

User Manual Revision 3.001

English

## OB737-CT Smart Energy Meter

OB737 0.075-1.5(6)A



[www.owen-brothers.com](http://www.owen-brothers.com)

### Benefits and Main Features

- CT metering with programmable CT Ratio
- Three phase metering 7 din modules.
- Standard DIN rail Format (DIN43880)
- EN50470-3 Class B
- Bi-directional active Import / Export, Bi-directional reactive measurement
- Records Maximum Demand and its current time for the latest 12 months
- Instant Volts, Amps, Power factor, Frequency, Active power, Reactive power, Apparent power.
- TOU (Time of Use) up to 4 tariffs, up to 12 time periods per day
- Summer time switch
- Clock time verification function
- Non-volatile memory, including 1-12 month's energy consumption, MD and MD's current time & historical time stamps
- Isolate pulse output and IR (DIN43864)
- LCD display, 6 integer 2 decimal,
- Meter displays when power fails (Battery Backup)
- Large clear display with backlight
- Internal transformer
- RS485 communication port, Modbus protocol
- IR port
- Program by button on the name plate
- Memory back-up (EEPROM)
- MID approved. 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
2. Content of delivery
3. Declaration of Conformity
4. Technical description
  - 4.1 Performance criteria
  - 4.2 Meter specification
5. Dimensions and sealing points
6. Wiring diagrams
7. Meter reading
8. Main functions
  - 8.1 Measuring Function
  - 8.2 Demand function
  - 8.3 Data storage function
  - 8.4 TOU (Time of use) function
  - 8.5 Electricity parameters measurement
  - 8.6 Display function
  - 8.7 Switching on the display
  - 8.8 Summer/winter time switch permit/prohibition
  - 8.9 Communication
  - 8.10 Alarm
  - 8.11 Pulse output function
    - 8.11.1 Active/reactive pulse output
    - 8.11.2 Multi functions signal output
9. Programming
  - 9.1 Password verification
  - 9.2 Baud rate setting
  - 9.3 Address setting
  - 9.4 Password setting
  - 9.5 CT Ratio setting
10. Battery replacement
11. Technical support

## 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.

Ensure CT's are installed correctly as per the wiring diagram with the correct polarity. Installing with incorrect polarity will cause the meter to run in reverse.

Primary            P1 = Mains            P2 = Load  
Secondary        S1 = Terminals 1,3,5    S2 = Terminals 2,4,6

### Health & Safety Notice:

If a current transformer is operated with the secondary open circuit, 50v RMS or more may be generated at the secondary leads or terminals.

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

We, Owen Brothers Metering UK Ltd  
New phoenix Works  
Glen Trading Estate  
Oldham  
OL4 3BF  
UK

Ensure and declare that apparatus:

**OB737 CT**

With the measurement range

**3 x 230/400V, 3 x 0.075-1.5(6)A, 50Hz, 6400imp/kWh**

Are in conformity with the type as described in the

**EC-type examination certificate SGS0147**

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 6 Glen Trading Estate  
Wollyhole Street  
OLDHAM OL4 3BF, England

