MITSUBISHI ELECTRIC

Electronic Multi-Measuring Instrument

MODEL

ME96SSRA-MB

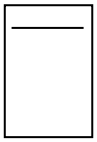
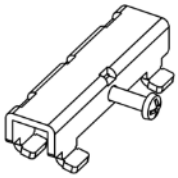
User's Manual: Detailed Edition

●Before operating the instrument, you should first read thoroughly this operation manual for safe operation and optimized performance of the product.

Deliver this user's manual to the end user.

Check on your delivery

Check the following point as soon as you receive Mitsubishi Electronic Multi-Measuring Instrument

Parts name	Quantity	Specifications
User's Manual (Simplified)	1	 A3 size
Attachment lug (with screw)	2	

About the optional plug-in module sold separately

This product has the following optional plug-in module.
It is possible to correspond to various I/O by installing the optional plug-in module.
We hope that you will order to us.

Type name of optional plug-in module	I/O specifications					
	Analog output	Pulse/Alarm output	Digital input	Digital output	Communication	Logging function
ME-4210-SS96	4 circuits	2 points	1 point	—	—	—
ME-0040C-SS96	—	—	4 points	—	CC-Link	—
ME-0052-SS96	—	—	5 points	2 points	—	—
ME-0000MT-SS96	—	—	—	—	MODBUS® TCP	—
ME-0000BU-SS96	—	—	—	—	—	6 items

Note	"ME-4201-NS96", "ME-0052-NS96" and "ME-0040C-NS96" can not use in the ME96SSRA-MB. They can use for ME96NSR, ME96NSR-MB only.

I/O Parts	Specifications	Type name of optional plug-in module
Analog output	Output :4 to 20mA Load resistance :600Ω or less	ME-4210-SS96
Pulse/Alarm output	No-voltage 'a' contact Contact Capacity :DC35V, 0.1A or less	ME-4210-SS96
Digital input	Contact Capacity :DC24V(DC19 to 30V),7mA or less Input Pulse Width :30ms or more	ME-4210-SS96 ME-0040C-SS96 ME-0052-SS96
Digital output	No-voltage 'a' contact Contact Capacity :DC35V, 0.2A or less	ME-0052-SS96

In this manual, when the optional plug-in module is installed, it explains.

Features

This instrument measures the load status by inputting the secondary side of the VT and CT, and displays various measurement values.

- This instrument supports active energy: class 0.5S and harmonic measurement up to 19th.

- This instrument enables measurement of integrated active energy divided into two time segments such as peak/off-peak and day/night. (Periodic Active Energy)

- This instrument enables measurement of the active energy in a block of any period (interval).(Rolling Demand)

- The password protection setting avoids undesired change of settings or deletion of measured data.

- The instruments with transmission functions (MODBUS®RTU communication, CC-Link communication, MODBUS® TCP communication) are able to transmit the measured data to superior monitoring devices.
(CC-Link communication: When the ME-0040C-SS96 optional plug-in module is installed)
(MODBUS® TCP communication: When the ME-0000MT-SS96 optional plug-in module is installed)

- Using the logging function, measurement data can be backup even when the MODBUS®RTU communication fails.
(Logging function: When the ME-0000BU-SS96 optional plug-in module is installed)

- The instruments with analog/pulse output function are able to output key measurement factors (current, voltage, active power, power-factor, and Active Energy) of the power receiving point alone and are optimum for remote monitoring.(When the ME-4210-SS96 optional plug-in module is installed)

- This instrument complies with the requirements of the CE marking, UL standards, KC mark, and FCC/IC.

MODBUS® is a registered trademark of SCHNEIDER ELECTRIC USA, INC in the United States.

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Safety Precaution

(Always read these instructions before using this equipment)

For personnel and product safety please read the contents of these operating instructions carefully before using. Make sure that the end users read this manual and then keep the manual in a safe place for future reference. Make sure to deliver this manual to the end-user.

If you are considering using this instrument for special purpose such as nuclear power plants, aerospace, medical care or passenger vehicles please refer to our sales representative.

HAZARD SYMBOLS

⚠

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. Terminal of control power (MA, MB) and voltage inputs (P1, P2, P3, PN) have hazards of electric shock, explosion, or arc flash. Turn off power supplying this device and the equipment in which it is installed before working on it.

⚠CAUTION

The above Indicates that incorrect handling may cause hazardous conditions. Always follow the instructions because they are important to personal safety. Otherwise, it could result in electric shock, fire, erroneous operation, and damage of the instrument. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

■ Normal service conditions

Use the instrument in an environment that meets the Normal service conditions as following points:

- Ambient temperature: -5 to +55°C
- Average day temperature: 35°C or less
- Humidity: 0 to 85%RH, non condensing.
- Altitude: 2000m or less
- Pollution Degree: 2 or less (Note 1)
- Atmosphere without corrosive gas, dust, salt, oil mist.
- Indoor use
- Transient over voltage: 4000V or less (Note 1)
- A place without excessive shocks or vibration.
- Do not expose to rain and water drips.
- Do not expose to direct sunlight.
- An area in where no pieces of metal and an inductive substance disperse.
- Do not expose to strong electromagnetic field and ambient noises.

Note 1. For the definition of the Pollution Degree and the Transient over voltage category, refer to EN61010-1:2010.

■ Installation instructions

Make sure to read this manual carefully before Installation and Wiring.

⚠CAUTION

- This instrument should be installed and used by a qualified electrician.
- The instrument must not be powered and used until its definitive assembly on the cabinet's door.
- The instrument is to be mounted on a panel. All connections must be kept inside the cabinet.
- Verify the following points:

■Auxiliary power supply and measuring ratings.

Auxiliary power supply		AC100-240V(±15%) 50-60Hz 8VA DC100-240V(-30% ＋15%) 5W		MA,MB terminals
Ratings	Voltage	3-PHASE 4-WIRE : max AC277/480V 3-PHASE 3-WIRE : (DELTA)max AC220V, (STAR)max AC440V 1-PHASE 3-WIRE : max AC220/440V 1-PHASE 2-WIRE : (DELTA)max AC220V, (STAR)max AC440V	Category Ⅲ	P1,P2,P3,PN terminals
	Current	5A(via current transformer),maxAC30V	Category Ⅲ	+C1,C1,+C2,C2,+C3,C3 terminals
	Frequency	50-60Hz		

Provide the basic insulation externally at the current input terminals.

Voltage-measuring and current-measuring circuit terminals should be permanently connected.

Safety Precaution

⚠CAUTION

■Others

MODBUS®RTU communication	T/R+,T/R-,SG,Ter terminals	maxDC35V
MODBUS®TCP communication	Ethernet terninals	
CC-Link communication	DA,DB,DG terminals	
Digital input	DI1,DI2,DI3,DI4,DI COM,DI+,DI-, DI1+,DI1-,DI2+,DI2-,DI3+,DI3-,DI4+,DI4-,DI5+,DI5- terminals	
Digital output	DO1+,DO1-,DO2+,DO2- terminals	
Analog output	CH1+,CH1-,CH2+,CH2-,CH3+,CH3-,CH4+,CH4- terminals	
Pulse/ Alarm output	C1A/A1,C1B/COM1,C2A/A2,C2B/COM2 terminals	

- Do not drop this instrument from high place. If you drop it and the display is cracked, do not touch the liquid crystal or get it in your mouth. If the liquid crystal is touched, wash it away at once.
- Work under the electric outage condition when installing and wiring. It may cause electric shock, electric burn injury or damage of the device.
- When tapping or wiring, take care not to entering any foreign objects such as chips and wire pieces into this instrument.
- If the terminal wiring is pulled with a strong force, the terminals may detach. (Tensile load: 39.2N or less)
- When wiring in this instrument, be sure that it is done correctly by checking the instrument‘s wiring diagram. Wrong wiring may cause failure of the instrument, a fire or electric shock.
- Use electrical wire sizes compatible with the rated current. Use of unsuitable sizes may cause heat generation, which may lead to a fire.
- Tighten the terminal screws with the specified torque and use the suitable pressure connectors and suitable wire size. (Refer to page 90)
- In order to prevent invasion of noise, do not bunch the control wires or communication cables with the main circuit or power wire, or install them close to each other. The distance between communicational signal lines, input signal lines and power lines, and high voltage lines when running parallel to each other are shown below.

Conditions	Length
Below 600V, or 600A power lines	30cm or more
Other power lines	60cm or more

- Protective conductor terminals for mains circuits shall be at least equivalent in current-carrying capacity to the mains supply terminals.
- If the protective conductor terminals are also used for other bonding purposes, the protective conductor shall be applied first and secured independently of other connections.

■ Matters concerning the precaution before use

- Use the instrument in the specified usage environment and conditions.
- The setting of this instrument is necessary before use it. Please read this manual carefully to ensure correct setting.
- Confirm the rating of this instrument, and supply power voltage within the specified range.

Safety Precaution

■ Operation instructions

- Before operating the product, check that active bare wire and so on does not exist around the product. If any bare wire exists, stop the operation immediately, and take an appropriate action such as isolation protection.
- In the event of a power outage during the setting, the instrument is not set correctly. Please set again after power recovery.

⚠CAUTION	● Do not disassemble or modify this instrument. It may cause failure, malfunction, injury or fire. ● Use this instrument within the ratings specified in this manual. If it is used outside the ratings, it may cause not only malfunction or failure but also fire burnout. ● Do not open the secondary side of the CT circuit. If the CT is not connected properly or if the secondary side of the CT is open, it may result in high voltage on the secondary side of the CT, the insulation of the secondary winding wire may be damaged, and burnout may be caused. ● When the external terminals are connected to the external equipment, the instrument and the external equipment must not be powered and used until its definitive assembly on the cabinet's door. ● The rating of the terminal of the external equipment should satisfy the rating of the external terminal of this instrument.

■ Maintenance instructions

- Wipe dirt off the surface with a soft dry cloth.
- Do not contact a chemical dust cloth to the instrument for a long time, or do not wipe it with benzene, thinner, alcohol.
- Check for the following items to use this instrument properly for long time.

(1)Daily maintenance

①No damage on this instrument
②No abnormality with LCD indicators
③No abnormal noise, smell or heat

(2)Periodical maintenance (Once every 6 months to 1 year)

- No looseness with installation and wire connection

⚠CAUTION	Do periodical maintenance under the electric outage condition. Failure to do so may cause electric shock, failure of the instrument or a fire. Tighten the terminal regularly to prevent a fire.

■ Storage conditions

To store this instrument, turn off the power and remove wires, and put it in a plastic bag.
For long-time storage, store at the following places. Failure to follow the instruction may cause a failure and reduced life of the instrument.

- Ambient temperature the: -25 to +75°C
- average day temperature: 35°C or less
- Humidity range 0 to 85%RH, non-condensing.
- Atmosphere without corrosive gas, dust, salt, oil mist.
- A place without excessive shocks or vibration.
- Do not expose to rain and water drips.
- Do not expose to direct sunlight.
- An area in where no pieces of metal and an inductive substance disperse.

Safety Precaution

■ Guarantee

- Gratis warranty is effective until the earlier of 1 year after the date of your purchase or 18 months after manufacturing.
- The gratis warranty shall apply if the product fails even though it is being used properly in the conditions, with the methods and under the environments in accordance with the terms and precautions described in the catalogs, the instruction manual, caution label on the product, etc.
- Repair shall be charged for the following cases even during the gratis warranty period.
  - ① Failures occurring due to your improper storage or handling, carelessness or fault.
  - ② Failures due to faulty workmanship
  - ③ Failures due to faults in use and undue modification
  - ④ Failures due to accidental force such as a fire, abnormal voltage, etc. and force majeure such as an earthquake, wind, flood, etc.
  - ⑤ Failures due to matters unpredictable based on the level of science technology at the time of product.
- Our company shall not be liable to compensate for any loss arising from events not attributable to our company, opportunity loss and lost earning of the customer due to failure of the product, and loss, secondary loss, accident compensation, damage to other products besides our products and other operations caused by a special reason regardless of our company's predictability

■ Replacement Cycle

Although it depends on the status of use, 10 years is the guideline for renewal.

■ Disposal

- When disposing of this product, treat it as industrial waste.
- A lithium battery is embedded in the optional plug-in module: ME-0000BU-SS96. Lithium batteries are disposed of according to local regulation.
- In EU member states, there is a separate collection system for waste batteries. Dispose of batteries properly at the local community waste collection/recycling center.
  The symbol shown below is printed on the packaging of ME-0000BU-SS96.

Note: This symbol is for EU member states only.
The symbol is specified in the new EU Battery Directive (2006/66/EC) Article 20 "Information for end-users" and Annex II.

The symbol indicates that batteries need to be disposed of separately from other wastes.

⚠CAUTION	A lithium battery is embedded in the optional plug-in module: ME-0000BU-SS96. Therefore, if it will be thrown in fire, evolution of heat, burst or ignition may occur. Lithium batteries are disposed of according to local regulation.

■ About packaging materials and this manual

For reduction of environment load, packaging materials are produced with cardboard, and this manual is printed on recycled paper.

EMC Directive Instruction

This section summarizes the precautions on conformance to the EMC Directive of the cabinet constructed using this instrument.
However, the method of conformance to the EMC Directive and the judgment on whether or not the cabinet conforms to the EMC Directive has to be determined finally by the manufacturer.

This instrument complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This instrument may not cause harmful interference, and (2) this instrument must accept any interference received, including interference that may cause undesired operation.

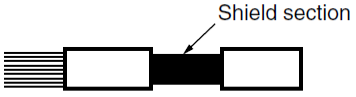
1. EMC Standards

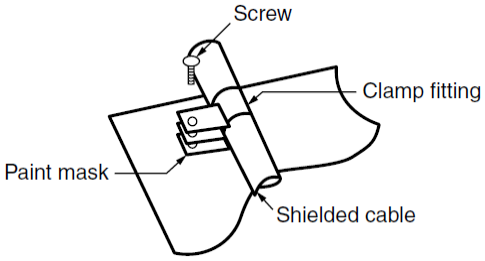
- EN 61326-1
- EN 61000-3-2
- EN 61000-3-3

2. Installation (EMC directive)

The instrument is to be mounted on panel of a cabinet.
Therefore, the construction of a cabinet is important not only for safety but also for EMC.
The instrument is examined by the following conditions.

- Conductive cabinet is used.
- Six faces of a cabinet have to be ensured conductivity for each other.
- A cabinet has to be connected to earth by a thick wire of low impedance.
- Holes on faces of cabinet have to be 10 cm or less in diameter.
- The terminals for protective earth and functional earth have to be connected to earth by a thick wire of low impedance. (A terminal for protective earth is important not only for safety but also for EMC.)
- All connections must be kept inside the cabinet.
- Wirings outside the cabinet have to be used with the shielded cable.
  The following diagram shows how to provide good contact of the shielded cable.
  - ･Remove part of the outer cover.
  - ･Remove part of the paint musk on the cabinet.
  - ･Connect those parts with the clamp.





Precautions for KC mark

사용자안내문

기 종 별	사 용 자 안 내 문
A급 기기(업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

■Precautionary note written in Korean
(Distributors and users must understand that this product meets the electromagnetic compatibility requirements and is designed for industrial use (Class A).
Do not use the product in a residential area.)

■Applicant for KC mark : MITSUBISHI ELECTRIC AUTOMATION KOREA CO.,LTD

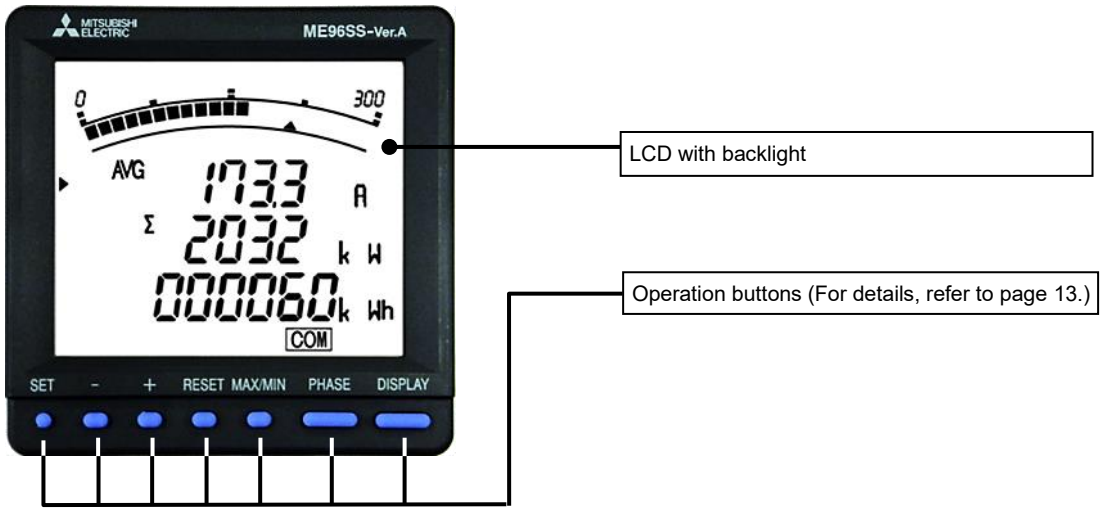
■Manufacturer : MITSUBISHI ELECTRIC CORPORATION

Note 1: This is the notification for the KC mark (Korea Certification)

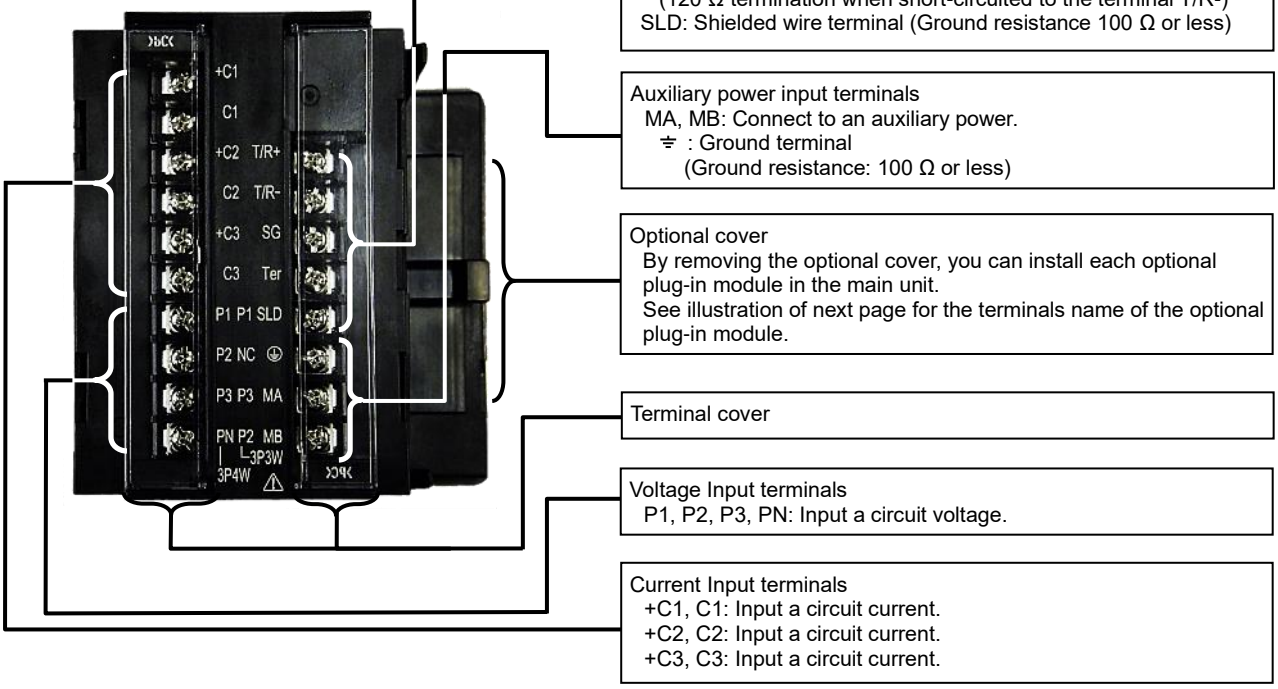
1. Display and Button Functions of Each Parts

Part names

■Front view



■Rear view (main unit)



1. Display and Button Functions of Each Parts

Part names

■Rear view (Optional plug-in module: ME-4210-SS96, ME-0040C-SS96, ME-0052-SS96)

Input/ output terminals (ME-4210-SS96)
- CH1+, CH1-: Analog output terminal
- CH2+, CH2-: Analog output terminal
- CH3+, CH3-: Analog output terminal
- CH4+, CH4-: Analog output terminal
- C1A/A1, C1B/COM1: Pulse/ Alarm output
- C2A/A2, C2B/COM2: Pulse/ Alarm output
- DI+, DI-: Digital input terminal

Input/ output terminals (ME-0040C-SS96)
- DA: CC-Link communication terminal
- DB: CC-Link communication terminal
- DG: CC-Link communication terminal
- SLD: Shielded terminal
- FG: Ground terminal (Ground resistance 100 Ω or less)
- DI1, DI2, DI3, DI4, DI COM: Digital input terminal

Input/ output terminals (ME-0052-SS96)
- DI1+, DI1-: Digital input terminal
- DI2+, DI2-: Digital input terminal
- DI3+, DI3-: Digital input terminal
- DI4+, DI4-: Digital input terminal
- DI5+, DI5-: Digital input terminal
- DO1+, DO1-: Digital output terminal
- DO2+, DO2-: Digital output terminal

■Side/Rear view (Optional plug-in module: ME-0000MT-SS96)

10BASE-T/100BASE-TX connector (RJ45)

Indicator LEDs (Refer to page 14)
- ERR. (Red)
- 10/100 (Green)
- LINK/ACT (Green)

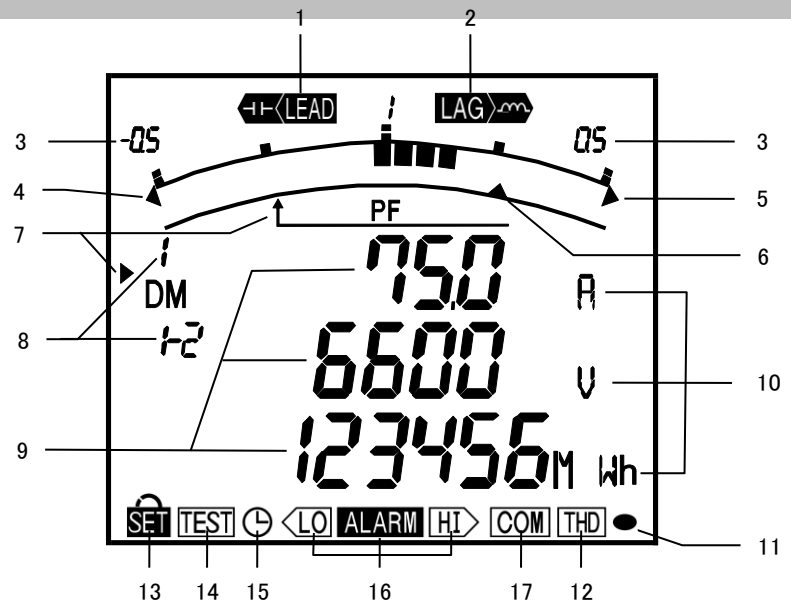
■Side/Rear view (Optional plug-in module: ME-0000BU-SS96)

SD memory card slot

Indicator LEDs (Refer to page 14)
- LOG. (Red)
- SD C. (Red)
- BAT. (Red)

1. Display and Button Functions of Each Parts

Display



Note: The above display is an example for explanation.

No.	Segment Name	Description
1	LEAD status	They show direction of Power Factor or Reactive Power on bar graph.
2	LAG status	They show the type of counting of Reactive Energy on Reactive Energy Display.
3	Scale of the bar graph	They show the scales of the bar graph.
4	Under scale input	Turns on when measuring values fall below the minimum scale.
5	Over scale input	Turns on when measuring values exceed the maximum scale.
6	Index indicator	When upper/lower limit alarm set, flickers at the limit setting value.
7	Bar graph status	They show the item expressed with the bar graph. When the item is the same as a digital displayed item, indicated with「▶」, otherwise indicated with「⮤」
8	Phase status	They show the phase for each of the digital displays.
9	Digital display	Measured values displayed in digital.
10	Unit	Units of measuring value displayed.
11	Metering status	Flickers when counting active energy.(Note.1)(only active energy imported display)
12	Harmonics	Turns on when harmonics displayed.
13	Setup status	Turns on at setting mode. (SET) Flickers at setting value confirmation mode. (SET)
14	Test mode status	Turns on at the test mode.
15	Clock status	Turns on when Operation time displayed.
16	Upper/lower limit alarm status	Flickers when upper/lower limit alarm is generated.
17	Communication or Logging status	See table below

Specification	On	Blinking	Off
CC-Link communication	Normal	CC-Link version mismatch Hardware error	Hardware error
MODBUS®RTU communication MODBUS®TCP communication	Normal	Communication error (Such as wrong address)*1	Hardware error
Logging function	Normal	Error such as incorrect setting, SD memory card error, low battery voltage)*1	Hardware error

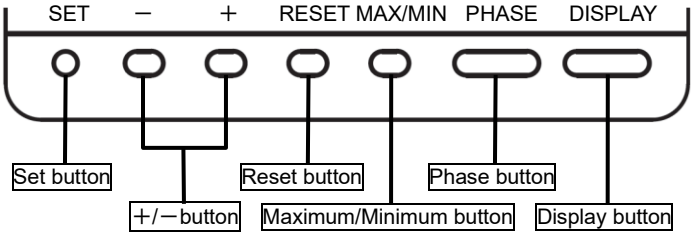
*1. For details, refer to Section 6.6.(page86).

Note 1. The blinking cycle is constant regardless of the size of the measured input.

1. Display and Button Functions of Each Parts

Functions of operation buttons

The operation buttons have various functions
According to how they are pressed down.



Meaning of code:○(press),□(press on over 1 second),◎(press on over 2 seconds),——(press simultaneously)

Mode \ Operation		Button							Function	
		SET	－	＋	RESET	MAX/MIN	PHASE	DISPLAY		
Operation mode	Display changes operation							○	Display changes.	
			○					○	Display changes.(reverse direction)	
							○		Phase changes.	
						○			Mode changes to the max./min. display and the instantaneous display	
			○	○					The item expressed with the bar graph is changed.	
									Harmonics number changes when harmonics displayed.	
								◎	Displays change cyclically. (Refer to page 65)	
							◎		Phases change cyclically. (Refer to page 65)	
			◎	◎					Change the unit of Wh, varh and VAh, etc. (Refer to page 68)	
	Measured value is reset/ Canceling the alarm, etc				◎				Maximum values and minimum values on the display are reset to the present value.	Only available for maximum/minimum value display
				◎	◎				All of the Maximum values and minimum values are reset to the present value.	
		◎			◎		◎		Wh, varh, VAh are zero reset. (All of the counting values are zero reset.)	
				◎	◎				Periodic active energy is zero reset. (Only effective in Periodic active energy display)	
			◎	◎					Adjusting rolling demand time(Only effective in rolling demand display)	
				◎	◎				Resetting the peak value of rolling demand (Only effective in rolling demand display)	
					◎				The operation time is zero reset (Screen operation time only)	
					○				An alarm condition is canceled. (Screen element is canceled)	Available only when manual cancelation is set
					◎				All alarm conditions are canceled. (Element is canceled for all screens)	
					○				Stopping backlight flickering alarm. (Only effective in setting backlight flicker)	
					◎				The latching data of digital input on the display is canceled. (Available only for contact point input screen)	
	Mode changes	◎			◎				The display of Setting mode appears.	
		◎							The display of Set value confirmation mode appears.	
					◎		◎		The display of password protection mode appears.	
Setting/ Setting value confirmation mode	Setting operation	○							The setting items are saved, and setting item is changed to next item.	
								○	Back to the previous item.	
			○ □	○ □					The values of setting are changed. (If it presses for 1 sec or more fast forward or fast return.)	
		□							Back to the setting display.	
		○							Save the settings(Only effective in End display)	
		○							Cancel the settings(Only effective in CANCEL display)	
	Special operation					□	□		Meter restart(Only effective in CANCEL display)	
					◎		◎		Returns set contents to the default settings (the default values, Only effective in CANCEL display) (Refer to page 52)	

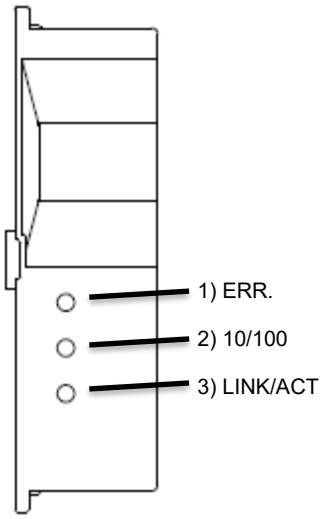
Note: While the back light is off, if the operation button is pressed, the back light is always lit. If the operation button is pressed once again, the function in the above table appears.

⚠CAUTION	●If the function of “maximum value and minimum value reset” and “Wh, varh, VAh zero reset” are done, data will be lost. If this data is needed, please record the data before the reset operation. ●If the function of “meter restart” is done, the entire measurement(measurement display, alarm, analog output, pulse) stops.

1. Display and Button Functions of Each Parts

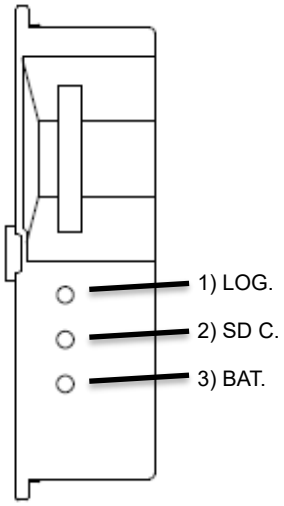
LEDs of the Optional plug-in module

■LEDs of ME-0000MT-SS96



No.	Name		Function
1)	ERR. LED		This indicates a communication error state of ME-0000MT-SS96
		OFF	Normal
		Blink	MODBUS TCP® communication error as follows was detected. ・MODBUS TCP® application protocol header was incorrect. ・Function code was incorrect(Serial only code was received), etc. When correct request is received, this LED turns off.
2)	10/100 LED		This indicates the transmission speed.
		ON	100Mbps or not connected.
		OFF	10Mbps
3)	LINK/ACT LED		This indicates the link status.
		ON	Link is good.
		Blink	Blinks when data send or receive.
		OFF	Not linked

■LEDs of ME-0000BU-SS96



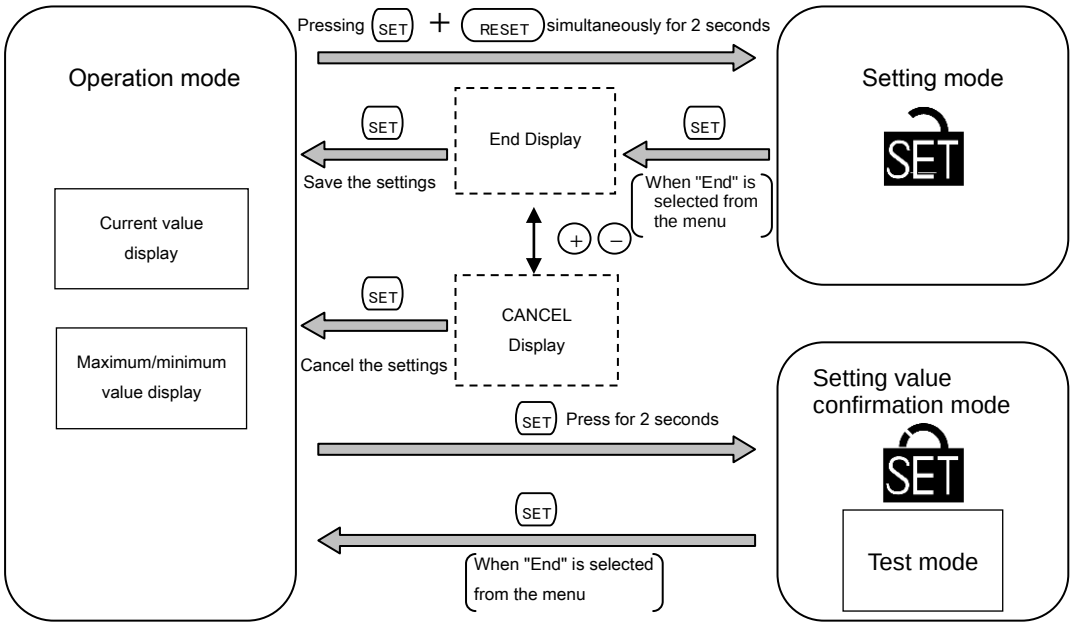
No.	Name		Function
1)	LOG. LED		This indicates a state of logging operation.
		ON	Logging is running.
		OFF	Logging is stopped.
		Blink slowly (0.5s:on/ 0.5s:off)	Change of logging condition settings finished. Blink of LED lasts 5 second.
		Blink quickly (0.25s:on/ 0.25s:off)	When Setting of Logging-item pattern is LP00, Setting data file needed to store in SD memory card was incorrect. LED blinks until correct setting is done.
2)	SD C. LED		This indicates a state of communication with the SD memory card.
		ON	Communicating
		OFF	Stop communicating
		Blink quickly (0.25s:on/ 0.25s:off)	SD memory card error. Check whether the SD memory card is write-protect and SD memory card capacity is sufficient or not.
3)	BAT. LED		This indicates a state of battery voltage.
		OFF	Normal
		ON	The battery is low voltage.

2. Function Modes

The following function modes are available for this Multi-Measuring instrument. Operation mode is displayed after auxiliary power turns on. It is then possible to switch to the desired mode.

Mode	Description	Reference Pages
Operation Mode	This mode is for displaying each measured value using digital numerical values and bar graphs. Operation mode contains "Current Value Display" that displays the current value, and "Maximum/Minimum Value Display" that displays old maximum/minimum values. In addition, for each display, the cyclic display function can be used to switch between the screens every 5 seconds.	P.63 to P.76
Setting Mode	This mode is for changing the setting values related to measurement and output functions. The following special operations can be executed from the "CANCEL Display" for changing/cancelling setting values. ●The instrument is reset. ●Reset the settings to the factory defaults	P.16 to P.49 P.51 to P.56
Setting Value confirmation mode (Test Mode)	This mode is for confirming the setting values for each setting item.(In this mode, settings cannot be changed in order to prevent accidental changing of settings.) This mode contains test functions that can be used for equipment startup. ●Analog Output Adjustment: Analog output can be adjusted (zero adjustment and span adjustment). ●Output Test: Analog output can be switched, pulse output can be executed, and alarm contact points can be opened/closed without measurement input (voltage/current). ●Communication Test: Fixed numerical data can be returned without measurement input (voltage/current).	P.50, P.57 to P.62

■Diagram of Each Mode

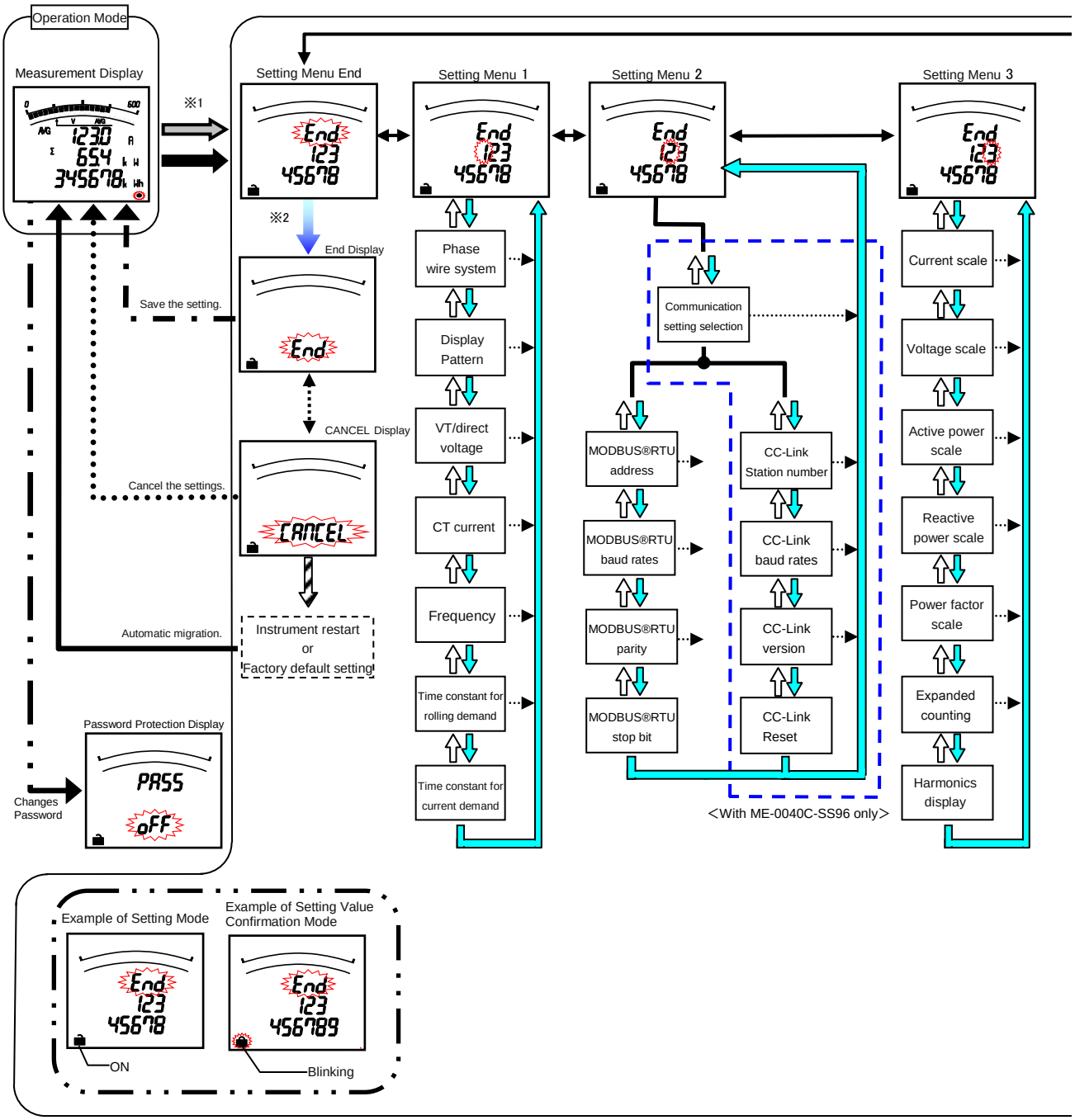


3. Setting

3.1. Setting flow

To measure, it is necessary to use Setting mode to set the phase wire system, VT / direct voltage, and CT primary current. From Operation mode, move to Setting mode and then set necessary items. Factory default settings will be used for items that you do not set.
Only the settings in Setting menu 1 (basic setting) are needed for normal use. For more information about the settings, refer to page 22 and after.
For more information about the factory default settings, refer to the setting table on page 104.

■Setting flow when without optional plug-in module, with ME-4210-SS96, with ME-0040C-SS96 or with ME-0052-SS96,



⚠CAUTION	Keep in mind that when a setting is changed, the related setting items and measurement data will be reset to the default settings. (Refer to page 51.)

3. Setting

3.1. Setting flow

<Setting Procedure>

① Press (SET) and (RESET) simultaneously for 2 seconds to get in the setting mode.

