SIQENS

Operating manual

SIQENS Ecoport 800

Methanol Fuel Cell System

24 V | 48 V

Status: 11/2021

Article: E-0800-24-S03 / E-0800-48-S03

Thank you, for choosing our products.

With your choice, you are opting for innovative technology and the clean alternative to diesel generators.

To ensure proper operation of your device, please read these operating instructions carefully before starting up your Ecoport.

You can contact our support team at any time with technical questions. For feedback, suggestions, and other requests, our sales team will be happy to assist you.

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1. Correct use

The SIQENS Ecoport is a methanol fuel cell system for automatic power supply of 24V or 48V batteries with up to 800W. Within the scope of installation and use, please note the following:

- The equipment may only be used to charge batteries that comply with the technical specification of the device (3.2. Technical data). When setting the voltage thresholds of the respective battery type, follow the manufacturer's recommended values or contact SIQENS technical support.
- The devices are designed for power or backup power supply under the environmental conditions specified in these operating instructions.
- Industrial methanol (IMPCA, > 99.85%) must be used for operation. This may be purchased from SIQENS or chemical suppliers and distributors. Methanol or methanol-water mixtures that do not comply with the enclosed specification (X.3. Methanol specification) may only be used after prior consultation with SIQENS.
- The devices are designed for commercial use. Installations for private use or in vehicles are only permitted after consultation with SIQENS or an authorized partner company.
- For installations in vehicles, it must be ensured that the device is not operated while the vehicle is in operation.
- The devices are not intended for use as an emergency power supply for medical and life-support equipment.
- Units may be connected in parallel to increase the charging current. A series connection to increase the voltage is not permitted.

2. Safety information

These operating instructions are intended for all persons who install, maintain and operate the Ecoport.

NOTICE

Read these instructions carefully before commissioning the Ecoport. Keep the manual for future reference. When handing over the device to other persons for use, make sure to hand over these instructions.
Persons who carry out activities on the device must have read the operating instructions, in particular the chapter "Safety" before starting work.

2.1. Description of symbols and notices

DANGER
Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING
Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION
Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE
Indicates information considered important but not hazard related.

2.2. General safety instructions

DANGER

DANGER DUE TO BLOCKED OR LEAKING EXHAUST PASSAGES
exhaust air may contain carbon monoxide. Carbon monoxide is a colorless, odorless, and tasteless toxic gas. Poisoning from carbon monoxide can cause significant health discomfort, unconsciousness, and even death.

The Ecoport must never be operated without an exhaust system in a house or garage, even if doors and windows are open.

The exhaust system must always have a connection to the outside.

FIRE OR EXPLOSION HAZARDS
Failure to comply with safety instructions may result in danger to persons or even death and property damage.

ELECTRIC SHOCKS
The Ecoport generates electrical energy which, if misused, can lead to electric shocks.

WARNING

The exhaust air of the unit may contain components that are harmful to health! Do not inhale exhaust air directly or permanently, but vent it to the outside.

Do not smoke when handling the SIQENS fuel cell or the QE Charge methanol cartridges. Keep away from any heat and ignition sources.

Methanol is highly flammable! Please observe the methanol safety data sheet.

The SIQENS Ecoport and SIQENS QE Charge methanol cartridges must be kept away from children - even when completely or partially empty.

The Ecoport and the SIQENS QE Charge methanol cartridge must not be opened without prior consultation with SIQENS. Modifications to the device compromise safety and will result in the loss of warranty and guarantee.

CAUTION

The fuel cell may only be installed by trained specialists or a SIQENS service technician.

The Ecoport must not be tilted when filled, otherwise damage to the device may occur.

Improper use or improper connection to other electrical equipment may cause damage.

When connecting the power cables, make sure that the polarity is correct.

The Ecoport must be operated, stored, and transported in a horizontal position.

The SIQENS fuel cell is not waterproof! Make sure that the device is installed in a water protected surrounding.

Do not operate and store SIQENS fuel cell and SIQENS QE Charge methanol cartridges at temperatures above 50°C.

NOTICE

Observe the safety instructions in the operating manual. Follow all instructions in the operating manual. Keep the operating instructions with the device.

Modifications endanger safety and lead to the loss of the operating permit, the expiration of the warranty and the guarantee.

Only use original SIQENS components and accessories.

Protect Ecoport and QE Charge methanol cartridges from heat and direct sunlight.

Operate the SIQENS fuel cell in compliance with the installation instructions and an exhaust system with connection to the outside.

2.2.1. Safety instructions for handling methanol

DANGER

Highly flammable liquid and vapor. (H225) Toxic if swallowed, contact with skin or inhalation. (H301 + H311 + H331) Causes damage to organs. (H370). Use only undamaged containers with suitable terminals with SIQENS fuel cell. Follow operating instructions. IF SWALLOWED: Immediately call a NATIONAL POISONS INFORMATION SERVICE. (UK (00 44) (1 71) 6 35 - 91 91).

Keep away from heat, hot surfaces, sparks, flames and other ignition sources. Do not smoke. (P210) Take precautionary measures against static discharge. Do not inhale vapor. (P260)) Store in a cool, well-ventilated place. Keep container tightly closed. (P403 + P233). Do not open or empty the cartridge by force. Dispose of empty containers in accordance with current regulations. Protect from temperatures > 50 ° C or direct sunlight. Do not leave in a parked car in hot climates. Store and transport upright. Fuel cell cartridge intended for single use only. Sale only to authorized persons over 18 years.

WARNING

Methanol is highly flammable! You can obtain methanol in safe, tested QE Charge methanol cartridges, which protect against leakage in intended use. Storage and transport may be subject to changes in legal regulations.

Methanol is toxic by inhalation, in contact with skin, and if swallowed. In case of direct contact, accidents, or discomfort, consult a physician immediately and display the QE Charge methanol label, the Methanol Safety Data Sheet, or the instruction manual.

CAUTION

CONTAMINED METHANOL
The original QE Charge methanol cartridges contain methanol that has been approved by SIQENS for usage with the Ecoport. Contamination or impurities in the methanol may cause irreversible damage to the unit and void the warranty or guarantee.

Only use methanol according to the specified purity level in the data sheet.

NOTICE

When using the Ecoport and the QE Charge methanol cartridge properly, there is no risk of exposure to methanol at any time.

2.2.2. Safety instructions for handling batteries

NOTICE

In case of emergencies, work on electrical systems and batteries should only be conducted if there is another person present.

The following points must be observed in addition to the instructions of the battery manufacturer.

DANGER

ACID BURN

- Keep soap and water ready in case battery acid comes in direct contact with skin.
- Wear eye protection and protective clothing. Do not touch your eyes while working on batteries.
- Wash off acid splashes on the skin or clothing with plenty of soap and water.
- If acid gets into your eyes, rinse immediately with clean water until no more burning is felt. Seek medical help immediately.

EXPLOSION

- Do not smoke near or around the batteries.
- No open fire. Danger of explosion in the vicinity of the battery.

BURNING

- Do not wear a bracelet or watch during installation. Short circuit of the battery can be generated resulting in skin burns

WARNING

- Only use cycle-resistant, deep-discharge capable batteries, no starter batteries.
- Never charge frozen batteries.
- Avoid short-circuits.
- Ensure good ventilation of the battery to dissipate any gases.
- Carefully lay the battery connection cable and check for improper heating under load. Periodically check the battery in the area of vibrating components for chafing and insulation problems.

NOTICE

- Cover battery poles to prevent damage from tools.
- Protect all battery contacts against unintentional contact.
- Check battery connection terminals for stability prior to each operation.

2.3. Operating personnel requirements

The operating personnel must be adequately trained in the use, operation and maintenance of the Ecoport.

NOTICE

- Follow the instructions in this manual when using the Ecoport. Failure to observe or follow the instructions may result in accidents, such as electric shock or suffocation.
- Observe the legal minimum age! Children should not have access to the device without supervision.

2.4. Product liability

In the following cases, the designated protection of the device may be impaired. Liability for the device function is then transferred to the operator:

- The Ecoport is not used according to the operating instructions.
- The Ecoport is used beyond application areas specified in this document.
- The user makes unauthorized functional or constructional changes to the Ecoport.

2.5. Disclaimer

The manufacturer is not liable for damages to persons and /or property in the case of neglect of safety information.

2.6. Warranty

All SIQENS GmbH devices and equipment are manufactured using modern production methods and are subjected to comprehensive quality control. SIQENS GmbH warrants that the delivered product is free from defects in material and workmanship and is committed to repair or replace any defective parts.

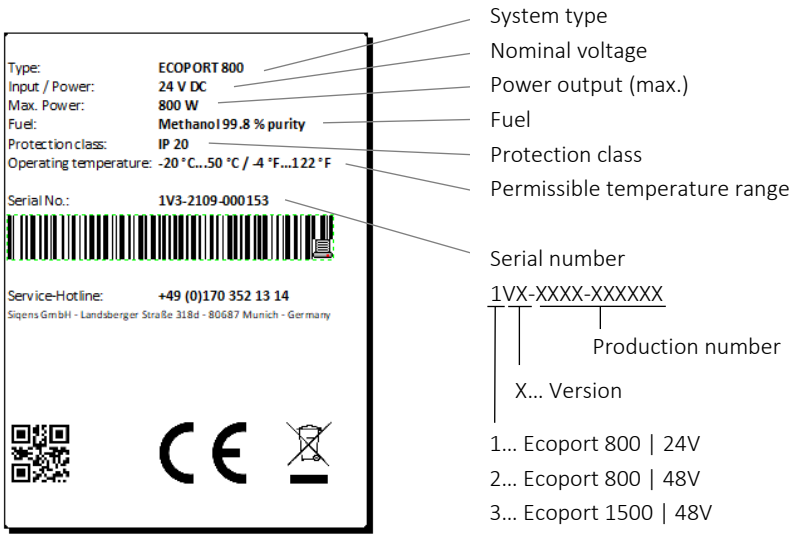
Claims for replacement and warranty are subject to the general terms and conditions of SIQENS GmbH.

3. Product description

The SIQENS Ecoport is a methanol powered fuel cell system for automatic power supply of 24V or 48V batteries with up to 800W.

Serial plate

The serial number of the Ecoport can be retrieved from the serial plate. Keep the serial number at hand when contacting the SIQENS technical support.



