Three Phase Multifunction Din Rail Meter
SDM530CT-MT
User Manual V1.5

- Measures kWh Kvarh, KW, Kvar, KVA, P, F, PF, Hz, dmd, V, A, etc.
- Bi-directional measurement IMP & EXP
- Two pulse outputs
- RS485 Modbus
- Din rail mounting 35mm
- 100A direct connection
- 4 tariffs,10 time segments
- Better than Class 1 / B accuracy

Introduction

The SDM530-MT measures and displays the characteristics of three phase four wires (3p4w) supply, including voltage, frequency, current, power, 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.

SDM530MT-MT supports max. 100A direct connection, saving the cost and avoiding the trouble to connect external CTs, giving the unit a cost-effective and easy operation. Built-in interfaces provides pulse and RS485 Modbus RTU outputs. Configuration is password protected.

Unit Characteristics

The Unit can measure and display:
- Line voltage
- Line Frequency
- Currents, Current demands
- 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
- Demand Interval Time(DIT)
- Reset for demand measurements
- Pulse output duration

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

RS485 Serial – Modbus RTU

SDM530-MT has an RS485 serial port with Modbus RTU protocol to provide a means of remotely monitoring and controlling the unit.
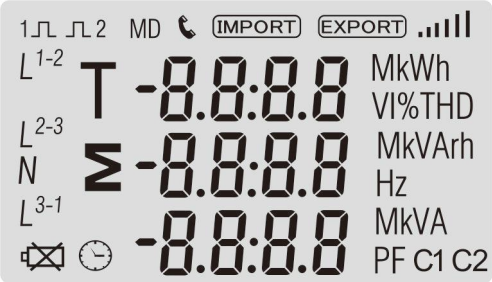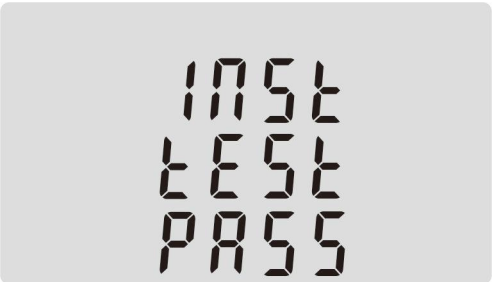
Set-up screens are provided for setting up the RS485 port.

Pulse output

This provides two pulse outputs that clock up measured active and reactive energy. The constant of pulse output 2 for active energy is 400imp/kWh, its width is fixed at 100ms.

The default constant of configurable pulse output 1 is 400imp/kWh default pulse width is100ms.The configurable pulse output 1 can be set from the set-up menu.

1	1⊓ ⊓2 MD ☎ (IMPORT) (EXPORT) ▪▪■■■ L¹⁻² **T** -8.8:8.8 MkWh VI%THD N **M** -8.8:8.8 MkVArh Hz L³⁻¹ 🔇 🕐 -8.8:8.8 MkVA PF C1 C2	The first screen lights up all display segments and can be used as a display check,
2	SoFt 1.001 2015	The second screen indicates the firmware installed in the unit and its build number.
3	INSt tESt PASS	The interface performs a self-test and indicates the result if the test passes.

After 5 seconds delay, the screen will display active energy measurements.
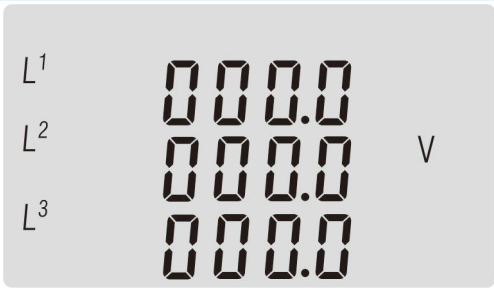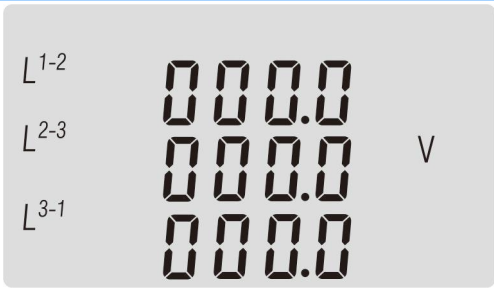
The buttons operate as follows:

