MITSUBISHI ELECTRIC

MITSUBISHI Electronic Multi-Measuring Instrument

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

Types

ME110SSR
ME110SSR-4AP
ME110SSR-4APH
ME110SSR-4A2P
ME110SSR-C
ME110SSR-CH
ME110SSR-MB

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

Deliver this user's manual to the end user.

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.

⚠ 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.

■Normal service conditions

⚠ CAUTION

Use the instrument in an environment that meets the Normal service conditions as following points:
- ●Ambient temperature :-5 to 50°C, average day temperature exceeds 35°C
- ●Humidity :30~85%RH, non condensing.
- ●Altitude: 1000m or less
- ●Pollution Degree : 2
- ●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 are no pieces of metal and an inductive substance disperse.
- ●Do not expose to strong electromagnetic field and ambient noises.

■Installation instructions

⚠ CAUTION

This instrument should be installed and used by a qualified electrician.
- ●The instrument must not be powered and used until its definitive assembly on the cabinet's door.
- ●Verity the following points;
  - ☐Auxiliary power supply and Measuring ratings

Auxiliary power supply		100-240V AC+10-15%(50-60Hz) 10VA 100V DC+40-25% 6W
Ratings	Voltage	277V AC phase to neutral / 480V AC phase to phase
	Current	5A or 1A (via current transformer)
	Frequency	50/60Hz

  - ☐Current circuits, C1, C2 and C3 are Measurement category Ⅰ.
  - ☐Voltage circuits, P1, P2 and P3 are Measurement category Ⅲ.
- ●The instrument is to be mounted on panel. All connections keep inside the cabinet.
- ●Tighten the terminal screws with the specified torque and use the suitable pressure connectors andsuitable wire size.
- ●When wiring in the instrument, be sure that it is done correctly by checking the instrument 's wiring diagrams.
- ●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 and or get it in your mouth. When touch the liquid crystal, 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. Keep the distance between communicational signal lines, input signal lines and power lines, high voltage lines are shown below, when run parallel to each other.

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

■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. (See Specifications.)

■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 contact the instrument for a long time, or do not wipe it with benzene, thinner, alcohol.

- ●Wipe dirt on surface with a soft dry cloth.
- ●Check the following points,
  - Condition of the apepearance
  - Condition of the Display
  - Unusual sound, a smell, and generation of heat
  - Condition of the wiring and the attachment

■Storage conditions
- ●Ambient temperature the :-20 to 60°C, average day temperature exceeds 35°C
- ●Humidity range 30~85%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 are pieces of metal and an inductive substance disperse.

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

■Guarantee

The period of guarantee is for 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 manufacture's instructions.

EMC DIRECTIVE INSTRUCTION

This section summarizes the precautions on conformance to the EMC Directive of the cabinet constructed using this Instrument.

However, the method of conformance to the EMC Directive and the judgment on whether or not the cabinet conforms to the EMC Directive has to be determined finally by the manufacturer.

1. EMC Standards
- ・EN 61326-1:2006
- ・EN 61000-3-2:2006/A1:2009/A2:2009
- ・EN 61000-3-3:2008

1. 2. Installation (EMC directive)

The instrument is to be mounted on panel of a cabinet.

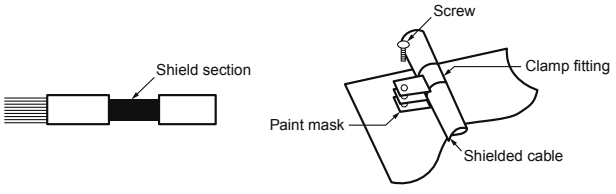
Therefore, the construction of a cabinet is important not only for safety but also for EMC.

The instrument is examined by the following conditions.
- ● Use a conductive cabinet.
- ● Six faces of a cabinet have to be ensured conductivity for each other.
- ● A cabinet has to be connected to earth by a thick wire of low impedance.
- ● Holes on faces of cabinet have to be 10 cm or less in diameter.
- ● The terminals for protective earth and functional earth have to be connected to earth by a thick wire of low impedance.
  (A terminal for protective earth is important not only for safety but also for EMC.)

⏚ Protective earth: Maintains the safety of the instrument and improves the noise resistance.
⏚ Functional earth: Improves the noise resistance.

- ● All connections should be kept inside the cabinet.
- ● Wirings outside the cabinet have to be used with the shielded cable.

The following diagram shows how to provide good contact of the shielded cable.
- ☐Remove part of the outer cover.
- ☐Remove part of the paint musk on the cabinet.
- ☐Connect those parts with the clamp.



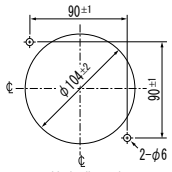
Check on your delivery

Check the following point as soon as you receive Mitsubishi Electronic Multi-Measureing Instrument :
- ● The package is in good condition.
- ● The product has not been damaged during transit.
- ● The product corresponds to your order specifications.
- ● This product had the following accessories.

Parts name	Quantity	Specifications
User's Manual (this document)	1	A3 size
Attaching nuts	2	M5 belleville spring nuts (contained in a bag)

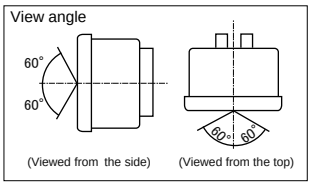
Mounting

1. Dimensions of the panel
   The panel hole dimensions are as shown below. And it can be attached to a panel of thickness 1.6 - 4.5mm.



Panel hole dimensions
(Viewed from the front of panel)

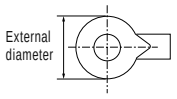
2. View angle
   The contrast of the display changes at view angles.



3. Attachment
   When to insert the main body into the panel hole, insert it slowly until the stopper at the bottom of the main body goes into the panel. After insertion, the effect of the stopper prevents the main body from dropping off even when you release your hand from it. Fasten the attachment nut (M5 nut with belleville spring) with torque about 1.47 - 1.96Nm.

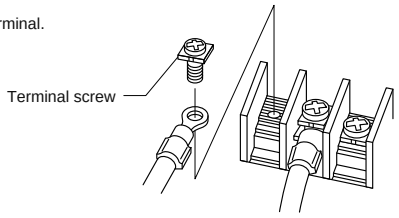
Wiring

Wirings of the terminals have to be fastened according to the following table.



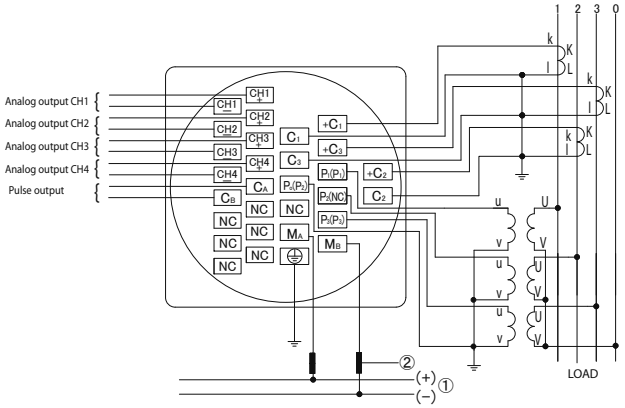
	Measurements inputs auxiliary power input terminal	Output terminal	⏚ Protective erasing terminal
Screw specification	M4 screw	M3 screw	M4 screw
Terminal	For M4 screw of external diameter below 8.5	For M3 screw of external diameter below 6.0	For M4 screw of external diameter below 8.5
Fastening torque	0.98 ~ 1.47N.m	0.5 ~ 0.6N.m	1.2 ~ 1.47N.m

Do not fasten three wires or more to one terminal.
Otherwise, it may generate heat or ignition.

