Technical Specification

DTSD545(Greece)

Three-phase Direct Smart Meter

(V1.0)

Holley Technology Ltd.

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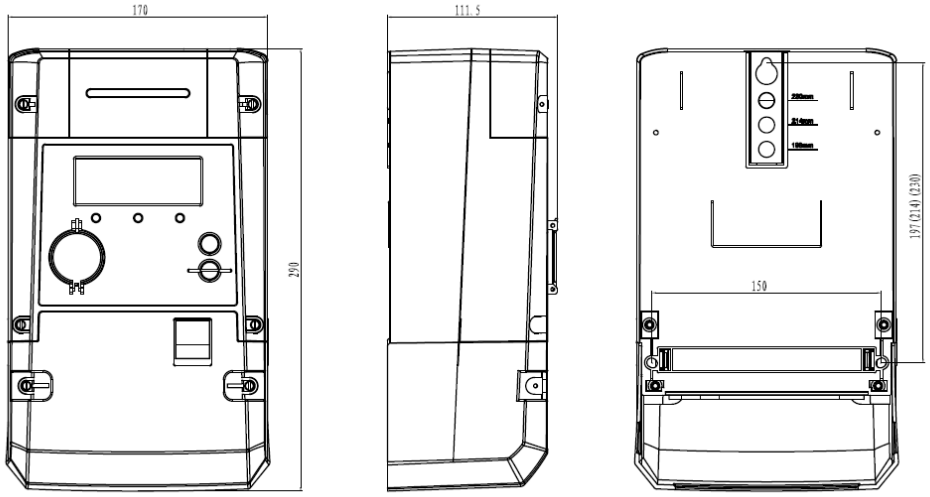
Contents

1 Reference Standards

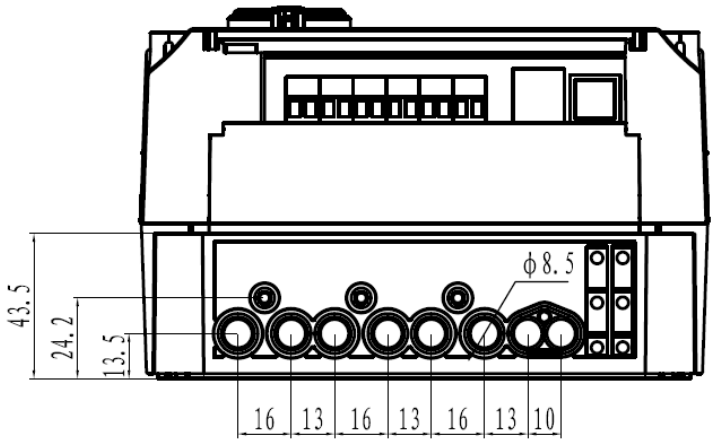
Standard	Description
IEC62052-11	Electricity metering equipment (a.c.) – General requirements, tests and test conditions – Part 11: Metering equipment
IEC62053-21	Electricity metering equipment (a.c.) – Particular requirements –Part 21: Static meters for active energy (classes 1and 2)
IEC62053-23	Electricity metering equipment (a.c.) – Particular requirements –Part 23: Static meters for reactive energy (classes 2 and 3)
IEC 62056-21	Electricity Metering-Data exchange for meter reading, Tariff and Load Control-Part 21: direct local data exchange.
IEC 62056-61	Electricity metering-Data exchange for meter reading, tariff and load control-Part61: object identification system (OBIS).
IEC 62056-53	Electricity metering-Data exchange for meter reading, tariff and load control-Part53: COSEM application layer.
IEC 62056-46	Electricity metering-Data exchange for meter reading, tariff and load control-Part 46: data link layer using HDLC protocol.
IEC 62056-42	Electricity metering-Data exchange for meter reading, tariff and load control-Part 42: physical layer services and procedures for connection-oriented asynchronous data exchange.

2 Meter Installation, Connection and Dimension Diagram

2.1 Front View, Side View, Back View and Dimension

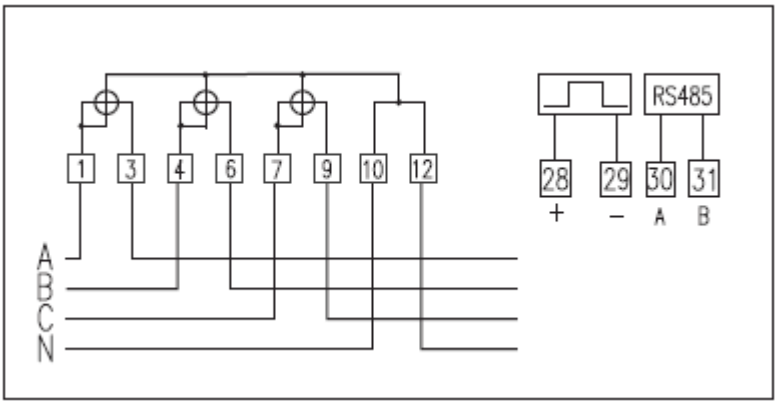


2.2 Terminal Dimension Diagram (terminal bottom diagram)



3P4W DT Type

2.3 Detailed Connection Diagram



3 Meter Function Introduction

3.1 Function and Performance Specification

Item	Sub-item	Parameter
Basic Parameter	Meter type	3P4W DT
	Active accuracy class	DT meter: Class 1 (IEC 62053-21)
	Reactive accuracy class	Class 2 (IEC 62053-23)
	Nominal voltage	3P4W direct meter: 3x 230/400 V Operating voltage: 0.7Un~1.12Un
	Nominal frequency	50Hz
	Current specification	DT meter: 10(60)A
	Starting current	DT meter: 0.004Ib
	Pulse constant	DT meter: 1000imp/kWh，1000imp/kvarh，
	Power consumption	Current circuit: active power consumption<0.5VA Voltage circuit: active consumption<2.0W, apparent power consumption<5VA
	Operating temperature range	-25 ℃ ~ +70 ℃
	Storage temperature range	-40 ℃ ~ +80 ℃
	Humidity range	5%~95%RH
	Waterproof and dustproof level	IP54
Basic Test Type	Basic test	IEC 62053-21 IEC 62053-23 IEC 62052-11
Special Test Type	Pulse voltage	6KV
Communication	Communication port	One near-infrared communication port, 300-9600bps One RS485 communication port, 9600bps One GPRS communication port, 9600bps
	Communication protocal	Near-infrared communication：IEC62056-21 E mode RS485 communication：HDLC DLMS/COSEM GPRS communication：HDLC DLMS/COSEM

