eMS home Energy Management System

Quick Guide, current 09/2021, Article number: 0301674_EN_a

1. Scope

This document applies to the eMS home Energy Management System with LAN and RS485 communication interfaces.

2. Connection and set-up

Before you can use your eMS home Energy Management System, it must be installed and taken into operation by a qualified specialist electrical contractor: The installation is described in a separate installation manual, which is available in digital format (PDF) from the www.ablmobility.de website.

https://www.ablmobility.de/en/service/downloads.php#bedienungsanleitungen

DANGER!

Danger of death by electric shock

Live components carry potentially fatal voltages.

- Before starting any installation or maintenance work, switch off the power to the distribution board and secure to prevent it being switched on again accidentally.
- Make sure that the conductors to be connected to the meter are voltage-free.
- All installation and maintenance work on this unit must be carried out by a trained and authorised electrician.

The Energy Management System is supplied with power via outer conductor L1. At least the outer conductor L1 and neutral conductor N need to be connected for the unit to switch on.

3. Intended use

The eMS home Energy Management System is a measuring device that measures electrical values at the point of connection and makes them available via LAN or RS485.

This product is NOT an active electrical energy meter as defined by EU Directive 2004/22/EC (MID); it must only be used for internal accounting purposes. The data that the Energy Management System collects about the energy generated by your system may differ from the data from the main energy meter.

As it is classified as overvoltage category III, the Energy Management System must only be connected in the sub-distribution board or consumer unit, downstream of the electricity supply company's energy meter.

The Energy Management System is suitable for indoor use only. The Energy Management System is approved for use in the EU Member States and the USA. Do not use the Energy Management System if it is damaged and then use only as described in the documentation provided. Any other use or the use of damaged units may result in injury or damage to property.

For safety reasons, the product (including the software) must NOT be modified and components must NOT be installed that are not expressly recommended or sold by ABL for this product. Any use of the product other than as described in the Intended use section shall be regarded as contrary to the intended use. Unauthorised changes, conversions or repairs and opening of the product are prohibited.

The enclosed documentation is part of the product and must be read, followed and then retained in a place that is accessible at all times.

4. Supported products and software versions

Information on the supported products, the individual functions of your preinstalled software and firmware updates can be found on our website www.ablmobility.de.

5. Items supplied

- 1 × eMS home Energy Management System
- 1 × Quick guide
- 2 × Connector for RS485 interface
- 2 × Terminating resistors
- 2 × Jumpers

The installation of the two terminating resistors and the two jumpers is described in the corresponding installation instructions, see https://www.ablmobility.de/en/service/downloads.php#bedienungsanleitungen

Please contact your dealer if you identify any damage or if the delivery is incomplete.

Additional materials required (not supplied):

- For the LAN connection: 1 × Network cable
- For operation with current transformers: 3 × Current transformers and current transformer connecting cables

6. Safety instructions

DANGER!

Danger of death by electric shock

Live components carry potentially fatal voltages.

- Only use the Energy Management System in a dry environment and keep it away from liquids.
- Install the Energy Management System only in approved enclosures or distribution boards downstream of the electricity supply company's meter so that the connections for the outer and neutral conductors are located behind a cover or guard to prevent accidental contact.
- The enclosure or distribution board must be accessible only with a key or suitable tool in order to limit access to authorised personnel.
- Before starting any installation or maintenance work, switch off the power to the distribution board and secure to prevent it being switched on again accidentally.
- Before cleaning, switch off the power to the Energy Management System and only use a dry cloth to clean.
- Maintain the prescribed minimum distances between the network cable and mains voltage installation components or use suitable insulation.

WARNING!

Avoid damage to or destruction of the Energy Management System

- Do not connect an ISDN cable to the Energy Management System's network connection.

Damage to or destruction of the Energy Management System by voltage surges on the network cable

If network cables are installed outside the building, voltage surges can be caused by lightning strike, for example.

- If installed outside the building, the network cable must be protected with suitable overvoltage protection.
- Protect your solar installation with inverters using suitable overvoltage protection.

Damage to or destruction of the Energy Management System by improper use

- Do not operate the Energy Management System outside the specified technical tolerances.

