

FEMS App DC Charging Station

Version:2023.5.2

Table of Contents

1. Introduction 2
2. Prerequisites 2
3. Installing the app 2
4. FEMS App DC Charging Station 2
4.1. Why should your wallbox be integrated in FEMS? . . . 2
4.2. Advantages of the FEMS App DC Charging Station . . . 3
4.3. Visualization and configuration in Online Monitoring . . . 3
4.4. FAQ & Troubleshooting . . . 13
4.5. Further information . . . 14
5. Contact us 15
6. Directories 16
6.1. List of illustrations . . . 16

1. Introduction

Dear customer,

Thank you for choosing the "FEMS App DC Charging Station". You are welcome to send us your suggestions so that we can further improve the quality of our products.

2. Prerequisites

A DC charging station supported by FEMS is required to use the "FEMS App DC Charging Station".

Models from the following manufacturers are currently supported:

Charging Station Providers	Compatible Models	FEMS App Instructions
Alpitronic Download platform (behind login)	**HyperCharger** • HYC50 • HYC150 • HYC300 • HYC400	• HyperCharger HYC50, HYC150, HYC300 & HYC400

3. Installing the app

When you ordered the "FEMS App DC Charging Station", you received a 16-digit license key. You can use this license key to redeem the app independently in the FEMS App Center.

Instructions on how to proceed can be found here.

4. FEMS App DC Charging Station

4.1. Why should your wallbox be integrated in FEMS?

FEMS, the open-source-based energy management system from FENECON, gives you the freedom to design your Energy Journey. Together with manufacturers of wallboxes, heat pumps, heating elements, etc., we are continuously working on further integrations for the FEMS App DC Charging Station.

Compatible wallboxes offer various manufacturer-side advantages that support you on your Energy Journey. New partnerships with other manufacturers are constantly being forged.

FENECON accompanies you step by step on your Energy Journey towards 100% self-sufficiency: For example, owners of a photovoltaic system can use the combination of FENECON electrical energy storage and electric vehicle to charge the solar power they produce themselves instead of feeding it

into the grid at low prices.

Use the FEMS App AC Charging Station or FEMS App DC Charging Station to control your wallbox.

Since 01/04/2023 you will receive the FEMS App Multi-Charging-Point Management free of charge from the second charging station or from the second charging point.

4.2. Advantages of the FEMS App DC Charging Station

- *Full control over charging processes*

  Control your wallbox via your FEMS Online Monitoring. Adapt the charging strategy to your respective everyday situation: whether it's an immediate charging start — in MANUAL mode — or intelligently controlled PV surplus charging — in AUTOMATIC mode.

- *One-time purchase, no recurring costs*

  After the one-off purchase, there are no further costs for the app — lifetime updates included.

- *OpenEMS Community*

  The software is being developed further in cooperation with universities, institutes and other manufacturers of energy management systems in the global OpenEMS community.

- *Energy Journey*

  We are already thinking about the next steps you might want to take on your personal Energy Journey. That's why we are working on integrating dynamic electricity tariffs for e-mobility, automatic phase switching, etc.

4.3. Visualization and configuration in Online Monitoring

After installing the FEMS App AC charging station or FEMS App DC charging station, you will see the following widget in your live monitoring:

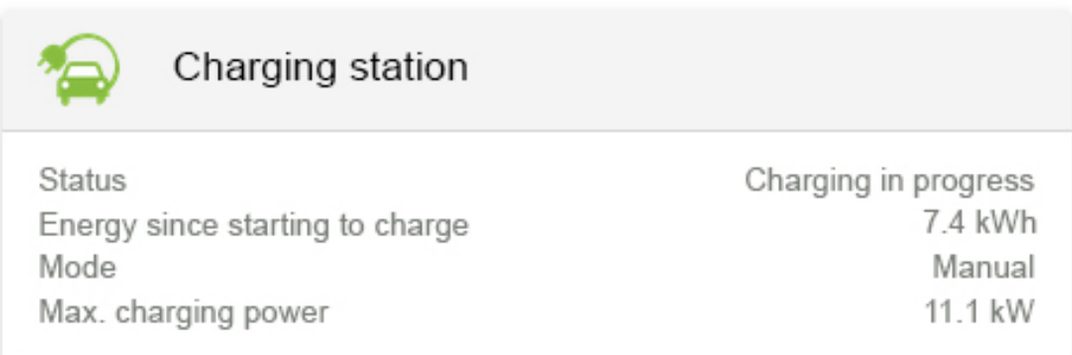


Image 1. Flat widget

The following information is displayed in the widget:

- **Status**: Shows the current status of the wallbox

  Charging in progress: The electric vehicle is plugged in and charging is in progress

  Car charged: The electric vehicle is plugged in and the desired charging status has been achieved

  Ready for charging: The electric vehicle is plugged in and waiting for the charging process to start

  Not ready for charging: The cable is not plugged in correctly

  Cable not connected: Electric vehicle is not connected to the wallbox
- **Energy since start of charging**: Shows the energy charged since the start of charging in [kWh].
- **Mode**: Shows the current operating mode (see Mode)
- **Maximum charging power**: Shows the current maximum charging power in [kW]

