



**MITSUBISHI
ELECTRIC**

Changes for the Better

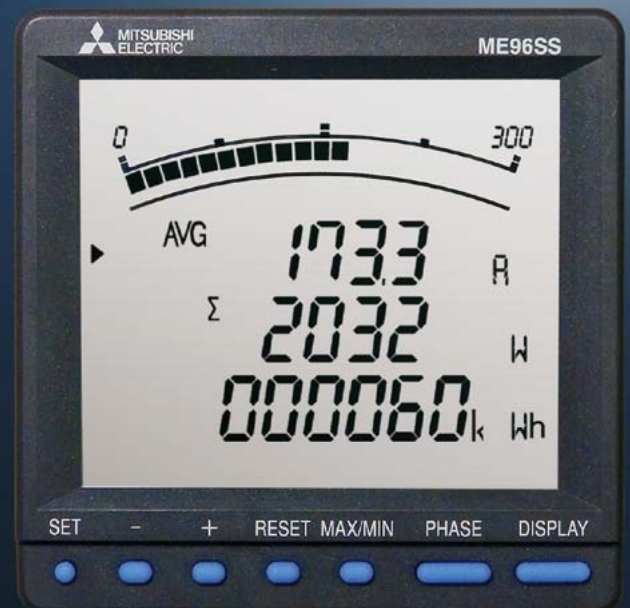
for a greener tomorrow



MITSUBISHI ELECTRONIC MULTI-MEASURING INSTRUMENT

MODEL

ME96SS



SS

Super-S Series

**Empowering
Industries**

MITSUBISHI Electric Multi-Measuring Instrument SS Series features high performance and crystal clear display. With simple operating functions, SS Series is the best support your measuring and monitoring systems.

ME96 Super-S

5 Advantages

**Expand
Line-up**

- **Three model line-up**
- **High-spec class**
- **Standard class**
- **Economy class**

**Enhanced
Measuring
Functions**

- **Improved Measuring Accuracy**

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■ ME96 Super-S Series Features	4	■ Related Products	29
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**Variety of
Complementary
Features**

- Password function
- Special primary voltage/current and special secondary voltage are settable
- Periodic monitoring function

**Impressive
Monitoring
Functions**

- Advanced alarm display
- Motor starting current mask

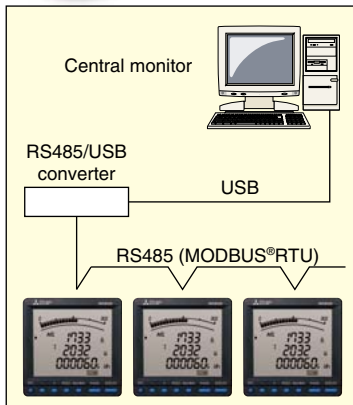
**Succeeded
Display
Functions**

- Large bar-graph display
- Special display
- High-brightness backlight

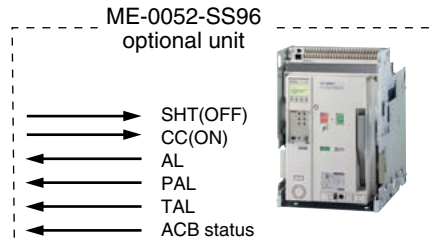


Outline

MODBUS® RTU System (ME96SSH-MB/ME96SSR-MB with ME-0052-SS96 (optional plug-in module))



- MODBUS® RTU communication system optimizes computer monitoring operations
- Attachment of ME-0052-SS96 (optional) enables remote monitoring of the contact input signal and on/off control of the contact output signal
- Digital input signals can be latched for over 30ms, and there is no need for external latch circuits



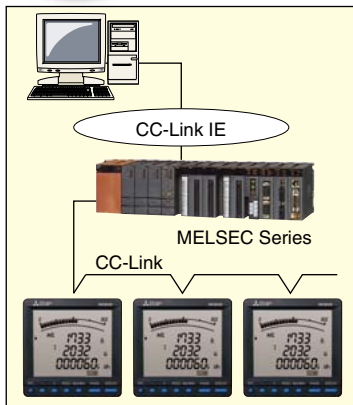
<MODBUS® RTU Interface Specifications>

- Max. Baud rate: 38.4kbps
- Max. Connection Distance: 1,200m
- Max. Connection Units: 31

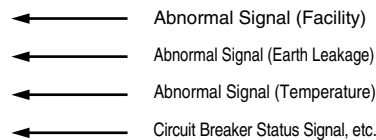
<Optional Plug-in Module ME-0052-SS96>

- Digital Input: 5 points (24VDC)
- Digital Output: 2 points (35VDC)

CC-Link System (ME96SSH-MB/ME96SSR-MB with ME-0040C-SS96 (optional plug-in module))



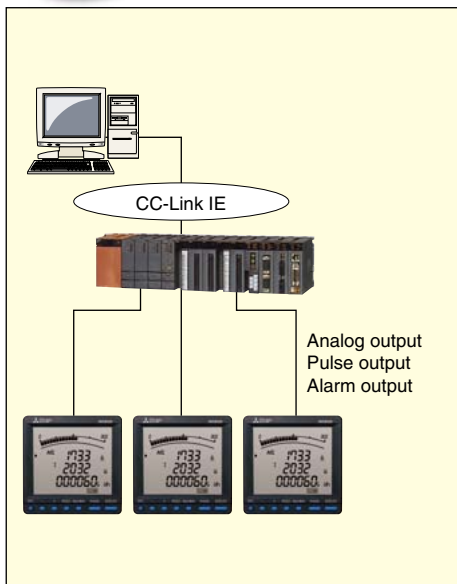
- Optimum transmission system for remote monitoring using Mitsubishi PLC
- Remote monitoring of contact signal leading to less wiring, less spacing
- Digital unit signal can be latched for over 30ms, and there is no need for external latch circuits



<CC-Link Interface>

- Max. Baud rate: 10Mbps
- Max. Connection Distance: 100m (10Mbps)~1,200m (156kbps)
- Max. Connection Units: 42
- Digital Input: 4 points (24VDC)

Analog/Pulse/Alarm Output System (ME96SSH-MB/ME96SSR-MB with ME-4210-SS96 (optional plug-in module))



- Remote monitoring of A, DA, V, W, var, VA, PF, Hz, Harmonics Current RMS value and Harmonics voltage RMS value at 4 to 20mA output (max.4 outputs)
- Active energy, reactive energy, apparent power and periodic energy (ME96SSH-MB) can be monitored by pulse output (max.of 2 pulse)
- Can remotely monitor upper/lower limit alarm by contact output (max.1 point)

<Analog output specifications>

- 4-20mA
- 4 outputs
- Resistance load 600Ω or less

<Pulse output specifications>

- No-voltage a contact point
- 35VDC, 0.1A
- Select output from pulse widths of 0.125, 0.5 or 1s

<Alarm output specifications>

- No-voltage a contact point
- 35VDC, 0.1A

<Digital input specifications>

- 1 point (24VDC)

ME96 Super-S Series Features



Expand Line-up

Three Model Line-up



Model name	Transmission/Option specifications	Main measurement items
ME96SSH-MB (High-spec class)	MODBUS® RTU communication Plug-in module (options) <ul style="list-style-type: none"> Analog/Pulse/Contact output/input CC-Link communication Digital input/output (for MODBUS® RTU communication) 	A, DA, V = $\pm 0.1\%$ W, var, VA, Hz = $\pm 0.2\%$ PF = 1.0% Wh = class 0.5s (IEC 62053-22) varh, Vah = class 2.0 (IEC 62053-23) Harmonics = 31 st -deg (max) Rolling demand
ME96SSR-MB (Standard class)	MODBUS® RTU communication Plug-in module (options) <ul style="list-style-type: none"> Analog/Pulse/Contact output/input CC-Link communication Digital input/output (for MODBUS® RTU communication) 	A, DA, V = $\pm 0.2\%$ W, var, VA, Hz = $\pm 0.5\%$ PF = 2.0% Wh = class 1.0 (IEC 62053-21) varh = class 2.0 (IEC 62053-23) Harmonics = 13 th -deg (max)
ME96SSE-MB (Economy class)	MODBUS® RTU communication	A, V = $\pm 0.5\%$ W, Hz = $\pm 0.5\%$ PF = 2.0% Wh = class 1.0 (IEC 62053-21)

Optional Plug-in Modules

Model name	Analog output	Pulse/Alarm output	Contact input	Contact output	Transmission function	Used with
ME-4210-SS96	4	2	1	—	—	ME96SSH-MB ME96SSR-MB
ME-0040C-SS96	—	—	4	—	CC-Link	
ME-0052-SS96	—	—	5	2	—	

Note: Optional Plug-in Module can not be used with ME96SSE-MB.



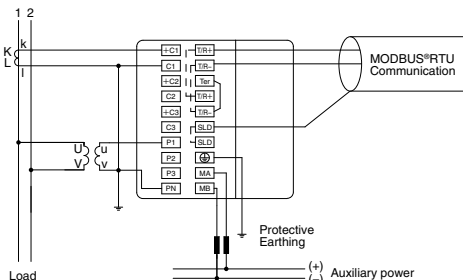
Enhanced Measuring Functions

Improved Measuring Accuracy

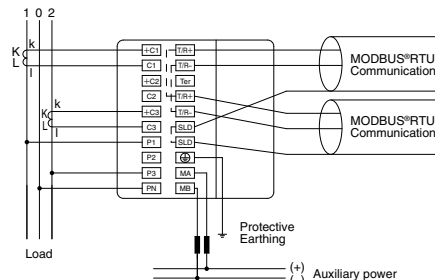
- Measuring accuracy of items such as current, voltage and active energy has been improved.
 - current/voltage $\pm 0.1\%$
 - active energy class 0.5s
 - Harmonics 1st to 31st

- Functions added for measuring Single phase 2-wire and Single phase 3-wire

Single phase 2-wire

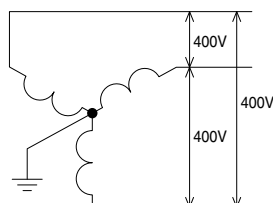


Single phase 3-wire



- Functions added for measuring Three phase 3-wire system star circuits and 400V direct connections

Three phase 3-wire system (star circuit)



ME96 Super-S Series Features

Succeeded Display Functions

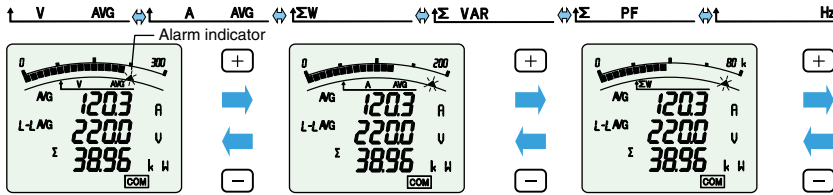
Large Bar Graph Display

● Bar Graph Display

Each measuring items can be displayed by a bar graph. With bar graph display, one can grasp the rated value and percentage against the alarm value instantly.

(1) Bar Graph Fixed Display

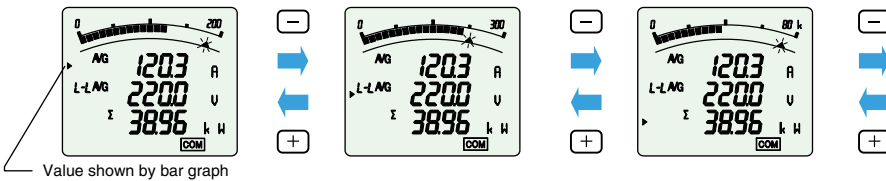
Measuring items can be displayed by bar graph. The \uparrow mark indicates that display is fixed. Furthermore, the (+) and (-) buttons can be used to change the display between items measured.



Note: Alarm indicator blinks when it is set on alarm mode.

(2) Digital Values Display by Bar Graph

Values on the tri-level digital display can be shown by bar graphs (Except when the tri-level display is measuring the same items). Bar graph shows the digital value of \blacktriangleright

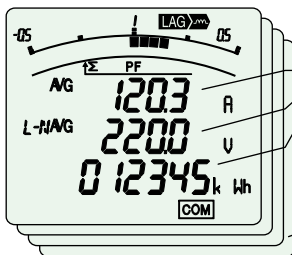


Value shown by bar graph

Special Display

● Special Display by Display Pattern P00

Display can be selected as desired Display Pattern P00.



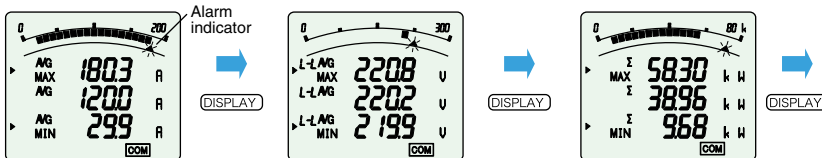
Upper/Middle/Lower levels: Select from A, DA, V, W, var, VA, PF, Hz, Wh, -Wh, varh, VAh

Maximum of four displays can be set

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. Also, range of minimum value to maximum value is shown by bar graph.



