VESTEL

EVC04 AC22-AC7.4

SERVICE MANUAL

VESTEL

Revision History:

First Version	Uğur Korcan İçten
Second Version	Overcurrent and under voltage values
Third Version	Smart Model extension
Fourth Version	
Fifth Version	
Sixth Version	
Seven Version	
Eight Version	

Table of Contents

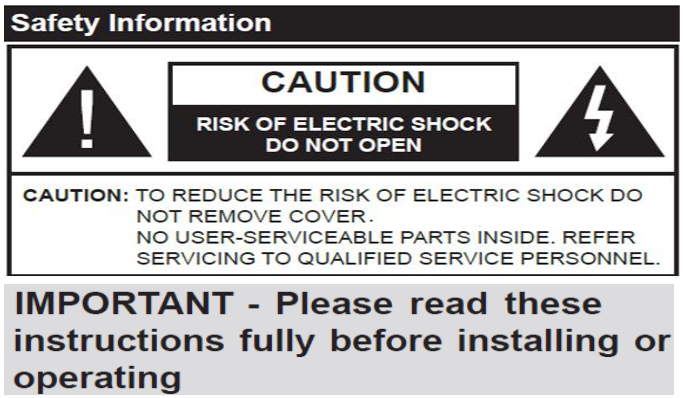
Notes, Cautions, and Warnings

Signs used in this manual

Some words and phrases are written in a different format to get your attention.

Note: It is being used to put emphasis on useful information and critical points regarding the product.

WARNING:



CAUTION: Disconnect product from the power supply before attempting any operation on it.

1 SYSTEM SPECIFICATION

1.1 General Specification

Model Name	**MODEL DESCRIPTION: EVC04-AC**-*** EVC04 : Electric Vehicle AC Charger (Mechanical Cabinet 04) 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 standard equipment for all of the model variants. “S” option must be included for selecting combinations of W and L: Blank : No connectivity module except RFID reader S : Smart Board with Ethernet Port W : Wi-Fi module or WiFi & Bluetooth module L : LTE / 3G / 2G module 3rd Asterisk (*) : Can be one of the following: Blank : No Display D : 4.3” TFT color display 4th Asterisk (*) can include combinations of the following: Blank : No RCCB A : Charging unit with Type-A RCCB E : Charging unit with EV / ZE Ready Compliance 5th Asterisk (*) can be one of the following: Blank : Case-B Connection with normal socket T2S : Case-B Connection with shuttered socket T2P : Case-C Connection with Type-2 plug T1P : Case-C Connection with Type-1 plug
Cabinet	EVC04

1.2 **Technical Specification**

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

Model		EVC04-AC22 Series	EVC04-AC11 Series
IEC Protection class		Class - I	Class - I
Vehicle Interface	**Socket Model**	Socket TYPE 2 (IEC 62196)	Socket TYPE 2 (IEC 62196)
	Cable Model	5 m Cable with TYPE 2 (IEC 62196) Female Plug	5 m Cable with TYPE 2 (IEC 62196) Female Plug
Voltage and Current Rates		400VAC 50/60 Hz - 3-phase 32A	400VAC 50/60 Hz- 3-phase 16A
AC Maximum Charge Output		22kW	11kW
Idle Power Consumptio		3.5W	3.5W
Required Circuit Breaker on AC Mains		4P-40A MCB Type-C	4P-20A MCB Type-C
Required Leakage Current Relay on AC Mains (for products which are not equipped with RCCB Type A)		4P -40A - 30mA RCCB Type-A	4P -20A - 30mA RCCB Type-A
Required AC Mains Cable		5x 6 mm² (< 50 m) External Dimensions: Ø 15-21 mm	5x4 mm² (< 50 m) External Dimensions: Ø 15-21 mm

Model		EVC04-AC7 Series
IEC Protection class		Class - I
Vehicle Interface	**Socket Model**	Socket TYPE 2 (IEC 62196)
	Cable Model	5 m Cable with TYPE 2 (IEC 62196) Female Plug
Voltage and Current Rates		230VAC 50/60 Hz - 1-phase 32A
AC Maximum Charge Output		7.4kW
Idle Power Consumptio		3.5W
Required Circuit Breaker on AC Mains		2P-40A MCB Type-C
Required Leakage Current Relay on AC Mains (for products which are not equipped with RCCB Type A)		2P -40A - 30mA RCCB Type-A
Required AC Mains Cable		3x 6 mm² (< 50 m) External Dimensions: Ø 11-15 mm

CONNECTIVITY (Connected Models)

Ethernet	10/100 Mbps Ethernet (Standard with Smart Options)
Wi-Fi (Optional)	Wi-Fi 802.11 a/b/g/n/ac

OTHER FEATURES (Connected Models)

Remote Diagnostics	Remote Diagnostics over OCPP
Software Update	Remote software update over OCPP

AUTHORIZATION

RFID	ISO-14443A/B and ISO-15693

MECHANIC SPECIFICATIONS

Material	Plastic
Size Dimensions (Package) Weight (Product) Weight with package AC Mains Cable Dimensions Cable Inlets	315 mm (Width) x 460 mm (Height) x 135 mm (Depth) 405 mm (Width) x 530 mm (Height) x 325 mm (Depth) 5 kg for socket equipped model, 6.8kg attached cable model 7.1 kg for socket equipped model, 8.9kg attached cable model For 22 kW version Ø 15-21 mm For 11 kW version Ø 15-21 mm For 7.4 kW version Ø 11-15 mm AC Mains / Ethernet / Modbus

ENVIRONMENTAL TECHNICAL SPECIFICATIONS

Protection Class	Ingress Protection Impact Protection	IP54 IK10
Usage Conditions	Temperature Humidity Altitude	-35 °C to 55 °C (without direct sunlight) (–25°C to +50 °C for RCCB equipped models) 5% - 95% (relative humidity, no dew) 0 - 4,000m

1.3 System Block Diagram

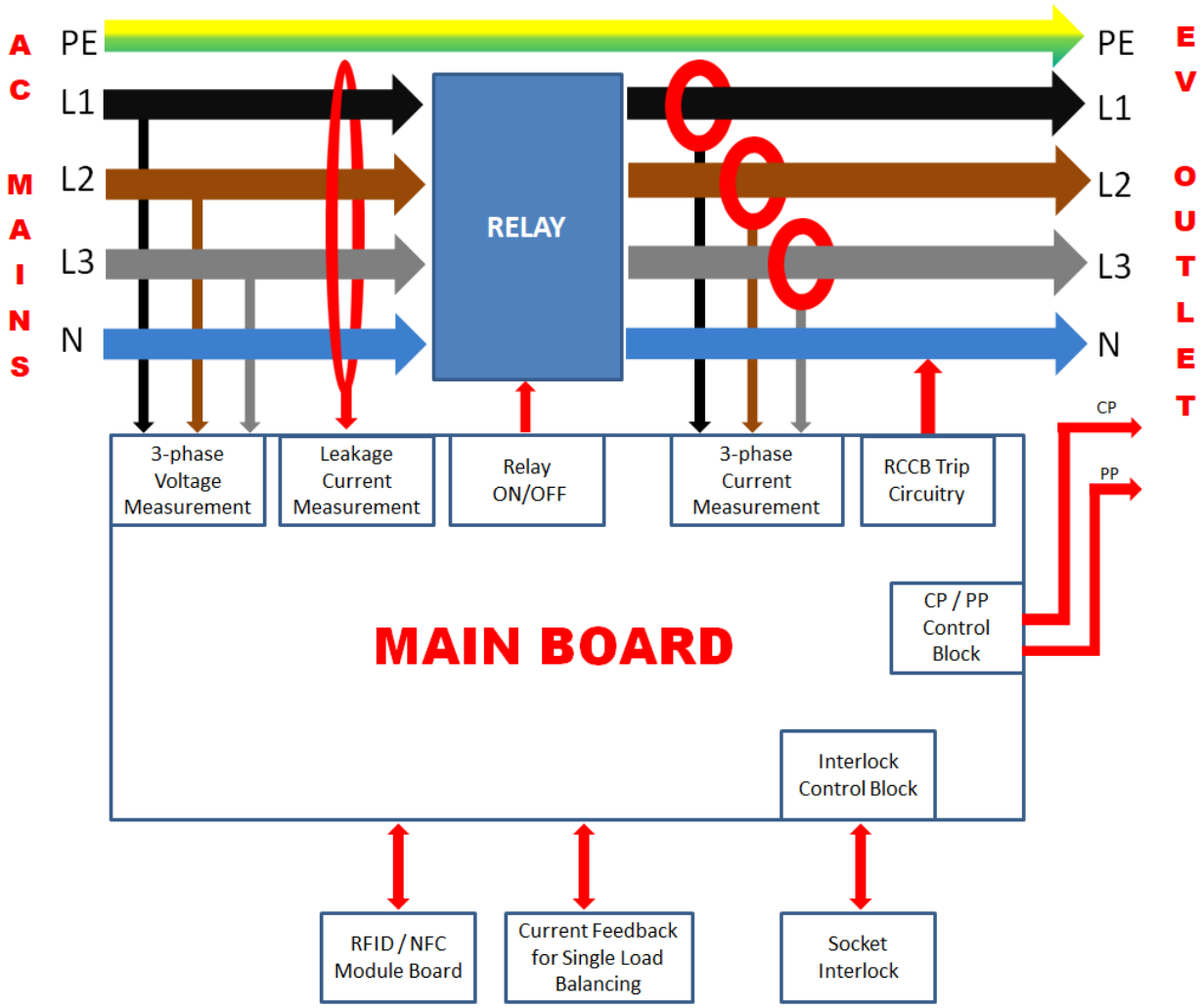


Figure 1-3

2 BOARD LAYOUT

2.1 Main Board

Top View

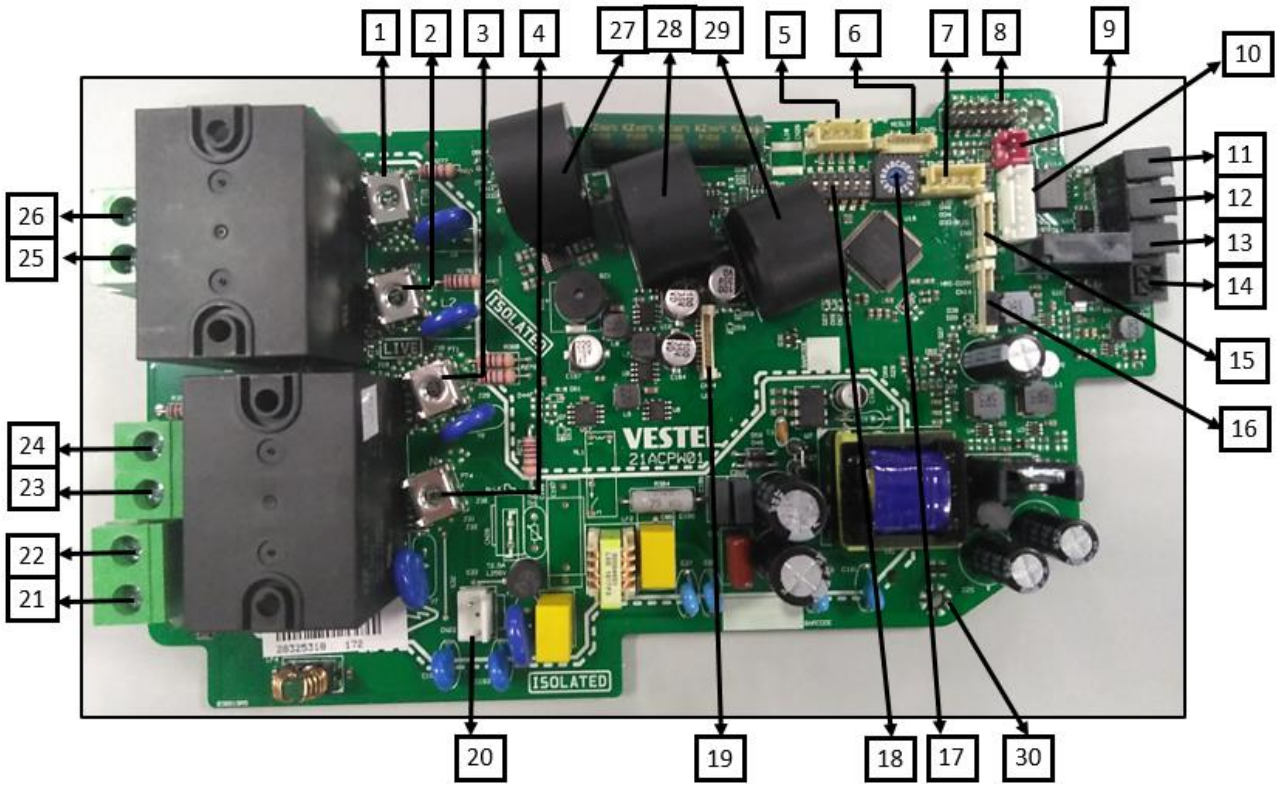


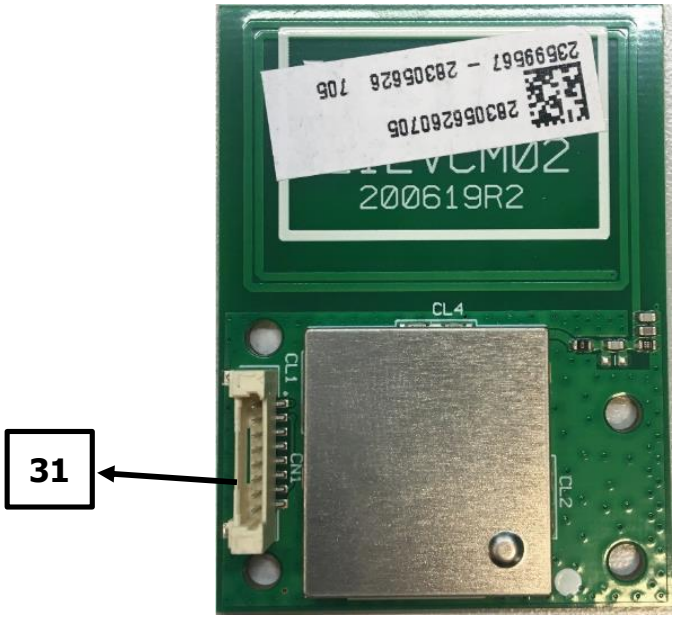
Figure 2.1

NO	COMPONENT	NO	COMPONENT
1	Relay input terminal (L3)	**16**	HMI connection socket
2	Relay input terminal (L2)	**17**	Rotary switch
3	Relay input terminal (L1)	**18**	Dip switch
4	Relay input terminal (N)	**19**	LED socket
5	Interlock connection socket	**20**	Power Input
6	Veslink connection socket	**21**	Protective Earth
7	LOG connection socket	**22**	Protective Earth
8	J-TAG/DEBUG socket	**23**	Relay output terminal (N)
9	CP/PP connection socket	**24**	Relay output terminal (L1)
10	RCD 6ma current sensor connection	**25**	Relay output terminal (L2)
11	RS-485 socket	**26**	Relay output terminal (L3)
12	RS-485 socket	**27**	Current Transformer
13	Switch contact output socket	**28**	Current Transformer
14	Enable/Input socket	**29**	Current Transformer
15	RFID connection socket	**30**	HMI Protective Earth