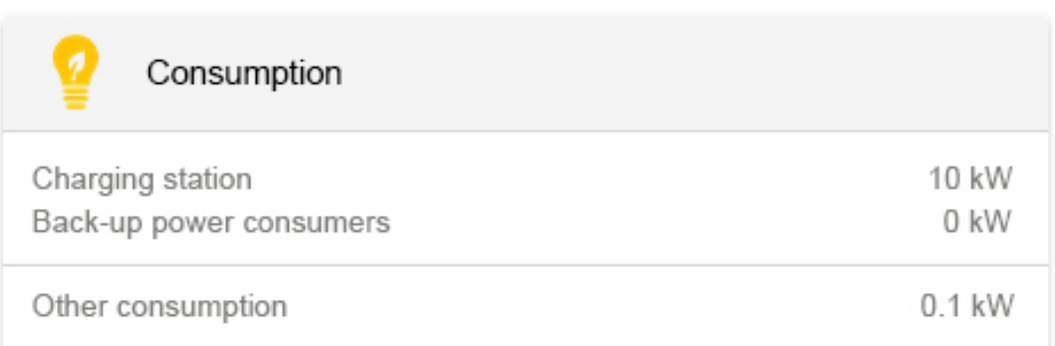


Image 2. Consumption widget

Click on the widget to open the detailed view of the FEMS App:

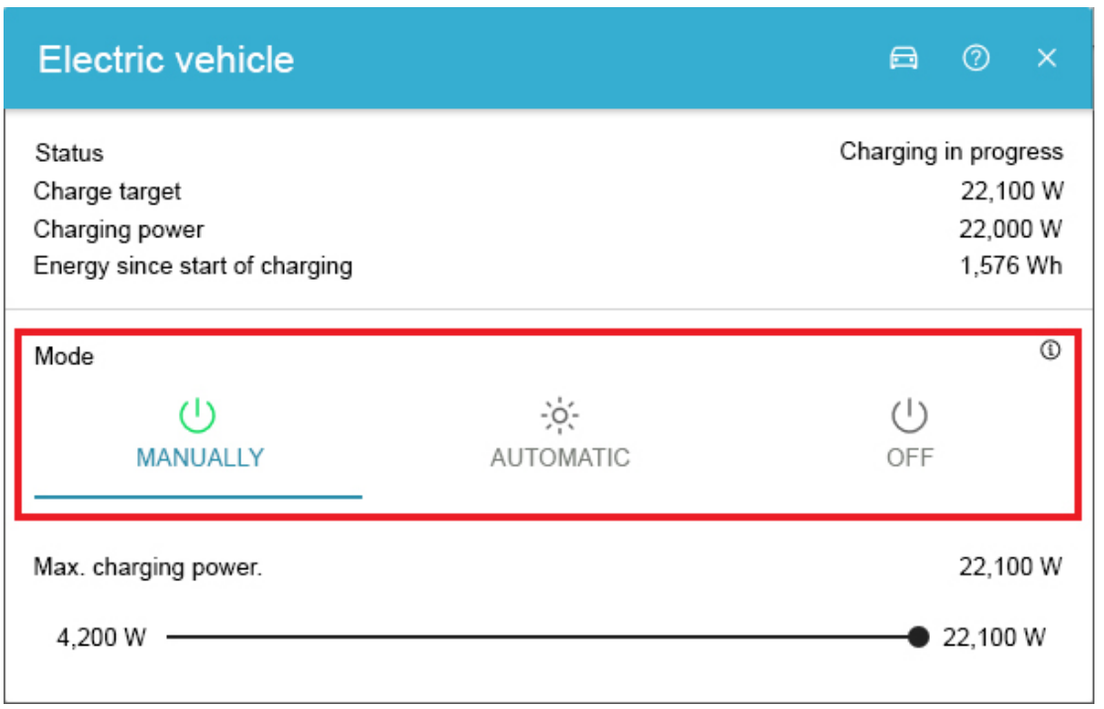


Image 3. Detail widget

Here you have the option of switching between three operating modes:

Manual

In manual mode, current is primarily drawn from the **battery storage** in accordance with self-consumption optimization. If there is not enough current in the electrical energy storage system, current is drawn from the grid. Charging takes place with a fixed maximum charging power*. This mode is always useful if the car is to be fully charged as quickly as possible or charged with a defined power.

