

## SDM18-M

### *Single-Phase Multifunction DIN Rail Meter*



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

### ***User Manual V1.1***

## Application

The energy-meters are used to measure single-phase applications like residential, utility and Industrial. The unit measures and displays various important electrical parameters. It equipped with a white back-lighted LCD screen for perfect reading. As well as a RS485 communication port for remote reading and monitoring. Bi-directional energy measurement makes it a good choice for solar PV energy metering. The compact design and din rail installation provides an easy and economical solution for your metering demand.

# PART 1 Specification

## General Specifications

|                           |                        |
|---------------------------|------------------------|
| Voltage AC (Un)           | 230V                   |
| Voltage Range             | 176~276V AC            |
| 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     | 30Imax for 0.01s       |
| Pulse LED                 | 1000imp/kWh            |
| Display                   | LCD with white backlit |
| Max. Reading              | 99999.9kWh             |

## Accuracy

|                 |                                            |
|-----------------|--------------------------------------------|
| Voltage         | ±0.5%                                      |
| Current         | ±0.5%                                      |
| Frequency       | ±0.2%                                      |
| Power factor    | ±0.1                                       |
| Active power    | ±1%                                        |
| Reactive power  | ±1%                                        |
| Apparent power  | ±1%                                        |
| Active energy   | Class 1 IEC62053-21<br>Class B EN50470-1/3 |
| Reactive energy | Class 2 IEC62053-23                        |

## Environment

|                                        |                          |
|----------------------------------------|--------------------------|
| Operating temperature                  | -40℃ to +70℃             |
| Storage and transportation temperature | -40℃ to +80℃             |
| Reference temperature                  | 23℃ ± 2℃                 |
| Relative humidity                      | 0 to 95%, non-condensing |
| Altitude                               | up to 2000m              |
| Warm up time                           | 3s                       |
| Installation category                  | CAT III                  |
| Mechanical Environment                 | M1                       |
| Electromagnetic environment            | E2                       |
| Degree of pollution                    | 2                        |

## Output

### RS485 output for Modbus RTU

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 bps. Default: 9600bps

**Parity:** NONE/EVEN/ODD. Default: NONE

**Stop bits:** 1 or 2

**Modbus Address:** 1 to 247 (default 1)

## Mechanics

|                     |                              |
|---------------------|------------------------------|
| Din rail dimensions | 18x90x66mm (WxHxD) DIN 43880 |
| Mounting            | DIN rail 35mm                |
| Ingress protection  | IP51 (indoor)                |
| Material            | Self-extinguishing UL94V-0   |

## PART 2 Operation

### Initialization Display

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

|   |                                                                                   |                                                                 |
|---|-----------------------------------------------------------------------------------|-----------------------------------------------------------------|
| 1 |  | Full Screen<br>It will last for 3 seconds.                      |
| 2 |  | Software version in kind prevail<br>It will last for 3 seconds. |

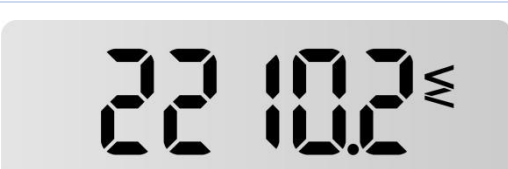
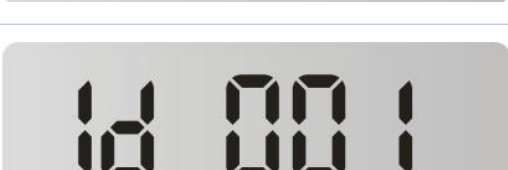
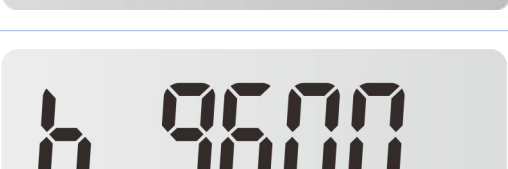
After the self-checking program, the meter display will show total active energy (kWh)

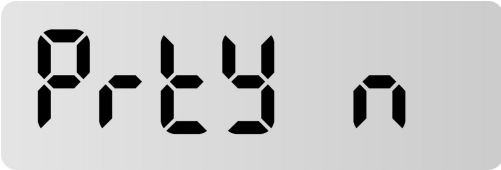
### Scroll Display by Button

There is a button on the front panel of the meter.

