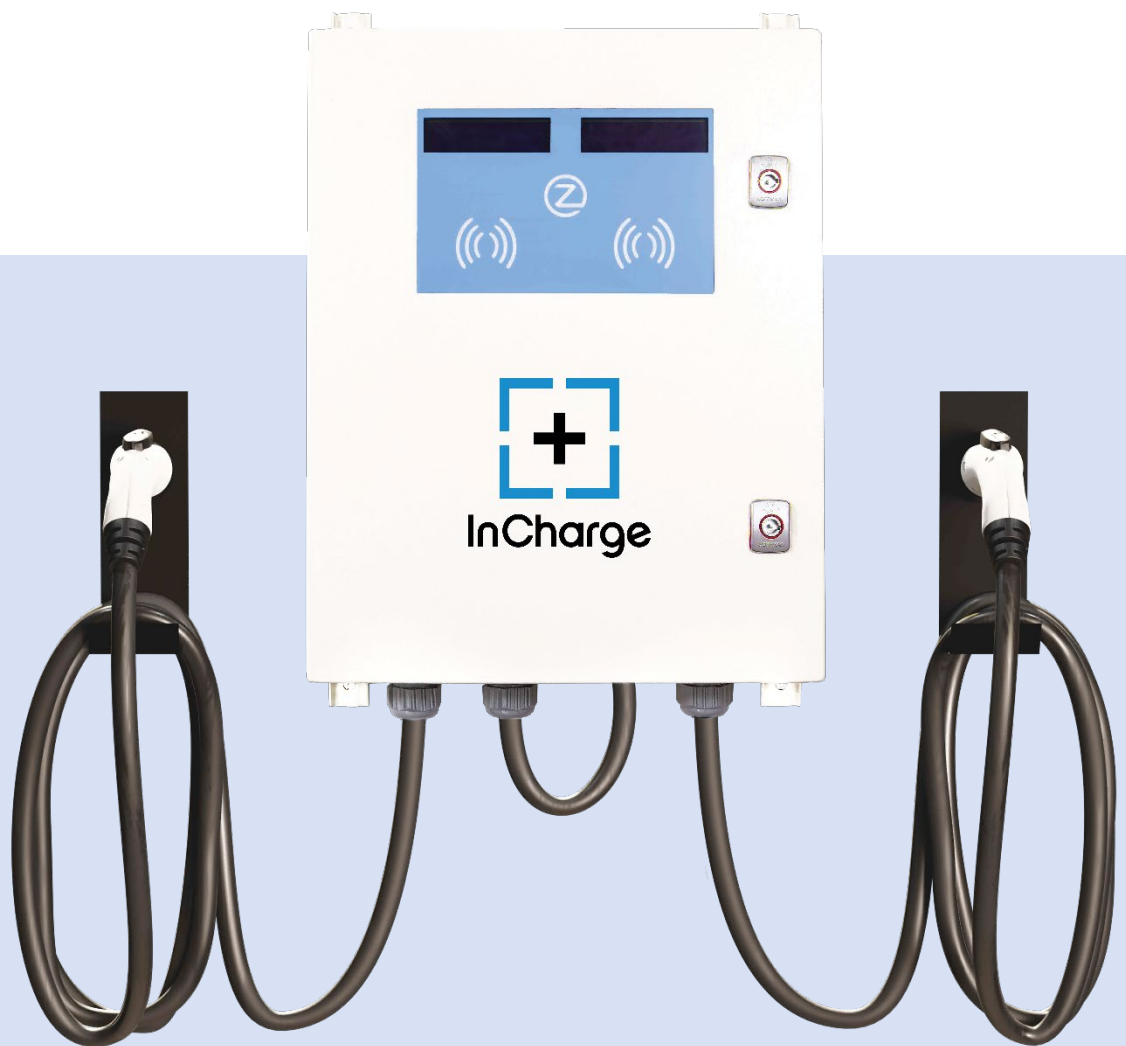


# ICE-80A Dual

## INSTALLATION MANUAL

V1.4



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# About this document

## Introduction

InCharge Energy ICE-80A Dual is a powerful AC EV charger that is capable of charging two electric vehicles concurrently at up to 19.2kW each. The unit comes with dual 25 feet charging cables attached with SAE J1772 standard charging plug (also called connector)

## Copyrights and Trademarks

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## About this manual

This manual provides the following information for InCharge Energy's ICE-80A Dual

- Safety Guidelines
- Technical specifications
- Dimensions
- Features
- Installation instructions
- Operating instructions

The contents of this manual are subject to change, therefore always refer to the latest version of the document.

This manual is intended for qualified installation persons who:

- Fully understand the specifications of the unit and process to safely install the unit
- Are qualified to do installation per applicable local rules

It is the responsibility of customer to make sure that installation persons obey local and state regulations, installation instructions and safety guidelines.

The symbols used in this manual have the following meaning:



**Warning:**  
**Risk of electric shock**



**Warning:**  
**Risk of personal injury**



**Warning:**  
**Risk of fire**



**Warning:**  
**Risk of damage to equipment**

# Safety Guidelines

This manual contains important instructions and warnings that must be followed when installing and maintaining the unit.

## Instructions pertaining to risk of fire or electric shock



### **Caution:** **To reduce risk of fire**

- Connect only to a circuit provided with the minimum branch circuit overcurrent protection requirements in accordance with the National Electrical Code, ANSI/NFPA 70, and the Canadian Electrical Code, Part I, C22.1.



