



# User manual



## LUMINA

Premium charger for electric vehicles.

# Dear user

Congratulations on your purchase of the Enelion charger and thank you for your trust.

Please read this manual before installation or prior to the station being commissioned.

**The manual may change as the product develops.**

**The information provided may not be correct. All rights reserved.**

**Revision: V 3.9 rev 2**

**Number of pages: 38**

**Release date: June 10, 2022**

Up-to-date manuals for users and installers always available at:

**[enelion.com/en/help](https://enelion.com/en/help)**

# Table of content

## Important information

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### Use of the charging station

Preparation for use	7
Charging	7
Completion of charging	8
Emergency stop	8
Procedure in the event of irregularities, faults and fire	8
General rules for safe operation	9
Health and Safety	9
Disposal and environmental protection	10

---

### Device configuration

Available variants	11
Initiating the device	12
Changing the configuration	12
LED bar	13

---

### Configuration panel

Features	14
Communication	14
Access to the configuration panel	15
Navigation in the configuration panel	16
Dashboard	16
Network	16
Overview	16
WiFi	17
GSM	17
Hotspot	18
OCCP	18
Connection	18
Configuration keys	19

# Table of content

Charger	19
Overview	19
Mains	20
Authorization	21
Accessories	21
Charging network	22
Overview	22
Settings	23
System	23
Overview	23
Update	24
Users	24
Time	24
Logs	25
Reboot	25
Technical data	25

---

## Maintenance

Cleaning	26
----------	----

---

## Operation

Operation and maintenance of charging stations	27
Technical tests	27
Continuity measurement of the protective conductors	28
Effectiveness of electric shock protection measurement	28

# Table of content

Testing insulation resistance	28
Testing the insulation resistance of the electrical installation supplying power to the charging station	28
Testing the insulation resistance of the charging station with a charging module	29
Adapter	30
Measurement of the effectiveness of protection against electric shock	31
Testing the operation of residual current devices	31
Functional tests of the device – methods of execution	32

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## Technical description

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## Troubleshooting

---

Alerts	36
Frequently Asked Questions	36

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# Important information

**Please read this manual before attempting to install or commission the charger.**

## Safety instructions for installation

- Do not carry out outdoor installation during precipitation or strong winds if there is a risk that water or debris may enter the device.
  - Carry out all operations described in this manual after ensuring that there is no voltage in the power cord.
  - This product may only be installed, repaired or serviced by an authorised electrician.
  - All local, regional and national electrical installation regulations must be observed.
  - Installation must not be carried out near explosive atmospheres or in areas where there is a risk of running water.
  - Risk to life from high electrical voltages.
  - The product must be permanently installed in its final location.
  - The product must be installed on a wall or structure with sufficient load bearing capacity.
  - The clamps on the rear panel are live when the power circuit is closed and must never come into direct contact with anything other than the Lumina plug-in electronics.
  - Lumina's network SSID and password are required for installation and configuration; they can be found on the back of the charging head.
- 
- ## Safety instructions for use
- Never use or touch the device if it is damaged or not functioning properly.
  - Always perform the recommended maintenance, installation and any repair work by an authorised service centre and in accordance with local requirements.
  - Do not use water to extinguish a fire.
  - Never clean the station with high pressure or running water.
  - Do not immerse the station in water or other liquids.
  - If the light bar on the device lights up red, there is an error.
  - Never touch the contacts of the type 2 socket/plug and never insert foreign objects into it.
  - Never use the charging cable if it is damaged or if the connector is wet or dirty.
  - Do not use extension cables or adapters in connection with the station.
  - The charging cable can only be disconnected from the station by pulling on the plug handle, not on the cable.
  - Make sure that the charging cable does not cause a tripping or running over hazard.
  - Even though the station is designed to withstand normal weather conditions, it is recommended to protect it from direct sunlight or exposure to extreme weather conditions.
  - Do not use the station near strong electromagnetic fields or in the immediate vicinity of radio transmitters.

# Use of the charging station

## 01 Preparation for use

Before the first use of the charger, make sure that the charger has been correctly installed and poses no danger to the user. More information may be found in the assembly manual available at

## 02 Charging

By default the charger is configured as Freecharge configuration, which means it starts charging as soon as a car is connected. To start charging:

1. Connect the cable to the charger<sup>1</sup>,
2. Connect the cable to the car,
3. Make sure the lock is closed properly<sup>2</sup> and charging process has started.

When RFID tag authorization is enabled, place the user tag on the RFID reader located in the top cover of the charger to perform RFID tag authorization. The use of a correct tag shall be signaled with the diodes of the light bar. After the card has been accepted perform steps described above.

After performing these steps, the charger switches to charging status, communicating the

<sup>1</sup>Applicable to devices with a socket.

<sup>2</sup>Not applicable to devices with Freecharge configuration or devices with cable.

fact with the light bar and showing the status on the display. While charging, the light bar flashes from the center towards the edge. See chapter **LED interface** for more information. When configuring the station as Freecharge, it is possible to disable the locking of the plug in the station before charging. This solution is used at times in public chargers and it allows one to stop charging without the need to use an RFID card or to unplug the vehicle. The plug design ensures that the communication contacts are disconnected first, interrupting the charging process. Next, the power contacts are disconnected, with the voltage already disconnected, and finally the protective conductor contact is disconnected. With such configuration of the station, checking the correct operation of the mechanical interlock should be skipped.

