

SINGLE PHASE TWO WIRE SPLIT PREPAYMENT METER

USER MANUAL FOR KAYZ-QPM16



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1. Summary

Single phase two wire split prepayment meter QPM16 is a new type of prepayment meter. Customer purchases energy from the vending network to get a serial number (named as “TOKEN”), and then use the keypad of CIU/Meter to enter the TOKEN. The credit data will be entered into the meter after the TOKEN being accepted. The TOKEN contains 20 digits and is encrypted. For the purchasing method reason, the meter named as “Keypad meter”.

The data transmission protocol of the meter complies with IEC62055-41, All the specifications comply with IEC62055-31. And meter designed in accordance with IEC62053-21.

2. Features and technical parameters

2.1. Features

- Measure active energy;
- Unidirectional or Bi-directional Measurement;
- 6+2 LCD display with backlight;
- 20-digit transmission as a token, customer purchases energy before consumption;
- Low energy alarm and low energy trip to remind the customer to purchase energy;
- With optical communication port for reading meter data and setting parameters;
- Overload protect;
- Open terminal cover and base cover detection alarm;
- Meter Information supply short code Enquiry;
- Multi-Level alarm value enable setup;
- Split type, including meter and ciu, communication through an embedded Lora(built-in);

2.2. technical parameters

Rated current	5(60)A, 20(80)A, 30(100)A
Accuracy class	1.0
Life span	≥10 years
Power consumption	<4VA, 1.5W
Meter constant	1000imp/kWh
Dimension	206*130*46mm

Notice: Please refer to the nameplate for the real values of rated current, accuracy class and meter constant of a specific meter.

3. Description

3.1 Outline diagram

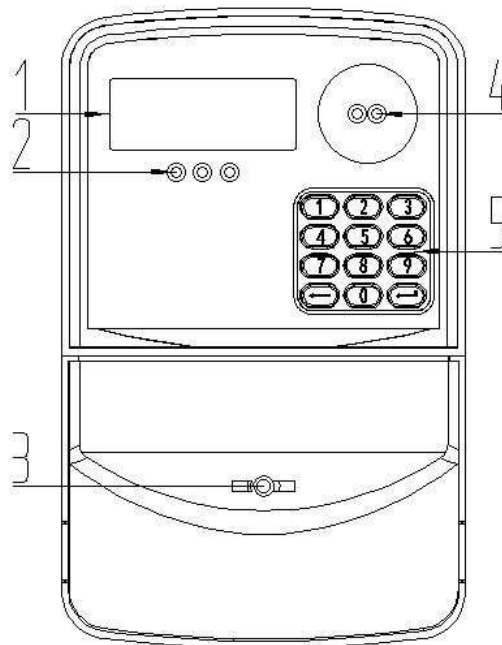


Figure 1

- 1- LCD display with backlight.
- 2- LED indicators. From left to right are: Pulse, alarm, status credit.
- 3- Assistance terminals, and detector of terminal cover opening.
- 4- Optical communication port which complies with IEC62056-21 protocol.
- 5- Keypad contains 12 buttons (0~9, "←" and "↵") to enter TOKEN and query meter data.

