

1. Scope

This document applies to the OptiBee Energy Manager with LAN, USB and RS485 communication interfaces.

In the following, this will be referred to as the Energy Manager.

2. Symbols used

Warning notice	Explanation
 DANGER	Failure to comply will result in immediate death or serious injury.
 WARNING	Failure to comply may result in death or serious injury.
 CAUTION	Failure to comply may result in minor injuries.
ATTENTION	Failure to comply may result in property damage.

3. Intended use

The Energy Manager 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 electricity meter for active energy consumption as defined by EU Directive 2004/22/EC (MID); It is not intended for billing-relevant measurements. The data that the Energy Manager 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 Manager must only be connected in the sub-distribution board or consumer unit, downstream of the utility meter.

The Energy Manager is suitable for indoor use only.

The Energy Manager is approved for use in the EU Member States and the UK. Only use the Energy Manager if it is undamaged and in accordance with 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 Beeker Tech GmbH & Co. KG 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

For information on the supported products, the individual functions of your preinstalled software and firmware updates, go to the Energy Manager product page at <https://www.beeker-tech.com>.

5. Safety instructions

This chapter contains safety instructions that must be observed when working on and with the product.

To avoid personal injury and property damage and to ensure long-term operation of the product, read this chapter carefully and follow the safety instructions.

 **DANGER**



Danger of death by electric shock.

Live components carry potentially fatal voltages.

- Installation and maintenance work may only be carried out by an authorized electrician.
- Install the Energy Manager only in approved enclosures or distribution boards downstream of the electricity supply company's meter so that the connections for the line and neutral conductors are located behind a cover or guard to prevent accidental contact.
- The enclosures or electrical distribution boards may only be accessible using a key or tool.
- 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.
- Before cleaning, switch off the power to the Energy Manager and only use a dry cloth to clean.
- Maintain the prescribed minimum distances between data cables (network, USB, and RS-485 cables) and mains voltage installation components or use suitable insulation.

 **WARNING**



Danger to life due to overvoltage

When data cables are laid outdoors, lightning strikes, for example, can cause power surges that damage the internal insulation of the Energy Manager. Continuous operation is not permitted.

- When laid outdoors, data cables and their counterpart (inverter, charging station, etc.) must be protected by suitable surge protection.

 **CAUTION**

System-wide malfunction

The Energy Manager is a subcomponent in complex systems.

- Devices that process data from the Energy Manager must ensure that no measurement data or incorrect measurement data leads to a hazard.
- The Energy Manager is not approved for controlling systems that must ensure fail-safe operation (e.g. life support systems).
- A functional failure or malfunction of the system consisting of the Energy Manager and other components may cause a power failure by tripping a fuse, which must not lead to any danger.

ATTENTION

Damage to the Energy Manager

Improper use may damage or destroy the Energy Manager.

- Do not operate the Energy Manager outside the specified technical data.

6. Technical data

Interfaces	LAN (10/100 Mbit) RS485 (half-duplex, max. 115200 baud)
Protection class	II
IP code	IP2X
Pollution degree	2
Connection cross section in line with EN 60204	10-25 mm² * *Mechanical: 1.5-25 mm (e.g. for connecting external current transformers)
Tightening torque for screw terminals	2.0 Nm
Weight	0.3 kg
Dimensions	88x70x65 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}	6.0 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 %

 **WARNING**



Danger of death by electric shock or fire

Operation of the Energy Manager at elevated ambient temperatures of max. 55°C is only permitted under the following conditions.

- Continuous operation is not permitted.
- The fuse rating for direct measurement must not exceed 32 A. For higher currents, only indirect measurement with a current transformer is permitted.
- The Energy Manager must be connected with cables that are at least 10 mm² in cross section and no less than 1 m long.

7. Items supplied

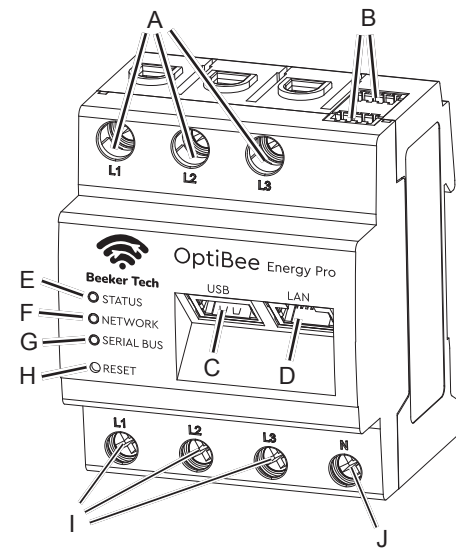
- 1 x OptiBee Energy Manager
 - 1 x installation instructions
 - 2 x connector for RS485 interface
- Please contact your dealer if you identify any damage or if the delivery is incomplete.

