# Graphical Digital Panel Meter
# [Tachometer/Speed Meter]
# Instruction manual

## WPMZ-5－□□□－□□－□□□

watanabe

**Watanabe Electric Industry Co., Ltd.**

IM-0836-04

## INTRODUCTION

Thank you for purchasing our graphical digital panel meter the WPMZ series.
This manual describes the functions, instructions on installing and wiring, operations etc.
Before using this product, please read this manual carefully and use the product correctly.
The latest manual can be downloaded as a file from our web site（http://www.watanabe-electric.co.jp/en/）.
The file is in the PDF format and has the bookmark function for your convenience.

## SUPPLIED ITEMS

Check that all the following items have been included in the delivered package.

| item name | | Quantity |
|---|---|---|
| Graphical panel meter WPMZ (body) | | 1 |
| Case fixing attachment | | 2 |
| Terminal block cover | | 1　（For supply power terminal） |
| Attached connectors | 1 input / no output model | 2（7P×1, 13P×1） |
| | 1 input / with output model | 3（7P×2, 13P×1）＊Not BCD output<br>3（7P×1, 13P×1, 34P×1）＊BCD output |
| | 2 inputs / no output model | 3（7P×2, 13P×1） |
| | 2 inputs / with output model | 4（7P×3, 13P×1）＊Not BCD output<br>4（7P×2, 13P×1, 34P×1）＊BCD output |
| Quick instruction manual | | 1 |

## NOTES

・This manual is subject to change without notice for improvements of the product.
・Keep this manual with close reach of persons who use this product to provide for future use.

# Table of contents

If you read this manual on a pc, you can jump to linked destination by clicking characters in blue.

# 1. PRECAUTIONS FOR USE

## 1－1. ENVIRONMENTS AND CONDITIONS OF USE

Please do not use the product under the following circumstances. It might cause malfunctions and shortening the life.

1) Ambient temperature of out of -5 to 50° C
2) Ambient humidity of out of 35 to 85%, or freezing condensing
3) High dust or metallic powder level
   (Storing in a dust-proof chassis and a countermeasure against heat dissipation are required.)
4) Environment of corrosive gas, salty air or oily smoke
5) Environment of much vibration or impact
6) Environment of rain or water drops (except the front panel)
7) Environment of strong electromagnetical field or much exogenous noise

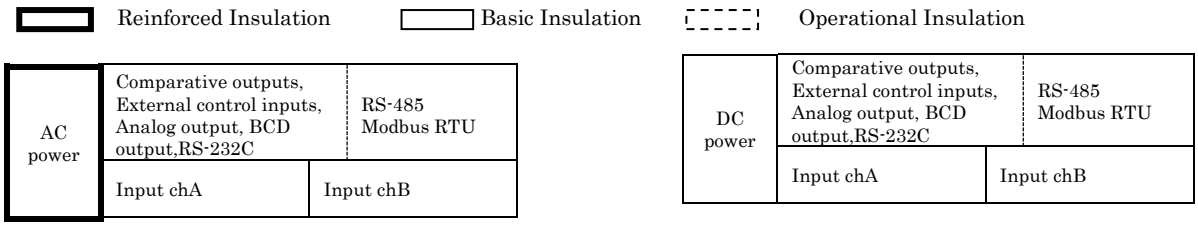
## RESTRICTION FOR USE

- **Do not use this product as a part of equipment which aimed at life maintenance of human bodies.**
- **Please avoid usages of this product which bring physical accident or property damage when it breaks down.**

We do not take any responsibility about the special damage, the indirect damage and the passivity damage that occurred due to this product under any circumstance.

## 1－2. INSTALLATION AND CONNECTION

1) Please read this manual carefully before setting and connecting, be performed by a person having a specialized technique.
2) The insulation class of this product is as shown by the figure below. Please confirm that the insulation class satisfies a use condition prior to setting.




3) Do not wire the power supply line, input signal lines and output signal lines near noise sources or relay drive lines.
4) Bundling or containing in a same duct with lines including noises might cause malfunctions.
5) This product works functionally normally right after power activation, but requires 30 minutes' warming to satisfy all performance requirements.

## ⚠CAUTION

1) This product is a precision measuring instrument. Please be careful not to add the strong shock to this product by falls and so on.
2) Paying attention to the circuit diagram, connect wires to this product carefully. An inappropriate connection may cause troubles of the product, a fire or an electric shock.
3) Please avoid live line works. It may cause an electric shock, troubles or a burnout of the product by the short circuit or a fire.
4) The FG terminal must be connected to ground. The grounding should be Class D grounding (previous class 3 grounding). An inappropriate grounding may cause malfunctions of the product.
5) Please use wire which has appropriate specifications. Inappropriate wire may cause a fire because of heat generation.
6) Please use crimp terminals which meet specifications of wire. Otherwise, it may cause breaking of wire, poor contact and may bring into a malfunction of the product, a breakdown, a burnout, or a fire.
7) After tightening screws, confirm that the screws do not loosen. A looseness of screws may cause a

malfunction of the product, a fire or an electric shock.
8) An excessive tightening of screws may damage terminals or screws. A poor tightening of screws may cause a malfunction of the product, a fire or an electric shock.
9) Attach a terminal block cover to the product. Otherwise it may cause an electric shock.
10) Never attempt to disassemble or modify this product. It may cause a breakdown, an electric shock or a fire.

## 1－3．CHECKING BEFORE USE

Please install this product under the environments and conditions of use which meet requirements. If you find any damage to the product by the transportation or any problem, please contact to your dealer or our company directly.

## 1－4．CHECKING FOR ABNORMALITIES

If you find strange sound, smell, smoke, heat from this product, shut down the power immediately. And check followings before considering a breakdown of the product.

1) Power is supplied correctly.
2) Wires are connected correctly.
3) Wires have no breaking.
4) Settings are configured correctly.

## 1－5．MAINTENANCE AND INSPECTION

For the stain on the surface of the product, wipe it off using soft cloth. For heavy stein, turning off the power, wipe off it using cloth wrung out of water. Do not use organic solvents such as benzene and thinner.
For a trouble-free and long use of this product, give inspections of followings periodically.

1) Whether the product has damage.
2) Whether the display has abnormality.
3) Whether the product give out strange sound, smell, heat.
4) Mounting and connections of terminals have no looseness, check under power off condition.

## 1－6．DISPOSAL OF THIS PRODUCT

When you dispose this product, treat as a general industrial waste.

# 2. WARRANTY

## 2－1. TERM OF WARRANTY

The term of a warranty of this product is one year after delivery.

## 2－2. WARRANTY RANGE

If any failures found to be the responsibility of our company occurs within the term of warranty, the product shall be offered a replacement or repaired by retuning to us at no cost.
However, in the case that the cause of the failure corresponds to the followings, it is excluded from the warranty range.

1) Failure caused by being used under inappropriate conditions, circumstances and handlings which are written in this manual.
2) Failure caused by unapproved modifications or repair of structure, performance and specifications etc. which are performed not by our company.
3) Failure caused not by this product.
4) Failure caused by reasons unpredictable by standards of science and technology at time of the shipment from our company.
5) Failure caused by any other reasons that are found not to be the responsibility of our company including natural disasters, human disasters and accidental forces.

In addition, this warranty is limited to this product as a component; any other damages provoked by failure or defect of this product are out of this warranty range.

## 2－3. LIMITATION OF LIABILITY

Our company is not responsible for any consequential damage caused by this product.

# 3. BEFORE USING THE PRODUCT

## 3－1. MODEL CODES

The model code of this product is shown as below. Check the product which has been delivered has a same model code you ordered.

WPMZ-5－□□□－□□－□□□

| Series name | Supply power | Input A | Input B | Output | Comparative output | Test report | Additional code | Description |
|---|---|---|---|---|---|---|---|---|
| WPMZ-5 | | | | | | | | Tachometer/Speed Meter |
| | 1 | | | | | | | Supply power : AC100 to 240V |
| | 3 | | | | | | | Supply power : DC12V |
| | 4 | | | | | | | Supply power : DC24 to 48V |
| | | P | | | | | | Pulse input（Note 2） |
| | | L | | | | | | Line driver input（Note 3） |
| | | | X | | | | | Nothing |
| | | | P | | | | | Pulse input（Note 1） |
| | | | L | | | | | Line driver input（Note 1） |
| | | | | X | | | | No output (Display only) |
| | | | | 1 | | | | Analog output |
| | | | | 2 | | | | BCD output (open collector NPN) |
| | | | | 3 | | | | BCD output (open collector PNP) |
| | | | | 4 | | | | RS-232C |
| | | | | 5 | | | | RS-485 Modbus RTU |
| | | | | | E | | | Open collector NPN |
| | | | | | F | | | Open collector PNP |
| | | | | | R | | | Relay output (Normally open) |
| | | | | | | X | | Without test report |
| | | | | | | T | | With test report |
| | | | | | | | 00 | Standard (Initial language:Japanese) |
| | | | | | | | E0 | Initial language setting: English |

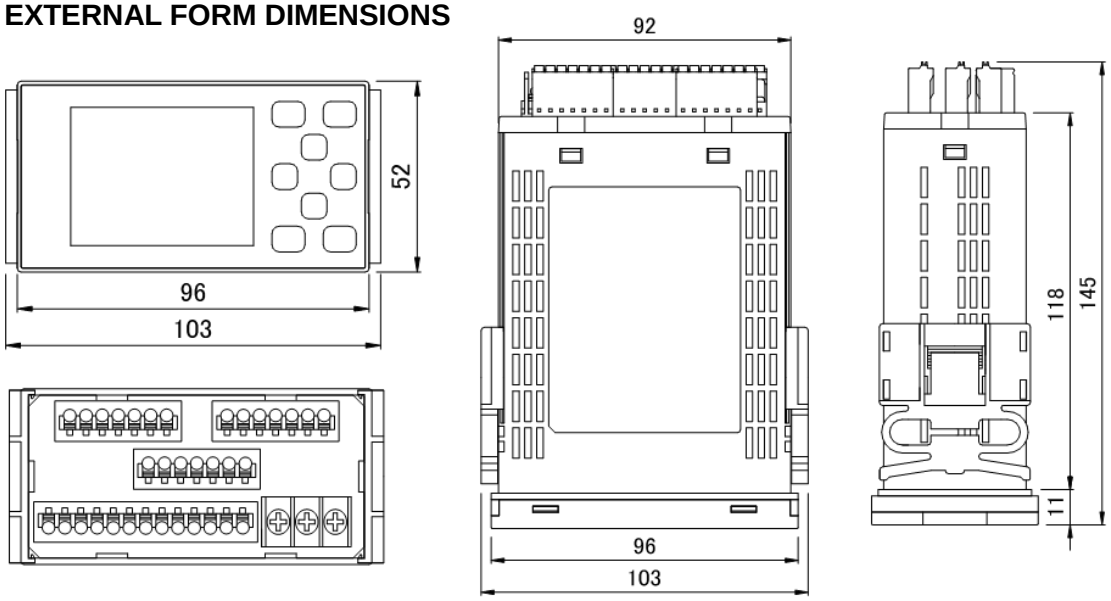
(Note 1) Combination of 2 inputs
The combination of a pulse input and a line driver input is NOT selectable.
(WPMZ-5-*PL and WPMZ-5-*LP are NOT available.)

(Note 2) Pulse input: Generic pulse input excluding Line driver input.
Open collector (NPN/PNP), voltage pulse, totem pole (complementary output), Zero cross (AC signal), two-wire (proximity sensor etc.)

(Note 3) Line driver input: Line driver pulse input.
RS-422 compatible line driver input.

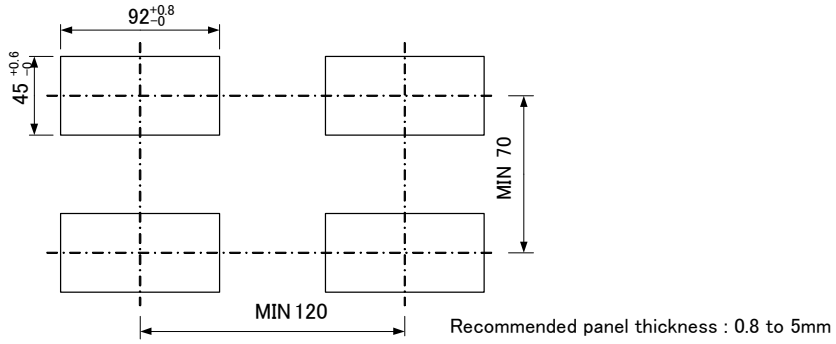
# 4. MOUNTING METHOD

## 4－1. EXTERNAL FORM DIMENSIONS

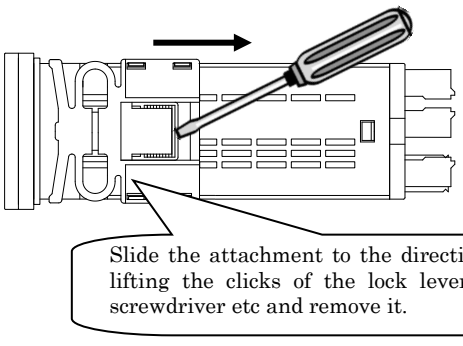



## 4－2. PANEL MOUNTING METHOD

Panel cut dimensions are as shown by the figure below.

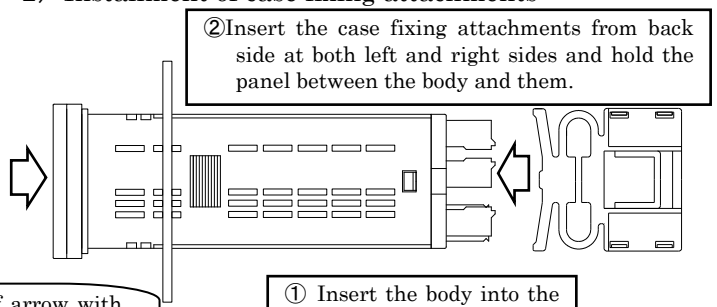



1) Removal of case fixing attachments



Slide the attachment to the direction of arrow with lifting the clicks of the lock lever by a flat-blade screwdriver etc and remove it.

2) Installment of case fixing attachments



②Insert the case fixing attachments from back side at both left and right sides and hold the panel between the body and them.

① Insert the body into the panel from the front side.

## CAUTION

○ Prior to the installation of this product please read "1-1. ENVIRONMENTS AND CONDITIONS OF USE" (page5).
○ In the case of installation or replacing of this product, please pay attention to the damage and accident by dropping.
○ In the case of some wires are connected, do not install or replacing this product. It may cause shock, damage ,fire etc.

# 5. CONNECTING TERMINALS

## 5－1．WIRING TO TERMINALS

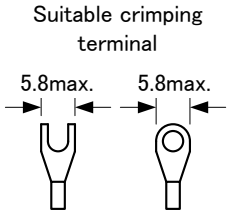
The connections to this product are done by connecting wires to the screw terminal block (power supply) and screwless terminal blocks on the back side of the body. Show below for the method and precautions.

### 5 - 1 - 1．CONNECTING TERMINALS

Use crimp-type terminal lugs for M3 screws to connect the terminals.

① Loosen the screws of the terminal block.
In the case of R-type terminal lugs, remove the screw terminals from the terminal block.