## 4.2 Meter specification

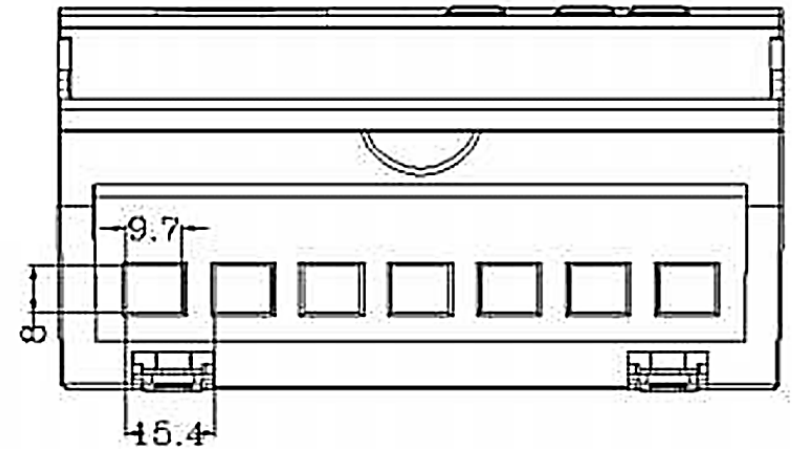
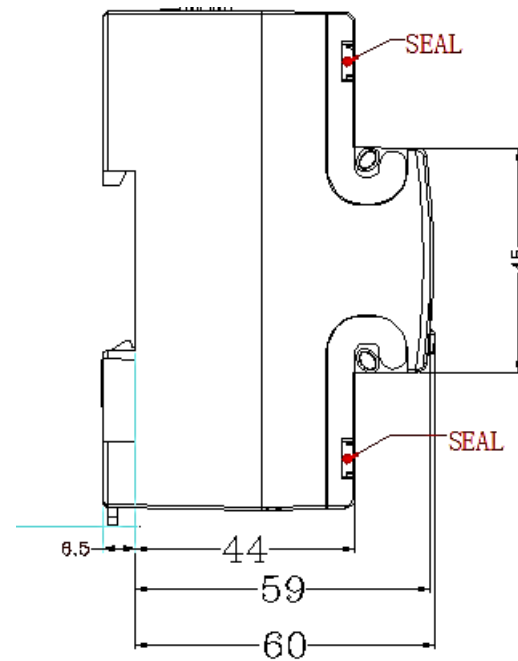
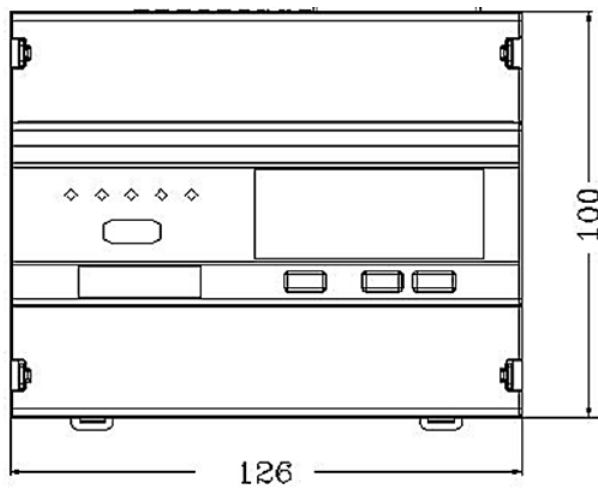
### 4. Technical Description

#### 4.1 Performance criteria

Operating humidity	≤ 75%
Storage humidity	≤ 95%
Operating temperature	-25°C to +55°C (3K6)
Storage temperature	-40°C to +70°C (1K4)
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× 0 - 25 mm <sup>2</sup>
Other terminals flexible	1× 0 - 2.5 mm <sup>2</sup>

Voltage(v)	3x 230/400V
Operational voltage	±70%Un
-Iref	10A
-Itr	1A
-I <sub>max</sub>	100A
-I <sub>min</sub>	0.5A
-I <sub>st</sub>	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)	400
LED constant	400
Width (mm)	126
Height (mm)	104.5
Depth (mm)	60

