SDM230 Series

Single Phase Two Wires Multifunction Din Rail Meter

User Manual V1.9

Safety Instruction

The Installation instructions do not include a complete list of all safety measures necessary for operating the device. Special operating conditions may require additional measures. The installation instructions contain notes that must be observed for your personal safety to prevent property damage.
Safety instructions in this document are highlighted with a warning triangle and are presented as follows depending on the level of risk.

The General warning symbol calls attention to possible risks of injury. Observe all the instructions listed under the symbol to prevent injuries or even death

This additional symbol indicates any electrical danger that can result in serious injuries or death

Attention

Warns of an imminently dangerous situation that can result in property damage or environmental damage in the event of noncompliance

1.Introduction

This document provides operating, maintenance and installation instructions of SDM230 series made by Eastron Electronic Co., Ltd. The SDM230 series measure and display the characteristics of single phase two wires (1p2w) network. The SDM230 series covers 5 models:SDM230-Modbus,SDM230-Pulse,SDM230-Mbus, SDM230-2T and SDM230M-DI.

The bi-directional measurement makes the meter suitable for import and export energy and power monitoring applications, and also perfect for solar PV measurements. With RS485 Modbus and M-bus port, the meter is easy to remote communicate with other AMR/SCADA systems.

Model	Measurements	Communi-cation	Pulse Outputs	Multi Tariffs
SDM230-Modbus	U, I, P, Q, S, PF, Hz, Dmd, kWh, kVArh, Import, Export	RS485 Modbus	1: configurable 2: 1000imp/kwh	NO
SDM230-Mbus	U, I, P, Q, S, PF, Hz, Dmd, kWh, kVArh, Import, Export	M-bus EN13757-3	1: configurable 2: 1000imp/kwh	NO
SDM230-Pulse	U, I, P, Q, S, PF, Hz, Dmd, kWh, kVArh, Import, Export	NO	1: configurable 2: 1000imp/kwh	NO
SDM230-2T	U, I, P, Q, S, PF, Hz, Dmd, kWh, kVArh, Import, Export	RS485 Modbus	1: configurable 2: 1000imp/kwh	2 Tariffs (Dual source)
SDM230 M-DI	U, I, P, Q, S, PF, Hz, Dmd, kWh, kVArh, Import, Export	RS485 Modbus	NO	NO

1.1 Key Characteristics

- Bi-directional measure and display
- Multi-function measurements
- Two pulse outputs
- RS485 Modbus / M-bus
- 100A direct connection
- Two module size (35mm)
- Password protected set-up
- Backlighted LCD display
- 2 tariffs dual power source
- 2 Digital Inputs

1.2 Pulse Output

The meter provides two pulse outputs. Both pulse outputs are passive type.
Pulse output 1 can be set to generate pulses to represent total / import/export kWh or kVArh.
The pulse constant can be set to generate 1 pulse per: 0.001/0.01/0.1/1kWh/kVArh (default is 0.001 export kWh).
Pulse width: 200/100/60ms
Pulse output 2 is non-configurable. It is fixed with active kWh (Imp). The constant is 1000imp/kWh.

1.3 RS485 Serial – Modbus RTU

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.

1.4 Mbus for SDM230-Mbus

This unit has an M-BUS serial port with M-BUS protocol to provide a means of remotely monitoring and controlling the unit. Set-up screens are provided for setting up the M-bus port.

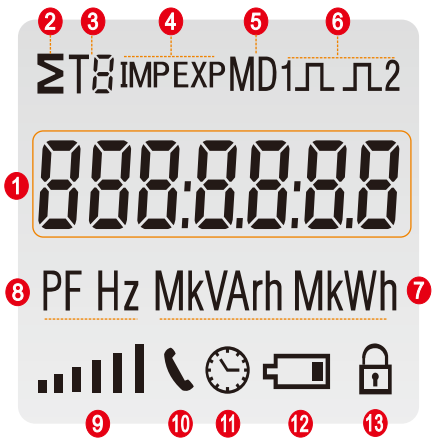
1.5 Dual Source Measurement for SDM230-2T

This unit can measure energy from two different power supplies. For example, when public grid is power off and electric generator is on, the meter switches to tariff 2 measurement automatically.