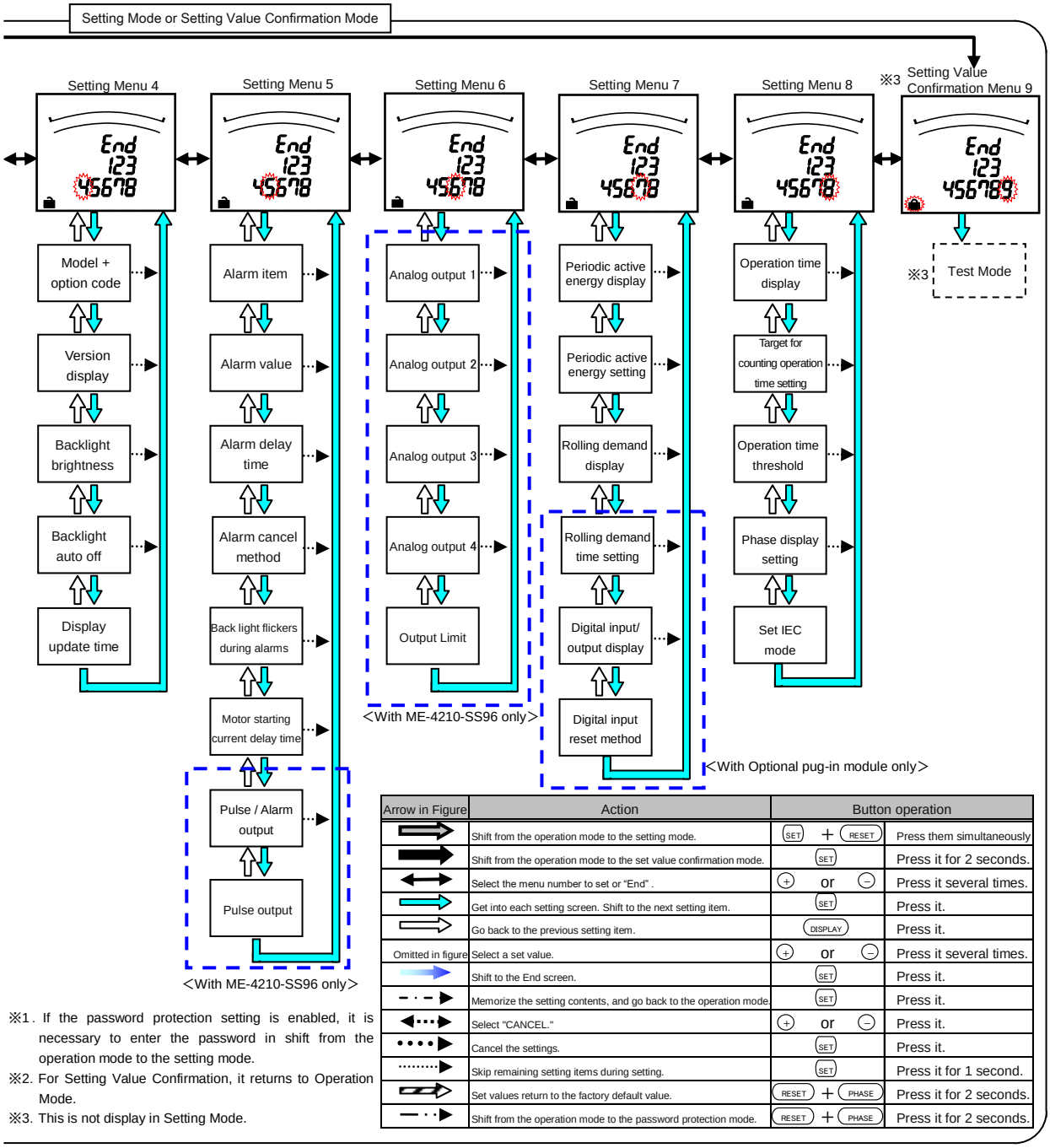
② Select a setting menu number by (+) or (–).

③ Use the (SET) button to select a setting menu number.

④ Set each setting item. (Refer to page 22 and later pages.)

⑤After completion of setting, select 'End' in the setting menu and press (SET).

⑥When the End display appears, press (SET) once again.



Arrow in Figure	Action	Button operation	
⇒	Shift from the operation mode to the setting mode.	(SET) + (RESET)	Press them simultaneously
➡	Shift from the operation mode to the set value confirmation mode.	(SET)	Press it for 2 seconds.
⇔	Select the menu number to set or "End" .	(+) or (–)	Press it several times.
→	Get into each setting screen. Shift to the next setting item.	(SET)	Press it.
⇨	Go back to the previous setting item.	(DISPLAY)	Press it.
Omitted in figure	Select a set value.	(+) or (–)	Press it several times.
⟹	Shift to the End screen.	(SET)	Press it.
- - ▶	Memorize the setting contents, and go back to the operation mode.	(SET)	Press it.
◀- - ▶	Select "CANCEL."	(+) or (–)	Press it.
• • • • ▶	Cancel the settings.	(SET)	Press it.
····· ▶	Skip remaining setting items during setting.	(SET)	Press it for 1 second.
⇨	Set values return to the factory default value.	(RESET) + (PHASE)	Press it for 2 seconds.
— · · ▶	Shift from the operation mode to the password protection mode.	(RESET) + (PHASE)	Press it for 2 seconds.

※1. If the password protection setting is enabled, it is necessary to enter the password in shift from the operation mode to the setting mode.

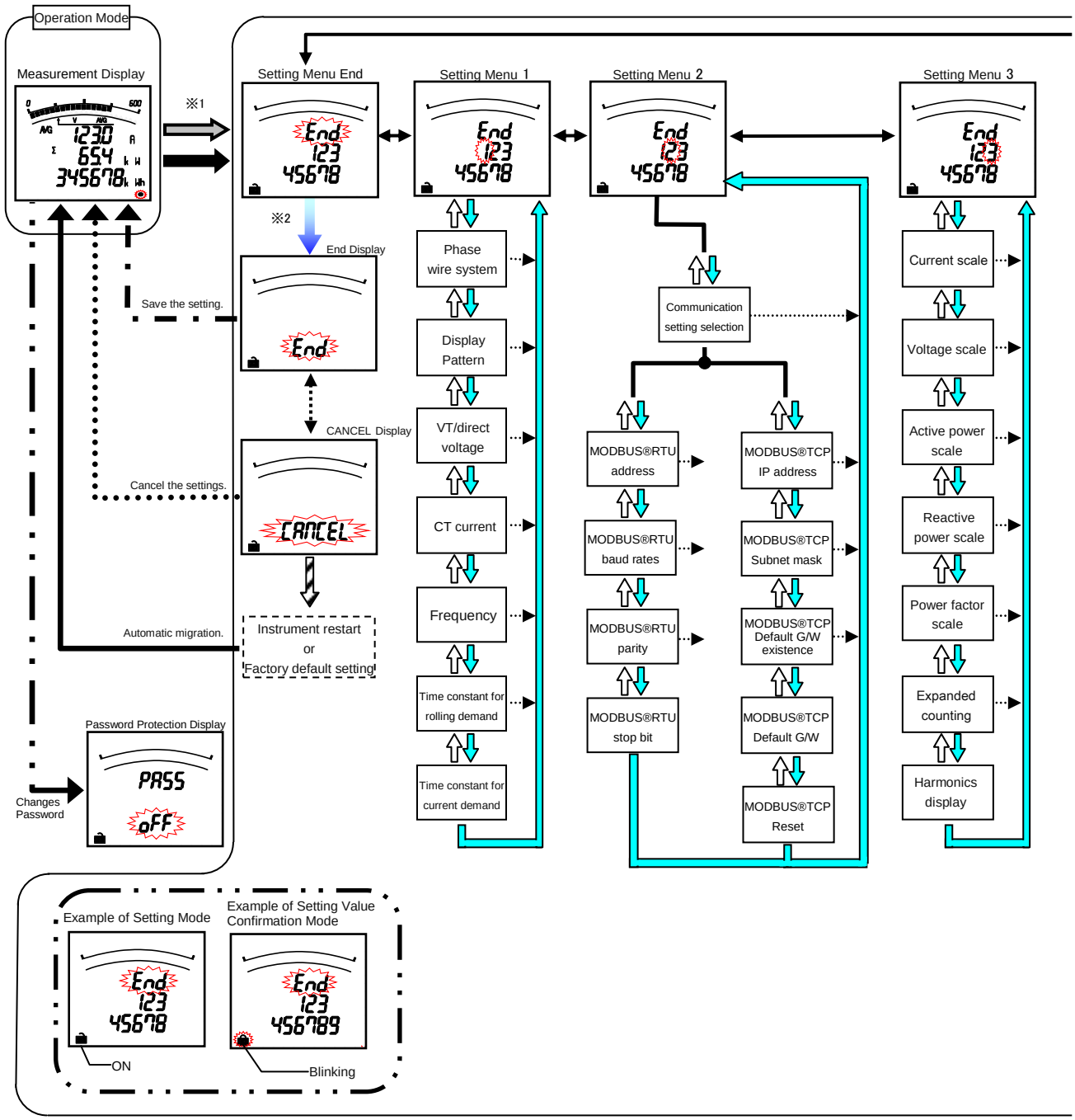
※2. For Setting Value Confirmation, it returns to Operation Mode.

※3. This is not display in Setting Mode.

3. Setting

3.1. Setting flow

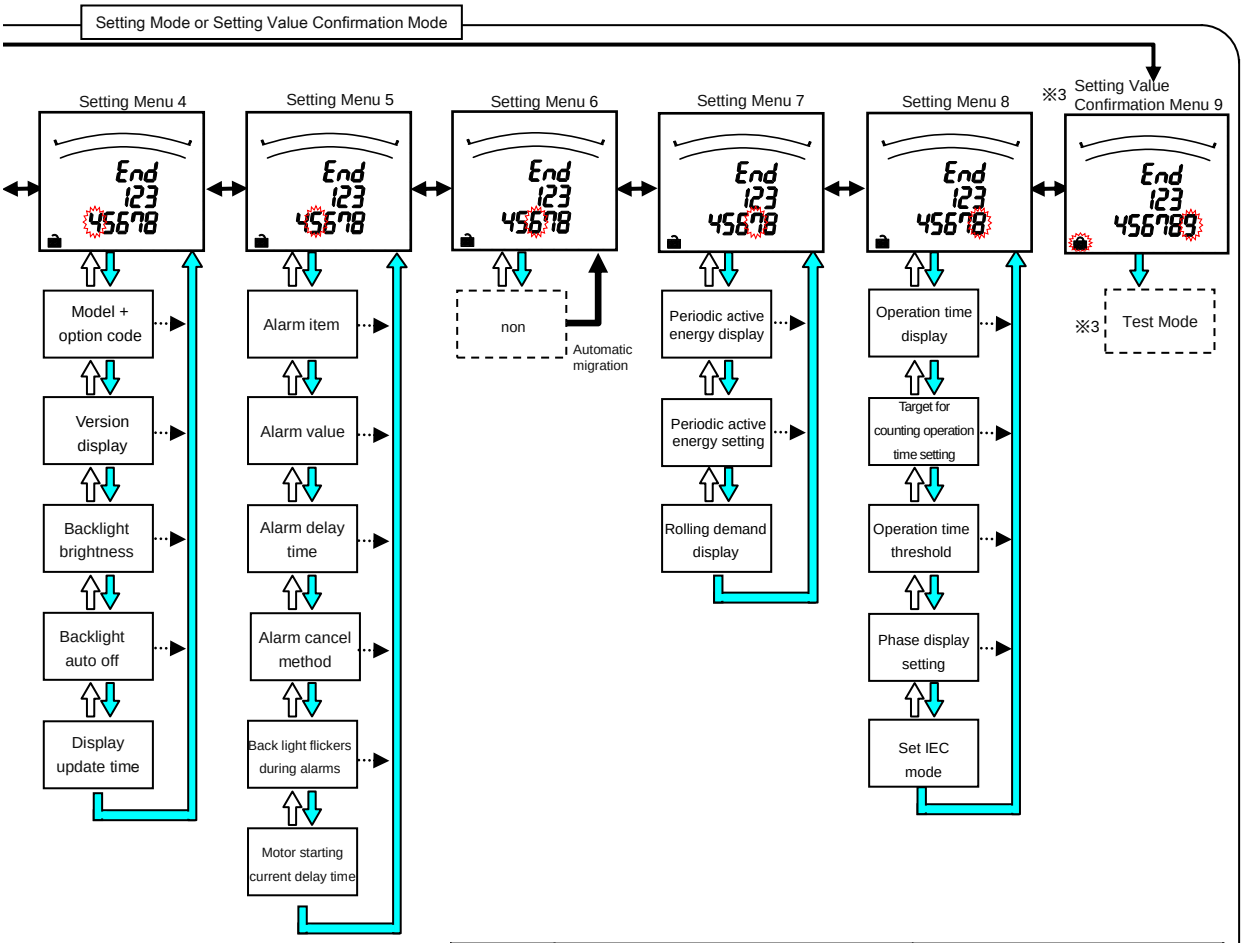
■Setting flow when with ME-0000MT-SS96



⚠CAUTION	Keep in mind that when a setting is changed, the related setting items and measurement data will be reset to the default settings. (Refer to page 51.)

3. Setting

3.1. Setting flow



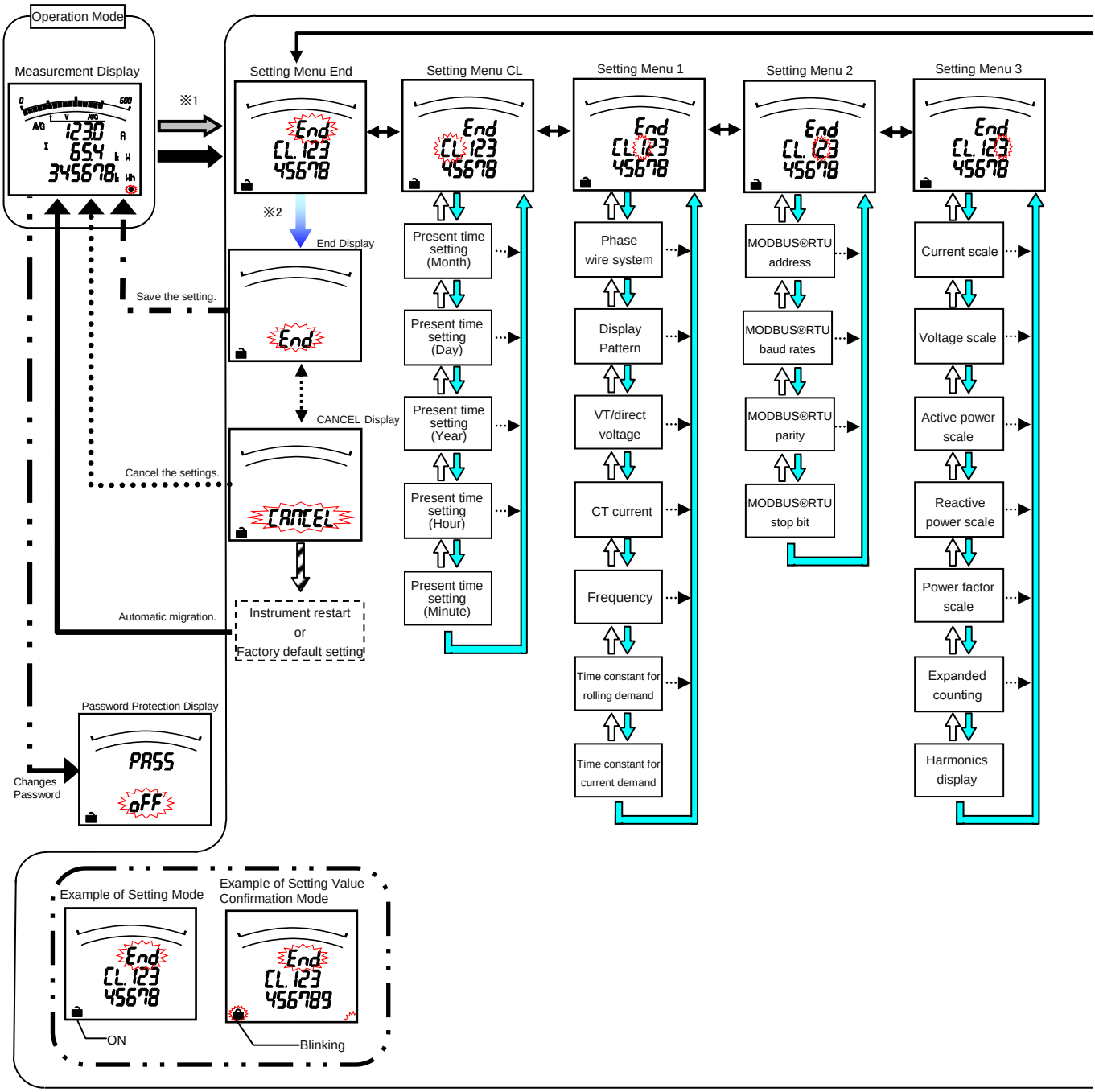
Arrow in Figure	Action	Button operation	
⇨	Shift from the operation mode to the setting mode.	SET + RESET	Press them simultaneously
➡	Shift from the operation mode to the set value confirmation mode.	SET	Press it for 2 seconds.
⇔	Select the menu number to set or "End" .	+ or −	Press it several times.
→	Get into each setting screen. Shift to the next setting item.	SET	Press it.
⇨	Go back to the previous setting item.	DISPLAY	Press it.
Omitted in figure	Select a set value.	+ or −	Press it several times.
→	Shift to the End screen.	SET	Press it.
-·-▶	Memorize the setting contents, and go back to the operation mode.	SET	Press it.
◀···▶	Select "CANCEL."	+ or −	Press it.
••••▶	Cancel the settings.	SET	Press it.
·····▶	Skip remaining setting items during setting.	SET	Press it for 1 second.
⇨	Set values return to the factory default value.	RESET + PHASE	Press it for 2 seconds.
—··▶	Shift from the operation mode to the password protection mode.	RESET + PHASE	Press it for 2 seconds.

※1. If the password protection setting is enabled, it is necessary to enter the password in shift from the operation mode to the setting mode.
※2. For Setting Value Confirmation, it returns to Operation Mode.
※3. This is not display in Setting Mode.

3. Setting

3.1. Setting flow

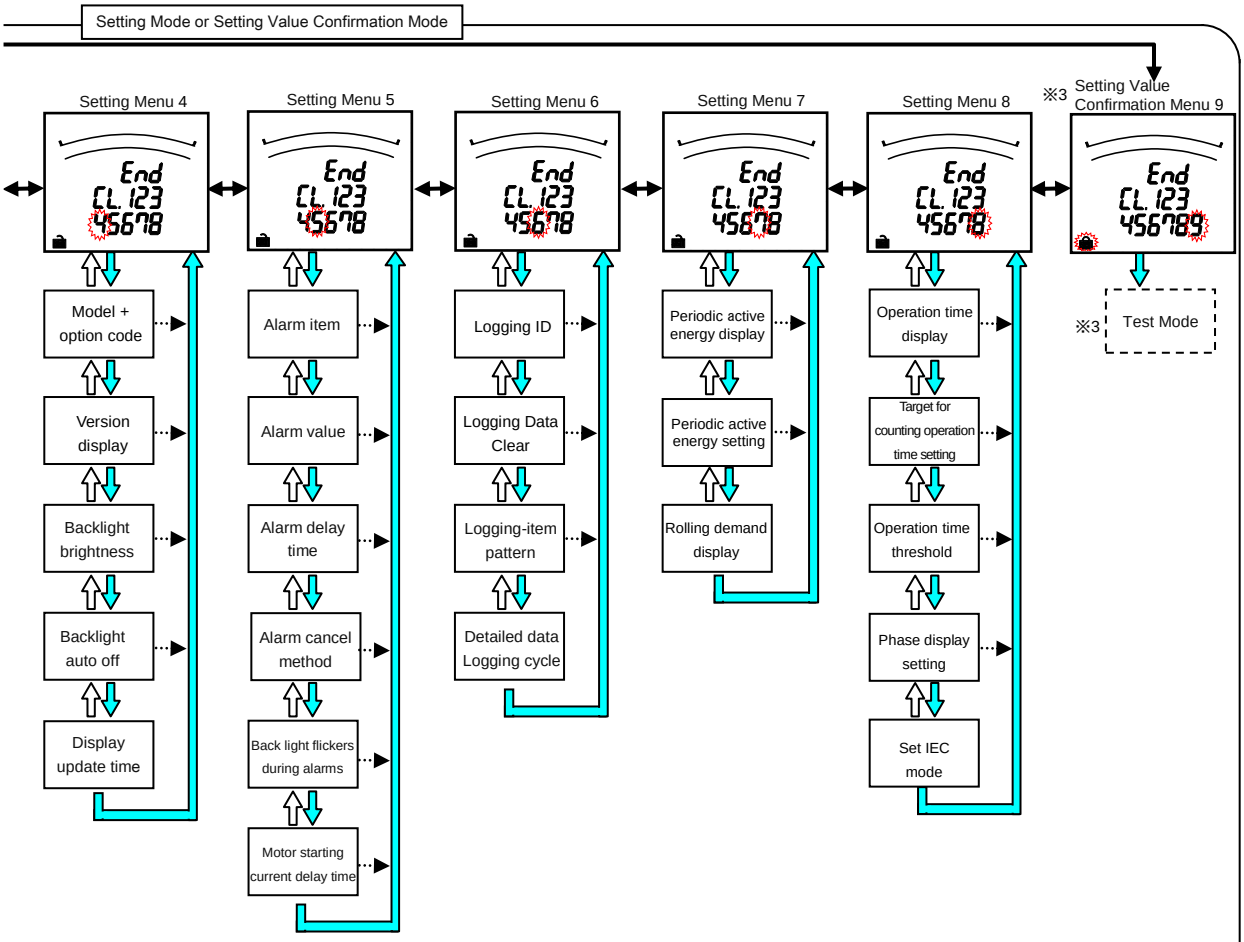
■Setting flow when with ME-0000BU-SS96



⚠CAUTION	Keep in mind that when a setting is changed, the related setting items and measurement data will be reset to the default settings. (Refer to page 51.)

3. Setting

3.1. Setting flow



Arrow in Figure	Action	Button operation	
⇨	Shift from the operation mode to the setting mode.	SET + RESET	Press them simultaneously
➡	Shift from the operation mode to the set value confirmation mode.	SET	Press it for 2 seconds.
⇔	Select the menu number to set or "End" .	⊕ or ⊖	Press it several times.
→	Get into each setting screen. Shift to the next setting item.	SET	Press it.
⇦	Go back to the previous setting item.	DISPLAY	Press it.
Omitted in figure	Select a set value.	⊕ or ⊖	Press it several times.
➡	Shift to the End screen.	SET	Press it.
–·–▶	Memorize the setting contents, and go back to the operation mode.	SET	Press it.
◀···▶	Select "CANCEL."	⊕ or ⊖	Press it.
••••▶	Cancel the settings.	SET	Press it.
·····▶	Skip remaining setting items during setting.	SET	Press it for 1 second.
⇨	Set values return to the factory default value.	RESET + PHASE	Press it for 2 seconds.
—··▶	Shift from the operation mode to the password protection mode.	RESET + PHASE	Press it for 2 seconds.

※1. If the password protection setting is enabled, it is necessary to enter the password in shift from the operation mode to the setting mode.
※2. For Setting Value Confirmation, it returns to Operation Mode.
※3. This is not display in Setting Mode.

3. Setting

Basic Operations for setting

Function	Operation	Remarks
Select a set value	Press (+) or (–).	Fast-forward when pressed over 1 sec.
Setting items are saved	Press SET.	Setting item will be cared and shift to the next item.
Go back to the previous setting item	Press DISPLAY .	The set value for the setting item just before Skip removing setting items returning is still available.
Skip removing setting items during setting	Press and hold SET for 1 sec.	

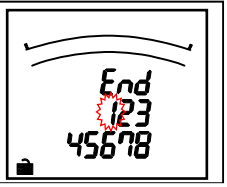
3.2. Setting Menu 1: Basic Settings (Setting the Phase Wire System, Display Pattern, VT/Direct Voltage, CT Primary Current, etc.)

Set the phase wire method, display pattern, VT/direct voltage, CT primary current, etc.

In the operation mode, after pressing SET and RESET simultaneously for 2 seconds or more, the following operation becomes available.

Setting Menu

Set the setting menu number to “1”.
(as shown in the right figure)



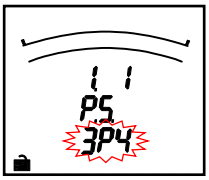
DISPLAY SET

①Phase Wire system

Set the phase wire system.

3P4 : 3-phase 4-wire
3P3. 2CT : 3-phase 3-wire（2CT）
3P3. 3CT : 3-phase 3-wire（3CT）
1P3. 1N2 : 1-phase 3-wire（1N2 display）
1P3. 1N3 : 1-phase 3-wire（1N3 display）
1P2 : 1-phase 2 -wire

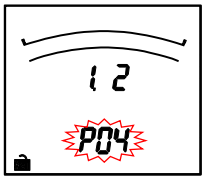
Supplemental Information:
Underlined portions indicate the default values.
(Same from here.)



DISPLAY SET

②Display Pattern

Set the display pattern.
The following table shows the measurement elements that can be displayed by each display pattern. (For more details about display patterns, refer to page 77,78.)
In addition, if there is no display pattern that you want from P01 to P13), select the special display pattern P00 to configure the screen freely.
(For more information about setting the special display pattern P00, refer to page53,54)



○ : Displayable at this display setting.
△ : Set at other additional settings.
☐ : Select "P00" and set the display order and display position.

(1)For 3-phase 4-wire

Display Pattern	Current	N Phase Current	Current Demand	N Phase Current Demand	Voltage	Active Power	Power Factor	Reactive Power	Apparent Power	Frequency	Active Energy(Imported)	Active Energy(Exported)	Reactive Energy (Imported LAG)	Apparent Energy	Additional display: Active Energy (Imported)	Active Energy(Exported)	Reactive Energy (Special)	Apparent Energy	Periodic Active Energy	Rolling Demand	Harmonic Current/ Voltage	Digital Input/ Output	Operation time
P01	○	○			○	○	○												△	△	△	△	△
P02	○	○			○	○	○				○				○	△			△	△	△	△	△
P03	○	○			○	○	○	○	○	○									△	△	△	△	△
P04	○	○			○	○	○	○	○	○	○		○	○	○	△	△	○	△	△	△	△	△
P05						○	○	○	○	○									△	△	△	△	△
P06	○	○			○														△	△	△	△	△
P07	○	○			○	○													△	△	△	△	△
P08	○	○			○	○					○				○	△			△	△	△	△	△
P09	○	○	○	○	○														△	△	△	△	△
P10	○	○	○	○	○	○													△	△	△	△	△
P11	○	○	○	○	○						○				○	△			△	△	△	△	△
P12	○	○	○	○	○	○					○				○	△			△	△	△	△	△
P13	○	○			○	○	○	○	○	○	○		○	○	○	△	△	○	△	△	△	△	△
P00	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	△	△	△	△	△	△	△	△	△

Note: The following settings are required for displaying elements on an additional display.

Measurement element on additional display	Setting item	Reference Pages
Active energy Exported /reactive energy Special(*)	Setting Menu 3 Active energy measurement	Page 32
Harmonic current/ Harmonic voltage	Setting Menu 3 Harmonics display	Page 32
Periodic Active Energy	Setting Menu 7 Periodic Active energy display	Page 44
Rolling Demand	Setting Menu 7 Rolling demand display	Page 44
Digital input / output status	Setting Menu 7 Digital input / output display	Page 45
Operation time	Setting Menu 8 Operation time display	Page 46

※When display elements does not set active energy/ reactive energy/ apparent energy, ‘P00’ of active energy/ reactive energy/ apparent energy on additional display does not appear.

(2) For other phase wire system except 3-phase 4-wire

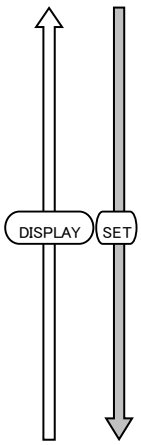
Display Pattern	Current	Current Demand	Voltage	Active Power	Power Factor	Reactive Power	Frequency	Active Energy(Imported)	Active Energy(Exported)	Reactive Energy y (Imported LAG)	Additional display: Active Energy (Imported)	Active Energy(Exported)	Reactive Energy (Special)	Periodic Active Energy	Rolling Demand	Harmonic Current/ Voltage	Digital Input/ Output	Operation time
P01	○		○	○	○									△	△	△	△	△
P02	○		○	○	○			○			○	△		△	△	△	△	△
P03	○		○	○	○	○	○							△	△	△	△	△
P04	○		○	○	○	○	○	○		○	○	△	△	△	△	△	△	△
P05				○	○	○	○							△	△	△	△	△
P06	○		○											△	△	△	△	△
P07	○		○	○										△	△	△	△	△
P08	○		○	○				○			○	△		△	△	△	△	△
P09	○	○	○											△	△	△	△	△
P10	○	○	○	○										△	△	△	△	△
P11	○	○	○					○			○	△		△	△	△	△	△
P12	○	○	○	○				○			○	△		△	△	△	△	△
P13	○		○	○	○	○	○	○		○	○	△	△	△	△	△	△	△
P00	□	□	□	□	□	□	□	□	□	□	△	△	△	△	△	△	△	△

Note: The following settings are required for displaying elements on an additional display.

Measurement element on additional display	Setting item	Reference Pages
Active energy Exported /reactive energy Special(*)	Setting Menu 3 Active energy measurement	Page 32
Harmonic current/ Harmonic voltage	Setting Menu 3 Harmonics display	Page 32
Periodic Active Energy	Setting Menu 7 Periodic Active energy display	Page 44
Rolling Demand	Setting Menu 7 Rolling demand display	Page 44
Digital input / output status	Setting Menu 7 Digital input / output display	Page 45
Operation time	Setting Menu 8 Operation time display	Page 46

※When display elements does not set active energy/ reactive energy, 'P00' of active energy/ reactive energy on additional display does not appear.

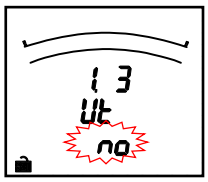
③VT / direct voltage



Set the VT

When direct input (without VT) ⇒ Select no, and then press (SET), shift to following (1).

When using VT ⇒ Select yES, and then press (SET), shift to following (2)



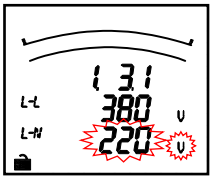
1. For 3-phase 4-wire
   no ⟷ yES

2. For 3-phase 3-wire or 1-phase 2-wire
   yES ⟷ no

<When ①phase wire system is set to 1-phase 3-wire>
Use only for direct input. This setting will be skipped.

Note. VT is voltage transformers.

(1) For direct input (without VT) Set the direct voltage.



(a) For 3-phase 4-wire
(phase to neutral voltage / phase to phase voltage)

63.5/110V ⟷ 100/173V ⟷ 110/190V ⟷ 220/380V ⟷ 230/400V ⟷ 240/415V
277/480V ⟷ 254/440V

(b) For 3-phase 3-wire (2CT, 3CT) or 1-phase 2-wire

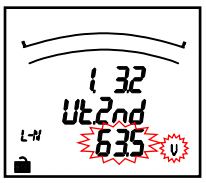
110V ⟷ 220V ⟷ 440V

(c) For 1-phase 3-wire (1N2, 1N3) (phase to neutral voltage / phase to phase voltage)

110/220V ⟷ 220/440V

Continued form the previous page

（2）When using VT



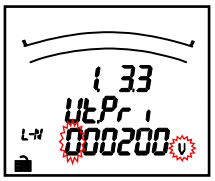
＜Set the secondary and primary voltages of the VT.＞

（a）For 3-phase 4-wire(Phase to phase Voltage)

63.5V ⟷ 100V ⟷ 110V ⟷ 115V ⟷ 120V

（b）For 3-phase 3-wire (2CT, 3CT) or 1-phase 2-wire（phase to neutral voltage）

100V ⟷ 110V ⟷ 220V



＜Primary Voltage Settings＞

Default value

For 3-phase 4-wire ：200V(Phase to phase Voltage)

For 3-phase 3-wire or 1-phase 2-wire：10000V

（phase to neutral voltage）

- From top digit, select the value of the flickering digit by ⊕ and ⊖
- The setting digit can be moved to right by SET
- The setting digit can be moved to left by DISPLAY
- Setting is available in range from 60V to 750000V
  Less than 100V : Upper 2 digits setting
  Over 100V : Upper 3 digits setting

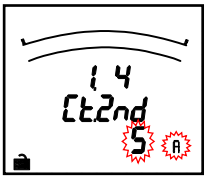
※Error display (E05) appears when set out of 60Vto750000V range.
After that, please press SET review the setting value and set it once Again.

※When over 100V set over upper 3 digits setting, the display appear switching upper 3 digits setting.

- Press SET at the lowest digit, the setting step will shift to the next one.

Set the CT.

Primary / secondary Current Setting



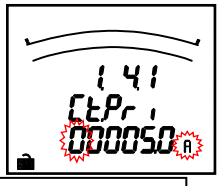
＜Set the secondary current＞

1A ⟷ 5A

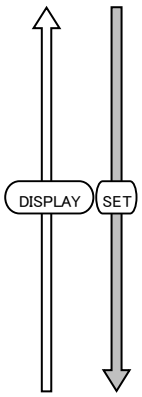
Note. CT is current transformers.

＜Set the primary current＞

Default Setting：5.0A



④CT current



- From top digit, select the value of the flickering digit by ⊕ and ⊖.
- The setting digit can be moved to right by the SET.
- The setting digit can be moved to left by the DISPLAY.
- Setting is available in range from 1.0A to 30000.0A
  Less than 10A : Upper 2 digits setting
  Over 10A : Upper 3 digits setting

※Error display (E05) appears when set out of 1.0 to 30000.0A range. After that, please press SET, review the setting value and set it once again.

※When over 10A set over upper 3 digits setting, the display appear switching upper 3 digits setting.

- Press SET at the lowest digit, the setting step will shift to the next one.

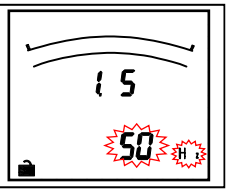
3.2 Setting menu 1: Basic Settings (Setting the Phase Wire System, Display Pattern, VT/Direct Voltage, CT Primary Current, etc.)

⑤Frequency

Set the frequency.

50Hz ◄——► 60Hz

Note1.The scale value of the frequency of the bar graph display is changed, too.
Note2.Scale of the analog output is changed, too.



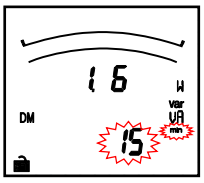
DISPLAY SET

⑥Time constant for rolling demand

Set the interval time constant for the rolling demand.
(For the rolling demand, refer to page 73.)

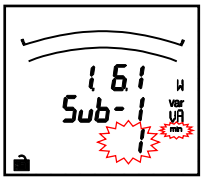
(1)Interval time constant

Setting range	Setting step
1 to 15 to 60（min）	1min



(2)Subinterval time constant

Setting range	Setting step
1 to 60（min）	1min



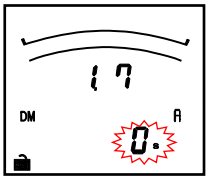
・Error display (E05) appears when the interval time constant is set to a value that is not dividable by the subinterval time period. After that, please press SET, review the setting value and it once again.
・Even when the display pattern not display the rolling demand, this screen appears. If the rolling demand is not necessary, press the SET as it is.

DISPLAY SET

⑦Time constant for current demand

Set the time constant for current demand.
(For the demand time period, refer to page 70.)

0 s	40 s	3 min	7 min	15 min
10 s	50 s	4 min	8 min	20 min
20 s	1 min	5 min	9 min	25 min
30 s	2 min	6 min	10 min	30 min

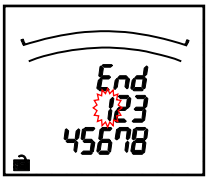


Note) Even when the display pattern not display the current demand, this screen appears. If the current demand is not necessary, press the SET as it is.

SET

Setting Menu

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.



In the case of use only by the Setting menu 1, please go to “5. Operation” (from page 63).
In the case to use additional functions, please go to “Setting Menus 2 - 8” (from page 26).

Note	**If the contents in the setting menu 1 are changed, the maximum value, minimum value, demand value of related measurement items will be reset. (However, active energy, reactive energy and Apparent energy will not be reset.) For detail, refer to section 3.15.**

3. Setting

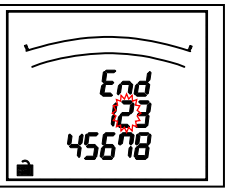
3.3. Setting Menu 2: Communication Settings (Setting the MODBUS®RTU communication)

<Setting flow when without optional plug-in module, with ME-4210-SS96, with ME-0052-SS96 or with ME-0000BU-SS96>

In the operation mode, press (SET) + (RESET) simultaneously for 2 seconds or more, and the following operation becomes available.

Setting Menu

Set the setting menu number to “2”.
(as shown in the right figure)

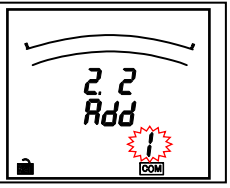


DISPLAY / SET

①MODBUS®RTU address

Set the MODBUS®RTU address number.

Selectable addresses: 1 to 255

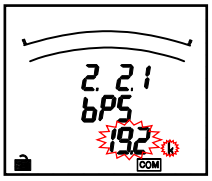


DISPLAY / SET

②MODBUS®RTU baud rates

Set the MODBUS®RTU baud rate.

2400bps
4800bps
9600bps
19.2kbps
38.4kbps

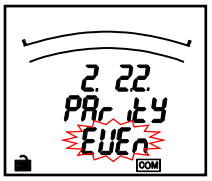


DISPLAY / SET

③MODBUS®RTU parity

Set the MODBUS®RTU parity.

non
odd
even（EVEn）

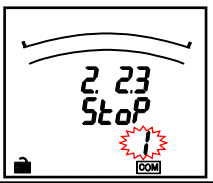


DISPLAY / SET

④MODBUS®RTU stop bit

Set the MODBUS®RTU stop bit.

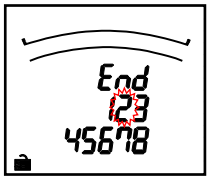
Stop bit 1 ⟷ Stop bit 2



SET

Setting Menu

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.



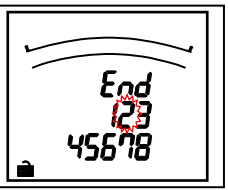
3.4. Setting Menu 2: Communication Settings (Setting the CC-Link communication)

<Setting flow when with ME-0040C-SS96>

In the operation mode, press SET + RESET simultaneously for 2 seconds or more, and the following operation becomes available.

Setting Menu

Set the setting menu number to “2”.
(as shown in the right figure)



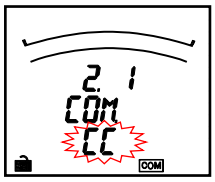
DISPLAY SET

①Communication setting selection

Select either of “Setting of CC-Link communication” or “Setting of MODBUS®RTU communication.”

CC ⟷ Mb.rtu
(CC-Link communication) (MODBUS®RTU communication)

When “MODBUS® RTU communication” is selected, refer to ① MODBUS®RTU Address at page 26.
Hereafter, CC-Link communication setting describes.

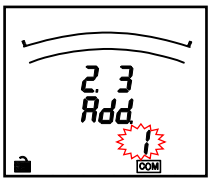


DISPLAY SET

②CC-Link station number

Set the CC-Link station number.

Selectable station number: 1 to 64

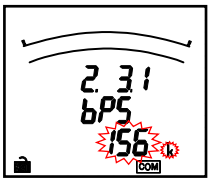


DISPLAY SET

③CC-Link baud rates

Set the CC-Link baud rate.

156kbps
625kbps
2.5Mbps
5Mbps
10Mbps

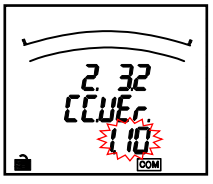


DISPLAY SET

④CC-Link version

Set the CC-Link version according to the configuration of the used CC-Link system.

Version 1.10 ⟷ Version 2.00



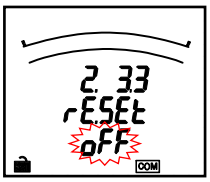
DISPLAY SET

3.4. Setting Menu 2: Communication Settings (Setting the CC-Link communication)

⑤Communication reset

When the changed above settings are enabled, set to "on."
（When it is not set to “on,” the changed settings of CC-Link do not become effective.）

oFF ◄——► on

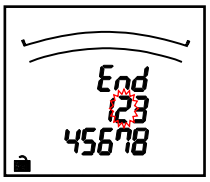


SET

Setting Menu

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.

If it is needed to set the MODBUS®RTU communication setting, Select the menu number “2” again, and select “Mb.rtu” at ①Communication setting selection.



3. Setting

3.5. Setting Menu 2: Communication Settings (Setting the MODBUS®TCP communication)

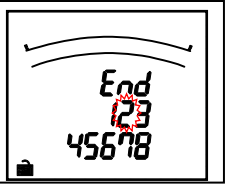
<Setting flow when with ME-0000MT-SS96>

In the operation mode, press SET + RESET simultaneously for 2 seconds or more, and the following operation becomes available.

Setting Menu

DISPLAY SET

Set the setting menu number to “2”.
(as shown in the right figure)



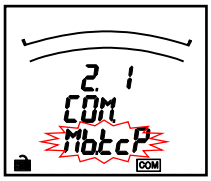
①Communication setting selection

DISPLAY SET

Select either of “MODBUS®TCP communication” or “MODBUS®RTU communication.”

Mb. tcP ⟷ Mb.rtu
(MODBUS®TCP communication) (MODBUS®RTU communication)

When “MODBUS® RTU communication” is selected,
refer to ① MODBUS®RTU Address at page 26.
Hereafter, MODBUS®TCP communication setting describes.

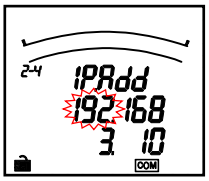


②MODBUS®TCP IP address

DISPLAY SET

Set the local station IP address for MODBUS®TCP by each octet.

