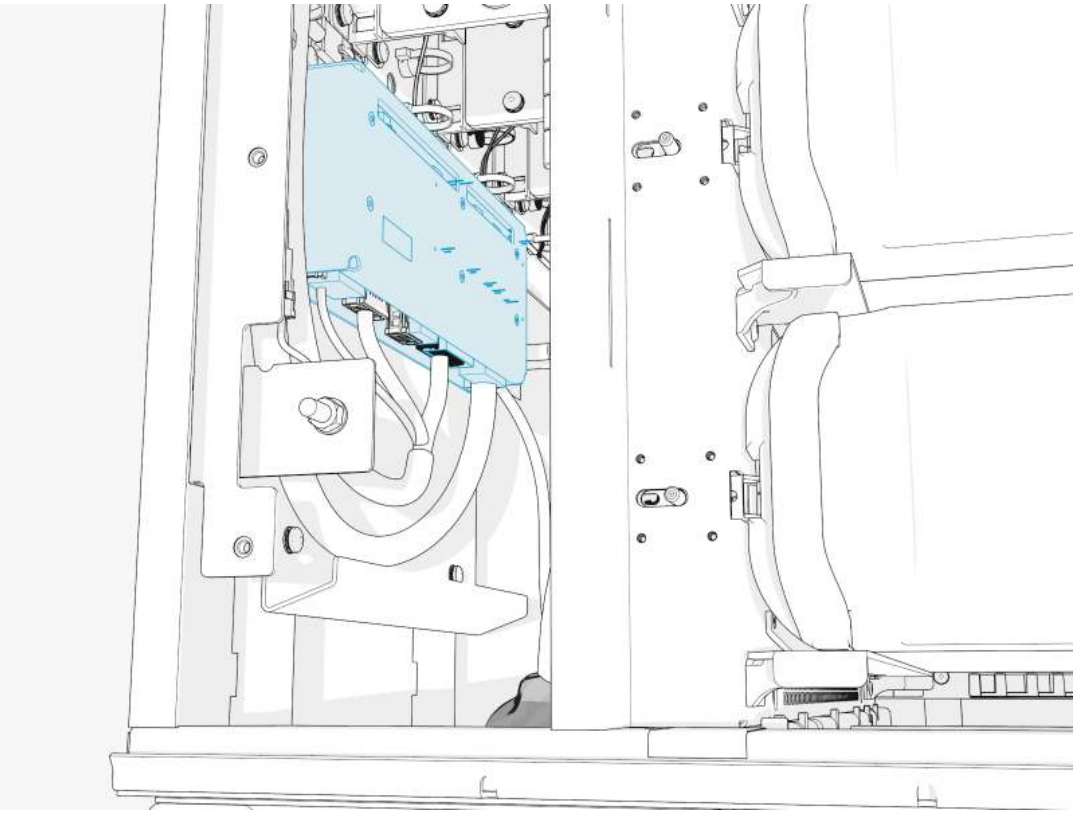
1. Replace AUX PS

CCB Faults Board Location

Front View for Locating the Boards for the CCB Faults



CCB Faults Board Location



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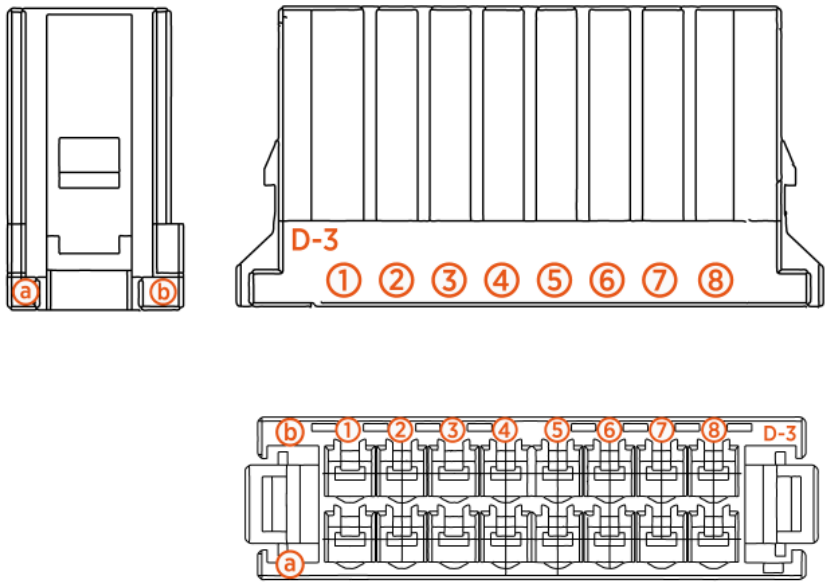


Note: The rest of the connectors have the same connector type, but with less pinputs. So, use the same logic to identify rows and columns for measurements.

CCB Faults

PUMP_OVERCURRENT

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

If the pump current exceeds 8 A for more than 100 ms, the fault is declared. The average and maximum current values are noted and saved on PBC. The pump is disabled in EEPROM and needs intervention from advanced users to reenable the pump after inspection or replacement.

Possible Causes

- Shorting in the pump harness
- Shorting in the motor winding, or locked rotor
- Issue with CCB

Troubleshooting

1. Check the voltage on the pump through CCB node (chassis-shell) and confirm if it is reading 48 V. If it is not reading 48 V, then go to the step 2. If 48 V is present, then go to step 3.
2. Confirm if there is short in the CCB harness. Measure continuity across A1 (P_DC_PUMP_RET) and B1 (P_DC_PUMP_POWER) on P5 connector going to CCB. If there is a short, then the CCB harness needs to be replaced.
3. If the continuity test is good, measure continuity between Pin 1 and Pin 4 on P120 harness. If it shorted, it is possible that the pump has failed. Replace the pump and confirm if the issue goes away.
4. If pump replacement does not fix the issue, then the CCB board might have the fault, like shorted pins (feeding the connector), or a short on the traces carrying this voltage. Replace CCB to resolve the issue.
5. If none of the above steps work, please contact ChargePoint.

PUMP_DRYRUN_DETECTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Major

Fault Description

If pump RPM is >20 RPM and <100 RPM for 5 s on commanding speed >10, then this fault is declared. The fault is cleared and counter is reset. The pump will go back to operation.

Note: Pumps (GRI) have dry run detection and protection. They auto-protect by not spinning for 30 s.

PUMP_DRYRUN_EXCEEDED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

If the pump dry run fault is detected 3 times in 24 hours, then this fault is declared.

Possible Causes

- Low coolant level in the reservoir
- Presence of air bubble in the coolant loop
- Pump failure
- Coolant leak

Troubleshooting

1. Check the coolant level to confirm if it is indeed low. Top up if it is less than LOW.
2. Possibility of air bubbles, so try to run the pump priming sub routine to clear them. See if the fault goes away. Also monitor the Pump RPM feedback in the CCB node of chassis-shell.
3. Verify if there is a coolant leak in the system.
4. If the issue persists, then replace the pump.
5. Contact ChargePoint for further debugging steps.

PUMP_OPENCIRCUIT_DETECTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Major

Fault Description

Fault is declared when pump runs at speed >10% for 10 s, but reports pump current <0.5 A.

Troubleshooting

1. Check the RPM value reported on the pump at the time of failure (logs or chassis-shell). Each RPM number is associated with certain fault type. Reach out to ChargePoint with RPM number for further debugging steps.

PUMP_OPENCIRCUIT_EXCEEDED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

The pump is disabled and the system is locked out when PUMP_OPENCIRCUIT_DETECTED fault repeats 3 times in 24 hours.

Possible Causes

- Issue with pump harness
- Pump failure
- CCB failure

Troubleshooting

1. Check the pump voltage in the CCB node - if it reads 48 V then, there is a break in the harness.
2. Check the continuity in the pump harness. Measure between A1 on P5 connector and B1 on P5 connector and see if it reads open.

FAN_TRAY1_OVERCURRENT

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

This fault is declared if fan current consumption exceeds 8 A for 100 ms. The Fan Tray is disabled in EEPROM and can only be cleared by a self-test or by an advanced user. Capture the fault in PBC and store the average Fan Tray current value along with maximum current.

Possible Causes

- Short in fan harness
- Shorting of fan winding
- Locked rotor on fan
- CCB failure

Troubleshooting

1. Confirm if there is anything blocking the fan blades from spinning.
2. Check the continuity between Pin 1 (FAN_RET_0) and 2 (FAN_PWR_0) on P109 connector (going to fans). Also, between Pins 5 (FAN_PWR_1) and 6 (FAN_RET_1). If there is a short in either of these measurements, then we have a short in the harness - go to step 3. If no issue, go to step 4.
3. Check if the short is from connector going from CCB or the junction in between. Measure continuity between Pins A1 (FAN_RET_0) and B1 (FAN_PWR_0) & Pins A3 (FAN_RET_1) and B3 (FAN_PWR_1). If issue found, you need to replace that harness.
4. If no issues were found in continuity test, replace the fan tray. Also re-enable the Fan 1 from EEPROM register.

5. If the issue persists, replace CCB.
6. Contact ChargePoint for further debugging.

FAN_TRAY2_OVERCURRENT

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

This fault is declared if fan current consumption exceeds 8 A for 100 ms. The Fan Tray is disabled in EEPROM and can only be cleared by a self-test or by an advanced user. Capture the fault in PBC and store the average Fan Tray current value along with maximum current.

Possible Causes

- Short in fan harness
- Shorting of fan winding
- Locked rotor on fan
- CCB failure

Troubleshooting

1. Confirm if there is anything blocking the fan blades from spinning.
2. Check the continuity between Pin 1 (FAN_RET_2) and 2 (FAN_PWR_2) on P110 connector (going to the fans). Also, between Pins 5 (FAN_RET_3) and 6 (FAN_PWR_3). If there is a short in either of these measurements, then we have a short in the harness - go to step 3. If no issue, go to step 4.
3. Check if the short is from P4 connector going from CCB. Measure continuity between Pins A6 (FAN_RET_2) and B6 (FAN_PWR_2) and Pins A8 (FAN_RET_3) and B8 (FAN_PWR_3). If an issue is found, then you need to replace that harness.
4. If no issues were found in continuity test, replace the fan tray. Also re-enable the fan 2 from EEPROM register.
5. If the issue persists, replace CCB.
6. Contact ChargePoint for further debugging.

FAN_TRAY3_OVERCURRENT

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

This fault is declared if fan current consumption exceeds 8 A for 100 ms. The Fan Tray is disabled in EEPROM and can only be cleared by a self-test or by an advanced user. Capture the fault in PBC and store the average Fan Tray current value along with the maximum current.

Possible Causes

- Short in fan harness
- Shorting of fan winding
- Locked rotor on fan
- CCB failure

Troubleshooting

1. Confirm if there is anything blocking the fan blades from spinning.
2. Check the continuity between Pin 1 (FAN_RET_4) and 2 (FAN_PWR_4) on P111 connector (going to fans). Also, between Pins 5 (FAN_RET_5) and 6 (FAN_PWR_5). If there is a short in either of these measurements, then we have a short in the harness - go to step 3. If no issue, go to step 4.
3. Check if the short is from connector going from CCB or the junction in between. Measure continuity between Pins A1 (FAN_RET_4) and B1 (FAN_PWR_4) and Pins A3 (FAN_RET_5) and B3 (FAN_PWR_5). If an issue is found, then that harness need to be replaced.
4. If no issues were found in continuity test, replace the fan tray. Also re-enable the Fan 3 from EEPROM register.
5. If the issue persists, replace CCB.
6. Contact ChargePoint for further debugging.

FAN_TRAY1_OPENCIRCUIT_DETECTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

The fault is declared if fan is run at >30% speed but, that fan current is <0.3 A for more than 10 s. This is a warning and not a fault. The system is operated as such until the self-test failure triggers a Service Call for fan tray replacement.

Possible Causes

- Break in harness
- Fan failure
- CCB failure

Troubleshooting

1. Confirm if all the connectors are seated correctly on CCB and at the Wet Zone section.
2. Confirm if there is a break in wire carrying 48 V to fans. Check if the fan voltage on CCB (chassis-shell) reads 48 V. Also confirm by measuring it across Pins 1 and 2 on P109 connector and Pins 5 and 6.
3. If 48 V is not present, it is possible that there is a break in the wire carrying 48 V. Measure continuity from:
    a. Pin A1 on P4 connector (on CCB) to Pin 1 on P109 connector.
    b. Pin B1 on P4 connector (on CCB) to Pin 2 on P109 connector.
    c. Pin A3 on P4 connector (on CCB) to Pin 5 on P109 connector.
    d. Pin B3 on P4 connector (on CCB) to Pin 6 on P109 connector.
4. If there is a break in continuity, then we need to replace the harness to clear the fault.
5. If the fault exists with no failure in continuity, then replace the Fan Tray 1 to fix the issue.
6. If the issue persists after the fan tray replacement, then reach out to ChargePoint for further debugging steps.

FAN1_TRAY1_NO_FEEDBACK

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Minor

Fault Description

The fault is declared if fan is run at >30% speed but, the fan RPM feedback is <2000 for more than 10 s. This is a warning and not a fault.

FAN2_TRAY1_NO_FEEDBACK

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Minor

Fault Description

The fault is declared if fan is run at >30% speed but, the fan RPM feedback is <2000 for more than 10 s. This is a warning and not a Fault.

FAN_TRAY2_OPENCIRCUIT_DETECTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

The fault is declared if fan is run at >30% speed but, the fan current is <0.3 A for more than 10 s. This is a warning and not a fault. The system is operated asis until the self-test failure triggers a Service Call for the replacement of the fan tray.

Possible Causes

- Break in harness
- Fan failure
- CCB failure

Troubleshooting

1. Confirm if all the connectors are seated correctly on CCB and at the Wet Zone section.
2. Confirm if there is a break in wire carrying 48 V to the fans. Check if fan voltage on CCB (chassis-shell) reads 48 V. Also confirm by measuring it across Pins 1 and 2 on P110 connector and Pins 5 and 6.
3. If 48 V is not present, it is possible that there is a break in wire carrying 48 V. Measure continuity from:
    a. Pin A6 on P4 connector (on CCB) to Pin 1 on P110 connector..
    b. Pin B6 on P4 connector (on CCB) to Pin 2 on P110 connector.
    c. Pin A8 on P4 connector (on CCB) to Pin 5 on P110 connector.
    d. Pin B8 on P4 connector (on CCB) to Pin 6 on P110 connector.
4. If there is a break in continuity, then we need to replace the harness to clear the fault.
5. If the fault exists with no failure in continuity, then replace the Fan Tray 2 to fix the issue.
6. If the issue persists after fan tray replacement, then reach out to ChargePoint for further debugging steps.

FAN1_TRAY2_NO_FEEDBACK

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Minor

Fault Description

The fault is declared if the fan is run at >30% speed but, the fan RPM feedback is <2000 for more than 10 s. This is a warning and not a fault.

FAN2_TRAY2_NO_FEEDBACK

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Minor

Fault Description

The fault is declared if the fan is run at >30% speed but, the fan RPM feedback is <2000 for more than 10 s. This is a warning and not a fault.

FAN_TRAY3_OPENCIRCUIT_DETECTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

The fault is declared if the fan is run at >30% speed but, the fan current is <0.3 A for more than 10 s. This is a warning and not a fault. The system is operated as is until the self-test failure triggers a Service Call for the fan tray's replacement.

Possible Causes

- Break in harness
- Fan failure
- CCB failure

Troubleshooting

1. Confirm if all the connectors are seated correctly on CCB and at the Wet Zone section.
2. Confirm if there is a break in wire carrying 48 V to fans. Check if the fan voltage on CCB (chassis-shell) is read 48 V. Also confirm by measuring it across Pins 1 and 2 on P111 connector and Pins 5 and 6.
3. If 48 V is not present, it is possible that there is a break in wire carrying 48 V. Measure continuity from:
    a. Pin A1 on P4 connector (on CCB) to Pin 1 on P111 connector.
    b. Pin B1 on P4 connector (on CCB) to Pin 2 on P111 connector.
    c. Pin A3 on P4 connector (on CCB) to Pin 5 on P111 connector.
    d. Pin B3 on P4 connector (on CCB) to Pin 6 on P111 connector.
4. If there is a break in continuity, then we need to replace the harness to clear the fault.
5. If the fault exists with no failure in continuity, then replace the Fan Tray 3 to fix the issue.

COOLANT_LEVEL_SENSOR_DISCONNECTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Major

Fault Description

This fault is declared when coolant sensor goes undetected for 120 s. This is a warning and does not stop system operation.

Possible Causes

- Break in harness
- Sensor failure
- CCB failure

COOLANT_LEVEL_LOW

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

This fault is declared when coolant sensor detects coolant level is below its LOW threshold for 120 s. This is a warning and does not affect system operation.

A Service call is automatically created when it fails during self-test.

Possible Causes

- Coolant level is low
- Coolant sensor failure.
- CCB failure

Troubleshooting

1. Check the coolant level in the reservoir and make sure it is topped up (if low).
2. If the coolant level is high and system still shows the fault, then make sure the sensor is still in its place and aligned the right way. Instances where the actual level sensing plate is wrongly fitted resulting in this error have been seen in the past.
3. Harness breaking and CCB failure should not result in this failure - highly unlikely but, cannot be ruled out. Contact ChargePoint for further debugging steps.

RTD_HX_INLET_DISCONNECTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Major

Fault Description

This fault is declared when temperature sensor at the HEX inlet reports >100 °C for 10 s. This is a warning and does not affect the system operation.

Service call is automatically created when it fails during self-test.

Possible Causes

- Harness failure.
- Sensor failure.
- CCB failure.

Troubleshooting

1. Measure the continuity between Pins A4 and B4 on P5 connector going to CCB. If it measures an open, then issue is with the harness and needs replacement.
2. Inspect the connector on the Inlet RTD for any obvious disconnect or damage. If no issues, then the sensor might have failed. Contact ChargePoint for further steps.

RTD_HX_INLET_SHORTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Major

Fault Description

This fault is declared when temperature sensor at the HEX inlet reports -40 °C for 10 s. This is a warning and does not affect the system operation.

Service call is automatically created when it fails during self-test.

Possible Causes

- Harness failure
- Sensor failure
- CCB failure

Troubleshooting

1. Measure the continuity between Pins A4 and B4 on P5 connector going to CCB. If it measures a short, then the issue is with the harness and needs replacement.
2. Inspect the connector on the Inlet RTD for any obvious disconnect or damage. If there are no issues, then the sensor might have failed. Contact ChargePoint for further steps.

RTD_HX_OUTLET_DISCONNECTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Major

Fault Description

This fault is declared when temperature sensor at the HEX outlet reports >100 °C for 10 s. This is a warning and does not affect the system operation.

Service call is automatically created when it fails during self-test.

Possible Causes

- Harness failure
- Sensor failure
- CCB failure

Troubleshooting

1. Measure the continuity between Pins A5 and B5 on P5 connector going to CCB. If it measures an open, then issue is with the harness and needs replacement.
2. Inspect the connector on the HEX Outlet RTD for any obvious disconnect or damage. If no issues, then sensor might have failed. Contact ChargePoint for further steps.

RTD_HX_OUTLET_SHORTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Major

Fault Description

This fault is declared when temperature sensor at the HEX outlet reports -40 °C for 10 s. This is a warning and does not affect the system operation.

Service call is automatically created when it fails during self-test.

Possible Causes

- Harness failure
- Sensor failure
- CCB failure

Troubleshooting

1. Measure the continuity between Pins A5 and B5 on P5 connector going to CCB. If it measures a short, then the issue is with the harness and needs replacement.
2. Inspect the connector on the HEX Outlet RTD for any obvious disconnect or damage. If no issues, then the sensor might have failed. Contact ChargePoint for further steps.

RTD_WETZONE_AMB_DISCONNECTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Major

Fault Description

This fault is declared when wetzone ambient RTD reports >100 °C for 10 s. This is a warning and does not affect the system operation.

Service call is automatically created when it fails during self-test.

Possible Causes

- Harness failure
- Sensor failure
- CCB failure

Troubleshooting

1. Measure the continuity between Pins A6 and B6 on P5 connector going to CCB. If it measures an open, then the issue is with the harness and needs replacement.
2. Inspect the connector on the Ambient Wetzone RTD for any obvious disconnect or damage. If no issues, then the sensor might have failed. Contact ChargePoint for further steps.

RTD_WETZONE_AMB_SHORTED

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Major

Fault Description

This fault is declared when temperature sensor at the HEX inlet reports -40 °C for 10 s. This is a warning and does not affect the system operation.

Service call automatically created when it fails during self-test.

Possible Causes

- Harness failure
- Sensor failure
- CCB failure

Troubleshooting

1. Measure the continuity between Pins A6 and B6 on P5 connector going to CCB. If it measures an short, then the issue is with the harness and needs replacement.
2. Inspect the connector on the Ambient Wetzone RTD for any obvious disconnect or damage. If no issues, then the sensor might have failed. Contact ChargePoint for further steps.

CCB_BOARD_TEMP

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

The temperature sensing chip on CCB board reports board temperature as >80 °C. This is a warning and the system operates normally.

Service call is created automatically.

Possible Causes

- Temp sensor is stuck in a bad state
- I2C chip measuring this temp has failed on CCB

Troubleshooting

1. I2C chip measures this board temperature, so it is possible that it is stuck at a certain value. Reboot the CCB to see if the issue goes away (recommend Hard Power Cycle).
2. If the issue persists over power cycle, then replace the CCB board to fix the issue.

   Contact ChargePoint if the issue persists.

CCB_12V_SUPPLY

Category	Fault Source	Fault Type	Criticality
Cooling	CCB	Hardware	Critical

Fault Description

12 V supply on CCB is used to control MOSFETs that turn ON/OFF the pump and fans. If this 12 V goes out of spec, DSP_12V_PGOOD signal goes low and then this fault is declared..

Possible Causes

- DSP stuck at some point
- Failure on CCB board

Troubleshooting

1. Power cycle to confirm if DSP is just stuck at some point bringing this 12 V down. If the issue persists after the power cycle then, see the following steps.
2. Replace CCB to fix the issue.
3. Contact ChargePoint if the issue persists.

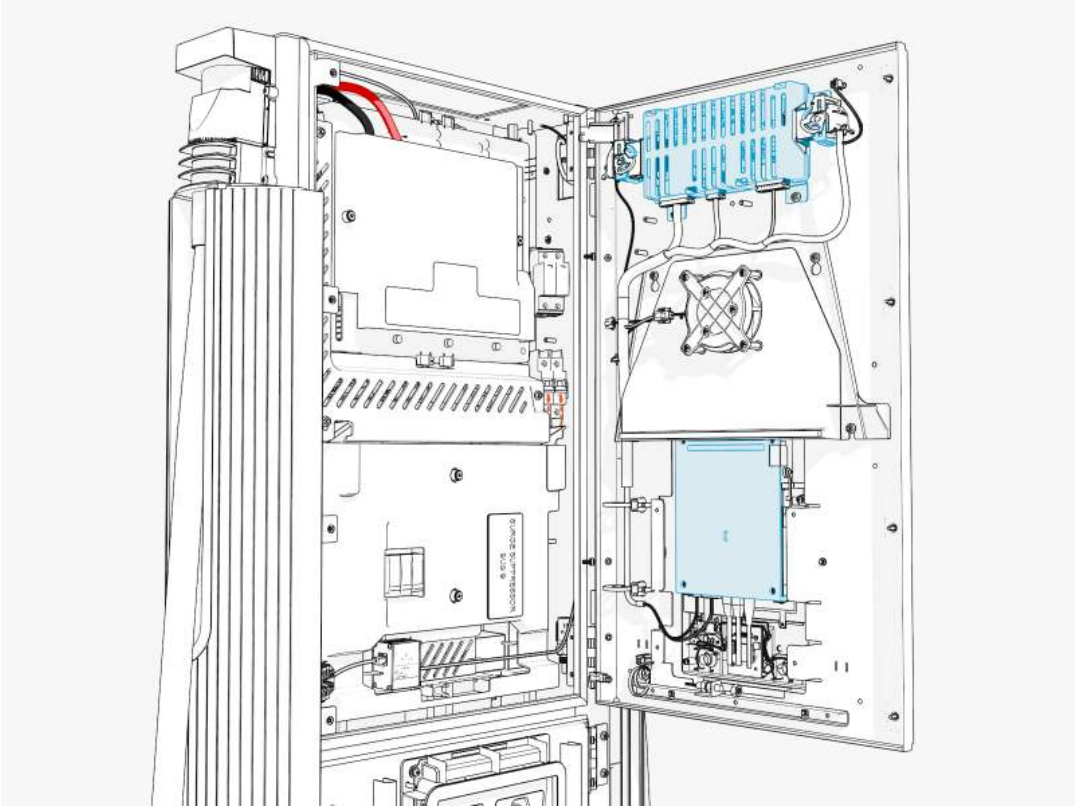
Power Link Troubleshooting 5

This section is aimed to help Industrial Support Engineers, field technicians, and the Commissioning team in identifying problems and performing initial debug of the problems related to Power Link and Power Link 2000.

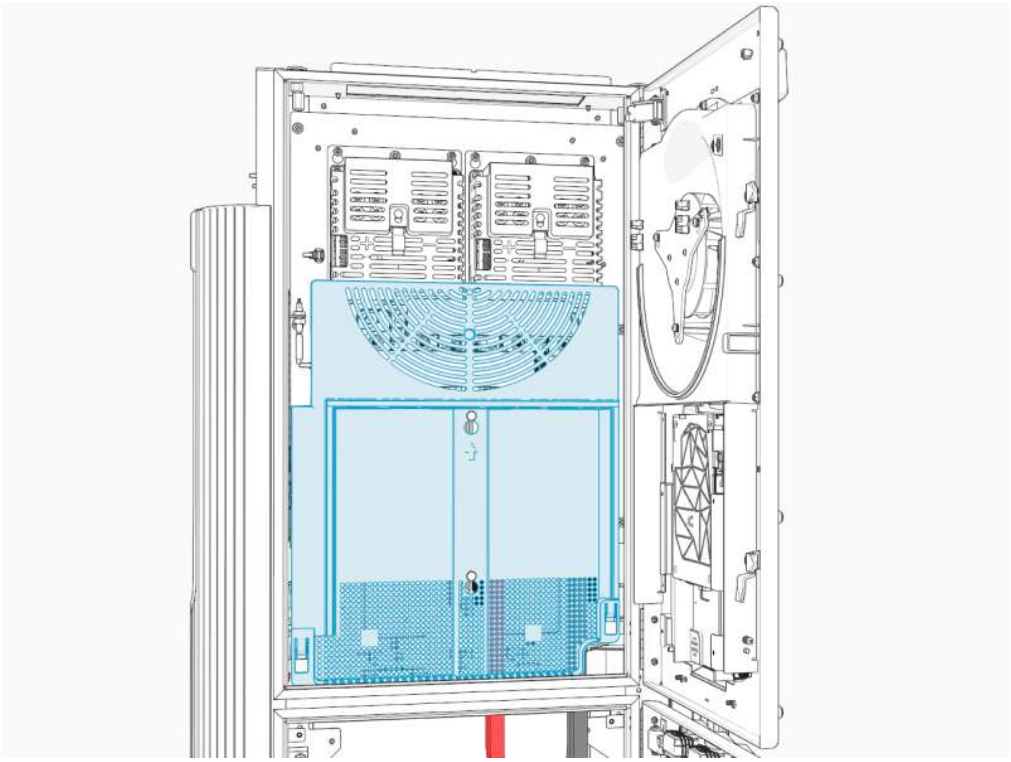
The troubleshooting steps for the following components' faults are included in this section:

- These components are applicable to both Power Link and Power Link 2000:
  - Ethernet switch (SSLAN)
  - Control and Communication Module (UCB)
- These components are only applicable to Power Link:
  - Metering, distribution, and safety board (MDS)
  - Power Link controller (FDC)
  - Smart cable (SEVB)
- These components are only applicable to Power Link 2000:
  - Contactor switch (Proton)
  - Power Link 2000 (FDC)
  - Cooling controller board (CCB)
  - Cable

