

Off Grid Systems

EFOY Pro Series - 2nd generation

The new EFOY Pro series is designed to provide reliable energy for off grid applications. Connected to a off grid application, the EFOY Pro device will automatically charge batteries when required, providing reliable power 24h a day, 365 day per year.

Robust industrial construction
EFOY Pro devices offer a robust metal housing. The new OP2 operation panel offers a easy to use interface and allows to configure switch on and off voltage settings etc.

DUO version: Extended autonomy with 2 fuel connectors
The EFOY Pro Duo comes with 2 fuel connectors instead of one. Therefore it is possible to connect 2 fuel cartridges directly to the EFOY Pro Duo device. If more fuel autonomy is required, up to 4 fuel cartridges can be connected by using the optional external Duocartswitch DCS1. Using 2 external DCS1 it is possible to connect up to 4 x M28 fuel cartridges providing up to 120 kWh of electrical energy without user intervention.

One for all – charges 12V and 24V batteries
EFOY Pro is compatible with 12V and 24V batteries. The integrated charge control system identifies battery voltage and automatically adjusts the charging voltage.

Low fuel consumption
Fuel consumption is 0.9 liters of Methanol/kWh el.

Extended Temperature Range
EFOY Pro 2nd generation operates reliable at ambient temperatures ranging from -20°C to +50°C.

Constant Current versus Constant Power
EFOY Pro 2. generation devices operate in constant current mode. Therefore the output power will decrease over time. In the datasheet a max and min value is specified for the output power. The min output power value is the guaranteed output power after 4500h of operation. The new constant current mode offers a extended operation lifetime of the fuel cell system.

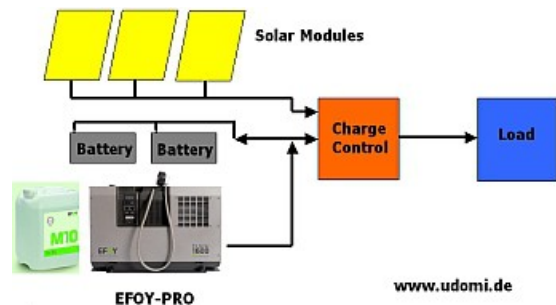
EFOY Pro 2nd generation – 4500h warranty
The EFOY Pro 2. generation devices warranty has been extended to 4500h or 24 months (1st generation EFOY Pro 3.000h).

Compatilby
EFOY Pro devices of the 2nd generation are almost fully compatible with the 1st generation. Overall dimensions and electrical interfaces are the same. Accessories such as DCS1, GSM-3 are also compatible – only exception is the new operation panel OP2 which is not compatible with 1st generation EFOY Pro units.

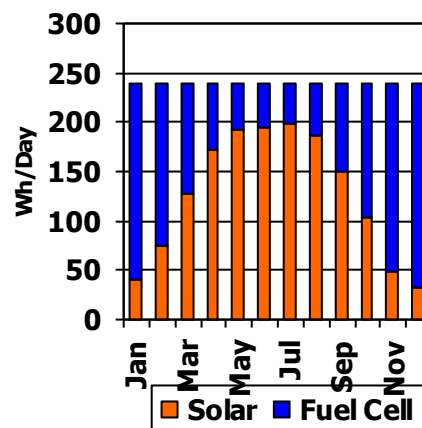
EFOY Pro 800 (DUO) replaces EFOY Pro 600
EFOY Pro 2400 (DUO) replaces EFOY Pro 1600/2200(XT)



EFOY-PRO-2400-DUO (110/80 Watt) with 2 fuel connectors



Fuel Cell – PV- Hybrid System



Typical energy contribution for Fuel Cell – PV - Hybrid System

EFOY Pro and solar cells – the winning combination
Combining EFOY Pro and solar cells is a powerful solution for off grid applications such as remote measuring systems, video surveillance or traffic control.

Off Grid Systems

Technical Specifications				
Device	EFOY-PRO-800	EFOY-PRO-800-DUO	EFOY-PRO-2400	EFOY-PRO-2400-DUO
Power max/min	45/25 Watt	45/25 Watt	110/80 Watt	110/80 Watt
Nominal Voltage	12V/24V	12V/24V	12V/24V	12V/24V
Charging current max/min	3.75A/2.1A@12V 1.88A/1.05A@24V	3.75A/2.1A@12V 1.88A/1.05A@24V	9.17A/6.7A@12V 4.58A/3.3A@24V	9.17A/6.7A@12V 4.58A/3.3A@24V
Recommended battery capacity	40-160Ah@12V 10-100Ah@24V	40-160Ah@12V 10-100Ah@24V	60-350Ah@12V 30-175Ah@24V	60-350Ah@12V 30-175Ah@24V
Warranty	2 years or 4.500 operation hours (related to min. power specified)			
Fuel Consumption	0.9l/kWh			
Fuel Cartridges	M5, M10 and M28 (M28 adapter required)			
Noise Emission	25dB(A) at 7m distance, 42dB(A) at 1m distance			
Weight	8kg	8.3kg	9kg	9.3kg
Operating Temp.	-20°C ... +50°C			
Dimensions	L x W x H 433 x 188 x 278mm			