### **Warnings:** **Risk of electric shock**

- The unit must be installed and serviced by only trained, skilled and qualified electricians who are familiar with the assembly and operation of the unit. These personnel should have proper personal protective and safety equipment.
- All installations must be done in accordance with the regional electric code safety standards. All installations must conform to the laws, regulations, codes, and standards applicable by local authorities having jurisdiction.
- Turn off power at the mains and secure against restart before installing or performing any maintenance operation on the unit.
- The working area must be secured in accordance with regional regulations.

- Appropriate cordoning off equipment must be used where necessary.
- The unit must be grounded through a permanent wiring system.
- Never spray water or any liquid on the unit or any parts of its assembly, including cables and plugs. Never submerge the unit or any parts of its assembly in water or any liquid.
- Do not touch unit's end terminals with fingers or any metallic object.
- The unit cabinet door must be kept closed and latched.
- The unit must not be operated outside its listed temperature range.
- Do not use this product if the flexible power cord or EV cable is frayed, has broken insulation, or any other signs of damage.
- Do not use this product if the enclosure or the EV connector is broken, cracked, open, or shows any other indication of damage.



### **Warning:** **To reduce the risk of personal injury**

- The charging plugs must be docked in the holder. Charging cables must not be left in a way that it creates tripping hazard or any other danger.

# Specifications

## Features

<b>Charging Mode</b>	Level 2 AC
<b>Charging Plug Type and cable</b>	Dual connectors & cables, SAE J1772 connectors, 208-240V 80A charging cable, 25 feet
<b>Max Output</b>	19.2 kW AC on each SAE J1772 connector simultaneously
<b>Mounting</b>	Wall mount
<b>HMI</b>	LCD display
<b>Advanced load management</b>	Load sharing across connectors from the same input source with total charging load managed within control limits sent to the charger
<b>Edge intelligence</b>	Charging functions available during communications outages

## Electrical specifications

<b>Input supply</b>	208-240VAC 100A or 208-240VAC Dual 100A 60Hz
<b>Network</b>	Single phase
<b>Energy metering</b>	NIST HB 44 compliant accuracy of +/- 1.0%
<b>Ground Fault Protection</b>	20 mA
<b>Over Current Protection</b>	80A per J1772 connector, Over Voltage, Under Voltage, Over Current & Over Temperature protection
<b>Open Ground Monitoring</b>	Yes

## Design

<b>Environmental rating</b>	Indoor and Outdoor, NEMA 3R
<b>Dimensions</b>	22.5 x 15.625 x 5.233 inches
<b>Weight</b>	Approx. 65 lbs (charging cables weight included)
<b>Ambient conditions</b>	Operating temperature: -30°C to 50°C, Storage Temp.: -40°C to 60°C, 98% non-condensing, Max. Operating Altitude: 9,840 feet

# Specifications

## Compliance and Protocols

<b>UL listed</b>	UL2594, UL223-1, UL2231-2, UL1998
<b>Energy Star</b>	Version 1.2
<b>CTEP/NTEP</b>	Q1 2024

## Communication

<b>Interfaces</b>	Wi-Fi, Cellular LTE, WCDMA, Modbus RS-485, Modbus TCP-IP
<b>Communication protocol with backend</b>	OCPP 1.6J, OCPP 2.0 upgradable
<b>Software upgrade</b>	Over the Air (OTA)
<b>User authentication</b>	RFID