3.1. Scope of delivery

E-0800-24-S03 / E-0800-48-S03 | SIQENS Ecoport 800

- Fuel cell system with 4CycleTec
- Methanol supply hose (1.5 m) with dispensing head

60130 | SIQENS Ecoport accessory kit

1 60140 | SIQENS Control Panel
Touch display with integrated modem and SIM-card

2 60138 | Exhaust air kit
1 x Corrugated pipe (Ø 100 mm), ca. 1 m
2 x Pipe clamp (Ø 100 mm)
1 x Corrugated pipe (Ø 70 mm), ca. 1 m
1 x Pipe clamp (Ø 70 mm)
1 x Ventilation grille (Ø 100 mm)
1 x Installation instructions

3 60131 | Supply air kit
1 x Corrugated pipe (Ø 100 mm), ca. 1 m
2 x Pipe clamp (Ø 100 mm)
1 x Ventilation grille (Ø 100 mm)
1 x Installation instructions

4 Installation documents (German & English)
1 x Operating manual | SIQENS Ecoport
1 x SIQENS Quickstart guide
1 x Operating manual | SIQENS QE Charge
1 x Safety data sheet | SIQENS QE Charge
1 x Barrel wrench
1 x Service manual

5 60132 | Mounting kit
4 x Mounting brackets
4 x Screw M6x14
1 x Installation instructions

6 60134 | Battery cable (2 m)
- with voltage measurement
- 16 mm² diameter
- Power connector to Ecoport (Type: Anderson Power SBE 80)
- Ring cable lugs M8 (Battery contacts)

7 60133 | Data transmission
1 x Patch cabel RJ45 (3 m)
2 x LTE antenna
1 x Connector strip Phoenix Contact FKC 2,5/8-STF-5,08

3.2. Technical data

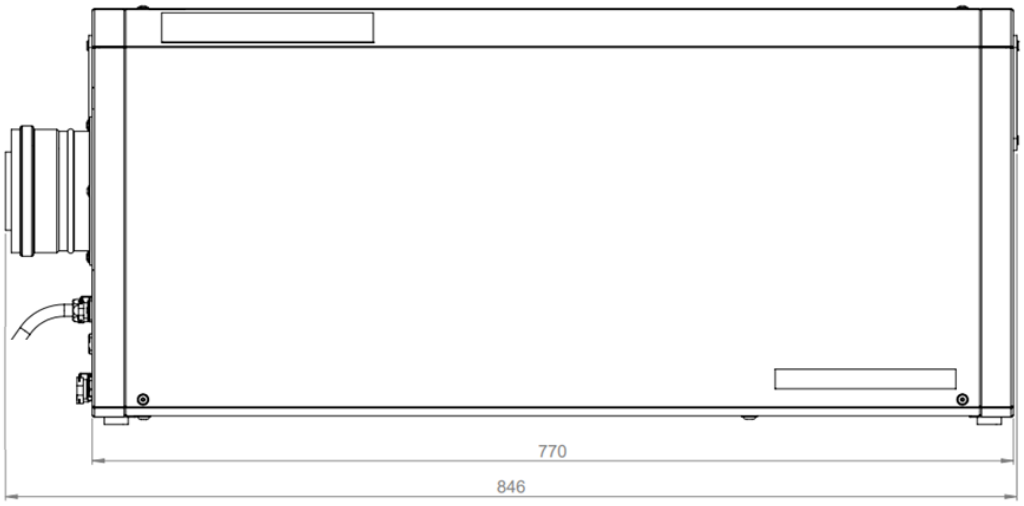
SIQENS Ecoport 800		
Nominal voltage	24 V DC	48 V DC
Voltage range	20 – 31 V DC	40 – 64 V DC
Backup Power (max.)	800 W	
Charging capacity per day (max.)	19.2 kWh	
Charging current (max.)	33.3 A	16.7 A
Primary Power	500 W	
Charging capacity per day	12 kWh	
Charging current	20.8 A	10.4 A
Stack performance (Primary Power)	min. 3,000 operating hours / 500 cycles	
Fuel	Methanol (IMPCA, > 99.85%)	
Consumption	0.6 l/kWh*	
Power consumption in standby (Sleep Mode)	< 0.1 W	
Electrical efficiency	38%*	
Starting time	30 min. (at 20°C)	
Noise level (at 7 m)	< 45 dB(A)	
Exhaust temperature	< 65°C	
Compatible batteries	Lithium-Ion LiFePO4 Lead acid Lead gel AGM	
Recommended battery capacity (min.)	2 kWh (net) 84 Ah**	2 kWh (net) 42 Ah**
Dimensions (L x W x H)	770 x 350 x 420 mm	
Weight (without packaging)	46 kg	
Protection class	IP 20	
Starting temperature	- 20°C / + 50°C	
Storage temperature	- 20°C / + 50°C	
Max. inclination during operation	10°	
Recommended altitude	Tested up 2,700 m	

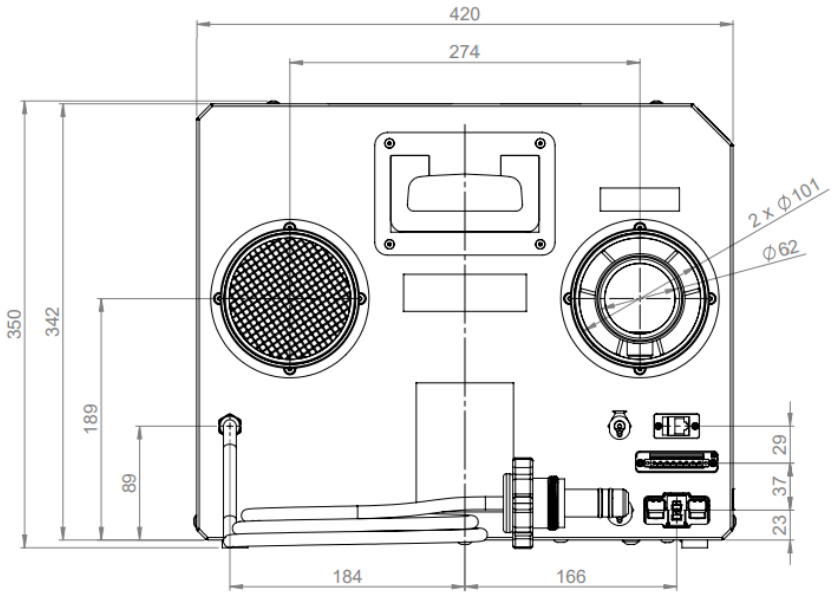
Technical changes reserved

For performance-enhancing operation and to reduce methanol consumption, the power output of the Ecoport in Primary Power Mode can vary depending on the load.

* Depending on ambient conditions
** Dependent on overall energy system configuration and load (e.g. higher capacity recommended when additional energy sources such as solar are installed).

3.3. Dimensions

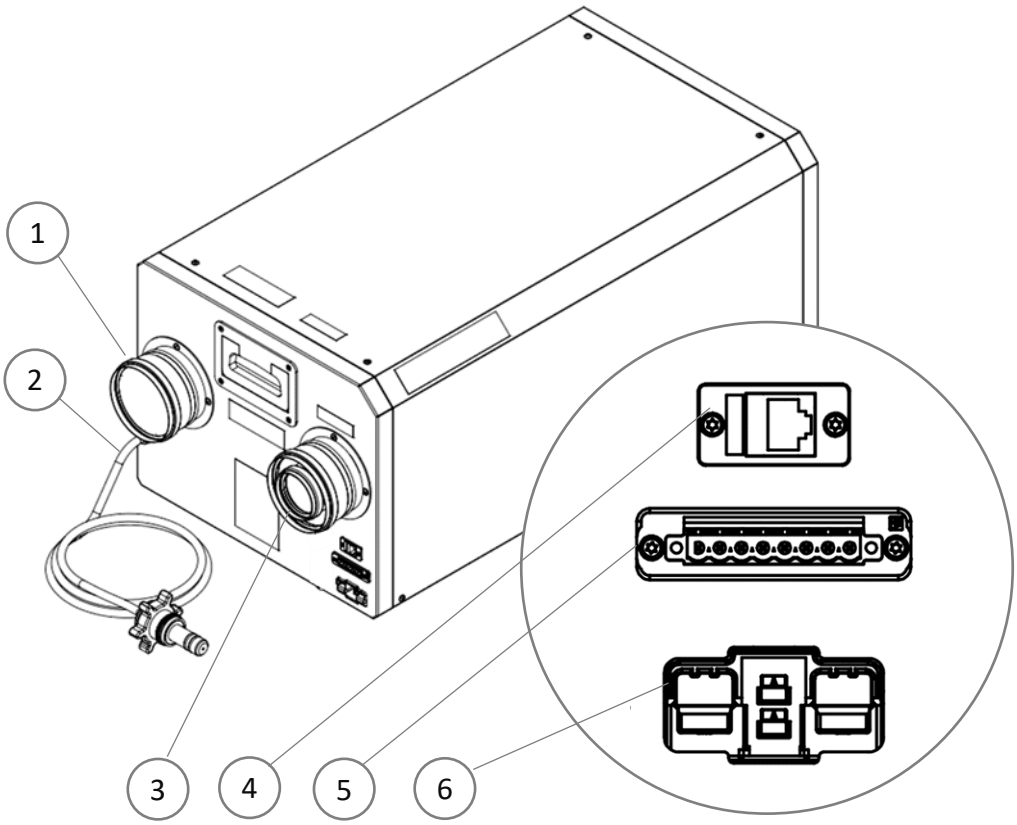




Technical drawings, STEP files and further installation documents are available under the following link

www.siqens.de/en/docs

3.4. Connections



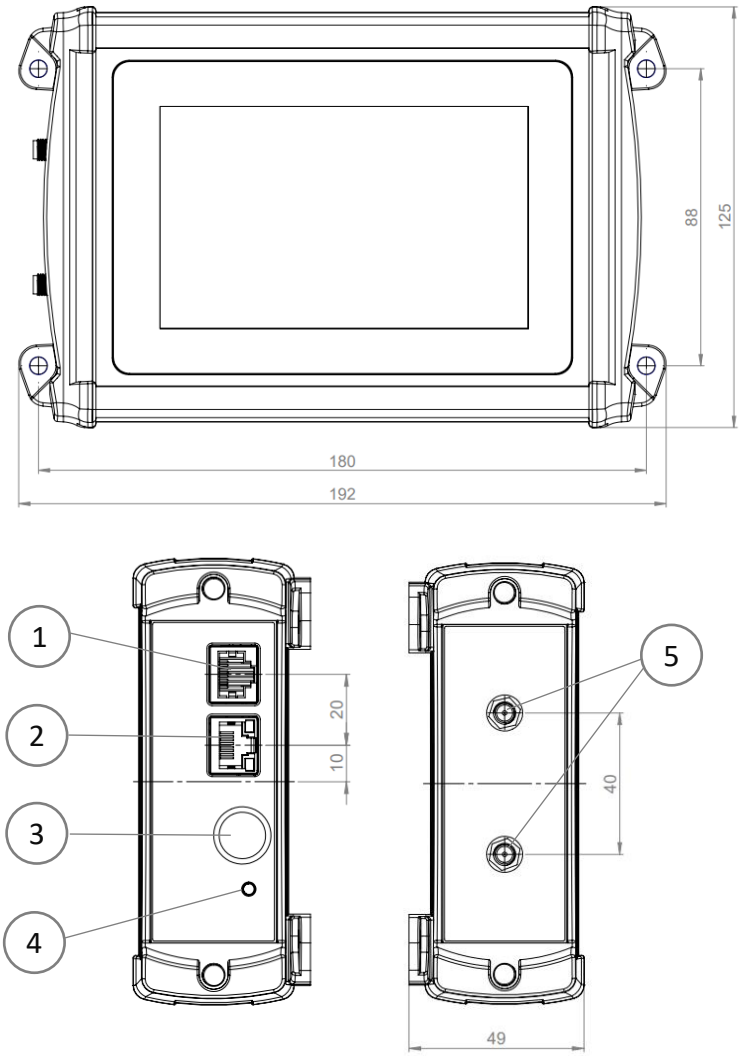
Connections at the Ecoport	
1	Air inlet
2	Methanol supply hose (1.5 m) with dispensing head
3	Air outlet
4	Connection to Control Panel (Ethernet RJ-45)
5	Signal plug for control via external switch (5.1.3. External input)
6	Battery plug with voltage measurement (Anderson Power SBE 80)

NOTICE

EMERGENCY OFF

The Ecoport can be disconnected from the 24V/48V mains via the battery plug.