1	▲	Select the Voltage and Current display screens In Set-up Mode, this is the "Up" or "back" button
2	▼	Select the Power, Frequency and Power factor display screens In Set-up Mode, this is the "Down" button
3	SET	Select the Energy display screens In Set-up mode, this is the "Enter" or "Right" button
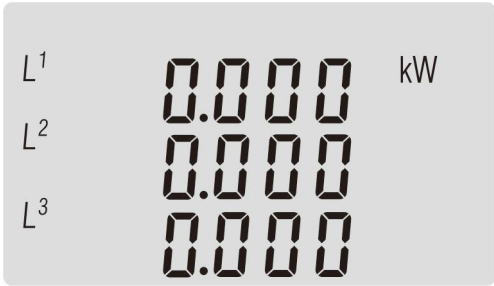
Voltage and Current and Max Demand

Each successive pressing of the ▲ button selects a new range:

1-1	L^1 000.0 L^2 000.0 V L^3 000.0	Phase to neutral voltages
1-2	L^{1-2} 000.0 L^{2-3} 000.0 V L^{3-1} 000.0	Phase to neutral voltages
2-1	L^1 0.000 L^2 0.000 A L^3 0.000	Current on each phase
2-2	N 0.000 A	Neutral current
3	MD L^1 0.000 L^2 0.000 A L^3 0.000	Maximum Current Demand

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Power and Frequency and Power factor

Each successive pressing of the ▼ button selects a new range:
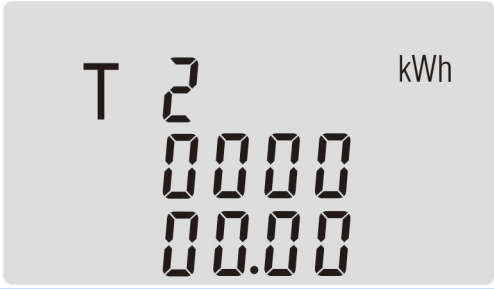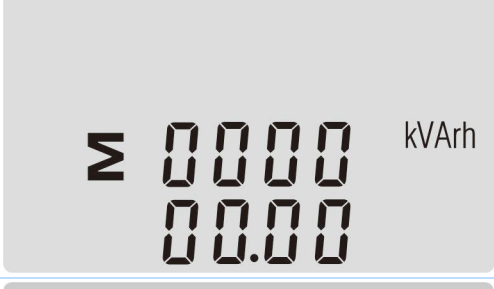
1-1	L¹ 0.000 kW L² 0.000 L³ 0.000	Instantaneous Active Power in kW When it's exported, there will be a mark of minus "一".
1-2	L¹ 0.000 L² 0.000 kVAr L³ 0.000	Instantaneous Reactive Power in kVAr When it's exported, there will be a mark of minus "一".
1-3	L¹ 0.000 L² 0.000 L³ 0.000 kVA	Instantaneous Volt-amps in KVA When it's exported, there will be a mark of minus "一".
1-4	0.000 kW M 0.000 kVAr 0.000 kVA	Total kW, kVArh, kVA When it's exported, there will be a mark of minus "一".
2	M 50.00 Hz 1.000 PF	Frequency and Power Factor (total)

3	L^1 1.000 L^2 1.000 L^3 1.000 PF	Power Factor of each phase
4	MD 0.000 kW M	Maximum Power Demand

Energy Measurements

Each successive short pressing (lasting less than 3s) of the SET button selects a new range:

1-1	kWh M 0000 00.00	Total active energy in kWh Total kWh=imported +exported (kWh)
1-2	IMPORT kWh 0000 00.00	Total Imported active energy in kWh
1-3	EXPORT kWh 0000 00.00	Total Exported active energy in kWh

