技术说明： 如有变动恕不另行通知！

伊米特电子科技
E-Meter electronic technology

E-METER
PRODUCT SELECTION MANUAL

产品使用手册

DN20系列多功能导轨表

DN20 series multifunctional guide table

更详细说明书请用手机扫一扫电表二维码

24.10.28版

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1、Product Introduction

DN20DMD4 single-phase multifunctional guide table, DN20SMD4, DN20SMD7 three-phase multifunctional guide table with electrical parameter measurement, positive and negative energy metering, demand, communication and energy pulse output and other functions. It can be widely used in substation automation, distribution automation, intelligent building and enterprise internal power measurement, remote management, assessment and so on. The performance indicators meet the requirements of GB/T17215.321-2021 standard, realize RS-485 communication, and support MODBUS-RTU and DL/T645-2007 protocol. 4G communication, support MQTT or TCP/IP protocol.

2、Product profile

Items			Parameters	
Model number			DN20DMD4	DN20SMD4 DN20SMD7
measuring quantity	Wiring		Single phase	Three-phase three-wire, three-phase four-wire
	electricity pressure	Reference voltage	220V	3×220/380V
		Power consumption	<10VA (single phase)	
		Impedance	> 2 m Ω	
		accuracy level	Error ±0.5%	
	electricity flow	Input current	5(80)A	3×5(80)A 3 x 1.5 (6) A
		Minimum current	0.25 A	
		Turning current	0.5 A	
		Power consumption	<4VA (single-channel rated current)	
		accuracy level	Error ±0.5%	
	Power		Active power, apparent power, error ±0.5%	
	Grid frequency		45 to 65Hz, error ±0.02Hz	

Items		Parameters	
Metrology	Electrical Energy	Active energy Class B	Active power level C
	Clock error	0.5s/d (for use with double rate feature only)	
Pulse	Active pulse constant	1600imp/kWh	400imp/kWh; 6400imp/kWh;
Communication	Baud Rate	RS485 interface :1200bps~38400bps(default 2400bps)	
	Protocol	DL/T645-2007 is compatible with MODBUS-RTU	
	verify	N.8.1, O.8.1, E.8.1(Factory default: E.8.1)	
	Address	The Modbus communication table number can be set from 1 to 247, the default is 01 645 Correspondence address see the display sticker number	
Environment	Operating temperature	- 30 ℃ ~ + 80 ℃	
Electrical properties	Insulation properties	Ac withstand voltage test, 4kV lasts 60s	
	Electromagnetic compatibility	Fast transient pulse group immunity, test voltage: ±4kV	
		Electrostatic discharge immunity test: contact discharge : ± 8kV, air discharge :± 15kV	

I、Instrument function

Features	Function description	DN20DMD4	DN20SMD4	DN20SMD7
Electric Energy Metering	Active and reactive power metering (forward and reverse)	■	■	■
	A, B, C are divided into phases of positive active energy	■	■	■
Electrical energy measurement	U, I	■	■	■
	P, Q, S, PF, F	■	■	■
LCD display	8-bit segment LCD backlight display	■	■	■
Key programming	4 Key programmable communication and other parameters	■	■	■
Pulse output	Active pulse output	■	■	■
LED alarm	Trip alarm	□		□
Multiple Rate	Support 4 time zones, 2 time tables 14 day slots, 4 rates	□	□	□
	Maximum demand and occurrence time	□	□	□
	Real-time demand	□	□	□
	History freeze data, power purchase records	□	□	□
	Date, time, week	□	□	□
Newsletters	Also supports Modbus, DL/T645-07 protocol	■	■	■
	4G Communications	■		■

Features	Function Description	DN20DMD4	DN20SMD4	DN20SMD7
Max Demand	Maximum voltage demand, maximum current demand, maximum active power demand, maximum reactive power demand	□	□	□
	Demand period (Default 15 minutes)	□	□	□
Electrical Energy Analysis	Three-phase voltage crest coefficient	□	□	□
	Telephone waveform factor	□	□	□
	Current K factor	□	□	□
	Total harmonics	□	□	□
	Graded harmonics	□	□	□
	Current and voltage unbalance degree		□	□
4G	Electrical data upload	□		□
	Remote control	□		□
	IP Settings	□		□

Note: "■" means standard, "□" means optional.

