VESTEL
MOBILITY

ELECTRIC VEHICLE CHARGER

EVC01 Series

Installation Guideline

CONTENTS

1 - SAFETY INFORMATION 3
1.1 - SAFETY WARNINGS 3
1.2- GROUNDING WARNINGS 4
1.3- WARNINGS ABOUT POWER CABLES, SOCKETS and CHARGING CABLES 4
1.4 - WARNING FOR WALL INSTALLATION 5
2 - DESCRIPTION 5
2.1 - MODEL DESCRIPTION 5
3 - GENERAL INFORMATION 6
3.1 - INTRODUCTION TO PRODUCT COMPONENTS 6
3.2 - DIMENSIONAL DRAWINGS 7
4 - REQUIRED EQUIPMENT, TOOLS and ACCESSORIES 8
5 - TECHNICAL SPECIFICATION 9
6- INSTALLING CHARGING STATION 11
6.1- SUPPLIED INSTALLATION EQUIPMENT and ACCESSORIES 11
6.2- PRODUCT INSTALLATION STEPS 12
6.2.1 - OPENING THE COVER OF THE CHARGING STATION 13
6.2.2 - WALL MOUNT INSTALLATION 14
6.2.3 - POLE MOUNT INSTALLATION 17
6.2.5 - SINGLE PHASE CHARGING STATION AC MAINS CONNECTION (with PEN optional) 18
6.2.6 - BROKEN PEN DETECTION FEATURE (Optional) 18
6.2.8 - ADJUSTING CURRENT LIMITER 20
6.2.9 - DIP SWITCH SETTINGS 22
6.2.9.1 - DATA CABLE CONNECTION 22
6.2.9.2 - MODE SELECTION 23
6.2.9.3 - EXTERNAL ENABLE INPUT FUNCTIONALITY 24
6.2.9.4 - POWER OPTIMIZER (REQUIRES OPTIONAL ACCESSORIES) 26
6.2.9.5 - POWER OPTIMIZER WITH EXTERNAL MID METER 28
6.2.9.5.1 - POWER OPTIMIZER WITH EXTERNAL CURRENT TRANSFORMER (CT) (Optional) 30
6.2.10 - LOAD SHEDDING 32
6.2.11 - FACTORY RESET 33
6.2.12 - RESETTING LOCAL RFID CARD LIST AND REGISTERING NEW MASTER RFID CARD IN STANDALONE USAGE MODE 33
6.2.13 - SETTING ETHERNET PORT OF CHARGER TO STATIC IP IN STANDALONE USAGE MODE 34
6.2.14 - WEB CONFIGURATION INTERFACE ENABLE / DISABLE 34
6.3 - OCPP CONNECTION 35
6.3.1 - CONNECT OCPP OVER CELLULAR NETWORK (Optional) 35
6.3.2 - CONNECT OCPP OVER ETHERNET 35

6.4 - COMMISSIONING 36
6.4.1 - CONNECT PC TO THE SAME NETWORK WITH SMART BOARD 36
6.4.2 - OPENING WEB CONFIGURATION INTERFACE VIA WI-FI HOTSPOT 36
6.4.3- OPENING WEB CONFIGURATION INTERFACE WITH BROWSER 37
6.5 - WEB CONFIGURATION INTERFACE 38
6.5.1 - GENERAL SETTINGS 39
6.5.2 - INSTALLATION SETTINGS 40
6.5.2.1 - FOLLOW THE SUN 42
6.5.2.1.1 - Inverter Type and Mode Configurations with Different Measurement Methods 42
6.5.2.1.1.1 - Export Mode with the usage of CTs 42
6.5.2.1.1.2 - Export Mode with the Usage of Utility Meter 43
6.5.2.1.2 - Modes of Operation 44
6.5.2.1.2.1 - Sun Only 44
6.5.2.1.2.2 - Sun Hybrid 44
6.5.2.1.2.3 - Max Hybrid 45
6.5.2.1.3 - Auto Phase Switching 45
6.5.3 - OCPP SETTINGS 45
6.5.4 - NETWORK SETTINGS 46
6.5.5 - STANDALONE MODE SETTINGS 47
6.5.6 - SYSTEM MAINTENANCE SETTINGS 48
6.5.7 - LOCAL LOAD MANAGEMENT OF THE DEVICE 49
6.5.7.1 - Modbus TCP/IP Protocol Parameters 49
6.5.7.2 - Static Management 49
6.5.7.3 - Dynamic Management 49
6.5.7.4 - Star Topology 50
6.5.7.4.1 - Static Supply Star Topology: 50
6.5.7.4.2 - Dynamic Supply Star Topology: 51
6.5.7.5 - Daisy Chain (Serial) 51
6.5.7.5.1 - Static Supply Daisy Chain Topology: 51
6.5.7.5.2 - Dynamic Supply Daisy Chain Topology: 52
6.5.7.6 - Master / Slave 53
6.5.7.6.1 - Configuration of Slave Charging Stations 53
6.5.7.6.2 - Configuration of Master Charging Station 54
6.5.7.6.3 - Equally shared 56
6.5.7.6.4 - FiFo (First in - First Out) 56
6.5.7.6.5 - Combined Load Management 57
7 - UK REGULATION CHANGES ACCORDING TO SMART CHARGING (OPTIONAL) 58

1 - SAFETY INFORMATION

CAUTION

RISK OF ELECTRIC SHOCK

CAUTION: ELECTRIC VEHICLE CHARGER DEVICE SHALL BE MOUNTED ELECTRICAL CONNECTED AND COMMISSIONED BY A LICENSED OR AN EXPERIENCED ELECTRICIAN AS PER ANY REGIONAL OR NATIONAL ELECTRIC REGULATIONS AND STANDARDS IN EFFECT.

CAUTION

AC grid connection and load planning of the electric vehicle charging device shall be reviewed and approved by authorities as specified by the regional or national electric regulations and standards in effect.

For multiple electric vehicle charger installations the load plan shall be established accordingly. The manufacturer shall not be held liable directly or indirectly for any reason whatsoever in the event of damages and risks that are borne of errors due to AC grid supply connection or load planning.

IMPORTANT - Please read these instructions completely before installing or commissioning the device

1.1 - SAFETY WARNINGS

- These safety and operating instructions should be kept in a safe place for future reference.
- Check the voltage reported on the label; do not use the charging station without the appropriate supply voltage.
- If there is any doubt about normal operation or if the unit is damaged in any way, DO NOT continue using the unit; switch off the main power switches (MCB and RCCB). Contact your installer.
- The room temperature range should be approximately between -25°C and +50°C without direct sunlight and at a relative humidity between 5% and 95%. Use the charging station only within operating conditions.
- The position of the device must be chosen in such a way that excessive heating of the charging station is avoided. High operating temperatures, caused by direct sunlight or heating sources, may cause the charging current to be reduced or the charging process to be temporarily interrupted.
- The charging station is intended both for outdoor and indoor use. Cannot be used in public areas.
- To reduce the risk of fire, electric shock or material damage, do not expose the unit to rain, snow, electrical storms or other severe weather events. Moreover, the charging station must not be exposed to splashes or spray of liquids.
- Do not touch the terminals, the electric vehicle connector and other hazardous live parts of the charging station with sharp metal objects.
- Avoid exposure to heat sources, and place the unit away from flammable, explosive, hard or combustible materials, chemicals or vapours.

- Risk of explosion. The equipment has internal flammable or spark-sensitive components that should not be exposed to flammable vapours. The unit should not be located in recessed spaces or below floor level.
- The device is designed solely for charging vehicles that do not require ventilation during loading.
- To avoid the risk of explosion and electric shock, make sure that the specified circuit breaker and earth leakage circuit breaker are connected to the network of the building.
- The lowest part of the socket should be between 0.9 m and 1.5 m above the ground.
- The use of adapters is not allowed. The use of extension cables is not allowed.

WARNING: Never let people (including children) with reduced physical, sensory or mental capabilities or lack of experience and or knowledge use electrical devices unsupervised.

CAUTION: This vehicle charger unit is intended only for charging electric vehicles not requiring ventilation during charging.

1.2- GROUNDING WARNINGS

- The charger must be connected to a grounded system. The earth conductor entering the charger must be connected to the instrument ground lug which is located inside the charger. This operation must be done with the circuit conductors and by connecting the equipment grounding bar or cable to the charging station. Connections to the loader are the sole responsibility of the installer.
- In order to reduce the risk of electric shock, connect only to earthed sockets.
- **WARNING:** Ensure that during installation and use the charging station is permanently and correctly grounded.
- **WARNING:** If Earthing Type is selected as IT, the protective earth error check is disabled.

1.3- WARNINGS ABOUT POWER CABLES, SOCKETS and CHARGING CABLES

- A damaged power cable can cause a fire or lead to electric shocks. Do not use the product if the flexible power cable or vehicle cable is frayed, if its insulation is damaged or if the unit shows other signs of damage.
- Therefore, please ensure that the charging cable is well positioned; do not step on it, do not trip over it or do not subject it to damage or stress.
- Do not forcibly pull on the cable and do not damage it with sharp objects.
- Never touch the vehicle plug/socket or cable with wet hands: this could cause a short circuit or an electric shock.
- In order to avoid the risk of fire or electric shock, do not use the device with extension cords. To avoid danger, if the mains cable or vehicle cable is damaged, it must be replaced by the manufacturer, its service agent or by similarly qualified persons.

1.4 - WARNING FOR WALL INSTALLATION

- Please carefully read the instructions before mounting the wall charging station.
- Do not install the charging station on the ceiling or on sloping walls.
- Use the indicated wall mounting screws and other accessories.
- The unit is certified to be used both indoors and outdoors. If the unit is mounted outdoors, the equipment for connecting the hoses to the unit must be certified for outdoor use and must also be installed in such a way that the IP certification on the unit is maintained.

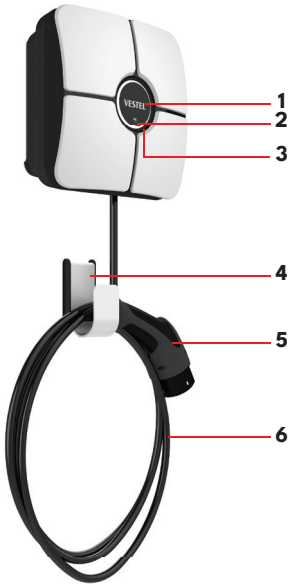
2 - DESCRIPTION

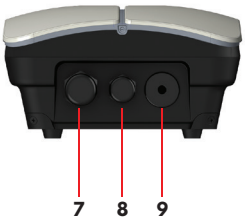
2.1 - MODEL DESCRIPTION

Model Name	**MODEL DESCRIPTION : EVC01-AC***** EVC01 : Electric Vehicle AC Charger (Mechanical Cabinet EVC01) 1st Asterisk (*): Rated Power 7 : 7.4 kW (1Phase Supply Equipment) 11 : 11 kW (3Phase Supply Equipment) 22 : 22 kW (3Phase Supply Equipment) 2nd Asterisk (*) can include combinations of the following communication module options.RFID reader is standart equipment for all of the model variant."S" option must be included for selecting combinations of W,L and P; S : Smart Board with Ethernet Port W : WiFi & Bluetooth module L : LTE / 3G / 2G module P : ISO 15118 PLC module 3rd Asterisk (*): Broken PEN Detection Option Blank : No broken PEN detection and disconnection functionality PEN : Broken PEN detection and disconnection function 4th Asterisk (*) can be one of the following for tethered cable length T2P : Type2 Charging Cable with 5m T2P7 : Type2 Charging Cable with 7m 5th Asterisk (*) can be one of the following: WHT : w/White Cosmetic Cover
Cabinet	EVC01

3 - GENERAL INFORMATION

3.1 - INTRODUCTION TO PRODUCT COMPONENTS

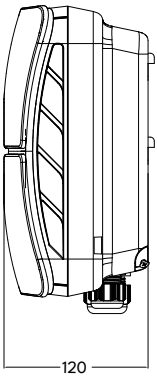


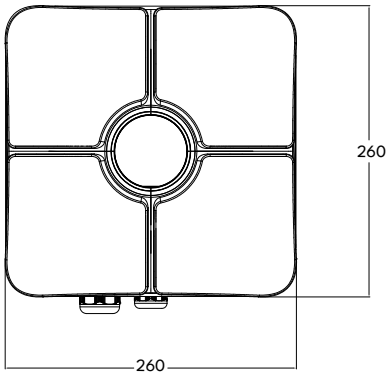


EVC01 Product Components

1- Branding Area
2- RFID Card Reader
3- LED Status Indicator
4- Cable Hook
5- Charging Plug
6- Charging Cable
7- Supply inlet cable gland
8- Communication cable gland
9- Charging cable gland

3.2 - DIMENSIONAL DRAWINGS





4 - REQUIRED EQUIPMENT, TOOLS and ACCESSORIES

		
Drill Bit 8mm	Impact Drill	PC
		
Volt Indicator	Torx T20 Security Screwdriver	Torx T10 Security Screwdriver
		
Water Level	Flathead Screwdriver (Tip width 2.00-2.5 mm)	Pointed Spudger
		
Right Angle Screwdriver Adapter / Torx T20 Security Bit	RJ45 Crimping Tool	Cat5e or cat6 ethernet cable

5 - TECHNICAL SPECIFICATION

This product is compliant to IEC61851-1 (Ed3.0) standard for Mode 3 use.