Inside View of Power Link

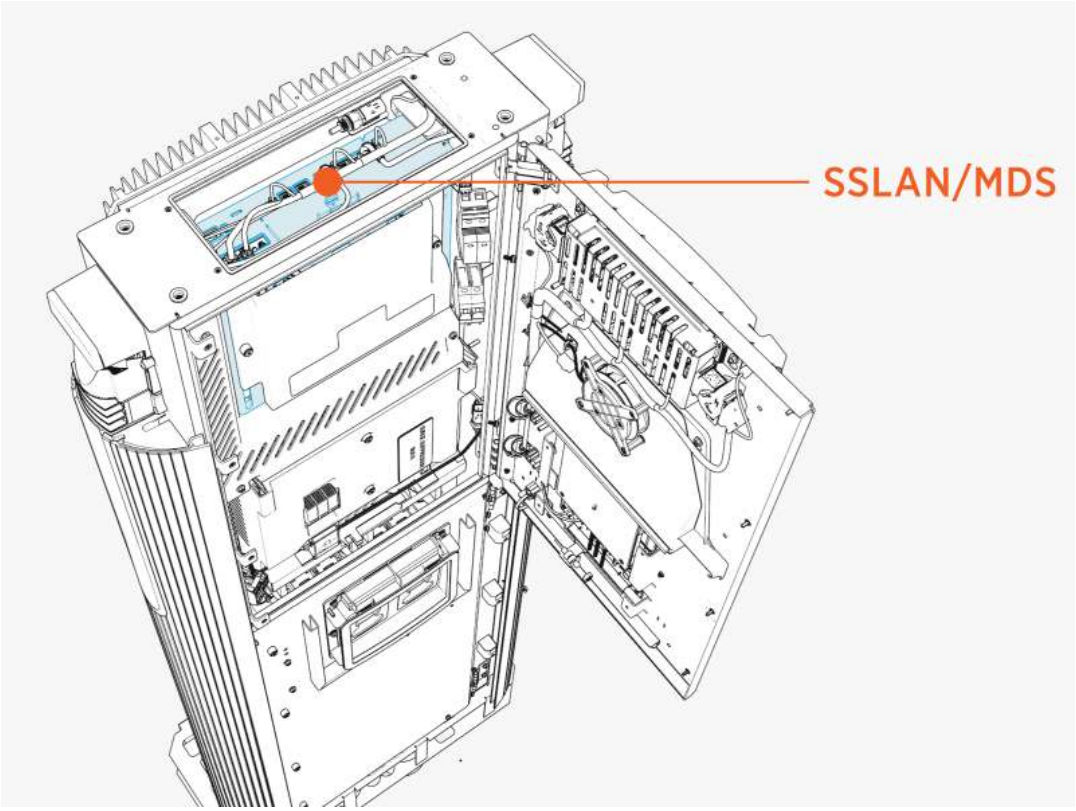


Inside View of Power Link 2000

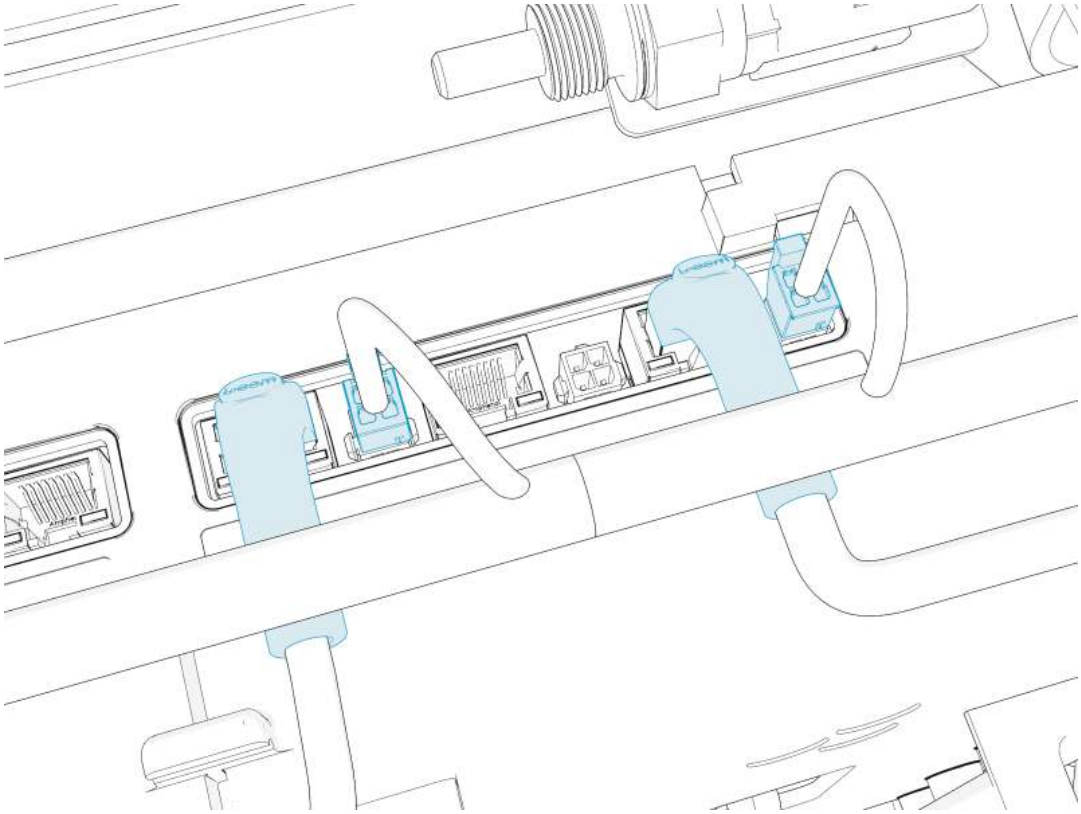


SSLAN Faults Board Location

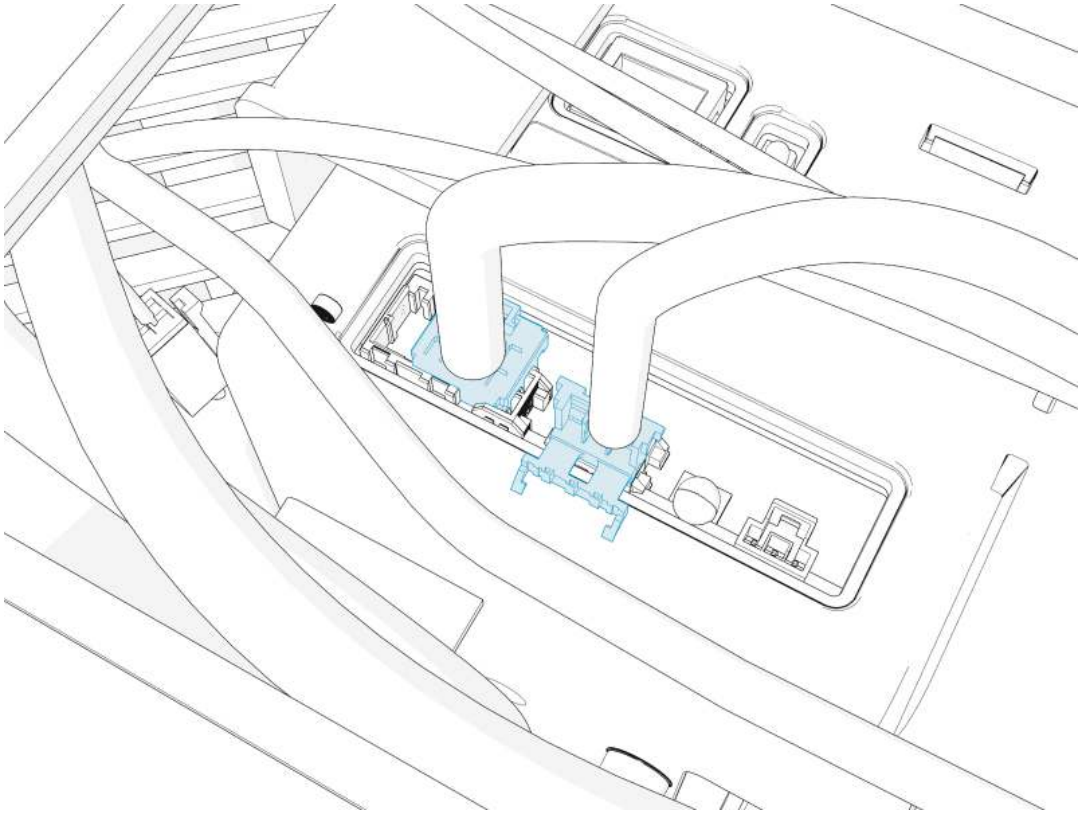
Top View



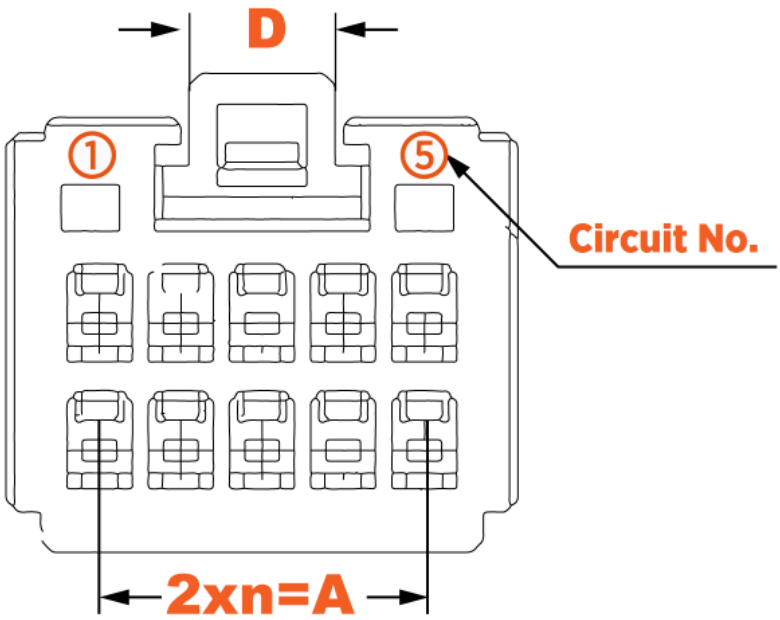
Side View



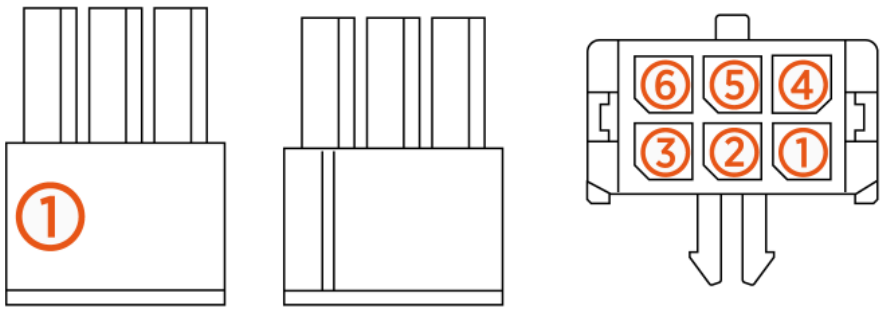
Other Side View



P223-07



P223-02



SSLAN Faults

SSLAN:SEVB_SUPPLY_1_FAULT

Category	Fault Source	Fault Type	Criticality
SEVB Power	SSLAN	Hardware	Critical

Fault Description

This fault is declared when the load switch 1 on SSLAN detects an overcurrent event. This load switch is feeding the SEVB, so the SEVB/output cable will be locked out upon this fault.

Possible Causes

- Short in the harness
- SSLAN failure

Troubleshooting

1. Measure continuity between:
    a. Pin 3 on P238-17 (upper side of MDS) to Pin 3 on P232B-06 (right SEVB).
    b. Pin 4 on P238-17 (upper side of MDS) to Pin 4 on P232B-06 (right SEVB).
2. If the continuity tests fail, then the issue is with the harness and needs replacement. If the harness looks good then SSLAN circuitry failure is possible. Replace MDS box.
3. If the issue persists, then reach out to ChargePoint.

SSLAN:SEVB_SUPPLY_2_FAULT

Category	Fault Source	Fault Type	Criticality
SEVB Power	SSLAN	Hardware	Critical

Fault Description

This fault is declared when load switch 1 on SSLAN detects an overcurrent event. This load switch is feeding the SEVB, so the SEVB/output cable will be locked out upon this fault.

Possible Causes

- Short in the harness
- SSLAN failure

Troubleshooting

1. Measure continuity between:
    a. Pin 3 on P238-18 (upper side of MDS) to Pin 3 on P232A-06 (left SEVB).
    b. Pin 4 on P238-18 (upper side of MDS) to Pin 4 on P232A-06 (left SEVB).
2. If the continuity tests fail, then issue is with the harness and needs replacement. If harness looks good then, see Step 3.
3. SSLAN circuitry failure is possible. Replace MDS box.
4. If the issue persists, then reach out to ChargePoint.

SSLAN:BOARD_TEMPERATURE_WARNING

Category	Fault Source	Fault Type	Criticality
SEVB board	SSLAN	Hardware	Minor

Fault Description

This fault is declared when temperature sensors on SSLAN board goes over 90 °C. The fault clears once the temperature goes below 90 °C.

Troubleshooting

1. No action needs to be taken on this failure. Fault is generated and if temperature goes above 100 °C, then the SSLAN_BOARD_TEMPERATURE_FAULT is generated.

SSLAN:BOARD_TEMPERATURE FAULT

Category	Fault Source	Fault Type	Criticality
SEVB board	SSLAN	Hardware	Critical

Fault Description

This fault is declared when temperature sensors on SSLAN board goes over 100 °C.

Possible Causes

- SSLAN failure

Troubleshooting

1. Replace MDS to resolve the issue.
2. Contact ChargePoint if the issue persists..

UCB:SSLAN_COMMS_FAILURE

Category	Fault Source	Fault Type	Criticality
SSLAN Communication	SSLAN	Hardware/Software	Critical

Fault Description

The fault is generated when we lose communication with SSLAN over ethernet.

Session is ended normally.

If the self-test passes, then Power Link is allowed to operate normally. If the fault is seen thrice within 24 hours, then the system is locked for a service.

Possible Causes

- Board stuck in unknown boot/SW state
- SSLAN failure

Troubleshooting

1. Try power cycle of the Power Link - can be a 48 V EXT cycling.
2. If the issue persists after power cycle, the issue could be with SSLAN board. Replace the MDS box to fix the issue.
3. Contact ChargePoint for further debugging on the issue persisting over MDS replacement.

UCB:SSLAN_FW/CHECKSUM_FAILURE

Category	Fault Source	Fault Type	Criticality
SSLAN FW	SSLAN	Hardware/Software	Critical

Fault Description

This fault is shown if SSLAN has an unexpected firmware on it and the fault persists until board swap or firmware update.

Power Link is locked out if the issue is seen after power cycle and calls for service.

Possible Causes

- Software not updated on system
- Bad FRU if seen on replacement
- Board failure

Troubleshooting

1. Check the software on the system and confirm if it is the latest released version.
2. If software) is correct, check if the fault is seen after a recent FRU replacement (MDS). It is possible the SSLAN/MDS FRU did not pass the Factory test and somehow got released to the field. Reach out to ChargePoint/Factory team to confirm this.
3. If none of the above is true, then try power cycle and clear any unknown state the board is stuck in. If there were disruptions noted during software update, maybe the board froze.
4. Contact ChargePoint for further debugging on the issue and possible MDS replacement and other software) debugging, if any.

UCB:SSLAN_SELFTEST_FAILURE

Category	Fault Source	Fault Type	Criticality
SSLAN	SSLAN	Hardware/Software	Critical

Fault Description

This fault is shown when SSLAN fails the self-test. Power Link is locked out and needs service/tech visit to bring it back to operation.

Possible Causes

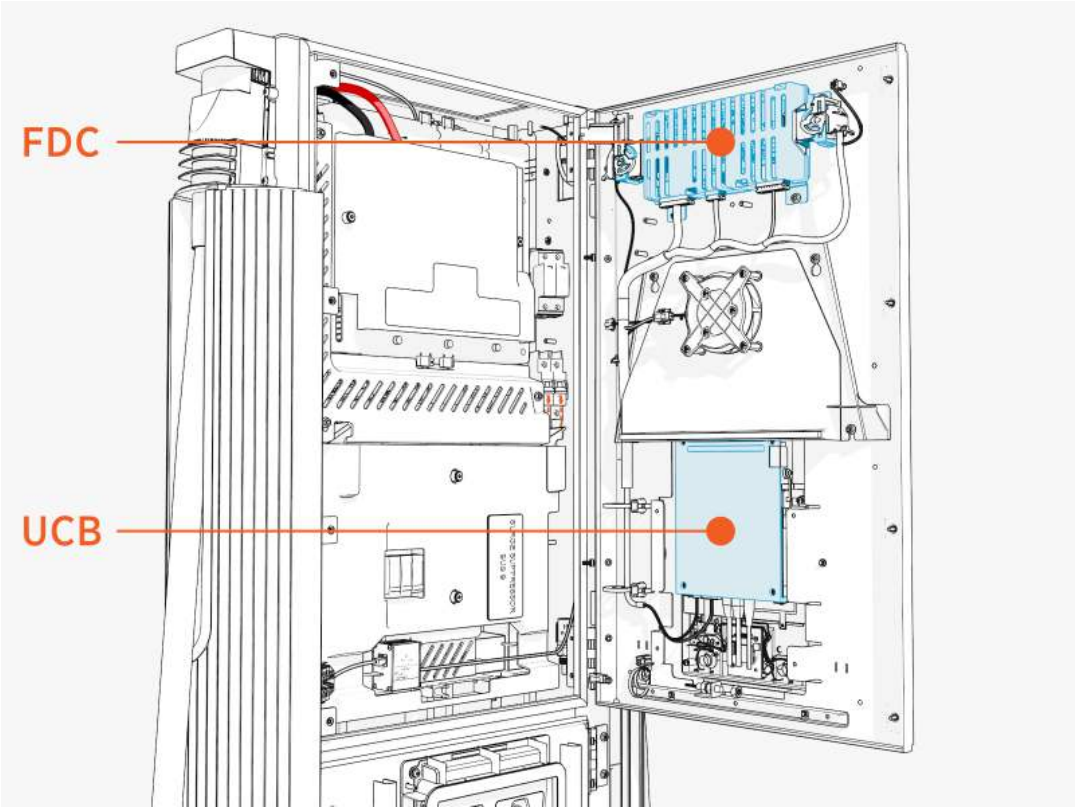
- Software not updated on system
- Bad FRU if seen on replacement
- Board failure

Troubleshooting

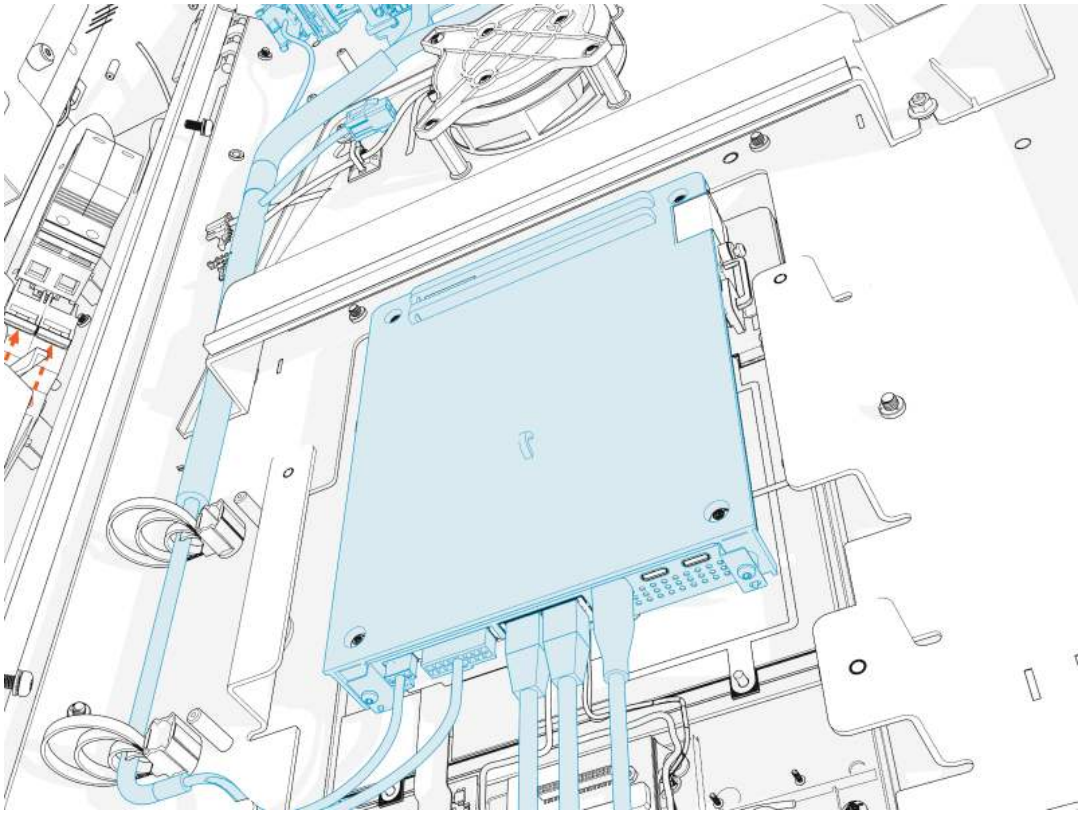
1. Check the software on the system and confirm if it is the latest released version.
2. If software is correct, check if the fault is seen after a recent FRU replacement (MDS). It is possible the SSLAN/MDS FRU did not pass the factory test and somehow got released to the field. Reach out to ChargePoint/Factory team to confirm this.
3. If none of the above is true, then try power cycle and clear any unknown state the board is stuck in. If there were disruptions noted during the software update, maybe the board froze.
4. Check the connections if the fault shown during self-test is hardware related. Reach out to ChargePoint for further assistance.

UCB Faults Board Location

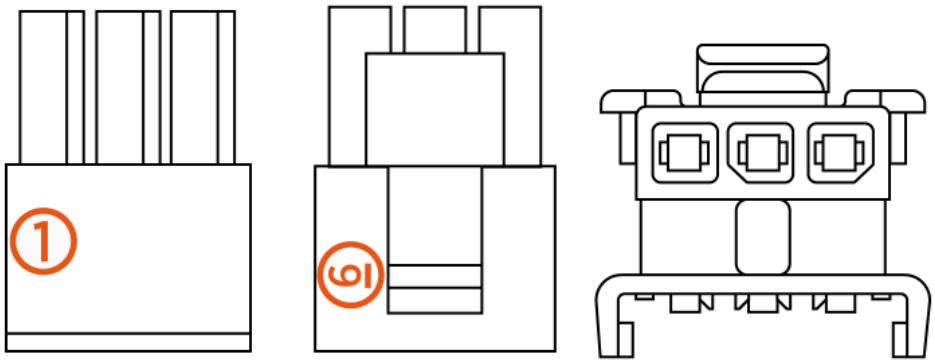
Front View



Inside View



UCB-P197-02



UCB Faults

UCB:48V_LOGIC_SUPPLY_OUT_OF_RANGE

Category	Fault Source	Fault Type	Criticality
UCB Power	UCB	Hardware/Software	Critical

Fault Description

Incoming 48 V to UCB is not within acceptable range (+ or -5 V). The system is locked out until service and only an advanced user can enable it.

Possible Causes

- UCB in unexpected state
- Harness issue
- UCB failure

- Incoming 480 V fluctuation
- AUXPS failure

Troubleshooting

1. Power cycle the system to clear UCB of any unexpected states.
2. Confirm if 48 V is coming on Pin 3 and Pin 1 on P197-02 connector going to UCB. If yes, then the issue might be with UCB. Replace UCB to resolve the issue. If 48 V is not seen, then proceed to the next step:
3. Confirm if there is no intermittent shorts or breaks in the harness. Disconnect the connector P249-02 on FDC prior to this test.
    - Measure continuity between Pin 3 and Pin 1 on connector P197-02 going to UCB. If there is a short detected between these pins, then harness replacement is needed.
    - Measure continuity between Pin 3 on P197-02 (on UCB) connector and Pin A1 on P249-02 connector (on FDC). Also, between Pin 1 on P197-02 connector (on UCB) and Pin B1 on P249-02 connector (on FDC). If there is a break in the harness, then harness replacement is needed.
4. Possible incoming power issue causing AUXPS 48 V to fluctuate. Confirm if 480 V incoming power is in the correct range. If not, then fix the incoming power source. If not, then there might be some AUXPS circuitry failure or a component is not within the tolerance range. Replace AUXPS if this fault is constantly seen.

UCB:HOLSTER_COMMS_FAILURE

Category	Fault Source	Fault Type	Criticality
Holster	UCB	Hardware/Software	Warning

Fault Description

This fault is declared if locking holster loses CAN communication. Warning message is sent to UCB and system is allowed to operate normally.

Possible Causes

- CAN harness issue
- Intermittent noise/packet loss

Troubleshooting

1. Power cycle if issue persists.
2. Contact ChargePoint if unable to resolve with power cycle.

UCB:HOLSTER_FW/CHECKSUM_FAILURE

Category	Fault Source	Fault Type	Criticality
Holster	UCB	Software	Warning

Fault Description

This fault is declared if Power Link holster firmware version and checksum does not match expected version after 2 attempts to reflash.

Ideally seen during new install or when software is updated on the system.

Possible Causes

- Bad FDC firmware flash at factory
- Interruption during software update
- Board firmware getting corrupted

Troubleshooting

1. If the UCB board had an issue during Finalizer step, then it is possible it is pushing a bad image on holster board, so login to chassis-shell and confirm if holster is reading correct firmware version.
2. If above is true, then try to flash the UCB again and push firmware manually.
3. If this happened during software update in the field, try to power cycle and see if it recovers.
4. If power cycle does not help, then replace the holster board.

UCB:SELF_TEST_FAILED

Category	Fault Source	Fault Type	Criticality
UCB Board	UCB	Hardware, Software	Critical

Fault Description

This fault is shown when UCB fails the self-test. Power Link is locked out and needs service/tech visit to bring it back to operation.

Possible Causes

- Software not updated on system
- Bad FRU (if seen on replacement)
- Board failure

Troubleshooting

1. Check the software on the system and confirm if it is the latest released version.
2. If the software is correct, check if the fault is seen after a recent FRU replacement (MDS). It is possible the UCB FRU did not pass Factory test and somehow got released to the field. Reach out to ChargePoint to confirm this.
3. If none of the above is true, then try power cycle and clear any unknown state the board is stuck in. If there were disruptions noted during software update, maybe the board froze.
4. Check the connections if the fault shown during self-test is hardware related. Reach out to ChargePoint for further assistance.

UCB:BOARD_TEMPERATURE_WARNING

Category	Fault Source	Fault Type	Criticality
UCB Board	UCB	Hardware	Warning

Fault Description

This warning is shown when UCB board temperature is higher than 80 °C for 10 seconds. The fault is cleared when board temperature goes below 80 °C for 10 seconds.

The system is allowed to operate normally and no action is taken.

Possible Causes

None

Troubleshooting

1. No action needed.

UCB:CPU_TEMPERATURE_WARNING

Category	Fault Source	Fault Type	Criticality
UCB Board	UCB	Hardware	Critical

Fault Description

This fault is shown when UCB board temperature is higher than 90 °C for 10 seconds. The fault is cleared when board temperature goes below 90 °C for 10 seconds.

Any ongoing session is stopped normally and system enters 30 minutes cool down period. Power Link will remain unavailable until cool down period and passing self-test after that. If this repeats 3 times in 24 hours, then Power Link is locked out for service.

Possible Causes

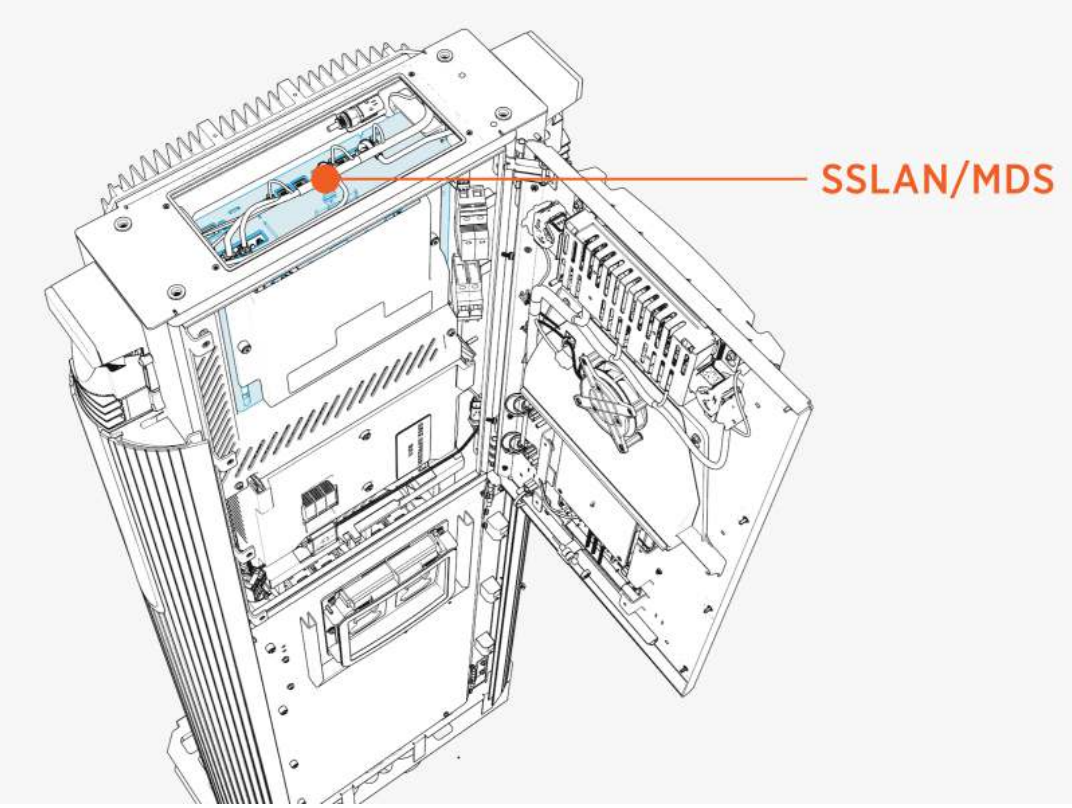
- Temperature sensor failure on the board

Troubleshooting

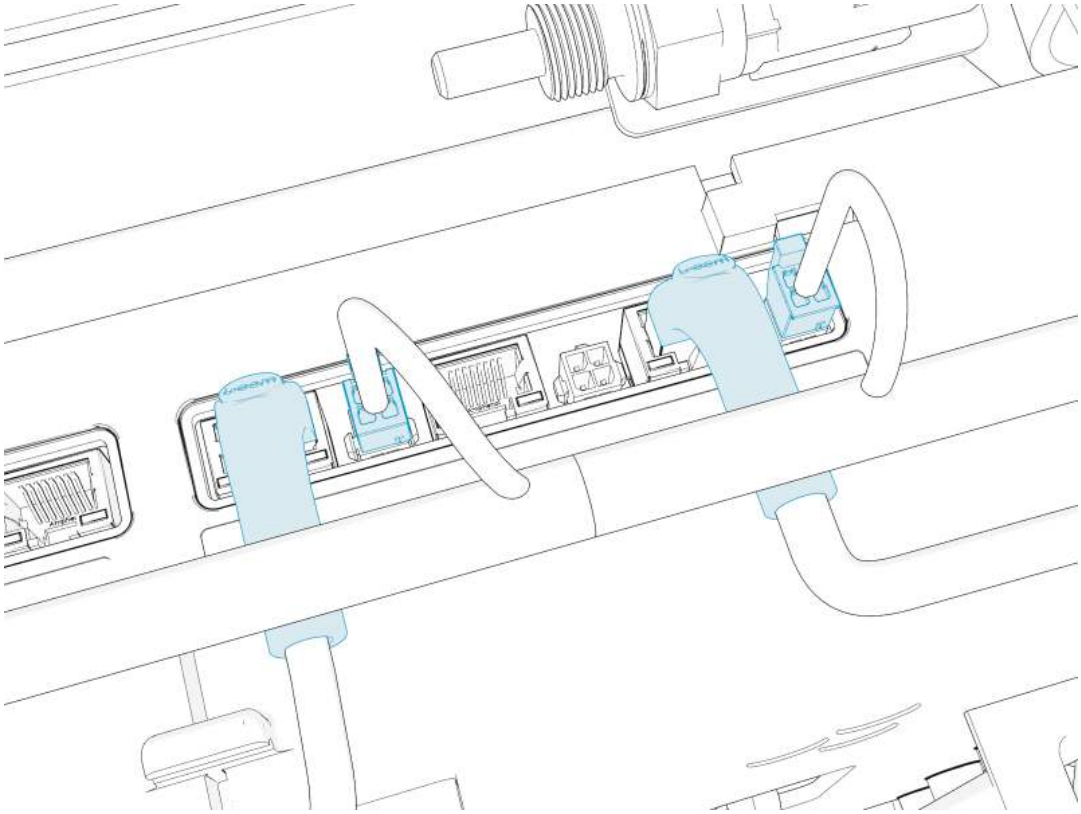
1. Possible failure on the board. Replace the UCB and resolve the issue.
2. Contact ChargePoint if the issue persists after UCB swap.

MDS Faults Board Location

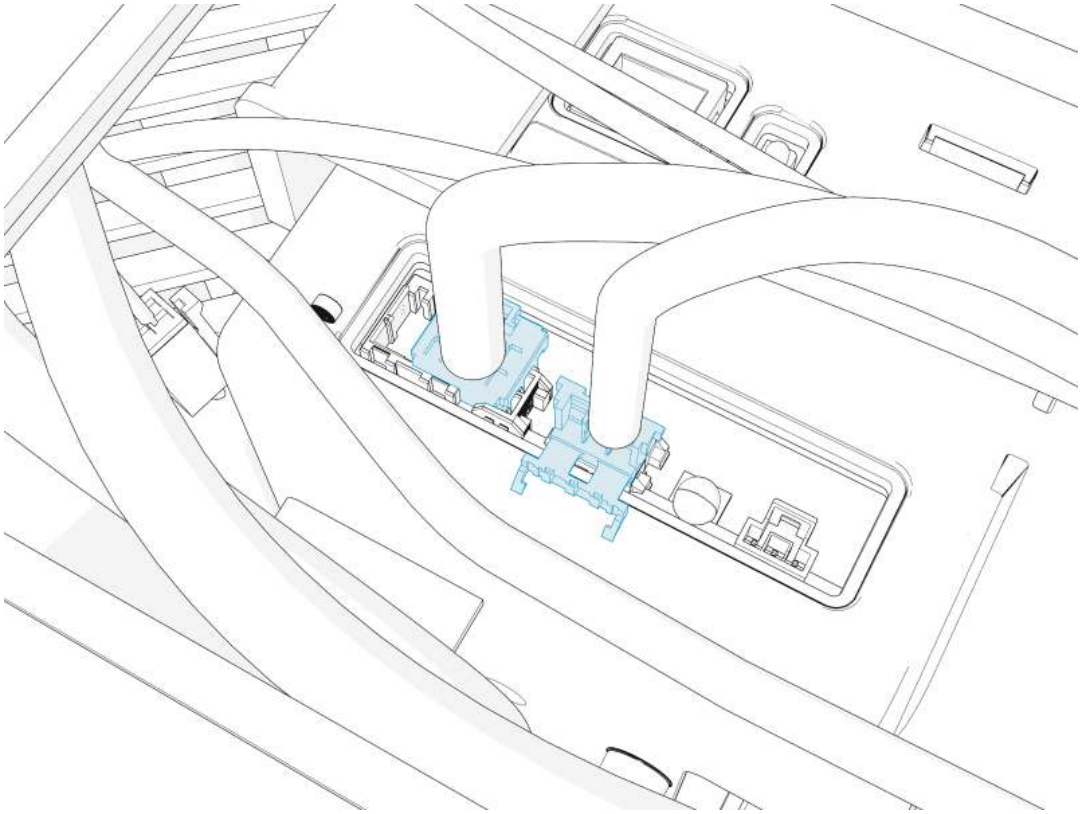
Top View



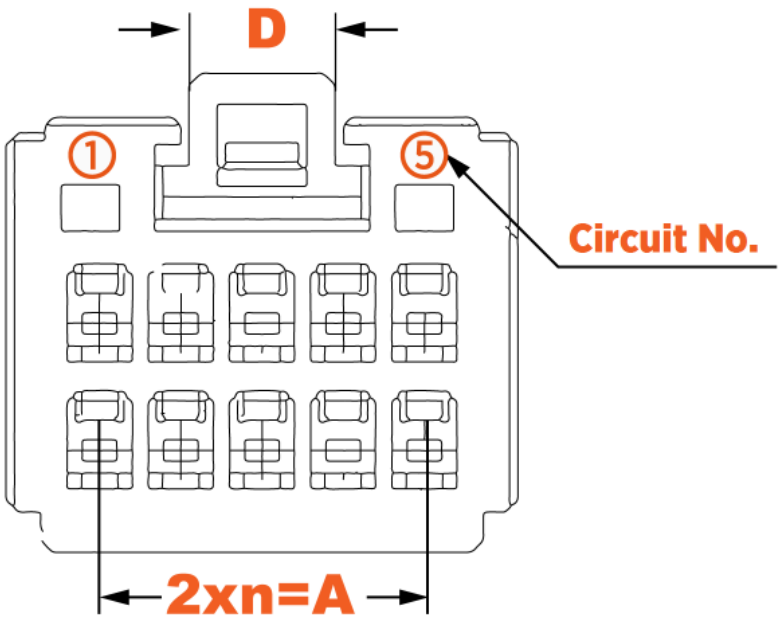
Side View



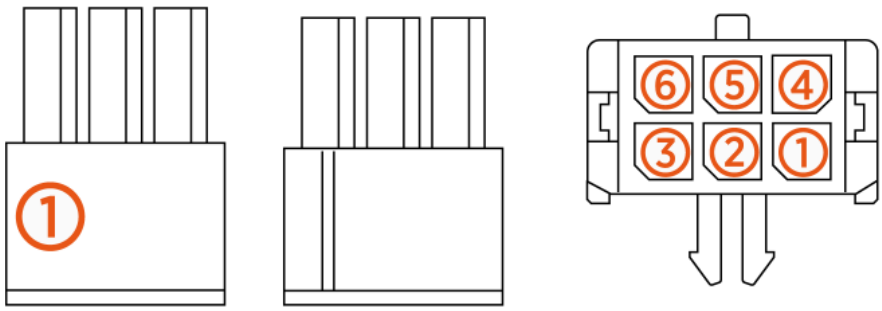
Other Side View



P223-07



P223-02



MDS Faults

UCB:ISOMON_COMMS_FAILURE

Category	Fault Source	Fault Type	Criticality
Isomon board	MDS	Hardware	Critical

Fault Description

Fault is described if UCB loses CAN Comms with MDS box for more than 10 seconds. If a session is active, then it is stopped and system is not available until the fault is cleared. If the fault is seen thrice in 24 hours, then the unit is locked for service.

