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EFOY

EN Installation



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MADE BY **SFC**
ENERGY



EFOY

- DE** Montage
- EN** Installation
- FR** Montage
- IT** Manuale d'istruzioni
- ES** Montaje
- NL** Montage

- SE** Montering
- DK** Montage
- NO** Montering
- FI** Kokoaminen



Thank you!

Congratulations on choosing an EFOY fuel cell from SFC Energy AG. We hope you enjoy your new power supply.

If you have any questions about installation or operation, please contact your sales partner or the EFOY hotline.

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Specifications may be changed without prior notice. Revised October 2020

Notes on safe operation



Please read the mounting instructions before installing the device. For your own safety, follow the instructions and warnings in these mounting instructions.

The mounting instructions are addressed to qualified personnel. The EFOY fuel cell must be installed by appropriately qualified personnel.



WARNING

The EFOY fuel cell is intended for operation in well-ventilated environments and requires sufficient incoming air which is free of exhaust gas. The device must be protected against direct weather influences, especially moisture infiltration. The device generates exhaust gases which must be led to the open air using the accompanying exhaust gas hose. Always ensure sufficient ventilation.



Do not open the EFOY fuel cell. Do not force fuel cartridges open and do not refill them.



Protect the EFOY fuel cell and fuel cartridges from heat and direct sunlight. Observe the temperature specifications for operation and storage in [SECTION 7](#).



Store the EFOY fuel cell in a place protected from frost. For frost-free operation at temperatures under 3 °C, leave a full fuel cartridge and intact battery connected.



Do not smoke around the EFOY fuel cell or fuel cartridges. Keep sources of heat and ignition away from the device and fuel cartridges.



The EFOY fuel cells and empty or partially emptied fuel cartridges are not intended for use by persons (including children) with limited physical, sensory or mental capacities or persons who lack experience and/or knowledge unless they are supervised by a person responsible for their safety or have received instructions from them on how to use the device. Children must be supervised to ensure that they do not play with the device.



Read the instructions before operating the device.



Do not expose the device to rain.



Transport in an upright position only.

Service and contact

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85649 Brunnthal
Germany

Hotline:	+49 (0) 89 673 592 555
Toll-free number*:	00800 732 762 78
E-mail:	service@sfc.com
Web:	www.efoy.com

**The toll-free number can be called free of charge from a landline telephone in the following countries: Austria, Belgium, Denmark, France, Germany, Great Britain, Italy, the Netherlands, Norway, Spain, Sweden and Switzerland.*

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1 Safety instructions

1.1 Explanation of signal words



DANGER

Indicates a hazard with a high degree of risk which, if not avoided, will result in death or serious injury.

- ▶ Pay attention to the danger warning.



WARNING

Indicates a hazard with a medium degree of risk which, if not avoided, can result in death or serious injury.

- ▶ Pay attention to the danger warning.



CAUTION

Indicates a hazard with a low degree of risk which, if not avoided, can result in minor or moderate injury.

- ▶ Pay attention to the danger warning.



INFO

Indicates an action that can cause material damage.

- ▶ Pay attention to the information.



Includes further information and tips on using the EFOY fuel cell in an optimal way.

1.2 Safety instructions for the EFOY fuel cell



DANGER

Risk of electric shock! The EFOY fuel cell is not waterproof. The combination of infiltrating water and electricity creates a risk of injury.

- ▶ Ensure that no water can enter the EFOY fuel cell.
- ▶ Install the EFOY fuel cell in an area protected from water.
- ▶ Do not use the EFOY fuel cell if any part of it has been submerged in water. A fuel cell which has been damaged by water is extremely dangerous. Attempting to use the EFOY fuel cell can result in fire or cause an explosion. Notify SFC Energy or your service partner immediately to have the EFOY fuel cell examined and the affected functional parts replaced.



WARNING

Poor installation of the EFOY fuel cell poses a risk of injury.

- ▶ Install the EFOY fuel cell and EFOY fuel cartridges in a safe and secure way.



CAUTION

Unapproved parts may damage the EFOY fuel cell, posing a risk of injury.

- ▶ Use original accessories only.

1.3 Safety instructions for ventilation



WARNING

Exhaust gases from the EFOY fuel cell may contain harmful components.

- ▶ Do not breathe in exhaust gases directly or for prolonged periods.
- ▶ Only use the exhaust gas hose supplied.
- ▶ Lead exhaust gases from the installation space to the open air.

**WARNING**

Blocked or clogged ventilation openings impede the required air supply and removal.

- ▶ The EFOY fuel cell may only be operated in a well-ventilated environment.
- ▶ Ensure that the openings for the incoming and outgoing air are not blocked by anything.
- ▶ Keep the environment around the EFOY fuel cell clean and free of gasoline, flammable substances and other ignitable vapors and liquids.

**CAUTION**

Harmful solvent vapors may be released when sealing the exhaust heat tube and exhaust gas hose.

- ▶ Observe the instructions for the respective sealant.
- ▶ Ensure sufficient ventilation.

1.4 Safety instructions for the electronics and battery

**DANGER**

Risk of fire! Incorrectly laid or sized cables can cause a fire.

- ▶ Ensure that all connected lines have sufficient insulation and electric strength.
- ▶ Ensure that the contact points cannot be touched.
- ▶ Do not install any bare metal lines or contacts.
- ▶ Only allow professional electricians to work on electrical systems.
- ▶ Only use the supplied EFOY charging cable.
- ▶ The battery terminal not connected to the chassis must be connected first. Make the other connection to the chassis at a distance from the battery and gasoline line.



WARNING

The battery may release explosive gases.

- ▶ Avoid flames and sparks.
- ▶ While charging the battery, ensure sufficient ventilation.
- ▶ Observe the battery manufacturer's safety information.



WARNING

Risk of fire!