## 03 Completion of charging

To complete the charging process, disconnect the charging cable from the car. This unlocks the cable lock on the charger and brings the charger to standby. In the case of RFID configuration, placing the appropriate card on the reader again also terminates charging and unlocks the lock. See chapter **3 Device configuration** for more information.



For online chargers, you may need to use the appropriate card to unlock the cable lock on the charger.

## 04 Emergency stop

The charging process can be interrupted by using the RFID card again or removing the plug from the vehicle. While charging, when the lock in the station is closed, it is not possible to pull out the plug from the socket. When configuring the station in Freecharge mode with the lock disabled, it is possible to interrupt the charging process by removing the plug from the charging station.

## 05 Procedure in the event of irregularities, faults and fire.

When a defect, damage or irregularity occurs, the use of the station should be stopped immediately and the situation should be reported to the station operator. In the event of a fire on the charging station, disconnect the charging station's power supply as soon as possible, then disconnect and, if possible, move the vehicle to a safe distance. Call the relevant services. Fire extinguishing should be carried out with tools intended for electrical devices up to 1000V – a carbon dioxide (CO<sub>2</sub>) or powder extinguisher or sand.



# 06

## General rules for safe operation

The device should be used in accordance with the recommendations included in the manufacturer's documentation and the principles of common sense. Electric vehicles may be charged only with the use of properly operating stations, charging cables and the vehicle.



It is forbidden to use extension cords, adapters or branch-joints.

After charging is complete, the charging cables must be put back to its designated storage location. Avoid driving over any cables or plugs while maneuvering the vehicle at all cost.

Do not use plugs that are clearly dirty or wet.

The vehicle must be parked so that the charging cable is not stretched excessively, since this may cause the user or a bystander to trip over and fall.



It is forbidden to open the station (especially when live), to place any objects in plugs and sockets.

[Use of the charging station](#)



The device meets the IP 54 standard.

Due to the IP 54 class of the device, it is forbidden to wash the charger with pressure washers, garden hoses, a shower or any other stream of water.



Incorrect use may result in damage to property, fire, and in extreme cases, loss of health or life as a result of an electric shock.

# 07

## Health and Safety

The device must be used in accordance with the health and safety requirements related to electrical devices. The device installation manual requires the installation of a residual current device (RCD) in the switchgear. The device is a form of anti-shock and fire protection.

Servicing may be performed only by authorized persons.

# 08

## Disposal and environmental protection

Electrical and electronic waste must not be disposed of together with normal household waste. According to the WEEE directive in force in the EU, separate methods of disposal must be used for electrical and electronic waste.

In accordance with the provisions on waste electrical and electronic equipment, it is forbidden to put waste equipment (marked with the symbol of a crossed out bin) with other waste. The user who intends to get rid of such product is obliged to return the above-mentioned waste to the equipment waste collection point.

The collection points are run by wholesalers and retailers of such equipment and by communal organizational units operating in the field of waste collection, to name a few.

# Device configuration

## 01 Available variants

The system of configuring the settings of Enelion Lumina charger is done in the configuration panel.

Available variants resulting from the configuration of the device are presented below:

### ► **Type of power system**

- **One-phase power system** – only the first phase connected to the device will be used for charging. The power range may be set between 1,4 kW to 7,4 kW.
- **Three-phase power system** – three phases will be used for charging. The power range may be set between 4,1 kW to 22 kW.

- **The charger power** – Available power capacity: 1,4 kW to 22 kW.

This is set depending on the type of power system of the user. Allows the power used for charging the car to be limited in order to protect the mains against overload.

### ► **Authorizing methods**

- **Freecharge** – User authorization is not required: connecting the car will initiate the charging process
- **RFID** – The charging process will initiate only after applying the correct RFID card. In case of offline chargers only the card dedicated to a specific charger will be accepted. Authorization in online chargers requires the user to be

accepted by the administrating system.

### ► Deauthorizing methods

The above options are applicable only with offline chargers. Deauthorizing the user in an online charger must be processed by the administrating system.

- **Only with an initiating card** – Ending the charging process is possible only after applying the same card which was used to initiate the charging
- **With each card issued for the charger** – This configuration is used in offline chargers. It allows to finish the charging process with the use of any card which was issued for a specific charger.

### ► Current limits

Given in amps. Limits current available for a single phase in the power connection. It is the border value of power which will not be exceeded by the total power of all chargers operating at the same time.

### ► Phase interlacing

The sequence of connecting phases to the charger. There are three possible connection sequences: L1, L2, L3, L2, L3, L1 and L3, L1, L2. It allows for the power of the connection in a network of chargers to be used more effectively.

## 02 Initiating the device

Once the charger is switched on for the first time it will use the default configuration in which it only accepts offline cards that can be added manually in the Charger -> Authorization section in the configuration panel.

To configure the charger you need to:

1. Install the charger according to the fitting instruction available on [enelion.com/en/help](http://enelion.com/en/help)
2. Turn power supply on
3. Connect with secured AP of the station
4. Log in to the configuration panel on the Admin account
5. Set required parameters

Above should be performed only by authorized personnel. configuration panel.

## 03 Changing the configuration

When needed it is possible to change the configuration of the charge which was already initialized.

In order to change the configuration just perform the same procedure as the first configuration using configuration panel. This should be done only by authorised personnel on the Admin account.

