

WIRING DIAGRAM

PHOTO 1

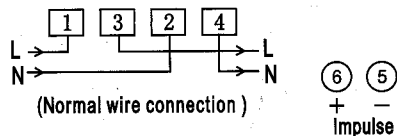
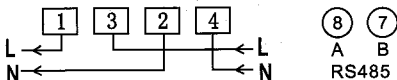
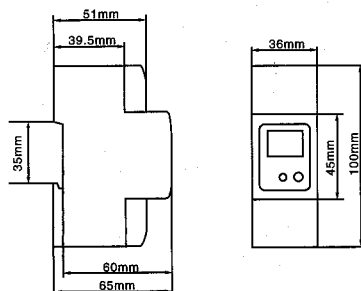


PHOTO 2

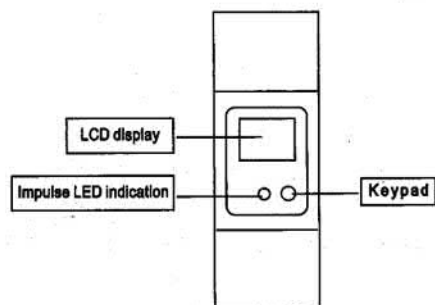


Note: If reverse wire connection as photo 2, the total energy still can measure

DIMENSION



SUMMARY



TECHNICAL SPECIFICATION

STANDARD	IEC 62053-21(IEC61036)
NOMINAL VOLTAGE	120/220/230/240V $\pm 10\%$
BASIC CURRENT (I _{b2})	5A or 10A
MAXIMUM CURRENT	65A or 100A
MINIMUM CURRENT	0.02A or 0.04A
FREQUENCY	50Hz
CONSUMPTION	<0.8W/8VA
ACCURACY CLASS	1
DISPLAY	LCD 5+1 DIGITS
INTERFACE	OPEN COLLECTOR OUTPUT(SO) 18~27V 27mA
IMPULSES	1000imp/kWh(1.0Wh/Imp)-100A 2000imp/kWh(0.5Wh/Imp)-65A

HIKING

Class1

DDS238-2 ZN/S TYPE SINGLE PHASE ENERGY METER

USER MANUAL

CE IEC ISO9001

Ver.3

SERVICE TEMPERATURE LIMIT: -25°C+70°C

L.E.D 1 COLOUR

NORMAL OPERATION
PINK FLASHING RATE PROPORTIONAL TO LOAD

INSTALLATION

MOUNTING DIN RAIL 35mm
PROTECTION IP20(TERMINAL COVERS INCLUDED)

DISPLAY:

	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 0000.00
06	Real Current A	I 000.00
07	Real voltage V	U 000.0
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 00.00
12	MODBUS-RTU ID	ID 000
13	DL/T645 high 6 digit ID	H 000000
14	DL/T645 low 6 digit ID	L 000000
15	Baudrate	b 0000

NOTE: The reset energy will change to zero, after you pull the button last 10s. RS485 Communication default baudrate is 9600 bps, address 1, none parity, baudrate can set from 1200-9600bps

WARRANTY

Warranty is 24 month

It is void if seal is removed/damaged.

(1) Transmission code

The information transmit in asynchronous mode in bytes. The communication information transmitting between the host computer and the slave computer is the 10 bits format , including one initial bit. 8data bit (firstly transmitting the least effective bit) . without parity check bit , 1 stop bit

(2) Data frame format

Address code	Function code	Data area	CRC check code
1 byte	1 byte	N byte	2 byte

Address code: address code is located at beginning of frame . composed of one byte (8 bit binary system code) decimal is 0-255 in the ACR meters . just 1-247 is used . other address is reserved. These bits indicate terminal device address specified by users . this device will receive the connecting host computer data. Every terminal device has only one address . only the addressing terminal respond to enquiry including this address. When terminal is transmitting one responding . the responding slave address data tell host computer that which terminal is it .

Function code : function code tell the target terminal to execute what function. Below table list . function code used in this series meters and their meaning and function .

Function	Definition	Operation
03H/04H	Read and data	Obtain current binary system value of one or multiple register
10H	Preset multi-register	Set binary system value into a series of multiple register

Data area: data area includes the data needed by terminal for executing specific function or the collected data when terminal is responding enquiry . content of these data could be value reference address or setting value . for example , the function code tell terminal to read one register . the data area need to specify the starting register and read how many data . the built-in address and data have different content depending on type and slave computer .

CRC check code : error check (CRC) domain occupies 2 byte . including one 16 bit binary system value. CRC value is calculated by transmission device. And then attached to the data frame . the receiving device . while receiving ,it calculates the CRC value again. Then comparing it with the receiving CRC domain value. If these two values are not equal . it and error occurs. .

Flow for forming one CRC:

1. Preset one 16 bit register as 0FFFFH (All-1) called as CRC register
2. 8 bit of data frame first byte and low byte of CRC register carry out exclusive or operation . the save its result back to CRC register .
3. Right shift CRC register for one bit . the most significant bit is filled with 0 . the least significant bit is shifted out and tested .
4. If the least significant bit is 0 . repeat the third step(next shift) if the significant bit is 1 .CRC register and preset fixed value specified (0A001H)

carry out exclusive or operation .