4. Installation and wiring



DN20DMD4



DN20SMD7







DN20DMD4

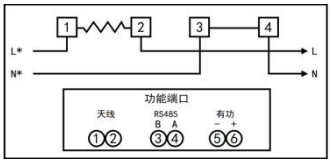
1, instrument size (unit: mm)

Model number	long	wide	high
DN20DMD4	76	89	77.6
DN20SMD7	126	97	77.6
DN20SMD4	72	99	66.5

External antenna terminal length 23mm (4G function included)

2, signal and function terminal number

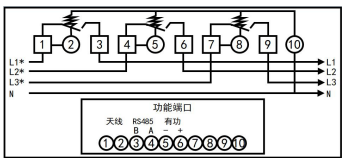
The terminal of the instrument adopts a unified number, which is suitable for all products of this series, as shown in the following table:



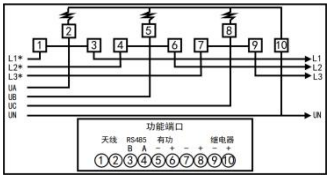
DN20DMD4 wiring

Items	Number	Instructions
Signal input	1,3	1 is L* and 3 is N*
Signal output	2,4	2 is L and 4 is N
RS485	③, ④	B, A, respectively
Electrical energy pulse	⑤, ⑥	Active pulse AP-, AP+, respectively
4G antenna	①, ②	External antenna accessories are self-replaceable

DN20SMD7 wiring diagram

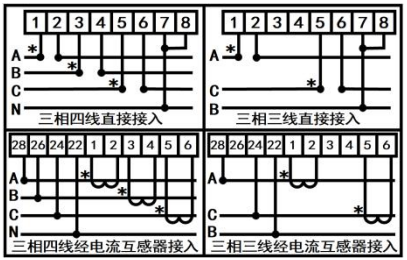


Items	Number	Instructions
Signal input	1,2,3,4,5,6,7,8,9	1 and 2,4 and 5,7 and 8 are L1*, L2*, and L3*, respectively 3, 6, and 9 are L1, L2, and L3, respectively
Signal output	10	10 for N
RS485	③, ④	B, A, respectively
Electrical energy pulse	⑤, ⑥	Active pulse AP-, AP+, respectively
4G antenna	①, ②	External antenna accessories are self-replaceable



DN20SMD7 wiring diagram

Items	Number	Instructions
Current signal	1,3,4,6,7,9	1,4,7 are L1*, L2*, and L3*, respectively 3, 6, and 9 are L1, L2, and L3, respectively
Voltage signal	2,5,8,10	Input UA, UB, UC, UN for three phase voltage respectively
RS485	③, ④	B, A, respectively
Electrical energy pulse	⑤, ⑥	Active pulse AP-, AP+, respectively
Relays	⑨, ⑩	Respectively -, +, default to normally on
4G antenna	①, ②	External antenna accessories are self-replaceable



DN20SMD4 wiring

Items	ID	Instructions
Current signal	1,2,3,4,5,6	1, 3, and 5 are L1*, L2*, and L3* respectively 2, 4, and 6 are L1, L2, and L3 respectively
Voltage signal	1,3,5, (7/8)	Direct access Three phase voltage input UA, UB, UC, UN
	(28), (26), (24), (22)	Current transformer connected Three phase voltage input UA, UB, UC, UN respectively
RS485	(17), (18)	A, B, respectively
Electrical energy pulse	(11), (12)	Active pulse AP+, AP-, respectively

