

C2000 Series

MID Approved Multifunction Meter complete with
Modbus RS485 Modbus and Pulse Output



Notes on meter type:

Reference	Spec	Main Deviations
Whole Current (Direct connected) Static Meters for active energy.	230V 10(100)A Multi-tariff 500 imp/kWh	

IEC 62053-21
IEC 62052-11
IEC 62056-21
IEC 62056-61

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1. Features and Applications

C-2000 Energy Meter meets the IEC 62053-21 (Class 1) standard for energy meters. The main features of the product include none physical adjustment components, digital signal processing, digital filters, digital error correcting, digital calibration, immunity to temperature fluctuation, and excellent stability. Due to its twelve times overload multiplier, the meter can record extremely low energy usage.

The basic functions of C-2000 include data processing units active bidirectional (import and export) energy.

Available C-2000 models:

- 1.10 (100) A Constant 500
Range 0 – 9999999.9 kWh

C-2000 Meter data processing functions include:

1.1 Energy Metering

1. Energy measurement using digital measuring chips, therefore metering precision can be digitally verified.
2. Export energy is counted into import energy register too, i.e. import = Export + import. There is another group of energy registers for metering Export energy only, this way C-2000 can flexibly meter bidirectional energy.
3. 4-Tariffs and total energy metering of active import and export energy.
4. There is one pulse output which can be used for verifying pulse or collected by other equipments. The pulse width is 80 ms. Energy pulse will be output upon both active import and export energy.

5. Pulse indication of energy metering using one bright LED which indicates active energy. (The LED's turn-on time equals to the output width of verifying pulse).

1.2 Demand Indicating

1. Calculating functions of active import and export demand include total 2 demand data with the occurrence time of each demand data. The format of date / time stamp is "year (2-digit), month, date, hour, minute". The indication range of demand (including power) is 0 - 99.99 kW.
2. Calculating mode is sliding mode. Sliding interval can be set to 1, 2, 3, or 5 minutes and demand cycle can be set to 5, 10, 15, 30, or 60 minutes. If demand cycle is set to 60 minutes, sliding interval can only be set to 2, 3, or 5 minutes. Demand cycle must be integer multiple of sliding interval.
3. Total demand is not affected when tariff is changed, but a rolling interval before the change will be skipped when calculating tariff demand. The recording will start from zero by eliminating the previous rolling interval. In general, total demand equals a certain tariff demand. But sometimes total demand may exceed all the demand combined. In other words, the maximum demand is recorded when tariff is being changed.

1.3 Instrumentation Data Display

Meter can measure instant voltage, current and power factor, which can be displayed directly on LCD and read through communication.

NOTE:

Because C-2000 displays current (amp) with only two decimal digit, so current smaller than 0.01A will be displayed as 0.

1.4 Time of Use (TOU) Revenue

1. TOU can be controlled by configuring the parameters that are based on the meter's internal hardware real-time clock.
2. "Daily-profile" can divide a day into 10 time sections. Each section can select one of 4 tariffs. The shortest time is one minute, and the longest is one day.

1.5 Automatic Meter Reading

1. C-2000 meter can be configured to record dynamic data at a pre-selected time to achieve the tasks of energy storing and demand reset automatically. The time is specified by 'day/date' and 'hour'.
2. The automatic meter reading cycle is month. The date of automatic meter reading can be set as non-zero value, namely date XX hour XX. Meter-reading date can be chosen from 1 to 28. If user needs to close the billing at 24 hour the end of last day each month, then it will be the same to set it at 0 hour at the first day of each month.
3. Automatic meter reading can be configured to execute energy recording and demand reset.
4. The active energy (kWh) and maximum demand (kW) shall be registered and stored for a period of eight months for billing purpose.

1.6 Neutral connect to earth

If user connects meter's neutral to earth, when load current > 0.5A, the meter will show warning.

1.7 Inputs and outputs

1. Passive pulse output interface with optical-coupling insulation, which meets IEC 62053-31.
2. C-2000 water-proof is up to IP53 level.
3. User can read meter or program meter by optical port, baud rate can update to 2400 bps.

