SDM320C-LR

Smart Single Phase Energy Meter

USER MANUAL

2025 V1.01

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Statements

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CONTENT

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Version History

Version	Date	Changes
1.00	2025-6-3	Initial issue
1.01	2025-9-18	Change the contact type of DI

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Risk Information

Information for Your Own Safety

This manual does not contain all of the safety measures operating the equipment (module, device) for different conditions and requirements. However, it does contain information which you must know for your own safety and to avoid damages. These information are highlighted by a warning triangle indicating the degree of potential danger.

Warning

This means that failure to observe the instruction can result in death, serious injury or considerable material damage.

Caution

This means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage.

Qualified personnel

Operation of the equipment (module, device) described in this manual may only be performed by qualified personnel. Qualified personnel in this manual means person who are authorized to commission, start up, ground and label devices, systems and circuits according to safety and Regulatory standards.

Proper handling

The prerequisites for perfect, reliable operation of the product are proper transport, proper storage, installation and proper operation and maintenance. When operating electrical equipment, parts of this equipment automatically carry dangerous voltages. Improper handling can therefore result in serious injuries or material damage.

- ✧ Use only insulating tools.
- ✧ Do not connect while circuit is live (hot).
- ✧ Place the meter only in dry surroundings.
- ✧ Do not mount the meter in an explosive area or expose the meter to dust, mildew and insects.
- ✧ Make sure the wires are suitable for the maximum current of this meter.
- ✧ Make sure the AC wires are connected correctly before activating the current/voltage to the meter.
- ✧ Do not touch the meter connecting clamps directly with metal, blank wire and your bare hands as you may get electrical shock.
- ✧ Make sure the protection cover is placed after installation.
- ✧ Installation, maintenance and reparation should only be done by qualified personnel.
- ✧ Never break the seals and open the front cover as this might influence the function of the meter, and will cause no warranty.
- ✧ Do not drop, or allow strong physical impact on the meter as the high precisely components inside may be damaged.
- ✧ Designed to be mounted inside of switchboards or cabinet on DIN rail.
- ✧ This device must have a suitable sized Circuit Breaker feeding the Multi Function Energy Meter so it

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does not exceed the maximum rated current.

- ✧ The supply wiring of this device shall be suitable sized cable to match the installed circuit breaker.
- ✧ A Disconnection Device (Circuit Breaker) should be installed close to the Multi Function Energy Meter.
- ✧ The Disconnection Device shall be marked as the Disconnection Device for the Multi Function Energy Meter.

Disclaimer

We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible.

However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors contained in the information given. The data in this manual is checked regularly and the necessary corrections are included in subsequent editions. We are grateful for any improvements that you suggest.

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Chapter 1. Introduction

1.1 Product Introduction

SDM320C-LR measures and displays the characteristics of single phase two wire (1p2w), including voltage, frequency, current, power, active and reactive energy, imported or exported. Energy is measured in terms of kWh, kVArh. Maximum demand current can be measured over preset periods of up to 60 minutes.

The meter is Max. 100A direct connected and do not need to connect with external current transformers(CT). LoRa communication is available on the meter for long distance wireless data transmission.

1.2 Product Characteristics

- Bi-directional measurement IMP & EXP
- Multi-parameters measurement
- LCD with white backlit, adjustable backlit time
- LoRaWan communication

Measurements:

- Phase voltage: V
- Current: A
- Active power: W
- Frequency: Hz
- Power factor: PF
- Active energy: Ep_imp (import active energy), Ep_exp (export active energy), Ep_total (total active energy)
- Reactive energy: Eq_imp (import reactive energy), Eq_exp (export reactive energy), Eq_total (total reactive energy)
- Maximum demand: MD

Setup:

- Demand interval time
- Backlit time
- Clear Max. demand info
- Password modification

1.3 LoRaWAN Classes

Eastron LoRaWAN energy meter is implement Class C functionality. The device will upload message after receiving the data sent from the network.

