

## 1. Safety Precaution

(Always read these instructions before using this equipment)  
For personnel and product safety please read the contents of these operating instructions carefully before using. Please save this manual to make it accessible when required and always forward it to the end user.

### HAZARD SYMBOLS

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

### CAUTION

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

### Normal service conditions

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

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

### Installation instructions

- This instrument should be installed and used by a qualified electrician.
- The instrument must not be powered and used until its definitive assembly on the cabinet's door.
- Verify the following points:

Auxiliary power supply	100-240V AC ±15% (50-60Hz) 8VA 100-240V DC +15% -30% 5W	MA, MB terminals
Ratings	3-PHASE 4-WIRE : MAX277V(L-N)/480V(L-L) 3-PHASE 3-WIRE(DELTA) : MAX220V(L-L) 3-PHASE 3-WIRE(STAR) : MAX440V(L-L) 1-PHASE 3-WIRE : MAX220V(L-N)/440V(L-L) 1-PHASE 2-WIRE(DELTA) : MAX220V(L-L) 1-PHASE 2-WIRE(STAR) : MAX440V(L-L)	Category III P1, P2, P3, PN terminals
Current	5A (via current transformer) (max 30V AC)	Category III +C1, C1, +C2, C2, +C3, C3 terminals
Frequency	50/60Hz	

Provide the basic insulation externally at the current input terminals.  
Voltage-measuring and current-measuring circuit terminals should be permanently connected.

MODBUS® RTU communication	T/R+, T/R-, Ter terminals	max 35V DC
CC-Link communication	DA, DB, DG terminals	
Digital input	DI1, DI2, DI3, DI4, DI COM, DI+, DI-, DI1+, DI1-, DI2+, DI2-, DI3+, DI3-, DI4+, DI4-, DI5+, DI5- terminals	
Digital output	DO1+, DO1-, DO2+, DO2- terminals	
Analog output	CH1+, CH1-, CH2+, CH2-, CH3+, CH3-, CH4+, CH4- terminals	
Pulse/Alarm output	C1A/A1, C1B/COM1, C2A/A2, C2B/COM2 terminals	

- The instrument is to be mounted on a panel. All connections must be kept inside the cabinet.
- Tighten the terminal screws with the specified torque and use the suitable pressure connectors and suitable wire size.
- When wiring the instrument, be sure that it is done correctly by checking the instrument's wiring diagram.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the instrument.
- Do not drop this instrument from high place. If you drop it and the display is cracked, do not touch the liquid crystal or get it in your mouth. If the liquid crystal is touched, wash it away at once.
- In order to prevent invasion of noise, do not bunch the control wires or communication cables with the main circuit or power wire, or install them close to each other. The distance between communication signal lines, input signal lines and power lines, high voltage lines running parallel to each other are shown below.

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

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

### Operation instructions

### CAUTION

- When the external terminals are connected to the external equipments, the instrument and the external equipments must not be powered and used until its definitive assembly on the cabinet's door.
- The rating of the terminal of the external equipment should satisfy the rating of the external terminal of this instrument.

### Maintenance instructions

### CAUTION

- Do not touch the terminals while all the circuits connected to this instrument are alive.
- Do not disassemble or modify the instrument.
- Do not contact a chemical dust cloth to the instrument for a long time, or do not wipe it with benzene, thinner, alcohol.

- Wipe dirt off the surface with a soft dry cloth.
- Check the following points, (at the cycle of six months to one year)
  - Condition of the appearance
  - Unusual sound, a smell, and generation of heat
  - Condition of the display
  - Condition of the wiring and the attachment

### Storage conditions

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

### Disposal

- When disposing of this product, treat it as industrial waste. ● A battery is not used for this product.

### Guarantee

The period of guarantee is earlier date of either 18 months from the manufacture date or 1 year from the sale date, except in the case that the failure has been caused by bad handling of the product, provided that it has been installed according to the manufacturer's instructions.

### FCC

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

● Please contact the service network when the equipment has a breakdown or abnormality.