2. Operation Instructions

2.1 Operation

1. Running Mode: In this mode, C-2000 meter automatically display data at given interval as programmed;
When data processing unit is running, LED will flash once an effective energy pulse is registered, no matter which mode it is in.
The red LED (Power indication) will lit on when meter powers up.

2.2 Data display

kWh (8 digit with 1 decimal), KW(2 digits with 2 decimal)

There are 3 types of data display modes:

1. Push button Display: After power up, if user push button, the meter will enter into this state. The display time interval is 60 Seconds(fixed).
2. Automatic Scrolling Display: After power up, C-2000 will enter into Automatic display. The display time interval is 8 Seconds (User can change it with software). The display is automatic and can be used for routine monitoring.
3. RWP (Meter reading without power):
Meter will display active import energy after losing power.

2.3 Meter Programming

Meter's parameters can be configured by optical port from PC or from HHU PR-510. Meter will be shipped with default parameters, to prevent un-authorized programming, meter will disable parameter programming after terminal cover is closed and enter into LOCK mode. Terminal cover is sealed.

2.4 Open Cover record

C-2000 can record up to 8 latest terminal cover open events.

3. Specifications and technical data

3.1 Specifications

Connection:	1 Phase 2-Wire
Voltage:	230V
work range:	161V~276VAC(phase to neutral)
Current:	10(100)A
Frequency:	50Hz
Work temperature:	-30°C to 70°C

3.2 Technical data

3.2.1 Power supply

Meter type	Current (mA)	Power consumption (VA)	Power (W)
230V	40mA	<10	<0.8

3.3 Pulse output

There is one channel of pulse output which will output fixed 80 ms wide telecontrol pulse upon both active import and export energy. The output is passive optical-coupling.

Telecontrol pulse may also be used as verifying pulse.

3.4 Modbus setting

Baud Rate:	9600
Parity type:	Even
Data Format:	Floating point
F.P. Format:	High word first
Modbus Address:	1-999
Wire mode:	Two

3.5 External size and weight

External Size:	102 x 43 x 165 (mm)
Weight:	480g

3.6 Clock

- 1) Real time clock: displaying year, month, day, week, hour, minute, second; in 24-hour format.
- 2) Error: ± 0.5 seconds/day ($23^{\circ}\text{C} \pm 2^{\circ}\text{C}$)

3.7 Backup Battery

- 1) One long-lifetime super lithium battery is provided as power-down protection for real time clock. Lifetime of the super lithium battery: ≥ 20 years.

4. Use, transportation and storage conditions

- Same requirements as indoor meters.
- The number of piling layers should not exceed five in original package.
- Moisture absorbent must be provided inside sealed package.
- It is strictly forbidden to store the meter in the environment of high temperature or dense moisture for long period of time.
- C-2000's LCD and meter cover are anti-ultraviolet. However, to achieve LCD's longest service life, it is recommended not to install C-2000 in environment that exposes to sunlight directly.

5. Warranty

The product will be repaired or replaced free of charge within warranty period if technical data do not comply with the standards when the product has been used properly according to the manufacturer's manual and the seal remains intact.

6. Ordering

Meter types and specifications must be specified in the orders. Either pulse output or data output should be specified.

Appendix A: Display Explanation

1. Display content

1.1 Full screen:



1.2 Explanation of display content:

Symbol	Explanation
0-0:8.8.8*8*8	Display code (OBIS)
T8	T8 Indicate the current tariff number, T1, T2, T3 or T4.
Rx Tx	Rx indicate the meter receive bytes. Tx indicate the meter send bytes.
► Reverse	First arrow which point 'Reverse' lit on, indicate the current is reversed.
► Lock	Second arrow "Lock" flash, indicate terminal cover open.
kWh kvarh VA	kWh : active energy unit Kvarh: reactive energy VA :Voltage and Current

1.3 Explanation of display content

Example	Explanation
	Meter NO. 07324708
1-0:09.2 07.11.09	Meter current date : 07(Day)-11(Month)-09(Year)
1-0:09.1 19.59	Meter current time : 19:59
1-1:18.0 00000 100 kWh	Current month Active import total energy is 100kWh
1-1:18.1 00000000 kWh	Current month Active import tariff 1 energy is 0kWh
1-1:16.0 0 100 kW	Current month Active import total max demand is 1.00kW
1-1:18.0 00000 100 kWh	Last month Active import total energy is 100 kWh.
0-0:F.F.1 00	Warning code : 00 (no warning) 01 (Neutral connect to earth) 02 (Current is reversed) 03 (Terminal cover is open)