# Dimensions

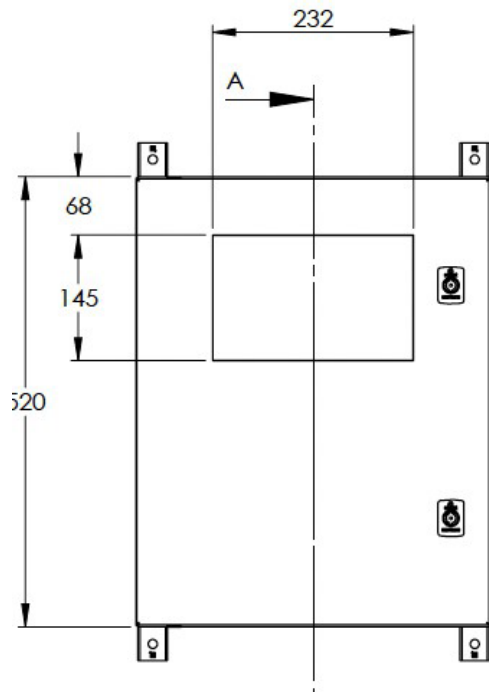


Figure 1

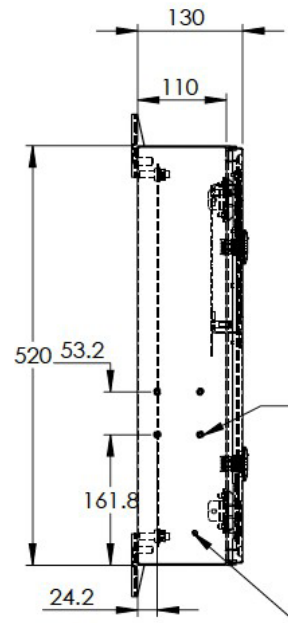


Figure 3

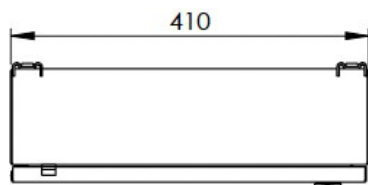


Figure 2

# Max combined concurrent output on each charging plug

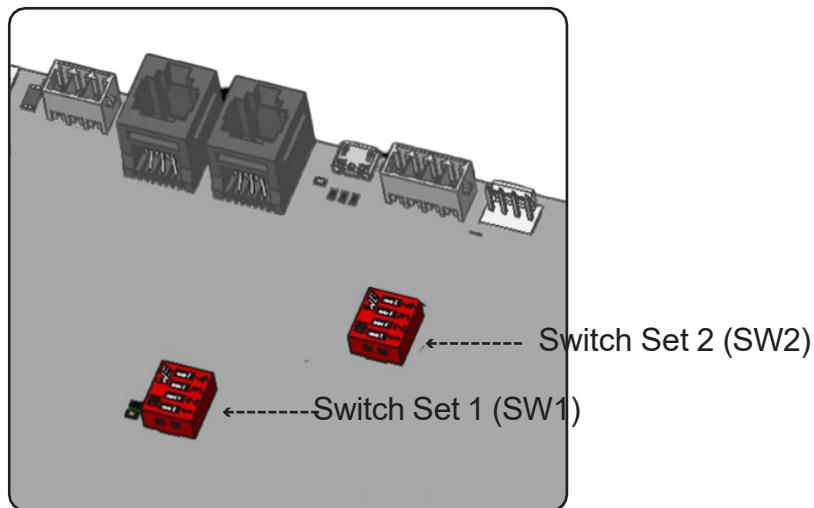


Figure 4: Location of dip switch sets on agent board

Dip Switch Set 1 combination	Max current at each output	Max combined current for both output
Switch 1 Position Down	80A	80A
Switch 1 Position Up	80A	160A

\* Dip Switch Set 2 is for future use.



# Installation instructions



## **WARNING:**

Installation must be performed by authorized trained and certified personnel. Must read and comply with Safety Guidelines. Disconnect power supply from the breaker before installing, repair or adjusting the unit.



## **CAUTION:**

Ensure that there is sufficient free space to install the unit.



## **WARNING:**

To reduce the risk of personal injury, make sure that at-least two qualified persons are available for installation.



## **WARNING:**

Read all instructions before installing and operating this unit.



## **WARNING:**

Do not use the unit if there is any damage on the power cable, charging cables or plugs.

# Installation instructions

## A – Unpacking

- Open the box
- Remove packaging material
- Remove the surrounding cardboard
- Take out the unit along with the attached cables and plugs from the box

## B – Wall Mounting Instructions

- The unit must be mounted at a height from ground such of not less than 450 mm (18 in.) and not more than 1.2 m (4 ft) above the floor level for indoor and outdoor locations above the grade level, per NEC Article 625.
- Mark the locations of all mounting holes
- Drill the mounting holes on the wall at marked locations
- Insert the anchors into all mounting holes
- Hold the unit against the wall and line up the holes on the top and bottom mounting plates of the unit with the mounting holes on the wall
- Secure the unit to the wall with appropriate mounting screws

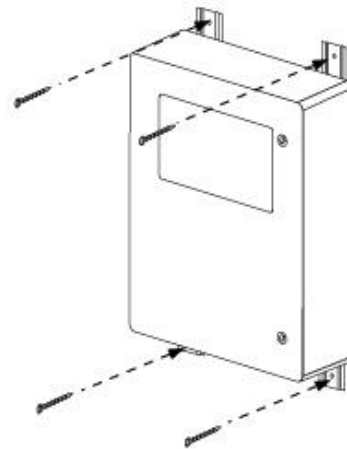


Figure 5

# Installation instructions

## C – Electrical Wiring Instructions

### Recommended Tools

- Ring Wire Terminals – 1AWG-4AWG (L1, L2, G), Stud size 1/4 “, Copper construction or Copper construction with tin plated
- Crimping tool for Ring Wire Terminals
- Socket Screwdriver - # 10
- Heat shrink tubes

### Instructions:

- **The unit can operate at two input supply current settings: 80A and 160A (80Ax2)**
- **If the maximum total input current supply to the unit is 80A then make sure that dip switch 1 is down.** In this configuration, the maximum combined output on both charging plugs will not exceed 80A. See Figure 4 above.
- **If the maximum input current supply to the unit is 160A, then set the dip switch 1 to up.** In this configuration, the unit will be able to charge two vehicles at 80A concurrently. See Figure 4 above.

### Please note:

- **Each input branch circuit for the unit has to be connected to a 100A circuit breaker. Up to two input branch circuits can be used to simultaneously operate each output at 80A.**



### CAUTION:

InCharge Energy ICE-80A Dual is a single- phase device. Do not connect three phases from a three-phase feed.

# Installation instructions

## C – Electrical Wiring Instructions cont.

### Instructions to wire the unit with a single branch circuit of 80A (refer Figure 6)

- For wiring with single 80A branch circuit:
  - Ensure that the amperage of input wires to the unit is rated at at-least 100A (at least 3AWG per current carrying conductor, at-least 6AWG grounding conductor).
- Using an appropriate tool, clamp a ring wire terminal to the copper wire. Use heat shrink tube to cover the non-insulated portion of terminal.
- Unlock the unit door using a Hex key or a screwdriver depending on the type of lock on the door.
- Unscrew the cable gland 1 at the bottom of the unit (see Figure 6) and pass the input wire through the cap of the gland into the unit box.
- Remove bus bars 1 and 2 (see Figure 6).
- Connect the input wires to the lugs on the

unit board as marked in the Figure 6.