5、 programming operation

1, display logo introduction

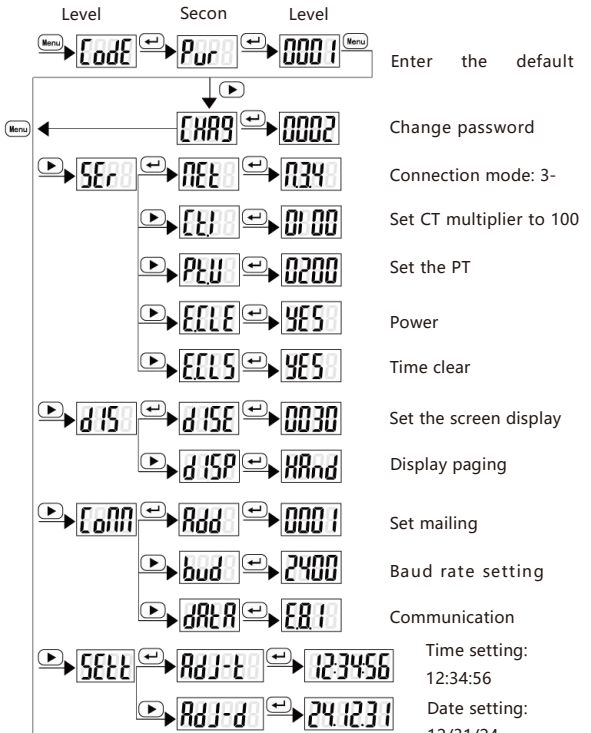


Logos	Features
Digital display 8	Display data, including voltage, current, power, power factor, electrical energy, etc
NO A B C	NoA stands for phase A, NoB stands for phase B, and NoC stands for phase C
MkWArh	Current A, kA; Voltage V, kV; Active power W, kW, MW; Reactive power var, kvar, MVar; Apparent power VA, kVA, MVA; Active power kWh, MWh; Reactive power kvarh, Mvarh;
	485 Communication indicator identifier
	4G Communication Sign
	Current power direction and quadrant
尖 峰 平 谷	Current Rate sign
正 反 向 总 尖 峰 平 谷 日 期 时 间	Rate power display interface and time display interface logo
电 量	The current power display interface
Menu	Menu key, enter the menu editing or return to the previous menu level, Exit "Cancel" key when saving modification Settings

◀ ▶	Value added or subtracted when menu left or right page turning or setting
↵	Enter key, numeric setting shift, exit "confirm key" when saving modified Settings

Level 1 Menu	Secondary menu		Third level menu	Description
Password	Enter your password	PUt	0 ~ 9999	Enter your current password (default 0001)
CodE	Change password	CHAG	0 ~ 9999	Change your current password (not recommended)
Parameter setting SEt	Wiring method	nEt	N.3.4 or N.3.3	N.3.4 Three-phase four-wire, N.3.3 three-phase three-wire
	Current ratio	CtI	1-9999	Set the current ratio
	Voltage ratio	PtU	1-9999	Set the voltage ratio
	Charge purge	ECLE	YES or NO	YES clears accumulated power, NO does not clear.
	Event Clear	ECLS	1-9999	YES clears accumulated SOE events, NO does not.
Communication setup CoMM	Table Number	Add	1-247	Modbus comm table number
	Baud Rate	bud	1200 ~ 38400	1200~38400(default 2400)
	Data format	dAtA	N, E, O data	N.8.1, O.8.1, E.8.1(default)
System Settings diSP	Display duration	diSE	0 ~ 9999	0 means the backlight is always on, and 0030 means the backlight time is 30s
	Fixed page	diSP	Auto or Hand	Auto indicates the automatic wheel display and Hand indicates the manual display

6、Programming structure diagram



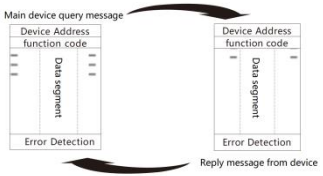
Note: After the parameters are set, press 3 [Menu] keys to appear SAVE, [↵] key to save the setting parameters. If you do not save, press the key to exit the setting. [Menu]

7、The meter page displays the information

Display interface	Display instructions	Display interface	Display instructions
9.490	Total positive active power 9.490kWh	220.0	The voltage is 220.0V
5.000	Current 5.000A	1.100	Power 1.100kW
L0.990	Power factor L0.990	49.99	Frequency 49.99Hz
H 202401	645 mailing address High byte bits 202401	L 011234	645 mailing address Low byte bit 011234
Add 001	Modbus Comm address 001	bUd 2400	Communication baud rate 2400bps
dAt E.8.1	Communication format E.8.1		
4G partial information display			
E 87654321	The number under the "E" character represents the IMEI number	C 12345678	The number under the "C" character indicates the SN device number
CES9 25	4G signal strength (Strength range: 0~30 The larger the number, the stronger the signal, and the signal greater than 14 is normal)	St 07 99 St 35	Communication status: 07 not connected 35 Unicom

8. Communication module

1. RS485 communication interface, asynchronous half duplex mode;
2. The communication speed can be set between 1200 and 9600bps, with a factory default of 9600bps;
3. Byte transfer format: 1 start bit, 8 data bits, 1 check bit, 2-3 stop bits(N81, E81, O81)optional;



The MODBUS protocol only allows communication between hosts (PCs, PLCs, etc.) and terminal devices, and does not allow data exchange between independent terminal devices. This way, each terminal device will not occupy the communication line during their initialization, but only respond to query signals that arrive locally.

