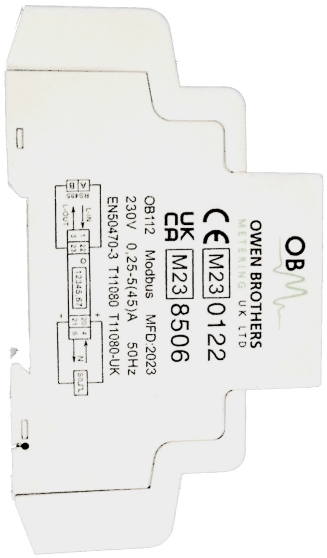
OB112 MODBUS 45A Direct Connected

Single phase two wire DIN Rail energy meter with MODBUS protocol
- MID approval

One module 17.5mm width



User Manual

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1.1 Safety instructions

Information for Your Own Safety

This manual does not contain all of the safety measures for operation of the equipment (module, device), because special operating conditions, and local code requirements or regulations may necessitate further measures. However, it does contain information which must be read for your personal safety and to avoid material damages. This information is highlighted by a warning triangle and is represented as follows, depending on the degree of potential danger.

Warning
This means that failure to observe the instruction can result in death, serious injury or considerable material damage.

Caution
This means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage.

Qualified personnel

Operation of the equipment (module, device) described in this manual may only be performed by qualified personnel. Qualified personnel in this manual means person who are authorized to commission, start up, ground and label devices, systems and circuits according to safety and Regulatory standards.

Use for the intended purpose

The equipment (device, module) may only be used for the application specified in the user manual, and only to be connected with devices and components recommended and approved by Owen Brothers Metering UK LTD.

Proper handling

The prerequisites for perfect, reliable operation of the product are proper transport, proper storage, installation and proper operation and maintenance. When operating electrical equipment, parts of this equipment automatically carry dangerous voltages. Improper handling can therefore result in serious injuries or material damage.

- ✧ Use only insulating tools.
- ✧ Do not connect while circuit is live (hot).
- ✧ Do not connect the meter to a 3 phase - 400VAC – network.
- ✧ Place the meter only in dry surroundings.
- ✧ Do not mount the meter in an explosive area or expose the meter to dust, mildew and insects.
- ✧ Make sure the wires are suitable for the maximum current of this meter.
- ✧ Make sure the AC wires are connected correctly before activating the current/voltage to the meter.
- ✧ Do not touch the meter connecting clamps directly with metal, blank wire and your bare hands as you may get electrical shock.
- ✧ Make sure the protection cover is placed after installation.
- ✧ Installation, maintenance and reparation should only be done by qualified personnel.
- ✧ Never break the seals and open the front cover as this might influence the function of the meter, and will cause no warranty.
- ✧ Do not drop, or allow strong physical impact on the meter as the high precisely components inside may be damaged.

Disclaimer
We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible.
However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors contained in the information given. The data in this manual is checked regularly and the necessary corrections are included in subsequent editions. We are grateful for any improvements that you suggest.

Subject to technical modifications without notice

1.2 Foreword
Thank you for purchasing the OBM OB112 Modbus series DIN rail single phase two wire energy meter. With the OBM product range we have provided a large scale of energy meters on the market suitable for 110V AC to 400V AC (50 or 60Hz).

We produce the OB112 Modbus series meter according to EN 50470-3 and our strict quality inspection

Under normal conditions your product should give you years of benefit and pleasure. In case there is a problem with the energy meter you should contact your dealer immediately. All energy meters are sealed with a special seal. Once this seal is broken there is no possibility to claim for warranty. Therefore, NEVER open meter by yourself or break the seal of the energy meter. The warranty time is 12 months after installation, and only valid for construction faults.

1.3 Performance criteria:

Operating humidity	≤ 75%
Storage humidity	≤ 95%
Operating temperature	-25°C - +55°C
Storage temperature	-30°C - +70°C
International standard	IEC62052-11 and IEC62053-21 EN 50470-1 and EN 50470-3
Accuracy class	1 / B
Protection against penetration of dust and water	IP51
Insulating encased meter of Protective class	Ⅱ
The mechanical and electromagnetic environment classes	B

