SDM230 Series

Single-Phase Two Module DIN rail Meters

- Measures kWh, kVArh, kW, kVAr, kVA, PF, Hz, dmd, V, A, etc.
- Bi-directional measurement IMP & EXP
- RS485 Modbus
- Din rail mounting 35mm
- 100A direct connection
- Better than Class 1 accuracy

User Manual V1.1

Application

This document provides operating, maintenance and installation instructions.

The unit measures and displays the characteristics of single phase two wire(1p2w) supplies, including voltage, frequency, current, power, actve and reactive energy, bi-directional energy measurement, etc. which makes it a good choice for solar PV energy metering, residential, utility and industrial application.

The unit equipped with a white back-lighted LCD screen for prefect reading. Built-in interfaces provides RS485 Modbus RTU outputs and pulse output. Digital input is provided for external signal counting. Configuration is password protected.

PART 1 Specification

General Specifications

Voltage AC (Un)	230V
Voltage Range	100-240V(L~N)
Base Current (Ib)	10A
Max. Current (Imax)	100A
Mini Current (Imin)	0.5A
Starting Current	0.4% of Ib
Power Consumption	<2W/10VA
Frequency	50/60Hz(±10%)
AC Voltage Withstand	4KV for 1 minute
Impulse Voltage Withstand	6KV-1.2uS waveform
Overcurrent Withstand	30 Imax for 0.01s
Display	LCD with white backlit
Max. Reading	999999.9 kWh/kVArh

Accuracy

Voltage	0.5% of range maximum
Current	0.5% of nominal
Frequency	0.2% of mid-frequency
Power factor	1% of Unity
Active power	1% of range maximum
Reactive power	1% of range maximum
Apparent power	1% of range maximum
Active energy	Class 1 IEC62053-21
Reactive energy	Class 2 IEC62053-23

Environment

Operating temperature	-25℃ to +55℃

Storage and transportation temperature	-40℃ to +70℃
Reference temperature	23℃±2℃
Relative humidity	0 to 95%, non-condensing
Altitude	up to 2000m
Warm up time	5s
Installation category	CAT III
Mechanical Environment	M1
Electromagnetic environment	E2
Degree of pollution	2

Output

RS485 output for Modbus RTU (For RS485 Modbus meters only)

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 bps. Default: 2400bps

Parity: NONE/EVEN/ODD. Default: NONE

Stop bits: 1 or 2

Modbus Address: 1 to 247

Mbus Port (For SDM230-Mbus only)

The meter rovides 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.

Baud rate: 300, 600, 1200, 2400, 4800, 9600 bps

Parity: NONE/ EVEN/ODD

Stop bit: 1 or 2

Primary address: 001-250

Secondary address: 00000001~99999999

Pulse Output (Not avaiable for SDM230M-DI)

The meter provides two pulse outputs. Both pulse outputs are passive type.

Pulse output 1 is configurable. The pulse output 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(default) /0.01/0.1/1kWh/kVarh.

Pulse width: 200/100/60ms

Pulse output 2 is non-configurable. It is fixed to import kWh. The constant is 1000imp/kWh.

2T for dual source measurement (For SDM230-2T only)

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

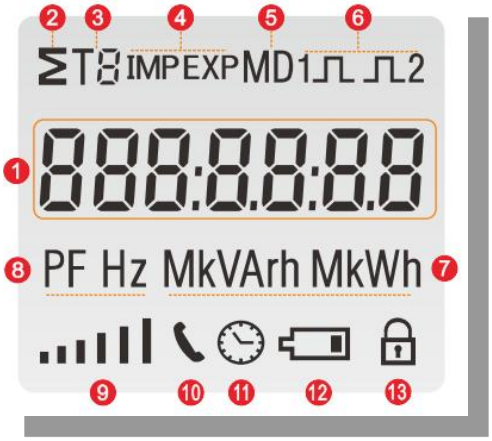
The meter can also be used as a tariff meter. The tariff is controlled by an external time relay.