2-1	T 1 kWh 0000 00.00	Tariff 1 Active energy
2-2	T 2 kWh 0000 00.00	Tariff 2 Active energy
2-3	T 3 kWh 0000 00.00	Tariff 3 Active energy
2-4	T 4 kWh 0000 00.00	Tariff 4 Active energy
3-1	Σ 0000 kVArh 00.00	Total reactive energy in kVArh Total kVArh=imported +exported (kVArh)
3-2	IMPORT 0000 kVArh 00.00	Imported reactive energy in kVArh

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3-3	EXPORT 0000 00.00 kVArh	Exported reactive energy in kVArh
4-1	T 1 0000 00.00 kVArh	Tariff 1 Reactive energy
4-2	T 2 0000 00.00 kVArh	Tariff 2 Reactive energy
4-3	T 3 0000 00.00 kVArh	Tariff 3 Reactive energy
4-4	T 4 0000 00.00 kVArh	Tariff 4 Reactive energy
5-1	dAtE 2000 01.01	Date Example:1st,Jan,2000

5-2	T IИЕ 00:02 :16	Time Hour: minute: second Example:00:02:16

Set-up

To enter set-up mode, long pressing the [SET] button for 2 seconds, until the password screen appears.

PASS

0000

Setting up is password-protected so you must enter the correct password (default '1000') before operating. If an incorrect password is entered, the display will show: Err

PASS

Err
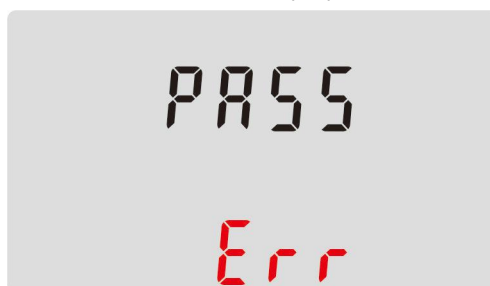
To exit setting-up mode, press [▲] repeatedly until the measurement screen is restored.

Menu Option Selection

1) Use the [▲] and [▼] buttons to select the required item from the menu;

2) Press [SET] to confirm your selection;

3) If an item flashes, then it can be adjusted by the [▲] and [▼] buttons. If not, there maybe a further layer;

4) Having selected an option from the current layer, press [SET] to confirm your selection. The SET indicator will appear;

5) Having completed a parameter setting, press [▲] to return to a higher menu level. The SET indicator will be removed and you will be able to use the [▲] and [▼] buttons for further menu selection;

6) On completion of all set-up, press [▲] 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 [▲] and [▼] buttons;

2) Press [SET] to confirm each digit setting. The SET indicator appears after the last digit has been set;

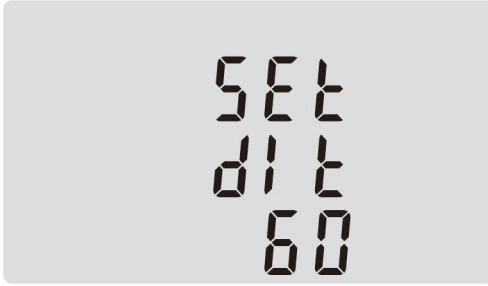3) After setting the last digit, press [▲] to exit the number setting routine. The SET indicator will be removed.

Change password

1	PASS 0000	Use the [▲] and [▼] to choose the change password option
2-1	PASS 0000	Press the [SET] to enter the change password routine. The new password screen will appear with the first digit flashing

2-2	SEt PASS 1000	Use ▲ and ▼ to set the first digit and press SET to confirm your selection. The next digit will flash.
2-3	SEt PASS 1100	Repeat the procedure for the remaining three digits.
2-4	SEt PASS 1100	After setting the last digit, SET will show.
	Press ▲ 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: 1, 5, 8,10, 15, 30,60 minutes

1	SEt dIt 60	From the set-up menu, use ▲ and ▼ buttons to select the DIT option. The screen will show the currently selected integration time. Default is 60mins
2-1	SEt dIt 60	Press SET to enter the selection routine. The current time interval will flash.

