ICE-22 V2X Installation and Operation Manual

Version: 3

Last Edited: 04/15/2025

InCharge Energy Inc.

https://inchargeus.com/

Service Hotline: 818-697-GOEV

Contents

1.) IMPORTANT SAFETY INSTRUCTIONS

- Please read the operating instructions and notes carefully before starting operation to prevent accidents. The "Caution, Attention, Warning, and Danger" statements in the products and product manual do not represent all safety matters to be observed and are intended to supplement various operational safety precautions.
- During the various operations of our products and equipment, it is necessary to comply with the relevant National Safety Regulations and strictly observe the precautions and special safety instructions for the relevant equipment provided by InCharge Energy.
- Any usage of water on the charger during a charge session or during idling is a safety hazard and prohibited.

1.1) Electrical Safety

 **Danger**	Since some parts of this power system are under high voltage during operation, direct or indirect contact can be fatal.

- It is necessary to comply with the relevant National Safety Regulations during the installation of the Portable DC Charger. Personnel who install and maintain this equipment must be qualified to work with high DC voltage up to 1000Vdc and 3-phase AC voltage up to 500Vac.
- It is strictly forbidden to wear watches, bracelets, bangles, rings and other conductive objects on the wrist during installation and maintenance.
- If there is water inside the DC Charger enclosure, AC power and DC connector must be disconnected immediately. During operation in a humid environment, water should be strictly prevented from entering the equipment.
- During installation, it is strictly forbidden to operate the DC Charger and an “Operation prohibited” signboard must be used.

 **Danger**	Construction operation of high voltage lines may cause fire or electric shock. The wiring area and the area where the line passes through for AC cables must comply with national and local regulations and norms. As this device utilizes high voltages do not attempt to install this equipment if you are not a qualified electrician.

1.2) Tools

 Warning	Special tools must be used during various operations involving high DC and AC voltages.

1.3) Thunderstorm

 Danger	It is strictly forbidden to carry out live installation and maintenance work during thunderstorms.

- A strong electromagnetic field will be produced in the atmosphere during a thunderstorm. Therefore, the equipment should be well grounded to avoid damage to the equipment due to lightning strikes.

1.4) Static Electricity

 Caution	Static electricity generated by the human body may damage electrostatic sensitive components on the circuit boards, such as the large-scale integrated circuit (IC), etc. Before handling any patch boards, circuit boards and IC chips, it is necessary to wear an anti-static wrist strap with the anti-static wrist strap wire connected to Ground to avoid damage to sensitive components due to static electricity.

1.5) Short Circuit

 Danger	During operation, it is strictly forbidden to short-circuit the positive and negative of the DC Charger DC distribution or short-circuit any DC distribution polarity to Ground. The DC Charger is a high voltage DC power supply, and short circuit may cause damage to the DC Charger and personal safety hazards.

- During work with High Voltage DC output, it is necessary to strictly check the polarity of cables and interface terminals.
- The space for DC power distribution work is compact and attention should be paid to planning cable routing etc. before starting any installation work.
- Insulated tools must be used.
- During live work, attention should be paid to keeping hands, arms tools etc. away from live high voltage parts to avoid accidents.

1.6) Sharp Corners of Objects

 Warning	During the handling of equipment by hand, it is necessary to wear protective gloves to prevent injuries caused by sharp objects.

1.7) Power Cable

 Caution	Make sure that the cable label is correct before the connection of cables.

1.8) Signal Cables

 Caution	Signal cables should be kept away from power cables, with a minimum distance of 100mm.

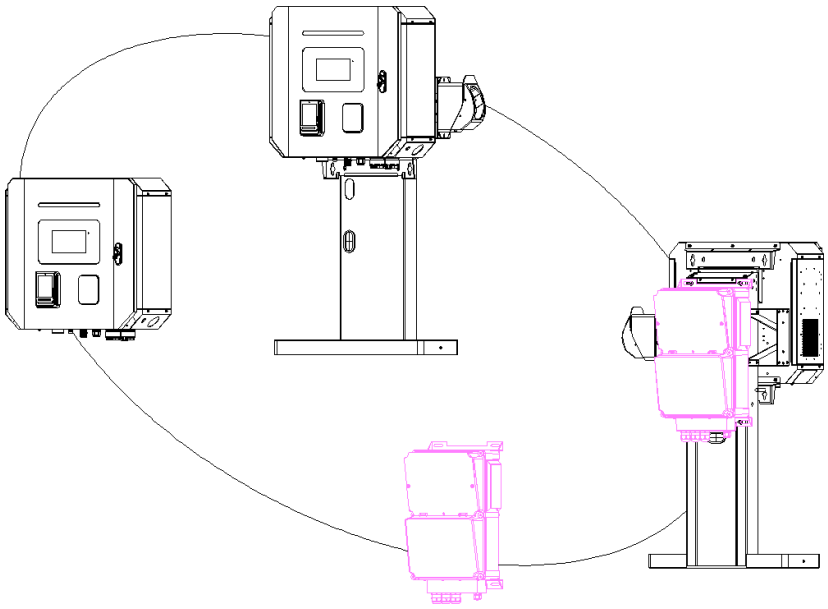
2.) General Product Description

The ICE-22 V2X is a 22kW “Vehicle-to-Everything” bidirectional DC Fast charger that supports Vehicle-to-Grid (V2G), Vehicle-to-Building, and other discharge use cases. Available as Buy America compliant, this charger may qualify for funding opportunities, including those with V2G-capability requirements.

2.1) Main Features

- The ICE22 V2X Wall Box Electric Vehicle V2X system can quickly charge all electric vehicles that comply with the CCS1 and CHAdeMO charging system standard and can be combined with local or remote energy management systems to use electric vehicle batteries as energy storage batteries, achieving power balance between the power grid and electric vehicle batteries.
- The ICE22 V2X Wall Box Electric Vehicle V2X system is specially designed for wall mounting or stand column installation. Features include the integrated design with wall mounting structure, small size, light weight, easy/multi-installation ways, IP55 level of protection, sturdiness, and durability for outdoor applications.
- The ICE22 V2X Wall Box Electric Vehicle V2X system can provide charging/discharging services for vehicles ranging from 150 to 1000Vdc, with a maximum charging/discharging power of 22kW.
- The **optional off-grid box** is required **only** when operating in **grid-forming mode**. In this mode, the system is isolated, and the off-grid box limits the grid to the load it serves.
    - When in **grid-following mode**, the charger operates normally, whether it is following "the" utility grid or a **microgrid**. From the charger’s perspective, being on a microgrid is not the same as being "off-grid." In grid-following mode, the charger functions as both a load and a grid-following source, responding to commands from either the local or microgrid controls.
- The battery charging/discharging state is displayed on the HMI and the charging/discharging cycle finishes by itself or can be interrupted by user command.
- The ICE22 V2X Wall Box Electric Vehicle V2X system is user friendly and safe. After user identification, it only requires coupling the charger’s output plug in the EV for automatic starting if all safety features are accomplished.
- Full safety functions with dual insulation and redundancy protection for input and output fuses
- ESD, SPD, and insulation detector software logic for multiple protections.

- 5G/LTE wireless modem support, RFID authorization and Mobile App payment support.



Note: The products marked in pink are off grid distribution boxes, which can be ordered and installed when the off-grid function is required

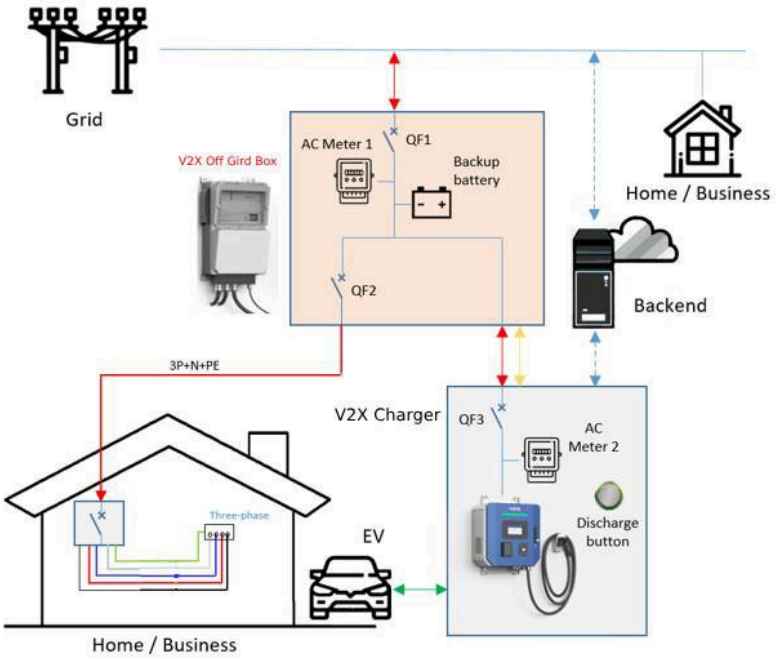


Figure 2-1: Application Scenario

Component Description：

Optional Accessory V2X Box： Includes the following main switch and load switch, an AC meter, and lead-acid batteries, used to achieve power distribution, protection, and hardware switching between parallel and off grid modes, support three-phase loads.

- QF1: Installed in V2X Box, Short circuit overload protection and disconnect switch of the system.
- QF2: Installed in V2X Box Short circuit overload protection and opening switch of load branch.
- AC Meter 1: Installed in V2X Box, used to record the power consumption of V2X system grid connection points.
- Backup battery: One 24V 5Ah lead-acid battery is installed in V2X Off Grid Box as the wake-up power source for V2X equipment during power outages. Users can release the battery level and wake up the system through the button in the lower right corner of V2X. The battery capacity can maintain a standby time of 1-2 hours under ambient temperature conditions of -4℉ to 122℉ (-20 ℃~50 ℃). After entering off grid mode, the system will release the battery power of the electric vehicle to supply power to the load and replenish the backup battery at the same time, provided that the battery allows discharge. But if there is no discharge operation after 3 minutes, the monitoring will activate the "Sleep" mode, automatically turn off the backup battery power output, and maintain its reserve power. The backup battery can cycle more than 800 times under 77℉ (25 ℃) conditions1.
- QF3: Installed V2X Charger, Short circuit overload protection and opening switch of V2X charger.
- AC Meter 2: Installed in V2X Charger, used to record the power consumption of V2X charging stations and grid connection points.
- Discharger Button: Installed in V2X Charger, click to release the backup battery energy, start the V2X system, and discharge the EV battery to important loads for use.

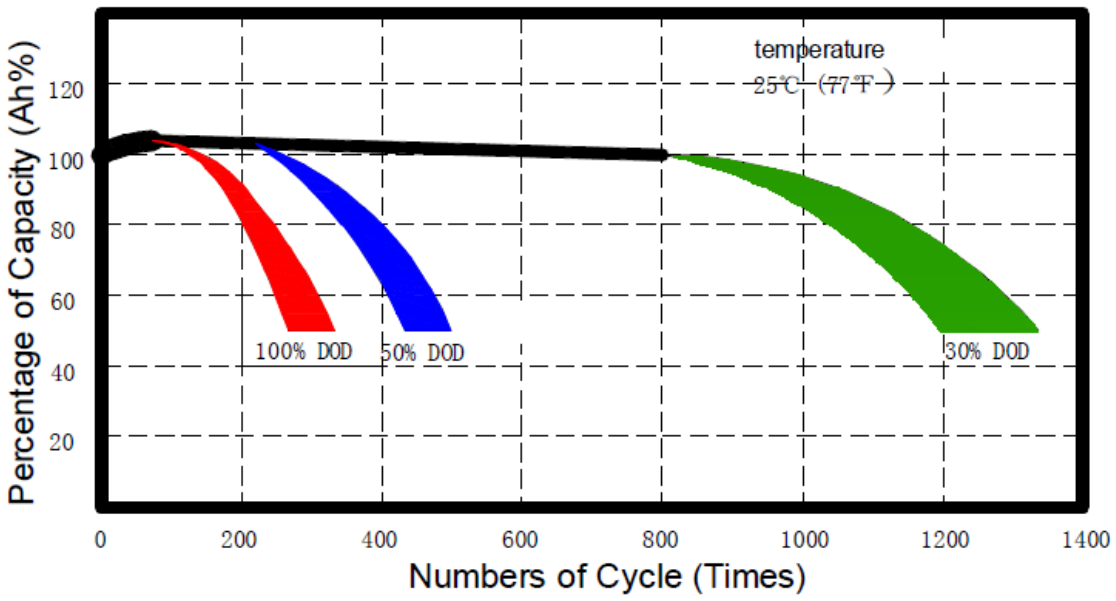


Figure 2-2: Life Cycle of Backup Battery (24V)

3.) General Characteristics

3.1) Technical Characteristics

- V2X System technical characteristics are indicated in Table 3-1 and 3-2. This system is intended to have one DC output connection

Table 3-1: ICE-22 V2X Technical Characteristics

Technical Data		Description	Remarks
Nominal Input	Phases/Lines	3 phases + neutral + PE	
	Voltage	480/277 Vac (+ / -10%)	
	Frequency	60Hz	
	Current	Max 28A (for AC output)	
	Max.AC Side Apparent Power	24.4kVA @Grid Charging. 24.4kVA @Grid Discharging. 22kVA @Off-Grid Charging.	
	Power Factor Range	⩾ 0.99 @Grid Charging. 0.8 Leading ~ 0.8 Lagging @Grid Discharging & Off-Grid Charging.	
	System Efficiency	≥ 94.5% (Full load)	
DC Output CCS1	Voltage	150 ~ 1000Vdc	
	Current	73.3A @Grid Charging. 80A @Grid Discharging 80A @Off-Grid Charging.	
	Nominal Power	22kW (300V) @Grid Charging. 22kW (300V) @Grid Discharging. 19.8kW (300V) @Off-Grid Discharging.	
Cabinet	Dimensions(W*D*H)	25.2*10.6*24 in (640*270*610 mm)	
	Weight	179.67 lbs (81.5 kg) (excluding power module, power module is 30.86 lbs (14kg.))	
	Protection Degree	IP55, Cabinet IK10, Screen IK8	
HMI and Command Unit	Local interface	TFT Color touch display 7”	
	Communication	Router 4G/5G (GSM, CDMA or LTE)	
	Protocol	OCPP 1.6 specification	
Environmental conditions	Operating temperature [1]	-13°F ~ 122°F (-25°C ~ +50°C)	
	Transportation/storage temperature	-40°F ~ 158°F (-40°C ~ +70°C)	
	humidity	5% RH ~ 95% RH	
	Place of installation	Indoor / Outdoor [2]	
	Altitude	6561.68 ft (2000 m)	
	Sound Noise	≤ 65dB (nominal input/output power, the environment temperature is 25°C.)	
	Atmospheric pressure	80Kpa ~ 110Kpa	
	Overvoltage category	II	
	Protection class	Class I	
Note 1: The DC Charger provides full output power up to 122°F (50°C), output power derating 5% / °C above 122°F (50°C).			

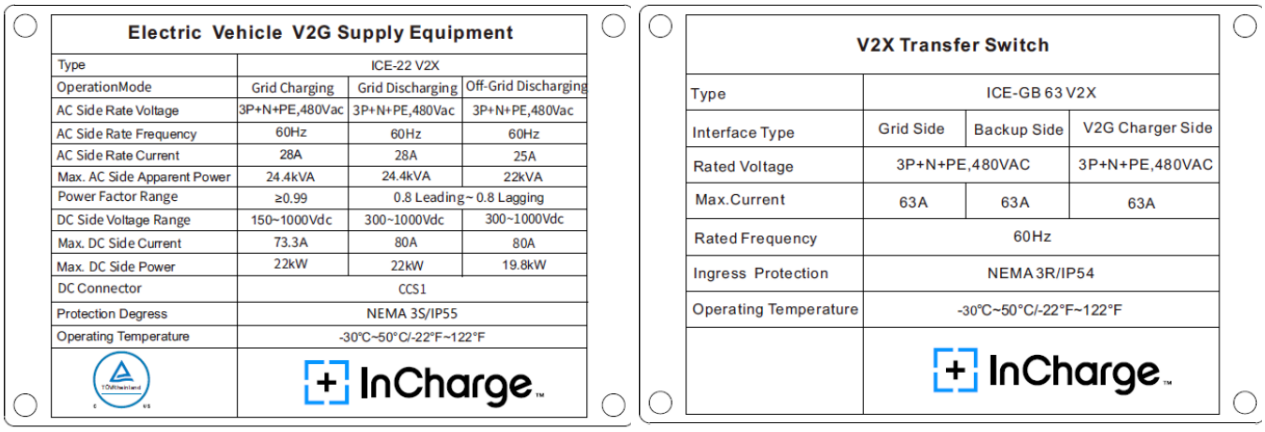
Note 2: The protection level of the V2G charger is IP55. But for charging safety it should not be used during rain or snow if water can reach the charger connector.

Table 3-2: Optional Accessory V2X Off Grid Box Technical Characteristics

Technical Data		Description	Remarks
Main Input	Phases/Lines	3 phases + neutral + PE	
	Voltage	480/277 Vac (+ / -10%)	
	Frequency	60Hz	
	Current	Max 63A	
Backup output	Phases/Lines	3 phases + neutral + PE	
	Voltage	480/277 Vac (+ / -10%)	
	Frequency	60Hz	
	Current	Max 63A	
Charger output	Phases/Lines	3 phases + neutral + PE	
	Voltage	480/277 Vac (+ / -10%)	
	Frequency	60Hz	
	Current	Max 63A	
Cabinet	Dimensions(W*D*H)	14.2*22*8.6 in (360*560*220 mm)	
	Weight	78.26 lbs (35.5 kg)	
	Protection Degree	IP55	
Environmental conditions	Operating temperature [1]	-13°F ~ 122°F (-25°C ~ +50°C)	
	Transportation/storage temperature	40°F ~ 158°F (-40°C ~ +70°C)	
	humidity	5% RH ~ 95% RH	
	Place of installation	Indoor / Outdoor [2]	
	Altitude	6561.28 ft (2000 m)	
	Atmospheric pressure	80Kpa ~ 110Kpa	
	Overvoltage category	II	
	Protection class	Class I	

Note 1: The protection level of theV2X Off-grid Box is IP55. But for charging safety it should not be used during rain or snow if water can reach the charger connector.

3.2) Name Plate Information



Electric Vehicle V2G Supply Equipment			
Type	ICE-22 V2X		
OperationMode	Grid Charging	Grid Discharging	Off-Grid Discharging
AC Side Rate Voltage	3P+N+PE,480Vac	3P+N+PE,480Vac	3P+N+PE,480Vac
AC Side Rate Frequency	60Hz	60Hz	60Hz
AC Side Rate Current	28A	28A	25A
Max. AC Side Apparent Power	24.4kVA	24.4kVA	22kVA
Power Factor Range	≥0.99	0.8 Leading~0.8 Lagging	
DC Side Voltage Range	150~1000Vdc	300~1000Vdc	300~1000Vdc
Max. DC Side Current	73.3A	80A	80A
Max. DC Side Power	22kW	22kW	19.8kW
DC Connector	CCS1		
Protection Degress	NEMA 3S/IP55		
Operating Temperature	-30℃~50℃/-22°F~122°F		

V2X Transfer Switch			
Type	ICE-GB 63 V2X		
Interface Type	Grid Side	Backup Side	V2G Charger Side
Rated Voltage	3P+N+PE,480VAC		3P+N+PE,480VAC
Max.Current	63A	63A	63A
Rated Frequency	60Hz		
Ingress Protection	NEMA 3R/IP54		
Operating Temperature	-30℃~50℃/-22°F~122°F		

3.3) Model Description

Model	Configuration	Output Power
ICE-22 V2X Charger		
I22-C1-R	CCS-1 125A	22 kW
I22-CH-R	CHAdeMO 125A	22 kW
ICE-22 V2X Off-grid BOX		
IAU63ATS-AW-2	63A MCB × 2	22 kW

3.4) Standards

The System complies with the following standards:

Table 3-3: Applicable Standards

Technical Data	Standards & Versions	Remarks
Applicable Standards	UL2202:2022 UL9741:2023 UL1741:2021 UL1741 SA/SB:2021 IEEE1547:2018 IEEE1547.1:2020 Rule 21 HECO Rule 14 PRC-024-1 BELCO	

- UL2202: 2022: DC Charging Equipment for Electric Vehicles
- UL9741: 2023: Electric Vehicle Power Export Equipment (EVPE)
- UL1741: 2021: inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources
- UL1741 SA/SB:2021: inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources
- IEEE1547:2018: IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces
- IEEE1547.1:2020: IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces

4.) Installation

4.1) Safety and Compliance

The working voltage and current inside the charging system is very high. The following rules should always be observed to ensure personal safety:

- Only personnel who have received training for and fully mastered the knowledge of the charging system can complete installation. During installation, always observe the safety precautions mentioned in this document and all relevant National Safety Regulations.
- It is necessary to make sure that the charging system DC output is disconnected in case of operation inside the charging system. The main inputs of the charging system must also be disconnected.

