# SDM120 45A Series

**Single Phase Din Rail Energy Meter**

Eastron

*User Manual V1.1*

- Measures kWh, kVArh, kW, kVAr, kVA, PF, Hz, dmd, V, A, etc.
- Bi-directional measurement IMP & EXP
- Two pulse outputs
- RS485 Modbus RTU / Mbus
- Din rail mounting 35mm
- 45A direct connect
- Better than Class B/C accuracy

## 1. Introduction

This document provides operating, maintenance and installation instructions of SDM120 45A series. The unit measures and displays the characteristics of single phase two wires application. It includs total 6 models, providing measurements on different parameters, like energy, voltage, current, power, frequency, power factor, etc. SDM120 45A series support Max. 45A direct connection. Pulse output and 1 communication port are provided for remote reading.

### Model table:

| Model | Display | Measurement | Outputs |
|---|---|---|---|
| SDM120-A | Analog | kWh | Pulse |
| SDM120-D | LCD | kWh | Pulse |
| SDM120-DB | LCD with Backlit | kWh | Pulse |
| SDM120-P | LCD with Backlit | Multi-parameters | Pulses |
| SDM120-M | LCD with Backlit | Multi-parameters | Pulses & RS485 |
| SDM120-MB | LCD with Backlit | Multi-parameters | Pulses & Mbus EN13757-3 |

## 2. Specifications ⚠

### 2.1 General Specifications

| | |
|---|---|
| Voltage AC (Un) | 230V |
| Voltage range | 176~276V AC (Max. 276V) |
| Current input | 0.15-5(45)A (Max. 45A) |
| Voltage Circuit | < 2W/10VA |
| Current Circuit | < 1VA |
| Frequency | 50/60Hz |
| AC voltage withstand | 4KV for 1 minute |
| Impulse voltage withstand | 6KV~1.2uS waveform |
| Overcurrent withstand | 30Imax for 0.01s |
| Pulse output 1 | 1000/100/10/1imp/kWh/kVArh(configurable) |
| Pulse output 2 | 1000imp/kWh(non-configurable) |
| Max. Reading | 99999.9kWh/kVArh |

### 2.2 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 or 0.5 IEC62053-21<br>Class B or C EN50470-3:2022 (MID version) |
| Reactive energy | Class 2 IEC 62053-23 |

### 2.3 Environment

| | |
|---|---|
| Operating temperature | -40℃ to + 70℃ |
| Storage and transportation temperature | -40℃ to + 80℃ |
| Reference temperature | 23℃±2℃ |
| Installation category | CATIII |
| Relative humidity | 0 to 95%, non-condensing |
| Altitude | Up to 2000m |
| Protective Class | II |
| Location | Dry |
| Warm up time | 3s |
| Mechanical environment | M1 |
| Electromagnetic environment | E2 |
| Degree of pollution | 2 |
| Utilization category | UC2 |

### 2.4 Mechanics

| | |
|---|---|
| Din rail dimensions | 18x118x64 (WxHxD) DIN 43880 |
| Mounting | DIN rail 35mm (wall or cabinet mounting) |
| Ingress protection | Front Panel IP51(in door) |
| Material | Self-extinguishing UL94V-0 |

## 3 Display

### Start-up Screens

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

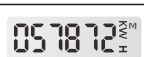
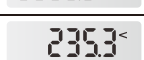
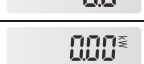
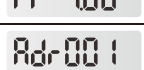
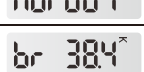
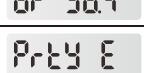
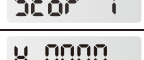
| | | |
|---|---|---|
| 1 | | Full screen |
| 2 | | Software version<br>In kind prevail |
| 3 | | Total active energy(kWh) |

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

### Scroll Display by Button

There is a button on the front 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.