- ▶ Non-rechargeable batteries may not be charged with the EFOY fuel cell.
- ▶ Use only battery types which correspond with the technical specifications.

1.5 Safety instructions for methanol

Safe and tested EFOY fuel cartridges contain methanol approved by SFC Energy AG. When the EFOY fuel cell and EFOY fuel cartridges are used properly, there is no danger of coming into contact with the methanol.



DANGER

Risk of fire! Methanol is highly flammable. Escaping methanol vapors can cause a fire.

- ▶ Do not smoke while changing an EFOY fuel cartridge and keep all sources of ignition away.
- ▶ Keep the area around the EFOY fuel cell and fuel cartridge clean and free of gasoline and other sources of ignition.
- ▶ Protect the EFOY fuel cell and EFOY fuel cartridges from temperatures over 50 °C.



DANGER

Risk of poisoning! Breathing in, touching or swallowing methanol can cause poisoning.

- ▶ Do not breathe in exhaust gases directly or for prolonged periods.
- ▶ Do not touch leaked methanol. In small quantities, methanol evaporates without leaving residues.
- ▶ Contact a doctor immediately in case of direct contact, an accident or if you are feeling unwell. Show the doctor the fuel cartridge label or methanol safety data sheet.

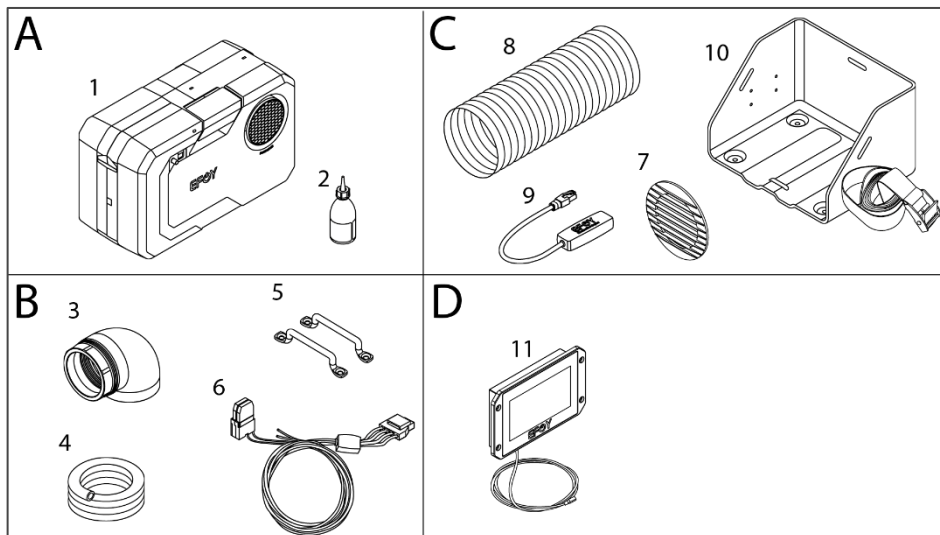
The storage and transportation of methanol are regulated by law. More information can be found in the safety data sheets at <https://www.my-efoy.com/safety-data-sheets/>

2 Product contents

All sets contain the following: Operating instructions with warranty conditions

Basic set: A | **BT set:** A + B + C | **OP Set:** A + B + D

- | | |
|--|---|
| <p>A</p> <ul style="list-style-type: none"> (1) EFOY fuel cell (2) EFOY service fluid | <p>C</p> <ul style="list-style-type: none"> (7) Outer cover (8) Exhaust heat tube (9) Bluetooth adapter (10) Fuel cartridge holder, incl. belt (BT set only) |
| <p>B</p> <ul style="list-style-type: none"> (3) Exhaust heat elbow (4) Insulated exhaust gas hose (5) Belt locks (6) Charging cable | <p>D</p> <ul style="list-style-type: none"> (11) Operating panel with cable |



A complete list of accessories and spare parts can be found at www.efoy.com.

3 Preparation for installation

- ▶ If the EFOY fuel cell has been in storage for more than 6 months, test its functionality prior to installation.
- ▶ Connect the EFOY fuel cell to a battery and allow it to complete a loading cycle. A loading cycle can take several hours.

For information on how to connect the EFOY fuel cell to a battery, see [SECTION 6.3](#).

Prepare tools

- Electric drill
- Jig saw
- Screwdriver
- Allen wrench 3 mm
- Crimping tool (0.75 mm² and 4 mm² cable diameter)
- Battery terminals to connect to your battery
- Sealant
- Scissors or cutter

The following screws should be used, depending on the substrate (screws are not included in the product contents):

- Attaching the belt brackets: 4 screws (countersunk screws, hole diameter Ø 5.2 mm)
- Attaching the mounting plate: 6 screws (countersunk screws/Ø 5 mm)
The shaft and thread type depend on the material to which the mounting plate will be attached.
- Attaching the fuel cartridge holder: 4 screws (e.g. pan head screws Ø 5.5 mm).
- Attaching the operating panel: 4 screws (e.g. pan head screws Ø 3.5 mm).

Optional:

- Plugs if needed
- Cable clips if needed

4 Installation space requirements

4.1 Installation conditions

The data in the following table apply to all EFOY fuel cells.

