
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 disabled 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 reenale.

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 reenale.

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 TEMPO 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 (TBD), 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

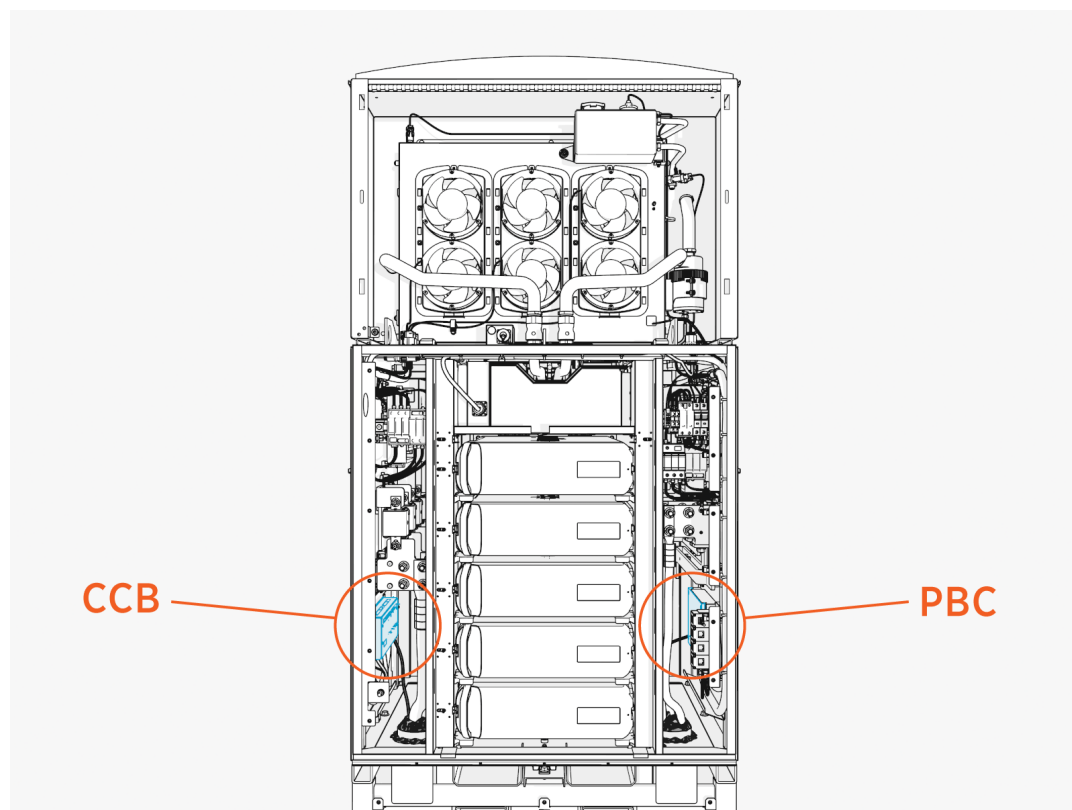
- Internal AUX PS circuitry
- Actual high humidity event

