

MITSUBISHI Electronic Multi-Measuring Instrument

Types

ME96SSH-MB

User's Manual: Detailed Edition

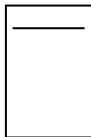
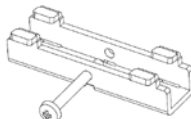


- Before operating the instrument, you should first read thoroughly this operation manual for safe operation and optimized performance of the product.

Deliver this user's manual to the end user.

Check on your delivery

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

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

About the optional plug-in module sold separately

This product has the following optional plug-in module.

It is possible to correspond to various I/O by installing the optional plug-in module.

We hope that you will order to us.

| Type name of optional plug-in module | I/O specifications | | | | |
|---|--------------------|-----------------------|---------------|----------------|---------------|
| | Analog output | Pulse/Alarm output | Digital input | Digital output | Communication |
| ME-4210-SS96 | 4 circuits | 2 points | 1 point | — | — |
| ME-0040C-SS96 | — | — | 4 points | — | CC-Link |
| ME-0052-SS96 | — | — | 5 points | 2 points | — |

| | |
|-------------|--|
| Note | "ME-4201-NS96", "ME-0052-NS96" and "ME-0040C-NS96" can not use in the ME96SSH-MB. They can use for ME96NSR, ME96NSR-MB only. |
|-------------|--|

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

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

Features

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

- This instrument supports highly accurate measurements (accuracy of current and voltage: 0.1%; active energy: class 0.5S) and high-order harmonic measurement (1st to 31st).
- This instrument enables measurement of integrated active energy divided into two time segments such as peak/off-peak and day/night. (Periodic Active Energy)
- This instrument enables measurement of the active energy in a block of any period (interval). (Rolling Demand)
- The password protection setting avoids undesired change of settings or deletion of measured data.
- The instruments with transmission functions (MODBUS®RTU communication, CC-Link communication) are able to transmit the measured data to superior monitoring devices. (CC-Link communication: When the ME-0040C-SS96 optional plug-in module is installed)
- The instruments with analog/pulse output function are able to output key measurement factors (current, voltage, active power, power-factor, and Active Energy) of the power receiving point alone and are optimum for remote monitoring. (When the ME-4210-SS96 optional plug-in module is installed)
- This instrument complies with the requirements of the CE marking, UL standards, KC mark, and FCC/IC.

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

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Safety Precaution

(Always read these instructions before using this equipment)

For personnel and product safety please read the contents of these operating instructions carefully before using.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

Make sure to deliver this manual to the end-user.

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

HAZARD SYMBOLS



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

CAUTION

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

■ Normal service conditions

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

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

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

■ Installation instructions

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

- 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 and measuring ratings.

| | | | | |
|------------------------|--|--|-----------------|--------------------------------|
| Auxiliary power supply | | AC100-240V(±15%) 50-60Hz 8VA DC100-240V(-30% +15%) 5W | MA,MB terminals | |
| Ratings | Voltage | 3-PHASE 4-WIRE : max AC277/480V 3-PHASE 3-WIRE : (DELTA)max AC220V, (STAR)max AC440V 1-PHASE 3-WIRE : max AC220/440V 1-PHASE 2-WIRE : (DELTA)max AC220V, (STAR)max AC440V | Category III | P1,P2,P3,PN terminals |
| | Current | 5A (via current transformer) ,maxAC30V | Category III | +C1,C1,+C2,C2,+C3,C3 terminals |
| | Frequency | 50-60Hz | | |
| | <p>Provide the basic insulation externally at the current input terminals.</p> <p>Voltage-measuring and current-measuring circuit terminals should be permanently connected.</p> | | | |

Safety Precaution

■Others

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

- Do not drop this instrument from high place. If you drop it and the display is cracked, do not touch the liquid crystal or get it in your mouth. If the liquid crystal is touched, wash it away at once.
- Work under the electric outage condition when installing and wiring. It may cause electric shock, electric burn injury or damage of the device.
- When tapping or wiring, take care not to entering any foreign objects such as chips and wire pieces into this instrument.
- If the terminal wiring is pulled with a strong force, the terminals may detach. (Tensile load: 39.2N or less)
- Check the connection diagram when wiring. Wrong wiring may cause failure of the instrument, a fire or electric shock.
- In order to prevent invasion of noise, do not bunch the control wires or communication cables with the main circuit or power wire, or install them close to each other. The distance between communicational signal lines, input signal lines and power lines, and high voltage lines when running parallel to each other are shown below.


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

■ Matters concerning the precaution before use

- Use the instrument in the specified usage environment and conditions.
- The setting of this instrument is necessary before use it. Please read this manual carefully to ensure correct setting.


■ Operation instructions

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

| | |
|---|---|
|  | <ul style="list-style-type: none"> Do not disassemble or modify this instrument. It may cause failure, malfunction, injury or fire. Use this instrument within the ratings specified in this manual. If it is used outside the ratings, it may cause not only malfunction or failure but also fire burnout. |
|---|---|

■ Maintenance instructions

- Wipe dirt off the surface with a soft dry cloth.
- Do not contact a chemical dust cloth to the instrument for a long time, or do not wipe it with benzene, thinner, alcohol.
- Check for the following items to use this instrument properly for long time.
 - (1) Daily maintenance
 - ① No damage on this instrument
 - ② No abnormality with LCD indicators
 - ③ No abnormal noise, smell or heat
 - (2) Periodical maintenance
 - No looseness with installation and wire connection. (Once every 6 months to 1 year)

| | |
|---|--|
|  | Do periodical maintenance under the electric outage condition. Failure to do so may cause electric shock, failure of the instrument or a fire. |
|---|--|

Safety Precaution

■ Storage conditions

To store this instrument, turn off the power and remove wires, and put it in a plastic bag.

For long-time storage, store at the following places. Failure to follow the instruction may cause a failure and reduced life of the instrument.

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

■ Guarantee

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

■ Replacement Cycle

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

■ Disposal

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

■ About packaging materials and this manual

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

EMC Directive Instruction

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

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

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

1. EMC Standards

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

2. Installation (EMC directive)

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

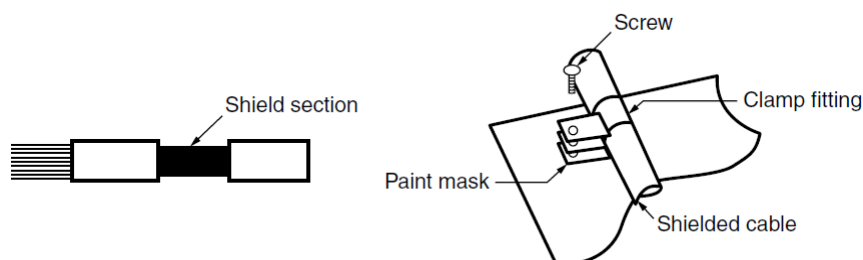
Therefore, the construction of a cabinet is important not only for safety but also for EMC.

The instrument is examined by the following conditions.

- Conductive cabinet is used.
- Six faces of a cabinet have to be ensured conductivity for each other.
- A cabinet has to be connected to earth by a thick wire of low impedance.
- Holes on faces of cabinet have to be 10 cm or less in diameter.
- The terminals for protective earth and functional earth have to be connected to earth by a thick wire of low impedance. (A terminal for protective earth is important not only for safety but also for EMC.)
- All connections must be kept inside the cabinet.
- Wirings outside the cabinet have to be used with the shielded cable.

The following diagram shows how to provide good contact of the shielded cable.

- Remove part of the outer cover.
- Remove part of the paint mask on the cabinet.
- Connect those parts with the clamp.



Precautions for KC mark

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.

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

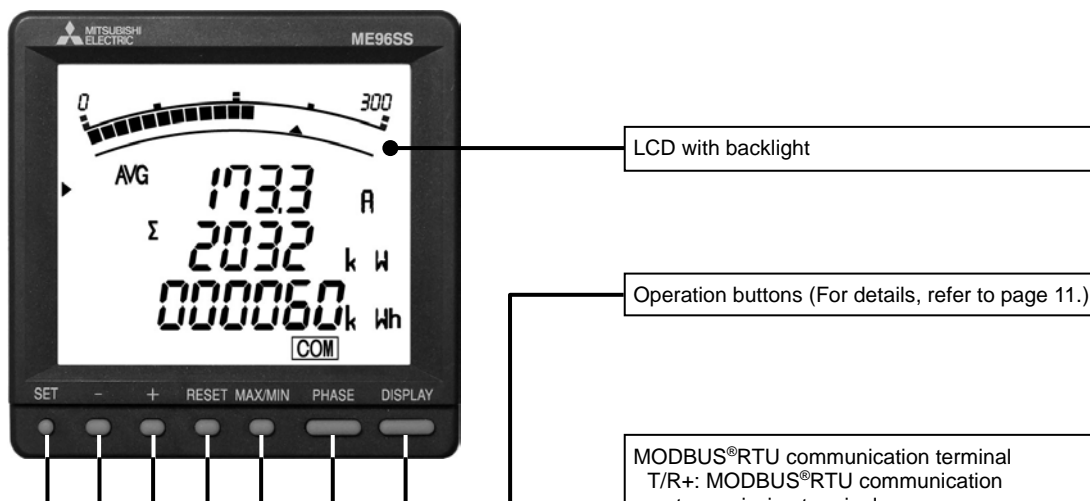
■ Manufacturer : MITSUBISHI ELECTRIC CORPORATION

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

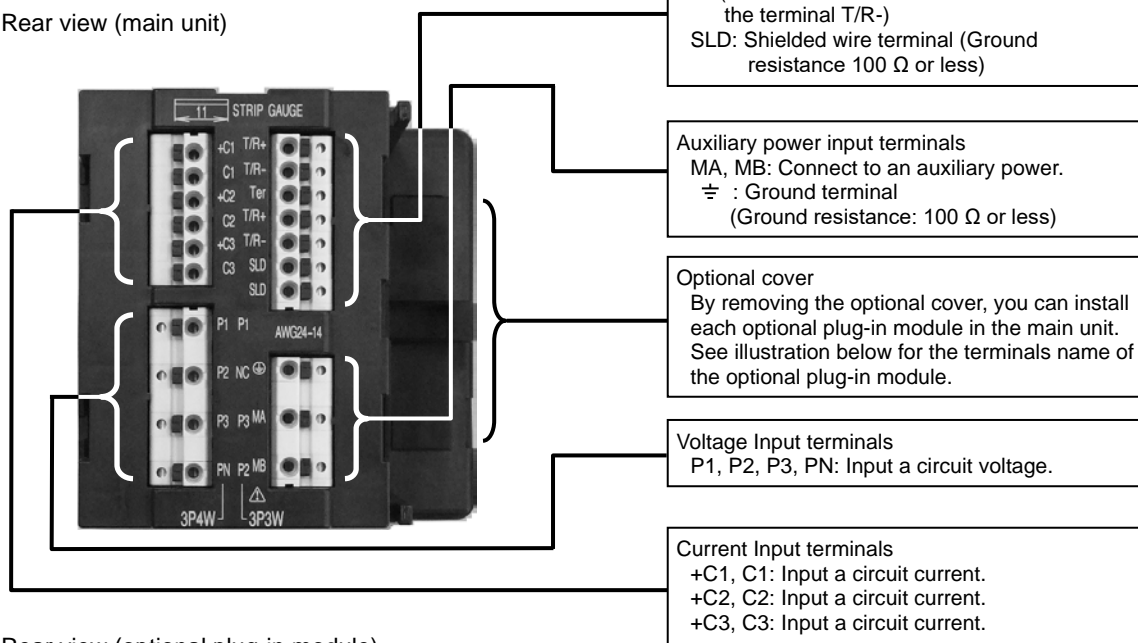
1. Display and Button Functions of Each Parts

Part names

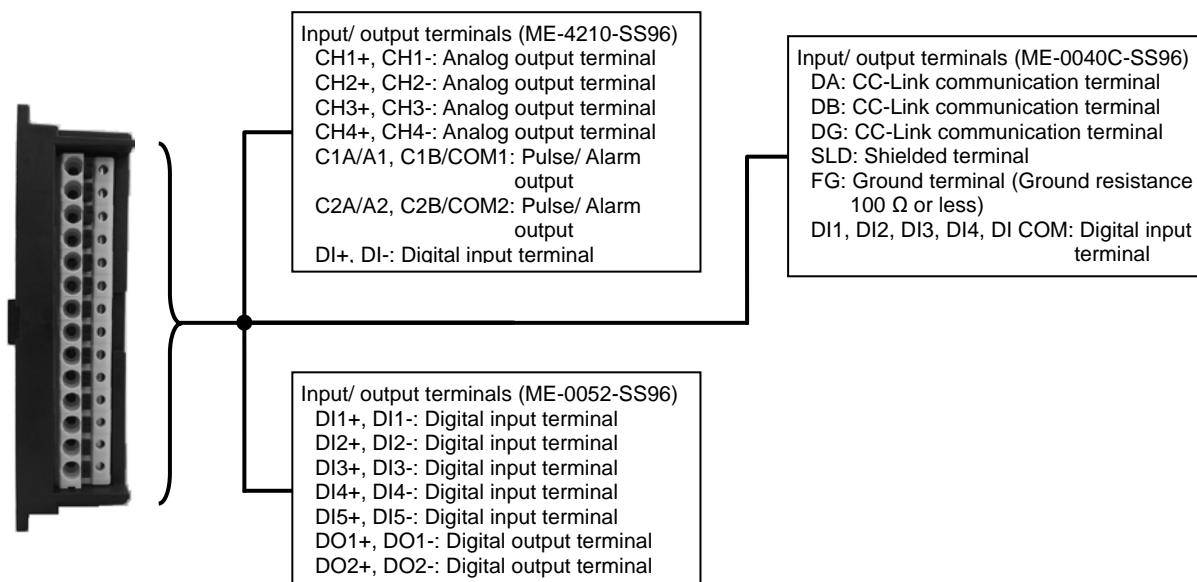
■ Front view



■ Rear view (main unit)

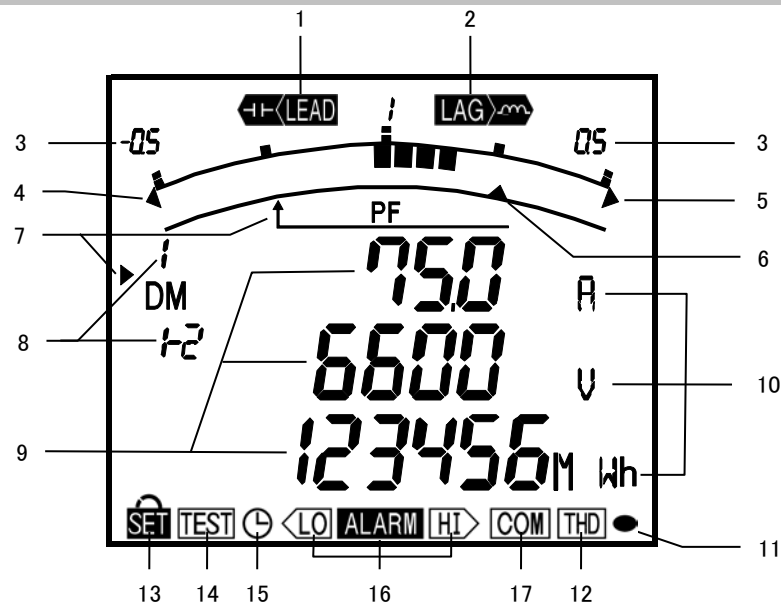


■ Rear view (optional plug-in module)





1. Display and Button Functions of Each Parts

Display



Note: The above display is an example for explanation.

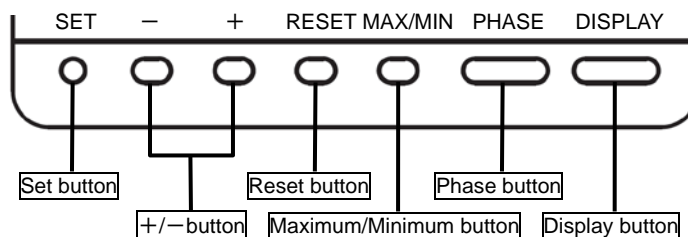
| No. | Segment Name | Description | | | | | | | | | | | | |
|--------------------------|--------------------------------|--|----------------|----------------|----------------|-----|-----------------------|--------|----------------|----------------|--------------------------|--------|--|----------------|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

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

1. Display and Button Functions of Each Parts

Functions of operation buttons

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



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

| Operation Mode | | Button | | | | | | | Function |
|--|---|--------|-------|-------|-------|---------|-------|---------|--|
| | | SET | - | + | RESET | MAX/MIN | PHASE | DISPLAY | |
| Operation mode | Display changes operation | | | | | | | ○ | 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. (Refer to page 50) |
| | | | | | | | ⊙ | | Phases change cyclically. (Refer to page 50) |
| | | | ⊙ — ⊙ | | | | | | Change the unit of Wh, varh and VAh, etc. (Refer to page 53) |
| | Measured value is reset/ Canceling the alarm, etc | | | | ⊙ | | | | Maximum values and minimum values on the display are reset to the present value. |
| | | | | ⊙ — ⊙ | | | | | All of the Maximum values and minimum values are reset to the present value. |
| | | ⊙ — ⊙ | | | ⊙ — ⊙ | | | ⊙ | Wh, varh, VAh are zero reset. (All of the counting values are zero reset.) |
| | | | | ⊙ — ⊙ | | | | | Periodic active energy is zero reset. (Only effective in Periodic active energy display) |
| | | | ⊙ — ⊙ | | | | | | Adjusting rolling demand time(Only effective in rolling demand display) |
| | | | | ⊙ — ⊙ | | | | | Resetting the peak value of rolling demand (Only effective in rolling demand display) |
| | | | | | ⊙ | | | | The operation time is zero reset (Screen operation time only) |
| | | | | | ○ | | | | An alarm condition is canceled. (Screen element is canceled) |
| | | | | | ⊙ | | | | All alarm conditions are canceled. (Element is canceled for all screens) |
| | | | | | ○ | | | | Stopping backlight flickering alarm. (Only effective in setting backlight flicker) |
| | | | | | ⊙ | | | | The latching data of digital input on the display is canceled. (Available only for contact point input screen) |
| | Mode changes | ⊙ — ⊙ | | | ⊙ | | | | The display of Setting mode appears. |
| | | ⊙ | | | | | | | The display of Set value confirmation mode appears. |
| | | | | | ⊙ — ⊙ | | | | The display of password protection mode appears. |
| Setting/ Setting value confirmation mode | Setting operation | ○ | | | | | | | The setting items are saved, and setting item is changed to next item. |
| | | | | | | | | ○ | Back to the previous item. |
| | | | ○ | ○ | | | | | The values of setting are changed. (If it presses for 1 sec or more fast forward or fast return.) |
| | | □ | | | | | | | Back to the setting display. |
| | | ○ | | | | | | | Save the settings(Only effective in End display) |
| | | ○ | | | | | | | Cancel the settings(Only effective in CANCEL display) |
| | Special operation | | | | | □ — □ | | | Meter restart(Only effective in CANCEL display) |
| | | | | | ⊙ — ⊙ | | | | Returns set contents to the default settings (the default values, Only effective in CANCEL display) (Refer to page 37) |

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

CAUTION

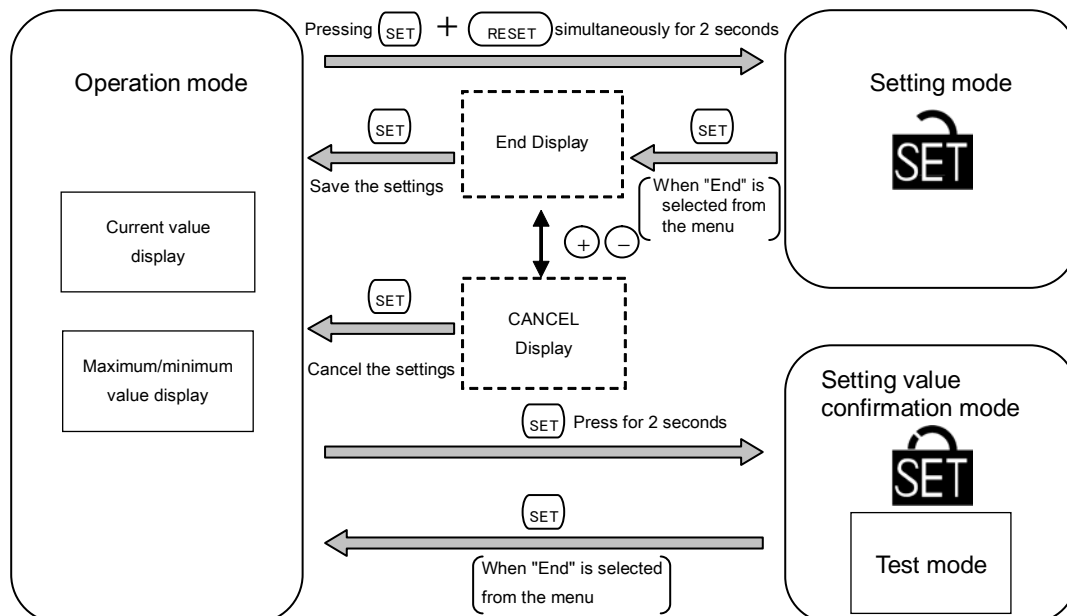
- If the function of "maximum value and minimum value reset" and "Wh, varh, VAh zero reset" are done, data will be lost. If this data is needed, please record the data before the reset operation.
- If the function of "meter restart" is done, the entire measurement(measurement display, alarm, analog output,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

2. Function Modes

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

| Mode | Description | Reference Pages |
|---|---|----------------------------|
| Operation Mode | This mode is for displaying each measured value using digital numerical values and bar graphs. Operation mode contains "Current Value Display" that displays the current value, and "Maximum/Minimum Value Display" that displays old maximum/minimum values. In addition, for each display, the cyclic display function can be used to switch between the screens every 5 seconds. | P.48 to P.60 |
| Setting Mode | This mode is for changing the setting values related to measurement and output functions. The following special operations can be executed from the "CANCEL Display" for changing/cancelling setting values. <ul style="list-style-type: none"> •The instrument is reset. •Reset the settings to the factory defaults | P.13 to P.35, P.37 to P.41 |
| Setting Value confirmation mode (Test Mode) | This mode is for confirming the setting values for each setting item. (In this mode, settings cannot be changed in order to prevent accidental changing of settings.) This mode contains test functions that can be used for equipment startup. <ul style="list-style-type: none"> •Analog Output Adjustment : Analog output can be adjusted (zero adjustment and span adjustment). •Output Test : Analog output can be switched, pulse output can be executed, and alarm contact points can be opened/closed without measurement input (voltage/current). •Communication Test : Fixed numerical data can be returned without measurement input (voltage/current). | P.36, P.42 to P.47 |

■ Diagram of Each Mode



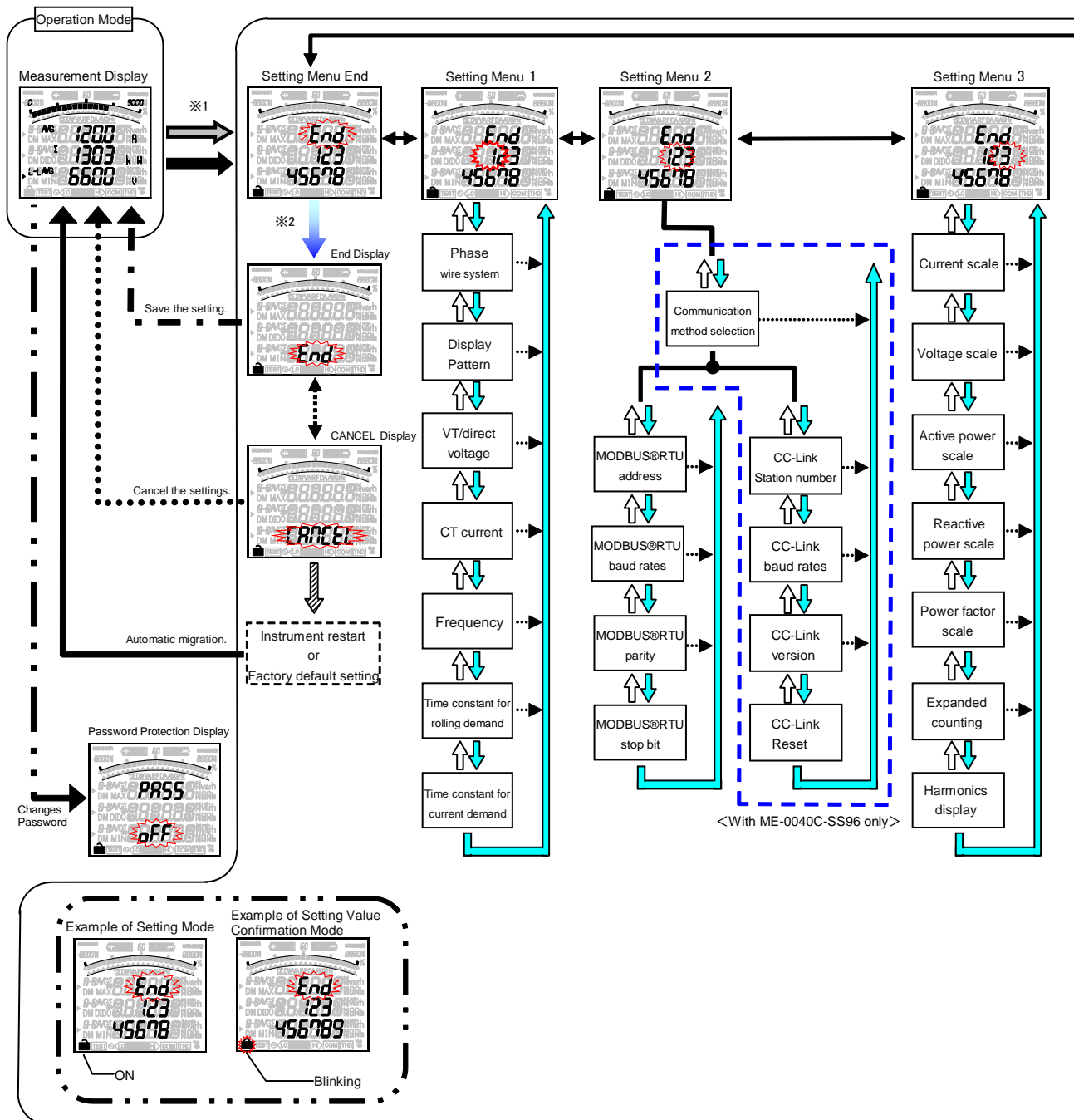
3. Setting

3.1 Setting flow

To measure, it is necessary to use Setting mode to set the phase wire system, VT / direct voltage, and CT primary current. From Operation mode, move to Setting mode and then set necessary items. Factory default settings will be used for items that you do not set.

Only the settings in Setting menu 1 (basic setting) are needed for normal use. For more information about the settings, refer to page 15 and after.

For more information about the factory default settings, refer to the setting table on page 83.



CAUTION

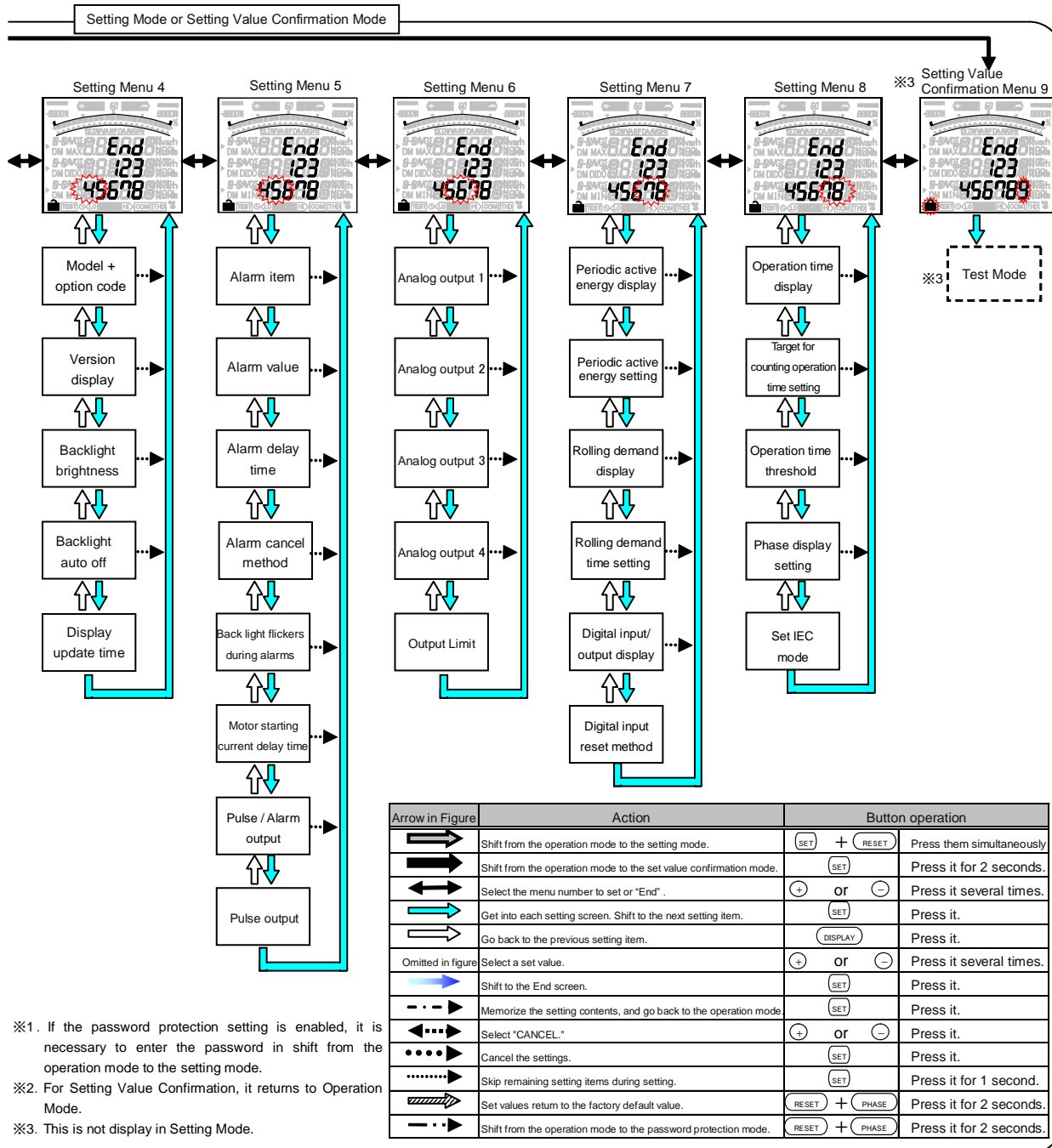
Keep in mind that when a setting is changed, the related setting items and measurement data will be reset to the default settings. (Refer to page 37.)

