



XJ Metering Co.,Ltd

User Manual of DTZY566-M

Three Phase Four Wires Smart Meter



CONTENT

1. Properties	1
1.1. Common.....	1
1.2. Properties.....	1
1.3. Technical Standards.....	3
2. Assembling and Installation.....	4
2.1. Appearance.....	4
2.2. Outside dimensions	5
2.3. Terminal block.....	5
2.4. Terminal Cover.....	6
2.5. Connection Diagram.....	6
2.6. Meter nameplate.....	7
2.7. Button.....	8
2.7.1. Alternate display button	8
2.7.2. Demand reset button.....	8
3. Measuring.....	9
3.1. Basic principle.....	9
3.1.1. Framework.....	9
3.1.2. Current sampling	9
3.1.3. Voltage sampling	9
3.1.4. Internal process.....	9
3.2. Basic function.....	10
3.3. Metering accuracy	10
3.4. Metering for energy and demand	10
3.5. Energy Register	11
3.6. Demand Register	12
3.7. Demand calculation method.....	13
3.8. Demand reset type	13
3.9. History energy record.....	13
3.10. Instantaneous parameter measurements	13
3.11. Load profile	14
4. Tariff characteristics.....	14
4.1. Energy and demand tariff control.....	14
4.2. Real time clock	14
4.3. TOU - Time of Use.....	14
5. Display control	15
5.1. Display	15
5.2. Display mode.....	18
5.2.1. Display formats and units.....	18
5.3. Switch of display mode	19
5.4. Back light	19
6. Battery	19



7. Pulse output.....	20
7.1. Led pulse output.....	20
7.2. Signal terminal pulse output.....	错误!未定义书签。
8. Relay Operation.....	20
9. Communication Interface	21
9.1. Optical port.....	21
9.2. RS232 port.....	22
9.2.1. RS232 port for communication	22
9.2.2. Power output.....	错误!未定义书签。
9.2.3. The Pin definition of RJ45	22
10. Security functions	22
10.1. None volatile memory	22
10.2. Anti tamper features	22
10.3. Error status (current and historical).....	23
10.4. Event status (current and historical)	23
10.5. Caution status (current and historical).....	23
10.6. Event log	24
10.7. User Manage	25



1. Properties

1.1. Common

Thank you for choosing to use DTZY566-M meter. This user manual is an introduction for the functions and operations of this product. This meter is 3P4W multifunctional smart meter. It adopts the advanced technology of LSI (Large Scale Integrated circuit) and digital signal processing. The craftsmanship of our product is exquisite and the functions provided are comprehensive and client-oriented. The energy meter is an intelligent instrument equipped with leading technology.

The function of DTZY566-M energy meter including:

- Measurement: active and reactive energy, absolute value of energy, apparent energy, active and reactive demand;
- Instantaneous value: voltage, current, frequency, power factor, power and THD;
- Communication port: optical communication port, RS485 communication port (RJ12), P1 communication port, and communication port for communication module;
- Anti-tamper protection: meter cover detection, module cover detection, magnetic field detection, relay status, etc.;
- Other functions: TOU, display, power quality events, load profile, LED pulse output, remote firmware upgrade and etc.

1.2. Properties

Type	Three Phase Four Wires Smart Meter
Voltage	
Nominal voltage U_n	3x277/480V
Voltage range	0.8 ~ 1.2 U_n
Frequency	
Nominal frequency f_n	60 Hz
Frequency range	0.95 ~ 1.05 f_n
Current	
Basic current I_n	5A
Maximum current I_{max}	100A
Starting current I_{st}	$\leq 0.004I_b$
Accuracy	
Cl. 1.0 for active energy	compliance with IEC 62053-21
Cl. 2.0 for reactive energy	compliance with IEC 62053-24
Meter constant	
Active energy pulse of LED	1000 imp/kWh
Reactive energy pulse of LED	1000 imp/kvarh
Measurement	
Measurement	Active and reactive energy,



	absolute value of energy, apparent energy Active and reactive demand;
Instantaneous value	Voltage, current, frequency, power factor, power and THD.
Tariff control	
Internal tariff control	12 season, 10 week profile, 10 day type and 12 daytime periods in each day type, 100 holidays
Load profile	
Parameters configuration	Load profile interval is configurable (5, 15, 30, 60 minutes); The load profile data are stored with time stamp; Max. 16 channels
Memory capable	4 channels, 30 minutes interval, record for more than 100days
Display	
LCD	9 digits with additional symbols
RTC	
Clock accuracy	<±0.5 sec/day at 23 °C; The variation of the time-keeping accuracy with temperature is less than 0.15s/ °C/day. Compliant with IEC 62054-21.
Communication Interface	
Optical port	Login parameters: 300bps, Communication parameters: 9600bps or 19200bps (configurable)
RS485 port (RJ12 type)	Configurable from 4800bps to 19200bps, Supports to connect 32 meters(devices) on one bus, within the length of 20m.
Power Consumption	
Voltage circuit	2W
Current circuit	4VA
Temperature Range	
Typical Operation	From -40 °C to + 70 °C
Storage	From -40 °C to + 85 °C
EMC Properties	
Immunity to Impulse voltage IEC 62052-11	8kV
Housing	
Dimension	287.5 mm (L) × 170.2mm (W) × 90.0mm (H)
Enclosure:	Comply with BS standard
Class of protection	II
Degree of protection	IP 54
Weight	
Weight	Approximately 2.0kg