Additional materials required (not supplied):

- For the LAN connection:
1 x network cable
- 1 x USB cable, 2 x RS-485 cables
- For operation with current transformers:
3 x current transformers and current transformer connecting cables

8. Product description

Figure: Front view of the Energy Manager



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

9. RS485 interface

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

Requirement for the cable:

- Nominal voltage/wire insulation: 300 V RMS
- Cable cross section: 0.25 ... 1.5 mm²
- Cable type: Rigid or flexible

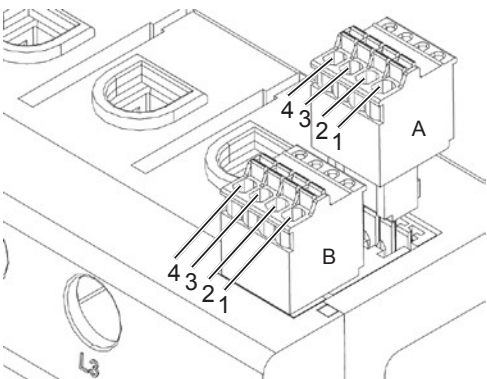
Requirement for cable installation:

- In the area for connecting the RS485 interface on the Energy Manager, 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 connected device:

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

Figure: RS485 connector



Connection diagram for RS485 connector:

Pin	Identification	Description
1A, 1B	VCC	Voltage output to supply external Devices * 1
2A, 2B	GND	Ground
3A, 3B	A	RS485 A
4A, 4B	B	RS485 B

*1 max. 500 mA for USB and RS485

10. USB-port

 **WARNING**



Danger to life due to electric shock

USB cables connected to the USB port may only be routed in front of the switch cabinet panel.

- The maximum length is limited to 50 cm.
- Only a USB flash drive is permitted as the connected device.
- An antenna connected to the USB stick via cable may only be laid and mounted in front of the cover.

11. LED states

LED states	
	Off
	Flashing slowly
	Flashing rapidly
	Permanently on

Status LED	
	Device is starting
	Device ready-to-operate
	Firmware update in progress
	Confirmation for resetting the network settings or device password (see section "15. Operation")
	Error - see section "16. Fault finding"

Network LED	
	No connection
	Link
	Activity

Serial bus LED	
	No connection
	Connection active
	Scanning active
	Error – overload at output
	Error – connected device not responding

12. Electrical connection

Designation	Explanation
L1, L2, L3	Phase
N	Neutral
OUT	Output, consumer side
IN	Input, mains side

The phase L1 and the neutral N must be connected to supply power to the Energy Manager.

The Energy Manager must be able to be switched off by the end user using a freely accessible meter fuse or an additional switch.

ATTENTION

Incorrect measurement data due to incorrect phase assignment

— Ensure that the phases are correctly assigned.

A. 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 Manager on a DIN rail. To do this, hook the Energy Manager onto the top edge of the DIN rail and press down until it latches into place.
2. Connect the conductors to the Energy Manager. Do not exceed the permitted connection cross section and tightening torque for the screw terminals (see section "6. Technical data"):
 - For a three phase power network, connect the line conductors L1, L2 and L3 and the neutral conductor N to the Energy Manager as shown in the connection diagram.
 - For a single phase power network, connect the line conductor L1 and neutral conductor N to the Energy Manager as shown in the connection diagram.

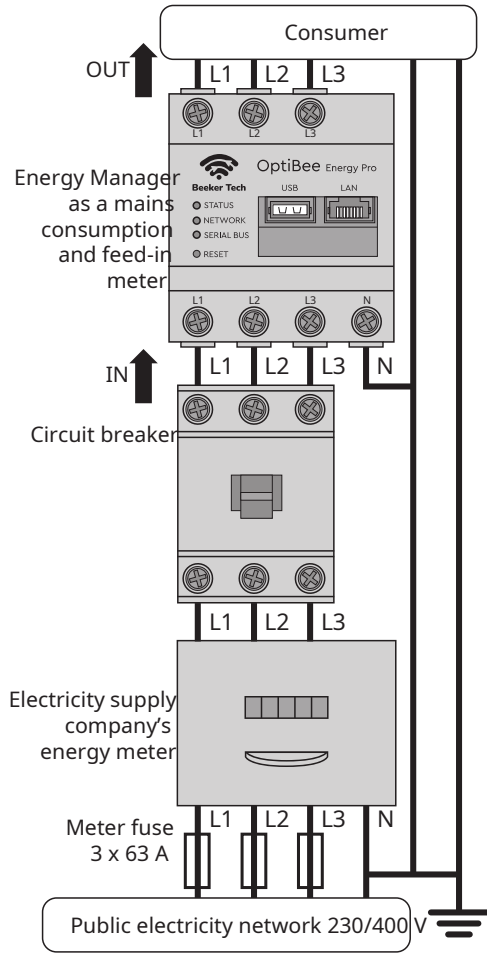
WARNING

Danger to life due to fire

In the event of an external short circuit, there is a risk of fire without current limitation.

— When connecting in direct measurement mode, the voltage inputs L1, L2, and L3 must each be protected with a selective circuit breaker of type E with a maximum rating of 63 A.