**This manual is a simple version. Please contact our Service Network for a detailed version of User's Manual.**

## 2. Content Poisonous Substance

### Environmental protection use time limit



Note: This symbol mark is for China RoHS.

### Contained name of six hazardous substances

Parts name	Poisonous hazardous substance or element					
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Printed wiring board	○	○	○	○	○	○
Electronic parts	×	○	○	○	○	○
Case	○	○	○	○	○	○
LCD	○	○	○	○	○	○
Terminal block	○	○	○	○	○	○
Contacts	○	○	○	○	○	○
Others	○	○	○	○	○	○

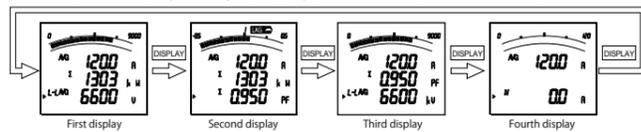
○ : It means the content of a poisonous hazardous substance in all homogeneous materials of the corresponding material doesn't exceed the standard that provides.

× : It means the content of a poisonous hazardous substance in homogeneous materials of the corresponding parts exceeds the standard that provides.

## 4. Operation

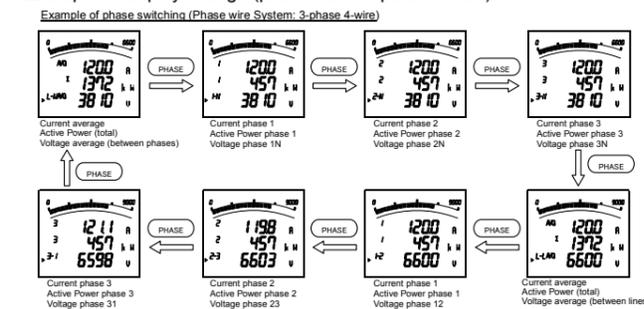
### 4.1 Display Change

By pressing [DISPLAY], the measurement display will switch over.  
Example of display change (display pattern:P01/phase wire : 3-phase 4-wire)



### 4.2 Phase Change

By pressing [PHASE], the current phase and the voltage phase will switch over.  
Example of display change (phase wire : 3-phase 4-wire)



### 4.3 Bar Graph Display

Measurement item to be displayed on bar graph can be selected. By displaying others than the measurement items digitally displayed, 4 elements can be displayed at once.

#### Explanation of bar graph

In the bar graph, measurement elements shown by "▶" or "↑" are displayed.

As for voltage, current, active power, reactive power, power factor, frequency, they can be displayed on the bar graph even if they are not set to display pattern.

#### Selection of bar graph

Press [▶] or [↑], to select measurement elements to be displayed the bar graph.

### 4.4 Maximum Value and Minimum Value Display

The maximum values and minimum values are displayed.

#### Display of maximum value and minimum value

When [MAX/MIN] is pressed, the display is changed into the maximum value and minimum value display. And when [MAX/MIN] is pressed, the display changes back to the instantaneous value display.

#### Reset the maximum value and minimum value

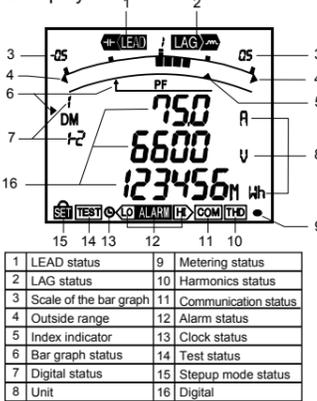
When [RESET] is pressed for 2 seconds or more, the displayed maximum value and minimum value can be reset.  
When [RESET] and [▶] are pressed simultaneously for 2 seconds or more, all the maximum values and minimum values are reset.