3.2 LCD display screen with back light

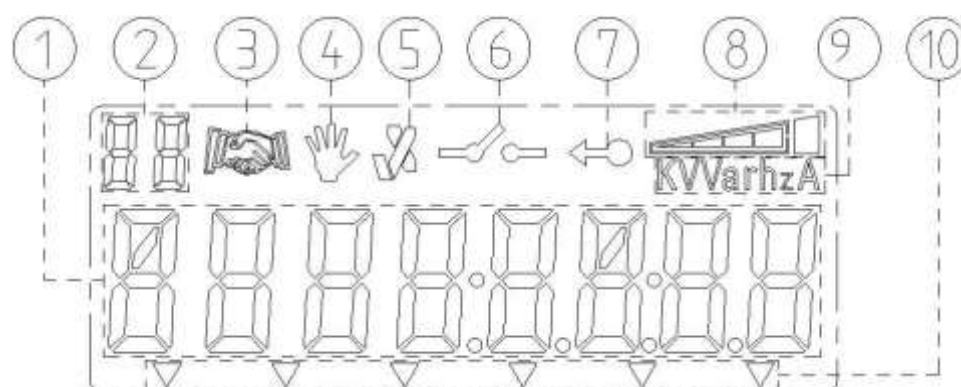


Figure 2

- | | |
|--|--------------------------------|
| 1- Main display area | 2- Display item No.(OBIS code) |
| 3- Friendly time | 4- Tamp |
| 5- Indication of token acceptance or rejection | 6- Relay trip off status |
| 7- Negative Power | 8- Credit status |
| 9- Measure unit | 10- other indicator |

3.3 Pulse: kWh consume indicator

3.4 Alarm:

- 3.4.1 The cover was opened.
- 3.4.2 The load is reverse, unbalance, or overload.
- 3.4.3 The voltage is overvoltage, or undervoltage.

3.5 Status credit: credit indicator

- 3.5.1 The green LED indicates the remained credit is enough.
- 3.5.2 The yellow LED indicates the remaining energy is below remained energy threshold 1.
- 3.5.3 The red LED indicates the remain credit is below remained credit threshold 2.
- 3.5.4 When the red LED is flash, it means the remaining credit is below remained credit threshold 3.

3.6 Keypad contains 12 buttons to enter TOKEN and query information 3.7 Optical port complies with IEC62056-21 3.8 Open cover detector inside the terminal

4. Operation principle

As shown in figure 3, the current and voltage of power covered into small signal separately and input into a special measurement IC, after a series of process such as multiplication calculation etc. and then output energy pulse, whose frequency is in direct proportion to the supply power, to the microprocessor unit (MCU). The MCU calculate and process energy impulse to perform the power metering and load control functions etc. The LCD displays the total credit and remained credit etc. relay tripping off indirect shows the meter operation state.

