



MITSUBISHI Electronic Multi-Measuring Instrument

Types

ME96NSR

ME96NSR-MB

User's Manual




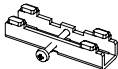
- Before operating the instrument, you should first read thoroughly this operation manual for safe operation and optimized performance of the product.

Deliver this user's manual to the end user.

Check on Your Delivery

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

- The package is in good condition.
- The product has not been damaged during transit.
- The product corresponds to your order specifications.
- This product has the following accessories.

| 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.

| Type name of optional plug-in modules | I/O specifications | | | | |
|---------------------------------------|--------------------|--------------|---------------|---------------------|---------------|
| | Analog output | Pulse output | Digital input | Digital output (*1) | Communication |
| ME-4201-NS96 | 4 circuits | 2 points | – | 1 point | – |
| ME-0052-NS96 (*2) | – | – | 5 points | 2 points | – |
| ME-0040C-NS96 | – | – | 4 points | – | CC-Link |

*1: The digital output of the ME-4201-NS96 is the alarm output of upper/lower limit.

The digital outputs of the ME-0052-NS96 are opened or closed the contacts by the 16bit set register of the ModBus.

*2: The ME-0052-NS96 is only combined with the type of ME96NSR-MB.

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

| Output | Specification | | Optional Plug-in Module Type |
|----------------|--|--------------|-------------------------------|
| Analog Output | Output | 4 to 20mA DC | ME-4201-NS96 |
| | Load Resistance | 600Ω max | |
| Pulse Output | No-voltage 'a' contact Contact Capacity: 35VDC, 0.1A | | ME-4201-NS96 |
| Digital Input | Rated 24VDC (19 to 30VDC), under 4mA Signal Width over 30ms (with 'DI' latch HoLd, over 30ms of pulse can be latched) | | ME-0052-NS96 ME-0040C-NS96 |
| Digital Output | No-voltage 'a' contact Contact Capacity: 35VDC, 0.2A | | ME-4201-NS96 ME-0052-NS96 |

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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. Please save this manual to make it accessible when required and always forward it to the end user.

HAZARD SYMBOLS



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

CAUTION

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

Normal service conditions

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

- Ambient temperature : -5 to +50°C, average day temperature exceeds 35°C
- Humidity : 30~85%RH, non condensing.
- Altitude : 1000m or less
- Pollution Degree : 2
- Atmosphere without corrosive gas, dust, salt, oil mist.
- Indoor use.
- Transient over voltage 4000V.
- A place without excessive shocks or vibration.
- Do not expose to rain and water drips.
- Do not expose to direct sunlight.
- An area in where no pieces of metal and an inductive substance disperse.
- Do not expose to strong electromagnetic field and ambient noises.

Installation instructions

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

- Auxiliary power supply and measuring ratings.

| | | |
|------------------------|---|---|
| Auxiliary power supply | 100-240V AC ^{+10%} -15% (50-60Hz) 8VA 100-240V DC ^{+10%} -30% 5W | MA, MB terminals |
| Ratings | Voltage | 277V AC phase-neutral / 480V AC phase-phase |
| | Current | 5A (via current transformer) (max 30V AC) |
| | Frequency | 50/60Hz |
| | Category III | P1, P2, P3, PN terminals |
| | Category III | +C1, C1, +C2, C2, +C3, C3 terminals |

Provide the basic insulation externally at the current input terminals.

Voltage-measuring and current-measuring circuit terminals should be permanently connected.

- Others

| | | |
|----------------------|--|------------|
| ModBus communication | T+, T-, Ter terminals | max 35V DC |
| Digital input | DA, DB, DG, DI1, DI2, DI3, DI4, COM, 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 output | C1A, C1B, C2A, C2B terminals | |
| Alarm output | A, COM terminals | |

Safety Precaution

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

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

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

■ Operation instructions

CAUTION

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

■ Maintenance instructions

CAUTION

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

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

■ Storage conditions

- Ambient temperature the : -20 to +60°C, average day temperature exceeds 35°C
- Humidity range 30~85%RH, non condensing.
- Atmosphere without corrosive gas, dust, salt, oil mist.
- A place without excessive shocks or vibration.
- Do not expose to rain and water drips.
- Do not expose to direct sunlight.
- An area in where are pieces of metal and an inductive substance disperse.

■ Disposal

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

■ Guarantee

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

We cannot take responsibility about the loss and lost profits caused by the damage, failure of the product caused by no fault of our company.

■ Replacement Cycle

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

EMC Directive Instruction

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

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

1. EMC Standards

The standards applicable to the EMC Directive (No.89/336/EEC) are listed below.

- (1) Radiated radio frequency emission ————— EN61000-6-4/2001
- (2) Radiated radio frequency electromagnetic field immunity —EN61000-6-2/2001

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.

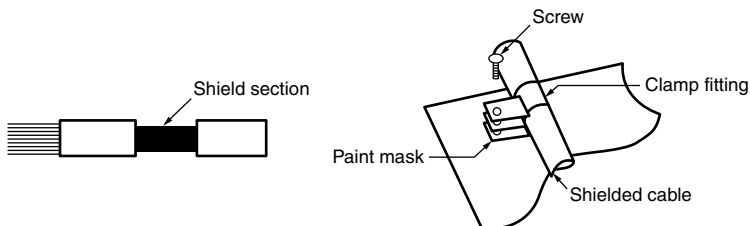
- Conductive cabinet is used.
- Six faces of a cabinet have to be ensured conductivity for each other.
- A cabinet has to be connected to earth by a thick wire of low impedance.
- Holes on faces of cabinet have to be 10 cm or less in diameter.
- The terminals for protective earth and functional earth 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.)

| |
|---|
| <p>Protective earth: Maintains the safety of the instrument and improves the noise resistance. Functional earth: Improves the noise resistance.</p> |
|---|

- 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.



1. Features

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

In addition, telemonitoring can be done by a variegated output function.

■ Various Measurement Parameters

| Phase wire system | | Three phase 4-wire | Three phase 3-wire |
|-------------------|------|---|-----------------------------------|
| Current | A | A1, A2, A3, AN, A _{AVG} | A1, A2, A3, A _{AVG} |
| Current demand | DA | DA1, DA2, DA3, DAN, DA _{AVG} | DA1, DA2, DA3, DA _{AVG} |
| Voltage | V | V12, V23, V31, V _{LLAVG} or V1N, V2N, V3N, V _{LN} AVG | V12, V23, V31, V _{LLAVG} |
| | | | |
| Active power | W | ΣW, W1, W2, W3 | ΣW |
| Reactive power | var | Σvar, var1, var2, var3 | Σvar |
| Apparent power | VA | ΣVA, VA1, VA2, VA3 | — |
| Power factor | PF | ΣPF, PF1, PF2, PF3 | ΣPF |
| Frequency | Hz | Hz | |
| Active energy | Wh | Imported, Exported | |
| Reactive energy | varh | Imported lag, Imported lead, Exported lag, Exported lead | |
| Harmonic current | HI | HI1, HI2, HI3, HIN | HI1, HI2, HI3 |
| | | THD, h1, h3, h5, h7, h9, h11, h13 (RMS, Distortion ratio) | |
| Harmonic voltage | HV | HV1N, HV2N, HV3N | HV12, HV23 |
| | | THD, h1, h3, h5, h7, h9, h11, h13 (RMS, Distortion ratio) | |

Refer to the followings in this manual.

Average value: AVG ex) Average value of current : A_{AVG}

Total RMS : Σ Three phase active power : ΣW

As for voltage, the phase to phase is described "L-L", the phase to neutral is described "L-N".

ex) Phase 1 to phase 2 voltage: V12

Phase 1 to neutral voltage : V1N

■ Element simultaneous display of four measurements by large-scale bar graph and digital three-stage display.

With the combination of bar graph and digital three-stage display, four measurement items can be displayed at the same time. Main measurements (A, V, W, PF) of the incoming panel can be displayed at the same time. And A_{AVG}, A1, A2 and A3 can be displayed at the same time, also.

■ Higher dimension measurement monitoring function by measurement ASIC of original our company.

Measuring elements are current, voltage, active power, reactive power, apparent power, power factor and frequency. In addition, it can measure harmonics and count active energy (imported, exported) and reactive energy (imported lag, imported lead, exported lag, exported lead).

■ Conformity with the standards.

This instrument conform with the UL/cUL (Component Recognition), CE Marking, KC Mark and FCC/IC.

■ Small & Flexible.

Its dimension is 96×96mm of DIN size, the depth is 86mm, smaller than the previous model.

And, it does not need the onerous specification of phase wire system when it is ordered because three phase 3-wire or the three phase 4-wire can be set in the set up mode.

In addition, because the output option can be installed later, it is possible to hold down initial investment to a phased system expansion plan.

■ Remote Input/Output Functions.

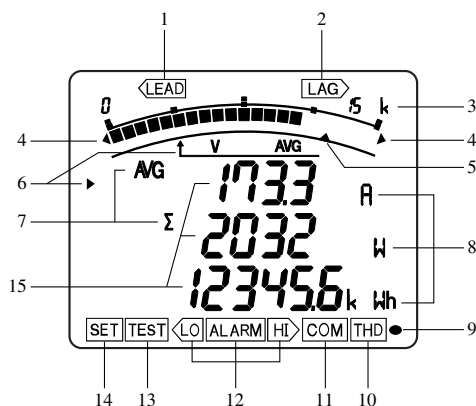
It can expand the remote input/output functions to the ModBus communication. It can observe the state of five digital inputs and control two digital outputs with the electric power monitor. And, because the latch function is provided in the remote digital input and the pulse signal of 30ms or more can be maintained, it is possible to use it as an input monitor of the OCR alarm of ACB.

■ Test Functions.

It can make sure the check of wiring and the check of monitor program of system with the test functions of analog outputs, pulse outputs, alarm outputs and reply of communication data if there is no measurement input at the start-up of the equipment.

2. Display and Key Functions

■ Display



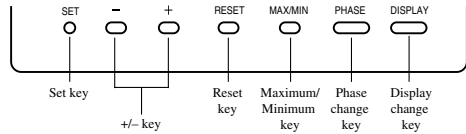
| | | |
|----|------------------------|---|
| 1 | LEAD status | They show direction of Power Factor or Reactive Power on bar graph. |
| 2 | LAG status | They show the type of counting of Reactive Energy on Reactive Energy Display. |
| 3 | Scale of the bar graph | They show the scales of the bar graph. |
| 4 | Outside range | Measurement value is outside range of scale of the bar graph. |
| 5 | Alarm indicator | It shows the setting value of the upper limit or lower limit. |
| 6 | Bar graph status | They show the item expressed with the bar graph. |
| 7 | Phase status | They show the phase for each of the digital displays. |
| 8 | Unit | They show the unit for each of the digital displays. |
| 9 | Metering status | When it is blinking, the instrument is counting active energy. |
| 10 | Harmonics | It means that the digital displays are harmonics values. |
| 11 | Communication status | It shows that the instrument is equipped with a communication function. It blinks under the condition of a communication error. |
| 12 | Alarm status | They show that the upper limit value or lower limit value was exceeded. |
| 13 | Test status | It shows that the output of the option module is tested. |
| 14 | Setup status | It appears at Set-up mode. |
| 15 | Digital | The measured value is displayed in a digital number. |

Note: The above display is an example for explanation.

2. Display and Key Functions

■ Functions of operation key

The operation key 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 | Key | | | | | | | Function |
|---|-----|-----|-----|-------|---------|-------|---------|---|
| | SET | - | + | RESET | MAX/MIN | PHASE | DISPLAY | |
| Basic | | | | | | | ○ | Display changes. |
| | | | | | | | ○ | Phase changes. |
| | | | | | ○ | | | Mode changes to the max./min. display and the instantaneous display. |
| | | | | ○ | | | | An alarm condition is canceled. |
| | | ○ | ○ | ○ | | | | The item expressed with the bar graph is changed. |
| | | ○ | ○ | | | | ○ | Stop the auto cyclical change. (*1) |
| | | ○ | ○ | | | | ◎ | Harmonics number changes at harmonics display. |
| | | | | | | | ◎ | The displays changes cyclically. |
| | | | | | | | ◎ | The phases changes cyclically. |
| | | | | ◎ | | | | All alarm conditions are canceled. |
| Special | | | | ◎ | | | | The latching data of digital input on the display is canceled. |
| | | | | ◎ | | | | The max./min. values on the display are reset to the instantaneous values. |
| | | | | ◎ | ◎ | | | All of the max./min. values are reset to the present values. |
| | | ◎ | ◎ | | | | | The counting values of 3 digits of low link are displayed. After pressing once again, the display returns. (*2) |
| | | ◎ | ◎ | ◎ | ◎ | | | All of the counting values are zero reset. |
| | | ◎ | ◎ | | | | | The display of set-up mode appears. |
| | | ◎ | | | | | | The display of set value confirmation mode appears. |
| | | ○ | | | | | | The setup contents that is blinking is saved. The setup contents is changed to next content. The display of set-up menu appears. (At the final contents of the setup.) The End display appears. (At the final contents of the setup in the simplified set-up menu.) After the setup contents are saved, the display on operation mode appears if it is the End display. After the setup contents are not saved, the display on operation mode appears if it is the CANCEL display. |
| | | □ | | | | | | The display of set-up menu appears. The End display appears. (In the simplified set-up menu.) |
| | | ○ □ | ○ □ | | | | | The values of set-up and number of the menu are changed. (If it presses for 1 sec or more fast forward or fast return.)(*3) The CANCEL display appears at the End display. |
| Set-up mode/ Set value confirmation mode | | ◎ | ◎ | | | | | The values of set-up and number of the menu are changed. Then it is carry up and fast forward. (*4) |
| | | | | | | ○ | | Change the display of simplified set-up menu, and move to the start. (The setup contents are saved.) |
| | | | | | | | ○ | Back to the previous contents. (The setup contents are saved.) The display of set-up menu appears. (At the start setup contents, and at the display of the option module.) The End display appears. (At the start setup contents in the simplified set-up mode.) |
| | | | | | | □ | □ | The display of simplified set-up mode appears. (At blinking the “End” in the set-up mode.) |
| | | | | | □ | □ | | The type of the option module appears. (At blinking the “End” in the set-up mode.) The instrument is initialized. (At the CANCEL display.) |
| | | | | | | | | |

*1: Each the phase cyclic and the display cyclic are stopped.

*2: It is available only that displayed element in the displayed Wh, varh.

*3: The last digit is fast-forwarded for 4 step per second.

*4: The one step up digit from the last one is fast-forwarded for 4 step per second. It is available only the set of the ModBus address and the set of CC-Link station number.

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

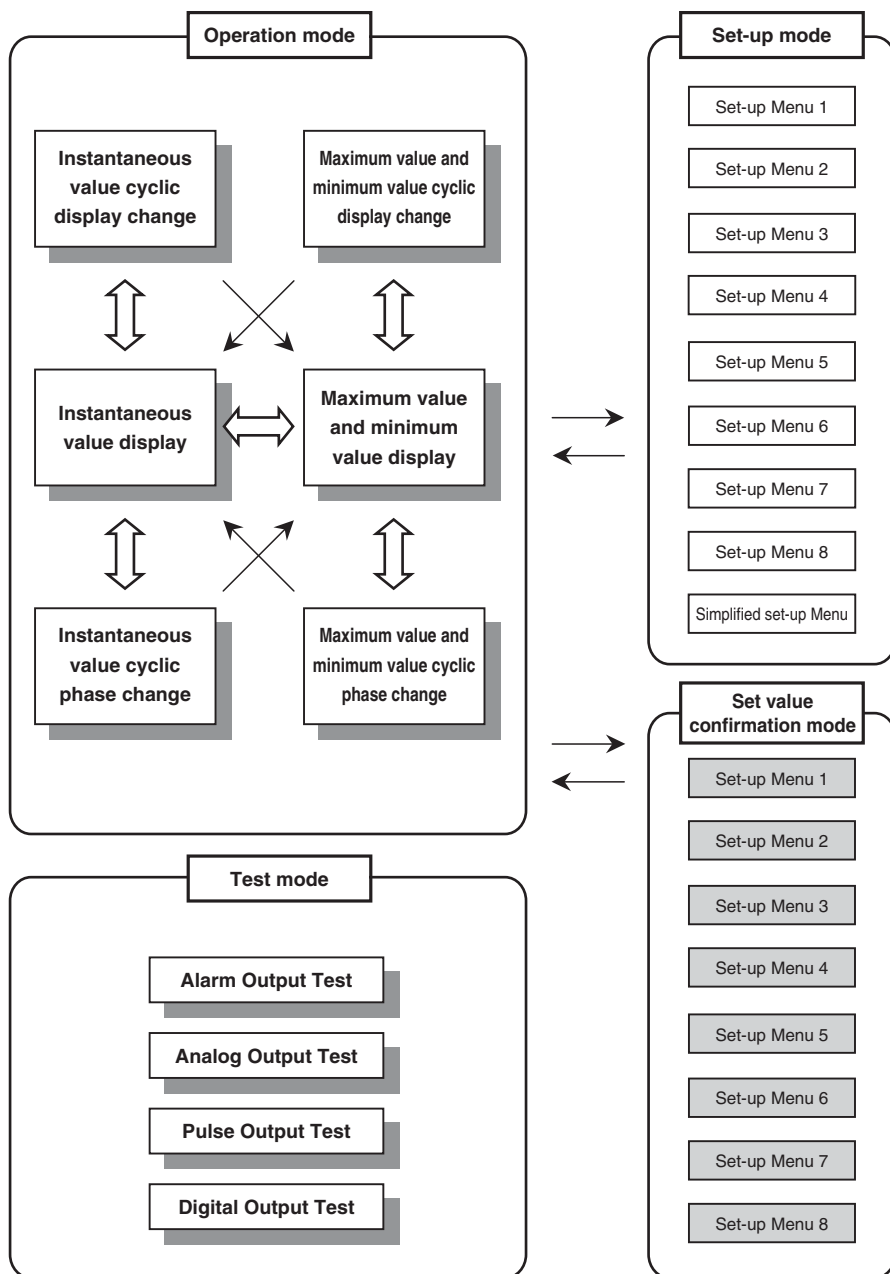
Notes

- If the function of “maximum value and minimum value reset” and “Wh, varh zero reset” are done, data will be lost. Before the operation, please record data.
- If the function of “initializing of instrument” is done, the entire measurement (measurement display, alarm, analog output, pulse) stops.

3. Function Modes

This meter has 4 kinds of function modes. Use it at each mode according to your requirements.

■ Diagram of Each Mode



Note: Shaded set menus of the set value confirmation mode are only for confirming set values, and their settings cannot be changed.

3. Function Modes

■ Outline of Function Mode

Operation mode

Measuring and displaying in this mode.

Instantaneous value display

The instantaneous values of the set-up display pattern are displayed. Usually, this display is used.

Maximum value and minimum value display

The maximum values and minimum values are displayed. (see page 39)

Instantaneous value cyclic display change

Instantaneous value displays are automatically changed every 5 seconds. (see page 40)

Instantaneous value cyclic phase change

Instantaneous value phases are automatically changed every 5 seconds. (see page 40)

Maximum value and minimum value cyclic display change

Maximum value and minimum value displays are automatically changed every 5 seconds. (see page 40)

Maximum value and minimum value cyclic phase change

Maximum value and minimum value phases are automatically changed every 5 seconds. (see page 40)

Set-up mode

In this mode, all the setting items including primary voltage, primary current, and so forth can be set. Set necessary items before operation. (see pages 12 to 31)

Set value confirmation mode

This mode is for checking the contents of the set-up items.

In this mode, the contents of the all set-up items are protected from changing accidentally. (see page 44)

Test mode

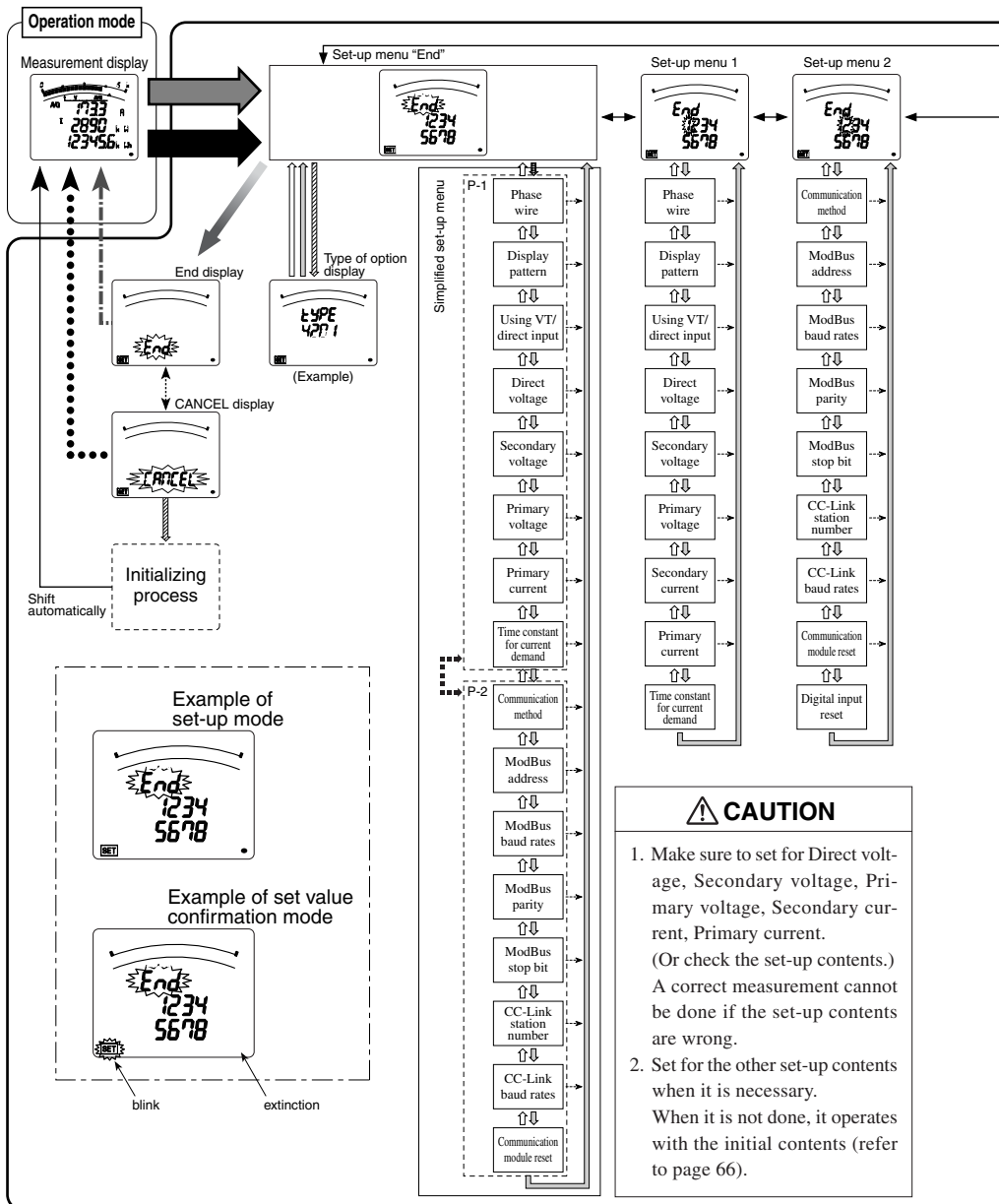
In this mode, the output function can be tested, when the option module is installed.

A mock output can be put out even if only it supplies power to the instrument, and there is no input. This mode is independent of other modes. (see page 33 to 36)

4. Set-up

4.1 Set-up Diagram

For correct measurement, it is necessary to set the primary voltage and the primary current, etc. in the set-up mode. It can set necessary items, after it shifts from the Operation mode to set-up mode. Items are not set is the initial setting. In the case of normal use, it can use only by the set-up menu 1 (basic set-up). In the case to use the communication function, set the set-up menu 2. Refer to the next page or later for the set-up items.



