User Manual
Revision 2.002
English

Smart energy meter

Owen Brothers Metering UK Ltd.

Benefits and Main Features

- ✓ Single phase metering
- ✓ Standard DIN rail Format (DIN43880)
- ✓ CI.1 Accuracy (ENS0470)
- ✓ Energy consumption LED, reverse current LED,
- ✓ Communication LED
- ✓ Isolated pulse output and IR (DIN43864)
- ✓ LCD display, 6 integer 1 decimal
- ✓ LCD backlight
- ✓ Internal transformer
- ✓ Direct metering up to 100A
- ✓ Smart communication port, RS48S Modbus RTU
- ✓ Can be set through front panel or via communications
- ✓ Memory back-up (EEprom)
- ✓ 4 DIN modules
- ✓ CE approval
- ✓ MID 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.

Index:

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 the applicable wiring diagram.

Incorrect connections to the electricity network will cause major display problems and can also 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 installation and operation

3. Technical description

3.1 Survey of types/Ordering numbers

The OB415 series is labeled as follows:

OB415 . 1 . 1

Communication type:

2= pulse output:

1 = Pulse output &M-bus

0= Pulse output, IR &RS485

Ordering numbers	Communication output
415-S	Pulse output
415-Mb	Pulse output &M-bus
415-MOD	Pulse output, IR &RS485

3.2 Performance criteria

Operating humidity	≤ 75%
Storage humidity	≤ 95%
Limit range of operating temperature	-25°C - +55°C(3K6)
Limit range for storage temperature	-25°C - +55°C(1K4)
Humidity	75% yearly average,95% on 30 days/year
International standard	EN50470-3 &IEC62053-21
Accuracy class	CI.1
Protection against penetration of dust and water	IP51
Insulating encased meter protective class	D

Connections: main terminals

Current terminals -flexible 1×mm ^{2} 0-16mm ^{2}

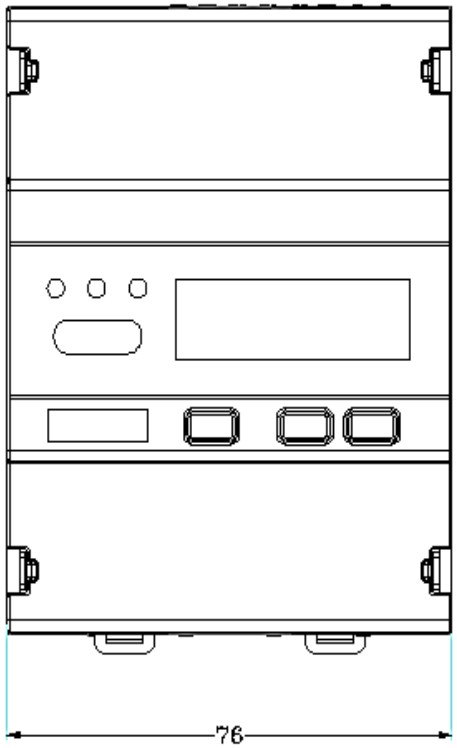
other terminals flexible 1×mm^2 0-2.5mm^2

