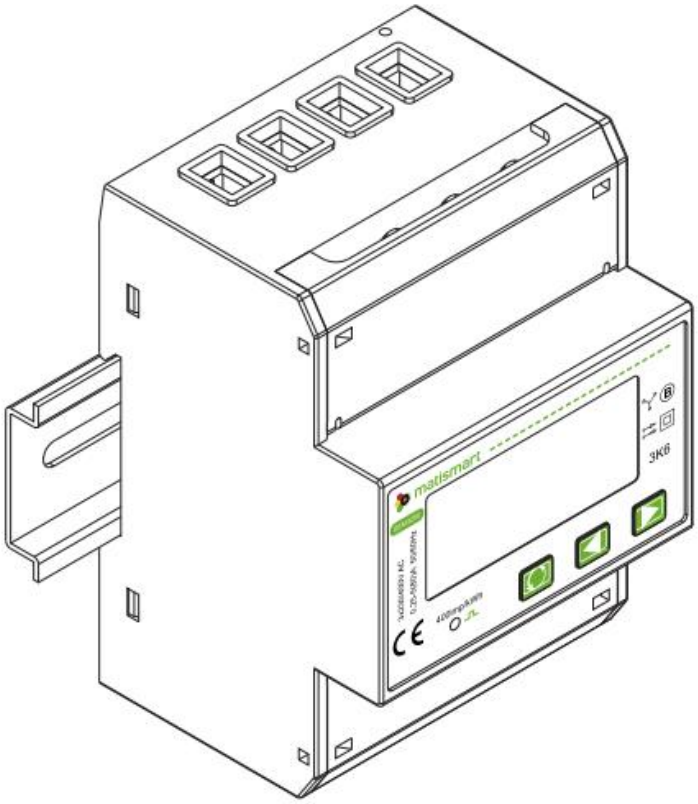
SEM3250 Three-Phase Multifunctional DIN Rail Meter

User Manual

01/2024



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Security Information

Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that accompany this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Failure to follow these instructions will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, serviced and maintained in restricted access locations only by qualified personnel. No responsibility is

assumed by Matis Electric for any consequences arising out of the use of this equipment. A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

About the Manual

This manual discusses features of the SEM3250 three-phase multi-function smart meter and is intended for use by designers, system manufacturers and maintenance technicians with knowledge of electrical distribution systems and monitoring device.

This manual does not provide configuration information for advanced features, which are advanced configurations to be performed by skilled users. It also does not include instructions on how to integrate meter data or perform meter configuration using other power management systems or software other than the RS-485 Matis Electric protocol tool.

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Safety Precautions

Any installation, wiring, testing and maintenance must be performed in accordance with all local and national electrical codes.

⚠⚠Danger

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate Personal Protective Equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462 or other local standards.
- Turn off all power supplying this device and the equipment in which it is installed before working on or in the equipment.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Assume communications and I/O wiring are hazardous live until determined otherwise.
- Do not exceed the maximum rated values of this device.
- Do not short secondary terminals of Voltage Transformer (VT).
- Do not open secondary terminals of Current Transformer (CT).
- Ground secondary circuit of CTs.
- Do not use the data from the meter to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.
- Do not install CTs or LPCTs in equipment where they exceed 75% of the wiring space of any cross-sectional area in the equipment.
- Do not install CTs or LPCTs in areas where ventilation openings may be blocked or in areas of breaker arc venting.
- Install CT or LPCT secondary conductors securely to ensure they do not contact live circuits
- Do not use water or any liquid material to clean the product. Use a cleaning cloth to remove dirt. If the dirt cannot be removed, please contact your local Technical Support representative..
- The installer is responsible for coordinating the rating and the characteristics of the supply side over current protection devices with the maximum current rating.

Failure to follow these instructions will result in death or serious injury.

NOTE: See IEC60950-1 Appendix W for more information on communications and I/O wiring connected to multiple devices.

WARNING

UNINTENDED OPERATION

Do not use this device for critical control or protection of persons, animals, property or equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

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INACCURATE DATA

- Do not rely solely on data shown on the display or in the software to determine whether this device is operating correctly or complies with all applicable standards.
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Failure to follow instructions may result in serious consequences such as personal injury, death, or device damage.

Introduction

Overview

SEM3250series three-phase multifunctional DIN rail meter is applied to three-phase four-wire power grids. It can accurately measure various important power parameters ,such as voltage, current, power, frequency, import and export energy.