Model	EVC01-AC22 Series	EVC01-AC11 Series	EVC01-AC7 Series
IEC Protection class	Class - I		
Vehicle Interface	Attached Cable with IEC 62196 Type-2 Plug (5 or 7 meters)		
Voltage and Current Rates	230/400V 50 Hz 3-Phase 32A	230/400V 50 Hz 3-Phase 16A	230V 50 Hz 1-Phase 32A
AC Maximum Charge Output	22kW	11kW	7.4kW
Earthing System Options	TN-TT by default, IT optional		
Serial Interface	Modbus over RS485		
Built-in DC residual current sense	6mA		
Required RCCB on AC Mains	4P-40A - 30mA RCCB Type- A	4P-20A - 30mA RCCB Type- A	2P-40A - 30mA RCCB Type- A
Required Circuit Breaker on AC Mains (Max Current)	4P-40A MCB Type-C	4P-20A MCB Type-C	2P-40A MCB Type-C
Broken PEN detection and disconnection function for the UK	Optional for 1-phase only		
Built-in Electrical Protection	Over Current, Over Voltage, Under Voltage, DC Residual Current, Over Temperature, Short Circuit, Surge/Lightning, Earth Fault, Phase- Neutral Reverse Detection		
Required AC Mains Cable (Recommended minimum cable size)	5x 6 mm^2 (< 50 m) External Dimensions: Ø 15-21 mm	5x4 mm^2 (< 50 m) External Dimensions: Ø 15–21 mm	3x 6 mm^2 (< 50 m) External Dimensions: Ø 11-15 mm

CONNECTIVITY

Ethernet	100 Mbps Ethernet
Wi-Fi	Wi-Fi 802.11 a/b/g/n/ac 2.4 GHz and 5 GHz
Bluetooth (Optional)	Bluetooth 5.1 ; Bluetooth 4.2 low energy
Cellular (Optional)	LTE / 3G / 2G GSM : B3 (1800 MHz), B8 (900 MHz) WCDMA : B1 (2100 MHz), B8 (900 MHz) LTE : B1 (2100 MHz), B3 (1800 MHz), B7 (2600 MHz), B8 (900 MHz), B20 (800 MHz), B28A (700 MHz)
RFID Reader	ISO 14443A/B and ISO 15693

OTHER FEATURES

Potential Free Enable Input	Signal input for enabling and disabling the charging station externally
Potential Free Load Shedding Input	Signal input for reducing the charging current down to 8A in case of overload on the upstream transformer

OTHER FEATURES

Remote Control / Monitoring	OCPP 1.6j
Remote Diagnostics	Remote Diagnostics over OCPP
Load Management	Ethernet / Wi-Fi / OCPP
Software Update	OCPP / Configuration WEB User Interface

MECHANICAL SPECIFICATIONS

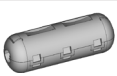
Material	PC 5VA f1, flame retardant
Product size	256.0 mm (Height) x 256.0 mm (Width) x 127.0 mm (Depth)
Dimensions (with package)	375.0 mm (Height) x 375.0 mm (Width) x 275.0 mm (Depth)
Product weight	6,6 KG (22 kW variant) 5,6 KG (7.4/11 kW variant)
Weight with package	8,5 KG (22 kW variant) 7,5 KG (7.4/11 kW variant)
AC Mains Cable Dimensions	For three-phase models Ø 15-21 mm For one-phase models Ø 11-15 mm
Cable Inlets	AC Mains / Ethernet / RS485

ENVIRONMENTAL TECHNICAL SPECIFICATIONS

Protection Class	Ingress Protection Impact Protection	IP54 IK08, IK10
Usage Conditions	Temperature Humidity Altitude	-25 ˚C to +50 ˚C (without direct sunlight) 5% - 95% (relative humidity, without condensation) 0 - 3,000m

6- INSTALLING CHARGING STATION

6.1- SUPPLIED INSTALLATION EQUIPMENT and ACCESSORIES

Accessory/Material Name	Use for	Quantity	Image
Mounting Plate	Mounting the unit to the wall or metal pole	1	
Dowels (M8x50) Plastic Dowels	Mounting the charging station to the wall	7	
Screw (M6x50)	Mounting the charging station to the wall	7	
Torx T20 Security L-Wrench	IP for the screws that are used to mount the charging station to the wall.	1	
Torx M4x9 security screw	Mounting the mounting plate to the product.	2	
Screw M4x8	Mounting the cosmetic cover to the front cover.	1	
Hook Mounting Plate	Mounting the unit to the wall or metal pole	1	
Ferrite	Inserted into the ethernet cable	2	
Metal Hook	This part is mounted on the hook mounting plate so that the cable is wound over it.	1	
SIM Card (Optional)	Product control with internet connection	1	
User RFID Card	Start&Stop Charging	2	
Master RFID Card	Adding&Removing the User RFID Cards to Local RFID List	1	
QSG	QuickStart Guide	1 Set	

6.2- PRODUCT INSTALLATION STEPS

CAUTION!

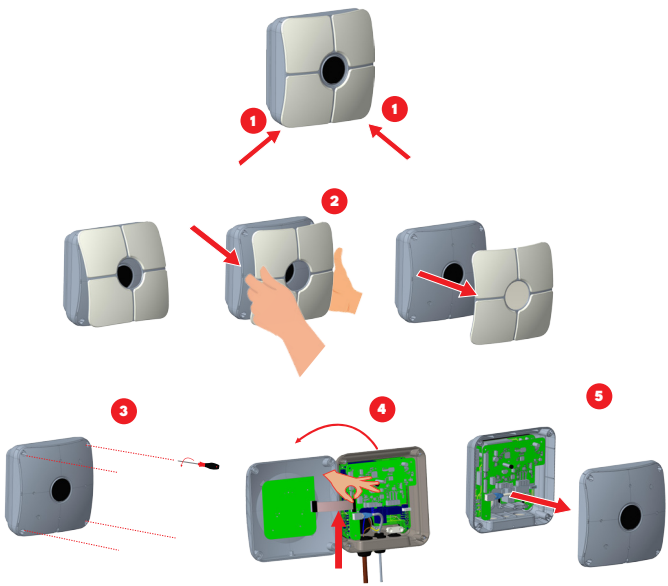
- Ensure that the ground resistance of the installation is less than 60 ohms.
- Read the instruction fully before mounting the charger
- Do not mount your charging station to the ceiling or an inclined wall.
- Use the wall mounting screws and other accessories specified.
- This charging station is classified as indoor and outdoor installation compatible. If the deviceis installed outside the building, the hardware that will be used to connect the cables to thecharger shall be compatible with outdoor use and the charging station shall be formatting the IP rating of the charger.

6.2.1 - OPENING THE COVER OF THE CHARGING STATION

ATTENTION

RISK OF ELECTRIC SHOCK

Please power off the charging station mains supply



1- Remove tabs of the cosmetic cover from the front cover corners.First, hold the bottom left corner of the front cover and pull it towards you, bottom left tab will be removed. Then hold the bottom right corner of the front cover and pull it to yourself, bottom right tab will be removed.

2- Remove the cosmetic cover by holding the corners and pulling it towards you, as shown in the picture.

3- Then unscrew the screws of the front cover, which is connected to the main body.

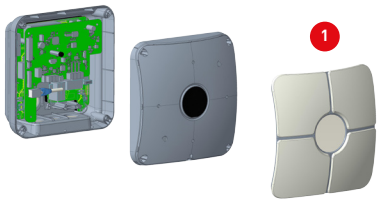
4- Disconnect the flat cable in between the boards which are on the back side and front side of the unit.

5- Remove the front cover.

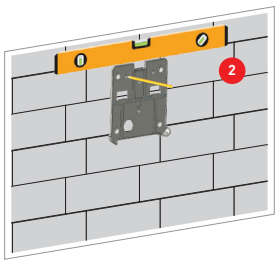
6.2.2 - WALL MOUNT INSTALLATION

Wall mount installation is common for all charging station models. Metal pole installation is explained seperately in metal pole intallation guide.

1- Open the product front cover by following the instruction.

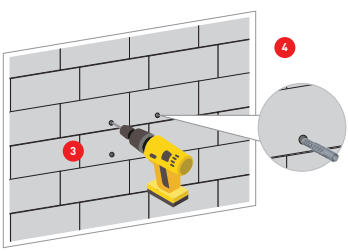


2- Place the mounting plate of the charging station to the wall which is given in accessory bag and mark the drill bit holes with a pencil.

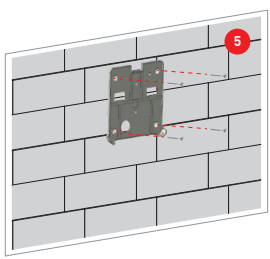


3- Drill the wall on the marked points using the impact drill (8mm drill bit).

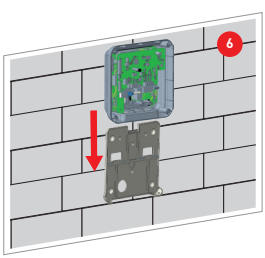
4- Place the dowels into the holes.



5- Screw the mounting plate to the wall with (M6x50) screws, which are inside the accessory bag, as shown in figure below.



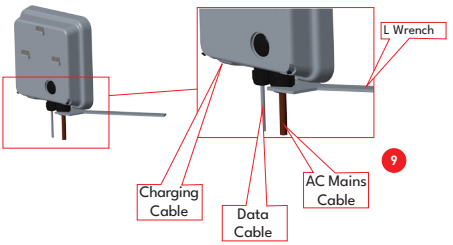
6- Hang back side of the unit to the mounting plate as shown in figure below.



7- Tighten the torx (M4x9) security screws of the product, which are inside the accessory bag, as shown in figure below.

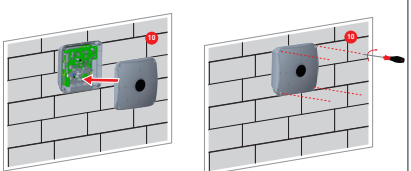
8- Insert the AC mains cable into the charging station from the left cable gland. Follow the AC Mains Connection instructions on the next pages, depending on the model of the charger. (Single/Three Phase)

9- Tighten the cable glands as shown in the figure. Before closing the cover of the charging station, follow the instructions in next sections if any function related to these sections are used.

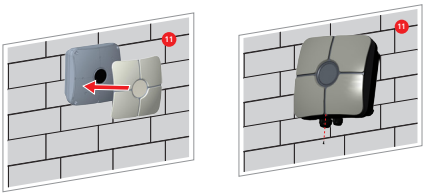


10- To close the front cover of the charging station, tighten the screws which were removed.

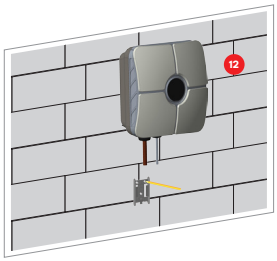
(Min:0,9 Nm ; Max:1,1 Nm torque value). Before closing the front cover, don't forget to connect the flat cable to the board which was removed.



11- To attach the cosmetic cover to the charging station, mount the cosmetic cover to front cover with its tabs.Tighten the screw (M4x8) of the front cover and cosmetic cover, which is inside the accessory bag, as shown in figure below.

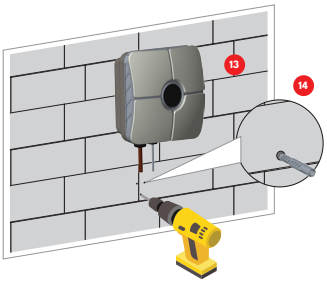


12- To be able to twist the charging cable, place the mounting bracket of the cable hook to the wall which is given in accessory bag and mark the drill bit holes with a pencil.

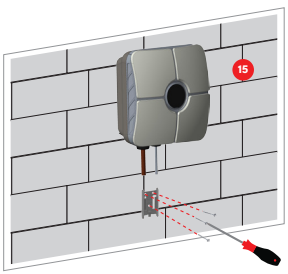


13- Drill the wall on the marked points using the impact drill (8mm drill bit).

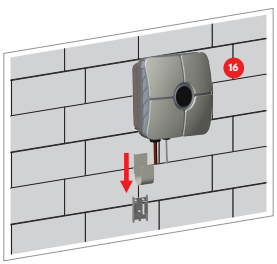
14- Place the dowels into the holes.



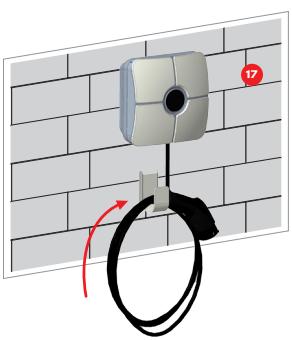
15- Tighten the security screws (M6x50) of the product using proper screwdriver.



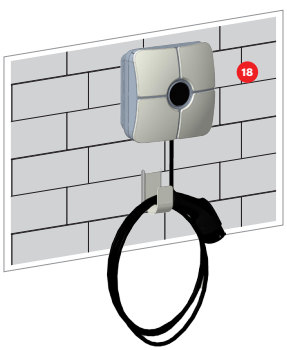
16- Position the metal cable hook, which is inside the accessory bag, over the mounting bracket as shown in figure.



17- Twist the charging cable over the cable hook.



