Charging Station Installation Manual
OlifeEnergy AC

Version 3
Updated on: 24th October 2023
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1 TABLE OF CONTENTS

2 INFORMATION ON DOCUMENTS

The following instructions shall guide you through the whole documentation. We are not liable for any damage caused by failure to follow these instructions.

1. **Parts of documentation**

   For equipment operators:

   - Charging Station Operating Instructions

   For service technicians:

   - Charging Station Installation Manual

2. **Archiving of Documents**

This Installation Manual as well as all relating documents and other necessary tools, if any, shall be handed over to the equipment operator. The operator shall store the instructions and other tools so that these are available, if necessary.

3. **Symbols Used**

The symbols used in the text shall have the following meaning:

Immediate threat to life

Risk of serious injuries

Risk of light injuries

Risk of material damage

Symbol for useful instructions and information

TRANSPORT INSTRUCTIONS

Caution!
Danger of damage to charging cables end connectors!

- Ensure that the end connectors of charging cables are fastened to the chassis and fitted with a protective element when being transported.

Caution!
Danger of damage to the charging station!
The control electronic unit of the charging station is sensitive to conductive dust particles and moisture.

- When transported, the charging station shall be always fully assembled.

The charging station is delivered in a single package.

- The charging station shall be transported to the place of installation. During transport, the charging station should remain in its protective packaging.

3 PLACE OF INSTALLATION

Caution!
Danger of damage to the charging station control electronic unit!
When installing the charging station, avoid any contact of liquid with internal part of the control electronic unit. There is a risk of degradation or bonding between contacts possibly resulting in short circuit in the connection place, and/or damage to the control part of the charging station.

4 PRODUCT CHARACTERISTICS

OlifeEnergy AC is a fast-charging station for electric cars complying with IEC 61851 standard. The station is an electrical device. It should be connected by a person qualified pursuant to relevant legislation. To ensure its safe operation, operating instructions must be followed. Failure to observe the instructions may result in the risk of injury or damage. The station is able to charge two electric vehicles simultaneously with one to-three phase connection (depending on the connection 230/400 V) in alternative current of 6 to 32 A.

The charging cycle can start automatically when the vehicle is connected or based on authorization with an RFID chip. A pair of RFID readers is supplied with the station.

Charging can be completely controlled by an external system using ModBus RTU module via RS 485 bus. Apart from ModBus RTU, the charging power of the station can be also controlled by 0-10 V analogue signal. For dynamic control of the charging power based on consumption or production (photovoltaic power station, cogeneration, etc.) use OlifeEnergy Smartmeter unit.

In SMART option, the unit can be partially or completely controlled via a remote server using the OlifeEnergy Cloud service or the OCPP protocol.

5 CONNECTION OF OLIFEENERGY AC22 CHARGING STATION

The charging station must be connected to a fixed installation, it is not equipped with moving lead-in cables. In the case of a publicly accessible charging station, the upstream-located installation must contain an overvoltage protection device according to ČSN 33 2000-7-722 standard. The charging station supply must be separately protected. The following devices are already installed in the station:

- 2x circuit breaker 3 x 32 A, tripping characteristics B
- 2x residual current protector, type A
- 2x device to detect the direct component according to EN 62196

The following diagram shows the recommended wiring of one OlifeEnergy AC22 charging station according to EN 61851-1 ed.3.

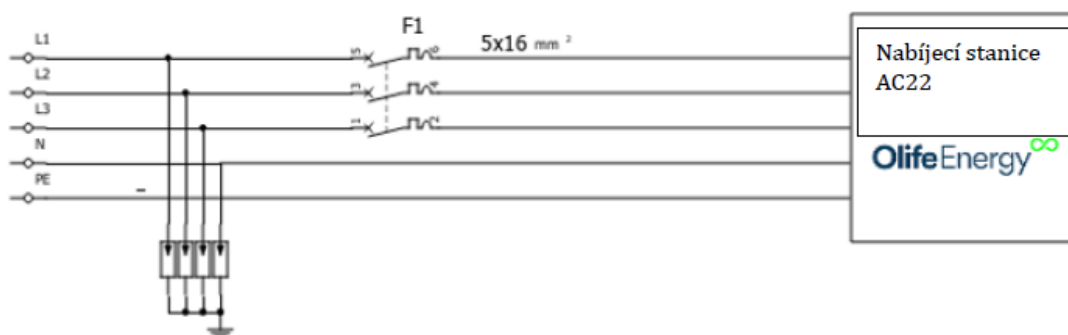*Figure 1: Recommended wiring diagram*

F1 – Circuit breaker 3x63 A, with tripping characteristics B

Attention! The wiring can may vary slightly according to national or local regulations. Always discuss wiring with your local inspection engineer or designer.
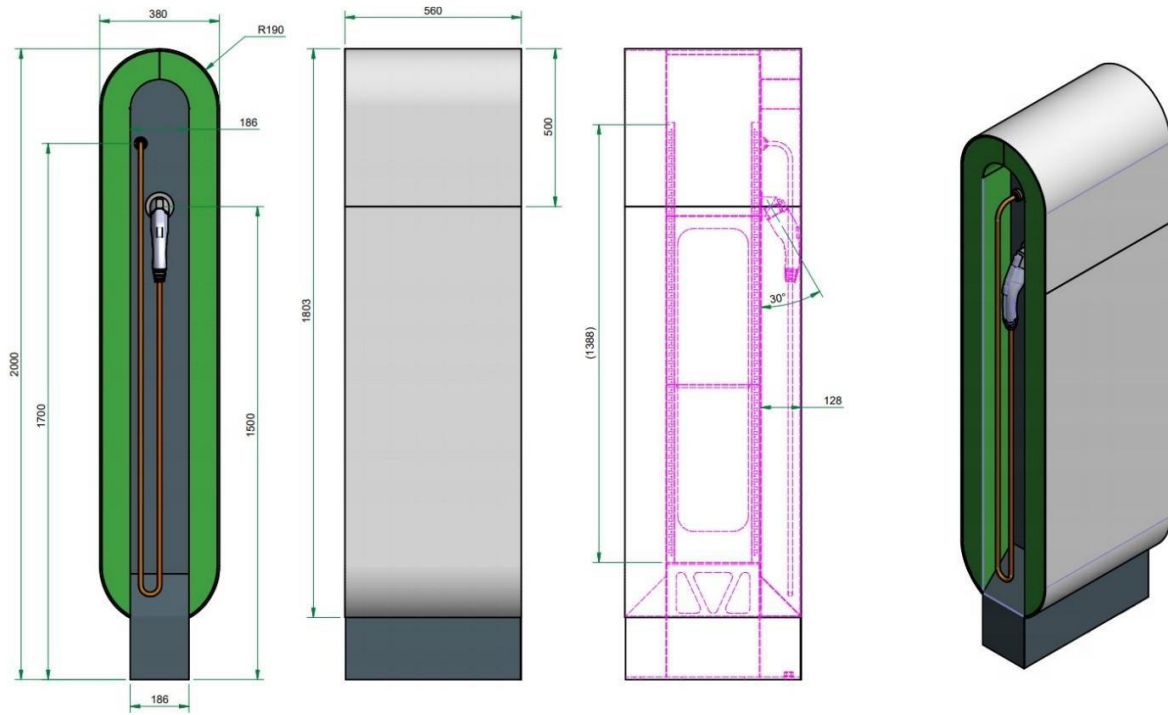
6 DIMENSIONS

