

EFOY-Generation

Partnertag SFCxMEV

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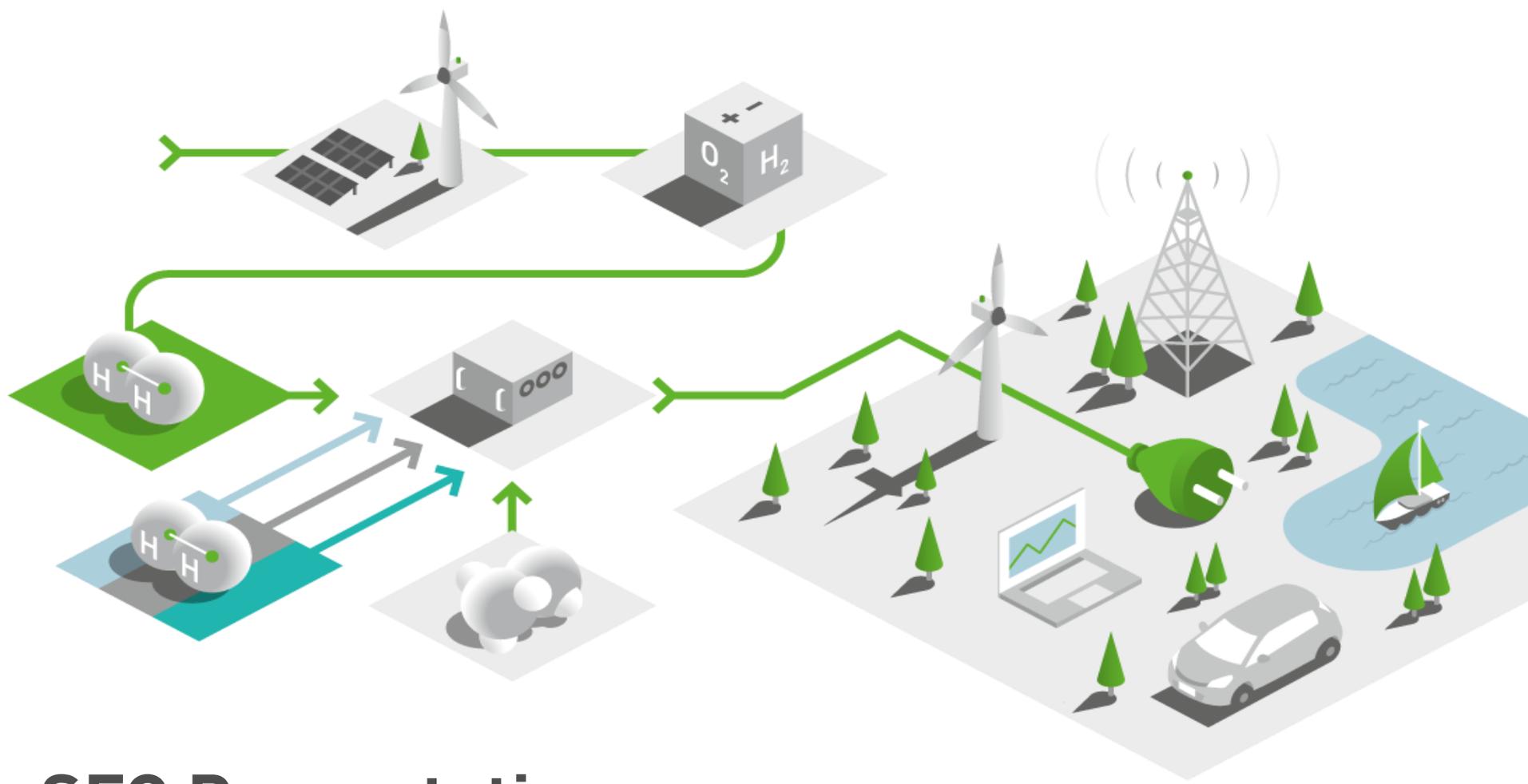
85649 Brunnthal

Germany



Agenda

- 01 Product Overview
- 02 Operation and Communication
- 03 Installation & Best Practice
- 04 EFOY Cloud
- 05 EFOY Cluster functionality & Multisense
- 06 Energy Solutions
- 07 Batteries & EFOY charging parameters
- 08 Warnings & Errors



SFC Presentation

Product Overview

How does the EFOY Pro work ?

Energy on demand – automatic charging



More on the EFOY fuel cell technology:
<https://www.efoy-pro.com/en/efoy/technology/>

EFOY Fuel Cells

Product Overview



EFOY 80

EFOY 150

EFOY Pro 900

EFOY Pro 1800

EFOY Pro 2800

Max. Output Power	40 W	75 W	42 W	82 W	125 W
Output Power after 3.000 hours	24 W	45 W	34 W	68 W	105 W
Output Power after 6.000 hours	--	--	28 W	56 W	87 W
Guaranteed lifetime	3000 h	3000 h	6000 h	6000 h	6000 h
Cumulated power output over guaranteed lifetime	~ 96 kWh	~ 180 kWh	~ 210 kWh	~ 414 kWh	~ 636 kWh

EFOY Fuel Manager

Product Overview



FM2



FM4

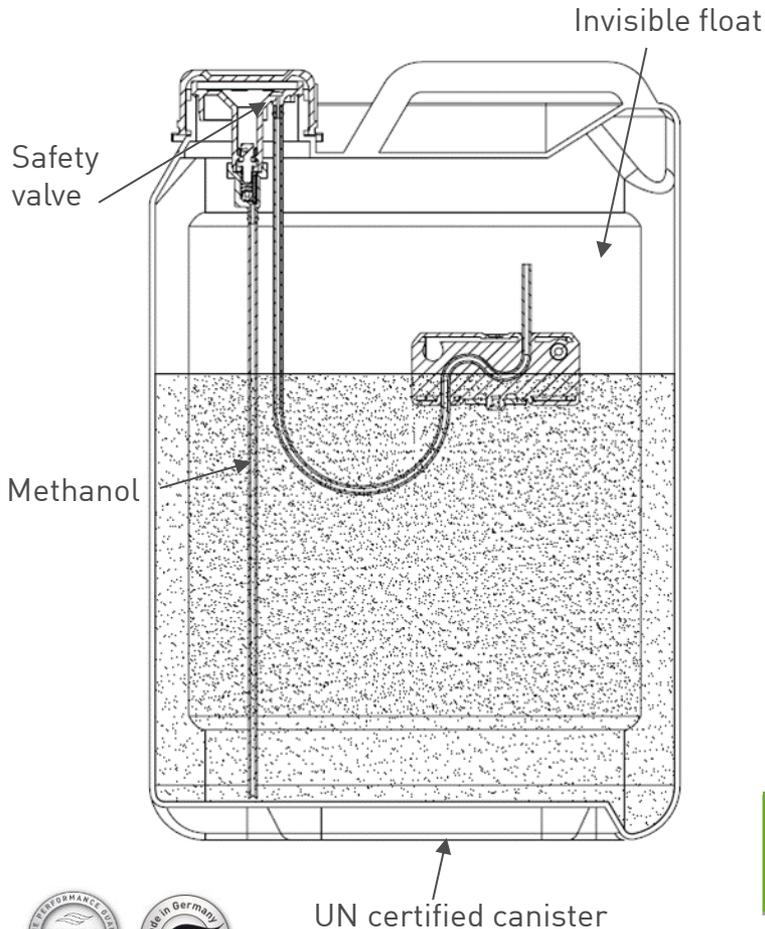


FM8

Article	EFOY Fuel Manager FM2	EFOY Fuel Manager FM4	EFOY Fuel Manager FM8
Connectable fuel cartridges	2	4	8
Dimensions (L x W x H)	150 x 73 x 170 mm	150 x 127 x 170 mm	150 x 235 x 170 mm
Weight	0,97 kg	1,73 kg	3,24 kg
Length of fuel connectors	1,25 m	1,25 m	1,25 m

EFOY Pro fuel cells and fuel cartridges

Product Safety



- 🔌 SFC developed and patented safety valve
- 🔌 Guaranteed ultra pure methanol quality !
- 🔌 Certified for road, sea and air freight



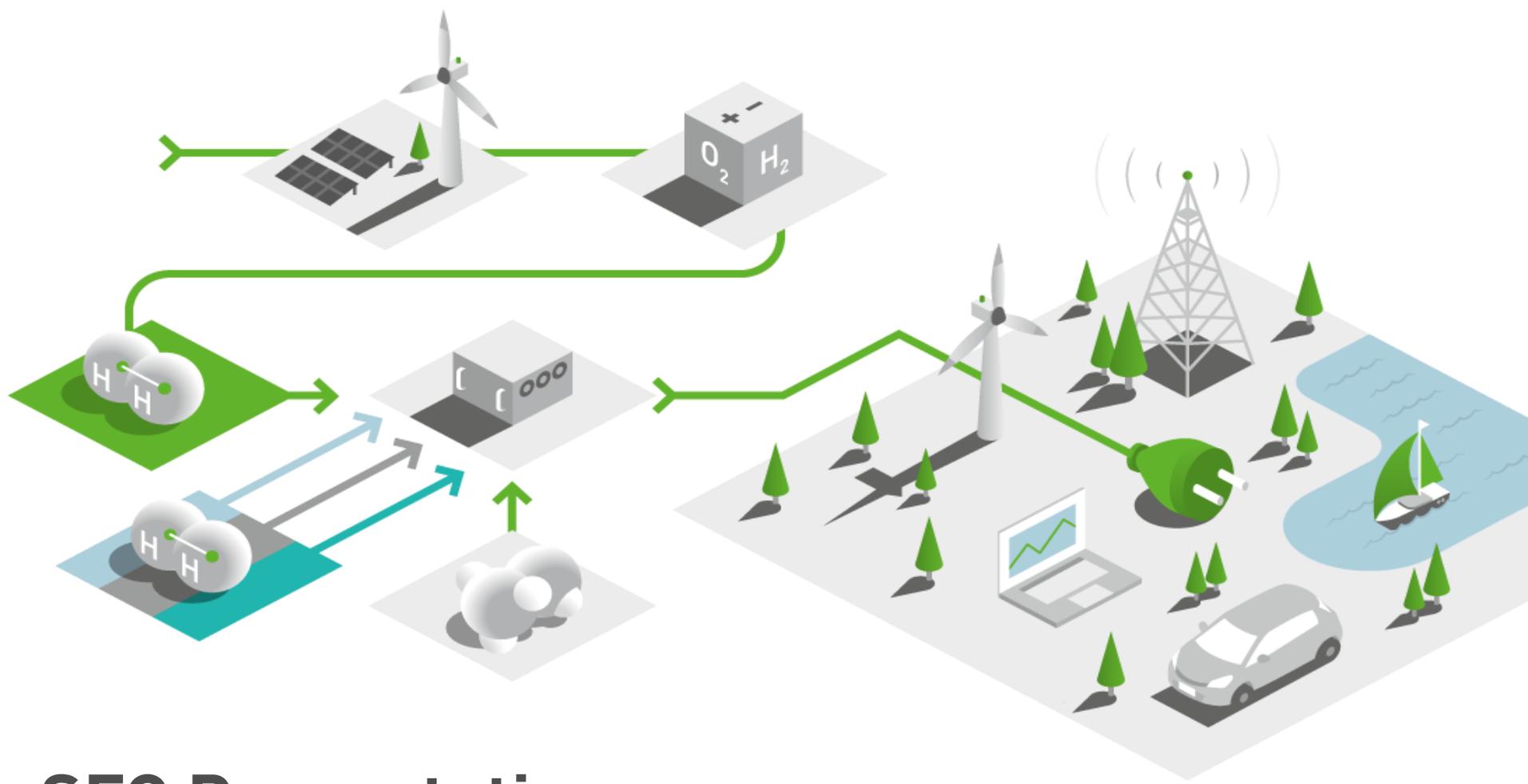
5 Liter
5.5 kWh

10 Liter
11 kWh

28 Liter
31 kWh

60 Liter
66 kWh





SFC Presentation

Operation & Communication

Operating options



- 🔌 Operating panel: via data cable
- 🔌 EF0Y App: via Bluetooth adapter
- 🔌 Button: on the device
- 🔌 EF0Y-Cloud, remote monitoring via Modem/Router
- 🔌 Modbus
- 🔌 Serial communication (SIO)



EF0Y Cloud



Terminal /
SIO



EFOY Mode

“Automatic” mode

- ⏻ EFOY fuel cell switches on and off automatically depending on battery voltage
- ⏻ The battery is automatically recharged

“Sleep” mode

- ⏻ Battery is not automatically recharged
- ⏻ The EFOY will protect the battery against deep discharge if necessary
- ⏻ The EFOY will perform frost protection if necessary

The "Automatic" mode is always recommended for optimal charging behavior.

Example EFOY States

State	Description
Off	The fuel cell is in Sleep mode and will not start charge. Only deep discharge protection and anti-freeze is active
Transportation protection	The fuel cell is in transport mode and will not start charging.
Battery protection	The fuel cell has started charging despite Sleep mode, to protect battery from further discharge and deep discharge.
Error	The fuel cell cannot charge the battery. Follow the information displayed on the different interfaces.

All states are described in the glossary in the user manual

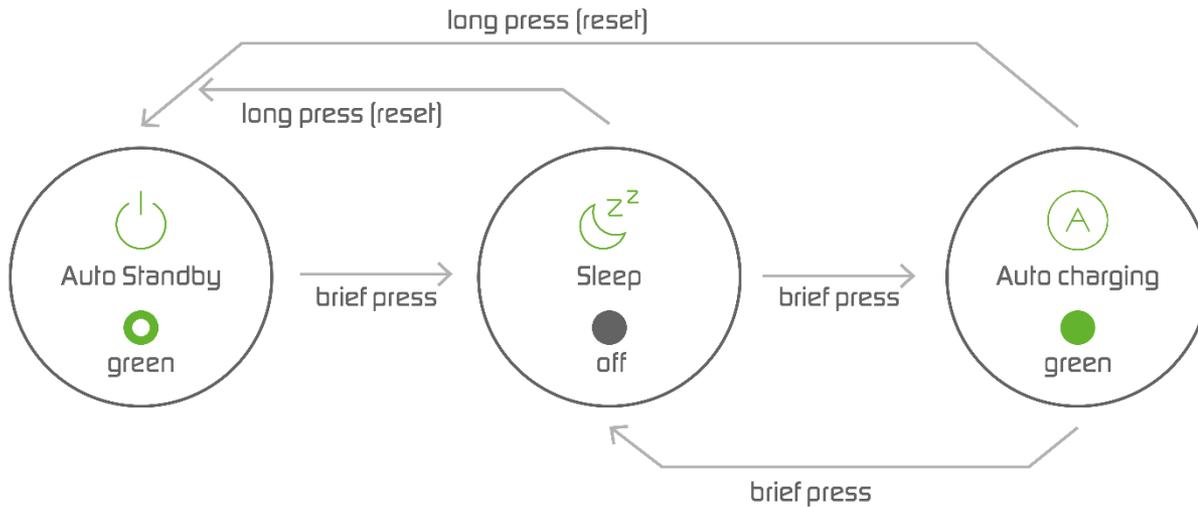
Command on the EFOY

Status LED (Part 1)

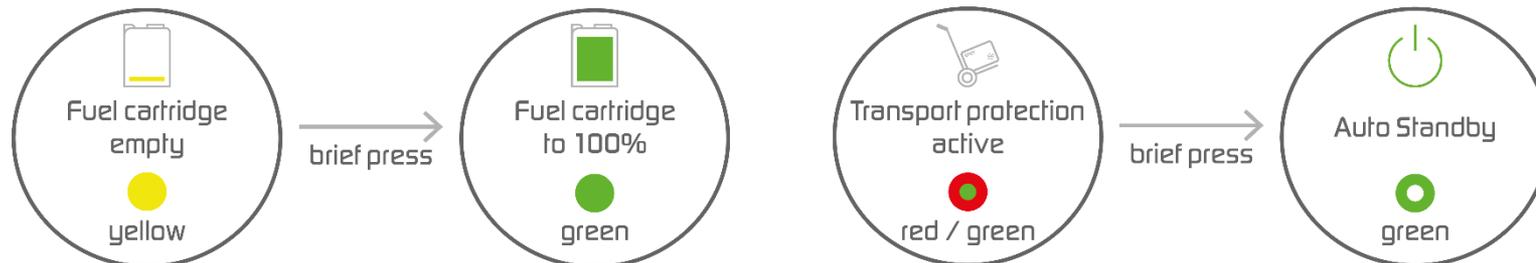
LED	LED	EFOY status	EFOY mode
	Off	Off	Sleep
	Permanent	Deep discharge protection	Sleep
	Flashing slowly (every 5 seconds)	Standby	Auto
	Permanent	Charging and start-up phase	Auto
	Flashing quickly (every 2 seconds)	Shutdown procedure	Auto/Sleep
	Permanent	Antifreeze	Auto/Sleep
	Permanent	Fuel cartridge empty	Auto/Sleep
	Permanent	Error	Auto/Sleep
	Flashing quickly (every second)	Warning	Auto/Sleep
	Permanent	Back-up antifreeze	Auto/Sleep

Button on the EFOY

Use the button for changing the Mode



Use the button for fuel cartridge change & to deactivate the transport protection



EFOY State: Frost protection

- 🔌 Active when EFOY temperature is below +3 °C
- 🔌 Frost protection requires:
 - 🔌 Good and functional battery
 - 🔌 Methanol



SFC climate chamber test
at -40 °C

Average methanol consumption in frost protection: 0.2 l / day (24 h)

EFOY App

Initial configuration

Configuration of the parameters:

- 🔌 Battery type, except for EFOY Battery
 - 🔌 Required information
- 🔌 Battery capacity, except for EFOY Battery
 - 🔌 Optional information; required for future functionality
- 🔌 Fuel Manager or fuel cartridge (type and level)
 - 🔌 Optional information; required for an exact display of the fill level

The initial configuration must take place before putting the EFOY into operation

EFOY App

Initial configuration

11:00 69%

Initial Setup

Battery type

Please choose the battery type

Lead acid (12V)

Lead acid (24V)

LiFePO4 (12V)

LiFePO4 (24V)

Back

Next

11:01 69%

Initial Setup

Battery capacity

Total capacity of the battery / batteries used.

20 20 600
- +
min. ampere-hour max.

Back

Next

10:53 71%

Initial Setup

Choose fuel cartridge

Select the installed fuel cartridge size

M5

M10

M28

MT60

Custom

Skip >

Back

Next

10:53 71%

Initial Setup

Select fuel level

If you connect a partially emptied fuel cartridge, you can choose a new fuel level

0 100 100
- +
min. % max.

Back

Next

EFOY App

Transport protection

- ⏻ When new, the EFOY is protected by transport protection
- ⏻ Fuel cell does not contain liquids and cannot freeze during transport*
- ⏻ The initial configuration can also be carried out with the transport protection activated

Deactivate transport protection to put the EFOY into operation.

Activate transport protection to transport or store the EFOY.

*for long time storage activate transport protection and don't store below +1 °C

EFOY App

General operation

11:14 65%

Overview **myEFOY**

Your device **EFOY Pro 1800**

EFOY State **Standby**

Mode **Automatic**

FM2 Port 1 active **72%**

Battery EFOY Battery **36.0 %**

a few seconds ago

11:14 65%

Fuel cell **myEFOY**

Your device **EFOY PRO 1800**

EFOY State **Standby**

Mode **Automatic**
[Change](#)

Information

Output power	0.0 W
Charging current	0.0 A
Voltage at the EFOY	12.5 V
Voltage at the battery	13.1 V
Device temperature	22.3 °C

11:14 65%

Fuel cell **myEFOY**

Firmware version **24.07**

Serial number **430400-2025-50496**

Bluetooth Adapter **2.0**

EFOY Internet connection

Last error messages

[Switch Connection](#)

[Disconnect](#)

08:27 74%

Fuel Manager **myEFOY**

M10 Fuel level **25 % / 2.5 L**

M10 Fuel level **100 % / 10.0 L**

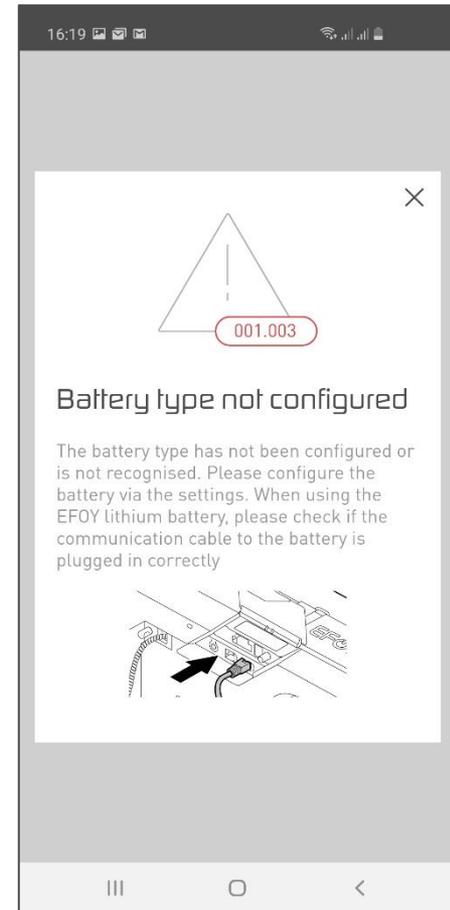
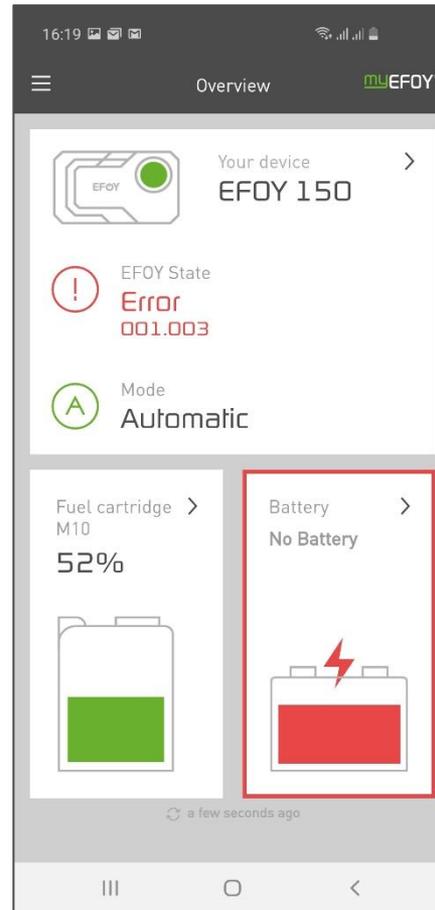
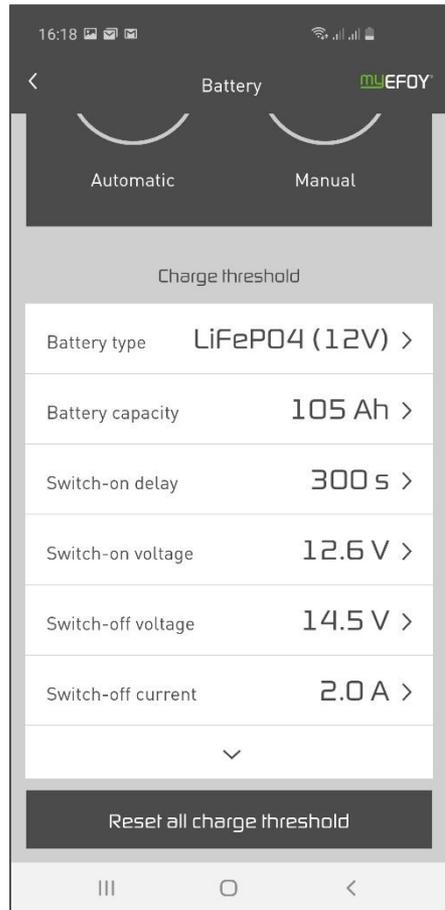
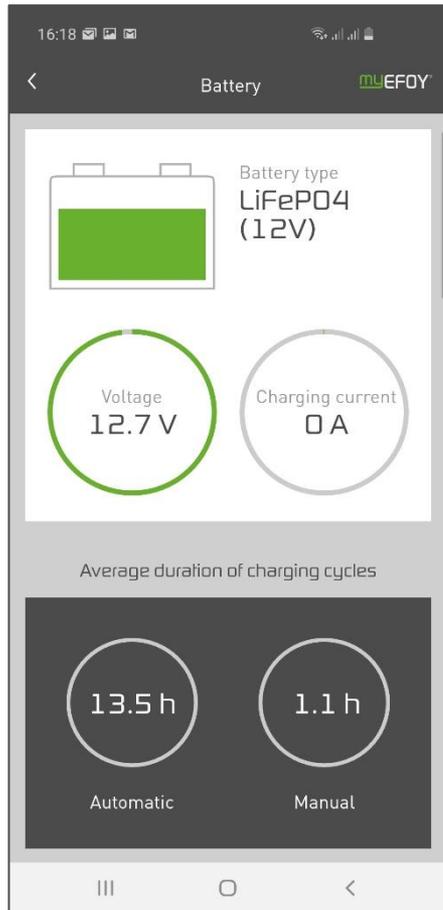
Firmware version **25.2**

Serial number **460100-2045-00044**

[Dealer search](#)

EFOY App

General operation



Operating Panel OP3



- ⏻ Cable-connected operation of the fuel cell
- ⏻ Same functionality as the EFOY App
 - ⏻ Display EFOY data
 - ⏻ Operate EFOY
 - ⏻ Configure battery
 - ⏻ Configure fuel cartridges

Modbus TCP

Unsecure port access



- ⏻ Modbus TCP is available on the Ethernet port **ONLY** with prior activation.
- ⏻ CAUTION: this mode opens an unsecure port into the network and thus requires local network with firewall, otherwise there are heavy risks of insecurity on the EFOY fuel cell.
- ⏻ The activation and configuration is possible via the Operating Panel and via the serial interface RS-232
- ⏻ Details on system requirement is available upon request

information and operation via Modbus

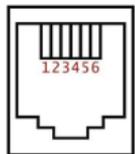
Discrete Inputs (read)	Input Register (Read)	Coil (write)	Holding Register (write)
<ul style="list-style-type: none"> • Get quick Information on EFOY state (Error, warning, Fuel Cartridge level) 	<ul style="list-style-type: none"> • Get all EFOY information 	<ul style="list-style-type: none"> • Control EFOY (ON / OFF / Reset) • Control Fuel Manager 	<ul style="list-style-type: none"> • Configure EFOY and battery parameters

SIO-Commands

For compatibility ONLY

- ⏻ Via Terminal-Interface on a computer
- ⏻ Hardware required: USB Adapter, Interface-Adapter and Data cable RJ45/RJ12 (1 meter)

SFC Bus RJ12

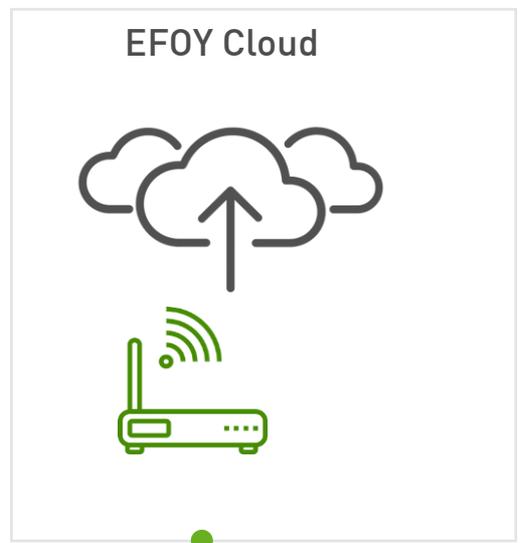


Pin	Description
1	RxD
2	TxD
3	GND, Ground
4	Battery +
5	CAN High
6	CAN Low



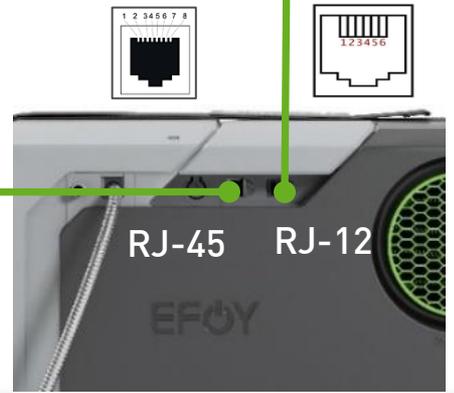
EFOY fuel cell

Connecting components – communication



EFOY Cloud

Ethernet



RJ-45 RJ-12

RS-232

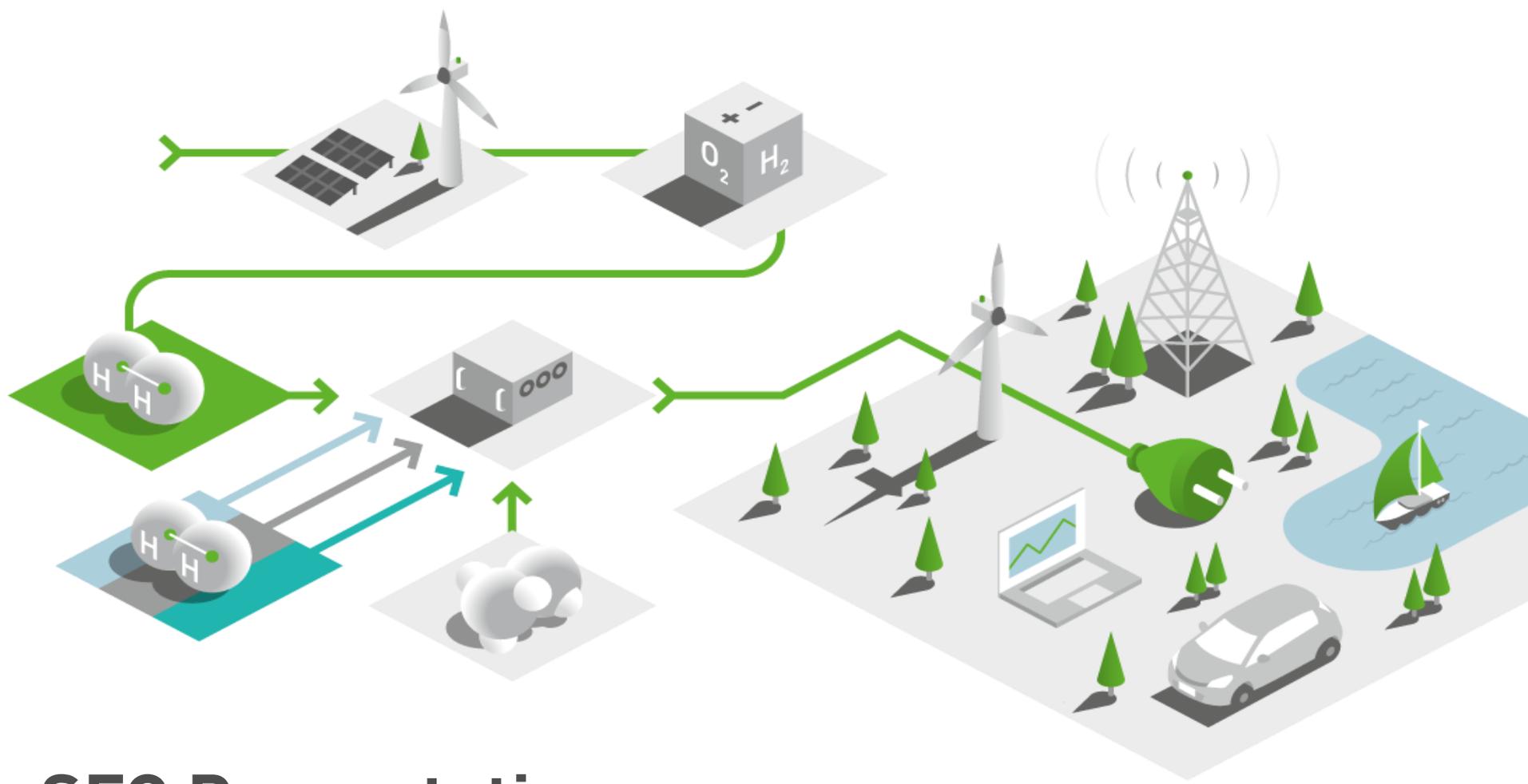
Pin Description	
1	RxD
2	TxD
3	GND,
4	Battery +
5	CAN High
6	CAN Low



SFC-Bus

Pin Description	
1	RxD
2	TxD
3	GND,
4	Battery +
5	CAN High
6	CANLow





SFC Presentation

Installation & Best Practice

Flexible installation

Connection of EFOY Pro, Fuel Manager and Cartridge



- 🔌 In boxes / cabinets with more than 2x M28
- 🔌 Use a fan for off heat
- 🔌 Separate the electronic devices from the fuel cartridges

More installation flexibility due to extended fuel connectors.