000.000.000.000 to 192.168.3.10 to 255.255.255.255



* If invalid IP address is set, error code E05 is appears.
If that happens, press SET and set again after review the IP address.

[Range of configurable IP address]

1.0.0.0 to 126.255.255.255
128.0.0.0 to 191.255.255.255
192.0.0.0 to 223.255.255.255

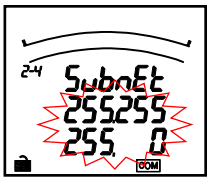
The following IP addresses cannot be configured.
・0.0.0.0
・xxx.xxx.xxx.255 (xxx are any values)

③MODBUS®TCP Subnet mask

DISPLAY SET

Set the subnet mask.

Select the subnet mask from the below table.



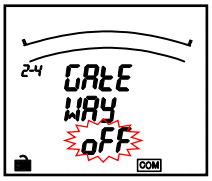
(1)	128.0.0.0	(9)	255.128.0.0	(17)	255.255.128.0	(25)	255.255.255.128
(2)	192.0.0.0	(10)	255.192.0.0	(18)	255.255.192.0	(26)	255.255.255.192
(3)	224.0.0.0	(11)	255.224.0.0	(19)	255.255.224.0	(27)	255.255.255.224
(4)	240.0.0.0	(12)	255.240.0.0	(20)	255.255.240.0	(28)	255.255.255.240
(5)	248.0.0.0	(13)	255.248.0.0	(21)	255.255.248.0	(29)	255.255.255.248
(6)	252.0.0.0	(14)	255.252.0.0	(22)	255.255.252.0	(30)	255.255.255.252
(7)	254.0.0.0	(15)	255.254.0.0	(23)	255.255.254.0		
(8)	255.0.0.0	(16)	255.255.0.0	(24)	255.255.255.0		

3.5. Setting Menu 2: Communication Settings (Setting the MODBUS®TCP communication)

④MODBUS®TCP Default gateway existence

Set the Default gateway existence.
If the default gateway exists on the Ethernet, select “on” to communicate with other network.

oFF ⟷ on

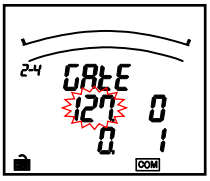


DISPLAY SET

⑤MODBUS®TCP Default gateway address

Set the Default gateway address.
If select “oFF” in ④MODBUS®TCP Default gateway existence, this display will be skipped.

000.000.000.000 to 127.0.0.1 to 255.255.255.255



* If invalid default gateway address is set, error code E05 is appears.
If that happens, press SET and set again after review the default gateway address.

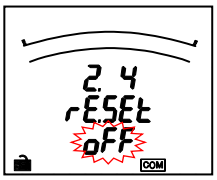
The following default gateway addresses cannot be configured.
・0.0.0.0
・xxx.xxx.xxx.255 (xxx are any values)

DISPLAY SET

⑥Communication reset

When the changed above settings of MODBUS® TCP are enabled, set to "on."
（When it is not set to “on,” the changed settings of MODBUS®TCP do not become effective.）

oFF ⟷ on

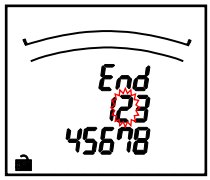


SET

Setting Menu

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.

If it is needed to set the MODBUS®RTU communication setting, Select the menu number “2” again, and select “Mb.rtu” at ①Communication setting selection.



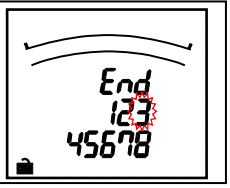
3. Setting

3.6. Setting Menu 3: Display Settings (Setting Maximum Scale, Active Energy Measurement, and Harmonic Display, etc.)

This section shows how to set maximum scale in the bar graph, expanded counting, and harmonics display.
In the operation mode, press SET and RESET simultaneously for 2 seconds or more, and the following operation becomes available.

Setting menu

Set the setting menu number to "3".
(as shown in the right figure)

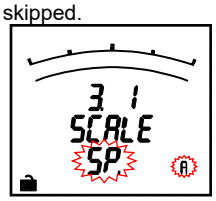


DISPLAY SET

①Current maximum scale

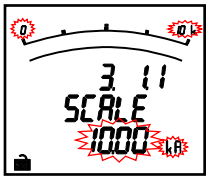
Set the current maximum scale.
If you have not set current to "Display pattern", this display menu will be skipped.
(1)Maximum scale value

Primary Current
(1.4.1Primary Current Setting value)
SP.(Special Setting)



(2)Special current maximum scale
This display is displayed when you set the "SP" in 3.1.

+ 3 STEP (About 120%)
to
± 0 STEP (100% : Rating)
to
-10 STEP (About 40%)



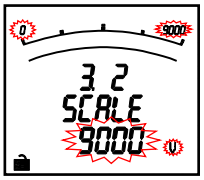
Note: The maximum scale value becomes the value in the table on Section 6.3.(page 80 and after).

DISPLAY SET

②Voltage maximum scale

Set the voltage maximum scale.
If you have not set voltage to "Display pattern", this display menu will be skipped.
Maximum scale value

+10 STEP (About 250%)
to
± 0 STEP (100% : Standard maximum scale value)
to
-18 STEP (About 20%)



Note: The maximum scale value becomes the value in the table on Section 6.3.(page 80 and after).

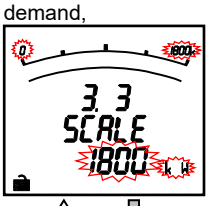
DISPLAY SET

③Active power maximum scale

Set the maximum scale of Active power, Rolling demand.
If you have not set active power and rolling demand to "Display pattern", this display will be skipped. And, if selected not Active power but rolling demand, "(2)single deflection/ double deflection" will be skipped.

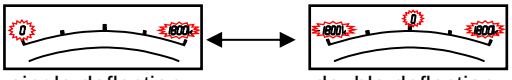
(1)Maximum scale value
+3 STEP (About 120%)
to
±0 STEP (100% : Rating)
to
-18 STEP (About 20%)

Note: The maximum scale value becomes the value in the table on Section 6.3.(page 80 and after).

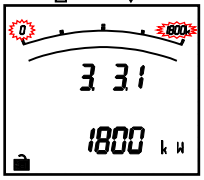


DISPLAY SET

(2)single deflection / double deflection



single deflection　　double deflection

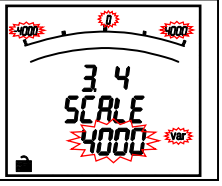


DISPLAY SET

④Reactive power maximum scale

Set the maximum scale of Reactive power.
If you have not set reactive power to "Display pattern", this display will be skipped.

The setting method is the same as ③active power maximum scale.
Reactive power is only "double deflection".

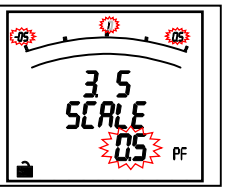


3.6. Setting Menu 3: Display Settings (Setting Maximum Scale, Active Energy Measurement, and Harmonic Display, etc.)

⑤Power factor scale

Set the power factor scale.
If you have not set power factor to “Display pattern”, this display will be skipped.

-0.5 to 1 to 0.5 ⟷ -0 to 1 to 0



DISPLAY SET

⑥Expanded counting

Set the combinations of imported / exported and lag / lead for active energy and reactive energy you want to display, and set the measurement method for reactive energy.

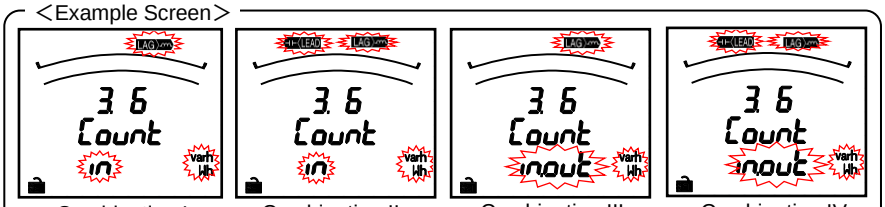
Combination (Setting value)	Display						Reactive energy measurement method
	Wh		varh				
	Imported	Exported	Imported		Exported		
			lag	lead	lag	lead	
I	○		○				2 quadrant measurement
II	○		○	○			
III	○	○	○		○		4 quadrant measurement
IV	○	○	○	○	○	○	

Note: For more information about the measurement method for reactive energy, refer to page 69.

Combination I, II ⇒It is suitable for the counting of equipment without the private electric generator and the reactive power of the capacitor load at the power factor = 0, generally.

Combination III, IV⇒It is suitable for the counting of equipment with the private electric generator.

＜Example Screen＞



Combination I　Combination II　Combination III　Combination IV

in :Imported out :Exported ⊣⊢LEAD :lead varh LAG〉 :lag varh

Depending on the above combination and the measurement element which set in ②Display pattern of the setting menu 1, the energies displayed at the additional screen are as below.

	Additional Screen			
Wh	Wh	-Wh	—	—
-Wh	—	—	—	—
varh	varh	varh(imported LEAD)	varh(exported LAG)	varh(exported LEAD)
VAh	VAh	—	—	—

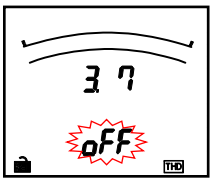
Note: Wh:Wh(imported), -Wh:Wh(exported), varh:varh(imported LAG)

DISPLAY SET

⑦Harmonics

Set “on or off” of the harmonic measurement display.

oFF ⟷ on
(Not displayed)　(Displayed)



When the display is set to "on," the harmonic measured value can be displayed on an additional screen of the display pattern.

SET

Setting Menu

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.

Note

- ●Accuracy is defined to rated current. Although the maximum scale may display 120% or more of rated current and rated voltage in order to make a scale easy to read depending on the settings of VT/direct voltage and CT primary current, current input is within 100% of rated current.
- ●Even if a display pattern is selected that cannot display active power, reactive power, active energy, and reactive energy, it is possible to display the sign according to 2 quadrant / 4 quadrant measurement of the power factor and reactive power due to ⑥Expanded counting, so setting items for ⑥Expanded counting will be displayed.

3. Setting

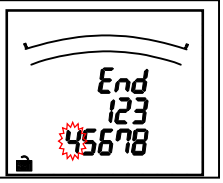
3.7. Setting Menu 4: LCD Settings (Setting Model Display, Version Display, Backlight, and Display Update Time)

This section is for confirming the model, option code and the product version, and also set the backlight and the display update time. In the operation mode, press SET + RESET simultaneously for 2 seconds or more, and the following operation becomes available.

Setting menu

Set the setting menu number to “4”.

(as shown in the right figure)



DISPLAY SET

①Model + option code

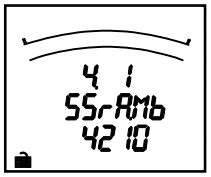
The model can be confirmed. (This is only display, and settings cannot be changed.)

(1) Middle Line

Model	
SSrAMb	ME96SSRA-MB

(2) Lower Line

Option code	
	Blank
4210	ME-4210-SS96
0040C	ME-0040C-SS96
0052	ME-0052-SS96
MT	ME-0000MT-SS96
0000bU	ME-0000BU-SS96



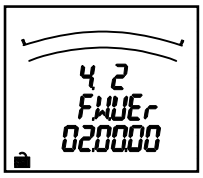
*1 If “E90xx” appears, MODBUS®TCP communication error will be occurred.

DISPLAY SET

②Version display

The product version can be checked.

(The product version is displayed, but cannot be changed.)



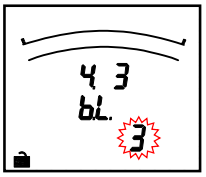
DISPLAY SET

③Backlight brightness

The backlight brightness can be adjusted.

1 ⟷ 2 ⟷ 3 ⟷ 4 ⟷ 5

Dark ⟶ Bright



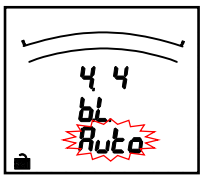
DISPLAY SET

④Backlight auto off

The backlight can be set to continuous on (HoLd) or auto off (Auto).

Auto ⟷ HoLd

(Auto off) (Continuous on)



<When auto off (Auto) is selected>
No button operation for 5 minutes → the backlight turns off
Button operation during off (Note) → the backlight turns on for 5 minutes

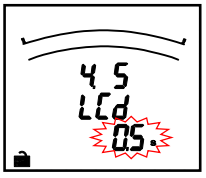
Note: When the backlight is off, pressing any button once does not switch the display but only turns on the backlight.
Pressing any button again switches the display.

DISPLAY SET

⑤Display update time

The display update time for the measured value can be change.
If the display switches too quickly for you to read the displayed value, set it to 1.0 second.
(Normally, leave this setting to 0.5 second.)

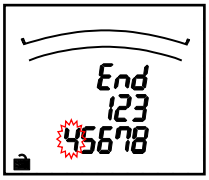
0.5second ⟷ 1second



SET

Setting Menu

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.



3.8. Setting Menu 5: Pulse and Alarm Settings (Setting Upper/Lower Limit Alarm, Motor Starting Current Mask Function, Pulse Output, etc.)

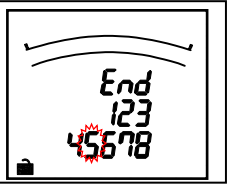
This section shows how to set the upper/lower limit alarm, backlight flickering during alarm, motor starting current delay time, and pulse output.

In the operation mode, press SET and RESET simultaneously for 2 seconds or more, and the following operation becomes available.

(For more details about each function, refer to the corresponding pages.
Upper/lower limit alarm → Pages 71 and 72, Motor startup current → Page 75)

Setting menu

Set the setting menu number to “5”.
(as shown in the right figure)



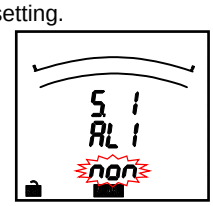
DISPLAY SET

①Alarm item 1

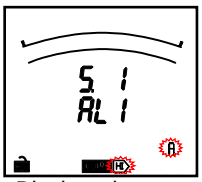
Set the Alarm item 1 to be allowed to measurement items.
The upper/lower limit measurement values can be monitored by this setting.

(1)For 3-phase 4-wire

non	DW upper limit
A upper limit	var upper limit
A lower limit	var lower limit
AN upper limit	Dvar upper limit
DA upper limit	DVA upper limit
DA lower limit	PF upper limit
DAN upper limit	PF lower limit
V (L-N) upper limit	Hz upper limit
V (L-N) lower limit	Hz lower limit
V (L-L) upper limit	Harmonic current total RMS Value
V (L-L) lower limit	N-phase harmonic current total RMS value
W upper limit	Harmonic voltage total distortion ratio
W lower limit	



Display when "non" is selected



Display when "A upper limit" is selected

(2)For other phase wire system except 3-phase 4-wire

non	DW upper limit
A upper limit	var upper limit
A lower limit	var lower limit
DA upper limit	Dvar upper limit
DA lower limit	DVA upper limit
V upper limit	PF upper limit
V lower limit	PF lower limit
W upper limit	Hz upper limit
W lower limit	Hz lower limit
	Harmonic current total RMS value
	Harmonic voltage total distortion ratio

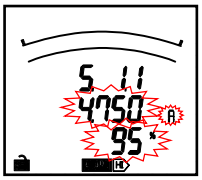
Note 1. Measurement items that are not selected in the display pattern can be selected.
Note 2. DA: Current demand, DAN: N-phase current demand,
V (L-N): Phase to neutral voltage, V (L-L): phase to phase voltage,
DW: Active power rolling demand, Dvar: Reactive power rolling demand,
DVA: Apparent power rolling demand

3.8. Setting Menu 5: Pulse and Alarm Settings (Setting Upper/Lower Limit Alarm, Motor Starting Current Mask Function, Pulse Output, etc.)

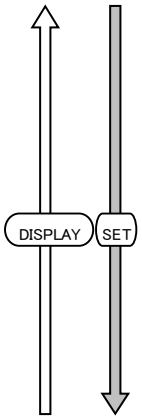
②Alarm value 1

Set the alarm value for upper/lower limit alarm element 1. The following table shows the setting range.

Measuring element	Setting range	Setting step(Note)
A, AN, DA, DAN upper limit	5 to 100 to 120(%)	1%
A, DA lower limit	3 to 10 to 95(%)	1%
V (L-N), V (L-L) upper limit	25 to 110 to 135(%)	1%
V (L-N), V (L-L) lower limit	20 to 70 to 95(%)	1%
W, var upper limit	-95 to 100 to 120(%)	1%
W, var lower limit	-120 to 3 to 95(%)	1%
DW, Dvar, DVA upper limit	5 to 100 to 120(%)	1%
PF upper limit	-0.05 to 1 to 0.05	0.05
PF lower limit	-0.05 to -0.5 to 0.05	0.05
Hz upper limit	45 to 65(Hz)	1Hz
Hz lower limit	45 to 65(Hz)	1Hz
Harmonic current total RMS value	1 to 35 to 120(%)	1%
N-phase harmonic current total RMS value	1 to 35 to 120(%)	1%
Harmonic voltage total distortion ratio	0.5 to 3.5 to 20.0(%)	0.5%



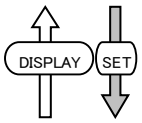
Note:W, var, DW, Dvar,DVA and var show the percentage for the maximum scale value (±0 step).
A, AN, DA, DAN, Harmonic current total RMS value, N-phase harmonic current total RMS value shows the percentage for the CT primary current.
"V" shows the percentage for the VT primary voltage (or direct voltage).
(The "V" for 1-phase 3-wire is the percentage for phase to neutral voltage.
Alarm monitoring is executed using twice the value which set upper/lower limit alarm for the 12-phase and 13-phase.)



③Alarm item 2 to 4

Set the measurement element assigned to the upper/lower limit alarm items 2 to 4. Elements that are set elsewhere cannot be set.

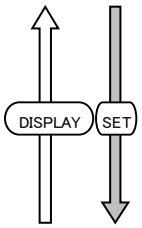
The setting method is the same as ①Alarm item 1 .



④Alarm value 2 to 4

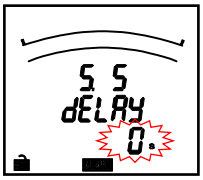
Set the alarm value for the upper/lower limit alarm items 2 to 4.

The setting method is the same as ②Alarm value 1 .



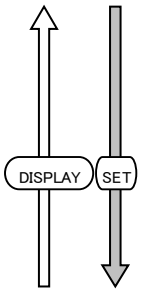
⑤Alarm delay time

Set the alarm mask time for when you want to prevent a momentary overload or noise alarm.
When this is set, an alarm is generated only when the alarm value over the upper/lower limit alarm value for a longer time than the delay time. On the setting screen, seconds are indicated by “s” and minutes are indicated by “min”.



0s → 5s → 10s → 20s → 30s → 40s → 50s → 1min → 2min → 3min → 4min → 5min → 0s

Note:
When all settings for ①Alarm item 1 and ③Alarm item 2 to 4 are set to “non”, this setting will be skipped.

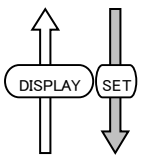


⑥Alarm cancel method

Set the alarm cancel method at generation of alarm. (screen, relay)

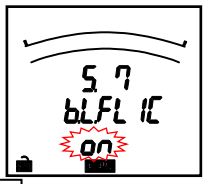
Reset method (Setting value)	Description (Refer to pages 71 and72)
Automatic (Auto)	When there is no alarm generation condition, alarm is automatically reset.
Manual (HoLd)	The alarm will continue even when the alarm generated conditions no longer exist. It is necessary to execute button operation to cancel the alarm.

Note: When all settings for ①Alarm item 1 and ③Alarm item 2 to 4 are set to "non," this setting will be skipped.



⑦Backlight flickers during alarms

It is possible to make the backlight to flicker when an alarm is generated.



oFF ⟷ on
(Not flicker) (Flicker)

Note: When all settings for ①Alarm item 1 and ③Alarm item 2 to 4 are set to "non," this setting will be skipped.

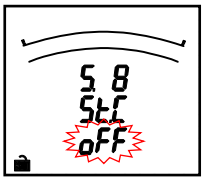
DISPLAY SET

⑧Motor starting current delay time

By using this setting for motor current monitoring delay time, it is possible to prevent unnecessary maximum value updating and unnecessary alarms caused by the motor startup current.

When this setting is not needed → Select "oFF" and press SET and return to the Setting Menu or go to menu 5.9(ME-4210-SS96)

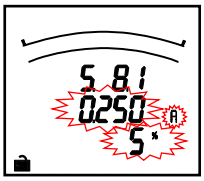
When this setting is executed → Select "on" and press SET , and go to (1) below.



oFF ⟷ on

(1) Motor starting current value.

Set the value for detecting the motor starting current.



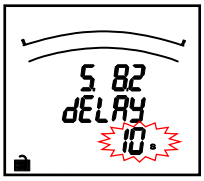
Setting range	Setting step (Note)
3 to 5 to 120 (%)	1%

* This is the percentage for the maximum scale value for the current (±0 step).

DISPLAY SET

(2) Motor starting current delay time

After the motor starting current is detected, maximum value update is not executed and an alarm is not generated for the delay time.



1s → 3s → 5s → 10s → 15s → 20s → 30s → 45s → 1min → 1.5min → 2min → 3min → 4min → 5min

DISPLAY SET

⑨Pulse/Alarm output 1

DISPLAY SET

⑩Pulse output 1 output item

DISPLAY SET

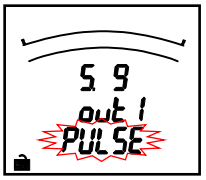
⑪Pulse output 1 pulse unit

DISPLAY SET

Set the output function of Pulse/Alarm output 1.

When the ME-4210-SS96 optional plug-in module is not installed, this display will be skipped.
Please refer to page 57 for the correspondence between Alarm output and Alarm item.

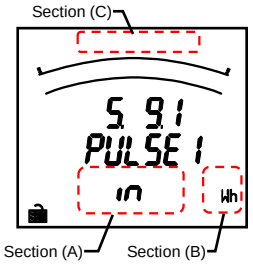
PULSE ⟷ AL
（Pulse output） （Alarm output）



Set the item that is output to pulse output 1.

In the following cases, this display will be skipped.
・ME-4210-SS96 optional plug-in module is not installed.
・Not set “PULSE” to ⑨Pulse/Alarm output 1.

Setting value	Display		
	Section (A)	Section (B)	Section (C)
Active energy (Imported)	in	Wh	OFF
Active energy (Exported)	out	Wh	OFF
Reactive energy (Imported, Lag)	in	varh	LAG
Reactive energy (Imported, Lead)	in	varh	LEAD
Reactive energy (Exported, Lag)	out	varh	LAG
Reactive energy (Exported, Lead)	out	varh	LEAD
Apparent energy		VAh	OFF
Periodic active energy 1	Wh1	Wh	OFF
Periodic active energy 2	Wh2	Wh	OFF
non (No output)	non	OFF	OFF

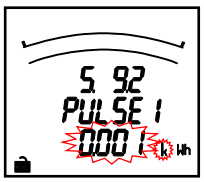


Note: The segment shown in The left table flickers according to the selected element.

Set the pulse value of pulse output 1.

Pulse value is selected from the table below, according to total load power[kW].

In the following cases, this display will be skipped.
・ME-4210-SS96 optional plug-in module is not installed.
・Not set “PULSE” to ⑨Pulse/Alarm output 1.
・Set “non” to ⑩Pulse output 1 output item.



$$\text{Total load power[kW]} = \frac{\alpha \times (\text{VT primary voltage}) \times (\text{CT primary current})}{1000}$$

α : 1 1-phase 2-wire
2 1-phase 3-wire
√3 3-phase 3-wire
3 3-phase 4-wire

*1: For 3-phase 4-wire setting, the VT primary voltage is calculated using the phase to neutral voltage.
*2: For 1-phase 3-wire setting, the VT primary voltage is calculated using the phase to neutral voltage.
*3: For direct voltage setting, the direct voltage is used for calculation instead of the VT primary voltage.

Total load [kW]	Possible pulse unit settings				
Less than 10	1	0.1	0.01	0.001	kWh/pulse
10 or higher but less than 100	10	1	0.1	0.01	
100 or higher but less than 1000	100	10	1	0.1	
1000 or higher but less than 10000	1	0.1	0.01	0.001	MWh/pulse
10000 or higher but less than 100000	10	1	0.1	0.01	
100000 or higher	100	10	1	0.1	

Note 1: When ⑩Pulse output 1 output item is set to "non", this setting will be skipped.
Note 2: The factory default setting values are minimum values for the pulse unit that can be set.
Note 3: For reactive power, kW in the above table needs to be read as kvar, kWh needs to be read as kvarh, and MWh needs to be read as Mvarh.
Note 4: For apparent power, kW in the above table needs to be read as kVA, kWh needs to be read as kVAh, and MWh needs to be read as MVAh.

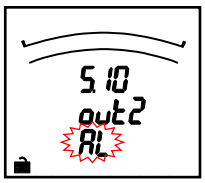
3.8. Setting Menu 5: Pulse and Alarm Settings (Setting Upper/Lower Limit Alarm, Motor Starting Current Mask Function, Pulse Output, etc.)

⑫Plulse/Alarm output2

Set the output function of Pulse/Alarm output 2.

When the ME-4210-SS96 optional plug-in module is not installed, this display will be skipped.
Please refer to page 72 for the correspondence between Alarm output and Alarm item.

AL ⟷ PULSE
(Alarm output) (Pulse output)

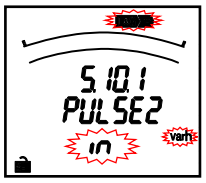


DISPLAY SET

⑬Pulse output 2 output item

Set the element that is output to pulse output 2.
The same elements as pulse output 1 can be set.
In the following cases, this display will be skipped.
・ME-4210-SS96 optional plug-in module is not installed.
・Not set “PULSE” to ⑫Pulse/Alarm output 2.

The setting method is the same as ⑩Pulse output 1 output item.
(Factory default setting value: Reactive energy (Imported, Lag))

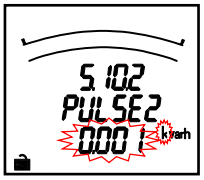


DISPLAY SET

⑭Pulse output 2 pulse unit

Set a pulse unit for pulse output 2.
In the following cases, this display will be skipped.
・ME-4210-SS96 optional plug-in module is not installed.
・Not set “PULSE” to ⑫Pulse/Alarm output 2.
・Set “non” to ⑬Pulse output 2 output item.

The setting method is the same as for ⑪Pulse output 1 pulse unit.
(Factory default setting values: Minimum possible value for pulse unit)

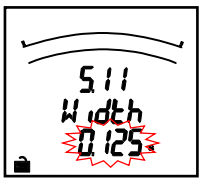


DISPLAY SET

⑮Pulse width

Set the pulse width for output pulse.
Set according to the input pulse conditions for the receiver.
In the following cases, this display will be skipped.
・ME-4210-SS96 optional plug-in module is not installed.
・Not set “PULSE” to ⑨Pulse/Alarm output 1 and ⑫Pulse/Alarm output 2.
・Set “non” to ⑩Pulse output 1 output item and ⑬Pulse output 2 output item.

0.125s ↔ 0.500s ↔ 1.000s

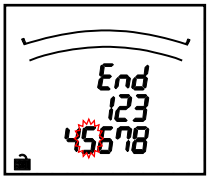


Note	When the pulse unit is set to the minimum value and the pulse width is set to 0.500s or 1.000s, the pulse output cannot follow if the load is too large, which can result in a decrease in the pulse output number.

SET

Setting Menu

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.



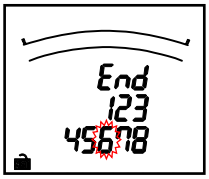
3. Setting

3.9. Setting Menu 6: Setting the Analog Output

This section shows how to set analog output. When the ME-4210-SS96 optional plug-in module is not installed, this test menu will be skipped.
In the operation mode, press (SET) and (RESET) simultaneously for 2 seconds or more, and the following operation becomes available.

Setting menu

Set the setting menu number to “6”.
(as shown in the right figure)



DISPLAY SET

①Analog output CH1 output item

Set the measurement item to be output to analog output CH1.
Select a measurement item for output from the following table.

(1)For 3-phase 4-wire

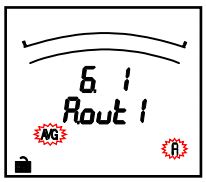
3-phase 4-wire		
non	V_{12}	PF_1
A_1	V_{23}	PF_2
A_2	V_{31}	PF_3
A_3	V_{AVG}(L-L)	PFΣ(CH4)
A_N	W_1	Hz
A^{AVG}(CH1)	W_2	Harmonic A_1
Demand A_1	W_3	Harmonic A_2
Demand A_2	WΣ(CH3)	Harmonic A_3
Demand A_3	var_1	Harmonic A_N
Demand A_N	var_2	Harmonic V_{1N}
Demand A_{AVG}	var_3	Harmonic V_{2N}
V_{1N}	var_Σ	Harmonic V_{3N}
V_{2N}	VA_1	
V_{3N}	VA_2	
V^{AVG}(L-N)(CH2)	VA_3	
	VA_Σ	

AVG：Average, Σ：Total RMS Value

(2)For other phase wire system except 3-phase 4-wire

3-phase 3-wire	1-phase 3-wire (1N2 display)	1-phase 3-wire (1N3 display)	1-phase 2-wire
non	non	non	non
A^1(CH1)	A^1(CH1)	A^1(CH1)	A(CH1)
A_2	A_N	A_N	Demand A
A_3	A_2	A_3	V(CH2)
A_{AVG}	A_{AVG}	A_{AVG}	W(CH3)
Demand A_1	Demand A_1	Demand A_1	var
Demand A_2	Demand A_N	Demand A_N	VA
Demand A_3	Demand A_2	Demand A_3	PF(CH4)
Demand A_{AVG}	Demand A_{AVG}	Demand A_{AVG}	Hz
V^{12}(CH2)	V^{1N}(CH2)	V^{1N}(CH2)	Harmonic A
V_{23}	V_{2N}	V_{3N}	Harmonic V
V_{31}	V_{12}	V_{13}	
V_{AVG}	V_{AVG}	V_{AVG}	
W(CH3)	W(CH3)	W(CH3)	
var	var	var	
VA	VA	VA	
PF(CH4)	PF(CH4)	PF(CH4)	
Hz	Hz	Hz	
Harmonic A_1	Harmonic A_1	Harmonic A_1	
Harmonic A_3	Harmonic A_2	Harmonic A_3	
Harmonic V_{12}	Harmonic V_{1N}	Harmonic V_{1N}	
Harmonic V_{23}	Harmonic V_{2N}	Harmonic V_{3N}	

AVG：Average, Σ：Total RMS Value



Note 1:The same measurement item can be set for each analog output.
Note 2:It is possible to select measurement item that are not included in the set display pattern.
Note 3:Setting to "non" are minimum output. In addition, it moves to the next analog output setting.
Note 4:Underlined portions are the factory default settings for measurement elements assigned to each analog output.
Note 5:VA is output by scaling 0 to 100% of the rating.
Note 6:When Frequency(Setting menu 1.5) is set to “50Hz”, Hz is output by a scale form 45Hz to 55Hz.
When Frequency(Setting menu 1.5) is set to “60Hz”, Hz is output by a scale form 55Hz to 65Hz.
Note 7:For the harmonic current, the total RMS value is output by a scale from 0 to 60%of the rating.
For the harmonic voltage, the total distortion ratio is output by scaling 0 to 20%.

3.9. Setting Menu 6: Setting the Analog Output

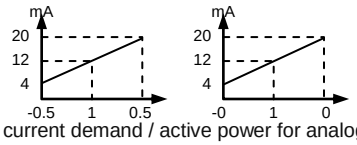
②Analog output CH1 detailed setting

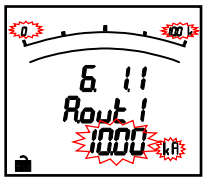
Analog output CH1 detailed setting

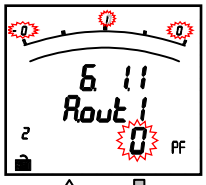
(The following setting can be made separately from the measurement items included in the display pattern.)

(1)Set the current / current demand / voltage / active power / reactive power / power factor for analog output.(Setting menu 6.1.1)

Output item	Setting range *2
A Demand A	Primary Current (1.4.1 Primary Current Setting value) SP.(Special Setting)
V	+10 STEP (About 250%) ≀ ± 0 STEP (100% :standard maximum scale value) ≀ -18 STEP (About 20%)
W var	+ 3 STEP (About 120%) ≀ ± 0 STEP (100% :Rating) ≀ -18 STEP (About 20%)
PF	-0.5 to 1 to 0.5 ⟷ -0 to 1 to 0





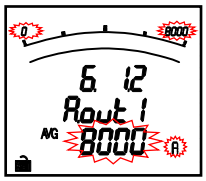


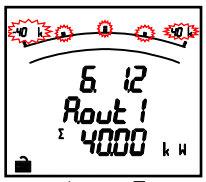
※1

DISPLAY SET

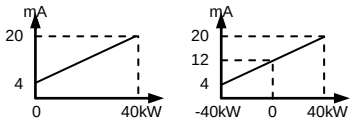
(2)Set the current / current demand / active power for analog output.
(Setting menu 6.1.2)

Output item	Setting range *2
A Demand A	+3 STEP (About 120%) ≀ ±0 STEP (100% :Rating) ≀ -10 STEP (About 40%)
W	Single deflection ⟷ Double deflection





＜Single deflection＞ ＜Double deflection＞



DISPLAY SET

To next CH settings

*1. When var or PF are set as output items, it moves to the next analog output settings.
*2. Detailed setting values are according to the values shown in the table on Section 6.3.

DISPLAY SET

③Analog output CH2 to CH4 measurement item

Set the measurement item that is output to analog output CH2 to CH4.

The setting method is the same as ①Analog output CH1 output item .

DISPLAY SET

④Analog output CH2 to CH4 detailed settings

Analog output CH2-CH4 detailed setting

The setting method is the same as ②Analog output CH1 detailed setting .

DISPLAY SET

3.9. Setting Menu 6: Setting the Analog Output

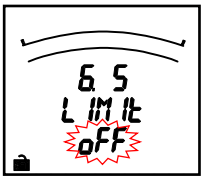
⑤Analog output limit

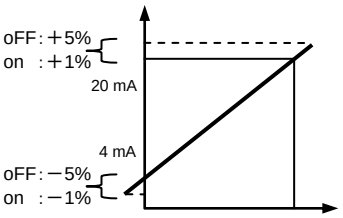
SET

Setting Menu

Set analog output for when full scale is over the limit.（The same in all the CH）

Setting value	Description
oFF (No limit)	For the span value, the maximum output is +5% and the minimum output is -5%.
on (Limited)	For the span value, the maximum output is +1% and the minimum output is -1%.





Note: When the output items for all analog output are set to "non," this setting is skipped.

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.

3. Setting

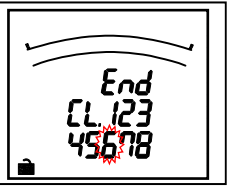
3.10. Setting Menu 6: Setting the Logging function

This section shows how to set the logging function. When the ME-0000BU-SS96 optional plug-in module is not installed, this menu will be skipped.
In the operation mode, press (SET) and (RESET) simultaneously for 2 seconds or more, and the following operation becomes available.

Setting Menu

DISPLAY SET

Set the setting menu number to “6”.
(as shown in the right figure)



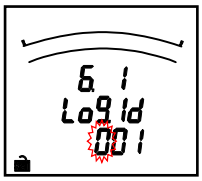
①Logging ID

DISPLAY SET

Set the ID number of the optional plug-in module: ME-0000BU-SS96.

Settable ID : 001 to 255

When ID number installed of the optional plug-in module is set, that ID number is appeared as the initial value.



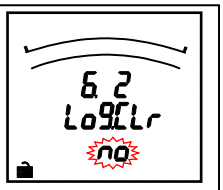
Note	If ME96SS cannot receive the setting value of logging ID from ME-0000BU-SS96, the screen does not appear. Just wait there for a moment.

②Logging Data Clear

DISPLAY SET

Clears logging data memorized in optional plug-in module: ME-0000BU-SS96.

no (Not clear) ⟷ yES (Clear)



When “yES(Clear)” is selected at the above setting, the confirmation screen appears in order to reconfirm whether the logging data can be cleared or not.

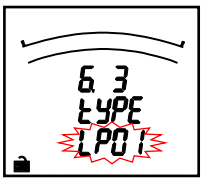
no (Not clear) ⟷ yES (Clear)

③Logging-item pattern

DISPLAY SET

Set the Logging-item pattern to select the logging items.

Settable pattern : ↳LP01 ⟷ LP02 ⟷ LP00↲



When LP00 is set, you can choose any 6-item.
(For details of LP00, refer to following manual:
ME-0000BU-SS96:Logging specifications..... LSPM-0092)
The logging-item pattern of LP01 and LP02 is defined as follows.

“Detailed data” is memorized shorter cycle than “One-hour data”.
Logging cycle of “Detailed data” is set in ④Detailed data logging cycle .

Phase-wire setting: 3P4W

Logging-item pattern	LP01		LP02	
	Detailed data	One-hour data	Detailed data	One-hour data
Data 1	Wh(import)	Wh(import)	Wh(import)	Wh(import)
Data 2	varh(import LAG)	Wh(export)	A_{AVG}	Wh(export)
Data 3	VAh	varh(import LAG)	V_{AVG}(L-L)	varh(import LAG)
Data 4	DW	varh(import LEAD)	W_{Σ}	varh(import LEAD)
Data 5	Dvar	VAh	PF	VAh
Data 6	DVA	-	Hz	-

Phase-wire setting: 3P3W_2CT, 3P3W_3CT, 1P3W

Logging-item pattern	LP01		LP02	
	Detailed data	One-hour data	Detailed data	One-hour data
Data 1	Wh(import)	Wh(import)	Wh(import)	Wh(import)
Data 2	varh(import LAG)	Wh(export)	A_{AVG}	Wh(export)
Data 3	VAh	varh(import LAG)	V_{AVG}	varh(import LAG)
Data 4	DW	varh(import LEAD)	W	varh(import LEAD)
Data 5	Dvar	VAh	PF	VAh
Data 6	DVA	-	Hz	-

3.10. Setting Menu 6: Setting the Logging function

Continued from the previous.

Phase-wire setting：1P2W

Logging-item pattern	LP01		LP02	
	Detailed data	One-hour data	Detailed data	One-hour data
Data 1	Wh(import)	Wh(import)	Wh(import)	Wh(import)
Data 2	varh(import LAG)	Wh(export)	A	Wh(export)
Data 3	VAh	varh(import LAG)	V	varh(import LAG)
Data 4	DW	varh(import LEAD)	W	varh(import LEAD)
Data 5	Dvar	VAh	PF	VAh
Data 6	DVA	-	Hz	-

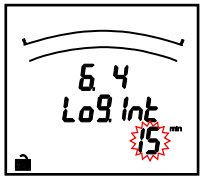
④Detailed data Logging cycle

SET

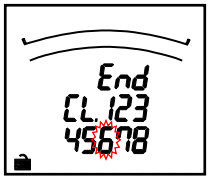
Setting Menu

Set the logging cycle of detailed data when ③Logging-item pattern is LP01 or LP02.

1min ↔ 5min ↔ 10min ↔ 15min ↔ 30min



According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.



3. Setting

3.11. Setting Menu 7: Setting Periodic Active Energy, Rolling Demand, and Digital Input/Output

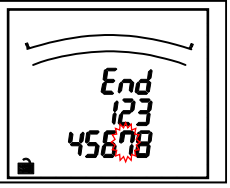
Set the periodic active energy, rolling demand, and digital input/output.
In the operation mode, press (SET) and (RESET) simultaneously for 2 seconds or more, and the following operation becomes available.

