⚠ 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

DN2020DMD2单相导轨表

DN2020DMD2 Series single-phase 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

The DN2020D MD2 series single-phase multi-function DIN rail meter integrates functions such as electrical parameter measurement, forward and reverse energy metering, communication, and energy pulse output. Its technical performance meets the Class B requirements specified in the national standard GB/T 17215.321-2021 and the Class 1 requirements for single-phase active energy meters in the international standard IEC62053-21. It implements RS-485 communication, supports Modbus-RTU protocol, offers optional Wi Fi communication, enables switching operations (on/off control) via 4G data loggers paired with RS-485, and also supports Wi Fi remote control.

2 、 Product Profile

Items			Parameters
Model number			DN2020DMD2 Series
Measure-ments	Voltage	Nominal Voltage	AC 115V/220V/230V
		Power Consumption	<10VA (per phase)
		Impedance	> 1MΩ
		Accuracy Class	Class 1
	Current	Current Rating	40A/60A (More specifications optional)
		Minimum Current	0.5 A
		Bending Current	0.25A
		Power Consumption	<1VA (per circuit rated current)
		Accuracy Class	Class 1
	Power		Active power, apparent power, Accuracy Class 1
	Grid frequency		45 ~ 65Hz, Error ±0.02Hz

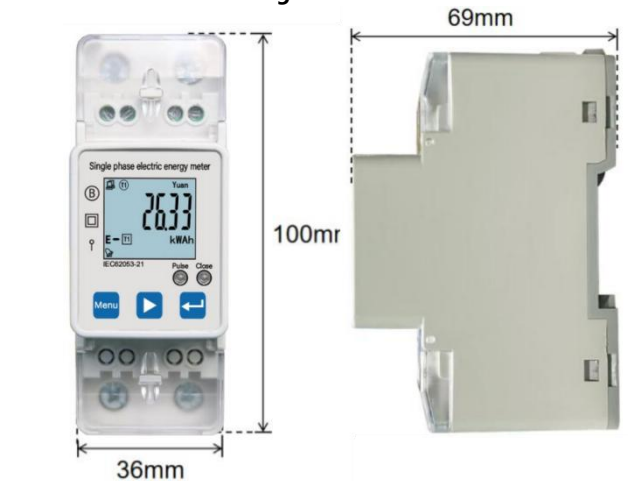
Items		Parameters
Metering	Energy	Active energy Class B
Pulse	Active pulse constant	1600imp/kWh
	Width	80ms±20ms
Communic-ation	Interface	RS485 interface (4G collector optional for matching), WiFi optional (Tuya)
	Baud Rate	RS485 interface :1200bps~9600bps(default9600bps)
	Protocol	Modbus-RTU and DL/T645-2007 compatible
	Parity	N.8.1, O.8.1, E.8.1(Factory default:N.8.1)
	Address	Modbus communication address can be set from 1 to 247, default is 001; DL/T645-2007 communication address is based on meter numbering
Environm-ental	Operating temperature	Specified operating temperature range: -25°C ~ +55°C; Extreme operating temperature range: -30°C ~ +70°C
	Humidity	Annual average relative humidity < 75% RH
Electrical properties	Insulation Performance	AC withstand voltage test: 4kV
	Electromagnetic compatibility	Fast transient pulse group immunity, test voltage: ± 4kV
		Electrostatic discharge immunity test: contact discharge :±8kV, air discharge :± 15kV

