MITSUBISHI ELECTRIC

Changes for the Better

Automating the World

FACTORY AUTOMATION

ELECTRONIC MULTI-MEASURING INSTRUMENT ME96SS

SS Ver.B

Super-S Series

Automating the World

Our Factory Automation business is focused on "Automating the World" to make it a better, more sustainable environment supporting manufacturing and society, celebrating diversity and contributing towards an active and fulfilling role.

Mitsubishi Electric is involved in many areas including the following:

Energy and Electric Systems
A wide range of power and electrical products from generators to large-scale displays.

Electronic Devices
A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home Appliance
Dependable consumer products like air conditioners and home entertainment systems.

Information and Communication Systems
Commercial and consumer-centric equipment, products and systems.

Industrial Automation Systems
Maximizing productivity and efficiency with cutting-edge automation technology.

SUSTAINABLE DEVELOPMENT GOALS

The Mitsubishi Electric Group is actively solving social issues, such as decarbonization and labor shortages, by providing production sites with energy-saving equipment and solutions that utilize automation systems, thereby helping towards a sustainable society.

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ME96 Super-S Series Electronic Indicating Instruments functions and optional units

Highly appreciated ME96SS Series Electronic Multi-Measuring Instruments measuring functions and network capability has been released.

① ME96SSHB-MB (high-performance model)

Major features

[1] Supports highly accurate measurement (accuracy of current/voltage: 0.1%, active energy: class 0.5S) and high-order harmonic measurement (1st to 31st).
[2] Incorrect wiring determination support function
[3] Wide viewing angle LCD
[4] Built-in logging function
[5] Display 4 items at the sametime

② ME96SSRB-MB (standard model)

Major features

[1] Incorrect wiring determination support function
[2] Wide viewing angle LCD
[3] Built-in logging function
[4] Display 4 items at the sametime

with enhanced measuring

have been remodeled, and ME96 Super-S Series with enhanced

③ ME96SSEB-MB (economy model)

Major features

[1] Compact size
[2] Incorrect wiring determination support function
[3] Display 4 items at the sametime

④ Optional plug-in modules

Major features

[1] Analog, pulse and alarm output unit (Model:ME-4210-SS96B)
[2] CC-Link communication unit (Model:ME-0040C-SS96)
[3] Digital input and output unit (Model:ME-0052-SS96)
[4] Data logging unit (Model:ME-0000BU-SS96)
[5] MODBUS TCP communication unit (Model:ME-0000MT-SS96)
[6] MODBUS TCP communication 2-port unit (Model:ME-0040MT2-SS96)

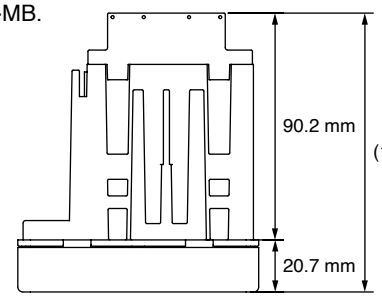
Remarks

MODBUS RTU communication function provided as standard

Outline and Features

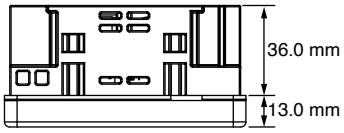
Compact size

● Realized downsizing for ME96SSEB-MB.



ME96SSEA-MB
(Conventional type)

It contributes to space saving!



ME96SSEB-MB
(New type)

Improved Measurement Functions

● Added measurement function, reactive energy, apparent energy, reactive power and apparent power for ME96SSEB-MB.

Model name	Transmission/Option specifications	Main measurement items
ME96SSHB-MB (High-performance model)	MODBUS RTU communication Plug-in module (options) • Analog/Pulse/Digital output/input • CC-Link communication • Digital input/output (for MODBUS RTU communication) • Backup (on SD card) • MODBUS TCP communication	A, DA, V, Hz = ±0.1% W, var, VA, PF = ±0.2% VAh = ±2.0% Wh = class 0.5S (IEC62053-22) varh = class 1S (IEC62053-24) Harmonics = 31st-deg (max) Rolling demand = W, var, VA
ME96SSRB-MB (Standard model)	MODBUS RTU communication Plug-in module (options) • Analog/Pulse/Digital output/input • CC-Link communication • Digital input/output (for MODBUS RTU communication) • Backup (on SD card) • MODBUS TCP communication	A, DA, V = ±0.2% Hz = ±0.1% W, var, VA, PF = ±0.5% VAh = ±2.0% Wh = class 0.5S (IEC62053-22) varh = class 1S (IEC62053-24) Harmonics = 19th-deg (max) Rolling demand = W, var, VA
ME96SSEB-MB (Economy model)	MODBUS RTU communication	A, DA, V = ±0.5% Hz = ±0.2% W, var, VA, PF = ±0.5% VAh = ±2.0% Wh = class 0.5S (IEC62053-22) varh = class 1S (IEC62053-24) Harmonics = Only total

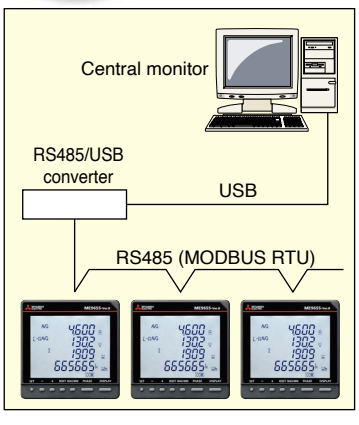
Optional Plug-in Modules

Model name	Characteristics						
	Analog output	Pulse/Alarm output	Digital input	Digital output	Communication	Logging function	Used with
ME-4210-SS96B	4	2	1	—	—	—	ME96SSHB-MB ME96SSRB-MB
ME-0040C-SS96	—	—	4	—	CC-Link	—	
ME-0052-SS96	—	—	5	2	—	—	
ME-0000BU-SS96	—	—	—	—	—	6 items	
ME-0000MT-SS96	—	—	—	—	MODBUS TCP 1 port	—	
ME-0040MT2-SS96	—	—	4	—	MODBUS TCP 2 ports *1	—	ME96SSHB-MB *2

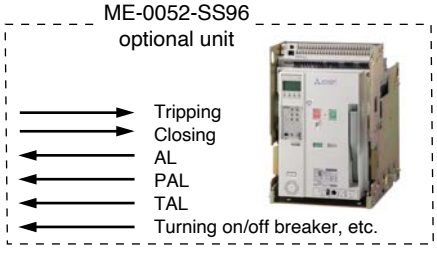
Note 1: Optional Plug-in Module can not be used with ME96SSEB-MB.
Note 2: For details of each characteristic, refer to the specifications section.

*1: 2 ports for daisy chain, one IP address.
*2: Applicable only to firmware version 01.01 or later.

MODBUS RTU System



● MODBUS RTU communication system optimizes computer monitoring operations.
● In addition, when ME-0052-SS96 is installed, remote monitoring of digital input signals and on/off control of digital output signals are possible. Therefore, no other DI/DO terminals are required.
● Digital input signals can be latched for over 30 ms, and there is no need for external latch circuits.

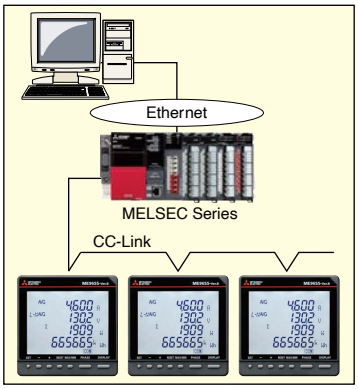


<MODBUS RTU Interface Specifications>
- Max. Baud rate: 38.4 kbps
- Max. Connection Distance: 1,200 m
- Max. Connection Units: 31

<Optional Plug-in Module ME-0052-SS96>
- Digital Input: 5 points (24 V DC)
- Digital Output: 2 points (35 V DC)

ME96 Super-S Series Ver.B Features

CC-Link System (With optional plug-in module (ME-0040C-SS96))

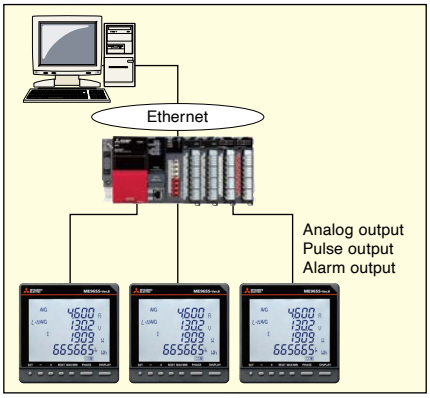


- Optimum transmission system for remote monitoring using Mitsubishi PLC.
- Contact signals can be remotely monitored by installing the optional module ME-0040C-SS96. This is helpful in wiring and space saving.
- Digital input signals can be latched for over 30 ms, and there is no need for external latch circuits.

← Abnormal Signal (Facility)
← Abnormal Signal (Earth Leakage)
← Abnormal Signal (Temperature)
← Circuit Breaker Status Signal, etc.

<CC-Link Interface>
- Max. Baud rate: 10 Mbps
- Max. Connection Distance: 100 m (10 Mbps)-1,200 m (156 kbps)
- Max. Connection Units: 42
- Digital Input: 4 points (24 V DC)

Analog/Pulse/Alarm Output System (With optional plug-in module (ME-4210-SS96B))



- Applicable to analog output, pulse output and alarm output with the aid of the optional module ME-4210-SS96B.
- Remote monitoring of A, DA, V, W, var, VA, PF, Hz, Harmonics Current RMS value and Harmonics voltage RMS value at 4 mA to 20 mA output (max. 4 outputs).
- Active energy, reactive energy, apparent power and periodic energy can be monitored by pulse output (max. 2 pulses).
- Can remotely monitor upper/lower limit alarm by digital output (max. 2 points).

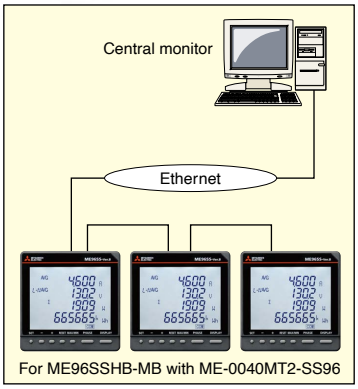
<Analog output specifications>
- 4 mA to 20 mA
- 4 outputs
- Resistance load 600 Ω or less

<Pulse output specifications>
- No-voltage a contact point
- 35 V DC, 0.1 A
- Select output from pulse widths of 0.125 s, 0.5 s or 1 s

<Alarm output specifications>
- No-voltage a contact point
- 35 V DC, 0.1 A

<Digital input specifications>
- 1 point (24 V DC)

MODBUS TCP System (With optional plug-in module (ME-0000MT-SS96/ME-0040MT2-SS96 *1))



- This is a MODBUS TCP communication unit that can be used in the Ethernet system. The number of network system selection methods is increased, and Ethernet and MODBUS RTU communication can be duplicated.
- The optional plug-in module ME-0040MT2-SS96 has 2 Ethernet ports, so straight-line topology is possible without using Ethernet SWITCH/HUB.
- The optional plug-in module ME-0040MT2-SS96 has 4 digital inputs, so remote monitoring of status signals is possible without a PLC.
- Digital input signal can be latched for over 30 ms, and there is no need for external latch circuits.

← Abnormal Signal (Facility)
← Abnormal Signal (Earth Leakage)
← Abnormal Signal (Temperature)
← Circuit Breaker Status Signal, etc.

<MODBUS TCP Communication Specifications>
- Ethernet port : 10BASE-T/100BASE-TX
- Maximum segment length : 100 m

<Optional Plug-in Module ME-0000MT-SS96>
- Number of ports : 1
- Digital Input : non

<Optional Plug-in Module ME-0040MT2-SS96 *1>
- Number of ports : 2
- Digital Input : 4 points (24 V DC)

*1 : ME-0040MT2-SS96 is only applicable to ME96SSHB-MB with firmware version 01.01 or later.

Data Logging (Built-in logging function and optional plug-in module (ME-0000BU-SS96))

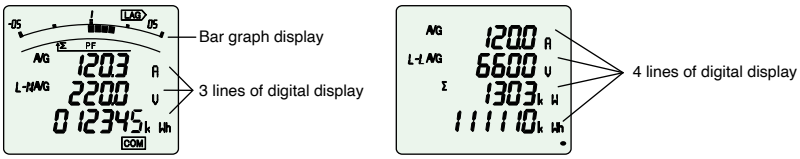
- The ME96SSHB-MB/ME96SSRB-MB has a built-in logging function stores measurement data as logging data in the internal non-volatile memory. The data to be stored as events occurred in this instrument are alarm data, the recorded time of the Max/Min value, and system log data. The stored data can be read from MODBUS RTU communication.
- Optional module ME-0000BU-SS96 can memorize the data of various quantities related to electricity measured by ME96SS-Ver.B for a certain period. Therefore, measurement data can be backup even when the MODBUS RTU communication of ME96SS-Ver.B fails. Memorized measurement data can be output to an SD memory card in CSV format. You can check the data files output to the SD memory card by Microsoft Excel.

ME96 Super-S Series Ver.B Features

Succeeded Display Functions

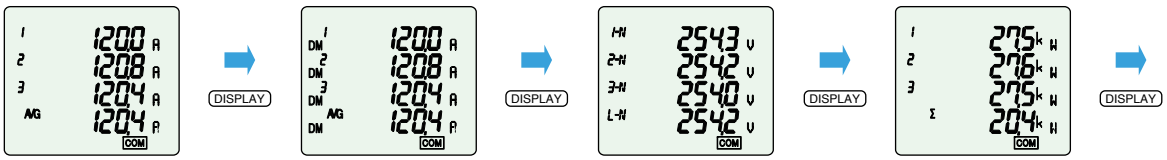
Concurrent Display of 4 items

The 4 measured values can be digitally confirmed on one screen.



Conventional type　　New type

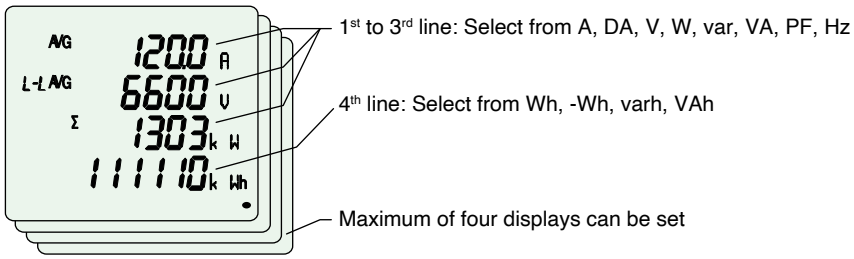
● Concurrent Display of Each Phase Measured Values
In Display Pattern P02, measured values of each phase can be concurrently displayed.



● Cyclic Display Function
In the cyclic display function, the display screen can be changed over in every 5 seconds without [DISPLAY] button operation.

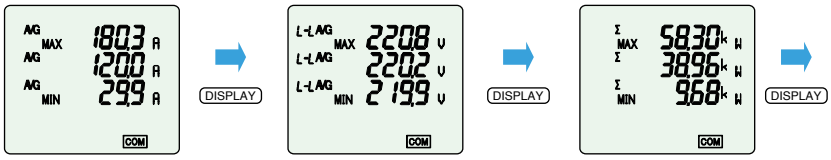
Special Display Function

● Special Display by Display Pattern P00
Display can be selected as desired Display Pattern P00.



Max/Min Display Function

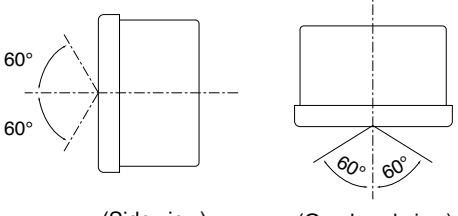
● Maximum/Minimum Value Display
The maximum and minimum value of each measuring items can be displayed. Since the max/min display shows the current value as well as max/min values, the display can be used for monitoring.



Wide-viewing-angle (ME96SSHB-MB, ME96SSRB-MB)

As the wide-viewing-angle LCD is mounted, good visibility is obtained even when the instrument is mounted at a level lower than the eye line.

Type	Model name	When viewed from the side		When viewed from the above	
		Up	Down	Left	Right
New type	ME96SSHB-MB ME96SSRB-MB	60°	60°	60°	60°
Conventional type	ME96SSHA-MB ME96SSRA-MB	10°	60°	60°	60°

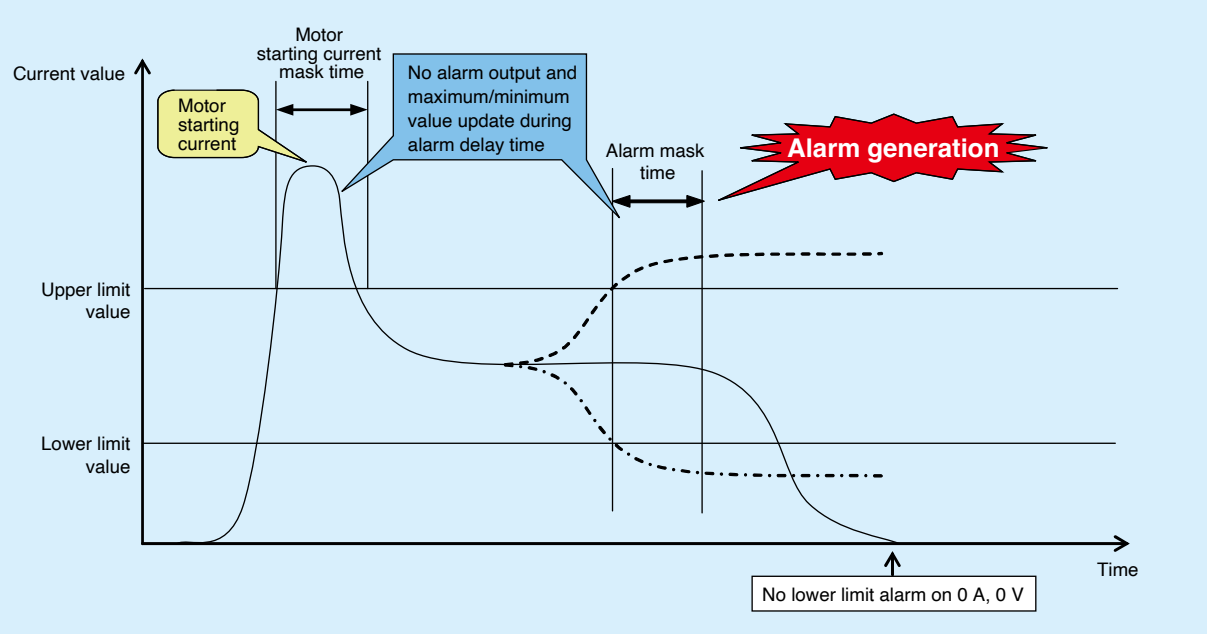


(Side view)　　(Overhead view)

Impressive Monitoring Functions

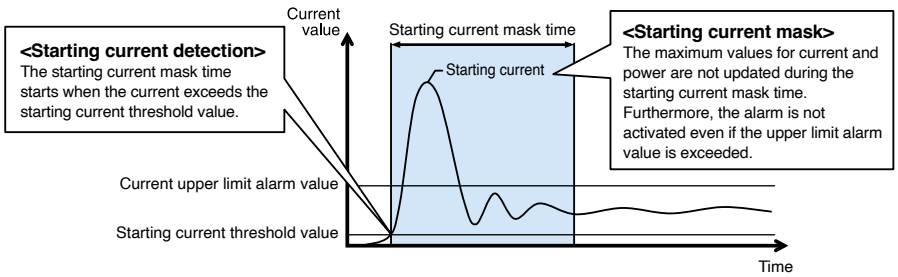
Advanced Alarm Display

(1) A function to blink the backlight upon occurrence of an alarm is provided.
The product has a setting function to blink the backlight upon occurrence of an alarm.
(2) The automatic or manual alarm cancel mode can be selected.
(3) Up to four points of upper and lower limits can be monitored.
(4) The alarm output delay time (alarm mask time) can be set.
Time of alarm output after the maximum value and minimum value is reached can be set.
With this function, alarm output caused by frequency change at start-up current of a motor and start-up of private power generating facility can be avoided.