The meter can also be used as a tariff meter. The tariff is controlled by an external time relay.

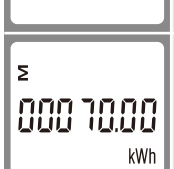
2.Operation

2.1 LCD Display



NO.	Descriptions
1	7 digits used to display measured values
2	Total value
3	Tariff information
4	Import information, Export information
5	Max. Demand for power or current.
6	Pulse output 1and Pulse output 2
7	Measurement units
8	PF = power factor Hz = frequency
9	Bar display of power
10	Communication indicator
13	Lock symbol

2.2 Initialization Display

	All display segments light up, display check.
	Software Version (This information is for reference only, in kind pervail.)
	Modbus ID or Mbus Primary Address
	Mbus Secondary Address (High) (for SDM230-Mbus only)
	Mbus Secondary Address (Low) (for SDM230-Mbus only)
	Baud Rate.
	Total kWh.

2.3 Scroll Display by Buttons

After initialization and self-checking program, the meter display the measured values. The default page is total kWh. If the user wants to check other information, he needs to press the scroll button on the front panel.

The display order by scroll button : ⟲

***For SDM230-Modbus:**

Total kWh→ Import kWh→Export kWh→ Resettable kWh→ Total kVArh→Import kVArh→ Export kVArh→Resettable kVArh → Max. Power Demand→ Voltage →Current→W→ VAr → VA→ Power Factor→Frequency →Pulse Constant→ Modbus ID →Baud Rate →Continuous Running Time
Display No:1,4~7,10~24.

***For SDM230-Pulse:**

Total kWh→ Import kWh→Export kWh→ Resettable kWh→ total kVArh→Import kVArh→ Export kVArh→resettable kVArh → Max. Power Demand→ Voltage →Current→W VAr →VA→ Power Factor→Frequency →Pulse Constant
Display No:1,4~7,10~21.

***For SDM230-2T:**

Total kWh→ T1 total kWh→ T2 total kWh→Import kWh→ Export kWh →resettable kWh→Total kVArh→T1 total kVArh→T2 total kVArh→Import kVArh→ Export kVArh→ resettable kVArh→Max. Power Demand→ Voltage → Current→W→ Var →VA→Power Factor→Frequency →Pulse Constant→Modbus ID →Baud Rate →Continuous Running Time
Display No: 1~24.

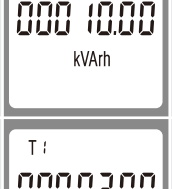
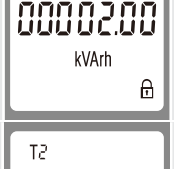
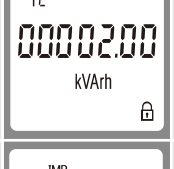
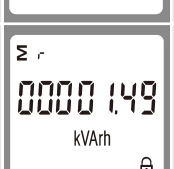
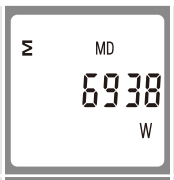
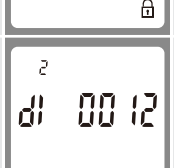
***For SDM230-Mbus:**

Total kWh→ Import kWh→Export kWh→ Resettable kWh→Total kVArh→Import kVArh→ Export kVArh→ Resettable kVArh→ Max. Power Demand→ Voltage → Current→W→ VAr →VA→ Power Factor → Frequency → Pulse Constant→ Mbus Primary Address→Mbus Secondary Address→ Baud Rate→Continuous Running Time
Display No:1,4~7,10~24.

***For SDM230M-DI:**

Total kWh→ Import kWh→Export kWh→ Resettable kWh →Total kVArh→Import kVArh→ Export kVArh→ Resettable kVArh→ Max. Power Demand → Voltage → Current → W → VAr → VA → Power Factor → Frequency → DI1 → DI2 → Modbus ID → Baud Rate → Continuous Running Time
Display No:1,4~7,10~20,22~26.