Troubleshooting

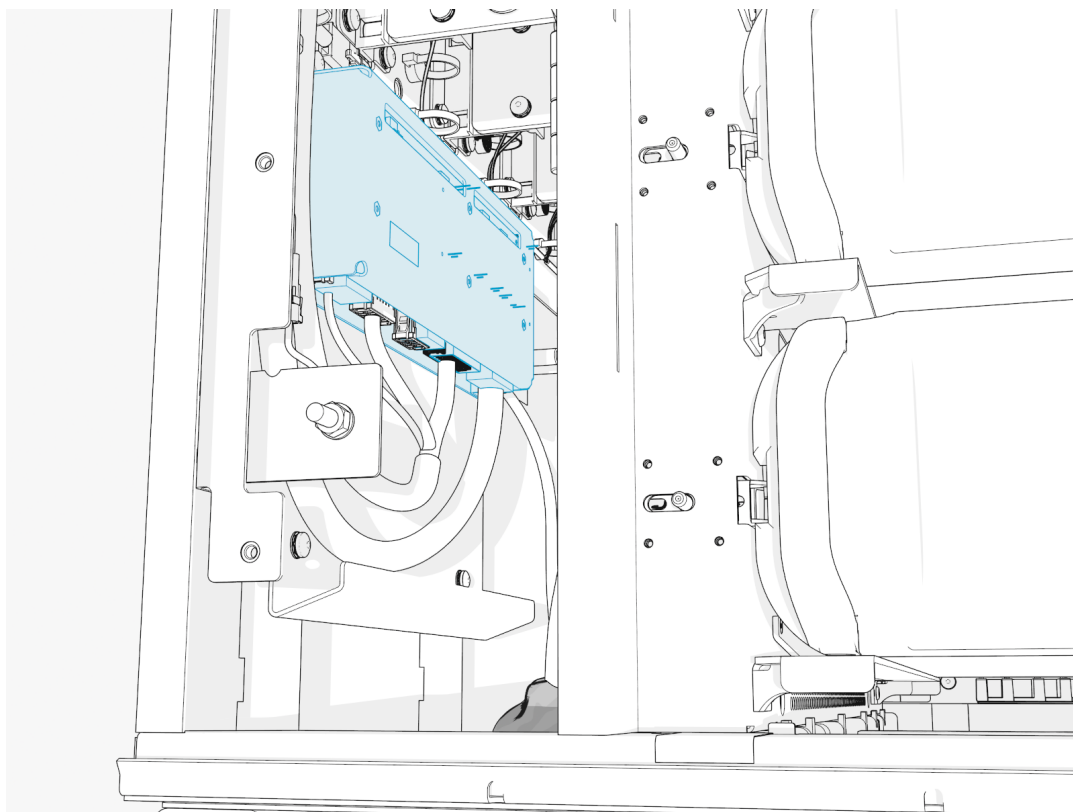
1. Replace AUX PS

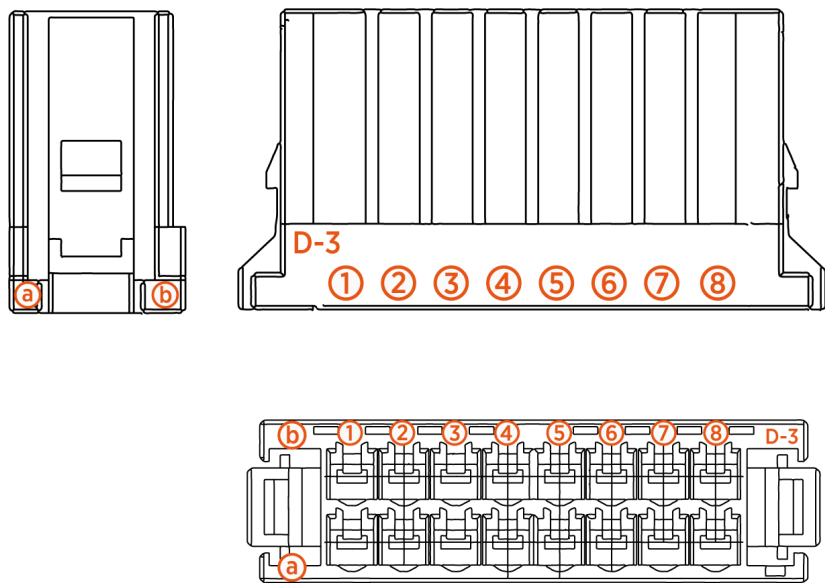
CCB Faults Board Location

Front View for Locating the Boards for the CCB Faults



CCB Faults Board Location





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 reenale 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 is 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 as is 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.

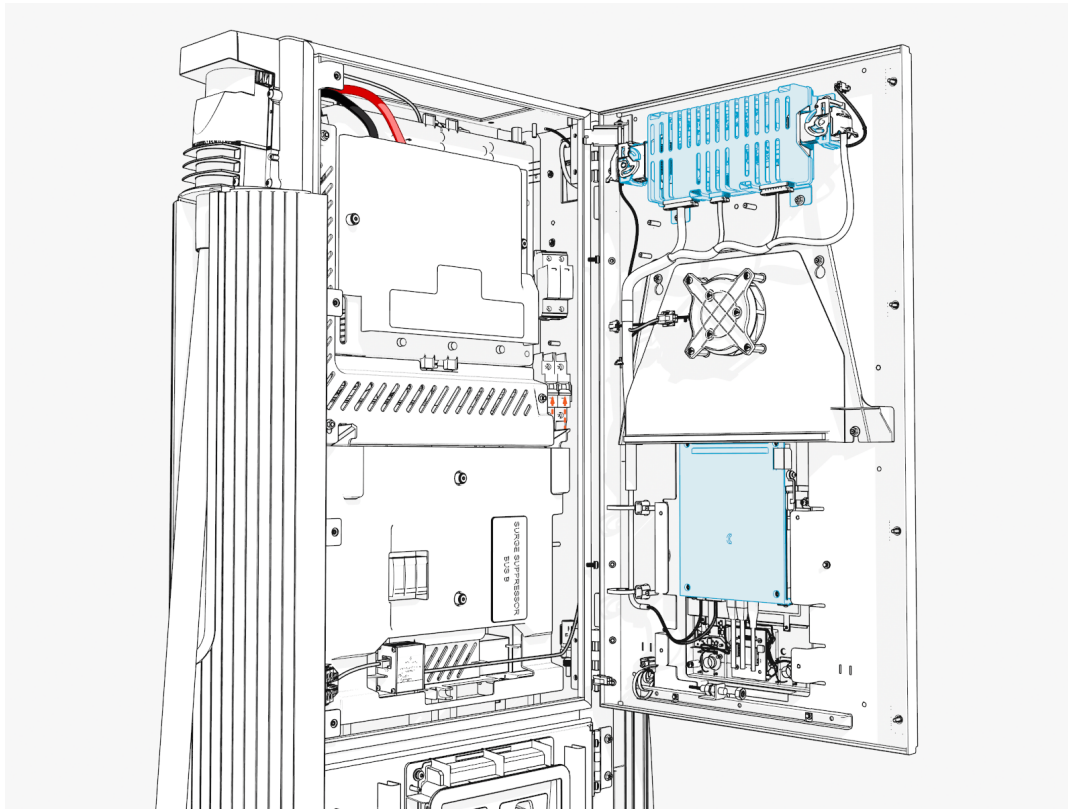
Power Link Troubleshooting 5

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.