Table 2-1

2.2 **RFID Module**

Top View

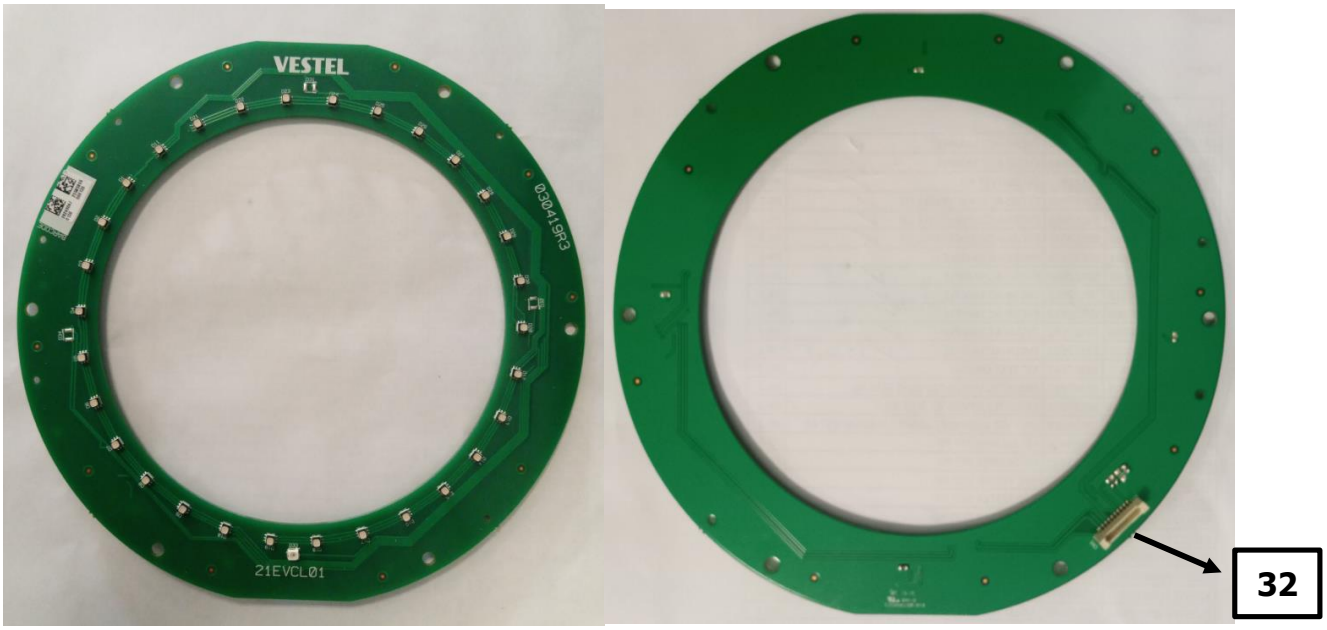


NO	COMPONENT
31	RFID Connection Socket

Table 2-3

2.3 **LED Board**

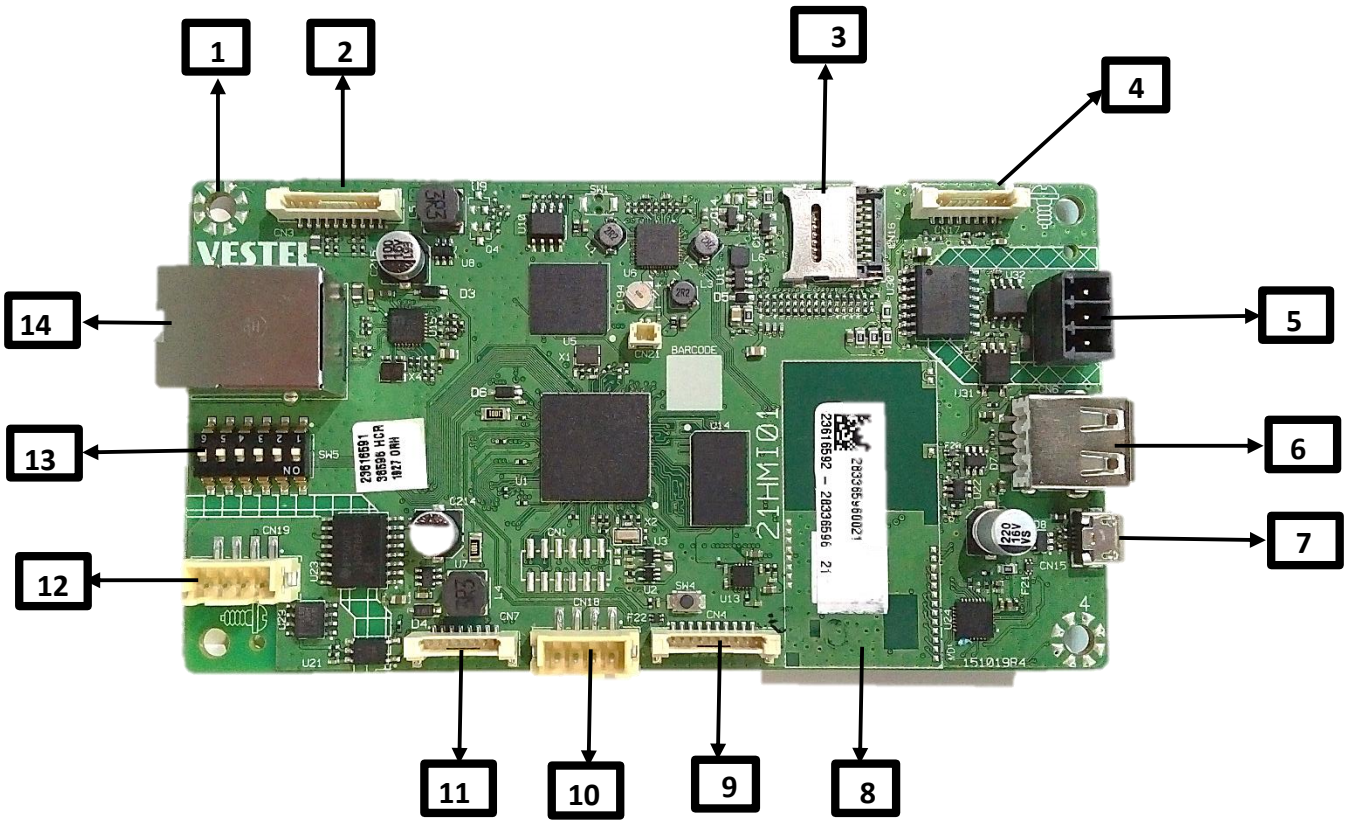
Top View **Back View**



NO	COMPONENT
32	LED Connection Socket

2.4 **HMI Board (Smart Model)**

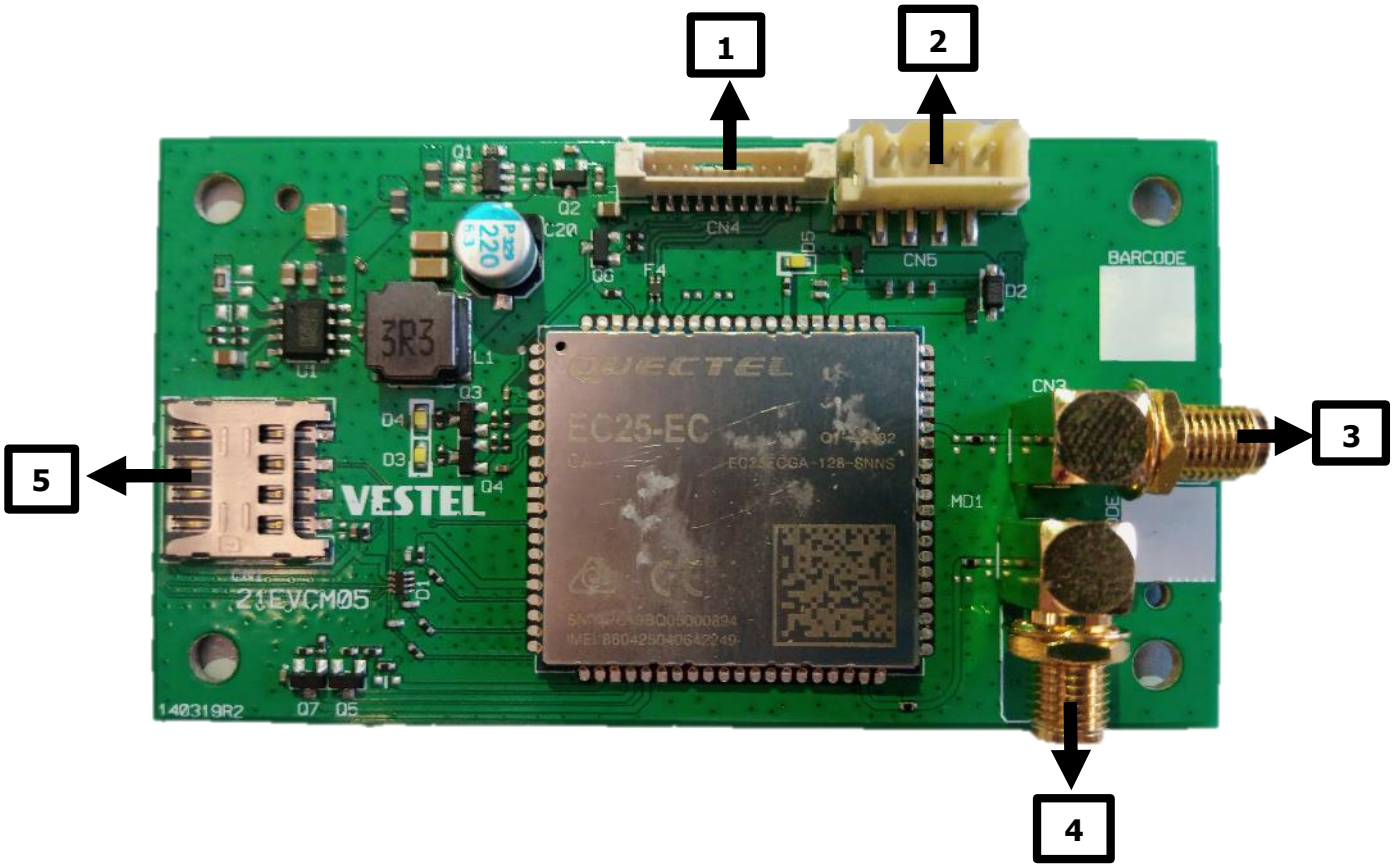
Top View



NO	COMPONENT
1	Protective Earth Cable ACPW-HMI
2	Power Board Connection Socket
3	Micro SD Card Socket
4	Wifi Module Socket
5	External RS485 Connection Socket
6	USB Connector
7	Micro USB Connector
8	PLC Module
9	GSM/WCDMA/LTE Module Socket
10	GSM/WCDMA/LTE Module Power Socket
11	RFID Module Socket
12	MID RS485 Connection Socket
13	Dip Switch
14	Ethernet Port

2.5 **LTE Board (Smart Model)**

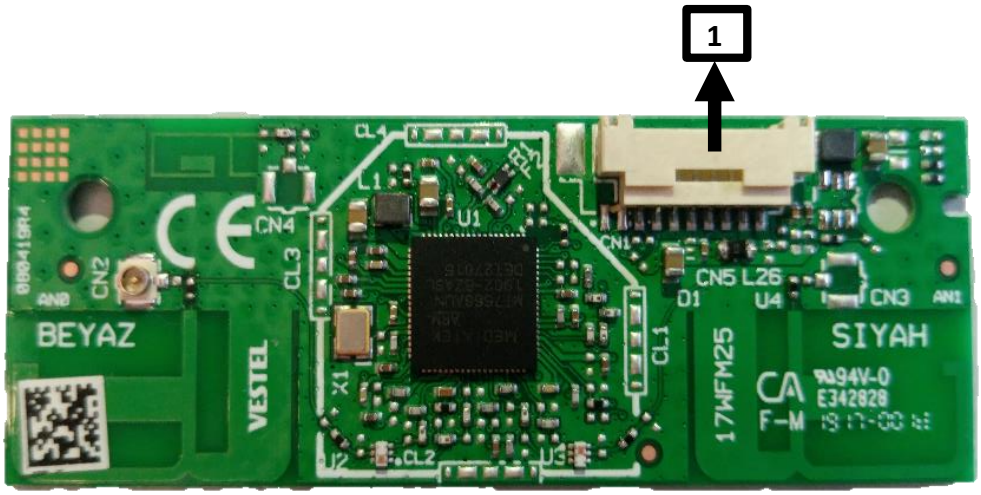
Top View



NO	COMPONENT
1	HMI Socket
2	Power-In Socket (HMI)
3	Main Antenna SMA Connector
4	Diversity Antenna SMA Connector
5	SIM Card Connector

2.6 **Wi-Fi Board (Smart Model)**

Top View



NO	COMPONENT
1	HMI Socket

3 PRODUCT BEHAVIOR

3.1 LED Behavior

VESTEL Electric Vehicle Charger (EVC) is designed to charge plug-in hybrid electric vehicles (PHEV) and battery electric vehicles (BEV) on charging station side.

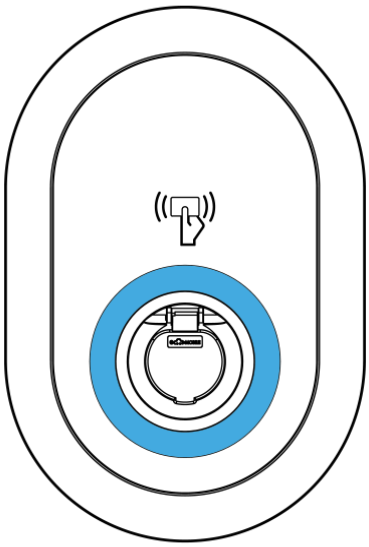


Figure 3.1

LED Light Color Indications

Ready **:** No Light

Charging **:** Blue Glowing

Waiting For Authorization: Blinking Blue

Charging Authorized: Green Glowing

Fault **:** Steady Red

Charging Disabled: Steady Purple

Charging Not possible due to over temperature: Steady Purple

Power Optimizer low current limit reached : Steady Purple

Charging limited to 16A due to over temperature : Blinking Puple

Ventilation Required Mode: Blinking Red

Please read important safety warnings and instructions in user manual and installation guideline inside the product package carefully before installing, servicing and operating the EVC.

If the LED is steady Red, please check troubleshooting section in user manual and service manual. Do not connect any charging plug to the VESTEL EVC.

4 DISASSEMBLING OF EVC04

Maintenance and troubleshooting procedure:

The list of equipment in order to use for parts replacement:

4.1 **Required Tools for Installation**

(1x) Drilling Machine
(1x) Drill bit Ø8mm
(1x) Hammer (for Screw Anchor)
(1x) Torque T25 (Security) Screwdriver
(1x) Torque T20 Screwdriver
(1x) Allen Screwdriver (4)
(1x) Allen Screwdriver (3)
(1x) Phillips PH2/PH3/P4/P5/P6 Screwdriver
(1x) Flat (Slot type) Screwdriver
(1x) Spirit Level (Water level)
(1x) Wire Cutters
(1x) Mains Tester Screwdriver
(1x) 37mm and Ø22mm wrench
(1x) Open-end wrench: 8mm
(1x) Triangle key

NOTE: The screws have different sizes for the different components. To prevent wrong match screws must be separated groups.

4.2 **Changing Main Board**

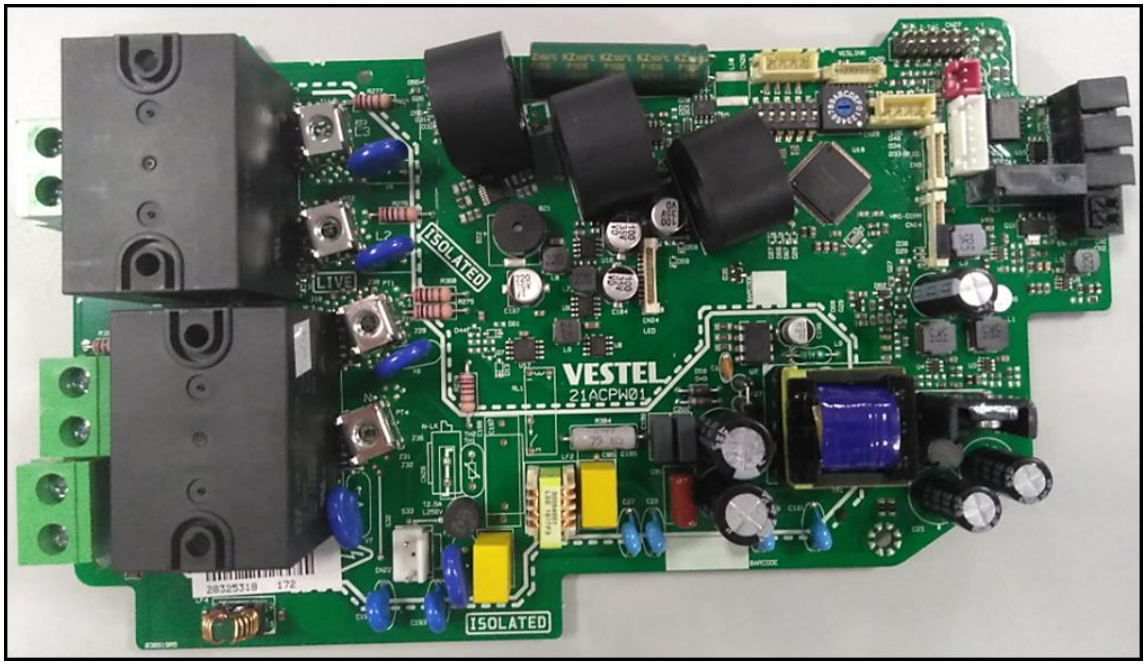
General Information and Warnings

Please make sure to be complete following operations before starting any repair or disassembly.

I. Shut down AC mains energy supply from MCB and RCCB.

Important!

If EVC is energized, do not disassemble the device for part replacement.



II. Use grounding wrist strap.

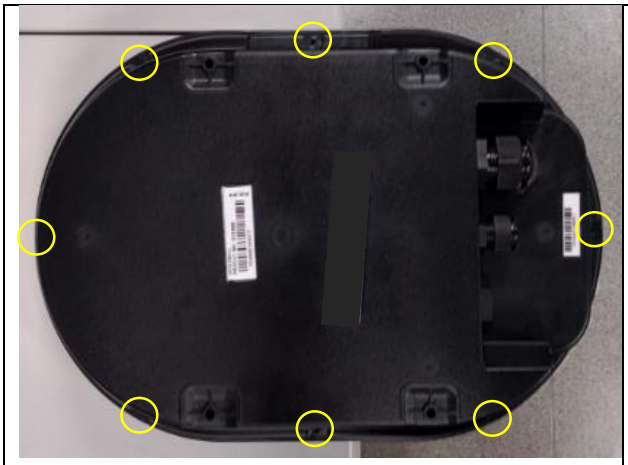
III. Obey ESD conditions.

Step 1. Unscrew the back cover and open front cover.
Step 2. Unscrew and remove RCD housing.
Step 3. Unlock and remove RCD cover on the left side of the charging station.
Step 4. Remove isolation sheet from the mainboard.
Step 5. Remove AC Mains cables on RCCB (between main board and RCCB).
Step 6. Disconnect the cables connected on the mainboard "ACPW".
Step 7. Unscrew the main board.
Step 8. Remove the main board.
Step 9. Change main board.
Step 10. Place the main board.
Step 11. Connect the cables connected on the mainboard "ACPW"
Step 12. Screw the main board.
Step 13. Connect AC Mains input cables to the mainboard then RCCB.
Step 14. Place the isolation sheet on the mainboard.
Step 15. Place and screw RCD cover.
Step 16. Place and lock RCD housing.
Step 17. Close the front cover, screw the back cover.
Step 18. Check the system operation.

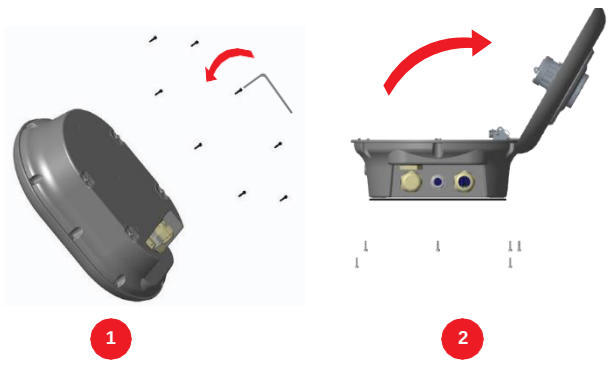
You can follow the steps which are explained respectively.

Step 1: Unscrew the back cover and open front cover:

Before beginning to change boards and cables unscrew back cover of the product. 8 screws shown below should be removed from back cover using Torx T20 Security L-Wrench or Right Angle Screwdriver Adapter using Torx T20 Security Bit. Then open the front cover.



1.1



1- Remove the cover screws with Torx T20 security L-Wrench or Right Angle Screwdriver Adapter using Torx T20 Security Bit.
2- Open the cover.

Step 2: Unscrew and remove RCD housing:
Unscrew the RCD HOUSING using "SCREW P C ZN RYSB 3.5*10*Ø8 ROH" with PH2 bit 1Nm Tork.

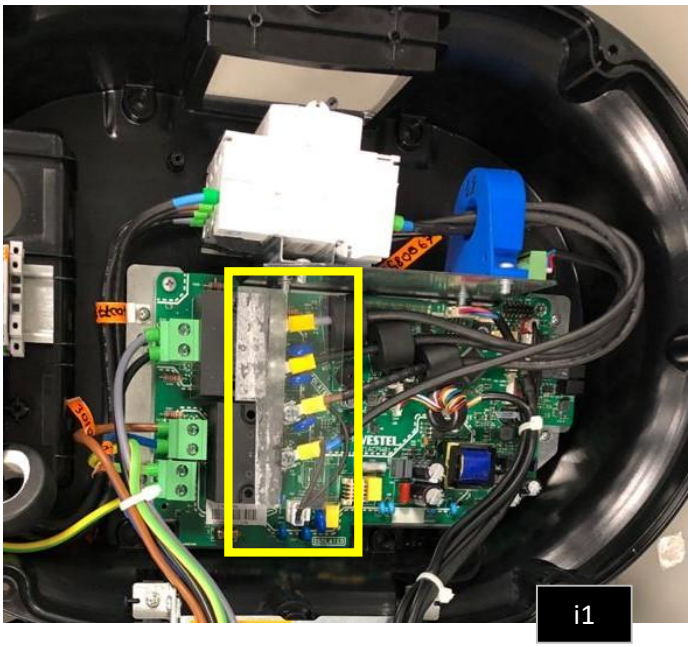
2.1

Step 3: Unlock and remove RCD cover on the left side of the charging station:
Place and push the triangle key on the side cover lock then rotate the key 90 degree counter-clockwise.