Motor Starting Current Mask Function

The use of the motor starting current mask function for monitoring the motor current can prevent updating of the maximum value and alarm output caused by the motor starting current.
Although the maximum value is not updated, the current value is displayed.
The starting current mask time can be set in the range from 1 s to 5 min.



Note: Set the starting current threshold to a value lower than the lower limit value in consideration of fluctuations in load current during operation.

ME96 Super-S Series Ver.B Features

Variety of Complementary Features

Password Function

With the password function, the following items can be protected from an accidental execution.

No.	Password-protected item	No.	Password-protected item
1	Shift to the setting mode	5	Adjust the time limit of rolling demand
2	Reset the max./min. values	6	Reset the peak value of rolling demand
3	Reset the value of active energy, reactive energy and apparent energy	7	Reset the value of operating time
4	Reset the value of periodic active energy		

Special Primary Voltage/Current and Special Secondary Voltage are settable

(1) Special primary current

1 A to 30 kA

(2) Special primary voltage

60 V to 750 kV

(3) Special secondary voltage

3-phase 4-wire system

(63.5 V, 100 V, 110 V, 115 V, 120 V)

3-phase 3-wire, 1-phase 2-wire system

(100 V, 110 V, 220 V)

Periodic Monitoring Function

Power consumption can be measured in three individual intervals (e.g., peak, off- peak and shoulder, etc.).

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).)

Power consumption (period 1)

Power consumption (period 2)

Power consumption (period 3)

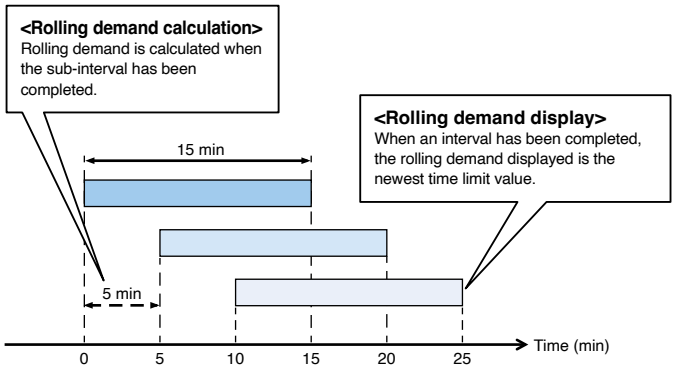
Rolling Demand Function

Rolling demand is the estimated power consumption in a specified period (interval).
For the block interval demand, select the duration (interval) of the block to be used for demand calculation.

①Rolling block

Use rolling block to set the interval and sub-intervals from 1 min to 60 min (1 min interval). Rolling demand is calculated and updated at the end of each sub-interval. However, Present and predictive values are always calculated.

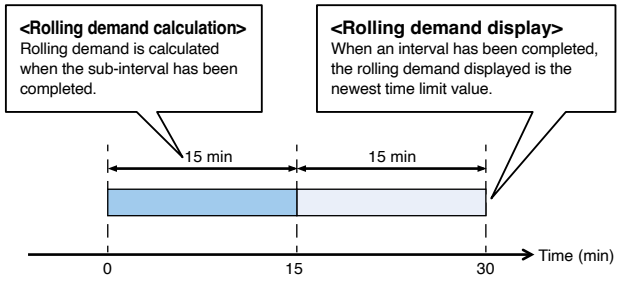
<Example: Interval, 15 min; Sub-interval, 5 min>



②Fixed block

Use fixed block to set the interval from 1 min to 60 min (1 min interval). Rolling demand is calculated and updated at the end of each interval. However, Present and predictive values are always calculated.
(For fixed block, use the same time limits both of interval and sub-interval).

<Example: Interval, 15 min; Sub-interval, 15 min>



Test Function

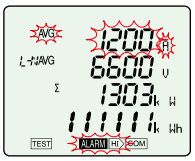
- A test function is provided to check the wiring for communication, alarm output/digital output, analog output and pulse output without input of voltage or current.
- At the time of wiring test before shipment of the board and counter test for system validation on site, test signals can be output only by applying the auxiliary power.

Note: Depending on the optional unit and settings, the test function may not be available (may not be displayed).

(1) Communications Test

①Display
- The same as for the operating mode, display patterns and other data are shown as set.
- Both maximum and minimum values can be displayed.

②Communication data
- Communication items and value are the same one on the display. The items value that are not displayed is 0 (zero).
- Measuring items set for alarm will be displayed at the time of an alarm.
- Digital input/output status can be monitored.



(2) Alarm/Digital Output Operation Test

①Displays current alarm and contact status.
②Press the Reset button for 2 sec, and regardless if there is an alarm or not, the display and digital output will operate as follows.

Status	Display	Output terminal
Alarm	ON	Closed
No alarm	OFF	Open

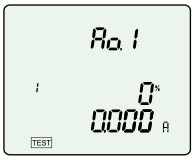
(3) Analog Output Operation Test

①Display the output items.
②Press the ⊕ or ⊖ button to change the analog output.

Note: Default value is 0%.

0% → 25% → 50% → 75% → 100% → 0%

Output	Output specs
	4 mA to 20 mA
0%	4 mA
25%	8 mA
50%	12 mA
75%	16 mA
100%	20 mA



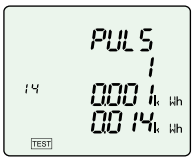
(4) Pulse Output Operation Test

Press the Reset button one time to output one pulse.

Note: After reaching 50, count will return to 1.

0 → 1 → 2 → ··· → 49 → 50 [pulse]

Note: Default value is 0 pulses.

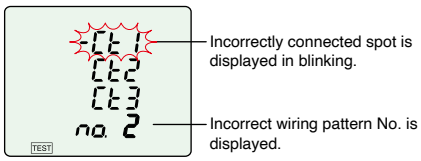


Checking Input Wiring Support Function

(1) Incorrect wiring pattern display function

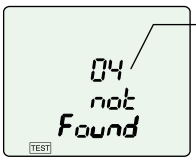
- Whether the voltage/current input wirings are correct or not is displayed. As for the incorrect wiring display pattern, see the instruction manual.

Normal state



When phase 1 CT is connected in reverse

Note 1: When wiring of either one of the current/voltage terminals is not correct, the incorrectly connected spot is easily identified.
Note 2: Not all incorrect wirings can be identified. When the voltage input is incorrectly connected and the current input is also incorrectly connected, a different pattern of incorrect wiring may be displayed.



When incorrect wiring pattern cannot be detected

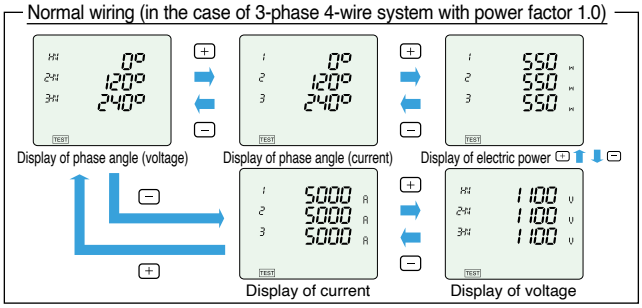
Display	Content	Display	Content
01	Low voltage	03	Voltage unbalance
02	Low current	04	Incorrect connections at multiple spots

➡ Check by using the incorrect wiring identification support display function.

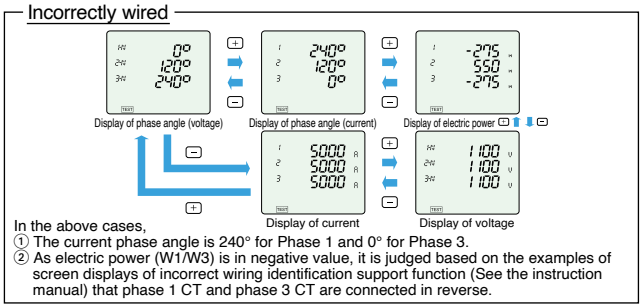
(2) Incorrect Wiring Identification Support Display Function

- This function displays each phase angle (voltage phase 1 standard) of voltage and current, power values (W1, W2, W3) of each phase, voltage value & current values to support identifying incorrect wirings. By knowing abnormality in the phase angle of voltage/current and by comparing it with the normal value, you can more easily identify an incorrectly wired spot.
- Examples of screen displays of incorrect wiring identification support function.

Normal wiring (in the case of 3-phase 4-wire system with power factor 1.0)



Incorrectly wired



In the above cases,
① The current phase angle is 240° for Phase 1 and 0° for Phase 3.
② As electric power (W1/W3) is in negative value, it is judged based on the examples of screen displays of incorrect wiring identification support function (See the instruction manual) that phase 1 CT and phase 3 CT are connected in reverse.

Standards

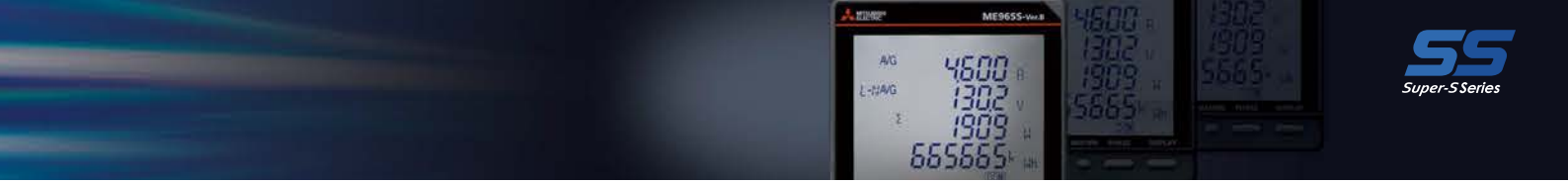
All products are compliant with CE Marking, UL Standards, KC mark and FCC/IC.

Specifications

■ME96SSHB-MB

Model name			ME96SSHB-MB	
Phase wire system			3-phase 4-wire, 3-phase 3-wire (3CT, 2CT), 1-phase 3-wire, 1-phase 2-wire (common use)	
Rating		Current	5 A AC, 1 A AC (common use)	
		Voltage	3-phase 4-wire: max 277/480 V AC 3-phase 3-wire: (DELTA) max 220 V AC, (STAR) max 440 V AC 1-phase 3-wire: max 220/440 V AC 1-phase 2-wire: (DELTA) max 220 V AC, (STAR) max 440 V AC	
		Frequency	50/60 Hz (common use)	
Item			Measuring Item	Class
Measuring element	Current (A)		A1, A2, A3, AN, A_{AVG}	±0.1%
	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	±0.2%
	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	Class 0.5S (IEC62053-22)
	Reactive energy (varh)		Imported lag, Imported lead, Exported lag, Exported lead	Class 1S (IEC62053-24)
	Apparent energy (VAh)		Imported + Exported	±2.0%
	Harmonic current (HI)		Total, 1st to 31st (Odd degree only)	±1.0%
	Harmonic voltage (HV)		Total, 1st to 31st (Odd degree only)	
	Rolling demand active power (DW)		Rolling block, Fixing block (Select either of them according to the settings.)	±0.2%
	Rolling demand reactive power (Dvar)		Rolling block, Fixing block (Select either of them according to the settings.)	±1.0%
	Rolling demand apparent power (DVA)		Rolling block, Fixing block (Select either of them according to the settings.)	
	Periodic active energy (Wh)		Periodic active energy 1, Periodic active energy 2, Periodic active energy 3	Class 0.5S
	Operating time (h)		Operating time 1, Operating time 2	(Reference)
	Current unbalance rate (Aunb)		Aunb	(Reference)
	Voltage unbalance rate (Vunb)		Vunb	(Reference)
	CO_2 equivalent		kg	(Reference)
Item			Specifications	
Measuring Method		Instantaneous Value	A, V: RMS value 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, Dvar, DVA: Rolling demand calculation	
Display	Display type		LCD with LED backlight	
	Number of display digits or segments	Digital section	First to third line indication: 4 digits, Fourth line indication: 6 digits	
			A, DA, V, W, var, VA, PF, DW, Dvar, DVA: 4 digits; Hz: 3 digits; Wh, varh, VAh: 9 digits (6-digit or 12-digit is also available.); Harmonic distortion ratio/content rate: 4 digits; Harmonic RMS value: 4 digits; Operating time: 6 digits; Digital input/output: I/O	
	Display update time interval		0.5 s, 1 s (selectable)	
Communication			MODBUS RTU communication	
Built-in logging	Logging mode		Automatic overwrite update	
	Logging data type	Measuring data *1	Measuring data and time data are logged at the interval set at the data logging period. (15 min, 30 min, 60 min)	
		Alarm log	Time data at alarm generating/cancellation and at waiting for alarm cancellation	
		The recorded time of the Max/Min value	Max/Min value data and time data	
	Number of logging items	Measuring data	Integrated value data: 5 items, Data other than integrated value: 15 items, Total: A maximum of 20 items	
		Alarm log	The number of the set alarms	
		The recorded time of the Max/Min value	The total is 19 items: Current Max/Min (AVG), Line voltage Max/Min (AVG), Phase voltage Max/Min (AVG), Total active power Max/Min (AVG), Total power factor Max/Min (AVG), Frequency Max/Min (AVG), Total reactive power Max/Min, Total apparent power Max/Min, Total harmonic current RMS Max value, Harmonic line voltage distortion ratio Max total, Harmonic phase voltage distortion ratio Max total	
	Internal memory logging period	Measuring data	30 days (Logging period: 15 minutes), 60 days (Logging period: 30 minutes), 120 days (Logging period: 60 minutes),	
		Alarm log	100 records	
		The recorded time of the Max/Min value	1 record for every Max/Min value factor	
	System log data		100 records	
	Saving logging data		Use of nonvolatile memory	
	How to acquire logging data		Acquire the logging data via MODBUS® RTU Communication	
	Clock accuracy		± 1 minute per month, typical	
Connectable Optional Plug-in Module			ME-4210-SS96B, ME-0040C-SS96, ME-0052-SS96, ME-0000BU-SS96, ME-0000MT-SS96, ME-0040MT2-SS96 *2	
Power interruption backup			Use of nonvolatile memory (Items: settings, MAX/MIN value, active energy, reactive energy, apparent energy, periodic active energy, rolling demand, operating time)	
		Built-in logging	Use of nonvolatile memory (Logging data, System log data)	
VA Consumption		Voltage circuit	Each phase: 0.1 VA (at 110 V AC), 0.2 VA (at 220 V AC), 0.4 VA (at 440 V AC)	
		Current circuit	Each phase: 0.1 VA	
		Auxiliary power circuit	13 VA (at 110 V AC), 14 VA (at 220 V AC), 9 W (at 100 V DC)	
Auxiliary power			100 V to 240 V AC (±15%), 100 V to 240 V DC (-30% +15%)	
Weight			0.5 kg	
Dimensions			96 (H) × 96 (W) × 90 (D) mm	
Mounting method			Embedded	
Operating temperature/humidity			-5°C to +55°C (Daily average temperature: 35°C or less), 0% to 85% RH, Non condensing	
Storage temperature/ humidity			-25°C to +75°C (Daily average temperature: 35°C or less), 0% to 85% RH, Non condensing	

Note 1. The class value represents the ratio to the rated value (100%).
Note 2. For measurement where the harmonic distortion ratio (content rate) is 100% or more, the class can exceed ±1.0%.
Note 3. Harmonic current cannot be measured without voltage input.
Note 4. Using the conventional ME-4210-SS96 (Optional Plug-in Module), the CE marking and UL standards safety certification requirements cannot be met.
*1: Integrated values (Wh, varh, and VAh) are measured values of ME96SS. They are not differential values by logging period.
*2: ME-0040MT2-SS96 is only applicable to ME96SSHB-MB with firmware version 01.01 or later.