Scroll display by buttons:

No.	Display	Descriptions
1		Total active energy Example:70.00kWh
2		T1 active energy Example: 10.00kWh (for SDM230-2T only)
3		T2 active energy Example: 10.00kWh (for SDM230-2T only)
4		Import active energy Example: 50.00kWh
5		Export active energy Example: 20.00kWh
6		Resettable total active energy
7		Total reactive energy Example: 10.00kVArh
8		T1 reactive energy Example: 2.00kVArh (for SDM230-2T only)
9		T2 reactive energy Example: 2.00kVArh (for SDM230-2T only)
10		Import reactive energy Example: 5.00kVArh
11		Export reactive energy Example: 5.00kVArh
12		Resettable total reactive energy
13		Max. power demand Example: 6938W
14		Voltage Example: 229.8V
15		Current Example: 30.156A
16		Active power Example: 4700W
17		Reactive power Example: 1030VAr
18		Apparent power Example: 4811VA
19		Power factor Example: 1.000
20		Frequency Example: 49.99Hz
21		Pulse 2 constant Example: 1000
22		Modbus address Example: 001 Mbus primary address Example:001
22-1		High and low bit of MBUS Secondary address (Default: same as SN) Example: if the Secondary address high bit is 0000, low bit is 0001, the integral Secondary address is 00 00 00 01 (for SDM230-Mbus only)
23		Baud rate Example: 9600
24		Continuous running time (since last time reset)
25		DI 1 counting number
26		DI 2 counting number

2.4 Set-up Mode

To get into Set-up Mode, the user needs to press the "Enter" button ↵ for 3 seconds.

	The setting is done correctly

	Err	The entering information is wrong. The operation fails.
1	PASS 0000	Password To get into Set-up mode, it asks a password confirmation. Default password: 1000
2	Add 001	Address For Modbus: Default ID is 001 Range: 001~247 For Mbus: Primary address ID Default ID is 001 Range:001~250
2-1	Add 001	Press the “Enter” button, the first digit flash. Press the “Scroll” button to change the value. After choosing the new address value, the user needs to press the “Enter” button to confirm the setting.
2-2	1 dH 0000	High bit of Mbus secondary address (for SDM230-Mbus only)
	1 dL 0001	Low bit of Mbus secondary address Example: if the secondary address high bit is 0000,low bit is 0001,the integral Secondary address is 00 00 00 01 (for SDM230-Mbus only)
3	bd 9600	Baud rate for Modbus Default value: 9600bps Range: 1200, 2400, 4800, 9600, 19200, 38400bps. Baud rate for Mbus: Default value: 2400bps Range:300, 600, 1200, 2400, 4800, 9600bps.
3-1	bd 9600	Press the “Enter” button, the red part flash. Press the “Scroll” button to change the value. After choosing the new baud rate, the user needs to press the “Enter” button to confirm the setting.
4	PrtY n	Parity Default: None Option : None, Even, Odd
4-1	PrtY n	Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new parity, the user needs to press the “Enter” button to confirm the setting.
5	PLS oUt kWh	Pulse output 1 Default: Exp kWh Option:kWh / KVArh / Imp. kWh / Exp.kWh / Imp.kVArh / Exp.kVArh
5-1	PLS oUt kWh	Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new pulse output option, the user needs to press the “Enter” button to confirm the setting.
6	PLS cSt	Pulse constant Default: 1000 Option: 1000 / 100 / 10 / 1
6-1	cSt 1000	Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new pulse constant option, the user needs to press the “Enter” button to confirm the setting.
7	PLS t	Pulse duration Default: 100mS Option: 200 / 100 / 60mS
7-1	PLSt 200	Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new pulse duration option, the user needs to press the “Enter” button to confirm the setting.
8	dIt SEt	Demand integration time Default: 15 min Option: off(0) / 5 / 10 / 15 / 30 / 60
8-1	dIt 15	Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new DIT option, the user needs to press the “Enter” button to confirm the setting.
9	ScrL t	Automatic scroll time interval Default: 0 S Option: 0 ~ 30S
9-1	t 30 S	Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new “Scroll” option, the user needs to press the “Enter” button to confirm the setting.
10	LP SEt	Backlit lasting time Default: 60 min Option: 0(off)/ 5/ 10/ 20/ 30/ 60 Long press “Enter” button to enter set-up mode.
10-1	LP 60	Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new “Scroll” option, the user needs to press the “Enter” button to confirm the setting.
11	clr	Clear Long press “Enter” button to enter the clear interface.
11-1	MD clr	Clear Max. demand of active power Long press the “Enter” button to confirm the operation.
12	Σ r clr kVArh kWh	Clear the resettable energy Long press the “Enter” button to confirm the operation.
13	SEtPASS	Password Default: 1000
13-1	PAS 1000	Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new “Scroll” option, the user needs to press the “Enter” button to confirm the setting.
14	dI FLtP	DI-filtering time Default: 100ms
15	FLtP 100	Press the “Enter” button, the red part flash. Press the “Scroll” button to choose the filter time . Options 100ms/200ms.
16	Good	Press & hold the “Enter” button to confirm the change to the option you have selected.