Installation: **Temperatures**

Operating temperature



EFOY - 20 °C to +40 °C
EFOY Pro -20 °C to + 50 °C

Start temperature



EFOY +3 °C to +40 °C
EFOY Pro +3 °C to + 50 °C

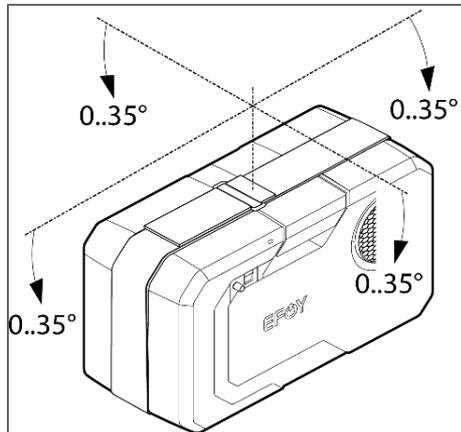
Storage temperature



+1 °C to +50 °C

*for long time storage activate transport protection and don't store below +1 °C

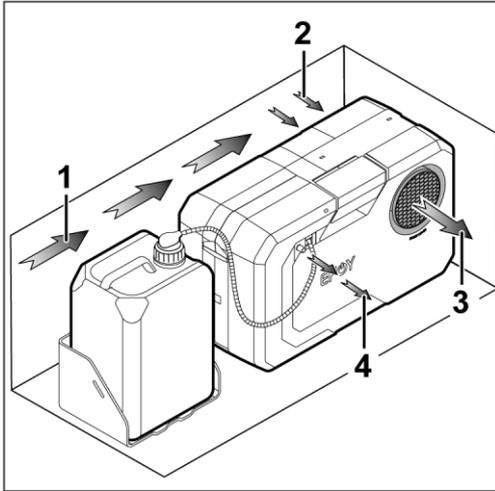
Installation: Inclination



Inclination

- 🔌 Inclination along the direct axis:
max. 35°
- 🔌 Inclination along the quadrature axis:
max. 35°

Installation: Inlet & outlet



Overview of airways

- 🔌 1 Incoming air
- 🔌 2 Air cooling via heat exchanger
- 🔌 3 Exhaust heat removal
- 🔌 4 Wastewater / exhaust gases

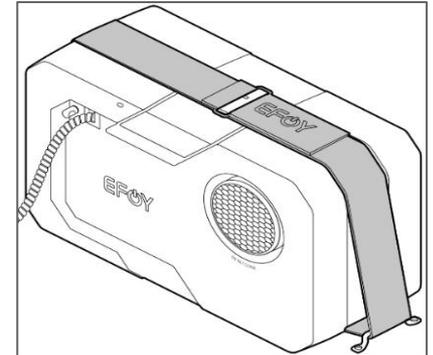
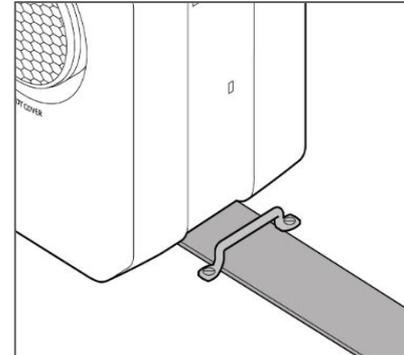
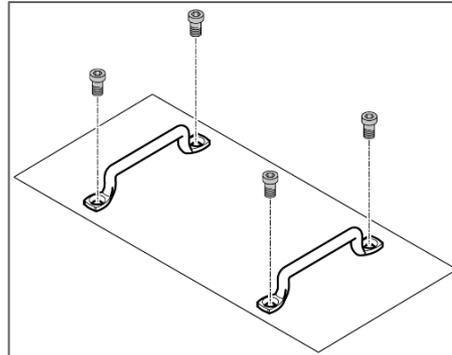
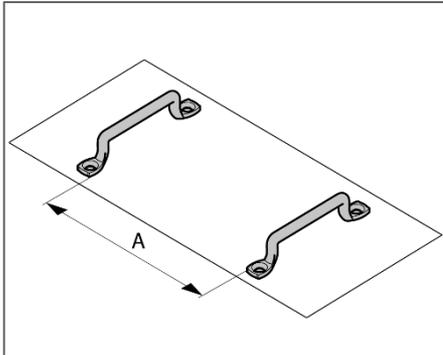
Inlet & outlet dimensions

Incoming air inlet Ø at least 10 cm

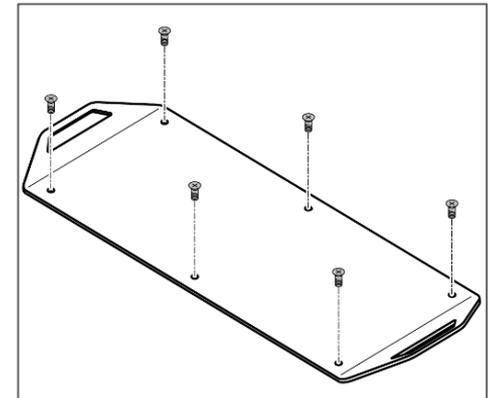
Exhaust heat outlet Ø at least 10 cm

Exhaust gas hose outlet Ø 1cm

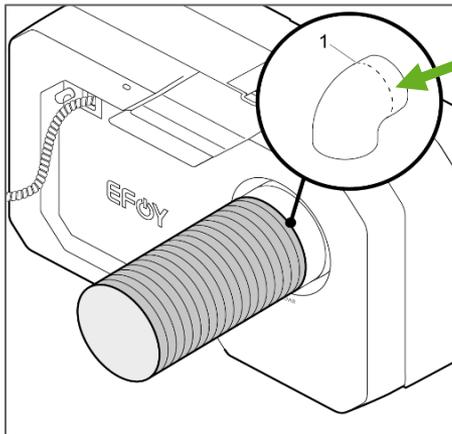
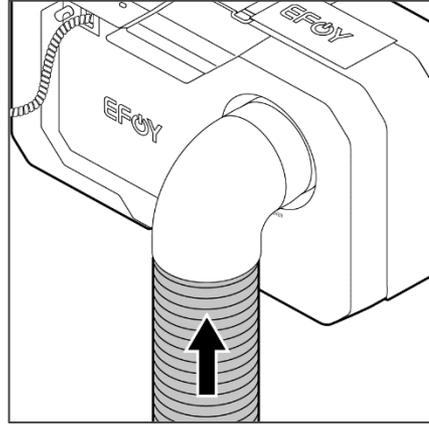
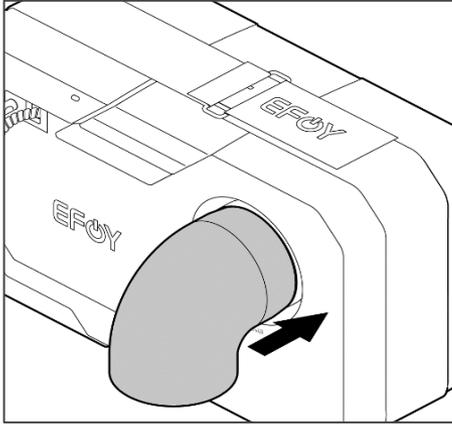
Installation: Mounting of the EFOY



- 🔌 Measure the position of the brackets (A = minimum length of the EFOY)
- 🔌 Fasten the brackets with screws
- 🔌 Insert EFOY and thread the strap into the brackets
- 🔌 Close belt
- 🔌 Optionally available: mounting plate



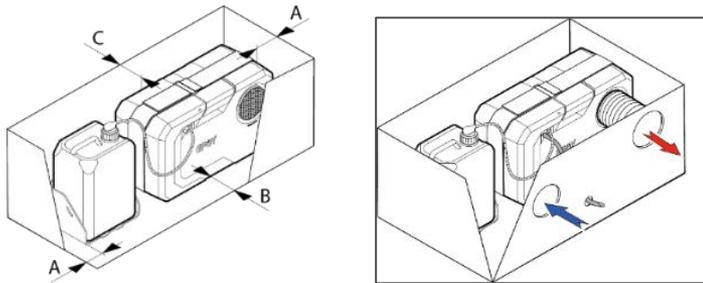
Installation: Assembly Off Heat Duct



- ⏻ Off heat duct vertically downwards:
 - ⏻ Attach the off heat bow to the EFOY
 - ⏻ Attach the tube and guide it vertically downwards
 - ⏻ Cut the pipe to the appropriate length and seal it to the outer wall
- ⏻ Off heat duct on the side:
 - ⏻ **Cut off** the off heat bow and attach it to the EFOY
 - ⏻ Put on the tube, lead it to the outside and seal it to the outside wall

Best Practice: Supply air and off-heat

- 🔌 Air inlet and outlet are separate from each other
 - 🔌 The position changes depending on the energy solution and its requirements
- 🔌 Adequate Inlet & Outlet dimensions
- 🔌 Off-heat tube installed



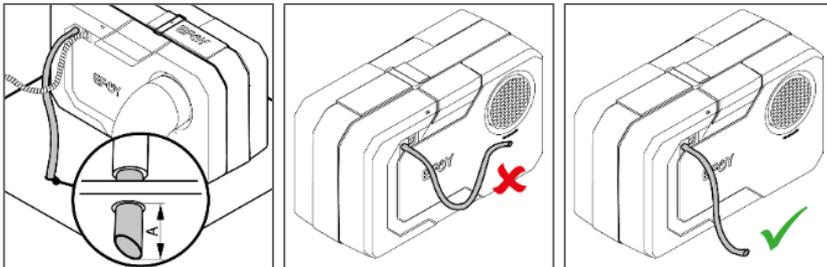
Best Practice: Supply air and off-heat

- 🔌 Gill plate to protect against rain
- 🔌 Additional: Insect protection (mesh) recommended
- 🔌 Air filter for installation locations with high dust levels or salty air recommended



Best Practice: Installation for the exhaust hose

- 🔌 Various options for the outlet:
 - 🔌 Exhaust hose via the exhaust off-heat tube
 - 🔌 Exhaust hose via the side outlet
 - 🔌 Exhaust hose between the double-walled enclosure of the cabinet
- 🔌 Adequate exhaust hose outlet (diameter + cut off at an angle)
- 🔌 Exhaust hose outlet as short as possible
- 🔌 Insect protection recommended



Best Practice:

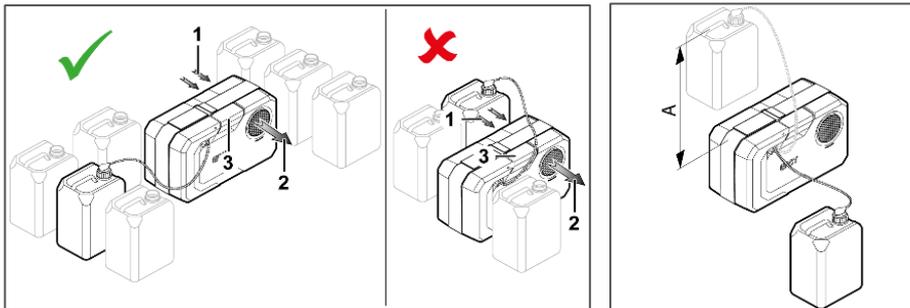
Arrangement of fuel cartridges

- 🔌 Install fuel cartridges upright and secured
 - 🔌 Secured by foam / mechanical structure
 - 🔌 Secured by belt
 - 🔌 Secured by fuel cartridge holder (M10)
- 🔌 Only M28 can be installed horizontally, but with valve facing upwards!
- 🔌 Attach & secure the fuel cartridge hoses to protect them from dirt while changing the Fuel Cartridges



Best Practice: Arrangement of fuel cartridges

- ⏻ If the enclosure exceeds $> 2x M28$, fuel cartridges should be separated from the electronics
- ⏻ Passive ventilation slots at the bottom of the enclosure to allow any methanol vapors to escape
- ⏻ DIN rail for the fuel sensor
- ⏻ No blockage of the incoming air inlet (1), off-heat outlet (2) and electrical connections (3)



Best Practice:

Subdividing the installation situation

- 🔌 Try to divide the installation situation into separate areas
- 🔌 Recommended temperatures for the areas:
 - 🔌 Battery 5 – 35°C
 - 🔌 EFOY 8 – 35°C
 - 🔌 SFC Fuel Cartridge -20 – 35°C
- 🔌 Do not be mistaken for maximum temperatures.

Battery →

EFOY →

Fuel Cartridge →



These are recommended temperatures (not max. temperatures) to help you estimate what temperatures should be aimed for in an enclosure.

Best Practice:

Challenge high temperature

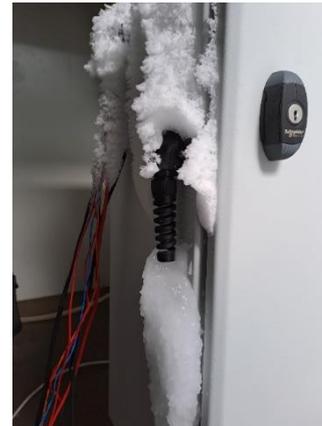
- 🔌 Good airflow through the complete energy solution
- 🔌 Additional fans starts automatically from 35°C in the enclosure
 - 🔌 Always: at least one additional fan (in off-heat tube)
 - 🔌 If necessary: more additional fans in the enclosure (depending on enclosure size)
 - 🔌 Typical fan model: DC; axial; 24VDC; 92x92x25mm; 128m³/h
- 🔌 More space as the minimal between EFOY and surrounding components to ensure better airflow
- 🔌 How to choose a fan:
 - 🔌 Air pressure and volume flow are crucial
 - 🔌 The pure technical data cannot be directly transferred to the installation situation. Objects in the room have an extreme impact on those values
 - 🔌 At temperatures above 45°C, a volume flow of 1 m³/min should be ensured



Best Practice:

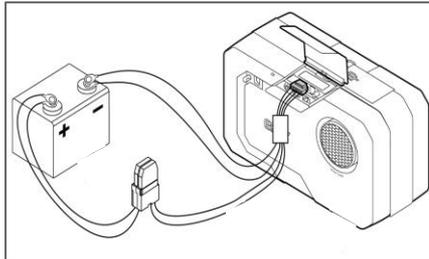
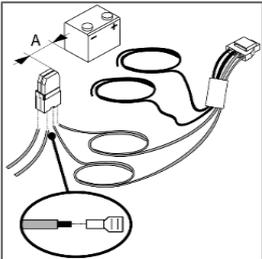
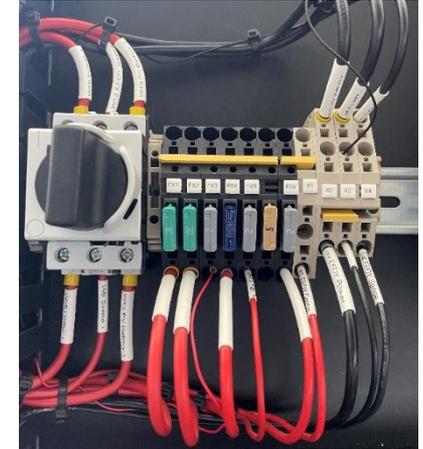
Challenge very low temperature

- ⏻ Always: Use short and insulated exhaust hose
- ⏻ Prevent that the exhaust hose gets frozen → Use exhaust air to heat the exhaust hose
- ⏻ Additionally: use heated exhaust hose if necessary
- ⏻ Sufficient space between exhaust outlet and ground in order to avoid ice growing up to the exhaust
- ⏻ More space between EFOY and enclosure (air as insulation)
- ⏻ Insulate the EFOY enclosure (SFC low temperature solutions)



Best Practice: Wiring, fuses and switches

- 🔌 Main switch to disconnect the EFOY fuel cell from the battery
- 🔌 Proper wiring with appropriate fuses
- 🔌 Document wiring with wiring diagram (helpful in case of technical support by SFC)



Best Practice:

Deep-discharge protection

- 🔌 Use of battery protection to prevent deep-discharge of the batteries
 - 🔌 Function included into charge controller
 - 🔌 Separate battery protect component

- 🔌 **IMPORTANT:** make sure that the EFOY can start at any time and is not disconnected from the battery
 - 🔌 In case of frost protection



SmartSolar Lade-Regler
MPPT 150/35



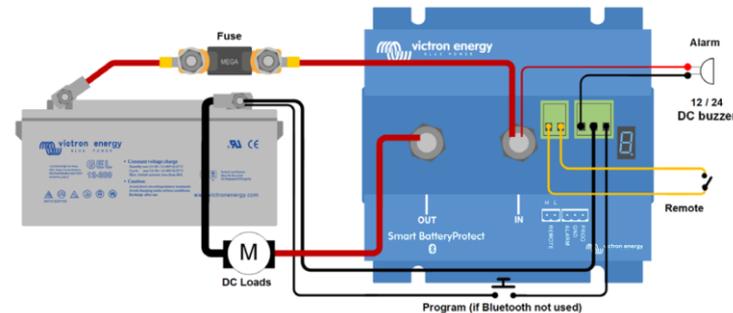
Smart BatteryProtect BP-65



Smart BatteryProtect BP-100



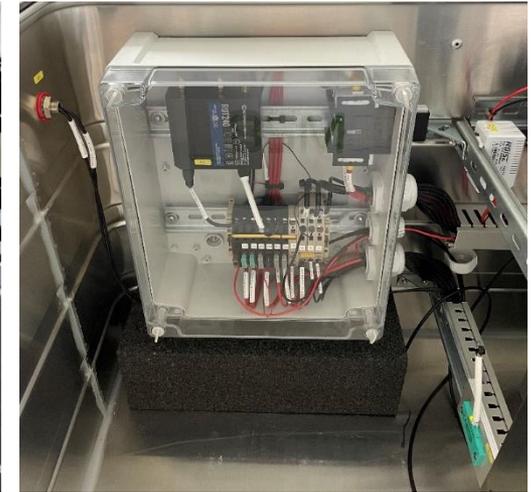
Smart BatteryProtect BP-220



Best Practice:

Internet connection via router (remote monitoring)

- 🕒 Any router can be used
- 🕒 Initial configuration of the router according to the router manufacturer
- 🕒 Antenna may have to be placed at the outside (avoid shielding by metal housing)
- 🕒 required data volume depends on the frequency of use of the EFOY Cloud → typically 500 MB / month is sufficient



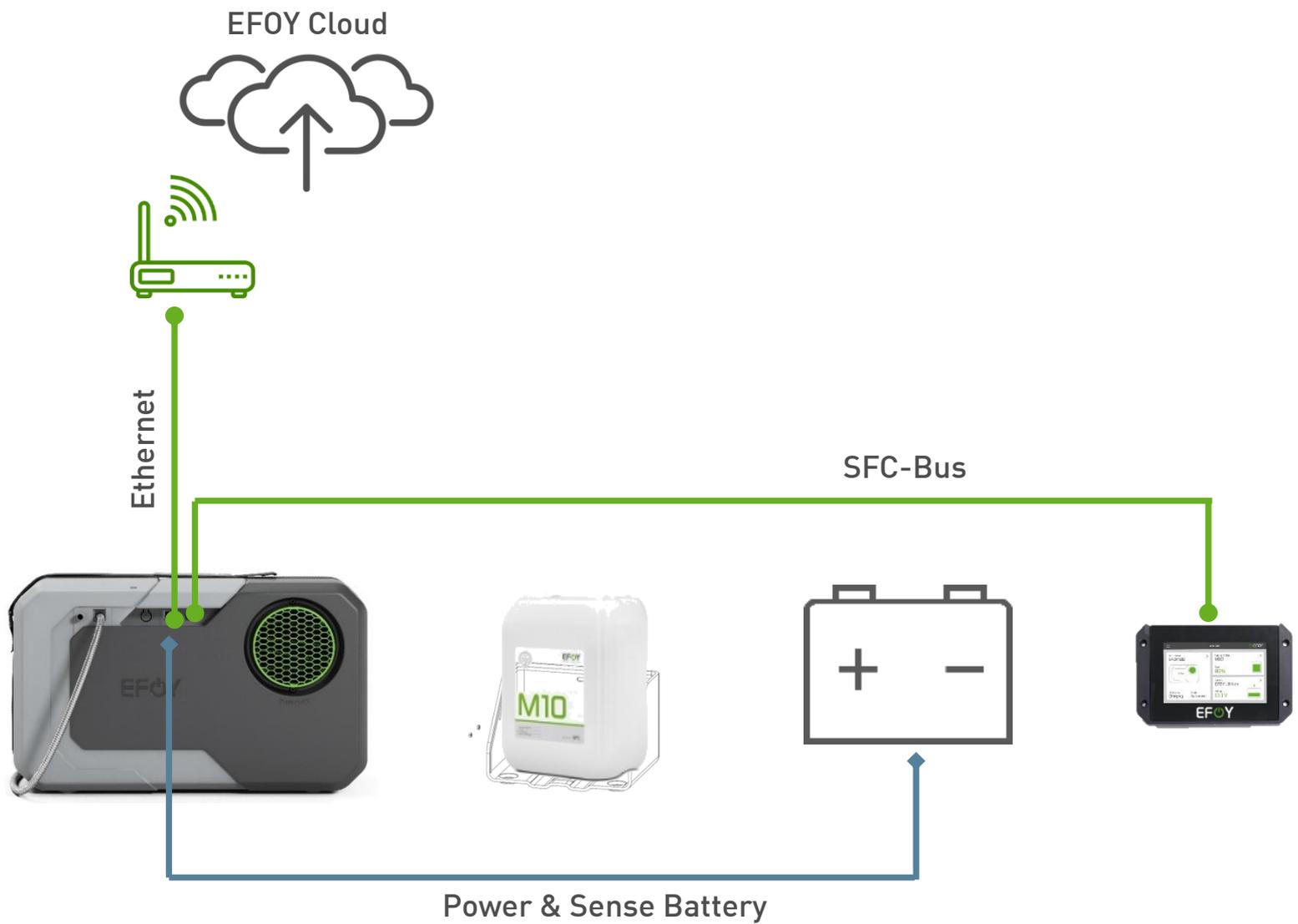
Connecting components

- ◆ Power
- Communication



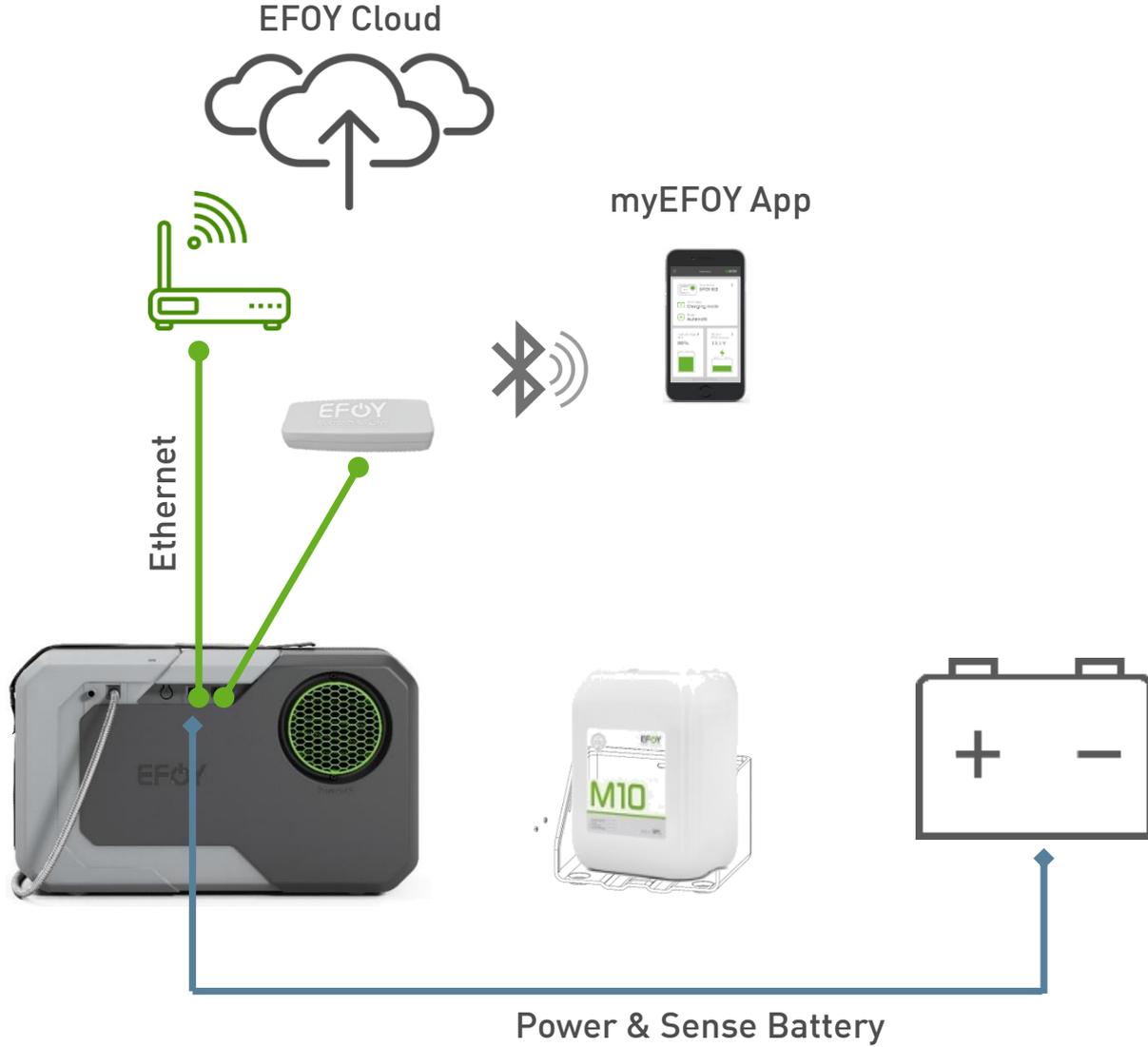
Connecting components

- Power
- Communication

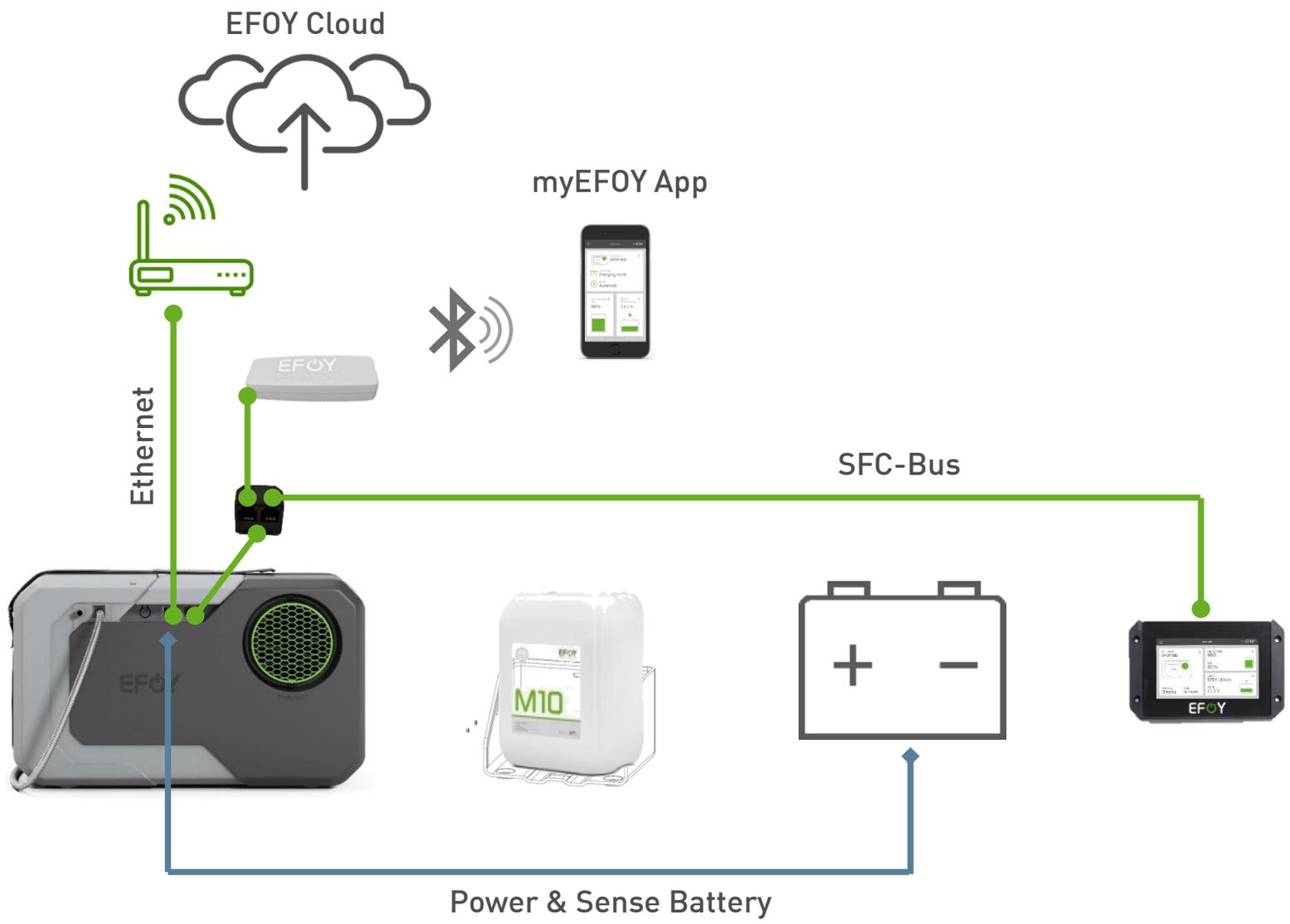
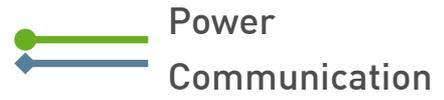