Figure 2: Dimensions of OlifeEnergy AC charging station

7 CONNECTORS – OVERVIEW
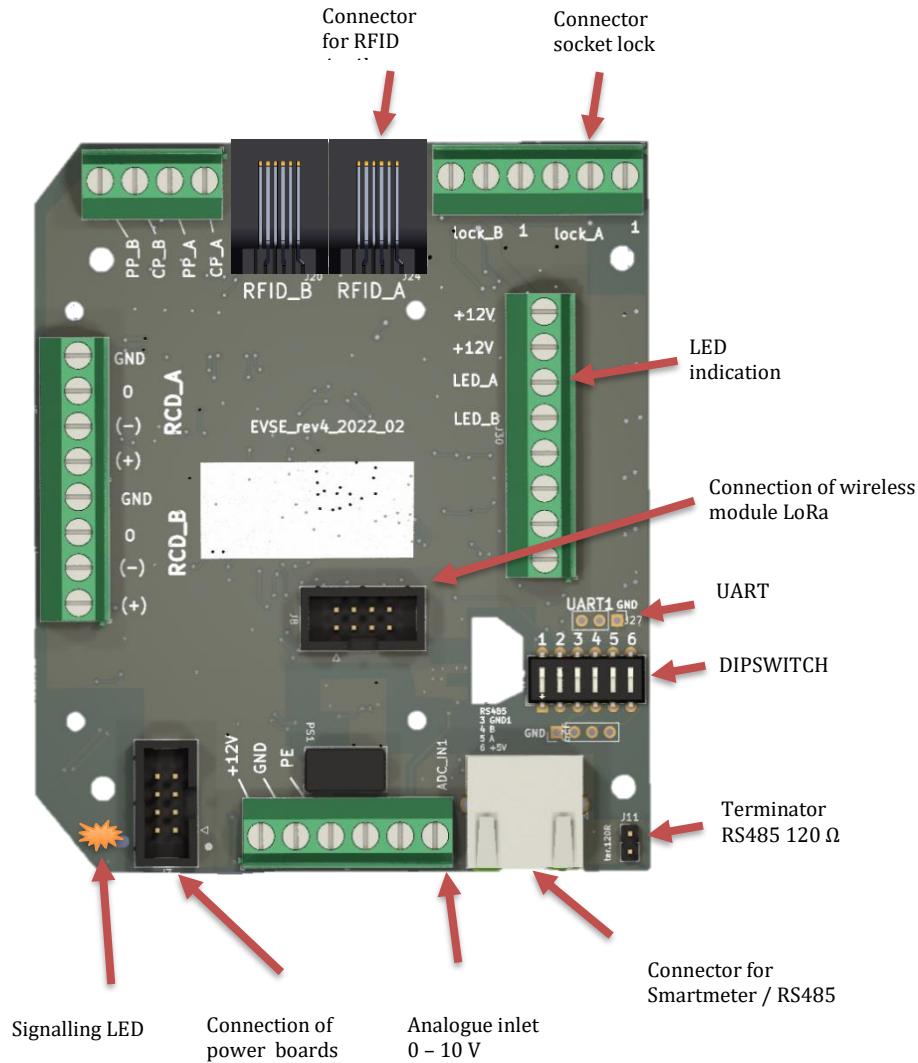
Figure 3: Control board connectors

8 INSTALLATION

SCOPE OF SUPPLY

Figure 2: OlifeEnergy AC

Pc	OlifeEnergy AC-22 kW Charging Station
1	Station OlifeEnergy AC 22 2x22kW
2	Integrated charging cable
2	RFID card

LIST OF TOOLS FOR CHARGING STATION ASSEMBLY

Material/Tool	Size	Description
Hex key	6	
Philips-head screwdriver	3	
Philips-head screwdriver	6	
Allan key	16	

CHARGING STATION INSTALLATION

Danger!
Unprofessional installation can cause danger to persons or damage to property!
Possible risk of personal injury and material damage to the charging station if not installed according to the prescribed instructions.

- When installing the charging station, make sure you follow the instructions

The following section will describe all steps taken to install the charging station. Following the sequence of steps will ensure safe installation of the charging station.

STEP 1: Preparing for the charging station installation

- At the place of installation, prepare a well-matured concrete base and anchoring points (M16) for the unit, as shown in the Figure below. Through the base centre, lead the protective pipe for both heavy and light power cables so that they can enter the station through the hole indicated (150x60 mm). Neither the anchoring material nor supply cables are part of the delivery.
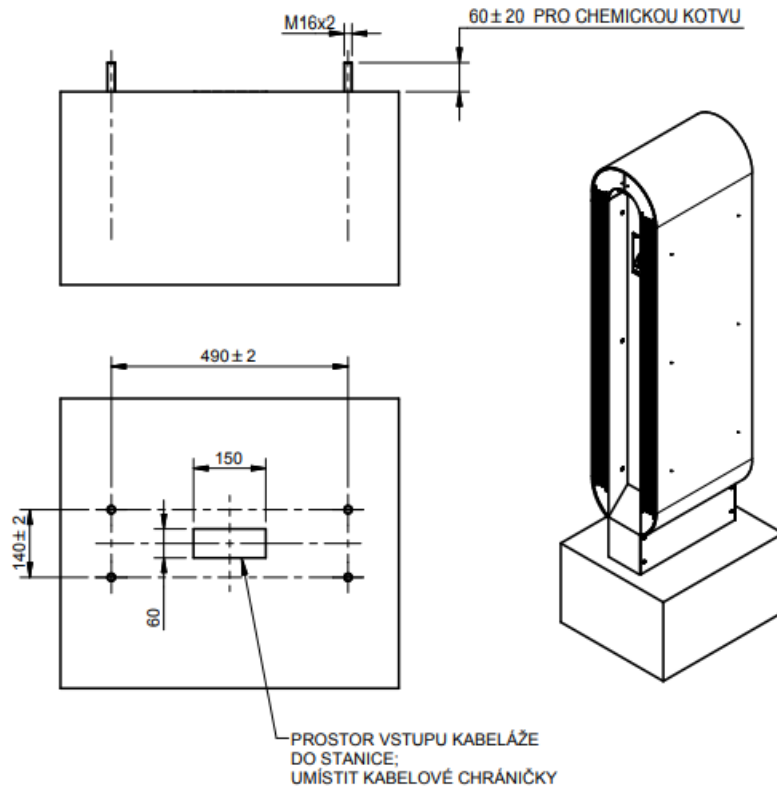
Figure 3: Dimensions of the charging station assembly leg

STEP 2: Opening the front cover

- Unscrew 6 screws and remove the front cover, as depicted in the picture below:

Assembly Tools	
Size	Type
6	⬡

Lift the metal cover slightly and turn externally. This way, the cover can be lifted and removed from the chassis.