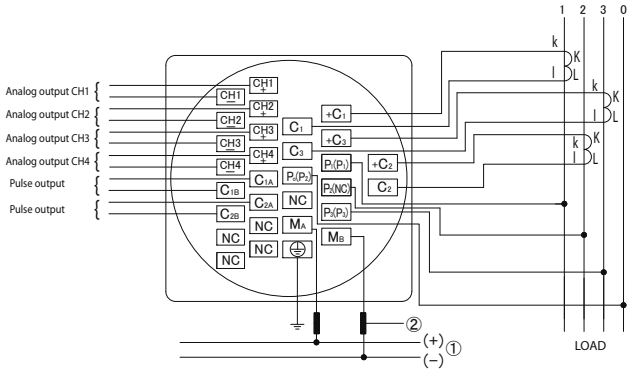


Wiring Diagram

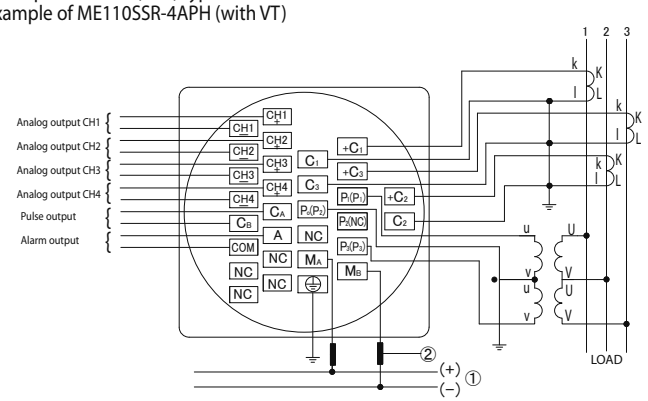
Three phase 4-wire type :
Example of ME110SSR-4AP (with VT)



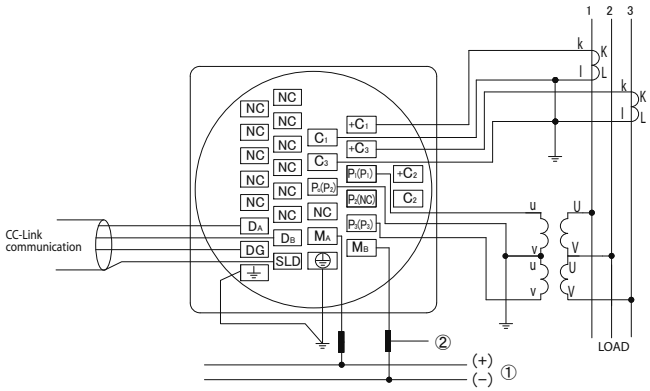
Three phase 4-wire type :
Example of ME110SSR-4A2P (for direct input)



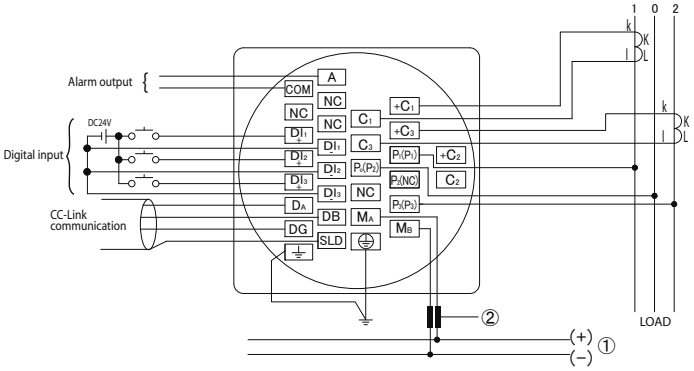
Three phase 3-wire(3CT) type :
Example of ME110SSR-4APH (with VT)



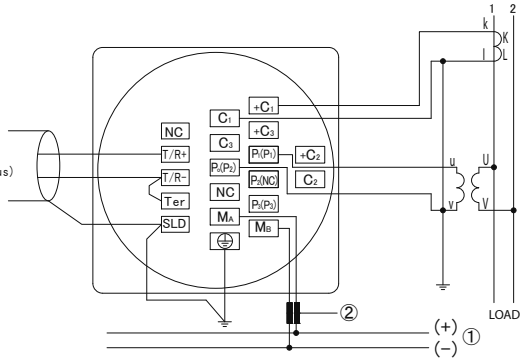
Three phase 3-wire(2CT) type :
Example of ME110SSR-C (with VT)



Single phase 3-wire type :
Example of ME110SSR-CH



Single phase 2-wire type :
Example of ME110SSR-MB (with VT)

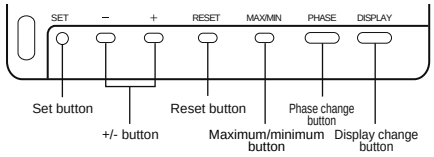


①Auxiliary power supply 100-240 VAC 100 VDC
②Fuses gG type(IEC269) or M type rated between 0.5 and 5A
※1 For low voltage circuits, grounding of the secondary side of VT and CT is not necessary.
※2 Do not connect to NC terminal.
※3 "( )" shows terminal block No. for 3P3W,1P3W,1P2W

Display and button functions

■ Functions of operation buttons

The operation button have various functions according to how they are pressed down.



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

Operation Mode		Button Name SET	–	+	RESET	Max/ Min	PHASE	DISPLAY	Function
Operation mode	BASIC						○		Display changes.
							○		Phase changes.
						○			Mode changes to the max./min. display and the instantaneous display
			○	○					The item expressed with the bar graph is changed.
									Harmonics number changes when harmonics displayed.
								◎	displays change cyclically.
							◎		phases change cyclically.
			◎	◎					The counting values of three digits of low rank are displayed. After pressing once again, the display returns.
	Special				◎				Maximum values and minimum values on the display are reset to the present value. Only available for maximum/minimum value screen
				◎	◎				All of the Maximum values and minimum values are reset to the present value.
		◎			◎		◎		All of the counting values are zero reset.
					◎				the operation time is zero veset (Screen operation time only)
					○				An alarm condition is canceled. (Screen element is canceled) Available only when manual cancelation is set
					◎				All alarm conditions are canceled. (Element is canceled for all screens)
					◎				The latching data of digital input on the display is canceled. (Available only for contact point input screen)
	Mode Switch	◎							The display of Set value confirmation mode appears.
		◎			◎				The display of Setup mode appears.
Setting mode/ Set value confirmation mode	Setting Operation	○							The set-up items are saved, and set-up item is changed to next item.
								○	Back to the previous item.
			○ □	○ □					The values of set-up is changed. (If it presses for 1 sec or more fast forward or fast return.)
		□							Back to the Setup display.
	Special Operation				◎				Returns from infrared mode to operation mode (Available only for infrared mode)
						□—□			Back to the Setup display.
					◎		◎		Returns set contents to the default settings (Only effective in CANCEL display)

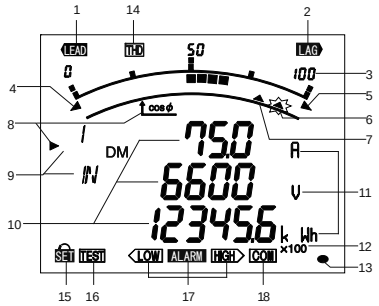
While the back light is off, if the operation key is pressed, the back light is always lit. If the operation button is pressed once again, the function in the above table appears.