■ME96SSRB-MB

Model name			ME96SSRB-MB	
Phase wire system			3-phase 4-wire, 3-phase 3-wire (3CT, 2CT), 1-phase 3-wire, 1-phase 2-wire (common use)	
Rating		Current	5 A AC, 1 A AC (common use)	
		Voltage	3-phase 4-wire: max 277/480 V AC 3-phase 3-wire: (DELTA) max 220 V AC, (STAR) max 440 V AC 1-phase 3-wire: max 220/440 V AC 1-phase 2-wire: (DELTA) max 220 V AC, (STAR) max 440 V AC	
		Frequency	50/60 Hz (common use)	
Item			Measurement items	Class
Measuring element	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	Class 0.5S (IEC62053-22)
	Reactive energy (varh)		Imported lag, Imported lead, Exported lag, Exported lead	Class 1S (IEC62053-24)
	Apparent energy (VAh)		Imported + Exported	±2.0%
	Harmonic current (HI)		Total, 1st to 19st (Odd degree only)	±1.0%
	Harmonic voltage (HV)		Total, 1st to 19st (Odd degree only)	
	Rolling demand active power (DW)		Rolling block, Fixing block (Select either of them according to the settings.)	±0.5%
	Rolling demand reactive power (Dvar)		Rolling block, Fixing block (Select either of them according to the settings.)	±1.0%
	Rolling demand apparent power (DVA)		Rolling block, Fixing block (Select either of them according to the settings.)	
	Periodic active energy (Wh)		Periodic active energy 1, Periodic active energy 2, Periodic active energy 3	Class 0.5S
	Operating time (h)		Operating time 1, Operating time 2	(Reference)
	Current unbalance rate (Aunb)		Aunb	(Reference)
	Voltage unbalance rate (Vunb)		Vunb	(Reference)
	CO_2 equivalent		kg	(Reference)
Item			Specifications	
Measuring Method		Instantaneous Value	A, V: RMS value 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, Dvar, DVA: Rolling demand calculation	
Display	Display type		LCD with LED backlight	
	Number of display digits or segments		First to third line indication: 4 digits, Fourth line indication: 6 digits	
		Digital section	A, DA, V, W, var, VA, PF, DW, Dvar, DVA: 4 digits; Hz: 3 digits; Wh, varh, VAh: 9 digits (6-digit or 12-digit is also available.); Harmonic distortion ratio/content rate: 4 digits; Harmonic RMS value: 4 digits; Operating time: 6 digits; Digital input/output: I/O	
	Display update time interval		0.5 s, 1 s (selectable)	
Communication			MODBUS RTU communication	
Built-in logging	Logging mode		Automatic overwrite update	
	Logging data type	Measuring data *1	Measuring data and time data are logged at the interval set at the data logging period. (15 min, 30 min, 60 min)	
		Alarm log	Time data at alarm generating/cancellation and at waiting for alarm cancellation	
		The recorded time of the Max/Min value	Max/Min value data and time data	
	Number of logging items	Measuring data	Integrated value data: 5 items, Data other than integrated value: 15 items, Total: A maximum of 20 items	
		Alarm log	The number of the set alarms	
		The recorded time of the Max/Min value	The total is 19 items: Current Max/Min (AVG), Line voltage Max/Min (AVG), Phase voltage Max/Min (AVG), Total active power Max/Min (AVG), Total power factor Max/Min (AVG), Frequency Max/Min (AVG), Total reactive power Max/Min, Total apparent power Max/Min, Total harmonic current RMS Max value, Harmonic line voltage distortion ratio Max total, Harmonic phase voltage distortion ratio Max total	
	Internal memory logging period	Measuring data	30 days (Logging period: 15 minutes), 60 days (Logging period: 30 minutes), 120 days (Logging period: 60 minutes),	
		Alarm log	100 records	
		The recorded time of the Max/Min value	1 record for every Max/Min value factor	
	System log data		100 records	
	Saving logging data		Use of nonvolatile memory	
	How to acquire logging data		Acquire the logging data via MODBUS® RTU Communication	
	Clock accuracy		± 1 minute per month, typical	
Connectable Optional Plug-in Module			ME-4210-SS96B, ME-0040C-SS96, ME-0052-SS96, ME-0000MT-SS96, ME-0000BU-SS96	
Power interruption backup			Use of nonvolatile memory (Items: settings, MAX/MIN value, active energy, reactive energy, apparent energy, periodic active energy, rolling demand, operating time)	
		Built-in logging	Use of nonvolatile memory (Logging data, System log data)	
VA Consumption		Voltage circuit	Each phase: 0.1 VA (at 110 V AC), 0.2 VA (at 220 V AC), 0.4 VA (at 440 V AC)	
		Current circuit	Each phase: 0.1 VA	
		Auxiliary power circuit	13 VA (at 110 V AC), 14 VA (at 220 V AC), 9 W (at 100 V DC)	
Auxiliary power			100 V to 240 V AC (±15%), 100 V to 240 V DC (-30% +15%)	
Weight			0.5 kg	
Dimensions			96 (H) × 96 (W) × 90 (D) mm	
Mounting method			Embedded	
Operating temperature/humidity			-5°C to +55°C (Daily average temperature: 35°C or less), 0% to 85% RH, Non condensing	
Storage temperature/ humidity			-25°C to +75°C (Daily average temperature: 35°C or less), 0% to 85% RH, Non condensing	

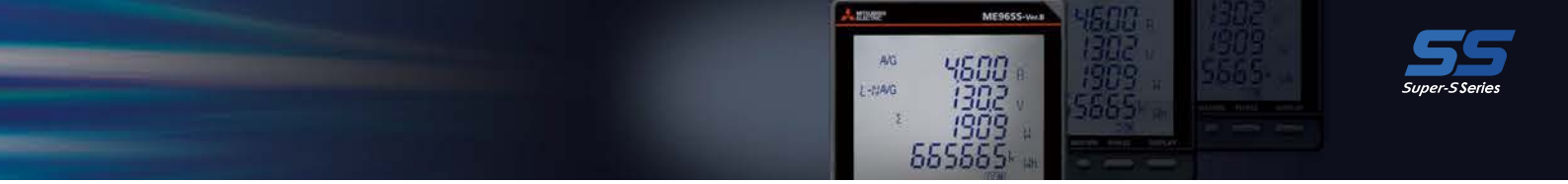
Note 1. The class value represents the ratio to the rated value (100%).
Note 2. For measurement where the harmonic distortion ratio (content rate) is 100% or more, the class can exceed ±1.0%.
Note 3. Harmonic current cannot be measured without voltage input.
Note 4. Using the conventional ME-4210-SS96 (Optional Plug-in Module), the CE marking and UL standards safety certification requirements cannot be met.
*1: Integrated values (Wh, varh, and VAh) are measured values of ME96SS. They are not differential values by logging period.

Specifications

■ME96SSEB-MB

Model name			ME96SSEB-MB	
Phase wire system			3-phase 4-wire, 3-phase 3-wire (3CT, 2CT), 1-phase 3-wire, 1-phase 2-wire (common use)	
Rating		Current	5 A AC, 1 A AC (common use)	
		Voltage	3-phase 4-wire: max 277/480 V AC 3-phase 3-wire: (DELTA) max 220 V AC, (STAR) max 440 V AC 1-phase 3-wire: max 220/440 V AC 1-phase 2-wire: (DELTA) max 220 V AC, (STAR) max 440 V AC	
		Frequency	50/60 Hz (common use)	
Item			Measuring Item	Class
Measuring element	Current (A)		A1, A2, A3, AN, A_{AVG}	±0.5%
	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	
	Reactive power (var)		var1, var2,var3, Σvar	
	Apparent power (VA)		VA1, VA2, VA3, ΣVA	
	Power factor (PF)		PF1, PF2, PF3, ΣPF	±0.5%
	Frequency (Hz)		Hz	±0.2%
	Active energy (Wh)		Imported, Exported	Class 0.5S (IEC62053-22)
	Reactive energy (varh)		Imported lag, Imported lead, Exported lag, Exported lead	Class 1S (IEC62053-24)
	Apparent energy (VAh)		Imported + Exported	±2.0%
	Harmonic current (HI)		Total	±2.0%
	Harmonic voltage (HV)		Total	
	Operating time (h)		Operating time 1, Operating time 2	(Reference)
Measuring method		Instantaneous value	A, V: RMS value 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	
Display	Display type		LCD with LED backlight	
	The number of display digits or The number of segments		First to Third line display: 4 digits, Fourth line display: 6 digits	
		Digital section	A, DA, V, W, var, VA, PF: 4 digits; Hz: 3 digits; Wh, varh, VAh: 9 digits (6-digit or 12-digit is also available.); Harmonic distortion ratio/content rate: 4 digits; Harmonic RMS value: 4 digits; Operating time: 6 digits	
	Display update time interval		0.5 s, 1 s (selectable)	
Communication			MODBUS RTU communication	
Connectable Optional Plug-in Module			Cannot connect optional module	
Power interruption backup			Use of nonvolatile memory (Items: settings, MAX/MIN value, active energy, reactive energy, apparent energy, operating time)	
VA consumption	Voltage circuit		Each phase: 0.1 VA (at 110 V AC), 0.2 VA (at 220 V AC), 0.4 VA (at 440 V AC)	
	Current circuit		Each phase: 0.1 VA	
	Auxiliary power circuit		4 VA (at 110 V AC), 5 VA (at 220 V AC), 3 W (at 100 V DC)	
Auxiliary power			100 V to 240 V AC (±15%), 100 V to 240 V DC (-30% +15%)	
Weight			0.3 kg	
Dimensions			96 (H) × 96 (W) × 36 (D) mm	
Mounting method			Embedded	
Operating temperature/humidity			-5°C to +55°C (Daily average temperature: 35°C or less), 0% to 85% RH, Non condensing	
Storage temperature/ humidity			-25°C to +75°C (Daily average temperature: 35°C or less), 0% to 85% RH, Non condensing	

Note 1. The class value is a percentage of rated value (100%).
Note 2. For harmonics measurement where distortion ratio (content rate) is 100% or more, it can exceed ±2.0%.
Note 3. When there is no voltage input, harmonic current cannot be measured.



■Standards Compliance

Electromagnetic Compatibility			
	Emissions		
		Radiated Emission	EN 61326-1 / EN 55011, CISPR 11 FCC Part15 Subpart B Class A
		Conducted Emission	EN 61326-1 / EN 55011, CISPR 11 FCC Part15 Subpart B Class A
		Harmonics Measurement	EN 61000-3-2
		Flicker Meter Measurement	EN 61000-3-3
	Immunity		
		Electrostatic discharge Immunity	EN 61326-1, EN IEC 61000-6-2 / EN 61000-4-2
		Radio Frequency Electromagnetic field Immunity	EN 61326-1, EN IEC 61000-6-2 / EN 61000-4-3
		Electrical Fast Transient/Burst Immunity	EN 61326-1, EN IEC 61000-6-2 / EN 61000-4-4
		Surge Immunity	EN 61326-1, EN IEC 61000-6-2 / EN 61000-4-5
		Conducted Disturbances, Induced By Radio Frequency Fields Immunity	EN 61326-1, EN IEC 61000-6-2 / EN 61000-4-6
		Power Frequency Magnetic Field Immunity	EN 61326-1, EN IEC 61000-6-2 / EN 61000-4-8
		Voltage Dips and Short Interruptions	EN 61326-1, EN IEC 61000-6-2 / EN 61000-4-11

Safety		
	Europe	CE, as per EN 61010-1: 2010 (3rd Edition)
	U.S. and Canada	UL Recognized Component as per UL 61010-1, IEC 61010-1
	Installation Category	III
	Measuring Category	III
	Pollution Degree	2

■MODBUS RTU Communication Specifications

Item	Specification
Interface	RS-485 2-wire half-duplex transmission
Protocol	RTU (binary data transfer)
Transmission method	Asynchronous
Connection type	Multi-point bus
Baud rate	2400, 4800, 9600, 19200, 38400 bps
Data bit	8
Stop bit	1, 2
Parity	ODD, EVEN, NONE
Address	1 to 255 (0: for broadcast mode)
Distance	1,200 m (max)
Max. connectable units	31 units
Terminal Resistance	120 Ω 1/2 W
Recommended Cable	Shielded twisted-pair AWG 24 to 14

■ For more information on data, please refer to the following document.
· Electronic Multi-Measuring Instrument ME series MODBUS Interface specifications…LSPM-0075

■CC-Link Communication Specifications for optional plug-in module

Item	Specification
No. of occupied stations	1 Station Remote device station
CC-Link version	CC-Link Ver 1.10 / Ver 2.00
Baud rate	10 Mbps / 5 Mbps / 2.5 Mbps / 625 kbps / 156 kbps
Transmission method	Broadcast polling system
Synchronous method	Frame synchronous system
Encoding method	NRZI
Transmission path format	Bus format (EIA RS485)
Transmission format	HDLC
Error control system	CRC ($X^{16} + X^{12} + X^5 + 1$)
Number of connectable units	42 units (max, remote device station)
Remote station numbers (station numbers)	1 to 64

■ For CC-Link connection cables, please use the dedicated cables.
For information regarding dedicated cables, please refer to the CC-Link Partner Product Catalog published by the CC-Link Partner Association or CC-Link Partner Product Information on the CC-Link Partner Association website (http://www.cc-link.org).
Notes 1. Dedicated CC-Link cables compatible with Ver. 1.00 cannot be used in tandem with dedicated CC-Link high-performance cables compatible with Ver. 1.00.
Notes 2. In the case of systems consisting of units compatible with Ver. 1.00, 1.10 or 2.00 used in tandem with Ver. 1.00 or 1.10 cables, Ver. 1.00 specifications will apply for the maximum total cable length and length of cables between stations.
Notes 3. For terminal resistance, be sure to use 110 Ω ±5% (1/2 W product) when using dedicated CC-Link cables or 130 Ω ±5% (1/2 W product) when using dedicated CC-Link high-performance cables.
■ For more information on data, please refer to the following document.
· Electronic Multi-Measuring Instrument programming manual (CC-Link)……LEN080334
· Electronic Multi-Measuring Instrument programming manual (CC-Link)(For ver. 2 remote device station)…LEN130391

■Input/Output Specifications for optional plug-in module

Item		Specifications	Optional Plug-in Module type
Analog output	Output specifications	4 mA to 20 mA	ME-4210-SS96B
	Load resistance	600 Ω or less	
	Response time	1 second or less (Hz: 2 seconds or less, HI, HV: 5 seconds or less)	
Pulse/Alarm output	Switch type	No-voltage a-contact	ME-4210-SS96B
	Contact capacity	35 V DC, 0.1 A or less	
	Pulse width	0.125 s, 0.5 s, 1.0 s	
Digital input (DI)	Contact capacity	24 V DC (19 V DC to 30 V DC), 7 mA or less	ME-4210-SS96B, ME-0040C-SS96, ME-0052-SS96, ME-0040MT2-SS96B
	Signal width	30 ms or more	
Digital output (DO)	Switch type	No-voltage a-contact	ME-0052-SS96
	Contact capacity	35 V DC, 0.2 A or less	

Specifications

■MODBUS TCP Communication Specifications for optional plug-in module

Item		Specification
Ethernet port		10BASE-T/100BASE-TX
Transmission method		Base band
Maximum segment length		100 m
Connector applicable for external wiring		RJ45
Cable	10BASE-T	Cable compliant with IEEE802.3 10BASE-T standard (Unshielded twisted pair cable (UTP cable), category 3 or higher)
	100BASE-TX	Cable compliant with IEEE802.3 100BASE-TX standard (Shielded twisted pair cable (STP cable), category 5 or higher)
Protocol		MODBUS TCP (Port No.502)
Number of simultaneously connection *1		Max. 4
Support functions		Auto-negotiation function (automatic recognition of 10BASE-T/100BASE-TX) Auto-MDIX function (automatic recognition of straight cable/cross cable)

*1: Indicates the number of TCP connections that can be established simultaneously.

■ For more information on data, please refer to the following document.
Electronic Multi-Measuring Instrument ME series MODBUS Interface specifications…LSPM-0075

■Logging Specifications for optional plug-in module

Item		Specification
Logging mode		Automatic updating by overwriting (not provided with a function to automatically start according to the start time setting)
Kinds of logging data	Detailed data	Measurement data is stored at the specified “detailed data logging interval” (1 min, 5 min, 10 min, 15 min or 30 min). Note: The data will be output as a detailed data file. Note: As the integrated values, not the difference values, but the values displayed on the multi indicating instrument will be output.
	1-hour data	Measurement data is stored at a one-hour interval. Note: The data will be output as a one-hour data file or a one-day data file. Note: As the integrated values, not the difference values, but the values displayed on the multi indicating instrument will be output.
Number of logging items	Detailed data	Max. 6 items
	1-hour data	Max. 6 items
Internal memory logging period	Detailed data	Detailed data logging interval: 1 min for 2 days Detailed data logging interval: 5 min for 10 days Detailed data logging interval: 10 min for 20 days Detailed data logging interval: 15 min for 30 days Detailed data logging interval: 30 min for 60 days
	1-hour data	400 days (about 13 months)
SD memory card (2 GB) logging period		10 years or more
System log data		1200 records
Logging data / system log data output format		CSV format (ASCII code)
Power failure compensation		Backup by built-in lithium battery Total power interruption backup time: 5 years (at daily average temperature of 35°C or less) (The life of the lithium battery is 10 years (at a daily average temperature of 35°C or less).) The battery cannot be replaced by the customer. Please consider updating the module.
Set values (logging ID, logging items and detailed data logging interval)		Stored in FRAM (non-volatile memory) Note: The data will not be deleted even if power interruption is caused by battery voltage drop (BAT. LED is on).
Logging data and system log data		Stored in SRAM (volatile memory) Note: The data will be deleted if power interruption is caused by battery voltage drop (BAT. LED is on).
Clock operation		Note: The clock operation will stop if power interruption is caused by battery voltage drop (BAT. LED is on). After power restoration, the clock operation will start from 00:00 on Jan. 1, 2016.
Clock accuracy		± 1 minute per month, typical
Output data storage medium		SD memory card (SD or SDHC)
Optional accessory		SD memory card (EMU4-SD2GB) *1

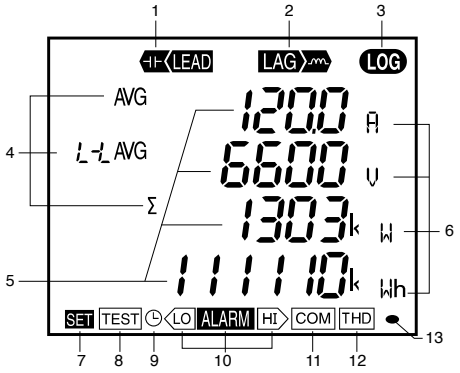
*1: Be sure to use a SD memory card, EMU4-SD2GB, manufactured by Mitsubishi Electric Corporation. Using a SD memory card not manufactured by Mitsubishi Electric Corporation may cause a trouble such as data corruption in the card or system stop. Regarding the use of commercially available SD memory cards, access our FA website. Note that the customer is responsible for verifying safe use of those SD memory cards.