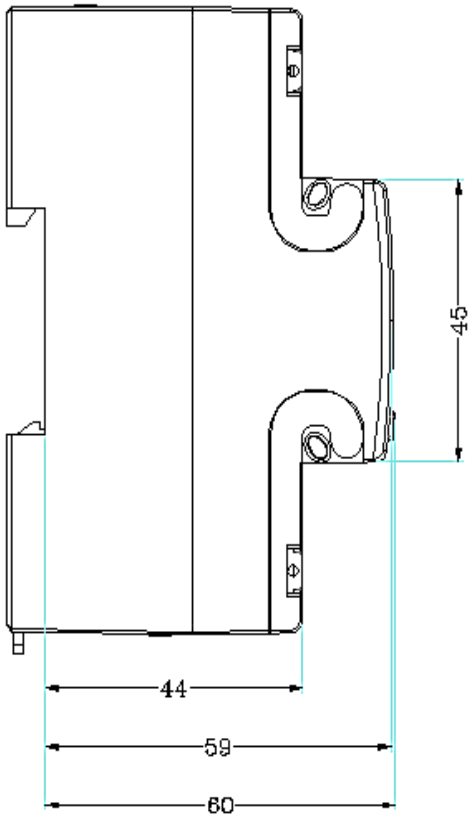
3.3 Meter specification

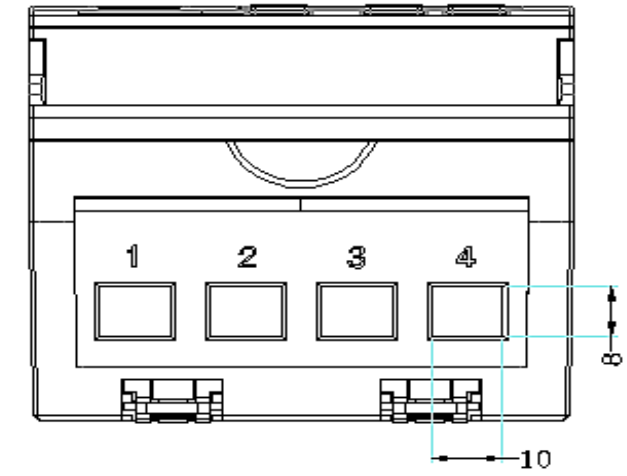
Voltage(v)	220/230V
Operational voltage	70%-130%Un
- Iref	10A
-Itr	1A
-Imax	100A
-Imin	0.5A
-Ist	40mA
Power consumption of current circuits(VA)	< 0.01
Power consumption of voltage circuits(W)	< 1.3W
General data	
Frequency (Hz)	50/60
Memory back-up	EEprom
Environment resistance to heat and fire	Terminal 960℃ Cover 650℃
upper	ABS+PC
lower	ABS+PC
Pulse output	
Pulse width(ms)	80
Pulse constant(imp/kWh)	1600

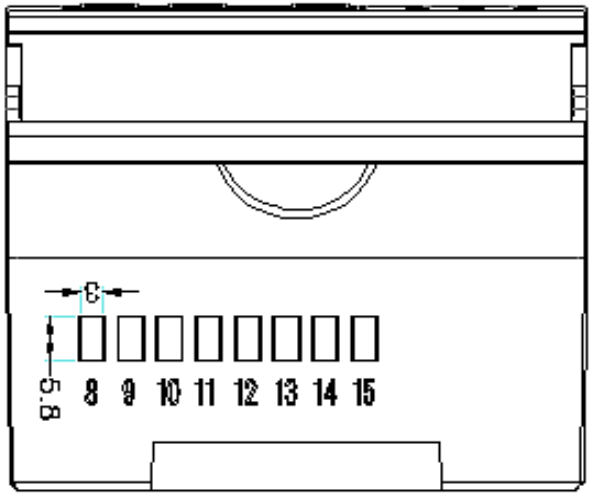
LED constant	1600
Width (mm)	72
Height (mm)	104.5
Depth (mm)	60

4. Dimensions and sealing points







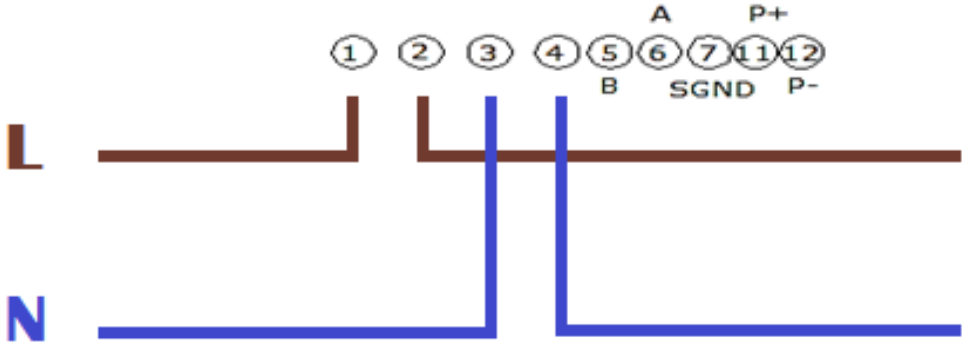


5. Wiring diagrams

Please Note:the following types of wiring diagrams showing this meter, include terminals for pulse output and RS485 communication interface. However, OB415-S Model is pulse only.

5.1 Direct connected meter

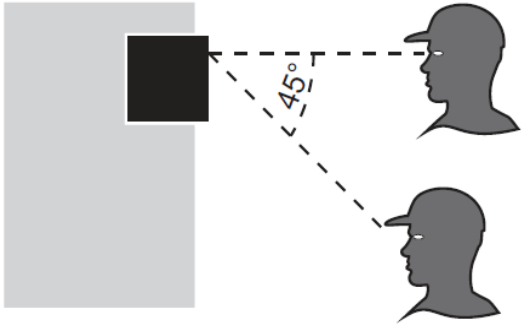
S.1.1 41S.1.2 diagram



1/2	Phase in & out
3/4	Neutral
5&6	RS485 Communication contact
	TX/RX(-) , Terminal 5
	TX/RX(+) Terminal 6
	G485 (⊥) Terminal7
11 &12	Test pulse output contact (12—,11+)

6. Meter reading

the view angle Operator--meter should be up to 45^0



7. Main function

7.1 Measuring Function

On the OB415'S front panel, there are three LED's, representing the Active energy pulse, reverse phase &/or communication. The constant of the impulse is shown on the nameplate of the meter.

The smart energy meter is equipped with 6+1 LCD display, which is used for recording consumption and can't be reset to zero. The numerical system is based on units of 10, 1 unit equals to 1 kWh. We can also read parameters via RS485, PC software or HHU's (hand held unit).

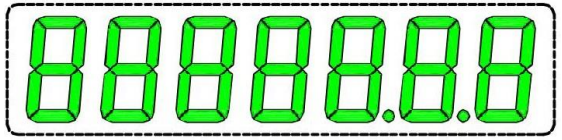
7.2 Display functionn

OB415 has four display cycles: self-inspection, cycle display & manual "button press".

Display and program status.