High-brightness Backlight

- High-reliability and high-brightness backlight is built in
- Backlight brightness can be adjusted from level 1 to 5 (default setting is 3)
- "Always-on mode" or "Automatic off mode" can be selected (default setting is automatic off mode)



ME96NS Series



ME96SS Series

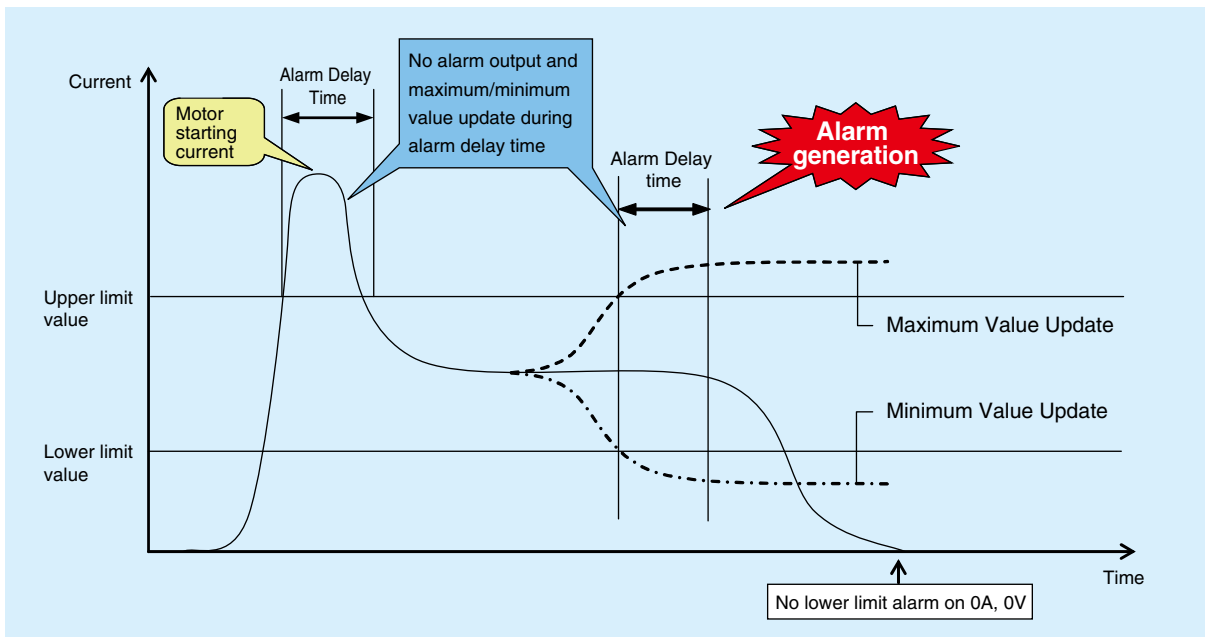


Impressive Monitoring Functions

Advanced Alarm Display

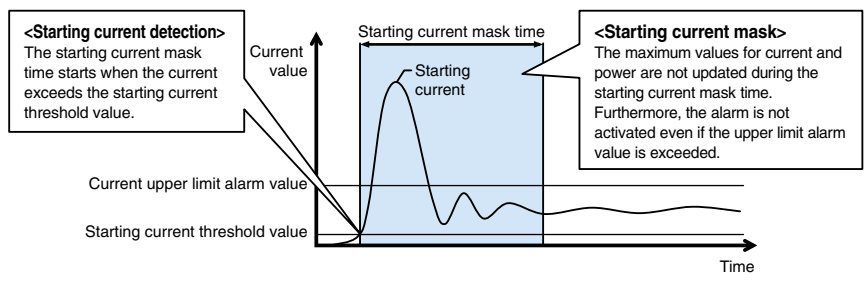
- (1) Backlight blinks when an alarm occur.
- (2) Automatic or manual alarm cancel can be selected.
- (3) Upper/lower limits of up to four points can be monitored.
- (4) Alarm output delay time can be set.

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. Furthermore, maximum value and minimum value do not update during alarm delay.



Motor Starting Current Mask

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



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 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

1A~30kA

Under 10A: Top two digits setting
Over 10A: Top three digits setting



(2) Special primary voltage

60V~75kV

Under 100V: Top two digits setting
Over 100V: Top three digits setting



(3) Special secondary voltage

Three phase 4-wire system

{ 63.5, 100, 110, 115 and 120V }

Three phase 3-wire, Single phase 2-wire system

{ 100, 110 and 220V }



Periodic Monitoring Function

Power consumption can be measured in two individual intervals (e.g., peak/off-peak, day/night, etc.).



Power consumption (period 1)



Power consumption (period 2)

Rolling Demand Function

Rolling demand is the estimated power consumption in a specified period (interval). There are two way calculation of rolling demand.

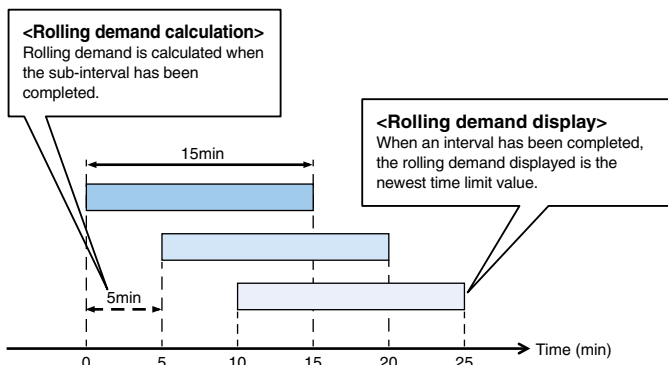
① Rolling block

Use rolling block to set the interval and sub-intervals from 1~60min (1min intervals). Rolling demand is calculated and updated at the end of each sub-interval.

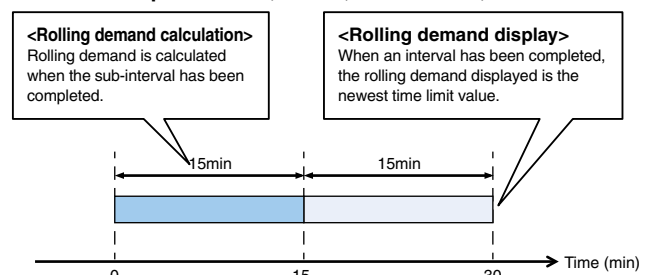
② Fixed block

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

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



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





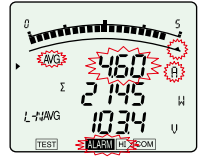
Test Function

● Even during a setup of a facility, where no current/voltage input is found, analog output, pulse output, alarm output, contact output, and communication data is replied. This allows for checkup of wiring and monitoring program system.

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

(1) Communications Test

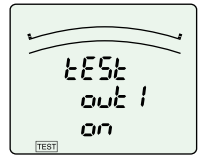
- ① Display
 - The same as for the operating mode, display patterns and other data are shown as set.
 - Both maximum and minimum values can be displayed.
- ② Communication data
 - Communication items and value are the same one on the display. The items value that are not displayed is 0 (zero).
 - Measuring items set for alarm will be displayed at the time of an alarm.
 - Input/Output contact status can be monitored.



(2) Alarm/Contact Output Operation Test

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

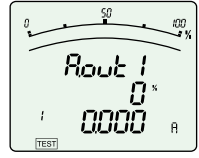
Status	Display	Output terminal
Alarm	ON	Open
No alarm	OFF	Closed



(3) Analog Output Operation Test

- ① Display the output items.
 - ② Press the (+) or (-) button to change the analog output.
- Note: Default value is 0%.

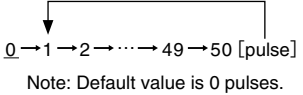
Output	Output specs
	4-20mA
0%	4mA
25%	8mA
50%	12mA
75%	16mA
100%	20mA



(4) Pulse Output Operation Test

Press the Reset button one time to output one pulse.

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



Standards

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

Specifications

ME96SSH-MB

Model name		ME96SSH-MB	
Phase wire		Three phase 4-wire, Three phase 3-wire (3CT, 2CT), Single phase 3-wire, Single phase 2-wire (common use)	
Rating	Current	5AAC, 1AAC (common use)	
	Voltage	Three phase 4-wire: 277/480VAC (max) Three phase 3-wire: Delta connections: 220VAC (max), Star connections: 440VAC (max) Single phase 3-wire: 220/440VAC (max) Single phase 2-wire: Delta connections: 220VAC (max), Star connections: 440VAC	
	Frequency	50-60Hz (common use)	
Measurement items and accuracy	Current (A)	A1, A2, A3, AN, A _{AVG}	±0.1%
	Current demand (DA)	DA1, DA2, DA3, DAN, DA _{AVG}	±0.1%
	Voltage (V)	V12, V23, V31, V _{AVG} (L-L) V1N, V2N, V3N, V _{AVG} (L-N)	±0.1%
	Active power (W)	W1, W2, W3, Σ W	±0.2%
	Reactive power (var)	var1, var2, var3, Σ var	±0.2%
	Apparent power (VA)	VA1, VA2, VA3, Σ VA	±0.2%
	Power factor (PF)	PF1, PF2, PF3, Σ PF	±1.0%
	Frequency (Hz)	Hz	±0.2%
	Active energy (Wh)	Imported, Exported	class 0.5S (IEC62053-22)
	Reactive energy (varh)	Imported lead, lag Exported lead, lag	class 2.0 (IEC62053-23)
	Apparent energy (Vah)	—	class 2.0
	Harmonic current (HI)	1 st to 31 st degree (odd number degree only)	±2.0%
	Harmonic voltage (HV)	1 st to 31 st degree (odd number degree only)	±2.0%
	Rolling demand (DW)	Rolling block, fixed block	±0.2%
	Periodic Active energy (Wh)	Periodic active energy 1, 2	class 0.5S (IEC62053-22)
Operating time	Operating time 1, 2	(Reference)	
Analog output response time		2s or less (except HI, HV. HI, HV: 10s or less)	
Measuring method	Instantaneous value	A/V: RMS calculation, W/var/VA/Wh/varh/Vah: Digital multiplication, PF: Power ratio calculation, Hz: Zero-cross, HI/HV:FFT	
	Demand value	DA: Thermal type calculation, DW: Rolling demand calculation	
Display	Type		LCD with backlight
	No. of display digits and segments	Digital display	6 digits each at upper, middle, and lower line A, DA, V, W, var, VA, PF: 4 digits DW, Hz: 3 digits Wh, varh, VAh: 9 digits (6 or 12 possible) Harmonic distortion ratio, content ratio: 3 digits Harmonic RMS: 4 digits Operating time: 6 digits Contact input/output: I/O
		Bar graph	21 segment bar graph, 22 segment indicator
	Display updating time interval		0.5s or 1s (selectable)
Communication		MODBUS [®] RTU communication	
Available optional plug-in module		ME-4210-SS96 ME-0040C-SS96 ME-0052-SS96	
Power Failure Compensation		Non-volatile memory used (items: setting value, max/min value, active/reactive energy, apparent energy, periodic active energy, rolling demand, operating time)	
Consumption (VA)	VT	Each phase 0.1VA (110VAC), 0.2VA (220VAC), 0.4VA (440VAC)	
	CT	Each phase 2VA (5AAC)	
	Auxiliary power circuit	7VA (at 110VAC), 8VA (at 220VAC), 5W (at 100VDC)	
Auxiliary power		100-240VAC (±15%), 100-240VDC (-30 +15%)	
Weight		0.5kg	
Dimensions		96×96×86 (H×W×D)	
Installation method		Embedded	
Operating temperature		-5~+55°C (average operating temperature: 35 or less per day)	
Operating humidity		0~85% RH (non condensing)	
Storage temperature		-25~+75°C (average temperature: 35 or less per day)	
Storage humidity		0~85% RH (non condensing)	

Notes 1. Class values based on 100% of rated value.

Notes 2. Harmonic measurements where distortion ratio (content rate) is 100% or more may exceed ±2.0%.

Notes 3. Harmonic current cannot be measured without voltage input.



ME96SSR-MB

Model name		ME96SSR-MB	
Phase wire		Three phase 4-wire, Three phase 3-wire (3CT, 2CT), Single phase 3-wire, Single phase 2-wire (common use)	
Rating		Current	5AAC, 1AAC (common use)
		Voltage	Three phase 4-wire: 277/480VAC (max) Three phase 3-wire: Delta connections: 220VAC (max), Star connections: 440VAC (max) Single phase 3-wire: 220/440VAC (max) Single phase 2-wire: Delta connections: 220VAC (max), Star connections: 440VAC
		Frequency	50-60Hz (common use)
Measurement items and accuracy	Current (A)	A1, A2, A3, AN, A _{AVG}	±0.2%
	Current demand (DA)	DA1, DA2, DA3, DAN, DA _{AVG}	±0.2%
	Voltage (V)	V12, V23, V31, V _{AVG} (L-L) V1N, V2N, V3N, V _{AVG} (L-N)	±0.2%
	Active power (W)	W1, W2, W3, Σ W	±0.5%
	Reactive power (var)	var1, var2, var3, Σ var	±0.5%
	Apparent power (VA)	VA1, VA2, VA3, Σ VA	±0.5%
	Power factor (PF)	PF1, PF2, PF3, Σ PF	±2.0%
	Frequency (Hz)	Hz	±0.5%
	Active energy (Wh)	Imported, Exported	class 1.0 (IEC62053-21)
	Reactive energy (varh)	Imported lead, lag Exported lead, lag	class 2.0 (IEC62053-23)
	Apparent energy (Vah)	—	—
	Harmonic current (HI)	1 st to 13 th degree (odd number degree only)	±2.0%
	Harmonic voltage (HV)	1 st to 13 th degree (odd number degree only)	±2.0%
	Rolling demand (DW)	—	—
	Periodic Active energy (Wh)	Periodic active energy 1, 2	class 1.0 (IEC62053-21)
Operating time	Operating time 1, 2	(Reference)	
Analog output response time		2s or less (except HI, HV, HI, HV: 10s or less)	
Measuring method		Instantaneous value	A/V: RMS calculation, W/var/VA/Wh/varh/Vah: Digital multiplication, PF: Power ratio calculation, Hz: Zero-cross, HI/HV:FFT
		Demand value	DA: Thermal type calculation
Display	Type		LCD with backlight
	No. of display digits and segments	Digital display	6 digits each at upper, middle, and lower line A, DA, V, W, var, VA, PF: 4 digits Hz: 3 digits Wh, varh: 9 digits (6 or 12 possible) Harmonic distortion ratio, content ratio: 3 digits Harmonic RMS: 4 digits Operating time: 6 digits Contact input/output: I/O
		Bar graph	21 segment bar graph, 22 segment indicator
	Display updating time interval		0.5s or 1s (selectable)
Communication		MODBUS [®] RTU communication	
Available optional plug-in module		ME-4210-SS96 ME-0040C-SS96 ME-0052-SS96	
Power Failure Compensation		Non-volatile memory used (items: setting value, max/min value, active/reactive energy, periodic active energy, operating time)	
Consumption (VA)	VT	Each phase 0.1VA (110VAC), 0.2VA (220VAC), 0.4VA (440VAC)	
	CT	Each phase 2VA (5AAC)	
	Auxiliary power circuit	7VA (at 110VAC), 8VA (at 220VAC), 5W (at 100VDC)	
Auxiliary power		100-240VAC (±15%), 100-240VDC (-30 +15%)	
Weight		0.5kg	
Dimensions		96×96×86 (H×W×D)	
Installation method		Embedded	
Operating temperature		-5~+55°C (average operating temperature: 35 or less per day)	
Operating humidity		0~85% RH (non condensing)	
Storage temperature		-25~+75°C (average temperature: 35 or less per day)	
Storage humidity		0~85% RH (non condensing)	

Notes 1. Class values based on 100% of rated value.