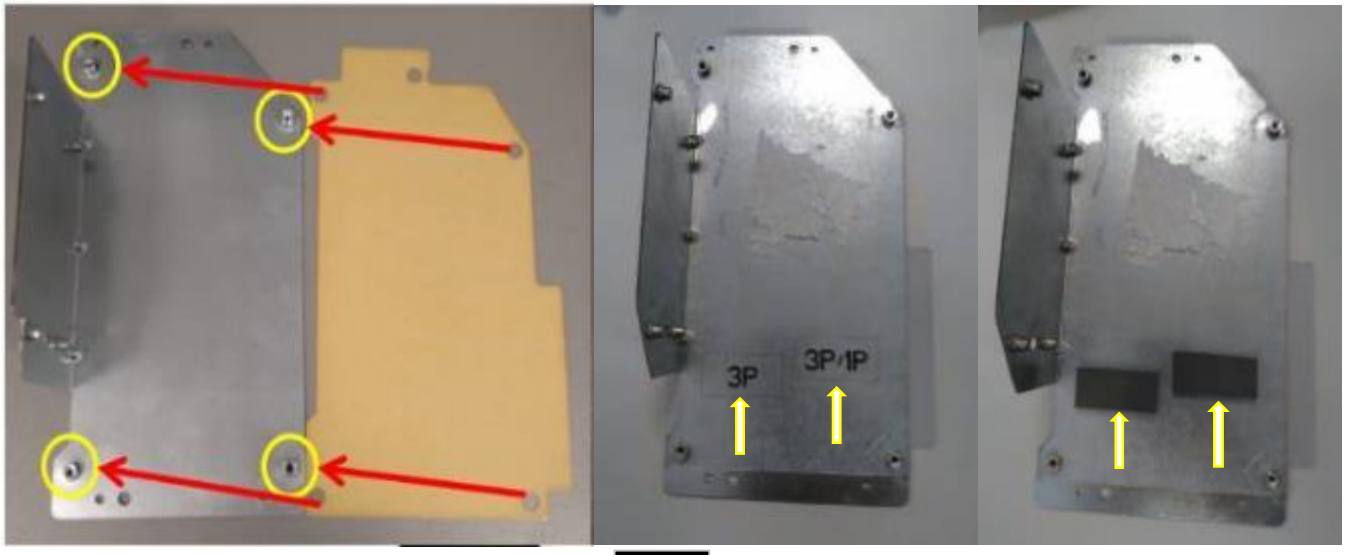
3.1

Important!

Isolation plates are Safety critical component. One isolation sheet is on the mainboard shown in Figure-i1 below, and the other is between the metal plate and the mainboard shown in Figure-i2 below.



i1



i2

Important!

Earth Protection Cable is Safety critical component. It must be connected properly to the mainboard. See "2- Board Layout, section "2.1- Mainboard"

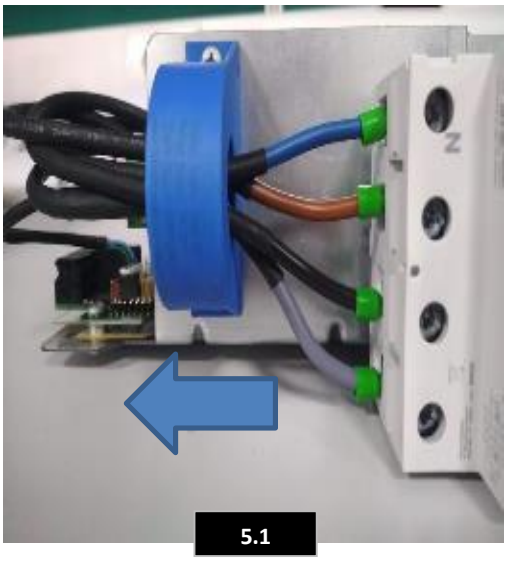
- **➔ Two protective earth cable connected on output terminals (21 and 22).**
- **➔ If it is a smart EVC04 model and there is HMI board then, one (HMI) protective earth cable connected on the mainboard (30)**

Step 4: **Remove isolation sheet from the mainboard:**

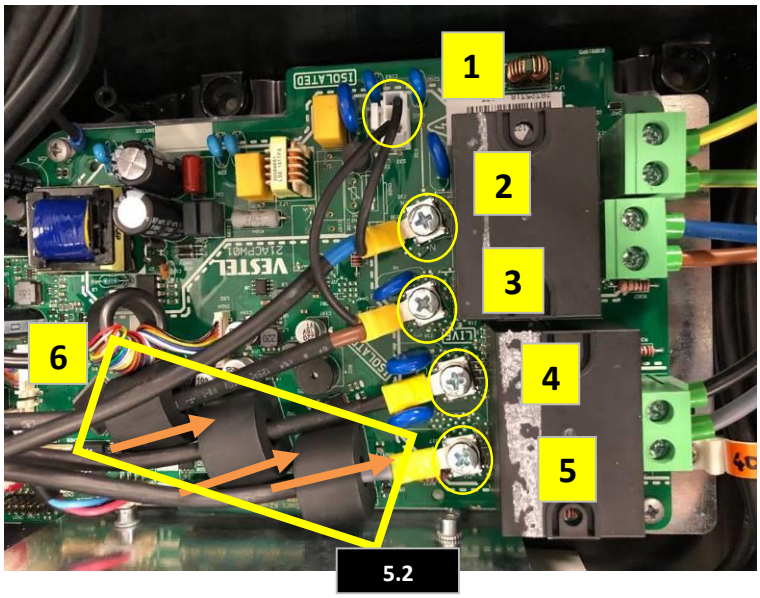
Remove the isolation sheet on the mainboard as shown in figure i1 in the previous section. Make sure that the isolation sheets are mounted as in figures i1 and i2 before the installation is finished.

Step 5: **Remove AC Mains cables on RCCB (between main board and RCCB):**

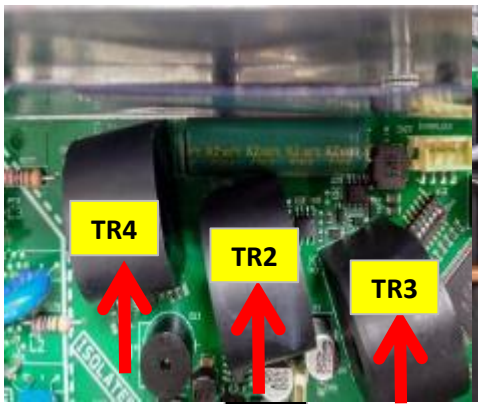
Unscrew AC Mains cables on RCCB (figure 4.2). Unscrew AC Mains cable on the main board (1, 2, 3, 4, 5 in figure 4.3). Pull the AC Mains input cables from RCCB through the RCD 6mA sensor (in the direction of arrows in figure 4.2) and current transformers (6 in figure 4.3) towards the AC Mains input terminals (in the direction of the arrows).



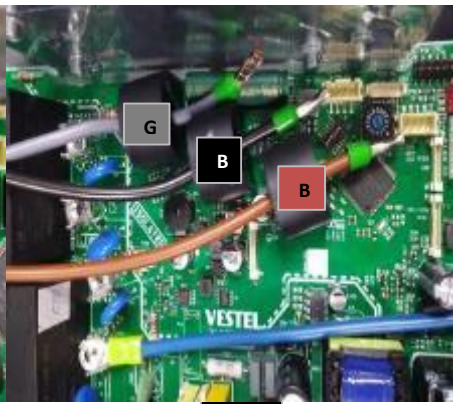
5.1



5.2



5.3

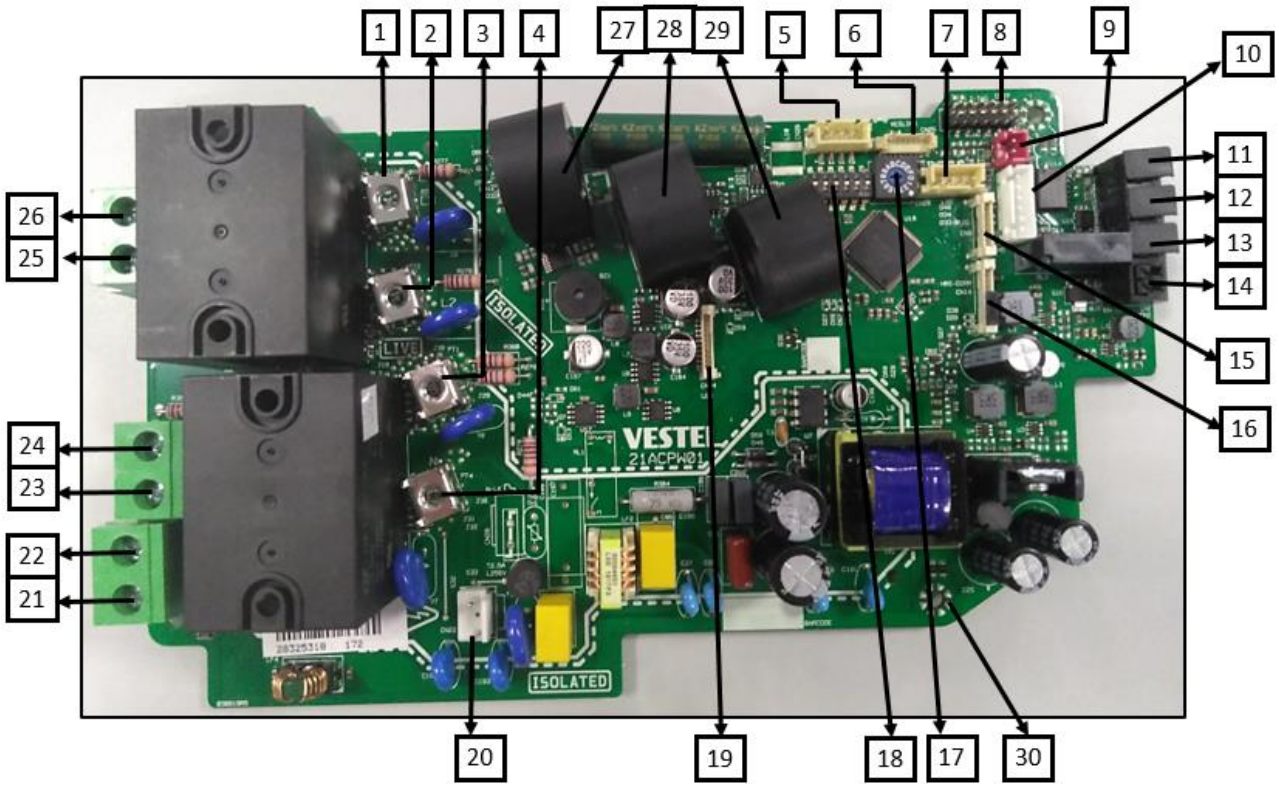


5.4

Cable	Line	Color	Trf
2	N	Blue	-
3	L1	Brown	TR3
4	L2	Black	TR2
5	L3	Gray	TR4

Step 6: Disconnect the cables connected on the mainboard "ACPW":

Disconnect AC Mains input cables (1, 2, 3, 4), output cables (23, 24, 25, 26) and protective earth cables (21, 22), board power input cable (20), LED cable (19), RFID cable (15), Earth and data cables between ACPW and HMI (only for Smart models: 16, 30), RCD DC 6mA cable (10), CP-PP cable (9), Interlock cable (5) and data cables (11, 12, 13, 14) from the main board.



2.1

Step 7: Unscrew the main board:

Unscrew the 4 screws from the main board from the metal bracket. (PH2 type 1Nm torque)

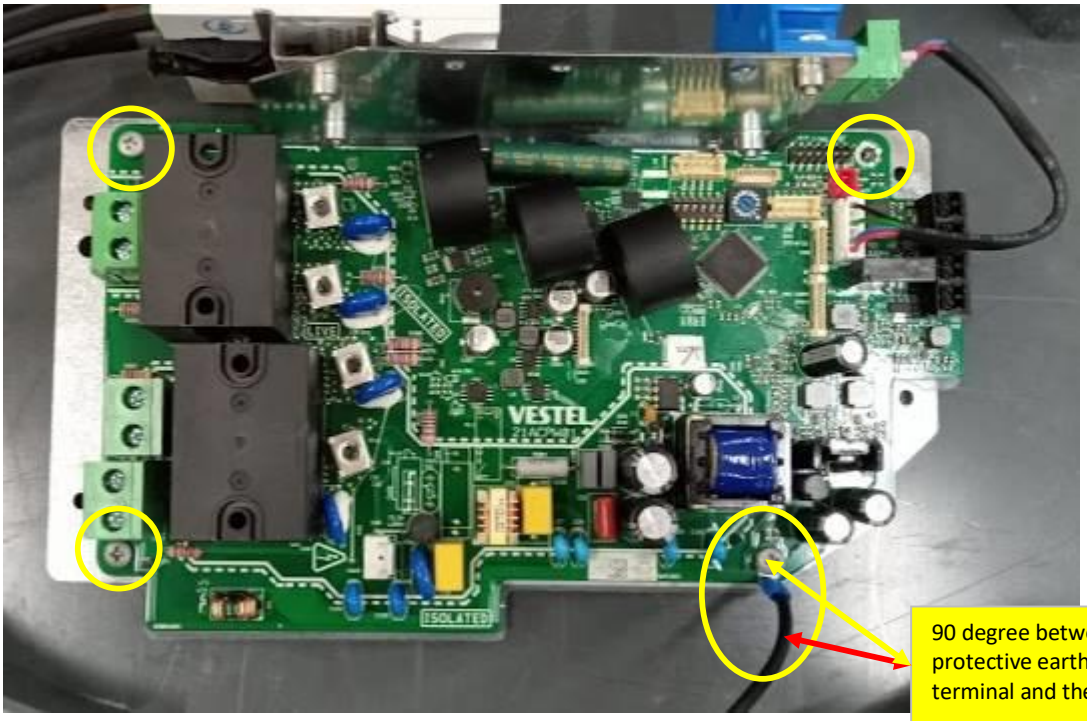
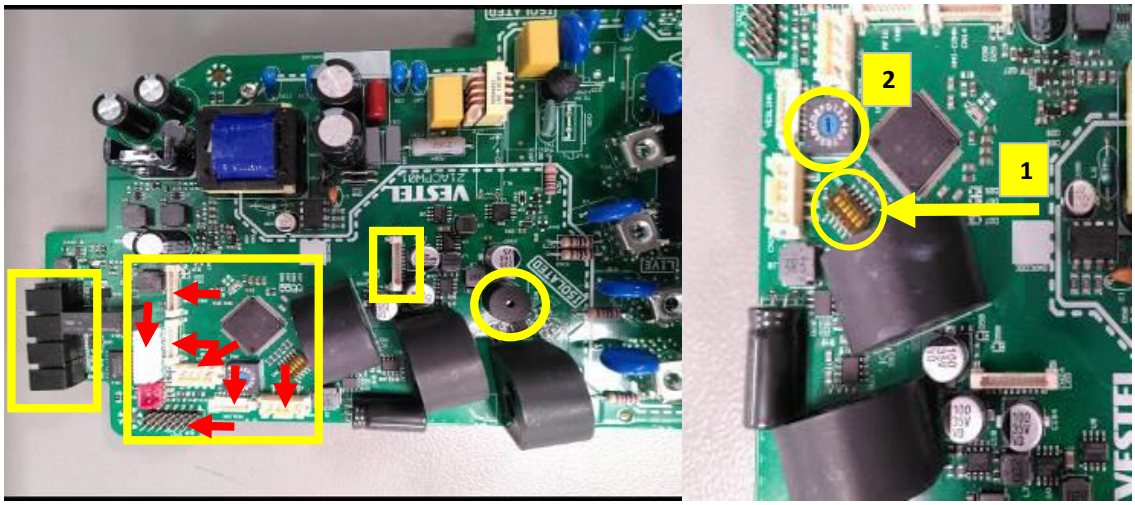


Figure 4-6

Step 8: Remove main board:
Remove main board from the bracket.
Step 9. Change main board:
Step 10. Place the main board to the bracket.

Remove the protective materials or labels on sockets, switch (SW1) and buzzer (BZ1) etc. Check "Installation Guide" for DIP Switch (1) and Rotary Switch (2) positions.

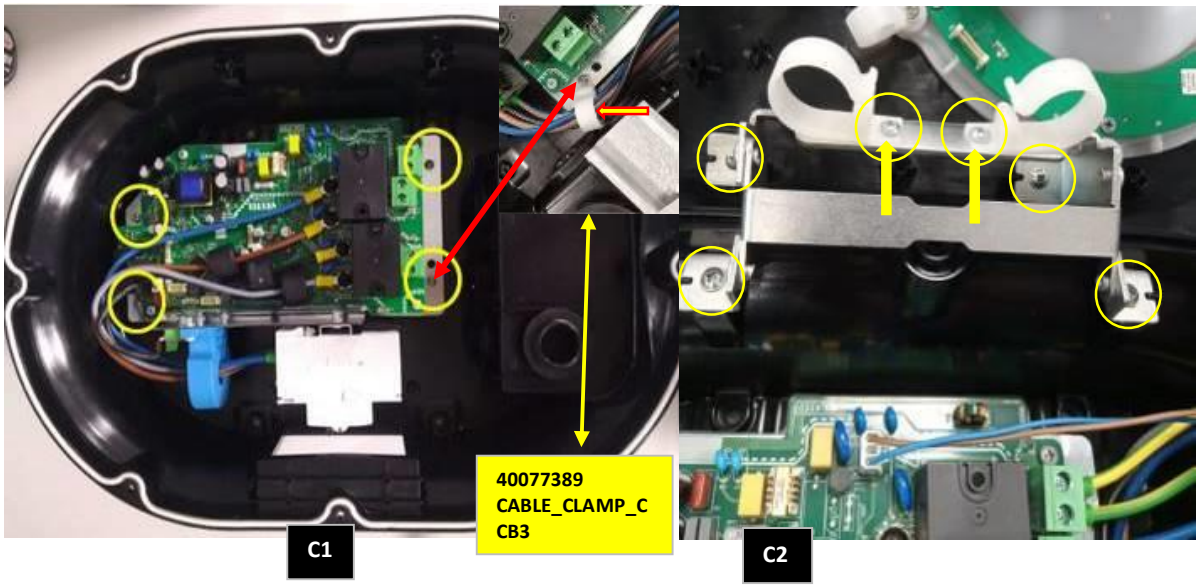


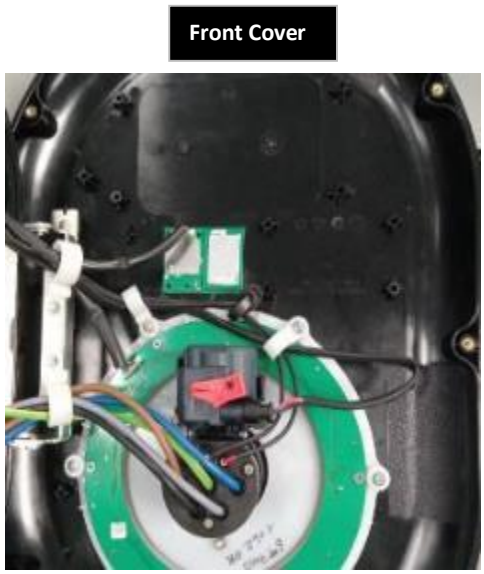
Please also check:

If you unscrew the metal plate (screws in circles in C1), check figures between previous steps 3 and 4 for isolation sheets.