Note: When all of the counting values are zero reset the CO2 emission value is also cleared.

⚠ CAUTION

- If the function of "maximum value and minimum value reset" and "Wh, varh zero reset" are done, data will be lost. If this data is needed,please record the data before the reset operation.
- If the function of "meter restart" is done, the entire measurement (measure-ment display, alarm, analog output, pulse) stops.

■ Display

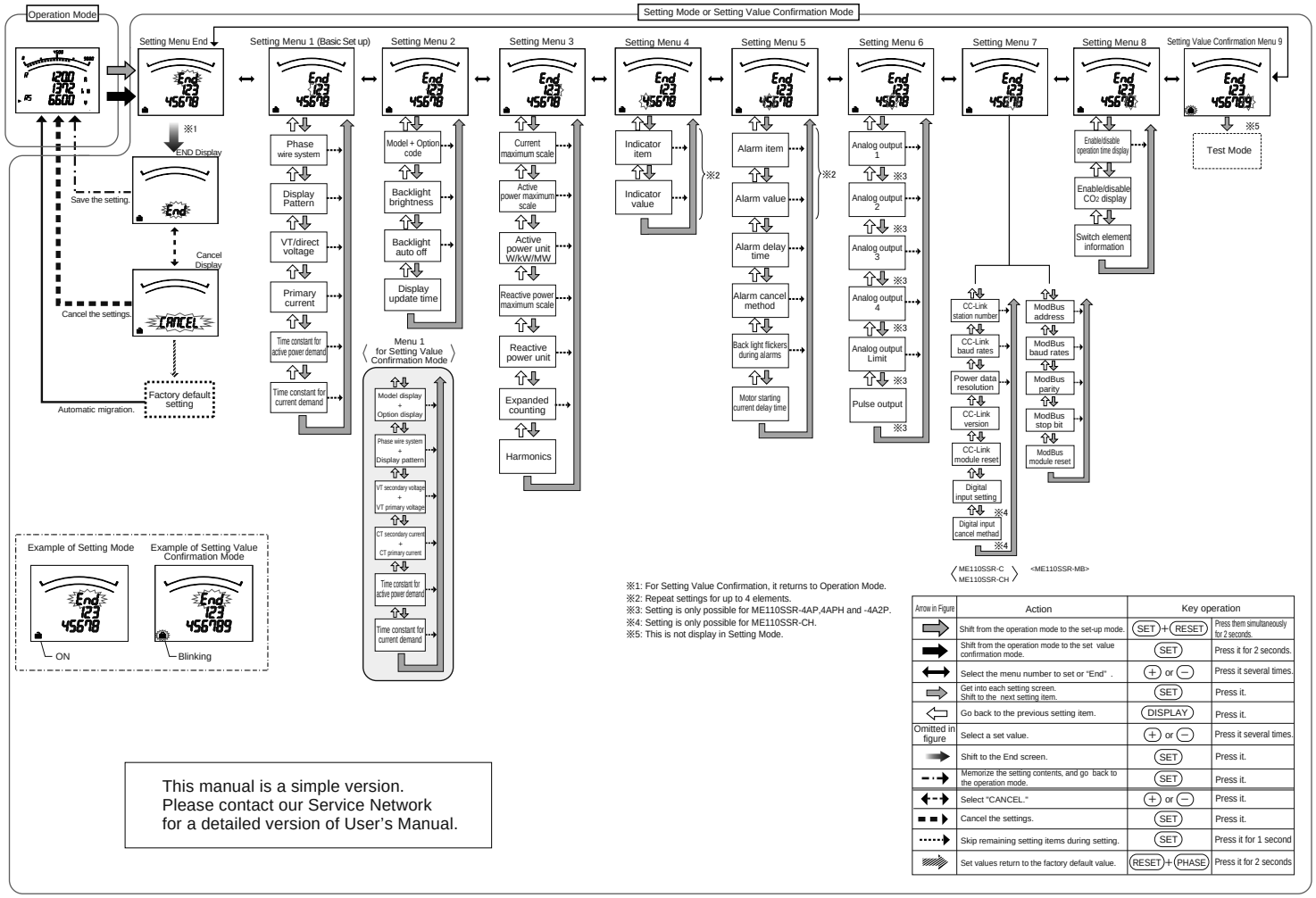


Note: The above display is an example for explanation.

No.	Segment Name	Description
1	LEAD status	Show direction power factor or reactive power on bar graph. Turns on at the additional display of reactive energy.
2	LAG status	
3	Scale of the bar graph	Show the scales at the bar graph.
4	Under scale input	Turns on when measuring values fall below the minimum scale.
5	Over scale input	Turns on when measuring values exceed the maximum scale.
6	Alarm indicator	When upper/lower limit alarm set, flickers at the limit setting value.
7	Index indicator	When set, turns on at the index indicator setting value.
8	Bar graph status	Shows the item displayed on the bar graph. When the item is the same as a digital displayed item,indicated with "▶", otherwise indicated with " ▙ "
9	Digital status	Phase status, "123N" , "MAX/MIN",demand etc. displayed.
10	Digital display	Measured values displayed in digital.
11	Units	Units of measuring value displayed.
12	Multiplying factor	Indicates the multiplying factor for calculating energy.
13	Metering status	Flickers when counting active energy.(Note.1)
14	Harmonics	Turns on when harmonics displayed.
15	Setup mode status	Turns on at setting mode. Flickers at setting value confirmation mode.
16	Test mode status	Turns on at the test mode.
17	Upper/lower limit alarm status	Flickers when upper/lower limit alarm is generated.
18	Status display for products with transmission function	Turns on when the instrument equipped with communication function. Flickers at communication error condition.

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

Setting flow



※1: For Setting Value Confirmation, it returns to Operation Mode.
※2: Repeat settings for up to 4 elements.
※3: Setting is only possible for ME110SSR-4AP,4APH and -4A2P.
※4: Setting is only possible for ME110SSR-CH.
※5: This is not display in Setting Mode.

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

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■ **Basic Operations while Executing Settings**

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

Setting Menu 1: Setting the Phase Wire System, Display Pattern, VT/Direct Voltage, CT Primary Current, and Time constant for Demand

In this setting menu 1, There are 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.

Setting Menu

DISPLAY SET

① Phase Wire system

DISPLAY SET

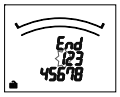
② Display Pattern

DISPLAY SET

③ VT / Direct Voltage

DISPLAY SET

Set the setting menu number to "1".