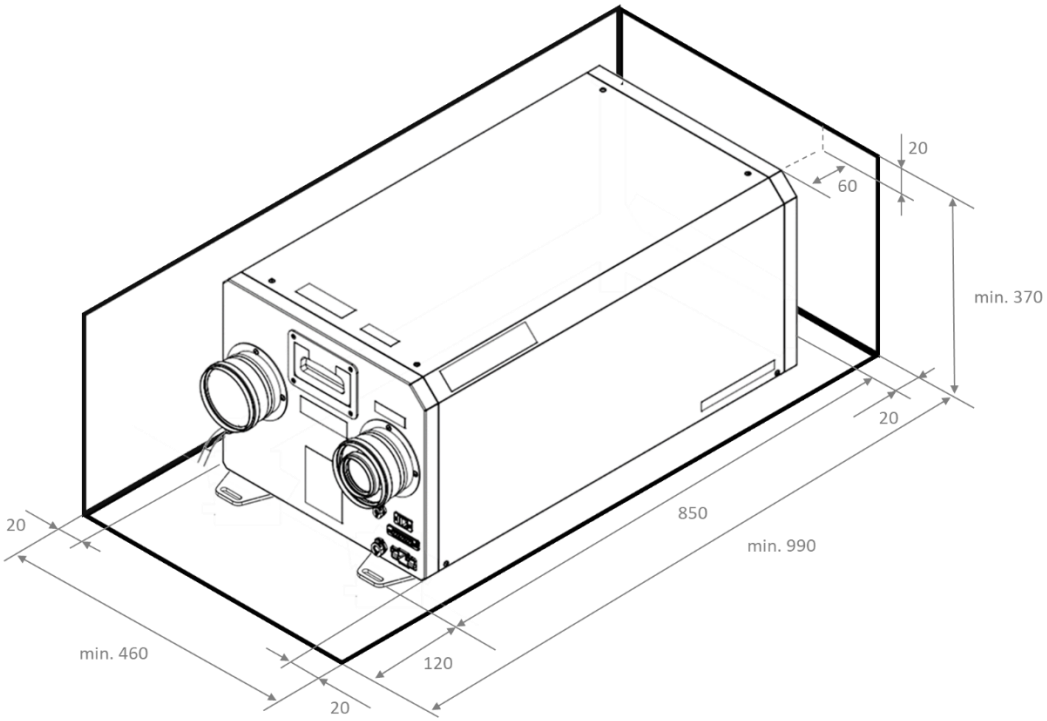
3.5. Control Panel



Connections at the Control Panel	
1	Data port to connect the Ecoport 800 (Ethernet RJ-45)
2	Data port to connect to a local network or laptop (Ethernet RJ-45)
3	Wake-Up from Sleep mode (hold for 3 seconds)
4	Signal LED (lights up red when there is voltage)
5	Connectors for LTE antennas

4. Installation

When selecting the installation space, make sure that the permissible ambient temperature for the device is between -20 °C and +50 °C. This temperature range must not be exceeded or undercut (for example, by cooling, cabinet insulation, etc.).



In addition, the following requirements need to be met:

- Solid, non-combustible and temperature-resistant foundation
- Max. inclination 10° towards all axes
- Protection from direct sunlight, rain, and atmospheric conditions
- Supply and exhaust air routed to the open air

CAUTION

Gloves should be worn during assembly to protect from cuts

NOTICE

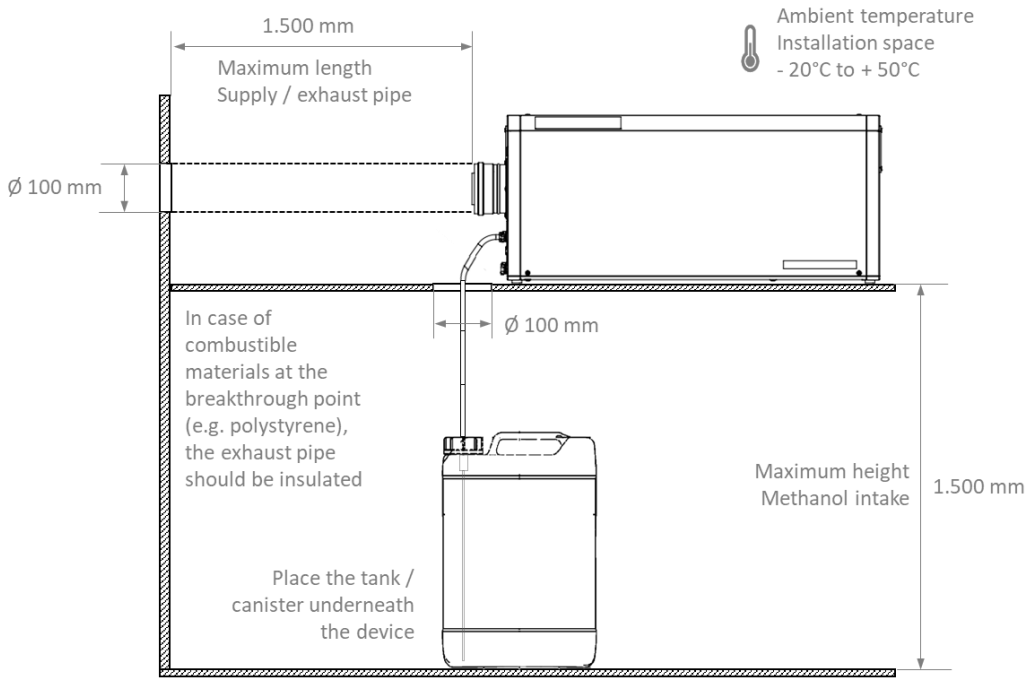
Follow the safety instructions specified in this manual. Installation must be carried out by qualified personnel only.

For a video on the setup, installation, and initial operation, please visit the following link:

https://youtu.be/Ve6oepZlvog

Installation space

- Opening for supply and exhaust air (Ø 100 mm each)
- Opening for the methanol supply line (approx. Ø 100 mm) in case of physical separation of Ecoport and methanol tank



NOTICE

The exhaust air must be separated from the supply air. During installation, make sure that the exhaust air is not sucked in again through the supply air.

When selecting the installation location, ensure that the permissible temperature range of -20°C to +50°C is not exceeded or undercut.

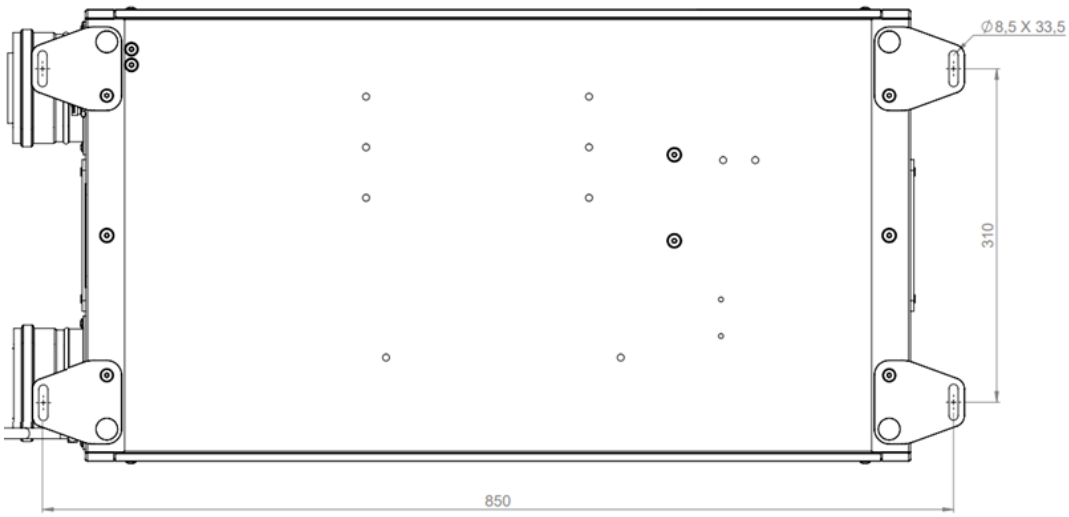
In order to ensure that the waste heat of the system reaches the outside, the maximum permissible length of the exhaust air hose is 1.5 m.

If you have a question about your installation setup or if your installation environment deviates from the one described in this manual, please contact the SIQENS Support.

Do not position the QE Charge methanol cartridge or external tank above the level of the Ecoport. Place the cartridge or tank with the opening facing upwards.

4.1. Installing the mounting kit

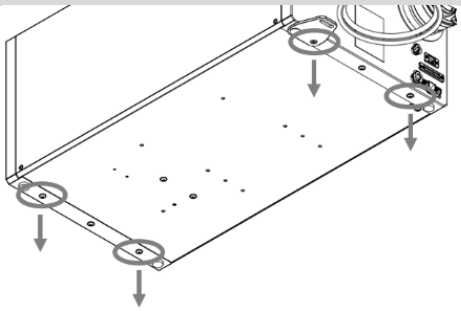
Four mounting brackets are included in the scope of delivery. With these, the device can optionally be fixed to a suitable base.