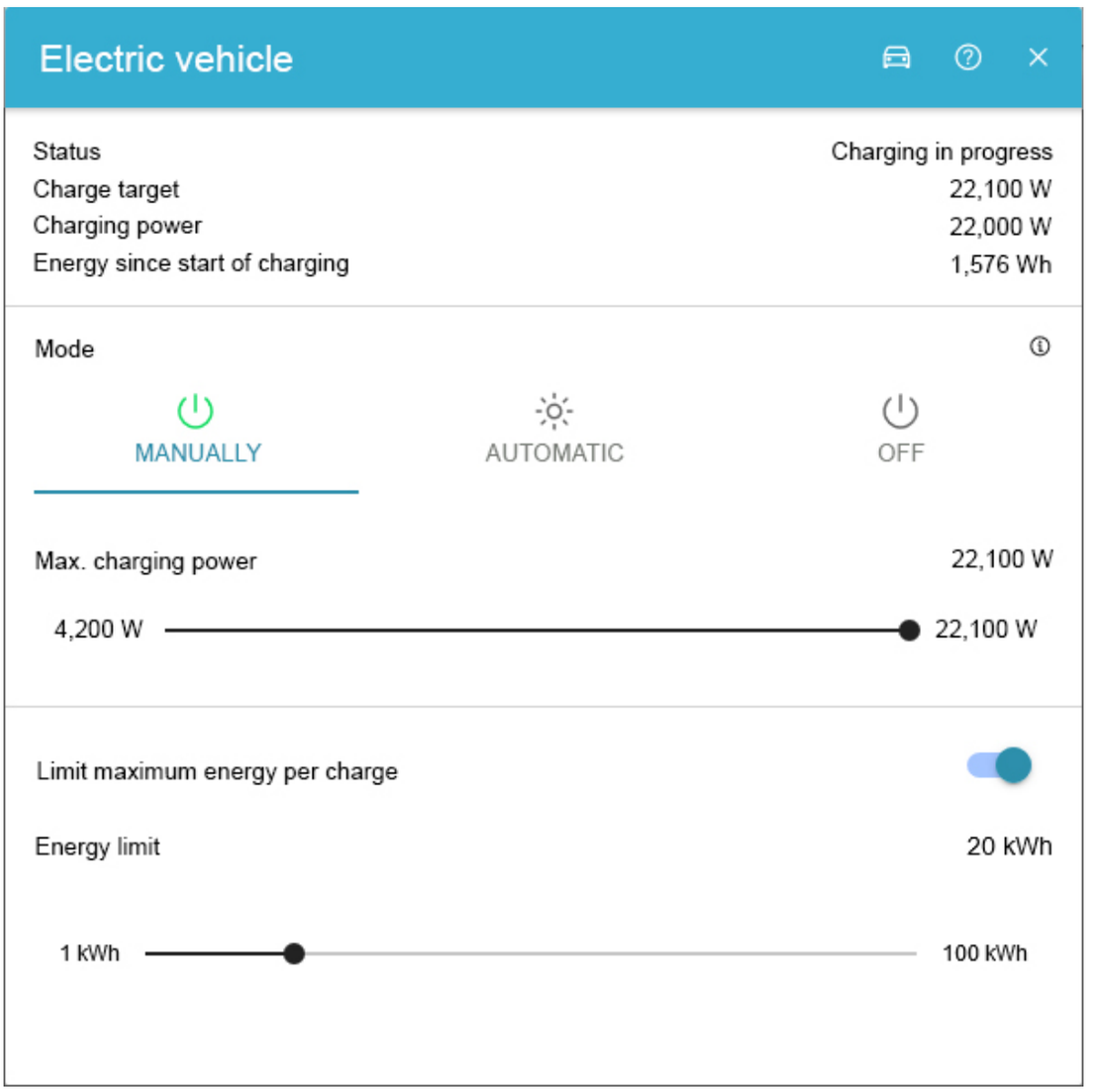


Image 4. Manual mode

You can also limit the maximum energy per charging process. The energy limit is set using a slider between 1 kWh and 100 kWh. In the example, the amount of energy per charging process was limited to 20 kWh.

We recommend limiting the energy if the EV is only to be charged with a fixed amount of energy (e. g. 20 kWh).

Automatic

In automatic mode, the charging of the EV is dynamically adapted to the surplus electrical energy (e. g. PV surplus). A surplus occurs when there is a positive difference between generation and consumption.

