smartcontroller

Electrical Excellence

USER MANUAL

DIN RAIL DUAL SOURCE ENERGY METER SMART - SME 204(D)

INTRODUCTION

The SMART-SME 204D measures and displays the characteristics of single phase two wires (1p2w), three phase three wires (3p3w,) and three phase four wires(3p4w) supplies, 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.

SMART-SME 104D sSupports max. 100A direct connection, saves the cost and avoid 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.

SMART SME-204D has 2 Source Powers and can show T1 energy and T2 energy. If you want to shift T1 to T2, as far as there is 230V load between terminal 7 and 8 ,the meter will count up to T2. When T1 is working, you can get Pulse1 output 2 from pin 9 & 10. When T2 is working, you can get Pulse 2 output from pin 11 & 12.
Both Pulse 1 output and Pulse 2 output Rate are configurable

UNIT CHARACTERISTICS

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

The unit has password-protected set-up:
- Changing password
- Supply system selection 1p2w, 3p3w,3p4w
- Demand Interval Time(DIT)
- Reset for demand measurements
- Pulse output duration

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

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 two pulse outputs that clock up 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.

MEASUREMENTS

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

Start-up Screens

1		The first screen lights up 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. *The build number(1.302.2019) is for reference only. The actual build number changes according to product requirements.
3		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.

VOLTAGE AND CURRENT

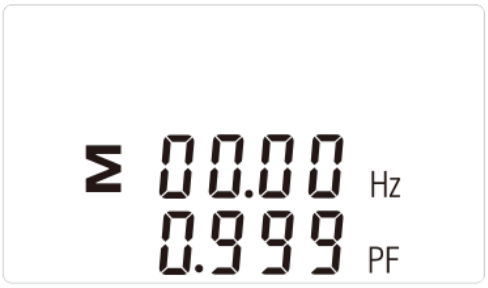
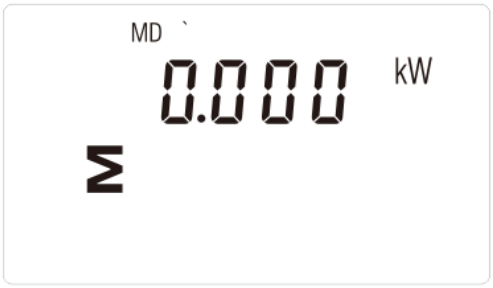
Each successive pressing of the U/I esc button selects a new range:

1-1		Phase to neutral voltages(3p4w)
1-2		Phase to neutral voltages(3p3w)
2		Current on each phase
3-1		Phase to neutral voltage THD%(3p4w)
3-2		Phase to neutral voltage THD%(3p3w)

4		Current THD% for each phase

FREQUENCY AND POWER FACTOR AND DEMAND

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

1		Frequency and Power Factor (total)
2		Power Factor of each phase
3		Maximum Power Demand
4		Maximum Current Demand

POWER

Each successive pressing of the P button select a new range:

1		Instantaneous Active Power in kW
2		Instantaneous Reactive Power in kVAr
3		Instantaneous Volt-amps in KVA
4		Total kW, kVArh, kVA

ENERGY MEASUREMENTS

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

1-1		Total active energy in kWh

1-2		Total reactive energy in kVArh
2-1		T1 active energy in kWh When T1 working, the symbol“ T1” will be flashing
2-2		T2 active energy in kWh When T2 working, the symbol “ T2” will be flashing
3-1		T1 reactive energy in kVArh When T1 working, the symbol “ T1” will be flashing
3-2		T2 reactive energy in kVArh When T2 working, the symbol “ T2” will be flashing

SET-UP

To enter set-up mode, pressing the E 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 U/I repeatedly until the measurement screen is restored.

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

1) Use the M and P buttons to select the required item from the menu. Selection does not roll over between bottom and top of list.

2) Press E to confirm your selection.

3) If an item flashes, then it can be adjusted by the M and P buttons. If not, there maybe a further layer.

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

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

6) On completion of all set-up, press U/I 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 M and P buttons.

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

3) After setting the last digit, press U/I to exit the number setting routine.

CHANGE PASSWORD

1		Use the M and P to choose the change password option.
2-1		Press the E to enter the change password routine. The new password screen will appear with the first digit flashing.
2-2		Use M and P to set the first digit and press E to confirm your selection. The next digit will flash.
2-3		Repeat the procedure for the remaining three digits

2-4		After setting the last digit, SET will show.

