DTZ1513 Single Phase Keypad Prepayment Energy Meter with Plug-in Communication Module Operation Manual

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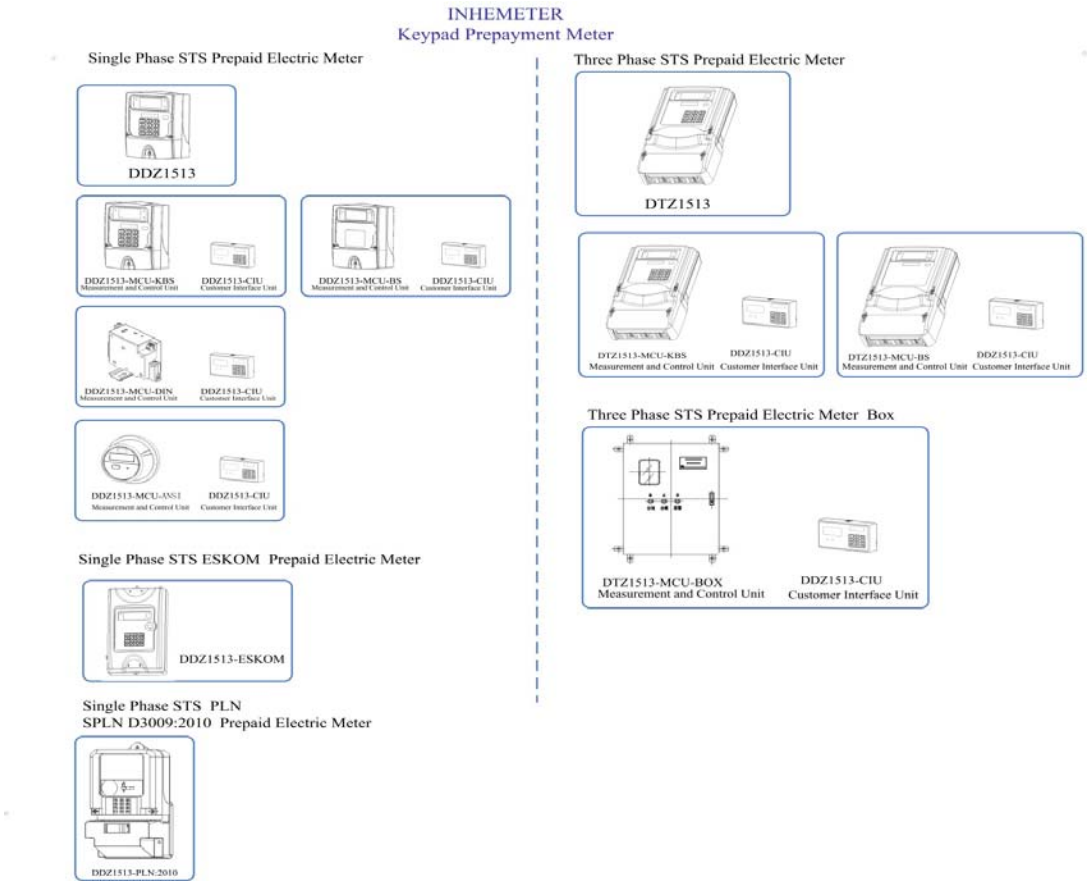
CONTENTS

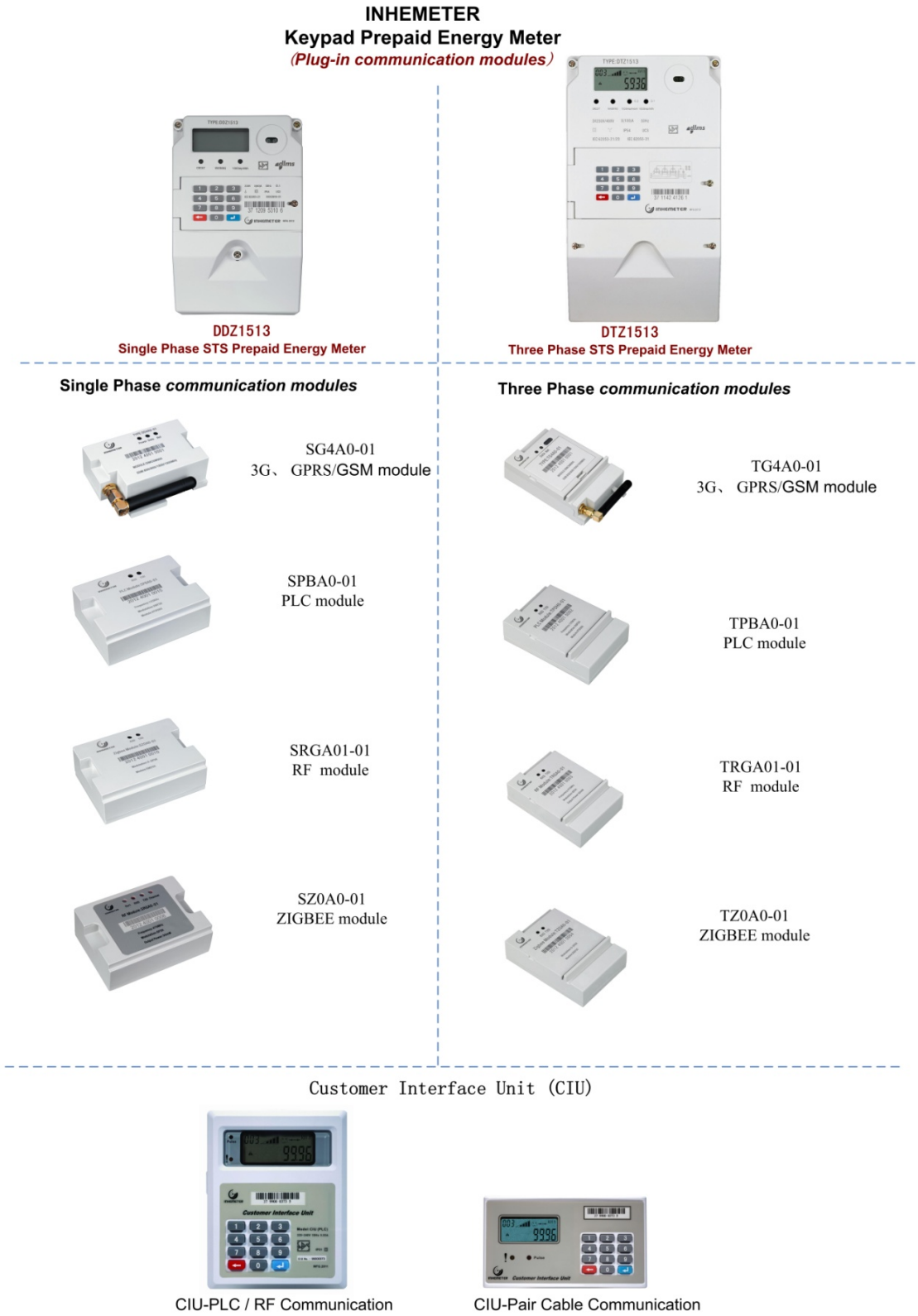
1 INHE Keypad Prepayment Energy Meter Series

INHEMETER keypad prepayment energy meter series include single & three phase keypad prepayment meters; integrated & split keypad prepayment meters; energy deduction&money deduction mode meters, multi-tariff TOU metering mode meters, monthly step-tariff mode meters; cable, PLC and RF communication mode meters and DLMS certified plug-in communication module single/three phase keypad prepayment meters; ANSI standard compliance split keypad prepayment meters, common base type single phase keypad prepayment meter complying with ESKOM installation requirements; three phase keypad prepayment metering box and single phase keypad prepayment meter complying with PLN D3 009:2010.



plug-in communication module single/three phase keypad prepayment energy meters

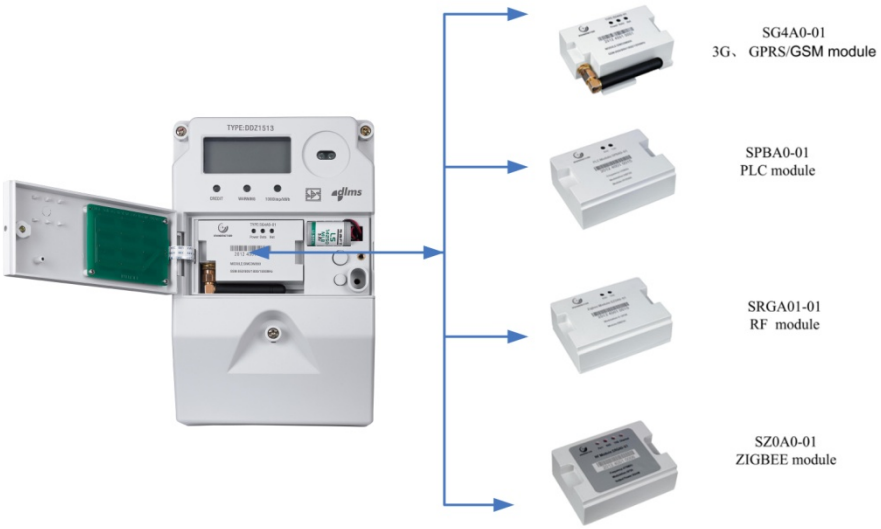
Diagram:



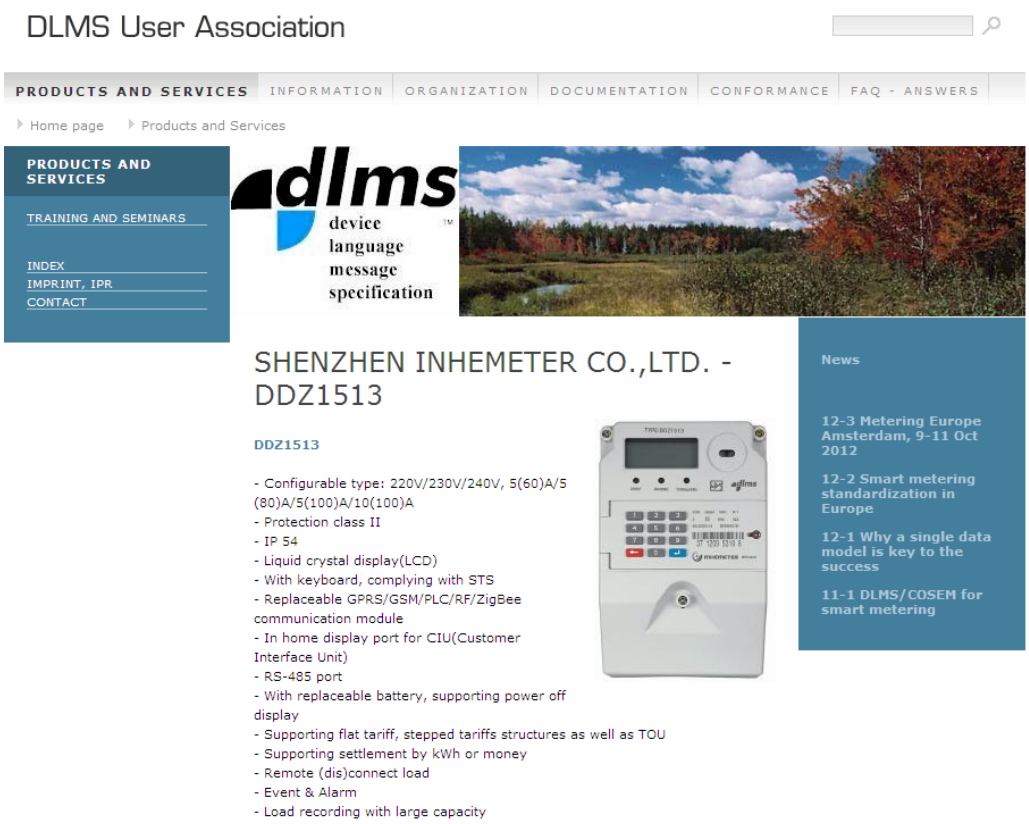
2 Introduction

DDZ1513 Single Phase Keypad prepayment Energy Meter with Plug-in Communication Module has acquired STS(Standard Transfer Specification) test certificate, which can accept 20 digits STS code inputting. The communication regulations comply with DLMS requirements and have had DLMS test certificate. The meter can realize multi tariff TOU metering of active, reactive and apparent energy , and hold different communication module. It can be configured to AMI/AMR system by adding relevant concentrator and centralized meter reading software, and also switch between prepayment/post payment (bill revenue collection mode) according to actual usage. Under prepayment mode, it can be energy or money deduction mode, monthly step tariff mode or multi tariff TOU metering mode. It is a preference for smart metering grid. It adopts international standard IEC62053, IEC62055 and IEC62056; its design and production comply with ISO9001.

According to usage requirement and site condition, users could choose different communication module and add relevant concentrator and centralized meter reading software for configuration of AMI/AMR system to realize functions of centralized meter reading, remote recharge/disconnect control and etc.



DDZ1513 single phase keypad prepayment energy meter with plug-in communication module complies with DLMS requirements and gets DLMS test certificate, which is the basic requirement for compatibility of smart meter and remote meter reading control system.



Split keypad prepayment meter is consisted of two parts:

A: MCU: Metering and Control Unit-- MCU can be installed outdoors, in centralized meter box or on telegraph pole.

B: CIU: Customer Interface Unit -- CIU is installed indoors, for users to get meter operation parameters and load pre-purchased energy (credit).

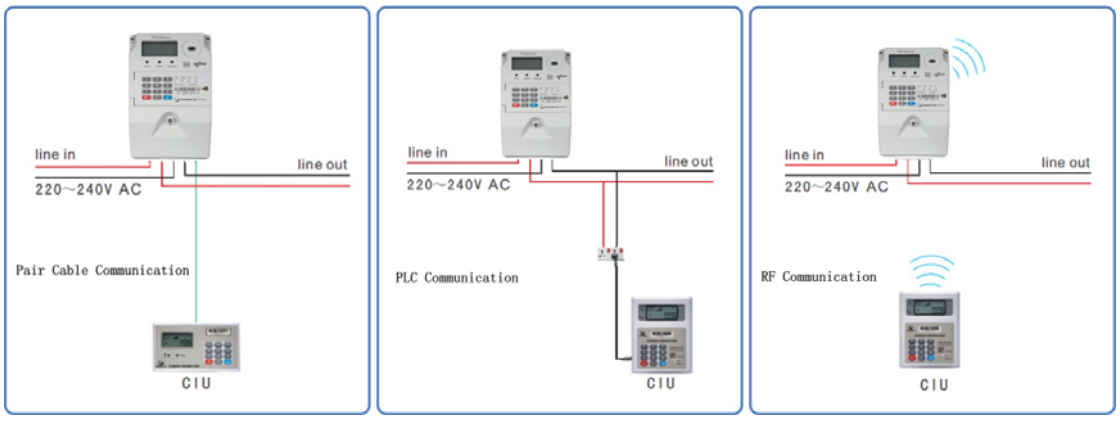
C: Optional communication mode between MCU and CIU: pair cable, PLC and RF.

Customer Interface Unit (CIU)

CIU-PLC / RF Communication

CIU-Pair Cable Communication

Split Keypad Energy Meter

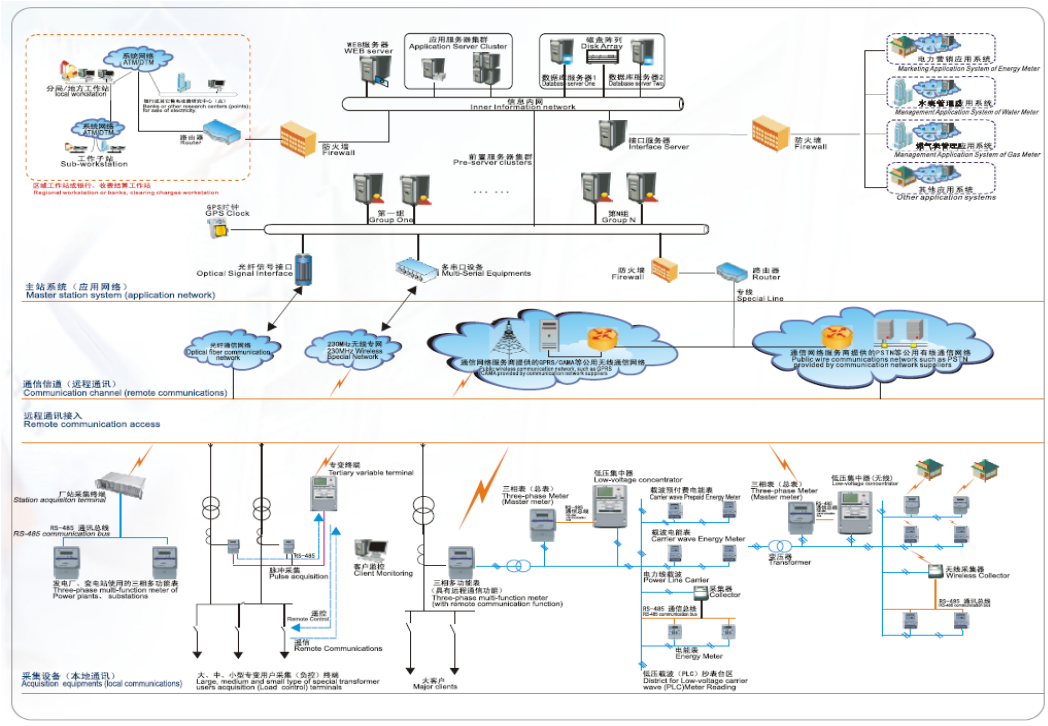


AMI/AMR system configuration

AMR/AMR system is configured with DDZ1513 single phase keypad prepayment energy meter with plug-in communication module , relevant concentrator, SMART vending/AMM system. System composition diagram is as below:

This system has the functions below:

- Remote meter reading
- Remote recharge
- Remote control
- Remote tariff setting/ load threshold setting
- Line loss analysis
- Remote meter software upgrade



Products order model Instruction:

S/N	Product type	Order model	Instruction
1	MCU	DDZ1513(MBS7K2A)	MCU of single phase keypad prepayment energy meter with plug-in communication module
2	Plug-in communication module (optional)		
2.1		SG4A0-01	Single phase meter GPRS/GSM communication module (（Simcom- SIM900，quadband）
2.2		SPDH0-01	Single phase meter PLC communication module (HT8560 central frequency 125kHz; PLC frequency range: 125±2.8kHz; PLC speed 550bps DPSK)
2.3		SRGB0-01	Single phase meter RF wireless communication module (APPCON APC320N; port speed default value: 9600bps; Frequency 470～510MHz; Programmable transmission power ; AMR module APC920)
2.4		SZ0A0-01	Single phase meter ZigBee communication module (EM250 communication speed: 250kps, modulate method O-QPSK; Concentrator module HD3501-SB/ZigBee chip EM357)
3	Optional CIU		
3.1		DDZ1513-CIU-PLC	PLC communication CIU and single/three phase keypad prepayment energy meter MCU compose split type keypad prepayment energy meter
3.2		DDZ1513-CIU-RF	RF communication CIU and single/three phase keypad prepayment energy meter MCU compose split type keypad prepayment energy meter
3.3		DDZ1513-CIU-CABLE	Pair cable communication CIU and single/three phase keypad prepayment energy meter MCU compose split type keypad prepayment energy meter
4	Low voltage side data concentrator option		
4.1		DJGZ22-INHE20	Low voltage PLC concentrator, upper communication GPRS/GSM, lower communication PLC
4.2		DJGJ22-INHE20	Low voltage RF wireless concentrator, upper communication GPRS/GSM, lower communication RF
4.3		DJGT22-INHE20	Low voltage ZigBee concentrator, upper communication GPRS/GSM, lower communication ZigBee

NOTICE:

Theoretically, a PLC concentrator can read or control 1024 pieces PLC meters under the same low voltage transformer. In real situation, only 100-600 pieces meters are installed under a low voltage transformer. PLC meters produced by INHEMETER have relay function so the PLC communication distance between meter and concentrator can reach 1,000m. The repeater installed in special region can improve efficiency of meter reading. Please refer to “Low Voltage PLC Concentrator Operation Manual” for details.

Meter circuit design, structure design and selection of components and materials are according to the greater environment tolerance to guarantee the lasting and stable operation of meter. Metering components take shielding and protection measures in structure design to resist interference of external DC and AC magnetic field, over-voltage and high frequency electromagnetism field. Energy meter is with good electromagnetism compatibility. These designs guarantee metering reliability and stability. Therefore, no more calibration is needed in its life cycle.

Meter cover is made of fire retardant, flame resistant and heat deformation resistant polycarbonate material. It can be recycled after the end of its life cycle to protect the environment. MCU cover is double insulated and in compliance with dust and water protection standard IP54 (IEC60529). MCU terminal is made of brass, and plated with nickel,the same as that for energy meter in tropical areas. MCU has terminal cover and fastened by a sealing screw.

Keypad Prepayment Meter has two settlement modes: energy deduction mode and money deduction mode.

Energy Deduction Mode:

The meter will realize the prepayment control function through the actual energy recharged every time.

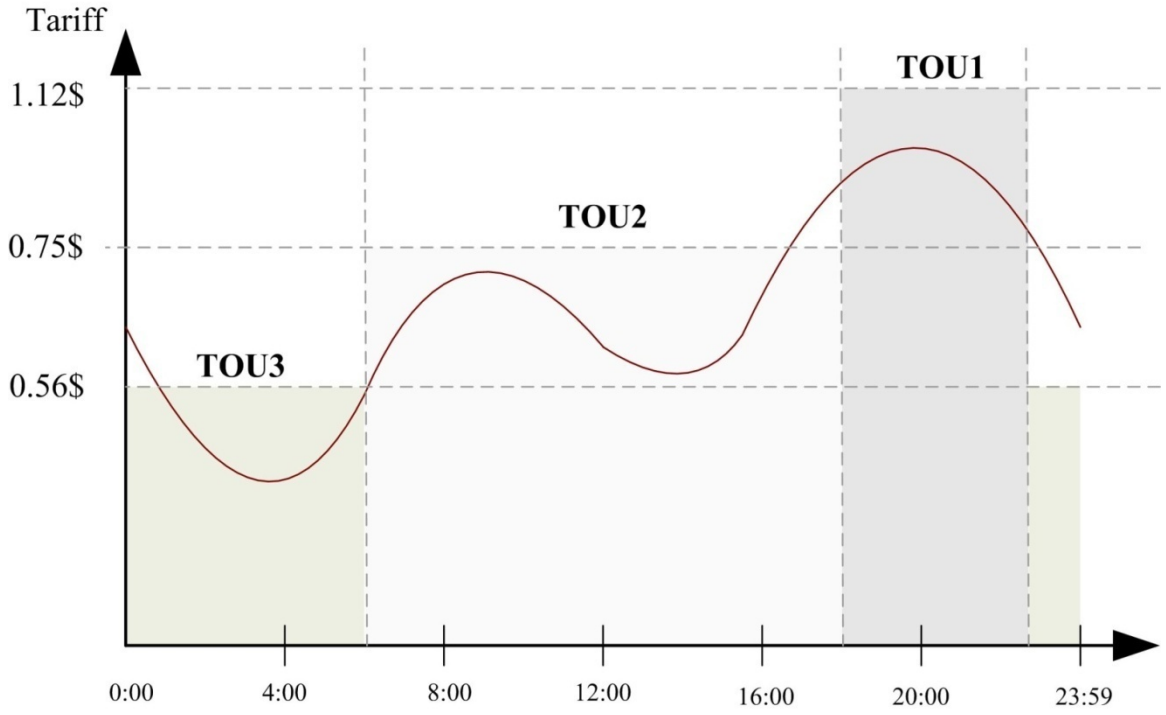
Money Deduction Mode:

The Keypad Prepayment Meter can store the preset tariff (TOU tariff or step tariff). For every purchase, the vending system will generate a TOKEN, according to the after-tax amount paid by the user. Then the user input the TOKEN into the meter. The balance credit will be displayed in money. The amount will be deducted after 0.01 kWh is consumed, as per the preset tariff rate. For meter without overdraft function, when the balance amount becomes zero, the power supply will be cut automatically.

Money deduction----TOU tariff application instruction:

The vending system will generate a TOKEN as per the after-tax amount paid by the user. Then the user input the TOKEN into the Keypad Prepayment Meter. The amount will be deducted according to the actual monthly consumed energy and agreed TOU tariff which is set by communication port. When the balance money becomes zero, the power supply will be cut

automatically. 4 tariff rates and 12 time shifts can be pre-programmed each day. Electricity price will be adjusted according to time period to encourage electricity usage at offpeak period and save at peak period.



