

Energy Manager 1.3

Instruction Manual



Energy Manager 1.3, Instruction Manual
Version 1.1
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1 About This Document

If only the masculine or feminine form is used in parts of this manual, this is only used for readability and simplicity. Persons of the respective other gender are always included.

1.1 Overview

The instruction manual is intended to help you understand, use and maintain the product. It is structured as follows.

Safety Instructions	In chapter safety instructions you will find information on the safe handling of the product. It is essential that you read and understand this chapter.
Components	This chapter presents the components of the product and their basic functions.
Getting Started	This chapter describes the scope of delivery and the necessary steps for initial startup of the product - from choosing a suitable installation location to connecting all required components.
Operating	This chapter provides instructions for the operation of the product.
Decommissioning	The necessary steps for the disassembly of the product and the conditions for its packaging, storage and transport are described in this chapter.
Troubleshooting	This chapter describes possible problems and their solution.
Maintenance and Service	This chapter describes all necessary measures arising in the product life cycle, such as the maintenance, cleaning, service, warranty and disposal.
Technical Data	An overview of important technical data is provided at the end of the instruction manual.
Abbreviations / Glossary	The abbreviations used in this manual are summarized in the appendix. An index can be used for fast orientation.

1.2 Notices and Symbols

1.2.1 Symbols

The following symbols and labels are used in this manual:

Symbol or label	Meaning
→	Instruction
✓	Aids or prerequisites that are required prior to an action
1.	Instructions in a specific sequence
⇒	Result of an action
●, -	List
<i>Switch, key, button</i>	Refers to a switch, key, button or icon
Reference to page x	Reference to further information

Figure 1-1 Symbols in the instruction manual

1.2.2 Warnings

The following warnings are used:



DANGER

Warns of dangers of fatal injury.



WARNING

Warns of dangers of serious injury.



CAUTION

Warns of dangers of injury.



NOTICE

Warns of physical damage to the product.

1.2.3 Tips

Useful tips are identified as follows:



TIP

Provides further tips.

2 Safety Instructions

In this chapter you will find information on the safe handling of the product. It is essential that you read and understand this chapter.

2.1 General Information on Safety & Responsibility



WARNING

Danger of injury due to improper use!

Improper use of the product can result in serious injuries.

- ▶ Ensure that the manual is accessible at all times.
- ▶ Make sure you have read and understood this manual in its entirety.
- ▶ Comply with all safety instructions and warnings.
- ▶ Store the manual and other documentation in a safe place and pass them on to future owners of the product.
- ▶ Comply with all local regulations.
- ▶ Only use product components.



DANGER

Danger of death due to unauthorized modifications!

Conversions and modifications to the product can result in general hazards (, danger of death due to electric shock).

- ▶ Do not make modifications to the product or its individual components.
- ▶ Do not remove components (exception: See [Replacing Components](#) on page 64).
- ▶ Its not allowed to replace parts and components which are not described in this manual. Violation voids all warranty claims.



DANGER

Danger of death due to handling electricity

- ▶ For electrical wiring follow the country-specific safety regulations for handling electricity.
- ▶ For electrical installation comply with the local safety regulations for handling electricity.
- ▶ All devices must be connected separately with the earth circuit connector and properly grounded.

2.2 Approved Use

The product has been designed for:

- Monitoring and controlling the power generation
- Reducing energy consumption and CO₂ emission
- Remote monitoring of site conditions such as temperature, current, fuel consumption.

The product is not intended for any other purpose; any other use is not approved.

2.3 Foreseeable Misuse

Do **not** use this product for:

- Operation beyond the technical specifications
- Operation beyond the approved operating environment
- Operation in potentially explosive areas

2.4 Hazards during Approved Use

Electricity

The unit poses no special electrical hazards as long as the following instructions are observed:

- ▶ Use only the specified supply voltage, see [Technical Data](#) on page 67.
- ▶ Do not short-circuit inputs and outputs.
- ▶ Do not reverse the polarity of inputs and outputs.
- ▶ Do not insert any mechanical parts, especially metal parts, into the product through the ventilation slots.
- ▶ Do not use liquids near the product.

2.5 General Information on Operation

2.5.1 Requirements for the Owner / Operator

The owner / operator are responsible for the following:

- ✓ Implementation of a risk analysis in accordance with national law and regulations concerning occupational health and safety.
- ✓ The owner / operator are responsible for compliance with local safety regulations.
- ✓ The owner / operator must ensure that the unit is accessible only to the persons defined in this manual.
- ✓ Unauthorized persons must be prevented, using corresponding measures, from installing, operating or maintaining the system.
- ✓ Installation, commissioning, shutdown and maintenance of the system must be carried out by appropriately qualified personnel.
- ✓ Only original or replacement parts and maintenance materials approved by Heliocentris may be used. Violation voids the warranty.
- ✓ Heliocentris is not responsible for damage arising from the use of unauthorized replacement parts and maintenance materials.
- ✓ It is not allowed to replace parts and components which are not described in this instruction manual. Violation voids all warranty claims. the guarantee and all other requirements are lost.
- ✓ The safety instructions and warnings listed in this instruction manual must be observed.

2.5.2 Requirements for the Location / Installation Location

Before installation, the installation site is inspected by Heliocentris or an authorized partner. The requirements for the location are included in the inspection and are recorded, among other things, in the Site Survey.

- ✓ The system must be operated in a telecommunication site that complies with the local regulations.
- ✓ The Energy Manager is designed for indoor installation in frost-free premises with a maximum ambient temperature of 50°C in a noncondensing environment.
- ✓ The Energy Manager has to be protected against external influences and kept in a preferably dust-free environment.



TIP

The Energy Manager is not sensitive to normal temperature and humidity fluctuations that may occur in a telecommunication site.

2.5.3 Requirements for the User

The product is for use by trained qualified personnel. Its design does not correspond to that of a "consumer-oriented" product whose proper use is generally known and which is protected against operating errors or improper use.

Only Qualified Users Installation, service and maintenance may only be done by personnel authorized and trained by Heliocentris:

- Heliocentris staff
- Authorized partners
- Personnel must be familiar with and comply with the local applicable accident prevention and safety regulations.

Necessary skills for installation:

- Advanced knowledge in electrical engineering
- Advanced knowledge in mechanical engineering
- Advanced knowledge in reading and developing electrical wiring diagrams

Additional skills for configuration, service and maintenance:

- Good PC knowledge
- Basic knowledge in Windows network connection setting
- Basic knowledge in Firefox settings

3 Components

The Energy Manager records all essential environmental conditions and controls, regulates, and monitors the components of the power generation system in a telecommunication site such as diesel generator, battery, fuel tank, and air condition.

The modular structure of the Energy Manager allows an implementation according to customer's demands.

The hardware and software components of the Energy Manager are briefly explained in the following:

- Energy Manager
- Wiring board
- Energy Manager software modules
- Operating and monitoring software
- Wireless remote access

3.1 Energy Manager Front Side

The elements shown in [Figure 3-1](#) are located on the Energy Manager front side:

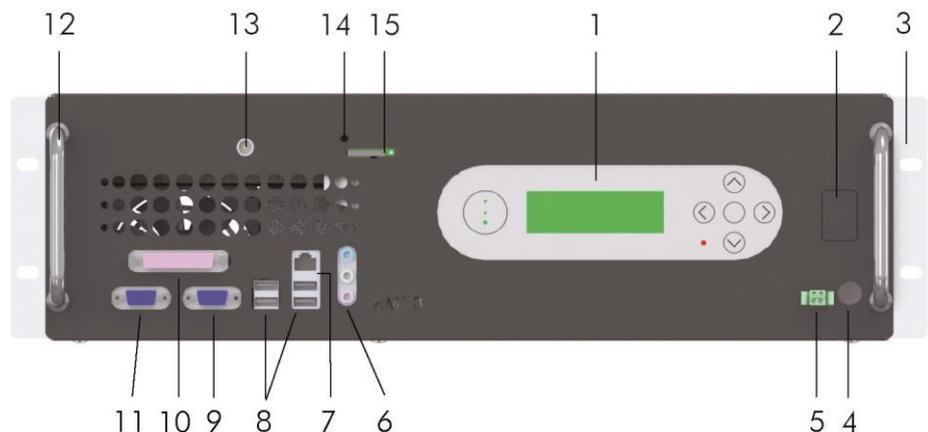


Figure 3-1 Energy Manager front side

- | | |
|---------------------|-------------------------|
| 1 Control panel | 2 Battery power reserve |
| 3 Fastening plate | 4 Main fuse |
| 5 Power supply port | 6 Audio output, empty |
| 7 RJ-45 LAN port | 8 4 USB 2.0 ports |
| 9 VGA port | 10 Parallel port, empty |
| 11 RS232 port | 12 Handle |
| 13 Antenna port | 14 LED |
| 15 SIM card holder | |

Control Panel

The control panel is the user interface of the Energy Manager. See [Operating Areas of the Control Panel](#) on page 25.

Battery Power Reserve

Switch for internal UPS (optional)

Main Fuse

Fuse to safeguard the power supply

Power Supply Port

Port for the power supply of the Energy Manager

LAN Port

Port for RJ-45 LAN and Ethernet

USB 2.0 Port

4 USB flash drive ports

VGA Port

Analog interface to connect computer and monitor with a 15-pin plug

RS232 Port

Standard serial interface

Antenna Port

Port for antenna of the GPRS modem

SIM Card Holder

Holder to insert SIM card

LED

Light emitting diode showing mode and status of the GPRS modem listed in [Table 3-1](#):

LED mode	Operating status
Permanently on	Connected to remote party or exchange of parameters while setting up or disconnecting a call.
600 ms on / 600 ms off	No SIM card inserted or network search in progress.
75 ms on / 3 s off	The modem is logged to the network. No data transfer.
500 ms on / off	Packet switched data transfer in progress. LED goes on within 1 second after data packets were exchanged.
Permanently off	No power supply

Table 3-1 LED modes of GPRS modem

3.2 Energy Manager Rear Side

The elements shown in [Figure 3-2](#) are located on the rear side of the Energy Manager.

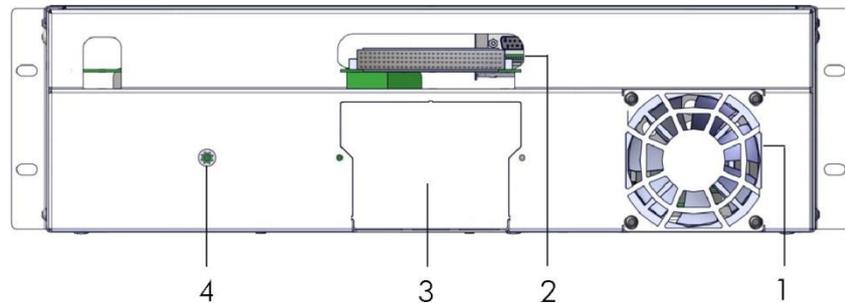


Figure 3-2 Energy Manager rear side

- 1 Fan
- 2 Plug connector for wiring board
- 3 Slot for internal UPS (optional)
- 4 Grounding connection point

3.3 Wiring Board

The wiring board serves as port expansion. The wiring board is attached to the rear side of the Energy Manager with a 128-pin plug connector. It provides ports for analog or digital inputs and outputs. All connecting points are shown in [Figure 3-3](#).