Accessories for EFOY-PRO-SET:

Included with shipment:

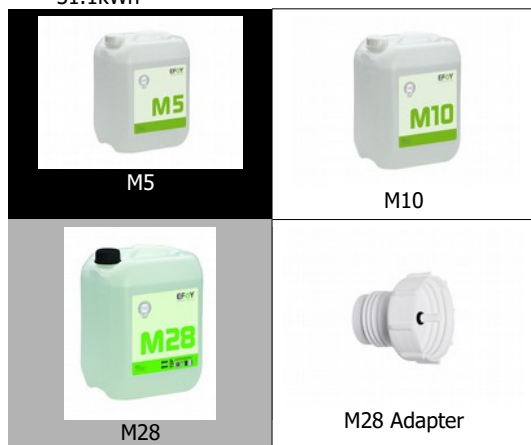
- Operation panel OP2 with cable
- Mounting plate
- Charge line
- Fuel cartridge holder with belt
- Exhaust hose EH1 (insulated)
- Off heat duct
- Service Fluid (included with BASIC)
- User manual (included with BASIC)

Optional:

- GSM-3 Modem and MUX-2
- Fuel Cartridge Sensor FS1
- M28 adapter
- Cluster Controller CC1 (for parallel operation of 2-5 EFOY systems)
- Interface adapter IA1
- Duocartswitch DCS1 (DCS1 allows to connect 2 fuel cartridges to EFOY Pro and up to 4 cartridges to EFOY Pro Duo)

Fuel Cartridges

- M5 cartridge (5 liters of Methanol), app 4.5kWh
- M10 cartridge (10 liters of Methanol), app 11.1kWh
- M28 cartridge (28 liters of Methanol), app 31.1kWh




Fuel Cartridge	M5	M10	M28
Volume	5 liters	10 liters	28 liters
Weight	4.3kg	8.4kg	25kg
Dimensions (WxDxH)	190x145x283	231x185x318	370x285x395
Capacity	4.5kWh	9.1kWh	25.3kWh



Product	Part#
EFOY-PRO-800-SET	EFOY-PRO-800-SET
EFOY-PRO-800-DUO-SET	EFOY-PRO-800-DUO-SET
EFOY-PRO-2400-SET	EFOY-PRO-2400-SET
EFOY-PRO-2400-DUO-SET	EFOY-PRO-2400-DUO-SET
EFOY-PRO-800-BASIC	EFOY-PRO-800-BASIC
EFOY-PRO-800-DUO-BASIC	EFOY-PRO-800-DUO-BASIC
EFOY-PRO-2400-BASIC	EFOY-PRO-2400-BASIC
EFOY-PRO-2400-DUO-BASIC	EFOY-PRO-2400-DUO-BASIC
Fuel Cartridge M5	M5
Fuel Cartridge M10	M10
Fuel Cartridge M28	M28
Fuel Cartridge Sensor	FS1
GSM-3	GSM-3
MUX-2	MUX-2
Cluster Controller	CC1
Interface Adapter	IA1
M28 Adapter	M28-Adapter
Duocartswitch DCS1	DCS1

Off Grid Systems

Technical Specifications	EFOY PRO 12000 DUO
Nominal Power (max)	500 Watt
Nominal Power (min. after 3000h)	400 Watt (+/-10%)
Nominal Voltage	24/48V
Charge Current	20,8/16,7A@24V 10,4A/8,3A@48V
Recommended battery capacity	200Ah@24V 100Ah@48V
Warranty	24 Months or 3000h
Fuel Consumption	0.9l/kWh
Fuel Cartridge	M5/M10 and M28 (requires M28 Adapter) max. 4 Fuel Cartridges with 2 x DCS1
Noise Level	35 dB(A) at 7m distance, 52 dB(A) at 1 m distance
Weight	32kg
Dimensions	L x B x H 640 x 441 x 310mm
Ambient Temperature	-20°C ... + 50°C
	
IP Protection	IP20
Data-Interface	RS232 (Text protocol or Modbus) RJ45 and connector (A,B, GND)
Standby Power Consumption	150mA@24V

Off Grid Systems

EFOY-OUTDOOR-Solutions

The EFOY-OUTDOOR solutions are an extension of the EFOY Pro system, designed to back up PV-Systems and to supply small off-grid industrial equipment. The EFOY Pro as well as the other components such as lead acid battery, Methanol tank and hybrid charge controller are installed in a robust outdoor housing.