2-2		Use ▲ and ▼ buttons to select the time required.
	SEt dIt **10**	
2-3	SEt dIt 10	Press **SET** to confirm the selection. SET indicator will appear.

Press ▲ to exit the DIT selection routine and return to the menu.

Backlit set-up

1	SEt LP 60	The backlit lasting time is settable. Default lasting time is 60mins. For example, if it's setted as 5,the backlit will be off in 5minutes from the last time operation on the meter.
2	SEt LP **60**	Press **SET** to enter the selection routine. The current time interval will flash. **The options can be:0/10/30/60/120** **"0" means always on.** **Default lasting time is 60mins.**

Use ▲ and ▼ buttons to select the time required. Press **SET** to confirm the set-up,

Pulse output

This 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 for:

Total kWh/ Total kVArh

Active kWh/Reactive kWh

Active kVArh/Reactive kVArh

1	SEt rLY kWh	From the Set-up menu, use ▲ and ▼ buttons to select the Pulse output option.
2-1	SEt kWh rLY	Press SET to enter the selection routine. The unit symbol will flash.
2-2	SEt rLY kVArh	Use ▲ and ▼ buttons to choose kWh or kVArh. Default is kwh.
On completion of the entry procedure, press SET to confirm the setting and press ▲ 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 DFt/0.1/1/10/100kWh/kVArh.

SEt rAtE 0.01
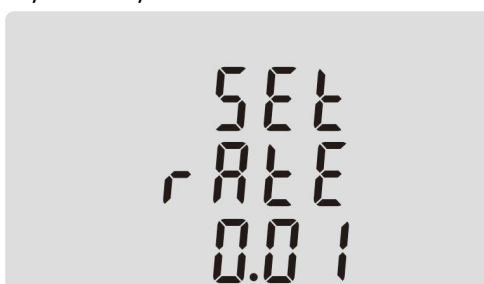
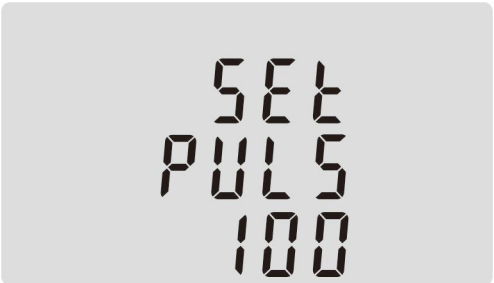(It shows 1 impulse = 0.01kWh/kVArh)

| 1 | SEt rAtE 0.01 | From the Set-up menu, use ▲ and ▼ buttons to select the Pulse Rate option. |

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2	**SEt** **rAtE** **0.01**	Press **SET** to enter the selection routine. The current setting will flash. Default is DFt (2.5kWh/kVArh).
	Use ▲ and ▼ buttons to choose pulse rate. On completion of the entry procedure, press **SET** to confirm the setting and press ▲ 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(default) or 60ms.

SEt
 PULS
 100

(It shows pulse width of 100ms)

1-1	**SEt** **PULS** **100**	From the Set-up menu, use ▲ and ▼ buttons to select the Pulse width option.
1-2	**SEt** **PULS** **100**	Press **SET** to enter the selection routine. The current setting will flash. Default is 100.
	Use ▲ and ▼ buttons to choose pulse width. On completion of the entry procedure, press **SET** to confirm the setting and press ▲ to return to the main set up menu.	

Scroll display

1-1	SEt AUto 255	From the Set-up menu, use [▲] and [▼] buttons to select the Scroll display option.
1-2	SEt AUto **255**	Press [SET] to enter the selection routine. The current setting will flash. **The options can be:**1 to255 Seconds. Default is 255s.

Use [▲] and [▼] buttons to choose interval of scroll display. On completion of the entry procedure, press [SET] to confirm the setting and press [▲] to return to the main set up menu. To activate the scroll display mode, press the [▲] lasting for 2seconds on the main interface. To close it, press [▲] button lasting for 2seconds accordingly. The default status of scroll display is closed.