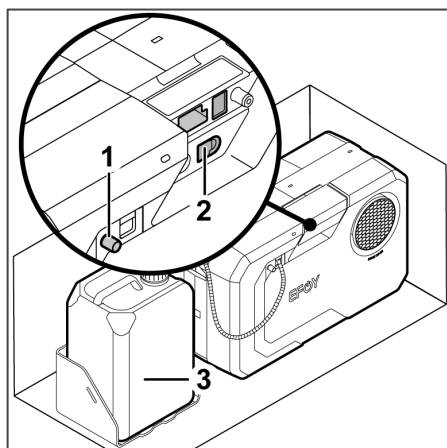
Installation space (L x W x H)¹	510 x 320 x 290 mm
Incline along longitudinal axis	For continual use = 35°
Incline along lateral axis	For continual use = 35°
Operating temperature²	EFOY: -20 °C to +40 °C/ EFOY Pro: -20 °C to +50 °C
Start temperature	EFOY: +3 °C to +40 °C/ EFOY Pro: +3 °C to +50 °C
Storage temperature	+1 °C to +50 °C
IP protection class	IP 21
Operating altitude	Performance may be limited at approx. 2,000 meters above sea level
Recommended distance to battery	As close as possible. The product contents include a 3-meter cable. Up to 3 m

¹ The installation space is given for an EFOY fuel cell including an M5 or M10 fuel cartridge.

² It may not always be possible to charge lithium batteries (LiFePO₄) at temperatures below 0 °C. Follow the battery manufacturer's instructions.

If the maximum permissible operating temperature in the installation space is exceeded, the EFOY fuel cell switches itself off and can no longer generate any energy. As soon as the operating temperature returns to the normal range, the EFOY fuel cell automatically starts up again.

4.2 Access



The following areas must be easily accessible:

- (1) Exhaust gas outlet and EFOY service fluid filling hole
- (2) Electrical connections
- (3) EFOY fuel cartridge

4.3 Necessary air inlets and outlets



INFO

The EFOY fuel cell requires incoming air and produces exhaust heat and exhaust gases.

- ▶ If installing the fuel cell in enclosed areas, always plan an inlet for incoming air, an outlet for exhaust heat and an opening for the exhaust gas hose.
- ▶ To avoid any build-up of heat, ensure that the installation space is adequately ventilated, e.g. through an additional opening and a temperature-controlled fan.
- ▶ Protect the opening from any water infiltration and foreign objects, e.g. by using a gill plate and fly screen.

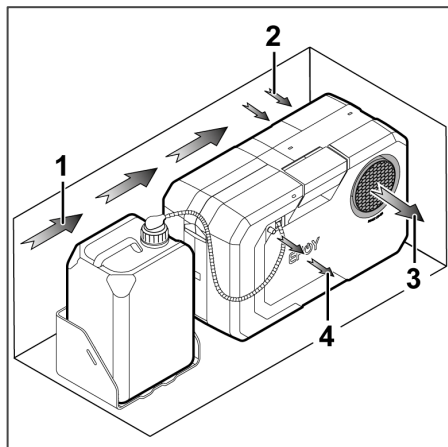
Inlet and outlet dimensions

Incoming air inlet	Ø at least 10 cm	
Exhaust heat outlet	Ø at least 10 cm	See SECTION 5.3 for installation information.
Exhaust gas hose outlet	Ø 1 cm	See SECTION 5.4 for installation information.



Before drilling or sawing breakthroughs, ensure that there is enough space behind the installation position.

Overview of airways



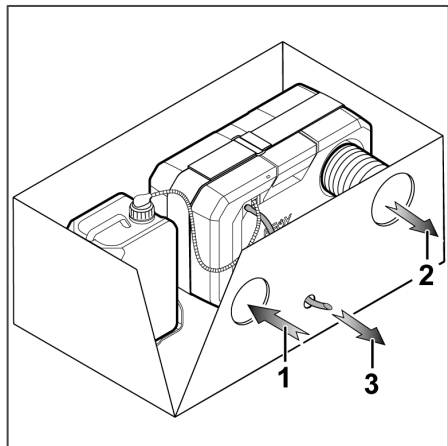
The following areas for incoming air and exhaust heat removal must remain accessible:

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



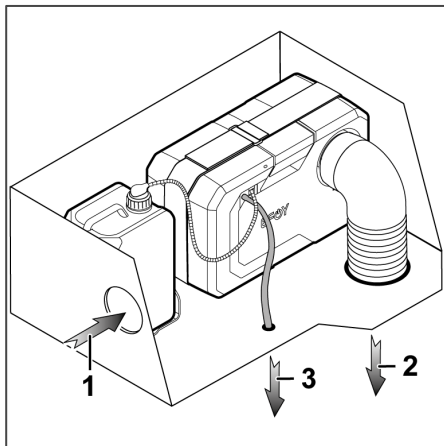
Exhaust heat and exhaust gases can be extracted from the installation space either at the side or through the base. The exhaust gas (condensate is also produced here) can also be discharged into the bilge on yachts.