Set the phase wire system.

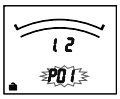
3P4 : Three-phase 4-wire
2CT 3P3 : Three-phase 3-wire (2CT)
3CT 3P3 : Three-phase 3-wire (3CT)
1N2 1P3 : Single-phase 3-wire (1N2)
1N3 1P3 : Single-phase 3-wire (1N3)
1P2 : Single-phase 2-wire

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

Set the display pattern.

The following table shows the measurement elements that can be displayed by each display pattern. (For more details about display patterns, refer to detailed edition.)In addition, if there is no display pattern that you want from P01 to P13 (P14 and P15), select the special display pattern P00 to configure the screen freely.(For more information about setting the special display pattern P00.)

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



(a) For three-phase 4-wire

Display Pattern	Current	N phase current	demand current	N Phase demand Current	Line Voltage	Phase Voltage	Active Power	Active demand Power	Power factor	Reactive power	Frequency	Active Energy	Reactive Energy	Apparent power	Additional Screen (Supplemental): Active Energy (Exported)	Reactive Energy (Exported)	Harmonic current	N Phase Harmonic Current	Harmonic voltage	Digital input (DI1 to DI3)	Operation time	CO₂ Emission
P01	○	○			○	○	○		○								△	△	△	△	△	△
P02	○	○			○	○	○		○			○					△	△	△	△	△	△
P03	○	○			○	○	○		○	○	○			○			△	△	△	△	△	△
P04	○	○			○	○	○		○	○	○	○	○	○	△	△	△	△	△	△	△	△
P05									○	○	○			○			△	△	△	△	△	△
P06	○	○			○	○											△	△	△	△	△	△
P07	○	○			○	○	○										△	△	△	△	△	△
P08	○	○			○	○	○					○					△	△	△	△	△	△
P09	○	○	○	○	○	○											△	△	△	△	△	△
P10	○	○	○	○	○	○	○										△	△	△	△	△	△
P11	○	○	○	○	○	○						○					△	△	△	△	△	△
P12	○	○	○	○	○	○	○										△	△	△	△	△	△
P13	○	○			○	○	○		○	○	○	○	○	○	△	△	△	△	△	△	△	△
P00	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	△	△	△	△	△	△

(b) For other phase wire system except three-phase 4-wire

Display Pattern	Current	demand current	N Phase demand Current	Voltage	Active Power	Active demand Power	Power factor	Reactive power	Frequency	Active Energy	Reactive Energy	Additional Screen (Supplemental): Active Energy (Exported)	Reactive Energy (Special)	Harmonic current	Harmonic voltage	Digital input (DI1 to DI3)	Operation time	CO₂ Emission
P01	○		○	○	○		○							△	△	△	△	△
P02	○		○	○	○		○			○			△	△	△	△	△	△
P03	○		○	○	○		○	○	○					△	△	△	△	△
P04	○		○	○	○		○	○	○	○	△	△	△	△	△	△	△	△
P05			○	○	○		○	○	○					△	△	△	△	△
P06	○		○											△	△	△	△	△
P07	○		○	○	○									△	△	△	△	△
P08	○		○	○	○					○	△			△	△	△	△	△
P09	○	○	○	○										△	△	△	△	△
P10	○	○	○	○	○									△	△	△	△	△
P11	○	○	○					○			△			△	△	△	△	△
P12	○	○	○	○	○			○			△			△	△	△	△	△
P13	○		○	○	○		○	○	○	○	△	△	△	△	△	△	△	△
P14	○		○	○	○		○							△	△	△	△	△
P15	○		○	○	○		○		○		△			△	△	△	△	△
P00	□	□	□	□	□	□	□	□	□	□	□	□	□	△	△	△	△	△

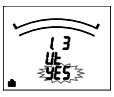
Note: The following settings are required for displaying elements on an additional screen.

Measurement element on additional screen	Setting item
Active Energy(Exported) / Reactive(Special)	Setting Menu 3 ● Expanded counting
Harmonic current / Harmonic voltage	Setting Menu 3 ● Harmonics Display
Digital input (DI1 to DI3)	Setting Menu 7 ● Digital input setting
Operation time	Setting Menu 8 ● Operation time display
CO_2 emission	Setting Menu 8 ● CO_2 emission display

When using VT⇒ Select yES, and then press (SET), shift to following (1)

When direct input (without VT) ⇒ Select no, and then press (SET), shift to following (2).

yES ◀▶ no



<When ① phase wire system is set to single-phase 3-wire>
Use only for direct input.
This set-up will be skipped and the setting starts from ④ Primary Current .
The rating voltage between P1-P2 or P2-P3 is 110V.
It is 220V between P1-P3

(1) When using VT

Set the secondary and primary voltage of VT.

(a) For Three-phase 4-wire

＜Secondary Voltage (Phase to phase Voltage) Setting Range＞

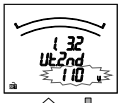
63.5V ◀▶ 100V ◀▶ 110V ◀▶ 115V ◀▶ 120V

〈Primary Voltage (Phase to phase Voltage) Setting〉
(The factory default value is 200V)

(b) When setting for Three-phase 3-wire (2CT, 3CT) or Single-phase 2-wire

＜Secondary Voltage Setting Range＞

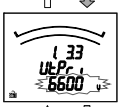
100V ◀▶ 110V ◀▶ 220V



DISPLAY SET

＜Primary Voltage Set-up Range＞

220V	3300V	15kV	110kV	500kV
440V	3.3kV	16.5kV	132kV	550kV
690V	6600V	22kV	154kV	SP.
1100V	6.6kV	24kV	187kV	
1.1kV	11kV	33kV	220kV	
2200V	13.2kV	66kV	275kV	
2.2kV	13.8kV	77kV	380kV	



DISPLAY SET

Note: If there is no primary voltage in the above that you want to set, select "SP." for a special primary voltage setting.

Setting except "SP.": To ④ CT Primary Current
When setting "SP.": To following "Special Primary Voltage"

④ Primary Current

DISPLAY SET

⑤ Time constant for Active power demand

DISPLAY SET

⑥ Time constant for current demand

SET

Set-up Menu

Set the "Special Primary Voltage" (Default value: 10,000V)

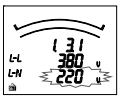
・From top digit, select the value of the flickering digit by (+) and (−).
・The setting digit can be moved to right by (SET).
・The setting digit can be moved to left by (DISPLAY).
・Setting is available in range from 60 to 750000V.
(Less than 100V : Upper 2 digits setting
Over 100V : Upper 3 digits setting)
* Error display (E05) appears when set out of 60 to 750000V range. After that, please press (SET), review the setting value and set it once again.
・Press (SET) at the lowest digit, the setting step will shift to the next one.

DISPLAY SET

To ④ CT Primary Current

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

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



63.5/110V ◀▶ 100V/173V ◀▶ 110V/190V ◀▶ 220V/380V ◀▶ 240V/415V ◀▶ 254V/440V ◀▶ 277V/480V

(b) When setting for three-phase 3-wire (2CT, 3CT) or single-phase 2-wire

110V ◀▶ 220V

(a) For Three-phase 4-wire
Set the primary current (Default Setting: 5A)

(b) For other phase wire system except Three-phase 4-wire
Set the primary current of the CT.