Communication

There is a RS485 port can be used for communication using Modbus RTU protocol.

RS485 Address

SEt Addr 001

(The range is from 001 to 247)

1	SEt Addr 001	From the Set-up menu, use [▲] and [▼] buttons to select the Address ID.

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2-1	SEt Addr 101	Press **SET** button to enter the selection routine. The current setting will be flashing.
2-2	SEt Addr 101	Use ▲ and ▼ buttons to choose Modbus Address(001 to 247) Default is 001.
On completion of the entry procedure, press **SET** button to confirm the setting and press ▲ button to return the main set-up menu.		

Baud Rate

1	SEt bAud 9.6 k	From the Set-up menu, use ▲ and ▼ buttons to select the Baud Rate option.
2-1	SEt bAud 9.6 k	Press **SET** to enter the selection routine. The current setting will flash.
2-2	SEt bAud 2.4 k	Use ▲ and ▼ buttons to choose Baud rate 1.2K.2.4k. 4.8k, 9.6k (default).

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

Parity

1	SEt PArI EVEN	From the Set-up menu, use ▲ and ▼ buttons to select the Parity option.
2-1	SEt PArI **EVEN**	Press **SET** to enter the selection routine. The current setting will flash.
2-2	SEt PArI NONE	Use ▲ and ▼ buttons to choose Parity (EVEN / ODD / NONE) Default is NONE.
On completion of the entry procedure, press **SET** to confirm the setting and press ▲ to return to the main set up menu.		

Stop bits
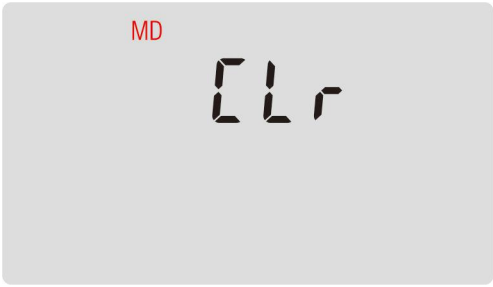
1	SEt StoP 2	From the Set-up menu, use ▲ and ▼ buttons to select the Stop Bit option.

2-1	SEt StoP 2	Press SET to enter the selection routine. The current setting will flash.
2-2	SEt StoP 1	Use ▲ and ▼ buttons to choose Stop Bit (2 or 1) Default is 1.

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

Note: Default is 1, and only when the parity is NONE that the stop bit can be changed to 2.

CLR

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

1	MD CLr	From the Set-up menu, use ▲ and ▼ buttons to select the reset option.
2	MD CLr	Press SET to enter the selection routine. The MD will flash.

Press SET 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 four phase four wires(3p4w) supply.

Voltage and Current

Phase to neutral voltages 176 to 276V a.c.

Power factor and Frequency and Max. Demand

Frequency in Hz

Instantaneous power:

Power 0 to 85000 W

Reactive Power 0 to 85000 VAr

Volt-amps 0 to 85000 VA

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 999999.99 kWh
- Exported active energy   0 to 999999.99 kWh
- Imported reactive energy   0 to 999999.99 kVArh
- Exported reactive energy   0 to 999999.99 kVArh
- Total active energy   0 to 999999.99 kWh
- Total reactive energy   0 to 999999.99 kVArh

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

Interfaces for External Monitoring

Three interfaces are provided:

- an RS485 communication channel that can be programmed via protocol remotely.
- an Pulse output(Pulse 1) indicating real-time measured energy.(configurable)
- an Pulse output(Pulse 2)

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 unit provides 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 pulse constant can be set to generate 1 pulse per:

DFt=2.5 Wh/VArh

0.01 = 10 Wh/VArh

0.1 = 100 Wh/VArh

1 = 1 kWh/kVArh

10=10Wh/kVArh

100 = 100 kWh/kVArh

Pulse width: 200/100/60ms

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

RS485 Output for Modbus RTU

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

> **Baud rate** 1200, 2400, 4800, 9600
>
> **Parity** none (default)/odd/even
>
> **Stop bits** 1 or 2
>
> **RS485 network address** *nnn* – 3-digit number, 001 to 247