# 04

## LED bar

The Lumina charging station has an LED interface that provides the user with basic information:



Status	Light type
Availability	Green flashing
Charging (energy transfer in progress)	Blue flashing from inside towards the edge
Charging (no energy transfer)	Blue flashing
Warning/minor error (the charger will attempt to return to its previous state)	Yellow flashing
Error	Red flashing
Fatal error	Steady red
Authorisation	
User acceptance	Running from left to right in green
User rejection	Running from left to right in red
Authorisation pending	White dot moving from left to right

**The interface provides only basic operational information, detailed information can be read from the configuration panel.**

# Configuration panel



Enelion Lumina App available on



GET IT ON  
Google Play



DOWNLOAD ON THE  
App Store

## 01

## Features

Enelion charger is equipped with connectivity features that enable:

Preview and basic management of charging point:

- Reading the status of the charging point, including its meter, charging power, available power
- Socket lock management
- Starting, stopping and scheduling charging

Internet connectivity:

- WiFi
- GSM LTE

Connectivity with Management Systems compliant with OCPP 1.6 (JSON)

- User authorization and billing
- Monitoring the status of chargers and charging power
- Reservations
- Charging power profiles
- Management of access to the charging point
- Remote diagnostics and software update

## 02

## Communication

Lumina charger allows you to connect to the configuration panel using its WiFi hotspot.

In order to connect to the WiFi hotspot, use

a computer or your smartphone to scan the available WiFi networks. The broadcast network is named “Enlion-XXXX-XXXX” where X signs stand for the charger’s serial number. Password for this network can be found on the identification sticker placed on the charger’s head.

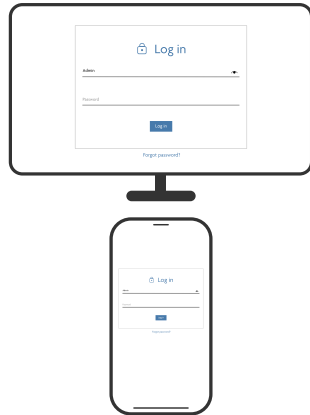
## 02.1 Access to the configuration panel

After connecting to the device’s network, it is possible to access the configuration panel via a web browser. Enter the address **http://192.168.8.8** in the address bar and log in.



There are accounts for the **user** (user) and **administrator** (admin) in the configuration panel. The default password for each of these users is the same as the username and can be changed in the settings.

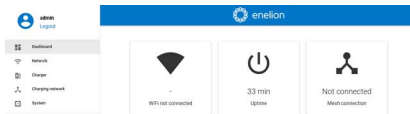
In case a password to the configuration panel is lost it is possible to reset the device to factory settings. To do so please choose **Forgot password?** link and confirm the choice.



Log in page of the configuration panel.

# 03 Navigation in the configuration panel

The interface of the configuration panel consists of an upper bar with the Enelion logo, common to all subpages, a side menu with the name of the logged in user and access to individual subpages, and the proper content of a given subpage.



Dashboard site of the configuration panel.

The interface is responsive, which means it adapts to the different screen sizes of the devices on which it is used. On small screens, the side menu is hidden, and to eject it, touch the dedicated button.



Mobile version of the Dashboard site.

[Configuration panel](#)

# 04 Dashboard

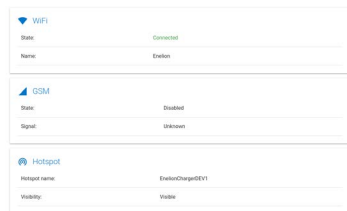
The Dashboard tab contains basic information about the overall status of the Bridge and the charging network and presents them in the form of tiles. Depending on the situation, not all tiles will be visible. The available tiles are:

- WiFi connection status
- GSM connection status
- Mesh communication status
- Device operation time from startup (uptime)
- Active alerts

# 05 Network

## 05.1 Overview

View the status of all available network interfaces. Clicking on any of them will take you to the corresponding subpage.



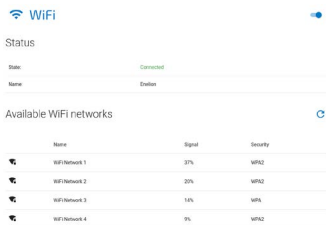
Overview section of the Network tab.



# 05.2

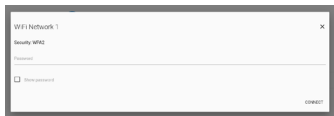
## WiFi

Enelion Bridge enables WiFi connectivity in the 802.11 b / g / n, 2.4 GHz standard. The WiFi subpage allows you to manage the Bridge's connection to the WiFi network. The switch on the right side of the subpage header can disable the WiFi interface, and the Status section shows detailed information about the WiFi connection.



WiFi section of the Network tab.

The **Available WiFi networks** section presents a list of WiFi networks detected by the Bridge module in its vicinity, along with information about the signal level and type of security. Clicking the button with the refresh icon on the right side of the section header will rescan the surroundings for WiFi networks. Clicking on any of them will open a window that allows you to enter the password (in the case of secured networks) and save the settings in order to connect to the network.



View of connecting to the WiFi network.

Configuration panel

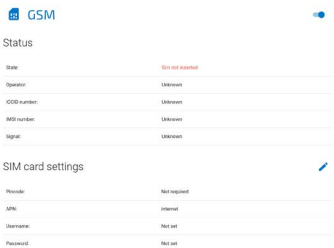
# 05.3

## GSM

Enelion Bridge is equipped with LTE cat 4 module. To connect the module with GSM internet please, before powering the charging station on, make sure that the SIM card is properly inserted in the SIM slot.