(For more details about each function, refer to the corresponding pages.
Periodic Active Energy ⇒page 72, Rolling Demand ⇒page 73, digital input/ output ⇒page 75)

Setting menu

DISPLAY SET

Set the setting menu number to “7”.
(as shown in the right figure)

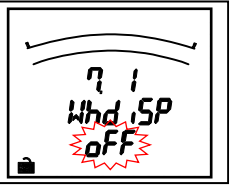


①Periodic Active energy display

DISPLAY SET

Set “on or off” of the periodic active energy display that enables display of the electric energy divided into two time segments.

oFF ⟷ on
（Not displayed） （Displayed）



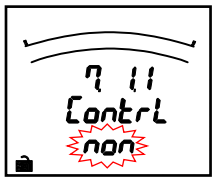
②Control setting for switching time segments of periodic active energy

DISPLAY SET

Set the control method to switch between time segments of periodic active energy.
When without the optional plug-in module, with ME-0000MT-SS96 or ME-0000BU-SS96, no item related to DI is displayed.

non ⟷ COM. ⟷ d.in1 ⟷ d.in2

＜ Non:Not switched, COM.:Communication control, d.in1:Digital input DI1, d.in2:Digital input DI2 ＞



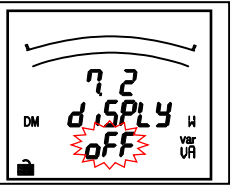
Note1. When the ME-4210-SS96 optional plug-in module is installed, “d.in2” will be skipped. The “d.in1” set ④Rolling demand time setting, no item related to DI is displayed.
Note2. When the ME-0040C-SS96 and ME-0052-SS96 the optional plug-in module is installed, this display will be skipped of ④Rolling demand time setting set DI.

③Rolling demand display

DISPLAY SET

Set “on or off” of the rolling demand display.

oFF ⟷ on
（Not displayed） （Displayed）

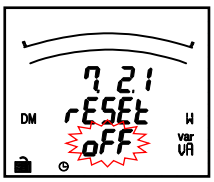


④Rolling demand time setting

DISPLAY SET

Set the rolling demand time.
When without the optional plug-in module, with ME-0000MT-SS96 or ME-0000BU-SS96, this display will be skipped.

oFF ⟷ d.in1 ⟷ d.in2
（Manual） （Digital input DI1） （Digital input DI2）



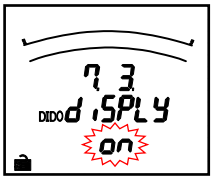
Note1. When the ME-4210-SS96 optional plug-in module is installed, “d.in2” will be skipped. The “d.in1” set ②Control setting for switching time segments of periodic active energy, this display will be skipped.
Note2. When the ME-0040C-SS96 and ME-0052-SS96 the optional plug-in module is installed, this display will be skipped of ②Control setting for switching time segments of periodic active energy set DI.

3.11. Setting Menu 7: Setting Periodic Active Energy, Rolling Demand, and Digital Input/Output

⑤Digital input/output display

Set “on or off” of the digital input/output display.
When without the optional plug-in module, with ME-0000MT-SS96 or ME-0000BU-SS96, this display will be skipped.

oFF ⟷ on
（Not displayed） （Displayed）

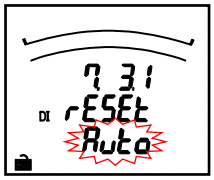


DISPLAY SET

⑥Digital input reset method

Set the method to reset the digital input.
When without the optional plug-in module, with ME-0000MT-SS96 or ME-0000BU-SS96, this display will be skipped.

Reset method (Setting value)	Description (For details, refer to page 75.)
Auto (Auto)	When the digital input is turned to OFF (opened), the digital input state is automatically turned to OFF (opened).
Latch (HoLd)	When the digital input detects ON (closed) once, even if the digital input is turned to OFF (opened), the digital input state is retained as ON (closed) until the operation of releasing the latch is performed.

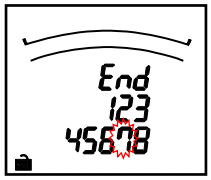


Note	When the ME-4210-SS96 optional plug-in module is installed, the “d.in1” set ②Control setting for switching time segments of periodic active energy or ④Rolling demand time setting, this display will be skipped.

SET

Setting Menu

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.



3. Setting

3.12. Setting Menu 8:Special Settings (Setting Operation Time, Phase Display, IEC Mode)

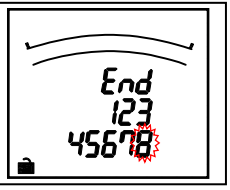
Set the operation time, phase display, IEC mode.

In the operation mode, press SET and RESET simultaneously for 2 seconds or more, and the following operation becomes available.

(For more details about each function, refer to the corresponding pages.
Operation time ⇒ page 74)

Setting menu

Set the setting menu number to “8”.
(as shown in the right figure)



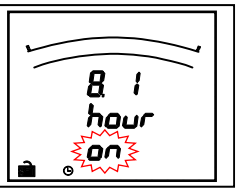
DISPLAY SET

①Operation time display

Set “on or off” of the Operation time display that integrates the time while the target for counting is input and display it as the load Operation time.

oFF ⟷ on

（Not displayed） （Displayed）



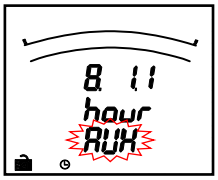
DISPLAY SET

②Target for counting Operation time setting

Select the target for counting Operation time from the auxiliary power, current, and voltage.

AUX ⟷ A ⟷ V

（Auxiliary power） （Current） （Voltage）



Item	3-phase 4-wire	1-phase 2-wire	Others
AUX	AUX	AUX	AUX
A	A_{AVG}	A	A_{AVG}
V	V_{AVG}(L-N)	V	V_{AVG}(L-L)

DISPLAY SET

③Operation time threshold

Set the target for counting Operation time threshold.

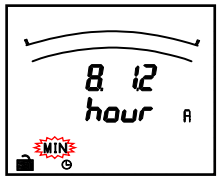
When the auxiliary power (AUX) is selected for the Operation time, this display will be skipped.

（1）When current is set target for counting Operation time.

min ⟷ 1 to 120%

（Setting step 1%）

*:If “min” is selected, the Operation time will be counting when display of current is not 0A.



（2）When voltage is set target for counting Operation time.

min ⟷ 20 to 120%

（Setting step 1%）

*:If “min” is selected, the Operation time will be counting when display of voltage is not 0V.

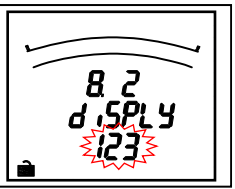
DISPLAY SET

3.12. Setting Menu 8: Special Settings (Setting Operation Time, Phase Display, IEC Mode)

④Phase display setting

Set the phase display.

123 ⟷ abc

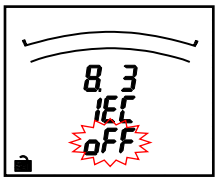


DISPLAY SET

⑤Set IEC mode

By the setting of this mode, the following calculation methods and signs are changed.

- Reactive energy counting method. (Refer to page 69)
- Each measurement item display during power transmission. (Refer to page 69)
- Display of rolling demand (Refer to page 73)
- Appendix : Calculation methods of ME96SS (Refer to page 106)



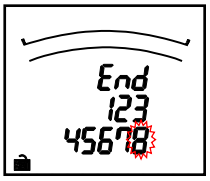
oFF ⟷ on

(Normal mode) (IEC mode)

SET

Setting Menu

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.



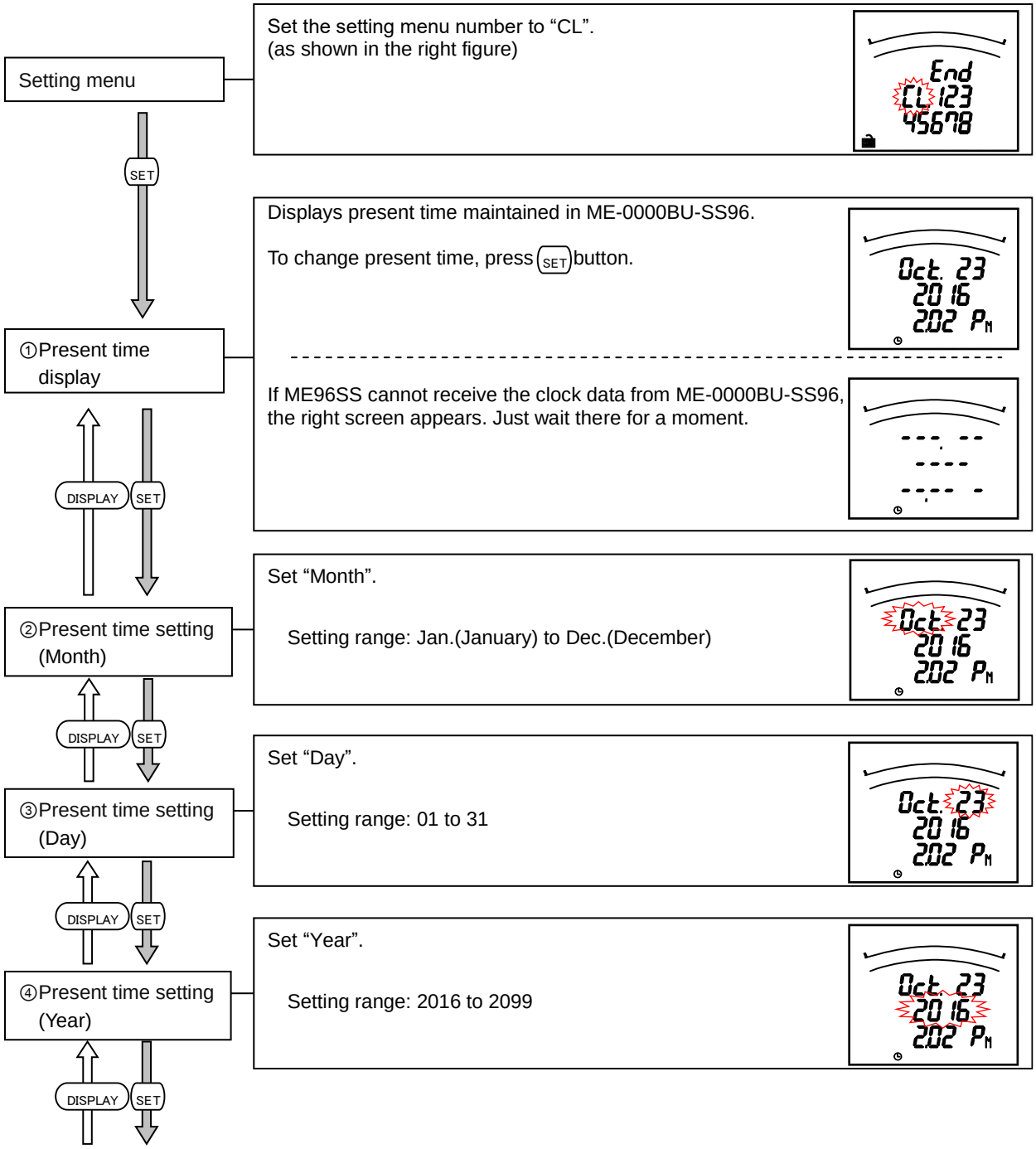
3. Setting

3.13. Setting Menu CL: Present Time Settings for Data Logging

Set the present clock time for data logging when installed the optional plug-in module: ME-0000BU-SS96. The present clock time should be set before operating the system.

In the operation mode, press SET and RESET simultaneously for 2 seconds or more, and the following operation becomes available.

⚠CAUTION	All logging data of ME-0000BU-SS96 are erased when you change the setting of “Present time” more than 31days from the time displayed ①Present time display. Before changing the setting of present clock time, output the logging data to the SD memory card and check the output data in the PC whether the logging data are memorized properly.



3.13. Setting Menu CL: Present Time Settings for Data Logging

⑤Present time setting (Hour)

DISPLAY SET

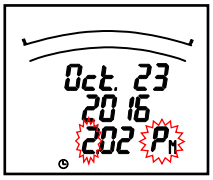
⑥Present time setting (Minute)

SET

Setting Menu

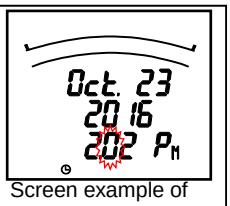
Set “Hour”.

Setting range: 12 AM ↔ 1 AM ↔ 2 AM ↔ ··· ↔ 11 AM
12 PM ↔ 1 PM ↔ 2 PM ↔ ··· ↔ 11 PM



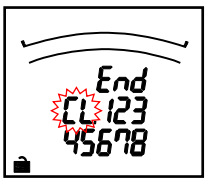
Set “Minute”

Setting range of the tens’ place: 0 to 5
Setting range of the ones’ place: 0 to 9



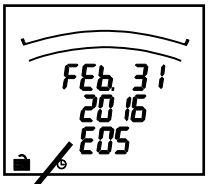
Screen example of setting the tens’ place

According to the setting flow (page 16 to 21), save the changed contents, or continue to the other setting menu.



If the “E05” appears in the lower-line as the right screen, clock time setting will be incorrect.
(For example, Month setting is February and Day setting is 31.)

After that, please press (SET) ,review the setting value and set it once again from ③Present time setting (Day) .



Error code

3.14. Setting Value Confirmation Menus 1-9: Confirming the Settings in the Setting Menus 1-8 and Test Mode in Setting Menu 9

● Setting Value Confirmation

When (SET) is pressed for at least 2 seconds in the operation mode, the following operation becomes available.

Setting value confirmation menu

The screen transitions and operations are the same as for Setting Menus 1 to 8 and CL.
Refer to Setting Menus 1 to 8 and CL (pages 22 to 49).
(Note: Settings cannot be changed in the Setting value confirmation mode.)

● Test Mode

Press (SET) for 2 seconds to move the set values confirmation mode.
Select setting value confirmation menu number “9”. Press (SET) to move to test mode.
For more information about how to use the Test Mode, refer to page 57 or later.

3. Setting

3.15. Initializing Related Items by Changing Settings

When a setting value is changed, the related setting items and measurement data (maximum/minimum values) will return to the default settings. Refer to the following list.

Initialized item \ Setting item to be changed			Menu 1				Menu 2		Menu 5	Menu 6	Menu 8		
					CT current								
			Phase wire system (*1)	VT / direct voltage	CT secondary current	CT primary current	MODBUS®TCP Default gateway existence	Communication Reset	Upper/lower limit alarm item	Analog output item	Target for counting Operation time	Setting of IEC mode	Change of optional plug-in module
Setting item	Menu 1	Phase wire system	＼										
		Display pattern	●										
		VT/direct voltage	○	＼									
	Menu2	MODBUS®TCP Default gateway					●						
	Menu 3	Current scale				●							
		Voltage scale	●	●									
		Power scale	●	●		●							
		Reactive power scale	●	●		●							
	Menu 5	Upper/lower limit alarm item	●						＼				
		Upper/lower limit alarm value	●						●				
	Menu 6	Analog output item	●							＼			
		Maximum current scale	●			●				●			
		Maximum current demand scale	●			●				●			
		Maximum voltage scale	●	●						●			
		Maximum active power scale	●	●		●				●			
		Active power single deflection/ double deflection	●							●			
		Maximum reactive power scale	●	●		●				●			
		Power factor -0.5 to 1 to 0.5／-0 to 1 to 0	●							●			
	Menu 7	Control setting for switching Periodic Active energy time segments											●
		Setting of rolling demand digital input time period											●
	Menu 8	Threshold for counting Operation time									●		
Measurement data	Current Maximum/minimum value		●		●	●							
	Current demand Maximum/minimum value		●		●	●							
	Voltage Maximum/minimum value		●	●									
	Active power Maximum/minimum value		●	●	●	●							
	Reactive power Maximum/minimum value		●	●	●	●						●	
	Apparent power Maximum/minimum value		●	●	●	●						●	
	Power factor Maximum/minimum value		●	●	●	●						●	
	Frequency Maximum/minimum value		●										
	Harmonic current Maximum value		●		●	●							
	Harmonic voltage Maximum value		●	●									
	Rolling demand(DW,Dvar,DVA) Maximum value		●	●	●	●						●	
Communication optional plug-in module reset (*2)			●	●		●		●					

●: The setting value will be reset to the default value.
○: The setting will be reset to the value corresponding to the phase wire system.

*1: The settings will not return to the default values when the setting is switched only between “1N2 display” and “1N3 display” in the 1-phase 3-wire setting.
*2: Communication optional plug-in module is reset.

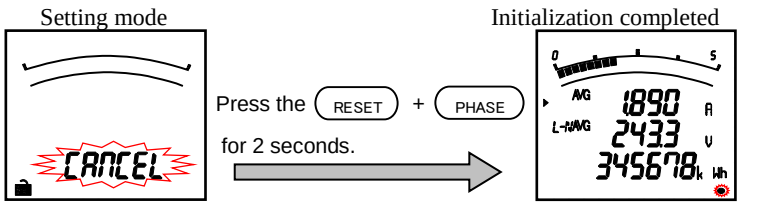
3.16. Initializing All Settings

When the following operations are executed, all settings are initialized to the factory defaults. Only the settings are initialized to the defaults. The measured active energy value and operating time etc. are not initialized.

For the initializing of maximum/minimum value, refer to the section 3.15 (page 51).
(For example, if the phase wire system is changed by initializing all settings, all maximum/minimum values will be initialized.)

To initialize all settings to the factory defaults, execute the following operation from the CANCEL screen in the setting mode.

For more information about how to get to the CANCEL screen, refer to 3.1.Setting flow (page16).



CANCEL screen　　Measurement screen

Note	Before initializing all settings, output the logging data of ME-0000BU-SS96 to the SD memory card and check the output data in the PC whether the logging data are memorized properly.

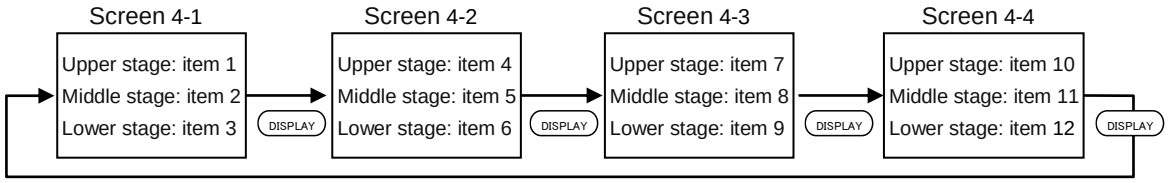
3. Setting

3.17. Setting the Special Display Pattern P00

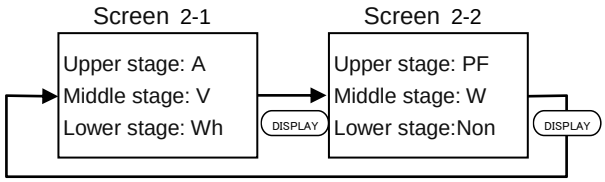
Even if there is no display pattern that you like in the display patterns P01 to P13, individual setting is available by the display pattern P00.

This setting is made in the setting menu 1. Explanation begins with the set “P00” in ②display pattern of the setting menu 1 (page 22). (Others are omitted here, so refer to the setting menu 1.)

(1) The number of settable display is up to 4. And the number of measurement elements to be displayed is up to 12 items.



(2) Explanation is made with the example of the following display pattern.

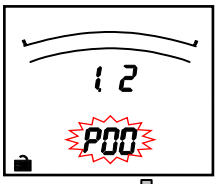


(3) Setting method

②Display pattern

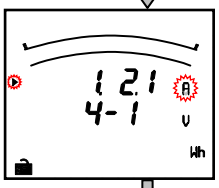
Set the display pattern.

(1) Select “P00” .
Select “P00” by ⊕ or ⊖ and press SET.



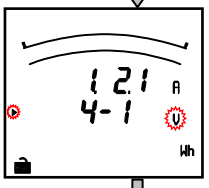
SET

(2) Set the upper stage of the display 4-1 to A.
Select “A” by ⊕ or ⊖ and press SET.



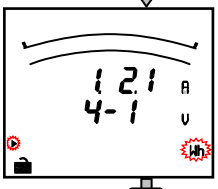
SET

(3) Set the middle stage of the display 4-1 to V.
Select “V” by ⊕ or ⊖ and press SET .



SET

(4) Set the lower stage of the display 4-1 to Wh.
Select “Wh” by ⊕ or ⊖ and press SET.



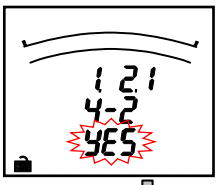
SET

3.17.Setting the Special Display Pattern P00

Continued form the previous page

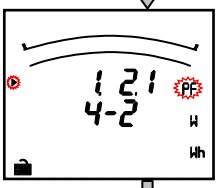
(5) Set the display of the display 4-2.
Select “yES” by ⊕ or ⊖ and press SET .

When you do not want to display the display 2, select “no” and press SET.



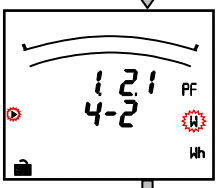
SET

(6) Set the upper stage of the display 4-2 to PF.
Select “PF” by ⊕ or ⊖ and press SET.



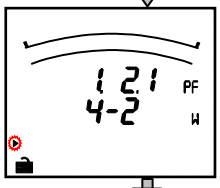
SET

(7) Set the upper stage of the display 4-2 to W.
Select “W” by ⊕ or ⊖ and press SET.



SET

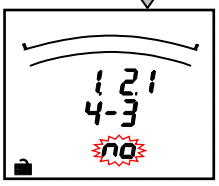
(8) Set the lower stage of the display 4-2 to no display.
Set the unit code of the lower stage to no display by ⊕ or ⊖ and press SET .



SET

(9) Set the display 4-3 to no display.
Select “no” by ⊕ or ⊖ and press SET.

Note: When the display 4-3 is set to no display, the display 4-4 is also set to no display automatically.



Returns to the setting for the upper stage of the display 4-1.

DISPLAY

③VT / direct voltage

(hereafter same as the setting menu 1)

Note	1. The following measurement items cannot be set by the display pattern “P00.” Set them separately in the “Setting menu 3”, “Setting menu 7” and “Setting menu 8.” Reactive energy (imported LEAD), Reactive energy (exported LAG), Reactive energy (exported LEAD), Harmonic current, Harmonic voltage, Periodic active energy, Rolling demand, Digital input, Digital output, Operation time 2. The phases of current and voltage cannot be specified. Press the PHASE button in the operation mode for switching phases. 3. For the settings other than the 3-phase 4-wire setting, the following measurement items cannot be set. N-phase current, N-phase current demand, apparent power, apparent energy

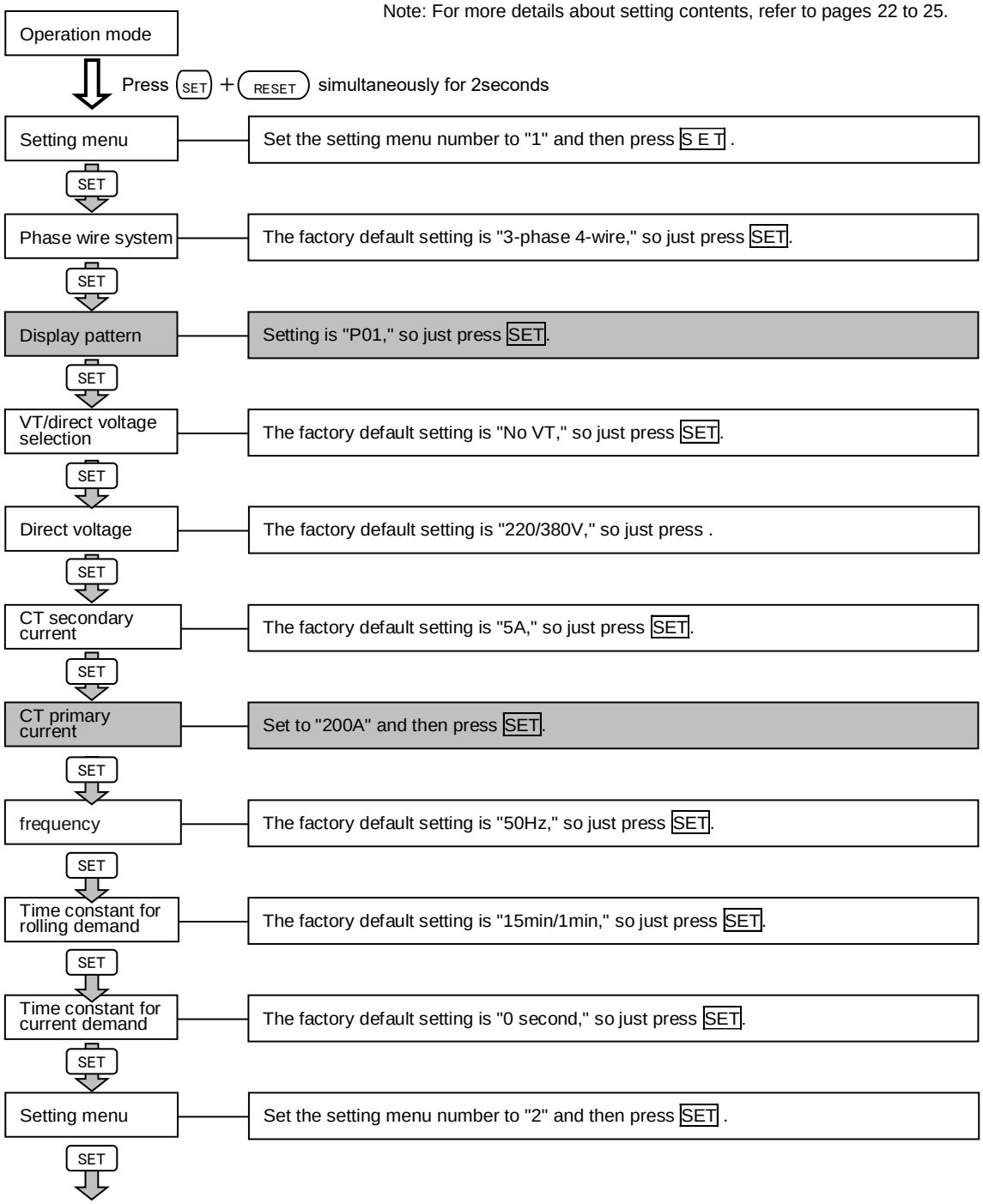
3.18. Examples of Simple Settings

The following shows a simple setting example.

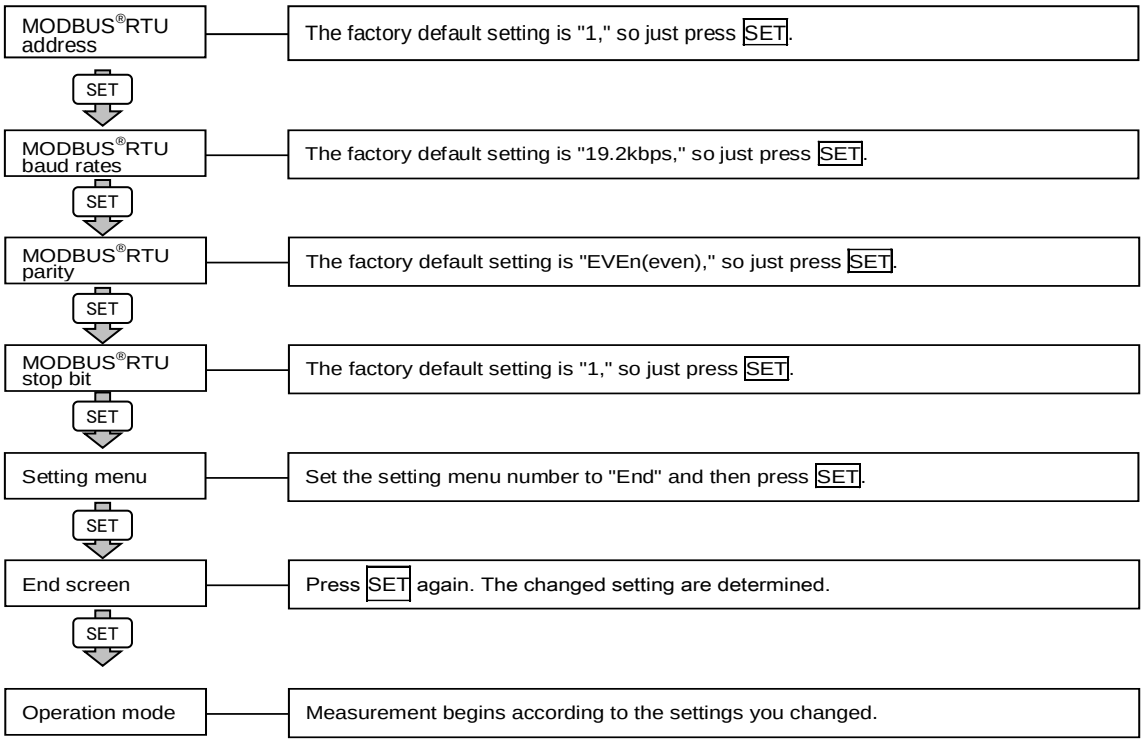
■Setting Example Model: ME96SSRA-MB(Not optional plug-in unit)
Phase wire system : 3-phase 4-wire
Measuring element : A, V, W, PF
Input Voltage :220/380V
CT primary current : 200A
CT Secondary current:5A
frequency :50Hz
MODBUS®RTU：address 1, baud rates 19.2kbps, parity even, stop bit 1

■Setting Procedure
Items of which setting value need to be changed are indicated by ▭.

Note: For more details about setting contents, refer to pages 22 to 25.



3.18. Examples of Simple Settings



4. Using Test Mode

Test mode includes functions that can be used for start-up of equipment.
The following table shows what can be done in the test mode.

Test menu	Description
1. Communication test	For models with a communication function, it is possible to monitor fixed numerical data without measurement (voltage/current) input. Use this for checking with the host system.
2. Alarm output/Digital output operation test	For functions with alarm output, it is possible to confirm alarm output (digital point output) without measurement (voltage/current) input. Use this for confirming connection with the contacted device.
3. Zero span adjustment for analog output	For functions with analog output, zero span adjustment can be done for analog output. Adjust this when matching with the receiver side and when output changes.
4. Analog output operation test	For functions with analog output, it is possible to confirm analog output operation without measurement (voltage/current) input. Use this for confirming connection with the receiver.
5. Pulse output operation test	For functions with pulse output, it is possible to confirm pulse output operation without measurement (voltage/current) input. Use this for confirming connection with the receiver.

■ Test Procedure

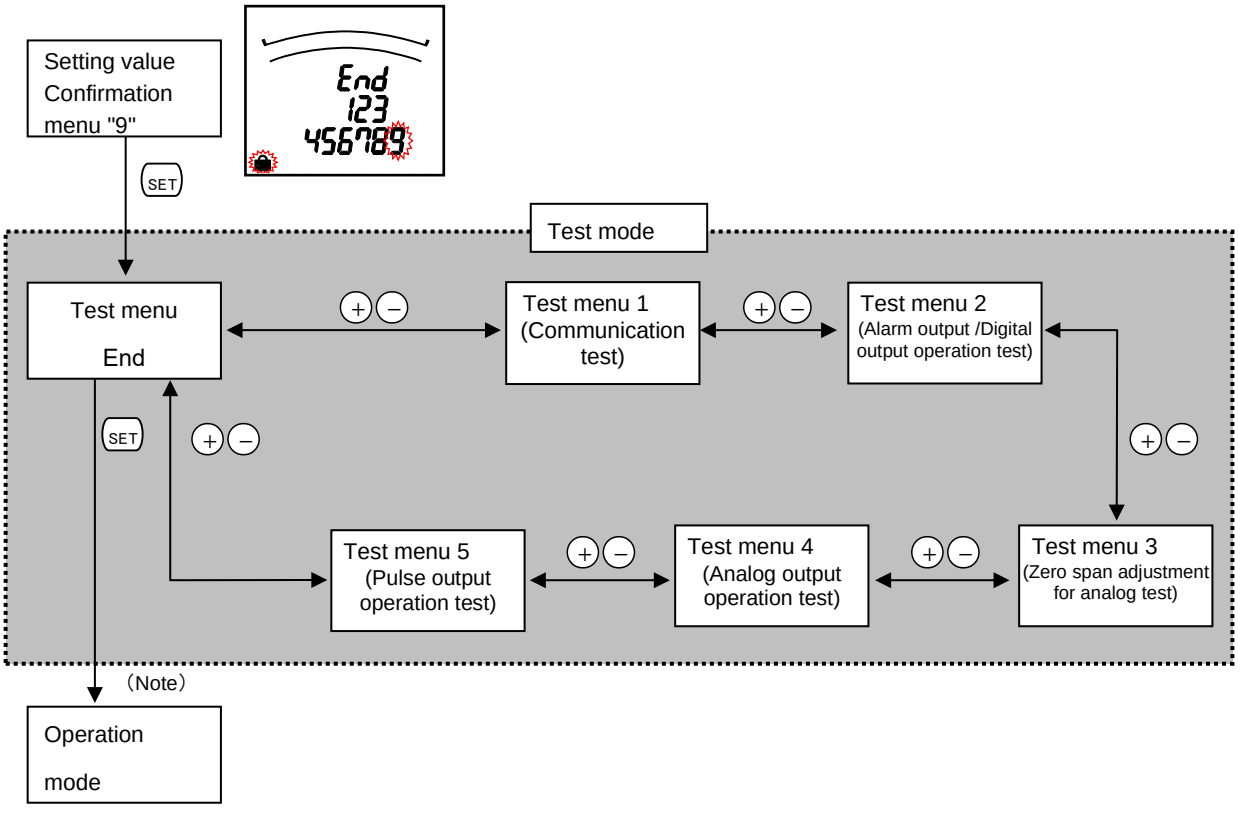
① Press (SET) for 2 seconds to move to the set value confirmation mode.

② Select setting value confirmation menu number "9" by (+) and (–) .

③ Press (SET) to move to test mode.

④ Execute tests using each test menu. (Refer to pages 58 to 62)

■ Test Mode Flow



(Note) The screen momentarily turns off.

Note	When moving the test mode, ME-0000BU-SS96 becomes power outage state not to be logging the test data. Therefore, the system log of “Power failure occurred” is recorded in ME-0000BU-SS96 and COM of the LCD is blinking.

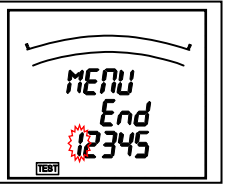
4. Using Test Mode

4.1. Test Menu 1: Communication Test

In the setting value confirmation mode, when the menu number is set to "9", you will enter the test mode.

Test menu

Set the test menu number to "1".
(as shown in the right figure)



SET

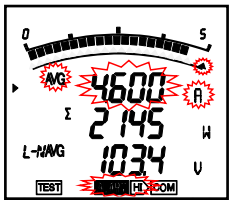
①Communication test

Execute communication test operation.
(Values other than zero can be monitored even when the voltage and current are not input.)

■ Monitor value by communication

- Values displayed on the screen,can be monitored.
  Measurement elements not displayed on the screen are zero.
  (only power factor is 1.000).
- If you set the Alarm item with Setting Menu 5, the display will be the same as the alarm is generating.
  (If you are using the ME-4210-SS96, alarm contact will remain open.)
- It is possible to monitor the digital input status.

■ Display screen



- As with the operation mode, it is displayed according to settings such as the display pattern.
- The maximum/minimum value can be displayed. (Cyclic display cannot be executed.)

■ Button operation

Operation	Function
Press DISPLAY	Switches the display screen.
Press PHASE	Switches the phase.
Press MAX/MIN	Moves or returns to the maximum/minimum value screen.
Press + or −	Switches the analog bar graph element.
	Switches the harmonic degree (when harmonics screen is displayed).
Press + and − together for at least 2 seconds.	Change the unit of Wh, varh and VAh.
Press SET	Return to the test menu.

Note: When executing a communication test, please read the following manual in addition to this instruction manual. (For more information refer to page 102.)

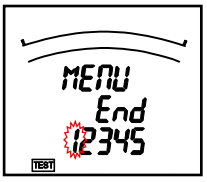
- Electronic Multi-Measuring Instrument ME Series MODBUS® Interface specifications
- Electronic Multi-Measuring Instrument Programming Manual (CC-Link communication)

SET

Test menu

<To continue other test mode>
⇒ Select other test menu number and then press SET

<To close test mode>
⇒ Select "End" as the test menu number and then press SET.
You will return to the operation mode.

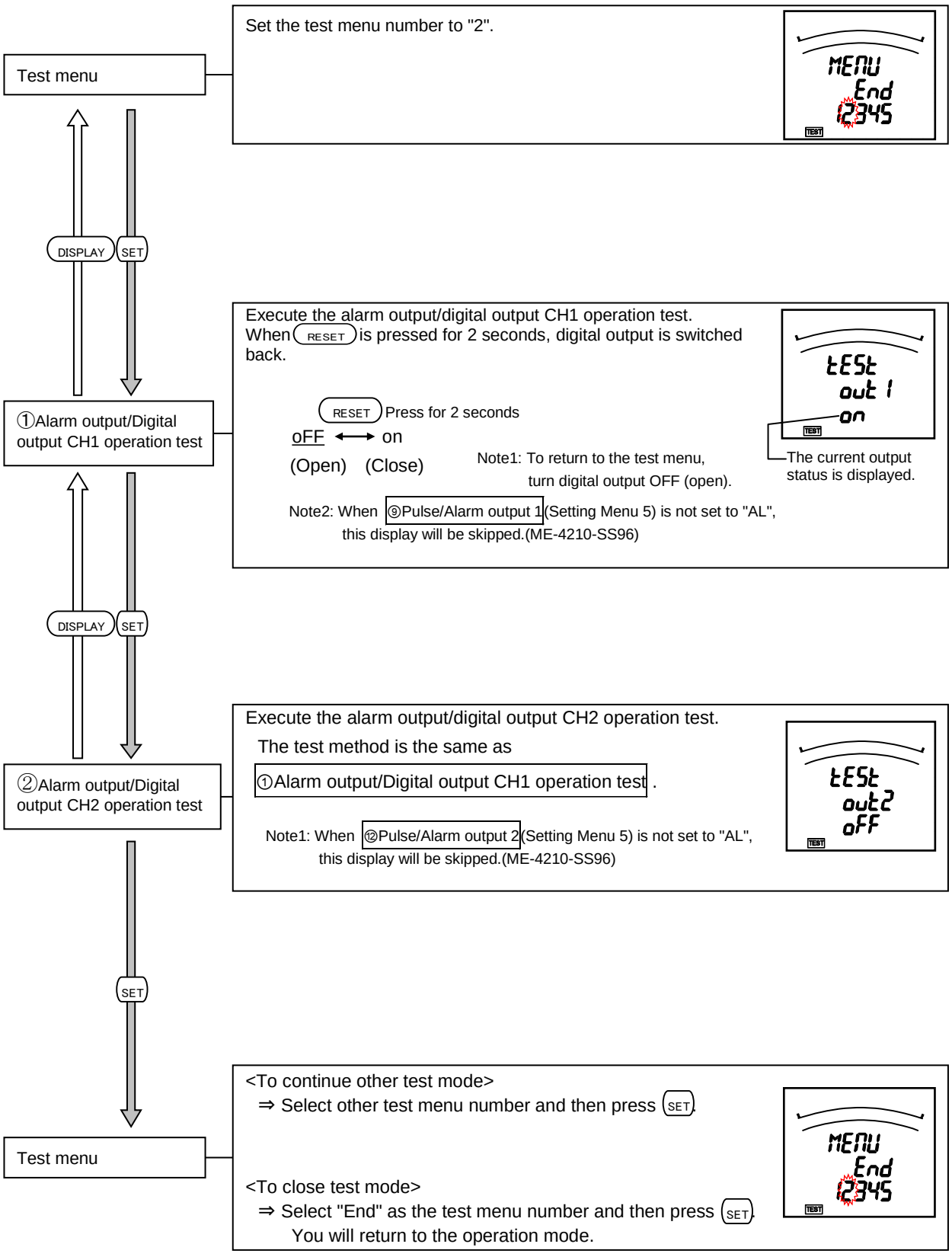


4. Using Test Mode

4.2. Test Menu 2: Alarm Output/Digital Output Operation Test

The following operations are available in the test mode.

- When the ME-4210-SS96 or ME-0052-SS96 optional plug-in module is not installed, this test menu will be skipped.
- When ⑨Pulse/Alarm output 1(Setting Menu 5) and ⑫Pulse/Alarm output 2(Setting Menu 5) is not set to "AL", this test menu will be skipped.(ME-4210-SS96)



4. Using Test Mode

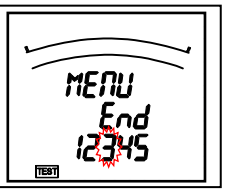
4.3. Test Menu 3: Zero Span Adjustment for Analog Output

The following operations are available in the test mode.

When the ME-4210-SS96 optional plug-in module is not installed, this test menu will be skipped.

Test menu

Set the test menu number to "3".



DISPLAY SET

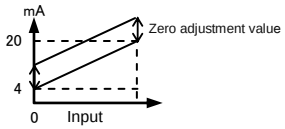
①Analog output CH1 zero adjustment

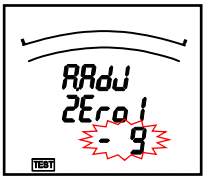
Execute zero adjustment for analog output CH1.

Possible setting range : -50 to ±0 to +50

Adjustment is possible up to about ±0.3mA

■ Zero adjustment movement





Note: For zero adjustment, set the measurement input to zero.