Tariff Rate Structure:

Serial No.	Tariff Rate	Tariff Code	Comments
1	P0	T1(TOU1)	On-Peak Energy Consumption Time Period
2	P1	T2(TOU2)	Peak Energy Consumption Time Period
3	P2	T3(TOU3)	Flat Energy Consumption Time Period
4	P3	T4(TOU4)	Off-Peak Energy Consumption Time Period

Notes: P0, P1, P2, P3---Tariff Rate (unit: $); minimum unit: 0.0001
T1, T2, T3, T4---Tariff Code

Period Division:

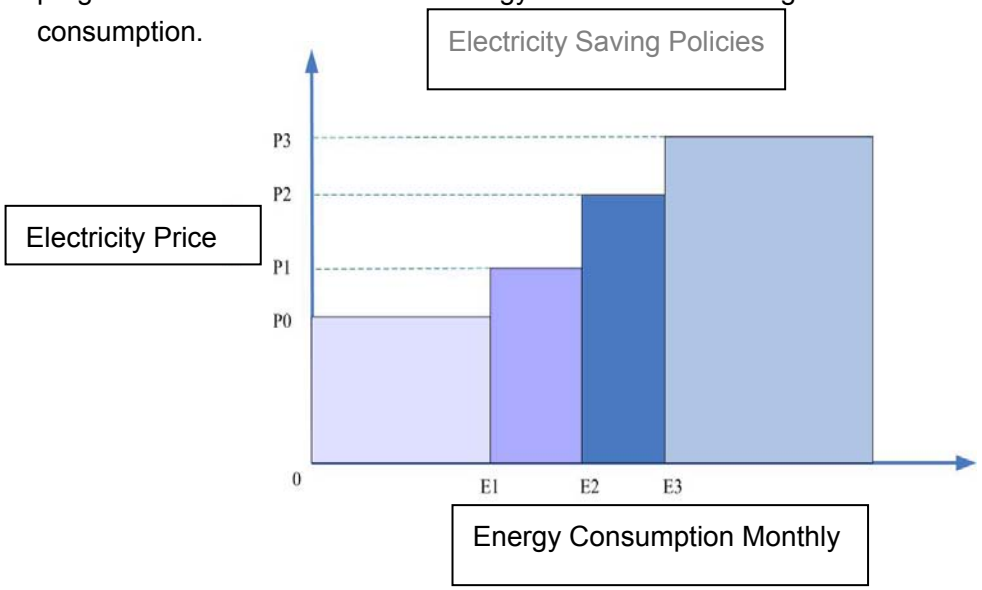
Serial No.	Period Start Time (HH:MM)	Tariff Rate / Tariff Code Option			
		TOU1	TOU2	TOU3	TOU1
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Period Setting Example:（as in below table）

Serial No.	Period Start Time (HH:MM)	Tariff Rate / Tariff Code Option			
		TOU1	TOU2	TOU3	TOU4
1	06:00		√		
2	18:00	√			
3	23:00			√	

Money deduction----Step tariff application instruction:

The vending system will generate a TOKEN as per the after-tax amount paid by the user. Then the user input the TOKEN code into the Keypad Prepayment Meter. The amount will be deducted according to the monthly consumed energy and preset step tariff. When the balance amount becomes zero, the power supply will be cut automatically. Seven step tariff rates can be programmed in one month. The energy can be saved through this rate change according to the consumption.



Note 1：Basic Monthly Consumption can also be preset. Once set, the fixed consumption will be deducted from the balance amount from 00:00 of the first day of each month.
Note 2：Basic Consumption /kWh can also be preset.Once set, the fixed consumption will be deducted from the balance amount after one kWh is consumed.

S/N	Monthly Electricity Consumption Division	Step-Tariff Rate	Tariff Code	Billing Mode
1	0 < Y ≤ E1	P0	T1	Y*P0
2	E1 < Y ≤ E2	P1	T2	E1*P0+(Y-E1)*P1
3	E2 < Y ≤ E3	P2	T3	E1*P0+(E2-E1)*P1+(Y-E2)*P2
4	E3 < Y ≤ E4	P3	T4	… … …
5	E4 < Y ≤ E5	P4	T5	… … …
6	E5 < Y ≤ E6	P5	T6	… … …
7	Y > E6	P6	T7	… … …

Note: Y---Monthly Consumed Energy (unit: kWh)
E1, E2, E3, E4, E5, E6--- Monthly Electricity Consumption Division (unit: kWh)
P0, P1, P2, P3, P4, P5, P6--- Ladder-type Tariff Rate (unit: $): minimum unit: 0.0001
T1, T2, T3, T4, T5, T6, T7, T8---Tariff Code

Tariff Setting

Keypad prepayment energy meter sets or adjusts tariff through communication ports. In other words, tariffs are set through AMI/AMR system or local communication port (optical communication port, RS-485 communication port). Tariff setting has requirements on security and must be set or adjusted by special module and controlled by TOKEN instead of pressing buttons.

Tariff setting comes with tariff version no. and tariff activation date/time.

Energy meter can store two sets of tariff: one is in use now, which has been preset and activated in the meter and its date of activation is prior to current date/time; another set of tariff will be activated in due date/time and replace the current running tariff settings. When finish replacing the tariff, energy meter will automatically delete the invalid tariff settings and get ready for next standby tariff settings.

DDZ1513 single phase direct connected prepayment energy meter has the following basic features:

● Forward./Reverse active power recording; Reverse active power can be separately recorded and displayed.

● Optional reactive power

● Optional apparent power

● Prepayment function comply with STS standard.

● Measurement accuracy

Active power 1 class: Comply with IEC62052-21

Reactive power 2 class: Comply with IEC62052-23

● Wide measurement range from starting current to maximum current

● Multi-tariff system: Energy will be calculated as per the tariff period

● Tariff switching

Tariff switching as per the meter in-built clock

Meter stores two sets of tariff sheets, and tariff can be switched automatically according to the default setting date/time

● Big LCD screen with code for energy consumption data, power direction and related indication.

● Maximum demand calculation: Slide method

● Real-time measurement, recording, and detecting of electrical parameter of phase voltage, current, frequency, active/reactive/apparent power, power factor etc.

● Load performance curve recording (can be programmed and selected for recording channel No., time interval and data content)

● Data frozen function: Selection of default time frozen daily frozen, agreed frozen, event frozen etc for measurement data.

● Event recording and saving function: such as detecting and recording of missing potential, power failure and voltage abnormal etc.

● Voltage qualification rate statistics

● Anti-tampering function: Detecting and recording of illegal terminal cover, communication module cover opening and illegal attempt of programming without authorization

●Meter reading function in case of power failure

● Optical communication port complied with IEC62056-21:

Meter data can be read through HHU

On-site programme through encrypted key mode

● RS-485 communication port

● Optional communication module type, and communication port extension can be realized based on the actual application.

● Meter has extended functions, and more additional functions can be realized according to the requirements.

● Meter communication protocol complies with DLMS regulation of granted testing certification.

● Meter can realize remote or on-line software upgrading.

● Meter with fundamental and harmonic distortion measurement analysis functions

DDZ1513 single phase direct access prepayment energy meter model No.and aided identification code.

DTZ1513 **(MBS7K2A-CIU)**

INHE Three Phase Meter Model No. (Register)

Auxiliary Identification Code

Meter Installation mode:

MBS： Single phase BS installation direct connected plug-in module type energy meter

DIN： Single phase DIN lead rail installation energy meter

0BS： Single phase BS installation direct connected (without communication module) type energy meter

ANI：American ANSI standard installation

Energy meter measurement wiring

2: Single Phase Two Wire Energy Meter

3: Three Phase three Wire Energy Meter

4：Single Phase Two Wire Energy Meter-single circuit, LLNN

5: Single Phase Two Wire Energy Meter-single circuit, LNLN

6. Single Phase Two Wire Energy Meter-double circuit, LLNN

7: Single Phase Two Wire Energy Meter-double circuit, LNLN

8: Single Phase Three Wire Energy Meter, LLNN

9: Single Phase Three Wire Energy Meter, LNLN

Meter Functions

K： Keypad prepayment energy meter (STS complied)

T： Multi-function and multi-tariff energy meter

Meter outlook design serial No.

2A: Inhemeter second version outlook design series

3A: Inhemeter third version outlook design series

CIU

Blank: Integrated energy meter without CIU

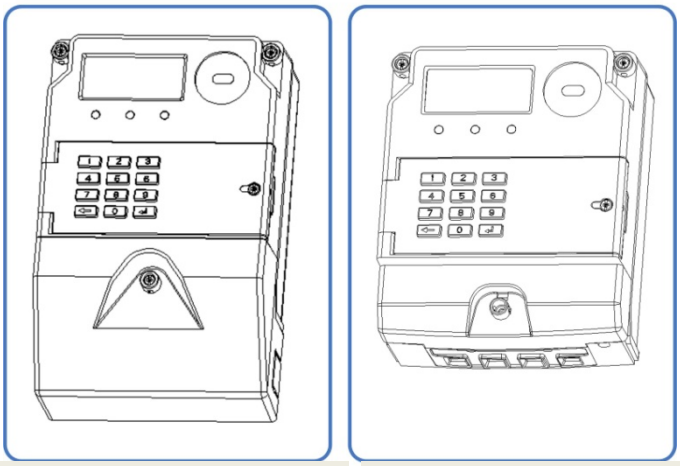
CIU: with additional CIU, and communication between MCU and CIU is two –core cable communication

CIF: with additional CIU, and communication between MCU and CIU is RF.

CIP: with additional CIU, and communication between MCU and CIU is PLC.

Options for terminal cover

Two Types of Terminal Cover



Extended Terminal Cover

Short Terminal Cover

3 MCU Technical Parameter

Single phase keypad prepayment energy meters with plug-in communication module is used to measure 1phase 2wire direct connected active energy in the system of 50/60Hz.

MCU------DDS1513 (MBS7K2A) Technical Parameter

Description	Specification	Note
Technical Standards	IEC 62052-11 2003 IEC 62053-21 2003 IEC 62055-31 2005 IEC 62055-41 2007 IEC 62055-51 2007 IEC62056-21（IEC61107） SANS 1524-1 2010 ESKOM DSP 34-1635 BS5685-1997/ DIN 43857	
Meter Type	1phase 2wire, direct connected, keypad prepayment energy meter Plug-in communication module (GPRS/GSM, PLC) Money settlement mode (multi-tariff; step tariff as standby) Normal display: balance credit	
Active Energy Metering Direction	Forward and reverse consumption will be added to total active accumulated energy; Reverse energy is detected and meter gives alarm and cut off power.	
Anti-tampering Mode	Double circuits metering. Meter will take maximum current as active energy. If the deviation value of the two circuits is beyond 6.5%, meter will give the unbalance tampering alarm.	
STS Manufacturer Code	37	
STS Test Certificate No.	STS-154、STS-167	
Rated operating voltage (Un)	220V;	
Working frequency	50Hz±5Hz ;	
Active Metering Accuracy	Class 1.0	
Basic Current (I)	5A	
Maximum Working Current	60A;100A	
Starting Current	≤20mA	
Threshold Current for	80A	

Description	Specification	Note
Accurate Metering		
Short-time Over current	2400A	
Power Consumption	Voltage circuit: ＜2W （or ＜7VA ）@220V Notice: 1. No communication module : Voltage circuit: ＜0.8W （or ＜4.5VA ）@220V 2. With PLC module (SPDH0-01) Voltage circuit: ＜1.2W （or ＜5VA ）@220V 3. With RF module (SRGB0-01) Voltage circuit: ＜0.90W （or ＜4.5VA ）@220V 4. With GPRS/GSM module(SG4A0-01) Normal: Voltage circuit: ＜1.9W （or ＜6VA ）@220V Data transfer: Voltage circuit: ＜2.2W （or ＜7VA ）@220V Current circuit: ＜0.2VA@ Base Reference Current (Ib)	
Meter Constant	1000 imp/kWh	
Output mode of meter pulse	LED, photoelectric isolation	
Working Voltage	Upper threshold: 264V Low threshold: 150V *68%--120%Un(Programmable)* *Note: meters are able to trip against abnormal voltage (programmable).*	
Maximum withstand voltage (48 hours)	500V No damage on meter, accurate metering and normal working can be assured after recovering to normal working voltage.	System line-to-line voltage of 3X220/380V
Short-time withstand voltage (1min)	600V AC No damage on meter, accurate metering and normal working can be assured after recovering to normal working voltage.	
Breaker Device		
Current Specification 5(60)A	Unipolar bitable latching relay 90A Standard class of load switch: UC2 IEC62055 (31) Connecting 2500A, withstand short-circuit current of 4500A Maximum switching power of disconnection device: 25000VA	
DDS1513(MBS7K2A)	With LCD,keypad and MCU	

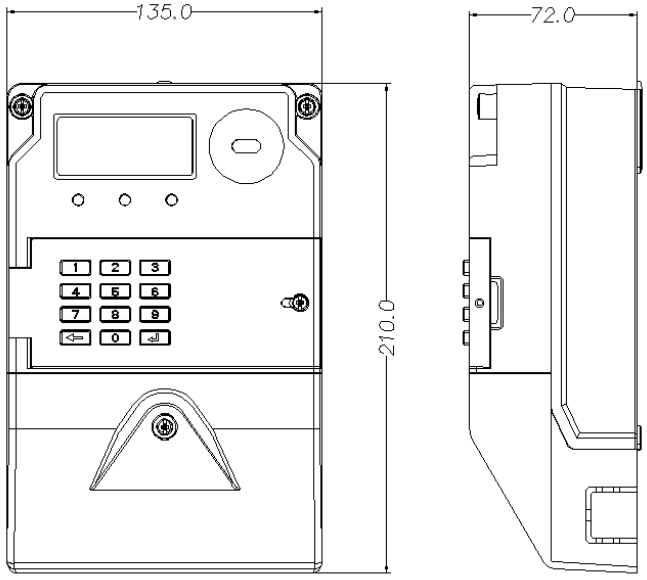
Description	Specification	Note
Display /Notice interface	With large screen, wide angle (≥120°), anti-ultraviolet function, wide temperature range of LCD display mode, Digital display is 8 bits, IEC62056 display code encoding, visualized prompt symbol, balance credit bar indication, alarm/tip LED indication, LCD screen with backlight instruction, user-friendly. LCD size: 60.0mm*31.0mm LCD visible display size: 55.4mm*22.0mm LCD digit size (height*width): 12.0mmX4.5mm Two display modes: auto-scroll (defaulted), manual scroll. Display content is programmable. Default regular display item is balance energy. RWP (reading without power) function.	
Working Environment:		
Working Temperature:	-25℃～+75℃	
Storage Temperature:	-40℃～+80℃	
Humidity Requirement:	During the night: 100 % relative humidity (Maximum) During the day: 25 % relative humidity	
Altitude	Less than 3500 meters	
Lighting Protection	Built-in varistor protection Meters can be used where severe lighting storms prevail.	
Communication Port	Infrared communication RS – 485 communication port :default baud rate 9600	
Communication Protocol	IEC62056-21 Mode C	
Communication modules Selection	*Please refer to the introduction of communication modules*	
SG4A0-01	GPRS/GSM communication module; (Simcom- SIM900, quadruple frequency)	
SPDH0-01	PLC communication module; (HT8560 center frequency 125kHz;carrier frequency range: 125±2.8kHz;carrier rate:550bps DPSK)	
SRGB0-01	RF communication module; (APPCON APC320N; default port rate: 9600bps; frequency: 470 ~ 510MHz; emission power is programmable; centralized meter reading module APC920)	
SZ0A0-01	Zigbee communication module (EM250 communication rate: 250kps, modulation mode: O-QPSK; concentrator module HD3501-SB/ZigBee chip EM357)	
Real-time clock	Real-time clock with crystal timing Crystal oscillator frequency: 32.768 kHz	

Description	Specification	Note
	Clock accuracy (support clock temperature compensation) : ±5ppm Within reference temperature (23℃) and working voltage range: clock accuracy ≤0.5s/d Within working temperature range (-25℃～+75℃) and under AC power supply or standby power supply mode: clock accuracy≤1.0s/d	
Real-time clock backup battery	Columnar battery: 3.6 V lithium-ion battery capacity ≥1200mAh During grid power failure, the battery can support clock working more than 10 years.	
Insulation performance	Class Ⅱ insulation envelope protection instruments, protection grade 2 , double insulation	
Pulse voltage **AC withstand voltage** **Current pulse**	6KV 4KV Service rating 5kA 8/20μs Withstand rating 30 kA, 4/10μs	According to 1.2/50μs in IEC60060
Electromagnetic compatibility		
Electrostatic discharge	Standard: IEC 61000-4-2 Contact discharge : 8 kV Air discharge: 15kV	Meter works normally.
RF electromagnetic interference resistance test	Standard:IEC 61000-4-3 With current status: 80MHz to 2GHz 10 V/m No current status: 80MHz to 2GHz 30V/m	Meter error meets the requirement. Meter works normally.
Fast transient pulse test	Standard: IEC61000-4-4 under basic current work condition For current and voltage circuit: 4KV For auxiliary circuit> 40V: 2KV	Meter error meets the requirement. Meter works normally.
RF field induction conduction disturb test	Standard:IEC61000-4-6 under basic current work condition Voltage level: 10V 150kHz to 80MHz	Meter error meets the requirement. Meter works normally.
Surge immunity test	Standard: IEC 61000-4-5 Test voltage levels: For current and voltage circuit: 4KV	Meter works normally.

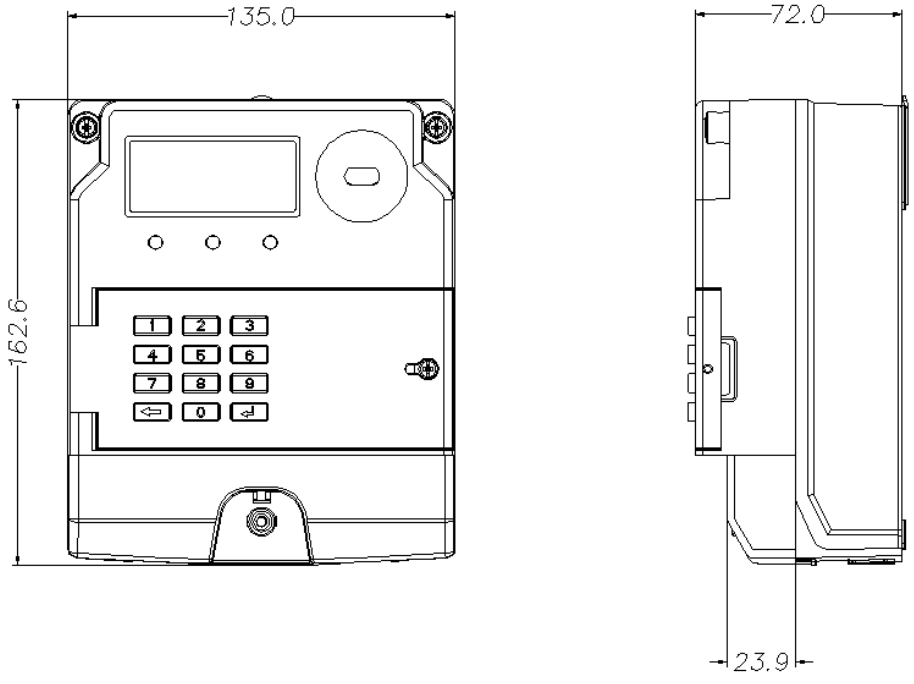
Description	Specification	Note
	For auxiliary loop: 1KV	
Structure		
Cover and terminal layout	Comply with BS5685/DIN 43857	
Cover protection class	IP54 IEC60529-4 Standard	
Housing Material	Fire retardant, flame resistant, thermal deformation engineering plastic PC+GF Inflaming retardant test : pass 960°C glow wire test （IEC60695-2-1） Fire resistant test: UL94-V0 rated @1.5mm. No toxic gases emitted: Green Material	
Physical Dimension （LxWxH）		
A: Extended cover	210.0mm X 135.0mm X 72.0mm	
B: Short cover	162.2mm X 135.0mm X 72.0mm	
Weight	About 600g	
Terminals	Terminals layout complies with BS5685/ DIN 43857 Main terminal is the pressure-plate type; two screws for a wire. The material is rust-proof. Hole diameter: 9mm; hole depth: 30mm: hole distance: 20mm Maximum Cable Cross Section: 35 mm^2	
Terminal material	Fire retardant, flame resistant, thermal deformation engineering plastic PC+20%GF Inflaming retardant test : pass 960°C glow wire test （IEC60695-2-1） Fire resistant test: UL94-V0 rated @1.5mm. No toxic gases emitted: Green Material	
Sealing	1)Two manufacturer seals on the top meter cover; 2)Two terminal cover seals; 3) One seal on communication module	

3.1 Meter Outline Diagram (unit: mm)

A: Extended terminal cover

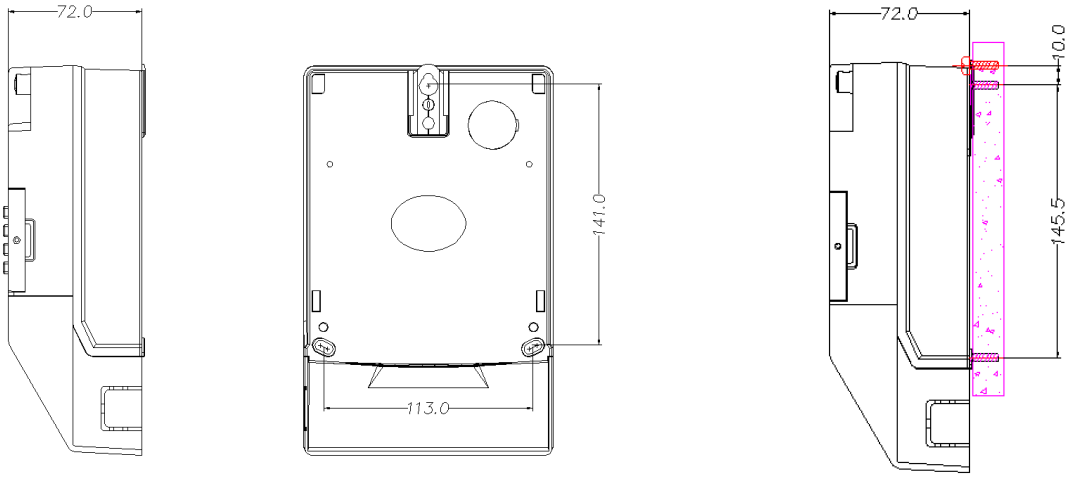


B： Short terminal cover (transparent/non-transparent)



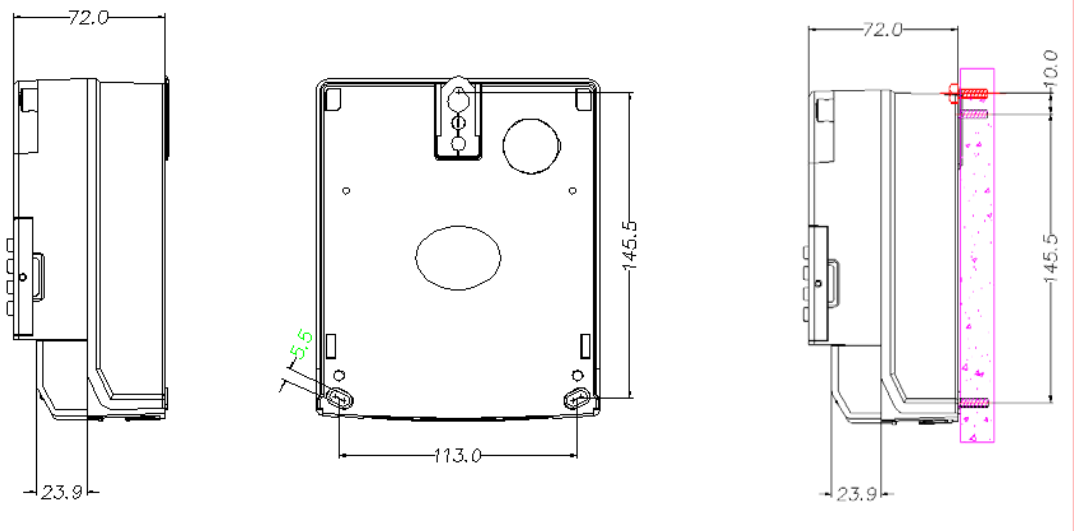
3.2 Installation Diagram (unit: mm)

A： Extended terminal cover



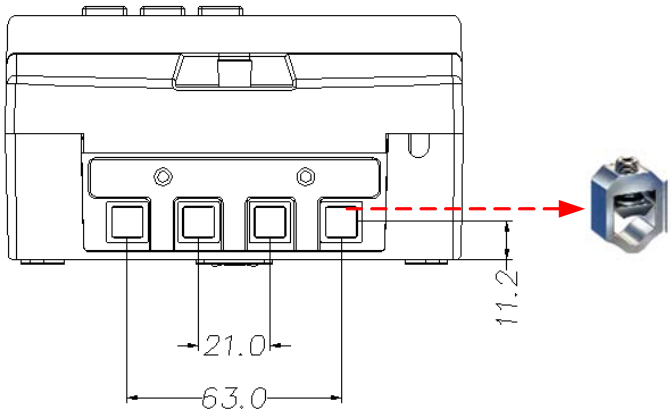
Pothook has two holes and the distance of which is 10mm. The distance is adjustable.

B： Short terminal cover (transparent/non-transparent)



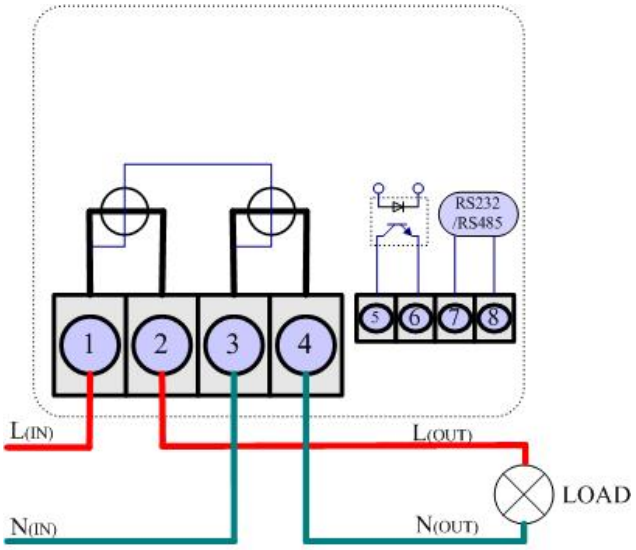
Pothook has two holes and the distance of which is 10mm. The distance is adjustable.