After powering the station on please go to the GSM section in the configuration and turn the GSM module on with the switch found in top-right corner. After a short moment you will see the SIM card state. If the PIN code is not necessary and the SIM card is activated and in GSM network coverage, then the GSM section will be filled with SIM card and network details, and State field will show the **Ready** text.

To type a PIN code in and configure a GSM connection please click a pencil icon found in the right side of **SIM card settings** section. The configuration window will open. After typing the configuration in please save the changes using a **Save** button.



GSM section of the Network tab

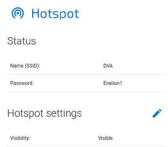
To change configuration please choose a pencil icon. A configuration window will open. After typing in the chosen configuration please click a **Save** button.



GSM configuration window.

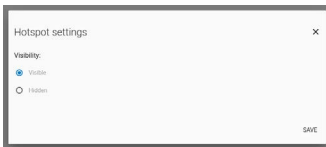
## 05.4 Hotspot

The hotspot section shows the status of the emitted WiFi network and its settings.



Hotspot section of the Network tab.

Since Hotspot is the only method to access the charger's configuration, its settings only include the possibility to hide the network, not to disable it.



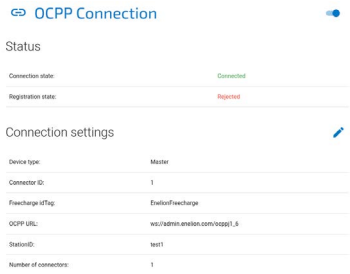
Hotspot settings.

The **Charger** section allows for configuring charging related settings.

# 06 OCPP

## 06.1 Connection

Lumina supports OCPP 1.6 over JSON. To connect to OCPP backend please use the toggle on the right of "OCPP Connection" header. The "Status" and "Connection settings" fields will become active and you will be able to see current connection status along with registration state.



To set OCPP url and Station ID click the pencil icon on the right of "Connection settings." You will see a modal window with OCPP settings. In charging networks consisting of multiple chargers one of them needs to be a Master device and the rest of them must be set as Slaves. The Master device will connect all the chargers with the OCPP backend. There can only

be one Master device in the network. If the device you are configuring is a Master type, choose Master as device type and fill other data, including OCPP URL, Station ID and the number of connectors in the network. When configuring multiple chargers in single charging network you need to assign different Connector IDs to each of them. Freecharge idTag is the tag used to OCPP authorization when Freecharge mode is enabled and RFID tag is not used.

Connection settings

Device type:

Master  
This device will connect directly to the OCPP backend; Internet access is required.

Slave  
This device will connect to OCPP via master device. Communication with the master device is required.

Connector ID:

1

Freecharge IDTag

EnelionFreecharge

OCPP URL:

wps://admin.enelion.com/occpp1.6

Station ID:

test1

Number of connectors:

1

After Connection settings form is filled, press "Save" button. The charger should connect to the OCPP backend.

## 06.2 Configuration keys

The Configuration keys subpage allows you to check and edit the values of configuration keys defined in the OCPP 1.6 specification. Using the pencil icon, you will open the window

for editing the value of a given configuration key. For read-only keys it is not possible to change their value. **WARNING:** Changing the value of these keys can change the behavior of the charging stations undesirably. Only use this feature if you know what you are doing.

### Configuration keys

This list contains all configuration keys and their values set in the charger. If the key is changeable you can change it here with a pencil button or using ChangeConfiguration request from your OCPP server.

Key	Value	Edit
AllowOfflineTuForUnknownId	false	
AuthorizationCacheEnabled	false	
AuthorizeRemoteTxRequests	true	
ClockAlignedStartInterval	1800	
ConnectionTimeOut	30	
ConnectorPhaseRotation	[1, RCT]	
ConnectorPhaseRotationMaxLength	50	
GetConfigurationMaxKeys	50	
HeartbeatInterval	200	

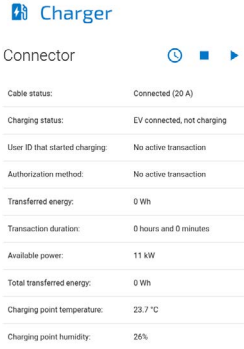
## 07 Charger

The **Charger** section allows for configuring charger related settings.

### 07.1 Overview

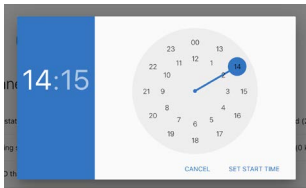
In the Overview section, we can check information about the connector status, schedule, start or stop charging.

In the Overview section, we can check information about the connector status, schedule, start or stop charging.



Overview section of the Charger tab.

To Schedule charging click "Schedule" icon on the right of "Connector" header. A modal will be opened in which we can set the time after which charging should start. After clicking "Set start time" next modal will allow to set stop time or choose "Don't stop" option.



# 07.2

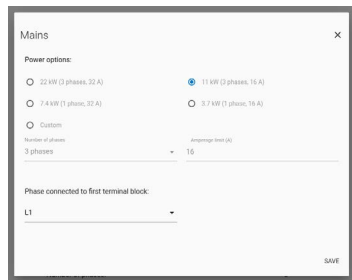
## Mains

In the Mains section, we can check Mains status and settings like power limit or phase sequence.



Mains section of the Charger tab.

To change power limit click an Edit icon. A settings modal will show up in which we can choose predefined power limit options or choose our own depending on number of phases and chosen maximum current limit.

