USER'S MANUAL

1. General Description

DDS238-2 ZN/S type multi-function energy meter is designed to measure single phase two wire AC active energy and variable parameter. All of its functions comply with the relative technical requirement for class 1 single phase watt hour meter in IEC62053-21 and its data communication rules obey the requirement of DL/T645 or MODBUS-RTU. It is a long life meter with the advantage of high stability , high over load capability , low power loss and small volume .

The meter should be installed in suitable environment with ambient temperature range between -25℃～+55℃,the relative humidity less than 75% and temperature limits between and-40℃～+70℃.

The meter is manufactured complying with international standard IEC62052-11 on "Electricity metering equipment (AC) General requirements tests and test conditions" and IEC62053-21 on "Static meters for active energy (classes 1 and 2)".

2.Specification and Technical Parameters

2.1Specification

Meter type	DDS238-2 ZN/S
Rate frequency	50 or 60 Hz
Rated current	5(65)A 10(100)A
Rate voltage	120V / 220V / 230V /240V
Normal voltage range	90%Un～110%Un
Limits voltage range	70%Un～120%Un
Accuracy	Class 1
Pulse constant	See meter
RS485 port	MODBUS-RTU protocol, 1200～9600bps,None parity, default 9600**bps**

2.2 Technical Parameters

2.2.1 Basic tolerance

Load current(A)	Power factor (CosΦ)	Basic error(%)	
		1.0 class	2.0 class
0.05Ib	1.0	+1.5	+2.5
0.1Ib—Imax	1.0	+1.0	+2.0
0.1Ib	0.5(lag)	+1.5	+2.5
	0.8(advanced)	+1.5	
02Ib—Imax	0.5(lag)	+1.0	+2.0
	0.8(advanced)	+1.0	

2.2.2 Self-consumption

Current circuit is less than 1.5VA

Voltage circuit is less than 1W/5VA

2.2.3 Starting current

Under the rated voltage , rated frequency and COSΦ=1 , the meter shall start and continue to register on application of 0.2% In (if CT is used) or 0.4% Ib .

2.2.4 Anti-creeping

The meter has anti-creeping logical circuit. When 115%Un is connected to the meter and current circuit is cut , the meter shall not create more than one pulse in a stipulated time

2.2.5 Average-life

The meter can be used for at least 10 years in normal operation specified in this manual

2.2.6 LCD: 5+1 (99999.9 kWh)

3.Basic Features

3.1 Measuring positive & negative active energy with negative energy accumulated into positive energy, LCD display with backlight .

3.2 The meter also display three phase real voltage , real current , real active power , real power factor , real frequency

3.3 Pulse LED indicates working of meter，Pulse output with optical coupling isolation 18~27V 27mA .

3.4 RS485 communication port

3.5 Measuring active energy without calibration under long term operation

3.6 display step by step with button

4.Working principles

Single phase voltage and current are sampled from respective sampling circuit and transformed into suitable signal, which is carried into integrated circuit , then the meter output pulse signal in positive appropriation to measured power to drive step-motor counter or LCD counter to realize energy measurement. The meter has energy pulse output for testing with pulse width of 80±20ms
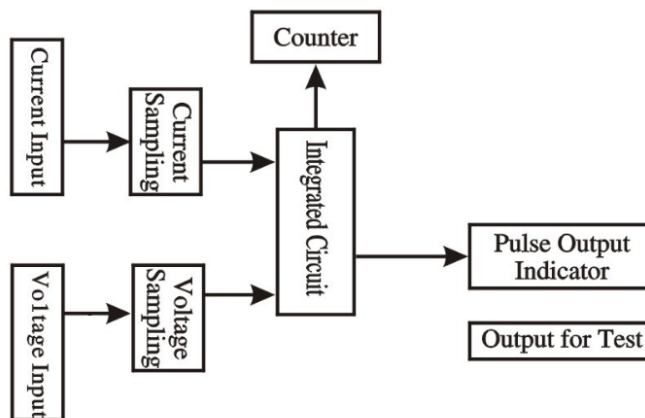
Diagram for Working Principles