Figure 4: Screws location for the cover metal

STEP 3: Removing the bottom cover

- To remove the cover, release 8 screws (4 on each side)

Assembly Tools	
Size	Type
6	

Figure 5: Screws location for the bottom cover

STEP 4: Leading the supply conductors

- Lead the supply conductors through the hole as depicted in Figure 6

Figure 6: Hole for the supply conductor

STEP 5: Putting the charging station in place

- Use the base prepared following the Step No. 1 and place the station on it. Lead in the cables and fix the station firmly to the base. The anchoring material is not part of the supply.

Caution! Danger to health and property if the station is released!
Considering the station's weight and high centre of gravity, the station can be overturned. Make sure that its connection with the base is really strong and stable, taking into account also any external circumstances.

STEP 6: Releasing the control electronics cover

- Unscrew 4 plastic screws fixing the grey cover.

Assembly Tools	
Size	Type
6	✚
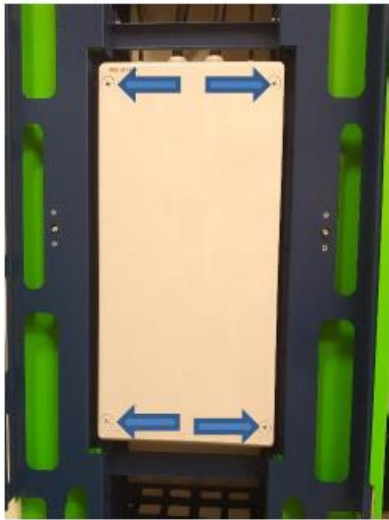
Figure 7: Screws in the distribution board

STEP 7: connecting the power cables

- Pull the cables through the rubber blind as shown in the picture below.

Figure 8: Hole for supply conductors

TN-S

- Connect the lead-in wires in the TN-S network, as shown below in Figure 9.
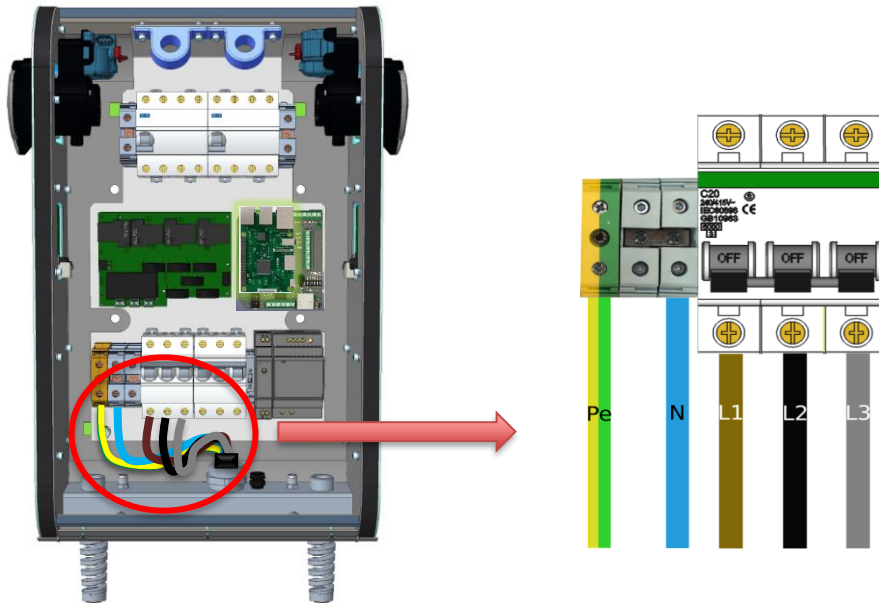
Figure 9: Supply cables connection in TN-S network

TN-C

- Connect the lead-in wires in the TN-C network, as shown below in Figure 10.
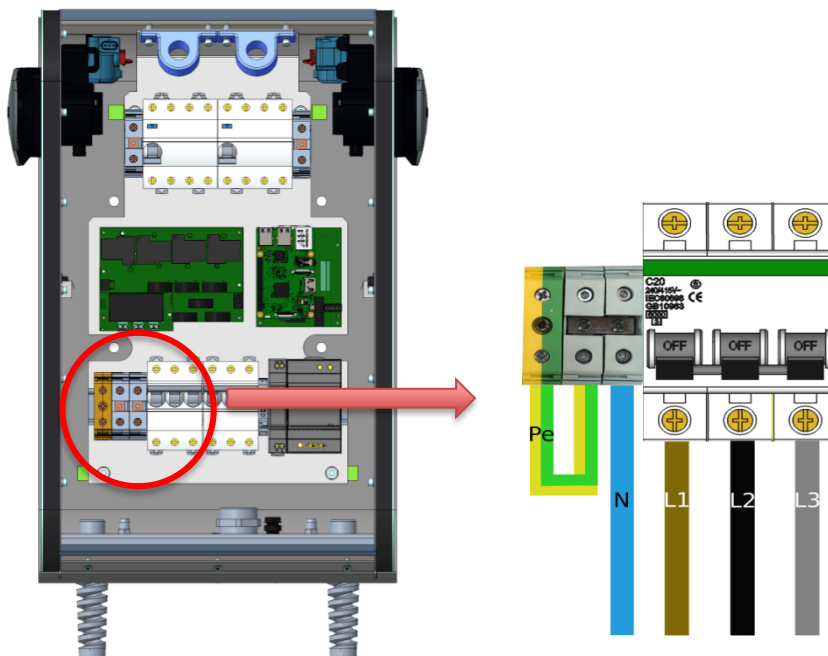
Figure 20: Supply cables connection in TN-C network

