SHORT CODE

By keying 3 digits short codes, users can easily access predefined information from customer interface unit. The following table offers the short code list and the related description.

Short Code	Description	OBIS code	Short Code	Description	OBIS code
800	Total energy consumption	1.8.0	801	Balance credit	c.51.0
802	Current date	0.9.2	803	Current time	0.9.1
804	Meter number	12.1.0	805	SGC number	c.51.3
806	Relay operation reason	-	807	Meter status	-
808	Total instantaneous power	-	809	Tariff index display	-
810	Overdraft limit	c.51.1	811	Emergency credit	-
812	Cancel audible alarm	-	813	Last day energy consumption	-
814	Current month energy consumption	1.9.0	815	Last charge date	99.3.1
816	Last charge time	99.3.2	817	Last charge amount	99.3.3
818	Log-off return code	-	819	Power down times	-
820	Energy consumption in the previous month	98.1.1	821	Energy consumption in the previous 2 months	98.1.2
822	Energy consumption in the previous 3 months	98.1.3	823	Energy consumption in the previous 4 months	98.1.4
824	Energy consumption in the previous 5 months	98.1.5	825	Energy consumption in the previous 6 months	98.1.6
830	Last Credit TOKEN	-	831	Last 2 Credit TOKEN	-
832	Last 3 Credit TOKEN	-	833	Last 4 Credit TOKEN	-
834	Last 5 Credit TOKEN	-	835	Last 6 Credit TOKEN	-
836	Last 7 Credit TOKEN	-	837	Last 8 Credit TOKEN	-
838	Last 9 Credit TOKEN	-	839	Last 10 Credit TOKEN	-
865	Meter cover open & terminal cover open detection	-	869	Maximum power display	1.35.0

1. Total energy consumption (800)

The customer interface unit displays the value of total energy consumption with a resolution of 0.01kWh. The maximum energy consumption is up to 999999.99 kWh.

2. Balance credit (801)

The customer interface unit displays the value of balance credit with a resolution of 0.01kWh when the meter is in the prepayment mode. This function is not available when the meter is in the credit mode.

3. Current date (802)

The customer interface unit displays the current date in the format "DD-MM-YY".

4. Current time (803)

The customer interface unit displays the current time in the format "hh:mm:ss".

5. Meter number (804)

The customer interface unit displays the 11-digit meter number splitted into two screens. The first screen displays the first 8 digits of the meter number, the second screen displays the last 3 digits of the meter number. The time interval between the two screens is 10 seconds.

6. SGC number (805)

The customer interface unit displays the initial Supply Group Code (SGC), personalised at the time of manufacture. Once a successful meter key-change has been performed, the SGC number displayed on the LCD will no longer change as the actual SGC changes.

7. Relay operation reason (806)

The customer interface unit displays the different 2-digit numbers representing the different operation reasons as below.

Display	Reason
01	Balance credit is not sufficient (overdraft function is not used)
02	Balance credit is not sufficient (overdraft function has used)
03	Overload switches off
04	STS test switches off
05	Meter cover opening switches off
06	Terminal cover opening switches off
07	Remote switch-out
08	Over-current switches off (optional)
09	Over-voltage switches off (optional)
0B	Relay switches off in default value (optional)
00	Normal electricity utilization
10	STS test switches on
20	Remote switch-on

Note: If relay switches off due to meter cover opening or terminal cover opening, it remains in switch-off status even though consumers close the meter cover or terminal cover again.

8. Meter status (807)

The customer interface unit displays the different 4-digit numbers representing the different meter status as below.

Display	Meter status
0001	Meter cover open

0002	Terminal cover open
0004	Over voltage
0020	Under voltage
0100	Reverse
1000	Overload

Note: If a meter is on two or more status, for example: the meter is over voltage and overload, the LCD will displays 1004 which is the sum of 0004 and 1000 representing over voltage and overload respectively.

9. Total instantaneous power (808)

The customer interface unit displays the value of total instantaneous power being consumed by the connected load.

10. Tariff index display (809)

The customer interface unit displays the current tariff index. The default tariff index is 01.

