

SDM320M

DDIN Rail Smart Energy Meter for Single Phase Electrical Systems



USER MANUAL
2014 V2.0

Important Safety Information is contained in the Maintenance section. Familiarize yourself with this information before attempting installation or other procedures.

Symbols used in this document:



Risk of Danger: These instructions contain important safety information:
Read them before starting installation or servicing of the equipment



Caution: Risk of Electric Shock

1 Introduction

This document provides operating and installation instructions . The SDM320M measures and displays the characteristics of single phase two wires(1p2w) supplies, including voltage, frequency, current, power ,active energy, imported or exported. Energy is measured in terms of kWh.

SDM320M supports max. 100A direct connection,saves the cost and avoid the trouble to connect external CTs,giving the unit a cost-effective and easy operation.Built-in interfaces provides pulse and RS485 Modbus RTU outputs.

1.1 Unit Characteristics

The Unit can measure and display:

- Line Frequency
- Currents, Current demands
- Power, maximum power demand and power factor
- Active energy imported and exported
- Reactive energy imported and exported

One pulse output indicates real-time energy measurement. An RS485 output allows remote monitoring from another display or a computer.

1.2 RS485 Serial – Modbus RTU

This uses an RS485 serial port with Modbus RTU protocol to provide a means of remotely monitoring and controlling the Unit.Set-up screens are provided for setting up the RS485 port.




1.2.1 RS485 communication

Bus type	RS485
Protocol	MODBUS RTU with 16 bit CRC
Baud rate	2400, 4800,9600(default),19200,38400
Address range	1-247 user settable
Bus Loading	64 meters per bus
Communication distance	1200m
Tariff number	2(default), 4(optional)
Time period	10
Clock accuracy	≤0.5S (every 24 hours)
Battery Voltage	3.6V DC, ≥1.2Ah

1.3 Pulse output

This provides one pulse outputs that clock up measured active energy. The constant of SDM320M for active energy is 1600imp/kWh.

2.Start Up Screens



	<p>The first screen lights up all display segments and can be used as a display check</p>
	<p>The second screen indicates the firmware installed in the unit and its build number.</p>
	<p>The interface perform a self-test and indicate the result if the test passes.</p>

After a short delay, the screen will display active energy measurement.

3.Parameters Screens

After display above three start up screens,the LCD will display and stay on the total kWh screen:

	<p>Total kWh</p>
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After two successive pressing the  button,the total kWh screen will transfer to the following screens one by one.(each screen will last for 20seconds,and if there is no further press on the  button,the screen will back to and stay on the Total kWh screen)

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	Import kWh
	Export kWh
	Total kWh of T1 period
	Total kWh of T2 period
	Active power Voltage Current
	Frequency Power factor

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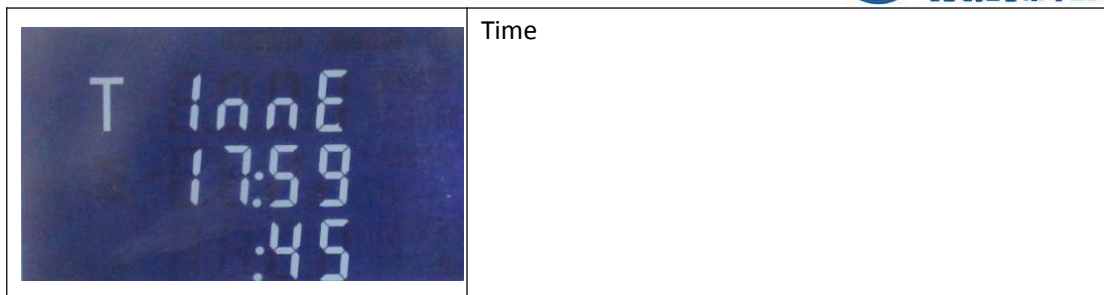
	Max. demand
	Max. Demand of T1 period
	Max. Demand of T2 period
	Address Default meter ID ranges from 001 to 247,default meter ID is 001.
	Baud rate The default baud is 9600,and 2400,4800,19200 and 38400 are optional.
	Date

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4.Set-up and data reading

4.1 Set-up

Before the set-up,it needs to set the meter into set-up model.The method is to long

press the  button for 5 seconds till the telephone symbol flash.



