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SDM54 series
Smart Three Phase Energy Meter

User Manual
2022 V1.0

1. Introduction

The SDM54 measures and displays the characteristics of single phase two wires (1p2w) and three phase four wires(3p4w) supplies, including voltage, frequency, current, power, power factor, active and reactive energy, imported or exported.

Energy is measured in terms of kWh and kVArh. Maximum demand on power and current can be measured over preset periods of up to 60 minutes. SDM54 supports max. 100A direct loads per phase, with dual tariff management availability. The meter is designed for DIN-rail mounting, with IP51 front protection. The meter is optionally equipped with pulse outputs, RS485 Modbus port or M-bus port. Configuration can also be done via keypad, which is password protected.

1.1 Unit Characteristics

The SDM54 Series are smart three phase energy meters, covering 3 models with following features and differences:

Model	Measurements	Outputs	Tariff Control
SDM54--2T	kWh, kVarh, W, Var, VA, PF, Hz, V,	2x Pulse outputs; RS485 Modbus	Double tariffs
SDM54-M	A, Max.dmd. Etc.	2x Pulse outputs; RS485 Modbus	Single tariff
SDM54-DI	kWh, kVarh, W, Var, VA, PF, Hz, V,	2x Digital inputs; RS485 Modbus	Single tariff
SDM54-MB-2T	A, Max.dmd. Etc.	2x Pulse outputs; M-Bus	Double tariffs
SDM54-MB	kWh, kVarh, W, Var, VA, PF, Hz, V,	2x Pulse outputs; M-Bus	Single tariff
SDM54-P	A, Max.dmd. Etc.	2x Pulse outputs	Single tariff

1.2 RS485 Serial–Modbus RTU

The RS485 serial port with Modbus RTU protocol provides a means of remotely monitoring and controlling the unit. Set-up screens are provided for setting up the RS485 port. D/LT645 protocol is optionally available on request.

1.3 M-Bus

The M-Bus port complying with EN13757-3 protocol provides a means of remotely monitoring and controlling the meter. Set-up screens are provided for setting up the M-Bus port.

1.4 Pulse outputs

Two pulse outputs that clock up the measured active and reactive energy. The constant of pulse output 2 for active energy is 400imp/kWh (unconfigurable), its width is fixed at 100ms.

The default constant of configurable pulse output 1 is 400imp/kWh, default pulse width is 100ms. The configurable pulse output 1 can be set from the set-up menu.

1.5 Double Tariffs

The meter has double tariffs function for the cost allocation management. There are two terminal to monitor voltage input from external device. Once there are voltage detected within 230V (80~120%), the energy will be counted in another registers.

2. Start-up Screens

> The interface performs initial testing.

```
Initial testing...
```

> The second screen indicates the software version.

```
Software Version
41 01.00
CX-XXXX
```

> Meter serial number; Modbus ID; Baudrate info are provided.

```
Meter SN:     10000001
Modbus ID:         001
Baudrate:         9600
```

After a short delay, the screen will display active energy measurements.

3. Measurements

3.1 Buttons

There are two buttons on the front panel.

Button	Function
⟳	> Scroll the display for data-check. > Change option at Set-up mode > Exit the Set-up mode
↵	> Set-up mode entry > Confirmation

3.2 Measured parameters

Each successive pressing of the ⟳ button shows different parameters measured:

Display	Parameter
T: 00000000.00 kWh / Imp: 00000000.00 / Exp: 00000000.00	Total kWh Import kWh Export kWh
T: 00000000.00 kVarh / Imp: 00000000.00 / Exp: 00000000.00	Total kVarh Import kVarh Export kVarh
T: 00000000.00 kWh / Imp: 00000000.00 / Exp: 00000000.00 T1	(Available in SDM54-2T only) Tariff 1's active energy Total kWh Import kWh Export kWh The "_" under T1 means tariff 1 is running at the moment.
T: 00000000.00 kVarh / Imp: 00000000.00 / Exp: 00000000.00 T1	(Available in SDM54-2T only) Tariff 1's reactive energy Total kVar Import kVar Export kVar
T: 00000000.00 kWh / Imp: 00000000.00 / Exp: 00000000.00 T2	(Available in SDM54-2T only) Tariff 2's active energy Total kWh Import kWh Export kWh
T: 00000000.00 kVarh / Imp: 00000000.00 / Exp: 00000000.00 T2	(Available in SDM54-2T only) Tariff 2's reactive energy Total kVar Import kVar Export kVar
L1 : 230.0 V / L2 : 230.0 / L3 : 230.0	L1-N Voltage L2-N Voltage L3-N Voltage
L1-2 : 400.0 V / L2-3 : 400.0 / L3-1 : 400.0	L1-2 Voltage L2-3 Voltage L3-1 Voltage
f 49.99 Hz	Frequency
L1 : 100.00 A / L2 : 100.00 / L3 : 100.00	L1 Current L2 Current L3 Current
N : 100.00 A	Neutral Current
PF L1 : 1.000 / T : 1.000 L2 : 1.000 / L3 : 1.000	Total PF (Power Factor) L1 PF L2 PF L3 PF
PF T : 1.000	Total PF (Power Factor)
L1 : 100.00 A / L2 : 100.00 Max. / L3 : 100.00 Dmd.	Max. Current Demand of L1 L2 L3
L1 : 10000 W / L2 : 10000 Max. / L3 : 10000 Dmd.	Max. Active Power Demand of L1 L2 L3
Total : 10000 W / Total : 10000 Var / Total : 10000 VA	Active Power Reactive Power Apparent Power
L1 : 10000 W / L2 : 10000 / L3 : 10000	Active Power of L1 L2 L3
L1 : 10000 Var / L2 : 10000 / L3 : 10000	Reactive Power of L1 L2 L3
L1 : 10000 VA / L2 : 10000 / L3 : 10000	Apparent Power of L1 L2 L3

