

# **HMI User Guide**

## **AC Controller GLCD**

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This HMI user guide is intended to improve the operator's efficiency throughout the procedure and does not entirely absolve them of responsibility.

## Change Record

Rev. No.	Date	Details	Revised By	Approved By
1	03/12/2025	Initial Release	Khusboo Singh	Samir Bhatt
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## 1 Intended Use

This HMI user guide describes the operation of the display (GLCD) for the AC EV Charger. It is intended for trained operators and service personnel to monitor charger status, supervise charging sessions, and identify basic faults using the HMI screens.

### 1.1 Scope

- Covers dashboard navigation, operating modes (Commissioning and Normal), charging states (Available, Preparing, Charging, Finished), and fault indications for single-gun, dual-gun, and three-gun configurations.
- Applies to Type-2 and Bharat AC controllers listed in this document.

<b>WARNING!</b>	<b>Risk caused by inappropriate use!</b>
	Any unconventional usage or operation of the product may have unintended repercussions. <ul style="list-style-type: none"><li>• Only use the product in a conventional manner.</li></ul>

### 1.2 Alteration and Restoration of the Product or System

To prevent risks and ensure optimal performance, no alterations, attachments, or restoration of the product are permitted without explicit authorisation of Bacancy Systems PVT LTD.

## 2 Functionality and Overview

This section explains how the AC charger operates from the HMI point of view, including supported controller variants, operating modes, and the main dashboard screen. It helps the operator understand which screens appear in each phase of operation.

### 2.1 AC Charger Controller and Number of Guns

The HMI screens displayed during charging depend on the AC controller type and the number of connectors (guns) configured in the charger. The following table shows the supported controller variants and the corresponding number of guns:

Table 1 Charging Operations: AC Controller and Guns

No.	AC Controller	Number of Gun
1.	Type-2 Single Gun Charger Controller (7.4kW)	Single Gun
2.	Type-2 Single Gun Charger Controller (22kW)	
3.	Bharat AC Single Socket Charger Controller	
4.	Bharat AC Single Socket Charger Controller with RFID	
5.	Type-2 Dual Gun Charger Controller (7.4kW)	Dual Gun
6.	Hybrid Charger Controller	Three Gun
7.	Bharat AC Three Socket Charger Controller	

### 2.2 Operating Mode

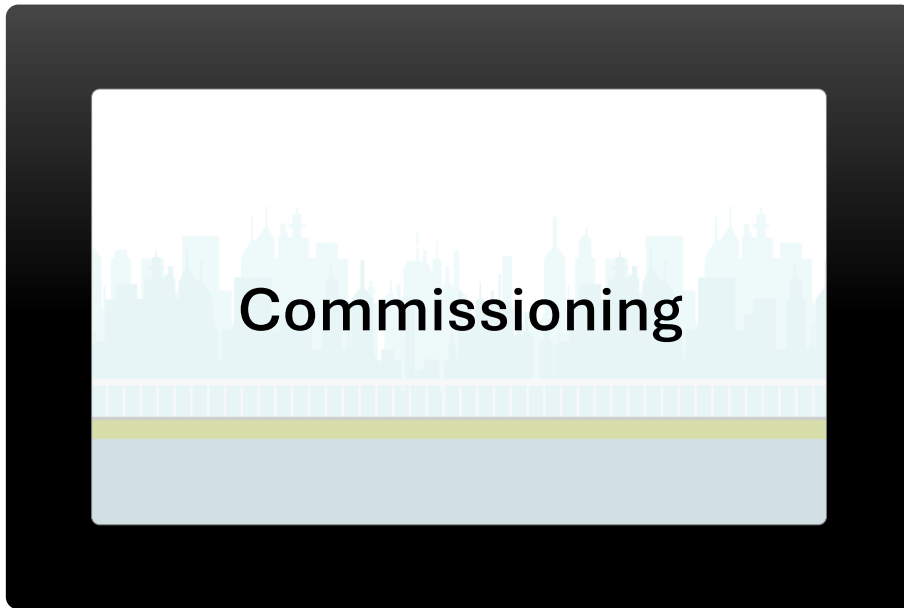
The charger operates in two main modes: Commissioning mode and Normal mode. The active mode determines which functions are available on the HMI.