4.2) Grounding Instructions

An equipment grounding conductor as well as a permanent grounding electrode is required for the ICE-22 V2X charger connection. This runs with circuit conductors and connects to the equipment grounding bar or lead on the ICE-22 V2X charger.

4.3) Unboxing and Visual Inspection

- Check if the exterior packaging has been damaged by mechanical impacts or any accidents during transportation.
- If applicable, check that the exterior panels of the ICE-22 V2X are without fault.
- Check if the interior of the Quick Charger Station is clean.
- Check if the door of the Quick Charger Station is working properly.
- Check for a proper Quick Charger Station protective ground connection point, which should be interconnected with the low voltage switchboard ground connection during the installation.

4.4) Assembly/Placing Instructions

- The wall mounted charging pile comprises a body, a back plate and two-gun holders, and the body is fixed on the wall through the back plate.
- The charging pile of the floor type charging pile consists of a body, a column and two-gun holders, and the body is installed on the concrete foundation through the column.
- The figure below shows some details of the power cabinet drilling layout.
- The position of cable entrance is shown by the red line mark in the figure below

4.4.1) ICE-22 V2X Wall Mounting

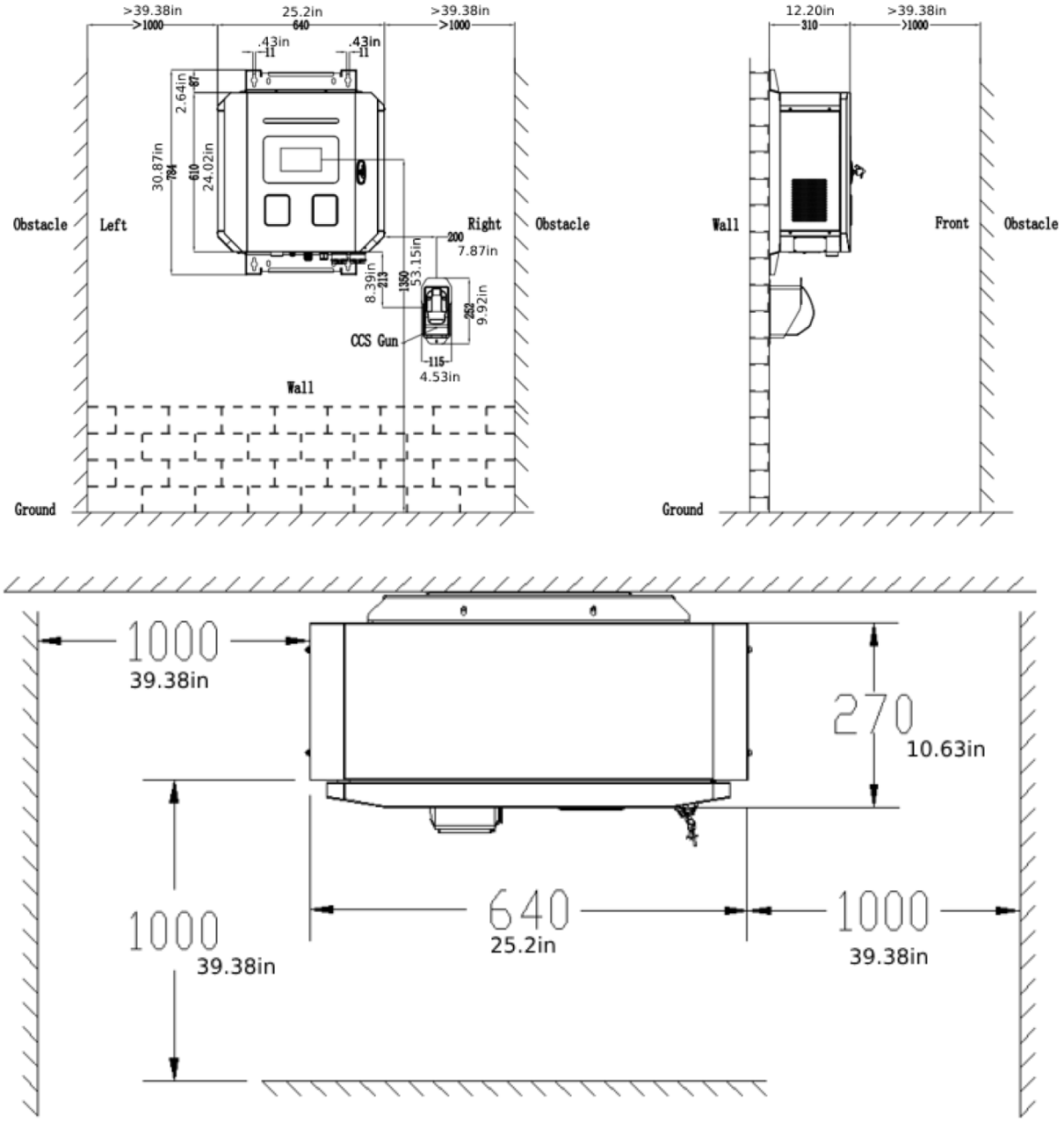


Figure 4-1: ICE-22 V2X Space Requirements View

Position	Screw specification	Quantity
Wall mounted		
Between cabinet and adapter plate	Combination screw, M6 * 16	6 PCS
Between adapter plate and wall	Expansion screw, M8 * 60	4 PCS
Between the gun holder and the wall	Expansion screw, M6 * 60	2PCS/ Gun

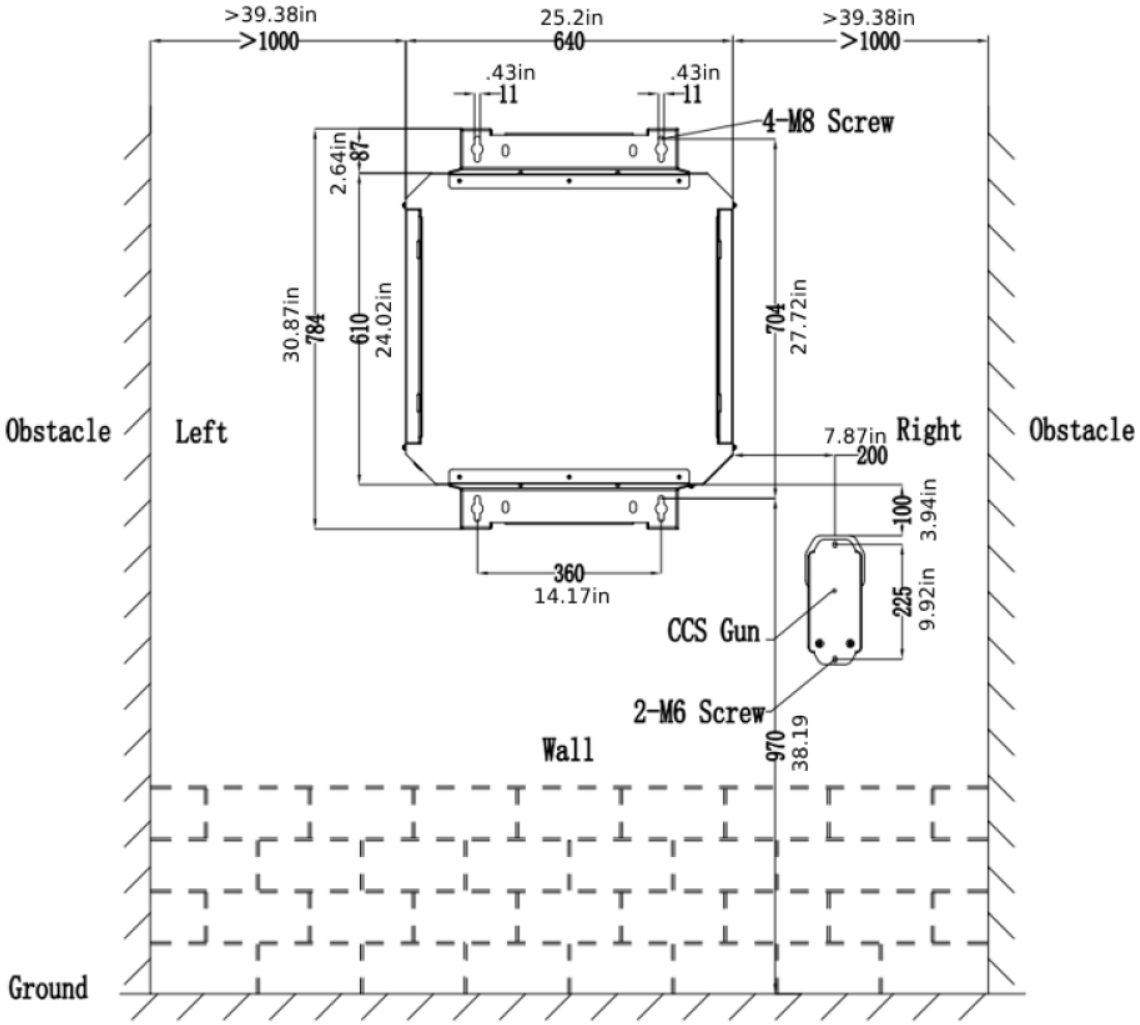


Figure 4-2: Back Hole Dimensions

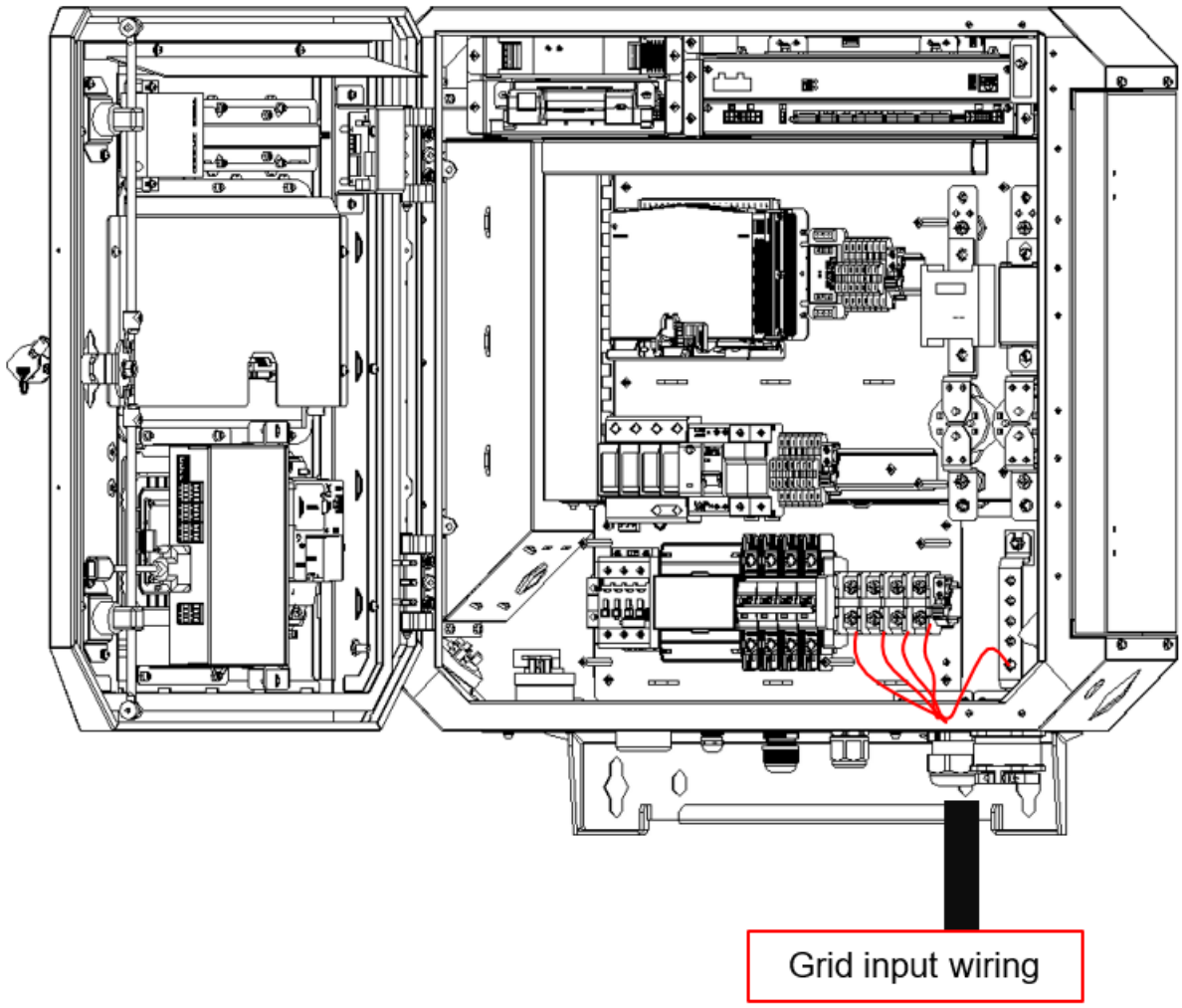


Figure 4-3: Grid Input Wiring

4.4.2) V2X Off Grid Box Wall Mounting

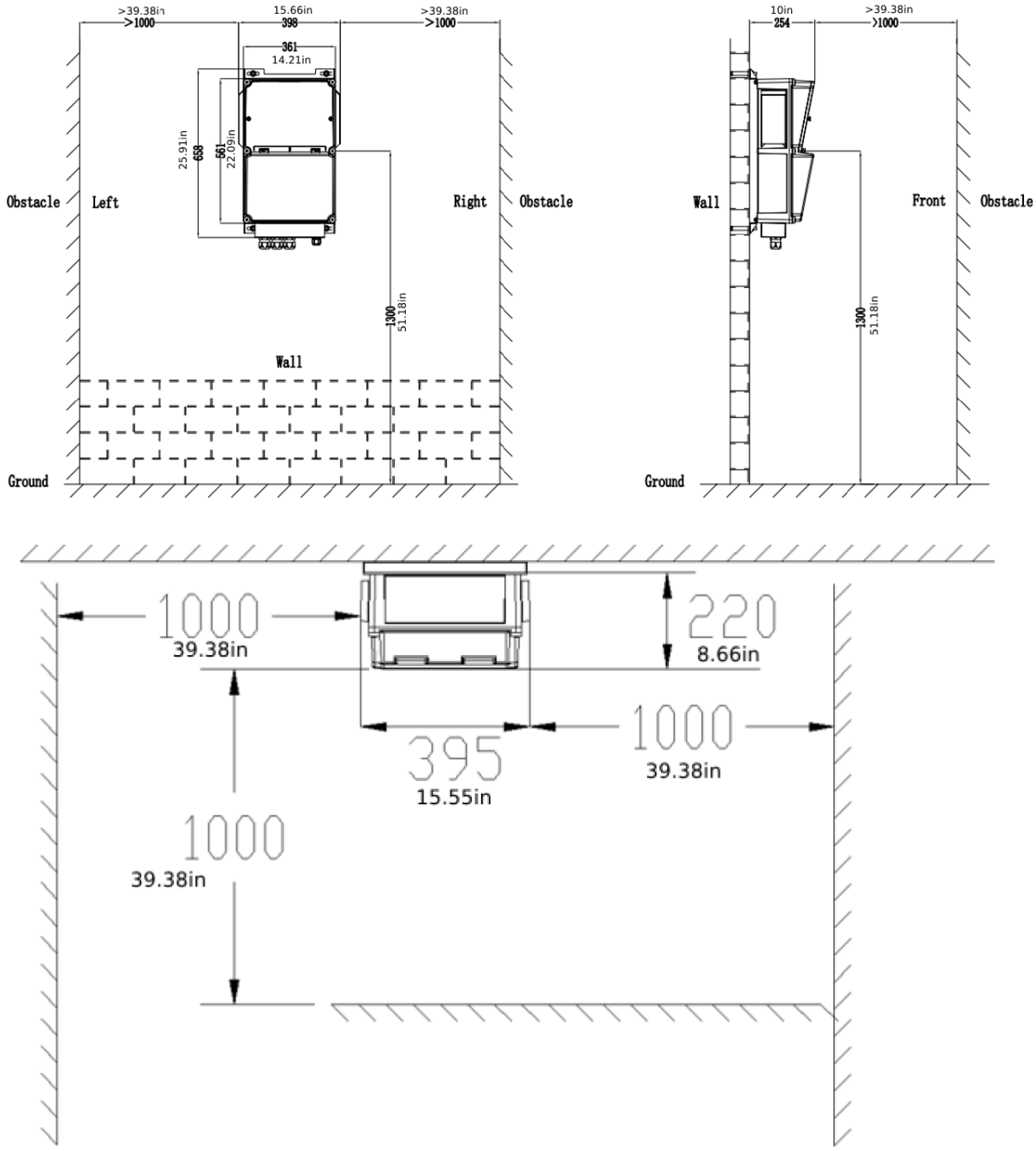


Figure 4-4: V2X Off Grid Box Space Requirements

Position	Screw specification	number
Wall mounted		
Between cabinet and adapter plate	Combination screw, M8 * 30	4 PCS
Between adapter plate and wall	Expansion screw, M10 * 30	4 PCS

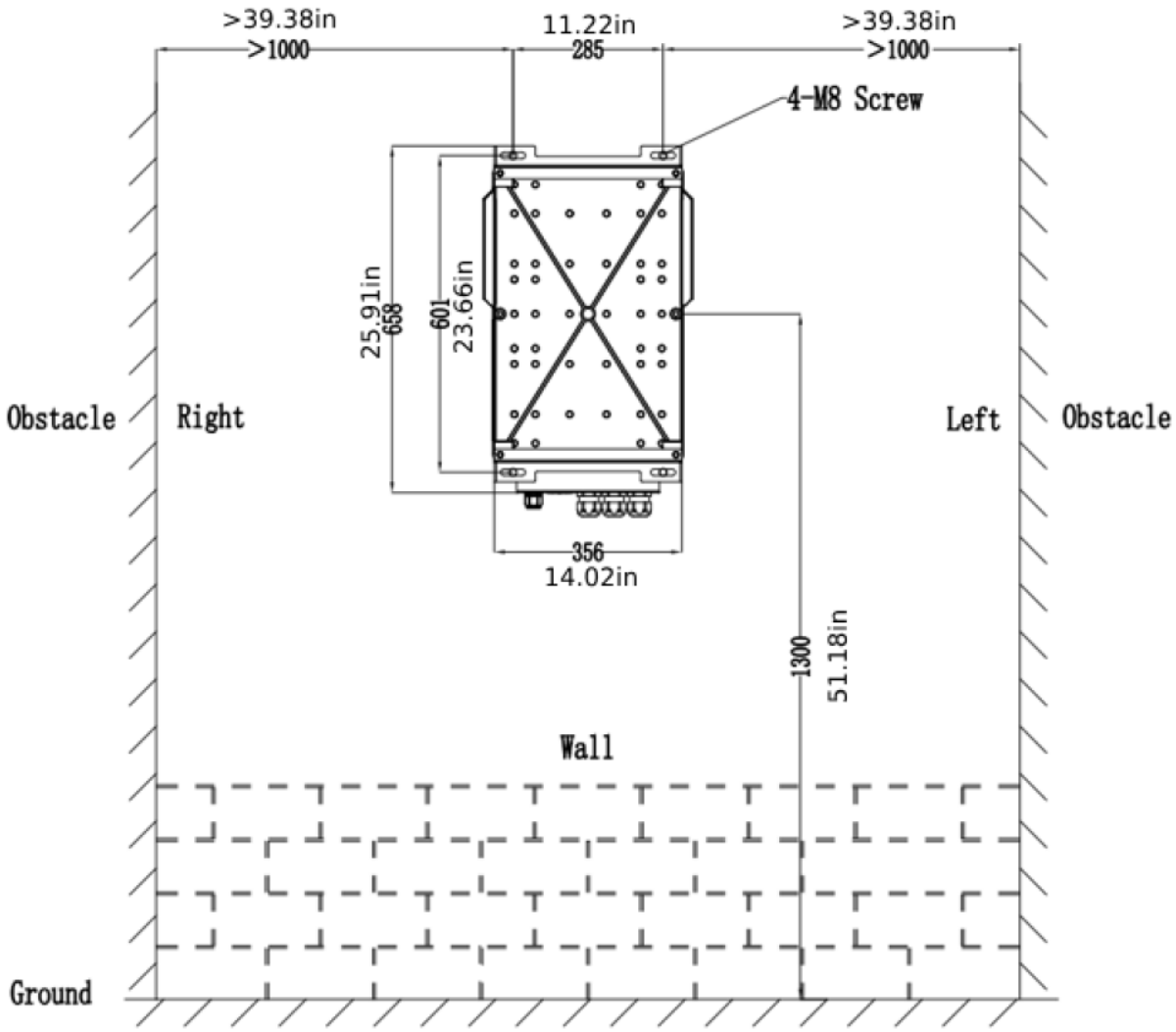


Figure 4-5: V2X Off Grid Box Back Hole Dimensions

4.4.3) Power Cable Connections

End terminal for input wiring: 5(five) end terminals up to 3phases+neutral+protective ground