Tab.1: Technical Properties

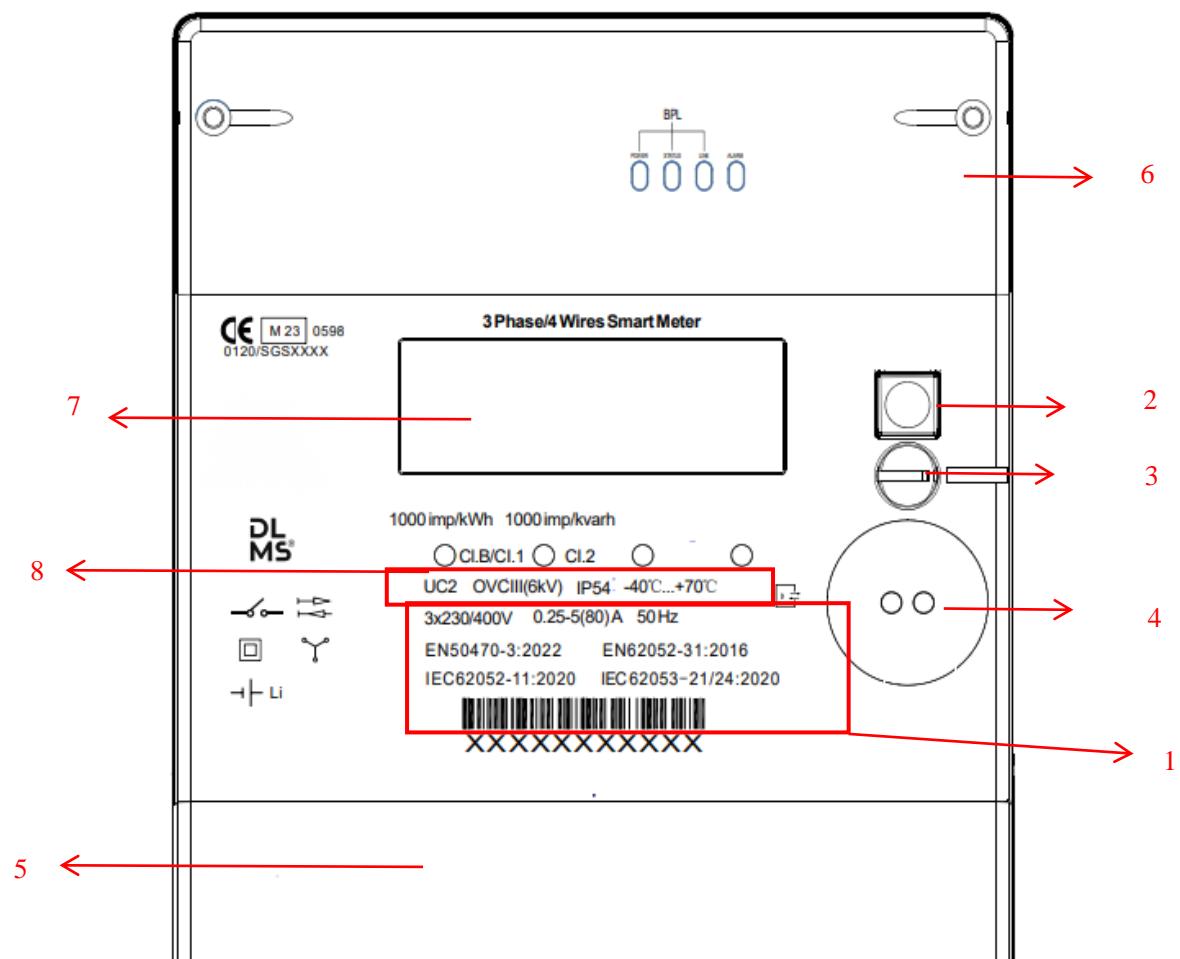
1.3. Technical Standards

- IEC 62053-21: Electricity metering equipment (a.c.) - Particular requirements - Part 22: Static meters for active energy (classes 1 and 2)
- IEC 62053-23: Electricity metering equipment (a.c.) - Particular requirements - Part 23: Static meters for reactive energy (classes 2 and 3)
- IEC 62052-11: Electricity metering equipment (AC) - General requirements, tests and test conditions - Part 11: Metering equipment
- IEC 62056-21: Electricity metering - Data exchange for meter reading, tariff and load control - Part 21: Direct local data exchange
- IEC 62056-53: Electricity metering - Data exchange for meter reading, tariff and load control - Part 53: COSEM application layer
- IEC 62056-62: Electricity metering - data exchange for meter reading, tariff and load control - Part 62: Interface classes
- IEC 62056-61: Electricity metering - data exchange for meter reading, tariff and load control - Part 61: Object Identification System (OBIS)
- IEC62059-41 Electricity metering equipment - Dependability - Part 41: Reliability prediction
- IEC62056-47 Electricity metering - Data exchange for meter reading, tariff and load control - Part 47: COSEM transport layers for IPv4 networks



2. Assembling and Installation

2.1. Appearance



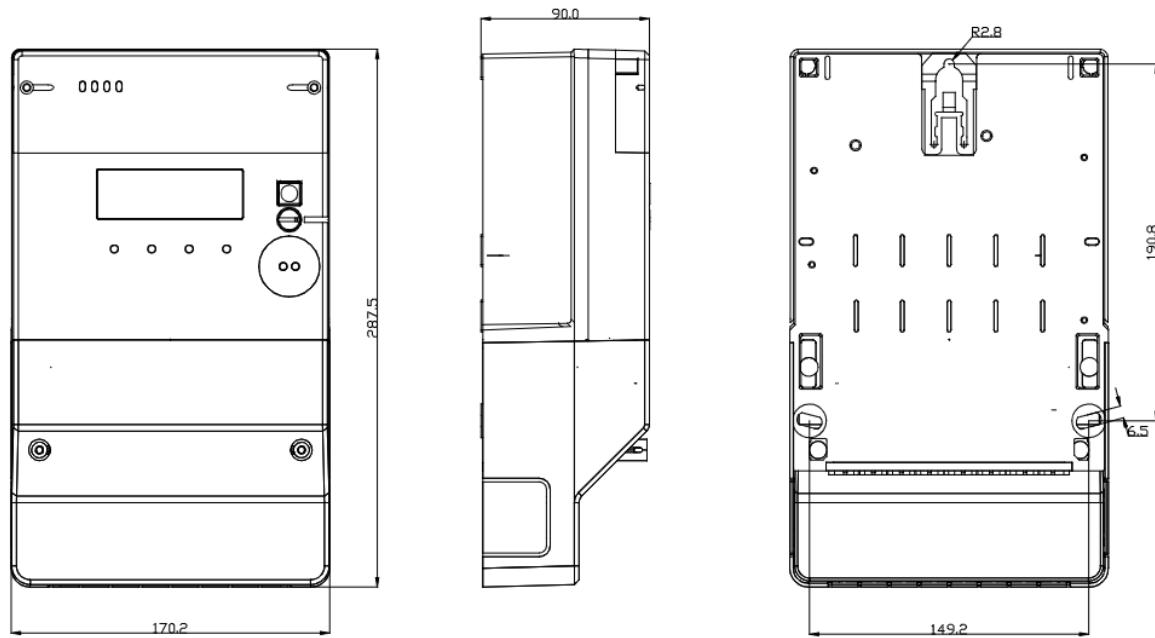
No.	Element
1	Basic information
2	Page up button
3	Demand reset button
4	Optical interface
5	Terminal (covered)
6	Case for communication module
7	LCD
8	LED for impulse