11. Overdraft limit (810)

The meter displays the overdraft limit value which is programmable at the time of manufacture or via PC software. The default value is 10.00 kWh.

12. Emergency credit (811)

This function is available to ensuring power supply for emergency case. For example, user can key in 811 to use emergency credit to resume power at the midnight when he is not able to purchase the credit immediately.

The balance would account toward negative under the emergency overdraft mode. This function only can be used once until user credit and the overdraft money should deduct from the next credit.

13. Cancel audible alarm (812)

When credit balance is lower than the alarm threshold 3 (programmable), the buzzer will ring. Consumers can cancel the audible alarm manually keying in 812 after hearing the alarm. Considering that not interfere with the consumer's normal rest time, the audible alarm function will close automatically between 20:00 to 08:00.

14. Last day energy consumption (813)

The customer interface unit displays the value of energy consumption of the previous day.

15. Current month energy consumption (814)

The customer interface unit displays the energy consumption consumed in this month.

16. Last charge date (815)

The customer interface unit displays the exact date when consumers charge last time.

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17. Last charge time (816)

The customer interface unit displays the exact time when consumers charge last time.

18. Last charge amount (817)

The customer interface unit displays the exact charge amount last time.

19. Log-off return code (818)

If a consumer does not need to use the meter, he could choose to log off his meter.

- The consumer applies for log-off to acquire a 20-digit log-off TOKEN from the utility.
- The consumer input the 20-digit TOKEN correctly via keypad of customer interface unit, then press the Enter key.
- If log-off is successful, the meter will return a 20-digit log-off return TOKEN code to the customer interface unit.
- By keying in the short code 818 via keypad of customer interface unit, the 20-digit log-off return TOKEN code will be displayed on the LCD splitted into three screens. The first screen displays the first 8 digits of the TOKEN, the second screen displays the middle 8 digits of the TOKEN, and the third screen displays the last 4 digits of the TOKEN. The time interval between every two screens display is 10 seconds. The consumer should record the 20-digit log-off TOKEN code.
- The consumer gives the TOKEN code to the utility. If the decoding for the code is correct, system will log off this meter and give back the consumer the corresponding balance amount.

20. Power down times (819)

The customer interface unit displays the total times of power-down resulting from power outage, loss of power and other reasons.

21. Energy consumption in the previous month ~ 6 months (820~825)

The customer interface unit displays the energy consumption in the previous month, 2 months, 3 months, 4 months, 5 months and 6 months respectively.

22. Last 1 ~ last 10 Credit TOKEN (830~839)

The customer interface unit displays the last 1 ~ last 10 Credit TOKEN respectively, which is splitted into three screens. The first screen displays the first 8 digits of the TOKEN, the second screen displays the middle 8 digits of the TOKEN, and the third screen displays the last 4 digits of the TOKEN. The time interval between every two screens display is 10 seconds.

23. Commissioning Meter (865)

When the meter completes the installation, you can input 865 via customer interface unit to open this function for anti-tampering. This short code only can be used once.

24. Maximum power display (869)

The customer interface unit displays the maximum power display.

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Reason cause rejection

The token has been used to credit meter before.

```
EE        ☹
      USEd
```

6. Communication

Keying in TOKEN or short code and CIU communicates with meter.

- If communication is successful, the display is shown below and continued with correct information.

```
ConnECt
```

- If the communication is failed, the display is shown below.

```
FA iLEd
```

- Cancel audible alarm with short code 812 successfully.

```
12
   SUCCESS
```

7. MCU&CIU Pairing

Input 11 meter number, press enter, Successfully paired:

```
SUCCESS
```

Failed:

```
FA iLEd
```

Remove pairing

Input the unpaired code: 1807-5773-902 Successfully unpaired:

```
SUCCESS
```

CUSTOMER INTERFACE UNIT

PLC Communication

Customer Interface Unit

CIU-EV-KP
Model:CIU
120V 60Hz
CIU No:12594201

12594201

Empire Hexing Africa (Pty) Ltd. 2014

▶ 1. LCD Display

LCD display information	Description
8888.8.8:8.8	Data display field
CREDIT kWArhz	Unit display field
⊶	Contact switching on
⟋⊶	Contact switching out
☺	Charge success
☹	Charge failure