- **Commissioning Mode**

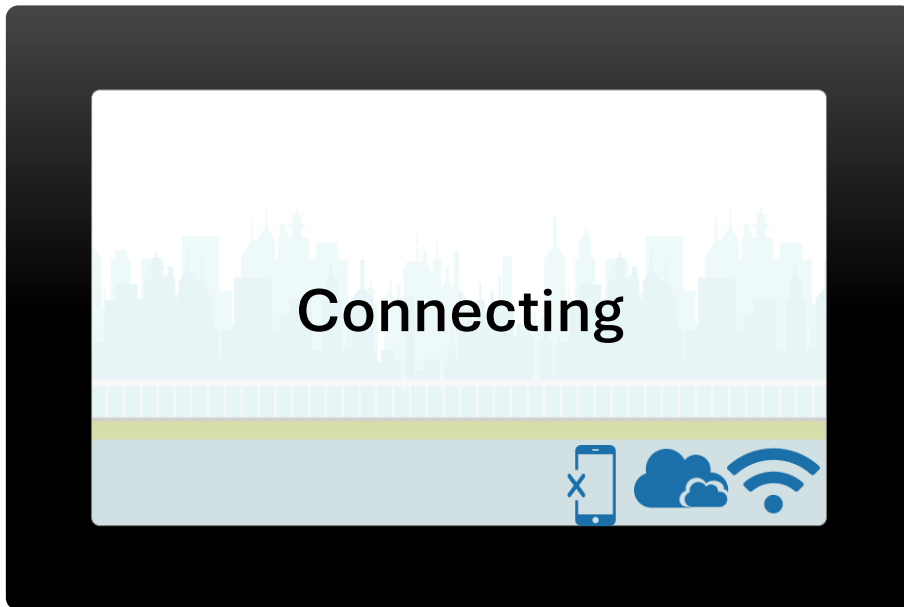
- After the EV charger boots, the commissioning screen is displayed for approximately 45 seconds.
- The operator must enter commissioning within this time window; otherwise, the charger automatically switches to Normal mode.
- Commissioning is used to configure charger parameters using the EVSE Commissioning mobile application or the Wi Fi web application, as referenced in the related documents.

- **Normal Mode**

- In Normal mode, the charger attempts to connect to the internet and the cloud/OCPP server.
- Once the connection is established, the dashboard screen is displayed, from which the operator can monitor charger status and start or observe charging sessions.



*Figure 1 Commissioning Mode Screen.*



*Figure 2 Normal Mode Screen.*

## 2.3 Dashboard

The dashboard is the main HMI screen and provides an overview of charger status and ongoing charging operations. It shows availability, online/offline status, date and time, connector status, and key icons for communication and charging.