Without V2X Off-Grid Box:

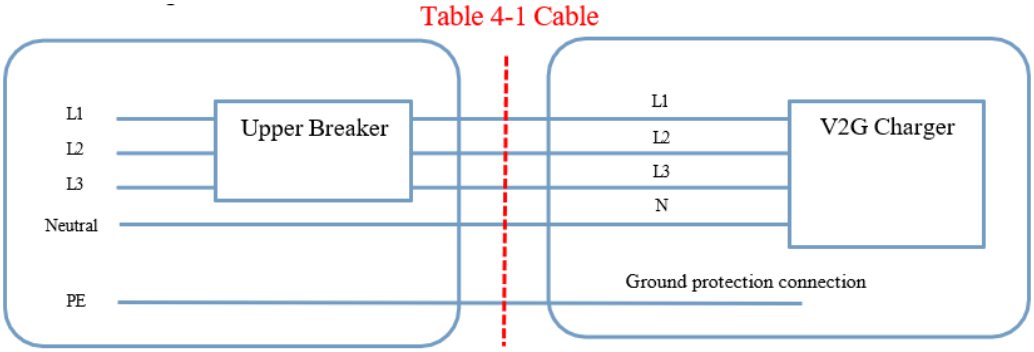


Table 4-1: AC Cables choice for V2X charger

NO.	The section for AC feed cables	Amperage at 480Vac	Max. Power of charger	Specification of terminal screw
1	10 AWG	28A	22kW	L1/L2/L3/N is M6, PE is M8

Note: The minimum circuit ampacity at full load would be 35A Circuit (125% of 28A)

With V2X Off Grid Box:

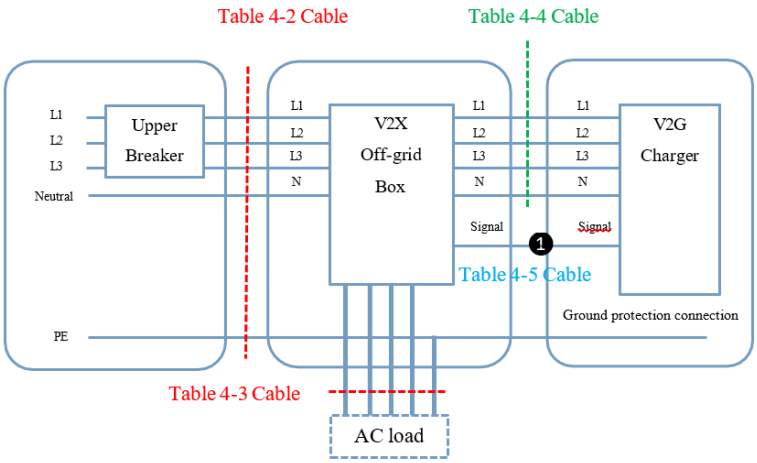


Table 4-2: AC input wiring cables chosen for V2X Off-grid Box

NO.	The section for AC feed cables	Amperage at 480Vac	Max. Power of charger	Specification of terminal screw
1	4 AWG	63A	22kW	L1/L2/L3/N/PE is M8

Table 4-3: Backup output wiring cables choose for V2X Off-grid Box

NO.	The section for AC feed cables	Amperage at 480Vac	Max. Power of charger	Specification of terminal screw
1	10 AWG	28A	22kW	L1/L2/L3/N is M6, PE is M8

Table 4-4: Charger output wiring cables choose for V2X Off-grid Box

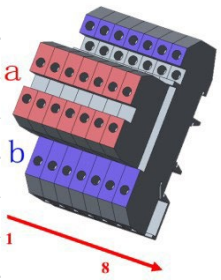
NO.	The section for AC feed cables	Amperage at 480Vac	Max. Power of charger	Specification of terminal screw
1	10 AWG	28A	22kW	L1/L2/L3 is M6, N/PE is M8

Table 4-5: Signal wiring cables choose between V2X Off-grid Box & V2G charger

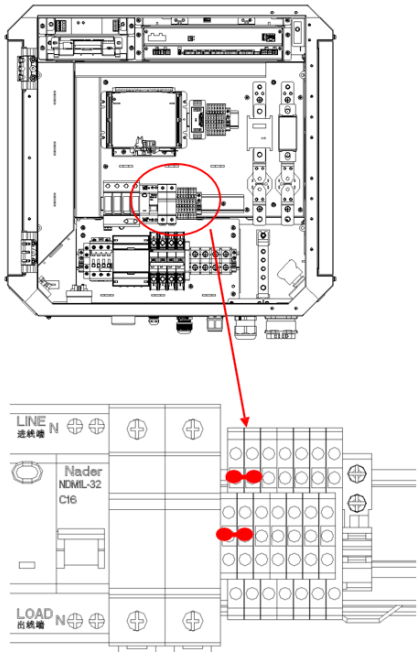
NO.	The section for AC feed cables	Amperage at 480Vac	Max. Power of charger	Specification of terminal screw
1	16AWG	4A	-	E1510 

Note: RS485 wiring requires twisted pair shielded wiring

V2X Off-grid Box Parallel cabinet terminals XT4			V2G Charger Parallel cabinet terminals XT6	
			XT6-1a	V2G Control electricity
			XT6-1b	
BOX Control electricity	XT6-1a	⟷	XT6-2a	BOX Control electricity
	XT6-1b	⟷	XT6-2b	
Box 485	XT6-2a	⟷	XT6-3a	Box 485
	XT6-2b	⟷	XT6-3b	
Backup power signal	XT6-3a	⟷	XT6-4a	Backup power signal
	XT6-3b	⟷	XT6-4b	
	XT6-4a	⟷	XT6-5a	
Backup power supply	XT6-4b	⟷	XT6-5b	Backup power supply
	XT6-5a	⟷	XT6-6a	
Contactor control	XT6-5b	⟷	XT6-6b	Contactor control
Module emergency stop	XT6-6a	⟷	XT6-7a	Module emergency stop
	XT6-6b	⟷	XT6-7b	

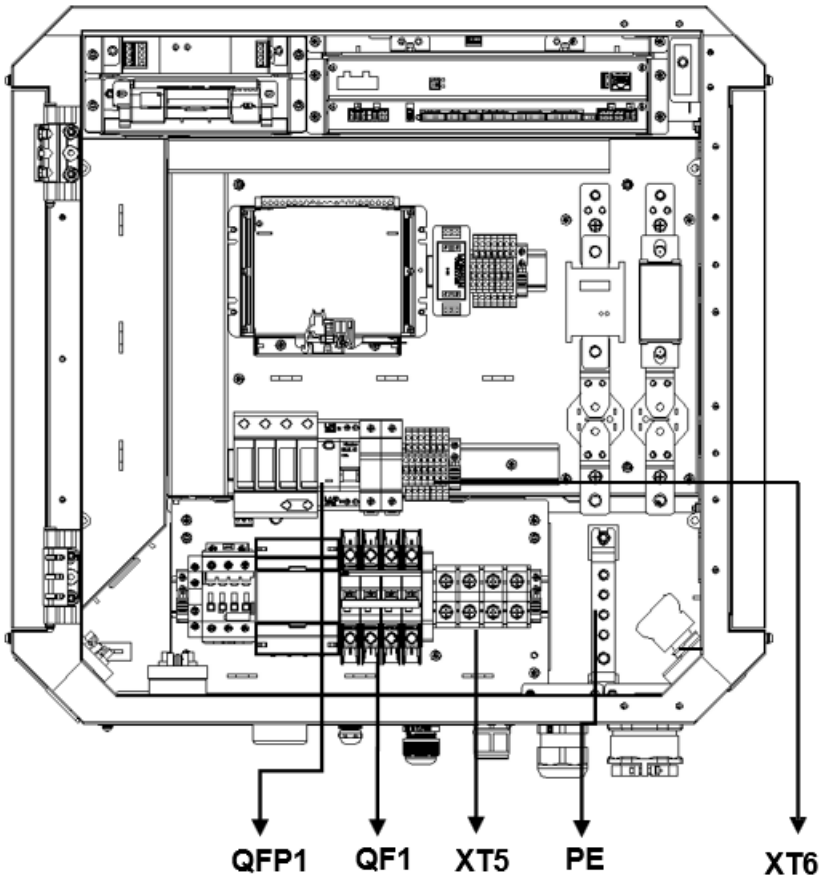


Note 1: With out the Off Grid Box, Short connector XT6-1a to XT6-7b, and XT6-1b to XT6-2b.

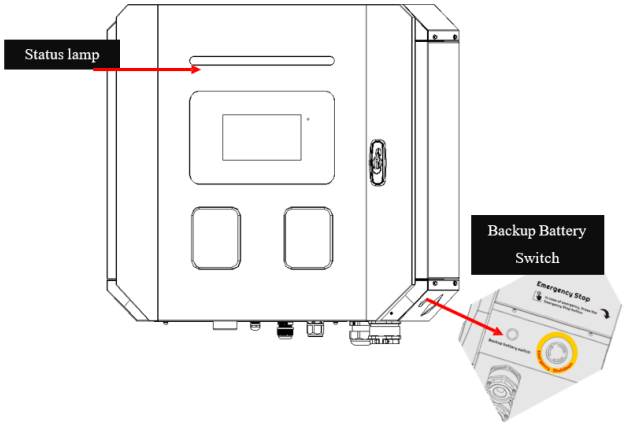


Notes:

- The AC feed power cables to the charger are not included.
- The AC feed power cables should at least be 194 F (90°C) resistant.
- The protective MCCB must be installed on the distribution cabinet, and the upper MCCB capacity should be at most 1.25 times the input current.
- It is recommended that the upper MCCB should not be equipped with RCD function.
- This system is to be connected to a grounded metal permanent wiring system; or an equipment-grounding conductor is to be run with circuit conductors and connected to equipment-grounding terminal or lead on battery charger.
- The section for feed cables is 10 to 16mm2. However, within this range, the selected section is based on the distance between distribution board and charger (to be decided by customer's electrician for installation).
- A disconnecting switch must be installed on the customer's distribution board.

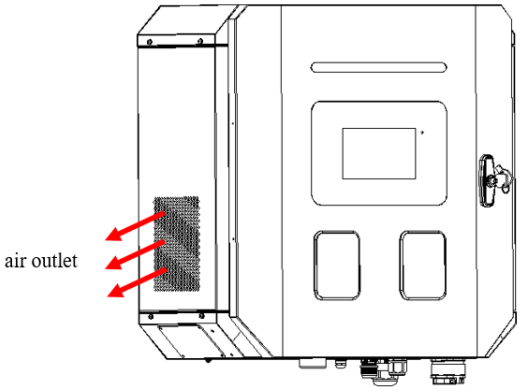


- PE: Earth Bus Bar
- XT5: Power Main Input Terminal Block: L1 L2 L3 N
- XT6: V2X Charger Parallel Cabinet Terminals
- QF1: AC Input MCB for Rectifier Module
- QFP1: AC Input RCD For Auxiliary Power

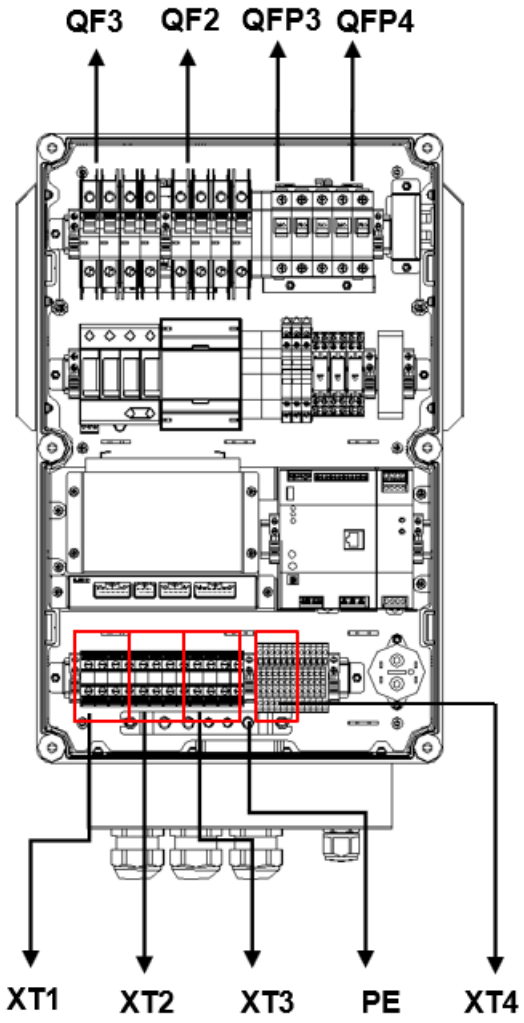


- Backup Battery Switch: Manually release the backup battery and start the system entering off grid mode.
- Status Lamp: Indicate the device status as follows:

STANDBY	Solid green
IN CHARGING	Solid yellow
INDISCHARGING	Solid blue
IN DISCHARGING	Flashing blue 1S on 1S off



Caution	**When the system operates under extreme voltage, the temperature of the air outlet is slightly higher**



- QF2: Main AC Input MCB
- QF3: AC Input MCB for User Load
- QFP3: AC Input RCD For Auxiliary Power
- QFP4: Control RCD For Time Relay
- XT1: Power Main Input Terminal Block: L1 L2 L3 N
- XT2: User Load Output Terminal Block: L1 L2 L3 N
- XT3: Output to V2X Terminal Block: L1 L2 L3 N
- XT4: V2X Off Grid Box Parallel Cabinet Terminals
- PE: Earth Bus Bar

5.) Start Up

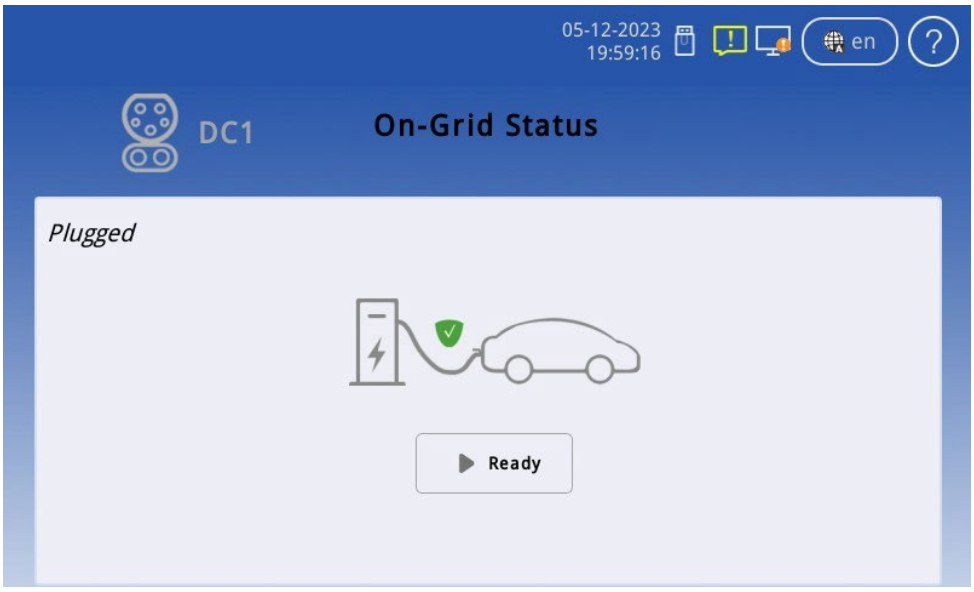
5.1) Verification and Inspection

- The installation location of charging device shall not be less than 20 feet away from commercial garage (repair facility) or outdoor vehicle fuel distribution device
- Check if the bolts of the AC and protective ground cables of the V2G Charger & V2X off-grid Box are correctly tightened to the specified torque
- Check the resistance between the V2G Charger & V2X off-grid Box protective ground and the low voltage switchboard ground connection; the value must be according to local codes.
- Grid-facing side (AC) with L1/L2/L3/N/PE wiring and Vehicle-facing side (DC) with DC+/DC-/PE.
- Power module address setting (dip switches) is correct.
- Before switching ON all the fuses and circuit breakers, check the supply voltage between lines: it must be 480V ± 10% 60Hz.

5.2) Switch On

- Switch on QF1, QF2, and QF3 in the V2X Off-grid BOX cabinet and QF1 and QF2 in the V2G Charger cabinet.
- Wait for a few seconds. The display will present a picture as below:

- Finally, the display will present the following screen.
- **CCS1 Units:**



Before attempting to install or start up the charger must ensure that the safety instructions in this manual have been carefully read and observed by technically competent personnel. Keep this manual with the charger for future reference.
This charger must not be started or put into use without having been commissioned by a fully trained and authorized person.

6.) User Manual

The V2X charger is equipped with CCS1 connector, which can achieve charging and discharging operations for one or two vehicles. The Human Machine Interface (HMI) will give instructions and signal different stages. These sequences are shown in this chapter.

6.1) Output Connector

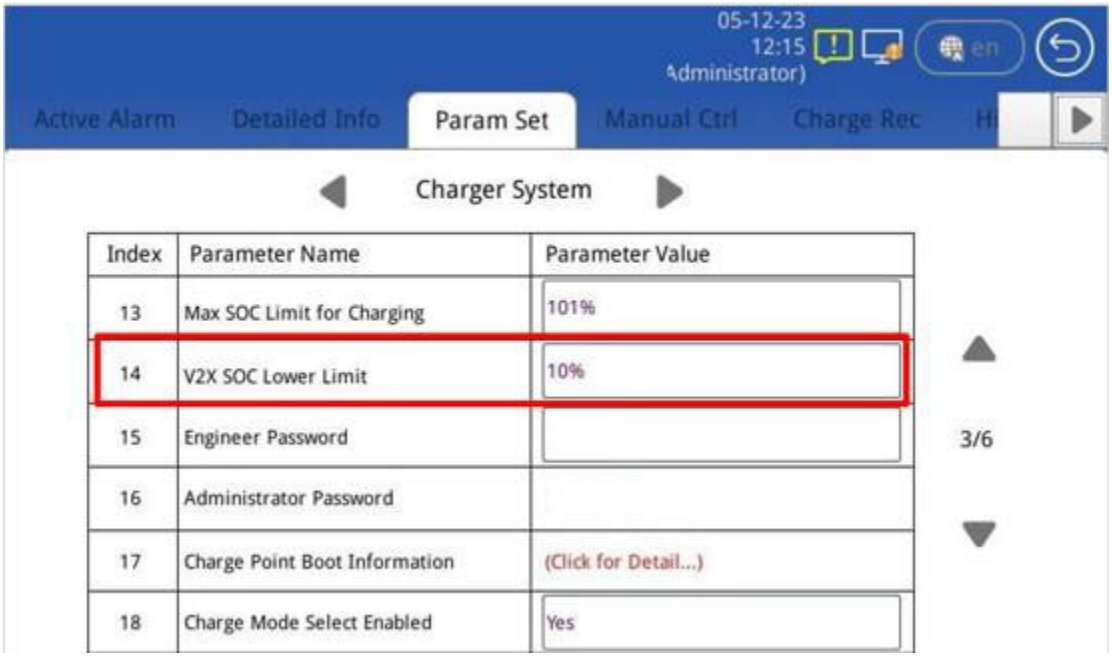
The ICE-22 V2X is prepared to charge electric vehicles according to the charging systems mentioned.