4. Set-up

Keep pressing the button ↵, the meter will get into Set-up mode.

Screen	Description
PASSWORD 0000	Password is needed be checked before any further operation. The default password is 1000.
Menu 1. Main 2. Com. 3. Time 4. Pulse	The left screen shows the set-up menu of the meter, including main, communication, time, and pulse.
1.Main 1.1 System Type 3P4W / 1.2 Password 1000 / 1.3 Reset DMD	System type: the network type where the meter is installed and working. Options: 3P4W(default), 3P3W, 1P3W, 1P2W.
1.Main 1.1 System Type 3P4W / 1.2 Password 1000 / 1.3 Reset DMD	Password: allows user to set a new password.
1.Main 1.1 System Type 3P4W / 1.2 Password 1000 / 1.3 Reset DMD	Reset: to reset the max. Dmd / DI DMD: information of current and active power. DI: digital input counts
Menu 1. Main 2. Com. 3. Time 4. Pulse	Com.: configure the communication parameters
2.Com. 2.1 Addr 001 / 2.2 Baud 19200 / 2.3 Parity None / 2.4 Stop 1	Addr: communication MODBUS Address, range from 001~247
2.Com. 2.1 Addr 001 / 2.2 Baud 9600 / 2.3 Parity None / 2.4 Stop 1	Baud: communication baudrate Options: 2400~38400bps; Default: 9600bps
2.Com. 2.1 Addr 001 / 2.2 Baud 19200 / 2.3 Parity None / 2.4 Stop 1	Parity: Communication Parity Options: None, Even, Odd Default: None
2.Com. 2.1 Addr 001 / 2.2 Baud 19200 / 2.3 Parity None / 2.4 Stop 1	Stop: Stop bit of communication Options: 1 or 2 Default: 1
Menu 1. Main 2. Com. 3. Time 4. Pulse	Time information setting
3.Time 3.1 Backlight on / 3.2 Scroll off / 3.3 DMD 60	Backlight: to set the backlight duration time after button operation. Options: on, off, 5, 10, 15, 30, 60, 120 minutes. Default: 60 minutes
3.Time 3.1 Backlight on / 3.2 Scroll off / 3.3 DMD 60	Scroll: automatic screen scroll time interval. Options: off, 5,10,15, 30,60 seconds. Default: off
3.Time 3.1 Backlight on / 3.2 Scroll off / 3.3 DMD 60	DMD: demand interval time Options: 0, 5, 8, 10, 15, 20, 30, 60 minutes. Default: 60 minutes
Menu 1. Main 2. Com. 3. Time 4. Pulse	Pulse output 1 parameter setting The meter pulse output 1 is configurable. Note: Pulse output 2 is fixed to
4.Pulse 4.1 Type Imp-kWh / 4.2 Constant 1000 / 4.3 Width 100mS	Type: the type of energy that pulse output is refer to. Options: kWh; Imp-kWh; Exp-kWh kVarh; Imp-kVarh; Exp-kVarh Default: Exp-kWh
4.Pulse 4.1 Type Imp-kWh / 4.2 Constant 1000 / 4.3 Width 100mS	Constant: Pulse output constant Options: 1000; 100; 10; 1 Default: 400
4.Pulse 4.1 Type Imp-kWh / 4.2 Constant 1000 / 4.3 Width 100mS	Width: Pulse width Options: 60,100,200mS Default: 100mS