Figure: Connection for direct measurement



B. Indirect measurement with current transformers

1. Install the Energy Manager on a DIN rail. To do this, hook the Energy Manager onto the top edge of the DIN rail and press down until it latches into place.
2. Connect a current transformer to each line 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.

— Disconnect the system from the power supply before disconnecting the current transformers from the Energy Manager.

— Only switch the system back on once the current transformers have been completely and correctly connected.

— Display a notice with this information on site to prevent accidents.

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 Manager (see section "6. Technical data").

4. Connect the connecting cable for the current measurement to the Energy Manager and do not exceed the permitted tightening torque for screw terminals (see section "6. Technical data").
5. Connect the connecting cable for the voltage measurement to the Energy Manager and do not exceed the permitted tightening torque for screw terminals (see section "6. Technical data").

WARNING

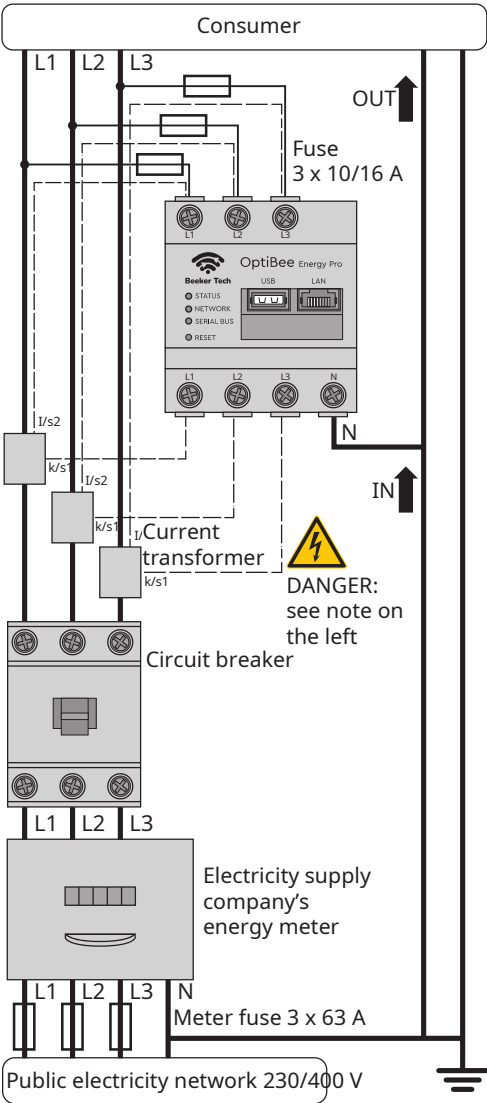
Danger to life due to fire

In the event of an external short circuit, there is a risk of fire without current limitation.

— When operating with current transformers, the voltage inputs L1, L2, and L3 must each be protected with a type B circuit breaker with a maximum rating of 16 A.

6. Connect the connecting cables for the voltage measurement to the line conductors L1, L2 and L3.

Figure: Connection for indirect measurement with current transformers



13. Set-up

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

1. Attach the cover or the contact guard of the sub-distribution board to the Energy Manager.
2. Connect the network cable to the network connection of the Energy Manager.
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 Manager light up during start-up.

14. User interface

Access via the IP address:

1. Enter the IP address of the Energy Manager in the address bar of your browser.
2. Pressing the Enter key opens the Energy Manager user interface in the browser.

Access via hostname:

The Energy Manager can be accessed directly via its hostname in the web browser.

Procedure:

1. Open a web browser.
2. Enter the hostname of the device in the address bar (example: <https://obem400p-A1B2C3D4.local>). Alternatively, you can scan the QR code on the device with a smartphone or tablet.
3. After entering the hostname or scanning the QR code, the Energy Manager user interface opens automatically in the web browser.

15. Operation

The following functions can be performed by pressing the reset button with a pointed object.

Reset the Energy Manager's network settings:

- Press the reset button as follows:
 - 1x briefly (0.5 seconds), then within 1 second: 1x long (3 to 5 seconds)

Resetting the Energy Manager password:

- Press the reset button as follows:
 - 1x long (3 to 5 seconds), then within 1 second: 1x short (0.5 seconds)

If the command is recognized correctly, the status LED flashes orange twice (see section "11. LED states"). The password is reset to the factory default setting (see type label on the device).

Restart the Energy Manager:

- Press the reset button for at least 6 seconds.

16. Fault finding

Further notes can be found in the FAQs at <https://www.beeker-tech.com>.

The status LED does not light up.

The Energy Manager is not being supplied with power.

- Make sure that at least the line conductor L1 and the neutral conductor N are connected to the Energy Manager.

The status LED lights up or flashes red.

An error has occurred.

- Restart the Energy Manager (see section "15. Operation").
- Please contact your service engineer or installation engineer.

The network LED does not light up or the Energy Manager 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 Manager is not on the same local area network.

- Connect the Energy Manager 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 Manager returns unrealistic measured values.

The Energy Manager was not connected 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 Manager's current IP address.

- Contact the network administrator.

17. Environmentally-friendly disposal

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

18. 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 Energy Manager user interface.

19. Contact

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

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