Exhaust heat and exhaust gas hose via the side wall

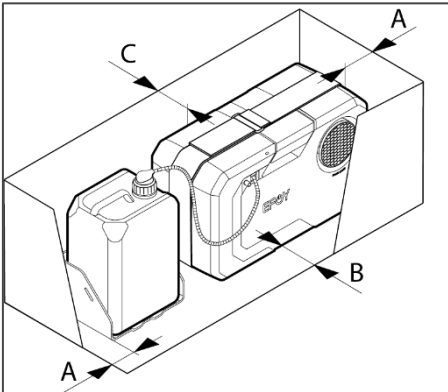


- (1) Incoming air inlet
- (2) Exhaust heat outlet
- (3) Exhaust gas hose outlet

Exhaust heat and exhaust gas hose via the base



4.4 Safe distance between the device and side wall

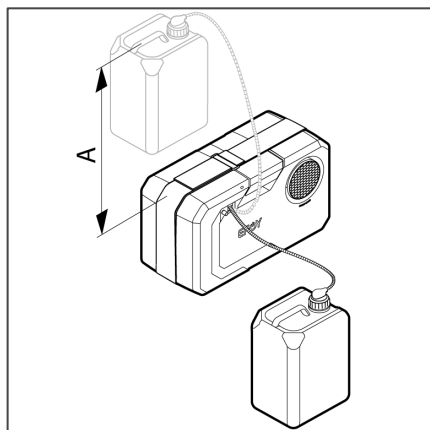
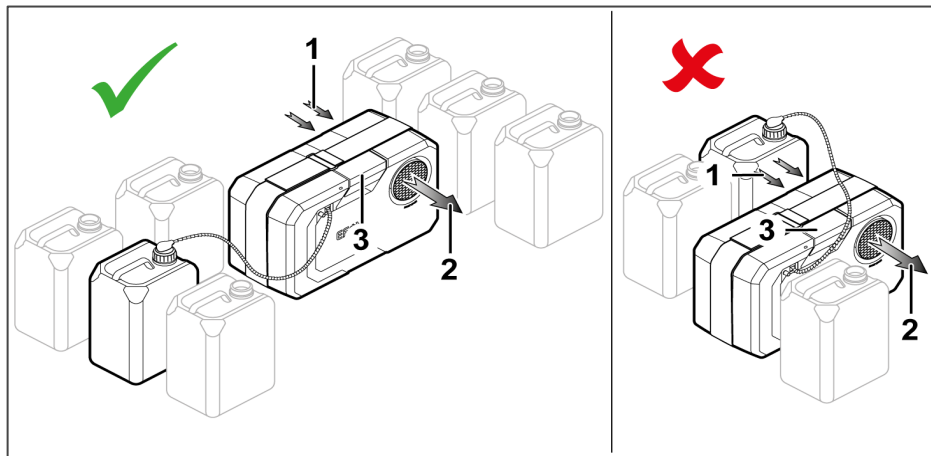


- ▶ Allow for the following safe distance between the side wall and the EFOY fuel cell and fuel cartridge when planning the installation.

Short side:
distance at least **A = 5 cm**

Long side:
distance at least **B = 5 cm/C = 8 cm**

4.5 Positioning the EFOY fuel cartridge

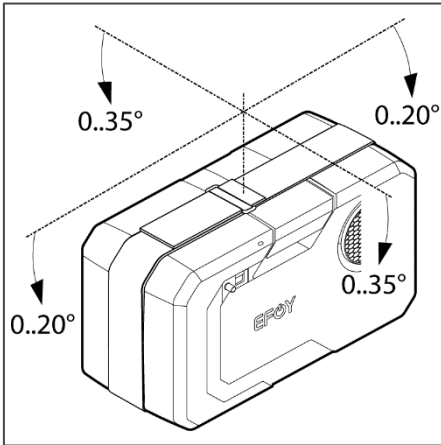


The incoming air inlet and (1) and exhaust heat outlet (2), as well as the electrical connections (3), may not be blocked by a fuel cartridge or other objects.

The fuel cartridge hose is 75 cm long.

- ▶ Position the fuel cartridge within reach of the fuel cartridge connection.
- ▶ Ensure that the fuel cartridge hose is not kinked.

4.6 Permissible installation angle



The inclination of the EFOY fuel cell may not exceed the permissible installation angle.

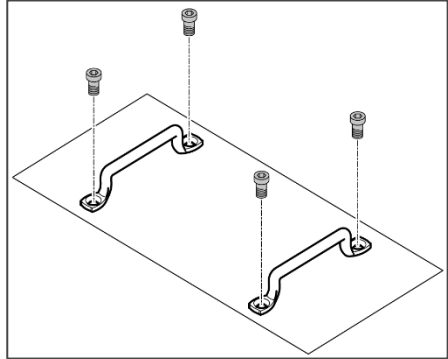
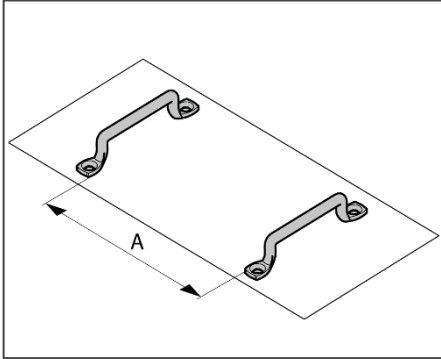
Incline along longitudinal axis: For continual use = 35°
Temporary (< 10 minutes) 45°

Incline along lateral axis:
For continual use = 35°

5 Installing the EFOY fuel cell

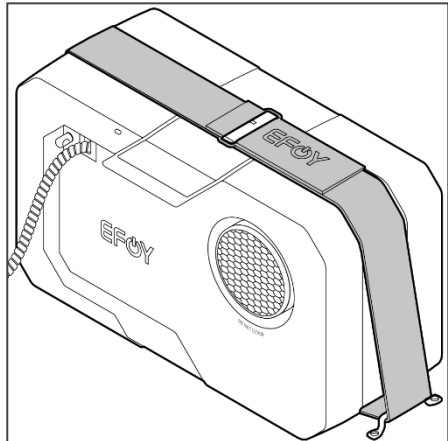
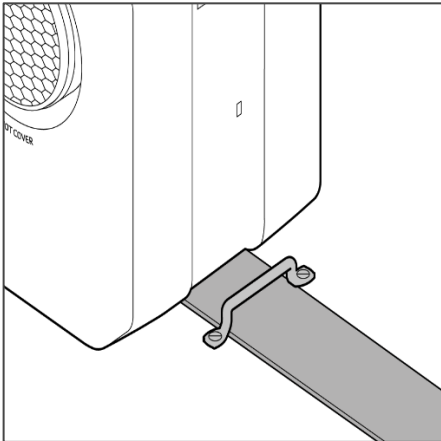
The EFOY fuel cell can be attached using the belt brackets (included in product contents) or the optionally available mounting plate.

5.1 Attaching the EFOY fuel cell using the belt brackets



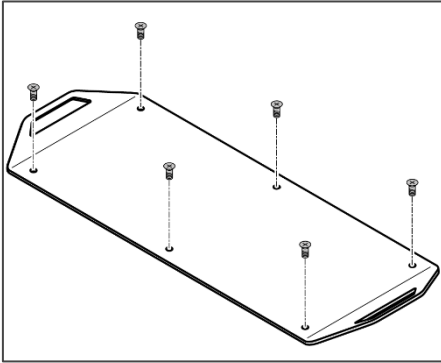
► Measure out the position of the belt bracket. **A** = at least the length of the EFOY fuel cell

► Secure the belt bracket using the screws.