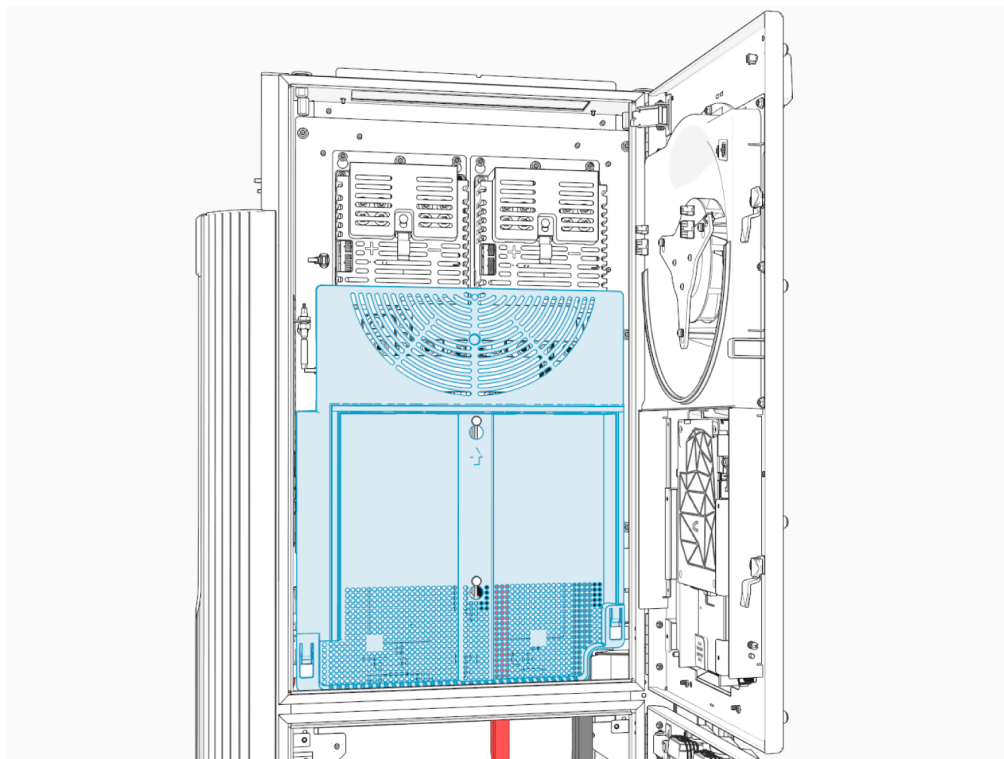
The troubleshooting steps for the following components' faults are included in this section:

- 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

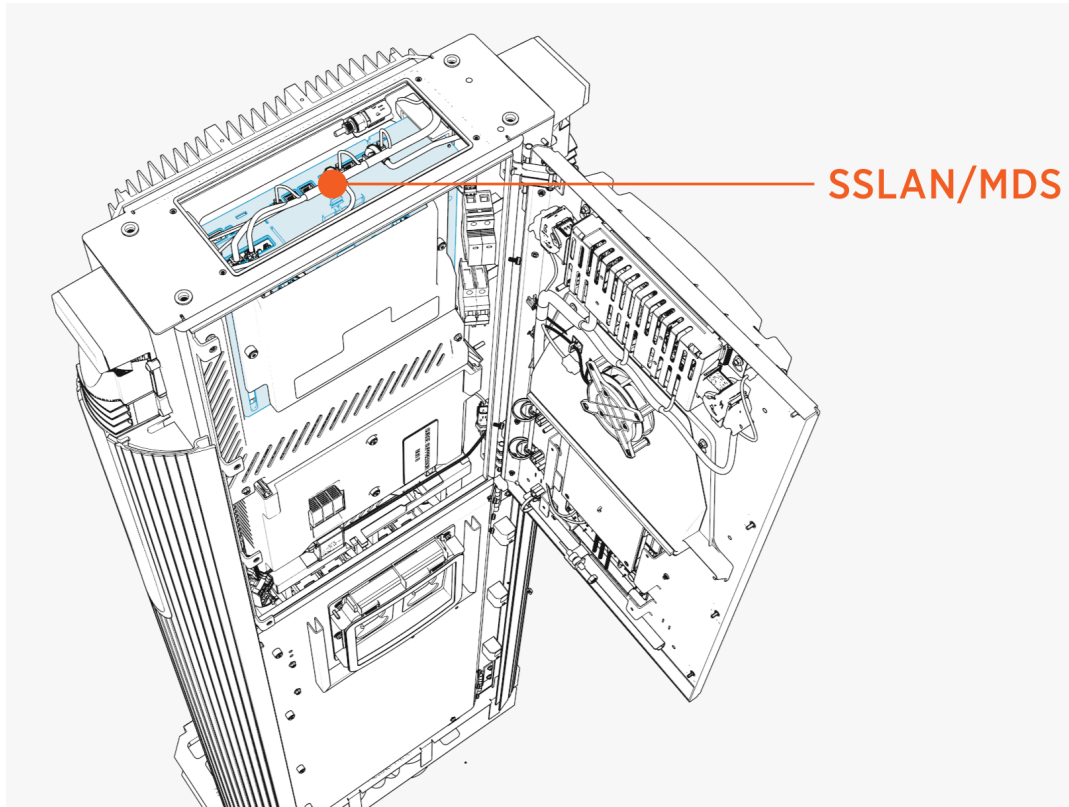


Inside View of Power Link 2000

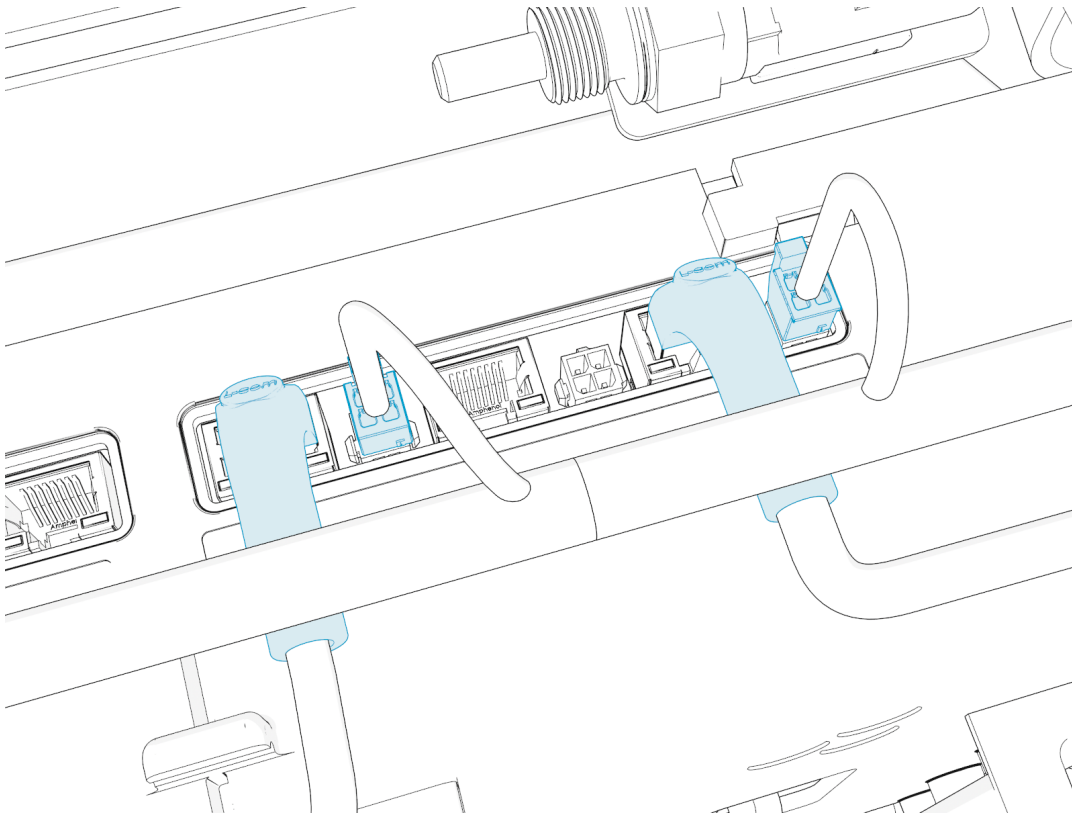


SSLAN Faults Board Location

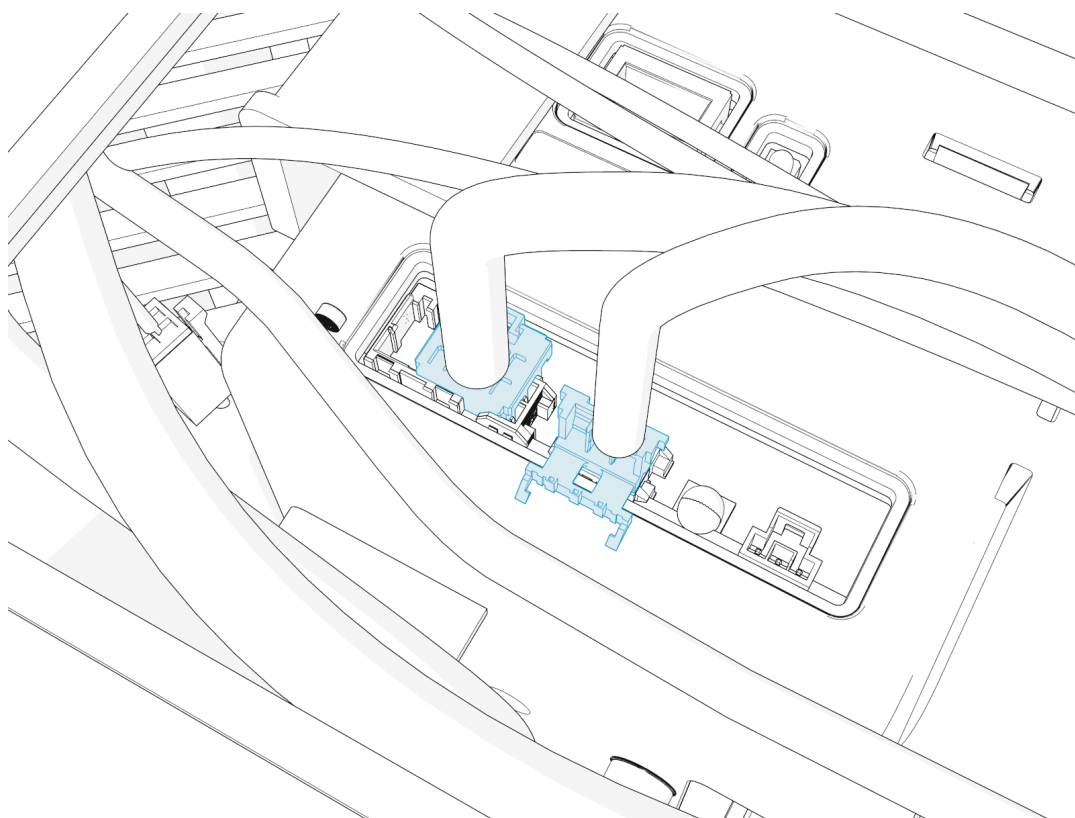
Top View

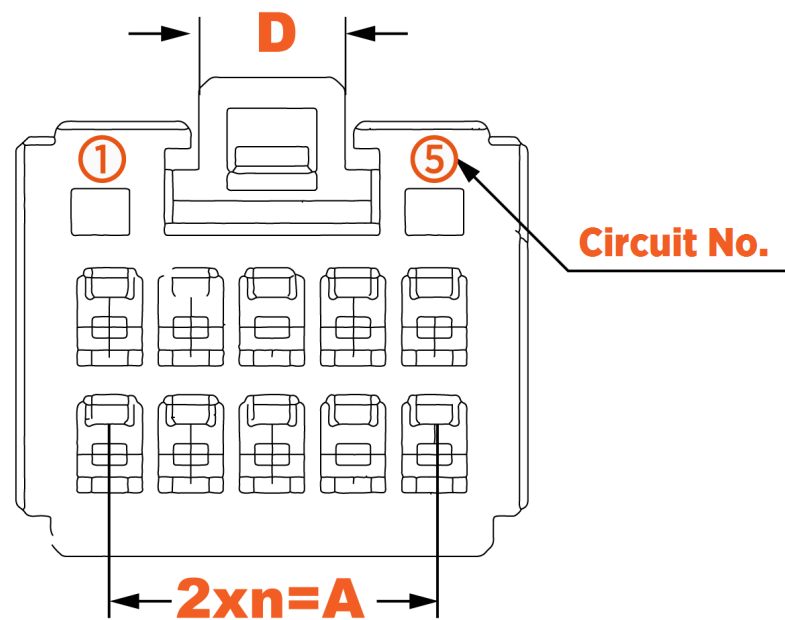