5. Repeat the third step and fourth step until shift for 8 times. The complete 8 bit is done .
6. Repeat the second step to fifth step to treat next 8 bit until all the byte is treated .
7. The CRC register final value is CRC value . besides . there is another CRC calculation method by preset table. Its main feature is fast calculating speed . but large saving space is needed . please refer to related data .

5.4.54. explain for communication applicable format

(1) Function 03H: read register

This function allow user to obtain data and parameters collected and recorded by equipment . data amount of once requested by host computer have no limit . but the address should be in range .

following example is one basic data read from 01 slave (each address in data frame occupy 2 bytes) the collected data is the total electric energy E(occupy 4 bytes) other address is 00H

(2) Function code 10H : writing register

Function code 10H allows the user to change the contents multiple registers .time ,data, rate period of time etc . in meter can be written by this function code . the one shot maximum write in data (32 bytes) of host computer is 16 .

Below meter example show : preset address 01 data ,time :12:00 , 01/02/2008

Master transmitting		Transmittin g information	Slave returning		Returning information
Address code		01H	Address code	01H	
Function code		10H	Function code	10H	
Initial address	High byte	00H	Initial address	High byte	00H
	Low byte	12H		Low byte	12H
Register No.	High byte	00H	Register No.	High byte	00H
	Low byte	03H		Low byte	03H
Byte number		06H	CRC check code	High byte	20H
0012H Data to be written	High byte	08H		Low byte	0DH
	Low byte	02H			
0013H Data to be written	High byte	01H			
	Low byte	0CH			
0014H Data to be written	High byte	00H			
	Low byte	00H			
CRC check code	High byte	FFH			
	Low byte	A8H			

Attachment:

1. belong to read/write: "R" read only, read this parameter use 03H command. "R/W" readable/writable write parameter use 10H command . write in address of non-listed or no-writable address is forbidden.
2. the communication address of electric energy meter is given with delivery . also read out through the software provided by our company.
3. the voltage value detected by electric energy meter is fixed by 2 bit decimal number . data format is XXX.XX , unit is V . if communication read out voltage value is 55EEH (21998) , then voltage actual value is 219.88V. the measured current value is fixed by 3 bit decimal number . data format is XX.XXX unit is A . if communication read out current value is 05DBH (1499), then current actual value is 1.499A
4. the active and reactive power value by electric energy meter is fixed by 2 bits decimal number . data format is XXX.XX ,unit is kW(kvar) 。 If communication read out the active and reactive power value is 0020H (0032) , then the active and reactive power actual value is 0.32kW(kvar) ,the apparent power value is fixed by 1 bit decimal number . data format is XXXX.X unit is VA. If communication read out the apparent power actual value is CE44H (3300), then the apparent power actual value is 330.0VA
5. the electric energy value measured by electric energy meter occupy 4 bytes. Unit is kWh . the high bit is before the low bit . if reading value is 0012D687H (1234567) , then the electric energy metering value is $1234567 \times 0.01 = 12345.67 \text{ kWh}$
6. order of 14-period of time parameter setting information of above address table

14-period of time parameter setting information	Note
Rate number for 1st period of time NN	1. starting time for 1st period of time 00:00 2. in DDS238-2 ZN DDS238-4 ZN between rate No. and rate period 01-spike 02-peak 03-flat 04-valley
Terminal time for 1st period of time——minute	
Rate number for 2nd period of time NN	
Terminal time for 2nd period of time——minute	
Terminal time for 2nd period of time——hour	

Rate number for 14th period of time NN	
Terminal time for 14th period of time——minute	
Terminal time for 14th period of time——hour	

5. 5 Notice

5. 5. 1 the loading capacity of electric energy meter is $0.5I_b—I_{max}$ (direct connecting)或 $0.02I_b—I_{max}$ (connecting via current transformer) if this loading capacity range is exceeded . the electric energy metering will be incorrect or damageable。

5. 5. 2 when electric energy meter is directly connected its electric energy reading value is actual kWh . when electric energy meter is equipped with current transformer . the electric energy reading value must multiply the current transformer rate multiply power to obtain actual kWh

Hiking DDS238-2 ZN/S energy meter

Modbus holding registers:

Register(s)	Meaning	Scale Unit	Data format	R/W
0000h-0001h	total energy	1/100 kWh	unsigned dword	R ¹
0002h-0003h	reserved		unsigned dword	
0004h-0005h	reserved		unsigned dword	
0006h-0007h	reserved		unsigned dword	
0008h-0009h	export energy	1/100 kWh	unsigned dword	R ¹
000Ah-000Bh	import energy	1/100 kWh	unsigned dword	R ¹
000Ch	voltage	1/10 V	unsigned word	R
000Dh	current	1/100 A	unsigned word	R
000Eh	active power	1 W	signed word	R
000Fh	reactive power	1 VAr	unsigned word	R
0010h	power factor	1/1000	unsigned word	R
0011h	frequency	1/100 Hz	unsigned word	R
0012h	reserved		unsigned word	
0013h	reserved		unsigned word	
0014h	reserved		unsigned word	
0015h:high	station address	1-247	unsigned char	R/W
0015h:low	baud rate	1-4 ²	unsigned char	R/W

Notes:

Note 1:

Total, export and import energy counters can erased writing 0 in total energy registers.