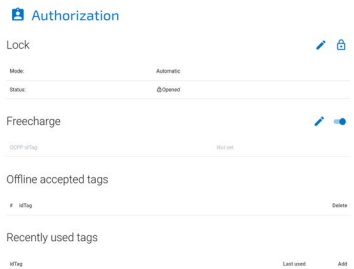


Mains settings.

Configuration panel

## 07.3 Authorization

Authorization section allows us to configure charger's lock, enable Freecharge feature and set tags that should be accepted offline.



Authorization section of the Charger tab.

To open or close the lock simply click the Lock icon. To set specific lock mode click the Edit icon and choose preferred lock mode.

Possible lock modes are explained in the table below:

Lock state	Description
Unlocked	Lock is open
Locked	Lock is closed
Unsupported	The charger does not have or does not allow the use of a socket lock

Possible lock status.

[Configuration panel](#)

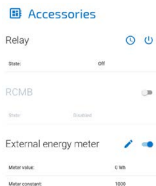
Enabling Freecharge option results in charger not requiring any RFID tag to start charging. Just connect a car and charging will start immediately. If we want to use Freecharge mode with OCPP charging management systems, we can choose what idTag is to be used for authorization. To change it click Edit icon and choose preferred idTag.

To see a list of recently used tags scroll to the bottom of the webpage. We will see tags numbers, date of last usage and an ability to add the tag to Offline accepted tags list. If we want to use specified tags for offline authorization, we can fill in this list according to our preferences. The list is limited to 5 tags. More advanced authorization and task management is available with OCPP charger management systems.

## 07.4 Accessories

Accessories section allows us to manage accessories supported by the station, which include: schuko socket relay, RCMB and External Energy Meter (MID).

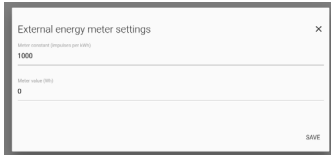
We can turn schuko socket relay on or off, as well as delay switching it off until a specific time.



Accessories section of the Charger tab.

If RCMB module is installed in the charger, we can enable it by a switch on the right. We can also check RCMB status under it.

To use an external energy meter, we need to enable it. If we use different than default meter constant or change displayed meter value, we can set it up in settings, by clicking an Edit icon.



External energy meter settings.

# 08 Charging network

The **Charging network** section allows for managing the network of Enelion devices connected locally to exchange charging, ocpp and maintenance related data.

## 08.1 Overview

In the Overview section, we can check network status and connection details, as well as the network topology.

### Charging network

Status	
Connection status:	Network host
Number of connected devices:	1
Signal:	This device is not
Load:	1

Overview section of the Charging network tab.

[Configuration panel](#)

# 08.2 Settings

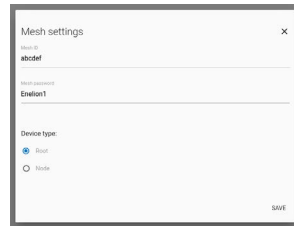
In charging network settings we can set and change wireless mesh settings. All chargers in a network must use the same mesh ID and mesh password. Bear in mind that there must be one and only one root device in the network.

### Connection settings



Mesh connection settings section

To change Wireless mesh settings click Edit icon and fill in fields with preferred configuration. Finally click Save and wait for the devices to connect with each other. You can see the network topology in an Overview section.



Mesh connection settings section

# 09

## System

The **System** section allows for managing the Bridge module settings.

### 09.1

#### Overview

In the Overview section, we can check information about the Lumina head and Backplate hardware details.

#### System overview

##### Charger

Serial Number:	DVA
Model number:	EmberCharger3.0
Production date:	2022-03-02
Connector type:	Socket
Multi-in lock:	Yes
Software version:	1
Uptime:	14 min

##### Backplate

Serial Number:	BackplateDVA
Model number:	EmberBackplate
Production date:	2021-10-18

Overview section of the System tab.

# 09.2

## Update

The **Update** section allows you to update the charging station software using an update file. To update, after selecting the file with the gray button, click the Submit button. The Bridge module will start the update process, and the configuration panel will count down for about 3 minutes and then restart with the new software version.

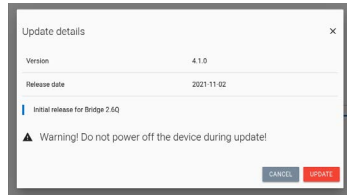
#### Update

Update From a file

Update section of the System tab.

After file upload and verification the Bridge module will present a window with update details to confirm the choice.



An example of update details

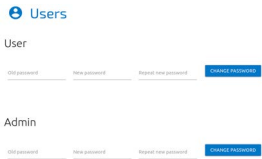
The Bridge module will start an update. The process should not last longer than 3 minutes. After the update the configuration panel will reload with a new firmware. In case the update is performed through the device's WiFi hotspot, you might need to connect to it again.

# 09.3

## Users

The configuration panel has two user accounts: **user** and **admin**.

The tabs that the user does not have access to are: OCPP and Update. Other functions to which the user has limited rights are: viewing logs and changing the administrator password.



Users section of the System tab.

The **Users** subpage allows you to change the users' password. In order to change the password of a given user, enter his previous password in the corresponding fields and enter the new password twice, and then confirm the change with the Change password button.

# 09.4

## Time

The Bridge module uses both the appropriate OCPP and NTP time server commands for time synchronization.

The **Time** tab allows you to check the current time used by the Bridge module and synchronize it with the time of the device from which you access the configuration panel.