## 6. Check on Your Delivery

Parts name	Quantity	Specifications
User's manual (this document)	1	A3 size
Attachment lug (with screw)	2	

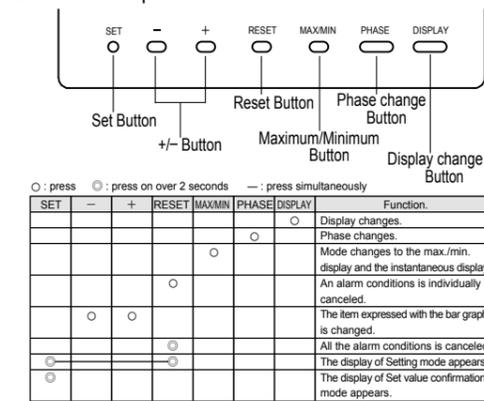
## 3. Display and Button Functions

### Display



1 LEAD status	9 Metering status
2 LAG status	10 Harmonics status
3 Scale of the bar graph	11 Communication status
4 Outside range	12 Alarm status
5 Index indicator	13 Clock status
6 Bar graph status	14 Test status
7 Digital status	15 Stepp mode status
8 Unit	16 Digital

### Function of operation button



Function	Function.
SET	Display changes.
-	Phase changes.
+	Mode changes to the max./min. display and the instantaneous display.
RESET	An alarm conditions is individually canceled.
MAX/MIN	The item expressed with the bar graph is changed.
PHASE	All the alarm conditions is canceled.
DISPLAY	The display of Set value confirmation mode appears.
○	The display of Set value confirmation mode appears.

### 4.5 Alarm Display and How to Cancel

#### Display and Alarm output, How to cancel

Alarm condition: If a measurement value exceeds an alarm value, the parts of display blink and an alarm relay contact closed.

Alarm cancel method	Alarm condition	Normal condition
Automatic (Auto)	Display [ALARM] HI or LO are blink Output (Alarm relay contact) Closed	State usually Opened
Manual (HoLd)	Display [ALARM] HI or LO are blink Output (Alarm relay contact) Closed	[ALARM] HI or LO are lighting cancel State usually Opened

#### Alarm cancel

Automatic : If a measurement value falls below an alarm value, alarm is automatically canceled.  
Manual : After the measurement value falls below an alarm value, alarm is maintained. The element of alarm is displayed and when [RESET] is pressed, alarm is canceled.

#### Alarm delay time

If the condition that the limit was exceeded continues more than the delay time, it will be in the alarm condition.  
The alarm output by rush current can be prevented.

### 4.6 Harmonics Display

Harmonic RMS value and distortion ratio can be displayed.

#### Measurement items

- ME96SSH-MB: Harmonic total, From 1st to 31st (only odd number)
- ME96SSR-MB: Harmonic total, From 1st to 13th (only odd number)

#### Degree change

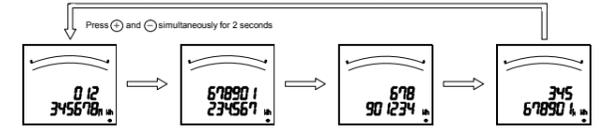
When [▶] and [↑] are pressed, harmonic degree change.  
When [PHASE] is pressed, harmonic phase change.

### 4.7 Expanded Counting Display

#### Active energy, reactive energy and apparent energy display

Active energy and reactive energy, apparent energy are display on unit switching and the lower stage.

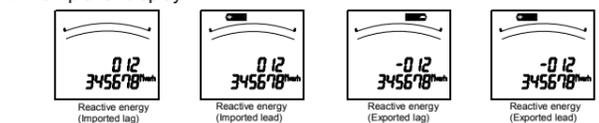
Active energy (Imported) : Example of switching 012,345,678,901,234,567Wh



#### Wh, varh and VAh zero reset

When [SET], [RESET] and [PHASE] are pressed simultaneously for 2 seconds, the measurement value of active energy (Wh), reactive energy (varh) and apparent energy (VAh) are reset.  
(This is effective only in the instantaneous value display.)