Notes 2. Harmonic measurements where distortion ratio (content rate) is 100% or more may exceed ±2.0%.

Notes 3. Harmonic current cannot be measured without voltage input.

Specifications

ME96SSE-MB

Model name		ME96SSE-MB	
Phase wire		Three phase 4-wire, Three phase 3-wire (3CT, 2CT), Single phase 3-wire, Single phase 2-wire (common use)	
Rating	Current	5AAC, 1AAC (common use)	
	Voltage	Three phase 4-wire: 277/480VAC (max) Three phase 3-wire: Delta connections: 220VAC (max), Star connections: 440VAC (max) Single phase 3-wire: 220/440VAC (max) Single phase 2-wire: Delta connections: 220VAC (max), Star connections: 440VAC	
	Frequency	50-60Hz (common use)	
Measurement items and accuracy	Current (A)	A1, A2, A3, AN, A_{AVG}	±0.2%
	Voltage (V)	V12, V23, V31, V_{AVG} (L-L) V1N, V2N, V3N, V_{AVG} (L-N)	±0.2%
	Active power (W)	W1, W2, W3, ΣW	±0.5%
	Power factor (PF)	PF1, PF2, PF3, ΣPF	±2.0%
	Frequency (Hz)	Hz	±0.5%
	Active energy (Wh)	Imported	class 1.0 (IEC62053-21)
	Operating time	Operating time 1, 2	(Reference)
Measuring method		Instantaneous value	A/V: RMS calculation, W: Digital multiplication, PF: Power ratio calculation, Hz: Zero-cross
Display	Type		LCD with backlight
	No. of display digits and segments	Digital display	6 digits each at upper, middle, and lower line A, V, W, PF: 4 digits Hz: 3 digits Wh: 9 digits (6 or 12 possible) Operating time: 6 digits
		Bar graph	21 segment bar graph, 22 segment indicator
	Display updating time interval		0.5s or 1s (selectable)
Communication		MODBUS [®] RTU communication	
Power Failure Compensation		Non-volatile memory used (items: setting value, max/min value, active energy, operating time)	
Consumption (VA)	VT	Each phase 0.1VA (110VAC), 0.2VA (220VAC), 0.4VA (440VAC)	
	CT	Each phase 2VA (5AAC)	
	Auxiliary power circuit	7VA (at 110VAC), 8VA (at 220VAC), 5W (at 100VDC)	
Auxiliary power		100-240VAC (±15%), 100-240VDC (-30 +15%)	
Weight		0.5kg	
Dimensions		96×96×86 (H×W×D)	
Installation method		Embedded	
Operating temperature		-5~+55°C (average operating temperature: 35 or less per day)	
Operating humidity		0~85% RH (non condensing)	
Storage temperature		-25~+75°C (average temperature: 35 or less per day)	
Storage humidity		0~85% RH (non condensing)	

Notes 1. Class values based on 100% of rated value.



Standards Compliance

Electromagnetic Compatibility	
Emissions	
Radiated Emission	EN61326-1/CISPR 11, FCC Part15 Subpart B Class A
Conducted Emission	EN61326-1/CISPR 11, FCC Part15 Subpart B Class A
Harmonics Measurement	EN61000-3-2
Flicker Meter Measurement	EN61000-3-3
Immunity	
Electrostatic discharge Immunity	EN61326-1/EN61000-4-2
Radio Frequency Electromagnetic field Immunity	EN61326-1/EN61000-4-3
Electrical Fast Transient/Burst Immunity	EN61326-1/EN61000-4-4
Surge Immunity	EN61326-1/EN61000-4-5
Conducted Disturbances, Induced By Radio Frequency Fields Immunity	EN61326-1/EN61000-4-6
Power Frequency Magnetic Field Immunity	EN61326-1/EN61000-4-8
Voltage Dips and Short Interruptions	EN61326-1/EN61000-4-11
Safety	
Europe	CE, as per EN61010-1
U.S. and Canada	cRUus as per UL61010-1, IEC61010-1
Installation Category	III
Measuring Category	III
Pollution Degree	2

Notes Regarding MODBUS® RTU Communication

Item	Specifications
Interface	RS-485 2-wire half-duplex transmission
Protocol	RTU mode
Transmission method	Asynchronous
Connection type	Multi-point bus
Baud rate	2,400/4,800/9,600/19,200/38,400bps
Data bit	8
Stop bit	1 or 2
Parity	Odd, even, none
Address	1 to 255 (0:for broadcast mode)
Distance	1,200m (max)
Max. connectable units	31 units
Terminal Resistance	120 Ω 1/2W
Recommended Cable	Shielded twisted-pair AWG24 to 14

Notes Regarding CC-Link Communication

Item	Specifications
No. of occupied stations	1 Station Remote device station
CC-Link version	CC-Link Ver 1.10/Ver 2.00
Baud rate	10Mbps/5Mbps/2.5Mbps/625kbps/156kbps
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 Number	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% (1/2W product) when using dedicated CC-Link cables or 130 Ω ±5% (1/2W product) when using dedicated CC-Link high-performance cables.

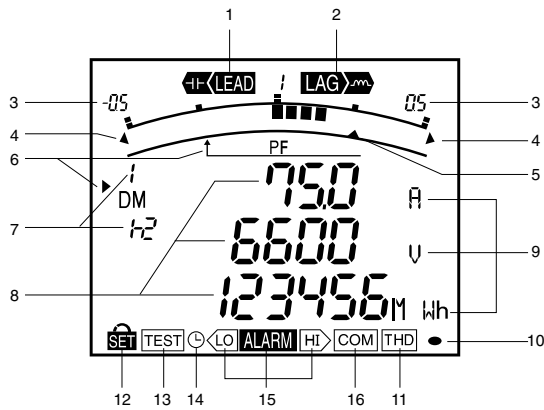
Option Specifications

Item	Specification	Optional Plug-in Module type
Analog output	4-20mA (0-600 Ω)	ME-4210-SS96
Pulse/Alarm output	No-voltage "a" contact Capacity: 35VDC, 0.1A	ME-4210-SS96
Digital input	19-30VDC 7mA or less	ME-4210-SS96, ME-0040C-SS96, ME-0052-SS96
Digital output	No-voltage a contact Capacity: 35VDC, 0.2A	ME-0052-SS96

Operating Instructions

Functions

LCD Functions



NO.	Segment name	Description
1	Lead Status	Power factor status is lead
2	Lag status	Power factor status is lag
3	Scale of the bar graph	The scale of the bar graph
4	Outside range	Measurement value is outside range of scale of the bar graph
5	Alarm indicator	The setting value of the upper or lower limit
6	Bar graph status	The item expressed with the bar graph
7	Phase status	The phase for each of the digital displays
8	Digital	The measured value is displayed in a digital number
9	Unit	The unit for each of the digital display
10	Metering status	When it is blinking, the instrument is counting active energy
11	Harmonics	The digital displays are harmonics values
12	Setup status	Setup mode
13	Test status	Test mode
14	Clock status	When it is blinking, the instrument is counting operating time
15	Alarm status	The upper or lower limit value was exceeded
16	Communication status	The instrument is equipped with communication function

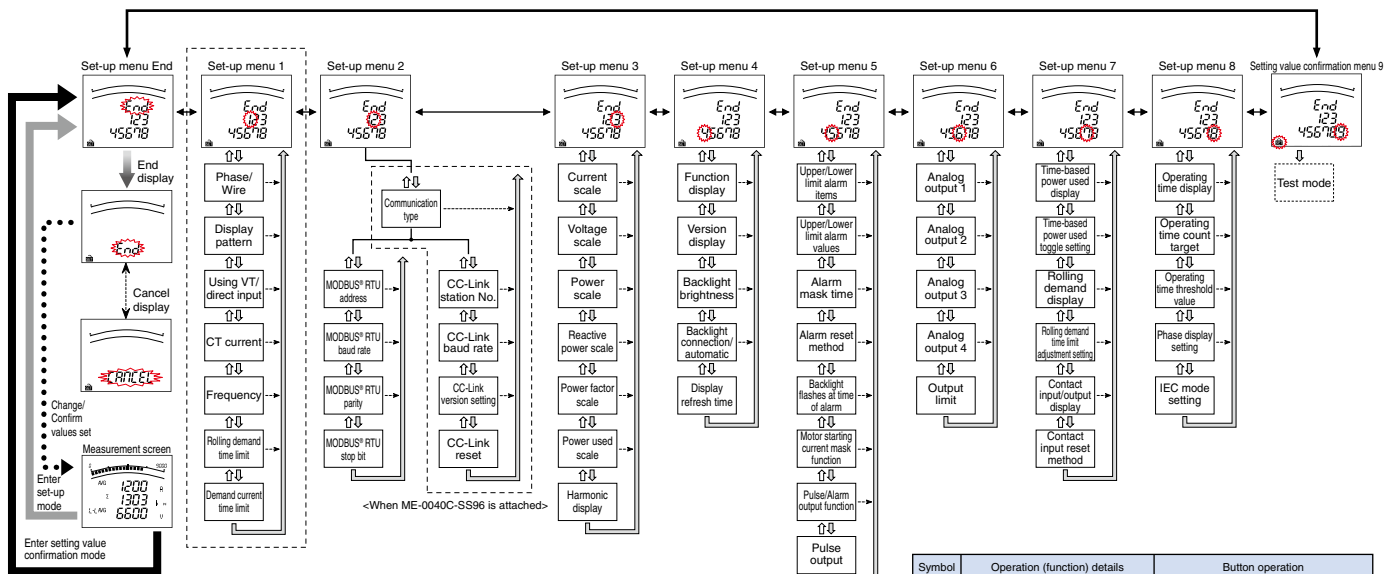
Button Functions

Basic functions		Special functions	
Button	Functions	Button	Functions
SET	Set up setting items such as primary voltage and current, and choose and indicate setting items	DISPLAY	Push for 2s Manual display change ⇄ Cyclic display change
+ or -	Change setting and bar graph display	PHASE	Push for 2s Manual phase change ⇄ Cyclic phase change
MAX/MIN	Change display from Max/Min to instantaneous value	+ + -	Push for 2s Zoom display of Wh, varh etc
PHASE	Change phase	+ + RESET	Push for 2s Reset all the Max/Min values
DISPLAY	Change display	+ or -	Push for 1s Fast forward or fast return values when setting
		SET + RESET + PHASE	Reset Wh, varh, Vah values to zero by holding down the buttons for 2 sec

Set-up

For correct measurement, it is necessary to set the primary voltage/current in set-up mode. Access set-up mode from the measurement mode and set the necessary items. Factory default settings will apply to items not set.

Set-up workflow (in the case of ME96SSH-MB)



Notes 1. Basic measurements are possible by adjusting settings in 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.