Model: EMU4-SD2GB

■ For more information on data, please refer to the following document.
Logging specifications…LSPM-0092

■Functions

●LCD Functions



No.	Name of each part	Function
1	LEAD status	Light up when leading reactive energy is measured
2	LAG status	Light up when lagging reactive energy is measured
3	Built-in logging status	Light up when the built-in logging function is operating
4	Digital element display	Display measuring elements expressed in digital numbers
5	Digital display	Display measured values in digital numbers
6	Unit	Display the units of measured values
7	Setup status	Light up in the setting mode Blink in the setting confirmation mode
8	Test mode status	Light up in the test mode
9	Clock status	Light up when the date and time are set
10	Upper/lower limit alarm status	Blink when the upper/lower limit alarm is generating
11	Communication/ Option logging status	Specification / ON / Blink / OFF CC-Link communication / Normal / CC-Link version mismatches, Hardware abnormality / Hardware abnormality MODBUS RTU communication MODBUS TCP communication / Normal / Communication error such as wrong address *1 / Hardware abnormality Logging function / Normal / Error occurrence such as setting abnormality, SD memory card error, or battery voltage drop *1 / Hardware abnormality *1. For details, refer to User's Manual.
12	Harmonics status	Light up when harmonic is displayed
13	Metering status	Blink when Imported active energy is measured *Note 1 *It appears on the imported active energy display screen only

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

●Button Functions

Basic performance		Special performance		
Button operation	Functions	Button operation		Functions
SET	Used to set items such as primary voltage and current, and to choose setting items	DISPLAY	Push for 2 seconds	Used to switch display between manual display change ⇔ cyclic display change
		PHASE	Push for 2 seconds	Used to switch display between manual phase change ⇔ cyclic phase change
⊕ or ⊖	Used to switch display between setting	⊕ + ⊖	Push for 2 seconds	Used to change Wh, etc. to another unit and to low order zoom display
MAX/MIN	Used to switch display between max/min values and instantaneous value	⊕ + RESET	Push for 2 seconds	Used to perform batch reset of all the max/min values
PHASE	Used to change over phase	⊕ or ⊖	Push for 1 seconds	Used to perform fast-forward or fast-return of numerical values in numerical value setting
DISPLAY	Used to change over the display screen	SET + RESET + PHASE		Used to reset Wh, varh, and VAh to zero by concurrently pushing for 2 seconds

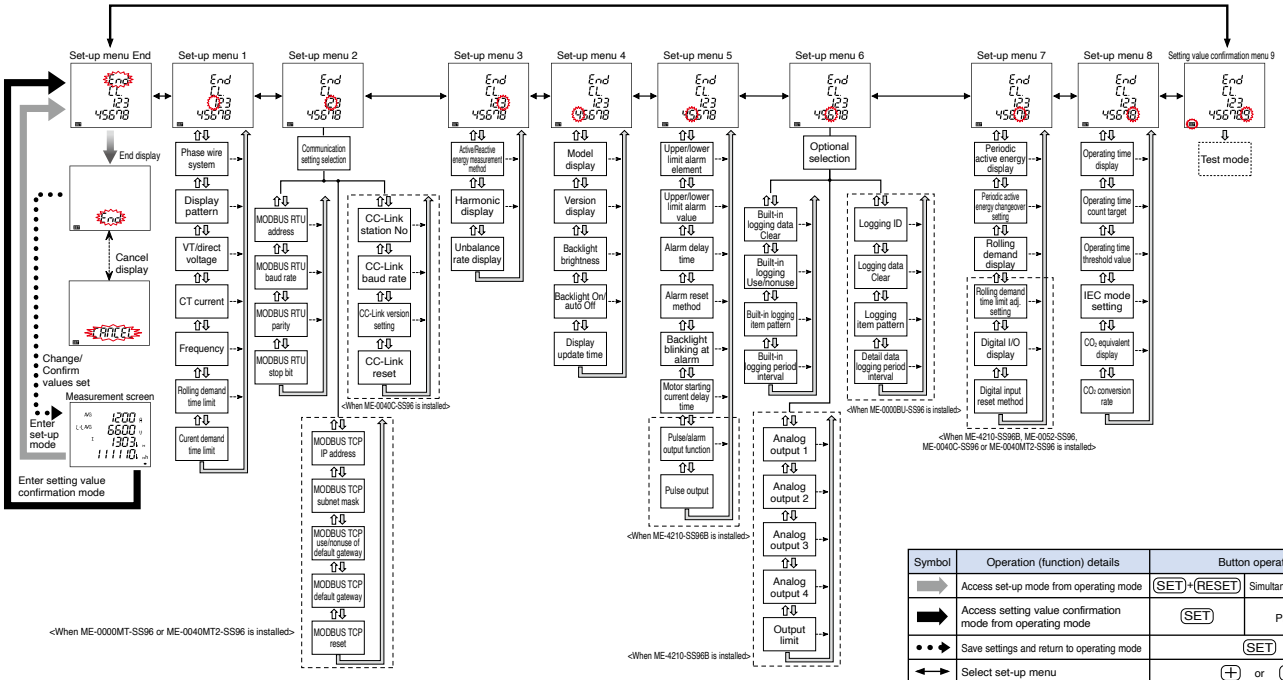
Note. An example. For details, refer to the user's manual.

■Set-up

For correct measurement, it is necessary to set the primary voltage/current in the set-up mode.

Enter the setting mode from the operating mode and set the necessary items. Any items not set remain in the factory default.

●Set-up workflow (Example for ME96SSHB-MB)



Symbol	Operation (function) details	Button operation	
➡	Access set-up mode from operating mode	SET+RESET	Simultaneously press for 2 s
➡	Access setting value confirmation mode from operating mode	SET	Press for 2 s
• • ➡	Save settings and return to operating mode	SET	
⟷	Select set-up menu	⊕ or ⊖	
⇨	Move to next screen	SET	
⇨	Return to previous setting item	DISPLAY	
⇢	Skip remaining settings	SET	Press for 1 s
⇠⇢	Select cancel	⊕ or ⊖	

Notes 1. Basic measurements are possible by adjusting settings in the menu 1 (⋯ area enclosed by dotted line).

Notes 2. Item settings vary depending on the model.

Notes 3. Setting confirmation menu 9 (test mode) is not displayed in the setting mode.

●Basic Set-up Operations

To access the setting mode, press and hold the SET and RESET buttons down at the same time for 2 s. Press the SET button to display the items to be set, and the + and − buttons, set the details. To save setting for each setting menu, press the SET button when the End screen is displayed.

The underlined setting parameters are the initial value.

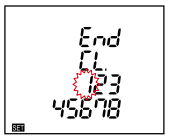
Set-up menu 1: Basic settings (set phase wire system, display pattern, Using VT/direct input, CT primary current, etc.)

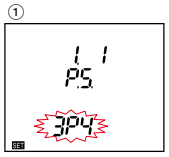
Set-up menu — Adjust the set-up menu No. to "1".

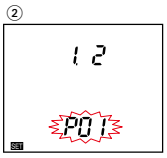
DISPLAY / SET

①Phase/Wire system — ①Set the phase/wire system according to the number of measurement circuits targeted.

3P4:	3-phase 4-wire system
3P3. 2Ct:	3-phase 3-wire system (2CT)
3P3. 3Ct:	3-phase 3-wire system (3CT)
1P3. 1n2:	1-phase 3-wire system (1N2 display)
1P3. 1n3:	1-phase 3-wire system (1N3 display)
1P2:	1-phase 2-wire system







DISPLAY / SET

②Display pattern — ②Set the display pattern

○: Can be displayed with this setting only
△: Other settings are required to display data
□: Select P00 and set display order and position

Refer to "■Display Pattern Contents" on page 26 for the detailed elements to be displayed.

(1) When set to 3-phase 4-wire system

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 Screen: Active Energy (Imported)	Active Energy (Exported)	Reactive Energy (Special)	Apparent Energy	Periodic Active Energy	Rolling Demand	Harmonic Current/Voltage	Unbalance Rate	Digital Input/output status	Operating Time	CO_2 Equivalent
P01	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	△	△	△
P02	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	△	△	△
P00	□	□	□	□	□	□	□	□	□	□	□	□	□	□	△	△	△	△	△	△	△	△	△	△	△

(2) When set to other than 3-phase 4-wire system
*For 1-phase 2-wire system, P02 is not selectable.

Display Pattern	Current	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 Screen: Active Energy (Imported)	Active Energy (Exported)	Reactive Energy (Special)	Apparent Energy	Periodic Active Energy	Rolling Demand	Harmonic Current/Voltage	Unbalance Rate	Digital Input/output Status	Operating Time	CO_2 Equivalent
P01	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	△	△	△
P02	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	△	△	△
P00	□	□	□	□	□	□	□	□	□	□	□	□	△	△	△	△	△	△	△	△	△	△	△

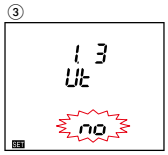
③VT/Direct voltage — ③Set VT

For direct measurement (without VT) ⇒ To select no, press SET and see (1) below.
For measurement with VT ⇒ To select yES, press SET and see (2) below.

·To set 3-phase 4-wire
no ◄——► yES

·To set 3-phase 3-wire or 1-phase 2-wire
yES ◄——► no

<For 1-phase 3-wire setting for ①Phase/Wire system>
Only used for direct measurements.
Skipped for this setting.



(1) For direct measurement (without VT)

(a) 3-phase 4-wire setting (phase voltage/line voltage)

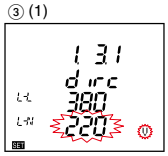
►63.5/110 V◄►100/173 V◄►110/190 V◄►220/380 V◄►230/400 V◄►240/415 V◄►254/440 V◄►277/480 V◄

(b) 3-phase 3-wire (2CT, 3CT) or 1-phase 2-wire setting (line voltage)

►110 V◄►220 V◄►440 V◄

(c) 1-phase 3-wire setting (1N2, 1N3) (phase voltage/line voltage)

►110/220 V◄►220/440 V◄



③VT/Direct voltage

(2) For measurement with VT

<Secondary voltage settings>

(a) 3-phase 4-wire setting (phase voltage)

63.5 V ⟷ 100 V ⟷ 110 V ⟷ 115 V ⟷ 120 V

(b) 3-phase 3-wire (2CT, 3CT) or 1-phase 2-wire setting (line voltage)

100 V ⟷ 110 V ⟷ 220 V

<Set primary voltage>

The setting ranges from 60 V to 750,000 V (setting unit: V)

Factory default settings

3-phase 4-wire: 200 V (phase voltage)

3-phase 3-wire; 1-phase 2-wire: 10,000 V (line voltage)

④CT current

④Set CT.

Set the primary and secondary currents of the CT to be combined.

<Set secondary current>

1 A ⟷ 5 A

<Set primary current>

The setting ranges from 1.0 A to 30,000.0 A (setting unit: A)

Factory default setting: 5.0 A

⑤Frequency

⑤Set frequency.

50 Hz ⟷ 60 Hz

Notes1. Analog output scale will also change.

⑥Rolling demand time limit

⑥Set the rolling demand interval time limit (Only ME96SSHB-MB and ME96SSRB-MB).

(1) Interval time limit

Setting range	Setting interval
1 - 15 - 60 (min)	1 min

(2) Sub-interval time limit

Setting range	Setting interval
1 - 60 (min)	1 min

⑦Current demand time limit

⑦Set the current demand time limit.

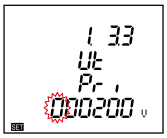
0 s	40 s	3 min	7 min	15 min
10 s	50 s	4 min	8 min	20 min
20 s	1 min	5 min	9 min	25 min
30 s	2 min	6 min	10 min	30 min

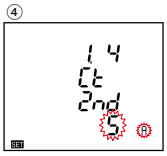
Set-up menu

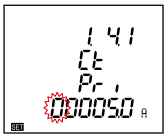
Select another set-up menu or finish set-up.

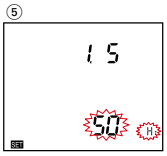
■To continue to set-up
Select the menu No.
using the ⊕ or ⊖ button.

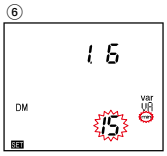
■To finish set-up
Press the ⊕ or ⊖ button
to display the End screen,
then press the SET button
to save the settings.

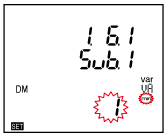


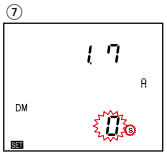


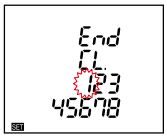


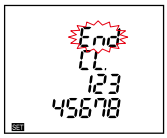












Set-up menu 2: MODBUS RTU Communication settings
(When ME-0040C-SS96, ME-0000MT-SS96 and ME-0040MT2-SS96 are not installed)

Set-up menu

Adjust the set-up menu No. to “2”.

①MODBUS RTU communication address

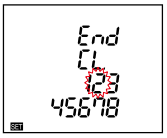
①Set MODBUS RTU communication address

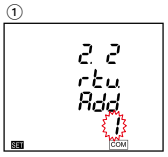
Possible address settings: 1-255

②MODBUS RTU Baud rate

②Set the MODBUS RTU communication baud rate.

2400 bps
4800 bps
9600 bps
19.2 kbps
38.4 kbps



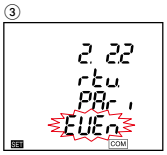


<Continued from previous page>

③MODBUS RTU communication parity

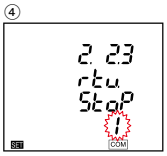
③Set the MODBUS RTU communication parity.

non
odd
even (EVEn)



④MODBUS RTU communication stop bit

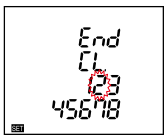
④Set the MODBUS RTU communication stop bit.
Stop bit 1 ◄——► Stop bit 2



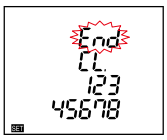
Set-up menu

Select another set-up menu or end set-up.

■To continue to set-up
Select the menu No. using the ⊕ or ⊖ button.



■To finish set-up
Press the ⊕ or ⊖ button to display the End screen, then press the SET button to save settings.

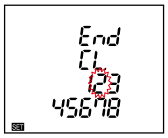


Set-up menu 2: CC-Link Communication settings (when ME-0040C-SS96 is installed)

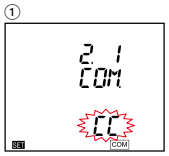
*Only for ME96SSHB-MB or ME96SSRB-MB, it is applicable.

Set-up menu

Adjust the set-up menu No. to "2".



①



①Communication setting selection

①Select CC-Link or MODBUS RTU communication.

CC : CC-Link communication
Mb. rtu : MODBUS RTU communication

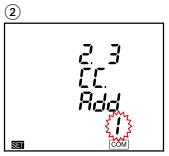
When "MODBUS RTU communication" is selected, set the communication conditions as stated in and after ①MODBUS RTU communication address on page 16.

②CC-Link communication station number

②Set the CC-Link communication station number.

Possible station number settings: 1-64

②

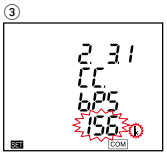


③CC-Link communication baud rate

③Set the CC-Link communication speed.

156 kbps
625 kbps
2.5 Mbps
5 Mbps
10 Mbps

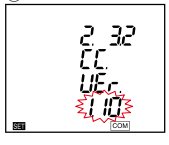
③



④Set CC-Link communication version

④Set the CC-Link communication version.
Version 1.10 ◄——► Version 2.00

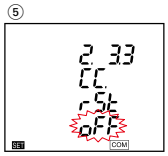
④



⑤Reset communication

⑤Set to "on" if changes have been made to the CC-Link settings.
(If not set to "on," changes will not be effective.)
oFF ◄——► on

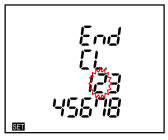
⑤



Set-up menu

Select another set-up menu or end set-up.

■To continue to set-up
Select the menu No. using the ⊕ or ⊖ button.



■To finish set-up
Press the ⊕ or ⊖ button to display the End screen, then press the SET button to save settings.

Set-up menu 2: MODBUS TCP Communication settings (when ME-0000MT-SS96 *1 or ME-0040MT2-SS96 *2 is installed)

*1 Only for ME96SSHB-MB or ME96SSRB-MB, it is applicable.
*2 Only for ME96SSHB-MB, it is applicable.

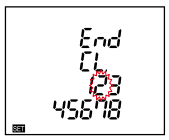
Set-up menu — Adjust the set-up menu No. to “2”.

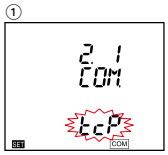
DISPLAY / SET

①Communication setting selection — ①Select MODBUS TCP communication or MODBUS RTU communication.

Mb.tcp : MODBUS TCP communication
Mb.rtu : MODBUS RTU communication

When “MODBUS RTU communication” is selected, set the communication conditions as stated in and after ①MODBUS RTU communication address on page 16.

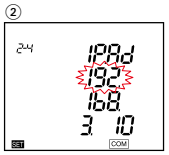




DISPLAY / SET

②MODBUS TCP communication IP address — ②Set the IP address of MODBUS TCP communication.

Allowable IP addresses:
000.000.000.000 - 192.168.3.10 - 255.255.255.255

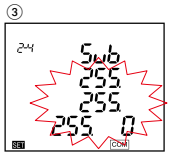


DISPLAY / SET

③MODBUS TCP communication subnet mask — ③Set the sub-net mask of MODBUS TCP communication.

Select one of the sub-net masks shown in the following table.

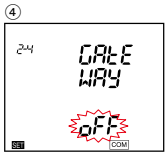
(1)	128.0.0.0	(9)	255.128.0.0	(17)	255.255.128.0	(25)	255.255.255.128
(2)	192.0.0.0	(10)	255.192.0.0	(18)	255.255.192.0	(26)	255.255.255.192
(3)	224.0.0.0	(11)	255.224.0.0	(19)	255.255.224.0	(27)	255.255.255.224
(4)	240.0.0.0	(12)	255.240.0.0	(20)	255.255.240.0	(28)	255.255.255.240
(5)	248.0.0.0	(13)	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		



DISPLAY / SET

④Use/non-use of MODBUS TCP communication default gateway — ④Determine whether or not to use the default gateway of MODBUS TCP communication.

oFF ◄——► on
(Non-use) (Use)



DISPLAY / SET

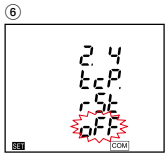
⑤MODBUS TCP communication default gateway — ⑤Set the default gateway of MODBUS TCP communication.
When the default gateway is not used, this window is not displayed.

Allowable default gateways:
000.000.000.000 - 127.0.0.1 - 255.255.255.255

DISPLAY / SET

⑥Reset communication — ⑥If settings relating to MODBUS TCP communication have been changed, turn on this item.
(If it is not turned on, the changes will not be enabled.)

oFF ◄——► on

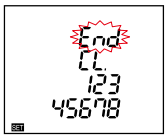


SET

Set-up menu — Select another set-up menu or end set-up.

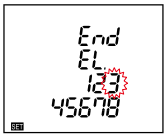
■ To continue to set-up
Select the menu No. using the ⊕ or ⊖ button.

■ To finish set-up
Press the ⊕ or ⊖ button to display the End screen, then press the SET button to save settings.



Set-up menu 3: Display settings (active energy, harmonics measurement, etc.)

Set-up menu — Adjust the set-up menu No. to “3”.



DISPLAY / SET

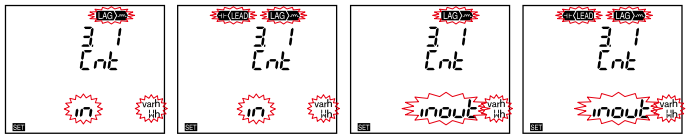
①Active/Reactive energy measurement method — ①Set the display combination for imported/exported and lag/lead of active/reactive energy and the measurement method for reactive energy.