3.3 Wiring Terminals (unit: mm)

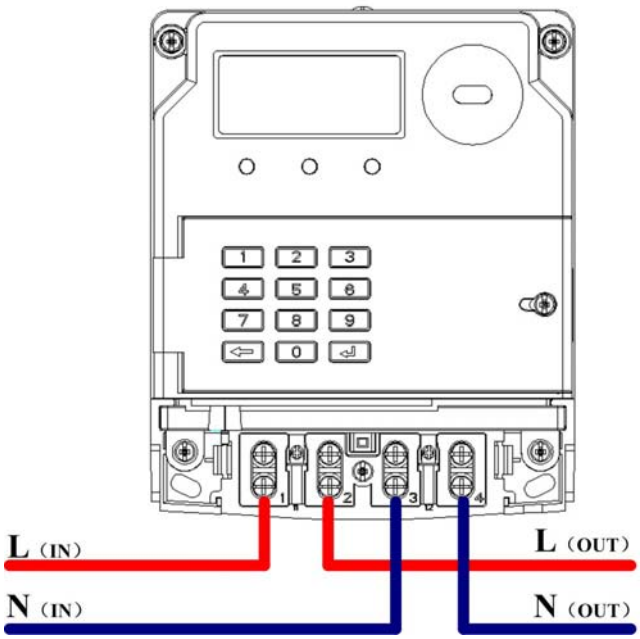


Characteristic: pressure plate wiring mode is suitable for wires of different materials and diameters, and it will not harm the wires.

3.4 Wiring Diagram

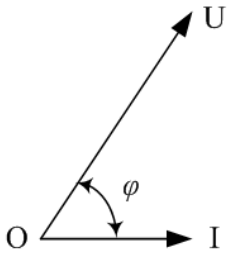


3.5 MCU Wiring Diagram



3.6 (MCU)Active Metering

Phasor diagram under correct wiring



Active power:

P=UI cos φ

Active energy metering indicated as:

EP =∫Pdt =∫UI cos φ dt

Active direction definition: Energy meter adopts the concept of import energy/ export energy from client position.

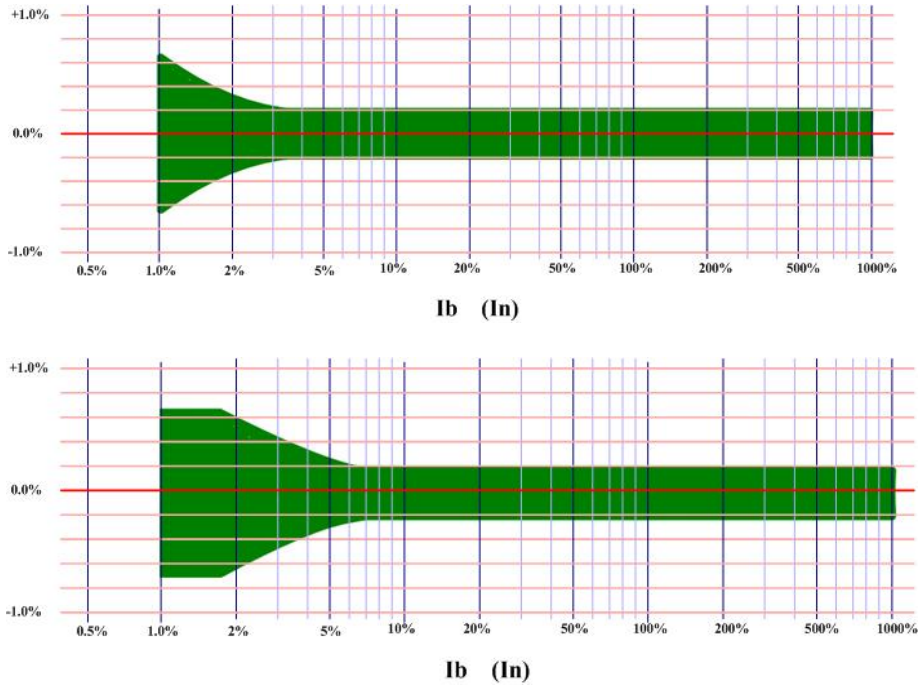
○ Client import energy=energy output by power supplier

○ Client export energy=energy input by power supplier

Error threshold (percentage) of energy meter DZ1513 active power (1 class)

Load Value	Power Factor	Error threshold indicated by percentage	
		Standard of IEC62053-21	Standard of INHEMETER
0.02Ib≤I< 0.05 Ib	1	±1.5	±1.0
0.05Ib≤I< 0.10 Ib	1	±1.5	±1.0
0.10Ib≤I＜Imax	1	±1.0	±0.6
0.02Ib≤I< 0.1Ib	0.5 lag 0.8 lead	±1.5 ±1.5	±1.0 ±1.0
0.1Ib≤I< 0.2Ib	0.5 lag 0.8 lead	±1.5 ±1.5	±1.0 ±1.0
0.2Ib≤I≤Imax	0.5 lag 0.8lead	±1.0 ±1.0	±0.6 ±0.6

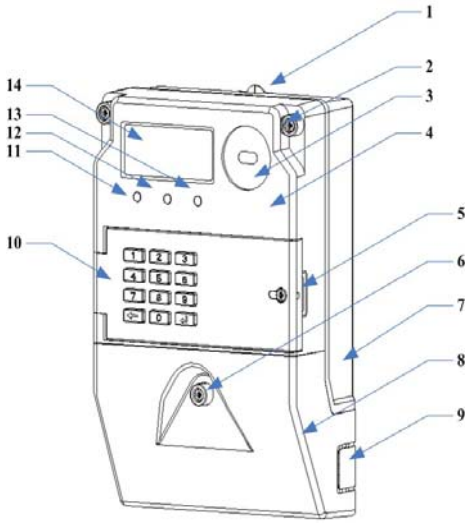
Active error diagram of INHEMETER 1P2W energy meter



COSΦ=0.5 Range of active error

3.7 Meter Characteristics

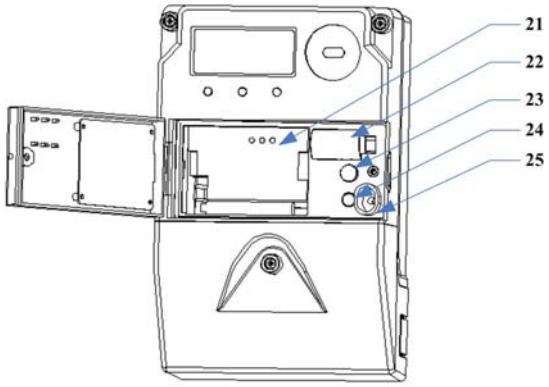
Components introduction of keypad prepayment energy meter DDZ1513:



1. Hook (extension-type)
2. Factory seal (one on the right and one left)
3. Optical (Infrared) communication interface
4. Meter cover
5. Cover of plug-in communication module
6. Terminal cover seal
7. Meter base
8. Terminal cover (extended terminal cover)
9. RJ45 output line port (output cable of communication interface, like RS-485 etc)
10. Keypad （4X3 12 key）
11. Balance credit LED(Two colors—red/ green)
12. Alarm indicator (yellow)
13. Active impulse LED(red)
14. LCD

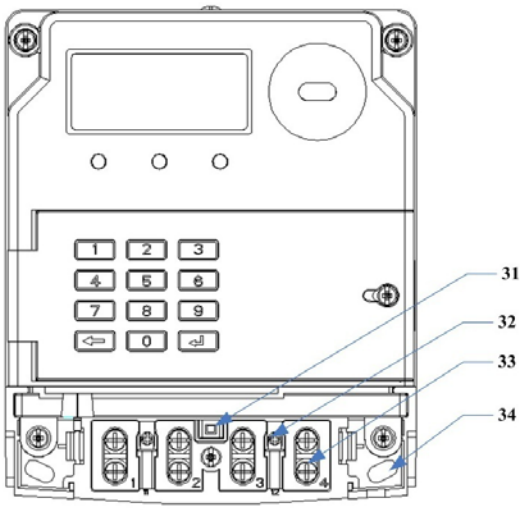
DDZ1513 (MBS7K2A)

Keypad prepayment energy meter with plug-in communication modules DDZ1513---Component introduction under status of opening module cover

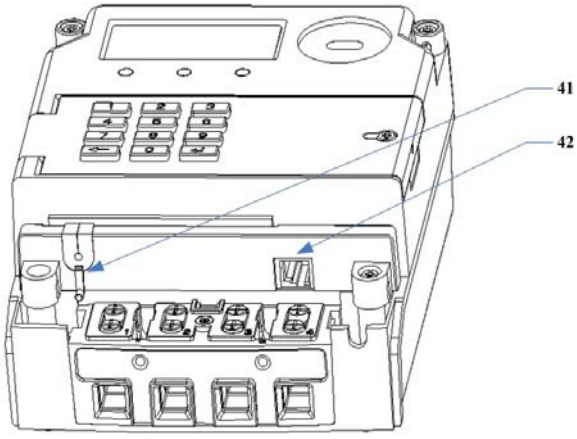


21 Plug-in communication module
22 Plug-in RTC battery
23 Reset button of maximum demand and setting permission
24 Electronic seal switch of module cover
25 Spare key of multi-tariff meter

Keypad prepayment energy meter (plug-in communication modules) DDZ1513---Component introduction under status of opening terminal cover



31 Electronic seal switch of terminal cover
32 Auxiliary terminal 11/12(Spare)
33 Main terminal 1/2/3/4
34 Installing location hole (Left& Right)



41. External antenna cable grommet of GPRS/GSM module; Seal with rubber seal when use internal antenna

42. RJ45 interface； Used for RS-485 interface

3.7.1 Energy Impulse Indicator (red LED)--#13

Flashing frequency of these two red LED indicator directly indicates instant load of the meter, the higher frequency indicating the higher load. Meanwhile, it can also be used as standard impulse output to measure the accuracy of meter. Meter impulse constant is 1000imp/kWh, which means that the red LED flashes 1000 times if consumes 1KWh.

3.7.2 Alarm Indicator (yellow LED)--#12

The yellow LED indicator is alarm indicator, which indicates the status of phase voltage(when there is grid power) and energy meter: The flashing frequency of yellow LED in 10s indicates the working status of energy meter, such as alarm, pre-alarm, overload, etc. for users to check and position the problem.

No.	Symbol	Flashing frequency in 10 seconds	Description
1		Once	Meter is working properly; relay is closed, no alarm or other abnormality
2		Twice	Meter balance amount is lower than the pre-alarm threshold; prompts the user to purchase and recharge
3		Three times	Meter balance amount is below the alarm threshold; prompts the user to purchase and recharge
4		Four times	Meter in overload state, if it continues, relay will disconnect.
5		Five times	Relay disconnected; the

			user can not use electricity.
6		Six times	Errors are found by self-check of the meter, Relay disconnected and users can't use electricity .
7		Seven times	Meter detects tamper and disconnects relay, the user can't use electricity,
8		Eight times	Meter detects over-current. If it has been set, the replay will disconnect.
9		Nine times	Meter detects communication module cover open, and should be dealt by administrator.
10		Ten times	Meter line -in side is without phase voltage and the user can not use electricity .

3.7.3 Balance Credit Indicator (Bi-color LED) -#11

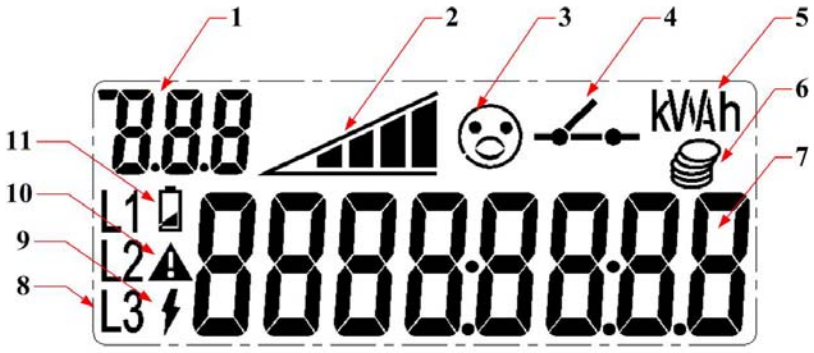
When the green LED indicator is on: credit more than alarm threshold.
When the yellow LED indicator flashes: credit between pre-alarm and alarm, user needs to recharge; otherwise power will be off.
When the red LED indicator flashes: credit less than alarm threshold, user needs to recharge;otherwise power will be off.
When the red indicator is on: 0 credit, power is off under no over-draft permission or non-friendly date/time. Recharge needs to be done to connect the electricity.

3.7.4 Photoelectricity Optical(infrared) Port--#3

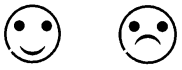
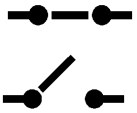
The optical port can be used to connect meter and portable devices (HHU and PC) by a optical cable.In such a way operator can read and configure meter tariff. The port protocol complies with C mode of IEC62056-21, and has safety levels and password control.

4 LCD

Meter adopts LCD display with large screen, wide visual angle（≥120°）,anti -UV function and wide temperature range;
LCD can display up to 8 digits. Digits can be programmed as following format:
8 integers;
7 integers + 1 decimal; or
6 integers + 2 decimals.
Meter adopts IEC62056 display code, visualized prompt symbol, bar indicator of available electricity credit (balance energy/ amount) and LED indicator of alarm/ prompt. LCD has Backlight.
Character size(height*width): 12X4.5mm；

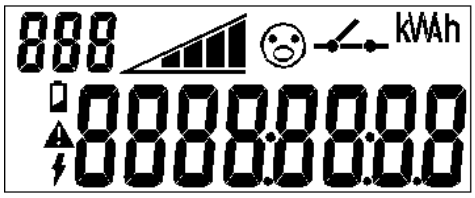


LCD visual icon

No.	Symbol	Description
1		A： code display area, supporting OIBS code display B：current tariff indication(for multi-tariff/step tariff deduction mode)
2		Bar indicator for balance credit
3	 **Happy** & **Sad face**	Smiley Face：Meter in Good Condition Sad Face,: Meter in Bad Condition
4	 Relay status indicator;	①  Relay connected ②  Relay disconnected
5		measured value unit kWh: active energy kW: active power kVArh: reactive energy kVAr: reactive power V: voltage A: current kVA: apparent power
6		Currency icon: money deduction mode
7		Data display area: through combination, displaying values: ① Measuring(metering) data、TOKEN input data ② Date: YY-MM-DD ③ Time: hh-mm-ss
8		Three phase prepayment meter phase voltage indication A ： Phase mark disappears when corresponding phase is lost B ： Phase mark flashes when the corresponding phase has an alarm.
9		Lighting symbol: PLC communication state ① Flashing:normal PLC communication ②Displaying: abnormal PLC communication
10		Alarm symbol: for tampering, cover open, 5. Displaying: with cover open event, the cover is closed currently ② Flashing: with cover open event, the cover is open currently

No.	Symbol	Description
11		Battery icon: for battery status Displaying: out of battery, need battery rechange Disappear: normal battery

Energy meter will automatically start self-checking status when power on, LCD shows full display at this time (as picture). After 2 seconds, energy meter enters into display mode of balance amount.



Normal display (balance amount): energy meter with built-in relay connected and electricity credit, it displays balance amount.

Mark NO.	Name	Remark
1	Current tariff code	T2: tariff shift 2 or step tariff rate2; referring to multi-tariff function introduction
2	Bar indicator	Balance credit
3	Meter status	Meter working status
4	Rely status	relay status
5	Quantity unit / currency unit	
6	Main display data	Balance credit: 12107.6

Data of meter measuring, reading and recording can be achieved through the following 3 ways:

- Auto-scroll display mode
- Manual scroll display mode
- Code inquiry mode

4.1 Auto- scroll Display Mode:

According to configurations of auto-scroll display data/sequence/time, LCD sequentially displays the data, and display time can be set as from 3 seconds to 99 seconds and auto- scrolling display data can be programmable up to 20 items(through upper computer). For “Rocket program”, factory setting only displays balance amount.

4.2 Manual Scroll Display Mode:

Under no code input condition, by pressing blue enter button, the meter will display certain data, as setted display sequence order and time. Display time can be programmed from 3s to 99s,and up to 20 items can be programmable. Therefore, under manual scrolling display mode, the searchable data is auto scrolling display item plus keypad scrolling item(program through upper computer).

For this program, factory setting of manual scrolling display is as follows:

Code	Code content	Display mode	Unit/Indication
170	Balance credit		
000	Accumulative active energy		
001	Tariff 1(T1) accumulative active energy/step 0 accumulative active energy		
002	Tariff 2(T2) accumulative active energy/step 1 accumulative active energy		
003	Tariff 3(T3) accumulative active energy/step 2 accumulative active energy		
004	Tariff 4(T4) accumulative active energy/step 3 accumulative active energy		
031	Voltage		
034	Current		
040	Active power		
038	Date(DD-MM-YY)		
039	Time(HH-MM-SS)		
700	Meter address(first 6 digits)		
	Meter address(last 5 digits)		

4.3 Short Code Inquiry Display Mode

Input 3 digits code and press enter button through meter keypad, desired items can be queried.
Meter short code display:

Code	Code content	Display mode(example)	Unit/Indication
000	Accumulative active energy		
001	Tariff 1(T1) accumulative active energy/step 0 accumulative active energy		
002	Tariff 2(T2) accumulative active energy/step1 accumulative active energy		
003	Tariff 3(T3) accumulative active energy/step 2 accumulative active energy		
004	Tariff 4(T4) accumulative active energy/step 3 accumulative active energy		
005	Tariff 5(T5) accumulative active energy/step 4 accumulative active energy		
006	Tariff 6(T6) accumulative active energy/step 5 accumulative active energy		
007	Tariff 7(T7) accumulative active energy/step 6 accumulative active energy		
008	Tariff 8(T8) accumulative active energy/step 7 accumulative active energy		
009	Accumulative reverse active energy		
010	*Accumulative reactive energy(optional)*		
020	Accumulative apparent energy(optional)		
031	Voltage		
034	L current		
035	N current		
037	Frequency		
038	Date(DD-MM-YY)		
039	Time(HH-MM-SS)		
040	Active power		
050	*Reactive power(optional)*		
060	*Apparent power(optional)*		
070	Power factor		
110	Current daily active energy		
	Current daily active deducted amount		
111	Current daily tariff 1(T1) active energy/step 0 active energy		
	Current daily tariff 1(T1) active energy deducted amount/step 0 active deducted amount		

Code	Code content	Display mode(example)	Unit/Indication
112	Current daily tariff 1(T2) active energy/step 1 active energy		
	Current daily tariff 2(T2) active energy deducted amount/step 1 active deducted amount		
113	Current daily tariff 3(T3) active energy/step 2 active energy		
	Current daily tariff 3(T3) active energy deducted amount/step 2 active deducted amount		
114	Current daily tariff 4(T4) active energy/step 3 active energy		
	Current daily tariff 4(T4) active energy deducted amount/step 3 active deducted amount		
115	Current daily tariff 5(T5) active energy/step 4 active energy		
	Current daily tariff 5(T5) active energy deducted amount/step 4 active deducted amount		
116	Current daily tariff 6(T6) active energy/step 5 active energy		
	Current daily tariff 6(T6) active energy deducted amount/step 5 active deducted amount		
117	Current daily tariff 7(T7) active energy/step 6 active energy		
	Current daily tariff 7(T7) active energy deducted amount/step 6 active deducted amount		
118	Current daily tariff 8(T8) active energy/step 7 active energy		
	Current daily tariff 4(T4) active energy deducted amount/step 3 active deducted amount		
130	Current monthly active energy		
	Current active deducted amount		
131	Current monthly tariff 1(T1) active energy/step 0 active energy		
	Current monthly tariff 1(T1) active energy deducted amount/step 0 active deducted amount		
132	Current monthly tariff 2(T2) active energy/step 1 active energy		
	Current monthly tariff 2(T2) active energy deducted amount/step 1 active deducted amount		
133	Current monthly tariff 3(T3) active energy/step 2 active energy		

Code	Code content	Display mode(example)	Unit/Indication
	Current monthly tariff 3(T3) active energy deducted amount/step 2 active deducted amount		
134	Current monthly tariff 4(T4) active energy deducted amount/step 3 active deducted amount		
	Current monthly tariff 4(T4) active energy deducted amount/step 3 active deducted amount		
135	Current monthly tariff 5(T5) active energy/step 4 active energy		
	Current monthly tariff 5(T5) active energy deducted amount/step 4 active deducted amount		
136	Current monthly tariff 6(T6) active energy/step 5 active energy		
	Current monthly tariff 6(T6) active energy deducted amount/step 5 active deducted amount		
137	Current monthly tariff 7(T7) active energy/step 6 active energy		
	Current monthly tariff 7(T7) active energy deducted amount/step 7 active deducted amount		
138	Current monthly tariff 8(T8) active energy/step 7 active energy		
	Current monthly tariff 8(T8) active energy deducted amount/step 7 active deducted amount		
139	Current monthly active MD		
	Current monthly MD date		
	Current monthly MD time		
170	Balance credit		
171	Accumulative recharged amount		
172	Accumulative deducted amount		
200	Load threshold		
201	Allowed overload times		
202	Over load power off recovery time		
203	Min. guaranteed power supply load threshold		
204	Over current power off threshold		
205	Phase power unbalance power off threshold		
206	Credit pre-alarm threshold		
207	Credit alarm threshold		
208	Billing date/time		
209	Buzzer alarm interval		
210	Excessive energy threshold		
211	Overdraft threshold		

Code	Code content	Display mode(example)	Unit/Indication
212	Over voltage power off threshold		
213	Low voltage power off threshold		
214	Value of over temperature power off		
215	Bypass tampering alarm threshold		
230	Prepayment configuration status flag 1		
231	Prepayment configuration status flag 2		
232	Prepayment configuration status flag 3		
240	Friendly time period(not allowing outage period)-starting hour hour minute minute		
241	Friendly time period(not allowing outage period)-ending hour hour minute minute		
242	Friendly weekend(not allowing outage period)		
251	1st friendly holiday(date of not allowing outage -YYMMDD)		
252	2nd friendly holiday(date of not allowing outage -YYMMDD)		
253	3rd friendly holiday(date of not allowing outage -YYMMDD)		
254	4th friendly holiday(date of not allowing outage -YYMMDD)		
255	5th friendly holiday(date of not allowing outage -YYMMDD)		
256	6th friendly holiday(date of not allowing outage -YYMMDD)		
257	7th friendly holiday(date of not allowing outage -YYMMDD)		
258	8th friendly holiday(date of not allowing outage -YYMMDD)		
259	9th friendly holiday(date of not allowing outage -YYMMDD)		
260	10^{th} friendly holiday(date of not allowing outage -YYMMDD)		
261	11^{th} friendly holiday(date of not allowing outage -YYMMDD)		
262	12^{th} friendly holiday(date of not allowing outage -YYMMDD)		
263	13^{th} friendly holiday(date of not allowing outage -YYMMDD)		
264	14th friendly holiday(date of not allowing outage -YYMMDD)		

Code	Code content	Display mode(example)	Unit/Indication
265	15th friendly holiday(date of not allowing outage -YYMMDD)		
266	16th friendly holiday(date of not allowing outage -YYMMDD)		
267	17th friendly holiday(date of not allowing outage -YYMMDD)		
268	18th friendly holiday(date of not allowing outage -YYMMDD)		
269	19th friendly holiday(date of not allowing outage -YYMMDD)		
270	20th friendly holiday(date of not allowing outage -YYMMDD)		
271	21st friendly holiday(date of not allowing outage -YYMMDD)		
272	22nd friendly holiday(date of not allowing outage -YYMMDD)		
273	23rd friendly holiday(date of not allowing outage -YYMMDD)		
274	24th friendly holiday(date of not allowing outage -YYMMDD)		
275	25th friendly holiday(date of not allowing outage -YYMMDD)		
300	Available electricity days		
301	Total billing		
302	Over load power off times		
303	Meter status flag 1		
304	Meter status flag 2		
305	Meter status flag 3(cover opening event)		
306	Meter status flag 4(grid event 1)		
307	Meter status flag 5(grid event 2)		
308	Meter status flag 6(grid event 3)		
310	Accumulative trip times		
311	Latest 1st trip date/time		
	Latest 1st trip recovery date/time		
	Latest 1st trip power off reason flag 1		
	Latest 1st trip power off reason flag 2		
	Latest 1st trip power off reason flag 3		
312	Latest 2nd trip date/time		
	Latest 2nd trip recovery date/time		