6.1.1) CCS1 Connector

6.2) Operation Instructions

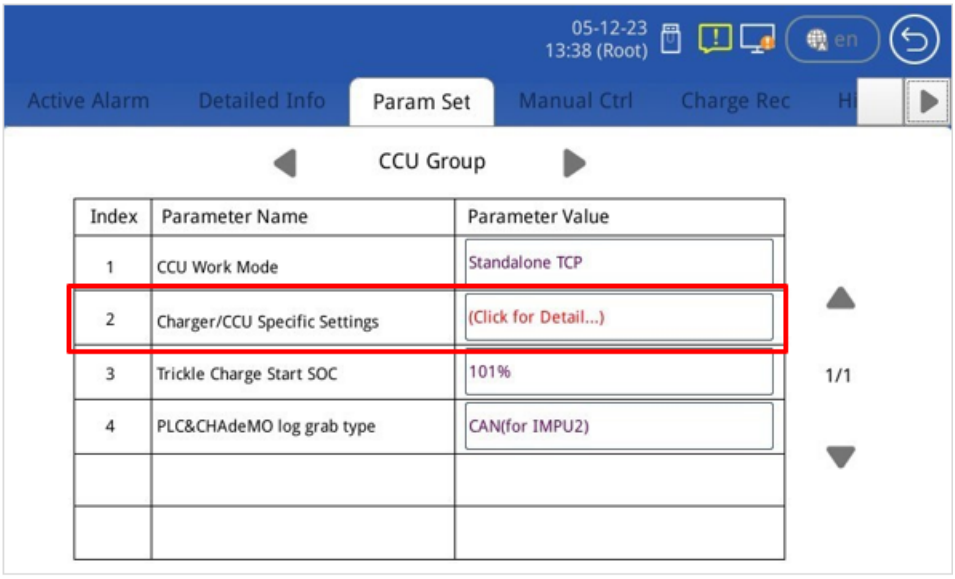
6.2.1) Setting the Discharge Cutoff Conditions

- Contact InCharge Energy to set proper discharge cutoff settings. The value of "V2X SOC Lower Limit" would be changed to a percentage, such as 30%. The V2X charger will stop discharging when the vehicle battery SOC reaches 30% in this example.

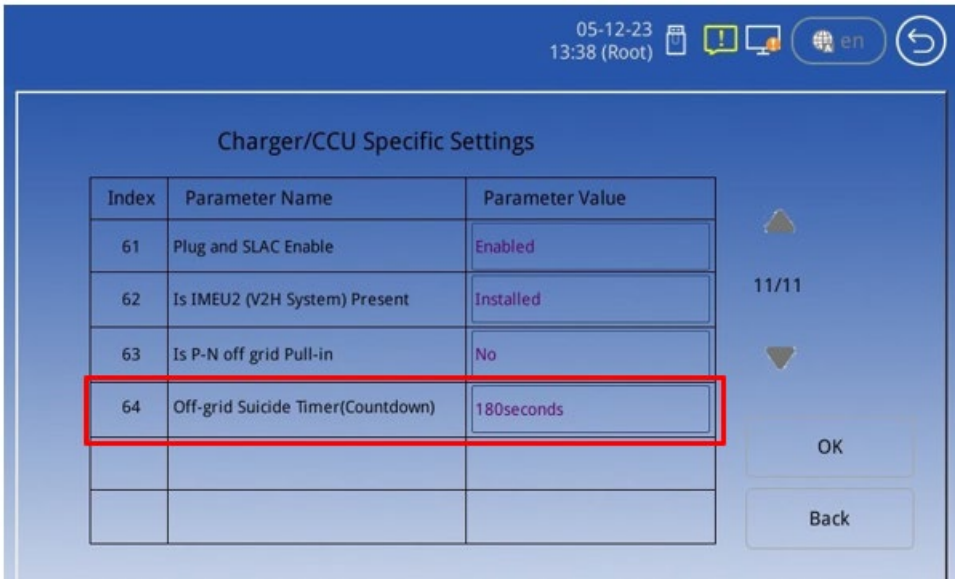


6.2.2) Off-Grid Standby Time Setting

- When the power grid suddenly loses power, the V2G charger automatically enters the off-grid interface and starts the standby countdown. The default time is 3 minutes. If there are no dischargeable vehicles connected or the user does not start off grid discharge after 3 minutes, the control system will automatically power off to save the backup battery's power. The maximum standby time can be set to 15 minutes. If you miss this process and the charger goes into standby, you can press the backup battery button (As seen in the red square above on the bottom right side of the EVSE) to restart the timer. Contact InCharge Energy to customize the standby time.

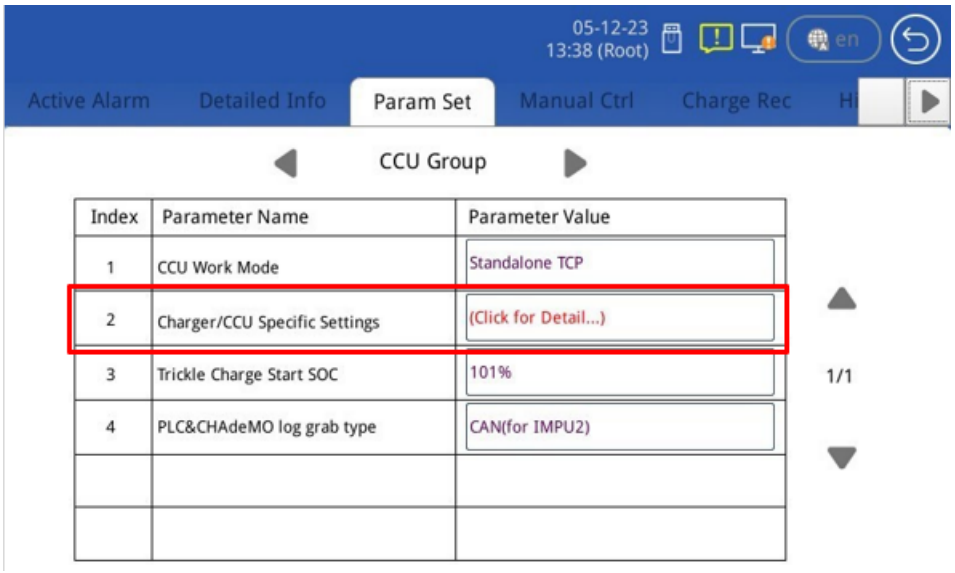

05-12-23
13:38 (Root)
en
Active Alarm
Detailed Info
Param Set
Manual Ctrl
Charge Rec
CCU Group
Index
Parameter Name
Parameter Value
1
CCU Work Mode
Standalone TCP
2
Charger/CCU Specific Settings
(Click for Detail...)
3
Trickle Charge Start SOC
101%
4
PLC&CHAdeMO log grab type
CAN(for IMPU2)
1/1

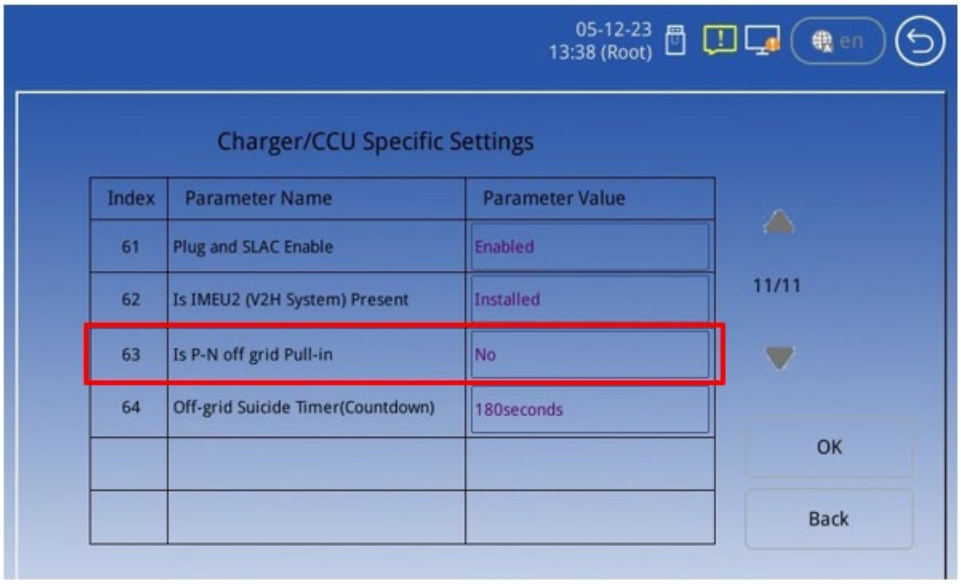

05-12-23
13:38 (Root)
en


05-12-23
13:38 (Root)
en
Charger/CCU Specific Settings
Index
Parameter Name
Parameter Value
61
Plug and SLAC Enable
Enabled
62
Is IMEU2 (V2H System) Present
Installed
63
Is P-N off grid Pull-in
No
64
Off-grid Suicide Timer(Countdown)
180seconds
11/11
OK
Back

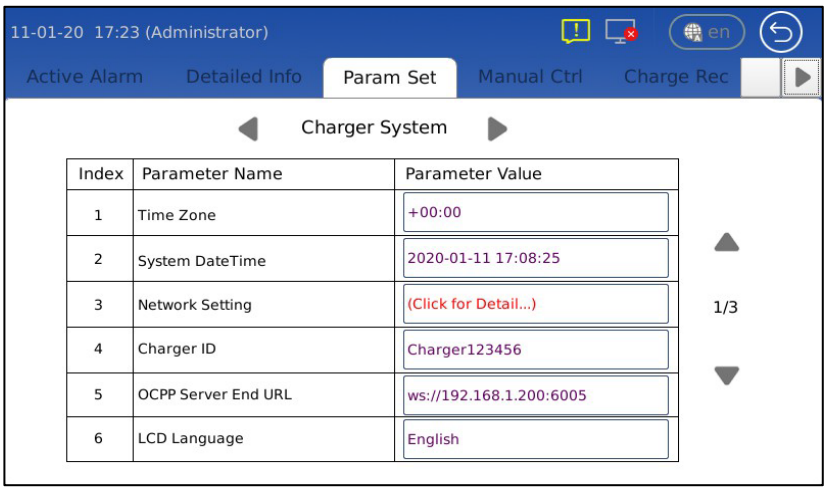
6.2.3) Create Stand-Alone Inverter Supply Earthing System

- You can set "Is P-N off grid Pull in" to “Yes” according to local regulations. When the system is in off grid discharge mode, it will automatically short circuit the neutral wire to the PE wire to ensure electrical safety. Contact InCharge Energy to validate this setting.





6.3) Ethernet and OCPP Setting



Here are basic descriptions of these parameters:

- **Time zone:** this determines the local time display on LCD. Please change it according to local time zone (Note this parameter only takes effect via LCD, that means even if charger is connected to OCPP server, this parameter is not affected).
- **System Date Time:** local system date time. Please set this along with time zone together.
- Network Setting: you can enter the sub-setting page to configure the network environment. Please refer to the next section for more details.
- **Charger ID & OCPP Server End URL:** these 2 parameters are for OCPP server communication. Please refer to the related sections below for more details.
- **LCD Language:** you can change the display language here. This has the same effect with the home page language selection dialog.
- There are 2 standard parameters for back-end setting. Please get them from the back-end supplier.
    - Charger ID
    - OCPP Server End URL

Example 1: for a charge point with identity “CP001” connecting to a Central System with OCPP-J endpoint URL "ws://centralsystem.example.com/ocpp" this would give the following connection URL:

ws://centralsystem.example.com/ocpp/CP001

Figure 6.1: Example of OCPP-J 1.6 Spec

- **Notes:** The protocol upper controller supports OCPP-J 1.6 and 2.0.1. Please refer to the OCPP official documents if you have any questions about the above 2 parameters or the protocol itself.

6.3.1) Connection Check

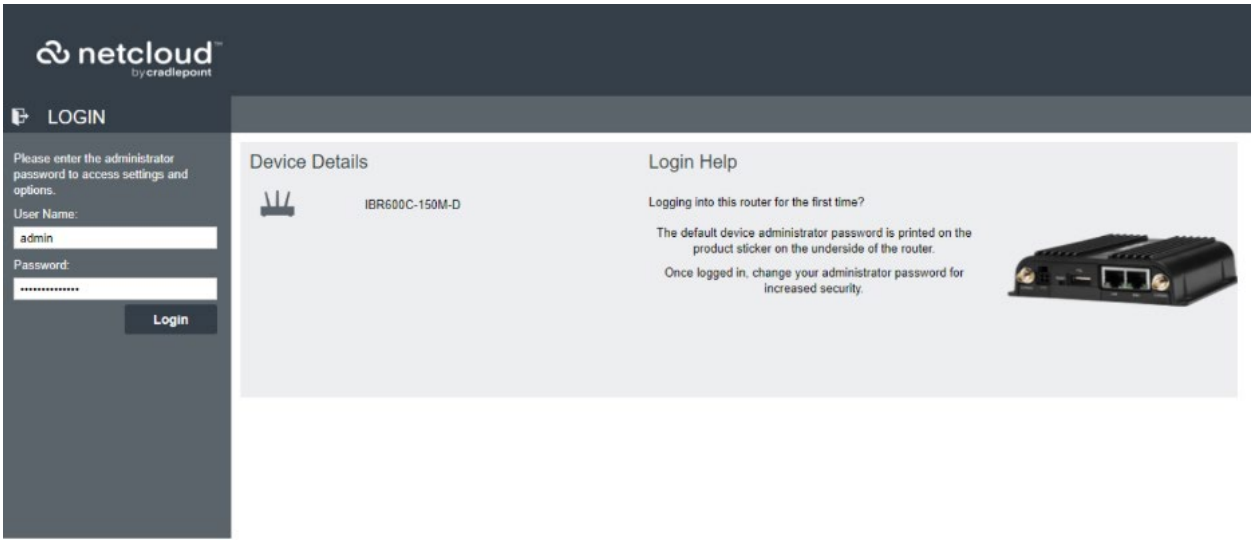
- If the above settings are done properly, you should see the ' 

' icon on screen (without reboot).
- Check the OCPP Platform for proper communication of the charger. Seeing the icon on the display screen only shows the charger is connected to the system but does not show the system sees the charger properly.

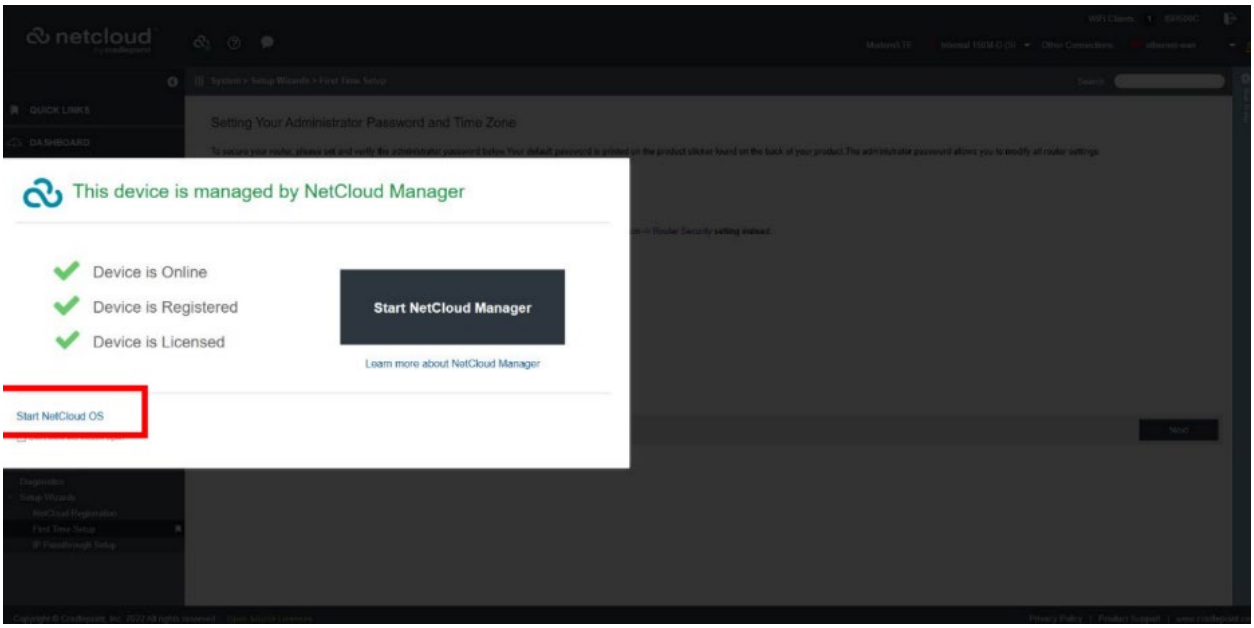
6.4) Network Setting

6.4.1) Router Set Up

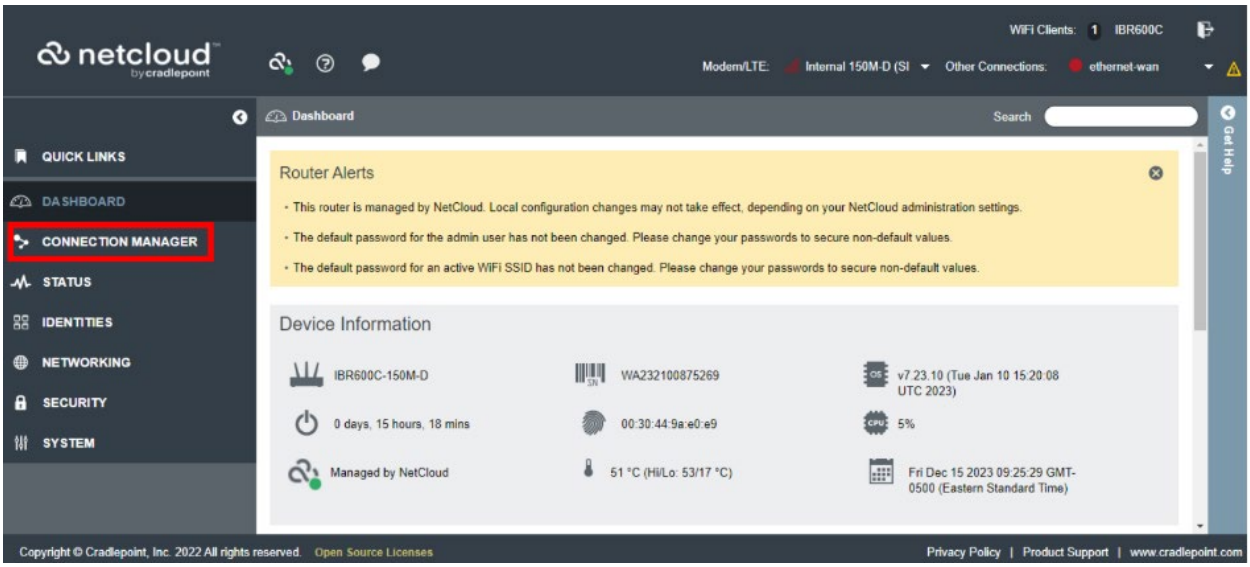
- Look at the WIFI networks on your computer and locate the Cradlepoint Network. Connect to the Cradlepoint Wi-Fi network (Ex: IBR600C-1D7) and enter the password from the back of the device.
- Once connected to the device via WIFI, Launch a browser in either Google Chrome or Firefox, and type in 192.168.0.1



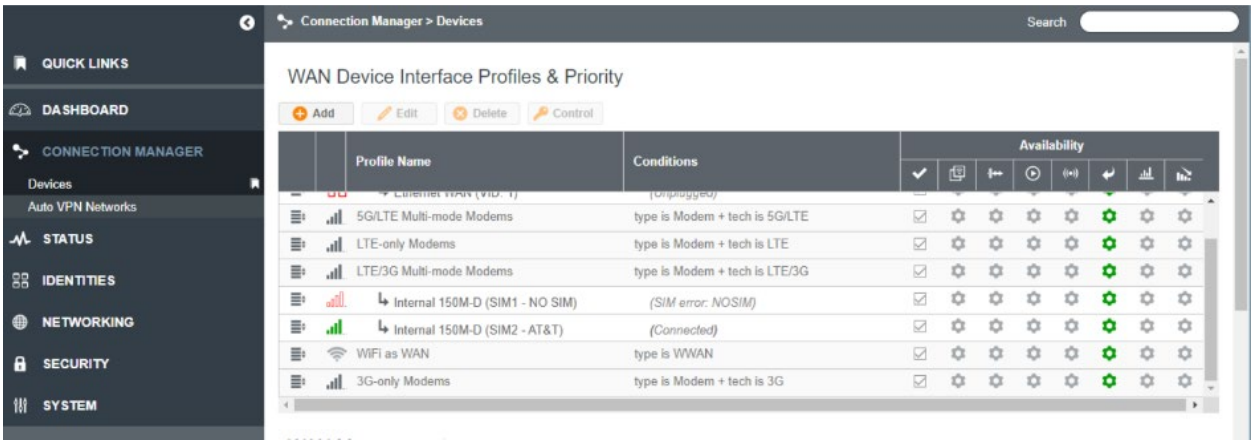
- For the Log in information, the username is (admin) and the password (Serial number from the back of the device, Ex: WA223200738571). Please note that the password is case sensitive.