#### Example for display



## 7. Handling precautions

### 사용자안내문

기종별	사용자안내문
A급 기기(업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

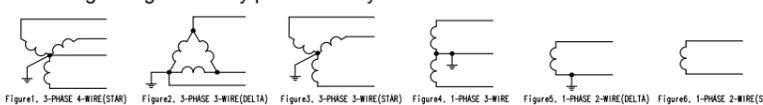
### Precautionary note written in Korean

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

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

## 5. Wiring Diagram

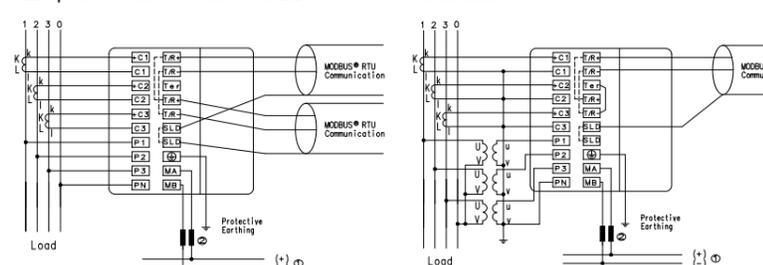
### Rating voltage for every phase wire system



Phase wire System	Voltage Connections		
	Type	Rating	Figure
3-PHASE 4-WIRE	STAR	MAX 277V(L-N)/480V(L-L)	Figure1
	DELTA	MAX 220V(L-L)	Figure2
3-PHASE 3-WIRE	STAR	MAX 440V(L-L)	Figure3
	-	MAX 220V(L-N)/440V(L-L)	Figure4
1-PHASE 3-WIRE	DELTA	MAX 220V(L-L)	Figure5
	STAR	MAX 440V(L-L)	Figure6

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

### 3-phase 4-wire circuit / MODBUS® RTU communication



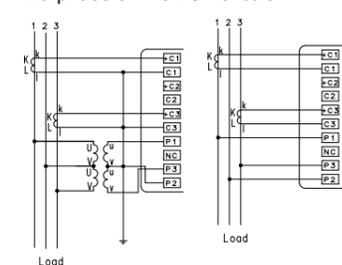
① Auxiliary power supply 100-240VAC or 100-240VDC

② Fuse : 0.5A

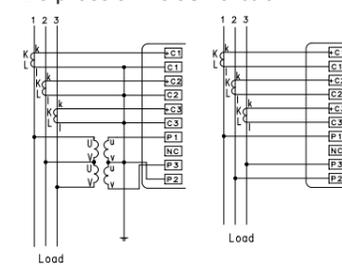
※1 For a low voltage circuit, grounding of the secondary sides of VT and CT is not necessary.

※2 Do not connect to NC terminal.