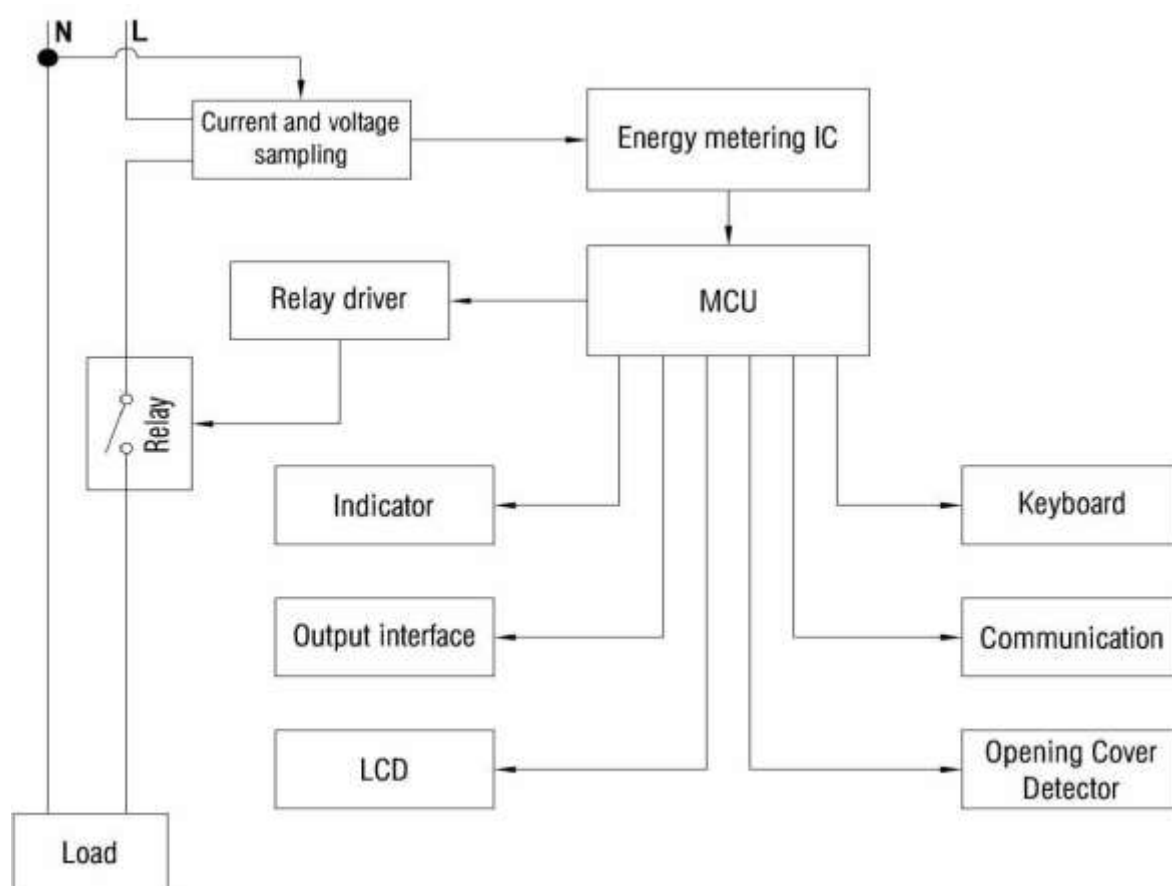


Figure 3

5. Application of TOKEN

5.1 Purchase credit

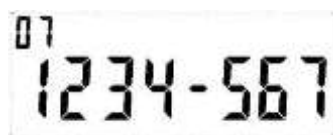
Customer purchases the credit at vending station that authorized by Power Supply Company (bank desk, super market) or purchases via telephone, internet etc. The TOKEN which contains 20 digits serial number will be offered to customer.

5.2 Entering TOKEN

Tokens are entered by the keypad on the meter. The meter sounds a “bi” every time a button pressed and displays the number on the main display area of the LCD. The number entered last displays at the most right-hand side. Per 4 digits appear “-”, When the eighth digit entered, the digit entered first will be moved out of the LCD. Press “←” to remove digits, one at a time, from the end of entered numbers.

Figure

Description



Before pressing “↵” button.



After pressing “↵” button, the last digital “7” is deleted.

5.3 Recharge success

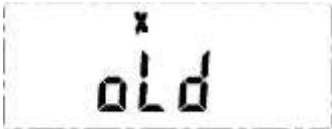
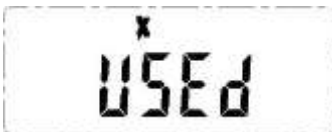
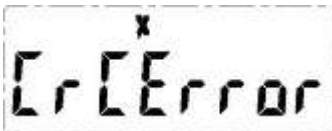
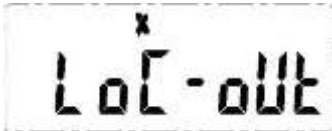
After finish these 20 digits TOKEN, press “↵” key to confirm. If the TOKEN is correct and accepted by meter, it will display “error information” and “✓” indicator on the LCD and sound “bi” long times. New purchased credit will increment the remaining credit register.

Figure	Description
	eleven digits have been inputted, the last one is “9”.
inputted, Press “↵” to 	After all of the TOKEN numbers confirm.
	The TOKEN is correct and accepted by the meter. Indicator “✓” means successful.
	The new purchased credit of TOKEN is 50kWh.

5.4 Recharge failure

Meter will sound “bi” three times and give the indicator of “✗” and show “used” or “old” or “reject” on LCD main display area, failure code will display on lower-left quarter of LCD. Remaining credit will not be changed.

Keypad lock-out function. If type incorrect TOKEN continuously more than 10 times, meter keypad will locked for security consideration. Max lock time is 60 seconds. During keypad locked period, meter will not accept credit TOKEN and clear TOKEN, but the user can use keypad to query meter data. and accept new credit TOKEN after 60 seconds.

Figure	Description
	Meaning: indicates the rejection of a token. Solution: Check the TOKEN with vending station.
	Meaning: token is old or has expired. Solution: Get another new TOKEN.
	Meaning: token has been previously used. Solution: Get another new TOKEN.
overflow 	Meaning: Credit TOKEN has been rejected due to a credit condition Solution: to used more credit, then purchase credit continue.
	Meaning: TOKEN has been rejected due to the TOKEN being incorrectly typed in. Solution: Check the TOKEN with vending station.
	Meaning: TOKEN continuously has been rejected. Solution: After 60seconds, enter TOKEN again.

