SDM630 MCT V2 Series

Three Phase Multifunction Energy Meter

DIN RAIL SMART METER
FOR SINGLE AND THREE PHASE
ELECTRICAL SYSTEMS

User Manual V4.9

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

1.Introduction

This document provides operating, maintenance and installation instructions. This unit measures and displays the characteristics of single phase two wire(1p2w),three phase three wire(3p3w) and three phase four wire(3p4w) networks.The measuring parameters include voltage(V), frequency(Hz),current(A),power(kW/kVA/kVAr),import, export and total Energy(kWh/kVArh).The unit can also measures Maximum demand of current and power. This is measured over preset periods of up to 60 minutes.

This unit is a 1A or 5A current transformer operated and can be configured to work with a wide range of CTs. Built-in pulse and Modbus or M-Bus outputs.Configuration is password protected.

This unit can be powered by a separate auxiliary (AC or DC) supply. Alternatively it can be powered from the monitored supply by linking the voltage reference and neutral reference to terminals 5 and 6 (Please refer to wiring diagram).

1.1 Unit Characteristics

This series includes 4 models:

SDM630MCT V2	SDM630MCT-Mbus V2	SDM630MCT-2T V2	SDM630MCT-2T-Mbus
Multi-parameter measurement	Multi-parameter measurement	Multi-parameter measurement	Multi-parameter measurement
Single Tariff	Single Tariff	2 Tariffs (dual source)	2 Tariffs (dual source)
RS485 Modbus	M-Bus EN13757-3	RS485 Modbus	M-Bus EN13757-3

1.2 RS485 Modbus RTU / M-Bus

SDM630MCT V2 and SDM630MCT-2T V2 have a RS485 port with Modbus RTU protocol. SDM630MCT-MbusV2 and SDM630MCT-2T-Mbus has a M-Bus port complying with EN13757-3. Refers to section 4.2

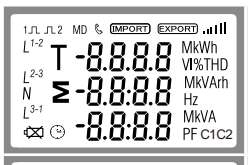
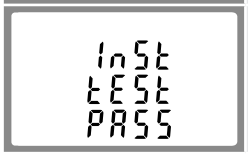
1.3 Current Transformer Primary Current

SDM630MCT V2 Series is CT operated. you will need to set the correct CT rate. Refers to section 4.3

1.4 Pulse Output

Two pulse outputs that pulse measured active and reactive energy.The Pulse 2 constant for active energy is fixed at 3200imp/kWh. The pulse output 1 is configurable. Refers to section 4.5

2.Start Up Screens

	The first screen lights up all display segments and can be used as a display check.
	Software version information (This information is for reference only, in kind pervail.)
	The interface performs a self-test and indicates the result if the test passes.

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

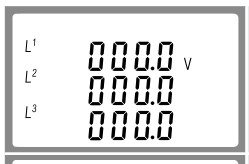
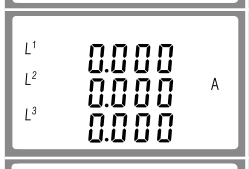
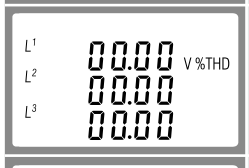
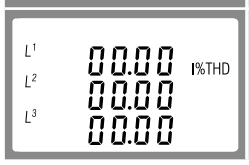
3.Measurements

The buttons operate as follows:

U/I ESC	Selects the Voltage and Current display screens. In Set-up Mode, this is the “Left” or “Back” button.
M	Select the Frequency and Power factor display screens. In Set-up Mode, this is the “Up” button.
P	Select the Power display screens. In Set-up Mode, this is the “Down” button.
E	Select the Energy display screens. In Set-up mode, this is the “Enter” or “Right” button.

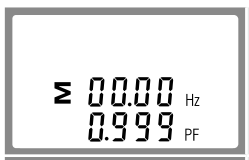
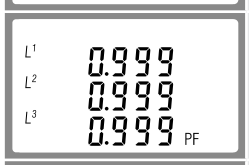
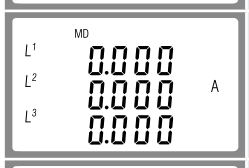
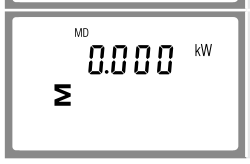
3.1 Voltage and Current

Each successive press of the U/I button selects a new parameter:

	Phase to neutral voltages.
	Current on each phase.
	Neutral Current
	Phase to neutral voltage THD%.
	Current THD% for each phase.