Press U/I 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: 0, 5, 8, 10, 15, 20, 30, 60 minutes

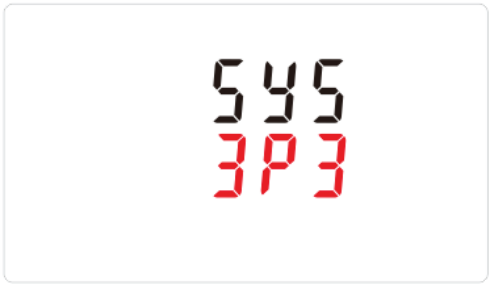
1		From the set-up menu, use M and P buttons to select the DIT option. The screen will show the currently selected integration time.
2-1		Press E to enter the selection routine. The current time interval will flash.
2-2		Use M and P buttons to select the time required.
2-3		Press E to confirm the selection. SET indicator will appear. Press U/I to exit the DIT selection routine and return to the menu.

BACKLIT SET-UP

1		The backlit lasting time is settable. Default lasting time is 60minutes. For example, if it's set as 5, the backlit will be off in 5minutes from the last time operation on the meter.
2		Press E to enter the selection routine. The current time interval will flash The options can be: 0(always on),5,10,30,60,120minutes
Use M and P buttons to select the time interval. Press E to confirm the set-up.		

SUPPLY SYSTEM

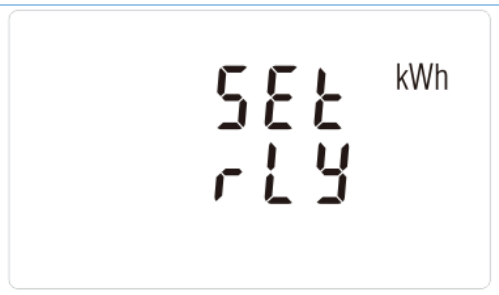
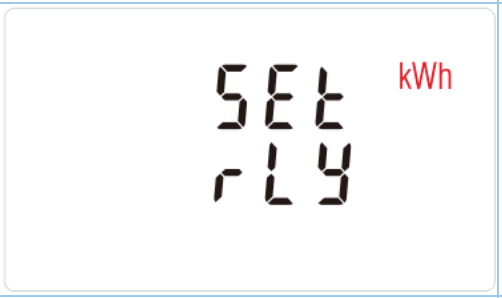
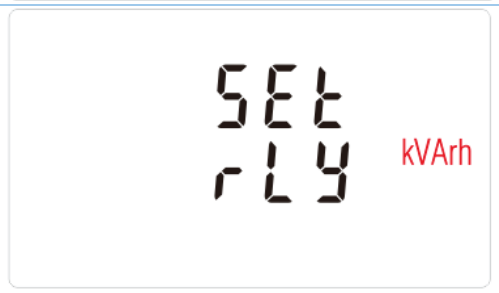
Use this section to set the type of electrical system.

1		From the Set-up menu, use M and P buttons to select the System option. The screen will show the currently selected system type.
2-1		Press E to enter the selection routine. The current selection will flash
2-2		Use M and P buttons to select the required system option: 1P2(W),3P3(W) ,3P4(W)

2-3		Press E to confirm the selection. SET indicator will appear.
Press U/I 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 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
Import kWh/Export kWh
Import KVArh/Export KVArh

1		From the Set-up menu, use M and P buttons to select the Pulse output option.
2-1		Press E to enter the selection routine. The unit symbol will flash.
2-2		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.		

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

(It shows 1 pulse = 10kWh/kVArh)

1		From the Set-up menu, use M and P buttons to select the Pulse Rate option.
2		Press E to enter the selection routine. The current setting will flash. Note: When it's dFt, it means 2.5Wh/VArh
Use M and P buttons to choose pulse rate. On completion of the entry procedure, press E to confirm the setting and press U/I 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.

(It shows pulse width of 200ms)

1-1		From the Set-up menu, use M and P buttons to select the Pulse width option.
1-2		Press E to enter the selection routine. The current setting will flash.
Use M and P buttons to choose pulse width. On Completion of the entry procedure, press E to confirm the setting and press U/I 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

(The range is from 001 to 247)

1		From the Set-up menu, use M and P buttons to select the Address ID.

2-1		Press E button to enter the selection routine. The current setting will be flashing.
2-2		Use M and P buttons to choose Modbus Address(001 to 247)
On completion of the entry procedure, press E button to confirm the setting and press U/I BSC button to return the main set-up menu.		