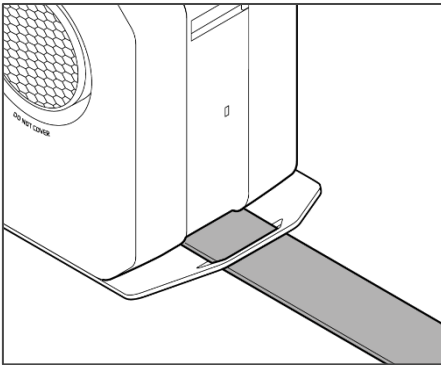


- ▶ Place the EFOY fuel cell between the two belt brackets.
- ▶ Run the belt through the belt brackets.
- ▶ Tighten the belt.
- ▶ Attach the end of the belt to the Velcro fastener.

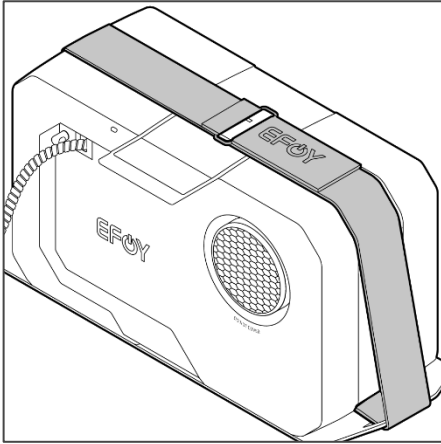
5.2 Attaching the EFOY fuel cell using the mounting plate



- ▶ Secure the mounting plate at the required position using countersunk screws (\varnothing 5 mm).
- ▶ If necessary, use plugs to ensure that the mounting plate does not come loose even under heavy load.

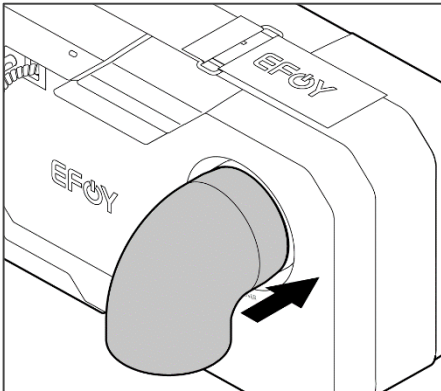


- ▶ Place the EFOY fuel cell on the mounting plate.
- ▶ Run the belt through the slits in the mounting plate.

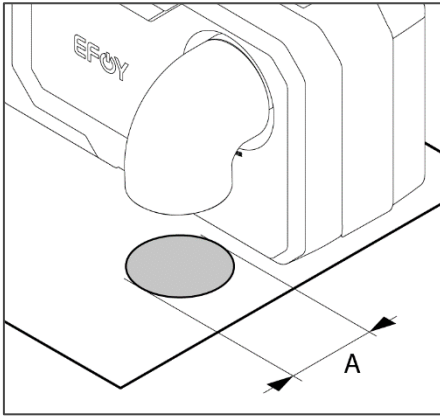


- ▶ Tighten the belt.
- ▶ Attach the end of the belt to the Velcro fastener.

5.3 Fitting the exhaust heat outlet



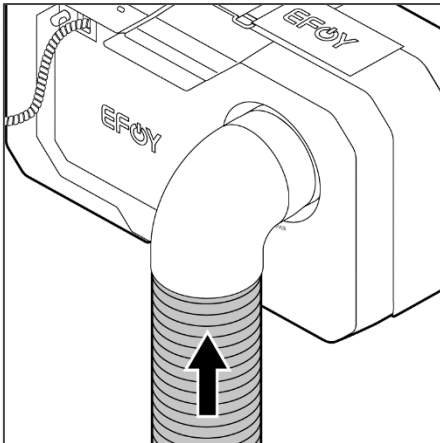
- ▶ Push the exhaust heat elbow into the exhaust heat outlet connection.



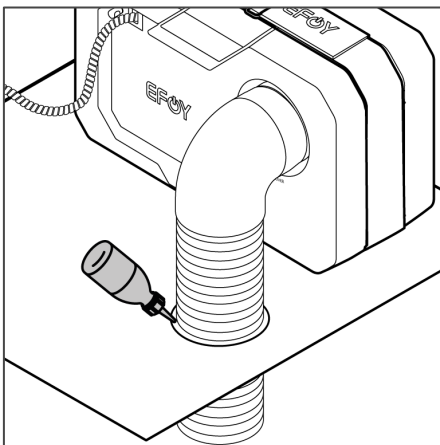
- ▶ Saw out the opening (\varnothing at least **A = 10 cm**).

Vehicle installation:

When drilling through hollow parts, do not cut through any load-bearing vehicle elements. Contact your vehicle manufacturer for additional information.

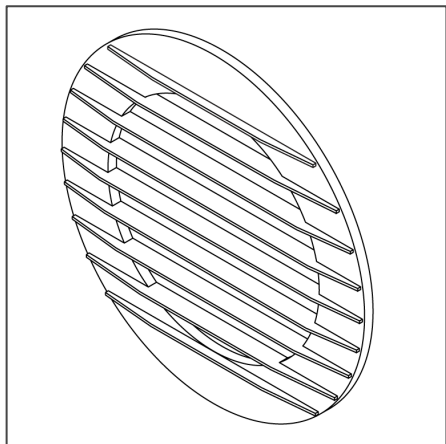


- ▶ Push the exhaust heat tube into the exhaust heat elbow.