1.4 Active Upload Mode

The device also can be customized to active upload mode. Total 19 parameters can be set for automatic uploading.
Interval time can be set from 0 to 255 through communication. 0 means the function is OFF. If there are many parameters, the interval shouldn't be set too short in case of conflicting on data uploading.
The meter will upload automatically once it joins the network. And after the interval time, it will upload again. The interval time is calculated since the last data uploading. Sometimes the interval time may have around 1-2 minutes difference due to the time error.

1.5 Join

The unit uses standard LoRaWAN protocol for long range communication. Before Communication, the meter has

to join the LoRaWAN network first.
There are two Activation Ways for Joining: OTAA(Over-the-Air Activatioin) and ABP(Activation by Personalization).

To ensure the meter join gateway successfully, below information must be confirmed:

I. DevEui, AppEui, Appkey or DevAddr, NwkSKey, AppSKey information are correctly recorded into the gateway.
II. The Uplink and downlink frequency are same as the gateway.
III. RX2 (frequency and SF) information are same as the gateway.

If the Join delay function is ON, the meter will join the network with a few seconds delay by random.

1.6 Join Delay

When Join delay function is ON, the meter will join the LoRaWAN network with a few seconds delay after booting.
When Join delay function is OFF, the meter will join the LoRaWAN network once the power is on.

1.7 Communication

LoRaWAN meter communicate based on international general purpose protocol. The communication data is placed in data segment of LoRaWAN protocol, they will be appointed follow the specified command format.

The format of standard LoRaWAN is shown below:

Radio PHY layer:

Preamble	PHDR	PHDR_CRC	PHYPayload				CRC*
			MHDR	MACPayload		MIC	
			MHDR	FHDR	Fport	FRMPayload	MIC

Note:CRC* is only available on uplink messages

The following description of the text is defined the data in the segment of FRMPayload region in LoRaWAN protocol. The software in PC only need to get this part of data from gateway. According to the following protocol definition to parse the data.

The data format and encoding of meter communication protocol are modified based on the Modbus ASCII transmission mode. Remove the start and end characters from the Modbus ASCII transmission mode and change LRC validation to CRC validation.

Encoding of data: communication data is encoded with ASCII, and each byte of data is sent with two ASCII characters.
E.g.: a byte data 0x5b is encoded as two characters: 0x35 and 0x62 (ASCII code 0x35= "5", 0x62= "b")

Command format definition:
I: The data format of the gateway sending the copy command:

Reserved	Function Code	The first Address of The Register to Read Data	The Number of Registers to Read Data	CRC Check Codes

1byte	1byte	2byte	2byte	2byte

Note: the reserved bit is fixed as 0x01

II: the data format returned by the meter after receiving the copy command:

Reserved	Function Code	The Length of Data Returned	Specific Data Returned by The Meter	CRC Check Codes
1byte	1byte	1byte	N byte	2byte

Note: the reserved bit is fixed as 0x01

III: Note: the above commands need to be ASCII, so 1byte data will have 2 characters.

E.g.

1). Suppose to read the current data of the meter L1, the data sent by the gateway is the ASCII coded data as shown in the following table:

Reserved		Function Code		The first Address of The Register to Read Data				The Number of Registers to Read Data				CRC Check Codes				
0x01		0x04		0x00		0x06		0x00		0x02		0x91		0xca		Hexadecimal Data
0x30	0x31	0x30	0x34	0x30	0x30	0x30	0x36	0x30	0x30	0x30	0x32	0x39	0x31	0x63	0x61	ASCII Coded Data
"0"	"1"	"0"	"4"	"0"	"0"	"0"	"6"	"0"	"0"	"0"	"2"	"9"	"1"	"c"	"a"	ASCII Character

Note: the first address of the register of the meter L1 current is 00 06 and the number of registers is 2.

2) After receiving the above command, the meter will return the current L1 current data of the meter, as shown in the following table after ASCII coding.