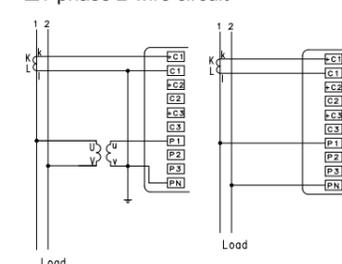
### 3-phase 3-wire 2CT circuit



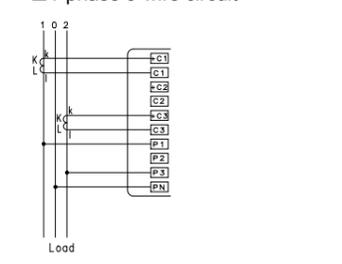
### 3-phase 3-wire 3CT circuit



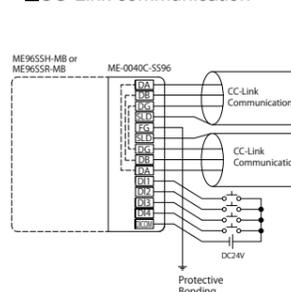
### 1-phase 2-wire circuit



### 1-phase 3-wire circuit

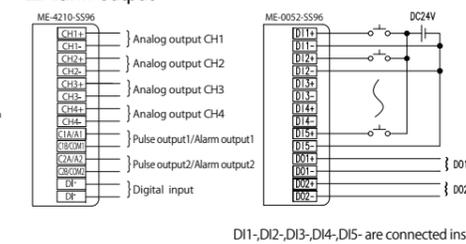


### CC-Link communication



### Analog output

- Pulse output
- Alarm output



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

### CAUTION

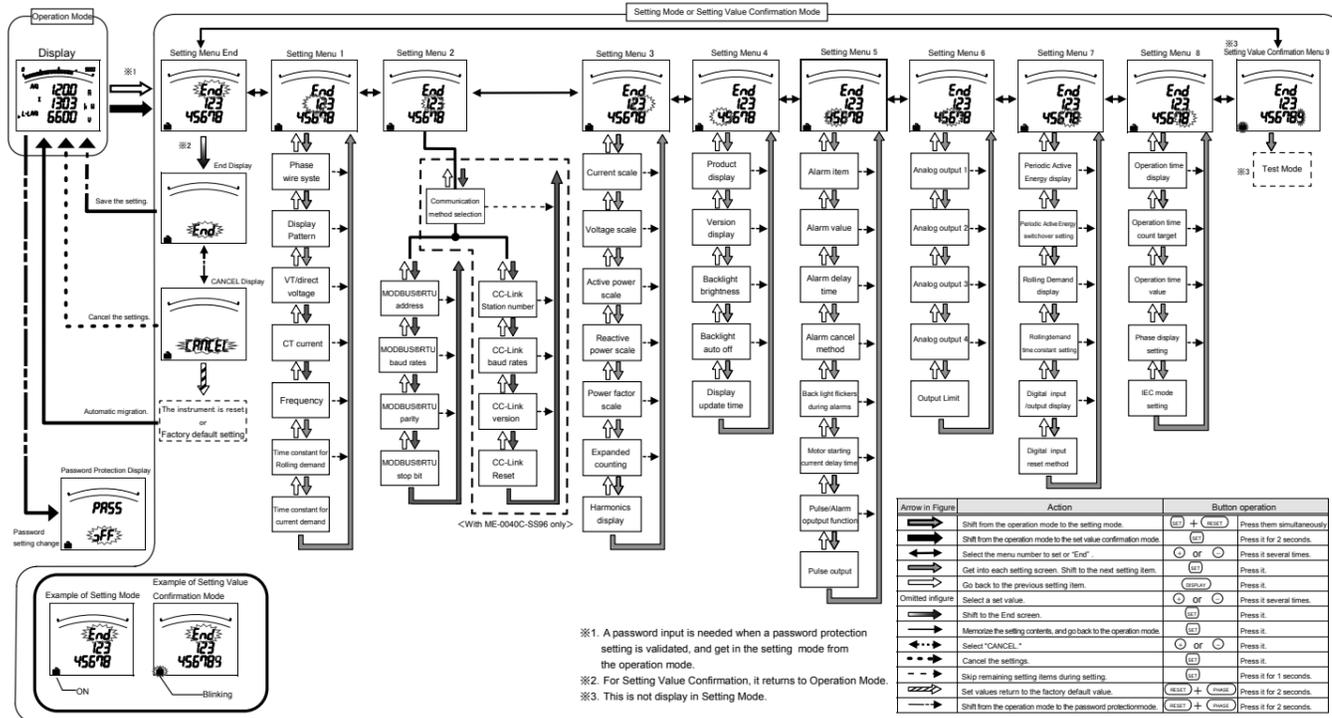
1. Do not connect with hot-line
2. Do not use in the condition that the secondary circuit of CT is opened.
3. Do not use in the condition that the secondary circuit of VT is short-circuited.
4. The wire size has to be suited for the rated current and rated voltage.  
Terminals of +C1, C1, +C2, C2, +C3, C3 : AWG24 to 14  
(For UL recognized: Single wire of AWG22 to 16)  
Terminals of instrument main body (except for +C1, C1, +C2, C2, +C3, C3 terminals) : AWG24 to 14  
(For UL recognized: AWG24 to 18)  
When using a stranded wire, use a ferrule.