1A	50A	500A	1.6kA	6000A
5A	60A	600A	2000A	6kA
6A	75A	750A	2kA	7500A
7.5A	80A	800A	2500A	7.5kA
8A	100A	1000A	2.5kA	8000A
10A	120A	1kA	3000A	8kA
12A	150A	1200A	3kA	10kA
15A	200A	1.2kA	4000A	12kA
20A	250A	1500A	4kA	20kA
25A	300A	1.5kA	5000A	25kA
30A	400A	1600A	5kA	30kA
40A				SP. Note 1

DISPLAY SET

Note 1: If there is no primary current in the above that you want to set, select "SP." for special primary current setting.

Setting except "SP" : To ⑤Time constant for active power demand
When setting "SP" : To following "Special Primary Current"

Set the "Special Primary Current" (Default value: 5A)

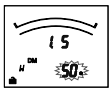
・From top digit, select the value of the flickering digit by (+) and (−).
・The setting digit can be moved to right by the (SET).
・The setting digit can be moved to left by the (DISPLAY).
・Setting is available in range from 1.0A to 30000.0A
(Less than 10A : Upper 2 digits setting
Over 10A : Upper 3 digits setting)
* Error display (E05) appears when set out of 1.0 to 30000.0A range. After that, please press (SET), review the setting value and set it once again.
・Press (SET) at the lowest digit, the setting step will shift to the next one

DISPLAY SET

To ⑤ Time constant for Active power demand

⑩ Set up the time constant for active power demand.

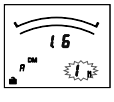
0 second	40 seconds	3 minutes	7 minutes	15 minutes
10 seconds	50 seconds	4 minutes	8 minutes	20 minutes
20 seconds	1 minute	5 minutes	9 minutes	25 minutes
30 seconds	2 minutes	6 minutes	10 minutes	30 minutes



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

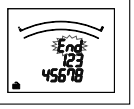
⑪ Set the time constant for current demmand.

0 second	40 seconds	3 minutes	7 minutes	15 minutes
10 seconds	50 seconds	4 minutes	8 minutes	20 minutes
20 seconds	1 minute	5 minutes	9 minutes	25 minutes
30 seconds	2 minutes	6 minutes	10 minutes	30 minutes



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

According to the set-up diagram,save the changed contents, or continue to the other set-up menu.



Note.	If the contents in the set-up menu 1 are changed, the maximum value, minimum value, demand value of related measurement items will be reset. (However, active energy and reactive energy will not be reset.)

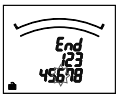
Setting Menu 6: Setting the Analog Output and Pulse Output

Output item of analog output, pulse output, pulse unit and so forth are set here.

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

Setting menu

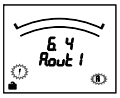
Set the setting menu number to "6". (Set as shown in the right display.)



DISPLAY SET

① Analog output CH1 measurement item

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



3-phase 4-wire		
non	W_R	$\cos\varphi_R$
A_R	W_S	$\cos\varphi_S$
A_S	W_T	$\cos\varphi_T$
A_T	W_Σ (CH3)	$\cos\varphi_\Sigma$ (CH4)
A_N	Demand W_R	Hz
A_{AVG} (CH1)	Demand W_S	Harmonic A_R
Demand A_R	Demand W_T	Harmonic A_S
Demand A_S	Demand W_Σ	Harmonic A_T
Demand A_T	var_R	Harmonic A_N
Demand A_N	var_S	Harmonic V_{RN}
Demand A_{AVG}	var_T	Harmonic V_{SN}
V_{RN}	var_Σ	Harmonic V_{TN}
V_{SN}	VA_R	
V_{TN}	VA_S	
V_{AVG} (L-N)(CH2)	VA_T	
V_{RS}	VA_Σ	
V_{ST}		
V_{TR}		
V_{AVG} (L-L)		

AVG: Average ∑: Total effective value

3-phase 3-wire (2CT, 3CT)	1-phase 3-wire (RNS display)	1-phase 3-wire (RNT display)	1-phase 2-wire
non	non	non	non
A_R (CH1)	A_R (CH1)	A_R (CH1)	A (CH1)
A_S	A_N	A_N	Demand A
A_T	A_S	A_T	V (CH2)
Demand A_R	Demand A_R	Demand A_R	W (CH3)
Demand A_S	Demand A_N	Demand A_N	Demand W
Demand A_T	Demand A_S	Demand A_T	var
V_{RS} (CH2)	V_{RN} (CH2)	V_{RN} (CH2)	cosφ (CH4)
V_{ST}	V_{NS}	V_{NT}	Hz
V_{TR}	V_{RS}	V_{TR}	Harmonic A
W (CH3)	W (CH3)	W (CH3)	Harmonic V
Demand W	Demand W	Demand W	
var	var	var	
cosφ (CH4)	cosφ (CH4)	cosφ (CH4)	
Hz	Hz	Hz	
Harmonic A_R	Harmonic A_R	Harmonic A_R	
Harmonic $A_{S(2CT)}$	Harmonic A_S	Harmonic A_T	
Harmonic A_T	Harmonic V_{RN}	Harmonic V_{RN}	
Harmonic V_{RS}	Harmonic V_{NS}	Harmonic V_{NT}	
Harmonic V_{ST}			

Note 1:The same measurement items can be set for each analog output.
Note 2:It is possible to select measurement items that are not included in the set display pattern.
Note 3:Setting to "non" are minimum output. In addition, it moves to the next analog output setting.
Note 4:For the harmonic current, the total RMS value is output by a scale from 0 to 60% of the rating.
For the harmonic voltage, the total distortion ratic is output by scaling 0 to 20%.
Note 5:Underlined portions are the factory default settings for measurement elements assigned to each analog output.

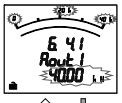
② Analog output CH1 detailed setting

Analog output detailed set-up
(The following setting can be made separately from the measurement items included in the display pattern.)

(1) When the current / current demand / active power / active power demand / reactive power are set as output items.

(a) Set the measurement value for the maximum analog output value.

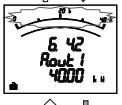
Output element	Setting range *3
A Demand A	+3 STEP (About 120%) to ±0 STEP (100%: Rating) to -10 STEP (About 40%)
W Demand W var	+3 STEP (About 120%) to ±0 STEP (100%: Rating) to -18 STEP (About 20%)



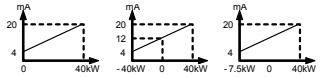
DISPLAY SET *1

(b) Set the Singledeflection / dauble deflection / special deflection for analog output.

Output element	Setting range
W Demand W	Single deflection ↔ Dauble deflection ↔ Special deflection
var	Single deflection ↔ Dauble deflection



<Single deflection> <Dauble deflection> <Special deflection>



DISPLAY SET *2

(c) For special deflection, set the measurement value for the minimum analog output value.