Code	Code content	Display mode(example)	Unit/Indication
	Latest 2nd trip power off reason flag 1		
	Latest 2nd trip power off reason flag 2		
	Latest 2nd trip power off reason flag 3		
313	Latest 3rd trip date/time		
	Latest 3rd trip recovery date/time		
	Latest 3rd trip power off reason flag 1		
	Latest 3rd trip power off reason flag 2		
	Latest 3rd trip power off reason flag 3		
314	Latest 4th trip date/time		
	Latest 4th trip recovery date/time		
	Latest 4th trip power off reason flag 1		
	Latest 4th trip power off reason flag 2		
	Latest 4th trip power off reason flag 3		
315	Latest 5th trip date/time		
	Latest 5th trip recovery date/time		
	Latest 5th trip power off reason flag 1		
	Latest 5th trip power off reason flag 2		
	Latest 5th trip power off reason flag 3		
316	Latest 6th trip date/time		
	Latest 6th trip recovery date/time		
	Latest 6th trip power off reason flag 1		
	Latest 6th trip power off reason flag 2		
	Latest 6th trip power off reason flag 3		
317	Latest 7th trip date/time		
	Latest 7th trip recovery date/time		
	Latest 7th trip power off reason flag 1		
	Latest 7th trip power off reason flag 2		
	Latest 7th trip power off reason flag 3		
318	Latest 8th trip date/time		
	Latest 8th trip recovery date/time		
	Latest 8th trip power off reason flag 1		
	Latest 8th trip power off reason flag 2		
	Latest 8th trip power off reason flag 3		
319	Latest 9th trip date/time		
	Latest 9th trip recovery date/time		
	Latest 9th trip power off reason flag 1		
	Latest 9th trip power off reason flag 2		
	Latest 9th trip power off reason flag 3		
320	Latest 10^{th} trip date/time		
	Latest 10^{th} trip recovery date/time		

Code	Code content	Display mode(example)	Unit/Indication
	Latest 10th trip power off reason flag 1		
	Latest 10th trip power off reason flag 2		
	Latest 10th trip power off reason flag 3		
Grid power off event record			
330	Accumulative times of grid power off events		
331	Latest 1st grid power off date/time		
	Latest 1st grid power recovery date/time		
332	Latest 2nd grid power off date/time		
	Latest 2nd grid power recovery date/time		
333	Latest 3rd grid power off date/time		
	Latest 3rd grid power recovery date/time		
334	Latest 4th grid power off date/time		
	Latest 4th grid power recovery date/time		
335	Latest 5th grid power off date/time		
	Latest 5th grid power recovery date/time		
336	Latest 6th grid power off date/time		
	Latest 6th grid power recovery date/time		
337	Latest 7th grid power off date/time		
	Latest 7th grid power recovery date/time		
338	Latest 8th grid power off date/time		
	Latest 8th grid power recovery date/time		
339	Latest 9th grid power off date/time		
	Latest 9th grid power recovery date/time		
340	Latest 10th grid power off date/time		
	Latest 10th grid power recovery date/time		
Special event record			
350	Accumulative event times		
351/001	Latest 1st event occurring date		
351/002	Latest 1st event occurring time		
351/003	Lately 1st event index flag		
351/004	Latest 1st event status flag 1(meter fault)		
351/005	Latest 1st even status flag 2(cover opening)		
351/006	Latest 1st even status flag 3(grid event 1)		

Code	Code content	Display mode(example)	Unit/Indication
351/007	Latest 1st even status flag 4(grid event 2)		
351/008	Latest 1st even status flag 5(grid event 3)		
352/001	Latest 2nd event occurring date		
352/002	Latest 2nd event occurring time		
352/003	Latest 2nd event index flag		
352/004	Latest 2nd event status flag 1(meter fault)		
352/005	Latest 2nd even status flag 2(cover opening)		
352/006	Latest 2nd event status flag 3(grid event 1)		
352/007	Latest 2nd event status flag 4(grid event 2)		
352/008	Latest 2nd event status flag 5(grid event 3)		
353/001	Latest 3rd event occurring date		
353/002	Latest 3rd event occurring time		
353/003	Latest 3rd event index flag		
353/004	Latest 3rd event status flag 1(meter fault)		
353/005	Latest 3rd event status flag 2(cover opening)		
353/006	Latest 3rd event status flag 3(grid event 1)		
353/007	Latest 3rd event status flag 4(grid event 2)		
353/008	Latest 3rd event status flag 5(grid event 3)		
354/0	Latest 4th event occurring date		

Code	Code content	Display mode(example)	Unit/Indication
01			
354/002	Latest 4th event occurring time		
354/003	Latest 4th event index flag		
354/004	Latest 4th event status flag 1(meter fault)		
354/005	Latest 4th event status flag 2(cover opening event)		
354/006	Latest 4th event status flag 3(grid event 1)		
354/007	Latest 4th event status flag 4(grid event 2)		
354/008	Latest 4th event status flag 5(grid event 3)		
355/001	Latest 5th event occurring date		
355/002	Latest 5th event occurring time		
355/003	Latest 5th event index flag		
355/004	Latest 5th event status flag 1(meter fault)		
355/005	Latest 5th event status flag 2(cover opening event)		
355/006	Latest 5th event status flag 3(grid event 1)		
355/007	Latest 5th event status flag 4(grid event 2)		
355/008	Latest 5th event status flag 5(grid event 3)		
356/001	Latest 6th event occurring date		
356/002	Latest 6th event occurring time		
356/003	Latest 6th event index flag		
356/0	Latest 6th event status flag 1(meter fault)		

Code	Code content	Display mode(example)	Unit/Indication
04			
356/005	Latest 6th event status flag 2(cover opening event)		
356/006	Latest 6th event status flag 3(grid event 1)		
356/007	Latest 6th event status flag 4(grid event 2)		
356/008	Latest 6th event status flag 5(grid event 3)		
357/001	Latest 7th event occurring date		
357/002	Latest 7th event occurring time		
357/003	Latest 7th event index flag		
357/004	Latest 7th event status flag 1(meter fault)		
357/005	Latest 7th event status flag 2(cover opening event)		
357/006	Latest 7th event status flag 3(grid event 1)		
357/007	Latest 7th event status flag 4(grid event 2)		
357/008	Latest 7th event status flag 5(grid event 3)		
358/001	Latest 8th event occurring date		
358/002	Latest 8th event occurring time		
358/003	Latest 8th event index flag		
358/004	Latest 8th event status flag 1(meter fault)		
358/005	Latest 8th event status flag 2(cover opening event)		
358/006	Latest 8th event status flag 3(grid event 1)		
358/0	Latest 8th event status flag 4(grid event 2)		

Code	Code content	Display mode(example)	Unit/Indication
07			
358/008	Latest 8th event status flag 5(grid event 3)		
359/001	Latest 9th event occurring date		
359/002	Latest 9th event occurring time		
359/003	Latest 9th event index flag		
359/004	Latest 9th event status flag 1(meter fault)		
359/005	Latest 9th event status flag 2(cover opening event)		
359/006	Latest 9th event status flag 3(grid event 1)		
359/007	Latest 9th event status flag 4(grid event 2)		
359/008	Latest 9th event status flag 5(grid event 3)		
360/001	Latest 10th event occurring date		
360/002	Latest 10th event occurring time		
360/003	Latest 10th event index flag		
360/004	Latest 10th event status flag 1(meter fault)		
360/005	Latest 10th event status flag 2(cover opening event)		
360/006	Latest 10th event status flag 3(grid event 1)		
360/007	Latest 10th event status flag 4(grid event 2)		
360/008	Latest 10th event status flag 5(grid event 3)		
401/H00	Last month active energy		

Code	Code content	Display mode(example)	Unit/Indication
401/H01	Last month tariff 1(T1) active energy//step 0 active energy		
401/H02	Last month tariff 2(T2) active energy//step 1 active energy		
401/H03	Last month tariff 3(T3) active energy//step 2 active energy		
401/H04	Last month tariff 4(T4) active energy//step 3 active energy		
401/H05	Last month tariff 5(T5) active energy//step 4 active energy		
401/H06	Last month tariff 6(T6) active energy//step 5 active energy		
401/H07	Last month tariff 7(T7) active energy//step 6 active energy		
401/H08	Last month tariff 8(T8) active energy//step 7 active energy		
401/H09	Last month active maximum demand		
	Last month active maximum demand date		
	Last month active maximum demand time		
401/H10	Last month active deduction amount		
401/H20	Last month reactive energy；reactive energy under all tariffs; reactive maximum demand; reactive deduction amount		
401/H50	Last month apparent energy;apparent energy under all tariffs; apparent maximum demand; apparent deduction amount		
402/H00	Last 2nd month active energy		
402/H01	Last 2nd month tariff 1(T1) active energy//step 0 active energy		
402/H02	Last 2nd month tariff 2(T2) active energy//step 1 active energy		
402/H03	Last 2nd month tariff 3(T3) active energy//step 2 active energy		
402/H04	Last 2nd month tariff 4(T4) active energy//step 3 active energy		
402/H05	Last 2nd month tariff 5(T5) active energy//step 4 active energy		

Code	Code content	Display mode(example)	Unit/Indication
402/H06	Last 2nd month tariff 6(T6) active energy//step 5 active energy		
402/H07	Last 2nd month tariff 7(T7) active energy//step 6 active energy		
402/H08	Last 2nd month tariff 8(T8) active energy//step 7 active energy		
402/H09	Last 2nd month active maximum demand		
	Last 2nd month active maximum demand date		
	Last 2nd month active maximum demand time		
402/H10	Last 2nd month active deduction amount		
402/H20	Last 2nd month reactive energy；reactive energy under all tariffs; reactive maximum demand; reactive deduction amount		
402/H50	Last 2nd month apparent energy;apparent energy under all tariffs; apparent maximum demand; apparent deduction amount		
403/H00	Last 3rd month active energy		
403/H01	Last 3rd month tariff 1(T1) active energy//step 0 active energy		
403/H02	Last 3rd month tariff 2(T2) active energy//step 1 active energy		
403/H03	Last 3rd month tariff 3(T3) active energy//step 2 active energy		
403/H04	Last 3rd month tariff 4(T4) active energy//step 3 active energy		
403/H05	Last 3rd month tariff 5(T5) active energy//step 4 active energy		
403/H06	Last 3rd month tariff 6(T6) active energy//step 5 active energy		
403/H07	Last 3rd month tariff 7(T7) active energy//step 6 active energy		
403/H08	Last 3rd month tariff 8(T8) active energy//step 7 active energy		
403/H09	Last 3rd month active maximum demand		
	Last 3rd month active maximum demand date		
	Last 3rd month active maximum demand time		

Code	Code content	Display mode(example)	Unit/Indication
403/H10	Last 3rd month active deduction amount		
403/H20	Last 3rd month reactive energy；reactive energy under all tariffs; reactive maximum demand; reactive deduction amount		
403/H50	Last 3rd month apparent energy;apparent energy under all tariffs; apparent maximum demand; apparent deduction amount		
	●		
	●		
	●		
	●		
	●		
413/H00	Last 13th month active energy		
413/H01	Last 13th month tariff 1(T1) active energy//step 0 active energy		
413/H02	Last 13th month tariff 2(T2) active energy//step 1 active energy		
413/H03	Last 13th month tariff 3(T3) active energy//step 2 active energy		
413/H04	Last 13th month tariff 4(T4) active energy//step 3 active energy		
413/H05	Last 13th month tariff 5(T5) active energy//step 4 active energy		
413/H06	Last 13th month tariff 6(T6) active energy//step 5 active energy		
413/H07	Last 13th month tariff 7(T7) active energy//step 6 active energy		
413/H08	Last 13th month tariff 8(T8) active energy//step 7 active energy		
413/H09	Last 13th month active maximum demand		
	Last 13th month active maximum demand date		
	Last 13th month active maximum demand time		
413/H10	Last 13th month active deduction amount		
413/H20	Last 13th month reactive energy；reactive energy under all tariffs; reactive maximum demand; reactive		

Code	Code content	Display mode(example)	Unit/Indication
	deduction amount		
413/H50	Last 13th month apparent energy;apparent energy under all tariffs; apparent maximum demand; apparent deduction amount		
451/d00	Last day active energy		
451/d01	Last day tariff 1(T1) active energy//step 0 active energy		
451/d02	Last day tariff 2(T2) active energy//step 1 active energy		
451/d03	Last day tariff 3(T3) active energy//step 2 active energy		
451/d04	Last day tariff 4(T4) active energy//step 3 active energy		
451/d05	Last day tariff 5(T5) active energy//step 4 active energy		
451/d06	Last day tariff 6(T6) active energy//step 5 active energy		
451/d07	Last day tariff 7(T7) active energy//step 6 active energy		
451/d08	Last day tariff 8(T8) active energy//step 7 active energy		
451/d10	Last day active deduction amount		
452/d00	Last 2nd day active energy		
452/d01	Last 2nd day tariff 1(T1) active energy//step 0 active energy		
452/d02	Last 2nd day tariff 2(T2) active energy//step 1 active energy		
452/d03	Last 2nd day tariff 3(T3) active energy//step 2 active energy		
452/d04	Last 2nd day tariff 4(T4) active energy//step 3 active energy		
452/d05	Last 2nd day tariff 5(T5) active energy//step 4 active energy		
452/d06	Last 2nd day tariff 6(T6) active energy//step 5 active energy		
452/d	Last 2nd day tariff 7(T7) active energy//step 6 active		

Code	Code content	Display mode(example)	Unit/Indication
07	energy		
452/d08	Last 2nd day tariff 8(T8) active energy//step 7 active energy		
452/d10	Last 2nd day active deduction amount		
	●		
	●		
	●		
	●		
	●		
495/d00	Last 45th day active energy		
495/d01	Last 45th day tariff 1(T1) active energy//step 0 active energy		
495/d02	Last 45th day tariff 2(T2) active energy//step 1 active energy		
495/d03	Last 45th day tariff 3(T3) active energy//step 2 active energy		
495/d04	Last 45th day tariff 4(T4) active energy//step 3 active energy		
495/d05	Last 45th day tariff 5(T5) active energy//step 4 active energy		
495/d06	Last 45th day tariff 6(T6) active energy//step 5 active energy		
495/d07	Last 45th day tariff 7(T7) active energy//step 6 active energy		
495/d08	Last 45th day tariff 8(T8) active energy//step 7 active energy		
495/d10	Last 45th day active deduction amount		
500	Recharge times		
501	Last 1st recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
502	Last 2nd recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
503	Last 3rd recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
504	Last 4th recharge(recharge amount、TOKEN value、		

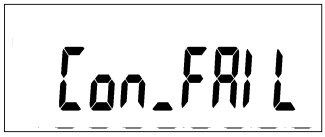
Code	Code content	Display mode(example)	Unit/Indication
	TID code、recharge date/time)		
505	Last 5th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
506	Last 6th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
507	Last 7th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
508	Last 8th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
509	Last 9th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
510	Last 10th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
511	Last 11th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
512	Last 12th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
513	Last 13th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
514	Last 14th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
515	Last 15th recharge(recharge amount、TOKEN value、TID code、recharge date/time)		
520	Technical TOKEN input times		
521	Latest 1st technical TOKEN input info.		
522	Latest 2nd technical TOKEN input info.		
523	Latest 3rd technical TOKEN input info.		
524	Latest 4th technical TOKEN input info.		
525	Latest 5th technical TOKEN input info.		
526	Latest 6th technical TOKEN input info.		
527	Latest 7th technical TOKEN input info.		
528	Latest 8th technical TOKEN input info.		
529	Latest 9th technical TOKEN input info.		
600	In-use tariff version NO.		
601	In-use tariff 1(T1) active energy rate//step tariff P0		
602	In-use tariff 2(T2) active energy rate//step tariff P1		
603	In-use tariff 3(T3) active energy rate//step tariff P2		
604	In-use tariff 4(T4) active energy rate//step tariff P3		

Code	Code content	Display mode(example)	Unit/Indication
605	In-use tariff 5(T5) active energy rate//step tariff P4		
606	In-use tariff 6(T6) active energy rate//step tariff P5		
607	In-use tariff 7(T7) active energy rate//step tariff P6		
608	In-use tariff 8(T8) active energy rate//step tariff P7		
621	Tariff time period 1 starting HHMM Tx//monthly step energy division E1		
622	Tariff time period 2 starting HHMM Tx//monthly step energy division E2		
623	Tariff time period 3 starting HHMM Tx//monthly step energy division E3		
624	Tariff time period 4 starting HHMM Tx//monthly step energy division E4		
625	Tariff time period 5 starting HHMM Tx//monthly step energy division E5		
626	Tariff time period 6 starting HHMM Tx//monthly step energy division E6		
627	Tariff time period 7 starting HHMM Tx//monthly step energy division E7		
628	Tariff time period 8 starting HHMM Tx//step tariff time table		
629	Tariff time period 9 starting HHMM Tx//next backup month step energy division E1		
630	Tariff time period 10 starting HHMM Tx//next backup month step energy division E2		
631	Tariff time period 11 starting HHMM Tx//next backup month step energy division E3		
632	Tariff time period 12 starting HHMM Tx//next backup month step energy division E4		
633	Tariff time period 13 starting HHMM Tx//next backup month step energy division E5		
634	Tariff time period 14 starting HHMM Tx//next backup month step energy division E6		
635	Tariff time period 15 starting HHMM Tx//next backup month step energy division E7		
636	Tariff time period 16 starting HHMM Tx		
637	Tariff time period 17 starting HHMM Tx		
638	Tariff time period 18 starting HHMM Tx		
639	Tariff time period 19 starting HHMM Tx		
640	Tariff time period 20 starting HHMM Tx		

Code	Code content	Display mode(example)	Unit/Indication
641	Tariff time period 21 starting HHMM Tx		
642	Tariff time period 22 starting HHMM Tx		
643	Tariff time period 23 starting HHMM Tx		
644	Tariff time period 24 starting HHMM Tx		
645	Next TOU shift date(multi-tariff mode)		
646	Next TOU shift time(multi-tariff mode)		
648	Next step tariff shift date(step tariff mode)		
649	Next step tariff shift time(step tariff mode)		
700	Energy meter NO.(meter address)		
701	Energy meter impulse constant		
702	Energy meter inserted software version NO.		
703	Energy meter temperature measurement value		
710	Key type		
711	Key version		
712	Tariff number		
713	Organization code(SGC code)		
714	STS software version		
720	Energy meter installation position info.(longitude)	Future definition and no such item now	
721	Energy meter installation position info.(latitude)	Future definition and no such item now	
722	Energy meter installation position info.(altitude)	Future definition and no such item now	
730	Plug-in communication module type、version		
731	GPRS/GSM module type info.	Future definition and no such item now	

Code	Code content	Display mode(example)	Unit/Indication
732	Signal quality(GPRS)		
733	Connection status(GPRS)		
741	PLC module info.	Future definition and no such item now	
751	Module number info.(RF)	Future definition and no such item now	
		Future definition and no such item now	
761	Module number info.(Zigbee)		
799	LCD full screen display check		

Special display symbol：

Display mode(example)	Data indication
	Communication between CIU and MCU, please wait. ***No display if no CIU***
	Failure of communication between CIU and MCU, please wait! ***No display if no CIU***
	Display: Cur_rEU LCD flashes with Cur_rEU, which means reverse current. Please check the wiring and electricity use?

	Display: no_USEd LCD displays no_USEd，which means the inquired item is not in use.
	Display: NULL LCD displays NULL, which means the inquired item is null and no data display.
	Display: OUEr_Uol LCD displays OUEr_Uol, which means energy meter disconnects supply circuit due to over voltage in power grid, and alternatively displays the voltage before power-off. The energy meter will re-supply power manually/automatically after voltage goes back to normal.
	Display: Lo_UoL LCD displays Lo_UoL, which means energy meter disconnects supply circuit due to too low the voltage in power grid, and alternatively displays the voltage before power-off. The energy meter will re-supply power manually/automatically after voltage goes back to normal.

4.4 Keypad Operation Instructions

The energy meter have 12 keys for Token entry and information inquiry. When numbers are typed through keypad, LCD will automatically display the input numbers and the current numbers of tokens in the token area on the left upper corner. When exceeding four numbers, the meter will automatically group four numbers, and separate every group by a dash. During the keypad operation, all the irrelevant symbols will no longer display for the time being. As shown in the picture, it is the status of inputting the token, and 10 numbers have been input. When press key, meter will make “di” sound.

Numeric keys 0-9, which are used for input of token, the other two special key buttons respectively are red ← for delete and blue ↵ for confirmation.

The red delete button ←: when the input token and the short token are wrong, the button can be used to delete the digitals from right to left.

The blue confirm button↵: After entering the token, press enter to confirm, the meter will load the purchasing power or power purchasing amount. Otherwise, if there is an error with the input token, there will be sound alarm, and LCD will have the corresponding error code accordingly.

If no other numbers have been entered, the confirmation key button will be used as manual display button, and you can press the button to check the manual data display which has been set in advance.

4.4.1 TOKEN Inputting

4.4.1.1 Complete and acceptable TOKEN

After enter 20 digits TOKEN and confirm, LCD will display “Accept” if this TOKEN is correct and accepted by the meter.

- keypad is locked up for 5 seconds for processing TOKEN.
- Meter sound indication
- Smile face
- Display total credit (balance KWh) after 5 seconds .

S.N	Picture	Instruction
1		Display: connected It is communicating with MCU, please waiting. *There is no display if meter without CIU*
2		Display：Accept Indicate the token has been accepted and the recharging is successful.
3		Display：1002.90kWh After recharge, the total balance is 1002.90kWh.

4.4.1.2. Incomplete TOKEN

If no number is input continuously within 30 seconds while inputting TOKEN code, it will be regarded as overtime.

- TOKEN code will disappear from LCD.
- Display balance KWh/credit

4.4.1.3. Used Token

Once a TOKEN is accepted and processed by the meter, it will be rejected if input again. Meter LCD will indicate “Used”.

- Keypad is locked up for 5 seconds and display “used”
- Meter sound alarm
- Sad face

4.4.1.4. Overdue Token

If the TOKEN is older than the oldest TOKEN that logged in meter record, it will be regarded as “overdue” and rejected by the meter. Meter LCD will display “Old”.

- Keypad is locked up for 5 seconds and indicating “Old”
- Meter sound alarm
- Sad face.

4. 4.1.5. The correct but rejected overflow token

Please refer to section 6.8 for anti-overflow function while recharge. The effective TOKEN code will be rejected if total balance credit register capacity is more than preset value. LCD display will indicate “Over- Crd”.

- Keypad is locked up for 5 seconds and indicating “Over Crd”
- Meter sound alarm
- Sad face.

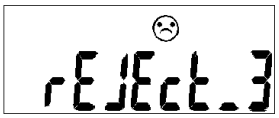
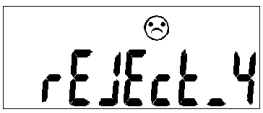
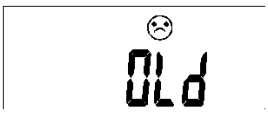
4.4.1.6 Incorrect TOKEN

The TOKEN will be rejected by meter if number inputting is wrong, meter No. is inconsistent, meter encryption key is incorrect, or random numbers are input for the purpose of tampering. LCD display will indicate “Reject-1”.

- Display “ Reject-1”
- Meter sound alarm
- Sad face.

Instructions of rejected token types:

S.N	Cutline	Instruction
1		Meter TOKEN decoding verification error TOKEN for recharge, load threshold modification, encryption key shift are incorrect; or TOKEN is inconsistent to meter number or meter encryption key.
2		Unsupported Token ， can not be decoded.

3		Meter encryption key type is DDTK, and does not support recharge TOKEN.
4		TOKEN data is out of range and it is abnormal data after decoding
5		Encryption replacement is illegal (error occurs when other encryption key type is transfer to unique encryption key.)
6		Used token
7		Overdue token
8		Correct but rejected overflow token.

4.4.2 Assignment Encryption Key Input Operation

Meter assignment key need to be replaced when install & re-install meter, or meter use area and power supply are changed, or prepayment management system vending encryption is refreshed, or security target un-periodically change encryption. These security measures need to be changed by inputting meter assignment encryption key. At the same time, vending system and meter require assignment encryption key separately generated by the same vending encryption key. Otherwise TOKEN from vending system will not be accepted by the meter.

Assignment encryption key has two groups of TOKEN(This first group of change encryption key TOKEN and the second group of change encryption key TOKEN). Settings for the first group and the second group will not be by sequence, user can input the first group or the second group at first. But two groups of TOKEN must be input within 5 minutes together, otherwise, user has to restart the input operation.

After inputting one group of TOKEN (accepted by meter correctly), the meter will indicate as followings::

The 2nd group of change encryption key TOKEN is input and accepted, please input the 1st group now.

The 1st group of change encryption key TOKEN is input and accepted, please input the 2nd group now.

4.4.3 Technical Token

There are several TOKEN codes with special functions for keypad prepayment energy meter, that is, technical Token, which can be applied for power off recovery due to tampering, record clearance,meter load threshold setting, etc. These special TOKEN codes are generated dispersedly according to each energy meter by vending Management System.

4.4.3.1 Tampering Clearance TOKEN

If power is cut off due to opening of terminal cover, the user must go to vending Management Center to apply for tamper clearance TOKEN to have power supply recovered. After inputting temper clearance TOKEN, the meter will recover from power failure to supplying power.