Features

- Measures kWh,kVArh,kW,kVAr,kVA,PF,Hz,dmd,V,A,etc.
- Bi-directional measures IMP and EXP.
- One pulse output, active energy pulse.
- RS485, Modbus_RTU.
- DIN rail 35mm.
- 80A directly connected.
- The product shell and base are welded by ultrasonic waves, cannot be disassembled.
- Degree of protection according to IEC 60529:IP20.

Application Scenarios

SEM3250 is a multi-functional energy meter designed for power monitoring in power systems, public facilities, industrial applications and residences.It is suitable for real-time power monitoring systems. The detection results can be used not only for local display, but also connected to industrial controlling equipments and computers, composing the measurement and control system.

Hardware Reference

Security Measures

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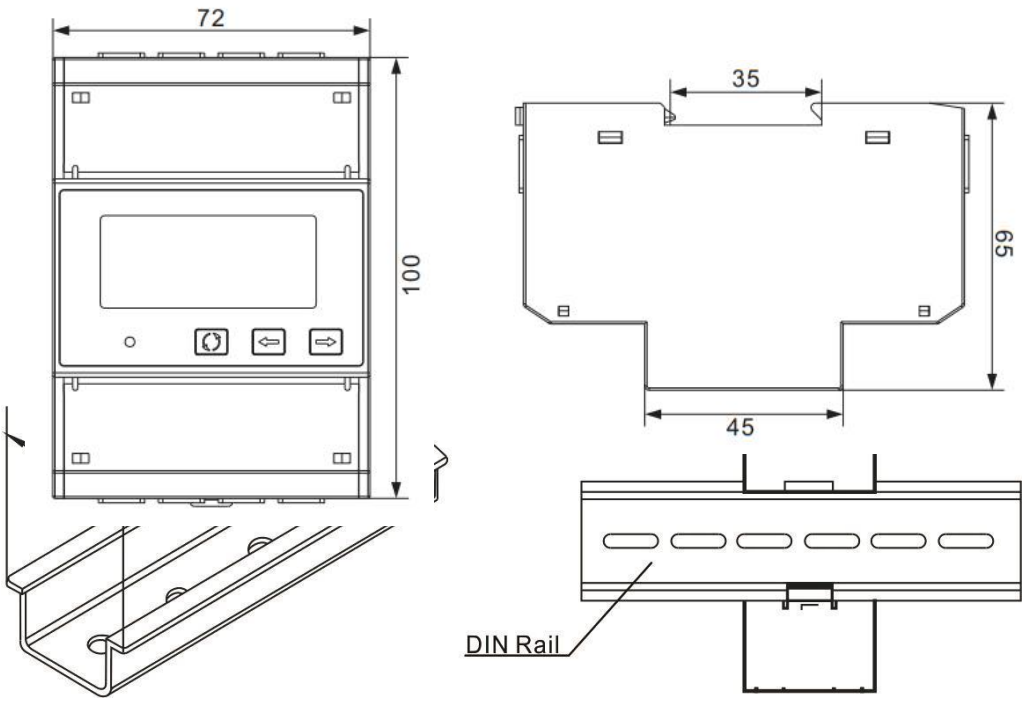
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Replace all devices, doors and covers before turning on power to this equipment.
- Do not exceed the maximum rated values of this device.
- Do not touch the current terminals when the meter is powered on.

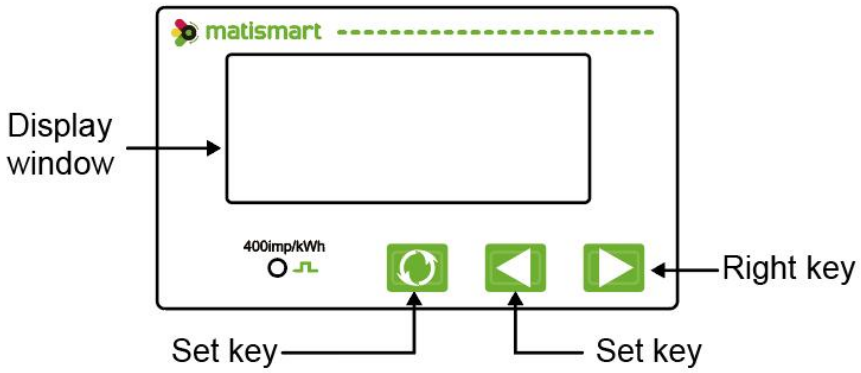
Failure to follow these instructions will result in death or serious injury.