Depending on the application different OUTDOOR solutions are offered. Make your choice between ProCube, EnergyBox, OUTDOOR-ALU box, OUTDOOR-EXPLORER case and the OUTDOOR-CABINET. All OUTDOOR solutions offer EFOY-SOLAR Hybrid capabilities.

The optional GSM-3 module provides remote control and monitoring of the EFOY Pro fuel cell system. In case of low Methanol fuel level or an error the system will automatically inform you via email or SMS. It is also possible to change system parameters from remote via our M2M (machine-to-machine) Internet portal using a standard Webbrowser. With the MUX-2 device it is possible to connect the GSM-3 with the EFOY PRO fuel cell and the SS-MPPT-15L charge controller to get additional informations such as load current, solar in current etc. The GSM-GPS-2 module provides additional GPS tracking capability. With GPS tracking the user always knows where the EFOY Pro system is located this may be very helpful when the Methanol cartridge has to be replaced etc.

Applications:

All year power supply as PV-Fuelcell Hybrid, or as self-sufficient unit.

- Remote weather stations
- Traffic control
- Measuring stations
- Camping, Outdoor, sailing etc.

Customized solutions on request.



OUTDOOR-XL-ALU



EXPLORER-BASE



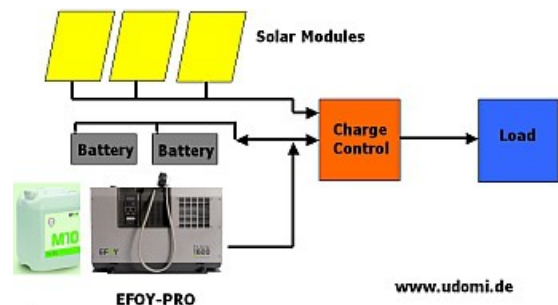
ProCube



EnergyBox



EFOY-OUTDOOR-CABINET-GFP-XL



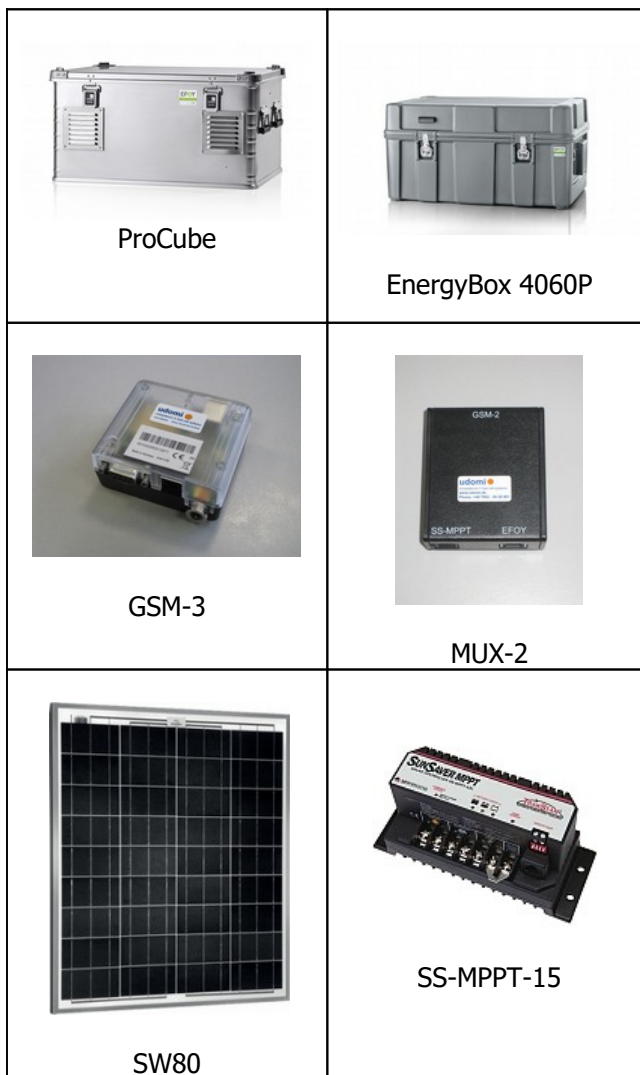
Off Grid Systems

Configuration	ProCube	EnergyBox 4060P
Box Dimensions (LxWxH)	800x600x410mm (Aluminum powder coated)	1215x794x616mm (Plastic grey)
Weight (empty)	15kg	51kg
EFOY-PRO	EFOY-PRO-800/2400 (DUO)	EFOY-PRO-800/2400 (DUO)
Methanol Cartridges	1xM28 or 2xM10	2 x M28
Battery Size	1x SPB12-100 or 2 x SPB12-55 (24V)	Up to 3 x SPB12-100
Ambient Temp.	-20°C to +50°C	-40°C to +50°C
IP Protection	IP34	IP43D
Solar Modules (extern)	SW80, SW150	SW80, SW150
Options	GSM-3, FS1	GSM-3, MUX-2

Includes:

- ProCube includes solar charge controller (Steca Solsum 10.10F)
- ProEnergyBox 4060P includes solar charge controller (Steca Solarix PRS 3030 or Morningstar SS-MPPT-15L)