5.5 Supported TOKENs

5.5.1 Credit transferring TOKEN

When remained credit is less than alarm limit, customer should recharge credit at vending station to avoid load disconnect.

If remained credit plus recharged credit is exceeded credit hoarding limit, the recharged credit will not be able to increment into meter, but this TOKEN is still valid. When remained credit plus recharged credit is less than credit hoarding limit, the TOKEN will be accepted, and the recharged credit will be increment into the remained credit register in the meter.

5.5.2 Key Change TOKEN

Use Set1stSectionDecoderKey and Set2ndSectionDecoderKey TOKEN to change the decoder key. The Decoder Key Register of a new or repaired meter contains manufacturer's DITK as the original value. When leaving the factory, the value is changed to manufacturer's DDTK through direct local connection. The value should be changed to DUTK to allow the customer to purchase energy.

Input each TOKEN respectively. If LCD displays "1st-good" and "✓" after the first TOKEN is

submitted, then input another. If LCD displays "good" and "✓" after the second TOKEN submitted, means the key is changed successfully.

5.5.3 Testing TOKEN

The tests supported by this meter are the Relay test, the LCD test, total KWh display, KRN display, tariff index display, the keypad test, maximum power threshold display, tampering status display, power consumption display, firmware version display, etc;

Testing TOKENs are not encrypted, The displays after testing TOKEN submitted are given in clause 6.3.

5.5.4 Set Maximum Power Limit Token

This TOKEN is used to set the maximum power limit. When load over this limit, relay will open, and "⚡" indicator will come out. Customer can wait for several seconds to resume power supply. The Trip delay and switch delay of overload is programmable.

5.5.5 Register resetting TOKEN

If the value of Register in TOKEN is 0x00 or 0xFFFF, the remained energy register will be reset.

5.5.6 Clear Tamper Condition TOKEN

Clear the tamper status register in meter. Please enter this clear TOKEN in the case of meter terminal cover closed.

5.5.7 Installation model and running model switching TOKEN

Meter after inspection and testing, out-factory be installation model. Customer enter 20 digits series code (TOKEN) "**6686 9447 2674 5367 2103**" switching the meter from installation model to running model.

Meter at DUTK state continue using more than 72 hours, meter will auto-switching in to running model.

* Installation model: Open terminal cover, will not trigger an alarm or trip. It is a user-friendly design when do meter installation and testing.

* Running model: Meter can detect terminal cover open.

6. Display function

There are three kinds of display status: Scrolling display, RWP display and Querying display.

6.1 Scrolling display

The meter auto-enter into scrolling display mode after power on. The LCD displays remained credit and total credit with 8 seconds interval. When pressing any key, the backlight will be turned on and last 60 seconds.

Figure

Description



Remained purchased credit

Purchased credit remains 130.65 kWh.

Indicator “” means credit level status.



“-” means the meter has no credit, and in a overdraft status now. the overdraft credit is 11.50kWh.

01 - Item No.

Total used kWh

Total consumption kWh is 120.28kWh.



Indicator “” appears when meter is the

status of friendly time. indicator

“” means overdraft credit, the meter built-in relay has been tripped off, power supply has been cut down.

02 - Item No.

Error information



When fault happened, fault indicator display automatically till it is reverted;

Error - 01: Relay fault;

Error - 04: Battery fail;

Error - 06: E2prom fault;

Error - 08: Real time calendar fail;

Error - 09: Relay testing fault; Error - 02: Meter in a power limiting status, and relay cutoff. resume after 60 seconds;

Error - 05: Meter in the low voltage status;

Error - 03: Meter in the overload voltage status;

6.2 RWP display

Meter will display following list sequentially after power down.

Figure



Description

Remained purchased Credit Purchased credit Remains10.55 kWh.

01 - Item No.

6.3 Querying display

Customer can press compounding key to query meter information. First, press number key, then press “”. LCD will display the corresponding information.