- Tighten the gland and lock it in place. For required torque, refer to ‘Torque settings’ in page 12.
- Close the unit door and lock it using a Hex key or a screwdriver depending on the type of lock on the door
- Turn on the power at the main breaker
- LCDs on the front of the unit should turn on and display message “InCharge Energy” accompanied with the software version on the display.

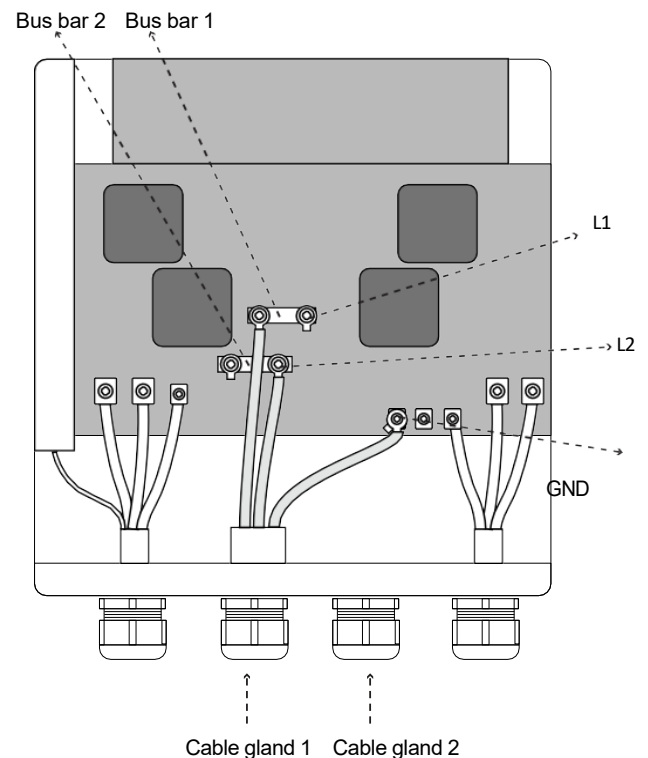


Figure 6

# Installation instructions

## C – Electrical Wiring Instructions cont.

### Instructions to wire the unit with two branch circuits of 80A each (refer Figure 7)

- Ensure that the amperage of input wires to the unit are rated at 100A (at least 3AWG per current carrying conductor, at least 6AWG grounding conductor).
- Using an appropriate tool, clamp a ring wire terminal to the copper wire. Use heat shrink tube to cover the non-insulated portion of terminal.
- Unlock the unit door using a Hex key or a screwdriver depending on the type of lock on the door.
- Unscrew the cable gland 1 at the bottom of the unit and pass the input wire of the first branch circuit through the cap of the gland into the unit box.
- Remove the cable gland sealer and screw in the cable gland (included) in the opening marked cable gland 2 in Figure 7. Pass the input wire of the second branch circuit through the cap of the gland into the unit box.
- Remove bus bars 1 and 2 (see Figure 7).
- Connect the input wires to the lugs for each channel on the unit board as marked in Figure 7
- Tighten both cable glands and lock in place. For required torque, refer to ‘Torque settings’ in page 12
- Close the unit door and lock it using a Hex key or a screwdriver depending on the type of lock on the door.
- Turn on the power at the main breaker.
- LCDs on the front of the unit should turn on and display message “InCharge Energy” accompanied with the software version on the display.

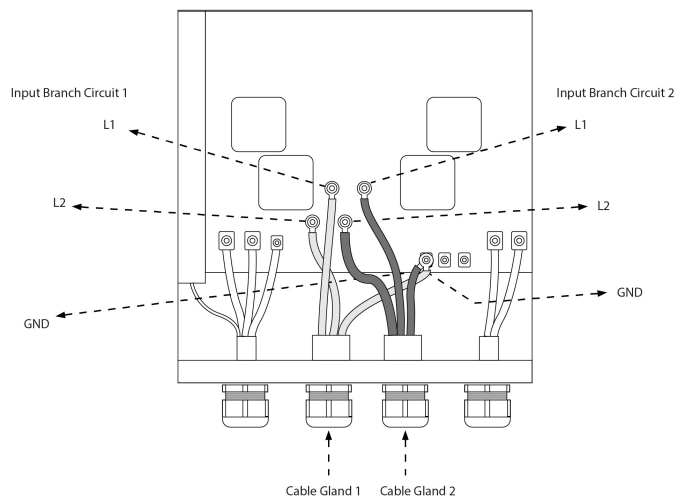


Figure 7

# Installation instructions

## C – Electrical Wiring Instructions cont.

### Torque settings

Sr No.	Process	Torque
1	Wall mount brackets installation	9 N-m
2	Door to enclosure ground harness installation	6.6±0.2 N-m
3	Master board module installation	1.7±0.2 N-m
4	Yellow beet PCB installation	5.5±0.5 kgf-cm
5	Agent board installation	5.5±0.5 kgf-cm
6	Yellow beet Pilot 1 & 2 installation	5.5±0.5 kgf-cm
7	Assy, Charging cable installation (locking nut for PG29 cable gland)	8.5 to 9 N-m
8	Assy, Charging cable installation Red & Black to pressure lug	60±2 in-lbs
9	Assy, Charging cable installation Green to pressure lug	40± in-lbs
10	Cable gland - PG29 installation on cable (sealing nu tightening)	11.3 to 12.4 N-m