## Time

Current time

Current charge time: Mon, 08 Nov 2021 11:32:54 GMT

Current session time: Mon, 08 Nov 2021 11:32:54 GMT

Download diagnostics

Reboot section of the System tab.

# 09.5

## Logs

The list of events that occurred in the Bridge module is available on the Logs subpage. Depending on whether we are interested in logs from the system or OCPP communication and inside the charging network, we can choose the appropriate category from the list signed **Displayed logs type**. The event list only refreshes when it is scrolled to the recent events view.

## Logs



Logs section of the System tab.

The **Download diagnostics** button allows you to download a diagnostic file to the disk, which, in case of possible problems with the Bridge module, will help the Enlon technical support diagnose their causes.



# 09.6

## Reboot

The **Reboot** button allows you to restart the Bridge module. After two minutes, the configuration panel will display the Dashboard section.



Reboot section of the System tab.

# 10

## Technical data

Technical data	
WiFi	2.4 GHz, 802.11 bgn
GSM modem	LTE Cat 4, Max. 150 Mbps (DL), Max. 50 Mbps (UL)
OCPP version	OCPP 1.6 JSON over websocket
Network ports used	TCP 20 i 21 - FTP protocol used for downloading firmware updates and uploading diagnostics data TCP 80 i 8080 - OCPP connection TCP 443 - Secured OCPP connection TCP i UDP 53 - DNS protocol UDP 123 - NTP protocol
Number of charging points supported in a network	up to 100

# Maintenance

The device is designed to operate in temperatures from  $-30^{\circ}\text{C}$  to  $55^{\circ}\text{C}$ . The manufacturer does not guarantee the proper functioning of the charging station in temperatures outside the specified range. Chargers that are damaged because of exposure to temperatures below  $-30^{\circ}\text{C}$  or above  $55^{\circ}\text{C}$  are not covered under the warranty. In case it is necessary to open the device, make sure that it is disconnected from the power source. With the device installed outdoors, make sure that there is no precipitation or strong wind.



It is not possible to open the head, any attempts may void the warranty. The backplate may only be opened by a qualified and authorized person.

## 01

## Cleaning

The correct way to clean the charger is to wipe the housing with a microfiber cloth using a cleaning agent dedicated to anodized aluminum. Plastic elements should be cleaned with a microfiber cloth using a cleaning agent dedicated to cleaning windowpanes. Other cleaning methods (e.g. wire brush) may lead to the damage of the device housing. Damage resulting from improper cleaning of the device does not constitute grounds for warranty claims



The device meets the IP 54 standard. Therefore, it is forbidden to wash the charger with pressure washers, garden hoses, shower or any other water stream sources

# Operation

## 01 Operation and maintenance of charging stations

Service inspection is performed once a year.

Mechanical elements such as a socket, charging cable, plug lock, require only a superficial inspection. Solid/durable components are not expected to wear out and to require replacement during the lifetime of station. During the visual inspection, one should pay attention to potential corrosion sources, traces of water, precipitated salts or other symptoms that may indicate deterioration of the station's condition.

Service work may only be performed when the voltage is turned off.

## 02 Technical tests

The charging station should be subject to a full electrical test at least every 5 years. The proper operation of the residual current device should be tested every year.

Tests checking the efficiency of the station, electric shock protection, etc. should be performed in accordance with the standards and regulations currently in force. Tests may only be performed by authorized personnel.

Below are some recommendations for the performance of the most important tests.

## 02.1 Continuity measurement of the protective conductors

The measurement should be made between the main potential equalization point and PE contact (wire input on the backplate) in the charging socket, or in the case of a cable station charger, in the plug.

The measurement should be made according to the PN-EN 61667-4:2007 standard.

The open circuit test voltage should be between 4 and 24 V (AC or DC). Continuity measurement should be performed with a current greater or equal to 200 mA. The required accuracy of the measurement should be better than 30%. The maximum acceptable resistance is  $3\Omega$ .

## 02.2 Effectiveness of electric shock protection measurement

The measurement should be made at the charging station's connection on the backplate.

The measurement should be made according to the PNHD 60364-6:2016-07, PN-HD 60364-4-41:2017 standards, for each powering phases of the charging point.

The test should be carried out using a meter which enables making an operation in the circuits with an RC switch.

Possibly: The measuring tool can be able to make the measurement in a circuit which contains the residual current device without it's tripping. It should be checked if the short-circuit current at the measurement site will be sufficient for the operation of the over-current protection in the required time. Use the most favorable result to access the effectiveness of protection.

The condition must be met:

$$Z_s I_a \leq U_0 \text{ for } t \leq 0,4s$$

$Z_s$  - short-circuit impedance

$I_a$  - the value of current which is able to automatic power-off in the time  $t \leq 0,4s$ ,

$U_0$  - nominal phase voltage (230V)

## 03 Testing insulation resistance

### 03.1 Testing the insulation resistance of the electrical installation supplying power to the charging station

During the test, the charger must be disconnected from the mains or the charging head removed from the backplate. The test should be performed in a 3 or 5 wire mode, depending on the installation. It is recommended to use devices dedicated to measuring

insulation resistance with a valid calibration certificate. The meter can be connected e.g. to the output terminals of the overcurrent circuit breaker installed in the switchgear, to the bottom part of the post or any other convenient place.



When measuring the insulation resistance, the supply voltage absolutely must be disconnected without any possibility of it being accidentally reconnected!