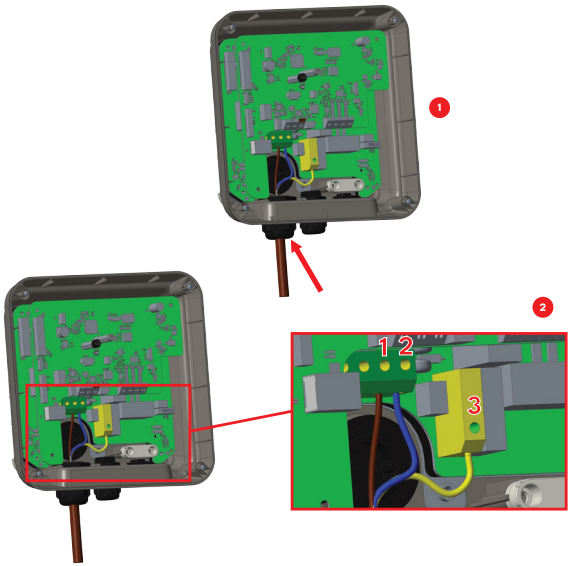
18- The unit is ready to use.



6.2.3 - POLE MOUNT INSTALLATION

The details of pole mounting is explained in pole installation manual with figures.

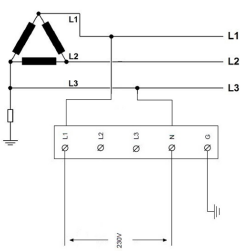
6.2.4- SINGLE PHASE CHARGING STATION AC MAINS CONNECTION



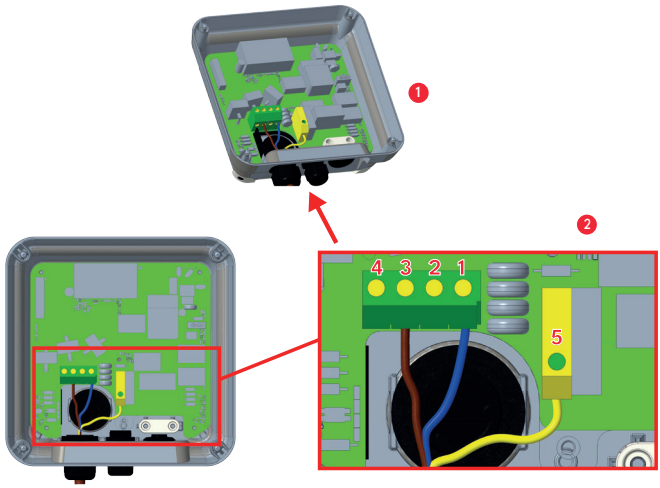
Insert the cable to the terminal block as shown in the image. Check the table below to match Electric Terminal number with AC Cable Color.

Electric Terminal	AC Cable Color
1	AC L1 (Brown)
2	AC Neutral (Blue)
3	Earth (Green-Yellow)

For single phase **IT Grid** installation, wiring diagram which is shown below should be used. Also grounding type should be set to “IT Grid” from the ”Installation settings” menu in web user interface.



6.2.5 - SINGLE PHASE CHARGING STATION AC MAINS CONNECTION (with PEN optional)



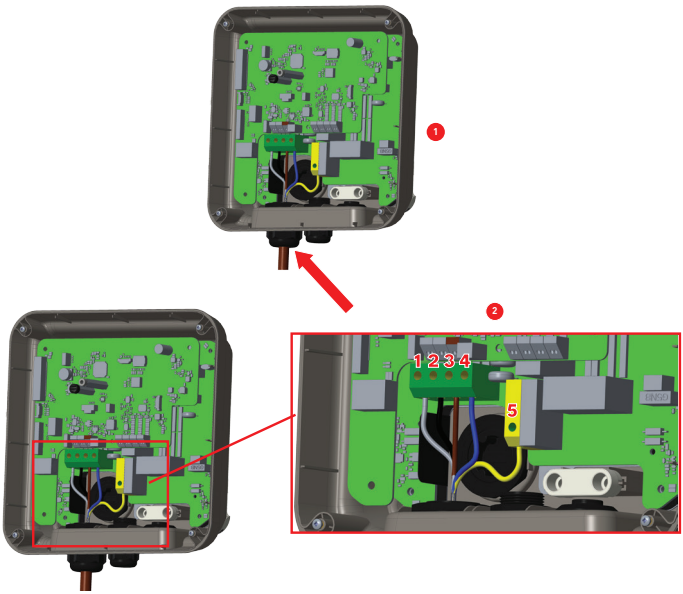
Insert the cable to the terminal block as shown in the image. Check the table below to match Electric Terminal number with AC Cable Color.

Electric Terminal	AC Cable Color
1	AC Neutral (Blue)
3	AC L1 (Brown)
5	Earth (Green-Yellow)

6.2.6 - BROKEN PEN DETECTION FEATURE (Optional)

This feature is valid for single phase units and should only be used on single phase TN-C-S supplies. Protection against electric shock in the installation is provided by a contactor which electrically disconnects the vehicle from the live conductors of the supply ,from protective earth and from control pilot within 5 seconds in the event of the supply voltage to the charging point, between the line and neutral conductors, being greater than 254 V rms or less than 208 V rms.
If the unit detects broken PEN, it automatically goes into error mode and can only be cleared by power cycling the charge point i.e. powering off and back on again. The unit should be reset to get over the error.

6.2.7- THREE PHASE CHARGING STATION AC MAINS CONNECTION

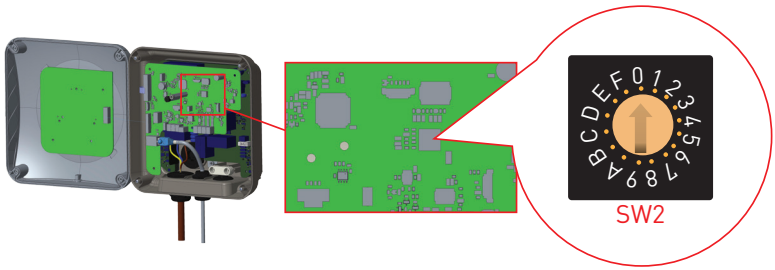


Insert the cable to the terminal block as shown in the image. Check the table below to match Electric Terminal number with AC Cable Color.

Electric Terminal	AC Cable Color
1	AC L3 (Grey)
2	AC L2 (Black)
3	AC L1 (Brown)
4	AC Neutral (Blue)
5	Earth (Green-Yellow)

6.2.8 - ADJUSTING CURRENT LIMITER

The charging station has current limiter (rotary switch) on the mainboard which is shown in figure below. This switch is used for adjusting the current and power of charging station. The arrow in the middle of the rotary switch must be adjusted gently by rotating with a flathead screwdriver to the position of the required current rate. The details of the current rates are desicribed in table below.



Other Location

Current Limiter Position	Current Limit Value			
	Phase	22 kW	11kW	7.4kW
0	1-Phase	10 A	10 A	10 A
1		13 A	13 A	13 A
2		16 A	16 A	16 A
3		20 A		20 A
4		25 A		25 A
5		30 A		30 A
6		32 A		32 A
7				
8	3-Phase	10 A	10 A	
9		13 A	13 A	
A		16 A	16 A	
B		20 A		
C		25 A		
D		30 A		
E		32 A		
F				

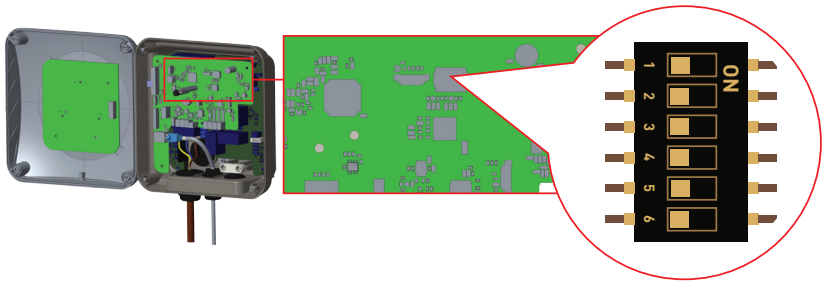
Required Circuit Braker on AC Mains	
EV Charging Station Current Limiter Setting	C-Curve MCB
10 A	13 A
13 A	16 A
16 A	20 A
20 A	25 A
25 A	32 A
30 A	40 A
32 A	40 A

GERMANY:

Current Limiter Position	Current Limit Value			
	Phase	22 kW	11kW	7.4kW
0	1-Phase	10 A	10 A	10 A
1		13 A	13 A	13 A
2		16 A	16 A	16 A
3		20 A		20 A
4		25 A		25 A
5		26 A		26 A
6		32 A		32 A
7				
8	3-Phase	10 A	10 A	
9		13 A	13 A	
A		16 A	16 A	
B		20 A		
C		25 A		
D		26 A		
E		32 A		
F				

Required Circuit Breaker on AC Mains	
EV Charging Station Current Limiter Setting	C-Curve MCB
10 A	13 A
13 A	16 A
16 A	20 A
20 A	25 A
25 A	32 A
26 A	40 A
32 A	40 A

6.2.9 - DIP SWITCH SETTINGS

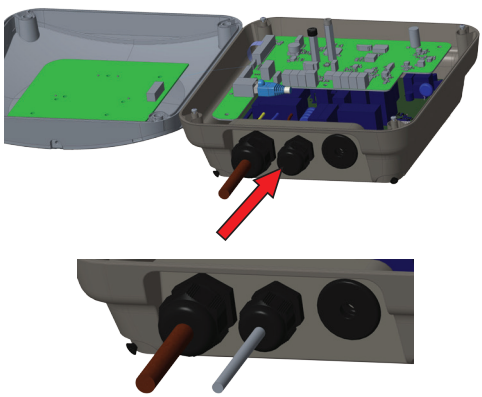


Brief descriptions of the DIP switch pin settings can be found in below table.

Pin Number	Description
Pin-1	Reserved
Pin-2	External Enable Input Functionality
Pin-3	No Function
Pin-4-5-6	Power Optimizer (Requires Optional Accessories)

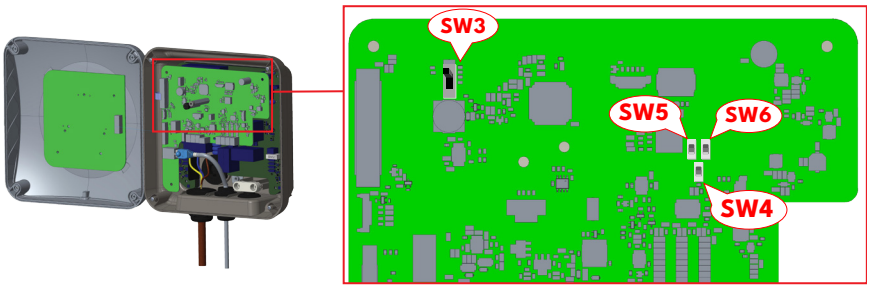
6.2.9.1 - DATA CABLE CONNECTION

Insert the cable through the gland as shown in the figure below.



6.2.9.2 - MODE SELECTION

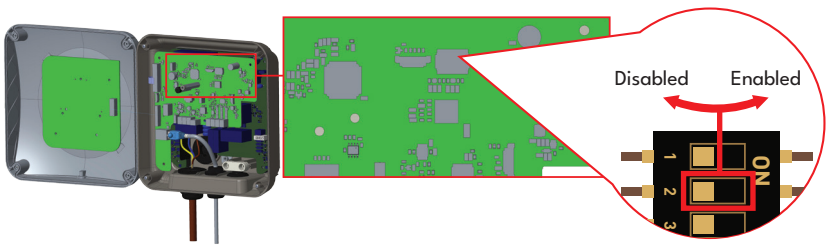
Mode Selection is supported in control board. There are slide switches on the as shown in below figure. Follow the positions for each function to activate or deactivate as shown in below table.

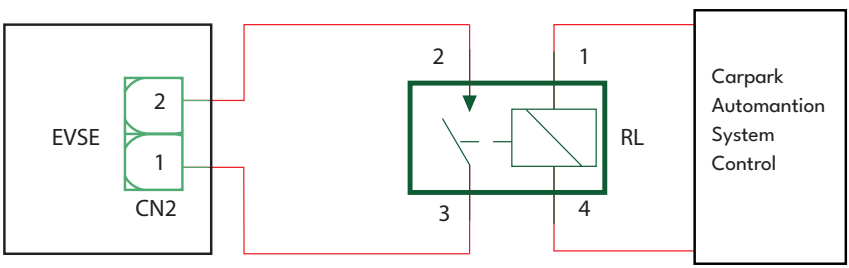


Switches	Main mode selection switch	Figure
SW3 (Position Switch 3)	1: Standart charging mode (Top Position)	
	2: Standart charging - Peak / Offpeak mode (Middle Position)	
	3: TIC mode (Bottom Position)	
SW4 (Position Switch 4)	1: TIC mode (Top Position)	
	2: Power Optimizer mode with extra accessory connection (Bottom Position)	
SW5 (Position Switch 5) SW6 (Position Switch 6) (Top Position)	Power Optimizer mode with CT	
SW5 (Position Switch 5) SW6 (Position Switch 6) (Bottom Position)	Power Optimizer mode with MID Meter	

6.2.9.3 - EXTERNAL ENABLE INPUT FUNCTIONALITY

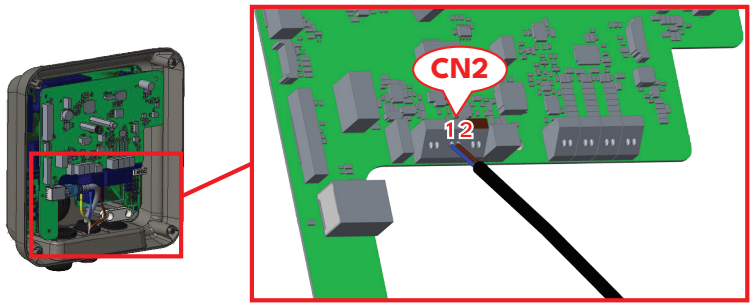
Your charging station has external potential free enable / disable functionality which can be used for integration of your charging station to carpark automation systems, energy supplier ripple control devices, time switches, photovoltaic inverters, auxiliary load control switches, external key lock switches etc. DIP switch position 2 is used for enabling and disabling this functionality.