# Operating instructions

The ICE-80A Dual unit can be configured to operate in the following modes:

- Non-Networked Mode – Switch 2 of Dip Switch Set 1 – UP
- Networked Mode – Switch 2 of Dip Switch Set 1 – DOWN

## D – Non-Networked Mode Operating Instructions

1. Insert the SIM in the SIM card holder (see 2 in the 'Master board' section, Page 18).
2. Confirm that LCD display of one or both displays shows "Available."
3. Plug the cable into the charging port of the Electric Vehicle (EV).
4. LCD should show the messages in the following sequence:
  - a. Plugged In
  - b. Charging (when charging begins)
5. If the display continues to show Plugged In, ensure that the EV is not set to scheduled or delayed charging.
6. Once the EV starts charging, the LCD display on the unit will show the power (kW) and energy dispensed (kWh) values.
7. Charging will be terminated when one of the following occurs:
  - a. The EV reaches its battery target state of charge.
  - b. SAEJ1772 plug is disengaged or removed.
  - c. Input power to the unit is turned off.

## E – Networked Mode Operating Instructions

1. Insert the SIM in the SIM card holder (see 2 in the 'Master board' section, Page 18).
2. Update charging configuration locally. For instructions refer to section 'L – Instructions for updating charging configuration locally', Page 21. Contact InCharge Energy support for further assistance.

# Error Monitoring and Recovery

- The unit monitors over current, over voltage, under voltage and over temperature conditions. In case of over current, the unit will stop the charging session for 30 seconds before resuming charging, for no more than 3 times
- In case of CCID trip, the unit will stop the charging session for 15 minutes before resuming charging, for no more than 3 times.



# Maintenance and configuration

## F – Product external view

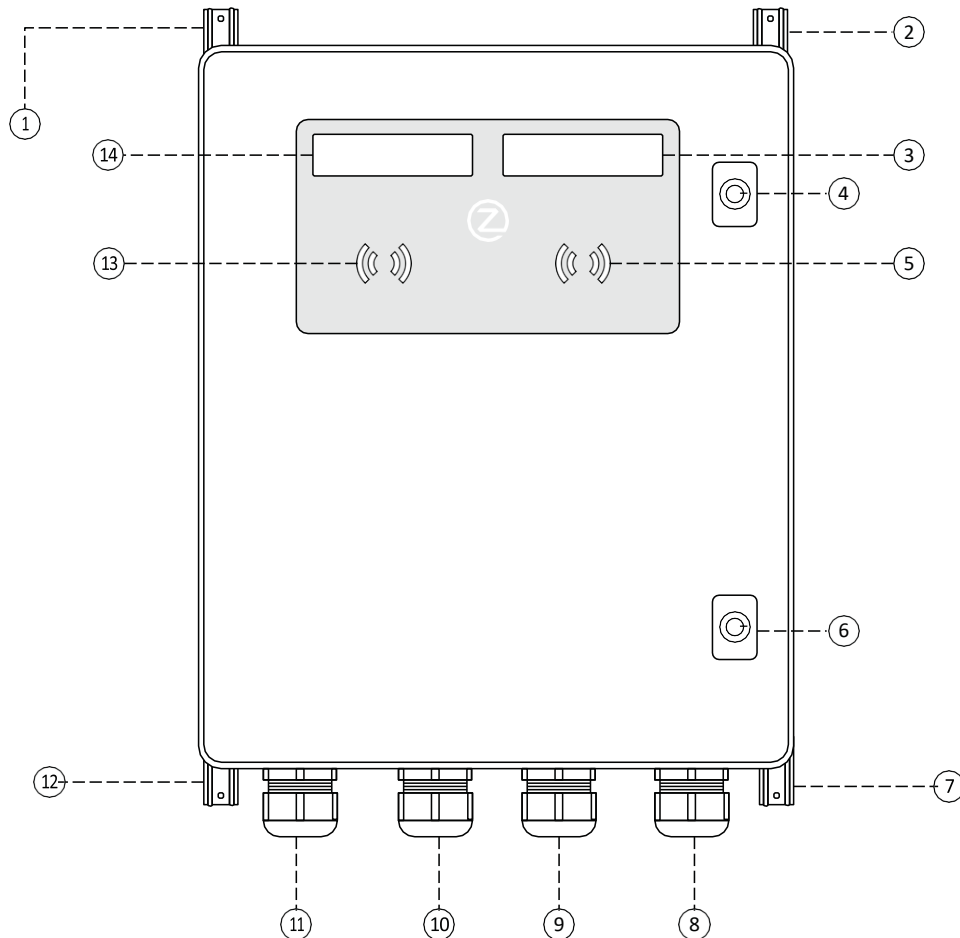


Figure 9: Front view

1. Wall mount (top left): Mounting bracket for wall attachment
2. Wall mount (top right): Mounting bracket for wall attachment
3. Operational information screen (right charging port)
4. Secure lock (enclosure access)
5. RFID reader area (right charging port)
6. Secure lock (enclosure access)
7. Wall mount (bottom right): Mounting bracket for wall attachment
8. Input for port cable (right charging port)
9. Inlet for input cable
10. Inlet for input cable
11. Input for port cable (left charging port)
12. Wall mount (bottom left): Mounting bracket for wall attachment
13. RFID reader area (left charging port)
14. Operational information screen (left charging port)