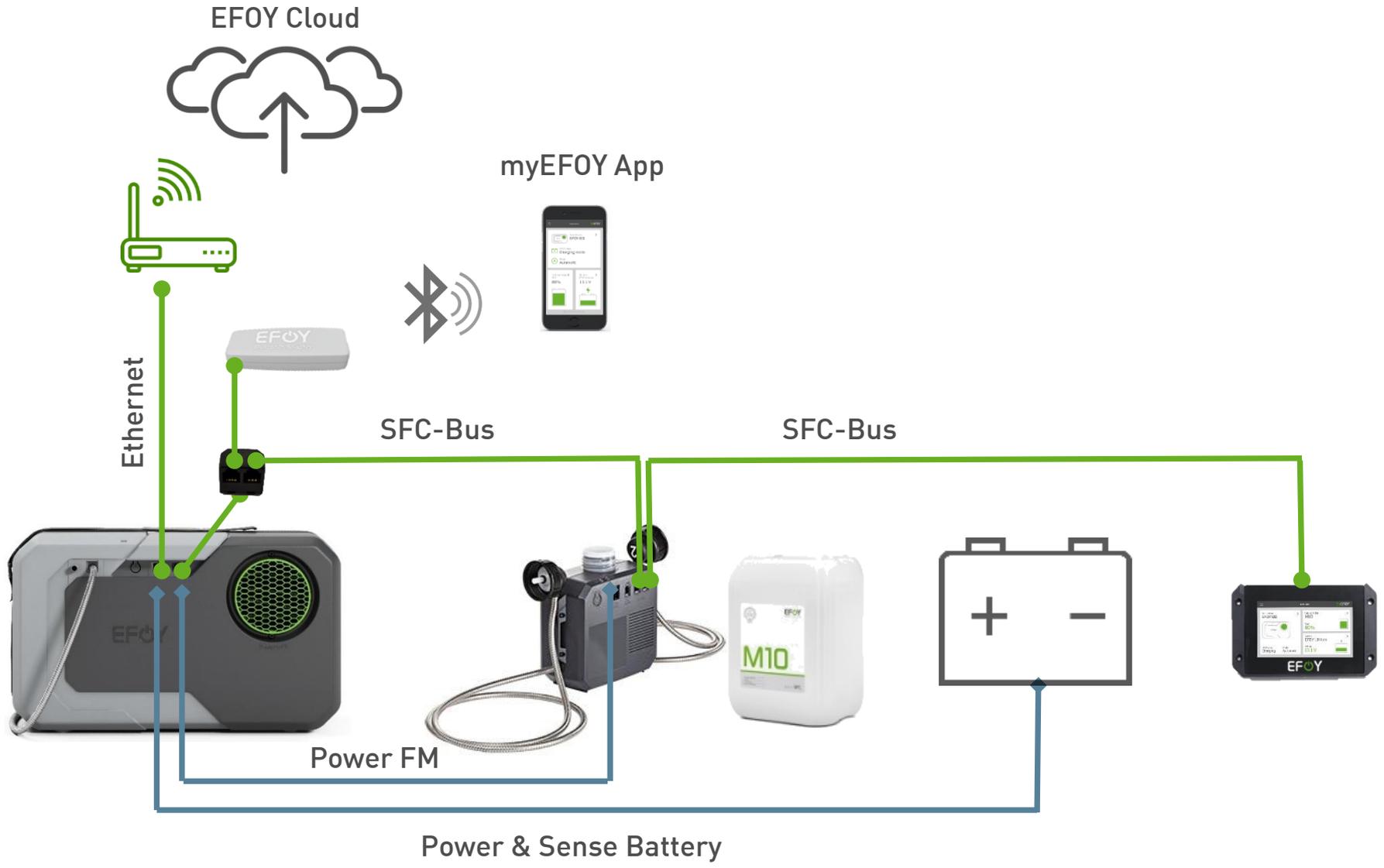
Connecting components

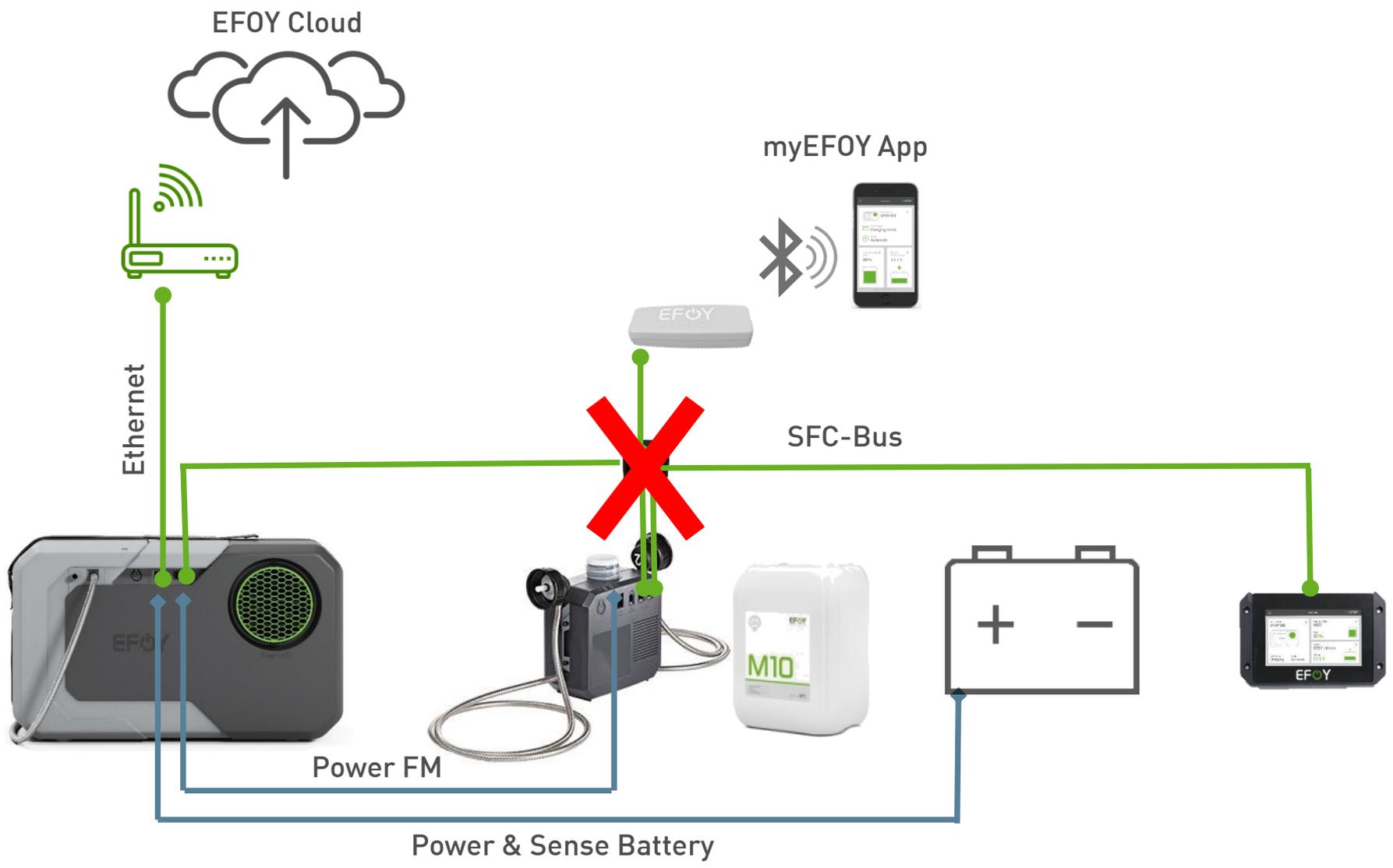
- ◆ Power (& sense)
- Communication

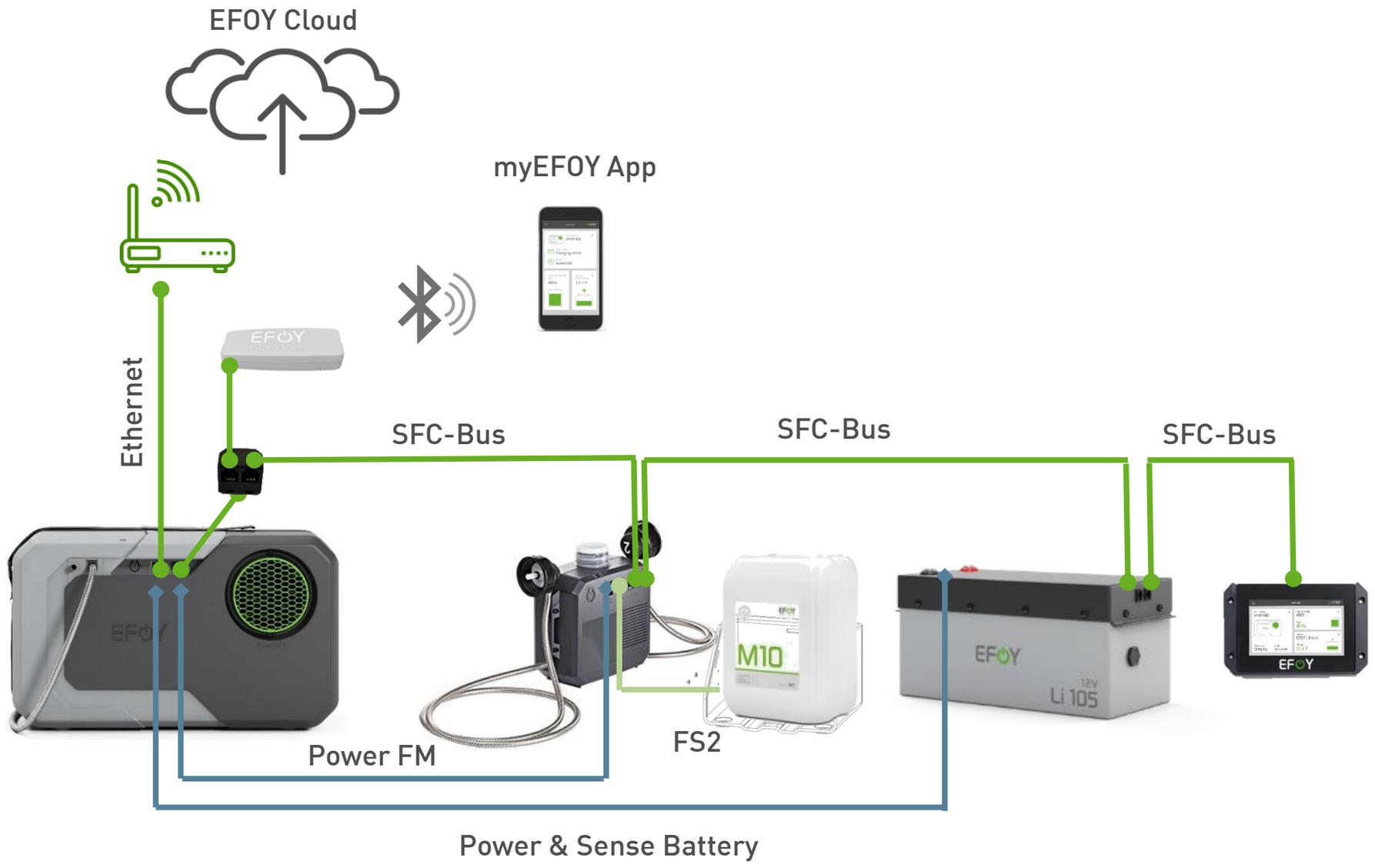


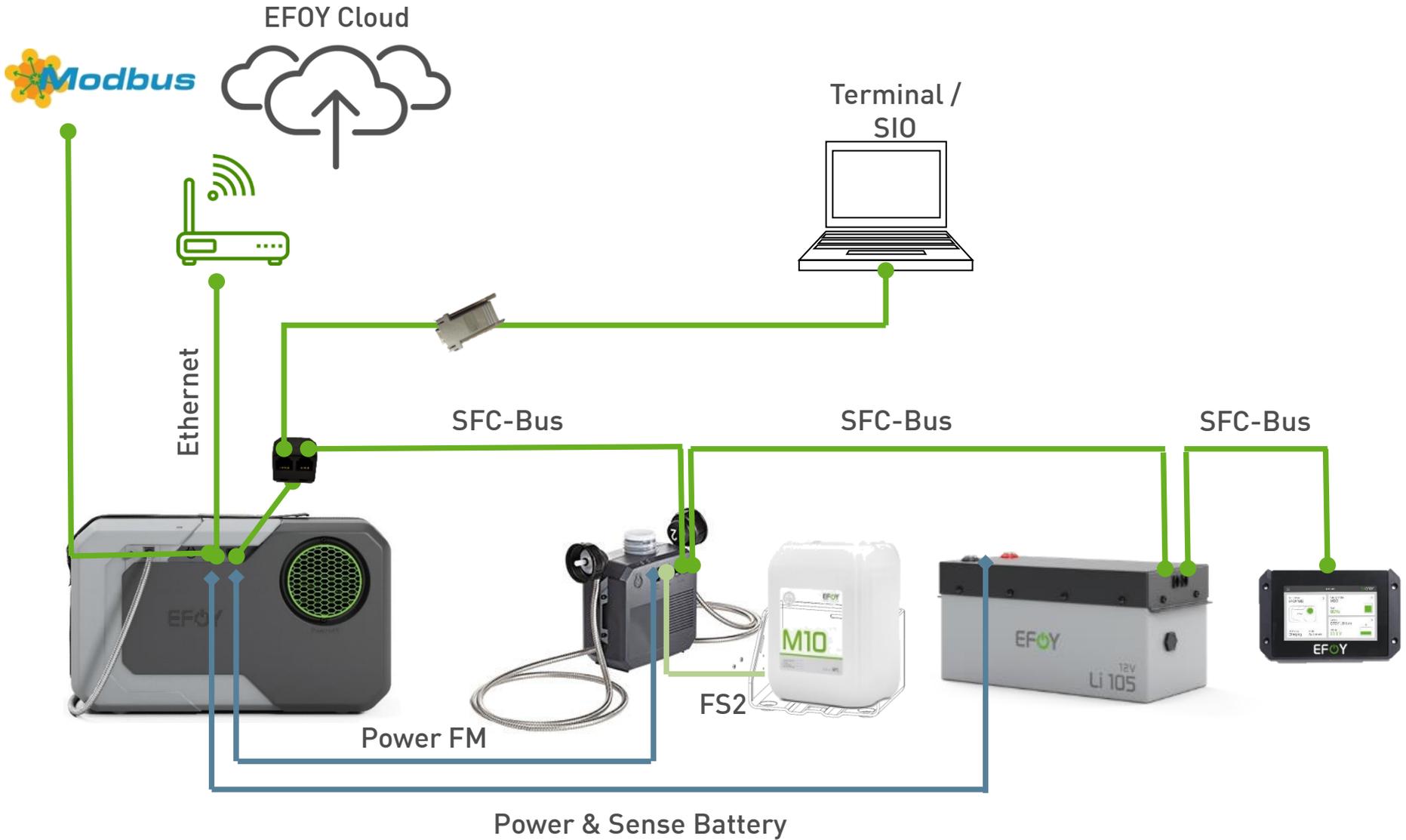
Connecting components

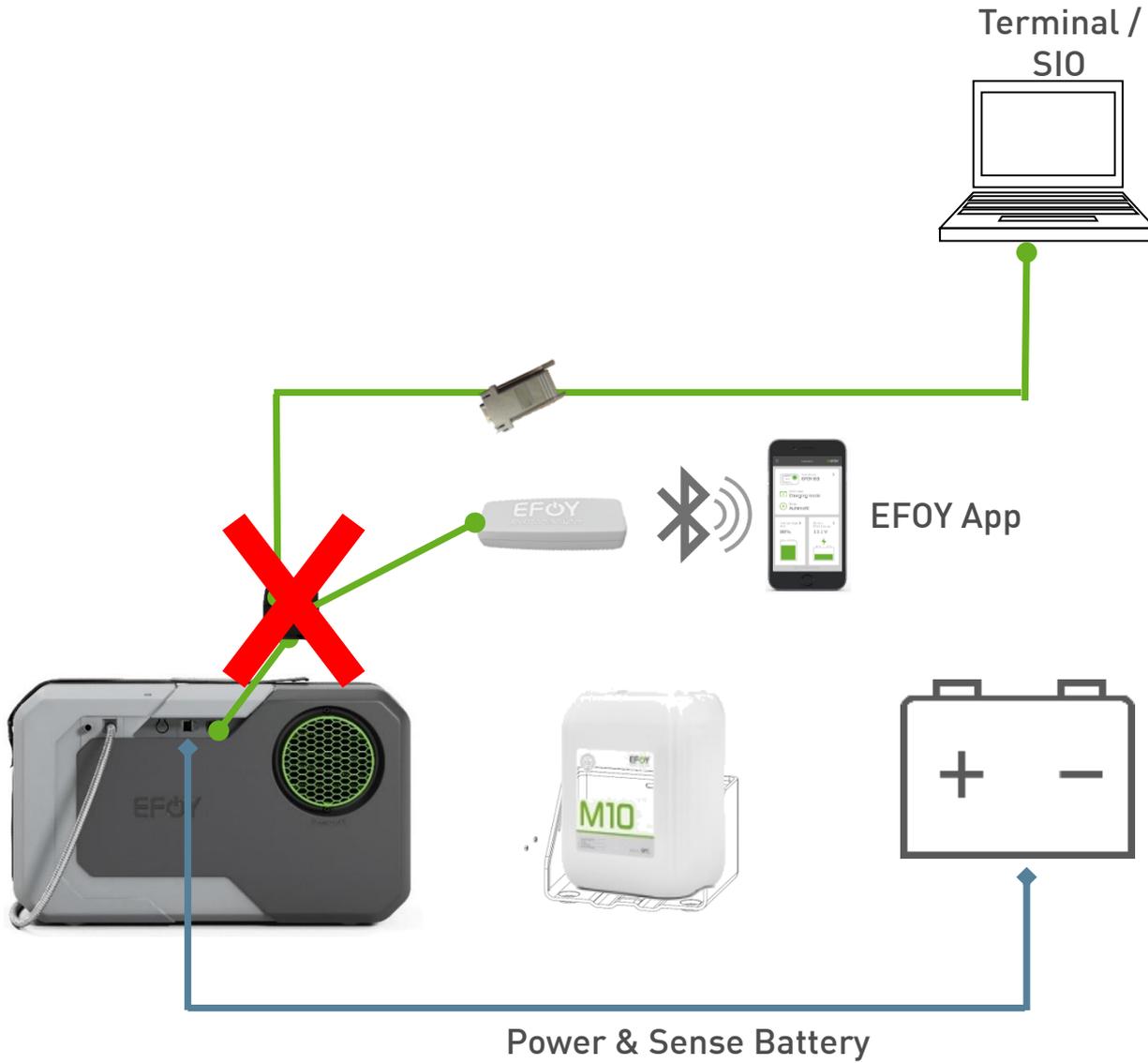


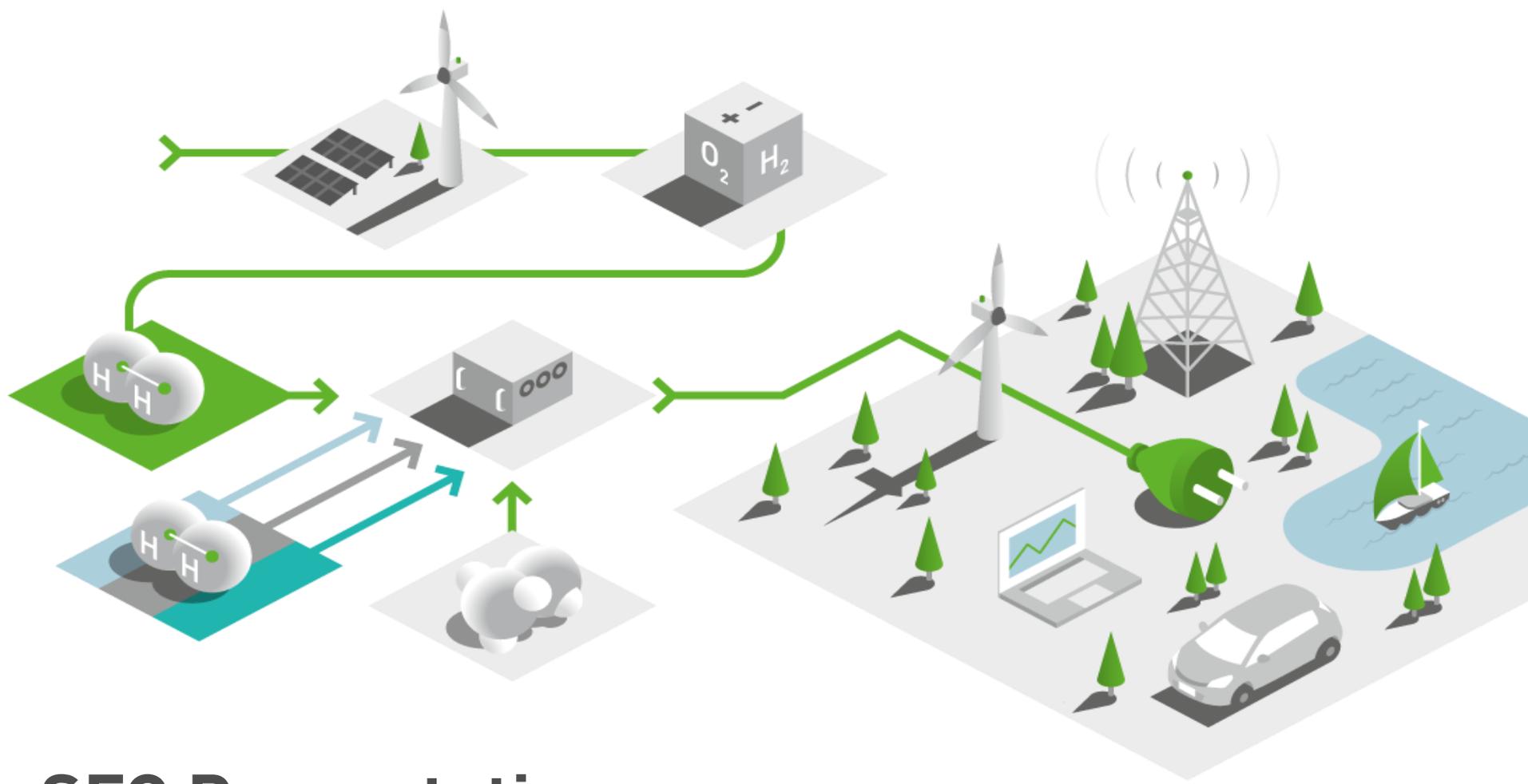












SFC Presentation

EFOY Cloud

EFOY Cloud

1	Login / Create Account
2	Claim your EFOY
3	Licenses
4	Rights and Roles
5	New features
6	Maintenance and updates

Start EFOY Cloud - Login

🕒 URL: <https://www.efoy-cloud.com/>

🕒 New landing page at first login (no longer visible after the login):

EFOY
Contact and Support

EFOY CLOUD

Remote monitoring
for EFOY Fuel Cells

Login >

Register Now >

EFOY Cloud

EFOY Fuel Cells are often used in remote locations and require the option of secure remote access. EFOY Cloud gives you access to your methanol fuel cells from anywhere so you can monitor continuous operation via laptop, tablet or smartphone. All you need for this is an Internet connection to your fuel cells.

Gain insight into the current operational status of individual fuel

EFOY Cloud licenses

The functions of the EFOY Cloud license depend on the license level selected for the respective EFOY. The license level is linked to the device.

When you purchase a license for your EFOY, you will receive a code which, when entered, gives you access to the corresponding license.

Start EFOY Cloud - Login

🔌 Login with your already created account:

Welcome to your EFOY Cloud

Login

 Remember me
 [Problems signing in?](#)
[Reset your Password / Create new Account](#)

[LEGAL NOTICE](#) / [CLOUD SUPPORT](#) / [PRIVACY POLICY](#) / [TERMS OF USE](#) / [EFOY CLOUD LICENSES](#)

● All systems operational

© SFC Energy AG 2025 | www.sfc.com
SFC Energy AG | Eugen-Sänger-Ring 7 | 85649
Brunnthal-Nord

Start EFOY Cloud – Create Account

🔌 Create a new Account if you do not already have one:

Registration

To register successfully all fields marked with * must be filled in.

<input type="text" value="First Name*"/>	<input type="text" value="Last Name*"/>
<input type="text" value="Email*"/>	<input type="password" value="Password*"/>
<input type="password" value="Repeat Password*"/>	<input type="text" value="Company"/>
<input type="text" value="Phone"/>	<input type="text" value="Street address and number"/>
<input type="text" value="Postcode"/>	<input type="text" value="Country"/>
<input type="text" value="Website"/>	

Terms of use *

I hereby consent the [terms of use](#).

Data privacy *

I hereby consent to the processing of my personal data for registration to use the EFOY Cloud by SFC Energy AG. I am aware that I can revoke my consent at any time by sending an informal email to info@sfc.com. By revoking the consent, the legality of the processing that has taken place based on the consent until the revocation is not affected. Further information on the handling of your data can be found in our [privacy policy](#).

Already have an account? [Login / Reset your Password](#)

Start EFOY Cloud – Create Account

🔌 Owner:

- 🔌 the account (e-mail) with which an EFOY is claimed is the owner
- 🔌 only the owner can claim EFOYs, enter license keys and delete the device from the EFOY Cloud
- 🔌 For legal reasons (owner's rights), the owner's e-mail address cannot be changed
- 🔌 The device must be deleted from the EFOY Cloud and claimed with a new account (owner) to replace the e-mail address
- 🔌 If an owner deletes his user account, all his devices are unclaimed



EFOY Setup schedule

Setup tasks can only be performed by account Owner

🔌 Step 1: create an Account

- 🔌 Can only be done online
- 🔌 Only by the owner



🔌 Step 2: claim EFOY to the Cloud

- 🔌 Live, in person access to the device is required
- 🔌 Only by the owner



🔌 Step 3: apply license key from label or in the Cloud

- 🔌 Live, in person access to the device is required (label)
- 🔌 Remote in the EFOY Cloud (no label – new feature)
- 🔌 Only by the owner



🔌 Step 4: Role assignment / Group management

- 🔌 Can only be done online via the EFOY Cloud
- 🔌 Performed either by the owner or other users with „full support“ role



The license key was located on the label underneath the belt - Has now been replaced by the new feature!

EFOY Account

🔌 Overview of your EFOY fuel cells

🔌 No EFOYs claimed yet in this example below:

EFOY fuel cells

All EFOY fuel cells currently claimed to your account are displayed here. You can organize your overview, export it or claim further EFOY fuel cells.

Search for Serial / Name + ADD EFOY

Total claimed devices: 0

1 of 1 status ideal attention required action required inactive

Device / License	Operating state	Fuel level	Firmware	Voltage / SOC	Operating hours	Serial number
No items to load						

SELECT EFOYS 1 of 1

EFOY Cloud

- 1 Login / Create Account
- 2 Claim your EFOY
- 3 Licenses
- 4 Rights and Roles
- 5 New features
- 6 Maintenance and updates

Claim your EFOY

🕒 Claim an EFOY by clicking the „ADD EFOY“ button

EFOY fuel cells

All EFOY fuel cells currently claimed to your account are displayed here. You can organize your overview, export it or claim further EFOY fuel cells.

Search for Serial / Name

+ ADD EFOY

Total claimed devices: 0

status ideal attention required action required inactive

Device / License	Operating state	Fuel level	Firmware	Voltage / SOC	Operating hours	Serial number
No items to load						

SELECT EFOYs

1 of 1

Claim your EFOY

🔌 Enter the serial number of your EFOY

(You can find these in the lid of the device itself or via the operating panel or the EFOY app, Internet connection at the EFOY is required)

Add EFOY ✕

Please enter the serial number of the EFOY fuel cell you would like to claim to your account. You can find the serial number on your EFOY, or read it on your operating panel or in the myEFOY App.

123456-1234-12345

CANCEL NEXT

Step 1 of 3



Add EFOY ✕

Please enter the serial number of the EFOY fuel cell you would like to claim to your account. You can find the serial number on your EFOY, or read it on your operating panel or in the myEFOY App.