If the external relay (RL) is in non-conducting (open), the charging station will not be not be able to charge the electric vehicle.

You can connect potential free input signals as shown in above circuitry (see figure).



Cable Terminal	Cable Color
CN2-1	Blue
CN2-2	Brown

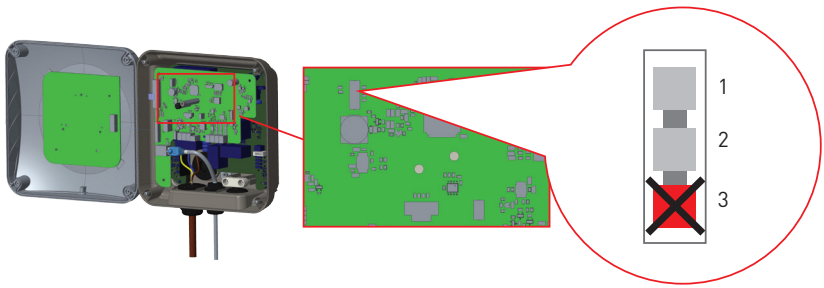
6.2.9.4 - POWER OPTIMIZER (REQUIRES OPTIONAL ACCESSORIES)

The EV charger has option to make single load balancing with different accessories.

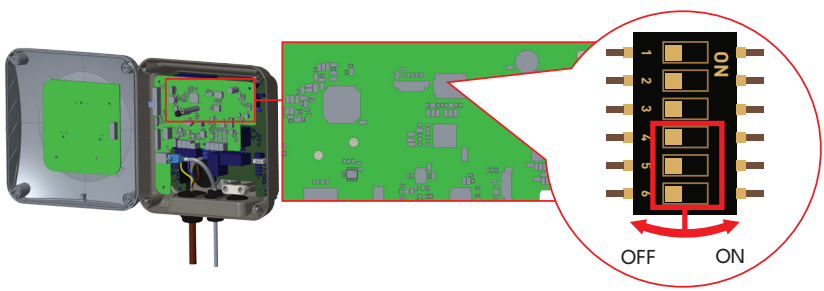
a. Power Optimizer with External MID meter

b. Power Optimizer with External Current Transformer (CT)

To adjust the power optimizer, the slide switch (mode selection switch - SW3) on the control board should be in position to 1 or 2 as shown in figure below. If the switch is set to position 3, power optimizer does not work.



This feature is provided with an optional metering accessories which are sold separately. In power optimizer mode, the total current drawn from the main switch of the house by charging station and other household appliances is measured with current sensor integrated to the main power line. Current limit of the main power line of the system is set through the DIP switches inside the charging station. According to the limit set by the user, charging station adjusts its output charging current dynamically according to the measurement of main power line.



Last 3 DIP switch pins (4,5,6) shown in figure below corresponds to binary digits of the maximum current value as shown in the table. When 4, 5, 6 pins are in OFF position, power optimizer functionality is disabled.

DIP Switch Positions			Current Limit Value
4	5	6	
OFF	OFF	OFF	Power Optimizer Disabled
OFF	OFF	ON	16
OFF	ON	OFF	20
OFF	ON	ON	25
ON	OFF	OFF	32
ON	OFF	ON	40
ON	ON	OFF	63
ON	ON	ON	80

Table-1

FRANCE:

DIP Switch Positions			Current Limit Value
4	5	6	
OFF	OFF	OFF	Power Optimizer Disabled
OFF	OFF	ON	25
OFF	ON	OFF	30
OFF	ON	ON	40
ON	OFF	OFF	45
ON	OFF	ON	50
ON	ON	OFF	60
ON	ON	ON	90

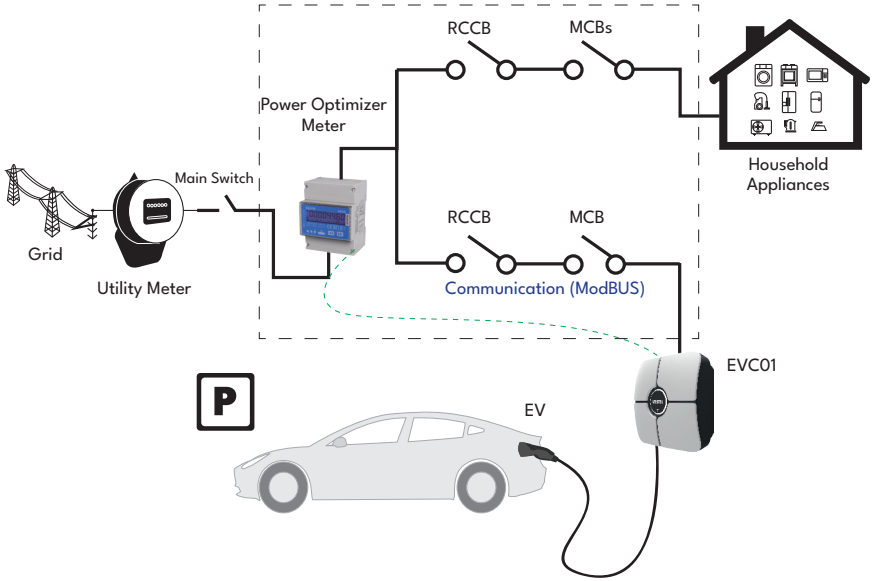
Table-2

ITALY:

DIP Switch Positions			Current Limit Value
4	5	6	
OFF	OFF	OFF	Power Optimizer Disabled
OFF	OFF	ON	14
OFF	ON	OFF	21
OFF	ON	ON	28
ON	OFF	OFF	32
ON	OFF	ON	40
ON	ON	OFF	63
ON	ON	ON	80

Table-3

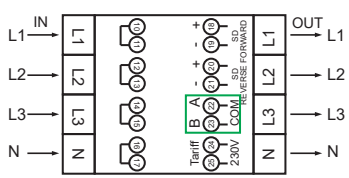
6.2.9.5 - POWER OPTIMIZER WITH EXTERNAL MID METER



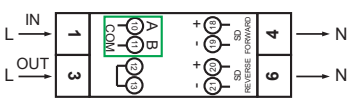
Power Optimizer Meter should be placed just after the main switch of the house as shown in the figure.

Power Optimizer Meter wiring connections can be made according to the information below.

Three Phase



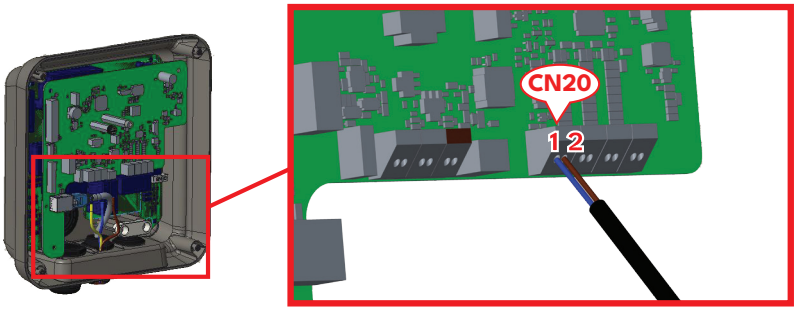
Single Phase



■ 22-23: A-B (COM) Modbus connection over RS485 for three phase charging station models.

■ 10-11: A-B (COM) Modbus connection over RS485 for single phase charging station models.

Related board wiring of Power Optimizer connections can be made as shown below:



Cable Terminal	Cable Color	Description
(CN20-2)	Brown	A (COM)
(CN20-1)	Blue	B (COM)

6.2.9.5.1 - POWER OPTIMIZER WITH EXTERNAL CURRENT TRANSFORMER (CT) (Optional)

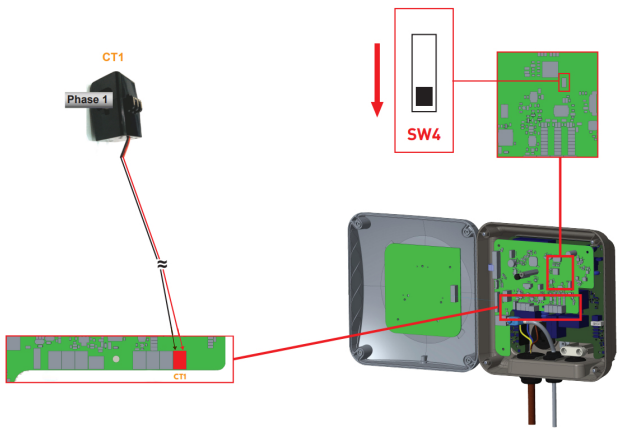
An external CT clamp is required for dynamic load management. One External CT Clamp (FATS16L-100) is required for a single phase installation. Three CT Clamps are required for a three phase installation. When connected the charger will use the energy consumption information provided by the CT clamp to adjust the charger output power. This is to ensure the load on the property does not exceed the rated load of the mains supply fuse. The current limit is set by the DIP switches inside the charger. Please see DIP switch setting table.

To perform the corresponding installation, follow the steps below.

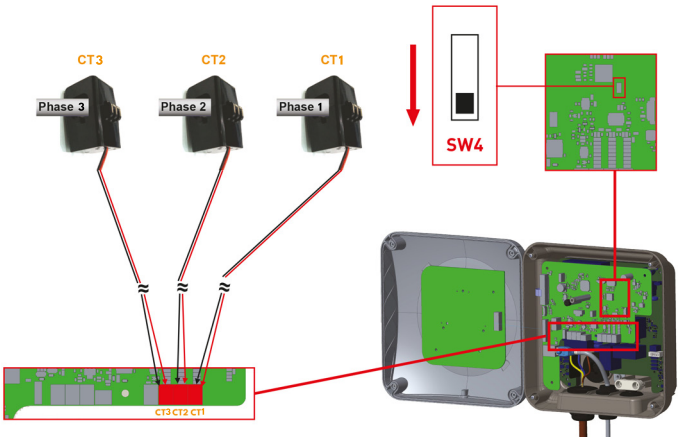
- The slide switch (SW3) on the control board shown in Figure should be set to 1 or 2.
- The wiring of the external electrical circuits and the control board inside the EV charger should be done as shown in Figure below.
- The slide switch (SW4) on " The Embedded Power Optimization Module" should be set as shown in Figure below. (Bottom side.)

NOTE : CAT5 cable can be used to extend the cables of the CT Clamp (FATS16L-100).

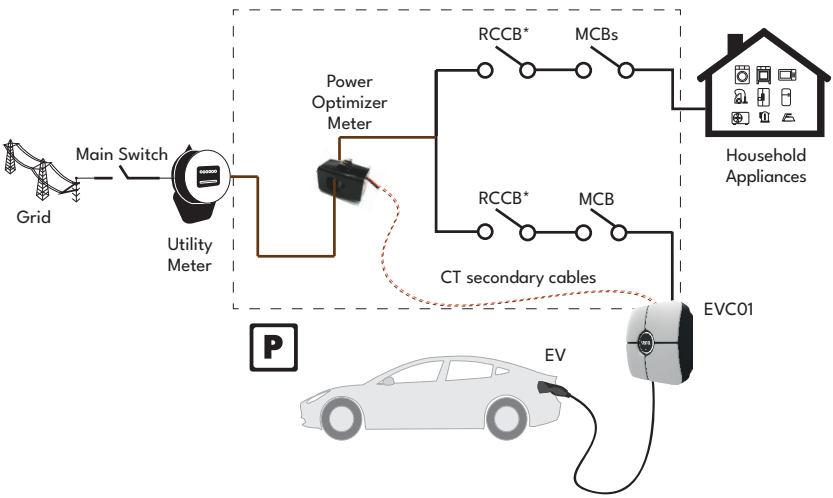
Single Phase:



Three Phase:



The power optimizer with external CT should be placed as shown in the figure below.



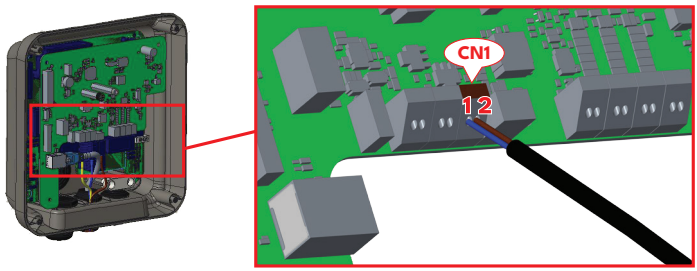
Note: The CT Clamp (FATS16L-100) is provided with 1meter cable. This can be extend using a twisted pair cable, e.g CAT5 Cable. Do not exceed the maximum length of 100m.

6.2.10 - LOAD SHEDDING

This charging station supports load shedding functionality which provides immediate charging current reduction in case of limited supply. Load shedding functionality can be used in any mode including Standalone and OCPP conntected modes. Load shedding triggering signal is a dry contact signal which must be provided externally and connected to the terminals 1 and 2 on the power board as shown in figure below.

When load shedding is activated by closing the contacts with an external device (Eg. ripple control receivers etc.) charging current reduces down to 8A. When load shedding is deactivated by opening the contacts charging continues with maximum available current. In normal use case when there is no signal connected to the load shedding input (contacts open between terminal 1 and 2) charging station supplies maximum available current.

You can connect dry contact (potential free) load shedding signal as shown in below. See figure below and table below.