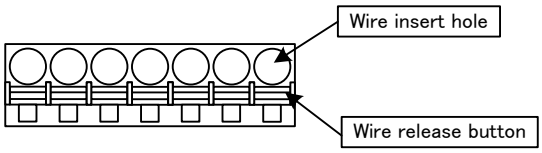
②Insert lugs under the washers of loosened screws and fasten the screws.
(Recommended torque：0.6 [N·m])



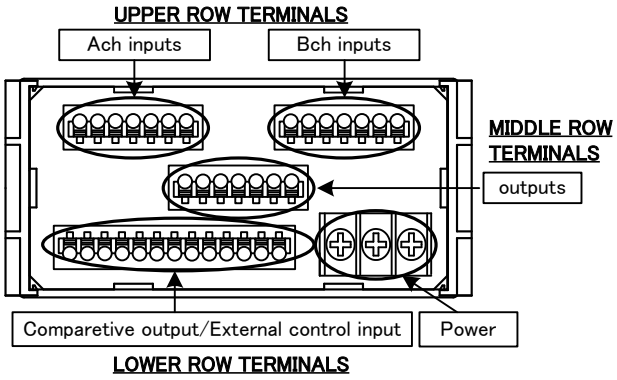

### 5 - 1 - 2．WIRING TO SCREWLESS TERMINALS

① Pushing the wire release button with a flat-blade screwdriver, open the wire insert hole.
(Flat-blade screwdriver : The point of a blade width 2.5mm)

② Wire is inserted in an expanded wire insertion hole and a flat-blade screwdriver is removed.
(Suitable wire:AWG24 to 16)




### 5 - 1 - 3．THE LOCATION OF EACH TERMINAL STAND

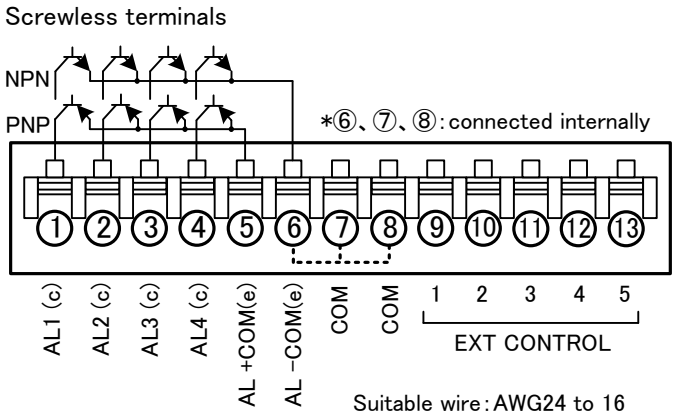



Note: In this manual, “channel A”, “channel B” may be abbreviated to “chA”,”chB” (or “Ach”,”Bch”).

## 5－2．CONNECTION FOR LOWER ROW TERMINALS

### 5 - 2 - 1．COMPARETIVE OUTPUT/EXTERNAL CONTROL INPUT

[Opencollector output product]



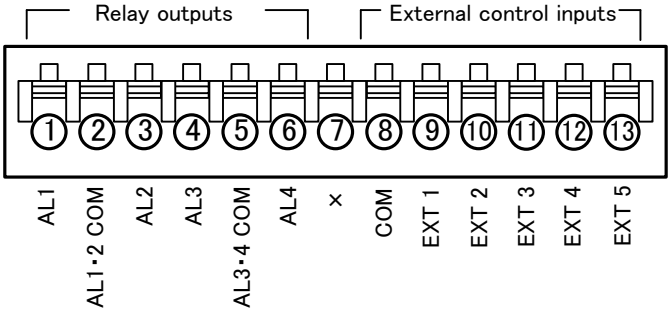

| No. | Name | Description |
|---|---|---|
| 1 | AL1 c | AL1 open-collector output (collector) |
| 2 | AL2 c | AL2 open-collector output (collector) |
| 3 | AL3 c | AL3 open-collector output (collector) |
| 4 | AL4 c | AL4 open-collector output (collector) |
| 5 | AL+COM e | Common terminal for PNP output (emitter)<br>(NPN output : no connection) |
| 6 | AL-COM e | Common terminal for NPN output (emitter)<br>(PNP output : GND for PNP) |
| 7,8 | COM | Common terminal for external control inputs |
| 9 | 1 | External control input No.1 |
| 10 | 2 | External control input No.2 |
| 11 | 3 | External control input No.3 |
| 12 | 4 | External control input No.4 |
| 13 | 5 | External control input No.5 |

*1 “AL-COM e terminal” and “COM terminal” is connected internally and same voltage level.

### 5 - 2 - 2. COMPARETIVE OUTPUT(relay)/EXTERNAL CONTROL INPUT

[Relay output product]

Screwless terminals



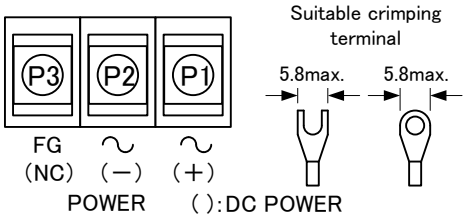

Suitable wire : AWG 24 to 16

| No. | Name | Description |
|---|---|---|
| 1 | AL1 | AL1 relay output |
| 2 | AL1・2 COM | Common terminal for outputs of AL1 and AL2 |
| 3 | AL2 | AL2 relay output |
| 4 | AL3 | AL3 relay output |
| 5 | AL3・4 COM | Common terminal for outputs of AL3 and AL4 |
| 6 | AL4 | AL4 relay output |
| 7 | × | N.C. *1 |
| 8 | COM | Common terminal for external control inputs |
| 9 | EXT CONTROL 1 | External control input No.1 |
| 10 | EXT CONTROL 2 | External control input No.2 |
| 11 | EXT CONTROL 3 | External control input No.3 |
| 12 | EXT CONTROL 4 | External control input No.4 |
| 13 | EXT CONTROL 5 | External control input No.5 |

*1 Please do not wire to N.C. terminal.

### 5 - 2 - 3. SUPPLY POWER

Screw terminals

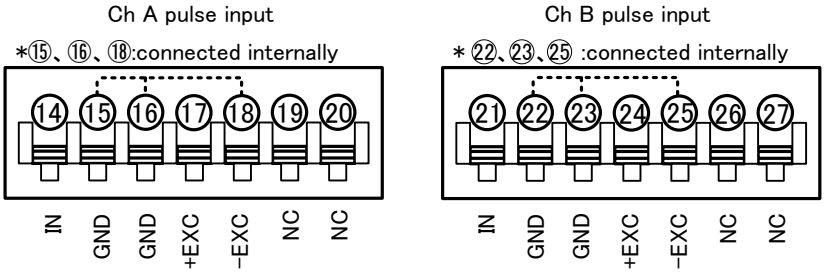



| Terminal | Name | Description |
|---|---|---|
| P1 | POWER (+) | Power source terminal (In case of DC power, +V) |
| P2 | POWER (-) | Power source terminal (In case of DC Power, 0V) |
| P3 | FG (NC) | FG terminal (DC power option: no connection ( Non-usable for a relay terminal)) |

## 5－3．CONNECTION FOR UPPER ROW TERMINALS

### 5 - 3 - 1．PULSE INPUTS

Screwless terminals




Suitable wire：AWG24 to 16　　Suitable wire：AWG24 to 16

●Channel A pulse input

| terminal | name | descriptions |
|---|---|---|
| 14 | IN | ChA pulse input terminal |
| 15,16 | GND | ChA input ground terminal |
| 17 | +EXC | ChA sensor power output terminal (+) |
| 18 | -EXC | ChA sensor power output terminal (-) |
| 19 | NC | No connection<br>*Non-usable for a relay terminal |
| 20 | NC | No connection<br>*Non-usable for a relay terminal |

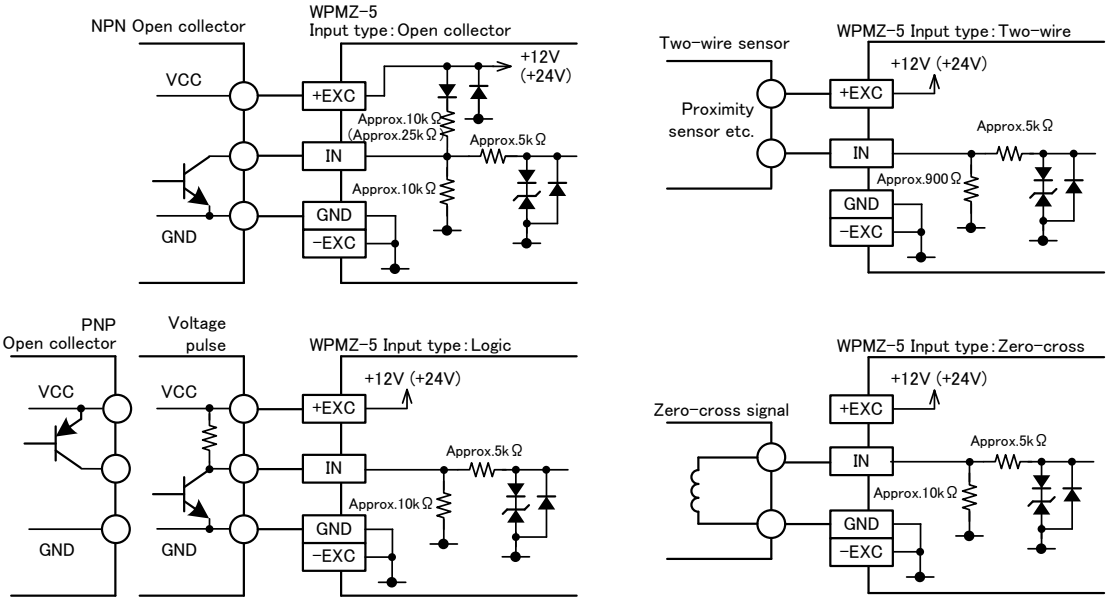
*1 “GND terminal” and “-EXC terminal” is connected internally and same voltage level.

●Channel B pulse input

| terminal | name | descriptions |
|---|---|---|
| 21 | IN | ChB pulse input terminal |
| 22,23 | GND | ChB input ground terminal |
| 24 | +EXC | ChB sensor power output terminal (+) |
| 25 | -EXC | ChB sensor power output terminal (-) |
| 26 | NC | No connection<br>*Non-usable for a relay terminal |
| 27 | NC | No connection<br>*Non-usable for a relay terminal |

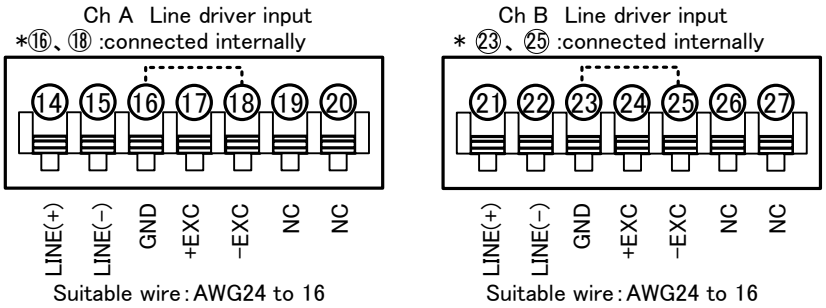
*1 “GND terminal” and “-EXC terminal” is connected internally and same voltage level.

●Examples for Input connections



## 5 - 3 - 2. LINE DRIVER INPUTS

Screwless terminals




●Channel A line driver input

| terminal | name | description |
|---|---|---|
| 14 | LINE (+) | ChA line driver input terminal (+) |
| 15 | LINE (-) | ChA line driver input terminal (-) |
| 16 | GND | ChA input ground terminal (+) |
| 17 | +EXC | ChA sensor power output terminal (+) |
| 18 | -EXC | ChA sensor power output terminal (-) |
| 19 | NC | No connection<br>*Non-usable for a relay terminal |
| 20 | NC | No connection<br>*Non-usable for a relay terminal |

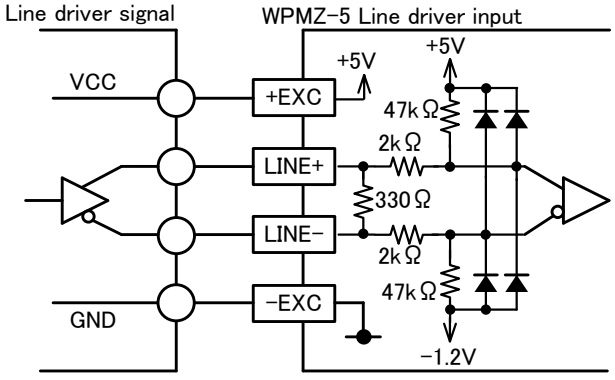
*1 “GND terminal” and “-EXC terminal” is connected internally and same voltage level.

●Channel B line driver input

| terminal | name | description |
|---|---|---|
| 21 | LINE (+) | ChB line driver input terminal (+) |
| 22 | LINE (-) | ChB line driver input terminal (-) |
| 23 | GND | ChB input ground terminal (+) |
| 24 | +EXC | ChB sensor power output terminal (+) |
| 25 | -EXC | ChB sensor power output terminal (-) |
| 26 | NC | No connection<br>*Non-usable for a relay terminal |
| 27 | NC | No connection<br>*Non-usable for a relay terminal |

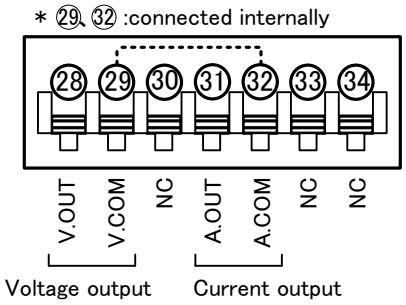
*1 “GND terminal” and “-EXC terminal” is connected internally and same voltage level.

●Examples for Input connections



## 5－4．CONNECTION FOR MIDDLE ROW TERMINALS (OUTPUT)

### 5 - 4 - 1．ANALOG OUTPUT




Suitable wire：AWG24 to 16

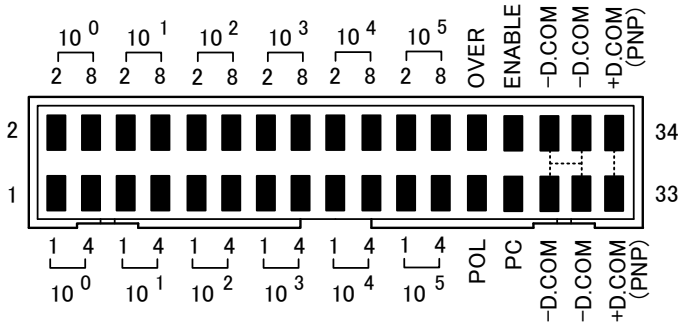
Screwless terminals

| terminal | name | descriptions |
|---|---|---|
| 28 | V.OUT | Analog voltage output terminal (+) |
| 29 | V.COM | Analog voltage output terminal (-) |
| 30 | NC | No connection<br>*Non-usable for a relay terminal |
| 31 | A.OUT | Analog current output terminal (+) |
| 32 | A.COM | Analog current output terminal (-) |
| 33,34 | NC | No connection<br>*Non-usable for a relay terminal |

*1 “V.COM terminal” and “A.COM terminal” is connected internally and same voltage level.