7. Technical specifications

Interfaces	LAN (10/100 Mbit) RS485 (half-duplex, max. 115200 baud)
Class of protection	II
IP rating	IP2X
Degree of pollution	2
Connection cross section in line with EN 60204	10–25 mm² * *Mechanical: 1.5–25 mm² (e.g. for connecting external current transformers)
Tightening torque for screw terminals	2.0 Nm
Weight	0.3 kg
Dimensions	88 × 70 × 65 mm
Ambient temperature in operation	-25 °C…+45 °C
with reduced measuring current I_N at 32 A	-25 °C…+55 °C
Ambient temperature during transportation / storage	-25 °C…+70 °C
Relative humidity (non-condensing)	Up to 75 % as an annual average, up to 95 % on up to 30 days/year
Max. altitude during operation	2000 m above sea level
Mains power supply	
Starting current	< 25 mA
Supply voltage / frequency	110 V AC ±10 % / 60 Hz ±5 % or 230 V AC ±10 % / 50 Hz ±5 %
Internal consumption P_{max}	5.0 W
Measuring current circuit for measurement category III	
Limit current I_N / phase	63 A
Rated voltage	max. 230/400 V AC
Frequency range	50/60 Hz ± 5 %

8. Operation of the Energy Management System at ambient temperature of 55 °C

The following conditions apply to operation of the Energy Management System at ambient temperatures up to 55 °C:

- The Energy Management System must not be run continuously at ambient temperatures of 55 °C

DANGER!

Danger of death by electric shock or fire

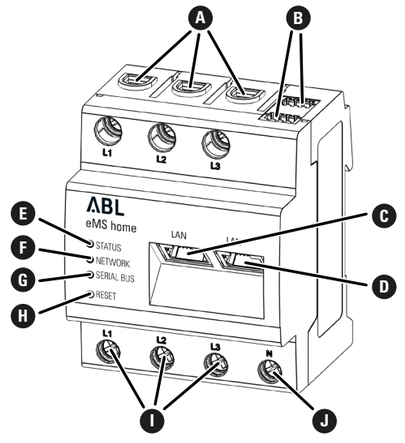
Live components carry potentially fatal voltages.

- Fuse protection must not exceed 32 A. External current transformers should be used for higher currents.
- The Energy Management System must be connected with cables that are at least 10 mm² in cross section and no less than 1 m long.

9. Available version

2 × LAN and 2 × RS485 interface (only with suitable RS485 cable)

10. Product description



A	Outer conductor L1, L2, L3 outputs
B	2 × RS485 connection
C	LAN connection
D	LAN connection
E	Status LED
F	Network LED
G	Serial bus LED for RS485 bus
H	Reset button
I	Outer conductor L1, L2, L3 inputs
J	Neutral conductor N

11. RS485 interface

Note the following points when connecting external devices to the RS485 interface of the Energy Management System:

Requirement for the cable:

- Nominal voltage/wire insulation: 300 V RMS
- Cable cross section: 0.25 … 1.5 mm²
- Cable type: rigid or flexible
- Recommendation: Use AlphaWire standard cable, designation 2466C. Alternatively, a CAT5e cable can also be used.

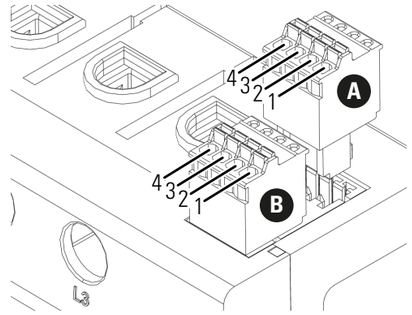
Requirement for cable installation:

- In the area for connecting the RS485 interface on the Energy Management System, mechanical means must be provided to ensure that individual wires of the connecting cable are at least 10 mm away from live parts.
- The connecting cable must be run separately from the mains cables in the distribution board and on the permanent link.

Requirements for the remote station:

- The RS485 interface of the connected unit must meet the safety extra low voltage requirements.

Figure: Enlarged detail of the figure from above WITH connector



Connection diagram for RS485 connector:

Pin	Identification	Description
1 A 1 B	VCC	Voltage output to supply external devices 9 V ± 10 %, max. 280 mA
2 A 2 B	GND	Ground
3 A 3 B	A	RS485 A
4 A 4 B	B	RS485 B

12. LED statuses

Status LED

Colour	Status	Description
Orange	On (<10 s)	Device is starting
Green	Flashing slowly	
Green	On	Device ready-to-operate
Green	Flashing rapidly	Firmware update in progress
Orange	Flashes 2×	Confirmation that the network settings have been reset using the Reset button (see section)"17. Reset the Energy Management System's network settings" or confirmation that the device password has been reset (see section "18. Reset the Energy Management System's password")
Red	On	Error - see section "20. Troubleshooting"
Red	Flashing	
Orange	On (>10 s)	

Network LED

Colour	Status	Description
-	Off	No connection
Green	On	Link
Green	Flashing	Activity

Serial bus LED

Colour	Status	Description
-	Off	No connection
Green	Flashing rapidly	Connection active
Green	Flashing slowly	Scanning active
Red	On	Error - overload at 9 V output
Orange	Flashing	Error - remote station not responding

13. Electrical connection for direct measurement

It must be ensured, by fitting a fuse, for example, that the maximum permitted current per phase is not exceeded.