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.

|                                                                                     |                                                                                     |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  | Press the button, the LCD display will scroll the measurements.                     |                                                                                       |
|                                                                                     | Keep pressing the button for 3 seconds, the meter will enter into set-up mode.      |                                                                                       |
| 1                                                                                   |  | Total active energy (kWh)<br>Display format: 0000.00→9999.99→10000.0→99999.9→0000.00  |
| 2                                                                                   |  | Import active energy (kWh)<br>Display format: 0000.00→9999.99→10000.0→99999.9→0000.00 |

|    |                                                                                     |                                                                                           |
|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| 3  |    | Export active energy (kwh)<br>Display format: 0000.00→9999.99→10000.0→<br>99999.9→0000.00 |
| 4  |    | Voltage (V)                                                                               |
| 5  |    | Current (A)                                                                               |
| 6  |    | Active power (W)                                                                          |
| 7  |  | Frequency ( F )                                                                           |
| 8  |  | Power factor ( PF)                                                                        |
| 9  |  | Modbus address ( ID)<br>Default: 001                                                      |
| 10 |  | Baud rate<br>Default : 9600bps                                                            |

|    |                                                                                   |                                                       |
|----|-----------------------------------------------------------------------------------|-------------------------------------------------------|
| 11 |  | Parity<br>None/even/odd are optional<br>Default: none |
| 12 |  | Software version in kind prevail                      |

### Set-up Mode

To get into Set-up Mode, the user need keep pressing the button for 3 seconds, the meter will enter into the set-up mode.

The meter support to set three parameters : Address, Baud Rate, and Parity.

Notice: Under the “SET” mode, If there is no operation, the display will back to the default display.

### Modbus Address setting

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Under this menu, long press the button  for 3 seconds enter to the set up mode.                                                                                                                                                                                                                                                                                                                |
|  | The rightmost digit will flash, press the button  to increase or decrease number, and then waiting for 4 seconds, the middle digit will flash, press the button  again to choose the correct number, and waiting 4 seconds until the last digit flash, repeat above options until all the digits are set. |
|  | After the setting of final digit, waiting for 4 seconds, the address information will be stored automatically.<br>Short press the button to enter into the next setting page. If long time no operation, the display will return to the default display.                                                                                                                                                                                                                            |

### Baud rate setting

|                                                                                     |                                                                                                                                                                      |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Under this menu, long press the button  for 3 seconds enter to the set-up mode. |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                   |                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | The digits will flash, press the button  to choose baud rate options (from 1200 to 9600 bps), then waiting for 4 seconds                                                                                       |
|  | the baud rate setting will be stored automatically after 4 seconds.<br>Short press the button  to enter into the next setting page. If long time no operation, the display will return to the default display. |

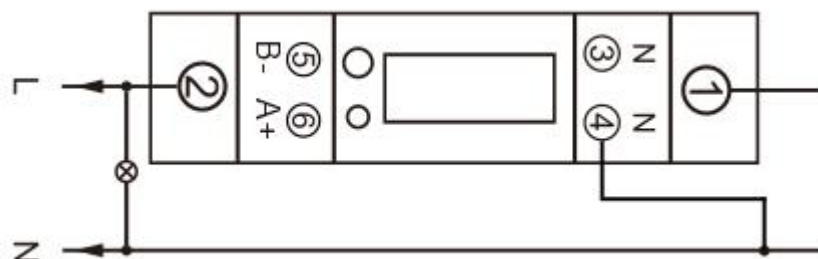
### Parity setting

|                                                                                   |                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Under this menu, long press the button  for 3 seconds enter to the set-up mode.                                                                 |
|  | The digits will flash, press the button  to choose parity options (None/Even/Odd), then waiting for 4 seconds<br>Notice: n=None, e=Even, o= Odd |
|  | the parity setting will be stored automatically after 4 seconds and the screen will return to the setting display.                                                                                                               |

The user can program the meter parameters by sending correct command via RS485 port.