Possible Causes

- Issue with CAN harness
- Isomon board (MDS box)

Troubleshooting

1. Confirm if the harness carrying CAN communication between MDS and UCB is seated correctly on both ends. P223-07 on MDS and P197-08 on UCB.
2. If both are seated correctly, then measure if there is a break in the CANH and CANL wire. Measure continuity on the following pins:
    a. Pin 6 (CANH) on P223-07 (going to MDS)
    b. Pin 2 on P197-08 (going to UCB)
    c. Pin 7 (CANL) on P223-07
    d. Pin 3 on P197-08

    This checks if there is a break in CAN harness going from MDS to UCB.
3. Check if there is short between CANH and CANL. Measure resistance between Pin 6 and Pin 7 of P223-07 going to MDS.
4. If no harness issues are found, then replace the MDS box to resolve the issue.
5. If the issue persists after MDS replacement, then contact ChargePoint for further debugging.

UCB:ISOMON_FW/CHECKSUM_FAILURE

Category	Fault Source	Fault Type	Criticality
Isomon board FW	MDS	FW	Critical

Fault Description

This fault is declared if ISOMON (MDS) firmware version and checksum does not match expected version after 2 attempts to reflash.

Ideally seen during new install or when software is updated on the system. However if this is seen during an ongoing session, then session is immediately terminated and Power Link is locked out of service.

Possible Causes

- Bad FDC firmware flash at factory
- Interruption during software update
- Board firmware getting corrupted

Troubleshooting

1. If the UCB board had an issue during Finalizer step, then it is possible it is pushing a bad isomon firmware, so login to chassis-shell and confirm if isomon is reading correct firmware version.
2. If above is true, then try to flash the UCB again to see if it pushes isomon firmware to recover.

3. If this happened during software update in the field, try to power cycle and see if it recovers.
4. If power cycle does not help, then replace the MDS.

ISOMON:BOARD_TEMPERATURE_WARNING

Category	Fault Source	Fault Type	Criticality
Isomon board	MDS	Hardware/Software	Major

Fault Description

MDS declared this fault when isomon board temperature is reported >100 °C for 10 s.

The fault clears if temperature is below the threshold for more than 60 s.

Possible Causes

- MDS board in unexpected state
- Failure on the board

Troubleshooting

1. No action needed on over temperature warning.

ISOMON Board Overtemperature Shutdown

Category	Fault Source	Fault Type	Criticality
Isomon board	MDS	Hardware/Software	Critical

Fault Description

MDS declared this fault when isomon board temperature is reported >115 °C for 10 s.

The fault clears if temperature is below the threshold for more than 60 s.

Possible Causes

- MDS board in unexpected state
- Failure on the board

Troubleshooting

1. Power cycle the system to clear any stuck faults on the board. Confirm if the temperature readings go to normal.

2. If not, replace the MDS box to resolve the issue.
3. Contact ChargePoint if the issue persists after MDS replacement.

Loss of Isolation

Category	Fault Source	Fault Type	Criticality
Isolation Loss	MDS	Hardware	Emergency

Fault Description

Isolation fault is triggered when isolation resistance between DC+/DC- and GND goes below 100 kΩ for more than 8 s (sampling time 2 s).

The fault clears if isolation resistance goes above the threshold value for 10 s.

If fault during ongoing session, then the session is stopped immediately and MDS & DC contactors are opened.

Unit locked out if this fault is seen thrice in 24 hours. If the controller shutdown does not happen within 10 s, then MDS relays are forced open and PL is locked out for investigation.

Snapshot of critical parameters are saved on PBC for debugging.

Possible Causes

- Loss of isolation
- Isomon board failure

Troubleshooting

1. Confirm if there is any short between bus bars and GND. Measure resistance between DC+ to GND and DC- to GND. If short is located, then take appropriate actions to fix the issue.
2. If there is no short located between various points, then it could be a failed isomon board. Replace MDS box to fix the issue.
3. Contact ChargePoint for further debugging.

MDS_RELAY_ABNORMAL_OPEN

Category	Fault Source	Fault Type	Criticality
Relay	MDS	Hardware	Critical

Fault Description

This fault is triggered when MDS relays open under higher load current (>200 A and <300 A).

Isomon board clears the fault if there is no welded relays detected at the start of next session.

If there are 100 of these abnormal openings noted in a unit, then the system is locked out for service for futher investigation.

Snapshot of critical parameters are saved on PBC for debugging.

Possible Causes

- Vehicle side issue
- MDS contactor failure
- Isomon failure

Troubleshooting

1. Check if this happened in the middle of the session or at the end of the session.
2. If at the end of the session, then it could be the EV opening its contactor under load after it reached max. SOC. Reach out to engineering with logs and pcap files.
3. If this happened at the middle of the session, the issue could be either EV or EVSE. Reach out to ChargePoint with logs and pcaps for further debugging.

MDS_RELAY_CRITICAL_OPEN

Category	Fault Source	Fault Type	Criticality
Relay	MDS	Hardware	Critical

Fault Description

This fault is triggered when MDS relays open under higher load current (>300 A).

Isomon board clears the fault if there is no welded relays detected at the start of next session.

If welded relay is detected, then Power Link is locked out for service.

Snapshot of critical parameters are saved on PBC for debugging.

Possible Causes

- Vehicle side issue
- MDS contactor failure
- Isomon failure

Troubleshooting

1. Confirm if the EV being charged is opening its contactor under load triggering MDS contactor to open at high current. Check if it is an issue with EV by trying sessions on other Power Link and other EVs on this Power Link.

2. If issue is seen with multiple vehicles, then issue might be with MDS contactors or isomon board. Replace MDS box to fix the issue.
3. Contact ChargePoint if the issue persists.

MDS_RELAY_WELDED

Category	Fault Source	Fault Type	Criticality
Relay	MDS	Hardware	Critical

Fault Description

This fault is triggered when MDS relays are welded stuck. The isomon board is monitoring the auxilliary contacts in the MDS contactor to determine if the contactors are welded.

Isomon board tries to clear the fault, but if it cannot then the system is locked out for service.

Possible Causes

- Vehicle side issue
- MDS contactor failure
- Isomon failure

Troubleshooting

1. Check if the contactor is indeed welded shut. Measure resistance across the MDS contactor on the bus bars (on the MDS).
2. If a short is detected when they are supposed to be open, then replace the MDS box to replace the issue.
3. Contact ChargePoint if the issue persists.

MDS Thermal Switch Open

Category	Fault Source	Fault Type	Criticality
Thermal Switch	MDS	Hardware	Emergency

Fault Description

This fault is triggered when thermal switch inside MDS reads OPEN for 100 ms. The fault clears if the switch reads good reading for 10 s.

If a session is going on at the time of this fault, then the session is stopped normally. The system is derated to 50% of max. available power for the next session.

If the fault is seen thrice in 24 hours, then the unit is locked out for service.

Possible Causes

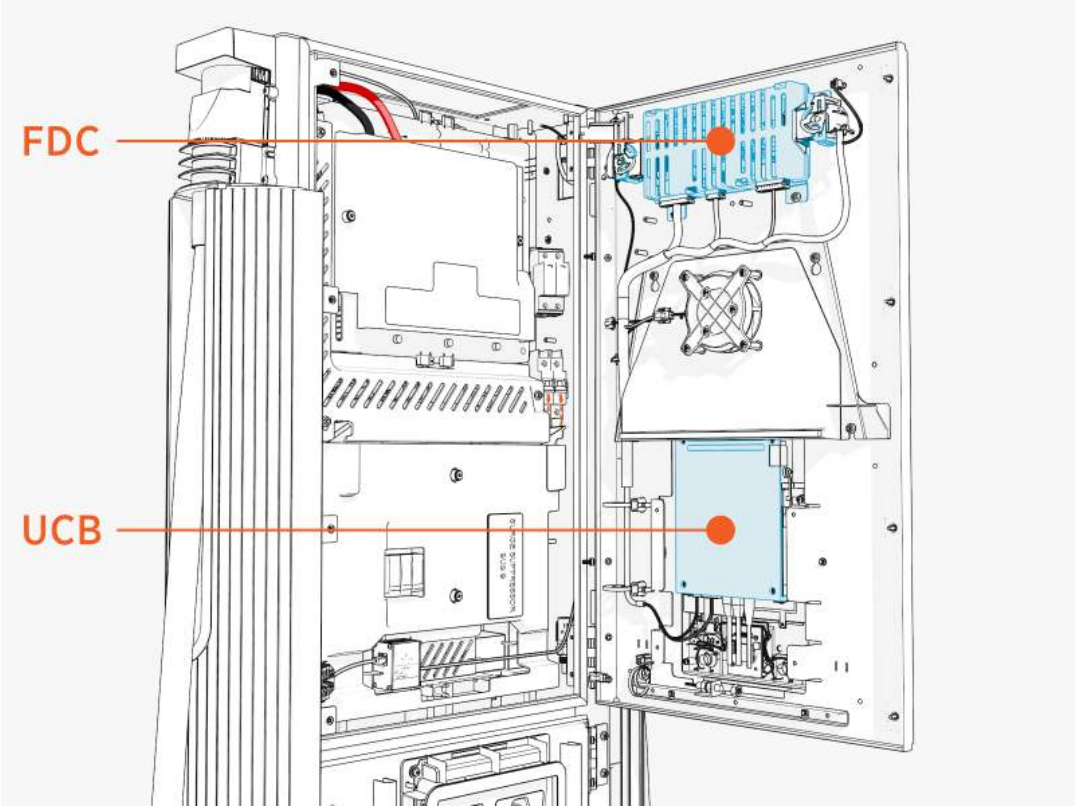
- Actual thermal event
- MDS thermal switch failure

Troubleshooting

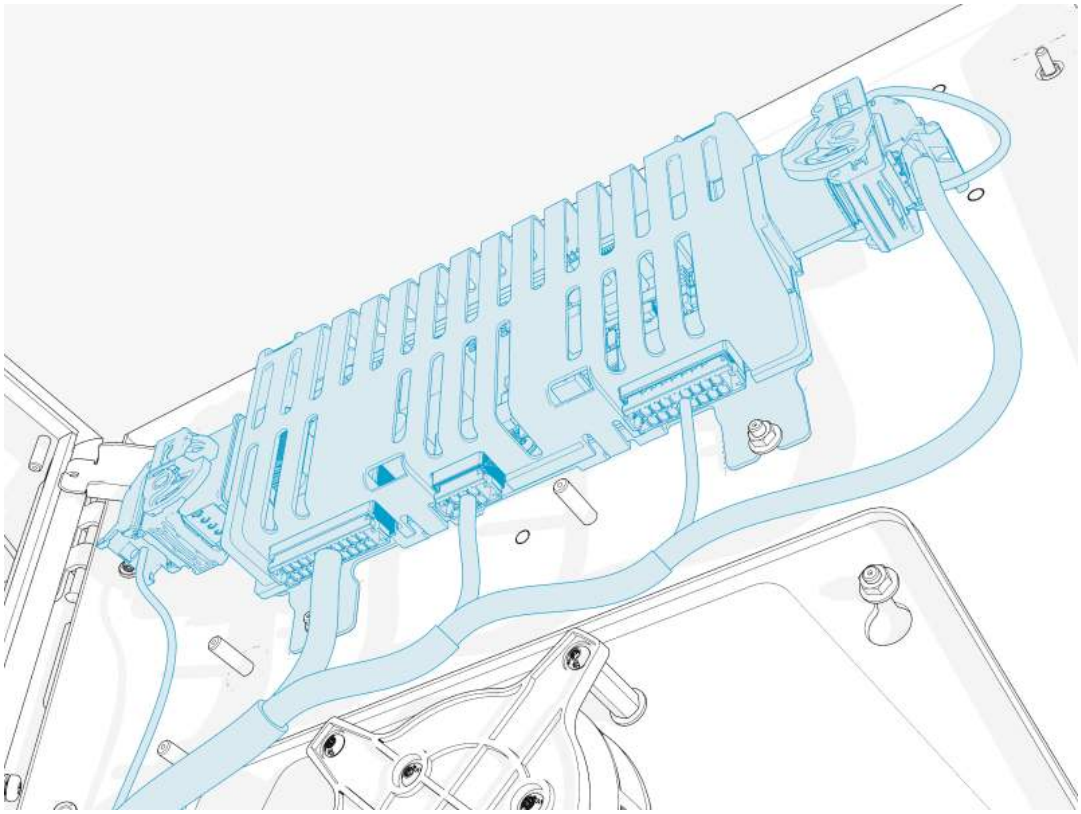
1. Replace MDS to resolve the issue.
2. Contact ChargePoint if the issue persists after MDS replacement.

FDC Faults Board Location

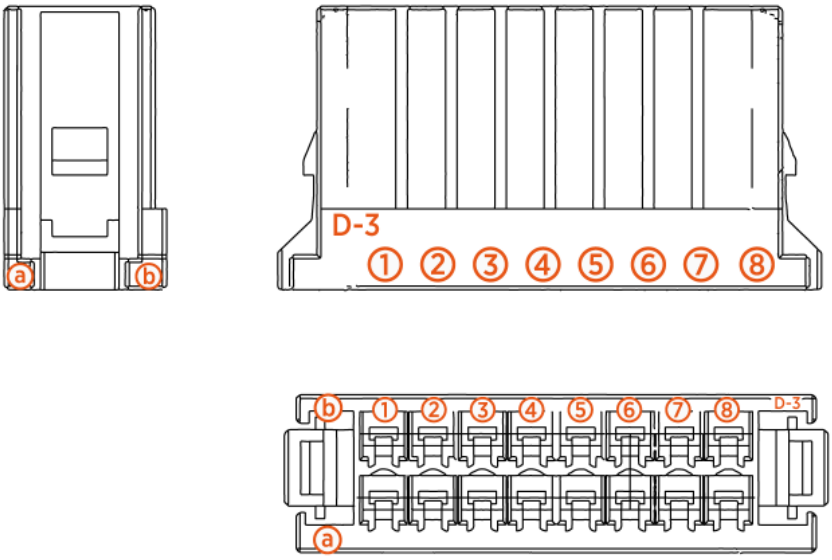
Front View



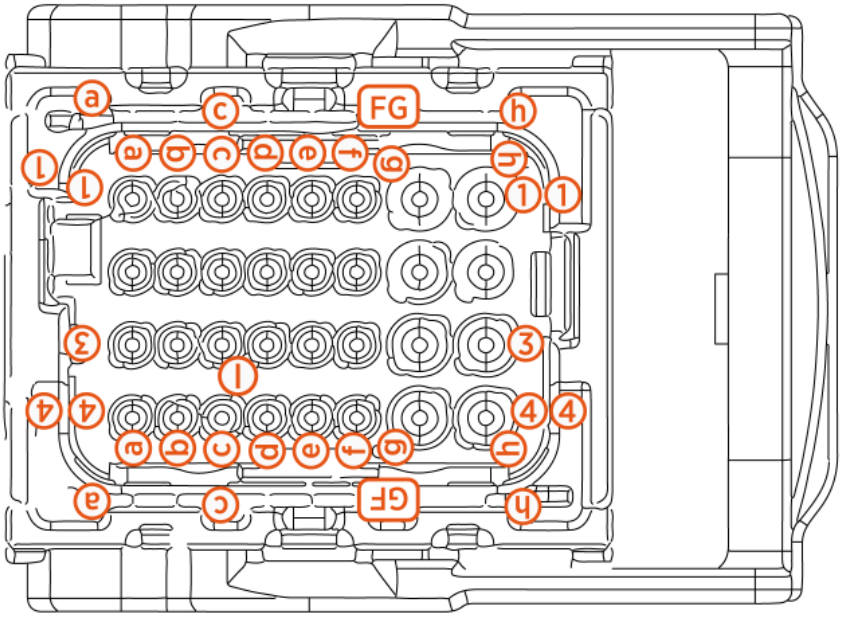
Close-up View



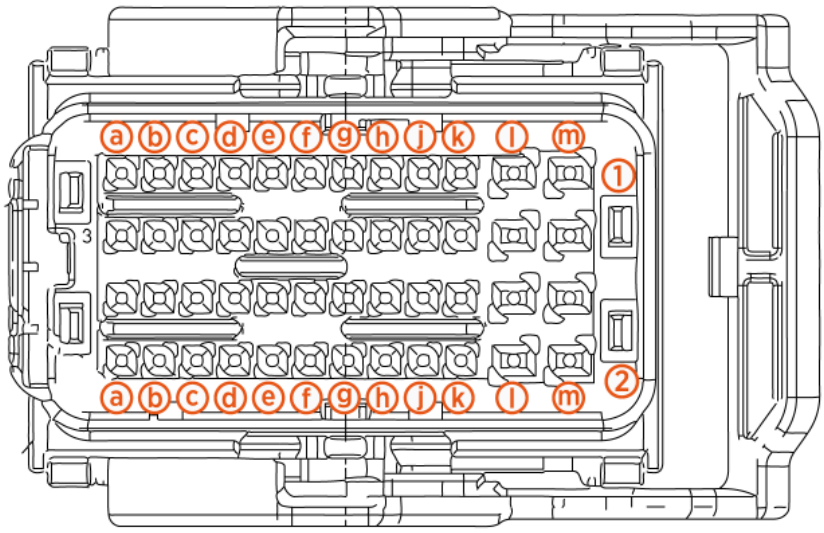
FDC-P249-05



FDC-P249-04



FDC-P-249-03



FDC Faults

Loss of Comms with UCB

Category	Fault Source	Fault Type	Criticality
FDC Communication	FDC	Hardware/Software	Emergency

Fault Description

If UCB loses communication with FDC for more than 5 seconds, this fault is declared. It does clear if the communication is back and stays up for 60 seconds. FDC will continue to run in the same state that it was at prior to the loss of communication. Any ongoing sessions will be stopped if the communication is not reestablished within 60 seconds and Power Link will be locked out of service. Snapshot of critical parameters from the last 10 seconds prior to failure is captured.

Possible Causes

If UCB is locked out due to a loss of communications:

- Issue with CAN harness - connector, CAN termination etc.
- FDC board failure

Troubleshooting

1. Look for CAN harness going to the FDC for proper seating: P-249-05 is the connector going to FDC which carries CAN signals.
2. If no connector seating issue is found, then measure continuity between CAN_OUT_H_J (Pin B1) and CAN_OUT_L_J (Pin B2). Check if there is a short between CAN H and CAN L lines, if yes then the harness will need to be replaced.
3. Confirm if the CAN termination is good - measure resistance across CAN_TERM (Pin A4) and CAN_TERM (Pin B4).
4. If no issues are found with the connector and the harness, then replace the FDC board due to possible board issues.
5. Contact ChargePoint for further debugging steps.

FDC Checksum Failure

Category	Fault Source	Fault Type	Criticality
FDC FW	FDC	Software	Critical

Fault Description

This fault is declared if FDC firmware version and checksum don't match the expected version after 2 attempts to reflash.

Ideally seen during a new installation or when the software is updated on the system. However, if this is seen during an ongoing session, then the session is immediately terminated and Power Link is locked out of service.

Possible Causes

- Bad FDC firmware flash at factory
- Interruption during software update
- Board firmware getting corrupted

Troubleshooting

1. If the UCB board had an issue during the Finalizer step, then it is possible it is pushing a bad FDC firmware, so login to chassis-shell and confirm if FDC is reading the correct firmware version.
2. If the above is true, then try to flash the UCB again to see if it pushes FDC to recover.
3. If this happened during software update in the field, try to power cycle and see if it recovers.
4. If power cycle does not help, then replace the FDC board.

FDC Vicor OverTemperature Warning

Category	Fault Source	Fault Type	Criticality
FDC Board	FDC	Hardware	Warning

Fault Description

The warning is declared when one of the module on FDC board reports 90 °C for 10 s.

The fault is cleared if the temperature goes below 100 °C for more than 60 s.

Possible Causes

- FDC board failure

Troubleshooting

1. No steps need as the system is allowed to operate normally with this warning.

FDC Vicor OverTemperature Shutdown

Category	Fault Source	Fault Type	Criticality
FDC Board	FDC	Hardware	Critical

Fault Description

The fault is declared when one of the module on the FDC board reports 100 °C for 10 s.

The fault is cleared if the temperature goes below 100 °C for more than 60 s.

Power Link locked out if this fault is seen thrice within 24 hours. UCB will record critical parameters as part of the snapshot feature.

Possible Causes

- FDC board failure

Troubleshooting

1. Replace the FDC board if the unit is locked out.
2. Contact ChargePoint if replacing the FDC board does not resolve the issue.

FDC Board OverTemperature Warning

Category	Fault Source	Fault Type	Criticality
FDC Board	FDC	Hardware	Warning

Fault Description

The warning is declared when the FDC board temperature exceeds 90 °C for 10 s.

The fault is cleared if the temperature goes below 90 °C for more than 60 s.

Possible Causes

- FDC board failure

Troubleshooting

1. No steps needed as the system is allowed to operate normally with this warning.

FDC Board OverTemperature Shutdown

Category	Fault Source	Fault Type	Criticality
FDC Board	FDC	Hardware	Critical

Fault Description

The fault is declared when one of the modules on the FDC board reports 100 °C for 10 s.

The fault is cleared if the temperature goes below 100 °C for more than 60 s.

Power Link is locked out if this fault is seen thrice within 24 hours. UCB will record critical parameters as part of the snapshot feature.

Possible Causes

- FDC Board failure

Troubleshooting

1. Replace the FDC board if the unit is locked out.
2. Contact ChargePoint if replacing the FDC board does not resolve the issue.

Top RTD OverTemperature Warning

Category	Fault Source	Fault Type	Criticality
Bus Bar RTD	FDC	Hardware	Warning

Fault Description

The warning is declared when TOP RTD temperature exceeds 85 °C for 10 s.

The warning is cleared if the temperature goes below 85 °C for more than 60 s.

Troubleshooting

1. No steps needed as the system is allowed to operate normally with this warning.
2. Replace the FDC board if the unit is locked out.
3. Contact ChargePoint if replacing the FDC board does not resolve the issue.

Top RTD Overtemperature Shutdown

Category	Fault Source	Fault Type	Criticality
Bus Bar RTD	FDC	Hardware	Critical

Fault Description

This overtemperature shutdown is declared when the Top RTD exceeds 95 °C for 10 s. If the session is going on, then it is emergency stopped. The fault is cleared if temperature goes below threshold for 60 s.

Power Link is locked out if this fault is seen thrice within 24 hours. UCB will record critical parameters as part of snapshot feature.

Possible Causes

- Issue with the harness
- Failure of Top RTD (located above MDS - back plane)

Troubleshooting

1. Verify if the wires E1 and F1 on P249-04 are pulled out of connector with basic pull test.
2. Confirm if the harness between RTD and FDC is good by measuring resistance across Pins E1 and F1 on connector P249-04. We should measure 100 Ω if the switch is good.
3. If the switch reads bad, then replace the RTD to resolve the issue.
4. Once harness is considered good and if it also reads 100 Ω, then replace FDC to resolve the issue..

MDS RTD OverTemperature Warning

Category	Fault Source	Fault Type	Criticality
MDS RTD	FDC	Hardware	Critical

Fault Description

The warning is declared when TOP RTD temperature exceeds 90 °C for 10 s.

The warning is cleared if the temperature goes below 90 °C for more than 60 s.

Possible Causes

- Issue with the harness
- Failure of Top RTD (located above MDS - back plane)

Troubleshooting

1. No steps needed as the system is allowed to operate normally with this warning.

MDS RTD Overtemperature Shutdown

Category	Fault Source	Fault Type	Criticality
MDS RTD	FDC	Hardware	Critical

Fault Description

This overtemperature shutdown is declared when the MDS RTD exceeds 90 °C for 10 s. If the session is going on, then it is emergency stopped. The fault is cleared if temperature goes below threshold for 60 s.

Power Link is locked out if this fault is seen thrice within 24 hours. UCB will record critical parameters as part of snapshot feature.

Possible Causes

- Issue with the harness
- Failure of MDS RTD (located behind MDS)
- FDC board

Troubleshooting

1. Verify if the wires C1 and D1 on P249-04 are pulled out of connector with basic pull test.
2. Confirm if the harness between RTD and FDC is good by measuring resistance across pins C1 and D1 on connector P249-04. We should measure 100 Ω if the switch is good.
3. If the switch reads bad, then replace the RTD to resolve the issue.
4. Once harness is considered good and if it also reads 100 Ω, then replace FDC to resolve the issue.

Bottom RTD OverTemperature Warning

Category	Fault Source	Fault Type	Criticality
Bus Bar RTD	FDC	Hardware	Warning

Fault Description

The warning is declared when Bottom RTD temperature exceeds 80 °C for 10 s.

The warning is cleared if the temperature goes below 80 °C for more than 60 s.

Troubleshooting

1. No steps need as the system is allowed to operate normally with this warning.

Bottom RTD OverTemperature Shutdown

Category	Fault Source	Fault Type	Criticality
Bus Bar RTD	FDC	Hardware	Critical

Fault Description

This overtemperature shutdown is declared when the Bottom RTD exceeds 90 °C for 10 s. If the session is going on, then it is emergency stopped. The fault is cleared if temperature goes below threshold for 60 s.

Power Link is locked out if this fault is seen thrice within 24 hours. UCB will record critical parameters as part of the snapshot feature.

Possible Causes

- Issue with the harness
- Failure of Bottom RTD (located on power plate)
- FDC board

Troubleshooting

1. Verify if the wires A1 and B1 on P249-04 are pulled out of connector with basic pull test.
2. Confirm if the harness between RTD and FDC is good by measuring resistance across Pins A1 and B1 on connector P249-04. We should measure 100 Ω if the switch is good.
3. If the switch reads bad, then replace the RTD to resolve the issue.
4. Once harness is considered good and if it also reads 100 Ω, then replace FDC to resolve the issue.

Mixing Fan Overcurrent

Category	Fault Source	Fault Type	Criticality
Door Fan	FDC	Hardware	Major

Fault Description

If the stirring fan current consumption exceeds 1 A for 100 ms, then we declare this fault. The fault is cleared if the current is <1 A for 1 s. Sampling done at 10 ms.

If this fault is seen thrice in 24 hours, then unit is locked out till service.

Possible Causes

- Issue with the harness
- Fan rotor stuck (debris stuck?)
- Fan failure
- FDC board

Troubleshooting

1. Visually confirm if there is anything blocking the fan blades. If yes, clear the debris/block and verify if the fault goes away.
2. Possible short in the harness. Check the continuity between A6 (V48VP0_Fan_1_J) and B6 (V48P0_Fan_1_RTN) on P249-02 connector. If there is a short, then we need to locate the short and replace the harness accordingly.
3. If no short found, then possible issue with fan circuitry internally. Replace the fan to resolve the issue.
4. If the issue persists, then replace the FDC board to resolve any issue with board circuitry that measures this parameter.
5. Contact ChargePoint if the issue persists.

MDS Fan Overcurrent

Category	Fault Source	Fault Type	Criticality
Door Fan	FDC	Hardware	Critical

Fault Description

If the MDS fan current consumption exceeds 1 A for 4 ms, then we declare this fault. The fault is cleared if the current is <1 A for 1 s. Sampling done at 4 ms.

If this fault is seen thrice in 24 hours, then the unit is locked out till service.

Possible Causes

- Issue with harness
- Fan rotor stuck (debris stuck?)
- Fan failure
- FDC board

Troubleshooting

1. Visually confirm if there is anything blocking the fan bladed. If yes, clear the debris/block and verify if the fault goes away.
2. Possible short in the harness. Check the continuity between A9 (V48VP0_Fan_2_J) and B9 (V48P0_Fan_2_RTN) on P249-02 connector. If there is a short, then we need to locate the short and replace the harness accordingly.
3. If no short found, then possible issue with fan circuitry internally. Replace the fan to resolve the issue.
4. If the issue persists, then replace the FDC board to resolve any issue with board circuitry that measures this parameter.
5. Contact ChargePoint if the issue persists.

Mixing Fan Open Circuit

Category	Fault Source	Fault Type	Criticality
Door Fan	FDC	Hardware	Critical

Fault Description

If the mixing fan current consumption goes below 0.1 A for 100 ms, then we declare this fault. The fault is cleared if the current is >0.1 A for 1 s. Sampling done at 10 ms.

If this fault is seen thrice in 24 hours, then the unit is locked out till service.

Possible Causes

- Issue with harness
- Fan failure
- FDC board

Troubleshooting

1. Confirm if the connector going to fan is seated correctly. If yes, seat it firmly and verify if the fault goes away.
2. Possible break in the harness. Confirm if the wires carrying 4 8 V (A6) and 48 V RTN (B6) is continuous from FDC connector to connector at the fan. Measure the continuity from A6 on P249-02 to pin 4 on -Fan1 (-A4); And, measure the continuity from B6 to Pin 3 on -Fan1 (-A4).

   If there is no continuity, then we need to locate the location of the break and replace the harness accordingly.
3. If no harness issue found, then possible issue with fan circuitry internally. Replace the fan to resolve the issue.
4. If the issue persists, then replace the FDC board to resolve the issue.
5. Contact ChargePoint if the issue persists.

MDS Fan Open Circuit

Category	Fault Source	Fault Type	Criticality
Door Fan	FDC	Hardware	Critical

Fault Description

If the MDS fan current consumption goes below 0.1 A for 100 ms, then we declare this fault. The fault is cleared if the current is >0.1 A for 1 s. Sampling done at 10 ms.

If this fault is seen thrice in 24 hours, then the unit is locked out until service.

Possible Causes

- Issue with harness
- Fan failure
- FDC board

Troubleshooting

1. Confirm if the connector going to fan is seated correctly. If yes, seat it firmly and verify if the fault goes away.

2. Possible break in the harness. Confirm if the wires carrying 48 V (A9) and 48 V RTN (B9) is continuous from FDC connector to connector at the fan. Measure continuity from A9 on P249-02 to Pin 4 on -Fan2 (-A5); And, continuity from B9 to Pin 3 on -Fan2 (-A5).

   If there is no continuity, then we need to locate the location of the break and replace the harness accordingly.
3. If no harness issue found, then possible issue with fan circuitry internally. Replace the fan to resolve the issue.
4. If the issue persists, then replace the FDC board to resolve the issue
5. Contact ChargePoint if the issue persists.

Low Mixing Fan Speed

Category	Fault Source	Fault Type	Criticality
Door Fan	FDC	Hardware	Major

Fault Description

If the mixing fan RPM goes below 500 for 10 s, then this fault is declared.

The fault clears if the RPM goes above 500 for 60 s.

If this fault is seen thrice in 24 hours, then the system is locked out for service.

Possible Causes

- Issue with harness
- Fan failure
- FDC board

Troubleshooting

1. Confirm if the connector going to fan is seated correctly. If yes, seat it firmly and verify if the fault goes away.
2. Possible break in the harness. Measure continuity from B7 on P249-02 to Pin 1 on -Fan1 (-A4);

   If there is no continuity, then we need to locate the location of the break and replace the harness accordingly.
3. If no harness issue found, then possible issue with fan circuitry internally. Replace the fan to resolve the issue.
4. If the issue persists, then replace the FDC board to resolve the issue
5. Contact ChargePoint if the issue persists.

Low MDS Fan Speed

Category	Fault Source	Fault Type	Criticality
Door Fan	FDC	Hardware	Major

Fault Description

If the MDS fan RPM goes below 500 for 10 s, then this fault is declared.

The fault clears if the RPM goes above 500 for 60 s.

If this fault is seen thrice in 24 hours, then the system is locked out for service.

Possible Causes

- Issue with harness
- Fan failure
- FDC board

Troubleshooting

1. Confirm if the connector going to fan is seated correctly. If yes, seat it firmly and verify if the fault goes away.
2. Possible break in the harness. Measure continuity from B10 on P249-02 to Pin 1 on -Fan2 (-A5);

   If there is no continuity, then we need to locate the location of the break and replace the harness accordingly.
3. If no harness issue found, then possible issue with fan circuitry internally. Replace the Fan to resolve the issue.
4. If the issue persists, then replace the FDC board to resolve the issue
5. Contact ChargePoint if the issue persists.

FDC:Thermal-Switch-Open

Category	Fault Source	Fault Type	Criticality
Thermal Switch	FDC	Hardware	Critical

Fault Description

This fault is declared when the thermal switch opens indicating a thermal event. The system is locked out for further inspection.