Check cable clamps are mounted in figures C1 and C2. Also check figures "Back Cover" and "Front Cover" below.

Check the hinge bracket is mounted properly in figure C2





4.3 *Changing HMI Board (Smart Model)*


Before changing the board see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board"

Step 1. Unscrew the back cover and open front cover.
Step 2. Disconnect the cables connected on the HMI Board
Step 3. Unscrew the HMI board.
Step 4. Remove the HMI board.
Step 5. Change the board.
Step 6. Place and screw the new board.
Step 7. Connect the cables.
Step 8. Close the front cover, screw the back cover.
Step 9. Check the system operation.

Step 1: Unscrew the back cover and open front cover.

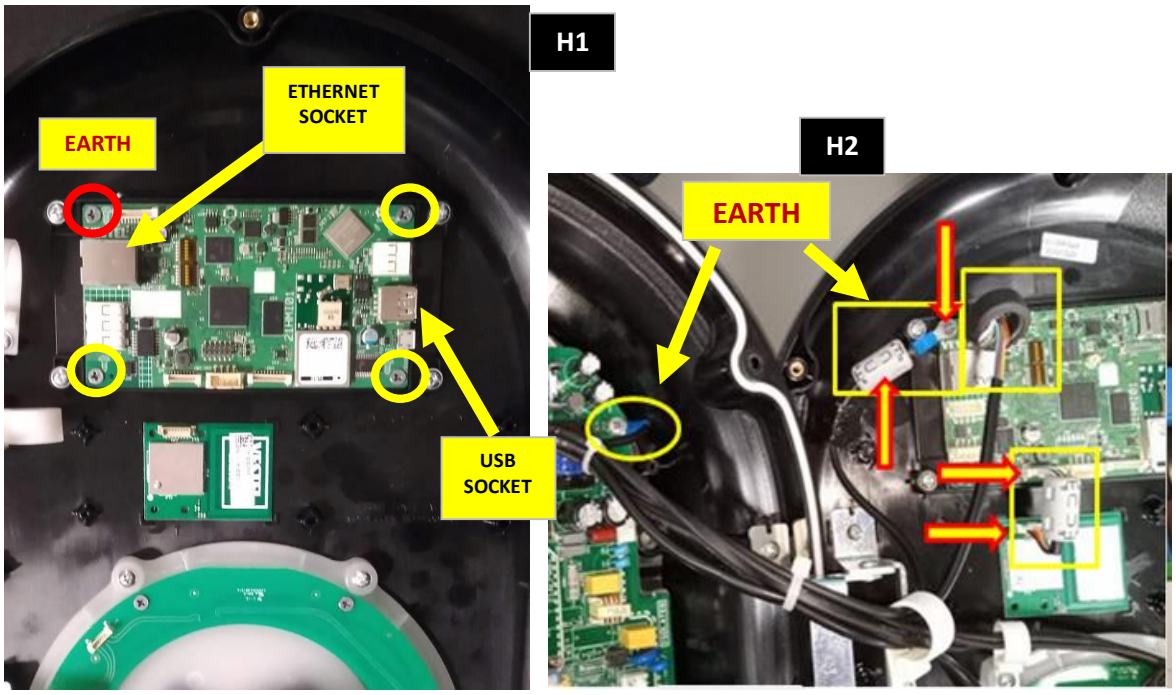
Follow the instructions on section 4.2 Changing Main Board.

Step 2. Disconnect the cables connected on the HMI Board

Disconnect the cables connected to the sockets on HMI Board shown in section "2.4. HMI Board (Smart Model)"

Step 3. Unscrew the HMI board.

Remove the screws on HMI board shown by circles in the figure "H1" below.



Step 4. Remove the HMI board.

Step 5. Change the board.

Step 6. Place and screw the new board.

Screw the top left corner of the board with earth connection coming from the main board as shown in the figure "H2"

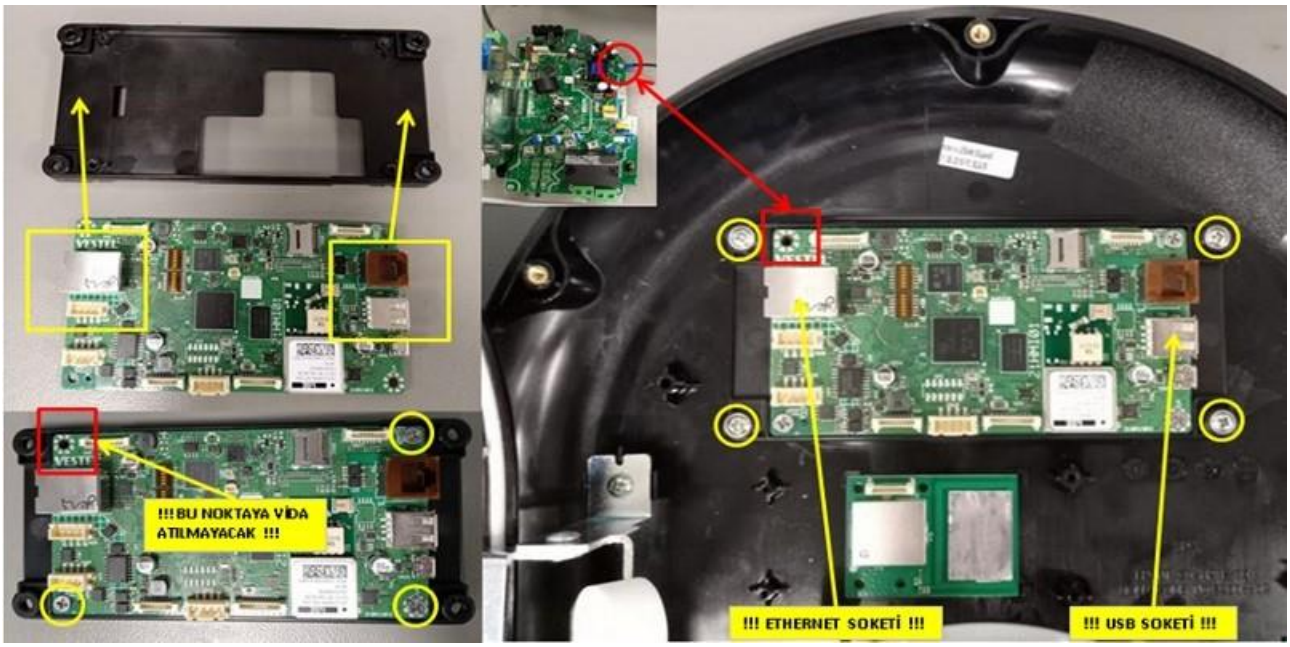
Step 7. Connect the cables.

Connect the cables back to the sockets on HMI Board shown in section "2.4. HMI Board (Smart Model)"

4.4 **Changing Display (Smart Model)**

Before changing the display see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board"

To change the display, first, remove the LCD Housing as shown in figure below.
Unscrew HMI Board as shown in the previous section "Changing HMI Board".



Two double sided tapes are mounted as shown the left side of the figure below.
The display is mounted on the LCD Housing as shown in the figure below
FFC cable is connected to CN5 socket (on HMI Board) as shown in the figure below.

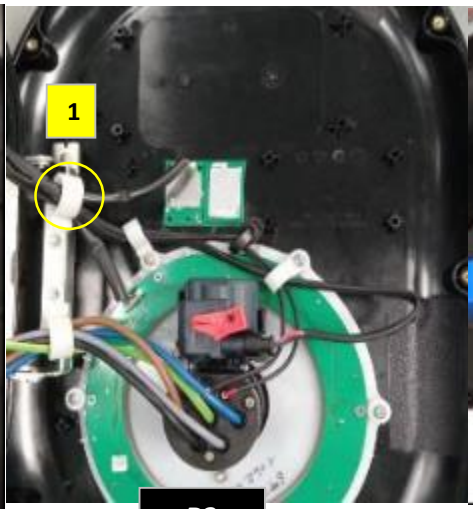
4.5 *Changing RFID Board*

Before changing the board see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board"

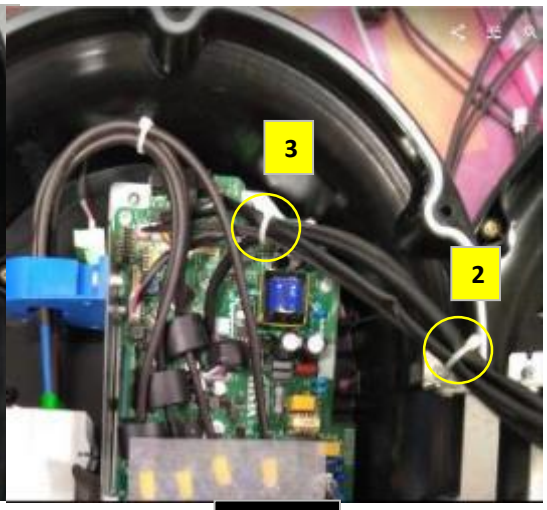
RFID card can be mounted with double sided tape "TAPE_DOUBLE_SIDE 40X50X1 VESTEL RFID", such that the socket on the board stays above as shown in the figure R1.

For Base model (No HMI Board), RFID board is connected to the main board ACPW (See "2-Board Layout" – "Main board" – "Socket 15") as shown in the figure R2 and R3, following the path: 1 -> 2 -> 3. (The cable pass through the cable clamp on the hinge, then tied by cable ties 2 and 3)

R1

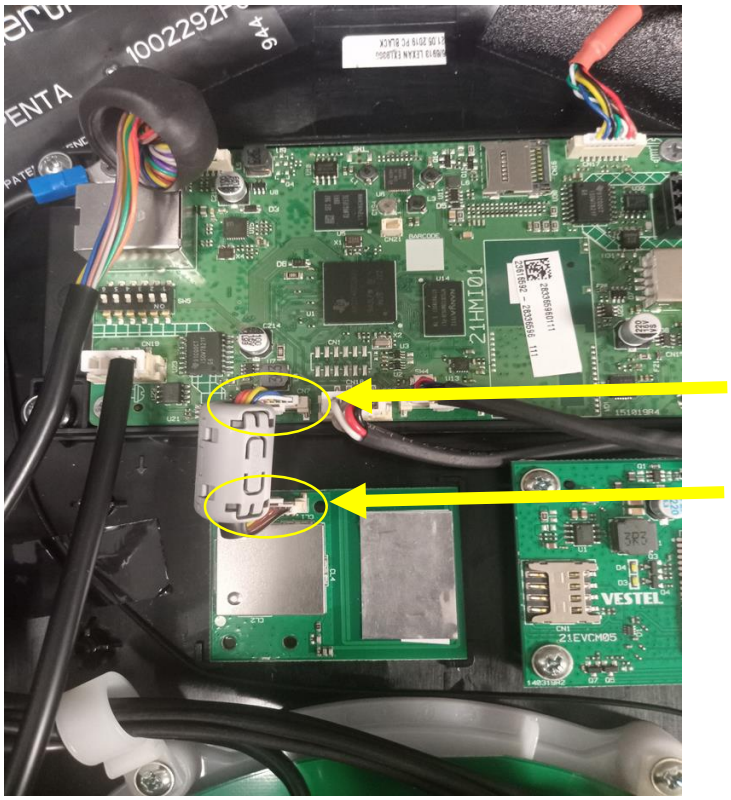


R2



R3

For Smart models (models with HMI Board), RFID Board is connected to HMI Board as shown in figure below.

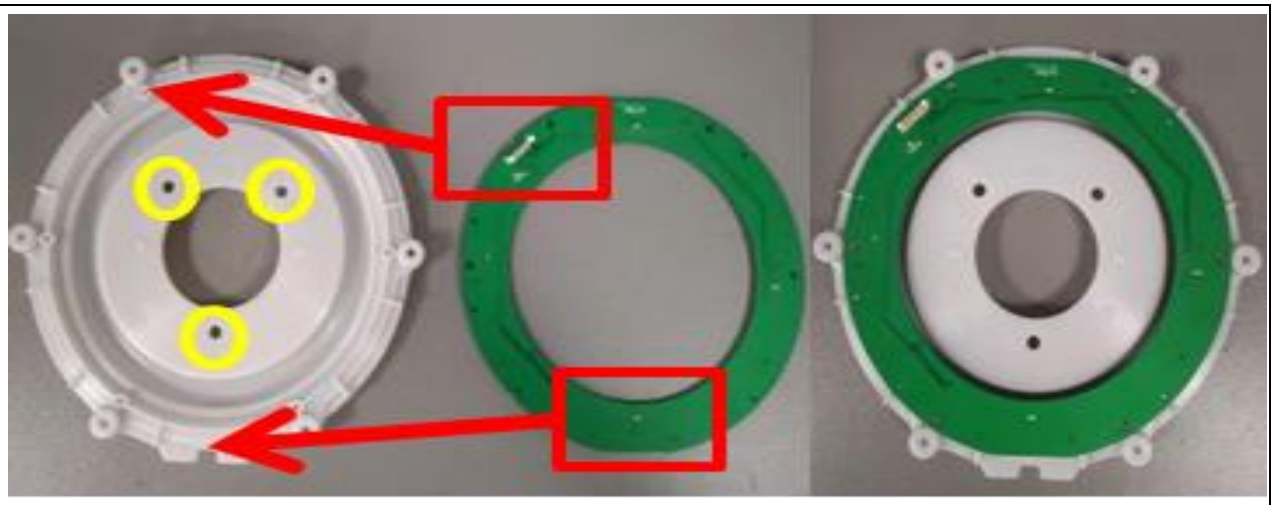


4.6 ***Changing LED Board***

Before changing the board see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board"

To demount LED board, first you need to demount interlock and output socket.
See next sections "Changing Interlock" and "Changing Output Socket".

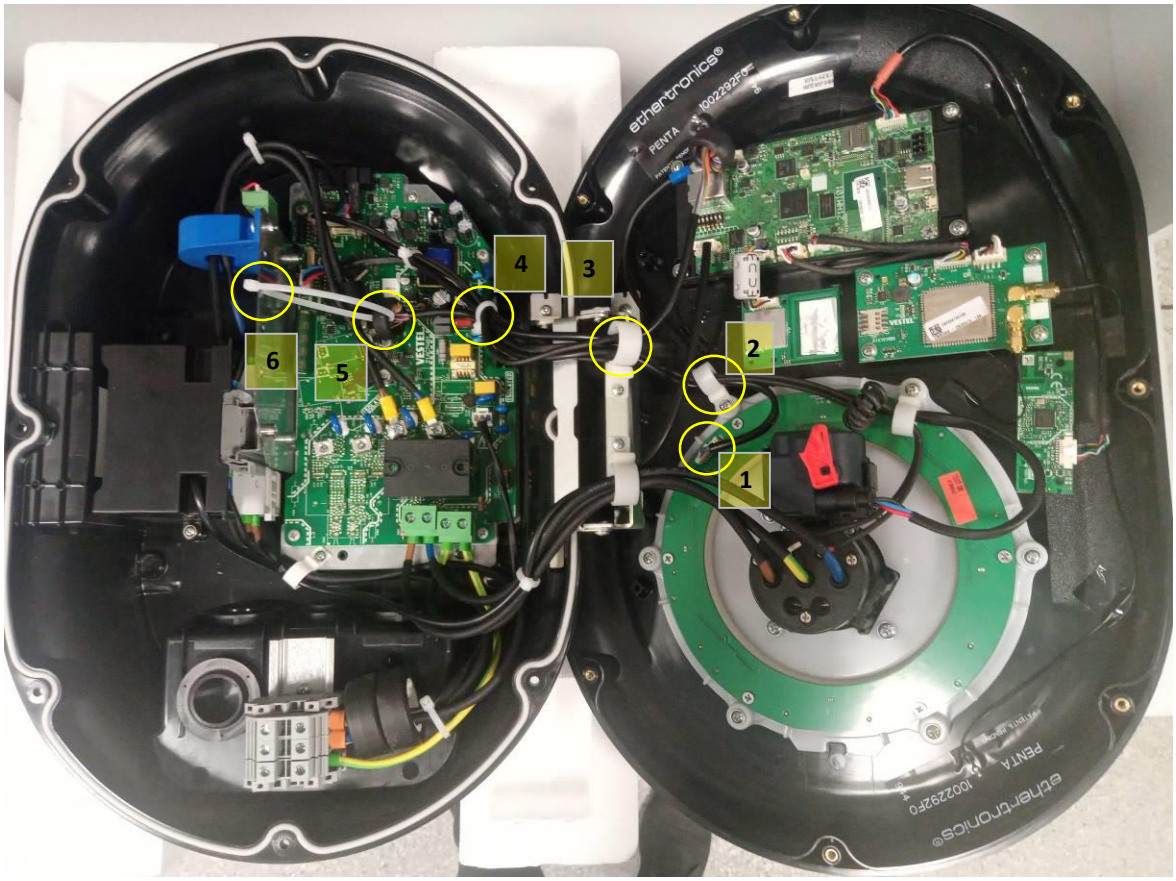
"21EVCL01" LED Board is mounted on the cosmetic frame "FRAME_COSMETIC_SOCKET" with 6 screws (PH1) as shown in the figure L1.



L1

After changing LED board, please mount interlock and output socket back.