Output element	Setting range *3
W Demand W	-21 STEP (About 15%) to -15 STEP (About 25%) to ±0 STEP (About 100%)

DISPLAY SET

To next CH settings

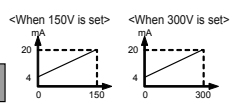
*1. When A or Demand A are set as output elements, it moves to the next analog output settings.
*2. When other than special deflection is selected, it moves to the next analog output settings.
*3. About Detailed setting values refer to a detailed edition.

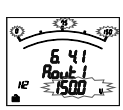
(2) When voltage is set as an output element for 1-phase 3-wire
Set V_{RN} and V_{NS} (V_{NT}) for the maximum analog output value.

150V ↔ 300V

Note:
V_{RS} (V_{RT}) is fixed at 300V.

<When 150V is set> <When 300V is set>





DISPLAY SET

③ Analog output CH2 to CH4 measurement item

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

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

④ Analog output CH2 to CH4 detailed settings

Analog output CH2-CH4 detailed set-up

The setting method is the same as ③Analog output CH1 detailed setting.

⑤ Analog output limit

Set analog output for when full scale is over the limit.

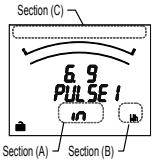
Setting value	Description
oFF (No limit)	For the span value, the maximum output is +5% and the minimum output is -5%.
on (Limited)	For the span value, the maximum output is +1% and the minimum output is -1%.

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

⑥ Pulse output 1 output item

Set the item that is output to pulse output 1.

Setting value	Display		
	Section (A)	Section (B)	Section (C)
Active energy (Imported)	in	Wh	OFF
Active energy (Exported)	out	Wh	OFF
Reactive energy (Imported, Lag)	in	varh	LAG
Reactive energy (Imported, Lead)	in	varh	LEAD
Reactive energy (Exported, Lag)	out	varh	LAG
Reactive energy (Exported, Lead)	out	varh	LEAD
non (No output)	non	OFF	OFF



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

⑦ Pulse output 1 pulse unit

Set the pulse value of pulse output 1.

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

$$\text{Total load [kW]} = \frac{\alpha \times (\text{VT Primary Voltage}) \times (\text{CT Primary Current})}{1000}$$

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

*1: For 1-phase 3-wire setting, the VT primary voltage is calculated using 110V.
*2: For direct voltage setting, the direct voltage is used for calculation instead of the VT primary voltage.
*3: For 3-phase 4-wire setting, the VT primary voltage is calculated using the phase to neutral voltage.

Total load [kW]	Display format		Possible pulse unit settings [kWh/pulse]			
	Digital display	Multiplier				
Less than 10	8888.88	× 1	1	0.1	0.01	0.001
10 or higher but less than 100	88888.8	× 1	10	1	0.1	0.01
100 or higher but less than 1000	88888.8	× 10	100	10	1	0.1
1000 or higher but less than 10000	88888.8	× 100	1000	100	10	1
10000 or higher but less than 100000	88888.8	× 1000	10000	1000	100	10
100000 or higher	88888.8	× 10000	100000	10000	1000	100

Note 1: When ⑦Pulse output 1 output element is set to "non," this setting will be skipped.
Note 2: The factory default setting values are minimum values for the pulse unit that can be set.
Note 3: For reactive power, kW in the above table needs to be read as kvar, and kWh needs to be read as kvarh.

⑧ Pulse output 2 output item

Set the item that is output to pulse output 2. (ME110SSR-4A2P)
The same item as pulse output 1 can be set.

The setting method is the same as ⑦Pulse output 1 output element.
(Factory default setting value: Reactive energy (Imported, Lag))

⑨ Pulse output 2 pulse unit

Set a pulse unit for pulse output 2. (ME110SSR-4A2P)

The setting method is the same as for ⑧Pulse output 1 pulse unit.

(Factory default setting values: Minimum possible value for pulse unit)

⑩ Pulse width

Set the pulse width for output pulse.
Set according to the input pulse conditions for the receiver.

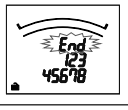
0.125s ↔ 0.500s ↔ 1.000s

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

SET

Setting menu

According to the set-up diagram, save the changed contents, or continue to the other setting menu.



Operation

Basic Operation

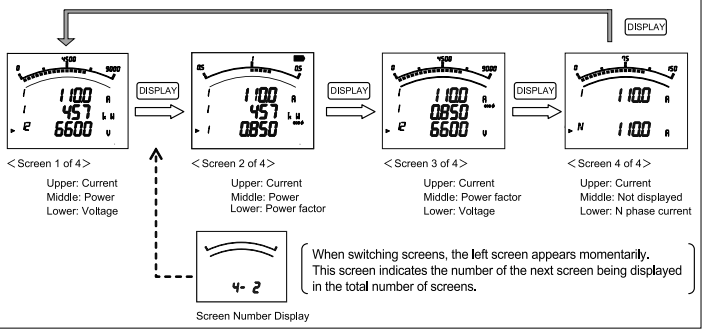
The following explains basic usages during operation.

●Switch display

By pressing (DISPLAY), the measurement display will switch over.

Display items differ depending on the phase wire system setting, display pattern settings and additional screen.

Example of display switching (Display Pattern: P01)

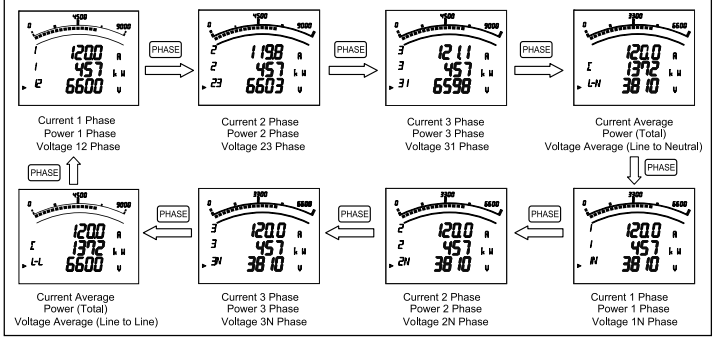


●Switch phase

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

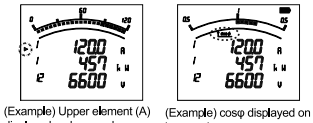
The phase cannot be switched in the following cases.
- Measurement Elements without Phase (Frequency)
- Activepower, reactive power, and power factor for settings other than 3-phase 4-wire
- When the setting is 1-phase 2-wire
- The measurement elements for upper, middle, and under are the same

Example of Display change (Phase Wire System: 3P4W)



●Bar Graph Display

Bar graph displays the measurement element indicated with " ▶ " or " ⮤ "



●Selection of bar graph

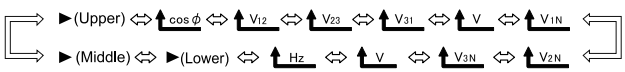
Press (+) or (−), to select measurement elements to be displayed on the bar graph.