Metering	Active energy	Import active energy(1-0.1.8.0.255) =|+A1|+|+A2|+|+A3| Or=|+A1|+|+A2|+|+A3|＋|-A1|+|-A2|+|-A3| Export reactive energy(1-0.2.8.0.255) =|-A1|+|-A2|+|-A3|
	Reactive energy	Import reactive energy(1-0.3.8.0.255) +R=|+Ri|+|+Rc| Export reactive energy(1-0.4.8.0.255) -R=|-Ri|+|-Rc| （+Ri: reactive quadrant 1 +Rc:reactive quadrant 2 -Ri: reactive quadrant 3 -Rc: reactive quadrant 4）
	Reacitve energy of 4 quadrant	Reacive energy of quadrant: I, II, III, IV
	Absolute energy	Absolute active energy (1-0.15.8.0.255) =|+A1|+|+A2|+|+A3|＋|-A1|+|-A2|+|-A3|
	Apparent energy	Import apparent energy(1-0.9.8.0.255) =|+A1|+|+A2|+|+A3| Or=|+A1|+|+A2|+|+A3|＋|-A1|+|-A2|+|-A3 Export apparent energy(1-0.10.8.0.255) =|-A1|+|-A2|+|-A3|
	Split-phase energy	A/B/C Import active energy (1-0.21/41/61.8.0.255) = |+A| or |+A|+|-A| A/B/C Export active energy (1-0.22/42/62.8.0.255) =|-A| A/B/C Import reactive energy (1-0.23/43/63.8.0.255) +R= |+Ri|+|+Rc| A/B/C Export reactive energy(1-0.24/44/64.8.0.255) -R=|-Ri|+|-Rc|

	Instantaneous quantity	Voltage（A/B/C） Current（A/B/C） Power factor（total/ A/B/C） Active power（total/ A/B/C） Export active power(A/B/C) Reactive power（Total/ A/B/C） Export reactive power(A/B/C) Apparent power（Total/ A/B/C） Power grid frequency A/B/C Phase voltage, current angle AB/AC voltage angle
LED and LCD Display	LED indicator	One active pulse output, one reactive pulse output, one alarm light
	LCD indicator	Electricity display mode: 5+3/6+2/7+1/8+0 configurable, dicimals of power off is the same as power on
	Display mode	Auto display mode Button display mode Power-off display mode: (display items are the same as button mode)
	Display operation	Normal display time is configurable: 1~99s, default is 10s. Buttom display: Press to wake up and switch to auto display mode without operation in 30s (details refer to display part) Power-off display: press to wake up. LCD displays about 8s and then off.
	Display content	Two display list, details refer to display part
TOU	Time period tarriff	Support 6 tariff maximally Support 8 days time period table and 24 time period maximally Support 12 week table maximally Support 12 time zone table maximally Support 100 holiday maximally
	2 type of tariff	Switch mode of main and vice tariff : immediate activation and periodic activation
	Clock	≤0.5s/day (in 23° C)
	Calendar	Auto-switch of leap year

	Daylight saving time	Support
	Battery life	10 years battery operation life; Operate for at least 2 years in case of any power failure
Load Record, Maximum Demand and Settlement Data	Load capture period	Capture period is configurable: 1~60 min
	Load curve 1 (energy, demand)	Support 24 capture object maximally Caputure interval: 1~60min, default is 30 min Load period is 30min, and can save data capture objects of two month at least: details refer to body part
	Load curve 2 (instantaneous quantity)	Support 24 capture object maximally Caputure interval: 1~60min, default is 30 min Load period is 30min, and can save data capture objects of two month at least: details refer to body part
	Maximum demand period	Period is configurable： 1min,5min，10 min，15 min，30 min，60 min Slip type: number of slip≤15 Interval type: number of slip:1
	Settlement curve Settlement way	Buttom settlement: press programmable buttom for 5s to settle manually and clear current maximum demand record. Programmable settlement: send settlement order by PC software, and meter will settle immediately
	Settlement data	Settlement objects are configurable; save last 14 billing data; settlement contents are as follows: Settlement time Meter number Import/Export active tariff energy of total and split Import/Export reactive tariff energy of total and split Reactive total and split tariff energy of quadrant 1 Reactive total and split tariff energy of quadrant 2 Reactive total and split tariff energy of quadrant 3 Reactive total and split tariff energy of quadrant 4 Import apparent total energy Export apparent total energy Import/Export active max.demand and occurrence time of total and split tariff Alarm status

		Settlement times
Event	Event log	Support last 100 items at most Details refer to body part
	Event operation Parameter set	Details refer to body part
Data Security	Data security	Sub users have access to meter Management user (21) Technical user (23) Module managemnet user (22) Upgrade user (20) Management user, technical user, module management user and upgrade user adopt LN access mode and LLS encryption mode; the secret key of each user is independent. Right read user: adopt LN mode, unencrypted access to meter Please pay attention to the differences of access to data permissions of each user.

3.2 Meter Function Description

3.2.1 Energy Metering

1) Metering method：

Import active energy=|+ A1|+|+ A2|+|+ A3|+|- A1|+|- A2|+|- A3|

Or =|+ A1|+|+ A2|+|+ A3|

Export active energy=|- A1|+|- A2|+|- A3|

Import reactive energy=|+Ri|+|+Rc|

Export reactive energy=|-Ri|+|-Rc|

(The +Ri is 1st quadrant reactive, the +Rc is 2nd quadrant reactive,The -Ri is 3rd quadrant reactive, the -Rc is 4th quadrant reactive)

The metering method of apparent energy is the same as active metering; Import active energy and apparent energy can be set by sending order

2) Metering accuracy
   - DC meter: active class 1, reactive class 2

3) Metering item：
   - Import active tariff energy of total and split
   - Export active tariff energy of total and split
   - Import reactive tariff energy of total and split
   - Export reactive tariff energy of total and split
   - Reactive total energy of quadrant 4
   - Import apparent energy of total
   - Export apparent energy of total
   - Import and export active total energy of split-phase
   - Import and export reactive total energy of split-phase