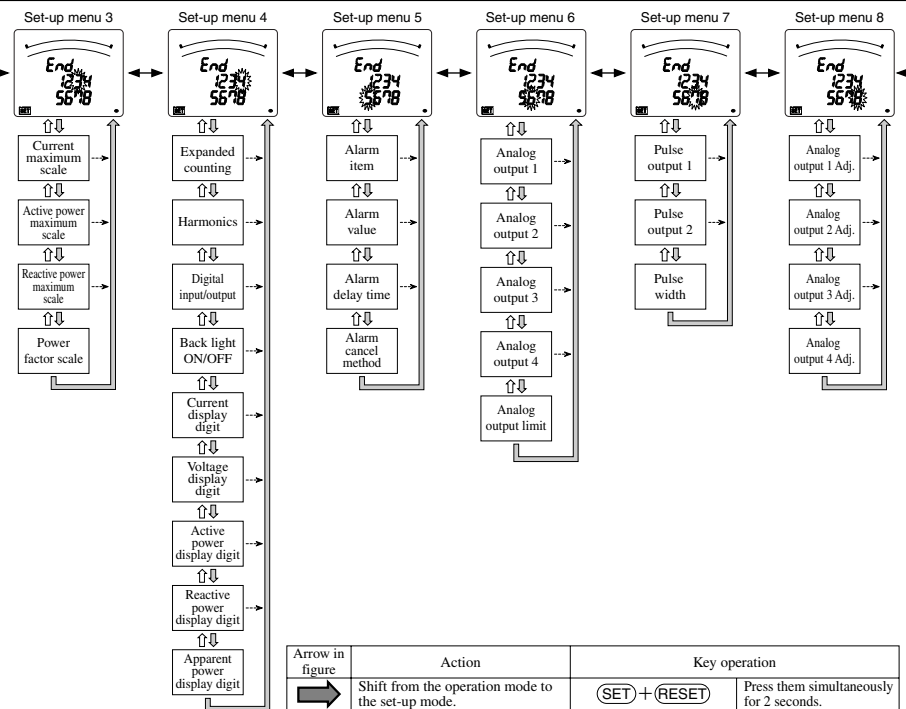
4. Set-up

4.1 Set-up Diagram

• How to Access the Set-up Items.

- ① Press the **(SET)** key and the **(RESET)** key simultaneously for 2 seconds to get in the set-up mode.
- ② Select a set-up menu number by **(+)** or **(-)** key.
- ③ Change the contents in each set-up menu. (Refer to pages 14 to 27.)
- ④ After completion of set-up, select 'End' in the set-up menu and press the **(SET)** key.
- ⑤ When the End display appears, press the **(SET)** key once again.

Set-up mode or set value confirmation mode



*This figure writes all set menus.

There is a menu not displayed by the presence of the setting condition and the option.

| Arrow in figure | Action | Key operation | |
|-------------------|---|----------------------------|--|
| | Shift from the operation mode to the set-up mode. | (SET) + (RESET) | Press them simultaneously for 2 seconds. |
| | Shift from the operation mode to the set value confirmation mode. | (SET) | Press it for 2 seconds. |
| | Select the menu number to set or "End". | (+) or (-) | Press it several times. |
| | Get into each setting screen. Shift to the next setting item. | (SET) | Press it. |
| | Go back to the previous setting item. | (DISPLAY) | Press it. |
| Omitted in figure | Select a set value. | (+) or (-) | Press it several times. |
| | Shift to the End screen. | (SET) | Press it. |
| | Memorize the setting contents, and go back to the operation mode. | (SET) | Press it. |
| | Select "CANCEL". | (+) or (-) | Press it. |
| | Cancel the setting. | (SET) | Press it. |
| | Skip remaining setting items during setting. | (SET) | Press it for 1 second. |
| | Shift from the set-up mode to simplified set-up menu. | (PHASE) + (DISPLAY) | Press them simultaneously for 1 second. |
| | Display the type of option unit. | (MAX/MIN) + (PHASE) | Press them simultaneously for 1 second. |
| | Initializing of instrument | (MAX/MIN) + (PHASE) | Press them simultaneously for 1 second. |
| | Change the page of the simplified set-up menu. | (PHASE) | Press it. |

4. Set-up

4.2 Basic Set-up

Set-up Menu 1

In this set-up menu 1, set-up the basic contents as following for correct measurement .

In the operation mode, after pressing **(SET)** and **(RESET)** simultaneously for 2 seconds or more, the following operation becomes available. The underline shows the initial value.

Set-up menu

← →

① Phase wire

← →

② Display pattern

← →

③ Using VT/
direct input

← →

④ Direct voltage

← →

DISPLAY

↑ ↓

SET

DISPLAY

↑ ↓

SET

DISPLAY

↑ ↓


SET

DISPLAY

↑ ↓

SET

Set the set-up menu number to "1". (Set as shown in the right display.)




① Set the phase wire system.

3P3.2Ct : Three phase 3-wire (2CT)

3P3.3Ct : Three phase 3-wire (3CT)

3P4 : Three phase 4-wire

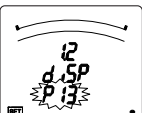


② Set the display pattern. (Initial content: P13)

Note: As for detailed display patterns, refer to pages 48, 49.

- Displayed in display setting.
- △: Set by the set-up menu 4. (page 20 to 21)
- : Select "P00", and set display sequence and display position. (page 45 to 46)
- DA: current demand, HI: harmonic current, HV: harmonic voltage,
- DI: digital input, DO: digital output (DI/DO: only when option module is installed)
- VA: Three phase 4-wire only

| Display pattern | A | DA | V | W | PF | var | Hz | VA | Wh | varh | Wh Exported active energy | varh Special | HI | HV | DI | DO |
|-----------------|---|----|---|---|----|-----|----|----|----|------|---------------------------|--------------|----|----|----|----|
| P01 | ○ | | ○ | ○ | ○ | | | | | | | | △ | △ | △ | △ |
| P02 | ○ | | ○ | ○ | ○ | | | | ○ | | | △ | △ | △ | △ | △ |
| P03 | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | | | | △ | △ | △ | △ |
| P04 | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | △ | △ | △ | △ | △ |
| P05 | ○ | | ○ | ○ | ○ | ○ | ○ | | | | | | △ | △ | △ | △ |
| P06 | ○ | | ○ | | | | | | | | | | △ | △ | △ | △ |
| P07 | ○ | | ○ | ○ | | | | | | | | | △ | △ | △ | △ |
| P08 | ○ | | ○ | ○ | | | | | ○ | | | △ | △ | △ | △ | △ |
| P09 | ○ | ○ | ○ | | | | | | | | | | △ | △ | △ | △ |
| P10 | ○ | ○ | ○ | ○ | | | | | | | | | △ | △ | △ | △ |
| P11 | ○ | ○ | ○ | | | | | | ○ | | | △ | △ | △ | △ | △ |
| P12 | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | △ | △ | △ | △ | △ |
| P13 | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | △ | △ | △ | △ | △ |
| P00 | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | △ | △ | △ | △ |

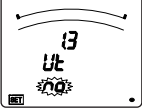


③ Choose VT or direct input (without VT).

YES : using VT

no : direct input

Initial content
 Three phase 3-wire : using VT
 Three phase 4-wire : direct input



④ Set-up the rated voltage for scaling of the bar graph.

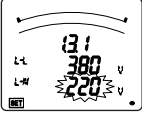
If you set "YES" on set-up No.③, this display does not appear.

Three phase 4-wire
(phase to phase(L-L)/phase to neutral(L-N))

110V/63.5V
173V/100V
190V/110V
380V/220V

415V/240V
440V/254V
480V/277V

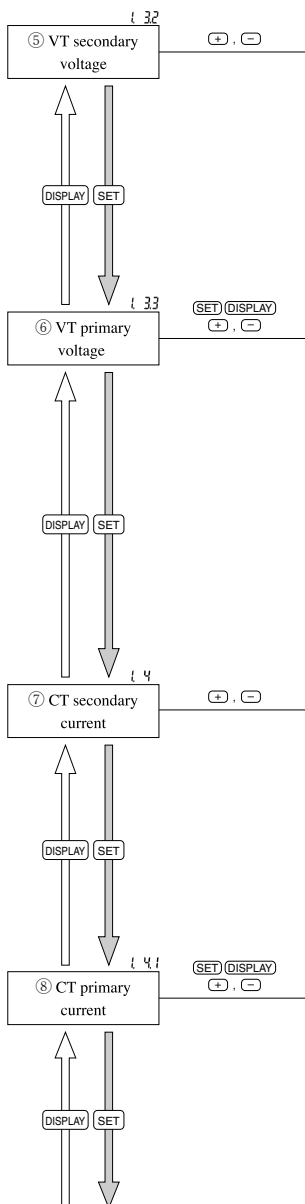
110V ↔ 220V



4. Set-up

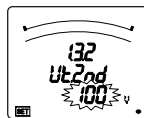
4.2 Basic Set-up

Set-up Menu 1



⑤ Set the secondary voltage values of VT.
If you set “no” on set-up No.③, this display does not appear.

| Three phase 4-wire | Three phase 3-wire |
|--------------------|--------------------|
| 63.5V | 100V |
| 100V | 110V |
| 110V | 220V |
| 115V | |
| 120V | |



⑥ Set the primary voltage value of VT in the case of using VT.
If you select “no” on set up No.③, this display does not appear.

Initial setting

Three phase 3-wire : 10000V

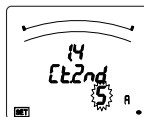
Three phase 4-wire : 200V



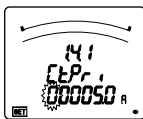
- From top digit, select the value of the flickering digit by (+) and (-).
- The setting digit can be moved to right by (SET).
- The setting digit can be moved to left by (DISPLAY).
- The number of settable digits are upper 3 digits. Setting is available in the range from 60V to 750kV (750000V).
- * If it is set on range other than 60V to 750kV, error display (E05) appears. At the moment of the error display, press (SET) and review the set value, and set it once again.
- When (SET) is pressed at the lowest digit, the setting item goes to the next one.

⑦ Set the secondary current value of CT.

5A ↔ 1A



⑧ Set the primary current value of CT. (The initial value is 5A.)

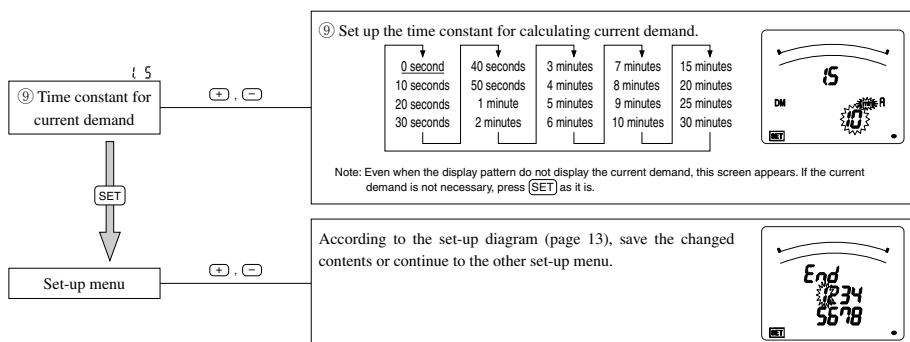


- From top digit, select the value of the flickering digit by (+) and (-).
- The setting digit can be moved to right by (SET).
- The setting digit can be moved to left by (DISPLAY).
- The number of settable digits are upper 3 digits. Setting is available in the range from 5A to 30kA (30000A).
- * If it is set on range other than 5A to 30kA, error display (E05) appears. At the moment of the error display, press (SET) and review the set value, and set it once again.
- When (SET) is pressed at the lowest digit, the setting item goes to the next one.

4. Set-up

4.2 Basic Set-up

Set-up Menu 1



In the case of use only by the Set-up Menu 1 (basic set-up), go to "5. Operation" in page 37.

In the case to use additional functions, go to "Set-up Menus 2 to 8" in page 17 to 32.

Note

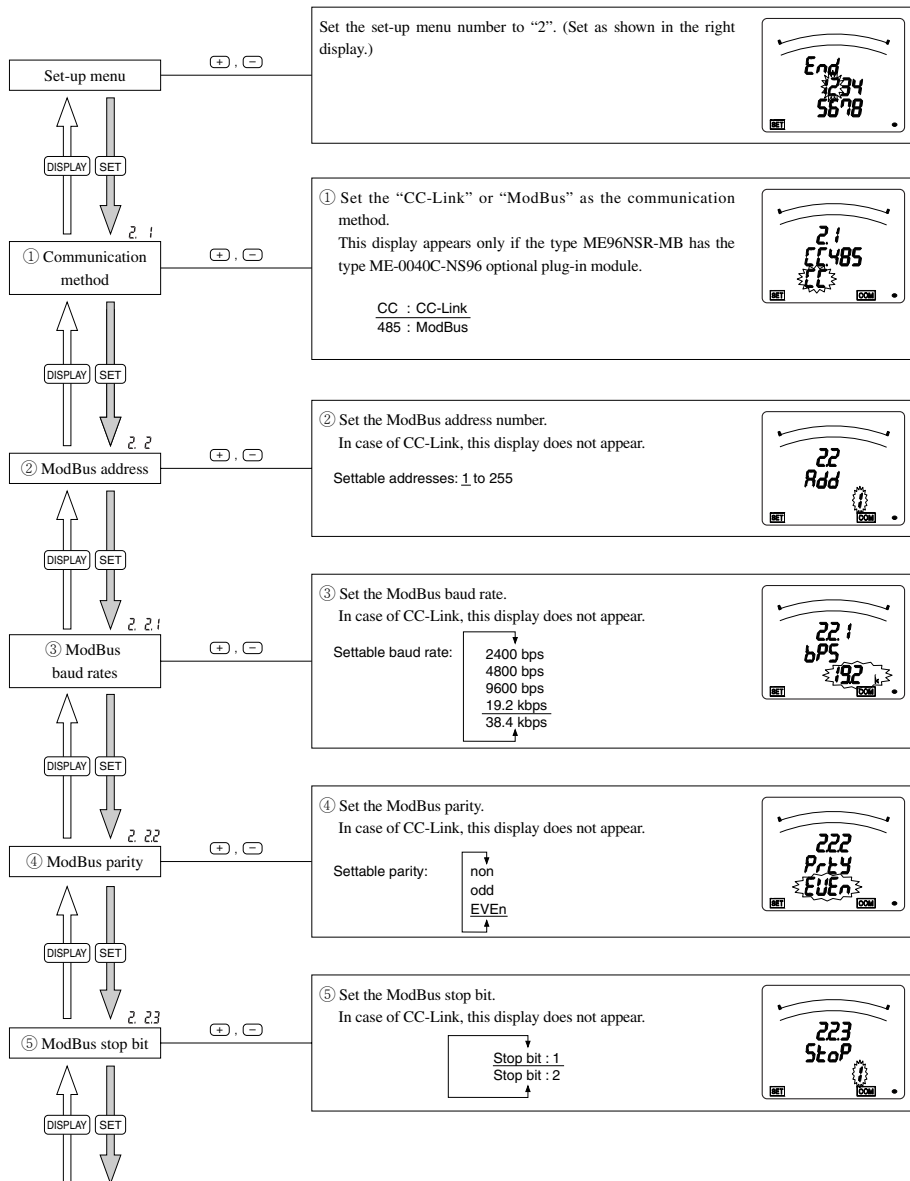
If the contents in the Set-up Menu 1 are changed, maximum value, minimum value, and demand value of related measurement items will reset. (However, all of the counting values are not reset.)

4. Set-up

4.3 Communication, Cancel of Digital Input Set-up

Set-up Menu 2

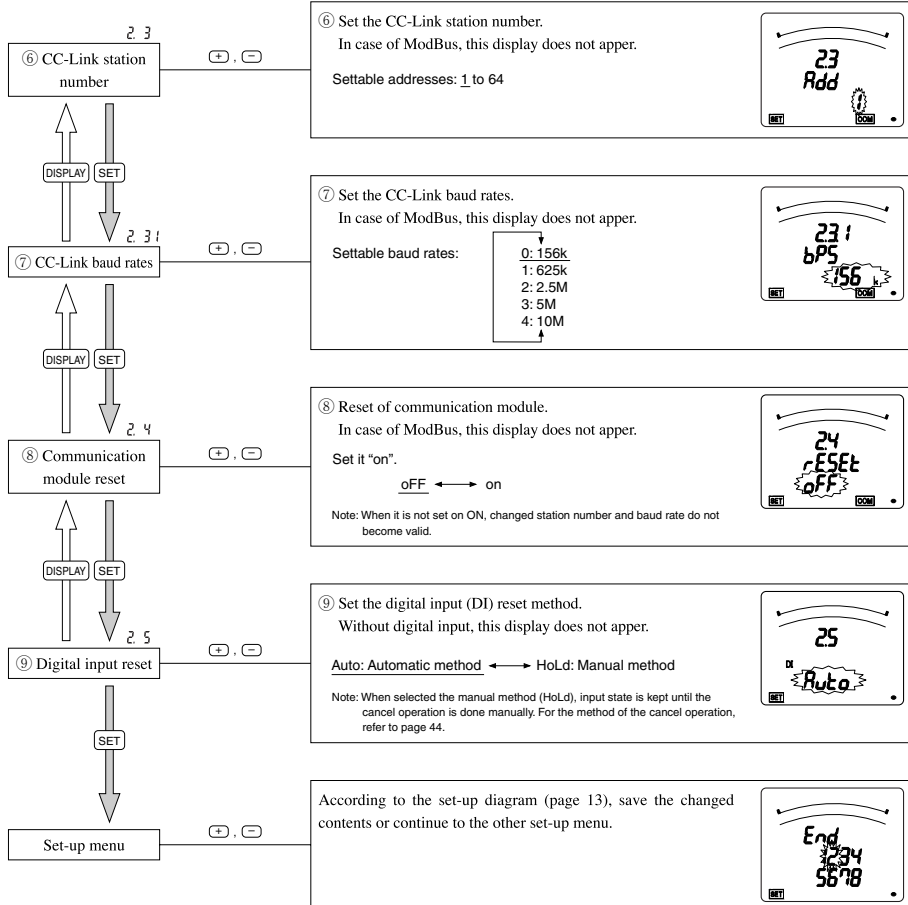
In the operation mode, press **(SET)** and **(RESET)** simultaneously for 2 seconds or more, and the following operation becomes available.



4. Set-up

4.3 Communication, Cancel of Digital Input Set-up

Set-up Menu 2

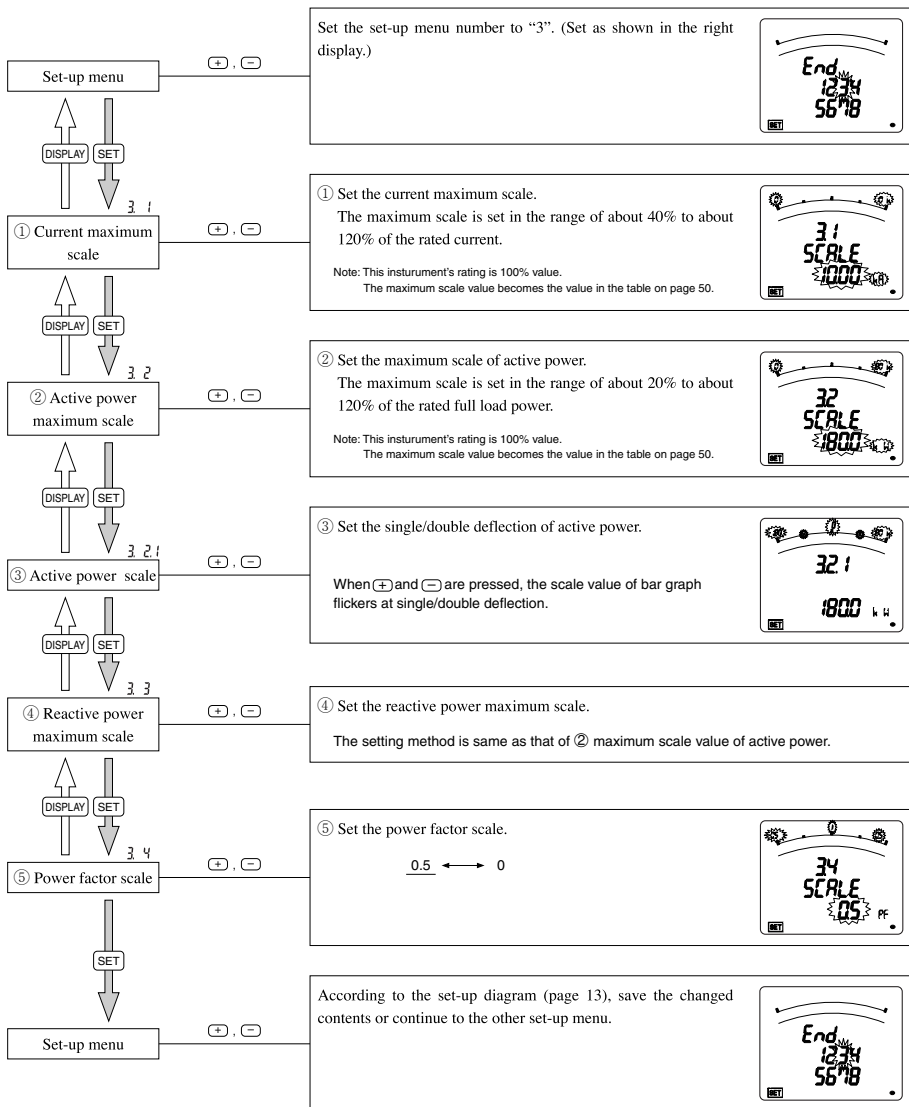


4. Set-up

4.4 Bar Graph Set-up

Set-up Menu 3

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



Note

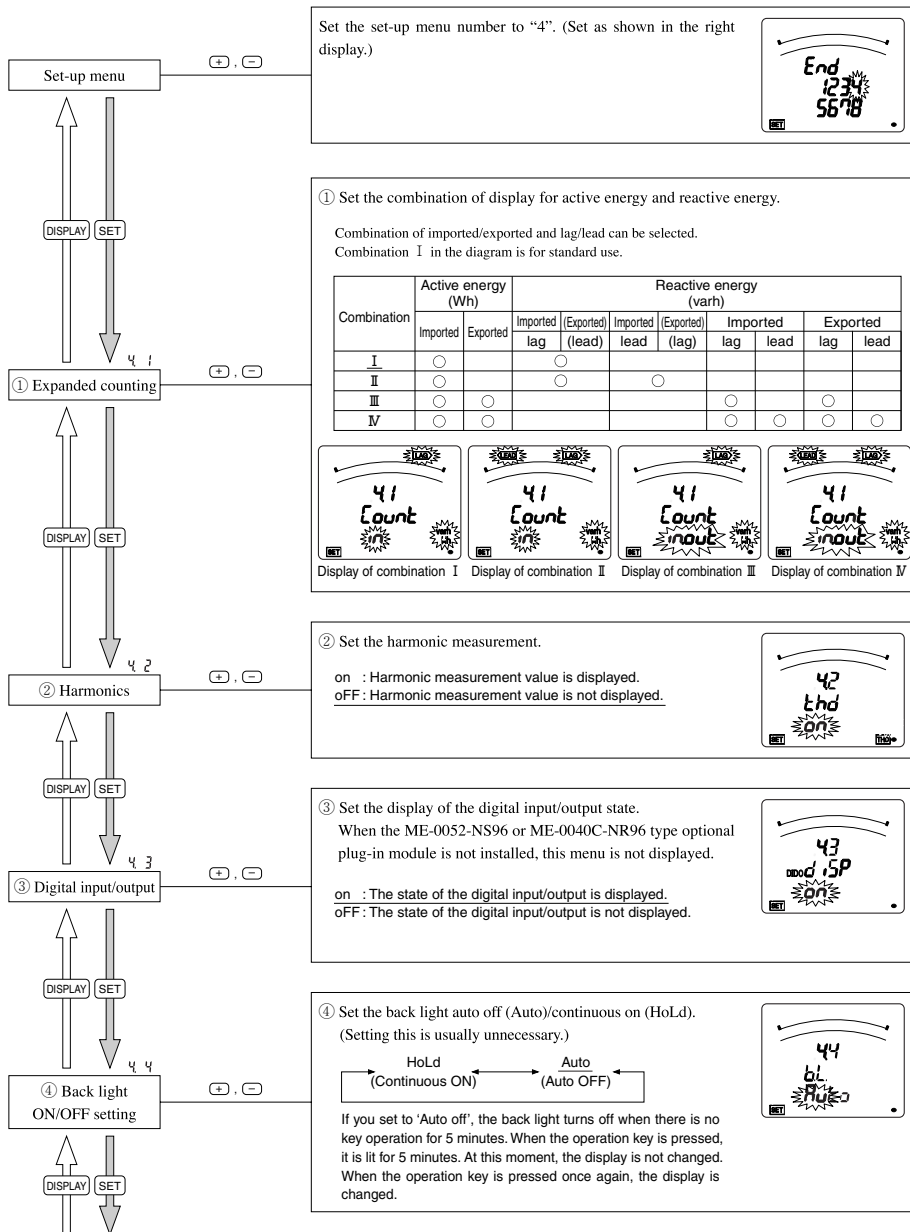
1. Accuracy is defined to rated current. Although the maximum scale may display 120% or more of rated current and rated voltage in order to make the scale easy to read, current input is within 100% of rated current.
2. When the display pattern that does not display power, reactive power, active energy and reactive energy is selected, the setting item related to them is skipped.