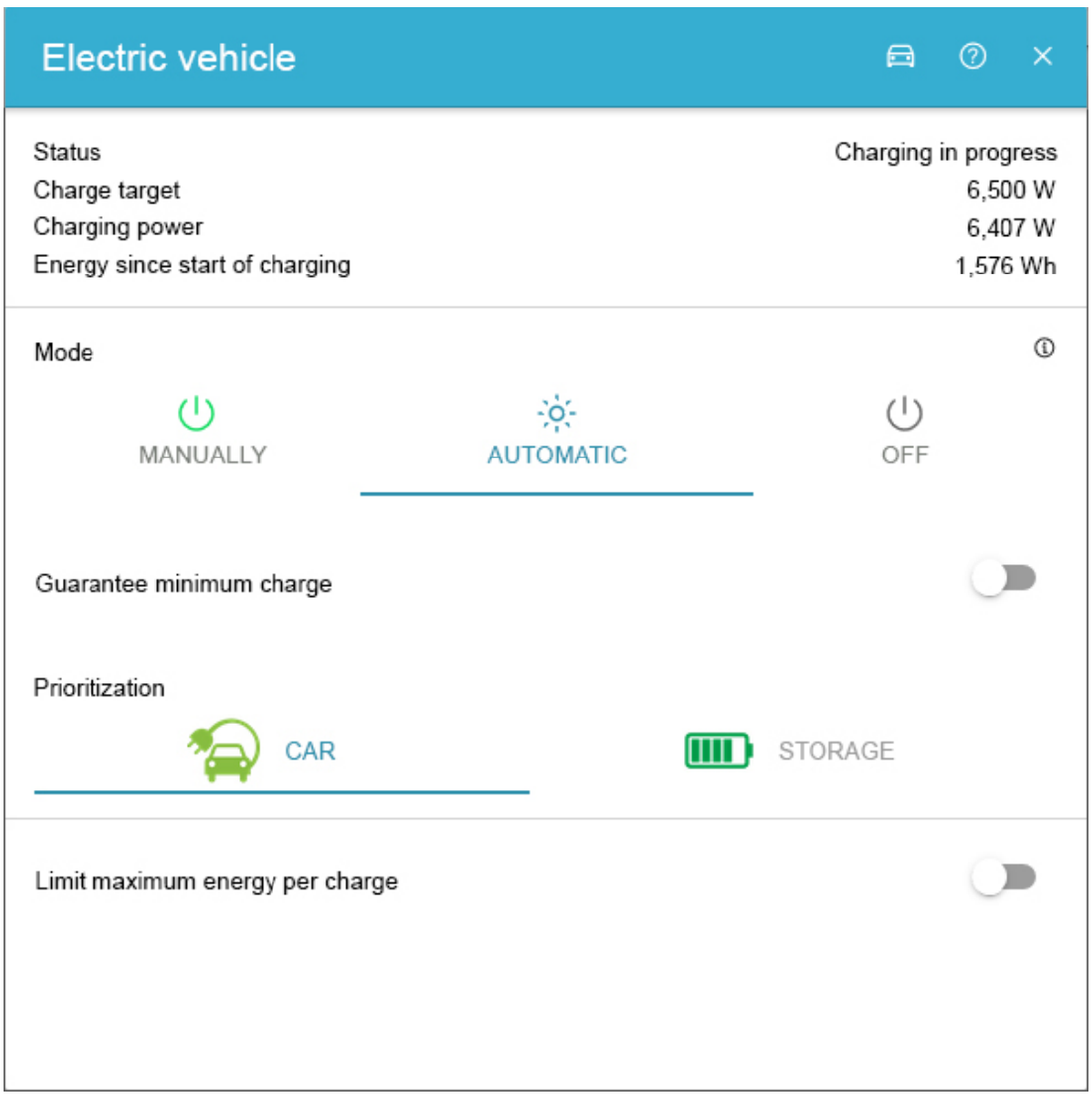


Image 5. Automatic mode

The priority for charging the vehicle is higher than charging the storage system by default. If the electrical energy storage is to be prioritized higher, this can be changed using the "Prioritization" button.

Important: If the surplus electricity is ...

- less than 6 A, the car will not charge
- greater than the maximum current (32 A), the car is charged with 32 A
- in between, the car is charged with the calculated current

Please note that only one electric vehicle at a time can be charged in AUTOMATIC mode in a domestic EV-charging park (here: from two charging stations or charging points). All other charging points can be operated simultaneously in ON (formerly: MANUAL) or OFF mode.

The sliders for the maximum/minimum charging power are adapted to the technical standards for the convertible power of the connected charging station. The minimum charging power of a standard wallbox is 6 A or 4.2 kilowatts. The maximum charging power is typically between 11 kW and 22 kW for AC charging points (alternating current) and between 50 kW

and 400 kW for DC charging points (direct current).

Furthermore, a minimum charging strength can be configured in automatic mode, at which the vehicle should at least be charged (see figure Minimum charging guarantee).