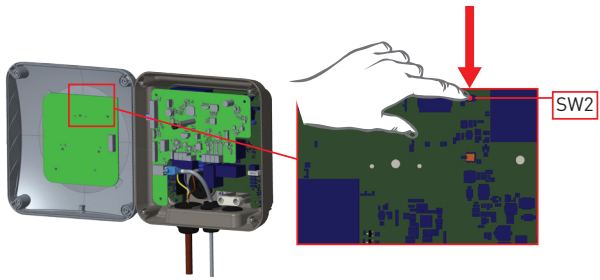


Cable Terminal	Input
CN1-1	Load Shedding Input +
CN1-2	Load shedding Input –

Load Shedding Input State	Behaviour
Opened Contact	Charge with max. available current
Closed Contact	Charge with 8A

6.2.11 - FACTORY RESET

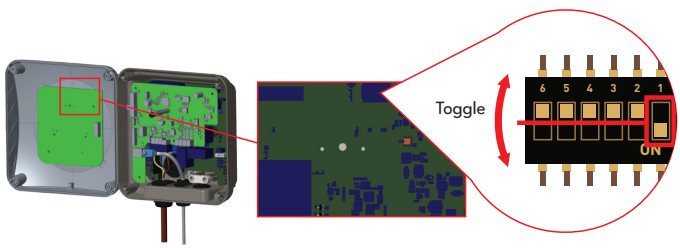
You must push the button on Smart board shown in figure below for factory reset. When you hold the button for 5 seconds user configuration will be reset to factory configuration. (e.g OCPP config, Network Config will be back to factory configuration.)



6.2.12 - RESETTING LOCAL RFID CARD LIST AND REGISTERING NEW MASTER RFID CARD IN STANDALONE USAGE MODE

If you loose your master RFID card and need to define a new master RFID card, below steps should be followed by your authorised service technician.

- Make sure the charging station is powered-off and open the front cover of your charger which is mentioned in installation guideline.
- Toggle the position of DIP switch No 1 which is located on the smart board of the charger shown in figure below. After that please turn on the charger again.



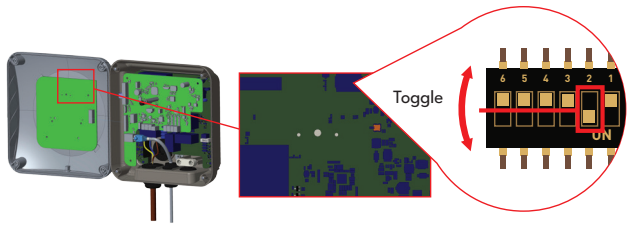
When the charger is powered on again please note that;

- Previously stored master card and user card list, if any exists, are deleted from charging station while entering the configuration mode. In configuration mode, the charger indication LED blinks red.
- If master card had not been registered during 60 seconds then configuration mode expires and charging station behaves as autostart product.
- The first RFID card which is registered within this 60 seconds of duration will be the new master RFID card. Please follow instructions to register RFID user card which is used during charging process.

6.2.13 - SETTING ETHERNET PORT OF CHARGER TO STATIC IP IN STANDALONE USAGE MODE

The charging station is preconfigured to DHCP mode in factory. If you need to connect to the charging station's web configuration interface directly using a computer, rather than using a router having DHCP server, steps below should be followed:

- Make sure the charging station is powered-off and open the front cover of your charger which is mentioned in installation guideline.
- Toggle the the position of DIP switch no 2, which is located on the smart board of the charger shown in figure below. After that please turn on the charger again.
- Charging station sets the Ethernet port to 192.168.0.10 adress statically and subnet mask will be set to 255.255.255.0



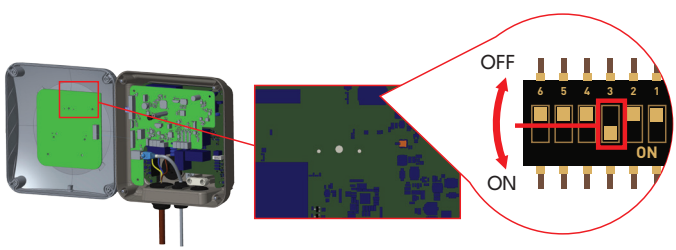
If the charger's LAN interface is needed to be set back to DHCP mode again this can be done from the web configuration interface.

Note: You can also use factory reset function to set the LAN interface back to DHCP mode again but please well note that all other parameters will be set to factory default parameters.

6.2.14 - WEB CONFIGURATION INTERFACE ENABLE / DISABLE

If you need to enable/disable the Web Configuration interface below steps should be followed:

- Make sure the charging station is powered-off and open the front cover of your charger which is mentioned in installation guideline.
- If you want to enable the web configuration interface, the position of DIP switch no 3 should be in "OFF" position as shown in figure below.
- If you want to disable the web configuration interface, the position of DIP switch no 3 should be in "ON" position as shown in figure below.



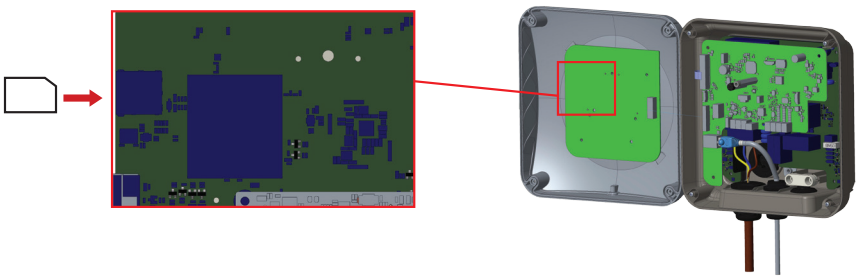
6.3 - OCPP CONNECTION

Make sure the charging station is powered-off.

6.3.1 - CONNECT OCPP OVER CELLULAR NETWORK (Optional)

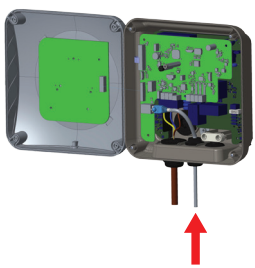
Insert the micro SIM card in the SIM card slot on cellular module as shown in the below figure.

NOTE: The device must be switched off during the process of inserting a micro SIM card into the product.

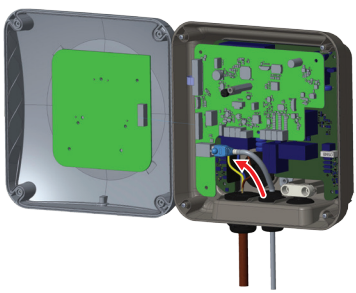


6.3.2 - CONNECT OCPP OVER ETHERNET

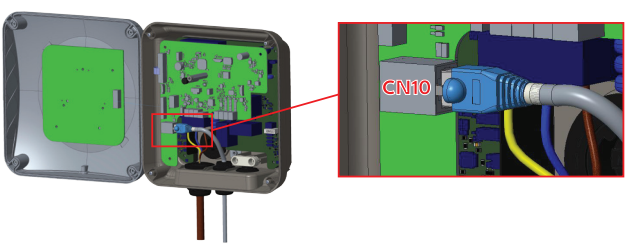
1- Insert cable through the cable gland.



2- Pull the cable through the cable clamps as indicated by arrows in below figure.



3- Insert the RJ45 connector to the socket as shown in figure below.



6.4 - COMMISSIONING

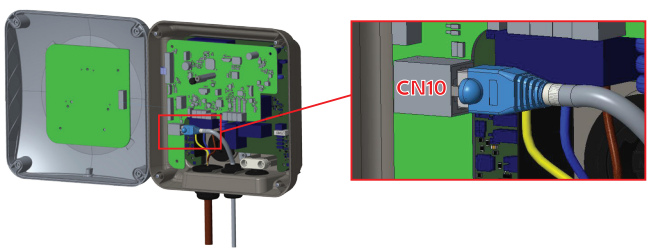
If you want to connect the charging station's web configuration interface, you have two options;

a. You can directly connect your PC to the charging station using a patch Ethernet cable. If you follow this option, please make sure that you have properly configured your charging station's LAN interface to static IP by following steps in section "SETTING ETHERNET PORT OF CHARGER TO STATIC IP IN STANDALONE USAGE MODE" and your charging station's web configuration interface is enabled via DIP switch which is mentioned in section "WEB CONFIGURATION INTERFACE ENABLE / DISABLE". By default, web configuration interface is enabled.

b. You can use a router having DHCP server. In this option, both the charging station and the PC should be connected to the router. Please be sure that you need to check the IP adress from the router to be able to make the connection.

6.4.1 - CONNECT PC TO THE SAME NETWORK WITH SMART BOARD

In order to access web configuration interface, first you need to connect your PC and EV charger to the same ethernet switch or connect EV charger to your PC directly.



In order to access web configuration interface, first you need to connect your PC and EV charger to the same ethernet switch or connect EV charger to your PC directly.

Default IP address of HMI board is 192.168.0.10. For this reason, you need to give static IP to your PC in the same network with HMI board.

You should assign static IP address to your PC in 192.168.0.0 network which means that IP address should be in a range of between 192.168.0.1 and 192.168.0.254.

6.4.2 - OPENING WEB CONFIGURATION INTERFACE VIA WI-FI HOTSPOT

For this unit, when accessing to Wi-Fi Hotspot settings in the WEB User Interface, under Network Settings tab, Wi-Fi Hotspot can be enabled or disabled. Also, optionally timeout activated can be changed as 5-30 minutes or continuous.
During the Wi-Fi Hotspot timeout duration, it is possible to connect a smart device (mobile phone, tablet or laptop) to the charging station.
Each product has a Wi-Fi Hotspot SSID and Wi-Fi Hotspot password set as factory configuration. Wi-Fi Hotspot SSID and Wi-Fi Hotspot password informations are located on the label pasted to the Quick Start Guide or Installation Guideline. You can log in to the Web configuration interface via Wi-Fi Hotspot by entering the network information written on the label.
After connecting to the "Wi-Fi Hotspot" network, the user can open the WEB browser from the computer or mobile device and type the IP address of the charging station, Wi-Fi Hotspot at IP-Address is written on the label.

For Android mobile devices, it is necessary to configure the browser to download and display the desktop site from the menu in the upper right corner of the Chrome browser. For iOS mobile devices, it is necessary to configure the browser to download and show the desktop site from the menu in the top right corner and also set the text size to 50%in the AA setting in the top left corner of the Safari browser.

Note: Maximum 3 users can connect to WEB Configuration Interface via Wi-Fi hotspot. It supports 2.4Ghz.

6.4.3- OPENING WEB CONFIGURATION INTERFACE WITH BROWSER

Open your web browser and type 192.168.0.10 which is IP address of HMI board.

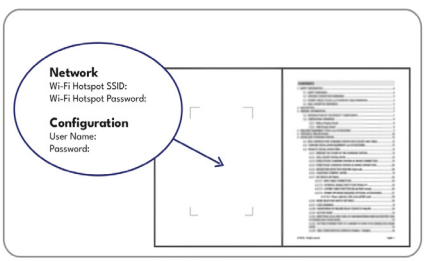
You will see login page on your browser;

Each product has a user name and password set as factory configuration.

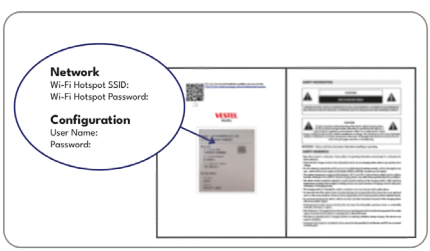
In this section you can log in to the Web configuration interface by entering the configuration information printed on the label. User Name and Password informations are located on the label pasted to the Quick Start Guide or first page of Installation Guideline as shown below.

Only for the first login you will be forced to change your password.

You can change password with Change Password Button in WEB UI login page or Administration Password section in the System Maintenance tab.



Visual representation is provided



Visual representation is provided

Attention: For web configuration interface accessibility problems; Web browsers usually save some information from websites in its cache and cookies. Forcing Refresh or Clearing (depending on your operating system and browser) them fixes certain problems, like loading or formatting issues on web page.

In case of security warning via web browser due to expired SSL certificate, please proceed to webpage connection.

After logging in for the first time using the default credentials, you will be prompted to review and confirm the Privacy Policy.

You must check the box “I read, I understand” and click “Confirm” to continue to the interface.

6.5 - WEB CONFIGURATION INTERFACE

MAIN PAGE	The Main page provides an overview of the key system information and connection status of the EVC device. Below are the descriptions of each displayed parameter: **User Name:** Username of the logged-in user. **CP Serial Number:** Unique serial number of the device. It is used for device authentication and remote management. **HMI Software Version:** The software version of smart board (HMI) that runs the device’s touchscreen interface. **OCPP Software Version:** The version of the Open Charge Point Protocol (OCPP) software, which enables communication with the charging network management system. **Power Board Software Version:** The version of the software that controls power management and charging operations of device. **Duration after Power On:** The total time (in hours, minutes, and seconds) that has passed since the device was last powered on. Useful for uptime tracking and performance monitoring. **Connection Interface:** The current communication method used by device. It can be Ethernet, WLAN (Wi-Fi), or Cellular. **Ethernet Interface IP:** The IP address assigned to device when connected via a wired Ethernet connection. **WLAN Interface IP:** The IP address assigned when device is connected via Wi-Fi. (If not connected, this field will be empty.) **Cellular Interface IP:** The IP address assigned when device is connected via a mobile network. (If not connected, this field will be empty.) **OCPP Device ID:** Unique identification number used by device when communicating with OCPP server. **Connector State:** Indicates current status of device's charging connector. This information helps users better understand the details displayed on the main page of the web configuration interface. You can also change the web configuration interface language and log out of the web configuration interface with the buttons in the upper right corner of the page. The following languages are available: Turkish, English, German, French, Romanian, Spanish, Italian, Finnish, Norwegian, Swedish, Hebrew, Danish, Czech, Polish, Hungarian, Slovak, Dutch, Greek, Bulgarian, Montenegrin, Bosnian, Serbian, Croatian.