Appearance Installation Dimensions

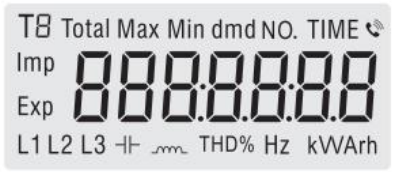


Panel & Button Instructions

Panel Instructions



After the correct wiring is completed and powered on,the meter enters the measurement state, displaying as follows：

1		Full Screen
2		Software version
3		Total active energy

Description of key function

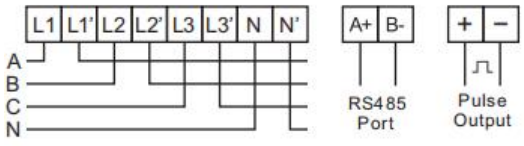
Set key:under the measuring display status, long press the key to enter the programming mode; Under the programming mode, press this key to enter the next parameter setting. When entering the last parameter setting interface, press this key to save and exit programming.

Left key:Under the programming mode.it is used for progressive decrease of parameter value .Under the measuring display mode,it is used to enter the previous display mode.

Right key:Under the programming mode.it is used for degressive increase of parameter value.Under the measuring display mode,it is used to enter the next display mode.

Long press : pressed for more than 3 seconds without release, it will enter programming mode. Under the programming mode,the parameter values of the face can be set by . Press to enter the next parameter interface, and then go to the last one, press to return to the display interface.

Wiring Diagram

Model	Wiring diagram	Parameter
SEM3250		3 × 230/400V 0.25-5(80)A 50/60Hz RS485

Measurement Parameters

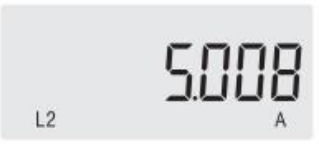
Parameter description

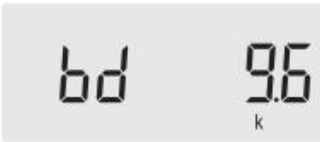
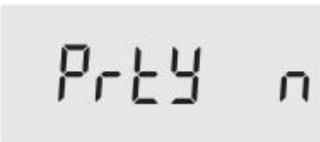
1		Modbus address (ID) Default: 001 range:001-247
2		Baud rate,default 9600bps, optional:2400/4800/19200bps
3		Parity ,default:NONE optional:N/VEN/ODD
4		Time of scroll display defualt 0:not display in turns range:0-60second
5		Backlit on time,default:60 0:always on,121:always off range:0-121minutes

Measurement parameters

Short:press ◀▶ , the LCD display will scroll the measurements.

1		Total active energy（kWh）
2		Import active energy（kWh）
3		Export active energy（kWh）
4		Total reactive energy（kvarh）

5		L1-phase voltage（V）
6		L2-phase voltage（V）
7		L3-phase voltage（V）
8		L1-phase current（A）
9		L2-phase current（A）
10		L3-phase current（A）
11		L1-phase active power（kW）
12		L2-phase active power（kW）
13		L3-phase active power（kW）
14		Total active power（kW）
15		L1-phase reactive power（kvar）
16		L2-phase reactive power（kvar）

17		L3-phase reactive power（kvar）
18		Total reactive power（kvar）
19		L1 phase power factor inductive ⏦ capacitive ⊣⊢
20		L2 phase power factor inductive ⏦ capacitive ⊣⊢
21		L3 phase power factor inductive ⏦ capacitive ⊣⊢
22		Total power factor inductive ⏦ capacitive ⊣⊢
23		Frequency
24		Pulse constant400imp/kWh
25		Modbus address (ID) Default: 001 range:001-247
26		Baud rate,default 9600bps, optional:2400/4800/19200bps
27		Parity ,default:NONE optional:NONE/EVEN/ODD
28		Software version(reference only)