*Notes:all the set-up need to be done via the RS485 communication instead of operation on the meter directly

4.1.1 Set the date

For example:set the date as **2012-02-03 16:47:31(Friday)**

Send order:**01 10 F0 00 00 04 08 31 47 16 05 03 02 12 20 CRC**

(sec--min--hour--week.date—month—year--20)

Correct response:**01 10 F0 00 00 04 CRC**

4.1.2 Set 2 tariffs and 10 periods

Register format

address	function code	date starts address	register number	date bit	DATA	CRC hi	CRC lo
XX	10H	0XF700	0X000F	(30)=1EH	XXXX	XX	XX

Notes:the basic date format is NNMMHH(HH is hour,from 0 to 23,MM is minute,from 0 to 59,NN is tariff number,from 1 to 2,all the parameters are BCD code)

Example:

Set 00:00-13:01,14:01-15:01,16:01-17:01,18:01-19:01,20:01-23:50 as **Tariff 1(T1)**

Set 13:01-14:01,15:01-16:01,17:01-18:01,19:01-20:01,23:50-00:00 as **Tariff 2(T2)**

Send order:01 10 F7 00 00 0F 1E 01 00 00 02 01 13 01 01 14 02 01 15 01 01 16 02 01 17 01 01 18 02 01 19 01 01 20 02 50 23

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4.1.3 Set baud rate

Write date format

address	function code	date starts address	register number	date bit	DATA	CRC hi	CRC lo
adr	10H	0X001C	0X0001	2	New baud rate code	XX	XX

Example:Modify the baud rate as **2400** instead of default **9600**

Send order:01 10 00 1C 00 02 04 00 00 00 00CRC

*Note: 00 00 00 00 corresponds to float 0.

4.1.4 Set meter ID

Write date format

address	function code	date starts address	register number	date bit	DATA	CRC hi	CRC lo
Old adr	10H	0X0014	0X0001	2	New mete ID float code	XX	XX

Example:Modify the ID as **77** instead of default **01**

Send order 01 10 00 14 00 02 04 42 9A 00 00CRC

*Note: **42 9A 00 00** corresponds to **float 77**.

4.2 Data reading

The data can be read on the meter screen directly,also it can be achieved remotely through RS485 with parameters' corresponding register map:

For example,to read the voltage

Register format

Address (Hex)	Length (bytes)	Parameter	Access(R/W)	Data format	Units
0x0000	4	Line to neutral volts	R	Float	V

Send order 01 03 00 00 00 02 C4 0B

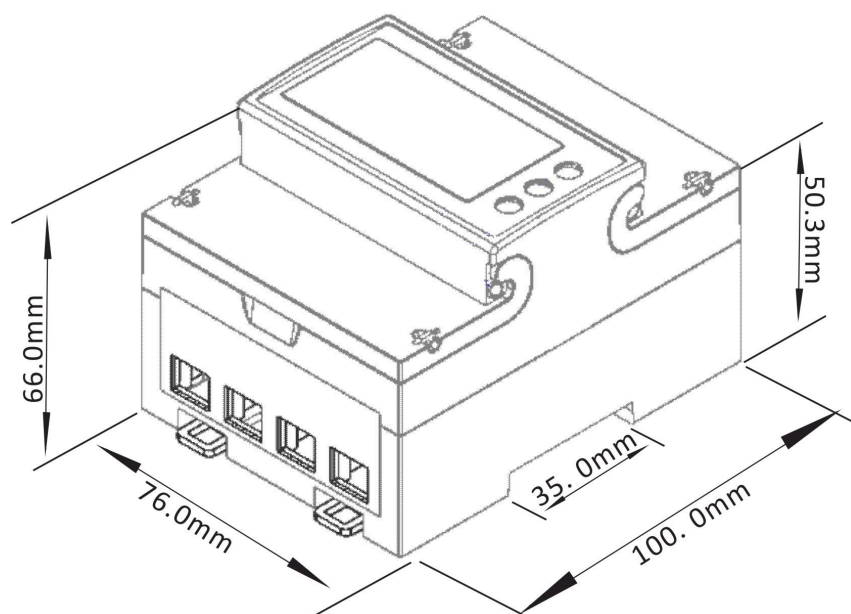
If the return value is 01 03 04 43 66 33 34 1A8F