4.4.3.2 Load threshold TOKEN

Load threshold can be changed by inputting load threshold TOKEN. If preset load threshold is low as user load demand increases, which brings about frequent overload consumption or overload power off, the user needs to go to Power Supply Management Department or Vending Department to apply for additional requirement of power load, and a new load threshold TOKEN will be provided after the application is permitted by Vending Department. Meter load threshold setting will be revised by inputting new load threshold TOKEN.

4.4.3.3 Credit clearance TOKEN

If energy meter needs to be changed or maintained or user is changed, after confirming related data, the user can input a KWh clearance TOKEN to reset balance energy/credit. Built-in relay will be disconnected to cut off power supply.

4.4.4 Special TOKEN

The following special TOKEN codes are special extended functions for keypad prepayment energy meter made by INHEMETER.

4.4.4.1 Low credit pre-warning threshold TOKEN

Balance KWh pre-warning threshold value and function can be set by inputting code: 4547 8xxx, the value of wich can be from 1 kWh to 999kWh.

4.4.4.2 Low credit warning threshold TOKEN

Balance KWh warning threshold value and function can be set by inputting code: 4547 9xxx, the value of which can be set from 0kWh to 999kWh. If the setting value is zero, this function is disabled.
As shown in section 6.7, pre-warning and warning function for meter of low credit.

4.4.4.3 Activation TOKEN after meter installation

Meter relay is in disconnection status since delivery from factory. After completion of installation, 20-digit special TOKEN should be input on the keypad to activate meter (relay is connected). Meter relay is always in disconnection status before activation whether there is presetting at factory, user recharging and balance credit or not. Activation TOKEN can only be used once in a meter. Once the meter is activated, it will not be restricted. Activation TOKEN will be issued by INHEMETER.
The activation TOKEN: 1275-4194-1448-6450-5970

4.4.5 Test TOKEN (non-specific meter TOKEN)

There are some non-specific TOKEN for prepayment keypad meter which are used for meter function test. Once the meter accept these TOKEN, the meter will do corresponding tests.

Function	TOKEN				
Activate the disconnection device (internal latching contactor)	0000	0000	0001	5099	7584
HMI test, which involves turning on all the LED's, displaying all segments on the LCD, and activating the buzzer	0000	0000	0001	6777	4880
Display the total units counter	0000	0000	0002	0132	8896
Display the key revision number and key type	1844	6744	0738	4377	2416
Display the tariff index	3689	3488	1475	5332	2496
Display the power threshold level	0000	0000	0012	0797	4400
Display the tamper state	0000	0000	0022	8172	8512
Display the instantaneous power	0000	0000	0044	2920	8064
Display the software version number	0000	0000	0087	2419	5840
Test all the above function(tests run sequentially)	5649	3153	7254	5031	3471

Every test (testing by sequence) will last for 2.5 seconds. If one test item operates independently ,it will last 5 seconds. After the test, meter returns to normal working mode.

4.4.6 Extended Function TOKEN

The setting data of overdraw threshold and minimum guaranteed power consumption can be transformed to TOKEN via vending system.

5 Measurement Functions

5.1 Active Energy Measurement

DDZ1513 single phase prepayment energy meter can measure and store single-phase two-wire active power; the measurement unit is kWh. Energy meter active power energy has already been cleared to zero at factory. Energy meter will adopt automatic clearing mode if cumulative energy is greater than 999999.99kWh (or 999999.99kVarh/ 999999.99kVah).

- Forward/reverse active energy is totaled into cumulative active energy. Cumulative reverse active energy will be measured and displayed separately.
- Measurement/ display of active cumulative energy and cumulative active energy under each tariff list
- Latest 45 days active power consumption and that under each tariff are recorded and can be searched(or downloaded) .
- Latest 13months active power consumption and that under each tariff are recorded and can be searched(or downloaded) .
- Active metering accuracy: Class 1.0
- Active energy display mode: 6+2, 6 digits of integer and 2 digits of decimal(factory default setting)

5.2 Calculation of Active MD (Maximum demand)

DDZ1513 energy meter can record statistics of active MD in current billing period, and its occurring date/time.

- Billing period is one month and the starting date of billing period can be set, the range of which is 1st day-27th day.
- Demand calculation mode is sliding window method. Sliding time is 3 min and demand calculation period is 15 min.
- Calculate/display MD of current month and its occurring date/time
- Latest 13months MD and its occurring date/time are recorded and can be searched(or downloaded) .

5.3 Electrical Parameter Measurement

Phase voltage measurement/display: 3 digits of integer, 2 digits of decimal, unit: V, accuracy:±1%
Phase current measurement / display: 3 digits of integer, 2 digits of decimal, unit A, accuracy ±1%
Power measurement / display:2 digits of integer, 4 digits of decimal, unit kW, accuracy ± 1%
Frequency measurement / display: 2 digits of integer, 2 digits of decimal, units Hz, accuracy ± 1%

Note: Besides active power, reactive power, apparent power measurement, INHE energy meter calculates the other electrical parameter`s percentage error according to the following:

Note：Parameter measurement error except that of energy can be calculated through following formula

Metering error (%) = (measured value-actual value)/ measured reference value *100%

Definition of measured reference value:

Voltage is rated voltage ; voltage measurement range is 0.6Um--1.2Um。

Current is maximum current ; current measurement range is 0.05Ib--Imax

5.4 TOU Multi-tariff Function

DDZ1513 single phase prepayment meter with plug-in communication module can measure active/reactive energy with TOU function. Meter supports 8 tariffs and 24 time shifts.

Tariff shift is based on a daily tariff table as the basic unit. The meter can prestore up to 16 sets of daily tariff table, and then based on the festival tariff table, seasonal tariff table, and weekly tariff table to select the corresponding tariff table so as to realize tariff swift in different holidays, seasons, and working days in the same week.

Tariff consists of the following basic units:

Sr/N	Basic unit	Number of bytes	Note
1	8 tariffs		
2	24 time shift per day		Daily TOU division
3	8 tariff rates		Tariff rate in each TOU
4	16 daily tariff		
5	12 weekly tariff		
6	12 seasonal tariff		
7	50 holiday tariff		
8	8 tariff rate tables		

5.4.1 Daily Tariff Table

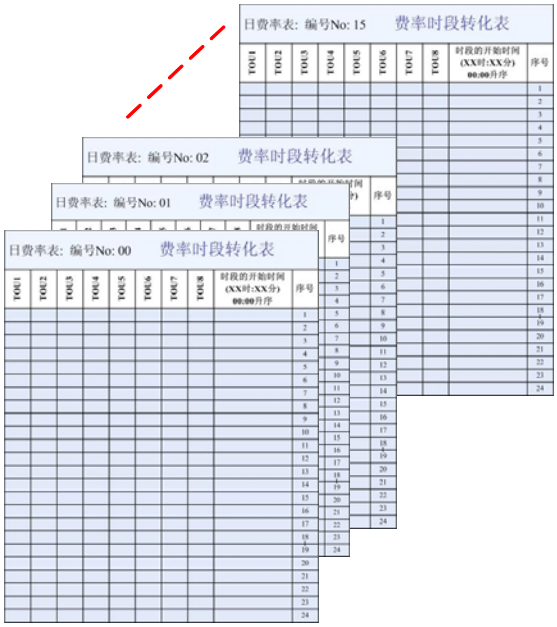
Daily tariff defines in every daily time shift to use with tariff rate code.
When a new day comes (at 00:00:00), meter will select a daily tariff according to program of holiday tariff, seasonal tariff and weekly tariff.
Meter can store maximum 16 different daily tariffs.
Daily tariff includes the following information:

- Daily tariff table code.
- It is applied to the status data (1 valid, 0 invalid) for 8 tariff time shifts, and maximum 24 starting time (hh: mm). The information input will be valid from midnight to the specified time at midnight.From 00:00 to 24:00, each time shift will start from the ending time of the last shift. When it is 0 second of every minute, in accordance with the status data of present time shift and tariff time shift in executed daily tariff table, the energy meter can define the tariff which is for current time shift measurement, and calculate forward /reverse active energy measurement from starting time to ending time within this time shift, and save them in the corresponding register so as to realize the function of TOU measurement.

Daily Tariff Table(8 tariffs/24 time shifts)

日费率表: 编号No: 00					费率时段转化表				
TOU1	TOU2	TOU3	TOU4	TOU5	TOU6	TOU7	TOU8	时段的开始时间 (XX时:XX分) 00:00升序	序号
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20
									21
									22
									23
									24

16 Daily Tariff Tables



Sample of Daily Tariff Table design:

Tariff code corresponding relations:

TOU1：00H

TOU2：01H

TOU3：02H

TOU4：03H

TOU5：04H

.

TOU12:0FH

Each daily tariff is 73 bytes.

The first byte of daily tariff code: 7XH X is daily tariff table code Range: 1-F

Daily tariff values are starting from the second byte. The basic unit of Daily tariff table is of every 3 bytes.

The unit of Daily tariff is hh:mm; Tariff code.(72 bytes unit in total)

12 Daily tariff in total is 16X73=1168 bytes.

The minimum time shift is 15 minutes, and should be larger than the setting of demand calculation period.

5.4.2 Weekly Tariff Table

According to working day and weekend day, daily tariff codes for a week can be defined.Weekly tariff defines effective day tariff table types on variety of occasions from Monday to Sunday. The administrative department can store maximum 12 different weekly tariff tables. It can set different daily tariff tables for every day of a week to differentiate each other (such as difference between working day and weekend). It can also set the same daily tariff code to use the same type of tariff.

Weekly Tariff Table							
Weekly tariff table No. 91H-9CH	MON	TUE	WED	THU	FRI	SAT	SUN
1: 91H							
2: 92H							
3: 93H							
4: 94H							
5: 95H							
6: 96H							
7: 97H							
8: 98H							
9: 99H							
10: 9AH							
11: 9BH							
12: 9CH							

Daily tariff table No. 71H-7CH

There are 8 bytes for each weekly tariff. The first byte is the number of weekly tariff , while for the last 7 bytes, each byte is in accordance with the number of daily tariff from Monday to Sunday.
8X12=96 bytes in total.

5.4.3 Seasonal Tariff Table

Based on the cost of electricity generation and the anticipation on the electricity market, different weekly tariff adopted in each season can be defined.Seasonal tariff defines the choices of weekly tariff table in practical use. Energy administration department could define up to 12 seasonal tariffs in different periods and situations. So the administration can work on the seasonal differences of tariff shift. The seasonal tariff table is annually repeatable as the year factor is not taken into consideration. The simplest situation is that there is only one weekly tariff number and the unique tariff number is used from January 1st, (Seasonal tariff is like year time zone. State Grid demands 2 time zones in a year.)

Seasonal Tariff Table

Seasonal Tariff Table		
Seasonal tariff table (No. 0B1H-OBCH)	Weekly tariff table change date (Month-Date: MM-DD)	Weekly tariff table
0B1H	MM-DD	
0B2H	MM-DD	
0B3H	MM-DD	
0B4H	MM-DD	
0B5H	MM-DD	
0B6H	MM-DD	
0B7H	MM-DD	
0B8H	MM-DD	
0B9H	MM-DD	
0B10H	MM-DD	
0B11H	MM-DD	
0B12H	MM-DD	

weekly tariff table No. 91H-9CH

Starting from Jan.1st, the starting date (Month and Date) of every season is the ending date (Month and Date) of the last season. Sequencing in ascending order is MM/DD.

4X12=48 bytes in total.

5.4.4 Holiday Tariff Table

In public holidays and festivals, the administration can select the particular daily tariff table in special days. So the particular tariff forms holiday tariff.

Holiday tariff defines different daily tariff in public holidays and festivals. Meter can store up to 100 special days. For regular holidays (same day for every year, for example Jan 1st), a special code “A1H” can be set. In the host computer or HHU, MMDD can be set to show this day is valid for every year. For the unfixed holidays (different day in different year, for example Easter Day or Chinese Spring Festival), data should be input each year in the term of YYMMDD. Maximum 50 Festivals can be set in this type of meter as well as there are 50 tables in this meter. Estimated validity period should be arranged and the time shifts of the festival tariff table should be modified in practical use.

Holiday Tariff Table

Festival Tariff Table		
Festival tariff table (No. 01H-64H)	Festival date (Year-Month-Date: YY-MM-DD)	Daily tariff table
0B1H	YY-MM-DD	
02H	YY-MM-DD	
03H	YY-MM-DD	
04H	YY-MM-DD	
05H	YY-MM-DD	
06H	YY-MM-DD	
07H	YY-MM-DD	
⋮		⋮
63H	YY-MM-DD	
64H	YY-MM-DD	

Daily tariff table No. 71H-7CH

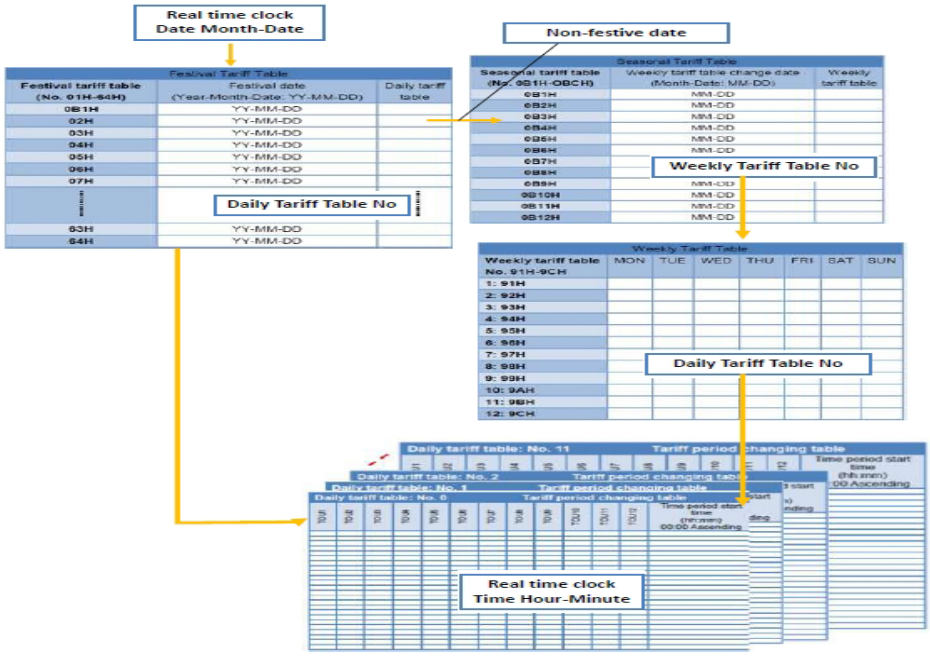
The basic unit is 5 bytes, the first byte is the number of holiday tariff, the second, third and fourth bytes are respectively YY/MM/DD of the holidays. The fifth byte is the number of daily tariff, all 5X50=250 bytes in total.

5.4.5 Tariff Rate Table

Every tariff is in correspondence with a tariff rate. There are 8 tariffs. Tariff rate consists of tariff number and price. All together is 8X5=40 bytes.

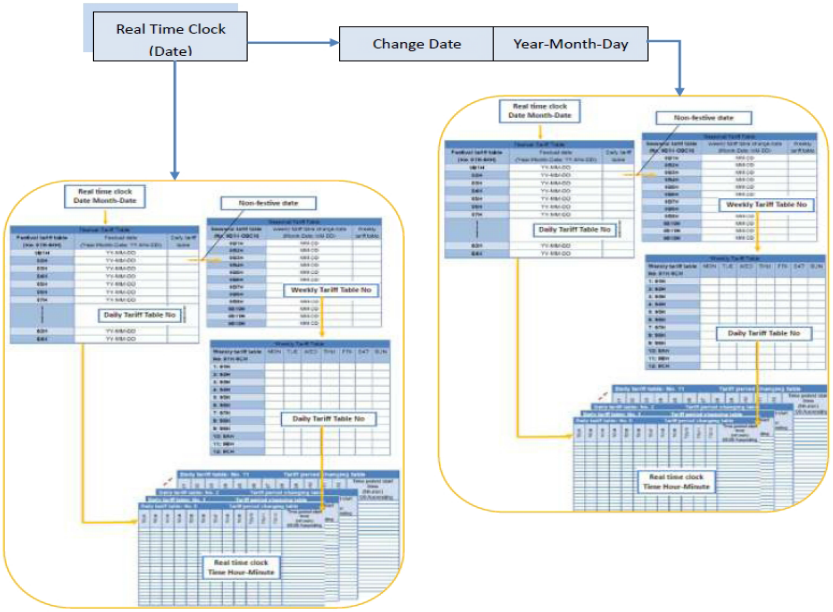
5.4.6 Confirmation of Valid Daily Tariff

At 00:00:00 each day, the energy meter will select proper daily tariff number from Holiday Tariff table, Seasonal Tariff table and Weekly Tariff table, then the daily tariff table of that day can be selected to RAM from ERROM. (For the energy meter which RAM is relatively small, time Daily tariff table of the present and the next period can be put in). At 0 second each minute, the energy meter will process the period of daily tariff, according to the present daily tariff table, to conduct tariff measurement control. It can be referred as follow:



5.4.7 Tariff Table Switching

As the changes of resource and the energy supply, as well as electricity generation,transportation and the electricity cost, tariff should be changed accordingly. Due to big quantity of energy meters and the dispersion of locations, it's impossible to modify the tariff for all meters at the same time. In order to solve this problem, a set of spare tariff which is pre-stored in the meter is applied. Utility can set activation date for the spare tariff. When the spare tariff is activated, meter will start to use new seasonal, weekly, daily and holiday tariff. After activation, the previous tariff will be no longer valid. In such way, utility can upload spare tariff to meters and on activation date all meters will execute new tariff.



Spare tariff and its activation date will be saved temporarily in the meter, after activation, the old tariff information will be deleted and meter will be able to accept another set of spare tariff.

5.5 Step Tariff Measurement Function

The step tariff rate consists of units as follow:

Sr.N.	Tariff Elementary Unit	Byte	Remark
1	7 step energy		
2	8 step tariffs		
3	2 step tariff tables	2X65=130	Energy:4 bytes; Unit Price: 4bytes; Code Number: 1 byte
4	2 Seasonal Tariff tables	2X3=6	

Step Tariff Table

Stepped Tariff Table: Serial No:1	Stepped Tariff Setting Table	
		f
		P0
		P1
		P2
		P3
		P4
		P5
		P6
		P7

Stepped Tariff Table: Serial No:0	Stepped Tariff Setting Table	
Serial No.	Monthly Power Consumption Stepped Classification	Stepped Tariff
1	0kWh	Stepped Tariff P0
2	E1	Stepped Tariff P1
3	E2	Stepped Tariff P2
4	E3	Stepped Tariff P3
5	E4	Stepped Tariff P4
6	E5	Stepped Tariff P5
7	E6	Stepped Tariff P6
8	E7	Stepped Tariff P7

Seasonal Tariff Table		
Seasonal Tariff Table Serial No.	Stepped Tariff Table Transfer Starting Date (MM DD)	Stepped Tariff Table
00	MM DD	
01	MM DD	

There is one set of spare Step Tariff table. It will activate on the appointed date;
The activation date and the new step tariff will be stored in the meter temporarily, after activation, the old tariff information will be deleted and meter will be able to accept another set of spare tariff.
The new Step Tariff Table's temporary memory is 136 bytes + the year and month of usage.
The step tariff is 272 bytes in total.

5.6 Tariff Data Settings

The tariff (holiday tariff, seasonal tariff, weekly tariff, daily tariff and spare tariff) can be programmed by the tariff setting software organized by the R&D Center of INHEMETER. After setting and confirmation, communication data module will be generated in accordance with energy meter's communication protocol, and data can be loaded to the meter through follows:

- Infrared (HHU or PC) local setting
- RS-485 communication port (HHU or PC) local settings
- Remote batch setting

When it is not factory settings (such as on site modification or user preference):
A: To modify tariff and electricity rate by local communication, operator needs to turn on the

programming switch (with seal protection), which needs password authentication.
B: To modify tariff and electricity rate by remote communication, operator must go through authorization and password authentication via data management center, it can also go through all or selected meter type/meter No. to modify the tariff and electricity rate in batch mode. Meanwhile meter must be allowed in remote programming mode.

6 Special Functions

6.1 Load Disconnect Function

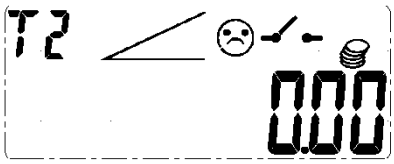
There is a built-in relay for DDZ1513 Single Phase Plug-in Keypad Prepayment Energy Meter. According to user's credit (balance amount), tamper status, load control status and voltage of power supply, it can control the power.
Relay status indication on LCD:

"⊶⊷⊶" It means built-in relay is connected, and power load is available.
" ⊶ ⊷" It means built-in relay is disconnected, and power load is not available

Notice: If the relay status indication on LCD does not match the real status, it maybe malfunction, and user should inform electricity management department to check.

6.2 Zero Credit Power Off

When balance credit in the meter is zero (except overdraw, friendly data/time), the built-in relay will disconnect, and realize power off. After user recharging, meter will automatically recover power supply.



6.3 Load Control Function

DDZ1513 single phase plug-in module type prepayment meter has load control function and complies with the load control algorithm method specially mentioned in SCSSCAAA9 item 7.7.2 of Eskom.

Notice: Meter load control function cannot be used to protect load security protection. It is normally used to control the users average load upper threshold in a associated area. (mainly concerned with grid security, cable loss reduction and power supply cable load threshold).

Automatic delay recovery mode after over load power off.

A. If one phase load is beyond load threshold value 15.180kWh (code 200 data item), the alarm will sound and LED indicator will flash, and LCD on MCU/CIU will display overload information, and switch to display on real time present overload phase power(040active power).

Above 2 LCD display by shift, which means it is in overload status and current load is 18.800kW.

B. If the consumption load is beyond load threshold for more than 45 seconds, the built-in relay will cut off power at 45th second. After 150 seconds, the relay will connect automatically (power supply will not work during the 150 seconds). And LCD on MCU/CIU will display balance time for power recovery (unit: second; it means balance lock time. The balance lock time will reduce by a second interval).

If the user does not low down the consumption load, which is beyond threshold value, above process will repeat (Power off- Delay recovery- Power off).

C. Within 30 minutes, if tripping occur for 5 times, meter will cut off power supply and last for 30 minutes. And power supply will automatically recover after 30 minutes. LCD will display balance lock time, it will reduce by one second interval. And LCD will display power at the last power off.

The recovery time after 5 tripping within 30 minutes can be programmable. Min. time period is 5minutes. It is default 30minutes at factory for this project.

Current load control threshold factory setting is : 15.1800kWh

Notice: When overload tripping occurs constantly, the user should check the power consumption load , and contact electricity company to modify load threshold.

Pressing key recovery mode:

If the configuration status flag 1 is set as key-pressing and no time interval recovery , the meter will display the following symbols. If press the key, power will be recovered.

If times of overload power-off are more than allowed threshold value

If times of overload power-off are more than allowed threshold value which preset (check TOKEN 201), the meter cannot recover power supply automatically after overload power-off. The user should inform electricity company and apply for load threshold change TOKEN or tamper record clearance TOKEN, and meter can recover power supply after TOKEN inputting.

Optional function: ① Overload is judged based on active power or apparent power which is decided by meter prepayment status word. The default is active power at factory.
② Options for power supply recovery after overload power off: automatic delay recovery or key-press immediate recovery.
③ Please check prepayment configuration instruction for more information.

6.4 Protection against Abnormal Grid Voltage

To prevent damage to electrical equipments due to abnormal grid voltage, keypad prepayment energy meter is equipped with automatic power disconnection under abnormal grid voltage.

6.4.1 Automatic Power Disconnection

When grid phase voltage is lower than 150 V and lasts for 30 seconds, or higher than 264 V and lasts for 3 seconds, meter will automatically disconnect (cut off power circuit), meter will notify its power off status and display the corresponding voltage before power disconnection.

Lo_UoL: power disconnection due to low voltage

108.00V: detected voltage before power disconnection

OUEr_UoL: power disconnection due to high voltage
306.70V: detected voltage before power disconnection

Note: Automatic power disconnection voltage threshold is programmable and could be checked through entering short codes.

212: High voltage disconnection threshold
213: Low voltage disconnection threshold

6.4.2 Recovery of Power Supply

A: Automatic recovery of power supply:
If the voltage falls between 150V AC~264V for 5 minutes, energy meter would automatically restore power supply.

B：Manual recovery of power supply:
If the voltage fall between 150V AC~264V, before the automatic restoration, user can connect the power supply manually through the CIU.
Note: There will exist not more than ±3V error value in meter for above voltage range determination due to such serious voltage deviation.Energy meter will cancel protection against low voltage power-off if threshold value under condition of low voltage power-off set as zero; Energy meter will cancel protection against high voltage power-off if threshold value under condition of high voltage power-off set higher.

6.5 Anti-tamper against Cover Opening Function

Energy meter has activated anti-tamper against cover opening (terminal cover or upper meter cover) function after delivery from factory.

6.5.1 Energy Meter Will Instantly Power off Once Terminal Cover or Upper Cover is Opened under Condition of Power- on.

Energy meter shall recover power supply after upper cover and terminal cover are taken to original position, and input corresponding TOKEN while meter still remains balance amount and other problem is free.