29		Full screen display

Communication Guide

Function code	Behavior
04	Read input parameters

Address	Input Register Parameter			Start Address Hex	
	Parameters	Unit	Format	Hi byte	Low Byte
30001	L1-phase voltage	V	Float	00	00
30003	L2-phase voltage	V	Float	00	02
30005	L3-phase voltage	V	Float	00	04
30007	L1L2-line voltage	V	Float	00	06
30009	L2L3-line voltage	V	Float	00	08
30011	L3L1-line voltage	V	Float	00	0A
30013	L1-phase current	A	Float	00	0C
30015	L2-phase current	A	Float	00	0E
30017	L3-phase current	A	Float	00	10
30019	L1-phase active power	kW	Float	00	12
30021	L2-phase active power	kW	Float	00	14
30023	L3-phase active power	kW	Float	00	16
30025	Total active power	kW	Float	00	18
30027	L1-phase reactive power	kvar	Float	00	1A
30029	L2-phase reactive power	kvar	Float	00	1C
30031	L3-phase reactive power	kvar	Float	00	1E
30033	Total reactive power	kvar	Float	00	20
30035	L1-phase apparent power	kVA	Float	00	22
30037	L2-phase apparent power	kVA	Float	00	24
30039	L3-phase apparent power	kVA	Float	00	26
30041	Total apparent power	kVA	Float	00	28
30043	L1-phase power factor	1	Float	00	2A
30045	L2-phase power factor	1	Float	00	2C
30047	L3-phase power factor	1	Float	00	2E
30049	Total power factor	1	Float	00	30
30051	Frequency	Hz	Float	00	32
30053	Positive active energy	kWh	Float	00	34
30055	Reverse active energy	kWh	Float	00	36
30057	Total active energy	kWh	Float	00	38
30059	Positive reactive energy	kvarh	Float	00	3A

Address	Input Register Parameter			Start Address Hex	
	Parameters	Unit	Format	Hi byte	Low Byte
30061	Reverse reactive energy	kvarh	Float	00	3C
30063	Total reactive energy	kvarh	Float	00	3E
30065	Active power demand	kW	Float	00	40
30067	Max active power demand	kW	Float	00	42
30069	Reactive power demand	kvar	Float	00	44
30071	Maxreactive power demand	kvar	Float	00	46
30073	Apparent power demand	kVA	Float	00	48
30075	Maxapparent power demand	kVA	Float	00	4A

Function code	Description
10H	Set holding parameter
03H	Read holding parameter

Address	Holding Register Parameter		Start Address Hex		Description
	Parameters	Format	HI byte	Low byte	
40001	Meter ID	HEX	00	00	Ranges from 1 to 247, Default ID is 1. Length : 2 byte.
40002	Baud rate	HEX	00	01	Baud rate for MODBUS , 0 = 2400 baud 1 = 4800 baud 2 = 9600 baud(default) 3 = 19200 baud Length : 2 byte

Address	Holding Register Parameter		Start Address Hex		Description
	Parameters	Format	HI byte	Low byte	
40003	Network Parity Stop	HEX	00	02	Write the port parity/stop bits: default:1 stop bit and even parity. 0 = 1 stop bit and no parity, 1 = 1 stop bit and even parity. 2 = 1 stop bit and odd parity. Length : 2 byte.
40004	Time of scroll display	HEX	00	03	Range:0-60s Default 0:not display in turns Length : 2 byte
40005	Backlit on time	HEX	00	04	Range: 0-121 minutes Default: 60 0 =the backlight is always on 121 = backlit permanently off Length: 2 bytes
40006	Current ratio	HEX	00	05	Range:1~9999 Default:1 Length:2 bytes (Only for transformer meter)
40007	Clear demand	HEX	00	06	00 00:clear max demand Length:2 bytes

Specifications

Technical Parameters

Measurement Accuracy

Parameters		Index
Input	Voltage	Voltage(Un)：3×230/400VAC
		Voltage range：0.8Un-1.2Un
	Current	directly connected：0.25-5(80)A
		Overcurrent withstand：30Imax for 0.01s
	Frequency	50/60Hz
	Wiring	Connecting capacity: from 16 to 25 mm2
Display		Display：LCD with white back-light
		Max reading：9999999kWh
Accuracy		Active energy：Class 1,Class B
Output	Communication	Interface：RS485
		Protocol：Modbus_RTU
	Pulse	Pulse constant：400imp/kWh
Power consumption		<2W/10VA
Withstand	AC voltage	4kV/1min
	DC impulse	6kV-1.2μs waveform
Climate environment	Temperature	Operating temperature：-25℃~+55℃
		Storage temperature：-40℃~+70℃
	Humidity	≤95%，non-condensing,no corrosive gas
	Altitude	≤2000m
mechanical environment		M1
electromagnetic environment		E2

Shanghai Matis Electric Co., Ltd.