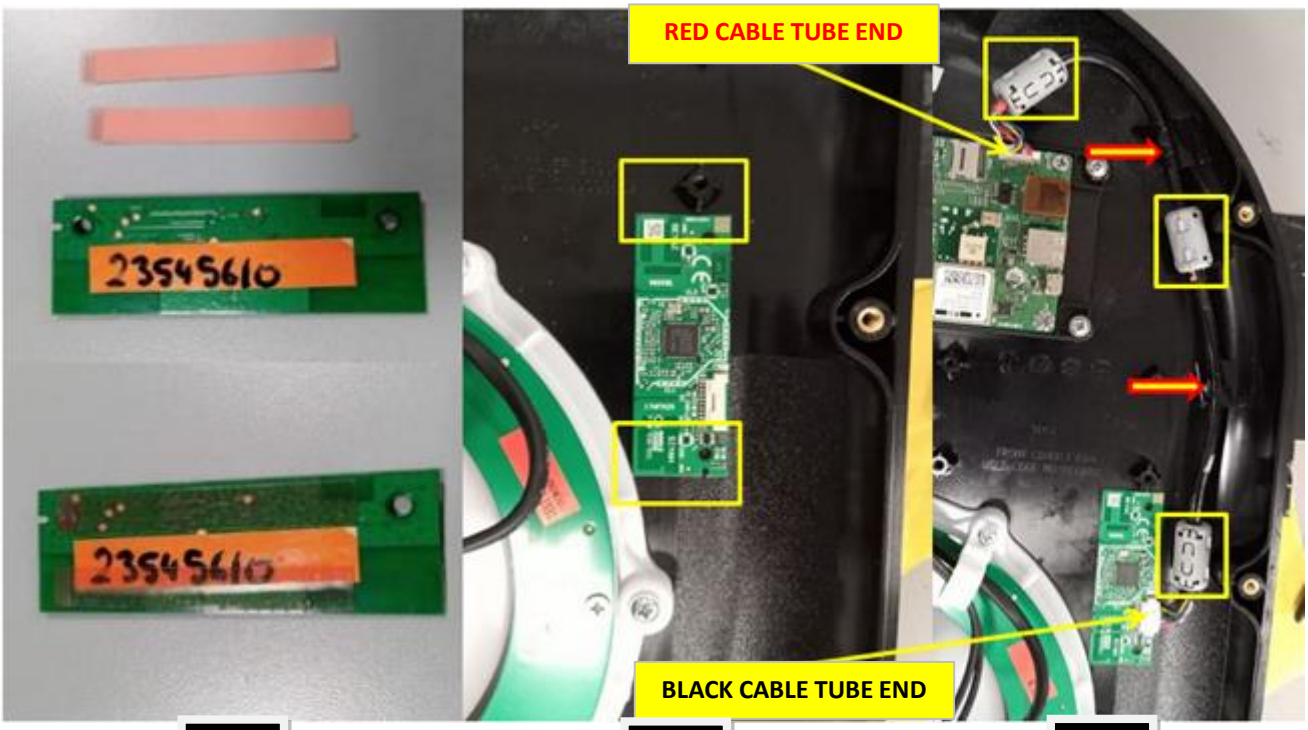
Led cable is mounted as shown in the figure passing through the cable clamps (2-3) and then tied with cable ties (4-5) marked by circles.
The ferrite on the ACPW-Led cable on ACPW side, is attached to the metal plate (5-6) as shown in the figure below.



4.7 ***Changing WiFi Board***

Before changing the board see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board"

Mount double sided tapes on the WiFi Board as shown in figure "W1" below.
Mount the WiFi Board as shown in the figure "W2" below.
Connect HMI to WiFi cable as shown in the figure below. (WiFi Board: Black end of the cable / HMI Board, Red end of the cable)
Note that there are 3 ferrite clamps mounted on the cable as shown in figure "W3".



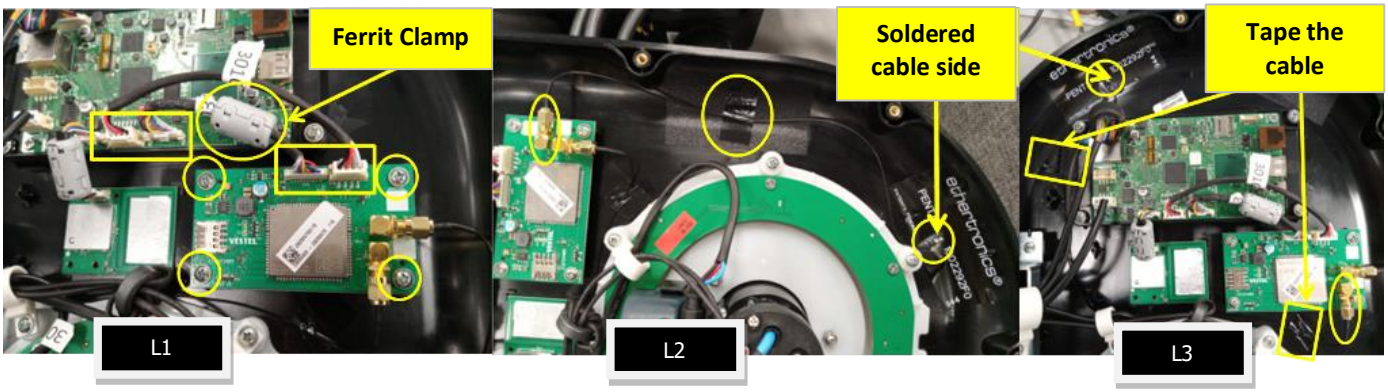
4.8 *Changing LTE Board*

Before changing the board see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board"

Disconnect the cables connected to LTE Board as shown in the figure "L1" below.
10P/90(1,25MM) AWG28 GSM-HMI cable is connected to CN4 on LTE Board and CN4 on HMI Board.
4P/130(2,5MM) AWG24 GSM-HMI cable is connected to CN5 on LTE Board and CN18 on HMI Board.

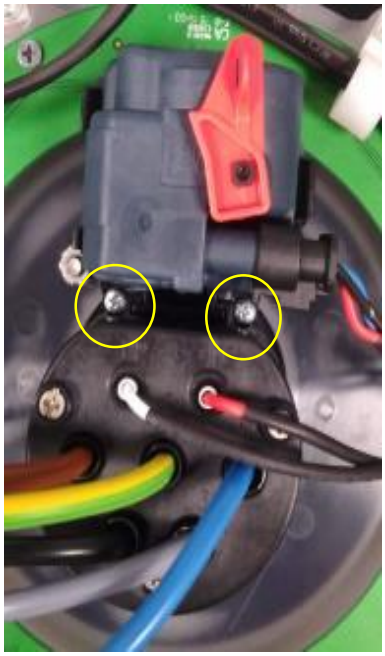
Unscrew the LTE Board as shown in figure "L1" below.
Note that there is a ferrite clamp mounted on the HMI-LTE cable "CABLE EVC 10P/90(1,25MM) AWG28 GSM-HMI" as shown in figure "L3".

ANTENNA LTE 9001495 MAIN SMA 290mm cable is connected to CN3 on LTE Board.
Main antenna is mounted on the front cover as shown in figure "L2"
ANTENNA LTE 9001495 DIV SMA 380mm cable is connected to CN2 on LTE Board.
Diversity antenna is mounted on the front cover as shown in figure "L3"

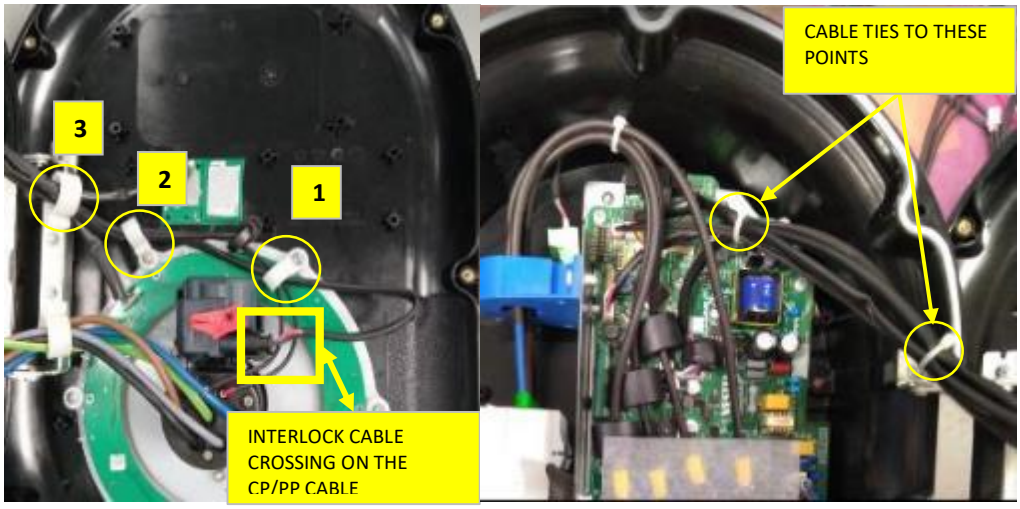


4.9 ***Changing Interlock***

If you need to change Interlock, **see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board"**, then refer to pictures below. Unscrew and remove the interlock first.



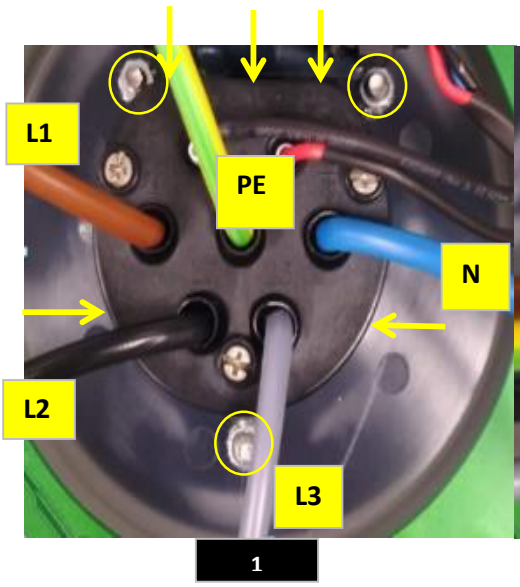
Connect the interlock cable back to the interlock and to the interlock socket (Board Layout: 5) on mainboard. Screw the interlock back. Make sure the cable is passing through the cable clamps and use cable ties as shown in figure below. Interlock cable is passing through the cable clamps 1, 2 and 3.



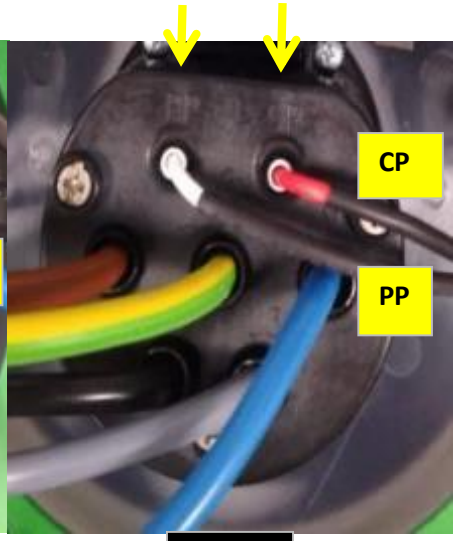
4.10 **Changing Output Socket**

First, **see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board"**, then follow Figure 1, 2 and 3 to change a broken socket.

After demounting Interlock as shown in previous section "Changing Interlock", unscrew the line output cables pointed by arrows in figure 1 with 3mm allen key (1Nm torque). You can see the screw points in figure 3 (the side of the socket).
Unscrew the CP, PP cables from the side (pointed by arrows) of the socket. (slotted 4mm tip)
Unscrew the socket screws shown in circles in figure 1, to release the socket. After that, remove the output socket to change as shown in the figure 5 bottom.
Note that there must be cosmetic frame sticker between the output socket and cosmetic frame (figure 5 top)
See also figure 4 for the socket connection on main board.



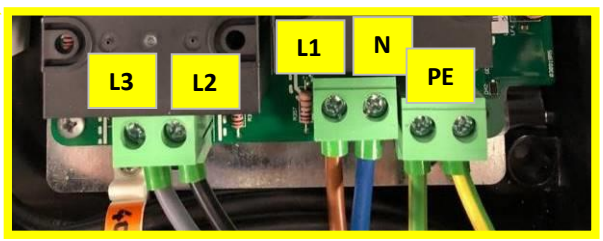
1

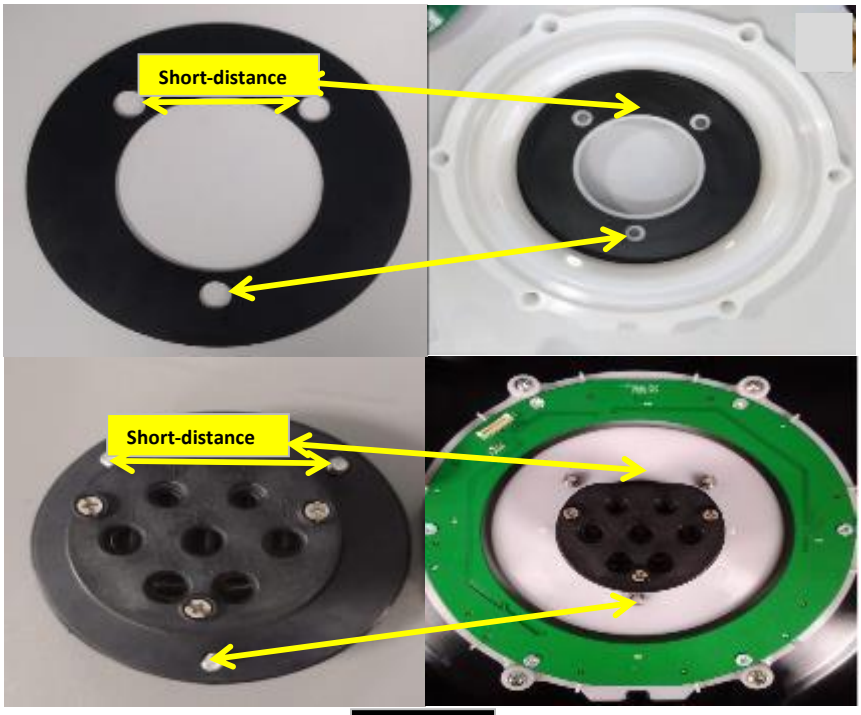


2


3


4



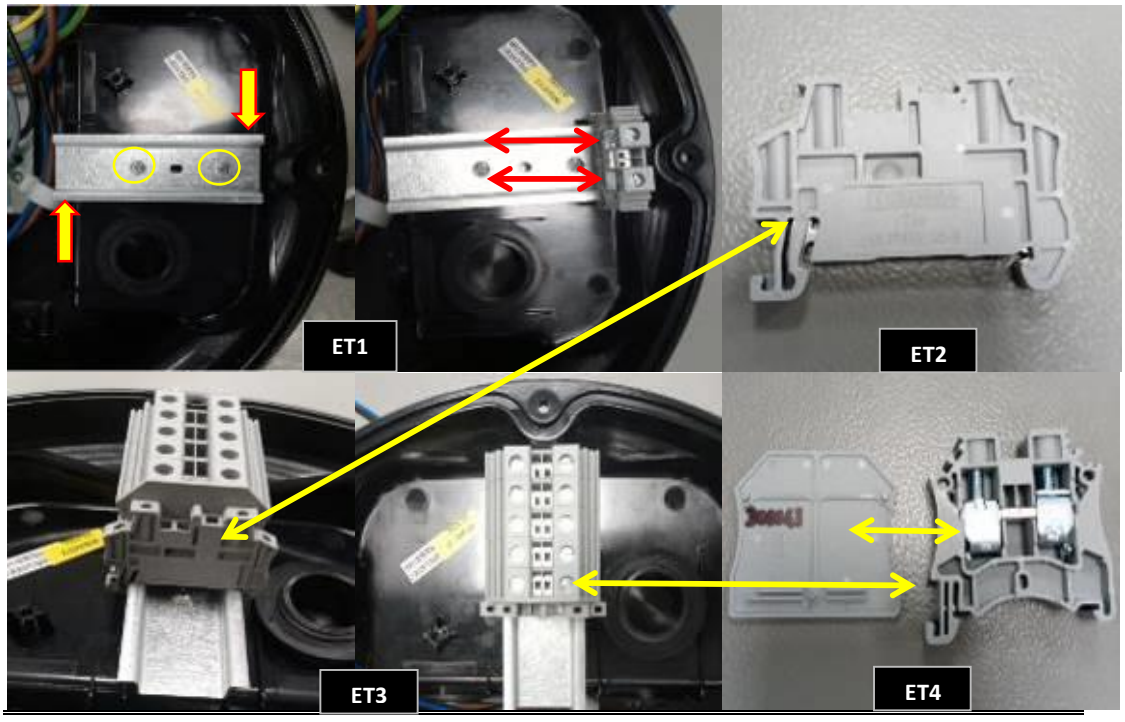


5

4.11 **Changing Electric Terminals**

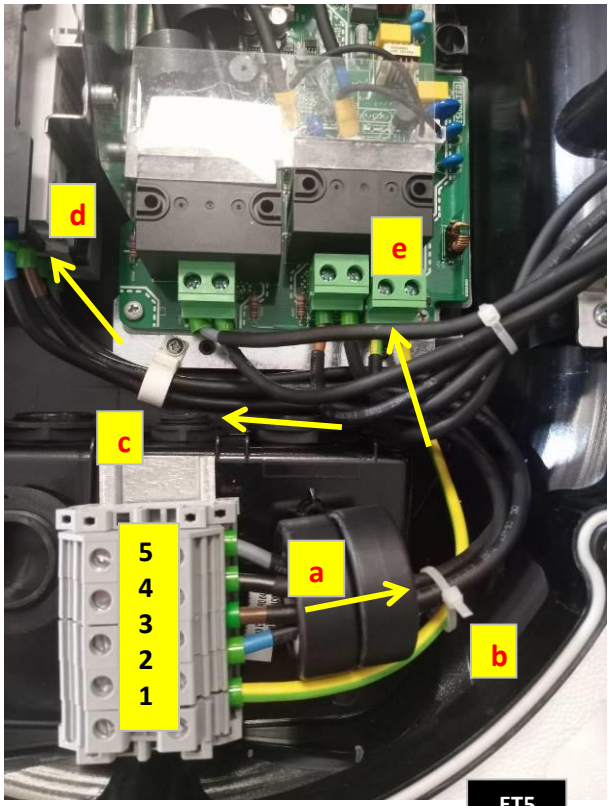
First, see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board" before any disassembly or repair.

Screw (PH1) 1x terminal rail "RAIL CONNECTOR KLEMENS EVC04" on the back cover and mount the 5 terminals "KLEMENS RAIL TYPE W/SCRW DC10-01P-11-00A" as in figure ET1. Mount the 1x terminal cover "KLEMENS COVER RAIL TYPE DC6-01P-1Y-00A" (figure ET4). Finally mount terminal stopper "KLEMENS DURDURUCU 3022276" to the end of the terminals. (see figure ET2 and ET3)



N, L1, L2 and L3 cables (2,3,4 and 5) are passing through two ferrit cores "a" shown by the arrow in the figure ET5 following the path: a -> b -> c -> d.