3.2 Frequency and Power Factor and Demand

Each successive press of the M button selects a new range:

	Frequency and Power Factor (total).
	Power Factor of each phase.
	Maximum Current Demand.
	Maximum Power Demand.

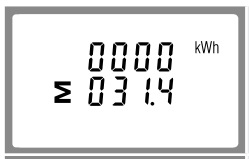
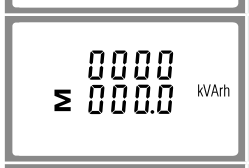
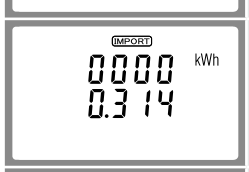
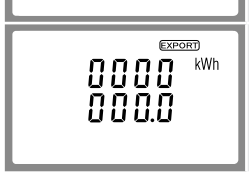
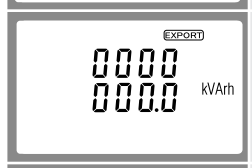
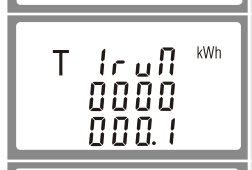
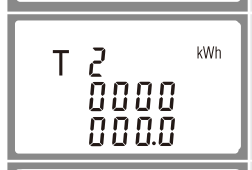
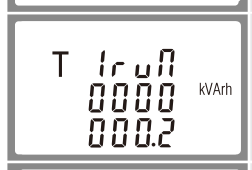
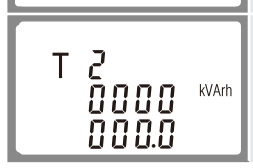
3.3 Power

Each successive press of the P button selects a new range:

	Instantaneous Active Power in kW.
	Instantaneous Reactive Power in kVAr.
	Instantaneous Volt-Amps in KVA.
	Total kW, kVAr, kVA.

3.4 Energy Measurements

Each successive press of the E button selects a new range:

	Total Active Energy in kWh.
	Total Reactive Energy in kVArh.
	Import Active Energy in kWh.
	Export Active Energy in kWh.
	Import Reactive Energy in kVArh.
	Export Reactive Energy in kVArh.
	T1 Active Energy in kWh *For SDM630MCT-2T and SDM630MCT-2T-Mbus only
	T2 Active Energy in kWh *For SDM630MCT-2T and SDM630MCT-2T-Mbus only
	T1 Reactive Energy in kVArh *For SDM630MCT-2T and SDM630MCT-2T-Mbus only
	T2 Reactive Energy in kVArh *For SDM630MCT-2T and SDM630MCT-2T-Mbus only

4.Set Up

To enter set-up mode, press the E button for 3 seconds until the password screen appears.

	Setting up is password-protected. The user should enter the correct password (default ‘1000’) before processing.
	If an incorrect password is entered, the display will show: PASS Err

To exit setting-up mode, press U/I repeatedly until the measurement screen is restored.

4.1 Set-up Entry Methods

Some menu items, such as password and CT, require a four-digit number entry while others, such as supply system, require selection from a number of menu options.

4.1.1 Menu Option Selection

1. Use the U/I and P buttons to scroll through the different options of the set up menu.
2. Press E to confirm your selection
3. If an item flashes, then it can be adjusted by the M and P buttons.
4. Having selected an option from the current layer, press E to confirm your selection.
5. Having completed a parameter setting, press U/I to return to a higher menu level. You will be able to use the M and P buttons for further menu selection.
6. On completion of all setting-up, press U/I repeatedly until the measurement screen is restored.

4.1.2 Number Entry Procedure

When setting up the unit, some screens require the entering of a number. In particular, on entry to the setting up section, a password must be entered. Digits are set individually, from left to right. The procedure is as follows:

1. The current digit to be set flashes and is set using the M and P buttons.
2. Press E to confirm each digit setting.
3. After setting the last digit, press U/I to exit the number setting routine.

4.2 Communication

4.2.1 RS485 / Mbus Primary Address

(The range is from 001 to 247 for Modbus and 001 to 250 for Mbus)

	From the set-up menu, M and P buttons to select the address ID.
	Press E button to enter the selection routine. The current setting will flash
	Use M and P buttons to choose Modbus or Mbus primary address

Procedure, press E button to confirm the setting and press U/I button to return the main set-up menu.

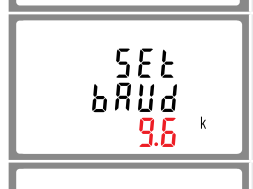
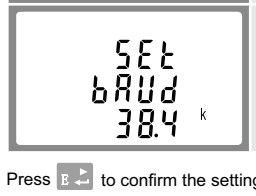
4.2.2 Mbus Secondary Address

	Secondary address: 00 00 00 01 to 99 99 99 99 From the set-up menu, use M and P buttons to find the setting page.
	Press E to enter the selection routine. The current setting will flash.
	Use M and P buttons to set the secondary address

Press E to confirm the setting and press U/I to return to the main set up menu.

