

User Manual
Revision 2.001
English

Smart energy meter

OB418 Series



www.owen-brothers.com

Benefits and Main Features

- Single phase metering 4 din modules ,Standard DIN rail Format (DIN43880)
- EN50470-3 Class B.
- Bi-directional active Import/Export , Bi-directional reactive measurement
- Records MD and its current time for the latest 12 months
- Instant Volt, Amp, Power factor, Frequency, Active power, Reactive power, Apparent power
- TOU of 4 tariffs, up to 12 time periods per day
- Summer time switch
- Clock time verification function
- Non volatile memory, including 1-12 month energy consumption, MD and MD's current time & historical time stamps.
- Isolate pulse output and IR (DIN43864)
- LCD display, 6 integer 2 decimal, meter display when power fails
- Large clear display with backlight
- Internal transformer
- Direct metering up to 100A
- RS485 communication port, Modbus protocol
- IR port
- Program by button on the nameplate
- Memory back-up (EEPROM)
- MID approval Annex B & D
- The meter is intended to be installed in a Mechanical Environment 'M1', with Shock and Vibrations of low significance, as per 2004/22/EC Directive and should be installed in Electromagnetic Environment 'E2', as per 2004/22/EC Directive.



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1. Safety notice

PLEASE NOTE: WE SUPPLY THESE METERS ON THE ASSUMPTION THEY WILL BE INSTALLED BY A QUALIFIED ELECTRICIAN FAMILIAR WITH THE INSTALLATION OF METERING EQUIPMENT. All meters must be installed according to applicable wiring diagram. Incorrect connections to the electricity network will cause major display problems and can cause serious damage to the meter. Before starting meter operation, it must be ensured local conditions of the energy system are consistent with the meter type and configuration. Make sure that cables (conductors) are not damaged during installation of the meter, not energized and are appropriate for the installation in question. Capacitors within the meter may still be charged even after disconnection from all energy sources.

2. Content of delivery

Single phase, electronic energy meter, instructions for assembly

ID setting

Baud rate setting

Password setting

3. Declaration of Conformity

Declaration of Conformity

We, Owen Brothers Metering UK Ltd
New Phoenix Works
Glen Trading Estate
Wellyhole Street
Oldham
United Kingdom
OL4 3BF

Ensure and declare that apparatus:
OB418

With the measurement range
230V - 0.5-10(100) A - 50Hz - 16000kWh - Modbus

Volts, Amps, Power factor, Frequency, Active power, Reactive power, Apparent Power
Import & Export kWh

Are in conformity with the type as described in the
EC-type examination certificate SGS0194

And satisfy the appropriate requirements of the Directive 2004/22/EC with the following standards:

EN 50470-1: 2006, Electricity metering equipment (AC) Part 1: General requirements, tests and test conditions. Metering equipment (class indexes A, B and C)

And

EN 50470-3: 2006, Electricity metering equipment (AC) Part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)



Company stamp and signature
Owen Brothers Metering UK Ltd
Unit 8 Glen Trading Estate
Wellyhole Street
OLDHAM OL4 3BF, England