1 Install the Energy Management System on a DIN rail. To do this, hook the Energy Management System onto the top edge of the DIN rail and press down until it latches into place.
2 Connect the conductors to the Energy Management System. Do not exceed the permitted connection cross section and tightening torque for the screw terminals (see section "7. Technical specifications"):
   - For a three phase power network, connect the outer conductors L1, L2 and L3 and the neutral conductor N to the Energy Management System as shown in the connection diagram.
   - For a single phase power network, connect the outer conductor L1 and neutral conductor N to the Energy Management System as shown in the connection diagram.

The following figure contains a connection example.

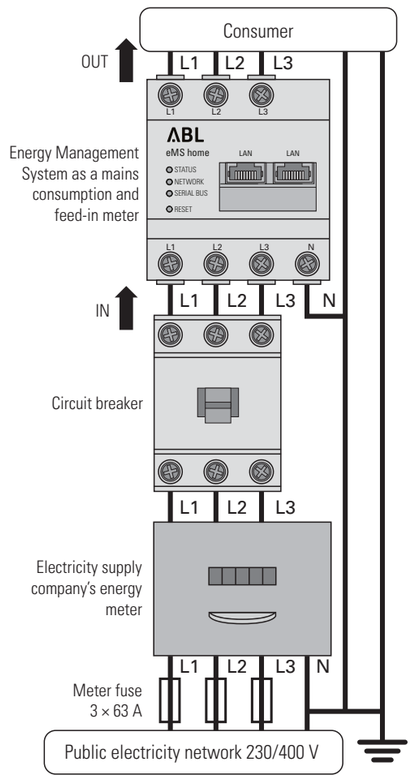
The end user must be able to isolate the Energy Management System from the power supply by means of a freely accessible meter fuse or an additional circuit-breaker.

WARNING!

Check correct allocation of the phases

Make sure that the phases are all correctly allocated, otherwise the Energy Management System will return incorrect measured values.

Figure: Connection for direct measurement



Designation	Explanation
L1, L2, L3	Outer conductor
N	Neutral
OUT	Meter output, consumer side
IN	Meter input, mains side

14. Electrical connection for indirect measurement with current transformers

1 Install the Energy Management System on a DIN rail. To do this, hook the Energy Management System onto the top edge of the DIN rail and press down until it latches into place.
2 Connect a current transformer to each outer conductor L1, L2 and L3.

DANGER!

Danger of death by electric shock at the current transformer terminals

Due to the type of connection, there is a mains voltage of 230 V present at conductors k/s1 and l/s2.

- To prevent accidents, put up a notice with this information at this location on site.

3 Connect a cable for the secondary current measurement to terminals k/s1 and l/s2 on each current transformer. Do not exceed the permitted connection cross section for the Energy Management System (see section "7. Technical specifications").
4 Connect the connecting cable for the current measurement to the Energy Management System and do not exceed the permitted tightening torque for screw terminals (see section "7. Technical specifications").
5 Connect the connecting cable for the voltage measurement to the Energy Management System and do not exceed the permitted tightening torque for screw terminals (see section "7. Technical specifications").
6 Connect the connecting cables for the voltage measurement to the outer conductors L1, L2 and L3.

The following figure contains a connection example.

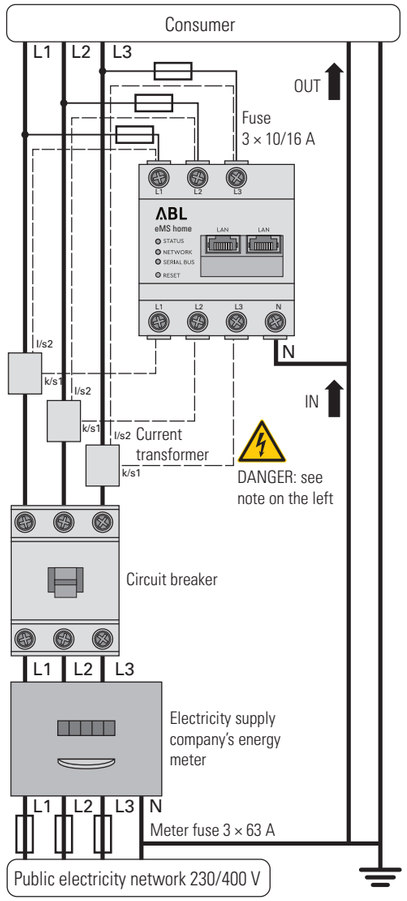
The end user must be able to isolate the Energy Management System from the power supply by means of a freely accessible meter fuse or an additional circuit-breaker.

