⚠ 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

DN2020SMD4 系列多功能导轨表

DN2020SMD4 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

The DN2020SMD4 series multifunctional guide tables are equipped with functions such as electrical parameter measurement, forward and reverse energy metering, demand measurement, communication, and energy pulse output. They are widely applicable in substation automation, distribution automation, smart buildings, as well as energy measurement, remote management, and assessment within enterprises. Their performance indicators comply with the requirements of the GB/T17215.321-2021 standard. These meters support RS-485 communication, are compatible with Modbus-RTU and DL/T645-2007 protocols, and offer optional WiFi functionality.

2、Product Profile

Items			Parameters
Model number			DN2020SMD4 series
Measurements	Wire		Three-phase three-wire or three-phase four-wire
	Voltage	Reference voltage	3×220/380V
		Power consumption	<10VA (single phase)
		Impedance	> ±0.5%
		Accuracy Class	Error ±0.5%
	Current	Current Rating	3×5(80)A 3 x 1.5 (6) A
		Minimum Current	0.25 A/0.025A
		Bending Current	0.5 A/0.05A
		Power Consumption	<4VA (single-channel rated current)
		Accuracy Class	Error ±0.5%
	Power		Active power, apparent power, error ±0.5%
	Grid frequency		45 to 65Hz, error ±0.02Hz

Items		Parameters
Metering	Energy	Active power level C
	Clock error	0.5s/d (for use with double rate feature only)
Pulse	Active pulse constant	400imp/kWh; 6400imp/kWh;
Communication	Interface	RS485 interface , optional WiFi function
	Baud Rate	RS485 interface :1200bps~38400bps(default 2400bps)
	Protocol	DL/T645-2007 is compatible with MODBUS-RTU
	Parity	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 001
Environmental	Operating temperature	- 30 ℃ ~ + 80 ℃
Electrical properties	Insulation Performa	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

3、Instrument function

Features	Function description	DN2020SMD4	DN2020SMD4-W
Energy Metering	Active and reactive power metering (forward and reverse)	■	■
	A, B, C are divided into phases of positive active 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	■	■
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	□	□
Communication	Supports Modbus protocol	■	■
	WiFi Communication		■
WIFI	Electrical parameter data upload		■

Features	Function Description	DN2020SMD4	DN2020SMD4-W
Max Demand	Maximum voltage demand, maximum current demand, maximum active power demand, maximum reactive power demand	□	□
	Demand period (Default 15 minutes)	□	□

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

4. Installation and wiring



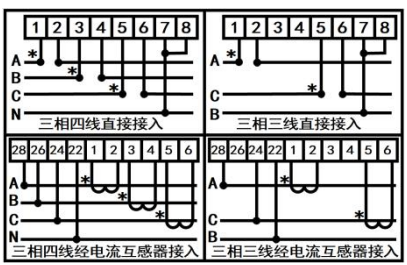
1, instrument size (unit: mm)

DN20SMD7

Model number	Long	Wide	High
DN2020SMD4 Series	72	99	66.5

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:



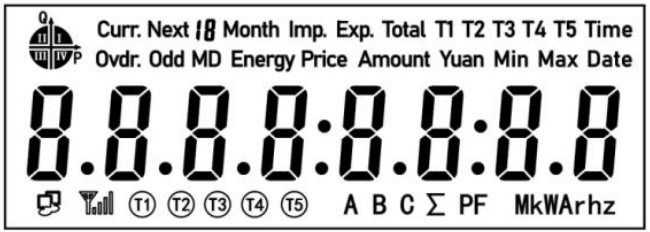
DN2020SMD4



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

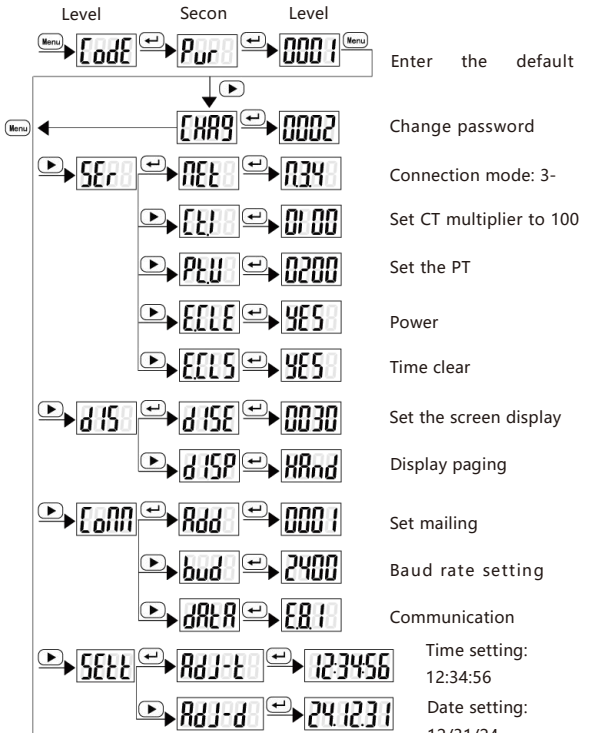


Logos	Features
Digital display 8	Display data, including voltage, current, power, power factor, electrical energy, etc
NO A B C	NoA stands for phase A, NoB stands for phase B, and NoC stands for phase C
MkWArh	Current A, kA; Voltage V, kV; Active power W, kW, MW; Reactive power var, kvar, MVar; Apparent power VA, kVA, MVA; Active power kWh, MWh; Reactive power kvarh, Mvarh;
	485 Communication indicator identifier
	WIFI Communication Sign
	Current power direction and quadrant
T1 T2 T3 T4 T5	Current Rate sign
Imp. Exp. Total T1 T2 T3 T4 T5 Time	Rate power display interface and time display interface logo
Energy	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 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 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 diS	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

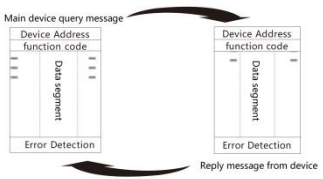


Note: After the parameters are set, press 3 Menu keys to appear SAVE, ↵ key to save the setting parameters. If you do not save, press the key to exit the setting. Menu

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		

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

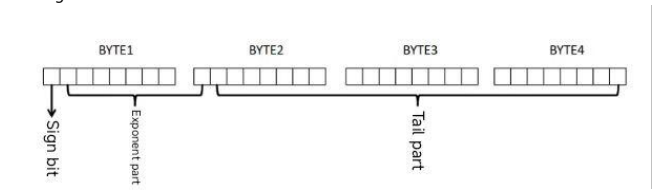
Response data frame (slave)

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.

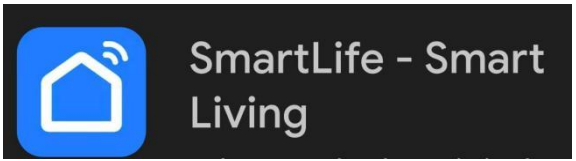
Its size: SIGN(sign bit =0, positive), index E=81H-126=3, mantissa :A3F35AH

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

Appendix 1 .WIFI function

1,Connection description.

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



② Add a device here.



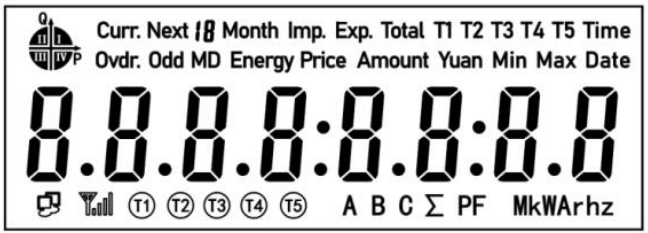
③ Follow the guidelines to select WIFI and enter the WIFI password, and the device is connected successfully.

④ If the device is not searched, press the key ↵ for 5 seconds to enter the re-distribution network state. (the icon disappears at this time)

2,Key function introduction.

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

3,Display function introduction.



Logos	Features
	Signal strength of WIFI.The sign disappears when the distribution network is in state.

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 split-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
One network data (Float)						
0A	A phase voltage	Float	2	V	R	Ua
0C	B phase voltage	Float	2	V	R	Ub
0E	C phase voltage	Float	2	V	R	Uc
10	AB phase line voltage	Float	2	V	R	Uab
12	BC phase line voltage	Float	2	V	R	Ubc
14	CA phase line voltage	Float	2	V	R	Uca
16	A phase current	Float	2	A	R	Ia
18	B phase current	Float	2	A	R	Ib
1A	C phase current	Float	2	A	R	Ic
1C	A phase active power	Float	2	W	R	Pa
1E	B phase active power	Float	2	W	R	Pb
20	C phase active power	Float	2	W	R	Pc
22	active power	Float	2	W	R	∑P
24	A phase reactive power	Float	2	var	R	Qa
26	B phase reactive power	Float	2	var	R	Qb
28	C phase reactive power	Float	2	var	R	Qc
2A	total reactive power	Float	2	var	R	∑Q
2C	total apparent power	Float	2	VA	R	∑S
2E	total power factor	Float	2	*1000	R	∑Cosφ
30	Voltage frequency	Float	2	Hz	R	FR
32	Positive active power	Float	2	kWh	R	EP+
34	Reverse active power energy	Float	2	kWh	R	EP-
36	Positive reactive power	Float	2	kvarh	R	EQ+
38	Reverse reactive power	Float	2	kvarh	R	EQ-
3A	A phase power factor	Float	2	*1000	R	Cosφ_a
3C	B phase power factor	Float	2	*1000	R	Cosφ_b
3E	C phase power factor	Float	2	*1000	R	Cosφ_c
40	A phase apparent power	Float	2	VA	R	Sa
42	B phase apparent power	Float	2	VA	R	Sb
44	C phase apparent power	Float	2	VA	R	Sc