3、Instrument function

Function	Function Description	DN2020DMD2	DN2020DMD2-485	DN2020DMD2-L	DN2020DMD2-W	DN2020DMD2-WL
Energy Metering	Active & reactive energy metering (positive/reverse direction)	■	■	■	■	■
Measurement	Voltage (U), Current (I)	■	■	■	■	■
	Power (P), Reactive Power (Q), Apparent Power (S), Power Factor (PF), Frequency (F)	■	■	■	■	■
LCD Display	8-segment LCD backlight display	■	■	■	■	■
Key Programming	Display switching, parameter setting, etc.	■	■	■	■	■
Pulse Output	Active pulse output	■	■	■	■	■
LED Alarm	Trip Alarm			■		■
Switching on/off	Switching control			■		■
Communication	RS485 interface, supporting both Modbus-RTU and DL/T645-2007 protocols		■	■	■	■
	4G collector communication			□		
	WiFi Communication				■	■
4G Data Collector	Electrical parameter data upload			□		
	Remote Control			□		
	IP Setting			□		
WiFi	Electrical parameter data upload				■	■
	Switch-on/switch-off control					■

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

4. Installation and wiring



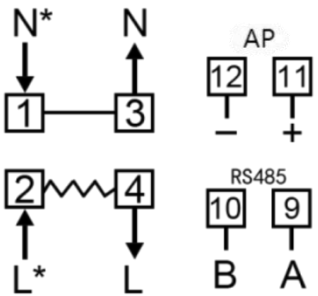
1, instrument size (unit: mm)

Model number	long	wide	high
DN2020DMD2 Series	100	36	69

2, signal and function terminal number

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

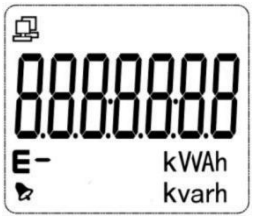




Items	Number	Instructions
Signal input	2，1	2 is L* and 1 is N*
Signal output	4，3	4 is L and3 is N
RS485	9,10	A, B respectively
Electrical energy pulse	11,12	Active pulse AP+, AP-, respectively

5、 programming operation

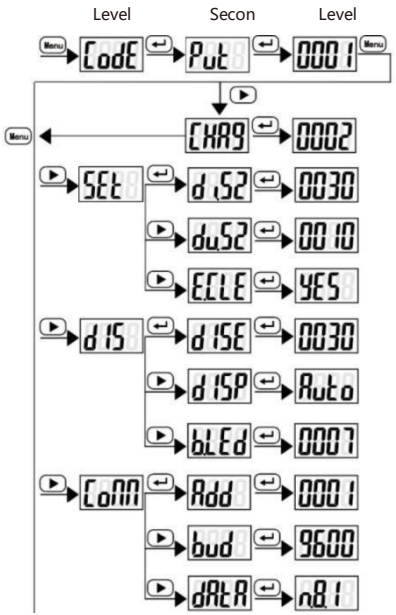
1. Display logo introduction



Logos	Features
Digital display 8	Display data, including voltage, current, power, power factor, electrical energy, etc
kVAh kvarh	Current A, kA; Voltage V, kV; Active power W, kW; Reactive power var, kvar; Apparent power VA, kVA; Active power kWh,; Reactive power KWH;
	485 Communication indicator identifier
E	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 increased when menu right page turns or Settings
↵	Enter key, cursor shift for numeric Settings, exit "Confirm key" when saving modified Settings

Level 1 Menu	Secondary menu		Third level menu	Description
Password CodE	Enter your password	PUt	0 ~ 9999	Enter your current password (default 0001)
	Change password	CHAG	0 ~ 9999	Change your current password (not recommended)
Parameter Settings SEt	Charge purge	ECLE	YES or NO	YES clears accumulated power, NO does not clear.
Communication Settings CoMM	Table Number	Add	1-247	Modbus com table number
	Baud Rate	bud	1200 ~ 9600	1200 ~9600(default 9600)
	Data format	dAtA	N, E, O data	N.8.1(default), O.8.1, E.8.1
System Settings d1S	Display duration	d1SE	0 ~ 9999	0030 represents 30s backlight time
	Fixed Page	d1SP	Auto or Hand	Auto is the automatic wheel display, Hand manually switches the display
	lcd contrast	bLEd	0007	The contrast default is 7, 0 ~ 7, 7 contrast brightness is the highest.