Combinations (set value)	Display combinations						Reactive energy measurement method
	Wh		varh				
	Imported	Exported	Imported		Exported		
			Lag	Lead	Lag	Lead	
I	○		○				2 Quadrants Measurement
II	○		○	○			
III	○	○	○		○		4 Quadrants Measurement
IV	○	○	○	○	○	○	

Combinations I, II ⇒ Suitable for measurement in facilities not equipped with in-house generators, and measuring reactive power of capacitor load, where power factor is around zero generally.

Combinations III, IV ⇒ Suitable for measurements in facilities equipped with in-house generators.

<Example display screens>



Combination I: in : Imported — Combination II: out : Exported — Combination III: LEAD : varh (lead) — Combination IV: LAG : varh (lag)

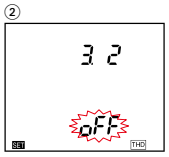
DISPLAY / SET

②Harmonic display — ②Set whether to display the harmonic measured value.

on ⟷ oFF
(Display) (Not display)

When you set to “on (Display)”, harmonic measured values are displayed on the additional screen of display pattern.

②



DISPLAY / SET

③Unbalance rate display — ③Set whether to display unbalance rate.

on ⟷ oFF
(Display) (Not display)

When you set to “on (Display)”, voltage/current unbalance rate can be displayed on the additional screen of display pattern.

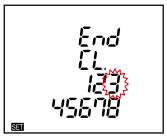
Note. For 1-phase 2-wire system, this setting is skipped.

③

SET

Set-up menu — Select another set-up menu or end set-up

■To continue to set-up
Select the menu No. using the ⊕ or ⊖ button.

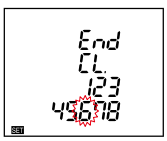


■To finish set-up
Press the ⊕ or ⊖ button to display the End screen, then press the SET button to save settings.

Set-up menu 6: Built-in logging settings

*Only for ME96SSHB-MB, ME96SSRB-MB, it is applicable.

Set-up menu — Adjust the set-up menu No. to “6”. (See the drawing on the right)



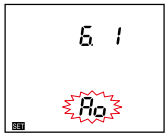
DISPLAY / SET

①Optional selection — Select analog output, built-in logging, or optional logging.

Ao ⟷ PLUG ⟷ buiLt
(Analog output) (Optional logging) (Built-in logging)

The explanation here is about built-in logging settings.
For the analog output settings, refer to Set-up menu 6: Analog output setting.
For the optional logging settings, refer to Set-up menu 6: Logging setting.

Note. When ME-4210-SS96B or ME-0000BU-SS96 of optional module is not installed, this setting is skipped.



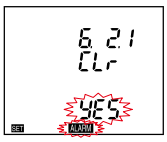
DISPLAY / SET

②Built-in logging Data clear — Clears logging data stored in the main body

no ⟷ yES
(Not clear) (Clear)

When yES (Clear) is selected above, the confirmation screen appears to ask whether or not to clear data.

no ⟷ yES
(Not clear) (Clear)

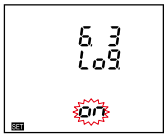


DISPLAY / SET

③Built-in logging Use/non-use

Sets whether or not to use the built-in logging function.

on (Use) ◄——► oFF (Non-use)

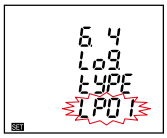


DISPLAY SET

④Built-in logging item patterns

Sets a logging item pattern to choose data that are internally logged.

Patterns usable for setting: LP00 ◄► LP01 ◄► LP02



By selecting LP00, you can freely choose logging items.

Logging item patterns for LP01 & LP02 are defined as in the table below.
Detailed data are recorded in an interval that is shorter than that of 1-hour data.
Logging cycle of the detailed data is set in [⑤ Built-in logging period].

Phase wiring type setting: 3-phase 4-wire system

Logging item pattern	LP01	LP02
Data 1 (integrated value)	Wh imported	Wh imported
Data 2 (integrated value)	Wh exported	Wh exported
Data 3 (integrated value)	varh imported (LAG)	varh imported (LAG)
Data 4 (integrated value)	varh imported (LEAD)	varh imported (LEAD)
Data 5 (integrated value)	VAh	VAh
Data 1	W (total) present value	W (total) present value
Data 2	PF (total) present value	PF (total) present value
Data 3	Hz (present value)	Hz (present value)
Data 4	var (total) present value	A (avg) present value
Data 5	VA (total) present value	V (line voltage) (avg) present value
Data 6	A (avg) present value	A1 present value
Data 7	V (line voltage) (avg) present value	A2 present value
Data 8	DW (last value)	A3 present value
Data 9	Dvar (last value)	AN present value
Data 10	DVA (last value)	V12 present value
Data 11	DW (peak value)	V23 present value
Data 12	Dvar (peak value)	V31 present value
Data 13	DVA (peak value)	V1N present value
Data 14	A1 Harmonic present value (total)	V2N present value
Data 15	V1N Harmonic voltage phase voltage distortion ratio (total)	V3N present value

Setting of phase wiring system: 3-phase 3-wire_2CT, 3-phase 3-wire_3CT, 1-phase 3-wire system

Logging item pattern	LP01	LP02
Data 1 (integrated value)	Wh imported	Wh imported
Data 2 (integrated value)	Wh exported	Wh exported
Data 3 (integrated value)	varh imported (LAG)	varh imported (LAG)
Data 4 (integrated value)	varh imported (LEAD)	varh imported (LEAD)
Data 5 (integrated value)	VAh	VAh
Data 1	W (total) present value	W (total) present value
Data 2	PF (total) present value	PF (total) present value
Data 3	Hz (present value)	Hz (present value)
Data 4	var (total) present value	A (avg) present value
Data 5	VA (total) present value	V (line voltage) (avg) present value
Data 6	A (avg) present value	A1 present value
Data 7	V (line voltage) (avg) present value	A2 present value
Data 8	DW (last value)	A3 present value
Data 9	Dvar (last value)	—
Data 10	DVA (last value)	V12 present value
Data 11	DW (peak value)	V23 present value
Data 12	Dvar (peak value)	V31 present value
Data 13	DVA (peak value)	—
Data 14	A1 Harmonic present value (total)	—
Data 15	V12 Harmonic voltage phase voltage distortion ratio (total)	—

Setting of phase wiring system: 1-phase 2-wire system

Logging item pattern	LP01	LP02
Data 1 (integrated value)	Wh imported	Wh imported
Data 2 (integrated value)	Wh exported	Wh exported
Data 3 (integrated value)	varh imported (LAG)	varh imported (LAG)
Data 4 (integrated value)	varh imported (LEAD)	varh imported (LEAD)
Data 5 (integrated value)	VAh	VAh
Data 1	W (total) present value	W (total) present value
Data 2	PF (total) present value	PF (total) present value
Data 3	Hz (present value)	Hz (present value)
Data 4	var (total) present value	A (avg) present value
Data 5	VA (total) present value	V (line voltage) (avg) present value
Data 6	A (avg) present value	A1 present value
Data 7	V (line voltage) (avg) present value	—
Data 8	DW (last value)	—
Data 9	Dvar (last value)	—
Data 10	DVA (last value)	V12 present value
Data 11	DW (peak value)	—
Data 12	Dvar (peak value)	—
Data 13	DVA (peak value)	—
Data 14	A1 Harmonic present value (total)	—
Data 15	V12 Harmonic voltage phase voltage distortion ratio (total)	—

<Continued from previous page>

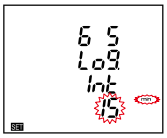
⑤Built-in logging period

SET

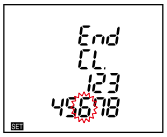
Set-up menu

③Use this to set the cycle in which detailed data of the built-in logging item pattern “LP01” or “LP02” are logged.

15 min ◄► 30 min ◄► 60 min



According to “3.1 Set-up Flow”, either exit from setting or continue setting in any other set-up menu.



Set-up menu 6: Analog output setting (only when ME-4210-SS96B is installed)

*Only for ME96SSHB-MB or ME96SSRB-MB, it is applicable.

Set-up menu

Adjust the set-up menu No. to “6”.

DISPLAY SET

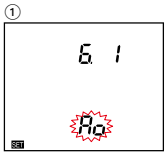
①Optional selection

Select “Analog output” or “Built-in logging”.

Ao ◄► buiLt
(Analog output) (Built-in logging)

The explanation here is about analog output setting.

①

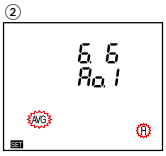


DISPLAY SET

②Analog output CH1 output item

②Set the output item for “analog output CH1”.
Select the measured item to be output from the table below.

②



When 3-phase 4-wire system has been selected

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)	PF_Σ (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	W_Σ (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 value, Σ: Total RMS value

Notes 1. The same measurement items can be set for all channels.
Notes 2. Measurement items not included in the selected display pattern can also be chosen.
Notes 3. Channels set to “non” will have minimum output (4 mA). Additionally, set-up will proceed to the next channel.
Notes 4. Underlined specifications are factory default settings of measurement items allocated to each channel.
Notes 5. Harmonic current is output at the scale of 0-60% (with respect to rated value) of the total effective value. Harmonic voltage is output at the scale of 0-20% of the total distortion ratio.

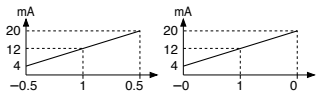
DISPLAY SET

③Analog output CH1 detailed settings

③Set the details for “analog output CH1.”
(The following settings can be made separately from the measurement items included in the display pattern.)

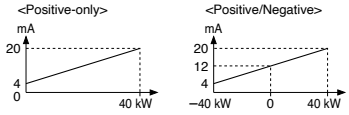
(1) If analog output is selected for current, current demand, voltage, power, reactive power, power factor (set-up menu: 6.6.1)

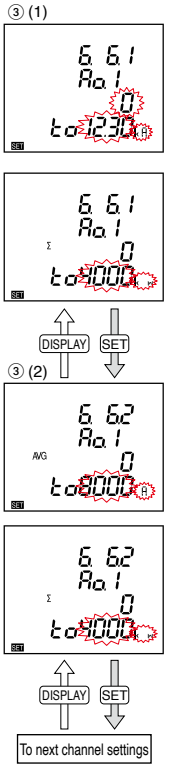
Output item	Setting range
A Demand A	CT primary current value (value set for set-up menu 1.4.1 primary current setting) ⟷ SP. (special primary current value)
V	+10 steps (approx. 250%) ≀ ±0 steps (100%: Standard value) ≀ –18 steps (approx. 20%) ⊕⊖
W var	+3 steps (approx. 120%) ≀ ±0 steps (100%: Standard value) ≀ –18 steps (approx. 20%) ⊕⊖
PF	–0.5-1-0.5 ⟷ –0-1-0



(2) If analog output is selected for current, current demand, power (set-up menu: 6.6.2)

Output item	Setting range
A Demand A	+3 steps (approx. 120%) ≀ ±0 steps (100%: instrument rating) ≀ –10 steps (approx. 40%) ⊕⊖
W	Positive-only ⟷ Positive/Negative





④Analog output CH2-4 output item

④Set the output item for “analog output CH2-4.”

The setting procedure is the same as that of ①Analog output CH1 output item.

⑤Analog output CH2-4 detailed settings

⑤Set the details for “analog output CH2-4.”

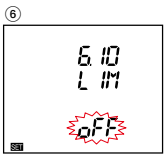
The setting procedure is the same as that of ②Analog output CH1 detailed settings.

⑥Analog output limit

⑥Set the upper limit for analog output (same for all channels).

Setting	Explanation
oFF (no limit)	Output to +5% of upper limit and -5% of lower limit (with respect to span value)
on (limit)	Output to +1% of upper limit and -1% of lower limit (with respect to span value)

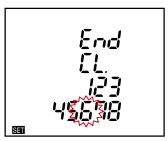
Note: Skip this setting when the analog output of all channel output items is set to “non.”



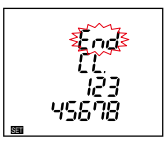
Set-up menu

Select another set-up menu or end set-up.

■To continue to set-up
Select the menu No. using the ⊕ or ⊖ button.



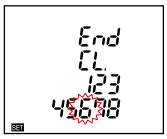
■To finish set-up
Press the ⊕ or ⊖ button to display the End screen, then press the SET button to save settings.



Set-up menu 6: Logging setting (only when ME-0000BU-SS96 is installed)

*Only for ME96SSHB-MB or ME96SSRB-MB, it is applicable.

Set-up menu — Adjust the set-up menu No. to “6”.

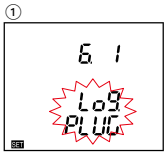


DISPLAY / SET

①Optional selection — ①Select “optional logging” or “built-in logging”

PLUG ◄——► buiLt
(Optional logging) (Built-in logging)

The explanation here is about optional logging setting.



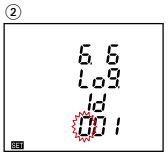
DISPLAY / SET

②Logging ID — ②Set the ID number of the optional logging unit.

Allowable IDs : 001 ～ 255

When an ID number has been set for the installed optional logging unit, the value is displayed as the default.

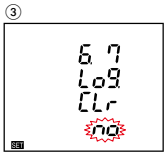
Notes: If the SD memory card contains data with the same logging ID, the data may be overwritten.
When the data of more than one optional logging unit are collected in one SD memory card, set the logging ID without fail.



DISPLAY / SET

③Logging data clear — ③Clear the data stored in the optional logging unit.

no ◄——► yES
(Not clear) (Clear)

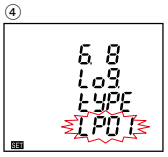


DISPLAY / SET

④Logging item pattern — ④Set the logging item pattern to select the data to be logged.
If the logging data is not cleared, the logging item pattern cannot be set.

Allowable patterns : ►LP01 ◄►LP02 ◄►LP00◄

When the pattern is set to LP00, any logging items can be selected.
For the details of LP00 setting, see the instruction manual.
The logging item patterns of LP01 and LP02 are defined as shown below.
Detailed data is recorded at a shorter interval than that of 1-hour data.
The detailed data logging interval can be set in ⑤“Detailed data logging interval.”



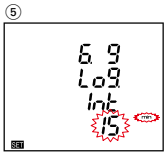
Phase wire system setting: For 3-phase 4-wire

Logging item pattern	LP01		LP02	
	Detailed data	1-hour data	Detailed data	1-hour data
Data 1	Wh imported	Wh imported	Wh imported	Wh imported
Data 2	varh imported (lag)	Wh exported	A_{AVG}	Wh exported
Data 3	VAh	varh imported (lag)	V_{AVG} (L-L)	varh imported (lag)
Data 4	DW (present value)	varh imported (lead)	W_{Σ}	varh imported (lead)
Data 5	Dvar (present value)	VAh	PF_{Σ}	VAh
Data 6	DVA (present value)	None	Hz	None

DISPLAY / SET

⑤Detailed data logging interval — ⑤Set the interval of logging the detailed data in the logging item pattern LP01 or LP02.
If the logging data is not cleared, the detailed data logging interval cannot be changed.

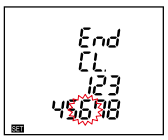
►1 min◄►5 min◄►10 min◄►15 min◄►30 min◄



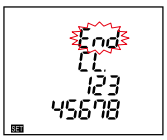
SET

Set-up menu — Select another set-up menu or end set-up.

■To continue to set-up
Select the menu No. using the ⊕ or ⊖ button.



■To finish set-up
Press the ⊕ or ⊖ button to display the End screen, then press the SET button to save settings.

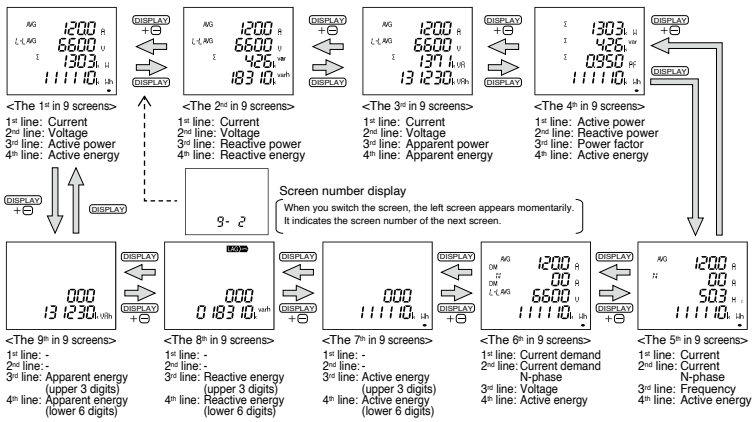


■Operation (for ME96SSHB-MB)

●Display Change

Press (DISPLAY), the measurement display switches over.
When the (DISPLAY) and (−) buttons are held down for 2 seconds or more, the display will change in reverse order.

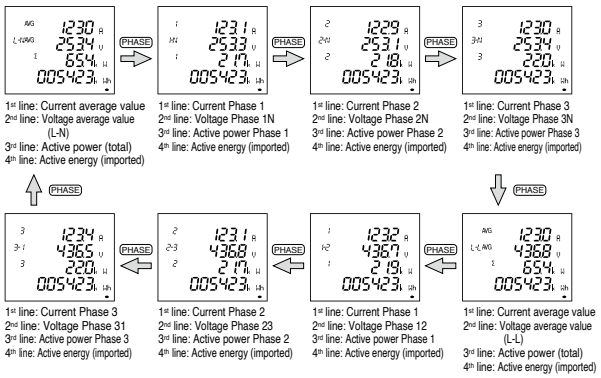
Example of display switching of measurement screen (Phase wire system: 3-phase 4-wire, Display pattern: P01)



●Changing Phases

Press (PHASE), the current phase and the voltage phase switches over.

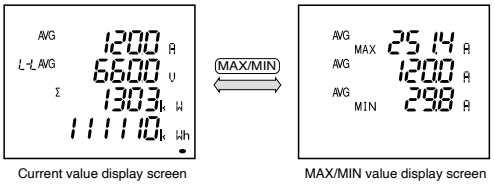
Example of display switching (Phase wiring system: 3P4W)



●Maximum/Minimum Display Values

Press the (MAX/MIN) button to change to the maximum and minimum values of the display screen. Press it again to return to the current value display screen.