5. Structure

The meter consists of meter base , meter cover , terminal base , terminal cover . there are lead seal on meter cover   and terminal cover . A special screw is used to fix the terminal cover on which a lead seal can be installed

6. Usage

6.1 Connection diagram

PHOTO 1

| 1 | 3 | 2 | 4 |

L →
N →
→ L
→ N

(Normal wire connection)

⑥ ⑤
+ −
Impulse
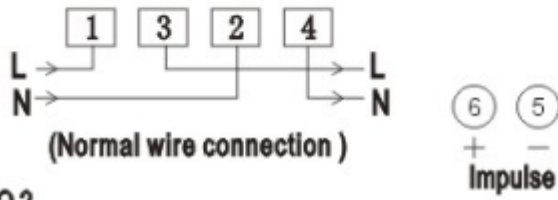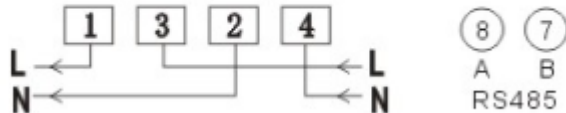
PHOTO 2

| 1 | 3 | 2 | 4 |

L ←
N ←
← L
← N

⑧ ⑦
A B
RS485

Note: If reverse wire connection as photo 2 , the total energy still can measure.

6.2 Installation

The meter can be installed on a 35 mm DIN rail

6.2.1 The meter can not installed and used until it is checked goods and sealed before delivery

6.2.2 The meter should be install in the water proof box indoor or outdoor . the meter's box should be fixed on strong and flame-resistant wall with a recommended height of about 1.8 m , where there is no corrosive gas around .

6.2.3 The meter should be install fully in accordance with connection diagram on the terminal cover, it is better to use copper as the leading wire for connection. All screws should be tightened.

6.2.4 Diagram for installation dimension

51mm
39.5mm
35mm
60mm
65mm

36mm
45mm
100mm
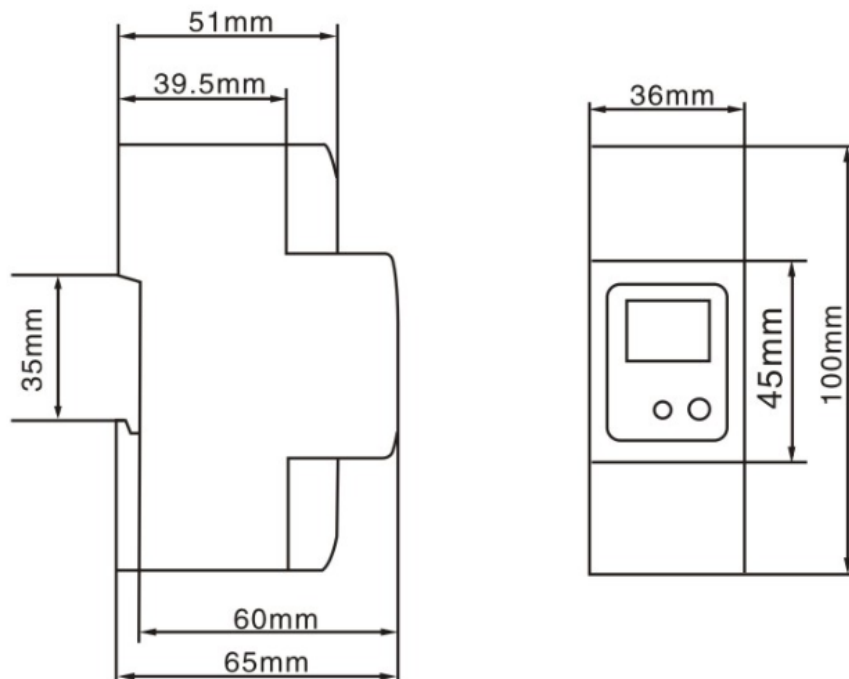
7. Transportation and Storage

7.1 Heavy impact should be burdened to the products while transportation and unpacking.

7.2 The products should be stored in the original package and kept in place with temperature between -40℃～+70℃,the relative humidity less than 75% and no corrosive gas around .