Transfer it into float number,it's 230.2

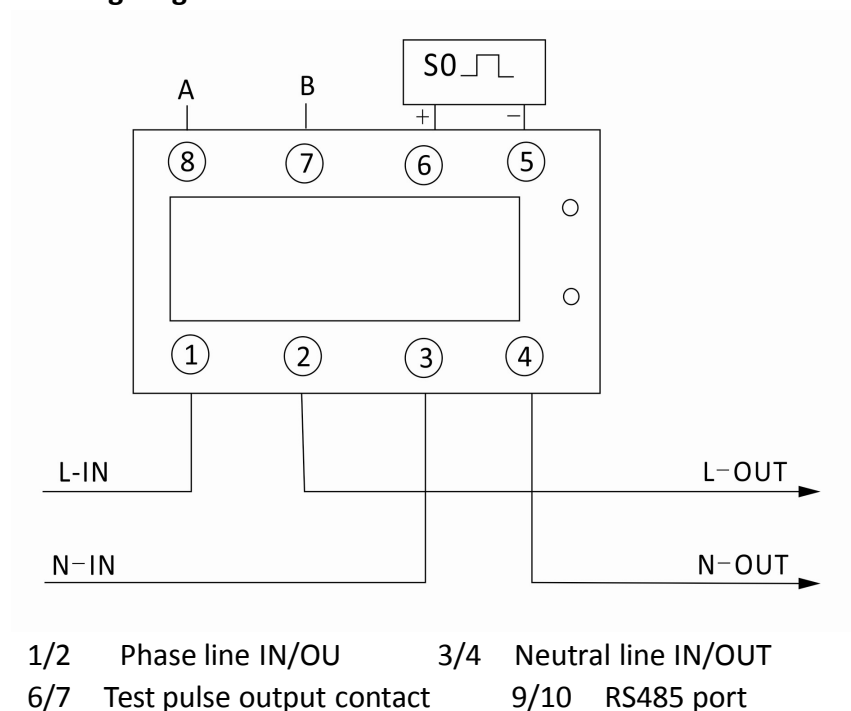
That means the voltage value is 230.2V

*Note:Other parameters can be achieved by same methods with its register map(refers to following 7.Register map)

5.Dimensions



6.Wiring diagram



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7.Register map

Part.1

*Parameters to be read by function code **04**.

Address (Register)	SDM320M Input Register Parameter			Modbus Protocol Start Address Hex	
	Description	Units	Format	Hi Byte	Lo Byte
30001	Line to neutral volts.	Volts	Float	00	00
30007	Current.	Amps	Float	00	06
30013	Power.	Watts	Float	00	0C
30019	Volt amps.	VoltAmps	Float	00	12
30025	Volt amps reactive.	VAr	Float	00	18
30031	Power factor	None	Float	00	1E
30037	Phase angle.	Degrees	Float	00	24
30071	Frequency of supply voltages.	Hz	Float	00	46
30073	Import Wh since last reset	kWh/MWh	Float	00	48
30075	Export Wh since last reset	kWh/MWh	Float	00	4A
30343	Total kwh	kwh	Float	01	56
30530	Total Last 1 month Energy (Total、Rate1、Rate2)	KWh	Float	02	11
30546	Total Last 2 month Energy (Total、Rate1、Rate2)	KWh	Float	02	21
30562	Total Last 3 month Energy (Total、Rate1、Rate2)	KWh	Float	02	31
30578	Total Last 4 month Energy (Total、Rate1、Rate2)	KWh	Float	02	41
30594	Total Last 5 month Energy (Total、Rate1、Rate2)	KWh	Float	02	51
30610	Total Last 6 month Energy (Total、Rate1、Rate2)	KWh	Float	02	61
30626	Total Last 7 month Energy (Total、Rate1、Rate2)	KWh	Float	02	71
30642	Total Last 8 month Energy (Total、Rate1、Rate2)	KWh	Float	02	81
30658	Total Last 9 month Energy (Total、Rate1、Rate2)	KWh	Float	02	91
30674	Total Last 10 month Energy	KWh	Float	02	A1