6.5.2 Tripping at Terminal Cover Opening under Condition of

Power-off（need to be activated）

Activation method:
Meter keeps continuous power supply for more than 2 hours after delivery from factory; or accumulative power consumption with more than 10kWh.
Activation status: Terminal cover opening under condition of power-off, and tripping at recovery of power supply. Meter will recover power supply only after subscriber takes back terminal cover to original position, and input corresponding TOKEN while meter remains balance amount and other problem is free.
Inactivation status: If terminal cover opening under condition of power-off, and meter will not power off when power supply recovery (terminal cover has been closed). Such activation will not be applied when delivery from factory as it's more convenient for electricity company to test and install meters.

Cover opening indication icon: ⚠

① continuous lighting: there used to be cover opening event, and terminal cover has been closed and built-in relay tripping.
② flashing: there used to be cover opening event, and terminal cover is still open.
Note: It's decided by meter's prepayment configuration flag to allow cover opening detection under condition of power-off or power-on.

6.5.3 Plug-In Communication Module Cover Open Recording Function

Energy meter would record plug-in communication module cover open event but would not disconnect.

6.6 Prewarning & Warning Function

This function is applied to prompt subscriber that the balance amount is not sufficient, and recharge is necessary; otherwise, meter will cut off power supply once balance amount uses up soon later, and will bring subscriber inconvenience. Furthermore, this function provides subscriber choices for settings. On the one hand, subscriber can reset threshold value of balance amount for pre-warning/ warning according to actual situation; on the other hand, subscriber can reset audible warning or not.

6.6.1 Prewarning Function

When balance amount is lower than threshold value for pre-warning(short code 206), meter will sound warning and yellow LED indicator will flash, and icons ☺ 、 ☹ will alternatively flash on LCD screen display to prompt subscriber to purchase electricity. It's programmable to set

threshold value for pre-warning and its relevant function by inputting code: 4547 8xxx, available value is from 1-999$. CIU screen will display “Accept” ,and indicate successful settings.

Current prewarning threshold is: 30.00$

Warning symbols instructions:

- Yellow warning indicator keeps continuous lighting ----- it means balance amount is lower than 30$;
- Red warning indicator flashes ----- It means balance amount is lower than warning threshold;
- Red warning indicator flashes and sounds warning ----- It means balance amount is 0;

6.6.2 Warning Function

When balance amount is equal or lower than threshold value (display code 207), meter sounds warning, red LED indicator keeps continuous lighting, and meter’s internal replay disconnects to cut off power supply. Icons 、 will alternatively flash and icon will display on LCD screen. subscriber has to press blue key on meter keypad for recovery of power supply if any inquiry. It’s programmable to set threshold value for warning by inputting code: 4547 9xxx, available value is from 0-999$. CIU screen will display “Accept” ,and indicate successful settings.

Current warning threshold is: 0.00$

Note: Threshold value for warning must be lower than threshold value for pre-warning; there will no corresponding warning or pre-warning if threshold value for warning or pre-warning is set as zero. It’s very convenient for subscriber to programme the settings and relevant function.

6.7 Anti-over Purchasing Function

The meter can set maximum allowable credit (display code 210 data item). The TOKEN code will be rejected if meter credit is more than allowable upper threshold credit when recharge TOKEN is effective. Recharge operation will only work normally when the sum of meter available credit and purchase credit is less or equal to user maximum allowed upper threshold credit.

Current maximum accumulative credit is: 799999.99$

6.8 Anti-tamper for Reverse Power Consumption

Meter will cut off power supply circuit when it detects reverse power consumption.

L line and N line are reverse in terminal connection. Meter will detect this event, and will automatically cut off power supply if reversing event keeps over 60 seconds. Meter will automatically recover power supply 5 minutes later when grid resumes work in proper way; or press keypad to recover power supply within 5 minutes when grid resumes work in proper way (it will be invalid to press in the first minute, and valid since the second minute).

Note: It's selected by prepayment configuration flag to cut off power supply or not when reverse power consumption event occurs.
Default setting at factory for this project: meter will cut off power supply circuit when reverse power consumption event occurs.

6.9 Bypass Tampering Disconnection

When energy meter detects by pass tampering event, (over preset bypass threshold), power supply would be disconnected.

Note: By pass tampering disconnection function is set by energy meter prepayment settings.

Current factory setting is disconnection when by pass tampering is detected

6.10 Energy Meter Overdraft Function (Optional)

Overdraft(default settings at factory will not allow overdraft): Meter will support overdraft. Metering administration department or electricity utility can apply such function to subscribers who have higher credit rating. Overdraft will be allowed when threshold is not zero(short code 211) Overdraft amount is equal to threshold value(short code 211). Threshold value consists of six integers and two decimals.When overdraft is allowed(threshold setting - short code 211), and balance amount is lower than threshold for pre-warning or balance amount is zero which results in power-off, subscriber can input short code 8989 8686 to activate overdraft function so as to continue power supply until available overdraft amount become zero.

A: When overdraft threshold setting (short code 211) is zero (211=0); type activation code 89898686, the overdraft function still will not be allowed. The LCD display will show symbols as below:

B: When overdraft threshold setting (short code 211) is not zero:

B1: when balance amount is higher than pre-alarming threshold, overdraft function is not activated; The LCD display will show symbols as below:

B2: when balance amount is lower than pre-alarming threshold, including lower than alarm threshold or balance amount is zero, overdraft function is activated.

B3: Under the condition of overdraft function activated, if recharge action occurs, overdraft function will be turned off! (no matter if balance amount is lower than pre-alarming threshold after recharging, overdraft function will be invalid.

Note: Overdraft function design is a temporal measure for users that are inconvenient to purchase credit. When overdraft function is activated, credits should purchase at the same time at once.

Current factory setting has no overdraft function

6.11 Minimum Guaranteed Load Control Function (Optional)

Minimum guaranteed load control function (basic guaranteed load--energy meter does nott allow this function in default setting). DDZ1513 single phase keypad prepayment energy meter could support minimum guaranteed load control function. For meter management departments or vending utilities who have social responsibility and responsibility to ensure users basic daily consumption, meter could be set with minimum guaranteed load control function in local region or certain users. For users with minimum guaranteed load control function, when credit balance is zero, if users' load is lower than the setting minimum guaranteed load threshold, the user could still on power, meter won't cut off power supply until the load is over the setting minimum guaranteed load limit. Meter would cut off power supply as it is over load limit according to over load control function.

Current factory setting is no minimum guaranteed load control function

6.12 Over Current Threshold Disconnection Function (Optional)

When current is over threshold(60A)(check short code 204), the meter will sound warning and yellow LED indicator will flash; meanwhile, LCD will display overload current information, and timely shift to display present real-time current.

If current value keeps higher than threshold (60A)within 45 seconds, meter built-in relay will cut off power supply at the 45th second, and power-off will The last 150 seconds; then built-in relay will automatically recover power supply(subscriber can not manually recover power supply within 150 seconds). Meanwhile, LCD will display remaining time information for recovery(unit: second; it means locked remaining time. Remaining time will descend by interval of 1 second based on the locking state). And LCD will timely shift the display for overload real-time current before power-off.

If subscriber does n't decrease consuming current, and continue to allow current over threshold, the process will repeat. Meter will automatically recover power supply after 30 minutes delaying provided that overload current results in 5 times successive tripping within 30 minutes. subscriber can not manually recover power supply during 30 minutes delaying. In the locking time, LCD will display locked remaining time which will descend by interval of 1 minute; meanwhile, LCD will display the current at the last time power- off .

It's programmable to set delaying time for recovery after 5 times successive tripping; Minimum setting value: 5 minutes; default value at factory: 30 minutes.

Current factory setting is : 0A, no request for this function!

Note: when meter suffers from successive tripping with overload current, subscriber should check the current, and contact electricity company to modify threshold so as to keep subscriber's normal power consumption.

6.13 Meter Friendly Time Guarantee Function

Meter is equipped with customer friendly special time or day guarantee function.
Evening(specific time period) power supply guarantee function(optional): DDZ1513 single phase keypad prepayment energy meter supports evening power guarantee function. For meter management departments or vending utilities that have social responsibility and responsibility to ensure users basic daily consumption, meter could be set with evening(specific time period) power supply guarantee function in local region or certain users.
Holiday/weekend power supply guarantee function (optional): DDZ1513 single phase keypad

prepayment energy meter supports evening power guarantee function. For meter management departments or vending utilities that have social responsibility and responsibility to ensure users basic daily consumption, meter could be set with holiday/weekend power supply guarantee function in local region or certain users.

Friendly power guarantee time period: 240 Friendly power guarantee start time
241 Friendly power guarantee end time
Friendly power guarantee weekend: 242 Power guarantee at each weekend
Friendly power guarantee holiday: 20 power guarantee holidays

6.14 Post Payment /Prepayment Mode Shift Function

DDZ1513 single phase keypad prepayment energy meter has function of shift between post-payment and prepayment. The shift is realized by prepayment configuration flag.

Prepayment configuration flag -item 230 can be programmed through optic commutation port, RS-485 or AMI system to realize the shift after it's allowed and authorized.

Prepayment metering(or shift from post-payment to prepayment); accumulative power consumption keep the same, but built-in relay will disconnect circuit when balance amount is zero.

Post-payment metering- billing settlement mode(or shift from prepayment to post-payment); accumulative power consumption keep the same, but built-in relay will not disconnect circuit when balance amount is zero.

6.15 TOU Multi-tariff / Step Tariff Shift Function in Credit(money) Settlement Mode (expandable)

DDZ1513 single phase keypad prepayment energy meter is allowed to shift between TOU multi-tariff and stepped tariff in credit settlement mode. Such shift will be realized through setting prepayment status word.

After permission as well as authorization, you can set the prepayment configuration status word 230 to realize such shift through optical communication port, RS485 communication port or AMI system.

6.16 Monthly Basic Power Consumption Setting (expandable)

It's programmable to set amount for Monthly Basic Power Consumption. If amount for actual monthly power consumption is less than amount for Monthly Basic Power Consumption, meter will automatically count electricity charge as amount for Monthly Basic Power Consumption(but D-value between two kinds of amount will not be calculated to amount for actual monthly power

consumption. If amount for Monthly Basic Power Consumption is set as zero, this function doesn't work.

6.17 Parameters and Status Flag Configuration

DDZ1513 single phase keypad prepayment energy meter has energy meter prepayment parameters and status flag configuration function so as to maintain ideal performance of energy meter.

Current single phase keypad meter prepayment status flag configuration is as follows:

Display code	Data item contents	Default factory setting	Data item unit/implication
200	Load threshold		
201	Number of times for overload threshold disconnection		
202	Recovery time for overload power-off		
203	Load threshold for minimum guaranteed power consumption		
204	Current threshold for over current disconnection		
205			
206	Prewarning threshold for balance credit		
207	Warning threshold for balance credit		
208	Billing date		
209	Buzzer alarm interval		
210	Overflow threshold		
211	Overdraft threshold		
212	Voltage threshold for over voltage disconnection		
213	Voltage threshold for low voltage disconnection		
214	Temperature threshold for over temperature disconnection		
215	Warning threshold for by pass tampering (6.25% 12.5%)		
230	Prepayment configuration status flag 1		
231	Prepayment configuration status flag 2		
232	Prepayment configuration status flag 3		

Meter prepayment status flag 1 configuration instruction: Item 230

Prepayment status flag 1 configuration--Item 230			
NO.	Displays	Function	Instruction
0	- - - - - - -1	Open cover detection	1: Open cover detection when power off

		when power off	valid (Activation required) 0: Open cover detection when power off invalid
1	- - - - - - 1-	Over load power restoration mode	1: Press key manually restore power immediately 0: Over load power restore mode
2	- - - - -1 - -	Power off disconnection mode	1: Built-in relay disconnects when power off 0: Built-in relay not disconnects when power off
3	- - - - 1- - -	Metering payment mode	1: post payment mode 0: prepayment mode
4	- - - 1- - - -	Overload detection mode	1: Apparent power 0: Active power
5	- -1 - - - - -	Money settlement mode	1: Step tariff mode 0: Multi tariff mode
6	- 1- - - - - -	Reverse energy disconnection or not	1: Reverse energy disconnection 0: Reverse energy no disconnection
7	1- - - - - - -	By pass tampering disconnection or not	1: By pass tampering disconnection 0: By pass tampering no disconnection

Current default factory setting meter prepayment status flag 1 configuration: 11000001

Meter prepayment status flag 2 configuration instruction: Item 231

Prepayment status flag 2 configuration--Item 231			
NO.	Display	Function	Instructions
0	- - - - - - -1	Phase loss power off	1: Phase loss disconnection; 0: Phase loss disconnection invalid
1	- - - - - - 1-	Reverse phase power off	1: Reverse phase sequence disconnection; 0: Reverse phase sequence disconnection invalid
2	- - - - -1 - -	Reactive energy deduction mode	1: Average amount deduction mode per hour; 0: real time reactive energy deduction mode
3	- - - - 1- - -	Magnetic field interference power off	1: Magnetic field interference disconnection; 0: Magnetic field interference disconnection invalid
4	- - - 1- - - -	Over temperature threshold power off	1: Over temperature threshold disconnection; 0: Over temperature threshold disconnection
5	- - - - - - -	Energy meter date	1: DDMMYY

		display mode	0: YYMMDD
6	- - - - - - -	Daylight saving time	1: On 0: Off
7	- - - - - - -	Reserved	

Current default factory setting meter prepayment status flag 1 configuration: 00100000

Meter prepayment status flag 3 configuration instruction: Item 232

Prepayment status flag 3 configuration--Item 232			
NO.	Display	Function	Instructions
0	- - - - - - -1	Alarm buzzer on or off	1: on 0: off
1	- - - - - - 1-	Whether the alarm trip	1: power cut 0: power on
2	- - - - -1 - -	neutral line missing	1: power cut 0: power on
3	- - - - 1- - -	Display of power cut or not	1: display after power cut 0: no display after power cut
4	- - - 1- - - -	Allow remote control or not	1: allow remote control 0: not allow remote control
5	- - - - - - -		
6	- - - - - - -		
7	- - - - - - -		

Current default factory setting meter prepayment status flag 2 configuration: 00000011

Current default factory setting meter prepayment status flag 2 configuration: 00100000

6.18 Negative Balance Amount Display

If balance amount is zero, and built-in relay suffers from breakdown, and still keeps connected(subscriber continue to consume power); meter still makes normal measurement.

Under this situation, meter will display negative value for balance amount.

6.19 Available Balance Amount Step Diagram Indication

Energy meter LCD screen displays balance amount step digram indication.

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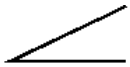
①	②	①	②	③
				
Four bars light up	Three bars light up	Two bars light up	One bar lights up	there is no bar, and framework keeps lighting

Available amount(balance amount) indication according to pre-warning / warning threshold(default at factory).

A. Four bars light up when available amount is more than pre-warning threshold (display code 206); please refer to ①
B. Three bars light up when available amount is less than pre-warning threshold but more than warning threshold(display code 207) +(pre-warning threshold - warning threshold) / 2hours ; prompt user to consider recharging by payment, please refer to ②.
C. Two bars light up when available amount is less than threshold(display code 207) +(pre-warning threshold - warning threshold) / 2hours, but more than or equal to warning threshold(display code 207) ; prompt user to consider recharging by payment, please refer to ③
D. One bar light up when available amount is less than threshold, but more than or equal to warning threshold) 1/ 2hours ; prompt user to recharge by payment, please refer to ④
E. There is no bar but framework keeps lighting when available amount is less than warning threshold 1/2 but not zero; prompt user to recharge by payment; otherwise power supply will not be available. Refer to ⑤.
F. There is no bar but framework keeps flashing when available amount is zero; it means built-in replay is disconnected, and power supply is not available(overdraft, minimum load consumption or night/holiday keeping power supply is exception). Refer to ⑤

6.20 Not Available to Program or Modify Meter Number(Serial Number) after Delivery from Factory

It's not allowed to reset or modify meter serial number after delivery from factory and meter is on running state.

6.21 Load Profile Record

DDZ1513 single phase keypad prepayment energy meter has load profile record function; it's available to record four channels, and each channel can save 1920 measurement value with time

scale. It will be convenient for electricity authority to check user's power consumption.
Load profile setting for time unit: （hh:mm）
Load profile setting for minimum time interval: 15minutes (00:15)
Load profile setting for maximum time interval: 1day (24:00)

Load profile record saving space details:

	Channel 1	channel 2	channel 4
15 mins	80 days	40 days	20 days
30 mins	160 days	80 days	40 days
60mins	320 days	160 days	80 days
120mins	640 days	320 days	160 days

Definitions for four channels of meter as below,

No.	Parameter	Remark
1	Active power	
2	Voltage	
3	Current	
4	Power factor	

It's available to read load profile record data through meter communication port.

6.22 Available Balance Days Indication (Optional)

Meter can estimate Available Balance Days For Power Consumption according to user's average consumption load (Display code 300), display unit: dd:hh, maximum indication time is 99 days 24 hours.

6.23 Power Failure Meter Display and Token Entry Function(Optional)

DDZ1513 single phase keypad prepayment energy meter has Power- off Display and TOKEN Input functions.

Meter can display power consumption information (balance amount), or user can check relevant information by inputting short code through keypad when meter is power off. But it's not available to check it by manual scroll display.

User can input TOKEN on meter keypad which include activation TOKEN, recharging TOKEN, and technique TOKEN when meter is power off. But it's available to operate meter state exchange or relay connection/ disconnection, etc only after meter is power on.

6.24 Monthly Energy Consumption Billing Date

Meter settlement day can be set according to electricity authority requirement, and default setting at factory is the end day of each month.(24:00 of the last day of each month)
If the meter settlement day/time is not zero (for example, date 15, time 8pm), the settlement time will be 8pm.
A: Meter settlement day is set at 20:00, January 15th; Monthly settlement is set at 8pm of date 15, daily settlement is 8pm.
B: Meter settlement day is settled at 0:00, January 15th; Monthly settlement is settled at 12pm of date 15, daily settlement is 0:00.
Meter settlement inquiry access code is 208.

6.25 Meter Cut-off for Over-temperature Function(Optional)

When meter checks out temperature inside is over threshold(item 214: 95℃ default at factory), meter will diagnose it as temperature over threshold, and buzzing will be alarming. Meter will automatically cut down power supply if such state keeps more than 30seconds. When temperature inside meter recovers as usual (less than temperature threshold), meter will automatically recover power supply after 5 mins; or user can input code through keypad to recover power supply within 5 mins. The reason for over temperature inside meter can be over load or meter terminal connection fault.

6.26 Over-temperature Disconnection Function (Optional)

When meter detects internal temperature over threshold(item 214: 95℃ default at factory), will diagnose it as over temperature, and buzzer will sound warning. If this status keeps over 30seconds, meter will automatically cut off power supply; meter will automatically resume to power on 5 minutes later or manually press keypad to resume power supply within 5 minutes if internal temperature recovers as usual (lower than threshold). Root for over temperature:overload or terminal connection trouble.

6.27 Remote On-line Upgrading

DDZ1513 single phase plug-in keypad prepayment meter will realize on-line software upgrading

locally or remotely to supplement or improve meter functions.

6.28 Meter Running Status Inquiry Function

User can check running state of DDZ1513 single phase plug-in keypad prepayment meter by keypad, local communication port or remote communication method.

■ Meter Running status flag 1(shot code 303)

Sr.No.	Definition of running status flag	Remark
0	Without balance amount (balance amount is zero).	0: balance amount is not zero. 1: balance amount is zero
1	Warning state	0: alarm on 1: alarm off
2	Pre-warning state	0: pre-alarm on 1: pre-alarm off
3	Relay state	0: normally close 1:normally open
4	Without balance amount (balance amount is negative).	0: balance amount isn't negative 1: reaming amount is negative
5	Remote programming allowed or not	0: not allow 1:allow
6	The current running tariff model	0: TOU tariff 1: Stepped tariff
7	Whether meter is power cut or not	0: power on 1:power cut

■ Meter running status flag 2(meter fault event short code 304)

Sr. No.	Definite of running status flag	Remark
0	Meter control circuit fault	0: No fault 1. fault exists
1	Clock battery voltage is low	0: battery voltage is normal 1: batter voltage is low/ no battery
2	Internal register fault	0: No fault 1: fault exists
3	Internal clock fault	0: No fault 1: fault exists
4	Overdraft	0: No overdraft 1: overdraft occurs
5	Whether in a state of electricity consumption	0: No 1: Yes
6		
7		

■ Meter running status flag 3(abnormal event short code 305)

Sr. No.	Definition of running status flag	Remark
0	Open meter terminal cover	0: close 1: open
1	Open meter cover	0: close 1: open
2	Open meter communication module cover	0: close 1: open
3	Over-temperature	0: normal 1.excess
4	Magnetic field interference	0: normal 1.under the

		interference

Note: In the design of energy meter has been considering measures to prevent opening cover. To perform the meter cover lid operation is only in the condition of opening the case of terminals. Meanwhile open the cover will trigger the event log of communication module. So meter cover is open (terminal cover has been opened), energy meter has been in the off state. Therefore, tatus word is power-reserve, temporarily not used (the same below).

■ Meter running status flag 4(grid event short code 306)

Sr. No.	Definition of running status flag	Remark
0	Active power reverse	
1	Serious unbalance of current (more than 6.5%)	
2		
3		
4		

6.29 Date Display Mode Shift Function

DDZ1513 single phase keypad prepayment energy meter is capable of converting date display mode through prepayment configuration status flag. The factory default display mode: YYMMDD
Upon permitted and authorized, through optical, RS485 communication port or AMI system, meter prepayment configuration status flag 231 can be changed, and the date display mode can be: DDMMYY

6.30 Real Time Clock Daylight Saving Time and Winter Time Automatic Shift

DDZ1513 single phase keypad prepayment energy meter is capable of converting daylight saving time and winter time.
Upon permitted and authorized, through optical, RS485 communication port or AMI system, once conversion date and time of daylight saving time and winter time is configured, automatic conversion between them can be achieved.

7 Historical Data Transfer & Storage and Event Recording Function

7.1 13 Months Energy Consumption Data Recording

Meter will save The last 13 months monthly historical metering data,and it's programmable for monthly(billing) settlement date& time (freezing time). Default at factory for freezing time is 24:00 hour, end of each month.

- Settlement(monthly) for power consumption at billing period; power consumption at different tariff period.
- Settlement(monthly) for amount at billing period; amount at different tariff period.
- Settlement(monthly) for MD and it's date & time .
- Inquiry for 13 months monthly power consumption data and amount data by inputting short code.
- Monthly energy consumption inquiry code : 401-413

7.2 45 Days Daily Energy Consumption Data Recording

Meter will save recent 45 days daily power consumption data. Default settlement time is 00:00.

- Power consumption on settlement day; power consumption by TOU
- Consumption amount on settlement day; consumption amount by TOU
- Check daily power consumption and corresponding amount data for 45 days by inputting short code
- Short coed for daily power consumption data inquiry : 451-- 495

7.3 Meter Tripping Event Recording

Meter will record last 20 power-off events, and user can check last 10 meter tripping events by short code. Record content as below,

- Accumulative tripping times
- Tripping date/time
- Recovery date/time after tripping
- meter tripping reason flag 1

Sr. No.	Definition of Running status flag	Remark
0	Balance amount is zero.	
1	Warning	
2	over load	
3	over current	
4	un-activation	
5	remote control	
6	fault by meter self-check	
7	Reserved	

- meter tripping reason flag 1

Sr. No.	Definition of running status flag	Remark
0	Over voltage	
1	Low voltage	
2	Reverse	
3	Open terminal cover	

4	Open meter cover	
5	Bypass tamper	
6	Phase loss	
7	Phase reverse	

7.4 Power Failure/Off Event Recording

Meter will record last 20 grid power-off events, and user can check last 10 grid power-off events. Record content as below,

- Grid power-off accumulative times
- Date/time of Grid power-off occurrence
- Recovery date/time after grid power-off
- When grid power--off, energy meter can send this information to main station management system automatically to achieve the automatic upload when power-off event to solve problems in time.

7.5 Special Event Recording

Meter will record last 50 special events, and user can check last 10 special events by short code (351-360). Record content as below,

- 001--Accumulative occurrence dates of special event
- 002--Occurrence date/time of special events
- 003—Index of special events

Sr. No.	Definition of Event Status Flag	Remark
0001	Power down	
0002	Power on	
0003	No voltage(has current but no voltage)--- three phase CT Meter	
0004	Under voltage	
0005	Overvoltage	
0006	Low current(lower than starting current)----three phase CT meter	
0007	Over current (power off if over balance current)	
0008	Current reverse start	
0009	Current reverse end	
0010	Phase loss (three phase meter)	
0011	Cuff off (for three phase mutual indicator meter)	Not for single phase meter
0012	Zero line off (three phase meter)	
0013	Reverse phase sequence voltage	

	(three-phase meter)	
0014	Reverse phase sequence current(three phase CT meter)	
0015	Unbalanced three-phase voltage	
0016	Unbalanced three-phase current	
0017	Active power outage overload	
0018	Apparent power outage overload	
0019	Maximum demand	Not for single phase meter
0020	Power factor lower than threshold	Not for single phase meter
0021	Split-phase active RP event	
0031	Relay disconnection	
0032	Closed relay	
0033	internal temperature higher than threshold setting	
0034	Balance amount over zero	
0035	Negative balance amount (overdraft)	
0036	Battery voltage lower than threshold setting	
0037	Meter control circuit self-test failure	
0038	Internal memory self-test failure	
0039	Internal clock self-test failure	
0051	Magnetic interference begins	
0052	Magnetic interference ends	
0053	Terminal cover open	
0054	Terminal cover closed	
0055	Module cover open	
0056	Module cover close	
0057	Meter cover open (reserved)	Not for single phase meter
0058	Meter cover close (reserved)	Not for single phase meter
0059	Bypass tampering begins	
0060	Bypass tampering ends	
0071	Recharge (input TOKEN succeed)	
0072	Input TOKEN remove tamper status	
0073	Change the key	
0074	Input TOKEN to clear balance amount	
0075	Input technical TOKEN(including	

	0072,0074)	
0081	Software updates	
0082	Time correction	
0083	Change standby rate	
0084	Meter runs rate conversion	
0085	Post payment and prepay mode conversion	
0086	Meter maximum demand reset	Not for single phase meter
0087	Meter runs parameters setting/change	

■ 004--Special event status flag 1(Meter failure event), User can distinguish event types according to it.