Tab.2: Description appearance

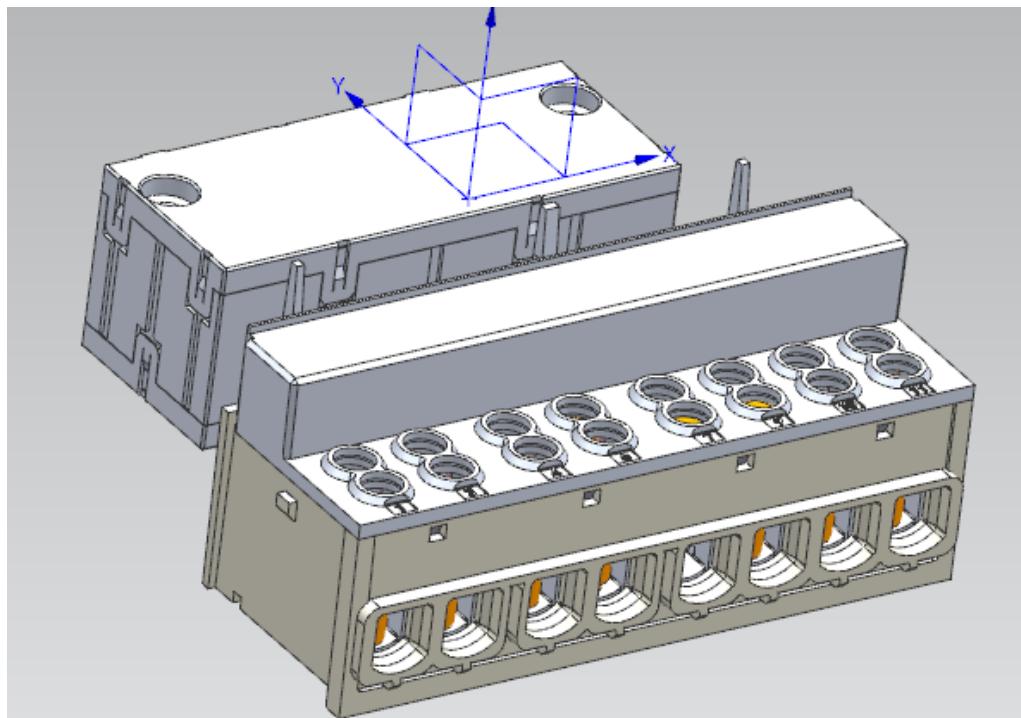


2.2. Outside dimensions

Outside dimensions: 287.5 mm (L) \times 170.2mm (W) \times 90.0mm (H)