3. Setting

3.1 Setting flow

<Setting Procedure>

- ① Press **[SET]** and **[RESET]** simultaneously for 2 seconds to get in the setting mode.
- ② Select a setting menu number by **[+]** or **[-]**.
- ③ Use the **[SET]** button to select a setting menu number.
- ④ Set each setting item. (Refer to page 15 and later pages.)
- ⑤ After completion of setting, select 'End' in the setting menu and press **[SET]**.
- ⑥ When the End display appears, press **[SET]** once again.



3. Setting

Basic Operations for setting

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

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

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

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

Setting Menu

\uparrow
 \downarrow

DISPLAY SET

① Phase Wire system

\uparrow
 \downarrow

DISPLAY SET

② Display Pattern

\uparrow
 \downarrow

DISPLAY SET

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

Set the phase wire system.

Set the display pattern.
The following table shows the measurement elements that can be displayed by each display pattern. (For more details about display patterns, refer to page 61,62.)
In addition, if there is no display pattern that you want from P01 to P13, select the special display pattern P00 to configure the screen freely.
(For more information about setting the special display pattern P00, refer to page 38,39.)

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

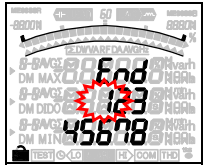
(1) For 3-phase 4-wire

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


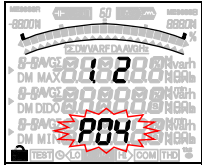
Note: The following settings are required for displaying elements on an additional display.

| Measurement element on additional display | Setting item | Reference Pages |
|---|---|-----------------|
| Active energy Exported / reactive energy Special(*) | Setting Menu 3 Active energy measurement | Page 22 |
| Harmonic current/ Harmonic voltage | Setting Menu 3 Harmonics display | Page 22 |
| Periodic Active Energy | Setting Menu 7 Periodic Active energy display | Page 32 |
| Rolling Demand | Setting Menu 7 Rolling demand display | Page 32 |
| Digital input / output status | Setting Menu 7 Digital input / output display | Page 33 |
| Operation time | Setting Menu 8 Operation time display | Page 34 |

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



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

3. Setting

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

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

| Display Pattern | Additional display | | | | | | | | | | | | | |
|-----------------|--------------------|----------------|---------|--------------|--------------|----------------|-----------|--------------------------|--------------------------|----------------------------------|--------------------------|--------------------------|---------------------------|------------------------|
| | Current | Current Demand | Voltage | Active Power | Power Factor | Reactive Power | Frequency | Active Energy (Imported) | Active Energy (Exported) | Reactive Energy y (Imported LAG) | Active Energy (Imported) | Active Energy (Exported) | Reactive Energy (Special) | Periodic Active Energy |
| P01 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P02 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P03 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P04 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P05 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P06 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P07 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P08 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P09 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P10 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P11 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P12 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P13 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P00 | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |

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

| Measurement element on additional display | Setting item | Reference Pages |
|---|---|-----------------|
| Active energy Exported / reactive energy Special(*) | Setting Menu 3 Active energy measurement | Page 22 |
| Harmonic current/ Harmonic voltage | Setting Menu 3 Harmonics display | Page 22 |
| Periodic Active Energy | Setting Menu 7 Periodic Active energy display | Page 32 |
| Rolling Demand | Setting Menu 7 Rolling demand display | Page 32 |
| Digital input / output status | Setting Menu 7 Digital input / output display | Page 33 |
| Operation time | Setting Menu 8 Operation time display | Page 34 |

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

Set the VT

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

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

1. For 3-phase 4-wire

no ↔ yES

2. For 3-phase 3-wire or 1-phase 2-wire

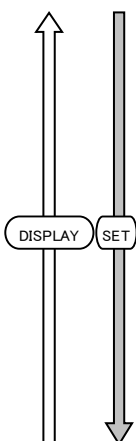
yES ↔ no



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

Note. VT is voltage transformers.

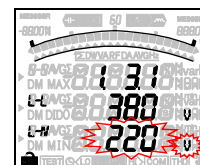
③VT / direct voltage



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

(a) For 3-phase 4-wire

(phase to neutral voltage / phase to phase voltage)



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

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

110V ↔ 220V ↔ 440V

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

110/220V ↔ 220/440V

3.Setting

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

Continued from the previous page

(2) When using VT

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

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

63.5V ↔ 100V ↔ 110V ↔ 115V ↔ 120V

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

100V ↔ 110V ↔ 220V



< Primary Voltage Settings >

Default value

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

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

(phase to neutral voltage)



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

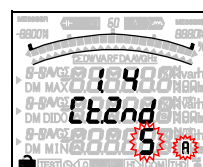
Set the CT.

Primary / secondary Current Setting

< Set the secondary current >

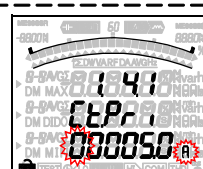
1A ↔ 5A

Note. CT is current transformers.



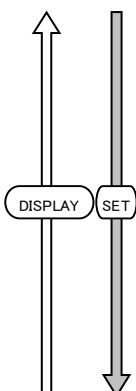
< Set the primary current >

Default Setting: 5.0A



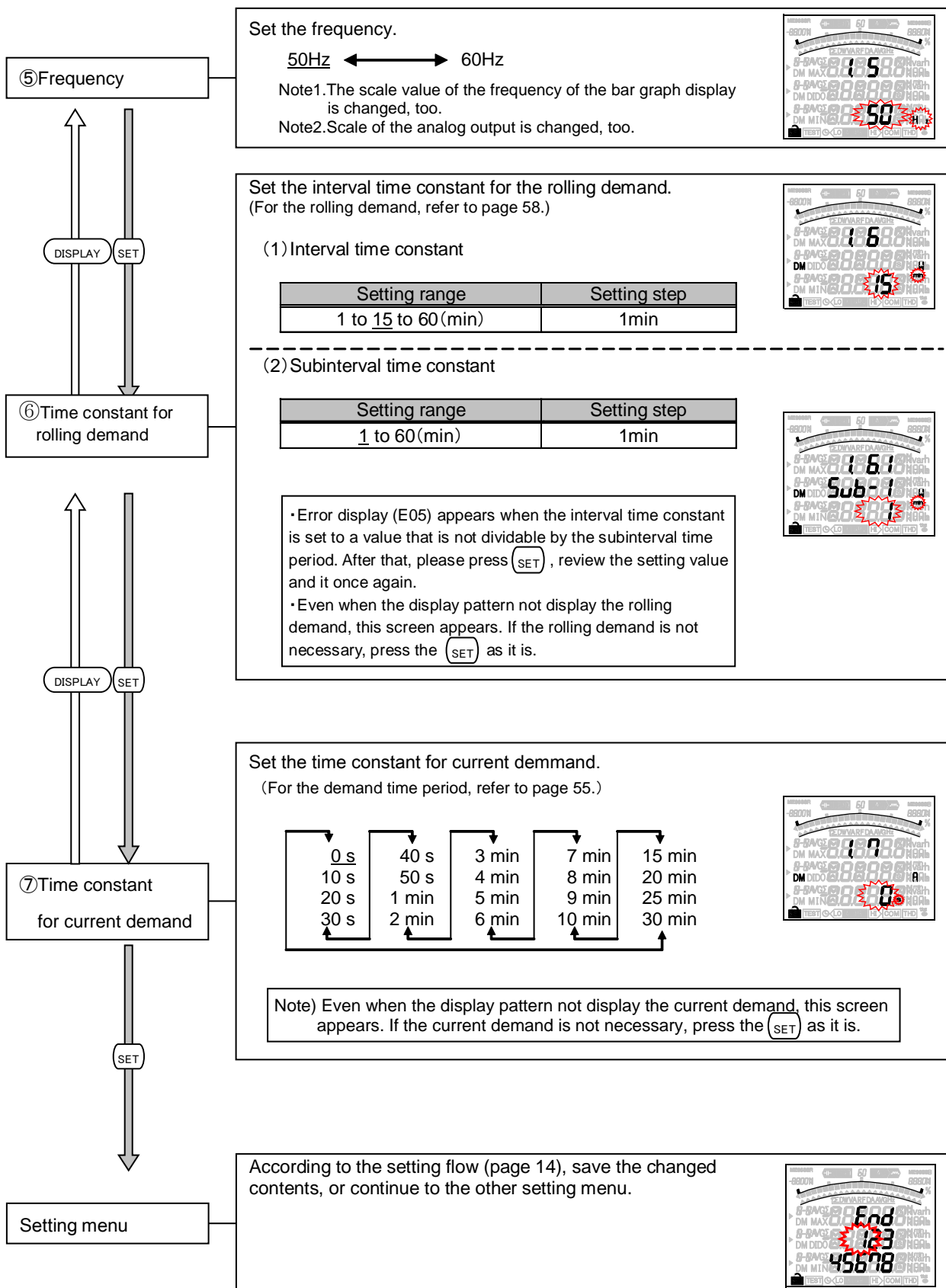
- From top digit, select the value of the flickering digit by (+) and (-).
- The setting digit can be moved to right by the (SET).
- The setting digit can be moved to left by the (DISPLAY).
- Setting is available in range from 1.0A to 30000.0A
 - Less than 10A : Upper 2 digits setting
 - Over 10A : Upper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

④CT current



3. Setting

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



In the case of use only by the Setting menu 1, please go to “5. Operation” (from page 48).

In the case to use additional functions, please go to “Setting Menus 2 - 8” (from page 19).

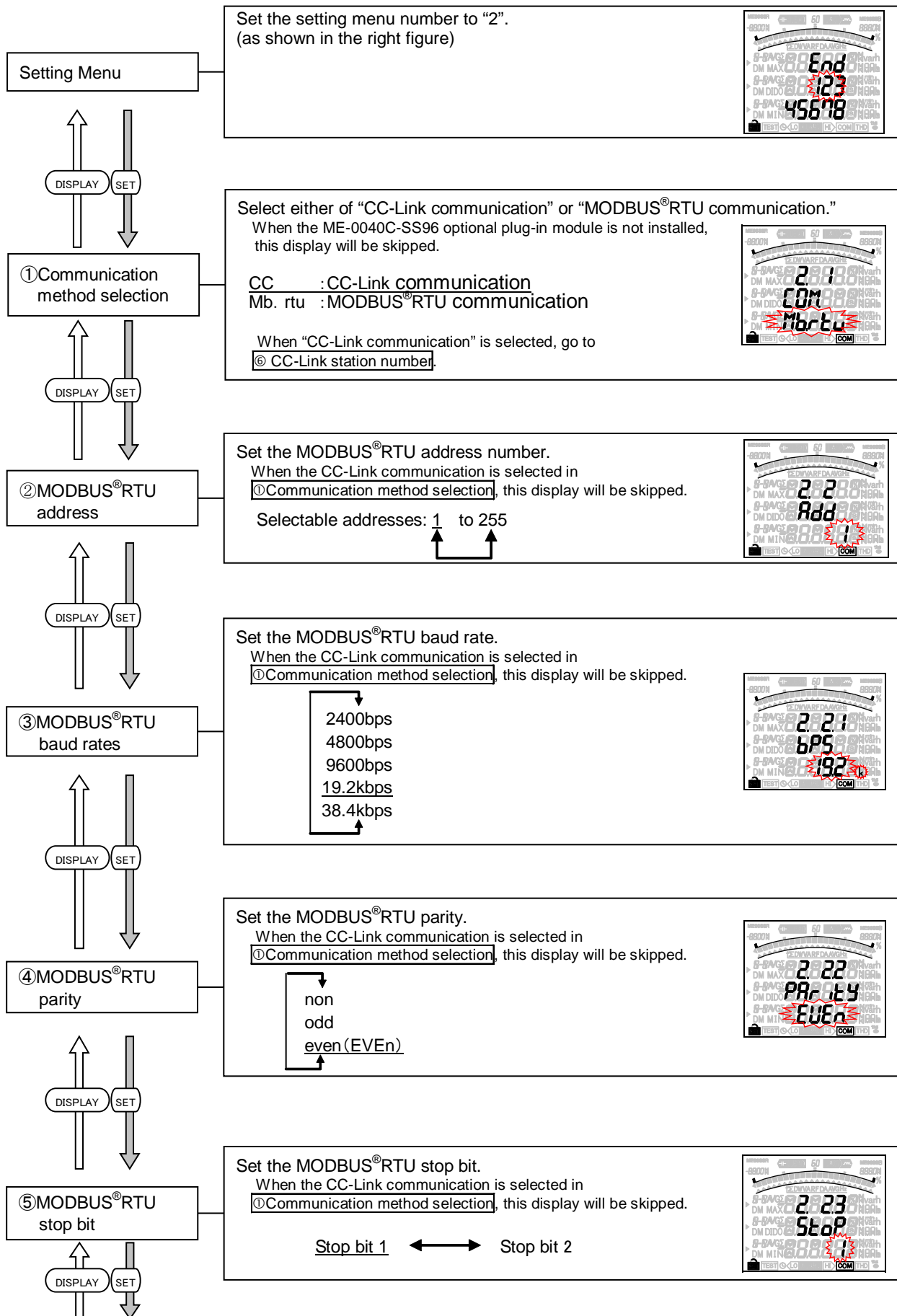
Note

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

3. Setting

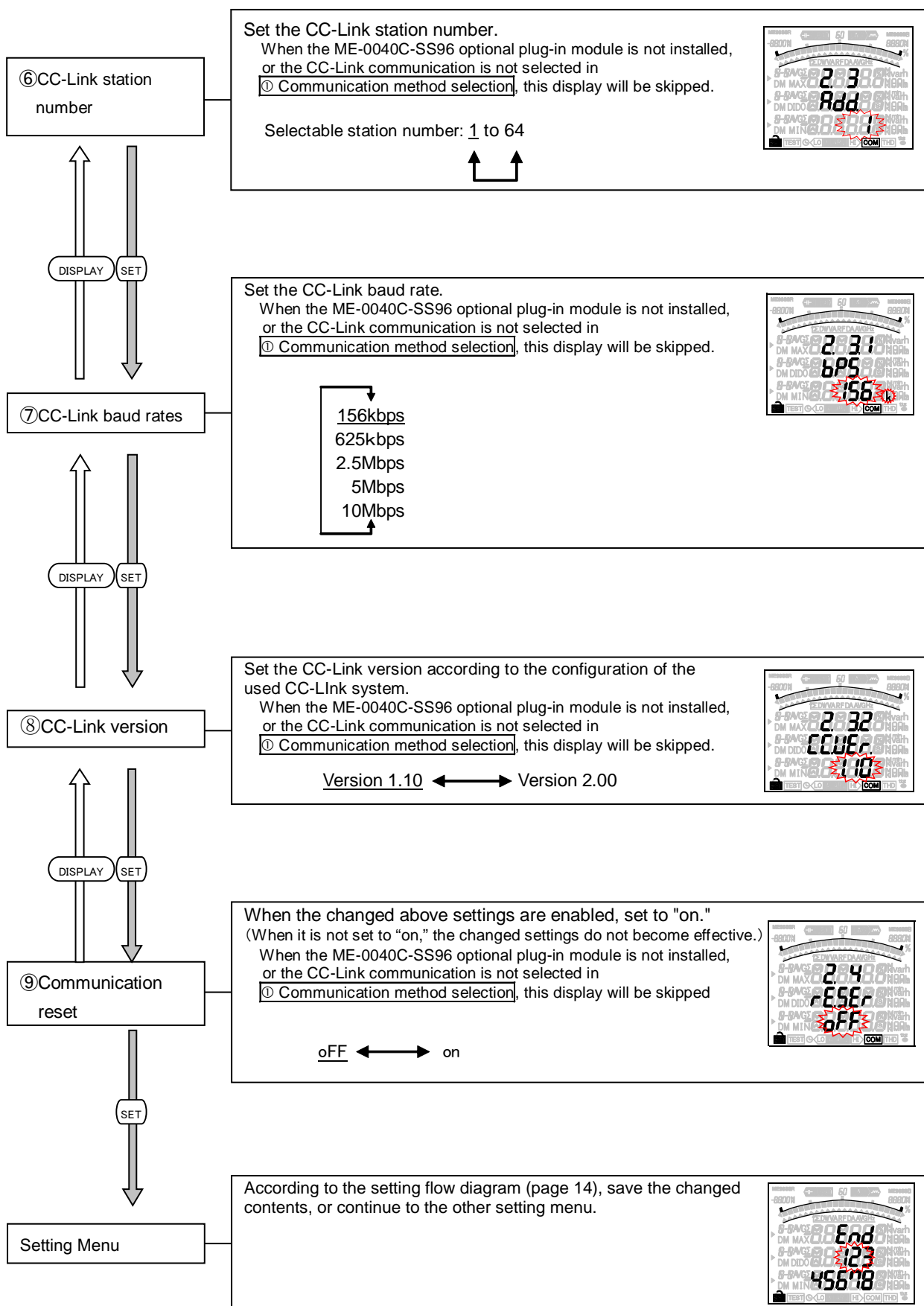
3.3 Setting Menu 2: Communication Settings (Setting the MODBUS®RTU communication and CC-Link communication)

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



3. Setting

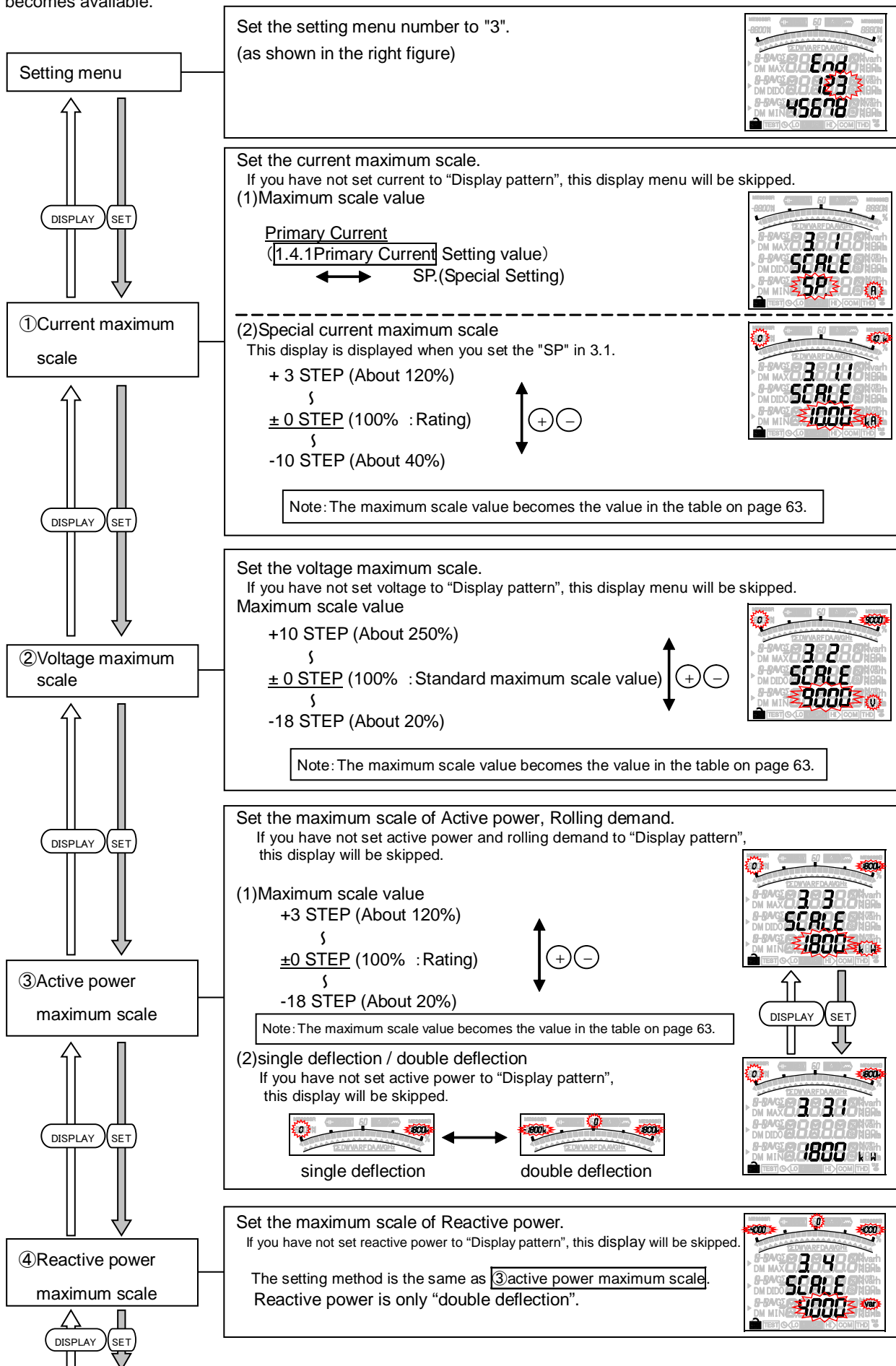
3.3 Setting Menu 2: Communication Settings(Setting the MODBUS®RTU communication and CC-Link communication)



3. Setting

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

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



3. Setting

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

⑤Power factor scale

↑

⑥Expanded counting

↓

⑦Harmonics

↓

Setting menu

DISPLAY

↑

SET

DISPLAY

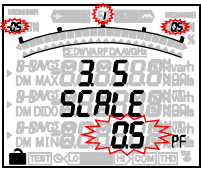
↓

SET

Set the power factor scale.

If you have not set power factor to "Display pattern", this display will be skipped.

-0.5 to 1 to 0.5 ↔ -0 to 1 to 0



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

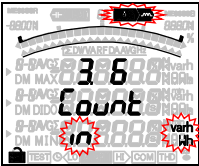
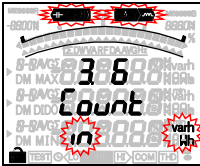
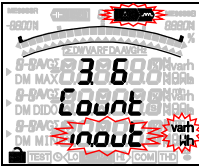
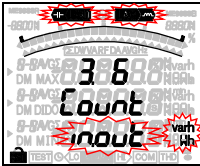
| Combination (Setting value) | Display | | | | | | Reactive energy measurement method | | |
|--------------------------------|----------|----------|----------|-----|----------|-----|--|--|---------------------------|
| | Wh | | varh | | | | | | |
| | Imported | Exported | Imported | | Exported | | |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

Note: For more information about the measurement method for reactive energy, refer to page 54.

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

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

< Example Screen >

in :Imported
out :Exported
LEAD : lead varh
LAG : lag varh

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

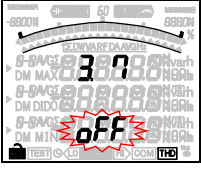
| | Additional Screen | | | |
|------|-------------------|---------------------|--------------------|---------------------|
| Wh | Wh | -Wh | — | — |
| -Wh | — | — | — | — |
| varh | varh | varh(imported LEAD) | varh(exported LAG) | varh(exported LEAD) |
| VAh | VAh | — | — | — |

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

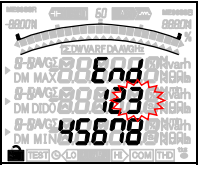
Set "on or off" of the harmonic measurement display.

oFF ↔ on

(Not displayed) (Displayed)



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



Note

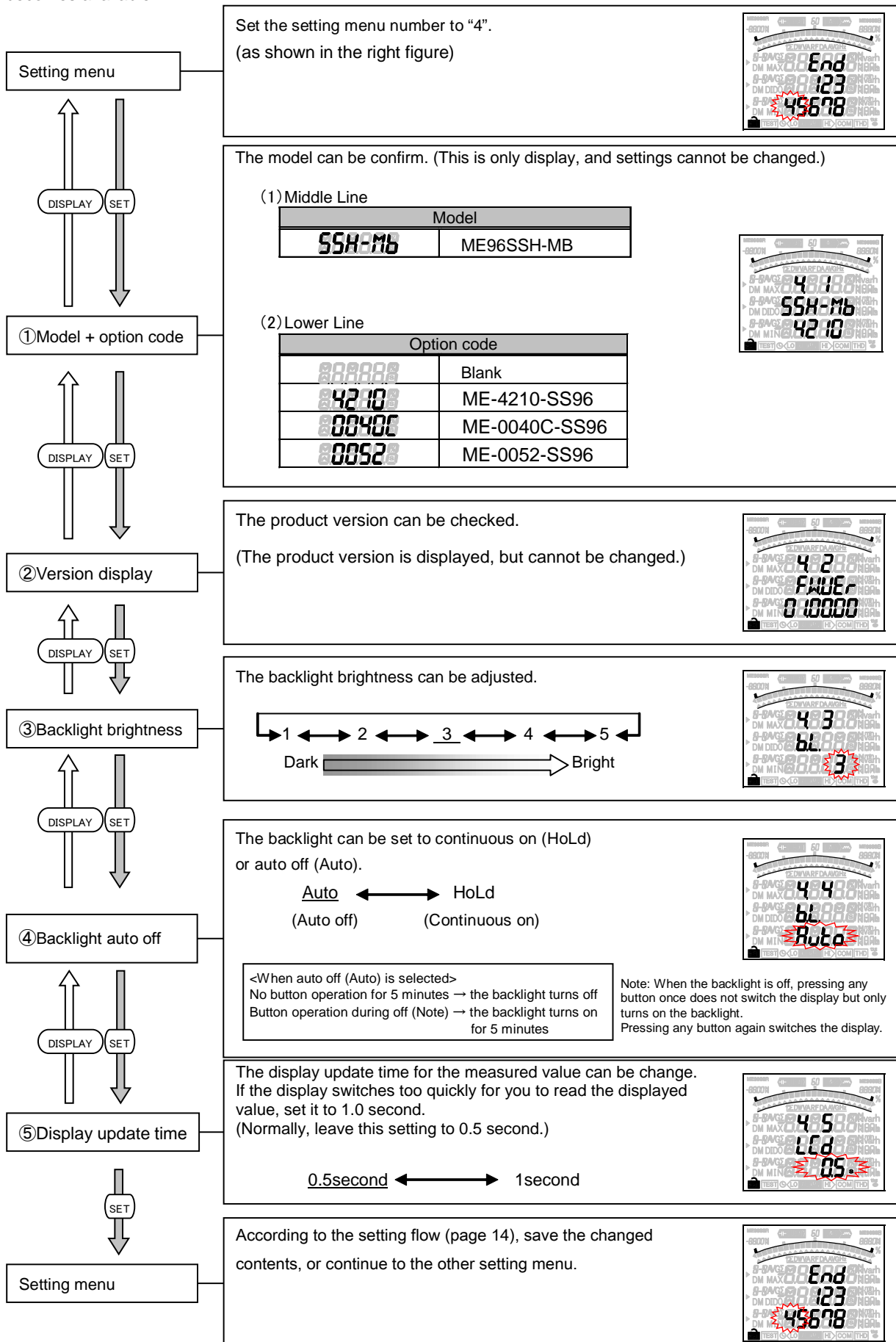
- Accuracy is defined to rated current. Although the maximum scale may display 120% or more of rated current and rated voltage in order to make a scale easy to read depending on the settings of VT/direct voltage and CT primary current, current input is within 100% of rated current.
- Even if a display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

- 22 -

3.Setting

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

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



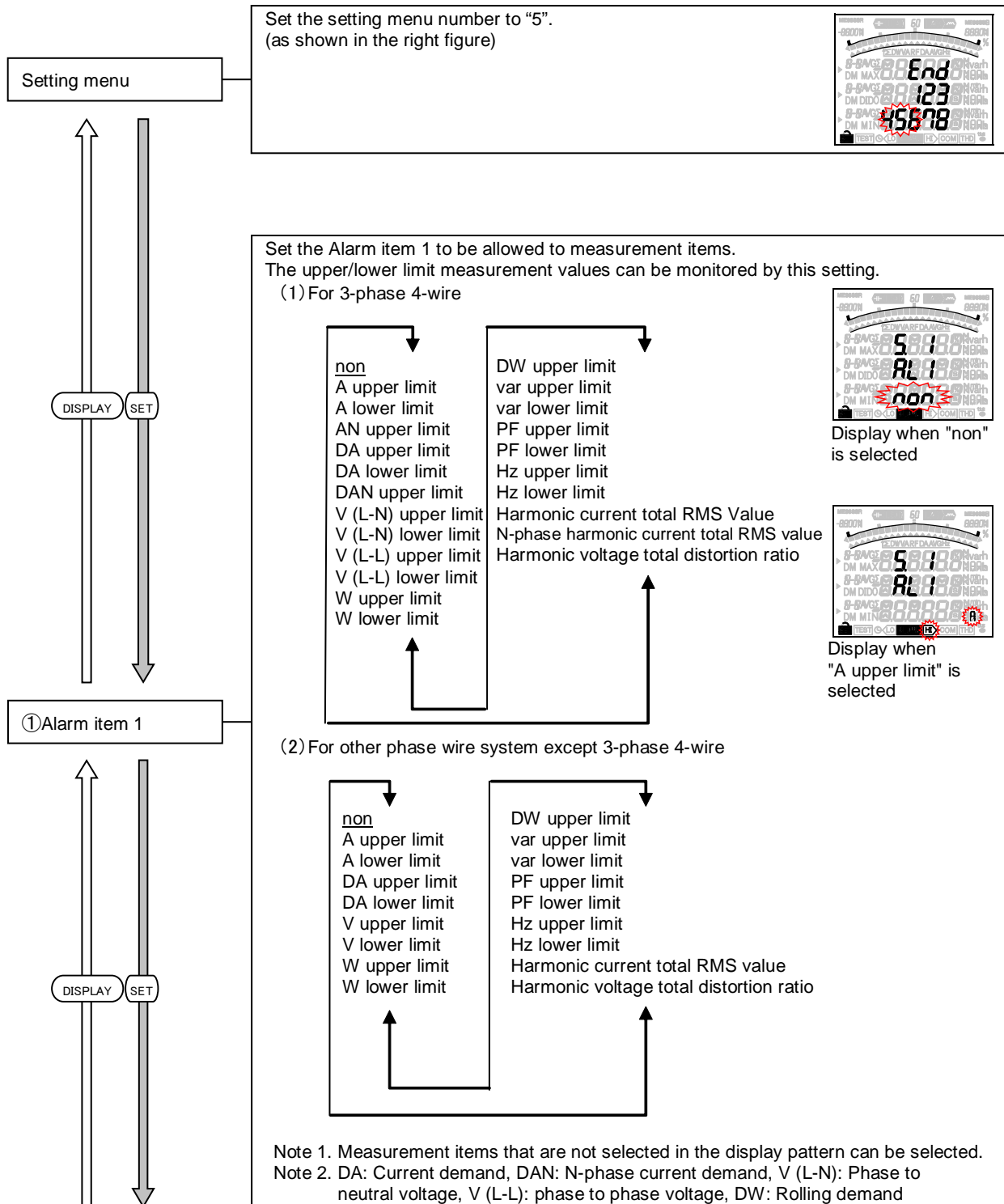
3.Setting

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

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

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

(For more details about each function, refer to the corresponding pages.
Upper/lower limit alarm → Pages 56 and 57, Motor startup current → Page 60)



3.Setting

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

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

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



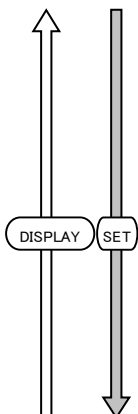
Note: W, DW, and var show the percentage for the maximum scale value (± 0 step).