| | |
|---|---|
| | Click the button, the LCD display will scroll the measurements. |
| | Keep pressing the button for 3 seconds, the meter will enter set-up mode. |

| | | |
|---|---|---|
| 1 |  | Total active energy(kWh) |
| 1-1 | | Import active energy(kWh) |
| 1-2 | | Export active energy(kWh) |
| 1-3 | | Total reactive energy(kVArh) |
| 2 |  | Voltage (V) |
| 3 | | Current (A) |
| 4 |  | Active power (kW) |
| 5 | | Frequency (Hz) |
| 6 | | Power factor (PF) |
| 7 |  | Modbus address or Mbus primary address |
| 8 |  | Baud rate |
| 9 |  | Parity<br>Option: None/Even/Odd<br>Default: none |
| 10 | | Stop bits<br>1/2 are optional<br>Default: 1 |
| 11 |  | M-Bus secondary address High<br>(M-Bus version only ) |
| 12 | | M-Bus secondary address Low<br>(M-Bus version only ) |
| 13 | | Software version<br>(In kind prevail) |

### The display of each model:

**SDM120-A/ SDM120-D/ SDM120-DB:**
Total kWh (*SDM120-A is analog display)

**SDM120-P:**
Total kWh → Import kWh → Export kWh → Total kVArh → Voltage → Current → Active power → Frequency → Power factor

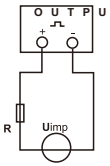
**SDM120-M:**
Total kWh → Import kWh → Export kWh → Total kVArh → Voltage → Current → Active power → Frequency → Power factor → Address → Baudrate → Parity → Stop bit

**SDM120-MB:**
Total kWh → Import kWh → Export kWh → Total kVArh → Voltage → Current → Active power → Frequency → Power factor → Address → Baudrate → Parity → Stop bit
Secondary address high → Secondary address low

## 4. Communication

### 4.1 Pulse output

The meter is equipped with pulse output, which is fully isolated from the inside circuit. That generates pulses in proportion to the measured energy. The pulse output is polarity dependent , passive transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage shall be 5-27V DC, and the maximum input current shall be 27mA DC.




ATTENTION:Pule 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

### 4.2 Pulse output for SDM120-A/ D/ DB

Pulse constant: 1000imp/kWh;  Pulse width: 80mS

### 4.3 Pulse Output for SDM120-P

Pulse constant: 1000imp/kWh; Pulse width: 60mS
Pulse output 1 is for export kWh; Pulse output 2 is for import kWh

### 4.4 Pulse Output for SDM120-M/ SDM120-MB

SDM120-M/MB provide 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 default is export kWh.
Pulse width: 200/100/60ms(default).
The pulse constant can be set to generate 1 pulse per:
0.001( default) / 0.01/ 0.1/ 1kWh/ kVArh.

Pulse output 2 is non-configurable. It is fixed to import kWh.
The constant is 1000imp/kWh. Post width: 60mS.

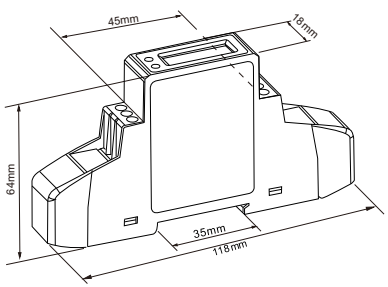
### 4.5 RS485 Output for SDM120-M

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 via Modbus communication or from the Set-up Mode.
Baud rate: 2.4k, 4.8k, 9.6k, 19.2k, 38.4k bps
Parity: NONE/EVEN/ODD
Stop bits: 1 or 2   Modbus Address: 1 to 247

### 4.6 M-bus Communication EN13757-3 for SDM120-MB

The meter provides an M-Bus port for remote communication. The protocol fully comply with EN13757-3.The following communication parameters can be configured via M-bus communication or from the Set-up Mode.
Baud rate: 300, 600, 1200, 2400, 4800, 9600bps
Parity: NONE/EVEN/ODD
Stop bits: 1 or 2
M-Bus network primary address: nnn - 3 digits number from 001 to 250
M-Bus network secondary address: 00 00 00 00 to 99 99 99 99
Default: last 8 digits of SN