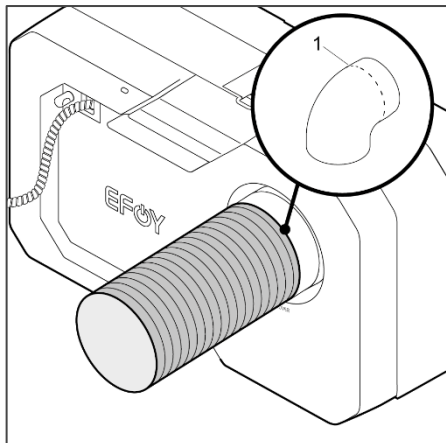


- ▶ Feed the exhaust heat tube through the opening in the exhaust heat guide plate.
- ▶ Take care not to kink the exhaust heat tube.
- ▶ Seal the opening for the exhaust heat tube using a sealant to prevent moisture from entering the installation space.

The exhaust heat tube can be shortened if necessary.



- ▶ Place the outer cover on the exhaust heat tube to prevent foreign objects from entering the exhaust heat tube outlet.
- ▶ Do not place any objects in front of the exhaust heat outlet.
- ▶ A second cover can be placed over the air inlet, if required.

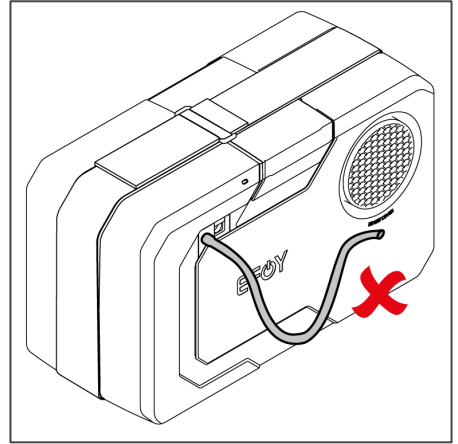
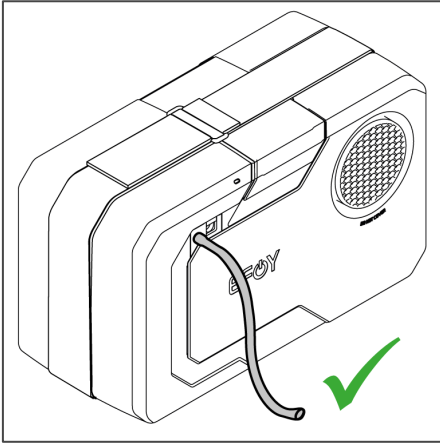


For installation in the side wall:

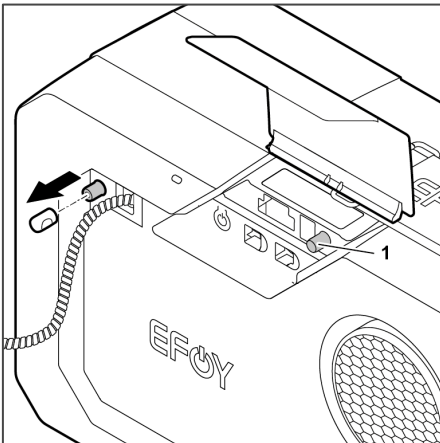
- ▶ To install the exhaust heat tube straight and perpendicular to the side wall, cut the exhaust heat elbow (1) at the marking.
- ▶ Push the short piece of the exhaust heat elbow into the exhaust heat connection.
- ▶ Fit the exhaust heat tube.

5.4 Fitting the exhaust gas hose

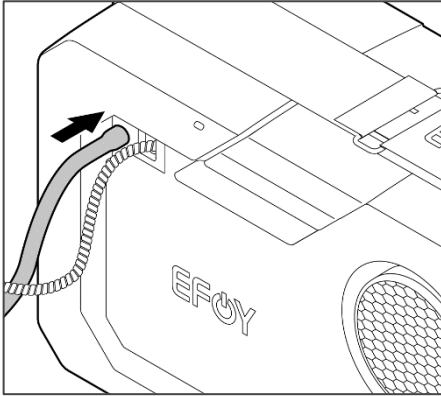
The exhaust gas hose should always be used in conjunction with the supplied insulation. Adapt the length of the hose to your installation situation and make sure to shorten the external piece to max. 5 cm, cutting it at an angle.



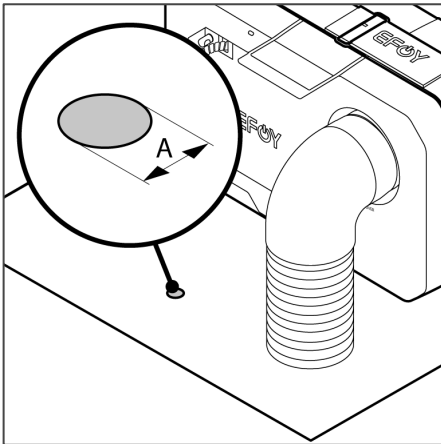
- ▶ To avoid siphoning, make sure that the exhaust gas hose is not kinked or blocked during installation.
- ▶ Make sure that the exhaust gas hose is only led sideways or downwards so that any water that may accumulate can drain off.



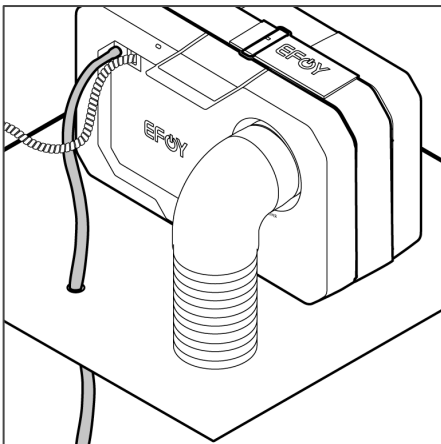
- ▶ Remove the protective cap from the exhaust gas opening.
- ▶ Place the protective cap on the holder (1), so that the exhaust gas opening can be closed again if necessary.