Mechanics

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

LCD display

Item	Descriptions
1	7 digits used to display measured values or RTC
2	Total value
4	Import information, Export information
5	Max. Demand for Power or Current
6	Pulse output 1 and Pulse output 2
7	Measurement units
8	PF = power factor Hz = frequency
9	Bar display of Power
10	Communication indicator
11	Time information
12	Low battery warning
13	Lock symbol



PART 2 Operation

Initialization Display

When it is powered on, the meter will initialize and do self-checking.

Page	Display	Descriptions
1		The first screen lights up all display segments and can be used as a display check.

2		The second screen indicates the firmware installed in the unit. (in kind prevail)
3		The third screen indicates the build number. (in kind prevail)
4		The fourth screen indicates its meter ID (*not available for SDM230-Pulse, SDM230-DR, SDM230-Bi)
5		The fifth screen indicates the baud rate (*not available for SDM230-Pulse, SDM230-DR, SDM230-Bi)

*After initialization and self-checking program, the meter will display total kWh.

Scroll display by Button

The buttons operate as follows:

1		Click the button, the LCD display will scroll the measurements
2		Click the button for 3 seconds to get into Set-up mode. In Set-up mode, it is the “confirm” button

Press the scroll button  to check other measurement information:

The display order by scroll button:

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→ DI 1→ DI 2→ Modbus ID → baud rate→ continuous running time.
Display number: 1, 4-7, 10-20,22-26

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 number:1, 4-7, 10-21, 24-26

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 number:1-21, 24-26

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 →continuous running time.
Display number:1, 4-7, 10-21, 26

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 ID → baud rate→ continuous running time.
Display number:1, 4-7, 10-21, 24-26

SDM230-Bi:
Import kWh→ export kWh→W→ resettable import kWh→ resettable export kWh
Display number: 4, 5, 16, 27, 28

SDM230-DR:
Total kWh→ resettable kWh→W
Display number: 1, 6, 16

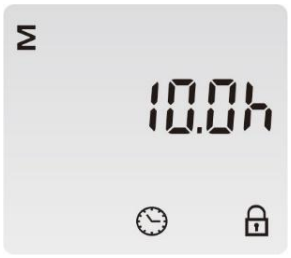
Page	Display	Descriptions
1		Total active energy Example:70.00kWh
2		T1 active energy Example: 10.00kWh *(For SDM230-2T only)
3		T2 active energy Example: 10.00kWh *(For SDM230-2T only)
4		Import active energy Example: 50.00kWh
5		Export active energy Example: 20.00kWh

6		Total resettable energy
7		Total reactive energy Example: 10.00kVArh
8		T1 reactive energy Example: 10.00kWh *(for SDM230-2T only)
9		T2 reactive energy Example: 10.00kWh *(for SDM230-2T only)
10		Import reactive energy Example: 5.00kVArh

11		Export reactive energy Example: 5.00kVArh
12		Total resettable reactive energy
13		Total Max. power demand Example: 6930W
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: 50.00Hz
22		DI 1 *(For SDM230M-DI only)
23		DI 2 *(For SDM230M-DI only)
24		Modbus address Example: 001 *(For Modbus meters only)
24-1		High and low bit of Mbus secondary address Default: same as meter ID *(For SDM230-Mbus only)

		
25		Baud rate Example: 9600
26		Continuous running time(In total)
27		Resettable import kWh For example: 58kWh *(For SDM230Bi only)
28		Resettable export kWh For example: 50kWh *(For SDM230-Bi only)

Set-up Mode

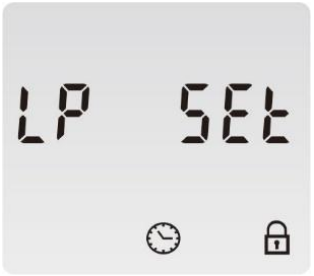
To get into Set-up Mode, the user need press the “Enter” button  for 3 second.