7.3 In storehouse , the meter should be placed on the shelf when kept in stock , there should not be more than 7 cartons piled up in vertical. Single-packed meters can not be piled up with more than 5 meters in vertical.

8. Warranty period

Within 24 months from the day of selling and provided that users operate correctly according to the requirement of the user's manual , if the meter doesn't reach its technical specification. It can be repaired or replaced in free f charge by the manufacturer .

9. Frame format

9.1 Read command（function code 03）

Send frame

Meter ID	Function code	Register address	Data number	Check code (CRC)
1byte	1byte	2byte	2byte	2byte

Receive frame

Meter ID	Function code	Data length n	Data area	Check code (CRC)
1byte	1byte	1byte	n byte	2byte

9.2 Write command（function code 10）

Send frame

Meter ID	Function code	Register address	Data number	Data length n	Data area	Check code (CRC)
1byte	1byte	2byte	2byte	1byte	n byte	2byte

Receive frame

Meter ID	Function code	Register address	Data number	Check code (CRC)
1byte	1byte	2byte	2byte	2byte

9.3 Energy meter register address

Register address	Data number	Data item	Data format	Data unit
0x0000	2	Total kWh	XXXXXX. XX	kWh
0x0001				
0x0008	2	Export kWh	XXXXXX. XX	kWh
0x0009				
0x000A	2	Import kWh	XXXXXX. XX	kWh
0x000B				
0x000C	1	Voltage	XXX. X	V
0x000D	1	Current	XX. XX	A
0x000E	1	Active power	XXX. XXX	kW
0x0010	1	Power factor	X. XXX	
0x0011	1	frequency	XX. XX	Hz
0x0015	1	ID + baud rate	First byte is ID 号, the second byte is baud rate，01~04 is means Respectively 9600、4800、2400、1200、	

Note 1： one register address is store 2 byte data ,so the data length read as 4 byte when data number is 2 .

Note 2:：you can use ID ID(0x00) to broadcast and got data when you do not know the meter ID. But this ways is only for 1 pcs meter to connection on RS485 wire

10. Display item

	INFORMATION	LCD DISPLAY	
01	Meter ID	ID　001	★
02	Real voltage V	U 000.0	★
03	Real current A	A 00.00	★
04	Real power W	P 0.0	★
05	Power factor COSΦ	PF 0.00	★
06	Real frequency Hz	F 00.00	★
07	Total energy kWh	T00 00000.0	★
08	Positive kWh	T00-00000	☆
09	Reverse kWh	T00-00000	☆
10	Reset energy	EP000000	☆

Note: ★Standard function ,☆special order function (It will reset energy to zero, after you pull the button last 10s,if you have order reset function)

		INFORMATION		LCD DISPLAY	
01	Impulse constant	imp/kWh	C	0000	
02	Total energy	kWh	T00	00000.0	
03	Import energy	kWh	T01	00000	
04	Export energy	kWh	T02	-00000	
05	Reset energy	kWh	EP	00000	
06	Real Current	A	I	000.00	
07	Real voltage	V	U	000.00	
08	Active power	W	P	00000.0	
09	Reactive power	var	q	00000.0	
10	POWER FACTOR COSΦ		PF	0.00	
11	Real frequency	Hz	F	0.00	
12	MODBUS-RUT ID		ID	000	
13	DL/T645 high 6 digit ID		H	00000	
14	DL/645 low 6 digit ID		L	00000	
15	Baudrate		B	0000	