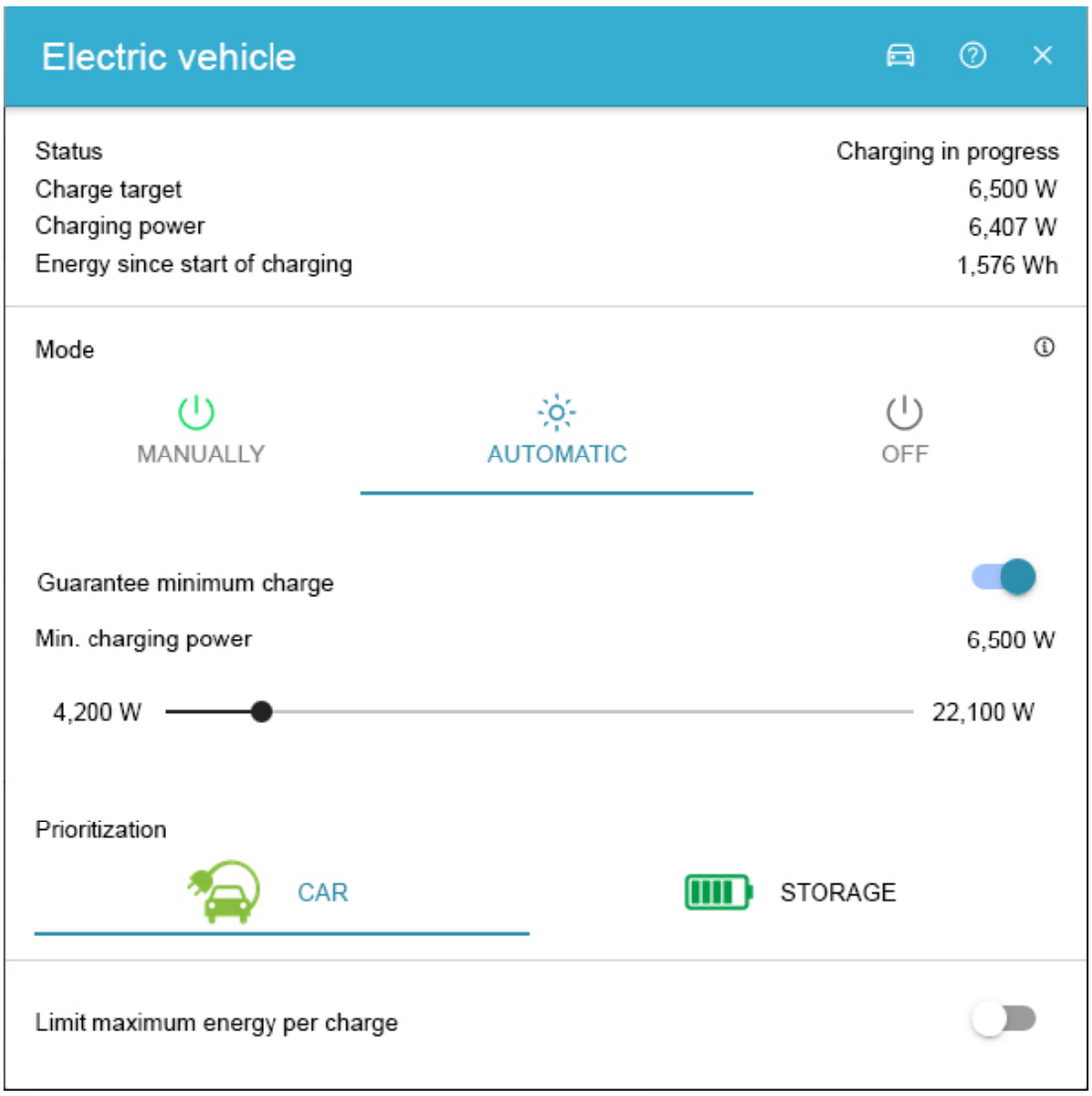


Image 6. Minimum charging guarantee

This ensures that the vehicle is also charged at night and on days when there is no surplus energy.

We recommend this setting to still guarantee charging on cloudy days.

Example using the settings in figure Minimum charging guarantee for a car with 11 kW maximum load:

- PV surplus = 4 kW (2.5 kW less than the set minimum of 6.5 kW)

  It is charged with 6.5 kW. The remaining 2.5 kW is taken from the electrical energy storage system or the grid.

- PV surplus = 10 kW (more than 6.5 kW)

The entire PV surplus of 10 kW is charged into the EV. If the storage system were prioritized, only 6.5 kW would also flow into the car as long as the electrical energy storage system is not full.

- PV surplus == 15 kW (> 11 kW)

  It is charged with 11 kW. The remaining 4 kW are used for charging the electrical energy storage system if it is not full.

In both modes, the energy delivered per charging process can be limited (e. g. 20 kWh).

Limiting the amount of energy per charging process is always useful if it is already known in advance that this will be sufficient until the next charging opportunity. For example, on cloudy days when the minimum charging power is guaranteed, excessive use of mains power is prevented or manual termination of charging is unnecessary.

Off

In "Off" mode, the charging station is completely deactivated.

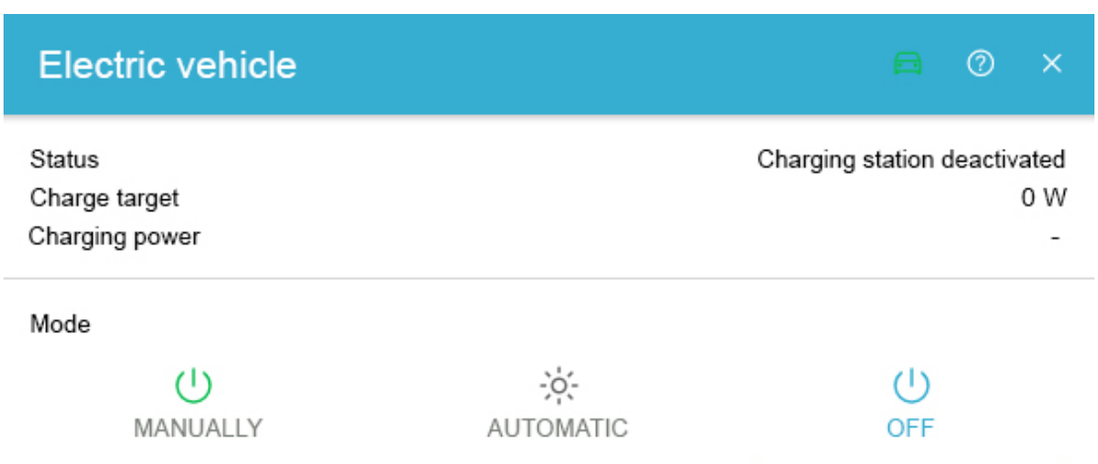
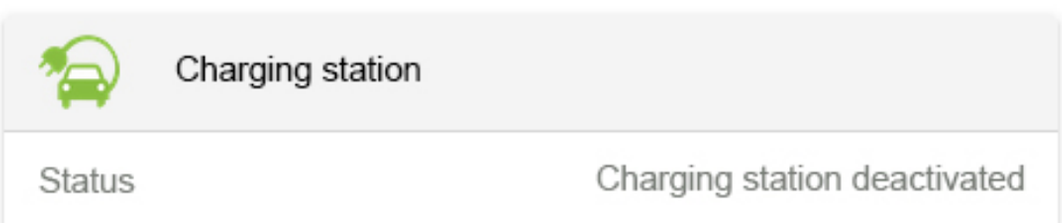


Image 7. Off



We recommend this setting if you wish to block the use of a publicly accessible charging station, for example.