Possible Causes

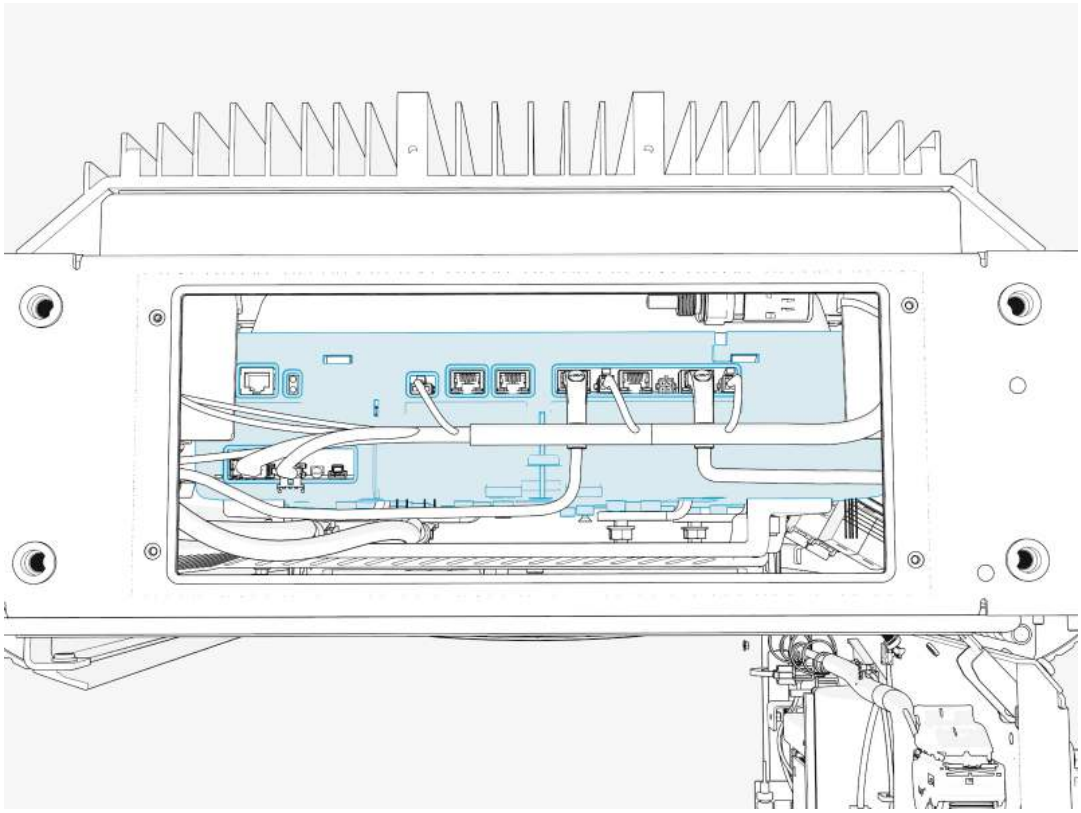
- Issue with harness
- Failed thermal switch
- Actual thermal event

Troubleshooting

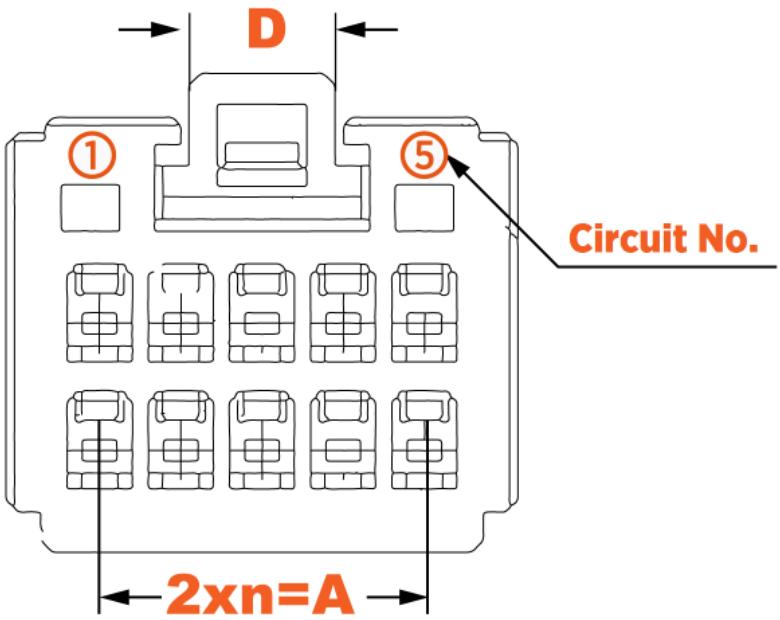
1. Confirm if there are any overtemp faults reported by other FRUs around the time of this failure. If yes, then report to ChargePoint for further log debugging and possible issues internal to the system.
2. If no other thermal faults seen, then confirm continuity across Pins G4 and H4 of the P249-04 connector going to FDC. If there is a short measured, then switch is good. Move to the next step. If the continuity test reads an Open, then the point of failure could be either harness or the switch. Since this switch is not easily accessible - reach out to ChargePoint for further steps.
3. Reach out to ChargePoint after confirming that the harness and switch are good.

SEVB Faults Board Location

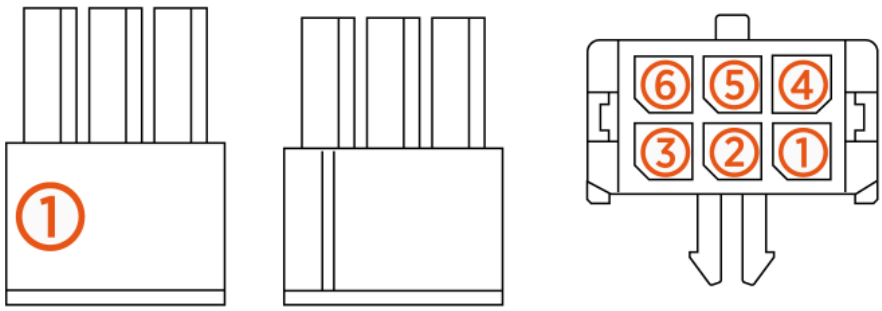
Top View



P223-07



P223-02



SEVB Faults

SEVB:COMMS-FAILURE

Category	Fault Source	Fault Type	Criticality
SEVB Communication	SEVB	Hardware/Software	Critical

Fault Description

This fault is declared when UCB loses communication with SEVB for 5 s.

Any ongoing session is stopped on encountering this fault. Power Link is allowed to operate once communication is reestablished.

3 such events in 24 hours will disable and lock the station.

Possible Causes

- Software issue
- Incorrect connection on SEVB/SSLAN
- Ethernet cable damage
- SEVB failure
- SSLAN failure

Troubleshooting

1. Confirm if the issue started happening after a software update. If yes, revert back to old software and confirm if the issue is resolved. If not, continue with next steps.
2. If this is a new install, confirm the connections between SSLAN and SEVB are correct. Check if the connectors P238-17 along with its ethernet cable are seated on the right most slot on the SSLAN. Check if the P238-18 and its ethernet cable are seated to the left most slot. Confirm that the middle slot is left empty and that the above two are not swapped with each other. Photo added for reference.
3. If the issue persists after the above checks, check if the Ethernet port is damaged on the cable or on the connector. Look for crimping inside the connector, broken locking mechanism, broken connector tab for any damage.
4. Check if the SEVB is losing power occasionally leading to SEVB comms loss. This could be issue with SSLAN board and could use MDS replacement if confirmed. Check logs to confirm the same and reach out to engineering prior to replacement.
5. Replace SEVC if SEVB comms issue continues after the above steps.
6. Replace UCB if comms failure persists after SEVC replacement.
7. Contact ChargePointif the issue is seen after the UCB replacement.

SEVB:INVALID-CABLE-DETECTED

Category	Fault Source	Fault Type	Criticality
Charging cable	SEVB	Hardware/Software	Critical

Fault Description

This fault is declared when SEVB is unable to be detected after a replacement or during new install.

The system won't be able to get into useful state with this fault being active.

Possible Causes

- Software Issue
- SEVB failure

Troubleshooting

1. Confirm if the issue started after a recent Cable Swap or during activation of a newly installed unit. If yes, confirm through chassis-shell if we are able to correctly read SEVB information (in SEVC node). If not, it is possible that provisionng of the SEVB was done correctly. Re-provision SEVB. Contact Engineering for steps.
2. Confirm if the issue started after a software update. If yes, then possibly the configuration files might not have loaded correctly, reflash the software and see if it resolves the issue.
3. If both steps do not resolve the issue, then replace the SEVC.
4. Contact ChargePoint if issue persists after SEVC swap.

SEVB:PLUG-OUT-DETECTED

Category	Fault Source	Fault Type	Criticality
Charging cable	SEVC	Hardware	Critical

Fault Description

This fault is seen when a plug out is detected in the middle of an ongoing session.

Possible Causes

- Software/Firmware change
- EV side issue
- Damage on the connector latch

Troubleshooting

1. Confirm if this fault is seen on every session end. Check if the fault started occurring after a recent software update or hardware change on the system. Reach out to ChargePoint for further debugging.
2. Confirm if this fault started occuring without changes on our system. If yes, then this could be an interop issue. Reach out to ChargePoint for further debugging.

SEVB:PLC-NOT-RESPONDING

Category	Fault Source	Fault Type	Criticality
SEVB PLC	SEVB	Hardware/Software	Critical

Fault Description

The fault is seen when PLC chip on the SEVB board stops responding. The system will be operational if there is more than one cable in the system. The port with issue will be nonoperational till resolution.

System will be locked out if this fault is seen 3 times within 24 hours.

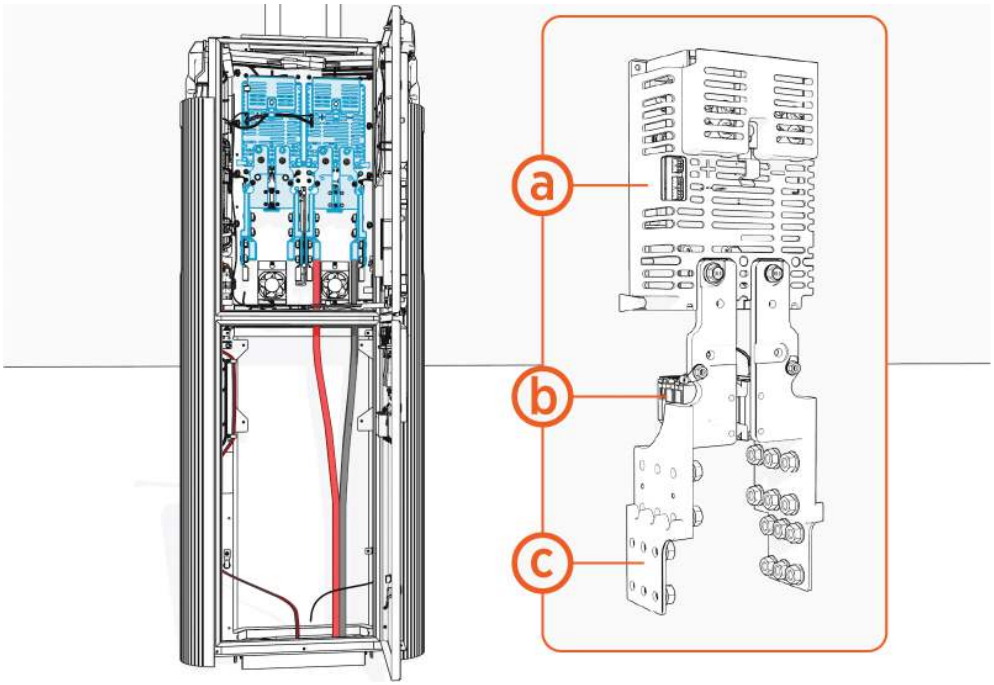
Possible Causes

- Software or Firware issue
- SEVB failure

Troubleshooting

1. Confirm if the issue occurred after a recent bootup, software update, or a hardware change. Power cycle the system to clear any stuck configuration or incomplete software update.
2. Replace SEVC to resolve the issue.
3. Contact ChargePoint if the issue persists after SEVC replacement.

Proton Location (Power Link 2000)



(a) Contactor switch (proton) module
(b) Surge arrestor
(c) Bus bars (x2)

Proton Faults

urn:fault:proton:primary-proton-isolation-fault

or

urn:fault:proton:optional-proton-isolation-fault

Category	Criticality	Fault Source	Fault Type
Isolation	Emergency	proton board	Hardware/Software

Fault Description

The Proton board monitors the isolation resistance from DC+ to ground and DC- to ground and triggers an isolation fault if the isolation resistance drops below 100 kΩ for 8s. Any ongoing session stops. The fault clears if the isolation resistance goes above 100 kΩ for 10s. If this fault is seen three times in 24 hours, the Power Link 2000 will be disabled and locked out for further investigation.

Possible Causes

- Real Isolation issue.
- Proton board failure.
- Software bug.

Troubleshooting

1. Check if the issue started occurring after a software change on the Power Link 2000. Contact the ChargePoint software team for debugging and troubleshooting steps.
2. Check if this happened after a hardware swap and contact the ChargePoint hardware team for debugging and troubleshooting steps.
3. If the isolation fault was noted without any of the above, follow the steps below:
    a. Check if it happened in the middle of the session. If yes, retry the session and see if the issue clears. This could be an EV side issue.
    b. If the issue persists over multiple session attempts and is independent of the EV, then replace the Proton FRU to resolve the issue.
    c. If the issue persists, contact ChargePoint support for further debugging.

urn:fault:proton:primary-proton-contactor-opening

or

urn:fault:proton:optional-proton-contactor-opening

Category	Criticality	Fault Source	Fault Type
Output Contactor	Critical	Contactor	Hardware/Software

Fault Description

The Proton board monitors the DC current as well as Aux witness contact feedback from Proton relays and triggers the fault if the current is >400 A and <450 A. The Proton board clears the fault if, during the start of the next charge session, the relays are not detected to be welded.

Possible Causes

- EV side issue.
- Proton issue.
- Software bug.

Troubleshooting

1. Check if this fault happened at the end of a session. Check the SOC and see if it is near 100%. If yes, then this could be due to the EV opening the output contactor at the end of the session, prior to ramping down the current. Observe if this happens on multiple sessions and contact engineering for further steps and to contact the EV manufacturer.
2. If it is happening randomly at various points in the charge cycle, then check if this event started happening after a hardware or software swap. Report to engineering for further steps.
3. If neither, replace the Proton and check if the issue resolves.
4. Contact engineering if the issue persists after the Proton replacement.

urn:fault:proton:primary-proton-abnormal-opening

or

urn:fault:proton:optional-proton-abnormal-opening

Category	Criticality	Fault Source	Fault Type
Output Contactor	Critical	Contactor	Hardware/Software

Fault Description

The Proton board monitors the DC current as well as Aux witness contact feedback from Proton relays and triggers the fault if the current is >480 A. Power Link 2000 locks out for troubleshooting. The Proton board clears the fault if, during the start of the next charge session, the relays are not detected to be welded.

Possible Causes

- EV side issue.
- Proton issue.
- Software bug.

Troubleshooting

1. Check if this fault happened at the end of a session. Check the SOC and see if it is near 100%. If yes, then this could be due to the EV opening the output contactor at the end of the session, prior to ramping down the current. Observe if this happens on multiple sessions and contact engineering for further steps and to contact the EV manufacturer.
2. If it is happening randomly at various points in the charge cycle, then check if this event started happening after a hardware or software swap. Report to engineering for further steps.
3. If neither, replace the Proton and check if the issue resolves.
4. Contact engineering if the issue persists after the Proton replacement.

urn:fault:proton:primary-proton-welded-contactor

or

urn:fault:proton:optional-proton-welded-contactor

Category	Criticality	Fault Source	Fault Type
Output Contactor	Critical	Contactor	Hardware/Software

Fault Description

This fault triggers when the auxiliary contacts are stuck due to an overcurrent event. Power Link 2000 locks out until the Proton is replaced.

Possible Causes

- EV side issue.
- Proton issue.
- Software bug.

Troubleshooting

1. Replace the Proton to fix the issue.
2. Pull logs and contact engineering if the issue is due to an EV, hardware, or software issue.

urn:fault:proton:primary-proton-ucb-comms-failure

or

urn:fault:proton:optional-proton-ucb-comms-failure

Category	Criticality	Fault Source	Fault Type
CAN Comms	Critical	Proton-UCB comms	Hardware/Software

Fault Description

This fault triggers when UCB loses CAN communication with Proton for 10s. The fault clears when CAN communication is reestablished for 10s. Any ongoing session stops, and Power Link 2000 locks out if the fault is seen three times in 24 hours.

Possible Causes

- Hardware issue.
- Software issue.

Troubleshooting

1. Check if you are able to establish communication with Proton (from UCB) through chassis-shell. If you are able to do so, reboot the cluster and confirm if the issue resolves.
2. If the issue persists, then check if all the connectors are seated on the Proton side. Check for connector P306-15 going to MDS and make sure it is seated correctly. Disconnect the connector and perform a pull test to confirm if the wires are properly sitting in the connector.
3. Locate connector P312-08 on the UCB and make sure it is seated correctly. Also, perform a pull test. Perform continuity tests to make sure there is no break in the harness:
    a. Measure continuity between Pin 2 (CAN_H) on P312-08 and Pin 7 on P306-15.
    b. Measure continuity between Pin 3 (CAN_L) on P312-08 and Pin 8 on P306-15.
    c. Measure continuity between Pin 4 (CAN_GND) on P312-08 and Pin 10 on P306-15.
4. If any break in continuity is located, then reach out to engineering for a harness replacement. If the issue persists after the above continuity tests, then reach out to engineering for further debugging steps.

urn:fault:proton:primary-proton-fw-checksum-failure

or

urn:fault:proton:optional-proton-fw-checksum-failure

Category	Criticality	Fault Source	Fault Type
Board firmware issue	critical	Proton	Hardware/Software

Fault Description

This fault triggers when Proton's firmware version and checksum don't match the expected version after two attempts to reflash. Proton reboots to force a firmware flash.

Possible Causes

- Hardware issue.
- Software issue.

Troubleshooting

1. Check if this fault happened after a software update. If yes, then try reflashing the software to resolve the issue. If the issue persists, contact engineering for resolution.
2. If the fault randomly shows up and persists after two reboots that are already part of the software, replace the Proton to resolve the issue.
3. Contact engineering if the issue persists after the Proton swap.

urn:fault:proton:primary-proton-board-temp-fault

or

urn:fault:proton:optional-proton-board-temp-fault

Category	Criticality	Fault Source	Fault Type
Board hardware/firmware issue	Critical	Proton	Hardware/Software

Fault Description

This fault triggers when the Proton oard temperature exceeds 115 °C for 1s. The fault clears when the temperature drops below 115 °C for 60s. A 30 minute cool-down period is required. Power Link 2000 is allowed to operate after the fault clears and the self-test passes.

Possible Causes

- Hardware issue.
- Software issue.

Troubleshooting

1. Try to cycle power to Proton. Restart chassis-server and check if the fault clears.
2. Check if this fault happened after a software update. If yes, then try reflashing the software to resolve the issue. If the issue persists, replace the Proton to resolve the issue.
3. If the issue persists, contact engineering for further steps.

urn:fault:proton:primary-proton-thermal-switch-fault

or

urn:fault:proton:optional-proton-thermal-switch-fault

Category	Criticality	Fault Source	Fault Type
Thermal switch	Critical	Switch or feedback	H

Fault Description

A thermal switch fault triggers when the proton switch on Proton is reported to be open.

Possible Causes

- Hardware issue.

Troubleshooting

1. Check if there is a break in the feedback wire. Measure the continuity between Pins 9 and 10 on connector P306-14. If there is an optional proton present that is showing the fault, then measure continuity between Pins 11 and 12 on connector P306-14. If it measures open, the thermal switch might have failed. Replace the thermal switch to fix the problem.
2. If it measures a short, ontact engineering for further troubleshooting.

urn:fault:proton:primary-proton-charging-voltage-measurement-failure

or

urn:fault:proton:optional-proton-charging-voltage-measurement-failure

Category	Criticality	Fault Source	Fault Type
Proton board	Critical	Proton	Hardware/Software

Fault Description

High voltage DC measurement failure (due to voltage being out of range, or measurement circuit error).

Possible Causes

- Hardware issue.
- Software issue.

Troubleshooting

1. Restart the chassis server and see if the issue resolves. If not, swap the Proton to resolve the issue.
2. If the problem still persists, contact engineering for further steps.

urn:fault:proton:primary-proton-charging-current-measurement-failure

or

urn:fault:proton:optional-proton-charging-current-measurement-failure

Category	Criticality	Fault Source	Fault Type
Proton board	Critical	Proton	Hardware/Software

Fault Description

Charging current measurement failure (due to loss of CAN with LEM or measurement circuit error).

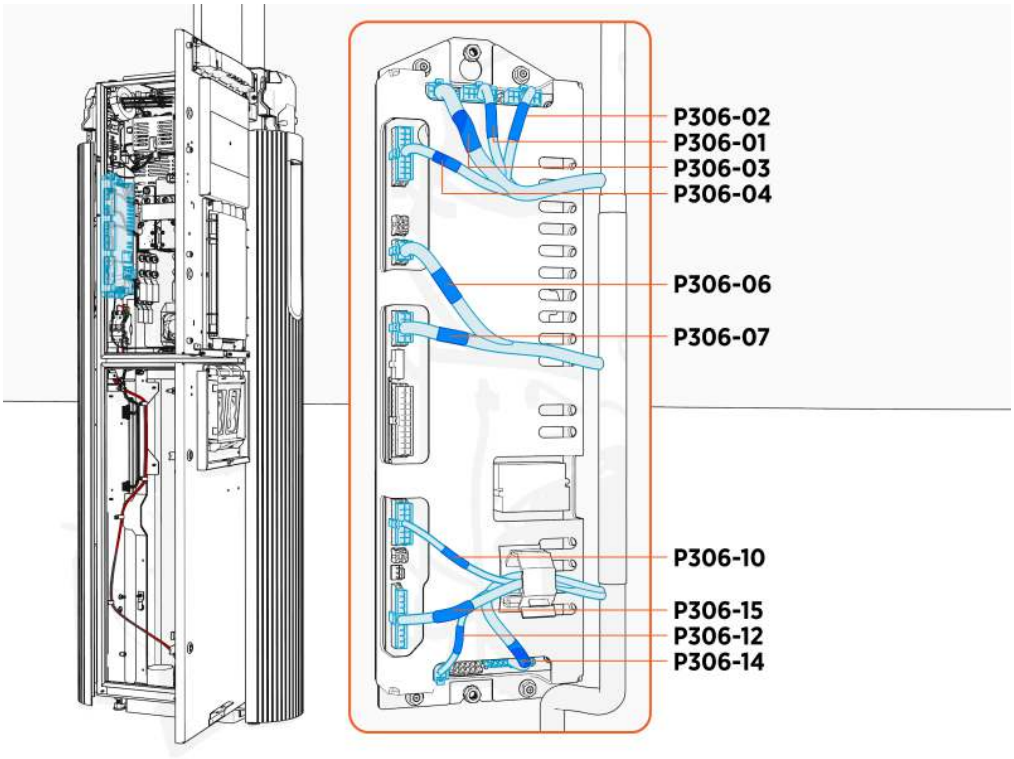
Possible Causes

- Hardware issue.
- Software issue.

Troubleshooting

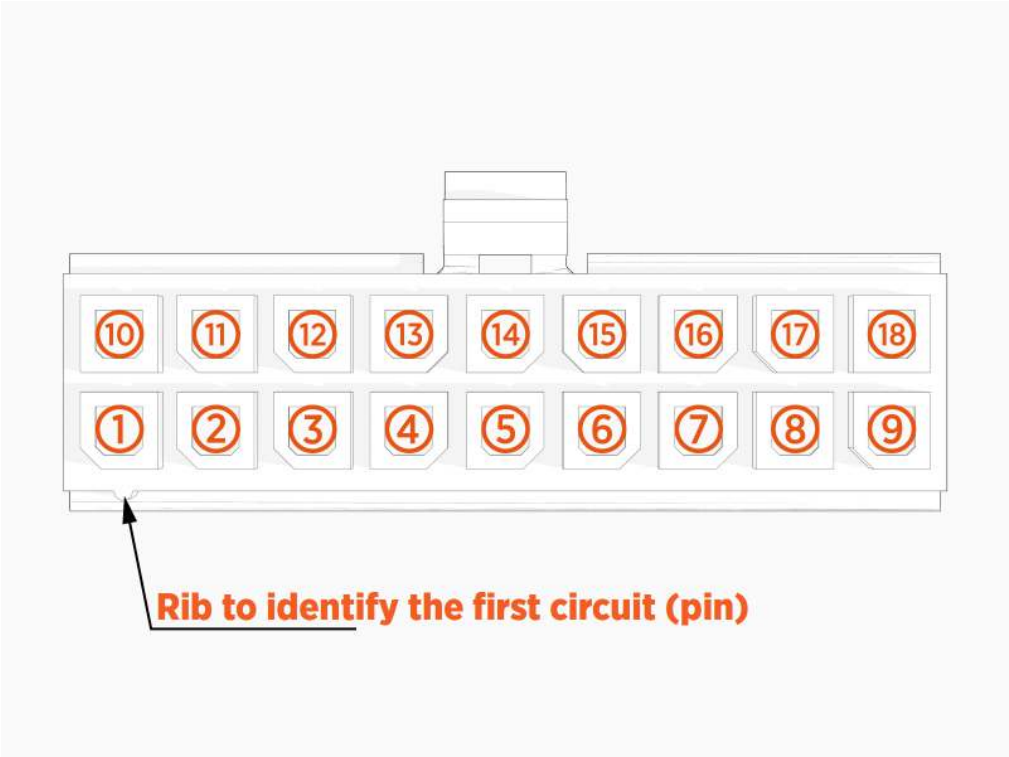
1. Restart the chassis server and see if the issue resolves. If not, swap the Proton to resolve the issue.
2. If the problem still persists, contact engineering for further steps.

FDC Location (Power Link 2000)

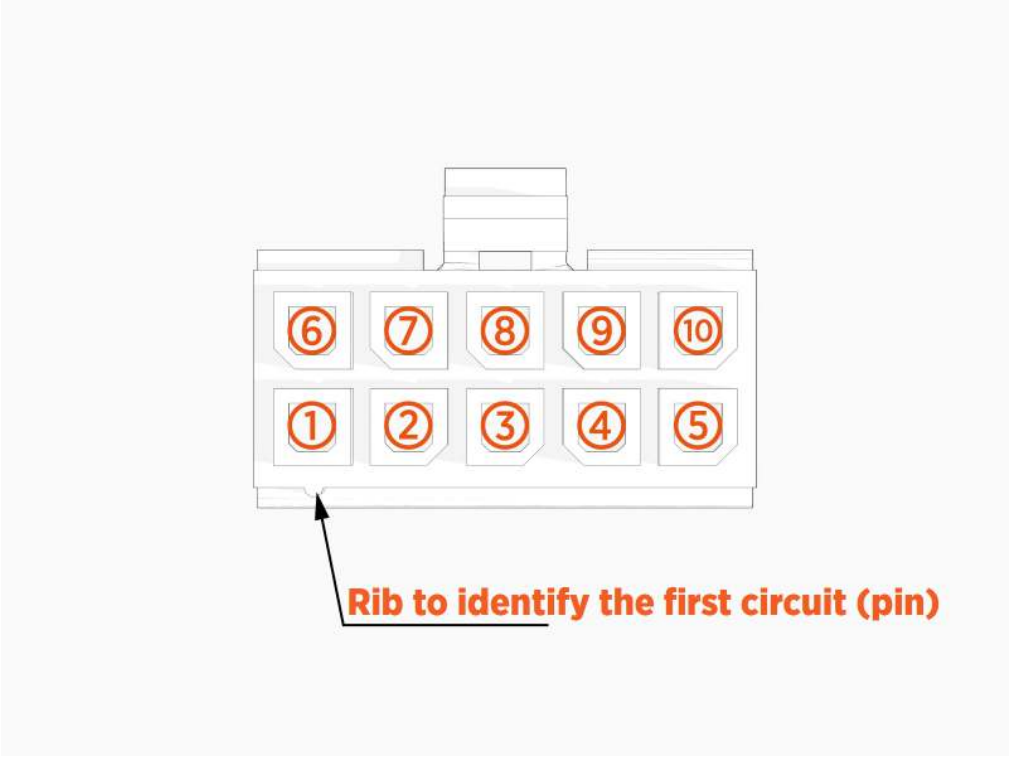


FDC Connectors' Pin Configuration

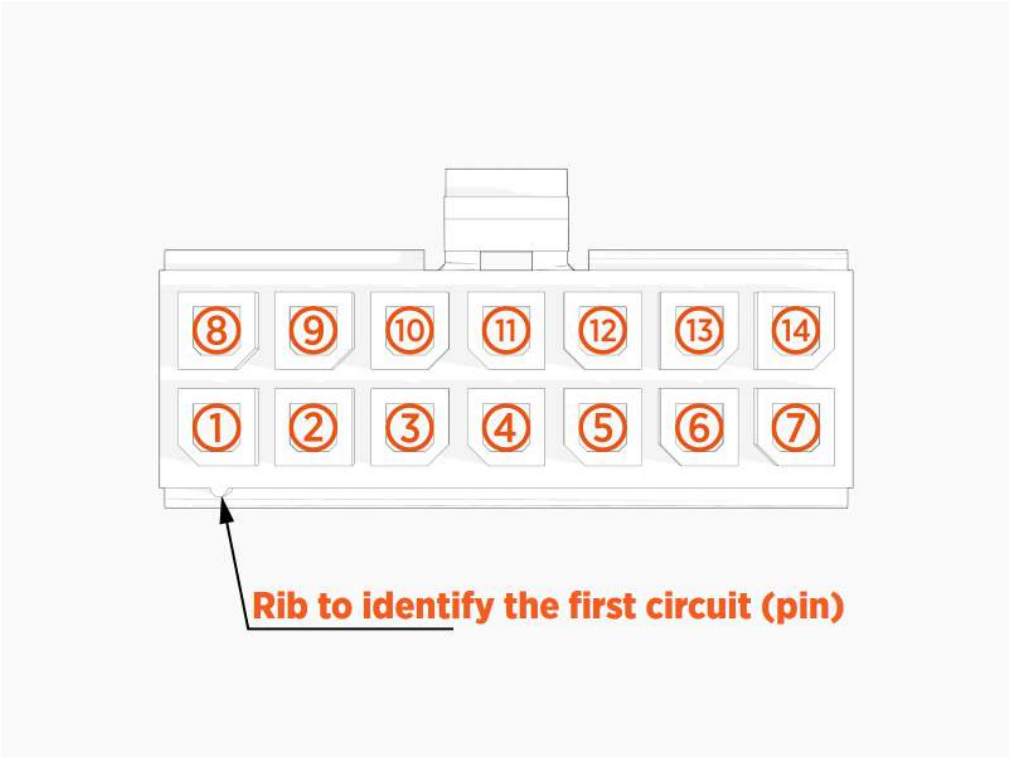
P306-04



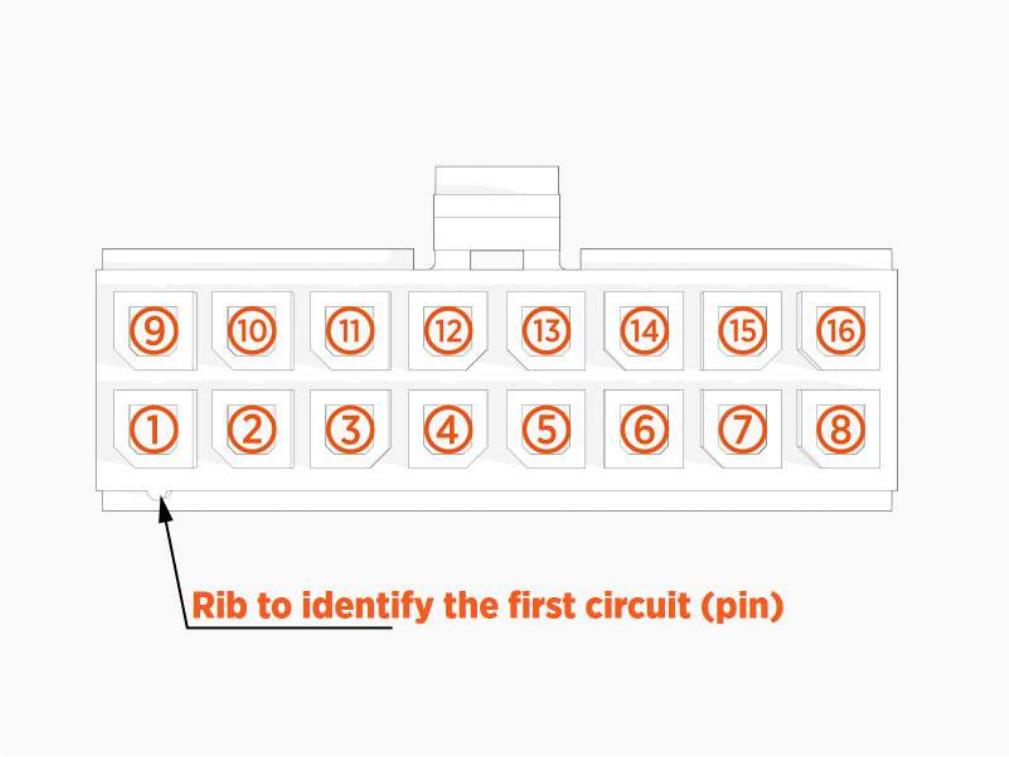
P306-07



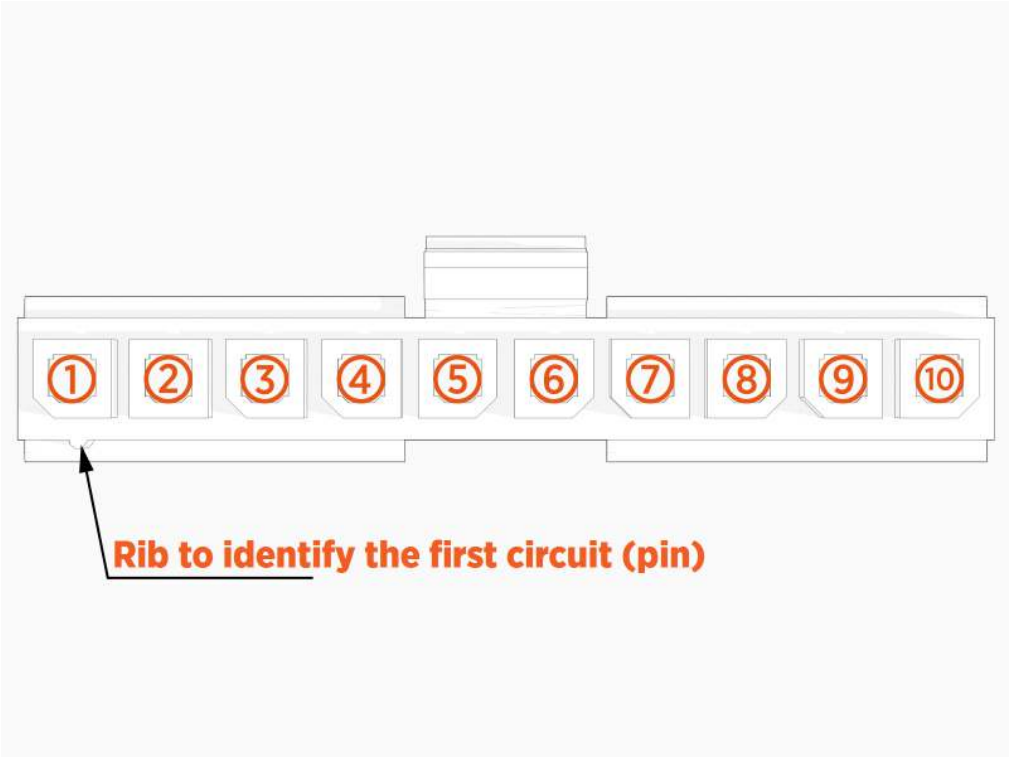
P306-10



P306-14



P306-15



FDC Faults

urn:fault:fdc:Loss-Comms-with-UCB

Category	Criticality	Fault Source	Fault Type
FDC communication	Emergency	FDC	Hardware/Software

Fault Description

UCB monitors the loss of CAN communications with FDC, monitors the heartbeat signal, and triggers a fault when there is no heartbeat for 5 seconds.