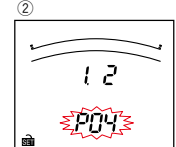
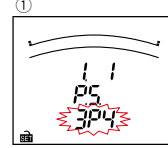
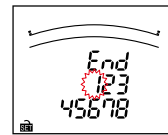
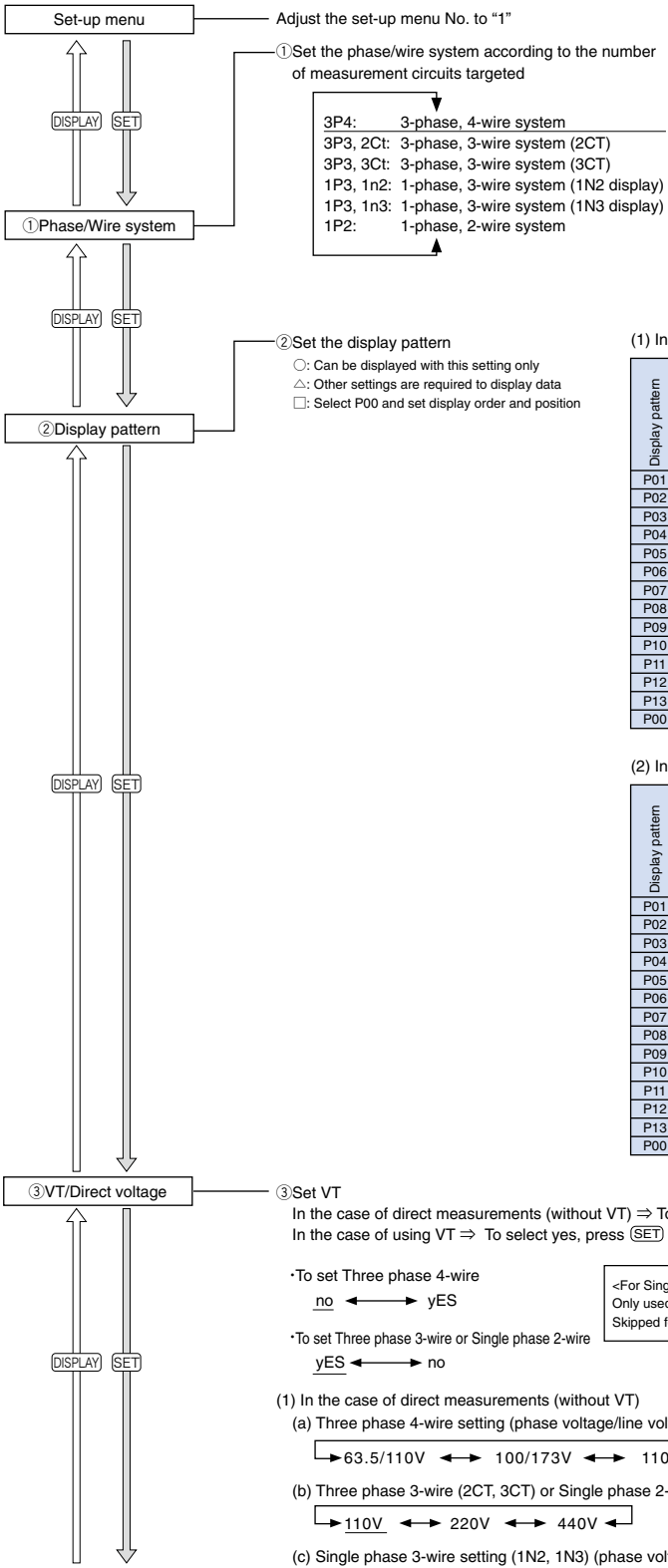
Symbol	Operation (function) details	Button operation	
→	Access set-up mode from operating mode	SET + RESET	Press for 2s
→	Access setting value confirmation mode from operating mode	SET	Press for 2s
••♦	Save settings and return to operating mode	SET	
↔	Select set-up menu	+ or -	
⇐	Move to next screen	SET	
⇐	Return to previous setting item	DISPLAY	
→	Skip remaining settings	SET	Press for 1s
←→	Select cancel	+ or -	

● Basic Set-up Operations

To access setting mode, press and hold the **(SET)** and **(RESET)** buttons down at the same time for 2s. Press the **(SET)** button to display the items to be set, and the **(+)** and **(-)** buttons to set the details. Settings can be saved for each set-up menu No. To do so, press the **(SET)** button when the End screen is displayed.

The underlined setting parameter are the initial value.

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



(1) In the case of Three phase 4-wire setting (ME96SSH-MB)

Display pattern	Main screens													Additional screens									
	A	AN	DA	DAN	V	W	PF	var	VA	Hz	Wh (Imported)	Wh (Exported)	Wh (Imported lag)	Wh (Exported lag)	Wh (Imported)	Wh (Exported)	varh	vah	Wh (periodic)	DW	HIHV	DI/DO	Operating time
P01	○	○			○	○	○												△	△	△	△	△
P02	○	○									○				○	△			△	△	△	△	△
P03	○	○																	△	△	△	△	△
P04	○	○																	△	△	△	△	△
P05	○	○																	△	△	△	△	△
P06	○	○																	△	△	△	△	△
P07	○	○																	△	△	△	△	△
P08	○	○									○				○	△			△	△	△	△	△
P09	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	△
P10	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	△
P11	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	△
P12	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	△
P13	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	△
P00	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	△	△	△	△	△

(2) In the case of settings other than Three phase 4-wire (ME96SSH-MB)

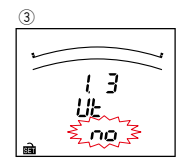
Display pattern	Main screens										Additional screens												
	A	DA	V	W	PF	var	Hz	Wh (Imported)	Wh (Exported)	Wh (Imported lag)	Wh (Exported lag)	Wh (Imported)	Wh (Exported)	varh	Wh (periodic)	DW	HIHV	DI/DO	Operating time				
P01	○		○	○	○			○				○	△			△	△	△	△	△	△	△	
P02	○		○	○	○			○				○	△			△	△	△	△	△	△	△	
P03	○		○	○	○			○				○	△			△	△	△	△	△	△	△	
P04	○		○	○	○			○				○	△			△	△	△	△	△	△	△	
P05	○		○	○	○			○				○	△			△	△	△	△	△	△	△	
P06	○		○	○	○			○				○	△			△	△	△	△	△	△	△	
P07	○		○	○	○			○				○	△			△	△	△	△	△	△	△	
P08	○		○	○	○			○				○	△			△	△	△	△	△	△	△	
P09	○	○	○	○	○			○				○	△			△	△	△	△	△	△	△	
P10	○	○	○	○	○			○				○	△			△	△	△	△	△	△	△	
P11	○	○	○	○	○			○				○	△			△	△	△	△	△	△	△	
P12	○	○	○	○	○			○				○	△			△	△	△	△	△	△	△	
P13	○	○	○	○	○			○				○	△			△	△	△	△	△	△	△	
P00	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	△	△	△	△	△

③ Set VT
 In the case of direct measurements (without VT) ⇒ To select no, press **(SET)** and see (1) below.
 In the case of using VT ⇒ To select yes, press **(SET)** and see (2) below.

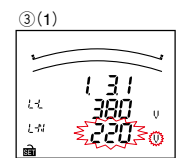
• To set Three phase 4-wire
no ↔ yES

• To set Three phase 3-wire or Single phase 2-wire
 yES ↔ no

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



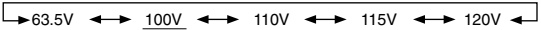
- (1) In the case of direct measurements (without VT)
- (a) Three phase 4-wire setting (phase voltage/line voltage)
 → 63.5/110V ↔ 100/173V ↔ 110/190V ↔ 220/380V ↔ 240/415V ↔ 254/440V ↔ 277/480V ←
- (b) Three phase 3-wire (2CT, 3CT) or Single phase 2-wire setting (line voltage)
 → 110V ↔ 220V ↔ 440V ←
- (c) Single phase 3-wire setting (1N2, 1N3) (phase voltage/line voltage)
 → 110/220V ↔ 220/440V ←

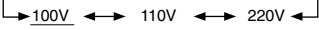


Operating Instructions

<Continued from previous page>

③ VT/Direct voltage

(2) In the case of using with VT
<Secondary voltage settings>
(a) Three phase 4-wire setting (phase voltage)


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


<Set primary voltage>
Can be set in 60~750,000V range (setting unit: V)
Under 100V: Top two digits settings Factory default settings
Over 100V: Top three digits settings Three phase 4-wire: 200V (phase voltage)
Three phase 3-wire; Single phase 2-wire: 10,000V (line voltage)

④ CT current

④ Set CT
<Set secondary current>
1A ↔ 5A

<Set primary current>
Can be set in 1.0~30,000.0A range (setting unit: A)
Under 10A: Top two digits settings Factory default setting: 5.0A
Over 10A: Top three digits settings

⑤ Frequency

⑤ Set frequency
50Hz ↔ 60Hz

Notes1. Frequency scale on bar graph display will also change.
Notes2. Analog output scale will also change.

⑥ Rolling demand time limit

⑥ Set the rolling demand interval time limit (ME96SSH-MB only)

(1) Interval time limit

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

(2) Sub-interval time limit

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

⑦ Demand current time limit

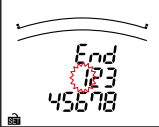
⑦ Set the demand current time limit (ME96SSH-MB, ME96SSR-MB only)

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

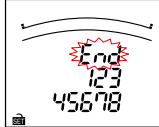
Set-up menu

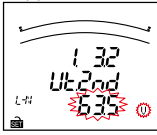
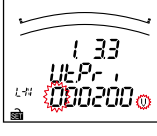
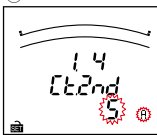
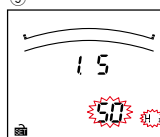
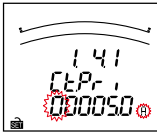
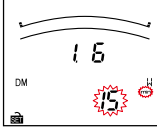
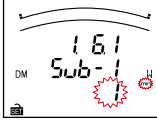
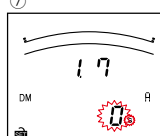
Select another set-up menu or finish set-up

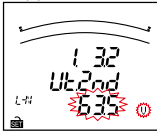
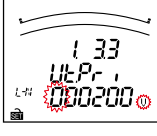
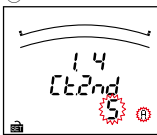
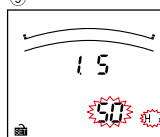
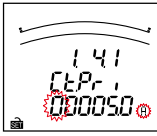
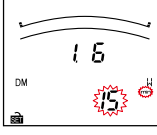
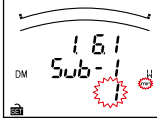
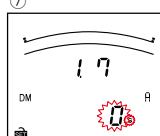
■ To continue to set-up
Select the menu No.
using the (+) or (-) button.



■ 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: Communication settings (MODBUS® RTU, CC-Link communication settings)

(CC-Link communication only possible when ME-0040C-SS96 is installed to ME96SSH-MB, ME96SSR-MB)

Set-up menu

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

① Select communication system

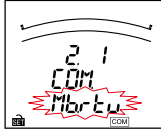
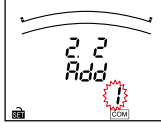
① Select CC-Link or MODBUS® RTU communication

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

② MODBUS® RTU communication address

② Set MODBUS® RTU communication address

Possible address settings: 1~255

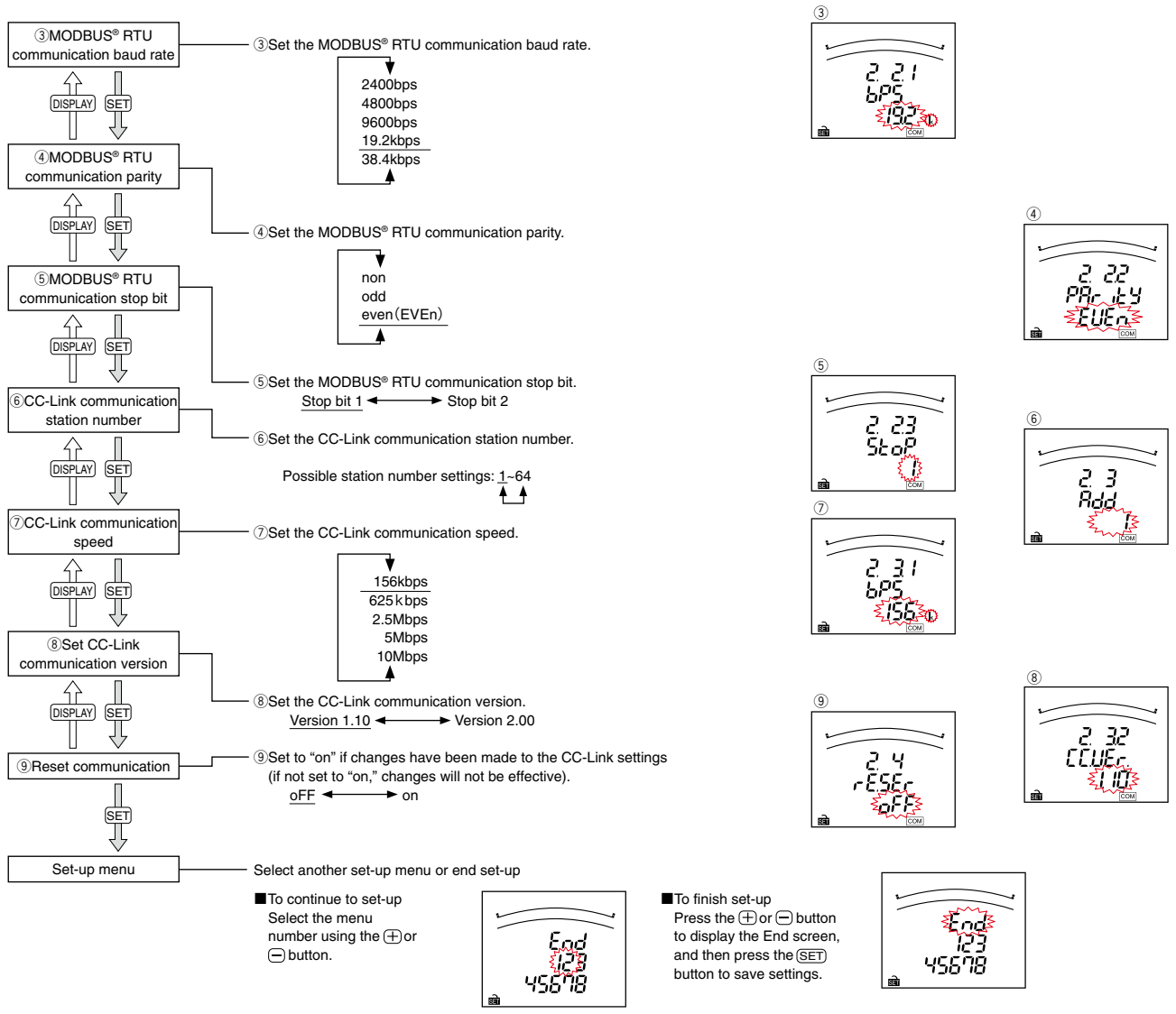



If ME-0040C-SS96 (optional) is not installed, this screen will not appear. In addition, when CC-Link communication is selected, settings are performed from [⑥ CC-Link station No.]