DISPLAY SET

②Analog output CH1 span adjustment

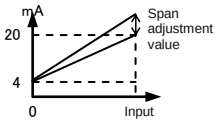
Execute span adjustment for analog output CH1.

Possible setting range : -50 to ±0 to +50

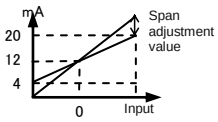
Adjustment is possible up to about ±0.3mA

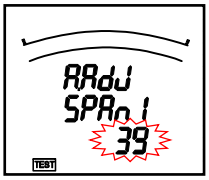
■ Span adjustment movement

<Single deflection>



<Double deflection>





Note: For span adjustment, measurement input is necessary.

DISPLAY SET

③Analog output CH2 to CH4 zero adjustment

Execute zero adjustment for analog output CH2 to CH4.

The adjustment method is the same as ①Analog Output CH1 Zero Adjustment.

DISPLAY SET

④Analog output CH2 to CH4 span adjustment

Execute span adjustment for analog output CH2 to CH4.

The adjustment method is the same as ②Analog Output CH1 Span Adjustment.

SET

Test menu

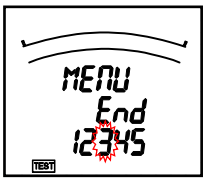
<To continue other test mode>

⇒ Select other test menu number and then press SET.

<To close test mode>

⇒ Select "End" as the test menu number and then press SET.

You will return to the operation mode.



4. Using Test Mode

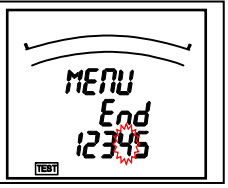
4.4. Test Menu 4: Analog Output Operation Test

The following operations are available in the test mode.

When the ME-4210-SS96 optional plug-in module is not installed, this test menu will be skipped.

Test menu

Set the test menu number to "4".



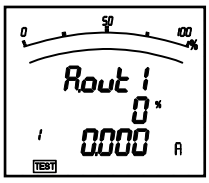
DISPLAY SET

①Analog output CH1 operation test

Execute the operation test for analog output CH1. (Input is not necessary.)

0% → 25% → 50% → 75% → 100%

Output	Output Specification 4-20mA
0%	4mA
25%	8mA
50%	12mA
75%	16mA
100%	20mA



Upper :Analog output 1
Middle :% value
Lower :Setting analog output item and the measurement value equivalent to the % value

Note: The analog output item set up with Setting the Analog Output (Setting Menu 6) is displayed.

DISPLAY SET

②Analog output CH2 to CH4 operation test

Execute the operation test for analog output CH2 to CH4.

The test method is the same as ①Analog output CH1 operation test .

SET

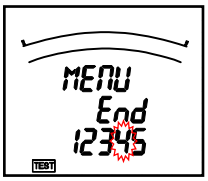
Test menu

<To continue other test mode>

⇒ Select other test menu number and then press SET.

<To close test mode>

⇒ Select "End" as the test menu number and then press SET.
You will return to the operation mode.



4. Using Test Mode

4.5. Test Menu 5: Pulse Output Operation Test

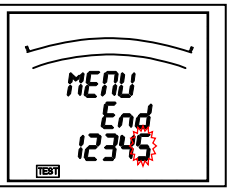
The following operations are available in the test mode.

・When the ME-4210-SS96 optional plug-in module is not installed, this test menu will be skipped.

・When ⑨Pulse/Alarm output 1(Setting Menu 5) and ⑫Pulse/Alarm output 2(Setting Menu 5) is not set to "PULSE", this test menu will be skipped.(ME-4210-SS96)

Test menu

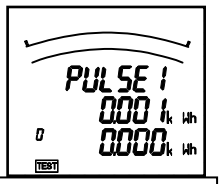
Set the test menu number to "5".



DISPLAY SET

①Pulse output CH1 operation test

Execute the operation test for pulse output CH1.
(Input is not necessary.)
When RESET is pressed, 1 pulse is output.



RESET

0 → 1 → 2 → ··· → 49 → 50[pulse]

Upper :Pulse output 1
Middle :Pulse Unit set up with setting menu 5.9.2.
Lower
Left :The number of output pulses
Right :(Pulse Unit)×(The number of output pulses)

Note1: When Pulse/Alarm output 1(Setting Menu 5) is not set to "PULSE", this display will be skipped.(ME-4210-SS96)
Note2: Output is executed according to the set pulse width.
Note3: After reaching 50, the number of output pulses returns to 1.

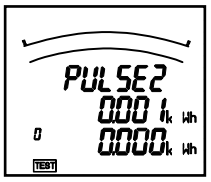
DISPLAY SET

②Pulse output CH2 operation test

Execute the operation test for pulse output CH2.

The test method is the same as

①Pulse Output CH1 Operation Test.



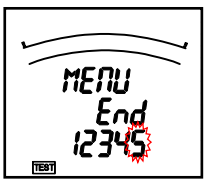
Note: When Pulse/Alarm output 2(Setting Menu 5) is not set to "PULSE", this display will be skipped.(ME-4210-SS96)

SET

Test menu

<To continue other test mode>
⇒ Select other test menu number and then press SET

<To close test mode>
⇒ Select "End" as the test menu number and then press SET.
You will return to the operation mode.



5. Operation

5.1. Basic Operation

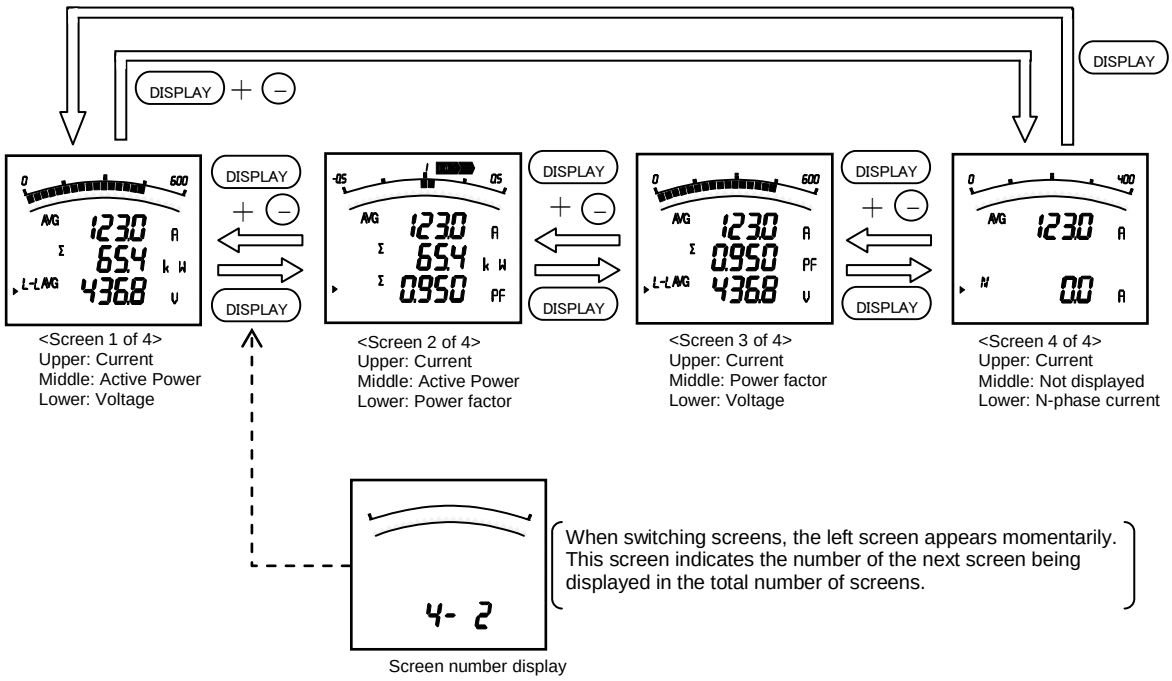
The following explains basic usages during operation.

Display items and the order differ depending on the phase wire method setting display pattern settings and additional screen. For more information about detailed display patterns, refer to pages 77 and 78.

● Switch display

By pressing (DISPLAY), the measurement display will switch over.
By pressing (DISPLAY) + (−), the measurement display will switch over in reverse.

Example of display switching(Phase wire System: 3-phase 4-wire,display pattern: P01, without additional display)

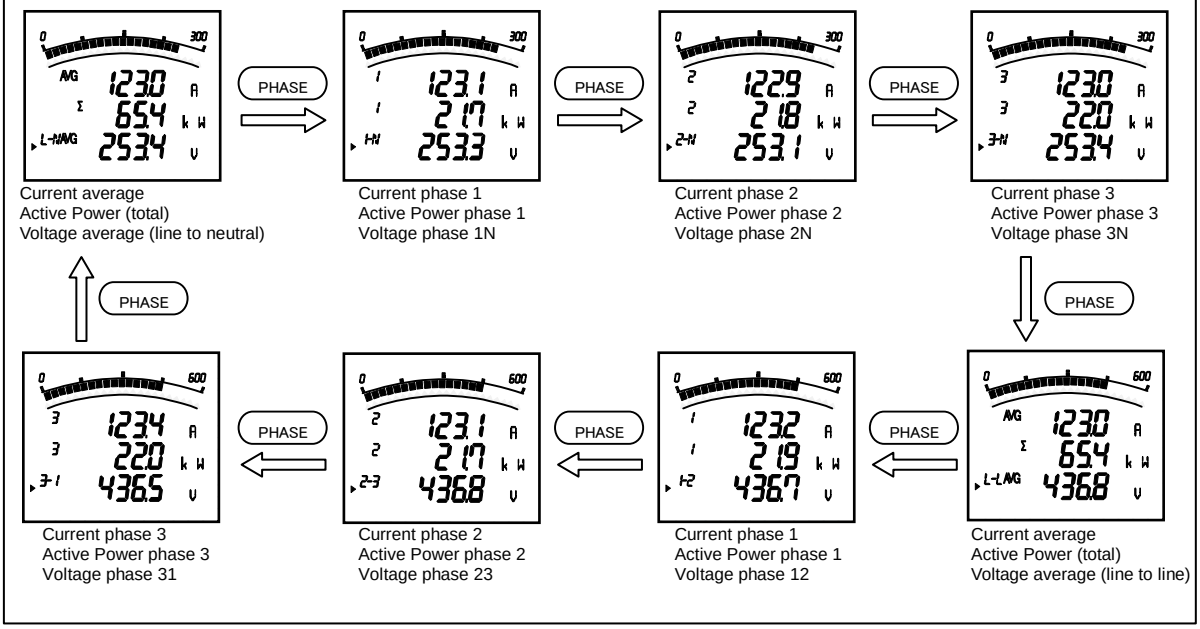


● Switch phase

By pressing (PHASE) the current phase and the voltage phase will switch over.

The phase cannot be switched in the following cases.
- Measurement elements without phase (Frequency)
- Active power, reactive power, apparent power and power factor for settings other than 3-phase 4-wire
- When the setting is 1-phase 2-wire

Example of phase switching (Phase wire System: 3-phase 4-wire)

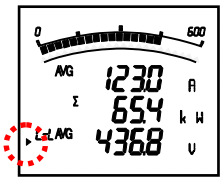


5. Operation

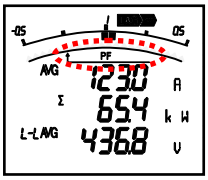
5.1. Basic Operation

● Bar graph display

Bar graph displays the measurement element indicated with " ▶ " or " ↑ ".



(Example) Lower element (V) displayed on bar graph



(Example) PF displayed on bar graph

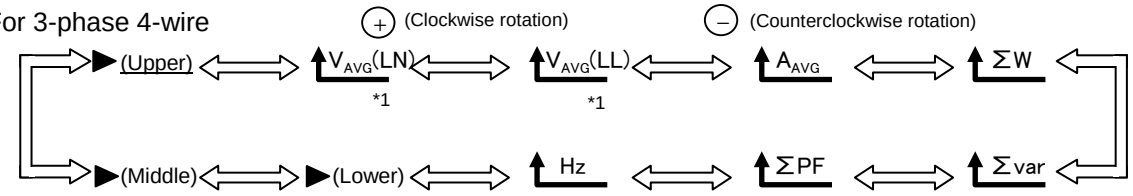
● Switching measurement factors displayed on bar graphs

Press the ⊕ or ⊖ button to switch.

The following example is the case of "3 measuring items of screen are different" or "2 measuring items of screen are same". In the case of "3 measuring items of screen are same", the bar graph of average value or total value appear instead of " ▶(Upper)", " ▶(Middle)" and " ▶(Lower)".

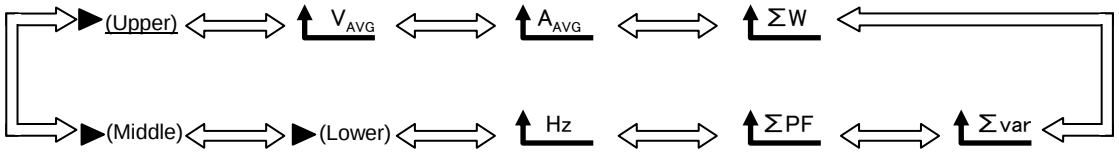
The bar graph cannot be displayed in the following cases.
- When active energy / reactive energy / apparent energy are selected
- When a line without measurement display is selected
- Rolling Demand Display
- Harmonics Display

(1) For 3-phase 4-wire

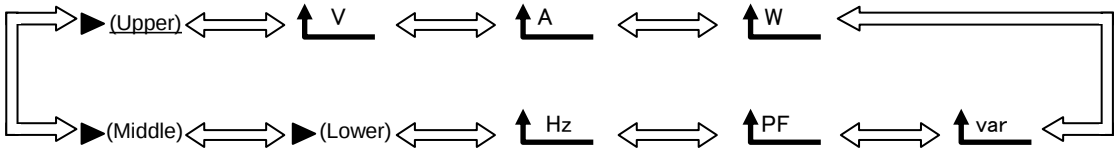


*1: "LN","LL" does not appear.

(2) For 3-phase 3-wire, 1-phase 3-wire



(3) For 1-phase 2-wire



5. Operation

5.1. Basic Operation

● Cyclic Display

In cyclic display, display and phases automatically change at every 5 seconds.

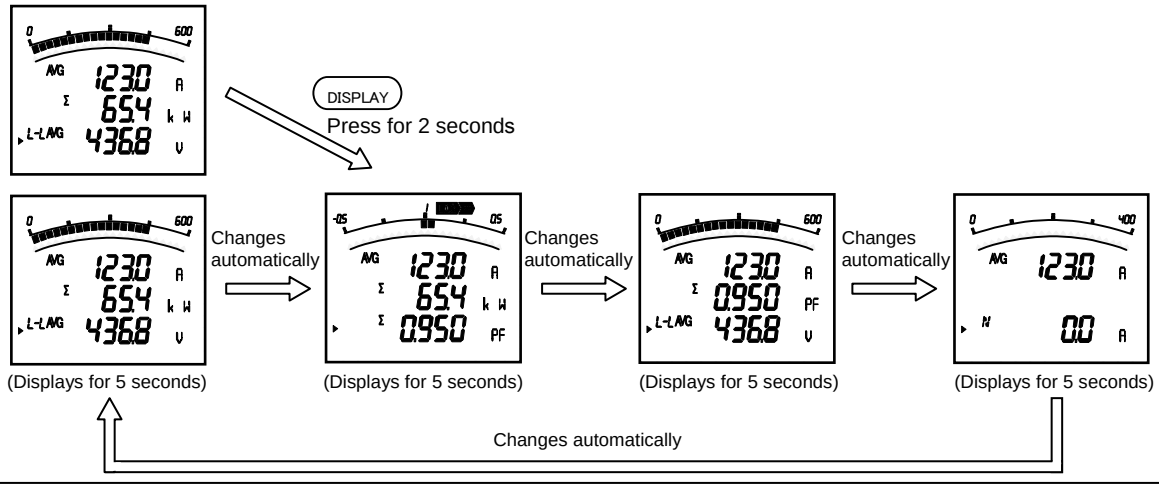
When (DISPLAY) is pressed for about 2 seconds, the cyclic display appears.

When (PHASE) is pressed for about 2 seconds, the cyclic phase appears.

By pressing any other buttons except (SET), cyclic display mode ends.

Note 1: Before shifting to the cyclic display change screen, the display flickering 3 times.
Note 2: In the cyclic display, drawing number is not displayed.
Note 3: In the maximum value and the minimum value display, cyclic display is not available.

Example Cyclic Display (Phase wire System: 3-phase 4-wire, Display Pattern: P01, without additional screens)



● Harmonics display

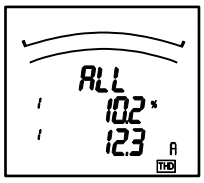
Harmonic RMS value and distortion ratio can be displayed.
It is necessary to set the harmonics display settings before displaying.(Refer to page 32)

■Measurement items

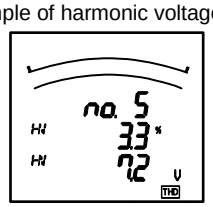
Degree	Harmonic current		N-phase harmonic current		Harmonic voltage	
	RMS value	Distortion ratio	RMS value	Distortion ratio	RMS value	Distortion ratio
Harmonic total	○	○	○	—	○	○
1st	○	—	○	—	○	—
3rd,5th,7th,9th, 11th,13th,15th, 17th,19th	○	○	○	—	○	○

■Example Display

<Example of harmonic current total display>



<Example of harmonic voltage 5th display>



Upper: Degree
Middle: Distortion ratio
Lower: RMS value

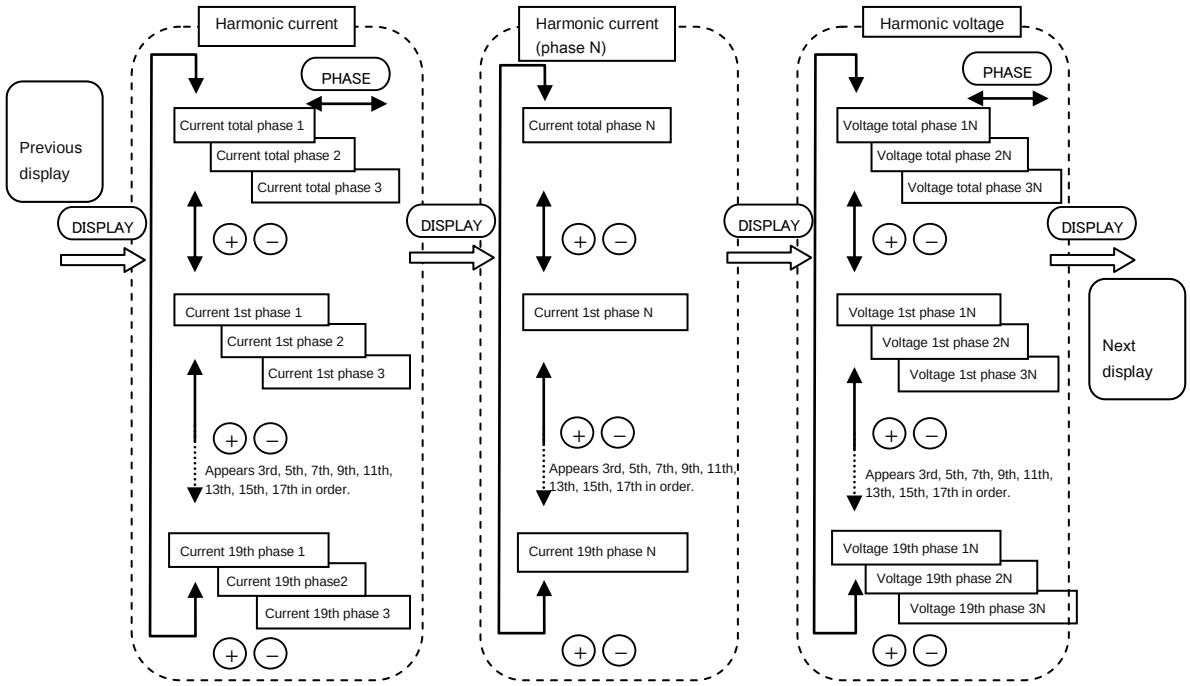
Note : Harmonic total is shown by “ALL”.

● **Harmonics display (Continued from previous page)**

■Switching degree / phase (Phase wire System: 3-phase 4-wire)

Press the ⊕ or ⊖ button to switch the degree.

Press PHASE to switch phases.



Note: For harmonic measurement, the following phases are not displayed.

Phase wire system		Harmonic current	Harmonic voltage
3-phase 3-wire	3CT	—	31-phase
	2CT	2-phase	31-phase
1-phase 3-wire	1N2 display	N-phase	12-phase
	1N3 display	N-phase	13-phase

5. Operation

5.1. Basic Operation

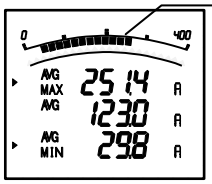
● Maximum value and minimum value display

For the maximum / minimum value display screen, the maximum value, current value, and minimum value for each measurement item are displayed on one screen.

(However, for harmonics only the following maximum values are displayed.
Harmonic current: Total, 1st to 19th (only odd number) effective values for where the phase was largest for each phase.
Harmonic voltage: Total distortion factor, 1st effective value, 3rd to 19th (only odd number) content factors for where the phase was largest for each phase)

■ Example Display

＜Example of current＞



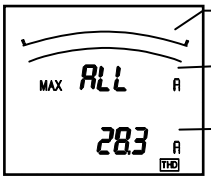
The bar graph turns on only between the maximum value and minimum value.

Upper: Maximum value

Middle: Current value

Lower: Minimum value

＜Example of current harmonics＞



Harmonics won't display as bar graph.

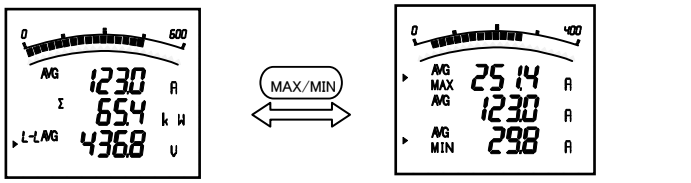
Harmonic degree

Maximum value

● Display of maximum value and minimum value

When (MAX/MIN) is pressed, the display is changed into the maximum value and minimum value display.
And when (MAX/MIN) is pressed, the display changes back to the present value display.

Example of switching between present value display and maximum/minimum value display



Present value display

Maximum value and minimum value display

On maximum/minimum value display, the following operation is also possible as current value display.

Button operation	Function
Press (DISPLAY)	Measurement items switch according to the following order. However, measurement items that are not included in the phase wire method display pattern setting and additional screens are not displayed. (A_N: N-phase current DA: Current demand DA_N: N-phase current demand HI: Harmonic current HI_N: N-phase harmonic current HV: Harmonic voltage) A→A_N→DA→DA_N→V→W→var→HV←HI_N←HI←Hz←PF←VA←
Press (PHASE)	3-phase 4-wire: A and DA switch as Average→1 Phase→2 Phase→3 Phase V switches as V_{AVG}(L-N)→V_{1N}→V_{2N}→V_{3N}→V_{AVG}(L-L)→V_{12}→V_{23}→V_{31} W, var, VA, PF switch as Total→1 Phase→2 Phase→3 Phase A_N, DA_N and Hz do not have phase switching. 3-phase 3-wire, 1-phase 3-wire: Phase for A, DA and V switch. 1-phase 2-wire: No phase switch.
Press (+) or (−)	The harmonic degree switch. (Only for harmonics display)
Press (DISPLAY) for 2 seconds	Switches to measurement item cyclic display.
Press (PHASE) for 2 seconds	Switches to phase cyclic display.

● Clear the maximum/minimum value

On the maximum/minimum value display screen, press the (RESET) for 2 seconds to clear the maximum/minimum value for the displayed measurement item to the present value.
On the maximum/minimum value display screen, press the (+) and (RESET) together for 2 seconds to clear all maximum/minimum values to the present value.
When the password protection setting is enabled, maximum/minimum values are cleared after you enter the password. Also, you can clear all maximum/minimum values by communication function. (In this case, the password is not necessary.)

5. Operation

5.1. Basic Operation

● Active Energy / Reactive Energy / Apparent Energy Display

■ Display format

The following table shows the display format of active energy / reactive energy / apparent energy based on the total load.

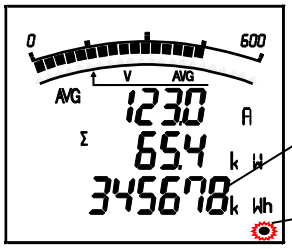
$$\text{Total load power[kW]} = \frac{\alpha \times (\text{VT primary voltage}) \times (\text{CT primary current})}{1000}$$

α : 1 1-phase 2-wire
2 1-phase 3-wire
√3 3-phase 3-wire
3 3-phase 4-wire

※1. For the direct voltage setting, the direct voltage is used for calculation instead of the VT primary voltage.
※2. For 3-phase 4-wire or 1-phase 3-wire, the VT primary voltage and direct voltage are calculated using the line to phase voltage.

Total load [kW]	Display type	
	Digital Display	Unit
Less than 10	888888	kWh (Unit can be changed from Wh/kWh/MWh.)
10 or higher and less than 100		
100 or higher and less than 1000		
1000 or higher and less than 10000		
10000 or higher and less than 100000		MWh (Unit can be changed from Wh/kWh/MWh.)
100000 or higher		

* For reactive energy or apparent energy, read Wh as varh or VAh.



Active energy measurement value

Metering status

The metering status blinks while the active energy is being counted.
When active energy is not counted, turns OFF.

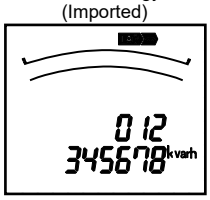
■ Example Display

Active energy (Imported)

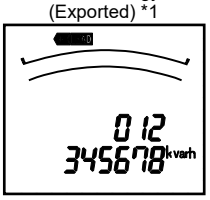
Active energy (Exported) *1

Apparent energy

Expanded counting setting of menu 3 is necessary in order to appear the screen of *1.
(Refer to page 32)



Reactive energy (Imported LAG)



Reactive energy (Imported LEAD) *1

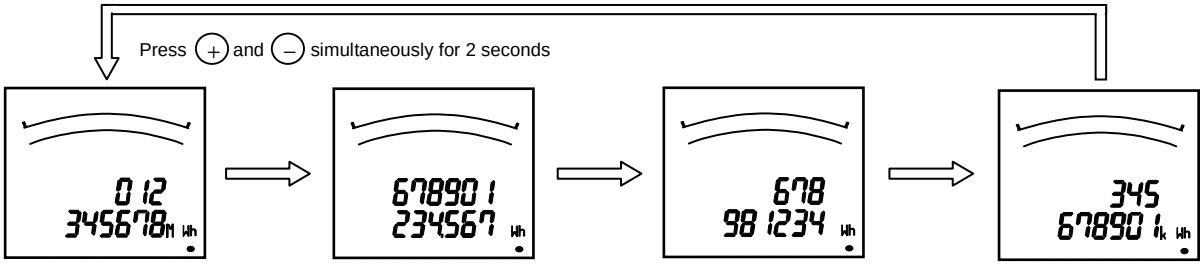
Reactive energy (Exported LAG) *1

Reactive energy (Exported LEAD) *1

● How to change the unit of Wh, varh and VAh

When (+) and (–) are pressed simultaneously for 2 seconds, the unit of Wh, varh and VAh will be changed. This will enable to check the upper digits or lower digits of counts.

Example of change: Case of active energy (imported) = 012,345,678,901,234.567Wh



Unit : Mega

Unit : non
(Lower digit enlarged)

Unit : non

Unit : kilo

Note1: All of Wh, varh and VAh change to same unit even if these are not shown on the screen.
Note2: When the setting value of the VT primary voltage and the CT primary current are large, the lower digits less than a measurement range display "0".

● Wh, varh and VAh zero reset

When (SET) , (RESET) ,and (PHASE) are pressed simultaneously for 2 seconds, the measured values of Wh, varh and VAh will be reset.

When the password protection setting is enabled, Wh, varh and VAh are reset after you enter the password.

Also, you can clear all Wh, varh and VAh values by communication function. (In this case, the password is not necessary.)

Note 1: This is effective only in the instantaneous value display.
Note 2: All of Wh, varh and VAh will be reset even if these are not shown on the screen.
Note 3: The periodic active energy will not be reset. Another operation is necessary. (Refer to page 72)

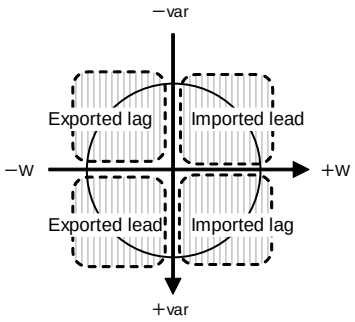
5. Operation

5.1. Basic Operation

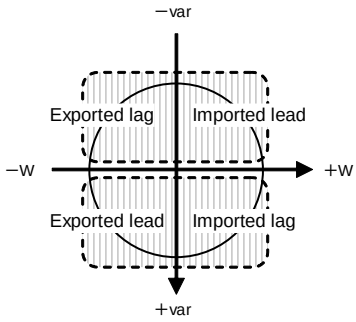
● Reactive energy counting method (2 quadrant counting / 4 quadrant counting)

There are the following two types of quadrants for counting reactive energy.

<4 quadrant counting>



<2 quadrant counting>



Counting method	Description
4 quadrant counting	It is counting (Imported lag), (Exported lead),(Imported lead) and (Exported lag) respectively as division of one. In general, it is counted by this method. However, at the boundary of each division, there is a dead region. It is suitable for the counting of equipment with the private electric generator.
2 quadrant counting	(Imported lag) and (Exported lead) are counted as division of one. (Imported lead) and (Exported lag) are counted as division of one. The dead region is made only nearby var=0 (power factor = 1). Therefore, because the dead region is not made nearby power factor = 0. It is suitable for the counting of equipment without the private electric generator and the reactive power of the capacitor load at the power factor = 0, generally.

The counting method for reactive energy (varh) is switched by “Expanded counting” in the Setting Menu 3.

Also, if setting of “IEC mode” in the Setting Menu 8 is ON, the counting method becomes 2 quadrant counting regardless of “Expanded counting” in the Setting Menu 3.

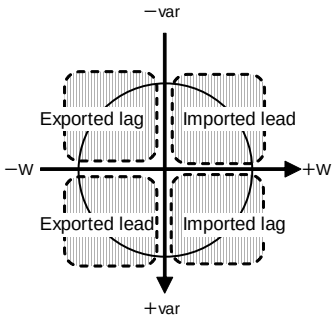
If setting of “Expanded counting” is selected for 4 quadrant counting and setting of “IEC mode” is ON, the screens of “exported lag” and “exported lag” appear, but these are not counting.

(Refer to page 32 about “Expanded counting” in the Setting Menu 3. Refer to page 47 about “IEC mode” in the Setting Menu 8.)

● Each measurement item display during power transmission

The following table shows the symbol display (±) for each measurement value according to the power reception /power sending status.

(Refer to page 32 about “Expanded counting” in the Setting Menu 3. Refer to page 47 about “IEC mode” in the Setting Menu 8.)

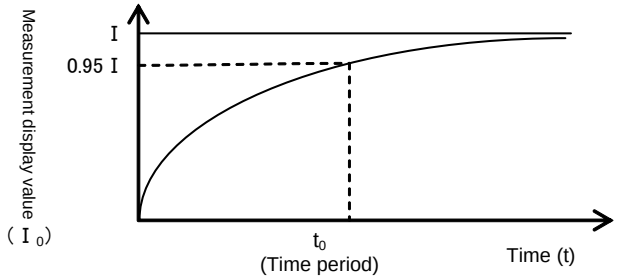


Measured items \ Quadrant		Imported Lag	Imported Lead	Exported Lag	Exported Lead
A,DA,N-A,N-DA,V,Hz,VA HI,N-HI,HV		Unsigned			
W		Unsigned		”−”sign	
var	Normal mode (For 2 quadrant counting)	Unsigned LAG display※	“−”sign LEAD display※	“−”sign LEAD display※	Unsigned LAG display※
	Normal mode (For 4 quadrant counting)	Unsigned LAG display※	“−”sign LEAD display※	Unsigned LAG display※	“−”sign LEAD display※
	IEC mode (For 2 quadrant counting)	Unsigned LAG display※	“−”sign LEAD display※	“−”sign LEAD display※	Unsigned LAG display※
PF	Normal mode (For 2 quadrant counting)	Unsigned LAG display※	“−”sign LEAD display※	“−”sign LEAD display※	Unsigned LAG display※
	Normal mode (For 4 quadrant counting)	Unsigned LAG display※	“−”sign LEAD display※	Unsigned LAG display※	“−”sign LEAD display※
	IEC mode (For 2 quadrant counting)	Unsigned LAG display※	“−”sign LEAD display※	Unsigned LAG display※	“−”sign LEAD display※

※Turns on when displayed on the bar graph.

● Demand time and demand value of current demand

The demand time (t_0) is the time until the measurement display value (I_0) displays 95% of the input (I) when a certain constant input (I) is given. To display 100% of the input (I), about three times more than the time (t_0) is needed.



The demand value is the measurement display value with the above time characteristics, and it shows the overall average within the demand time.
The demand value changes over a relatively long time, so it is not affected by input changes within a short time.
Therefore, this is good for monitoring transformer overload.

5. Operation

5.2. Usage According to Purpose (Alarm, Periodic Active Energy, Rolling Demand, Operating Time, Password, etc.)

The following explains usage according to the purpose during operation.

● Display and operation of the upper/lower limit alarm

When the value exceeds the upper or lower limit setting value set in advance, the display flickers and alarm can be output.
(For more information about how to set the upper/lower limit alarm, refer to page 34 and after.)

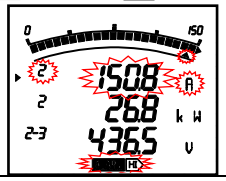
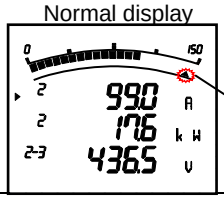
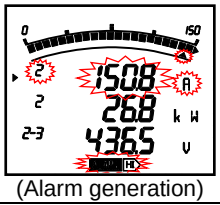
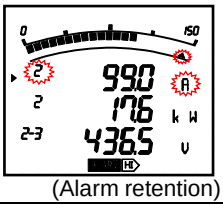
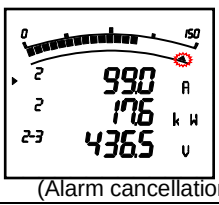
■ Alarm indicator

When the measurement element with an upper/lower limit alarm is displayed on the bar graph, "▲" flickers on the bar graph to indicate the upper/lower limit.

■ Behavior During Alarm Generation

Alarm condition: When measurement value exceeds alarm value, display flicker and an alarm contact closes.
Alarm cancel: When alarm is canceled, display flickers normally and alarm contact opens.

Note: When the alarm delay time is set, an alarm is generated only when the alarm value is continuously beyond the upper/lower limit alarm value for the delay time.

<table>
<tr><th colspan="2">Alarm cancel method</th><th>Measurement value ≥ Upper limit value
(or Measurement value ≤ Lower limit value)</th><th colspan="2">Measurement value < Upper limit alarm value
(or Measurement value > Lower limit alarm value)</th></tr>
<tr><td rowspan="2">Automatic
(Auto)</td><td>Display</td><td>ALARM , HI or LO flickers
  </td><td colspan="2">Normal display
 
Upper/lower limit indicator</td></tr>
<tr><td>Output (Alarm relay contact)</td><td>Closed</td><td colspan="2">Opened</td></tr>
<tr><td rowspan="2">Manual(
HoLd)</td><td>Display</td><td>ALARM , HI or LO flickers
 
(Alarm generation)</td><td>ALARM , HI or LO turns ON
 
(Alarm retention)</td><td>Normal display
 
(Alarm cancellation)</td></tr>
<tr><td>Output (Alarm relay contact)</td><td>Closed</td><td>Closed</td><td>Opened</td></tr>
</table>

Note 1: When the measurement element where the alarm generated exists on the display screen, the display for the digital value, unit (A, V, W, var, PF, Hz, %, DM,THD), and phase (1, 2, 3, N) will be based on the alarm status according to the following table. If it does not exist on the display screen, it does not flicker.

Alarm status	Digital value	Unit	Phase
Alarm generation	Flickering*	Flickering	Flickering*
Alarm retention	On	Flickering	Flickering*
Alarm cancellation	On	On	On

* Does not flicker when displaying phases where no alarm occurred.

Note 2: When the backlight flickering setting is set to ON (flicker) during alarm generation, the backlight also flickers when an alarm is generated.

Note 3: On the maximum/minimum value display screen, the present value (middle of the digital display) and ALARM , HI or LO blinks.

■ Monitoring phase for upper/lower limit alarm element

The phase that monitors the upper/lower limit alarm differs according to the measurement item. For more details, refer to the following table.

Upper/lower limit alarm element	Monitored phase			
	3-phase 4-wire	3-phase 3-wire (3CT,2CT)	1-phase 3-wire (1N2)	1-phase 3-wire (1N3)
Upper limit current, current demand	1, 2, 3	1, 2, 3	1, N, 2	1, N, 3
Lower limit current, current demand	1, 2, 3	1, 2, 3	1, 2	1, 3
Upper limit N-phase current, N-phase current demand	N	—	—	—
Lower limit N-phase current, N-phase current demand	N	—	—	—
Upper limit voltage (L-L) (Note 1)	12, 23, 31	12, 23, 31	1N, 2N, 12	1N, 3N, 13
Lower limit voltage (L-L) (Note 1)	12, 23, 31	12, 23, 31	1N, 2N, 12	1N, 3N, 13
Upper limit voltage (L-N)	1N, 2N, 3N	—	—	—
Lower limit voltage (L-N)	1N, 2N, 3N	—	—	—
Upper limit active power, reactive power, power factor	Total	Total	Total	Total
Lower limit active power, reactive power, power factor	Total	Total	Total	Total
Upper limit frequency	1N	12	1N	1N
Lower limit frequency	1N	12	1N	1N
Harmonic current total RMS value	1, 2, 3	1, 2, 3 (note 2)	1, 2	1, 3
Harmonic current total RMS value N-phase	N	—	—	—
Harmonic voltage total distortion ratio	1N, 2N, 3N	12, 23	1N, 2N	1N, 3N
Upper limit rolling demand	Total	Total	Total	Total

Note1: For phase 12 (or phase 31) at 1-phase 3-wire, alarm monitoring is executed using a value that is two times the set upper/lower limit alarm value.

Note2: Only 3-phase 3-wire (3CT) is measured for the phase 2 harmonic current.

● Canceling the upper/lower limit alarm

The alarm cancellation method differs depending on the setting for alarm reset. The upper and lower limit alarms can be cancelled also via communication.

Alarm cancel method	Cancelation method
Automatic(Auto)	When the measurement value is below the upper/lower limit set value, the alarm is automatically reset.
Manual(HoLd)	The alarm is maintained even after the measurement value is below the upper/lower limit set value. After the measurement value is below the upper/lower limit alarm value, operate the following alarm cancellation operation. (Note: However, alarms cannot be cancelled from the maximum/minimum value display screen, or the digital input/output screen.) <Cancelling alarms for selected elements> Display the element where the alarm generated, and then press (RESET) to cancel the alarm. When an element has a phase such as current and voltage, it is necessary to press (RESET) for each phase when cancelling an alarm. <Cancelling alarms for all elements> At the current value display screen, press (RESET) for 2 seconds to cancel all alarms.

Note: The difference of 0.8% between the maximum scale and alarm value is used for determining whether the measurement value is below the upper/lower limit alarm value in order to prevent chattering.

● Stopping backlight flickering caused by upper/lower limit alarm generation

Press (RESET) the button to stop the backlight flickering.

● Upper/lower limit alarm items on the alarm contacts

Setting		Alarm item for alarm output	
Contact output function 1	Contact output function 2	C1A and C1B terminals	C2A and C2B terminals
Alarm output	Alarm output	Alarm item 1	Alarm items 2-4 (output collectively with either of them)
Alarm output	Pulse output	Alarm items 1-4 (output collectively with either of them)	No alarm
Pulse output	Alarm output	No alarm	Alarm items 1-4 (output collectively with either of them)
Pulse output	Pulse output	No alarm	No alarm

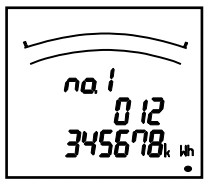
● Display of periodic active energy

The ability to measure the active energy divided into two time segments enables individual measurement of the active energy in a desired time segment such as peak/off-peak and day/night.
The periodic active energy is counting, even if the periodic active energy display setting is OFF.

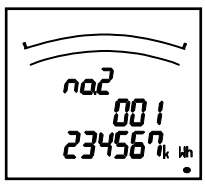
(For the setting of the Periodic active energy display, refer to page 44.)