NOTICE

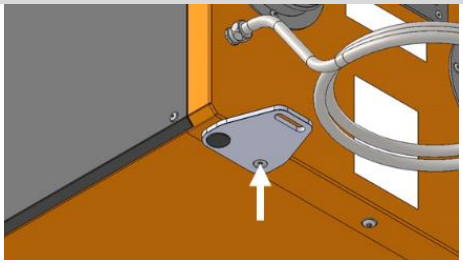
Do not tilt the unit when installing the mounting brackets.

1. Remove flange head screws



Remove the 4 flange head screws (M6) next to the rubber feet

2. Install mounting brackets



Screw the 4 mounting brackets to the housing by using the 4 countersunk screws.

Check the mounting brackets for firm hold.

4.2. Installing the supply and exhaust air

DANGER

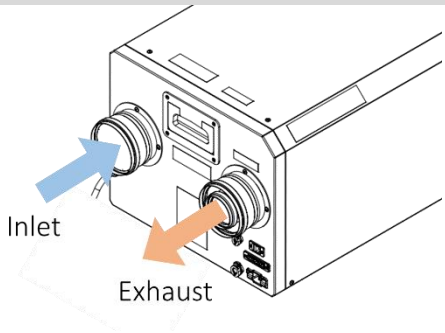
DANGER DUE TO BLOCKED OR LEAKING EXHAUST PASSAGES

exhaust air may contain carbon monoxide. Carbon monoxide is a colorless, odorless, and tasteless toxic gas. Poisoning from carbon monoxide can cause significant health discomfort, unconsciousness, and even death.

The Ecoport must never be operated without an exhaust system in a house or garage, even if doors and windows are open.

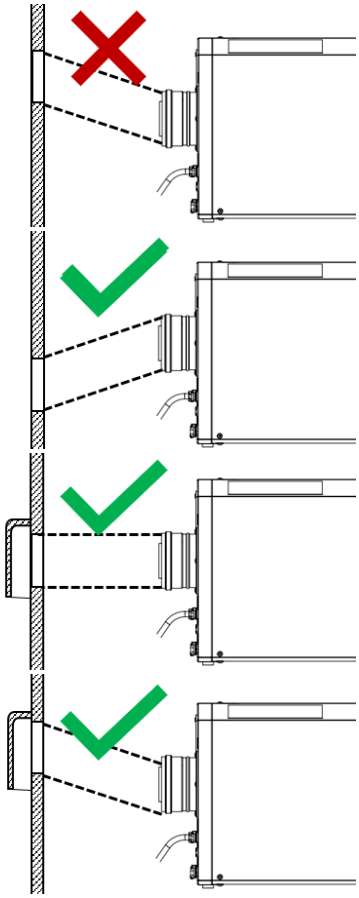
The exhaust system must always have a connection to the outside.

1. Prepare the installation space



Place the Ecoport at the desired location.

Prepare two openings to the outside with a diameter of Ø 100 mm each.



NOTICE

To prevent water from entering (due to rain or snow), the supply and exhaust air hoses should be routed downwards or the opening to the outside should be protected from atmospheric exposure

Air supply

1. Bring the supply air pipe to size

Bring the corrugated aluminum pipe (Ø 100 mm) to the appropriate length between the black inlet air socket of the Ecoport and the passage to the outside by pulling it out or cutting it to size

NOTICE

To facilitate installation, the pipe clamps (Ø 100 mm) can already be placed onto the cut-to-size corrugated aluminum pipe (Ø 100 mm).

2. Fasten the supply air pipe

Fasten the corrugated aluminum pipe (Ø 100 mm) with the pipe clamps (Ø 100 mm) to the black inlet air socket of the Ecoport and the passage to the outside

Exhaust air

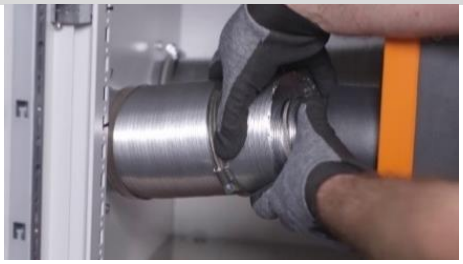
3. Bring the exhaust air pipe to size

By extending or cutting to size, bring the two corrugated aluminum pipes (Ø 100 mm & Ø 70 mm) to the appropriate length between the black exhaust air socket of the Ecoport and the passage to the outside.

4. Insert inner into outer exhaust air pipe

Insert the narrower corrugated aluminum tube (Ø 70 mm) into the wider corrugated aluminum tube (Ø 100 mm).

5. Fasten inner exhaust pipe



Attach the inner corrugated aluminum pipe (Ø 70 mm) to the inner exhaust pipe of the Ecoport and fix it with the pipe clamp (Ø 70 mm)

6. Fasten outer exhaust pipe

Fix the outer corrugated aluminum pipe (Ø 100 mm) on both sides with one pipe clamp each.

7. Control air inlet and outlet

Mount the supply and exhaust air grille at the outer end of the corrugated aluminum pipes.

Check that the inlet and outlet is firmly fitted.

NOTICE

Covers and blockages must be removed. Ensure that the exhaust air outlet and the supply air inlet are free of clogging.

4.3. Connecting the methanol supply

DANGER

Please observe the safety instructions for handling methanol

NOTICE

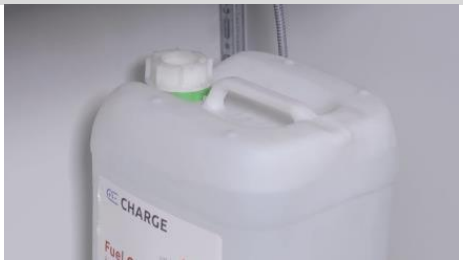
Make sure that the methanol supply line is protected against tearing and free from bends

Do not position the QE Charge methanol cartridge or external tank above the level of the Ecoport. Place the cartridge or tank with the opening facing upwards.

1. Prepare the installation space

Guide the tank supply line of the Ecoport through the prepared breakthrough (approx. Ø 100 mm).

2. Place tank



Place the full cartridge in the desired position. Make sure that the cartridge is upright and stands on solid ground.

3. Open the cartridge

Open the cap of the full cartridge using the barrel wrench (this is included in the accessories of your Ecoport) by turning it counterclockwise

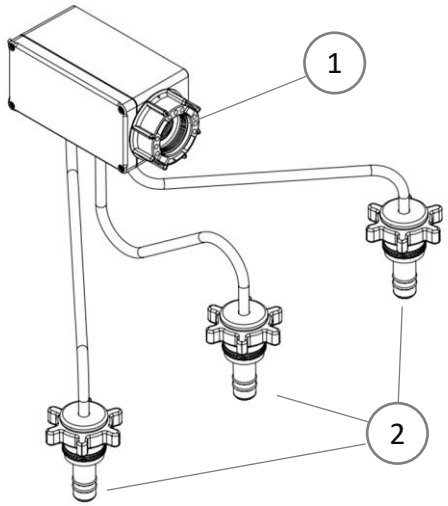
Stow the sealing cap safely (for example in the barrel wrench bag)

4. Connect the dispensing head

Insert the dispensing head into the full cartridge by turning it clockwise. Check for firm hold.

SIQENS multi tank connector

The SIQENS multi tank connector enables the connection of several tanks or canisters with one Ecoport.



- Connect the dispensing head of the Ecoport to the connector socket
- Connect the dispensing heads of the multi tank connector to the individual tanks or cartridges.
- Make sure that all dispensing heads are tightly and firmly connected to the tanks or cartridges.

Connectors multi tank connector
1 Connector to the SIQENS Ecoport
2 Dispensing head to be connected to cartridge or tank

NOTICE

The methanol is extracted evenly from the cartridges. Any difference regarding the filling level in the cartridges is automatically balanced out. Please note that all tanks should be placed on even ground.

Make sure that no air is sucked into the system through any of the hoses (for example, through an empty or unconnected tank or cartridge).

4.4. Connecting the battery

NOTICE

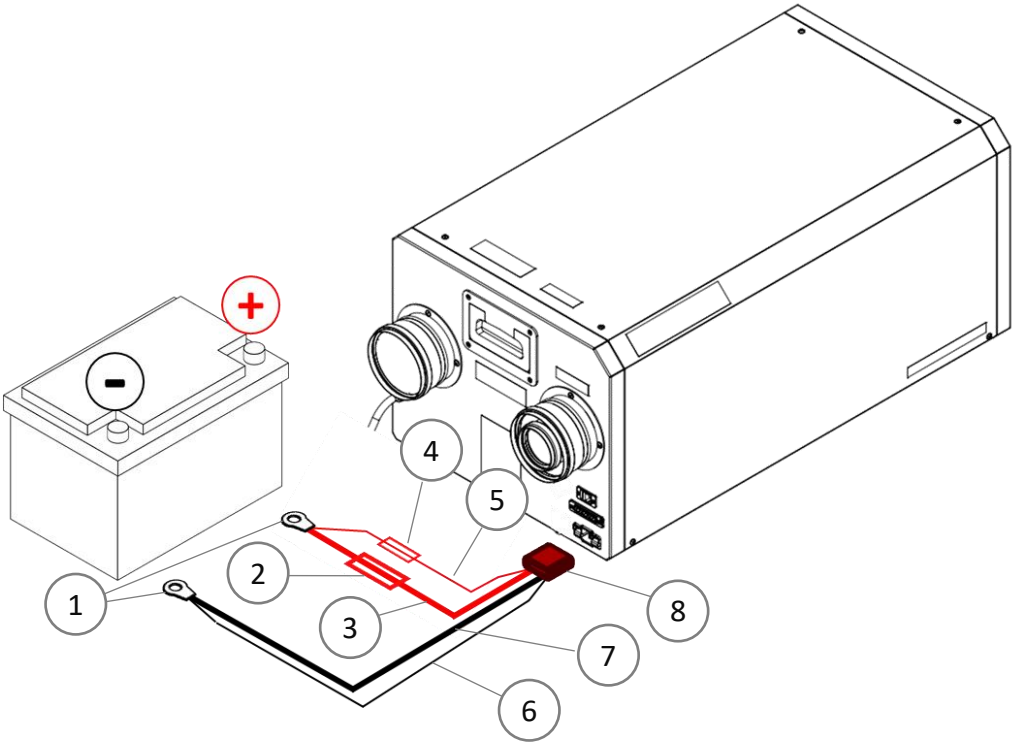
EMERGENCY OFF

The Ecoport can be disconnected from the 24V/48V mains via the battery plug.

Besides the Ecoport, other energy sources, for example photovoltaic and wind, can be connected to the same battery.

The Ecoport is connected directly to the battery.

The SIQENS Ecoport 800 is available as a 24V or 48V version. Please ensure that the nominal voltage of the battery matches the nominal voltage of your Ecoport.