Please see the back

## 8. Setting Diagram

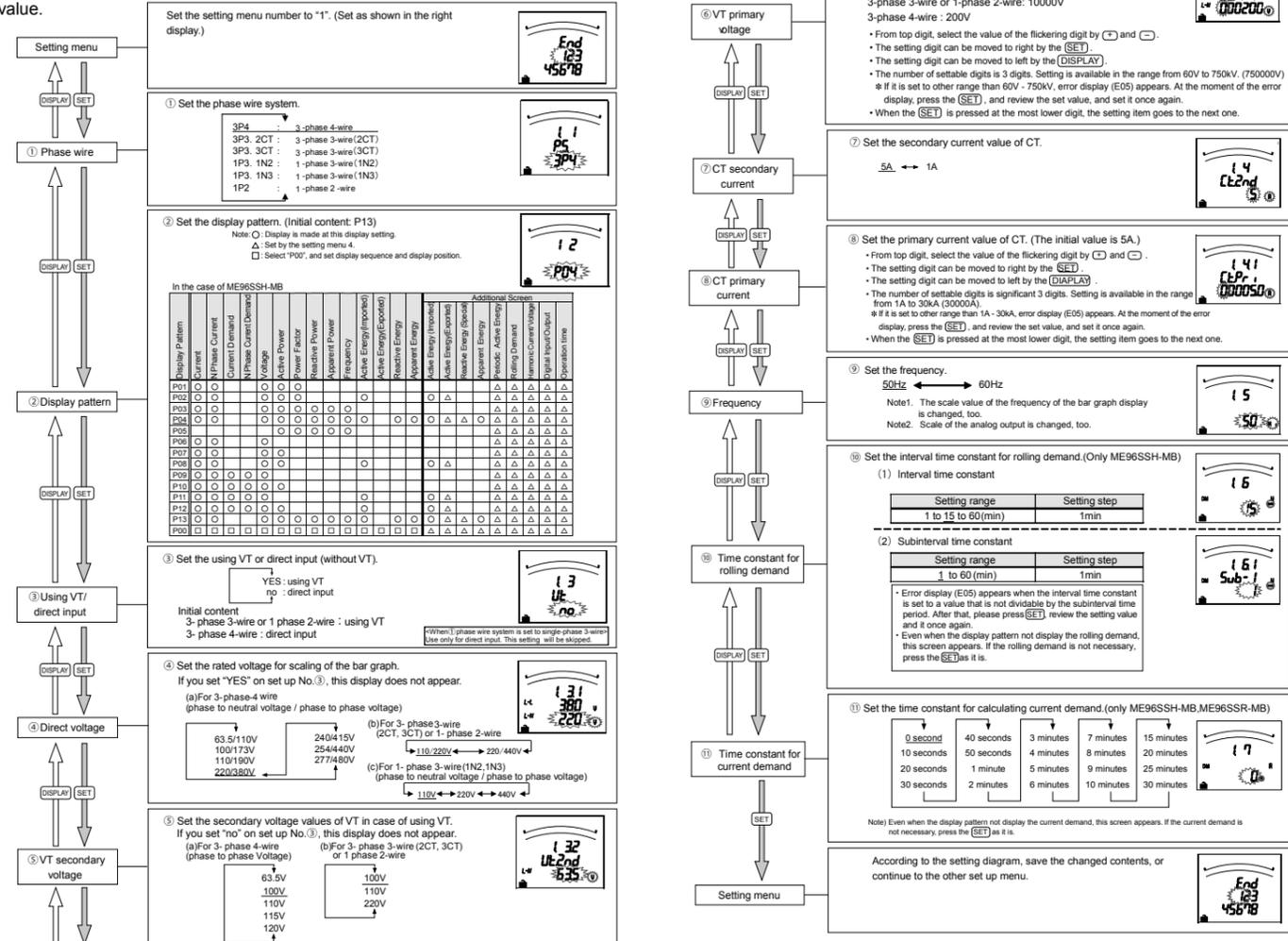
• How to access the setting items.

- 1 Press the **(SET)** button and the **(RESET)** key simultaneously for 2 seconds to get in the setting mode.
- 2 Select a setting menu number by **(+)** or **(-)** button.
- 3 Change the contents in each setting menu.
- 4 After completion of setting, select 'End' in the setting menu and press the **(SET)** button.
- 5 When the End display appears, press the **(SET)** button once again.



## 9. Setting

In this setting menu 1, setting the basic contents as following for correct measurement. In the operation mode, after pressing the **(SET)** and the **(RESET)** simultaneously for 2 seconds or more, the following operation becomes available. An underline shows the initial value.