4.2.3 Baud Rate

Baud rate range for Modbus RTU: 2.4k, 4.8k, 9.6k, 19.2k, 38.4k.
For Mbus: 0.3k, 0.6k, 2.4k, 4.8k, 9.6k.

	From the set-up menu, use M and P buttons to select the baud rate option.
	Press E to enter the selection routine. The current setting will flash.
	Use M and P buttons to choose baud rate 2.4k, 4.8k, 9.6k, 19.2k, 38.4k

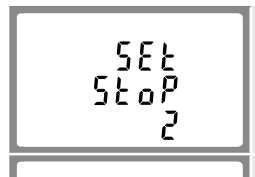
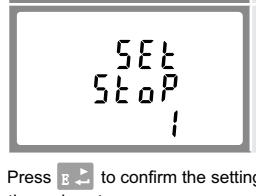
Press E to confirm the setting and press U/I to return to the main set-up menu.

4.2.4 Parity

	From the set-up menu, use M and P buttons to select the parity option.
	Press E to enter the selection routine. The current setting will flash.
	Use M and P buttons to choose parity (EVEN / ODD / NONE (default)).

Press E to confirm the setting and press U/I to return to the main set-up menu.

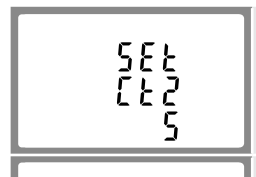
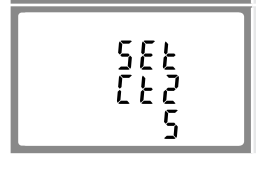
4.2.5 Stop Bits

	From the set-up menu, use M and P buttons to select the stop bit option.
	Press E to enter the selection routine. The current setting will flash.
	Use M and P buttons to choose stop bit (2 or 1) Note: Default is 1, and only when the parity is NONE that the stop bit can be changed to 2.

Press E to confirm the setting and press U/I to return to the main set-up menu.

4.3 CT

The CT option sets the secondary current (CT2 1A or 5A) of the current transformer (CT) that wires to the meter.

	From the set-up menu, use M and P buttons to select the CT option.
	Secondary CT setting Press E to enter the CT secondary current selection routine:5A/1A

CT rAtE 0001	Set CT rate value Press E to enter the CT rate setting screen. The range is from 0001 to 2000.

For example, if using a 100/5A current transformer you will enter 0020, as you need to divide the primary by the secondary to get the ratio (CT rate).

*** Please note for the MID approved version device,you will only have one opportunity to set the CT rate.**

4.4 PT

The PT option sets the secondary voltage (PT2 100 to 500V) of the voltage transformer (PT) that may be connected to the meter.

SEt Pt2 400	Use M and P buttons to select the PT option. The screen will show the voltage PT secondary voltage value. The default value is 400V.
SEt Pt2 400	Secondary PT setting Press E to enter the PT secondary voltage selection routine. The range is from 100 to 500V.
Pt rAtE 0001	Set PT rate value Press E to enter the PT rate screen. The range is from 0001 to 2000.

For example, if set the rate to 100,it means the primary voltage equals secondary voltage x100.

4.5 Pulse Output

The option allows you to configure the pulse output 1. The output can be set to provide a pulse for a defined amount of energy active or reactive. Use this section to set up the pulse output—Units: kWh, kVArh

SEt kWh rLy	From the set-up menu, use M and P buttons to select the Pulse output option.
SEt kWh rLy	Press E to enter the selection routine. The unit symbol will flash.
SEt kVArh rLy	Use M and P buttons to choose kWh or kVArh.

Press E to confirm the setting and press U/I to return to the main set up menu.

4.5.1 Pulse Rate

Use this to set the energy represented by each pulse.
Rate can be set to 1 pulse per 0.01/0.1k/1/10/100/1000kWh/kVArh.

SEt rAtE 10	(It shows 1 impulse = 10kWh/kVArh)
SEt rAtE 10	From the set-up menu, use M and P buttons to select the pulse rate option.
SEt rAtE 10	Press E to enter the selection routine. The current setting will flash. 0.01/0.1/1/10/100/1000kWh/kVArh per pulse.

Use M and P buttons to choose pulse rate.
Press E to confirm the setting and press U/I to return to the main set up menu.