3.Specifications

3.1 General Specifications

Voltage AC (Un)	230V
Voltage range	176~276V AC
Base current (Ib/Iref)	10A
Max. current (Imax)	100A(65A for ETL version)
Mini current (Imin)	0.5A
Starting current	0.4% of Ib/Iref
Power consumption	＜2W/10VA
Frequency	50Hz(for MID version) 50/60Hz ± 2% (for non-MID version)
AC voltage withstand	4KV for 1 min
Impulse voltage withstand	6KV-1.2uS waveform
Over current withstand	30Imax for 0.01s
Pulse 1 output rate	configurable, default 1000i/kWh
Pulse 2 output rate	non-configurable,1000i/kWh
Display	LCD with backlit
Max. reading	999999.9kWh

3.2 Accuracy

Voltage	0.5% of range maximum
Current	0.5% of nominal
Frequency	0.2% of mid-frequency
Active power	1% of range maximum
Reactive power	1% of range maximum
Apparent power	1% of range maximum
Active energy	Class 1 IEC62053-21 Class B EN50470-1/3
Reactive energy	Class 2 IEC62053-23

3.3 Environment

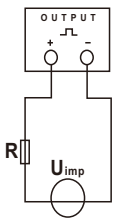
Operating temperature	-25℃ to +55℃
Storage/transportation temperature	-40℃ to +70℃
Reference temperature	23℃ ± 2℃
Relative humidity	0 to 95%, non-condensing
Installation category	CAT III
Mechanical environment	M1
Electromagnetic environment	E2
Degree of pollution	2

*Maximum operating and storage temperatures are in the context of typical daily and seasonal variation.

3.4 Pulse Output

Not for SDM230M-DI

The pulse output 1 can be set to generate pulses to represent total kWh, total kVArh,import kWh, export kWh,import kVArh, export kVArh.
Constant can be set to 1000/100/10/1 impulse per kWh or kVArh.
Pulse width 200/100/60mS.

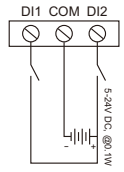


ATTENTION: Pulse output must be fed as shown in the wiring diagram on the left. Scrupulously respect polarities and the connection mode. Opto-coupler with potential-free SPST-NO Contact.

Contact range:5~27VDC
Max. current Input:27mA DC.

3.5 Digital Inputs

***For SDM230M-DI only**



The meter equipped with two digital inputs. An input signal is detected on a digital input if a voltage of at least 5V and maximum 24V DC@0.1W is applied.

3.6 RS485 Output for Modbus RTU

***Not for SDM230-Pulse or SDM230-Mbus**

The meter provides a RS485 port for remote communication. Modbus RTU is the protocol applied. For Modbus RTU, the following RS485 communication parameters can be configured from the set-up menu.
Baud rate: 1200, 2400, 4800, 9600, 19200, 38400 bps
Parity: NONE/ODD/EVEN
Stop bits: 1 or 2
Modbus Address: 1 to 247