## 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

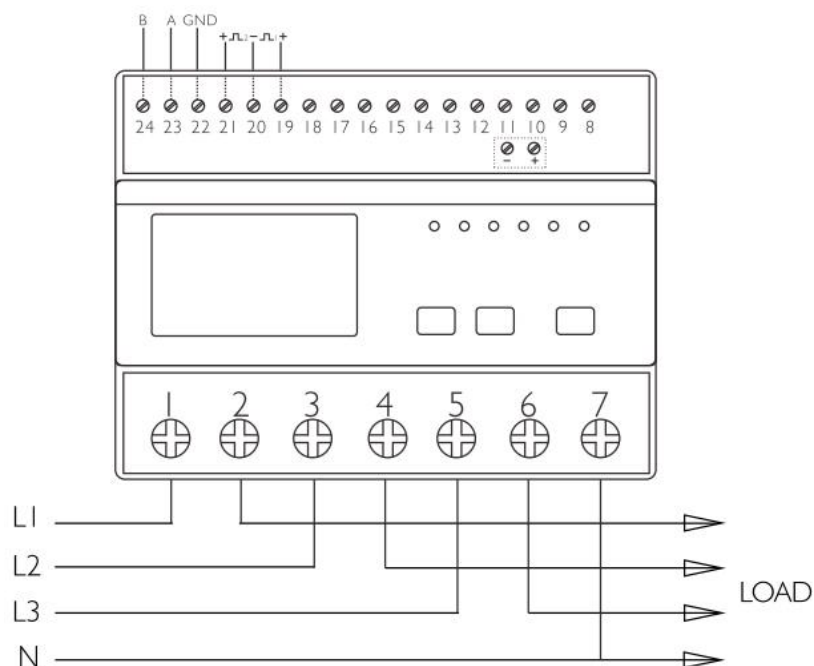## Environment

- Operating temperature   -25°C to +55°C*
- Storage temperature   -40°C to +70°C*
- Relative humidity   0 to 90%, non-condensing
- Altitude   Up to 2000m
- Warm up time   1 minute
- Vibration   10Hz to 50Hz, IEC 60068-2-6, 2g

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Dimensions
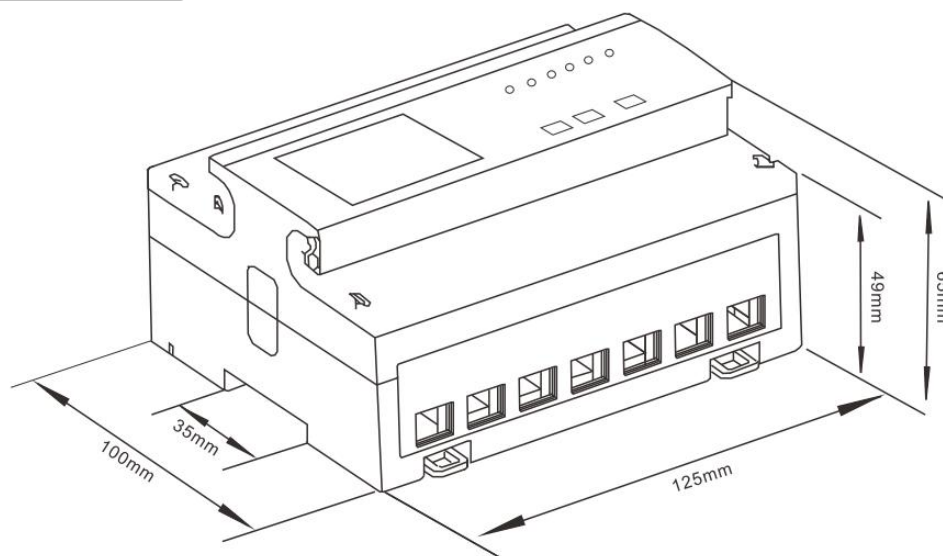
Wiring diagram

IF you have any question, please feel free to contact our sales team.

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