SDM630MV CT-2C

Multi-Channel Din Rail Smart Energy Meter

- Measures kWh Kvarh, KW, Kvar, KVA, P, F, PF, Hz, dmd, V, A, THD, etc.
- Bi-directional measurement IMP & EXP
- Two pulse outputs
- RS485 Modbus
- Din rail mounting 35mm
- 0.333V CT connection
- Better than Class 1 / B accuracy
- 2pcs 3p4w meters and 6pcs 1p2w

USER MANUAL

V4.2 2015

Address: No.1369 Chengnan Road, Jiaxing, Zhejiang, 314001, China.
Tel: 0086-573-83698881/83698882 Fax: 0086-573-83698883  Web: www.eastron.com.cn
Introduction
SDM630MV CT-2C measures and displays the characteristics of two three phase four wires circuits or 6 single phase circuits, including voltage, frequency, current, power and active and reactive energy, imported or exported. Energy is measured in terms of kWh, kVarh. Maximum demand current can be measured over preset periods of up to 60 minutes. In order to measure energy, the unit requires voltage and current inputs in addition to the supply required to power the product. The requisite current input(s) are obtained via current transformers (CT).

This meter can be configured to work with a wide range of CTs with 0.333V output, giving the unit a wide range of operation. Built-in interfaces provides pulse and RS485 Modbus RTU outputs. Configuration is password protected.

Unit Characteristics
The Unit can measure and display electronic information of multi-channels
- L-N voltage and THD% (total harmonic distortion) of all phases
- Line Frequency
- Currents, Current demands and current THD% of all phases
- Power, maximum power demand and power factor
- Active energy imported and exported
- Reactive energy imported and exported

The unit has password-protected set-up screens for:
- Changing password
- Supply system selection 1phase2wire, 3phase 4wires
- CT1 value
- PT ratio (1 to 9999)
- Demand Interval time
- Reset for demand measurements
- Pulse output duration

A pulse output indicates real-time energy measurement. An RS485 output allows remote monitoring from another display or a computer.

Current Transformer Primary Current
The unit can be configured to operate with Primary Current.
The secondary CT is fixed at 0.333V

RS485 Serial – Modbus RTU
This uses an RS485 serial port with Modbus RTU protocol to provide a means of remotely monitoring and controlling the Unit
Set-up screens are provided for setting up the RS485 port.

Pulse output
This provides 2 pulse outputs referring the energy consumption of two circuits. Both pulse
outputs are configurable. The pulse width for active energy can be set from the Set-up menu.

Start Up Screens

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

2. The second screen indicates the firmware installed in the unit and its build number.

3. Next the unit performs a self-test and indicates if the test passes.

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

Measurements

The SDM630MV-2C measures all important electrical parameters, which is shown on the LCD display and approachable via RS485. On the front panel there are four sensitive buttons and four LED indicators.

The buttons operate as follows:

1. Selects the Voltage and Current display screens
   In Set-up Mode, this is the “Left” or “Back” button.

2. Select the Frequency and Power factor display screens
   In Set-up Mode, this is the “Up” button

3. Select the Power display screens
   In Set-up Mode, this is the “Down” button

4. Select the Energy display screens
   In Set-up mode, this is the “Enter” or “Right” button
There are four LED indicators on the front panel, namely C1, C2, Pulse1 and Pulse2. The unit can measures and displays data of two three phase circuits: C1 circuit and C2 circuit. If C1 LED shows, that means the reading on the LCD are for C1 circuit. While C2 is there, it means the measurements on the LCD are for C2 circuit.

The default display after the meter is power on, the LCD show “C1” circuit information. The way to shift “C1” circuit information to “C2” circuit information is by pressing the “Down” button. If the meter are showing “C2”, and the user want to shift it to be “C1” circuit,

Then he shall keep pressing the “UP” button.