The time segments can be switched according to the setting via communication or the digital input (DI).
(The time segments cannot be switched manually (button operation).)

<For control via communication> ・When the selected bit is ON (1), the active energy (Imported) is added to the periodic active energy n (where n = 1, 2). ・When the selected bit is OFF (0), the active energy (Imported) is not added to the periodic active energy n (where n = 1, 2).
<For control from the digital input (DI)> ・When there is no digital input (DI), the active energy (Imported) is added to the periodic active energy 1 and the active energy (Imported) is not added to the periodic active energy 2. ・When there is digital input (DI), the active energy (Imported) is not added to the periodic active energy 1 but the active energy (Imported) is added to the periodic active energy 2.
<For setting without switching> ・The active energy (Imported) is added to the periodic active energy 1 and periodic active energy 2. (No switching between time segments)



Periodic active energy 1



Periodic active energy 2

This is displayed when the (DISPLAY) button is pressed repeatedly in the operation mode to switch the measurement displays.

● Resetting periodic active energy to zero

Showing the periodic active energy 1 or 2 on the display and holding down the (RESET) button for 2 seconds reset the periodic active energy to zero. (Only the displayed periodic active energy is reset.)
When the password protection setting is enabled, the periodic active energy is reset to zero after the password is entered.
The periodic active energy can be individually or simultaneously reset to zero via communication. (In this case, the password is not necessary)

5.2 Usage According to Purpose (Alarm, Periodic Active Energy, Rolling Demand, Operating Time, Password, etc.)

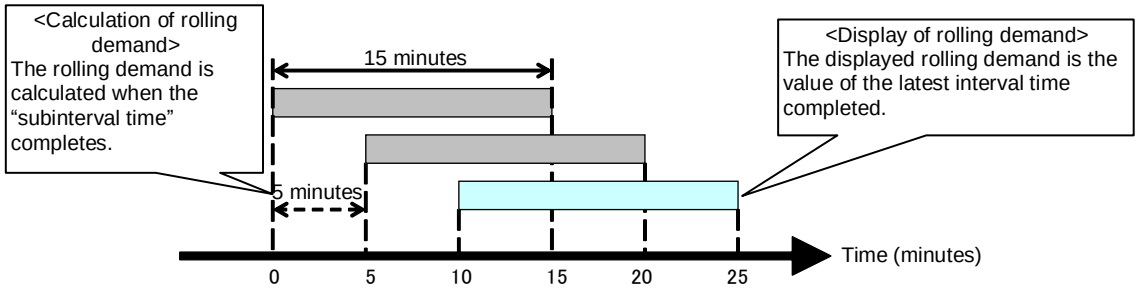
● Display and calculation of rolling demand

The rolling demand is the value obtained by dividing the active energy/reactive energy/apparent energy (*1) in a specified time (interval) by the length of the interval.
The block interval demand is to select the time width (interval) of the “block” used for the demand calculation.
(For setting of the rolling demand display, refer to page 44.)

①Rolling block

The rolling block is to select the interval and sub-interval from 1- to 60-minute intervals (by minutes) and calculate and update the rolling demand at the end of each subinterval.

＜Example when the interval is 15 minutes and the subinterval is 5 minutes＞

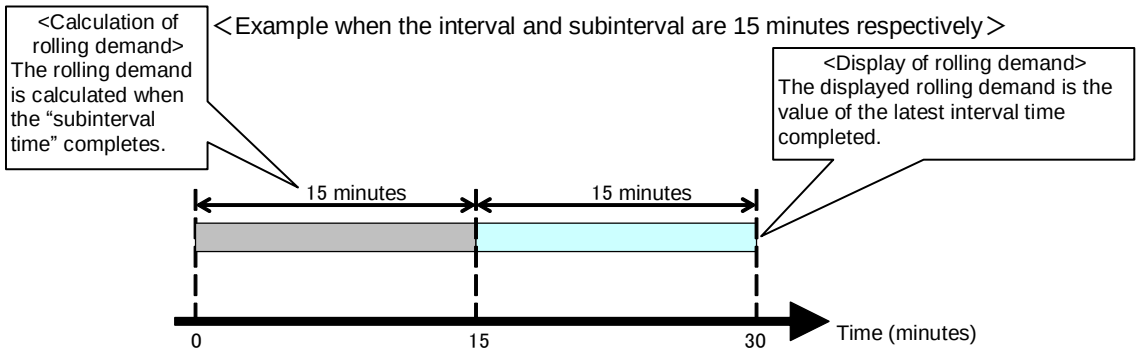


Note. Immediately after the adjusting rolling demand time is set, the demand time timer starts at "0 minute."

②Fixing block

The fixing block is to select the interval from 1- to 60-minute intervals (by minutes) and calculate and update the rolling demand at the end of each interval. (For the fixing block, the interval time and subinterval time should be the same.)

＜Example when the interval and subinterval are 15 minutes respectively＞

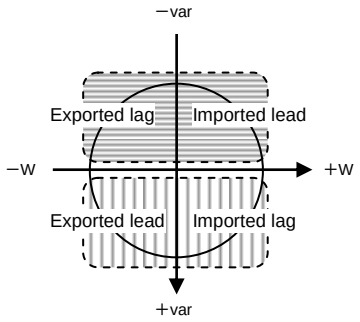


Note. Immediately after the adjusting rolling demand time is set, the demand time timer starts at "0 minute."

This is displayed when the (DISPLAY) button is pressed repeatedly in the operation mode to switch the measurement displays.

*1: The energy counting used the calculation of the rolling demand are as follows.

Item	Setting of IEC mode		Remarks
	Normal mode	IEC mode	
Rolling demand W (DW)	Active energy(import)	Active energy(import) - Active energy(export)	
Rolling demand var (Dvar)	{Reactive energy(Imported lag) + Reactive energy(Exported lead)}	{Reactive energy(Imported lag) + Reactive energy(Exported lead)} -{Reactive energy(Exported lag) + Reactive energy(Imported lead)}	Refer to the below picture.
Rolling demand VA (DVA)	Apparent energy		

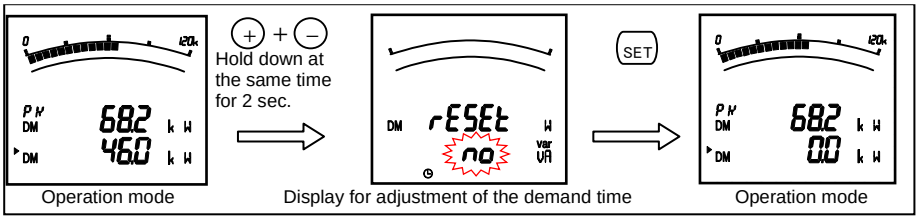


● Adjusting rolling demand time

Showing the rolling demand on the display and then holding down the (+) and (−) buttons at the same time for 2 seconds or more allows adjustment of the rolling demand time.
(Even if adjustment of the demand time is set to “Digital input,” the demand time can be adjusted manually (by button operation).)
When the password protection setting is enabled, the demand time can be adjusted after the password is entered.
The rolling demand time can be adjusted also via communication although the setting item is not provided in the demand time adjustment setting. (In this case, the password is not necessary)

■ Select “whether to adjust or not” the demand time.

no ◄——► yES
（Not adjust） （Adjust）



● Resetting the peak value of rolling demand

Showing the rolling demand on the display and then holding down the (+) and RESET buttons at the same time for 2 seconds reset the peak value of rolling demand.
When the password protection setting is enabled, the peak value of rolling demand is reset after the password is entered.
The rolling demand can be reset also via communication. (In this case, the password is not necessary)

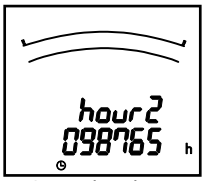
● Display of operation time

The measurement time is integrated according to the value set to the target for counting operation time (AUX, A, and V) and displayed as the load operation time.
To display the operation time, the operation time display setting should be configured in advance.
The operation time is counting, even if operation time display setting is OFF.
(For setting of the operation time display, refer to page 46.)

When the following set target for counting the operation time exceeds the threshold, the operation time 1 and operation time 2 are integrated.

Item	3-phase 4-wire	1-phase 2-wire	Others
AUX (Auxiliary power)	AUX	AUX	AUX
A (Current)	A_{AVG}	A	A_{AVG}
V (Voltage)	V_{AVG}(L-N)	V	V_{AVG}(L-L)

Operation time 1



Operation time 2

＜Using the operation time 1 and operation time 2 as appropriate＞

For example, if you want to check both of the operation time on a monthly basis (the value which is periodically reset) and the cumulative operation time from when the system started to operate (the value which is not periodically reset), use the operation time 1 and operation time 2 accordingly. If it is unnecessary to use the operation time 1 and operation time 2 at the same time, monitor either of them.

This is displayed when the DISPLAY button is pressed repeatedly in the operation mode to switch the measurement displays.

● Resetting the operation time to zero

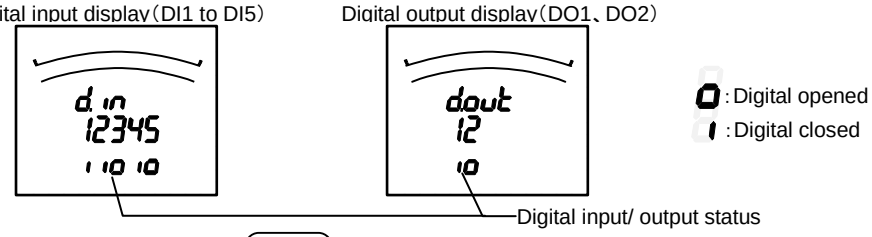
Showing the operation time 1 or the operation time 2 on the display and then holding down the RESET button for 2 seconds resets the operation time to zero.
(Only the displayed operation time is reset to zero.)
When the password protection setting is enabled, the operation time is reset to zero after the password is entered.
All the operation times can be reset to zero also via communication. (In this case, the password is not necessary)

● Display and operation of digital input/output status

The digital status can be displayed by inputting the switching signal of the breaker and the alarm signal of the over current relay to the digital input (DI) terminal.
The digital output (DO) terminal opens and closes the contact by communication control.
To display the digital input/output status, the digital input/output status display setting should be configured in advance.
(For setting of the digital input/output display, refer to page 45.)

■ Display examples

＜When the optional plug-in module “ME-0052-SS96” is installed＞



These are displayed when the (DISPLAY) button is pressed repeatedly in the operation mode to switch the measurement displays.

■ Digital input reset method

The method for maintaining the digital input status differs according to the digital input reset method.

Reset method	Cancelation method
Auto reset (Auto)	If the digital input turns OFF (Open), the digital input status automatically turns OFF (Open).
Latch (HoLd)	After it is detected that the digital input is ON (Closed), the digital input status is kept ON (Closed) until executing latch cancelation, even when the digital point input turns OFF (Open). (When alarm contact such as ACB are input, alarm generation status continues on this measurement instrument even when an alarm generation stops so that an alarm cannot be missed.)

■ Digital input conditions

The following are the digital input conditions.

Input conditions	Terminals DI
Rating	24VDC(19 to 30VDC),7mAor less
ON (Closed) / OFF (Open) time	30ms or longer for both ON and OFF

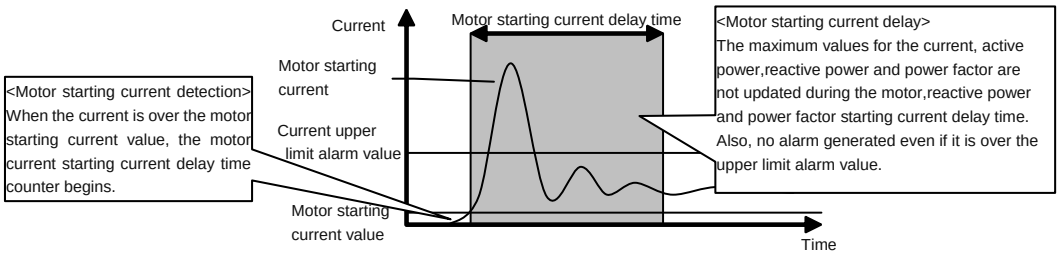
● Releasing the digital input latch

Holding down the (RESET) button for 2 seconds while the digital input display (DI) is displayed releases the digital input (DI) latches collectively.
The digital input latches can be released also via communication.

● Preventing maximum value update by motor starting current

When the motor current is monitored, use the motor starting current delay function to prevent maximum value update and alarm generation for the current, active power, reactive power, apparent Power ,and power factor due to the motor starting current. It is necessary to set in advance to use the motor starting current delay function.
(About settings, refer to page 36.)

■ Movement when the motor starting current delay function is used



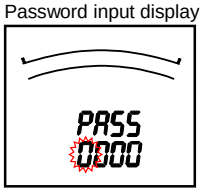
Note 1: Set the motor starting current value to a value lower than the lower limit value considering changes in the load current during operation.
Note 2: When the input current is below the motor starting current value, the minimum value update stops.

● Password protection setting

In the operation mode, after pressing RESET and PHASE simultaneously for 2 seconds or more, the password input display will be displayed. It is possible to set the password protection if you enter the password. Default password is "0000". If you enter the wrong password, to return to the password input display (the highest digit blink).
By pressing DISPLAY at the highest digit, to return to the operation mode.
If you enable password protection setting, you need to input password when performing the item of the following table.

■Password input

Password input display



- Select a value of the blinking digit by pressing the + or − button from the highest digit.
- Pressing the SET button moves the setting digit (blinking digit) to a lower digit.
- Pressing the DISPLAY button moves the setting digit (blinking digit) to a higher digit.
- If you enter a correct password and pressing the SET in the lowest digit, password protection item is enabled.
- If you enter an incorrect password and pressing the SET in the lowest digit, to return to the highest digit.

■Password protection item

No.	Item
1	Shift to the setting mode
2	Clear the maximum/minimum value
3	Wh and varh, etc zero reset
4	Periodic Wh zero reset
5	Adjusting rolling demand time
6	Resetting the peak value of rolling demand
7	Clearing the operation time

■Password protection setting

(1)Set a password protection.

oFF ⟷ on
（Not protected） （Protected）

(2)Change the password.

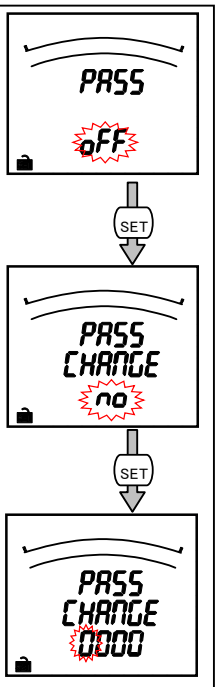
no ⟷ yES
（Not change） （Change）

Note1. Select "no", and go back to the operation mode.

Note2. Select "yES", and the current password is displayed.

(3)Input a new password.

- Select a value of the blinking digit by pressing the + or − button from the highest digit.
- Pressing the SET button moves the setting digit (blinking digit) to a lower digit.
- Pressing the DISPLAY button moves the setting digit (blinking digit) to a higher digit.
- Pressing the SET button at the lowest digit saves the password.
- Setting is available in range from 0000 to 9999



Important	If You Forget Your Password : It is not possible to cancel the password in the field. Please contact your supplier.

6. Other

6.1. Display Pattern Contents

When the display pattern in the Setting menu 1 and the additional screen in the Setting menus 3, 7, and 8 are set, pressing DISPLAY changes the screens shown in the table below from the left to the right.

[For 3-phase 4-wire]

Display pattern		Screen set by display pattern									Additional display (Set in the setting menus 3, 7, 8)																			
		No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17	No.18	No.19	No.20	No.21	No.22	No.23	No.24	No.25	No.26	No.27	No.28
											Wh	Wh Exported	varh Imported (LAG)	varh Imported (LEAD)	varh Exported (LAG)	varh Exported (LEAD)	VAh	Periodic Wh1	Periodic Wh2	Rolling demand			Harmonic current	Harmonic current N-phase	Harmonic voltage	DI status	DO status	Operation time1	Operation time2
																				DW	Dvar	DVA							
P01	Upper	A	A	A	A													–	–	–	–	–	Degree	Degree	Degree	DI	DO	–	–
	Middle	W	W	PF	–													Periodic Wh1	Periodic Wh2	Peak Value	Peak Value	Peak Value	Distortion ratio	-	Distortion ratio	DI No.	DO No.	hour1	hour2
	Lower	V	PF	V	AN															Demand value	Demand value	Demand value	RMS value	RMS value	RMS value	status	status	Operation time	Operation time
P02	Upper	A	A	A	A						–	–						ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	V	W	PF	–						Wh	Wh Exported																
	Lower	Wh	Wh	Wh	AN																								
P03	Upper	A	A	A	A	A	A											ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	PF	PF	PF	PF	PF	–																						
	Lower	V	W	var	VA	Hz	AN																						
P04	Upper	A	A	A	A	A	A	A			–	–	–	–	–	–	–	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	V	W	var	VA	PF	Hz	–			Wh	Wh Exported	varh Imported (LAG)	varh Imported (LEAD)	varh Exported (LAG)	varh Exported (LEAD)	VAh												
	Lower	Wh	Wh	varh	VAh	Wh	Wh	AN																					
P05	Upper	PF	Hz	VA														ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	W	W	W																									
	Lower	var	var	var																									
P06	Upper	A1	V1N	A	A													ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	A2	V2N	–	–																								
	Lower	A3	V3N	V	AN																								
P07	Upper	A	A1	V1N	A													ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	V	A2	V2N	–																								
	Lower	W	A3	V3N	AN																								
P08	Upper	A	A	A1	V1N	A					–	–						ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	V	W	A2	V2N	–					Wh	Wh Exported																
	Lower	Wh	Wh	A3	V3N	AN																							
P09	Upper	A	A1	DA1	V1N	A	DA											ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	DA	A2	DA2	V2N	–	–																						
	Lower	V	A3	DA3	V3N	AN	DAN																						
P10	Upper	A	A	A1	DA1	V1N	A	DA										ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	DA	DA	A2	DA2	V2N	–	–																					
	Lower	V	W	A3	DA3	V3N	AN	DAN																					
P11	Upper	A	A	DA1	V1N	A	DA				–	–						ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	DA	V	DA2	V2N	–	–				Wh	Wh Exported																
	Lower	Wh	Wh	DA3	V3N	AN	DAN																						
P12	Upper	A	A	A	DA	W	A	DA			–	–						ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	DA	W	V	V	V	–	–			Wh	Wh Exported																
	Lower	Wh	Wh	Wh	Wh	Wh	AN	DAN																					
P13	Upper	A1	V1N	W1	var1	VA1	PF 1	V	V	A	–	–	–	–	–	–	–	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	A2	V2N	W2	var2	VA2	PF 2	Hz	Hz	AN	Wh	Wh Exported	varh Imported (LAG)	varh Imported (LEAD)	varh Exported (LAG)	varh Exported (LEAD)	VAh												
	Lower	A3	V3N	W3	var3	VA3	PF 3	Wh	varh	VAh																			
P00	Upper	Arbitrary	Arbitrary	Arbitrary	Arbitrary						–	–	–	–	–	–	–	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	Arbitrary	Arbitrary	Arbitrary	Arbitrary						Wh	Wh Exported	varh Imported (LAG)	varh Imported (LEAD)	varh Exported (LAG)	varh Exported (LEAD)	VAh												
	Lower	Arbitrary	Arbitrary	Arbitrary	Arbitrary																								

Note 1: When an additional screen is added, a screen number is added.
Note 2: In the table, “Wh” indicates Imported active energy , and “varh” indicates Imported reactive energy (lag).
Note 3: When Wh is selected at the screen of from No.1 to No.4, the additional display of Wh appears. varh or VAh is same, too.

6. Other

6.1 Display Pattern Contents

[For others except 3-phase 4-wire]

Display pattern		Screen set by display pattern						Additional display (Set in the setting menus 3, 7, 8)																		
		No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17	No.18	No.19	No.20	No.21	No.22	No.23	No.24
								Wh	Wh Exported	varh Imported (LAG)	varh Imported (LEAD)	varh Exported (LAG)	varh Exported (LEAD)	VAh	Periodic Wh1	Periodic Wh2	Rolling demand DW	Rolling demand Dvar	Rolling demand VAW	Harmonic current	Harmonic voltage	DI status	DO status	Operation time1	Operation time2
P01	Upper	A	A	A											–	–	–			Degree	Degree	DI	DO	–	–
	Middle	W	W	PF											Periodic Wh1	Periodic Wh2	Peak Value	Peak Value	Peak Value	Distortion ratio	Distortion ratio	DI No.	DO No.	hour1	hour2
	Lower	V	PF	V													Demand value	Demand value	Demand value	RMS value	RMS value	RMS value	status	Operation time	Operation time
P02	Upper	A	A	A				–	–						ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	V	W	PF				Wh	Wh Exported																
	Lower	Wh	Wh	Wh																					
P03	Upper	A	A	A	A	A									ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	PF	PF	PF	PF	PF																			
	Lower	V	W	var	VA	Hz																			
P04	Upper	A	A	A	A	A	A	–	–	–	–	–	–		ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	V	W	var	VA	PF	Hz	Wh	Wh Exported	varh Imported (LAG)	varh Imported (LEAD)	varh Exported (LAG)	varh Exported (LEAD)	VAh											
	Lower	Wh	Wh	varh	VAh	Wh	Wh																		
P05	Upper	PF	Hz	VA											ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	W	W	W																					
	Lower	var	var	var																					
P06	Upper	A1	V12	A											ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	A2	V23	–																					
	Lower	A3	V31	V																					
P07	Upper	A	A1	V12											ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	V	A2	V23																					
	Lower	W	A3	V31																					
P08	Upper	A	A	A1	V12			–	–						ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	V	W	A2	V23			Wh	Wh Exported																
	Lower	Wh	Wh	A3	V31																				
P09	Upper	A	A1	DA1	V12										ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	DA	A2	DA2	V23																				
	Lower	V	A3	DA3	V31																				
P10	Upper	A	A	A1	DA1	V12									ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	DA	DA	A2	DA2	V23																			
	Lower	V	W	A3	DA3	V31																			
P11	Upper	A	A	DA1	V12			–	–						ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	DA	V	DA2	V23			Wh	Wh Exported																
	Lower	Wh	Wh	DA3	V31																				
P12	Upper	A	A	A	DA	W		–	–						ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	DA	W	V	V	V		Wh	Wh Exported																
	Lower	Wh	Wh	Wh	Wh	Wh																			
P13	Upper	A1	V12	W	V	V	V	–	–	–	–	–	–	–	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	A2	V23	var	Hz	Hz	VA	Wh	Wh Exported	varh Imported (LAG)	varh Imported (LEAD)	varh Exported (LAG)	varh Exported (LEAD)	VAh											
	Lower	A3	V31	PF	Wh	varh	VAh																		
P00	Upper	Arbitrary	Arbitrary	Arbitrary	Arbitrary			–	–	–	–	–	–	–	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto	ditto
	Middle	Arbitrary	Arbitrary	Arbitrary	Arbitrary			Wh	Wh Exported	varh Imported (LAG)	varh Imported (LEAD)	varh Exported (LAG)	varh Exported (LEAD)	VAh											
	Lower	Arbitrary	Arbitrary	Arbitrary	Arbitrary																				

Note 1: When an additional screen is added, a screen number is added.
Note 2: When 1-phase 2-wire, only phase1 (A_1, DA_1) is displayed for current and only phase12 (V_{12}) is displayed for voltage. Other phases are not displayed even when they are set in the display pattern.
Note 3: The phases displayed in the display patterns of the above table are displayed on the screen according to the phase wire system setting shown in the table below.

Phase display in the table above \ phase wire		1-phase 2-wire	1-phase 3-wire (1N2)	1-phase 3-wire (1N3)	3-phase 3-wire
Current	1	Phase not displayed	1	1	1
	2	Measurement not displayed	N	N	2
	3	Measurement not displayed	2	3	3
Voltage	12	Phase not displayed	1N	1N	12
	23	Measurement not displayed	2N	3N	23
	31	Measurement not displayed	12	13	31

Note 4: In the table, “Wh” indicates Imported active energy , and “varh” indicates Imported reactive energy (lag).
Note 5: When Wh or varh is selected at the screen of from No.1 to No.4, the additional display of Wh or varh appears. (P00)

6. Other

6.2. Maximum Scale Value

Settable primary voltage, primary current, and standard maximum scale value are shown in the tables below.

●Maximum scale value of each item

Measurement element				Maximum scale value
Current, Current demand		Setting of current maximum scale ＝SP.		CT Primary current
Voltage	In the case with VT (Note 2)	1-phase 2-wire, 3-phase 3-wire		VT Primary voltage×150/110
		3-phase 4-wire		VT Primary voltage (Phase voltage)×150/110
				VT Primary voltage (Line voltage)×√3×150/110
	At direct input	1-phase 2-wire, 3-phase 3-wire	110V	150V
			220V	300V
			440V	600V
		1-phase 3-wire (Phase voltage / Line voltage)	110/220V	150V/300V
			220/440V	300V/600V
		3-phase 4-wire (Phase voltage / Line voltage)	63.5/110V	100/150V
			100/173V, 110/190V	150/300V
			220/380V, 230/400V, 240/415V, 254/440V	300/600V
			277/480V	400/640V
Active power, Rolling demand W (Note 1)				VT ratio×CT ratio ×specific power(100%)kW
Reactive power, Rolling demand var (Note 1)				VT ratio×CT ratio ×specific power(100%)kvar
Apparent power, Rolling demand VA (Note 1)				VT ratio×CT ratio ×specific power(100%)kVA

Note1: At direct voltage setting, VT ratio = 1. The specific power is according to the table on the right.

Note2: For convenience of scale, this is rounded off to the nearest whole number.

●Specific power value for scale calculation

Phase line type	CT Secondary	Rated voltage		Specific power value (100%)
1-phase 2-wire	5A	At direct input (Line voltage)	110V	0.5kW
			220V	1.0kW
			440V	2.0kW
		In the case with VT (Line voltage)	100V, 110V	0.5kW
			220V	1.0kW
	1A	At direct input (Line voltage)	110V	0.1kW
			220V	0.2kW
			440V	0.4kW
		In the case with VT (Line voltage)	100V, 110V	0.1kW
			220V	0.2kW
1-phase 3-wire	5A	Without VT (Line voltage)	220V	1.0kW
			440V	2.0kW
	1A		220V	0.2kW
			440V	0.4kW
3-phase 3-wire	5A	At direct input (Line voltage)	110V	1.0kW
			220V	2.0kW
			440V	4.0kW
		In the case with VT (Line voltage)	100V, 110V	1.0kW
			220V	2.0kW
	1A	At direct input (Line voltage)	110V	0.2kW
			220V	0.4kW
			440V	0.8kW
		In the case with VT (Line voltage)	100V, 110V	0.2kW
			220V	0.4kW
3-phase 4-wire	5A	At direct input	63.5/110V	1.0kW
			100/173V 110/190V	2.0kW
			220/380V, 230/400V, 240/415V, 254/440V	4.0kW
			277/480V	5.0kW
		In the case with VT (Phase voltage)	63.5V	1.0kW
			100V, 110V, 115V, 120V	2.0kW
	1A	At direct input	63.5/110V	0.2kW
			100/173V 110/190V	0.4kW
			220/380V, 230/400V, 240/415V, 254/440V	0.8kW
			277/480V	1.0kW
		In the case with VT (Phase voltage)	63.5V	0.2kW
			100V, 110V, 115V, 120V	0.4kW

Note: For reactive power or apparent power, read kW of above as kvar or kVA.

6.3. Possible Setting Range for Maximum Scale

The maximum scale of current can be selected from about 40% to 120% of rating, and maximum scale of voltage can be selected from about 20% to 250% of rating, and maximum scale of active power and reactive power can be selected from about 20% to 120% of rating. But for the convenience of scale conditions, the values in the following tables are applied. Also, this is same as with corresponding measured values for maximum scale of analog output.

■Current maximum scale value

Possible setting range:-10 STEP to +3STEP of the rating
Example: When the rating is 100A, the value is from 45A to 160A.

Current maximum scale value (1/3)

STEP	A unit
1	1A
2	1.2A
3	1.5A
4	1.6A
5	1.8A
6	2A
7	2.2A
8	2.4A
9	2.5A
10	3A
11	3.2A
12	3.6A
13	4A
14	4.5A
15	4.8A
16	5A
17	6A
18	6.4A
19	7.2A
20	7.5A
21	8A
22	9A
23	9.6A
24	10A
25	12A
26	15A
27	16A
28	18A
29	20A
30	22A
31	24A
32	25A
33	30A
34	32A
35	36A
36	40A
37	45A
38	48A
39	50A
40	60A
41	64A
42	72A
43	75A
44	80A
45	90A
46	96A
47	100A
48	120A
49	150A
50	160A

Current maximum scale value (2/3)

STEP	A unit	kA unit
51	180A	
52	200A	
53	220A	
54	240A	
55	250A	
56	300A	
57	320A	
58	360A	
59	400A	
60	450A	
61	480A	
62	500A	
63	600A	
64	640A	
65	720A	
66	750A	
67	800A	
68	900A	
69	960A	
70	1000A	
71	1200A	
72	1500A	
73	1600A	
74	1800A	
75	2000A	
76	2200A	
77	2400A	
78	2500A	
79	3000A	
80	3200A	
81	3600A	
82	4000A	
83	4500A	
84	4800A	
85	5000A	
86	6000A	
87	6400A	
88	7200A	
89	7500A	
90	8000A	
91		9kA
92		9.6kA
93		10kA
94		12kA
95		15kA
96		16kA
97		18kA
98		20kA
99		22kA
100		24kA

Current maximum scale value (3/3)

STEP	kA unit
101	25kA
102	30kA
103	32kA
104	36kA
105	40kA

6.3 Possible Setting Range for Maximum Scale

■Voltage maximum scale value

Possible setting range:-18 STEP to +10STEP of the standard maximum scale value.
Example: When the standard maximum scale value is 100V, the value is from 20V to 320V.

Voltage maximum scale value (1/3)

STEP	V unit
1	15V
2	16V
3	18V
4	20V
5	22V
6	24V
7	25V
8	30V
9	32V
10	36V
11	40V
12	45V
13	48V
14	50V
15	60V
16	64V
17	72V
18	75V
19	80V
20	90V
21	96V
22	100V
23	120V
24	150V
25	160V
26	180V
27	200V
28	220V
29	240V
30	250V
31	300V
32	320V
33	360V
34	400V
35	450V
36	480V
37	500V
38	600V
39	640V
40	720V
41	750V
42	800V
43	900V
44	960V
45	1000V
46	1200V
47	1500V
48	1600V
49	1800V
50	2000V

Voltage maximum scale value (2/3)

STEP	V unit	kV unit
51	2200V	
52	2400V	
53	2500V	
54	3000V	
55	3200V	
56	3600V	
57	4000V	
58	4500V	
59	4800V	
60	5000V	
61	6000V	
62	6400V	
63		7.2kV
64		7.5kV
65		8kV
66		9kV
67		9.6kV
68		10kV
69		12kV
70		15kV
71		16kV
72		18kV
73		20kV
74		22kV
75		24kV
76		25kV
77		30kV
78		32kV
79		36kV
80		40kV
81		45kV
82		48kV
83		50kV
84		60kV
85		64kV
86		72kV
87		75kV
88		80kV
89		90kV
90		96kV
91		100kV
92		120kV
93		150kV
94		160kV
95		180kV
96		200kV
97		220kV
98		240kV
99		250kV
100		300kV

Voltage maximum scale value (3/3)

STEP	kV unit
101	320kV
102	360kV
103	400kV
104	450kV
105	480kV
106	500kV
107	600kV
108	640kV
109	720kV
110	750kV
111	800kV
112	900kV
113	960kV
114	1000kV
115	1200kV
116	1500kV
117	1600kV
118	1800kV
119	2000kV
120	2200kV

6.3 Possible Setting Range for Maximum Scale

■Maximum scale value for active power / reactive power

Possible setting range:-18 STEP to +3STEP of the rating
Example: When the rating is 1000W, the value is from 200W to 1600W.

Maximum scale value of active power (1/5)

STEP	W unit
1	8W
2	9W
3	9.6W
4	10W
5	12W
6	15W
7	16W
8	18W
9	20W
10	22W
11	24W
12	25W
13	30W
14	32W
15	36W
16	40W
17	45W
18	48W
19	50W
20	60W
21	64W
22	72W
23	75W
24	80W
25	90W
26	96W
27	100W
28	120W
29	150W
30	160W
31	180W
32	200W
33	220W
34	240W
35	250W
36	300W
37	320W
38	360W
39	400W
40	450W
41	480W
42	500W
43	600W
44	640W
45	720W
46	750W
47	800W
48	900W
49	960W
50	1000W

Maximum scale value of active power (2/5)

STEP	W unit	kW unit
51	1200W	
52	1500W	
53	1600W	
54	1800W	
55	2000W	
56	2200W	
57	2400W	
58	2500W	
59	3000W	
60	3200W	
61	3600W	
62	4000W	
63	4500W	
64	4800W	
65	5000W	
66	6000W	
67	6400W	
68	7200W	
69	7500W	
70	8000W	
71		9kW
72		9.6kW
73		10kW
74		12kW
75		15kW
76		16kW
77		18kW
78		20kW
79		22kW
80		24kW
81		25kW
82		30kW
83		32kW
84		36kW
85		40kW
86		45kW
87		48kW
88		50kW
89		60kW
90		64kW
91		72kW
92		75kW
93		80kW
94		90kW
95		96kW
96		100kW
97		120kW
98		150kW
99		160kW
100		180kW

Maximum scale value of active power (3/5)

STEP	kW unit	MW unit
101	200kW	
102	220kW	
103	240kW	
104	250kW	
105	300kW	
106	320kW	
107	360kW	
108	400kW	
109	450kW	
110	480kW	
111	500kW	
112	600kW	
113	640kW	
114	720kW	
115	750kW	
116	800kW	
117	900kW	
118	960kW	
119	1000kW	
120	1200kW	
121	1500kW	
122	1600kW	
123	1800kW	
124	2000kW	
125	2200kW	
126	2400kW	
127	2500kW	
128	3000kW	
129	3200kW	
130	3600kW	
131	4000kW	
132	4500kW	
133	4800kW	
134	5000kW	
135	6000kW	
136	6400kW	
137	7200kW	
138	7500kW	
139	8000kW	
140		9MW
141		9.6MW
142		10MW
143		12MW
144		15MW
145		16MW
146		18MW
147		20MW
148		22MW
149		24MW
150		25MW

Maximum scale value of active power (4/5)

STEP	MW unit
151	30MW
152	32MW
153	36MW
154	40MW
155	45MW
156	48MW
157	50MW
158	60MW
159	64MW
160	72MW
161	75MW
162	80MW
163	90MW
164	96MW
165	100MW
166	120MW
167	150MW
168	160MW
169	180MW
170	200MW
171	220MW
172	240MW
173	250MW
174	300MW
175	320MW
176	360MW
177	400MW
178	450MW
179	480MW
180	500MW
181	600MW
182	640MW
183	720MW
184	750MW
185	800MW
186	900MW
187	960MW
188	1000MW
189	1200MW
190	1500MW
191	1600MW
192	1800MW
193	2000MW
194	2200MW
195	2400MW
196	2500MW
197	3000MW
198	3200MW
199	3600MW
200	4000MW

Maximum scale value of active power (5/5)

STEP	MW unit
201	4500MW
202	4800MW
203	5000MW
204	6000MW
205	6400MW
206	7200MW
207	7500MW
208	8000MW

Note: For reactive power or apparent power, read kW of above as kvar or kVA.

6. Other

6.4. Measurement Items and Correspondence between Display and Output

The table below shows the measurement items and correspondence between display and output.

○ : Data can be displayed or output　　－ : Data cannot be displayed or output

Measurement item			Item measurement display												Analog				Pulse	Communication
			3-phase 4-wire			3-phase 3-wire(3CT)			3-phase 3-wire(2CT) 1-phase 3-wire			1-phase 2-wire			3-phase 4-wire	3-phase 3-wire(3 CT)	3-phase 3-wire (2CT), 1-phase 3-wire	1-phase 2-wire		
			Inst	Max	Min	Inst	Max	Min	Inst	Max	Min	Inst	Max	Min						
Current	1 phase		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	
	2 phase		○	○	○	○	○	○	○	○	○	-	-	-	○	○	○	-	-	
	3 phase		○	○	○	○	○	○	○	○	○	-	-	-	○	○	○	-	-	
	AVG		○	○	○	○	○	○	○	○	○	-	-	-	○	○	○	-	-	
	N phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
Current demand	1 phase		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	
	2 phase		○	○	○	○	○	○	○	○	○	-	-	-	○	○	○	-	-	
	3 phase		○	○	○	○	○	○	○	○	○	-	-	-	○	○	○	-	-	
	AVG		○	○	○	○	○	○	○	○	○	-	-	-	○	○	○	-	-	
	N phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
Voltage	1-N phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	2-N phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	3-N phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	AVG(L-N)		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	1-2 phase		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	
	2-3 phase		○	○	○	○	○	○	○	○	○	-	-	-	○	○	○	-	-	
	3-1 phase		○	○	○	○	○	○	○	○	○	-	-	-	○	○	○	-	-	
	AVG(L-L)		○	○	○	○	○	○	○	○	○	-	-	-	○	-	-	-	-	
Active power	1 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	2 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	3 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	Σ		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	
Reactive power	1 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	2 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	3 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	Σ		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	
Apparent power	1 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	2 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	3 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	Σ		○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	
Power factor	1 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	2 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	3 phase		○	○	○	-	-	-	-	-	-	-	-	-	○	-	-	-	-	
	Σ		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	
Frequency			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	
Harmonic Current (Note 1)	RMS value	1 phase	○	Max Phase	-	○	Max Phase	-	○	Max Phase	-	○	○	-	Total	Total	Total	Total	-	○ (Note3)
		2 phase	○		-	○		-	-		-	-	-	-	Total	Total	-	-	-	
		3 phase	○		-	○		-	○		-	-	-	-	Total	Total	Total	-	-	
		N phase	○	○	-	-	-	-	-	-	-	-	-	-	Total	-	-	-	-	
	Distortion ratio	1 phase	○	-	-	○	-	-	○	-	-	○	-	-	-	-	-	-	-	
		2 phase	○	-	-	○	-	-	-	-	-	-	-	-	-	-	-	-	-	
		3 phase	○	-	-	○	-	-	○	-	-	-	-	-	-	-	-	-	-	
		N phase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Harmonic Voltage (Note 1)	RMS value	1-N phase	○	Primary Max Phase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		2-N phase	○		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		3-N phase	○		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		1-2 phase	-	-	-	○	Primary Max	-	○	Primary Max	-	○	Primary	-	-	-	-	-	-	
		2-3 phase	-	-	-	○		-	○		-	-	-	-	-	-	-	-	-	
		3-1 phase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Distortion ratio	1-N phase	○	Max Phase	-	-	-	-	-	-	-	-	-	-	Total	-	-	-	-	
		2-N phase	○		-	-	-	-	-	-	-	-	-	-	Total	-	-	-	-	
		3-N phase	○		-	-	-	-	-	-	-	-	-	-	Total	-	-	-	-	
		1-2 phase	-	-	-	○	Max Phase	-	○	Max Phase	-	○	○	-	-	Total	Total	Total	-	
		2-3 phase	-	-	-	○		-	○		-	-	-	-	-	Total	Total	-	-	
		3-1 phase	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Active energy	2/4 quadrant counting	Imported	○			○			○			○			-	-	-	-	○	
		Exported	○			○			○			○			-	-	-	-	○	
Active energy	Periodic	1	○			○			○			○			-	-	-	-	○	
		2	○			○			○			○			-	-	-	-	○	
Reactive energy	2 quadrant counting (Note2)	Imported	○			○			○			○			-	-	-	-	○	
		Exported	○			○			○			○			-	-	-	-	○	
	4 quadrant counting	Imported lag	○			○			○			○			-	-	-	-	○	
		Imported lead	○			○			○			○			-	-	-	-	○	
		Exported lag	○			○			○			○			-	-	-	-	○	
		Exported lead	○			○			○			○			-	-	-	-	○	
Apparent Energy		Imported+ Exported	○			○			○			○			-	-	-	-	○	
Rolling Demand(Active power)			○	○	-	○	○	-	○	○	-	○	○	-	-	-	-	-	-	
Rolling Demand(Reactive power)			○	○	-	○	○	-	○	○	-	○	○	-						
Rolling Demand(Apparent power)			○	○	-	○	○	-	○	○	-	○	○	-						
Operation time		1	○			○			○			○			-	-	-	-	-	
		2	○			○			○			○			-	-	-	-	-	

Note 1: RMS values of harmonics are total value and 1st to 19th (odd only). Distortion ratios of harmonics are total value and 3rd to 19th (odd only).