### 5 - 4 - 2．BCD OUTPUT

Crimp connector

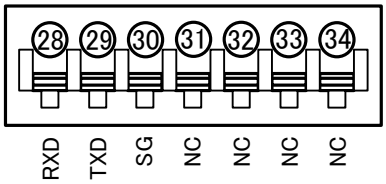



Suitable wire：AWG#28 flat cable(7/0.127mm)

| terminal | name | description |
|---|---|---|
| 1 to 4 | $10^0$1-8 | Bit 1-8 of BCD $10^0$ digit output terminals |
| 5 to 8 | $10^1$1-8 | Bit 1-8 of BCD $10^1$ digit output terminals |
| 9 to 12 | $10^2$1-8 | Bit 1-8 of BCD $10^2$ digit output terminals |
| 13 to 16 | $10^3$1-8 | Bit 1-8 of BCD $10^3$ digit output terminals |
| 17 to 20 | $10^4$1-8 | Bit 1-8 of BCD $10^4$ digit output terminals |
| 21 to 24 | $10^5$1-8 | Bit 1-8 of BCD $10^5$ digit output terminals |
| 25 | POL | BCD polarity output terminal |
| 26 | OVER | BCD over output terminal |
| 27 | PC | BCD synchronous signal output terminal |
| 28 | ENABLE | BCD enable terminal<br>By bringing to same voltage level of -D.COM or connecting to -D.COM, transistors of BCD outputs become OFF. |
| 29 to 32 | -D.COM | Common terminal for BCD open collector NPN |
| 33,34 | +D.COM | External power terminal for BCD open collector PNP |

### 5 - 4 - 3. RS-232C

Screwless terminals

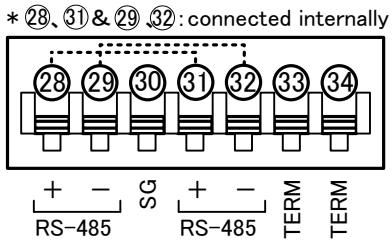



Suitable wire : AWG24 to 16

| terminal | name | description |
|---|---|---|
| 28 | RXD | receive data terminal |
| 29 | TXD | transmit data terminal |
| 30 | SG | common terminal for communication function |
| 31 to 34 | NC | no connection<br>*Non-usable for a relay terminal |

### 5 - 4 - 4. RS-485 MODBUS RTU

Screwless terminals



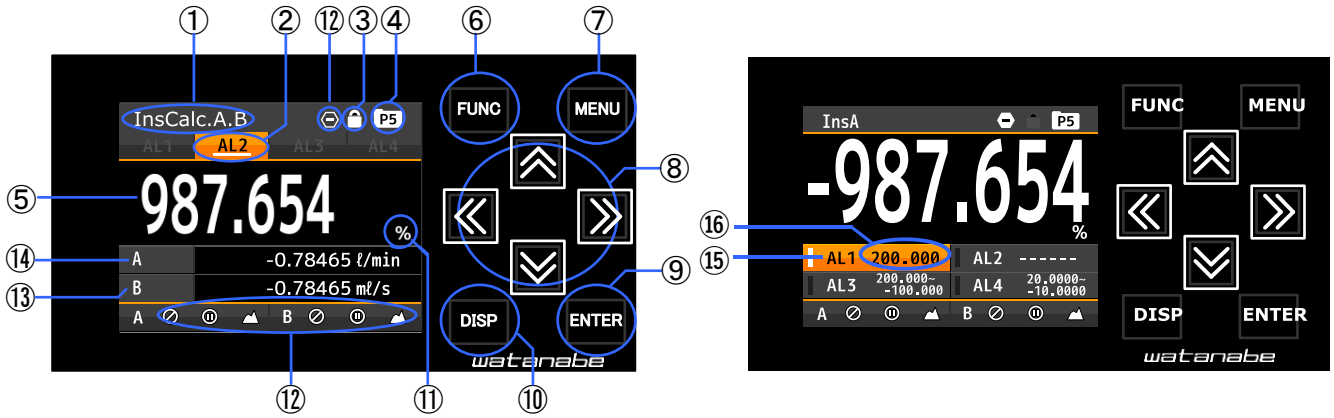

Suitable wire : AWG24 to 16

| terminal | name | description |
|---|---|---|
| 28 | + | Non-inverting signal |
| 29 | - | Inverting signal |
| 30 | SG | Signal ground |
| 31 | + | Non-inverting signal |
| 32 | - | Inverting signal |
| 33,34 | TERM | Terminal resistance (120Ω) terminals<br>* Short 33 and 34 to be enable the resistance. |

*1 "No.28 and No.31 terminal" and "No.29 and No.32 terminal" is connected internally and same voltage level at RS-485 .

# 6. NAMES OF EACH PART

## 6－1. NAMES OF EACH PART




| No. | Name | Function |
|---|---|---|
| ① | Display title | Indicates contents of display |
| ② | Comparison result | Lights when the result of comparative output is ON. |
| ③ | Key lock | Lights when the key lock is effective. |
| ④ | Pattern | Indicates pattern No. in use. |
| ⑤ | 1st item display | Displays measured value of 1st item |
| ⑥ | FUNC key | Used for registering external control shortcut function. |
| ⑦ | MENU key | Used for moving to setting window and returning measurement window. |
| ⑧ | Arrow keys | Used to move the cursor while setting and move other windows.<br>*When the shortcut function is registered, the assigned function will be valid by holding down the arrow key (over 1 second). |
| ⑨ | ENTER key | Used to validate setting value. |
| ⑩ | DISP key | Used to switch measurement windows. |
| ⑪ | Display unit | Unit for 1st item display |
| ⑫ | External control | Lights when any of external control functions are valid |
| ⑬ | 3rd item display | Displays measured value of 3rd item |
| ⑭ | 2nd item display | Displays measured value of 2nd item |
| ⑮ | Comparison result | Lights when the result of comparative output is ON. |
| ⑯ | Judgement value | Shows value or area of comparison judgement |

## 6－2. EXPLANATION OF ICONS

### 6 - 2 - 1. DISPLAY ICONS ON THE MEASUREMENT WINDOW

These icons are displayed on the top or the bottom of the measurement window.

| icon | meanings |
|---|---|
| P5 | Indicates pattern No. in use. |
| | Indicates key lock function is effective. |
| | Indicates comparative output reset function (an external control function) is effective. |
| | Indicates measurement inhibit function (an external control function) is effective. |
| | Indicates display hold function (an external control function) is effective. |
| | Indicates maximum value or minimum value hold function (an external control function) is effective. |

### 6 - 2 - 2. KEY OPERATION ICONS ON THE SETTING WINDOW

Key operation icons which are displayed on setting windows are shown below.

| icon | Meanings | icon | meanings |
|---|---|---|---|
| M | MENU key | | ARROW key (LEFT) |
| F | FUNC key | | ARROW key (RIGHT) |
| E | ENTER key | | ARROW key (UP&DOWN) |
| D | DISP key | | ARROW key (LEFT&RIGHT) |
| | ARROW key (UP) | | ARROW key (ALL) |
| | ARROW key (DOWN) | P1 | Pattern No. under setting |

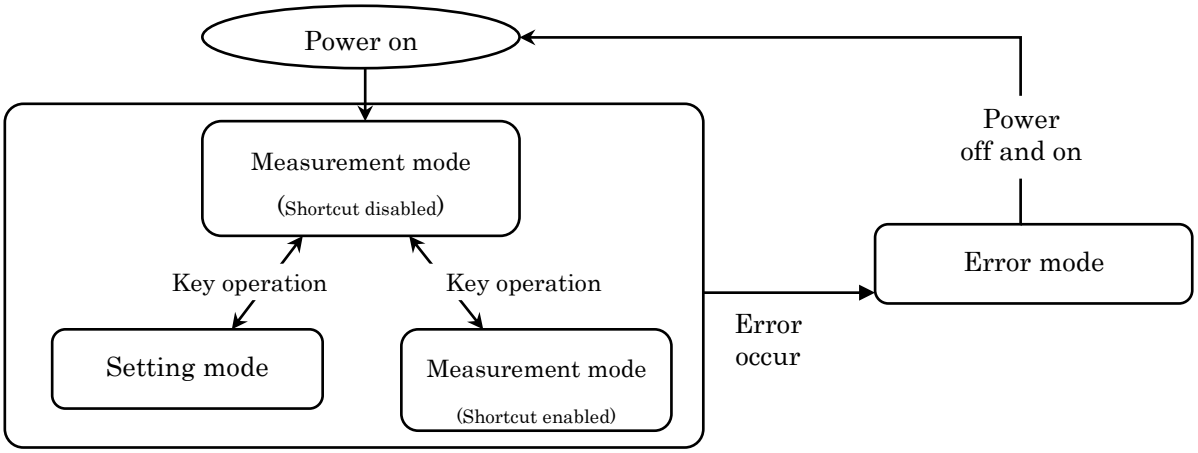
# 7. MODES OF OPERATION

## 7－1. WHAT YOU CAN DO USING THIS PRODUCT

| Mode | Summary | Related Page |
|---|---|---|
| Measurement mode | **Measured Value Display**<br>・Can display the measured value with a numerical number, a bar graph or a trend graph. | page20 |
| Setting mode | **1. Input Setting**<br>PULSE INPUT A / PULSE INPUT B<br>・Settings for inputs such as input type, scaling etc. for each channel.<br>2-INPUT CALCULATION<br>・Settings of calculation such as formula etc. for 2 channel inputs.<br>EXTERNAL CONTROL<br>・Settings of external control functions which are assigned to external control terminals. | page23 |
| | **2. Output Setting**<br>COMPARATIVE OUTPUT AL1 to AL4<br>・Settings of comparative output such as compare judgement value, output mode etc.<br>PULSE OUTPUT A / PULSE OUTPUT B<br>・Settings of pulse output A and pulse output B.<br>ANALOG OUTPUT<br>・Setting of analog output such as output range, scaling.<br>BCD OUTPUT<br>・Setting of BCD outputs such as output logic<br>RS-485 MODBUS RTU<br>・Setting of communication such as unit ID, baud rate.<br>RS-232C<br>・Setting of communication such as baud rate, delimiter. | page 24 |

| Mode | Summary | Related Page |
|---|---|---|
| Setting Mode | **3. Display Setting**<br>DISPLAY SELECT<br>・Selection of display in measurement mode such as numerical value, trend display etc.<br>LEVEL DISPLAY<br>・Setting of scale on level display<br>TREND DISPLAY<br>・Setting of scale on trend display | page 24 |
| | **4. System Setting**<br>GENERAL<br>・Basic setting such as brightness of display, direction of display etc.<br>INITIALIZE<br>・Setting about initialize such as initialize to user settable values or factory defaults etc. | page 25 |
| | **5. Input-Output Diagnosis**<br>INPUT DIAGNOSIS<br>・Makes a diagnosis to inputs.<br>SIMULATED OUTPUT (OUTPUT TEST)<br>・Outputs simulated signals for each output. | page25 |
| Shortcut enabled mode | Can control external control functions which are assigned to arrow keys by operations of the keys | page139 |
| Error mode | Displays error codes when some error occurs. | page 152 |

## 7－2．STATE TRANSITION DIAGRAM



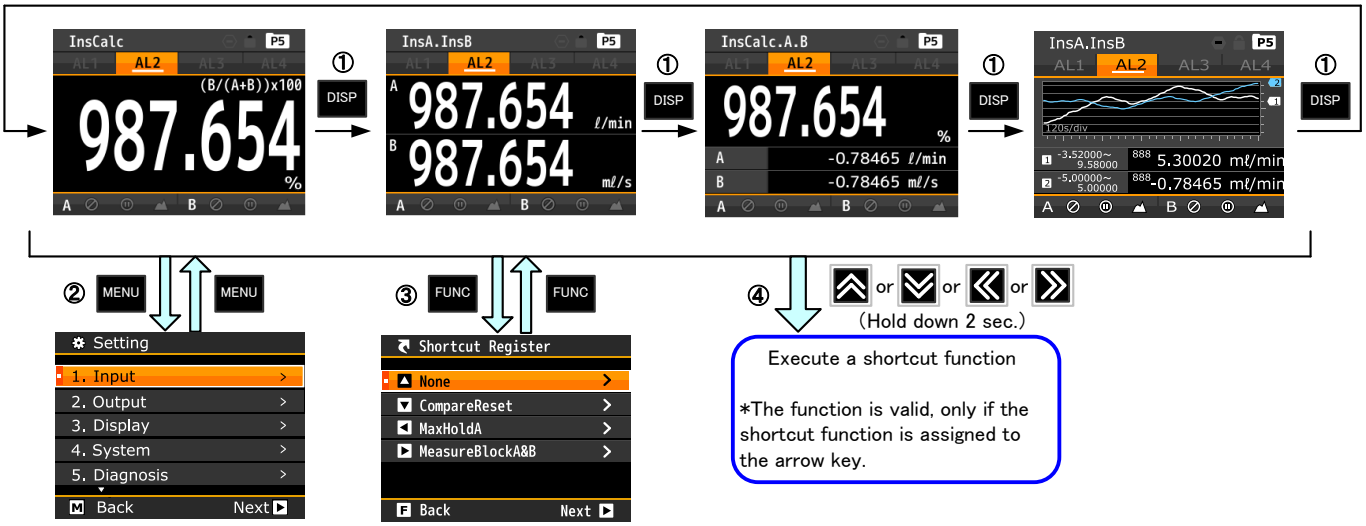
# 8. MEASUREMENT MODE

## 8－1. WHAT YOU CAN DO IN MEASUREMENT MODE

| WHAT YOU CAN DO | DESCRIPTION | RELATED PAGE |
|---|---|---|
| Display of measured value | Displays results of measurement | page 21 |
| Switch of measurement displays | Switches measurement displays which are entries in advance. | page20 |
| Shortcut functions | Executes external control functions which are assigned to arrow keys. | page139 |

## 8－2. OPERATIONS IN MEASUREMENT MODE

In the measurement mode, the following key operations are available.




| No. | Key operation | Action |
|---|---|---|
| ① | DISP | Can switch measurement displays which are set in “Display select”. |
| ② | MENU | Moves to the setting display. |
| ③ | FUNC | Moves to the shortcut entry display. |
| ④ |  | By holding down each key for 1 seconds (i.e. long-pressing), executes or cancels external control functions which are registered. |
| ⑤ | DISP + ENTER | Executes or cancels key lock function. |

**⚠CAUTION**

When the key lock is enabled, key operations are not acceptable. Operate the keys after canceling key lock function.

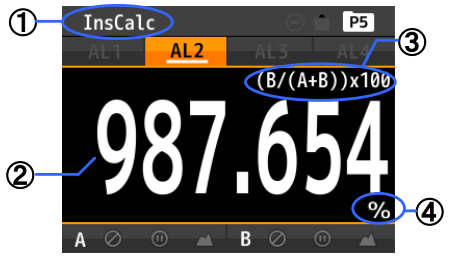
## 8－3．MEASUREMENT VALUE DISPLAY

Along with the numerical number format, this product can display the measured value in level format (bar graph) or trend format (polygonal line graph).

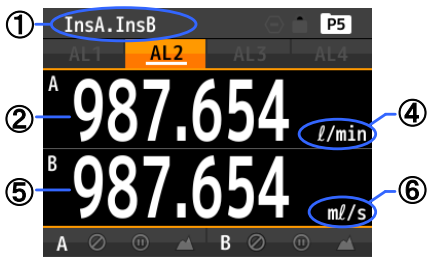
### 8 - 3 - 1．MEASUREMENT (NUMERICAL NUMBER) DISPLAY

The measurement (numerical number) display shows measurement result in numerical number and can display 1 item to 3 items on one window.

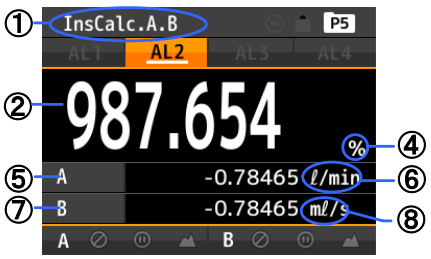
1st item display




2nd item display




3rd item display



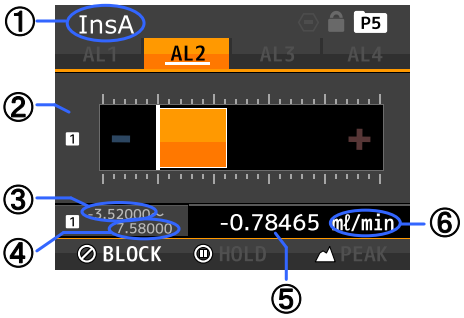

| No. | Description |
|---|---|
| ① | Shows the title of display which is currently displayed in measurement display.<br>*In the case of “Ins Calc, A,B”, instantaneous calculation value is treated as the 1st item, Instantaneous value A is treated as the 2nd item and Instantaneous value B is the 3rd item. |
| ② | Shows measurement result of the 1st item. |
| ③ | If displayed value on 1st item is calculated value, shows calculating formula.<br>*If calculated value display is selected in 2-item display, calculating formula is not displayed. |
| ④ | When any units are selected in display setting, the unit is displayed.<br>*The unit can be replaced by custom unit with up to 6 characters of the combination of alphabets and symbols. |
| ⑤ | Shows measurement result of the 2nd item. |
| ⑥ | When any units are selected in display setting, the unit is displayed.<br>*The unit can be replaced by custom unit with up to 6 characters of the combination of alphabets and symbols. |
| ⑦ | Shows measurement result of the 3rd item. |
| ⑧ | When any units are selected in display setting, the unit is displayed.<br>*The unit can be replaced by custom unit with up to 6 characters of the combination of alphabets and symbols. |

Note: Other than ①-⑧, refer to “6-1.NAME OF EACH PART”.