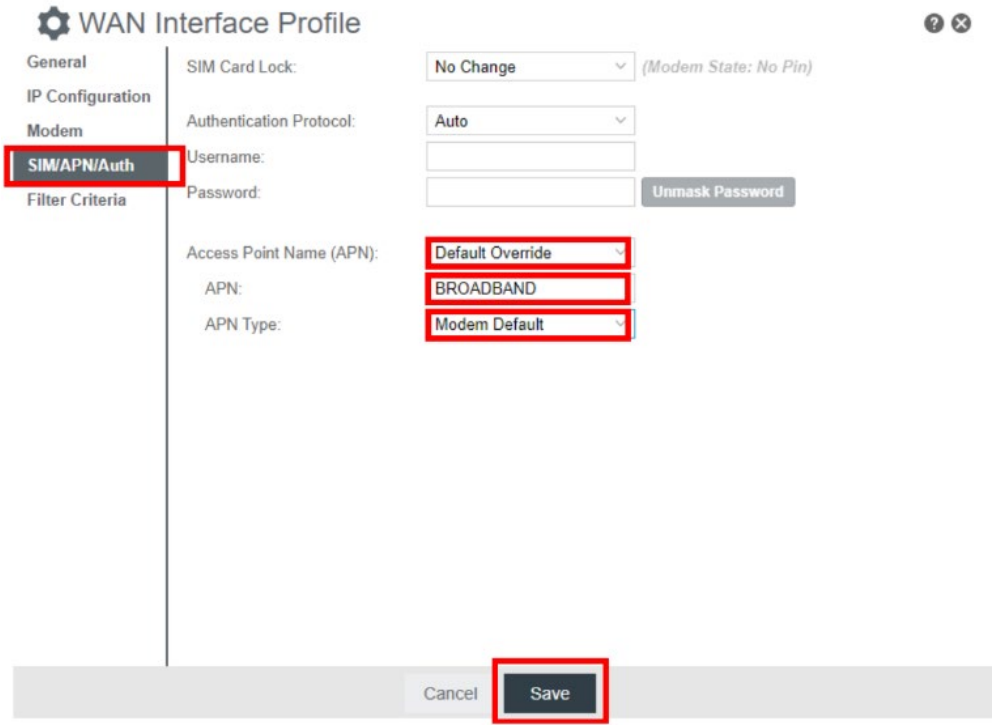
- Once logged in, click (Start NetCloud OS) and the Dashboard will launch.



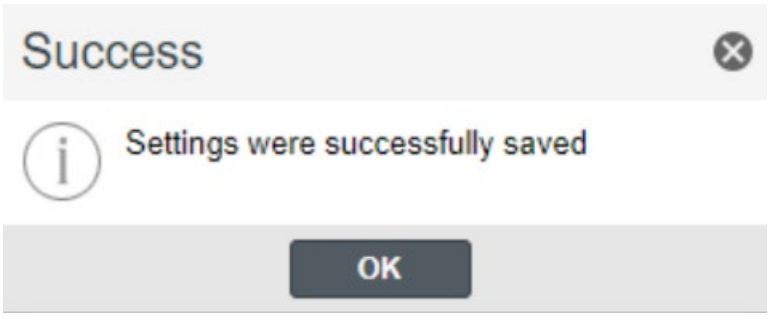
- On the left side of the dashboard, click (Connection Manager)



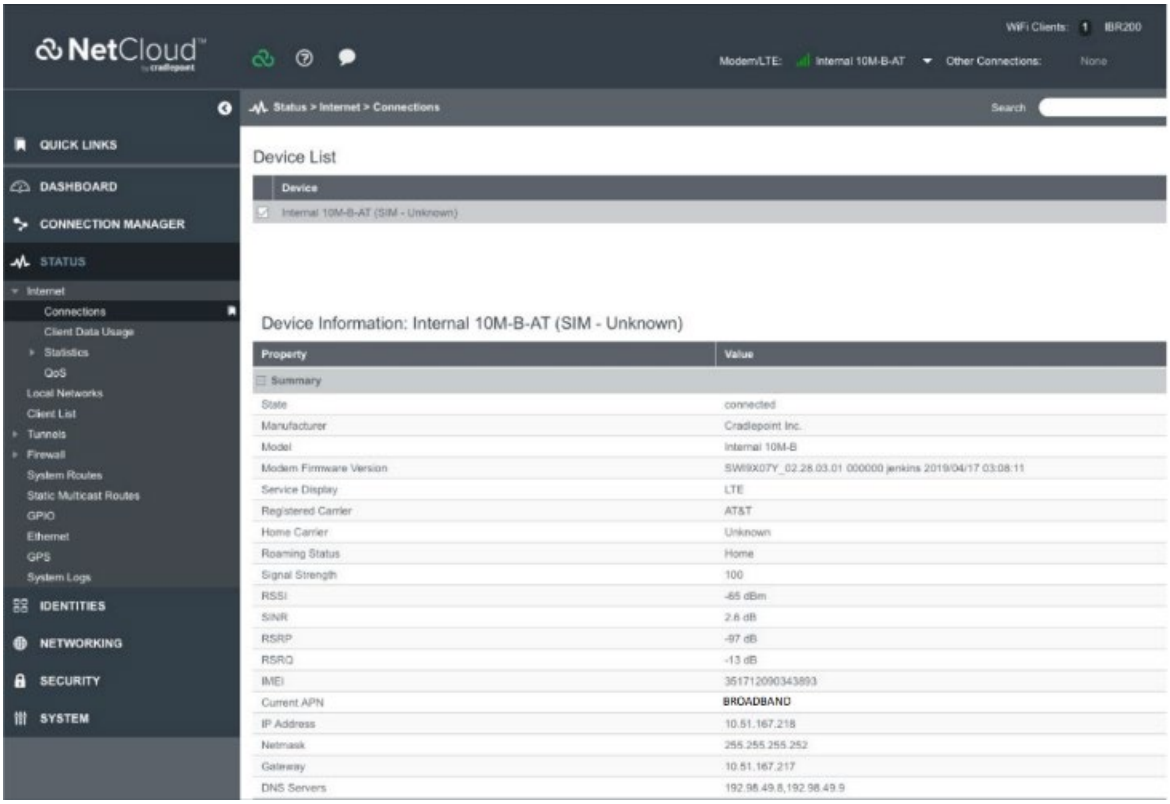
- Click (Internal 150M-D (SIM2 – AT&T) from the list. Please note that the error (CPPM Failed: Carrier Reject) means the APN has not yet been provided.



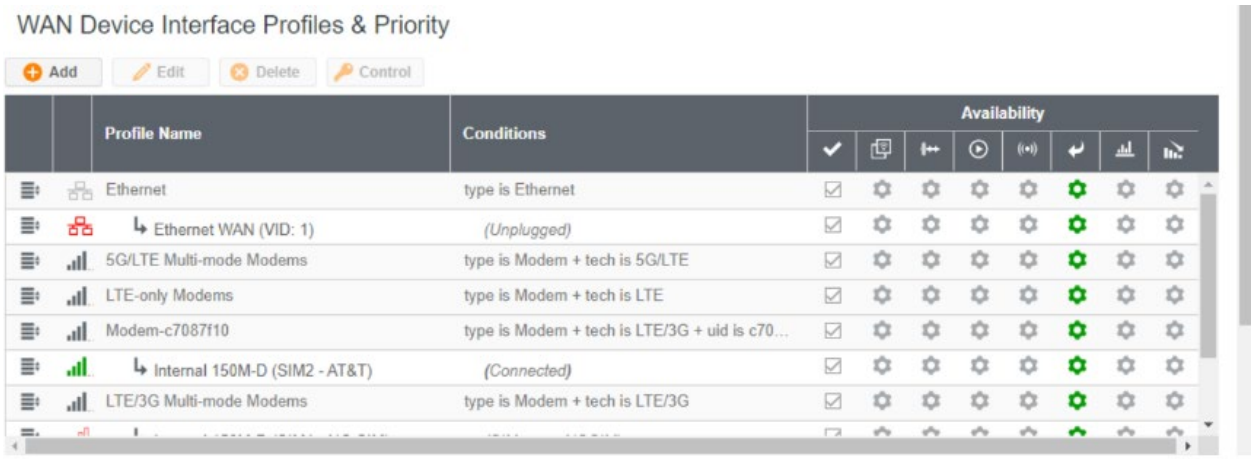
- Right click on the (Internal 150M-D (SIM2 – AT&T) and click (Edit)
- Click (SIM/APN/AUTH)
- Set Access Point Name (APN) to “Default Override”
- In the APN field, type in (BROADBAND)

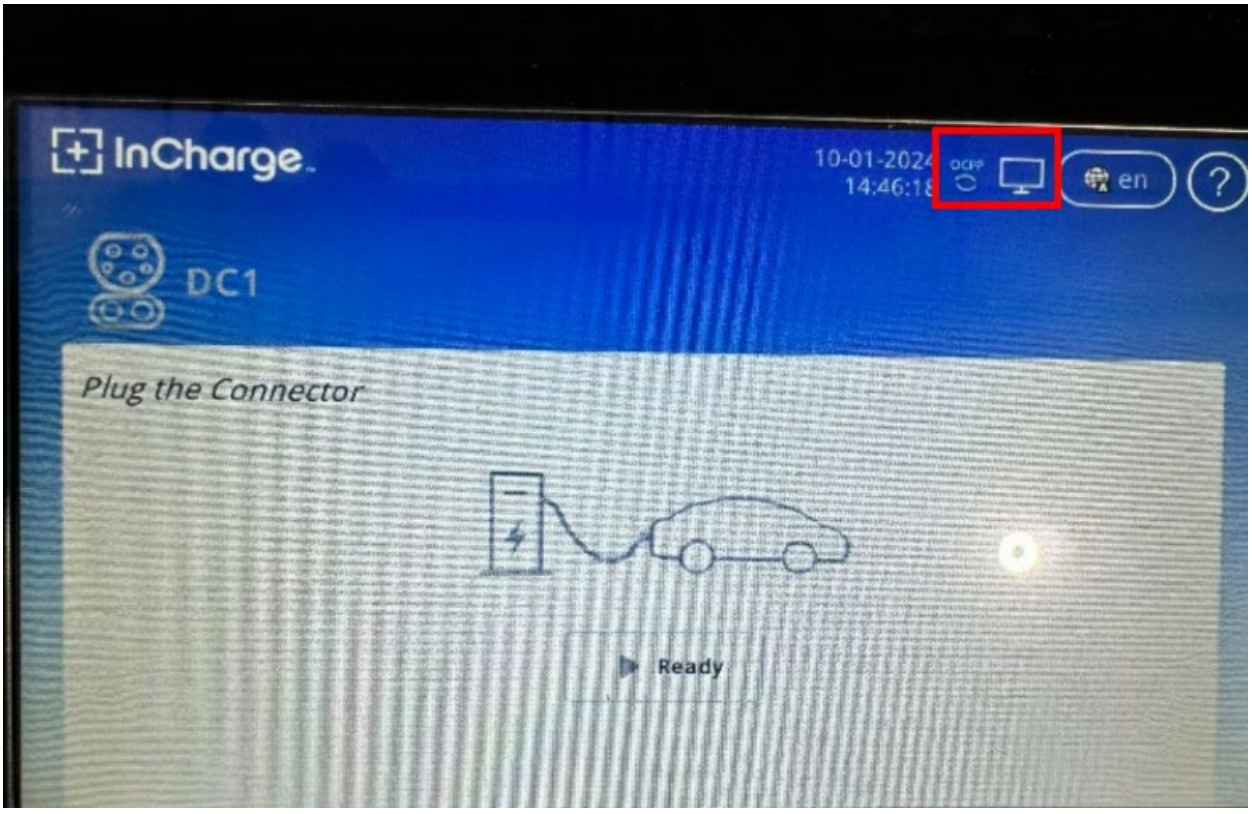


- Click Save
- The device will now be rebooted.



- To check signal strength --> On the dashboard --> click Status --> Internet --> Connections --> and it will show the device information.





- Verify the EVSE shows these icons in the upper right corner.
- After verification, then the Device is now ready to use.

6.4.2) Wireless Network Configuration

- First, check if your system is equipped with an external wireless router.
- This router is installed inside the Power Cabinet and is interconnected with the Network Switch with a RJ45 network cable. The router is usually pre-installed along with the charger before leaving the factory, therefore the only thing needed to ensure it is operating properly.

6.4.3) Wired Network Configuration

- First, check if your system is equipped with an external wireless router.
- Connect the customer ethernet cable from their router LAN port to the WAN port of the Cradlepoint.

6.5 Charger Software Update

- The charger can update the firmware through OCPP or OEM backend remotely, or local update through USB drive to update the firmware of the upper controller and pilot controller.
- The following figure 6.2 software version is for reference only, the actual situation shall prevail.

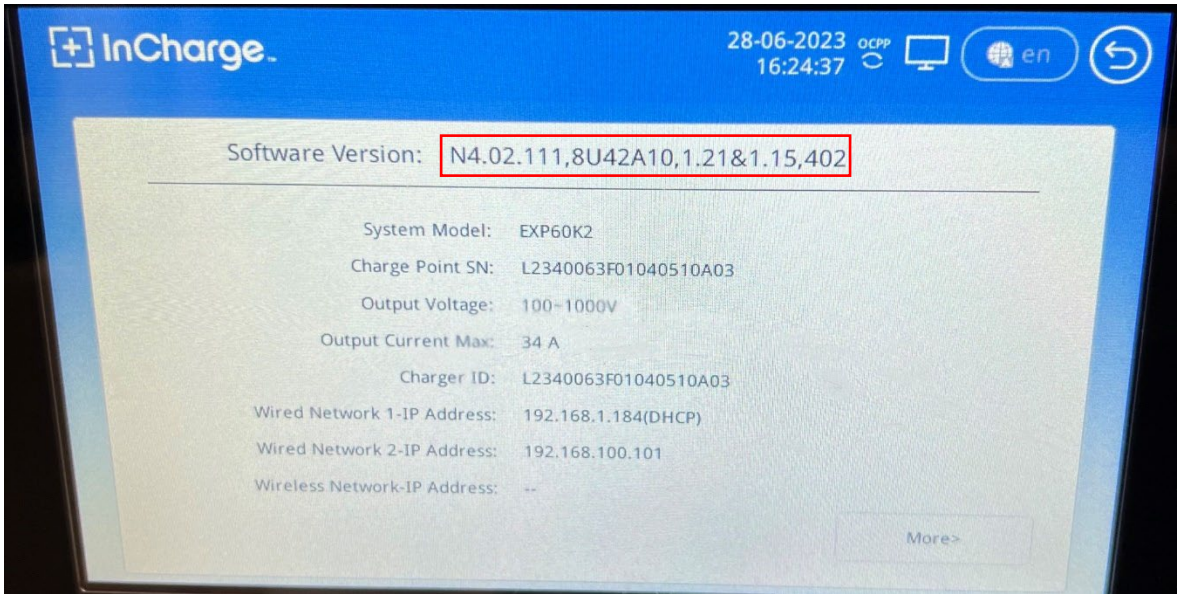
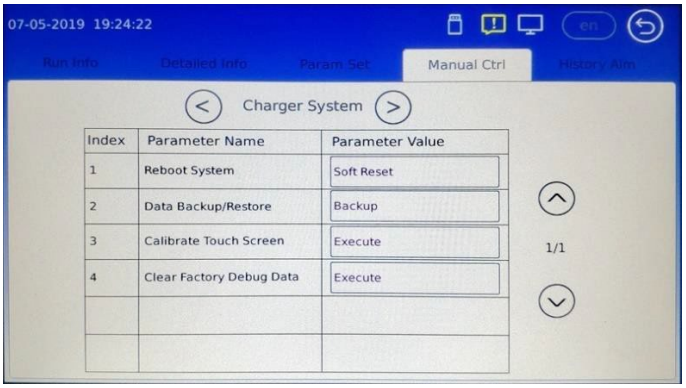


Figure 6.2: Software Version

- CAUTION: It is imperative that the correct firmware be installed into each component. If the incorrect firmware for a component is installed, the component may require replacement and full reprogramming prior to operating properly. Please contact InCharge Support for assistance.

6.5.1) Upper Controller Update

- For upper controller's update, firstly power on the controller, and then plug the USB drive into the controller's USB inlet, and then go into the setting in "Manual Ctrl" --> "Charger System" --> "Reboot System", need to input "Soft Reset", and waiting the automatic update finish, and then take off the USB disk. Check the software version as shown in Figure 6.3.



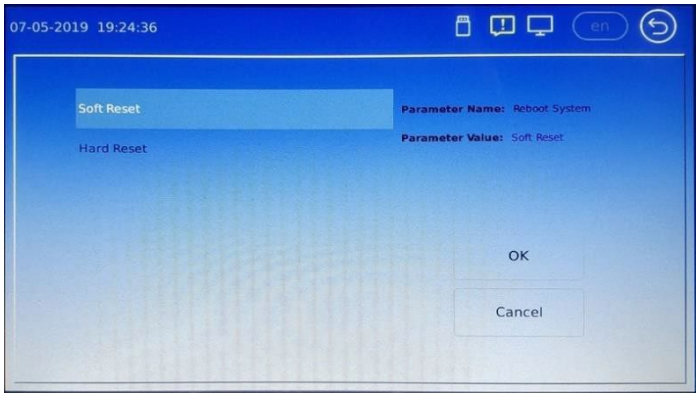


Figure 6.3: Software Version

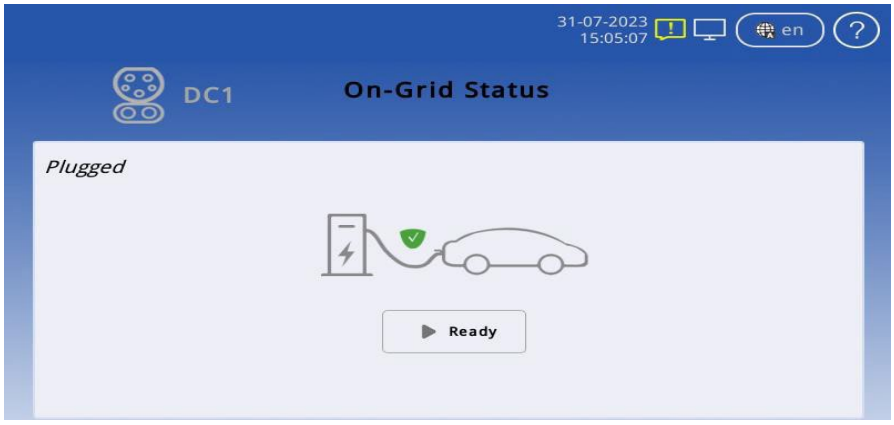
6.5.2) Pilot Controller Update

- For pilot controller's update, firstly power on the controller, and then plug the USB disk into the controller's USB inlet. Then restart the system (disconnect the auxiliary switch, then close it again). Pay attention to the sound. After hearing three beeps, it means the upgrade is complete. You can pull out the USB drive. Check the software version as shown in Figure 6.4.