# Maintenance and configuration

## G – Product internal view

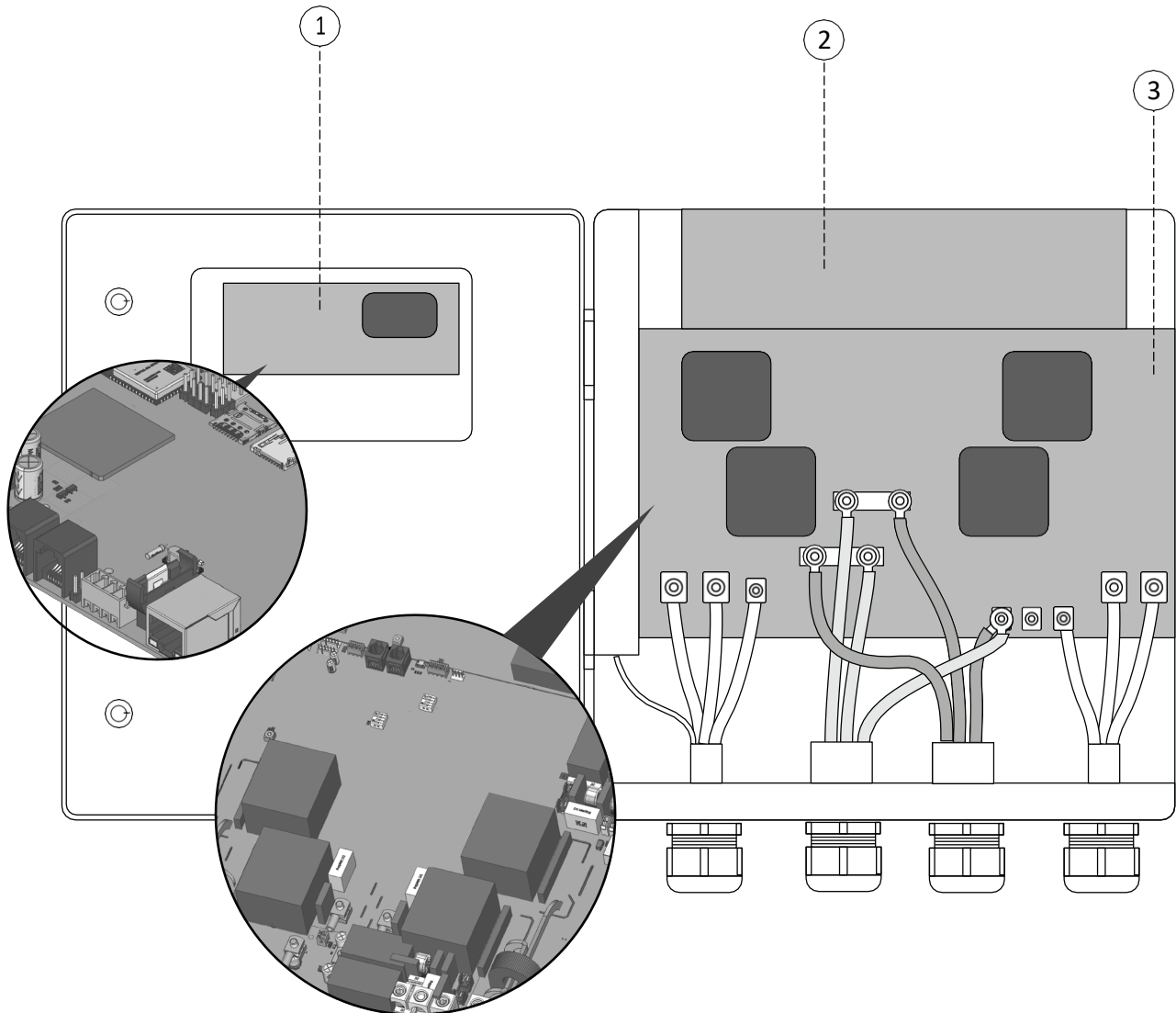


Figure 10: Detailed internal view of product

1. Master board - 100500: Required for network communication
2. Yellow beet - 100227: Hardware to enable ISO 15118 communication
3. Agent board - 100400: Required for power management