4. Set-up

4.5 Display of Each Measurement, etc. Set-up

Set-up Menu 4

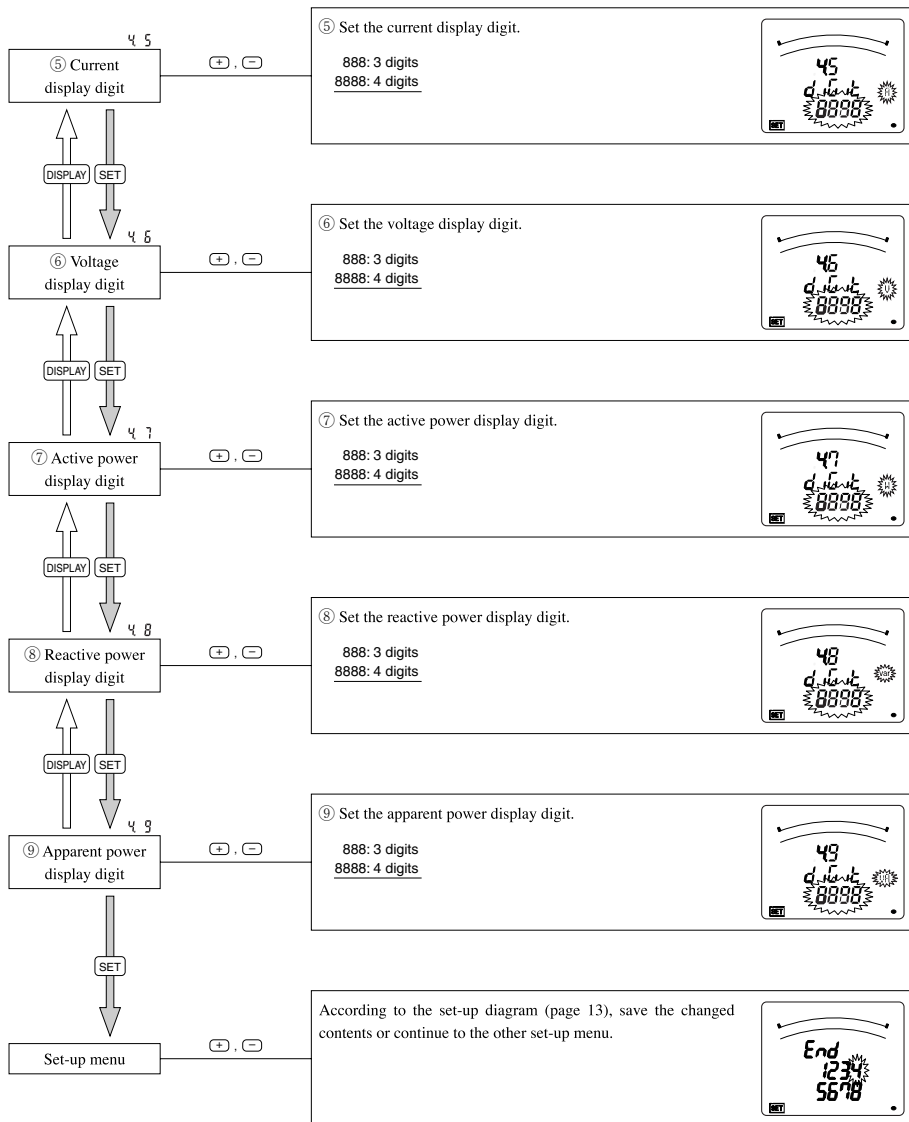
In the operation mode, press **(SET)** and **(RESET)** simultaneously for 2 seconds or more, and the following operation becomes available.



4. Set-up

4.5 Display of Each Measurement, etc. Set-up

Set-up Menu 4



Note: In No.⑤ to No.⑨, the measurement elements that are not included in the display pattern setting are skipped.

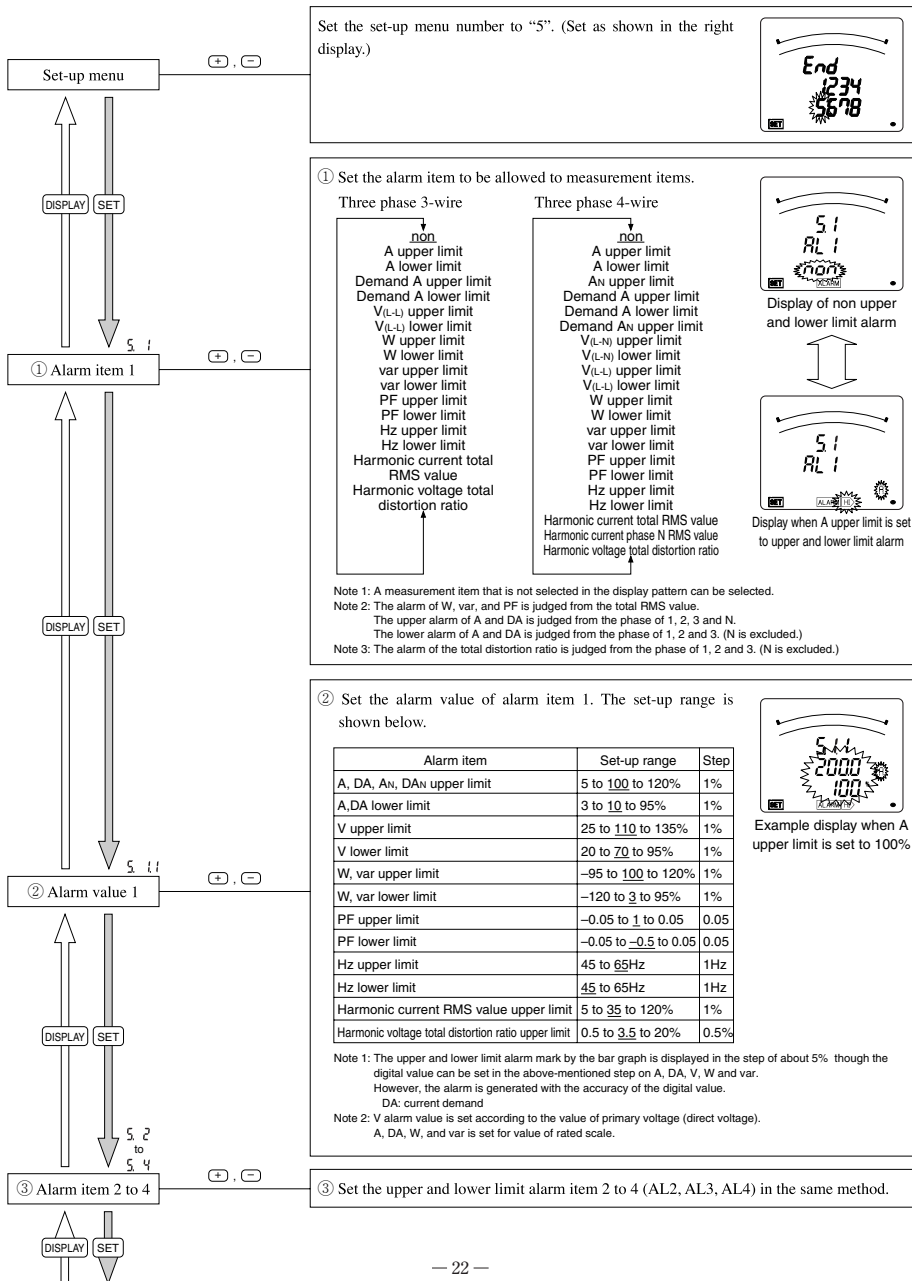
4. Set-up

4.6 Alarm Set-up

Set-up Menu 5

This sets the upper and lower limit alarm. The upper and lower limit set value mark “▲ (blinking)” is displayed on the bar graph. From the display items, 4 items can be set.

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



4. Set-up

4.6 Alarm Set-up

Set-up Menu 5

④ Alarm delay time,
delay time of
max/min value



DISPLAY

SET

⑤ Alarm cancel
method



SET

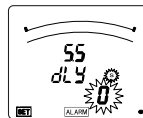
Set-up menu



④ Set the alarm delay time.

If the condition of limit exceeding continues for more than the delay time, the alarm generates. And if it does not continue during this time, the maximum/minimum value is not updated.

| | | |
|------------|------------|-----------|
| 0 seconds | 30 seconds | 2 minutes |
| 5 seconds | 40 seconds | 3 minutes |
| 10 seconds | 50 seconds | 4 minutes |
| 20 seconds | 1 minute | 5 minutes |



⑤ Set the alarm cancel method at generation of alarm. (screen, relay)

| Method | Cancel method |
|---------------------|---|
| Automatic (Auto) | When there is no alarm generating condition, alarm is automatically reset. |
| Manual (HoLd) | Alarm is reset by pressing RESET . Alarm continues until RESET is pressed. |

(see page 41)

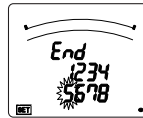


Display of automatic reset method



Display of manual reset method

According to the set-up diagram (page 13), save the changed contents or continue to the other set-up menu.



4. Set-up

4.7 Analog Output Set-up

Set-up Menu 6

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

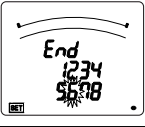
The set-up screen can be displayed for measurement items that are not selected in display pattern.

When the ME-4201-NS96 optional plug-in module is not installed, this menu cannot be set.

Set-up menu

← . →

Set the set-up menu number to "6". (Set as shown in the right display.)



↑

↓

↑

↓

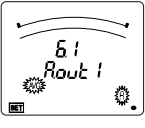
① Analog output CH1 measurement item

← . →

① Set the measurement item for analog output CH1. Select measurement element output from below.

| Three phase 3-wire | Three phase 4-wire |
|--------------------|--------------------|
| non | non |
| A1 | A1 |
| A2 | A2 |
| A3 | A3 |
| <u>AVG:CH1</u> | AN |
| DA1 | <u>AVG:CH1</u> |
| DA2 | DA1 |
| DA3 | DA2 |
| DAAVG | DA3 |
| V12 | DAN |
| V23 | DAAVG |
| V31 | V1N |
| <u>VLLAVG:CH2</u> | V2N |
| <u>ΣW:CH3</u> | V3N |
| Σvar | <u>VLNAV:CH2</u> |
| <u>ΣPF:CH4</u> | V12 |
| Hz | V23 |
| HI1 | V31 |
| HI2 | VLLAVG |
| HI3 | W1 |
| HV12 | W2 |
| HV23 | W3 |
| | <u>ΣW:CH3</u> |
| | var1 |
| | var2 |
| | var3 |
| | Σvar |
| | VA1 |
| | VA2 |
| | VA3 |
| | ΣVA |
| | PF1 |
| | PF2 |
| | PF3 |
| | <u>ΣPF:CH4</u> |
| | Hz |
| | HI1 |
| | HI2 |
| | HI3 |
| | HI _N |
| | HV _{1N} |
| | HV _{2N} |
| | HV _{3N} |

Note:
 DA: current demand
 HI: harmonics current total RMS value
 HV: harmonics voltage total distortion ratio



↑

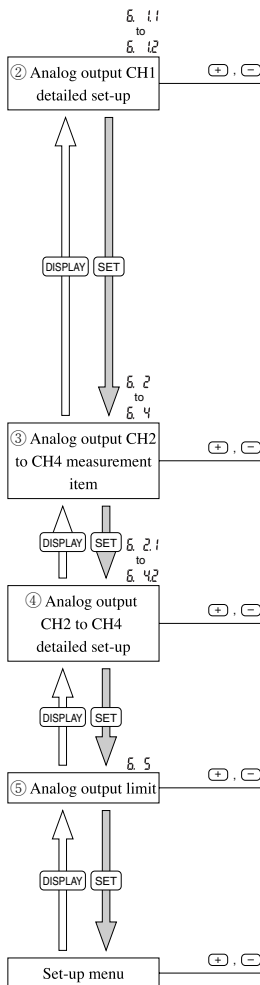
↓

↑

↓

Set-up menu

← . →



② Detailed analog output set-up

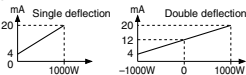
(1) When A, DA are set (6.1.1)

- Current value is set to the maximum output value of analog output. It can be set in the range of about 40% to about 120% of ratings. As for detailed set values, refer to the user's manual.

(2) When W, var are set

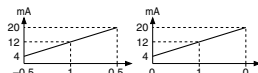
- Power value and reactive power value are set to the maximum output value of analog output. (6.1.1) It can be set in the range of about 20% to about 120% of ratings. As for detailed set values, refer to the user's manual.
- In the case of W, set to the single/double deflection. (initial content : single deflection) (6.1.2)

Example of power 1000W



(3) When PF is set

- The power factor value to the maximum output value of analog output CH1 is set from $-0.5-1-0.5/-0-1-0$



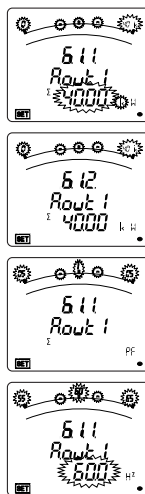
(4) When Hz is set

- The frequency range of analog output is set.



Note: When it is set to 50Hz, output is made at span 45 to 55Hz.
When it is set to 60Hz, output is made at span 55 to 65Hz.

These settings can be set separately from measurement items.



③ Analog output CH2 to CH4 measurement item set-up

Analog outputs CH2 to CH4 are set also in the same method as ① analog output CH1 measurement item set-up.

④ Analog output CH2 to CH4 detailed set-up

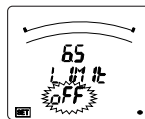
Analog outputs CH2 to CH4 are set also in the same manner as ② analog output CH1 detailed set-up.

⑤ Set of the analog output limit.

Set to cut undefined analog output.

- on : Cut undefined analog output.
- oFF: Don't cut undefined analog output.

Note: As for output range, refer to page 53.



According to the set-up diagram (page 13), save the changed contents or continue to the other set-up menu.



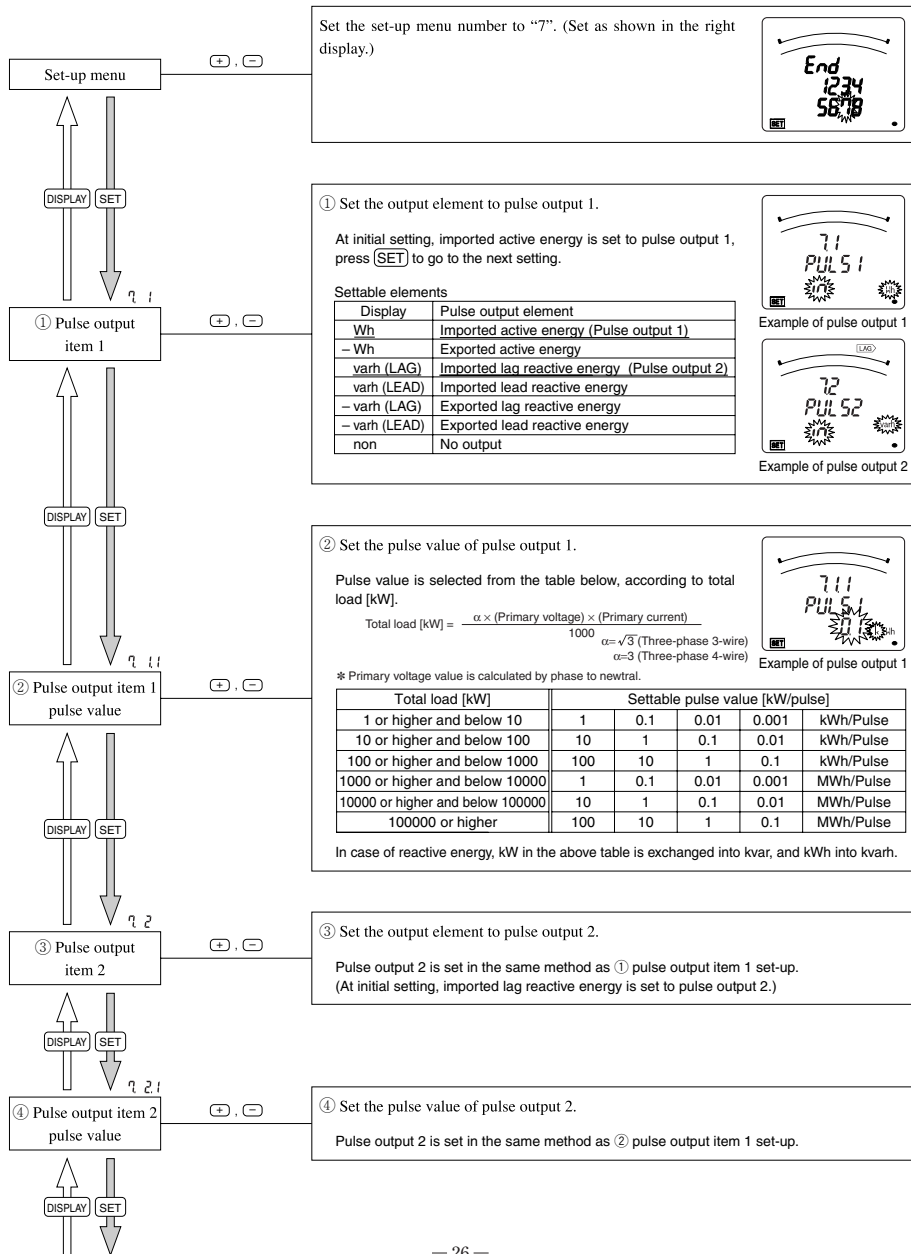
4. Set-up

4.8 Pulse Output Set-up

Set-up Menu 7

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

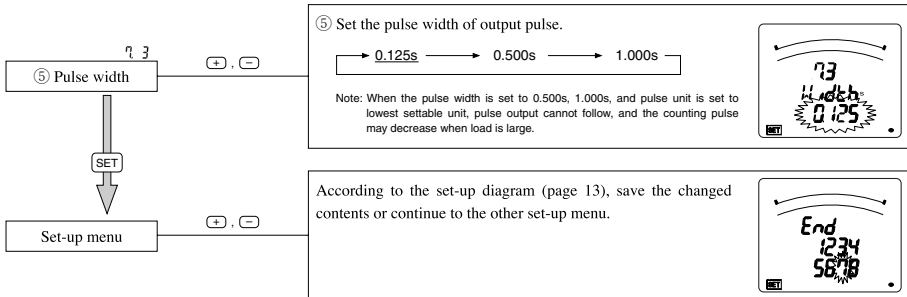
When the ME-4201-NS96 optional plug-in module is not installed, this menu cannot be set.



4. Set-up

4.8 Pulse Output Set-up

Set-up Menu 7



4. Set-up

4.9 Simplified Set-up

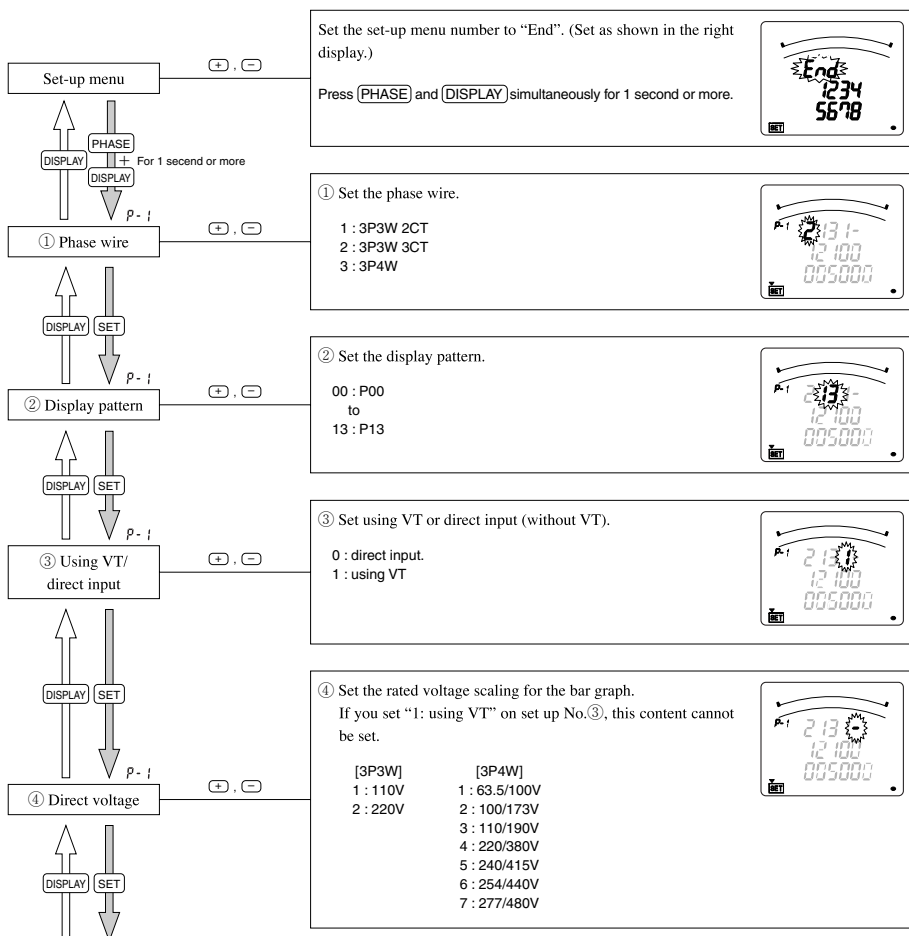
The setting contents of the main 16 items can be set by using two displays. It can be set by the method of substituting numerical value.