The protocol is Modbus RTU. For the details. Please look at the “Eastron SDM18-M Modbus protocol”.

### Wiring Diagram



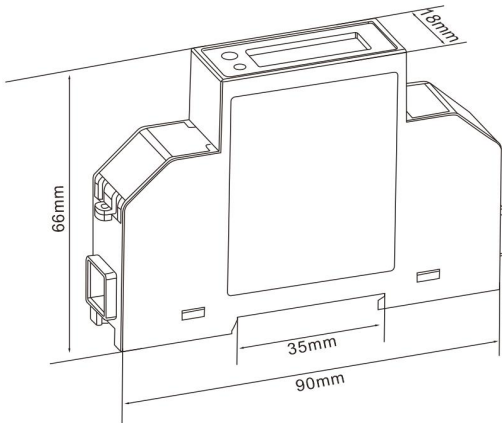
Port 1 / 2: L-in/ L-out

Port 3 / 4: N

Port 5 / 6: RS485 B- / RS485 A+

|                  |                                |                           |                                                                                     |
|------------------|--------------------------------|---------------------------|-------------------------------------------------------------------------------------|
| Terminal<br>①②   | Measurement Connection         | Screw Connection          | Diameter<br>7.0mm*PH2                                                               |
|                  | Strip Length                   | 14-15mm                   |  |
|                  | Screw                          | M7                        |                                                                                     |
|                  | Rigid/supple                   | 4-25mm²                   |                                                                                     |
|                  | Tightening torque              | 2.5Nm                     |                                                                                     |
|                  | Model                          | PZ2                       |                                                                                     |
| Terminal<br>③④⑤⑥ | Measurement Connection         | Screw Connection          | Diameter<br>3.0mm*PH1                                                               |
|                  | Strip Length                   | 5-6mm                     |  |
|                  | Screw                          | M3                        |                                                                                     |
|                  | Fixed/flexible<br>(Wire Range) | 0.5-1.5mm²<br>(26~14 AWG) |                                                                                     |
|                  | Tightening torque              | 0.2Nm                     |                                                                                     |
|                  | Model                          | PZ0                       |                                                                                     |

Dimensions



Installation

35mm

D IN Rail

## Modbus register Map

## Eastron SDM18-M Modbus protocol

| Function code |                          |
|---------------|--------------------------|
| 04            | to read input parameters |

| Address<br>(Register) | Input Register Parameter           |       |        | Modbus Protocol Start Address Hex |          |
|-----------------------|------------------------------------|-------|--------|-----------------------------------|----------|
|                       | Parameters                         | Unit  | Format | Hi byte                           | Low Byte |
| 30001                 | Voltage                            | Volts | Float  | 00                                | 00       |
| 30007                 | Current                            | Amps  | Float  | 00                                | 06       |
| 30013                 | Active power                       | Watts | Float  | 00                                | 0C       |
| 30019                 | Apparent power                     | VA    | Float  | 00                                | 12       |
| 30025                 | Reactive power                     | VAr   | Float  | 00                                | 18       |
| 30031                 | Power factor                       | None  | Float  | 00                                | 1E       |
| 30071                 | Frequency                          | Hz    | Float  | 00                                | 46       |
| 30073                 | Import active energy               | kWh   | Float  | 00                                | 48       |
| 30075                 | Export active energy               | kWh   | Float  | 00                                | 4A       |
| 30077                 | Import reactive energy             | kVArh | Float  | 00                                | 4C       |
| 30079                 | Export reactive energy             | kVArh | Float  | 00                                | 4E       |
| 30085                 | Total system power demand          | W     | Float  | 00                                | 54       |
| 30087                 | Maximum total system power demand  | W     | Float  | 00                                | 56       |
| 30089                 | Import system power demand         | W     | Float  | 00                                | 58       |
| 30091                 | Maximum Import system power demand | W     | Float  | 00                                | 5A       |
| 30093                 | Export system power demand         | W     | Float  | 00                                | 5C       |
| 30095                 | Maximum Export system power demand | W     | Float  | 00                                | 5E       |
| 30259                 | current demand.                    | Amps  | Float  | 01                                | 02       |
| 30265                 | Maximum current demand.            | Amps  | Float  | 01                                | 08       |
| 30343                 | Total active energy                | kWh   | Float  | 01                                | 56       |
| 30345                 | Total reactive energy              | kVArh | Float  | 01                                | 58       |