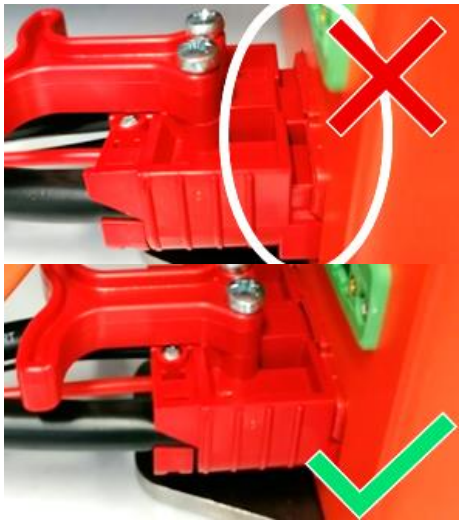
Description battery cable
1 M8 ring lugs (for battery contacts)
2 Fuse (40 A) for battery cable
3 Battery cable (+) (16mm²)
4 Quick micro fuse (200 mA) for voltage sensing line
5 Voltage sensing line (+)
6 Voltage sensing line (-)
7 Battery cable (-) (16mm²)
8 Power connector to Ecoport (type: Anderson Power SBE 80)

NOTICE

To protect the battery from deep discharge, the Ecoport will not start if the battery voltage is below 22.0 V / 44.0 V. Before starting, the battery must be charged externally (e.g. via a battery charger or generator).

1. Connect battery cable to Ecoport

Insert the battery cable into the battery plug of the Ecoport.



Make sure that the cable is firmly seated and fully latched in place.

2. Connect battery cable to battery

The red contact of the battery cable must be connected to the positive pole (+) of the battery.

The black contact of the battery cable must be connected to the negative pole (-) of the battery.

As soon as a voltage is present, the fans of the Ecoport start a function check.

NOTICE

Pay attention to the polarity when connecting the cables

Voltage thresholds

The following values are predefined in the control panel for the end-of-charge voltage of different battery types. You can manually assign other values via the control panel.

Battery type	Charging end voltage	
	24 V	48 V
Lithium battery	29.0 V	58.0 V
Lead-acid battery	28.8 V	57.6 V
Lead-AGM battery	29.4 V	58.8 V
Lead-gel battery	29.0 V	58.0 V
Custom	up to 30.0 V	Up to 60.0 V

Please note that voltages may vary depending on the cell type and manufacturer. Follow the manufacturer's charging recommendations or contact SIQENS technical support.

NOTICE

Defective batteries or a reduction in battery capacity due to aging effects or improper use (e.g. deep discharge) can lead to an increased number of starts and thus a shortened operating life of the Ecoport.

The Ecoport does not perform trickle charging of batteries. Regular full charging via photovoltaics or an external battery charger can increase the lifetime of lead batteries.

4.5. Connecting the control panel

1. Connect the data cable

Use the data cable (Ethernet RJ-45) included in the accessories to connect the Ecoport to the control panel.

The control panel is supplied with power via the data cable.

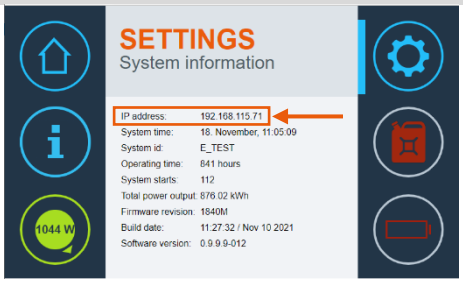
As soon as the Ecoport is connected to a battery, the control panel automatically establishes a connection. This requires no further input.

2. Connect the LTE antennas

To use SIQENS remote monitoring, the two LTE antennas must be attached to the control panel.

Please note that a mobile signal is required to establish a connection.

3. Check the network connection



If the value for the IP address in the “Info” menu is 127.0.0.0, the Ecoport has no connection to the mobile network.

Please check the position and connection of the LTE antennas.

5. Operation

A charging cycle of the Ecoport follows the procedure described below:

1. The system start is triggered by a preset battery voltage, the external input or manually via the control panel.
2. The device heats up until it reaches the operating temperature. This process takes about 30 min.
3. The charging phase takes place with nearly constant power.
4. When the preset charging end voltage is reached or as soon as the external signal is no longer applied, the cooling phase begins and the Ecoport returns to stand-by.

Further information on the startup behavior can be obtained under X.1. Energy consumption during startup

To ensure the correct connection of all components of your energy system, the initial start-up of the Ecoport should be carried out right after installation.

For a video on installation and initial operation, please visit the following link:

https://youtu.be/Ve6oepZlvog

5.1. Quickstart

1. Connect the QE Charge methanol cartridge or tank

Connect the QE Charge methanol cartridge or the external tank to the methanol supply line (1.5 m) of the Ecoport.

Use the enclosed barrel wrench to open and close the cartridge.

For a detailed description, see 4.3. Connecting the methanol supply.

DANGER

Please observe the safety instructions for handling methanol

NOTICE

Do not position the QE Charge methanol cartridge or external tank above the level of the Ecoport. Place the cartridge or tank with the opening facing upwards.

2. Connect the battery

Insert the battery cable into the battery plug of the Ecoport.

The red contact of the battery cable must be connected to the positive pole (+) of the battery.

The black contact of the battery cable must be connected to the negative pole (-) of the battery.

As soon as a voltage is present, the fans of the Ecoport start a function check.

For a detailed description, see 4.4. Connecting the battery.

NOTICE

Pay attention to the polarity when connecting the cables

Besides the Ecoport, other energy sources, for example photovoltaic and wind, can be connected to the same battery

3. Connect the control panel

Use the data cable (Ethernet RJ-45) included in the accessories to connect the Ecoport to the control panel.

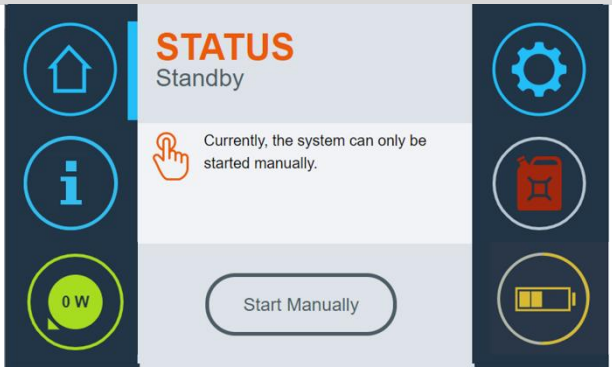
As soon as the Ecoport is connected to a battery, the control panel automatically establishes a connection. This requires no further input..

Operating modes

The Ecoport It can be started and stopped via three different operating modes:

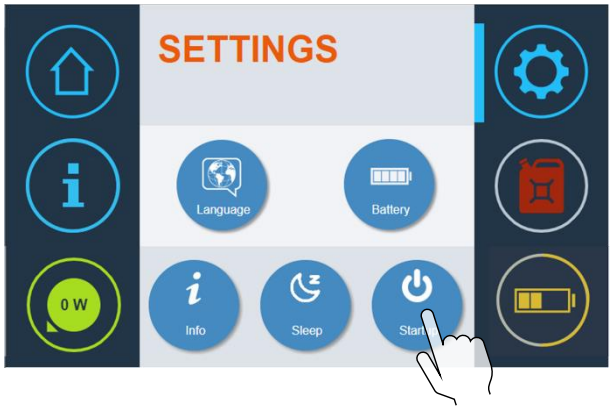
- Automatically via the battery voltage
- Manually through the control panel
- Via the external input

Changing the operating mode

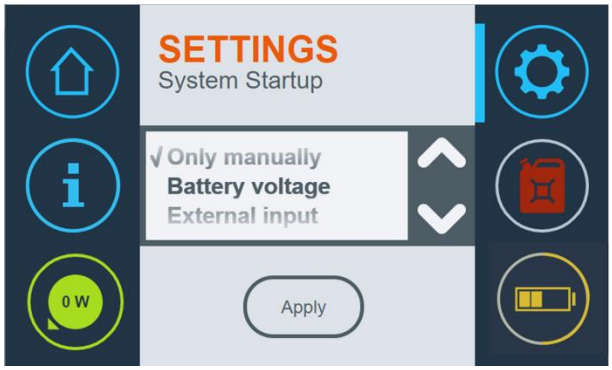


At the first start, the Ecoport is in manual mode. Perform the following settings to select the desired operating mode.

Further information on how to use the control panel can be found under 5.3. Control panel



Under "Settings", select the "Startup" item.



Choose the desired mode and confirm your selection:

- Only manually
- Battery voltage
- External input

5.1.1. Battery voltage

In battery voltage operation, the Ecoport starts automatically as soon as the battery reaches a preset voltage threshold.

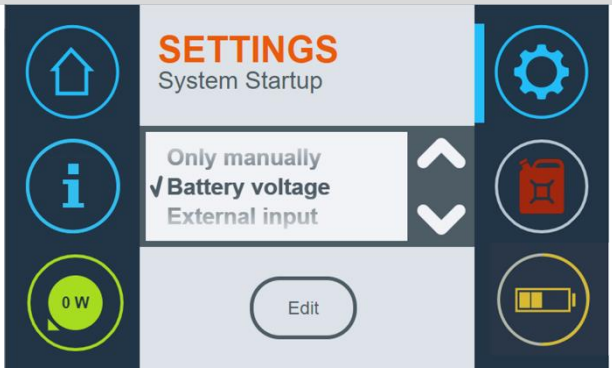
The battery is then charged until a specified upper voltage threshold is reached.

The following values are predefined in the control panel for the end-of-charge voltage of different battery types. You can manually assign other values via the control panel.

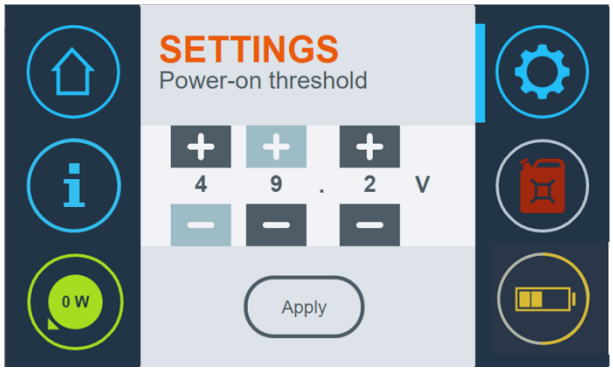
Battery type	Charging end voltage	
	24 V	48 V
Lithium battery	29.0 V	58.0 V
Lead-acid battery	28.8 V	57.6 V
Lead-AGM battery	29.4 V	58.8 V
Lead-gel battery	29.0 V	58.0 V
Custom	up to 30.0 V	Up to 60.0 V

Please note that voltages may vary depending on the cell type and manufacturer. Follow the manufacturer's charging recommendations or contact SIQENS technical support.