Connection Data	SDM54
Measurement connection	Screw connection
Conductor cross section solid/stranded/AWG	4-25mm2
Tightening torque	2.5Nm
Other connections (COM and Pulse)	Screw connection
Conductor cross section solid/stranded/AWG	0.5-1.5mm2
Tightening torque	0.4Nm

5. Specifications

5.1 Electrical specifications

• Power:	self power supply (via measured voltage)
• Consumption:	<1W, 8VA
• Basic current:	10A
• Max. current :	100A
• Min. current:	0.5A
• Starting current :	0.02A
• Over-current:	30 x Imax for 0.01s
• L-N voltage:	100 to 289V a.c. (not for 3p3w supplies)
• L-L Voltage:	173 to 500V a.c. (3p supplies only)
• Frequency:	50Hz (MID version) 50/60Hz (non-MID version)

Accuracy

active energy	Class 1(IEC62053-21)/Class B(EN50470-3)
Reactive energy	Class 2 (IEC62053-23)
Voltage	0.5% of range maximum
Current	0.5% of nominal
Frequency	0.2% of mid-frequency
Power factor	1% of unity (0.01)
Active power (W)	±1% of range maximum
Reactive power (VAr)	±1% of range maximum
Apparent power (VA)	±1% of range maximum

5.2 Environmental specifications

• Operating temperature	-25°C to +55°C
• Storage temperature	-30°C to +80°C
• Relative humidity	0 to 90%, non-condensing @40°C
• Altitude	Up to 2000m
• Mechanical environment	M2
• Electromagnetic environment	E2

5.3 Output specifications

Three interfaces are available:
- Modbus RS485 port output ... (SDM54-M, SDM54-2T, SDM54-DI)
- M-Bus port output ... (SDM54-MB, SDM54-MB-2T)
- two Pulse outputs

5.3.1 Modbus RS485 port output

Baud rate:	2400, 4800, 9600(default), 19200, 38400
Parity:	none /odd/even
Stop bits:	1 or 2
RS485 address:	001 to 247
Response time:	<80mS
Transmission distance:	1000m

5.3.2 M-Bus port output

Baud rate:	300, 600, 1200, 2400, 4800, 9600
Parity:	even/odd
Stop bits:	1 or 2
M-Bus primary address:	001 to 250
M-Bus Secondary address:	same as the serial number of the meter.

5.3.3 Pulse Output

The unit provides two pulse outputs indicating real-time measured energy. Pulse output 1 is configurable; Pulse output 2 is fixed with constant 400imp/kWh.. Both pulse outputs are passive type.

Pulse output 1 is configurable. Default setting is exp-kWh; 100mS, constant 400imp/kWh

Pulse output 2 is non-configurable. It is fixed up with active kWh. The constant is 400imp/kWh.

5.4 Safety and EMC

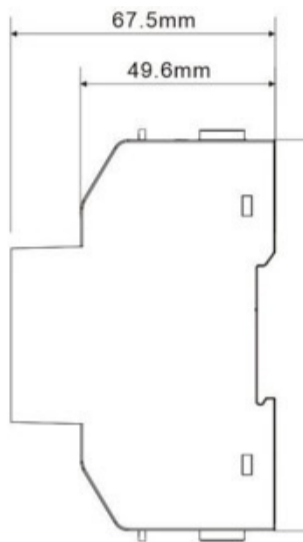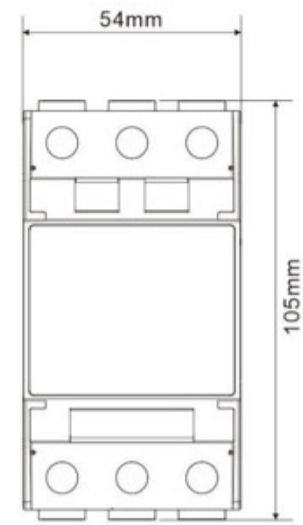|	
• Measurement category	IEC 61010-1 CAT III
• Current input	Direct connect
• Over-voltage category	CAT III
• Dielectric withstand	IEC 61010-1 double insulated
• Protective class	II
• EMC	IEC 61326-1:2013 ; IEC 61326-2-3:2013

5.5 Mechanics specifications

• DIN rail dimensions	54x100x67.5mm(WxHxD)
• Mounting	DIN Rail 35mm
• Ingress protection	IP51 front panel (indoor)
• Material	Self-extinguishing UL94 V-0
• Weight	265g