Protect Your Revenue

▶ 2. Installation

- Optionally the CIU may be mounted to the wall by fixing the mounting clip to the wall with suitable screws (not provided)
- Insert four 1.5VAAA batteries with correct orientation for polarity
- Slide the Customer Interface Unit (CIU) onto clip
- Fit the power cord into the CIU and plug the other end into an AC power socket

▶ 3. Credit status

Status Indicator	Description	Values(programmable)
Green lamp lighting	Sufficient credit	Balance credit is more than 40kWh
Red lamp lighting	Low credit warning Alarm level 1	Balance credit is less than 40kWh but more than 20kWh
Red lamp flashing	Low credit warning Alarm level 2	Balance credit is less than 20kWh but more than 10kWh
Red lamp flashing and bell alarm	Low credit warning Alarm level 3	Balance credit is less than 10kWh

▶ 4. Short code

By entering 3 digit codes the user can access information present in the meter. The table below displays the codes and related description.

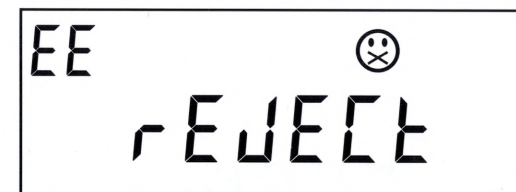| Short code	Description	Short code	Description
800	Total energy consumption	801	Balance credit
804	Meter number	805	SGC number
812	Cancel alarm	817	Last charging amount

▶ 5. Charge meter

- User finds the credit balance indicator alarms with low balance credit;
- User goes to POS (point of sale) to buy a voucher;
- The voucher contains a 20-digit TOKEN. For example: "6418 8786 2991 6780 9510". Enter the token via keypad;
- On successful entry of the TOKEN, the LCD display will immediately display the energy amount. An "SS" shown in the top left hand corner, indicates successful entry.

- If the TOKEN is not correctly entered, the reject reason will be shown on the display.

Reason cause rejection

The 20-digits TOKEN is not entered correctly.

HEXING

HEXING

C.5 1.0

100.00 kW/ h

Credit Status
Green:Enough
Red:Low
Flash:Low Out

CIU-EV-KP
Model:CIU
120V 60Hz
CIU No:12594201

12594201
Hexing Electrical Co., Ltd. 2012

CIU EV-KP

Focus on creating value for clients

CIU EV-KP is a customer interface unit with keypad for credit charging. It communicates with metering unit by MBUS or PLC for energy consumption and credit balance monitoring, credit limitation alarming and credit charging.

■ Main Functionalities

➢ Balance display configurable
➢ Communication via PLC or MBUS, depending on the site
➢ Large digit LCD display, easy for reading
➢ 3×4 number and function keypad easy to operate
➢ Display readable without main power (RWP) for PLC
➢ Easy to match with meter, convenient for site installation
➢ Rechargeable when disconnected
➢ LCD backlights to increase readability in low light conditions(optional)

■ Specifications (PLC/MBUS)

Description	Value
Voltage(PLC)	
Reference voltage	110-127V,220-240V
Operating voltage range	70%-120%Un
Frequency(PLC)	50Hz or 60Hz
Temperature	
Operation range	-25℃ to +60℃
Limit range for storage and transport	-40℃ to +75℃
Humidity	Up to 95%
Housing	
Protection degree	IP51（IEC60529）
Meter cove	Opaque PC+ fiber glass with a transparent window
Meter base	Opaque PC+ fiber glass
Display	
Digit size	4.5mm x 8.8mm
Number of digits	8
Communication Interface	
PLC/MBUS	

Weight	
Net weight	Approx.0.48kg (PLC); Approx.0.32kg (MBUS)
Package	Approx.0.08kg(PLC); Approx.0.08kg (MBUS)
Dimension	158mm×110mm×55mm