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

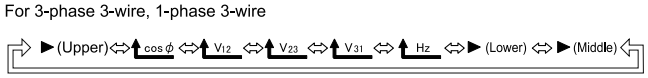
The bar graph cannot be displayed in the following cases.
- When active energy / reactive energy are selected
- When a line without measurement display is selected
- Harmonics Display Screen

For 3-phase 4-wire

(+) (Clockwise rotation) (−) (Counterclockwise rotation)



For 3-phase 3-wire, 1-phase 3-wire



For 1-phase 2-wire

●Cyclic Display

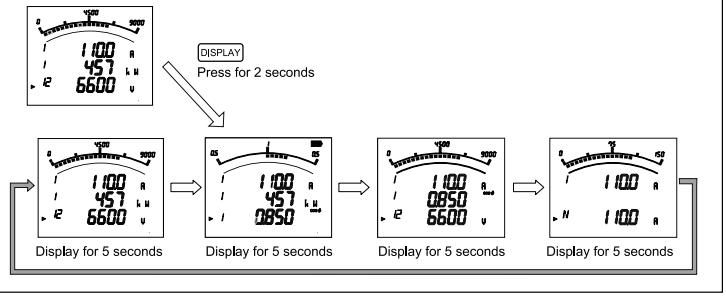
In cyclic display, display and phases automatically change at every 5 seconds.

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

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

Note 1: Before shifting to the cyclic display change screen, the display flickering 3 times.
Note 2: By pressing any other key than the (SET) and the (RESET) it goes back to manual change.
Note 3: In the maximum value and the minimum value display, cyclic display is not available.
Note 4: In the cyclic display, drawing number is not displayed.

Example Cyclic Display Change (Display Pattern: P01)

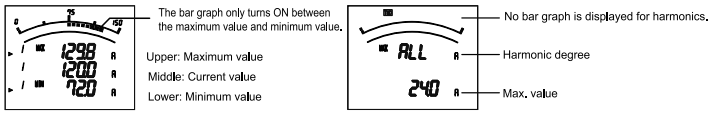


●Maximum / Minimum Value Display

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

However, only the following maximum values are displayed for harmonics.
Harmonic Current: Total, 1st, 3rd, 5th, 7th, 9th, 11th, and 13th RMS values for where the phase was largest for each phase
Harmonic Voltage: Total distortion ratio, 1st RMS value, 3rd, 5th, 7th, 9th, 11th, and 13th distortion ratio for where the phase was largest for each phase

■ Example Screen Display

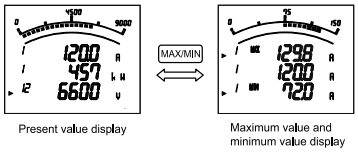


●Display of Maximum/Minimum Value

When (MAX/MIN) is pressed, the display is changed into the maximum value and minimum value display.

When (MAX/MIN) is pressed, the display changes back to the present value display.

Example of Display change current value display screen and maximum/minimum value display screen



As with the present value display, it is possible to change the following display from the Maximum value and minimum value display.

Key Operation	Function
Press (DISPLAY)	Measurement items are changed as the following. However, measurement items that are not included in the phase wire system display pattern setting and additional screens are not displayed. A→ AN →DA→DAN→V→W→DW→var HV ← HIN ← HI ← Hz ← cosϕ ← VA AN : N phase current DA : demand current DAN : N phase demand current DW: Active power demand HI : Harmonics current HIN: N Phase Harmonics Current HV : Harmonics voltage
Press (PHASE)	3-phase 4-wire Setting: A and DA are changed as the following Average→ Phase1 → Phase2 → Phase3 V is changed as the following VAVG(L-N)→VIN→V2N→V3N →VAVG(L-L) →V12 →V23 → V31 W, DW, var, VA, and cos ϕ are changed as the following Total Effective Value →1-Phase →2-Phase →3-Phase AN, DAN, and Hz do not have phase change. 3-Phase 3-Wire, 1-Phase 3-Wire Setting: Phases for A, DA, and V are changed. 1-Phase 2-Wire Setting: No phase switching.
Press (+) or (−)	The harmonics degree is changed. (Only for harmonics display)
Press (DISPLAY) for 2 seconds	Display changes cyclically .
Press (PHASE) for 2 seconds	Phase changes cyclically.

●Reset the Maximum/Minimum Value

When (RESET) is pressed for 2 second or more, the displayed maximum value and minimum value can be reset. ("Reset" means that maximum/minimum value turns into the same velue as the present value.)

When (RESET) and (+) are pressed simultaneously for 2 seconds or more, all the maximum values and minimum values are reset.

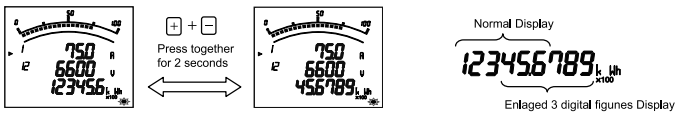
●Enlarged 3 digital figures

When (+)and (−)are pressed simultaneously for 2 seconds, values of active energy and reactive energy are enlarged by 3 figures.

Use this for confirming the active energy measurement.

It will automatically return to normal display if no button is pressed for 5 minutes or if it is switched to cyclic display.

Note 1: This function is made only on active energy and reactive energy displayed.



●Wh and varh zero reset

When (SET), (RESET), and (PHASE) are pressed simultaneously for 2 seconds, the measured values of active energy (Wh) and reactive energy (varh) are reset.

(This is effective only in the instantaneous value display.)

Note 1: All of active energy (Wh) and reactive energy (varh) not displayed are reset too.

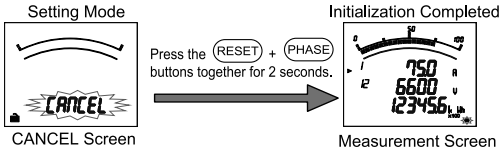
Initializing All Setting Contents

When the following operations are executed, all setting contents return to the factory default settings.

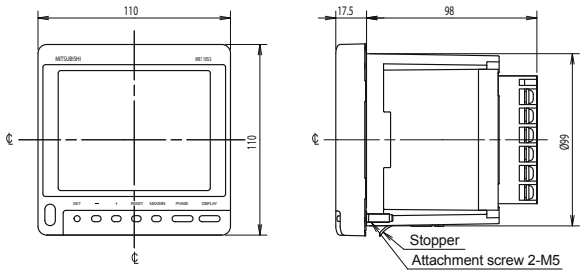
Only the setting contents return to the default settings. Adjusted values (Test Mode Menu 2) and electric energy measured values are not changed.

To return all setting contents to the default settings, execute the following operation from the Settings Mode CANCEL screen.

For more information about how to get to the CANCEL screen, refer to Setting Flow (page 3).



External Dimensions



Warranty

If you have any question or technical troubles in using the product, contact Mitsubishi Electric System & Service or your nearest branch of Mitsubishi Electric Corporation. (Refer to the end of this instruction manual for details.)