For the setting contents, refer to the following table.

| Simplified setting page: P-1 | | | | Simplified setting page: P-2 | | | |
|------------------------------|-----------------------|-----|----------------------------------|------------------------------|----------------------|-----|----------------------------|
| No. | Content | No. | Content | No. | Content | No. | Content |
| ① | Phase wire | ⑤ | VT secondary voltage | ⑨ | Communication method | ⑬ | ModBus stop bit |
| ② | Display pattern | ⑥ | VT primary voltage | ⑩ | ModBus address | ⑭ | CC-Link station number |
| ③ | Using VT/direct input | ⑦ | CT primary current | ⑪ | ModBus baud rates | ⑮ | CC-Link baud rates |
| ④ | Direct voltage | ⑧ | Time constant for current demand | ⑫ | ModBus parity | ⑯ | Communication module reset |

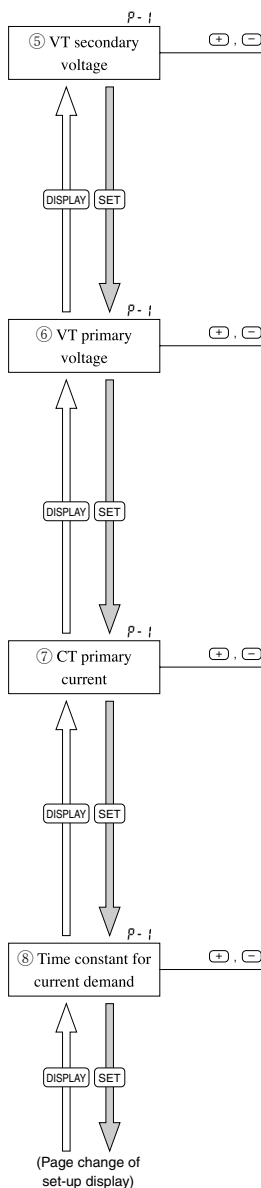
In the operation mode, press **(SET)** and **(RESET)** simultaneously for 2 seconds or more, and the following operation becomes available.

By pressing **(PHASE)** in the simplified set-up mode, the simplified setting page is changed.



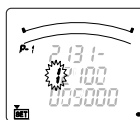
4. Set-up

4.9 Simplified Set-up



⑤ Set the secondary voltage values of VT.
If you set "0: direct input" on set up No.③, this content cannot be set.

| | |
|----------|-----------|
| [3P3W] | [3P4W] |
| 1 : 100V | 1 : 63.5V |
| 2 : 110V | 2 : 100V |
| 3 : 220V | 3 : 110V |
| | 4 : 115V |
| | 5 : 120V |



⑥ Set the primary voltage values of VT.
If you set "0: direct input" on set up No.③, this content cannot be set
It is set by the top 3 digits voltage values and the exponent values (10 to the n-th power).
The set-up order is the exponent values and the voltage values.

- Exponent values: 0 ($10^0 = 1$ time)
1 ($10^1 = 10$ times)
2 ($10^2 = 100$ times)
3 ($10^3 = 1000$ times)

Voltage values: the top 3 digits (0 to 9)
Example: Set-up to 10000V
Exponent values: 2
Voltage values: 100



⑦ Set the primary current values of CT.
It is set by the top 3 digits current values and the exponent values (10 to the (n-1)th power).
The set-up order is the exponent values and the current values.

- Exponent values: 0 ($10^{-1} = 0.1$ time)
1 ($10^0 = 1$ time)
2 ($10^1 = 10$ times)
3 ($10^2 = 100$ times)

Current values: the top 3 digits (0 to 9)
Example: Set-up to 1250A
Exponent values: 2
Current values: 125



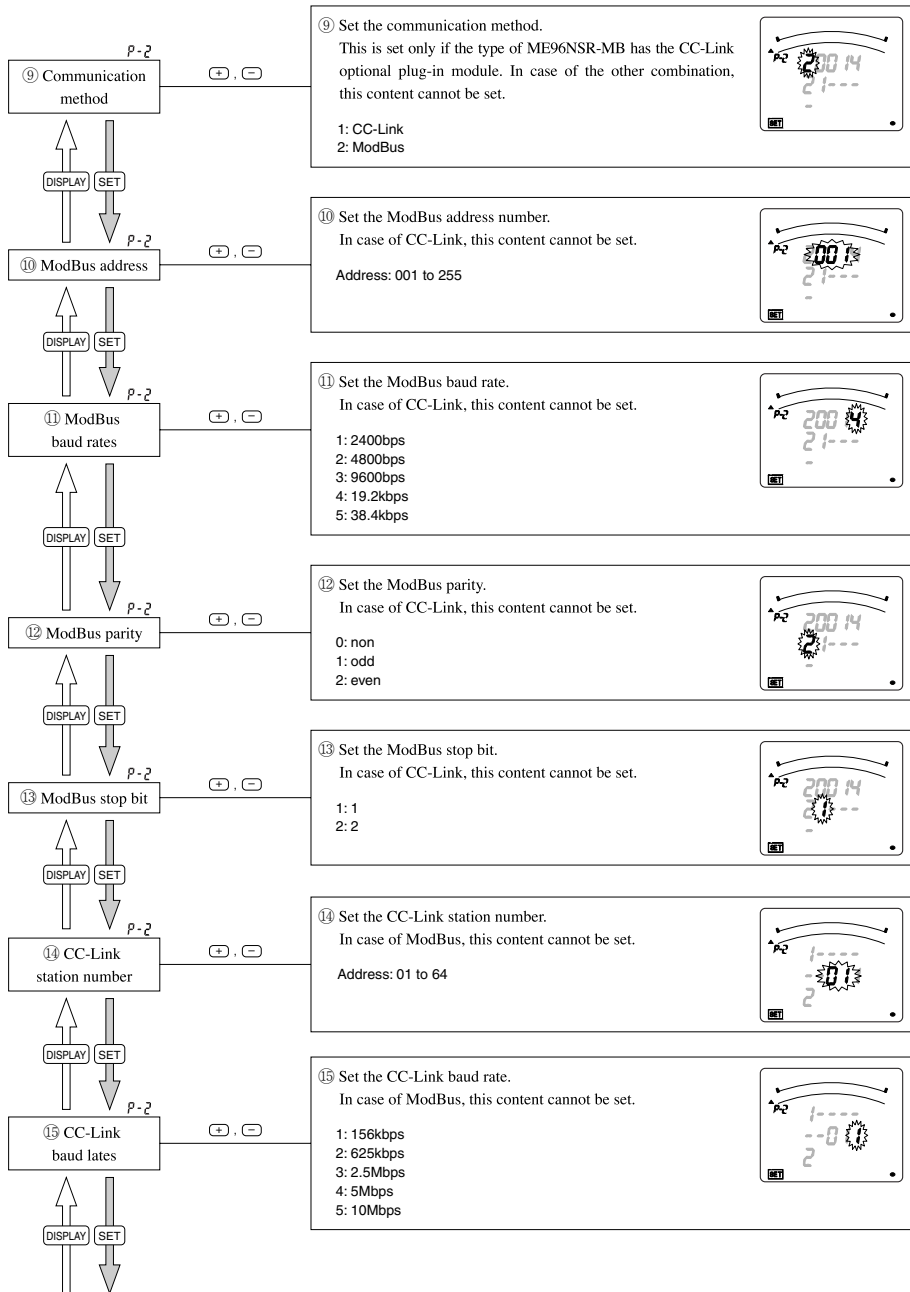
⑧ Set the time constant for calculating current demand.

| | |
|----------|-----------|
| 00: 0s | 10: 5min |
| 01: 10s | 11: 6min |
| 02: 20s | 12: 7min |
| 03: 30s | 13: 8min |
| 04: 40s | 14: 9min |
| 05: 50s | 15: 10min |
| 06: 1min | 16: 15min |
| 07: 2min | 17: 20min |
| 08: 3min | 18: 25min |
| 09: 4min | 19: 30min |



4. Set-up

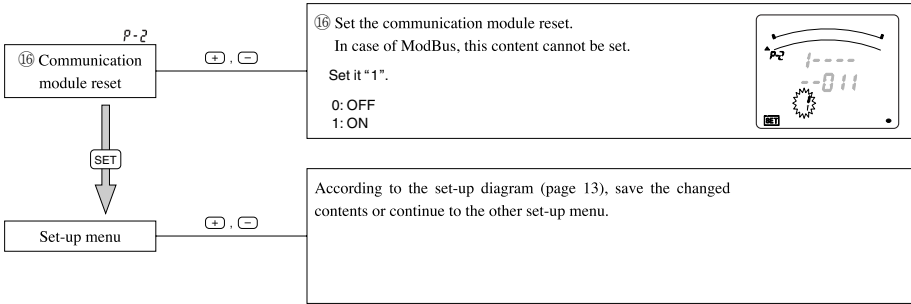
4.9 Simplified Set-up



Note: If it doesn't have the communication function, contents on a simplified setting page P-2 (No.⑨ to ⑮) cannot be set.

4. Set-up

4.9 Simplified Set-up



■ Simplified Set-up contents list

<Setting page: P-1>

| | | | |
|---|---|---|---|
| 1 Phase wire 1:3P3W (2CT) 2:3P3W (3CT) 3:3P4W | 2 Display pattern 00:P00 11:P11 01:P01 12:P12 02:P02 13:P13 03:P03 04:P04 05:P05 06:P06 07:P07 08:P08 09:P09 10:P10 | 3 Using VT 0:direct input 1:using VT | 4 Direct voltage [3P4W] 1:63.5V/110V 2:100V/173V 3:110V/190V 4:220V/380V 5:240V/415V 6:254V/440V 7:277V/480V [3P3W] 1:110V 2:220V |
|---|---|---|---|

| | | | |
|--|---|---|---|
| 5 VT secondary voltage [3P4W] 1:63.5V 2:100V 3:110V 4:115V 5:120V [3P3W] 1:100V 2:110V 3:220V | 6 VT primary voltage [Exponent value] 0:60 to 999V 1:1000 to 9990V 2:10000 to 99900V 3:100000 to 750000V [Voltage value] (100 digits) (10 digits) (1 digit) 0 to 9 0 to 9 0 to 9 | 7 CT primary current [Exponent value] 0: 5.0 to 99.9A 1: 100 to 999A 2: 1000 to 9990A 3: 10000 to 30000A [Current value] (100 digits) (10 digits) (1 digit) 0 to 9 0 to 9 0 to 9 | 8 Time constant for current demand 00:0s 10:5min 01:10s 11:6min 02:20s 12:7min 03:30s 13:8min 04:40s 14:9min 05:50s 15:10min 06:1min 16:15min 07:2min 17:20min 08:3min 18:25min 09:4min 19:30min |
|--|---|---|---|

<Setting page: P-2>

| | | |
|--|--|--|
| 9 Communication method 1:CC-Link 2:ModBus | 10 ModBus address 001 to 255 | 11 ModBus baud rates 1:2400bps 2:4800bps 3:9600bps 4:19.2kbps 5:38.4kbps |
|--|--|--|

| | | | | |
|--|---|--|--|---|
| 12 ModBus parity 0:none 1:odd 2:EVEn | 13 ModBus stop bit 1:1 2:2 | 14 CC-Link station number 01 to 64 | 15 CC-Link Baud rates 1:156kbps 2:625kbps 3:2.5Mbps 4:5Mbps 5:10Mbps | 16 Communication module reset 0:OFF 1:ON |
|--|---|--|--|---|

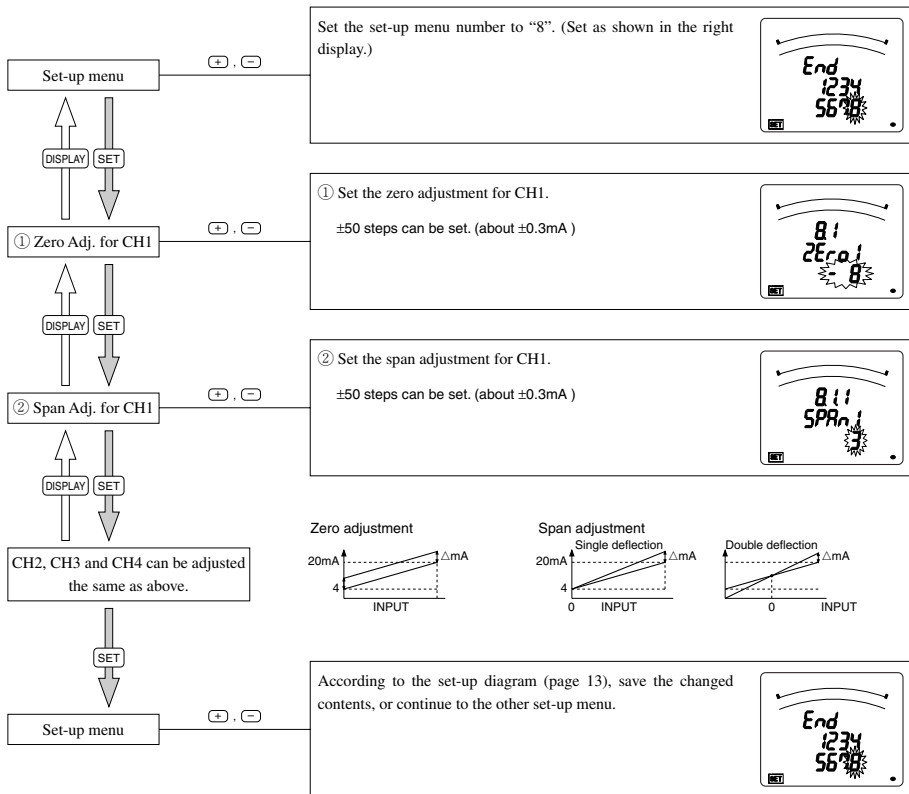
5. Output Adjustment and How to Test

5.1 Analog Output Adjustment

When the ME-4201-NS96 optional plug-in module is installed, zero adjustment and span adjustment of analog output is possible. (Only for circuits set on analog output)

Please adjust it only when the matches with the receiving instrument or the output have changed.

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



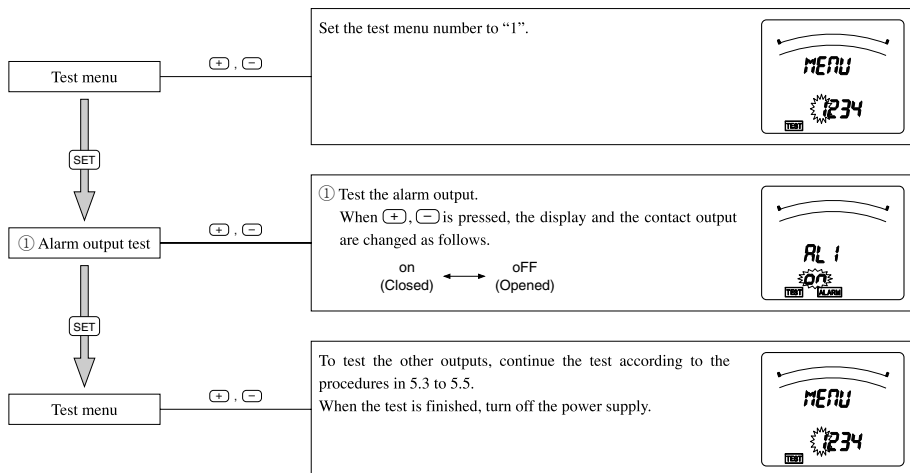
5. Output Adjustment and How to Test

5.2 Alarm Output Test

When the ME-4201-NS96 optional plug-in module is installed, simulated signal output to test the alarm output circuit can be put out.

The following operation becomes possible when you turn on the power supply while pressing **DISPLAY** at the state of power failure.

It is not possible to test without the optional plug-in module.



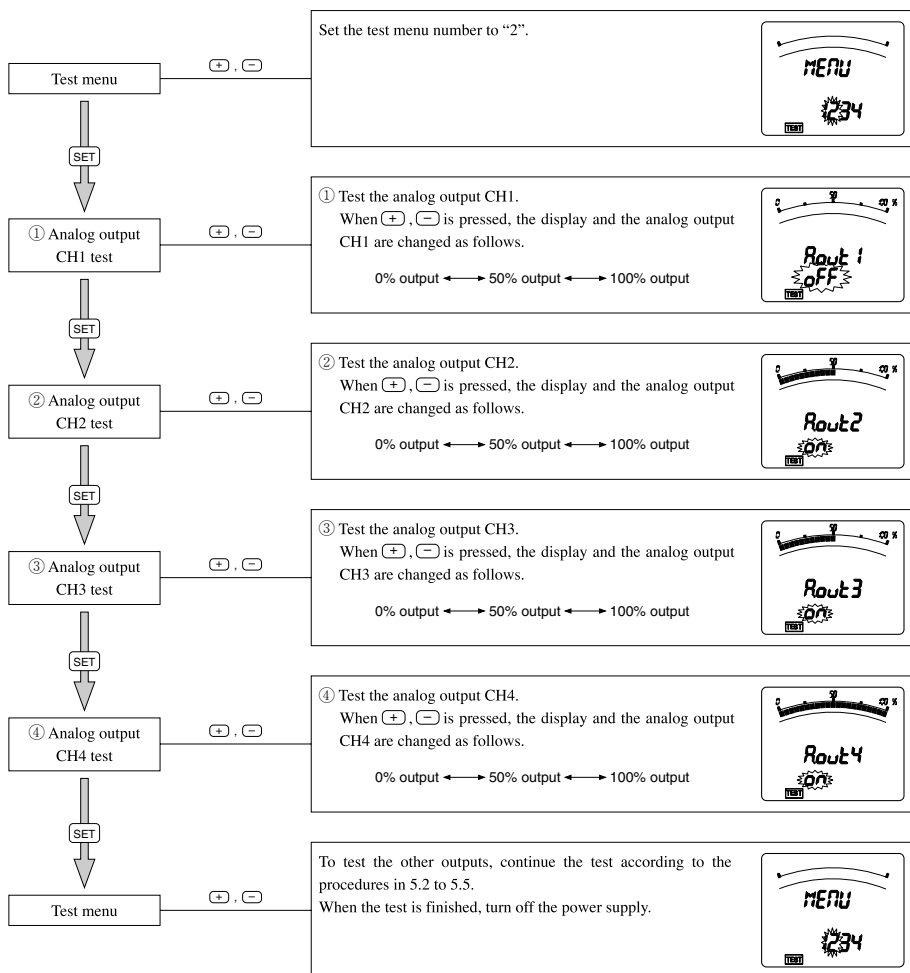
5. Output Adjustment and How to Test

5.3 Analog Output Test

When the ME-4201-NS96 optional plug-in module is installed, simulated signal output to test the analog output circuit can be put out.

The following operation becomes possible when you turn on the power supply while pressing **DISPLAY** at the state of power failure.

It is not possible to test without the optional plug-in module.



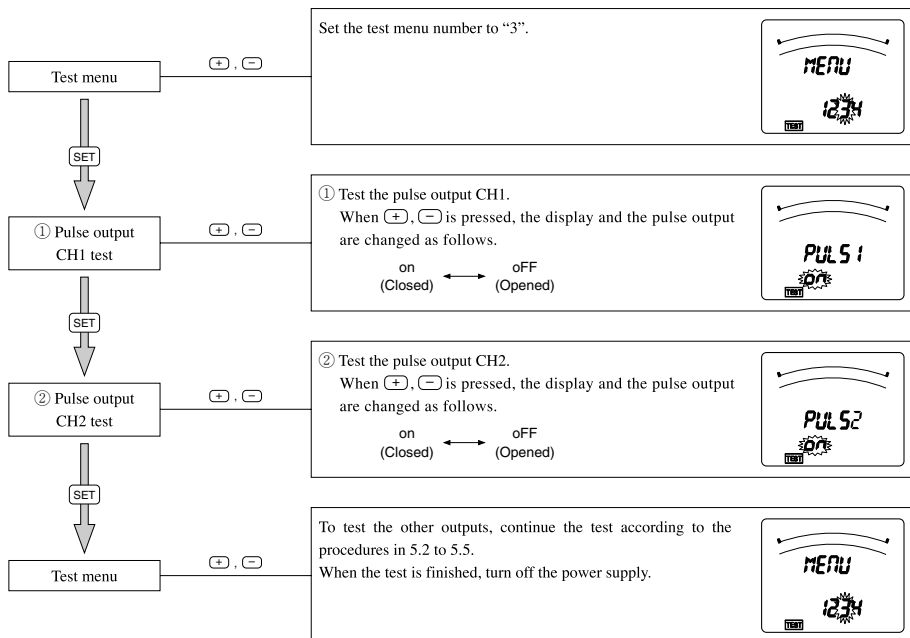
5. Output Adjustment and How to Test

5.4 Pulse Output Test

When the ME-4201-NS96 optional plug-in module is installed, simulated signal output to test the pulse output circuit can be put out.

The following operation becomes possible when you turn on the power supply while pressing **DISPLAY** at the state of power failure.

It is not possible to test without the optional plug-in module.



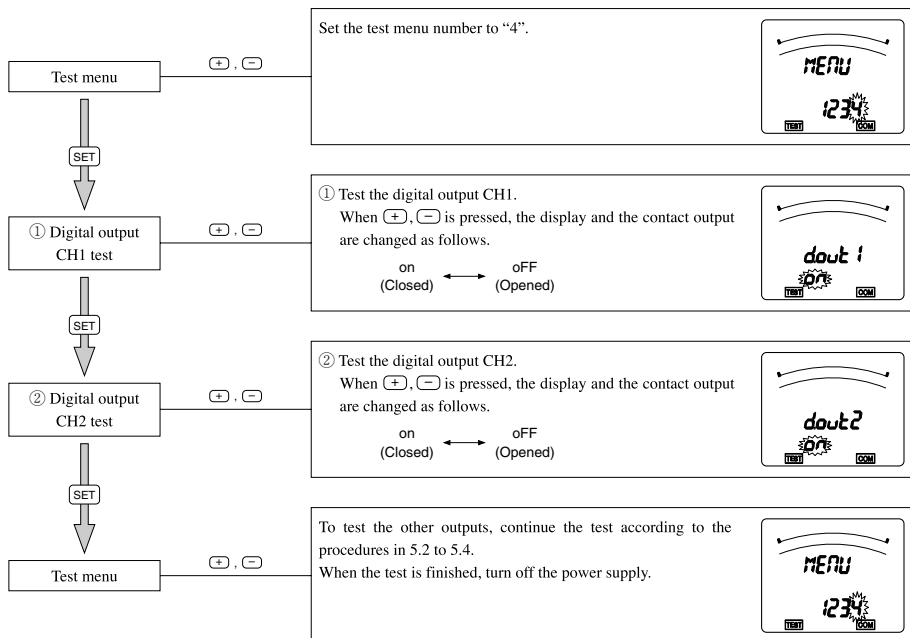
5. Output Adjustment and How to Test

5.5 Digital Output Test

When the ME-0052-NS96 optional plug-in module is installed, simulated signal output to test the digital output circuit can be put out.

The following operation becomes possible when you turn on the power supply while pressing **DISPLAY** at the state of power failure.

It is not possible to test without the optional plug-in module.



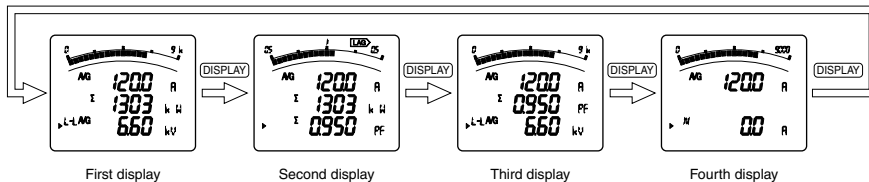
Note: The initial value of each CH of this test mode is "Open". If CH is changed or this test mode ends, the output becomes "Open".

6. Operation

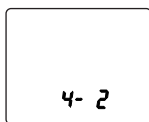
6.1 Display Change

By pressing **[DISPLAY]**, the measurement display switches over.

Display change example (Display pattern: P01, Phase wire: Three phase 4 wire)



Note 1: When the display is changed by pressing **[DISPLAY]**, the following display is displayed just for a few seconds.



← This shows that second display of the four displays is being displayed.

Display number

Note 2: Even in the maximum and minimum value display, when **[DISPLAY]** is pressed, the display will switch over.

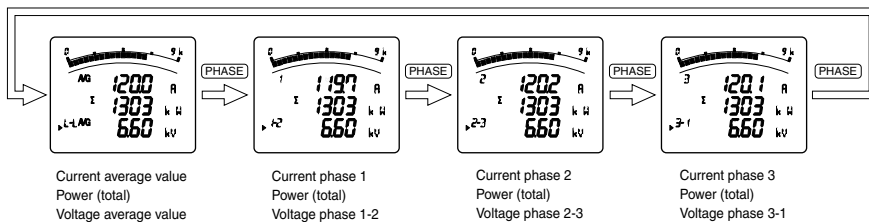
Reference Display items and sequences vary with display patterns (P01 to P13) and additional display.