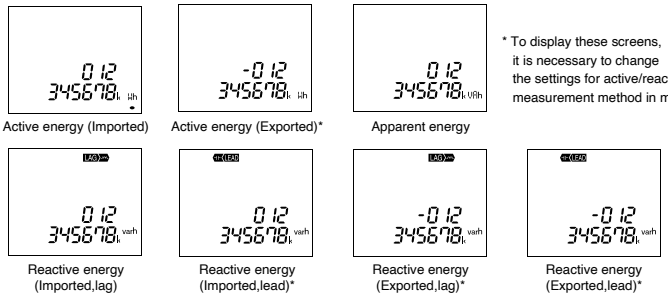
Example of display switching between the current value display screen and MAX/MIN value display screen



●Reset Maximum/Minimum Values

Press the (RESET) button for 2 s to reset the maximum/minimum values of the measurement items displayed. The maximum/minimum values will become the current values.
Press the (RESET) and (+) buttons simultaneously for 2 s to reset all maximum/minimum values. The maximum/minimum values will become the current values.

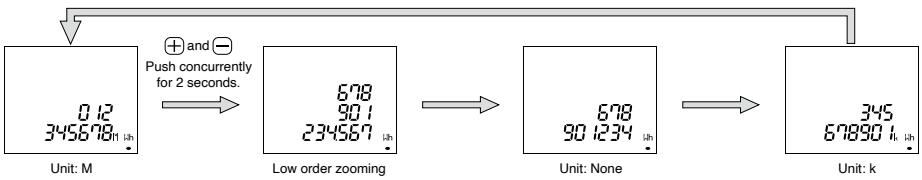
●Displaying Active energy/Reactive energy/Apparent energy



* To display these screens, it is necessary to change the settings for active/reactive energy measurement method in menu 3.1.

Change the unit (M, k, none) or increase the digits in the bottom display for power used/reactive power used/apparent power used/time-based power used to check the lower/higher-order digits. Push the (+) and (−) buttons simultaneously for 2 s to switch between screens.

Active energy (imported): Example of switching 012, 345, 678, 901, 234, 567 Wh



●Reset Active energy/Reactive energy/Apparent energy

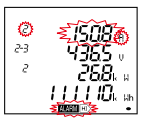
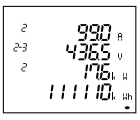
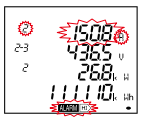
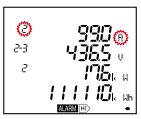
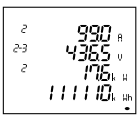
Press the (SET), (RESET) and (PHASE) buttons simultaneously for 2 s to reset all of the following together: active energy/reactive energy/apparent energy (this operation only works on the current value display screen).

●Changing Upper/Lower Limits for Alarm Activation and Cancellation

When measurement values exceed the upper/lower limit values that have been set, an alarm activates and the screen begins to blink.

●During Alarm Generation

Alarm condition: When a measured value exceeds the alarm value setting, the screen begins to flash and the alarm contact closes.
Alarm cancelled: When the alarm is cancelled, the screen stops flashing and the alarm contact opens.

Alarm reset method		Measurement value > Upper limit alarm value (or < Lower limit alarm value)	Measurement value < Upper limit alarm value (or > Lower limit alarm value)	
Automatic (Auto)	Screen	ALARM HI or LO will flash 	Normal display 	
	Alarm contact	Closed	Open	
Manual (Hold)	Screen	ALARM HI or LO will flash  (Alarm activated)	ALARM HI or LO light up  (Alarm on hold)	Normal display  (Alarm cancelled)
	Alarm contact	Closed	Closed	Open

If the item that caused the alarm is displayed on the screen, the digital value, unit (A, V, W, var, PF, HZ, %, DM, THD) and phase (1, 2, 3, N) will be displayed as shown in the table below. If the item is not displayed on the screen, the screen will not flash.

Alarm status	Digital value	Unit	Phase
Alarm activated	Flashing*	Flashing	Flashing*
Alarm on hold	Light up	Flashing	Flashing*
Alarm cancelled	Light up	Light up	Light up

* Only flashes if the phase that caused the alarm is being displayed.

●Alarm Cancel

The alarm can be reset automatically or manually. The alarm recovery method varies according to the reset method setting.

Alarm reset method	Cancellation method
Automatic (Auto)	The alarm resets automatically when the measurement value returns to within the upper/lower limit set value.
Manual (Hold)	The alarm setting changes to "on hold" even after the measurement value becomes returns to within the upper/lower limit value setting. Once the value returns to within the upper/lower limit value set, perform the following alarm recovery operations. (Note: Alarm recovery operations cannot be carried out from the maximum/minimum value display screen or digital input screen.) <To select item and cancel alarm> When the item that caused the alarm is displayed, press the RESET button to deactivate the alarm. (For items with phases such as current and voltage, it is necessary to press the RESET button for each phase to cancel the alarm.) <To cancel alarms for all items> To cancel alarms for all items at once (batch), press the RESET button for 2 s when in operating mode.

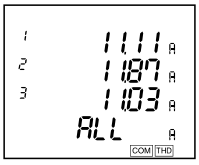
●Alarm delay Time

If an alarm delay time has been set, alarm notification begins only when the measurement value exceeds the upper/lower limit alarm value for a period longer than the alarm delay time.

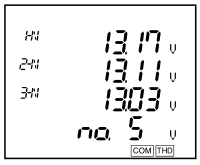
●Harmonic Display

The harmonic effective value, distortion ratio and content ratio can be displayed. To do so, first set the harmonic display (set-up menu: 3.2).

<Harmonic current "total" Display example>

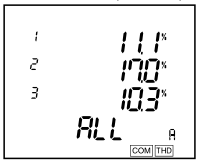


<Harmonic voltage "5th degree" Display example>



1st line: 1-phase RMS value
2nd line: 2-phase RMS value
3rd line: 3-phase RMS value
4th line: Degree number

<Harmonic current "total" (distortion rate) Display example >

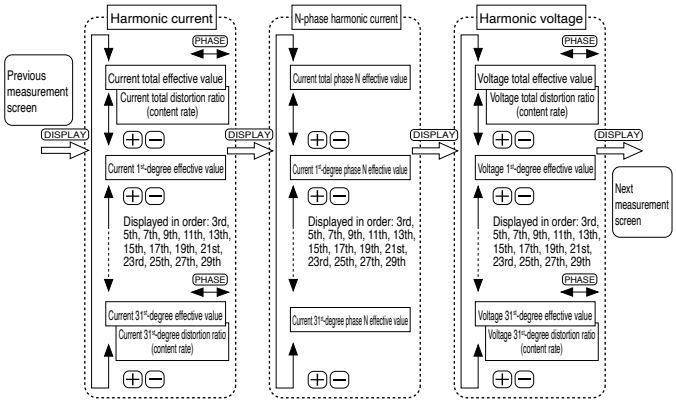


1st line: 1-phase distortion ratio (content rate)
2nd line: 2-phase distortion ratio (content rate)
3rd line: 3-phase distortion ratio (content rate)
4th line: Degree number

Degree	Harmonic current		N-phase harmonic current		Harmonic voltage	
	RMS	Distortion (content) ratio	RMS	Distortion (content) ratio	RMS	Distortion (content) ratio
Harmonic total	○	○	○	—	○	○
1st (fundamental)	○	—	○	—	○	—
3rd, 5th, 7th, 9th, 11th, 13th, 15th, 17th, 19th, 21st, 23rd, 25th, 27th, 29th and 31st	○	○	○	—	○	○

●Changing the Harmonic Degree Display

Press the ⊕ or ⊖ button to change the harmonic degree.



■Display Pattern Contents

The items set in display patterns and additional settings will be displayed as explained in the following table.

●ME96SSHB-MB/ME96SSRB-MB Screen Display (3-phase 4-wire)

Display pattern		Screen set based on display pattern									
		No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10
P01	1st line	A	A	A	W	A	DA				
	2nd line	V	V	V	var	AN	DAN				
	3rd line	W	var	VA	PF	Hz	V				
	4th line	Wh	varh	VAh	Wh	Wh	Wh				
P02	1st line	A1	DA1	V1N	W1	var1	VA1	PF1	A	A	DA
	2nd line	A2	DA2	V2N	W2	var2	VA2	PF2	Hz	AN	DAN
	3rd line	A3	DA3	V3N	W3	var3	VA3	PF3	W	var	VA
	4th line	Aavg	DAavg	VLN avg	WΣ	varΣ	VAΣ	PFΣ	Wh	varh	VAh
P00	1st line	Free 1	Free 1	Free 1	Free 1						
	2nd line	Free 1	Free 1	Free 1	Free 1						
	3rd line	Free 1	Free 1	Free 1	Free 1						
	4th line	Free 2	Free 2	Free 2	Free 2						

Note 1. Selectable elements for “Free 1” include A, AN, DA, DAN, V, W var, VA, PF, and Hz. Selectable elements for “Free 2” include Wh, -Wh, varh, and VAh.

Display pattern		Additional screens (set in set-up menu Nos. 1, 3, 7 and 8)																				
		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	No.29	No.30	No.31	No.32
		Wh	Wh (exported)	varh	varh imported (Lead)	varh exported (Lag)	varh exported (Lead)	VAh	Period Wh1	Period Wh2	Period Wh3	Rolling demand			Harmonic Current	Harmonic Current Phase N	Harmonic voltage	Unbalance rate	DI status	DO status	Operating time 1	Operating time 2	CO_2 equivalent
												DW	Dver	DVA									
Common to P00 to P02	1st line	–	–	–	–	–	–	–	No.1	No.2	No.3	Peak value			1-phase value	N-phase value	1-phase value	–	–	–	–	–	–
	2nd line	Wh	Wh exported	varh	varh imported (Lead)	varh exported (Lag)	varh exported (Lead)	VAh	Period Wh1	Period Wh2	Period Wh3	Rolling demand, active power Predictive value	Rolling demand, reactive power Predictive value	Rolling demand, apparent power Predictive value	2-phase value	–	2-phase value	Aunb	DI	DO	hour 1	hour 2	CO_2
	3rd line											Rolling demand, active power Last value	Rolling demand, reactive power Last value	Rolling demand, apparent power Last value	3-phase value	–	3-phase value	Vunb	DO No.	DO No.	–	–	Equivalent
	4th line											Rolling demand, active power Present value	Rolling demand, reactive power Present value	Rolling demand, apparent power Present value	Degree number	Degree number	Degree number	“unb”	Contact status	Contact status	Operating time	Operating time	

Note 2. The additional screen is displayed when it is set to “ON (Display)” in the setting menu.
Note 3. Wh in the table indicates Wh imported. The varh indicates varh imported (Lag).
Note 4. The additional screen for Wh, varh, and VAh of “P00” is not displayed unless Wh, varh, and VAh are set as the display elements.

●ME96SSHB-MB/ME96SSRB-MB Screen Display (3-phase 3-wire, 1-phase 3-wire, 1-phase 2-wire)

Display pattern		Screen set based on display pattern					
		No.1	No.2	No.3	No.4	No.5	No.6
P01	1st line	A	A	A	W	A	
	2nd line	V	V	V	var	DA	
	3rd line	W	var	VA	PF	Hz	
	4th line	Wh	varh	VAh	Wh	Wh	
P02	1st line	A1	DA1	V12	W	A	A
	2nd line	A2	DA2	V23	var	Hz	V
	3rd line	A3	DA3	V31	PF	var	VA
	4th line	Aavg	Davg	Vavg	Wh	varh	VAh
P00	1st line	Free 1	Free 1	Free 1	Free 1		
	2nd line	Free 1	Free 1	Free 1	Free 1		
	3rd line	Free 1	Free 1	Free 1	Free 1		
	4th line	Free 2	Free 2	Free 2	Free 2		

Note 1. For 1-phase 2-wire setting, the display pattern P02 cannot be set.
Note 2. Selectable elements for Free 1 include A, DA, V, W, var, VA, PF, and Hz. Selectable elements for Free 2 include Wh, -Wh, varh, and VAh.

Display pattern		Additional screens (set in set-up menu Nos. 1, 3, 7 and 8)																				
		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
		Wh	Wh (exported)	varh	varh imported (Lead)	varh exported (Lag)	varh exported (Lead)	VAh	Period Wh1	Period Wh2	Period Wh3	Rolling demand			Harmonic Current	Harmonic voltage	Unbalance rate	DI status	DO status	Operating time 1	Operating time 2	CO_2 equivalent
												DW	Dvar	DVA								
Common to P00 to P02	1st line	–	–	–	–	–	–	–	No.1	No.2	No.3	Peak value			1-phase value	1-phase value	–	–	–	–	–	–
	2nd line	Wh	Wh exported	varh	varh imported (Lead)	varh exported (Lag)	varh exported (Lead)	VAh	Period Wh1	Period Wh2	Period Wh3	Rolling demand, active power Predictive value	Rolling demand, reactive power Predictive value	Rolling demand, apparent power Predictive value	2-phase value	3-phase value	Aunb	DI	DO	hour 1	hour 2	CO_2
	3rd line											Rolling demand, active power Last value	Rolling demand, reactive power Last value	Rolling demand, apparent power Last value	3-phase value	–	Vunb	DO No.	DO No.	–	–	Equivalent
	4th line											Rolling demand, active power Present value	Rolling demand, reactive power Present value	Rolling demand, apparent power Present value	Degree number	Degree number	“unb”	Contact status	Contact status	Operating time	Operating time	

Note 3. The additional screen is displayed when it is set to “ON (Display)” in the setting menu.
Note 4. Wh in the table indicates Wh imported. The varh indicates varh imported (Lag).
Note 5. The additional screen for Wh, varh, and VAh of “P00” is not displayed unless Wh, varh, and VAh are set as the display elements.
Note 6. For 1-phase 2-wire system, Unbalance rate (No.22) is not displayed.
Note 7: The 2-phase value of harmonic current (No.20) is displayed only for 3-phase 3-wire system (3CT).

●ME96SSEB-MB Screen Display (3-phase 4-wire)

Display pattern		Screen set based on display pattern									
		No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10
P01	1st line	A	A	A	W	A	DA				
	2nd line	V	V	V	var	AN	DAN				
	3rd line	W	var	VA	PF	Hz	V				
	4th line	Wh	varh	VAh	Wh	Wh	Wh				
P02	1st line	A1	DA1	V1N	W1	var1	VA1	PF1	A	A	DA
	2nd line	A2	DA2	V2N	W2	var2	VA2	PF2	Hz	AN	DAN
	3rd line	A3	DA3	V3N	W3	var3	VA3	PF3	W	var	VA
	4th line	Aavg	DAavg	VLN avg	WΣ	varΣ	VAΣ	PFΣ	Wh	varh	VAh
P00	1st line	Free 1	Free 1	Free 1	Free 1						
	2nd line	Free 1	Free 1	Free 1	Free 1						
	3rd line	Free 1	Free 1	Free 1	Free 1						
	4th line	Free 2	Free 2	Free 2	Free 2						

Note 1. Selectable elements for “Free 1” include A, AN, DA, DAN, V, W var, VA, PF, and Hz. Selectable elements for “Free 2”include Wh, -Wh, varh, and VAh.

Display pattern		Additional screens (set in set-up menu Nos. 3 and 8)											
		No.11	No.12	No.13	No.14	No.15	No.16	No.17	No.18	No.19	No.20	No.21	No.22
		Wh	Wh (exported)	varh	varh imported (Lead)	varh exported (Lag)	varh exported (Lead)	VAh	Harmonic current	Harmonic current Phase N	Harmonic voltage	Operating time 1	Operating time 2
Common to P00 to P02	1st line	–	–	–	–	–	–	–	1-phase value	N-phase value	1-phase value	–	–
	2nd line	Wh	Wh exported	varh	varh imported (Lead)	varh exported (Lag)	varh exported (Lead)	VAh	2-phase value	–	2-phase value	hour 1	hour 2
	3rd line								3-phase value	–	3-phase value	–	–
	4th line								Degree number	Degree number	Degree number	Operating time	Operating time

Note 2. The additional screen is displayed when it is set to “ON (Display)” in the setting menu.
Note 3. Wh in the table indicates Wh imported. The varh indicates varh imported (Lag).
Note 4. The additional screen for Wh, varh, and VAh of “P00” is not displayed unless Wh, varh, and VAh are set as the display elements.

●ME96SSEB-MB Screen Display (3-phase 3-wire, 1-phase 3-wire, 1-phase 2-wire)

Display pattern		Screen set based on display pattern					
		No.1	No.2	No.3	No.4	No.5	No.6
P01	1st line	A	A	A	W	A	
	2nd line	V	V	V	var	DA	
	3rd line	W	var	VA	PF	Hz	
	4th line	Wh	varh	VAh	Wh	Wh	
P02	1st line	A1	DA1	V12	W	A	A
	2nd line	A2	DA2	V23	var	Hz	V
	3rd line	A3	DA3	V31	PF	var	VA
	4th line	Aavg	DAavg	Vavg	Wh	varh	VAh
P00	1st line	Free 1	Free 1	Free 1	Free 1		
	2nd line	Free 1	Free 1	Free 1	Free 1		
	3rd line	Free 1	Free 1	Free 1	Free 1		
	4th line	Free 2	Free 2	Free 2	Free 2		

Note 1. In the case of 1-phase 2-wire setting, the display pattern P02 cannot be set.
Note 2. Selectable elements for Free 1 include A, DA, V, W, var, VA, PF, and Hz. Selectable elements for Free 2 include Wh, -Wh, varh, and VAh.

Display pattern		Additional screens (set in set-up menu Nos. 3 and 8)										
		No.7	No.8	No.9	No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17
		Wh	Wh (exported)	varh	varh imported (Lead)	varh exported (Lag)	varh exported (Lead)	VAh	Harmonic current	Harmonic voltage	Operating time 1	Operating time 2
Common to P00 to P02	1st line	–	–	–	–	–	–	–	1-phase value	1-phase value	–	–
	2nd line	Wh	Wh exported	varh	varh imported (Lead)	varh exported (Lag)	varh exported (Lead)	VAh	2-phase value	3-phase value	hour 1	hour 2
	3rd line								3-phase value	–	–	–
	4th line								Degree number	Degree number	Operating time	Operating time

Note 3. The additional screen is displayed when it is set to “ON (Display)” in the setting menu.
Note 4. Wh in the table indicates Wh imported. The varh indicates varh imported (Lag).
Note 5. The additional screen for Wh, varh, and VAh of “P00” is not displayed unless Wh, varh, and VAh are set as the display elements.
Note 6: The 2-phase value of harmonic current (No.14) is displayed only for 3-phase 3-wire system (3CT).

●Phase/Wire Displays

The phase/wire system will be displayed as shown in the following table and is common for all models.