6.5.1 - GENERAL SETTINGS

LED Dimming Settings	To optimize visibility of status indicator LED according to daylight conditions, Sunrise Time and Sunset Time can be selected when Led Dimming Level is time based.
Standby LED Behaviour	Standby status indicator LED behaviour can be set as On or Off.
Scheduled Charging	If the device is in Standalone Mode, you can only set Randomised Delay Maximum Duration and Continue Charging After Power Loss settings. Randomised Delay Maximum Duration is the setting that allows device to apply a random delay time before charging starts and can take values between 0 and 1800. The device waits for a random time before starting the charging process. For example, if Randomized Delay Maximum Duration = 60 seconds, the device will apply a random delay between 0 and 60 seconds. **Off- peak Chargig:** If the device is in OCPP Mode, for this mode you should enabled OCPP Connection in OCPP Settings. In OCPP Mode you can make all Off-Peak Charging settings. Off-Peak Charging is a feature that allows an electric vehicle to be charged during off-peak hours, when the grid is less busy. **Off- peak Charging at the Weekends:** Time period of charging at weekends when the electricity demand is low (off-peak hours). **Off- peak Charging Second Time Period:** Refers to charging in the second of the low electricity demand time periods. Some electricity tariffs offer more than one low-price time slot during the day. For example: First Off-peak time: 00:00 - 06:00 at night 2nd Off-peak time: 13:00 - 16:00 in the afternoon This expression means that charging is done during the second off-peak hour. So you are charging during the second off-peak time slot instead of the first off-peak time slot. **Off- peak Charging Periods:** User can determine set off-peak hours. Randomised Delay At Off Peak End: When the low tariff hours end, charging is delayed for a random period of time. Off-Peak End → End of low tariff (off-peak) hours Randomized Delay → Random delay **Timezone:** Refers to the local time zone in a particular region. **Continue Charging End Peak Interval:** Continue charging at the end of the peak interval. **Continue Charging Without Reauth After Power Loss:** Charging process will continue without requiring reauthorization after a power loss.

6.5.2 - INSTALLATION SETTINGS

Earthing system	In web configuration interface, earthing type is “TN/TT” by default. If Earthing Type is selected as IT, the protective earth error check is disabled.
Current Limiter Settings	Current Limiter Phase information can be adjusted in this menu. Also Current Limiter Value can be written manually between 6-32A. If a value below 6A is written, a warning will be shown to write minimum 6A. **Note:** The current limiter of the charging station can be set in hardware via the rotary switch or manually in the web configuration interface. There is no hardware or software configuration interface priority. The charging station uses the current value last set by the installer from either interface.
Unbalanced Load Detection	You can enable or disable the Unbalanced Load Detection. If enable option is selected, Unbalanced Load Detection Max Current can be selected. Unbalanced Load Detection Minimum value is 6, max value is Current Limiter Value. Current Limiter Value can be set on Current Limiter Settings.
External Enabled Input	You can enable or disable the External Enable Input.
Charging Mode Selection and Power Optimizer Configuration	In this part, you can select Follow The Sun, Follow The Sun Mode, Auto Phase Switching, Operation Mode, Power Optimizer Total Current Limit and Power Optimizer External Meter. **For a detailed explanation of Follow The Sun, please refer to section 6.5.2.1.** Operation Mode can be Normal, Peak / Off-Peak, TIC without Peak / Off Peak. TIC Power Optimizer Total Current Limit can be Disabled or can take values between 10 and 100. When TIC selected in Operation Mode , Power Optimizer Total Current Limit and Power Optimizer External Meter can not be selected. When Power Optimizer Total Current Limit is Disabled, Power Optimizer External Meter can not be selected. Power Optimizer External Meter. can be selected Auto Selected, Klefr 6924 / 6934, Garo GNM3T / GNM3D, Embedded Power Optimizer with CT, P1 Slimmemeter. If Power Optimizer External Meter is Auto Selected, Power Optimizer value reads from main board.
Load Shedding Minimum Current	Load Sheddding Status is reading from main board, you can select Load Shedding Minimum Current from Web configuration. This parameter can take values between 0 and Current Limiter Value. Current Limiter Value can be set on Current Limiter Settings.

G100 Settings	G100 settings allows you to enable or disable **G100 Mode** and select the Installation Type as either Domestic or Commercial. When the **Installation Type** is set to Domestic, the **G100 OP State** automatically changes to State - 3 which means the device has entered safety mode beacuse the grid voltage or frequency has exceeded its limits. In this case, you can restart the device by pressing the **G100 STATE-3 RESET** button. However, this action can only be performed a limited number of times. If the G100 State-3 reset limit is reached to maximum, the admin can press the **G100 LOCKOUT RESET** button and confirm the action to exit the Excursion condition. In this part, to change the Installation Type to Domestic, ensure the following: 1. If using Local Load Management, the Maximum Grid Current must be 100 or less. 2. If using Power Optimizer, the Total Current Limit of the Power Optimizer must be 100 or less.

6.5.2.1 - FOLLOW THE SUN

6.5.2.1.1 - Inverter Type and Mode Configurations with Different Measurement Methods

6.5.2.1.1.1 - Export Mode with the usage of CTs

Export Mode with the usage of CTs at the inverter output and input of the electrical consumer devices of the house. Inverter may only be single phase for CT usage and also supports energy export to grid.

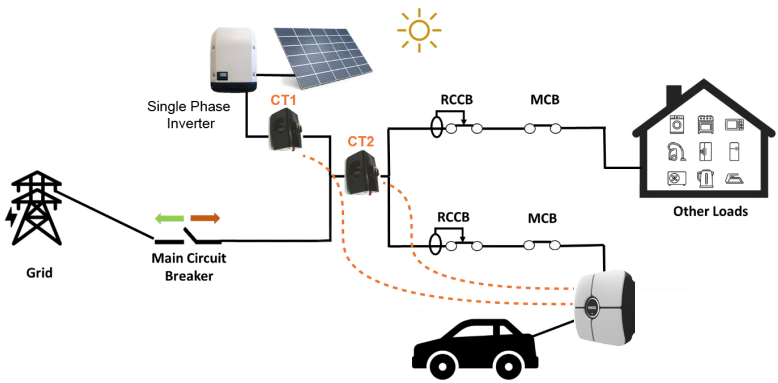


Figure 1

Connection of CT1 and CT2 in Figure-1 to the power optimizer board(21PO01-r5) in the EVC device is shown in Figure-2.

Power Optimizer with external current transformer (CT) should be placed to the main lines as shown in Figure-2:

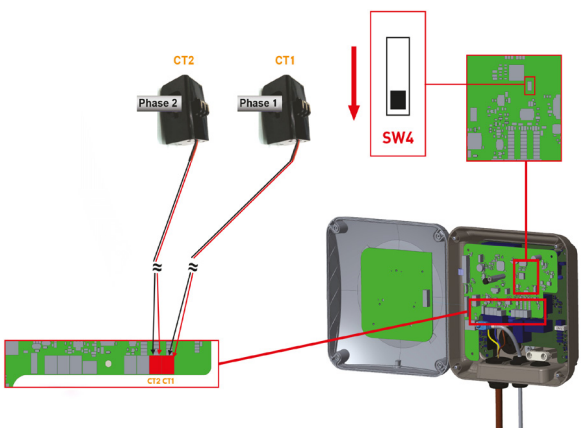


Figure 2

• Slide the switch (SW2) on " The Embedded Power Optimization Module" should be set as shown in Figure-2. (Downward)

NOTE: CAT5 cable length to use should be below 100 meters.

6.5.2.1.1.2 - Export Mode with the Usage of Utility Meter

Export Mode with the usage of Energy Meter at the Grid output.

Energy meter may be single phase or three phase for supports energy export to grid.

The energy meter KLEFR 6934 is used for a 3-phase installation or the model KLEFR 6924 for a 1-phase installation.

The total energy drawn from the main switch of the house by charging station and other household appliances is measured with this device integrated to the main power line. The charging station regulates the charging power of the electric vehicle according to the load on main switch of the house.

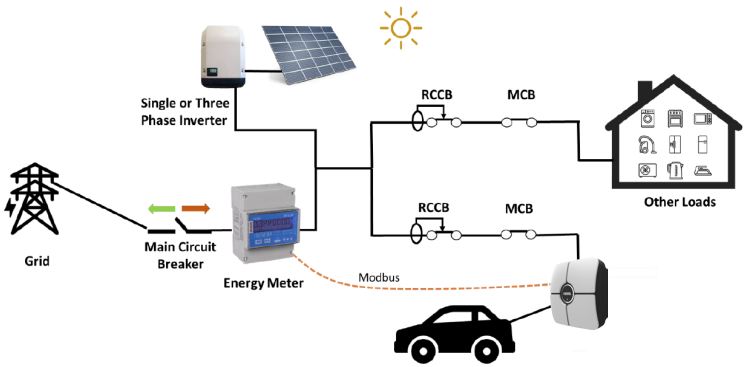


Figure 3

Energy Meter is connected to the CN20 port of the power board(ACPW) inside the device as shown in Figure-5.

The figures are just generic examples of power optimizer meter installation to a distribution box of the house, not to be exactly the same for the actual house installation.

Energy Meter wiring connections can be made according to the information below.

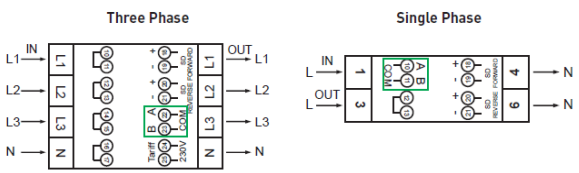


Figure 4

22-23: A-B (COM) Modbus connection over RS485 for three phase charging station models. (See the following section “DATA CABLE CONNECTION TO EVC04 CHARGING STATION“)

10-11: A-B (COM) Modbus connection over RS485 for single phase charging station models. (See the following section “DATA CABLE CONNECTION TO EVC04 CHARGING STATION“)

Related board wiring connections can be made as shown below:

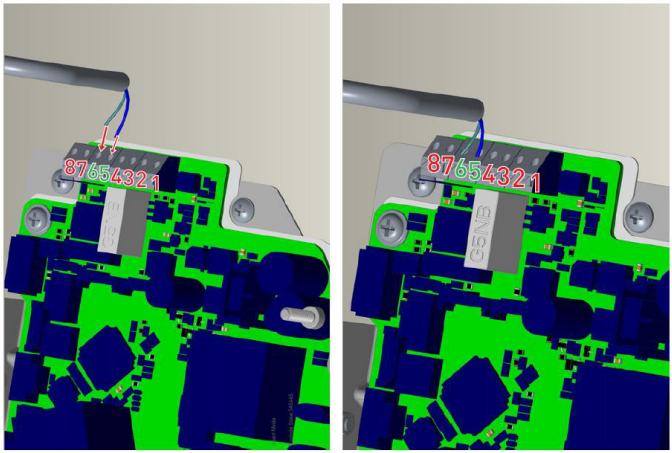


Figure 5

Cable Terminal	Cable Color	Description
6 (CN20-2)	White Blue	A (COM)
5 (CN20-1)	Blue	B (COM)

6.5.2.1.2 - Modes of Operation

Follow The Sun mode functionality can be enabled and disabled. If Follow The Sun mode is enabled; there are 3 options for the Follow The Sun;

6.5.2.1.2.1 - Sun Only

This mode is used for pure solar charging of the electric vehicle for least carbon footprint. When the user activates this mode, charging is only with energy from solar power generation. Vehicle can be charged with whatever solar generation is currently available, without using grid support at all. Charging is possible only with solar surplus. If solar generation is low, charging will not be possible.

6.5.2.1.2.2 - Sun Hybrid

This mode is used for solar charging with limited support from the grid when there is no solar generation. If solar generation is high enough, grid support won't be used. If solar generation is low, charging station will use grid support to be able to start charging. Eg. Solar generation is 3A and minimum charging current of the charging station is 6A, 5A will be used from the grid (minimum charging current is calculated as 8A because 6A + 2 A hysteresis). (CP min charging current is 6A for IEC 61851, 8A for ZE Ready 1 phase charging, 13A for ZE Ready 3 phase charging.)

Sun Only and Sun Hybrid modes can be overridden (forced charge) from Drive Green App and charging station will switch to max available charging current mode for that single charging session and will fallback to Sun Only mode after active charging session is finished.

6.5.2.1.2.3 - Max Hybrid

When the user activates this mode, the charging process should be a normal charging process that can charge at maximum power regardless of solar generation or grid support option.

6.5.2.1.3 - Auto Phase Switching

When the user activates the Follow the Sun, the charging station can automatically switch 1 phase/3 phase according to the amount of solar production and consumption.