6、Programming structure diagram



Enter the default

Change password

Current shielding point, 30mA

Voltage shielding point, 10V

Power clear

Set the screen display

Display paging

Set lcd contrast

Modbus address 001

Baud rate setting

Communication format setting: N.8.1

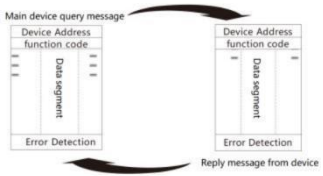
Note: After the parameters are set, press 3 [Menu] keys to SAVE.
[↵] Press the key to save the parameters. If you do not save, press the key to exit the setting. [Menu]

7.、Display information on instrument page

Display interface	Display instructions	Display interface	Display instructions
	Total positive active power 123.45kWh		Reverse total reactive power 123.45kWh
	Voltage 220.0V		Current 5.000A
	The active power is 1.100kW		Power factor 1.000
	Frequency 50.01 Hz		Modbus Comm address 001
	 Communication		Communication format 8.1 N.

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)	Register number (lower 8 bits)	CRC16 (low 8 bits)	CRC16 (high 8 digits)
01H	03H	00H	4CH	00H	01H	45H	DDH

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 12	CRC16 (lower 8 digits)	CRC16 (lower 8 digits)
01H	03H	02H	1388H	B5H	12H

Indicate current I=1388H(5.000A)

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)	Register number (lower 8 bits)	CRC16 (low 8 bits)	CRC16 (high 8 digits)
01H	03H	00H	16H	00H	02H	25H	CFH

Response data frame (slave)

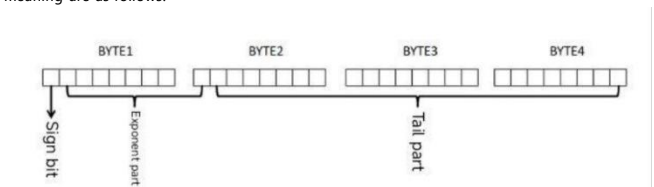
The response contains the slave address, function code, amount of data, and CRC error check.L

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

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), exponent E=81H-126 =3, mantissa :A3F35AH

Result: (2^35)xA3F35AH/1000000H =5.123456A =5.123A.

Appendix 1 .WIFI function

1,Connection description.

① Download the corresponding APP through mobile phone.【SmartLife】

SmartLife - Smart Living

Or you can download the APP by scanning the following two-dimensional code.

② Add a device here.



③ Follow the guidelines to select WIFI and enter the WIFI password, and the device is connected successfully.

④ If the device is not searched, press the key ↵ for 5 seconds to enter the re-distribution network state.

2,Key function introduction.

Logos	Features
↵	The configuration network of WIFI is configured by pressing the key for five seconds.

3, Introduction to Display Pages

Logos	Features
C59 -81	The last two digits indicate the WiFi signal strength of the current meter.

4,APP page introduction.



：Click on the icon to enter the setting item, which can set APP parameters such as device name and network.

Switching between total power data and A-phase data.

Cumulative positive total active power and reverse total active power.

The positive active total electric energy and the reverse active total electric energy of the day.

:Refresh the data of the current page.

:Disconnect the WIFI connection of the current meter and then enter the re-distribution network state.