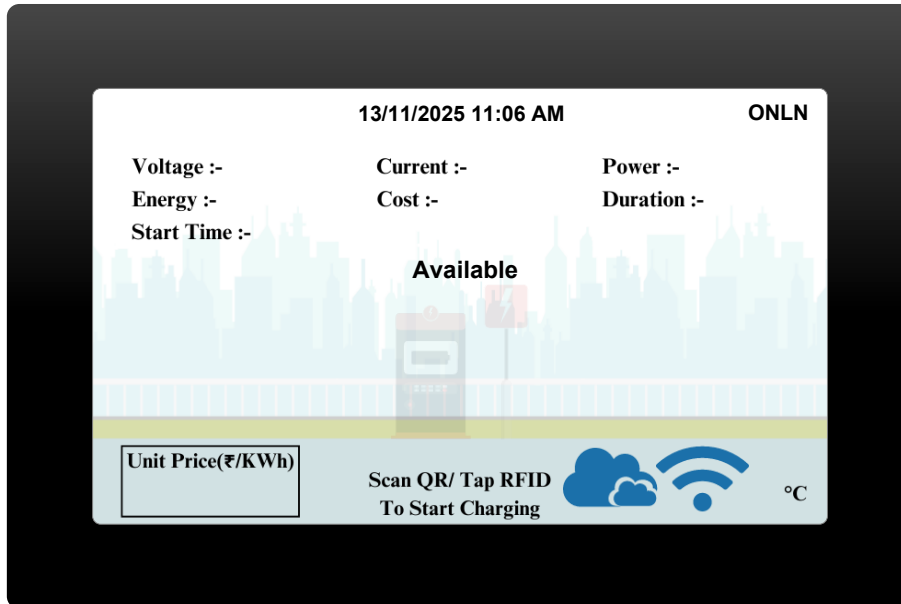












Figure 3 Dashboard Screen.

Operators should be familiar with all dashboard icons and indicators as listed in the “Dashboard: Icon and Function” table so that they can quickly assess charger and network status before starting or supervising charging sessions.

Table 2 Dashboard: Icon and Function

No.	Icon	Function
1.		Mobile is connected.
2.		Mobile is disconnected.
3.		Mobile is connecting to the EV charger using Wi-Fi or Bluetooth.
4.		Network is disconnected.
5.		Network is connected.
6.		Server is disconnected.
7.		Server is connected.

No.	Icon	Function
8.		Charging started
9.		Charging finished.
10.		Fault is active
11.	DD-MM-YYYY	Date format (Day-Month-Year).
12.	HH:MM:SS	Time format in 24 hours. (Hour: Minute: Second)
13.	ONLN	Charger is online with the OCPP server.
14.	OFLN	Charger is offline with the OCPP server (Network or the server is disconnected).
15.	RFID	RFID authentication mode for starting a charging session.
16.	P&P	Plug and Play charging mode.

### 3 Charging Operations

This section describes the charging sequence on the HMI for single-gun, dual-gun, and three-gun chargers. The charging sequence uses the same four states for all variants: Available, Preparing, Charging, and Finish.

#### Charging Sequence: all variants

##### 1. Available

- In this state, the AC charger is ready to start a charging session.
- The HMI shows status “Available” along with the current date, time, and online/offline status (ONLN / OFLN / RFID / P&P).

##### 2. Preparing

- When the gun (connector) is plugged into the vehicle, and the session is authorised (for example, by OCPP, RFID or Plug & Play), the charger enters the Preparing state.
- The HMI displays status “Preparing” while the system performs safety checks and communication with the vehicle.

##### 3. Charging

- After all checks are successful, the charger enters the Charging state and energy transfer to the vehicle starts.
- The HMI shows charging parameters such as voltage, current, power, energy, start time, and elapsed charging duration.