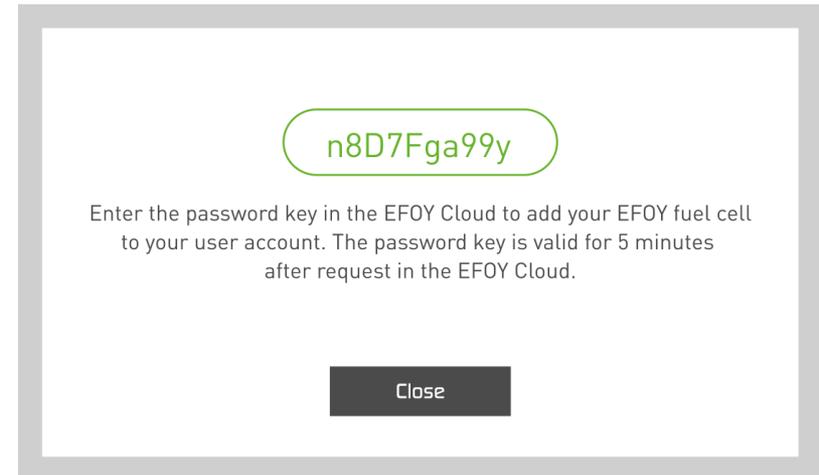
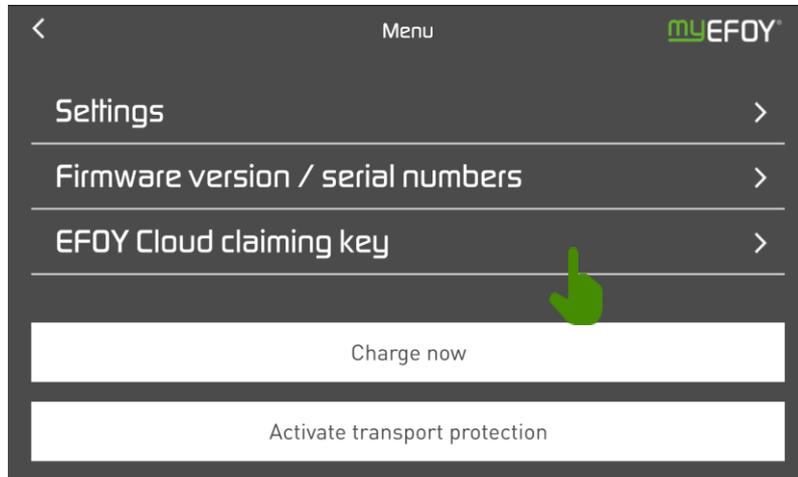
430100-2027-50707

CANCEL NEXT

Step 1 of 3

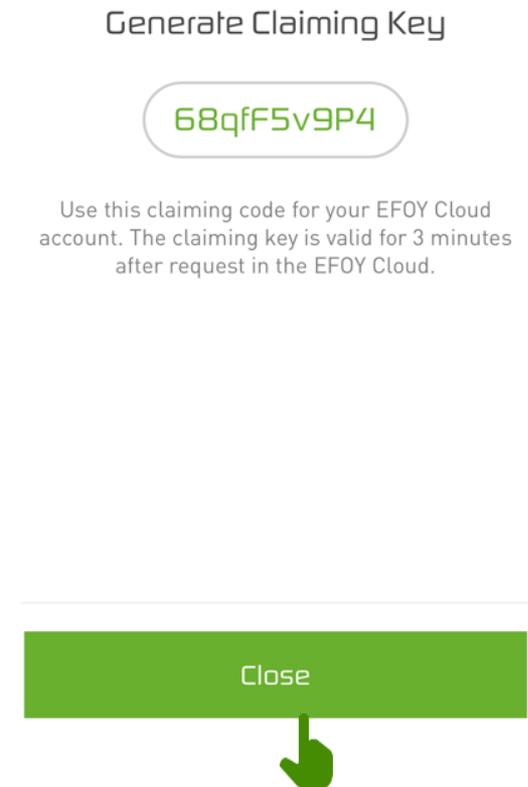
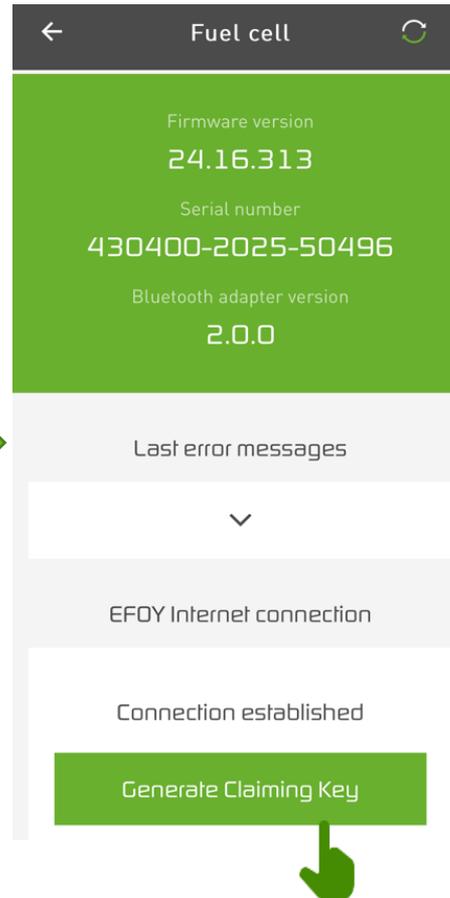
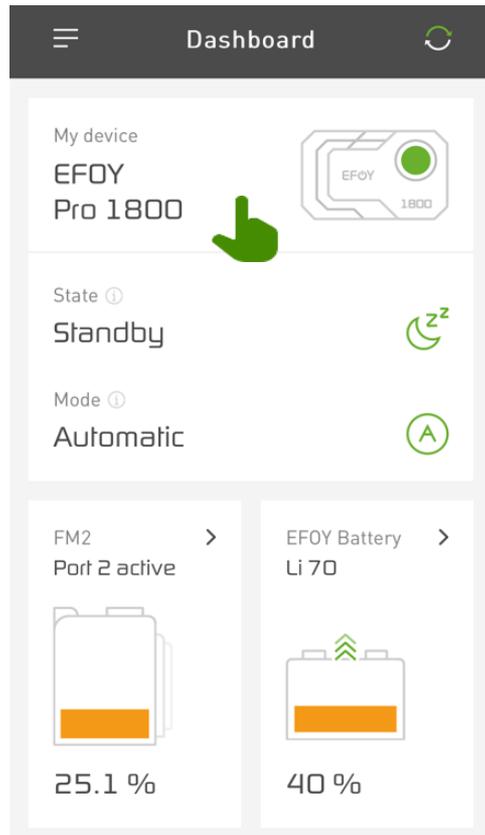
Claim your EFOY

🔌 Claiming Key on the Operating Panel



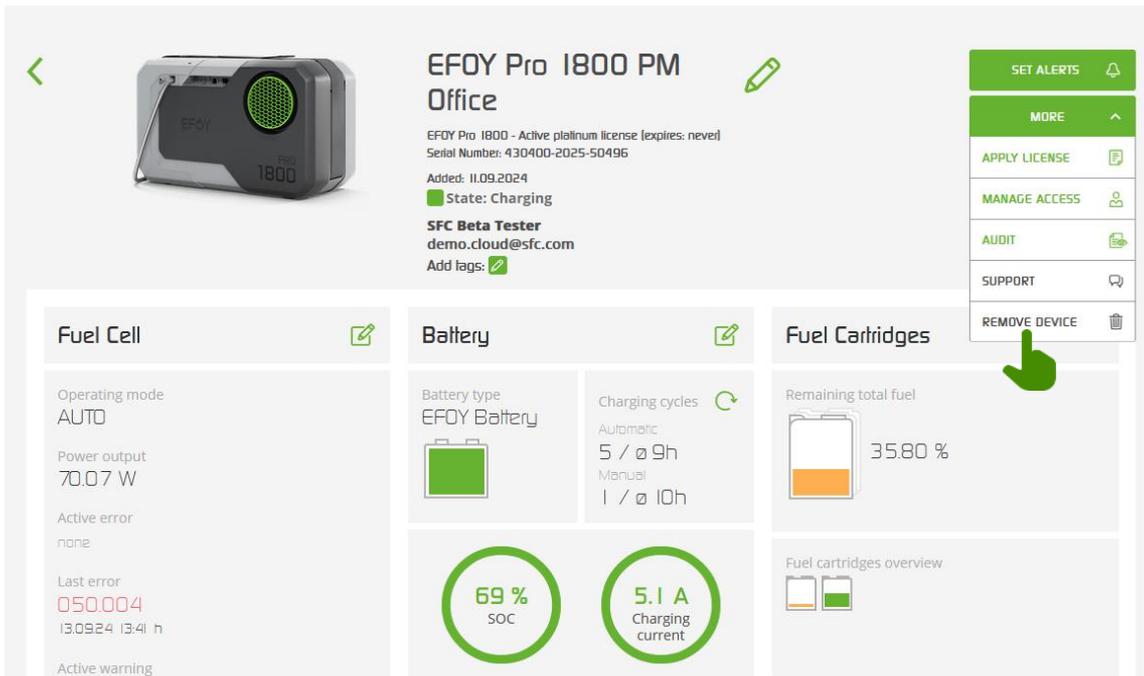
Claim your EFOY

🕒 Claiming Key on the EFOY App



Delete your EFOY

- 🕒 Select the EFOY you want to remove from the EFOY Cloud and go to the detailed page of the device
- 🕒 Click the “MORE” button in the upper right corner – then select “REMOVE DEVICE”
- 🕒 Confirm the pop-up window by clicking on the “CONFIRM” button



EFOY Pro 1800 PM Office

EFOY Pro 1800 - Active platinum license (expires: never)
Serial Number: 430400-2025-50496
Added: 11.09.2024
State: Charging
SFC Beta Tester
demo.cloud@sfc.com
Add tags:

Fuel Cell

Operating mode: AUTO
Power output: 70.07 W
Active error: none
Last error: 050.004
13.09.24 13:41 h
Active warning

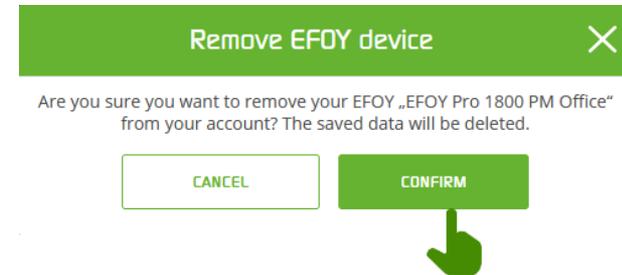
Battery

Battery type: EFOY Battery
Charging cycles: Automatic 5 / ø 9h, Manual 1 / ø 10h
69% SOC
5.1 A Charging current

Fuel Cartridges

Remaining total fuel: 35.80 %
Fuel cartridges overview

SET ALERTS
MORE
APPLY LICENSE
MANAGE ACCESS
AUDIT
SUPPORT
REMOVE DEVICE



Remove EFOY device

Are you sure you want to remove your EFOY „EFOY Pro 1800 PM Office“ from your account? The saved data will be deleted.

CANCEL CONFIRM

EFOY Cloud

1	Login / Create Account
2	Claim your EFOY
3	Licenses
4	Rights and Roles
5	New features
6	Maintenance and updates

EFOY Cloud – Licenses

- 🔌 Demo license keys are included with every new EFOY
 - 🔌 EFOY 80 / 150: free of cost first 6 months (Platinum)
 - 🔌 EFOY Pro 900 / 1800 / 2800: free of cost first 12 months (Platinum)

- 🔌 License validity period starts with entering the license key in the EFOY Cloud or by activation via the new feature (later more)
- 🔌 A running license can't be paused or stopped to be re-activated
- 🔌 Purchased licenses are not assigned to any specific EFOY, and can be distributed freely
- 🔌 Once a license is activated with an EFOY it remains assigned and can't be unpaired

- 🔌 12-month license keys can be bought at any time via your EFOY service partner / distributor:
 - 🔌 158 920 007 - Basic License
 - 🔌 158 920 008 - Platinum License

Add a license to your EFOY

- 🕒 As soon as your EFOY is integrated in the cloud, it will show up in the EFOY fuel cells overview
- 🕒 Here, you can also see directly which license is assigned to the device – here “No license”
- 🕒 Go to the product detail page by clicking on your EFOY to add a license to the device

EFOY fuel cells

All EFOY fuel cells currently claimed to your account are displayed here. You can organize your overview, export it or claim further EFOY fuel cells.

Search for Serial / Name + ADD EFOY

Total claimed devices: 3

1 of 1
■ status ideal
 ■ attention required
 ■ action required
 ■ inactive

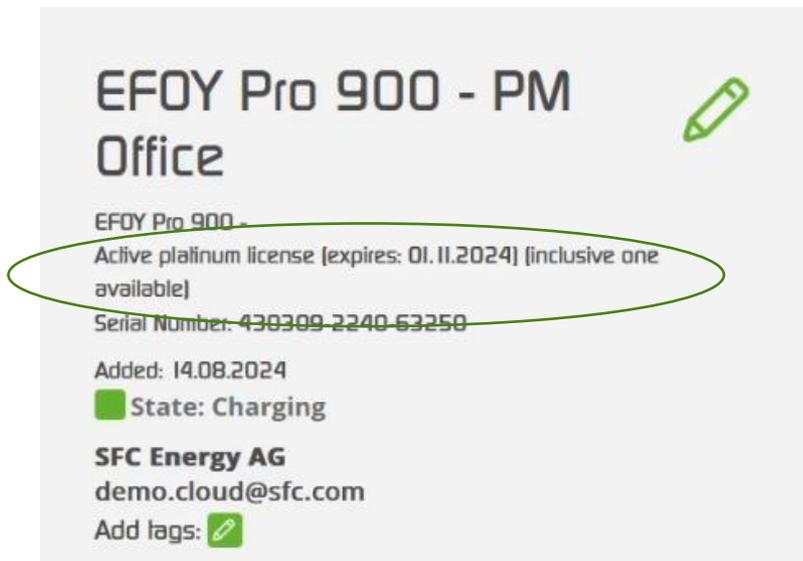
Device / License	Operation state	Fuel	Firmware	Voltage /	Operating	Serial number
 <p>EFOY Pro 900 Showroom ProEnergyCase 2020P-3</p> <p>EFOY Pro 900 No license</p>	■ Standby	Your current license does not support this feature. Please upgrade your license to see more information.				430306-2151-57140

SELECT EFOYs 1 of 1

Add a license to your EFOY (without license key label)

- Every new device automatically comes with an EFOY Cloud license (Platinum 6 or 12 months) and previously you had to read the key from the label under the belt and enter it online.

Now, when claiming in the EFOY Cloud, you are asked whether you want to activate the license immediately or later.



EFOY Pro 900 - PM Office

EFOY Pro 900 -

Active platinum license (expires: 01.11.2024) (inclusive one available)

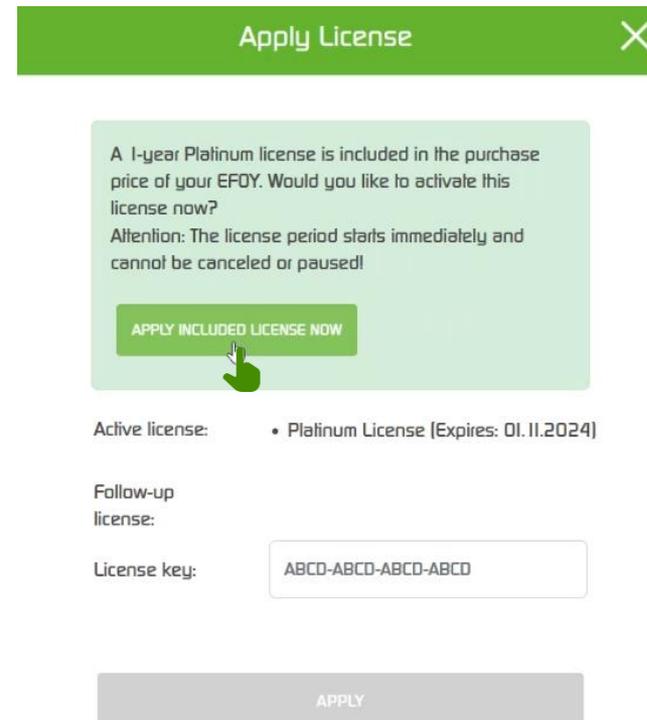
Serial Number: 430309-2240-63250

Added: 14.08.2024

State: Charging

SFC Energy AG
demo.cloud@sfc.com

Add tags:



Apply License X

A 1-year Platinum license is included in the purchase price of your EFOY. Would you like to activate this license now?
Attention: The license period starts immediately and cannot be canceled or paused!

APPLY INCLUDED LICENSE NOW

Active license: • Platinum License (Expires: 01.11.2024)

Follow-up license:

License key: ABCD-ABCD-ABCD-ABCD

APPLY

Add a license to your EFOY (with a license key label under the belt)

- ⌚ You can now add a license by clicking on the “MORE” button in the upper right corner
- ⌚ A drop-down menu will then open and you can select “APPLY LICENSE”
- ⌚ If you would like to continue using the advantages of the EFOY Cloud after the expiration of your inclusive license, you can order and apply a follow-up license as well

EF0Y Pro 900
Showroom
ProEnergyCase
2020P-3

EF0Y Pro 900 - No license
Serial Number: 430306-2151-57140
Added: 17.10.2023
State: Standby
SFC Beta Tester
demo.cloud@sfc.com

SET ALERTS

MORE

APPLY LICENSE

MANAGE DEVICES

AUDIT

SUPPORT

REMOVE DEVICE

Your current license does not support this feature. Please upgrade your license to see more information.

GET YOUR LICENSE

Add a license to your EFOY (with a license key label under the belt)

- ⌚ A separate window will open where you can enter your license key
- ⌚ After successfully entering the key, you will see an overview with the type of license, its duration and the exact start and end date

The image illustrates the 'Apply License' process in three stages:

- Initial State:** The 'Apply License' window shows 'Active licenses: None' and 'Follow-up licenses: None'. The 'License key:' field is empty.
- Key Entry:** A license key 'ABCD-ABCD-ABCD-ABCD' is entered into the 'License key:' field. The 'APPLY' button is highlighted.
- Successful Activation:** A new license key 'PNLY-SUSZ-2K5T-Y714' is entered. The 'APPLY' button is clicked, leading to a confirmation screen:

License successfully activated	
License:	platinum
Duration:	one_year
Start date:	01.03.2024
End date:	01.03.2025

- ⌚ You can enter up to two licenses successively
- ⌚ The follow-up license starts the moment the active license ends

EFOY licenses

- ⏻ Now "no license" has become "Platinum license" and the expiration date
- ⏻ You will immediately see how the view changes with a Platinum license and all the information displayed

EFOY Pro 900
Showroom
ProEnergyCase
2020P-3

Active platinum license (expires: 12.09.2024)
Serial Number: 430306-2151-57140
Added: 17.10.2023
State: Standby
SFC Beta Tester
demo.cloud@sfc.com

Fuel Cell	Battery	Fuel Cartridges
<p>Operating mode AUTO</p> <p>Power output 0 W</p> <p>Voltage at the battery 13.1 V</p> <p>Voltage at the EFOY 12.5 V</p> <p>Charging current 0.0 A</p> <p>EFOY temperature 22.6 °C</p> <p>Operating hours 1489 h</p> <p>Firmware version</p>	<p>Battery type EFOY Battery</p> <p>Charging cycles Automatic: 22 / 10h Manual: 5 / 3h</p> <p>35% SOC</p> <p>0.0 A Charging current</p> <p>Battery capacity 70 Ah</p> <p>Switch-off SOC 80%</p>	<p>Remaining total fuel 78.8%</p> <p>Fuel cartridges overview</p> <p>Fuel cartridge sensor Fuel level above sensor or no sensor connected</p> <p>2. M10 (10L) Fuel Level 100% (100%)</p>

EFOY licenses

🔌 Basic license

EFOY Pro 900
Showroom
ProEnergyCase
2020P-3

EFOY Pro 900 - Active basic license (expires: 12.09.2024)
Serial Number: 430306-2151-57140
Added: 17.10.2023
State: Standby
SFC Beta Tester
demo.cloud@sfc.com

Fuel Cell

- Operating mode: AUTO
- Power output: 0 W
- Voltage at the battery: 13.1 V
- Voltage at the EFOY: 12.5 V
- Charging current: 0.0 A
- EFOY temperature: 22.0 °C
- Operating hours: 1504 h
- Firmware version: 24.15.303
- Active error: none
- Last error: 050.004 (13.11.23 15:22 h)

Battery

- Battery type: EFOY Battery
- Charging cycles: Automatic (23 / 0 11h), Manual (5 / 0 3h)
- 41% SOC
- 0.0 A Charging current
- Battery capacity: 70 Ah
- Switch-off SOC: 80%
- Switch-on SOC: 20%
- Battery protection: 10%

Fuel Cartridges

- Remaining total fuel: 75.85%
- Fuel cartridges overview: 2 M10 (10L), 1 M10 (10L)
- Fuel cartridge sensor: Fuel level above sensor or no sensor connected
- 2. M10 (10L): Fuel Level 100% (10.00l)
- 1. M10 (10L) Active Port: Fuel Level 52% (5.17l)

🔌 On this EFOY detail page you can see all the functions that are available with the basic license as an owner

🔌 Under the Battery tab, you see the arrow icons indicating that your license does not have sufficient authorization for these settings

EFOY licenses

🔌 Platinum license

EFOY Pro 900
 Showroom
 ProEnergyCase
 2020P-3

EFOY Pro 900 - Active platinum license [expires: 12.09.2024]
 Serial Number: 430306-2151-57140
 Address: 17.10.2023
 State: Standby
SFC Beta Tester
 demo.cloud@sfc.com

Fuel Cell

- Operating mode: AUTO
- Power output: 0 W
- Voltage at the battery: 13.1 V
- Voltage at the EFOY: 12.5 V
- Charging current: 0.0 A
- EFOY temperature: 22.1 °C
- Operating hours: 1504 h
- Firmware version: 24.15.303
- Active error: none
- Last error: 050.004 (13.11.23 15:22 h)

Battery

- Battery type: EFOY Battery
- Charging cycles: Automatic (23 / ø 11 h), Manual (5 / ø 3 h)
- 41% SOC
- 0.0 A Charging current
- Battery capacity: 70 Ah
- Switch-off SOC: 80%
- Switch-on SOC: 20%
- Battery protection: 10%

Fuel Cartridges

- Remaining total fuel: 75.85%
- Fuel cartridges overview: 2 M10 (10L), 1 M10 (10L) Active Port
- Fuel cartridge sensor: Fuel level above sensor or no sensor connected
- 2. M10 (10L): Fuel Level 100% (10.00)
- 1. M10 (10L) Active Port: Fuel Level 52% (5.17)

🔌 On this EFOY detail page you can see all the functions that are available with the platinum license as an owner

🔌 Now you have the pen icon under the battery tab and can make changes to the settings, which is not possible with the Basic license

EFOY licenses

🕒 License expiration notice to the owner (cannot be unsubscribed):

🕒 28 days, 14 days, 7 days and 24 h before expiration

Active License Expiration


Expiration Date
Your platinum license expires in 14 days (at 2024-03-19 11:00:00 UTC).

Device name: EFOY Pro 900 Showroom
Serial number: 430306-2151-57140

[> TO EFOY](#)

If you want to continue using the EFOY Cloud, you will need a new license key.
You can purchase EFOY license keys from your EFOY service partner or distributor.

[> MORE INFORMATION](#)

Your EFOY Team






Active License Expiration


Follow-up license
Your platinum license has just expired.
The follow-up platinum license is now active until 2025-03-14 10:00:00 UTC.

Device name: EFOY Pro 900 Showroom
Serial number: 430306-2151-57140

[> TO EFOY](#)

If you want to continue using the EFOY Cloud, you will need a new license key.
You can purchase EFOY license keys from your EFOY service partner or distributor.

[> MORE INFORMATION](#)

Your EFOY Team



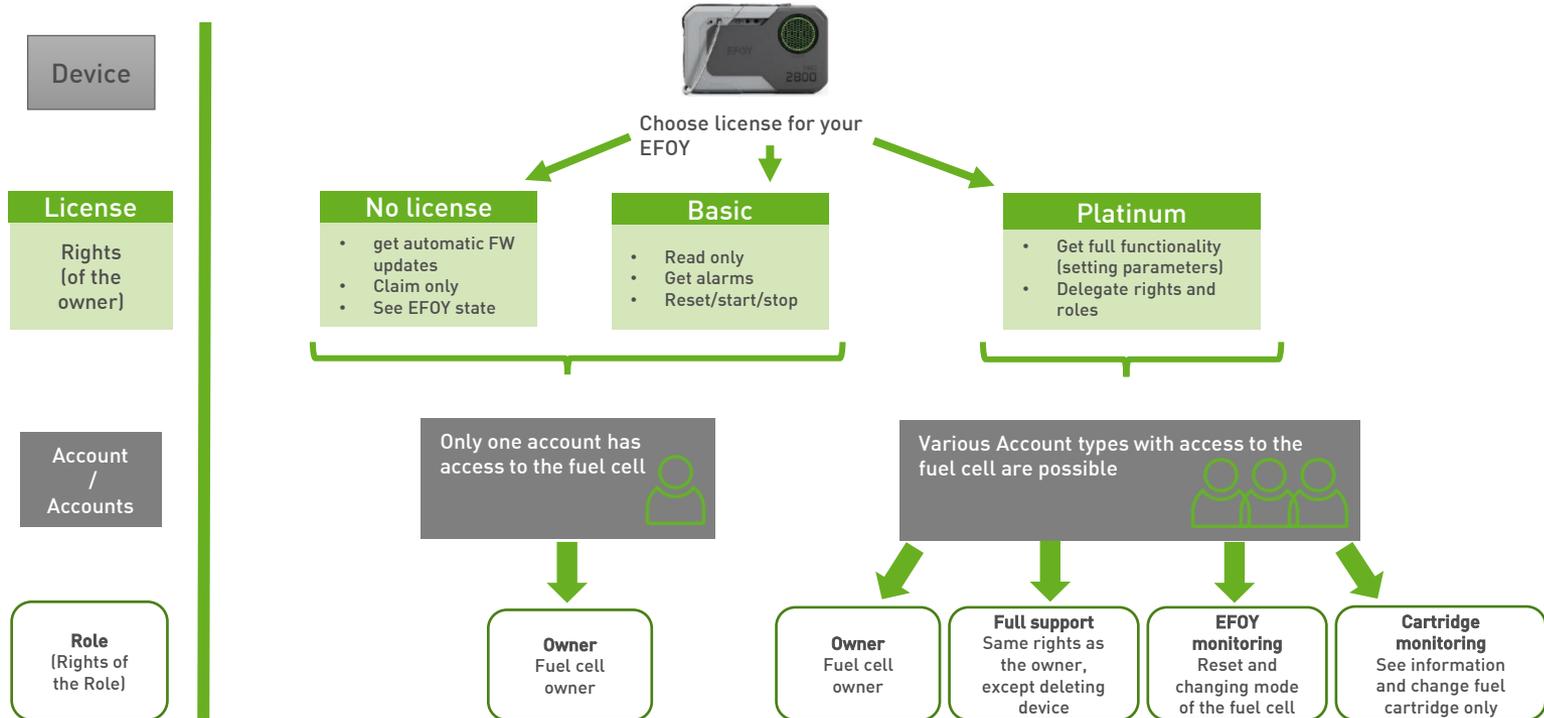



EFOY Cloud

1	Login / Create Account
2	Claim your EFOY
3	Licenses
4	Rights and Roles
5	New features
6	Maintenance and updates

EFOY Cloud

Rights and Roles - Overview



Add groups and users

- 🕒 If you have already registered devices in the cloud, you will see your EFOYs in this overview
- 🕒 To use rights & roles you need to add a group by clicking on „GROUPS“ on the upper right corner
- 🕒 Then a new window opens – called „Group Management“

EFOY EFOY FUEL CELLS USER ACCOUNT **GROUPS**

EFOY fuel cells

All EFOY fuel cells currently claimed to your account are displayed here. You can organize your overview, export it or claim further EFOY fuel cells.

Search for Serial / Name **+ ADD EFOY**

Total claimed devices: 0

1 of 1 status ideal attention required action required inactive

Device / License	Operating state	Fuel level	Firmware	Voltage / SOC	Operating hours	Serial number
No items to load						

SELECT EFOYs 1 of 1

[Back to EFOY fuel cells](#)

Group Management

No Content

Please note that the Group ID is sorted alphabetically.

ADD GROUP

1 of 0

- 🕒 There you can add a new group by clicking on the „ADD GROUP“ button

Add groups and users

Group Management	User	Role	Remove
Group ID* <input type="text"/>	demo.cloud@sfc.com	<input type="button" value="Admin"/>	
Description* <input type="text"/>	+ Add User		
Company <input type="text"/>			
Address <input type="text"/>			
Cancel		<input type="button" value="SAVE"/>	

1 of 0

Group Management	User	Role	Remove
Group ID* <input type="text" value="123456789"/>	demo.cloud@sfc.com	<input type="button" value="Admin"/>	
Description* <input type="text" value="Demo sfc-123"/>	+ Add User		
Company <input type="text"/>			
Address <input type="text"/>			
Cancel		<input type="button" value="SAVE"/>	

1 of 0

- Now you have to assign a Group ID – which is required and unique like an email address (once worldwide)
- Use lower case letters, numbers and minus signs like our example
- Groups are necessary to give the same rights to several employees in a company
- You also have to add a description and voluntary other company information to your group
- Group ID is the info that you share with our customers

EFOY Rights and Roles

🕒 Now you can assign a role to the user you have previously assigned to your group or individual users by clicking the "MORE" button in the upper right corner again – then select "MANAGE ACCESS"

EFOY Pro 900
Showroom
ProEnergyCase
2020P-3

EFOY Pro 900 - Active platinum license (expires: 12.09.2024)
Serial Number: 430306-2151-57140
Added: 17.10.2023
State: Standby
SFC Beta Tester
demo.cloud@sfc.com

SET ALERTS
MORE
APPLY LICENSE
MANAGE ACCESS
AUDIT
SUPPORT
REMOVE DEVICE

Fuel Cell

Operating mode: AUTO
Power output: 0 W
Voltage at the battery: 13.1 V
Voltage at the EFOY: 12.5 V
Charging current: 0.0 A
EFOY temperature: 22.1 °C
Operating hours: 1504 h
Firmware version: 24.15.303
Active error: none
Last error

Battery

Battery type: EFOY Battery
Charging cycles: Automatic 23 / ø 11 h, Manual 5 / ø 3 h
41% SOC
0.0 A Charging current
Battery capacity: 70 Ah
Switch-off SOC: 80%
Switch-on SOC: 20%
Battery protection: 10%

Fuel Cartridges

Remaining total fuel: 75.85 %
Fuel cartridges overview
Fuel cartridge sensor: Fuel level above sensor or no sensor connected
2. M10 (10L) Fuel Level: 100 % (10.00)
1. M10 (10L) Active Port Fuel Level: 52 % (5.17)

EFOY Rights and Roles

🔌 Assign a role

[← Back to Fuel Cell](#)

 EFOY Pro 900 Showroom
 ProEnergyCase 2020P-3
 Serial number: 430306-2151-57140
 Owner

Manage Access

NAME	EMAIL ADDRESS	ROLE	DECOUPLING
Demo Cloud	demo.cloud@sfc.com	Owner	

ADD

[← Back to Manage Access](#)

 EFOY Pro 900 Showroom
 ProEnergyCase 2020P-3
 Serial number: 430306-2151-57140
 Owner

Add user/group to EFOY

User/Group
 Email / Group ID

Role
 Full support
 Cartridge monitoring
 EFOY monitoring
 Full support

[CANCEL](#)
[SAVE & NEW](#)
[SAVE & GO BACK](#)

- 🔌 By clicking on the "ADD" button, you can connect a user or an entire group ID to the EFOY
- 🔌 Please note that all users must have an EFOY Cloud account in order to add them and distribute them a role
- 🔌 The "SAVE & NEW" button is meant for when you want to add multiple users at once and don't always want to go back to the overview

EFOY Rights and Roles

< Back to Fuel Cell



EFOY Pro 900 Showroom
ProEnergyCase 2020P-3
Serial number: 430306-2151-57140
Owner

Manage Access

NAME	EMAIL ADDRESS	ROLE	DECOUPLING
Demo Cloud	demo.cloud@sfc.com	Owner	
SFC Energy AG	info@sfc.com	Full support	

ADD

< Back to Fuel Cell



EFOY Pro 900 Showroom
ProEnergyCase 2020P-3
Serial number: 430306-2151-57140
Owner

Manage Access

NAME	EMAIL ADDRESS	ROLE	DECOUPLING
Demo Cloud	demo.cloud@sfc.com	Owner	
SFC Energy AG	info@sfc.com	Full support	
Demo	Group ID: 123456789	EFOY monitoring	

ADD

- Here in the overview you see all Users and groups with their corresponding assigned role
- Please note that if a user has multiple roles (individual & group), the role with more permissions always overrides the lower role
- In this case the whole group with all its Users has access to the “EFOY monitoring”
- But info@sfc.com as an individual user has even “full support”

EFOY Rights and Roles

🕒 These 3 detail pages "Fuel Cell ", "Battery" and "Fuel Cartridges" are all visible and editable in the "full support" role.