Minimum switching time or hysteresis

To prevent charging interruptions due to starting/pausing the charging process too often, the currently set charging mode is continued for the next few minutes.

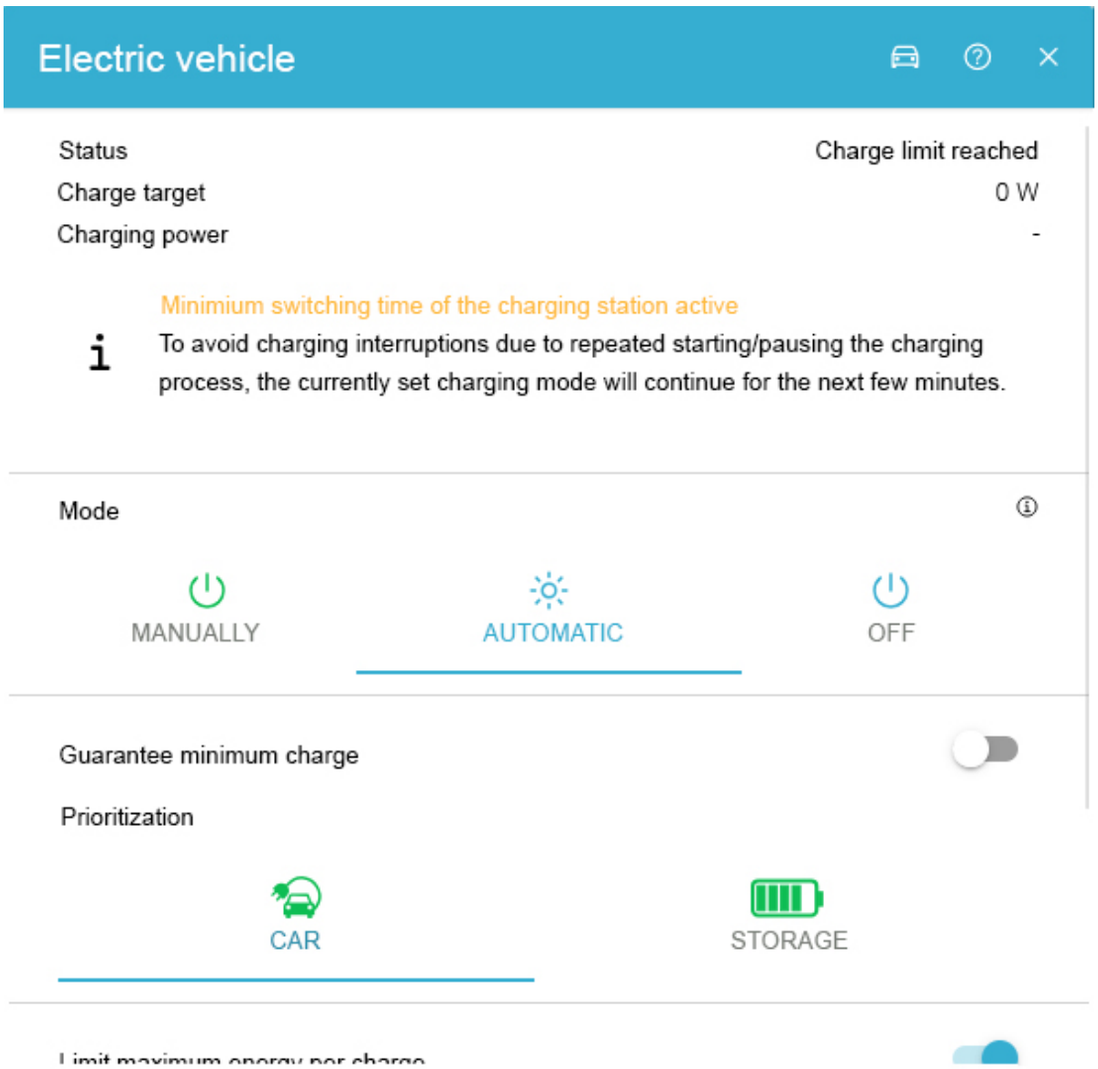


Image 8. Hysteresis

Navigation bar

Two functions are available in the [fig2:navigation bar]:

- Question mark: The question mark icon takes you to the app's technical instructions.
- Car: The car icon takes you to vehicle management.



Image 9. Navigation bar

You can use the vehicle management function to specify whether a Renault Zoe in particular should be charged at the charging station.