4. Technical description

4.1 Performance criteria

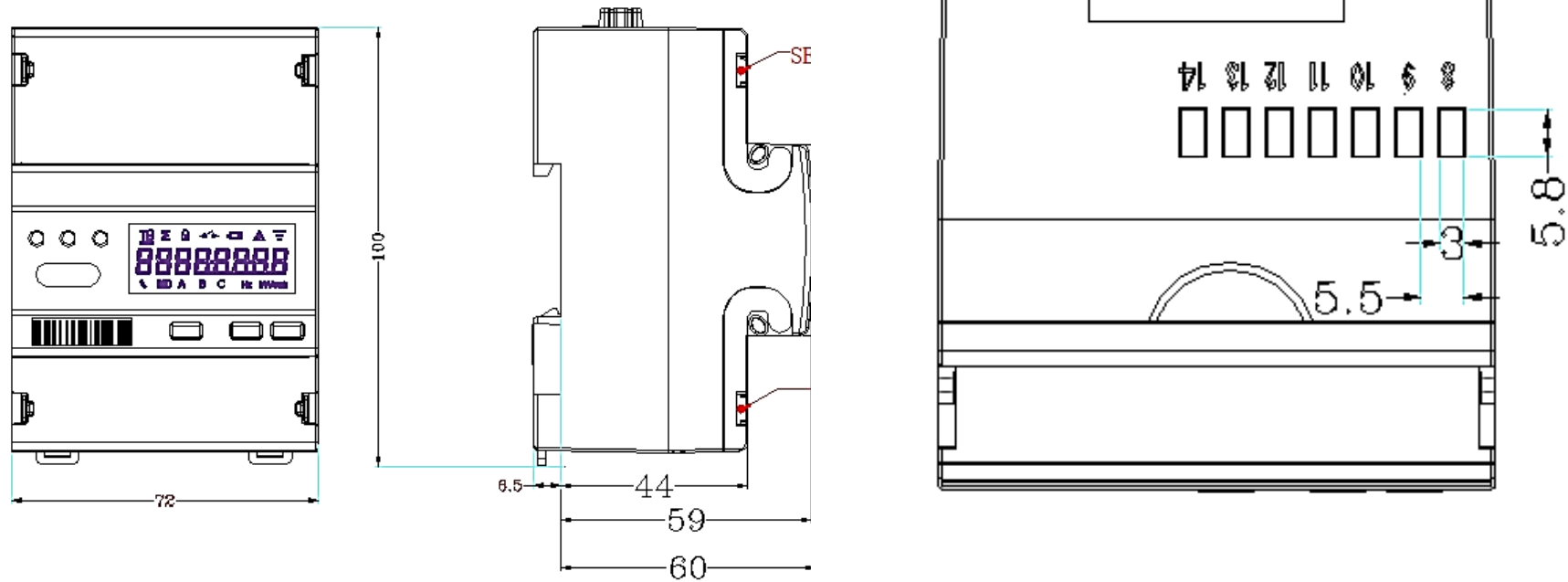
Operating humidity	≤ 75%
Storage humidity	≤ 95%
Operating temperature	-25°C - +55°C
Storage temperature	-40°C - +70°C
Humidity (Relative)	0 to 95%,non-condensing
International standard	EN50470-3 & IEC62053-21
Accuracy class	B
Protection against penetration of dust and water	IP51
Insulating encased meter protective class	II
Install place	Indoor Meter
Connection area main terminals	
Current terminals flexible 1×mm ²	0-16mm ²
Other terminals flexible 1×mm ²	0-2.5mm ²

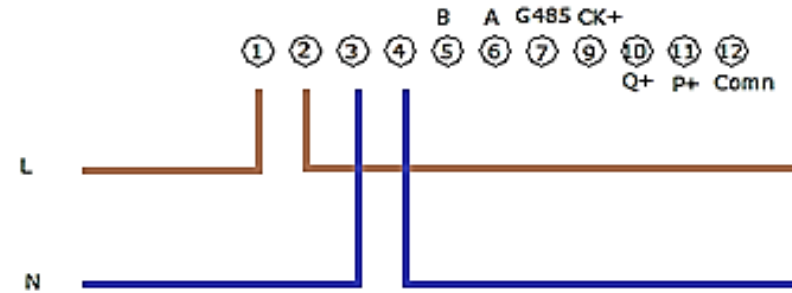
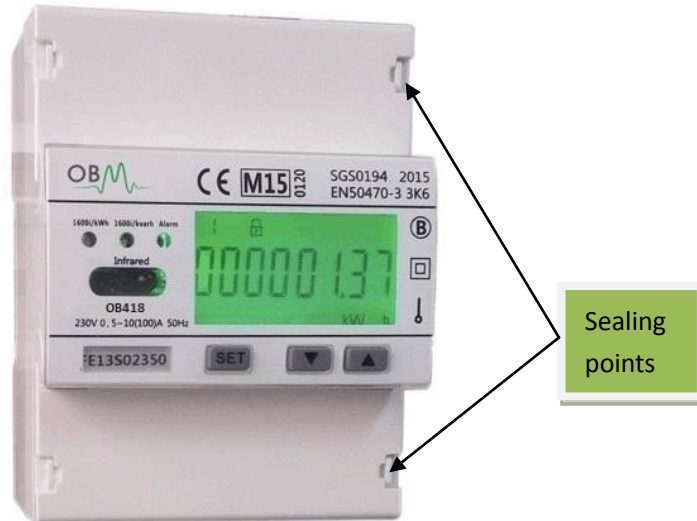
4.2 Meter specification

Voltage(v)	230V
Operational voltage	70%~ 130%Un
- Iref	10A
-Itr	1A
-Imax	100A

-Imin	0.5A
-Ist	40mA
Power consumption of current circuits(VA)	< 0.01
Power consumption of voltage circuits(W)	< 1.3W
Frequency (Hz)	50
Memory back-up	EEPROM
Environment resistance to heat and fire	Terminal 960°C Cover 650°C
Time-keeping accuracy	<0.5s/day
Clock operating with battery	>15 years
Power off clock running time	>5 years
Upper	ABS+PC
Lower	ABS+PC
Pulse width(ms)	80
Pulse constant(imp/kWh)	1600
LED constant	1600
Width (mm)	72
Height (mm)	10
Depth (mm)	60