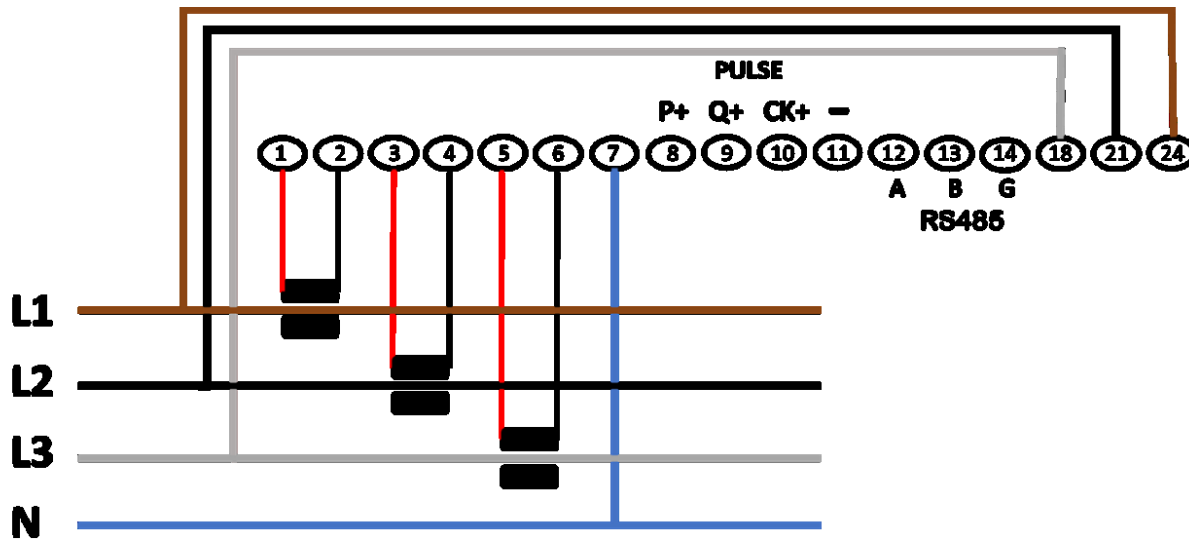
## 5. Dimensions and sealing points



### Sealing Points



### 6. Wiring Diagram



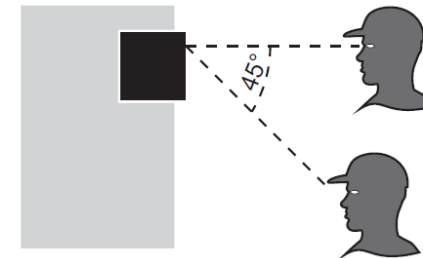
### Terminal

### Function

1/2	L1 in & Out - CT (S1, S2)		
3/4	L2 in & Out - CT (S1, S2)		
5/6	L3 in & Out - CT (S1, S2)		
7	Neutral		
8/11	Active test pulse output contact (8+, 11-)		
9/11	Reactive test pulse output contact (9+, 11-)		
10/11	Clock test pulse output contact (10+, 11-)		
11	Pulse -		
12	RS485	A	TX/RX (+)
13	RS485	B	TX/RX (-)
14	RS485	GND	
18	UL3		
21	UL2		
24	UL1		

### 7. Meter reading

Operator viewing angle should be up to 45°



## 8. Main functions

### 8.1 Measuring Function

On the OB737'S front panel are three LED's, Active / Reactive energy pulse and Alarm 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. Maximum demand can be set by with a Demand interval and slip frequency time (Parameters are programmable). Default: demand interval is 15 minutes, Slip Frequency is 1min. Can store maximum 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 12 months 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 (Time of Use) Function

The internal real time clock has automatic switch function. Calendar, clock and rates can be set or adjusted through RS485 or infrared interface (HHU). Up to 4 tariffs and 12 time intervals can be set within a natural day, minimum time interval is 15 minutes. Time interval can be set beyond Zero o'clock. The Meter also automatically accounts for leap-years.

### 8.5 Electricity Parameter Measurement

Measure and display voltage, current, active power, reactive power, apparent Power and power factors. Error is not more than  $\pm 1\%$ .

### 8.6 Display Information

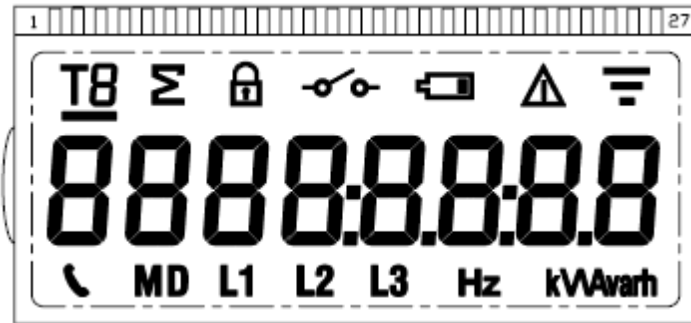
The OB737 meter has two cycle schemes: Auto cycle display and manual button press. When pressing the buttons, users can view parameters accordingly. Button press will illuminate the LCD. Display cycle interval can be set @ 5~20 seconds, the default is 5 seconds. The meter display schemes can be configured by IR and RS485. The meter can display maximum 20 screens within auto cycle and 40 screens within the button press cycle.