Voltage and Current

Each successive pressing of the button selects a new range:

1. Phase to neutral voltages
2. Current on each phase
3. Phase to neutral voltage THD%
### Frequency and Power factor and demand

Each successive pressing of the $\text{M} \uparrow$ button selects a new range:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1    | Frequency  
      | Power factor (total) |
| 2    | Power factor of each phase |
| 3    | Max. Power demand |
| 4    | Max. Current demand |

### Power

Each successive pressing of the $\text{P} \downarrow$ button selects a new range:
1. Instantaneous active power (kW)

2. Instantaneous reactive power (kVAR)

3. Instantaneous Volt-amps (KVA)

2. Total kW, kVAR, kVA

Energy Measurements

Each successive pressing of the button selects a new range:

1. Total active energy in kWh
### Table

<table>
<thead>
<tr>
<th>2-1</th>
<th>C1-L1 kwh</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td>L1 002.1 042.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2-2</th>
<th>C1-L2 kwh</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td>L2 002.7 042.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2-3</th>
<th>C1-L3 kwh</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3.png" alt="Image" /></td>
<td>L3 001.9 134.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3-1</th>
<th>Imported active energy in kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4.png" alt="Image" /></td>
<td>IMPORT 003.8 310.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3-2</th>
<th>Exported active energy in kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5.png" alt="Image" /></td>
<td>EXPORT 002.8 908.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>Total reactive energy in kVAh</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image6.png" alt="Image" /></td>
<td>Σ 009.8 550.7</td>
</tr>
</tbody>
</table>
5-1  C1-L1 kVarh

5-2  C1-L2 kVarh

5-3  C1-L3 kVarh

6-1  Imported reactive energy in kVarh

6-2  Exported reactive energy in kVarh
Setting Up

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

Setting up is password-protected so you must 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 repeatedly until the measurement screen is restored.

Set-up Menu Structure

Change password

nnnn  4-digit number – default ‘1000’

CT  Set the value of the CT1

nnnn  4-digit number  0005~9999.
PT set the value of PT Ratio

Nnnn  4-digit number  0001~9999

DIT Demand Integration Time

This is the period in minutes over which the current and power readings are integrated for maximum demand measurement. Options are: 5, 10, 15, 30 and 60 minutes.

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.

Menu Option Selection

1) Use the \text{M} \text{A} \text{nd} \text{P} \text{V} buttons to select the required item from the menu

2) Press \text{E} \rightarrow to confirm your selection

3) If an item flashes, then it can be adjusted by the \text{M} \text{A} \text{nd} \text{P} \text{V} buttons. If not, there maybe a further layer.

4) Having selected an option from the current layer, press \text{E} \rightarrow to confirm your selection. The SET indicator will appear.

5) Having completed a parameter setting, press \text{U/I} \text{ESC} to return to a higher menu level. The SET indicator will be removed and you will be able to use the \text{M} \text{A} \text{nd} \text{P} \text{V} buttons for further menu selection.

6) On completion of all setting-up, press \text{U/I} \text{ESC} repeatedly until the measurement screen is restored.
**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 \( \text{M} \) and \( \text{P} \) buttons.

2) Press \( \text{E} \) to confirm each digit setting. The SET indicator appears after the last digit has been set.

3) After setting the last digit, press \( \text{U/I} \) to exit the number setting routine. The SET indicator will be removed.

**Change password**

1. Use the \( \text{M} \) and \( \text{P} \) to choose the change password option.

2-1. Press the \( \text{E} \) to enter the change password routine. The new password screen will appear with the first digit flashing.

2-2. Use \( \text{M} \) and \( \text{P} \) to set the first digit and press \( \text{E} \) to confirm your selection. The next digit will flash.

2-3. Repeat the procedure for the remaining three digits.
After setting the last digit, SET will show.

Press \( U/\text{ESC} \) to exit the number setting routine and return to the Set-up menu. SET will be removed.

**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: 5, 10, 15, 30, 60 minutes.

1. From the set-up menu, use \( M \uparrow \) and \( P \downarrow \) buttons to select the dlt option. The screen will show the currently selected integration time.

2-1. Press \( E \rightarrow \) to enter the selection routine. The current time interval will flash.

2-2. Use \( M \uparrow \) and \( P \downarrow \) buttons to select the time required.

3. Press \( E \rightarrow \) to confirm the selection. SET indicator will appear.

Press \( U/\text{ESC} \) to exit the dlt selection routine and return to the menu.
### CT

The CT option sets the primary current (CT2 fixed 0.333V) of the current transformer (CT) that wires to the meter.

1. From the Set-up menu, use left and right buttons to select the CT option. The screen will show the current CT primary current value.

2. Secondary CT (CT2) It’s fixed 0.333V, and cannot be set. C1.CT2 → Circuit 1  
   C2.CT2 → Circuit 2

### PT

The PT option sets the secondary voltage (PT2 100~500V) of the Voltage transformer (PT) that wires to the meter and the PT ratio between PT1 to PT2. The default value is 400V for Secondary PT (L-L), and the ratio between PT1 and PT2 is 1.