Appendix 1: Modbus Communication Address 1

Modbus-RTU Communication Address Information Table						
address Hex	Data content	data format	data length	unit	Read/Write R/W	explain
Float data						
0x0A	voltage	Float	2	V	R	U
0x16	current	Float	2	A	R	I
0x22	active power	Float	2	W	R	ΣP
0x2A	reactive power	Float	2	var	R	ΣQ
0x2C	apparent power	Float	2	VA	R	ΣS
0x3A	power factor	Float	2	*1000	R	Σcosφ
0x30	Voltage frequency	Float	2	Hz	R	Hz
0x32	Positive active power	Float	2	kWh	R	EP+
0x34	reverse active power	Float	2	kWh	R	EP-
0x36	Positive reactive power	Float	2	kvarh	R	EQ+
0x38	Reverse reactive power	Float	2	kvarh	R	EQ-
Int integer data						
0x46	voltage	Int	1	0.1V	R	U
0x4C	current	Int	1	0.01A	R	I
0x4F	active power	Int	1	W	R	P
0x52	active power	Int	1	W	R	ΣP
0x53	reactive power	Int	1	var	R	Q
0x56	total reactive power	Int	1	var	R	ΣQ
0x57	apparent output	Int	1	VA	R	S
0x5A	total apparent power	Int	1	VA	R	ΣS
0x5B	total power factor	Int	1	*0.001	R	Σcosφ
0x6B	power factor	Int	1	*0.001	R	cosφ
0x5C	Voltage frequency	Int	1	0.01Hz	R	Hz
Long integer data						
0x5D	Positive active power	Long	2	0.01kWh	R	EP+
0x5F	reverse active power	Long	2	0.01kWh	R	EP-
0x61	Positive reactive power	Long	2	0.01kvarh	R	EQ+
0x63	Reverse reactive power	Long	2	0.01kvarh	R	EQ-

DModbus-RTU Communication Address Information Table						
address Hex	Data content	data format	data length	unit	Read/Write R/W	explain
parameter setting						
0x0122	Backlight on time	Int	1	second	R/W	0 is always on, 0~9999
0x0123	Auto/manual display	Int	1		R/W	
0x0124	backlight contrast	Int	1		R/W	0~7.7 maximum contrast
0x012B	active constant	Int	1		R	
0x012D	address of instrument	Int	1		R/W	1-247
0x0130	communication baud rate	Int	1	bps	R/W	0-3 are respectively: 1200/2400/4800/9600
0x0131	communication data format	Int	1		R/W	0-2 are respectively: N.8. 1/O.8.1/E.8.1
0x0160	Voltage zero point shielding	Int	1	V	R/W	0-9999
0x0162	current zero shielding	Int	1	mA	R/W	0-9999
0x040f	Energy Reset	Int	1		W	Write 0xFF00 to reset the energy

Appendix 2: Modbus Communication Address 2

Modbus-RTU Communication Address Information Table						
address Hex	Data content	data format	data length	unit	Read/Write R/W	explain
Float data						
300A	voltage	Float	2	V	R	U
3016	current	Float	2	A	R	I
3022	active power	Float	2	W	R	P
302A	reactive power	Float	2	var	R	Q
3032	apparent power	Float	2	VA	R	S
303A	power factor	Float	2	*1000	R	cosφ
303C	voltage frequency	Float	2	Hz	R	Hz
303E	continue to have					
3040	total active power	Float	2	kWh	R	EP
3042	positive active power	Float	2	kWh	R	EP+
3044	reverse active power	Float	2	kWh	R	EP-
3046	total reactive power	Float	2	kWh	R	EP-
3048	positive reactive power	Float	2	kvarh	R	EQ+
304A	reverse reactive power	Float	2	kvarh	R	EQ-

Version update records		
version number	Modification time	revise content
V1.0	2024-12-10	Initial version
V1.1	2025-6-5	1. The newly added communication section includes active and reactive power reading addresses. 2. Voltage precision optimization: The unit of voltage reading has been updated from 1V to 0.1V. 3. The precision of the current measurement has been optimized, with the reading unit updated from 1A to 0.01A.
V1.2	2025-6-26	1. In Appendix 1 (Modbus Communication Address 1), the unit for active power data (Float type) has been updated from 0.01kWh to 1kWh, and the unit for reactive power data (Float type) has been updated from 0.01kvarh to 1kvarh. 2. Appendix 2: Table of Modbus communication addresses has been added.
V1.3	2025-7-26	1. Uniformly modify descriptive vocabulary; 2. Correction of the format unit for mailing address data.