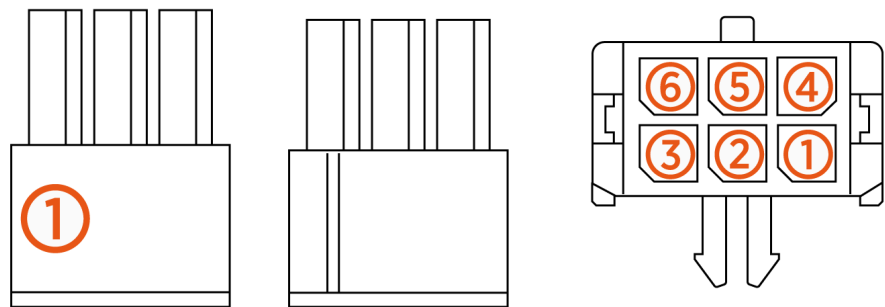
Side View



Other Side View







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

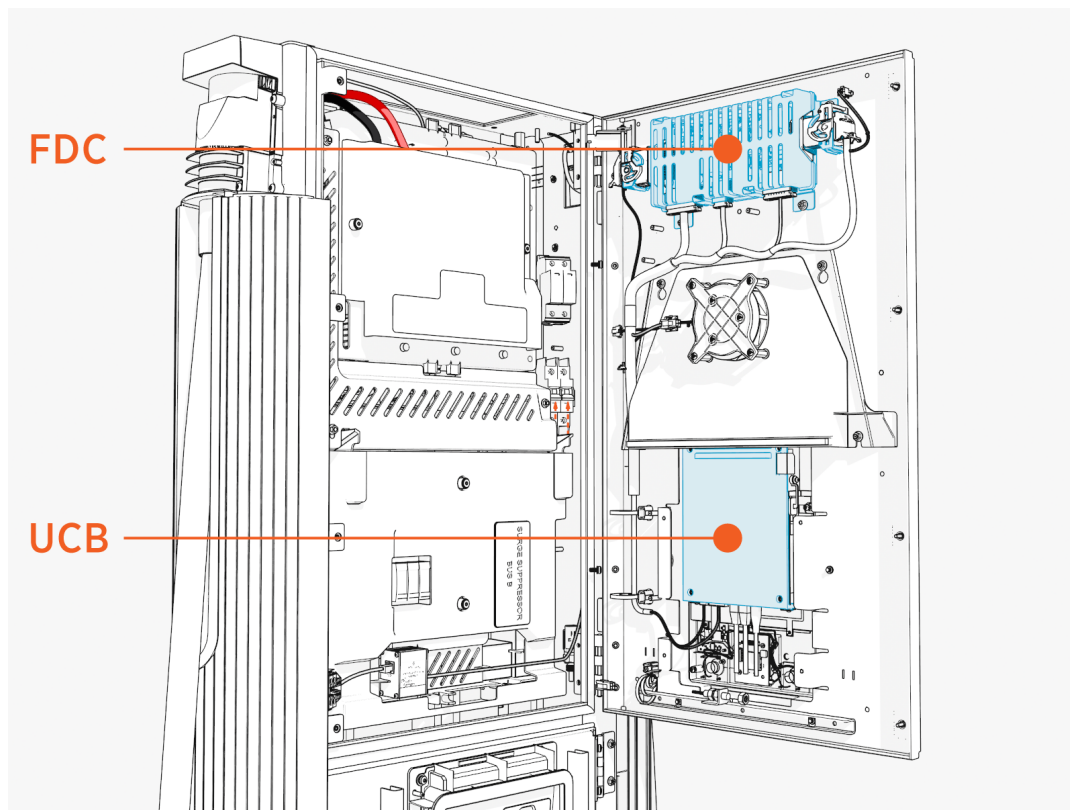
- Software not updated on system
- Bad FRU if seen on replacement
- Board failure