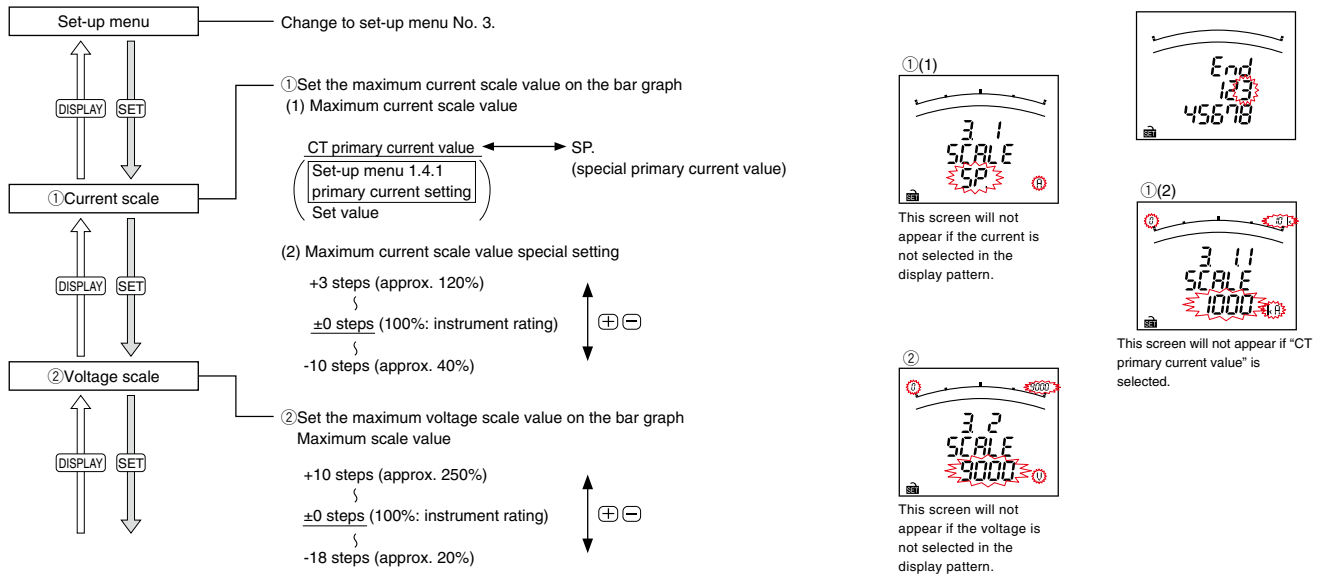
This screen will not be displayed if CC-Link communication is selected using [① Communication system selection.]

15

• Set-up menu 2 screens ③-⑤ will not be displayed if CC-Link communication is selected using [① Communication system selection].
 • Set-up menu 2 screens ⑥-⑨ will not be displayed if ME-0040C-SS96 (optional) is not attached or if CC-Link communication is selected using [① Communication system selection].



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



Operating Instructions

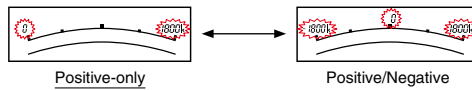
③ Power scale

③ Set the maximum power/rolling demand scale value on the bar graph, and select positive-only scale or positive/negative scale (rolling demand is only for ME96SSH-MB).

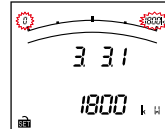
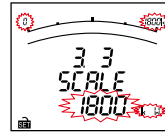
- (1) Maximum scale value
 +3 steps (approx. 120%)
 ±0 steps (100%: instrument rating)
 -18 steps (approx. 20%)



(2) Positive-only or Positive/Negative



③(1)



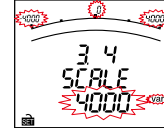
This screen will not appear if the power is not selected in the display pattern.

④ Reactive power scale

④ Set the maximum reactive power scale value on the bar graph (ME96SSH-MB, ME96SSR-MB only).

The setting procedure is the same as that described in ③ Power unit (1) Max. scale value. The reactive power scale can only be positive/negative.

④



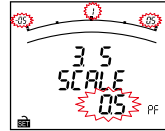
This screen will not appear if the reactive power is not selected in the display pattern.

⑤ Power factor scale

⑤ Set the power factor scale on the bar graph.

-0.5~1~0.5 ← → -0~1~0

⑤



⑥ Measure power consumption

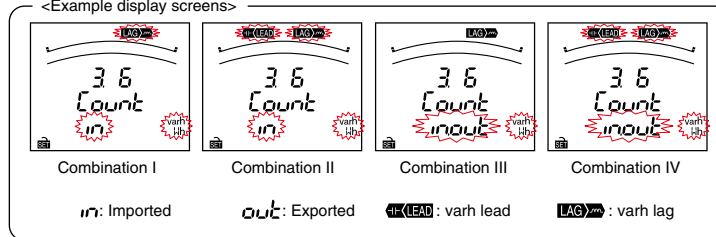
⑥ Set display combinations of receiving/transmitting, lag/lead, power used/reactive power used and the measurement method for reactive power used (ME96SSH-MB, ME96SSR-MB only).

Combinations (set value)	Display combinations						Reactive energy used 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 measuring reactive power in facilities not equipped with in-house generators, and generally for capacitor loads where the power factor is close to zero.

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

<Example display screens>



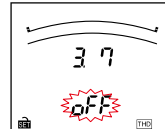
⑦ Harmonic display

⑦ Select with or without harmonic display (ME96SSH-MB, ME96SSR-MB only).

OFF ← → ON
 (without) (with)

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

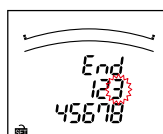
⑦



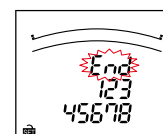
Set-up menu

Select another set-up menu or end set-up

■ To continue to set-up
 Select the menu number using the (+) or (-) button.



■ To finish set-up
 Press the (+) or (-) button to display the End screen, and then press the (SET) button to save settings.



Set-up menu 6: Analog output setting (ME96SSH-MB, ME96SSR-MB only)

This menu will not appear if ME-4210-SS96 (optional) is not installed.

Set-up menu

↑ DISPLAY ↓ SET

① Analog output CH1 output items

↑ DISPLAY ↓ SET

② Analog output CH1 detailed settings

↑ DISPLAY ↓ SET

③ Analog output CH2-4 output items

↑ DISPLAY ↓ SET

④ Analog output CH2-4 detailed settings

↑ DISPLAY ↓ SET

⑤ Analog output limit

↓ SET

Set-up menu

Adjust settings to match set-up menu No. 6.

① Set the output items for "analog output CH1."
Select the measured items to be output from the table below.

Three phase 4-wire

Three 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 _{IN}
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 effective value

② Set 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, demand current, voltage, power, reactive power, power factor (set-up menu: 6.1.1)

Output item	Setting range
A	CT primary current value (value set for [set-up menu 1.4.1 primary current setting])
Demand A	←→ SP. (special primary current value)
V	+10 steps (approx. 250%) ±0 steps (100%: standard max. scale value) -18 steps (approx. 20%)
W	+3 steps (approx. 120%) ±0 steps (100%: instrument rating) -18 steps (approx. 20%)
PF	-0.5~1~0.5 ←→ -0~1~0

(2) If analog output is selected for current, demand current, power (set-up menu: 6.1.2)

Output item	Setting range
A	+3 steps (approx. 120%) ±0 steps (100%: instrument rating) -10 steps (approx. 40%)
W	Positive-only ←→ Positive/Negative

③ Set the output items for "analog output CH2-4."
The setting procedure is the same as that of [① Analog output CH1 output items].

④ Set the details for "analog output CH2-4."
The setting procedure is the same as that of [② Analog output CH1 detailed settings].

⑤ Set the upper limit for analog output (same for all channels)

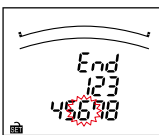
Setting	Explanation
oFF (no limit)	Output to +5% of upper limit and -5% of lower limit (with respect to span value)
on (limit)	Output to +1% of upper limit and -1% of lower limit (with respect to span value)

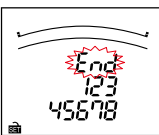
Note: Skip this setting when the analog output of all channel output items is set to "non."

Select another set-up menu or end set-up

■ To continue to set-up
Select the menu number using the ⊕ or ⊖ button.

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





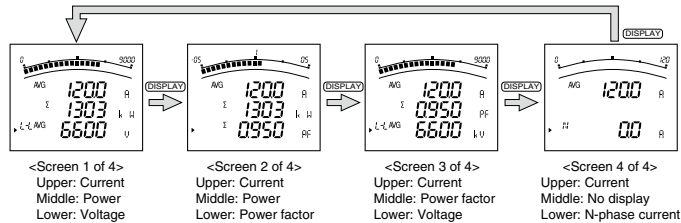
Operating Instructions

■ Operation (for ME96SSH-MB)

● Display Change

Press **[DISPLAY]**, the measurement display switches over.

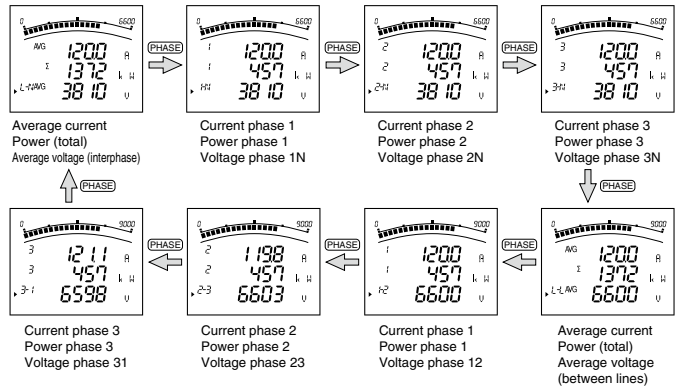
Example of changing display (Three phase 4-wire system; display pattern: P01; no additional screens)



● Changing Phases

Press **[PHASE]**, the current phase and the voltage phase switches over.

Example of changing phases (Three phase 4-wire system)



● Bar Graph Display

Items measured can be displayed on the bar graph. By displaying one item by a bar graph and other three items by digital numbers four elements can be displayed at once.

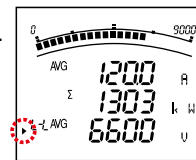
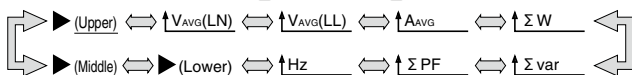
• Bar graph explanation

The **▶** or **↑** mark indicates that the measurement item is displayed on the bar graph.

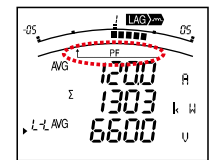
• Select bar graph

Press the **[+]** or **[-]** button to select the measurement items to be displayed on the bar graph.

Three phase 4-wire system **[+]** (clockwise) **[-]** (anticlockwise)



Example of bottom item displayed in the bar graph

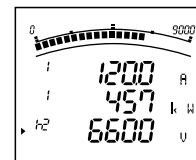


Example of power factor displayed in the bar graph

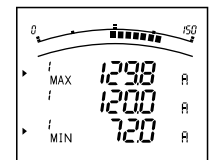
● Maximum/Minimum Display Values

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 switching between changing current value display and maximum/minimum value display screens



Current value display screen



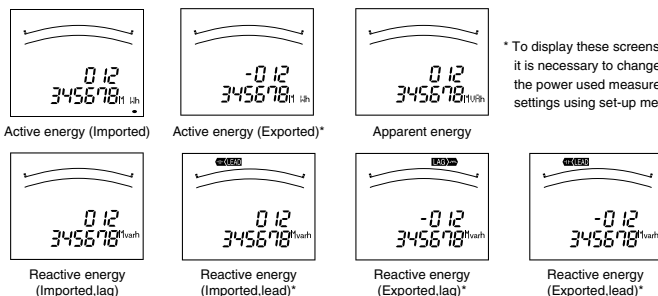
Maximum/Minimum value display screen

● Reset Maximum/Minimum Values

Press the **[RESET]** button for 2s 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 2s to reset all maximum/minimum values. The maximum/minimum values will become the current values.

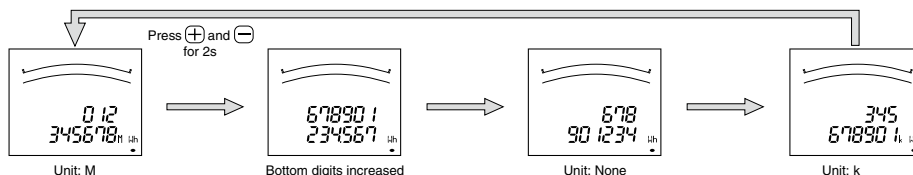
● Displaying Active energy/Reactive energy/Apparent energy



* To display these screens, it is necessary to change the power used measurement settings using set-up menu 3.