Self--inspection:

Full screen display:



Meter version number:

active energy:

Id:

Serial number (high 5 bit): Sn=00000 1303019

Serial number (low 7bit):

Baud rate:

Cycle status:

Meter display as follows: active energy, id, Serial number, Baud rate. Display cycle is 3 seconds.

Button press display:

Meter display as follows: Meter version number, Baud rate, Serial number. active energy

7.3 Communication Function

With an infrared COM and a RS485 COM or M-bus COM. Its physical layers are lindependent o f each other. One communication channel will not be affected by the other one.

The infrared communication port is on the right of the LCD. It is a infrared wireless communication port used with a HHU (hand held unit) & can directly communicate the data between the meter and this port. The data transmission speed is 1200bps.

The communication distance is max 5m.

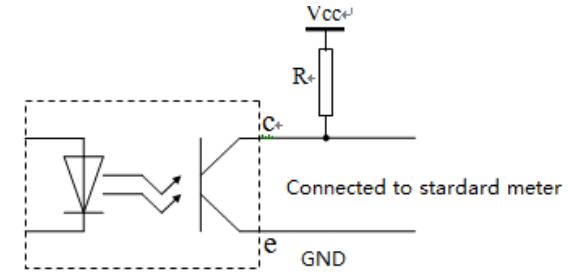
. There are two options for the communication ， RS485 or M-bus.

	RS48S output
Protocol	Modbus RTU
Data format	8 data bit,NONE,1 stop bit
Baud rate	1200(option),2400,4800,9600
Address range	1-256 User settable
Bus loading	64pcs
Cable	AWG18

7.4 Pulse output function

The OB415 Smart Meter is equipped with a pulse output which is fully separated from the live circuit that generates pulses in proportion to the measured energy, including the testing pulse output of active energy and reactive energy. 12- / 11+ Test pulse output contacts (P+/P-).

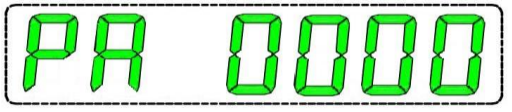
The pulse output is a polarity dependent, passive transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage (Ui) should be 5-27V DC, and the maximum input current (Imax) should be 27mA DC. To connect the impulse output, connect 5-27V DC to connector 12 (anode), and the signal wire (S) to connector 11 (cathode). The meter pulse is indicated on the front panel.



opto-coupler outpout into meter

8 Programming

By holding the keys “SET” pressed for at last 3 sec., starts menu programming mode. LCD will show:



Password setup interface “--“ symbol will blink.

8.1 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 well the Password, you can only reset the Password to default (8888) by opening the meter and short connect the “CLEAR” on PCB board.

8.2 ID setting

After the Password authentication , the meter will display the “ID XX” setup interface. As the following picture ”Id 01” it means the current ID address is 01 (the ID address is hex code)

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

Please Note：Type 415.1.1 meters without communication function do not have the setup interface

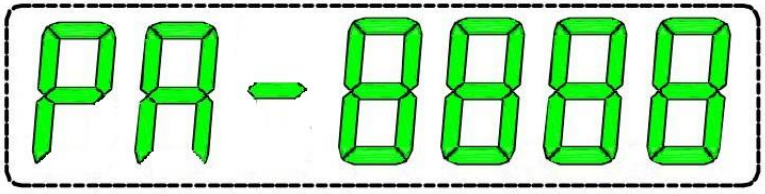
8.3 Baud rate setting

Press “Page down” and “page up” buttons to select the communication baud rate, press “PRO” button to save the setup.the interface will enter CT setup.

Remarks

1. Type 415.1.0 default baudrate will be 1200bps
2. Type 415.1.1 default baudrate will be 2400bps
3. Type 415.1.2 without communication function do not have the setup interface

! Password setting：



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

Remarks:

1 Do not forget the password you setup.

2 Please press the button to check if every setup is correct after the program.

9. Technical support

Any questions, please contact:

TEL: **0161 627 1275**
FAX: **0870 622 0424**
Email: **support@owen-brothers.com**

Basic errors

Value of current	Power factor	Errors	Test pulse number
Imin	1.0	±1.5%	4
Itr	1.0	±1.0%	4
Itr	0.5ind	±1.5%	4
Itr	0.8cap	±1.5%	4
10Itr	1.0	±1.0%	8
10 Itr	0.5ind	±1.0%	8
10Itr	0.8cap	±1.0%	8
Imax	1.0	±1.0%	12
Imax	0.5ind	±1.0%	12
Imax	0.8cap	±1.0%	12

Declaration of Conformity

We, Owen Brothers Metering UK Ltd

www.owen-brothers.com

Ensure and declare that apparatus:

OB415-S/OB415-Mb/OB415-Mod

With the measurement range

230V, 0.5-10(100)A, 50Hz, 1600imp/kWh

Are in conformity with the type as described in the

EC-type examination certificate SGS0202

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)

2 . 9 . 15

Company stamp and signature

Owen Brothers Metering UK Ltd
Unit 6 Glen Trading Estate
Wellyhole Street
OLDHAM OL4 3BF, England