Product Description	Part#
EFOY ProCube	EFOY-PROCUBE
EFOY ProEnergyBox 4060P	EFOY-PROENERGYBOX-4060P
EFOY-PRO-800	EFOY-PRO-800-BASIC
EFOY-PRO-800-DUO	EFOY-PRO-800-DUO-BASIC
EFOY-PRO-2400	EFOY-PRO-2400-BASIC
EFOY-PRO-2400-DUO	EFOY-PRO-2400-DUO-BASIC
Fuel Cartridge M10	M10
Fuel Cartridge M28	M28
Fuel Cartridge Low Sensor	FS1
M28 Adapter	M28-Adapter
Solar Modules	SW80, SW150
Solar Charge Controller 15A	SS-MPPT-15L
Battery 12V/55Ah	SPB12-55
Battery 12V/80Ah	SPB12-100
Remote Monitoring Solution for EFOY PRO	GSM-3
Multiplexer MUX-2 to connect EFOY PRO and SS-MPPT-15L to GSM-3	MUX-2



Off Grid Systems

Configuration	EFOY-OUTDOOR-SMALL ALU	EFOY-OUTDOOR-XL ALU
Box dimensions (LxWxH)	600x600x410mm (Alu)	950x690x480mm(Alu)
EFOY-PRO	EFOY-PRO-800 (DUO)	EFOY-PRO-800/2400 (DUO)
Methanol Cartridges	1 x M10	2 x M28
Battery Sizes	1 x SPB12-55 or V-LFP12-40	2 x SPB12-100 or V-LFP12-40
Ambient Temperature	-20°C to + 50°C	-20°C to + 50°C
External solar modules	SW80, SW150	SW80, SW150
Options	GSM-3, FS1	GSM-3, MUX-2

EFOY-OUTDOOR-SMALL and XL Box include:

- Robust box in aluminum for outdoor usage
- Electrical installation on DIN rail. Ready to connect EFOY Pro, battery, fuel cartridge sensor and GSM-3
- External connectors for solar modules and load
- Air in- and outlet for cooling
- Exhaust outlet (anti freeze)

Product Description	Part#
EFOY OUTDOOR SMALL in aluminum	EFOY-OUTDOOR-SMALL
EFOY-OUTDOOR-XL Box in aluminum	EFOY-OUTDOOR-XL
EFOY-PRO-800-BASIC	EFOY-PRO-800-BASIC
EFOY-PRO-800-DUO-BASIC	EFOY-PRO-800-DUO-BASIC
EFOY-PRO-2400-BASIC	EFOY-PRO-2400-BASIC
EFOY-PRO-2400-DUO-BASIC	EFOY-PRO-2400-DUO-BASIC
Fuel Cartridge M10	M10
Fuel Cartridge M28	M28
M28 Adapter	M28-Adapter
Fuel Cartridge Low Sensor	FS1
Solar Charge Controller 15A	SS-MPPT-15
Solar Charge Controller 40A	PS-MPPT-40M NEW
Solar Modules	SW80, SW150
Battery AGM 100Ah@12V	SPB12-100
Battery AGM 55Ah@12V	SPB12-55
LiFePo Battery 12V/40Ah	V-LFP12-40
Remote Monitoring Solution for EFOY Pro	GSM-3
Multiplexer MUX-2 to connect EFOY PRO and SS-MPPT-15L to GSM-3	MUX-2