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 2s to switch between screens.

Power used (receiving): Example of changing 012,345,678,901,234.567Wh



● Reset Active energy/Reactive energy/Apparent energy

Press the **[SET]**, **[RESET]** and **[PHASE]** buttons simultaneously for 2s 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. The blinking ▲ mark on the bar graph indicates the current upper/lower limit value settings.

● 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 	Constantly on
	Alarm contact	Closed	Open
Manual (Hold)	Screen	ALARM [HI] or [LO] will flash (Alarm activated)	ALARM [HI] or [LO] will flash (Alarm on hold) → RESET → (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	On	Flashing	Flashing
Alarm cancelled	On	On	On

* 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.

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 contact 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 2s when in operating mode.

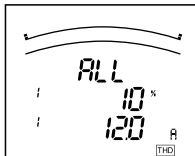
● Alarm delay Time

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.

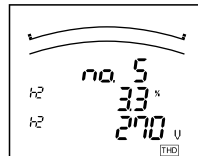
● Harmonic Display

The harmonic effective value, distortion ratio and content ratio can be displayed. To do so, first set the harmonic display (set-up menu: 3.7).

<Example of total harmonic current display>



<Example of 5th-degree harmonic voltage display>

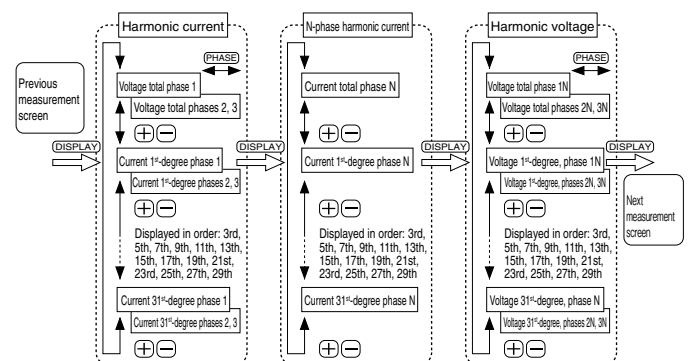


Upper: Degree No.
Middle: Distortion (content) ratio
Lower: Effective value

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.



Operating Instructions

■ Display Pattern Contents

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

● ME96SSH-MB Screen Display (Three phase 4-wire)

Display pattern	Screen set based on display pattern										Additional screens (set in set-up menu Nos. 3, 7 and 8)																
	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17	No.18	No.19	No.20	No.21	No.22	No.23	No.24	No.25	No.26	
											Wh	Wh exported	varh	varh Imported (lead)	varh exported (lag)	varh exported (lead)	VAh	Periodic active energy Wh1	Periodic active energy Wh2	Rolling demand	Harmonic current	Harmonic N-phase	Harmonic voltage	DI status	DO status	Operating time 1	Operating time 2
P01	Upper	A	A	A	A															Degree No.	Degree No.	Degree No.	DI	DO			
	Middle	W	W	PF	—															Peak value	Distortion (content) ratio	—	Distortion (content) ratio	DI No.	DO No.	hour1	hour2
	Lower	V	PF	V	AN															Demand value	RMS	RMS	RMS	Contact status	Contact status	Operating time	Operating time
P02	Upper	A	A	A	A															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	V	W	PF	—															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	Wh	Wh	Wh	AN															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P03	Upper	A	A	A	A	A	A													Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	PF	PF	PF	PF	—														Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	V	W	var	VA	Hz	AN													Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P04	Upper	A	A	A	A	A	A	A												Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	V	W	var	VA	PF	Hz	—												Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	Wh	Wh	varh	VAh	Wh	Wh	AN												Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P05	Upper	PF	Hz	VA																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	W	W	W																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	var	var	var																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P06	Upper	A1	V1N	A	A															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	A2	V2N	—	—															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	A3	V3N	V	AN															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P07	Upper	A	A1	V1N	A															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	V	A2	V2N	—															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	W	A3	V3N	AN															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P08	Upper	A	A	A1	V1N	A														Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	V	W	A2	V2N	—														Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	Wh	Wh	Wh	A3	V3N	AN													Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P09	Upper	A	A1	DA1	V1N	A	DA													Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	DA	A2	DA2	V2N	—	—													Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	V	A3	DA3	V3N	AN	DAN													Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P10	Upper	A	A	A1	DA1	V1N	A	DA												Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	DA	A2	DA2	V2N	—	—													Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	V	W	A3	DA3	V3N	AN	DAN												Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P11	Upper	A	A	DA1	V1N	A	DA													Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	DA	V	DA2	V2N	—	—													Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	Wh	Wh	DA3	V3N	AN	DAN													Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P12	Upper	A	A	A	DA	W	A	DA												Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	DA	W	V	V	V	—	—												Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	Wh	Wh	Wh	Wh	Wh	AN	DAN												Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P13	Upper	A1	V1N	W1	var1	VA1	PF 1	V	V	A										Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	A2	V2N	W2	var2	VA2	PF 2	Hz	Hz	AN										Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	A3	V3N	W3	var3	VA3	PF 3	Wh	varh	VAh										Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P00	Upper	Free	Free	Free	Free															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	Free	Free	Free	Free															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	Free	Free	Free	Free															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above

● ME96SSH-MB Screen Display (Three phase 3-wire, Single phase 3-wire, Single phase 2-wire)

Display pattern	Screen set based on display pattern					Additional screens (set in set-up menu Nos. 3, 7 and 8)																					
	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17	No.18	No.19	No.20							
						Wh	Wh exported	varh	varh Imported (lead)	varh exported (lag)	varh exported (lead)	Periodic active energy Wh1	Periodic active energy Wh2	Rolling demand	Harmonic current	Harmonic voltage	DI status	DO status	Operating time 1	Operating time 2							
P01	Upper	A	A	A																Degree No.	Degree No.	DI	DO				
	Middle	W	W	PF																Peak value	Distortion (content) ratio	—	Distortion (content) ratio	DI No.	DO No.	hour1	hour2
	Lower	V	PF	V																Demand value	RMS	RMS	Contact status	Contact status	Operating time	Operating time	
P02	Upper	A	A	A																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	V	W	PF																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	Wh	Wh	Wh																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P03	Upper	A	A	A	A															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	PF	PF	PF	PF															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	V	W	var	Hz															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P04	Upper	A	A	A	A															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	V	W	var	PF	Hz														Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	Wh	Wh	varh	Wh	Wh														Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P05	Upper	PF	Hz																	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	W	W																	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	var	var																	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P06	Upper	A1	V12	A																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	A2	V23	—																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	A3	V31	V																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P07	Upper	A	A1	V12																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	V	A2	V23																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	W	A3	V31																Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P08	Upper	A	A	A1	V12															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	V	W	A2	V23															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	Wh	Wh	Wh	A3	V31														Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P09	Upper	A	A1	DA1	V12															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Middle	DA	A2	DA2	V23															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
	Lower	V	A3	DA3	V31															Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above
P10	Upper	A	A	A1	DA1	V12																					



● ME96SSR-MB Screen Display (Three phase 4-wire)

Display pattern	Screen set based on display pattern									Additional screens (set in set-up menu Nos. 3, 7 and 8)														
	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17	No.18	No.19	No.20	No.21	No.22	No.23	No.24
										Wh	Wh exported	varh	varh imported (lead)	varh exported (lag)	varh exported (lead)	Periodic active energy Wh1	Periodic active energy Wh2	Harmonic current	Harmonic current N-phase	Harmonic voltage	DI status	DO status	Operating time 1	Operating time 2
P01	Upper	A	A	A	A													Degree No.	Degree No.	DI	DO			
	Middle	W	W	PF												Periodic active energy Wh1	Periodic active energy Wh2	Distortion (content) ratio	Distortion (content) ratio	DI No.	DO No.	hour1	hour2	
	Lower	V	PF	V	AN											RMS	RMS	RMS	RMS	Contact status	Contact status	Operating time	Operating time	
P02	Upper	A	A	A	A											Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	V	W	PF						Wh	Wh exported													
	Lower	Wh	Wh	Wh	AN																			
P03	Upper	A	A	A	A	A	A									Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	PF	PF	PF	PF	PF	AN																	
	Lower	V	W	var	VA	Hz	AN																	
P04	Upper	A	A	A	A	A	A									Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	V	W	var	VA	PF	Hz			Wh	Wh exported	varh	varh imported (lead)	varh exported (lag)	varh exported (lead)									
	Lower	Wh	Wh	varh	VAh	Wh	Wh	AN																
P05	Upper	PF	Hz	VA												Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	W	W	W																				
	Lower	var	var	var																				
P06	Upper	A1	V1N	A	A											Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	A2	V2N																					
	Lower	A3	V3N	V	AN																			
P07	Upper	A	A1	V1N	A											Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	V	A2	V2N																				
	Lower	W	A3	V3N	AN																			
P08	Upper	A	A	A1	V1N	A										Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	V	W	A2	V2N					Wh	Wh exported													
	Lower	Wh	Wh	A3	V3N	AN																		
P09	Upper	A	A1	DA1	V1N	A	DA									Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	DA	A2	DA2	V2N																			
	Lower	V	A3	DA3	V3N	AN	DAN																	
P10	Upper	A	A	A1	DA1	V1N	A	DA								Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	DA	DA	A2	DA2	V2N																		
	Lower	V	W	A3	DA3	V3N	AN	DAN																
P11	Upper	A	A	DA1	V1N	A	DA									Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	DA	V	DA2	V2N					Wh	Wh exported													
	Lower	Wh	Wh	DA3	V3N	AN	DAN																	
P12	Upper	A	A	A	DA	W	A	DA								Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	DA	W	V	V	V				Wh	Wh exported													
	Lower	Wh	Wh	Wh	Wh	Wh	AN	DAN																
P13	Upper	A1	V1N	W1	var1	VA1	PF 1	V	V	A						Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	A2	V2N	W2	var2	VA2	PF 2	Hz	Hz															
	Lower	A3	V3N	W3	var3	VA3	PF 3	Wh	varh	AN														
P00	Upper	Free	Free	Free	Free											Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	
	Middle	Free	Free	Free	Free					Wh	Wh exported	varh	varh imported (lead)	varh exported (lag)	varh exported (lead)									
	Lower	Free	Free	Free	Free																			

● ME96SSR-MB Screen Display (Three phase 4-wire, Single phase 3-wire, Single phase 2-wire)

Display pattern	Screen set based on display pattern					Additional screens (set in set-up menu Nos. 3, 7 and 8)													
	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10	No.11	No.12	No.13	No.14	No.15	No.16	No.17	No.18	No.19
						Wh	Wh exported	varh	varh imported (lead)	varh exported (lag)	varh exported (lead)	Periodic active energy Wh1	Periodic active energy Wh2	Harmonic current	Harmonic voltage	DI status	DO status	Operating time 1	Operating time 2
P01	Upper	A	A	A															
	Middle	W	W	PF															
	Lower	V	PF	V															
P02	Upper	A	A	A												Same as above	Same as above	Same as above	Same as above
	Middle	V	W	PF						Wh	Wh exported								
	Lower	Wh	Wh	Wh															
P03	Upper	A	A	A	A											Same as above	Same as above	Same as above	Same as above
	Middle	PF	PF	PF	PF														
	Lower	V	W	var	Hz														
P04	Upper	A	A	A	A											Same as above	Same as above	Same as above	Same as above
	Middle	V	W	var	PF	Hz				Wh	Wh exported	varh	varh imported (lead)	varh exported (lag)	varh exported (lead)				
	Lower	Wh	Wh	varh	Wh	Wh													
P05	Upper	PF	Hz													Same as above	Same as above	Same as above	Same as above
	Middle	W	W																
	Lower	var	var																
P06	Upper	A1	V12	A												Same as above	Same as above	Same as above	Same as above
	Middle	A2	V23																
	Lower	A3	V31	V															
P07	Upper	A	A1	V12												Same as above	Same as above	Same as above	Same as above
	Middle	V	A2	V23															
	Lower	W	A3	V31															
P08	Upper	A	A	A1	V12											Same as above	Same as above	Same as above	Same as above
	Middle	V	W	A2	V23					Wh	Wh exported								
	Lower	Wh	Wh	A3	V31														
P09	Upper	A	A1	DA1	V12											Same as above	Same as above	Same as above	Same as above
	Middle	DA	A2	DA2	V23														
	Lower	V	A3	DA3	V31														
P10	Upper	A	A	A1	DA1	V12										Same as above	Same as above	Same as above	Same as above
	Middle	DA	DA	A2	DA2	V23													
	Lower	V	W	A3	DA3	V31													
P11	Upper	A	A	DA1	V12											Same as above	Same as above	Same as above	Same as above
	Middle	DA	V	DA2	V23					Wh	Wh exported								
	Lower	Wh	Wh	DA3	V31														
P12	Upper	A	A	A	DA	W										Same as above	Same as above	Same as above	Same as above
	Middle	DA	W	V	V	V				Wh	Wh exported								
	Lower	Wh	Wh	Wh	Wh	Wh													
P13	Upper	A1	V12	W	V	V										Same as above	Same as above	Same as above	Same as above
	Middle	A2	V23	var	Hz	Hz				Wh	Wh exported	varh	varh imported (lead)	varh exported (lag)	varh exported (lead)				
	Lower	A3	V31	PF	Wh	varh													
P00	Upper	Free	Free	Free	Free											Same as above	Same as above	Same as above	Same as above
	Middle	Free	Free	Free	Free					Wh	Wh exported	varh	varh imported (lead)	varh exported (lag)	varh exported (lead)				
	Lower	Free	Free	Free	Free														