Possible Causes

- Issue with CAN harness (connector, CAN termination, etc.).
- FDC board failure.

Troubleshooting

1. Check if the P306-15 connector that carries CAN signals is seated correctly and locked in. If not, reseat it and confirm if the issue clears.
2. If no connector seating issue is found, then measure continuity between CAN_H (pin 7) and CAN_L (pin 8). Check if there is a short between the CAN H and CAN L lines; if yes, then replace the harness.
3. Confirm if the CAN termination is good; measure resistance across CAN_TERM (pin 4) and CAN_ TERM (pin 5).
4. If no issues are found with the connector and harness, then replace the FDC board due to possible board issues.
5. Contact engineering for further debugging steps.

urn:fault:fdc:Checksum-Failure

Category	Criticality	Fault Source	Fault Type
FDC Firmware	Critical	FDC	Firmware

Fault Description

This fault triggers when the FDC firmware version and checksum don't match the expected version after two attempts to reflash. Ideally seen during a new install or when software is updated on the system. However, if this is seen during an ongoing session, then the session is immediately terminated and Power Link 2000 is locked out of service.

Possible Causes

- Bad FDC firmware flash at factory.
- Interruption during software update.
- Board firmware getting corrupted.

Troubleshooting

1. If the UCB board had an issue during the finalizer step, then it is possible it is pushing a bad FDC firmware, so login to chassis-shell and confirm if FDC is reading the correct firmware version.
2. If the above is true, then try to flash the UCB again to see if it pushes FDC to recover.
3. If this happened during the software update in the field, try to power cycle it and see if it recovers.
4. If the power cycle does not help, then replace the FDC board.

urn:fault:fdc:Vicor-Overtemp-Shutdown

Category	Criticality	Fault Source	Fault Type
FDC Board	Critical	FDC	Hardware/Software

Fault Description

This warning triggers when one of the modules on the FDC board reports 90 °C for 10s.

The fault occurs when the temperature drops below 100 °C for more than 60s.

Possible Causes

- FDC board failure.

Troubleshooting

No action is required as the system is allowed to operate normally with this warning.

urn:fault:fdc:Board-Overtemp-Shutdown

Category	Criticality	Fault Source	Fault Type
FDC Board	Critical	FDC	Hardware

Fault Description

The fault triggers when one of the modules on the FDC board reports 100 °C for 10s. A 30 minute cooldown period is added after the fault. The fault clears when the temperature drops below 100 °C for more than

60s. Power Link 2000 is locked out if this fault is seen three times within 24 hours. UCB will record critical parameters as part of the snapshot feature.

Possible Causes

- FDC board failure.

Troubleshooting

1. Replace the FDC board if Power Link 2000 is locked out.
2. Contact engineering if replacing the FDC does not resolve the issue.

urn:fault:fdc:Top-RTD-Overtemp-Shutdown

Category	Criticality	Fault Source	Fault Type
PL RTD	Critical	FDC	Hardware

Fault Description

This overtemperature shutdown triggers when the top RTD exceeds 95 °C (<125 °C) for 10s. If the session continues, then it is an emergency. The fault clears when the temperature drops below 95 °C for 60s. Power Link 2000 locks out if the fault appears three times within 24 hours. UCB will record critical parameters as part of the snapshot feature.

Possible Causes

- Issue with the harness.
- Failure of Top RTD (located above MDS - back plane).
- FDC board.

Troubleshooting

1. Check if the wires 1 and 2 on P306-10 are pulled out of the connector with a basic pull test.
2. Measure the resistance across Pins 1 and 2 on connector P306-10 to check if the harness between RTD and FDC is not broken. You will measure 100 Ω if the switch is good. If the switch reads bad, then replace the RTD to resolve the issue.
3. If the issue persists after replacing the switch, confirm that the feedback wire is not broken. Measure continuity across pin 1 (on P306-10), pin 2 (feedback wire on RTD), and continuity across pin 2 (on P306-10) and pin 1 (feedback wire on RTD). If there is a break in the wire, contact engineering for further steps.
4. Once you find the harness is not broken and the switch reads 100 Ω, replace the FDC to resolve the issue.

urn:fault:fdc:Top-RTD-Shorted

Category	Criticality	Fault Source	Fault Type
PL RTD	Critical	FDC	Hardware

Fault Description

This fault triggers when the Top RTD feedback is detected below -70 °C for 10s.

Possible Causes

- Issue with the harness.
- Failure of Top RTD (located above MDS, back plane).
- FDC board.

Troubleshooting

1. Check if the wires 1 and 2 on P306-10 are pulled out of the connector with a basic pull test.
2. Measure the resistance across Pins 1 and 2 on connector P306-10 to check if the harness between RTD and FDC is not broken. You will measure 100 Ω if the switch is good. If the switch reads bad, then replace the RTD to resolve the issue.
3. If the issue persists after replacing the switch, confirm that the feedback wire is not broken. Measure continuity across pin 1 (on P306-10), pin 2 (feedback wire on RTD), and continuity across pin 2 (on P306-10) and pin 1 (feedback wire on RTD). If there is a break in the wire, contact engineering for further steps.
4. Once you find the harness is not broken and the switch reads 100 Ω, replace the FDC to resolve the issue.

urn:fault:fdc:Top-RTD-Open

Category	Criticality	Fault Source	Fault Type
PL RTD	Critical	FDC	Hardware

Fault Description

This fault triggers when the Top RTD feedback is detected below 125 °C for 10s.

Possible Causes

- Issue with the harness.
- Failure of Top RTD (located above MDS, back plane).

- FDC board.

Troubleshooting

1. Check if the wires 1 and 2 on P306-10 are pulled out of the connector with a basic pull test.
2. Measure the resistance across Pins 1 and 2 on connector P306-10 to check if the harness between RTD and FDC is not broken. You will measure 100 Ω if the switch is good. If the switch reads bad, then replace the RTD to resolve the issue.
3. If the issue persists after replacing the switch, confirm that the feedback wire is not broken. Measure continuity across pin 1 (on P306-10), pin 2 (feedback wire on RTD), and continuity across pin 2 (on P306-10) and pin 1 (feedback wire on RTD). If there is a break in the wire, contact engineering for further steps.
4. Once you find the harness is not broken and the switch reads 100 Ω, replace the FDC to resolve the issue.

urn:fault:fdc:ExternalHS-Fan-Open

Category	Criticality	Fault Source	Fault Type
PL Fan	Critical	FDC	-

Fault Description

This fault triggers when the fan commands more than 30% PWM and fan current drops below 30 mA for 100 ms.

Possible Causes

- Issue with harness.
- Fan failure.
- FDC board.

Troubleshooting

1. Confirm if the connector going to the fan is seated correctly. If not, seat it firmly and check if the fault clears.
2. Check if the wires carrying 48 V are continuous from the FDC connector to the connector at the fan. Measure continuity from Pin 1 on the P306-04 to Pin 2 on the HTSNFN connector, and continuity from Pin 10 on the P306-04 to pin 1 on the HTSNFN connector.
3. If there is no continuity, then find the location of the break and replace the harness accordingly.
4. If no harness issue is found, then there is a possible issue with the fan circuitry internally. Replace the fan to resolve the issue.

5. If the issue persists, then replace the FDC board to resolve the issue.
6. Contact engineering if issue persists.

urn:fault:fdc:Primary-Proton-Fan-Open

Category	Criticality	Fault Source	Fault Type
PROTON Fan	Critical	FDC	-

Fault Description

This fault triggers when the fan commands more than 30% PWM and fan current drops below 250 mA for 100 ms.

Possible Causes

- Issue with harness.
- Fan failure.
- FDC board.

Troubleshooting

1. Confirm if the connector going to the fan is seated correctly. If not, seat it firmly and check if the fault clears.
2. Check if the wires carrying 48 V are continuous from the FDC connector to the connector at the fan. Measure continuity from Pin 1 on the P306-04 to Pin 2 on the PROTSTRFAN(P) connector, and continuity from Pin 10 on the P306-04 to pin 1 on the PROTSTRFAN(P) connector.
3. If there is no continuity, then find the location of the break and replace the harness accordingly.
4. If no harness issue is found, then there is a possible issue with the fan circuitry internally. Replace the fan to resolve the issue.
5. If the issue persists, then replace the FDC board to resolve the issue.
6. Contact engineering if issue persists.

urn:fault:fdc:Optional-Proton-Fan-Open

Category	Criticality	Fault Source	Fault Type
PL Fan	Critical	FDC	-

Fault Description

This fault triggers when the fan commands more than 30% PWM and fan current drops below 250 mA for 100 ms.

Possible Causes

- Issue with harness.
- Fan failure.
- FDC board.

Troubleshooting

1. Confirm if the connector going to the fan is seated correctly. If not, seat it firmly and check if the fault clears.
2. Check if the wires carrying 48 V are continuous from the FDC connector to the connector at the fan. Measure continuity from Pin 1 on the P306-04 to Pin 2 on the PROTSTRFAN(O) connector, and continuity from Pin 10 on the P306-04 to pin 1 on the PROTSTRFAN(O) connector.
3. If there is no continuity, then find the location of the break and replace the harness accordingly.
4. If no harness issue is found, then there is a possible issue with the fan circuitry internally. Replace the fan to resolve the issue.
5. If the issue persists, then replace the FDC board to resolve the issue.
6. Contact engineering if issue persists.

urn:fault:fdc:Stirring-Fan-Open

Category	Criticality	Fault Source	Fault Type
PL Fan	Critical	FDC	-

Fault Description

This fault triggers when the fan commands more than 30% PWM and fan current drops below 30 mA for 100 ms.

Possible Causes

- Issue with harness.
- Fan failure.
- FDC board.

Troubleshooting

1. Confirm if the connector going to the fan is seated correctly. If not, seat it firmly and check if the fault clears.

2. Check if the wires carrying 48 V are continuous from the FDC connector to the connector at the fan. Measure continuity from Pin 1 on the P306-04 to Pin 2 on the DSTFN connector, and continuity from Pin 10 on the P306-04 to pin 1 on the DSTFN connector.
3. If there is no continuity, then find the location of the break and replace the harness accordingly.
4. If no harness issue is found, then there is a possible issue with the fan circuitry internally. Replace the fan to resolve the issue.
5. If the issue persists, then replace the FDC board to resolve the issue.
6. Contact engineering if issue persists.

urn:fault:fdc:Fan-Load-Switch

Category	Criticality	Fault Source	Fault Type
Fan power	Critical	FDC	-

Fault Description

This fault triggers when the load switch controlling the fan switches off, indicating either an issue with the fan, harness, and/or the FDC board.

Possible Causes

- Issue with harness.
- Fan failure.
- FDC board.

Troubleshooting

Check that there is no short across 48 V and the ground line. Measure continuity across the Pin.

urn:fault:fdc:Load-Switch-UCB-Fault

Category	Criticality	Fault Source	Fault Type
FDC Power	Critical	FDC	-

Fault Description

This fault triggers when the load switch feeding the UCB switches off, indicating either an issue with the UCB, harness, and/or the FDC board.

Possible Causes

- Issue with harness.
- UCB failure.
- FDC board.

Troubleshooting

1. Check that there is no short across 48 V going into UCB. Disconnect P306-07 on the FDC board and P312-02 on the UCB. Measure continuity across Pin 1 and Pin 6 on the P306-07 connector. If there is a short, replace the harness. Contact engineering for further steps.
2. If no short is detected in the harness, replace the UCB to fix the issue.
3. If the issue persists, replace FDC to resolve the problem.
4. Contact engineering if the issue persists after the above steps.

urn:fault:fdc:Load-Switch-SSLAN-Fault

Category	Criticality	Fault Source	Fault Type
FDC Power	Critical	FDC	-

Fault Description

This fault triggers when the load switch feeding the SSLAN switches off, indicating either an issue with the SSLAN, harness, and/or the FDC board.

Possible Causes

- Issue with harness.
- SSLAN failure.
- FDC board.

Troubleshooting

1. Check that there is no short across 48 V going into UCB. Disconnect P306-07 on the FDC board and P238-20 on the SSLAN. Measure continuity across Pin 1 and Pin 6 on the P306-07 connector. If there is a short, replace the harness. Contact engineering for further steps.
2. If no short is detected in the harness, replace the SSLAN to fix the issue.
3. If the issue persists, replace FDC to resolve the problem.
4. Contact engineering if the issue persists after the above steps.

urn:fault:fdc:Load-Switch-Proton-Fault

Category	Criticality	Fault Source	Fault Type
FDC Power	Critical	FDC	-

Fault Description

This fault triggers when the load switch feeding the Proton switches off, indicating either an issue with the Proton , harness, and/or the FDC board.

Possible Causes

- Issue with harness.
- PROTON failure.
- FDC board.

Troubleshooting

1. Check that there is no short across 48 V going into UCB. Disconnect P306-07 on the FDC board and P285-1-02 on the primary Proton (and P285-2-01 on the optional Proton). Measure continuity across Pin 3 and Pin 7 on P306-07 connector. If there is a short, replace the harness. Contact engineering for further steps.
2. If no short is detected in the harness, replace the Proton to fix the issue.
3. If the issue persists, replace FDC to resolve the problem.
4. Contact engineering if the issue persists after the above steps.

urn:fault:fdc:door-open-pedestal

Category	Criticality	Fault Source	Fault Type
PL door	Critical	FDC	-

Fault Description

UCB detects the status of the door switches and triggers a fault if the top door sensor is detected to be open for more than 300 ms.

Possible Causes

- Door is open.
- Reed sensor feedback is compromised.
- Sensor is misaligned with magnet or missing from its position.

Troubleshooting

1. Check if the pedestal door is open.
2. Find the magnet and the sensor on the door. Check the presence of both and ensure that they are aligned with each other when closing the door. They need not touch each other, but as long as they are in the vicinity.
3. Measure the continuity of the feedback wire from Pin 2 on the pedestal reed switch sensor and Pin 3 on P306-14 on the FDC. Also, measure the continuity between Pin 1 on the sensor and Pin 4 on P306-14.
4. If there is no continuity, then the feedback wire or harness is broken.
5. If continuity is good, use an external magnet and place it around the sensor. Check if the sensor feedback on the chassis-shell changes when the magnet is around the sensor. If the feedback changes, then the sensor is bad and needs replacement.

urn:fault:fdc:door-open-main

Category	Criticality	Fault Source	Fault Type
PL door	Critical	FDC	-

Fault Description

UCB detects the status of the door switches and triggers a fault if the top door sensor is detected to be open for more than 300 ms.

Possible Causes

- Door is open.
- Reed sensor feedback is compromised.
- Sensor is misaligned with magnet or missing from its position.

Troubleshooting

1. Check if the main door is open.
2. Find the magnet and the sensor on the door. Check the presence of both and ensure that they are aligned with each other when closing the door. They need not touch each other, but as long as they are in the vicinity.
3. Measure the continuity of the feedback wire from Pin 2 on the main reed switch sensor and Pin 1 on P306-14 on the FDC. Also, measure the continuity between Pin 1 on the sensor and Pin 2 on P306-14.
4. If there is no continuity, then the feedback wire or harness is broken.
5. If continuity is good, use an external magnet and place it around the sensor. Check if the sensor feedback on the chassis-shell changes when the magnet is around the sensor. If the feedback changes, then the sensor is bad and needs replacement.

urn:fault:fdc:OPEN-DC-Input-Contactor

Category	Criticality	Fault Source	Fault Type
PL Contactor	Emergency	FDC	-

Fault Description

Possible Causes

Troubleshooting

urn:fault:fdc:DC-Input-Bus-Bar-Thermal-Switch-Primary-Proton

Category	Criticality	Fault Source	Fault Type
PL thermal switch	Critical	FDC	-

Fault Description

This fault triggers when the thermal switch opens, indicating a thermal event. The system locks out for further inspection.

Possible Causes

- Issue with harness.
- Failed thermal switch.
- Actual thermal event.

Troubleshooting

1. Check if other FRUs reported any overtemperature faults around the time of this failure. If yes, report it to engineering for further log debugging and possible internal issues with the system.
2. If no other thermal faults are seen, then measure continuity across Pins 9 and 10 on the P306-14 connector going to the FDC. If there is a short measurement, then the switch is good. Continue to the next step. If the continuity test reads open, then the point of failure could be either the harness or the switch. Since this switch is not easily accessible, contact engineering for further steps.
3. Contact engineering after confirming the harness and switch are good.

urn:fault:fdc:DC-Input-Bus-Bar-Thermal-Switch-Optional-Proton

Category	Criticality	Fault Source	Fault Type
PL thermal switch	Critical	FDC	-

Fault Description

This fault triggers when the thermal switch opens, indicating a thermal event. The system locks out for further inspection.

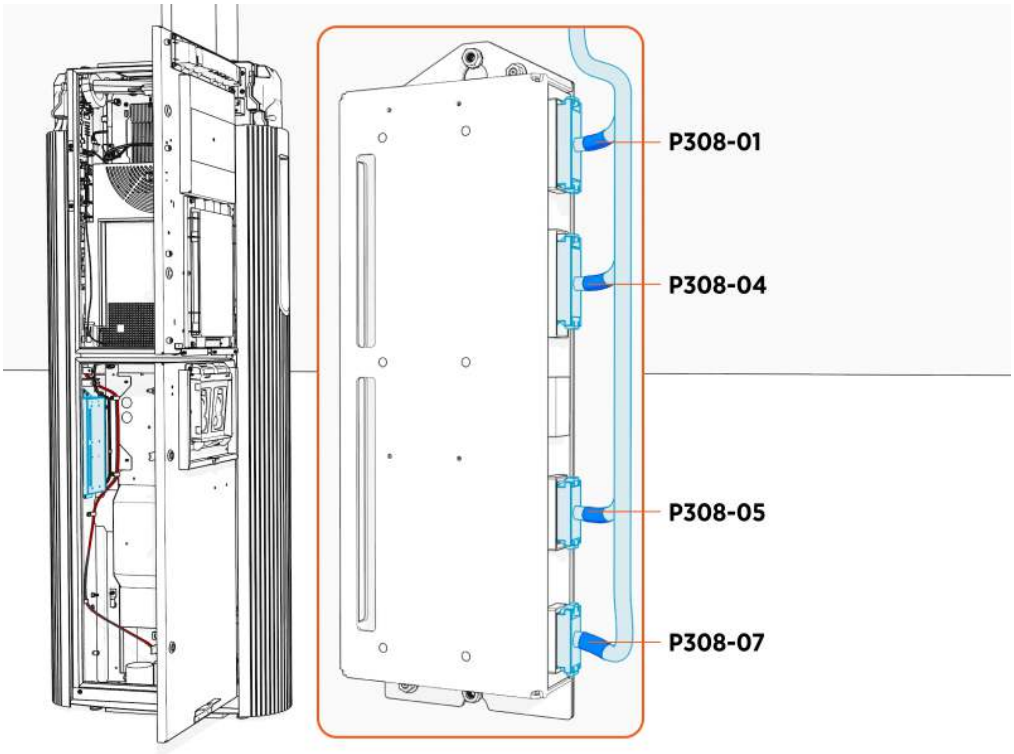
Possible Causes

- Issue with harness.
- Failed thermal switch.
- Actual thermal event.

Troubleshooting

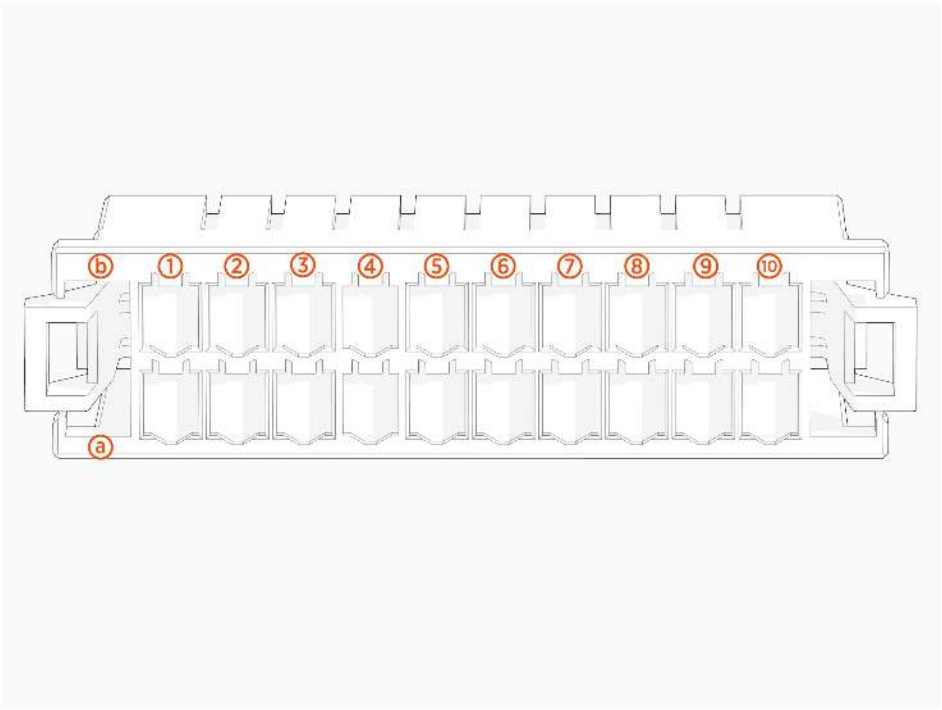
1. Check if other FRUs reported any overtemperature faults around the time of this failure. If yes, report it to engineering for further log debugging and possible internal issues with the system.
2. If no other thermal faults are seen, then measure continuity across Pins 11 and 12 on the P306-14 connector going to the FDC. If there is a short measurement, then the switch is good. Continue to the next step. If the continuity test reads open, then the point of failure could be either the harness or the switch. Since this switch is not easily accessible, contact engineering for further steps.
3. Contact engineering after confirming the harness and switch are good.

CCB Location (Power Link 2000)

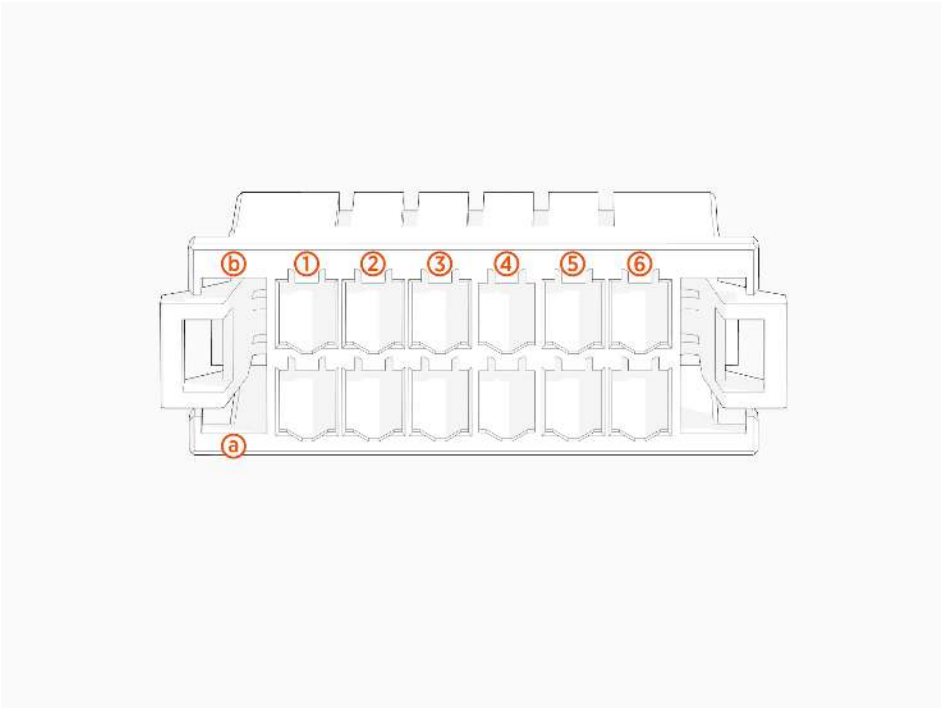


CCB Connectors' Pin Configuration

P308-04



P308-05



CCB Faults

urn:fault:coolcntl:fan-tray1-overcurrent

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Fan1	Hardware

Fault Description

This fault triggers when the fan tray current exceeds 8 A for more than 100 ms.

Possible Causes

- Break in harness.
- Fan failure.
- CCB failure.

Troubleshooting

1. Check if there is anything blocking the fan blades from spinning.
2. Check the continuity between B1 and A1 on the P308-04 connector (connecting to the CCB). If there is a short, continue to the next step.
3. If there are no issues in the continuity test, replace the fan tray. Also, re-enable fan tray 1 from EEPROM register.
4. If the issue persists, replace CCB.
5. Contact engineering for further debugging.

urn:fault:coolcntl:fan-tray2-overcurrent

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Fan2	Hardware

Fault Description

This fault triggers when the fan tray current exceeds 8 A for more than 100 ms.

Possible Causes

- Break in harness.
- Fan failure.
- CCB failure.

Troubleshooting

1. Check if there is anything blocking the fan blades from spinning.
2. Check the continuity between B6 and A6 on the P308-04 connector (connecting to the CCB). If there is a short, continue to the next step.
3. If there are no issues in the continuity test, replace the fan tray. Also, re-enable fan tray 2 from EEPROM register.
4. If the issue persists, replace CCB.
5. Contact engineering for further debugging.

urn:fault:coolcntl:fan-tray1-opencircuit

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Fan1	Hardware

Fault Description

This fault triggers when the fan is running at >10% speed, but the fan current is <0.3 A for more than 10s. This is a warning, not a fault. The system operates until a self-test failure triggers a service call for the fan tray replacement.

Possible Causes

- Break in harness.
- Fan failure.
- CCB failure.

Troubleshooting

1. Check if all connectors are seated correctly on the CCB and the fan tray.
2. Check if there is a break in the wire carrying 48 V to the fans. Check if the fan voltage on the CCB (chassis shell) reads 48 V.

3. Measure continuity from:
    a. Pin B1 on the P308-04 connector (on the CCB) to red wire 48 V on the fan tray 1 connector.
    b. Pin A1 on the P4 connector (on CCB) to black wire 48 V RTN on the fan tray 1 connector
4. If there is a break in continuity, then replace the harness to clear the fault.
5. If the fault exists with no failure in continuity, then replace the fan tray 1 to fix the issue.
6. If the issue persists after fan tray replacement, then contact engineering for further debugging.

urn:fault:coolcntl:fan-tray2-opencircuit

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Fan2	Hardware

Fault Description

This fault triggers when the fan is running at >10% speed, but the fan current is <0.3 A for more than 10s. This is a warning, not a fault. The system operates until a self-test failure triggers a service call for the fan tray replacement.

Possible Causes

- Break in harness.
- Fan failure.
- CCB failure.

Troubleshooting

1. Check if all connectors are seated correctly on the CCB and the fan tray.
2. Check if there is a break in the wire carrying 48 V to the fans. Check if the fan voltage on the CCB (chassis shell) reads 48 V.
3. Measure continuity from:
    a. Pin B1 on the P308-04 connector (on the CCB) to red wire 48 V on the fan tray 2 connector.
    b. Pin A1 on the P4 connector (on CCB) to black wire 48 V RTN on the fan tray 2 connector
4. If there is a break in continuity, then replace the harness to clear the fault.
5. If the fault exists with no failure in continuity, then replace the fan tray 2 to fix the issue.
6. If the issue persists after fan tray replacement, then contact engineering for further debugging.

urn:fault:coolcntl:fan-tray1-fan1-no-rpm-feedback

Category	Criticality	Fault Source	Fault Type
PL_CCB	Alarm	PL_Fan1	Hardware

Fault Description

This fault triggers when the fan is running at >30% speed but the fan RPM feedback is <2000 for more than 10s. This is a warning, not a fault.

Troubleshooting

No action is required.

urn:fault:coolcntl:fan-tray2-fan1-no-rpm-feedback

Category	Criticality	Fault Source	Fault Type
PL_CCB	Alarm	PL_Fan2	Hardware

Fault Description

This fault triggers when the fan is running at >30% speed but the fan RPM feedback is <2000 for more than 10s. This is a warning, not a fault.

Troubleshooting

No action is required.

urn:fault:coolcntl:pump-overcurrent

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Pump	Hardware

Fault Description

This fault triggers when the pump current exceeds 8 A for more than 100 ms. The average and maximum current values are noted and saved on the PBC. Relevant derating conditions are applied based on these faults. The pump is disabled in EEPROM and needs intervention from an advanced user to re-enable the pump after inspection or replacement.

Possible Causes

- Shorting in the pump harness.
- Shorting in the motor winding or locked rotor.
- Issue with CCB.

Troubleshooting

1. Check the voltage on the pump through the CCB node (chassis shell) and confirm if it's reading 48 V. If there is no 48 V, then go to step 2. If 48V is present, then go to step 3.
2. Confirm if there is a short in the CCB harness. Measure continuity across A1 (P_DC_PUMP_RET) and B1 (P_DC_PUMP_POWER) on the P5 connector going to the CCB. If there is a short, then replace the harness.
3. If the continuity test is good, measure continuity between Pin 1 and Pin 4 on the P120 harness. If it shorted there, it is possible that the pump has failed. Replace the pump and confirm if the issue exists.
4. If pump replacement does not fix the issue, then the CCB board might have the fault-shorted pins (that feed connector) or short on the traces carrying this voltage. Replace CCB to resolve the issue.
5. If none of the above steps work, contact engineering.

urn:fault:coolcntl:pump-opencircuit

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Pump	Hardware

Fault Description

This fault triggers when the fan is running at >10% speed but the fan current is <0.5 A for more than 5s. The fault clears if the pump runs a self-test and clears it. If the fault repeats three times in 24 hours, then the station is marked offline until the pump is replaced.

Possible Causes

- Break in harness.
- Pump failure.
- CCB failure.

Troubleshooting

1. Check if all connectors are seated correctly on the CCB and the pump. Particularly, connectors P308-05 on the CCB and P:CCBTOPUMP on the pump controller.
2. Check if there is a break in the wire carrying 48 V to the fans. Check if the pump voltage on the CCB (chassis shell) reads 48 V.
3. If 48 V is not present, it is possible that there is a break in the wire carrying 48 V. Measure continuity from:
    a. Pin B1 on the P308-05 connector (on the CCB) to Pin 6 on the pump PCBA connector.
    b. Pin A1 on P308-05 connector (on the CCB) to Pin 5 on the pump PCBA connector.
4. If there is a break in continuity, replace the harness to clear the fault.

5. If the fault exists with no break in continuity, replace the HEX to fix the issue.
6. If the issue persists after the fan tray replacement, reach out to engineering for further debugging.

urn:fault:coolcntl:pump-dryrun

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Pump	Hardware

Fault Description

This falt triggers when the pump is running at >10% speed but the fan RPM feedback is >10000 for more than 5s.

Possible Causes

- Coolant level low.
- Pump internal failure.