3.2.2 Demand Metering

1) Metering method：
   - Interval type：
     Interval: 1 min,5min,10 min,15 min,30 min,60 min(configurable)
     Slip type: interval period time/ slip period time ratio must≤15
2) Maximum demand reset
   - Key settlement: keep pressing the programmable button for 5s to settle the energy manually and reset current maximum demand records
   - Programmable settlement: Reset current maximum demand by settlement order sending by PC software.
   - Monthly settlement: Reset current maximum demand
3) Definition：
   - Demand: User’s average consumption during period
   - Maximum demand: maximum demand during settlement period

- Cumulative maximum demand: Maximum demand during the whole working period

4）Metering contents:

- Import/Export active max.demand and occurrence time of total and split tariff
- Import/Export reactive max.demand and occurrence time of total and split tariff
- Import apparent max.demand and occurrence time of total
- Export apparent max.demand and occurrence time of total

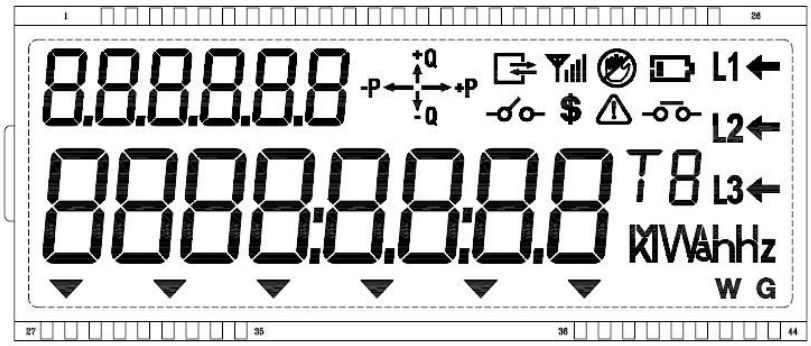
3.2.3 Instantaneous Quantity

- Voltage (A/B/C)
- Current (A/B/C)
- Power factor (Total/A/B/C)
- Active power (Total)
- Import active power (A/B/C)
- Export active power (A/B/C)
- Reactive power (Total)
- Import reactive power (A/B/C)
- Export reactive power (A/B/C)
- Apparent power (Total/A/B/C)
- Power grid frequency
- Phase angle (A/B/C)
- Angle between AB and AC
- Angle between voltage and current (A/B/C)

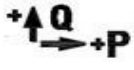
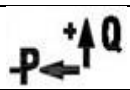
3.2.4 Display

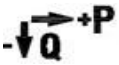
3.2.4.1 LCD Display

1) LCD full display:



2) LCD status and alarm display

LCD Short Code	Description
	Main display area: display value, energy, instantaneous energy etc.
	Display OBIS code
	Communication indicator: meter is exchanging data if displayed Meter is not communicate if not displayed
	kWh, kvarh, VA, V, A, W unit
	The order is from left to right (default), user status display latch and factory status displays in real time 1st triangle (far left): GPRS\RF\PLC is connected to meter successfully 2nd triangle: terminal cover open 3rd triangle: meter cover open 4th triangle: magnetic influence 5th triangle: GPRS\RF\PLC is removed (unused) 6th triangle: reversed phase sequence
	Keep display: A phase voltage is normal Keep flash: overvoltage or undervoltage Without display: loss of phase
	Keep display: B phase voltage is normal Keep flash: overvoltage and undervoltage Without display: loss of phase
	Keep display: C phase voltage is normal Keep flash: overvoltage or undervoltage Without display: loss of phase
	If L1/L2/L3 flash at the same time, take reversed phase sequence into first consideration, and then consider overvoltage and undervoltage of three phase
	“T1”: current running tariff 1 “T2”: current running tariff 2 “T3”: current running tariff 3 “T4”: current running tariff 4 “T5”: current running tariff 5 “T6”: current running tariff 6
	Q1: current active power is positive, reactive power is positive
	Q2: current active power is negative, reactive power is positive

	Q3: current active power is negative, reactive power is negative
	Q4: current active power is positive, reactive power is negative
	Low-battery alarm
	Without display: meter has no module or module has no SIM card IP Meter failed to obtain IP if the symbol ‘ ’ flash mean IP has been obtained and indicates the intensity of signal
	Current reversed event
	Alarm indicator: it will display in the condition of power control disconnection
	Temper indicator: it will display in the condition of meter cover open, terminal cover open and magnetic influence
	It will display when relay is disconnected remotely. If the switch is closed remotely and the symbol keep flashing, then only switch be closed manually can power be supplied normally It will flash when relay is disconnected manually
	It will display when meter disconnected because of normal power control. It will flash when meter disconnected because of urgent power control.
	Relay is in closed status

3.2.4.2 Display Mode

1) Auto display mode
2) Button display mode
3) Power-off display mode

3.2.4.3 Display Time

- Auto display mode: auto display time is configurable: 1~99s, default is 10s;
- Buttton display mode: fixed time is 30s; switch to anto display mode automatically after 30s;

  Power-off display mode: without display in power-off status, press to wake up LCD display and it will keep display for 12s.

- Backlight display mode: backlight display time is configurable, which can be activated by power on and button (backlight will be closed while voltage of three phases is less than 150V)

3.2.4.4 Display Contents

Auto display mode and button display mode are divided into two scroll display lists. Each list can support 60 items at most. Press button to wake up button display list, and LCD will switch to scroll display list after 30s. Specific display contents are as follows:

OBIS	Description	Unit
1.8.0	Import Active Energy of Total	kWh
1.8.1	Import Active Energy of T1	kWh
1.8.2	Import Active Energy of T2	kWh
1.8.3	Import Active Energy of T3	kWh
1.8.4	Import Active Energy of T4	kWh
1.8.5	Import Active Energy of T5	kWh
1.8.6	Import Active Energy of T6	kWh
2.8.0	Export Active Energy of Total	kWh
2.8.1	Export Active Energy of T1	kWh
2.8.2	Export Active Energy of T2	kWh
2.8.3	Export Active Energy of T3	kWh
2.8.4	Export Active Energy of T4	kWh
2.8.5	Export Active Energy of T5	kWh
2.8.6	Export Active Energy of T6	kWh
3.8.0	Import Reactive Energy of Total	kvarh
3.8.1	Import Reactive Energy of T1	kvarh
3.8.2	Import Reactive Energy of T2	kvarh
3.8.3	Import Reactive Energy of T3	kvarh
3.8.4	Import Reactive Energy of T4	kvarh
3.8.5	Import Reactive Energy of T5	kvarh
3.8.6	Import Reactive Energy of T6	kvarh
4.8.0	Export Reactive Energy of Total	kvarh
4.8.1	Export Reactive Energy of T1	kvarh
4.8.2	Export Reactive Energy of T2	kvarh
4.8.3	Export Reactive Energy of T3	kvarh
4.8.4	Export Reactive Energy of T4	kvarh
4.8.5	Export Reactive Energy of T5	kvarh
4.8.6	Export Reactive Energy of T6	kvarh
9.8.0	Import Apparent Energy of Total	kVAh
10.8.0	Export Apparent Energy of Total	kVAh