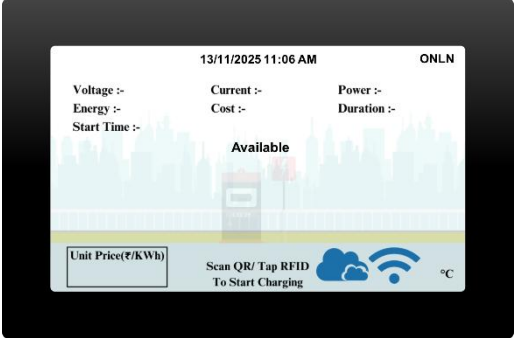
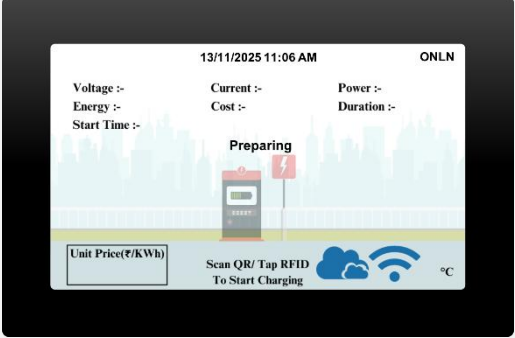
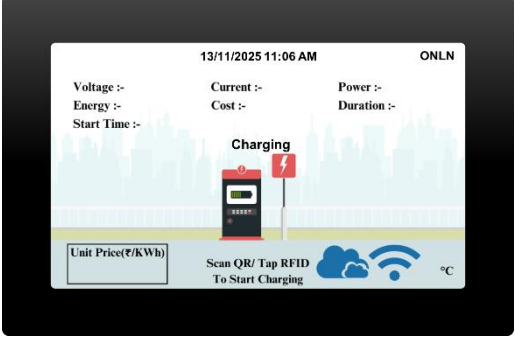
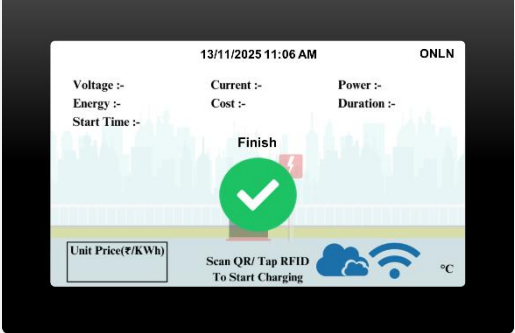
##### 4. Finish

- When the charging session is stopped by the user, the vehicle, or due to completion, the charger enters the Finish state.
- The HMI displays a charging summary, including total energy delivered, charging cost and total charging duration.

### 3.1 Single-Gun Charger

For a single-gun charger, one gun (connector) is shown on the HMI, and the above four states apply to that gun. The screen transitions through Available → Preparing → Charging → Finish for each session, as illustrated in the corresponding figures in this section.

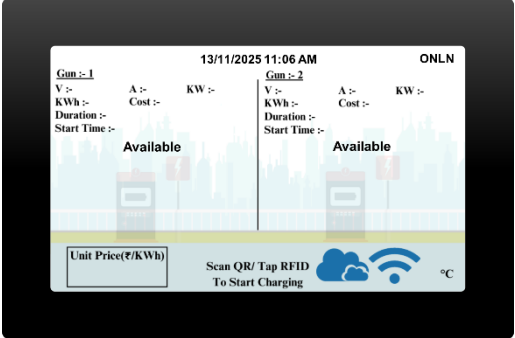
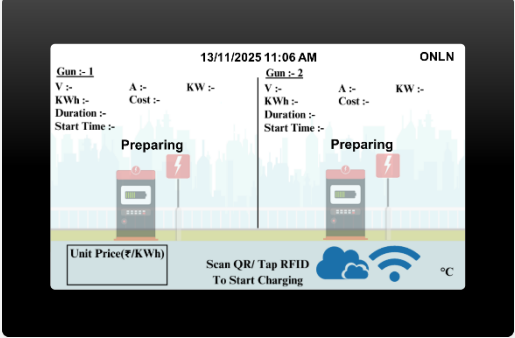
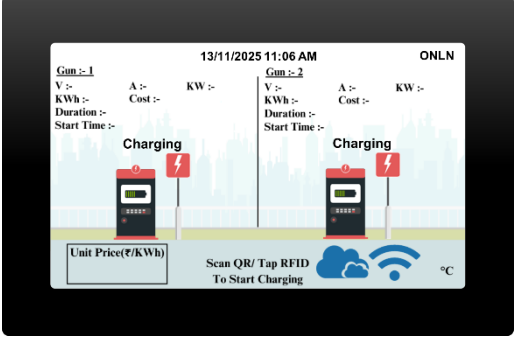
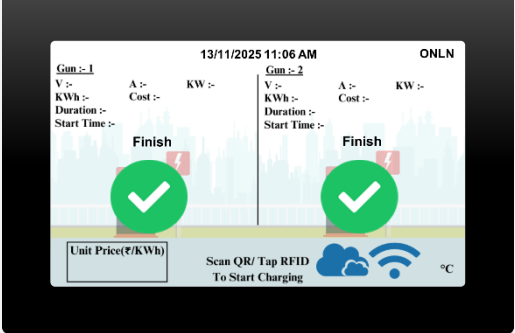
Table 3 HMI Screens of Single Gun Charger