If overvoltage protectors have been used in the tested installation, the connection of the protector with the phases L1, L2, L3 and the N conductor should be disconnected before starting the measurements, and reconnected after the measurement. If the station is equipped with energy meters, disconnect the wires from the input terminals of the meter and use them as a measuring point. Failure to disconnect the meter will lower the phase-to-phase resistance values to approximately 1500 kΩ and the phase-neutral resistance values to approximately 750 kΩ. The method of measuring and the required values of test voltages and minimum insulation resistance for the electrical installation during acceptance and periodic tests are specified in the PN-IEC 60364-6-61 standard. Typically, the test voltage is 500 VDC and the minimum insulation resistance is 1MΩ. Measurements should be made between the leads as specified in the attached table.

Resistance in [MΩ]										
L1- L2	L1- L3	L2- L3	L1- N	L2- N	L3- N	L1- PE/ PEN	L2- PE/ PEN	L3- PE/ PEN	NPE	

[MΩ]

## 03.2 Testing the insulation resistance of the charging station with a charging module

Additionally, the values of the insulation of the entire charging station can be checked. The test should be performed in a similar way to the test of the condition of insulation of the power supply circuits, i.e. without voltage being applied, in a 5-wire mode and with the overvoltage protection circuit disconnected. It is recommended to use tools with a valid calibration certificate dedicated to measuring insulation resistance. The maximum permissible test voltage is 500 VDC. When testing the insulation resistance of the charging station, attention should be paid to the polarization of the test voltage. It is important due to the measuring and protection systems used inside the device. The polarization of the insulation resistance meter can be easily checked with a universal multimeter on a DC voltage measurement. If this is not possible, the measurement of the insulation between N and PE on the charging station socket will indicate the polarization of the meter. When the result is around 90 kΩ to 400 kΩ the applied voltage has N-PE+ polarization. Otherwise, the meter will show >500MΩ, which means N+ PE- polarization. For convenience, mark the test probes appropriately and take the remaining measurements with the correct polarization from the table. When performing measurements with the Sonel MPI 520/530 Meter with an AUTO ISO-1000 adapter or similar in automatic mode, all measurements will have the correct polarization. It is sufficient to take N-PE measurement in one polarization only. When taking measurements

with the Gossen Metrawatt PROFITEST MXTRA meter and a 2-pole adapter, the measurement polarization is marked in the photo below.



Insulation resistance is measured with direct voltage. Various manufacturers of measuring devices adopt different polarization conventions for measurements and this is not standardized. For example, the Sonel MPI 520/530 meter gives negative voltage to phase conductors and positive voltage to N/PE. With reverse polarization (plus on L, minus on N), an internal power supply through the socket is activated in the device. This system is used to test devices. As a result, the measuring device is loaded with the starting converter and the resistance results are at the level of several k $\Omega$ , which does not correspond to the actual condition.

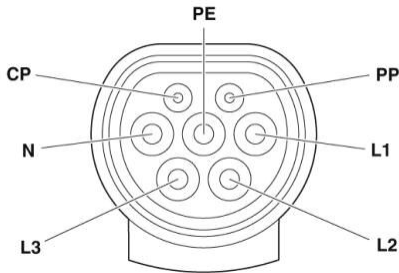
The table with the criteria for assessing the insulation status and the measurement polarization has been presented below.

Measurement configuration and polarization	Insulation resistance rated value	Minimum acceptable value
PE+ L1-	1M $\Omega$	800 k $\Omega$
PE+ L2-	1M $\Omega$	800 k $\Omega$
PE+ L3-	1M $\Omega$	800 k $\Omega$
N+ L1-	>500M $\Omega$	1M $\Omega$
N+ L2-	>500M $\Omega$	1M $\Omega$
N+ L3-	>500M $\Omega$	1M $\Omega$
N+ PE-	>500M $\Omega$	90 k $\Omega$
N- PE+	400 k $\Omega$	90 k $\Omega$
L1- L2+	2M $\Omega$	900 k $\Omega$
L1- L3+	2M $\Omega$	900 k $\Omega$
L3+ L2-	2M $\Omega$	900 k $\Omega$

## 03.3 Adapter

An additional factor is the adapter used: charging station – measuring device. The Metrawatt device (PROTYP II Z525A) uses LED voltage indicators, which are useful during functional tests of the charger. Unfortunately, these diodes together with the current limiting resistors (80 k $\Omega$ ) significantly affect the results of insulation resistance measurements (results below 80 k $\Omega$ ) depending on the polarization. For this reason, do not use this and other adapters with voltage indicators for insulation measurements as that may affect the value of the measured resistance. It is allowed to use adapters, which do not contain additional circuits – that are adapters for the measuring system. Otherwise, the measurement

should be carried out directly on the station socket/plug contacts, observing appropriate safety rules.



Pin designation of the Type 2 socket of the charging station.

## 04 Measurement of the effectiveness of protection against electric shock

The station is tested prior to the first overcurrent protection. Measurements are taken with the station/charging module disconnected.

The power cord must be protected in the switchgear in accordance with the guidelines included in the installation manual.

## 05 Testing the operation of residual current devices

Each charging point must be protected against type B residual current (devices with the EU declaration of conformity with the PN-EN IEC 61851-1: 2019-10 standard). This requirement can be met by installing a type B residual current device (RCD B 30 mA/40 A) or an RCD EV (30 mA/40 A) in the switchgear. It is also possible to use the Enelion RCM B – Residual Current Monitor type B accessory. Enelion RCM B in combination with the RCD A used in the switchgear meet all safety requirements.