For detailed display pattern, refer to page 48, 49.

6.2 Phase Change

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

Display change example (Phase wire: Three phase 3 wire)



Note 1: When **[PHASE]** is pressed, the phase will switch over, even in the maximum and minimum value display.

6. Operation

6.3 Bar Graph Display

Measurement item to be displayed on bar graph can be selected. By displaying one item by a bar graph and other three items by digital numbers, four elements can be displayed at once.

● Explanation of Bar Graph

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

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

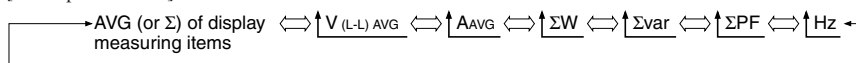
● Selection of Bar Graph

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

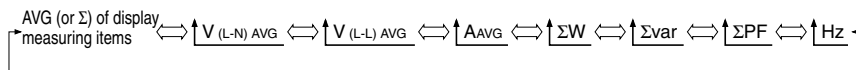
The display element in the bar graph changes as follows by the display pattern that has been selected.

(i) When digital tri-level display are the same items

[Three-phase 3 wire]

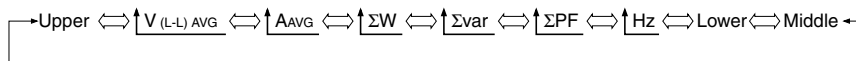


[Three-phase 4 wire]

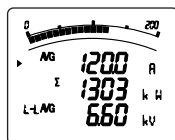
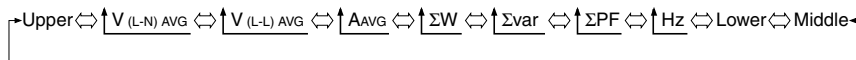


(ii) When the measuring items are all different

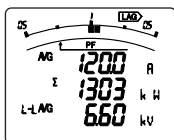
[Three-phase 3 wire]



[Three-phase 4 wire]



Example of display of upper stage element on bar graph



Example of display of power factor on bar graph

6. Operation

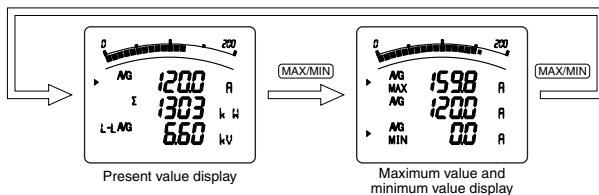
6.4 Maximum Value and Minimum Value Display

The maximum values and the minimum values can be displayed.

● Display of maximum value and minimum value

When (MAX/MIN) is pressed, the display changes into maximum value and minimum value display. And when (MAX/MIN) is pressed, the display changes back to the present value display.

Display change example (Display pattern : P01)



Note 1: In the maximum value and minimum value display, bar graph is lit only between the maximum value and the minimum value.

Note 2: When the screen shifts to the maximum value and minimum value display, the following are displayed in the order below.
A → An → DA → DAN → V → W → var → VA → PF → Hz → HI → HIn → HV
However, item that are not set for display are not displayed.

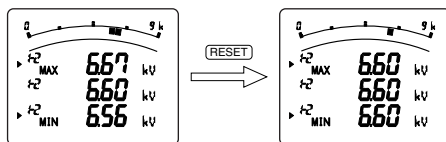
Note 3: For harmonics, only the following maximum values are displayed.

Harmonic current total effective value, 1st, 3rd, 5th, 7th, 9th, 11th, 13th current effective values

Harmonic voltage total distortion ratio, 1st voltage effective value, 3rd, 5th, 7th, 9th, 11th, 13th containing ratio

● Reset of Maximum Value and Minimum Value

When (RESET) is pressed for 2 seconds or more, the displayed maximum value and minimum value can be reset. (The maximum/minimum value and the present value become the same.)



Note 1: The maximum values and minimum values not displayed are not reset.

Note 2: All degrees are reset for harmonics.

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

● Update of Delay Time

If maximum/minimum values do not continue for a long time since delay time, it is not updated. (Delay time is set by set-up menu 5.)

Please set the delay time when you do not want to make the maximum value updated in the condition of excessive value in short time such as starting currents of the motor.

Note 1: When delay time is set, the value whose value of middle stage is larger than the maximum value might be displayed until delay time passes.

Note 2: The demand current, harmonics current, and harmonics voltage are not delayed, so the current and voltage may display larger value than the present value.

6. Operation

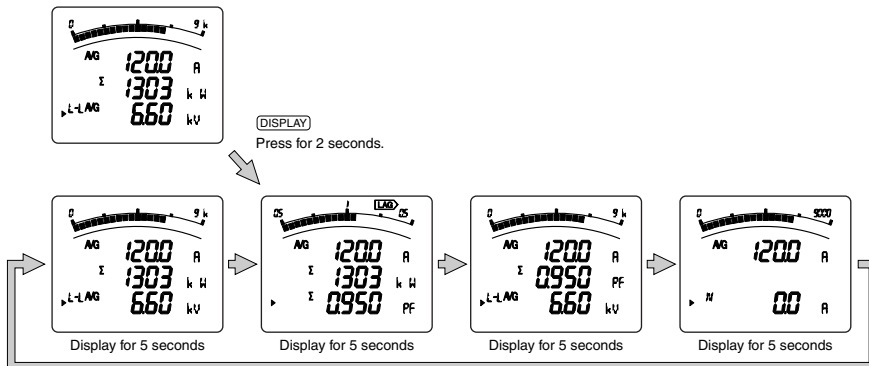
6.5 Cyclic Display Change

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

● Cyclic Display

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

Cyclic display is possible even on the maximum value and minimum value display.



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

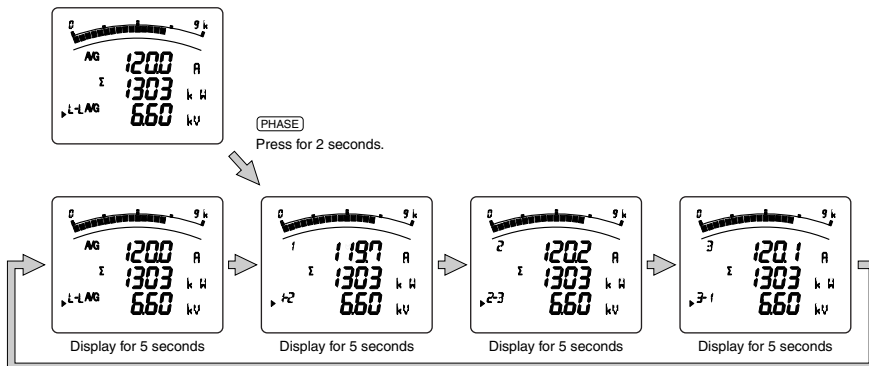
Note 2: By pressing any key other than the **SET**, it goes back to manual display change.

Note 3: In the cyclic display, display number is not displayed.

● Phase Cyclic Display

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

Phase cyclic display is possible even on the maximum value and minimum value display.



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

Note 2: By pressing any key other than the **SET**, it goes back to manual display change.

6. Operation

6.6 Generation and Cancel of Upper/Lower Limit Alarm

When the value exceeds the upper or lower limit setting value set in advance, the display blinks and alarm can be output. (No alarm output when all of the input voltage/input current is zero)

- Set-up

Refer to 4.6 Alarm Set-up. (see page 22)

- Alarm Indicator

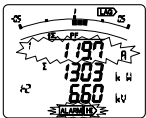
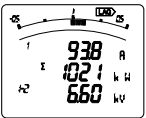
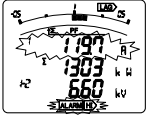
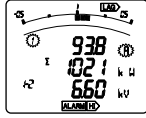
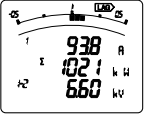
If the item that had alarm set-up is displayed on the bar graph, the alarm indicator appears.

By blinking of “▲”, upper or lower limit is shown.

- Behavior During Alarm Generation

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

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

| Alarm Cancel Method | | Measurement value > Upper limit value (or Measurement value < Lower limit value) | Measurement value < Upper limit value (or Measurement value > Lower limit value) |
|---------------------|---------------|--|--|
| Automatic (Auto) | Display | ALARM, HI or LO : blink  | Normal display  |
| | Alarm contact | Closed | Opened |
| Manual (HoLd) | Display | ALARM, HI or LO : blink  | ALARM, HI or LO : appear  (Alarm retention) |
| | | | Normal display  |
| | Alarm contact | Closed | Closed |
| | | | Opened |

Note 1: In alarm condition, the digital value, the unit (A, V, W, var, VA, PF, Hz), and the phase (1, 2, 3, N, AVG, Σ, DM) of the measurement items blink. There is no blinking when the item is not on the display.

Note 2: In alarm hold condition, the unit (A, V, W, var, VA, PF, Hz) and the phase (1, 2, 3, N, AVG, Σ, DM) of the measurement items blink. There is no blinking when the element is not on the display.

Note 3: Only the present value (middle digital display) blinks on maximum and minimum value screen.

Note 4: In harmonics, only total distortion ratio and RMS value blink. The display of degree does not blink.

- Alarm Cancel Method

Timing of alarm cancel differs by alarm cancel method.

| | |
|---------------------|---|
| Automatic (Auto) | When the measurement value falls below the upper setting value or exceeds the lower setting value, alarm automatically resets. |
| Manual (HoLd) | After the measurement value falls below the upper value or exceeds the lower setting value, alarm is maintained. When the item that generates the alarm is displayed, and (RESET) button is pressed, the alarm resets. When (RESET) button is pressed for two seconds or more, all items of alarm are reset. |

Note: In contact input screen, alarm reset (including all items batch reset) cannot be operated.

- Alarm Delay

When alarm delay time is set, alarm is not generated until status of measurement value exceeding upper/lower setting value continues for delay time.

6. Operation

6.7 Harmonics Display

Harmonic RMS value, distortion ratio, and content rate can be displayed.

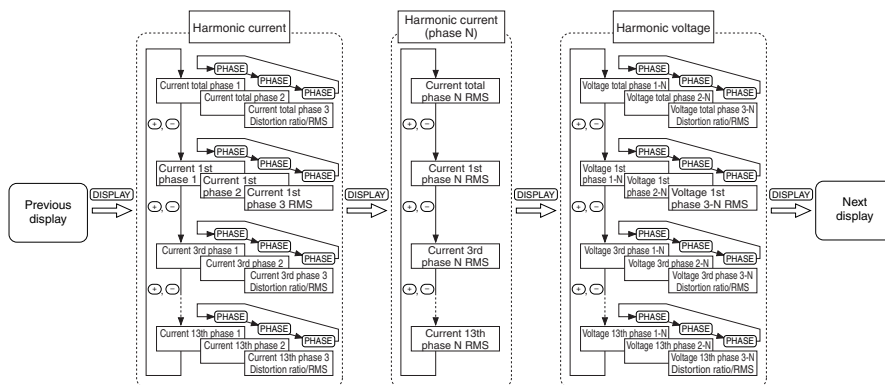
● Measuring Items

| Degree | Current (other than phase N) | | Current (phase N) | | Voltage | |
|----------------|------------------------------|------------------|-------------------|------------------|-----------|------------------|
| | RMS value | Distortion ratio | RMS value | Distortion ratio | RMS value | Distortion ratio |
| Harmonic total | ○ | ○ | ○ | — | ○ | ○ |
| 1st | ○ | — | ○ | — | ○ | — |
| 3rd | ○ | ○ | ○ | — | ○ | ○ |
| 5th | ○ | ○ | ○ | — | ○ | ○ |
| 7th | ○ | ○ | ○ | — | ○ | ○ |
| 9th | ○ | ○ | ○ | — | ○ | ○ |
| 11th | ○ | ○ | ○ | — | ○ | ○ |
| 13th | ○ | ○ | ○ | — | ○ | ○ |

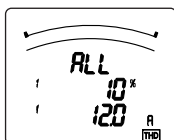
Note: When a fundamental harmonic is 0, the distortion ratio display 0%.

● Degree change method

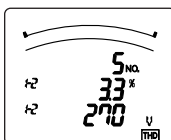
When (+) and (-) are pressed, harmonic degrees changes. When (PHASE) is pressed, harmonic phases changes.



● Harmonic display examples



(Example of harmonic current total display)



(Example of harmonic voltage 5th display)

Note: Harmonic total is shown by "ALL".

6. Operation

6.8 Expanded Counting Display

Measured value display and enlarged 3 digital figures display of active energy and reactive energy can be displayed.

● Display of Active Energy and Reactive Energy Display

Active energy and reactive energy are displayed on the lower stage.

Display type is shown in the right table according to total load power.

$$\text{Total load [kW]} = \frac{\alpha \times (\text{Primary voltage value}) \times (\text{Primary current value})}{1000}$$

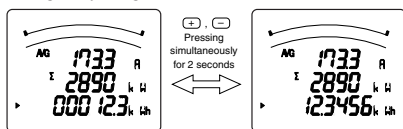
- $\alpha = 3$ Three-phase 4-wire type
(Primary voltage value: phase to neutral)
- $\sqrt{3}$ Three-phase 3-wire type
(Primary voltage value: phase to phase)

| Total load [kW] | Digital display | Unit (k/M) |
|----------------------------------|-----------------|------------|
| 1 or higher and below 10 | 8888.88 | k |
| 10 or higher and below 100 | 88888.8 | |
| 100 or higher and below 1000 | 888888 | |
| 1000 or higher and below 10000 | 8888.88 | |
| 10000 or higher and below 100000 | 88888.8 | M |
| 100000 or higher | 888888 | |

In the case of reactive power, kW in the right table is exchanged into kvar, and kWh into kvarh.

● Enlarged 3 digital Figures

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



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

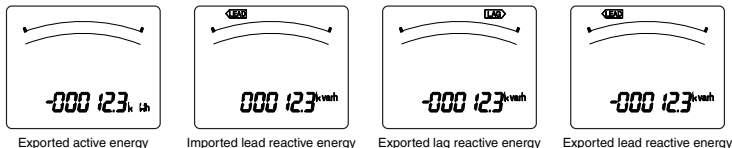
(Example: When 3 digital figures are enlarged on active energy screen, reactive energy is not enlarged.
In order to enlarge digital figures of reactive energy, display reactive energy on the screen and operate the same way.)

● Wh and varh Reset

When (SET), (RESET) and (PHASE) are pressed simultaneously for 2 seconds, the measured values of active energy (Wh) and reactive energy (varh) are reset. (This is effective only in the present value display.)

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

● Example of Display



● Measurement of 2 quadrants/4 quadrants by Reactive energy

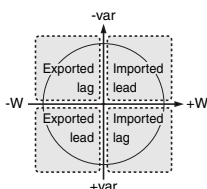
There are two ways of counting quadrant in measurement of reactive energy.

<4 quadrants counting>

Counts each import lag, import lead, export lag, and export lead as one segment.

It is generally felt that a dead region occurs in the border of each segment.

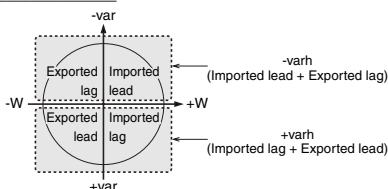
This is suited for measurement of facilities with private power generators.



<2 quadrants counting>

Counts imported lag and exported lead as 1 segment, and imported lead and exported lag as 1 segment.

Dead region occurs only in around var=0 (Power ratio: 1). Since dead region does not occur around Power ratio=0, this is suited for facility without private power generator or measurement of reactive power with condenser load of Power ratio=0.



In the set of the expanded counting of the set-up menu 4.1,

- 2 quadrants counting is selected in the combination I and II.
- 4 quadrants counting is selected in the combination III and IV.

6. Operation

6.9 Display of Digital Input and Digital Output

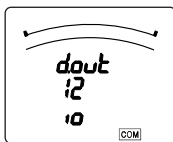
Displays the digital input and digital output state.

When the type ME-0052-NS96 or ME-0040C-NS96 optional plug-in module is not installed, this operation cannot be done.

● Display of Digital Input and Digital Output



(Example of digital input display)



(Example of digital output display)

● Reset Method of Digital Input

There are “Auto reset method” and “Latch method” for digital input reset method.

When set on the latch method, the input status is continued until the latch canceling operation.

For example, when the alarm contact is input and the alarm is stopped, you cannot miss the alarm because the alarm generated status is continued in the basic device.

● Canceling of the Latch

① In the operation mode, press **(DISPLAY)** and digital input (d.in) screen is displayed.

② In the digital input screen, the latch is canceled by pressing **(RESET)** for 2 seconds.

Note: To display digital input screen, it is needed to set “display of the digital input/output” on “on”. The initial setting is set on “on”.

6.10 Setting Value Confirmation Mode

When confirming the setting value, use the setting value confirmation mode.

In this mode, the contents of the set-up items cannot be set, which prevents changing other set values by mistake during operation.

● Going into Setting Value Confirmation Mode

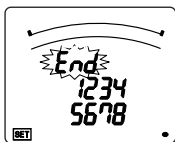
In the operation mode, press **(SET)** for 2 seconds.

● Setting Value Confirmation

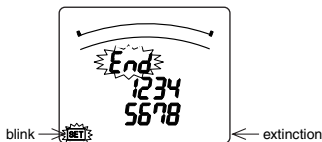
As same as in the set-up diagram (page 12), select the set-up menu number to confirm, and press **(SET)**.

The way to get back into the operation mode is same as in the set-up diagram.

However, the simplified set-up menu cannot be confirmed in the setting value confirmation mode.



(Set-up mode)



(Set value confirmation mode)

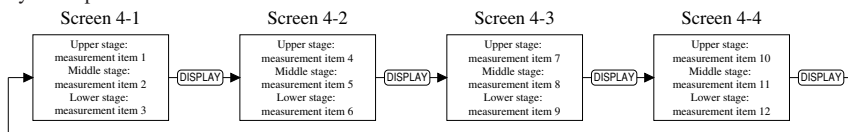
7. Others

7.1 How to Rearrange the Display Pattern (P00)

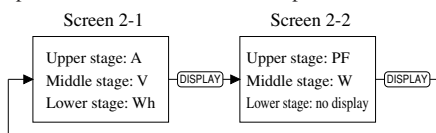
Even if there is no display pattern that you like in the display patterns P01 to P13, individual set-up is available by the display pattern P00.

This set-up is made in the set-up menu 1. Explanation begins with the set “P00” in ② display pattern of the setting menu 1 (page 14). (Others are omitted here, so refer to the setting menu 1.)

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



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



- Setting method

② Display pattern

② Set the display pattern.

- 1) Select “P00”.
By \leftarrow or \rightarrow select “P00” and press **SET**.
- 2) Set the upper stage of the display 4-1 to A.
By \leftarrow or \rightarrow select “A” and press **SET**.
Note: Set the stage where \blacktriangleright is flickering. (This is same to the following explanations.)
- 3) Set the middle stage of the display 4-1 to V.
By \leftarrow or \rightarrow select “V” and press **SET**.
- 4) Set the lower stage of the display 4-1 to Wh.
By \leftarrow or \rightarrow select “Wh” and press **SET**.

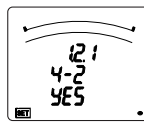
7. Others

7.1 How to Rearrange the Display Pattern (P00)

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

By \leftarrow or \rightarrow select "YES" and press $\boxed{\text{SET}}$.

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

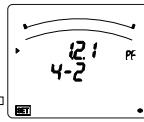


6) Set the upper stage of the display 4-2 to PF.

By \leftarrow or \rightarrow select "PF" and press $\boxed{\text{SET}}$.

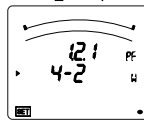
(Back to the upper stage of the display 4-1.)

$\boxed{\text{DISPLAY}}$



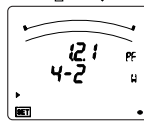
7) Set the middle stage of the display 4-2 to W.

By \leftarrow or \rightarrow select "W" and press $\boxed{\text{SET}}$.



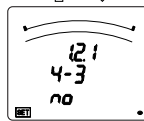
8) Set the lower stage of the display 4-2 to no display.

By \leftarrow or \rightarrow set the unit code of the lower stage to no display and press $\boxed{\text{SET}}$.



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

By \leftarrow or \rightarrow select "no" 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.

(Back to the upper stage of the display 4-1.)



③ Primary voltage

(Here after same as the set-up menu 1)

Note

1. The following measurement item cannot be set by the display pattern P00. Set them separately in the set-up menu 4 (page 20).

Exported active energy, exported reactive energy, capacitive reactive energy, inductive reactive energy, harmonic current, harmonic voltage

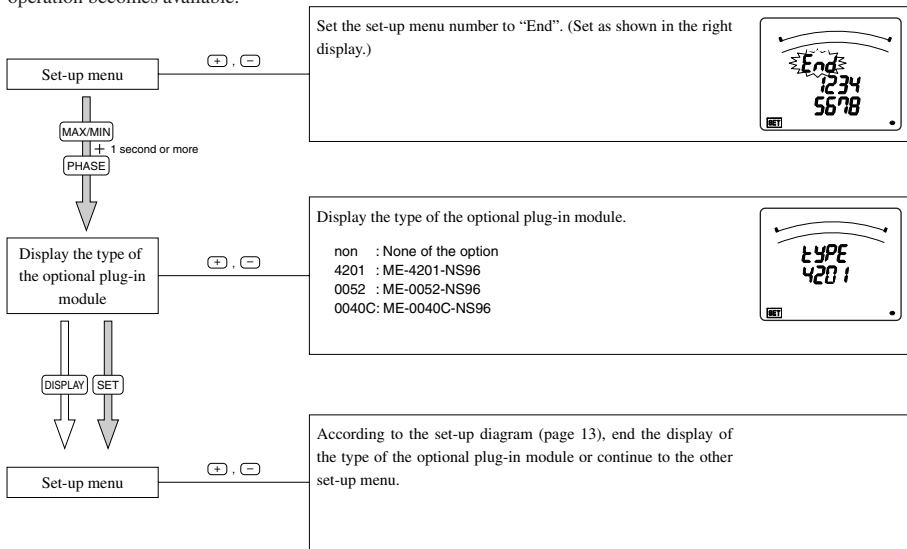
2. Phase cannot be designated by current, voltage. Press $\boxed{\text{PHASE}}$ in the operation mode to change phase.

3. Active energy, and reactive energy cannot be displayed at the upper stage and the middle stage.

7. Others

7.2 Display the Type of the Optional Plug-in Module

It is possible to display the type of the optional plug-in module when the optional plug-in module is applied. In the operation mode, after pressing the (SET) and the (RESET) simultaneously for 2 seconds or more, the following operation becomes available.



Note: Even in the set value confirmation mode, the type of the option module can be displayed. The procedure is the same as the above-mentioned.