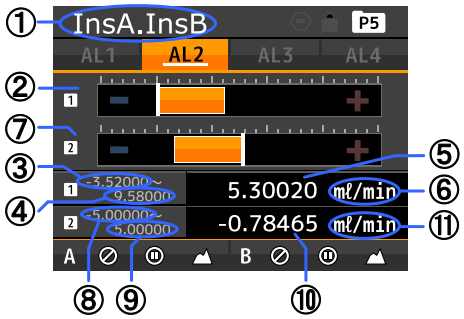
### 8 - 3 - 2．LEVEL DISPLAY (BAR GRAPH)

The level display (Bar graph) shows measurement result in level (bar graph) and numerical number.
Upper limit value (right edge) and lower limit value (left edge) of level display can be set arbitrary and are displayed on display.
The display can show 1 item or 2 items on one window.

1st item display




2nd item display




| Item | Description |
|---|---|
| ① | Shows the title of display which is currently displayed in measurement display.<br>*In the case of “InsA InsB”, instantaneous value A is treated as 1st item and instantaneous value B is treated as 2nd item. |
| ② | Shows measurement result (1st item) by level display (bar graph).<br>* 1 denotes 1st item. |

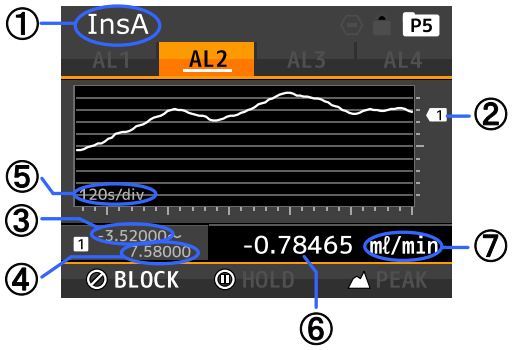
| | |
|---|---|
| ③ | Shows lower limit value (left edge) of level display (bar graph) scale for 1st item. |
| ④ | Shows upper limit value (right edge) of level display (bar graph) scale for 1st item. |
| ⑤ | Shows measurement result of 1st item by numerical number. |
| ⑥ | When any units are selected in display setting, the unit is display<br>*The unit can be replaced by custom unit with up to 6 characters of the combination of alphabets and symbols. |
| ⑦ | Shows measurement result of 2nd item by level display (bar graph).<br>* 2 denotes 2nd item. |
| ⑧ | Shows lower limit value (left edge) of level display (bar graph) for 2nd item. |
| ⑨ | Shows upper limit value (right edge) of level display (bar graph) for 2nd item. |
| ⑩ | Shows measurement result of 1st item by numerical number. |
| ⑪ | When any units are selected in display setting, the unit is displayed.<br>*A custom unit, which is up to 6 characters of the combination of alphabets and symbols, can be also used as a unit. |

Note: Other than ①-⑪, refer to "6-1.NAME OF EACH PART".

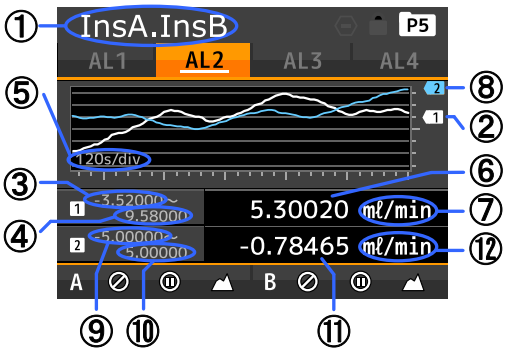
### 8 - 3 - 3. TREND DISPLAY (LINE GRAPH)

Trend display shows measurement result in a line graph, therefore the chronological change of the measurement value can be recognized simply and also shows current measurement value in numerical number.
Upper limit value (upper edge) and lower limit value (lower edge) of trend display can be set arbitrary and are displayed on display.
The display can show 1 item or 2 items on one window.

1st item display




2nd item display




| Item | Description |
|---|---|
| ① | Shows the title of display which is currently displayed in measurement display.<br>* In the case of "InsA InsB", instantaneous value A is treated as 1st item and instantaneous value B is treated as 2nd item. |
| ② | Shows measurement result of the 1st item by trend display (line graph).<br>* 1 denotes 1st item. |
| ③ | Shows lower limit value (lower edge) of level display (bar graph) scale for 1st item. |
| ④ | Shows upper limit value (upper edge) of level display (bar graph) scale for 1st item. |
| ⑤ | Shows unit of time axis (time base).<br>*The time axis (time base) is common to the 1st item and the 2nd item. |
| ⑥ | Shows measurement result of the 1st item in numerical number. |
| ⑦ | When any units are selected in display setting, the unit is displayed.<br>*A custom unit, which is up to 6 characters of the combination of alphabets and symbols, can be also used as a unit. |
| ⑧ | Shows measurement result of the 2nd item by trend display (line graph).<br>* 2 denotes 2nd item. |
| ⑨ | Shows lower limit value (lower edge) of trend display (line graph) scale for 2nd item. |
| ⑩ | Shows upper limit value (upper edge) of trend display (line graph) scale for 2nd item. |
| ⑪ | Shows measurement result of the 2nd item in numerical number. |
| ⑫ | When any units are selected in display setting, the unit is displayed.<br>*A custom unit, which is up to 6 characters of the combination of alphabets and symbols, can be also used as a unit. |

Note: Other than ①-⑫, refer to "6-1.NAME OF EACH PART".

# 9. SETTING MODE

## 9－1. WHAT YOU CAN DO IN “THE SETTING MODE”

### 9 - 1 - 1. WHAT YOU CAN DO IN “THE INPUT SETTING GROUP”

PULSE INPUT (chA / chB) →page36

- Select a pattern number to configure settings.
- Selects the type of the input.
- Selects the analog filter of input.
- Selects voltage of supply power for sensor.
- Sets scaling for instantaneous value display.
- Selects position of decimal point for instantaneous value display.
- Selects a unit for instantaneous value display.
- Makes settings for stabilizing instantaneous value display.

*Available for models with pulse input.

LINE DRIVER INPUT (chA / chB) →page 50

- Select a pattern number to configure settings.
- Selects the type of the input.
- Selects the analog filter of input.
- Selects voltage of supply power for sensor.
- Sets scaling for instantaneous value display.
- Selects position of decimal point for instantaneous value display.
- Selects a unit for instantaneous value display.
- Makes settings for stabilizing instantaneous value display.

*Available for models with line driver input.

2 INPUT CALCULATION SETTING →page61

- Select a pattern number to configure settings.
- Sets calculating formula for instantaneous value display.
- Sets decimal point for instantaneous value display.
- Sets unit for instantaneous value display.
- Sets step for instantaneous value display.

*Available for 2-input (A channel and B channel ) models

EXTERNAL CONTROL →page68

- Selects a function assigned to the external control terminal 1.
- Selects a function assigned to the external control terminal 2.
- Selects a function assigned to the external control terminal 3.
- Selects a function assigned to the external control terminal 4.
- Selects a function assigned to the external control terminal 5.

## 9 - 1 - 2. WHAT YOU CAN DO IN "THE OUTPUT SETTING GROUP"

COMPARATIVE OUTPUTS (AL1–AL4) SETTING →page70

- Select a pattern number to configure settings.
- Select source display item for comparative output.
- Select compare mode of comparative output.
- Set ON condition of comparative output.
- Set judgement value of comparison.
- Set delay time of comparative output.
- Set output mode of comparative output.
- Set logic of comparative output.
- Select color of display background when comparative output is ON.

ANALOG OUTPUT SETTING→page82

- Select a pattern number to configure settings.
- Select output range of analog output.
- Select display item to be output from analog output.
- Set scaling of analog output.

*Available for models with analog output.

BCD OUTPUT SETTING→page87

- Select a pattern number to configure settings.
- Select display item to be output from BCD output.
- Select output logic of BCD data.
- Select output logic of data synchronized signal.

*Available for models with BCD output.

RS–485 MODBUS COMMUNICATION SETTING →page98

- Set unit ID.
- Set parameters for communication.

*Available for models with RS-485 Modbus.

RS–232C COMMUNICATION SETTING →page92

- Set parameters for communication.

*Available for models with RS-232C.

## 9 - 1 - 3. WHAT YOU CAN DO IN "THE DISPLAY SETTING GROUP"

DISPLAY SELECT SETTING→page102

- Select display items to switch.
- Select the display item to show level display.
- Select the display item to show trend display.

LEVEL DISPLAY SETTING →page107

- Select a pattern number to configure settings.
- Set display scales of the level display.

TREND DISPLAY SETTING →page110

- Select a pattern number to configure settings.
- Set display scales of the trend display.
- Set the time axis.

### 9 - 1 - 4. WHAT YOU CAN DO IN "THE SYSTEM SETTING GROUP"

GENERAL SETTINGS →page114

- Change brightness of display.
- Provide wait time after power on.
- Darken the display after a specified period of time.
- Select languages of display.
- Set the direction of the display.
- Disable changing the settings.
- Copy pattern data.

INITIALIZINGS →page123

- Save current settings as user defaults.
- Initialize to save settings.
- Initialize to factory defaults.

### 9 - 1 - 5. WHAT YOU CAN DO IN "THE DIAGNOSIS GROUP"

INPUT DIAGNOSIS →page125

- Check input signals are applied.
- Check status of external control terminals.

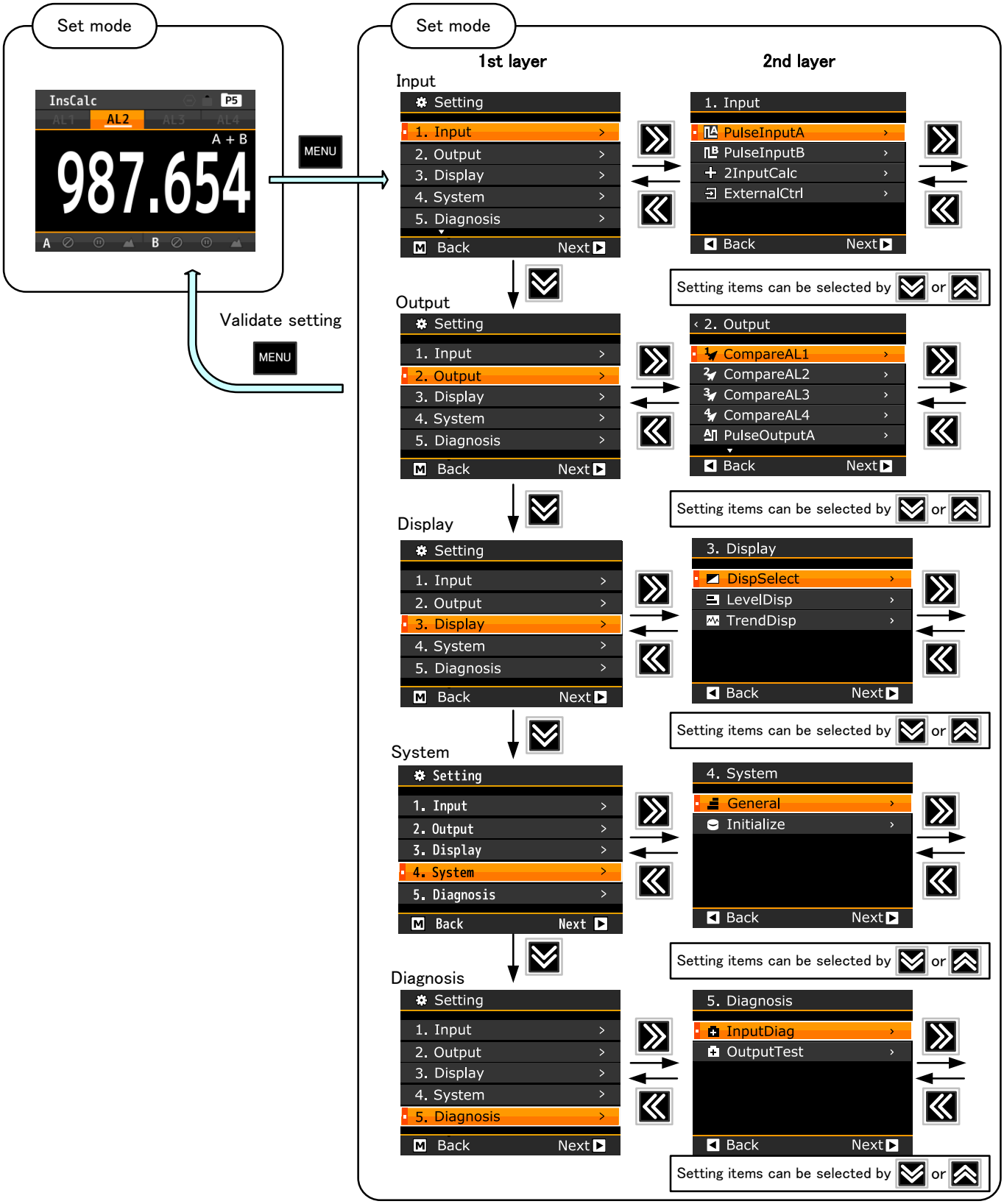
SIMULATED OUTPUT (OUTPUT TEST) →page128

- Output simulated output to comparative output.
- Output simulated output of specified value to analog output.
- Output simulated output to each bit of BCD output.
- Display receive data and transmit data of communication.

## 9－2．OPERATION IN SETTING MODE

### 9 - 2 - 1．TRANSFER BETWEEN SETTING GROUPS

The chart below shows basic operation procedures such as transfers between each setting groups.




## ⚠CAUTION

During the setting mode, external control inputs become disabled and the analog output and comparative judgement results hold values just before the transfer to the setting mode.