Select: Battery voltage

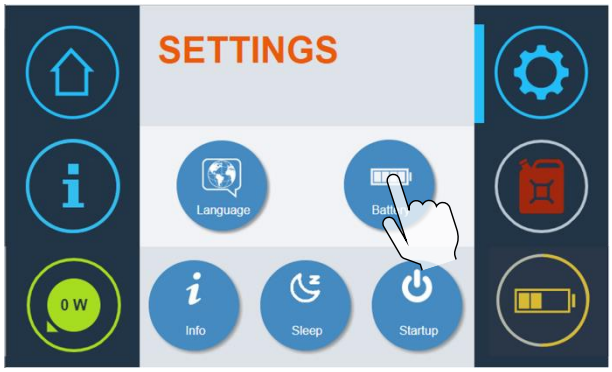


Select “Battery voltage” in the “Startup” menu.

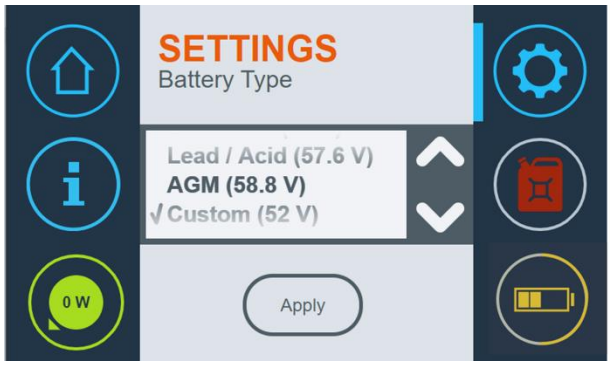


Next, set the switch-on voltage.

Confirm your selection by clicking "Apply".



Then select the upper voltage threshold under "Settings" in the "Battery" menu item. Once the battery reaches this voltage, the Ecoport will stop charging.



Recommended values for the upper voltage threshold of various battery types are already specified in the control panel. Additional end charge voltages can be set by the user.

NOTICE

Do not select the start voltage threshold too low. Approx. 200 Wh of electrical energy from the battery are required to start the Ecoport. Further information on the starting behavior can be found under X.1. Energy consumption during startup

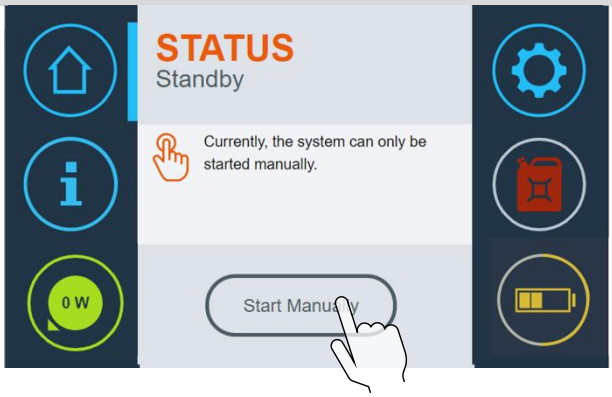
To protect the battery from deep discharge, the Ecoport will not start if the battery voltage is below 22.0 V / 44.0 V. Before starting, the battery must be charged externally (e.g. via a battery charger or generator).

5.1.2. Only manually

In manual mode, the operation of the Ecoport is started and stopped via the control panel. No further configuration is necessary.

A manual start of the Ecoport is possible at any time. Even if the operating mode "battery voltage" or "external input" is selected.

Select: Manually only



Select the option " Manually only" under "Settings" in the menu item "Startup" and confirm your selection.

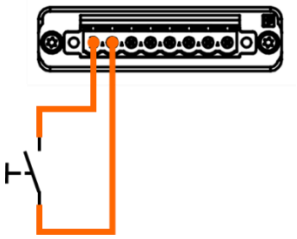
The Ecoport can be started as desired via the "Home" menu.

5.1.3. External input

The Ecoport can be started using the signal connector.

A typical application is, for example, a user-defined hard-wired switch and automatic control by an external battery management system (BMS).

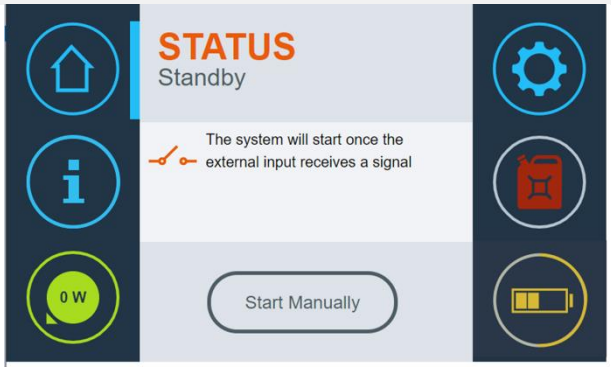
Functionality



The Ecoport is started by short-circuiting pin 1 and pin 2. This can be controlled via an external switch.

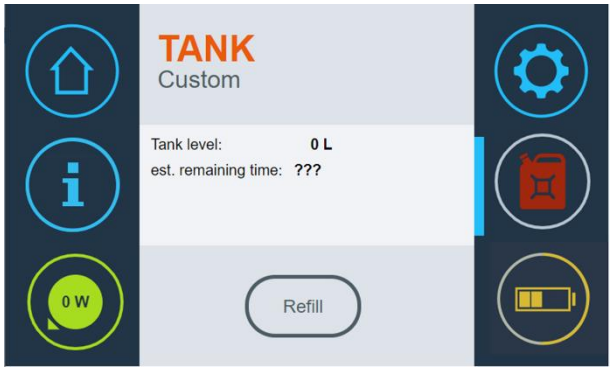
When the switch is opened, the Ecoport stops producing power and returns to stand-by.

Select: External input

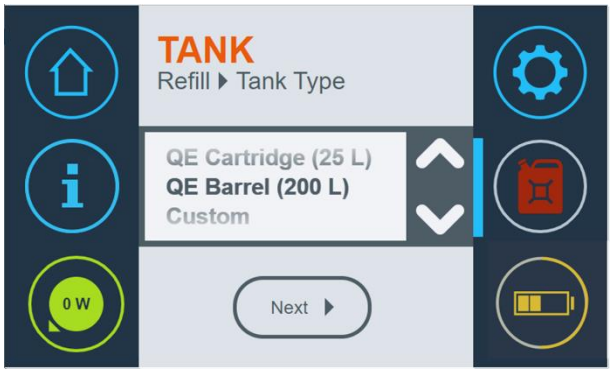


Under "Settings" in the "Startup" menu, select the "External input" option and confirm your selection.

4. Set tank level

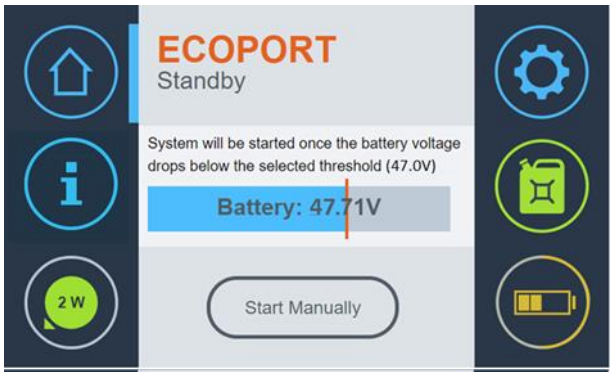


Select the "Refill" option in the "Tank" menu.

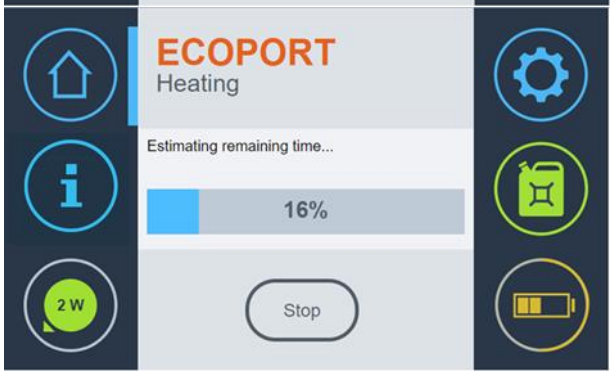


You can choose between preselected container sizes or specify the refill by volume individually.

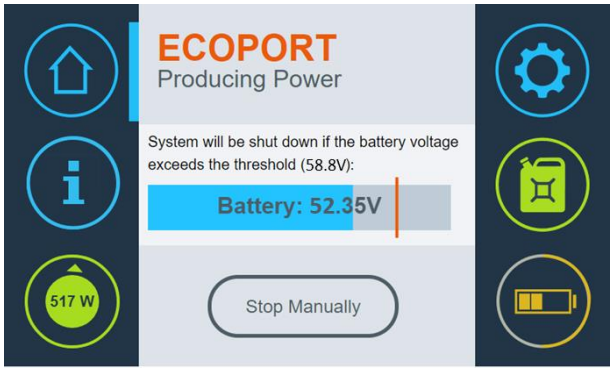
5. First start of the Ecoport



Carry out the first start of the Ecoport by clicking the button "Start manually".



The heating phase starts automatically. After approx. 30 minutes, the Ecoport starts charging the battery. You can interrupt this process at any time.



The "Home" screen indicating the operating status is displayed automatically after the heating phase. The charging process (charging cycle) begins.

NOTICE

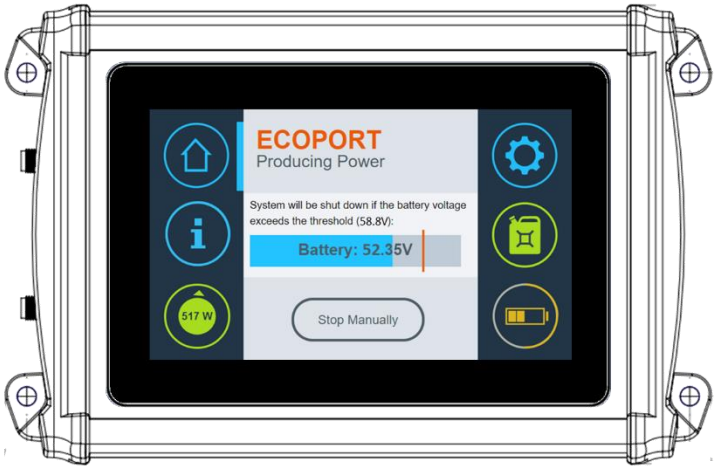
Too many starts may damage the Ecoport. The net capacity of the battery should be at least 2 kWh. When designing the battery system, it is recommended that the Ecoport runs for at least 6 h per charging cycle.