Note 2: "Imported" is what "Imported lag" and "Exported lead" are counted as a single division. "Exported" is what "Imported lead" and "Exported lag" are counted as a single division.

Note 3: The values which can be monitored by communication are same as the values displayed.

Note 4: When 1-phase 3-wire is selected, read the phase for the measurement item according to the following table.

Phase wire method	1 -phase	2 -phase	3 -phase	12 -phase	23 -phase	31 -phase
1-phase 3-wire (1N2)	1 -phase	N -phase	2 -phase	1N -phase	2N -phase	12-phase
1-phase 3-wire (1N3)	1 -phase	N -phase	3 -phase	1N -phase	3N -phase	13 -phase

6. Other

6.5. Measurement Characteristic

■Metering actions in other than operation mode

Status	Measurement	Display	Analog output	Alarm contact point	Pulse output
Several seconds just after turning on the auxiliary power supply (Backlight is lit, and LCD is not lit.)	No measurement	No display	Output over about 100% may be made until internal voltage becomes stable.	Opened	No output
Setting mode, Set value confirmation mode Password protection mode	Same actions as in operation mode	No display of measured value	Same actions as in operation mode	Status before getting into setting mode and set value confirmation mode is kept.	Same actions as in operation mode
During power failure	No measurement	No display	No output	Opened	No output

■Metering actions in input status

Measurement items	Actions	
Current (A) Current demand (DA)	0A when the input current is less than 0.005A	When it is over the upper limit of the possible display range (9999), the upper limit of the possible display range (9999) is displayed.
Voltage (V)	0V when the input voltage (line voltage) is less than11V. For 3-phase 4-wire, 0V when the line to neutral voltage is less than 11V or the line to line voltage is less than 19V. For 1-phase 3-wire, 0V when the voltage between P1-P3 is less than 22V.	When it is over the upper limit of the possible display range (9999), the upper limit of the possible display range (9999) is displayed. (Note 2)
Active power (W) Reactive power (var) Apparent power (VA)	0W, 0var and 0VA for total when the current and the voltage are 0A and 0V for all 3 phases. 0W, 0var and 0VA for each phase when the current of phase n is 0A or the voltage of phase n is 0V. (where n = 1,2 or 3)	When it is over the upper limit of the possible display range (9999), the upper limit of the possible display range (9999) is displayed.
Power factor (PF)	1.0 for total when the current and the voltage are 0A and 0V for all 3 phases. 1.0 for each phase when the current of phase n is 0A or the voltage of phase n is 0V. (where n = 1,2 or 3)	
Frequency (Hz)	When the input voltage of phase1 is low voltage, ---- will be displayed. Input 22V or more.	When the frequency is less than 44.5Hz or over 99.9Hz, ---- is displayed.
Harmonic current (HI)	For effective value measurement : When the current is 0A, 0A is displayed. (Each phase) : When the voltage of phase1 is 0V or the frequency is less than 44.5Hz, ---- is displayed for all phases.	For content factor measurement : When the 1st current harmonic is 0A, 0% is displayed. (Each phase) : When the voltage of phase1 is 0V or the frequency is less than 44.5Hz, ---- is displayed for all phases
Harmonic Voltage (HV)	For effective value measurement : When the current is 0V, 0V is displayed. (Each phase) : When the voltage of phase1 is 0V or the frequency is less than 44.5Hz, ---- is displayed for all phases.	For content factor measurement : When the voltage is 0V, 0% is displayed. (Each phase) : When the voltage of phase1 is 0V or the frequency is less than 44.5Hz, ---- is displayed for all phases
Operating Time	999999 hour is displayed if it is over 999999.	

Note1: Input current and input voltage means the input to the instrument. They are not to primary sides of VT, CT.

Note2: For direct measurement, it does not input upper maximum scale value.

■Analog output action

Output setting	Output range
Output limit setting is “ON”	-1% to 101% of span
Output limit setting is “OFF”	-5% to 105% of span

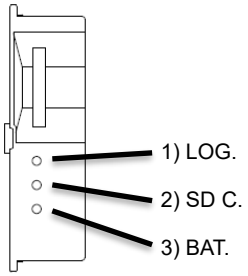
6. Other

6.6. Troubleshooting

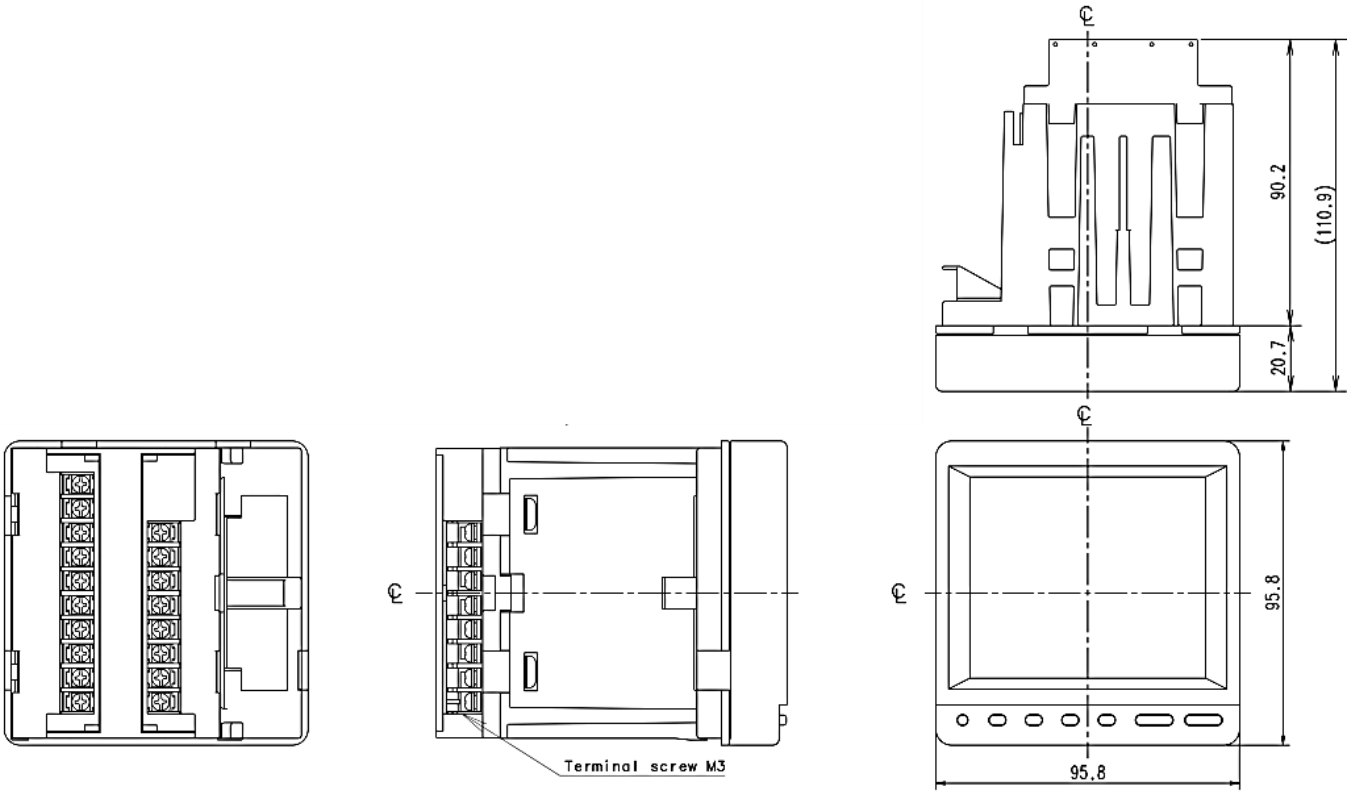
In the case of abnormal noise, odor, smoke, or heat generation from this instrument, turn it off at once.
Check the followings before you ask for repair.

	Condition	Possible cause	Solution
Display	The display is not lit.	Auxiliary power supply is not impressed on MA and MB terminals.	Impress auxiliary power supply.
	When the auxiliary power supply is impressed, display is not lit soon.	This is not an error. For about a few seconds after auxiliary power source is charged, initialization of internal circuit is carried out.	Use it as it is.
	The back light is not lit.	The back light may be set to auto off (Auto). (If it turns on after you press an operation button, it means the backlight is set to auto off.)	When the auto off is enabled, it automatically turns off in 5 minutes. Continue using it as it is or change the setting to HoLd (it stays on). (Refer to page 33)
	The display becomes black.	It may become black owing to static electricity.	It goes off after a while.
	“End” display remains.	The product is still in the setting mode.	Press (SET) .
Measurement error	The current and voltage have large errors.	The settings for VT / direct voltage and CT primary current may be incorrect.	Please check the set values for VT / direct voltage and CT primary current.
	The current and voltage are correct, but the active power, reactive power, and power factor have large errors.	The wiring for VT/CT or for the measurement instrument may be incorrect.	Please check the wiring for VT/CT and for the measurement instrument.
	Measured values of PF are including large error.	If the input current is smaller than the rating, error becomes large. (about 5% or below of rated current)	This is not an error, or uses it as it is, or if error is troublesome, changes the CT according to the actual current to be used.
	The displayed active power is different from the active power that is calculated by multiplying the displayed current, voltage, and power factor.	If the AC of the current and voltage deteriorate due to harmonics, it will not be the same as the calculated value. (For AC without harmonics, the calculated value will match with the displayed value.)	Please continue using the instrument as it is.
	The total effective harmonics value from the harmonic current is very different from the current value.	The distortion factor (content factor) is way over 100%. (Such as measurement of the inverter secondary side output)	Please check the measured item.
	The current measured by another measurement instrument (such as a clamp meter) is different from the current measured by this instrument. (More than the tolerance)	If another measurement instrument uses the average method for measuring, the measurement instrument used will have a larger error when the AC deteriorates due to harmonics. (This measurement instrument uses the RMS value method.)	Please compare the currents using a measurement instrument that uses the RMS value method.
	Analog output has a large error.	If the wiring to the receptor is long, the error may increase.	Perform the zero and span adjustment for analog output. (Refer to page 60.)
	Pulse output has a large error.	When the pulse unit is set to the minimum value and the pulse width is set to 0.500s or 1.000s, the pulse output cannot follow if the load is too large, which can result in a decrease in the pulse output number.	Review the pulse unit or pulse width setting (refer to pages 38).
	On the maximum/minimum value display screen, a present value that is outside of the maximum/minimum range is displayed.	During the starting current delay time, the maximum value is not updated, so the present value that is over the maximum value may be displayed.	Please continue using the instrument as it is.
Operation	Cannot change the settings in the setting mode.	If SET at the bottom of the screen is blinking, you are in the set value confirmation mode. Settings cannot be changed in this mode.	Please go to the setting mode to change settings.
	“PASS 0000” appears when trying to change the setting mode.	The password protection setting is turned to valid.	Please enter the set password. Also, the default password is “0000” (Refer to page 76)
Other	Maximum value and minimum value changed.	These are cleared if the settings for the phase wire, VT/direct voltage, and CT primary current are changed.	Make a note of the values before changing the settings
	The values of the setting items that were not supposed to change have changed.	Some setting items return to the default values when settings for the phase wire method, VT/direct voltage, and CT primary current are changed.	Please refer to “Initializing Related Items by Changing Settings” (page 51) and reconfigure the setting items that returned to their default values.
	“PASS 0000” appears when trying to clear the energy or maximum/minimum value.	The password protection setting is turned to valid.	Please enter the set password. Also, the default password is “0000” (Refer to page 76)

6.6 Troubleshooting

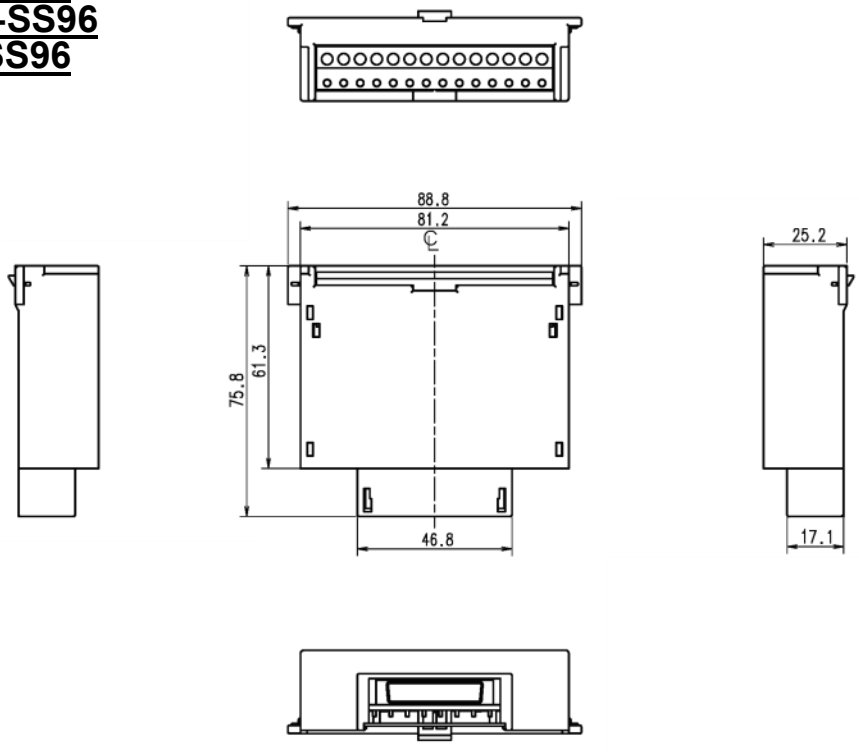
	Condition	Possible cause	Solution
Communication or Logging	COM in the LCD screen is blinking. (Appears for 0.25sec. / Disappears for 0.25sec.)	MODBUS RTU® communication error as follows was detected. ・Communication setting(Slave address, baud rate, stop bit and parity) was incorrect. ・Function code was incorrect. ・Register address was incorrect. etc.	Review the communication setting, the function code and the register address and so on. If the correct query received, COM is lit.
	COM in the LCD screen is blinking. (Appears for 1sec. / Disappears for 1sec.)	When using ME-0000MT-SS96, MODBUS TCP® communication error as follows was detected. ・MODBUS TCP® application protocol header was incorrect. ・Function code was incorrect. ・Register address was incorrect. etc.	Review the MODBUS TCP® application protocol header, the function code and the register address and so on. If the correct query received, COM is lit.
		When using ME-0000BU-SS96, the error as follows was detected. ・Setting value set from the SD card was incorrect. ・SD memory card error. ・The battery is low voltage. etc.	Check the LEDs of ME-0000BU-SS96.  1) LOG. LED is blink quickly. When Setting of Logging-item pattern is LP00, Setting data file needed to store in SD memory card was incorrect. Review the setting data file in SD memory card. 2) SD C. LED is blink quickly. Check whether the SD memory card is write-protect and SD memory card capacity is sufficient or not. 3) BAT. LED is lit. The voltage of the embedded lithium battery becomes low. It is impossible for customer to exchange the battery. Please consider renewal.

ME96SSRA-MB

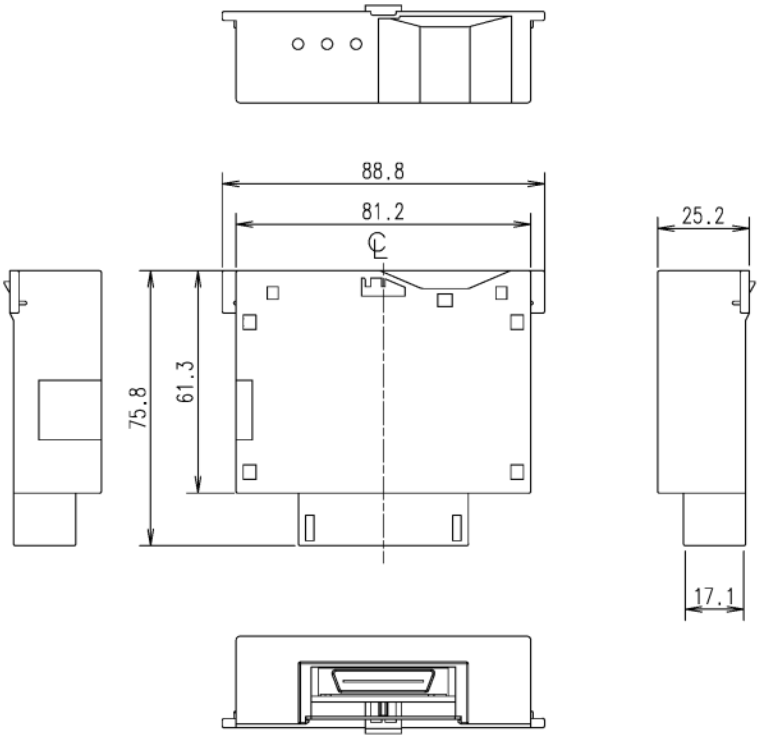


Optional Plug-in Module

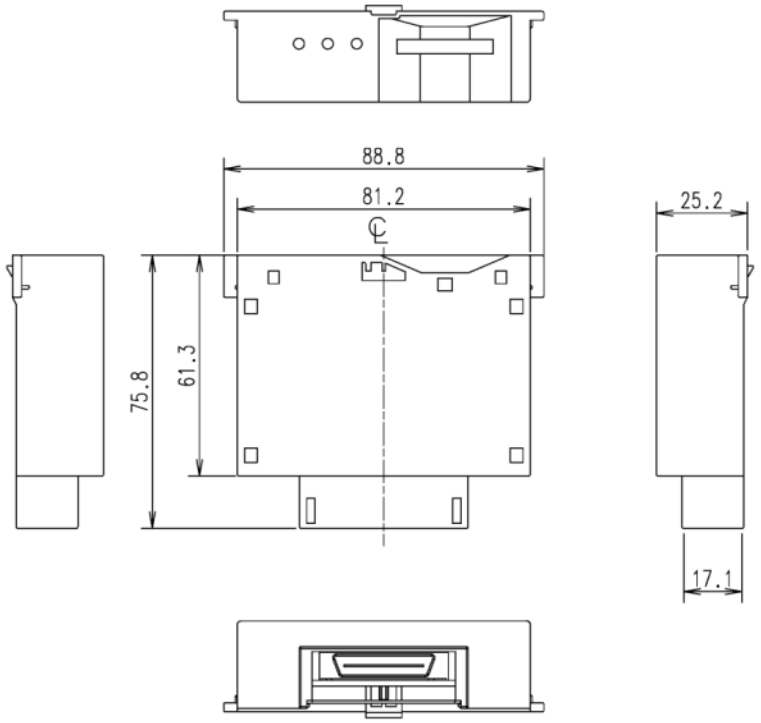
ME-4210-SS96
ME-0040C-SS96
ME-0052-SS96



Optional Plug-in Module
ME-0000MT-SS96



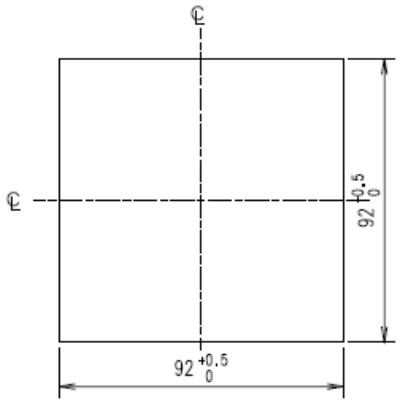
Optional Plug-in Module
ME-0000BU-SS96



Installation 2. Mounting

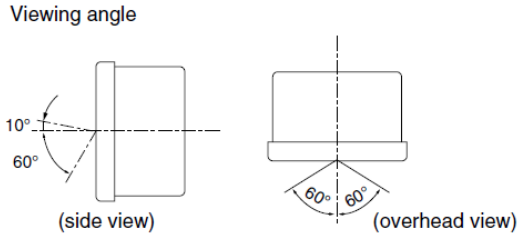
1 Dimensions of mounting holes

The drilling dimensions of the panel are as shown in the right figure.
The product can be installed to a panel having a thickness of 1.6 to 4.0 mm.



2 Mounting position

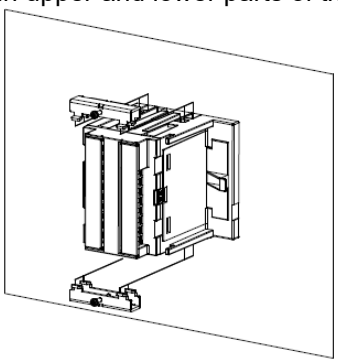
The contrast of the LCD changes depending on the angle at which it is viewed.
Mount the product in the easy viewable position.



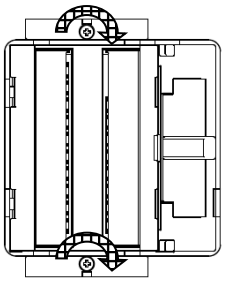
3 Mounting and fixing

Mount the product to the panel of the main unit according to the following procedure.

①Attach the mounting brackets to two areas each in upper and lower parts of the main unit.



②Tighten the screws of the mounting brackets to fix them to the panel.



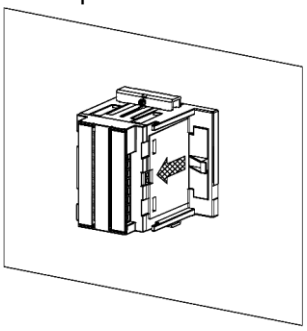
Note	To avoid damage to the panel and screws, do not overtighten the screws. The recommended torque for this product is 0.3 N•m to 0.5 N•m (about half the normal torque). Tighten the upper and lower screws evenly.

Screw type for mounting to the main unit: M3

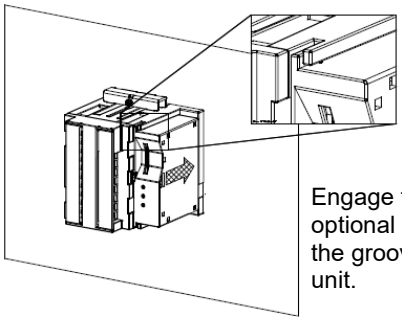
4 Mounting the optional plug-in module

Mount the optional plug-in module to the main unit according to the following procedure.

①Remove the optional cover.



②Mount the optional plug-in module to the main unit.



Engage the convex of the optional plug-in module in the groove of the main unit.

Note

Protecting sheet

The LCD part is covered with a protecting sheet to avoid scratches to the LCD during mounting of the panel. Before starting operation, remove the sheet. When removing the sheet, the LCD may illuminate due to static electricity, but this is not a product failure. After a while, the LCD goes off as it naturally discharges electricity.

Mounting position

To mount the product to the edge of the panel, check the space for wiring work before determining the mounting position.

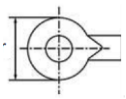
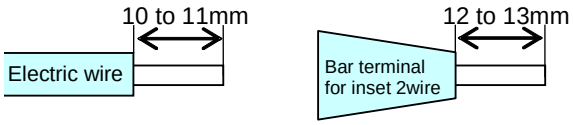
Optional plug-in module

Turn off the auxiliary power before mounting the optional plug-in module.
If the optional plug-in module is mounted during energization, the optional plug-in module cannot be recognized on the main unit side.
In this case, turning on/restoring the auxiliary power or performing operation of “restarting the instrument” allows the optional plug-in module to be recognized.

Installation 3. Wiring

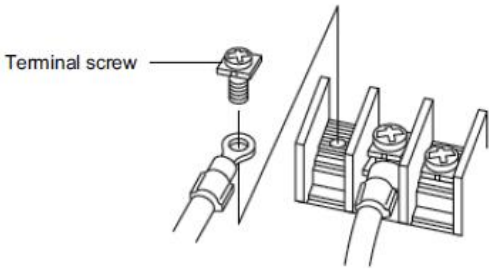
1 Applicable electric wire specifications

The following table shows applicable electric wire sizes.

Section	Screw type	Specification of wire used	Tightening torques
Terminal of main unit. (Auxiliary power, Voltage input, Current input, MODBUS®RTU communication terminal)	M3	・Use crimping terminals: AWG26 to 14 (Connectable 2 wires) Applicable crimping terminals: Outer Diameter  For M3 screw with an outer diameter of less than 6.0mm.	0.6 to 0.8N･m
Terminal of Optional plug-in module ・ME-4210-SS96 ・ME-0040C-SS96 ・ME-0052-SS96	Without screw	Single wire, Stranded wire: AWG24 to 14 Wire coating stripping length：10 to 11mm (Stranded wire is bar terminal can be used in combination.) Note: UL recognized corresponds, use according to the following conditions. ・Single wire, Stranded wire: AWG24 to 18 ・Bar terminal can be not used in combination. Note: When using the bar terminal for insert 2 wire, please select insertion length of 12 to 13mm. 	-

2 Wiring of the main unit.

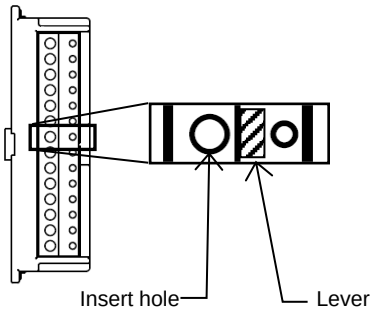
Be sure to securely tighten the terminal screws to the terminal block.



⚠CAUTION	・ Please do not connect three or more electric wires to one terminal. This can cause heat and fire due to imperfect contact. ・ If you are using bare crimped terminals, provide the insulation needed to cover exposed live parts and prevent electric shock and short circuits (e.g., use insulated tubing).

3 Connection method of terminal of optional plug-in module.

①Peel the cover of the electric wire tip or crimp the bar terminal.
②With the lever pressed, insert the electric wire
and then release the lever for connection.



4 Checking

Check the following after connection.
□The electric wire is securely connected.
□There is no error in connection.

Installation 3. Wiring

⚠CAUTION

Do not work with live wires

Do not connect terminal and RJ-45 connector with live wires.
Do not insert and remove SD CRAD with live wires.
It may cause electric shock, burns, device burn out, or fire.
It is recommended that a protection fuse be used for VT and the auxiliary power source.

Do not open the secondary side of the CT circuit

Connect the CT secondary side signal correctly to the terminal for CT connection.
If the CT is not connected properly or if the secondary side of the CT is open, it may result in high voltage on the secondary side of the CT, the insulation of the secondary winding wire may be damaged, and burnout may be caused.

Do not short the secondary side of the VT circuit

Connect the VT secondary side signal correctly to the terminal for VT connection.
If the VT is not connected properly or if the secondary side of the VT shorts, over current may flow to the secondary side of the VT, which can burn out the secondary winding wire. If the secondary winding wire burns out, it can damage the insulation of the primary winding wire, resulting in a short between phases.

Make sure connections to the connection terminals are tight

Electrical wires must be properly tightened to the connection terminal.
Otherwise, heat and measurement errors may be caused.

Do not forget wiring of "C_1","C_2" and "C_3" for pass.

When the L side of CT circuit is common wire, it is necessary to short-circuit "C1","C2", and "C3" terminal of this device.

Do not use improper electrical wires

Make sure that the electrical wires have the proper rating for current and voltage.
If inappropriate electrical wires are used, fire may be caused.

Do not pull the connection wires with force

If the terminal wiring is pulled with a strong force, the input and output portion may detach.
(Tensile load: 39.2N or less)

Do not apply an abnormal voltage.

If a pressure test is given to a high-pressure device, a ground must be used in order to avoid damaging this measurement instrument. If a high voltage of AC2000V is applied for over one minute to the measurement instrument, damage may occur.

Do not connect to Non-Connection (NC) terminal.

Do not connect to Non-Connection (NC) terminals for the purpose of relay etc.

Use the proper voltage for the auxiliary power source.

Use the proper voltage for the auxiliary power source terminal.
If an improper voltage is used, the instrument may be damaged or fire may be caused.

Installation 4. Wiring Diagram

Rating voltage for every phase wire system

Phase wire type	Type	Rating voltage	Figure
3-phase 4-wire type	STAR	max AC277V(L-N)/480V(L-L)	Figure 1
3-phase 3-wire type	DELTA	max AC220V(L-L)	Figure 2
	STAR	max AC440V(L-L)	Figure 3
1-phase 3-wire type	—	max AC220V(L-N)/440V(L-L)	Figure 4
1-phase 2-wire type (Note)	DELTA	max AC220V(L-L)	Figure 5
	STAR	max AC440V(L-L)	Figure 6

Note. In case of a circuit which is wired from the delta connection of a 3-phase 3-wire type or a circuit of a transformer of a 1-phase 2-wire type, the maximum rating is “AC220V”.
In case of a circuit which is wired from a 3-phase 4-wire type, the star connection of a 3-phase 3-wire type or a 1-phase 3-wire type, the maximum rating is “AC440V”.

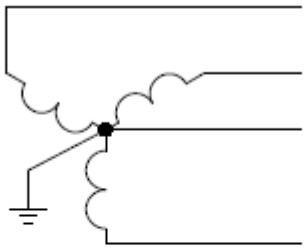


Figure1. 3-PHASE 4-WIRE(STAR)

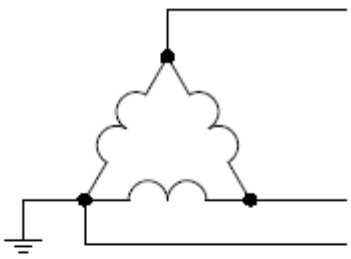


Figure2. 3-PHASE 3-WIRE(DELTA)

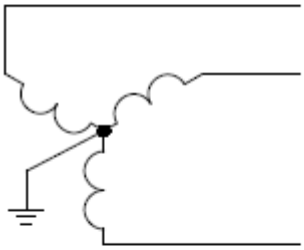


Figure3. 3-PHASE 3-WIRE(STAR)

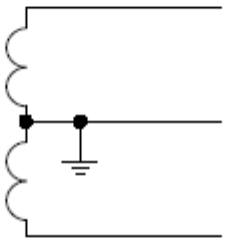


Figure4. 1-PHASE 3-WIRE

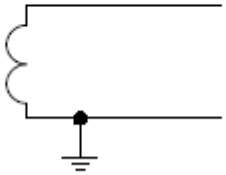
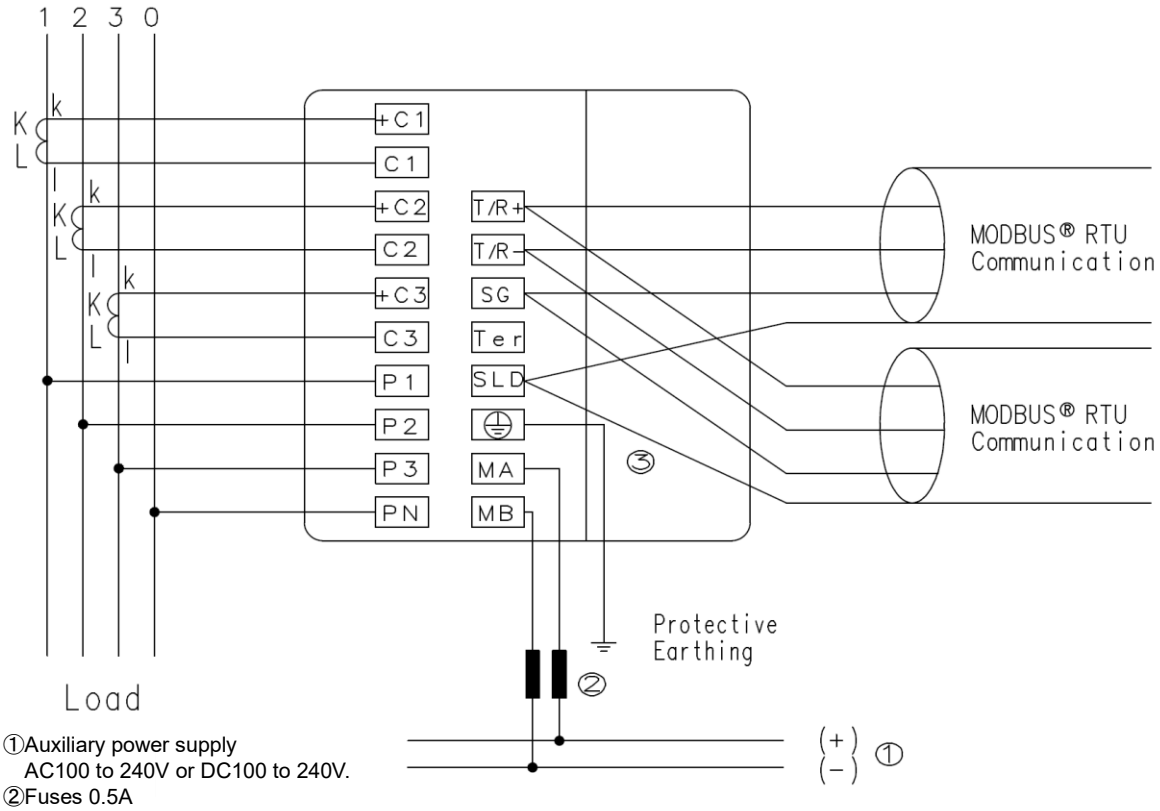


Figure5. 1-PHASE 2-WIRE(DELTA)

Figure6. 1-PHASE 2-WIRE(STAR)

Installation 4. Wiring Diagram

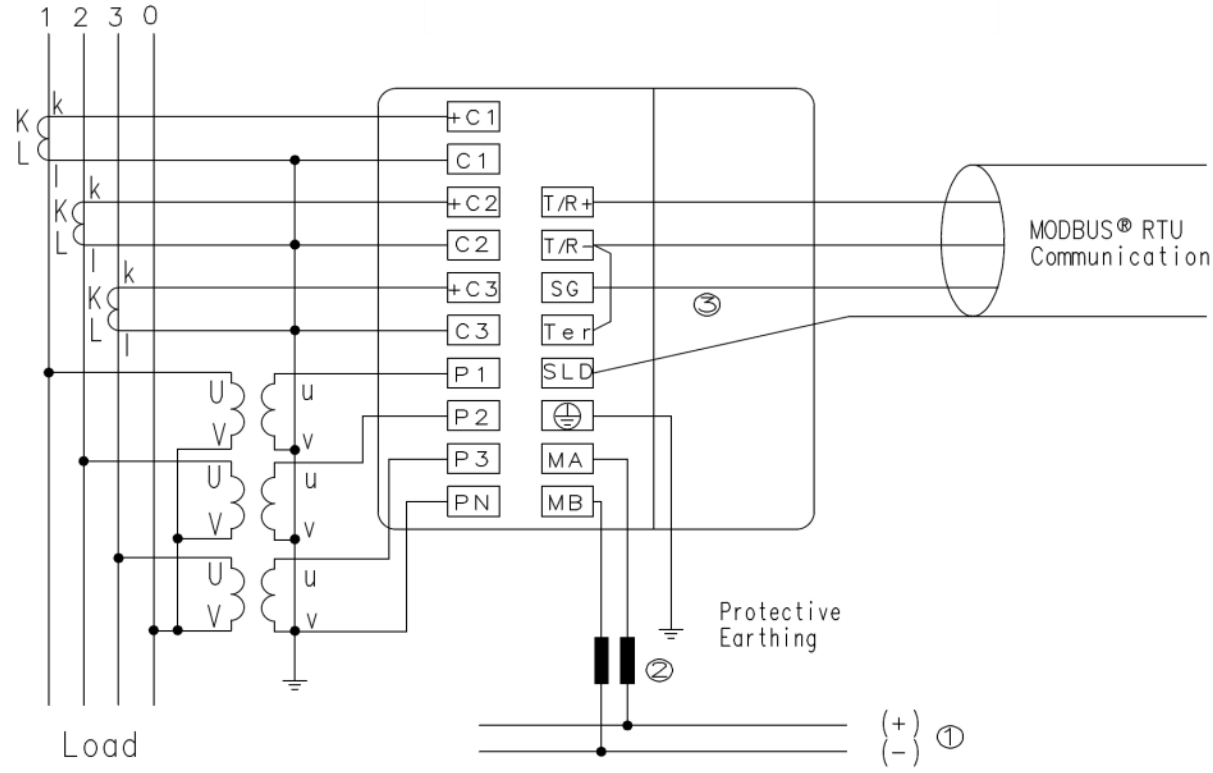
3-phase 4-wire type: Direct input



①Auxiliary power supply
AC100 to 240V or DC100 to 240V.
②Fuses 0.5A
③Some MODBUS®RTU equipment doesn't have SG. In this case, the wiring between SG is unnecessary.

Note 1: For low voltage circuits, grounding the secondary side of VT and CT is not t necessary.

3-phase 4-wire type: With VT

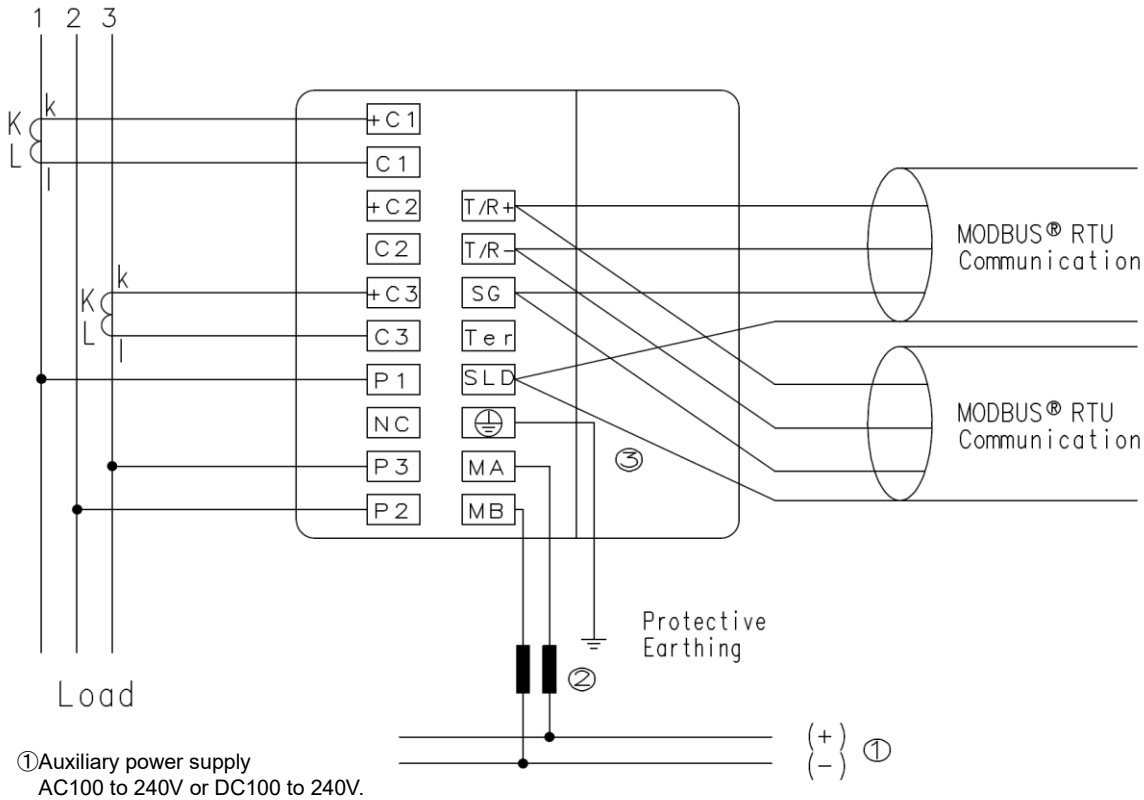


①Auxiliary power supply
AC100 to 240V or DC100 to 240V.
②Fuses 0.5A
③Some MODBUS®RTU equipment doesn't have SG. In this case, the wiring between SG is unnecessary.

Note 1: For low voltage circuits, grounding the secondary side of VT and CT is not t necessary.