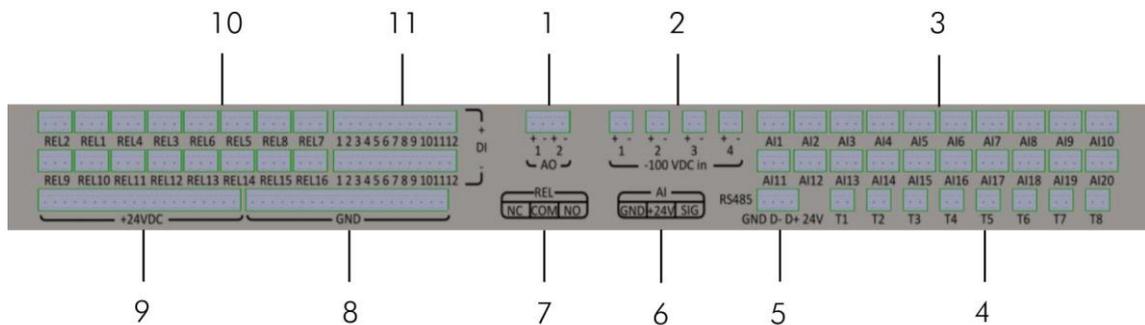


Figure 3-3 Wiring board ports

- 1 Analog output (2x)
- 2 Analog input large battery (4x)
- 3 Universal input (20x)
- 4 Input for temperature. sensor (8x)
- 5 Serial comm. genset controller
- 6 PIN assignment for analog input
- 7 PIN assignment for relay
- 8 Grounding
- 9 +24 VDC
- 10 Relay (16x)
- 11 Digital input (12x)

3.4 Energy Manager Software Modules

The Energy Manager comprises various modules which adapt to the customer's needs. The modules are related to specific hardware components and implemented into the Energy Manager when agreed with the customer.

In this chapter an overview of the following modules is given. This overview may not correspond completely to every customized solution.

Genset Management Module

The genset management module controls the diesel generator. Depending on the system status, the generator is switched on or off. In order to increase genset efficiency, maintenance, and reliability, the runtime can be split between different generators and up to 2 genset management modules can be implemented.

Several generator state variables are monitored: the starter battery voltage and variables depending on the generator controller hardware like the coolant level, coolant temperature, and oil pressure. Optionally, a generator oil management system can be installed and controlled.

Fuel Management Module

The diesel fuel management module monitors data related to the fuel tank like the measured tank level and related variables such as fuel loss, fuel refill, total consumption.

Battery Management Module

The battery management module controls the charging and discharging of the connected batteries. It monitors battery state variables like voltage and current of the whole battery string, symmetry voltage, state of charge, state of health, depth of discharge, capacity, battery temperature. Up to 12 banks, each with up to 6 strings can be implemented.

Aircon Management Module

The aircon management module controls the connected air conditioners. The air conditioners are switched on and off depending on the measured temperature and selected control algorithm. Different aircon units can be cascaded in order to start one air conditioner after the other depending on the required cooling capacity. The runtime of the air conditioners is logged.

Site Management Module

The site management module monitors general state variables affecting the whole site, like grid, ambient temperature, humidity, and delivers alarms like gate, fence, and shelter alarms.

Load Management Module

The load management measures the voltage and calculates the power. The total energy consumption is calculated in kWh.

Shelter Management Module

The shelter management module monitors shelter specific state variables like temperature, humidity, and delivers alarms, like door, motion, smoke, flood, fence, and seismic alarms.

Free Cooling Unit Module

The free cooling module controls the free cooling unit which is used to cool a shelter with ambient air. Indoor and outdoor temperature levels are constantly compared.

Inverter Module

The inverter module measures voltage and current and calculates the power output and total energy output of up to 6 inverter units installed on a site.

Rectifier Module

The rectifier module monitors and controls the rectifier. The current limit of output voltage and battery charge can be set via SNMP.

3.5 Operating and Monitoring Software

For operating and monitoring the Energy Manager comprises the following software:

- System software for entries via the control panel of the Energy Manager and monitoring of Energy Manager conditions.
- Live Access Application (LAA)
The LAA is a Java-based application and runs as a browser applet. It allows access to the Energy Manager via LAN or GPRS and remote access via RMS. Administration and configuration data is entered via LAA.
- Remote Management Server (RMS)
The RMS offers 2 web applications: RMS Operation and RMS Administration. RMS Operating can be used to access the server and visualize the data acquired by all Energy Managers implemented in the network. RMS Administration can be used to access the server and administer customers, regions, users, sites, hardware and software modules.

3.6 Wireless Remote Access

Wireless remote access is realized by an internal GRPS / GSM access modem that is permanently connected to the Internet.

The wireless remote access module is used for:

- Connecting the Energy Manager to the Remote Management Server. Life signals containing site data are sent at regular intervals from the Energy Manager to a Remote Management Server and stored there.
- Sending event triggered life signals in real time.
- Sending events such as diesel fill level, and changes in the status of the components as SMS message from the Energy Manager to an administrated telephone number.

Each customer and partner is given a separate login and password that allow him to have remote access to the Energy Manager on sites and systems he has been authorized for.

During the transmission of an SMS, the remote access is interrupted. After the successful transmission of an SMS, a new connection to the server is automatically created by the wireless access module.

Many kinds of SIM cards from different providers can be used for calling party address and charging the data transfer.

- ✓ The SIM card is worldwide Internet-capable through APN



Heliocentris recommends a data flat rate or a volume rate with a very high minimum volume. Prepaid cards should not be used.

4 Getting Started

4.1 Scope of Delivery

The following components are delivered by Heliocentris:

- Energy Manager
- Wiring board
- Grounding cable (2 m)
- Connecting cable (2 m) from Energy Manager to -48 VDC distribution
- Set of connectors
- Sensors (optional)



TIP On customer request Heliocentris takes responsibility for the delivery and installation of all hardware and software components for power generation in the telecommunication site.

4.2 Unpacking and Installation

To install the Energy Manager the following steps are necessary:

- Unpacking and Visual Inspection Installation in a 19-inch rack
- Connecting sensor cables to wiring board
- Grounding
- Connecting the power supply
- Inserting SIM card



TIP A connection to an external power supply grid is realized exclusively by the customer or a qualified company.

4.2.1 Unpacking and Visual Inspection

A delivery receipt is delivered with the device.

- ▶ Check for the correct number as per delivery receipt.
- ▶ Check all parts for external damage.

4.2.2 Installation Tools

For a standard installation the following tools are needed:

- ✓ Standard tool box including:
 - Hex keys
 - Set of wrenches (metric)
 - Flathead screw driver set
 - Grippers
 - Wire cutter
 - Crimping tool
 - 1 - 6 mm² duct tape
- ✓ Digital multimeter
- ✓ Clamp-on ammeter DC

4.2.3 How to Mount the Energy Manager

The Energy Manager is integrated in a free unit of a 19-inch-rack and requires 3 height units.

- ✓ The rack is fastened with wall or floor fasteners to prevent it from tilting over.

Install the Energy Manager as follows:

1. Take Energy Manager with both hands from the front side and insert it into the rack.

If there is enough space for wiring from behind the backside of the Energy Manager:

- ▶ Fasten the device with 2 screws on the left and on the right side.

If there is not enough space for wiring from behind the backside of the Energy Manager:

- ▶ Proceed with wiring the device (see [How to Connect Sensors](#) on page 21). Only after wiring fasten the device as described above.

4.3 How to Connect Sensors and Actuators

Through sensors the Energy Manager records all essential environmental conditions and controls, regulates, and monitors the components of the system.

In general, the Energy Manager is delivered in a customer specific configuration. The configuration corresponds to the modules installed in a site. If applicable, the Energy Manager ports are configured according to the standard configuration.

- ✓ Calibration of sensors
- ✓ All sensors are installed in the appropriate facilities and wired in accordance with the specific conditions
- ✓ Standard installation on USB flash drive



TIP

Modifications of the installation are performed via LAA and described in the associated documentation.

4.3.1 How to Connect Cables and Plugs

If there is enough space left behind the Energy Manager, you can first connect the cables to the wiring board and then attach the wiring board to the 128 pin plug connector. If there is not enough space, you have to pull out the Energy Manager with wiring board for about 20 cm and insert the connections on the rear side from the front side.

- ✓ Energy Manager installed in 19-inch rack
- ✓ All connecting cables from sensors and actuators are transferred to the rack
- ✓ Side cutter, connectors, wire end ferrules

For all connections, proceed as follows:

1. Cut cable to length with a side cutter.
2. Insulate cable with wire end ferrules.
3. Fix cable in the connector by tightening the screws.

When installing the standard configuration:

4. Insert connector and cable to the wiring board according to [Table 4-2](#).



TIP

When installing a customer specific configuration or to change the default settings, see LAA documentation and wiring diagram.

4.3.2 Port Assignment

Port assignments can be delivered as configuration package or administered via LAA. As default configuration no ports are assigned.

The port assignment described in this chapter is 1 possibility to configure the ports and does not necessarily correspond to the realized solution.

Contact allocation The contact allocation may not exceed values given in [Table 4-1](#):

Contact	Value
Digital output: REL 1 – 16	<ul style="list-style-type: none"> • Max. switching current: 0.5 A • Max. switching voltage: 60 V DC • Max. switching power: 30 W
Digital input: DI 1 – 12	<ul style="list-style-type: none"> • Low Level: 0 – 2 V DC • High Level: 4 – 35 V DC
Analog output: AO 1 – 2	Output voltage: 0 – 10 V DC, max. 5 mA DC
Analog inputs: -100 VDC 1 – 4	-100 – 0 VD
Analog inputs: AI1 – AI20	0–20 mA / 0–5, 0–10 , 0–30 VDC (configurable)
Analog inputs: T1 – 8	PT 1000
RS 485	Not used in standard configuration
GND	GND
+24 VDC	+24 VDC max. 50 W

Table 4-1 Standard contact allocation

Configuration example Depending on the installed modules Heliocentris recommends a configuration as indicated in [Table 4-2](#). The assignments may differ because of the installed software and hardware components.