■ Dimensions
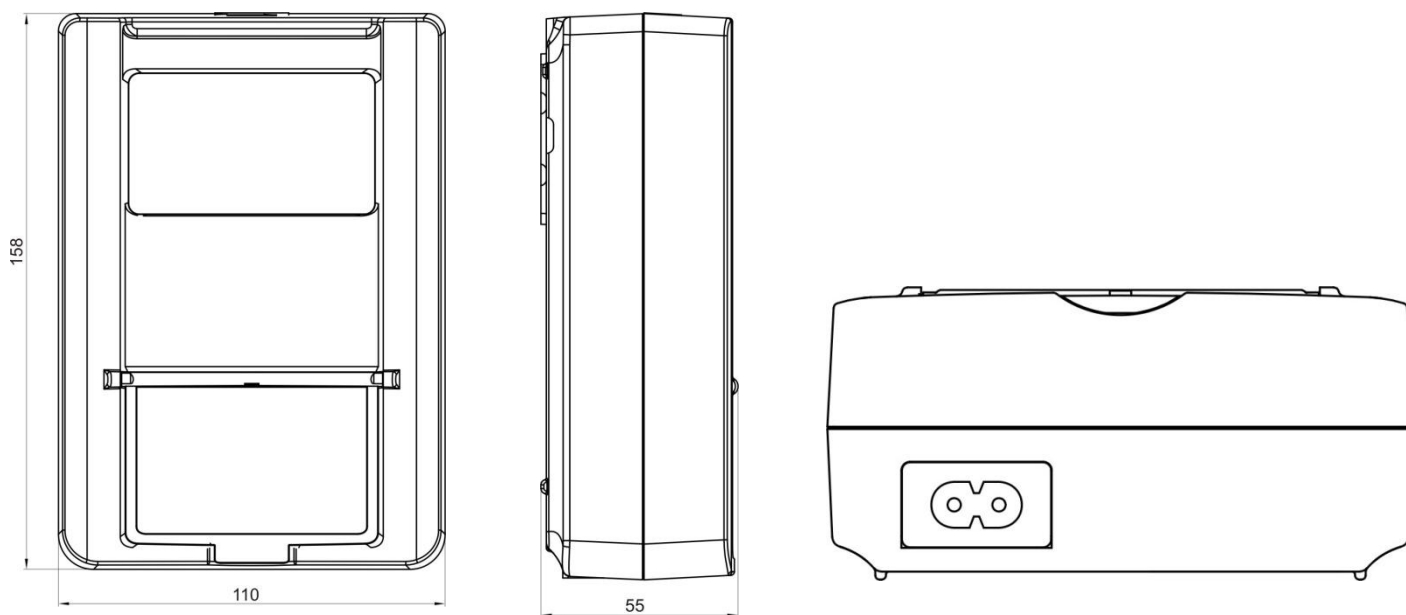
COMPANY HEADQUARTERS

Add: 1418-5 Moganshan Road,
Shangcheng Industrial Zone, 310011,
Hangzhou City, China

Tel: 86 571 28029898
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HEXING

HXE110-P

Single Phase
Residential Meter

Focus on creating value for clients

Communication Module, PLC

HXE110-KP

HXE110-P is a single phase residential meter used in a split prepayment metering system. It complies with STS standard and communicates with a CIU by MBUS or PLC for energy consumption monitoring and credit charging.

■ Highlights

➢ STS standard protocol ensures an open and secure operating system
➢ Optical Communication, Open Protocol: DLMS/COSEM Standard
➢ Internal switch relay for load demand control by configuration or remote communication
➢ Prepayment and post-payment mode switchable for users' convenience