Website: www.matismart.cn

Email: info@matismart.com

Tel/Fax: 021-6050 3668

Mobile: +86-18621879631

As various standards, specifications and designs change from time to time, please request confirmation of the information given in this manual.

SEM2250
Single-Phase Multifunctional DIN Rail Meter
User Manual

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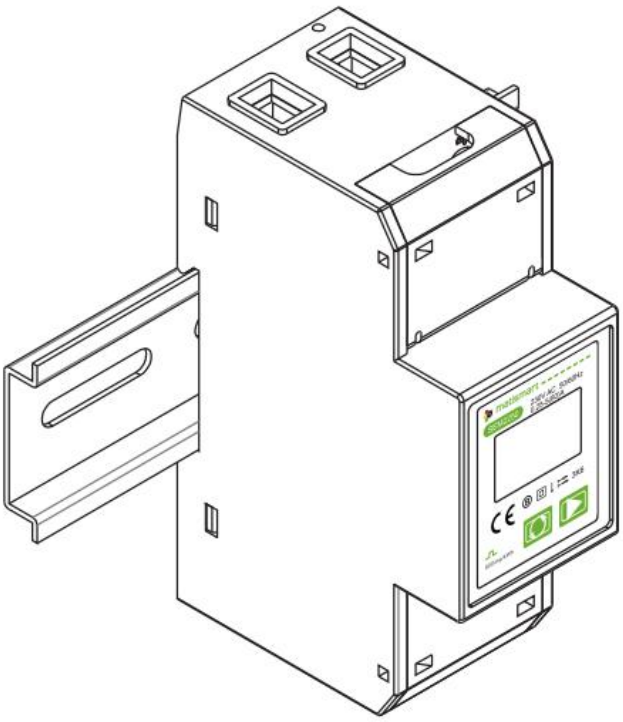

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- Turn off all power supplying this device and the equipment in which it is installed before working on or in the equipment.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Assume communications and I/O wiring are hazardous live until determined otherwise.
- Do not exceed the maximum rated values of this device.
- Do not short secondary terminals of Voltage Transformer (VT).
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- Bi-directional measures IMP and EXP.
- One pulse output, active energy pulse.
- RS485, Modbus_RTU.
- DIN rail 35mm.
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- Do not touch the current terminals when the meter is powered on.

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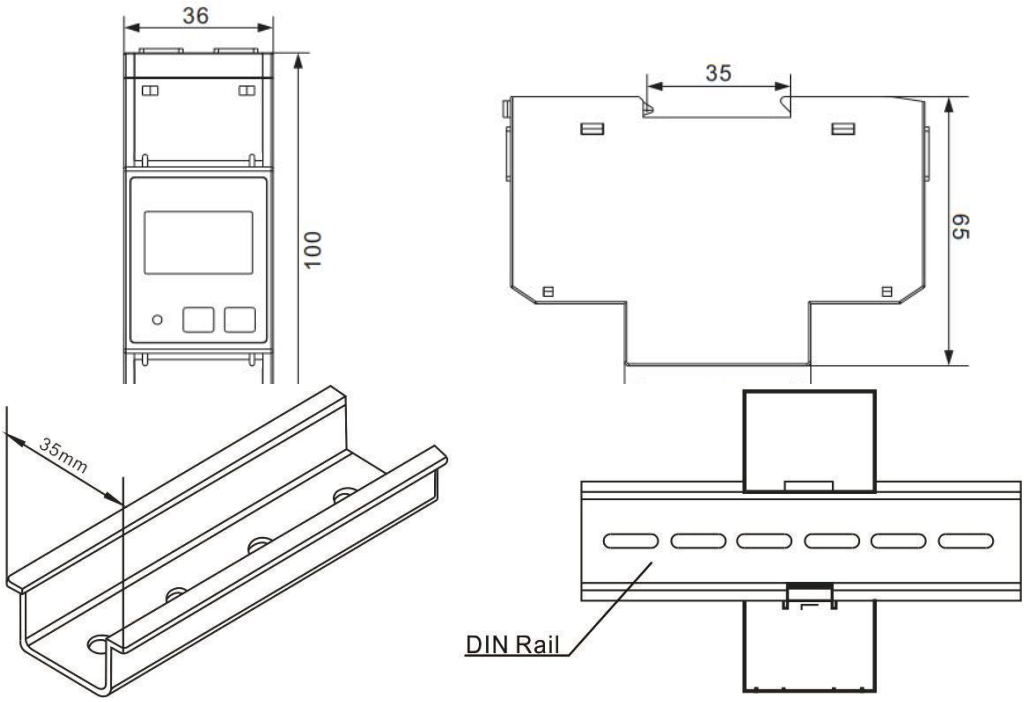
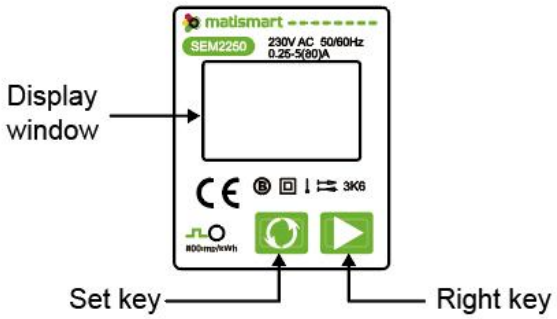
Appearance Installation Dimensions