5.2. Control panel

The Ecoport can be controlled and displayed via a touch-sensitive color display with illuminated background.

NOTICE

- Only operate the touch panel with your fingers.
- Pointed or sharp objects can damage the surface of the touch panel.
- Avoid touching several buttons at once



Control Panel

Home
Operating status

Information
Error messages

Power
Current output

Settings
Language, Sleep mode, …

Tank
Fill level > 50%

Battery
Voltage > 27.5 V
(48V-Version: > 55 V)

Notifications

Home
System stopped due to error

Information
New error message

Tank
Fill level > 25%

Tank
Fill level < 25%

Battery
Voltage < 27.5 V *(< 55 V)*

Battery
Voltage < 26 V *(< 52 V)*

Battery
Voltage < 24 V *(< 48 V)*

Battery
Voltage < 22.5 V *(< 45 V)*

5.2.1. Settings

To change a setting, press the corresponding button.

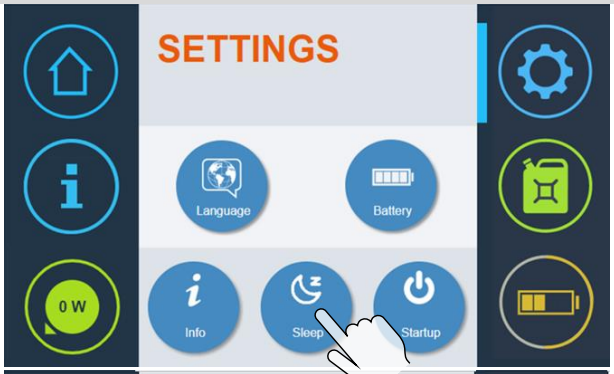
Settings	
	**Language** Change system language for menu navigation, messages, etc. to German or English
	**Battery** Select battery type to specify the upper voltage threshold (5.1.1. Battery voltage)
	**System information:** - IP address - Time - System ID - Operating time (total) - System starts . Generated energy (total) - Firmware version - Build date - Software version
	**Sleep mode** Activates a sleep interval to reduce stand-by consumption (5.2.2. Sleep mode)
	**Start** Configure operating mode (Operating modes in 5.1. Quickstart)

5.2.2. Sleep mode

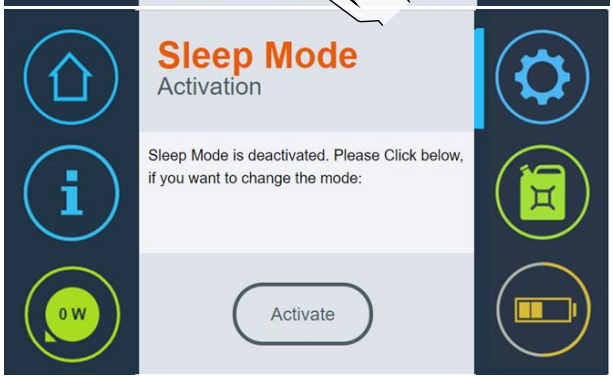
In sleep mode, the Ecoport enters an energy-efficient standby mode. In this state, automatic operation is still possible without restrictions. For manual intervention, the black button on the side of the control panel must be pressed and held for about 3 seconds.

At an adjustable wake-up interval, the Ecoport sends the system status and data on battery voltage and tank level to the remote monitoring platform.

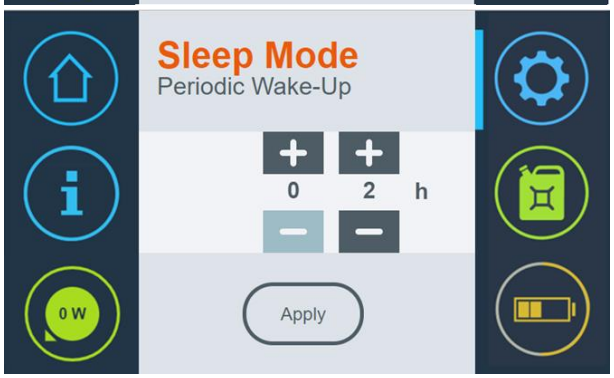
Activate the sleep mode



Select the "Sleep mode" menu item under "Settings".



Activate the sleep mode by pressing "Activate" and confirming your entry.



Set the desired wake-up interval.

5.2.3. Error messages

Error messages display malfunctions of the system. They consist of:

Error message

1 Error number
2 Error description
3 Solution

As soon as the cause of the error has been eliminated, the error can be cleared and the device restarted.

5.3. Refueling

Refueling of the Ecoport 800 is easy and safe thanks to the built-in dispensing head. A tank change is also possible during operation. To prevent air from being drawn into the system via the suction hose, the tank should be changed quickly (within 30 seconds).

NOTICE

The methanol is extracted evenly from the cartridges. Any difference regarding the filling level in the cartridges is automatically balanced out. Please note that all tanks should be placed on even ground.

Make sure that no air is sucked into the system through any of the hoses (for example, through an empty or unconnected tank or cartridge).

The following video will guide you through the refueling process:

https://youtu.be/cq8FuFq-GX8

1. Remove dispensing head

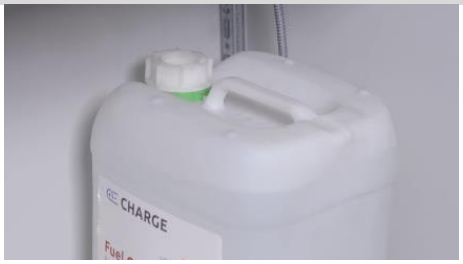
Remove the dispensing head of the Ecoport or the multi tank connector from the connected cartridge by turning it counterclockwise.

2. Open the cartridge / tank

Open the cap of the full cartridge using the barrel wrench (this is included in the accessories of your Ecoport) by turning it counterclockwise

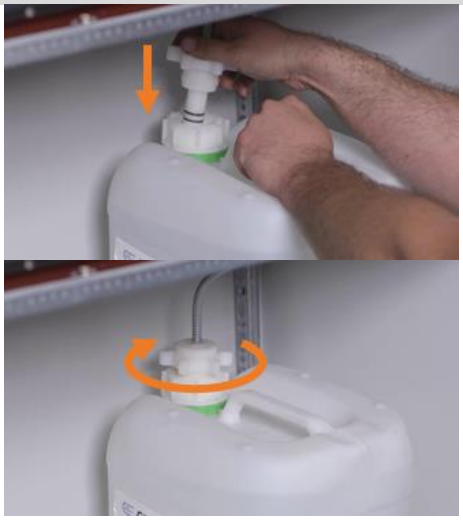
Stow the sealing cap safely (for example in the barrel wrench bag)

3. Place tank / cartridge



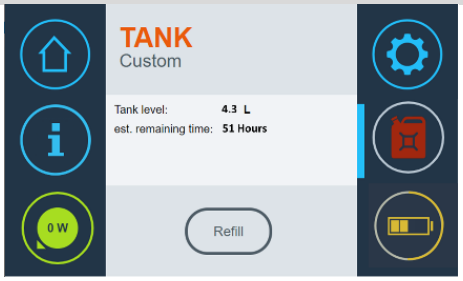
Place the full cartridge in the desired position. Make sure that the cartridge is upright and stands on solid ground.

4. Connect the dispensing head



Insert the dispensing head into the full cartridge by turning it clockwise. Check for firm hold.

5. Adjust tank level



In the Control Panel, update the fill level of your Ecoport in the "Tank" menu item.

You can choose between preset container sizes or adjust the refill quantity individually.

6. Seal cartridge

Close the old cartridge with a sealing cap and hand-tighten it with the barrel wrench by turning it clockwise.

To ensure the correct connection of the cartridge or external tank, it is recommended to start the Ecoport manually after refueling.

CAUTION

Observe sections 2.2. General safety instructions and 2.2.1. Safety instructions for handling methanol, as well as the enclosed safety data sheet.

6. Service and maintenance

If you have technical questions, our support team will be happy to assist:

Technical Support
support@siqens.de
+ 49 176 420 257 03

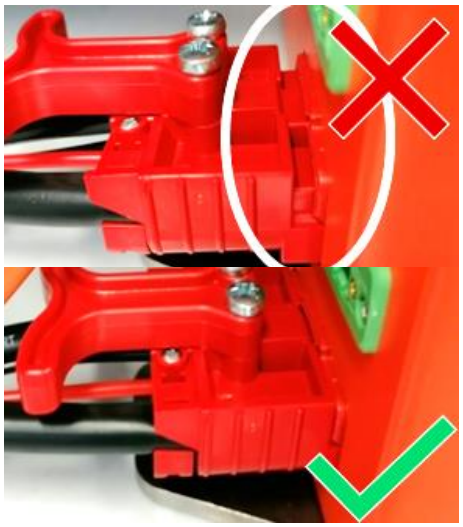
Under normal operating conditions, the Ecoport is maintenance-free.

If a dust filter (Art. No. 60136) is installed in the black air inlet of your Ecoport, it should be replaced when visible contamination occurs (e.g. in particularly dusty application areas).

6.1. Trouble shooting

In most cases, errors can be eliminated by simply checking the installation setup. Before the first start, check the following points:

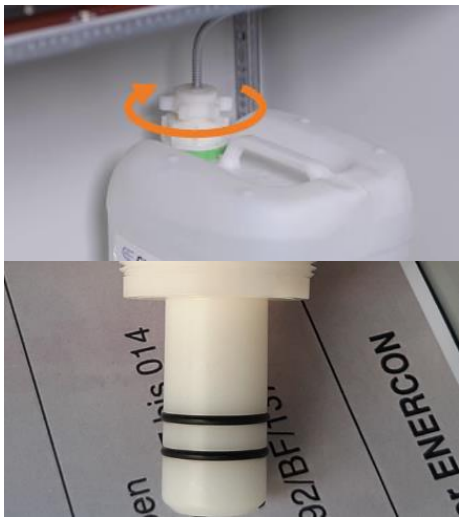
Battery cable



Description: The Ecoport does not perform a function check (start the fans) after connecting the battery and the signal light on the control panel does not light up.

Solution: Make sure that the battery cable is firmly seated and fully snapped into place.

Tank connection



Description: Air is drawn in via a connected tank. In the control panel, this could be signaled - among others - by error #48 (E_MAX_SYSTEM_RESTARTS).

Solution: Make sure that the dispensing head is firmly connected to the attached cartridge or external tank.

Solution: Make sure that the O-rings on the dispensing head are correctly positioned

Air supply and exhaust

Description: The system overheats during operation. In the control panel, this may be indicated - among others - by error #21 (E_ME_TEMPERATURE_ CRITICAL).

Solution: Check the supply and exhaust air pipes for blockages and ensure that the exhaust air is correctly released to the outside via the exhaust air pipe.