6.5.3 - OCPP SETTINGS	
OCPP Connection	If you select mode as “Enabled”; you should type all fields in the connection settings and configuration parameters sections are enable. For now, the only available OCPP version is OCPP 1.6, so it will be selected as default. The Central System Address and Charge Point Id are mandatory fields for saving this page. You can set OCPP configuration parameters to their default values by clicking “Set to Defaults” button. **OCPP Ciphers Support:** A cipher suite is a set of algorithms that help secure a network connection. If “Ocpp Security Profile” is selected as 2 or 3, OCPP specification enforces one of two cipher suites to be used. If your backend uses a different cipher suite you can change this setting as “All Ciphers” but it will be incompatible to OCPP standard. You can select the OCPP settings type you want from the menu which is at the left side of the page. For example OCPP Connection, OCPP Version, OCPP Ciphers Support, Connection Settings and OCPP Configuration Parameters. Then, click “Save” button. **Note:** Be careful for your entered values because the system does not accept the unsuitable values and gives warning. In this case, values will not be saved. Then you will not be redirected to the main page so you should check your values.

6.5.4 - NETWORK INTERFACES SETTINGS

There are four types of network interfaces in this page; Cellular, Ethernet, Wi-Fi and Wi-Fi Hotspot.

Select interfaces' modes as "Enabled" if you want to activate it.

You should fill all spaces in suitable formats.

CELLULAR	If "Static" is selected; "IMEI", "IMSI" and "ICCID" fields are mandatory. When cellular getaway is enabled, the LAN interface IP setting mode will be set to static and DHCP Server will be enabled.
LAN	If you select Ethernet or Wi-Fi IP Settings as "Static"; "IP Address", "Network Mask", Default Gateway"and "Primary DNS" spaces are mandatory.
WLAN	If you set Wi-Fi as enabled, "SSID", "Password" and "Security" are mandatory. A list of available wireless networks is displayed in the WLAN section.
WIFI HOTSPOT	Details are described in section "OPENING WEB CONFIGURATION INTERFACE VIA WIFI HOTSPOT".
FIREWALL	Input and output policies determine how the network is operated. Default policies in this area should be adjusted as needed by authorized people. Access to the device may be completely blocked after incorrect settings. This is not a software issue but a configuration error. These policies should be adjusted according to the whitelist or blacklist logic and the necessary rule configuration should be made for the desired situations. **Status** This setting controls the firewall status: "Enable" activates it, while "Disable" deactivates it. The "Disable" option turns off the firewall, preserving the status of all settings. **Incoming Trafic** This policy determines the default behavior for incoming traffic. The "Allow" option accepts all incoming traffic, while the "Deny" option rejects all incoming traffic. **Outgoing Trafic** This policy determines the default behavior for incoming traffic. The "Allow" option accepts all incoming traffic, while the "Deny" option rejects all incoming traffic. **Adding Custom Rules:** Users can add custom firewall rules and select and delete them. To delete a rule, check the box in the "Select" column and click the "Delete" button. Rules are prioritized from top to bottom. The "Add" button will open a pop-up and the rules will be added to the list by making the necessary settings and pressing "Add".

	Policy: This setting determines whether to accept or reject a certain type of traffic. The “Allow” option allows the traffic, while the “Deny” option blocks the traffic. **Direction:** This setting determines which direction of traffic the rule applies to. The “Input” option targets incoming traffic, while the “Output” option targets outgoing traffic. **Interface:** This setting determines which network interface the rule is applied to. Options include “LAN”, “wlan”, “Cellular”, and “lo”. **Protocol:** This setting determines which communication protocol the rule is applied to. Options include “tcp”, “udp”, and “None”. **Port:** This setting determines which port number the rule is applied to. Users can add as many rules as they want and can edit or delete them as needed. This enhances the flexibility and convenience of your firewall application.

6.5.5 - STANDALONE MODE SETTINGS

If you have set OCPP as enabled in OCPP settings before, standalone mode cannot be selected. Otherwise, you can select standalone mode. There are three modes in the list;

Select “RFID Local List” mode to authenticate a RFID local list which will be entered by you. You can make an addition or deletion from the RFID local list later.

Select “Accept All RFID’s” mode to authenticate all RFID’s.

Select “Autostart” mode to allow charging without the need for authorization. It will be enough to plug to start charging.

If you are done with mode selection, click “Save” button and reboot the device.

For an in-depth overview of the LOCAL LOAD MANAGEMENT configuration settings, please refer to Section 6.5.7.

6.5.6 - MAKING SYSTEM MAINTENANCE OF THE DEVICE

Log Files	**In the Log Files page**, you can download device event logs for a selected date range (maximum 5 days) using the Start Date and End Date fields. Device logs are automatically deleted every 30 days. You can also click CLEAR to permanently delete all event logs stored on the device. **Download Change Logs:** Within the scope of Personal Data Protection, all changes made to the device settings are kept. Saved logs of which users and which actions were taken can be downloaded with the "Download Change Logs" button.
Firmware Updates	You can upload the firmware update file from your PC, after the file is uploaded, click on "Update" button to start the firmware update. When update is started, your charger's LED indication will be seen as constant red. After the firmware update is finished, your charger will restart automatically. You can see the latest firmware version of your charger from webconfig UI in main page.
Configuration and Backup	You can backup of the sytem. If you want to restore you can click the Restore Config File button and upload the backup file. The system only accepts the .bak files.
System Reset	You can proceed to this section to make Hard Reset and Soft Reset.
Administration Password	A password is required for administrative access.
Factory Default Configuration	You can reset your device to its factory settings.
Local Charge Sessions	From this page, you can download and view the full session log and charging summary, including the duration of charging and the RFID card used, in Excel format.

6.5.7 - LOCAL LOAD MANAGEMENT

The Local Load Management tab includes two parts: **General Settings** and **Load Management Group.**

GENERAL SETTINGS

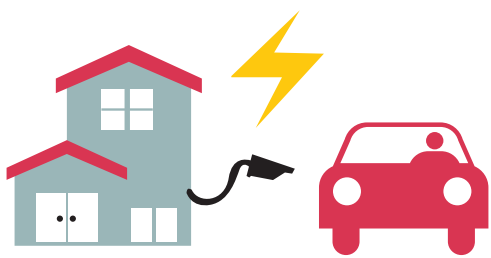
If the device with dynamic local load management; local management option can be disabled, Modbus TCP or Master/Slave.

6.5.7.1 - Modbus TCP/IP Protocol Parameters

EVC01 charging station acts as a slave device in the Modbus TCP/IP communication. Charging station should be in the same network with the master device or a proper routing should be applied to provide communication between slave and the master devices in different sub networks. Each charging station should have different IP address. Modbus TCP communication port number is 502 and Modbus Unit ID is 255 for EVC01 charging stations. There can be only one active Modbus master connection at any time. When a new Modbus connection is established, the master is expected to set the Failsafe Current, Failsafe Timeout and Charging Current registers immediately. The master also periodically sets the Alive register to indicate that the connection is still alive. If the master does not update the value of the alive register until the failsafe timeout, the device switches to the failsafe state; TCP socket is terminated and failsafe current becomes active. As the update period of the Alive register, half of the failsafe timeout is recommended.

6.5.7.2 - Static Management

For static management, a power limit can be set to the load management group and the charger won't go above the power limit.



6.5.7.3 - Dynamic Management

With the help of dedicated power optimizer option, EV Charging station can manage the power limit based on the available power. When the household appliances consumes more, the charger consumes less and doesn't overload the main switch.

There are 2 different types of network topologies available for connecting multiple EVC01 charging stations in master/slave clusters. According to the customer needs, one of these alternatives can be chosen.

6.5.7.4 - Star Topology

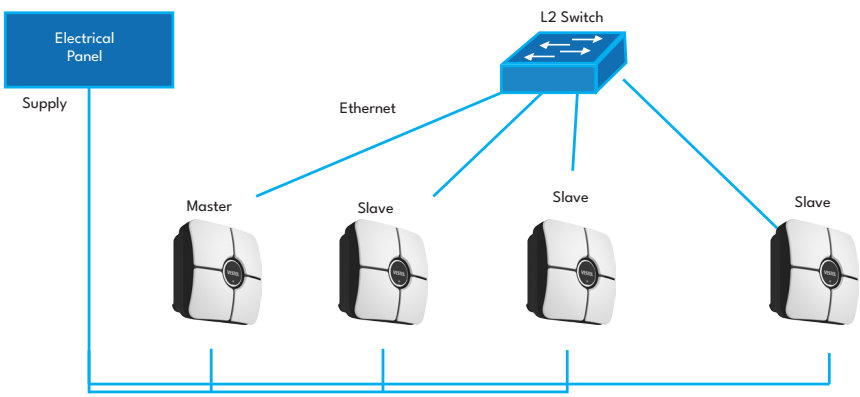
In star network topology, all chargers are connected to the master station via a network switch or router. This topology needs cabling between each charging station and the central switch. This topology is more reliable than daisy chain topology since each charging station has its own connectivity to the network switch. For connection of each station to the central switch, Cat5e or Cat6 Ethernet cables can be used up to 100 meters each.

For the IP configuration of the network, either the router may have DHCP server or the master charging station can be configure as DHCP server. If you use a router with a DHCP server, you need to configureall charging stations including the master station LAN IP address setting as “Dynamic” from “Network Interfaces” menu. In this scenario, all the charging stations get their IP addresses from central DHCP server.

If you use a router or a L2-switch without DHCP server, you need to configuremaster charging station LAN IP settings to DHCP server and slave charging station LAN IP setting to “Dynamic” from “Network Interfaces” menu. In this scenario, slave charging stations get their IP addresses from master charging station.

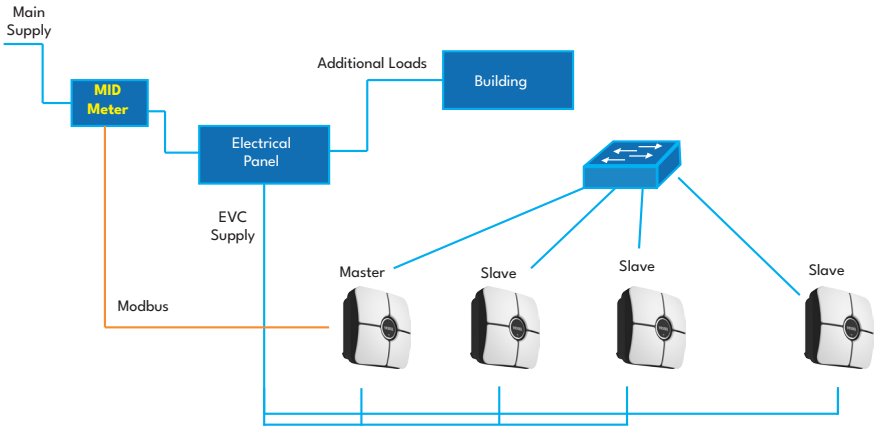
Block diagrams for static and dynamic supply in star network topology are provided as below.

6.5.7.4.1 - Static Supply Star Topology:



Local Load Management configuration of static supply.

6.5.7.4.2 - Dynamic Supply Star Topology:



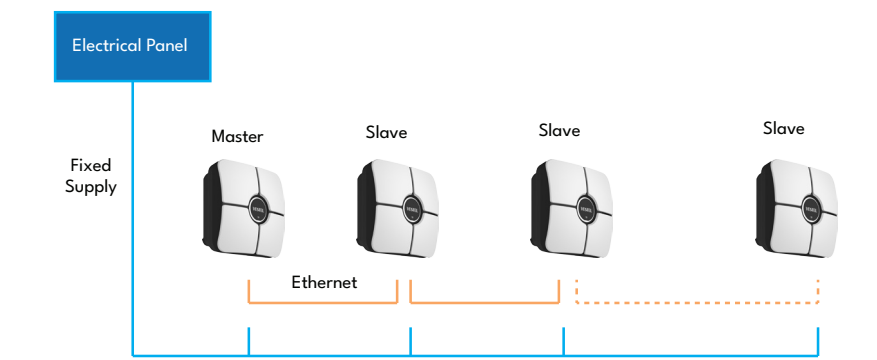
6.5.7.5 - Daisy Chain (Serial)

Daisy chain topology needs cabling between each charging station as in and out connection. To be able to use daisy chain topology, the charging station needs optional daisy chain two port switch board inside. For the connection of each charging station in series topology, Cat5e or Cat6 Ethernet cables can be used up to 100 meters each.

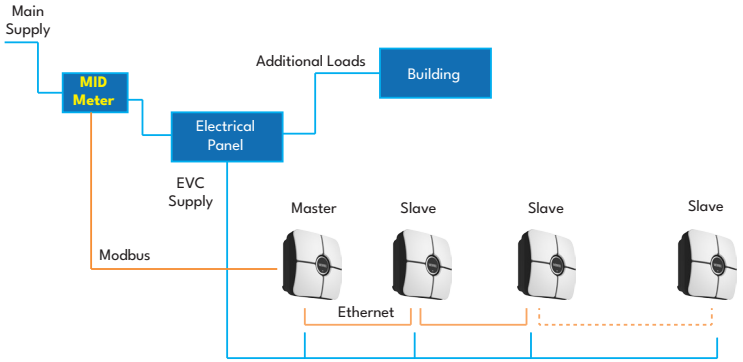
For the IP configuration of the network, master charging station should be configure as DHCP server. You need to configureslave charging stations' LAN IP address setting as "Dynamic" from "Network Interfaces" menu. In this scenario, all the charging stations get their IP addresses from the DHCP server inside master charging station.

Block diagrams for static and dynamic supply in daisy chain network topology are provided as below.