Page	Display	Descriptions
		**Password** To get into Set-up mode, it asks a password confirmation. Default password: 1000
		If the setting is done successfully, the screen will show “good”
		If the entered information is wrong, the screen will show “ERR”, which means the setting is failed.
1		**To set the Modbus ID** Default ID is 001 Range: 001~247

1-1		Press the “Enter” button, the first digit flash. Press the “Scroll” button to change the value. After choosing the new address value, the user need pressing the “Enter” button to confirm the setting.
1-2		**High bit of Mbus Secondary address** Press the “Scroll” button to change the value. After choosing the new address value, the user need pressing the “Enter” button to confirm the setting.
		**Low bit of Mbus Secondary address** Press the “Scroll” button to change the value. After choosing the new address value, the user need pressing the “Enter” button to confirm the setting.
2		**To set the Baud rate** Default value: 2400bps Range: 1200, 2400, 4800, 9600，19200 bps.
2-1		Press the “Enter” button, the red digit flash. Press the “Scroll” button to change the value. After choosing the new baud rate, the user need pressing the “Enter” button to confirm the setting.

3		**To set the Parity** Default: None Option： None, Even, Odd
3-1		Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new Parity, the user need pressing the “Enter” button to confirm the setting.
4		**To set the Pulse output 1** Default: kWh Option:kWh/ kVArh/ imp.kWh/ exp.kWh/ imp. kVArh/ exp.kVArh
4-1		Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new option, the user need pressing the “Enter” button to confirm the setting.
5		**To set the Pulse constant** Default: 1000 Option: 1000/ 100/10/1 imp/kWh

5-1		Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new option, the user need pressing the “Enter” button to confirm the setting.
6		**To set the Pulse Duration** Default: 100mS Option: 200/ 100/ 60mS
6-1		Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new option, the user need pressing the “Enter” button to confirm the setting.
7		**To set the Demand Integration Time** Default: 15 minutes Option: 5 / 10 / 15 / 30 / 60 / OFF
7-1		Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new DIT option, the user need pressing the “Enter” button to confirm the setting.

8		**To set the Automatic Scroll Time Interval** Default: 0 S Option: 0 ~ 30S
8-1		Press the “Enter” button, the red part flash. Press the “Scroll” button to change the option. After choosing the new “Scrl” option, the user need pressing the “Enter” button to confirm the setting.
9		**To set the Backlit lasting time** Default: 60 min Option: OFF/ 5/ 10/ 20/ 30/ 60 Long press “Enter” button to enter set-up mode.
9-1		Press the “Scroll” button to change the option. After choosing the new “Scrl” option, the user need pressing the “Enter” button to confirm the setting.
10		**Clear** Long press “Enter” to enter clear interface.

10-1		**To Clear Max demand of active power** Long press “Enter” button to confirm the operation.
10-2		**To Clear the resettable energy** From the “7-1” page, press “Scroll” button enter into the energy reset page. Long press the “Enter” button to confirm the operation.
11		**To change the Password** Default: 1000
11-1		Press the “Enter” button, the red part flash. Press the “Scroll” button to change the value. After choosing the new password, the user need pressing the “Enter” button to confirm the setting.
12		**To set the DI Fliter time** Default: 100 Range: 000 -255 mins

12-1		Press the “Enter” button, the red part flash. Press the “Scroll” button to change the value. After choosing the new DI fliter time, the user need pressing the “Enter” button to confirm the setting.

**Both SDM230-DR and SDM230-Bi are not available with above settings.*

**SDM230-Pulse is not available with the Modbus/Mbus communication setting or DI fliter time setting*

**SDM230M-DI is not available with the pulse setting*

Setting on SDM230-DR and SDM230-Bi:

To get into Set-up Mode, the user need press the “Enter” button  for 3 second.