## 9 - 2 - 2. OPRERATING PROCEDURE

An operating procedure for a concrete setting is shown below. The chart below is an explanation for changing of the sensor power voltage.


| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the 1st layer (major categories). By moving the cursor with "**ARROW (UP/DOWN)**" key, the selection of major categories to set can be changed. |
| | * On the 1st layer, by pushing the "**MENU**" key, the display returns to the measurement display. |
| ② | Pointing the cursor to a major category to set and pushing "**ARROW (RIGHT)**" key, the display moves to the 2nd layer (small categories).<br>By moving the cursor with "**ARROW (UP/DOWN)**" key, the selection of small categories of the setting can be changed. If the "**ARROW (LEFT)**" key is pushed, the display returns to the 1st layer. |
| | * On the 2nd layer, by pushing the "**MENU**" key, the display returns to the measurement display. |
| ③ | Pointing the cursor to a small category to set and pushing "**ARROW (RIGHT)**" key, the display moves to the 3rd layer (setting variables).<br>If the "**ARROW (LEFT)**" key is pushed, the display returns to the 2nd layer. |
| | * On the 3rd layer, by pushing the "**MENU**" key, the display returns to the measurement display. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, select a setting variable.<br>If the "**ARROW (LEFT)**" key is pushed, the display returns to the 2nd layer. |
| ⑤ | At the selected setting variable, by pushing "**ARROW (RIGHT)**" key, the display moves to the 4th layer (setting contents) and a current selected content has a check mark.<br>If the "**ARROW (LEFT)**" key is pushed, the display returns to the 3rd layer. |
| ⑥ | By moving the cursor with "**ARROW key (UP/DOWN)**", select content.<br>If the "**ARROW (LEFT)**" key is pushed, the display returns to the 3rd layer. |
| ⑦ | By pushing the **"ENTER"** key, the selected content is confirmed and a check mark accompanies.<br>If the "**ARROW (LEFT)**"key is pushed, the display returns to the 3rd layer. |
| ⑧ | By pushing the **"MENU"** key, the selected contents are stored and the display returns the measurement display. |

Note : **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

# 9－3．OVERVIEW OF PARAMETERS AND INITIAL VALUES

## 9 - 3 - 1．INPUT SETTING GROUP OVERVIEW

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting variables) | | 4th Layer (Setting values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Names of variables | Character Strings on Display (Abbreviated Form) | Initial Values | Selectable Values | |
| 1.Input | Pulse input A, Pulse input B [PulseInputA, PulseInputB] | Pattern select | PatternSelect | Pattern1 (or pattern No. in use) | Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8 | Select pattern No. to set. |
| | | Input type | InputType | OpenCollector | OpenCollector/Logic/ ZeroCross/2Wire | Select input signal type |
| | | Input filter | InputFilter | None | None/30Hz/1.5kHz/15kHz | Select analog input filters |
| | | Sensor power | SensorPower | 12V | 12V/24V | Switch Sensor power voltage |
| | | Instantaneous value display coefficient | InsDispCoef | $1.00000\times10^{0}$ | $0.00000$ to $9.99999\times10^{-9\sim9}$ | For scaling setting of instantaneous value display, multiply frequency by instantaneous coefficient and unit time. |
| | | Instantaneous Unit Time | InsUnitTime | Sec | Sec/Min/Hour | |
| | | Instantaneous value decimal point position | InsDecPoint | ###### (No decimal point) | ###### / #####.# / ####.## / ###.### / ##.#### / #.##### | Set number of digits after decimal point |
| | | Instantaneous value display unit | InsDispUnit | None | None/select from 62 units | Refer to detailed instruction manual about custom unit |
| | [WPMZ-5-*P*] (Generic pulse input) | Instantaneous value auto zero | InsAutoZero | 0.00 | 0.00 to 99.99sec | Displays 0 if no pulse input over more than setting time. |
| | | Instantaneous value moving average | InsMoveAve | None | None/2times/3times /4times /5times /6times /7times /8times / 9times | Set number of moving average. |
| | | Instantaneous value simple average | InsSimpleAve | None | None/2 times /4 times /8 times /16 times /32 times /64 times /128 times /256 times | Set number of simple average for internal sampling (10ms) |
| | | Instantaneous value display step | InsDispStep | None | None/5steps/10steps | Setting of steps of display（If set to 5steps, displayed only 0 or 5 on LSB) |

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting variables) | | 4th Layer (Setting values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Names of variables | Character Strings on Display (Abbreviated Form) | Initial Values | Selectable Values | |
| 1.Input | Pulse input A, Pulse input B [PulseInputA, PulseInputB] | Pattern select | PatternSelect | Pattern1 (or pattern No. in use) | Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8 | Select pattern No. to set. |
| | | Input type | InputType | Line driver | Line driver | Line driver only |
| | | Input filter | InputFilter | None | None | No analog input filter |
| | | Sensor power | SensorPower | 5V | 5V | 5V only |
| | | Instantaneous value display coefficient | InsDispCoef | $1.00000\times10^{0}$ | 0.00000 to $9.99999\times10^{-9\sim9}$ | For scaling setting of instantaneous value display, multiply frequency by instantaneous coefficient and unit time. |
| | | Instantaneous Unit Time | InsUnitTime | Sec | Sec/Min/Hour | |
| | | Instantaneous value decimal point position | InsDecPoint | ###### (No decimal point) | ###### / #####.# / ####.## / ###.### / ##.#### / #.##### | Set number of digits after decimal point |
| | | Instantaneous value display unit | InsDispUnit | None | None/select from 62 units | Refer to detailed instruction manual about custom unit |
| | [ WPMZ-5-*L* ] (Line driver input) | Instantaneous value auto zero | InsAutoZero | 0.00 | 0.00 to 99.99sec | Displays 0 if no pulse input over more than setting time. |
| | | Instantaneous value moving average | InsMoveAve | None | None/2times/3times /4times /5times /6times /7times /8times / 9times | Set number of moving average. |
| | | Instantaneous value simple average | InsSimpleAve | None | None/2 times /4 times /8 times /16 times /32 times /64 times /128 times /256 times | Set number of simple average for internal sampling (10ms) |
| | | Instantaneous value display step | InsDispStep | None | None/5steps/10steps | Setting of steps of display（If set to 5steps, displayed only 0 or 5 on LSB) |

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting variables) | | 4th Layer (Setting values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Names of Variables | Character Strings on Display (Abbreviated Form) | Initial Values | Selectable Values | |
| 1.Input | 2 input calculation | Pattern select | PatternSelect | Pattern1(or pattern No. in use) | Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8 | Select pattern No. to set. |
| | | Expression for instantaneous value | InsExpression | None | None/ (B/A)*100 / (B/A-1)*100 /B-A / (B/(A+B))*100 / A+B | Select expression for calculation of instantaneous value. |
| | | Instantaneous value decimal point position | InsDecPoint | ###### (No decimal point) | ######/#####.#/####.##/###.###/##.####/#.##### | Set number of digits after decimal point |
| | | Instantaneous value display unit | InsDispUnit | None | None/select from 62 units | Refer to detailed instruction manual about custom unit |
| | | Instantaneous value display step | InsDispStep | None | None/5steps/10steps | Setting of steps of display（If set to 5steps, displayed only 0 or 5 on LSB) |
| | External Control | Function of external control terminal 1 to 5 | ExtCtrl1Func<br>ExtCtrl2Func<br>ExtCtrl3Func<br>ExtCtrl4Func<br>ExtCtrl5Func | None | None/ CompareReset/ MeasureBlockA/ MeasureBlockB/ MeasureBlockA&B/ DispHoldA/ DispHoldB/ DispHoldA&B/ MaxHoldA/ MaxHoldB/ MaxHoldA&B/ MinHoldA/ MinHoldB/ MinHoldA&B/ PatternChange1/ PatternChange2/ PatternChange3/ MonitorChange/ TrendHold | Select functions assigned to external control terminals. |

*1 According to the model code of the product you have purchased, some setting variables do not appear.

## 9 - 3 - 2. OUTPUT SETTING GROUP OVERVIEW

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting variables) | | 4th Layer ( Setting values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Names of Variables | Character Strings on Display (Abbreviated Form) | Initial Values | Selectable Values | |
| 2.Output | Comparative Output AL1,Comparative Output AL2 Comparative Output AL3,Comparative Output AL4 | Pattern select | PatternSelect | Pattern1 (or pattern No. in use) | Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8 | Select pattern No. to set. |
| | | Source output display value | OutputDispValue | None | None/InsA/InsB/InsCalc | Select source output display value to compare. |
| | | Compare mode | CompareMode | LevelJudge | LevelJudge/ ZoneJudge | Select compare mode |
| | | Condition of ON | OnConditions | Excess | Excess/LessThan | In level judge mode |
| | | | | InTheZone | InTheZone/OutsideTheZone | In zone judge mode |
| | | Comparison judgement value | Threshold | 10000<br>0 | Threshold:±999999<br>Hysteresis:0 to 999999 | In level judge mode |
| | | | | 0<br>10000<br>0 | Zone lower limit:±999999<br>Zone upper limit :±999999<br>Hysteresis:0 to 999999 | In zone judge mode |
| | | Comparison ON delay | OnDelay | None | None/20ms/50ms/100ms/200ms/500ms<br>1s/5s/10s/20s | Comparative output turns ON, if ON condition continues over set delay time. |
| | | Comparison OFF delay | OffDelay | None | | Comparative output turns OFF, if OFF condition continues over set delay time. |
| | | Output mode | OutputMode | Normal | Normal/Latch/OneShot5ms/ OneShot 10ms/ OneShot 20ms/<br>OneShot 50ms/ OneShot 0.1s/ OneShot 0.2s/ OneShot 0.5s/ OneShot 1s/ OneShot 2s | Select output mode of comparison |
| | | Output logic | OutputLogic | Negative(NO) | Positive(NC)/Negative(NO) | NC/NO are for relay output product. |
| | | Background Color at ON | OnBgColors | Black | Black/Red/Yellow/Green | Background color priority AL1>AL2>AL3>AL4 |
| | Analog Output | Pattern select | PatternSelect | Pattern1(or pattern No. in use) | Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8 | Select pattern No. to set. |
| | | Output range | OutputRange | 0-10V | 0-10V/±10V/1-5V/0-20mA/4-20mA | Select output range (type). |
| | | Source output display value | OutputDispValue | None | None/InsA/InsB/InsCalc | Select a displayable item for analog output |
| | | Output scale | OutputScale | 0<br>10000 | 0% display value :±999999 (±99999)<br>100% display value : ±999999(±99999) | Set scaling for analog output.<br>Set expected display values at 0% and 100% output. |

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting variables) | | 4th Layer ( Setting values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Names of Variables | Character Strings on Display (Abbreviated Form) | Initial Values | Selectable Values | |
| 2.Output | BCD Output | Pattern select | PatternSelect | Pattern1(or pattern No. in use) | Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8 | Select pattern No. to set. |
| | | Source output display value | OutputDispValue | None | None/InsA/InsB/InsCalc | Select a displayable item for BCD output |
| | | Data signal logic | DataSignalLogic | Negative | Positive /Negative | Select logic of data signal output. |
| | | Synchronous signal logic | SyncSignalLogic | Negative | Positive /Negative | Select logic of synchronous signal (PC) output. |
| | RS-485 Modbus communication | Slave Address | SlaveAddress | 1 | 1/2/3/4/ ····· /30/31 | Set ID number. |
| | | Baud rate | Baudrate | 19200bps | 9600bps/19200bps/38400bps | Set baud rate. |
| | | Parity | Parity | Even | None/Even/Odd | Set parity bit. |
| | RS-232C communication | Protocol | Protocol | Modbus-RTU | Modbus-RTU/OriginalCommand/OriginalOutput | Set protocol |
| | | Baud rate | Baudrate | 19200bps | 9600bps/19200bps/38400bps | Set baud rate. |
| | | Data length | DataLength | 7bit | 7bit/8bit | Set data character length |
| | | Parity | Parity | Even | None/Even/Odd | Set parity bit. |
| | | Stop bit | Stopbit | 1bit | 1bit/2bit | Set stop bit length. |
| | | Delimiter | Delimiter | CR LF | CR/CR LF | Set delimiter type. |

*1 According to the model code of the product you have purchased, some setting variables do not appear.

## 9 - 3 - 3. DISPLAY SETTING GROUP OVERVIEW

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting variables) | | 4th Layer ( Setting values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Names of Variables | Character Strings on Display (Abbreviated Form) | Initial Values | Selectable Values | |
| 3.Display | Display Select | Measure select | MeasureSelect | 1input: InsA<br>2inputs: InsA+InsB | InsA/InsB/InsCalc/ InsA+InsB / InsCalc+A+B/ InsA+Comp/InsB+Comp/Ins Calc+Comp | Select displayable items can be switched by DISP key or external control (multiple selects are available) |
| | | Level select | LevelSelect | | InsA/InsB/InsCalc/ InsA+InsB | Select an item displayed on level display |
| | | Trend select | TrendSelect | | | Select an item displayed on trend display. |
| | Level Display | Pattern select | PatternSelect | Pattern1(or pattern No. in use) | Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8 | Select pattern No. to set. |
| | | Instantaneous value A scale | InsA Scale | 0<br>10000 | Lower limit:±999999<br>Upper limit:±999999 | Set display scale of level display. Left edge of display is lower limit and right edge of display is higher limit |
| | | Instantaneous value B scale | InsB Scale | | | |
| | | Instantaneous calculation scale | InsCalcScale | | | |
| | Trend Display | Pattern select | PatternSelect | Pattern1(or pattern No. in use) | Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8 | Select pattern No. to set. |
| | | Instantaneous value A scale | InsA Scale | 0<br>10000 | Lower limit :±999999 (±99999)<br>Upper limit :±999999 (±99999) | Set display scale of trend display. Bottom edge of display is lower limit and top edge of display is higher limit. |
| | | Instantaneous value B scale | InsB Scale | | | |
| | | Instantaneous calculation scale | InsCalcScale | | | |
| | | Time axis | TimeAxis | 1s/div | 1s/div,2s/div,5s/div,10s/div,30 s/div,60s/div,120s/div | Select time for 1 division of time axis. |

*1 According to the model code of the product you have purchased, some setting variables do not appear.

## 9 - 3 - 4. SYSTEM SETTING GROUP OVERVIEW

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting variables) | | 4th Layer ( Setting values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Names of Variables | Character Strings on Display (Abbreviated For) | Initial Values | Settable Variables | |
| 4.System | General | Brightness | Brightness | 5 Bright | 5 Bright/4/3/2/1 Dark/0 Off | Select brightness of display<br>*"0 Off" is set, whole display is black out |
| | | Power on delay | PowerOnDelay | None | None/2sec/5sec/10sec/20sec /30sec/60sec | Select time from power on to starting measurement |
| | | Power saving time | PowerSavingTime | None | None/1min/2 min/5 min/10 min/30 min/60 min | In power saving state, brightness becomes "1 Dark" level. |
| | | Language | Language | 日本語 | 日本語 /English | Select language |
| | | Direction of display | DisplayDirection | Horizontal | Horizontal/Vertical | Select direction of display |
| | | Setting protect | SettingProtect | Disable | Disable/Enable | If Enable, changing settings are disabled. |
| | | Pattern Copy | PatternCopy | Pattern1<br>(Copy From)<br>PatternAll<br>(Copy To)<br>Execute<br>(OperationSelect) | Pattern1/2/3/4/5/6/7/8<br>Pattern1/2/3/4/5/6/7/8/PatternAll | Function of copying settings for each pattern. |
| | Initialize | Save user defaults | UserDefaultSave | Message "Save current settings as user initial values?" | | |
| | | Initialize to user defaults | UserDefaultLoad | Message "Initialize setting values to user initial values?" | | |
| | | Initialize to factory default | FactoryDefaultLoad | Message "Initialize setting values to factory default?" | | |

*1 According to the model code of the product you have purchased, some setting variables do not appear.

## 9 - 3 - 5. DISGNOSIS OVERVIEW

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting Variables) | | 4th Layer (Test Outputs) | | Remarks |
|---|---|---|---|---|---|---|
| | | Names of variables | Character Strings on Display (Abbreviated Form) | Initial Values | Outputs (Test Result) | |
| 5. Diagnosis | Input Diagnosis | Pulse Input A<br>Pulse Input B | PulseInputA<br>PulseInputB | – | – | - Check for input signal existence.<br>- Common to "Pulse Input" and "Line driver input". |
| | | External control inputs | ExternalCtrl | – | – | Checks each terminal.for ON/OFF state and displays the status. |
| | Output Test | Comparative output AL1 to AL4 | CompareAL1<br>CompareAL2<br>CompareAL3<br>CompareAL4 | – | – | Outputs ON level or OFF level |
| | | Analog output | AnalogOutput | – | – | Outputs level of 10% steps of rating.<br>**= 0,10,…,100. |
| | | BCD Output(Data) | BCD Output(Data) | – | – | Outputs ON level or OFF level for each bit |
| | | BCD Output(PC) | BCD Output(PC) | – | – | |
| | | Modbus Communication RS-485 | ModbusCom | – | – | Displays receive data and transmit data |
| | | RS-232C | RS-232C Com | – | – | Displays receive data and transmit data |

*1 According to the model code of the product you have purchased, some setting variables do not appear.