Sr. No.	Definition of Event Status Flag	Remark
0	Meter control circuit failure	
1	Voltage of the clock battery is low	
2	Internal memory failure	
3	Internal clock failure	
4	Overdraft situation	
5		
6		
7		

■ 005--Special event status flag 2(abnormal cover open event), User can distinguish event types according to it.

Sr. No.	Definition of Event Status Flag	Remark
0	Open terminal cover	
1	Open meter cover (reserved)	Not for single phase meter
2	Open communication module cover	
3	Over temperature	
4	Magnetic interference	
5		
6		
7		

■ 006--Special event status flag 3(grid event). User can distinguish event types according to it.

Sr. No.	Definition of Event Status Flag	Remark
0	Active power reverse	
1	Serious unbalance of current (more	

	than 6.5%)	
2		
3		
4		
5		
6		
7		

■ 007--Special event status flag 4(grid event2). User can distinguish event types according to it.

Sr. No.	Definition of Event Status Flag	Remark
0	No voltage	
1	Lack of voltage	
2	Overload voltage	
3	No current (three-phase meter)	
4	Overload current	
5	Loss of phase (three-phase meter)	
6	Loss of current (three-phase meter)	
7	Loss of neutral line (three-phase meter)	

■ 008--Special event status flag 5(grid event3). User can distinguish event types according to it.

Sr. No.	Definition of Event Status Flag	Remark
0	Reverse voltage phase sequence	
1	Reverse current phase sequence	
2	Unbalanced three-phase voltage	
3	Unbalanced three-phase current	
4	Over demand	
5	Power factor in excess of the threshold (three-phase meter)	
6	Split active power reverse	
7	Power overrun	

Note: A normal meter, because of the action of opening terminal cover---cause relay closed---to close the terminal cover---input TOKEN to clear tampering action---relay open, power is recovered. It'll be 6 events recorded.

Special events inquiry order	Event index flag	Special events inquiry order
	32: relay is closed	

	72: Input TOKEN to clear tamper status	
	75:Input technical TOKEN	
	54:Terminal cover is closed	
	31:Relay is closed	
	53:Terminal cover is open	

7.6 Electricity Purchasing Information

Meter will record last 15 purchasing and recharging events, and user can check last 15 purchasing and recharging events by short code. Record content as below,

- Total recharging times
- Recharging amount
- Recharging TOKEN
- Corresponding TID code for recharging TOKEN
- Recharging date/time

User can check last 10 recharging events.

Inquiry code as below,

Display item code	Content	Display method	Data unit/meaning
500	Accumulative recharging times	XXXX	Four digits, Max. Record: 9999 times
501	Last recharging event	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
502	Last 2nd recharging events	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
503	Last 3rd recharging events	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
504	Last 4th recharging events	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
505	Last 5th recharging events	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
506	Last 6th recharging events	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
507	Last 7th recharging events	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
508	Last 8th recharging events	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
509	Last 9th	display by 7	Recharging amount, TOKEN value, TID

	recharging events	split screens	code, Recharging date/time
510	Last 10th recharging event	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
511	Last 11th recharging event	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
512	Last 12th recharging event	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
513	Last 13th recharging event	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
514	Last 14th recharging event	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time
515	Last 15th recharging event	display by 7 split screens	Recharging amount, TOKEN value, TID code, Recharging date/time

Example (check last recharging event, code 501):

Display No.	Example	Display Statement
1		The first screen: Display recharging amount for this time(it shows 40.00kWh)
2		The second screen: Display the first 7 digits of TOKEN for this recharging(it show TOKEN as: 1162 4313 9811 8735 7405）
3		The third screen: Display the middle 6 digits of TOKEN for this recharging(it show TOKEN as: 1162 4313 9811 8735 7405）
4		The fourth screen: Display the last 7 digits of TOKEN for this recharging(it show TOKEN as: 1162 4313 9811 8735 7405）
5		The fifth screen: Corresponding TID code for recharging TOKEN(it shows 09968569）
6		The sixth screen: Date for inputting recharging TOKEN(it shows 15th, Dec, 2011）
7		The seventh screen: Time for inputting recharging TOKEN(it shows 16:20）

Display example (Check the last charge, code is 501)

Display No.	Display example	Display item description
1		The first screen Display this charge credit；（Picture shows 40.00kWh）
2		The second screen Display the first 7 digits of charge code （Picture shows TOKEN code：1162 4313 9811 8735 7405）
3		The third screen Display the middle 6 digits of charge code （Picture shows TOKEN code：1162 4313 9811 8735 7405）
4		The fourth screen Display the last 7 digits of charge code （Picture shows TOKEN code：1162 4313 9811 8735 7405）
5		The fifth screen The associated TID code of charged TOKEN （Picture shows：09968569）
6		The sixth screen The date of TOKEN entered:Picture shows Dec.15th, 2011
7		The seventh screen The time of TOKEN entered: Picture shows 16:20.

7.7 Technical TOKEN Usage Information

Single phase prepayment energy meter can record/ check the using information of last 10 technical TOKENs, and the using events of last 10 technical TOKENs can also be viewed via short codes. Recorded contents as below:

- Total using times of technical TOKEN
- Technical TOKEN type
- Technical TOKEN value
- Using time and date of technical TOKEN

Energy meter can view the dealing events of last 10 technical TOKEN, the short codes show below:

Display item code	Data item content	Display method	Data item unit/ implication

520	Dealing times of Technical TOKEN	XXXX	Four digits, 9999 at most
521	The last technical TOKEN event	Display in 6 Screens	Technical TOKEN type, TOKEN value, the date and time of TOKEN entered
522	The last 2nd technical TOKEN events	Display in 6 Screens	Technical TOKEN type, TOKEN value, the date and time of TOKEN entered
523	The last 3rd technical TOKEN events	Display in 6 Screens	Technical TOKEN type, TOKEN value, the date and time of TOKEN entered
524	The last 4th technical TOKEN events	Display in 6 Screens	Technical TOKEN type, TOKEN value, the date and time of TOKEN entered
525	The last 5th technical TOKEN event	Display in 6 Screens	Technical TOKEN type, TOKEN value, the date and time of TOKEN entered
526	The last 6th technical TOKEN events	Display in 6 Screens	Technical TOKEN type, TOKEN value, the date and time of TOKEN entered
527	The last 7th technical TOKEN events	Display in 6 Screens	Technical TOKEN type, TOKEN value, the date and time of TOKEN entered
528	The last 8th technical TOKEN event	Display in 6 Screens	Technical TOKEN type, TOKEN value, the date and time of TOKEN entered
529	The last 9th technical TOKEN events	Display in 6 Screens	Technical TOKEN type, TOKEN value, the date and time of TOKEN entered
530	The last 10th technical TOKEN events	Display in 6 Screens	Technical TOKEN type, TOKEN value, the date and time of TOKEN entered

Technical TOKEN type

Srr. No.	Technical TOKEN type	Technical TOKEN definition
1	00	Set Maximum Load
2	01	Clear Credit
3	02	Set Tariff Rate
4	03	Set Dispenser Key
5	05	Clear Tamper Condition
6	06	Phase Pwr. Unbal Threshold

Display example (View the last technical dealing event, code No. 520)

Display No.	Display Example	Display item description
1		The first screen Display technical TOKEN type Picture shows 01 which is the TOKEN for cleaning credit.
2		The second screen Display the first 7 digits of technical TOKEN （Picture shows TOKEN is：2531 3886 8909 4070 5121）
3		The third screen Display the middle 6 digits of technical TOKEN （Picture shows TOKEN is：2531 3886 8909 4070 5121）
4		The fourth screen Display the last 7 digits of technical TOKEN （Picture shows TOKEN is：2531 3886 8909 4070 5121）
5		The fifth screen Display the date of TOKEN entered （Picture shows 2011-12-15）
6		The sixth screen Display the time of TOKEN entered （Picture shows 16:20）

8 Communication port

Single phase prepayment energy meter consists of optical (infrared) communication interface, Eskom power reader interface, RS-485 interface; PLC module, RF module, GPRS/GSM module and Zigbee module are optional. Main control unit and customer interface unit can make up a split prepayment energy meter; or they and form AMI/AMR system with concentrator and AMR software.

8.1 Optical (infrared) Communication Port

Energy meter optical (infrared) communication port works as the diagram shows below, it can read the user's billing data, such as: total active (reactive/apparent) power, max demand, the historical total power and data of last 13 months, the daily using data of last 45 days and event record. It can also be used to set the energy meter operation parameters, for example, the energy meter operation parameters and multi tariff/ TOU can be set via code management. According to the different requirements of customers, the factory setting can be done or done by

Electricity Company. It can also be used to update the software.

Notice: The factory setting should be done before shipment.

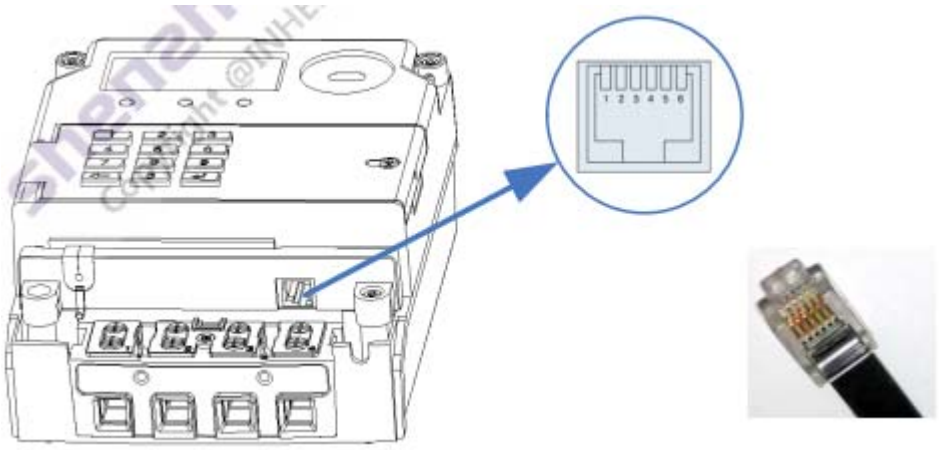
Inhemeter provides following accessories.

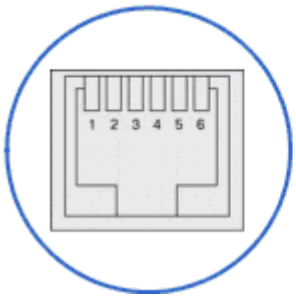
Sr. No.	Accessory Name	Description	Material
1	Optical communication cable	Communication cable between meter and HHU or computer	The operation manual for optical communication cable _V1.3_ English
2	HHU：C5000W	Optical HHU, with charger and communication cable, operation software.	Mobile data terminal user manual Mobile data terminal introduction
3	SMARTview	INHEMETER Smart meter management system software	

8.2 RS-485 Communication Port

Energy meter RS-485 can be used to read the user's billing data, such as: total active (reactive/apparent) power, max demand, the historical total power and data of last 13 months, the daily using data of last 45 days and event record. It can also be used to set the energy meter operation parameters, for example, the energy meter operation parameters and multi tariff/ TOU can be set via code management. According to the different requirements of customers, the factory setting can be done or done by Electricity Company. It can also be used to update the software. It can form a AMI/AMR network via RS-485 port.

RJ11 port diagram





1 CIU port(nonpolarity)
2 CIU port(nonpolarity)
3 RS-485(A+)
4 RS485(B-)
5 NIL
6 NIL

Note：Through the optical communication port, RS-485 interface for setting / modifying the operating parameters, you must open the communication module box, press the allow / maximum demand reset button of the meter communication module compartment under the flap settings, so that meter is allowed to be in set state. Press once reset button of allow / maximum demand on the meter to communicate, the effective duration is 1 minute. In other words, if within a minute, there is a communication operation on the meter, the function of setting state within the next minute remains valid; if within a minute, no meter communication operates, the function of setting the state will be automatically invalid.

8.3 SG4A0-01 Single Phase Meter GPRS/GSM Module

Please see attachment 《SG4A0(TG4A0) Data sheet GPRS single-phase (three-phase) meters plug-in communication modules》

8.4 SPDH0-01 Single Phase Meter PLC Module

Please see attachment 2《SPDH0(TPDH0) Data sheet PLC single-phase(three-phase) meters plug-in communication modules》

8.5 SRGB-01 Single Phase Meter RF Module

Please see attachment 3 《SRGB0(TRGB0) Data sheet RF wireless single-phase(three-phase) meters plug-in communication modules》

8.6 SZ0A0-01 Single Phase Meter Zigbee Module

Please see attachment 4 《SZ0A0(TZ0A0) Data sheet ZIGBEE single-phase(three-phase) meters plug-in communication modules》

8.7 SPPT0-01 Single Phase OFDM(PRIM) Wide Range PLC Module

Please see attachment 5 SPPTP(TPPTO) Data sheet 0FDM(PRIME) wide range PLC single-phase(three-phase) meters plug-in communication modules》

8.8 Credit Reader Interface (Eskom Port)- Optional

Note: plug-in module type, version number---input short code 730

: It means no module inside

9 Security rule

DDZ1513 single phase prepayment energy meter can be installed outdoor, indoor and power box, but wiring security and operation conveniences should be pay much attention. Energy meter is insulation-protected product; button, panel, LCD and cover are safe in normal use. The safe protection is needed in installation and operation. Naked conduct and interface is not permitted.

10 Single Phase Meter Trouble-Shooting

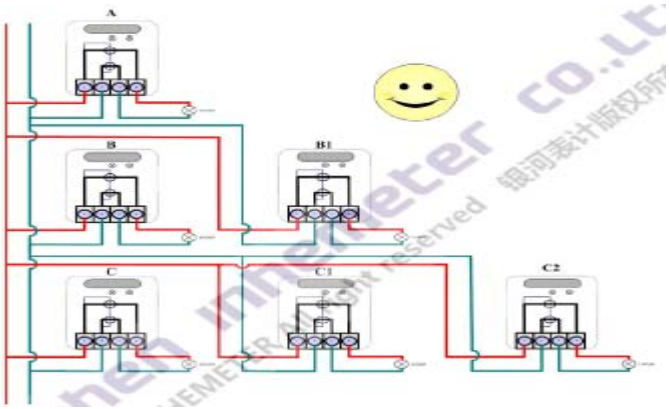
DDZ1513 single phase prepayment energy meter has self-diagnosis function, and long life and adaptability have been considered in design and manufacture. Fault may appear in some conditions because of incorrect operation. Please deal with the faults in following table.

Sr.No.	Appearance	Error Description	Reason or dealing method
1		Data memory error.	Please contact power supply company for maintenance.
2	In LCD full screen, some flag is not complete or power indictor flashes, but no display in LCD.		It means LCD is broken; manufacturer or agent should replace the LCD.
3	LCD cannot display, power indictor and pulse indictor do not flash.		①Power off or check following items when power on ②Check wiring ③Check voltage
4	LCD and power indicator can work; pulse indictor does not flash in power using.		①Check wiring. ②Current is less than 0.1%Ib.
5	LCD works and battery bar flashes.		Change battery.

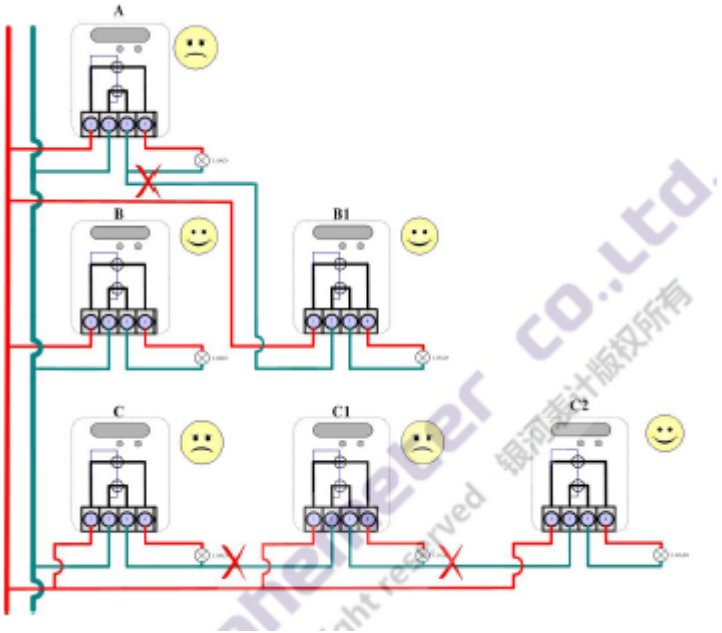
11 Meter Installation and Operation Instructions

1) Before installation, meter appearance, manufacturer mark, power company inspection mark and seal should be checked. The energy meter can be installed inside the meter box after confirmation.
2) Before wiring, please check the diagram on the meter terminal cover, and confirm input and output cables are correspondence with the diagram on the cover. Copper cable or copper joint is preferred.
3) In meter wiring, screw on every terminal should be unlocked first, and insert the cable; the screw should be locked tightly and confirmed be touched well.
4) After confirm wiring is correct, meter cover should be fixed and special seal from Power Company should be installed.
5) Pulling cable is not permitted when arranging cables, to avoid affecting fix on joint. Fix the cable till it cannot move. Dust and water is not permitted to enter meter.
6) Supply power to meter and check its work condition. If it works well, record the data; if it doesn't work please check the installation, wiring and voltage.
7) Be careful all-in meter in stallion process and avoid dropping or shocking.
8) In meter installation and operation, be careful about safety and avoid accident.

Notice: Because DDZ1513 single phase prepayment energy meter (double circuit tempering measuring mode) adopts measuring mode which using double measuring circuit comparison, and measures via higher circuit. So in the meter installation, please confirm meter connected to power network and load correctly. The meter may re-measure if it is connected incorrect. Following is correct and incorrect wiring diagram example:



Correct Wiring Diagram



Incorrect Wiring Diagram

In incorrect wiring diagram, meter C1, B1 and C2 connected incorrect.
"A"=A+B1 Mistake 1: It can result in the active power of meter A is the meter A load plus meter B1 load. The additional measure is caused by incorrect connection of earth lines of meter A and meter B1.
"C"=C+C1+C2 Mistake 2: It can result in the active power of meter C is the meter C load plus meter C1 load plus meter C2 load. The additional measure is caused by incorrect connection of earth lines of meterC1 and meter C.
"C1"= C1+C2 Mistake 3: It can result in the active power of meter C1 is the meter C1 load plus meter C2 load. The additional measure is caused by incorrect connection of earth lines of meter C1 and meter C2.
Correct: Meter B, MeterB1 and Meter C2 measure correctly.

12 Transport and Storage Instructions

The product shall be transported and stored according to the related rules. No intense impact to the product is allowable during transportation and unpacking.
The product shall be stored in original packing, the ambient temperature is -35℃～80℃, and the relative humidity is not more than 100%, and no corrosive gas or harmful material is present. Natural ventilation is good.
The product shall be stored on shelf in a warehouse and the stacking height shall not be more than 8 layers.

13 Warranty

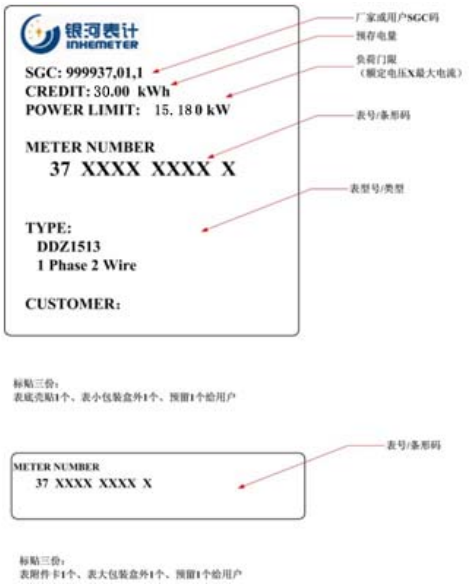
If the meter does not meet the requirements of technical specifications according to the purchase contract after leaving factory, and the user follows the manual instruction and manufacturer's sealing is in good condition, we furnish free maintenance or replace the defective meter within 24 months from the shipment.

14 Annex Instructions

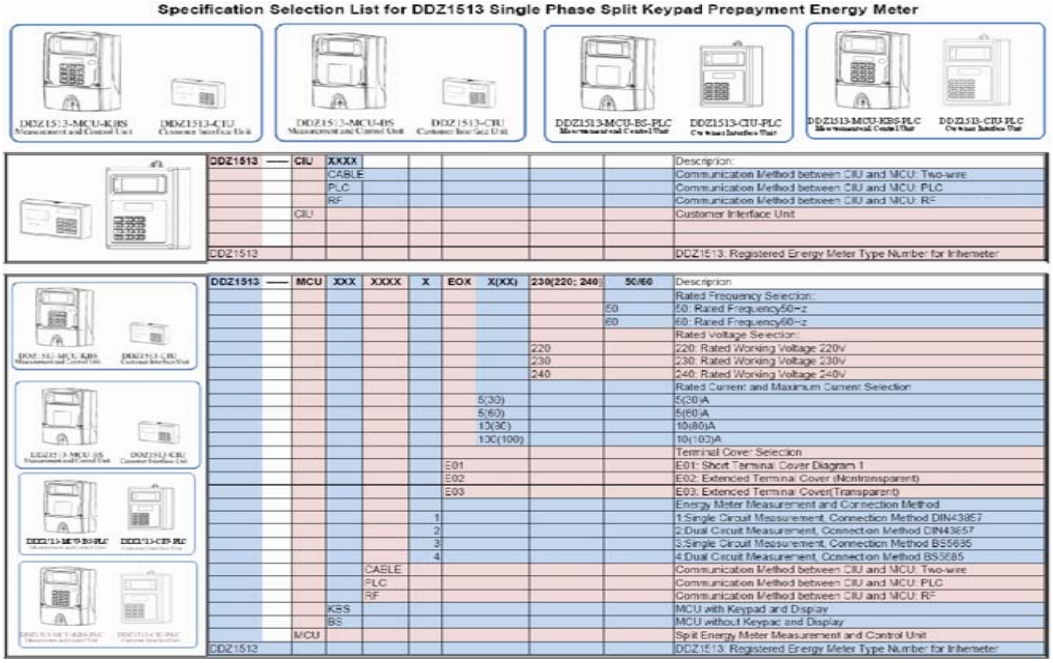
During meter leave the factory, there are related accessories attached (For each single meter packing).