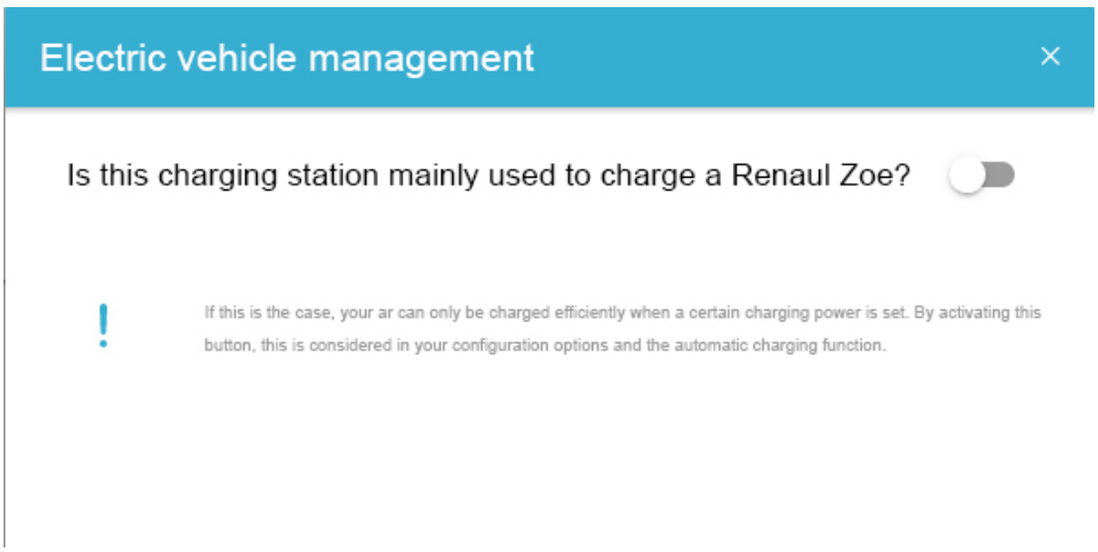


Image 10. Vehicle management

As soon as this setting is activated, it is no longer possible to make any settings below 10 A (6.9 kW) in either manual or automatic mode. The background to this is that charging the Renault Zoe below 10 A is only possible with poor efficiency.

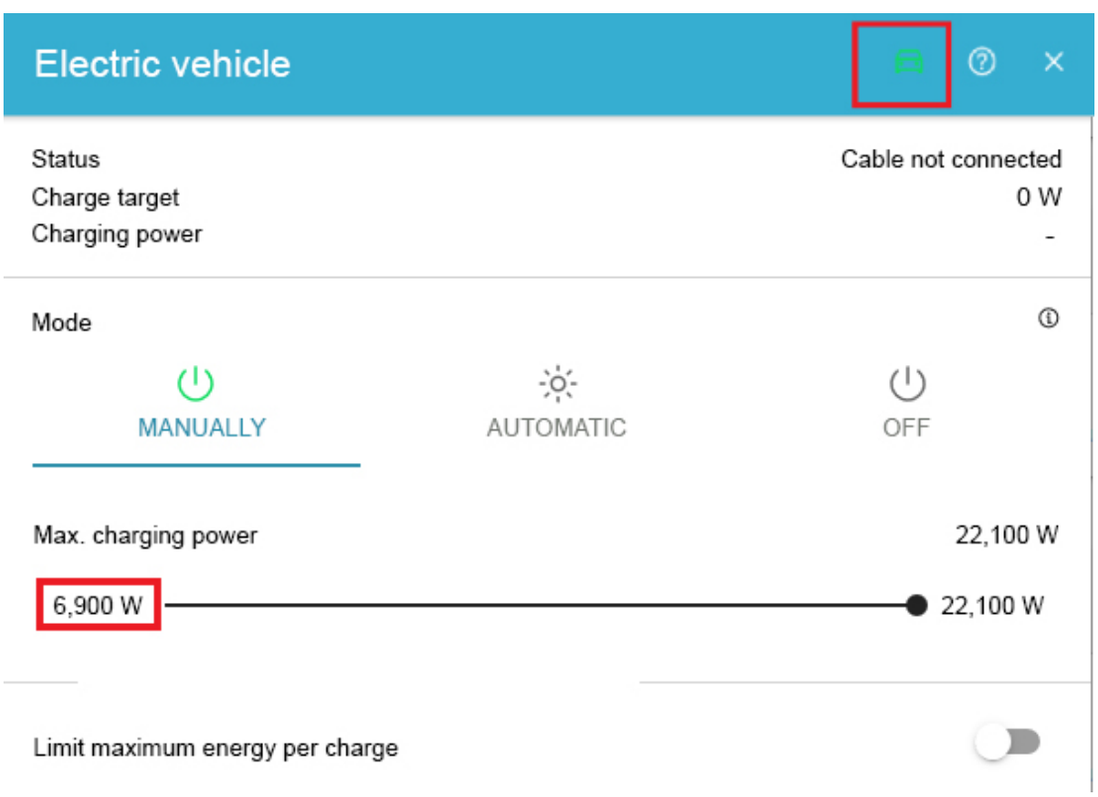


Image 11. Vehicle management

We recommend activating this option if you mainly charge a Renault Zoe at the charging station.

Consumption

4.3. Visualization and configuration in Online Monitoring

You can see the current charging power - together with other consumer loads - in the separate Consumption widget in Online Monitoring.