A, AN, DA, DAN, Harmonic current total RMS value, N-phase harmonic current total RMS value shows the percentage for the CT primary current.

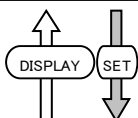
"V" shows the percentage for the VT primary voltage (or direct voltage).

(The "V" for 1-phase 3-wire is the percentage for phase to neutral voltage. Alarm monitoring is executed using twice the value which set upper/lower limit alarm for the 12-phase and 13-phase.)

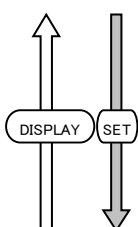
②Alarm value 1



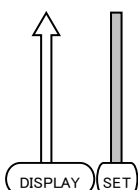
③Alarm item 2 to 4



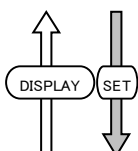
④Alarm value 2 to 4



⑤Alarm delay time



⑥Alarm cancel method



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

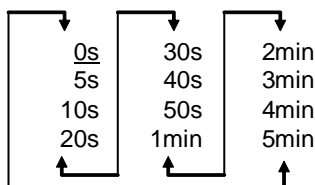
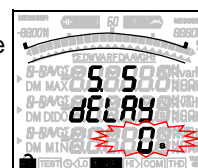
The setting method is the same as ①Alarm item 1.

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

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

Set the alarm mask time for when you want to prevent a momentary overload or noise alarm.

When this is set, an alarm is generated only when the alarm value over the upper/lower limit alarm value for a longer time than the delay time. On the setting screen, seconds are indicated by "s" and minutes are indicated by "min".



Note:

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

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

| Reset method (Setting value) | Description (Refer to pages 56 and 57) |
|------------------------------|--|
| Automatic (Auto) | When there is no alarm generation condition, alarm is automatically reset. |
| Manual (HoLd) | The alarm will continue even when the alarm generated conditions no longer exist. It is necessary to execute button operation to cancel the alarm. |

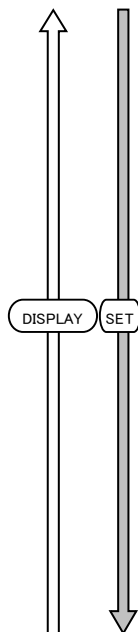


Note: When all settings for ①Alarm item 1 and ③Alarm item 2 to 4 are set to "non," this setting will be skipped.

3. Setting

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

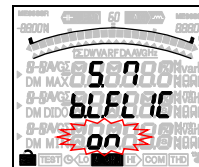
⑦ Backlight flickers during alarms



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

oFF ↔ on
(Not flicker) (Flicker)

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

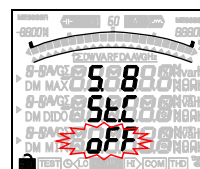


By using this setting for motor current monitoring delay time, it is possible to prevent unnecessary maximum value updating and unnecessary alarms caused by the motor startup current.

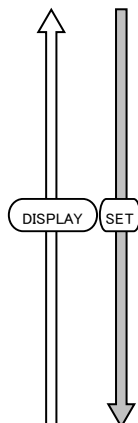
When this setting is not needed → Select "oFF" and press (SET) and return to the Setting Menu or go to menu 5.9(ME-4210-SS96)

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

oFF ↔ on



⑧ Motor starting current delay time



(1) Motor starting current value.

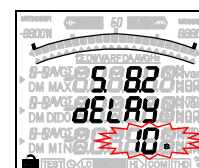
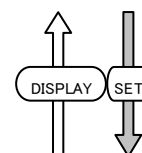
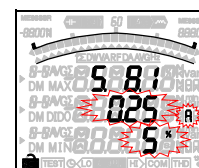
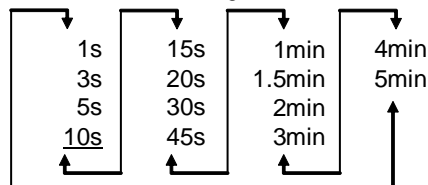
Set the value for detecting the motor starting current.

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

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

(2) Motor starting current delay time

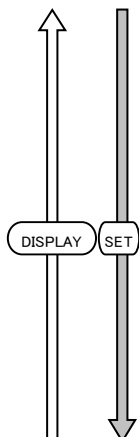
After the motor starting current is detected, maximum value update is not executed and an alarm is not generated for the delay time.



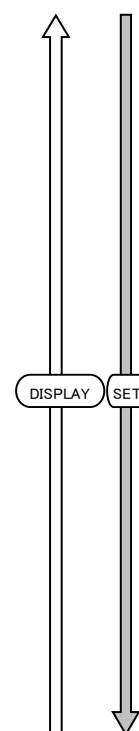
3.Setting

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

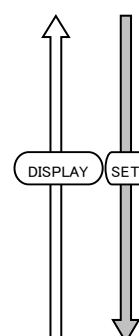
⑨Pulse/Alarm output 1



⑩Pulse output 1 output item



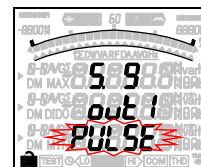
⑪Pulse output 1 pulse unit



Set the output function of Pulse/Alarm output 1.

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

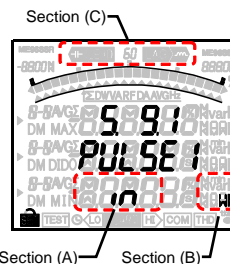
PULSE ↔ **AL**
(Pulse output) (Alarm output)



Set the item that is output to pulse output 1.

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

| Setting value | Display | | |
|----------------------------------|-------------|-------------|-------------|
| | Section (A) | Section (B) | Section (C) |
| Active energy (Imported) | 8888 | Wh | OFF |
| Active energy (Exported) | 8888 | Wh | OFF |
| Reactive energy (Imported, Lag) | 8888 | varh | LAG |
| Reactive energy (Imported, Lead) | 8888 | varh | LEAD |
| Reactive energy (Exported, Lag) | 8888 | varh | LAG |
| Reactive energy (Exported, Lead) | 8888 | varh | LEAD |
| Apparent energy | 8888 | VAh | OFF |
| Periodic active energy 1 | Wh1 | Wh | OFF |
| Periodic active energy 2 | Wh2 | Wh | OFF |
| non (No output) | non | OFF | OFF |



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

Set the pulse value of pulse output 1.

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

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

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

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

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

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

Note 1: When ⑩Pulse output 1 output item is set to "non", this setting will be skipped.

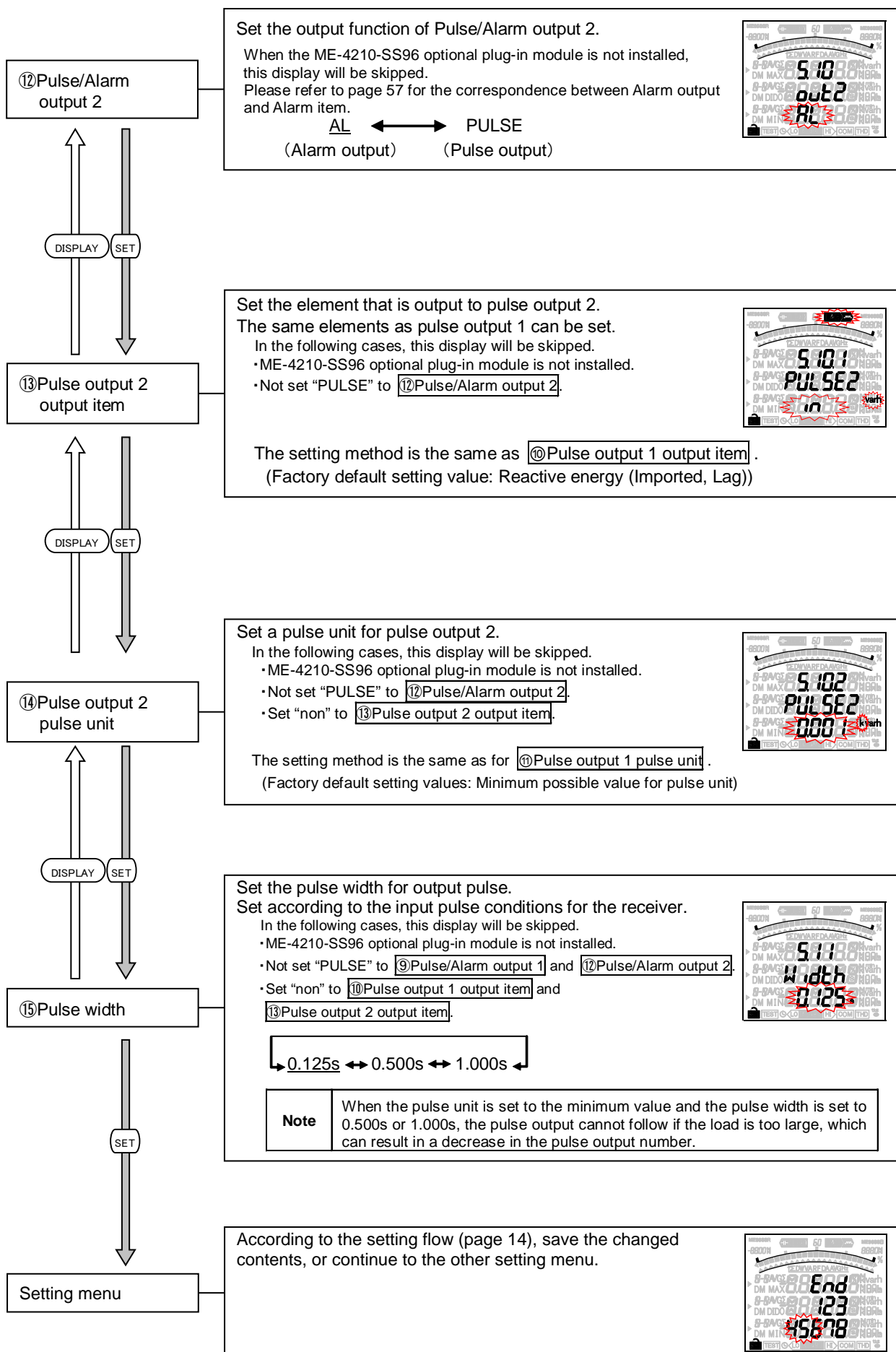
Note 2: The factory default setting values are minimum values for the pulse unit that can be set.

Note 3: For reactive power, kW in the above table needs to be read as kvar, kWh needs to be read as kvarh, and MWh needs to be read as Mvarh.

Note 4: For apparent power, kW in the above table needs to be read as kVA, kWh needs to be read as kVAh, and MWh needs to be read as MVAh.

3.Setting

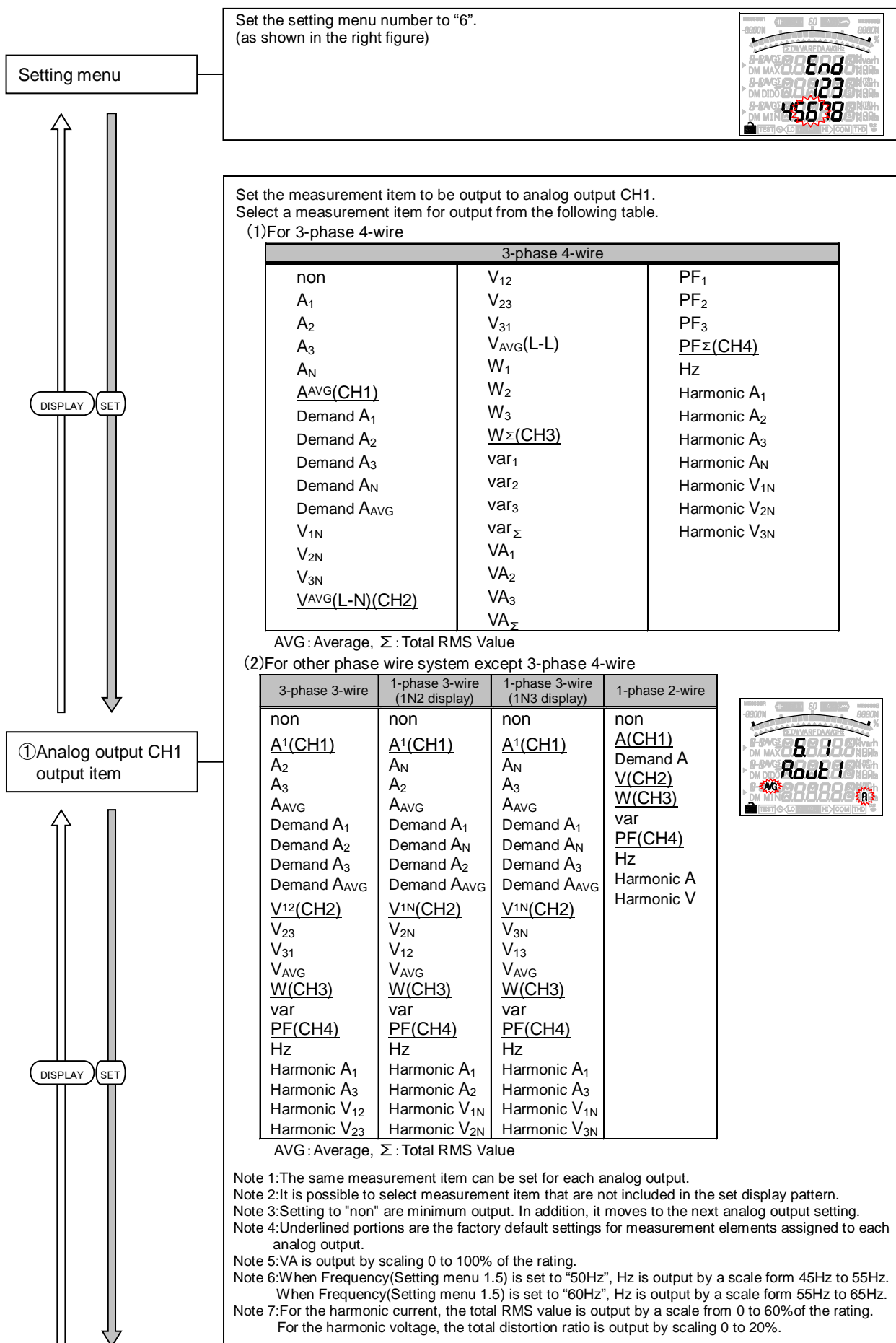
3.6 Setting Menu 5: Pulse and Alarm Settings (Setting Upper/Lower Limit Alarm, Motor Starting Current Mask Function, Pulse Output, etc.)



3. Setting


3.7 Setting Menu 6: Setting the Analog Output


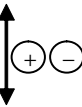
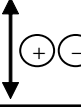

This section shows how to set analog output. When the ME-4210-SS96 optional plug-in module is not installed, this test menu will be skipped. In the operation mode, press (SET) and (RESET) simultaneously for 2 seconds or more, and the following operation becomes available.

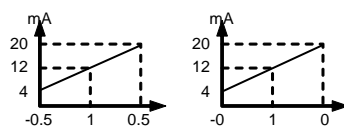
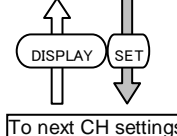
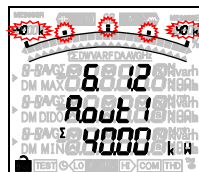
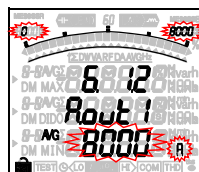
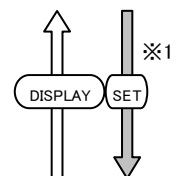
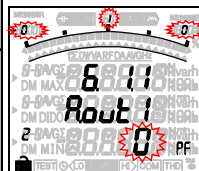
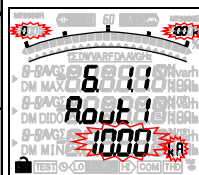


3.7 Setting Menu 6: Setting the Analog Output

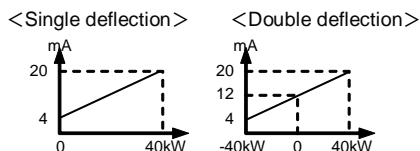
(The following setting can be made separately from the measurement items included in the display pattern.)

| Output item | Setting range *2 |
|-------------|---|
| A Demand A | <u>Primary Current</u> (1.4.1 Primary Current Setting value)  SP.(Special Setting) |

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

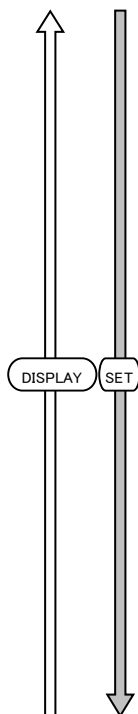
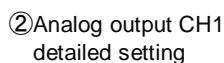


| Output item | Setting range *2 |
|---------------|---|
| A Demand A | <div style="display: flex; align-items: center; justify-content: space-between;"> <div style="text-align: center;"> <p>+3 STEP (About 120%)</p> <p>↓</p> <p>±0 STEP (100% : Rating)</p> <p>↓</p> <p>-10 STEP (About 40%)</p> </div> <div style="text-align: center;"> <p>↕</p> <p>(+) (-)</p> <p>↕</p> </div> </div> |
| W | <p><u>Single deflection</u> ↔ Double deflection</p> |



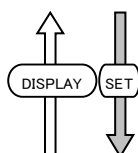
*1. When var or PF are set as output items, it moves to the next analog output settings.

*2. Detailed setting values are according to the values shown in the table on pages 64 to 66.



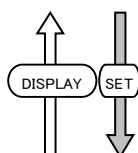
③Analog output CH2 to CH4 measurement item

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



④ Analog output CH2 to CH4 detailed settings

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



⑤Analog output limit

SET

↓

Setting menu

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

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

oFF : +5%
on : +1%

20 mA

4 mA

oFF : -5%
on : -1%

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

According to the setting flow (page 14), save the changed contents, or continue to the other setting menu.

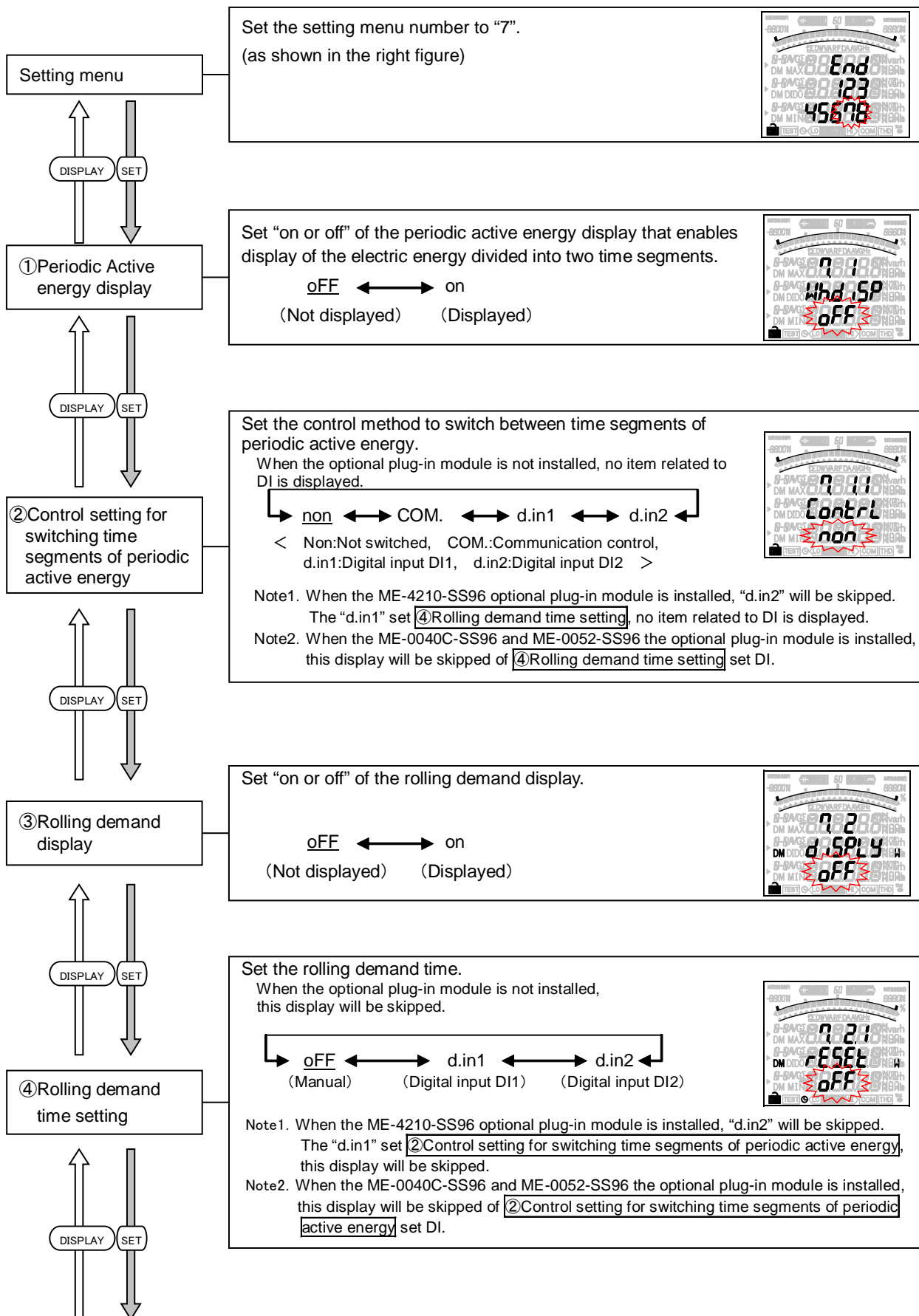
3. Setting

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

Set the periodic active energy, rolling demand, and digital input/output.

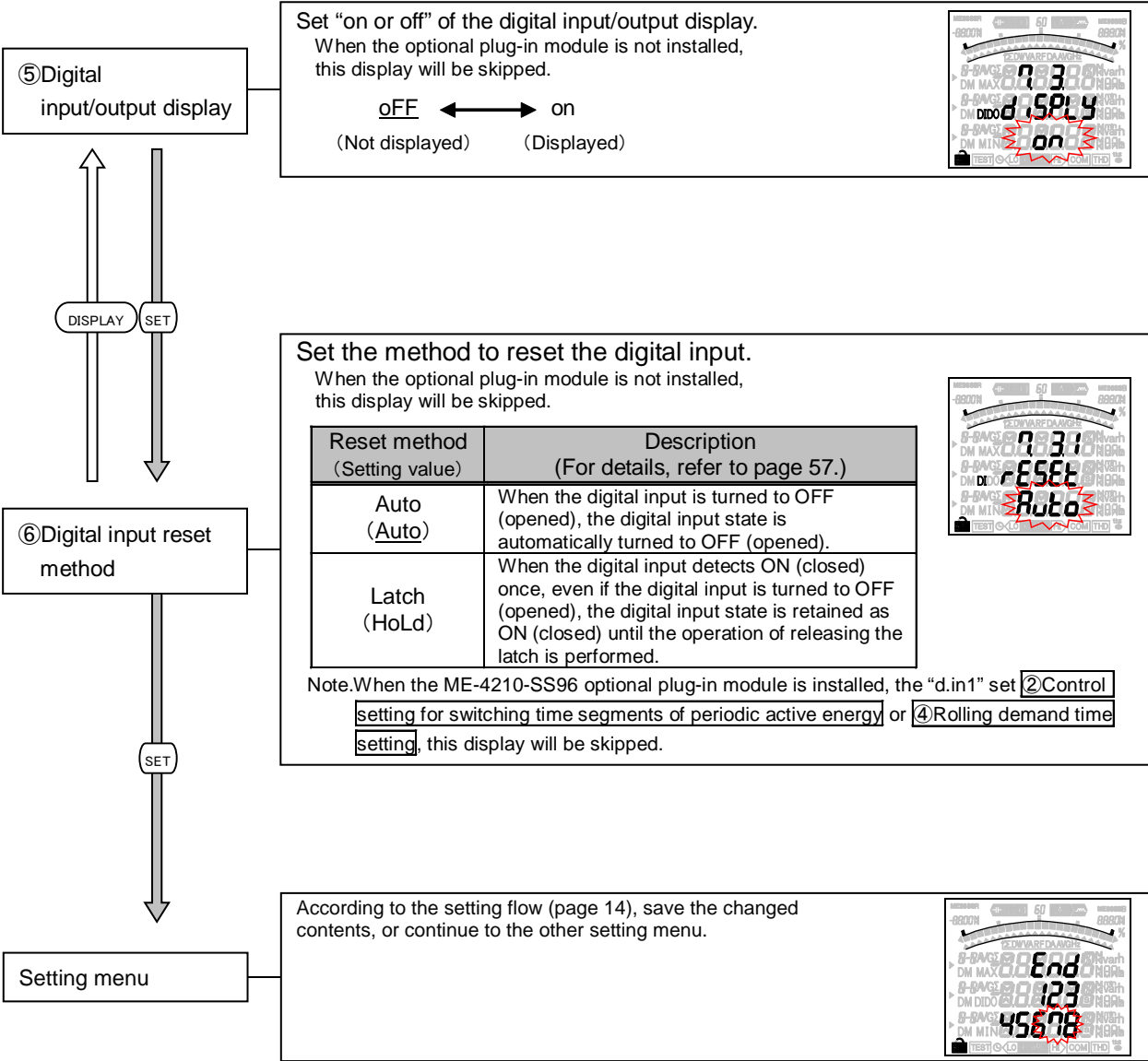
In the operation mode, press **SET** and **RESET** simultaneously for 2 seconds or more, and the following operation becomes available.

(For more details about each function, refer to the corresponding pages.
Periodic Active Energy ⇒page 57, Rolling Demand ⇒page 58, digital input/ output ⇒page 59)



3. Setting

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



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

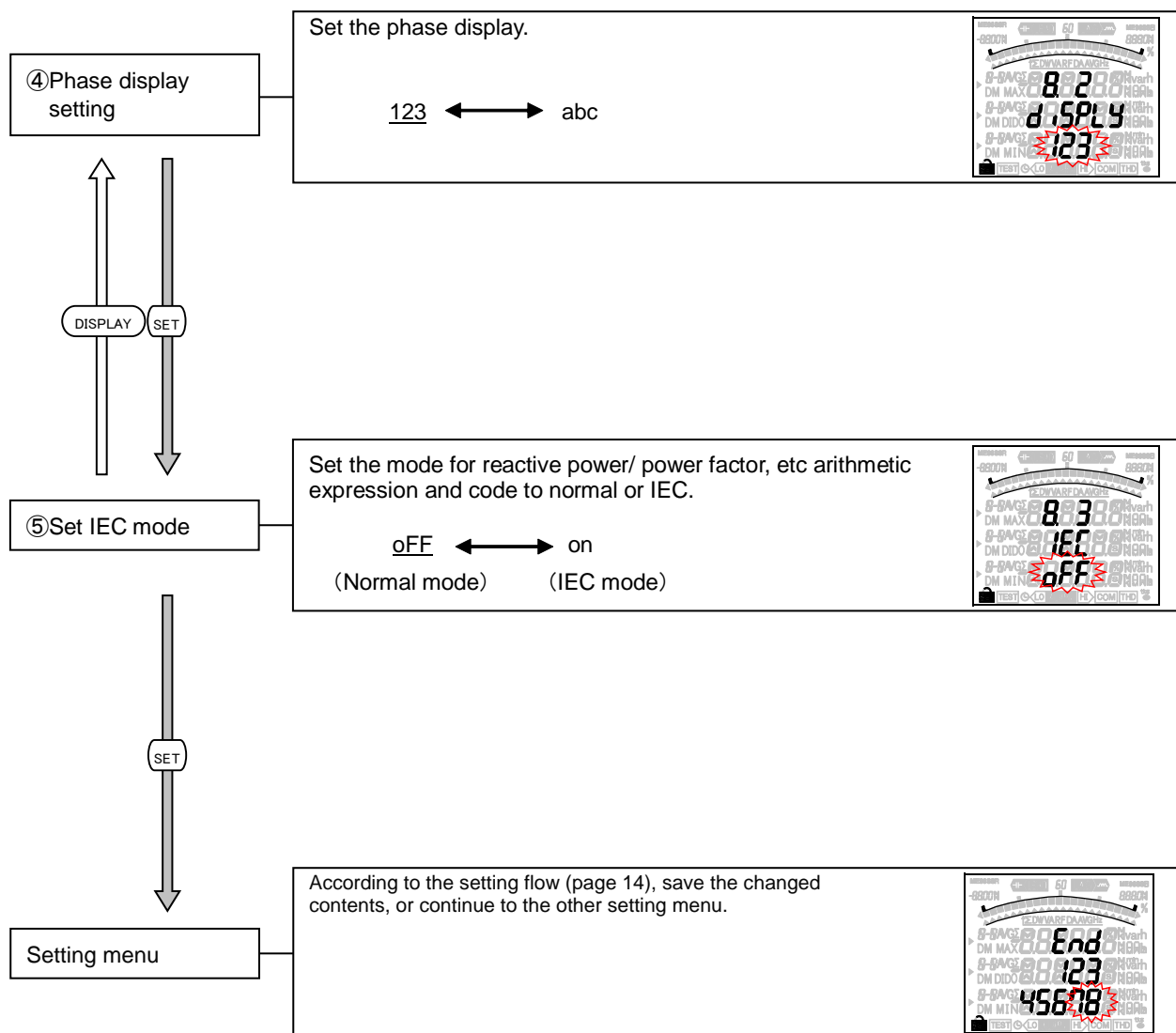
In the operation mode, press **SET** and **RESET** simultaneously for 2 seconds or more, and the following operation becomes available.