Panel & Button Instructions

Panel Instructions



After the correct wiring is completed and powered on,the meter enters the measurement state, displaying as follows：

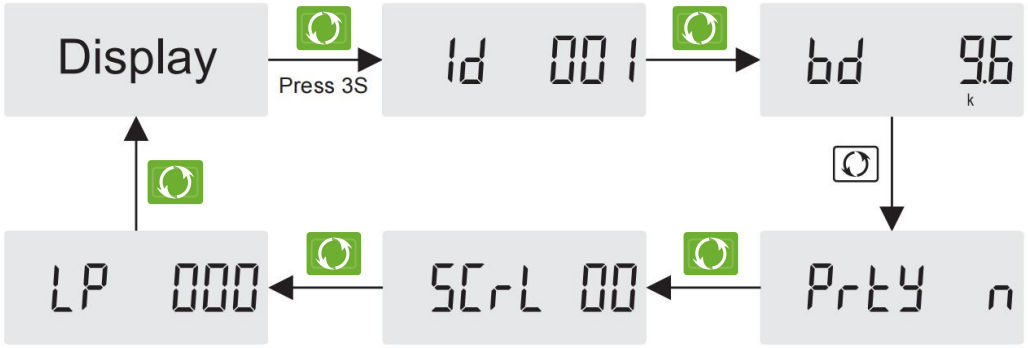
1		Full Screen
2		Software version
3		Total active energy

Description of key function

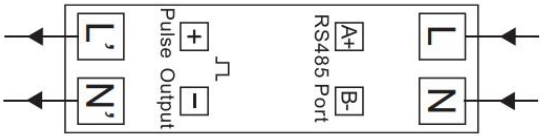
Set key:under the measuring display status, long press the key to enter the programming mode; Under the programming mode, press this key to enter the next parameter setting. When entering the last parameter setting interface, press this key to save and exit programming.

Right key:Under the programming mode.it is used for degressive increase of parameter value.Under the measuring display mode,it is used to enter the next display mode.

Long press : pressed for more than 3 seconds without release, it will enter programming mode. Under the programming mode,the parameter values of the face can be set by Press to enter the next parameter interface, and then go to the last one, press to return to the display interface.



Wiring Diagram

Model	Wiring diagram	Parameter
SEM2250		230V 0.25-5(80)A 50/60Hz RS485

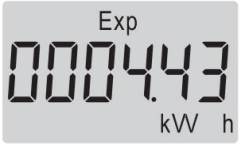
Measurement Parameters

Parameter description

1		Modbus address (ID) Default: 001 range:001-247
2		Baud rate,default 9600bps, optional:2400/4800/19200bps
3		Parity ,default:NONE optional:NONE/EVEN/ODD
4		Time of scroll display defualt 0:not display in turns range:0-30second
5		Backlit on time,default:60 0:always on,121:always off range:0-121minutes

Measurement parameters

Short:press ▶ , the LCD display will scroll the measurements.