Port	Default sensor	Connection
REL1		Genset 1 acc/start
REL2		Genset 1 glow (fixed in firmware)
REL3		Genset 1 crank (fixed in firmware)
REL4		Genset 1 load switch / ATS 1
REL5		ATS 2
REL7		Battery 1 LVD
REL9		Genset 2 acc/start
REL10		Genset 2 glow (fixed in firmware)
REL11		Genset 2 crank (fixed in firmware)
REL12		Aircon management modul 1
REL13		Aircon management modul 2
REL14		Aircon management modul 3
REL15		Aircon management modul 4
REL16		Aircon management modul 5
DI1		Genset run signal

Port	Default sensor	Connection
DI2		Oil alarm (oil pressure)
DI3		Overheat alarm (water temperature)
DI4		General genset alarm
DI5		Grid available signal
DI6		Door contact
DI7		Panic button
DI8		Motion sensor
DI9		Water sensor
DI10		Smoke detector
DI12		Genset 2 / grid – Genset run signal
AO1	GND 0-10V	FCU 1
AO2	GND 0-10V	FCU 2
- 100 VDC In 1	-100V	Voltage battery 1
- 100 VDC In 3	-100V	Voltage battery 2
AI1	0-20mA	Fuel1 level
AI2	10V	Current battery 1
AI3	10V	Current battery 2
AI4	10V	Current load 1
AI5	10V	Current load 2
AI6	10V	Current load 3
AI7	10V	Current load 4
AI10	30V	Genset 1 starter battery
AI11	5V	Solar
AI12	10V	Wind
A 20	30V	Genset 2 starter battery
T1	PT1000	Temperature shelter
T2	PT1000	Temperature outdoor
T3	PT1000	Temperature battery 1
T4	PT1000	Temperature battery 2
T5	PT1000	Temperature aircon 1
T6	PT1000	Temperature aircon 2
T7	PT1000	Temperature aircon 3

Table 4-2 Port assignment

4.4 How to Ground the Energy Manager

In order to ground the Energy Manager, the ground cable must be connected at the rear side of the Energy Manager. If a genset is installed, the other end of the grounding cable is in general connected with the grounding of the rectifier. It can also be connected with the rack grounding or another ground.

- ✓ Ground cable (green-yellow protective conductor, wire cross section at least 6 mm², included in delivery)
- ✓ Screw driver
- ✓ M5x10 screws

Ground the Energy Manager as follows:

1. Remove screw with hex key.
2. Tighten the earth circuit connector of the ground cable with the screw on the rear side of the Energy Manager.

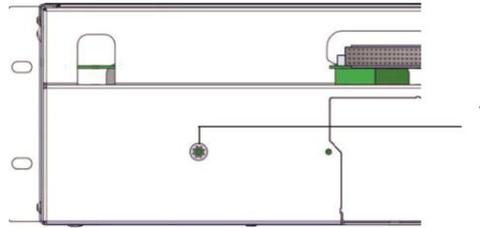


Figure 4-1 Grounding connection (1)

3. Connect the other end of the ground cable to the appropriate grounding.

4.5 How to Connect Energy Manager to Power Supply

The power supply of the Energy Manager is connected to the priority load of the rectifier, e.g. battery.

- ✓ 2-pin cable
- ✓ Small screw driver
- ✓ Connector

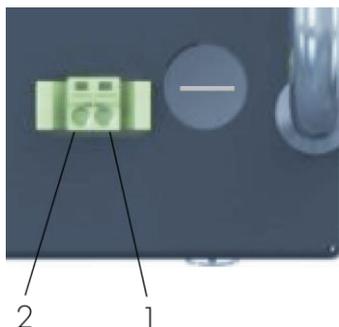


NOTICE

Property damage due to incorrect polarity !

- ▶ Incorrect polarity will permanently damage the device. Watch out for correct polarity of the connection:.

Connect the power cable as follows:



1. Check the polarity of the supply cables.
2. Insert the cables into the connector and tighten the screws.
3. Insert the connector with the positive plug (2) into the left side and the negative plug (1) into the right side.



TIP Different supply voltages or polarities are possible. This requires hardware changes like a different main adapter or different jumper settings in the power supply board.

- ▶ Contact the Heliocentris Service.

4.6 How to Use the Control Panel

4.6.1 Operating Areas of the Control Panel

The control panel comprises the different operating areas of the Energy Manager. The operating areas are shown in the following figure and explained further on:

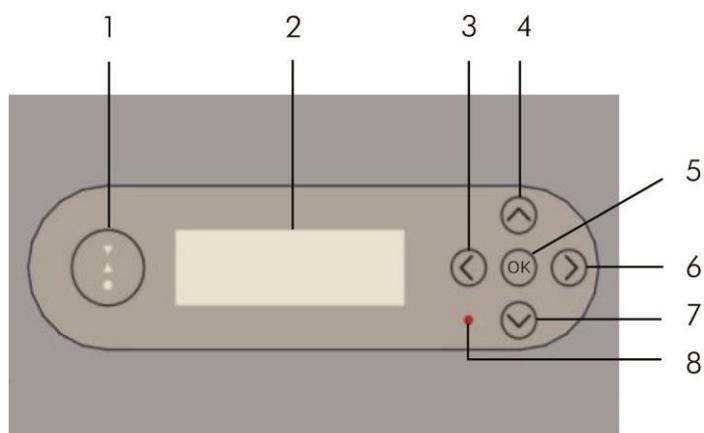


Figure 4-2 Control panel

- | | |
|------------------------|---------------------------|
| 1 LED system status | 2 4-line 20-character LCD |
| 3 Control key <left> | 4 Control key <up> |
| 5 Control key <OK> | 6 Control keys <right> |
| 7 Control keys <down > | 8 Reset button |

LED

The LED (light-emitting diode) indicates the system status by using the following symbols and colors:

Symbol	Color	Description
▼	Red	Critical system status, one of the installed modules is in error status.
▲	Yellow	System is still in operating, pending information e. g., warning or

Symbol	Color	Description
		maintenance.
●	Green	No unit in error or warning status

Table 4-3 LED display

LCD

The Liquid Crystal Display (LCD) comprises 4 lines with 20 characters to display menu functions, system information and events.

Control keys

Control keys allow to navigate the Energy Manager menu and to activate available items. The control keys have the following functions:

Control Key	Function
<up ▲> and <down ▼>	Change up or down to next menu, submenu, or item.
<left ◀>	Select a digit in the active line. Press <left> for more than 2 seconds to go back to the main menu.
<right ▶>	Confirm a selected menu or submenu item. Select a digit in the active line. Press <right> to change to next level (like OK). If an error is displayed in the main menu, press <right> for more than 2 seconds to skip the display of the error and confirm next submenu or item.
<OK>	Activate a selected menu or submenu item. Press <right> for more than 2 seconds to skip the display of an error. If an error is displayed in the main menu, press <right> for more than 2 seconds to skip the display of the error and confirm next submenu or item.

Table 4-4 Control key functions

Reset button

Reset button for a manual reset of the system. Operating software and system are shut down and restarted. All events are reset and, if applicable, set anew. See [How to Shut Down and Restart Energy Manager](#)

How to Reboot Energy Manager_on page 61.

4.6.2 How to Select Menu Items

To operate the Energy Manager on-site, commands can be entered into the control panel. The control panel serves to enter the commands to operate the Energy Manager on-site. The commands are displayed in the LCD, selected and entered with the control keys.

For all available commands, see [LCD Menu Structure](#) on page 33.

Select and confirm items

Before entering a command you have to select it. Selected items are marked with an arrow (→) or an asterisk (*).

Mark	Description
→	An arrow in front an item indicates a selected menu item.
*	An asterisk in front an item indicates a value.

Table 4-5 Marks in front of items

With the control keys <up> and <down> you navigate the arrow up and down in a menu and select an item.

By pressing the **OK** button you confirm the selected item.

Example

- ✓ The main menu is displayed in the LCD.
- ✓ **Sys** is selected.

```
→Sys: err 80 #1
Gen: offline
Batt: err 5e #1
Fuel: -48L
```

Figure 4-3 Selected menu item Sys

To select another item, for example **Fuel**, proceed as follows:

1. Select **Fuel** by pressing the <down> key 3 times.
 - ⇒ *The item is selected.*

To display the **Fuel** submenu:

2. Confirm with **OK**
 - ⇒ *The submenu **Fuel** is displayed.*

To display the fill level:

3. Select **Total**.
4. Confirm with **OK**
 - ⇒ *The total consumption since last reset is displayed.*

To go back to the main menu:

5. Press the <left> key several times or continuously, until the main menu is displayed.

4.6.3 How to Enter Digits

System settings like **IP address** or **password** can be entered via the control panel.

With the control keys <left> and <right> you navigate the cursor in a line and place the cursor to the character you wish to change.

With the control keys <up> and <down> you select a digit between 0 and 9.

Example ✓ **Login** has been confirmed in the main menu and the LCD login is displayed.



Figure 4-4 LCD login

The cursor is placed on the selected and active digit.

To enter another digit:

1. Select the desired entry with <up> and <down> key.
2. Place cursor to the next digit with <right> key.
3. Continue until all letters and signs are entered.
4. Confirm with **OK**.
⇒ A message informs if the login level has been changed to service.
5. Press any key to leave the message.
6. Press the <left> key several times or continuously, until the main menu is displayed.

4.7 How to Login as Service User

A login with a proper password is necessary to perform service and administration operations. Password and PIN are defined during the configuration of the system.



For a login as user without particular rights, no password is required.

To login as service user, proceed as follows:

1. In the main menu, select **Login**.
2. Confirm with **OK**.
⇒ You are asked to enter your PIN code.
3. Enter your PIN code. See [How to Enter Digits](#) on page 27.
4. Confirm with **OK**.
⇒ A message indicating your access level is displayed.

Automatic logoff Upon successful conclusion of a service operating, a logoff is necessary to protect the system against unauthorized access. The logoff is performed automatically 5 minutes after the last keystroke took place.

4.8 How to Install the Short Message Service

Wireless Remote Access and SMS are provided by a common GRPS/GSM wireless access module. During the transmission of a text message, the remote access is interrupted. After the successful transmission of a text message, a new connection to the server is automatically created by the wireless access module.

The following information is delivered by the SMS provider.

- ✓ APN
- ✓ User name and password



TIP Installation of the Short Message Service can also be performed via LAA.

To configure SMS on the control panel, proceed as follows:

1. In the main menu, select **Configuration**.
2. Select **System** and the **Modem** item.
3. Select **APN** and enter the APN as given by the SMS provider.
4. Select **User** and enter the user name if necessary.
5. Select **Pass** and enter the password if necessary.
6. Confirm with **Save & Apply**.

⇒ *The data is stored in the data base.*

On the Energy Manager you insert the SIM card and connect the antenna for the modem.

- ✓ The SIM card must be able to send short messages
- ✓ PIN must be deactivated
The PIN can be deactivated with a mobile phone.
- ✓ Antenna cable for modem is installed

Connect antenna as follows:

- ▶ Insert antenna connector to the antenna port on the front of the Energy Manger.

Insert SIM card as follows:

1. Insert SIM card into the slot of the card holder until it clicks into place.
2. Check the LED status. See [Table 3-1 LED modes of GPRS modem](#).

4.9 How to Configure Site Specific Parameters

4.9.1 How to Connect EM and RMS

Wireless remote access from RMS to Energy Manger is realized as web-based application. To establish the connection between RMS and Energy Manger the IP address of the RMS, port number and the site ID have to be configured. This data can be entered via the **Configuration** menu.



The configuration of the connection between EM and RMS can also be performed with the LAA.