## 9－4．DETAILS OF INPUT SETTING GROUP

The input setting group is classified into the following 4 groups which can be configured respectively.

| 2nd layer/ Small categories | Descriptions | Remarks |
|---|---|---|
| Pulse input A | - Settings for the sensor connected with.<br>- Settings for scaling | Displayed in models with pulse input and line driver input. |
| Pulse input B | | |
| 2 input calculation | Setting for the calculation of 2 channel inputs. | Displayed only in models with chB input. |
| External control inputs | Setting about assignments of external control terminals. | |

### 9 - 4 - 1．PULSE INPUT A / PULSE INPUT B (WPMZ-5-*P*)

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select | page37 |
| Select input signal type | Input type | page 38 |
| Select input analog filter | Input filter | page 39 |
| Select voltage of power for the sensor | Sensor power | page 40 |
| Set scaling functions for instantaneous value | Instantaneous value display coefficient | page 41 |
| | Instantaneous unit time | |
| | Instantaneous value decimal point position | |
| Set units for instantaneous value display | Instantaneous value display unit | page 44 |
| Set time after that passes the instantaneous value display becomes zero | Instantaneous value auto zero | page 46 |
| Set functions which stabilize the instantaneous value display. | Instantaneous value moving average | page 47 |
| | Instantaneous value simple average | |
| | Instantaneous value display step | |

**⚠CAUTION**

Only WPMZ-5-*PP-**-***, “Pulse input B” is displayed.
In this case, “PulseInputA” corresponds to the channel A input and “Pulse input B” corresponds to the channel B input.

### 9 - 4 - 1 - 1. Select a Pattern Number to Configure Settings

This product can memorize 8 patterns (8 kinds) of parameters including input settings (pulse input A/B, 2 input calculations), output settings and display settings.
In measurement mode, the product calculates using one of 8 patterns which are configured.
This setting selects the pattern number which a configuration is performed.

**⚠CAUTION**

The pattern number is common to input settings, output settings and display settings. Please pay attention to the target pattern number which the following "Pulse Input" configuration is performed to.

| 3rd layer Setting variable | 4th layer Setting values | Initial value | Meanings of setting values |
|---|---|---|---|
| Pattern select [PatternSelect] | Pattern1 | Pattern number which is selected in measurement mode. | Performs a configuration to pattern No.1 |
| | Pattern2 | | Performs a configuration to pattern No.2 |
| | Pattern3 | | Performs a configuration to pattern No.3 |
| | Pattern4 | | Performs a configuration to pattern No.4 |
| | Pattern5 | | Performs a configuration to pattern No.5 |
| | Pattern6 | | Performs a configuration to pattern No.6 |
| | Pattern7 | | Performs a configuration to pattern No.7 |
| | Pattern8 | | Performs a configuration to pattern No.8 |

●How to select "Pattern 8" is shown below.
(Same operation could be applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"1. Input"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"PatternSelect"** and push "**ARROW (RIGHT)**" key, then the display moves to the 4th layer (setting values).<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Pattern8"**<br>* Select pattern No. which need to be set. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 1 - 2. Selecting Type of Input

This setting variable selects a suitable input type for the sensor you use.

| 3rd layer Setting variable | 4th layer Setting values | Initial value | Meanings of setting values |
|---|---|---|---|
| Input type [InputType] | Open collector | * | Connecting for a sensor with NPN open collector output etc. |
| | Logic | | Connecting for a sensor with voltage pulse or PNP open collector output etc. |
| | Zero cross | | AC voltage signal. |
| | 2 wire | | Connecting for a proximity sensor etc. |

**⚠CAUTION**

When the input type setting is changed, the measurement function is inhibited in 50ms after returning to the measurement mode.

●How to set the input type to "Zero cross" is shown below. (Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW(UP/DOWN)**" key, point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)**" key, then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InputType**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**ZeroCross**"<br>*Select input type which is suitable for the sensor in use. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 1 - 3. Selecting Analog Filter for Input

The low pass filter eliminates high-frequency noise from input signal.
The filer can be set to 4 kinds of cutoff frequency so that match usage environment.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Input filter [InputFilter] | None | * | No low pass filter |
| | 30Hz | | Low pass filter of 30Hz |
| | 1.5kHz | | Low pass filter of 1.5KHz |
| | 15kHz | | Low pass filter of 15KHz |

**⚠CAUTION**

When the input filter setting is changed, the measurement function is inhibited in 50ms after returning to the measurement mode.

●How to set the input analog filter to "1.5 kHz" is shown below. (Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW(UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW(UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InputFilter**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1.5kHz"**.<br>*Select a parameter in conformity with the actual condition of use. |
| ⑥ | By pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note**: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 1 - 4. Selecting Voltage of Supply Power for the Sensor

This setting variable selects supply power voltage which is supplied to the sensor.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Sensor power [SensorPower] | 12V | * | Supplies DC12V power to the sensor (100mA max. ).<br>* For 2 channel inputs, total current for chA and chB is up to 100mA. |
| | 24V | | Supplies DC24V power to the sensor (50mA max. )*For 2 channel inputs, total current for chA and chB is up to 50mA. |

**⚠CAUTION**

- When the sensor power voltage setting is changed, the measurement function is inhibited in approx. 1 second after returning to the measurement mode.
- In the case of the combination of DC12V and DC24V, the total power is 1.2 W max.

●How to set the sensor power to "DC24V" is shown below. (Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)**" key, then the display moves to the **3nd layer (small categories)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**SensorPower**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**24V**".<br>*Select suitable voltage for the sensor in use. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 1 - 5. Setting Scaling for Instantaneous Value Display

Set scaling parameters of scaling settings required for measurement.

| 3rd layer (Setting variables) | | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|---|
| Names of variables | Character Strings on Display (Abbreviated Form) | | | |
| Instantaneous value display coefficient | InsDispCoef | 0.00000 to $9.99999\times10^{-9\sim9}$ | $1.00000\times10^{0}$ | Scaling setting for instantaneous value display. Multiplying frequency by instantaneous coefficient and unit time. |
| Instantaneous Unit Time | InsUnitTime | Sec | Sec | |
| | | Min | | |
| | | Hour | | |
| Instantaneous value decimal point position | InsDecPoint | ###### | ###### | Select decimal point position for instantaneous value display. |
| | | #####. # | | |
| | | ####. ## | | |
| | | ###. ### | | |
| | | ##. #### | | |
| | | #. ##### | | |

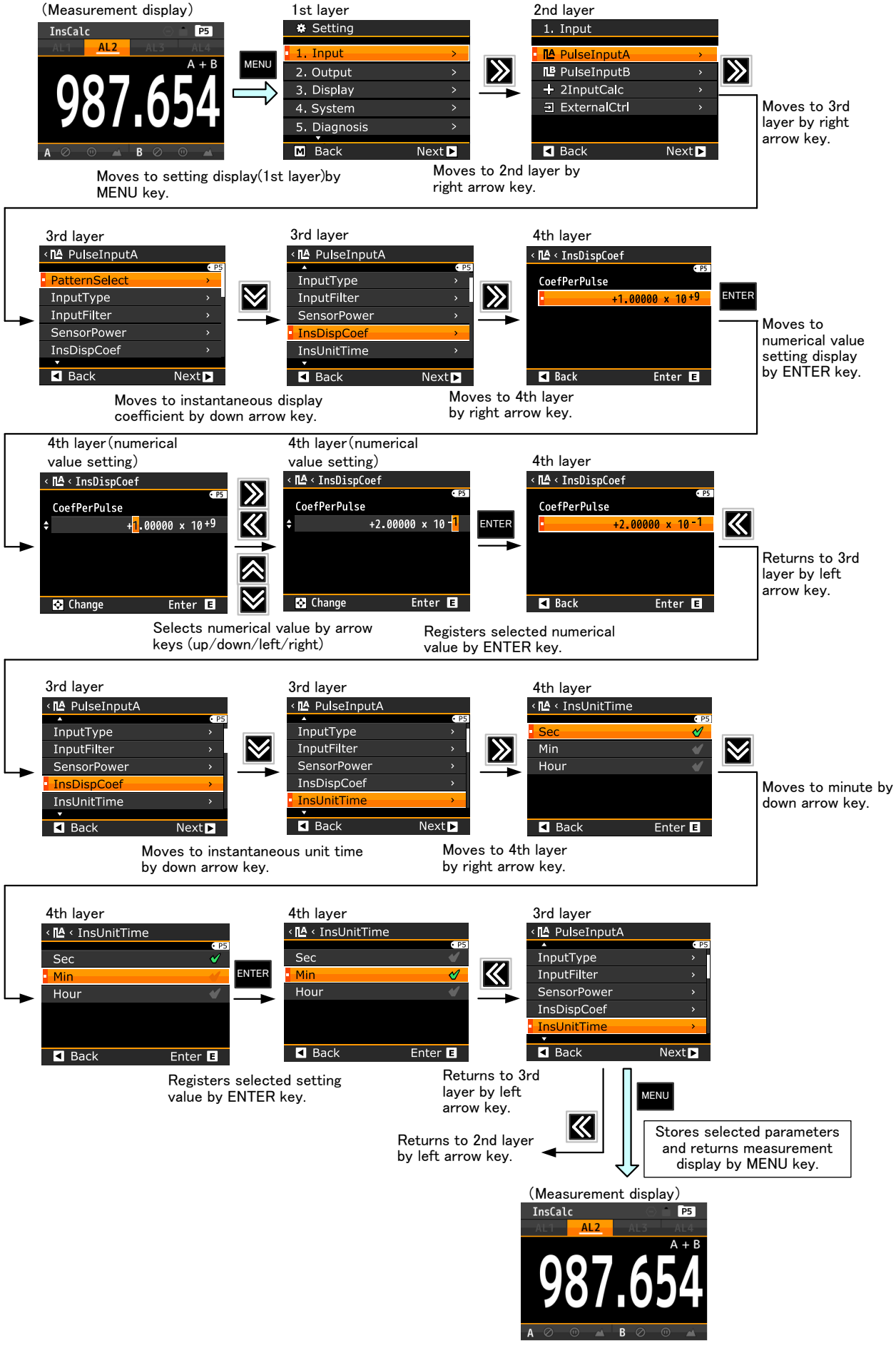
【Scaling setting examples】

1) **Example 1**

Detecting pulses from a gear wheel which generates 5 pulses per 1 round by proximity switch (open collector output), displays the revolving speed in [rpm].

| 3rd layer (Setting variables) | 4th layer (Setting values) | Descriptions for setting examples |
|---|---|---|
| Input type [InputType] | Open collector | The sensor is an NPN open collector type, therefore "open collector" should be selected as the input type. |
| Instantaneous value display coefficient [InsDispCoef] | $2.00000\times10^{-1}$ | (Setting for Instantaneous revolving speed display)<br>For setting of Instantaneous display coefficient, number of rotation per 1 pulse is needed.<br>・Calculate the number of rotation per 1 pulse.<br>Because of 5 [Pulse] per 1 round, therefore,<br>$1/5=2\times10^{-1}$[round]<br>・Set " **$2.00000\times10^{-1}$** " as the Instantaneous display coefficient |
| Instantaneous Unit Time [InsUnitTime] | Min | Unit to display is [rpm], therefore, select "**Min**" for the instantaneous unit time. |
| instantaneous decimal point position [InsDecPoint] | ###### | Displays without decimal point, therefore select "######" for Instantaneous value decimal point position |

●Setting method of instantaneous display coefficient and Instantaneous Unit Time is shown below.
Setting procedures for other setting variables are same.
(Same operation is also applied to the pulse input B.)



### 2) Example 2

When maximum flow rate is approx. 40[ℓ/min], using a sensor of rating 7.5[mℓ/Pulse] (NPN open collector type), instantaneous flow rate will be displayed in [ℓ/min] with 3 decimal places.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Descriptions for setting examples |
|---|---|---|
| Input type [InputType] | Open collector | The sensor is an open collector output type, therefore select "open collector" as input type. |
| Instantaneous value display coefficient [InsDispCoef] | $7.50000\times10^{-3}$ | (Setting for instantaneous flow rate display)<br><br>Set flowrate per 1 pulse as instantaneous display coefficient<br>Although instantaneous flow rate will be displayed in [ℓ/min], the rating of the sensor is 7.5[mℓ/Pulse], it should be converted to$7.5\times10^{-3}$[ℓ/Pulse].<br>・Set the "Instantaneous display factor" as "**$7.50000\times10^{-3}$**" |
| Instantaneous Unit Time [InsUnitTime] | Min | Displayed unit is [ℓ/min], therefore select "**Min**" as the instantaneous unit time. |
| instantaneous decimal point position [InsDecPoint] | ###. ### | To display 3 digits after the decimal point, select "###.###" for "instantaneous decimal point position". |

*Setting procedures are same as Example 1. Refer to example 1.

### 3) Example 3

Using a sensor (Voltage output type) which outputs 15 [Hz] for 90[ℓ/min], instantaneous flow rate will be displayed in [ℓ/sec] without a decimal point.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Descriptions for setting examples |
|---|---|---|
| Input type [InputType] | Logic | The sensor is voltage output type, therefore select "Logic" for "input type". |
| Instantaneous value display coefficient [InsDispCoef] | $1.00000\times10^{-1}$ | (Setting for instantaneous flow rate display)<br><br>Set flowrate per 1 pulse as "instantaneous display coefficient".<br>・Calculate number of pulses per 1 [ℓ].<br>The sensor outputs pulses of 15[Hz] at 90[ℓ/min], therefore,<br>$(15\times60)/90=10$[Pulse/ℓ] .<br><br>・Calculate flowrate par 1 pulse.<br>Number of pulses per 1 litter is 10[Pulse/ℓ], therefore,<br>$1/10=1\times10^{-1}$[ℓ/Pulse].<br>・Set "**$1.00000\times10^{-1}$**" for the "instantaneous value display coefficient".<br><br>* Any of "$1.00000\times10^{-1}$", "$0.10000\times10^{0}$" and "$0.01000\times10^{1}$" for the "instantaneous value display coefficient" bring same results. |
| Instantaneous Unit Time [InsUnitTime] | Sec | Unit to display is [ℓ/sec], therefore, select "Sec" for the "instantaneous unit time". |
| instantaneous decimal point position [InsDecPoint] | ###### | Displays without decimal point, therefore select "######" for Instantaneous value decimal point position |

*Setting procedures are same as Example 1. Refer to Example 1.