Modbus-RTU Communication Address Information Table						
address Hex	data content	data format	data length	unit	Read/Write R/W	explain
Secondary grid data (Int/Long integer data)						
46	A phase voltage	Int	1	0.1V	R	Ua
47	B phase voltage	Int	1	0.1V	R	Ub
48	C phase voltage	Int	1	0.1V	R	Uc
49	AB phase line voltage	Int	1	0.1V	R	Uab
4A	BC phase line voltage	Int	1	0.1V	R	Ubc
4B	CA phase line voltage	Int	1	0.1V	R	Uca
4C	A phase current	Int	1	0.01A	R	Ia
4D	B phase current	Int	1	0.01A	R	Ib
4E	C phase current	Int	1	0.01A	R	Ic
4F	A phase active power	Int	1	0.01kw	R	Pa
50	B phase active power	Int	1	0.01kw	R	Pb
51	C phase active power	Int	1	0.01kw	R	Pc
52	Total active power	Int	1	0.01kw	R	ΣP
53	A phase reactive power	Int	1	0.01kvar	R	Qa
54	B phase reactive power	Int	1	0.01kvar	R	Qb
55	C phase reactive power	Int	1	0.01kvar	R	Qc
56	total reactive power	Int	1	0.01kvar	R	ΣQ
57	A phase apparent power	Int	1	0.01kVA	R	Sa
58	B phase apparent power	Int	1	0.01kVA	R	Sb
59	C phase apparent power	Int	1	0.01kVA	R	Sc
5A	total apparent apparent power	Int	1	0.01kVA	R	∑S
5B	total power factor	Int	1	0~1000	R	∑Cosφ
5C	Voltage frequency	Int	1	0.01Hz	R	FR
5D	Positive active power	Long	2	0.01kWh	R	EP+
5F	Reverse active power energy	Long	2	0.01kWh	R	EP-
61	Positive reactive power	Long	2	0.01kvarh	R	EQ+
63	Reverse reactive power	Long	2	0.01kvarh	R	EQ-
65	maximum voltage demand	Int	1	0.1V	R	UXLmax
66	maximum current demand	Int	1	0.01A	R	IXLmax
67	maximum active power demand	Int	1	0.01kw	R	PXLmax
68	maximum demand for reactive power	Int	1	0.01kvar	R	QXLmax
6B	A phase power factor	Int	1	0~1.000	R	Cosφ_a
6C	B phase power factor	Int	1	0~1.000	R	Cosφ_b

Modbus-RTU Communication Address Information Table						
address Hex	data content	data format	data length	unit	Read/ Write R/W	explain
6D	C phase power factor	Int	1	0~1.000	R	Cosφ_c
74	voltage unbalance	Int	1	0.01%	R	Navg-U
75	current unbalance	Int	1	0.01%	R	Navg-I
76	AB voltage angle	Int	1	0.01°	R	PHase_Uab
77	BC voltage angle	Int	1	0.01°	R	PHase_Ubc
78	CA voltage angle	Int	1	0.01°	R	PHase_Uca
128	Settlement date (H: day L: hour)	Int	1		R/W	Default: 00:00 on day 1
129	demand cycle	Int	1		R/W	Default: 15
12A	slip time	Int	1		R/W	Default: 1
12B	active constant	Int	1		R	
12C	meter status	Int	1		R	
12D	address of instrument	Int	1		R/W	1-247
12E	voltage ratio	Int	1		R/W	1-9999
12F	current ratio	Int	1		R/W	1-9999
130	communication baud rate	Int	1		R/W	0-5 are: 1200/2400/4800/9600 /19200/38400
131	communication data format	Int	1		R/W	0-2 are: N.8.1/O.8.1/E.8.1
132	connection system	Int	1		R/W	three phase four wire three phase three wire

Modbus-RTU Communication Address Information Table						
address Hex	data content	data format	data length	unit	Read/ Write R/W	explain
Time and rate settings						
440+2*(n-1)	Time zone n (month, day, time slot number)	MM.DD.NN	2		R/W	n is the number of time zones 1--4
460+(n-1)*m*3/2	Schedule table n (including m time slots: hour, minute, and rate number)	hh.mm.NN	m*3/2		R/W	n=2,m=14 Rate: 1 peak/2 peaks 3 flat/4 valley;