1.4 Display indicator explanation

OBIS CODE	Indicator
Full screen	Full screen self check display
1-0:0.0.0	8 digitals of Meter No
1-0:0.9.2	Date(DD-MM-YY)
1-0:0.9.1	Time(HH:MM)
1-1:1.8.0	Current month active import total energy
1-1:1.8.1	Current month active import tariff 1 energy
1-1:1.8.2	Current month active import tariff 2 energy
1-1:1.8.3	Current month active import tariff 3 energy
1-1:1.8.4	Current month active import tariff 4 energy
1-1:2.8.0	Current month active export total energy
1-1:1.6.0	Current month import total Max Demand
1-1:1.16.0	The highest kW in last 6 months
1-1:1.8.0*1	Last month active import total energy
1-1:1.8.1*1	Last month active import tariff 1 energy
1-1:1.8.2*1	Last month active import tariff 2 energy
1-1:1.8.3*1	Last month active import tariff 3 energy
1-1:1.8.4*1	Last month active import tariff 4 energy
1-1:2.8.0*1	Last month active export total energy
1-1:1.6.0*1	Last month import total Max Demand
1-1:32.7.0	Instant Voltage
1-1:31.7.0	Instant Current
1-1:13.7.0	Instant Power Factor
1-0:0.1.2*1	Last billing date
0-0:F.F.1 00 01 02 03	Warning code No warning Neutral connect to earth Current is reversed, i.e. reverse connected Terminal cover is open
1-1:P.98.0	Cumulative tamper occurrence count

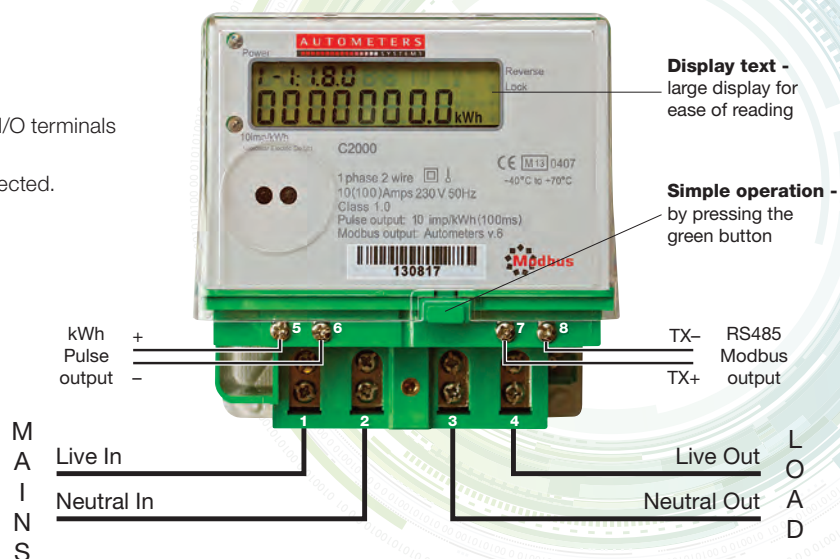
1.5 Default meter setting

OBIS CODE	Explanation	Display
1- 1:1.8.0	Total energy kwh	0000000.0
TO DISPLAY ADDITIONAL INFORMATION - PRESS GREEN BUTTON		
1- 0.0.0.0	Meter number	013003
1- 0.0.010	Modbus address	02
1- 1: 31.7.0	Amps	000.0
1- 1: 32.7.0	Volts	230.0
1- 1: 1.7.0	Instantaneous kW	00.0000
1- 1: 13.7.0	Power Factor	1.00

Appendix B: Connection Diagram

Each meter has the power connection terminals and I/O terminals printed on nameplate as below diagrams.

Meter illustrated 100 Amp 230 volt 50 Hz direct connected.



Meter Dimensions