Sr. No.	Accessory Name	Quantity	Remark
1	Meter MCU Unit	1	
2	Meter CIU Unit	1	
3	CIU cable	1	
4	CIU Unit AA battery	4	
5	User Operation Manual	1	
6	Keypad meter identification card	1pcs	
7	MCU Unit Serial No. Bar Code sticker	3pcs	
8	Installation screw	1sets	Not included
9	Sealing wire and sealing	1sets	Not included

Keypad prepayment meter sticker information：



15 Detailed Specification Options



Specification Selection List for DDZ1513 Single Phase Split Keypad Prepayment Energy Meter

DDZ1513	—	CIU	XXXX						Description:
			CABLE						Communication Method between CIU and MCU: Two-wire
			PLC						Communication Method between CIU and MCU: PLC
			RF						Communication Method between CIU and MCU: RF
		CIU							Customer Interface Unit
DDZ1513									DDZ1513: Registered Energy Meter Type Number for Inhemeter

DDZ1513	—	MCU	XXX	XXXX	X	EOX	X(XX)	230(220; 240)	50/60	Description
										Rated Frequency Selection:
									50	50: Rated Frequency50~z
									60	60: Rated Frequency60~z
										Rated Voltage Selection:
								220		220: Rated Working Voltage 220V
								230		230: Rated Working Voltage 230V
								240		240: Rated Working Voltage 240V
										Rated Current and Maximum Current Selection
							5(30)			5(30)A
							5(60)			5(60)A
							10(80)			10(80)A
							10(100)			10(100)A
										Terminal Cove: Selection
						E01				E01: Short Terminal Cover Diagram 1
						E02				E02: Extended Terminal Cover (Nontransparent)
						E03				E03: Extended Terminal Cover(Transparent)
										Energy Meter Measurement and Connection Method
					1					1:Single Circuit Measurement, Connection Method DIN43857
					2					2:Dual Circuit Measurement, Connection Method DIN43857
					3					3:Single Circuit Measurement, Connection Method BS5685
					4					4:Dual Circuit Measurement, Connection Method BS5685
				CABLE						Communication Method between CIU and MCU: Two-wire
				PLC						Communication Method between CIU and MCU: PLC
				RF						Communication Method between CIU and MCU: RF
			KBS							MCU with Keypad and Display
			BS							MCU without Keypad and Display
		MCU								Split Energy Meter Measurement and Control Unit
DDZ1513										DDZ1513: Registered Energy Meter Type Number for Inhemeter

Single phase PLC communication split keypad prepayment energy meter's package diagram:

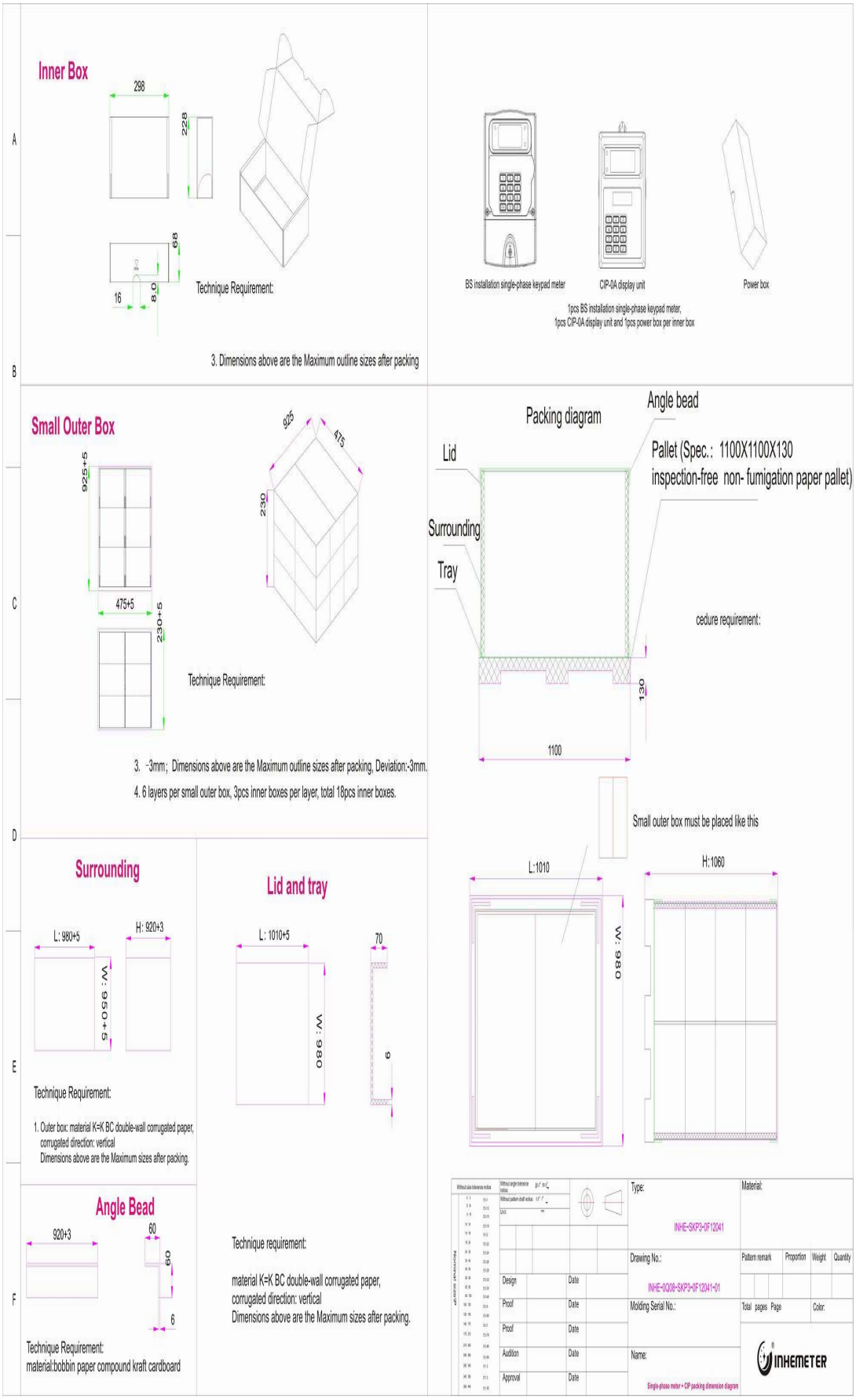
Quantity of each cartoon: 144 sets；

Cartoon dimension：980.0 X 920.0 X 950.0 (mm).

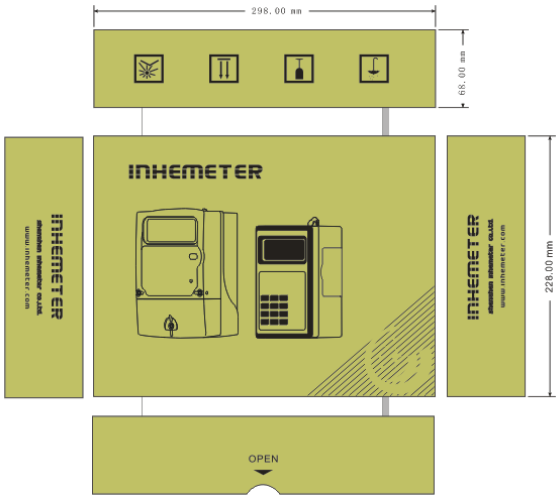
Net Weight： 210kg

Gross Weight： 259kg

Inner package box for each set:


Inner Box
298
228
68
16
8.0
Technique Requirement:
3. Dimensions above are the Maximum outline sizes after packing
BS installation single-phase keypad meter
CIP-0A display unit
Power box
1pcs BS installation single-phase keypad meter,
1pcs CIP-0A display unit and 1pcs power box per inner box
Small Outer Box
925+5
475+5
230+5
Technique Requirement:
3. -3mm; Dimensions above are the Maximum outline sizes after packing, Deviation:-3mm.
4. 6 layers per small outer box, 3pcs inner boxes per layer, total 18pcs inner boxes.
Packing diagram
Angle bead
Lid
Pallet (Spec.: 1100X1100X130
inspection-free non- fumigation paper pallet)
Surrounding
Tray
cedure requirement:
130
1100
Small outer box must be placed like this
L:1010
H:1060
W: 980
Surrounding
L: 980+5
H: 920+3
W: 950+5
Technique Requirement:
1. Outer box: material K=K BC double-wall corrugated paper,
corrugated direction: vertical
Dimensions above are the Maximum sizes after packing.
Lid and tray
L: 1010+5
70
W: 980
6
Technique requirement:
material K=K BC double-wall corrugated paper,
corrugated direction: vertical
Dimensions above are the Maximum sizes after packing.
Angle Bead
920+3
60
60
6
Technique Requirement:
material:bobbin paper compound kraft cardboard
Type:
INHE-SKP3-0F12041
Material:
Drawing No.:
INHE-10008-SKP3-0F12041-01
Molding Serial No.:
Name:
Design
Proof
Audition
Approval
Date
Pattern remark
Proportion
Weight
Quantity
Total pages Page
Color
INHEMETER

Outer carton design:



16 INHEMETER SMARTtvend Management System

SMARTvend: Inhemeter smart network power vending management system (Smart Vending Anywhere) is introduced after years' of experience of developing IC prepayment energy meter, keypad prepayment energy meter, SMS prepayment energy meter power vending Management system and after-payment power vending management mode. It uses B/S and C/S mixing network construction and network data is under centralized management. Value added service, various power vending, 7*24 power vending anywhere can be realized by co-operation with the bank, the network companies, etc. It is mainly used to manage energy charge collection of utilities, companies, schools and etc, and plays important role in automatic collection of energy charges and load control. Smart Vending Anywhere System （SVAS） brings convenience, efficiency and security for users and thus simplifies the complexity of management, reduces cost and improves revenue collection. It can be used in prepayment / post-payment smart vending system of energy meters, water meters, and gas meters.

SMARTvend System Characteristics

- Network based system structure and operation mode;
- Multi-method Billing and compatible with various billing solutions;
- Various power vending methods available, i.e. vending through internet, vending point, agent, POS, ATM, SMS and scratch card;
- Multi-station or single station management for vending points; Vending points can be centralized for control and vending authorization.
- Support many kinds of prepayment energy meter including IC card prepayment energy meter and all STS certified keypad prepayment energy meter, SMS message prepayment energy meter etc.
- Abundant graphic statistics and analysis report forms;
- Multi-level management mode and digital certified authentication system to ensure system security.

- Users are given rights according to position that can be done to each control point of each module.
- Built-in third party data exchange port and can communicate with exterior system like marketing system, AMR system closely.
- Desktop user-defined.

SMARTvend Structure

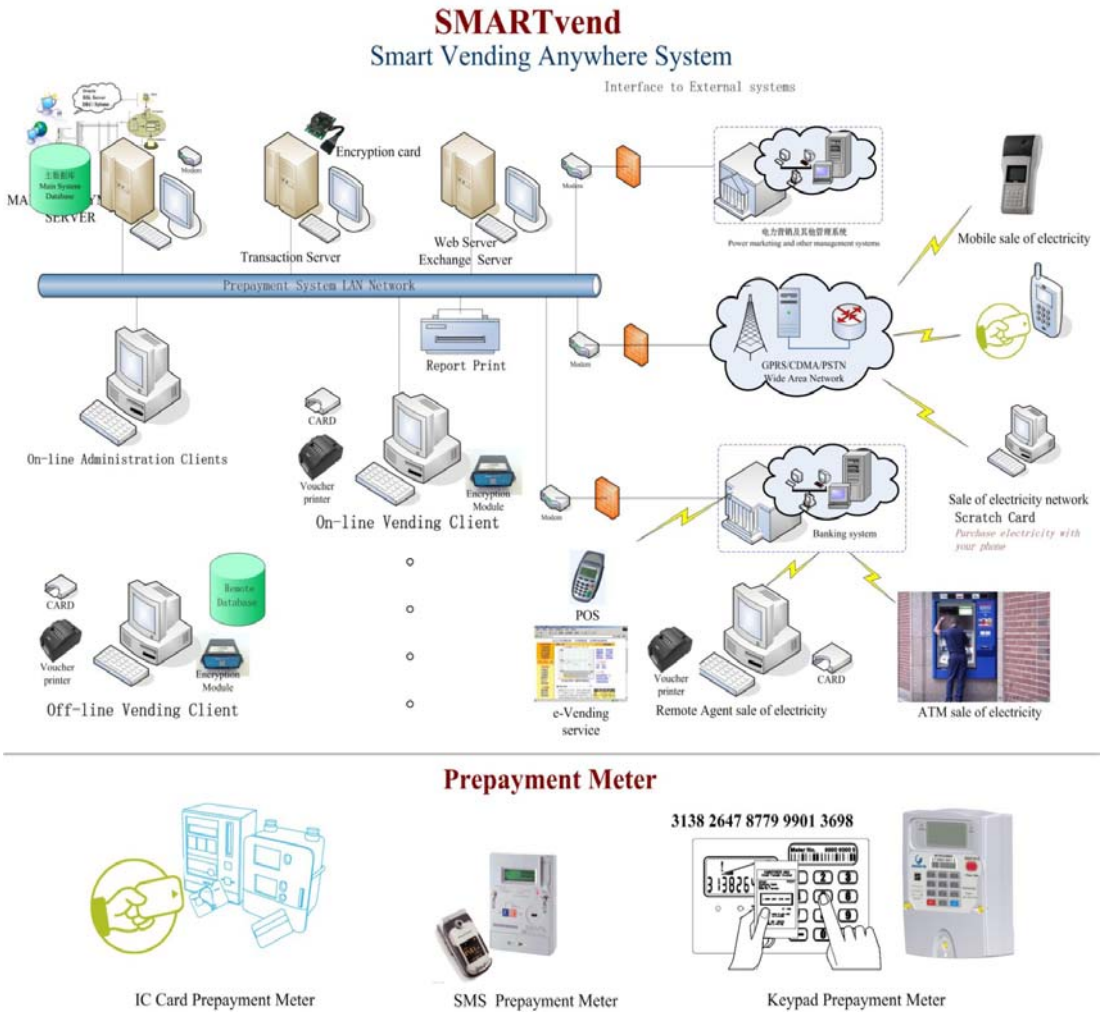
SMARTvend includes server application as following:

- Database Server: used for storage of business data.
- Web Server: used for providing HTTP service to connect vending points of utility company and connection for bank payment collection, internet power vending, vending agency, internet vending etc.
- Data Exchange Server: maintaining multi-layer system data exchange and data exchange with different suppliers;
- Affair Handling Server: for affair handling, TOKEN generation and data encryption, decryption etc;
- Management Terminal: for system comprehensive maintenance and report analysis of client side PC;

Notice: Above-mentioned server application can be grouped according to customer demand and development condition; all service function operated in one server is supported as well.

Provide corresponding port for other systems:

- Power marketing system, power deployment automation EMS system, distribution automation DMS system, superior measurement system, and other system.
- Telecommunication port: payment collection port provided by bank for ATM automatic and internet power vending;
- Other System port: payment collection through agents like network company, telecommunication company or scratch card



System Compatibility and Scalability

SMARTvend adopts unified power vending and revenue collection method, compatible with IC prepayment energy meter, STS keypad prepayment energy meter, SMS prepayment energy meter researched by Inhemeter, as well as STS keypad energy meter made by different manufacturers. Meanwhile, it makes SMARTvend compatible with prepayment energy meter with different types and different protocols, prepayment water meter, prepayment hot water meter and gas meter by system's third party extended interface base.

Diversified Power Vending Module

SMARTvend SVAS provides various vending modes in order to bring convenience and efficiency to users and reduce workload of vending personnel.

- ATM: Users purchase electricity from ATM self-help equipment. Recharge will be made by connecting with bank system after safety certificate. ATM will read the card and print digit code.
- PC recharge: Users enter online network vending website to purchase electricity(IC card reader is needed for operation for IC prepayment energy meter). After paying and confirming the payment on internet, vending management center will make safety authentication and give vending instruction for printing digit code.

- POS, PDA recharge: Users enter network vending website by internet with handhold computer for recharge (It can not recharge for IC prepayment energy meter).
- Agent vending: Banks or other agent vendors authorized by the utility provide vending business for users.
- Recharge hall: Integrated petty charges recharge hall provide electricity vending business.
- Vending hall: Power supply system provides internal vending network.
- Scratch card: Telecom companies use their value added service to transfer the recharge payment and give recharge instruction (It can not recharge for IC prepayment energy meter).
- SMS: Telecom companies use their value added service to transfer the recharge payment, and after successful recharge transferring, recharge can be made by SMS. It is applicable for SMS prepayment energy meter and STS keypad prepayment energy meter (It can not recharge for IC prepayment energy meter).

SMARTvend Functions

SMARTvend has three versions: standard version, professional version and enterprise version. Different version system contains different functions and supports different meter type. Customers can choose according to their actual business requirement.

SMARTvend SVAS has following function modules:

1） Daily business processing module

Customer data maintenance, power consumption contact signing and canceling, petty charge collection, power vending, meter exchange, card complement, card data maintenance, and complementally bill printing.

2） Power vending network management module:

Contact signing or canceling of vending network, vending terminal management, vending network reconciliation, vending network permission, commission payment, etc

3） Tempering module

Customer power off/power recovery, tempering charge collection, handling charge collection of power off made by customers, etc

4） Charge collection module

Petty charge collection, capacitance increase charge collection, meter freezing charge collection

5） Reports outputting module

Account opening integrated report, vending integrated report, consumption integrated report, tempering integrated report, vending network integrated report, charges integrated report, etc daily report outputting, consumption and vending and other analyses report outputting

6） System management module

Company information management, department management, role permission management, user management, electricity price management, system operation data management, data management, data maintenance, data exchange management, etc,

7） Assistance module: Online assistance display

17 Pre-stored Energy and Preset Load Threshold Instruction

17.1 Power Pre-store and Load Pre-setting Stipulation

For batches: DDZ1513 single phase keypad prepayment energy meter:

- Pre-stored electricity：30.00kWh
- Load threshold ：15.180kW
- Preset pre-warning alarm threshold：30.00kWh
- Preset alarm threshold：0.00kWh

17.2 Dealings to Pre-stored Energy

It aims to test before installation, check the circulation status after installation. There several modes regarding pre-stored electricity. Detailed operation will refer to local practice.

A: After finishing the test before installation, installation operation and circulation status check after installation, the pre-stored electricity can be reset to zero by installation worker before officially handing over to users.

Carry-out ways: In the stage of installation, while registering user and meter information in the power vending system, the system will generate the TOKEN code specialized in clearing up power consumption credit. After finishing the circulation check status and before officially handing over to users, installation workers will input this TOKEN code into keypad prepayment energy meter to clear up power consumption credit (clear up pre-stored electricity).

B: After completing measurement meter testing, installation and inspection of electricity circulation status after the installation, energy meter can be formally delivered to users in the prior record by a meter installer residual value of the stored power to submit the sale of electricity management system.

Specific carrying out ways: After completing measurement meter testing, installation and inspection of power after the installation, energy meter can be formally delivered to users in the prior by a meter installer record residual value of the stored charge and get the user to confirm it; installer will record the pre-stored electricity meter to log on to the balance value of the stored power management system for the sale of electricity from the sale of electricity management system in the user when the first purchase deducted.

C: Give the pre-stored power to users for free.
Since the quantity of pre-stored electricity is not very big, then it can be given to users for free use after energy meter test, installation and circulation statuses check.

D: The pre-stored power will be deducted with one time by power vending management system.

According to pre-stored power in the energy meter before delivery, power vending management system will deduct it while users open an account and purchase the power.

17.3 Load Threshold Pre-setting

The purpose of pre-set load threshold is to facilitate measurement test before installation of energy meter. According to the user information and load threshold permitted by utilities, the special load threshold TOKEN code will be generated by the power vending management system, and then users input it into related energy meter to finish load threshold setting.

In the process of using the meter, if the actual load of users changes, then they can apply for load threshold change anytime. If the application is authorized, the specific TOKEN code used for load threshold will be generated by power vending management system, then users input this TOKEN to the related meter and finish load threshold changes.

18 Mass Production Key Setting

18.1 Customized SGC Code Setting

Energy meters are set according to the client's requirement for SGC. A series of operation like installation, power vending, recharging, etc. can be processed once the client receives the products.

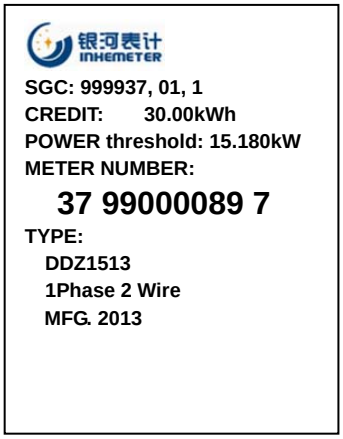
When leaving factory, Inhemeter keypad prepayment energy meter's meter number, factory setting and other information are given together with the whole batch. It's convenient to import all the information to customer vending management system

18.2 Inhe Default Key（SGC：999937）Setting

Set with the default factory key (SGC: 999937)-key type is DDTK.

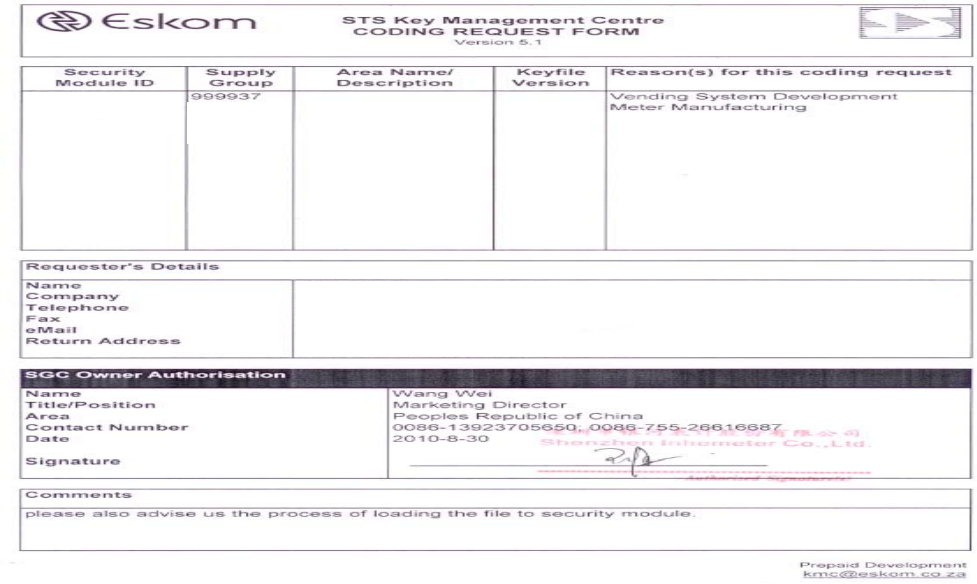
Key will be replaced as follows:

1. Inhemeter provides an authorization table with the SGC code: 999937 and manufacturer's information of Inhemeter as table 1.
2. Customer fill in the vending security module number, customer information (as table 2), submit the table to the Key Management Center（KMC）and apply for a key file of the keypad prepayment energy meters of Inhemeter, then update their security module.
3. Energy meters will be set with the SGC: 999937 of Inhemeter, and can be supplied to all customers who have this requirement, key on the back plate is as the follow diagram.



4. After customer receive energy meters from Inhemeter, they should generate 2 groups of replace TOKEN codes as per new security modules, input them into the energy meters, so as to change the default keys（DDTK）to unique keys （DUTK）, the back plate has to be replaced too.

B5: Prepayment meters which their keys are changed can be installed, sale of electricity, recharged and used within the scope of vending system.



Eskom

STS Key Management Centre
CODING REQUEST FORM
Version 5.1

Security Module ID	Supply Group	Area Name/ Description	Keyfile Version	Reason(s) for this coding request
	999937			Vending System Development Meter Manufacturing

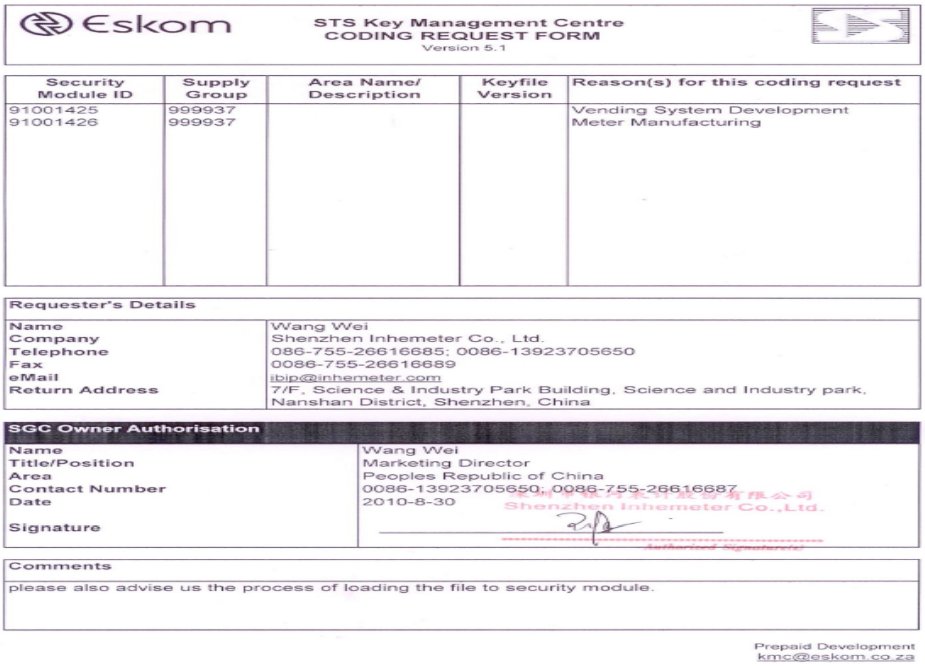
Requester's Details	
Name	
Company	
Telephone	
Fax	
eMail	
Return Address	

SGC Owner Authorisation	
Name	Wang Wei
Title/Position	Marketing Director
Area	Peoples Republic of China
Contact Number	0086-13923705650; 0086-755-26616687
Date	2010-8-30
Signature	

深圳市银河表计股份有限公司 Shenzhen Inhemeter Co.,Ltd.

Comments
please also advise us the process of loading the file to security module.

Prepaid Development
kmc@eskom.co.za



Eskom

STS Key Management Centre
CODING REQUEST FORM
Version 5.1

Security Module ID	Supply Group	Area Name/ Description	Keyfile Version	Reason(s) for this coding request
91001425 91001426	999937 999937			Vending System Development Meter Manufacturing

Requester's Details	
Name	Wang Wei
Company	Shenzhen Inhemeter Co., Ltd.
Telephone	086-755-26616685; 0086-13923705650
Fax	0086-755-26616689
eMail	ibip@inhemeter.com
Return Address	7/F, Science & Industry Park Building, Science and Industry park, Nanshan District, Shenzhen, China

SGC Owner Authorisation	
Name	Wang Wei
Title/Position	Marketing Director
Area	Peoples Republic of China
Contact Number	0086-13923705650; 0086-755-26616687
Date	2010-8-30
Signature	

深圳市银河表计股份有限公司 Shenzhen Inhemeter Co.,Ltd.

Comments
please also advise us the process of loading the file to security module.

Prepaid Development
kmc@eskom.co.za