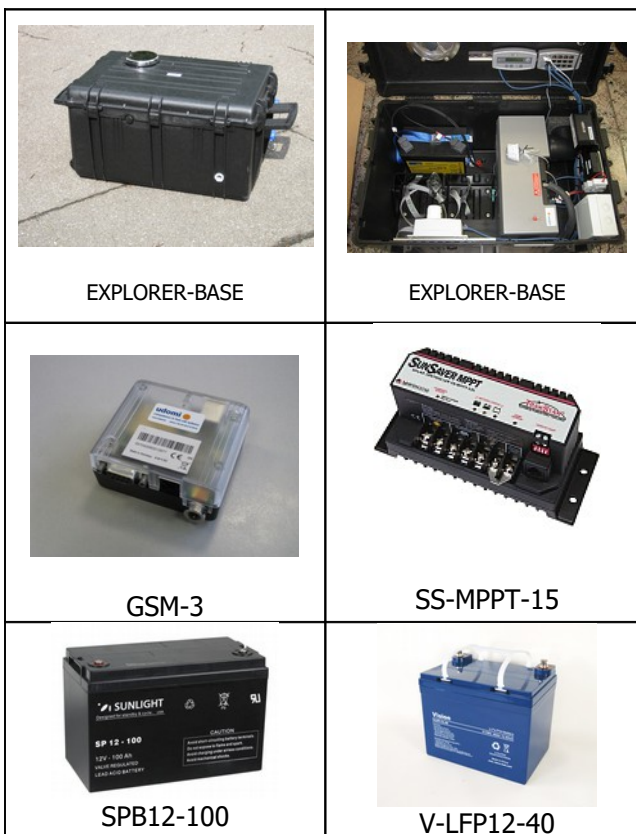
Off Grid Systems

Configuration	EFOY-OUTDOOR-EXPLORER-BASE
Dimensions (LxWxH)	860x550x435mm
EFOY Systems	EFOY-PRO-800/2400 (DUO)
Methanol Cartridge	M10 (2 x M10 inside Explorer BASE) or M28 externally
Battery sizes	SPB12-100 (100Ah@12V) or LiFePo V-LFP12-40
Solar Module (external)	SW80, SW150
Options	GSM-3, MUX-2, SS-MPPT-15L

EFOY-OUTDOOR-EXPLORER-BASE includes:

- Robust and light weight plastic case with integrated wheels for easy transport.
- Electrical installation on DIN rail. Ready to connect EFOY Pro, GSM-3, MUX-2, FS1 and battery
- External connectors for solar modules and load
- Air in- and outlet for cooling
- Exhaust outlet (anti freeze)

Product Description	Part#
EFOY OUTDOOR BASE	EFOY-OUTDOOR-EXPLORER-BASE
EFOY-PRO-800-BASIC	EFOY-PRO-600-BASIC
EFOY-PRO-800-DUO-BASIC	EFOY-PRO-1600-BASIC
EFOY-PRO-2400-BASIC	EFOY-PRO-2200-BASIC
EFOY-PRO-2400-DUO-BASIC	EFOY-PRO-2200-XT-BASIC
Fuel Cartridge M10	M10
Fuel Cartridge M28	M28
M28 Adapter	M28 Adapter
Fuel Cartridge Sensor	FS1
Solar Modules	SW80, SW150
Battery 100Ah@12V	SPB12-100
LiFePo Battery 12V/40Ah	V-LFP12-40
Remote Monitoring for EFOY Pro	GSM-3
Multiplexer MUX-2 to connect EFOY PRO and SS-MPPT-15L to GSM-3	MUX-2



Off Grid Systems

Configuration	EFOY-OUTDOOR-CABINET-SMALL	EFOY-OUTDOOR-CABINET-GFP-XL
Dimensions (HxWxD)	845x635x300mm	1250x750x420
EFOY Pro Systems	EFOY-PRO-800/2400 (DUO)	EFOY-PRO-800/2400 (DUO)
Methanol Cartridges	2 x M10	M10/M28 (max 2 x M28)
Battery Sizes	1 x SPB12-55 or V-LFP12-40	Up to 4 x SPB12-100 or V-LFP12-40
Ambient Temp.	-20°C to + 50°C	-20°C to + 50°C
Solar Module (externally)	SW80, SW150	SW80, SW150
Options	GSM-3, MUX-2, SS-MPPT-15L	GSM-3, MUX-2, SS-MPPT-15L

EFOY-OUTDOOR-CABINET-GFP includes:

- Outdoor cabinet (plastic).
- Electrical installation, ready to connect EFOY Pro, GSM-3/GSM-GPS-2, FS1 and battery
- External connectors for solar modules and load
- Air in- and outlet for cooling
- Exhaust outlet (anti freeze)