## 5. Dimensions




## 6. Installation

### 6.1 Safety instruction

**Information for your own safety**

Important safety information is contained in the maintenaned section. Familarize yourself with this information before attempting installation or other procedures. Symbols used in this documents:

**Risk of Danger**
This means to call attention to a high risk, for example:"High voltage". 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.
The installer is responsible for coordinating the rating and the characteristics of the supply side overcurrent protection devices with the maximum current rating and, in the case of direct connected meters, with the UC rating of the metering equipment.

**Proper handling**

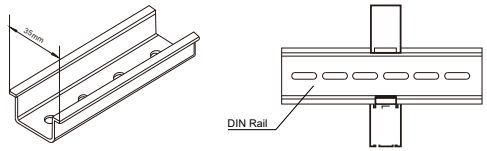
The equipment (device, module) may only be used for the application specified in the catalogue and the user manual,and only be connected with devices and components recommended and approved by EASTRON.

- The unit does not have internal fuses therefore external fuses must be used for protection and safety under fault conditions.
- 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 used 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 connect the meter to a 3 phase - 400VAC - network.
- Do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other material as you may get an 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 functionality of the meter, and will avoid any warranty.
- Do not drop, or allow physical impact to the meter as there are high precision components inside that may break.
- An external switch or circuit-breaker should be installed on the power supply wires, which will be used to disconnect the meter and the device supplying energy. It is recommended that this switch or circuit-breaker is placed near the meter because that is more convenient for theoperator. The switch or circuit-breaker must comply with the specifications of the building'selectrical design and all local regulations

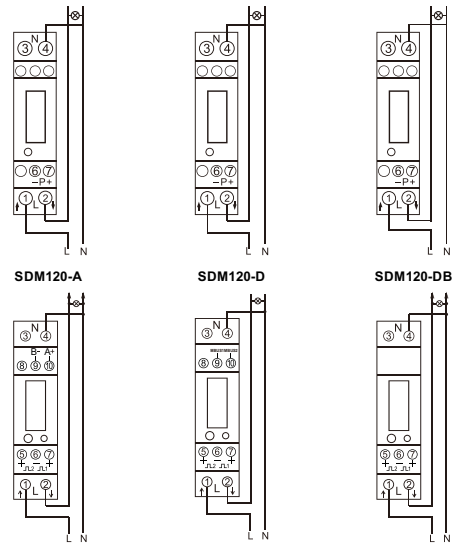
### 6.2 Maintance

In normal use, little maintenance is needed. As appropriate for service conditions, isolate electrical power, inspect the unit and remove any dust or other foreign material present. Periodically check all connections for freedom from corrosion and screw tightness, particularly if vibration is present.
The front of the case should be wiped with a dry cloth only. Use minimal pressure, especially over the viewing window area. If necessary wipe the rear case with a dry cloth. If a cleaning agent is necessary, isopropyl alcohol is the only recommended agent and should be used sparingly. Water should not be used. If the rear case exterior or terminals should be contaminated accidentally with water, the unit must be returned to EASTRON for inspection and testing.

### 6.3 Installation




### 6.4 Wiring diagram




| | | |
|---|---|---|
| Terminals Capacity | COMM / Pulse | 0.5~1.5mm² |
| | Load | 2.5~10mm² |
| Screw Torque | COMM / Pulse | 0.2Nm |
| | Load | 1.5Nm |

## 7. Declaration of Conformity (for the MID approved meters only)

**We Zhejiang Eastron Electronic Co., Ltd.**
Declares under our sole responsibility as the manufacturer that the single phase multifunction electrical energy meter SDM120 45A series 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 0120/SGS0701.
Identification number of the Notified Body: 0598.

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