### 9 - 4 - 1 - 6. Set Units for Instantaneous Value Display

Units for the instantaneous value display can be set.
The WPMZ has 62 selectable units. If you cannot find a suitable unit among them, you can compose custom unit up to 6 characters.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value display unit [InsDispUnit] | None,<br>μA,mA,A,kA,<br>μV,mV,V,kV,VA,<br>W,kW,MW,<br>μm,mm,cm,m,<br>Ω,kΩ,MΩ,<br>g,kg,<br>N,kN,MN,<br>Pa,kPa,MPa,hPa,<br>J,kJ,MJ,<br>Hz,kHz,MHz,<br>$m^3$,<br>mm/s,mm/min,<br>cm/min, m/s,m/min,m/h,$m/s^2$,<br>$m^3/s$,$m^3/min$,$m^3/h$,<br>kg/h,$kg/m^2$,$kg/m^3$,<br>$N/m^2$,<br>ℓ,ℓ/s,ℓ/min,ℓ/h,<br>%,‰,%RH,˚C,<br>pH,ppm,rpm,t,inch,<br>custom unit | None | Set unit for instantaneous value display. |

**⚠CAUTION**

If you choose the custom unit, define the unit in the 5th layer.
Characters which can be used in custom unit are alphabets “a” to “z”, “A” to “Z” and marks.
（marks：[,],(,),$_1$,$_2$,$_3$,$^1$,$^2$,$^3$,$^-$,μ,Ω,g,・,/,ℓ,%,‰,°,’,”）

【Display unit setting example】

## 1) Example 1

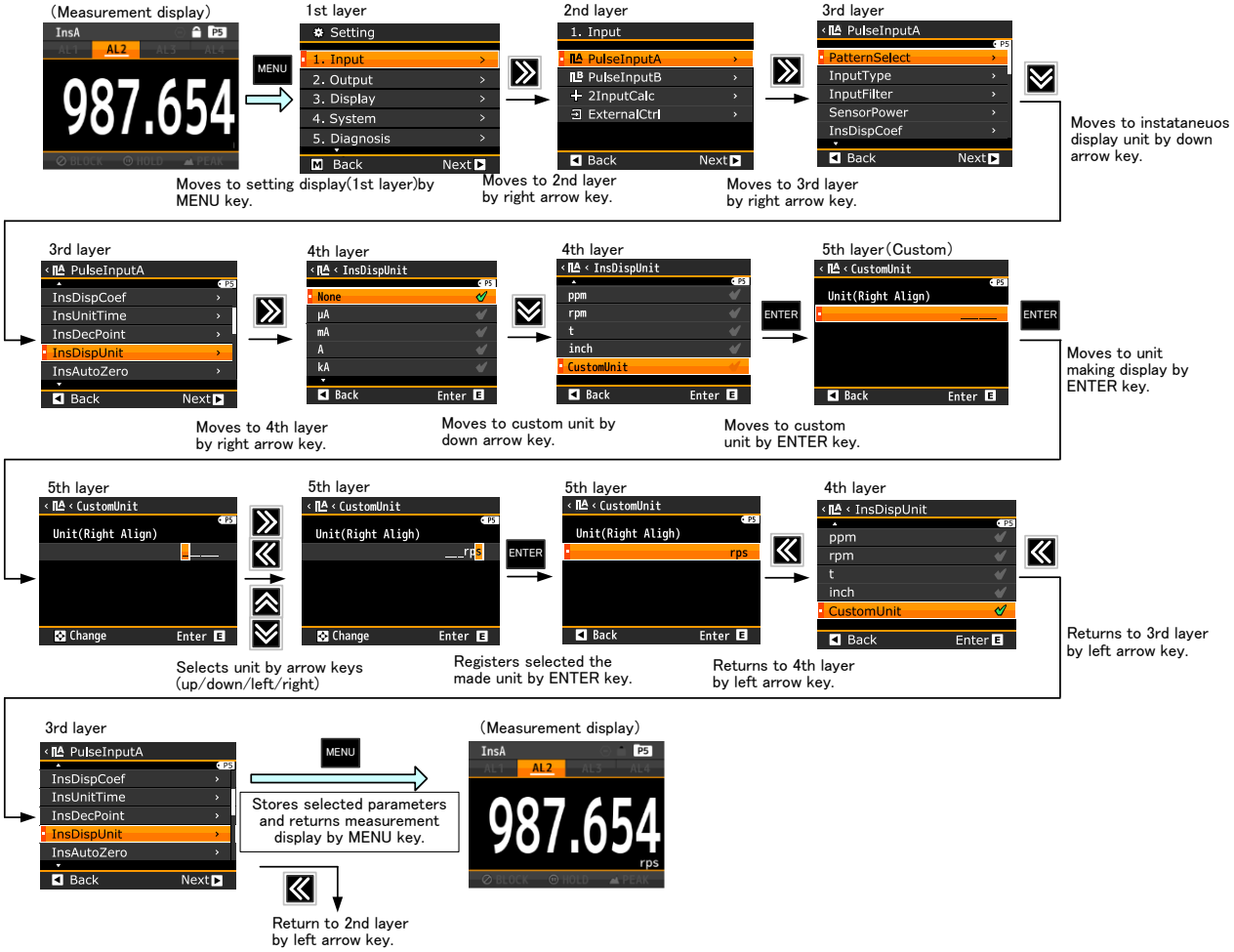
The method for setting the display unit of Instantaneous value to “m/s” is shown below. (Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the “**MENU**” key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with “**ARROW (UP/DOWN)**” key, point the cursor to “**1. Input**” and push “**ARROW (RIGHT)**” key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with “**ARROW (UP/DOWN)** key”, point the cursor to **“PulseInputA”** and push “**ARROW (RIGHT)** key”, then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with “**ARROW (UP/DOWN)**” key, point the cursor to “**InsDispUnit**” and push “**ARROW (RIGHT)**” key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑥ | By moving the cursor with “**ARROW (UP/DOWN)**” key, point the cursor to “**m/s**”.<br>*Select a proper unit for your use. |
| ⑥ | Pushing **“ENTER”** key, selected parameter becomes valid and a check mark accompanies.<br>*Pushing “**ARROW (LEFT)**”key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **“MENU”** key, the selected parameters are stored and display returns the measurement display. |

Note : **If the power is shut down before being pushed the “MENU” key, the selected contents are not stored.**

## 2) Example 2

As the display unit for the instantaneous value, steps of making a custom unit of “rps” are shown below. (Same steps are also applied to the pulse input B.)



### 9 - 4 - 1 - 7. Setting Time for Instantaneous Value Set to Zero

As input gets closer to 0 Hz, the pulse period gets longer, and the displayed value is not updated waiting a pulse input.
If a pulse is not detected before setting time, judging no input, the displayed value becomes "0".

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value auto zero [InsAutoZero] | 00.00 to 99.99s | 00.00s | Set waiting time for input pulse.<br><br>*The unit is "Second".<br>By setting to 0.00, the function is disabled. |

●How to set the waiting time for input pulse (Instantaneous value auto zero) to 1 second is shown below. (Same operation is also applied to the pulse input B.)

### 9 - 4 - 1 - 8. Stabilizing Instantaneous Value Display (Instantaneous Value Moving Average)

This setting variable set the number of moving average for input pulse.
Instantaneous value of an impeller which has a difference to the installation angles of the blades is not stable. To reduce it, the number of moving average for the number of the blades can be set.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous Value Moving Average [InsMoveAve] | None | * | Sets the number of moving average for input pulse. |
| | 2times | | |
| | 3times | | |
| | 4times | | |
| | 5times | | |
| | 6times | | |
| | 7times | | |
| | 8times | | |
| | 9times | | |

●A method to set the moving average to "5 times" is shown below.
(Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsMoveAve**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**5 times**".<br>*Select a parameter in conformity with the actual condition of use. |
| ⑥ | By pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 1 - 9. Stabilizing Instantaneous Value Display (Instantaneous Value Simple Average)

The simple average is not an average of input pulses but an average in multiple internal sampling periods (calculation periods).

**⚠CAUTION**

Internal sampling period (calculation period) is 10ms. Each of this period, comparative outputs, analog output and BCD outputs are outputted.
*If Instantaneous Value Simple Average are set to 2 to 256, PC signal of BCD outputs (synchronization signal of BCD data) is output in 10ms period.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value simple average [InsSimpleAve] | None | * | No average. Update interval of data is 10ms. |
| | 2times | | Update interval of data is 20ms. |
| | 4 times | | Update interval of data is 40ms. |
| | 8times | | Update interval of data is 80ms. |
| | 16 times | | Update interval of data is 160ms. |
| | 32times | | Update interval of data is 320ms. |
| | 64 times | | Update interval of data is 640ms. |
| | 128 times | | Update interval of data is 1.28s. |
| | 256times | | Update interval of data is 2.56s. |

●A method to set the simple average to "32 times" is shown below.
(Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsSimpleAve**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**32times**".<br>*Select a parameter in conformity with the actual condition of use. |
| ⑥ | By pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 1 - 10. Stabilizing Instantaneous Value Display (Instantaneous Value Display Step)

By adjusting the LCD (least significant digit) of instantaneous display value, drift of the displayed value is suppressed.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value display step [InsDispStep] | None | * | LSD 0 to 9 (No adjusting) |
| | 5steps | | LSD 0 or 5<br>Adjusts 0-4 to "0" and 5-9 to "5". |
| | 10steps | | LSD 0<br>Adjusts 0-9 to "0" ＊LSD is fixed to "0". |

●A method to set the display step to "10 steps" is shown below. (Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsDispStep**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>＊In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**10steps**".<br>*Select a step number in conformity with the actual condition of use. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>＊Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 2. LINE DRIVER INPUT A / LINE DRIVER INPUT B (WPMZ-5-*L*)

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select | Page50 |
| Select input signal type | Input type | page 51 |
| Select input analog filter | Input filter | page 51 |
| Select voltage of power for the sensor | Sensor power | page 51 |
| Set scaling functions for instantaneous value | Instantaneous value display coefficient | page 52 |
| | Instantaneous unit time | |
| | Instantaneous value decimal point position | |
| Set units for instantaneous value display | Instantaneous value display unit | page 54 |
| Set time after that passes the instantaneous value display becomes zero | Instantaneous value auto zero | page 56 |
| Set functions which stabilize the instantaneous value display. | Instantaneous value moving average | page 57 |
| | Instantaneous value simple average | |
| | Instantaneous value display step | |

## ⚠CAUTION

・Only WPMZ-5-*LL-**-***, “Pulse input B” is displayed. In this case, **“PulseInputA”** corresponds to the channel A input and “Pulse input B” corresponds to the channel B input.

### 9 - 4 - 2 - 1. Select a Pattern Number to Configure Settings

This product can memorize 8 patterns (8 kinds) of parameters including input settings (pulse input A/B, 2 input calculations), output settings and display settings.
In measurement mode, the product calculates using one of 8 patterns which are configured.
This setting selects the pattern number which a configuration is performed.

**⚠CAUTION**

The pattern number is common to input settings, output settings and display settings. Please pay attention to the target pattern number which the following "Pulse Input" configuration is performed to.

| 3rd layer Setting variable | 4th layer Setting values | Initial value | Meanings of setting values |
|---|---|---|---|
| Pattern select [PatternSelect] | Pattern1 | Pattern number which is selected in measurement mode. | Performs a configuration to pattern No.1 |
| | Pattern2 | | Performs a configuration to pattern No.2 |
| | Pattern3 | | Performs a configuration to pattern No.3 |
| | Pattern4 | | Performs a configuration to pattern No.4 |
| | Pattern5 | | Performs a configuration to pattern No.5 |
| | Pattern6 | | Performs a configuration to pattern No.6 |
| | Pattern7 | | Performs a configuration to pattern No.7 |
| | Pattern8 | | Performs a configuration to pattern No.8 |

●How to select "Pattern 8" is shown below.
(Same operation could be applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"1. Input"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"PatternSelect"** and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting values)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑦ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Pattern8"**<br>* Select pattern No. which need to be set. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 2 - 2. Selecting Type of Input

On a line driver input model (WPMZ-5-*L*), although input type setting menu appears, the setting variable cannot be changed.

| 3rd layer Setting variable | 4th layer Setting values | Initial value | Meanings of setting values |
|---|---|---|---|
| Input type [InputType] | LineDriver | * | Can be connected to a device which has RS-422 compatible line driver output on one-on-one level. |

### 9 - 4 - 2 - 3. Selecting Analog Filter for Input

On a line driver input model (WPMZ-5-*L*), although analog filter setting menu appears, the setting variable cannot be changed.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Input filter [InputFilter] | None | * | No low pass filter |

### 9 - 4 - 2 - 4. Selecting Voltage of Supply Power for the Sensor

On a line driver input model (WPMZ-5-*L*), although sensor power setting menu appears, the setting variable cannot be changed.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Sensor power [SensorPower] | 5V | * | Supplies DC5V power to the sensor (200mA max. ).<br>* For 2 channel inputs, total current for chA and chB is up to 200mA. |

### 9 - 4 - 2 - 5. Setting Scaling for Instantaneous Value Display

Set scaling parameters of scaling settings required for measurement.

| 3rd layer (Setting variables) | | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|---|
| Names of variables | Character Strings on Display (Abbreviated Form) | | | |
| Instantaneous value display coefficient | InsDispCoef | 0.00000 to $9.99999\times10^{-9\text{ to }9}$ | $1.00000\times10^{0}$ | Scaling setting for instantaneous value display. Multiplying frequency by instantaneous coefficient and unit time. |
| Instantaneous Unit Time | InsUnitTime | Sec | Sec | |
| | | Min | | |
| | | Hour | | |
| Instantaneous value decimal point position | InsDecPoint | ###### | ###### | Select decimal point position for instantaneous value display. |
| | | #####. # | | |
| | | ####. ## | | |
| | | ###. ### | | |
| | | ##. #### | | |
| | | #. ##### | | |

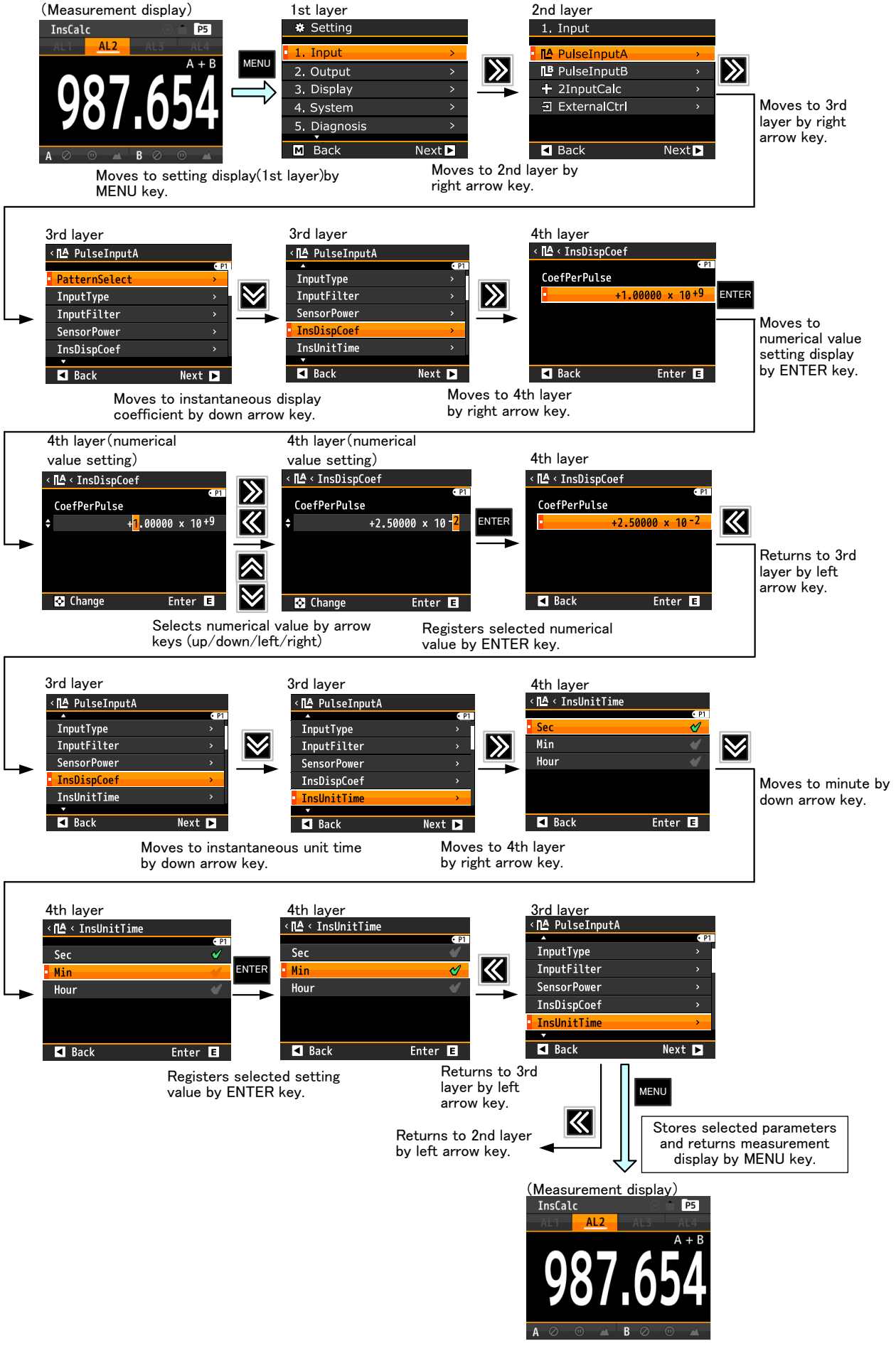
【Scaling setting examples】

1) **Example 1**

Attach the rotary encoder of the line driver output type which gives 40 [Pulse] per rotation to the shaft of the rotating object, and display the rotation speed of the rotating object up to the third decimal place with [rpm].

| 3rd layer (Setting variables) | 4th layer (Setting values) | Descriptions for setting examples |
|---|---|---|
| Input type [InputType] | LineDriver | |
| Instantaneous value display coefficient [InsDispCoef] | $2.50000\times10^{-2}$ | (Setting for displaying the rotation speed of the object)<br><br>Set the number of revolutions per pulse.<br>・Calculate the number of revolutions per pulse.<br>Since it is 40 [Pulse] in one revolution,<br>1/40 = 0.025 = 2.5 × 10 - 2 [rotation].<br>・Set the “instantaneous value display coefficient” to "2.50000 × 10 -2". |
| Instantaneous Unit Time [InsUnitTime] | Min | Displayed unit is [rpm], therefore select “minute” as the instantaneous unit time. |
| instantaneous decimal point position [InsDecPoint] | ###. ### | To display 3 digits after the decimal point, select “###.###” for “instantaneous decimal point position”. |

●Setting method of instantaneous display coefficient and Instantaneous Unit Time is shown below.
Setting procedures for other setting variables are same.
(Same operation is also applied to the pulse input B.)