7.3 Judgment Phase of Alarm Element

Phase that judge upper/lower limit alarm differs by measuring items. Please refer to the following table.

| Alarm item (*1) | Phase wire | Phases | | | | | | | |
|---|------------|---------|---------|---------|---------|-----------|-----------|-----------|-------|
| | | Phase 1 | Phase 2 | Phase 3 | Phase N | Phase 1-2 | Phase 2-3 | Phase 3-1 | AVG/Σ |
| A upper limit | 3P3W/3P4W | ○ | ○ | ○ | | | | | |
| A lower limit | 3P3W/3P4W | ○ | ○ | ○ | | | | | |
| An upper limit (*2) | 3P4W | | | | ○ | | | | |
| Demand A upper limit | 3P3W/3P4W | ○ | ○ | ○ | | | | | |
| Demand A lower limit | 3P3W/3P4W | ○ | ○ | ○ | | | | | |
| Demand An upper limit (*2) | 3P4W | | | | ○ | | | | |
| V(L-N) upper limit | 3P4W | ○ | ○ | ○ | | | | | |
| V(L-N) lower limit | 3P4W | ○ | ○ | ○ | | | | | |
| V(L-L) upper limit | 3P3W/3P4W | | | | | ○ | ○ | ○ | |
| V(L-L) lower limit | 3P3W/3P4W | | | | | ○ | ○ | ○ | |
| W upper limit | 3P3W/3P4W | | | | | | | | ○ |
| W lower limit | 3P3W/3P4W | | | | | | | | ○ |
| var upper limit | 3P3W/3P4W | | | | | | | | ○ |
| var lower limit | 3P3W/3P4W | | | | | | | | ○ |
| PF upper limit | 3P3W/3P4W | | | | | | | | ○ |
| PF lower limit | 3P3W/3P4W | | | | | | | | ○ |
| Hz upper limit | 3P3W/3P4W | ○ | | | | | | | |
| Hz lower limit | 3P3W/3P4W | ○ | | | | | | | |
| Harmonic current total RMS value | 3P3W | ○ | ○ | ○ | | | | | |
| | 3P4W | ○ | ○ | ○ | | | | | |
| Harmonic current phase N RMS value (*2) | 3P4W | | | | ○ | | | | |
| Harmonic voltage total distortion ratio | 3P3W | | | | | ○ | ○ | | |
| | 3P4W | ○ | ○ | ○ | | | | | |

*1: The apparent power is not included in the alarm element.

*2: Phase N is a alarm element to be independent.

7. Others

7.4 Display Pattern Contents

When the display elements are set in the set-up menu 1 and the set-up menu 4, by pressing (DISPLAY), the display transits from No.1 in the order shown in the following table.

[Three phase 4-wire]

| Display pattern | Digital display | Screen set on display pattern | | | | | | | | | Additional screen (displays when Set-up Menu 4 is set) | | | | | | | | | |
|-----------------|-----------------|-------------------------------|------|------|------|------|------|------|------|------|--|-------------------------------|------------------------------|-------------------------------|------------------|--------------------------|------------------|---------------------|----------------------|--|
| | | 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 | |
| | | | | | | | | | | | Exported active energy | Imported lead reactive energy | Exported lag reactive energy | Exported lead reactive energy | Harmonic current | Harmonic phase N current | Harmonic voltage | Digital input state | Digital output state | |
| P01 | Upper stage | A | A | A | A | | | | | | | | | | Degree | Degree | Degree | di | do | |
| | Middle stage | W | W | PF | — | | | | | | | | | | Ratio | — | Ratio | DI No. | DO No. | |
| | Lower stage | V | PF | V | AN | | | | | | | | | | RMS value | RMS value | RMS value | State | State | |
| P02 | Upper stage | A | A | A | A | | | | | | — | | | | | | | | | |
| | Middle stage | V | W | PF | — | | | | | | — | | | | | | | | | |
| | Lower stage | Wh | Wh | Wh | AN | | | | | | Exported active energy | | | | | | | ditto | ditto | |
| P03 | Upper stage | A | A | A | A | A | A | | | | | | | | | | | | | |
| | Middle stage | PF | PF | PF | PF | PF | — | | | | | | | | | | | | | |
| | Lower stage | V | W | var | VA | Hz | AN | | | | | | | | | | | | | |
| P04 | Upper stage | A | A | A | A | A | A | | | | — | — | — | — | | | | | | |
| | Middle stage | V | W | var | VA | PF | Hz | — | | | — | — | — | — | | | | | | |
| | Lower stage | Wh | Wh | varh | Wh | Wh | Wh | AN | | | Exported active energy | Imported lead reactive energy | Exported lag reactive energy | Exported lead reactive energy | | | | | | |
| P05 | Upper stage | PF | Hz | VA | | | | | | | | | | | | | | | | |
| | Middle stage | W | W | W | | | | | | | | | | | | | | | | |
| | Lower stage | var | var | var | | | | | | | | | | | | | | | | |
| P06 | Upper stage | A1 | V1N | A | A | | | | | | | | | | | | | | | |
| | Middle stage | A2 | V2N | — | — | | | | | | | | | | | | | | | |
| | Lower stage | A3 | V3N | V | AN | | | | | | | | | | | | | | | |
| P07 | Upper stage | A | A1 | V1N | A | | | | | | | | | | | | | | | |
| | Middle stage | V | A2 | V2N | — | | | | | | | | | | | | | | | |
| | Lower stage | W | A3 | V3N | AN | | | | | | | | | | | | | | | |
| P08 | Upper stage | A | A | A1 | V1N | A | | | | | — | | | | | | | | | |
| | Middle stage | V | W | A2 | V2N | — | | | | | — | | | | | | | | | |
| | Lower stage | Wh | Wh | A3 | V3N | AN | | | | | Exported active energy | | | | | | | | | |
| P09 | Upper stage | A | A1 | DA1 | V1N | A | DA | | | | | | | | | | | | | |
| | Middle stage | DA | A2 | DA2 | V2N | — | — | | | | | | | | | | | | | |
| | Lower stage | V | A3 | DA3 | V3N | AN | DAN | | | | | | | | | | | | | |
| P10 | Upper stage | A | A | A1 | DA1 | V1N | A | DA | | | | | | | | | | | | |
| | Middle stage | DA | DA | A2 | DA2 | V2N | — | — | | | | | | | | | | | | |
| | Lower stage | V | W | A3 | DA3 | V3N | AN | DAN | | | | | | | | | | | | |
| P11 | Upper stage | A | A | DA1 | V1N | A | DA | | | | — | | | | | | | | | |
| | Middle stage | DA | V | DA2 | V2N | — | — | | | | — | | | | | | | | | |
| | Lower stage | Wh | Wh | DA3 | V3N | AN | DAN | | | | Exported active energy | | | | | | | | | |
| P12 | Upper stage | A | A | A | DA | W | A | DA | | | — | | | | | | | | | |
| | Middle stage | DA | W | V | V | V | — | — | | | — | | | | | | | | | |
| | Lower stage | Wh | Wh | Wh | Wh | Wh | AN | DAN | | | Exported active energy | | | | | | | | | |
| P13 | Upper stage | A1 | V1N | W1 | var1 | VA1 | PF1 | V | V | A | — | — | — | — | | | | | | |
| | Middle stage | A2 | V2N | W2 | var2 | VA2 | PF2 | Hz | Hz | — | — | — | — | — | | | | | | |
| | Lower stage | A3 | V3N | W3 | var3 | VA3 | PF3 | Wh | varh | AN | Exported active energy | Imported lead reactive energy | Exported lag reactive energy | Exported lead reactive energy | | | | | | |
| P00 | Upper stage | * | * | * | * | | | | | | — | — | — | — | | | | | | |
| | Middle stage | * | * | * | * | | | | | | — | — | — | — | | | | | | |
| | Lower stage | * | * | * | * | | | | | | Exported active energy | Imported lead reactive energy | Exported lag reactive energy | Exported lead reactive energy | | | | | | |

Wh: Imported active energy, varh: Imported lag reactive energy
 Note: When an additional screen is added, a screen number is added.
 *: Individual set-up (see page 46)

7. Others

7.4 Display Pattern Contents

[Three phase 3-wire]

| Display pattern | Digital display | Screen set on display pattern | | | | | | Additional screen (displays when Set-up Menu 4 is set) | | | | | | | |
|-----------------|-----------------|-------------------------------|-----------------|-----------------|-----------------|-----------------|------|--|---------------------------------------|--------------------------------------|--|---------------------------|---------------------------|------------------------------|-------------------------------|
| | | NO.1 | NO.2 | NO.3 | NO.4 | NO.5 | NO.6 | NO.7 Exported active energy | NO.8 Imported lead reactive energy | NO.9 Exported lag reactive energy | NO.10 Exported lead reactive energy | NO.11 Harmonic current | NO.12 Harmonic voltage | NO.13 Digital input state | NO.14 Digital output state |
| P01 | Upper stage | A | A | A | | | | | | | | Degree | Degree | di | do |
| | Middle stage | ΣW | ΣW | ΣPF | | | | | | | | Ratio | Ratio | DI No. | DO No. |
| | Lower stage | V | ΣPF | V | | | | | | | | RMS value | RMS value | State | State |
| P02 | Upper stage | A | A | A | | | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | V | ΣW | ΣPF | | | | | | | | | | | |
| | Lower stage | Wh | Wh | Wh | | | | Exported active energy | | | | | | | |
| P03 | Upper stage | A | A | A | A | | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | ΣPF | ΣPF | ΣPF | ΣPF | | | | | | | | | | |
| | Lower stage | V | ΣW | Σvar | Hz | | | | | | | | | | |
| P04 | Upper stage | A | A | A | A | A | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | V | ΣW | Σvar | ΣPF | Hz | | | | | | | | | |
| | Lower stage | Wh | Wh | varh | Wh | Wh | | Exported active energy | Imported lead reactive energy | Exported lag reactive energy | Exported lead reactive energy | | | | |
| P05 | Upper stage | ΣPF | Hz | | | | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | ΣW | ΣW | | | | | | | | | | | | |
| | Lower stage | Σvar | Σvar | | | | | | | | | | | | |
| P06 | Upper stage | A ₁ | V ₁₂ | A | | | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | A ₂ | V ₂₃ | - | | | | | | | | | | | |
| | Lower stage | A ₃ | V ₃₁ | V | | | | | | | | | | | |
| P07 | Upper stage | A | A ₁ | V ₁₂ | | | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | V | A ₂ | V ₂₃ | | | | | | | | | | | |
| | Lower stage | W | A ₃ | V ₃₁ | | | | | | | | | | | |
| P08 | Upper stage | A | A | A ₁ | V ₁₂ | | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | V | ΣW | A ₂ | V ₂₃ | | | | | | | | | | |
| | Lower stage | Wh | Wh | A ₃ | V ₃₁ | | | Exported active energy | | | | | | | |
| P09 | Upper stage | A | A ₁ | DA ₁ | V ₁₂ | | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | DA | A ₂ | DA ₂ | V ₂₃ | | | | | | | | | | |
| | Lower stage | V | A ₃ | DA ₃ | V ₃₁ | | | | | | | | | | |
| P10 | Upper stage | A | A | A ₁ | DA ₁ | V ₁₂ | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | DA | DA | A ₂ | DA ₂ | V ₂₃ | | | | | | | | | |
| | Lower stage | V | ΣW | A ₃ | DA ₃ | V ₃₁ | | | | | | | | | |
| P11 | Upper stage | A | A | DA ₁ | V ₁₂ | | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | DA | V | DA ₂ | V ₂₃ | | | | | | | | | | |
| | Lower stage | Wh | Wh | DA ₃ | V ₃₁ | | | Exported active energy | | | | | | | |
| P12 | Upper stage | A | A | A | DA | ΣW | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | DA | ΣW | V | V | V | | | | | | | | | |
| | Lower stage | Wh | Wh | Wh | Wh | Wh | | | Exported active energy | | | | | | |
| P13 | Upper stage | A ₁ | V ₁₂ | ΣW | V | V | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | A ₂ | V ₂₃ | Σvar | Hz | Hz | | | | | | | | | |
| | Lower stage | A ₃ | V ₃₁ | ΣPF | Wh | varh | | Exported active energy | Imported lead reactive energy | Exported lag reactive energy | Exported lead reactive energy | | | | |
| P00 | Upper stage | * | * | * | * | | | | | | | ditto | ditto | ditto | ditto |
| | Middle stage | * | * | * | * | | | | | | | | | | |
| | Lower stage | * | * | * | * | | | Exported active energy | Imported lead reactive energy | Exported lag reactive energy | Exported lead reactive energy | | | | |

Wh: Imported active energy, varh: Imported lag reactive energy, ΣW : Total active power, Σvar : Total active power, ΣPF : Total power factor

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

*: Individual set-up (see page 46)

7. Others

7.5 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

[Three phase 4-wire]

| Measurement element Voltage | Maximum scale value | |
|--|---|---|
| | In the case of direct voltage setting | Phase to neutral voltage |
| (Phase voltage/ line voltage) 63.5V/110V 100V/173V 110V/190V 220V/380V 240V/415V 254V/440V 277V/480V | 100V | 150V |
| | | 300V |
| | 150V | 300V |
| | 300V | 600V |
| | 400V | 640V |
| In the case of VT connected to secondary side | Primary voltage $\times \frac{150}{*2}$ | Primary voltage $\times \sqrt{3} \times \frac{150}{*2}$ |
| Current | Primary current value | |
| Active power | VT ratio \times CT ratio \times specific power (100%) kW *1 | |
| Reactive power | VT ratio \times CT ratio \times specific power (100%) kvar *1 | |
| Apparent power | VT ratio \times CT ratio \times specific power (100%) VA *1 | |
| Power factor | LEAD0.5 to 1 to LAG0.5 | |
| Frequency | 45 to 55Hz (at 50Hz) 55 to 65Hz (at 60Hz) | |

[Three phase 3-wire]

| Measurement element Voltage | Maximum scale value | |
|---|---|--------------------------------|
| | In the case of direct voltage setting | Phase to phase voltage |
| Line voltage 110V 220V | In the case of VT connected to secondary side | 150V |
| | | 300V |
| | | VT ratio \times 150V |
| (Secondary voltage) 100V, 110V 220V | In the case of VT connected to secondary side | VT ratio \times 300V |
| | | Same as the three phase 4-wire |
| Current | Same as the three phase 4-wire | |
| Active power | Same as the three phase 4-wire | |
| Reactive power | Same as the three phase 4-wire | |
| Power factor | Same as the three phase 4-wire | |
| Frequency | Same as the three phase 4-wire | |

*1 At the direct voltage setting, VT ratio = 1. Specific power value is according to the following.

*2 For convenience of the scale, it is rounded the good number.

● Specific power value for scale calculation

| Phase wire system | With or without VT | Rated voltage | Specific power value | Specific power value |
|------------------------------|---------------------------------|------------------------------|----------------------|----------------------|
| Three phase 4-wire | At direct input (phase voltage) | 63.5V | 1kW | 1kvar |
| | | 100V, 110V | 2kW | 2kvar |
| | | 220V, 240V | 4kW | 4kvar |
| | | 254V, 277V | | |
| | | 63.5V | 1kW | 1kvar |
| Using VT (Secondary voltage) | 100V, 110V | 2kW | 2kvar | |
| Three phase 3-wire | At direct input | 110V | 1kW | 1kvar |
| | | 220V | 2kW | 2kvar |
| | | 100V, 110V | 1kW | 1kvar |
| | | 220V | 2kW | 2kvar |
| | | Using VT (Secondary voltage) | 220V | 2kW |

■ Maximum scale value of power and reactive power (representative example)

| Phase wire system Primary current value (A) | Primary voltage value | Three phase 4-wire | |
|--|-----------------------|--------------------|----------------------------|
| | | direct 110V/190V | direct 254V/440V 240V/415V |
| 10.00 | W | 4000 | 8000 |
| | var | 4000 | 8000 |
| 15.00 | W | 6000 | 12 k |
| | var | 6000 | 12 k |
| 20.00 | W | 8000 | 16 k |
| | var | 8000 | 16 k |
| 25.00 | W | 10 k | 20 k |
| | var | 10 k | 20 k |
| 30.00 | W | 12 k | 24 k |
| | var | 12 k | 24 k |
| 40.00 | W | 16 k | 32 k |
| | var | 16 k | 32 k |
| 50.00 | W | 20 k | 40 k |
| | var | 20 k | 40 k |
| 60.00 | W | 24 k | 48 k |
| | var | 24 k | 48 k |
| 75.00 | W | 30 k | 60 k |
| | var | 30 k | 60 k |
| 80.00 | W | 32 k | 64 k |
| | var | 32 k | 64 k |

* The upper bound of the scale is 8000M.

| Phase wire system Primary current value (A) | Primary voltage value | Three phase 4-wire | |
|--|-----------------------|--------------------|----------------------------|
| | | direct 110V/190V | direct 254V/440V 240V/415V |
| 100.0 | W | 40 k | 80 k |
| | var | 40 k | 80 k |
| 120.0 | W | 48 k | 100 k |
| | var | 48 k | 100 k |
| 150.0 | W | 60 k | 120 k |
| | var | 60 k | 120 k |
| 200.0 | W | 80 k | 160 k |
| | var | 80 k | 160 k |
| 250.0 | W | 100 k | 200 k |
| | var | 100 k | 200 k |
| 300.0 | W | 120 k | 240 k |
| | var | 120 k | 240 k |
| 400 | W | 160 k | 320 k |
| | var | 160 k | 320 k |
| 500 | W | 200 k | 400 k |
| | var | 200 k | 400 k |
| 600 | W | 240 k | 480 k |
| | var | 240 k | 480 k |
| 750 | W | 300 k | 600 k |
| | var | 300 k | 600 k |

| Phase wire system Primary current value (A) | Primary voltage value | Three phase 4-wire | |
|--|-----------------------|--------------------|----------------------------|
| | | direct 110V/190V | direct 254V/440V 240V/415V |
| 800 | W | 320 k | 640 k |
| | var | 320 k | 640 k |
| 1000 | W | 400 k | 800 k |
| | var | 400 k | 800 k |
| 1200 | W | 480 k | 1000 k |
| | var | 480 k | 1000 k |
| 1500 | W | 600 k | 1200 k |
| | var | 600 k | 1200 k |
| 2000 | W | 800 k | 1600 k |
| | var | 800 k | 1600 k |
| 2500 | W | 1000 k | 2000 k |
| | var | 1000 k | 2000 k |
| 3000 | W | 1200 k | 2400 k |
| | var | 1200 k | 2400 k |
| 4000 | W | 1600 k | 3200 k |
| | var | 1600 k | 3200 k |
| 5000 | W | 2000 k | 4000 k |
| | var | 2000 k | 4000 k |

7. Others

7.6 Maximum Scale Table

The maximum scale of A, W, and var can be selected in the range from about 40% to about 120% of ratings, from scale conditions, the values of the table below are applied. This is same to measured values to correspond to the maximum output of analog output.

[Settable range] A : From -10 steps to +3 steps of ratings.
 W, var : From -18 steps to +3 steps of ratings.
 Example: With rating 100A, from 40A to 160A.

Example) At the VT ratio: $\frac{6600}{\sqrt{3}} / \frac{110}{\sqrt{3}}$, CT ratio: 100/5A,

W = VT ratio × CT ratio × Specific power value
 = 60 × 20 × 1.0kW = 1200kW
 (Specific power value: refer to page 50)

Current maximum scale value (1/2)

| STEP | A unit | kA 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 | 10A | |
| 24 | 12A | |
| 25 | 15A | |
| 26 | 16A | |
| 27 | 18A | |
| 28 | 20A | |
| 29 | 22A | |
| 30 | 24A | |
| 31 | 25A | |
| 32 | 30A | |
| 33 | 32A | |
| 34 | 36A | |
| 35 | 40A | |
| 36 | 45A | |
| 37 | 48A | |
| 38 | 50A | |
| 39 | 60A | |
| 40 | 64A | |
| 41 | 72A | |
| 42 | 75A | |
| 43 | 80A | |
| 44 | 90A | |
| 45 | 100A | |
| 46 | 120A | |
| 47 | 150A | |
| 48 | 160A | |
| 49 | 180A | |
| 50 | 200A | |
| 51 | 220A | |
| 52 | 240A | |
| 53 | 250A | |
| 54 | 300A | |
| 55 | 320A | |
| 56 | 360A | |
| 57 | 400A | |
| 58 | 450A | |
| 59 | 480A | |
| 60 | 500A | |
| 61 | 600A | |
| 62 | 640A | |
| 63 | 720A | |
| 64 | 750A | |
| 65 | 800A | |
| 66 | 900A | |
| 67 | 1000A | 1kA |

Current maximum scale value (2/2)

| STEP | A unit | kA unit |
|------|--------|---------|
| 68 | 1200A | 1.2kA |
| 69 | 1500A | 1.5kA |
| 70 | 1600A | 1.6kA |
| 71 | 1800A | 1.8kA |
| 72 | 2000A | 2kA |
| 73 | 2200A | 2.2kA |
| 74 | 2400A | 2.4kA |
| 75 | 2500A | 2.5kA |
| 76 | 3000A | 3kA |
| 77 | 3200A | 3.2kA |
| 78 | 3600A | 3.6kA |
| 79 | 4000A | 4kA |
| 80 | 4500A | 4.5kA |
| 81 | 4800A | 4.8kA |
| 82 | 5000A | 5kA |
| 83 | 6000A | 6kA |
| 84 | 6400A | 6.4kA |
| 85 | 7200A | 7.2kA |
| 86 | 7500A | 7.5kA |
| 87 | 8000A | 8kA |
| 88 | | 9kA |
| 89 | | 10kA |
| 90 | | 12kA |
| 91 | | 15kA |
| 92 | | 16kA |
| 93 | | 18kA |
| 94 | | 20kA |
| 95 | | 22kA |
| 96 | | 24kA |
| 97 | | 25kA |
| 98 | | 30kA |
| 99 | | 32kA |
| 100 | | 36kA |
| 101 | | 40kA |

Active power maximum scale value (1/2)

| STEP | W unit | kW unit | MW unit |
|------|--------|---------|---------|
| 1 | 180W | | |
| 2 | 200W | | |
| 3 | 220W | | |
| 4 | 240W | | |
| 5 | 250W | | |
| 6 | 300W | | |
| 7 | 320W | | |
| 8 | 360W | | |
| 9 | 400W | | |
| 10 | 450W | | |
| 11 | 480W | | |
| 12 | 500W | | |
| 13 | 600W | | |
| 14 | 640W | | |
| 15 | 720W | | |
| 16 | 750W | | |
| 17 | 800W | | |
| 18 | 900W | | |
| 19 | 1000W | 1kW | |
| 20 | 1200W | 1.2kW | |
| 21 | 1500W | 1.5kW | |
| 22 | 1600W | 1.6kW | |
| 23 | 1800W | 1.8kW | |
| 24 | 2000W | 2kW | |
| 25 | 2200W | 2.2kW | |
| 26 | 2400W | 2.4kW | |
| 27 | 2500W | 2.5kW | |
| 28 | 3000W | 3kW | |
| 29 | 3200W | 3.2kW | |
| 30 | 3600W | 3.6kW | |
| 31 | 4000W | 4kW | |
| 32 | 4500W | 4.5kW | |
| 33 | 4800W | 4.8kW | |
| 34 | 5000W | 5kW | |
| 35 | 6000W | 6kW | |
| 36 | 6400W | 6.4kW | |
| 37 | 7200W | 7.2kW | |
| 38 | 7500W | 7.5kW | |
| 39 | 8000W | 8kW | |
| 40 | | 9kW | |
| 41 | | 10kW | |
| 42 | | 12kW | |
| 43 | | 15kW | |
| 44 | | 16kW | |
| 45 | | 18kW | |
| 46 | | 20kW | |
| 47 | | 22kW | |
| 48 | | 24kW | |
| 49 | | 25kW | |
| 50 | | 30kW | |
| 51 | | 32kW | |
| 52 | | 36kW | |
| 53 | | 40kW | |
| 54 | | 45kW | |
| 55 | | 48kW | |
| 56 | | 50kW | |
| 57 | | 60kW | |
| 58 | | 64kW | |
| 59 | | 72kW | |
| 60 | | 75kW | |
| 61 | | 80kW | |
| 62 | | 90kW | |
| 63 | | 100kW | |
| 64 | | 120kW | |
| 65 | | 150kW | |
| 66 | | 160kW | |
| 67 | | 180kW | |
| 68 | | 200kW | |