## 10. Specification

Type	ME96SSH-MB, ME96SSR-MB, ME96SSE-MB				
Phase wire system	3-PHASE 4-WIRE, 3-PHASE 3-WIRE(3CT, 2CT), 1-PHASE 3-WIRE, 1-PHASE 2-WIRE (common)				
Rating	Current	AC5A, AC1A (common)			
	Voltage	3-PHASE 4-WIRE: max AC277/480V 3-PHASE 3-WIRE: (DELTA)max AC220V, (STAR)max AC440V 1-PHASE 3-WIRE: max AC220/440V 1-PHASE 2-WIRE: (DELTA)max AC220V, (STAR)max AC440V			
	Frequency	50-60Hz (common)			
Measurement elements	Item	Measurement Item	ME96SSH-MB	ME96SSR-MB	ME96SSE-MB
	Current (A)	A1, A2, A3, AN, A <sub>AVG</sub>	±0.1%	±0.2%	±0.5%
	Current Demand (DA)	DA1, DA2, DA3, DAN, DA <sub>AVG</sub>	±0.1%	±0.2%	—
	Voltage (V)	V12, V23, V31, V <sub>AVG</sub> (L-L), V1N, V2N, V3N, V <sub>AVG</sub> (L-N)	±0.1%	±0.2%	±0.5%
	Active Power (W)	W1, W2, W3, ΣW	±0.2%	±0.5%	±0.5%
	Reactive Power (var)	var1, var2, var3, Σvar	±0.2%	±0.5%	—
	Apparent Power (VA)	VA1, VA2, VA3, ΣVA	±0.2%	±0.5%	—
	Power Factor (PF)	PF1, PF2, PF3, ΣPF	±1.0%	±2.0%	±2.0%
	Frequency (Hz)	Hz	±0.2%	±0.5%	±0.5%
	Active Energy (Wh)	Imported, Exported	class0.5S(IEC62053-22)	class1.0(IEC62053-21)	class1.0(IEC62053-21, Only Imported Lag)
	Reactive Energy (varh)	Imported Lag, Imported Lead, Exported Lag, Exported Lead	class2.0(IEC62053-23)	class2.0(IEC62053-23)	—
	Apparent Energy (VAh)	Imported + Exported	class2.0	—	—
	Harmonic current (HI)	Only odd number	±2.0% (1 to 31)	±2.0% (1 to 13)	—
	Harmonic voltage (HV)	Only odd number	—	—	—
	Rolling Demand (DW)	Rolling Block, Fixing Block	±0.2%	—	—
Periodic Active Energy (Wh)	Periodic Active Energy 1, Periodic Active Energy 2	class0.5S(IEC62053-22)	class1.0(IEC62053-21)	—	
Operation time (h)	Operation time 1, Operation time 2	(Reference)	(Reference)	(Reference)	
Analog output response time	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		
	Method	Demand Value	DA: Thermal type calculation, DW: Rolling Demand calculation		
Display	Type	LCD with backlight			
	Maximum Number of Display Digits or Segment Number	Number of display digits	Upper stage display: 6 digits, Middle stage display: 6 digits, Lower stage display: 6 digits		
	Bar graph	A, DA, V, W, var, VA, PF: 4 digits DW, Hz: 3 digits Wh, varh, VAh: 9 digits (6 digits or 12 digits possible) Harmonic total distortion ratio: 3 digits Harmonic RMS value: 4 digits Operation time: 6 digits Digital input/output: I/O			
	Display updating time interval	21 Segment-Bar graph, 22 Segment-Indicator			
Communication Specification	Communication Method	MODBUS <sup>®</sup> RTU communication			
	Accessible option unit	ME-4210-SS96, ME-0040C-SS96, ME-0052-SS96 (Only ME96SSH-MB, ME96SSR-MB)			
Analog output	Output specification	DC4 to 20mA(0 to 600Ω)			
	The kind of switch	No-voltage 'a' contact			
Pulse/Alarm output	Contact Capacity	DC35V, 0.1A			
	Pulse width	0.125s, 0.5s, 1.0s			
	Contact Capacity	DC24V/DC19 to 30V, 7mA or less			
Digital input (DI)	Signal width	30ms or longer			
	The kind of switch	No-voltage 'a' contact			
Digital output (DO)	Contact Capacity	DC35V, 0.2A			
	Contact Capacity	DC35V, 0.2A			
Power Failure Compensation	Non volatile memory (Items: Setting value, MAX/MIN value, Active/Reactive/Apparent energy, Periodic Active Energy, Rolling Demand, Operation time)	—			
	Operation time	—			
VA Consumption	VT	0.1VA/phase, 0.2VA (at direct input 220V)			
	CT	0.1VA/phase			
Auxiliary power	Auxiliary power	7VA(AC110V), 8VA(AC220V), 5W(DC100V)			
	Weight	AC100-240V(±15%), DC100 to 240V (-30% +15%)			
Attachment Method	Weight	0.5kg			
	Dimension	96(H)×96(W)×86(D)			
Operating temperature/humidity	Attachment Method	Embedding attachment			
	Storage temperature/humidity	-5 to +55°C (average temperature: 35°C or less per day), 0 to 85%RH, non condensing			
		-25 to +75°C (average temperature: 35°C or less per day), 0 to 85%RH, non condensing			