For more details about each function, refer to the corresponding pages.
Operation time ⇒ page 59, IEC mode ⇒ page 54



3. Setting

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



3.Setting

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

● Setting Value Confirmation

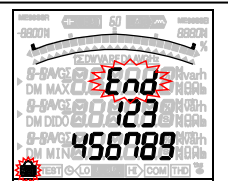
When **(SET)** is pressed for at least 2 seconds in the operation mode, the following operation becomes available.

Setting value confirmation menu

The screen transitions and operations are the same as for Setting Menus 1 to 8.

Refer to Setting Menus 1 to 8 (pages 15 to 35).

(Note: Settings cannot be changed in the Setting value confirmation mode.)



● Test Mode

Press **(SET)** for 2 seconds to move the set values confirmation mode.

Select setting value confirmation menu number "9". Press **(SET)** to move to test mode.

For more information about how to use the Test Mode, refer to page 42 or later.

3. Setting

3.11 Initializing Related Items by Changing Settings

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

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

● : The setting value will be reset to the default value.

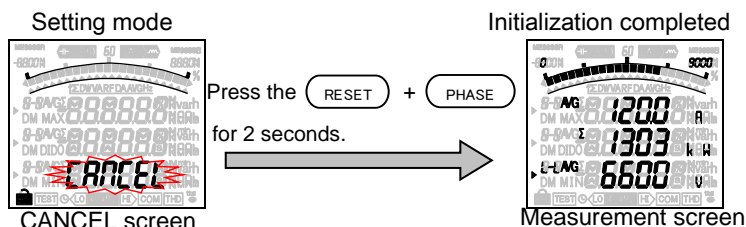
○ : The setting will be reset to the value corresponding to the phase wire system.

Note: The settings will not return to the default values when the setting is switched only between "1N2 display" and "1N3 display" in the 1-phase 3-wire setting.

3.12 Initializing All Settings

When the following operations are executed, all settings are initialized to the factory defaults. Only the settings are initialized to the defaults. The Maximum/minimum value and the measured active energy value, etc are not initialized. To initialize all settings to the factory defaults, execute the following operation from the CANCEL screen in the setting mode.

For more information about how to get to the CANCEL screen, refer to 3.1 setting flow (page 13).



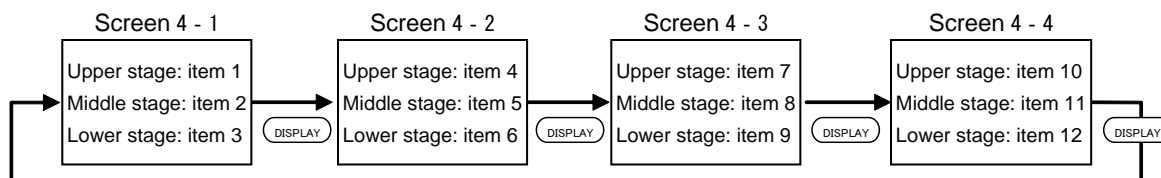
3. Setting

3.13 Setting the Special Display Pattern P00

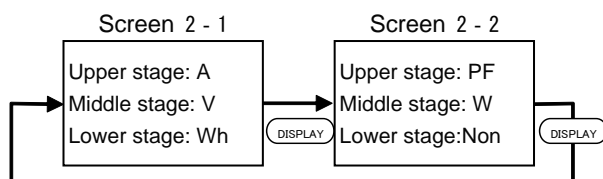
Even if there is no display pattern that you like in the display patterns P01 to P13, individual setting is available by the display pattern P00.

This setting is made in the setting menu 1. Explanation begins with the set "P00" in ②display pattern of the setting menu 1 (page 15). (Others are omitted here, so refer to the setting menu 1.)

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



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



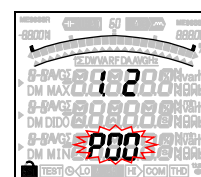
- (3) Setting method

②Display pattern

Set the display pattern.

- (1) Select "P00".

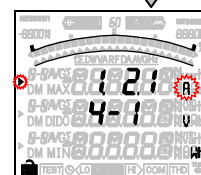
Select "P00" by (+) or (-) and press (SET).



SET

- (2) Set the upper stage of the display 4-1 to A.

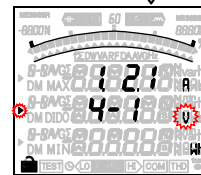
Select "A" by (+) or (-) and press (SET).



SET

- (3) Set the middle stage of the display 4-1 to V.

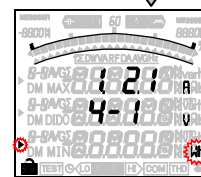
Select "V" by (+) or (-) and press (SET).



SET

- (4) Set the lower stage of the display 4-1 to Wh.

Select "Wh" by (+) or (-) and press (SET).



SET

3.Setting

3.13 Setting the Special Display Pattern P00

Continued form the previous page

(5) Set the display of the display 4-2.

Select "yES" by \oplus or \ominus and press $\boxed{\text{SET}}$.

When you do not want to display the display 2,
select "no" and press $\boxed{\text{SET}}$.

(6) Set the upper stage of the display 4-2 to PF.

Select "PF" by \oplus or \ominus and press $\boxed{\text{SET}}$.

(7) Set the upper stage of the display 4-2 to W.

Select "W" by \oplus or \ominus and press $\boxed{\text{SET}}$.

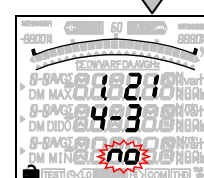
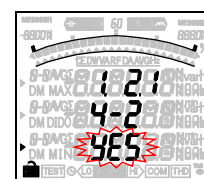
(8) Set the lower stage of the display 4-2 to no display.

Set the unit code of the lower stage to no display
by \oplus or \ominus and press $\boxed{\text{SET}}$.

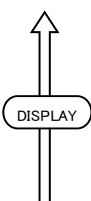
(9) Set the display 4-3 to no display.

Select "no" by \oplus or \ominus and press $\boxed{\text{SET}}$.

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



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



③VT / direct voltage

(hereafter same as the setting menu 1)

Note

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

3.Setting

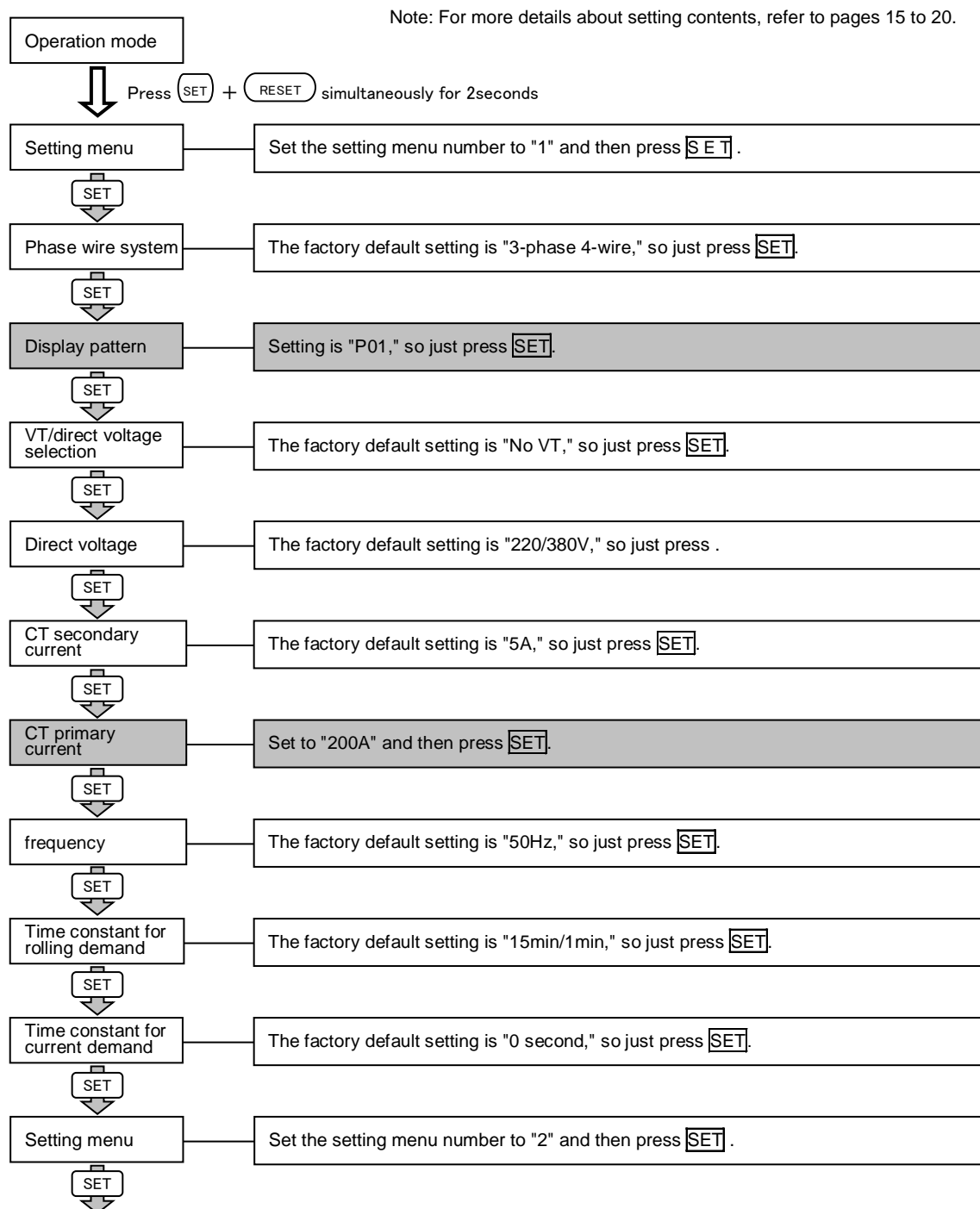
3.14 Examples of Simple Settings

The following shows a simple setting example.

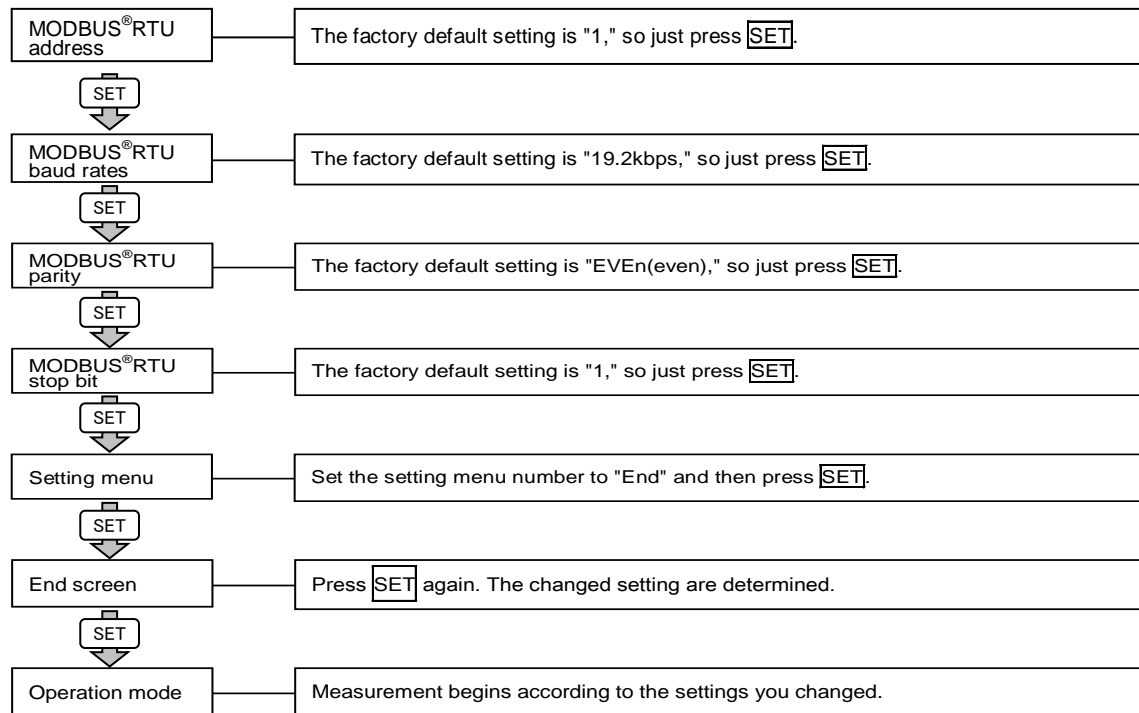
■ Setting Example Model: ME96SSH-MB (Not option unit)
Phase wire system : 3-phase 4-wire
Measuring element : A, V, W, PF
Input Voltage :220/380V
CT primary current : 200A
CT Secondary current:5A
frequency :50Hz
MODBUS®RTU: address 1, baud rates 19.2kbps, parity even, stop bit 1

■ Setting Procedure

Items of which setting value need to be changed are indicated by .



3.14 Examples of Simple Settings



4. Using Test Mode

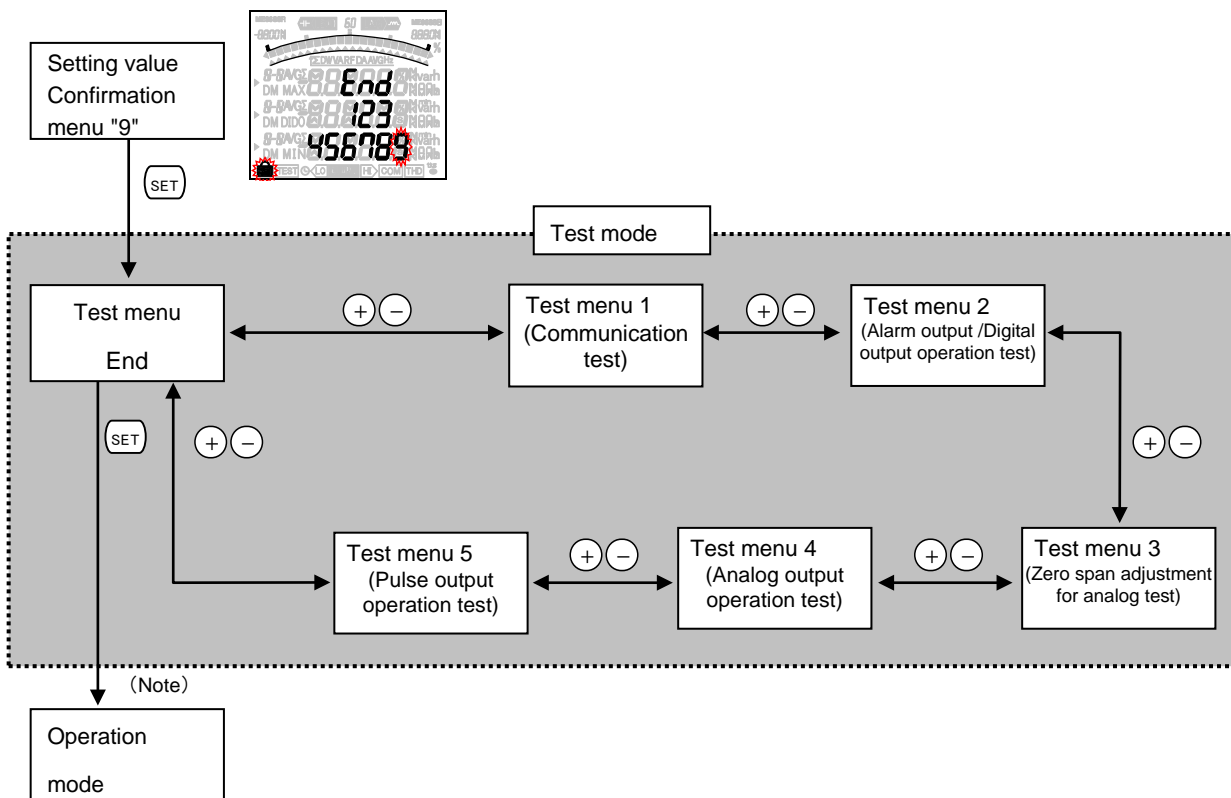
Test mode includes functions that can be used for start-up of equipment.
The following table shows what can be done in the test mode.

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

■ Test Procedure

- ① Press **[SET]** for 2 seconds to move to the set value confirmation mode.
- ② Select setting value confirmation menu number "9" by **[+]** and **[-]**.
- ③ Press **[SET]** to move to test mode.
- ④ Execute tests using each test menu. (Refer to pages 43 to 47)

■ Test Mode Flow

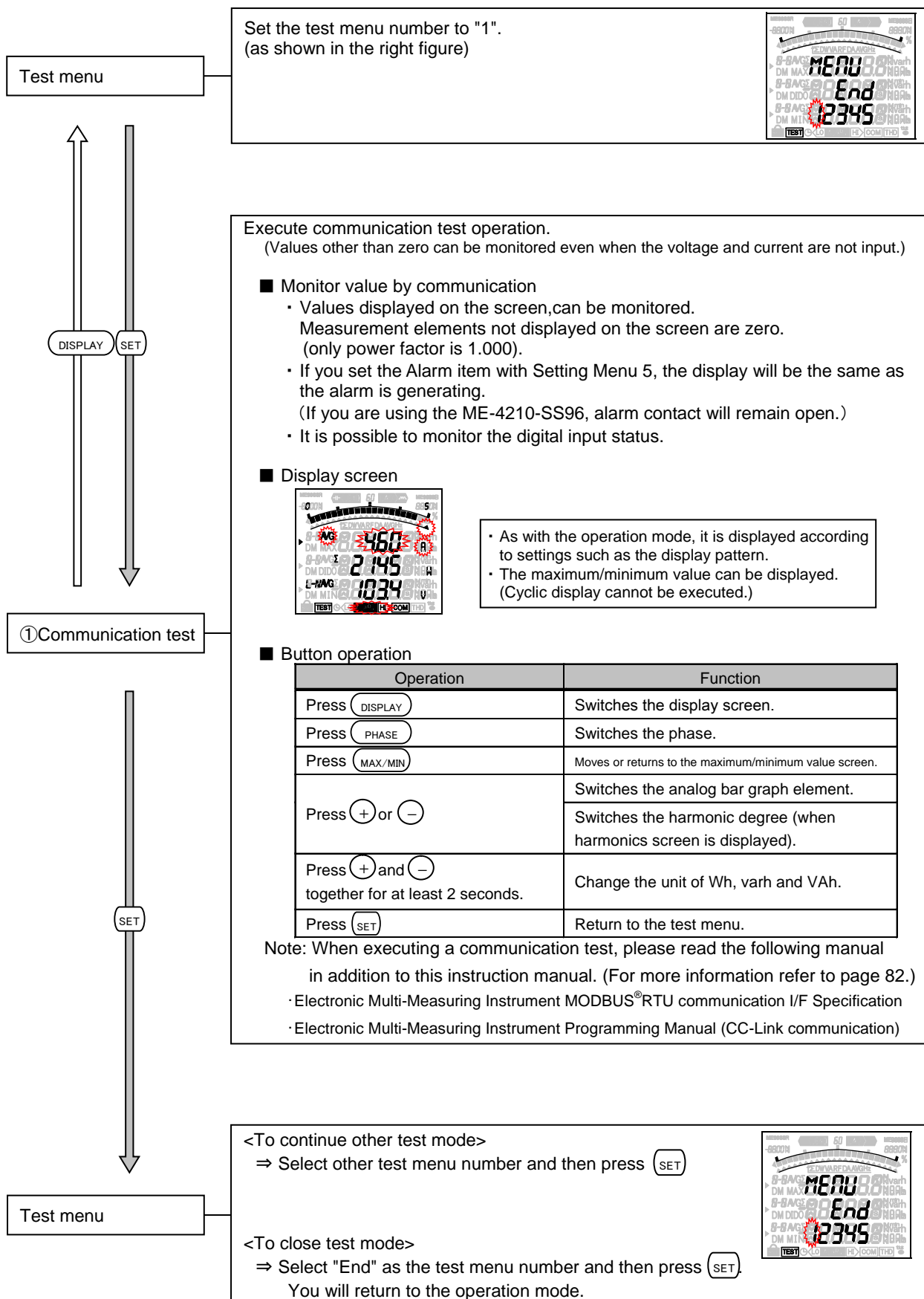


(Note) The screen momentarily turns off.

4. Using Test Mode

4.1 Test Menu 1: Communication Test

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

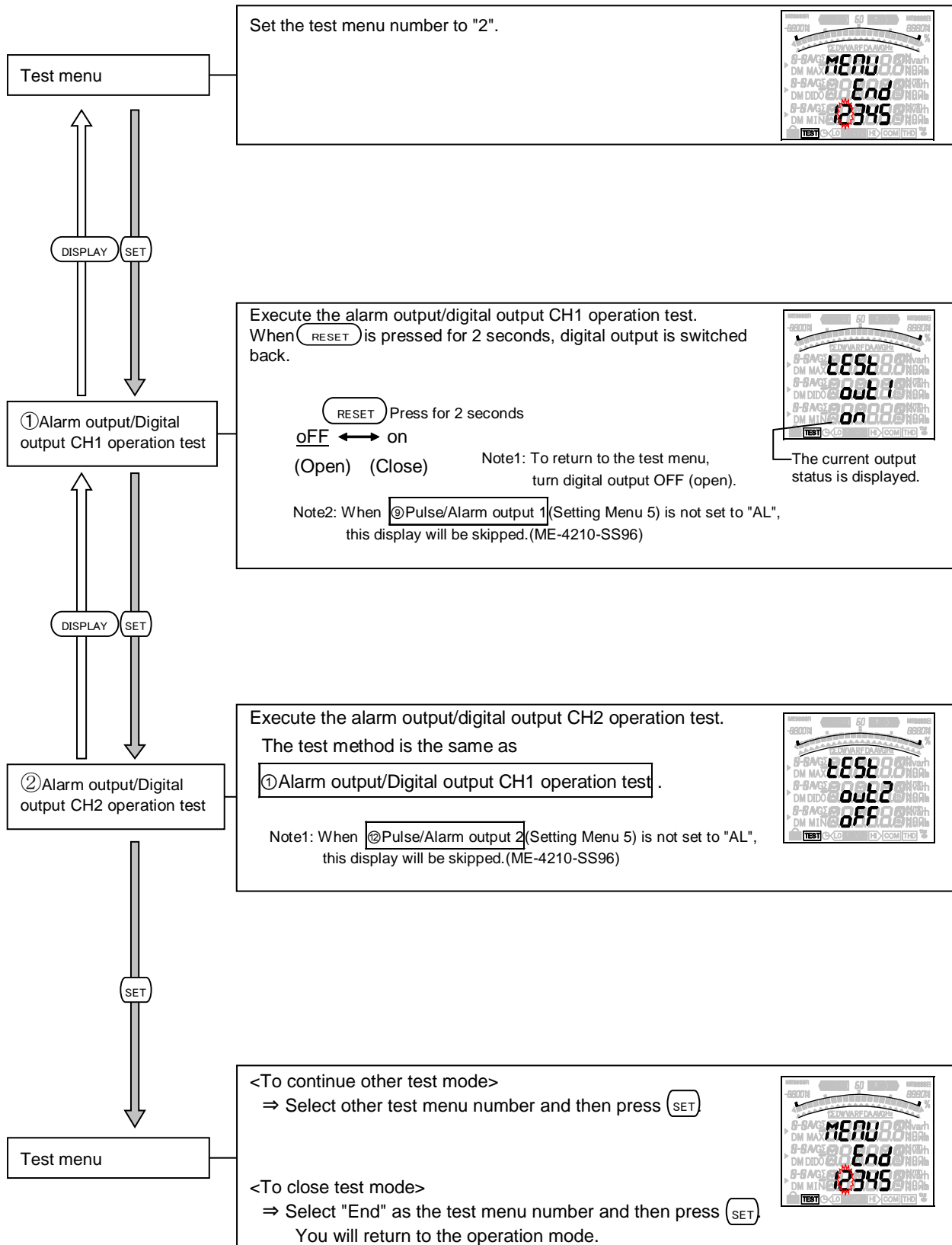


4. Using Test Mode

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

The following operations are available in the test mode.

- When the ME-4210-SS96 or ME-0052-SS96 optional plug-in module is not installed, this test menu will be skipped.
- When **⑨Pulse/Alarm output 1** (Setting Menu 5) and **⑩Pulse/Alarm output 2** (Setting Menu 5) is not set to "AL", this test menu will be skipped. (ME-4210-SS96)

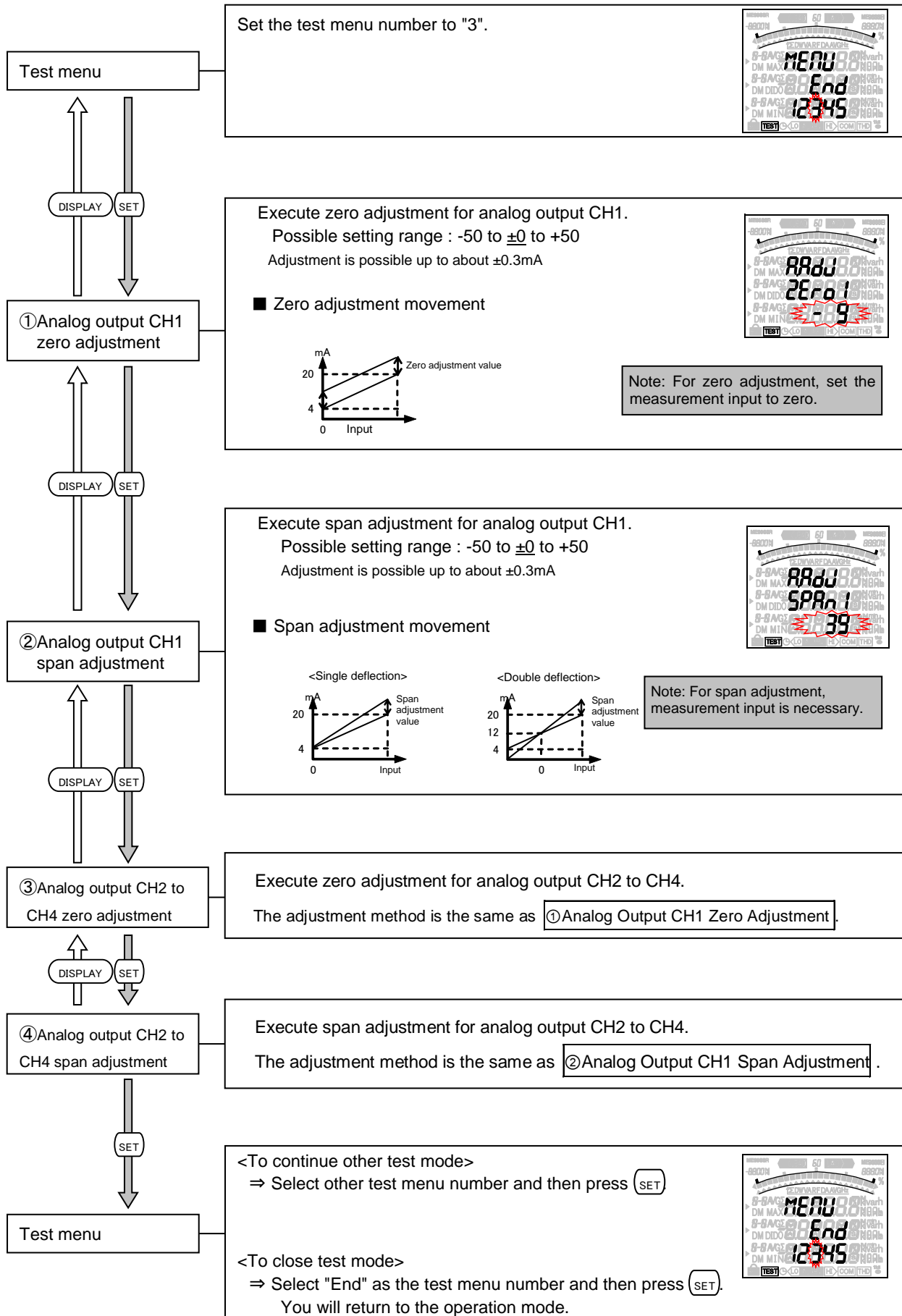


4. Using Test Mode

4.3 Test Menu 2: Zero Span Adjustment for Analog Output

The following operations are available in the test mode.