No.	Charger State	Display
1.	Available	 <p>The HMI screen displays the date and time (13/11/2025 11:06 AM) and status (ONLN). It shows fields for Voltage, Current, Power, Energy, Cost, and Duration. The central status is 'Available' with an icon of a red gun. At the bottom, it prompts 'Scan QR/ Tap RFID To Start Charging' and shows a unit price field, QR code, and temperature indicator.</p>
2.	Preparing	 <p>The HMI screen displays the date and time (13/11/2025 11:06 AM) and status (ONLN). It shows fields for Voltage, Current, Power, Energy, Cost, and Duration. The central status is 'Preparing' with an icon of a red gun and a lightning bolt. At the bottom, it prompts 'Scan QR/ Tap RFID To Start Charging' and shows a unit price field, QR code, and temperature indicator.</p>
3.	Charging	 <p>The HMI screen displays the date and time (13/11/2025 11:06 AM) and status (ONLN). It shows fields for Voltage, Current, Power, Energy, Cost, and Duration. The central status is 'Charging' with an icon of a red gun and a lightning bolt. At the bottom, it prompts 'Scan QR/ Tap RFID To Start Charging' and shows a unit price field, QR code, and temperature indicator.</p>
4.	Finish	 <p>The HMI screen displays the date and time (13/11/2025 11:06 AM) and status (ONLN). It shows fields for Voltage, Current, Power, Energy, Cost, and Duration. The central status is 'Finish' with a green checkmark icon. At the bottom, it prompts 'Scan QR/ Tap RFID To Start Charging' and shows a unit price field, QR code, and temperature indicator.</p>

### 3.2 Dual-Gun Charger

For a dual-gun charger, two guns (connectors) are displayed on the HMI, and each gun follows the same four charging states independently. The HMI can show different states for each gun at the same time (for example, one gun in Charging while the other is Available).

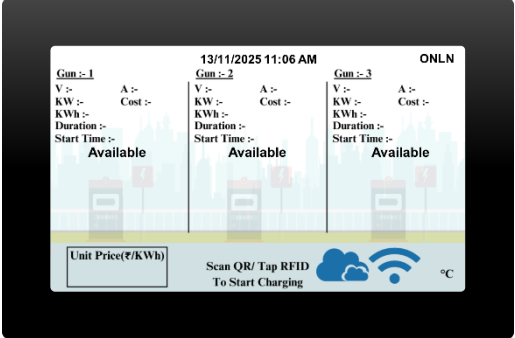
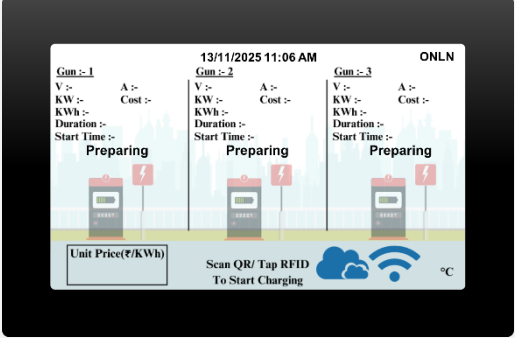
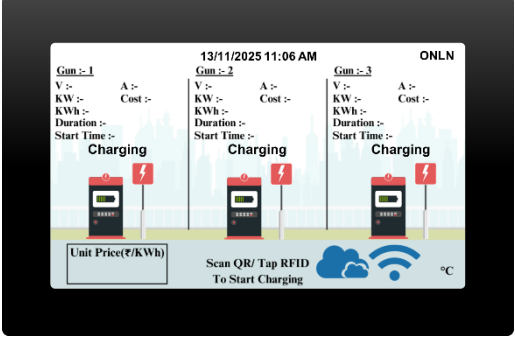
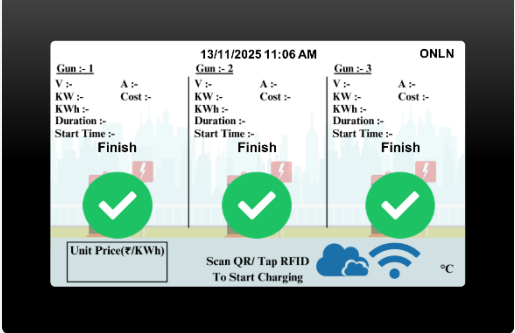
Table 4 HMI Screens of Dual-Gun Charger