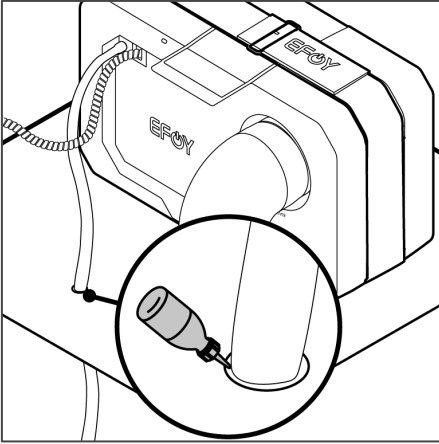
- ▶ Push the insulated exhaust gas hose onto the exhaust gas opening.



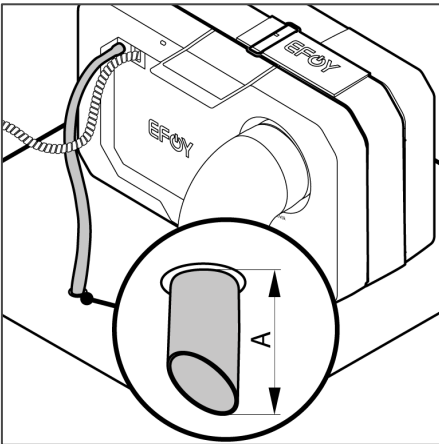
- ▶ Drill the opening for the exhaust gas hose (\varnothing A = 1 cm).



- ▶ Feed the exhaust gas hose from the installation space to outdoors through the opening.

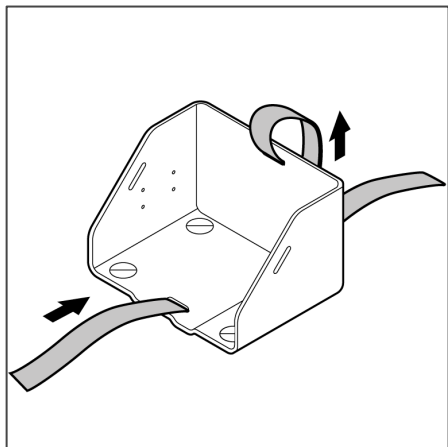


- ▶ Seal the opening for the exhaust gas hose using sealant.

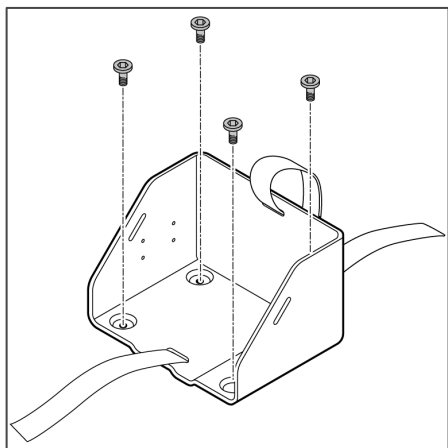


- ▶ Cut the exhaust gas hose as short as possible. The external piece may be a maximum of **A = 5 cm** long.
- ▶ Cut the end of the exhaust gas hose at an angle to prevent droplet formation.

5.5 Fitting the fuel cartridge holder



- ▶ Thread the belt through the fuel cartridge holder.



- ▶ Attach the fuel cartridge holder using 4 screws (Ø 5 mm).
- ▶ If necessary, use plugs to ensure that the fuel cartridge holder does not come loose even under heavy load.

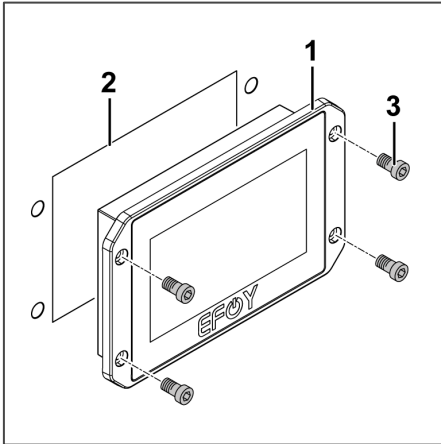
Correctly position the fuel cartridge in the fuel cartridge holder and connect (see operating instructions).

5.6 Flush-mounting the operating panel



During installation, make sure there is enough space for the electronics behind the installation opening.

Use the respective supplied template for drilling and sawing.




- (1) Operating panel
- (2) Installation opening
- (3) Screws

- ▶ Pre-drill the installation opening (2).
- ▶ Saw out the installation opening (2) using the jig saw.
- ▶ If necessary, pre-drill the holes for the screws (3).
- ▶ Secure the operating panel (1) using the screws (3).

6 Electrical connection

6.1 Install charging cable

The EFOY fuel cell charges 12 V and 24 V batteries. When installing a new battery, the voltage profile must be configured on the EFOY fuel cell.

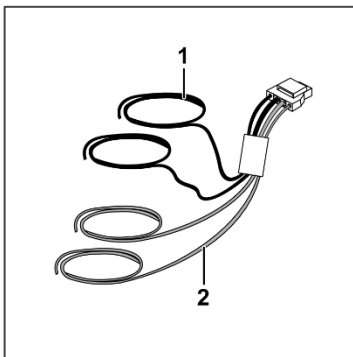
-  The EFOY fuel cell may only be used to charge batteries that comply with the EFOY fuel cell battery specifications, see section 6.4



DANGER

Risk of fire! Incorrectly installed or damaged cables may cause a fire.

- ▶ Ensure that all connected lines have sufficient insulation and electric strength. Regularly inspect cables for insulation faults, breakages or loose connections.
- ▶ Ensure that the contact points cannot be touched.
- ▶ Install cables in such a way that they cannot be damaged. Ensure they are well secured.
- ▶ The charging cable of the EFOY fuel cell must always be disconnected when performing electrical welding work or working on the electrical system.