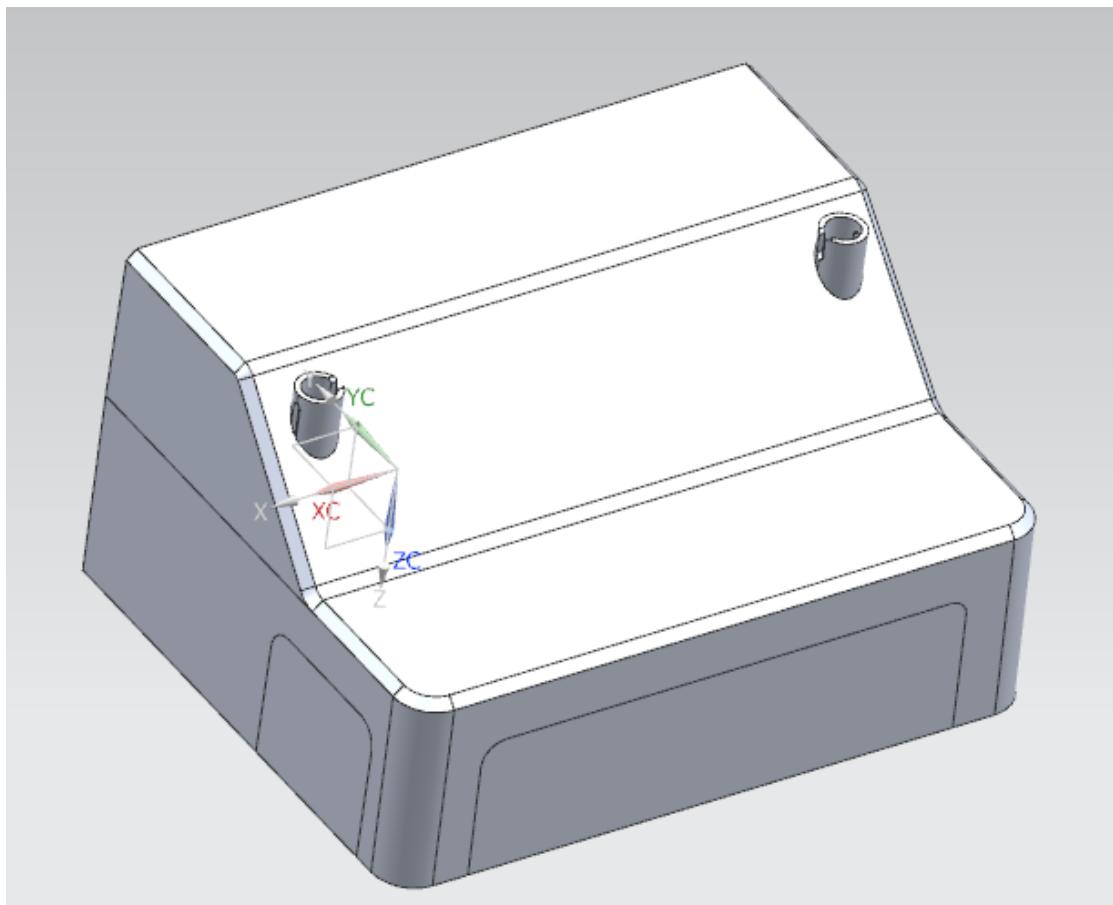


2.3. Terminal block





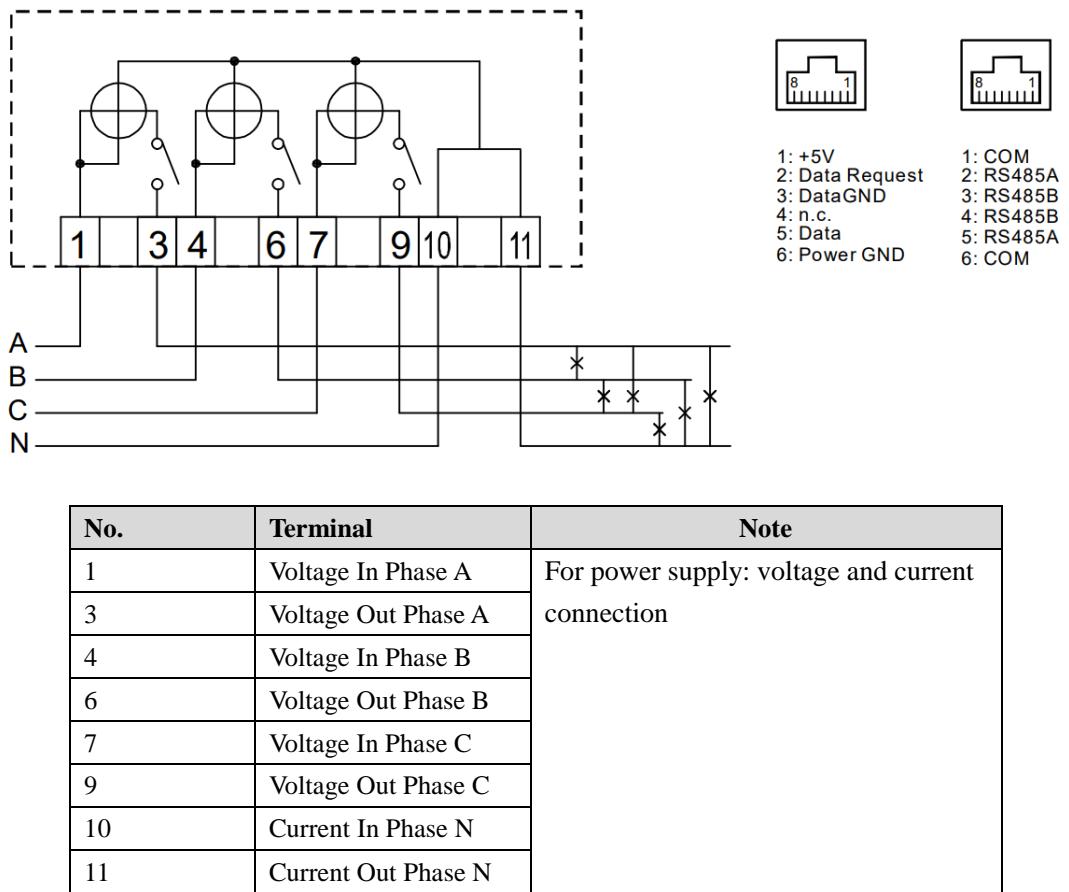
2.4. Terminal Cover



2.5. Connection Diagram

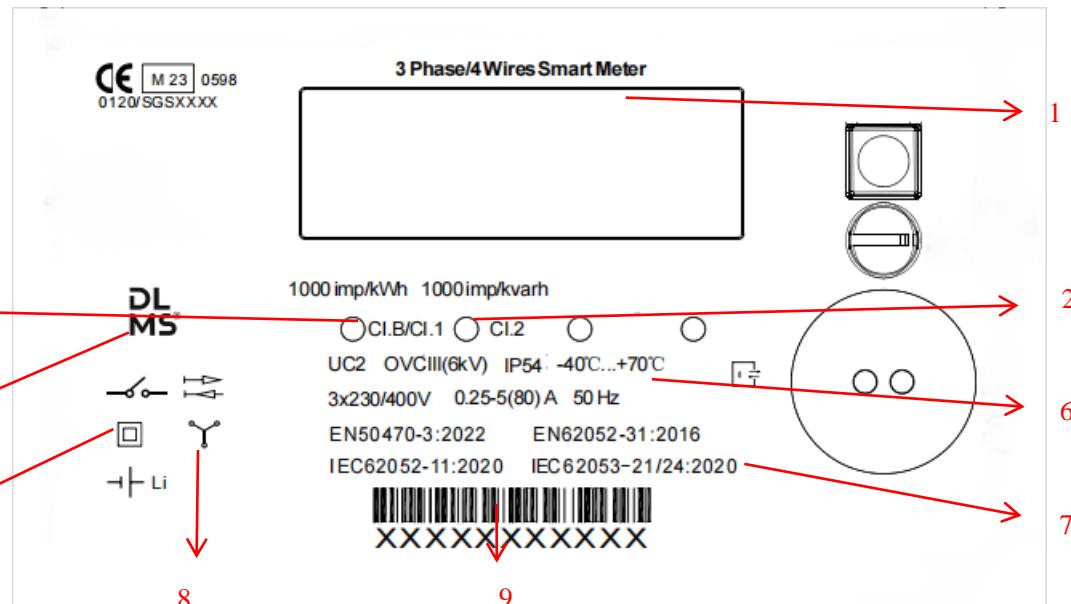
The connection diagram printed on the terminal cover needs to be carefully learned before connecting the meter to the power and the load.

After connecting all of power cable with terminal, terminal cover can cover all connect terminal and sealed by screw, only authorized operator can open the terminal cover, otherwise, it'll be recorded.



Tab.3: Connection Diagram

2.6. Meter nameplate





2	LED of reactive pulse	1000 imp/kvarh
3	LED of active pulse	1000 imp/kWh
4	DLMS logo	
5	Protection degree	II
6	Meter technical parameter	Un, Ib and Imax, Fn
7	Standards	
8	3P4W indication	
9	Meter serial number and barcode	with barcode I25

Tab. 4: Description of Nameplate

2.7. Button

2.7.1. Alternate display button

There is one buttons for alternating the LCD display contents.

When the meter is in AUTO, Service, Test, Power down display mode, short press the button to display the next item.

Apart from the function above, button is used to enter and exit Test display mode.

When the meter is power off, short press button can wake up display, entering the power down mode.

2.7.2. Demand reset button

The demand reset button is sealed and only authorized person should open this seal and long press this button.

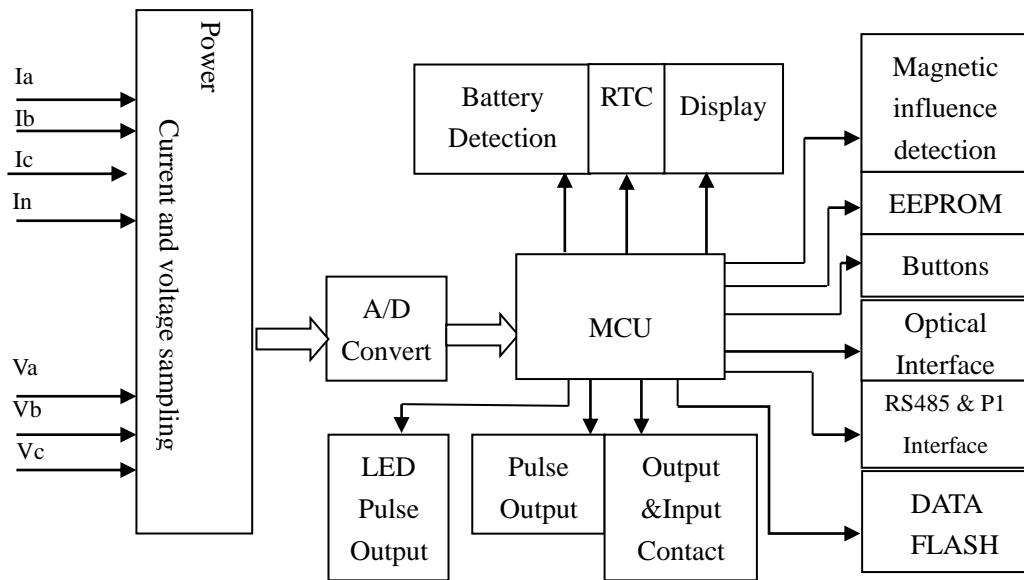
When manual demand reset is enable, after pressing this button, the current energy and demand will be saved in separate register, and then reset current demand.