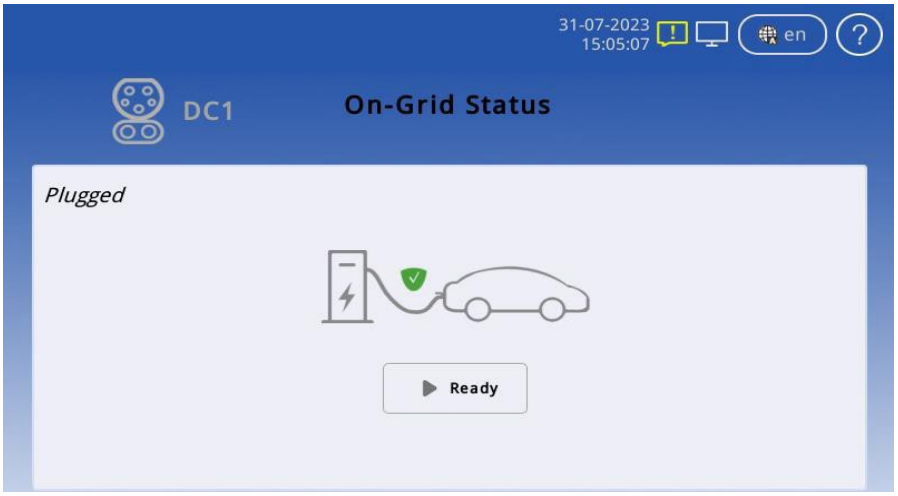
Figure 6.4: Software Version

6.5.3) Charging/Discharging Steps

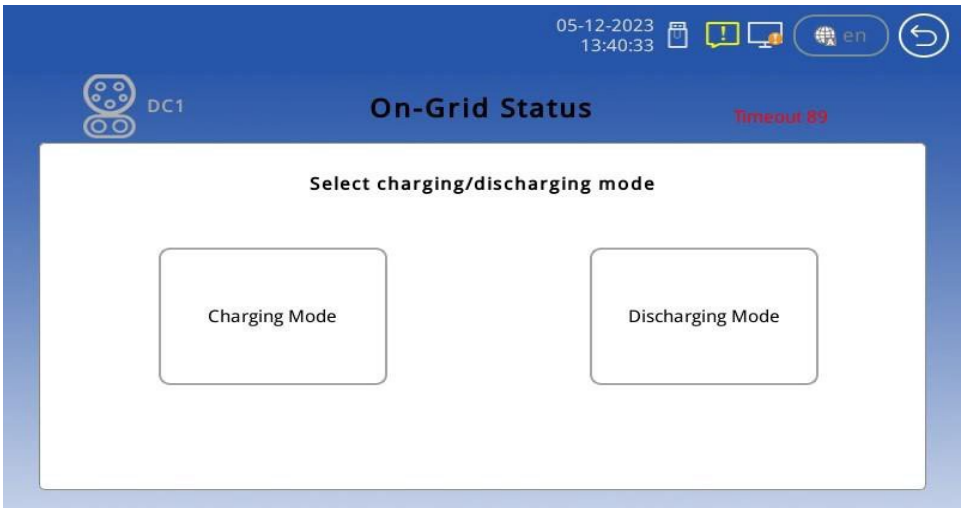
- When a user starts a session with an ICE-22 V2X, the HMI will display the following screen.



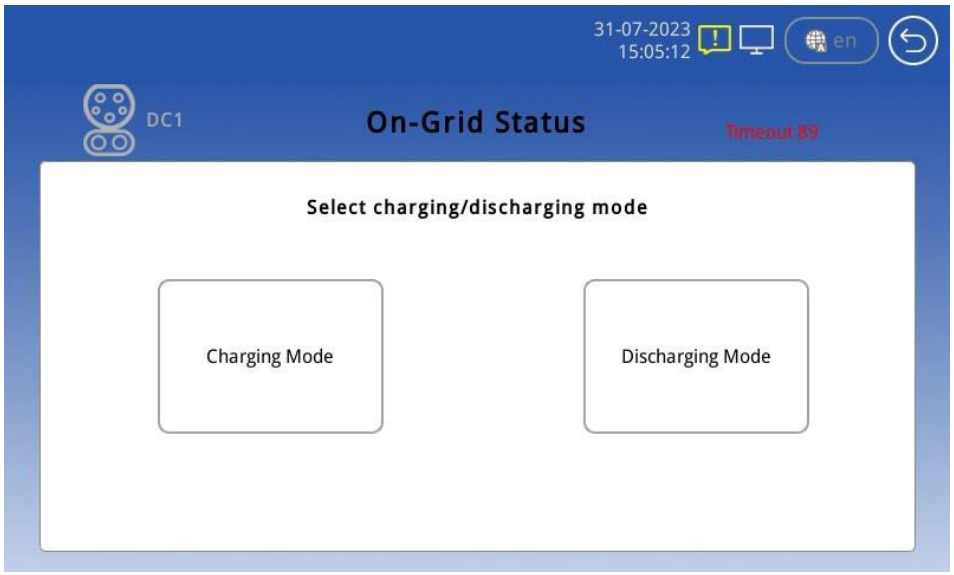
- Plug the charging connector into the vehicle's charging inlet.

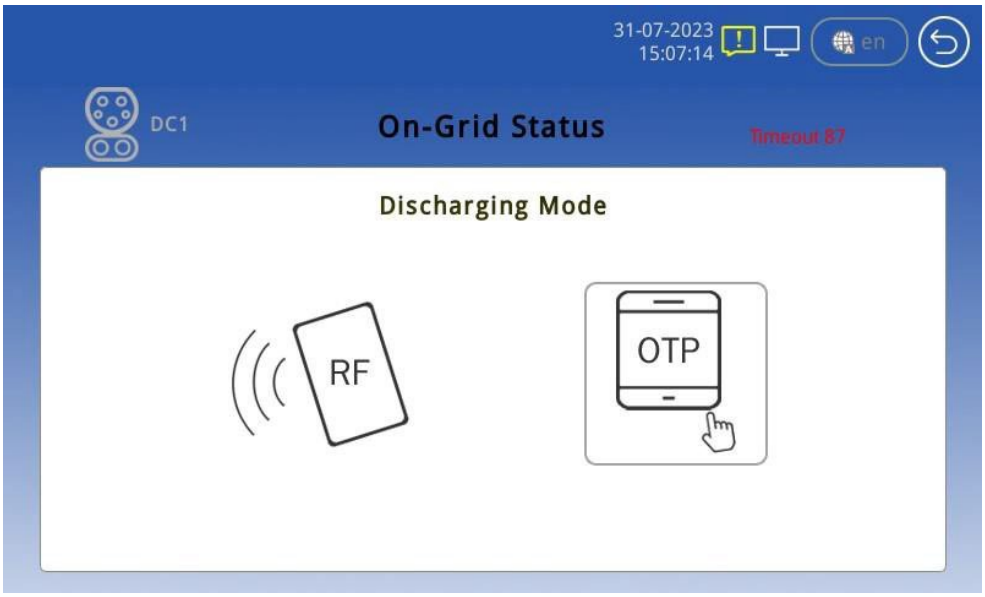


- Start charging/discharging on the screen

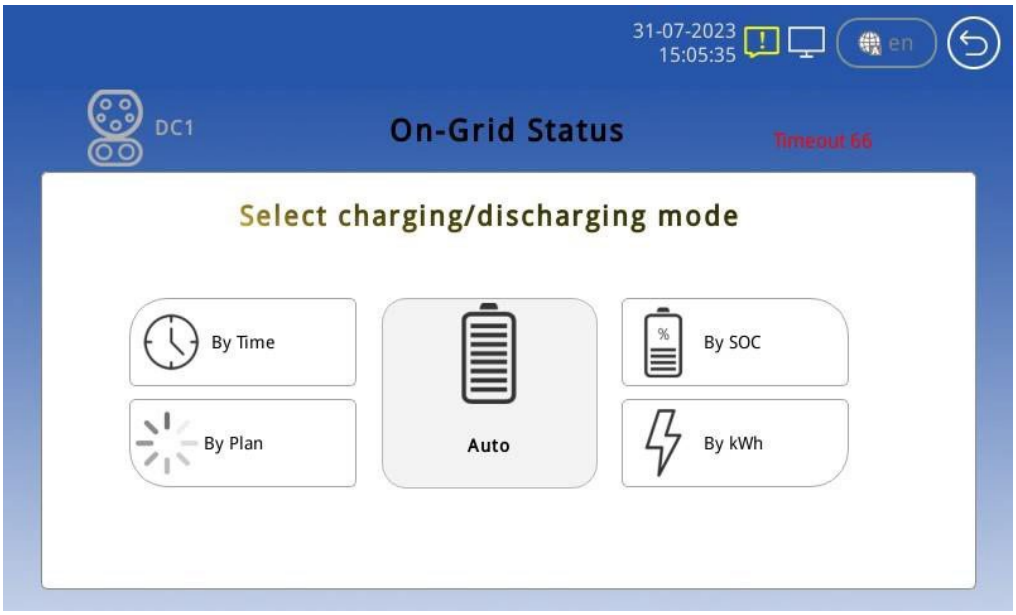


- Waiting for charging/discharging

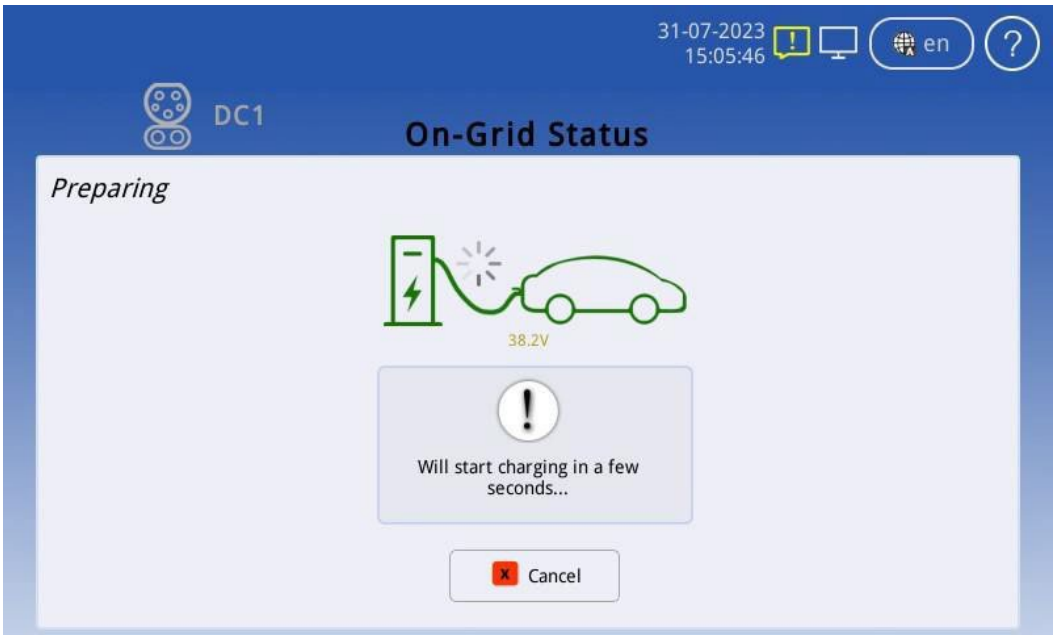




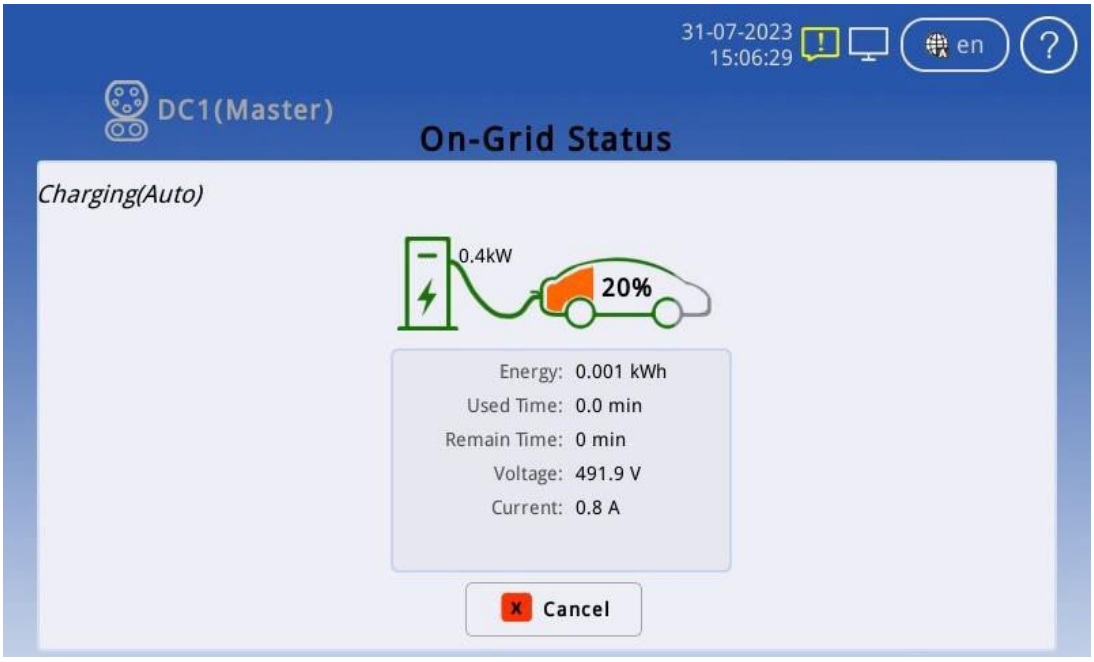
- After passing verification, enter the “starting up” page and select a charging mode to begin.



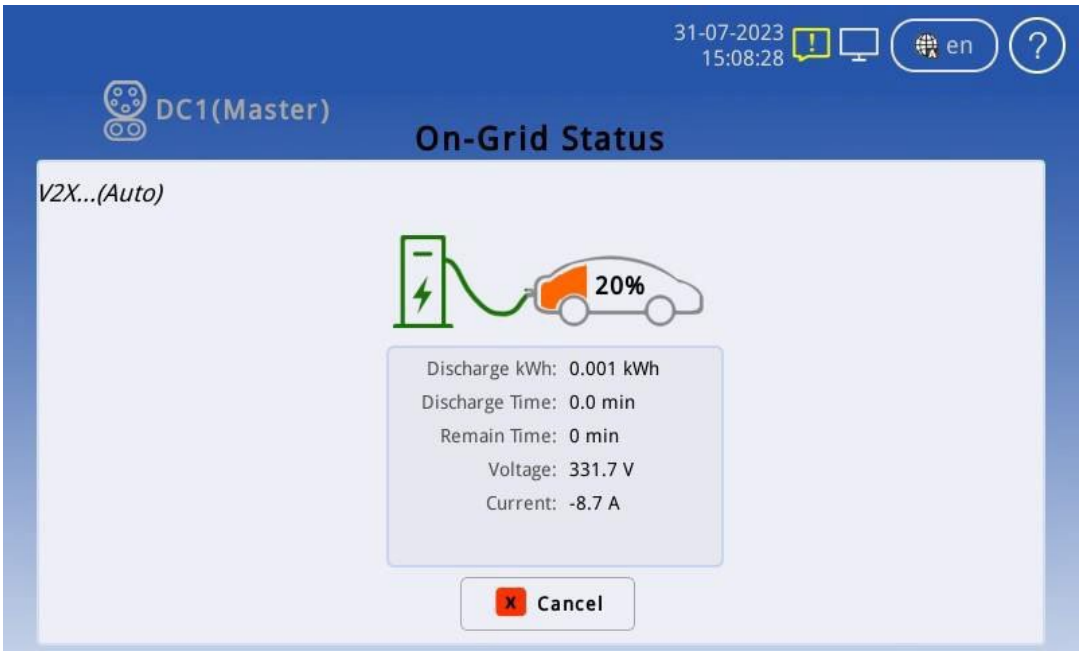
- Starting up successfully, now “Charging”



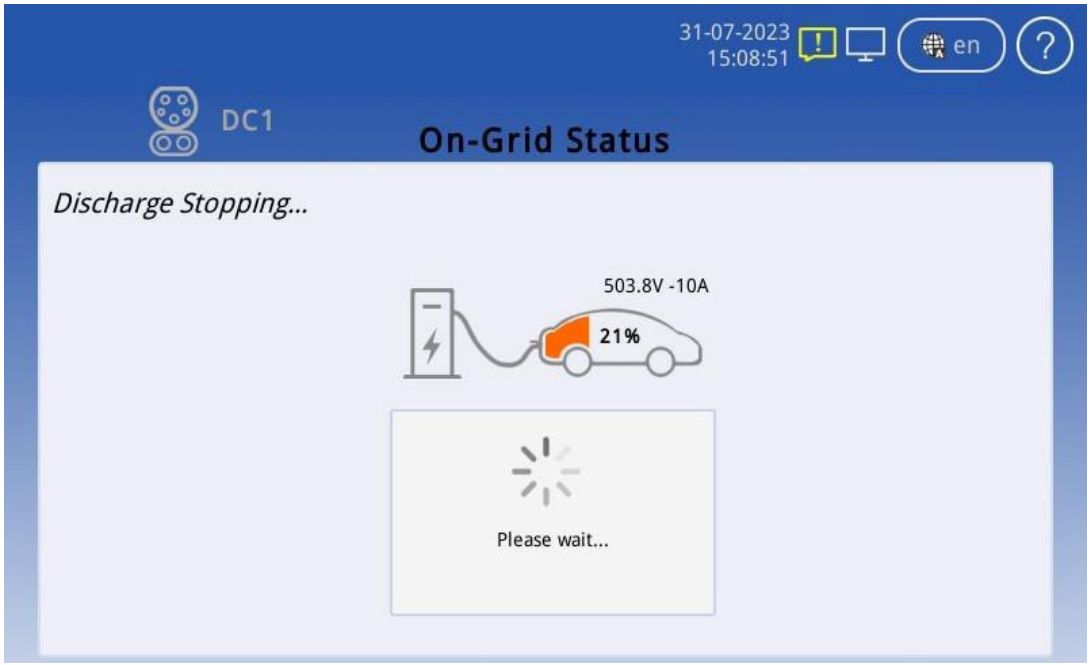
- After the vehicle is fully charged or reaches the SOC discharge cut off condition, stop the charging/discharging session and unplug the connector from the vehicle.
- Charging interface, current display positive value.