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

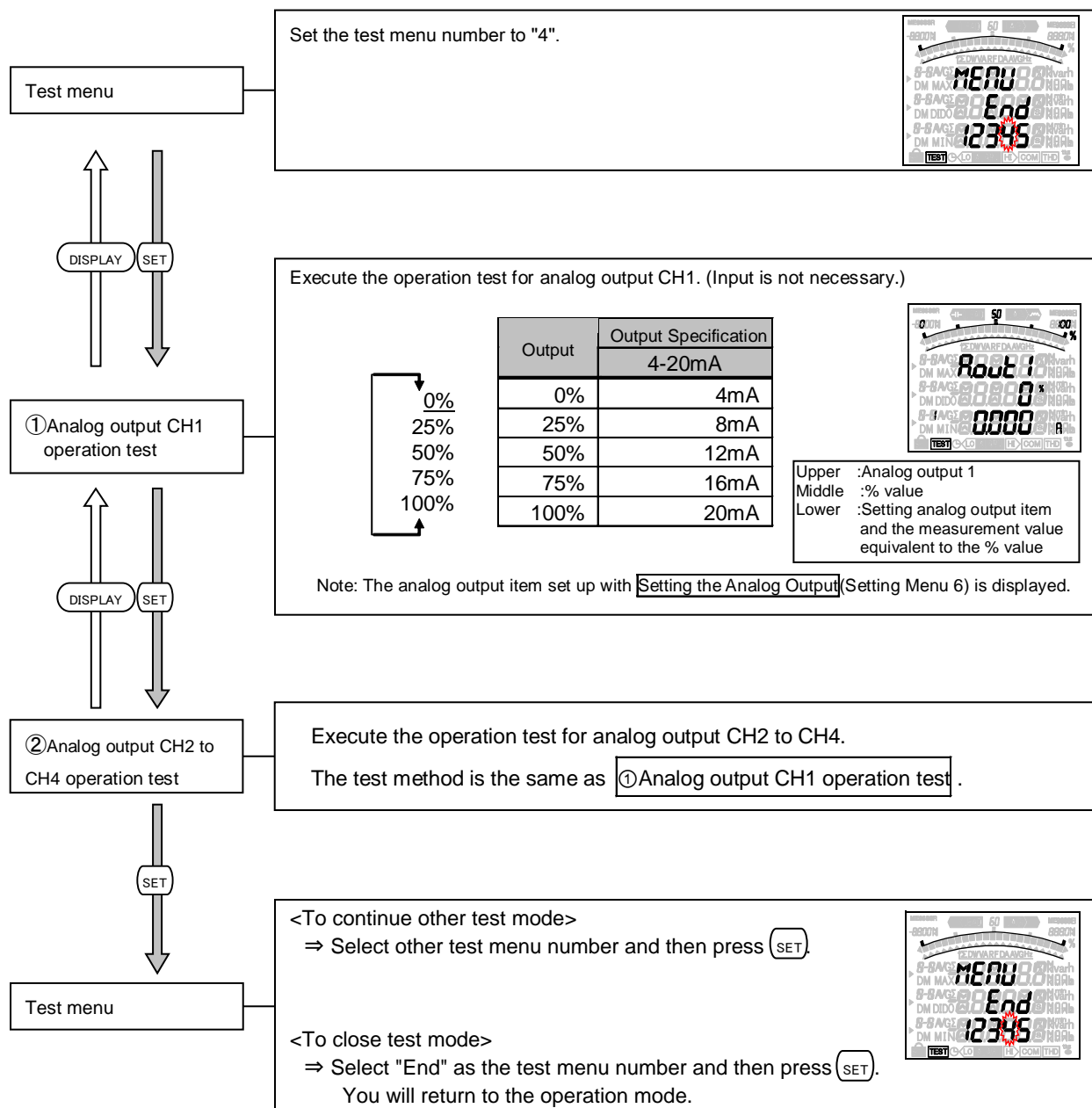


4.Using Test Mode

4.4 Test Menu 4: Analog Output Operation Test

The following operations are available in the test mode.

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

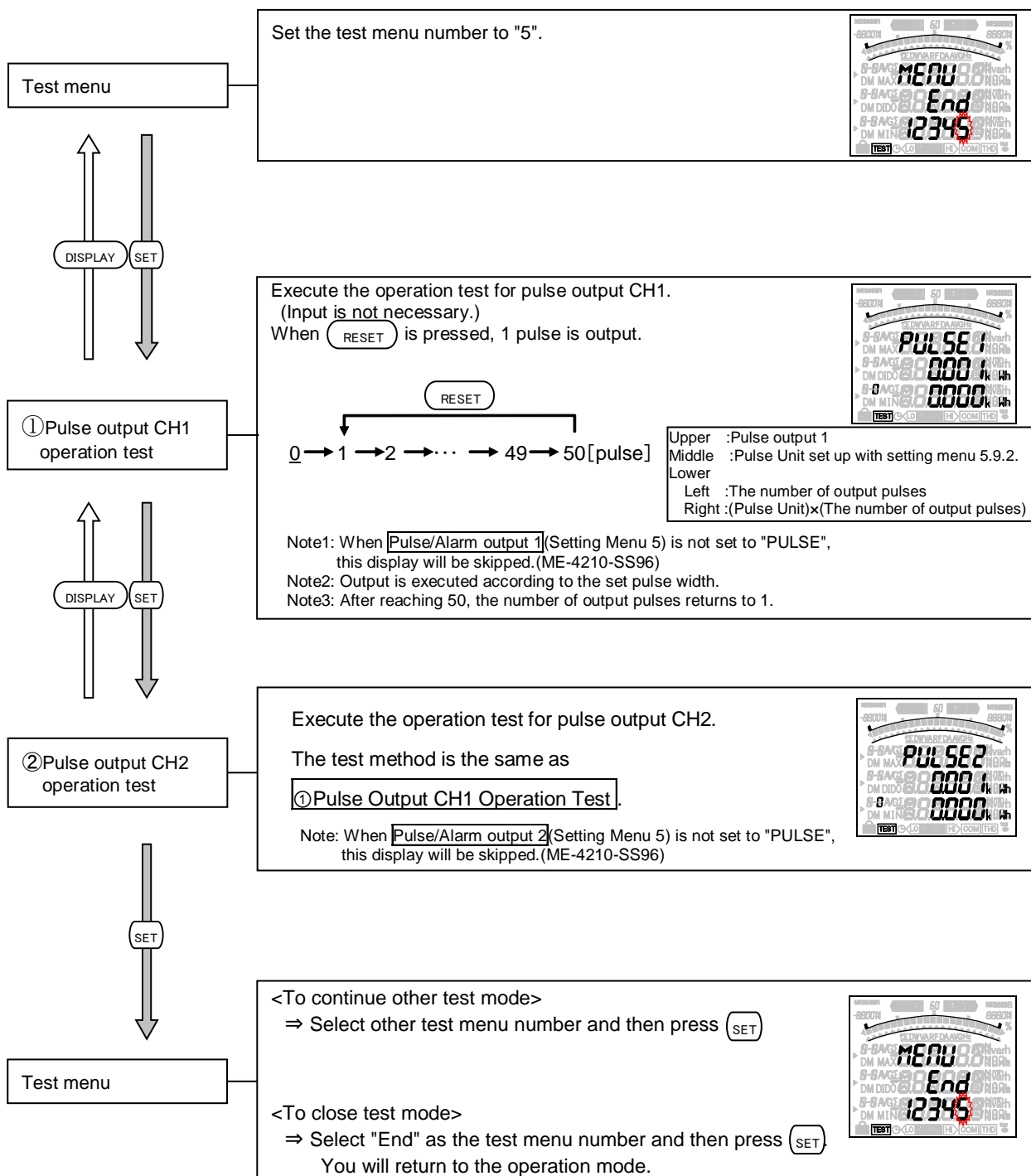


4. Using Test Mode

4.5 Test Menu 5: Pulse Output Operation Test

The following operations are available in the test mode.

- When the ME-4210-SS96 optional plug-in module is not installed, this test menu will be skipped.
- When ⑨Pulse/Alarm output 1 (Setting Menu 5) and ⑩Pulse/Alarm output 2 (Setting Menu 5) is not set to "PULSE", this test menu will be skipped. (ME-4210-SS96)



5. Operation

5.1 Basic Operation

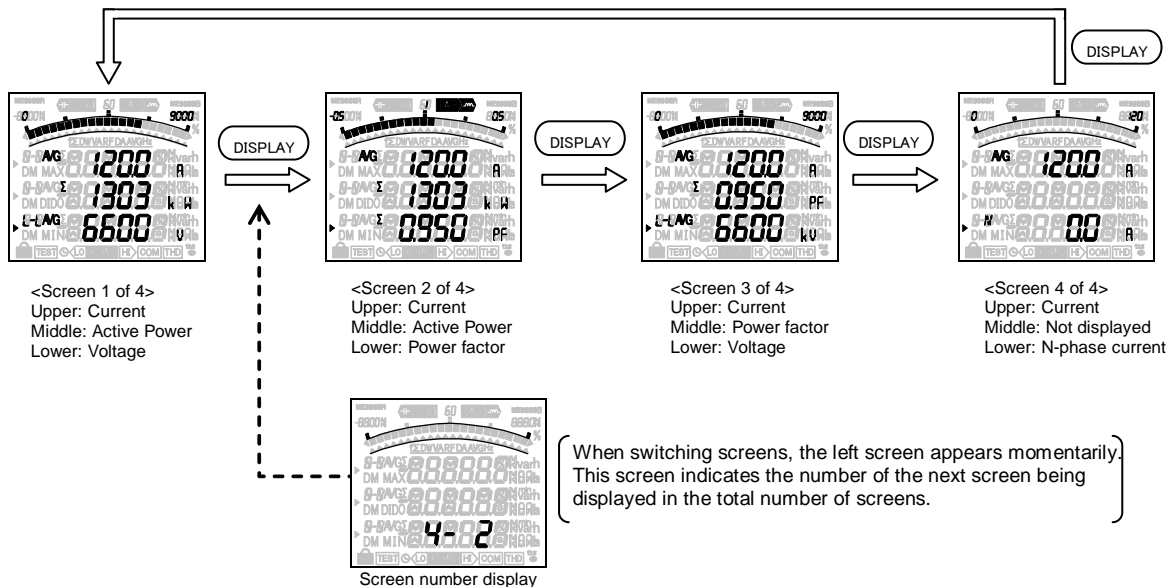
The following explains basic usages during operation.

● Switch display

By pressing **DISPLAY**, the measurement display will switch over.

(Display items and the order differ depending on the phase wire method setting display pattern settings and additional screen. For more information about detailed display patterns, refer to pages 61 and 62.)

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



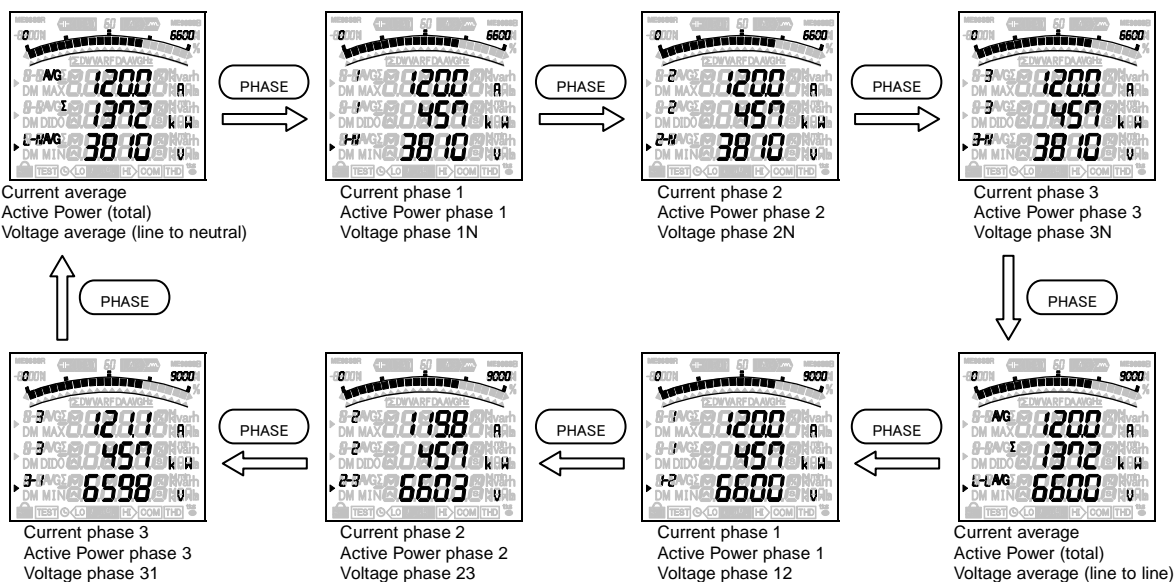
● Switch phase

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

The phase cannot be switched in the following cases.

- Measurement elements without phase (Frequency)
- Active power, reactive power, and power factor for settings other than 3-phase 4-wire
- When the setting is 1-phase 2-wire

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

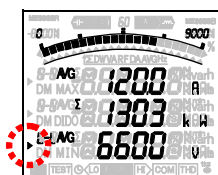


5. Operation

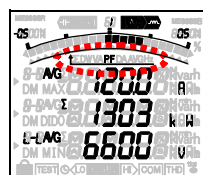
5.1 Basic Operation

● Bar graph display

Bar graph displays the measurement element indicated with “▶” or “⬆”.



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



(Example) PF displayed on bar graph

● Switching measurement factors displayed on bar graphs

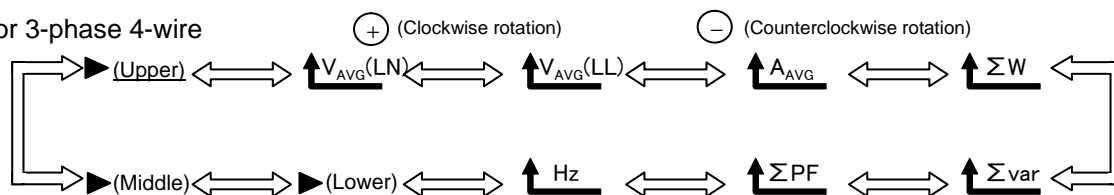
Press the (+) or (−) button to switch.

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

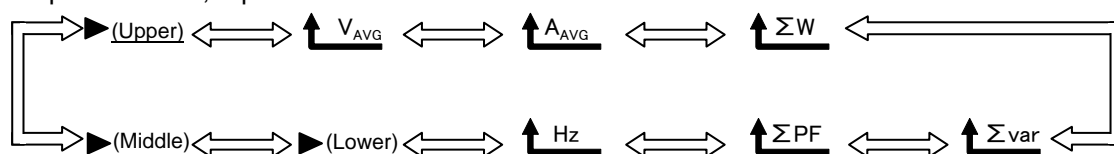
The bar graph cannot be displayed in the following cases.

- When active energy / reactive energy / apparent energy are selected
- When a line without measurement display is selected
- Rolling Demand Display
- Harmonics Display

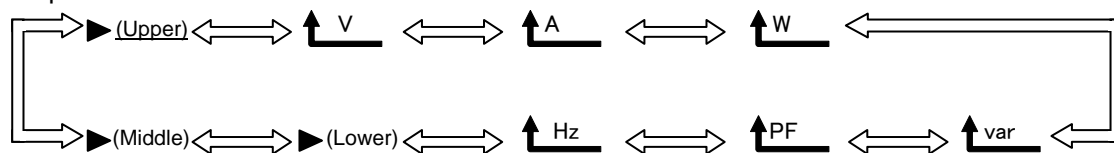
(1) For 3-phase 4-wire



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



(3) For 1-phase 2-wire



5. Operation

5.1 Basic Operation

● Cyclic Display

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

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

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

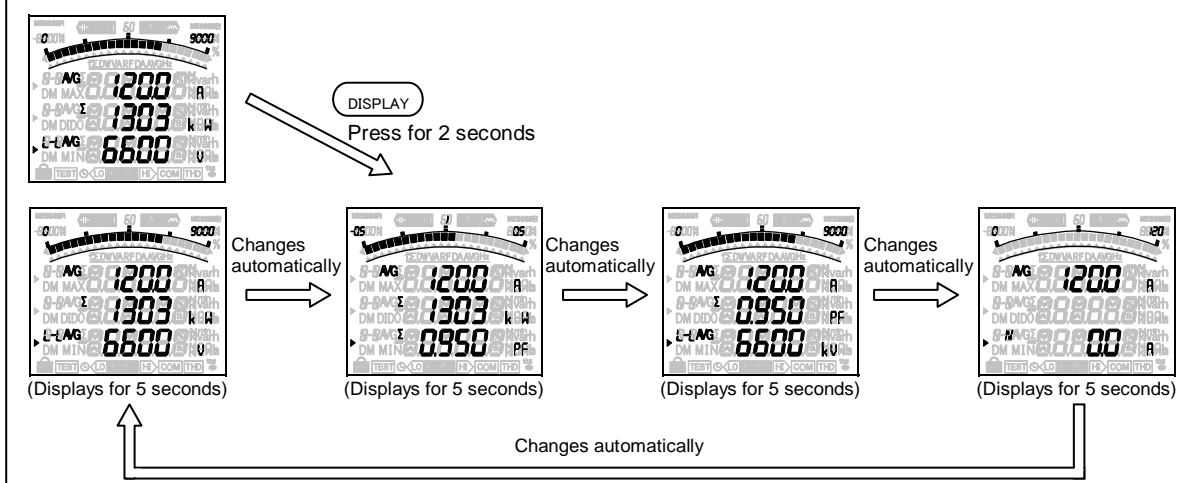
By pressing any other buttons except **SET**, cyclic display mode ends.

Note 1: Before shifting to the cyclic display change screen, the display flickering 3 times.

Note 2: In the cyclic display, drawing number is not displayed.

Note 3: In the maximum value and the minimum value display, cyclic display is not available.

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



● Harmonics display

Harmonic RMS value and distortion ratio can be displayed.

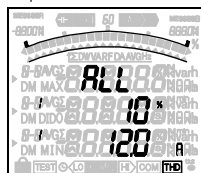
It is necessary to set the harmonics display settings before displaying. (Refer to page 22)

■ Measurement items

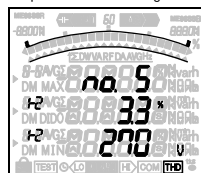
| Degree | Harmonic current | | N-phase harmonic current | | Harmonic voltage | |
|--|------------------|------------------|--------------------------|------------------|------------------|------------------|
| | RMS value | Distortion ratio | RMS value | Distortion ratio | RMS value | Distortion ratio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

■ Example Display

<Example of harmonic current total display>



<Example of harmonic voltage 5th display>



Upper: Degree
Middle: Distortion ratio
Lower: RMS value

Note : Harmonic total is shown by "ALL".

5. Operation

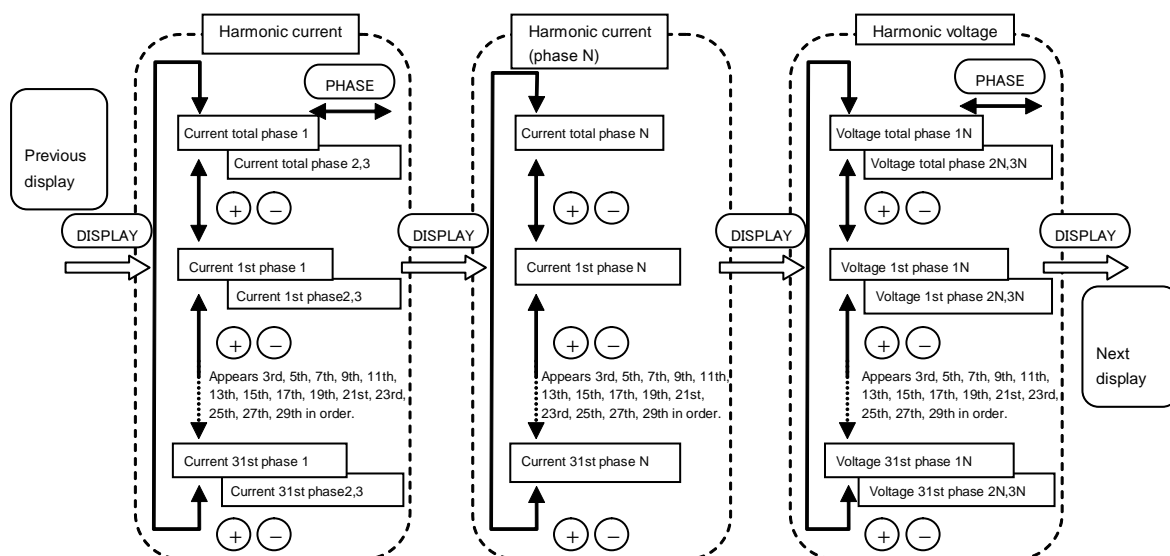
5.1 Basic Operation

● Harmonics display (Continued from previous page)

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

Press the \oplus or \ominus button to switch the degree.

Press PHASE to switch phases.



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

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

5. Operation

5.1 Basic Operation

● Maximum value and minimum value display

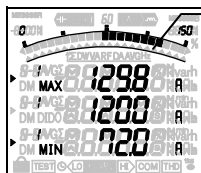
For the maximum / minimum value display screen, the maximum value, current value, and minimum value for each measurement item are displayed on one screen.

However, for harmonics only the following maximum values are displayed.

Harmonic current: Total, 1st to 31st (only odd number) effective values for where the phase was largest for each phase.
Harmonic voltage: Total distortion factor, 1st effective value, 3rd to 31st (only odd number) content factors for where the phase was largest for each phase

■ Example Display

<Example of current>



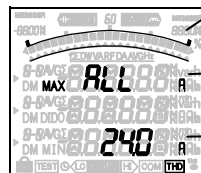
The bar graph turns on only between the maximum value and minimum value.

Upper: Maximum value

Middle: Current value

Lower: Minimum value

<Example of current harmonics>



Harmonics won't display as bar graph.

Harmonic degree

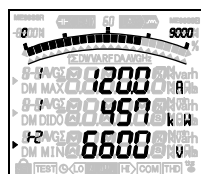
Maximum value

● Display of maximum value and minimum value

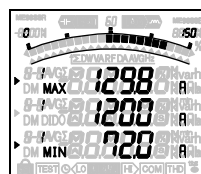
When **MAX/MIN** is pressed, the display is changed into the maximum value and minimum value display.

And when **MAX/MIN** is pressed, the display changes back to the present value display.

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



Present value display



Maximum value and minimum value display

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

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

● Clear the maximum/minimum value

On the maximum/minimum value display screen, press the **RESET** for 2 seconds to clear the maximum/minimum value for the displayed measurement item to the present value.

On the maximum/minimum value display screen, press the **+** and **RESET** together for 2 seconds to clear all maximum/minimum values to the present value.

When the password protection setting is enabled, maximum/minimum values are cleared after you enter the password. Also, you can clear all maximum/minimum values by communication function. (In this case, the password is not necessary.)

5.Operation

5.1 Basic Operation

● Active Energy / Reactive Energy / Apparent Energy Display

■ Display format

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

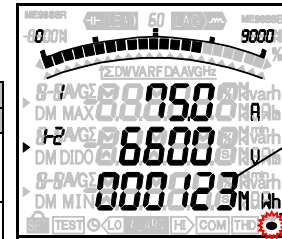
$$\text{Total load power[kW]} = \frac{\alpha \times (\text{VT primary voltage}) \times (\text{CT primary current})}{1000}$$

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

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

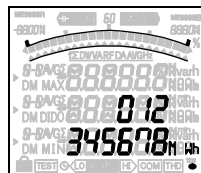
| Total load [kW] | Display type | |
|--------------------------------------|-----------------|--|
| | Digital Display | Unit |
| Less than 10 | 888888 | kWh |
| 10 or higher and less than 100 | | (Unit can be changed from Wh/kWh/MWh.) |
| 100 or higher and less than 1000 | | |
| 1000 or higher and less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

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



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

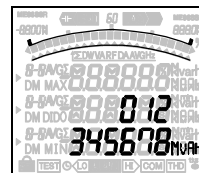
■ Example Display



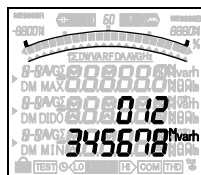
Active energy (Imported)



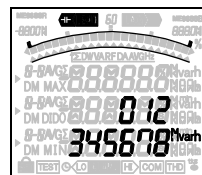
Active energy (Exported)*



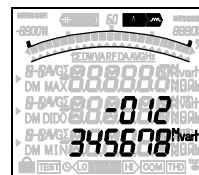
Apparent energy



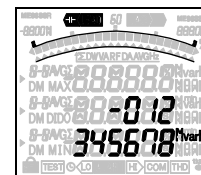
Reactive energy (Imported lag)



Reactive energy (Imported lead)*



Reactive energy (Exported lag)*



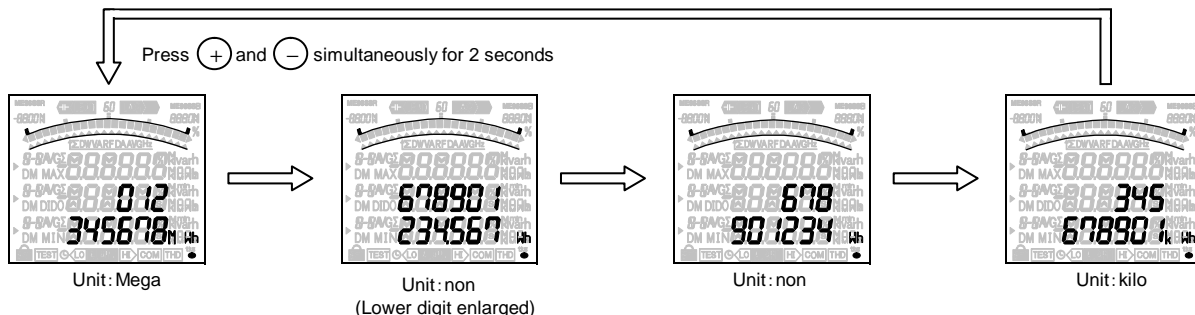
Reactive energy (Exported lead)*

Expanded counting setting of menu 3 is necessary in order to appear the screen of *.
(Refer to page 22)

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

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

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



Note1: All of Wh, varh and VAh change to same unit even if these are not shown on the screen.

Note2: When the setting value of the VT primary voltage and the CT primary current are large, the lower digits less than a measurement range display "0".

● Wh, varh and VAh zero reset

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

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

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

Note 1: This is effective only in the instantaneous value display.

Note 2: All of Wh, varh and VAh will be reset even if these are not shown on the screen.

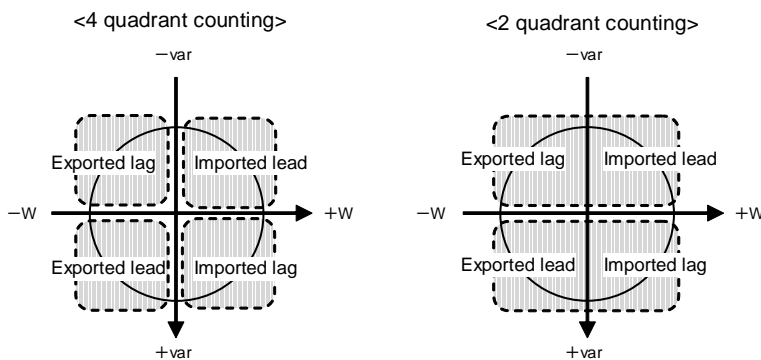
Note 3: The periodic active energy will not be reset. Another operation is necessary. (Refer to page 57)

5.Operation

5.1 Basic Operation

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

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



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

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

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

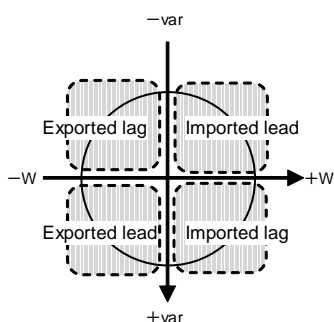
If setting of “Expanded counting” is selected for 4 quadrant counting and setting of “IEC mode” is ON, the screens of “exported lag” and “exported lag” appear, but these are not counting.

(Refer to page 22 about “Expanded counting” in the Setting Menu 3. Refer to page 35 about “IEC mode” in the Setting Menu 8.)

● Each measurement item display during power transmission

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

(Refer to page 22 about “Expanded counting” in the Setting Menu 3. Refer to page 35 about “IEC mode” in the Setting Menu 8.)



| Quadrant | | Imported Lag | Imported Lead | Exported Lag | Exported Lead |
|-------------------------------------|--|--------------------------|-----------------------------|-----------------------------|-----------------------------|
| Measured items | | | | | |
| A,DA,N-A,N-DA,V,HZ,VA HI,N-HI,HV | | Unsigned | | | |
| W | | Unsigned | | "—"sign | |
| var | Normal mode (For 2 quadrant counting) | Unsigned LAG display※ | "—"sign +I-LEAD display※ | "—"sign +I-LEAD display※ | Unsigned LAG display※ |
| | Normal mode (For 4 quadrant counting) | Unsigned LAG display※ | "—"sign +I-LEAD display※ | Unsigned LAG display※ | "—"sign +I-LEAD display※ |
| | IEC mode (For 2 quadrant counting) | Unsigned LAG display※ | "—"sign +I-LEAD display※ | "—"sign +I-LEAD display※ | Unsigned LAG display※ |
| PF | Normal mode (For 2 quadrant counting) | Unsigned LAG display※ | "—"sign +I-LEAD display※ | "—"sign +I-LEAD display※ | Unsigned LAG display※ |
| | Normal mode (For 4 quadrant counting) | Unsigned LAG display※ | "—"sign +I-LEAD display※ | Unsigned LAG display※ | "—"sign +I-LEAD display※ |
| | IEC mode (For 2 quadrant counting) | Unsigned LAG display※ | "—"sign +I-LEAD display※ | Unsigned LAG display※ | "—"sign +I-LEAD display※ |

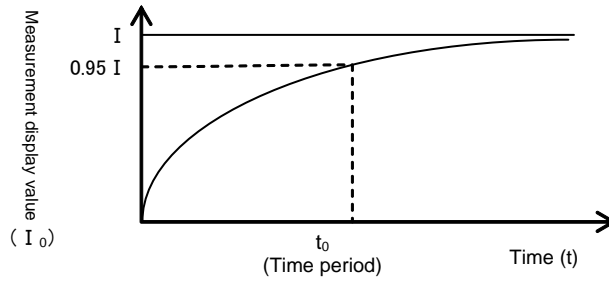
※Turns on when displayed on the bar graph.

5.Operation

5.1 Basic Operation

● Demand time and demand value of current demand

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



The demand value is the measurement display value with the above time characteristics, and it shows the overall average within the demand time.

The demand value changes over a relatively long time, so it is not affected by input changes within a short time.