1.4 Specifications:

Meter type	OB112 MODBUS (LCD display)
Nominal voltage (Un)	230V AC
Operational voltage	(-15% ～ +15%)Un
Insulation capabilities:	
- AC voltage withstand	4KV for 1 minute
- Impulse voltage withstand	6KV – 1.2μS waveform
Basic current (Ib)	5A
Maximum rated current (Imax)	45A
Operational current range	0.4% Ib- Imax
Over current withstand	30Imax for 0.01s
Operational frequency range	50Hz ±10%
Internal power consumption	≤2W / 10VA
Test output flash rate (RED LED)	1000 or 2000imp/kWh
Pulse output rate (pins 20 & 21)	1000 or 2000imp/kWh
Consumption indicator (RED LED)	Flashing at load running

1.5 Basic errors:

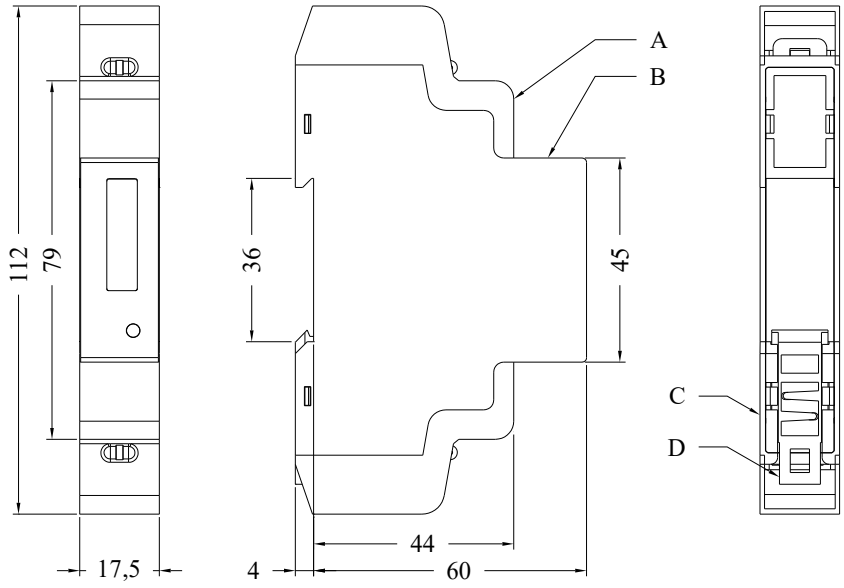
0.05Ib	Cosφ = 1	±1.5%
0.1Ib	Cosφ = 0.5L	±1.5%
	Cosφ = 0.8C	±1.5%
0.1Ib - Imax	Cosφ = 1	±1.0%
0.2Ib - Imax	Cosφ = 0.5L	±1.0%
	Cosφ = 0.8C	±1.0%

1.6 Description

A	LCD	B	Terminal block
C	Case	D	Protection cover

Material

Register	PC inflammable retarding
Case	ABS inflammable retarding
Terminal block	ABS inflammable retarding
Protections cover	ABS inflammable retarding



1.7 Dimensions

Height	112 mm
Width	17.5 mm
Depth	60 mm
Weight	0.1 Kg (net)

1.8 Installation

Connection of the wires should be done in accordance with the underneath connection diagram.

Connection diagram:

1	Inlet phase line
6	Inlet neutral line
3	Outgoing phase line
4	Outgoing neutral line
20 and 21	Pulse output contact
22	RS485 A
23	RS485 B

1.9 Operating

Consumption indication

There is a LED which has two colors (green and red) while flashing in the front panel of OB112 Modbus series. When consumption happens, the LED will flash and display red. The more quickly LED flash, the more consumption there is.

Reading the meter

The OB112 MODBUS energy meter is equipped with 5+2 LCD display (6+1 LCD display available) which is used as recording consumption and can't be reset to zero. The reading accuracy is 1/10 kWh (1/100 kWh).

Pulse output

The OB112 Modbus Series DIN rail energy meter is equipped with a pulse output which is fully separated from the inside circuit. That generates pulses in proportion to the measured energy for accuracy testing. The pulse output is a polarity dependent, passive transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage (Ui) should is 5-27V DC, and the maximum input current (Imax) is 27mA DC. To connect the impulse output, connect 5-27V DC to connector 20 (anode), and the signal wire (S) to connector 21 (cathode).