3. Measuring

3.1. Basic principle

3.1.1. Framework



3.1.2. Current sampling

The phase current sampling through shunt, and let current signal become voltage signal, then the voltage signal input A/D convert chip.

3.1.3. Voltage sampling

The phase voltage sampling through resistance network, and let big signal become small signal, then Small analogue signal input A/D convert chip. Also, it will supply power for A/D chip, MCU and other circuits.

3.1.4. Internal process

After A/D convert, the digit signal will transport to MCU, and MCU will calculate energy and demand according to digit signal.

At the same time, MCU will control LCD display and pulse output, respond to button and optical port, battery and event detection, read and write EEPROM and RTC, and so on.

3.2. Basic function

It's a multifunctional electronic meter, including:

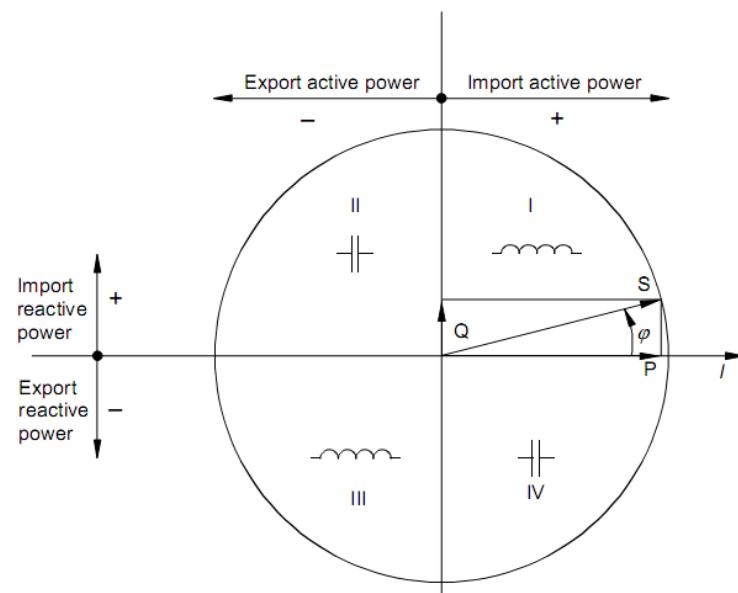
- Measurement: active and reactive energy, absolute value of energy, apparent energy, active and reactive demand;
- Instantaneous value: voltage, current, frequency, power factor, power and THD;
- Communication port: optical communication port, RS485 communication port (RJ12), P1 communication port, and communication port for communication module;
- Anti-tamper protection: meter cover detection, module cover detection, magnetic field detection, relay status, etc.;
- Other functions: TOU, display, power quality events, load profile, LED pulse output, remote firmware upgrade and etc.

3.3. Metering accuracy

Class 1.0 for active energy and class 2.0 for reactive energy measurement, compliant with IEC 62053-21/23.

3.4. Metering for energy and demand

According to IEC standard, import and export for active and reactive definition as following:



Metering Functions:

- ◆ Active import and export energy measurement
- ◆ Active(import + export) + Imax energy measurement
- ◆ Active Imax energy measurement
- ◆ Reactive import and export energy measurement
- ◆ Active import and export maximum demand registers



- ◆ Reactive import and export maximum demand registers
- ◆ Maximum demand calculation base on demand interval
- ◆ Cumulative demand calculation.
- ◆ Up to 12 month's history energy and demand data

3.5. Energy Register

The meter supports the following energy registers.

➤ Consumption Energy Register	
1.	Active import power $[AL1 + AL2 + AL3 \text{ if } ALX \geq 0]$ (kW)
2.	Active export power $[AL1 + AL2 + AL3 \text{ if } ALX < 0]$ (kW)
3.	Total active power $[AL1+AL2+AL3]$ (\pm kW)
4.	Total active power $[AL1+AL2+AL3]$ (kW)
5.	Total active power $[AL1 + AL2 + AL3]$ (kW)
6.	Active power phase L1 $[AL1]$ (\pm kW)
7.	Active power phase L2 $[AL2]$ (\pm kW)
8.	Active power phase L3 $[AL3]$ (\pm kW)
9.	Active power phase L1 $[AL1]$ (kW)
10.	Active power phase L2 $[AL2]$ (kW)
11.	Active power phase L3 $[AL3]$ (kW)
12.	Active import power phase L1 $[AL1 \text{ if } AL1 \geq 0]$ (kW)
13.	Active import power phase L2 $[AL2 \text{ if } AL2 \geq 0]$ (kW)
14.	Active import power phase L3 $[AL3 \text{ if } AL3 \geq 0]$ (kW)
15.	Active export power phase L1 $[AL1 \text{ if } AL1 < 0]$ (kW)
16.	Active export power phase L2 $[AL2 \text{ if } AL2 < 0]$ (kW)
17.	Active export power phase L3 $[AL3 \text{ if } AL3 < 0]$ (kW)
18.	Total reactive power $[RL1+RL2+RL3]$ (kvar)
19.	Total reactive power $[RL1 + RL2 + RL3]$ (kvar)
20.	Reactive power phase L1 $[RL1]$ (kvar)
21.	Reactive power phase L2 $[RL2]$ (kvar)
22.	Reactive power phase L3 $[RL3]$ (kvar)
23.	Reactive import power phase L1 $[RL1 \text{ if } RL1 \geq 0]$ (kvar)
24.	Reactive import power phase L1 $[RL2 \text{ if } RL2 \geq 0]$ (kvar)
25.	Reactive import power phase L1 $[RL3 \text{ if } RL3 \geq 0]$ (kvar)
26.	VRMS phase L1/L2/L3
27.	IRMS phase L1/L2/L3
28.	Power Factor phase L1/L2/L3
29.	Power Factor phase summation
30.	Mains frequency
31.	THD
➤ Cumulative Energy Register	
1	Active forward (import + export) energy of total and each tariff



2	Active import energy of total and each tariff
3	Active export energy of total and each tariff
4	Reactive forward (import + export) energy of total and each tariff
5	Reactive import energy of total and each tariff
6	Reactive export energy of total and each tariff
7	Consumption Active (import + export) energy + Imax
➤ Internal cumulative energy Register	
1	Active import energy for phase A
2	Active import energy for phase B
3	Active import energy for phase C
4	Active export energy for phase A
5	Active export energy for phase B
6	Active export energy for phase C
7	Reactive import energy for phase A
8	Reactive import energy for phase B
9	Reactive import energy for phase C
10	Reactive export energy for phase A
11	Reactive export energy for phase B
12	Reactive export energy for phase C

Tab. 5: Energy Register

3.6. Demand Register

There are 6 demand channels, the meter supports the following demand measurements.