- ✓ IP address of RMS server configured
- ✓ Port number of the RMS server configured
- ✓ RMS site identification configured

To configure the connection via the Energy Manager Control Panel proceed as follows:

1. In the main menu, select **Configuration**.
2. Select **System** and the **Remote access** item.
3. Select **Host** and enter the IP address of the server, e.g. 212.202.132.59 for the Heliocentris server.
4. Select **Port** and enter the port used by the server, e.g. 10021
5. Select **Site** and enter the RMS site identification.
6. Confirm with **Save & Apply**.
⇒ *The data is stored as configuration data.*

4.9.2 How to Configure Battery Capacity

- ✓ Serial number of the battery
- ✓ Battery capacity

Proceed as follows:

1. In the main menu, select **Configuration**.
2. Select **Battery** and the item **Serial number**.
3. Enter the serial number of the battery.
4. Select **Battery** and the **Battery capacity** item.
5. Enter the battery capacity in ampere-hour.
6. Confirm with **Save & Apply**.
⇒ *The data is stored as configuration data.*

4.9.3 How to Configure Fuel Sensors with Fuel Wizard

For fuel level measurements, special pressure transmitters can be configured via the Fuel wizard in the LCD menu. See [How to Use the Control Panel](#) on page 7.

Sensor types	User guidance	Menu item	User guidance
Keller PR-36 XW 100mbar Keller PR-36 XW 200mbar Keller PR-36 XW 250 mbar	Liquid density [kg/m ³] Mounting distance to bottom [mm]		
Jumo MAERA S26 Jumo MAERA F27	Geometry type	Rectangular	Material thickness [mm] Box width [m] Box depth [m] Box height [m] Apply, Cancel
		Cylinder vertical	Material thickness [mm] Cylinder perimeter [m] Cylinder length [m] Vessel head type: Flat, Conic m, F&D Apply, Cancel
		Cylinder horizontal	Material thickness [mm] Cylinder perimeter [m] Cylinder length [m] Vessel head type: Flat, Conic [m], F&D Apply, Cancel

Table 4-6 Fuel wizard 1 user guidance

Configure fuel sensors with the fuel wizard as follows:

1. In the main menu, select **Configuration**.
2. Confirm with **OK** or **<right>** key.
3. Select **Fuel wizard 1**.
4. Confirm with **OK** or **<right>** key.
5. Select **Sensor type**.
6. Confirm with **OK** or **<right>** key.
⇒ *The sensor types are displayed.*
7. Select the installed sensor type.
8. Confirm with **OK** or **<right>** key.
9. Enter the **liquid density** value in kg/m³.
or:
Confirm the diesel default value.
10. Confirm with **OK** or **<right>** key.
11. Enter the **mounting distance** in mm (height of sensor above tank ground).
12. Confirm with **OK** or **<right>** key.

⇒ *The **Geometry type** submenu is displayed.*

13. Confirm with **OK** or **<right>** key.

3 possible geometry types are displayed.

14. Select 1 geometry type.

15. Confirm with **OK** or **<right>** key.

16. Define one after another the requested values.

17. Confirm each entry with **OK** or **<right>** key.

18. Select **Apply** to save all entries.

5 Operating

This chapter describes how to operate the Energy Manager via the control panel. For operation via Live Access Application, see LAA manual.

5.1 LCD Menu Structure

Configuration changes and adjustments can be entered directly at the Energy Manager via the LCD menu.

The available items in the main menu as in the submenus depend on the customized system configuration and can differ from the items listed in this chapter.

For information on operating of the control panel, see [How to Use the Control Panel](#) on page 25.

5.1.1 Main Menu

The main menu comprises all modules which are installed and controlled by the Energy Manager plus a login function for the technical service. The items of the main menu lead to submenus for the selected modules.

Behind each item of the main menu, the current operating mode or an import event is displayed. Possible operating modes for each module are described in the following chapters.



TIP Modules not implemented are not displayed in the main menu.

The following table comprises all modules which may be implemented. It does not necessarily and entirely correspond to your installed solution.

Main menu	Description
System (Sys)	General Energy Manager System. Status data of the EM and the network can be accessed. Behind the item either an event code or the operating mode is displayed.
Gen	Genset module. Status data concerning the generation set can be accessed. Behind the item either an event code or the operating mode is displayed.
Batt	Battery module. Status data of battery can be accessed. Behind the item the operating mode is displayed.
Fuel	Fuel module. Status data of diesel can be accessed. Behind the item either the filling status in liter or an event is displayed.

Main menu	Description
Load	Load module. Status data of the power consumption of the site can be accessed. Behind the item either the load in kW or an event is displayed.
Solar	Solar module. Behind the item the power generation in kW or an event is displayed.
Wind	Wind module. Behind the item the power generation in kW or an event is displayed.
Airc	Aircondition module. Status data of air condition can be accessed. Behind the item the operating mode or an event is displayed.
FCU	Free Cooling Unit module. Status data of fan can be accessed. Behind the item the operating mode or an event is displayed.
Rect	Rectifier module. Behind the item the operating mode or an event is displayed.
Invert	Inverter module. Behind the item the power in the 3 phases in kW or an event is displayed.
Site	Site module. Behind the item the outside temperature and humidity or an event is displayed.
Shelter	Shelter module. Behind the item the inside temperature and humidity or an event is displayed.
Service	Service contact and system information for different low level modules, reboot and power down command can be accessed.
Login	Login for service matters.
Configuration	A limited amount of configuration settings can be accessed.

Table 5-1 Main menu

5.1.2 System Submenu (Sys)

Submenu	Menu item	Display	Description	I/C	
Info	OpMode	1 of the modes:	Operation mode of the EM. The mode is also displayed in the main menu if no error occurred.		
		Init	Software module initializes	I	
		Active	System is running	I	
		Error	Error detected	I	
	Epoch_start	Up to 8 digits	Time stamp of initial start time in seconds since Jan 1, 1970	I	
	Reset epoch_start*	Up to 8 digits	Reset of initial start time stamp by service staff	C*	
	Error list	Number in hexadecimal format	All active events are displayed one after another with their number and a short text, and can be confirmed.	I+C	
Alarm Unit	IOM3 Unit 1 to 8	1 of the states:			
		Ignore	Relay is switched by control SW.	I+C	
		Off	Relay always off	I+C	
		On	Relay always on	I+C	
		Default	Reset to default values	I+C	
	IOB4 Unit 1 to 16	1 of the states:			
		Ignore	Relay is switched by control software.	I+C	
		Off	Relay always off	I+C	
		On	Relay always on	I+C	
		Default	Reset to default values	I+C	
Network	IP	IP address in format: aaa.bbb.ccc.ddd	IP address of the controller	I	
	NM	Netmask in format: aaa.bbb.ccc.ddd	Netmask	I	
	GW	GW address, format: aaa.bbb.ccc.ddd	Gateway address (no gateway: 0.0.0.0)	I	
	Mode	1 of the states:	Integration of EM into the network		
		dhcp	Dynamic host configuration protocol	I+C	
		static	Manual network configuration	I+C	
	Static Setup	IP address	Set IP manually	C	
		Network mask	Set network mask manually	C	
		Gateway address	Set gateway manually (no gateway: 0.0.0.0)	C	
	Save Net Cfg*		Save network configuration	S*	
Modem	Usage	-	Usage of the modem: <ul style="list-style-type: none"> - Not used - SMS: send outgoing / receive incoming - Updating status: change between two states 	I	
	Error			I	

Submenu	Menu item	Display	Description	I/C
	SMS In		Number of received SMS	I
	SMS Out		Number of outgoing SMS	I
	Data		Inactive: no internet connection	I
	Signal		Strength of signal	I
	SIM		Missing, unknown or active	I
	GSM	-	<ul style="list-style-type: none"> - Not registered, searching - Not registered, not searching - Registered 	I
	GPRS	-	<ul style="list-style-type: none"> - Not registered, searching - Not registered, not searching - Registered 	I
	Reset		Modem reset	I+C
RMS Status			Describes the communication between RAS and EM	
	Status		Status of RMS: Connected or not connected	
	Last Error		No error or "name of the last error"	I
	Pkgid Gen		Number Pkgid created	I
	Pkgid Sent		Number Pkgid sent to RMS	I
	Tunnels		Number of tunnels to RMS	I
Legend: * Item is only displayed if the access level is service I/C Information/Command				

Table 5-2 System submenu

5.1.3 Genset Submenu (Gen)

Menu item	Display	Description	I/C
OpMode	One of the modes:	Operating mode of the genset unit. The mode is also displayed in the main menu if no error occurred.	I
	init	Software module initializes	
	active	Generator is running.	I
	offline	Generator is offline and will not be started by EM control software.	I
	standby	Generator is ready for operating and will be started by EM, if required.	I
	error	An error was detected, generator cannot run.	I
	manual	A manual genset start was detected, not triggered by EM	I
	monitor	Genset unit is currently in monitoring mode.	I

Menu item	Display	Description	I/C
	remote on	Genset unit was switched on remotely. It will run as long as the remote on mode is set.	I
StateRpl	One of the replies:	State reply. System answer on a user command (CMD).	
	run	User requested online mode. Genset unit will switch to 1 of the following operating modes: <ul style="list-style-type: none"> - Standby - Active - Error - Manual 	I
	offline	User requested offline mode. Genset unit will switch to offline operating mode.	I
	monitor	User requested monitoring mode. Genset unit will switch to 1 of the following operating modes: <ul style="list-style-type: none"> - Monitor - Active - Error 	I
	remote on	User requested remote on mode. Genset unit will switch to 1 of the following operating modes: <ul style="list-style-type: none"> - Remote on - Error 	I
	test	User requested test mode.	I
CMD	One of the commands:	Commands to be entered by a service user.	
	go online	Request for online/run state. Unit will switch to 1 of the online operating modes. Can only be executed in offline or remote on operating mode.	C
	go offline	Request for offline state. Unit will switch to offline operating mode. Can be executed in any operating mode.	C
	go testmode	Request for test mode state. Unit will switch to test mode. Can only be executed in offline mode.	C
	go monitor	Request for monitor mode. Unit will switch to 1 of the monitor operating modes once the command was successful. Can only be executed in offline or Remote on operating mode.	
	cancel cmd	Cancel a pending state request.	C

Menu item	Display	Description	I/C
Start relay*	One of the commands:	Commands to be entered by a user.	
	Start relay on	Switch on generator manually	I+C*
	Start relay off	Switch off generator manually	I+C*
Load relay	One of the commands:	Commands can only be executed if unit is in test mode.	
	Load relay on	Switch on generator manually.	I+C
	Load relay off	Switch on generator manually.	I+C
Consum	x.xx l	Diesel consumption in liter per hour	I
t_on	x.xx h	Operating hours of generator	I
Battery	xx.x V	Voltage of starter battery	I
t_serv	x.xx h	Genset runtime since last service	I
Oil management	Returns one of the operating modes:	Operating status of oil management	I
	not configured	Oil management is not configured.	I
	active	Oil management is running.	I
	monitored	Oil management is monitored.	I
	failure	Oil management is in error status.	I
Reset counters*		Reset of operating counters excepted t_serv	C*
Reset t service*		Reset genset service interval counter	C*
Error list	Number in hexadecimal format	All active events are displayed one after another with their number and a short text, and can be confirmed.	I+C
Legend: * Item is only displayed if the access level is service I/C Information/Command			