Troubleshooting

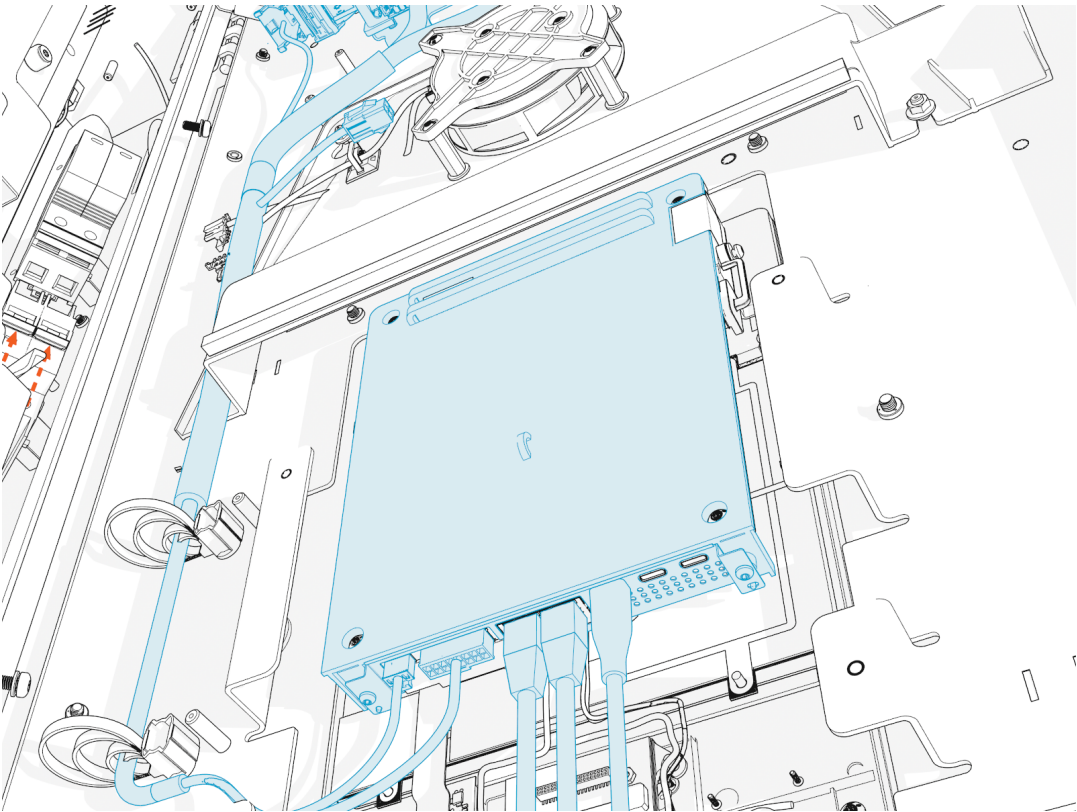
1. Check the software on the system and confirm if it is the latest released version.
2. If software is correct, check if the fault is seen after a recent FRU replacement (MDS). It is possible the SSLAN/MDS FRU did not pass the factory test and somehow got released to the field. Reach out to ChargePoint/Factory 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.