➤ Max Demand	
1	Active forward (import + export) demand of total and each tariff
2	Active import demand of total and each tariff
3	Active export demand of total and each tariff
4	Reactive forward (import + export) demand of total and each tariff
5	Reactive import demand of total and each tariff
6	Reactive export demand of total and each tariff
➤ Cumulative Max Demand	
1	Active forward (import + export) demand of total and each tariff
2	Active import demand of total and each tariff
3	Active export demand of total and each tariff
4	Reactive forward (import + export) demand of total and each tariff
5	Reactive import demand of total and each tariff
6	Reactive export demand of total and each tariff

Tab. 6: Demand Register



3.7. Demand calculation method

The meter supports block methods for demand calculation:

Demand interval is 15 minutes.

3.8. Demand reset type

No.	Ways of Demand Reset	Description
1	Reset on regular date	Choose one day from day 1 to day 28; The time of the demand reset can also be configured.
2	Reset on irregular date	Can select 0~12 special demand reset dates for each year;
3	Reset demand manually	Reset demand by pressing the button. There is time limit between two manual demand resets which can be set up from 30 minute to 65535 minutes by software.
4	Demand reset by software	Demand can be reset by software through infrared interface

Tab. 7: Ways of Demand Reset

The above-mentioned ways for demand reset can be disabled or enabled by MMS.

If the relevant demand reset is disabled, then the demand will not be reset even if it complies with the reset condition.

After reset the demand, a period of time(MDR lock) are not allowed to reset again. The period can be configure by MMS. The default value is 30min.

When demand reset occurs, the current energy and the maximum demand will be automatically saved for the last month. The energy of current month will be continuously cumulated, and the demand will be reset and restart to record.

3.9. History energy record

There are 12 months history energy and demand data.

All this history data can be read out via MMS through optical port, RS485 port.

3.10. Instantaneous parameter measurements

The instantaneous parameter can be displayed on LCD and be read out via communication. Instantaneous parameter measurements support:

No.	Element	Unit
1	Voltage of phase A/B/C	V
2	Current of phase A/B/C	A
3	Power factor of total and each phase	



4	Import active power for total and each phase	kW
5	Export active power for total and each phase	kW
6	Import reactive power for total and each phase	kvar
7	Export reactive power for total and each phase	kvar
8	Apparent power for total and each phase	kVA
9	Frequency	Hz

Tab. 8: Instantaneous parameter

3.11. Load profile

Load profile interval is configurable, there are 5, 15, 30, 60 minutes.

Memory capable: 4 channels, 30 minutes of interval, more than 100 days.

The load profile data are stored with time stamp.

4. Tariff characteristics

4.1. Energy and demand tariff control

There are 6 tariffs, T1, T2, T3 ... T6 are used for energy and demand measurement, and tariff control by internal clock.

4.2. Real time clock

AC power, battery and super capacity supply power for internal clock.

Clock accuracy: $<\pm 0.5$ sec/day at 23 °C, the variation of the time-keeping accuracy with temperature is less than 0.15s/ °C/day), compliant with IEC 62054-21.

RTC use Gregorian calendar. (100 years calendar including leap year).

Time and date can be set through the optical, RS485 communication interface with MMS.

The real-time clock supplies the time stamp for maximum demand measurement, all events inside the meter, such as time stamp for voltage interruptions, reverse polarity etc.

4.3. TOU - Time of Use

The meter is TOU (time of use) meter with 8 tariffs.

The current tariff is determined by the fix holiday setting, holiday setting, season table, weekday setting and the day type setting table.

Count:

100 holidays, 12 seasons, 10 week profiles, 10 day type and 12 daytime periods in each day type, all of



that are programmable by software.

● **Holidays and Fix holidays:**

Can configure holidays and fix holidays, and the total numbers shall not be more than 100, each holiday can be set different day type, totally 10 day type are configurable.

● **Seasons:**

Maximum number of seasons can be set 10

Format of the season: user defined

Please note the seasons must be programmed from small to big.

● **Week day:**

Weekly day-off(s)

Weekend and its day type are configurable from Sunday to Saturday

● **Day type**

There are 10 day types that can be configured.

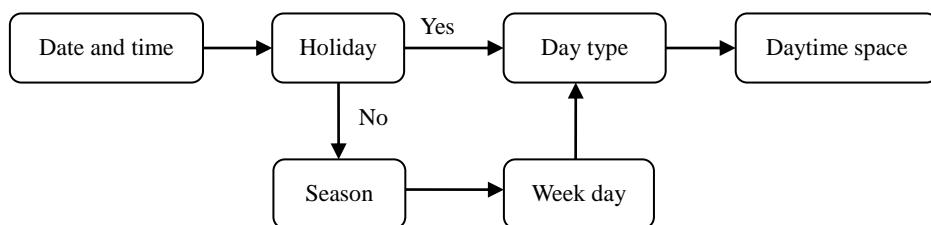
● **Switch time:**

Each table can set up 10 switch time (sequential time interval).

Switch time must be set up from early to later.

The priority determine: Season<holiday

What's tariff of meter running now according to current date and time, please reference flow chart as the following:



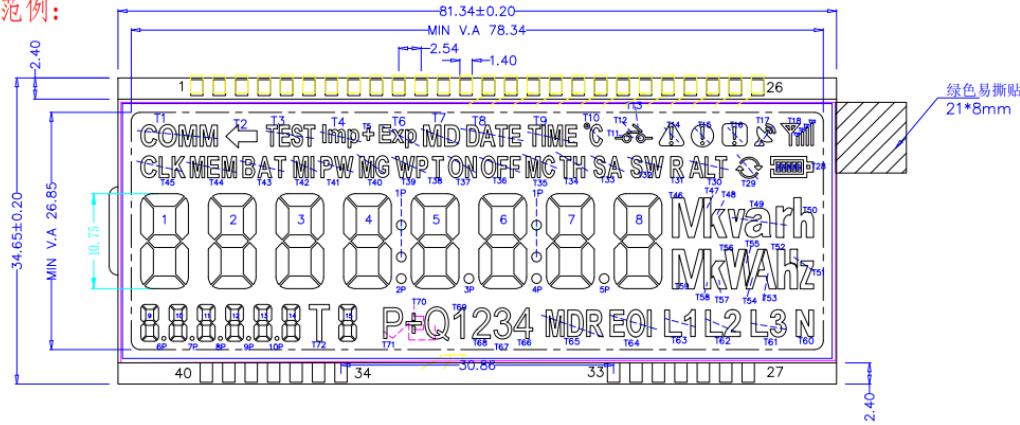
5. Display control

5.1. Display

LCD size and display font size is show as below:



图纸标注范例：

总点数: $10+15*7+72=187$

All Segments of LCD is shown as below:



The detail describe of LCD segments as following:

	Symbol	Description
1	8888888:888.8	Measuring quantity.
2	8.8.8.8.8	The OBIS code of the current functional items
3	T8	Meter Tariff Indication
4	P+Q1234	<p>The quadrant indication of Active and Reactive power The indicators for each quadrant:</p> <p>First Quadrant: P+Q1</p> <p>Second Quadrant: P-Q 2</p> <p>Third Quadrant: P-Q 3</p>



		Fourth Quadrant: P+Q 4
5	L1L2L3	Phase Indication L1 L2 L3 Over voltage, Under voltage, Reverse polarity and Anti phase sequence: flashing Phase Disconnection: disappeared The circle is indicate for current Current missing: disappeared. Reverse Current: flashing
6		Flashing when current reverse
7	Imp + Exp	Indication for Direction of Energy, Demand and etc.
8	MD	Indication for maximum demand
9		Event Alarm Indication
10		Battery status Indication. Over 3.5V: Between 3.3-3.5V: Below 3.3V:
11	ALT	Service mode Indication
12	TEST	TEST mode Indication
13		DATE indication
14		Time indication
15	MDR	Manual Demand reset lock Indication
16	EOI	End of Demand Interval
17		Communication Process Indication (On)
18	kvarh kVAh	Measuring Units: It supports V, A, W, kW, var, kvar, VA, kVA, Wh, kWh, varh, kvarh, VAh, kVAh, Hz



19		Relay status Indication Disconnect: always on Connect: always on Ready for connect: blinking in 1Hz
----	--	---

Tab. 9: describe of LCD segments

5.2. Display mode

Mode	Description
AUTO MODE	The meter will display the configured pages(max. 100items) one by one. The content of each page in AUTO mode is configurable. Duration time also can be configured by software.
Service MODE	The meter will display the configured pages one by one. The content of each page in service mode is configurable. Short touch the button once to scroll one display item. If no buttons are touched within a long time(the time is configurable), the meter will back to auto display mode automatically.
TEST MODE	The meter will display the configured pages one by one. The content of each page in TEST mode is configurable.
Power Down MODE	When the meter was power off, short touch the button to wake up display, the display items is same with service mode. Short touch the button once to scroll one display item. If no buttons are touched within a long time(the time is configurable), the meter will back to sleep mode, and LCD will not display.

Tab. 10: Display mode

5.2.1. Display formats and units

Leading zero:

- 1). Energy data with leading zeros
- 2). Demand data without leading zeros
- 3). Instantaneous data (voltage, current, power) without leading zeros.

Number of decimal could be configured and its default configuration is as shown below:

Type of value	Number of decimal (default)		Unit
	Auto/service mode	Test mode	
Energy (3)	3	3	kWh
Demand (2)	2	2	kW



Power (2)	2	2	kW
Voltage (2)	2	2	V
Current (3)	3	3	A
Power Factor (3)	3	3	--
Frequency (2)	2	2	Hz

Tab. 11: Display formats and units

5.3. Switch of display mode

The detail describe of display mode switch, and how to enter and exit of different display mode.

Display mode	How to enter	How to exit
AUTO mode	1) Power on 2) Exit from service mode automatically	1) Power down 2) Enter service mode 3) Enter Test mode.
service mode	Short press scrolling button	1) Power down 2) Without press button N second, exit to normal mode. (N can be configured 1~255s, the default is 10s)
TEST mode	Long touch scrolling button for more than 5 sec	1) Power down 2) Long touch scrolling button for more than 3 sec to exit to AUTO mode
Power Down mode	When meter is on power outage, LCD will display by pressing scrolling button	Automatically exit Power Down mode after N second. (N is configurable)

Tab. 12: Display mode switch

5.4. Back light

Back light will on after press button, it's useful to read meter through LCD when it in dark environment.

Its light on time is configurable, from 5 to 60 seconds.

The back light also used for tamper warn, it will blink when tamper event is occupying if we enable back light blink for the tamper (Such as reverse polarity, meter cover open, terminal cover open, reverse current, magnetic influence, bypass, loss phase), back light blink for each tamper event could be disable and enable, also blink frequency can be programmed.

6. Battery

The replaceable battery is a lithium battery, it's supply power for RTC, power down mode, and easy to replacement it without soldering when meter in service.



Nominal voltage: 3.6V

Nominal capacity: 1200mAh

Lifetime: >15 years

Back up time for RTC when power outage: >2 year

7. Pulse output

7.1. Led pulse output

LED pulse output of active and reactive energy, it's using for test, and meter constant is 1000 imp/kWh for active energy and 1000 imp/kvarh for reactive energy.

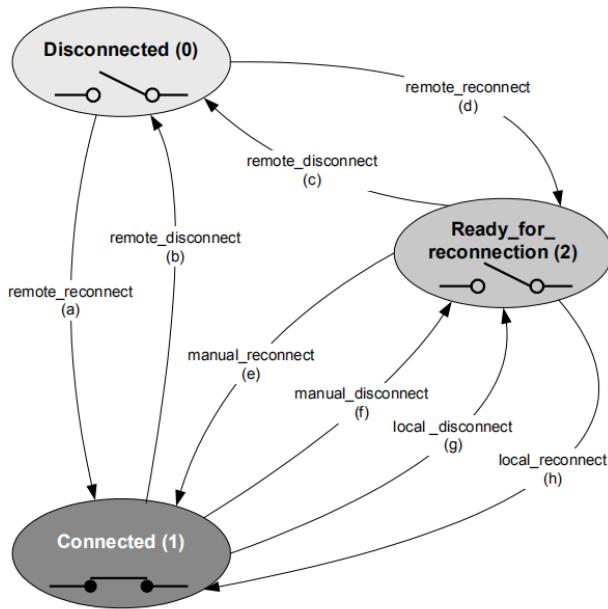
8. Relay Operation

The meter internal relay supports modes as below:

control _mode	Disconnection			Reconnection		
	Remote	Manual	Local	Remote	Manual	Local
enum:	(b)	(c)	(f)	(g)	(a)	(h)
(0)	-	-	-	-	-	-
(1)	x	x	x	x	x	x
(2)	x	x	x	x	-	x
(3)	x	x	-	x	-	x
(4)	x	x	-	x	x	-
(5)	x	x	x	x	-	x
(6)	x	x	-	x	-	x

NOTE 3 In Mode (0) the disconnect control object is always in 'connected' state.