Short Code

Figure

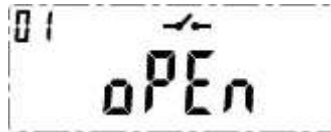
Description

“ ” “ ”
0 +  LCD Self



Full screen -**check** display test

 “1”+“ ”



Relay Self-check

Relay connection and disconnection test

Display Item No. Is 01.



“ ” “ ”
2 +  BBuzzer



speak **uzz**er **Self-check**“bi” test.

Display Item No. Is 02.

“ ” “ ”
3 +  Total



Total consumption **used kWh** kWh is 21.20kWh.

Display Item No. Is 03.

 “4”+“ ”



KRN and KT display

KRN(key revision no.) is 1.

KT(key type) is 2.

Display Item No. Is 04.

“5”+“ ” TI



display

TI(Tariff index) is 1.

Display Item No. Is 05.

“6”+“ ” MFC



display MFC(Manufacturer Code) is

325.

Display Item No. Is 06.

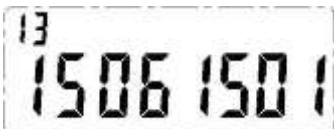
“7”+“ ” MPL



display MPL(Maximum power limit) is

13.2kW.

Display Item No. Is 07.

open ed	“8”+“  ”	Tamper		words display Bit0 is terminal cover is Bit1 is base cover is opened Bit2 is negative power Bit3 is magnetic disturb Bit4 is load unbalance Bi5-Bit7 is reserved Display Item No. Is 08.
	“9”+“  ”	Power		display Instantaneous Power is 12.5800kW. Display Item No. Is 09.
version is 01.01.	“10”+“  ”			Software version display Software Display Item No. Is 10.
	“11”+“  ”	SGC		display SGC(Supply group code) is 600059. Display Item No. Is 11.
	“12”+“  ”	MFC		display MFC(Manufacturer Code) is 325. Display Item No. Is 12.
	“13”+“  ”	DSN		display DSN is an 8-digit serial number allocated by the manufacturer. Display Item No. Is 13.
	 “14”+“”			Week days define bits From bit0 to bit6 there 7 digits means Sun to Sat. 0: weekend (when there is no credit, the relay will not open) 1: work day

↩ "

Display Item No. Is 14.

↩

"15"+""

15
4 15.0604

Day and Week display

Thursday 2015 June.04

Display Item No. Is 15.

"16"+"↩"

Time

16
15:3408

display

Now is 15:34:08

Display Item No. Is 16.

"17"+" -"

17
EA 07

EA display

EA(Encryption Algorithm) is
07(STA).

Display Item No. Is 17.

"18"+"↩"
consumption

Last

18
KVV A
12.50

day used kWh Last day Total

kWh is 12.50kWh.

Display Item No. Is 18.

"19"+"↩"
consumption

Last

19
KVV A
212.51

month used kWh Last month Total

kWh is 212.51kWh.

Display Item No. Is 19.

↩

"20"+""

20
V
230.0

Voltage display

Real time Voltage is 230.0V.

Display Item No. Is 20.

↩

"21"+""

21
A
60.010

Current display

Real time Current is 60.010A.

Display Item No. Is 21.

↩

"22"+""

22
KVV
10.0310

Active power display

Real time Active power is
10.0310kW.



Display Item No. Is 22. “23”+“ ” **Reactive power display**



Real time Reactive power is 30.0018kVar.

Display Item

No. Is 23.

“24”+“ ”



Apparent power

Real time Apparent power is 13.1000kVA.

Display Item No. Is 24.



“25”+“ ”



Power factor display

Power factor is 1.000.

Display Item No. Is 25.



“26”+“ ”



Frequency display

Frequency is 50.00Hz.

Display Item No. Is 26.



“27”+“ ”

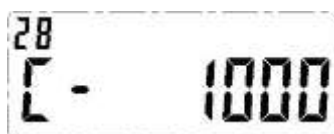


The last Purchase credit

The last purchase credit is 100.00kWh.

Display Item

No. Is 27.



“28”+“ ” **Meter constant display**

The Meter constant is 1000imp/kWh.