■ Main Functionalities

➢ **Measurement**
  • Unidirectional or Bi-directional Measurement
  • Active energy, Active reverse energy Measurement
  • Instantaneous value measurement
➢ Prepayment is made via a numeric token
➢ Balance display configurable
➢ Communication with CIU via PLC or MBUS, depending on the site
➢ **LCD Display**
  • Large digit LCD display, easy for reading
  • LCD backlights to increase readability in low light conditions(optional)
  • Scrolling display configurable for instant information enquiry
  • Display the latest 6 months active energy consumption
  • 12-month billing d and more frozen data for inquiry
➢ RS485 Communication with interface in accordance to DLMS standard (optional)
➢ Emergency Credit for a certain sum of energy supply depending on User's credit level
➢ User-friendly mode for energy supply for low credit during weekends or holidays (optional)
➢ **Tampering Proof:**
  • Meter Cover open detection and record
  • Meter terminal detection and record
  • Bypass (optional)
  • Large magnetic event(optional)
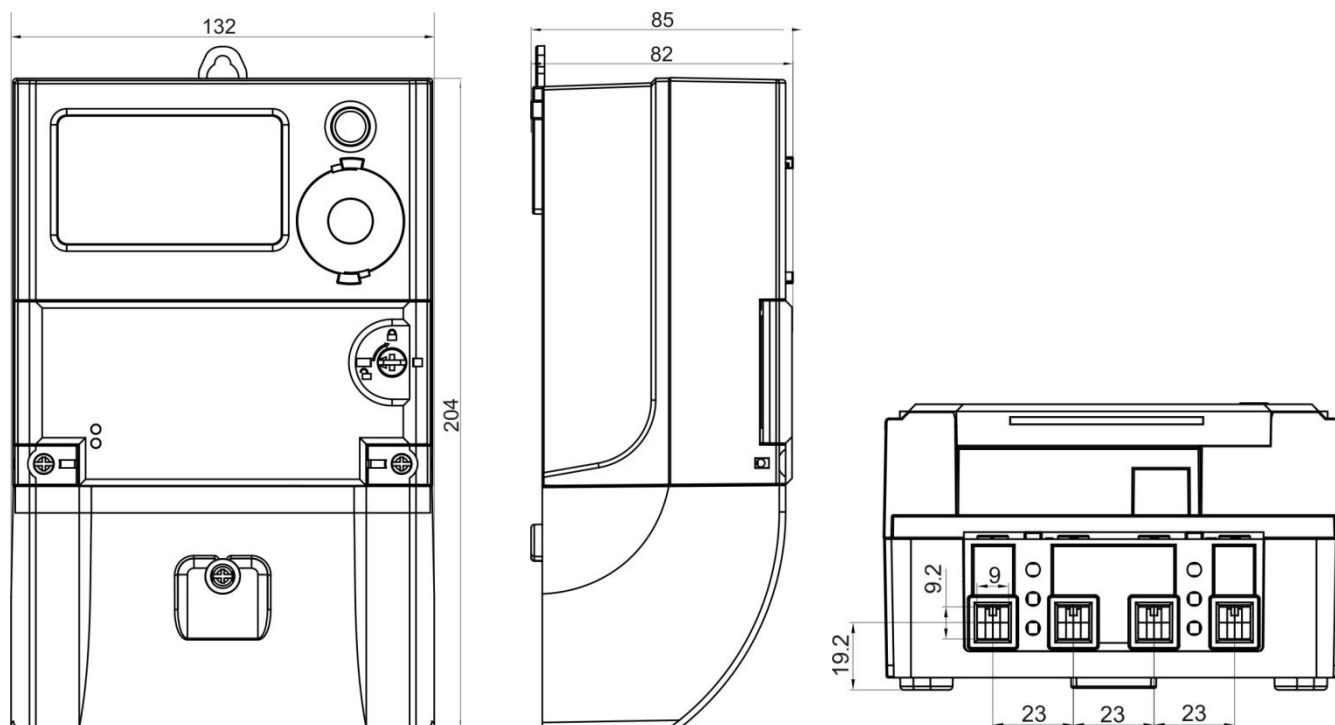➢ Auxiliary Terminal for Energy Pulse Output(optional)