BAUD RATE

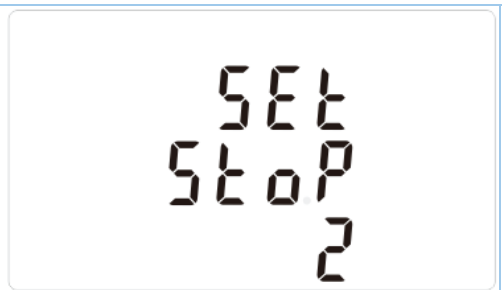
1		From the Set-up menu, use M and P buttons to select the Baud Rate option.
2-1		Press E to enter the selection routine. The current setting will flash.
2-2		Use M and P buttons to choose Baud rate 2.4k. 4.8k, 9.6k, 19.2k, 38.4k
On completion of the entry procedure, press E to confirm the setting and press U/I BSC to		

return to the main set-up menu.

PARITY

1		From the Set-up menu, use M and P 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)
On Completion of the entry procedure, press E to confirm the setting and press U/I BSC 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.

VOLTAGE AND CURRENT

Phase to neutral voltages 100 to 289V a.c. (not for 3p3w supplies)
Voltages between phases 173 to 500V 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

POWER FACTOR AND FREQUENCY AND MAX. DEMAND

Frequency in Hz
Instantaneous power:
Power 0 to 99999 W
Reactive Power 0 to 99999 VAr
Volt-amps 0 to 99999 VA
Maximum demanded power since last Demand reset Power factor
Maximum neutral demand current, since the last Demand reset (for 3p4w supply only)

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

MEASURED INPUTS

Voltage inputs through 4-way fixed connector with 25mm^2 stranded wire capacity. single pha two wire(1p2w), three phase three wire(3p3w) or four phase four wire(3p4w) unbalanced. Line frequency measured from L1 voltage or L3 voltage.

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
	Class B EN50470-1⁄3
Reactive energy (VArh)	Class 2 IEC 62053-23
Response time to step input	1s, typical, to >99% of final reading, at 50 Hz.

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 = 10 kWh/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 2400, 4800, 9600, 19200, 38400
Parity none (default)/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

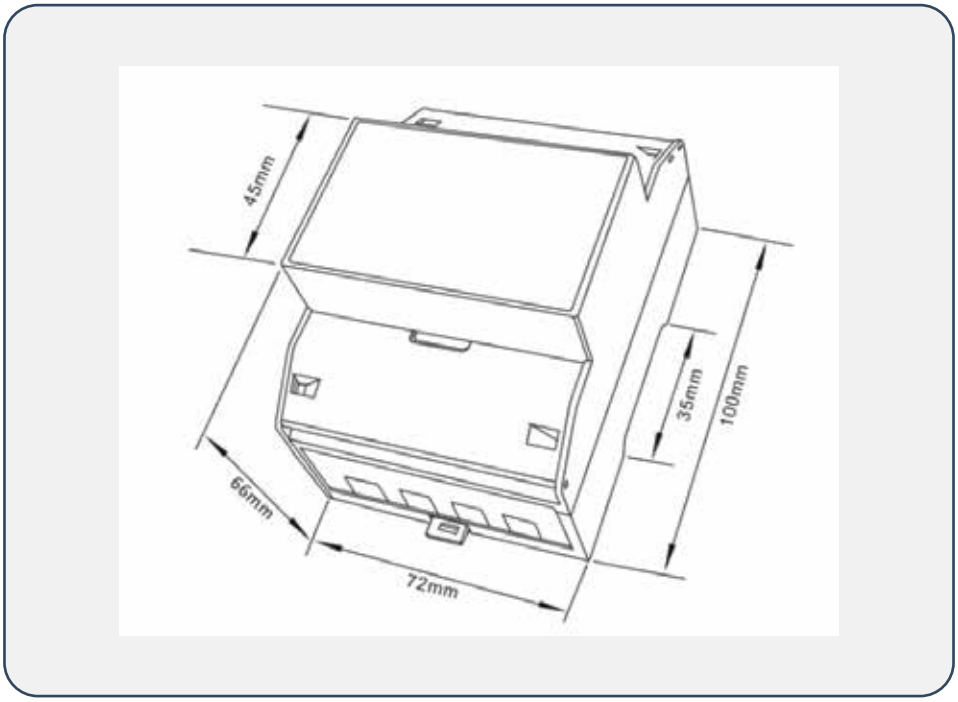
Influence Quantities are variables that affect measurement errors to a minor degree. Accuracy is verified under nominal value (within the specified tolerance) of these conditions.