## 11. Optional Plug-in Module

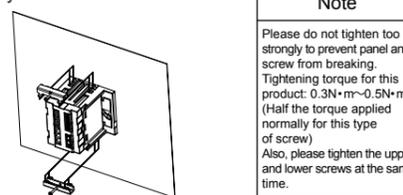
I/O Parts	Model name		
	ME-4210-SS96	ME-0052-SS96	ME-0040C-SS96
Analog output	4ch	—	—
Pulse/Alarm output	2ch	—	—
Digital input	1ch	5ch	4ch
Digital output	—	2ch	—
Communication	—	—	CC-Link

Note: The optional plug-in module can be installed in the ME96SSH-MB, the ME96SSR-MB.

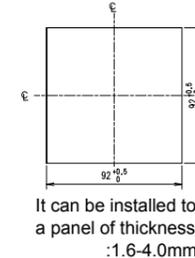
## 12. Installation

### Installation on panel

- 1 The attachment lug is installed in four holes of the top and bottom of the main body.
- 2 The screw of the attachment lug is tightened, and it fixes to the panel.

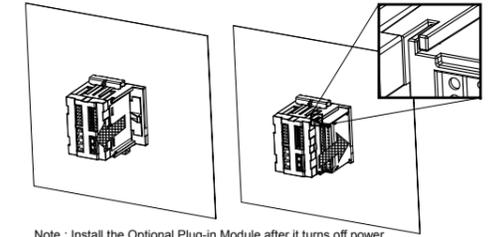


### Panel hole dimensions



### Installation of Optional Plug-in Module

- 1 The option cover is removed.
- 2 The Optional Plug-in Module is installed.



## 13. Service Network

Country/Region	Company	Address	Telephone
China	Mitsubishi Electric Automation (CHINA) Ltd.	No. 1386 Hongqiao Road, Mitsubishi Electric Automation Center Shanghai China, 200336	+86-21-2322-3030
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
Philippines	Edison Electric Integrated, Inc.	24th Fl. Galleria Corporate Center, Edsa Cr. Origas Ave., Quezon City Metro Manila, Philippines	+63-(0)2-634-8691
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
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	+84-8-8386727/2829

## 14. Standards

Standard	Safety	Europe	CE, as per EN61010-1 USA and Canada cRUS as per UL61010-1, IEC61010-1 (Edition 3.0)
EMC	Installation Category	III	III
	Measuring Category	III	III
	Pollution Degree	2	2
		EN 61326-1, EN 61000-3-2, EN 61000-3-3	

## 15. Symbols

1	---	direct current	2	~	Alternating current	3	⊥	Protective conductor terminal
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**MITSUBISHI ELECTRIC CORPORATION**  
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