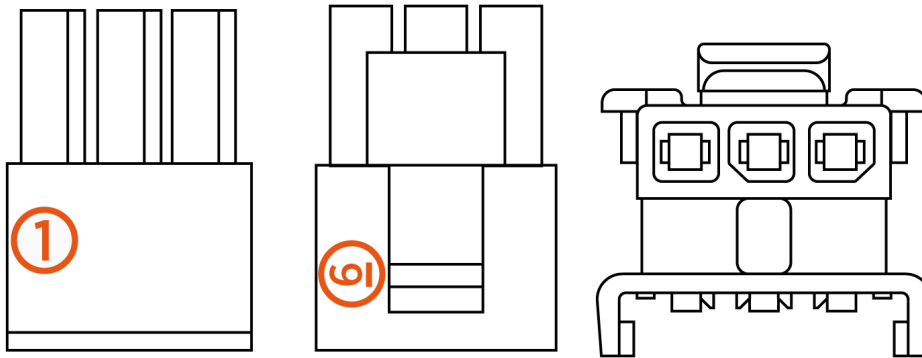
UCB Faults Board Location

Front View



Inside View





UCB 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

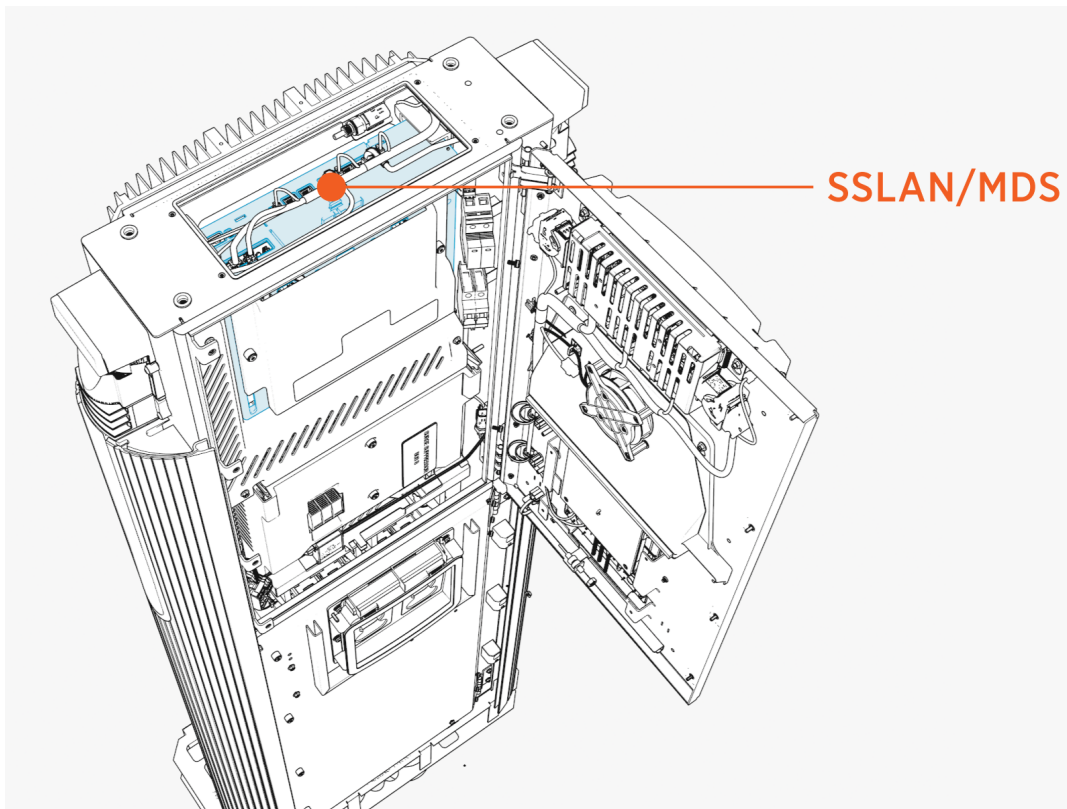
- Temperature sensor failure on the board

Troubleshooting

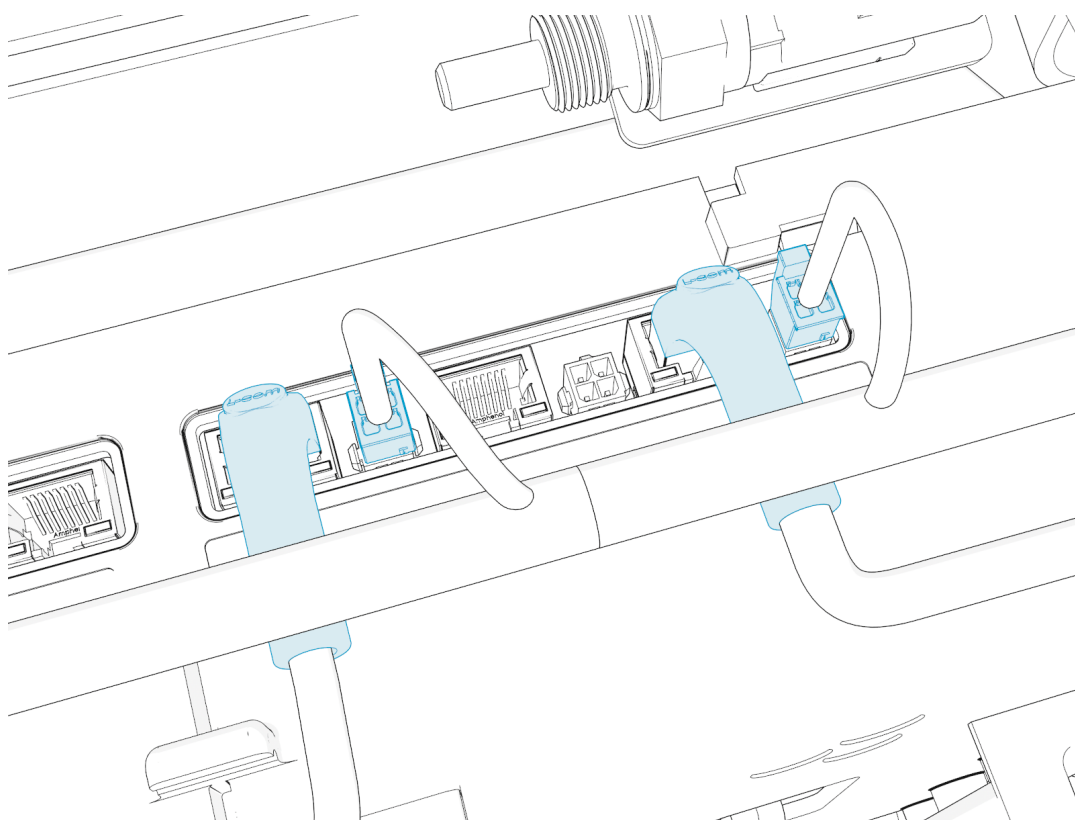
1. Possible failure on the board. Replace the UCB and resolve the issue.
2. Contact ChargePoint if the issue persists after UCB swap.