Table 5-3 Genset submenu

5.1.4 Battery Submenu (Batt)

Menu item	Display	Description	I/C
OpMode	1 of the following modes:	Operating mode of the battery. The mode is displayed in the main menu if no error occurred.	
	init	Software module initializes	I
	offline	Battery is offline and will not be monitored by EM control software.	I
	error	Error detected, battery cannot run.	I
	blk charge	Battery charges with fixed current	I
	flt charge	Genset is running or site is running on grid. Voltage is at configured float voltage to maintain voltage at floating level (default: 54 V).	I
	eboost ch.	Battery charges with fixed voltage.	I
	discharge	Battery is in discharge.	I
	eboost ch	Battery is in extended boost charge and will be charged for 10 h (time is set in LAA).	I
	equali ch	Battery is in equalization charge and will be charged for 20 h (time is set in LAA).	I
	v_sub_low	Battery is not charged or discharged and the voltage is below the float voltage.	I
StateRpl	One of the replies:	State reply. System answer to a user command (CMD).	
	init	SW initializes.	I
	run	Battery module reports "Ready for operating".	I
	offline	Battery module reports request to switch to offline operating mode as soon as possible.	I
CMD	One of the commands:	Command to be entered by a user.	
	no command	No command stands in a queue.	I+C
	go online	Start battery module	C
	go offline	Stop battery module	C
	cancel cmd	Cancel command in queue.	C
Voltage	x.xx V	Battery voltage	I

Menu item	Display	Description	I/C
Current	x.x A	Battery current	I
Temp	xx.x °C	Battery temperature	I
SOC	xx.x %	State of charge	I
DOD	x.x %	Depth of discharge	I
cycles	x	Charging cycles	I
t_charg:	x.x h	Charging time. Current or most recent charging process. Value is automatically reset.	I
t_disch	x.x h	Discharging time. Current or most recent discharging process. Value is automatically reset.	I
Cap charg	x.xx Ah	Charged capacity. Current or most recent charging process. Value is automatically reset.	I
Cap disch	x.xx Ah	Discharged capacity. Current or most recent discharging process. Value is automatically reset	I
T_min	x.x °C	Minimum battery temperature on current day. Automatic reset at 24:00.	I
T_max	x.x °C	Maximal battery temperature on current day. Automatic reset at 24:00.	I
T_mean	x.x °C	Average battery temperature on current day. Automatic reset at 24:00.	I
U_bmin	x.x V	Minimum battery voltage since last reset.	I
U_bmax	x.x V	Maximum battery voltage since last reset.	I
E_in	x.x kWh	Energy that has charged the battery since the last reset.	I
E_out	xx.x kWh	Energy that has been drawn from the battery since the last reset.	I
Reset Counters*		Reset operating counters	C*
Reset SOH*		Reset state of health	C*
Error List	Number in hexadecimal format	All active events are displayed one after another with their number and a short text, and can be confirmed.	I+C
Legend: * Item is only displayed if the access level is service I/C Information/Command			

Table 5-4 Battery submenu

5.1.5 Fuel Submenu

Menu item	Display	Description	I/C
OpMode	One of the modes:	Operating mode of fuel system. The mode is displayed in the main menu if no error occurred.	I
	init	Software module initializes	I
	active	Tank is available and will be used.	I
	offline	Fuel module is offline and will not be monitored by the EM control software.	I
	standby	Tank is available.	I
	error	Fuel module is in error status.	I
StateRpl	One of the replies:	State reply. System answer on a user command (CMD).	
	init	Software module initializes	I
	run	Fuel module reports "Ready for operating".	I
	offline	Fuel module reports request to switch as soon as possible to "offline" in OpMode.	I
CMD	One of the commands:	Command to be entered by user.	
	no command	No command in queue	I+C
	go online	Start Fuel module	C
	go offline	Stop Fuel module	C
	cancel command	Cancel command in queue	C
Level	x.x %	Filling status in %	I
Content	xxx L	Filling status in liters	I
Remain	x.xx d	Available remaining life at current consumption in days	I
Total cons	xxxx L	Total consumption since last reset	I
Reset Counters*		Resetting operating counters	C*
Error List	Number in hexadecimal format	All active events are displayed one after another with their number and a short text and can be confirmed.	I+C
Legend: * Item is only displayed if the access level is service I/C Information/Command			

Table 5-5 Fuel submenu

5.1.6 Load Submenu

Menu item	Display	Description	I/C
OpMode	One of the modes:	Operating mode of the load system. The mode is also displayed in the main menu if no error occurred.	
	init	Software module initializes	I
	active	Load module is active	
	offline	Load is offline and will not be monitored by the EM control software.	I
	standby	Load module is available.	I
	error	Load module is in error status.	I
StateRpl	One of the replies:	State reply. System answer on a user command (CMD).	
	init	Software module initializes	I
	offline	Load module is offline	I
	run	Load module is available and used.	I
	test	Load module indicates that it is in "Test mode".	I
CMD	One of the commands:	Command to be entered by a user.	
	no command	No command in queue	I+C
	go online	Start Load module	C
	go offline	Stop Load module	C
	go testmode	Set Load module to test mode	C
	cancel command	Cancel command in queue	C
Load	One of the commands:	Command to be entered by a user.	
	Disconnect load	Switch load relay off manually	I+C
	Connect load	Switch load relay on manually	I+C
Voltage	x.xx V	Load voltage [V]	I
Current	x.x A	Load current [A]	I
Power	x.x kW	Load power [kW]	I
P-Meter	xxxx kWh	Load energy [kWh]	I
Reset Counter*		Reset operating counters	C*
Error List	Number in hexadecimal format	All active events are displayed one after another with their number and a short text and can be confirmed.	I+C
Legend: * Item is only displayed if the access level is service I/C Information/Command			

Table 5-6 Load submenu

5.1.7 Aircon Submenu

Menu item	Display	Description	I/C
OpMode	One of the modes	Operating mode of the air condition system. The mode is also displayed in the main menu if no error occurred.	
	init	Software module initializes.	I
	active	Aircon module is active.	
	offline	Aircon module is offline and will not be started by the EM control software.	I
	standby	Aircon is available, but is not used in the moment.	I
	error	Aircon module is in error status.	I
StateRpl	One of the replies:	State reply. System answer on a user command (CMD).	
	init	Software module initializes.	I
	run	Aircon module reports "Ready for operating".	I
	offline	Aircon module reports request to switch as soon as possible to OpMode "offline".	I
	test	Aircon module indicates that it is in "Test mode".	I
CMD	One of the commands:	Commands to be entered by user.	
	no command	No command stands in a queue.	I+C
	go online	Start Aircon module	C
	go offline	Stop Aircon module	C
	go testmod	Set Aircon module to test mode	C
	cancel command	Cancel command in queue	C
Temp	x.x °C	Temperature at outlet of Aircon	I
Current	x.x A	Current consumption of Aircon (if sensor is installed)	I
Prio	xxxx	Priority value of the Aircon	I
Op-Time	x.xx h	Operating hours of Aircon	I
Reset counter*		Resetting operating counters	C*
Error List	Number in hexadecimal format	All active events are displayed one after another with their number and a short text and can be confirmed.	I+C
Legend: * Item is only displayed if the access level is service I/C Information/Command			

Table 5-7 Aircon submenu

5.1.8 Free Cooling Unit Submenu (FCU)

Menu item	Display	Description	I/C
OpMode	One of the modes:	Operating mode of the free cooling unit. The mode is displayed also in the main menu if no error occurred.	
	init	Software module initializes.	I
	active	FCU is active.	I
	offline	FCU module is offline and will not be started by the EM control software.	I
	standby	FCU is available	I
	error	FCU module is in error status.	I
StateRpl	One of the replies:	State reply. System answer to a user command (CMD).	
	init	Software module initializes.	I
	run	FCU module reports "Ready for operating".	I
	offline	FCU module reports request to switch as soon as possible to offline operation mode..	I
	test	FCU module indicates that it is in "Test mode" (i.e., manual switching on / off is possible).	I
CMD	One of the commands:	Command to be entered by user.	
	no command	No command stands in a queue.	I+C
	go online	Start FCU module.	C
	go offline	Stop FCU module.	C
	go testmode	Set FCU module to test mode.	C
	cancel command	Cancel command in queue.	C
Relay	One of the commands:	Available in test mode.	
	Relay on	Switch FCU controller reset relay to manual.	C
	Relay off	Switch FCU controller reset relay off to manual	C
Temp	x.x °C	Room temperature of FCU - controlled shelter.	I
Fanspeed	xxx RPM	Fan speed of FCU in volts.	I
PWM	x.x %	Percentage of max value only for FCU if controlled via analog signal.	I
Op-Time	x.xx h	Operating hours of FCU.	I
Reset Counter*		Reset operating counters.	C*

Menu item	Display	Description	I/C
Error List	Number in hexadecimal format	All active events are displayed one after another with their number and a short text and can be confirmed.	I+C
Legend: * Item is only displayed if the access level is service I/C Information / Command			

Table 5-8 Free Cooling Unit submenu

5.1.9 Solar Submenu

Menu item	Display	Description	I/C
OpMode		Operating mode of the solar system. The mode is also displayed in the main menu if no error occurred.	
	init	Software module initializes.	I
	offline	Solar module is offline and will not be started by the EM control software.	
	active	Solar module is active.	I
	standby	Solar module is available.	I
	error	Solar module is in error status.	I
StateRpl	One of the replies:	State reply. System answer to a user command (CMD).	
	init	Software module initializes.	I
	offline	Solar module is offline.	I
	run	Solar module is active.	I
CMD	One of the commands:	Command to be entered by user.	
	no command	No command stands in a queue.	I+C
	go online	Start solar module.	C
	go offline	Stop solar module.	C
	cancel command	Cancel command in queue.	C
Voltage	x.xx V	Solar voltage [V]	I
Current	x.x A	Solar current [A]	I
Power	x.x kW	Solar power [kW]	I
P-Meter	xxxx kWh	Solar energy [kWh]	I
Reset Counters *		Reset operating counters.	C*
Error List	Number in hexadecimal format	All active events are displayed one after another with their number and a short text and can be confirmed.	I+C

Menu item	Display	Description	I/C
Legend: * Item is only displayed if the access level is service I/C Information / Command			

Table 5-9 Solar submenu

5.1.10 Wind Submenu

Menu item	Display	Description	I/C
OpMode	1 of the modes:	Operating mode of the wind system. The mode is also displayed in the main menu if no error occurred.	
	init	Software module initializes.	I
	offline	Wind module is offline and will not be started by the EM control software	I
	standby	Wind module is available.	I
	error	Wind module is in error status.	I
	active	Wind module is running.	I
StateRpl	1 of the replies:	State reply. System answer to a user command (CMD).	
	init	Software module initializes.	I
	offline	Wind module is offline	I
	run	Wind module is available and will be used.	I
CMD	1 of the commands:	Command to be entered by user.	
	no command	No command in a queue.	I+C
	go online	Start wind module	C
	go offline	Stop wind module	C
	cancel command	Cancel command in queue.	C
Voltage	x.xx V	Wind voltage [V]	I
Current	x.x A	Wind current [A]	I
Power	x.x kW	Wind power [kW]	I
P-Meter	xxxx kWh	Wind energy [kWh]	I
Reset Counter*		Reset operating counters.	C*
Error List	Number in hexadecimal format	All active events are displayed one after another with their number and a short text and can be confirmed.	I+C
Legend: * Item is only displayed if the access level is service I/C Information / Command			