Note 2:

Value mapping, default 1.

Value	Baud rate
1	9600 Bd
2	4800 Bd
3	2400 Bd
4	1200 Bd

Data formats

Data format	Lenght	Byte order
char	8 bits	
word	16 bits	Big endian
dword	32 bits	Big endian

Writing registers

The meter does not understand the ‘write sigle register’ function code (06h), only the ‘write multiple registers’ function code (10h).

Address	Variable	Belong to R/W	Data format	sign	Data Model
0000H 0001H	Current total energy	R	Each electric energy occupy 4 byte 999999.99	unsigned	Dword
0002H 0003H	Reserved	Reserved	Reserved	unsigned	Dword
0004H 0005H	Reserved	Reserved	Reserved	unsigned	Dword
0006H 0007H	Reserved	Reserved	Reserved	unsigned	Dword
0008H 0009H	Current export energy	R	Each electric energy occupy 4 byte 999999.99	unsigned	Dword
000AH 000BH	Current import energy	R	Each electric energy occupy 4 byte 999999.99	unsigned	Dword
000CH	Voltage	R	XXX.X V	unsigned	Word
000DH	Current	R	XXX.XX A	unsigned	Word
000EH	Active power	R	XX.XXX KW	signed	Word
000FH	Reactive power	R	XX.XXX Kvar	signed	Word
0010H	Power factor	R	X.XXX	unsigned	Word
0011H	Frequency	R	XX.XX	unsigned	Word
0012H	Reserved	Reserved	Reserved	unsigned	Word
0013H	Reserved	Reserved	Reserved	unsigned	Word
0014H	Reserved	Reserved	Reserved	unsigned	Word
0015H High Byte	Communication address	R/W	001-247	unsigned	Char
0015H Low byte	Communication baudrate	R/W	01 ——9600bps (default) 02 ——4800bps 03 ——2400bps 04 ——1200bps	unsigned	Char

MODBUS-RTU PROTOCOL

The host computer send code : address 03 00 00 00 02 CRC low byte CRC high byte (total 8 byte)
(1) address code (1 byte) it is the same meter address from 1~ 247 , the meter default address is 1 .
(2) function code(1 byte) 03 . please use 03 function code to read data .
(3)register address (2 byte):0000
(4) data number(2 byte):0002 read 2 pcs 16 bit data
(5)CRC(2 byte):check code

Meter send code: address 03 04 XX XX XX XX CRC low byte CRC high byte (total 9 byte)
(1) address code (1 byte) it is the same meter address from 1~ 247 , the meter default address is 1 .
(2) function code(1 byte) 03 . please use 03 function code to read data .
(3)quantity (1 byte):4 . means send data how many byte!
(4) data (4 byte): 32 bit standard of IEEE754 floating-point
(5)CRC(2 byte):check code

Example:

read address which address is 0 : 0

send 00 03 00 15 00 01 94 1F

reply 00 03 02 00 02 04 45

EXAMPLE

read the meter which address is 1

read the total energy which the energy is 10 kWh

send 01 03 00 00 00 02 c4 0b

reply 01 03 04 00 00 03 e8 crc16

Read the real voltage which is 220V

SEND 01 03 00 0c 00 01 44 09

REPLY 01 03 02 08 98 crc16

Read the real voltage which is 220V

SEND 01 03 00 0c 00 01 44 09

REPLY 01 03 02 08 98 crc16

READ REAL CURRENT WHICH IS 5A

SEND 01 03 00 0d 00 01 15 c9

REPLY 01 03 02 01 f4 crc16

READ ACTIVE POWER WHICH IS 10.5 KW

SEND 01 03 00 0e 00 01 crc16

REPLY 01 03 02 29 04 crc16

READ REACTIVE POWER WHICH IS 0.5 KVAR

SEND 01 03 00 0f 00 01 crc16

REPLY 01 03 02 01 f4 crc16

READ THE POWER FACTOR WHICH IS COS 0.99

SEND 01 03 00 10 00 01 crc16

REPLY 01 03 02 03 de crc16

READ FREQUENCY WHICH IS 50.5

SEND 01 03 00 11 00 01 crc16

REPLY 01 03 02 13 ba crc16

Example

Change address 01 to 02 and baudrate to 9600 (ID address should write with baudrate on meantime)

Send code 0110H 0015 0201 58AE

01 = address

10H = function write

0015 = register address

0201 = change address to 02 and baudrate to 9600

58AE = check sum