STEP 8: Connecting network (Ethernet) cable / GSM modem

This step applies only for the following option: AC22 Smart
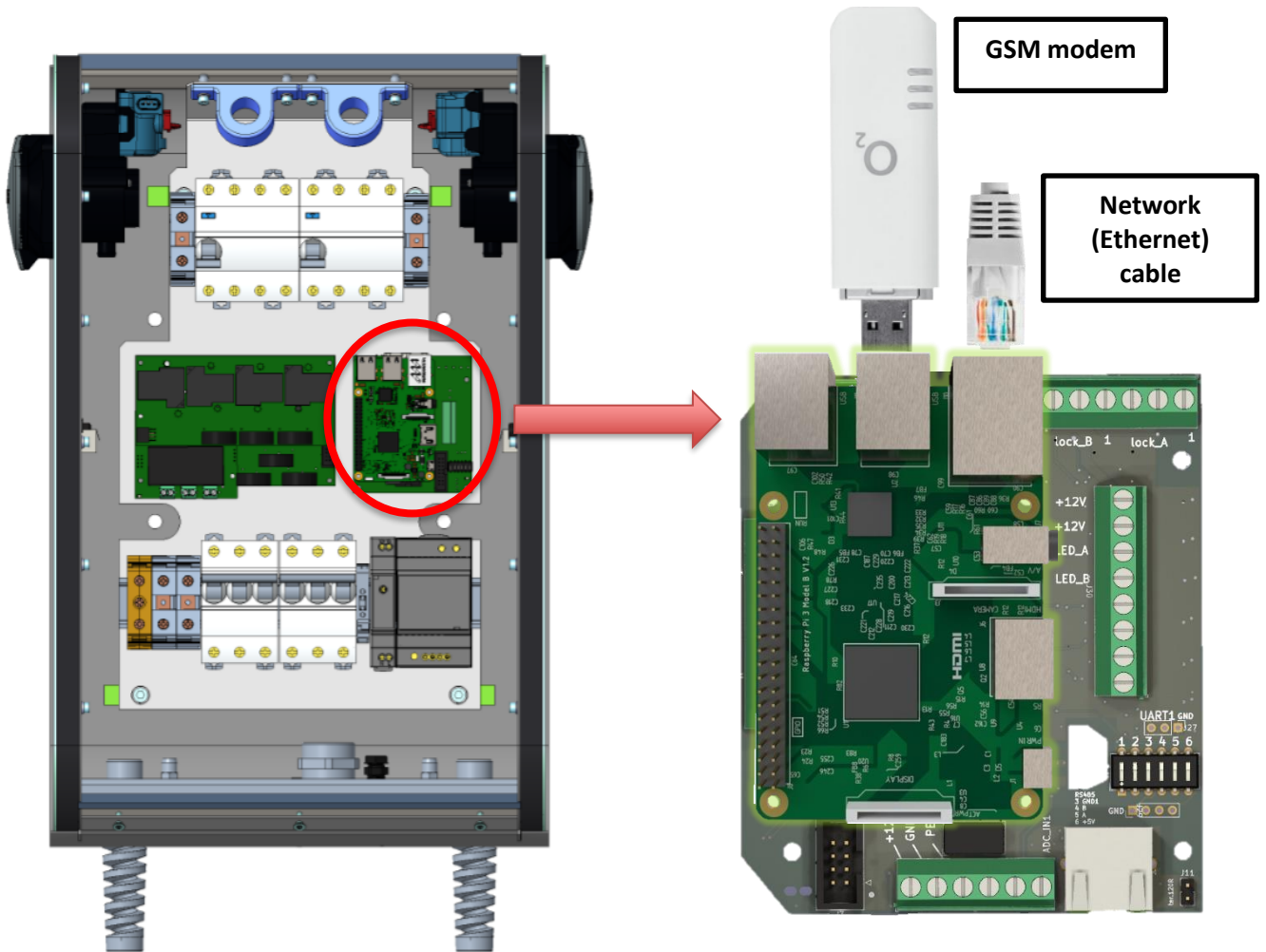
Figure 31: Connection of GSM modem / network cable

STEP 9: Checking the charging station

The station must be checked before connection; the inspection is performed when the whole set is not under tension. The inspection must be performed to confirm that the following permanently connected electric items:
- comply with safety requirements of corresponding standards;
- have been chosen and installed properly;
- have no visible damages;
- have been chosen properly with respect to their current carrying capacity and voltage drop;
- protective and neutral conductors are properly marked;
- protective conductors including conductors of protective and additional coupling are used;
- the device is accessible for the purpose of control, marking and maintenance;
- power supply wires have been suitably fixed (it is recommended to tight with torque of > 10 Nm).
- *Figure 40: Supply cable connection in TN-C network*

STEP 10: Closing the chassis

Perform Step No. 1 in reverse order and verify that the charging station works properly.

9 AC22 SETTING

The basic settings of the charging station can be made using switches (DIP-switch) located on the station's control board. Comprehensive charging station setup can be done using the ModBus RTU protocol or the OlifeEnergy mobile app. Setup using the mobile app is described in the following chapter.
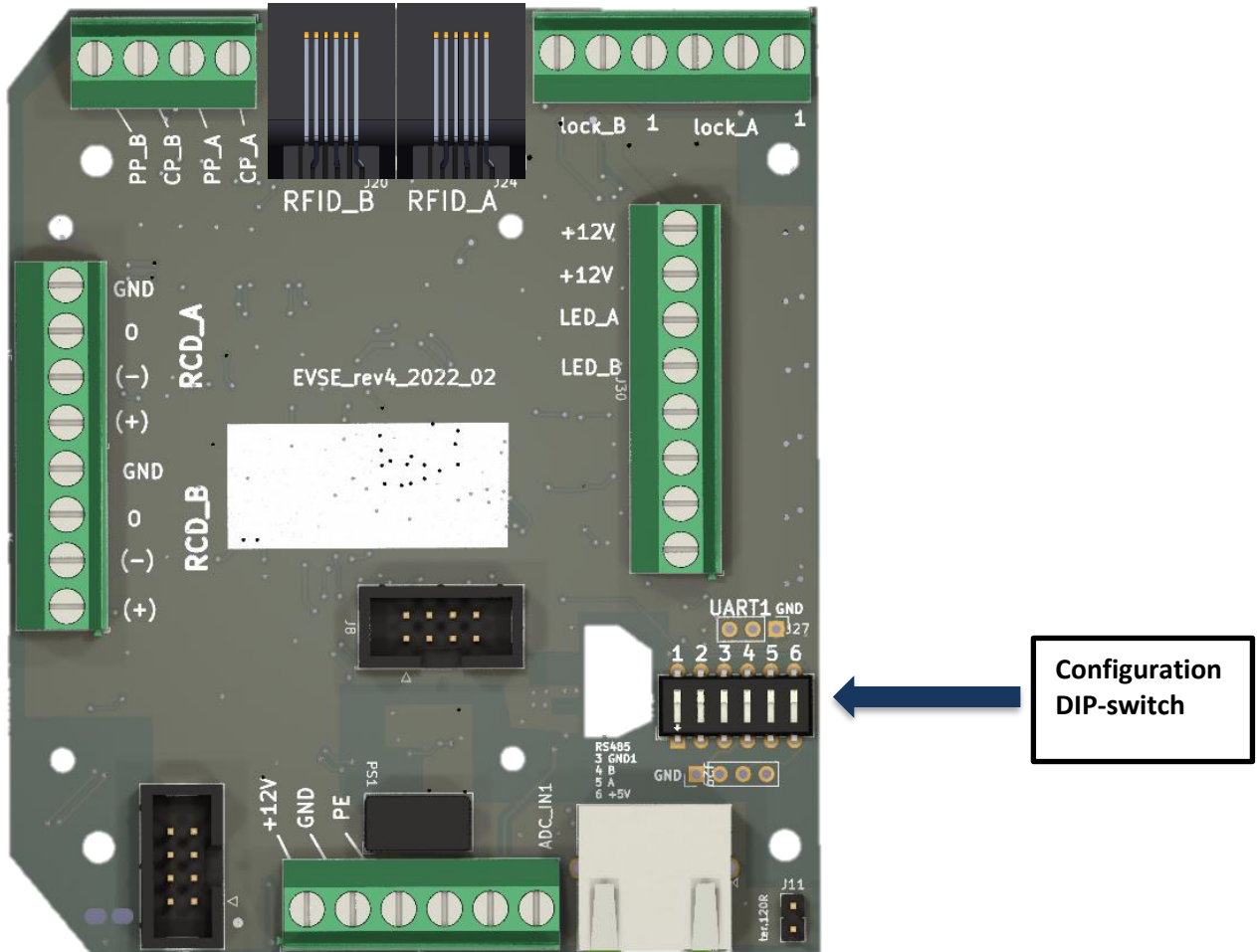
Figure 4: DIP-switch marking on the wallbox control board

ADJUSTMENT OF MAXIMUM CURRENT TAKEN BY AC22
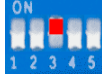
The factory default setting for maximum charging current is 32 A per connector and 63 A for the entire station. The charging current at a specific time is determined by the vehicle up to the maximum defined by the charging station. If you wish to reduce this maximum, set the switches as shown in the table. This function is useful for installations where a lower-rate circuit breaker is mounted upstream or where there are frequent electricity failures due to an undersized main circuit breaker. If charging on both connectors, the current is divided in half for each connector. If charging on one connector, the entire current is allocated to that connector until charging begins on the other connector.