MDS Faults Board Location

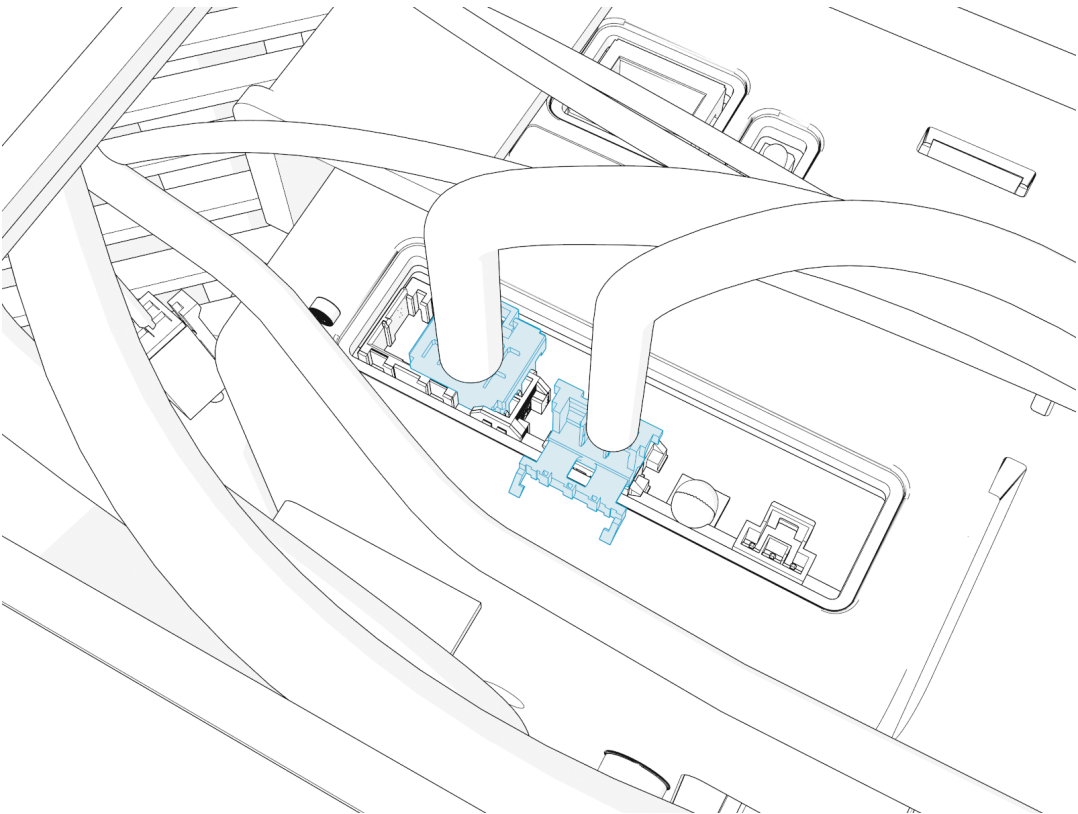
Top View

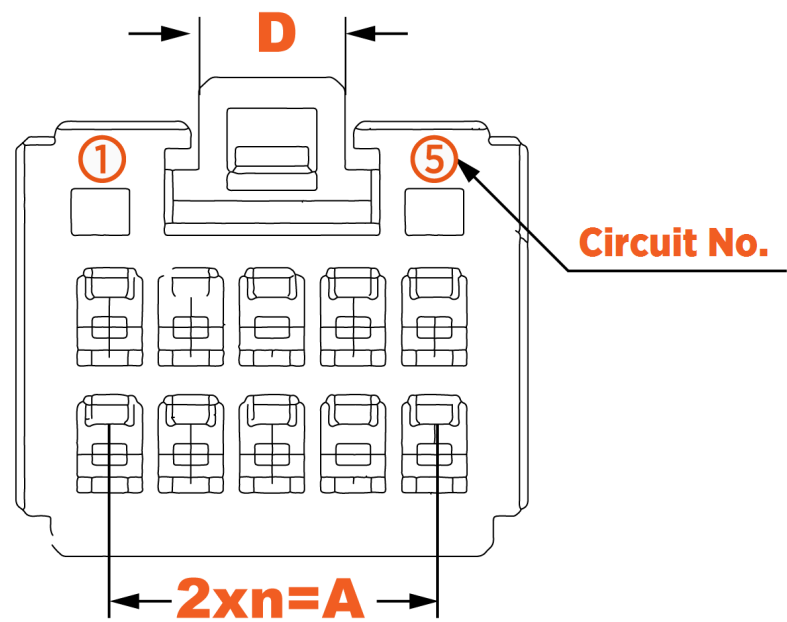


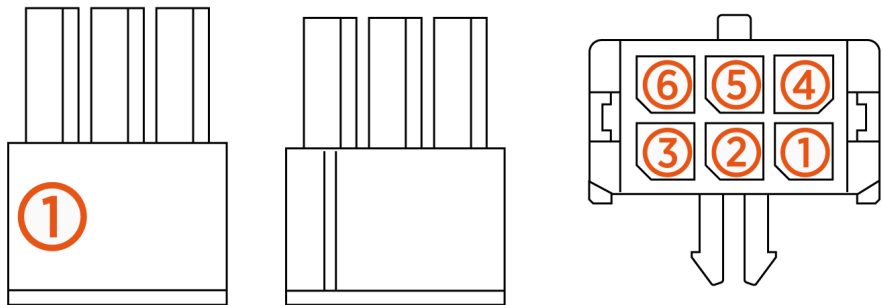
Side View



Other Side View







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 k Ω 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 further 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.