Troubleshooting

1. Check the coolant level and top it up if it is less than the low level.
2. There may be air bubbles in the reservoir, so try to run the pump priming subroutine to clear them. Check if the fault clears. Also, monitor the pump RPM feedback in the CCB node of the chassis shell.
3. Check if there is a coolant leak in the system.
4. If issue persists, replace the HEX.
5. Contact engineering for further debugging.

urn:fault:coolcntl:pump-no-rpm-feedback

Category	Criticality	Fault Source	Fault Type
PL_CCB	Major	PL_Pump	Hardware

Fault Description

This fault triggers when the fan is running at >30% speed but the fan RPM feedback is <2000 for more than 10s. This is a warning, not a fault.

Possible Causes

- Break in harness.
- Pump failure.

Troubleshooting

1. Action required only if it starts failing self-tests and system functionality.
2. Contact engineering for debugging steps.

urn:fault:coolcntl:pump-internal-dry-run

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Pump	Hardware

Fault Description

The pump's internal controller triggers this fault. It detects any dry run condition and triggers the faults. Also, this results in pump open circuit as the internal controller opens the 48 V relay.

Possible Causes

- Coolant level low.
- Pump internal failure.

Troubleshooting

1. Check the coolant level and top it up if it is less than the low level.
2. There may be air bubbles in the reservoir, so try to run the pump priming subroutine to clear them. Check if the fault clears. Also, monitor the pump RPM feedback in the CCB node of the chassis shell.
3. Check if there is a coolant leak in the system.
4. If issue persists, replace the HEX.
5. Contact engineering for further debugging.

urn:fault:coolcntl:pump-internal-start-failure

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Pump	Hardware

Fault Description

The pump's internal controller triggers this fault. Also, this results in pump open circuit as the internal controller opens the 48 V relay.

Possible Causes

- Pump Internal failure.

Troubleshooting

1. Check if the pump is receiving 48 V power on the CCB node.
2. If yes, then replace HEX to resolve the issue.
3. If the fault persists after HEX replacement, then reach out to engineering for further debugging steps.

urn:fault:coolcntl:pump-internal-overcurrent

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Pump	Hardware

Fault Description

The pump's internal controller triggers this fault. Also, this results in pump open circuit as the internal controller opens the 48 V relay.

Possible Causes

- Pump Internal failure.

Troubleshooting

1. Check if the pump is receiving 48 V power on the CCB node.
2. If yes, then replace HEX to resolve the issue.
3. If the fault persists after HEX replacement, then reach out to engineering for further debugging steps.

urn:fault:coolcntl:pump-internal-locked-rotor

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_Pump	Hardware

Fault Description

The pump's internal controller triggers this fault. Also, this results in pump open circuit as the internal controller opens the 48 V relay.

Possible Causes

- Pump Internal failure.

Troubleshooting

1. Check if the pump is receiving 48 V power on the CCB node.
2. If yes, then replace HEX to resolve the issue.
3. If the fault persists after HEX replacement, then reach out to engineering for further debugging steps.

urn:fault:coolcntl:level-sensor-disconnected

Category	Criticality	Fault Source	Fault Type
PL_CCB	Major	PL_reservior	Hardware

Fault Description

This fault triggers when the coolant level sensor goes undetected for 10 seconds. The system is derated for the ongoing session but is not allowed to operate until the fault is cleared.

Possible Causes

- Break in harness.
- Sensor failure.
- CCB failure.

Troubleshooting

1. Check if the P-308-07 connector is seated correctly on the CCB. Also, the level sensor connected to the reservoir is seated properly. If not, then fix them to resolve the issue.
2. If the issue persists, then there could be a break in harness. Measure continuity between:
    a. Pin A1 on P-308-07 and Pin 1 on the P:LVSPMT connector on the reservoir side.
    b. Pin A2 on P-308-07 and Pin 2 on the P:LVSPMT connector on the reservoir side.
    c. Pin A3 on P-308-07 and Pin 3 on the P:LVSPMT connector on the reservoir side.
3. Replace the harness if any of the continuity checks fail from the above tests.
4. Replace the sensor if the issue persists.
5. If the issue persists, reach out to engineering for further steps.

urn:fault:coolcntl:level-low

Category	Criticality	Fault Source	Fault Type
PL_CCB	Critical	PL_reservior	Hardware

Fault Description

This fault triggers when the coolant level sensor detects that the coolant level is lower than its low level for 10s. This is a warning and does not affect the system's operation. The service call automatically triggers when it fails during the self-test.

Possible Causes

- Coolant level is low.
- Coolant sensor failure.
- CCB failure.

Troubleshooting

1. Check the coolant level in the reservoir and make sure it is topped up (if low).
2. If the coolant level is high and the system is still showing the fault, then make sure the sensor is still in its place and aligned the right way. Instances where the actual level sensing plate is wrongly fitted, resulting in this error, have been seen in the past.
3. Harness breaking and CCB failure should not result in this failure, which is highly unlikely but cannot be ruled out. Contact engineering for further debugging.

urn:fault:coolcntl:level-overfill

Category	Criticality	Fault Source	Fault Type
PL_CCB	Minor	PL_reservior	Hardware

Fault Description

This fault triggers when the coolant level is at its max. possible level. No action is required.

urn:fault:coolcntl:fan-tray1-disabled

Category	Criticality	Fault Source	Fault Type
PL_CCB	Alarm	PL_Fan1	Hardware

Fault Description

This fault triggers when the fan is disabled in EEPROM due to the fan's overcurrent fault.

Possible Causes

- Break in harness.
- Fan failure.
- CCB failure.

Troubleshooting

1. Check if there is anything blocking the fan blades from spinning.
2. Check the continuity between B1 and A1 on the P308-04 connector (connecting to the CCB). If there is a short, continue to the next step.
3. If there are no issues in the continuity test, replace the fan tray. Also, re-enable fan tray 1 from EEPROM register.
4. If the issue persists, replace CCB.
5. Re-enable the fan after each step to let it run. Since it is disabled, it won't run. Reach out to engineering for an EEPROM address to enable.
6. Contact engineering for further debugging.

urn:fault:coolcntl:fan-tray2-disabled

Category	Criticality	Fault Source	Fault Type
PL_CCB	Alarm	PL_Fan2	Hardware

Fault Description

This fault triggers when the fan is disabled in EEPROM due to the fan's overcurrent fault.

Possible Causes

- Break in harness.
- Fan failure.
- CCB failure.

Troubleshooting

1. Check if there is anything blocking the fan blades from spinning.
2. Check the continuity between B6 and A6 on the P308-04 connector (connecting to the CCB). If there is a short, continue to the next step.
3. If there are no issues in the continuity test, replace the fan tray. Also, re-enable fan tray 1 from EEPROM register.
4. If the issue persists, replace CCB.
5. Re-enable the fan after each step to let it run. Since it is disabled, it won't run. Reach out to engineering for an EEPROM address to enable.
6. Contact engineering for further debugging.

Cable Faults (Power Link 2000)

urn:fault:Cooled-Cable:UL-Stop

Category	Criticality	Fault Source	Fault Type
PL_LCC	Critical	PL_cable	Hardware/Software

Fault Description

This fault triggers when the UL2202 Annex C code decides there is a safety critical fault on one of the LCC cables (UL2202 Annex C does not apply to non-LCC cables). The loop runs continuously. The exact cause of the fault will be sent as a separate fault.

Troubleshooting

Look for the exact fault sent out and follow troubleshooting steps for that fault code.

urn:fault:Cooled-Cable:CAN_COMM_UNSTABLE

Category	Criticality	Fault Source	Fault Type
PL_LCC	Critical	PL_Phoenix_cable	Hardware/Software

Fault Description

The CAN traffic to the Phoenix cable has dropped three (or perhaps six) consecutive packets.

Possible Causes

- CAN overload.
- SEVB firmware.
- Intermittent connection.

Troubleshooting

1. Check if the SEVB firmware or any hardware has been changed recently on the Power Link 2000. Reboot SEVB/Power Link 2000 to force a power cycle on SEVB. Check if this clears up the fault.
2. If software was updated, leading to this fault, then re-flash the firmware and check if the issue resolves.
3. If hardware was updated, leading to this fault, then check if all connectors are seated correctly. If any are disconnected, then re-seat them and see if the issue resolves.
4. Contact engineering if the issue persists.

urn:fault:Cooled-Cable:DATA_INVALID

Category	Criticality	Fault Source	Fault Type
PL_LCC	Critical	PL_Phoenix_cable	-

Fault Description

This fault is declared when the CAN traffic from the Phoenix cable has temperature data outside the expected range.

Possible Causes

- CAN overload.
- SEVB firmware.
- Intermittent connection.

Troubleshooting

1. Check if the SEVB firmware or any hardware has been changed recently on the Power Link 2000. Reboot SEVB/Power Link 2000 to force a power cycle on SEVB. Check if this clears up the fault.
2. If software was updated, leading to this fault, then re-flash the firmware and check if the issue resolves.
3. If hardware was updated, leading to this fault, then check if all connectors are seated correctly. If any are disconnected, then reseat them and see if the issue resolves.
4. Contact engineering if the issue persists.

urn:fault:Cooled-Cable:POS_TERMINAL_TEMP_FAULT

or

urn:fault:Cooled-Cable:NEG_TERMINAL_TEMP_FAULT

Category	Criticality	Fault Source	Fault Type
PL_LCC	Critical	PL_cable	Hardware

Fault Description

This fault triggers when the cable's positive terminal temperature exceeds the limit of 89 °C.

Possible Causes

Cable internal joint failure.

Troubleshooting

Contact engineering for the debugging steps if this fault triggers three times in 24 hours.

Category	Criticality	Fault Source	Fault Type
PL_LCC	Critical	PL_cable	Hardware

urn:fault:Cooled-Cable:STD_200A_TOO_HOT

Category	Criticality	Fault Source	Fault Type
PL_LCC	Critical	PL_Cooling	Hardware

Fault Description

This fault triggers when terminal temperatures are still above 84 °C and when the current is below the rated 200 A. The fault clears with UL-Stop and when terminal temperatures reach below 80 °C.

Possible Causes

- Issue with cable cooling.
- Cable internal conductor issue.

Troubleshooting

1. Run Power Link 2000 self-test to confirm if the system is functioning as expected.
2. If this fault triggers on more than three consecutive sessions, replace the cable to resolve the issue (refer to the *Power Link 2000 Service Guide*).
3. Contact engineering if the issue persists.

urn:fault:cable:RTD0_SHORTED

or

urn:fault:cable:RTD1_SHORTED

or

urn:fault:cable:RTD0_OPEN

or

urn:fault:cable:RTD1_OPEN

Category	Criticality	Fault Source	Fault Type
PL_LCC	Critical	PL_SEVB_RTD	Hardware

Fault Description

This fault triggers when the SEVB RTD temperature is below 70 °C for 10 seconds.

Possible Causes

Hardware failure.

Troubleshooting

1. Replace the cable to resolve the issue (refer to the *Power Link 2000 Service Guide*).
2. Contact engineering if the issue persists.

Conformity - Metering and Calibration Law (Eichrecht) A

Electric Metering Data

This device is in conformance with German regulations regarding metering and calibration (MessEG, MessEV).

Hardware and software are certified according to the type examination process (MessEV Module B). The Legally Relevant Software (LRS) versions, along with their checksums, are found in the type examination certificate. The checksum of the software installed on a device can be retrieved from the 'Info' menu.

The LRS version of the charging station is also included in each digitally signed data set for a charging session (OCMF). See there "lrs_rel". The software version of the charging station can be found under "sw_rel".

Notification and Proof Obligations

Operators of charging stations must register new or decommissioned stations with German regulatory authorities BNetzA, in accordance with §5 Ladesäulenverordnung (LSV), and Eichamt, in accordance with §32 Mess- und Eichgesetz (MessEG).

BNetzA Requirements

- Notification up to two weeks after commissioning.
- Notification immediately after decommissioning.

Notification is done on the website of Bundesnetzagentur (www.bnetza.de).

Eichamt Requirements

- Notification up to six weeks after commissioning.

Notification is done on the website of Eichamt (www.eichamt.de).

Logbook and Charging Data Record

The station stores the signed charging data record (CDR), the public key, and its metrological logbook locally and uploads it to the charging point operator (CPO) backend.

1. When a charging session starts, the CDR is created and saved on the station by the legally relevant software. Upon completion of charging, this CDR for the session is digitally signed by the legally relevant software and the data is transmitted to the charging point operator (CPO) backend.
2. The CPO transmits the signed CDR to the e-mobility service provider (eMSP).
3. The eMSP makes the signed CDR available to the driver.
4. The driver downloads the signed CDR.
5. The driver can check the data by examining it using the industry standard transparency software from the SAFE Initiative (www.safe-ev.de). The driver can also ask the Market Supervision office (Eichbehörde) to investigate the invoice.
6. The Market Supervision office requests the logbook and CDR from the CPO.
7. The CPO downloads the logbook and CDR from the CPO backend.
8. The CPO provides the data to the Market Supervision office.
9. The Market Supervision office reviews the logbook and CDR.

Note: The metrological logbook has a dedicated storage capacity of 512 MB. Given typical legally relevant events, the metrological logbook will have enough space for more than 8 years. It is periodically uploaded to the cloud for secure and long-term storage. Copies of the legally relevant logbook can be provided by ChargePoint upon request.

The logbook can be accessed on the charging station display via settings (gear wheel symbol). Visit Eichrecht Log Book for an illustrated description. The following events are logged and displayed.

Event	Description	Metadata
EichrechtServiceStarted	Eichrecht Service Started	NIL
EichrechtServiceStopped	Eichrecht Service Stopped	NIL
MeterTestPassed	Meter is detected by Chassis-server and has reported signed energy values	Meter UDID
MeterTestFailed	Meter is not detected	NIL
MeterDataCorrupt	Signed Meter Data authentication fails when received by UCB	Meter UDID
ClockSync	NTP Time synched	NIL
ClockUnsync	NTP Time Sync lost after multiple retries. Based on deviation of RTC part used in UCB. This will occur after around 12hour of continuous NTP server communication miss.	NIL
ClockChanged	Time changed on running system	NIL
FirmwareUpdateRequested	OTA on station started	Current LRS version New LRS version
FirmwareDownloaded	The Firmware package is successfully downloaded	Current LRS version
FirmwareDownloadFailed	Happens in cases of network outage	Current LRS version

Event	Description	Metadata
FirmwareInstalled	OTA Completed on station	Previous LRS Version
FirmwareInstallFailed	OTA Failed	Current LRS version
ChargingStarted	Charging Session Started	Outlet Number Session ID
ChargingSuspended	Session is suspended	Outlet Number Session ID
ChargingResumed	Session Resumed	Outlet Number Session ID
ChargingStopped	Session End	Outlet Number Session ID
SigningKeyInvalid	Private is lost or invalid when opened for signing logbook or OCMF Charge Record	NIL
MeterReplaced	Device Changed when checked with Dev- pair	Device UDID expected Device UDID detected
StationActivated	Station has been activated	Eichrecht Activation State. True/False

Time and Clock

The station uses the standard time (legally relevant). The station clock is periodically synchronised with a trusted NTS endpoint. The endpoint is hosted by a cluster of chrony servers which upstream to PTB's public NTS endpoints. The standard time on the station clock is used for whenever legally relevant time is required (e.g., timestamps on signed CDRs).

Installation

For details about installation, view the Installation Guide at chargepoint.com/guides.

Station Logic

After authorization via ChargePoint permitted authorization means, which will be processed on the Power Link 2000 Control and Communication Module (CCOM), the session start is triggered there and executed in the relays of the PLIM2000. The PLIM2000 meter measures energy and sends this data to the CCOM of the station periodically and at certain events, such as the end of the session. From there on, additional information, such as timestamps and user ID will be added to the dataset and sent to the ChargePoint backend. Cable losses are also designated in the CCOM. During and after the charging session, the Eichrecht relevant info appears both on the station display and in the driver portal.

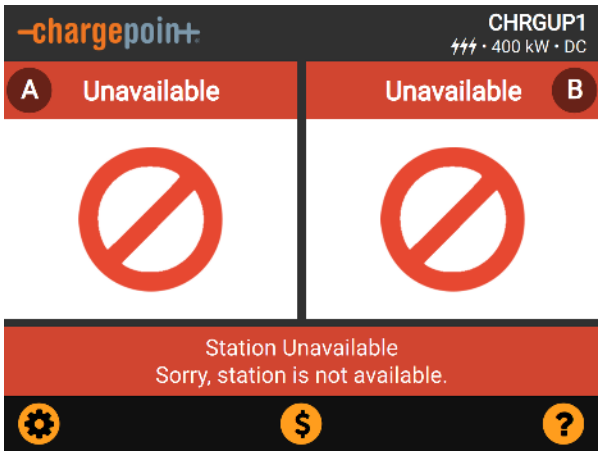
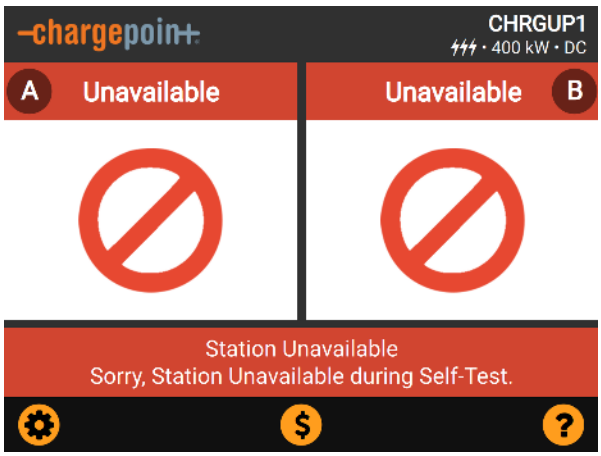
Fault Detection

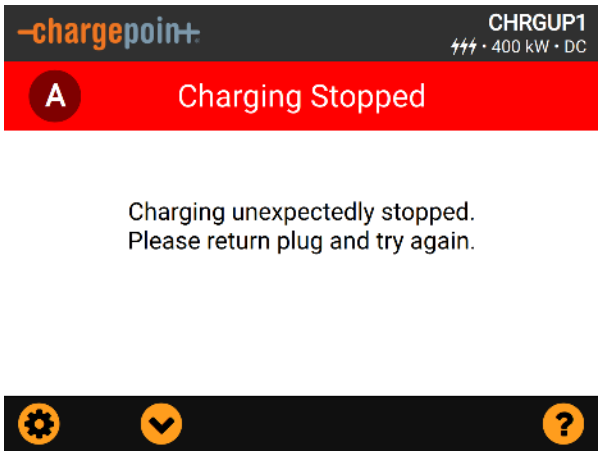
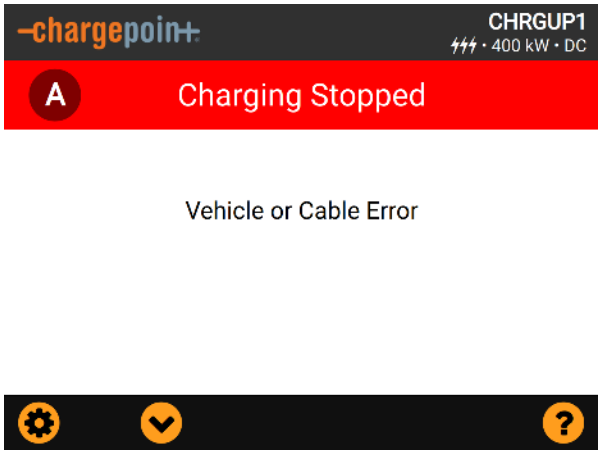
Via ChargePoint Cloud Dashboard

ID	Severity	Description	Message Shown on Device
urn:fault:system:eichrecht-meter-mismatch	critical	This fault is raised when the Eichrecht service discovers that the discovered PLIM2000 Meter is not the same as the one which was paired in the factory.	Station is not available.

For assistance, go to chargepoint.com/support and find your region's technical support number.

Via Station User Interface

Fault Category	Message Shown on Device
Station faults	 

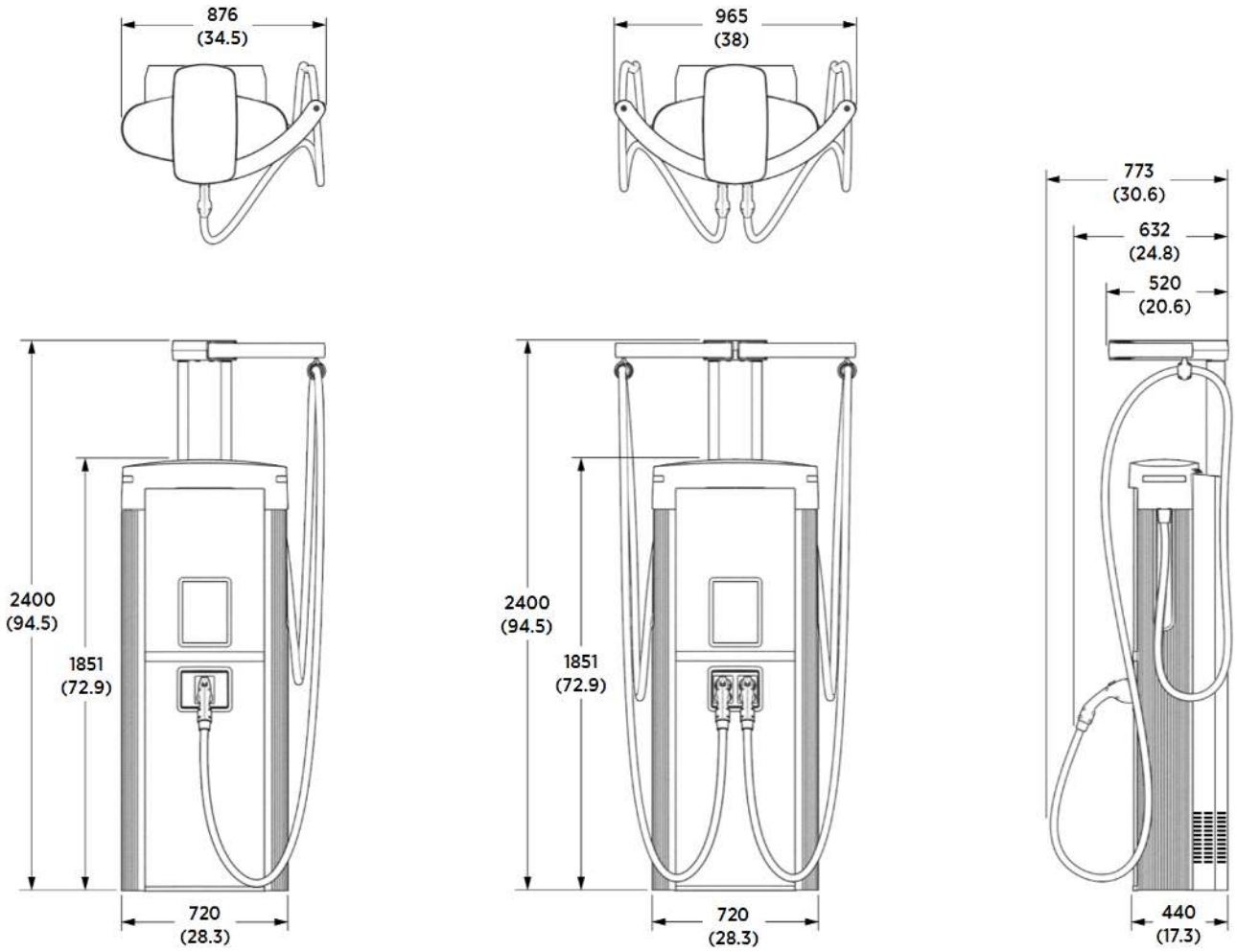
Session fault	
Port fault	

For assistance, go to chargepoint.com/support and find your region's technical support number.

Dimensions

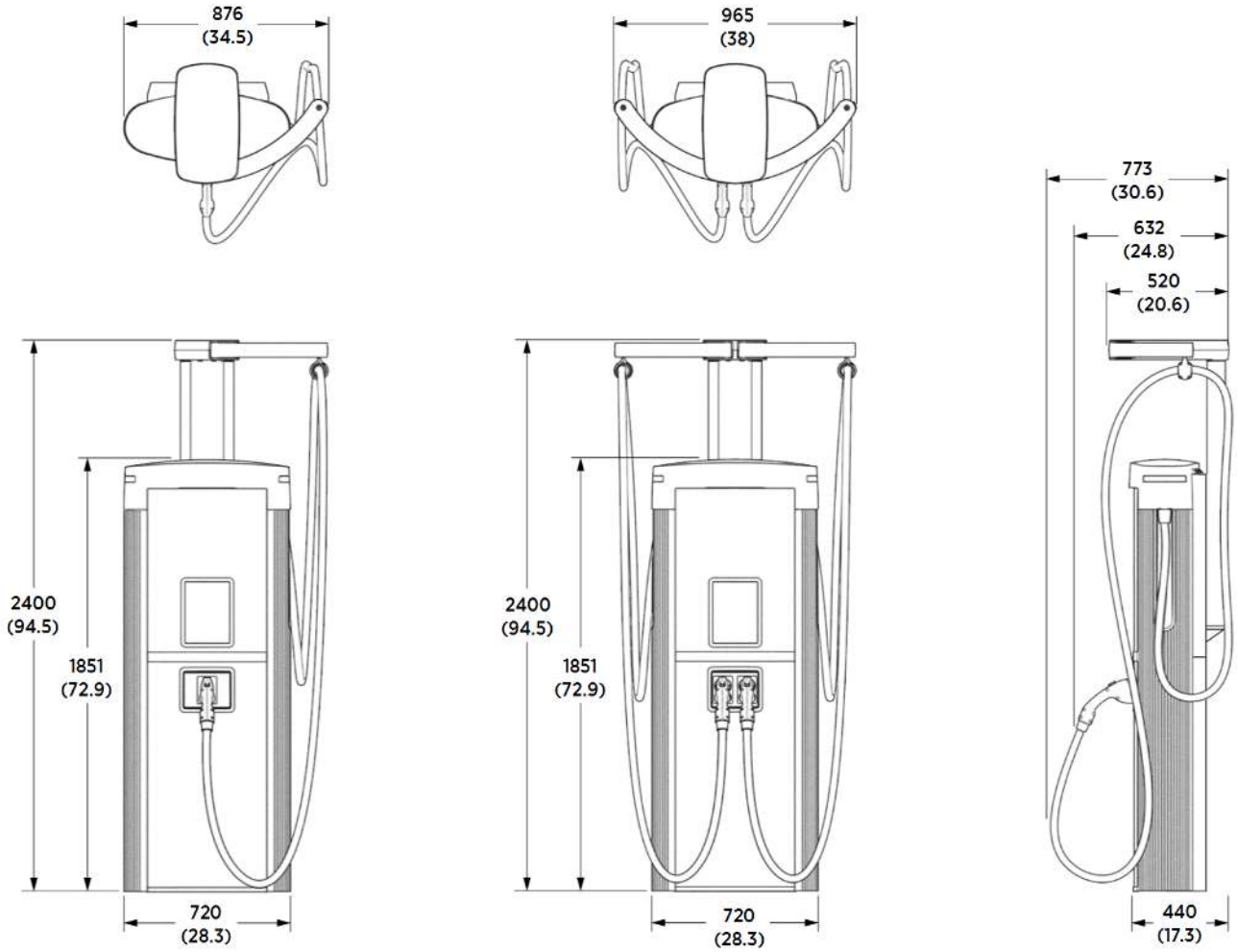
Pedestal Mounted Power Link 2000 With Liquid Cool Cable (LCC), Single or Dual Cable, and Standard CMK

Note: Images are not to scale. Measurements appear in metric units (mm), followed by imperial equivalents (inches).



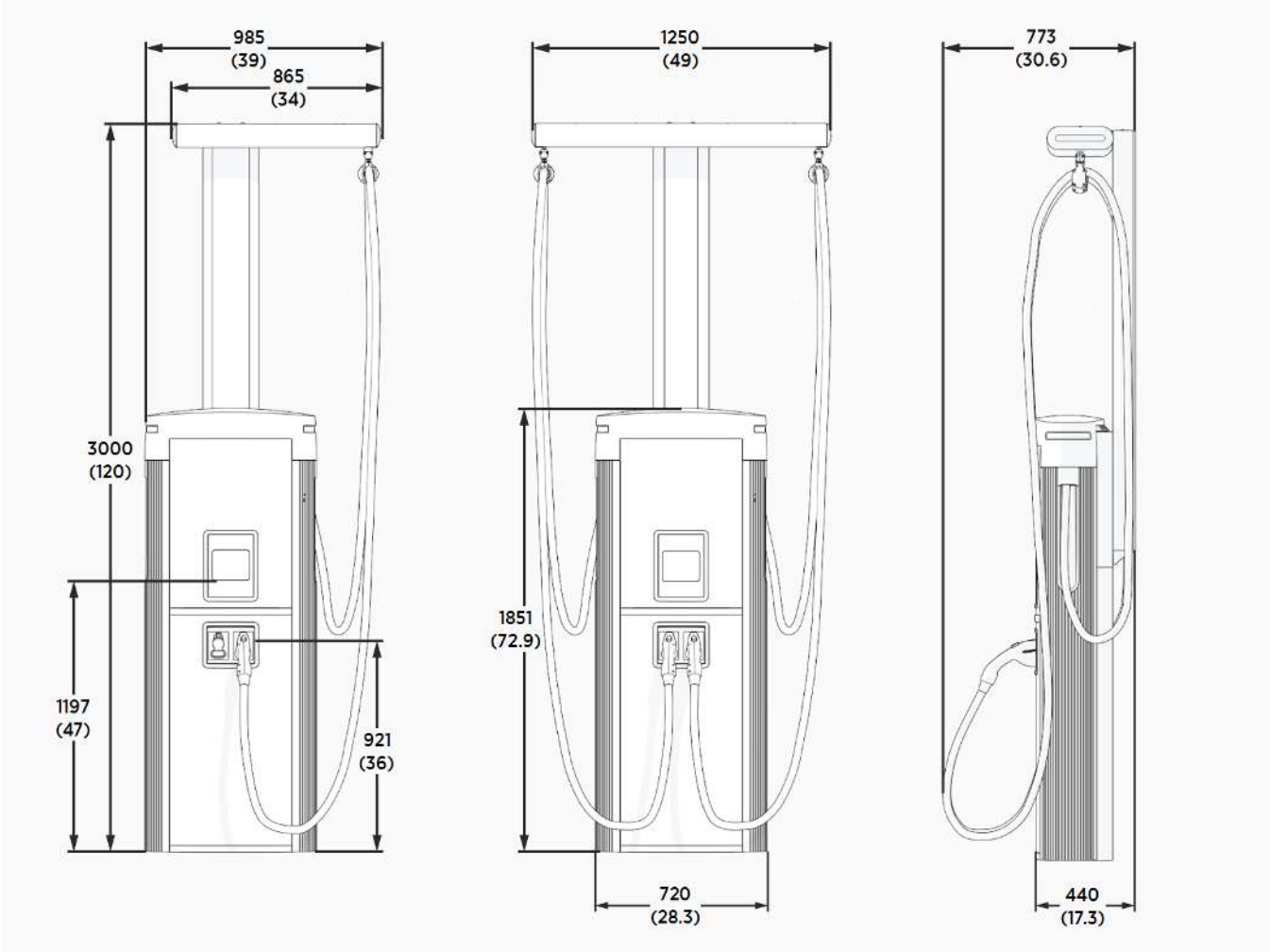
Pedestal Mounted Power Link 2000 With Non-LCC, Single or Dual Cable, and Standard CMK

Note: Images are not to scale. Measurements appear in metric units (mm), followed by imperial equivalents (inches).