Maximum current	Change-over switch 1	Change-over switch 2	Change-over switch 3	Change-over switch 4	Description
63 A	off	off	off	off	
40 A	**ON**	off	off	off	
32 A	off	**ON**	off	off	
20 A	**ON**	**ON**	off	off	

AUTOMATIC CHARGING SETUP

By default – switch 3 in ON position – the charging station will start charging immediately after the vehicle has been connected. This behaviour can be changed by setting switch 3 to OFF position. This will activate RFID authorization.

Automatic mode	Change-over switch 1	Change-over switch 2	Change-over switch 3	Change-over switch 4	Description
-	off	off	**ON**	off	

10 MOBILE APPLICATIONS

The OlifeEnergy mobile app for station control is free to download on Google Play and App Store. The mobile app communicates with the charging station via Bluetooth. This communication works over a distance of units of meters. For remote communication, management and setup, use the SMART version and the remote OCPP server or the OlifeEnergy Cloud service.
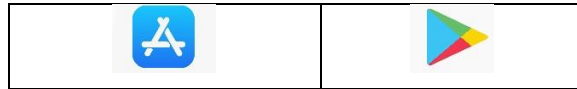
Procedure to connect to the OlifeEnergy charging station
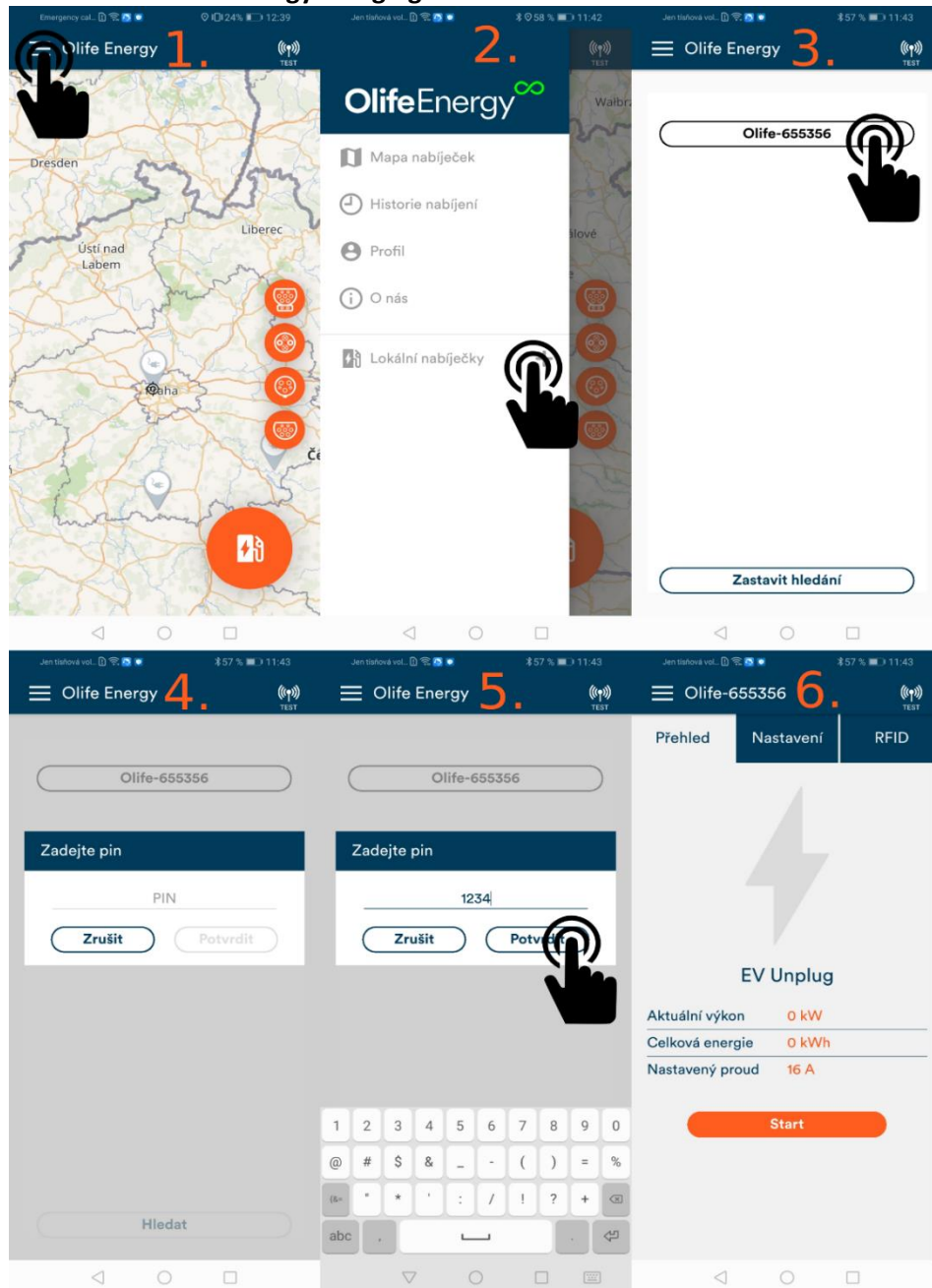
Figure5: Procedure to connect to the OlifeEnergy charging station

1) Open the left navigation bar.
2) Open the item "Local stations".
3) The app will start searching for charging stations. If a station is within range, it will appear in the list. Select the station you want.
4) After selecting a station, a dialog box will appear.
5) Enter the PIN, set by default to **1234**. **After the first connection, change your PIN using the mobile app**.
6) After successful authorisation, information and configuration cards of the charging station will be displayed.

The app displays 3 cards:

1) Overview – it displays current overview of the charging station statuses.
2) Settings – it displays configuration registers. To see what the current register means, click on the question mark icon. After clicking, a dialogue box will appear with a description of the register.
3) RFID – it is used to manage local RFID database.

11 RESET TO FACTORY SETTING

DIPSWITCH No. 4 is used to reset the charging station to factory settings.

1. Turn off the power supply to the charging station.
2. Remove the charging station cover and switch DIPSWITCH No. 4 to "ON" position.

3. Turn on the power supply to the charging station and wait for 30 seconds.
4. Turn off the power supply to the charging station again and return DIPSWITCH No.4 to "OFF" position.

5. Finished - Install the charging station cover and turn on the power supply; the charging station is now in default setting with PIN being "1234".

12 RFID

DESCRIPTION

The reader is designed to read RFID chips operating at a frequency of 13.56 MHz. The system supports communication with ISO/IEC 14443 A / MIFARE cards and transponders with no other active circuits. Indicating piezo speaker is added to the electronics.