5.8.0	Reactive Total Energy of Q1	kvarh
6.8.0	Reactive Total Energy of Q2	kVAh
7.8.0	Reactive Total Energy of Q3	kVAh
8.8.0	Reactive Total Energy of Q4	kVAh
21.8.0	Import Active Total Energy of L1	kWh
41.8.0	Import Active Total Energy of L2	kWh
61.8.0	Import Active Total Energy of L3	kWh
22.8.0	Export Active Total Energy of L1	kWh
42.8.0	Export Active Total Energy of L2	kWh
62.8.0	Export Active Total Energy of L3	kWh
23.8.0	Import Reactive Total Energy of L1	kvarh
43.8.0	Import Reactive Total Energy of L2	kvarh
63.8.0	Import Reactive Total Energy of L3	kvarh
24.8.0	Export Reactive Total Energy of L1	kvarh
44.8.0	Export Reactive Total Energy of L2	kvarh
64.8.0	Export Reactive Total Energy of L3	kvarh
1.6.0	Import Active Max. Demand and Occurrence Time of Total	kW
1.6.1	Import Active Max. Demand and Occurrence Time of T1	kW
1.6.2	Import Active Max. Demand and Occurrence Time of T2	kW
1.6.3	Import Active Max. Demand and Occurrence Time of T3	kW
1.6.4	Import Active Max. Demand and Occurrence Time of T4	kW
1.6.5	Import Active Max. Demand and Occurrence Time of T5	kW
1.6.6	Import Active Max. Demand and Occurrence Time of T6	kW
2.6.0	Emport Active Max. Demand and Occurrence Time of Total	kW
2.6.1	Emport Active Max. Demand and Occurrence Time of T1	kW
2.6.2	Emport Active Max. Demand and Occurrence Time of T2	kW
2.6.3	Emport Active Max. Demand and Occurrence Time of T3	kW
2.6.4	Emport Active Max. Demand and Occurrence Time of T4	kW
2.6.5	Emport Active Max. Demand and Occurrence Time of T5	kW
2.6.6	Emport Active Max. Demand and Occurrence Time of T6	kW
3.6.0	Import Reactive Max. Demand and Occurrence Time of Total	kvar
3.6.1	Import Reactive Max. Demand and Occurrence Time of T1	kvar
3.6.2	Import Reactive Max. Demand and Occurrence Time of T2	kvar
3.6.3	Import Reactive Max. Demand and Occurrence Time of T3	kvar
3.6.4	Import Reactive Max. Demand and Occurrence Time of T4	kvar
3.6.5	Import Reactive Max. Demand and Occurrence Time of T5	kvar
3.6.6	Import Reactive Max. Demand and Occurrence Time of T6	kvar
4.6.0	Export Reactive Max. Demand and Occurrence Time of Total	kvar
4.6.1	Export Reactive Max. Demand and Occurrence Time of T1	kvar

4.6.2	Export Reactive Max. Demand and Occurrence Time of T2	kvar
4.6.3	Export Reactive Max. Demand and Occurrence Time of T3	kvar
4.6.4	Export Reactive Max. Demand and Occurrence Time of T4	kvar
4.6.5	Export Reactive Max. Demand and Occurrence Time of T5	kvar
4.6.6	Export Reactive Max. Demand and Occurrence Time of T6	kvar
9.6.0	Import Apparent Max.Demand and Occurrence Time of Total	kVA
10.6.0	Export Apparent Max.Demand and Occurrence Time of Total	kVA
32.7.0	A Phase Voltage	V
52.7.0	B Phase Voltage	V
72.7.0	C Phase Voltage	V
31.7.0	A Phase Current	A
51.7.0	B Phase Current	A
71.7.0	C Phase Current	A
14.7.0	Frequency	Hz
1.7.0	Import Active Power	kW
21.7.0	Import Active Power of Phase A	kW
41.7.0	Import Active Power of Phase B	kW
61.7.0	Import Active Power of Phase C	kW
23.7.0	Import Reactive Power of Phase A	kvar
43.7.0	Import Reactive Power of Phase B	kvar
63.7.0	Import Reactive Power of Phase C	kvar
9.7.0	Apparent Power of Total	kVA
29.7.0	Apparent Power of Phase A	kVA
49.7.0	Apparent Power of Phase B	kVA
69.7.0	Apparent Power of Phase C	kVA
22.7.1	Export Active Power of Phase A	kW
42.7.1	Export Active Power of Phase B	kW
62.7.1	Export Active Power of Phase C	kW
24.7.1	Export Reactive Power of Phase A	kvar
44.7.1	Export Reactive Power of Phase B	kvar
64.7.1	Export Reactive Power of Phase C	kvar
13.7.0	Power Factor of Total	
33.7.0	Power Factor of Phase A	
53.7.0	Power Factor of Phase B	
73.7.0	Power Factor of Phase C	
0.9.1	Time	hh:mm:ss
0.9.2	Date	DD-MM-YY
0.9.6	Settlement Times	