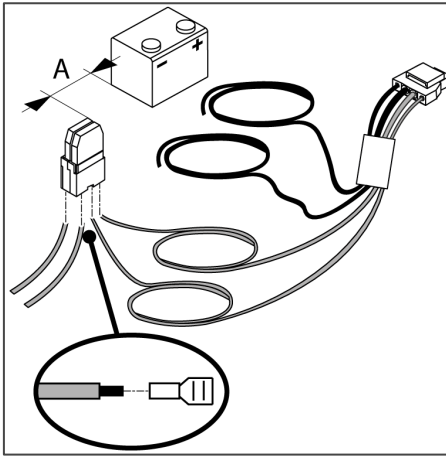


Charging cable structure:

Two sense cables (1) measure the battery voltage.

Two power cables (2) charge the battery.

The charging cable must be properly assembled before connection:

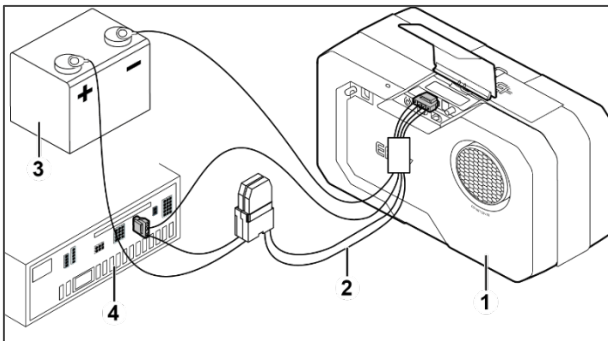


- ▶ Shorten the cable to the required length.
- ▶ Fit the supplied fuse holder (for power cables (20 A) and sense cables (2 A)) near the battery (A: recommended: 50 cm).
- ▶ Fit the cable with suitable battery terminals.
- ▶ Always connect both the power and the sense cables.
- ▶ Install the power and sense cables separately where possible, so that the current flowing through the power cables does not falsify the measurement of the battery voltage through the sense cables.

The charging cable can be extended if required. In order to minimize ohmic losses in the charging cable, the following cable cross-sections are recommended:

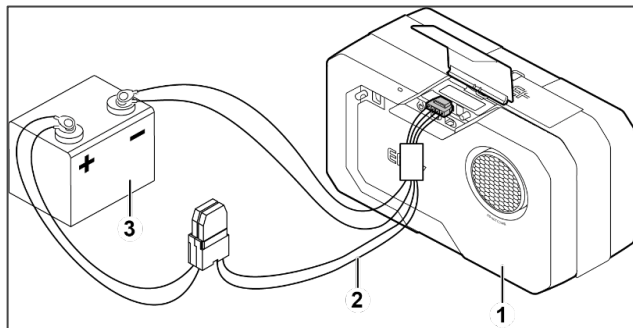
Length of charging cable	Cable cross-section
Up to 10 m	at least 4 mm ²
10–15 m	at least 6 mm ²

6.2 Connection via power supply unit



- (1) EFOY fuel cell
- (2) Charging cable
- (3) Battery
- (4) Power supply unit

6.3 Connection directly at the battery



- (1) EFOY fuel cell
- (2) Charging cable
- (3) Battery

6.4 Charging parameters

6.4.1 Lead batteries (AGM, lead acid and lead gel)

	Factory settings 12 V/24 V	Min. 12 V/24 V	Max. 12 V/24 V
Switch-on voltage	12.3 V/24.6 V	11.0 V/22.0 V	13.0 V/26.0 V
Switch-off voltage	14.2 V/28.4 V	13.5 V/27.0 V	14.7 V/29.4 V
Switch-off current	2.0 A/1.0 A	0.5 A/0.25 A	10.0 A/5.0 A
Absorption time	180 min	0 min	300 min
Capacity	---	20 Ah	400 Ah
Max. charging duration	24 h	0 h	120 h
Min. charging duration	30 min	30 min	180 min
Switch-on delay	60 s	2 s	300 s
Battery protection	11.2 V/22.4 V	10.5 V/21.0 V	12.0 V/24.0 V
Required start voltage	9 V/18.5 V		
Max. "charge now" voltage	13.2 V/26.4 V		
Max. battery voltage	16.0 V/31.5 V		

6.4.2 LiFePO4 batteries (lithium iron phosphate)



For optimum charging, we recommend using an LiFePO4 battery with EFOY fuel cell communication capability.

	Factory settings 12 V/24 V	Min. 12 V/24 V	Max. 12 V/24 V
Switch-on voltage	12.6 V/25.2 V	12.0 V/24.0 V	13.4 V/25.2 V
Switch-off voltage	14.5 V/29.0 V	13.8 V/27.6 V	14.6 V/29.2 V
Switch-off current	2.0 A/1.0 A	0.5 A/0.25 A	10.0 A/5.0 A
Absorption time	180 min	0 min	300 min
Capacity	---	20 Ah	600 Ah
Max. charging duration	48 h	0 h	120 h
Min. charging duration	30 min	30 min	180 min
Switch-on delay	300 s	2 s	600 s
Battery protection	11.0 V/22.0 V	10.5 V/21.0 V	12.5 V/25.0 V
Required start voltage	9 V/18.0 V		
Max. "charge now" voltage	13.4 V/26.8 V		
Max. battery voltage	16.0 V/31.5 V		

6.4.3 EFOY Li battery

	Factory settings	Min.	Max.
Switch-on threshold	20%	5%	50%
Switch-off threshold	80%	50%	100%
Battery protection	10%	5%	20%

6.5 Combining the EFOY fuel cell with other energy sources

The EFOY fuel cell can be combined with other energy sources, e.g. a photovoltaic system, which then jointly charge the battery.



Follow the manufacturer's instructions.