# Maintenance and configuration

## H – Agent board

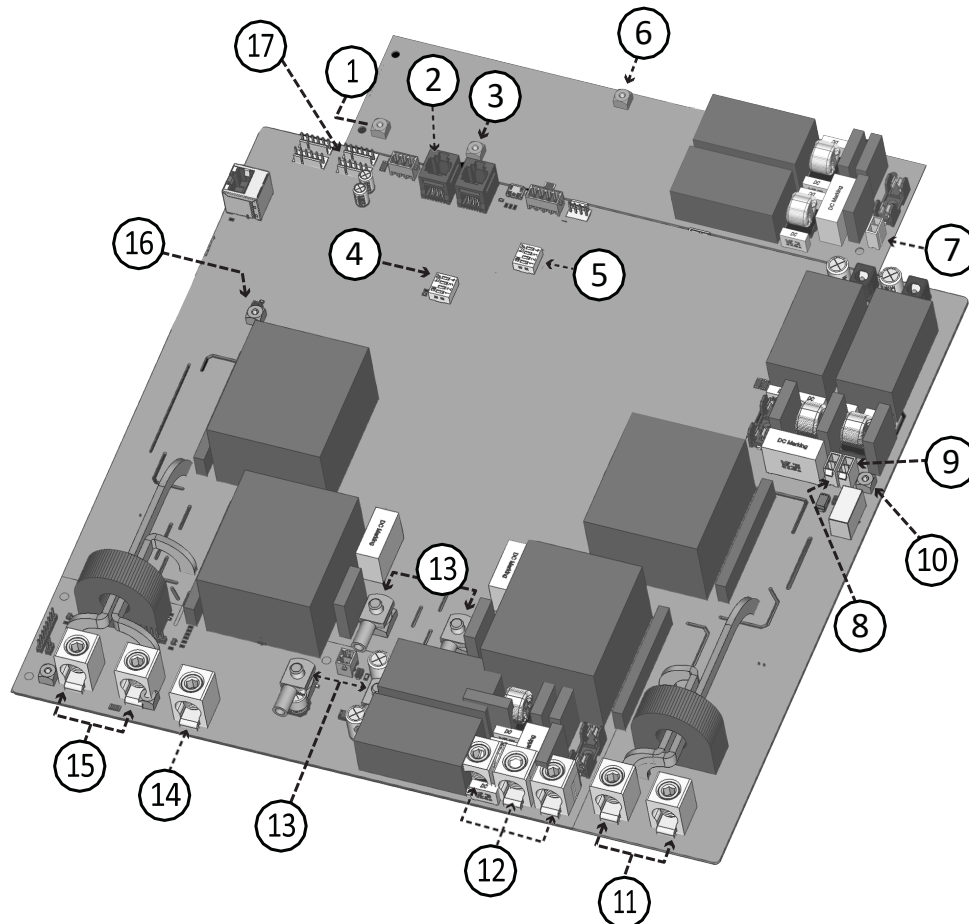


Figure 11: Labelled agent board components

- |                                      |                            |
|--------------------------------------|----------------------------|
| 1. Channel 1 pilot signal            | 9. Yellow beet supply      |
| 2. Agent & master communication port | 10. Channel 2 pilot signal |
| 3. Channel 2 pilot signal            | 11. Channel 2 output       |
| 4. Dip switch set 1                  | 12. Ground (earth)         |
| 5. Dip switch set 2                  | 13. Power input            |
| 6. Ground (earth)                    | 14. Ground (earth)         |
| 7. Yellow beet supply                | 15. Channel 1 output       |
| 8. Master board supply               | 16. Channel 1 pilot signal |

# Maintenance and configuration

## I – Master board

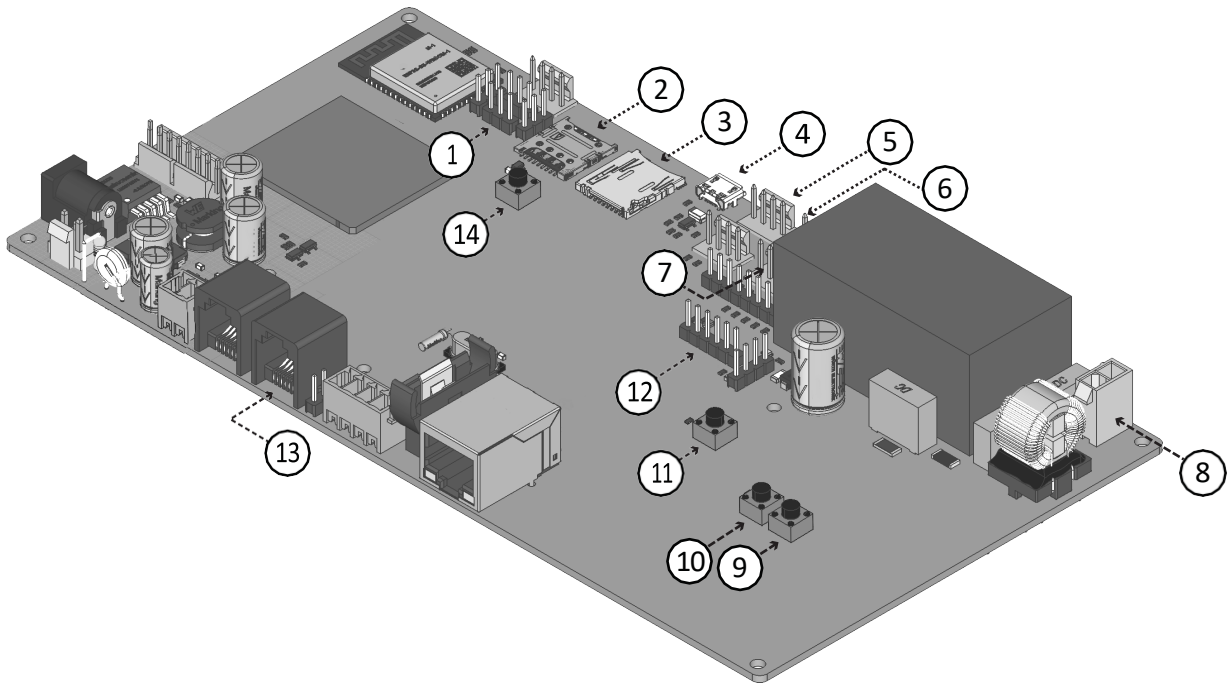


Figure 12: Labelled master board components

- |  |  |
|--|--|
| 1. ESP32 communication module            | 9. SW-2 (no function, for future use)            |
| 2. SIM card holder                       | 10. SW-1 (no function, for future use)           |
| 3. SD card holder for local data storage | 11. SW-8 for resetting microcontroller           |
| 4. Micro USB port (for future use)       | 12. Programming connector (P19)                  |
| 5. ESP32 communication module            | 13. SW-3 for resetting GSM module                |
| 6. Channel 1 RFID module                 | 14. Agent & master board communication connector |
| 7. Channel 2 RFID module                 |  |
| 8. Input supply                          |  |