1		Total active energy（kWh）
2		Import active energy（kWh）
3		Export active energy（kWh）
4		Voltage (V)

5		Current (A)
6		Active power (W)
7		Frequency (F)
8		Power factor (PF)
9		Modbus address (ID) Default: 001
10		Baud rate,default 9600bps, optional:1200bps/2400bps/4800bps
11		Parity ,default:NONE optional:NONE/EVEN/ODD
12		Software version in kind prevail
13		Full screen display

Communication Guide

Function code	Behavior
04H	Read input parameters

Address	Input Register Parameter			Start Address Hex	
	Parameters	Unit	Format	Hi byte	Low Byte
30001	Voltage	Volts	Float	00	00
30007	Current	Amps	Float	00	06
30013	Active power	Watts	Float	00	0C
30019	Apparent power	VA	Float	00	12
30025	Reactive power	Var	Float	00	18
30031	Power factor	1	Float	00	1E
30071	Frequency	Hz	Float	00	46
30073	Import active energy	kWh	Float	00	48
30075	Export active energy	kWh	Float	00	4A
30077	Import reactive energy	kvarh	Float	00	4C
30079	Export reactive energy	kvarh	Float	00	4E
30085	Total power demand	W	Float	00	54
30087	Max total power demand	W	Float	00	56
30089	Import power demand	W	Float	00	58
30091	Max Import power demand	W	Float	00	5A
30093	Export power demand	W	Float	00	5C
30095	Max Export power demand	W	Float	00	5E
30259	Current demand	Amps	Float	01	02
30265	Max current demand	Amps	Float	01	08
30343	Total active energy	kWh	Float	01	56
30345	Total reactive energy	kvarh	Float	01	58

Function code	Description
10H	Set holding parameter
03H	Read holding parameter

Address	Holding Register Parameter		Start Address Hex		Description
	Parameters	Format	HI byte	Low byte	
40003	Demand Period	Float	00	02	Demand period, unit:min default 60min Settable range: 0~60, 0 represents Real time update (1 second update of demand) Length: 4 bytes
40019	Network Parity Stop	Float	00	12	Write the port parity/stop bits: default:1 stop bit and even parity. Length : 4 byte. 0 = 1 stop bit and no parity, 1 = 1 stop bit and even parity. 2 = 1 stop bit and odd parity. 3 = 2 stop bits and none parity.
40021	Meter ID	Float	00	14	Ranges from 1 to 247, Default ID is 1. Length : 4 byte.

Address	Holding Register Parameter		Start Address Hex		Description
	Parameters	Format	HI byte	Low byte	
40029	Baud rate	Float	00	1C	Baud rate for MODBUS , 0 = 2400 baud 1 = 4800 baud 2 = 9600 baud(default) 5 = 1200 baud Length : 4 byte
40061	Backlit on time	Float	00	3C	Range: 0-121 minutes Default: 60 0 =the backlight is always on 121 = backlit permanently off Length: 4 bytes
461457	Reset historical data	HEX	F0	10	00 00: reset demand info Length : 2 byte
463745	Time of scroll display	BCD	F9	00	0-30s Default 0:not display in turns Length : 2 byte
463777	Measurement mode	HEX	F9	20	0001:mode 1 (total = import) 0002:mode 2 (Default) (total = import + export) 0003:mode 3 (total = import - export) Length : 2 byte

Specifications

Technical Parameters

Parameters		Index
Input	Voltage	Voltage(Un)：230VAC
		Voltage range：176-276VAC
	Current	directly connected：0.25-5(80)A
		Overcurrent withstand：30Imax for 0.01s
	Frequency	50Hz
	Wiring	Connecting capacity: from 16 to 25 mm^2
Display		Display：LCD with white back-light
		Max reading：9999999kWh
Accuracy		Active energy：Class 1,Class B
Output	Communication	Interface：RS485
		Protocol：Modbus_RTU
	Pulse	Pulse constant：400imp/kWh
Power consumption		⩽2W/10VA
Withstand	AC voltage	4kV/1min
	DC impulse	6kV-1.2μs waveform
Climate environment	Temperature	Operating temperature：-25℃~+55℃
		Storage temperature：-40℃~+70℃
	Humidity	≤95%，non-condensing,no corrosive gas
	Altitude	≤2000m
mechanical environment		M1
electromagnetic environment		E2

Shanghai Matis Electric Co., Ltd.

Website: www.matismart.cn

Email: info@matismart.com

Tel/Fax: 021-6050 3668

Mobile: +86-18621879631

As various standards, specifications and designs change from time to time,

please request confirmation of the information given in this manual.