4.5.2 Pulse Duration

The energy monitored can be active or reactive and the pulse width can be set as 200, 100 or 60ms.

SEt PULS 200	(It shows pulse width of 200ms)
SEt PULS 200	From the set-up menu, use M and P buttons to select the pulse width option.
SEt PULS 200	Press E to enter the selection routine. The current setting will flash.

Use M and P buttons to choose pulse width.
Press E to confirm the setting and press U/I to return to the main set-up menu.

4.6 DIT Demand Integration Time

This sets the period in minutes over which the current and power readings are integrated for maximum demand measurement. The options are: 0, 5, 8, 10,15, 20, 30, 60 minutes.

SEt dIt 10	From the set-up menu, use M and P buttons to select the DIT option. The screen will show the currently selected integration time.
SEt dIt 10	Press E to enter the selection routine. The current time interval will flash.

Use M and P buttons to choose the selection.
Press E to confirm the setting and press U/I to return to the main set-up menu.

4.7 Backlit Set-up

The meter provides a function to set the backlit lasting time(0/5/10/30/60/120 minutes).
Option 0 means the backlit always on here.

SEt LP 60	Default:60 If it is set as 5,the backlit will be off in 5minutes.
SEt LP 60	Use M and P buttons to choose the time

Press E to confirm the setting and press U/I to return to the main set-up menu.

4.8 Supply System

The unit has a default setting of 3Phase 4wire (3P4).
Use this section to set the type of electrical system.

SYS 3P3	From the set-up menu, use M and P buttons to select the system option. The screen will show the currently selected system type.
SYS 3P3	Press E to enter the selection routine. The current selection will flash.
SYS 1P2	Use M and P buttons to select the required system option: 1P2(W),3P3(W) ,3P4(W).

Press E to confirm the selection.
Press U/I to exit the system selection routine and return to the menu.

4.9 CLR

The meter provides a function to reset the maximum demand value of current and power.

CLr	From the set-up menu, use M and P buttons to select the reset option.
MD CLr	Press E to enter the selection routine. The “MD” will flash.

Press E to confirm the reset and press U/I to return to the main set-up menu.

4.10 Change Password

SEt PASS 1000	Use the M and P to choose the change password option.
SEt PASS 1000	Use the M and P to choose the change password option.
SEt PASS 1000	Press the E to enter the change password routine. The new password screen will appear with the first digit flashing.
SEt PASS 1000	Use M and P to set the first digit and press E to confirm your selection. The next digit will flash.
SEt PASS 1100	Repeat the procedure for the remaining three digits.
SEt PASS 1100	After setting the last digit, Press E to confirm the selection.

Press U/I to exit the number setting routine and return to the Set-up menu.

4.11 CT Reversal

If the CT connections are incorrectly wired, they can be reversed through the set-up menu:

SEt SYS Cont	Use the M and P buttons to select the menu option. Hold the E button to view the sub-menu.
SEt 1A Frd	This screen will display, you can change Forward to Reverse on each individual CT connection.
SEt 1A rEU	Hold the E button to confirm your adjustment. You can then move on to IB or IC using the M and P buttons.

Hold the U/I button for 3 seconds to exit the set up menu.

5.Specifications

5.1 Measured Parameters

The unit can monitor and display the following parameters of a single phase two wire(1p2w), three phase three wire(3p3w) or three phase four wire(3p4w) system.

5.1.1 Voltage and Current

- Phase to neutral voltages 100 to 276V a.c. (not for 3p3w supplies).
- Voltages between phases 173 to 480V a.c. (3p supplies only).
- Percentage total voltage harmonic distortion (THD%) for each phase to N (not for 3p3w supplies).
- Percentage voltage THD% between phases (three phase supplies only).
- Current THD% for each phase

5.1.2 Power Factor and Frequency and Max. Demand

- Frequency in Hz
- Power factor
- Instantaneous power:
- Power 0 to 3600 MW
- Reactive power 0 to 3600 MVAr
- Volt-amps 0 to 3600 MVA
- Maximum demanded power since last reset
- Maximum neutral current demand, since the last reset (for three phase supplies only)

5.1.3 Energy Measurements

• Import/Export active energy	0 to 9999999.9 kWh
• Import/Export reactive energy	0 to 9999999.9 kVArh
• Total active energy	0 to 9999999.9 kWh
• Total reactive energy	0 to 9999999.9 kVArh

5.2 Measured Inputs

Voltage inputs through 4-way fixed connector with 2.5mm² stranded wire capacity. single phase two wire(1p2w), three phase three wire(3p3w) or three phase four wire(3p4w) unbalanced. Line frequency measured from L1 voltage or L3 voltage.