5. Dimensions and sealing points





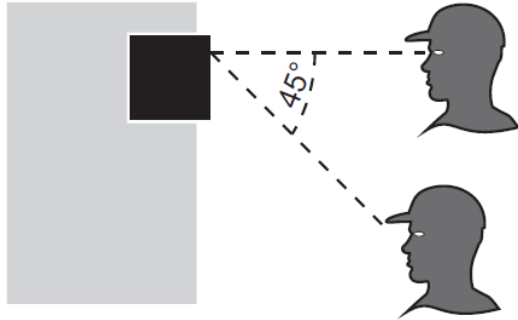
- 1/2 L1 in &Out
- 3/4 Neutral in &Out
- 5/6 /7 RS485 Communication contact
 TX/RX(-) , Terminal 5
 TX/RX(+) Terminal 6
- G485 (⊥) Terminal7
- 11/12 Active test pulse output contact(12-,11+)
- 10/12 Reactive test pulse output contact(12-,10+)
- 9/12 Clock test pulse output contact(12-,9+)

6. Wiring diagrams

Note: the following types of wiring diagrams show the energy meter terminals for pulse output and the RS485 communication interface. However, depending on the part number of the energy meter only some terminals are involved.

7. Meter reading

Operator viewing angle should be up to 45°



8. Main functions

a) Measuring Function

On the OB418'S front panel, there are three LED, active/reactive energy pulse light, and current reverse indicator lights.

The Meter can measure import active energy, export active energy, Bi-directional reactive energy.

With time-division measurement functions, user can store or calculate active and reactive energy according to the time interval of 4 tariffs (Sharp, Peak, Even, Valley).

8.2 Demand function

The meter can calculate the forward and reverse active/reactive demand and the demand occurrence time for the last 12 months.

Max demand can be set by with a Demand interval and slip Frequency time (Parameters are programmable). Factory default: demand interval is 15mins, slip Frequency is 1min.

It can store Max demand data for 12 periods.

8.3 Data storage function

The meter can store total active energy, Import/Export active total energy and TOU Tariffs ~ reactive Import/Export total energy including time-stamp, four-quadrant reactive total energy including time-stamp.

Data point is at 0'clock at the end of a month or any day of a month on the hour.

The meter can store the current and previous 12months data.

When the meter has no power, all settlement –related data will be saved for 10 years, other data is preserved for 3 years.

8.4 TOU function

The internal real time clock function has automatic switching functions.

Calendar, clock and rates can be set or adjusted through RS485, infrared interface (HHU).

At least 4 tariffs and 12 time intervals can be set within a natural day, min time interval is 15 minutes. Time interval can be set beyond Zero o'clock.

The Meters also automatically accounts for leap-years.

8.5 Electricity parameter measurement

Measure record and display voltage, current, active power, reactive power, apparent Power and power factors. error is not more than $\pm 1\%$. The resolution of frequency is 0.01Hz.



8.6 Display function

OB418 meters have two cycle schemes: Auto cycle display and manual button press.

When pressing the buttons, Users can view parameters accordingly. Button press will illuminate the LCD. Display cycle interval can be set @ 5~20 seconds, the default is 5 seconds.

The meter display schemes can be configured by IR and RS485. The meter can display max 20 screens within auto cycle and 40 screens within the button press cycle. The default

display items are as follows:

Instantaneous values

No	Comments	Read	Write	Bytes	Starting address
1	Voltage	Y	N	4	0010
2	Frequency	Y	N	4	004E
3	Current	Y	N	4	0052
4	Active power	Y	N	4	0092
5	Apparent power	Y	N	4	00D2
6	Reactive power	Y	N	4	0112
7	Power factor	Y	N	4	0152

Total energy accumulator

No	Comments	Read	Write	Bytes	Starting address
8	Active energy net	Y	N	4	0700/0618
9	Active energy import	Y	N	4	0800/0160
10	Active energy export	Y	N	4	0900/0166
11	Reactive energy import	Y	N	4	0A00/0162
12	Reactive Energy export	Y	N	4	0B00/0168