WARNING!

Check correct allocation of the phases

Make sure that the phases are all correctly allocated, otherwise the Energy Management System will return incorrect measured values.

Figure: Connection for indirect measurement with current transformers



Designation	Explanation
L1, L2, L3	Outer conductor
N	Neutral
OUT	Meter output, consumer side
IN	Meter input, mains side

15. Set-up

Note: Only start up the Energy Management System with a PC / laptop.

1 Attach the cover or the contact guard of the sub-distribution board to the Energy Management System.
2 Connect the network cable to the network connection of the Energy Management System.
3 Connect the other end of the network cable to a router/switch or directly to the PC/laptop.
4 Restore the power to the sub-distribution board.
   - The LEDs on the Energy Management System light up during start-up.

16. Start the user interface

Find the Energy Management System on the network (using the UPnP function)

Note: On Windows computers, the UPnP service automatically detects the Energy Management System on the same network and displays it in the network environment. This allows users to find the unit on the network even if they do not know the IP address. To be able to do this, your local network must be set to 'Home network' or 'Work network' but not to 'Public network'. The UPnP function is enabled in the Energy Management System at the factory.

1 Open File Explorer and select the "Network" option beneath the drives.
2 The Energy Management System appears with the other network devices such as printers.
3 Double-click the device icon with the product name and serial number (example: eMS home-xxxxxxx) to open the browser with the user interface of the Energy Management System.

Start the user interface using the IP address

1 Enter the Energy Management System's IP address in your browser's address line.
2 Press Enter
   - The Energy Management System user interface opens.

17. Reset the Energy Management System's network settings

- Use a pointed object to press the Reset button as follows:
  1 × short (0.5 second), then within 1 second:
  1 × long (between 3 and 5 seconds).

18. Reset the Energy Management System's password

- Use a pointed object to press the Reset button as follows:
  1 × long (between 3 and 5 seconds), then within 1 second: 1 × short (0.5 second)

If the command was recognised correctly, the Status LED flashes orange twice (see section "12. LED statuses"). The password is reset to the factory default (see rating plate on the device).

19. Restarting the Energy Management System

- Use a pointed object to press the Reset button for at least 6 seconds.

20. Troubleshooting

The status LED does not light up.

The Energy Management System is not being supplied with power.

- Make sure that at least the outer conductor L1 and the neutral conductor N are connected to the Energy Management System.

The status LED lights up or flashes red.

An error has occurred.

- Restart the Energy Management System (see section "19. Restarting the Energy Management System").
- Please contact your service engineer or installation engineer.

The network LED does not light up or the Energy Management System is not found on the network.

The network cable is not plugged into the network connection correctly.

- Make sure that the network cable is plugged into the network connection correctly.

The Energy Management System is not on the same local area network.

- Connect the Energy Management System to the same router/switch.

The serial bus LED flashes orange or red-green.

- Check the message under sensor settings on the web interface to identify which sensors are no longer responding. If necessary, test the wiring to the sensor or replace the sensor.

The Energy Management System provides unrealistic readings.

The Energy Management System was not installed correctly.

- Check connections L1 to L3 again.
- The current transformers are not configured. Activate the current transformer on the web interface and set the correct transformer ratio.

The user interface cannot be started via the Energy Management System's current IP address.

- Contact the network administrator.
- You can find further information in the corresponding installation manual.
  https://www.ablmobility.de/en/service/downloads.php#bedienungsanleitungen

21. Environmentally-friendly disposal

Dispose of the Energy Management System in accordance with the electronic waste disposal regulations that apply on site.

22. Open source licenses

This product also contains open source software that was developed by third parties. This relates, in particular, to the GPL and LGPL licenses.

You will find the license text and associated notes on the user interface of the Energy Management System.

23. Contact

If you have technical problems, please contact your service engineer or installation engineer.

Kontakt / Contact

ABL

ABL GmbH

Albert-Büttner-Straße 11
91207 Lauf an der Pegnitz
Germany

+49 (0) 9123 188-0
+49 (0) 9123 188-188

info@abl.de
www.ablmobility.de

CE