🕒 So you see here all subpages that open when you click on the pencil icon in each case

🕒 This is just to give you an overview of which options are no longer editable with the other two roles "EFOY monitoring" and "Cartridge monitoring"

The screenshot displays the EFOY monitoring interface with three main subpages: Fuel Cell, Battery, and Fuel Cartridges. Each subpage has a pencil icon in the top right corner, indicating it is editable. The Fuel Cell subpage shows 'Operating Mode: AUTO' and 'Power Output: 0.07 W'. The Battery subpage shows 'Battery Type: EFOY Battery', 'Charging cycle: Automatic 10 / @ 8.5 h, Manual 7 / @ 4.7 h', and 'Voltage: 13.28 V' and 'Charging current: 6 A'. The Fuel Cartridges subpage shows 'Remaining total fuel: 70.3%' and an 'EDIT CARTRIDGES' button.

Three detailed configuration windows are shown:

- Fuel Cell Configuration:**
 - Operating Mode:** You can choose between automatic and sleep operating mode. Options: AUTO, SLEEP, CHARGE NOW.
 - Reset EFOY fuel cell:** RESET button.
 - AUTO:** The fuel cell will switch on and off according to the preset thresholds.
 - Sleep:** The fuel cell will switch off. Frost protection and battery protection will be performed if necessary.
 - Charge now:** The fuel cell will start charging if possible. The operating mode will switch to AUTO.
- Battery Capacity Configuration:**
 - Total capacity of the battery/batteries connected:** Min. 40 Ah, Max. 800 Ah, Value: 60 Ah.
 - Switch-on voltage:** Min. 8 V, Max. 8 V, Value: 12.3 V.
 - Switch-off voltage:** Min. 8.5 V, Max. 14.7 V, Value: 14.2 V.
 - Cut-off current:** Min. 0.5 A, Max. 0 A, Value: 2 A.
 - Cut-off time:** Min. 0 min, Max. 300 min, Value: 180 min.
 - Max. charge time:** Min. 4 h, Max. 120 h, Value: 2.9 h.
 - Min. charge time:** Min. 30 min, Max. 80 min, Value: 30 min.
 - Switch-on delay:** If the battery voltage falls below the switch-on voltage or the state of charge falls below the max. switch-on charge level for the time.
- Fuel Cartridge Configuration (1. CUSTOM (222L)):**
 - Port 1 / 2:** Current fuel level: 39%.
 - Port:** ENABLED / DISABLED.
 - Type:** CUSTOM.
 - Capacity [L]:** 222.
 - New fuel level:** 39 % (0% up to 100%).
 - SAVE CHANGES** button.

EFOY Cloud

1	Login / Create Account
2	Claim your EFOY
3	Licenses
4	Rights and Roles
5	New features
6	Maintenance and updates

New features - Tags

- 🕒 Tags are used to “filter” or sort the devices according to customer-specific requirements.

You can freely choose the color and name and there are your own (My Tags), which you can only see yourself and there are Group Tags, which everyone in a group can see and also change (with the right role)

< Back to Dashboard

Device Tags

My Tags:

Munich

+ add tag

Group Tags:

Demo (123456789)

+ add tag

SFC Demo Group (sfcdemo)

Test unit

+ add tag

 **EFOY Pro 900 - PM Office**

EFOY Pro 900
Platinum license
(expires: 01.11.2024)

Munich

 **Product EFOY150 ProCube 2060A-3 Showroom**

EFOY 150
Platinum license
(expires: 01.11.2024)

Munich Test unit

New features - License Batch Apply

- From now on, several devices can be selected simultaneously in the EFOY Cloud, multiple license keys can also be inserted and the Cloud automatically assigns a license to the EFOYs (a follow-up for already active licenses or error messages if something did not work)

You will then receive an overview of the remaining unused license keys and the devices that have not been successfully applied

< Back to EFOY fuel cells

Apply Licenses

Selected EFOYs: 3

Results for apply license keys

1 of 3 Successful

430100-2027-50707 (EFOY 80-50707) **failed** to apply key - P1XG-URJU-CENA-QX57 - (Another license already exists)

430309-2240-63250 (EFOY Pro 900 - PM Office) applied the key: P1LY-F3B4-MCZJ-8821 - **success**

430208-2227-60965 (Product EFOY150 ProCube 2060A-3 Showroom) **failed** to apply key - P1CY-RMBZ-4HEA-EF71 - (You have not the sufficient permission to apply the licence key)

Remaining keys:
P1XG-URJU-CENA-QX57
P1CY-RMBZ-4HEA-EF71

Not successful devices:
430100-2027-50707
430208-2227-60965

[BACK TO FUEL CELL](#)

New features - Inclusive License Apply (Replacement for the license key label)

- Every new device automatically comes with an EFOY Cloud license (Platinum 6 or 12 months) and previously you had to read the key from the label under the belt and enter it online.

Now, when claiming in the EFOY Cloud, you are asked whether you want to activate the license immediately or later.

EFOY Pro 900 - PM Office

EFOY Pro 900 -
Active platinum license (expires: 01.11.2024) (inclusive one available)

Serial Number: 430309-2240-63250

Added: 14.08.2024

■ State: Charging

SFC Energy AG
demo.cloud@sfc.com

Add tags:

Apply License ✕

A 1-year Platinum license is included in the purchase price of your EFOY. Would you like to activate this license now?
Attention: The license period starts immediately and cannot be canceled or paused!

APPLY INCLUDED LICENSE NOW

Active license: • Platinum License (Expires: 01.11.2024)

Follow-up
license:

License key:

ABCD-ABCD-ABCD-ABCD

APPLY

New features – Alert Configuration

- ⚡ No more Mailaccount Alert Configuration possible – just Usersaccount Alert Configuration - everyone must set their own alerts -> only possible with a EFOY Useraccount

< Back to Fuel Cell

Alert Configuration

 EFOY 150-51770
Serial number: 430201-2046-51770
Delegated

All alerts will be sent only to:
demo.cloud@sfc.com

All

Total remaining fuel level below %

Battery voltage below V

Battery SOC below %

No connection

Error

Warning

Firmware updated

SAVE CHANGES

New features – Service mode

- 🔌 In service mode during the repair time, no parameter settings or changes can be made by the customer and no alerts are sent

EFOY Fuel Cells

All EFOY Fuel Cells currently claimed to your account are displayed here. You can organize your overview, export it or claim further EFOY Fuel Cells.

Search for Serial / Name + ADD EFOY

Total devices: 3

SELECT EFOYS COLUMN SETTINGS 1 of 1

Device / License	Operating state	Fuel level	Firmware	Voltage / SOC	Operating hours	Serial number
 EFOY 150 Showroom ProCube 2060A-3 EFOY 150 Platinum license (expires: never) Brunnthal	⚠ Warning	11%	24.16.319	38 % (13.1 V)	791	430208-2227-60965
 EFOY Pro 1800 PM Office EFOY Pro 1800 Platinum license (expires: never)	✖	✖	✖	✖	✖	430400-2025-50496
 EFOY Pro 900 Showroom ProEnergyCase 2020P-3 EFOY Pro 900 Platinum license (expires: 12.09.2025)	⏸ Standby	37%	24.16.319	36 % (13.1 V)	2292	430306-2151-57140

■ status ideal ■ attention required ■ action required ■ inactive
🔄 License upgrade needed ✖ In service 👤 cluster controller 👤 cluster client 1 of 1

Your EFOY is currently being repaired. Please contact support if you did not expect this.



EFOY Pro 1800 PM Office

EFOY Pro 1800 - Active platinum license (expires: never)
 Serial Number: 430400-2025-50496

Added: 11.09.2024
In service
State: Standby

SFC Beta Tester
 demo.cloud@sfc.com
 Add tags: ✔

SET ALERTS 🔔

MORE ▼

Fuel Cell ✎

Operating mode
AUTO

Power output
0 W

Battery ✎

Battery type
LiFePO4 12V

Charging cycles 🔄
 Automatic
20 / ⌀ 11h
 Manual
5 / ⌀ 7h

Fuel Cartridges ✎

Remaining total fuel


52.20 %

New features – Multi-factor Authentication

- 🕒 We now offer the option of multi-factor authentication in the EFOY Cloud if you would like to use it. You will find the feature in the menu under “User Account”.

The image displays two screenshots related to multi-factor authentication in the EFOY Cloud system.

Left Screenshot (User Account Management): This is a web interface for managing user accounts. The top navigation bar includes "EFOY FUEL CELLS", "USER ACCOUNT" (highlighted), "GROUPS", and "TAGS". The main content area is titled "Account" and contains a form with fields for "First name" (Demo), "Last name" (Cloud), "Email" (demo.cloud@sfc.com), "Password", "Company" (SFC Energy AG), "Phone", "Street address and number", "Postcode", "Country", and "Website". An "Edit account" link is visible in the top right. Below the form, the "Multifactor Authentication" section is circled in green. It lists two options: "One time password authentication" and "Passkey Registration", each with an "add new" button and a note that "No configuration found."

Right Screenshot (Google Authenticator): This is a mobile app interface for Google Authenticator. It shows a search bar with "Suchen...", the account name "Efoy Cloud: demo.cloud@sfc.com", and a blue circular icon with the number "659 652" inside, which is circled in green. A plus sign button is visible at the bottom right.

New features – Public REST API Token

- 🕒 Generate your personal access token in the EFOY Cloud in the menu under “User Account” to use the public REST API. This bearer token is stored once by the user in their software in order to authenticate themselves.
- 🕒 Here you can find the documentation for the REST API: <https://public.efoy-cloud.com>

Name	Expires at	
Isabell	19.02.2025	

Add a new token

<input type="text" value="Name"/>	<input type="text" value="15.03.2025 00:00"/>	<input type="button" value="ADD"/>
-----------------------------------	---	------------------------------------

New features – Public REST API Token

🕒 Here you can find the documentation for the REST API: <https://public.efoy-cloud.com>

Devices	
🕒 List Devices	GET
🕒 Get Summary	GET
🕒 Get Device State	GET
🕒 Get Device Owner	GET
🕒 List Licenses	GET
🕒 Get Active License Chain End Date	GET
🕒 Get Fuel Cartridges	GET
🕒 Get Battery Configuration	GET
🕒 Get Device Reset State	GET
🕒 Reset Device	PUT
🕒 Get Operating Mode	GET
🕒 Update Operating Mode	PUT

```
Request Sample: Shell / cURL
```

```
curl --request GET \  
--url https://public.api.stage.efoy-dev.de/v1/devices/430100-1234-1-1 \  
--header 'Accept: application/json, application/problem+json' \  
--header 'Authorization: Bearer 123'
```

```
Response Example
```

```
1 {  
2   "name": "string",  
3   "serialNumber": "string",  
4   "firmwareVersion": {  
5     "major": 0,  
6     "minor": 0,  
7     "patch": 0  
8   },  
9   "state": {  
10    "operatingMode": "automatic",  
11    "state": "standby",  
12    "isConnected": true,  
13    "lastUpdated": "2024-09-04T08:00:00Z"  
14  },  
15  "latestTelemetry": {  
16    "powerOutput": 0,  
17    "voltageBattery": 0,  
18    "voltageEfoy": 0,  
19    "chargingCurrent": 0,  
20    "efoyTemperature": 0,  
21    "stackOperationTime": 0  
22  },  
23  "events": {  
24    "activeError": {  
25      "major": 0,
```

New features – Column settings

- With the column settings, you can arrange the columns of your EFOY individually and display the values that are most important to you personally on the overview page.

EFOY Fuel Cells

All EFOY Fuel Cells currently claimed to your account are displayed here. You can organize your overview, export it or claim further EFOY Fuel Cells.

pm + ADD EFOY

Total devices: 1

SELECT EFOYS COLUMN SETTINGS 1 of 1

Device / License	Operating state	Fuel level	Firmware	Voltage / SOC	Operating hours
 EFOY Pro 1800 PM Office EFOY Pro 1800 Platinum license (expires: 31.01.2025)	Standby	22%	24.16.315	80 % (13.3 V)	

■ status ideal
 ■ attention required
 ■ action required
 ■ inactive
 ↑ License upgrade needed
 ✂ In service
 🗣️ cluster controller

[LEGAL NOTICE](#) / [CLOUD SUPPORT](#) / [PRIVACY POLICY](#) / [TERMS OF USE](#) / [EFOY CLOUD LICENSES](#) / [COOKIE SETTINGS](#)

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 SFC Energy AG | Eugen-Sänger-Ring 7 | 85649
 Brunnthal-Nord

Select 7 of 7 columns
 RESET APPLY FILTER

New features – Port in use

- With this new feature, you can actively determine from which fuel cartridge methanol is drawn. Select the port on the FuelManager and set it to “in use”.

2. M10 (10L)✕

Port 2 / 4

Current fuel level 26 % 

Port ACTIVATED DEACTIVATED

Type M10 ▼

New fuel level 26
0 % up to 100 %

SAVE CHANGES

Advanced configuration:

Port state	Port not in use	USE THIS PORT
------------	-----------------	---

EFOY Cloud

1	Login / Create Account
2	Claim your EFOY
3	Licenses
4	Rights and Roles
5	New features
6	Maintenance and updates

EFOY Cloud Maintenance

- ⌚ From time to time, routine technically necessary or major maintenance work on the cloud is required to keep the application up to date and make new features available
- ⌚ This maintenance work is always displayed days in advance via a banner in the EFOY Cloud
- ⌚ For detailed information on maintenance, you can click on the link in the banner on “More information here” for an overview of the points that will be carried out
- ⌚ Here is an example of a technically necessary routine update on the EFOY Cloud:



System Under Maintenance

← Necessary routine maintenance of the infrastructure

In progress Scheduled for March 27, 2024 at 4:00 PM – 5:00 PM

AFFECTED

EFOY Cloud Frontend

EFOY Cloud Backend

UPDATES

In progress March 27, 2024 at 4:00 PM

Necessary routine maintenance of the infrastructure is running since 27.03.2024 16:00 for about 1 hour. More information [here](#).

SIGN OUT

EFOY EFOY FUEL CELLS USER ACCOUNT GROUPS

EFOY fuel cells

All EFOY fuel cells currently claimed to your account are displayed here. You can organize your overview, export it or claim further EFOY fuel cells.

Search for Serial / Name

Total claimed devices: 3

+ ADD EFOY

■ status ideal
 ■ attention required
 ■ action required
 ■ inactive

Device / License	Operating state	Fuel level	Firmware	Voltage / SOC	Operating hours	Serial number
<p>EFOY Pro 2800-00083-PM-Case EFOY Pro 2800 Basic license</p>	<p>Standby</p> <p style="font-size: x-small;">Last updated: 72 weeks ago (08.11.2022 17:40)</p>	0	24.13.258	12.5 V	4201	430500-2011-00083
<p>EFOY Pro 900 PM Office EFOY Pro 900 Platinum license</p>	<p>Standby</p>	58%	24.16.308	12.3 V	3861	430309-2240-63250
<p>EFOY Pro 900 Showroom ProEnergyCase 2020P-3 EFOY Pro 900 Platinum license</p>	<p>Standby</p>	79%	24.15.303	38 %	1489	430306-2151-57140

SELECT EFOYS 1 of 1

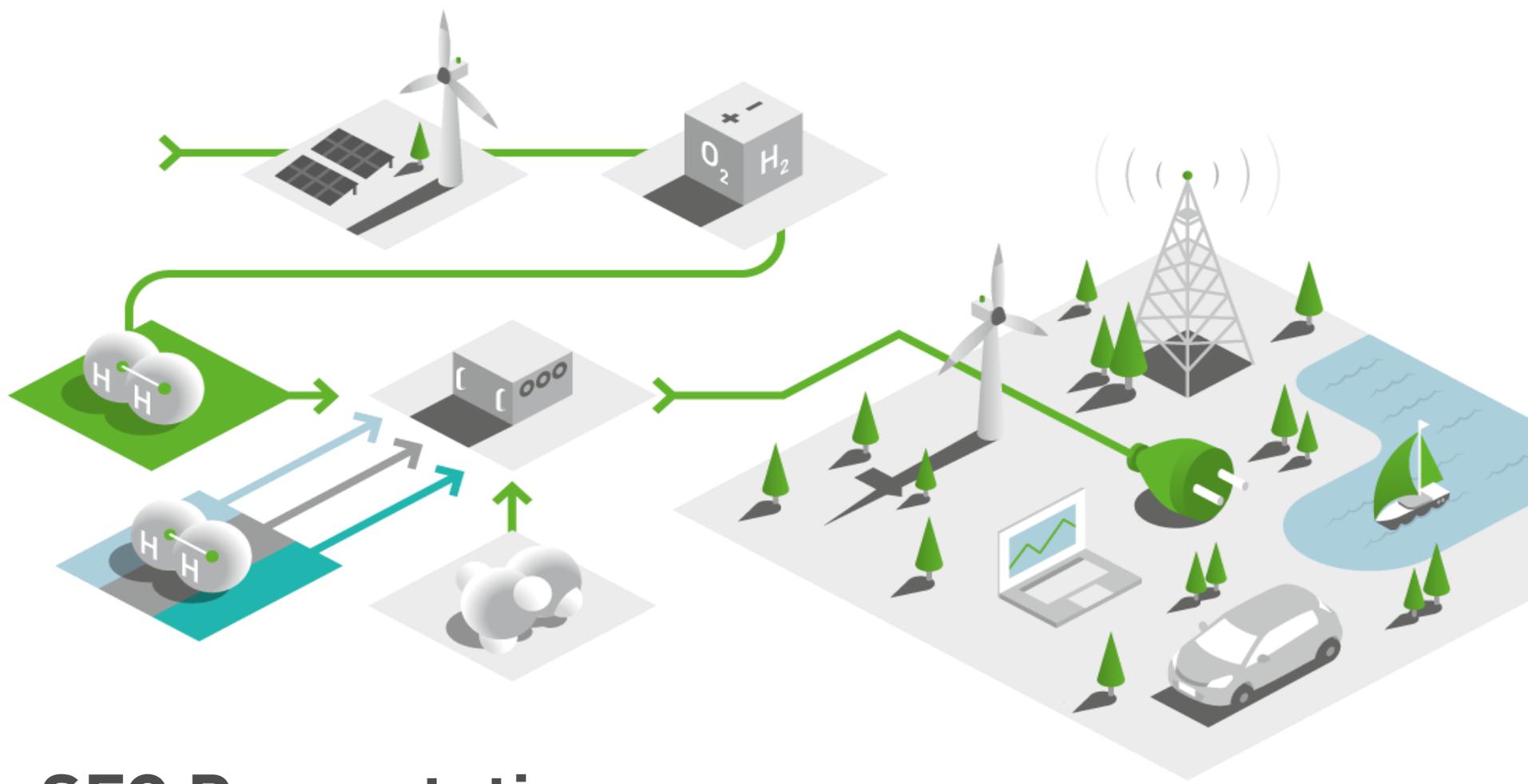
CLOUDSUPPORT / IMPRINT/LEGALS



Firmware update via the EFOY Cloud

- ⌚ The usual file size of the firmware file is 3 MB
- ⌚ The file transfer of the firmware to the EFOY can take 5 to 10 minutes via the Internet with a “normal” Internet connection
- ⌚ The installation of the update on the EFOY and on all connected accessory devices takes approx. 6 minutes
- ⌚ The EFOY requires approx. 500 MB of data per month



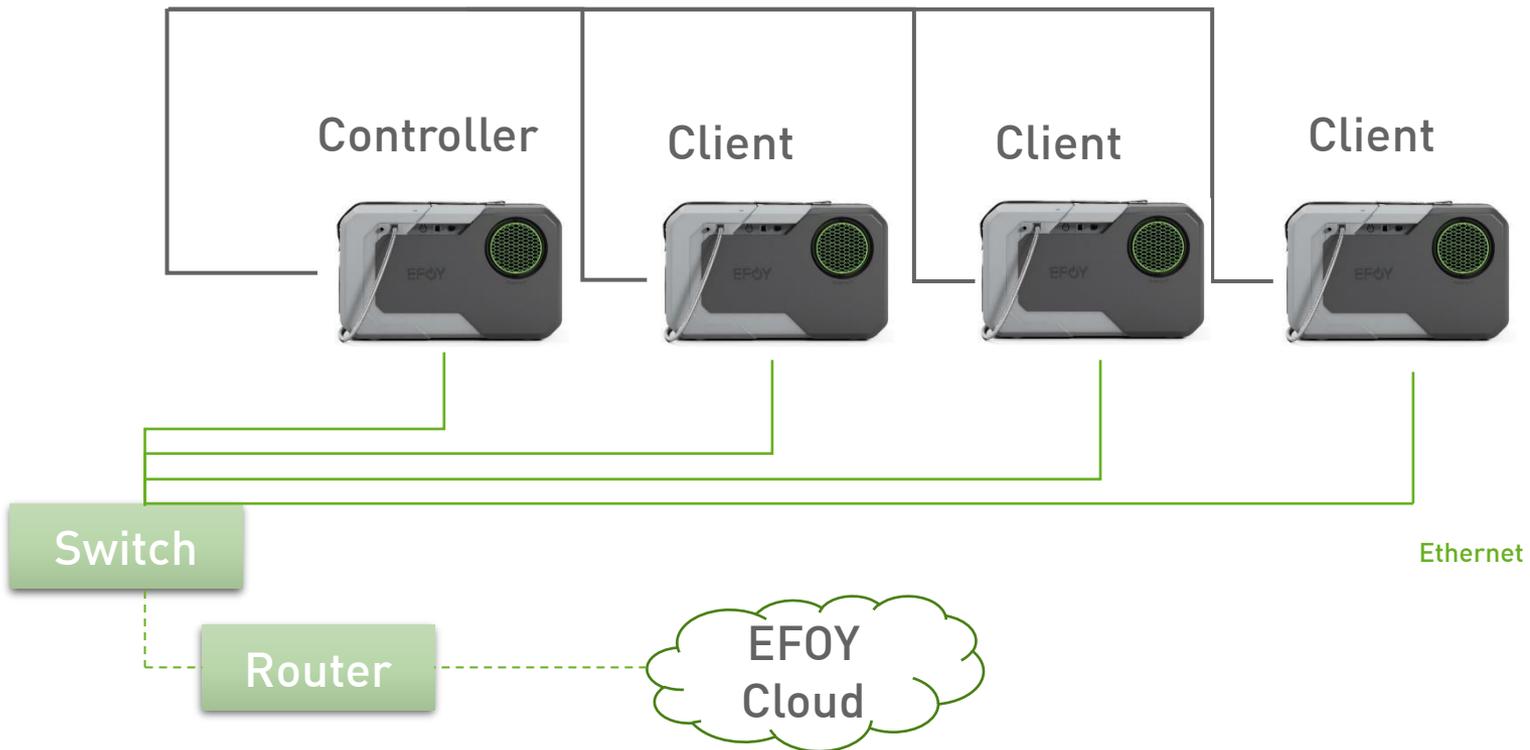


SFC Presentation

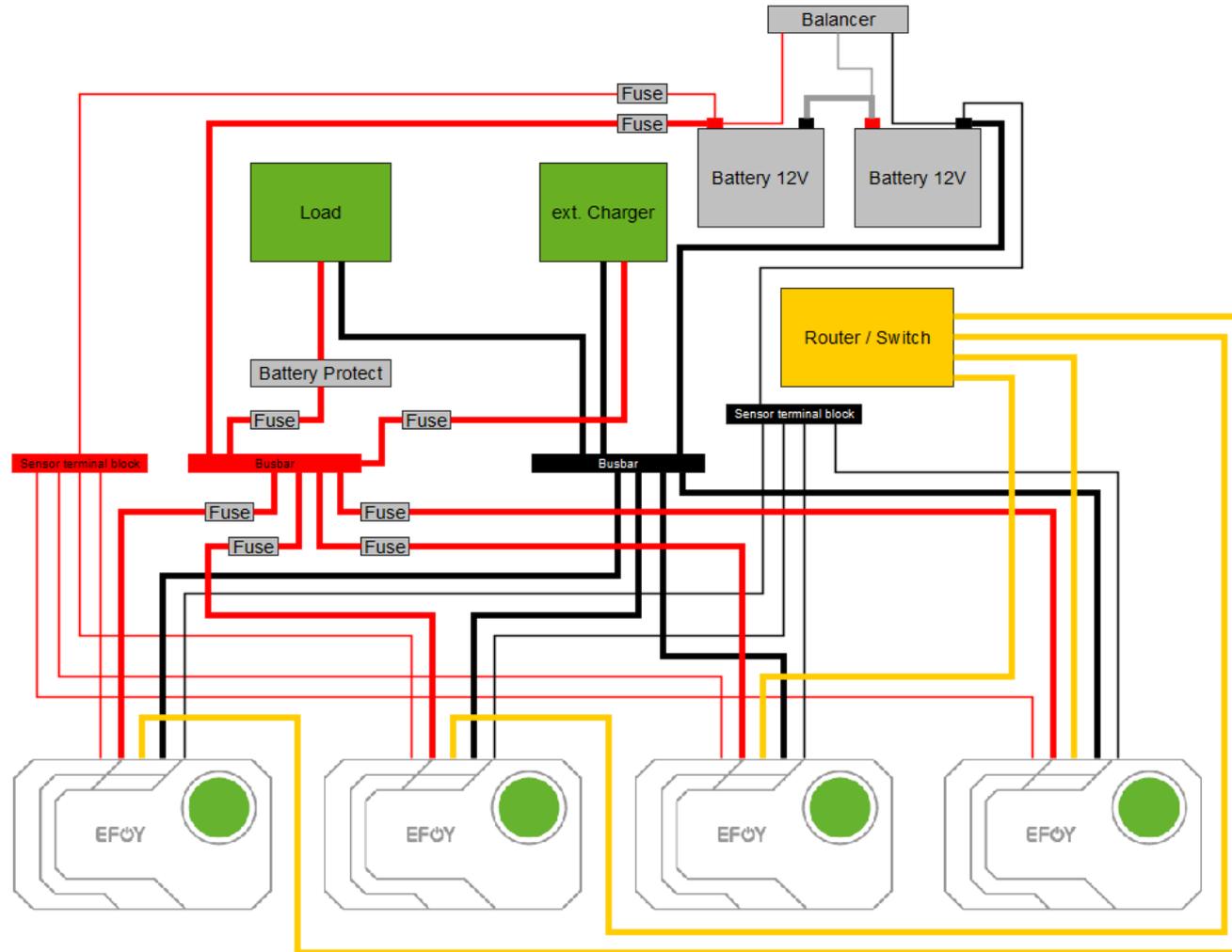
EFOY Cluster functionality

Cluster - Functionality

- 🔌 Cluster of 4 EFOYs
 - 🔌 1 Controller / max. 3 Client
 - 🔌 Advantage: Same operating hours, same fuel consumption
- 🔌 Connection via ethernet cable to switch or router (if enough ports available)

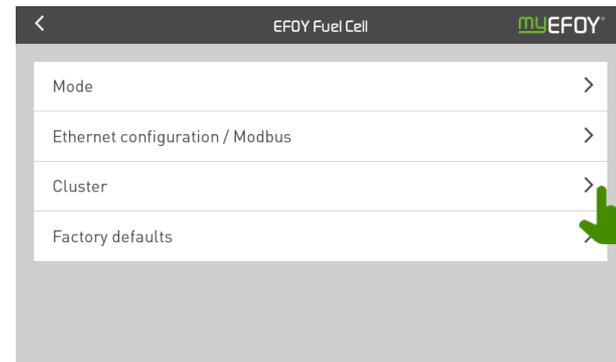
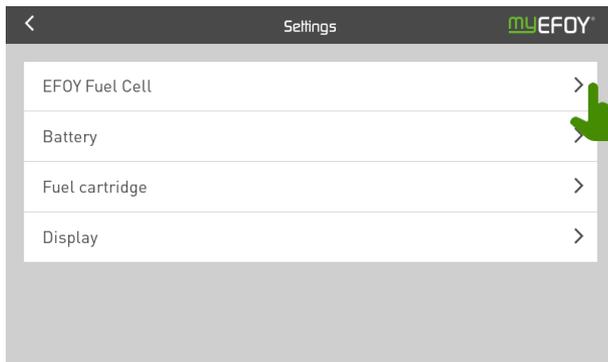


Cluster – Electrical connection



Start cluster configuration

- 🔌 Available with
 - 🔌 EFOY firmware 24.14.275 or higher
 - 🔌 Operatin panel OP3 firmware 27.08.49
- 🔌 Configuration is mandatory, start in the settings menu at the operating panel



Configuration via operating panel

- 🔌 Set the “Controller” EFOY
 - 🔌 Same charging parameter for all EFOYs in the Cluster is essential
 - 🔌 If necessary assign IP-address
 - 🔌 Note IP-address & PIN or save on operating panel (automatically)

The image illustrates the configuration process for an EFOY cluster via the operating panel. It consists of three sequential screenshots:

- Cluster Selection:** The 'Cluster' menu is shown with three options: 'Set this EFOY as controller' (selected with a green radio button), 'Set this EFOY as client', and 'No cluster configured'. A 'Configure' button is highlighted with a green arrow.
- Cluster Settings:** A dialog box titled 'Cluster settings' displays a warning icon and the text: 'Please ensure that all EFOYs of the cluster have the same charging parameters.' Below this is a link 'Check charging parameter >' and two buttons: 'Cancel' and 'Confirm'. A green arrow points to the 'Confirm' button.
- Configuration Details:** A dialog box titled 'Set this EFOY as controller' shows the configuration details: 'IP address' is set to '192.168.123.28' and 'Cluster PIN' is '64252896'. Below this is a text block: 'By setting this EFOY as controller, the IP address and the cluster PIN are automatically saved and can be used for the client configuration. Only possible if this operating panel is used for the configuration of the client EFOYs.' A 'Save' button is highlighted with a green arrow.

Configuration via operating panel

🔌 Set further EFOYs as client

🔌 Enter IP-address & PIN from controller or **use same operating panel and restore**

Cluster muEFOY

< > Set this EFOY as controller

< > Set this EFOY as client

⊘ No cluster configured

Show active configuration Configure

Cluster settings

Please ensure that all EFOYs of the cluster have the same charging parameters.