Address (hex)	Length (bytes)	Parameter Name	Access (R/W)	Function code	Data Format	Units
0x0010	4	Voltage L1	R	04/03	Float/ Hex	V
0x0012	4	Voltage L2	R	04/03	Float/ Hex	V
0x0014	4	Voltage L3	R	04/03	Float/ Hex	V
0X004E	4	Frequency	R	04/03	Float/ Hex	Hz
0X0050	4	Current L1	R	04/03	Float/ Hex	A
0X0052	4	Current L2	R	04/03	Float/ Hex	A
0X0054	4	Current L3	R	04/03	Float/ Hex	A
0X0056	4	Current Neutral	R	04/03	Float/ Hex	A
0X0058	4	Current total	R	04/03	Float/ Hex	A
0x0090	4	Power L1	R	04/03	Float/ Hex	kW
0x0092	4	Power L2	R	04/03	Float/ Hex	kW
0x0094	4	Power L3	R	04/03	Float/ Hex	kW
0x0096	4	Power Total	R	04/03	Float/ Hex	kW
0x00D0	4	Apparent Power	R	04/03	Float/ Hex	kVA
0x00D2	4	Apparent Power L2	R	04/03	Float/ Hex	kVA
0x00D4	4	Apparent Power L3	R	04/03	Float/ Hex	kVA
0x00D6	4	Apparent Power Total	R	04/03	Float/ Hex	kVA
0x0110	4	Reactive Power L1	R	04/03	Float/ Hex	kvar
0x0112	4	Reactive Power L2	R	04/03	Float/ Hex	kvar
0x0114	4	Reactive Power L3	R	04/03	Float/ Hex	kvar
0x0116	4	Reactive Power Total	R	04/03	Float/ Hex	kvar
0x0150	4	Power Factor L1	R	04/03	Float/ Hex	
0x0152	4	Power Factor L2	R	04/03	Float/ Hex	
0x0154	4	Power Factor L3	R	04/03	Float/ Hex	
0x0156	4	Power Factor Total	R	04/03	Float/ Hex	
0x0160	4	Import Active Energy	R	04/03	Float/ Hex	KWh
0x0162	4	Import Reactive Energy	R	04/03	Float/ Hex	KWh
0x0166	4	Export Active Energy	R	04/03	Float/ Hex	KWh
0x0168	4	Export Reactive Energy	R	04/03	Float/ Hex	KWh
0X0618	4	Total Energy	R	04/03	Float/ Hex	kWh
0x0800	4	Import Active Energy	R	04	Float	KWh
0x0900	4	Export Active Energy	R	04	Float	KWh
0X0700	4	Total Active Energy	R	04	Float	kWh
0x0A00	4	Import Reactive Energy	R	04	Float	Kvarh
0x0B00	4	Export Reactive Energy	R	04	Float	kvarh
0x0524	2	Modbus slave address number	R/W	04/06	16 bit address	
0x0525	2	Modbus slave Baud rate	R/W	04/06	16 bit	1200bps 0x04B0 2400bps 0x0960 4800bps 0x12C0 9600bps 0x2580



LCD content



### Description of LCD symbols displayed

<b>kVAvarh</b>	kWh - active energy kW - active power kvarh - reactive energy kvar - reactive power kVA—apparent power
<b>M</b>	Total
<b>lock icon</b>	Unpermitted programming
<b>battery icon</b>	Battery status: 3.6V When the battery voltage is low flashes show (<3V)

<b>alarm icon</b>	LCD alarm indicator
<b>phone icon</b>	Communication symbol
<b>MD</b>	Maximum demand
<b>T8</b>	Tariff: T1,T2,T3,T4
<b>T8</b>	Tariff of current time
<b>menu icon</b>	Last 1 Month    Last 2 Months    Last 3 Months

### 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 view readings which were displayed before power loss.

### 8.8 Summer Time Switch Enable/Disable

OB737 meter provides automatic summer/winter time switching at 02.00 on the last Sunday of March (forward 1 hour) and at 03:00 on the last Sunday of October (back

1 Hour). Summer time switch can be Enabled or Disabled by RS485 or IR port.

## 8.9 Communication

Infrared and RS485 Communication.

Physical layers are independent of each other and 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 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

Displays when the meters wiring is wrong.

Example: current reverse, the meter will display  and the ALARM led will be on.

## 8.11 Pulse output function

### 8.11.1 Active /reactive pulse output

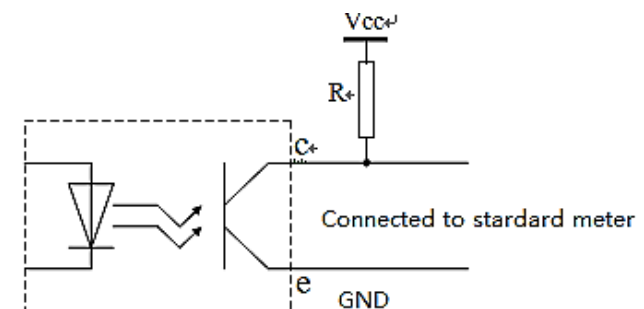
OB737 smart meters are equipped with a pulse output which is fully separated from the live circuits. It generates pulses in proportion to the measured energy including the pulse output of active energy and reactive energy.