TECHNICAL PARAMETERS

Communication interface	UART	Reading range	<50 mm
Frequency	13,56 MHz	Dimensions (mm)	64 x 40 mm
For types of chips	14443 A, MIFARE	Working current	<50 mA
Power supply	2.7 – 5.5 V	Signalling interface	Buzzer

RFID READER CARDS AND CHIPS MANAGEMENT

User authentication by RFID cards is activated by placing change-over switch 3 to OFF position, or in the mobile application. RFID card authentication is performed against an internal database located directly in the station. The RFID card and chip database is managed via the OlifeEnergy mobile application, see Chapter 10 "Mobile App".

In the SMART version, authentication of RFID records on a remote server can be activated. Thus, the station reads the card and asks the server if it can start charging. In this case, RFID cards and chips are registered on the remote server.

Adding an RFID card to the local database:
- Click on the "Add" button as shown in Figure 6.
- A dialogue window will pop up with the requirement: "Attach the card to the RFID reader located on the side of the charging station."
- When the card is attached to the reader, the station will alert you with a short beep. To add more cards, repeat the procedure.
- To exit the adding mode, click on "End Adding" button. When the dialogue window closes, the added cards will be displayed in the RFID card.
- To save them in the charging station, click on the "Save" button.

Figure6: RFID menu to add cards + a symbol on the station to which cards and chips are added

Deleting the RFID card:

- Click on the "Delete" button for the desired RFID card. To confirm the request, click on the "Save" button.
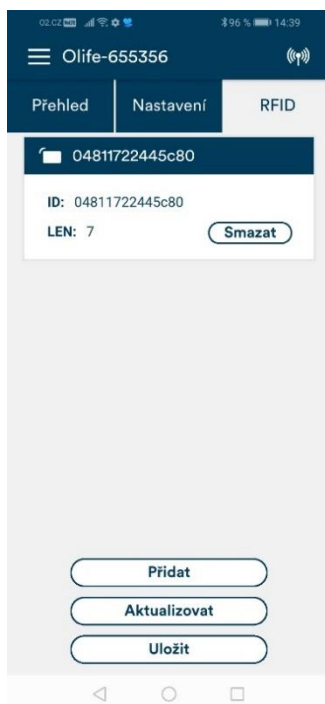
Figure7: Deleting the RFID card

13 CHARGING STATION CONTROL VIA RS485 – MODBUS RTU

The charging station can be completely controlled by digital communication over RS485 busbar with MODBUS RTU communication protocol, where the charging station is in the Slave role.

CAUTION! It is not possible to combine third party control systems via RS485 and OlifeEnergy Smartmeter, which uses RS485 for its communication with the station.

The Slave ID can be changed in the mobile application. The bus bar terminator is disconnected in the station, its connection can be done using a jumper, see Figure 8.
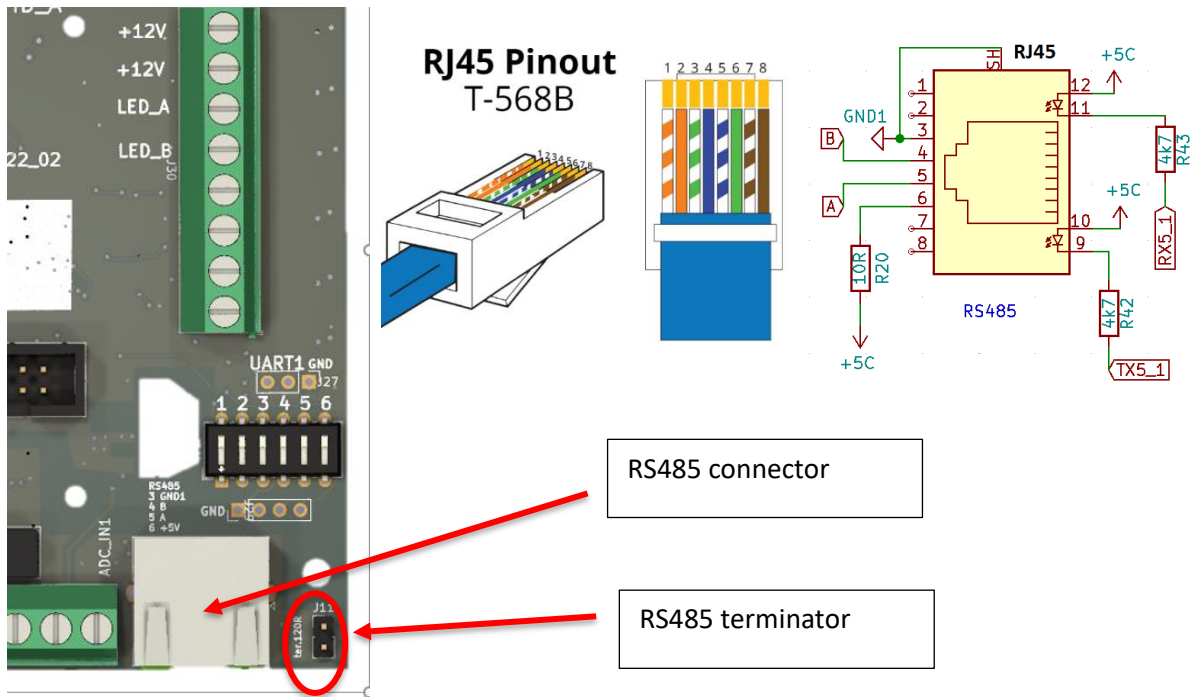
Figure 8: Connection of RS485

Register	Parameter	Description	Operation	Type	Range
Right connector					
2001	**Verify user**	**1 - enable charging, 0 - disable charging (only if register 5003 != 0)**	**R/W**	**uint16_t**	**0-65535**
2004	EV state	Charging station state	R	uint16_t	0-65535
		1 - disconnected			
		2 - connected			
		3 - user verified			
		4 - charging			
		5 - vehicle stopped charging			
		6 - current set up below 6A			
		7 - user authentication off			
		90 - Error			
2006	**current limit control**	**connector current setup**	**R/W**	**uint16_t**	**0-65535**

2007	Actual Current limit	currently valid current limit	R	uint16_t	0-65535
4006	E sum	power of running charging	R	uint32_t	0-4294967295
4013	P sum	capacity of running charging	R	uint16_t	0-65535
	Left connector				
2101	**Verify user**	**1 - enable charging, 0 - disable charging (only register 5003 != 0)**	**R/W**	**uint16_t**	**0-65535**
2104	EV state	charging station status	R	uint16_t	0-65535
2106	**current limit control**	**connector current setup**	**R/W**	**uint16_t**	**0-65535**
2107	Actual Current limit	currently valid current limit	R	uint16_t	0-65535
4106	E sum	power of running charging	R	uint32_t	0-4294967295
4113	P sum	capacity of running charging	R	uint16_t	0-65535
	both connectors				
5003	Automatic	1 - user verification not required for charging, 0 – verification required	R/W	uint16_t	0-1
5006	Max station current	maximum current collection of the entire station	R/W	uint16_t	0-63
5008	Max LED PWM	LED lighting intensity - 0 to 1,000	R/W	uint16_t	0-1000

Only function 03 – Read Multiple Registers – is allowed for reading
Function 16 – Write Multiple Registers – for writing down the function

Comprehensive description of MODBUS registers can be required from the producer.