Check charging parameter >

Cancel Confirm

Cluster: Client configuration (1/2) muEFOY

Cluster controller IP address

192 168 123 28

0 1 2 3 4 < x

5 6 7 8 9 ✓

Fill in Controller IP address Next

Cluster: Client configuration (2/2) muEFOY

Cluster PIN

6 4 2 5 2 8 9 6

0 1 2 3 4 < x

5 6 7 8 9 ✓

Fill in cluster PIN Save

Overview

Controller

Overview myEFOY

Your device **EFOY 80**

EFOY state **Charging**

FM4 Port 1 active

Total **50.0%**

Battery **EFOY Li 70**

State of Charge **50 %**

Client

Overview myEFOY

Your device **EFOY 80**

EFOY state **Charging**

FM4 Port 1 active

Total **50.0%**

Battery **EFOY Li 70**

State of Charge **50 %**

🔌 Controller shows the total number of EFOYs in the cluster

Detail page

Controller

Fuel cell myEFOY

Your device **EFOY 80**



Power	28.9 W
Voltage at the EFOY	13.6 V
Voltage at the battery	13.2 V
Charging current	2.1 A
EFOY temperature	20 °C
Total operating hours	1.0 h

Mode **Automatic** >

EFOY state **Charging**

Cluster role **Controller** >

Last error messages ▾

Active configuration myEFOY

Cluster controller IP address	192.168.123.28
Cluster PIN	87654321
Cluster role	 Client

Store active configuration to this operating panel to configure further client EFOYs.

Controller

Store

Client

Fuel cell myEFOY

Your device **EFOY 80**



Power	28.9 W
Voltage at the EFOY	13.6 V
Voltage at the battery	13.2 V
Charging current	2.1 A
EFOY temperature	20 °C
Total operating hours	1.0 h

Mode **Automatic** >

EFOY state **Charging**

Cluster role **Client** >

Last error messages ▾

Active configuration myEFOY

Cluster controller IP address	192.168.123.28
Cluster PIN	87654321
Cluster role	 Client

Store active configuration to this operating panel to configure further client EFOYs.

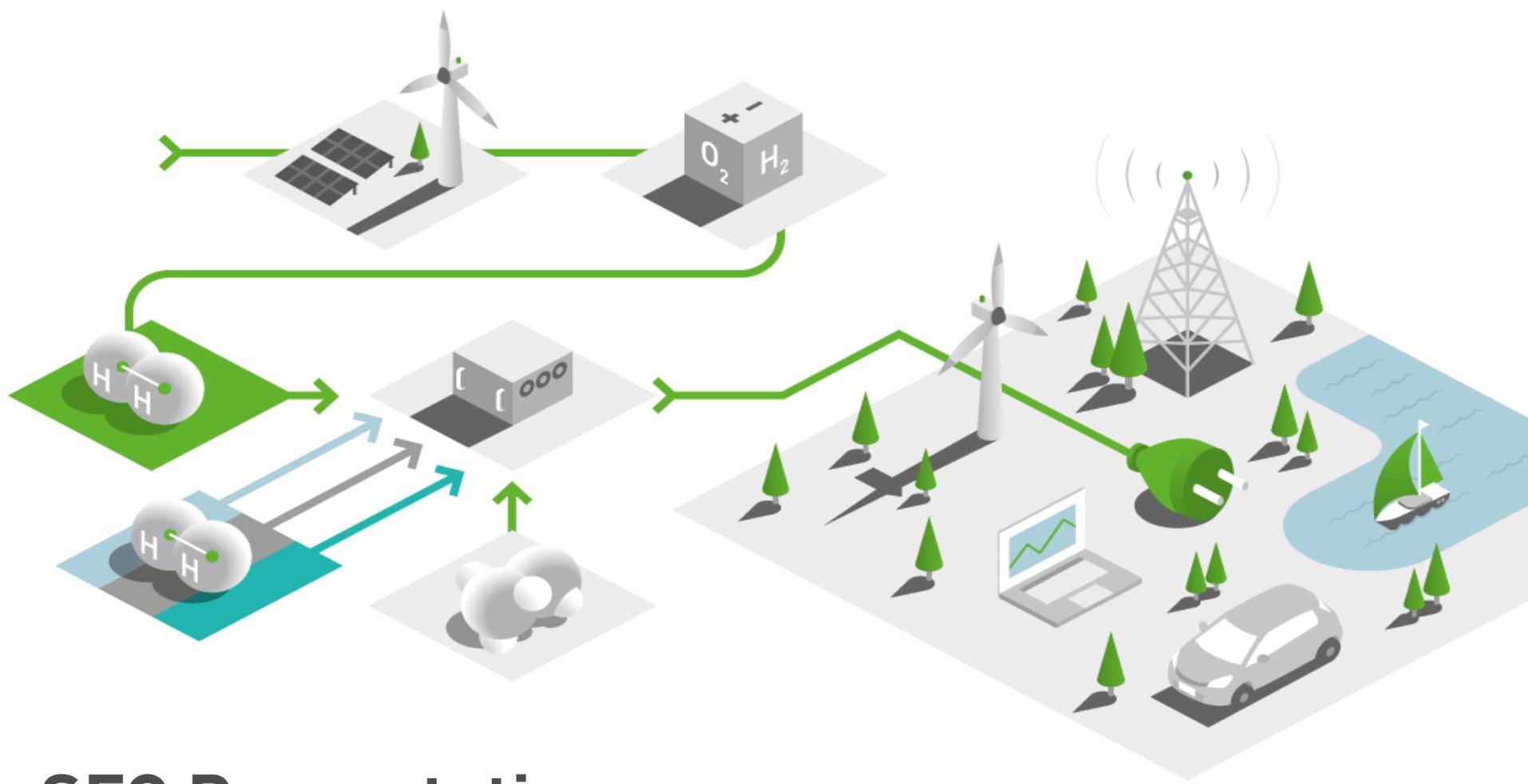
Store

Typical questions

- ⏻ What happens if a Client has an error?
 - ⏻ Cluster stays if more than one client is involved
 - ⏻ Only 1 Client: Warning on the controller => no clients connected

- ⏻ What happens if the Controller has an error?
 - ⏻ Warning on the clients => No connection to controller
 - ⏻ Every EFOY operates on it's own
 - ⏻ Error solved => Cluster automatically forms again

- ⏻ Cluster possible without router?
 - ⏻ Yes, Controller needs a static IP address



SFC Presentation

EFOY Multisense

EFOY MultiSense



Data monitoring via EFOY Cloud

All sensor data can be viewed via the EFOY Cloud. Historical display of measured values and notification via alerts possible.

Extended data collection

Measurement of electrical currents such as load currents or PV charging currents
Measurement of temperatures in the installation area
Additional integration of digital I/O sensors and actuators.

Intuitive configuration and operation

Intuitive configuration and operation of the EFOY MultiSense
All measured values are displayed on the OP3 control panel and in the EFOY Cloud.

Simple installation

Easy mounting option (DIN-rail mounting) Communicative integration via the SFC bus.

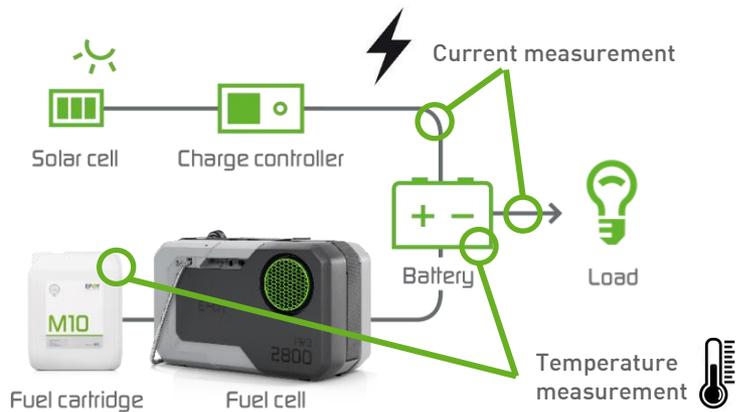
Extended data collection

Temperature and current measurement, digital I/Os

Your application:
Fuel Cell + solar + battery



Gain more data on your overall application
with the EFOY MultiSense



- 🔌 Measure additional charging currents, e.g. from your solar panels
- 🔌 Measure your real-time electrical load
- 🔌 Measure temperatures outside or inside your installation situation or measure the battery temperature
- 🔌 With MultiSense MS8: Include digital inputs / outputs, e.g. door-contacts

EFOY MultiSense Sets

Delivery content

EFOY MultiSense MS4 Set Basic

- 🔌 EFOY MultiSense MS4
- 🔌 Power supply cable (including fuse)
- 🔌 SFC Bus cable
- 🔌 Port Doubler



Part no. 158 000 196

EFOY MultiSense MS8 Set Basic

- 🔌 EFOY MultiSense MS8
- 🔌 Power supply cable (including fuse)
- 🔌 SFC Bus cable
- 🔌 Port Doubler



Part no. 158 000 197

EFOY MultiSense MS4 Set Sensors

- 🔌 EFOY MultiSense MS4
- 🔌 Power supply cable (including fuse)
- 🔌 SFC Bus cable
- 🔌 Port Doubler
- 🔌 Temperature sensor type PT100 probe
- 🔌 current sensors: max. 50 A



Part no. 158 000 198

*Note: preliminary illustration

Sensors overview

The following sensors are available to be used in combination with the

EFOY MultiSense MS4 and MS8:



current sensors: max. 10 A
(with cable)



current sensors: max. 50 A
(with cable)



current sensors: max. 150 A
(with cable)



Temperature sensor:
type PT100 probe
(with cable)



Temperature sensor for
battery temperature:
type PT100 cable lug
(with cable)

EFOY MultiSense MS4/MS8

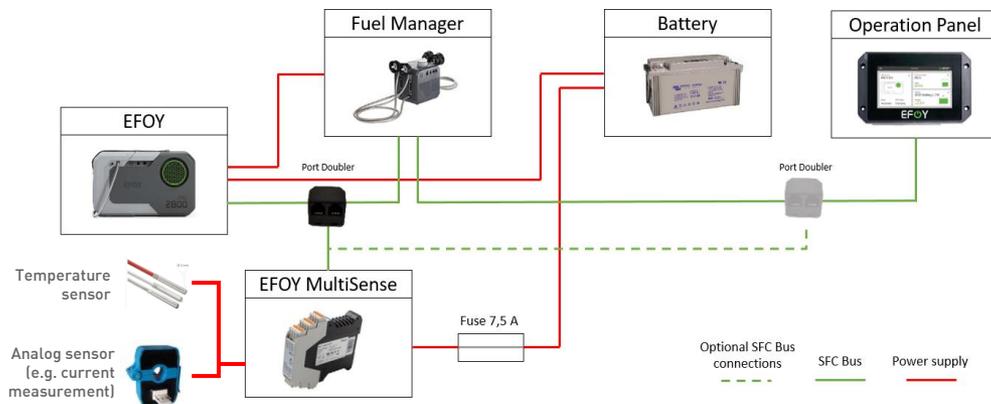
Installing & removing the EFOY MultiSense



- ⏻ Can be mounted on a top-hat rail
- ⏻ Required connections should be easily accessible in the installation space
- ⏻ At least 10 cm below the top-hat rail

EFOY MultiSense MS4

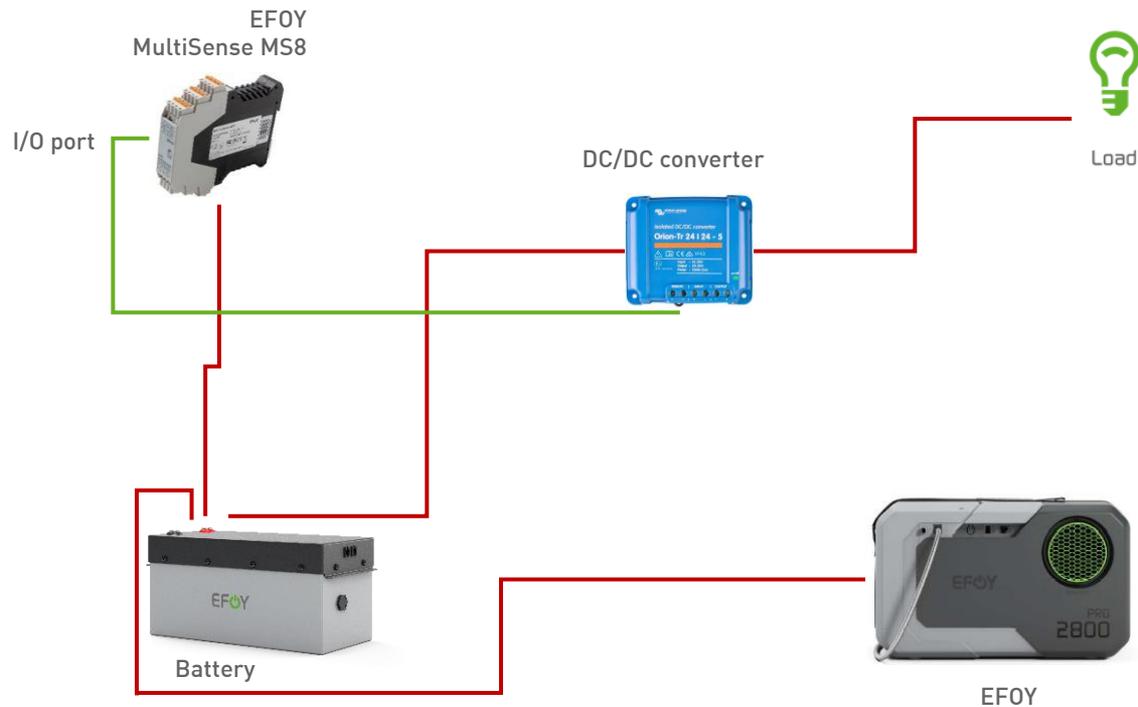
Wiring and communication connection



- ⏻ The EFOY and the OP3 control panel are connected as permanently terminated devices
- ⏻ Data transmission via the SFC Bus using a port doubler as an unterminated stub line
- ⏻ The sequence of the unterminated devices in the system and of the EFOY MultiSense is not relevant and can be determined as required
- ⏻ If no OP3 control panel is connected, the EFOY Fuel Manager or the EFOY battery must be terminated using a terminating resistor
- ⏻ Power supply of the EFOY MultiSense via battery connection (protected by a 7.5 A fuse)
- ⏻ Sensors are connected directly to the EFOY MultiSense

EFOY MultiSense MS8

Using I/Os for load disconnection (Option 1)



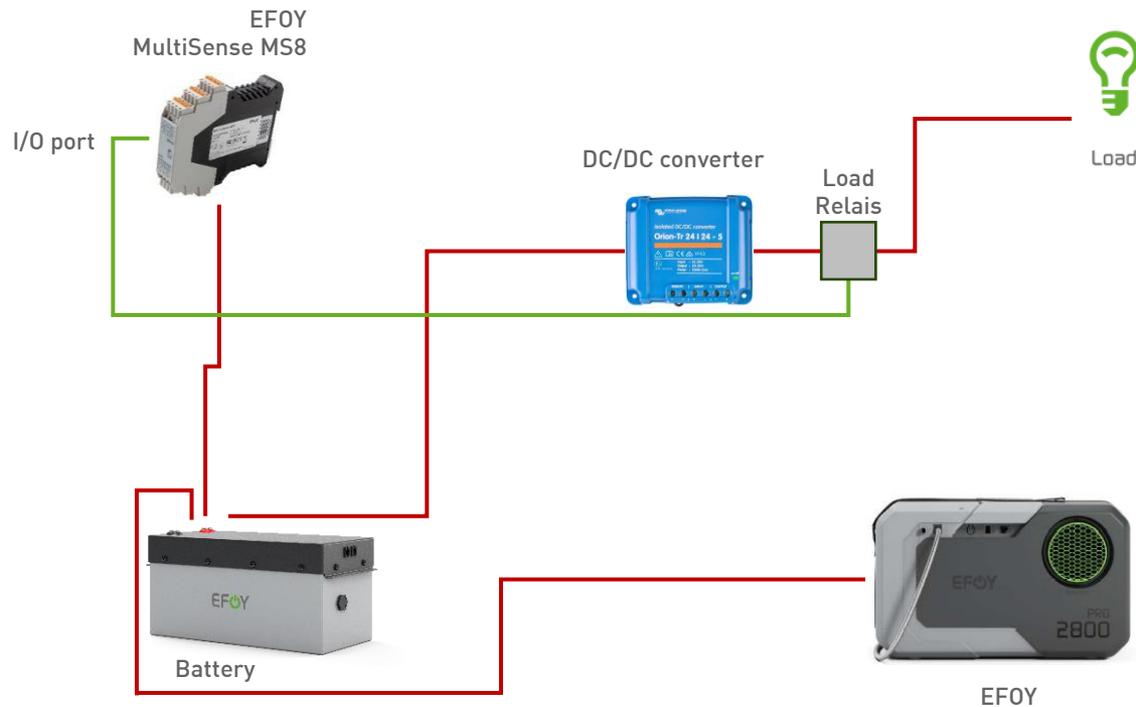
- ⏻ Configure I/O port as output port
- ⏻ Send a signal to the remote on/off port of the DC/DC converter

SFC Bus

Power supply

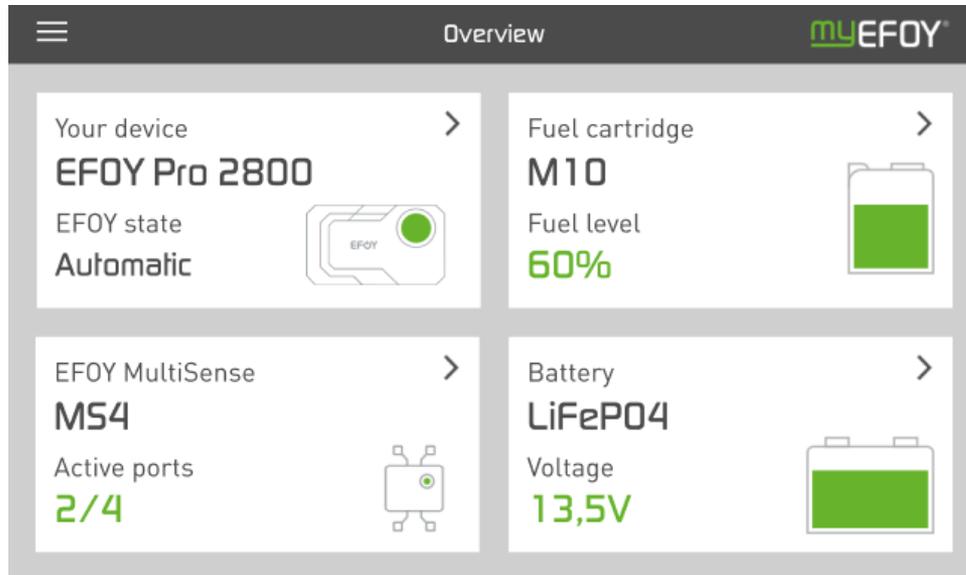
EFOY MultiSense MS8

Using I/Os for load disconnection (Option 2)



- ⏻ Configure I/O port as output port
- ⏻ Send a signal to a load relais to open the relais and disconnect the load from the DC/DC converter

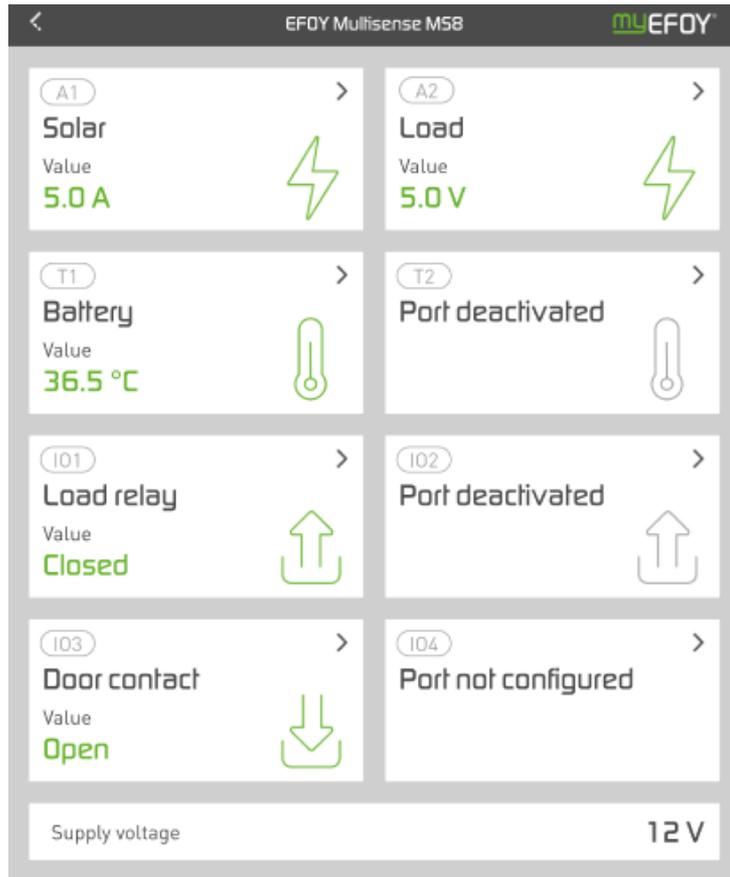
Configuration of the EFOY MultiSense Main Screen



- ⏻ The EFOY MultiSense is displayed in the main menu of the operating panel, next to the fuel cell, the fuel cartridge and the battery overview
- ⏻ Product type is visible at first glance (MultiSense MS4 or MS8)
- ⏻ Number of active ports is visible
- ⏻ For detailed information: click on the EFOY MultiSense menu

Tutorial: <https://www.efoy-pro.com/service/efoy-cloud/>

Configuration of the EFOY MultiSense Detail Screen

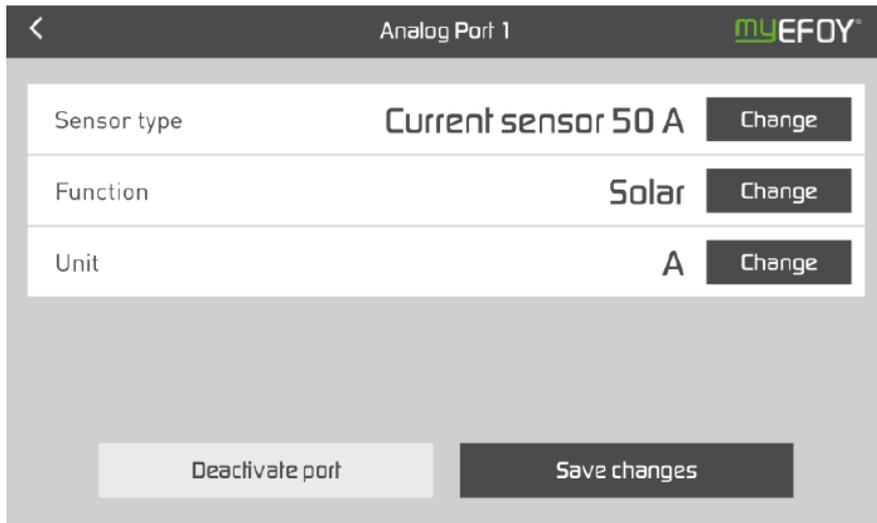


- ⏻ Overview on analog sensors (current measurements)
- ⏻ Overview on temperature sensors
- ⏻ Overview on I/O ports (only for EFOY MultiSense MS8)
- ⏻ Supply Voltage is displayed
- ⏻ List of last error messages

The initial configuration as well as the activation or de-activation of each port can be done by clicking on the respective icon.

Configuration of the EFOY MultiSense

Analog Ports



The screenshot shows the configuration page for Analog Port 1. The page has a dark header with a back arrow, the text 'Analog Port 1', and the 'myEFOY' logo. Below the header, there are three rows of configuration options, each with a 'Change' button:

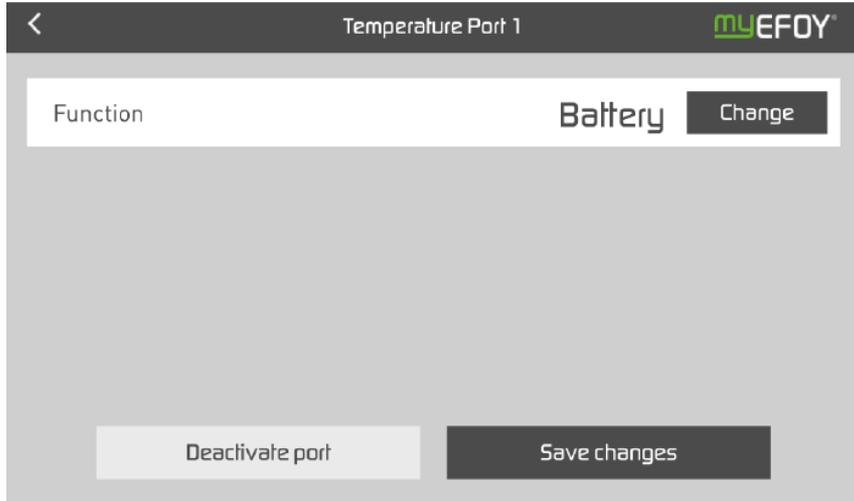
Sensor type	Current sensor 50 A	Change
Function	Solar	Change
Unit	A	Change

At the bottom of the page, there are two buttons: 'Deactivate port' (light gray) and 'Save changes' (dark gray).

The configuration of the analog ports can be set by selecting port A1 or A2. The sensor type, the function and the unit can each be selected from a drop-down menu.

Confirm the changes to the configuration using the save button.

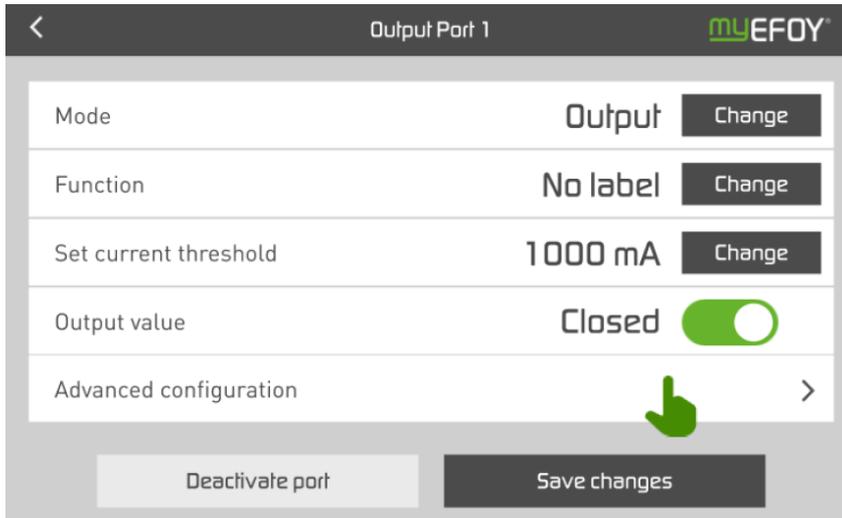
Configuration of the EFOY MultiSense Temperature Ports



The configuration of the temperature ports can be set by selecting port T1 or T2. The measuring environment can be selected from a drop-down menu.

Confirm the changes to the configuration using the save button.

Configuration of the EFOY MultiSense Digital I/O Ports



The screenshot shows the configuration interface for Output Port 1. The interface is titled "Output Port 1" and features the EFOY logo. It contains several configuration options, each with a "Change" button:

Parameter	Current Value	Action
Mode	Output	Change
Function	No label	Change
Set current threshold	1000 mA	Change
Output value	Closed	Toggle (On)
Advanced configuration	>	Click (indicated by a hand icon)

At the bottom of the interface, there are two buttons: "Deactivate port" (disabled) and "Save changes" (active).

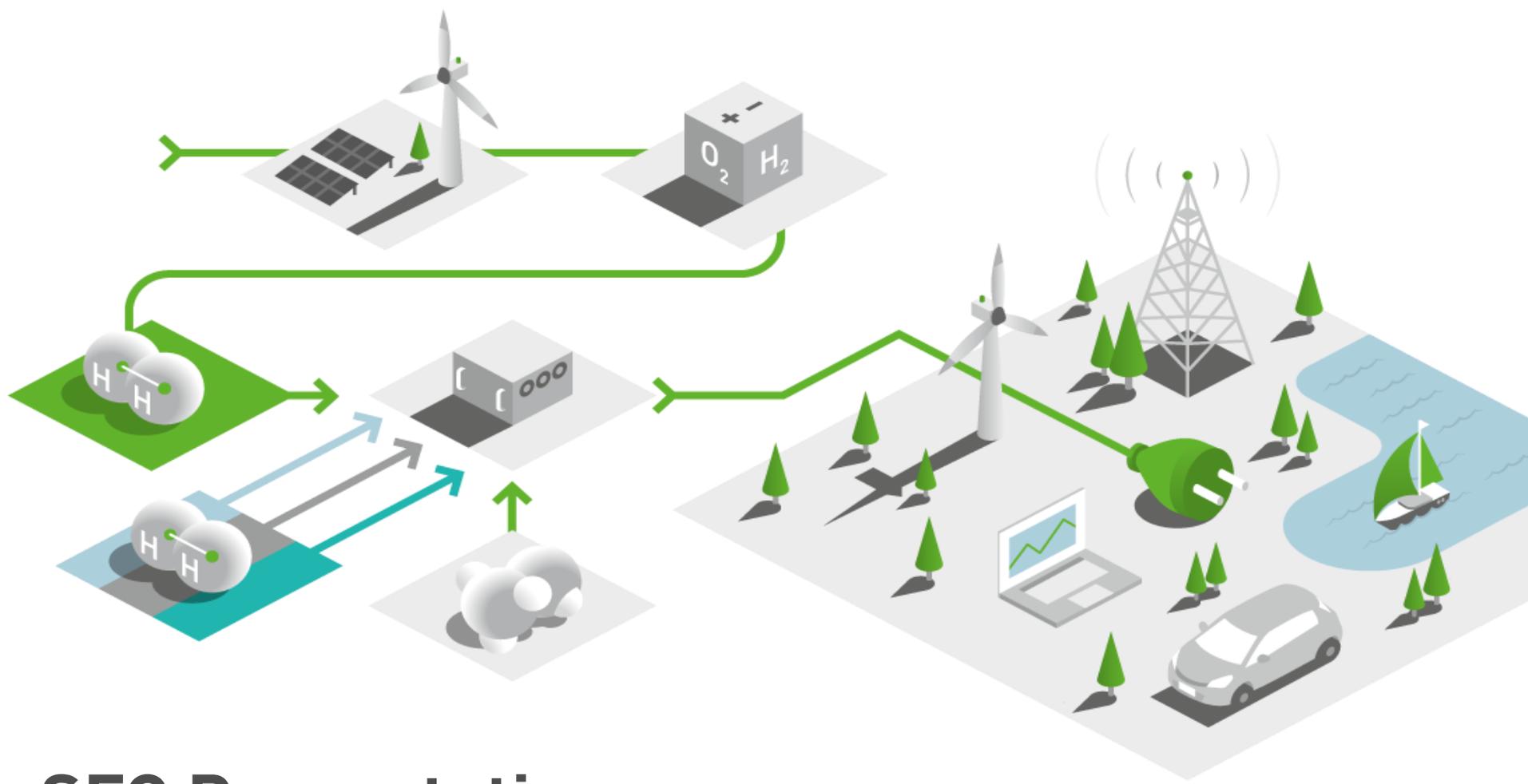
The configuration of the I/O ports can be set by selecting ports I01 - I04. The mode, the function, the current threshold setting and the output value can each be selected from a drop-down menu.