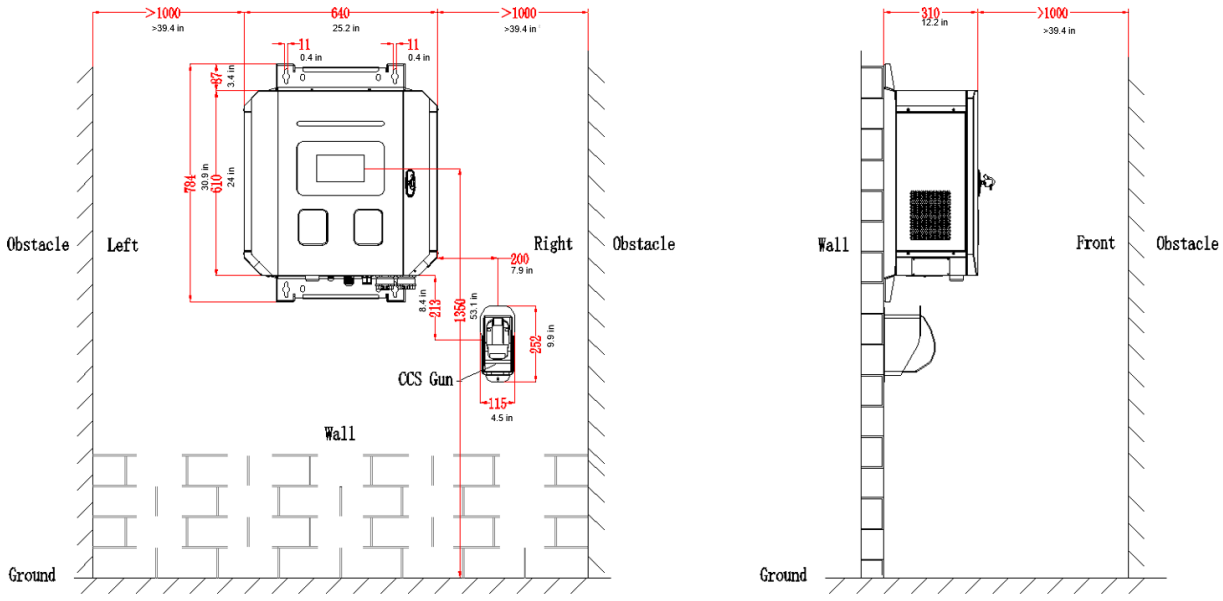
- Discharging interface, current display negative value



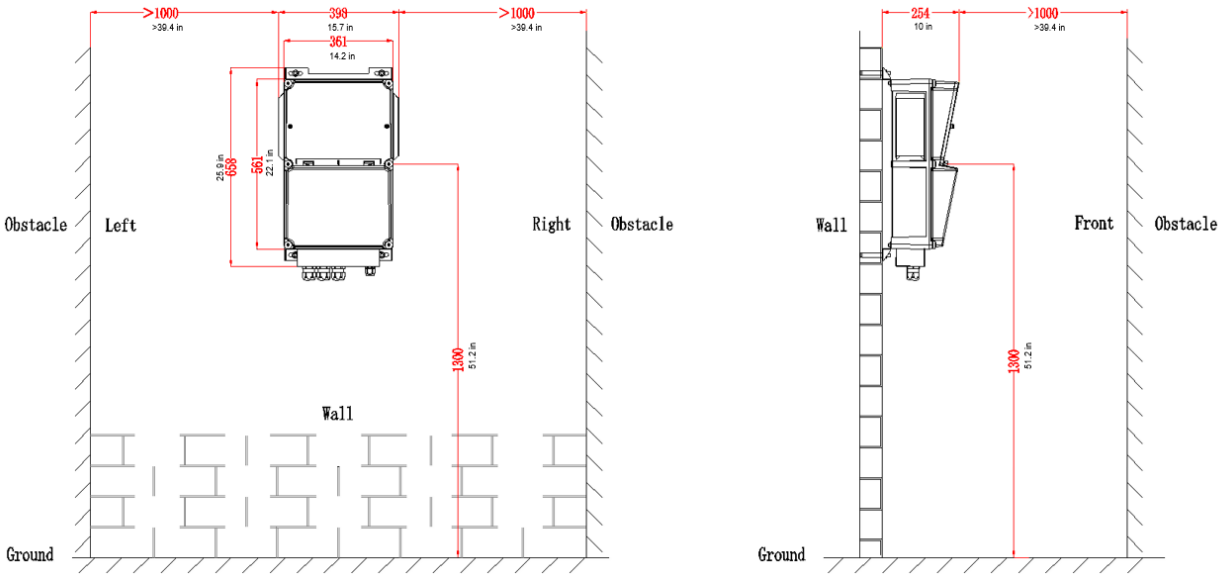
- Stop Interface



Appendix 1) Engineering and Technical Parameters

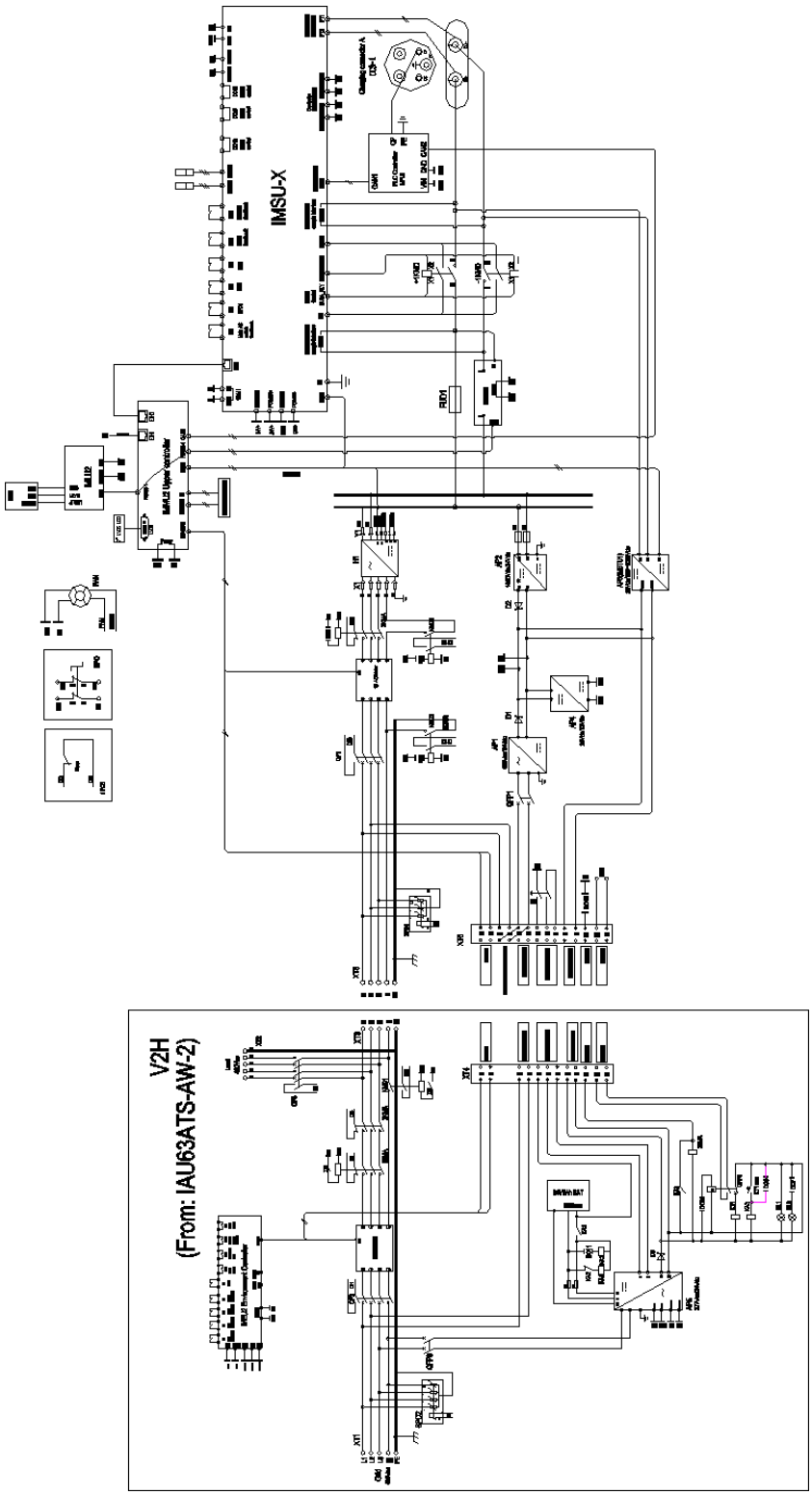


ICE-22 V2X: Dimensional view

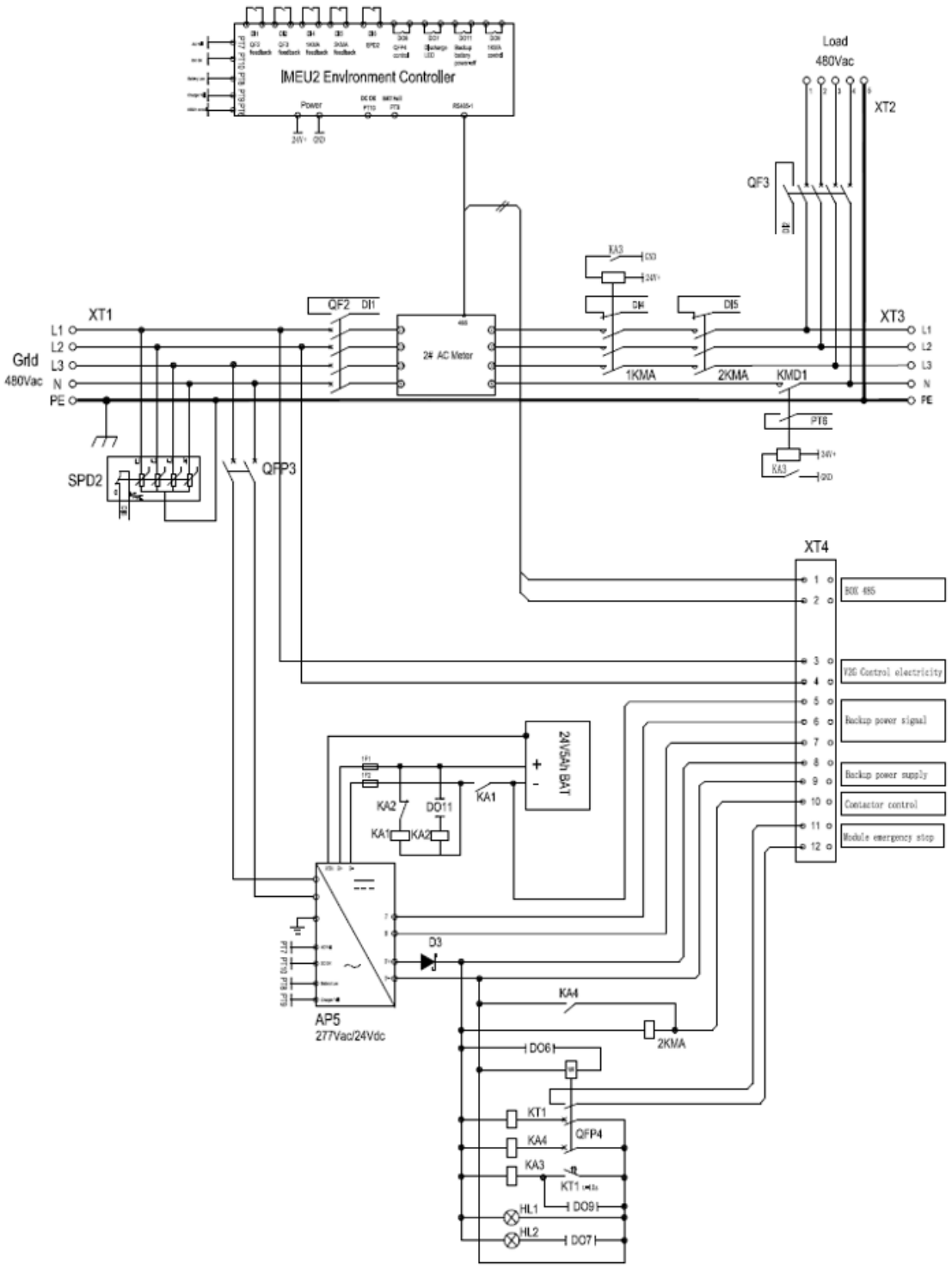


V2X Off Grid Box: Dimensional View

Appendix 2) ICE 22 V2X and Off Grid Box Schematic Diagram



Appendix 3) V2X Off Grid Box Schematic Diagram



Appendix 4) Maintenance

1.) Maintenance Table

Hardware Torque Values

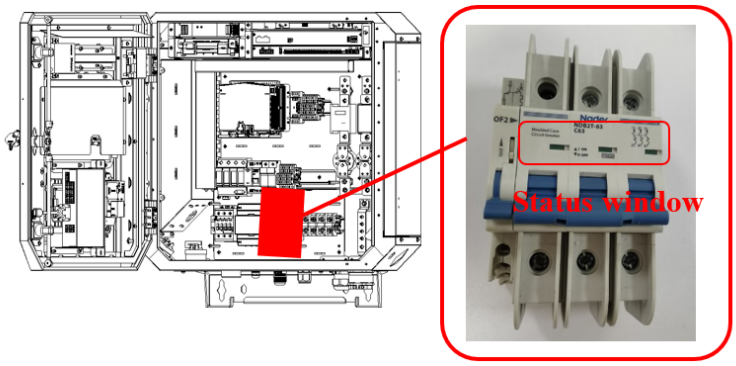
Screw specification (applicable scenario)	Normal torque (kgf.cm)	Normal torque (in-lbs)	Primary tightening tool	Secondary tightening tool
M4 (connection between DC contactor and copper bar)	12±10%	10.4±10%	Electric screwdriver	torque screwdriver
M5 (connection between air switch/lightning arrester and cable)	18--20	15.6±10%	Electric screwdriver	torque screwdriver
M5 (connection between copper bars and between cable and terminal)	30±10%	26±10%	Electric screwdriver	Cross screwdriver or torque screwdriver
M6 (connection between copper bars and between cable terminals)	45±10%	39.1±10%	Electric screwdriver	Cross screwdriver, torque screwdriver or wrench
M6 (connection between AC contactor and cable)	45±10%	39.1±10%	Electric screwdriver	Slot-type screwdriver and torque screwdriver
M6 (connection between DC contactor and copper bar)	45±10%	39.1±10%	Electric screwdriver	Torque screwdriver or wrench
M8 (connection between copper bars and between shunt and copper bar)	110±10%	95.4±10%	Electric screwdriver	Wrench, rocker arm or torque wrench
M8 (connection between DC contactor and copper bar)	100±10%	86.7±10%	Electric screwdriver	Wrench, rocker arm or torque wrench
M10 (connection between copper bars and between shunt and copper bar)	220±10%	191±10%	Electric screwdriver	Wrench, rocker arm or torque wrench
M12 (connection between copper bars)	390±10%	338.5±10%	Electric screwdriver	Wrench, rocker arm or torque wrench
Screw specification (applicable scenario)	Normal torque (kgf.cm)	Normal torque (in-lbs)	Primary tightening tool	Secondary tightening tool
M4 (connection between DC contactor and copper bar)	12±10%	10.4±10%	Electric screwdriver	torque screwdriver

2.) Maintenance Operation (ICE-22 V2X)

NO.	Position	Method	Tool	Maintenance cycle
1	AC input main breaker	Visual Check	/	2 months
2	Devices and connection points Main circuit devices (circuit breaker, AC contactor, DC contactor, DC fuse), copper bar, power module connector	Visual Check	Torque wrench	2 months
3	AC SPD	Visual Check	/	3 months
4	Charging plug	Visual Check	Brush	Daily
5	Cooling Fan and Filter cotton	Visual Check	Blower, Screwdriver Soft Brush Vacuum Cleaner	3～6 months
6	ESD	Visual Check	/	Daily
7	Alarm information check	Visual Check	/	Daily

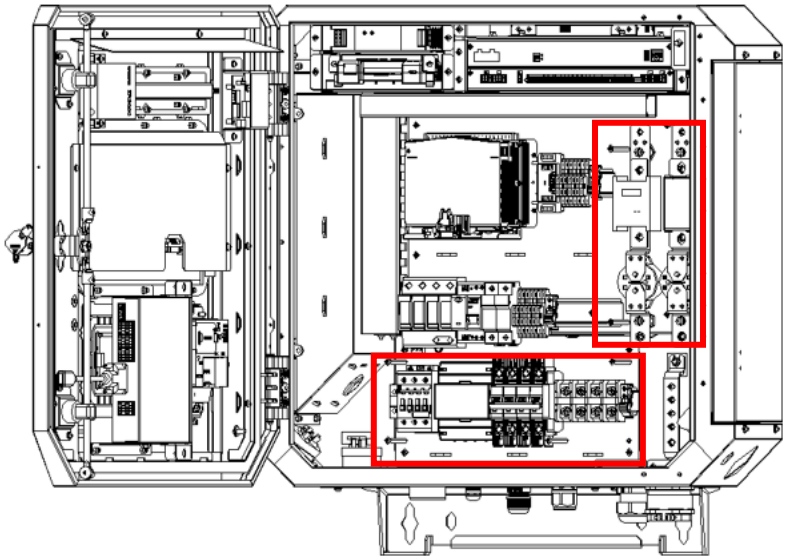
2.1) AC Input Main Breaker

- Check the window of this MCB. Normally, the window will display green when the MCB is disconnected and red when it is closed; If the status is opposite, MCB needs to be replaced



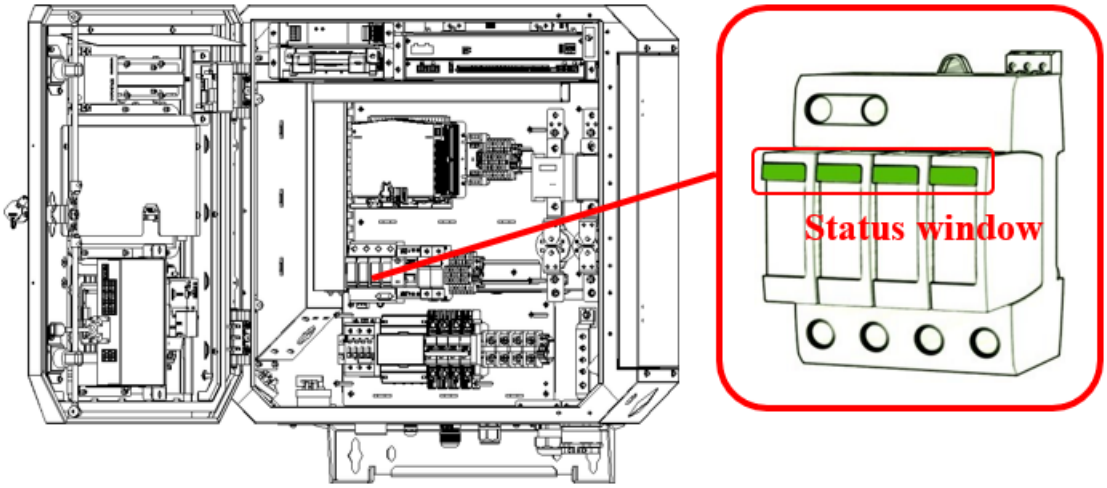
2.2) Devices and Connection Points

- Check the connection points (circle in the picture) between the main circuit components (circuit breaker, AC contactor, DC contactor, fuse) and copper bar or cable, the connection points between copper bar and copper bar, and the connector of power module for burns or serious discoloration. If any are seen, please check the torque and connection according to point 2) and replace the damaged cable.
- Check whether the screw fixing torque mark is normal. If there is any deviation, please retorque with a torque wrench and mark with a marker.



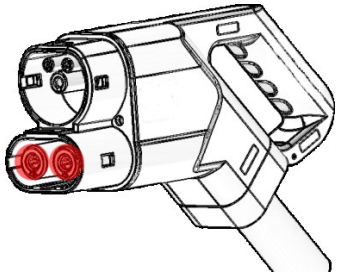
2.3) AC SPD

- Check the status window of SPD. If the window color changes from green to red, it indicates that SPD has been damaged. In this event, the manufacturer will need to be contacted for replacement.



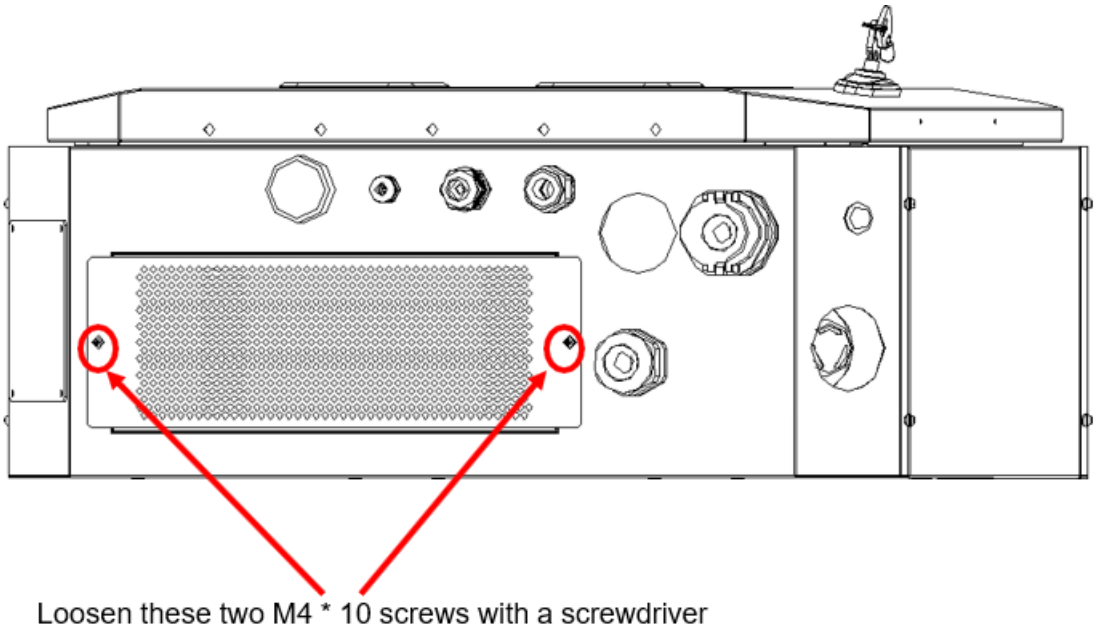
2.4) Charging Plug

- Check whether the charging plug is cracked or damaged. If so, please contact the manufacturer.
- Check whether the DC + and - terminals of the charging plug have obvious burning marks. If so, please contact the manufacturer for treatment.
- Use a brush to remove the dust on the surface of DC + and - terminals.