14 CONTROL OF THE CHARGING CURRENT THROUGH ANALOGUE SIGNAL

The charging station can be controlled by an external third-party system´s analogue signal 0−10 V, or charging can be interrupted by 10−20 V digital signal.

CAUTION! The analogue input is galvanically connected to the PE protection conductor, the 0−10 V control signal must be galvanically isolated.

The control characteristic is linear and inverse. Thus, if no voltage is connected to the analogue input, the station charges with the maximum current set.

0–1 V	Maximum charging current (according to the station's maximum set)
1–9 V	Continuous, inverse, linear regulation of charging current from the maximum up to 6 A
9 V	6 A (the lowest possible charging current)
9–9.3 V	Hysteresis for switching off/on
9.3–10 V	Switched off

CAUTION! The IEC 61851-1:2017 charging standard allows a minimum charging current of 6 A per phase. Within the range from 0 to 6 A, the station will interrupt/not start charging.

According to the standard, continuous control may range between 6 and 32 A and the minimum step is 1 A; all phases may only be controlled simultaneously, so it is not possible to require a different charging current on each phase; if necessary the Wallbox can only be powered from one or two phases. Maximum input voltage for linear current control is 10 V, but for digital START/STOP control, voltage of 10 to 20 V can be used.

Connection on the charging station side:
- Connect a galvanically isolated output signal from an external device (e.g. PLC, Wattrouter, etc.) to the charging station to ADC_IN1 terminal.
- Connect the signal ground/reference to GND terminal.
- If +12 V supply is required for a galvanically isolated signal, charging station supply may be used from the +12 V terminal. CAUTION! Current collection may not exceed 50 mA.

Charging station setup:

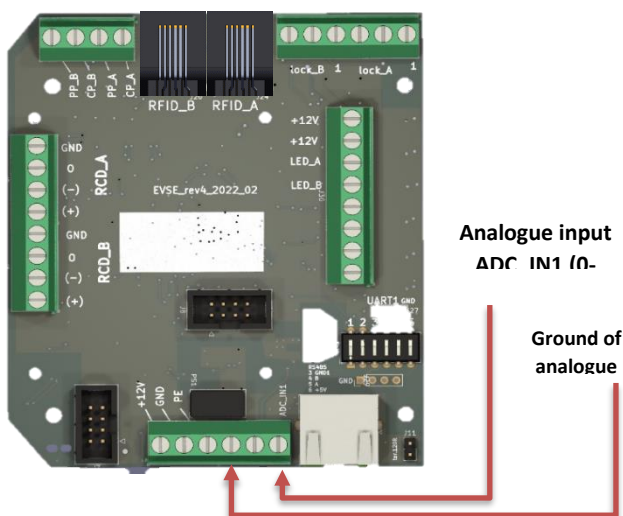The charging station does not have to be set up, as the control described above is activated by default.

Figure 9: Connection of the controlling conductor

15 HDO CONNECTION

Place the "REL" relay with a NC contact "normally closed" and a 230 V coil in the upstream-located switchboard. Feed the relay contact using a twisted or shielded two-wire cable into the charging station from the bottom side through the middle bushing. Connect one conductor to the +12 V terminal and the other to the ADC_IN1 terminal.

The relay coil can be controlled from the HDO receiver or HDO contactor by a switched phase or a switched neutral conductor. We recommend protecting the coil with a single-pole circuit breaker.

If charging is required at a time when the HDO signal is not active (high tariff), the analogue input function can be switched off via Bluetooth using the mobile application; thus also the function of charging only in HDO signal presence will be switched off.

Function description

If the "REL" relay is activated (contact closed), i.e. +12 V and ADC_IN1 are connected, the charging station disables charging. As soon as the relay disconnects the contact, the charging station will enable charging.

CAUTION! Recommended HDO connection uses the 0−10 V input, therefore it cannot be used for subsequent control afterwards.
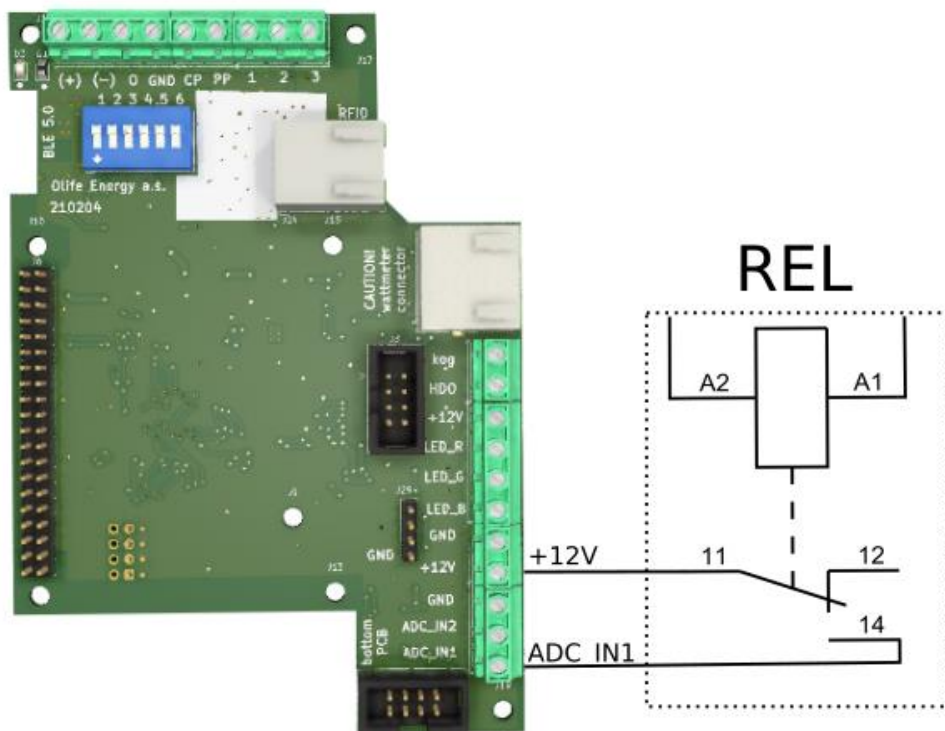

Figure 10: Example of external control connection using HDO signal controlled relay

16 CHARGING INSTRUCTIONS

If the charging station is ready for charging, insert the charging plug of the station in the vehicle. Charging will begin upon successful RFID authorization; if the station is in automatic mode, charging will begin immediately. Charging can be terminated by the vehicle or by RFID.

Attention! The charging station is intended for electric cars complying with ČSN EN 61851 standard that all modern mass-produced electric cars meet.