7. Others

7.6 Maximum Scale Table

Active power maximum scale value (2/2)

| STEP | W unit | kW unit | MW unit |
|------|--------|---------|---------|
| 69 | | 220kW | |
| 70 | | 240kW | |
| 71 | | 250kW | |
| 72 | | 300kW | |
| 73 | | 320kW | |
| 74 | | 360kW | |
| 75 | | 400kW | |
| 76 | | 450kW | |
| 77 | | 480kW | |
| 78 | | 500kW | |
| 79 | | 600kW | |
| 80 | | 640kW | |
| 81 | | 720kW | |
| 82 | | 750kW | |
| 83 | | 800kW | |
| 84 | | 900kW | |
| 85 | | 1000kW | 1MW |
| 86 | | 1200kW | 1.2MW |
| 87 | | 1500kW | 1.5MW |
| 88 | | 1600kW | 1.6MW |
| 89 | | 1800kW | 1.8MW |
| 90 | | 2000kW | 2MW |
| 91 | | 2200kW | 2.2MW |
| 92 | | 2400kW | 2.4MW |
| 93 | | 2500kW | 2.5MW |
| 94 | | 3000kW | 3MW |
| 95 | | 3200kW | 3.2MW |
| 96 | | 3600kW | 3.6MW |
| 97 | | 4000kW | 4MW |
| 98 | | 4500kW | 4.5MW |
| 99 | | 4800kW | 4.8MW |
| 100 | | 5000kW | 5MW |
| 101 | | 6000kW | 6MW |
| 102 | | 6400kW | 6.4MW |
| 103 | | 7200kW | 7.2MW |
| 104 | | 7500kW | 7.5MW |
| 105 | | 8000kW | 8MW |
| 106 | | | 9MW |
| 107 | | | 10MW |
| 108 | | | 12MW |
| 109 | | | 15MW |
| 110 | | | 16MW |
| 111 | | | 18MW |
| 112 | | | 20MW |
| 113 | | | 22MW |
| 114 | | | 24MW |
| 115 | | | 25MW |
| 116 | | | 30MW |
| 117 | | | 32MW |
| 118 | | | 36MW |
| 119 | | | 40MW |
| 120 | | | 45MW |
| 121 | | | 48MW |
| 122 | | | 50MW |
| 123 | | | 60MW |
| 124 | | | 64MW |
| 125 | | | 72MW |
| 126 | | | 75MW |
| 127 | | | 80MW |
| 128 | | | 90MW |
| 129 | | | 100MW |
| 130 | | | 120MW |
| 131 | | | 150MW |
| 132 | | | 160MW |
| 133 | | | 180MW |

Reactive power maximum scale value (1/2)

| STEP | var unit | kvar unit | Mvar unit |
|------|----------|-----------|-----------|
| 1 | 90var | | |
| 2 | 100var | | |
| 3 | 120var | | |
| 4 | 150var | | |
| 5 | 160var | | |
| 6 | 180var | | |
| 7 | 200var | | |
| 8 | 220var | | |
| 9 | 240var | | |
| 10 | 250var | | |
| 11 | 300var | | |
| 12 | 320var | | |
| 13 | 360var | | |
| 14 | 400var | | |
| 15 | 450var | | |
| 16 | 480var | | |
| 17 | 500var | | |
| 18 | 600var | | |
| 19 | 640var | | |
| 20 | 720var | | |
| 21 | 750var | | |
| 22 | 800var | | |
| 23 | 900var | | |
| 24 | 1000var | 1kvar | |
| 25 | 1200var | 1.2kvar | |
| 26 | 1500var | 1.5kvar | |
| 27 | 1600var | 1.6kvar | |
| 28 | 1800var | 1.8kvar | |
| 29 | 2000var | 2kvar | |
| 30 | 2200var | 2.2kvar | |
| 31 | 2400var | 2.4kvar | |
| 32 | 2500var | 2.5kvar | |
| 33 | 3000var | 3kvar | |
| 34 | 3200var | 3.2kvar | |
| 35 | 3600var | 3.6kvar | |
| 36 | 4000var | 4kvar | |
| 37 | 4500var | 4.5kvar | |
| 38 | 4800var | 4.8kvar | |
| 39 | 5000var | 5kvar | |
| 40 | 6000var | 6kvar | |
| 41 | 6400var | 6.4kvar | |
| 42 | 7200var | 7.2kvar | |
| 43 | 7500var | 7.5kvar | |
| 44 | 8000var | 8kvar | |
| 45 | | 9kvar | |
| 46 | | 10kvar | |
| 47 | | 12kvar | |
| 48 | | 15kvar | |
| 49 | | 16kvar | |
| 50 | | 18kvar | |
| 51 | | 20kvar | |
| 52 | | 22kvar | |
| 53 | | 24kvar | |
| 54 | | 25kvar | |
| 55 | | 30kvar | |
| 56 | | 32kvar | |
| 57 | | 36kvar | |
| 58 | | 40kvar | |
| 59 | | 45kvar | |
| 60 | | 48kvar | |
| 61 | | 50kvar | |
| 62 | | 60kvar | |
| 63 | | 64kvar | |
| 64 | | 72kvar | |
| 65 | | 75kvar | |
| 66 | | 80kvar | |
| 67 | | 90kvar | |

Reactive power maximum scale value (2/2)

| STEP | var unit | kvar unit | Mvar unit |
|------|----------|-----------|-----------|
| 68 | | 100kvar | |
| 69 | | 120kvar | |
| 70 | | 150kvar | |
| 71 | | 160kvar | |
| 72 | | 180kvar | |
| 73 | | 200kvar | |
| 74 | | 220kvar | |
| 75 | | 240kvar | |
| 76 | | 250kvar | |
| 77 | | 300kvar | |
| 78 | | 320kvar | |
| 79 | | 360kvar | |
| 80 | | 400kvar | |
| 81 | | 450kvar | |
| 82 | | 480kvar | |
| 83 | | 500kvar | |
| 84 | | 600kvar | |
| 85 | | 640kvar | |
| 86 | | 720kvar | |
| 87 | | 750kvar | |
| 88 | | 800kvar | |
| 89 | | 900kvar | |
| 90 | | 1000kvar | 1Mvar |
| 91 | | 1200kvar | 1.2Mvar |
| 92 | | 1500kvar | 1.5Mvar |
| 93 | | 1600kvar | 1.6Mvar |
| 94 | | 1800kvar | 1.8Mvar |
| 95 | | 2000kvar | 2Mvar |
| 96 | | 2200kvar | 2.2Mvar |
| 97 | | 2400kvar | 2.4Mvar |
| 98 | | 2500kvar | 2.5Mvar |
| 99 | | 3000kvar | 3Mvar |
| 100 | | 3200kvar | 3.2Mvar |
| 101 | | 3600kvar | 3.6Mvar |
| 102 | | 4000kvar | 4Mvar |
| 103 | | 4500kvar | 4.5Mvar |
| 104 | | 4800kvar | 4.8Mvar |
| 105 | | 5000kvar | 5Mvar |
| 106 | | 6000kvar | 6Mvar |
| 107 | | 6400kvar | 6.4Mvar |
| 108 | | 7200kvar | 7.2Mvar |
| 109 | | 7500kvar | 7.5Mvar |
| 110 | | 8000kvar | 8Mvar |
| 111 | | | 9Mvar |
| 112 | | | 10Mvar |
| 113 | | | 12Mvar |
| 114 | | | 15Mvar |
| 115 | | | 16Mvar |
| 116 | | | 18Mvar |
| 117 | | | 20Mvar |
| 118 | | | 22Mvar |
| 119 | | | 24Mvar |
| 120 | | | 25Mvar |
| 121 | | | 30Mvar |
| 122 | | | 32Mvar |
| 123 | | | 36Mvar |
| 124 | | | 40Mvar |
| 125 | | | 45Mvar |
| 126 | | | 48Mvar |
| 127 | | | 50Mvar |
| 128 | | | 60Mvar |
| 129 | | | 64Mvar |
| 130 | | | 72Mvar |
| 131 | | | 75Mvar |

7. Others

7.7 Measurement Characteristics

■ 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 (Back light 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 | 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) | At the 5A set of CT secondary current. : When input current is below 0.02A, it becomes 0A. ----- At the 1A set of CT secondary current. : When input current is below 0.008A, it becomes 0A. | When it exceeds the upper limit of the display (9999), it becomes the upper limit of the display (9999). ----- When N phase current exceeds the 150% of the rating, it may not monitor the correct measurements. |
| Voltage (V) | When input voltage is below 11V, it becomes 0V. | When it exceeds the upper limit of the display (9999), it becomes the upper limit of the display (9999). |
| Active power (W) Reactive power (var) Apparent power (VA) | When three-phase currents are all 0 or three-phase voltages are all 0, it becomes 0W, 0var and 0VA. | When it exceeds the upper limit of the display (9999), it becomes the upper limit of the display (9999). |
| Power Factor (PF) | When three-phase currents are all 0 or three-phase voltages are all 0, it becomes 1.0. | |
| Frequency (Hz) | When input voltage of phase 1 is 0V, it becomes "----". | When it is below 44.5Hz or over 99.9Hz, "----" is displayed. |
| Harmonics Voltage (HV) | At measuring the RMS value : When input voltage is 0V, it becomes 0V. (For each phase) : When the frequency is below 44.5Hz, "----" is displayed for all phases. | At measuring the distortion ratio : When input voltage is 0V, it becomes "----". (For each phase) : When the frequency is below 44.5Hz, "----" is displayed for all phases. |
| Harmonics Current (HI) | At measuring the RMS value : When input current is 0A, it becomes 0A. (For each phase) : When the frequency is below 44.5Hz, "----" is displayed for all phases. | At measuring the distortion ratio : When input current is 0A, it becomes "----". (For each phase) : When the frequency is below 44.5Hz, "----" is displayed for all phases. |

Note: Input current, input voltage and input power mean input to instrument. They are not to Primary sides of VT, CT.

■ Analog output action

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

7. Others

7.8 Troubleshooting

In the case of abnormal noise, odor, smoke, heat generation from this instrument, turn it off at once. And if you think the instrument is erroneous, please check the followings before asking for repair.

| | Condition | expected 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 5 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 is set to auto off. | When any of the operation key is pressed, it is lit for 5 minutes. Use it as it is, or change the setting to continuous lighting in the set-up menu 4. |
| | The display becomes black. “End” display remains. | It may become black owing to static electricity. set-up is on its way. | It goes off after a while. Press (SET). |
| Measurement error | Measured value error is large. | Settings of primary voltage and primary current are erroneous. | Check the set value in the set value confirmation mode. |
| | Measured values of W, var, $\cos\phi$ are including large errors. | Wiring is erroneous. | Check the wire. |
| | Measured values of $\cos\phi$ is 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 to one to meet the actual use current. |
| | Maximum value is not held. | (RESET) is pressed continuously. | Release (RESET). |
| | Maximum value and minimum value changed. | When the set-up items of the set-up menu 1 are changed, initialization is carried out. | Record before changing set-up. |
| | Index indicator and alarm value changed. | When the set-up items of the set-up menu 1 are changed, initialization is carried out. | Set once again. |
| | The harmonic total RMS value of harmonic current (HI) is largely different from current (A) value. | Distortion ratio (containing ratio) exceeds 100% largely. (measurement of secondary output of inverter) | Check measured environment. |
| The active power value calculated by the current, the voltage, and the power factor is largely different from measured value of active power. | The active power value by the calculation and the measurements might be largely different when there are a lot of harmonics elements. | The active power value that the instrument measured is correct. | |
| Operation | Set-up cannot be made even when (SET) is pressed. | When (SET) is pressed for 2 seconds, the set value confirmation mode gets in, and some items cannot be changed. | Press (SET) and (RESET) simultaneously for 2 seconds to get into the set-up menu. |

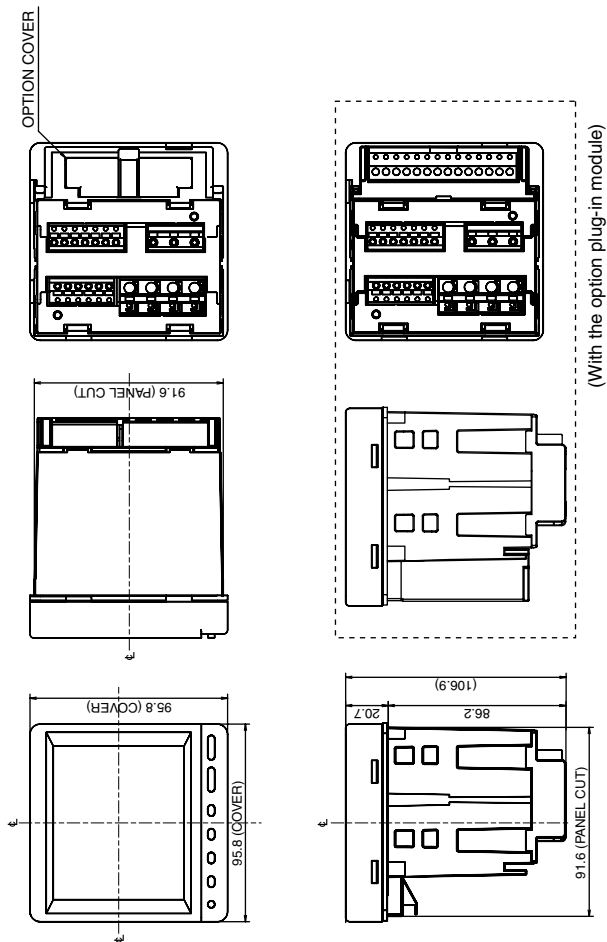
■ After Service

For any questions about the instrument's performance or whether the instrument has a problem, contact our service network. (refer to the last page of this user's manual.)

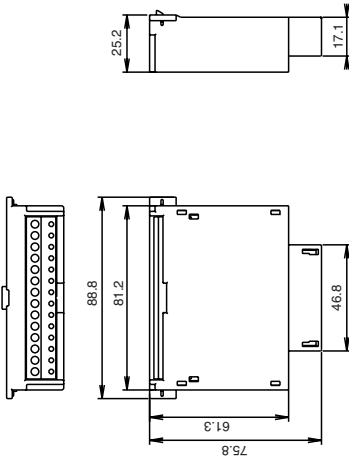
- The period of guarantee is earlier date of either 18 months from the manufacture date or 1 year from the sale date, except in the case that the failure has been caused by bad handling of the product, provided that it has been installed according to the manufacture's instructions.

Installation 1. Dimensions

ME96NSR, ME96NSR-MB



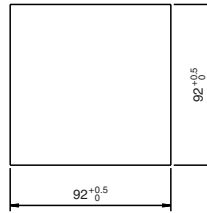
Optional Plug-in Module



Installation 2. Mounting

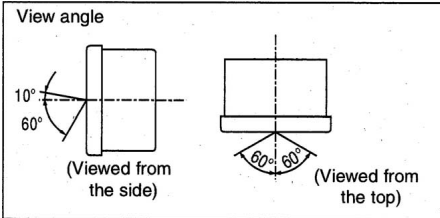
1 Dimensions of panel

The panel hole dimensions are shown right.
It can be attached to a panel with thickness of 1.6 to 4.0mm.



2 View angle

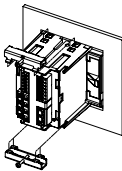
The contrast of the display changes at view angles.
Mount it at the position that is easy to see.



3 Attachment

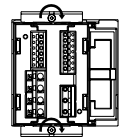
For attachment of the basic device into the panel hole, attach according to the following procedure.

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



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

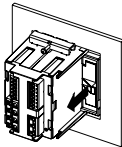
| Note |
|--|
| <p>Please do not tighten too strongly to prevent panel and screw from breaking. Tightening torque for this product: 0.3N•m to 0.5N•m (Half the torque applied normally for this type of screw) Also, please tighten the upper and lower screws at the same time.</p> |



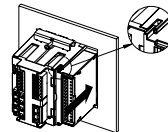
4 Installing the optional plug-in module

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

① The option cover is removed.



② The optional plug-in module is installed.



Combine the slot of the basic device and the convex part of the optional plug-in module.

Note

Protective sheet

A protective sheet is attached to the display for protection against scratch during the attachment to panel. Before using, remove the protective sheet. When you remove it, the display may light up due to generation of static electricity, but it is not an error. It goes off by natural discharge after a while.

Attachment position

In the case to attaching to the end of the panel, check the wiring work space and decide the attachment position.

Optional Plug-in module

Install the optional plug-in module after the power is turn off.

The option is not recognized when installed while power is on.

In this case, the option is recognized by power suspension/power resumption or restarting the basic device.

Installation 3. Wiring

1 Applicable cable size

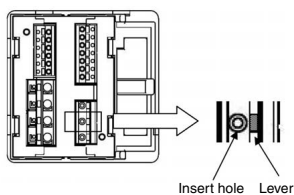
The below table describes the applicable wire size.

| | | Terminals of P1, P2, P3, PN | Other terminals |
|-----------------------|-------------|--|--|
| Applicable cable size | For UL | AWG 22 to 14 When using a stranded wire, use a ferrule. | AWG 24 to 18 When using a stranded wire, use a ferrule. |
| | For general | AWG 24 to 14 When using a stranded wire, use a ferrule. | |
| Strip Gauge | 11 mm | | |

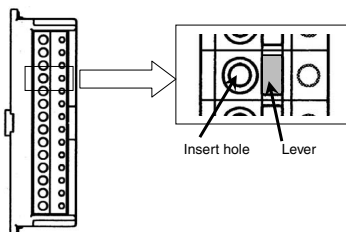
2 Wiring

- ① Strip top of the cable or crimp the ferrule.
- ② Insert the cables by pushing the lever, and connect by releasing the lever.

■ Example of the basic device



■ Example of the plug-in module




3 Confirmations


After wiring, make sure the followings:

- The wires are connected correctly.
- There is no mistake in wiring.

Installation 3. Wiring

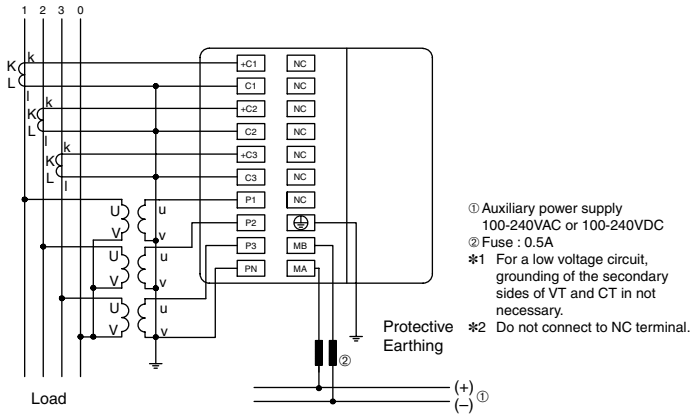
| | |
|--|--|
|  CAUTION | Do not perform hot-line jobs. |
| | Do not perform hot-line work. It can cause on electrification, electric burn, fire and damage by fire on apparatus. Installation of protection fuse etc. is recommended to VT and auxiliary power. |
| | Do not open the secondary side of CT circuit. |
| | Correctly connect the secondary side signal of CT to the CT connection terminal. Incorrect connection of CT or disconnection of the secondary side of CT induces high voltage on the secondary side. It can cause insulation breakdown of the secondary winding which can result in burnout accidents. |
| | Do not short circuit the secondary side of VT. |
| | Correctly connect secondary side signal of VT to the VT connection terminal. Incorrect connection of VT or short circuiting in the secondary side of VT causes excessive current to pass in the VT secondary side. It can cause burnout of the secondary winding which can result in insulation breakdown of the primary winding and inter phase short-circuiting in the end. |
| | Connect electric wire certainly to a terminal. |
| | If the connection to a terminal is not as tight as it should be and result in a measurement mistake. |
| | Do not forget wiring of “C1”, “C2” and “C3” for pass. |
| | When the L side of CT circuit is common wire in 3 phase 4-wire, it is necessary to short-circuit “C1”, “C2” and “C3” terminal of this device. In the case of 3 phase 3-wire, “C1” and “C3” should be short circuited. |
| Do not use unsuitable electric wire. | |
| Electric wire size should be suitable for rated current and voltage. Use of unsuitable electric wire can cause a fire. | |
| Do not strongly pull the wire. | |
| If terminal wire is pulled strongly, there is possibility that an option unit can break away. Tensile load is less than 39.2N | |
| Do not impress unusual voltage. | |
| At the time of the resisting pressure examination of the high voltage apparatus, carry out grounding to avoid any negative influence. The device can break down if more than 2000V is impressed for 1 minute. | |
| Do not connect to Non-connection terminal. | |
| Do not connect to non-connection terminal for the purpose of relay etc. | |

Auxiliary Power

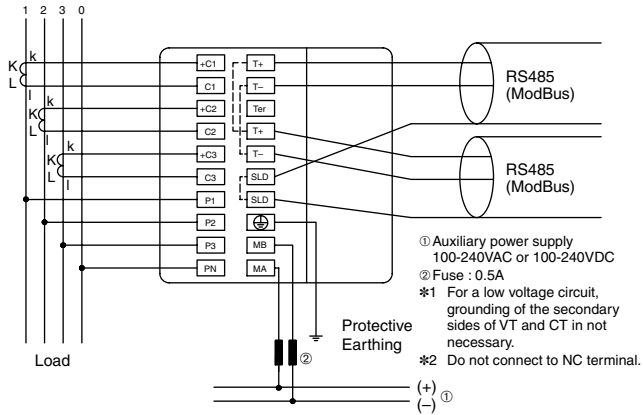
| | |
|--|---|
|  CAUTION | Impress the appropriate voltage to auxiliary power. |
| | Impress the right voltage to auxiliary power. If inappropriate voltage is impressed, it can cause a fire or breakdown of the device. |

Installation 4. Wiring Diagram

Three phase 4-wire type : Example of ME96NSR (with VT)



Three phase 4-wire type : Example of ME96NSR-MB (for direct input)

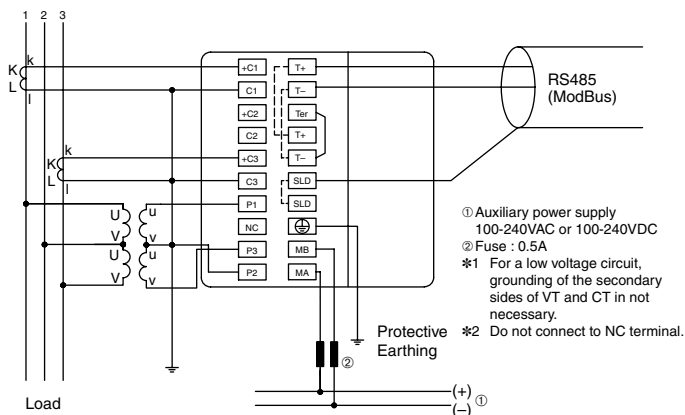


Note

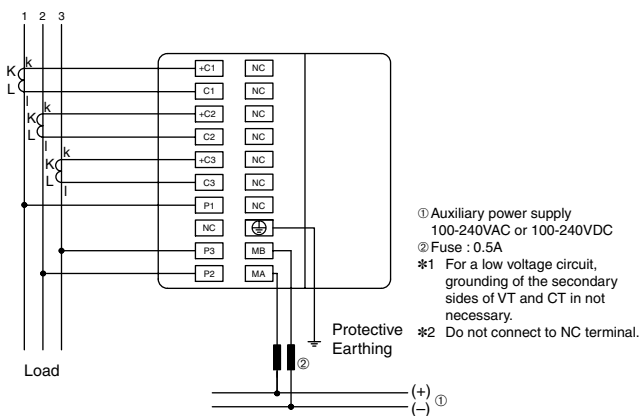
1. If the polarity of VT and CT is not correct, it cannot be measured correctly.
2. In case of DC auxiliary power, it should be wired correctly because it has polarity. In case of AC auxiliary power, it does not have polarity.
3. For a low voltage circuit, grounding of the secondary sides of VT and CT is not necessary.
4. Always earth the \ominus terminal to the protective earth conductor. Earth the terminal with under 100 ohm of earth resistance. Otherwise there will be a false operation.