Display Item

No. Is 28.



“29”+“ ” **Freeze Day and time_{st}**

01 is the 1 day, 00 is 0 clock.

Display Item No. Is 29.

7. Dimension and installation

7.1 Meter should have been initialized and the basic parameters should have been set before installation..



7.2 Meter should have manufacturer sealing.

7.3 Meters should be installed indoors, meter base should be fixed firmly on anti-fire wall without erosion gas around. 1.8 meter height installation is recommended.

7.4 The connection should be carried out according to the diagram printed on the terminal cover and copper cable is ready for connection.

7.5 The following is the connection diagrams, figure 4 and figure 5.

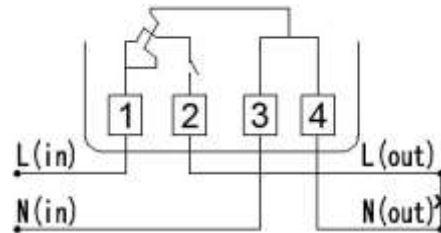


Figure 4 (LLNN) Main connection wires and auxiliary terminal

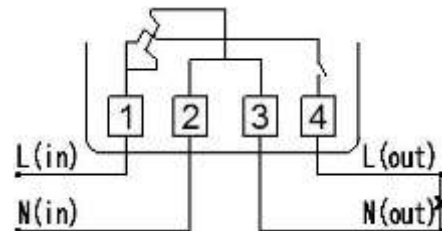


Figure 5 (LNNL) Main connection wires and auxiliary terminal **Notice** : The accuracy connection method reference to the terminal tab.

7.6 Overall and mounting dimensions

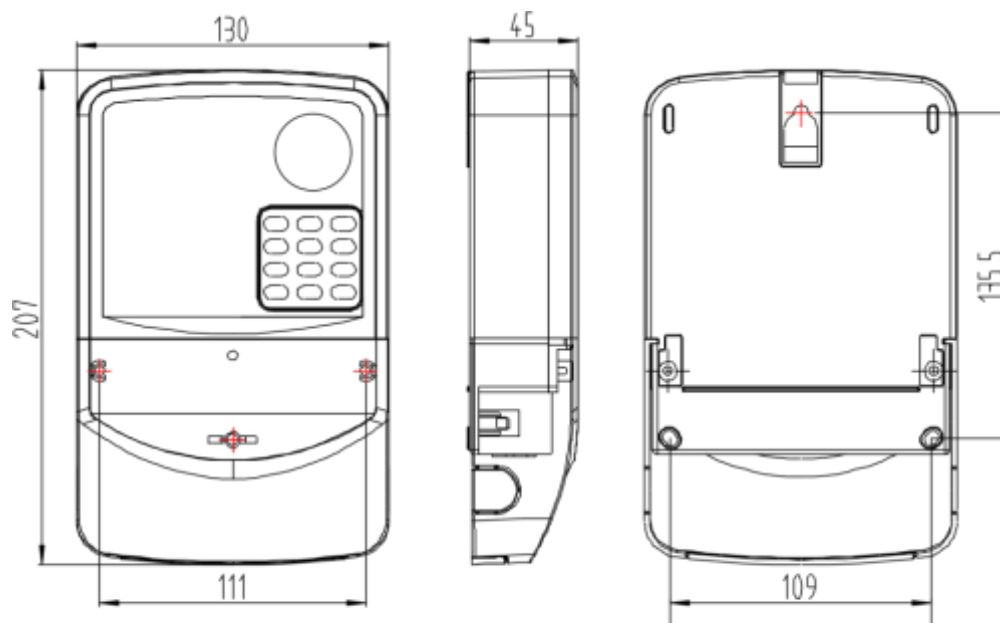


Figure 8

8. Transportation and Storage

8.1 The sharp impacts should be avoided in the transportation of the energy meter.

8.2 The energy meter should be kept in its original package, the storage temperature should be between -25°C and $+60^{\circ}\text{C}$, and related humidity should not exceed 85%, and no corrosive gases in the air.

8.3 The meter is kept on a shelf, and no more than 10 sets of meters in a pile.