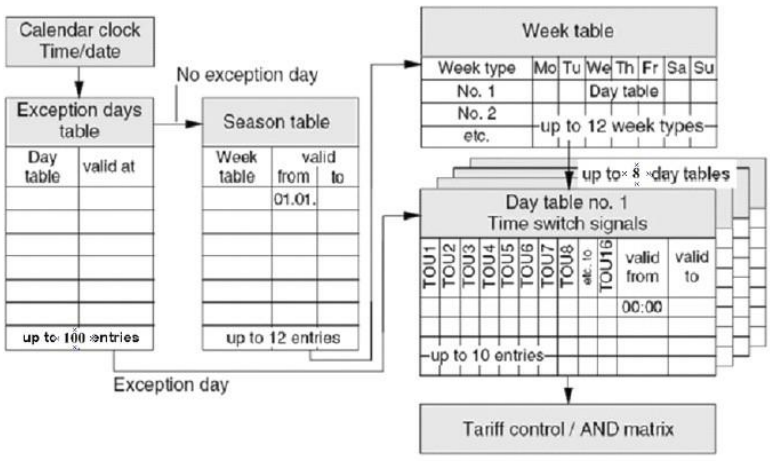
0.9.5	Settlement Time	
0.2.2	Current Tariff Name	
C.1.0	Meter Number	
C.13.1	Power Grid Imformation (display in real time when in alarm status)	

3.2.4.5 Alarm Code

Definition of power grid information(C.13.1) are as follows:(from left to right，0 means not occur，1means occurred):

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Reversed phase sequence	Loss of current	Reverse	Reverse, A/B/C phase	Loss of zero line	Loss of phase	Undervoltage	Overvoltage

3.2.5 TOU



It contains two switchable tariff scheme: immediate activation and periodic activation

Item	Value
Tariff Number	6
Daily Time Span	24
Daily Profile Table	8
Weekly Profile Table	12
Season Profile Table	12
Definable special days	100

3.2.6 Clock

1) Auto-switch of leap year.
   The clock error≤0.5s/Day(in 23℃)
2) Built-in battery life: 10 years battery operation life; Operating for at least 2 years in case of any power failure.

3.2.7 Daylight Saving Time

The meter can be set to daylight saving time which can be switched at any time of each year or specified year. The format is XX Year XX Month XX Week XX Day XX Hour ~ XX Year XX Month XX Week XX Day XX Hour, and time difference is -120min-+120min (configurable). Day light saving time will be closed when time difference turns into 0

Set rules:

1) Year: If the year is unspecified, then daylight saving time is valid for every year; If the year is specified, then the start and end year of daylight saving time must be set within the same year instead of beyond the year.
2) Month: configurable: 1~12, month cannot be unspecified
3) Day: Day 1~28, last second days and last day of one month are configurable, and day cannot be unspecified.
4) Week: Monday ~ Friday is unspecified and configurable.

- If week is unspecified, then week is invalid and day is valid
- If week is specified, then day is invalid and week is valid. Day 1~7 is the first week; day 8~14 is the second week; day 15~21 is the third week; day 22~28 is the fourth week; the last second days of one month means the last second week of the month; the last day of one month means the last week of the moth; for example, 12th, Wednesday means the second Wednesday of this month.

5) When meter is in the daylight saving time mode, the mark of current operation tariff will flash, and if the meter drops out daylight saving mode, the mark will stop flashing. The tariff mark will stop flash whether meter is in daylight saving time mode or not during power off. If the switch time of daylight saving time is during power off, then the next switch time is the integral minute after power on.

3.2.8 Event

3.2.8.1 Standard Event

Record last 100 journal events, and the contents are as follows；

Event	Event
Meter reset (display during power off, battery removal and	Meter is introspected falsely

discharging)	
Firmware is updated successfully	Meter is introspected successfully
Programmable event	Start of battery undervoltage
Total event reset	End of battery undervoltage
Password error	Start of daylight saving time
Clock setting	End of daylight saving time
Seasonal variation	

3.2.8.2 Power Grid Event

Record last 100 power grid event, and the contents are as follows:

Event	Event
A phase reversed current start	A phase losing start
A phase reversed current end	A phase losing end
B phase reversed current start	B phase losing start
B phase reversed current end	B phase losing end
C phase reversed current start	C phase losing start
C phase reversed current end	C phase losing end
A phase overvoltage 1/2 start	A phase undervoltage 1/2 start
A phase overvoltage 1/2 end	A phase undervoltage 1/2 end
B phase overvoltage 1/2 start	B phase undervoltage 1/2 start
B phase overvoltage 1/2 end	B phase undervoltage 1/2 end
C phase overvoltage 1/2 start	C phase undervoltage 1/2 start
C phase overvoltage 1/2 end	C phase undervoltage 1/2 end
Unbalanced current start	A phase current losing start
Unbalanced current end	A phase current losing end
Unbalanced voltage start	B phase current losing start
Unbalanced voltage end	B phase current losing end
Reverse phase sequence start	C phase current losing start
Reverse phase sequence end	C phase current losing end
Reverse polarity start	A phase with current and no voltage start
Reverse polarity end	A phase with current and no voltage end
Power off start	B phase with current and no voltage start
Power off end	B phase with current and no voltage end

Zero line losing start	C phase with current and no voltage start
Zero line losing end	C phase with current and no voltage end

3.2.8.3 Relay Event

Record last 100 relay connect and disconnect event, and contents are as follows:

Event	Description
Remote disconnect/connect	Record the event when swith is disconnected and connected by sending orders remotely
Local disconnect/connect	Record the disconnecting power value of overload and overpower simultaneously
R1 On/Off	R1 On and Off event
R2 On/Off	R2 On and Off event
Tariff variation	Inner tariff variation

3.2.8.4 Tamper Event

Record last 100 tampering events, and contents are as follows:

Event	Event
Open terminal cover start	A phase reversed current start
Open terminal cover end	A phase reversed current end
Strong magnetic influence test start	B phase reversed current start
Strong magnetic influence test end	B phase reversed current end
Open meter cover start	C phase reversed current start
Open meter cover end	C phase reversed current end

3.2.8.5 GPRS Event

Record last 100 GPRS relevant events, and contents are as follows:

Event	Event
GPRS signal lose	GPES IP lose
GPRS signal built	GPRS IP obtain

3.2.8.6 Clock Set Event

Record last 100 clock set events:

Event	Description
Clock set	Record the clock data of before

	and after setting

3.2.8.7 Total Event Reset

Record last 100 total event resetting events.

3.2.8.8 LED Alarm Description

When meter cover open, terminal cover open, magnetic influence, reverse phase sequence and unset alarm occur, the alarm light will keep on and alarm light will off when these events end.