NOTE 4 Local disconnection is always possible unless the corresponding trigger is inhibited.



➤ Remote connection and disconnection

The meter internal relay can be disconnected or connected by remote command

➤ Manual mode for connection and disconnection:

a) When relay is under connected status,  on the LCD will display, long press scrolling button 10s, the relay disconnect, and it will under "Ready for reconnection" status,

 will 1Hz flash on the LCD.

b) When relay is under "Ready for reconnection" status,  1Hz flash on the LCD, long

press scrolling button 10s, the relay connect, it is under connected status,  will display on the LCD.

➤ Over current for relay disconnection

If meter occurring overload than threshold value, the duration time is longer than ignore time, the relay will disconnect. The ignore time is configurable, default time is 300s.

➤ Recover connection because of overload

If overload is lower than threshold value, the duration time is longer than ignore time, then the relay will connect automatically. The ignore time is configurable, default time is 300s.

9. Communication Interface

9.1. Optical port

Optical port for meter reading and program according to IEC62056-21 MODE E and IEC62056-53/61/62.



Login parameters: 300bps, 7, Even, 1

Communication parameters: 9600bps or 19200bps (configurable), 7, Even, 1

9.2. RS485 port & P1 port

The meter have each one RJ12 type communication port for RS485 and P1.

9.2.1. RS485 port for communication

RS485 port for meter reading and program according to IEC62056-53/61/62

Login/ Communication parameters: configurable from 4800bps to 19200bps, 8, None, 1

9.2.2. The Pin definition of RJ12

The Pin definition of RJ12 as below. (Left:P1, Right:RS485)



1: +5V
2: Data Request
3: DataGND
4: n.c.
5: Data
6: Power GND

1: COM
2: RS485A
3: RS485B
4: RS485B
5: RS485A
6: COM

10. Security functions

10.1. None volatile memory

In case of power lack, basic data like consumed energy, demand will be saved in none volatile memory. If the meter parameters were modified and power outage, the meter will record events.

10.2. Anti tamper features

- The meter's cover and terminal can be sealed, and that's no way for tampering.
- Protection of reset and change cumulative energy in memory.
- Event log of any tamper.
- The back light will blink when tamper event is occupying.
- The meter would switch to maximum load condition during magnetic interference of more than



10.3. Error status (current and historical)

The error status code can be configured in the LCD display.

When some errors are happening, the corresponding bit of error status code will set to “1”.

When the errors were finished, the current error status will be set to “0”, but historical error status still is “1”.

Error status items as following:

Bit	LCD display format	Content of error
Bit 3	00001000	Watchdog error
Bit 2	00000100	Program error
Bit 1	00000010	EEPROM or dataflash error
Bit 0	00000001	RTC error

Tab.13: Error status items

10.4. Event status (current and historical)

The event status code can be configured in the LCD display

When some events are happening, the corresponding bit of status code will set to “1”.

When the events were finished, the current event status will be set to “0”, but historical event status still is “1”.

Event status items as following:

Bit	LCD display format	Content of event
Bit 7	10000000	Under voltage
Bit 6	01000000	Over voltage
Bit 5	00100000	Phase C missing voltage
Bit 4	00010000	Phase B missing voltage
Bit 3	00001000	Phase A missing voltage
Bit 2	00000100	Asymmetrical voltage
Bit 1	00000010	Active energy reverse
Bit 0	00000001	Reactive energy reverse

Tab.14: Event status items

10.5. Caution status (current and historical)

The caution status code can be configured in the LCD display.

When some caution events are happening, the corresponding bit will set to “1”.

When the caution events were finished, the caution event status will be set to “0”, but historical caution status still is “1”.

Caution status items as following:



Bit	LCD display format	Content of event	
Bit 6	01000000	Terminal cover removed	
Bit 5	00100000	Missing neutral (optional)	
Bit 4	00010000	No RTC battery	
Bit 3	00001000	Magnetic influence	
Bit 2	00000100	Meter un-programmed	
Bit 1	00000010	Low battery voltage	
Bit 0	00000001	Meter cover removed	

Tab.15: Caution status items

10.6. Event log

The meter support 4 types of event log: Standard event, Fraud event, Power quality event and Alarm event. Alarm event supports record 100 entries, other three types of event log support 500 entries for each type. The events start and finish after ignore time. The thresholds values for event detection and event ignore time are configurable by MMS

Event name	SEL	FEL	PQEL	AL
Standard event log cleared	√	/	/	/
Alarm register cleared	√	/	/	√
Fraud event log cleared	/	√	/	√
Power quality event log cleared	/	/	√	√
Load profile 1 cleared	√	/	/	/
Load profile 2 cleared	√	/	/	/
Meter cover closed	/	√	/	√
Meter cover removed	/	√	/	√
Terminal cover closed	/	√	/	√
Terminal cover removed	/	√	/	√
Strong magnetic filed	/	√	/	√
Strong magnetic filed no longer	/	√	/	√
Power failure	√	/	/	√
Power returned	√	/	/	√
Asymmetrical voltage	/	/	√	/
Asymmetrical voltage returned	/	/	√	/
Phase A/B/C back to normal	/	/	√	/
Phase A/B/C missing voltage	/	/	√	/
Phase A/B/C over voltage	/	/	√	/
Phase A/B/C under voltage	/	/	√	/
Phase A/B/C reversed	√	/	/	/
Disconnect: Remote disconnect	√	/	/	√
Disconnect: Remote connect	√	/	/	√
Disconnect: Local disconnect	√	/	/	√



Disconnector: Local connect	√	/	/	√
Disconnector due to load limit	√	/	/	√
Clock adjusted	√	/	/	/
Clock set	√	/	/	/
One or more parameters changed	√	/	/	√
Global key changed	√	/	/	√
Unauthorised access request	/	√	/	√
Decryption or authentication failure	/	√	/	√
Battery low	√	/	/	√
Replace battery	√	/	/	√

Tab.16: Event log

Note: “√” means corresponding item with options;

“/” means corresponding item without options;

When meter occur magnetic influence event, meter will operate with Imax. The maximum load register will maintain to record as long the tamper condition is present and revert to normal operating condition once the influence is removed.

10.7. User Manage

There are four level of permissions:

- Reader
- Operator
- Supervisor
- Master.

User	Level of permissions	Operate Permissions			
		Create user accounts; Set meter ID; Set meter communication password	Configure parameters scheme file; Configure parameter and write it directly	Download parameter scheme file	Read all the Data in the meter
Master	The Highest level	Y	Y	Y	Y
Supervisor	Second level	N	Y	Y	Y
Operator	Third level	N	N	Y	Y
Reader	The lowest level	N	N	N	Y

Tab. 17: User manage



11. FCC warning statements

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The device has been evaluated to meet general RF exposure requirement. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.