Table 5-10 Wind submenu

5.1.11 Rectifier Submenu (Rect)

Menu item	Display	Description	I/C
OpMode	1 of the modes:	Operating mode of the rectifier. The mode is displayed in the main menu if no error occurred.	
	init	Software module initializes.	I
	active	Rectifier module is active.	I
	offline	Rectifier module is offline.	I
	standby	Rectifier module is available.	I
	error	Rectifier module is in error status.	I
StateRpl	1 of the replies:	State reply. System answer to a user command (CMD).	
	init	Software module initializes.	I
	run	Rectifier module reports "Ready for operating" .	I
	offline	Rectifier module reports request to switch to offline operation mode as soon as possible.	I
CMD	One of the commands:	Command to be entered by user.	
	no command	No command stands in queue.	I+C
	go online	Start rectifier module	C
	go offline	Stop rectifier module	C
	cancel command	Cancel command in queue.	C
Voltage	x.x V	Rectifier voltage	I
Current	x.x A	Rectifier current	I
Temp	x.x °C	Rectifier temperature	I
Reset Counter*		Reset operating counters.	C*
Error List	Number in hexadecimal format	All active events are displayed one after another with their number and a short text.	I+C
Legend: * Item is only displayed if the access level is service I/C Information / Command			

Table 5-11 Rectifier submenu

5.1.12 Inverter Submenu (Invert)

Menu item	Display	Description	I/C
OpMode	1 of the modes:	Operation mode of the inverter. The mode is also displayed in the main menu if no error occurred.	
	init	Software module initializes	I
	active	Inverter module is active	I
	offline	Inverter module is offline	
	standby	Inverter is available	I
	error	Inverter module is in error status	I
StateRpl	1 of the replies:	Command to be entered by user.	
	init	Software module initializes.	I
	run	Inverter module reports "Ready for operation"	
	offline	Inverter module reports request to switch to offline operation mode as soon as possible.	
Cmd	1 of the states:	Command to be entered by user.	I+C
	no command	No command stands in a queue.	C
	go online	Start inverter module	C
	go offline	Stop inverter module	C
	cancel command	Cancel command in queue.	C
Power1-3	xxx kW	Inverter power	I
Reset counter		Reset operating counters.	C
Error list	Number in hexadecimal format	All active events are displayed one after another with their number and a short text.	I+C
Legend: * Item is only displayed if the access level is service I/C Information / Command			

Table 5-12 Inverter submenu

5.1.13 Site Submenu

Menu item	Display	Description	I/C
OPMode	1 of the modes:	Operating mode of the site system and site power source. The mode is also displayed in the main menu if no error occurred.	
	init	Software module initializes.	I
	active	Site power source unknown.	I
	error	Site module is in error status.	I
	grid	Site is running on grid.	I
	battery	Site is running on battery.	I
	genset	Site is running on genset.	I
StateRpl	1 of the replies:	State reply. System answer on a user command (CMD).	
	init	Software module initializes.	I
	run	Ready for operating.	I
	offline	Site module reports request to switch to offline operating mode as soon as possible.	I
Cmd	1 of the states:	Command to be entered by user.	
	no command	No command stands in queue.	I+C
	go online	Start site module.	C
	go offline	Stop site module.	C
	cancel command	Cancel command in queue.	C
T outdoor	x.x °C	Current outdoor temperature, if sensor is installed.	I
T od min	x.x °C	Minimum outdoor temperature of current day, automatic reset at 24:00, if sensor is installed.	I
T od max	x.x °C	Maximum outdoor temperature of current day, automatic reset at 24:00, if sensor is installed.	I
T od mean	x.x °C	Average temperature of current day, automatic reset at 24:00, if sensor is installed.	I
Humidity	x.x °C	Site humidity, if sensor is installed.	I
Reset counter*		Reset operating counters.	C*
Error List	Number in hexadecimal format	All active events are displayed one after another with their number and a short text.	I+C
Legend: * Item is only displayed if the access level is service I/C Information / Command			

Table 5-13 Site submenu

5.1.14 Shelter Submenu

Menu item	Display	Description	I/C
OpMode	1 of the modes:	Operating mode of shelter system. The mode is also displayed in the main menu if no error occurred.	
	init	Software module initializes.	I
	active	Shelter module is online.	I
	offline	Shelter module is offline.	I
	error	Shelter module is in error status.	I
StateRpl	1 of the replies:	Command to be entered by user.	I
	init	Software module initializes.	I+C
	run	Shelter module reports "Ready for operating"	C
	offline	Shelter module reports request to switch to offline operating mode as soon as possible	C
CMD	1 of the states:	Command to be entered by user.	
	no command	No command stands in a queue.	I+C
	go online	Start shelter module.	C
	go offline	Stop shelter module.	C
	cancel cmd	Cancel command in queue.	C
T shelter	x.x °C	Current ambient temperature inside shelter, if sensor is installed.	I
T sh min	x.x °C	Minimum ambient temperature of current day, automatic reset at 24:00, if sensor is installed.	I
T sh max	x.x °C	Maximum ambient temperature of current day, automatic reset 24:00, if sensor is installed.	I
T sh mean	x.x °C	Average temperature of current day, automatic reset 24:00, if sensor is installed.	I
Humidity	xx%	Current ambient humidity inside shelter, if sensor is installed.	I
Reset Counters*		Reset of minimum, maximum, and mean ambient temperature, currently "out of order".	C *
Error List	Number in hexadecimal format	Events are displayed one after another with their number and a short text.	I+C

Menu item	Display	Description	I/C
Legend: * Item is only displayed if the access level is service I/C Information / Command			

Table 5-14 Shelter submenu

5.1.15 Login Submenu

Menu item	Display	Description	I/C
Login		Login for service staff	C
	0000	Password entry.	C
Legend: * Item is only displayed if the access level is service I/C Information / Command			

Table 5-15 Login submenu

5.1.16 Service Submenu

Menu item	Display	Description	I/C
Contact		Address of technical support	I
Forcedrestart		Restart of core processes "mwc", "enqd" and "logd", required after software update of an MWC module	C
Poweroff		Switching off Energy Manager. See How to Perform a Forced Restart on page 63	C
Reboot		Reboot Energy Manager	C
Legend: * Item is only displayed if the access level is service I/C Information / Command			

Table 5-16 Service submenu

5.1.17 Configuration Submenu

Submenu	Menu item	Display	Description	I/C
System	System clock	time time zone	Day and time in format: yyyy-mm-dd hh:mm:ss Time zone of TS	I+C
	Modem	APN:	Access Point Name	I+C
		User:	User name	I+C
		Pass:	Password	I+C
	Remote access	Host:	RMS host address	I+C
		Port:	RMS port number	I+C
		Site:	RMS site identification	I+C
Save & Apply		Save and apply new settings.	I+C	
Battery 1	Serial number		Serial number of battery	I+C
	Battery capacity		Battery capacity	I+C
	Save & Apply		Save and apply new settings.	I+C
Fuel wizard 1			See n page	C
Legend: * Item is only displayed if the access level is service I/C Information / Command				

Table 5-17 Configuration submenu

5.2 How to Administer IP Settings

The Energy Manager is delivered with default IP address 192.168.1.2. The address can be displayed and replaced.

5.2.1 How to Display IP Address, Netmask and Gateway Address

The IP settings are displayed as follows:

1. In the *main menu*, select *Sys*.
2. Confirm with *OK*.
3. Select *Network*.
4. Confirm with *OK*.

⇒ *The actual IP, Netmask and Gateway address are displayed.*

5.2.2 How to Change IP address, Gateway or Netmask

IP settings have only to be administered if the system is implemented in a company network using own IP addresses.

To change an address, proceed as follows:

1. In the *main menu*, select **Sys**.
2. Confirm with **OK**.
 - ⇒ *The system submenu is displayed.*
3. Select the **Network** submenu
4. Confirm with **OK**.
5. Select the **Static Setup** submenu.
6. Confirm with **OK**.
7. Select **IP address**, **Network mask** or **Gateway**.
8. Confirm with **OK**.
 - ⇒ *The selected item and address are displayed.*
9. Change the desired number, see [How to Enter Digits](#) on page 27.
10. Confirm with **OK**.
 - ⇒ *The changed address will be stored until the system is rebooted.*
 See [How to Shut Down and Restart Energy Manager](#)
 ⇒ *How to Reboot Energy Manager* on page 63.

To store changes permanently:

11. Select **Save Net Cfg** (only with service login).
12. Confirm with **OK**.
 - ⇒ *The changed address is stored permanently.*

5.3 How to Update the EM Software

Software updates are performed by transferring the software stored and delivered on USB flash drive to the Energy Manager.

- ✓ New software version on USB flash drive

Perform a software update as follows:

1. Plug USB flash drive into the USB port of the Energy Manager.
 - ⇒ *After a few seconds the status of the update procedure is displayed on the LCD.*



NOTICE

Property damage due to data loss!

The copying process takes some minutes and continues until finishing.

- ▶ Do not remove the USB flash drive during the copy process.

⇒ *You are informed by a message or by the main menu coming up again that the process is finished.*

2. Remove the USB flash drive.

5.4 How to Reset Counters and Statistics Displays

After replacing a hardware component of the system like genset or aircon, the counter display for this component has to be reset by the service.



TIP

This function is reserved for users with service rights.

Reset counters and statistics data as follows:

1. In the *main menu*, select *Login*.
2. Enter the appropriate password.
3. In the *main menu*, select the respective module.
4. Confirm with *OK*.
5. Select *Reset Counters*.
6. Confirm with *OK*.

⇒ *The counter value is reset to 0 and starts counting from 0 again.*

5.5 How to Observe Alarms and Other Events

Messages concerning alarms and other events are displayed in LCD of the control panel. They indicate significant changes in the state of the Energy Manager and the affected systems or inform about the behavior of the system.

For each event an event code and a short description are displayed by the system.

The value range of the event code is per module 0 – FF in hexadecimal format. The lower the code, the more severe is the event. The following event levels are distinguished:

Event code	Event level
01 - 9F	Alarm In case of alarms, the normal operating mode is no longer available. The respective modules are switched off or an emergency program is started.
a1 - ff	Warning Warnings do not affect operation.
<ff	Information

Table 5-18 Event codes and levels



NOTICE

Property damage if alarms are neglected!

- ▶ In case of alarms (event code 0-7), notify the service of Heliocentris or an authorized partner.



All possible event messages are explained in a separate reference manual.

How to display events

Events occurring during the runtime of the systems connected to the Energy Manager can be observed on the LCD. The appropriate module has to be selected and the error or event will be reported.

