



America

CERTIFICATE

No. U8 13 02 49097 010

Holder of Certificate: **SFC Energy AG**

Eugen-Sänger-Ring 7
85649 Brunnthal-Nord
GERMANY

Production

49097

Facility(ies):

Certification Mark:



Product:

**Battery charger
(Direct Methanol Fuel Cell Battery Charger)**

Model(s):

EFOY 600, EFOY 900, EFOY 1200, EFOY 1600,
EFOY Comfort 80, EFOY Comfort 140, EFOY Comfort 210,
EFOY 2200, EFOY Pro 600, EFOY Pro 800, EFOY Pro 800 Duo,
EFOY Pro 1600, EFOY Pro 2200, EFOY Pro XT 2200,
EFOY Pro 2400, EFOY Pro 2400 Duo

Parameters:

Rated Input Voltage:	See attachment
Rated Frequency:	DC
Rated Input Current:	See attachment
Rated Output Voltage:	See attachment
Rated Output Current:	See attachment
Protection Class:	Class III

Equipment is to be installed and operated per the manufacturer's instructions.

Tested according to:

CAN CSA C22.2 No. E60335-1/R:2007
CAN CSA C22.2 No. E60335-2-29:2006
UL 60335-1:2011
(supplemented by UL1564/R:2010-06,
IEC 60335-2-29/A2:2010, CSA America FC-3:2004,
NFPA 1192:2005, NFPA 70, UL 458/R:2010-03,
ANSI/RVIA 12V:2008)
This product is intended and certified for
Canada and the USA. Additional requirements
may apply in other countries.

The product was voluntarily tested according to the relevant safety requirements noted above. It can be marked with the certification mark above. The mark must not be altered in anyway. This product certification system operated by TÜV SÜD America Inc. most closely resembles system 3 as defined in ISO/IEC Guide 67. Certification is based on the TÜV SÜD "Testing and Certification Regulations". TÜV SÜD America Inc. is an OSHA recognized NRTL and a Standards Council of Canada accredited certification body.

Test report no.: 231-809919-500

Date, 2013-02-25

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**ATTACHMENT TO CERTIFICATE NO. U8 13 02 49097 010
FOR SFC ENERGY AG
DIRECT METHANOL FUEL CELL BATTERY CHARGER**

ELECTRICAL RATINGS:

Model/Type reference	EFOY Pro 600	EFOY Pro 800	EFOY Pro 800 Duo	EFOY Pro 1600
Ratings:	25 W	45 W	45 W	65 W
Charging Capacity/Day:	600 Wh/day (50 Ah/day)	1080 Wh/day	1080 Wh/day	1560 Wh/day 1130 Ah/day)
Nominal Input / Output Voltage, DC:	12 V / 24 V	12 V / 24 V	12 V / 24 V	12 V / 24 V
Charging Current at 12V / 24V:	2.1 A / 1.05 A	2.1 A / 1.05 A	2.1 A / 1.05 A	5.4 A / 2.7 A

Model/Type reference.....	EFOY 600	EFOY 900	EFOY 1200	EFOY 1600
Ratings :	25 W	38 W	50 W	65 W
Charging Capacity/Day:	600 Wh/day (50 Ah/day)	900 Wh/day (75 Ah/day)	1200 Wh/day 100 Ah/day)	1560 Wh/day 130 Ah/day)
Nominal Input / Output Voltage, DC:	12 V	12 V	12 V	12 V
Charging Current at 12 V:	2.1 A	1.0 A	4.2 A	5.4 A

Model/Type reference.....	EFOY Comfort 80	EFOY Comfort 140	EFOY Comfort 210	EFOY 2200
Ratings :	40 W	72 W	105 W	90 W
Charging Capacity/Day:	960 Wh/day (80 Ah/day)	1728 Wh/day (144 Ah/day)	2520 Wh/day (210 Ah/day)	2160 Wh/day (180 Ah/day)
Nominal Input / Output Voltage, DC:	12 V	12 V	12 V	12 V
Charging Current at 12 V:	3.3 A	6.0 A	8.75 A	7.5 A