Therefore, this is good for monitoring transformer overload.

5.Operation

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

The following explains usage according to the purpose during operation.

● Display and operation of the upper/lower limit alarm

When the value exceeds the upper or lower limit setting value set in advance, the display flickers and alarm can be output.
(For more information about how to set the upper/lower limit alarm, refer to page 24 and after.)

■ Alarm indicator

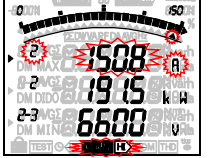


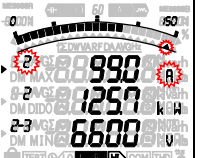
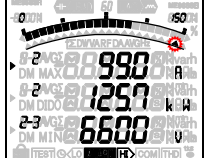
When the measurement element with an upper/lower limit alarm is displayed on the bar graph, "▲" flickers on the bar graph to indicate the upper/lower limit.

■ Behavior During Alarm Generation

Alarm condition: When measurement value exceeds alarm value, display flicker and an alarm contact closes.

Alarm cancel: When alarm is canceled, display flickers normally and alarm contact opens.

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

| Alarm cancel method | | Measurement value \geq Upper limit value (or Measurement value \leq Lower limit value) | Measurement value $<$ Upper limit alarm value (or Measurement value $>$ Lower limit alarm value) |
|---------------------|------------------------------|---|--|
| Automatic (Auto) | Display | ALARM , HI or LO flickers  | Normal display  Upper/lower limit indicator |
| | Output (Alarm relay contact) | Closed | Opened |
| Manual (HoLd) | Display | ALARM , HI or LO flickers  (Alarm generation) | ALARM , HI or LO turns ON  (Alarm retention) → RESET → Normal display  (Alarm cancellation) |
| | Output (Alarm relay contact) | Closed | Closed → Opened |

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

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

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

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

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

■ Monitoring phase for upper/lower limit alarm element

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

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

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

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

5.Operation

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

● Canceling the upper/lower limit alarm

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

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

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

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

Press **RESET** the button to stop the backlight flickering.

● Upper/lower limit alarm items on the alarm contacts

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

● Display of periodic active energy

The ability to measure the active energy divided into two time segments enables individual measurement of the active energy in a desired time segment such as peak/off-peak and day/night.

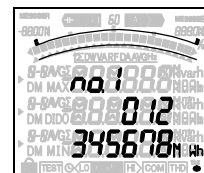
The periodic active energy is counting, even if the periodic active energy display setting is OFF.

(For the setting of the Periodic active energy display, refer to page 32.)

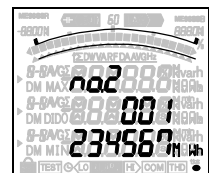
The time segments can be switched according to the setting via communication or the digital input (DI).

(The time segments cannot be switched manually (button operation).)

| |
|--|
| <p><For control via communication></p> <ul style="list-style-type: none"> When the selected bit is ON (1), the active energy (Imported) is added to the periodic active energy n (where n = 1, 2). When the selected bit is OFF (0), the active energy (Imported) is not added to the periodic active energy n (where n = 1, 2). |
| <p><For control from the digital input (DI)></p> <ul style="list-style-type: none"> When there is no digital input (DI), the active energy (Imported) is added to the periodic active energy 1 and the active energy (Imported) is not added to the periodic active energy 2. When there is digital input (DI), the active energy (Imported) is not added to the periodic active energy 1 but the active energy (Imported) is added to the periodic active energy 2. |
| <p><For setting without switching></p> <ul style="list-style-type: none"> The active energy (Imported) is added to the periodic active energy 1 and periodic active energy 2. (No switching between time segments) |



Periodic active energy 1



Periodic active energy 2

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

● Resetting periodic active energy to zero

Showing the periodic active energy 1 or 2 on the display and holding down the **RESET** button for 2 seconds reset the periodic active energy to zero. (Only the displayed periodic active energy is reset.)

When the password protection setting is enabled, the periodic active energy is reset to zero after the password is entered. The periodic active energy can be individually or simultaneously reset to zero via communication. (In this case, the password is not necessary)

5.Operation

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

● Display of rolling demand

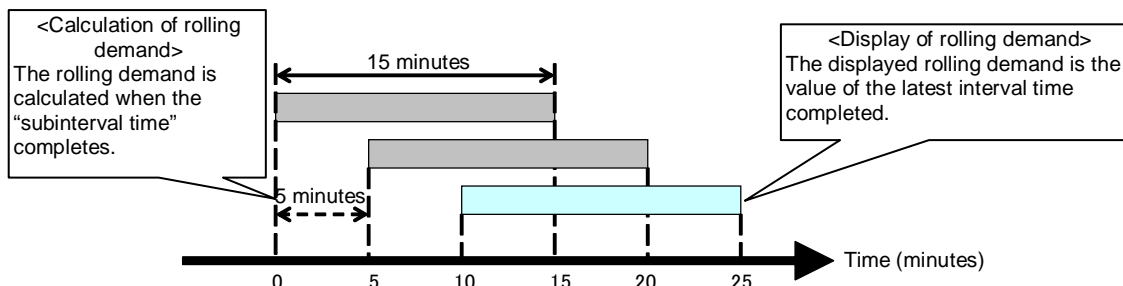
The rolling demand is the value obtained by dividing the active energy (imported) in a specified time (interval) by the length of the interval.

The block interval demand is to select the time width (interval) of the “block” used for the demand calculation.
(For setting of the rolling demand display, refer to page 32.)

① Rolling block

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

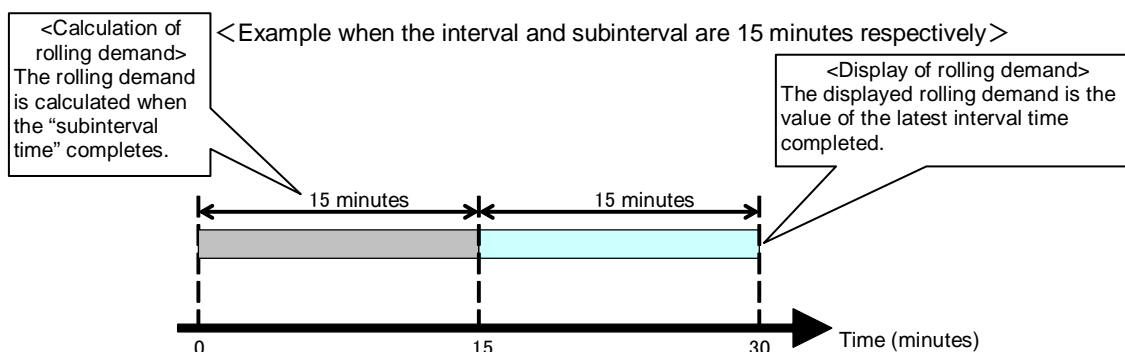
<Example when the interval is 15 minutes and the subinterval is 5 minutes>



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

② Fixing block

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



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

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

● Adjusting rolling demand time

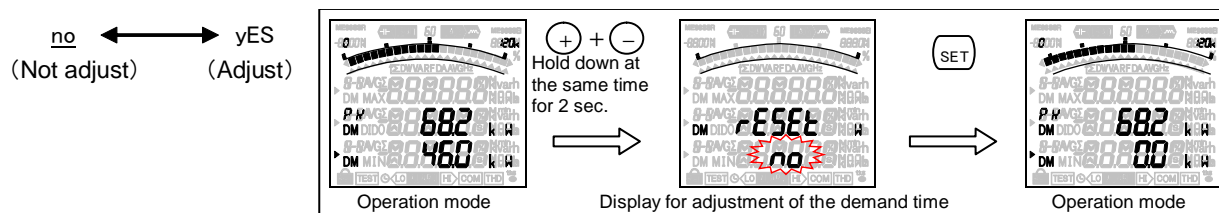
Showing the rolling demand on the display and then holding down the **+** and **-** buttons at the same time for 2 seconds or more allows adjustment of the rolling demand time.

(Even if adjustment of the demand time is set to “Digital input,” the demand time can be adjusted manually (by button operation).)

When the password protection setting is enabled, the demand time can be adjusted after the password is entered.

The rolling demand time can be adjusted also via communication although the setting item is not provided in the demand time adjustment setting. (In this case, the password is not necessary)

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



● Resetting the peak value of rolling demand

Showing the rolling demand on the display and then holding down the **+** and **RESET** buttons at the same time for 2 seconds reset the peak value of rolling demand.

When the password protection setting is enabled, the peak value of rolling demand is reset after the password is entered.
The rolling demand can be reset also via communication. (In this case, the password is not necessary)

5.Operation

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

● Display of operation time

The measurement time is integrated according to the value set to the target for counting operation time (AUX, A, and V) and displayed as the load operation time.

To display the operation time, the operation time display setting should be configured in advance.

The operation time is counting, even if operation time display setting is OFF.

(For setting of the operation time display, refer to page 34.)

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

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



Operation time 1



Operation time 2

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

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

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

● Resetting the operation time to zero

Showing the operation time 1 or the operation time 2 on the display and then holding down the **RESET** button for 2 seconds resets the operation time to zero.

(Only the displayed operation time is reset to zero.)

When the password protection setting is enabled, the operation time is reset to zero after the password is entered.

All the operation times can be reset to zero also via communication. (In this case, the password is not necessary)

● Display and operation of digital input/output status

The digital status can be displayed by inputting the switching signal of the breaker and the alarm signal of the over current relay to the digital input (DI) terminal.

The digital output (DO) terminal opens and closes the contact by communication control.

To display the digital input/output status, the digital input/output status display setting should be configured in advance.

(For setting of the digital input/output display, refer to page 33.)

■ Display examples

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

Digital input display(DI1 to DI5)



Digital output display(DO1, DO2)



0 : Digital opened
1 : Digital closed

Digital input/ output status

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

■ Digital input reset method

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

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

■ Digital input conditions

The following are the digital input conditions.

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

● Releasing the digital input latch

Holding down the **RESET** button for 2 seconds while the digital input display (DI) is displayed releases the digital input (DI) latches collectively.

The digital input latches can be released also via communication.

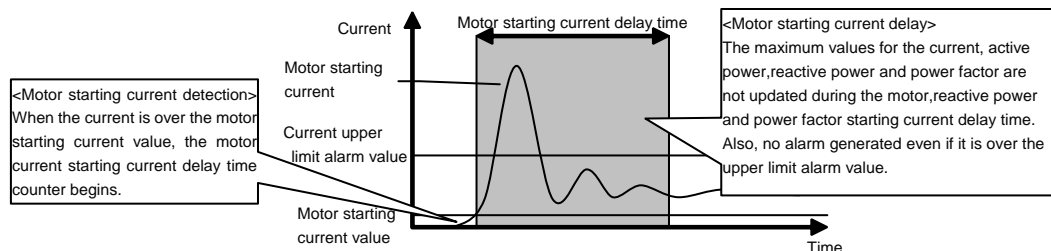
5.Operation

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

● Preventing maximum value update by motor starting current

When the motor current is monitored, use the motor starting current delay function to prevent maximum value update and alarm generation for the current, active power, reactive power, apparent Power ,and power factor due to the motor starting current. It is necessary to set in advance to use the motor starting current delay function.
(About settings, refer to page 26.)

■ Movement when the motor starting current delay function is used



Note 1: Set the motor starting current value to a value lower than the lower limit value considering changes in the load current during operation.

Note 2: When the input current is below the motor starting current value, the minimum value update stops.

● Password protection setting

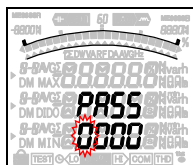
In the operation mode, after pressing **RESET** and **PHASE** simultaneously for 2 seconds or more, the password input display will be displayed. It is possible to set the password protection if you enter the password. Default password is "0000". If you enter the wrong password, to return to the password input display (the highest digit blink).

By pressing **DISPLAY** at the highest digit, to return to the operation mode.

If you enable password protection setting, you need to input password when performing the item of the following table.

■ Password input

Password input display



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

■ Password protection item

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

■ Password protection setting

(1) Set a password protection.

off \longleftrightarrow on
(Not protected) (Protected)

(2) Change the password.

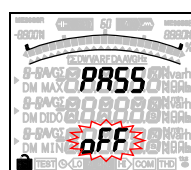
no \longleftrightarrow yES
(Not change) (Change)

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

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

(3) Input a new password.

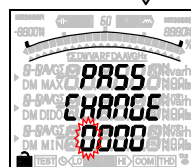
- Select a value of the blinking digit by pressing the **+** or **-** button from the highest digit.
- Pressing the **SET** button moves the setting digit (blinking digit) to a lower digit.
- Pressing the **DISPLAY** button moves the setting digit (blinking digit) to a higher digit.
- Pressing the **SET**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



SET



SET




Important

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

6.Other

6.1 Display Pattern Contents

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

[For 3-phase 4-wire]

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

Note 1: When an additional screen is added, a screen number is added.

Note 2: In the table, “Wh” indicates Imported active energy, and “varh” indicates Imported reactive energy (lag).

Note 3: When Wh is selected at the screen of from No.1 to No.4, the additional display of Wh appears. varh or VAh is same, too.

6. Other

6.1 Display Pattern Contents

[For others except 3-phase 4-wire]

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

Note 1: When an additional screen is added, a screen number is added.

Note 2: When 1-phase 2-wire, only phase1 (A1, DA1) is displayed for current and only phase12 (V12) is displayed for voltage. Other phases are not displayed even when they are set in the display pattern.

Note 3: The phases displayed in the display patterns of the above table are displayed on the screen according to the phase wire system setting shown in the table below.

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

Note 4: In the table, "Wh" indicates Imported active energy, and "varh" indicates Imported reactive energy (lag).

Note 5: When Wh or varh is selected at the screen of from No.1 to No.4, the additional display of Wh or varh appears. (P00)

6. Other

6.2 Maximum Scale Value

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

•Maximum scale value of each item

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

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

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

•Specific power value for scale calculation

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

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

6. Other

6.3 Possible Setting Range for Maximum Scale

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

■ Current maximum scale value

Possible setting range:-10 STEP to +3STEP of the rating

Example: When the rating is 100A, the value is from 45A to 160A.

Current maximum scale value (1/3)

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

Current maximum scale value (2/3)

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

Current maximum scale value (3/3)

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

6. Other

6.3 Possible Setting Range for Maximum Scale

■ Voltage maximum scale value

Possible setting range:-18 STEP to +10STEP of the standard maximum scale value.

Example: When the standard maximum scale value is 100V, the value is from 20V to 320V.

Voltage maximum scale value (1/3)

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

Voltage maximum scale value (2/3)

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

Voltage maximum scale value (3/3)

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

6. Other

6.3 Possible Setting Range for Maximum Scale

Maximum scale value for active power / reactive power

Possible setting range:-18 STEP to +3STEP of the rating

Example: When the rating is 1000W, the value is from 200W to 1600W.

Maximum scale value
of active power (1/5)

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

Maximum scale value
of active power (2/5)

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

Maximum scale value
of active power (3/5)

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

Maximum scale value
of active power (4/5)

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

Maximum scale value
of active power (5/5)

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

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

6. Other

6.4 Measurement Items and Correspondence between Display and Output

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

○ : Data can be displayed or output

— : Data cannot be displayed or output

| Measurement item | | | Item measurement display | | | | | | | | | | | | Analog | | | | Pulse | | | Communication |
|---------------------------|-----------------------------|-------------------|--------------------------|-------------------|-----|---------------------|-----------|-------------|---------------------------------------|-----------|-------------|----------------|-----|---------|----------------|---------------------|--|----------------|----------------|--------------------|---|---------------|
| | | | 3-phase 4-wire | | | 3-phase 3-wire(3CT) | | | 3-phase 3-wire(2CT) 1-phase 3-wire | | | 1-phase 2-wire | | | 3-phase 4-wire | 3-phase 3-wire(3CT) | 3-phase 3-wire(2CT), 1-phase 3-wire | 1-phase 2-wire | 3-phase 4-wire | Not 3-phase 4-wire | | |
| | | | Inst | Max | Min | Inst | Max | Min | Inst | Max | Min | Inst | Max | Min | | | | | | | | |
| Current | 1 phase | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | | |
| | 2 phase | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | - | ○ | ○ | ○ | - | - | - | | | |
| | 3 phase | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | - | ○ | ○ | ○ | - | - | - | | | |
| | AVG | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | - | ○ | ○ | ○ | - | - | - | | | |
| | N phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| Current demand | 1 phase | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | | |
| | 2 phase | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | - | ○ | ○ | ○ | - | - | - | | | |
| | 3 phase | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | - | ○ | ○ | ○ | - | - | - | | | |
| | AVG | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | - | ○ | ○ | ○ | - | - | - | | | |
| | N phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| Voltage | 1-N phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 2-N phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 3-N phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | AVG(L-N) | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 1-2 phase | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | | |
| | 2-3 phase | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | - | ○ | ○ | ○ | - | - | - | | | |
| | 3-1 phase | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | - | ○ | ○ | ○ | - | - | - | | | |
| | AVG(L-L) | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | - | ○ | - | - | - | - | - | | | |
| | Σ | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| Active power | 1 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 2 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 3 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | Σ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | | |
| Reactive power | 1 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 2 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 3 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | Σ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | | |
| Apparent power | 1 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 2 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 3 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | Σ | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| Power factor | 1 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 2 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | 3 phase | | ○ | ○ | ○ | - | - | - | - | - | - | - | - | ○ | - | - | - | - | - | | | |
| | Σ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | | |
| Frequency | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | - | - | | |
| Harmonic Current (Note 1) | RMS value | 1 phase | ○ | Max Phase | - | ○ | Max Phase | - | ○ | Max Phase | - | ○ | ○ | - | Total | Total | Total | Total | - | - | | |
| | | 2 phase | ○ | | - | ○ | | - | ○ | | - | - | - | Total | Total | - | - | - | | | | |
| | | 3 phase | ○ | | - | ○ | | - | ○ | | - | - | - | Total | Total | Total | - | - | - | | | |
| | | N phase | ○ | | ○ | - | | - | - | | - | - | - | Total | - | - | - | - | - | | | |
| | Distortion ratio | 1 phase | ○ | - | ○ | - | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | | | |
| | | 2 phase | ○ | - | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | - | | | | |
| | | 3 phase | ○ | - | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | - | | | | |
| | | N phase | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | | | |
| Harmonic Voltage (Note 1) | RMS value | 1-N phase | ○ | Primary Max Phase | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | | |
| | | 2-N phase | ○ | | - | - | - | - | - | - | - | - | - | - | - | - | - | | | | | |
| | | 3-N phase | ○ | | - | - | - | - | - | - | - | - | - | - | - | - | - | | | | | |
| | | 1-2 phase | - | | - | - | ○ | Primary Max | - | ○ | Primary Max | - | ○ | Primary | - | - | - | - | - | | | |
| | Distortion ratio | 2-3 phase | - | - | - | ○ | - | ○ | - | ○ | - | - | - | - | - | - | - | - | - | | | |
| | | 3-1 phase | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | | |
| | | 1-N phase | ○ | Max Phase | - | - | - | - | - | - | - | - | - | - | Total | - | - | - | - | | | |
| | | 2-N phase | ○ | | - | - | - | - | - | - | - | - | - | - | Total | - | - | - | - | | | |
| 3-N phase | ○ | - | - | | - | - | - | - | - | - | - | - | - | - | - | - | - | | | | | |
| 1-2 phase | - | - | - | | ○ | Max Phase | - | ○ | Max Phase | - | ○ | ○ | - | - | Total | Total | Total | - | - | | | |
| Reactive energy | 2 quadrant counting(Not e2) | Imported | ○ | ○ | | | | ○ | | | | ○ | | | | - | - | - | - | ○ | ○ | |
| | | Exported | ○ | ○ | | | | ○ | | | | ○ | | | | - | - | - | - | ○ | ○ | |
| | 4 quadrant counting | Imported lag | ○ | ○ | | | | ○ | | | | ○ | | | | - | - | - | - | ○ | ○ | |
| | | Imported lead | ○ | ○ | | | | ○ | | | | ○ | | | | - | - | - | - | ○ | ○ | |
| | | Exported lag | ○ | ○ | | | | ○ | | | | ○ | | | | - | - | - | - | ○ | ○ | |
| | | Exported lead | ○ | ○ | | | | ○ | | | | ○ | | | | - | - | - | - | ○ | ○ | |
| Apparent Energy | | Imported+Exported | ○ | | | | - | | | | - | | | | - | - | - | - | ○ | - | | |
| Rolling Demand | | | ○ | ○ | - | ○ | ○ | - | ○ | ○ | - | ○ | ○ | - | - | - | - | - | - | | | |
| Operation time | 1 | ○ | | | | ○ | | | | ○ | | | | - | - | - | - | - | - | | | |
| | 2 | ○ | | | | ○ | | | | ○ | | | | - | - | - | - | - | - | | | |

○ (Note3)

Note 1: RMS values of harmonics are total value and 1st to 31st (odd only). Distortion ratios of harmonics are total value and 3rd to 31st (odd only).
 Note 2: "Imported" is what "Imported lag" and "Exported lead" are counted as a single division. "Exported" is what "Imported lead" and "Exported lag" are counted as a single division.

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

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

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

6.Other

6.5 Measurement Characteristic

■ Metering actions in other than operation mode

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

■ Metering actions in input status

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

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

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

Note3: Depending on the setting, "----" is displayed when the voltage of phase 1 is not 0V.



■ Analog output action

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

6.Other

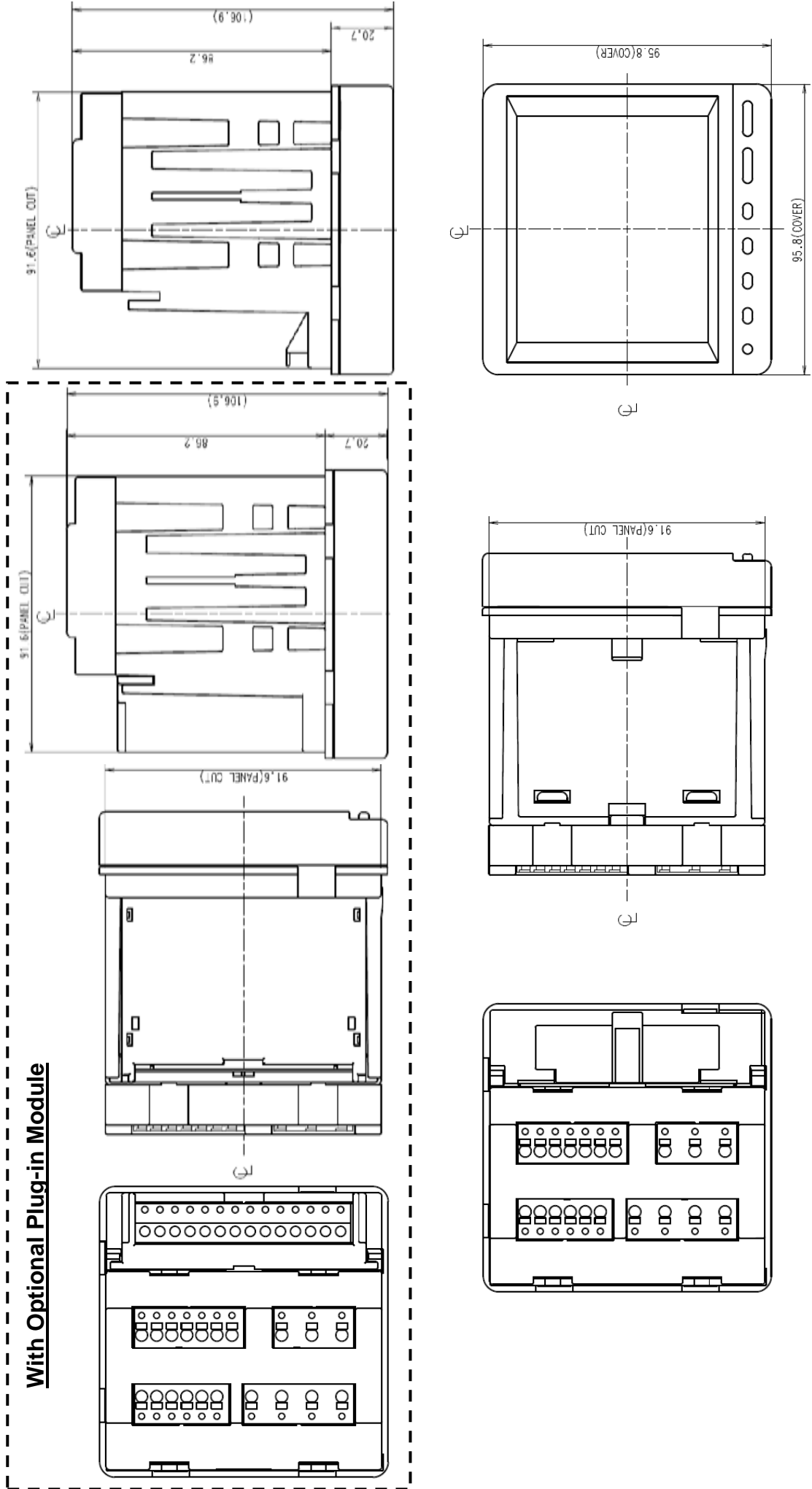
6.6 Troubleshooting

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

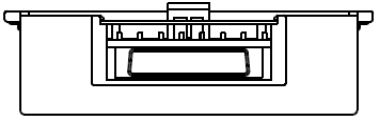
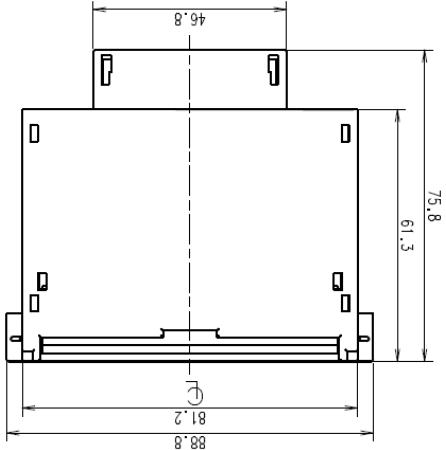
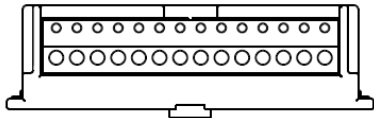
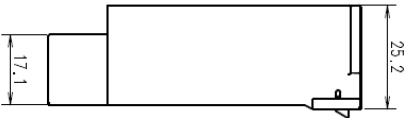
| | Condition | Possible cause | Solution |
|-------------------|---|--|---|
| Display | The display is not lit. | Auxiliary power supply is not impressed on MA and MB terminals. | Impress auxiliary power supply. |
| | When the auxiliary power supply is impressed, display is not lit soon. | This is not an error. For about a few seconds after auxiliary power source is charged, initialization of internal circuit is carried out. | Use it as it is. |
| | The back light is not lit. | The back light may be set to auto off (Auto). (If it turns on after you press an operation button, it means the backlight is set to auto off.) | When the auto off is enabled, it automatically turns off in 5 minutes. Continue using it as it is or change the setting to HoLd (it stays on). (Refer to page 18) |
| | The display becomes black. | It may become black owing to static electricity. | It goes off after a while. |
| | "End" display remains. | The product is still in the setting mode. | Press  . |
| Measurement error | The current and voltage have large errors. | The settings for VT / direct voltage and CT primary current may be incorrect. | Please check the set values for VT / direct voltage and CT primary current. |
| | The current and voltage are correct, but the active power, reactive power, and power factor have large errors. | The wiring for VT/CT or for the measurement instrument may be incorrect. | Please check the wiring for VT/CT and for the measurement instrument. |
| | Measured values of PF are including large error. | If the input current is smaller than the rating, error becomes large. (about 5% or below of rated current) | This is not an error, or use it as it is, or if error is troublesome, change the CT according to the actual current to be used. |
| | The displayed active power is different from the active power that is calculated by multiplying the displayed current, voltage, and power factor. | If the AC of the current and voltage deteriorate due to harmonics, it will not be the same as the calculated value. (For AC without harmonics, the calculated value will match with the displayed value.) | Please continue using the instrument as it is. |
| | The total effective harmonics value from the harmonic current is very different from the current value. | The distortion factor (content factor) is way over 100%. (Such as measurement of the inverter secondary side output) | Please check the measured item. |
| | The current measured by another measurement instrument (such as a clamp meter) is different from the current measured by this instrument. (More than the tolerance) | If another measurement instrument uses the average method for measuring, the measurement instrument used will have a larger error when the AC deteriorates due to harmonics. (This measurement instrument uses the RMS value method.) | Please compare the currents using a measurement instrument that uses the RMS value method. |
| | Analog output has a large error. | If the wiring to the receptor is long, the error may increase. | Perform the zero and span adjustment for analog output. (Refer to page 45.) |
| | Pulse output has a large error. | When the pulse unit is set to the minimum value and the pulse width is set to 0.500s or 1.000s, the pulse output cannot follow if the load is too large, which can result in a decrease in the pulse output number. | Review the pulse unit or pulse width setting (refer to pages 29). |
| | On the maximum/minimum value display screen, a present value that is outside of the maximum/minimum range is displayed. | During the starting current delay time, the maximum value is not updated, so the present value that is over the maximum value may be displayed. | Please continue using the instrument as it is. |
| Operation | Cannot change the settings in the setting mode. | If  at the bottom of the screen is blinking, you are in the set value confirmation mode. Settings cannot be changed in this mode. | Please go to the setting mode to change settings. |
| | "PASS 0000" appears when trying to change the setting mode. | The password protection setting is turned to valid. | Please enter the set password. Also, the default password is "0000" (Refer to page 60) |
| Other | Maximum value and minimum value changed. | These are cleared if the settings for the phase wire , VT/direct voltage, and CT primary current are changed. | Make a note of the values before changing the settings |
| | The values of the setting items that were not supposed to change have changed. | Some setting items return to the default values when settings for the phase wire method, VT/direct voltage, and CT primary current are changed. | Please refer to "Initializing Related Items by Changing Settings" (page 35) and reconfigure the setting items that returned to their default values. |
| | "PASS 0000" appears when trying to clear the energy or maximum/minimum value. | The password protection setting is turned to valid. | Please enter the set password. Also, the default password is "0000" (Refer to page 60) |

ME96SSH-MB

With Optional Plug-in Module



Optional Plug-in Module
ME-4210-SS96
ME-0040C-SS96
ME-0052-SS96



Installation 2. Mounting

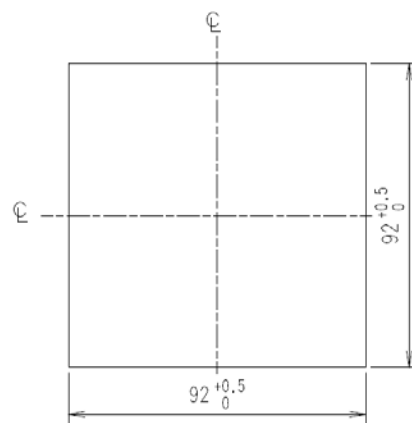
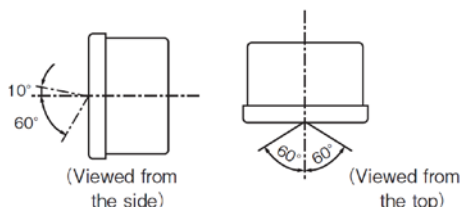
1 Dimensions of mounting holes

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

2 Mounting position

The contrast of the LCD changes depending on the angle at which it is viewed.