Installation 4. Wiring Diagram

Three phase 3-wire type : Example of ME96NSR-MB (with VT, wiring 2CT)



Three phase 3-wire type : Example of ME96NSR (for direct input, wiring 3CT)

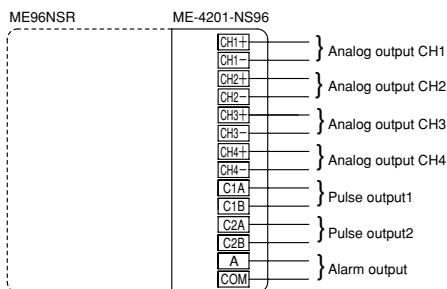


Note

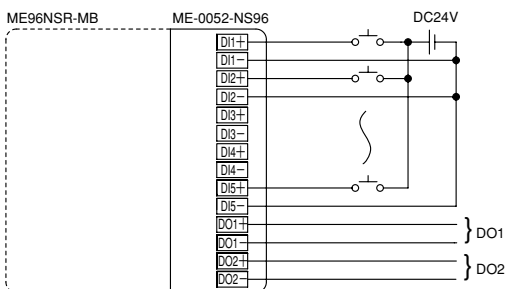
1. Use the shielded twisted pair cable.
2. To the units of both the end of ModBus link, the 120 ohm resistance has to be attached.
This instrument can perform a 120 ohm termination by short-circuiting the terminal of "T-" and "Ter".
3. The earth has to be connected to earth by a thick wire of low impedance.
4. Keep the distance between ModBus link to power line.
5. When the setting is 2CT, the use by 3CT wiring cannot correctly measure for phase 2.

Installation 4. Wiring Diagram

Optional Plug-in Module : ME-4201-NS96



Optional Plug-in Module : ME-0052-NS96



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

Note

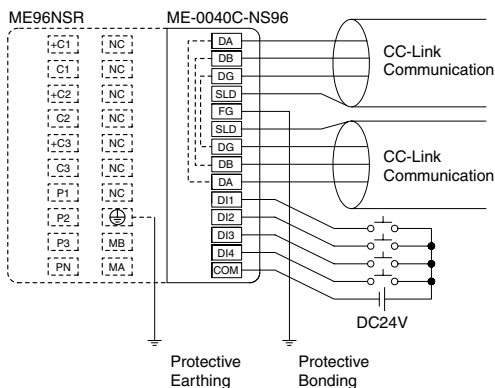
1. Do not bunch the digital input/output signal cables with the main circuit or power cables, or install them close to each other. Keep the distance between the digital input/output signal cables and the main circuit or power cables, and high voltage lines shown below, when they run parallel to each other.

| Conditions | Distance |
|------------------------|--------------|
| Below 600V power lines | 30cm or more |
| Other power lines | 60cm or more |

2. Analog output 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, serge, and induction. Also, the wiring cables should be as short as possible.
3. In case of ME96NSR-MB with ME-4201-NS96, the ModBus interface and the analog outputs do not have the insulation between them.

Installation 4. Wiring Diagram

Optional Plug-in Module : ME-0040C-NS96



Note

- As for CC-Link cable, use the designated cable. Each of Ver.1.10 compatible CC-Link cables, CC-Link specified cables, and CC-Link specified high-performance cables cannot be used together with other cable types. If used together, correct data transmission will not be guaranteed.
The terminating resistor is different depending on the applied cable.
- Connect the shielded wire of the CC-Link specified cable to "SLD" of each module, and earth the both ends of the shielded wire "FG". The SLD and FG are connected into the module.
- Keep the distance between CC-Link cables to power lines.
(Refer to Installation instruction in Safety Precaution.)
- Fill the requirements of total wire distance, station distance, and terminal resistance value according to baud rate and type of cable.
(As for detail of the requirements, refer to the operation manual for CC-Link master unit.)
- To the units of both the end of CC-Link line, the terminal resistors should be attached. And the terminal resistors should be attached in between DA and DB.
Terminal registers are accessories of CC-Link master unit.

Specifications

Specifications

| Type | | ME96NSR, ME96NSR-MB | | | | | | | | | |
|---|---|---|--|---|-----------------------------|----------------------|------------|-------------------|------|-----------------------------|------|
| Phase wire | | Three phase 4-wire | | Three phase 3-wire | | | | | | | |
| Rating | Current | 5AAC/1AAC | | 5AAC/1AAC | | | | | | | |
| | Voltage | max 277V/480VAC | | 110VAC, 220VAC | | | | | | | |
| | Frequency | 50-60Hz | | 50-60Hz | | | | | | | |
| Measuring Items | Current (A) | A ₁ , A ₂ , A ₃ , A _N , Aavg | | A ₁ , A ₂ , A ₃ , Aavg | | | | | | | |
| | Current Demand (DA) | DA ₁ , DA ₂ , DA ₃ , DA _N , DAavg | | DA ₁ , DA ₂ , DA ₃ , DAavg | | | | | | | |
| | Voltage (V) | V ₁₂ , V ₂₃ , V ₃₁ , V _{Lavg} , V _{1N} , V _{2N} , V _{3N} , V _{Lavg} | | V ₁₂ , V ₂₃ , V ₃₁ , V _{Lavg} | | | | | | | |
| | Active Power (W) | ΣW, W ₁ , W ₂ , W ₃ | | ΣW | | | | | | | |
| | Reactive Power (var) | Σvar, var ₁ , var ₂ , var ₃ | | Σvar | | | | | | | |
| | Apparent Power (VA) | ΣVA, VA ₁ , VA ₂ , VA ₃ | | - | | | | | | | |
| | Power Factor (PF) | ΣPF, PF ₁ , PF ₂ , PF ₃ | | ΣPF | | | | | | | |
| | Frequency (Hz) | Hz | | | | | | | | | |
| | Active Energy (Wh) | Imported, Exported | | | | | | | | | |
| | Reactive Energy (varh) | Imported lag, Imported lead, Exported lag, Exported lead | | | | | | | | | |
| | Harmonics Current (HI) | H ₁₁ , H ₁₂ , H ₁₃ , H _{1N} | | H ₁₁ , H ₁₂ , H ₁₃ | | | | | | | |
| | | THD, h ₁ , ..., h ₁₃ RMS value and Distortion ratio (max.60%) | | | | | | | | | |
| | Harmonics Voltage (HV) | HV _{1N} , HV _{2N} , HV _{3N} | | HV ₁₂ , HV ₂₃ | | | | | | | |
| THD, h ₁ , ..., h ₁₃ RMS value and Distortion ratio (max.20%) | | | | | | | | | | | |
| Measuring Range and Accuracy | Measuring Range | | Display | | Analog Output, Pulse Output | | | | | | |
| | Current | 0 to Rated×120% | 5AAC | 1AAC | 5AAC | 1AAC | | | | | |
| | Current Demand | | | | | | | | | | |
| | Voltage | | 0 to Rated×15/11×120% | 0.5% | 1.0% | 0.5% | 1.0% | | | | |
| | Active Power | | | | | | | | | | |
| | Reactive Power | | | ±Rated×110% | 2.0% | 3.0% | 2.0% | 3.0% | | | |
| | Apparent Power | | | | | | | | | | |
| | Frequency | | | | 45 to 55Hz or 55 to 65Hz | 2.0% | 2.0% | 2.0% | 2.0% | | |
| | Power Factor | | | | | | | | | | |
| | Active Energy | | | | | Lead 0 to 1 to Lag 0 | 2.5% | 2.5% | 2.5% | 2.5% | |
| | Reactive Energy | | | | | | | | | | |
| | Harmonics Current | | | | | | 0 to Rated | 2.5% | 2.5% | 2.5% | 2.5% |
| | | | | | | | | | | | |
| 0 to 20% | | | | | | | | 2.5% | | (Total RMS, 0 to Rated×60%) | |
| | | | | | | | | (T.H.D, 0 to 20%) | | | |
| Measuring Method | Instantaneous Value | A, V: RMS calculation, W, var, Wh, varh: Digital multiplication, PF: Power ratio calculation | | | | | | | | | |
| | Demand Value | Hz: Zero-cross, HV, HI: FFT Thermal type calculation | | | | | | | | | |
| Display | Type | LCD with backlight | | | | | | | | | |
| | Number of Display Digits and Segments | Digital Display | A, DA, V, W, var, VA; 4 digits or 3 digits PF; 4 digits, Hz; 3 digits Wh, varh; 6 digits HI (Distortion ratio); 3 digits, HV (Distortion ratio); 4 digits, HV, HI (RMS); 3 digits | | | | | | | | |
| | | Bar Graph | 21 Segment-Bar Graph Displays on the digital part by selecting upper, middle, lower display. (Excluding Wh, varh, Harmonics) Or displays current, voltage, active power, reactive power, frequency, power factor which is independent from digital display. 22 Segment-Indicator Displays values that were set on alarm setting in the setting mode according to elements shown on bar graph elements. | | | | | | | | |
| | Display Updating Time Interval | Digital Display | 0.5s | | | | | | | | |
| | Bar Graph | 0.5s | | | | | | | | | |
| Response Time | Display: 2s or less, Analog output: 2s or less In HI and HV, 10s or less | | | | | | | | | | |
| Time Constant of Current Demand | Select from 0, 10, 20, 30, 40, 50s, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30min. | | | | | | | | | | |
| Temperature Influence | Within class index at 23 ±10 degrees celsius | | | | | | | | | | |
| Power Failure Compensation | Non-volatile memory (Items: setting value, max/min value, active/reactive energy) | | | | | | | | | | |
| VA Consumption | VT | 0.1VA/phase, 0.2VA/phase (at direct input) | | | | | | | | | |
| | CT | 0.1VA/phase | | | | | | | | | |
| | Auxiliary Power Circuit | 7VA at 110VAC, 8VA at 220VAC, 5W at 100VDC | | | | | | | | | |
| Auxiliary power | 100 to 240VAC (+10%, -15%) 50/60Hz 100 to 240VDC (+10%, -30%) | | | | | | | | | | |
| Weight | 0.5kg | | | | | | | | | | |
| Dimensions | 96(H)×96(W)×86(D) | | | | | | | | | | |
| Enclosure | Thermoplastic self-extinguish (UL94V0) | | | | | | | | | | |
| Operating Temperature | -5 to 50 degrees celsius (average operating temperature ; 35 or less per day) | | | | | | | | | | |
| Operating Humidity | 30 to 85%RH, non condensing | | | | | | | | | | |
| Storage Temperature | -20 to 60 degrees celsius | | | | | | | | | | |

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

Standard

| | |
|--|--|
| 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 |

Communication Specifications

■ ModBus specifications

| Item | Specifications |
|---------------------|---|
| Interface | RS485, 2 wires half duplex |
| Protocol | ModBus RTU (binary data) |
| Speed | 2400, 4800, 9600, 19200, 38400bps |
| Distance | 1000m |
| Address | 1 to 255 |
| Station number | 31 |
| Terminal resistance | 120Ω 1/2W |
| Recommended cables | Shielded twisted pair, AWG26 (or wider) gauge |

As for details of ModBus communication, refer to “Modbus.org. Website”

“Modbus.org. Website”: <http://www.modbus.org>

■ CC-Link specifications

| Item | Specifications |
|--|---|
| Numbers of occupied stations | 1 station Remote device station (I/O data and word data can be transmitted) |
| CC-Link version | CC-Link Ver 1.10 |
| Baud rate | 10Mbps/5Mbps/2.5Mbps/625kbps/156kbps |
| Maximum number of connected units | The following conditions should be satisfied. If the system is configured by only this instrument, up to 42 units can be connected. Condition 1 : $\{(1 \times a) + (2 \times b) + (3 \times c) + (4 \times d)\} \leq 64$ a: number of units occupied by 1 station b: number of units occupied by 2 stations c: number of units occupied by 3 stations d: number of units occupied by 4 stations Condition 2 : $\{(16 \times A) + (54 \times B) + (88 \times C)\} \leq 2304$ A: number of remote I/O stations B: number of remote device stations C: number of local stations |
| Remote station number (station number) | 1 to 64 |

■ 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

Necessary information for operating this device by MELSEC-Q series sequencer loading CC-Link interface unit are as follows. In addition to this operation manual, read the following documents also.

- PLC I/F unit user's manual
- Electronic Multi-Measuring Instrument programming manual (CC-Link) LEN080334

■ Data collection for ModBus

Electronic Multi-Measuring Instrument ModBus I/F specification LSPM0075

Specifications

Set-up Table

| Set-up menu No. | Set-up menu item | Initial content | Notes | |
|-----------------|----------------------------|----------------------------------|--|-----------------------------|
| 1 | 1.1 | Phase wire | 3P4W | |
| | 1.2 | Display pattern | P13 | |
| | | 1.2.1 | Pattern P00 | — |
| | 1.3 | Using VT or direct input | 3P4W:Direct input 3P3W:Using VT | |
| | | 1.3.1 | Direct input | 3P4W:220V/380V 3P3W:110V |
| | | | Secondary voltage | 3P4W:100V 3P3W:100V |
| | | 1.3.3 | Primary voltage | 3P4W:200V 3P3W:10000V |
| | 1.4 | Secondary current | 5A | |
| | 1.4.1 | Primary current | 5A | |
| | 1.5 | Time constant for current demand | 0s | |
| 2 | 2.1 | Communication method | — | |
| | 2.2 | ModBus address | 1 | |
| | | 2.2.1 | ModBus baud rates | 19.2kbps |
| | | 2.2.2 | ModBus parity | even |
| | | 2.2.3 | ModBus stop bit | 1 |
| | 2.3 | CC-Link station number | 1 | |
| | | 2.3.1 | CC-Link baud rates | 156kbps |
| 2.4 | Communication module reset | OFF | | |
| 2.5 | Digital input reset | Auto (automatic reset) | | |
| 3 | 3.1 | Current maximum scale | 0 step | |
| | 3.2 | Active power maximum scale | 0 step | |
| | | 3.2.1 | Active power scale type | Single deflection |
| | 3.3 | Reactive power maximum scale | 0 step | |
| | 3.4 | Power factor scale | -0.5 to 1 to 0.5 | |
| 4 | 4.1 | Expanded counting | Imported active energy Imported lag reactive energy (Combination I) | |
| | 4.2 | Harmonics | No displayed | |
| | 4.3 | Digital input/output | Displayed | |
| | 4.4 | Back light ON/OFF | Auto (automatic off) | |
| | 4.5 | Current display digit | 4 digits | |
| | 4.6 | Voltage display digit | 4 digits | |
| | 4.7 | Active power display digit | 4 digits | |
| | 4.8 | Reactive power display digit | 4 digits | |
| | 4.9 | Apparent power display digit | 4 digits | |
| 5 | 5.1 | Alarm item 1 | non | |
| | 5.1.1 | Alarm value 1 | — | |
| | | Alarm value 2 | — | |
| | 5.3 | Alarm item 3 | non | |
| | 5.3.1 | Alarm value 3 | — | |
| | | Alarm value 4 | — | |
| | 5.4 | Alarm item 4 | non | |
| 5.4.1 | Alarm value 4 | — | | |
| 5.5 | Alarm delay time | 0s | | |
| 5.6 | Alarm cancel method | Auto (automatic cancel) | | |
| 6 | 6.1 | Analog output CH1 | A _{AVG} | |
| | | 6.1.1 | Detailed setting | — |
| | | 6.1.2 | Detailed setting | Single deflection |
| | 6.2 | Analog output CH2 | 3P4W:V _{AVG(L-N)} 3P3W:V _{AVG(L-L)} | |
| | | 6.2.1 | Detailed setting | — |
| | | 6.2.2 | Detailed setting | Single deflection |
| | 6.3 | Analog output CH3 | ΣW | |
| | | 6.3.1 | Detailed setting | — |
| | | 6.3.2 | Detailed setting | Single deflection |
| | 6.4 | Analog output CH4 | ΣPF | |
| | | 6.4.1 | Detailed setting | — |
| | | 6.4.2 | Detailed setting | Single deflection |
| | 6.5 | Analog output limit | OFF | |
| 7 | 7.1 | Pulse output 1 | Imported active energy | |
| | | 7.1.1 | Pulse unit | (Minimum value) |
| | 7.2 | Pulse output 2 | Imported lag reactive energy | |
| | | 7.2.1 | Pulse unit | (Minimum value) |
| 7.3 | Pulse width | 0.125s | | |

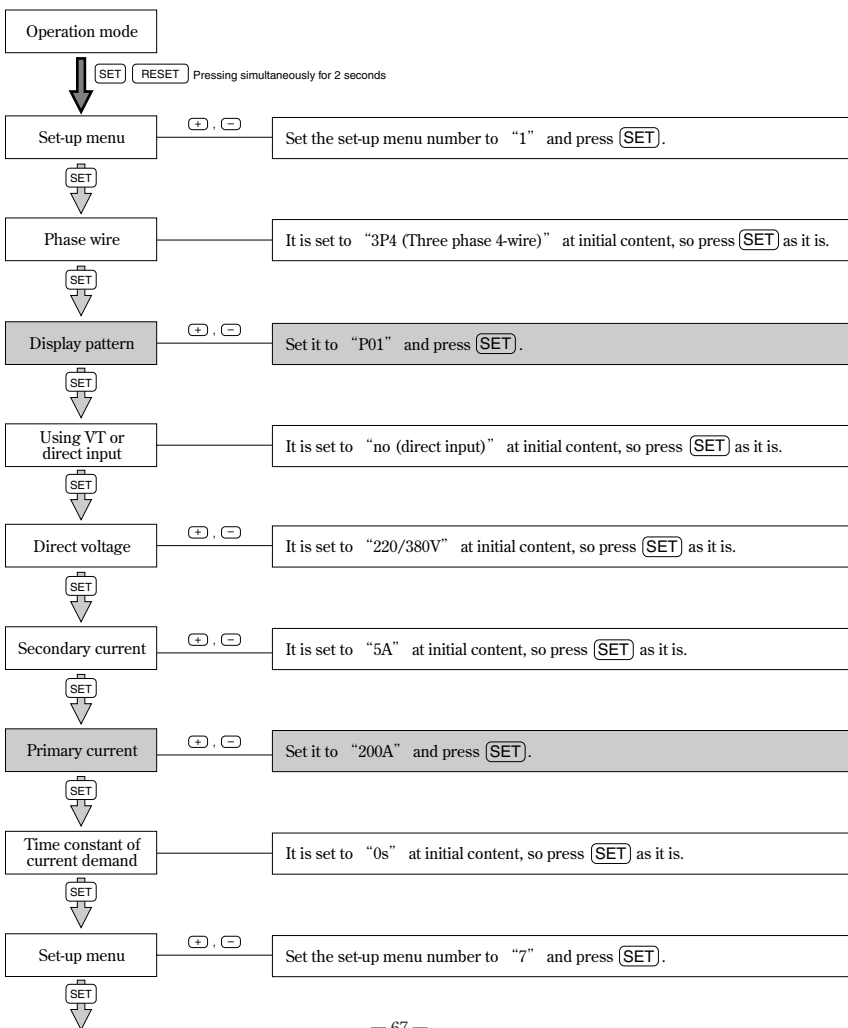
Example of Simple Set-up

A simple set-up example is shown below.

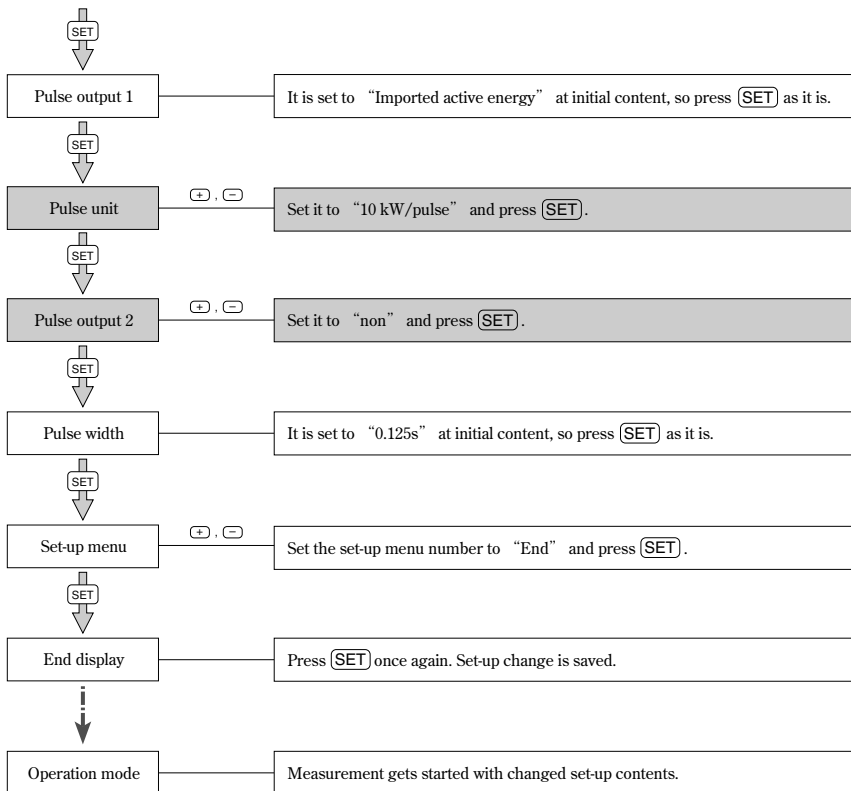
- Set-up example** Model type: ME96NSR (with ME-4201-NS96 optional plug-in module)
 - Phase wire: Three phase 4-wire Voltage display: Phase to phase
 - Measurement items: A, V, W, PF
 - Input voltage: 220V/380V direct
 - Primary current: 200A
 - Secondary current: 5A
 - Active power maximum scale: 160kW (standard: rating 100%)
 - Analog output: CH1(AVG), CH2(V_{AVG(L-N)}), CH3(Σ W, 160kW), CH4(Σ PF, 0.5 to 1 to 0.5)
 - Pulse output: Imported active energy, Pulse unit: 10kW/pulse

Set-up procedures

Items that require set value change are shown in shade.



Example of Simple Set-up



Supplementary: As for detailed setting contents, refer to pages 12 to 28.

MITSUBISHI Electronic Multi-Measuring Instrument

Service Network

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| Malaysia | Mitric Sdn Bhd | 5 Jalan Pemberita U1/49, Temasya Industrial Park, Gienmarie 40150 Shah Alam, Selangor, Malaysia | +603-5569-3748 |
| Myanmar | Peace Myanmar Electric Co.,Ltd. | NO137/139 Botataung Pagoda Road, Botataung Town Ship 11161, Yangon, Myanmar | +95-(0)1-202589 |
| Nepal | Watt & Volt House | KHA 2-65, Volt House Dillibazar Post Box: 2108, Kathmandu, Nepal | +977-1-4411330 |
| Middle East Arab Countries & Cyprus | Comptoir d'Electricite Generale-International-S.A.L. | Cebaco Center - Block A Autostrade Dora P.O. Box 11-1314 Beirut - Lebanon | +961-1-240430 |
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| Philippines | Edison Electric Integrated, Inc. | 24th Fl. Galleria Corporate Center, Edsa Cr. Ortigas Ave., Quezon City Metro Manila, Philippines | +63-(0)2-634-8691 |
| Saudi Arabia | Center of Electrical Goods | Al-Shuwayer St. Side way of Salahuddin Al-Ayoubi St. P.O. Box 15955 Riyadh 11454 - Saudi Arabia | +966-1-4770149 |
| Singapore | Mitsubishi Electric Asia Pte. Ltd. | 307, Alexandra Road, #05-01/02 Mitsubishi Electric Building, Singapore 159943 | +65-6473-2308 |
| South Africa | CBI-electric: low voltage | Private Bag 2016, Isando, 1600, South Africa | +27-(0)11-9282000 |
| Taiwan | Setsuyo Enterprise Co., Ltd | 6th Fl., No.105, Wu Kung 3rd, Wu-Ku Hsiang, Taipei, Taiwan, R.O.C. | +886-(0)2-2298-8889 |
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