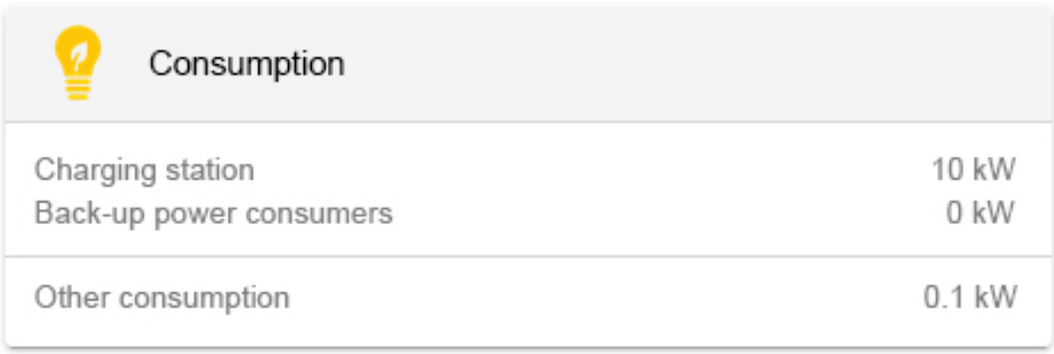


Image 12. Consumption widget

Historic view

The historical consumption of the charging station is found in the consumption widget.



Image 13. Historic representation

The app is not suitable for commercial or municipal multi-charging point management. For this purpose, we also offer the "Multi-Charging-Point Management" app.

4.4. FAQ & Troubleshooting

Compatibility & Connection

Which FENECON systems are compatible with "FEMS App DC Charging Station"?

The app is currently compatible with all current models of the FENECON Home, FENECON Commercial and FENECON Industrial series.

Is a constant internet connection required?

The charging station must be connected to the FENECON Energy Management System in order to display all required values in Online Monitoring and to be able to set charging limits.

This is usually automatic, as your FEMS and your charging station are set up in the same customer network during installation.

> If the FEMS does not have an internet connection, the values can only be viewed and specified via the local monitoring.

If there is no connection, the following text is displayed in the monitoring:

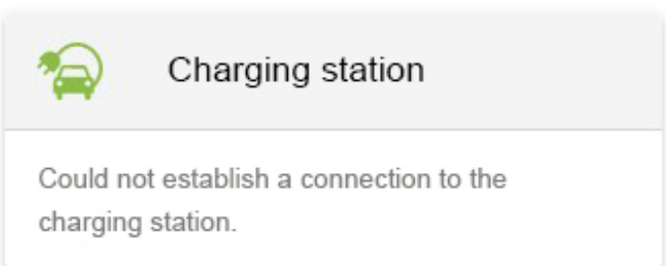


Image 14. Charging station is not connected

Charging Behavior & Power Control

Why isn't my electric vehicle charging even though there is excess electricity available?

Depending on the connection of the charging station and the car's onboard charger, at least 4,140 W (3-phase) of excess power is required to achieve a default of 6 A.

Furthermore, the Renault Zoe can only charge efficiently from 10 A (below this, it charges with very poor efficiency). Charging therefore requires an excess current of 6,900 kW (3). We therefore recommend activating the Renault Zoe limitation mentioned before.

Why isn't the power limit being adhered to? I. e., is the charge controller or set charge rate higher than the actual power being charged?

Every car charges with different levels of accuracy, and the conversion in the interface from kW to Ampere means that minimal deviations are accepted when the charging command is given.

Why does the FEMS Online Monitoring system report "Car full" even though my electric vehicle isn't fully charged yet?

The FEMS Online Monitoring estimates the state of charge. This means that if a charging process is started and your electric vehicle does not begin charging within a specified period of time, FEMS Online Monitoring assumes that your electric vehicle has already been fully charged.

> The same applies if you have selected MANUAL mode and have defined a charging start time in your wallbox manufacturer's app (e. g. calendar function).

4.5. Further information

- We develop the algorithms and connections used in the "FEMS App DC Charging Station" in cooperation with universities, institutes and other manufacturers of energy management systems in the global OpenEMS community.

  For more information about OpenEMS, visit www.openems.io

  If you're interested, feel free to join the English-language discussion at OpenEMS Community
- From the beginning of 2024, all wallboxes & charging stations in the German private sector must be controllable by the grid operator in accordance with § 14a of the Energy Industry Act. Depending on the manufacturer, your wallbox can be dimmed to the required 4.2 kW charging power and/or switched off for the required period of time. For further information, please contact your wallbox manufacturer.

  KEBA

  Hardy Barth

> Currently, the proper dimming of wallboxes & charging stations is not done via the FENECON Energy Management System, but via the solution paths of the wallbox manufacturers.

5. Contact us

For support, please contact:

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Phone — Service: +49 (0) 9903 6280 0
E-mail — Service: service@fenecon.de

6. Directories

6.1. List of illustrations

Image 1. Flat widget
Image 2. Consumption widget
Image 3. Detail widget
Image 4. Manual mode
Image 5. Automatic mode
Image 6. Minimum charging guarantee
Image 7. Off
Image 8. Hysteresis
Image 9. Navigation bar
Image 10. Vehicle management
Image 11. Vehicle management
Image 12. Consumption widget
Image 13. Historic representation
Image 14. Charging station is not connected