- The product is under free warranty for one year from purchase or 18 months after production, whichever comes first.
- The charge-free warranty shall apply only if the product is being used properly in the conditions, with the methods and under the environments in accordance with the terms and precautions described in the catalogue and instruction manual, etc.
- Replacement shall be charged for the following cases even during the charge-free warranty period.
  - ①Failures due to improper storage, improper handling, carelessness, or negligence
  - ②Failures due to improper installation
  - ③Failures due to improper usage and unauthorized modifications
  - ④Failures due to external factors such as fire, and abnormal voltage, and force majeure such as an earthquake, wind, or flooding.
  - ⑤Failures due to matters unpredictable based on the level of science technology at the time of shipping.
- Our company shall not be liable to compensate for any loss arising from events not attributable to our company, opportunity loss and lost earnings of the customer due to failure of the product, and loss, secondary loss, accident compensation, damage to other products besides our products and other operations caused by a special reason regardless of our company's ability to foresee it

Specifications

Item			Specification				
Type			ME110SSR,ME110SSR-4AP,ME110SSR-4APH,ME110SSR-4A2P, ME110SSR-C,ME110SSR-CH,ME110SSR-MB				
Phase wire system			Three phase 4-wire(3P4W),Three phase 3-wire(3P3W),Single phase3-wire(1P3W), Single phase 2-wire(1P2W)				
Rating		Current	5AAC , 1AAC (1AAC is special-purpose item)				
		Voltage	3P4W: max277/480VAC 3P3W,1P2W: 110VAC,220VAC 1P3W, 220VAC (110/220VAC)				
		Frequency	50-60Hz				
Measuring Items and accuracy			3P4W	3P3W,1P3W	1P2W	Display	Output
	Current (A)		A1, A2, A3, AN, Aavg	A1, A2, A3	A1	0.5%	0.5%
	Current Demand (DA)		DA1, DA2, DA3, DAN, DAavg	DA1, DA2, DA3	DA1		
	Voltage (V)		V12, V23, V31, Vavg(L-L), V1N, V2N, V3N, Vavg(L-N)	V12, V23, V31	V12		
	Active Power (W)		ΣW, W1, W2, W3	ΣW	ΣW		
	Active Demand Power (DW)		Σ DW, DW1, DW2, DW3	ΣDW	ΣDW		
	Reactive Power (var)		Σ var, var1, var2, var3	Σvar	Σvar		
	Apparent Power (VA)		ΣVA, VA1, VA2, VA3	-	-		
	Power Factor (cosφ)		Σcosφ, cosφ1, cosφ2, cosφ3	Σcosφ	Σcosφ	2.0%	2.0%
	Frequency (Hz)		Hz			0.5%	0.5%
	Active Energy (Wh)		Import, Export			2.0%	2.0%
	Reactive Energy (varh)		Import Capacitive, Import Inductive, Export Capacitive, Export Inductive			2.0%	2.0%
	Harmonics Current (HI)		HI1, HI2, HI3, HIN	HI1,HI3	HI1	2.5%	
			THD, h1...h13 (without even number) RMS value and Distortion ratio (max.100%)			(Total RMS, 0 to Rated x 60%)	
	Harmonics Voltage (HV)		HV1N, HV2N, HV3N	HV12, HV23	HV12	2.5%	
			THD, h1...h13 (without even number) RMS value and Distortion ratio (max.20%)			(THD,0 to 20%)	
Measuring Method	Instantaneous Value		A,V: RMS calculation, W,var,VA,Wh,varh: Digital multiplication, cosφ:Power ratio calculation Hz: Zero-cross, HV,HI: FTT				
	Demand Value		Thermal type calculation				
Display	Type		LCD with backlight				
	Number of display digits		A,DA,V,W,DW,var,VA,cosφ: 4 digits Hz,HI,HV: 3 digits Wh,varh: 6 digits				
	Bar graph		21 Segment-Bar graph, 22 Segment-Indicator				
	Display updating time interval		0.5s / 1s				
Response time			Display: 4s or less, Analog output: 4s or less In HI and HV, 10s or less				
Analog output (ME110SSR-4AP/-4APH/-4A2P)			Range	4~20mA DC			
			Load resistance	600Ω max			
Alarm output (ME110SSR-4APH/-CH)			No-voltage 'a' contact 35VDC, 0.2A				
Pulse output (ME110SSR-4AP/-4APH)			No-voltage 'a' contact 35VDC, 0.1A				
Digital input (ME110SSR-CH)			Rated 24VDC(19 to 30VDC)				
Power Failure Compensation			Non volatile memory (Items: setting value, max/min value, active/reactive energy)				
VA Consumption		VT	0.1VA/phase, 0.2VA/phase (at direct input)				
		CT	0.1VA/phase				
		Auxiliary power	8VA at 110VAC, 9VA at 220VAC, 6W at 100VDC				
		Digital input	DC19-30V, under 7mA				
Auxiliary power			100 to 240VAC (+10%,-15%) 50/60Hz 100VDC (+10%,-30%)				
Weight			0.5kg				
Dimension			110(H)x110(W)x98(D)				
Enclosure			Thermoplastic self-extinguish (UL94V0)				
Operating temperature			-5~50°C (average operating temperature ; 35°C or less per day)				
Operating humidity			85%RHmax, non condensing				
Storage temperature			-20~60°C				
Standard			EMC:EN61326-1:2006 LVD:EN61010-1/2001				

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

Specifications

Communication Specifications

ME110SSR-C,ME110SSR-CH

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

note1: As for details, refer to the following manuals.

Manual Name	Manual Number (Model Code)
CC-Link System Master/Local Module User's Manual type QJ61BT11N Describes the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the QJ61BT11N. (Optionally available)	SH-080394E (13JR64)

■CC-Link Dedicated Cable

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

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

■ About Programming

In addition to this manual, read the following documents too.

- Electronic multi-Measuring Instrument programming manual (CC-Link) LAN040503
- Electronic multi-Measuring Instrument programming manual (CC-Link) (For ver.2 remote device station)..... LAN110300

ME110SSR-MB

Item	Specifications
Interface	RS485, 2 wires half duplex
Protocol	ModBus RTU (binary data)
Speed	2400, 4800, 9600, 19200, 38400bps
Distance	1000m
address	1-255
Station number	31
Resistance at end of the link	120Ω 1/2W
Recommended cables	Shielded twisted pair, AWG26 (or wider) gauge

As for details of ModBus communication, refer to "Modbus. org.Website" "Modbus. org.Website": http://www.modbus.org

Handling precautions

사용자안내문

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

Precautionary note written in Korean

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

note1: This is the notification for the KC mark (Korea Certification)

MITSUBISHI Electronic Multi-Measuring Instrument

Service network

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Australia	Mitsubishi Electric Australia Pty. Ltd.	348 Victoria Road, Rydalmere, N.S.W. 2116, Australia	+61-2-9684-7777
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China	Mitsubishi Electric Automation (HongKong) Ltd.	10/F., Manulife Tower, 169 Electric Road, North Point, Hong Kong	+852-2887-8810
Europe	Mitsubishi Electric Europe B.V.	Gothaer Strasse 8, D-40880 Ratingen, Germany	+49-(0)2102-486-0
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
Lebanon	Comptoir d'Electricite Generale-Liban	Cebaco Center - Block A Autostrade Dora, P.O. Box 11-2597 Beirut - Lebanon	+961-1-240445
Philippines	Edison Electric Integrated, Inc.	24th Fl. Galleria Corporate Center, Edsa Cr. Ortigas Ave., Quezon City Metro Manila, Philippines	+63-(0)2-634-8691
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
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