Mount the product in the easy viewable position.

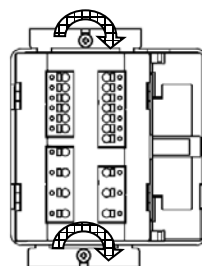
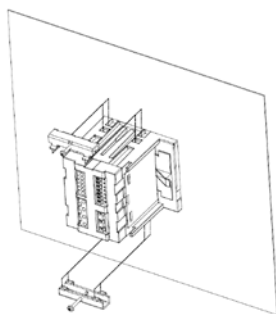


3 Mounting and fixing

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

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

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



Note

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

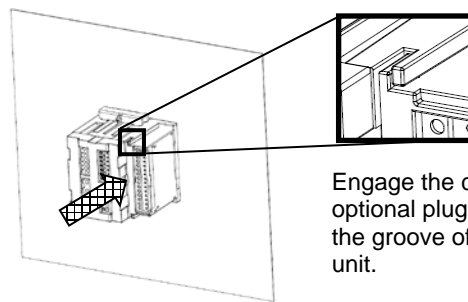
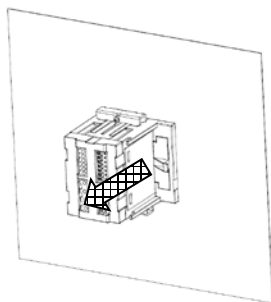
Screw type for mounting to the main unit: M3

4 Mounting the optional plug-in module

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

① Remove the optional cover.

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



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

Note

Protecting sheet

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

Mounting position

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

Optional plug-in module

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

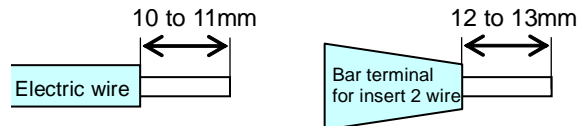
Installation 3. Wiring

1 Applicable electric wire

The following table shows applicable electric wire sizes. (Wire coating stripping length : 10 to 11mm)

| Section | Screw type | Specification of wire used |
|--|---------------|--|
| Auxiliary power, voltage input, MODBUS®RTU communication terminal | Without screw | Single wire, Stranded wire: AWG24 to 14 (Stranded wire is bar terminal can be used in combination.) Note: UL recognized corresponds, use according to the following conditions. • Single wire, Stranded wire: AWG24 to 18 • Bar terminal can be not used in combination. |
| Current input terminal | Without screw | Single wire, Stranded wire: AWG24 to 14 (Stranded wire is bar terminal can be used in combination.) Note: UL recognized corresponds, use according to the following conditions. • Single wire: AWG22 to 16 • Bar terminal can be not used in combination. |
| Option terminal | Without screw | Single wire, Stranded wire: AWG24 to 14 (Stranded wire is bar terminal can be used in combination.) Note: UL recognized corresponds, use according to the following conditions. • Single wire, Stranded wire: AWG24 to 18 • Bar terminal can be not used in combination. |

Note : When using the bar terminal for insert 2 wire, please select insertion length of 12 to 13mm.

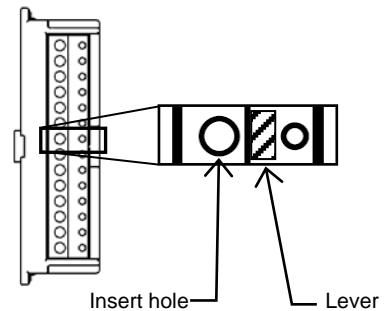
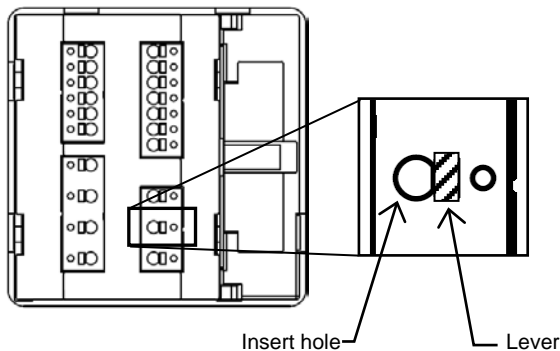


2 Connection method

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

■ Example of the main unit

■ Example of the optional plug-in module



3 Checking

Check the following after connection.

- ☐ The electric wire is securely connected.
- ☐ There is no error in connection.

| | |
|------------------|--|
| ⚠ CAUTION | <div>Do not work with hot-line jobs</div> <p>Do not connect hot-line jobs. It may cause electric shock, burns, device burn out, or fire. It is recommended that a protection fuse be used for VT and the auxiliary power source.</p> |
| | <div>Do not open the secondary side of the CT circuit</div> <p>Connect the CT secondary side signal correctly to the terminal for CT connection. If the CT is not connected properly or if the secondary side of the CT is open, it may result in high voltage on the secondary side of the CT, the insulation of the secondary winding wire may be damaged, and burnout may be caused.</p> |
| | <div>Do not short the secondary side of the VT circuit</div> <p>Connect the VT secondary side signal correctly to the terminal for VT connection. If the VT is not connected properly or if the secondary side of the VT shorts, over current may flow to the secondary side of the VT, which can burn out the secondary winding wire. If the secondary winding wire burns out, it can damage the insulation of the primary winding wire, resulting in a short between phases.</p> |
| | <div>Make sure connections to the connection terminals are tight</div> <p>Electrical wires must be properly tightened to the connection terminal. Otherwise, heat and measurement errors may be caused.</p> |
| | <div>Do not forget wiring of “C₁”, “C₂” and “C₃” for pass.</div> <p>When the L side of CT circuit is common wire, it is necessary to short-circuit “C₁”, “C₂”, and “C₃” terminal of this device.</p> |
| | <div>Do not use improper electrical wires</div> <p>Make sure that the electrical wires have the proper rating for current and voltage. If inappropriate electrical wires are used, fire may be caused.</p> |
| | <div>Do not pull the connection wires with force</div> <p>If the terminal wiring is pulled with a strong force, the output portion may detach. (Tensile load: 39.2N or less)</p> |
| | <div>Do not apply an abnormal voltage.</div> <p>If a pressure test is given to a high-pressure device, a ground must be used in order to avoid damaging this measurement instrument. If a high voltage of AC2000V is applied for over one minute to the measurement instrument, damage may occur.</p> |
| | <div>Do not connect to Non-Connection (NC) terminal.</div> <p>Do not connect to Non-Connection (NC) terminals for the purpose of relay etc.</p> |
| | <div>Use the proper voltage for the auxiliary power source.</div> <p>Use the proper voltage for the auxiliary power source terminal. If an improper voltage is used, the instrument may be damaged or fire may be caused.</p> |

Installation 4. Wiring Diagram

Rating voltage for every phase wire system

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

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

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

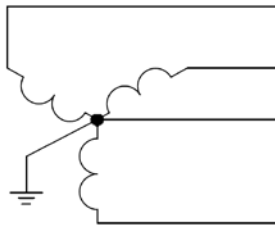


Figure1. 3-PHASE 4-WIRE(STAR)

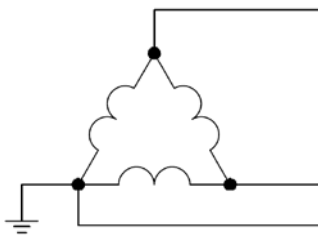


Figure2. 3-PHASE 3-WIRE(DELTA)

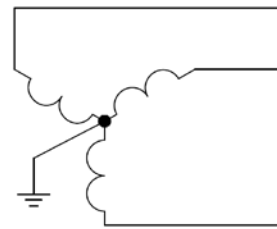


Figure3. 3-PHASE 3-WIRE(STAR)

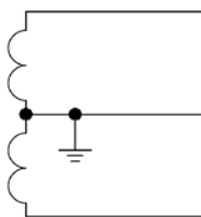


Figure4. 1-PHASE 3-WIRE

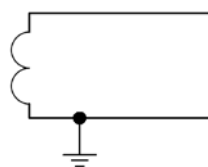


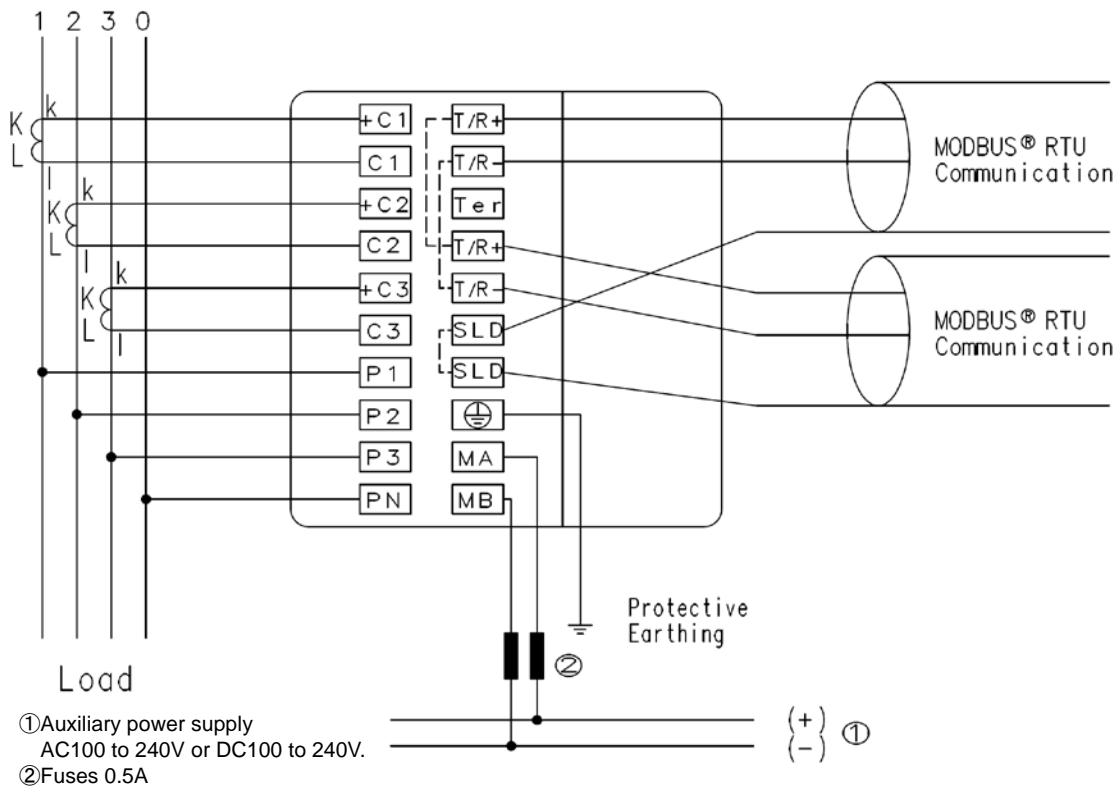
Figure5. 1-PHASE 2-WIRE(DELTA)



Figure6. 1-PHASE 2-WIRE(STAR)

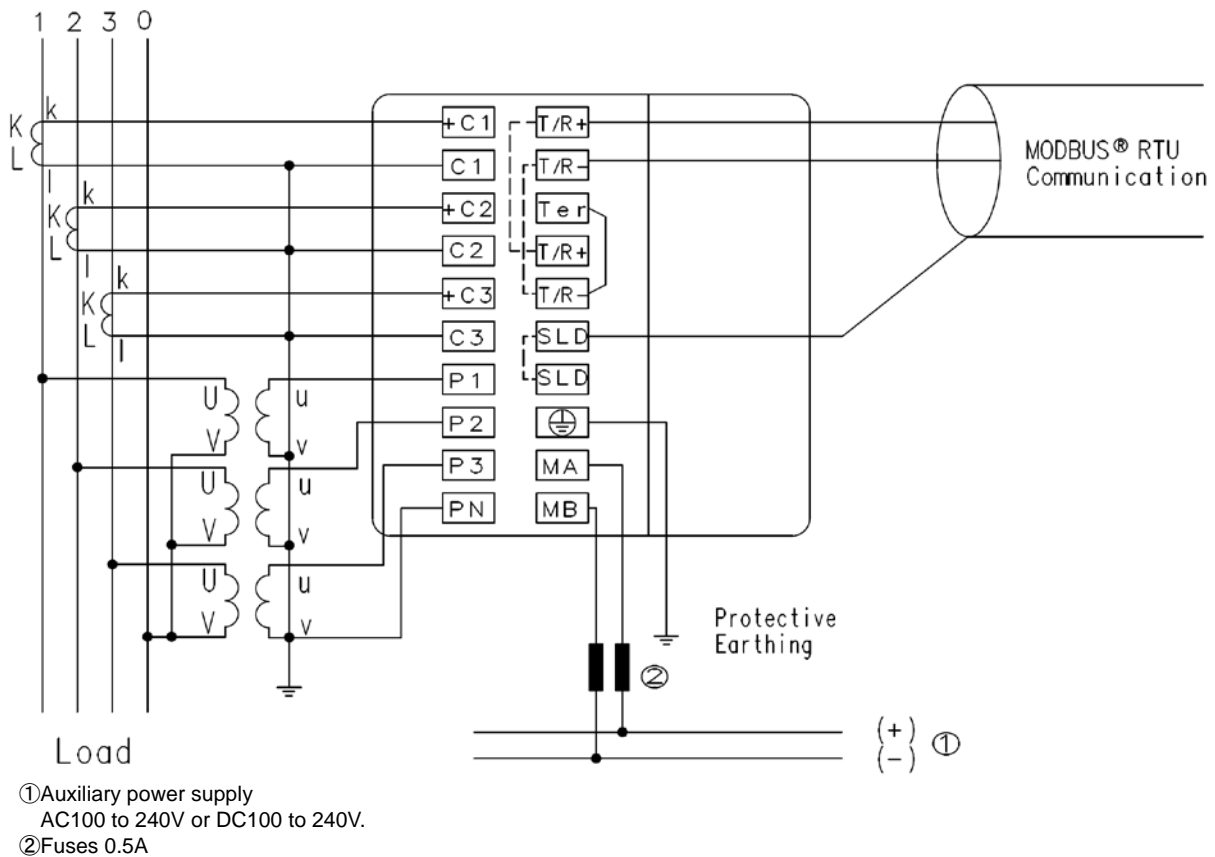
Installation 4. Wiring Diagram

3-phase 4-wire type: Direct input



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

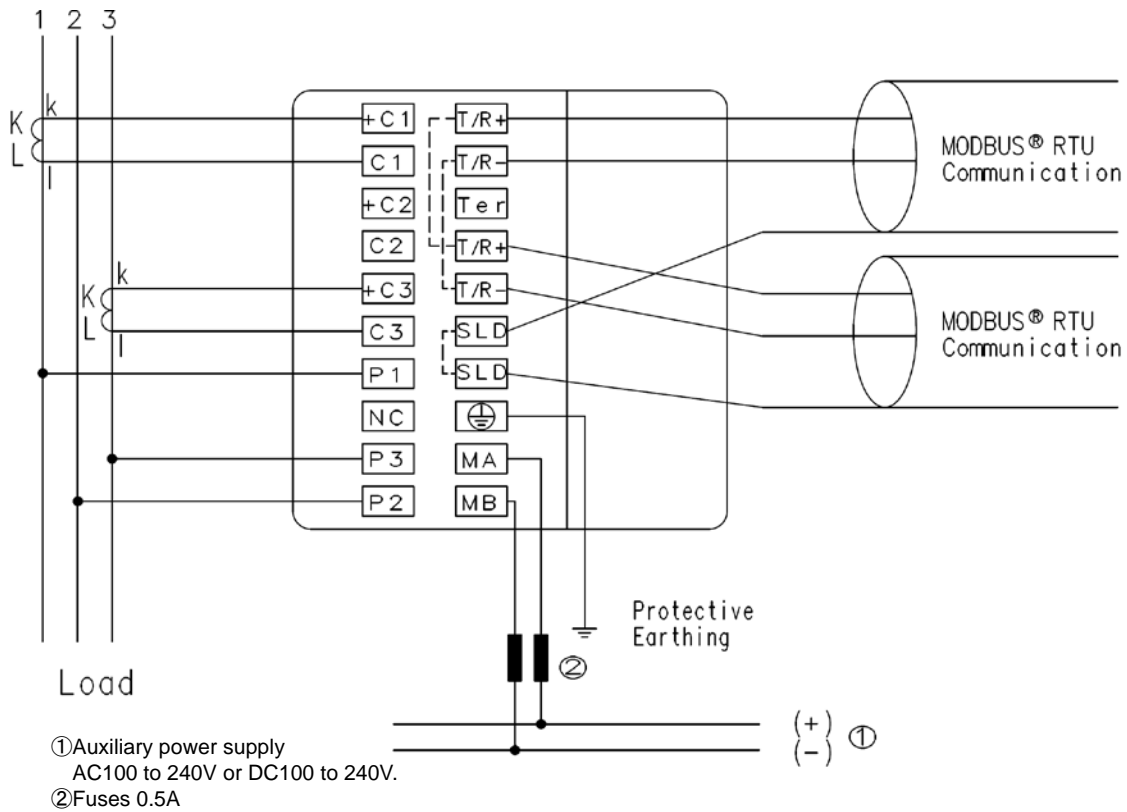
3-phase 4-wire type: With VT



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

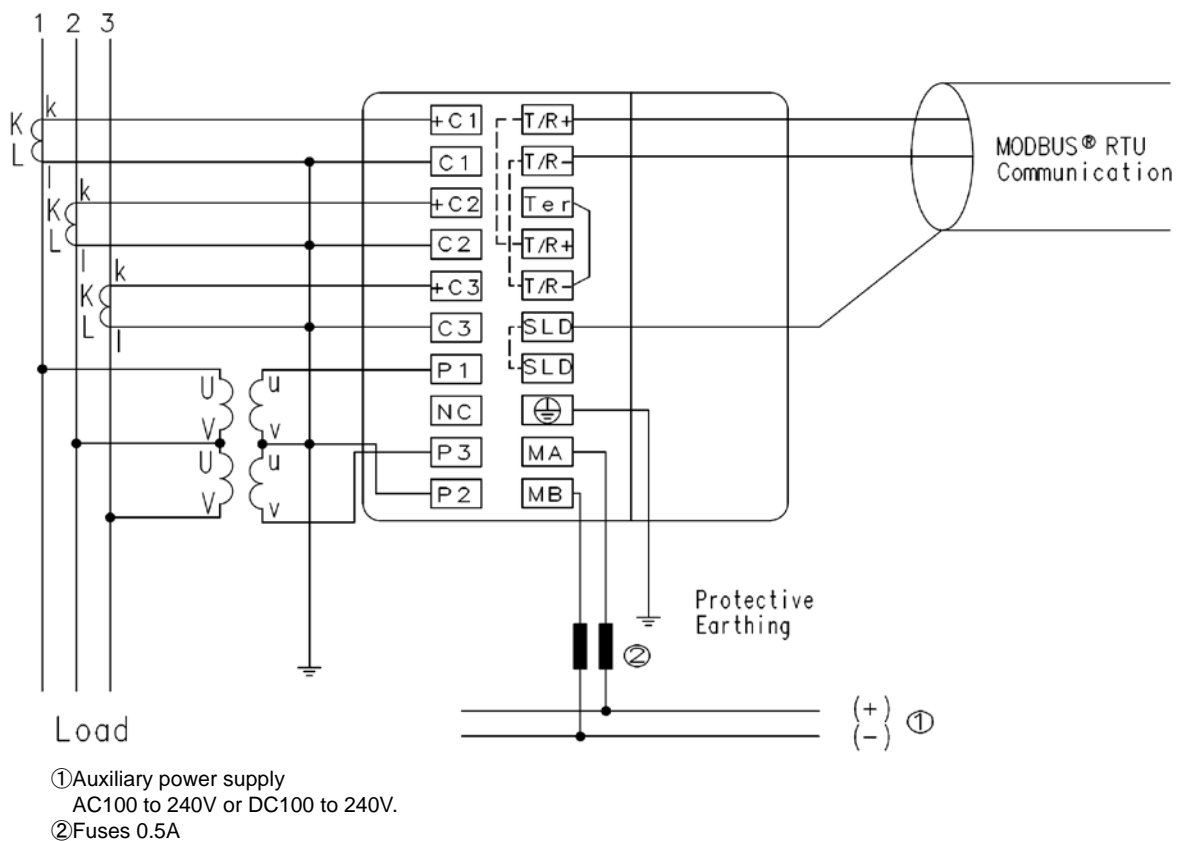
Installation 4. Wiring Diagram

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



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

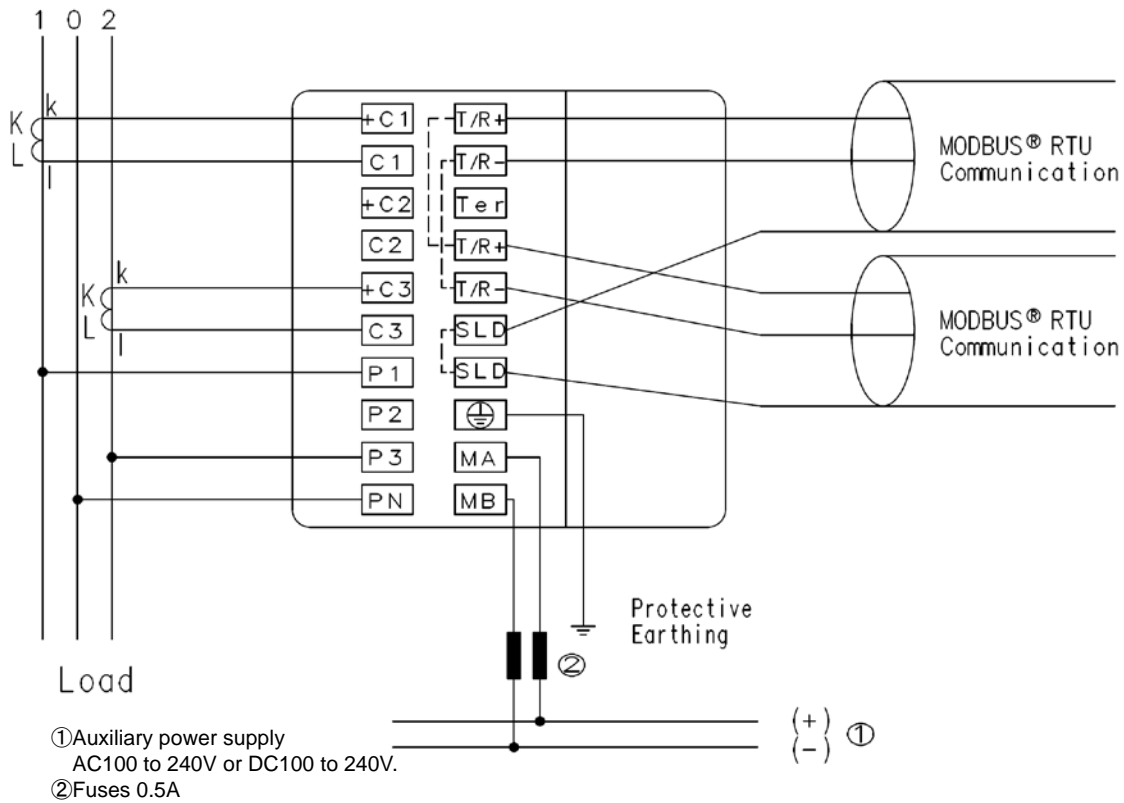
3-phase 3-wire(3CT) type: With VT



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

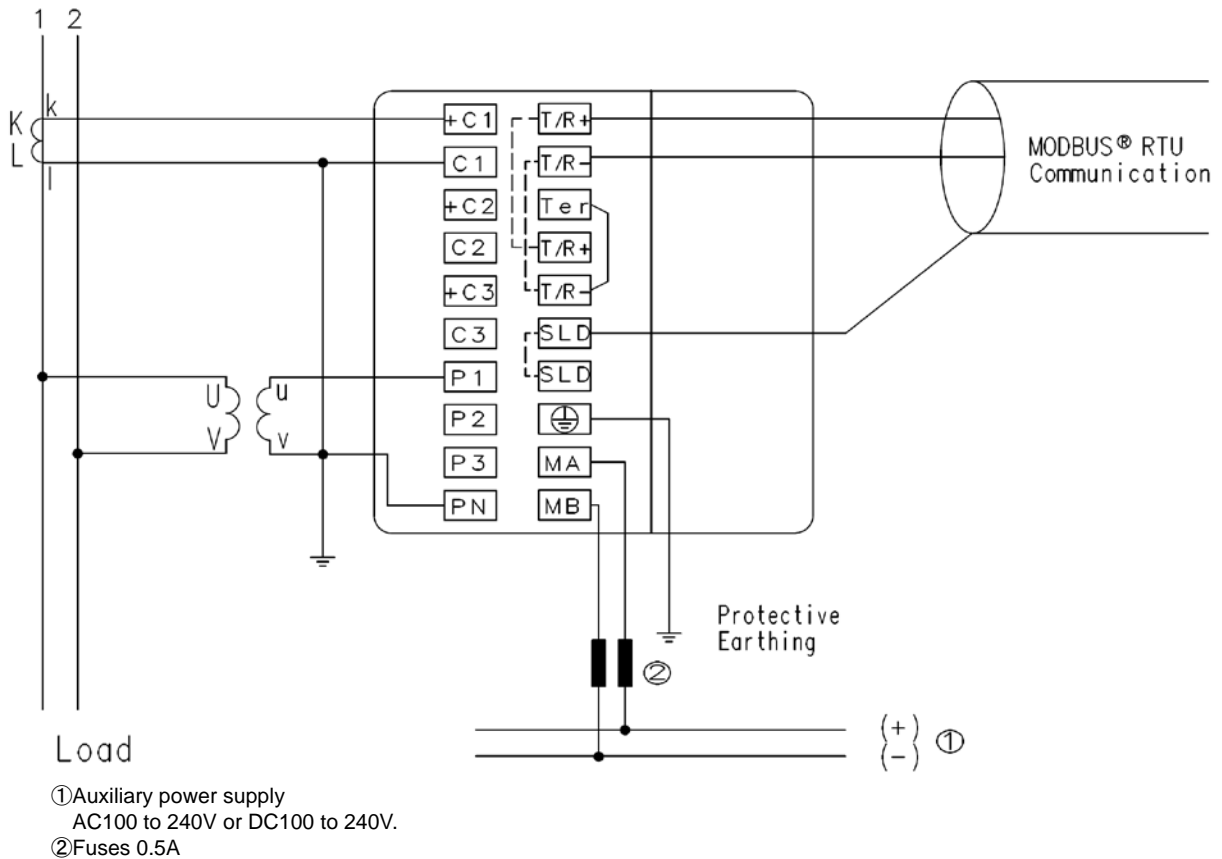
Installation 4. Wiring Diagram

1-phase 3-wire type



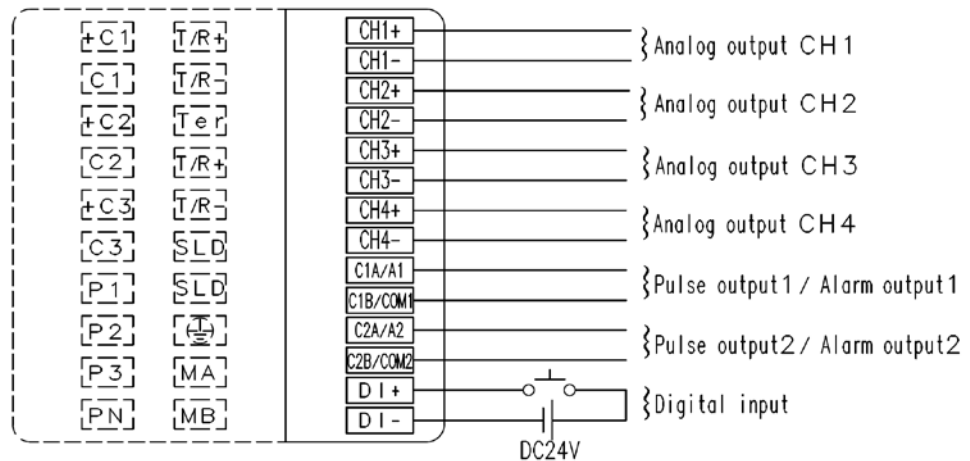
Note 1: For low voltage circuits, grounding the secondary side of CT is not t necessary.