SDM230-Bi		
		
SDM230-DR		

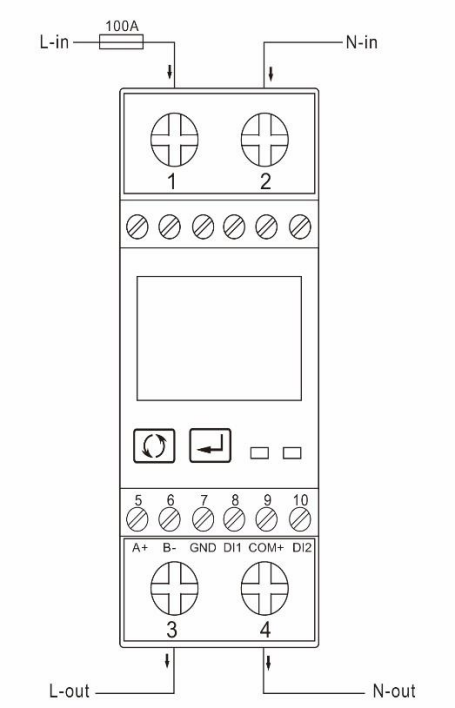
Warning

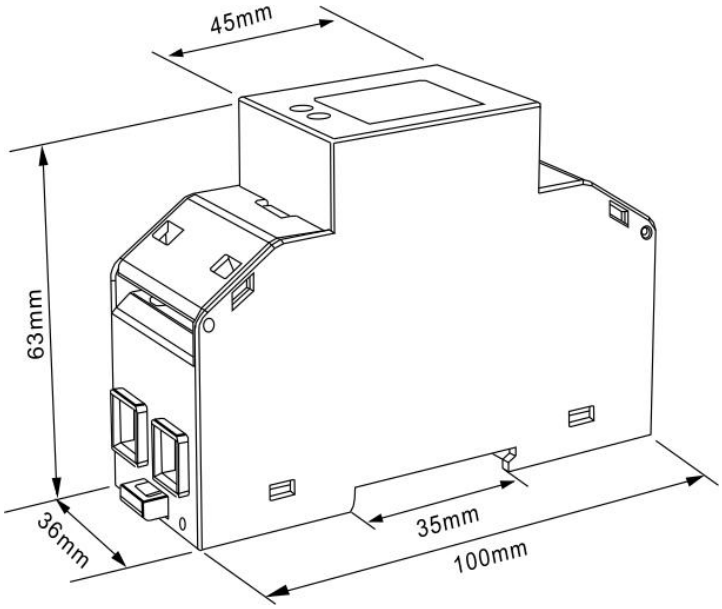
- During normal operation, voltages hazardous to life may be present at some of the terminals of this unit. Installation and servicing should be performed only by qualified, properly trained personnel abiding by local regulations. Ensure all supplies are de-energized before attempting connection or other procedures.
- Terminals should not be user accessible after installation and external installation provisions must be sufficient to prevent hazards under fault conditions.
- This unit is not intended to function as part of a system providing the sole means of fault protection - good engineering practice dictates that any critical function be protected by at least two independent and diverse means.
- If this equipment is used in a manner not specified by the manufacturer, protection provided by the equipment may be impaired.

Avertissement

- En fonctionnement normal, des tensions mortelles peuvent être présentes sur certaines des bornes de cet appareil. L'installation et la maintenance ne doivent être effectuées que par du personnel qualifié et dûment formé, conformément à la réglementation en vigueur. Assurez-vous que toutes les arrivées sont hors tension avant toute tentative de connexion ou autre manipulation.
- Après l'installation, les équipements ne doivent pas être accessibles à l'utilisateur et les dispositions de protection d'installation externe doivent être suffisantes pour prévenir les risques en cas de défaillance.
- Cet appareil n'est pas conçu pour faire partie d'un système offrant l'unique moyen de protection contre les défaillances. Les bonnes pratiques d'ingénierie exigent que toute fonction critique soit protégée par au moins deux moyens divers et indépendants.
- Si cet équipement est utilisé d'une manière non spécifiée par le fabricant, la protection fournie par l'équipement peut être altérée.

Wiring and Dimension





Installation