No.	Charger State	Screen
1.	Available	
2.	Preparing	
3.	Charging	
4.	Finish	

### 3.3 Three-Gun Charger

For a three-gun charger, three guns (connectors) are displayed on the HMI, and each gun follows the same four charging states independently. Depending on the configuration, one or more guns may charge simultaneously, and the HMI shows the state of each gun separately.

Table 5 HMI Screens of Three-Gun Charger

No.	Charger State	Screen
1.	Available	
2.	Preparing	
3.	Charging	
4.	Finish	

### 3.4 Fault

The faults are displayed on the screen as shown in the figure below and are common for single-gun, dual-gun, and three-gun chargers; details of each fault are provided in the table below, and the fault indication is automatically cleared within 30 seconds after the fault condition is resolved.

For example, the HMI shows “Over Current” instead of the placeholder “ABC ABC ABC” seen in the display. Refer to the fault table for the exact fault name that appears during each fault condition.

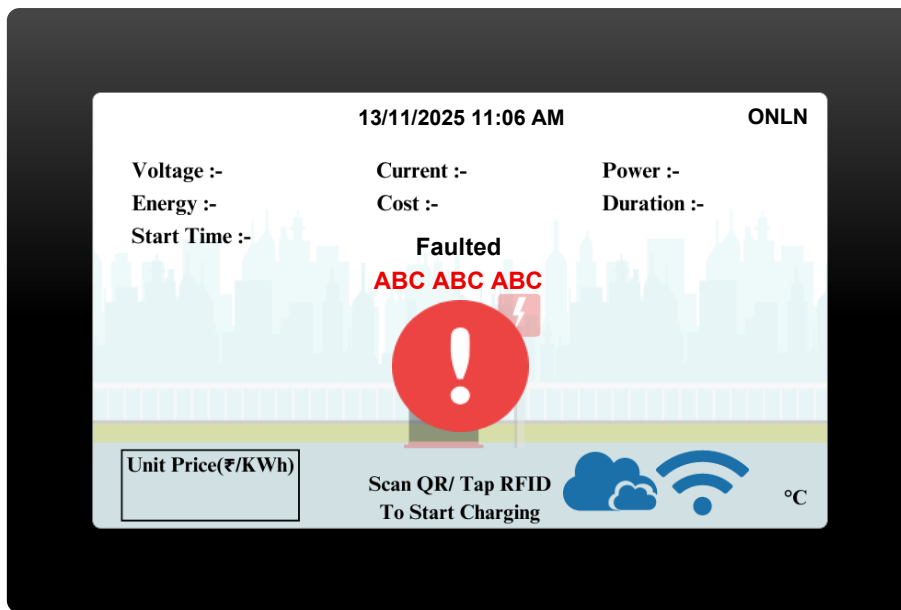


Figure 4 Fault Screen.