To display events, proceed as follows:

1. In the *main menu*, select the module showing an event or error code, e.g. **System**.

```

→Sys: err 80 #1
Gen: offline
Batt: err 5e #1
Fuel: -48L

```

Figure 5-1 System error, example

2. Confirm with **OK**.
3. Select following submenu, e.g. **Info**.
4. Confirm with **OK**.
5. Select **Error List**.
6. Confirm with **OK**.
 - ⇒ *Event number and a short text explaining the event are displayed.*
7. If several events are displayed, you can scroll in the list with the <down> key.

To delete an event from the list:

8. Confirm with **OK**.
 - ⇒ *The event will no longer be displayed in the LCD display. A message is sent to the RMS and the event is still active on the RMS until it is cleared by the system.*

5.6 How to Reset the Service Interval

After providing service for the genset, the service interval has to be reset in the Energy Manger.

 **TIP** This function is reserved for users with service rights.

To reset the service interval, proceed as follows:

1. Login as **Service**.
2. In the **main menu**, select **Gen**.
3. Confirm with **OK**.
4. In the **Gen** menu, select **Reset t_serv**.
5. Confirm with **OK**.
⇒ *The service interval is reset to 0 minutes*
6. Leave the menu by pressing 2 times <left> key.

 **TIP** The service interval can only be reset via the Energy Manager LCD. It cannot be reset via LAA nor via Remote Access.

5.7 How to Copy Log Files to USB Flash Drive

The entire log file directory of the Energy Manager can directly be copied to a USB flash drive.

- ✓ USB flash drive with one partition only (FAT32 formatted)

On the USB flash drive a file with a log identifier has to be created using the Windows Editor or WordPad. The file name must not be complemented by any extension (such as txt or csv).



Don't use Microsoft Word, the format is not supported.

The log files are copied to the USB flash drive with the current date and time. Each time the USB flash drive is plugged in, a new directory is created and all files are copied again.

Prepare USB flash drive

Prepare USB flash drive as follows:

1. Insert USB flash drive into USB port of PC or laptop.
2. Open the Windows Editor or WordPad.
3. Create a new file.
4. Write identifier **P21getlog** into the file.
5. Save file under file name **Identifier** (capital "I", without extension).
6. Remove USB flash drive from PC or laptop.

Copy log file to USB flash drive

The copying process takes a few minutes. The copying process continues until finishing. If the USB flash drive has not enough memory left a message is shown at the display.

Copy log file to USB flash drive as follows:

1. Plug USB flash drive into a USB port on the left side of Energy Manager.

⇒ *After a few seconds the status of the copy procedure is displayed on the LCD.*



Notice Damage to the data of the USB flash drive might result on removing the drive during the running process. Don't remove the USB flash drive during the running process.

⇒ *A message is displayed when the process is finished.*

2. Remove USB flash drive.

6 Decommissioning

6.1 How to Decommission the Energy Manager

The decommissioning of Energy Manager is composed of the following steps:

- Shut down the Energy Manager. See [How to Shut Down Energy Manager](#) on page 62.
- Disconnect the Energy Manager from the -48 V_{DC} network.
- Check that connections are voltage-free and ensure that they are not turned on again.
- Remove all electrical connections from and to the Energy Manager.
- Disassemble all sensors and actuators.



Return Energy Manager devices and equipment parts no longer needed to Heliocentris Industry GmbH for disposal. Dispose of packaging material that is no longer needed in accordance with the local laws and regulations.

6.1.1 How to Disconnect the Energy Manager



NOTICE

Danger of data loss!

Improper shut down of the Energy Manager can destroy the flash disk module.

- ▶ Wait until the software of the Energy Manager are shut down before disconnecting the power cable.

1. Shut down Energy Manager. See [How to Shut Down Energy Manager](#) on page 62.
2. Disconnect power supply.
 - ⇒ A message on the display indicates when the power supply can be disconnected.
3. Check that connections are voltage-free.
4. Disconnect all connection from wiring board.
5. Remove SIM card.
 - ⇒ Energy Manager is disconnected and can be removed from the rack.

6.2 How to Store the Energy Manager

The Energy Manager should be stored in a dust free and save location. See [Technical Data](#) on page 67.

6.3 How to Ship the Energy Manager

The Energy Manger is shipped in a box suitable for transportation and protected from damage during transportation.

It is recommended to keep the box for later use.

7 Troubleshooting

7.1 FAQ

Frequently asked questions and possible remedies are listed in this chapter. The listed actions can be performed one after the other or individually.

- | | |
|--|---|
| Connection EM/RMS | In the event of connection problems, it has to be checked if the ports 80 (HTTP) and 10021 are released by the provider. |
| GPRS/GSM/SMS access problems | <ol style="list-style-type: none">1. What to do if the connection to the Remote Access Server does not work?<ul style="list-style-type: none">▶ Check IP address for Remote Management Server. Repeat IP-address, if necessary.▶ Check internet connection with another address.▶ Check browser and update Mozilla Firefox, if necessary.▶ Check network settings and proxy settings. Disable proxy settings or add the IP address to the settings, if necessary. Ask your ITdepartment for help.▶ Check firewall settings. Disable firewall settings or add the IP address to the settings, if necessary. Ask your ITdepartment for help.▶ Check port settings. Port 10021 must be allowed to send out. |
| LAN connection laptop/ EM | <ol style="list-style-type: none">2. What to do if the connection between Laptop and Energy Manager does not work?<ul style="list-style-type: none">▶ Check the LAN cable - if a switch is connected, use a straight through cable.▶ Check IP, Netmask and Gateway address.▶ Check firewall – EM must allow connecting.▶ Port 22 (only for WinSCP and Putty), 8000 and 8001 must be allowed for communication.▶ Proxy must be disabled or IP of the EM must be added.▶ Check Java Runtime Environment (JRE). Version 1.6 has to be installed (http://www.java.com). |
| No message indicating storage from or to USB flash drive | <ol style="list-style-type: none">3. What to do, if no messages are displayed while reading or copying data from or to USB flash drive.<ul style="list-style-type: none">▶ Wait about 15 to 20 seconds, remove the stick and try once again.▶ Use another USB flash drive. |

8 Maintenance and Service

All service and maintenance tasks described in this chapter may only be executed by Heliocentris or authorized partners.

It is not allowed to replace parts and components which are not described in this manual. Violation voids all warranty claims.

Maintenance

The Energy Manager is practically maintenance-free. If maintenance is necessary, the following prerequisites are to be respected:

- ✓ Disconnect the EM completely from power supply during maintenance.
- ✓ Check for the absence of voltage.

8.1 How to Shut Down and Restart Energy Manager

8.1.1 How to Reboot Energy Manager

With the function **Reboot** operating system and software are shut down and started anew. Event messages are not reset.

In an error situation, a reboot may only be carried out by service personnel.



NOTICE

Property damage due to overcharging batteries!

When genset is switched on, an overcharging of batteries has to be avoided.

- ▶ Call service staff to reboot Energy Manager.

Reboot Energy Manager as follows:

1. Login with service password.
See [How to Login as Service User](#) on page 28.
2. In the main menu, select **Service**.
3. Confirm with **OK**.
4. Select **Reboot**.



TIP

There is no security query. After confirming **OK**, the function will immediately be performed.

5. Confirm with **OK**.
⇒ *The Energy Manager is rebooted without further query.*

8.1.2 How to Shut Down Energy Manager

With the function **Poweroff** operating system and software are shut down. The shutdown has to be completed before disconnecting the system.

Shut down the Energy Manger as follows:

1. In the main menu, select **Service**.
2. Confirm with **OK**.
3. Select **Poweroff**.



There is no security query. After confirming **OK**, the function will immediately be performed.

4. Confirm with **OK**, if you are sure that you want to shut down the system.
⇒ *The Energy Manager is shut down without further query.*
5. Remove power cable to prevent an automated restart.

8.1.3 How to Perform a Forced Restart

With the function **Forcedrestart** selected software processes are started anew. The function is performed automatically after new units have been implemented into the system. A system message informs you that a forced restart has to be performed manually.

Proceed as follows:

1. Login with service password. See [How to Login as Service User](#) on page 28.
2. In the main menu, select **Service**.
3. Confirm with **OK**.
4. Select **Forcedrestart**.

 **NOTICE!** There is no security query. After confirming with **OK**, the function will immediately be performed.

5. Confirm with **OK**.
 - ⇒ *The Energy Manager is restarted without further query.*

8.1.4 How to Apply the Reset Button



In case the LCD functions are not available, the mainboard reset button (1) allows to:

- Restart the system
- Switch-off the system

A main board reset may only be executed by Heliocentris or an authorized partner.

A mainboard reset does not reset error messages and does not reset the system.

- ✓ Small screw driver or a ball pen

The reset button (1) is behind a small opening in the control panel.

- | | |
|------------|--|
| Restart | To restart the Energy Manger: <ul style="list-style-type: none"> ▶ Press the reset button for a short time (> 2 seconds). ⇒ <i>The mainboard is shut down and rebooted.</i> |
| Switch-off | To switch-off the Energy Manger: <ul style="list-style-type: none"> ▶ Press the rest button for about 5 seconds. ⇒ <i>The Energy Manager is switched-off.</i> |

8.2 Cleaning

- ✓ Moist cloth
- ▶ Clean the case with a slightly moist cloth.



In case the unit is extremely dirty, use a mild detergent; never use chemical cleaners.

8.3 Service

If you experience problems with the unit, then please contact the manufacturer:

Heliocentris Industry GmbH
Rudower Chaussee 29
12489 Berlin
Germany

Phone +49 (0)30 – 340601-700

Fax +49 (0)30 – 340601-599

Email: service@heliocentris.com

An employee from Heliocentris customer service will contact you and explain all further steps. If you return the unit for repair or replacement, you must ship the unit sufficiently secured and packaged.

Heliocentris is not responsible for damage which has been caused by improper packaging and / or improper shipment. You must bear the costs yourself for the shipment of units with expired warranty.

8.4 Replacing Components

It is not allowed to replace parts and components which are not described in this manual. Violation voids all warranty claims.

8.4.1 How to Replace Main Fuse

Fuse designation	Function	Fuse	Type
F1	-48 V DC input	5A slow-blow	5x20 mm/250 V

Table 8-1 Fuse designation

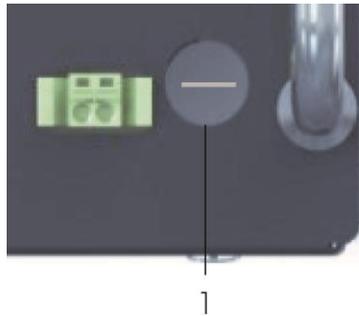
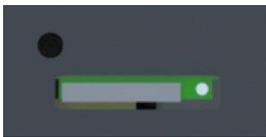


Figure 8-1 Main fuse (1)

8.4.2 How to Replace SIM Card

- ✓ Small screw driver or a ball pen

Proceed as follows:



1. Unlock the SIM card holder pressing the button at the right of the slot with a small screw driver or a ball pen and pull out the card.
2. Place the new SIM card in the holder and push it gently into the modem.