Energy accumulators divided into tariffs

No	Comments	Read	Write	Bytes	Starting address
13	Active net total	Y	N	4	0700
14	Active net Tariff 1	Y	N	4	0702
15	Active net Tariff 2	Y	N	4	0704
16	Active net Tariff 3	Y	N	4	0706
17	Active net Tariff 4	Y	N	4	0708
18	Active import total	Y	N	4	0800
19	Active import Tariff 1	Y	N	4	0802
20	Active import Tariff 2	Y	N	4	0804
21	Active import Tariff 3	Y	N	4	0806
22	Active import Tariff 4	Y	N	4	0808
23	Active export total	Y	N	4	0900
24	Active export Tariff 1	Y	N	4	0902
25	Active export Tariff 2	Y	N	4	0904
26	Active export Tariff 3	Y	N	4	0906
27	Active export Tariff 4	Y	N	4	0908
28	Reactive import total	Y	N	4	0A00
29	Reactive import Tariff 1	Y	N	4	0A02
30	Reactive import Tariff 2	Y	N	4	0A04
31	Reactive import Tariff 3	Y	N	4	0A06
32	Reactive import Tariff 4	Y	N	4	0A08
33	Reactive export total	Y	N	4	0A00
34	Reactive export Tariff 1	Y	N	4	0A02

35	Reactive export Tariff 2	Y	N	4	0A04
36	Reactive export Tariff 3	Y	N	4	0A06
37	Reactive export Tariff 4	Y	N	4	0A08

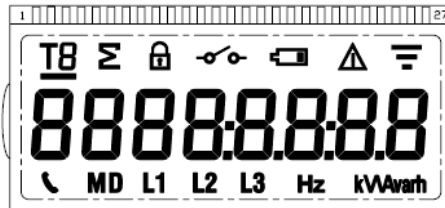
Production data and identification

No	Comments	Read	Write	Bytes	Starting address
38	Serial number	Y	Y	4	FF00
39	Manufacture code	Y	Y	4	FF02
40	Type code	Y	Y	2	FF04
41	Hardware version	Y	Y	2	FF05
42	Software version	Y	Y	2	FF06

Settings

No	Comments	Read	Write	Bytes	Starting address
43	Date	Y	Y	4	FC00
44	Time	Y	Y	2	FC02
45	Modbus id	Y	Y	2	0524
46	Baud rate	Y	Y	2	0525

LCD content



Description of LCD symbols displayed

Symbol	Description
kVAvarh	kWh—active energy kW—active power kvarh—reactive energy kvar—reactive power

	kVA—apparent power
	Total
	Unpermitted programming
	Battery status:3.6V When the battery voltage is low, flashes show (<3V)
	LCD alarm indicator
	Communication symbols
	Max demand
	Tariff: T1,T2,T3,T4
	Tariff of current time
	<div style="display: flex; justify-content: space-around;"> Last1 month Last2 month </div> <div style="display: flex; justify-content: center; margin-top: 10px;"> last 3 month </div>

8.7 Switching on the display

When the power is off, users can read the meter by pressing buttons on the panel.

The user can interrogate readings which were displayed before power loss.

8.8 Summer/winter time switch permit/prohibition

OB418 meter provides automatic summer/winter time switching accomplished at 02:00 on the last Sunday of March (forward 1 hours) and at 03:00 on the last Sunday of October (back 1 Hours). Summer/winter time switch can be permitted or prohibition by RS485 or IR port.

8.9 Communication Function


Infrared and RS485 COMs. Physical layers are independent of each other. One communication channel cannot be affected by the other. The meter can realize data acquisition, broadcast time settings, read, program and debug through hand-held terminals, data acquisition units, Ethernet, GSM/GPRS, test equipment and computers.

Communication protocols fit Modbus RTU standard.

RS485 circuit and energy meter internal circuit are electrically isolated with built in short protection.

RS485 communications transfer rates allow 1200bps, 2400bps, 4800 bps and 9600bps, default is 2400bps.

8.10 Alarm function

When the meter connect wire wrong example: current reverse, the meter will display  , the ALARM led will be on.

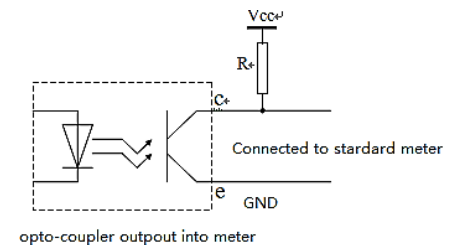
8.11 Pulse output function

8.11.1 Active/reactive pulse output

OB418 smart meters are equipped with a pulse output which is fully separated from the live circuits. That generates pulses in proportion to the measured energy .including the pulse