1-phase 2-wire type: With VT

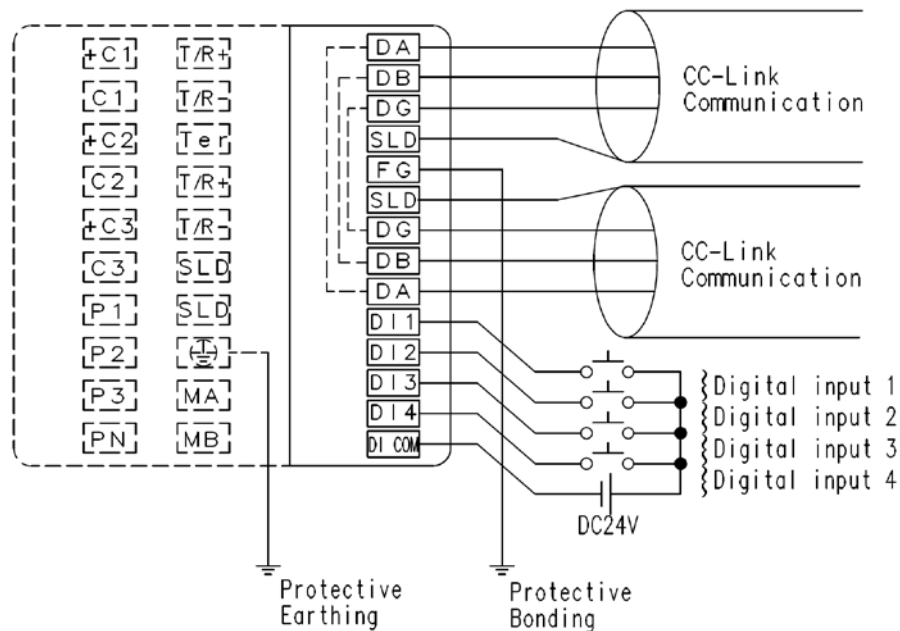


Note 1: For low voltage circuits, grounding the secondary side of VT and CT is not t necessary.

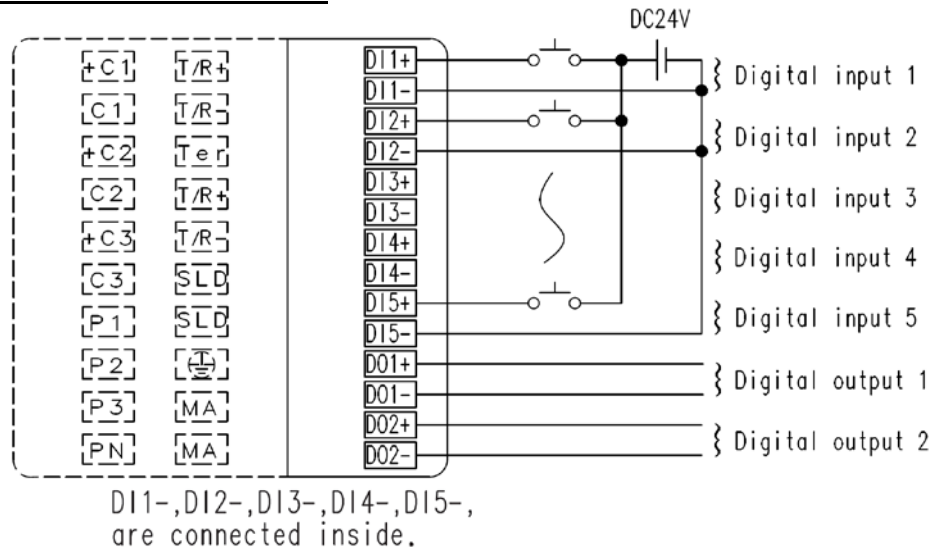
Optional Plug-in Module: ME-4210-SS96



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



Optional Plug-in Module: ME-0052-SS96



Note for Input

| | |
|-------------|--|
| Note | <ol style="list-style-type: none"> 1. The voltage input terminals for 3-phase 3-wire are different from those for others. 2. If the polarity for VT and CT are wrong, the measurement cannot be executed correctly. 3. Do not connect wires to the NC terminals. 4. In the case of low voltage, there is no need for grounding of the secondary sides of VT and CT. 5. Always earth the \oplus terminal to the protective earth conductor. Earth the terminal with less than 100 ohm of earth resistance. Otherwise there will be a false operation. |
|-------------|--|

Note for Output

| Note | <ol style="list-style-type: none"> 1. Do not bunch pulse outputs, alarm outputs and digital inputs/outputs signal cables with the main circuit or power cables, or install them close to each other. Keep the distance between the inputs/outputs signal cables and the main circuit or power cables and high voltage lines shown below, when they run parallel to each other. <table border="1" data-bbox="443 645 1093 779"> <thead> <tr> <th>Conditions</th><th>Distance</th></tr> </thead> <tbody> <tr> <td>Below 600V and less than 600A power lines</td><td>30cm or more</td></tr> <tr> <td>Other power lines</td><td>60cm or more</td></tr> </tbody> </table> 2. Analog outputs signal cables should keep the distance from the other power cables and input signal (VT, CT and auxiliary power) cables, and should not be bunched. And use the shielded cables or twisted pair cables so that it is not affected the noise, surge, and induction. Also, the wiring cables should be as short as possible. 3. MODBUS[®]RTU interface and analog outputs of ME-4210-SS96 do not have the insulation between them. | Conditions | Distance | Below 600V and less than 600A power lines | 30cm or more | Other power lines | 60cm or more |
|---|--|------------|----------|---|--------------|-------------------|--------------|
| Conditions | Distance | | | | | | |
| Below 600V and less than 600A power lines | 30cm or more | | | | | | |
| Other power lines | 60cm or more | | | | | | |

Note for MODBUS[®]RTU

| | |
|-------------|--|
| Note | <ol style="list-style-type: none"> 1. Use the shielded twisted pair cable. (Recommended cables: Refer to page 82.) 2. To the units at both ends of the MODBUS[®]RTU link, the 120-ohm resistance has to be attached. This instrument can perform a 120-ohm termination by short-circuiting the terminal of T/R- and Ter. 3. The earthing has to be connected to earth by a thick wire of low impedance. 4. Keep the distance between MODBUS[®]RTU link to power lines. 5. Connect to earth the SLD terminal at one end. |
|-------------|--|

Note for CC-Link

| | |
|-------------|---|
| Note | <ol style="list-style-type: none"> 1. As for CC-link cable, use the designated cable. (Refer to page 82.) Ver.1.10-compatible CC-Link dedicated cables, CC-Link dedicated cables (Ver.1.00) and CC-Link dedicated high-performance cables cannot be used together. If used together, correct data transmission will not be guaranteed. Also attach the terminating resistor which matches the kind of the cable. 2. Connect the shielded wire of the CC-Link dedicated cable to "SLD" of each module, and ground both ends of the shielded wire using grounding via "FG". The SLD and FG are connected within the module. 3. Because the CC-Link transmission line is a small signal circuit, it should be separated from any strong-current circuit by 10cm or more. However, if it is laid parallel for a long distance, it must be laid at least 30cm away. The terminal must be grounded before using. 4. The CC-Link transmission line should use an exclusive line that meets the requirements for total wiring length, distance between stations, and termination resistance values according to the communication speed. If you do not use an exclusive line or observe the wiring requirements, communication may fail. (Refer to the "CC-Link Cable Wiring Manual" about the exclusive line and wiring requirements.) 5. Connect the supplied "terminal resistor" to each module at both ends of the CC-Link system. Connect the terminal resistors between "DA" and "DB". |
|-------------|---|

Specifications

1. Specification

| Type | | ME96SSH-MB | |
|--------------------------------|--|--|-------------------------|
| Phase wire system | | 3-PHASE 4-WIRE, 3-PHASE 3-WIRE (3CT, 2CT), 1-PHASE 3-WIRE, 1-PHASE 2-WIRE (common) | |
| Rating | Current | AC5A, AC1A (common) | |
| | Voltage | 3-PHASE 4-WIRE : max AC277/480V 3-PHASE 3-WIRE : (DELTA)max AC220V, (STAR)max AC440V 1-PHASE 3-WIRE : max AC220/440V 1-PHASE 2-WIRE : (DELTA)max AC220V, (STAR)max AC440V | |
| | Frequency | 50-60Hz (common) | |
| Item | | Measurement Item | Accuracy |
| Measurement elements | Current (A) | A1, A2, A3, AN, A_{AVG} | ±0.1% |
| | Current Demand (DA) | DA1, DA2, DA3, DAN, DA_{AVG} | |
| | Voltage (V) | V12, V23, V31, $V_{AVG}(L-L)$, V1N, V2N, V3N, $V_{AVG}(L-N)$ | |
| | Active Power (W) | W1, W2, W3, ΣW | ±0.2% |
| | Reactive Power (var) | var1, var2, var3, Σvar | |
| | Apparent Power (VA) | VA1, VA2, VA3, ΣVA | |
| | Power Factor (PF) | PF1, PF2, PF3, ΣPF | ±1.0% |
| | Frequency (Hz) | Hz | ±0.2% |
| | Active Energy (Wh) | Imported, Exported | class0.5S (IEC62053-22) |
| | Reactive Energy (varh) | Imported Lag, Imported Lead, Exported Lag, Exported Lead | class2.0 (IEC62053-23) |
| | Apparent Energy (VAh) | Imported + Exported | class2.0 |
| | Harmonic current (HI) | 1 to 31st(Only odd number) | ±2.0% |
| | Harmonic voltage (HV) | 1 to 31st(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) |
| | Operation time (h) | Operation time 1, Operation time 2 | (Reference) |
| Analog output response time | | 2 s or less (HI and HV: 10s or less) | |
| Measuring Method | Instantaneous Value | A·V: RMS calculation, W·var·VA·Wh·varh·VAh: Digital multiplication, PF: Power ratio calculation, Hz: Zero-cross, HI·HV: FFT | |
| | Demand Value | DA: Thermal type calculation, DW: Rolling Demand calculation | |
| Display | Type | LCD with backlight | |
| | Maximum Number of Display Digits or Segment Number | Upper stage display: 6 digits, Middle stage display: 6 digits, Lower stage display: 6 digits 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 | |
| | Bar graph | 21 Segment-Bar graph, 22 Segment-Indicator | |
| | Display updating time interval | 0.5s, 1s | |
| Communication Specification | | MODBUS®RTU communication | |
| Accessible option unit | | ME-4210-SS96, ME-0040C-SS96, ME-0052-SS96 | |
| Analog output | Output specification | DC4 to 20mA (0 to 600Ω) | |
| Pulse/Alarm output | The kind of switch | No-voltage 'a' contact | |
| | Contact Capacity | DC35V, 0.1A | |
| | Pulse width | 0.125s, 0.5s, 1.0s | |
| Digital input (DI) | Contact Capacity | DC24V (DC19 to 30V), 7mA or less | |
| | Signal width | 30ms or longer | |
| Digital output (DO) | The kind of switch | No-voltage 'a' contact | |
| | Contact Capacity | DC35V, 0.2A | |
| Power Failure Compensation | | Non volatile memory (Items : Setting value, MAX/MIN value, Active/Reactive/Apparent energy, Periodic Active Energy, Rolling Demand, Operation time) | |
| VA Consumption | VT | 0.1VA/phase, 0.2VA (at direct input 220V) | |
| | CT | 0.1VA/phase | |
| | Auxiliary power | 7VA (AC110V), 8VA (AC220V), 5W (DC100V) | |
| Auxiliary power | | AC100-240V (±15%), DC100-240V (-30% +15%) | |
| Weight | | 0.5kg | |
| Dimension | | 96 (H) × 96 (W) × 86 (D) | |
| Attachment Method | | Embedding attachment | |
| Operating temperature/humidity | | -5 to +55°C (average temperature: 35°C or less per day), 0 to 85%RH, non condensing | |
| Storage temperature/ humidity | | -25 to +75°C (average temperature: 35°C or less per day), 0 to 85%RH, non condensing | |

Note1: Accuracy is specified according to the maximum scales value of rated value.

Note2: Measurement of harmonics which its distortion ratio is exceeded 100% may exceed the accuracy.

Note3: Harmonics cannot be measured without voltage input.

Specifications

2. Applicable Standards

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

3. Precautions for MODBUS® RTU Communication

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

■ About Programming

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

- Electronic Multi-Measuring Instrument ME96NSR-MB/ ME96SSH-MB/ ME96SSR-MB/ ME96SSE-MB Interface specifications LSPM-0075

4. Precautions for CC-Link Communication

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

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)..... LEN080334
- Electronic Multi-Measuring Instrument programming manual (CC-Link)(For ver. 2 remote device station)..... LEN130391

Specifications

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

| Setting menu No. | Setting items | Initial content | Memo |
|------------------|---------------|---|------------------------|
| 1 | 1.1 | Phase wire system | 3P4(3-phase 4-wire) |
| | 1.2 | Display pattern | P04 |
| | 1.2.1 | Pattern P00 | — |
| | 1.3 | VT/direct selection | no(No VT) |
| | 1.3.1 | Direct voltage | 220/380V |
| | 1.3.2 | VT secondary voltage | — |
| | 1.3.3 | VT primary voltage | — |
| | 1.4 | CT secondary current | 5A |
| | 1.4.1 | CT primary current | 5A |
| | 1.5 | Frequency | 50Hz |
| 2 | 1.6 | Time constant for rolling demand (Interval time constant) | 15min |
| | 1.6.1 | Subinterval time constant | 1min |
| | 1.7 | Time constant for current demand | 0s |
| | 2.1 | Communication method selection (With ME-0040C-SS96) | CC(CC-Link) |
| | 2.2 | MODBUS®RTU address | 1 |
| | 2.2.1 | MODBUS®RTU baud rate | 19.2kbps |
| | 2.2.2 | MODBUS®RTU parity | EVEn(even) |
| | 2.2.3 | MODBUS®RTU stop bit | 1 |
| | 2.3 | CC-Link station number | 1 |
| | 2.3.1 | CC-Link baud rate | 156kbps |
| 3 | 2.3.2 | CC-Link version | 1.10 |
| | 2.4 | Communication reset | oFF |
| | 3.1 | Current maximum scale | 5A(CT primary current) |
| | 3.1.1 | Special current maximum scale | — |
| | 3.2 | Voltage maximum scale | 300V(±0 STEP) |
| | 3.3 | Power maximum scale | 4000W(±0 STEP) |
| | 3.3.1 | Single / Double deflection | Single deflection |
| | 3.4 | Reactive power maximum scale | 4000var(±0 STEP) |
| | 3.5 | Power factor scale | 0.5(-0.5 to 1 to 0.5) |
| | 3.6 | Expanded counting | Combination I |
| 4 | 3.7 | Harmonics display | oFF |
| | 4.1 | Model name + option code | (Model name) |
| | 4.2 | Version display | (Version) |
| | 4.3 | Back light brightness | 3 |
| | 4.4 | Back light auto off | Auto(Auto off) |
| | 4.5 | Display update time | 0.5s |
| | 5.1 | Alarm item 1 | non |
| | 5.1.1 | Alarm value 1 | — |
| | 5.2 | Alarm item 2 | non |
| | 5.2.1 | Alarm value 2 | — |
| 5 | 5.3 | Alarm item 3 | non |
| | 5.3.1 | Alarm value 3 | — |
| | 5.4 | Alarm item 4 | non |
| | 5.4.1 | Alarm value 4 | — |
| | 5.5 | Alarm delay time | — |
| | 5.6 | Alarm cancel method | — |
| | 5.7 | Back light flickers during alarms | — |
| | 5.8 | Motor start-up current masking | oFF |
| | 5.8.1 | Motor start-up current threshold | — |
| | 5.8.2 | Motor start-up current delay time | — |
| 6 | 5.9 | Pulse / Alarm output 1 (With ME-4210-SS96) | PULSE(Pulse output) |
| | 5.9.1 | Pulse output 1: output item | Wh |
| | 5.9.2 | Pulse output 1: pulse unit | 0.001kWh/pulse |
| | 5.10 | Pulse / Alarm output 2 (With ME-4210-SS96) | AL (Alarm output) |
| | 5.10.1 | Pulse output 2: output item | — |
| | 5.10.2 | Pulse output 2: pulse unit | — |
| | 5.11 | Pulse width | 0.125s |
| | 6.1 | Analog output CH1: output item | A _{AVG} |
| | 6.1.1 | Detailed setting (1) | 5A(CT primary current) |
| | 6.1.2 | Detailed setting (2) | — |
| 7 | 6.2 | Analog output CH2: output item | V _{AVG} (L-N) |
| | 6.2.1 | Detailed setting (1) | 300V(±0 STEP) |
| | 6.2.2 | Detailed setting (2) | — |
| | 6.3 | Analog output CH3: output item | ΣW |
| | 6.3.1 | Detailed setting (1) | 4000W(±0 STEP) |
| | 6.3.2 | Detailed setting (2) | Single deflection |
| | 6.4 | Analog output CH4: output item | ΣPF |
| | 6.4.1 | Detailed setting (1) | 0.5(-0.5 to 1 to 0.5) |
| | 6.4.2 | Detailed setting (2) | — |
| | 6.5 | Analog output limit | oFF |
| 8 | 7.1 | Periodic Active energy display | oFF (Not displayed) |
| | 7.1.1 | Control setting for switching time segments of periodic active energy | non(Not switched) |
| | 7.2 | Rolling demand display | oFF (Not displayed) |
| | 7.2.1 | Rolling demand time setting | oFF(Manual) |
| | 7.3 | Digital input/output status display | oFF(Not displayed) |
| | 7.3.1 | Digital input reset method | Auto(Auto off) |
| | 8.1 | Operating time display | oFF |
| | 8.1.1 | Target for counting Operation time setting | AUX(Auxiliary power) |
| | 8.1.2 | Operating time threshold | — |
| | 8.2 | Switch element information | 123 |
| | 8.3 | Set IEC mode | oFF (Normal mode) |

MITSUBISHI Electronic Multi-Measuring Instrument

Service Network

| Country/Region | Corporation Name | Address | Telephone |
|-------------------------------------|---|--|------------------------|
| Australia | Mitsubishi Electric Australia Pty. Ltd. | 348 Victoria Road, Rydalmere, N.S.W. 2116, Australia | +61-2-9684-7777 |
| Algeria | Mec Casa | Rue I N 125 Hay-Es-Salem, 02000, W-Chief, Algeria | +213-27798069 |
| Bangladesh | PROGRESSIVE TRADING CORPORATION | HAQUE TOWER, 2ND FLOOR, 610/11, JUBILEE ROAD, CHITTAGONG, BANGLADESH | +880-31-624307 |
| | ELECTRO MECH AUTOMATION & ENGINEERING LTD. | SHATABDI CENTER, 12TH FLOOR, SUITES: 12-B, 292, INNER CIRCULAR ROAD, FAKIRA POOL, MOTIJHEEL, DHAKA-1000, BANGLADESH | +88-02-7192826 |
| Belarus | Tehnikon | Oktyabrskaya 19, Off. 705, BY-220030 Minsk, Belarus | +375 (0)17 / 210 46 26 |
| Belgium | Koning & Hartman B.V. | Woluweaan 31, BE-1800 Vilvoorde, Belgium | +32 (0)2 / 2570240 |
| Brazil | Mitsubishi Electric do Brasil Comércio e Serviços Ltda. | Avenida Adelino Cardana, 293 21 andar Bethaville, Barueri SP, Brasil | +55-11-4689-3000 |
| Cambodia | DHINIMEX CO.,LTD | #245, St. Tep Phan, Phnom Penh, Cambodia | +855-23-997-725 |
| Central America | Automation International LLC | 7050 W. Palmetto Park Road Suite #15 PMB #555, Boca Raton, FL 33433 | +1-561-237-5228 |
| Chile | Rhona S.A. (Main office) | Vte. Agua Santa 4211 Casilla 30-D (P.O. Box) Vina del Mar, Chile | +56-32-2-320-600 |
| China | Mitsubishi Electric Automation (China) Ltd. | Mitsubishi Electric Automation Building, No.1386 Hongqiao Road, Shanghai, China 200336 | +86-21-2322-3030 |
| | Mitsubishi Electric Automation (China) Ltd. Beijing | 5/F, ONE INDIGO, 20 Jiuxianqiao Road Chaoyang District, Beijing, China 100016 | +86-10-6518-8830 |
| | Mitsubishi Electric Automation (China) Ltd. ShenZhen | Level 8, Galaxy World Tower B, 1 Yabao Road, Longgang District, Shenzhen, China 518129 | +86-755-2399-8272 |
| | Mitsubishi Electric Automation (China) Ltd. GuangZhou | Rm.1006, A1 Times E-Park, No.276-282, Hanxi Road East, Zhongcun Street, Panyu Distric, Guangzhou, China 510030 | +86-20-8923-6730 |
| | Mitsubishi Electric Automation (China) Ltd. ChengDu | 1501-1503, 15F, Guang-hua Centre Building-C, No.98 North Guang Hua 3th Rd Chengdu, China 610000 | +86-28-8446-8030 |
| | Mitsubishi Electric Automation (Hong Kong) Ltd. | 20/F., Cityplaza One, 1111 King's Road, Taikoo shing, Hong Kong | +852-2510-0555 |
| Colombia | Proelectrico Representaciones S.A. | Carrera 42 No 75 - 367 Bodega 109, Itagüí, Medellín, Antioquia, Colombia | +57-4-4441-224 |
| Czech Republic | AUTOCONT CONTROL SYSTEMS S.R.O | Technologická 374/6, CZ-708 00 Ostrava - Pustkovec | +420 595 691 150 |
| Denmark | BEIJER ELECTRONICS A/S | LYKKEGARDSVEJ 17, DK-4000 ROSKILDE, Denmark | +45 (0)46 / 75 76 66 |
| Egypt | Cairo Electrical Group | 9, Rostoum St. Garden City P.O. Box 165-11516 Maglis El-Shaab, Cairo - Egypt | +20-2-27961337 |
| France | Mitsubishi Electric Europe B.V. French Branch | FR-92741 Nanterre Cedex | +33 (0)1 55 68 57 01 |
| Germany | Mitsubishi Electric Europe B.V. | Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany | +49 (0) 2102 4860 |
| Greece | KALAMARAKIS - SAPOUNAS S.A. | IONIAS & NEROMILOU STR., CHAMOMILOUS ACHARNES, ATHENS, 13678 Greece | +30-2102 406000 |
| | UTECO | 5, MAVROGENOUS STR., 18542 PIRAEUS, Greece | +30-211-1206-900 |
| Hungary | Meltrade Ltd. | Fertő utca 14, HU-1107 Budapest, Hungary | +36 (0)1-431-9726 |
| India | Mitsubishi Electric India Private Limited | 2nd Floor, Tower A&B, Cyber Greens, DLF Cyber City, DLF Phase-III, Gurgaon - 122 022 Haryana, India | +91-124-4630300 |
| | Mitsubishi Electric India Private Limited Pune Sales Office | ICC-Devi Gaurav Technology Park, Unit no. 402, Fourth Floor, Survey no. 191-192 (P), Opp. Vallabh Nagar Bus Depot, Pune - 411018, Maharashtra, India | +91-20-68192100 |
| | Mitsubishi Electric India Private Limited FA Center | 204-209, 2nd Floor, 31FIVE, Corporate Road, Prahladnagar, Ahmedabad 380015, Gujarat, India | +91-79677-77888 |
| Indonesia | PT.Mitsubishi Electric Indonesia | Gedung Jaya 8th floor, J.L.MH. Thamrin No.12 Jakarta Pusat 10340, Indonesia | +62-21-3192-6461 |
| | P.T. Sahabat Indonesia | P.O.Box 5045 Kawasan Industri Perumahan, Jakarta, Indonesia | +62-(0)21-6610651-9 |
| Ireland | Mitsubishi Electric Europe B.V. | Westgate Business Park, Ballymount, IRL-Dublin 24, Ireland | +353 (0)1-4198800 |
| Israel | Gino Industries Ltd. | 26, Ophir Street IL-32235 Haifa, Israel | +972 (0)4-867-0656 |
| Italy | Mitsubishi Electric Europe B.V. | Viale Colleoni 7, I-20041 Agrate Brianza (MI), Italy | +39 039-60531 |
| Kazakhstan | Kazpromavtomatika | Ul. Zhambyla 28, KAZ - 100017 Karaganda | +7-7212-501000 |
| Korea | Mitsubishi Electric Automation Korea Co., Ltd | 9F Gangseo Hangang xi-tower A, 401 Yangcheon-ro, Gangseo-gu, Seoul 07528 Korea | +82-2-3660-9573 |
| Laos | AROUNKIT CORPORATION IMPORT-EXPORT SOLE CO.,LTD | SAPHANMO VILLAGE. SAYSETHA DISTRICT, VIENTIANE CAPITAL, LAOS | +856-20-415899 |
| Lebanon | Comptoir d'Electricite Generale-Liban | Cebaco Center - Block A Autostrade Dora, P.O. Box 11-2597 Beirut - Lebanon | +961-1-240445 |
| Lithuania | Rifas UAB | Tinklu 29A, LT-5300 Panevezys, Lithuania | +370 (0)45-582-728 |
| Malaysia | Mitric Sdn Bhd | No. 5 Jalan Pemberita U1/49, Temasya Industrial Park, Glenmarie 40150 Shah Alam, Selangor, Malaysia | +603-5569-3748 |
| Malta | ALFATRADE LTD | 99 PAOLA HILL, PAOLA PLA 1702, Malta | +356 (0)21-697-816 |
| Marocco | SCHIELE MAROC | KM 7.2 NOUVELLE ROUTE DE RABAT AIN SEBAA, 20600 Casablanca, Marocco | +212 661 45 15 96 |
| Myanmar | Peace Myanmar Electric Co.,Ltd. | NO137/139 Botahtaung Pagoda Road, Botahtaung Town Ship 11161, Yangon, Myanmar | +95-(0)1-202589 |
| Nepal | Watt&Volt House | KHA 2-65, Volt House Dilibazar Post Box:2108, Kathmandu, Nepal | +977-1-4411330 |
| Netherlands | Imtech Marine & Offshore B.V. | Sluisjesdijk 155, NL-3087 AG Rotterdam, Netherlands | +31 (0)10-487-19 11 |
| North America | Mitsubishi Electric Automation, Inc. | 500 Corporate Woods Parkway, Vernon Hills, IL 60061 USA | +847-478-2100 |
| Norway | Scanelec AS | Leirvikasen 43B, NO-5179 Godvik, Norway | +47 (0)55-506000 |
| Mexico | Mitsubishi Electric Automation, Inc. Mexico Branch | Blvd. Miguel de Cervantes Saavedra 301, Torre Norte Piso 5, Col. Ampliación Granada, Miguel Hidalgo, Ciudad de México, CP 11520, México | +52-55-3067-7511 |
| 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. | 2-P GULBERG II, LAHORE, 54600, PAKISTAN | +92-42-575232, 5753373 |
| Peru | Rhona S.A. (Branch office) | Avenida Argentina 2201, Cercado de Lima | +51-1-464-4459 |
| Philippines | MELCO Factory Automation Philippines Inc. | 128, Lopez Rizal St., Brgy. Highway Hills, Mandaluyong City, Metro Manila, Philippines | +63-(0)2-256-8042 |
| | Edison Electric Integrated, Inc. | 24th Fl. Galleria Corporate Center, Edsa Cr. Ortigas Ave., Quezon City Metro Manila, Philippines | +63-(0)2-634-8691 |
| Poland | Mitsubishi Electric Europe B.V. Polish Branch | Krakowska 48, 32-083 Balice, Poland | +48 12 347 65 00 |
| Republic of Moldova | Intehsis SRL | bld. Traian 23/1, MD-2060 Kishinev, Moldova | +373 (0)22-66-4242 |
| Romania | Sirius Trading & Services SRL | RO-060841 Bucuresti, Sector 6 Alea Lacul Morii Nr. 3 | +40-(0)21-430-40-06 |
| Russia | Mitsubishi Electric (Russia) LLC | 2 bld.1, Letnikovskaya street, Moscow, 115114, Russia | +7 495 721-2070 |
| 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, Mitsubishi Electric Building, Singapore 159943 | +65-6473-2308 |
| Slovakia | PROCONT, Presov | Kupelna 1/, SK - 08001 Presov, Slovakia | +421 (0)51 - 7580 611 |
| | SIMAP | Jana Derku 1671, SK - 91101 Trenčin, Slovakia | +421 (0)32 743 04 72 |
| Slovenia | Inea RBT d.o.o. | Stegne 11, SI-1000 Ljubljana, Slovenia | +386 (0)1-513-8116 |
| South Africa | CBI-electric: low voltage | Private Bag 2016, ZA-1600 Isando Gauteng, South Africa | +27-(0)11-9282000 |
| Spain | Mitsubishi Electric Europe B.V. Spanish Branch | Carretera de Rubi 76-80, E-08190 Sant Cugat del Vallés (Barcelona), Spain | +34 (0)93-565-3131 |
| Sweden | Mitsubishi Electric Europe B.V. (Scandinavia) | Hedvig Möllers gata 6, 223 55 Lund, Sweden | +46 (0)8-625-10-00 |
| | Euro Energy Components AB | Järnvägsgränd 36, S-434 24 Kungälv, Sweden | +46 (0)300-690040 |
| Switzerland | TriElec AG | Muehlentalstrasse 136, CH-8201 Schaffhausen, Switzerland | +41-(0)52-6258425 |
| Taiwan | Setsuyo Enterprise Co., Ltd | 5th 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 |
| Tunisia | MOTRA Electric | 3, Résidence Imen, Avenue des Martyrs Mourouj III, 2074 - El Mourouj III Ben Arous, Tunisia | +216-71 474 599 |
| Turkey | Mitsubishi Electric Turkey A.Ş. | Şerifali Mahallesi Kale Sokak No: 41, 34775 Ümraniye, İstanbul, Turkey | +90-216-969-2666 |
| United Kingdom | Mitsubishi Electric Europe B.V. | Travellers Lane, UK-Hatfield, Herts. AL10 8XB, United Kingdom | +44 (0)1707-276100 |
| Uruguay | Fierro Vignoli S.A. | Avda. Uruguay 1274 Montevideo Uruguay | +598-2-902-0808 |
| Vietnam | Mitsubishi Electric Vietnam Co.,Ltd. Head Office | 11th & 12th Floor, Viettel Tower B, 285 Cach Mang Thang 8 Street, Ward 12, District 10, Ho Chi Minh City, Vietnam | +84-28-3910-5945 |
| | Mitsubishi Electric Vietnam Co.,Ltd. Hanoi Branch | 24th Floor, Handico Tower, Pham Hung Road, khu do thi moi Me Tri Ha, Nam Tu Liem District, Hanoi City, Vietnam | +84-24-3937-8075 |

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