Product	Part#
OUTDOOR CABINET SMALL (wall/mast mount)	EFOY-OUTDOOR-CABINET-GFP-SMALL
Mounting set mast	MH-CABINET-GFP
OUTDOOR CABINET XL	EFOY-OUTDOOR-CABINET-GFP-XL
EFOY-PRO-800-BASIC	EFOY-PRO-800-BASIC
EFOY-PRO-800-DUO-BASIC	EFOY-PRO-800-DUO-BASIC
EFOY-PRO-2400-BASIC	EFOY-PRO-2400-BASIC
EFOY-PRO-2400-DUO-BASIC	EFOY-PRO-2400-DUO-BASIC
Fuel Cartridge M10	M10
Fuel Cartridge M28	M28
M28 Adapter	M28 Adapter
Fuel Cartridge Sensor	FS1
Solar Charge Controller 15A	SS-MPPT-15L
Solar Charge Controller 40A	PS-MPPT-40M NEW
Solar Modules	SW80, SW150
Battery AGM 100Ah@12V	SPB12-100
Battery AGM 55Ah@12V	SPB12-55
LiFePo Battery 12V/40Ah	VIS-LFP12-40
Remote Monitoring for EFOY Pro	GSM-3
Multiplexer MUX-2 to connect EFOY PRO and SS-MPPT-15L to GSM-3	MUX-2



OUTDOOR-CABINET-GFP-SMALL



OUTDOOR-CABINET-GFP-SMALL



OUTDOOR-CABINET-GFP-XL



OUTDOOR-CABINET-GFP-XL

Off Grid Systems

GSM-3 - Off-Grid-Monitor

For EFOY Pro (1st and 2nd Generation)

The udomi off grid monitor is perfectly suited to monitor and control EFOY Pro fuel cell systems in remote locations with GSM coverage. Installation is easy. Just connect the GSM-3 module with the Data Interface of the EFOY Pro unit, insert a SIM card and the EFOY Pro unit will automatically connect with the udomi off grid monitor. Using your standard webbrowser you then can monitor and control the EFOY Pro fuel cell. In case of low fuel level or an error, the system will automatically inform your service personnel via SMS and/or Email. In case of an error it is possible to communicate with the EFOY Pro via the udomi-m2m-portal. This increases reliability and saves time and money.

- Monitoring and control of EFOY Pro fuel cell via Webbrowser
- Sends SMS/Email automatically when fuel level is low or system error occurs
- Errors can be diagnosed and fixed online (in most cases it is not required to send service personal to fuel cell location)
- EFOY Pro fuel cell can be reconfigured online
- Monthly communication traffic (GPRS) is typically 2MB
- GSM-2-GPS combines GSM-3 functions with GPS tracking. Allows user to find current location of EFOY Pro system via Google Maps.
- GSM-2-GPIO includes 6 digital alarm inputs and 2 relays outputs for additional functions.



udomi-off-grid-monitor

Demo access at:

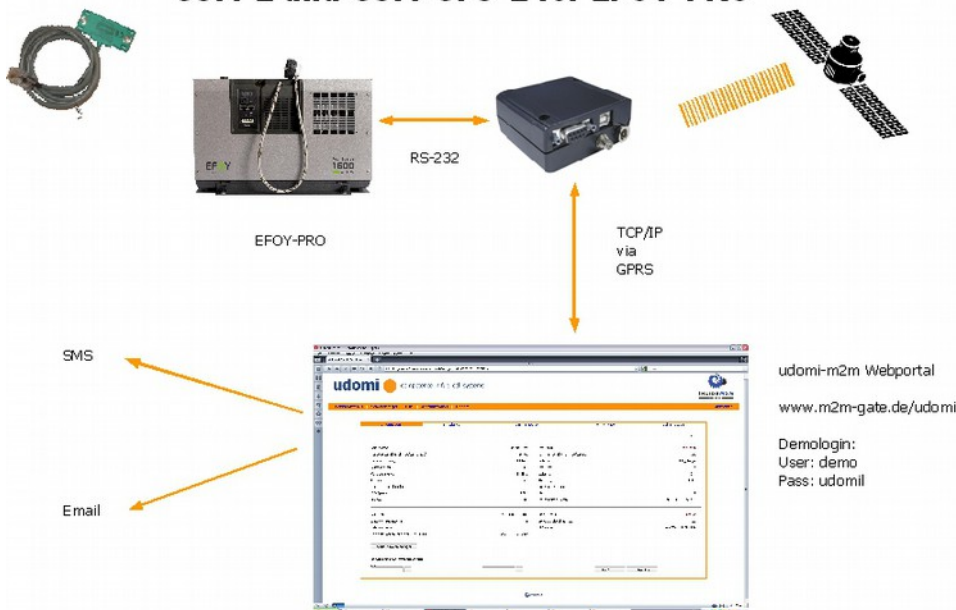
www.m2mgate.de/udomi/

user: demo

password: demo

With the optional Meterbus Adapter the GSM-3 modem can be used to remotely monitor the SS-MPPT-15L. For simultaneous monitoring of EFOY PRO and SS-MPPT-15L use the MUX-2 device (see next page).