CCS	CAJ
	

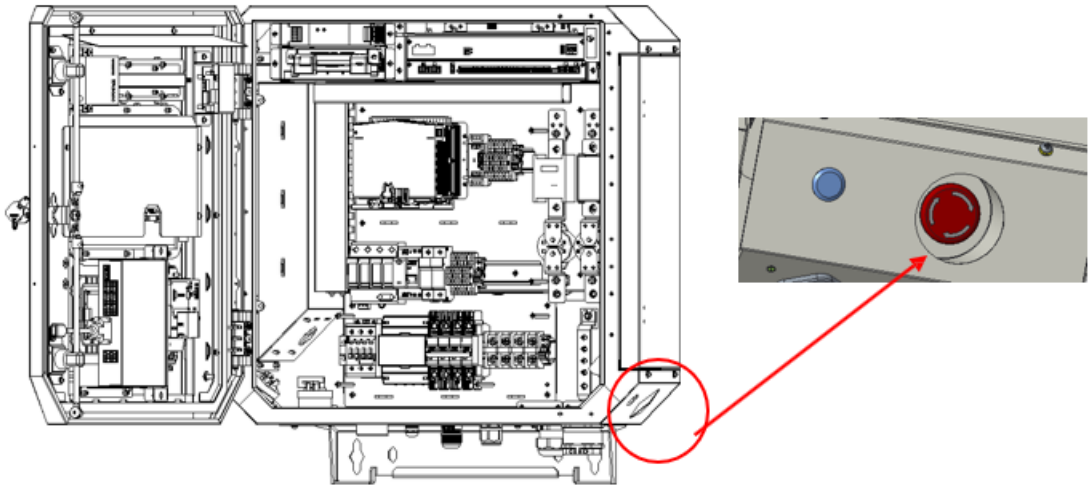
2.5) Cooling Fan and Filter Cotton

- Open the protective plate of the bottom air inlet, as shown in the figure below. After loosening the two screws, the filter plate can be removed.
- Check if there is dust on the bottom dust screen.
- Use the fan to clean the dust on the dustproof net.
- According to the site environment, the dust net shall be effectively removed at least once every three to six months, and it shall be replaced once a year at most.
- Remove the dust screen with a screwdriver, and use a soft brush, blower and vacuum cleaner to remove the dust effectively.
- Use vacuum cleaner and soft brush cloth to effectively remove the sundries and dust in the cabinet.



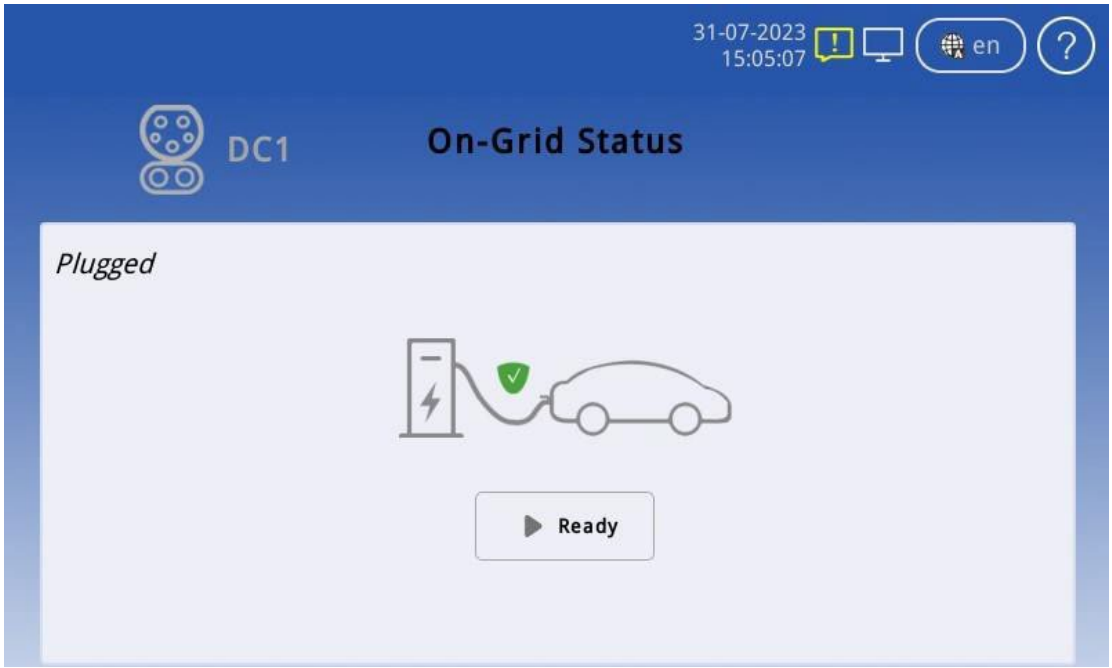
2.6) ESD

- Check the emergency stop cover plate. If the cover plate is damaged, please contact the manufacturer for replacement.



2.7) Alarm Information

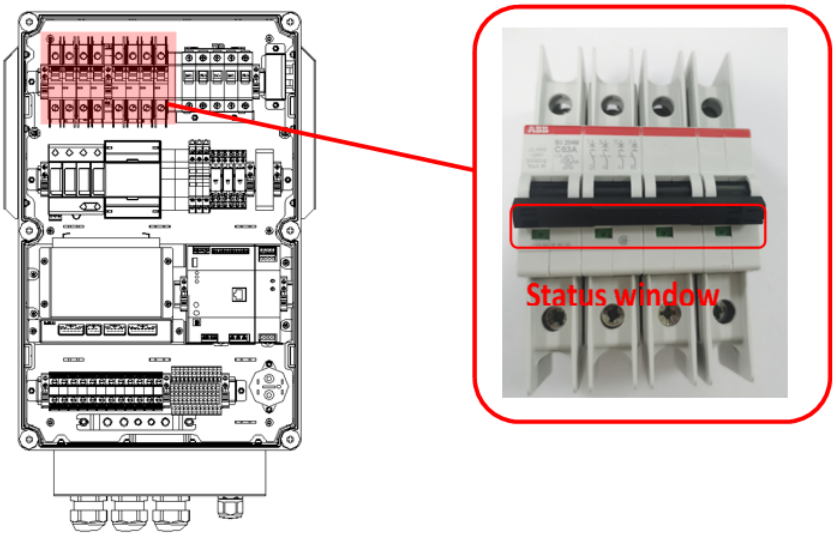
- Click “?” In the upper right corner of the screen to view the alarm information.
- If there is alarm information, it should be handled immediately. If it cannot be handled, contact the manufacturer to handle it.



3.) Maintenance Operation (V2X Off Grid Box)

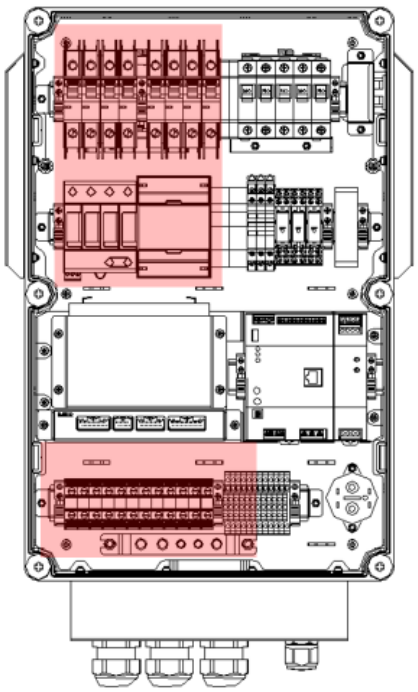
NO.	Position	Method	Tool	Maintenance cycle
1	MCB	Visual check	/	2 months
2	Devices and connection points Main circuit devices (circuit breaker, AC contactor), copper bar	Visual check	Torque wrench	2 months
3	AC SPD	Visual check	/	3 months

3.1) MCB



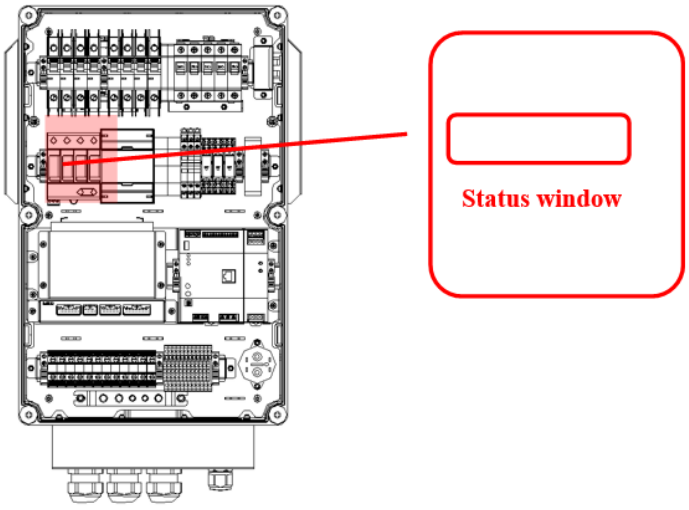
3.2) Devices and Connection Points

- Check the following marked areas the connection points between the main circuit components (circuit breaker, AC contactor, DC contactor, fuse) and copper bar or cable, the connection points between copper bar and copper bar, and the connector of power module for burns or serious discoloration.
- Check whether the screw fixing torque mark is normal. If there is any deviation, please re torque with a torque wrench and mark with a marker.

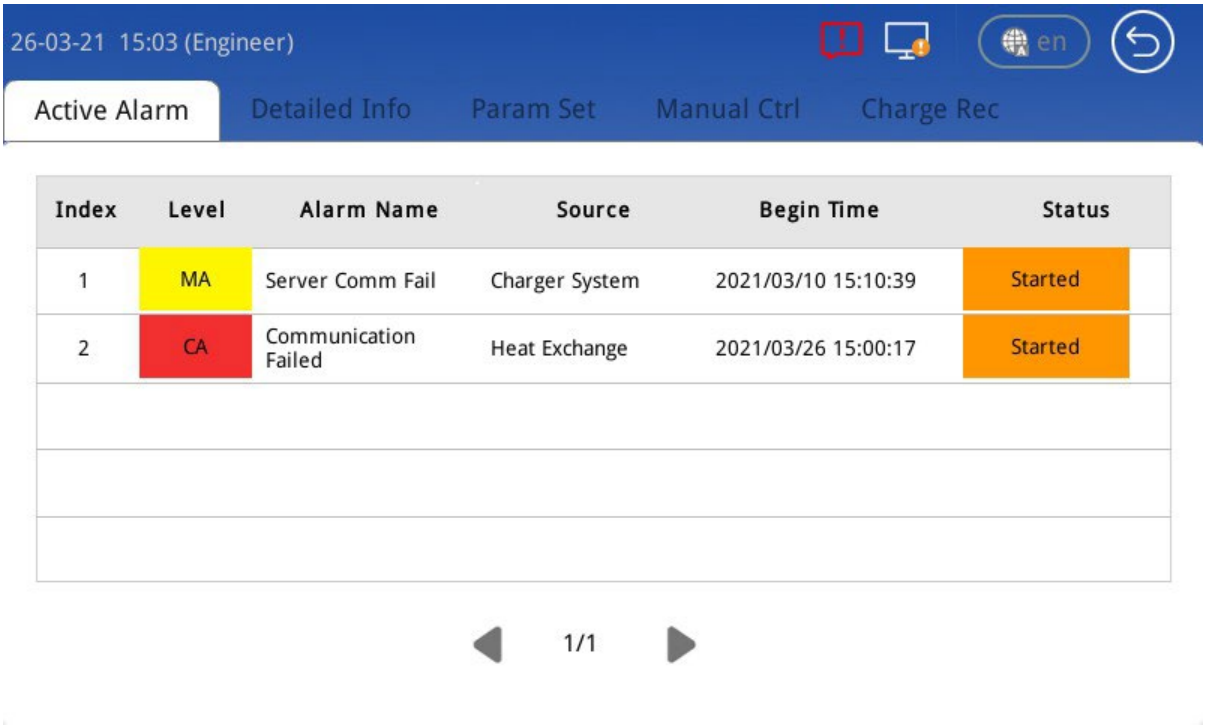


3.3) AC SPD

- Check the status window of SPD. If the window color changes from green to red, it indicates that SPD has been damaged. Need to contact the manufacturer for replacement.



Appendix 5) Error Codes and Possible Solutions



- Reason for end of charging
- In case of abnormal shutdown, the charging interface will display the code reason for the end of charging, such as (**401**) in the following figure

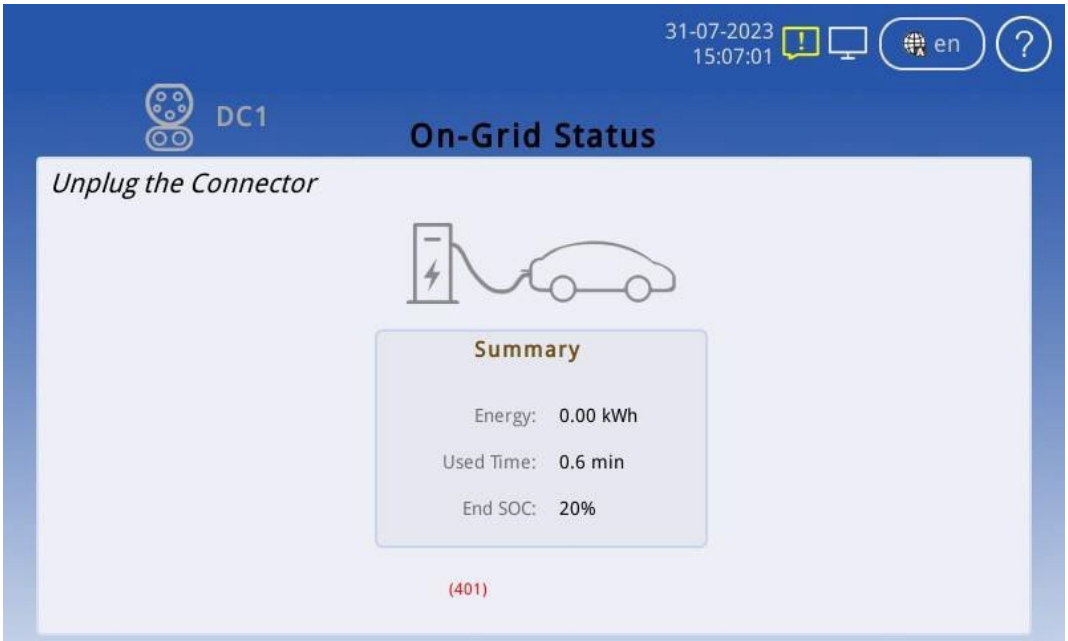


Table: Charger Alarms					
NO.	**Alarm ID**	**Alarm Name**	**Alarm Level**	**Description**	**Remark**
1	1	System Not Availa be	CA	The system is out of service and charge is not allowed. This usually comes after another critical alarm (e.g. EPO pressed)	
2	2	System Disabled	MA	The system is out of service and charge is not allowed. This happens after system is set to 'In-operative' by service guy or backend.	
3	3	All CCU Comm Fail (Not used right now)	CA	Note used any longer	
4	4	Server Comm Fail	MA	Whether the network is not accessible or the connection between server and charger is broken	
5	5	All kWhMeter Not Installed	MA	All kWh meters are set to 'Not installed'. This means system not available	
6	6	CCU Comm Fail	CA	The communication between IMMU2 and IMSU-D is failed. This means system not available	
7	7	EPO is pressed	CA	This means system not available	
8	8	Door is opened	CA	This means system not available	
9	9	SPD alarm	CA	This means system not available	
10	10	Mains Fail Alarm	CA	This means system not available	
11	11	Gun is disabled	MA	The specified gun is out of service and not allowed to charge. This happens after the gun is set to 'In-operative' by service guy or backend.	Gun A/B/C shall be specified
12	12	System over temp	MA	The temperature measurement from sensor is over the high limit point (default is 167°F (75°C))	Note that this alarm does not stop/prohibit charge function
13	13	All Rectifier Failure	CA	This means system not available	

14	14	All Rectifier Comm Fail	CA	This means system not available	
15	15	Rectifiers Failure	CA	This means the specified gun will not be available	Rectifier group 1/2 shall be specified
16	16	Rectifiers Comm Fail	CA	This means the specified gun will not be available	Rectifier group 1/2 be specified
17	17	Insulation Comm Fail	CA	This means the specified gun will not be available	
18	18	Output Shorted	CA	This is from Rectifiers after detected the internal circuit shorted	
19	19	Insulation Alarm	CA	This is from IMSU-D after detected the insulation abnormal	
20	20	PLC ComFail Alarm	CA	This is from IMSU-D when the PLC communication is lost	
21	21	Ground Fault	CA	This is from IMSU-D after detected ground fault	
22	22	AC Fail Alarm (for AC only)	CA	This is from IMSU-D after detected AC gun input fails (DI)	
23	301	CR CommFail	CA	The communication between IMMU2 and Card Reader has failed. This usually means the authentication with RFID card loses efficacy and user must take other method instead (e.g. OTP)	
24	401	kWhMeterCommFail	CA	The communication between IMMU2 and specified kWh meter has failed. This means the specified gun will be out of service and forbid to charge	
25	402	Sampled Invalid Current	CA	The measurement from the specified kWh meter is invalid. This usually happens with a reversed wiring for the current shunt.	

1. CA - Critical alarm MA - Major alarm OA - Observative Alarm

Stop Reason Classification	Code	Description	Remark
Normal Stop	1	Normal Stop	Condition satisfied
	2	EV Request Stop	EV Request Stop
Charger Error	201	Parameter configuration failed	
	202	Charging Enable timeout	
	203	Abnormal volt of outside bus	
	204	Unable lock charging gun	
	205	Insulation inspection abnomal	
	206	Insulation inspection timeout	
	207	EV Relay Pull-In timeout	
	208	Require Curr Timeout	
	209	Remain time over stop	
	210	Ring fail alarm (reserved)	
	211	Communication with EV failed	
	212	Plugged gun timeout	
	213	Pre-Charging fault	
	214	DoorOpen	
	215	EPO	
	216	SPD	
	217	AllRectFail	
	218	MainsFailAlm	
	219	AlRectCommFail	
	220	E_LockFail	
	221	GunOverTemp	
	222	OutputShortCircuit	
	223	PWM Failure	

	224	Ground Fault Detected	
	250	CR Comm Fail	
	251	kWhMeterComm Fail	
	252	CCU Comm Fail	
EV Error	301	Battery overvoltage	
	302	Battery undervoltage	
	303	Battery current deviation error	
	304	High battery temperature	
	305	Battery voltage deviation error	
	306	Charger Connector Lock Fault	
	307	Vehicle shift position	
	308	Error Status Noticed by EV	
	309	PLC Low Level Comm Fail	
	310	PLC High Level Comm Fail	
	311	PLC Authentication Timeout	
	312	PLC ParamDiscovery Timeout	
Canceled	401	Local Stop	
	402	Server Stop	
	403	Network fault	
	404	Reboot	
	405	DeAuthorized	
	406	One-Click Stop	
	407	Hard Reset	
	408	Soft Reset	
Other	501	Other	