Operating Instructions

■ Display Pattern Contents

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

● ME96SSE-MB Screen Display (Three phase 4-wire)

Display pattern		Screen set based on display pattern					Additional screens (set in set-up menu No. 8)		
		No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8
P01	Upper	A	A	A	A		Wh	Operating time 1	Operating time 2
	Middle	W	W	PF	—			hour1	hour2
	Lower	V	PF	V	AN			Operating time	Operating time
P02	Upper	A	A	A	A	—		Same as above	Same as above
	Middle	V	W	PF	—	Hz	Wh		
	Lower	Wh	Wh	Wh	AN	Wh			
P03	Upper	A1	V1N	A	A			Same as above	Same as above
	Middle	A2	V2N	—	—				
	Lower	A3	V3N	V	AN				
P04	Upper	A	A1	V1N	A			Same as above	Same as above
	Middle	V	A2	V2N	—				
	Lower	W	A3	V3N	AN				
P05	Upper	A	A	A1	V1N	A	—	Same as above	Same as above
	Middle	V	W	A2	V2N	—	Wh		
	Lower	Wh	Wh	A3	V3N	AN			
P00	Upper	Free	Free	Free	Free	Free	—	Same as above	Same as above
	Middle	Free	Free	Free	Free	Free			
	Lower	Free	Free	Free	Free	Free	Wh		

● ME96SSE-MB Screen Display (Three phase 3-wire, Single phase 3-wire, Single phase 2-wire)

Display pattern		Screen set based on display pattern					Additional screens (set in set-up menu No. 8)		
		No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8
P01	Upper	A	A	A				—	—
	Middle	W	W	PF				hour1	hour2
	Lower	V	PF	V				Operating time	Operating time
P02	Upper	A	A	A	A	—		Same as above	Same as above
	Middle	V	W	PF	Hz		Wh		
	Lower	Wh	Wh	Wh	Wh				
P03	Upper	A1	V12	A				Same as above	Same as above
	Middle	A2	V23	—	—				
	Lower	A3	V31	V					
P04	Upper	A	A1	V12				Same as above	Same as above
	Middle	V	A2	V23					
	Lower	W	A3	V31					
P05	Upper	A	A	A1	V12	—		Same as above	Same as above
	Middle	V	W	A2	V23	—	Wh		
	Lower	Wh	Wh	A3	V31				
P00	Upper	Free	Free	Free	Free	Free	—	Same as above	Same as above
	Middle	Free	Free	Free	Free	Free			
	Lower	Free	Free	Free	Free	Free	Wh		

● Phase/Wire Displays

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

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

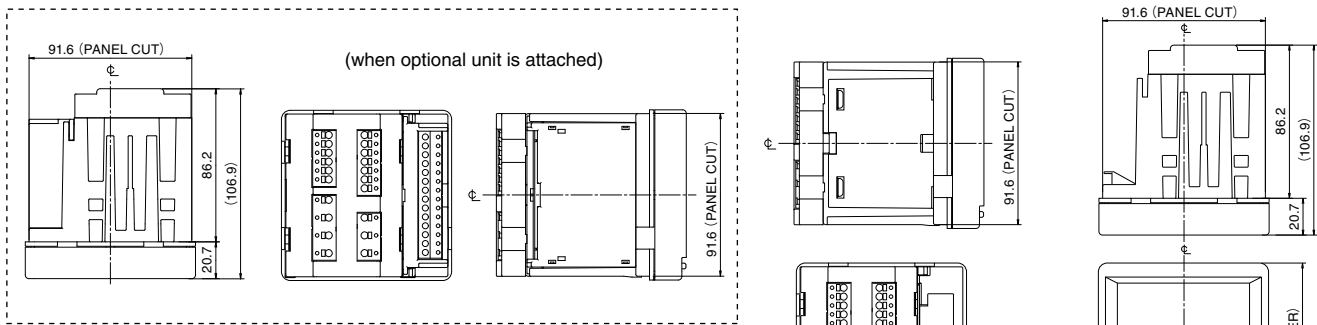


■ MEMO

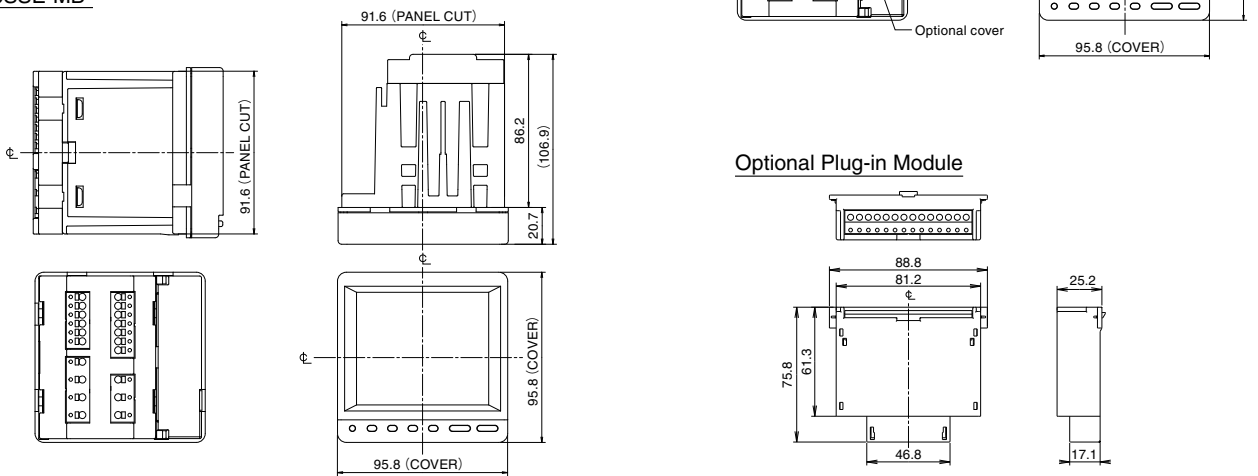
External Dimensions/Installation/Connections

Dimensions

ME96SSH-MB, ME96SSR-MB



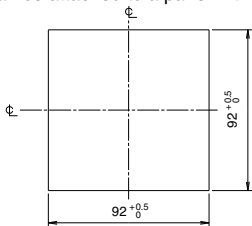
ME96SSE-MB



Mounting

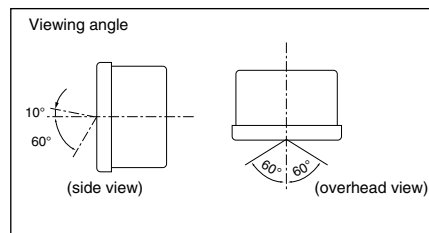
1 Dimension of panel

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



2 View Angle

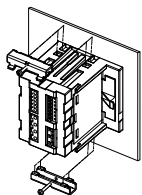
The contrast of the display changes at view angle. Mount it at the position that is easy to see.



3 Attachment

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

- ① The attachment lug is installed in two holes of the top and bottom of the basic device.
- ② Tighten the screws of the lug, and fix onto the panel.



Note

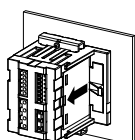
To prevent damage to the panel and screws, do not fasten screws too tightly.
Recommended torque for these products: 0.3~0.5N·m (approx. half of standard torque)
Also, please tighten the upper and lower screws at the same time.

Main unit mounting screws: M3

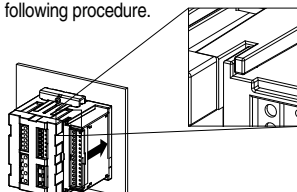
4 Installing Optional Plug-in Module

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

- ① Remove the optional cover.



- ② Attach 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

The table on the right describes the applicable wire size.

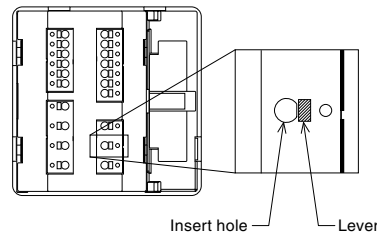
Part	Screw type	Wire specifications
Auxiliary power supply, voltage input, MODBUS® RTU communication terminal	Screwless	<ul style="list-style-type: none"> Single-line, stranded-line: AWG24-14 (combined use of rod terminals possible for stranded-line applications) Notes 1. AWG 24-18 can be used when compliance with UL standards is required. Notes 2. Rod terminals cannot be used when compliance with UL standards is required.
Current input terminal	Screwless	<ul style="list-style-type: none"> Single-line, stranded-line: AWG24-14 (combined use of rod terminals possible for stranded-line applications) Notes 1. AWG 22-16 can be used for single-line applications when compliance with UL standards is required. Notes 2. Rod terminals cannot be used when compliance with UL standards is required.
Optional unit terminal	Screwless	<ul style="list-style-type: none"> Single-line, stranded-line: AWG24-14 (combined use of rod terminals possible for stranded-line applications) Notes 1. AWG 24-18 can be used when compliance with UL standards is required. Notes 2. Rod terminals cannot be used when compliance with UL standards is required.

2 Wiring

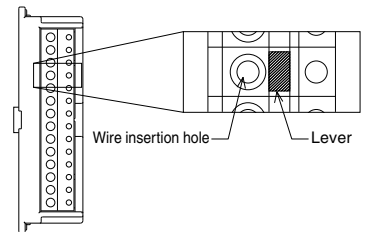
Main Unit Input/Output Terminal

- Remove the wire casing at the end of the wire and solder to the rod terminal.
- With the lever pushed in, insert the wire and then release the lever to connect.

Main Unit Terminal



Optional Plug-in Module Terminal



3 Confirmations

After wiring, make sure the following:

- All wiring is connected
- There is no mistake 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

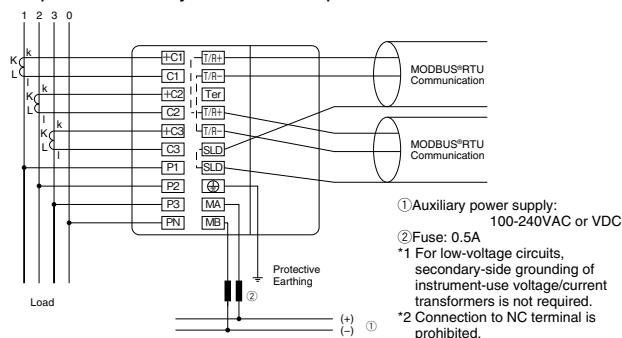
If installing the unit at the panel edge, choose an installation position where there is sufficient space for wiring work.

Optional unit

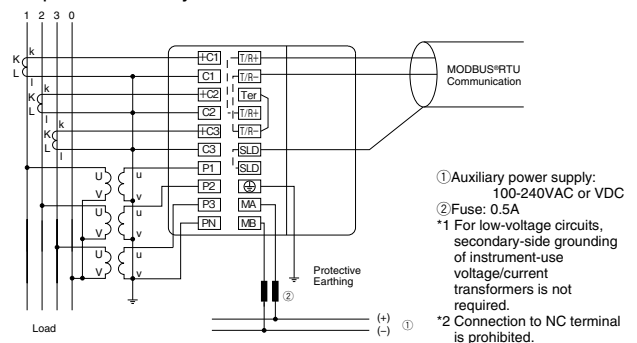
Turn the auxiliary power supply off before attaching the optional unit. If attached with the power on, the main unit will not recognize the optional unit. To remedy this, turn off/restart the auxiliary power supply or execute the "instrument restart" operation.

Wiring Diagrams

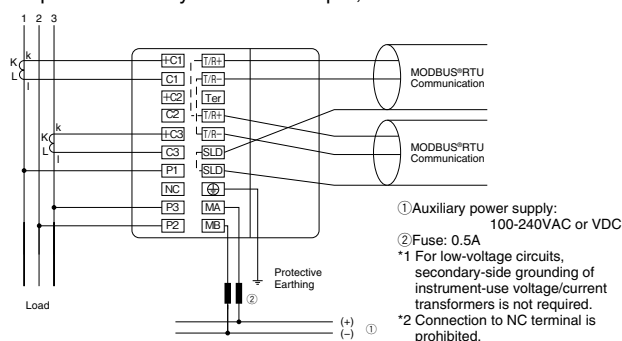
Three phase 4-wire system: Direct input



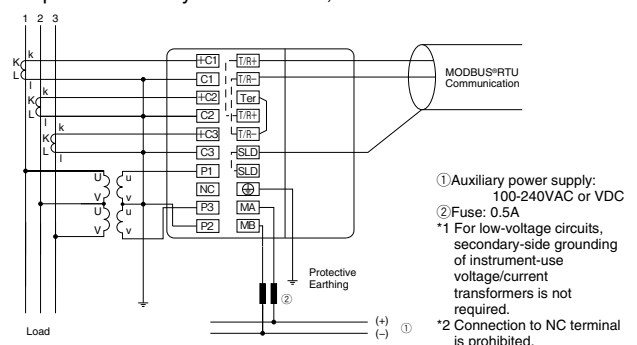
Three phase 4-wire system: With VT



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



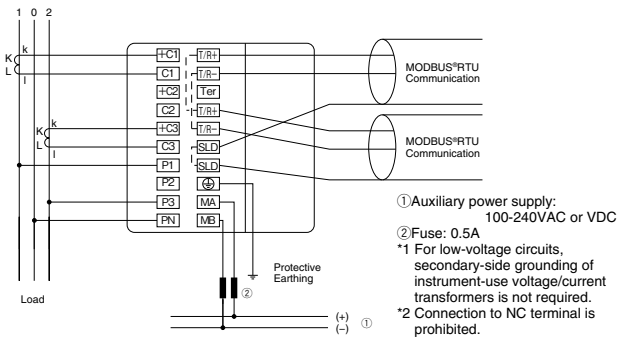
Three phase 3-wire system: With VT, 3CT



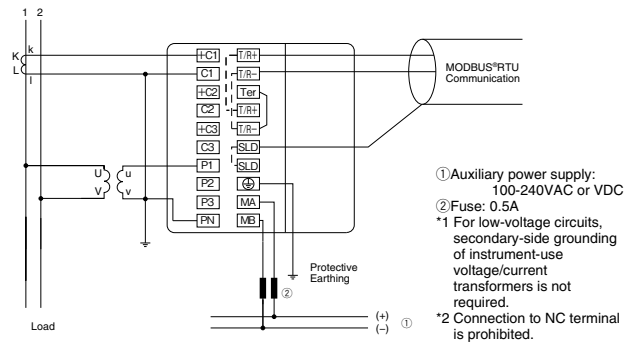
External Dimensions/Installation/Connections