Model/Type reference.....	EFOY Pro 2200	EFOY Pro XT 2200	EFOY Pro 2400	EFOY Pro 2400 Duo
Ratings :	90 W	90 W	110 W	110 W
Charging Capacity/Day:	2160 Wh/day (180 Ah/day)	2160 Wh/day (180 Ah/day)	2640 Wh/day	2640 Wh/day
Nominal Input / Output Voltage, DC:	12 V / 24 V	12 V / 24 V	12 V / 24 V	12 V / 24 V
Charging Current at 12V / 24V:	7.5 A / 3.75 A	7.5 A / 3.75 A	6.7 A / 3.3 A	6.7 A / 3.3 A



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Turn on threshold $U_{batt} < 12.3 \text{ V} / 24.6 \text{ V}$

Cut off threshold: $U_{batt} > 14.2 \text{ V} / 28.4 \text{ V}$

Required starting voltage: $> 9.0 \text{ V} / 21.0 \text{ V}$

Quiescent current requirements: 15 mA for EFOY 600, EFOY 900, EFOY 1200, EFOY 1600, EFOY 2200, EFOY Comfort 80, EFOY Comfort 140, EFOY Comfort 210, EFOY Pro 600, EFOY Pro 1600, EFOY Pro 2200, EFOY Pro 2200 XT.

20 mA for EFOY Pro 800, EFOY Pro 800 Duo, EFOY Pro 2400, EFOY Pro 2400 Duo

Methanol requirements: 0.9 l/kWh

Compatible batteries: 12 V and 24 rechargeable (lead-acid or lead-gel) batteries with :

40 to 350 Ah capacity (Pro Models); 10 to 350 Ah capacity (EFOY 600, EFOY 900, EFOY 1200, EFOY1600, EFOY 2200 & Comfort Models)

CRITICAL CONDITIONS OF INSTALLATION AND USE:

The following are among the considerations to be made when installing and using this equipment. Consult the User's Manual for details. Items included are, but not limited to:

- All work should be carried out by qualified technicians in accordance with the technical regulations.
- Do not operate unit if there is danger of explosion.
- Do not operate at temperatures above 45°C or below -20°C for EFOY Pro 600, EFOY Pro 1600, EFOY Pro 2200, EFOY Pro 2200 XT and above 50°C or below -20°C for EFOY Pro 800, EFOY Pro 800 Duo, EFOY Pro 2400, EFOY Pro 2400 Duo. If the device has been exposed to temperatures under 0°C without being connected to a battery or with insufficiently filled fuel cartridge (Antifreeze), it must stand at room temperature for 24 hours before operating.
- For indoor use only: Unit is not watertight. Make sure that no water can enter.
- The unit may be used only to charge lead batteries that conform to the specification in chapters 3.4, S. 12) of the user manual.
- Operate only with original-equipment EFOY fuel cartridges.
- Do not smoke while changing the cartridges and avoid open flames.
- Do not expose fuel cartridges to temperatures above 45°C for EFOY Pro 600, EFOY Pro 1600, EFOY Pro 2200, EFOY Pro 2200 XT and above 50°C for EFOY Pro 800, EFOY Pro 800 Duo, EFOY Pro 2400, EFOY Pro 2400 Duo.
- Do not place the fuel cartridges in front of the air intake or outlet.
- At no time may siphoning occur in the hose. Make sure that the hose is neither clogged nor blocked.
- Switch off device before cleaning and unplug the battery charging cable.
- Never refill more than one bottle of Service Fluid at a time.
- The unit generates heat, thus requiring proper ventilation, see installation instructions.
- Exhaust gases contain moisture and may exceed 60°C, causing scalding.
- Exhaust by-products may contain injurious substances. Avoid inhaling exhaust directly or for long periods of time.
- Exhaust hose may not be longer than 50 cm in order to prevent freezing in winter. The hose may be up to 150 cm long for summer operation and during transitional seasons.
- The circuit connecting to the battery must contain a fuse.
- Check polarity before connecting the unit.
- Both sensor and power lines must always be connected. Always use separate lines for changing (power) and for voltage metering (sensor) to the battery.
- Do not open unit. Unauthorized tampering may jeopardize safe operation. The unit does not contain any user replaceable or serviceable components.
- Use only original equipment. Use of unauthorized parts will compromise safety. Consult user manual for authorized parts.
- Replace fuses only with fuses of the same type and rating. Never repair or override a fuse.
- Consult Material Safety Data Sheet (MSDS) for Methanol Fuel before use.