Ambient temperature	23°C ±1°C
Input frequency	50Hz(MID) 50 or 60Hz ±2%(non-MID)
Input waveform	Sinusoidal (distortion factor < 0·005)
Magnetic field of external origin	Terrestrial flux

Environment

Operating temperature	3K6(-25°C to +55°C*),Default 3K7(-40°C to +70°C*)
Storage temperature	-40°C to +70°C*
Relative humidity	0 to 90%, non-condensing
Altitude	Up to 2000m
Warm up time	5S
Vibration	10Hz to 50Hz, IEC 60068-2-6, 2g
Shock	30g in 3 planes

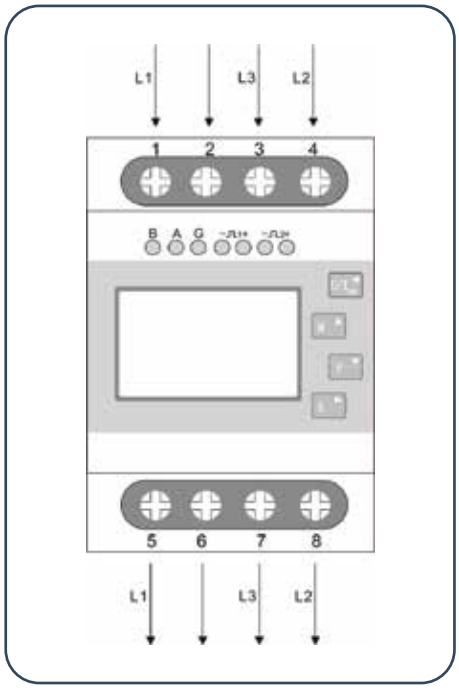
DIMENSIONS

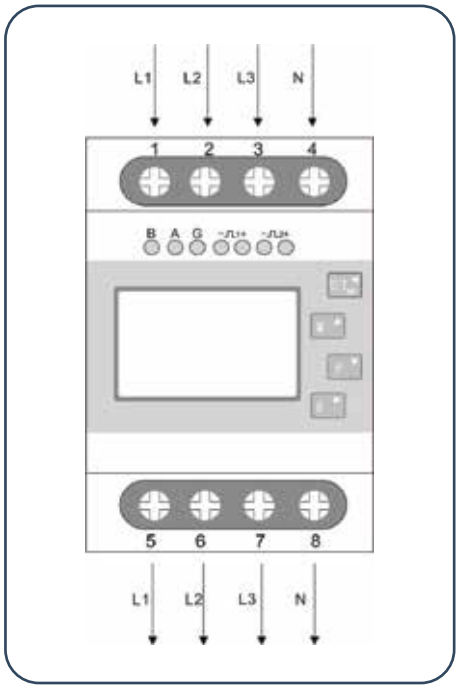


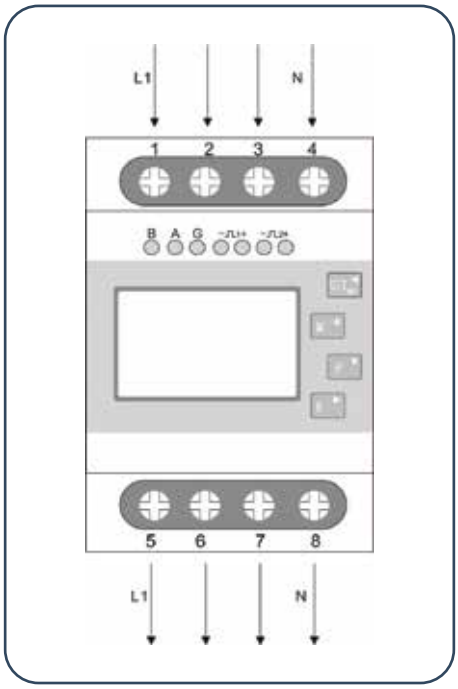
WIRING GUIDE

Terminals		
COMM/Pulse/2T	0.5~1.5mm²	0.4Nm
Load	4~25mm²	3Nm

WIRING DIAGRAM







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