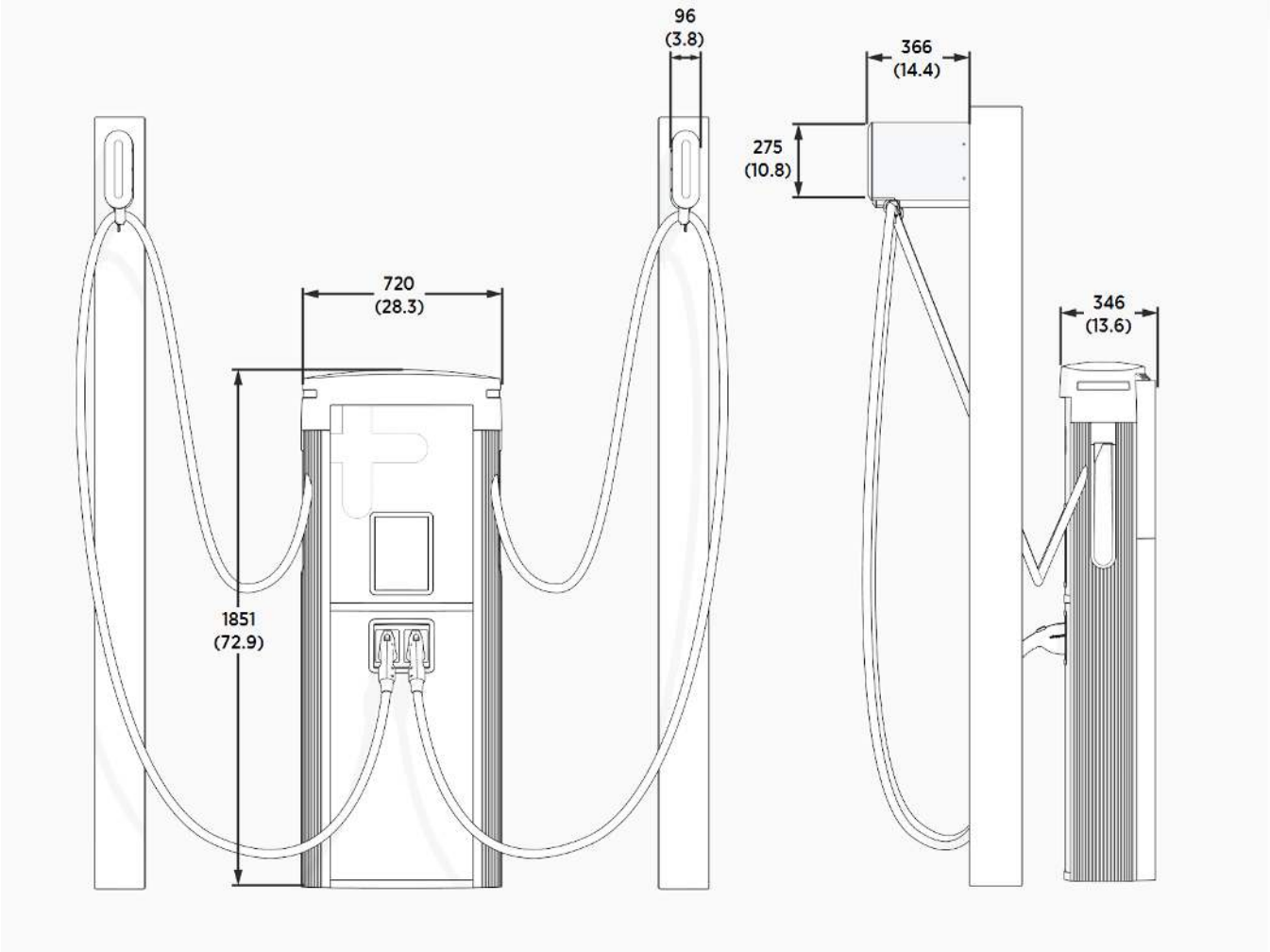
Pedestal Mounted Power Link 2000 With Non-LCC, Single or Dual Cable, and Tall CMK

Note: Images are not to scale. Measurements appear in metric units (mm), followed by imperial equivalents (inches).



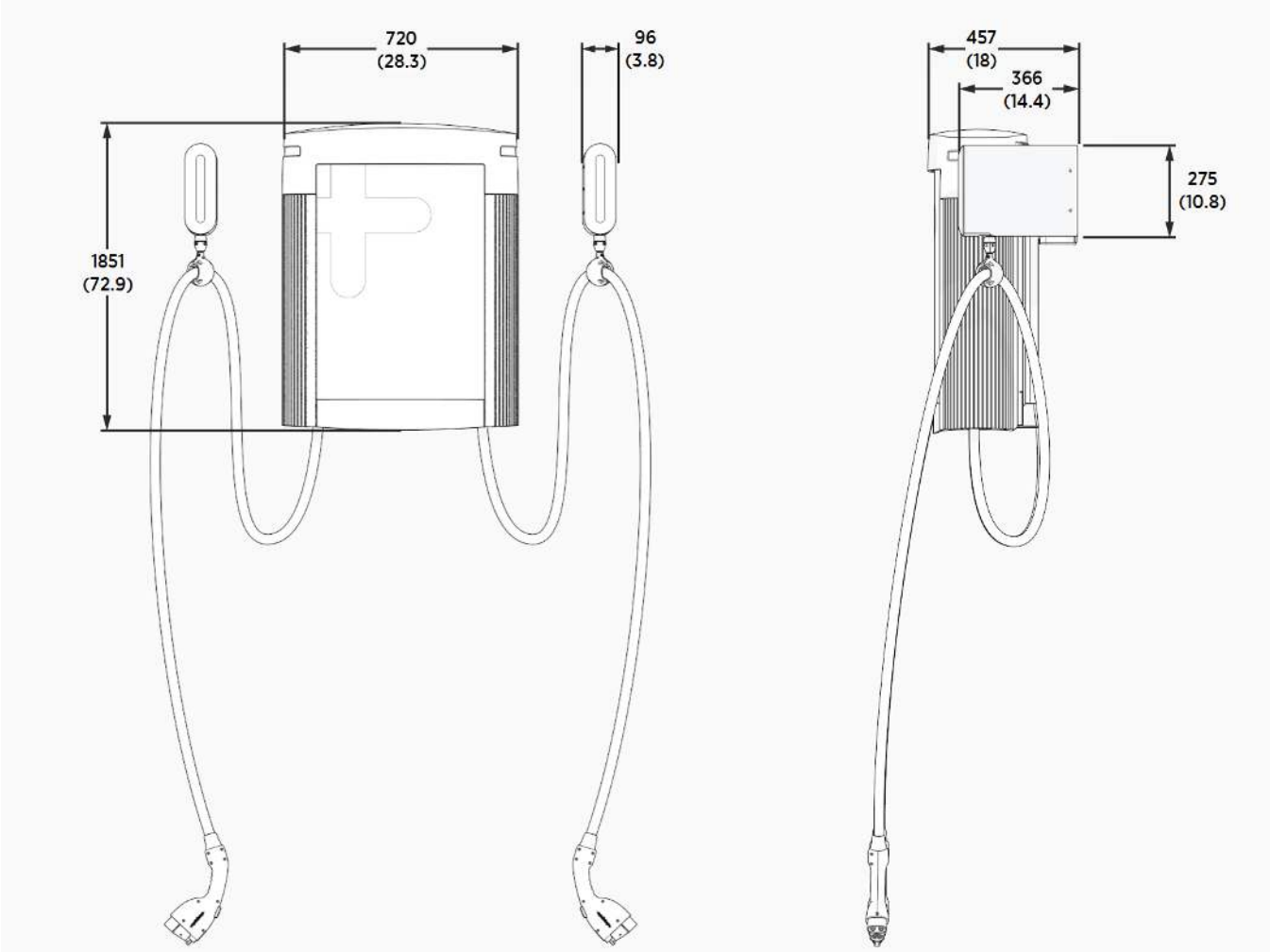
Pedestal Mounted Power Link 2000 With Non-LCC, Single or Dual Cable, and Overhead CMK

Note: Images are not to scale. Measurements appear in metric units (mm), followed by imperial equivalents (inches).



Wall Mounted Power Link 2000 With Single or Dual Cable and Overhead CMK

Note: Images are not to scale. Measurements appear in metric units (mm), followed by imperial equivalents (inches).



Main Connectors

1. Power Input
2. ETH connector
3. CCS2 plug

Note a: bus bars located inside of the charger, upper door, lower area

Note b: blue connector directed downwards, located inside of the charger, upper door, bottom right

Note c: attached to the cable, the plug for connection to the EV

Power Link 2000 Station Display

This section lists the screens that contain legally relevant data. Legally relevant data is always rendered on a white paper-like background and is easily identifiable from other non-legally relevant data items. See user guide for more detailed information.

Note: These are reference screens that illustrate the concept of the display. QR codes and serial numbers shown may be invalid.

Due to software-based rounding errors for computing the energy difference value on the Eichrecht receipt on the display, the very last digit can differ by 1 from the real, accurate digit.

Software Digest

To access, click **Settings (gear wheel) > Energy Meter > Station** on the station display.

The legally relevant information is in the middle in the framed box. The time stamp appears first followed by the QR code for the LRS version of the charging station.

CDR Signing Public Key

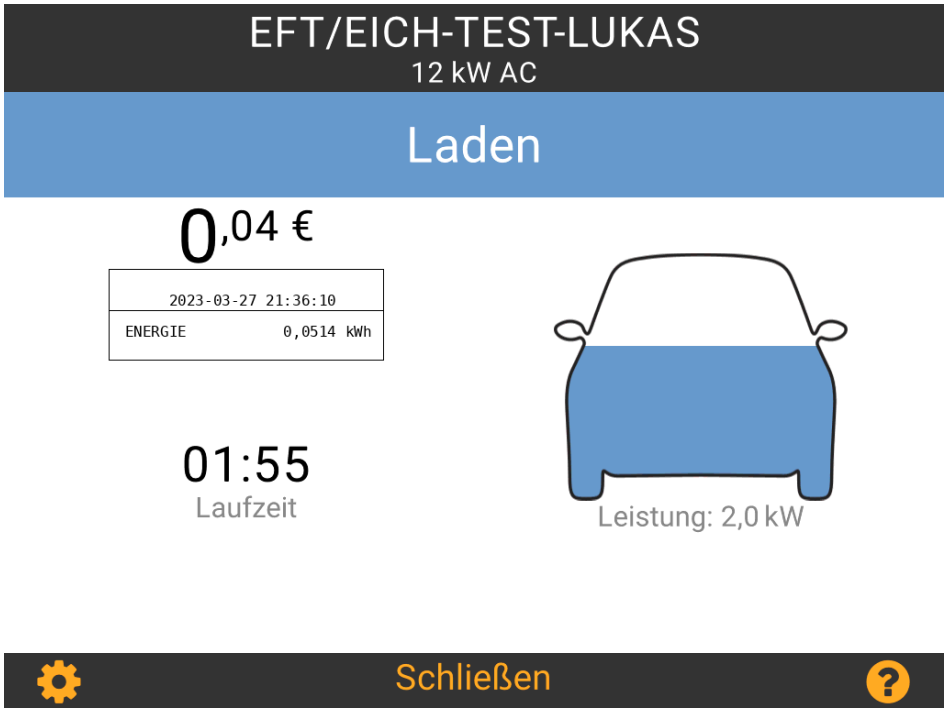
To access, click **Settings (gear wheel) > Energy Meter**.

Each charging station has a unique public key. It is displayed as a QR code after pressing "Anschl. 1" or "Anschl. 2". It is used for all charging points of a charging station (up to two ports). To identify which charging point was used for a charging session on a charging station with two ports, see the generated OCMF and the field called "CI" (ChargePoint-Identification according to OCMF specification). The number "1" equals the left charging point, the number "2" the right one.

The legally relevant information is in the middle in the framed box. The time stamp appears first followed by the information on the selected charging point.

Live Charging Screen

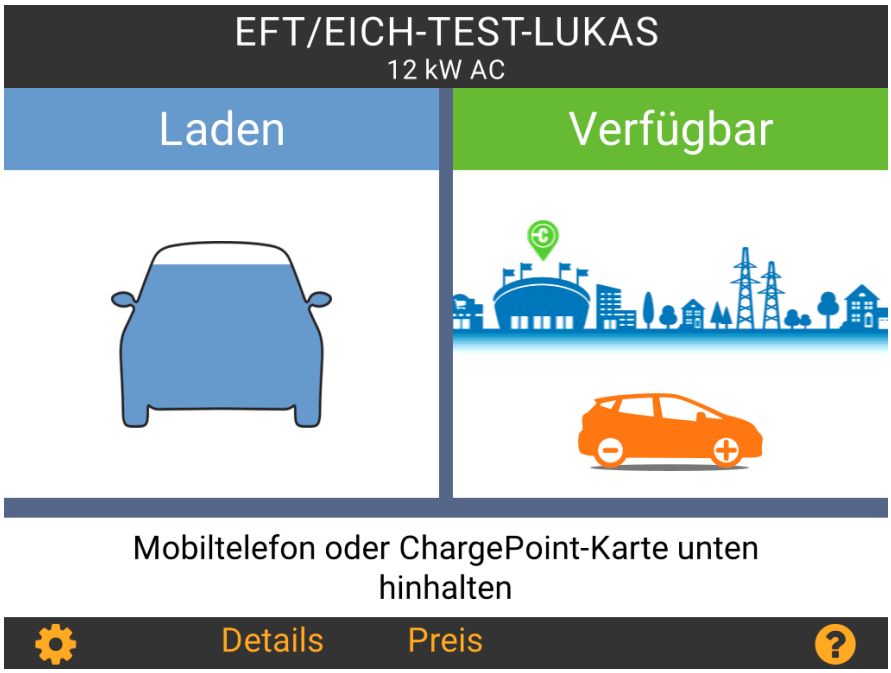
The Live Charging Screen appears as soon as a charging session starts. If the home screen appears during a session, click “Details” to access the Live Charging Screen.



The legally relevant information is in the framed box (refreshing every 5 seconds) on the side of the active and selected charging session (in this case left port). The time stamp appears first, followed by the charged electrical energy in kWh (uncompensated).

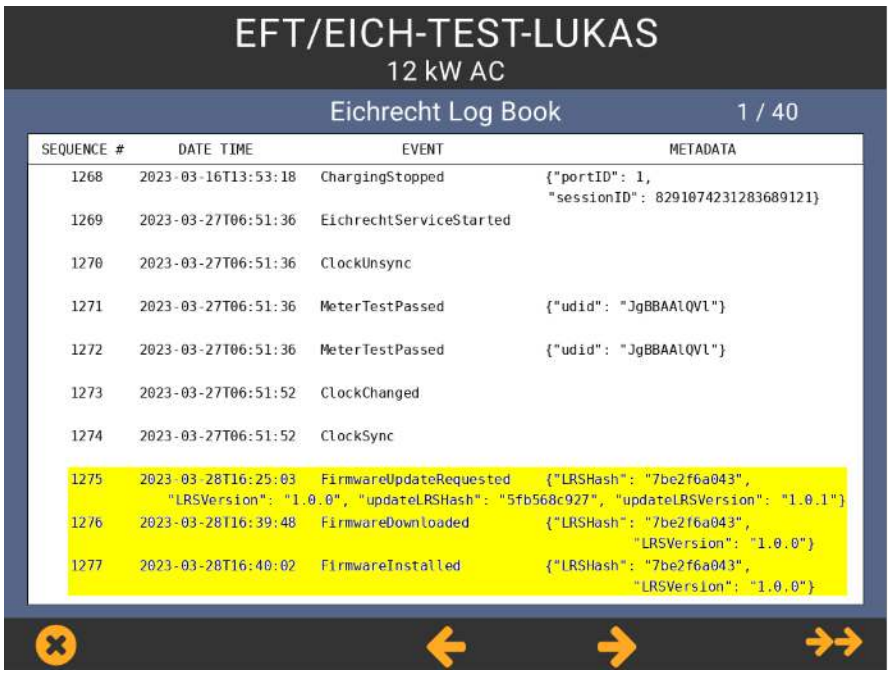
Eichrecht Log Book

1. To access, click **Settings (gear wheel)**.



2. Click **Eichrecht Log Book**.

3. An Eichrecht log similar to the following displays.

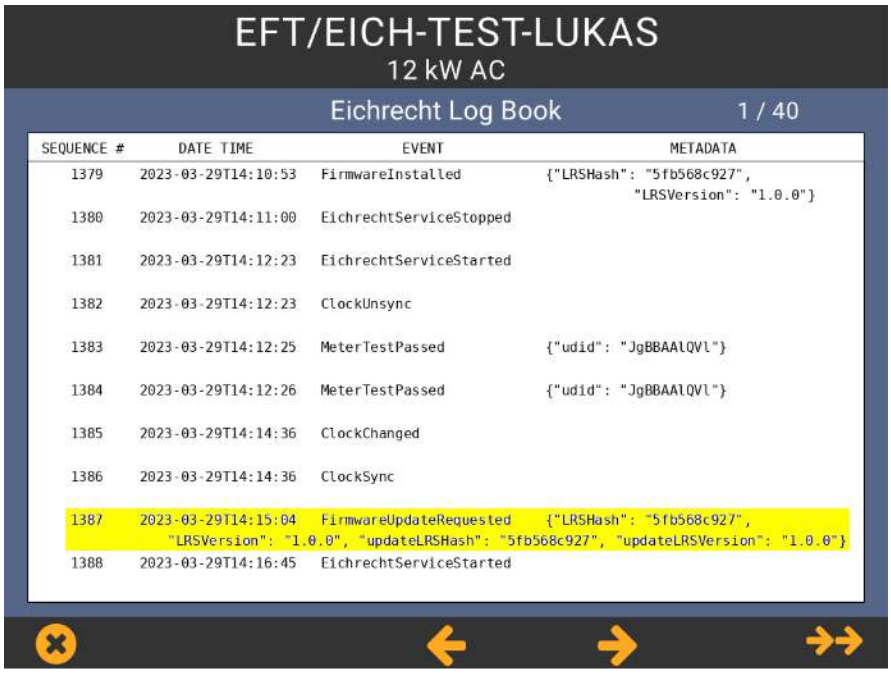


A successful LRS update can be identified by the events "FirmwareUpdateRequested", "FirmwareDownloaded" and "FirmwareInstalled" (in that order).

Metadata for "FirmwareUpdateRequested" shows "LRSHash" (the truncated LRS hash of the current LRS version), "LRSVersion" (the current LRS version), "updateLRSHash" (the truncated LRS hash of the new LRS version) and "updateLRSVersion" (the new LRS version).

Metadata for “FirmwareDownloaded” shows "LRSHash" (the truncated LRS hash of the current LRS version) and "LRSVersion" (the current LRS version) as already described for “FirmwareUpdateRequested”.

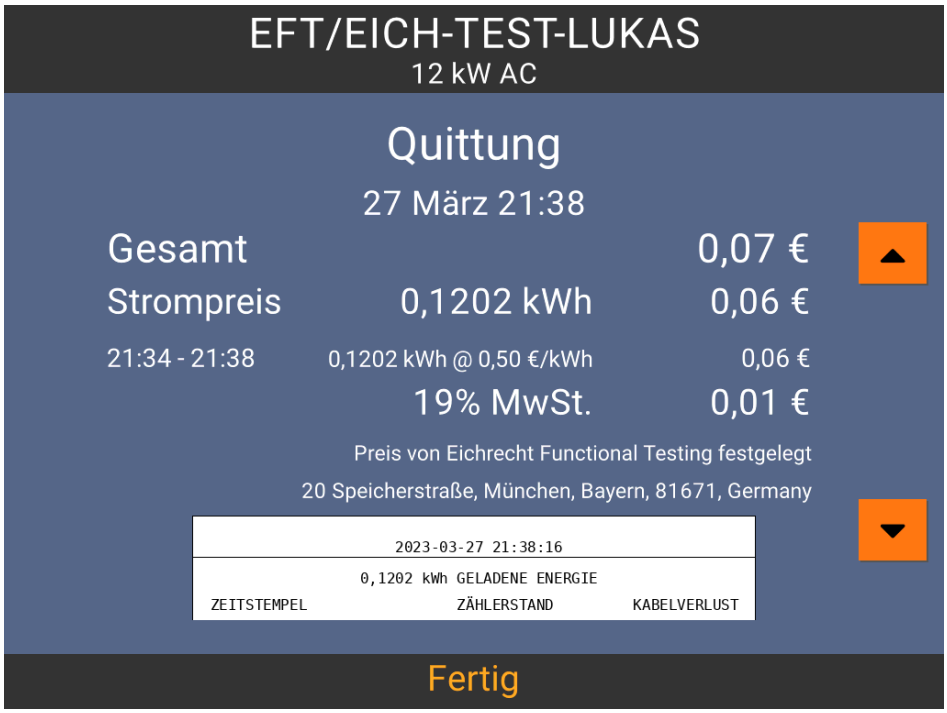
Metadata for “FirmwareInstalled” shows "LRSHash" (the truncated LRS hash of the previous and now overridden LRS version) and "LRSVersion" (the previous LRS version).

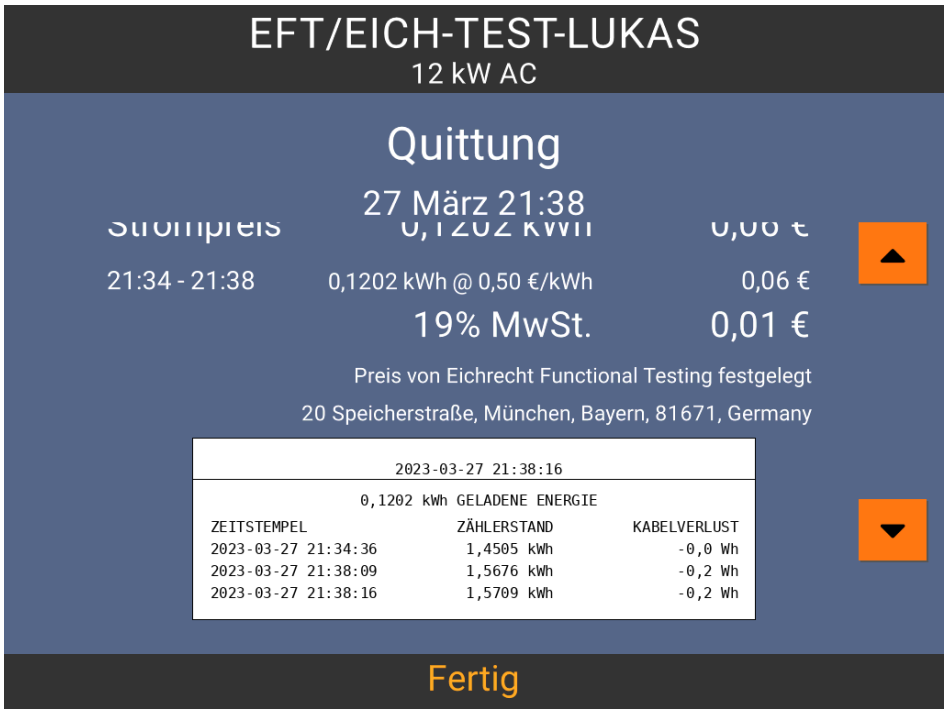


An LRS update attempt can be identified by a single event "FirmwareUpdateRequested". If none of the previous mentioned events, "FirmwareDownloaded" and "FirmwareInstalled" follow, the update was not installed.

Session Summary

This summary screen is shown at the end of a session and is displayed for 20 seconds.





Note: The minimum amount of energy that a charging station needs to transfer to an electric vehicle for a charging session is 0.0001 kWh. The accuracy is ensured for an energy of at least 1 kWh (MMQ).

Note: The invoice will be based on compensated electrical energy (kWh) shown on the receipt on the display (see energy value and unit before "GELADENE ENERGIE".) This will also be in the corresponding OCMF. Both have the same resolution. For more details on OCMF see the user guide.

The legally relevant information is in the middle in the framed box. The time stamp appears first, followed by the time stamps for metered energy values (uncompensated) during the charging session and the corresponding cable losses (from left to right). Use the up and down buttons (orange with black arrows) to scroll through all entries.

Time Sync Display

Each LRD (legally relevant display) Bitmap includes a timestamp at the top. On loss of time sync status, a new message “Time Out Of Sync” will be displayed in place of the ISO-formatted timestamp. Here is an example:

Verifying Signed Charge Data Records

Power Link 2000 charging stations produce signed charge data records in the industry-standard OCMF format for permanent storage in the CPO backend. Users can verify a record's signature using any version of the transparency software by the SAFE Initiative. Drivers can obtain step-by-step instructions on how to obtain and verify records for their charging sessions, by following procedures in the user manual.

Measurement Dataset

The pagination is ensured via an increasing counter for each measurement. In the OCMF dataset, the counter is placed in the field labeled as "PG" (pagination), following the "T" and preceding the dash, such as "PG":T5-5333490790308772492. In this example, the number 5 represents the counting number, indicating that this is the fifth session on that station. The port used for that measurement can be identified via the "CI" field in the OCMF dataset. When it equals the integer 1, it signifies the right port (as seen from the front), and if it equals 2, it indicates the left port (as seen from the front).

RFID

The RFID interface is located on the front of the charging station below the display. See the wave icon and the hand with card. Place an RFID card in this field for the charging station to read the card.

Identifiers

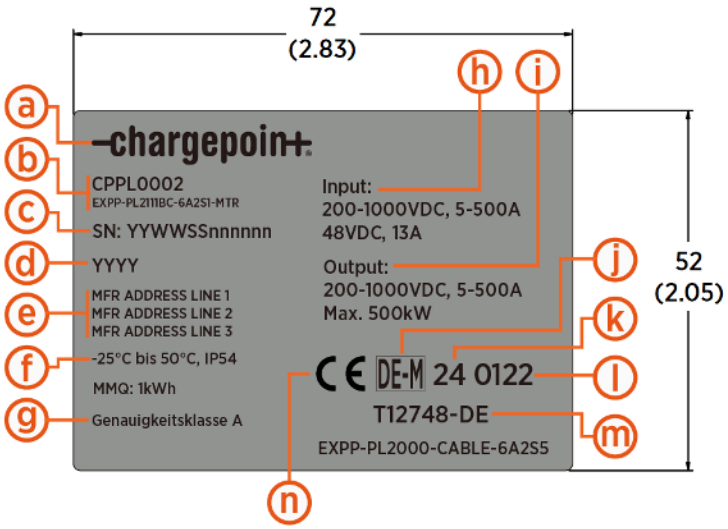
	Typenschild	Falcon-Display	OCMF-Datenpaket	Logbuch
Seriennummer der Ladeinrichtung (=Zähler)	vollständig und in Klartext	vollständig und codiert	vollständig und codiert	nur die ersten 10 Zeichen der codierten Form
Version des eichrechtlich relevante Softwareteils des Falcons (Messkapselkomponente)	---	---	vollständig und in Klartext	---
Hash-Code des eichrechtlich relevanten Softwareteils des Falcons (Messkapselkomponente)	---	vollständig via QR-Code	---	nur die ersten 10 Zeichen
Eichrechtlich relevante Software-Version des CPIM1000 (Messkapselkomponente)	---	(am Zählerdisplay)	Klartext	---
Version der Ladekontroller-Software (eichrechtlich nicht relevanter Softwareteil des Falcons)	---	---	vollständig und in Klartext	--

Eichrecht Type Label

The Eichrecht type label is located on the backplate on the left side (front view).

Eichrecht Type Label: LCC

Note: Images are not to scale. Measurements appear in metric units (mm), followed by imperial equivalents (inches).

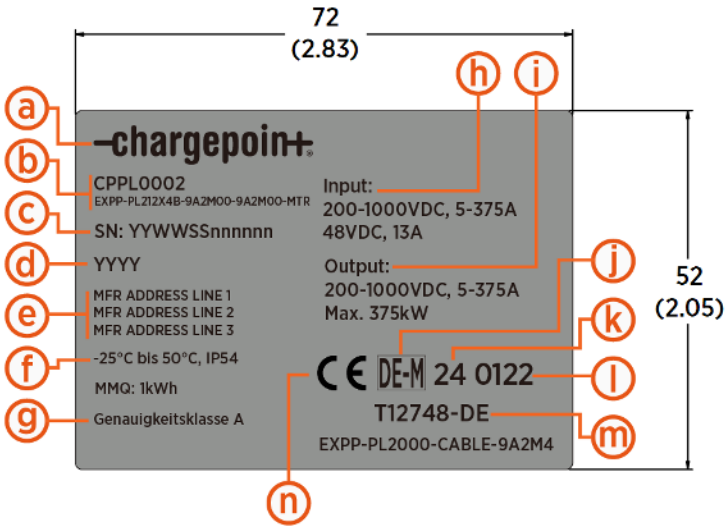


a. Manufacturer logo
b. Type and type designation
c. Serial number
d. Year of manufacture
e. Company address
f. Temperature rating / IP rating
g. Accuracy class
h. Nominal electrical input parameters per port
i. Nominal electrical output parameters per port
j. Eichrecht metrology marking
k. Year of affixion
l. Number of the notified body for Eichrecht
m. Approval number
n. CE marking, 5 mm (0.2 in) height

Eichrecht Type Label: Non-LCC

Note: Images are not to scale. Measurements appear in metric units (mm), followed by imperial equivalents (inches).

a. Manufacturer logo
b. Type and type designation
c. Serial number
d. Year of manufacture
e. Company address
f. Temperature rating / IP rating
g. Accuracy class
h. Nominal electrical input parameters per port
i. Nominal electrical output parameters per port
j. Eichrecht metrology marking
k. Year of affixion
l. Number of the notified body for Eichrecht
m. Approval number
n. CE marking, 5 mm (0.2 in) height



Eichrecht-Compliant Type Designations

Pos.	Type Designation	Description
1	EXPP-PL2111BC-6A2S1-MTR-A	Express Plus Power Link 2000 series, Europe/UK, DC Station, 1x CCS2 500A liquid cooled 5.8 m cable, 1 Holster, 2.4 m Cable management kit, Pedestal, 200 mm (8 in) Touch Display, ChargePoint signage, Contactless credit card and RFID reader, Cellular/WiFi, Eichrecht conforming
2	EXPP-PL212X1BC-6A2S1-6A2S1-MTR-A	Express Plus Power Link 2000 series, Europe/UK, DC Station, Simultaneous charging, 2x CCS2 500A liquid cooled 4.5 m cable, 2 Holsters, 2.4 m Cable management kit, Pedestal, 200 mm (8 in) Touch Display, Contactless credit card and RFID reader, Cellular/WiFi, Eichrecht conforming

Pos.	Type Designation	Description
3	EXPP-PL212X1B-9A2M0-9A2M0-MTR	Express Plus Power Link 2000 series, Europe/UK, DC Station, Simultaneous charging, 2 Holsters, 2.4 m Cable management kit, Pedestal, 200 mm (8 in) Touch Display, Contactless credit card and RFID reader, Cellular/WiFi, Eichrecht conforming
4	EXPP-PL2111B-9A2M0-MTR	Express Plus Power Link 2000 series, Europe/UK, 1 Holster, Pedestal, 200 mm (8 in) Touch Display, ChargePoint signage, Contactless credit card and RFID reader, Cellular/WiFi, Eichrecht conforming
5	EXPP-PL212X4B-9A2M0-9A2M0-MTR	Express Plus Power Link 2000 series, Europe/UK, Simultaneous charging, 200 mm (8 in) Touch Display, Overhead mount, ChargePoint signage, Contactless credit card and RFID reader, Cellular/WiFi, Eichrecht conforming
6	EXPP-PL2114B-9A2M0-MTR	Express Plus Power Link 2000 series, Europe/UK, Overhead mount, 200 mm (8 in) Touch Display, ChargePoint signage, Contactless credit card and RFID reader, Cellular/WiFi, Eichrecht conforming

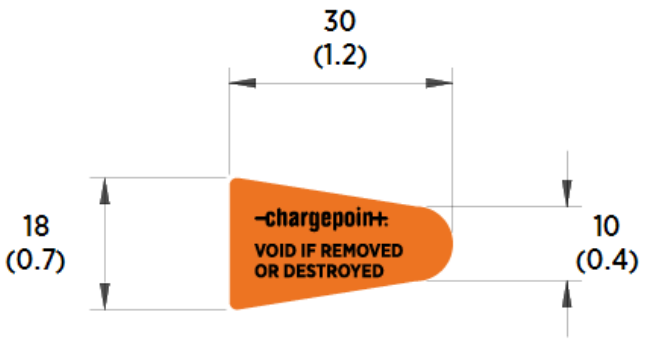
Falcon and Proton form the measuring capsule and meter, called PLIM2000. These are the core components of an Eichrecht-compliant Power Link 2000, which meet the essential legal requirements.

The measuring capsule can consist of one Falcon and one Proton (single cabled station) or one Falcon and two Protons (dual cabled station).