Installation 4. Wiring Diagram

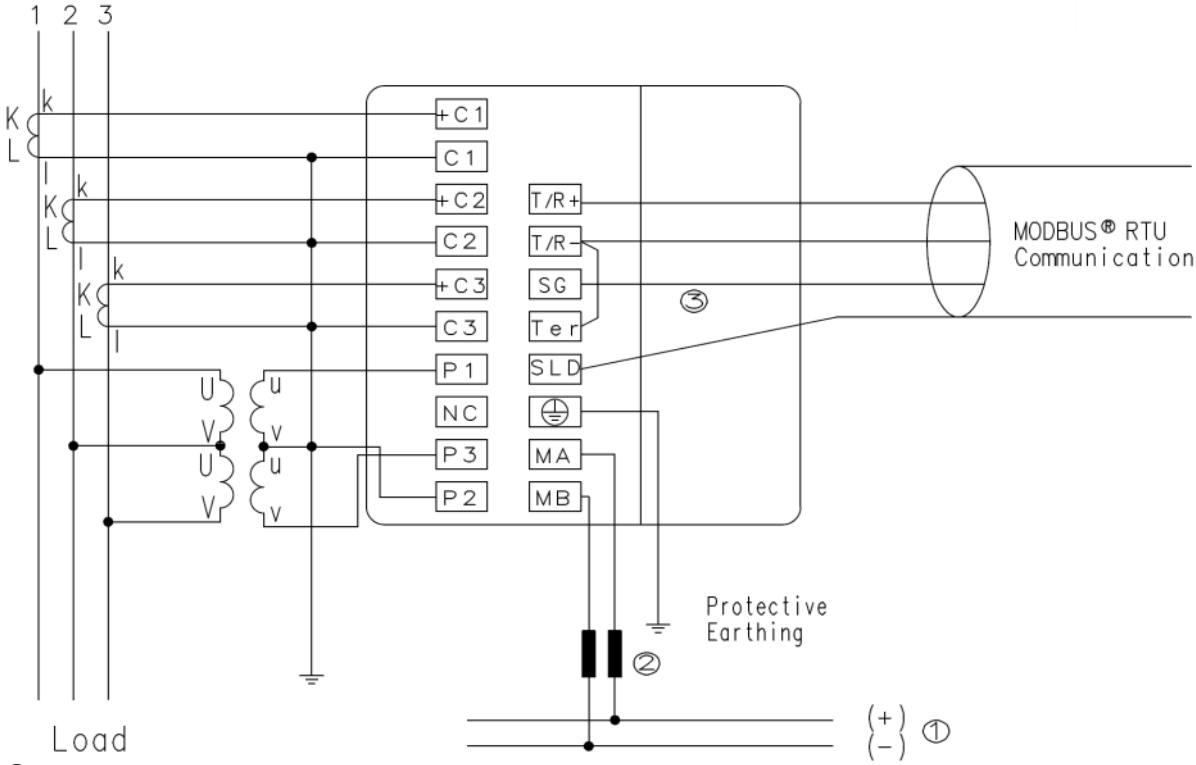
3-phase 3-wire(2CT) type: Direct input



①Auxiliary power supply
AC100 to 240V or DC100 to 240V.
②Fuses 0.5A
③Some MODBUS®RTU equipment doesn't have SG. In this case, the wiring between SG is unnecessary.

Note 1: For low voltage circuits, grounding the secondary side of VT and CT is not t necessary.
Note 2: Do not connect to NC terminal.

3-phase 3-wire(3CT) type: With VT

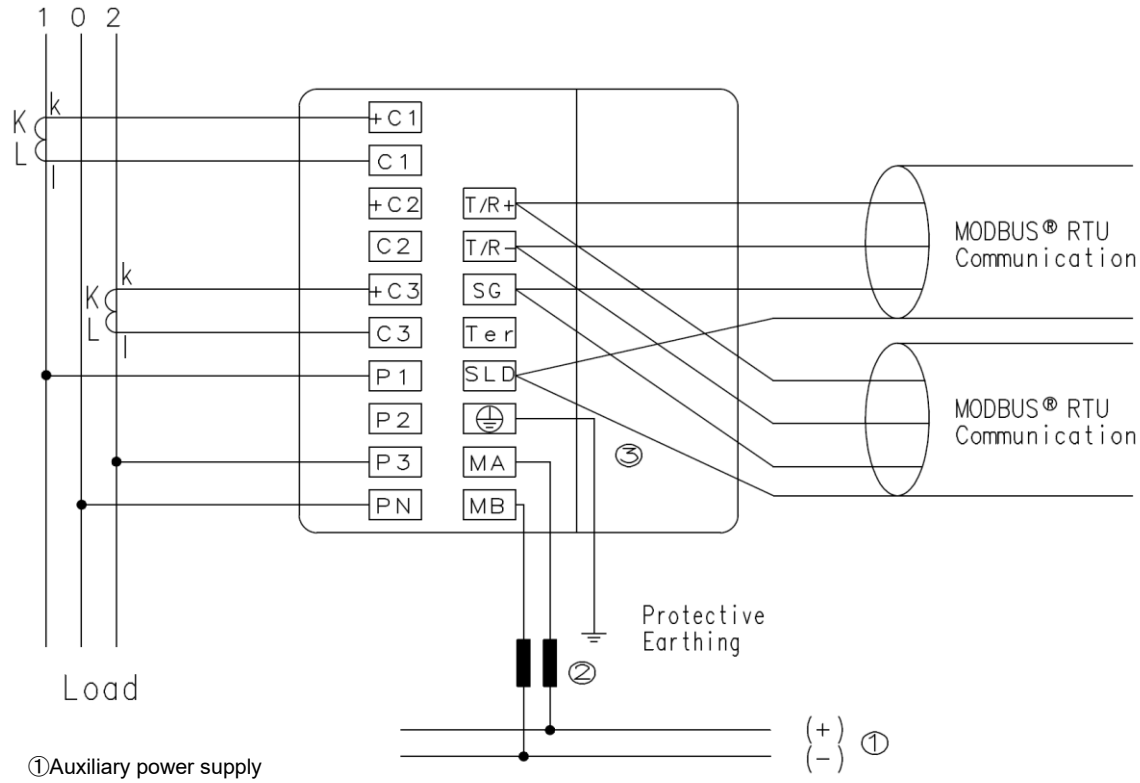


①Auxiliary power supply
AC100 to 240V or DC100 to 240V.
②Fuses 0.5A
③Some MODBUS®RTU equipment doesn't have SG. In this case, the wiring between SG is unnecessary.

Note 1: For low voltage circuits, grounding the secondary side of VT and CT is not t necessary.
Note 2: Do not connect to NC terminal.

Installation 4. Wiring Diagram

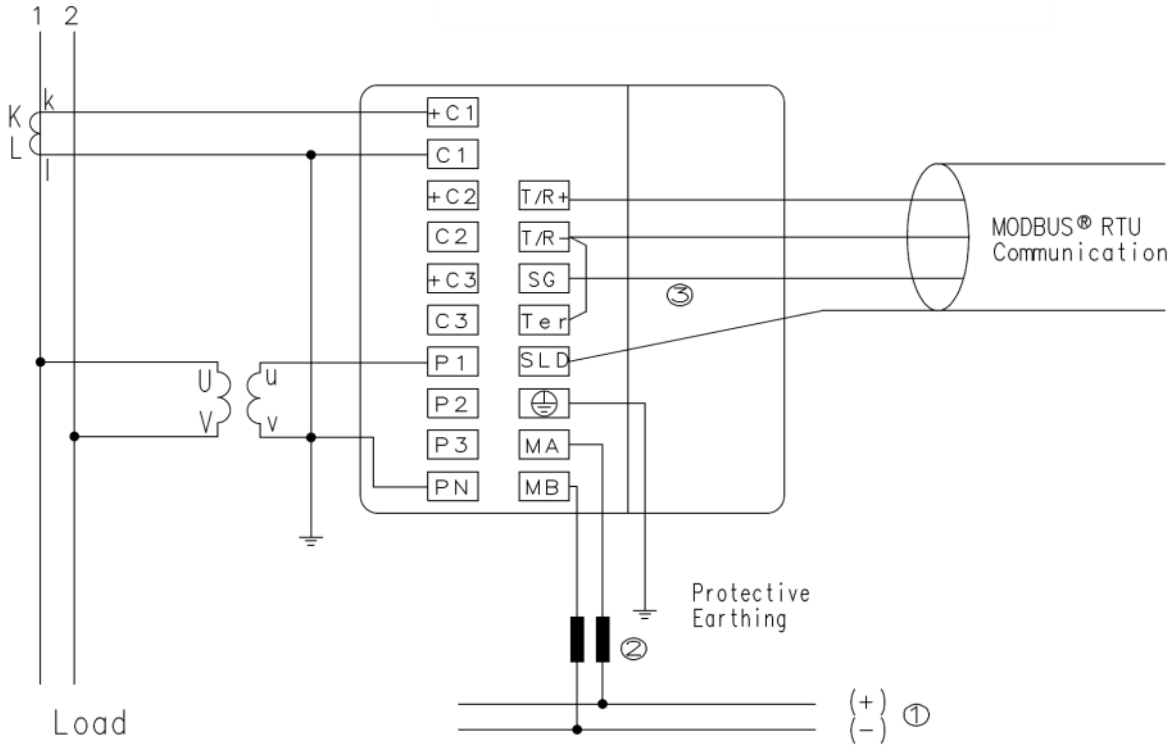
1-phase 3-wire type



①Auxiliary power supply
AC100 to 240V or DC100 to 240V.
②Fuses 0.5A
③Some MODBUS®RTU equipment doesn't have SG. In this case, the wiring between SG is unnecessary.

Note 1: For low voltage circuits, grounding the secondary side of CT is not t necessary.

1-phase 2-wire type: With VT

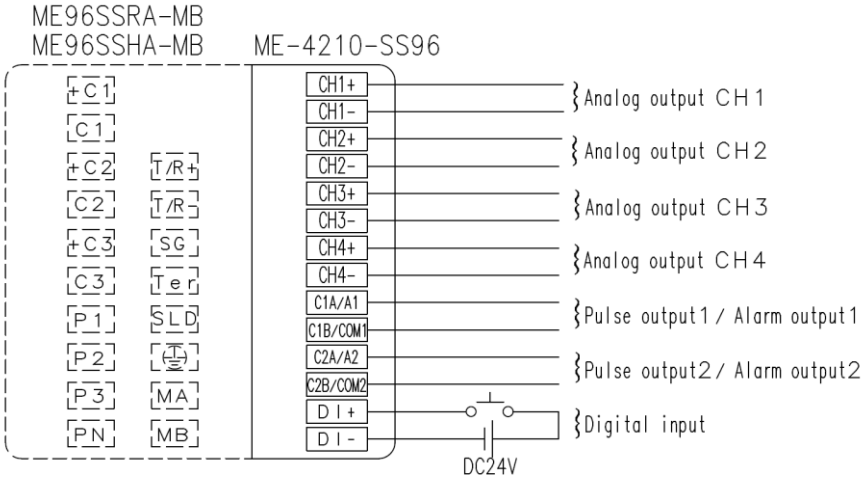


①Auxiliary power supply
AC100 to 240V or DC100 to 240V.
②Fuses 0.5A
③Some MODBUS®RTU equipment doesn't have SG. In this case, the wiring between SG is unnecessary.

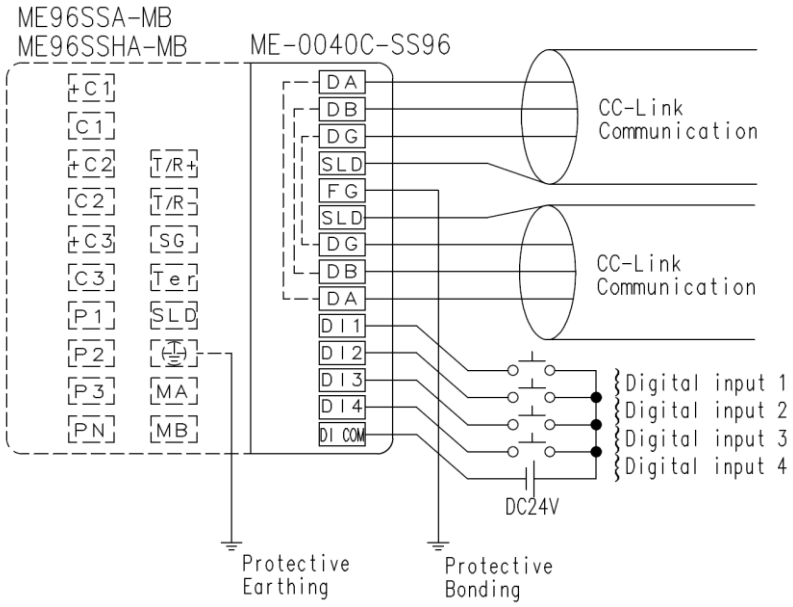
Note 1: For low voltage circuits, grounding the secondary side of VT and CT is not t necessary.

Installation 4. Wiring Diagram

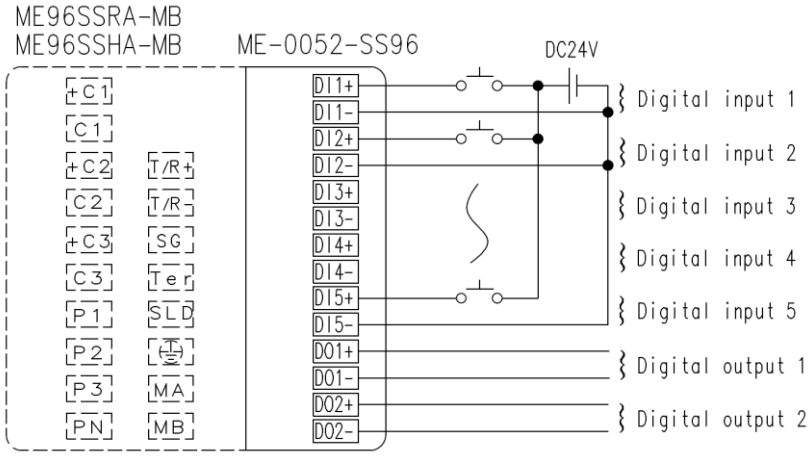
Optional Plug-in Module: ME-4210-SS96



Optional Plug-in Module: ME-0040C-SS96



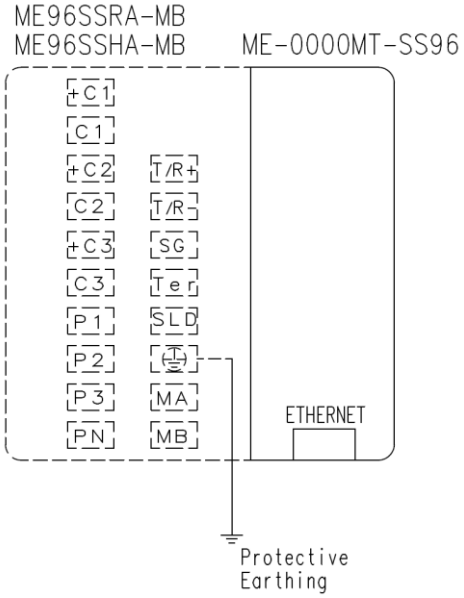
Optional Plug-in Module: ME-0052-SS96



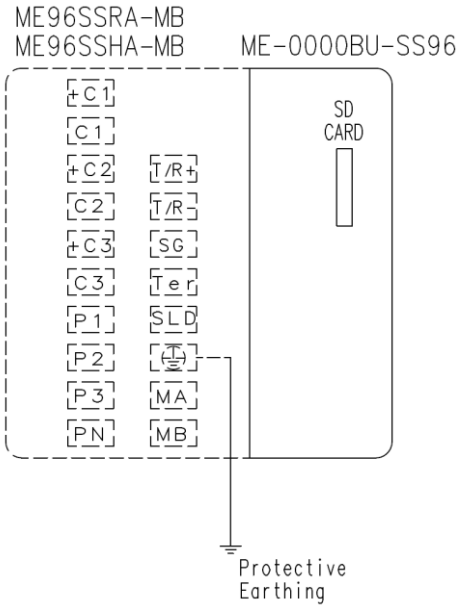
DI1-,DI2-,DI3-,DI4-,DI5-,
are connected inside.

Installation 4. Wiring Diagram

Optional Plug-in Module: ME-0000MT-SS96



Optional Plug-in Module: ME-0000BU-SS96



Installation 4. Wiring Diagram

Note for Input

Note	1. The voltage input terminals for 3-phase 3-wire are different from those for others. 2. If the polarity for VT and CT are wrong, the measurement cannot be executed correctly. 3. Do not connect wires to the NC terminals. 4. In the case of low voltage, there is no need for grounding of the secondary sides of VT and CT. 5. Always earth the ⏚ terminal to the protective earth conductor. Earth the terminal with less than 100 ohm of earth resistance. Otherwise there will be a false operation.

Note for Output

Note	1. Do not bunch pulse outputs, alarm outputs and digital inputs/outputs signal cables with the main circuit or power cables, or install them close to each other. Keep the distance between the inputs/outputs signal cables and the main circuit or power cables and high voltage lines shown below, when they run parallel to each other. 2. Analog outputs signal cables should keep the distance from the other power cables and input signal (VT, CT and auxiliary power) cables, and should not be bunched. And use the shielded cables or twisted pair cables so that it is not affected the noise, serge, and induction. Also, the wiring cables should be as short as possible. 3. MODBUS®RTU interface and analog outputs of ME-4210-SS96 do not have the insulation between them.

Conditions	Distance
Below 600V and less than 600A power lines	30cm or more
Other power lines	60cm or more

Note for MODBUS®RTU

Note	1. Use the shielded twisted pair cable. (Recommended cables: Refer to page 102.) 2. To the units at both ends of the MODBUS®RTU link, the 120-ohm resistance has to be attached. This instrument can perform a 120-ohm termination by short-circuiting the terminal of T/R- and Ter. 3. The earthing has to be connected to earth by a thick wire of low impedance. 4. Keep the distance between MODBUS®RTU link to power lines. 5. Connect to earth the SLD terminal at one end.

Note for CC-Link

Note	1. As for CC-link cable, use the designated cable. (Refer to page 102.) Ver.1.10-compatible CC-Link dedicated cables, CC-Link dedicated cables (Ver.1.00) and CC-Link dedicated high-performance cables cannot be used together. If used together, correct data transmission will not be guaranteed. Also attach the terminating resister which matches the kind of the cable. 2. Connect the shielded wire of the CC-Link dedicated cable to “SLD” of each module, and ground both ends of the shielded wire using grounding via “FG”. The SLD and FG are connected within the module. 3. Because the CC-Link transmission line is a small signal circuit, it should be separated from any strong-current circuit by 10cm or more. However, if it is laid parallel for a long distance, it must be laid at least 30cm away. The terminal must be grounded before using. 4. The CC-Link transmission line should use an exclusive line that meets the requirements for total wiring length, distance between stations, and termination resistance values according to the communication speed. If you do not use an exclusive line or observe the wiring requirements, communication may fail. (Refer to the “CC-Link Cable Wiring Manual” about the exclusive line and wiring requirements.) 5. Connect the supplied “terminal resister” to each module at both ends of the CC-Link system. Connect the terminal resistors between “DA” and “DB”. 6. CC-Link interface and MODBUS®RTU do not have the insulation between them.

Installation 4. Wiring Diagram

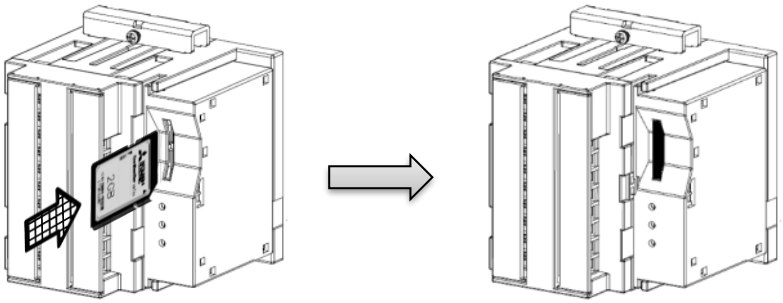
Note for MODBUS®TCP

Note	1. In 100Mbps communication by the 100BASE-TX connection, a communication error may occur under the influence of high frequency noise from devices other than this device in the installation environment. Take the following action to prevent the influence of high frequency noise in the construction of a network system. (1) Wiring connection ・Do not install a twisted pain cable together with the main circuit and power cables, etc. ・Place the twisted pair cable in a duct. (2) Communication system ・Increase the number of communication retries if necessary. ・Change the hub used for connection into a 10Mbps hub, and make communication at a transmission speed of 10Mbps.

Installation 5. How to insert and eject the SD memory card (ME-0000BU-SS96)

■How to insert the SD memory card

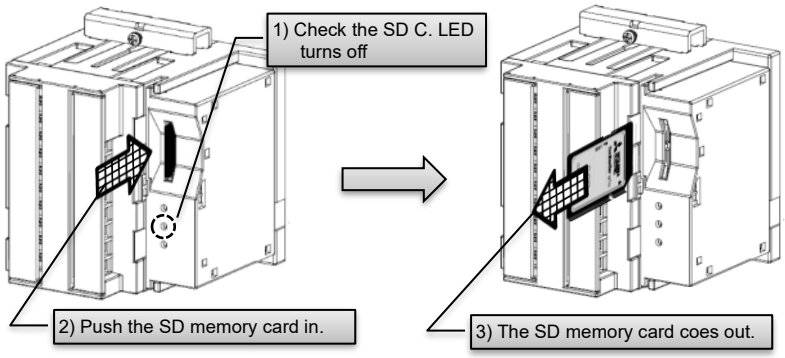
Slide the SD memory card straight into the slot until it clicks into place.



⚠CAUTION	・Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB). Using the other types of the SD memory card may cause the trouble such as data destruction of the memory card or system failure. ・Insert the SD memory card with the write protect switch “OFF”. If the write protect switch is “ON”, the ME-0000BU-SS96 does not communicate with an SD memory card.

■How to eject the SD memory card

1) Check the SD C. LED turns off
2) Push the SD memory card in until it clicks into place.
3) The SD memory card comes out by itself.



⚠CAUTION	During communication with the SD memory card, ejection of the memory card may cause data corruption of the memory card or failure of this unit or the memory card. Check that SD C.LED turns off to eject the SD memory card.

Specifications

1. Specification

Type		ME96SSRA-MB	
Phase wire system		3-PHASE 4-WIRE, 3-PHASE 3-WIRE(3CT, 2CT), 1-PHASE 3-WIRE, 1-PHASE 2-WIRE (common)	
Rating	Current	AC5A, AC1A (common)	
	Voltage	3-PHASE 4-WIRE : max AC277/480V 3-PHASE 3-WIRE : (DELTA)max AC220V, (STAR)max AC440V 1-PHASE 3-WIRE : max AC220/440V 1-PHASE 2-WIRE : (DELTA)max AC220V, (STAR)max AC440V	
	Frequency	50-60Hz (common)	
Item		Measurement Item	Accuracy
Current (A)		A1, A2, A3, AN, A_{AVG}	±0.2%
Current Demand (DA)		DA1, DA2, DA3, DAN, DA_{AVG}	
Voltage (V)		V12, V23, V31, V_{AVG}(L-L), V1N, V2N, V3N, V_{AVG}(L-N)	
Active Power (W)		W1, W2, W3, ΣW	±0.5%
Reactive Power (var)		var1, var2, var3, Σvar	
Apparent Power (VA)		VA1, VA2, VA3, ΣVA	
Power Factor (PF)		PF1, PF2, PF3, ΣPF	
Frequency (Hz)		Hz	±0.1%
Active Energy (Wh)		Imported, Exported	class0.5S (IEC62053-22)
Reactive Energy (varh)		Imported Lag, Imported Lead, Exported Lag, Exported Lead	class1S (IEC62053-24)
Apparent Energy (VAh)		Imported + Exported	±2.0%
Harmonic current (HI)		Total, 1 to 19th(Only odd number)	±1.0%
Harmonic voltage (HV)		Total, 1 to 19th(Only odd number)	
Rolling Demand(DW)		Rolling Block, Fixing Block (Selectable by setting)	±0.5%
Rolling Demand(Dvar)		Rolling Block, Fixing Block (Selectable by setting)	±1.0%
Rolling Demand(DVA)		Rolling Block, Fixing Block (Selectable by setting)	
Periodic Active Energy (Wh)		Periodic Active Energy 1, Periodic Active Energy 2	class0.5S (IEC62053-22)
Operation time (h)		Operation time 1, Operation time 2	(Reference)
Analog output response time		2 s or less (HI and HV : 10s or less)	
Measuring Method	Instantaneous Value	A・V : RMS calculation, W・var・VA・Wh・varh・VAh : Digital multiplication, PF : Power ratio calculation, Hz : Zero-cross, HI・HV : FFT	
	Demand Value	DA : Thermal type calculation, DW : Rolling Demand calculation	
Display	Type	LCD with backlight	
Maximum Number of Display Digits or Segment Number	Number of display digits	Upper stage display : 6 digits, Middle stage display : 6 digits, Lower stage display : 6 digits	
		A, DA, V, W, var, VA, PF DW, Dvar, DVA : 4 digits Hz : 3 digits Wh, varh, VAh : 9 digits(6 digits or 12 digits possible) Harmonic total distortion ratio : 3 digits Harmonic RMS value : 4 digits Operation time : 6 digits Digital input/output : I/O	
	Bar graph	21 Segment-Bar graph, 22 Segment-Indicator	
Display updating time interval		0.5s, 1s	
Communication Specification		MODBUS®RTU communication	
Accessible option unit		ME-4210-SS96, ME-0040C-SS96, ME-0052-SS96, ME-0000MT-SS96, ME-0000BU-SS96	
Analog output	Output specification	DC4 to 20mA(0 to 600Ω)	
Pulse/Alarm output	The kind of switch	No-voltage 'a' contact	
	Contact Capacity	DC35V, 0.1A	
	Pulse width	0.125s, 0.5s, 1.0s	
Digital input(DI)	Contact Capacity	DC24V(DC19 to 30V), 7mA or less	
	Signal width	30ms or longer	
Digital output(DO)	The kind of switch	No-voltage 'a' contact	
	Contact Capacity	DC35V, 0.2A	
Power Failure Compensation		Non volatile memory(Items : Setting value, MAX/MIN value, Active/Reactive/Apparent energy, Periodic Active Energy, Rolling Demand, Operation time)	
VA Consumption	VT	0.1VA/phase (at 110VAC), 0.2VA/phase(at 220VAC) , 0.4VA/phase(at 440VAC)	
	CT	0.1VA/phase (at 5AAC)	
	Auxiliary power	7VA(AC110V), 8VA(AC220V), 5W(DC100V)	
Auxiliary power		AC100-240V(±15%), DC100-240V(-30% +15%)	
Weight		0.5kg	
Dimension		96(H)×96(W)×90(D)	
Attachment Method		Embedding attachment	
Operating temperature/humidity		-5 to +55℃(average temperature : 35℃ or less per day), 0 to 85%RH, non condensing	
Storage temperature/ humidity		-25 to +75℃(average temperature : 35℃ or less per day), 0 to 85%RH, non condensing	

Note1: Accuracy is specified according to the maximum scales value of rated value.
Note2: Measurement of harmonics which its distortion ratio is exceeded 100% may exceed the accuracy.
Note3: Harmonics cannot be measured without voltage input.

2. Applicable Standards

Electromagnetic Compatibility		
	Emissions	
	Radiated Emission	EN61326-1/CISPR 11, FCC Part15 Subpart B Class A
	Conducted Emission	EN61326-1/CISPR 11 FCC Part15 Subpart B Class A
	Harmonics Measurement	EN61000-3-2
	Flicker Meter Measurement	EN61000-3-3
	Immunity	
	Electrostatic discharge Immunity	EN61326-1/EN61000-4-2
	Radio Frequency Electromagnetic field Immunity	EN61326-1/EN61000-4-3
	Electrical Fast Transient/Burst Immunity	EN61326-1/EN61000-4-4
	Surge Immunity	EN61326-1/EN61000-4-5
	Conducted Disturbances, Induced By Radio Frequency Fields Immunity	EN61326-1/EN61000-4-6
	Power Frequency Magnetic Field Immunity	EN61326-1/EN61000-4-8
	Voltage Dips and Short Interruptions	EN61326-1/EN61000-4-11

Safety		
	Europe	CE, as per EN61010-1
	U.S. and Canada	cRUus as per UL61010-1, IEC61010-1
	Installation Category	Ⅲ
	Measuring Category	Ⅲ
	Pollution Degree	2

3. Specifications of MODBUS® RTU Communication

Item	Specifications
Physical interface	RS－485 2wires half duplex
Protocol	RTU (Binary data)
Synchronization method	Start-stop synchronization
Network topology	Daisy-chain
Baud rate	2400, 4800, 9600, 19200, 38400bps
Data bit	8
Stop bit	1, 2
Parity	Odd, Even, None
Slave address	1 to 255 (0：For broadcast)
Distance	1200m
Maximum Number	31
Response time	1s or less (time to a response after receiving a query)
Terminate	120Ω　1/2W
Recommended cable	Shielded twisted pair, AWG24 to 14 gauge

■ About Programming
In addition to this manual, read the following documents too.
- Electronic Multi-Measuring Instrument ME Series MODBUS® Interface specifications LSPM-0075

4. Specifications of CC-Link Communication

Item	Specifications
CC-Link station type	Remote device station (ver.1 remote device station or ver.2 remote device station)
Number of occupied stations	Ver.1 remote device station (ver.1 compatible slave station) setting: 1 station Ver.2 remote device station (ver.2 compatible slave station) setting: 1 station (Expanded cyclic setting: Octuple)
CC-Link version	CC-Link Ver 1.10 / 2.00
Transmission speed	Can select from 156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps
Maximum number of connected stations	If the system is configured by only this instrument, up to 42 units can be connected. (note1)

■ CC-Link Dedicated Cable
Use the CC-Link dedicated cables for the CC-Link system. If a cable other than the CC-Link dedicated cable is used, the performance of the CC-Link system cannot be guaranteed.
For the specifications of the CC-Link dedicated cables or any other inquiries, visit the following website:
CC-Link Partner Association:http://www.CC-link.org/

REMARK
For details, refer to the CC-Link cable wiring manual issued by CC-Link Partner Association.

■ About Programming
In addition to this manual, read the following documents too.
- Electronic Multi-Measuring Instrument programming manual (CC-Link)..... LEN080334
- Electronic Multi-Measuring Instrument programming manual (CC-Link)(For ver. 2 remote device station)..... LEN130391

Note1: As for details, refer to the above manuals.

5. Specifications of MODBUS® TCP Communication

Item		Specifications
Interface		1 port (10BASE-T/100BASE-TX)
Transmission method		Base band
Number of cascade connection stages *1		Max. 4 stages (10BASE-T), Max. 2 stages (100BASE-TX)
Maximum node-to-node distance		200m (656.16ft.)
Maximum segment length *2		100m (328.08ft.)
Connector applicable for external wiring		RJ45
Cable	10BASE-T	Cable compliant with the IEEE802.3 10BASE-T Standard (unshielded twisted pair cable (UTP cable), Category 3 or more)
	100BASE-TX	Cable compliant with the IEEE802.3 100BASE-TX Standard (shielded twisted pair cable (STP cable), Category 5 or more)
Protocol		MODBUS TCP (Port number 502)
Number of simultaneously connection		Max. 4 connection
Functions supported		Autonegotiation (10BASE-T/100BASE-TX automatically detected) Auto MDIX function (straight/crossover cable automatically detected)

*1. This is the maximum number of cascade connection stages when a repeater hub is used.
For the maximum number of cascade connection stages, contact to the manufacturer for the switching hub used.
*2. Length between a hub and a node.

■ About Programming
In addition to this manual, read the following documents too.
- Electronic Multi-Measuring Instrument ME Series MODBUS® Interface specifications LSPM-0075

6. Specifications of Logging

Item		Specifications
Logging mode		Auto overwriting updating
Type of logging data (*1)	Detailed data	Memorize measured data in the specified “Detailed data logging cycle” (1 minute, 5 minutes, 10 minutes, 15 minutes or 30 minutes). Data is output as detailed data file.
	One-hour data	Memorize measured data in one-hour cycle. Data is output as One-hour data file and One-day data file
The number of logging items	Detailed data	Up to 6 items
	One-hour data	Up to 6 items
Internal memory logging period	Detailed data	Logging cycle / Logging period: 1minute / 2 days 5minute / 10 days 10minute / 20 days 15minute / 30 days 30minute / 60 days
	One-hour data	400 days (About 13 months)
Logging period with SD memory card (2GB) *2		10 years or longer
System log data		1200 records
Output format of logging data and system log data		CSV format (ASCII)
Compensation for power failure		Lithium battery (Embedded in ME-0000BU-SS96) Total time of compensation is 5 year (average daily temperature is less than +35°C). (Lifetime expectancy of lithium battery is 10 year) (average daily temperature is less than +35°C). It is impossible for customer to exchange the battery. Please consider renewal.
	Setting values (Logging ID, Logging items, Detailed data logging cycle)	Memorized in FRAM (nonvolatile memory) The data is memorized during power failure.
	Logging data, System log data	Memorized in SRAM (volatile memory) Data is erased if power failure occurs under low battery voltage condition (BAT.LED turns on).
	Clock time operation	Clock time operation is stopped if power failure occurs under low battery voltage condition (BAT.LED turns on). After power recovery, timing is started from Jan 1, 2016 00:00:00.
Clock accuracy		Within ±1 minute per month (at 25℃)
Memory media for data output *3		SD memory card (SD, SDHC)
Optional part		SD memory card (EMU4-SD2GB) *3 *4

*1. Energy data (Wh,varh,VAh) is measuring data in ME96SS. These are not difference value calculated by logging cycle.
*2. It is the period until capacity of 2GB SD memory card is filled in always-on connection. Data amount depends on the number of characters. It is the logging period when data is output in maximum volume.
*3. Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB). Using the other types of the SD memory card may cause the trouble such as data destruction of the memory card or system failure.
*4. For purchase of optional parts, contact the shop you bought this product.

In addition to this manual, read the following documents too.
- ME-0000BU-SS96:Logging specifications LSPM-0092

7. Setting Table (Factory Settings and Customer Setting Note)

Setting menu No.			Setting items	Initial content	Memo
1	1.1		Phase wire system	3P4(3-phase 4-wire)	
	1.2		Display pattern	P04	
		1.2.1	Pattern P00	—	
	1.3		VT/direct selection	no(No VT)	
		1.3.1	Direct voltage	220/380V	
		1.3.2	VT secondary voltage	—	
		1.3.3	VT primary voltage	—	
	1.4		CT secondary current	5A	
		1.4.1	CT primary current	5A	
	1.5		Frequency	50Hz	
	1.6		Time constant for rolling demand (Interval time constant)	15min	
		1.6.1	Subinterval time constant	1min	
	1.7		Time constant for current demand	0s	
2	2.1		Communication setting selection	CC or Mb.tCP	
	2.2		MODBUS®RTU address	1	
		2.2.1	MODBUS®RTU baud rate	19.2kbps	
		2.2.2	MODBUS®RTU parity	EVEn(even)	
		2.2.3	MODBUS®RTU stop bit	1	
	2.3		CC-Link station number	1	
		2.3.1	CC-Link baud rate	156kbps	
		2.3.2	CC-Link version	1.10	
		2.3.3	Communication reset	oFF	
	2.4		MODBUS®TCP IP address	192.168.3.10	
			MODBUS®TCP Subnet mask	255.255.255.0	
			MODBUS®TCP Default gateway existence	oFF(No existence)	
			MODBUS®TCP Default gateway	127.0.0.1	
			Communication reset	oFF	
3	3.1		Current maximum scale	5A(CT primary current)	
		3.1.1	Special current maximum scale	—	
	3.2		Voltage maximum scale	300V(±0 STEP)	
	3.3		Power maximum scale	4000W(±0 STEP)	
		3.3.1	Single / Double deflection	Single deflection	
	3.4		Reactive power maximum scale	4000var(±0 STEP)	
	3.5		Power factor scale	0.5(-0.5 to 1 to 0.5)	
	3.6		Expanded counting	Combination I	
	3.7		Harmonics display	oFF	
4	4.1		Model name + option code	(Model name)	
	4.2		Version display	(Version)	
	4.3		Back light brightness	3	
	4.4		Back light auto off	Auto(Auto off)	
	4.5		Display update time	0.5s	
5	5.1		Alarm item 1	non	
		5.1.1	Alarm value 1	—	
	5.2		Alarm item 2	non	
		5.2.1	Alarm value 2	—	
	5.3		Alarm item 3	non	
		5.3.1	Alarm value 3	—	
	5.4		Alarm item 4	non	
		5.4.1	Alarm value 4	—	
	5.5		Alarm delay time	—	
	5.6		Alarm cancel method	—	
	5.7		Back light flickers during alarms	—	
	5.8		Motor start-up current masking	oFF	
		5.8.1	Motor start-up current threshold	—	
		5.8.2	Motor start-up current delay time	—	
	5.9		Pulse / Alarm output 1 (With ME-4210-SS96)	PULSE(Pulse output)	
		5.9.1	Pulse output 1: output item	Wh	
		5.9.2	Pulse output 1: pulse unit	0.001kWh/pulse	
	5.10		Pulse / Alarm output 2 (With ME-4210-SS96)	AL (Alarm output)	
		5.10.1	Pulse output 2: output item	—	
		5.10.2	Pulse output 2: pulse unit	—	
	5.11		Pulse width	0.125s	

7. Setting Table (Factory Settings and Customer Setting Note)

Setting menu No.			Setting items	Initial content	Memo
6	6.1		Analog output CH1: output item	A_{AVG}	
		6.1.1	Detailed setting (1)	5A(CT primary current)	
		6.1.2	Detailed setting (2)	—	
	6.2		Analog output CH2: output item	V_{AVG}(L-N)	
		6.2.1	Detailed setting (1)	300V(±0 STEP)	
		6.2.2	Detailed setting (2)	—	
	6.3		Analog output CH3: output item	ΣW	
		6.3.1	Detailed setting (1)	4000W(±0 STEP)	
		6.3.2	Detailed setting (2)	Single deflection	
	6.4		Analog output CH4: output item	ΣPF	
		6.4.1	Detailed setting (1)	0.5(-0.5 to 1 to 0.5)	
		6.4.2	Detailed setting (2)	—	
	6.5		Analog output limit	oFF	
6	6.1		Logging ID	001	
	6.2		Logging data clear	no (Not clear)	
		6.2.1	Logging data clear reconfirm	no (Not clear)	
	6.3		Logging-item pattern	LP01	
	6.4		Detailed data logging cycle	15min	
7	7.1		Periodic Active energy display	oFF(Not displayed)	
		7.1.1	Control setting for switching time segments of periodic active energy	non(Not switched)	
	7.2		Rolling demand display	oFF(Not displayed)	
		7.2.1	Rolling demand time setting	oFF(Manual)	
	7.3		Digital input/output status display	oFF(Not displayed)	
		7.3.1	Digital input reset method	Auto(Auto off)	
8	8.1		Operating time display	oFF	
		8.1.1	Target for counting Operation time setting	AUX(Auxiliary power)	
		8.1.2	Operating time threshold	—	
	8.2		Switch element information	123	
	8.3		Set IEC mode	oFF(Normal mode)	

Appendix

1. Calculation methods of ME96SS (for 3 phase unbalanced system with neutral)

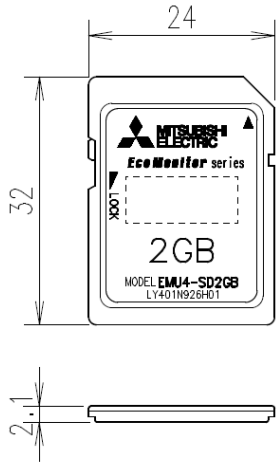
Item	Normal mode	IEC mode	Remark
R.m.s current for phase p	$I_p = \sqrt{\frac{\sum_{k=0}^{N-1} i_{p_k}^2}{N}}$		
R.m.s neutral current	$I_N = \sqrt{\frac{\sum_{k=0}^{N-1} (i_{1_k} + i_{2_k} + i_{3_k})^2}{N}}$		
Lp-N r.m.s voltage	$V_{pN} = \sqrt{\frac{\sum_{k=0}^{N-1} v_{pN_k}^2}{N}}$		
Lp-Lg r.m.s voltage	$V_{pg} = \sqrt{\frac{\sum_{k=0}^{N-1} (v_{gN_k} - v_{pN_k})^2}{N}}$		
Active power for phase p	$P_p = \frac{1}{N} \cdot \sum_{k=0}^{N-1} (v_{pN_k} \times i_{p_k})$		
Apparent power for phase p	$S_p = V_{pN} \times I_p$		
Reactive power for phase p	$Q_p = \frac{1}{N} \cdot \sum_{k=0}^{N-1} (v_{pN_k} \times i_{90_p_k})$ where i_{90_pk} is the current waveform shifted by 90°.	$Q_p = \sqrt{S_p^2 - P_p^2}$	Refer to page 69 for the sign.
Power factor for phase p	$PF_p = \frac{P_p}{\sqrt{P_p^2 + Q_p^2}}$	$PF_p = \frac{P_p}{S_p}$	Refer to page 69 for the sign.
Total active power	$P = P_1 + P_2 + P_3$		
Total reactive power	$Q = Q_1 + Q_2 + Q_3$		Refer to page 69 for the sign.
Total apparent power	$S = S_1 + S_2 + S_3$	$S = \sqrt{P^2 + Q^2}$	
Total power factor	$PF = \frac{P}{\sqrt{P^2 + Q^2}}$	$PF = \frac{P}{S}$	Refer to page 69 for the sign.

2. Optional part (Available part)

■ SD memory card

Item	Specifications
Model	EMU4-SD2GB
Amount of memory	2GB
Mass	2g

[Note] Unit: mm



MITSUBISHI Electronic Multi-Measuring Instrument

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