Wiring (Continued)

Single phase 3-wire system



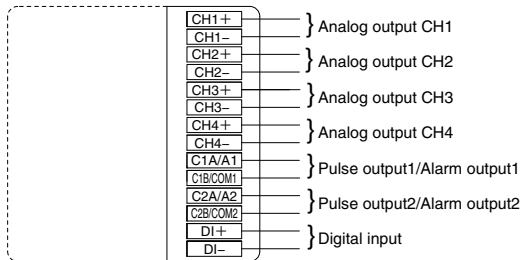
Single phase 2-wire system: With VT



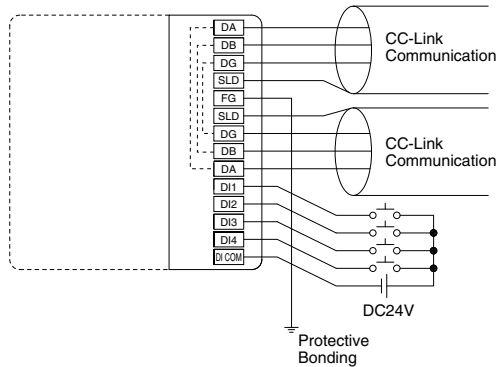
Note

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 100Ω or less. Insufficient grounding may cause erroneous operation.
4. Use shielded twisted-pair cables for transmission signal lines.
5. Use terminal resistance (120Ω) for devices at both ends of the MODBUS® RTU communication transmission line. These meters can be terminated at 120Ω by short-circuiting the "T-" and "Ter" terminals.
6. Use the thickest possible grounding wire to ensure low impedance.
7. MODBUS® RTU transmission signal cables must not be in close proximity or bundled with high-voltage cables.

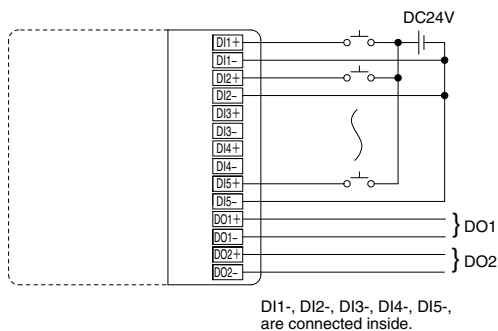
Optional Plug-in Module: ME-4210-SS96



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



Optional Plug-in Module: ME-0052-SS96



Wiring (Continued)

Note

1. Pulse output, alarm output, and contact 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 under 600V/600A	More than 30cm
Other power lines	More than 60cm

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 ME-4210-SS96 unit.
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 transmission lines are small signal circuits: separate from strong electrical circuits by a distance of 10cm or more, or 30cm or more if laid in parallel over a long distance. Ground the terminal before use.
7. For CC-Link transmission, 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 transmission line. If the meter is at the end of the CC-Link transmission line, connect it between the DA and DB terminals.

Rated voltage for each phase/wire system

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

* For circuits removed from three phase 3-wire (delta) system, the maximum rating is 220VAC. For circuits removed from three phase 4-wire (star), three phase 3-wire (star) and single phase 3-wire systems, the maximum rating is 440VAC.

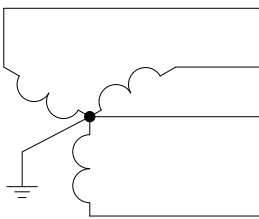


Fig. 1. Three phase 4-wire (star)

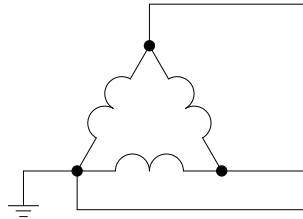


Fig. 2. Three phase 3-wire (delta)

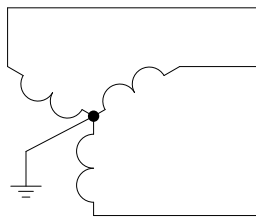


Fig. 3. Three phase 3-wire (star)

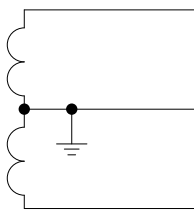


Fig. 4. Single phase 3-wire

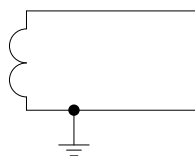


Fig. 5. Single phase 2-wire (delta)

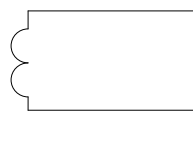


Fig. 6. Single phase 2-wire (star)

Related Products

■ EcoWebServerIII

Mitsubishi Electric Energy-saving Data Collection Server

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

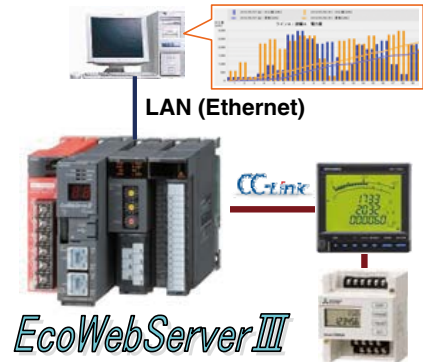
The main unit has a built-in web server that allows anyone, anywhere to understand the amount of energy being used in real time via computer without requiring additional software, thereby supporting early detection of energy waste.

Automatic Transmission of Data Collected, Mail Notifications and Contact 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.
- ◇ Utilize an internal network to show the data of numerous company sites at a centralized location (e.g., head office).

Simplify data management with EcoWebServer III!



■ ME110SS

ME110 Super-S Series Electronic Multi-measuring Instruments
The innovative design of the SS Series is supporting the realization of energy-saving measurement monitoring systems that are easy to use and read

Common-use Models

Two phase wiring system (Three phase 3-wire and Three phase 4-wire systems) were required previously, but user needs can now be met with a single unit.

Enhanced Visibility

Wide-angle-view LCD with top and bottom tiers integrated for total freedom in installation. Crystal-clear display makes text even easier to read when viewed from the front.

Operating Time, CO₂ Conversion, Alarm Display Functions

Functions that enable load operating time measurement, conversion to CO₂ emissions and backlight blinking at the time of an alarm are incorporated.



■ EcoMonitorLight

Energy Measuring Unit
Easily accessible "energy visualization" with a single unit!

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

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 250µs 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 -5~55°C
- Daily average temperature over 35°C
- Relative humidity over 85% or presence of condensation
- 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 2,000m
- Excessive external noise
- Pollution level is 2 or higher
- Transient overvoltage is 4,000V 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. 0.3~0.5N·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 instrument ratings

Auxiliary power supply		AC100~240V (±15%) 50-60Hz DC100~240V (-30%, +15%)
Instrument ratings	Voltage	3-phase, 4-wire: Max. 277/480VAC 3-phase, 3-wire: Delta connection: Max. 220VAC, Star connection: Max. 440VAC 1-phase, 3-wire: Max. 220/440VAC 1-phase, 2-wire: Delta connection: Max. 220VAC, Star connection: Max. 440VAC
		Current
	Frequency	50-60Hz (dual use)

3 Connections

See pages 26~28 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.

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~+75°C
 - Daily average temperature of more than 35°C
 - Relative humidity exceeding 85% 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.

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.

MITSUBISHI ELECTRONIC MULTI-MEASURING INSTRUMENT

Service Network

Country / Region	Company	Address	Telephone
Australia	Mitsubishi Electric Australia Pty. Ltd.	348 Victoria Road, Rydalmere, N.S.W. 2116, Australia	+61-2-9684-7777
USA	Mitsubishi Electric Automation Inc.	500 Corporate Woods Parkway Vernon Hills, IL 60061, USA	+1-847-478-2100
Brazil	MELCO-TEC Rep. Com. e Assessoria Tecnica Ltda.	Av. Paulista, 1439-Cj.72, Cerqueira Cesar CEP 01311-200, Sao Paulo, SP, CEP:01311-200, Brazil	+55-11-3146-2200
Chile	Rhona S.A.	Agua Santa 4211 P.O. Box 30-D Vina del Mar, Chile	+56-32-2-320-600
China	Mitsubishi Electric Automation (CHINA) Ltd.	No. 1386 Hongqiao Road, Mitsubishi Electric Automation Center Shanghai China, 200336	+86-21-2322-3030
China	Mitsubishi Electric Automation (HongKong) Ltd.	10/F., Manulife Tower, 169 Electric Road, North Point, Hong Kong	+852-2887-8810
Colombia	Proelectrico Representaciones S.A.	Carrera 53 No 29C-73 - Medellin, Colombia	+57-4-235-30-38
Egypt	Cairo Electrical Group	9, Rostoum St. Garden City P.O. Box 165-11516 Maglis El-Shaab, Cairo - Egypt	+20-2-27961337
Europe	Mitsubishi Electric Europe B.V.	Gothaer Strasse 8, D-40880 Ratingen, Germany	+49-(0)2102-486-0
India	Milite Electric Company Pvt Ltd	Plot No-32, Sector-6, IMT Maneser,	+91-124-4695300
Indonesia	P. T. Sahabat Indonesia	P.O.Box 5045 Kawasan Industri Pergudangan, Jakarta, Indonesia	+62-(0)21-6610651-9
Korea	Mitsubishi Electric Automation Korea Co., Ltd	1480-6, Gayang-Dong, Gangseo-Gu, Seoul, Korea	+82-2-3660-9572
Laos	Societe Lao Import Co., Ltd.	43-47 Lane Xang Road P.O. BOX 2789 VT Vientiane Laos	+856-21-215043
Lebanon	Comptoir d'Electricite Generale-Liban	Cebaco Center - Block A Autostrade Dora, P.O. Box 11-2597 Beirut - Lebanon	+961-1-240445
Malaysia	Mitric Sdn Bhd	5 Jalan Pemberita U1/49, Temasya Industrial Park, Glenmarie 40150 Shah Alam, Selangor, Malaysia	+603-5569-3748
Myanmar	Peace Myanmar Electric Co.,Ltd.	NO137/139 Botataung Pagoda Road, Botataung Town Ship 11161, Yangon, Myanmar	+95-(0)1-202589
Nepal	Watt & Volt House	KHA 2-65, Volt House Dillibazar Post Box: 2108, Kathmandu, Nepal	+977-1-4411330
Middle East Arab Countries & Cyprus	Comptoir d'Electricite Generale-International-S.A.L.	Cebaco Center - Block A Autostrade Dora P.O. Box 11-1314 Beirut - Lebanon	+961-1-240430
Pakistan	Prince Electric Co.	1&16 Brandreth Road, Lahore-54000, Pakistan	+92-(0)42-7654342
Philippines	Edison Electric Integrated, Inc.	24th Fl. Galleria Corporate Center, Edsa Cr. Ortigas Ave., Quezon City Metro Manila, Philippines	+63-(0)2-634-8691
Saudi Arabia	Center of Electrical Goods	Al-Shuwayer St. Side way of Salahuddin Al-Ayoubi St. P.O. Box 15955 Riyadh 11454 - Saudi Arabia	+966-1-4770149
Singapore	Mitsubishi Electric Asia Pte. Ltd.	307, Alexandra Road, #05-01/02 Mitsubishi Electric Building, Singapore 159943	+65-6473-2308
South Africa	CBI-electric: low voltage	Private Bag 2016, Isando, 1600, South Africa	+27-(0)11-9282000
Taiwan	Setsuyo Enterprise Co., Ltd	6th Fl., No.105, Wu Kung 3rd, Wu-Ku Hsiang, Taipei, Taiwan, R.O.C.	+886-(0)2-2298-8889
Thailand	United Trading & Import Co., Ltd.	77/12 Bamrungmuang Road, Klong Mahanak, Pomprab Bangkok Thailand	+66-223-4220-3
Uruguay	Fierro Vignoli S.A.	Avda. Uruguay 1274, Montevideo, Uruguay	+598-2-902-0808
Venezuela	Adesco S.A.	Calle 7 La Urbina Edificio Los Robles Locales C y D Planta Baja, Caracas - Venezuela	+58-212-241-9952
Vietnam	CTY TNHH-TM SA GIANG	10th Floor, Room 1006-1007, 255 Tran Hung Dao St., Co Giang Ward, Dist 1, Ho Chi Minh City, Vietnam	+84-8-8386727/28/29

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 damage 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) Damage, secondary damage or accident compensation resulting from special factors regardless of whether or not such factors could be predicted by Mitsubishi Electric.
 - 4) Damage to products of other companies and/or guarantees relating to other services.



for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



MITSUBISHI ELECTRIC CORPORATION

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