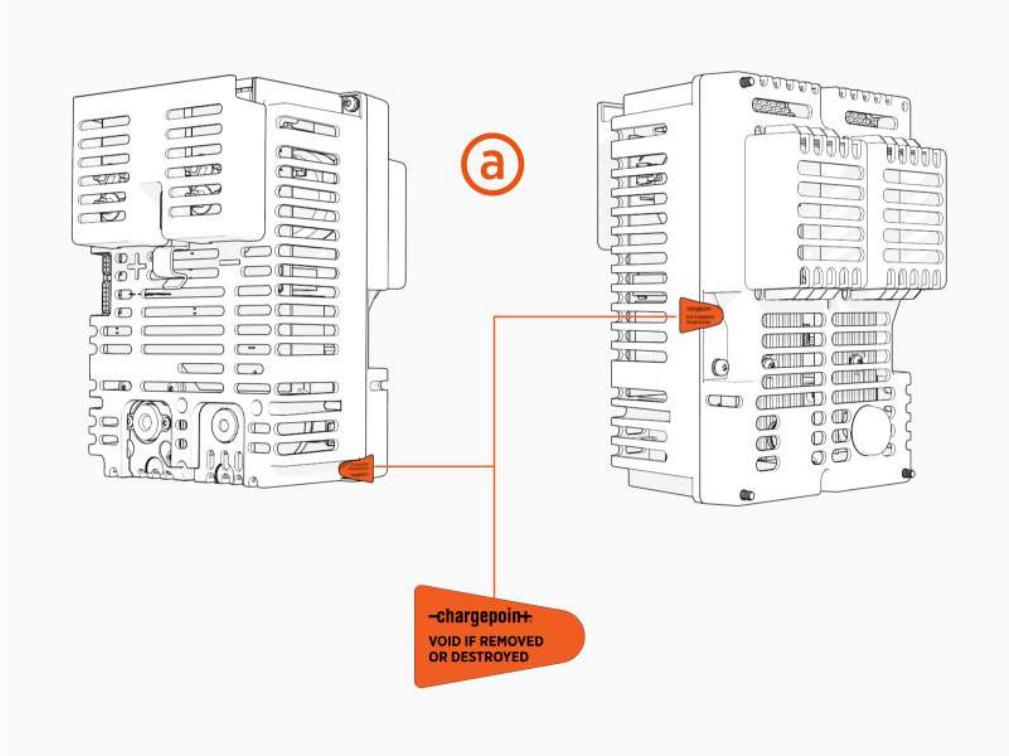
Power Link 2000 Protection Labels

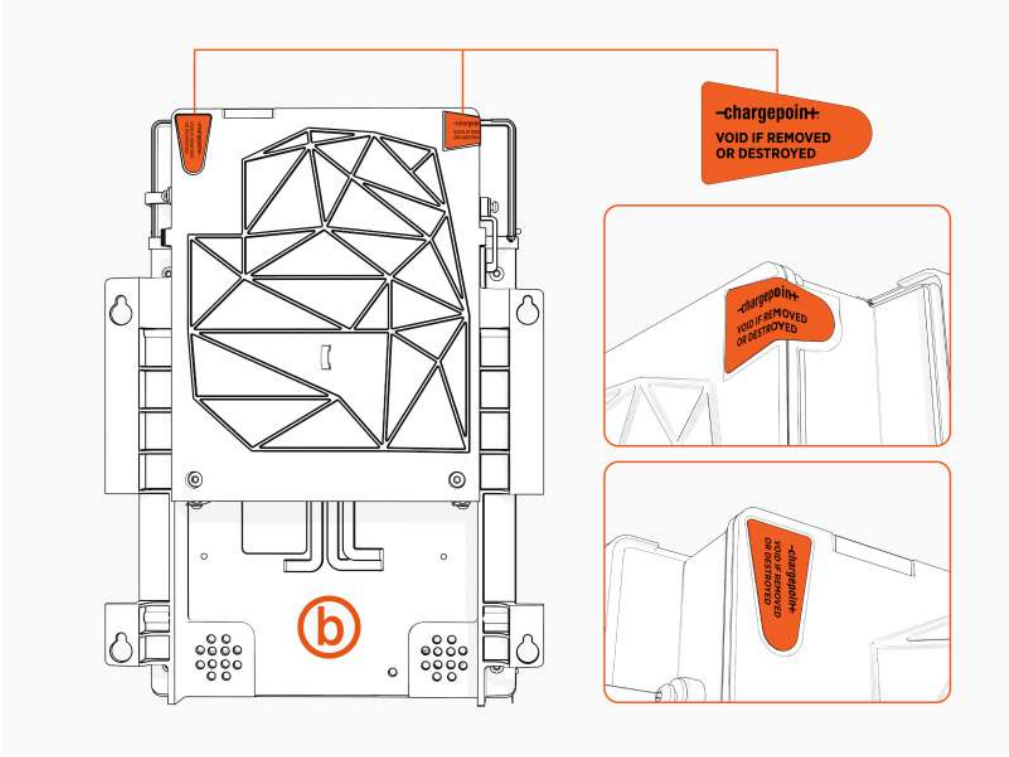
Components of the measuring capsule (PLIM2000: Falcon and Proton) have self-destructive tamper evident labels.

Note: Images are not to scale. Measurements appear in metric units (mm), followed by imperial equivalents (inches).



The labels are applied by the manufacturer in several locations on the Proton **(a)** and Falcon **(b)**.





The connection between Proton and Falcon is signed for Eichrecht relevant information and the components are digitally paired. The Power Link 2000 has a digital installation seal. Once the door is opened to access the enclosure (for example, to route a cable or acccess the PLIM2000), the station goes into a lockout mode and can only be made available again by authorized personnel who are able to retrieve the service code of the station.

Power Link 2000 Interface Descriptions

No Eichrecht-relevant parameters can be set after production. All interfaces are only used by ChargePoint or its installation and service partners.

Only the energy values of the signed metering datasets must be used for commercial purposes and are covered by the Eichrecht certificate. Other measuring quantities do not meet Eichrecht requirements.

The following instructions can be found in the user manual:

- Running a charging session
- Retrieving the public key
- Retrieving an Eichrecht-relevant metering dataset
- Usage, download and installation of the transparency software

Technical Specifications

Power Link 2000 charging stations comply with the following standards:

IEC 62052-11:2020
EN 50470-4:2023
REA-Dokument 6-A
PTB-A 50.7

1	Hersteller	ChargePoint
2	Typbezeichnung	CPPL0002
3	Klasse der mechanischen Umgebungsbedingungen	M1
4	Klasse der elektromagnetischen Umgebungsbedingungen	E2
5	Betriebstemperaturbereich	-25 °C bis 50 °C

The charging station meets the following rated operating conditions. An Eichrecht-compliant operation is only possible within the given characteristics of Power Link 2000.

Input per port	200-1000 V dc, Max 500 A, Max 500 kW (simultaneous)
Output per port	200-1000 V dc, Max 500 A, Max 500 kW (simultaneous)
Wiring	
Insulation class	Class 2 (isolated dc supply, reinforced insulation)
Mechanical environment	M1
Electromagnetic environment	E2
Accuracy class of a charging point	A
IP rating	IP46

Working temperature	-25 °C to 50 °C
Storage temperature	-40 °C to 60 °C
Application field	Outdoor, Indoor
Storage and operating humidity	Up to 95%@ +50 °C, non-condensing for up to two years

Test Instructions for Eichrecht Tests in Field Devices

Kontrolle in Betrieb befindlicher Geräte

In diesem Abschnitt werden die im Rahmen der Kontrolle von im Betrieb befindlichen Geräten durchzuführenden Prüfungen beschrieben. Alle Prüfungen sind pro Ladepunkt durchzuführen.

Die beschriebenen Prüfungen beschreiben eine zulässige Vorgehensweise. Sinngemäße Alternativen sind nach Ermessen der die Kontrollen Vornehmenden statthaft. Die Prüfungen umfassen im Wesentlichen folgende Kategorien:

A. Beschaffenheitsprüfungen
B. Funktionale Prüfungen einschließlich Genauigkeitsprüfung
C. Prüfung der Messschaltkoordination

A. Beschaffenheitsprüfung

   Das Gerät muss auf Übereinstimmung mit der BMP geprüft werden:

   - Physikalischer Aufbau der Ladeeinrichtung
   - Verwendete Zähler/Messkapseln
   - Typenschildaufschriften
   - Stempelungen/ Plombierungen/ Versiegelungen
   - Überprüfung gemäß den im Abschnitt 1.6 aufgeführten Unterlagen der BMP*, notwendigen Herstellerunterlagen und GMP-P-6-1 bzw. die PTB-Prüfregeln Band 6 (dritte Auflage, Teil B und D) sind zu verwenden. Dies gilt u.a. für:
     - Kompensationsfaktor (bei Verwendung der angeschlagenen Ladekabeln Typ 2)
     - Abgleich Public Key des Krypto-Moduls mit dem angezeigten Public Key am Falcon-Display
     - Abgleich der gesetzlichen Uhrzeit mit dem verwendeten NTS-Server
     - Überprüfung der Funktion des gesetzlichen Logbuchs
     - Überprüfung der Übereinstimmung der Seriennummer am Typenschild (Klartext) mit der Seriennummer im Logbuch/OCMF-Datenpaket (codiert)
     - Überprüfung der geladenen Energie am Falcon-Display mit dem signierten OCMF-Datensatz

   ** die Baumusterprüfbescheinigung sowie relevante Unterlagen werden staatlichen oder staatlich anerkannten Stellen auf Anfrage von ChargePoint zur Verfügung gestellt.*

B. Funktionale Prüfungen einschließlich Genauigkeitsprüfung

Im Rahmen der funktionalen Prüfungen ist mindestens ein vollständiger Ladeprozess pro Ladepunkt mit der Ladeeinrichtung durchzuführen. Dabei muss mind. ein Identifizierungsmittel im Rahmen des Dauerschuldverhältnisses zur Anwendung kommen.

Die Verbindung der Ladeeinrichtung an das Back-End-Portal zur Fernanzeige ist über Mobilfunk möglich. Die Art der Verbindung wird hardwareseitig festgelegt.

Schließlich ist der Anwendungsfall „Prüfung auf Unverfälschtheit“ durchzuführen. Somit gibt es folgende Hauptschritte bei der Prüfung:

1. Durchführung eines Ladevorgangs mit Genauigkeitsprüfung elektrische Arbeit und funktionale Prüfung der Fernanzeige über Mobilfunk, Authentifizierung mit Identifizierungsmittel
2. Prüfung auf Unverfälschtheit der Daten

Genauigkeitsprüfung und funktionale Prüfung werden wie folgt durchgeführt:

1. Beginn des Ladevorganges durch Anschließen des Fahrzeugsimulators und Authentifizierung des Kunden (Prüfers) an der Ladesäule mit Identifizierungsmittel.
2. Beobachten der Energieabgabe (unkompensiert) über die Live-Anzeige. Bei Stromfluss erhöht sich der Zählerstand.
3. Beenden des Ladevorgangs durch Abziehen des Steckers.

Die Genauigkeitsprüfung für die elektrische Arbeit wird wie folgt beschrieben vorgenommen:

- Das unter Nr. 3 im Kapitel Spezielle Prüfeinrichtungen oder Prüfsoftware genannte Normalleistungsmessgerät wird an den Fahrzeugsimulator unmittelbar nach dem Abgabepunkt geschaltet.
- Es wird davon ausgegangen, dass die Genauigkeit der Messung der über den Ladepunkt abgegebenen Energie im Wesentlichen durch die eichrechtkonformen Elektrizitätszähler und die dazugehörige Konformitätserklärung des Zählerherstellers bestimmt wird.
- Die Bestimmung der Messabweichung der Ladeeinrichtung erfolgt mittels des so genannten „Dauereinschaltverfahrens“ durch den Vergleich der einerseits von der Ladeeinrichtung und andererseits von dem Normalleistungsmessgerät innerhalb derselben Zeitspanne gemessenen Energie. Die Länge der Zeitspanne muss so bemessen werden, dass die niederwertigste Stelle des per eichrechtkonformer Fernanzeige angezeigten kWh-Wertes zwischen Beginn und Ende der Messung abhängig von der Messunsicherheit des Prüfaufbaus mindestens 100 Ziffernsprünge durchführt.

Die eichrechtkonforme Fernanzeige ist wie folgt zu realisieren: Entnehmen von mit der Signatur der Ladeeinrichtung versehenen Messwert-Datenpaketen ein Portal des EMSP, der das Identifizierungsmittel zur Autorisierung des Ladevorgangs ausgegeben hat, und Prüfen der Signatur mittels der Transparenz- und Display- bzw. Signatur-Prüfsoftware.

- Während des Ladevorgangs wird auch die fortschreitende unkompensierte kWh-Anzeige auf dem Display des Falcons beobachtet. Die kompensierte bezogene Energie wird im Rahmen der Übersicht der Ladesitzung dargestellt.
- Die Messabweichung der Ladeeinrichtung darf den durch die MID, Anhang V (MI003), Tabelle 2, vorgegebenen Wert für Zähler der Klasse A nicht überschreiten.

Die Prüfung auf Unverfälschtheit der Daten wird wie folgt prüfend durchgeführt:

- Bezug eines Datensatzes (XML-Format), den der EMSP dem Kunden zusammen mit der Rechnung per Web-Portal des EMSP zur Verfügung stellt,
- Entnehmen von mit der Signatur der Ladeeinrichtung versehenen Datenpaketen aus der E-Mail oder dem Portal und
- Prüfen der Signatur mittels der Transparenz- und Displaysoftware gemäß Abschnitt 1.4.4 der BMP.

C. Prüfung der Messschaltkoordination

Zwischen den durchzuführenden Ladevorgängen muss die unter Punkt 1.5.6 der BMP beschriebene richtige Messschaltkoordination geprüft werden. Dazu müssen die Endzählerstände mit den darauffolgenden Startzählerständen zwischen den durchgeführten Ladeprozessen abgeglichen werden. Somit gibt es folgende Hauptschritte bei der Prüfung:

1. Ladeprozess 1: Durchführung eines Ladevorgangs mit angeschlossener elektrischer Prüflast am Fahrzeugsimulator, Durchführung des Ladevorgangs unter Berücksichtigung der technischen Möglichkeit mit maximaler Ladeleistung, Authentifizierung mit Identifizierungsmittel.
2. Ladeprozess 2: Durchführung eines Ladevorgangs mit angeschlossener elektrischer Prüflast am Fahrzeugsimulator, Durchführung des Ladevorgangs unter Berücksichtigung der technischen Möglichkeit mit maximaler Ladeleistung, Authentifizierung mit Identifizierungsmittel.
3. Vergleich der Endzählerstände mit den darauffolgenden Startzählerständen zwischen den durchgeführten Ladeprozessen. Zwischen diesen Zählerständen darf keine Differenz auftreten.
4. Die Paginierung in den signierten Datenpaketen dieser beiden Ladevorgänge muss den unter Punkt 1.5.6 der BMP beschriebenen nachvollziehbaren Sprung machen.

   Bei diesem Vergleich der Zählerstände muss folgendes Verhalten berücksichtigt werden:

   Werden die Werte des Elektrizitätszählers CPIM1000 durch die Kompensation des Falcon um die Kabelverluste reduziert, besteht am Ende eines Ladevorgangs eine Abweichung zwischen dem Stopp-Registerwert und dem darauffolgenden Start-Registerwert im OCMF-Datenpaket/Transparenzsoftware.

   Ausgehend aus dem Herstellerkonzept für die Kompensation, wird im Gegensatz zum Start-Registerwert beim Stopp-Registerwert die ermittelte Verlustenergie auf Basis des Kompensationsfaktors (Widerstandswert) berücksichtigt.

   Aus diesem Grund müssen im Falle einer Kompensation entweder die dargestellten Registerwerte vom Falcon (unter „Zählerstand“ bei der Übersicht unmittelbar nach Beenden des Ladevorgangs; siehe Kapitel 1.4.1 der BMP) oder die Registerwerte des CPIM1000 herangezogen werden. Hier befinden sich die unkompensierten Registerstände.

Die Vorgehensweise für die Prüfungen ist in weiteren Einzelheiten in der unter Punkt 1.6 der BMP beschriebenen Bedienungs- und Betriebsanleitung beschrieben.

Unterlagen für die Prüfung

Neben dieser Anlage zum Zertifikat sind für die Prüfungen die im Abschnitt 1.6 der BMP unter den Nummern 1 genannten Dokumente heranzuziehen.

Spezielle Prüfeinrichtungen oder Prüfsoftware

Zur Prüfung der von der BMP abgedeckten 6.8-Geräte im Rahmen der Produktion (Abschnitt 4.1 der BMP) und zur Kontrolle in Betrieb befindlicher Geräte sind erforderlich:

1. Eine ein Elektrofahrzeug simulierende elektrische Prüflast, mit der mit mindestens zwei unterschiedlichen Stromstärkestufen bei dreiphasiger, symmetrischer Belastung und bei einphasiger Belastung mit symmetrischer Mehrphasenspannung Energie aus der Ladeeinrichtung entnommen werden kann.
2. Ein ein Elektrofahrzeug simulierender Kabeladapter, der an den Abgabepunkt der Ladesäule gesteckt wird.
3. Ein Normalleistungsmessgerät, das zwischen den unter Nummer 2 genannten Adapter und die unter Nummer 1 genannte Prüflast geschaltet wird. Das Normalleistungsmessgerät muss im Sinne von § 47 MessEG metrologisch rückgeführt sein.
4. Ein in das Internet eingebundener Rechner, zum Aufruf des Portals, über das der EMSP die signierten Datenpakete zur Prüfung zur Verfügung stellt (Fernanzeige). Im Fall der Prüfung der Geräte vor dem Inverkehrbringen (Modul D oder F) muss ggf. ein Ladeeinrichtungsbetreiber und ein EMSP emuliert werden. Der Rechner muss über ein Windows-Betriebssystem verfügen, das die Nutzung der Transparenz- und Display-Software zur Prüfung der Signatur der Datenpakete ermöglicht. Bei dem Rechner muss sichergestellt sein, dass er schadsoftwarefrei und das Betriebssystem nicht kompromittiert ist. Dies kann z.B. dadurch erfolgen, dass der Rechner für die Prüfungen mit einem

   „Live-Betriebssystem“ von einem USB-Stick gebootet wird, bei dem wegen bekannten Ursprungs und Vorgeschichte mit Sicherheit von einem nicht-kompromittierten Speichereinhalt ausgegangen werden kann. Das Betriebssystem Microsoft-Windows wird wegen seiner starken Verbreitung als Leit-Betriebssystem verwendet.
5. Die Transparenz- und Display- bzw. Signaturprüf-Software zur visuellen Kontrolle der Unverfälschtheit übertragener Daten.
6. Identifizierungsmittel, um an der Ladeeinrichtung einen Ladevorgang initiieren zu können.
7. Das Logbuch ist vertrauenswürdig am Falcon-Display auszulesen. Zur einfacheren Auslesung der Logbucheinträge können vom Hersteller über die ChargePoint Cloud Dashboard die signierten Logbucheinträge zusätzlich zur Verfügung gestellt werden.

Identifizierung

Hard- und Software der Messkapsel sind durch die Aufschrift auf dem Typenschild des Zählers und der Ladeeinrichtung bzw. durch die Displayanzeige/OCMF identifizierbar.

Anhand der nachfolgenden Tabelle wird dargestellt, wo und in welcher Form die Informationen entnommen werden können.

Durch ein softwarebasiertes Pairing bildet der AC-Zähler CPIM1000 und Falcon nach der End-Of-Line-Prüfung eine feste Einheit.

	Typenschild Type plate	Falcon-Display	OCMF-Datenpaket OCMF data package	Logbuch Logbook
Seriennummer der Ladeeinrichtung (=Zähler) Serial number of the charging device (=meter)	vollständig und in Klartext complete and in plain text	vollständig und codiert complete and coded	vollständig und codiert complete and coded	Nur die ersten 10 von 24 Zeichen der codierten Form only the first 10 of 24 characters of the coded form
Version des eichrechtlich relevante	---	---	vollständig	---
Softwareteils des Falcons (Messkapselkomponente) Version of the legal relevant software part of the Falcon (measurement capsule component)			und in Klartext complete and in plain text	
Hash-Code des eichrechtlich relevanten Softwareteils des Falcons (Messkapselkomponente) Hash code of the legal relevant software part of the Falcon (measurement capsule component)	---	vollständig via QR-Code complete via QR code	---	Nur die ersten 10 Zeichen von insg. 128 Zeichen only the first 10 characters of 128 in total
Eichrechtlich relevante Software-Version des PLIM2000 (Messkapselkomponente) Legal relevant software version of the PLIM2000 (measurement capsule component)	---	(am Zähler Info-Bildschirm) (Meter info display)	Klartext plain text	---
Version der Ladekontroller-Software (eichrechtlich nicht relevanter Softwareteil des Falcons) Version of the charging controller software (software part of the Falcon not relevant for custody transfer)	---	---	vollständig und in Klartext complete and in plain text	--

Tabelle 7

Die Entkodierung kann nur durch den Hersteller (ChargePoint) selbst vorgenommen werden. In diesem Fall ist ChargePoint zu kontaktieren. Die Überprüfung der Übereinstimmung erfolgt im Rahmen der End-Of-Line Prüfung.

In den nachfolgenden beiden Tabellen sind die eichrechtlich relevanten Software-Informationen dargestellt, die mit der Ausstellung der Zertifizierung abgedeckt sind.

Zusatzmodul-Spezifikationen “Falcon“ / auxiliary device specifications “Falcon”	
Software-Version (eichrechtlich relevanter Teil) Software version (legal relevant)	1.0.0
Hash-Code (eichrechtlich relevanter Softwareteil) Hash code (legal relevant software part)	QR-Code-Anzeige / QR code display: 54468fd3c0582f60f41113ab415676e2 3250575d12c511b833f873479d113bed 0210d7a5dd053deebe16c9f517d85a8 dfa143c9041fdd732c755aa2f29c5549d

Zählerspezifikationen PLIM2000 / meter specifications PLIM2000	
Hash-Code des eichrechtlich relevanten Softwareteils (LRS) Hash code of the legal relevant software part (LRS)	eda296bc4506dfeaa3c922db8fa 77f7c71facad318aad30e29ab50ae 11eb8429

Kalibrier- und Justierverfahren

Kalibrierungen und Justierungen im Rahmen der Kontrolle im Betrieb befindlicher Geräte sind nicht vorgesehen.

Messrichtigkeitshinweise gemäß Baumusterprüfbescheinigung

A. Auflagen für den Betreiber der Ladeeinrichtung, die dieser als notwendige Voraussetzung für einen bestimmungsgemäßen Betrieb der Ladeeinrichtung erfüllen muss.

   Der Betreiber der Ladeeinrichtung ist im Sinne § 31 des Mess- und Eichgesetzes der Verwender des Messgerätes.

   1. Die Ladeeinrichtung gilt nur dann als eichrechtlich bestimmungsgemäß und eichrechtkonform verwendet, wenn die in ihr eingebauten Zähler nicht anderen Umgebungsbedingungen ausgesetzt sind, als denen, für die ihre Baumusterprüfbescheinigung erteilt wurde. Zusätzlich müssen die angegebenen Umgebungsbedingungen der eichrechtlich relevanten Zusatzeinrichtung Falcon eingehalten werden.
   2. Die Ladeeinrichtung gilt nur dann als eichrechtlich bestimmungsgemäß und eichrechtkonform verwendet, wenn nur die unter Punkt 1.3.2.3.2 der aktuell gültigen BMP dieser 6.8-Geräte aufgelisteten Authentifizierungsmethoden verwendet werden.
   3. Der Verwender dieses Produktes muss bei Anmeldung der Ladepunkte bei der Bundesnetzagentur in deren Anmeldeformular den an der Ladeeinrichtung zu den Ladepunkten angegebenen Public Key mit anmelden! Ohne diese Anmeldung ist ein eichrechtkonformer Betrieb der Säule nicht möglich. Weblink: https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/E-Mobilitaet/start.html
   4. Der Verwender dieses Produktes hat sicherzustellen, dass die Eichgültigkeitsdauern für die Komponenten in der Ladeeinrichtung und für die Ladeeinrichtung selbst nicht überschritten werden.

5. Der Verwender dieses Produkts hat sicherzustellen, dass Ladeeinrichtungen zeitnah außer Betrieb genommen werden, wenn wegen Stör- oder Fehleranzeigen im Display der eichrechtlich relevanten Mensch-Maschine-Schnittstelle ein eichrechtkonformer Betrieb nicht mehr möglich ist. Es ist der Katalog der Stör- und Fehlermeldungen in dieser Betriebsanleitung zu beachten.
6. Der Verwender muss die aus der Ladeeinrichtung ausgelesenen, signierten Datenpakete - entsprechend der Paginierung lückenlos dauerhaft (auch) auf diesem Zweck gewidmeter Hardware in seinem Besitz oder durch entsprechende Vereinbarungen im Besitz des EMSP oder Backend- System speichern („dedizierter Speicher“), - für berechtigte Dritte verfügbar halten (Betriebspflicht des Speichers.). Dauerhaft bedeutet, dass die Daten nicht nur bis zum Abschluss des Geschäftsvorganges gespeichert werden müssen, sondern mindestens bis zum Ablauf möglicher gesetzlicher Rechtsmittelfristen für den Geschäftsvorgang. Für nicht vorhandene Daten dürfen für Abrechnungszwecke keine Ersatzwerte gebildet werden.
7. Der Verwender dieses Produktes hat Messwertverwendern, die Messwerte aus diesem Produkt von ihm erhalten und im geschäftlichen Verkehr verwenden, eine elektronische Form einer von der CSA genehmigten Betriebsanleitung zur Verfügung zu stellen. Dabei hat der Verwender dieses Produktes insbesondere auf die Nr. II „Auflagen für den Verwender der Messwerte aus der Ladeeinrichtung“ hinzuweisen.
8. Den Verwender dieses Produktes trifft die Anzeigepflicht gemäß § 32 MessEG (Auszug):

   § 32 Anzeigepflicht (1) Wer neue oder erneuerte Messgeräte verwendet, hat diese der nach Landesrecht zuständigen Behörde spätestens sechs Wochen nach Inbetriebnahme anzuzeigen...
9. Soweit es von berechtigten Behörden als erforderlich angesehen wird, muss vom Messgeräteverwender der vollständige Inhalt des dedizierten lokalen oder des Speichers beim EMSP bzw. Backend-System mit allen Datenpaketen des Abrechnungszeitraumes zur Verfügung gestellt werden.

B. Auflagen für den Verwender der Messwerte aus der Ladeeinrichtung (EMSP)

Der Verwender der Messwerte hat den § 33 des MessEG zu beachten:

§ 33 MessEG (Zitat)

§ 33 Anforderungen an das Verwenden von Messwerten

(1) Werte für Messgrößen dürfen im geschäftlichen oder amtlichen Verkehr oder bei Messungen im öffentlichen Interesse nur dann angegeben oder verwendet werden, wenn zu ihrer Bestimmung ein Messgerät bestimmungsgemäß verwendet wurde und die Werte auf das jeweilige Messergebnis zurückzuführen sind, soweit in der Rechtsverordnung nach § 41 Nummer 2 nichts anderes bestimmt ist. Andere bundesrechtliche Regelungen, die vergleichbaren Schutzzwecken dienen, sind weiterhin anzuwenden.

(2) Wer Messwerte verwendet, hat sich im Rahmen seiner Möglichkeiten zu vergewissern, dass das Messgerät die gesetzlichen Anforderungen erfüllt und hat sich von der Person, die das Messgerät verwendet, bestätigen zu lassen, dass sie ihre Verpflichtungen erfüllt.

(3) Wer Messwerte verwendet, hat

1. *dafür zu sorgen, dass Rechnungen, soweit sie auf Messwerten beruhen, von demjenigen, für den die*

   Rechnungen bestimmt sind, in einfacher Weise zur Überprüfung angegebener Messwerte nachvollzogen

   werden können und
2. *für die in Nummer 1 genannten Zwecke erforderlichenfalls geeignete Hilfsmittel bereitzustellen*

Für den Verwender der Messwerte entstehen aus dieser Regelung konkret folgende Pflichten einer eichrechtkonformen Messwertverwendung:

1. Der Vertrag zwischen EMSP und Kunden muss unmissverständlich regeln, dass ausschließlich die Lieferung elektrischer Energie und nicht die Ladeservice-Dauer Gegenstand des Vertrages ist.
2. Die Zeitstempel an den Messwerten stammen von einer Uhr in der Ladeeinrichtung, die nicht nach dem Mess- und Eichrecht zertifiziert ist. Sie dürfen deshalb nicht für eine Tarifierung der Messwerte verwendet werden.
3. Der EMSP muss sicherstellen, dass dem Kunden automatisch nach Abschluss der Messung und spätestens zum Zeitpunkt der Rechnungslegung ein Beleg der Messung und darin die Angaben zur Bestimmung des Geschäftsvorgangs zugestellt werden, solange dieser hierauf nicht ausdrücklich verzichtet. Die Angaben zur Bestimmung des Geschäftsvorgangs können folgende sein:
   a. Name des EMSP
   b. Start- und Endzeitpunkt des Ladevorgangs
   c. Geladene Energie in kWh
   d. Kreditkartennummer

4. Fordert der Kunde einen Beweis der richtigen Übernahme der Messergebnisse aus der Ladeeinrichtung in die Rechnung, ist der Messwertverwender entsprechend MessEG, § 33, Abs. (3) verpflichtet, diesen zu erbringen. Fordert der Kunde einen vertrauenswürdigen dauerhaften Nachweis gem. Anlage 2 10.2 MessEV, ist der Messwertverwender verpflichtet ihm diesen zu liefern. Der EMSP hat seine Kunden über diese Pflichten in angemessener Form zu informieren.

   Dies kann z.B. auf folgende Arten und je nach Authentifizierungsmethode erfolgen:

   a. Beim Laden mit Dauerschuldverhältnis über den textlichen Vertrag
   b. Beim punktuellen Laden (ad-hoc-Laden) über APP oder Mobile Webseite zusammen mit dem Beleg über eine E-Mail oder SMS
   c. Beim punktuellen Laden (ad-hoc-Laden) mittels (kontaktloser) Geldkarte zusammen mit dem Beleg über den Kontoauszug

5. Der EMSP muss dem Kunden die abrechnungsrelevanten Datenpakte automatisch nach Abschluss der Messung und spätestens zum Zeitpunkt der Rechnungslegung einschließlich Signatur als Datenfile in einer Weise zur Verfügung stellen, dass sie mittels der Transparenz- und Displaysoftware auf Unverfälschtheit geprüft werden können. Die Zurverfügungstellung der Datenpakete kann über eichrechtlich nicht geprüfte Kanäle auf folgende Arten und je nach Authentifizierungsmethode erfolgen:

   a. Beim Laden mit Dauerschuldverhältnis über eine E-Mail oder Zugang zu einem Backend-System
   b. Beim punktuellen Laden über APP oder Mobile Webseite über eine E-Mail oder SMS
   c. Beim punktuellen Laden mittels (kontaktloser) Geldkarte über den Kontoauszug und einem damit verbundenen Zugang zu einem Backend-System

      Zusätzlich muss der EMSP dem Kunden die zur Ladeeinrichtung gehörige Transparenz- und Displaysoftware zur Prüfung der Datenpakete auf Unverfälschtheit verfügbar machen. Dies kann durch einen Verweis auf die Bezugsquelle in der Bedienungsanleitung für den Kunden oder durch die oben genannten Kanäle erfolgen.

6. Der EMSP muss beweissicher prüfbar zeigen können, welches Identifizierungsmittel genutzt wurde, um den zu einem bestimmten Messwert gehörenden Ladevorgang zu initiieren. Das heißt, er muss für jeden Geschäftsvorgang und in Rechnung gestellten Messwert beweisen können, dass er diesen die Personenidentifizierungsdaten zutreffend zugeordnet hat. Der EMSP hat seine Kunden über diese Pflicht in angemessener Form zu informieren.
7. Der EMSP darf nur Werte für Abrechnungszwecke verwenden, für die Datenpakete in einem ggf. vorhandenen dedizierten Speicher in der Ladeeinrichtung und oder dem Speicher beim EMSP bzw. Backend-System vorhanden sind. Ersatzwerte dürfen für Abrechnungszwecke nicht gebildet werden.
8. Der EMSP muss durch entsprechende Vereinbarungen mit dem Betreiber der Ladeeinrichtung sicherstellen, dass bei diesem die für Abrechnungszwecke genutzten Datenpakete ausreichend lange gespeichert werden, um die zugehörigen Geschäftsvorgänge vollständig abschließen zu können.

9. Der EMSP hat bei begründeter Bedarfsmeldung zum Zwecke der Durchführung von Eichungen, Befundprüfungen und Verwendungsüberwachungsmaßnahmen durch Bereitstellung geeigneter Identifizierungsmittel die Authentifizierung an den von ihm genutzten Exemplaren des zu dieser Betriebsanleitung gehörenden Produktes zu ermöglichen.
10. Alle vorgenannten Pflichten gelten für den EMSP als Messwerteverwender im Sinne von

§ 33 MessEG auch dann, wenn er die Messwerte aus den Ladeeinrichtungen über einen Roaming-Dienstleister bezieht.

Limited Warranty Information and Disclaimer

The Limited Warranty you received with your charging station is subject to certain exceptions and exclusions. For example, your use of, installation of, or modification to, the ChargePoint® charging station in a manner in which the ChargePoint® charging station is not intended to be used or modified will void the limited warranty. You should review your limited warranty and become familiar with the terms thereof. Other than any such limited warranty, the ChargePoint products are provided "AS IS," and ChargePoint, Inc. and its distributors expressly disclaim all implied warranties, including any warranty of design, merchantability, fitness for a particular purposes and non-infringement, to the maximum extent permitted by law.

Limitation of Liability

CHARGEPOINT IS NOT LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS, LOST BUSINESS, LOST DATA, LOSS OF USE, OR COST OF COVER INCURRED BY YOU ARISING OUT OF OR RELATED TO YOUR PURCHASE OR USE OF, OR INABILITY TO USE, THE CHARGING STATION, UNDER ANY THEORY OF LIABILITY, WHETHER IN AN ACTION IN CONTRACT, STRICT LIABILITY, TORT (INCLUDING NEGLIGENCE) OR OTHER LEGAL OR EQUITABLE THEORY, EVEN IF CHARGEPOINT KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY EVENT, THE CUMULATIVE LIABILITY OF CHARGEPOINT FOR ALL CLAIMS WHATSOEVER RELATED TO THE CHARGING STATION WILL NOT EXCEED THE PRICE YOU PAID FOR THE CHARGING STATION. THE LIMITATIONS SET FORTH HEREIN ARE INTENDED TO LIMIT THE LIABILITY OF CHARGEPOINT AND SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Important: Changes or modifications to this product not authorized by ChargePoint, inc., could affect the EMC compliance and revoke your authority to operate this product.

Exposure to Radio Frequency Energy: The radiated power output of the 802.11 b/g/n radio and cellular modem (optional) in this device is below the FCC radio frequency exposure limits for uncontrolled equipment. The antenna of this product, used under normal conditions, is at least 20 cm away from the body of the user. This device must not be co-located or operated with any other antenna or transmitter by the manufacturer, subject to the conditions of the FCC Grant.

ISED (formerly Industry Canada)

This device complies with the licence-exempt RSS standard(s) of Innovation, Science and Economic Development Canada (ISED). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux flux RSS exemptés de licence d'Innovation, Sciences et Développement économique Canada (ISDE). L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter.

Radiation Exposure Statement: This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un Distance minimale de 20 cm entre le radiateur et votre corps.

FCC/IC Compliance Labels

Visit chargepoint.com/labels.

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