Confirm the changes to the configuration using the save button.

Maintenance and Troubleshooting

- 🔌 There are no firmware updates on the EFOY MultiSense needed
- 🔌 Information on the displayed error codes can also be found in the SFC Service Tool:

<https://www.efoy-pro.com/service/servicetool/>



SFC Presentation

Energy Solutions

Product portfolio

Overview: ProEnergyCase, ProCube & ProFuelBox



ProEnergyCase
2020P-3

153 002 080

ProCube
2030A-3

153 002 090

ProCube
2060A-3

153 002 060

ProCube
2060A-3 XF

153 002 070

ProFuelBox
2120A

153 002 130

Operating temperature: -20 to +50°C

Protection class: IP 33

Compatible fuel cell: EFOY 80/150, EFOY Pro 900/1800/2800

Product portfolio

Overview: ProCabinet



ProCabinet
2020S-3

153 002 100



ProCabinet
2020SX-3

153 002 110



ProCabinet
2130A-3

153 002 120



ProCabinet
2260A

153 002 150

Operating temperature: -20 to +50°C

Protection class:

IP 33

IP 54

Compatible fuel cell:

EFOY 80/150, EFOY Pro 900/1800/2800

EFOY Pro12000

Product portfolio

Overview: SFC CA Energy Solutions



**ProEnergyBox
4060P 24V**

153 002 140



**ProCabinet
4060S 24V**

153 002 160



**ProCabinet
4060SX 24V**

153 002 170

Operating temperature: -40 to +50°C

Protection class: IP 43D

IP 54

Compatible fuel cell: EFOY 80/150, EFOY Pro 900/1800/2800

Product catalogue for Methanol Energy Solutions

The image displays several overlapping pages from the 'Produktkatalog EL3.0' for 'Neue Generation EFOY Energielösungen'. The pages contain detailed technical information, including:

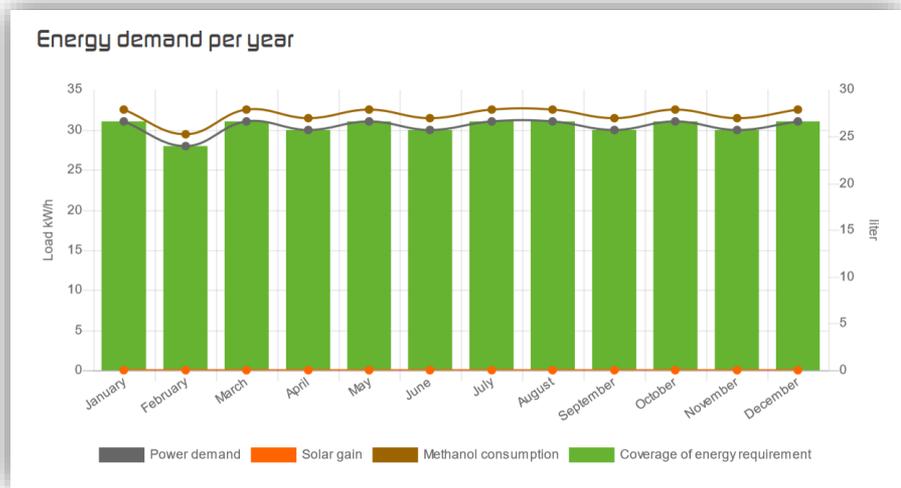
- Product Description:** 'Produktkatalog EL3.0 Neue Generation EFOY Energielösungen'.
- Section 2.2: Kabeldurchführung und Anschlüsse** (Cable passage and connections), describing the ease of installation and the availability of various connectors (MCA, Souriau, RJ45).
- Section 2.3: EFOY ProCube 2060A-3**, detailing the description of the basic configuration and general information for the EFOY ProCube 2060A-3.
- Table of General Information:**

Allgemeine Informationen EFOY ProCube 2060A-3	
Maße (L x B x H)	997 x 787 x 438
Behälter	Aluminiumgehäuse mit
Betriebstemperatur	-20°C bis +60°C
Einbaumaß für Batterien (L x B x H)	440 x 390 x 220 (gemäß Formel 6)
IP Schutzklasse	IP33
Nennspannung	12V oder 24V DC
Kompatible EFOY Brennstoffzellen	EFOY180/190, EFOY Pro
Kompatible Akkumulatoren	EFOY L170/180, Blei-Gel, Blei
Kompatible EFOY Tankpatronen	Zu M28 (mit M28-Kit)
Kompatible EFOY Fuel Manager	EFOY FM2
Kompatible Kommunikationstechnik	Openring Peak, Bluetooth Adapter
- Section 2.4: EFOY ProCube 2060A-3 XF / ProFuelBox 2120A-3**, describing the XF model's suitability for mobile applications and the ProFuelBox's role as a methanol storage solution.
- Section 2.5: EFOY ProEnergyCase 2020P-3**, describing the rugged case for the ProEnergyCase.
- Table of Contents:**
 - 1 Einführung
 - 2 Mobile Energielösungen
 - 2.1 EFOY ProCube 2060A-3
 - 2.2 EFOY ProCube 2060A-3
 - 2.3 EFOY ProCube 2060A-3 XF / ProFuelBox 2120A-3
 - 2.4 EFOY ProEnergyCase 2020P-3
 - 3 Stationäre Energielösungen
 - 3.1 EFOY ProCabinet 2020S-3
 - 3.2 EFOY ProCabinet 2020SX-3
 - 3.3 EFOY ProCabinet 2120A-3
 - 4 Kundenspezifische Lösungen
 - 5 In den Energielösungen verbaute Komponenten
 - 5.1 Laderegler
 - 5.2 Kabeldurchführung und Anschlüsse
 - 5.3 FuelSensor FS2
 - 5.4 Router für Remote Monitoring
 - 5.5 ODC/Wandler
 - 5.6 Luftfilter
 - 6 Zusätzlich erforderliche Komponenten für Energielösungen
 - 6.1 EFOY Brennstoffzellen
 - 6.2 EFOY Tankpatronen
 - 6.3 EFOY Fuel Manager
 - 6.4 Bedienmöglichkeiten
 - 6.5 Batterien
 - 7 Optionales Zubehör für Energielösungen
 - 7.1 EFOY Cloud
 - 7.2 Hybridbetrieb mit Solaranlagen
- Image:** A photograph of a helicopter on a snowy mountain slope, with a solar panel array and a fuel tank nearby, illustrating the application of these energy solutions in remote, high-altitude environments.

➔ Catalogue contains description of all Energy Solution models and variants and also all the additional accessories (PV-modules, PV-holder, batteries, etc.)

Energy Calculator Example

Solar hybrid system

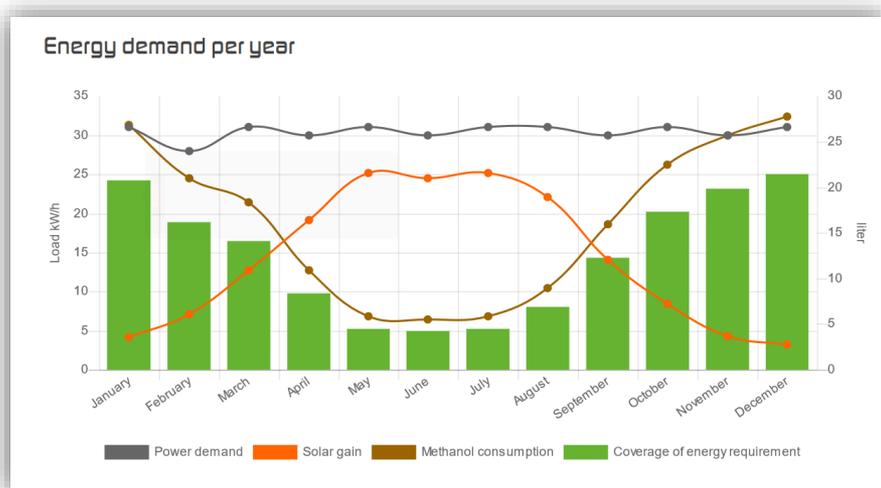


Example:

Energy demand: 1000 Wh/day
No Solar

Recommendation:

EFOY Pro 2800



Example:

Energy demand: 1000 Wh/day
Solar 200 Wp/Germany

Recommendation:

EFOY Pro 1800

Hybridization of EFOY Pro Fuel Cells with a solar panel combines the advantages of both off-grid power solutions.

Energy Calculator

For every application

- ⏻ Enter your energy demand or choose one of our application scenario
- ⏻ Enter the nominal power of your solar panel, if available, including geographical region
- ⏻ Calculate your recommended EFOY fuel cell
- ⏻ See an overview of your annual energy demand / energy supply, autonomy, operating hours and methanol consumption per year

> Calculate

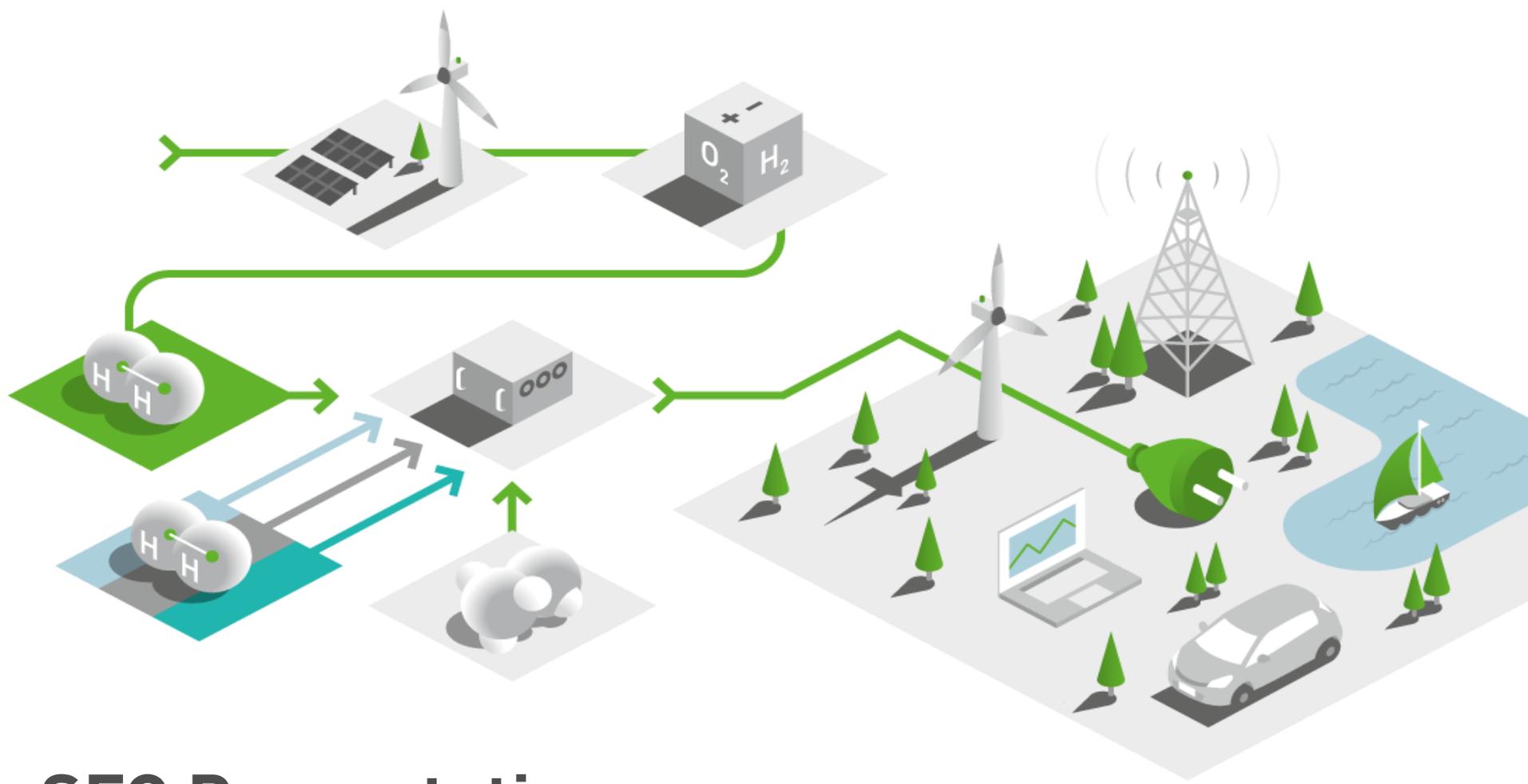


Off-grid calculator



Back-up calculator

<https://www.efoy-pro.com/en/service/energy-calculator/>



SFC Presentation

Batteries & EFOY charging parameters

Batteries and EFOY charging parameters



Target values for good charging behavior

- 🔌 Max. 1x charging cycle per 24h
- 🔌 Min. 4h charging cycles
- 🔌 Recommendation: 5-8h charging cycles

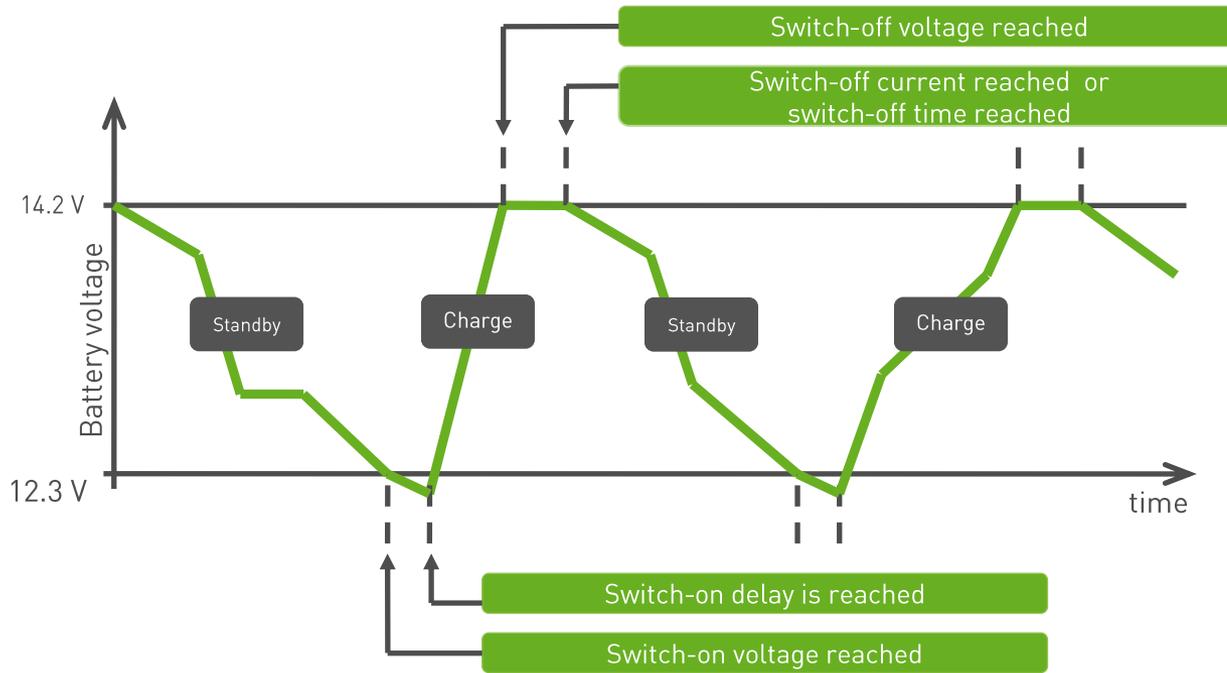
Electrical installation

Dos and don'ts

- ⚡ Sense cables should be connected **directly to the battery** terminals and not via any relays, common blocks, etc.
- ⚡ The voltage difference during charging at the fuel cell and at the battery should be as low as possible, best 0.1 V
- ⚡ To keep power losses as low as possible, make sure to keep the **power cable** as **short** as possible
- ⚡ Size the battery correctly and ensure that the **battery** is in **good health** to avoid short charging cycles
- ⚡ Electrical installation and interconnection can be done with **own fuses**.
- ⚡ **Fuses** must be placed close to the battery.



EFOY Mode: Automatic Charging

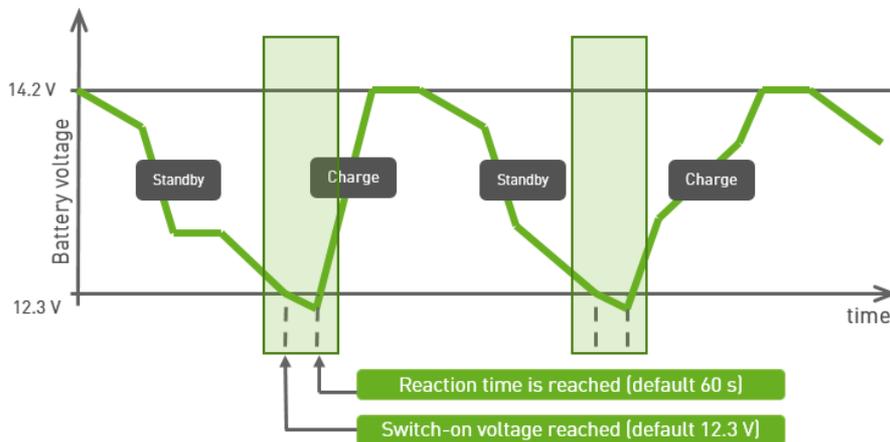


*All stated standards are default settings for a lead-battery with 12 V.
Settings can be changed with operating panel, EFOY App or EFOY Cloud

Switch-on voltage and switch-on delay

Lead Batteries

- ⚡ If the voltage remains below the “switch-on voltage” for a longer time than the “switch-on delay”, the fuel cell switches on
- ⚡ Default setting: Switch-on voltage: 12.3 V - corresponds to approx. 50% charging capacity
- ⚡ Default setting: Switch-on delay: 60 seconds → Can be set up to 5 minutes
- ⚡ Info: Above 13.2 V the fuel cell can NOT be switched on manually (battery full!)

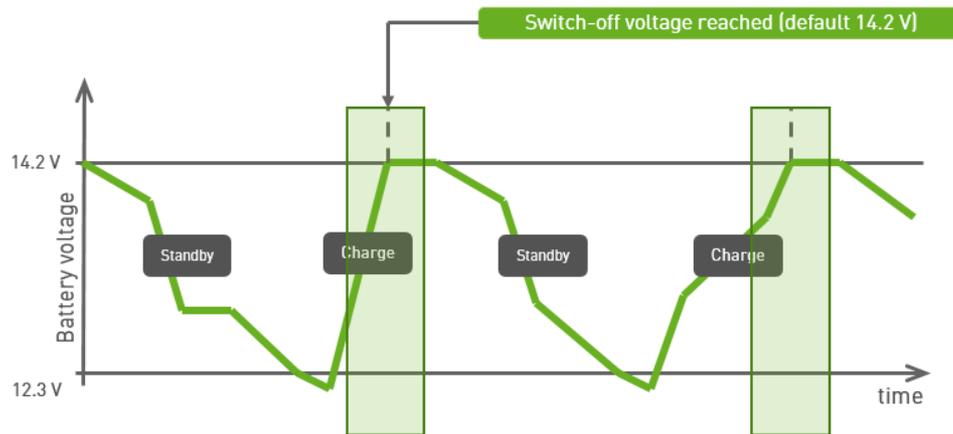


Recommendation

- ⚡ Switch-on voltage: Do not set the switch-on threshold too low. The EFOY has a start-up phase in which it still needs power from the battery. Do not set the switch-on voltage too high since this might result in short charging cycles
- ⚡ Switch-on delay: Useful in any application where a high load is switched on for a very short time and this might result in a voltage drop but immediate switch-on of the fuel cell should be avoided

Switch-off voltage

- ⌚ The switch-off voltage must be reached for the fuel cell to automatically end its charging process and goes to standby
- ⌚ Default setting 14,2 V (Lead) / 14,5 V (LiFePO₄)
- ⌚ The battery voltage alone cannot be used as the only criterion for end of charge, otherwise sulfating of the battery can occur more intensively (only for Lead-Battery types)



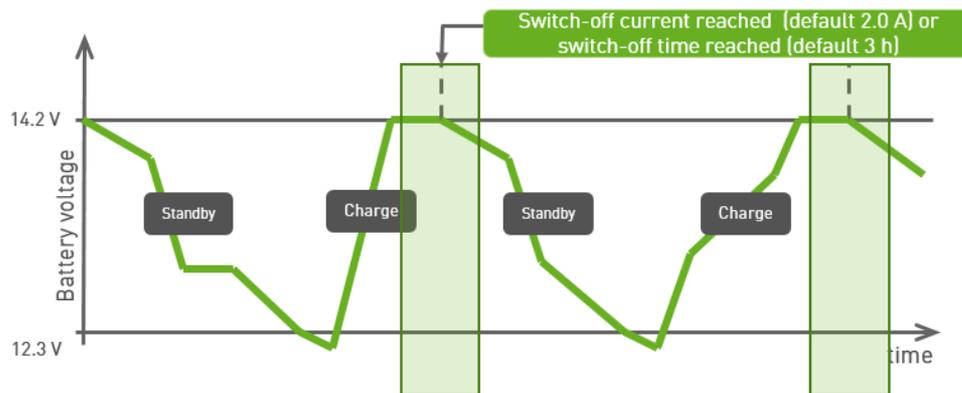
Switch-off current and switch-off time

Switch-off current:

- After reaching the switch-off voltage, the charging current is reduced. When it meets the switch-off current the EFOY will finally stop charging. This behavior serves to further fully charge the battery and keep the battery healthy
- Default setting (Lead & LiFePO4): 2A @ 12 V

Second criterion: Switch-off time

- If the switch-off current is NOT reached within the switch-off time, the second criterion takes effect and the EFOY is switched off
- Default setting (Lead & LiFePO4): 3 hours



Recommendation

- With constant load it makes sense to set the switch-off current as follows :
 - Load + 0,5 A
 - Example: 3 A load -> rise Switch-Off current to 3,5 A
- **Note:** If the switch-off current is below the load, this would never be reached and the EFOY will switch-off with the second criterion: switch-off time / absorption phase

Automatic Charging

Additional parameters

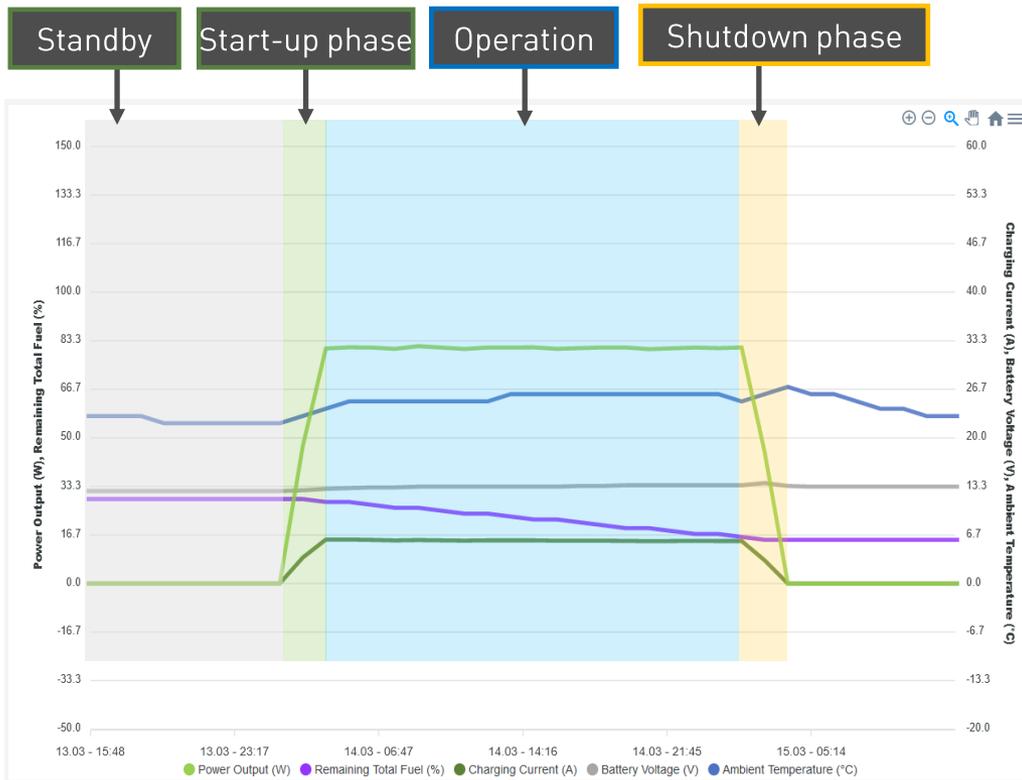
Maximum charge time

- ⏻ Protection against unintentionally long charging cycle with high associated methanol consumption
 - ⏻ For example: Large battery banks
- ⏻ If the switch-off voltage is not reached within the set maximum charge time, the EFOY fuel cell will still switch off, independently of the battery voltage
 - ⏻ Default setting: 24 h (Lead) / 48 h (LiFePO4)
 - ⏻ **Attention:** Maximum charge time should never be set too short. It could lead to too short charging cycles, and damage the battery (never fully charged) and the fuel cell

Minimum charge time

- ⏻ Protection against short charging cycles and faster degradation of the EFOY stack
- ⏻ If this minimum charge time is not reached for several charging cycles, it is recommended to the customer to verify the battery settings or the battery itself
- ⏻ This value is used in the warnings (151.001) and errors (051.001)
 - ⏻ Default setting: 30 minutes

EFOY phases during charging

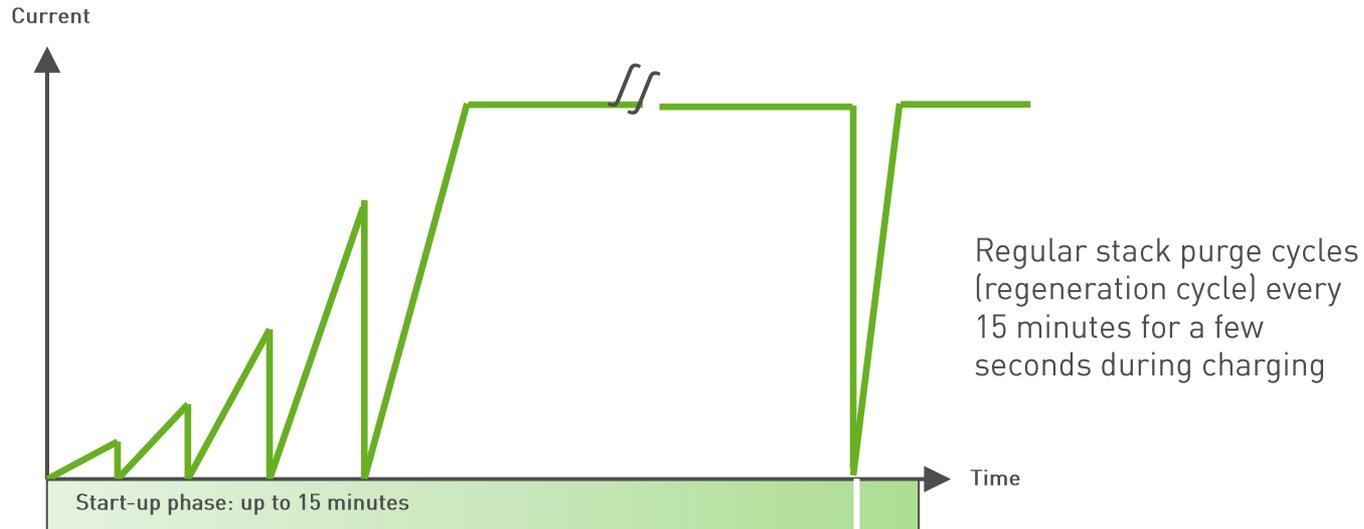


- 🔌 **Standby:** Monitoring the battery voltage
- 🔌 **Start phase:** Continuous increase of power output (max. 15min)
- 🔌 **Operation:** Continuous power output
- 🔌 **Shutdown phase:** Controlled termination of the charging process (depending on switch-off current & switch-off time)

Recommendation

- 🔌 Avoid interrupting the Shutdown phase!
- 🔌 When EFOY is switched-off manually, the started charging cycle will be ended

Start-up phase and short purge cycles



- ⏻ Regular purge cycles needed to clean the stack from possible deposits (regeneration)
- ⏻ Necessary to ensure guaranteed operating hours and high power output
- ⏻ No influence on the charging behavior of the EFOY

Recognizing poor charging cycles



Short charging cycles

- ⌚ Switch-off voltage quickly reached
- ⌚ Very short operation time followed by direct shutdown phase
- ⌚ Five very short charging cycles in a row
- ⌚ Incident 051.001 is set by the EFOY “short cycle error”