1. From the Set-up menu, use left and right buttons to select the PT option. The screen will show the voltage PT secondary voltage value.

2. Secondary PT setting The setting method is same as Primary voltage setting PT1 Max PT2 value is 500V

3. Set PT Ratio Value Press ‘E’ to enter the PT Ratio The range is from 0001~9999.
Press **ESC** to exit the system selection routine and return to the menu. SET will disappear and you will be returned to the main Set-up Menu.

**Pulse output**

This option allows you to configure the pulse output. The output can be set to provide 2 pulses, Pulse 1 is lock to C1, and Pulse 2 is lock to C2. The setting will be effective for both pulse outputs. Use this section to set up the pulse output (Units: kWh, kVarh).

1. From the Set-up menu, use **↑** and **↓** buttons to select the Pulse output option.

2-1. Press **ESC** to enter the selection routine. The unit symbol will flash.

2-2. Use **↑** and **↓** buttons to choose kWh or kVarh.

On completion of entry procedure, press **ESC** to confirm the setting and press **ESC** to return to the main set up menu.

**Pulse rate**

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

(It shows 1 impulse = 10kWh/kVarh)
1. From the Set-up menu, use \( \text{M} \uparrow \) and \( \text{P} \downarrow \) buttons to select the Pulse Rate option.

2. Press \( \text{E} \leftarrow \) to enter the selection routine. The current setting will flash. Use \( \text{M} \uparrow \) and \( \text{P} \downarrow \) buttons to choose pulse rate.

On completion of the entry procedure, press \( \text{E} \leftarrow \) to confirm the setting and press \( \text{U} \leftarrow \) to return to the main set up menu.

**Pulse Duration**

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

(It shows pulse width of 200ms)

1. From the Set-up menu, use \( \text{M} \uparrow \) and \( \text{P} \downarrow \) buttons to select the Pulse width option.

2-1. Press \( \text{E} \leftarrow \) to enter the selection routine. The current setting will flash.
Use \( \text{M} \uparrow \) and \( \text{P} \downarrow \) buttons to choose pulse width.

On completion of the entry procedure, press \( \text{E} \) to confirm the setting and press \( \text{U/ESC} \) to return to the main set up menu.

**Communication**

There is a RS485 port can be used for communication using Modbus RTU protocol. For Modbus RTU, parameters are selected from Front panel.

**RS485 Address**

From the Set-up menu, use \( \text{M} \uparrow \) and \( \text{P} \downarrow \) buttons to select the Address ID.

Press \( \text{E} \) button to enter the selection routine. The current setting will be flashing.

Use \( \text{M} \uparrow \) and \( \text{P} \downarrow \) buttons to choose Modbus Address(001 to 247)
On completion of the entry procedure, press button to confirm the setting and press button to return the main set-up menu.

**Baud Rate**

1. From the Set-up menu, use and buttons to select the Baud Rate option.

2-1. Press to enter the selection routine. The current setting will flash.

2-2. Use and buttons to choose Baud rate 2.4k, 4.8k, 9.6k, 19.2k, 38.4k.

On completion of the entry procedure, press to confirm the setting and press to return to the main set up menu.

**Parity**

1. From the Set-up menu, use and buttons to select the Parity option.
2-1

Press **E** to enter the selection routine. The current setting will flash.

2-2

Use **M** and **P** buttons to choose Parity (EVEN / ODD / NONE) Default is NONE

On completion of the entry procedure, press **E** to confirm the setting and press **U/ESC**

to return to the main set up menu.

**Stop bits**

1

From the Set-up menu, use **M** and **P** buttons to select the Stop Bit option.

2-1

Press **E** to enter the selection routine. The current setting will flash.

2-2

Use **M** and **P** buttons to choose Stop Bit (2 or 1)

On completion of entry procedure, press **E** to confirm the setting and press **U/ESC**
to return to the main set up menu.

---

EASTRON SDM630MV CT-2C User Manual

Address: No.1369 Chengnan Road, Jiaxing, Zhejiang, 314001, China.
Tel: 0086-573-83698881/83698882 Fax: 0086-573-83698883 Web: www.eastron.com.cn
The meter provides a function to reset the maximum demand value of current and power.

1. From the Set-up menu, use and buttons to select the reset option.

2. Press to enter the selection routine. The dlt will flash.

Press to confirm the setting and press to return to the main set up menu.

Specifications

Measured Parameters
The unit can monitor and display the following parameters of a single phase, 3-phase 4-wire supply.