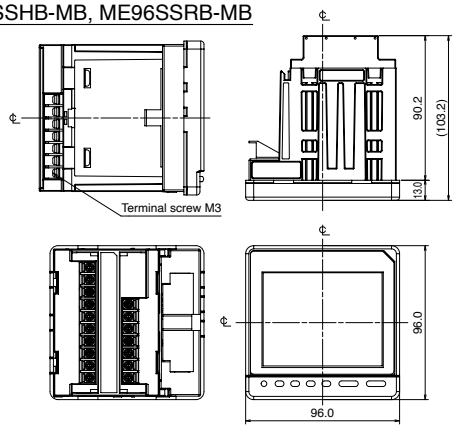
Top phase display \ Phase/Wire settings		1P2W	1P3W(1N2)	1P3W(1N3)	3P3W
current	1	None	1	1	1
	2	None	N	N	2
	3	None	2	3	3
Voltage	12	None	1N	1N	12
	23	None	2N	3N	23
	31	None	12	13	31

Memo

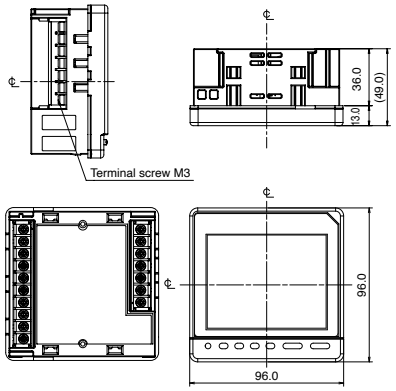
External Dimensions, Installation and Connections

Dimensions

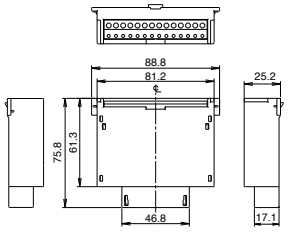
ME96SSHB-MB, ME96SSRB-MB



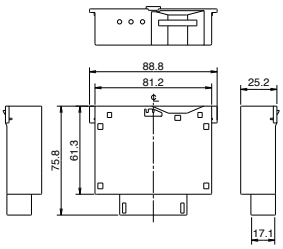
ME96SSEB-MB



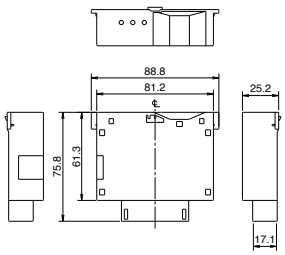
Optional Plug-in Module :
ME-4210-SS96B,
ME-0040C-SS96, ME-0052-SS96



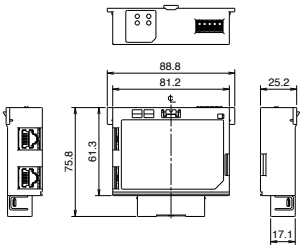
Optional Plug-in Module :
ME-0000BU-SS96



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



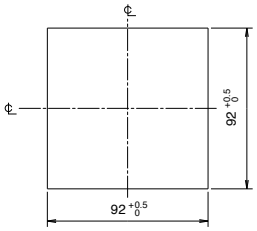
Optional Plug-in Module :
ME-0040MT2-SS96



Mounting

1 Dimension of panel

Panel hole dimensions are as shown in the following figure.
It can be attached to a panel with thickness of 1.6 to 4.0 mm.

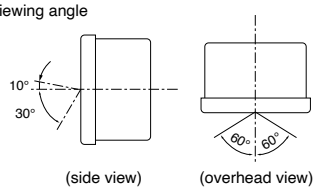


2 View Angle

The contrast of the display changes at view angle. Mount it at the position that is easy to see.

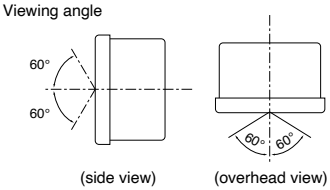
ME96SSEB-MB

Viewing angle



ME96SSHB-MB/ME96SSRB-MB

Viewing angle

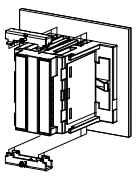


The specified angles are evaluated at +23°C.

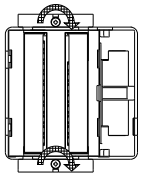
3 Attachment

For attachment of the basic device into the panel hole, attach according to the following procedure.

①The attachment lug is installed in two holes of the top and bottom of the basic device.



②Tighten the screws of the lug, and fix onto the panel.



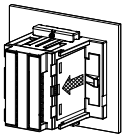
Note	To prevent damage to the panel and screws, do not overtighten the screws. The recommended torque for this product is 0.3 N·m to 0.5 N·m (about half the normal torque). Tighten the two screws evenly.

Main unit mounting screws: M3

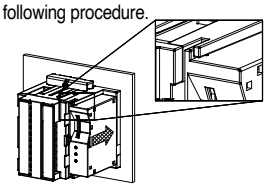
4 Installing Optional Plug-in Module

When installing the optional plug-in module onto the basic device, install according to the following procedure.

①Remove the optional cover.



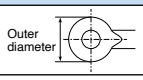
②Attach the optional unit to the main unit.



Fit the protruding part of the optional unit into the slot in the main unit.

Wiring

1 Applicable Cable Size

Product type	Screw type	Wire for use	Tightening torque
ME96SSHB-MB, ME96SSRB-MB	M3	For crimped terminal: AWG 26 to 14 (Connection up to two wires) Appropriate crimped terminal: One for M3 screw 6.0 mm or less in outer diameter. 	0.8 N·m
ME96SSEB-MB			0.5 N·m
Optional plug-in module: ME-4210-SS96B, ME0052-SS96, ME-0040C-SS96	Non-screw	Single wire, Stranded wire: AWG 24 to 14 (For stranded wire, possible in combination with rod terminals) The peeling size of the cable sheath: 10 to 11 mm *1: If complying with UL standards, follow the conditions listed below. • Single wire, Stranded wire: AWG 24 to 18 • Rod terminals are not available. *2: When using a rod terminal with insertion points of two wires, select the terminal that insertion hole depth of the terminal block is 12 to 13 mm as a guide.	–
Optional plug-in module: ME-0040MT2-SS96	Non-screw	Single wire, Stranded wire: AWG 24 to 16 (For stranded wire, possible in combination with rod terminals) The peeling size of the cable sheath: 8 mm Rod terminals (without plastic sleeve): 0.2 to 1.5 mm^2 Rod terminals (with plastic sleeve): 0.2 to 0.75 mm^2	–

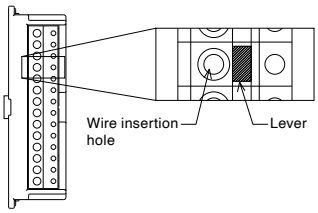
2 Wiring

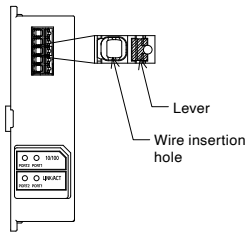
■Optional Plug-in Module Terminal

①Peel the wire tip or pressure-weld a rod terminal.

②Insert the wire with the lever pressed and then release the lever to connect.

■Optional Plug-in Module Terminal





3 Confirmations

After wiring, make sure the following:

☐ All wiring is connected

☐ There is no misitake in wiring

Note

Protective sheet

There is a protective sheet covering the LCD screen to prevent scratching during panel installation. Please remove the sheet before using the meter. When removing the sheet, the LCD may turn on due to the static electricity generated. This is not abnormal; the LCD will turn off after a short time.

Installation position

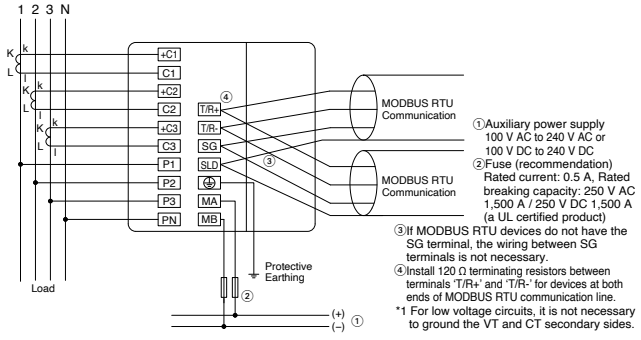
If installing the unit at the panel edge, choose an installation position where there is sufficient space for wiring work.

Optional unit

Turn the auxiliary power supply off before attaching the optional unit. If attached with the power on, the main unit will not recognize the optional unit. To remedy this, turn off/restart the auxiliary power supply or execute the “instrument restart” operation.

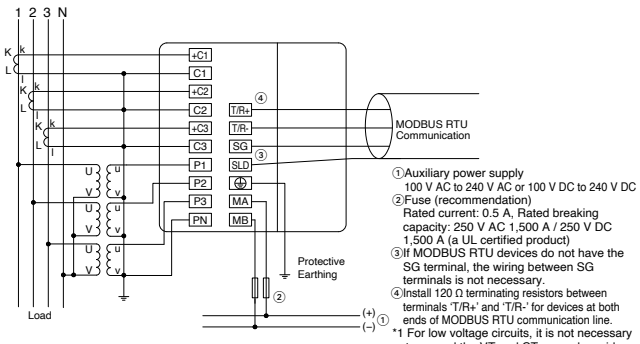
Wiring Diagrams

3-phase 4-wire system: Direct input



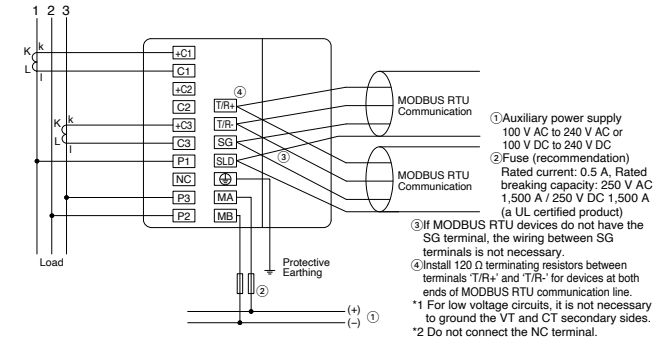
①Auxiliary power supply 100 V AC to 240 V AC or 100 V DC to 240 V DC
②Fuse (recommendation) Rated current: 0.5 A, Rated breaking capacity: 250 V AC 1,500 A / 250 V DC 1,500 A (a UL certified product)
③If MODBUS RTU devices do not have the SG terminal, the wiring between SG terminals is not necessary.
④Install 120 Ω terminating resistors between terminals ‘T/R+’ and ‘T/R-’ for devices at both ends of MODBUS RTU communication line.
*1 For low voltage circuits, it is not necessary to ground the VT and CT secondary sides.

3-phase 4-wire system: With VT



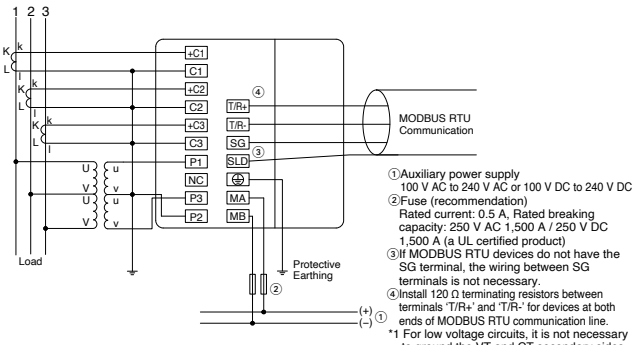
①Auxiliary power supply 100 V AC to 240 V AC or 100 V DC to 240 V DC
②Fuse (recommendation) Rated current: 0.5 A, Rated breaking capacity: 250 V AC 1,500 A / 250 V DC 1,500 A (a UL certified product)
③If MODBUS RTU devices do not have the SG terminal, the wiring between SG terminals is not necessary.
④Install 120 Ω terminating resistors between terminals ‘T/R+’ and ‘T/R-’ for devices at both ends of MODBUS RTU communication line.
*1 For low voltage circuits, it is not necessary to ground the VT and CT secondary sides.

3-phase 3-wire system: Direct input, 2CT



①Auxiliary power supply 100 V AC to 240 V AC or 100 V DC to 240 V DC
②Fuse (recommendation) Rated current: 0.5 A, Rated breaking capacity: 250 V AC 1,500 A / 250 V DC 1,500 A (a UL certified product)
③If MODBUS RTU devices do not have the SG terminal, the wiring between SG terminals is not necessary.
④Install 120 Ω terminating resistors between terminals ‘T/R+’ and ‘T/R-’ for devices at both ends of MODBUS RTU communication line.
*1 For low voltage circuits, it is not necessary to ground the VT and CT secondary sides.
*2 Do not connect the NC terminal.

3-phase 3-wire system: With VT, 3CT

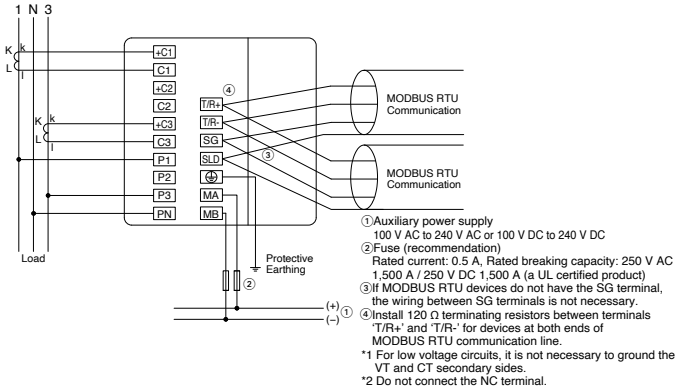


①Auxiliary power supply 100 V AC to 240 V AC or 100 V DC to 240 V DC
②Fuse (recommendation) Rated current: 0.5 A, Rated breaking capacity: 250 V AC 1,500 A / 250 V DC 1,500 A (a UL certified product)
③If MODBUS RTU devices do not have the SG terminal, the wiring between SG terminals is not necessary.
④Install 120 Ω terminating resistors between terminals ‘T/R+’ and ‘T/R-’ for devices at both ends of MODBUS RTU communication line.
*1 For low voltage circuits, it is not necessary to ground the VT and CT secondary sides.
*2 Do not connect the NC terminal.

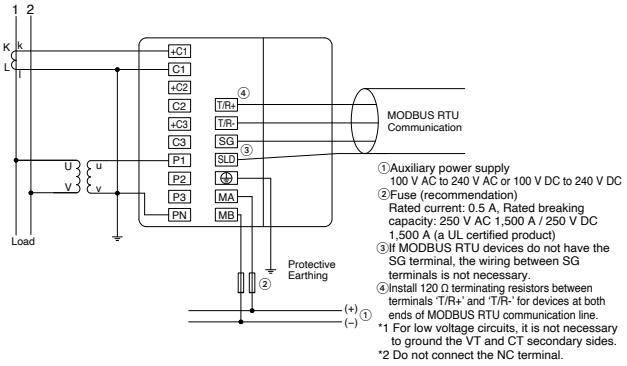
External Dimensions, Installation and Connections

Wiring Diagrams (Continued)

1-phase 3-wire system



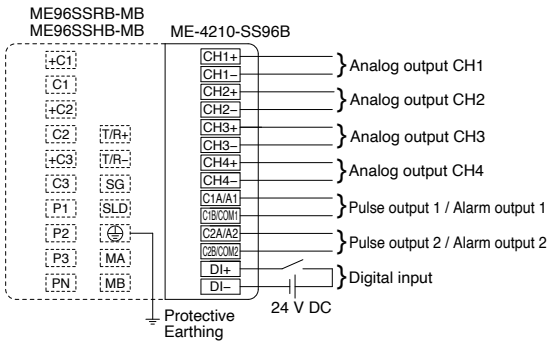
1-phase 2-wire system: With VT



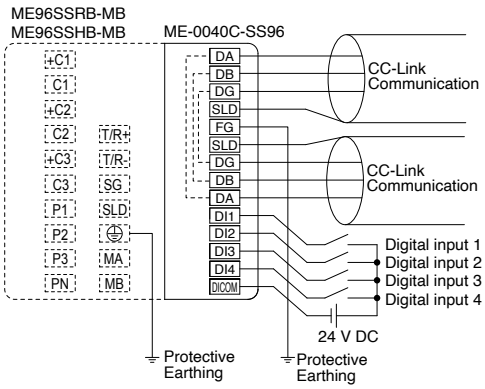
Note

1. The voltage input terminal will vary depending on if it is a 3-phase, 3-wire system or otherwise.
2. VT/CT polarity errors will cause incorrect measurement.
3. Always use the grounding terminal (⏚) in a grounded state. Perform grounding with a grounding resistance of 100 Ω or less. Insufficient grounding may cause erroneous operation.
4. Use shielded twisted-pair cables for transmission signal lines.
5. Install 120 Ω terminating resistors between terminals "T/R+" and "T/R-" for devices at both ends of MODBUS RTU communication line.
6. Use the thickest possible grounding wire to ensure low impedance.
7. MODBUS RTU communication signal cables must not be in close proximity or bundled with high-voltage cables.

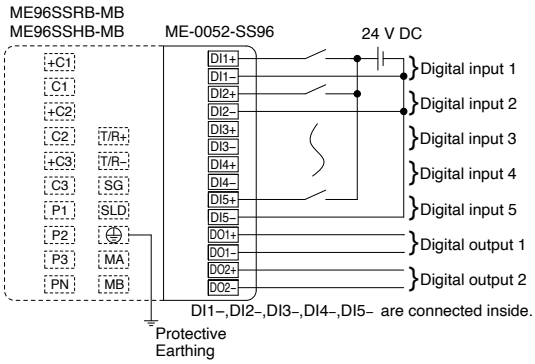
Optional Plug-in Module: ME-4210-SS96B



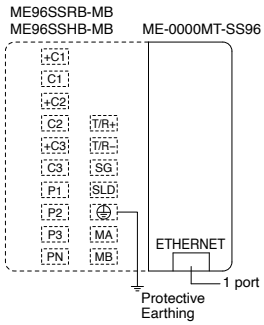
Optional Plug-in Module: ME-0040C-SS96



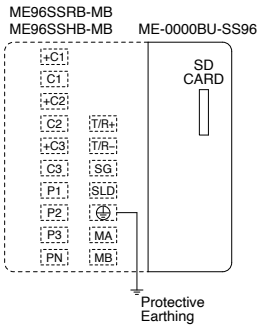
Optional Plug-in Module: ME-0052-SS96



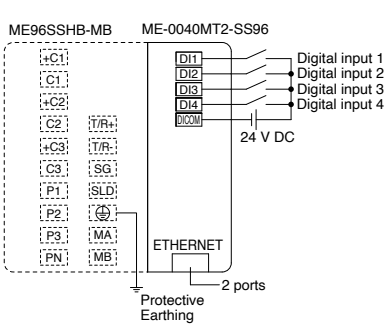
Optional Plug-in Module: ME-0000MT-SS96



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



Optional Plug-in Module: ME-0040MT2-SS96



Wiring Diagrams (Continued)

Note

1. Pulse output, alarm output, and digital input/output cables must not be in close proximity or bundled with power cables or high-voltage cables. When laid parallel, separate by the distance shown in the following table.