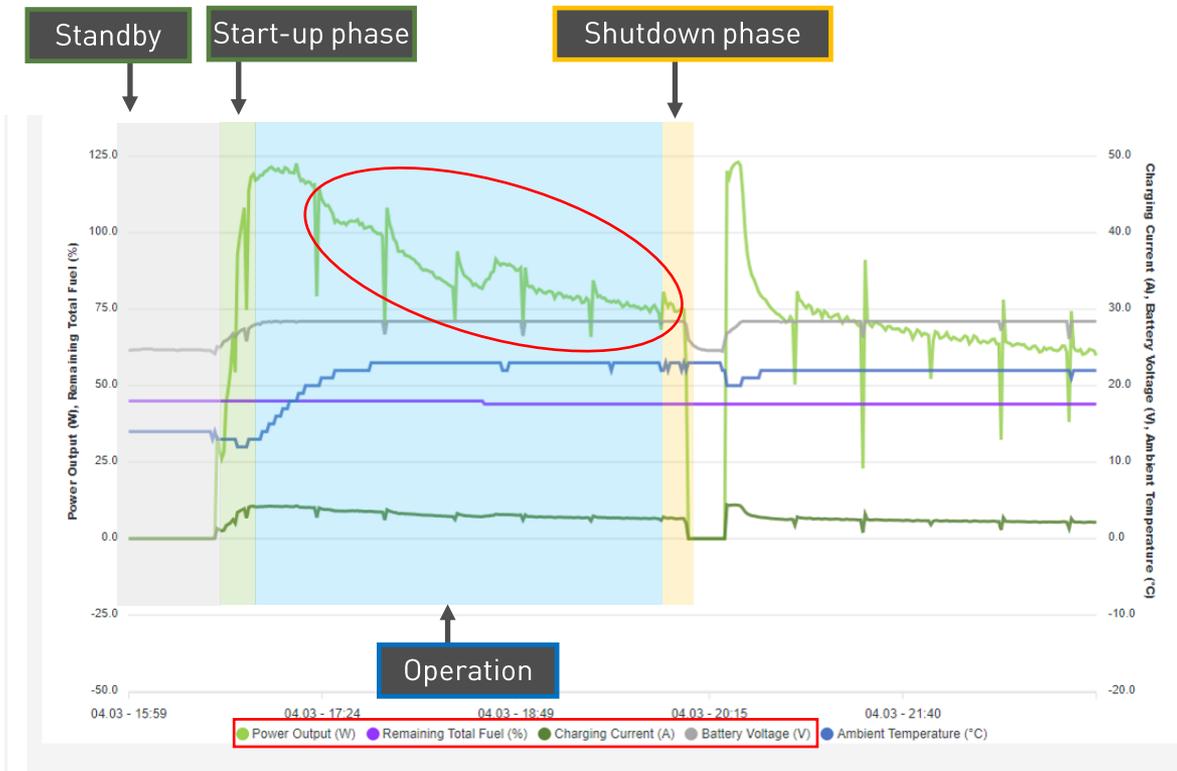
Reason

- ⌚ Too small battery capacity
- ⌚ Battery ageing
- ⌚ Incorrectly set battery parameters

Recommendation

- ⌚ Check your battery capacity

Recognizing poor charging cycles



Parameter Setup

- ⏻ Switch-off time set to 3 hours
- ⏻ EFOY does not stop before reaching the set switch-off time

Reason

- ⏻ Switch-off current is not reached, therefore the Switch-off time takes effect

Recommendation

- ⏻ Adapt your switch-off current to your connected load
- ⏻ Long part-load operation should be avoided

Choosing a battery

Using the manufacturer's data sheet

- 🕒 Checking the correct battery type (LiFePO₄/AGM/Lead)
- 🕒 Checking the correct battery voltage (12 V & 24 V)
- 🕒 Checking the recommended battery capacity
- 🕒 Checking the heating mat (only for LiFePO₄)
 - 🕒 Check how much the heating mat consumes
 - Must not exceed the output of the EFOY
 - Output of the heating mat max. 50% EFOY output

	Float Service (V)	Cycle service Normal (V)	Cycle service Fastest recharge (V)
Victron AGM 'Deep Cycle'			
Absorption		14,2 - 14,6	14,6 - 14,9
Float	13,5 - 13,8	13,5 - 13,8	13,5 - 13,8
Storage	13,2 - 13,5	13,2 - 13,5	13,2 - 13,5
Victron Gel 'Deep Cycle'			
Absorption		14,1 - 14,4	
Float	13,5 - 13,8	13,5 - 13,8	
Storage	13,2 - 13,5	13,2 - 13,5	

Attention

Without a heating element, the EFOY cannot charge a battery at <0°C

→ Heavy partial load operation would lead to rapid ageing of the stack

Choosing EFOY Parameters

Most important parameters for stack lifetime

Switch-off current

- ⚡ Never too small → Switch-off current must be greater than the connected load

Switch-off time

- ⚡ The shorter, the better → recommendation approx. 15min (default 180min)

→ Both parameters ensure that the battery is not charged “completely full”

→ This protects the stack from partial load operation

Attention for LiFePO₄ batteries with heating mat

- ⚡ **Switch-off current** and **switch-off time** must be adapted to heating mat, otherwise the battery cannot be heated for long enough before loading is possible

Recommendation for series connections

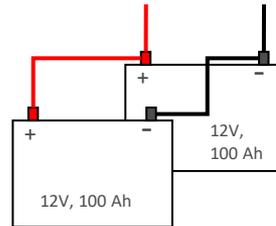
24 V Battery Setup

Series connection of 2x 12 V batteries

- 🔋 Balancer recommended
- 🔋 Same ageing condition required
- 🔋 Same battery type
- 🔋 Same capacity
- 🔋 Ideally same production batch

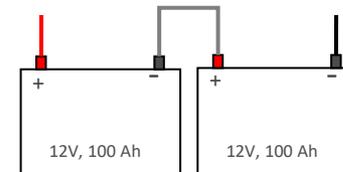
Parallel connection

= 12 V, 200 Ah



Series connection

= 24 V, 100 Ah



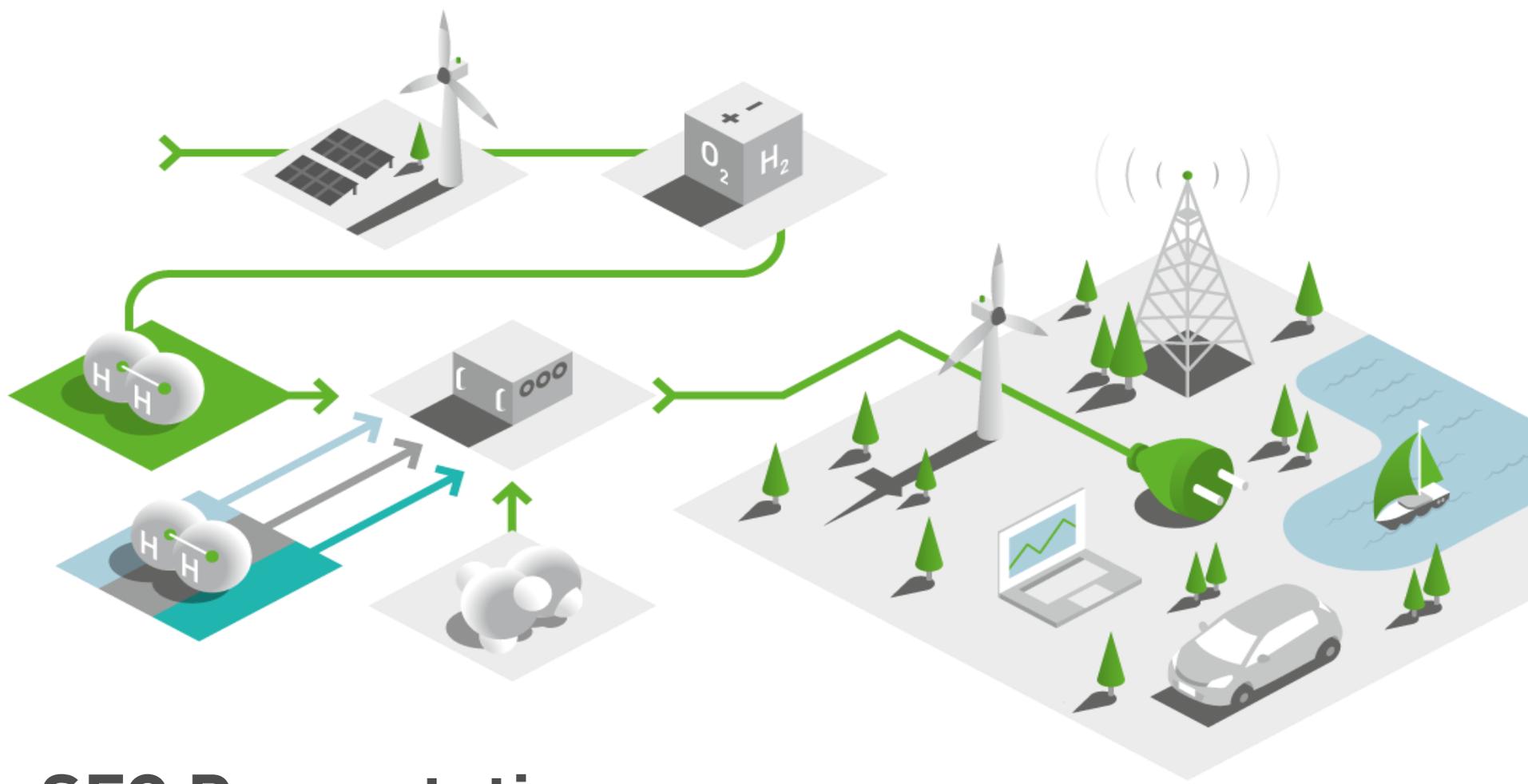
Attention

Completely charge each battery independently before connecting them to a 24 V battery set up and connect this set up to the EFOY

Industrial Application SetUp

Necessary information about the installation?

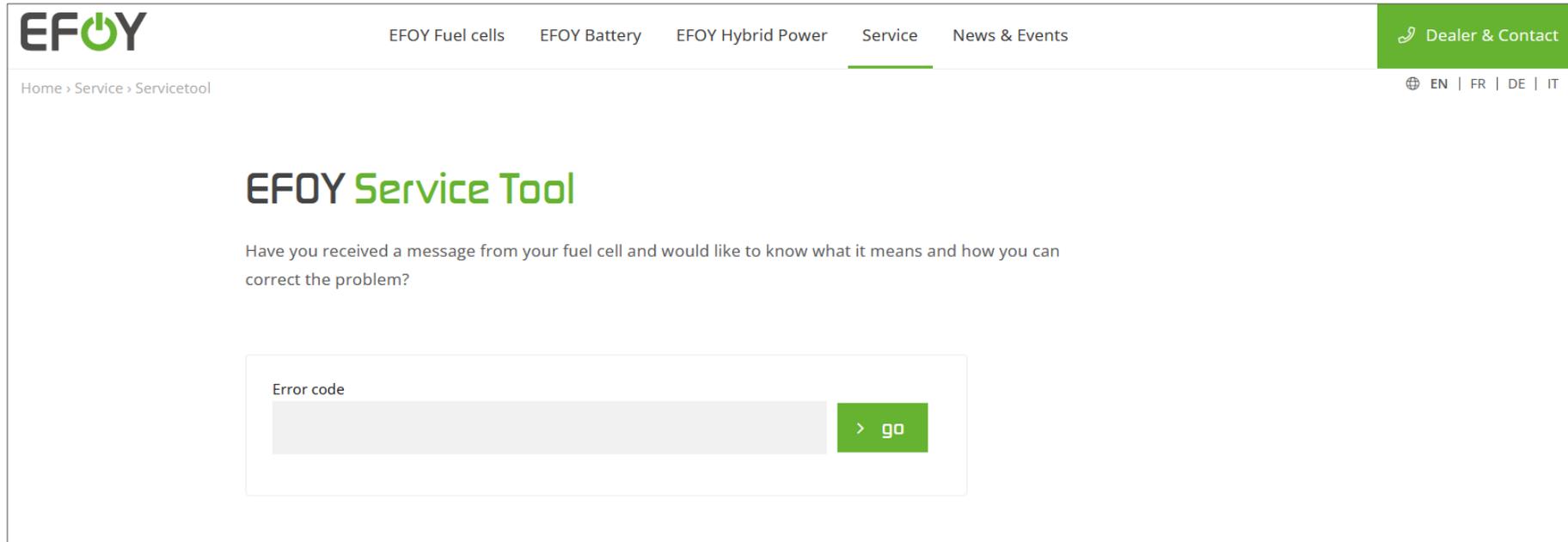
- 🔌 Battery technology (lead/AGM or LiFeP04)
- 🔌 Voltage level of the installation (12V or 24V)
- 🔌 Total electrical consumption of the installation
- 🔌 In general, you need to know:
 - 🔌 when which load is applied
 - 🔌 for how long it is applied and
 - 🔌 how much current it draws
- 🔌 Installed battery capacity
- 🔌 Additional PV modules available?
 - 🔌 If yes, how many watts are installed?
 - 🔌 Location of the system (geographical and local e.g. under trees or on a field)
 - 🔌 Alignment of the PV modules (do not calculate with the maximum possible yield)
- 🔌 Background to the operating strategy of the installation
 - 🔌 How is the installation to be used?
 - 🔌 For which case should the EFOY be used (all year round/winter only)?



SFC Presentation

Warnings & Errors

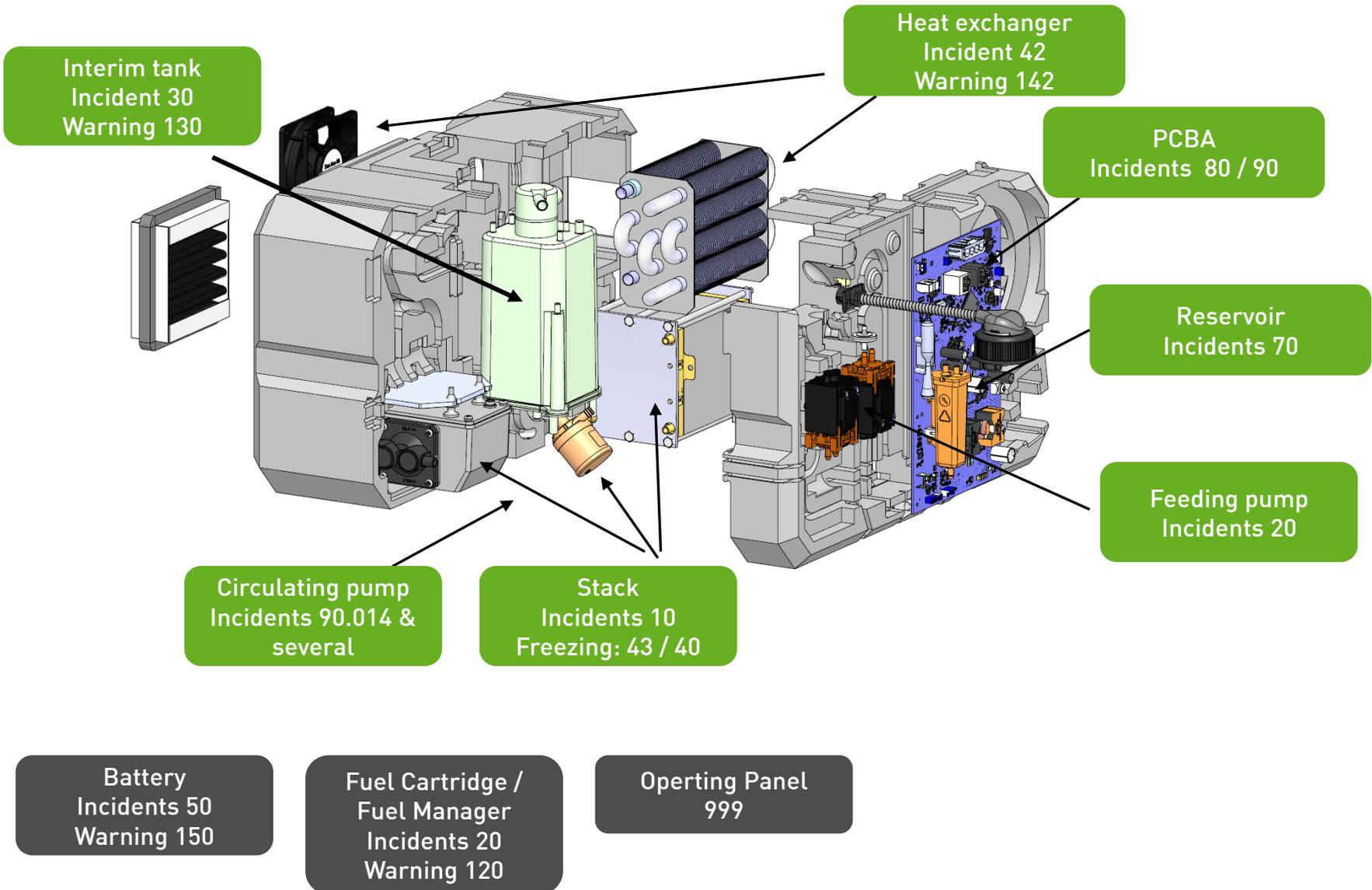
Warnings and Error Codes



The screenshot shows the EFOY website's 'Service' page. At the top left is the EFOY logo. The navigation menu includes 'EFOY Fuel cells', 'EFOY Battery', 'EFOY Hybrid Power', 'Service' (which is highlighted with a green underline), and 'News & Events'. On the right, there is a green button for 'Dealer & Contact' and language selection options for 'EN', 'FR', 'DE', and 'IT'. The breadcrumb trail reads 'Home > Service > Servicetool'. The main heading is 'EFOY Service Tool'. Below it, a text block asks: 'Have you received a message from your fuel cell and would like to know what it means and how you can correct the problem?'. A form is provided with a text input field labeled 'Error code' and a green button with a right arrow and the text '> go'.

The EFOY Service Tool can be found here:
<https://www.my-efoy.com/service/servicetool/>

Trouble Shooting EFOY Fuel Cells



Warnings and Errors

- ⏻ Different warnings and error code types for EFOY fuel cells
- ⏻ Major Codes:
 - ⏻ Starting with „0“ : Incident / Error on the EFOY itself
 - ⏻ Starting with „1“ : Warning – EFOY can proceed with operation, but without intervention, this will eventually lead to an Error
 - ⏻ Starting with „2“ : Incidents /errors on the EFOY Fuel Manager
 - ⏻ Starting with „4“: Incidents / errors on the EFOY Battery
 - ⏻ Starting with „999“: Incident / errors on the Operating Panel OP3 itself – no communication to the EFOY Fuel Cell possible

Warnings and Errors

General

- 🔌 Different warnings and error code types for EFOY fuel cells
- 🔌 Major Codes:
 - 🔌 Starting with „0“ : Incident / Error on the EFOY itself
 - 🔌 Starting with „1“ : Warning – EFOY can proceed with operation, but without intervention, this will eventually lead to an Error
 - 🔌 Starting with „2“ : Incidents /errors on the EFOY Fuel Manager
 - 🔌 Starting with „4“ : Incidents / errors on the EFOY Battery
 - 🔌 Starting with „999“: Incident / errors on the Operating Panel OP3 itself – no communication to the EFOY Fuel Cell possible

Dos and don'ts

General

🔌 DO NOT RESTART THE FUEL CELL MORE THAN TWICE IN A ROW

When trying to reset an error, do not attempt a restart more than twice in a row. If the error persists after two restarts, a service is required.

🔌 Please disconnect the charging cable of the EFOY when replacing the battery.

🔌 Do not connect the operating panel directly to the battery.

Incidents „20“

020.001 – 020.004

- 🔌 20.001 Fuel Cartridge is empty during startup.
 - 🔌 If fuel cartridge is not empty, check the cartridge itself, the cartridge connection (including M28 adapter)
- 🔌 20.002 Fuel Cartridge is empty during operation
 - 🔌 Mostly the cartridge is empty.
- 🔌 20.003 No fuel available at the Fuel Manager. Error at the Fuel Manager or not methanol available.
- 🔌 20.004 No fuel available at the Fuel Manager, for a prolonged time. The error is set after 24 minutes.

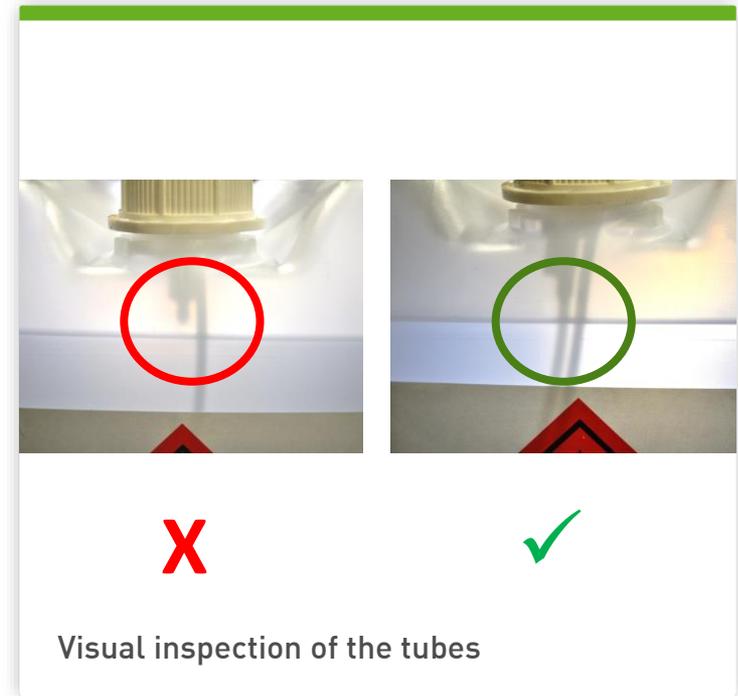


Incidents „20“

Fuel not empty

Follow these steps:

- 🔌 Check the fuel cartridge connection.
 - 🔌 Is the connector correctly screwed on the M28 adapter?
 - 🔌 Is the M28 adapter correctly screwed on the fuel cartridge?
 - 🔌 Please unscrew fuel cartridge and M28 adapter when changing the fuel cartridge and screw the separately
- 🔌 Check the fuel cartridge itself
 - 🔌 Verify that both tubes are in place
 - 🔌 Check the intermediate cap
 - 🔌 Make a picture of the batch number
- 🔌 Change connectors in case of EFOY Pro Duo or Fuel Manager



Warning 120.001 / 120.002

🔌 120.001

- 🔌 EFOY detects an incident on the Fuel Manager while the EFOY is in standby or sleep mode.
- 🔌 This warning will lead to an error if EFOY tries to start a charging cycle.
- 🔌 **Solution:** check EFOY Fuel Manager

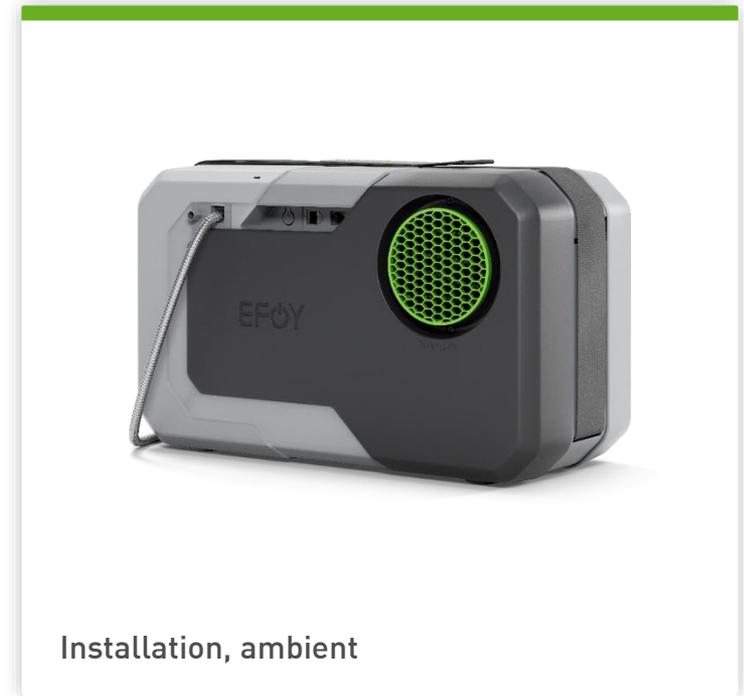
🔌 120.002

- 🔌 The connected Fuel Sensor FS2 detects no methanol
- 🔌 **Solution:** Level of methanol below sensor



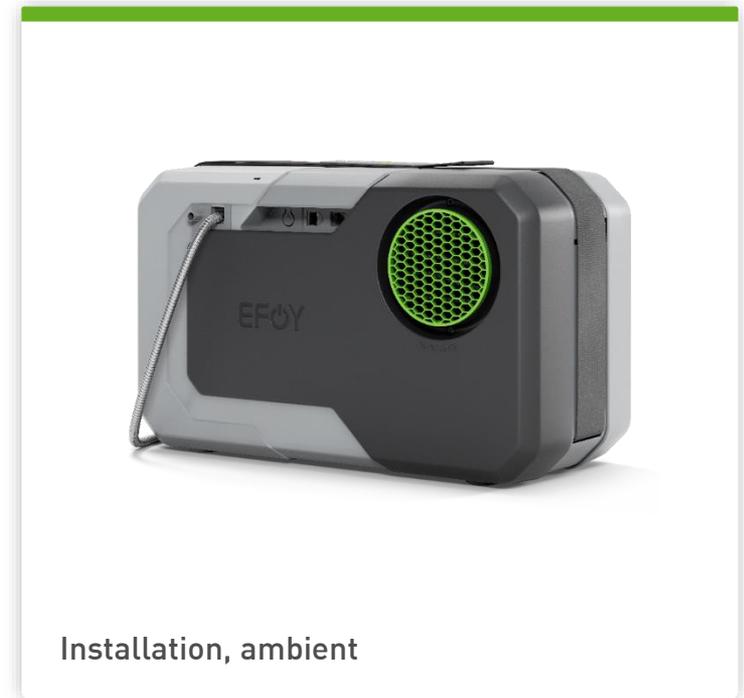
Incidents „40“, Warning 142 040.001 – 043.001 (I)

- 🔌 Warning 142, Incidents 41 & 42. high temperature
- 🔌 EFOY has measured high temperatures.
 - 🔌 41 temperature at the reservoir
 - 🔌 42 temperature at the heat exchanger above 70 °C. Resets when temperature falls below 30 °C
 - 🔌 142 – early warning, EFOY charges with reduced power
- 🔌 **Solution:** ambient temperature, installation and cooling must be checked



Incidents „40“, Warning 142 040.001 – 043.001 (II)

- 🔌 Incident 43 and 40 – low temperature
 - 🔌 43 : EFOY would need to start frost protection. Operation is not possible because another incident has occurred.
 - 🔌 40: EFOY is frozen. **Solution:** Gentle defrost needed
 - 🔌 **Solution:** verify previous incidents and solve them



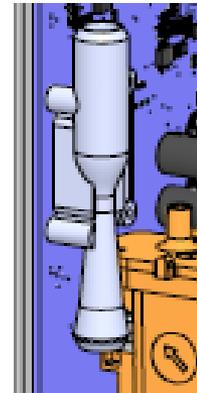
Warning 160 / 161

Warning 160

- Irregular ambient pressure and air volume flow was measured.
- EFOY runs without detail air pressure measurement, which may reduce the performance

Warning 161

- Air supply is insufficient.
- Please check the exhaust hose and installation



Air pressure measurement

Incidents „50“, Warning 151 / 152

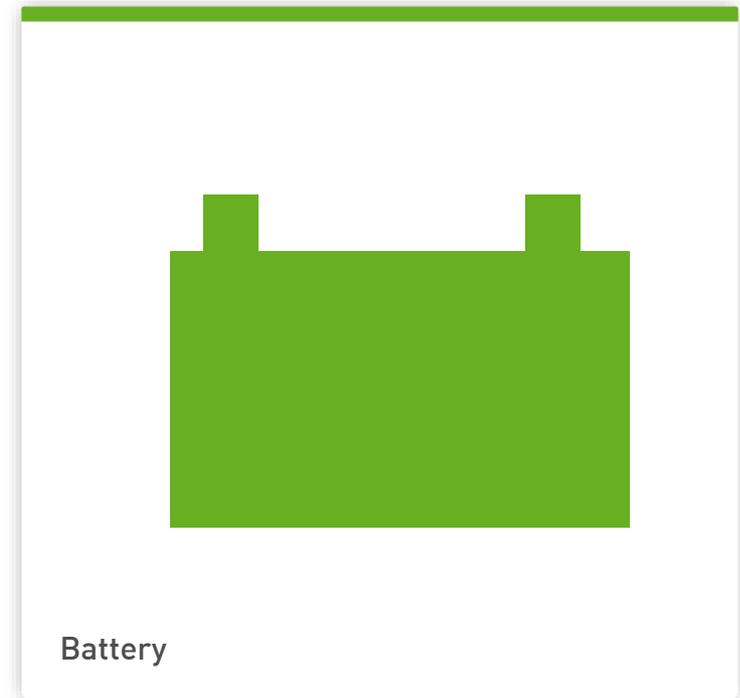
050.001 – 051.001

⏻ Warning 151.001

- ⏻ EFOY has measured short charging cycles.
- ⏻ At least 5 charging cycles below the configured limit (factory setting 30 minutes)

⏻ Incident 051.001

- ⏻ EFOY has measured 5 short charging cycles in a row.
- ⏻ EFOY stops charging the battery
- ⏻ Indication of battery damage or battery parameter configuration
- ⏻ **Solution:** verify the battery and the parameters.
- ⏻ **Important note:** repeated incidents 051.001 will lead to a faster degradation of the EFOY fuel cell !



Incident „999“

Incident 999

- 🔌 Incident related to the operating panel OP3
- 🔌 The EFOY fuel cell cannot communicate with the operating panel OP3
- 🔌 Possible causes:
 - 🔌 Cable, plug or socket defective.
 - 🔌 The firmware of the operating panel is newer than the firmware of the EFOY. Communication is not possible. A firmware update of the EFOY is necessary.
 - 🔌 If both products are up to date, then communication may be interrupted.
 - 🔌 **Solution:** if both products are up to date, then communication may be interrupted.



Operating Panel OP3

Incidents EFOY Fuel Manager



Reservoir
Incidents 270

Component
290

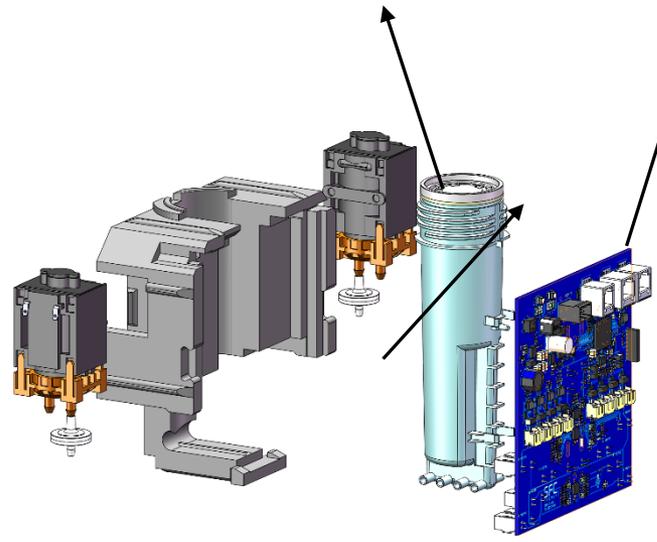
Temperature
Incidents 241

Feeding pump
Incidents 220

Tilt
Incident 260

Battery
Incidents 250

Fuel Cartridge /
Fuel Manager
Incidents 220



Incidents „220“

220.002 – 220.003

- 🔌 220.002
 - 🔌 All fuel cartridge connections on the EFOY Fuel Manager are deactivated. At least one connector must be activated.
- 🔌 220.003
 - 🔌 The Fuel Manager is not supplied with Methanol. All cartridges are empty.



Incident 241.001

- 🔌 241.001
 - 🔌 The ambient temperature measured at the EFOY Fuel Manager is too high.
 - 🔌 The Fuel Manager restarts automatically when the temperature has dropped.



Thank you
for your attention

EFOY Pro Fuel Cells
Clean energy everywhere