Reserved		Function Code		The Length of Data Returned		current L1 current data of the meter						CRC Check Codes				
0x01		0x04		0x04		0x40		0xa0		0x00		0xee		0x66		Hexadecimal Data
0x30	0x31	0x30	0x34	0x30	0x30	0x34	0x30	0x61	0x30	0x30	0x30	0x30	0x30	0x65	0x65	0x36	0x36	ASCII Coded Data
"0"	"1"	"0"	"4"	"0"	"0"	"4"	"0"	"a"	"0"	"0"	"0"	"0"	"0"	"e"	"e"	"6"	"6"	ASCII Character

Note: Assume that the current meter's L1 current is 5.0A, since the data is in floating point format, the Hex data is converted to 0x40, 0xa0, 0x00 and 0x00.

To ensure the successful communication, below information must be confirmed:

1. The command is sent through Class C mode.
2. The command is sent in ASCII format.

Chapter 2. Technical Parameters

2.1 Technical Parameters

Voltage AC (Un)	230V AC
Voltage Range	100 - 277V AC(L-N)
Current Input	0.25-5(100)A
Starting Current (Ist)	0.02A
Transition Current (Itr)	0.5A
Over Current Withstand	30Imax for 0.01S
Frequency Rating Value	50/60Hz
AC Voltage Withstand	4KV/1min
Impulse Voltage Withstand	6kV – 1.2/50μS waveform
Voltage Circuit Power Consumption	≤ 2W/10VA
Current Circuit Power Consumption	≤3VA
Display	LCD with white backlit
Max. reading	999999.99 kWh/kVArh

2.2 Mechanical Characteristics

Net Weight	≈352g
IP Degree of Protection (IEC 60529)	IP51 front display IP20 whole meter
Dimensions (DxHxW)	76.5*96.5*76mm
Mounting	DIN Rail 35mm
Material of Meter Case	Self-extinguishing UL 94 V-0
Mechanical Environment	M1

2.3 Performance Criteria

Operation Humidity	≤90% Non-condensing
Storage Humidity	≤95% Non-condensing
Operating Temperature	-40℃~+70℃
Storage Temperature	-40℃~+80℃
Pollution Degree	2
Altitude	≤2000m
Vibration	10Hz to 50Hz, IEC 60068-2-6

2.4 Electromagnetic Compatibility

Electrostatic Discharge	IEC 61000-4-2
Immunity to Radiated Fields	IEC 61000-4-3
Immunity to Fast Transients	IEC 61000-4-4
Immunity to Impulse Waves	IEC 61000-4-5
Conducted Immunity	IEC 61000-4-6
Immunity to Magnetic Fields	IEC 61000-4-8
Immunity to Voltage Dips	IEC 61000-4-11
Radiated Emissions	EN55032 Class B

Conducted Emissions	EN55032 Class B

2.5 Safety

Over-voltage Category	CAT III
Installation Category	CAT III
Insulating Encased Meter of Protective Class	II

2.6 Accuracy

Parameters	Accuracy	Resolution
Voltage	±0.5%	0.1V
Current	±0.5%	0.001A
Frequency	±0.2%	0.01Hz
Power Factor	±0.01	0.001
Active Power	±1%	0.001kW
Reactive Power	±1%	NA
Apparent Power	±1%	NA
Active Energy	Class 1 IEC62053-21 Class B EN50470-3:2022	0.01kWh
Reactive Energy	Class 2 IEC 62053-23	0.01kVArh

2.7 Digital input

This meter is furnished with an internal relay and features a single digital input (DI) channel. In the absence of a DI signal, the relay remains in a normally - closed state. Upon the detection of a valid DI input by the m eter, the relay will transition to an open state. To restore the relay to its closed state after it has opened, a m anual command must be issued.