GSM-2 and GSM-GPS-2 for EFOY-PRO



Off Grid Systems

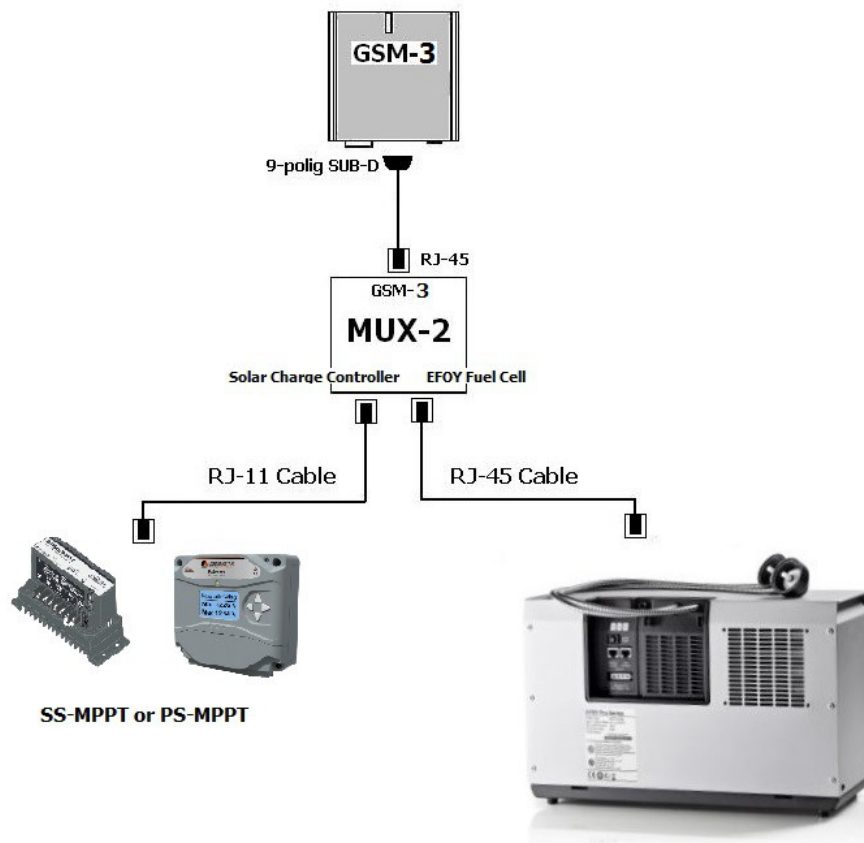
MUX-2 connects EFOY PRO and SS-MPPT-15L/PS-MPPT-XX with GSM-3 modem (Energy Manager)

With the MUX-2 device users of the GSM-3 modem can now remotely monitor EFOY PRO fuel cell and the SS-MPPT-15L/PS-MPPT-XX solar charge controller together. With this solution the user has all informations of his off grid power system available on the the udomi off grid monitor website. Battery voltage, load current, solar input current, fuel cell charge current and many other informations are available to monitor and optimize your off grid power system.