The test can be carried out when the charging process is started – voltage is on at the socket, status C. For this purpose, an appropriate RCD tester and a vehicle simulator – adapter should be used. During the tests, access to the switchgear or the lower part of the station should be ensured in order to enable lifting the protection. Any activation of the switches during the tests will turn off power to the station. After powering the station again, start the charging process anew.

The procedure looks similar for stations protected by RCD A cut-out switches and equipped with Enelion RCM B. The difference appears when testing the protections in mode B. When the built-in protection RCM B is triggered, the relays are immediately opened, interrupting the charging process and the LED interface blinks in a specific way (see [Chapter 3.4 LED bar](#)), to draw the user's attention. The charging process is

suspended until the user's action.

To reset the system and enable recharging again, pullout the plug from the station socket. For chargers with RFID identification, the identification must be used to open the plug lock. In public chargers – in Free Charge configuration – the vehicle must be disconnected – this also opens the lock in the station.

After the charging process has been completed, the station is ready for the next charging. In the event that the protection in the switchgear is activated earlier, the voltage should be reinitiated by lifting the lever and starting the next charging process. The process should be repeated until all necessary tests have been performed.

## 05.1 Functional tests of the device – methods of execution

Functional tests must be carried out with a suitable tester. The charging point should be handled as in the standard charging process. The entire procedure for the initiation and termination of charging etc. is provided in Chapter **2 Use of the charging station**. Attention should be paid to the different operation of the station depending on the configuration: with RFID authorization and Freecharge. Chapter 8 Troubleshooting describes the error codes and the situations diagnosed by the station. On their basis, it can be determined whether the station correctly diagnoses damage on the vehicle end. Examples of damage are the lack of a diode, CP short-circuit, PP short-circuit, etc. Such situations can be simulated with an appropriate test system dedicated to the AC charging station.



# Technical description

<b>Charging Station/General Access Charging Station</b>	
<b>Charging point, an element of public road transport infrastructure</b>	
Housing	Polycarbonate, Anodized aluminum*
Ingress Protection rate	IP54
Impact protection (IK rate)	IK10
Flammability class	UL94-V0
Charging connector type	Lumina Socket - Type2 Socket, Lumina Cable - Type2 connector with 4,7 m cord
Residual current protection	Embedded residual current monitor - Enelion RCMB 6 mA DC
Energy metering	Integrated 3-phase energy meter >99 % accuracy
Certified electricity meter (MID)	Impulse* - possible to install inside the housing
User interface	multi-color LED strip EVC status indication; Dedicated app connecting station via WiFi AP 2.4 GHz b/g/n
Online communication unit	<ul style="list-style-type: none"> <li>• Integrated LTE/4G modem</li> <li>• WiFi 2.4 GHz b/g/n - direct access point to the station with an option to hide the AP and connect the station to local Wi-Fi network</li> </ul>
OCPP	compliance with OCPP 1.6 J protocol
Authorization	<ul style="list-style-type: none"> <li>• built-in RFID / NFC reader - Mifare Classic / Free Charge</li> <li>• dedicated app connected via WiFi AP 2.4 GHz b/g/nWW</li> </ul>
Current /Charging power	up to 7.4 kW at 32 A 1-phase up to 22 kW at 32 A 3-phase (TN system)
Charging voltage	3 x 400 V AC/ 230 V AC ( ±10 % )

Supply voltage	3 x 400 V AC/ 230 V AC ( ±10 % ) (TN/IT) Possibility of connecting the cable from the top, bottom and the back of the station
Other features	<ul style="list-style-type: none"> <li>• configuration with no additional tools</li> <li>• remotely controlled schuko outlet (max 2000W/10A)*</li> <li>• remote start / stop, delay and charging schedule</li> <li>• temperature and humidity monitoring inside device</li> </ul>
Operating temperature	-30°C / +55°C
Maximum altitude for installation	2000 m
Height	390 mm
Depth	133 mm
Width	155 mm
Depth	133 mm
Weight	3 kg / 4,2 kg (depending on device-version)
Compliance	2014/53/EU (RED) 2011/65/EU (RoHS) 2014/30/EU (EMC) 2014/35/EU (LVD)

\* option

# Troubleshooting

## 01

### Alerts

There are three types of alerts:

- warning – the charger will pause charging, but it will also try to return to return to the charging state on its own. The LED strip will blink in yellow.
- error – the charger will blink in red indicating an issue that required human interaction. The alert can be cleared by reconnecting a car.
- critical – the charger will flash in steady red color, indicating an issue that required servicing of the charger.

For detailed error information check Alerts section in the configuration panel.

## 02

### Frequently Asked Questions

#### LUMINA CHARGER DOESN'T CONNECT TO THE WIFI NETWORK

Make sure the WiFi password was entered correctly and that the proper security method was chosen ("Authentication type" box). Positioning the WiFi router closer to the charger may also prove helpful.

## LUMINA CHARGER DOESN'T CONNECT TO THE WIFI NETWORK

Make sure the GSM network settings were entered correctly and that the charger is in the network signal range.

## I CANNOT ACCESS THE CONFIGURATION PANEL

Make sure you are connected to the charger's wifi hotspot. Please check if you use correct IP address: 192.168.8.8.

### **In other cases contact technical support.**

Describe in detail the situation in which the problem occurs, which will help the technicians locate the source of the problem quicker and help you more effectively. If possible attach the file with the charger operations log (you can download it by pressing "Download logs" in the Logs page from Diagnostics section).

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