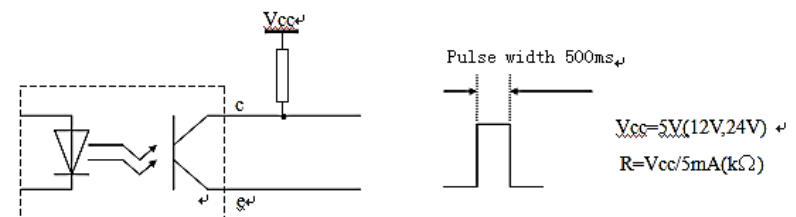
output of active energy and reactive energy. 11/ 12 Test pulse output contact (P+/P-), 10/ 12 Test pulse output contact (Q+/Q-)

The test 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 be 5-27V DC, and the maximum input current (Imax) should be 27mA DC. To connect the impulse output, connect 5-27V DC to connector 10&11 (anode), and the signal wire (S) to connector 12 (cathode). The meter pulses is indicated on the front panel.



8.11.2 Multi-function signal output

Terminal 9 and 12 are the Multi-function signal output ports. The common status is 1Hz for meter's clock accuracy testing. Testing diagram as below:

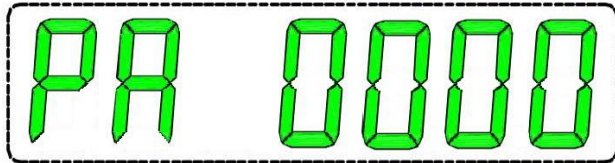


The terminals can be setup to switch to demand circle signal output and time output by RS485 and Infrared. When the meters power is off it will switch to 1Hz clock pulse output.

9 Programming

Holding the “SET” key pressed for at last 3 seconds, starts menu programming mode.

LCD will show:



9.1 password verify

On the smart meter display will appear : PA followed by the currently memorized value . “PA” means “Password”, “0000” means the 4 digits of the Password. we can use press “Page Down” button to decrease the input value, and press “Page Up” to increase the input value ,press the “SET” button to switch the input Password digits, when the Password is correct, the meter will enter “program status” and display the “ID” program interface.

Remarks:

Please remember the Password, Password default (####).

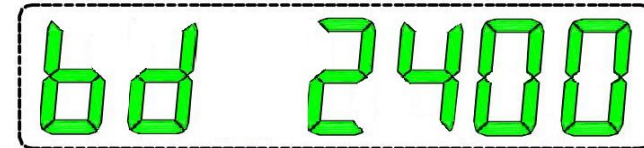
9.2 ID setting

After the Password authentication , the meter will display the “ID XX” setup interface. As the following picture “Id 00” it means the current ID address is 00 (the ID slave address hex code)



Press “Page Down” button to decrease the digits. press “Page Up” to increase the digits, press “SET” button to save the setup, the interface will switch to Baud rate setup interface automatically. Press “SET” button to enter next interface if you do not need to change the baud rate.

9.3 Baud rate setting

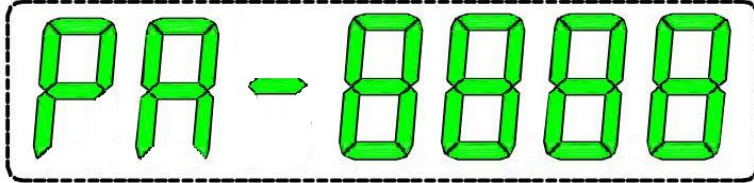


we can use press “Page Down” button to decrease the input value, and press “Page Up” to increase the input value ,press the “SET” button to switch the input digits, when the baud rate is correct, the meter will enter “program status” and display the password setting.

Remarks:

1. default baud rate will be 9600bps
2. 1200/2400bps /4800bps/9600bps can be set

9.4 Password setting:




The meter will display the current password after entering the password setup interface, press the “SET” key to change the password. Use “page down” and “page up” button to input password as you want. After 30 seconds the meter will save the password you chose.

Remarks:

- 1 Do not forget the password you setup.
- 2 Please press the buttons to check if setup is correct.
- 3 Password setup interface “-” symbol will blink.

10. Battery replacement.

When the battery symbol”  ” blinks on the LCD, it means the battery volume is low.

Users can replace the battery as follows:

- ★ Open the meter terminal cover.
- ★ Open the battery cover.
- ★ Put new battery inside(connect positive pole with“+” , connect negative pole with“-” , then tighten the terminal screws)
- ★ close both battery cover and meter terminal cover.

11. Technical support

Any questions, please contact:

TEL: +44(0)161624211

FAX: 0870 6220424

Email: sales@owen-brothers.com

support@owen-brothers.com

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