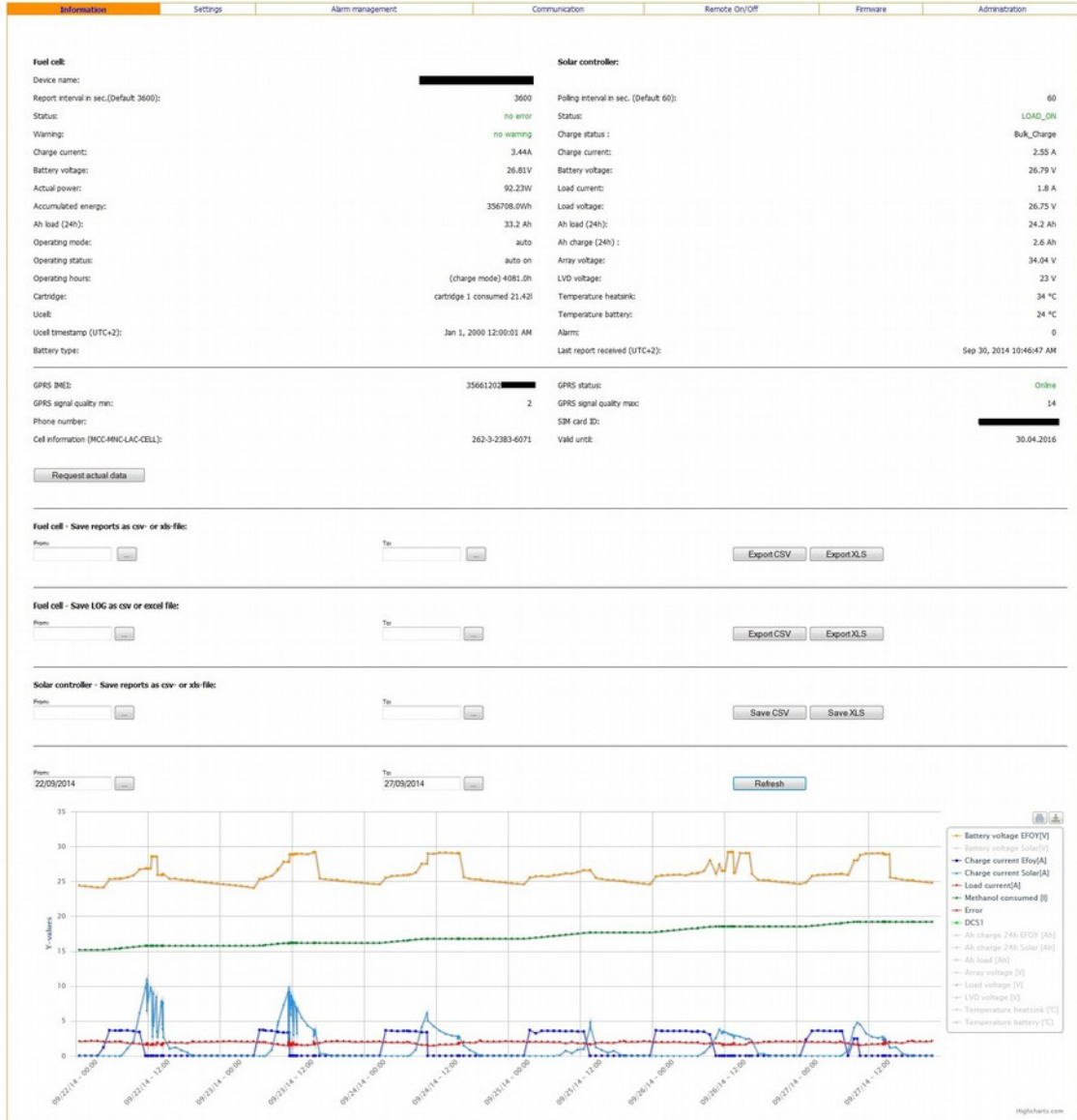
- Measurement of all currents in and out of the battery allows to determine the state of charge of the battery (SOC).
- Load output of SS-MPPT-15L/PS-MPPT-XX can be switched on/off remotely
- Charging parameters for EFOY PRO fuel cell and can be changed via the udomi off grid manager to adapt for different battery types etc.



MUX-2



Off Grid Systems (Energy Manager)



Off Grid Systems

Off Grid Solar Modules

SW80

36-cell PV module with 80 Watt Peak
Dimensions (LxWxH): 640x680x34mm
Weight: 6.2kg
Junction box for cable with diameter 2.5 to 4mm²



SW80



LX-160M

LX-160M

36-cell PV module with 160 Watt Peak
Dimensions (LxWxH): 1482x676x35mm
Weight: 11.5kg
Junction box with cable 850mm length

Mast holder for solar modules

Polefix S – Mast holder

Mast holder to install 1 x SW80 solar module on a round pole. Mast clamps available for 60, 76, 89, 108 and 130mm diameter.

Inclination angle: 60°

Material: Aluminium



Polefix L – Mast holder

Mast holder to install 2 x SW80 solar modules on a round pole. Mast clamps available for 108 and 130mm diameter.

Inclination angle: 60°

Material: Aluminium



Ground mounting system

Cube – Ground mounting system

Cube Set for installation of 2 x LX-160M solar modules. Multiple cubes can be arranged in a row (orientation south). East-west orientation is also possible (see 2nd image)

Inclination angle: 60°

Material: Aluminium