6.5.7.5.1 - Static Supply Daisy Chain Topology:



6.5.7.5.2 - Dynamic Supply Daisy Chain Topology:



6.5.7.6 - Master/Slave

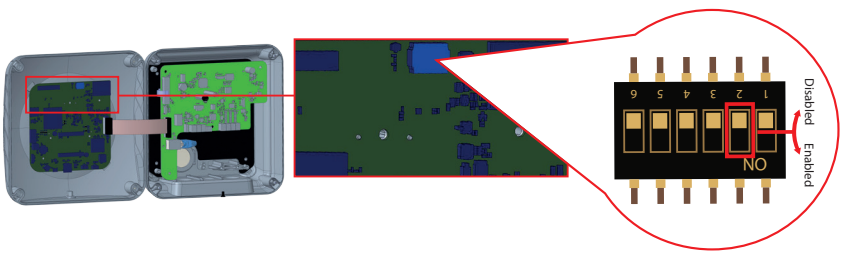
If Load Management Option is selected as Master/Slave, there will be two part in this page; General Settings and Load Management Group.
Operation Selection on Web-UI
Users can select one of the following three options:

a. Slave
b. Master

6.5.7.6.1 - Configuration of Slave Charging Stations

The charging station is preconfigure to DHCP mode in factory. If you need to connect to the charging station's web configuration interface directly using a computer, rather than using a router having DHCP server, steps below should be followed:

- Make sure the charging station is powered-off and open the front cover of your charger which is mentioned in installation guideline.
- Toggle the second position of DIP switch which is on the smart board of the charger shown in figure-below After that please turn on the charger again.
- Charging station sets the Ethernet port to 192.168.0.10 address statically and subnet mask will be set to 255.255.255.0



Open your web browser and type 192.168.0.10 which is IP address of smart board.

You will see login page on your browser;

When you want to enter to the web configuration interface in the first time, you will see the warning as "We recommend you to change your default password from system maintenance menu".

You can enter the system with:

Default username = xxxxx

Default password = xxxxx

You can change password with Change Password Button in login page or Administration Password section in the System Maintanence tab.

Attention: For web configuration interface accessibility problems; Web browsers usually save some information from websites in its cache and cookies. Forcing Refresh or Clearing (depending on your operating system and browser) them fixes certain problems, like loading or formatting issues on web page.

Load management option is **"disabled"** by default. After accessing to configuration web interface, you need to tab **"Local Load Management"** menu and select **"Master/Slave"** in **"Load management Option"**. **"Charge Point Role"** should be selected as **"Slave"** as shown in below menus.

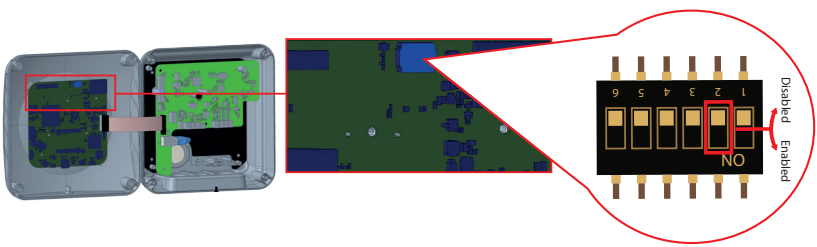
DLM Network Selection: You can select the DLM communication type from the DLM Network Selection dropdown. The available options are Ethernet and WLAN, depending on how the slave will communicate with the master. This must be same for both Slave and Master.

The slave charging stations should be set as DHCP client as shown in image below. Note that, this setting causes disconnection from configuration web interface of the charging station, so this setting should be the latest setting in slave configuration of the charging station.

6.5.7.6.2 - Configuration of Master Charging Station

The charging station is preconfigure to DHCP mode in factory. If you need to connect to the charging station's web configuration interface directly using a computer, rather than using a router having DHCP server, steps below should be followed:

- Make sure the charging station is powered-off and open the front cover of your charger which is mentioned in installation guideline.
- Toggle the second position of DIP switch which is on the smart board of the charger shown in figure below After that please turn on the charger again.
- Charging station sets the Ethernet port to 192.168.0.10 address statically and subnet mask will be set to 255.255.255.0



Open your web browser and type 192.168.0.10 which is IP address of smart board.

You will see login page on your browser;

When you want to enter to the web configuration interface in the first time, you will see the warning as "We recommend you to change your default password from system maintenance menu".

You can enter the system with:

Default username = xxxxx

Default password = xxxxx

You can change password with Change Password Button in login page or Administration Password section in the System Maintanence tab.

Attention: For web configuration interface accessibility problems; Web browsers usually save some information from websites in its cache and cookies. Forcing Refresh or Clearing (depending on your operating system and browser) them fixes certain problems, like loading or formatting issues on web page.

The master charging station should be set as DHCP server with a valid static IP address E.g. 192.168.0.10 with DHCP start and end IP addresses 192.168.0.50 and 192.168.0.100, respectively, as shown in the image below.

Note that if there is an external DHCP server in the local network, you also need to set master charging station to DHCP client.

Load management option is **"disabled"** by default. After accessing to configuration web interface, you need to tab **"Local Load Management"** menu and select **"Master/Slave"** in **"Load management Option"**. **"Charge Point Role"** should be selected as **"Master"** as shown in the image below.

You can also select the DLM communication type from the **DLM Network Selection** dropdown. The available options are Ethernet and WLAN, depending on how the slave will communicate with the master.

Master charging station has additional configuration settings for dynamic load management group.

Grid Settings:

"Maximum Grid Current " value should be set to the maximum allowed current which can be drawn from the upstream electrical circuit.

"Grid Protection Margin Percentage" A safety margin is set for grid (electrical network) protection. It is usually used to prevent overloads or imbalances. The device limits itself to a certain percentage (%) to avoid damaging the network.

You must increase the **Maximum Grid Current** or decrease the Grid Protection Margin Percentage before saving the settings. The Maximum Grid Current limit cannot be lower than 10A when using the Grid Protection Margin Percentage.

The Cluster Max Current defines the maximum current that can be distributed among the connected nodes within the DLM system except home load in dynamic supply.

Cluster FailSafe Current represents the total available current when the external meter is no longer connected or has lost connection.

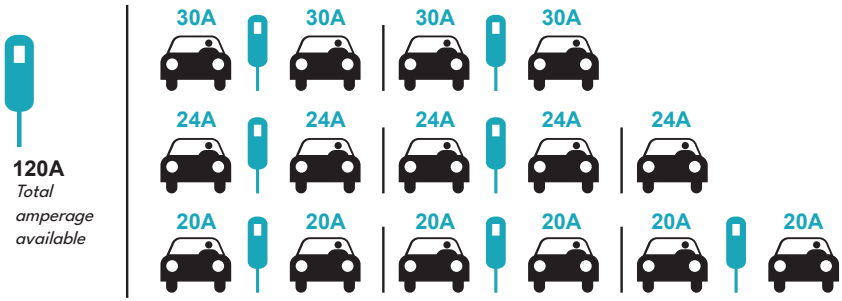
"Supply Type" should be set according to the load management type such as **"static"** current limit or **"dynamic"** current limit. For static current limit, "static" option should be selected. For dynamic current measurement, "MID" should be selected in "supply type". Note that dynamic current limit setting needs optional current measurement accessories.

Appropriate **load management mode** can be selected from three options as **"Equally shared"**, **"First in First out"** and **"Combined"** modes. Combined mode needs extra configuration as **"Fifo Charging Percentage"** which effects the share between equally shared and first-in first-out calculations of the load managament algorithm.

There are 3 different scenarios of load management usage:

6.5.7.6.3 - Equally shared

All available power is distributed equally to all EVs connected. This is more suitable-for workplace or condominium chargings where the cars are parked for a considerable period of time.



6.5.7.6.4 - FiFo (First in - First Out)

This type of load management is more oriented for fleets in order to let them have more fully charged EVs when they need. The available power is redistributed and when a new EV arrives, it waits until an EV finishes its charge or leaves the charging point.

			Gm = 120A				Gm = 80A
EVSE/Tp	T1	T2	T3		T4	T5	T6
1	32A	32A	32A	32A	16A ↓	6A	6A
2	32A	32A	32A	32A	32A	32A	32A
3	32A	32A	32A	32A	32A	32A	32A
4	32A	24A	24A	18A	32A	32A	6A
5	32A	24A	6A	6A	8A	24A	6A

** Tp: Time Period, Gm = Maximum Grid dlocated for the chargers. Available maximum current for each EVSE in a certain Tp is indicated in black color. Charging current which is drown by EV is indicated in Blue color. An EV drawing less current is incated by " ↓ " symbol.*

6.5.7.6.5 - Combined Load Management

Combined load management is a combination of FiFo and Equally shared methods. A percentage of total power allocated for EV charging cluster can be set and this percentage of total power distributed to all EVs according to FiFo and the remaining power will be delivered as equally shared principal to all EVs.

F% =50			Gm = 120A				Gm = 80A		Gm=29A	Gm = 30A
EVSE/Tp	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
1	32A	32A	32A	32A	20A	6A	6A	8A		6A
2	32A	32A	32A	32A	32A	32A	32A	32A	32A	6A
3	32A	32A	32A	32A	32A	32A	26A	28A	32A	6A
4	32A	24A	24A	12A	24A	32A	8A	10A	32A	6A
5	32A	24A	24A	12A	12A	18A	8A	10A	32A	6A

** Tp: Time Period, Gm = Maximum Grid dlocated for the chargers. Available maximum current for each EVSE in a certain Tp is indicated in black color. Charging current which is drown by EV is indicated in Blue color. An EV drawing less current is incated by " ↓ " symbol.*

LOCAL LOAD MANAGEMENT - LOAD MANAGEMENT GROUP

After the basic load management configurations are finished, be sure to connect all of the slave charging stations to the master charging station through daisy chain or star network topology.

When all the charging stations are ready to communicate with the master charging station, click "UPDATE DLM GROUP" button in "Load Management Group" menu. When "UPDATE DLM GROUP" button is clicked, master charging station starts slave discovery mode and automatically finds and lists slave charging stations in the list including master charging station itself as connector.

After master charging station discovers all the slave charging stations, then you can make other required settings of each connector one by one

If the selected connector is required to be prioritized over the other charging stations, you can set "VIP Charging" as enabled as shown in the image below.

For setting the actual phase connection sequence of each charging station, you need to select correct sequence from the dropdown menu as shown in the image below.

Note that if the charging station has only one phase supply, then you just need to select correct phase number from the drop down menu.

Other parameters are just read only information from the connectors, which can be updated to the latest values by refreshing the configuration web interface.

7 - UK REGULATION CHANGES ACCORDING TO SMART CHARGING (OPTIONAL)

CONFIGURATION WEB INTERFACE SETTINGS

Randomised Delay and Off-Peak Charging Behaviour

a.Randomised delay won't be repeated if applied in a charging period (except after power off and second transition to off peak hour, E.g: charging starts at 15:00 and paused at 16:00, when starting at 22:00 again randomized delay will be applied again.)

b.Randomised delay and waiting for off-peak charging will be cancelled if user tap RFID card for forced charging (first tap if charging station is in autostart mode, second tap if the charging station is in authorized mode). If the unit is in autostart mode any RFID card will force a charge, if the unit is in authorized mode the authorizing card of that charging session will force charge. Forced Charge will cancel both off-peak hour waiting period and randomized delay for that charging session.

c.While starting a charge session, if the time is in a peak period, the charging start will be delayed to the upcoming off-peak period start time.Randomized delay will be applied when the charging (actual energy transfer) starts.

d.If the time is in off-peak period, the randomized delay will be applied (if enabled) and then charging will start after delay. (It is only a numerical value and should be 600 by default). During the charging session if the time shifts from off-peak to peak, charging will continue or pause according to the setting "ContinueAfterOffPeakHour".

h.Waiting for off-peak hour will be shown on LED as Blue-Red blinking. (will be shut of after 5 mins)

i.Randomised delay will be shown on LED as Green blinking.

OCPP mode change config items:

i. RandomisedDelayMaxSeconds: [0, 1800] (default:600, can be set to "0" for disabling)

ii. CurrentSessionRandomDelay: random delay value calculated for active charging session.

The value will be decremented by 1 minute intervals with time passes. (subject to change)

iii. OffPeakCharging: TRUE / FALSE (Default: TRUE)

iv. OffPeakChargingWeekend: TRUE / FALSE (Default: FALSE)

v.OffPeakChargingTimeSlots: 11:00-16:00, 22:00-08:00 (default: 11:00-16:00, 22:00-08:00)

vi. ContinueAfterOffPeakHour: TRUE / FALSE (Default: FALSE)

vii. ContinueChargingAfterPowerLoss: TRUE / FALSE (Default: TRUE)

viii. ForcedCharging: TRUE / FALSE (Default: False, OCPP CS may set this to TRUE for overriding randomised delay and off-peak and after the charging session charging station will set this to FALSE again.)

Standalone / Local RFID List:

Webconfig General Settings menu "Smart Charging" tab:

i.Randomised delay maximum duration (seconds) Editable for admin user, readonly for end user credentials [0, 1800] (default: 600, can be set to "0" for disabling)

ii. Off-peak Charging (Enabled / Disabled)

iii. Off-peak Charging at the Weekends (Enabled / Disabled) (default:Enabled for UK, Disabled for rest)

iv. Off-peak Charging Periods: 11:00-16:00, 22:00-08:00 (default: 11:00-16:00, 22:00-08:00)

v. Continue charging at the end of off-peak interval (Enabled / Disabled)

vi. Continue charging without re-authentication after power loss (Enabled / Disabled)

Off-peak charging function will be active if and only if device is connected to the central system.

For the unit in standalone mode the settings will be as above. For Standalone modes, off peak charging will be hidden because of the time sync issue.

Randomised Delay Maximum Duration, can take values between 0 and 1800.

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