17 LED INDICATION DESCRIPTION

STATUS		REPEATING	ON [ms]	OFF [ms]	BREAK [ms]
STATION READY FOR OPERATION			∞		
EV CONNECTED		1x	100	200	3000
EV IS BEING CHARGED		∞	2000	1000	
EV STOPPPED CHARGING		2x	100	200	3000
CURRENT SET TO 0A		3x	100	200	3000
CONTROLLER STOPPED CHARGING		4x	100	200	3000
ERROR OF RCD PROTECTOR		5x	100	200	3000
ERROR	STATE_E_0	6x	100	200	3000
	STATE_E_3	7x	100	200	3000
	STATE_E_L12	8x	100	200	3000
	STATE_E_MIN	9x	100	200	3000
	STATE_E_MAX	10x	100	200	3000
RFID	Accepted	10x	100	100	
	Rejected	1x	0	2000	

STATUS can be observed in smartphone application Olife Energy. The status is also indicated by repeated blinking of LEDs at the side of the charger.

EV STOPPED CHARGING: this status occurs if the charging session is stopped by electric vehicles. For example EV is unlocked, charged to 100% (or any pre-set value in EV if available) or EV error

CURRENT SET TO 0A: Charging current can be set to 0A (or less then 6A) by various reasons:

1) Through RS485 interface:

>a) Olife Energy meter is connected into RS485 MODBUS interface in order to prevent local grid overload or to provide charging from photovoltaic energy only. If the Smartmeter keeps stopping charging even you think it should not, please check the settings in smartphone application, such as enabled charging from PV excess energy under insufficient sunlight conditions, HDO (ripple control) input enabled, correct values of current measured in overview tab, etc.

>b) any other 3rd party RS485 Modbus RTU controller

2) Olife Energy Cloud

3) 3rd party OCPP server

4) 0-10V analog input.

>a) Connected HDO (ripple control) relay 12V into 0-10V input

>b) 3rd party 0-10V analog control unit or 12V digital input unit

CONTROLLER STOPPED CHARGING: If the charger Authorisation method is NOT set to AUTO through the smartphone app or dip-config, the controller stops charging based on different inputs:

1) Charging was stopped by repeated RFID authorization.
2) Charging was stopped by STOP button in smartphone application
3) Charging was stopped by OlifeEnergy Cloud (for SMART/CLOUD charging stations only)
4) Charging was stopped by 3rd party OCPP server
5) Charging was stopped by RS485 input by external MODBUS RTU control unit. CAUTION: this status cannot be triggered by Olife Energy Smartmeter!

ERROR OF RCD PROTECTOR: CAUTION! This error is result of safety step triggered by current leakage sensor! It is necessary to check the cable connection of the charger, especially moisture of EV charging connector of the charger output plug / socket. It is recommended to leave that to qualified electrician. The error can be deleted by restarting the charger.

EV error: These errors can not be influenced or repaired by used. Try restarting the charger. If the error occurs please contact the Olife Energy service.

18 SCOPE OF RECOMMENDED REGULAR INSPECTION

OlifeEnergy charging station shall be subject to regular inspection performed by the operator. Visual inspection should be carried out before each use! Therefore, please check the charging station before each use. If a defect occurs, record the result of your check for later inspection by a specialist.

Recommended inspection points:

- Visual inspection of the integrity of metal parts placed on the charging station chassis. If the station is visibly damaged, there is a risk of leakage and failure of the internal electronics. It is prohibited to use the charging station with any visible damage. If the station is damaged, it

is imperative to shut down the station immediately by turning off the upstream mounted main switch or the appropriate circuit breaker.

- Visual inspection of the condition of charging connectors and cables. If a charging connector or cable is visibly damaged, its further use is not permitted. It is imperative to shut down the station immediately by turning off the upstream mounted main switch or appropriate circuit breaker and it must be switched off until the problem has been remedied.
- Visual inspection of the charging connector pins for oxidation. If any corrosion or oxidation is visible, the station must be shut down by turning off the upstream mounted main switch or the appropriate circuit breaker, and it must be switched off until the problem has been remedied.
- Visual inspection of station lighting. If the LED indication on the station shows problems (non-functioning, partial non-functioning), the station should be shut down by turning off the upstream mounted main switch or the appropriate circuit breaker and it must be switched off until the problem has been remedied.
- Always after six consecutive calendar months, equipment of Hager current protectors shall be checked (CDA440D, 4P, 40A, 30mA, 6kA, type: A) using TEST button. Both current protectors are subject to such inspection.

Attention! Charging station internal electronics is not subject to the scope of regular inspection. Any intervention by persons without the appropriate electrical qualifications is prohibited.

19 FAULT DETECTION AND TROUBLESHOOTING

Danger!
Danger of injury and damage to property through improper maintenance and repair! Charging station may only be maintained and repaired by properly qualified service technician.

Information about faults occurring during the charging station operation, their possible causes and troubleshooting are mentioned in the table below.

All the works on the charging station (assembly, maintenance, repairs, etc.) may be carried out solely by service workers.

Failure	Possible cause	Troubleshooting
The charging station does not light up	- Failure of the main circuit breaker - Connectivity failure (if SmartCharge module is installed) - Internal fault of the station FW	Disconnect the relevant circuit breaker marked by the installation company in the distribution board. Wait for 20 s and reconnect the circuit breaker.
The charging station does not charge	- Current protector equipment - Failure of the charging station input circuit breakers - Cable failure - Authorisation	Contact the service technician of your charging station.
The charging station is flashing intensely.	- Error status of the station	Disconnect the relevant circuit breaker marked by the installation company in the distribution board. Wait for 20 s and reconnect the circuit breaker. If the error reoccurs, contact the service technician of your charging station.

20 OCPP

The OCPP is available for CLOUD and SMART versions of Olife Energy Wallbox. The BASE version of the products does not support OCPP.

Description
The charging station shall be configured via a web interface in the station. The following modes can be set: charging (automatic/authorized), web interfaces (Ethernet, Wi-Fi, GSM modem) and connection to a remote server (Olife-Energy Cloud, OCPP).

Procedure
1. Connect a network cable (Ethernet) in the station. In the initial setting, the station expects being assigned IP address from DHCP server.
2. Open the web server on your device and connect to the station IP address (*http://charger_ip*).
3. Log in the web interface with username: *owner* and password: *owner*.

Now you can start adjusting the station setting. Once changed, the new setting must be saved. To see the changes, the station must be restarted.

21 INFORMATION FOR USERS ON THE DISPOSAL OF ELECTRICAL AND ELECTRONIC DEVICES

HOUSEHOLDS
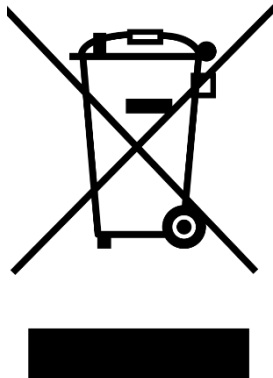
The symbol indicated on the product or in the accompanying documentation means that used electrical or electronic products must not be disposed of with municipal waste. For correct disposal of the product, please take it to designated collection points where it will be accepted free of charge.

Proper disposal of the charging station helps preserving valuable natural resources, as well as preventing potential negative environmental and health impacts that could result from improper waste disposal. For more details, contact your local authority or the nearest collection point.

Incorrect disposal of the charging station may be subject to fines pursuant to national regulations.

USE IN COMPANIES

To ensure proper disposal of electrical and electronic equipment, please ask your dealer or supplier for detailed information.

22 PRODUCER CONTACT DETAILS

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