Contact type	Wet Contact
Input resistance	10k Ω
Max.frequency	1kHz
Response time	10ms
Isolation	2.5KV ac for 1min

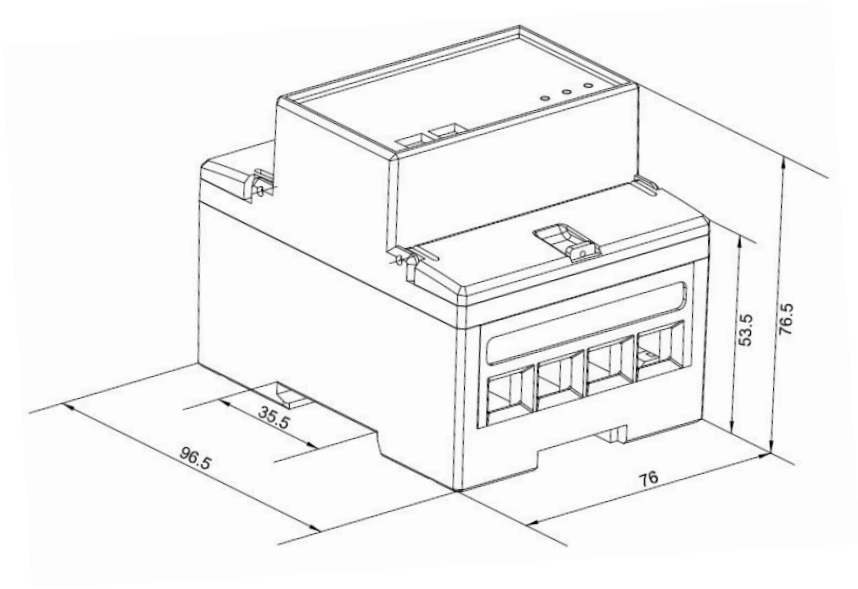
2.8 Outputs

2.8.1 LoRaWan

Interface standard and protocol	LoRaWAN Specification 1.0.2
Frequency	EU868/AS923/AU915...
LoRaWAN Class	Class C
Auto-upload	Max. 19 parameters
Auto-upload Interval	Configurable
Activation Way	OTAA or ABP
Output Power	13dBm in transmission
Coding Format	ASCII

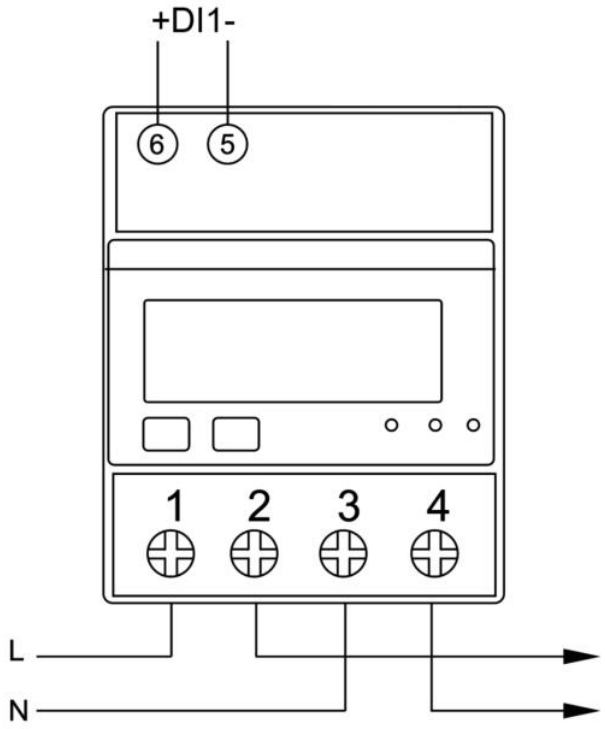
Communication Distance	3000M in an open area