Protective earth cable is passing outside the ferrite cores (NOT inside) following the path: b -> e



ET5

Cable	Line	Color
1	E	Yellow/Green
2	N	Blue
3	L1	Brown
4	L2	Black
5	L3	Gray

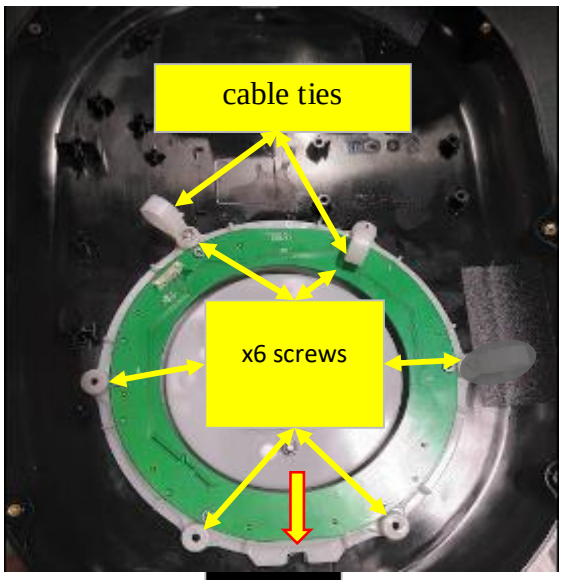
a	x2 ferrit core
b	Cable tie
c	Cable clamp
d	RCCB Connection
e	Board: CN17 (earth terminal)

d: RCCB Connection -> see figure 5.4.1 in section 5.4 (under next section "5 RCCB and DC6mA")

4.12 **Changing Cosmetic Frame**

To demount cosmetic frame, first you need to demount interlock and output socket. See previous sections "Changing Interlock" and "Changing Output Socket".

Cosmetic frame is screwed on the front cover as shown in figure CF1 below with PH2 bit 0.5Nm torque. Cable clamps "CABLE_CLAMP_CCB1" are mounted such that their directions are as shown in the figure.



CF1

After changing cosmetic frame, please mount interlock and output socket back.

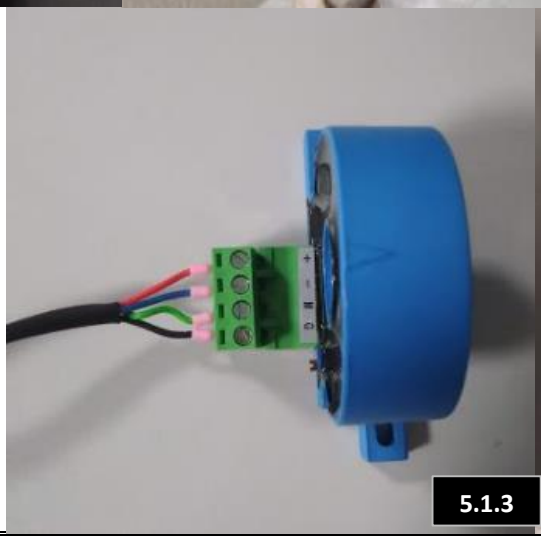
5 RCCB AND DC6mA

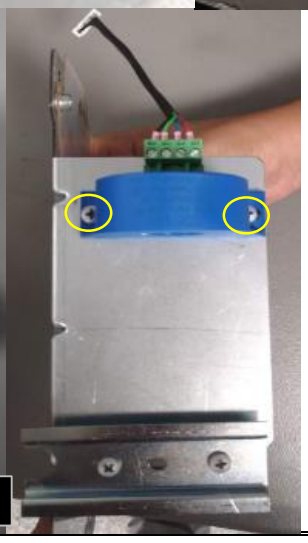
First, see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board".

5.1. "RAIL_CONNECTOR_EVC04 R2" is fixed to the METAL PLATE and mounted with two screws (PH2 tip 1Nm torque) as shown in figure 5.1.1. "FUSE SAFE RCCB 40A 4P TYPE AI 30mA" is mounted on the RAIL as shown in figure 5.1.2. DC6mA sensor is mounted on METAL PLATE and as shown in figure 5.1.3. DC6mA connector can be mounted on the socket as shown in figure 5.1.3. Cable order must be as follows: Red: + / Blue: - / Green: M / Black: G
After the RCCB fuse is inserted into the RAIL, the black plastic bracket is locked by pushing it in the direction of the arrow in figure 5.1.2.


5.1.1


5.1.2

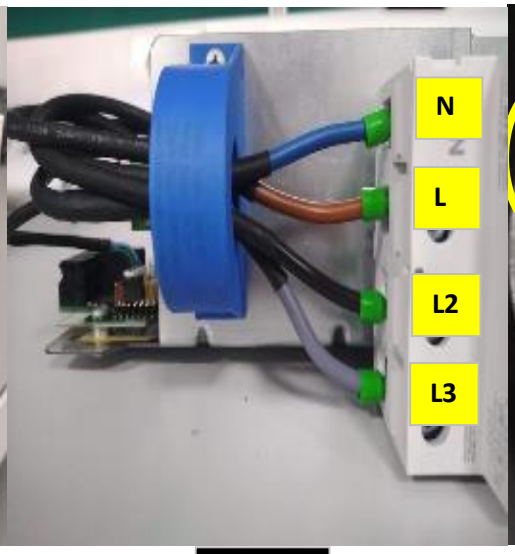

5.1.3



5.2. DC6mA sensor connector is mounted to the socket "CN5" on the mainboard.

5.3. The line input cables coming from the side of the RCCB side or terminal side are passed through the DC6mA sensor and goes through the mainboard as shown in the figüre "DC6a".
The line cables from the mainboard input side are terminated on RCCB as shown in the figure DC6b. Cable order top to bottom: Blue-brown-black-gray (top: neutral/blue)
Line cables are tied by cable tie as shown in figure DC6c.

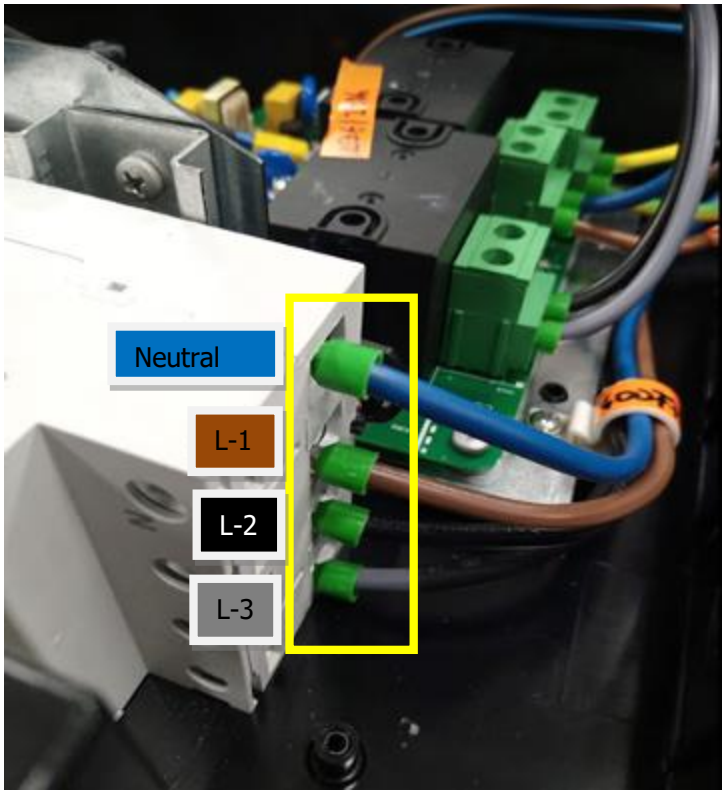
DC6a



DC6b

DC6c

5.4. The cables from the side of the terminal (N-L1-L2-L3) are mounted to the RCCB fuse in the order shown in figure below. Cable order top to bottom: Blue-brown-black-gray (top: neutral/blue)



5.4.1

5.5. The gasket "GASKET_SIDE_COVER_EVC04" (left in the figure below) is mounted on the RCCB as shown in the middle in figure below. The housing "HOUSING_3P_RCCB_EVC04" is mounted with two cross-head screws as shown in the figure (right). PH2 bits 1 Nm torque

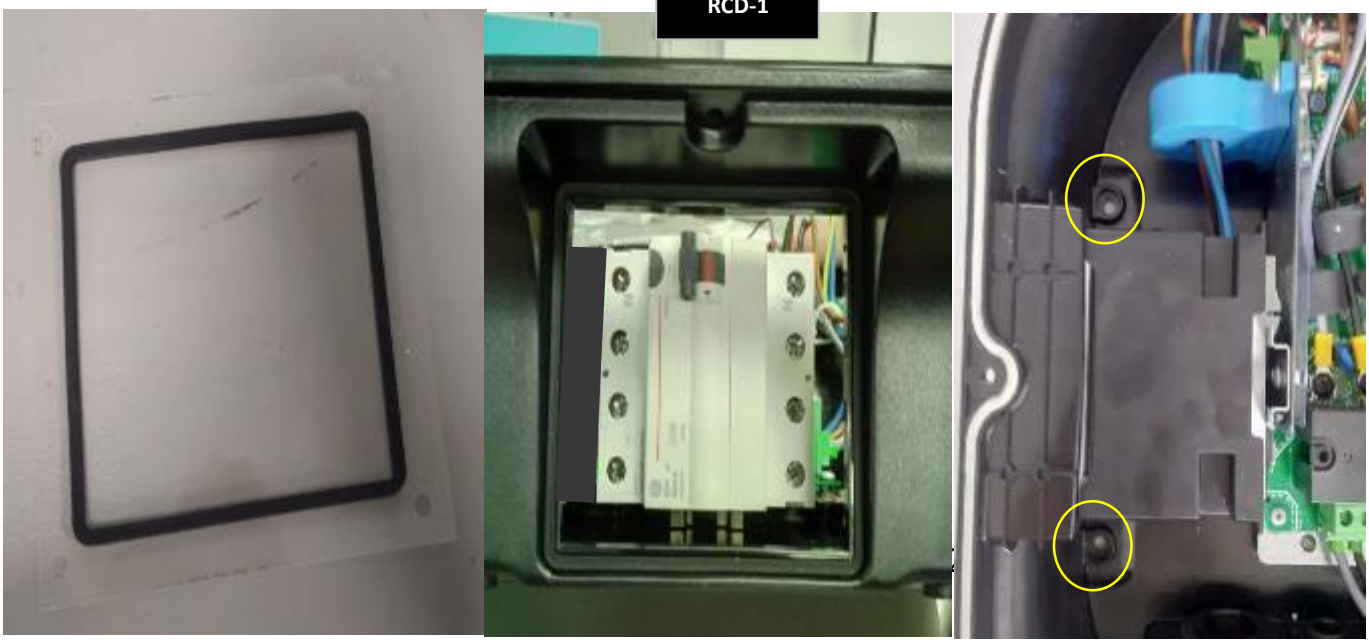
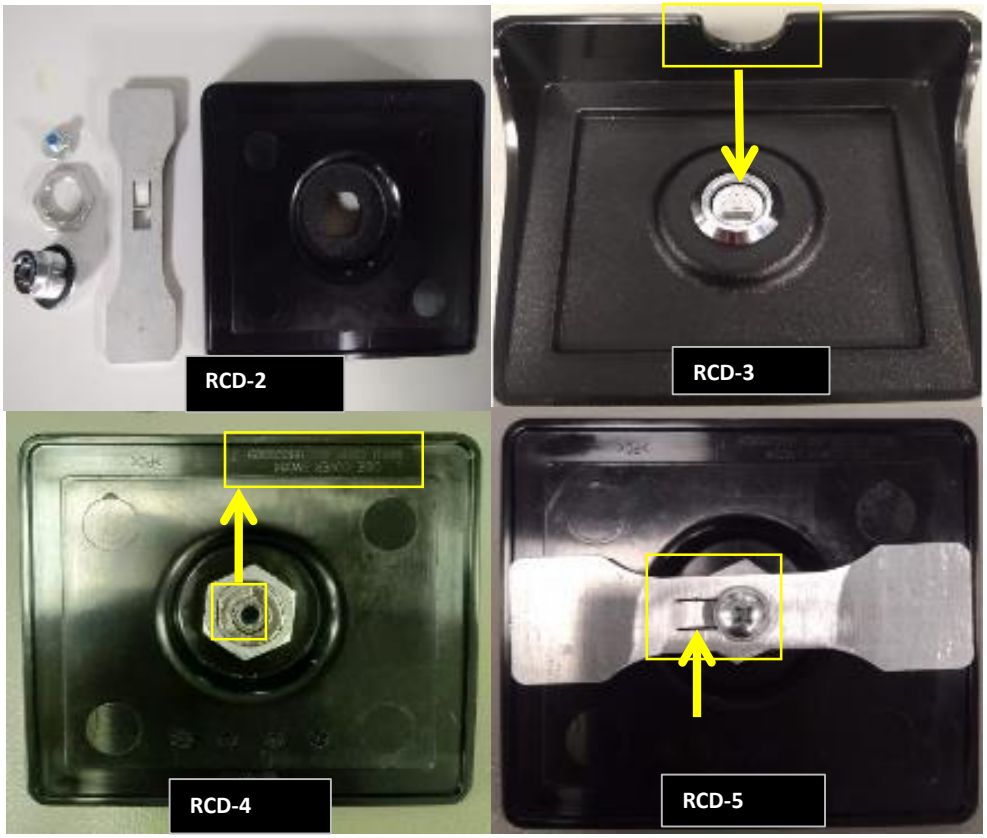


figure "RCD-3", the gap must be on upper left on rear side of "LOCK BOLT WIDE EVC04 R1".
To demount that part use triangle key on part "RCD-2" to hold the material tight, and use a PH2-type screw driver on "RCD-4"



6 CABLE GLAND NUT

First, see "General Information and Warnings" in the beginning of the section "4.2 Changing Main Board".

For models with sockets (without cable) you can see the gland nuts and blind caps/flanges in figure 6.1 for wall installation. For stand installation, 1 and 2 will be replaced. See STAND IG document.

For models with cable, there is a gland nut "RAKOR M32X1.5 Ø15-21 RAL9005" instead of plastic blind flange "HOLE PLUG BLIND CAP" in position 1 (cable hole on the left).

7 SOFTWARE UPDATE GUIDE WITH VESLINK

There is one MCU on the mainboard. It is used for main control and basic metering.

4.13 Software Update Procedure

6.1.1 Tool Parts:

1. Veslink Programmer Driver
2. PC
3. USB connection cable and special cable (Cable 7 of Veslink) to download software to selected IC
4. WG-VESTA Veslink device

6.1.2 Installing Software to Veslink

Step1: Download VESTEL Veslink Programmer to a PC. Select update at the beginning of downloading program. Open Driver.exe file and download Veslink programmer to PC.

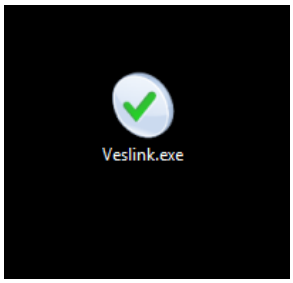


Figure 5-1

Step 2. Make the connection between WG-VESTA Veslink device and PC via USB cable.

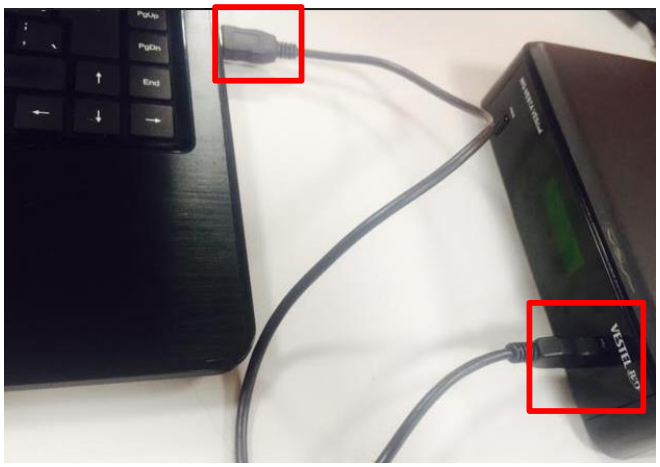


Figure 5-2

Step 3. Open the programmer and select TI MSP430F67X51AIPZ as microcontroller for main control software update.

Figure 5-3

Step 4. Select open and choose your SW based on .hex file which you want to download your main control IC. Then, select "Open".

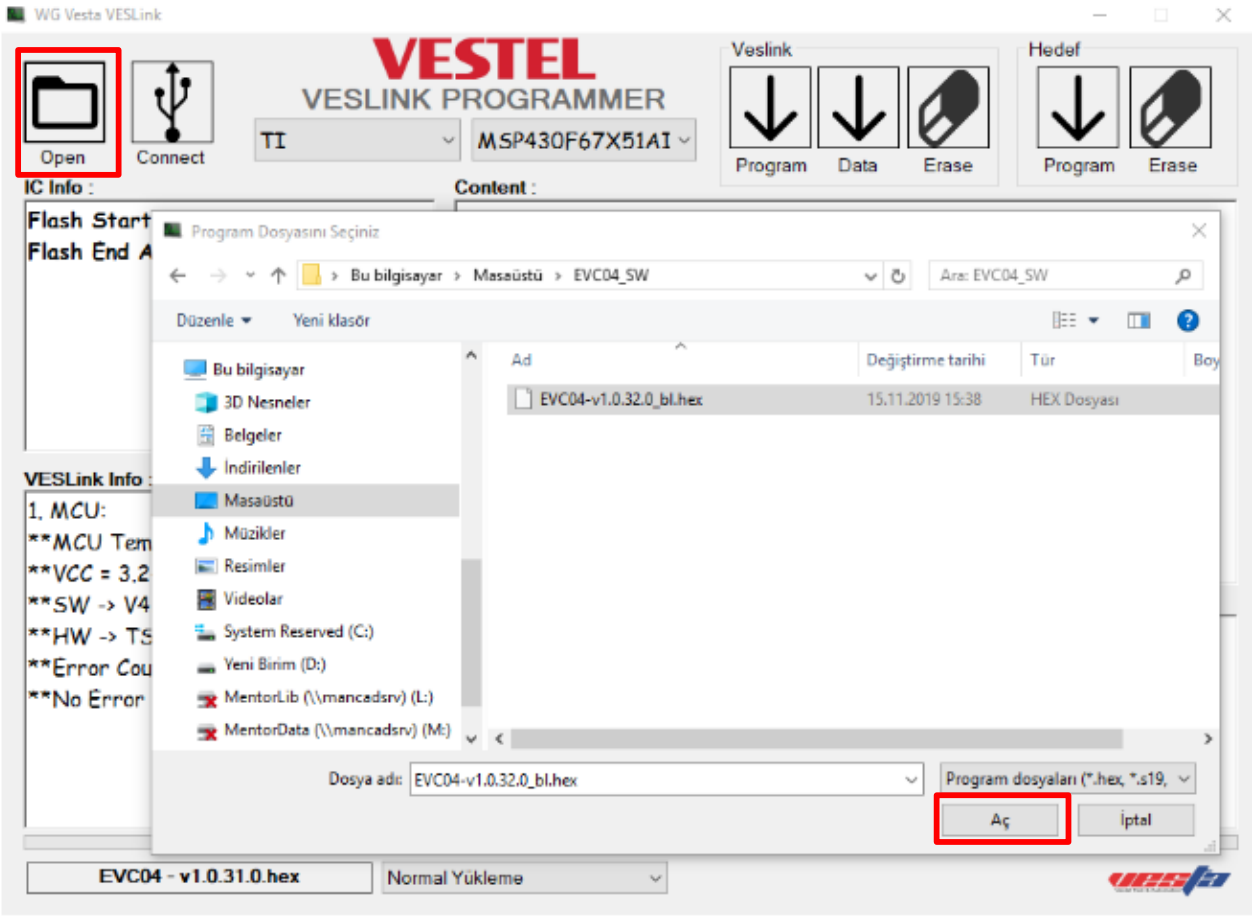


Figure 5-4

Step 5. Select Veslink Program on PC interface to download selected SW to Veslink device. In this step, energize to Veslink Device with 12V adapter or PC with USB cable

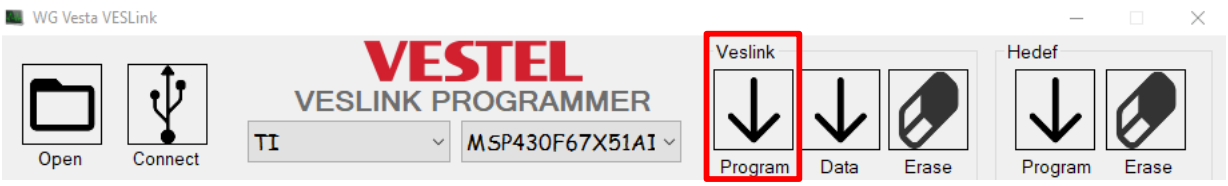


Figure 5-5

Veslink screen is changed with name of your SW hex file name as shown in Figure 5.6 after downloading.