Warnings

Important Safety Information is contained in the Maintenance section. Familiarize yourself with this information before attempting installation or other procedures. Symbols used in this document:
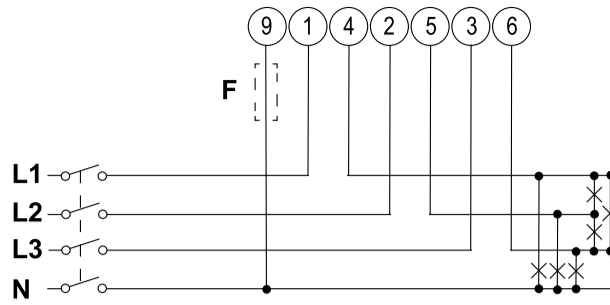
⚠ **Risk of Danger:** These instructions contain important safety information. Read them before starting installation or servicing of the equipment.
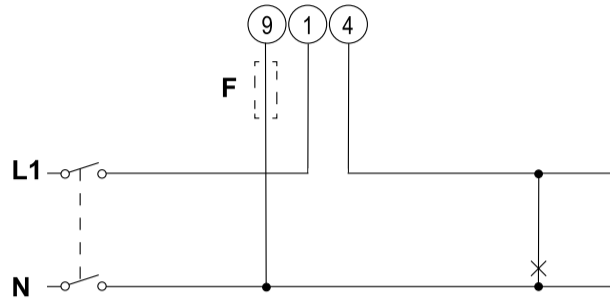
⚡ **Caution: Risk of Electric Shock**

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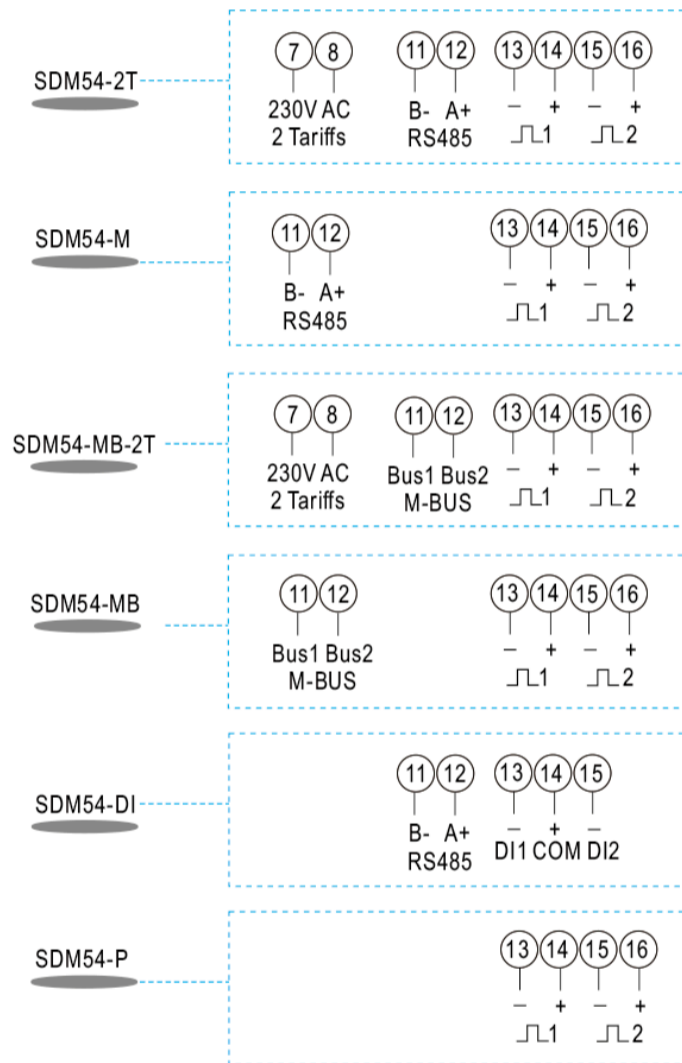## control & instrumentation

6. Dimensions

54mm

105mm

67.5mm

49.6mm

7. Wiring diagram

• **Three Phase Four Wires:**

9 1 4 2 5 3 6

F

L1
L2
L3
N

• **Single Phase Two Wires:**

9 1 4

F

L1

N

• **Other terminals**

SDM54-2T

7 8	11 12	13 14	15 16
230V AC 2 Tariffs	B- A+ RS485	− + ⊓1	− + ⊓2

SDM54-M

11 12	13 14	15 16
B- A+ RS485	− + ⊓1	− + ⊓2

SDM54-MB-2T

7 8	11 12	13 14	15 16
230V AC 2 Tariffs	Bus1 Bus2 M-BUS	− + ⊓1	− + ⊓2

SDM54-MB

11 12	13 14	15 16
Bus1 Bus2 M-BUS	− + ⊓1	− + ⊓2

SDM54-DI

11 12	13 14 15
B- A+ RS485	− + − DI1 COM DI2

SDM54-P

13 14	15 16
− + ⊓1	− + ⊓2

8. EU Declaration of Conformity

9. MID certificate

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CONTACT US

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