2.9 Dimensions



Height: 96.5mm
Width: 76mm
Depth: 76.5mm

2.10 Wiring Diagram



Wiring Guide

Terminal 1~4	Measurement Connection	Screw Connection
	Strip Length	12-13mm
	Screw	M5
	Rigid/Supple	4-25mm² (11~3AWG)
	Tightening Torque	3.5Nm
	Model	PH2
Terminal ⑤⑥	Measurement Connection	Screw Connection
	Strip Length	5-6mm
	Rigid/Supple	0.5-1.5mm² (22 ~ 14AWG)
	Tightening Torque	0.4Nm
	Model	PH0

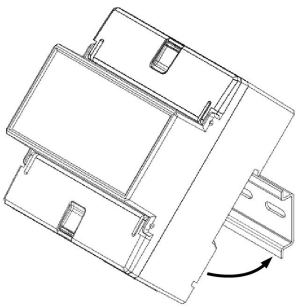
Installation

Step 1: Select a 35mm-wide DIN rail, Pull down the back-end clip on the meter to unlock the mounting mechanism.

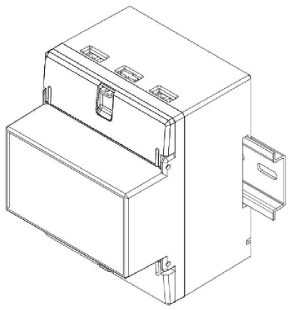
Step 2: Align Upper Slot with DIN Rail. Position the upper slot of the meter's DIN rail groove onto the DIN rail, ensuring full contact (see Figure 1).

Step 3: Following the direction indicated in Figure 1, engage the lower slot of the DIN rail groove onto the DIN rail until audibly seated (see Figure 2).

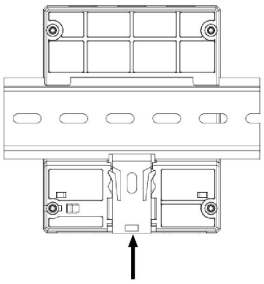
Step 4: Push up the back-end clip to lock the meter firmly onto the DIN rail (see Figure 3).



①



②



③

Chapter 3. Operation

3.1 Installation Display

	The first screen lights up all display segments and can be used as a display check.
	The second screen show software version. Note： the actual display may be differ from the picture show in left.
	The third screen show program number. Note： the actual display may be differ from the picture show in left.
	The interface performs a self-test and indicates the result if the test passes.

3.2 Button Functions

	◆ In measurement mode: Short press: switch display screen Long press: cyclic redundancy check code ◆ In setup mode: Short press: next page or increase value Long press: back to previous menu
	◆ In measurement mode: Long press: enter setup mode ◆ In setup mode: Short press: move the cursor Long press: confirm setting

3.3 Measurements

Each successive pressing of the  button selects a new range:

Can be viewed by pressing the button：
Total active energy in kWh →Imported active energy in kWh → Exported active energy in kWh → Total reactive energy in kVArh→ Imported reactive energy in kVArh → Exported reactive energy in kVArh→I voltage → Current → Instantaneous active power in W → Power factor → Frequency → Maximum total power demand → Software version

	Total active energy in kWh
	Imported active energy in kWh
	Exported active energy in kWh
	Total reactive energy in kVArh
	Imported reactive energy in kVArh

	Exported reactive energy in kVArh
	voltage
	Current
	Instantaneous active power in W
	Power factor
	Frequency
	Maximum total power demand

	Software version

3.4 Auxiliary Mode

Each successive Long pressing of the  button enter the auxiliary mode:

	CRC-high bytes
	CRC-low bytes

3.5 Setup Mode 1

The meter's settable parameters are password protected. Long pressing on the  button will allow you to enter the setup mode. Some menu items, such as password, require a four-digit number entry, while others require selection from a number of menu options,such as baud rate.