The structure of data frames: i.e. message format

Address code	function code	data code	verification code
1个BYTE	1个BYTE	N个BYTE	2个BYTE

Address code: composed of one byte (8-bit binary code), with decimal values ranging from 0 to 255. In our system, only 1 to 247 are used, while other addresses are reserved. The address of each terminal device must be unique, and only the addressed terminal will respond to the corresponding query.

Function code: tells the addressed terminal what function to perform. The following table lists the function codes supported by Z-series instruments, as well as their meanings and functions.

Code	Description
0x01	Read the output status of the relay
0x02	Read switch input status
0x03/0x04	Read the register value
0x05	Remote control of a single relay action
0x0F	Remote control of multiple relay actions
0x10	Write register setting instruction

9、 communication application examples

1, read data register instruction (function code 03/04)(integer data)

This function allows the user to obtain the data and system parameters collected and recorded by the device. There is no limit to the number of data that the host can request at one time, but it cannot exceed the defined address range.

The following example reads 3 data IA/IB/IC from the slave machine at address 01. (The data in the data frame takes up 2 bytes per address, the IA starts with 76(4CH) addresses, and the data length is 6(06H) numbers.) Query Data frame (host)

Address	Commands	Start register address (high 8 bits)	Start register address (low 8 bits)	Number of registers (high 8 bits)	Number of registers (low 8 bits)	CRC16 (low 8 bits)	CRC16 (high 8 digits)
01H	03H	00H	4CH	00H	03H	C4H	1CH

Response data frame (slave)

The response contains the slave address, function code, amount of data, and CRC error check.

Address	Commands	Data byte length	Data 123456	CRC16 (lower 8 digits)	CRC16 (lower 8 digits)
01H	03H	06H	1388H 0FA0H 0BB8H	C7H	BDH

Indicate IA=1388H(5.000A), IB=0FA0H(4.000A), IC=0BB8H (3.000A)

2, read data register instruction (function code 03/04) (floating-point data)

Address	Commands	Start register address (high 8 bits)	Start register address (low 8 bits)	Number of registers (high 8 bits)	Number of registers (low 8 bits)	CRC16 (low 8 bits)	CRC16 (high 8 digits)
01H	03H	00H	16H	00H	02H	25H	CFH

Response data frame (slave)

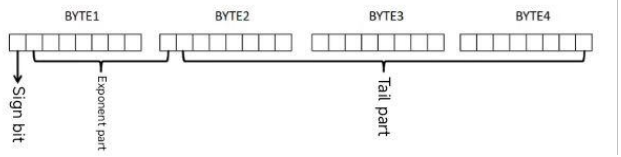
The response contains the slave address, function code, amount of data, and CRC error check.

Address	Commands	Data byte length	Data 1234	CRC16 (lower 8 digits)	CRC16 (lower 8 digits)
01H	03H	04H	40A3H F35AH	DBH	1AH

Response data frame (slave)

The response contains the slave address, function code, amount of data, and CRC error check.
Read the phase A current to 40A3H F35AH, converted to decimal 5.123456A, which is 5.123A

3. Convert IEEE-754 floating point numbers to decimal numbers.
IEEE-754 is the use of 4 bytes of binary floating point number to represent a data power, its data format and meaning are as follows:



SIGN bits: SIGN=0 is positive, SIGN=1 is negative.
Exponent part: E= exponent part -126.
Mantissa part: M= mantissa part is complemented by the highest place of 1.
Data result: REAL=SIGN x(2^E) x M/(256 x 65536).
For example, the host reads the power data, and the power can be known from the address table (positive active power absorption).
The address is: 22(0016H) and the length is 2(0002H).
Host: 01 03 00 16 00 02 25 CF
Slave: 01 03 04 40 A3 F3 5A DB 1A Where 40 A3 F3 5A is the phase A current data, DB, 1A is the low and high of the CRC16 check code.
Its size: SIGN(sign bit =0, positive), index E=81H-126=3, mantissa :A3F35AH
Result: (2^35)xA3F35AH/1000000H=5.123456A=5.123A.