Figure 5-6

Step 6. Firstly make sure that EVC is de-energized and make connection with special cable (Cable 7) between WG-VESTA Veslink device socket and SW update socket (CN25 Veslink) on main board as shown in Figure 5.7 and Figure 5.8.

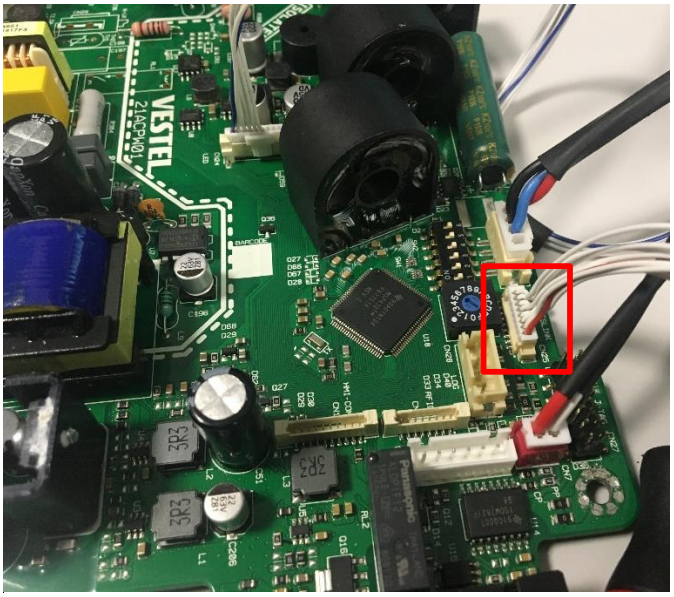


Figure 5-7

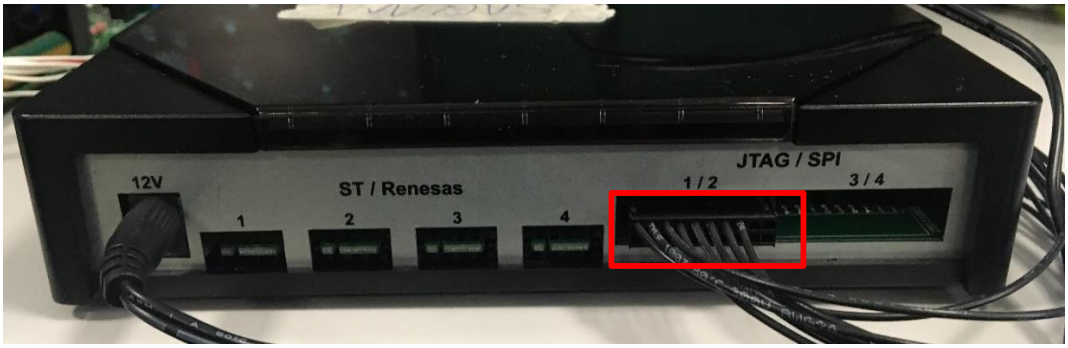


Figure 5-8

Step 7. To download SW to main board press the PROG button on Veslink device or select "Hedef Program" on Veslink PC interface**.**

Figure 5-9

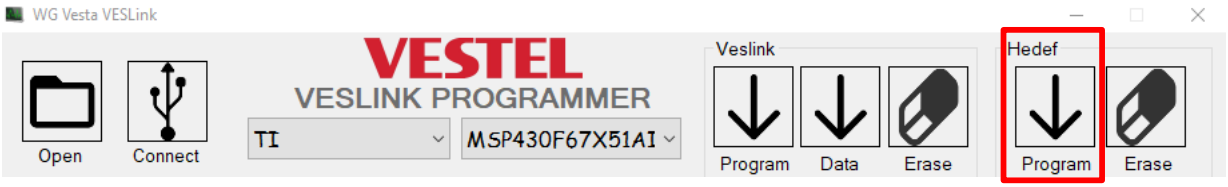


Figure 5-10

1. PROG Button: This button is downloading SW to main board MCU. If the SW is downloaded in Veslink before, you can direct to start Step 7 to download SW to main board without PC.

2. USB Socket: This is for the connection between PC and Veslink device.

3. Veslink Screen: This screen shows the software update status of the target MCU.

Figure 5-11

Step 8. Programming process is shown on the Veslink screen in Figure 5.12 and when it completes the screen is shown as Figure 5.13.

Figure 5-12

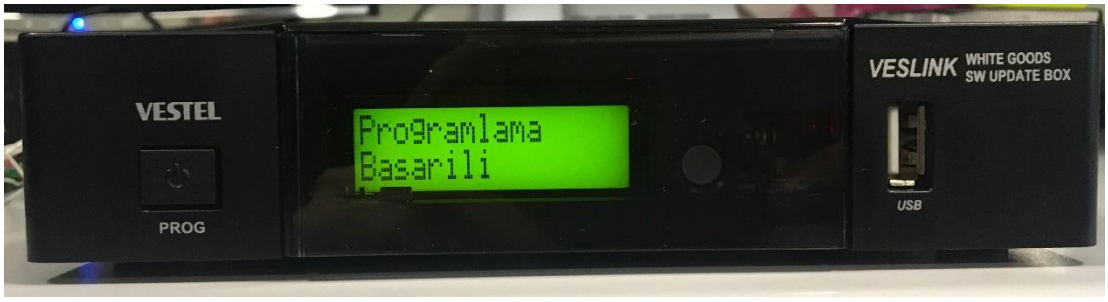


Figure 5-13

If the SW is installed in WG-VESTA Veslink device once, use only Step 7 to download SW to the microcontroller without PC.

Important!

- Before installing software, check the VESLINK device for correct IC selection and compatible software installed.

8 GETTING LOG WITH EVC TESTER AND MOBILE APPLICATION

Figure 7-1 Veslink device and required cables/tools to get log

"Vestel EVC Configurator" mobile application must be downloaded from play store for android mobile phones. Mobile phone must have OTG support.

Step 1. Please make following connections between mobile phone, EVC Tester and EVC.

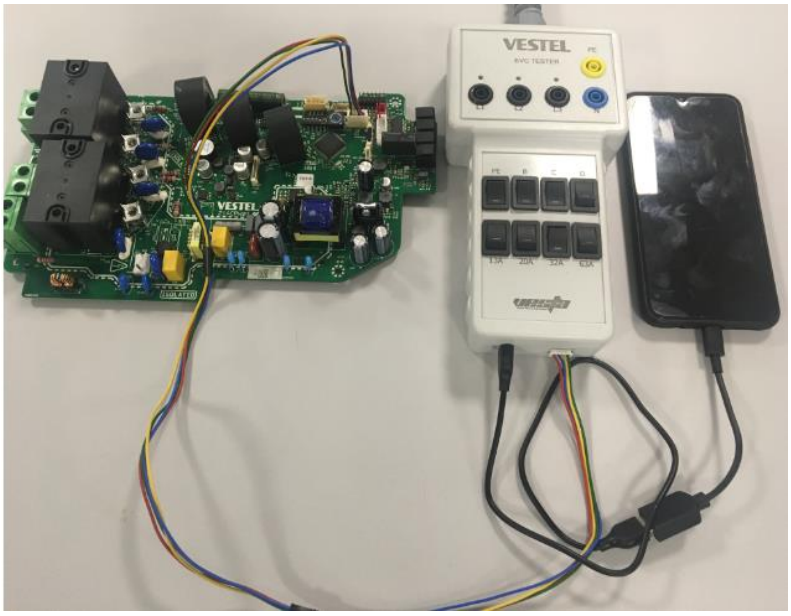


Figure 7-2 Cable connections between EVC tester, EVC main board and mobile phone

Step 2. Open "Vestel EVC Configurator" application on your mobile phone and go to home page.

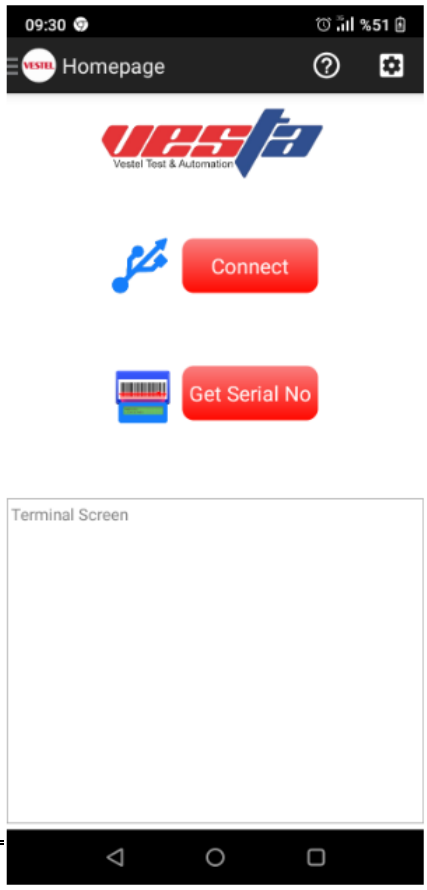


Figure 7-3

Step 3. Energize the EVC and press Connect button on mobile application to get logs.

Figure 7-4

State of the EVC is displayed with "S:" prefix.

Possible states are as follows;

A1: Pilot State Unplugged – No Cable

A2: Pilot State Unplugged PWM

B1: Pilot State Plugged in – Vehicle connected

B2: Pilot State Ready – Vehicle connected and charging device ready to charge

C1: Pilot State EV Ready – Vehicle connected and electric vehicle ready to charge

C2: Pilot State Charging – Charging

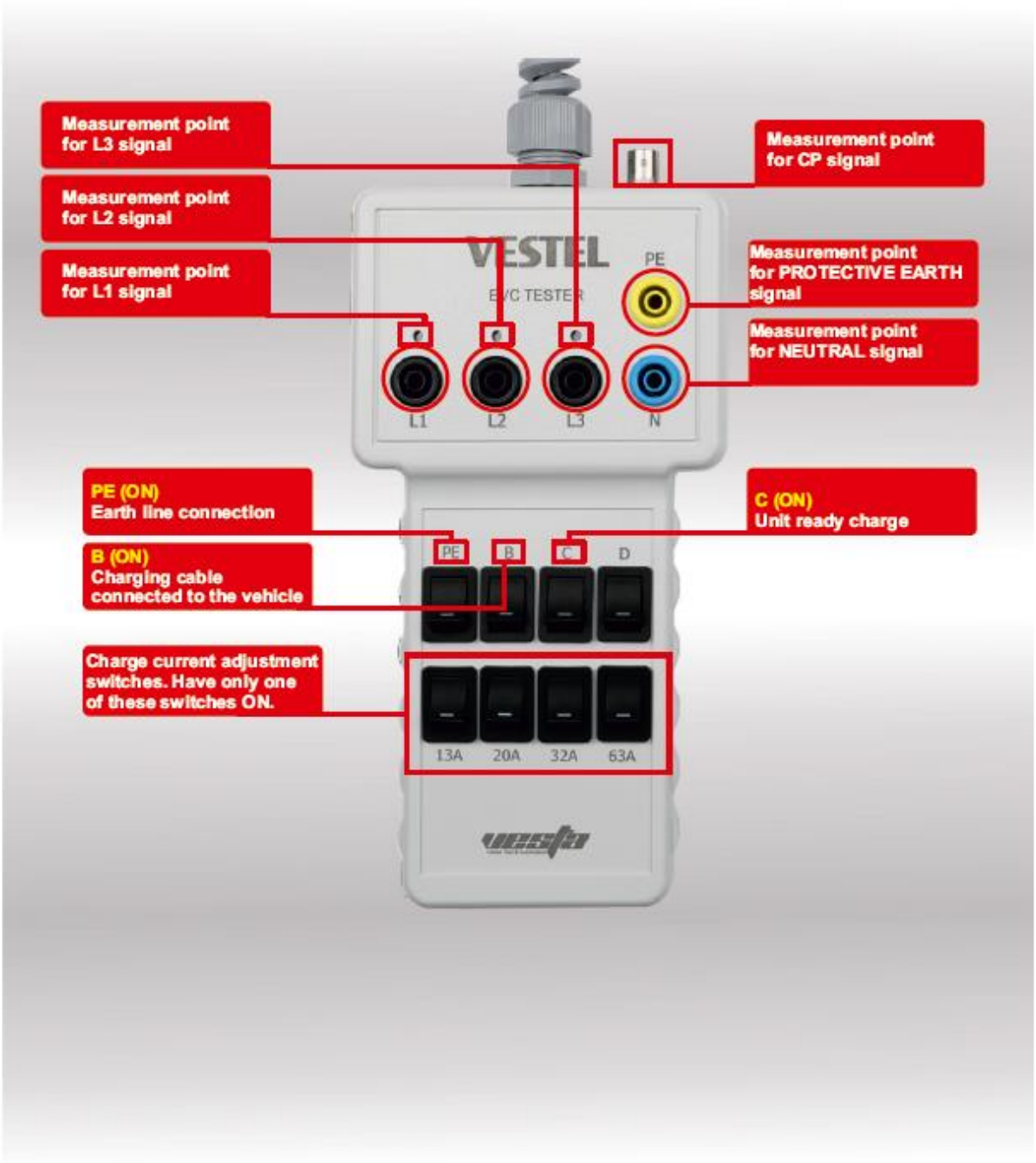
D1- D2: Pilot State Ventilation required

If any error occurs in EVC then error number is printed into the log with "ERROR: " prefix. Error numbers are as follows;

Error	Code	Timeout to enter error	Limit to enter error	Recover case	Recover Timeout
Contactor Welded	0	3 sec.		Auto	30 sec.
Contactor does not respond	1	3 sec.		Auto	30 sec.
Interlock lock error	2	5 sec.		Auto	20 sec.
Interlock unlock error	3	5 sec.		Auto	20 sec.
Proximity pilot error	4	2 sec.		Auto	Immediately
CP diode error	5	2 sec.		A1 state	Immediately
CP short error	6	2 sec.	CP voltage is between -1 to 1 V	Auto	Immediately
Over voltage phase 1	7	5 sec.	270 V	Auto	Immediately
Over voltage phase 2	8	5 sec.	270 V	Auto	Immediately
Over voltage phase 3	9	5 sec.	270 V	Auto	Immediately
Under voltage phase 1	10	5 sec.	190 V	Auto	Immediately
Under voltage phase 2	11	5 sec.	190 V	Auto	Immediately
Under voltage phase 3	12	5 sec.	190 V	Auto	Immediately
Over current phase 1	13	5 sec.	Max Current *1,20	Auto	10 sec.
Over current phase 2	14	5 sec.	Max Current *1,20	Auto	10 sec.
Over current phase 3	15	5 sec.	Max Current *1,20	Auto	10 sec.
Residual current error	16	100 msec.	Minimum 4 mA Typical 5 mA Maximum 6 mA	Auto	10 sec.
Protective Earth Fault	17	2 sec.		Auto	Immediately
RFID error	18	20 sec.		Auto	Immediately

Interlock Permanent Error	19	1 sec.	If interlock error occurs 3 times sequentially then permanent error occurs	Interlock state changed	Immediately
Overcurrent Permanent Error	20	1 sec.	If overcurrent error occurs 3 times sequentially then permanent error occurs	A1 state	Immediately
Power Optimizer Phase 1 Communication Error	21	In 1 Phase Product: 10 sec. In 3 phase product: 30 sec.	Communication error occurs	Auto	Immediately
Power Optimizer Phase 2 Communication Error	22	30 sec.	Communication error occurs	Auto	Immediately
Power Optimizer Phase 3 Communication Error	23	30 sec.	Communication error occurs	Auto	Immediately

USING THE HAND TERMINAL



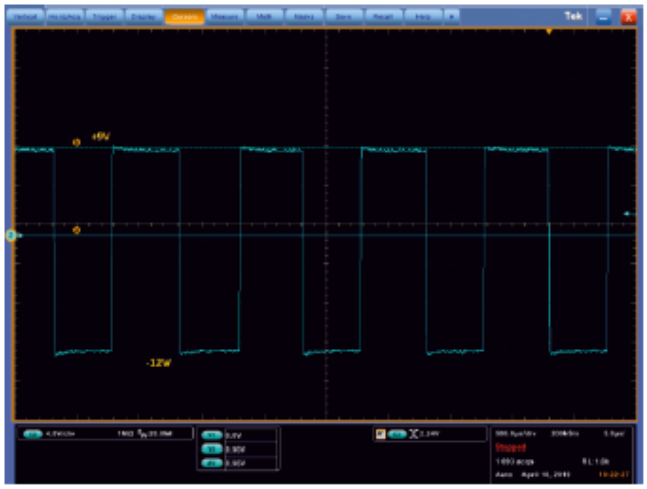
-When PE and B switches are activated the Ground line, Charger-Cable, Charger-Vehicle connections are established.
-Have one of 13A, 20A, 32A and 63A cable type activated and then activate the C switch to simulate Charging.
-If D switch is activated the Ventilation can be simulated. If activated during Charging, the device will turn off charging.