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	(Total、Rate1、Rate2)				
30690	Total Last 11 month Energy (Total、Rate1、Rate2)	KWh	Float	02	B1
30706	Total Last 12 month Energy (Total、Rate1、Rate2)	KWh	Float	02	C1
32001	Import Energy Rate 1	kWh	Float	07	D0
32003	Import Energy Rate 2	kWh	Float	07	D2
32005	Import Energy Rate 3	kWh	Float	07	D4
32007	Import Energy Rate 4	kWh	Float	07	D6
32257	Export Energy Rate 1	kWh	Float	08	D0
32259	Export Energy Rate 2	kWh	Float	08	D2
32261	Export Energy Rate 3	kWh	Float	08	D4
32263	Export Energy Rate 4	kWh	Float	08	D6
361714	Last 1 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	11
361730	Last 2 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	21
361746	Last 3 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	31
361762	Last 4 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	41
361778	Last 5 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	51
361794	Last 6 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	61
361810	Last 7 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	71
361826	Last 8 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	81
361842	Last 9 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	91
361858	Last10 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	A1
361874	Last11 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	B1
361890	Last12 month positive Energy (Total、Rate1、Rate2)	kWh	Float	F1	C1
361970	Last 1 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	11
361986	Last 2 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	21

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362002	Last 3 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	31
362018	Last 4 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	41
362034	Last 5 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	51
362050	Last 6 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	61
362066	Last 7 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	71
362082	Last 8 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	81
362098	Last 9 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	91
362114	Last 10 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	A1
362130	Last 11 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	B1
362146	Last 12 month reverse Energy (Total、Rate1、Rate2)	Kwh	Float	F2	C1
362226	Last 1 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	11
362242	Last 2 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	21
362258	Last 3 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	31
362274	Last 4 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	41
362290	Last 5 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	51
362306	Last 6 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	61
362322	Last 7 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	71
362338	Last 8 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	81
362354	Last 9 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	91
362370	Last 10 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	A1
362386	Last 11 month positive max Demand	KW	Float	F3	B1

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	(Total、Rate1、Rate2)				
362402	Last 12 month positive max Demand (Total、Rate1、Rate2)	KW	Float	F3	C1
362466	Current month reverse max Demand (Total、Rate1、Rate2)	Kw	Float	F4	01
362482	Last 1 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	11
362498	Last 2 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	21
362514	Last 3 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	31
362530	Last 4 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	41
362546	Last 5 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	51
362562	Last 6 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	61
362578	Last 7 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	71
362594	Last 8 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	81
362610	Last 9 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	91
362626	Last 10 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	A1
362642	Last 11 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	B1
362658	Last 12 month reverse max Demand (Total、Rate1、Rate2)	KW	Float	F4	C1
362738	Time of max. demand in current month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	11
362754	Time of max. demand in Last 1month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	21
362770	Time of max. demand in Last 2 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	31
362786	Time of max. demand in Last 3 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	41
362802	Time of max. demand in Last 4 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	51
362818	Time of max. demand in Last 5 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	61

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362834	Time of max. demand in Last 6 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	71
362850	Time of max. demand in Last 7 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	81
362866	Time of max. demand in Last 8 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	91
362882	Time of max. demand in Last 9 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	A1
362898	Time of max. demand in Last 10 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	B1
362914	Time of max. demand in Last 11 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	C1
362930	Time of max. demand in Last 12 month (Total、Rate1、Rate2)	MM DD.HH:mm	BCD	F5	D1
362002	Current month positive max Demand (Total、Rate1、Rate2)	KW	Float	FA	01
364259	Current month reverse max Demand (Total、Rate1、Rate2)	KW	Float	FB	01

Part.2

*Parameters to be setted by function code **10**,and to be read by function code **04**.

Address Register	Input Register Parameter		Modbus Protocol Start Address Hex		Description
	Parameter	Format	High Byte	Low Byte	
40021	Meter ID	Float	00	14	Ranges from 1 to 247,and requires restart to become effective. Default ID is 1
40029	Network Baud Rate	Float	00	1C	Write the network port baud rate for MODBUS Protocol: 0 = 2400 baud. 1 = 4800 baud. 2 = 9600 baud(default) 3 = 19200 baud 4 = 38400 baud 5=1200 baud Requires a restart to become effective

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461441	Time	BCD	F0	00	sec--min--hour--week. Date—Month—Year--20 (Modify the date and time with one order at same time)
462721	Demand interval、 slide time、 Display time、 LED time	BCD	F5	00	min-min-s-min Display time=0 do not display in turns LED time=0 always on
463233	Tariff	BCD	F7	00	Tariff number-Min-Hour

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