3.2.8.9 Event Parameter Set

Event	Event judgment conditions and delay
Overvoltage	1-600V (configurable), overvoltage 1< overvoltage 2
Undervoltage	1-600V is configurable, undervoltage 1> undervoltage 2
Undervoltage/overvoltage judgment time	Delay 1-60s (configurable), Renew the judgment time immediately once the start time change, and renew the judgment time untill the next event happen when end time change (the follwing judgment time are same as this one)
Loss of phase	Delay 1~60s (configurable), threshold: undervoltage> undervoltage> loss of phase
Reverse	Delay 1~60s (configurable) Judgment condition: direct current >12mA, and power is reverse; mutual current >5mA, and power is reverse
Reverse phase sequence	Delay 1~60s (configurable) Three phase voltage must > 0, angle BA>CA+5 °
With current and no voltage	Delay 3s Judgment condition: current>20mA, voltage<phase losing value
Loss of current	Delay 30s If current of each phase is no more than judgment threshold, it was loss of current
Reverse polarity	Delay 1~60s (configurable) Judgment condition: 1,the value of reverse polarity voltage*1.73 is between ±5V of other two measured value 2, The angle between one phase and another is from 25℃ to 35℃, and angle between one phase and the rest one is from 325℃ to 335℃.
Unbalanced voltage	Delay 1~60s (configurable) Judgment condition: (max – min) > (max*50%)

Unbalanced current	Delay 1~60s (configurable) Unbalanced judgment conditions: (max-min) > (max*50%)
Loss of zero line	Delay 3s, one detection period is 6s
Detection of meter cover, terminal cover and magnetic influence	Delay 3s, Meter cover and terminal cover can be opened for detection during power failure

3.2.9 Load Record

Support two load curve: energy demand load curve and instantaneous quantity load curve, each curve can store data of 512000 byte at most.

3.2.9.1 Energy and Demand Load Curve

1) Support 24 capture channel at most (channel content is configurable)
2) Load record time: 1~60 minutes, default is 30 minutes, load storage: period is 30min, and can store data of 4 month at most.
3) Load record reset
4) Support split channel reading
5) Load record contents:

Capture Object
Capture Time
Import Active Demand of Total
Export Active Demand of Total
Import Reactive Demand of Total
Export Reactive Demand of Total
Import Apparent Demand of Total
Export Apparent Demand of Total
Import Apparent Max.Demand of Total and Occurrence Time
Export Apparent Max. Demand of Total and Occurrence Time
Import Active Tariff Energy of Total and Split
Export Active Tariff Energy of Total and Split
Import Reactive Tariff Energy of Total and Split
Export Reactive Tariff Energy of Total and Split
Reactive Total Energy of Quadrant 1
Reactive Total Energy of Quadrant 2
Reactive Total Energy of Quadrant 3
Reactive Total Energy of Quadrant 4
Import Apparent Energy of Total
Export Apparent Energy of Total

3.2.9.2 Instantaneous Load Curve

1) Support 24 capture channel at most (channel content is configurable)
2) Load record time: 1~60 minutes, default is 30min.
3) Load storage: period is 30min, can save data of 100 days at least
4) Load record reset
5) Support split channel reading
6) Load record contents:

Capture Object
Capture Time
A/B/C Phase Voltage (Ins,Max,Min,Avg)
A/B/C Phase Current (Ins,Max,Min,Avg)
Active Power of Total/A/B/C (Ins,Max,Min,Avg)
Reactive Power of Total/A/B/C(Ins,Max,Min,Avg)
Apparent Total/A/B/C Power(Ins,Max,Min)
Power Grid Frequency (Ins)
Frequency Factor of Total /A/B/C (Ins,Max,Min,Avg)
Voltage and Current Angle of A/B/C Phase (Ins,Max,Min)
Voltage Angle of AB, AC Phase (Ins,Max,Min)

3.2.10 Settlement

3.2.10.1 Settlement Method

1) Button settlement: keep pressing the programmable button for 5s to settle manually and reset current maximum demand recording.
2) Programmable settlement: send settlement order by PC software, and meter will settle immediately.
3) Automatic settlement: the meter will settle automatically at settlement day, and the settlement date and time are configurable: every month from 1 to 28, 00:00:00~23:00:00, save last 14 data.
4) Settlement channel object can be programmed flexibly, and supportive settlement objects refer to following chart; reset objet is settlement curve clearing.
5) Support split channel reading.

3.2.10.2 Settlement Curve

1) Settlement object

OBIS	Description	Unit
1-0.1.8.0.255	Import Active Energy of Total	kWh
1-0.1.8.1.255	Import Active Energy of T1	kWh

1-0.1.8.2.255	Import Active Energy of T2	kWh
1-0.1.8.3.255	Import Active Energy of T3	kWh
1-0.1.8.4.255	Import Active Energy of T4	kWh
1-0.1.8.5.255	Import Active Energy of T5	kWh
1-0.1.8.6.255	Import Active Energy of T6	kWh
1-0.2.8.0.255	Export Active Energy of Total	kWh
1-0.2.8.1.255	Export Active Energy of T1	kWh
1-0.2.8.2.255	Export Active Energy of T2	kWh
1-0.2.8.3.255	Export Active Energy of T3	kWh
1-0.2.8.4.255	Export Active Energy of T4	kWh
1-0.2.8.5.255	Export Active Energy of T5	kWh
1-0.2.8.6.255	Export Active Energy of T6	kWh
1-0.3.8.0.255	Import Reactive Energy of Total	kvarh
1-0.3.8.1.255	Import Reactive Energy of T1	kvarh
1-0.3.8.2.255	Import Reactive Energy of T2	kvarh
1-0.3.8.3.255	Import Reactive Energy of T3	kvarh
1-0.3.8.4.255	Import Reactive Energy of T4	kvarh
1-0.3.8.5.255	Import Reactive Energy of T5	kvarh
1-0.3.8.6.255	Import Reactive Energy of T6	kvarh
1-0.4.8.0.255	Export Reactive Energy of Total	kvarh
1-0.4.8.1.255	Export Reactive Energy of T1	kvarh
1-0.4.8.2.255	Export Reactive Energy of T2	kvarh
1-0.4.8.3.255	Export Reactive Energy of T3	kvarh
1-0.4.8.4.255	Export Reactive Energy of T4	kvarh
1-0.4.8.5.255	Export Reactive Energy of T5	kvarh
1-0.4.8.6.255	Export Reactive Energy of T6	kvarh
1-0.5.8.0.255	Reactive Total Energy of Q1	kVAh
1-0.6.8.0.255	Reactive Total Energy of Q2	kVAh
1-0.7.8.0.255	Reactive Total Energy of Q3	kVAh
1-0.8.8.0.255	Reactive Total Energy of Q4	kVAh
1-0.1.6.0.255	Import Active Max. Demand and Occurrence Time of Total	kW
1-0.1.6.1.255	Import Active Max. Demand and Occurrence Time of T1	kW
1-0.1.6.2.255	Import Active Max. Demand and Occurrence Time of T2	kW
1-0.1.6.3.255	Import Active Max. Demand and Occurrence Time of T3	kW
1-0.1.6.4.255	Import Active Max. Demand and Occurrence Time of T4	kW
1-0.1.6.5.255	Import Active Max. Demand and Occurrence Time of T5	kW
1-0.1.6.6.255	Import Active Max. Demand and Occurrence Time of T6	kW
1-0.2.6.0.255	Export Active Max. Demand and Occurrence Time of Total	kW