# Maintenance and configuration

## J – LED indicators

### Agent board LED indicators

D2 LED	'RED' indicates for 12V.
D6 LED	'RED' indicates for 5V.
D10 LED	'ORANGE' indicates microcontroller is enabled.
D18 LED	'BLUE' indicates for 12V relay.
D19 LED (Back of agent board)	'GREEN' indicates status for channel 1 is charging.
D28 LED (Back of agent board)	'GREEN' indicates status for channel 2 is charging.

### Master board LED indicators

D1 LED	'BLUE' indicates for network mode.
D2 LED	'GREEN' indicates agent-master communication is enabled.
D5 LED	'BLUE' indicates for network status.
D12 LED	'RED' indicates for 3.3V power.
D13 LED	'RED' indicates for 5V power.
D14 LED	'GREEN' indicates microcontroller is enabled.
D25 LED	'GREEN' indicates for online status.
D27 LED	'RED' indicates for 5V power.

# Maintenance and configuration

## K – DIP Switch Set configuration

Switch Set 1	Function
Switch 1	Current Configuration (40 Amp, 80 Amp)
Switch 2	Authentication Mode ON/OFF
Switch 3	Not Applicable (NA)
Switch 4	Not Applicable (NA)

Switch Set 2	Function
Switch 1	Not Applicable (NA)
Switch 2	Not Applicable (NA)
Switch 3	Not Applicable (NA)
Switch 4	Not Applicable (NA)

### Configuration Details

- 80 Amp, Authentication not required: Set Switch Set 1 to 0000
- 80 Amp, Authentication required: Set Switch Set 1 to 0100
- 40 Amp, Authentication not required: Set Switch Set 1 to 1000
- 40 Amp, Authentication required: Set Switch Set 1 to 1100

**Note:** Switch positions are represented as 0 (OFF) and 1 (ON)

# Maintenance and configuration

## L – Instructions for updating charging configuration locally

1. Connect to EVSE Wi-Fi
2. To access the configuration web page, follow the below instructions:
  - a. Open any web browser.
  - b. Enter the IP address 192.168.1.1 in the browser's address bar.
  - c. The configuration web page as in Figure 13 should appear.



The screenshot shows a configuration web page with five rows of input fields. Each row consists of a label in teal text, an empty white input box, and a grey 'Save' button to the right. The labels are: 'OCPP PServer', 'OCPP SServer', 'Network APN', 'Firmware URL', and 'Other Values'.

Figure 13: Configuration web page

3. Enter configuration values to the input fields in the page. The input needs to be saved for each configuration field.
  - a. In 'OCPP PServer' field: Enter the OCPP server URL link for the charger.
  - b. In 'OCPP SServer' field: Not applicable.
  - c. In 'Network APN' field: Enter the Network APN for the SIM card.
  - d. In 'Firmware URL' field: Enter the local firmware update link.
  - e. In 'Other Values' field: Use to set-reset the charger configuration according to the command as in table.

**NOTE:** If there are more than 1 ICE-80A Dual chargers within range of your computer when connecting in step 1, You may not be connecting to the desired charger. It is recommended that all other ICE-80A Dual chargers nearby be turned off to ensure Wi-Fi connection is to the desired unit.

# Maintenance and configuration

## L – Instructions for updating charging configuration locally contd.

Sr No.	Command	Type	Details
1	<b>CP_ID:</b> 'ChargerPointID'	String	Set Custom Charge Point ID
2	<b>CP_ID: Reset</b>	NA	Set the default charge point ID.
3	<b>RBT:</b> 'GSM Reboot Timeout'	Integer	Set the GSM module reboot timeout.
4	<b>ResetUnit</b>	NA	Perform hard reset.
5	<b>QRCode:</b> 'string'	String	Set new QR code.
6	<b>LoadBalancing:</b> 'string'	String (TRUE or FALSE only)	Set-reset load balancing flag.

4. Successful entries will trigger a buzzer sound.
5. Run power cycle for the unit.



# Maintenance and configuration

## M – Power board errors reported on LCD screen

LCD error message	Details
OTA DId Fail xx%	OTA downloading failed after xx% progress.
OTA INSTAL FAIL	OTA installation failed.
Fault High Volt	System voltage is high beyond the higher threshold of 265V.
Fault Low Volt	System voltage is below the lower threshold of 165V.
Fault High Amps	Respective channel current is over the max current limit of 80 amps.
Fault Over Temp	Respective channel circuit temperature crossed the higher threshold of 70°C.
Fault Ground NC	System ground fault detected.
Fault CCID Erro	Respective channel CCID fault detected.
Fault Relay Weld	Respective channel relay weld fault detected.
Fault Over Alloc	Respective channel current is over the allocated current limit set by CMS/Dipswitch.
C x Suspended	Channel x charging suspended after current falls between 0.2A and 2A for 45 seconds, indicating charging is completed.