No.	Fault	Description
1.	<b>Over Current</b>	<b>Cause:</b> Output current exceeds safe limit. <b>Action:</b> Re-plug the gun and restart charging.
2.	<b>Over Voltage</b>	<b>Cause:</b> Input/output voltage too high. <b>Action:</b> Check power supply; retry when voltage stabilises.
3.	<b>Power Meter Failure</b>	<b>Cause:</b> Energy meter not responding. <b>Action:</b> Restart the charger; contact service if the issue persists.
4.	<b>Power Switch Failure</b>	<b>Cause:</b> Contactor/relay not switching. <b>Action:</b> Restart the charger; call a technician if unresolved.
5.	<b>Under Voltage</b>	<b>Cause:</b> Supply voltage too low. <b>Action:</b> Verify grid supply; retry after voltage recovers.
6.	<b>Weak Signal</b>	<b>Cause:</b> Poor network connectivity. <b>Action:</b> Check network connection or adjust router placement.

No.	Fault	Description
7.	<b>Emergency Stop Button</b>	<b>Cause:</b> Emergency stop button is pressed/active. <b>Action:</b> Release or reset the E-Stop; restart the charger.
8.	<b>Gun Fault</b>	<b>Cause:</b> Charging connector issue (CP/PP/wiring). <b>Action:</b> Reconnect the gun securely; inspect connector pins.
9.	<b>Under Current</b>	<b>Cause:</b> Output current lower than expected. <b>Action:</b> Reconnect the gun or try with another vehicle.
10.	<b>Earth Protection</b>	<b>Cause:</b> Earth/ground fault detected. <b>Action:</b> Check earthing; do not use until the issue is fixed.
11.	<b>Zero Current</b>	<b>Cause:</b> No current detected during charging. <b>Action:</b> Disconnect and reconnect the vehicle.
12.	<b>Trip Stop</b>	<b>Cause:</b> MCB/MCCB/RCD has tripped. <b>Action:</b> Reset the breaker; restart the charger.
13.	<b>High Temperature</b>	<b>Cause:</b> Internal temperature too high. <b>Action:</b> Allow the charger to cool; clear ventilation areas.
14.	<b>Reader Failure</b>	<b>Cause:</b> RFID/card reader malfunction. <b>Action:</b> Clean the reader; try another RFID card or app.
15.	<b>Reset Failure</b>	<b>Cause:</b> Charger cannot complete a reset. <b>Action:</b> Power-cycle the charger; contact support if needed.
16.	<b>Current Leakage</b>	<b>Cause:</b> Leakage current beyond the permissible limit. <b>Action:</b> Stop using the charger; call a technician.
17.	<b>Internal Error</b>	<b>Cause:</b> General internal malfunction. <b>Action:</b> Restart the system; contact the service if recurring.
18.	<b>Ground Failure</b>	<b>Cause:</b> Grounding connection unsafe or missing. <b>Action:</b> Check ground connection; do not operate until safe.


## 4 Appendix


### 4.1 Abbreviations and Glossary

AC	<i>Alternating current, is a type of electrical current in which the current repeatedly changes direction</i>
EV	<i>An EV is defined as a vehicle that can be powered by an electric motor that draws electricity from a battery and is capable of being charged from an external source.</i>
HMI	<i>Human Machine Interface.</i>
kW	<i>Kilowatt (symbol: kW) is a unit of electric power.</i>
kWh	<i>A kilowatt-hour is a non-SI unit of energy equal to 3.6 megajoules in SI units which is the energy delivered by one kilowatt of power for one hour. Kilowatt-hours are a common billing unit for electrical energy supplied by electric utilities.</i>
OCPP	<i>The OCPP (Open Charge Point Protocol) enables the integration of equipment from different manufacturers.</i>
RFID	<i>Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify, and track tags attached to objects.</i>
Wi-Fi	<i>Wi-Fi is a family of wireless network protocols based on the IEEE 802.11 family of standards, which are commonly used for local area networking of devices and Internet access, allowing nearby digital devices to exchange data by radio waves.</i>

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