3.7 Mbus

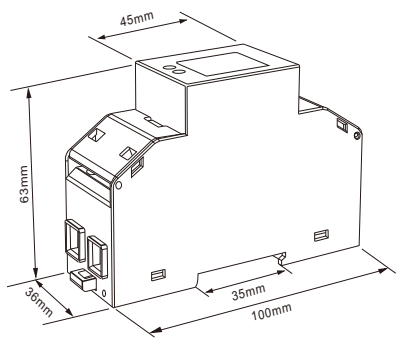
***For SDM230-Mbus only**

The meter provides a Mbus Port for remote communication. the meter adopts EN13757-3 Mbus communication protocol. The communication parameters can be configured via the set-up mode.
Baudrate: 300,600,1200,2400,4800,9600 bps
Parity: NONE/ODD/EVEN
Stop bits: 1 or 2
Primary address: 001~250
Secondary address: 00000001~99999999

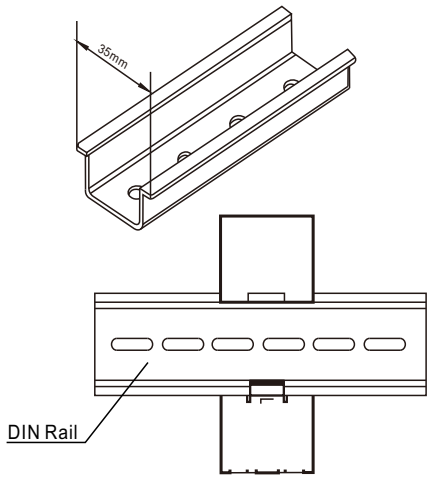
3.8 Mechanics

Din rail dimensions	36x100x63 (WxHxD) Per DIN 43880
Mounting	DIN rail 35mm
Ingress protection	IP51 (indoor)
Material	Self-extinguishing UL94V-0

4.Dimensions



5.Installation and Sealing

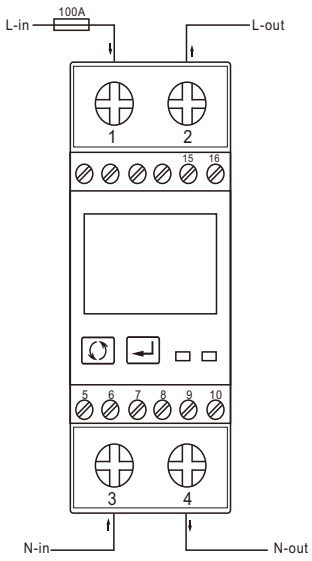


Declaration of Conformity(for the MID approved version meter only)

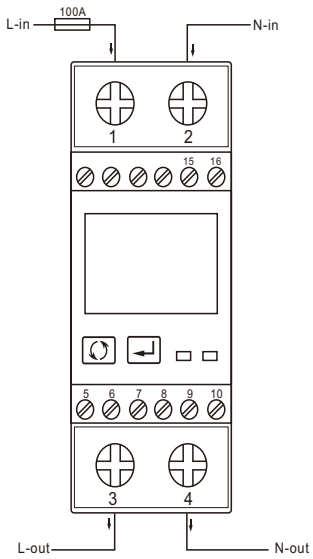
We Zhejiang Eastron Electronic Co.,Ltd.
Declare under our sole responsibility as the manufacturer that the single phase multi-funtion electrical energy meter “SDM230 Series” correspond to the production model described in the EU-type examination certificate and to the requirements of the Directive 2014/32/EU EU type examination certificate number 0120/SGS0206.
Identification number of the NB0598

6.Wiring Diagram

6.1 SDM230-V1

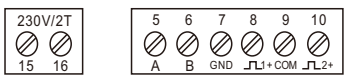


6.2 SDM230-V2

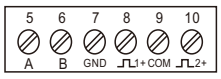


6.3 Definitions of other terminals

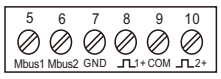
SDM230-2T



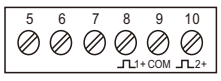
SDM230-Modbus/Std



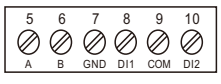
SDM230-Mbus



SDM230-Pulse



SDM230M-DI



Terminals Capacity	COMM / Pulse / 2T	0.5~1.5mm²
	Load	4~25mm²
Screw Torque	COMM / Pulse / 2T	0.2Nm
	Load	2.5Nm

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CE RoHS MID