| Function code |                           |
|---------------|---------------------------|
| 10            | to set holding parameter  |
| 03            | to read holding parameter |

| Address Register | Holding Register Parameter |        | Modbus Protocol<br>Start Address Hex |          | Description                                                                                                                                                                                                                                                                                                                     |
|------------------|----------------------------|--------|--------------------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | Parameters                 | Format | Hi byte                              | Low byte |                                                                                                                                                                                                                                                                                                                                 |
| 40003            | Demand Period              | Float  | 00                                   | 02       | Write demand period: : 0, 5,8, 10, 15, 20, 30, 60 minutes, default 60. Setting the period to 0 will cause the demand to show the current parameter value, and demand max to show the maximum parameter value since last demand reset.                                                                                           |
| 40019            | Network Parity Stop        | Float  | 00                                   | 12       | Write the network port parity/stop bits for MODBUS Protocol.where:<br>0 = One stop bit and no parity,<br>1 default.= One stop bit and even parity.<br>2 = One stop bit and odd parity.<br>3 = Two stop bits and none parity.<br>Requires a restart to become effective.<br><b>Length : 4 byte</b><br><b>Data Format : Float</b> |
| 40021            | Meter ID                   | Float  | 00                                   | 14       | Ranges from 1 to 247, Default ID is 1.<br><b>Length : 4 byte</b><br><b>Data Format : Float</b>                                                                                                                                                                                                                                  |
| 40029            | Baud rate                  | Float  | 00                                   | 1C       | Write baud rate for MODBUS Protocol, where:<br>0 = 2400 baud<br>1 = 4800 baud.<br>2 = 9600 baud(default)<br>5=1200 baud .<br><b>Length : 4 byte</b><br><b>Data Format : Float</b>                                                                                                                                               |
| 461457           | Reset historical data      | Hex    | F0                                   | 10       | 00 00: reset demand info<br><b>Length : 2 byte</b><br><b>Data Format : Hex</b>                                                                                                                                                                                                                                                  |
| 463745           | Time of scroll display     | BCD    | F9                                   | 00       | 0-30s<br>Default 0:does not display in turns<br><b>Length : 2 byte</b><br><b>Data Format : BCD</b>                                                                                                                                                                                                                              |
| 463777           | Measurement mode           | Hex    | F9                                   | 20       | 0001:mode 1 (total = import)<br>0002:mode 2 (total = import + export )                                                                                                                                                                                                                                                          |

|        |                  |                   |    |    |                                                                                                          |
|--------|------------------|-------------------|----|----|----------------------------------------------------------------------------------------------------------|
|        |                  |                   |    |    | (default)<br>0003:mode 3 (total = import - export)<br><b>Length : 2 byte</b><br><b>Data Format : HEX</b> |
| 464513 | Serial number    | Unsigned<br>int32 | FC | 00 | Serial Number<br><b>Length : 4 byte</b><br><b>Data Format: Unsigned int32</b>                            |
| 464515 | Meter code       | Hex               | FC | 02 | Meter code = 0XD3<br><b>Length: 2 bytes</b><br><b>Data Format: Hex</b><br>Note: read only                |
| 464516 | Software version | Hex               | FC | 03 | Software version<br><b>xx.yy</b><br><b>Length: 2 bytes</b><br><b>Data Format: BCD</b><br>Note: read only |