Three current inputs (six physical terminals) with 2.5mm² stranded wire capacity for connection of external CTs. Nominal rated input current 5A or 1A a.c. RMS.

5.3 Accuracy

• 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
• Active energy (Wh)	Class 1 IEC 62053-21
• Reactive energy (VArh)	Class 2 IEC 62053-23
• Total harmonic distortion	1% up to 31st harmonic
• Response time to step input	1s, typical, to >99% of final reading, at 50 Hz.

5.4 Auxiliary Supply

Two-way fixed connector with 2.5mm² stranded wire capacity.
85 to 275V a.c. 50/60Hz ±10% or 120V to 380V d.c. ±20%.
Consumption < 10W.

5.5 Interfaces for External Monitoring

Three interfaces are provided:

- RS485/Mbus communication channel that can be programmed via protocol remotely.
- Pulse output(Pulse 1) indicating real-time measured energy (configurable)
- Pulse output(Pulse 2) 3200imp/kWh (non-configurable)

The Modbus configuration (baud rate etc.) and the pulse output assignments (kWh/kVArh) are configured through the set-up screens.

5.6 Reference Conditions of Influence Quantities

Influence Quantities are variables that affect measurement errors to a minor degree. Accuracy is verified under nominal value (within the specified tolerance) of these conditions.

• Ambient temperature	23°C ±2°C
• Input frequency	50 or 60Hz ±2%
• Input waveform	Sinusoidal (distortion factor < 0.005)
• Auxiliary supply voltage	Nominal ±1%
• Auxiliary supply frequency	Nominal ±1%
• Auxiliary supply waveform (if AC)	Sinusoidal (distortion factor < 0.05)
• Magnetic field of external origin	Terrestrial flux

5.7 Environment

• Operating temperature	-25°C to +55°C*
• Storage temperature	-40°C to +70°C*
• Relative humidity	0 to 95%, non-condensing
• Altitude	Up to 2000m
• Warm-up time	5s
• Vibration	10Hz to 50Hz, IEC 60068-2-6, 2g
• Shock	30g in 3 planes

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

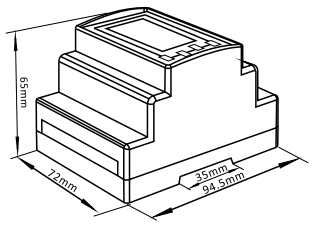
5.8 Mechanics

• DIN rail dimensions	72 x 94.5 mm (WxH) per DIN 43880
• Mounting	DIN rail 35mm
• Ingress protection	IP51 (indoor)
• Material	Self-extinguishing UL94 V-0

5.9 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 poly phase multifuntion electrical energy meter “SDM630MCT V2 Serise”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/SGS0142. Identification number of the NB0598.

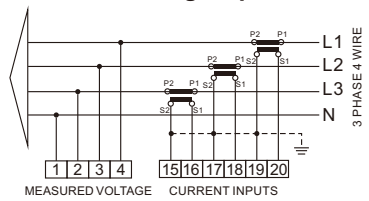
6.Dimensions

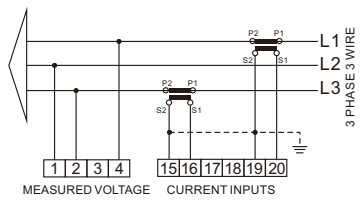


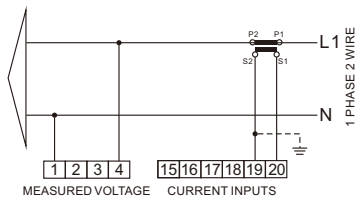
7.Installation

The wiring diagram of SDM630MCT V2 series has little difference from different models. please make sure the wiring is correct before turning on power of the meter.

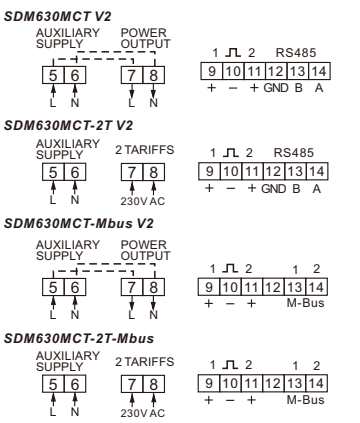
Current and Voltage Inputs







Definitions of Other Terminals



Terminals Capacity	RS485 / Pulse / 2T	0.5~2.5mm²
	Load	1.5~2.5mm²
Screw Torque	RS485 / Pulse / 2T	0.4Nm
	Load	0.4Nm

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