Test pulse output contact (P+ / P- 8 / 11)

Test pulse output contact (Q+ / Q- 9 / 11)

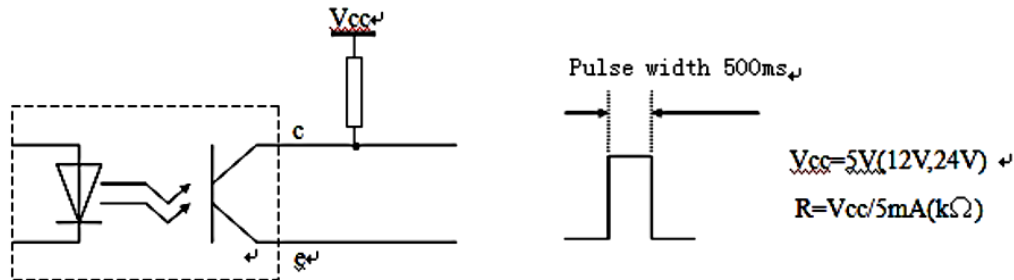
The test pulse output is a polarity dependent, passive transistor output requiring an external voltage source for correct operation. This external voltage source, the voltage ( $U_i$ ) should be 5-27v DC, and the maximum input current ( $I_{max}$ ) should be 27mA DC. To connect the impulse output, connect 5-27v DC to connector 10 or 11 (anode), and the signal wire (S) to connector 12 (cathode).

The meter pulses are indicated on the front panel.



### 8.11.2 Multi-function signal output

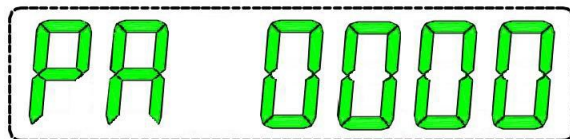
Terminal 9 with 12 is the Multi-function signal output port. The common status is 1Hz for meters clock accuracy testing. Testing diagram as below.



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 shows:



### 9.1 Password Verify

PA followed by the currently memorized value.

"PA" means "Password", "0000" is the 4 digits to enter the Password. Press ▼ button to decrease the input value, and press ▲ to increase the input value. Press "SET" button to input digit and move to next digit. Once the correct password is entered, the meter will enter programming mode.

--- Please ensure to remember password if altered. ---

### 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 ▼ button to decrease the digits.

Press ▲ button to increase the digits.

press "SET" button to save the setup, the interface will switch to Baud rate setup automatically. Press "SET" to skip to next menu item if no changes are required.

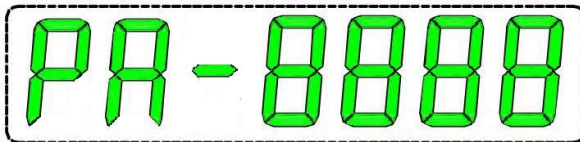
### 9.3 Baud rate setting



Press ▼ button to decrease the input value.  
press ▲ button to increase the input value.  
press the “SET” button to confirm.

1. Default Baud Rate is 9600.
2. 1200/ 2400bps / 4800bps/ 9600bps can be selected.

### 9.4 Password Setting



The meter will display the current password after entering the password setup menu, press the “SET” key to change the password. Use ▲ and ▼ buttons to input new password. After 30 seconds the meter will save the password you chose.

Remarks:

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

### 9.5 CT Ratio Setting




Press ▲ and ▼ buttons to select the required CT Ratio.

<b>CT Ratio's</b>	5/5	50/5	60/5	75/5	100/5	125/5	150/5
	160/5	200/5	250/5	300/5	400/5	500/5	600/5
	750/5	800/5	1000/5	1200/5	1500/5	1600/5	2000/5
	2400/5	2500/5	3000/5	4000/5	5000/5	6000/5	7500/5

Note: If CT ratio is 200 or Greater, the meter display has no decimal place. If the CT ratio is less than 200, the meter display has 1 decimal place.

## 10. Battery Replacement

When the battery symbol  on the display blinks. The battery is running low. Users can replace the battery as follows:

- ★ Open the meter top terminal cover.
- ★ Open the battery compartment cover.
- ★ Replace battery inside and connect positive pole with “+” & connect negative pole with “-”. Tighten the terminal screws.
- ★ Close both battery compartment and meter terminal covers.

## 11. Technical Support

Telephone: +44 (0)161 624 6211  
Fax: +44 (0)870 622 0424  
E-Mail: [Support@owen-brothers.com](mailto:Support@owen-brothers.com)  
E-Mail: [Sales@owen-brothers.com](mailto:Sales@owen-brothers.com)



New Phoenix Works  
Glen Trading Estate  
Wellyhole Street  
Oldham  
United Kingdom  
OL4 3BF

[www.owen-brothers.com](http://www.owen-brothers.com)

## OB737-CT Three Phase CT Smart Meter