8.5 Disposal

Figure 8-2

Unit

The system is not to be disposed of at the local recycling centers.

- ▶ Return the system to Heliocentris for disposal.

Packaging material

- ▶ Store packaging material for future storage of the system.
- ▶ Dispose of packaging material that is no longer needed in accordance with the local laws and regulations.

Batteries



Never dispose of batteries with the household waste.

- ▶ Recycle batteries.
- ▶ Drop off used batteries at a collection center.

9 Disassembly and Removal

The deactivation for repairs or disassembly may be done only by qualified personnel trained by Heliocentris Industry GmbH.

Devices and equipment parts no longer needed can be returned to Heliocentris Industry GmbH for disposal.

10 Technical Data

Energy Manager

Designation	Definition	Specification
Physical data	Dimensions	Height 3 HU, Depth 19" W 305 x H 132 x D 483 mm incl. handhold Depth without handhold: 282 mm
	Installation Depth	280 mm + Wiring
	Weight	~ 5,9 kg (with battery ~ 7,2 kg)
Electrical	Supply Voltage	-36 to -72 VDC 19 to 36 VDC (optional) 100 to 240 VAC (optional)
	Power Consumption	< 30 W
	Operating Temperature	0 to 50°C
	Relative humidity	10 to 90% (non condensing)
	Storage Conditions	-20 to + 85°C, 0 to 95%
Standards	EMC (CE)	EN 61000-6-1 & 6-3
	Protection Grade	EN 60529 (IP20)
Connection Ports	Alarm Outputs / Dry Contacts	16 Relay change-over contacts, max. 0,5A / 230V
	Analog Input	20 configurable 0-20 mA / 0-5, 0-10, 0-30 VDC 4 voltage measurement -100-0 VDC, 8 Pt 1000
	Digital Input	12 electrical isolated low level: 0-2 V high level: 4-35V
	Analog output	2 ports 0-10 VDC
Communication Interfaces/Remote Monitoring	Wireless	GPRS Quad band CS1-CS4, CSD 9.6k; SMS
	Ethernet	RJ 45 10/100 BaseT
	Serial	RS 232, RS 485 (optional)
	USB	2.0
Onsite Monitoring & Control	Control	Panel 5 way keypad & 4-line LCD-display configuration and monitoring
	Ethernet	Interface Advanced configuration, monitoring

Designation	Definition	Specification
	LED	Status / Error indication Under- and overvoltage Status of relays / alarm contacts
	Customizable Data Logging	Lifetime sensor log (10 years), Events, Errors
Energy Manager Modules	Genset Management Module	Genset efficiency Genset monitoring
	Diesel Fuel Management Module	Fuel consumption Fuel level & delivery supervision Fuel theft & contamination
	Battery Management Module	Battery monitoring Battery lifetime extension features
	Aircon Management Module	Smart scheduling State of health monitoring Efficient cooling solutions
	Remote Access	Remote monitoring and control Predefined and customized reports
	Site Security Module	Site access control Intruder alarms

Table 10-1 Energy Manager technical data

Appendix

Licenses

This product includes Open Source software licensed by the copyright holder under the license conditions of the GNU General Public License (GPL) and the GNU Lesser General Public License (LGPL) as well as additional Open Source licenses. The copyright holder offers no guarantee with regard to the Open Source components. For the corresponding regulations in this respect, refer to the printed license texts delivered with the software.

In Table 10-2 you will find a list with the corresponding software components:

Library	License	Disclaimer
libkeyutils1	GNU LGPL	This program comes with ABSOLUTELY NO WARRANTY; for details see Sec. 15 and 16 of the GNU Lesser General Public License, Version 2.1.
libmodbus	GNU LGPL	
libpcan	GNU LGPL	
e2fslibs	GNU GPL, LGPL	This program comes with ABSOLUTELY NO WARRANTY; for details see Sec. 15 and 16 of the GNU Lesser General Public License, Version 2.1 or Sec. 11 and 12 of the GNU General Public License, Version 2.
e2fsprogs	GNU GPL, LGPL	
libacl1	GNU GPL, LGPL	
libattr1	GNU GPL, LGPL	
libblkid1	GNU GPL, LGPL	
libcomerr2	GNU GPL, LGPL	
libss2	GNU GPL, LGPL	
mount	GNU GPL, LGPL	
procps	GNU GPL, LGPL	
util-linux	GNU GPL, LGPL	
adduser	GNU GPL	This program comes with ABSOLUTELY NO WARRANTY; for details see Sec. 11 and 12 of the GNU General Public License, Version 2.
apt	GNU GPL	
base-passwd	GNU GPL	
bash	GNU GPL	
bc	GNU GPL	
bsdutils	GNU GPL	
console-tools	GNU GPL	
coreutils	GNU GPL	
cpio	GNU GPL	
cron	GNU GPL	
dash	GNU GPL	
debian-archive-keyring	GNU GPL	
debianutils	GNU GPL	

Technical Data

Library	License	Disclaimer
dialog	GNU GPL	This program comes with ABSOLUTELY NO WARRANTY; for details see Sec. 11 and 12 of the GNU General Public License, Version 2.
diff	GNU GPL	
diffutils	GNU GPL	
dpkg	GNU GPL	
extlinux	GNU GPL	
findutils	GNU GPL	
gcc-4.4-base	GNU GPL	
gnupg	GNU GPL	
gpgv	GNU GPL	
grep	GNU GPL	
gsm-utils	GNU GPL	
gzip	GNU GPL	
hostname	GNU GPL	
htop	GNU GPL	
ifupdown	GNU GPL	
inetutils-ftpd	GNU GPL	
initramfs-tools	GNU GPL	
initscripts	GNU GPL	
insserv	GNU GPL	
iotop	GNU GPL	
iproute	GNU GPL	
iptables	GNU GPL	
iptraf	GNU GPL	
iputils-ping	GNU GPL	
klibc-utils	GNU GPL	
klogd	GNU GPL	
libconsole	GNU GPL	
libgdbm3	GNU GPL	
libgsmme1c2a	GNU GPL	
libklibc	GNU GPL	
libkrb5-3	GNU GPL	
libkrb5support0	GNU GPL	
liblocale-gettext-perl	GNU GPL	
liblzma2	GNU GPL	
libnfnetwork0	GNU GPL	
libopts25	GNU GPL	
libpam-modules	GNU GPL	
libpam-runtime	GNU GPL	
libpam0g	GNU GPL	
libperl5.10	GNU GPL	
libpopt0	GNU GPL	

Library	License	Disclaimer
libsensors4	GNU GPL	This program comes with ABSOLUTELY NO WARRANTY; for details see Sec. 11 and 12 of the GNU General Public License, Version 2.
libsepol1	GNU GPL	
libslang2	GNU GPL	
libtext-charwidth-perl	GNU GPL	
libtext-wrapi18n-perl	GNU GPL	
libudev0	GNU GPL	
libusb-0.1-4	GNU GPL	
libuuid1	GNU GPL	
linux-base	GNU GPL	
linux-image-2.6.32-5-686	GNU GPL	
linux-image-2.6-686	GNU GPL	
lm-sensors	GNU GPL	
localepurge	GNU GPL	
lsb-base	GNU GPL	
mawk	GNU GPL	
module-init-tools	GNU GPL	
nano	GNU GPL	
net-tools	GNU GPL	
openssh-blacklist	GNU GPL	
openssh-blacklist-extra	GNU GPL	
openssh-client	GNU GPL	
openssh-server	GNU GPL	
perl	GNU GPL	
perl-base	GNU GPL	
perl-modules	GNU GPL	
psmisc	GNU GPL	
python-support	GNU GPL	
readline-common	GNU GPL	
resolvconf	GNU GPL	
rsync	GNU GPL	
screen	GNU GPL	
sed	GNU GPL	
sensible-utils	GNU GPL	
snarf	GNU GPL	
sysklogd	GNU GPL	
syslinux	GNU GPL	
syslinux-common	GNU GPL	
sysv-rc	GNU GPL	
sysvinit	GNU GPL	
sysvinit-utils	GNU GPL	
tar	GNU GPL	

Library	License	Disclaimer
tofrodos	GNU GPL	This program comes with ABSOLUTELY NO WARRANTY; for details see Sec. 11 and 12 of the GNU General Public License, Version 2.
ucf	GNU GPL	
udev	GNU GPL	
update-inetd	GNU GPL	
usbutils	GNU GPL	

Table 10-2 GPL and LGPL software components

We can send you the source code of the components licensed under the GPL and LGPL on a data carrier for a copy fee of €10.

Your request must be sent within three years of acquiring this product to the following address:

Heliocentris Industry GmbH,
Rudower Chaussee 29
12489 Berlin
Germany

Abbreviations

Abbreviation	Meaning
BTS	Base Transceiver Station
CES	Clean Energy Solution
CMD	Command
DC	Direct Current
DOD	Depth of Discharge
EM	Energy Manager
GND	Grounding
HTTP	Hypertext Transfer Protocol.
HW	Hardware
LAA	Life Access Application
NOC	Network Operating Center
PV	Photovoltaic
RMS	Remote Management Server
SHE	Solar Hydrogen Extension HG 60
SW	Software
SOC	State of Charge
TCP/IP	Transmission Control Protocol and Internet Protocol. TCP/IP is a protocol combination which connects the transport and network layers form the OSI layer model.
TS	Telecommunication Site
URL	Uniform Resource Locator

10-1 Overview and explanation of the abbreviations used in the operating manual and in the supplied software

Glossary

Bezeichnung	Erklärung
Ammeter	A device that measures current flowing in a circuit.
Ampere (amp)	The unit of electric current, having the symbol A.
Circuit, electrical	Any closed path followed or capable of being followed by an electrical current.
Efficiency	A measure of the energy-effectiveness of a system with unity or 1 being a perfect result. Efficiencies are usually expressed as percentages where the output is divided by the input.
HTTP	HTTP is a client-server communication protocol developed for the World Wide Web. A web browser may be the client and an application running on a computer hosting a web site may be the server.
Input	The amount of whatever is being measured entering a system.
Milliampere	One thousandth of an ampere, having the symbol mA.
Output	The amount of whatever is being measured leaving a system.
Power, electrical	The power (in watts) generated or used by a device can be calculated by multiplying its current (in amperes) times the voltage across its terminals (in volts). Often designated by the symbol P.
Short circuit	A situation in which a circuit is complete but has little or no resistance or load.
Solar cell	A device that changes light into an electric current. Solar cells are usually mounted together to produce a solar panel.
Volt	The unit of electric potential difference, having the symbol V.
Voltage	A measure of the electrical potential between two points, usually measured in volts and designated by the symbol V.
Voltmeter	A device that measures voltage difference between two points in a circuit.
Watt	The unit of electric power, having the symbol W.

Table 10-3 Glossary

Technical Data

replace SIM card	65	load	42
requirement		solar	45
user	12	symbols	8
requirement		system submenu	35
location	11		
operator	11	T	
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service interval	56	UPS	14
RS232	14	USB	14
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S		approved	10
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aircon	43		



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