1-0.2.6.1.255	Export Active Max. Demand and Occurrence Time of T1	kW
1-0.2.6.2.255	Export Active Max. Demand and Occurrence Time of T2	kW
1-0.2.6.3.255	Export Active Max. Demand and Occurrence Time of T3	kW
1-0.2.6.4.255	Export Active Max. Demand and Occurrence Time of T4	kW
1-0.2.6.5.255	Export Active Max. Demand and Occurrence Time of T5	kW
1-0.2.6.6.255	Export Active Max. Demand and Occurrence Time of Total	kW
1.0.9.6.0.255	Import Apparent Max.Demand and Occurrence Time of Total	kVA
1.0.10.6.0.255	Export Apparent Max.Demand and Occurrence Time of Total	kVA
1-0.0.1.0.255	Settlement times	
0.0.96.1.0.255	Meter number	
0.0.97.98.0.255	Alarm status	

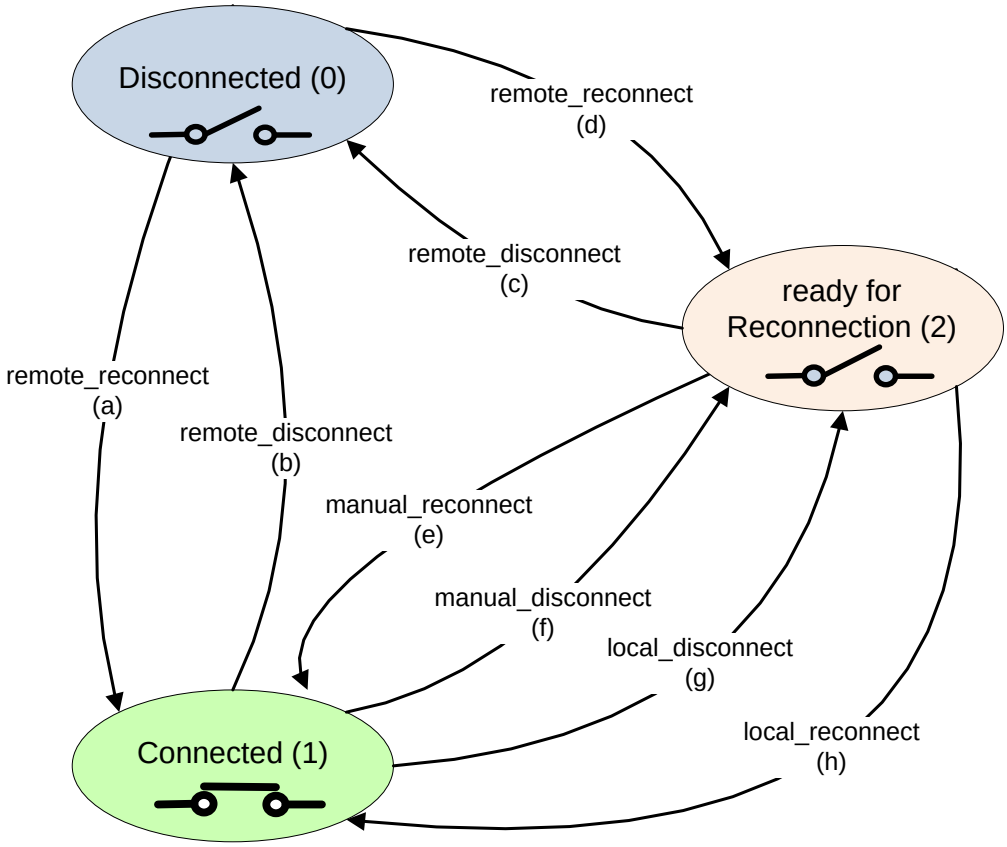
3.2.11 Daily Freezing

Meter will freeze data one time at 0 o'clock daily. Freeze energy data are as follows (data is configurable and will be cleared if reset), Supporting split channel reading

1.8.0	Import Active Energy of Total	kWh
1.8.1	Import Active Energy of T1	kWh
1.8.2	Import Active Energy of T2	kWh
1.8.3	Import Active Energy of T3	kWh
1.8.4	Import Active Energy of T4	kWh
1.8.5	Import Active Energy of T5	kWh
1.8.6	Import Active Energy of T6	kWh
2.8.0	Export Active Energy of Total	kWh
2.8.1	Export Active Energy of T1	kWh
2.8.2	Export Active Energy of T2	kWh
2.8.3	Export Active Energy of T3	kWh
2.8.4	Export Active Energy of T4	kWh
2.8.5	Export Active Energy of T5	kWh
2.8.6	Export Active Energy of T6	kWh
3.8.0	Import Reactive Energy of Total	kvarh
3.8.1	Import Reactive Energy of T1	kvarh
3.8.2	Import Reactive Energy of T2	kvarh
3.8.3	Import Reactive Energy of T3	kvarh
3.8.4	Import Reactive Energy of T4	kvarh
3.8.5	Import Reactive Energy of T5	kvarh
3.8.6	Import Reactive Energy of T6	kvarh
4.8.0	Export Reactive Energy of Total	kvarh

4.8.1	Export Reactive Energy of T1	kvarh
4.8.2	Export Reactive Energy of T2	kvarh
4.8.3	Export Reactive Energy of T3	kvarh
4.8.4	Export Reactive Energy of T4	kvarh
4.8.5	Export Reactive Energy of T5	kvarh
4.8.6	Export Reactive Energy of T6	kvarh
5.8.0	Reactive Total Energy of Q1	kvarh
6.8.0	Reactive Total Energy of Q2	kvarh
7.8.0	Reactive Total Energy of Q3	kvarh
8.8.0	Reactive Total Energy of Q4	kvarh
9.8.0	Import Apparent Energy of Total	kVAh
10.8.0	Export Apparent Energy of Total	kVAh

3.2.12 Relay Control



3.2.12.1 Mode 0

Relay keeps connecting; No disconnecting operation is allowed to relay.