6.1.1. Error list and description

ID	Error code	Description	1. Solution	2. Solution
1	E_SENSOR_NOT_ALIVE	Sensor failure	Please contact the SIQENS support	
10	E_FS_ME_ABOVE	The level of the media unit is too high	Please contact the SIQENS support	Please contact the SIQENS support
12	E_FS_ME_EMPTY	The level of the media unit is too low	Please check the ambient temperature, as well as the air supply and exhaust for any blockages	Please contact the SIQENS support
13	E_FS_ME_LS_STATE_INCONSISTENT	Faulty sensor in the media unit	Please contact the SIQENS support	
17	E_BATTERY_VOLTAGE_TOO_LOW	The battery voltage is too low To prevent over-discharge, it is no longer possible to start the Ecoport. Please charge the battery externally via a charger or replace it.	Please charge the battery externally or replace the battery.	
21	E_ME_TEMPERATURE_CRITICAL	The media unit temperature is too high	Please check the ambient temperature, as well as the air supply and exhaust for any blockages	Please contact the SIQENS support
23	E_KB_TEMPERATURE_CRITICAL	The catalytic burner temperature is too high	Please check the ambient temperature, as well as the air supply and exhaust for any blockages	Please contact the SIQENS support
25	E_REF2_TEMPERATURE_CRITICAL	The reformer temperature is too high	Please check the ambient temperature, as well as the air supply and exhaust for any blockages	Please contact the SIQENS support
40	E_KG_CRITICAL_PERFORMANCE	Faulty sensor value or defective fan	Please contact the SIQENS support	
41	E_KBG_CRITICAL_PERFORMANCE	Faulty sensor value or defective fan	Please contact the SIQENS support	

ID	Error code	Description	1. Solution	2. Solution
42	E_CURRENT_ERROR	Faulty voltage measurement	Please check the battery cable for firm hold	Please contact the SIQENS support
48	E_MAX_SYSTEM_RESTARTS	Operating error	Please check the battery and the fuel tank for firm hold and make sure that supply and exhaust air are free from blockages	Please contact the SIQENS support
50	E_ME_EMPTY_STARTUP	The level of the media unit is too low	Please contact the SIQENS support	
51	E_SB_TOO_HOT	The startup burner temperature is too high	Please check the ambient temperature, as well as the air supply and exhaust for any blockages	Please contact the SIQENS support
58	E_SB_FLAME_GUARD	Defective startup burner	Please contact the SIQENS support	
61	E_F5SY_CRITICAL_PERFORMANCE	Faulty sensor value or defective fan	Please contact the SIQENS support	
62	E_SBG_CRITICAL_PERFORMANCE	Faulty sensor value or defective fan	Please contact the SIQENS support	
63	E_F1L_CRITICAL_PERFORMANCE	Faulty sensor value or defective fan	Please contact the SIQENS support	

7. Decommissioning

7.1. Storage

Before storing the Ecoport over longer periods of time, make sure to separate the device from battery and tank. Seal the tank properly.

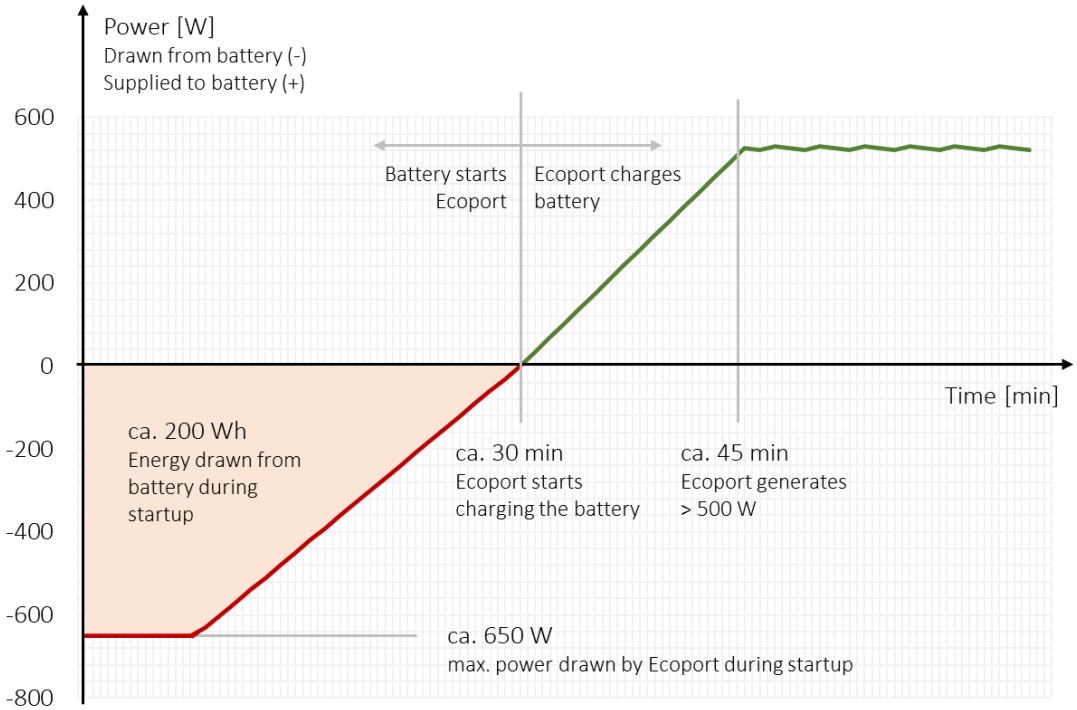
7.2. Disposal

Protect the environment and contribute to saving resources. SIQENS will collect and professionally recycle your Ecoport. Please contact the SIQENS sales team before you dispose of old devices.

The device must be disposed of in accordance with the administrative regulations in the country of use. National rules and legislation must be observed.

X. Appendix

X.1. Energy consumption during startup



Average values for startup. Actual curve may show minor fluctuations resulting from different environmental conditions.

X.2. Methanol specification

IMPCA METHANOL REFERENCE SPECIFICATIONS
Version 9, 10th June 2021

	TEST	UNIT	METHOD	LIMITS
1	Appearance		IMPCA 003	Clear and free from suspended matter
2	Purity on dry basis	% W/W	IMPCA 001	Min 99.85
3	Acetone	mg/kg	IMPCA 001	Max 30
4	Ethanol	mg/kg	IMPCA 001	Max 50
5	Colour	Pt-Co	ASTM D 1209 ASTM D 5386	Max 5
6	Water	% W/W	ASTM E 1064	Max 0.100
7	Distillation Range at 760 mm Hg	°C	ASTM D 1078	Max 1.0
8	Specific Gravity 20°C/20°C		ASTM D 4052	0.7910-0.7930
9	Potassium Permanganate Time test at 15°C	minutes	ASTM D 1363	Min 60
10	Chloride as Cl- Note 3, page 3	mg/kg	IMPCA 002	Max 0.5
11	Sulfur Note 1, page 3	mg/kg	ASTM D 3961 ASTM D 5453	Max 0.5
12	Water miscibility		ASTM D 1722	Pass test
13	Carbonizables	Pt-Co	ASTM E 346	Max 30
14	Acidity as Acetic Acid	mg/kg	ASTM D 1613	Max 30
15	Iron in solution	mg/kg	ASTM E 394	Max 0.10
16	Non Volatile Matter	mg/1000ml	ASTM D 1353	Max 8
17	TMA Note 2, page 3		optional (see notes for recommended methods)	
18	Aromatics Note 2, page 3		optional (see notes for recommended methods)	

The current version of the IMPCA spec sheet can be retrieved through the following link:

www.siqens.de/en/docs

X.3. EG-Decleration of conformity

SIQENS

EC-Declaration of conformity

CE

The manufacturer:

Siqens GmbH
Landsberger Straße 318 d
80687 Munich, Germany

The manufacturer hereby declares that the following products, an ECOPORT series fuel cell power generator with the type designation **ECOPORT 800, design 1V2** according to serial number, the applicable requirements have been applied in accordance with this EC Directive:

EMC-Directive 2004/108/EG

Applied harmonized standards are:

DIN EN 61000-6-3
DIN EN 61000-6-1

The authorized person for the compilation of the technical documentation is:
Mr. Sascha Adler, Siqens GmbH, Landsberger Straße 318 d, 80687 Munich, Germany.

Other standards and technical specifications were applied and the requirements were implemented:

- **DIN EN 62282-5-1**
  Fuel cell technologies – Portable fuel cell energy systems - Safety
- **DIN EN 60529**
  International protection marking by mechanical casings and electrical enclosures (IP Code)
- **UL 94**
  Flammability class – Use of flame retardant self-extinguishing materials after V-1
- **DIN EN 60079-10-1**
  Explosive atmospheres – Classification of the areas affected by gas explosions

This declaration of conformity will become invalid if the product is used improperly or unauthorized.

Signatories:
Volker Harbusch, Managing Director

Munich, 29th of may 2018 Signature:

Siqens GmbH
Landsberger Str. 318d
80687 München
Germany
Amtsgericht München
HRB 201201

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Volker Harbusch

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Appendix:

Further explanations and details of our declaration of conformity.

In addition to the normal requirements for CE conformity, our fuel cell systems undergo extensive testing and testing to ensure all functions and reliability even under various environmental conditions.

In the table below, we have listed all tests necessary for the functional proof of the product specification. The validation tests are combined with the corresponding product properties / specifications.

Specification	Standards / Guidlines	Validation
Operating life 3,000 h guaranteed	DIN EN 62282-5-1 DIN EN 62282-6-200: Fuel cell energy systems - Performance rating test	Lifetime test
Cycle stability	Cyclic system operation over 3,000 hours with at least 500 starts and stops	
	DIN EN 62282-6-200 At least 10 cycles (freezing / thawing) freezing at -20 ° C / 24 h, thawing at +23 ° C / 12	
Ambient temperature	DIN EN 62282-5-1 3x 24 h Cycles in the high and low temperature range - 25 ° C to +50 ° C, cold starts at <0 ° C to -20 ° C	Function in high and low temperature operation, surface temperatures
Power	DIN EN 62282-6-200 Performance determination: output power, fuel consumption, starting time	Function, partial load operation, charging strategy
Methanol consumption		
Material resistance	DIN EN 62282-5-1, UL 94	Material suitability
Variable orientation	DIN EN 62282-6-200	Tilt tests around X / Y axis
Vibration test	VW 801 01: Electrical and electronic assemblies in motor vehicles	Mechanical strength, vibration resistance
Degree of protection for touch and foreign body protection; Degree of protection for water protection	DIN EN 60529; DIN EN 40050: Road vehicles DIN EN ISO 9227 Salt spray test especially for filter materials	Dust and splash protection

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