Measurement Specifications

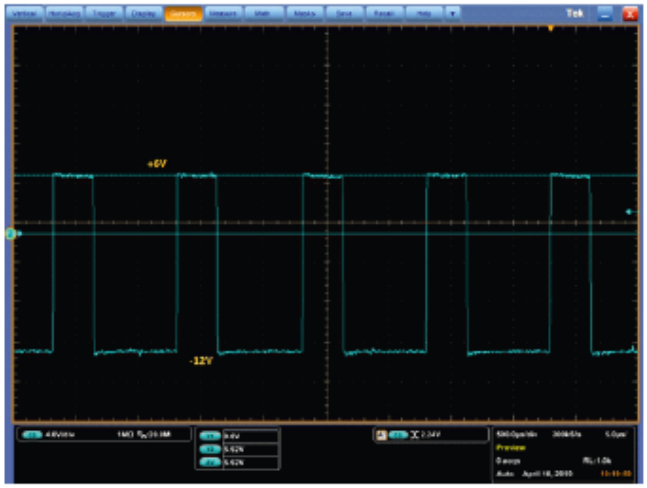
Voltage Measurements	
Display Range	0.0V - 300V AC
Measurement Range	0.0V - 300V AC
Frequency Range	45Hz - 65Hz

Control Pilot PWM Measurements	
Voltage Range	±14V DC
Voltage Resolution	0.1V
Frequency Range	940Hz- 1040Hz
Frequency Resolution	1Hz
Duty Cycle Range	2% - 98%
Response Time Range	1ms - 10s
Resolution	1ms

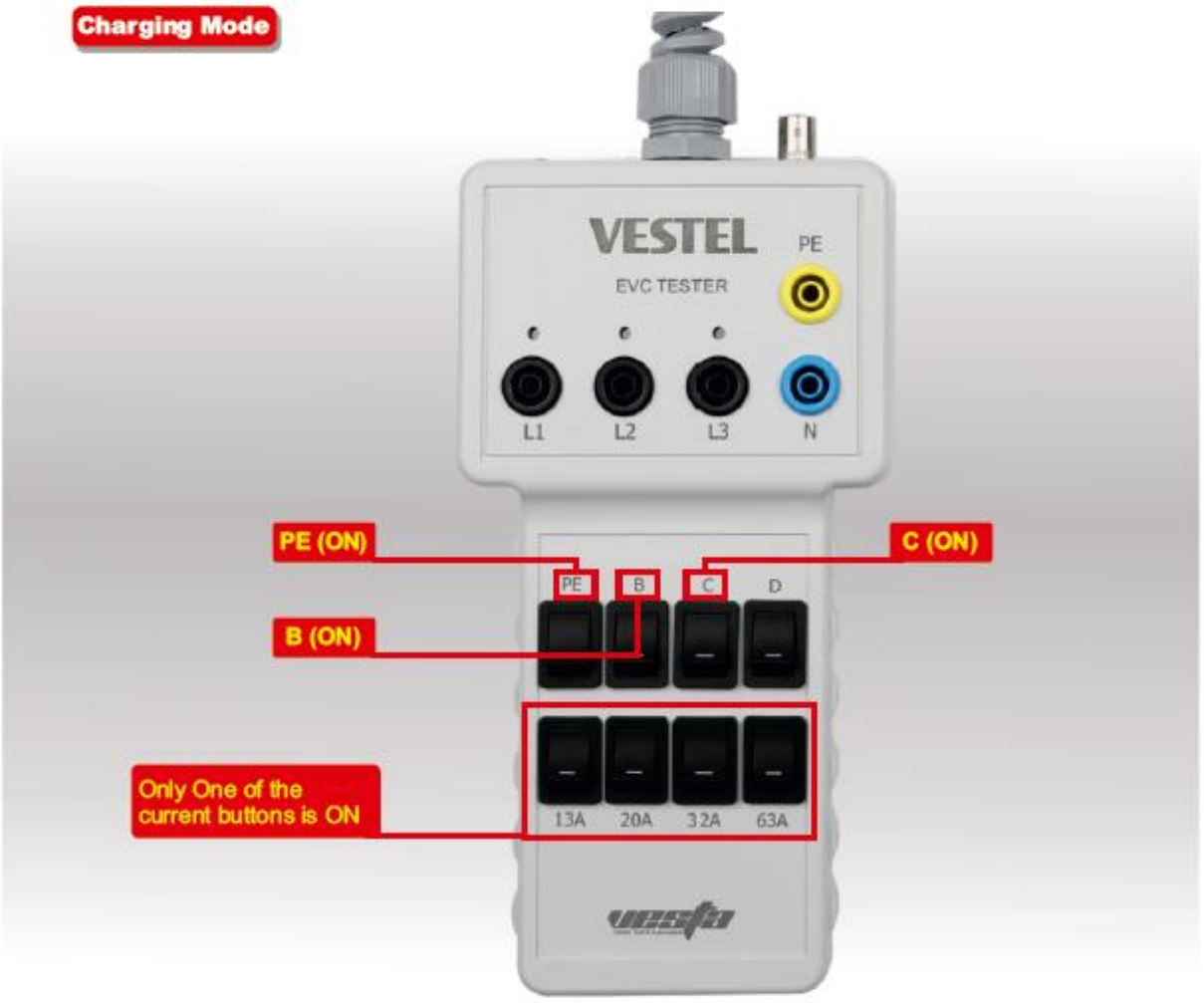
According to IEC61851-1, when B switch is in Turn ON position and C Switch is in Turn OFF position, "Charge is not requested" from EVSE, Pilot State B. The scope measurement of the CP signal can be measured through measurement point. In Pilot State B, CP signal should be visible on the oscilloscope. The positive portion of the signal should be approximately +9V, which indicates charge has not been requested by EV and scope output should be like below figure.



According to IEC61851-1, when both B and C switches are in Turn ON position, “Charge is requested” from EVSE, Pilot State C. The scope measurement of the CP signal can be measured through measurement point. In Pilot State C, CP signal should be visible on the oscilloscope. The positive portion of the signal should be approximately +6V, which indicates charge has been requested by EV and scope output should be like below figure.



According to IEC61851-1, when B, C and D switches are in Turn ON position, “Charge is requested” from EVSE with ventilation requirement, Pilot State D. The scope measurement of the CP signal can be measured through measurement point. In Pilot State D, CP signal should be visible on the oscilloscope. The positive portion of the signal should be approximately +3V, which indicates charge and ventilation have been requested by EV.



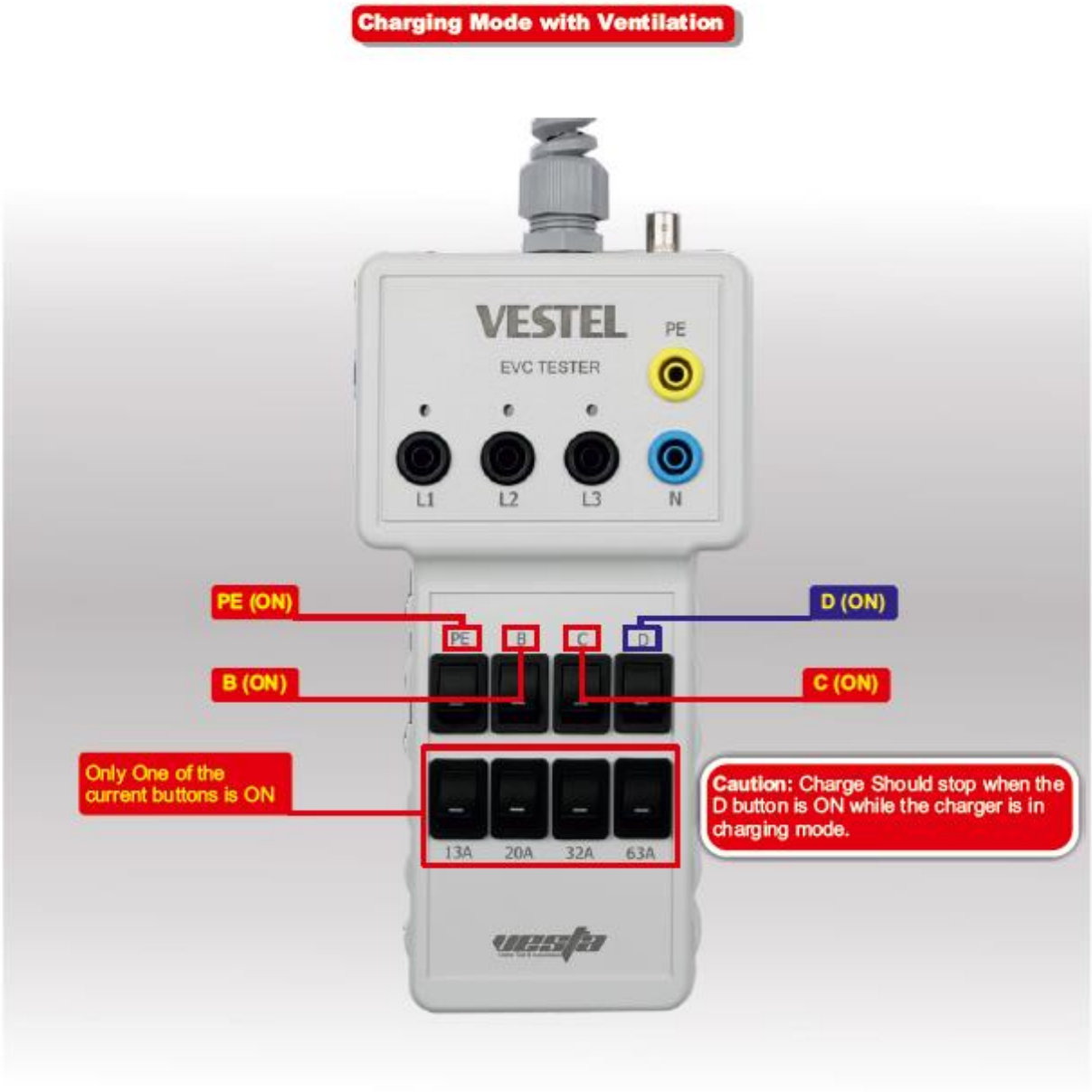
ATTENTION: The unit can be tested for cables with different current rates by turning only one of the current switches ON and turning OFF the other switches.

Electric Vehicles that Require Ventilation during Charging

WARNING

For some vehicles the battery systems include hazardous gases and the vehicle is charged in an enclosed space, the environment shall be ventilated.

EVC02-AC series charging station is only for charging vehicles that does not require ventilation during charging.


Charging Mode with Ventilation
VESTEL
EVC TESTER
PE
L1
L2
L3
N
PE (ON)
B (ON)
D (ON)
C (ON)
PE
B
C
D
Only One of the current buttons is ON
13A
20A
32A
63A
Caution: Charge Should stop when the D button is ON while the charger is in charging mode.

9 DETAILS OF VESTEL EVC TESTER

Follow the steps below for testing a repaired charger.
Step 1.a: Connect your AC power cable to EV charger input terminal.
Be sure to connect L1, L2, L3, N and Earth correctly.

Three-phase:

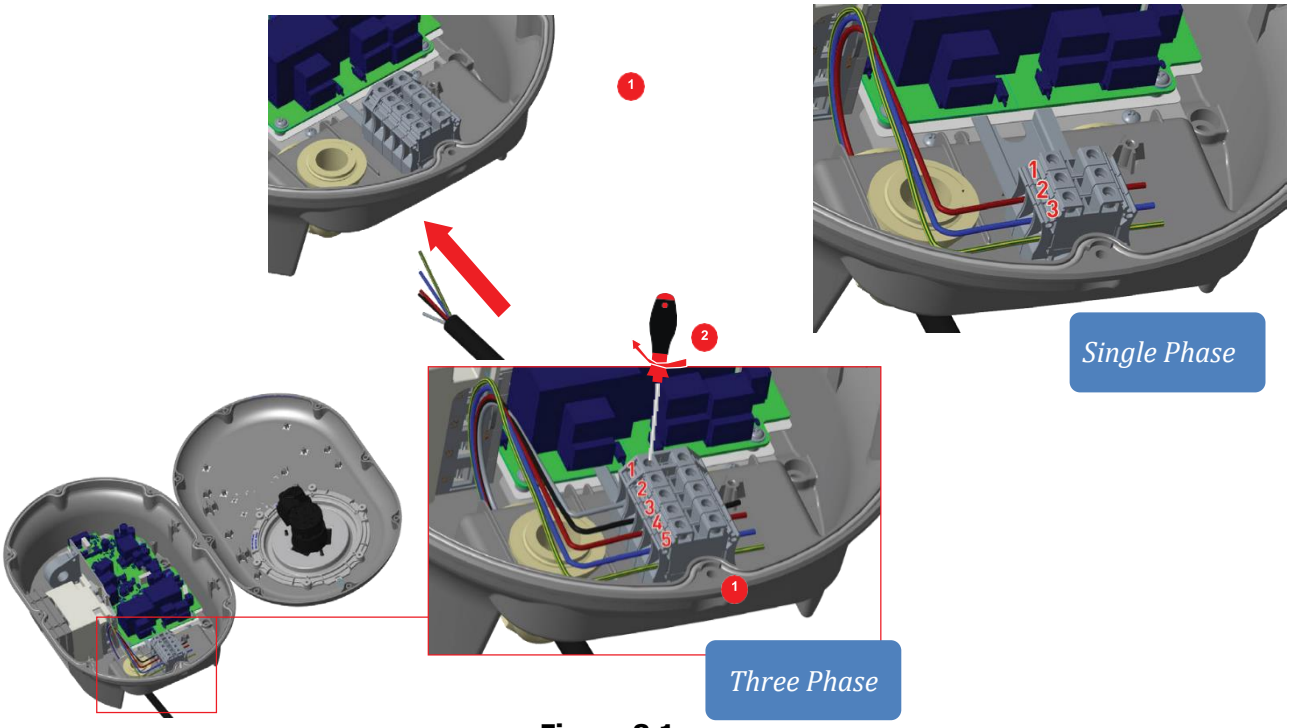


Figure 8.1

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

Table 8.1

10 TROUBLESHOOTING

Follow the Steps below in Case of Error Situations for Electric Vehicle Charging Station

If the charger does not start charging,
Step 1: Make sure that the electric cables of product are connected correctly for input.
Step 2: If the charging process does not start although the LED color is correct according to LED behavior section, check the states of switches on EVC tester to make sure that they are correct.
Step 3: If the problem is not solved, update the software.

If the LED is red,
Step 1: It means that there is an error on the charger.
Step 2: To understand the reason of the error get log from the EVC as explained in the related section.
Step 3: Realize the error from error number with output of Log. According to error number, take the steps below to solve problems.

Error Number ERROR: 0
- This error shows that there is an error on Relay.
- Line voltage is transmitted to electric vehicle via relay at this electric vehicle charging station. This relay must not be at transmission except for charging mode. There mustn't be any voltage on socket of station outlet. If the charge socket of device has line voltage except for charging mode, the relay in the station or mainboard has this fault.

Error Number ERROR: 1
- This error means that relay does not transmit at the electric vehicle charging station. Relay or mainboard is faulty.

Error Number ERROR: 2
- This error shows that there is an error on Interlock Locking.
- Interlock must be locked during charging state.
- This error occurs if the interlock could not be locked although the charging cable is plugged in and authorization for the charging is given.
- Make sure that interlock connections are correct.
- If this error is still observed, the interlock must be replaced.
- If the interlock lock is not broken and connected correctly, there may be a problem on the mainboard of charging station.

Error Number ERROR: 3
- This error shows that there is an error on Interlock Unlocking.
- Before charging process, the charging cable is locked by the EVC. Because of safety of charging process, the electric vehicle charger cable remains locked during charging.

- When the charge cable is removed from the electric vehicle, the charging station opens the lock on its own socket and allows the user to remove the cable from the charging station.
- This error occurs when interlock cannot open lock properly. When this error is seen, interlock is at lock position and does not allow user to remove cable.
- Make sure that interlock connections are correct.
- If this error is still observed, the interlock must be replaced.
- If the interlock lock is not broken and connected correctly, there may be a problem on the mainboard of charging station.

Error Number ERROR: 4

- This error means that the product does not have a PP connection.
- The charging cable types of electric vehicles are standardized. According to standards, there are four different types of cables which are 13A, 20A, 32A and 63A for four different current capacities. There is a resistance that is located in Proximity Pilot(PP) connection in cables and this resistance provides to decide current carrying capacity.
- Electric vehicle charging station charges with 13A, 20A and 32A thanks to the current carrying cables. So, if the E4 error is occurred, you should control the resistance which is located in PP connection.
- If electric vehicle charger cable is not connected when this error occurs, there is an error on the mainboard of charger or the PP connection of the charger's output socket. The mainboard must be replaced to solve this problem.
- If this error occurs while the electric vehicle charger cable is plugged in, the resistance of the PP connection for charging cable is faulty. The PP connection for charging cable must be controlled.
- If there is no problem with the charging cable, there is a fault in the PP connection for the charging station or the mainboard.

Error Number ERROR: 5, ERROR: 6

- This error shows that there is an error on CP communication line.
- If the error occurs, the reason is probably fault of the mainboard or CP connections.

Error Number ERROR: 7, ERROR: 8, ERROR: 9

- These errors occur when the input voltage of the EVC exceeds the predefined maximum voltage limit (270 V). Voltages of first, second and third phases are controlled respectively. When these errors occur, the grid voltages which the charging station is connected to them must be checked.
- The mainboard must be replaced if the problem is still observed even though the phase voltages are within specified range.

Error Number ERROR: 10, ERROR: 11, ERROR: 12

- These errors occur when the input voltage of the EVC is below than the predefined minimum voltage limit (150 V). Voltages of first, second and third phases are controlled respectively. When these errors occur, the grid voltages which the charging station is connected to them must be checked.
- The mainboard must be replaced if the problem is still observed even though the phase voltages are within specified range.

Error Number ERROR: 13, ERROR: 14, ERROR: 15, ERROR: 20

- These errors occur when the current drawn by the EV exceeds the current offered by the EVC with a percentage of nearly 20%. Each phase is checked separately. EVC stops charging and retries thrice to make sure that overcurrent failure occurs.
- If the problem still appears then EVC enters a permanent overcurrent error(Error 20).
- This error must be related to electric vehicle and error must disappear when the charging cable is unplugged from the EVC.
- The mainboard must be replaced if the problem is still observed even though the charging cable is unplugged.

Error Number ERROR: 16

- The charge station is equipped with a DC leakage current sensor that reacts a DC leakage current higher than 6mA.
- If the charging station goes to error state due to leakage current then;
  - In Unplugged state(A1); Charge station stays in error state at least 10 seconds. if error conditions are removed then station becomes available again automatically.
  - In Plugged state; Charge station stays in error state and auto recover mechanism waits for cable unplug. If charging cable is unplugged and error conditions are removed then error is cleared after 10 seconds.
- The mainboard must be replaced if the problem is still observed even though the charging cable is unplugged.

Error Number ERROR: 17

- This error shows that there is an error on Protective Earth. Please check earth cable connection.

Error Number ERROR: 18

- This error shows that there is an error on RFID.
- Check connection of the RFID reader.
- Change the RFID module if connection cable of RFID reader is correct.

Error Number ERROR: 19

- This error shows that there is an error on Interlock.
- If any interlock error(ERROR:2 or ERROR:3) occurs 3 times sequentially then permanent error occurs.
- Make sure that interlock connections are correct.
- If this error is still observed, the interlock must be replaced.
- If the interlock lock is not broken and connected correctly, there may be a problem on the mainboard of charging station.

Error Number ERROR: 21, ERROR: 22, ERROR: 23

- This error shows that there is an error on Power Optimizer communication.
- Make sure that RS485 communication cables are connected correctly.
- The mainboard must be replaced if the problem is still observed even though the cable connections are correct.