S0 output

0.001kWh/imp (default), 0.001kWh/imp, 0.01kWh/imp, 0.1kWh/imp, 1kWh/imp, 5kWh/imp, 10kWh/imp (to choose)

Display function

Cycle display status, Display cycle can be set within 5~20 seconds, the default is 5 seconds. The display items as following:

Parameters	format	display	LCD display way
Full screen	88888.8.8		Power on
Software version	4 letters		Power on
Baud Rate	BD 2400		Power on
Constant	C (1000 (2000) (1600) (3200)		Power on
ID number	ID 00		Power on
Serial number	Sn L0000(low four digits)		Power on
	Sn H0000 (high four digits)		

Parameters	format	display	LCD display way
Total active kWh	XXXXX. XX (XXXXXX.X)		Cycle display
Import kWh	XXXXX. XX		Cycle display
Export kWh	XXXXX. XX		Cycle display
Voltage	V XXX. X		Protocol settle
Current	A XX. XX		Protocol settle
Active power	P XXXXX		Protocol settle
Power factor	PF X. XX		Protocol settle
Frequency	F XX.X		Protocol settle
Constant	C XXXX		Protocol settle
Baud rate	BD XXXX		Protocol settle
ID number	ID FF		Protocol settle
Serial number	SnXXXX (high four digits)		Protocol settle
	SnXXXX (low four digits)		

RS485 communication specifications:

Bus type	RS485
Protocol	MODBUS RTU with 16 bit CRC
Baud rate	1200,2400(default),4800,9600
Parity	Even
Address range	1-255 user settable
Bus loading	32 meters per bus
Rage	1000m

OB112-MODBUS

Default Settings:	Baud Rate:	2400
	Data Bits:	8
	Parity:	Even
	Stop Bits:	1
	Word / Byte Order	Big Endian: (AB CD)
	Function Code:	4

Item	Register (HEX)	Register (Decimal)	Register Qty	Type	Notes
Total active energy	0x0000	0	2	BCD	
Import active energy	0x0002	2	2	BCD	
Export active energy	0x0004	4	2	BCD	
Voltage	0x0006	6	2	BCD	
Current	0x0008	8	2	BCD	
Active power	0x000A	10	2	BCD	
Power factor	0x0010	16	2	BCD	
Frequency	0x0012	18	2	BCD	
Modbus ID	0x0018	24	1	BCD	0 – 255
Baud rate	0x001D	29	1	BCD	04: 1200 08: 2400 10: 4800 20: 9600
Parity	0x0050	80	1	BCD	00: Even 01: Odd 02: None

1.10 Trouble shooting

Problem	Check	Solution
No light for the Power supply indicator (Phase A, B & C LED).	Is correct AC power supply connected to the meter? Is the A, B, or C and N connecting correct? Is the terminals 1, 3, and4,,6 connecting correct ?	Check switch or circuit-breaker and fuse or thermal cut-off. Re-install terminal screws on the A, B, C and N. Make sure all screws are fixed. Than there should be a 230V 50Hz AC voltage between the terminal screws on the N and A or B or C, when power supply is input. Reinstall terminal screws on the 1, 2, 3, 4, 5, 6 and 7. Make sure all screws are fixed. Than there should be a 230V 50Hz AC voltage between the terminal screws on the 7 and 1 or 3 or 5, when power supply is input.
No light for the communication indicator (COM LED)	Is there a power supply inside the meter? Does any equipment outside communicate with the meter?	Check that the power supply Only when the communication between the meter's infrared port Or the RS485 port and the equipment outside, The LED will blink
No communication Of RS485 wire data with the meter	Is the meter ID correct? Is the communication distance too long? Are there too many meters connected to RS485 Line?? Is the RS485 port connection correct?	Check the Meter ID. Default ID 1. Shorten the communication distance between the reading equipment outside and the meter. not more than 1200m RS485 Line Max 32 Devices The correct connection is: the A signal wire of RS485 main wire to the meter terminal 22, the B signal wire of RS485 main wire to the meter terminal 23

Problem	Check	Solution
The LCD energy register can't run.	Is the load running? Is the operating power too low? Maybe there is a fault in the inside circuit.	Only when load is running, RED LED is burning continue, the LCD energy register will run. If the operating power is too low, the spacing interval of the pulses will take some more time. This is why it seems like the LCD energy register can't run
No pulse output.	Is DC power supply connected to the meter? Is the connecting correct?	Check the external voltage source (Ui) is 5-27V DC. Check correct connecting: Connect 5-27V DC to connector 3 (anode), and the signal wire (S) to connector 2 (cathode).

1.11 Technical support

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www.owen-brothers.com