Condition	Distance
Power lines of 600 V AC or less	300 mm or more
Other power lines	600 mm or more

2. Analog output cables must not be in close proximity or bundled with other power cables or input cables (e.g., VT, CT, auxiliary power supply). In addition, to prevent noise, surge and induction, use shielded cables or twisted-pair cables. Make sure that cables are as short as possible.
3. There is no insulation between the MODBUS RTU communication portion and the optional module ME-4210-SS96B, ME-0040C-SS96.
4. Use only designated cables when connecting the CC-Link (see communication specifications). CC-Link dedicated cables cannot be used at the same time as CC-Link dedicated high-performance cables. Normal data transmission cannot be guaranteed if used at the same time.
   The terminal resistance value varies depending on the type of dedicated cable.
5. For cables connecting the CC-Link, connect shielded cables to “SLD” and ground “FG” cables. “SLD” and “FG” cables are connected inside the unit.
6. CC-Link communication lines are small signal circuits: separate from strong electrical circuits by a distance of 10 cm or more, or 30 cm or more if laid in parallel over a long distance.
   Ground the terminal before use.
7. For CC-Link communication, always use dedicated lines and comply with conditions for total wiring distance, distance between stations and terminal resistance values according to the communication speed. Not doing so may prevent normal communication (see the CC-Link Master Unit Operations Manual for information on dedicated lines and wiring conditions).
8. The terminal resistance supplied with the CC-Link Master Unit must always be used for the units at both ends of the CC-Link communication line. If the meter is at the end of the CC-Link communication line, connect it between the DA and DB terminals.
9. Communication errors may occur under the influence of high-frequency noise from other devices in the installation environment during high-speed communication (100 Mbps) via 100BASE-TX connection of MODBUS TCP.
   Measures to be taken when the network system is configured to avoid the influence of high-frequency noise are shown below.
   (1) Wiring connection
   - When laying a twisted pair cable, do not bundle the cable together with any main circuit line or power line or lay it close to such a line.
   - Keep the twisted pair cables in the duct.

   (2) Communication method
   - Increase the number of communication retries as needed.
   - Replace the hub to be used for connection with that for 10 Mbps, and communicate at a data transmission speed of 10 Mbps.
10. Do not connect any terminal or RJ45 connector in the live state.
11. Do not insert or remove the SD memory card in the live state.

Rated voltage for each phase/wire system

Phase/Wire	Connection	Rated voltage	Figure
3-phase 4-wire	Star	Max. 277 V AC (L-N)/480 V AC (L-L)	Figure 1
3-phase 3-wire	Delta	Max. 220 V AC (L-L)	Figure 2
	Star	Max. 440 V AC (L-L)	Figure 3
1-phase 3-wire	–	Max. 220 V AC (L-N)/440 V AC (L-L)	Figure 4
1-phase 2-wire*	Delta	Max. 220 V AC (L-L)	Figure 5
	Star	Max. 440 V AC (L-L)	Figure 6

* The circuit derived from the 3-phase 3-wire delta connection and the 1-phase 2-wire transformer circuit have the maximum rating of 220 V AC.
The circuits derived from the 3-phase 4-wire and 3-phase 3-wire star connections and 1-phase 3-wire connection have the maximum rating of 440 V AC.

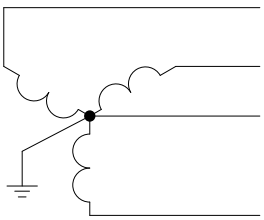


Fig. 1. 3-phase 4-wire (star)

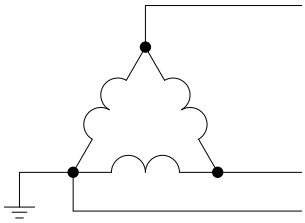


Fig. 2. 3-phase 3-wire (delta)

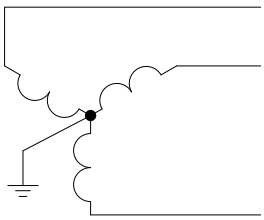


Fig. 3. 3-phase 3-wire (star)

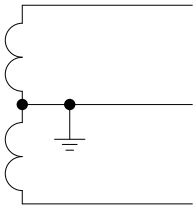


Fig. 4. 1-phase 3-wire

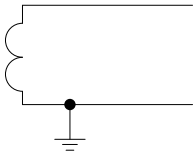


Fig. 5. 1-phase 2-wire (delta)

Fig. 6. 1-phase 2-wire (star)

Related Products

■EcoWebServerIII

Mitsubishi Electric Energy-saving Data Collection Server
From visualization to publication of energy data

Simple Set-up

When using the set-up software supplied, power management meters connected to CC-Link and measurement data can be set by mouse and keyboard operations.

Display Measurement Data as Graphs on a Web Browser

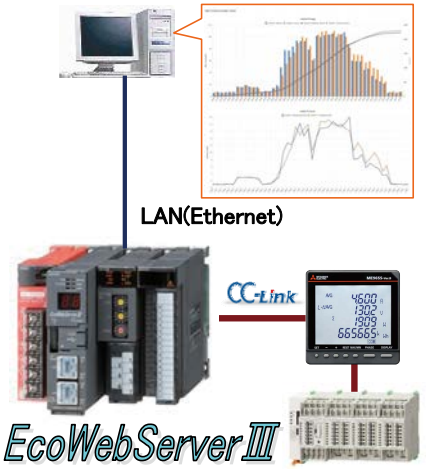
The main unit has a built-in web server that allows anyone, anywhere to understand the amount of energy being used in real time via computer without requiring additional software, thereby supporting early detection of energy waste.

Automatic Transmission of Data Collected, Mail Notifications and Digital Output

Users are notified of changes in energy, facilities, etc. via e-mail and alarms. Energy management targets and status monitoring of entire factories and buildings help ensure that problems onsite are detected without fail.

◇PLC data can also be sent to EcoWebServerIII by Ethernet.
◇Data of various sites can be browsed in the head office by utilizing the internal network.

Collection, storage, visualization, publication on the web, analysis and monitoring
All can be realized by one server.



■EcoMonitorPlus

Energy measuring units helpful in adding units for increased number of measuring circuits and preventive maintenance by simultaneous measurement of electric power and leakage

Phased expansion of energy-saving system

At first, energy-saving measurement can be started on a small scale from a desired place.
The system can be configured by adding units according to the increase of measuring circuits.

Leakage current monitoring

Lineup of basic units for monitoring insulation
Helpful in early detection of equipment problems through accurate leakage current trend monitoring by Ior method
* Ior: Leakage current caused by insulation deterioration (leakage current of resistive component)

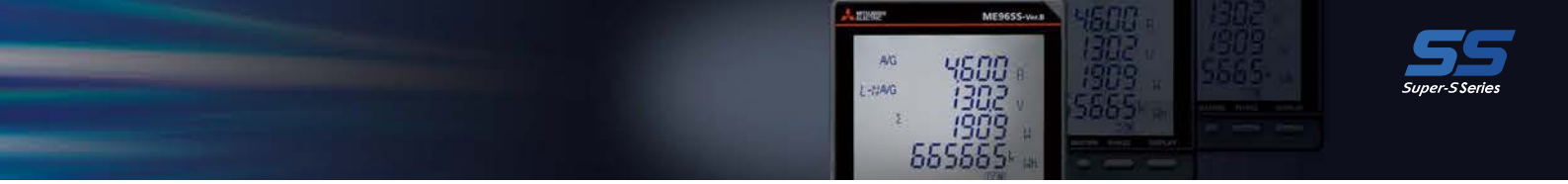
Simple management of measurement data with prepared forms and graphs

Data can be collected by the logging unit (SD memory card) without the host application on the PC, etc.
Forms and graphs can be easily prepared by using the spreadsheet software (logging unit utility*).
* The logging unit utility can be downloaded for free from Mitsubishi Electric FA site.

Realize energy saving with a unit equipped with “control” function

Equipped with functions interlocked with measurement value to control equipment automatically.
Start control just by setting simple control parameters with a personal computer.
Combine units according to various data, including energy, pressure, flow rate, and temperature.

Energy Measuring Unit
EcoMonitorPlus



■EcoMonitorLight

Energy measuring unit with integrated display for easily realizing the visualization of energy

A three-model line-up: a 3-phase 3-wire system designed for users wanting simple power measurements at low cost; and a 3-phase 4-wire system designed for users looking for basic power measurements plus something extra (harmonic measurements, alarm monitoring, etc.).

Energy Measuring Unit
EcoMonitor Light

Simple Measurements

The built-in LCD enables easy setting, measurement and display of power used for energy management.

MODBUS RTU (RS-485) Communication as Standard Equipment

Meters come with MODBUS RTU communication as standard equipment, allowing the device to be used as a PLC system, other high-order system, display device (GOT), etc.

Logging/Communication Units for Expanded Measurement Applications

The product line-up also includes logging units/communication units (CC-Link communication unit) that can be incorporated as add-on options, enabling installations that best match to the customer's usage environment.

■ Logging unit: Data measured by the main unit (current, voltage, power, etc.) can be output to an SD memory card in CSV file format, realizing simple data management.

Highly Accurate Measurements and Support Functions

Customer activities are supported through functions such as 250 μs high-precision (short-cycle load) measurement, operating time measurement, wiring error detection and test output.

Safety Precautions

To ensure safety, read the following items carefully before use and always comply with procedures during use. Special attention should be given to items enclosed in a box and marked “Caution.” Additionally, please carefully read the operations manual supplied with the product before use, and ensure that the manual read by the end user as well.

1 Usage Environment and Conditions

Do not use these products under any of the following conditions. Doing so may cause erroneous operation and/or reduced service life.

• Ambient temperature is outside the range of -5°C to +55°C • Daily average temperature over 35°C • Relative humidity over 85% RH non-condensing • Presence of excessive dust, corrosive gas, salt or oil/smoke • Product is subject to excessive vibration or shock • Product is in direct contact with rain, water drops or sunlight • Altitude is above 2,000 m • Excessive external noise • Pollution level is 2 or higher • Transient overvoltage is 4,000 V or higher • Presence of metal fragments or conducting substances

2 Installation

Please note the following items regarding installation. To ensure safety, installation is to be performed by a qualified technical electrician.

• Affix the main unit to the panel before use • The LCD display contrast changes depending on the angle from which it is viewed. Install it in a position that ensures a suitable angle of view. • Tighten screws using a torque of approx. 0.3-0.5 N·m • To prevent damage to the LCD, take care not to subject the LCD/front of the main unit to shock/impact.

■ Auxiliary power supply and measuring elements

Auxiliary power supply		100 V AC to 240 V AC (±15%) 50 Hz to 60 Hz 100 V DC to 240 V DC (-30%, +15%)		MA, MB terminal
Measuring element	Voltage	3-phase 4-wire: max 277/480 V AC 3-phase 3-wire: (DELTA) max 220 V AC (STAR) max 440 V AC 1-phase 3-wire: max 220/440 V AC 1-phase 2-wire: (DELTA) max 220 V AC (STAR) max 440 V AC	Category III	P1, P2, P3, PN terminals
	Current	5 A (CT secondary side), max 30 V AC	Category III	+C1, C1, +C2, C2, +C3, C3 terminals
	Frequency	50 Hz or 60 Hz		

■ Others

MODBUS RTU communication	T/R+, T/R-, SG terminals	max 35 V DC
MODBUS TCP communication	Ethernet terminal	
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	

3 Connections

See pages 30-32 of this catalog for information regarding connections.

⚠ CAUTION	• To ensure safety, connections are to be performed by an electrical engineer qualified in wiring. • Check connection diagrams carefully before performing connections. Incorrect connections may result in VT burnout caused by a VT secondary-side short circuit or high voltage on the CT secondary side, which may lead to device malfunction, fire or electrical shock. • Do not work with live wires; there is a risk of electric shock and exposure to high voltage due to short-circuiting or CT secondary side opening, which may lead to malfunction, fire or electrical shock. • Use electrical wire sizes compatible with the rated current. Use of unsuitable sizes may cause heat generation, which may lead to a fire. • After performing connections, check that no connections have been missed. Missed connections may result in erroneous operation or high voltage on the CT secondary side, which may lead to a fire or electrical shock. • At the time of wiring, an electric wire can be broken by pulling with strong power. (The load of pulling is less than 3-9 N)

4 Preparations Before Use

• Before use, perform settings such as the VT primary voltage, CT primary current, power scale and demand time limit in accordance with the operations manual supplied with the product; setting errors may cause incorrect measurement/operation.

5 Usage Procedures

• Use the products within the rated range. Using the products outside the rated range may cause erroneous operation or product malfunction.

• Do not use the products for special applications such as nuclear power, aerospace or medical devices/systems.

⚠ CAUTION	• Do not make any modifications to the products. Using products after modification may cause a malfunction, electrical shock or fire.

6 Repairing at Time of Malfunction/Error

- If a product listed in this catalog malfunctions, read the troubleshooting section of the operations manual (detailed version) and confirm the symptoms. If the problem is not listed, please contact a Mitsubishi Electric representative.

7 Maintenance/Inspections

- Wipe away any dust/dirt on the surface of the product with a soft cloth.
- Do not leave chemical cloths, etc. in contact with the product for long periods, and avoid the use of benzene, thinner, etc. when wiping the product surface. Doing so may cause deformation or cause the coating to peel away.
- To ensure correct use for the full service life of the product, please perform the following inspections:

① Check for damage to the product ② Check for display malfunctions (e.g., does not respond to input) ③ Check for loose installation or terminal block wire connections (check regularly once every six months/year) always making sure that power has been turned off beforehand) ④ Check for unusual smell, noise or rise in temperature.

8 Storage

Do not store the product for long periods of time under any of the following conditions. Doing so may lead to a malfunction or reduced service life.

• Ambient temperature outside the range of -25°C to +75°C • Daily average temperature of more than 35°C • Relative humidity exceeding 85% RH or condensation present • Excessive dust, corrosive gas, salt or oil/smoke present • Product is subject to excessive vibration or shock • Product is in direct contact with rain, water drops or sunlight

9 Disposal

- These products do not use nickel-cadmium batteries. Dispose of them as industrial waste.
- The optional module ME-0000BU-SS96 contains a lithium battery. Dispose of the battery in accordance with the municipal regulations.
- In EU member states, there is a separate collection system for used batteries. Dispose of the batteries properly at the local collection/recycling center. The following symbol is printed on the package of ME-0000BU-SS96.

This symbol is applicable only in EU member states. The symbol is designated in Article 20 “Information for end-users” and Annex II of the new European Directive on batteries (2006/66/EC).

The above symbol indicates that the batteries must be disposed of after separation from general waste.

⚠ CAUTION	• The optional module ME-0000BU-SS96 contains a lithium battery. Therefore, if it is thrown into the fire, it may generate heat, rupture or ignite. Dispose of the lithium battery in accordance with the municipal regulations.

10 Warranty Period

The warranty period for the products in this catalog expires one year from the date of purchase or one year and six months after the date of manufacture; whichever is earliest. Even during the warranty period, the warranty shall not apply to malfunctions attributable to intentional negligence or erroneous use by the customer, and the fee for any repair required as the result of such negligence shall be the liability of the customer.

Mitsubishi Electric shall not be liable for: Damage that cannot be attributed to Mitsubishi Electric; lost opportunity or earnings resulting from failure of a Mitsubishi Electric product; damage, secondary damage or compensation for an accident resulting from special circumstances regardless of whether or not the circumstances were foreseeable; or damage to products or other services for products not manufactured by Mitsubishi Electric.

11 Product Exchange Cycle

Although it depends on usage conditions, as a guide, it is recommended that the products listed in this catalog be renewed after 10 years.

●Trademarks

- MODBUS is a trademark of Schneider Electric USA Inc.
- Ethernet is a trademark of Fuji Xerox Co., Ltd.
- Microsoft, Excel is the registered trademark of the U.S. Microsoft Corporation in the U.S. and other countries.
- Other company and product names herein are trademarks or registered trademarks of their respective owners.
- In the text, trademark symbols such as "TM" and "®" may not be written.

(MEMO)

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Automating the World

Creating Solutions Together.

Low-voltage Power Distribution Products

Transformers, Med-voltage Distribution Products

Power Monitoring and Energy Saving Products

Power (UPS) and Environmental Products

Compact and Modular Controllers

Servos, Motors and Inverters

Visualization: HMIs

Edge Computing Products

Numerical Control (NC)

Collaborative and Industrial Robots

Processing machines: EDM, Lasers

SCADA, analytics and simulation software

Mitsubishi Electric's product lineup, from various controllers and drives to energy-saving devices and processing machines, all help you to automate your world. They are underpinned by software, innovative data monitoring, and modelling systems supported by advanced industrial networking and Edgecross IT/OT connectivity. Together with a worldwide partner ecosystem, Mitsubishi Electric factory automation (FA) has everything to make IoT and Digital Manufacturing a reality.

With a complete portfolio and comprehensive capabilities that combine synergies with diverse business units, Mitsubishi Electric provides a one-stop approach to how companies can tackle the shift to clean energy and energy conservation, carbon neutrality and sustainability, which are now a universal requirement of factories, buildings, and social infrastructure.

We at Mitsubishi Electric FA are your solution partners waiting to work with you as you take a step toward the realization of sustainable manufacturing and society through the application of automation.
Let's automate the world together!

Note: not all products are available in all countries

ELECTRONIC MULTI-MEASURING INSTRUMENT

Service Network for Fukuyama Products

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	Pump Elctric Solution CO.,LTD.	C19 Street R8, Phnom Penh 120210, Cambodia	+855-12-318-190
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Safety Tips: Be sure to read the instruction manual fully before using this product.

Precautions Before Use

- Please consult with a Mitsubishi Electric representative when considering the application of products presented in this catalogue with machinery or systems designed for specialized use such as nuclear power, electrical power, aerospace/outer space, medical, or passenger transportation vehicles.
- Mitsubishi Electric Corporation shall not be liable, to the customer or equipment user, for:
  1) Any damege found not to be attributable to a Mitsubishi Electric product.
  2) The loss of opportunity or profits for the customer or user caused by any fault in a Mitsubishi Electric product.
  3) Damege, secondary damege or accident compensation resulting from special factors regardless of whether or not such factors could be predicted by Mitsubishi Electric.
  4) Damege to products of other companies and/or guarantees relating to other services.

e-F@ctory

Mitsubishi Electric's e-F@ctory concept utilizes both FA and IT technologies, to reduce the total cost of development, production and maintenance, with the aim of achieving manufacturing that is a "step ahead of the times". It is supported by the e-F@ctory Alliance Partners covering software, devices, and system integration, creating the optimal e-F@ctory architecture to meet the end users needs and investment plans.

e-F@ctory Alliance

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

Y-0758D 2025 (IP)

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Specifications subject to change without notice.