3.2.12.2 Mode 1

1) Remote control: allow remote disconnect operation and force relay into “disconnection” status (b and c). Remote reconnect order force relay into “ready for reconnection” status (d), and then reconnect the relay manually (e).
2) Manual control: allow manual disconnect and manual reconnect operation. Manual disconnect order force relay into “ready for reconnection” status (f), and then reconnect the relay manually by button.
3) Local control: allow local disconnect operation and force relay into “ready for reconnection” status (g), and then reconnect the relay manually by button (e).

3.2.12.3 Mode 2

1) Remote control: allow remote disconnect operation and force relay into “disconnection” status (b and c). Remote connect order force relay into “ready

for connection" status (a).

2) Manual control: Allow manual disconnect and connect operation. Manual disconnect order force relay into "ready for reconnection" status (f), and then reconnect the relay manually by button (e).
3) Local control: allow local disconnect operation and force relay into "ready for reconnection" status (g), and then reconnect the relay manually by button (e).

3.2.12.4 Mode 3

1) Remote control: allow remote disconnect operation and force relay into "disconnection" status. Remote reconnect order force relay into "ready for reconnection" status (d), and then reconnect the relay manually by button (e).
2) Manual control: No permission to manual disconnection. Manual reconnect operation is allowed after remote and local disconnect operation (e).
3) Local control: allow local disconnect operation and force relay into "ready for reconnection" status (g), and then reconnect the relay manually by button (e).

3.2.12.5 Mode 4

1) Remote control: allow remote disconnect operation and force relay into "disconnection" status (b and c). Remote reconnect order force relay into "ready for reconnection" status (d), and then reconnect the relay manually by button (e).
2) Manual control: No permission to manual disconnection. Manual reconnect operation is allowed after remote and local disconnect operation (e).
3) Local control: allow local disconnect operation and force relay into "ready for reconnect" status (g), and then reconnect the relay manually by button (e).

3.2.12.6 Mode 5

1) Remote control: allow remote disconnect operation and force relay into "disconnection" status (b and c). Remote reconnect order force relay into "ready for reconnection" status (d), and then reconnect the relay manually by button (e).
2) Manual control: allow manual disconnect.
3) Local control: allow local disconnect operation and force relay into "ready for reconnection" status (g), and then reconnect the relay manually by button (e).

3.2.12.7 Mode 6

1) Remote control: allow remote disconnect operation and force relay into "disconnection" status (b and c). Remote reconnect order force relay into "ready for reconnect" status (d), and then reconnect the relay manually by button.
2) Manual control: no permission to manual disconnection. Manual reconnect is allowed after local disconnect operation (e).

3) Local control: allow local disconnect operation and force relay into “ready for reconnection” status (g), and then reconnect the relay manually by button (e) or connect the relay locally to get into “connection” status (h) which will connect automatically.

3.2.12.8 Parameter of local disconnect and connect operation

Direct meter adopts built-in power relay.

1) Selective mode of normal and urgent power control
2) Function selection of normal power control
3) Threshold of normal power control
4) Punishing time of normal power control
5) Function selection of urgent power control
6) Threshold of urgent power control
7) Punishing time of urgent power control
8) Control mode of relay
9) Detection time of urgent power control

3.2.13 Communication

3.2.13.1 Optical communication

1) Communication rate range: 1200~9600bps, handshaking baud rate: 300bps
2) Communication protocol: IEC62056-21 E mode, HDLC protocol
3) Special handling of optical communication ((IEC readout)

Optical communication must support mode E and mode A simultaneously, and data returns orderly according to given contents and formats.

Returned configurable data include current energy, demand energy, historical energy and real-time information of power grid and so on.

Returned data can be set separately by PC software order.

Configuration of historical returned data can decrease the amount of returned data and improve efficiency.

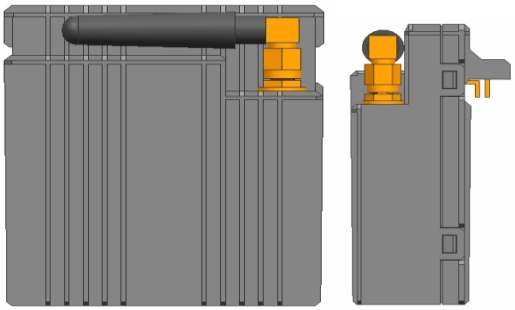
3.2.13.2 RS485 Communication

1) Communication rate: 9600bps
2) Communication protocol: HDLC

3.2.13.3 GPRS Communication

User can program and copy meter data by remote GPRS communication, application layer protocol is DLMS/COSEM Protocol IPV4.

1) GPRS Module Drawing



2) Operation Steps

- Step 1: Insert SIM card into GPRS Module, and then set parameters by PC software. Parameters are as follows:

TCP port	7011
APN name	cmnet
Server IP	218.108.107.78
PDP user name	
PDP password	
GPRS mode	Client mode
GPRS heartbeat interval	10 minutes;

- Step 2: Check the signal intensity on LCD, if the signal mark appears, meter will carry out remote GPRS communication, and the show of first triangle mark indicates that the meter and GPRS module are connected to main station successfully. Meter need to be re-activated in order to ensure normal connection between meter, GPRS module and the main station on condition that meter number and parameters are changed.

NOTE: After finishing the parameter setting and accessing with the internet, user can read other meters which are connected by the port of the module and meter. The communication protocol between module and meter is DLMS-HDLC.

3.2.13.4 Communication Security

- Factory state: Meter can alter all parameter and not support settlement.
- User state: Not be able to modify clearing energy and total clearing energy.
- The unit of meter number is 12.

3.2.13.5 Remote Update

User can complete remote hardware update by optical and RS485 communication.