Voltage and Current
Phase to neutral voltages 100 to 289V a.c.
Voltages between phases 173 to 500V a.c.
Percentage total voltage harmonic distortion (THD%) for each phase to N
Percentage voltage THD% between phases
Current THD% for each phase

Power factor and Frequency and Max. Demand
Frequency in Hz
Instantaneous power:
- Power 0 to 3600 MW
- Reactive Power 0 to 3600 MVAr
- Volt-amps 0 to 3600 MVA

Maximum demanded power since last Demand reset Power factor
Maximum neutral demand current, since the last Demand reset

Energy Measurements
- Imported active energy 0 to 9999999.9 kWh
- Exported active energy 0 to 9999999.9 kWh
• Imported reactive energy 0 to 9999999.9 kVArh
• Exported reactive energy 0 to 9999999.9 kVArh
• Total active energy 0 to 9999999.9 kWh
• Total reactive energy 0 to 9999999.9 kVArh

**Measured Inputs**

Voltage inputs through 4-way fixed connector with 2.5mm² stranded wire capacity. 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.

**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) ±1% of range maximum
- Total harmonic distortion 1% up to 31st harmonic

**Power Supply**

Two-way fixed connector with 2.5mm² stranded wire capacity.

The meter is powered from Phase L1. The user must make sure the meter Phase 1 has power on.

**Interfaces for External Monitoring**

Three interfaces are provided:

- an RS485 communication channel that can be programmed for Modbus RTU protocol
- an output indicating real-time measured energy. (configurable)
- an pulse output 3200imp/kWh (not configurable)

The Modbus configuration (Baud rate etc.) and the pulse output assignments (kW/kVARh, import/export etc.) are configured through the Set-up screens.

**Pulse Output**

The pulse output can be set to generate pulses to represent kWh or kVARh.

**Rate** can be set to generate 1 pulse per:

- 0.01 = 10 Wh/VArh
- 0.1 = 100 Wh/VArh
- 1 = 1 kWh/kVARh
- 10 = 10 kWh/kVARh
- 100 = 100 kWh/kVARh
- 1000 = 1000 kWh/kVARh

Address: No.1369 Chengnan Road, Jiaxing, Zhejiang, 314001, China.
Tel: 0086-573-83698881/83698882 Fax: 0086-573-83698883 Web: www.eastron.com.cn
**Pulse width** 200/100/60 ms.

### RS485 Output for Modbus RTU

For Modbus RTU, the following RS485 communication parameters can be configured from the Set-up menu:

- **Baud rate** 2400, 4800, 9600, 19200, 38400
- **Parity** none/odd/even
- **Stop bits** 1 or 2
- **RS485 network address** nnn – 3-digit number, 001 to 247

**Modbus™ Word order** Hi/Lo byte order is set automatically to normal or reverse. It cannot be configured from the set-up menu.

### 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 ±1°C
- Input waveform 50 or 60Hz ±2%
- Input waveform Sinusoidal (distortion factor < 0.005)
- Magnetic field of external origin Terrestrial flux

### Environment

- Operating temperature -25°C to +55°C*
- Storage temperature -40°C to +70°C*
- Relative humidity 0 to 90%, non-condensing
- Altitude Up to 3000m
- Warm up time 1 minute
- Vibration 10Hz to 50Hz, IEC 60068-2-6, 2g
- Shock 30g in 3 planes

### Case Dimensions

![Case Dimensions Diagram]

Address: No.1369 Chengnan Road, Jiaxing, Zhejiang, 314001, China.
Tel: 0086-573-83698881/83698882 Fax: 0086-573-83698883 Web: www.eastron.com.cn
Wiring diagram

2 circuits 3p4w

1 Circuit 3p4w+3 circuits 1p2w

Address: No.1369 Chengnan Road, Jiaxing, Zhejiang, 314001, China.
Tel: 0086-573-83698881/83698882 Fax: 0086-573-83698883 Web: www.eastron.com.cn
6 circuits 1p2w

CT1, CT2, CT3

Circuit 1
L32, L31, L22, L21, L12, L11
CT input for Circuit1

Circuit 2
L32, L31, L22, L21, L12, L11
CT input for Circuit2

Voltage input
N, L3, L2, L1

Pulse 1, Pulse 2, RS485
- + - + B A

1A fast blow fuses

Address: No.1369 Chengnan Road, Jiaxing, Zhejiang, 314001, China.
Tel: 0086-573-83698881/83698882 Fax: 0086-573-83698883  Web: www.eastron.com.cn