■ Specifications

Description	Value
Accuracy	Class 1 or 2 (IEC), Class A or B (MID)
Voltage	
Reference voltage	110-127V,220-240V
Operating voltage range	70%-120%Un
Current	
Basic current	5A, 10A
Maximum current	60A, 80A, 100A
Starting current	≤ 0.4%Ib
Frequency	50Hz or 60Hz
Temperature	
Operation range	-25℃ to +60℃
Limit range for storage and transport	-40℃ to +75℃
Humidity	Up to 95% non-condensing
Power Consumption	
Power consumption in voltage circuit (active)	≤2 W
Power consumption in voltage circuit (apparent)	≤10 VA
Power consumption in current circuit	≤1 VA
Insulation Strength	
AC voltage test	4kV during 1min
Impulse voltage test	1.2/50µs mains connections 6kV
EMC	
Electrostatic discharges(Contact discharges)	8kV
Electrostatic discharges(Air discharges)	15kV
Surge immunity test	4kV
Fast transient burst test	4kV
Electromagnetic RF fields (80MHz to 2000MHz)	10V/m(with current), 30V/m(without current)
Connection Terminals	¢ 8mm
Housing	
Protection degree	IP54 (with long terminal cover)
Meter cove	Opaque PC+ fiber glass with a transparent window
Meter base	Opaque PC + fiber glass
Terminal cover	Opaque PC+ fiber glass
Display	
Digit size	8.8mm x 4.5mm
Number of digits	8
Communication Interface	
Optical communication	DLMS/COSEM
PLC/MBUS alternative	
Weight	
Net weight	Approx.0.93kg(extended terminal cover)
	Approx.0.89kg(short terminal cover)
Package	Approx.0.08kg(extended terminal cover),
	Approx.0.08kg(short terminal cover)

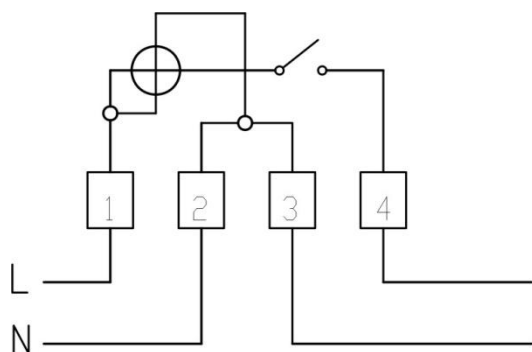| Dimension	204mm×132mm×85mm(extended terminal cover)
	164mm×132mm×85mm (short terminal cover)

■ Standard

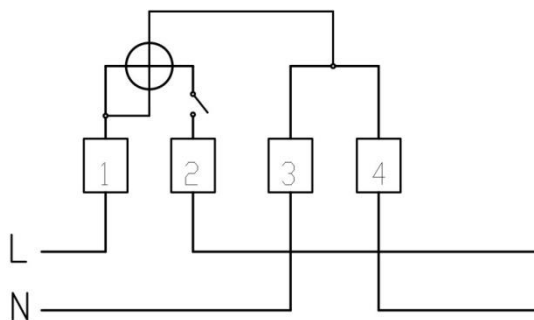| IEC62052-11	Electricity metering equipment (a.c.) General requirements, tests and test conditions – Part 11: Metering equipment
IEC62053-21	Electricity metering equipment (a.c.) Particular requirements –Part 21:Static meters for active energy(classes 1 and 2)
IEC62055-41	Electricity metering - Payment systems - Part 41: Standard transfer specification (STS) - Application layer protocol for one-way token carrier systems
IEC62055-51	Electricity metering - Payment systems - Part 51: Standard transfer specification (STS) - Physical layer protocol for one-way numeric and magnetic card token carriers
IEC62056-46	Electricity metering – Data exchange for meter reading, tariff and load control – Part 46: Data link layer using HDLC protocol
IEC62056-53	Electricity metering – Data exchange for meter reading, tariff and load control – Part 53:COSEM Application layer
IEC62056-61	Electricity metering – Data exchange for meter reading, tariff and load control – Part 61:OBIS Object identification system
IEC62056-62	Electricity metering – Data exchange for meter reading, tariff and load control – Part 62:Interface classes
EN50470-1	Electricity metering equipment (a.c.) —Part 1: General requirements, tests and test conditions — Metering equipment(class indexes A, B and C)
EN50470-3	Electricity metering equipment (a.c.) —Part 3: Particular requirements —Static meters for active energy (class indexes A, B and C)
IEC62056-21	Electricity metering – Data exchange for meter reading, tariff and load control – Part 21:Direct local data exchange

■ Dimensions

■ Connection Diagram

Symmetric Connection

Asymmetric Connection

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