1.Long press  button, entering the password "1000", long-press again to enter setup mode

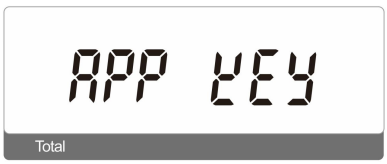
2.Short press  button, select the settings menu;

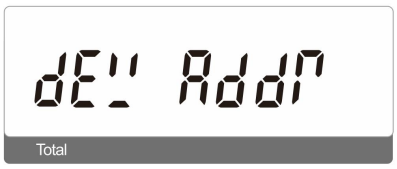
3.Long press  button to access the edit interface, short press  button to select the required settings, long-press  again to confirm the setting;

4.Long press  button to return to the higher menu level.

Settings interface	Set status	Optional configuration

		**Password** Default: 1000
		**Demand interval time setting** Range: 00 ~60min Default: 60min
		**CLR Max.demand**
		**Auto-Cycle display time setting** Range: 00~30 S Default: 0 S
		**Backlit time setting** Option: OFF, 5, 10, 20, 30, 60 min Default: 60 min
		**Automatic disconnection function setting** Option: F0, F1, F2 Default: F0 F0: The relay is completely controlled by communication commands and does not follow DI signals. F1: No DI signal, relay disconnected. After receiving the DI signal, communication sends a command to close the relay. F2: No DI signal, relay disconnected. There is a DI signal and the relay is closed.

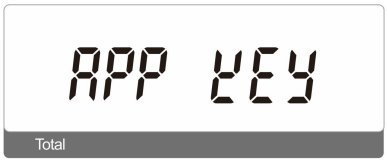
		**DI filter time setting** Range: 000~255 mS Default: 100 mS
		**Password setting** Range: 0000~9999 Default: 1000
		**DevEui: end-device identifier** **********(16 digits) -High 8 digits in first page
		-low 8 digits in 2nd page
		**AppEui: application identifier** **********(16 digits) -High 8 digits in first page
		-low 8 digits in 2nd page
		**AppKey: application key** **********(32 digits) *The 32 digits is partially displayed only the first 6 and last 6 digits are visible on the meter

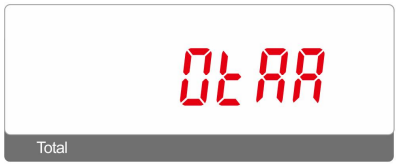
		**View ADR settings**
		**Join status**
		**View Join mode setting**
		**Auto** 1.Upload Option: ON/OFF
		2.Interval Time Option: 5, 30, 60, 90, 120, 150, 180, 210, 240 min Default: 5 min
		**View Confirm Mode setting**
		**Dev address** ********(8 digits) Default: last 8 digits of SN

3.6 Setup Mode 2

1.Long press  button, entering the password ”3308”, long-press  and  button to gether to enter setup mode 2;

In set up mode 2, all the changes must be saved by performing a long press on the Save screen.

Settings interface	Set status	Optional configuration
		**Password** Default: 3308
		**Join status**
		**DevEui: end-device identifier setting** **********(16 digits)
		**AppEui: application identifier setting** **********(16 digits)
		**AppEui: application key setting** **********(32 digits)
		**ADR setting** Option: ON,OFF

		**Confirm Mode** Option: ON/OFF
		**Join mode** Option: OTAA,ABP
		**SAVE setting** *Any changes made above must be saved by performing a long press on the Save screen.
		**Re-JOIN setting** *This function allows the meter re-join the network when disconnected.
		**Auto upload setting**
		**Join delay setting** Option: ON,OFF
		**OFFLINE setting** Option: 0, 30, 60, 90, 120, 150, 180, 210, 240min Default: 30 min

Chapter 4. Declaration of Conformity (For MID meter only)

We, Zhejiang Eastron Electronic Co., Ltd. declares under our sole responsibility as the manufacturer that the three phase multi-function electrical energy meter SDM320C-LR correspond to the production model described in the EU-type examination certificate and the requirements of the Directive 2014/32/EU.
Type examination certificate number T 12870.
Identification number of the Notified Body: 0598.

If you have any question, please feel free to contact our sales team.

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