### 9 - 4 - 2 - 6. Set Units for Instantaneous Value Display

Units for the instantaneous value display can be set.
The WPMZ has 62 selectable units. If you cannot find a suitable unit among them, you can compose custom unit up to 6 characters.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value display unit [InsDispUnit] | None,<br>μA,mA,A,kA,<br>μV,mV,V,kV,VA,<br>W,kW,MW,<br>μm,mm,cm,m,<br>Ω,kΩ,MΩ,<br>g,kg,<br>N,kN,MN,<br>Pa,kPa,MPa,hPa,<br>J,kJ,MJ,<br>Hz,kHz,MHz,<br>$m^3$,<br>mm/s,mm/min,<br>cm/min, m/s,m/min,m/h,$m/s^2$,<br>$m^3/s$,$m^3/min$,$m^3/h$,<br>kg/h,$kg/m^2$,$kg/m^3$,<br>$N/m^2$,<br>ℓ,ℓ/s,ℓ/min,ℓ/h,<br>%,‰,%RH,˚C,<br>pH,ppm,rpm,t,inch,<br>custom unit | None | Set unit for instantaneous value display. |

**⚠CAUTION**

If you choose the custom unit, define the unit in the 5th layer.
Characters which can be used in custom unit are alphabets “a” to “z”, “A” to “Z” and marks.
（marks：[,],(,),$_1$,$_2$,$_3$,$^1$,$^2$,$^3$,-,μ,Ω,g,・,/,ℓ,%,‰,°,’,”）

【Display unit setting example】

## 1) Example 1

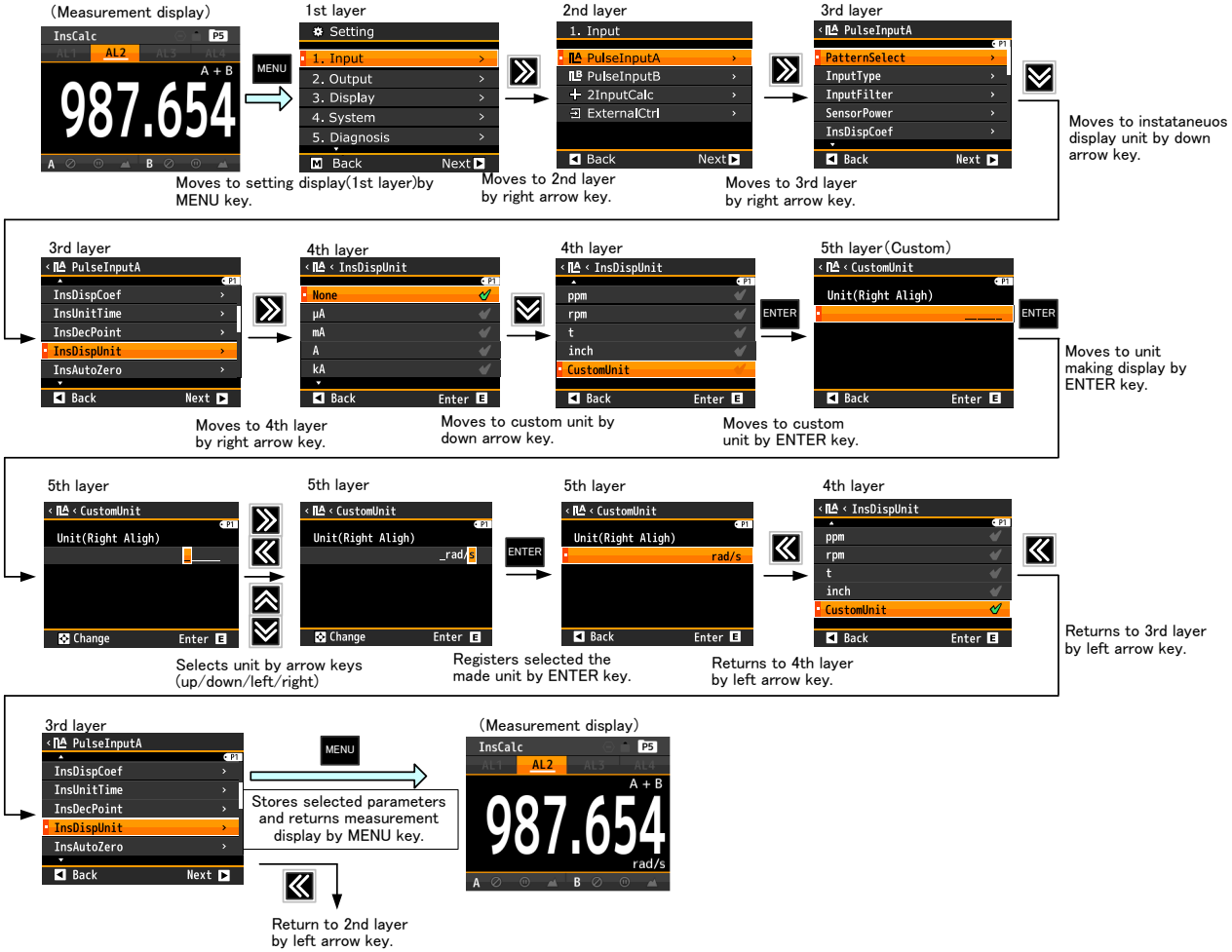
The method for setting the display unit of Instantaneous value to "rpm" is shown below. (Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsDispUnit**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**rpm**".<br>*Select a proper unit for your use. |
| ⑥ | Pushing **"ENTER"** key, selected parameter becomes valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

**Note**: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

## 2) Example 2

As the display unit for the instantaneous value, steps of making a custom unit of "rad/s" are shown below. (Same steps are also applied to the pulse input B.)

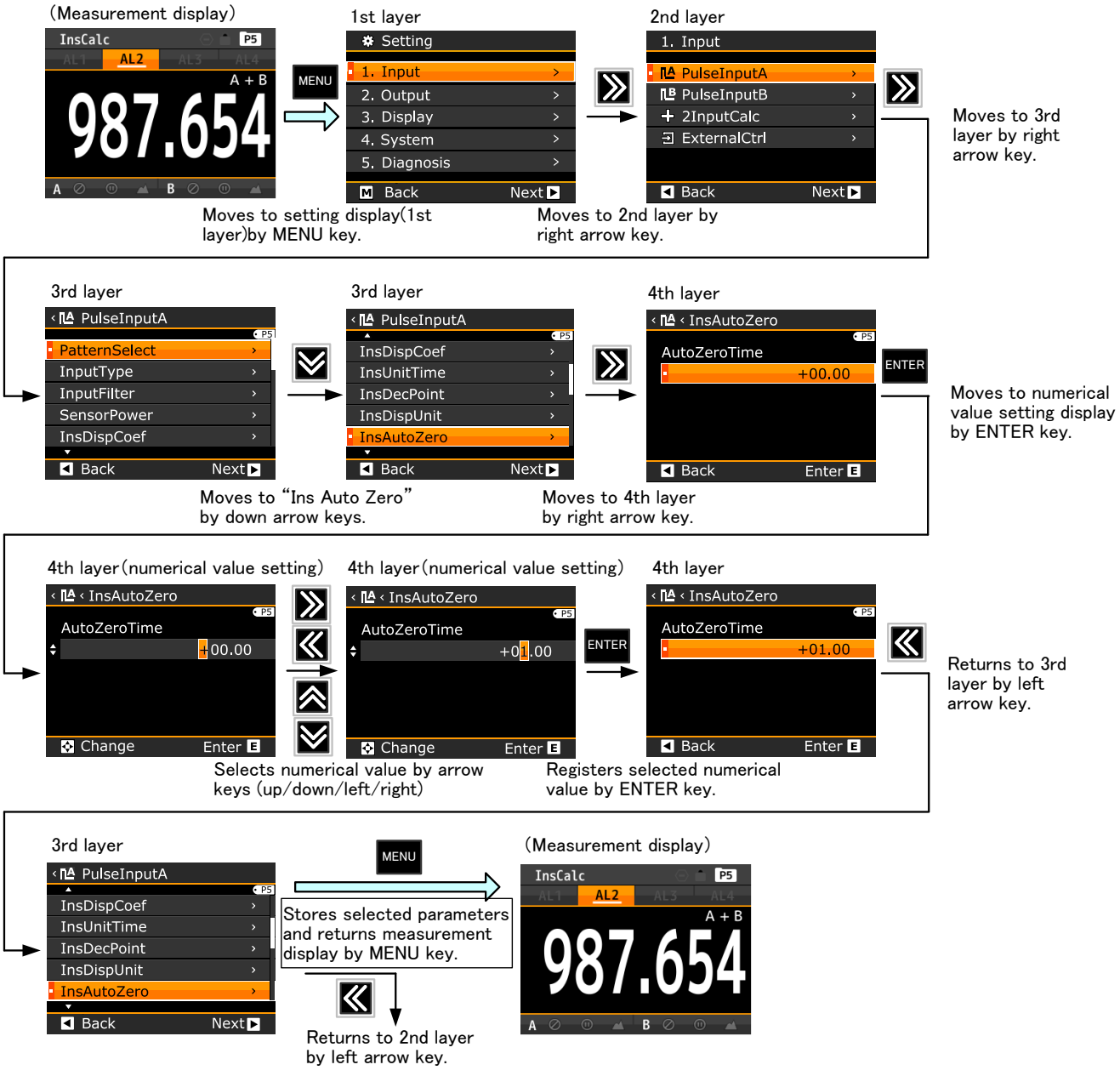


### 9 - 4 - 2 - 7. Setting Time for Instantaneous Value Set to Zero

As input gets closer to 0 Hz, the pulse period gets longer, and the displayed value is not updated waiting a pulse input.
If a pulse is not detected before setting time, judging no input, the displayed value becomes "0".

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value auto zero [InsAutoZero] | 00.00 to 99.99s | 00.00s | Set waiting time for input pulse.<br><br>*The unit is "Second".<br>By setting to 0.00, the function is disabled. |

●How to set the waiting time for input pulse (Instantaneous value auto zero) to 1 second is shown below. (Same operation is also applied to the pulse input B.)



### 9 - 4 - 2 - 8. Stabilizing Instantaneous Value Display (Instantaneous Value Moving Average)

This setting variable set the number of moving average for input pulse.
Instantaneous value of an impeller which has a difference to the installation angles of the blades is not stable. To reduce it, the number of moving average for the number of the blades can be set.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous Value Moving Average [InsMoveAve] | None | * | Sets the number of moving average for input pulse. |
| | 2times | | |
| | 3times | | |
| | 4times | | |
| | 5times | | |
| | 6times | | |
| | 7times | | |
| | 8times | | |
| | 9times | | |

●A method to set the moving average to "5 times" is shown below.
(Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsMoveAve**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**5 times**".<br>*Select a parameter in conformity with the actual condition of use. |
| ⑥ | By pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 2 - 9. Stabilizing Instantaneous Value Display (Instantaneous Value Simple Average)

The simple average is not an average of input pulses but an average in multiple internal sampling periods (calculation periods).

**⚠CAUTION**

Internal sampling period (calculation period) is 10ms. Each of this period, comparative outputs, analog output and BCD outputs are outputted.
*If Instantaneous Value Simple Average are set to 2 to 256, PC signal of BCD outputs (synchronization signal of BCD data) is output in 10ms period.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value simple average [InsSimpleAve] | None | * | No average. Update interval of data is 10ms. |
| | 2times | | Update interval of data is 20ms. |
| | 4 times | | Update interval of data is 40ms. |
| | 8times | | Update interval of data is 80ms. |
| | 16 times | | Update interval of data is 160ms. |
| | 32times | | Update interval of data is 320ms. |
| | 64 times | | Update interval of data is 640ms. |
| | 128 times | | Update interval of data is 1.28s. |
| | 256times | | Update interval of data is 2.56s. |

●A method to set the simple average to "32 times" is shown below.
(Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsSimpleAve**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**32times**".<br>*Select a parameter in conformity with the actual condition of use. |
| ⑥ | By pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 2 - 10. Stabilizing Instantaneous Value Display (Instantaneous Value Display Step)

By adjusting the LSD (least significant digit) of instantaneous display value, drift of the displayed value is suppressed.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value display step [InsDispStep] | None | * | LSD 0 to 9 (No adjusting) |
| | 5steps | | LSD 0 or 5<br>Adjusts 0-4 to "0" and 5-9 to "5". |
| | 10steps | | LSD 0<br>Adjusts 0-9 to "0" ＊LSD is fixed to "0". |

●A method to set the display step to "10 steps" is shown below. (Same operation is also applied to the pulse input B.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsDispStep**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>＊In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**10steps**".<br>*Select a step number in conformity with the actual condition of use. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 3. 2-INPUT CALCULATION

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select [PatternSelect] | page62 |
| Select Calculation Expression for 2-Input Instantaneous values | Expression for instantaneous values [InsExpression] | page 63 |
| Set decimal point position of calculation result for instantaneous values | Instantaneous value decimal point position [InsDecPoint] | page 64 |
| Set variation width for instantaneous calculation result | Instantaneous value display step [InsDispStep] | page 65 |

**⚠CAUTION**

These setting variables appear only on WPMZ-5-*PP-**-*** and WPMZ-5-*LL-**-***.

### 9 - 4 - 3 - 1. Select a Pattern Number to Configure Settings

This product can memorize 8 patterns (8 kinds) of parameters including input settings (pulse input A/B, 2-input calculation), output settings and display settings.
In measurement mode, the product calculates using one of 8 patterns which are configured.
This setting selects the pattern number which a configuration is performed.

**⚠ CAUTION**

The pattern number is common to input settings, output settings and display settings.
Design contents related to**"2 InputCalc"**are registered in the pattern number selected.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Pattern select [PatternSelect] | Pattern1 | Pattern number which is selected in measurement mode. | Performs a configuration to pattern No.1 |
| | Pattern2 | | Performs a configuration to pattern No.2 |
| | Pattern3 | | Performs a configuration to pattern No.3 |
| | Pattern4 | | Performs a configuration to pattern No.4 |
| | Pattern5 | | Performs a configuration to pattern No.5 |
| | Pattern6 | | Performs a configuration to pattern No.6 |
| | Pattern7 | | Performs a configuration to pattern No.7 |
| | Pattern8 | | Performs a configuration to pattern No.8 |

●Setting steps to set pattern number to "Pattern8" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2-InputCalc"** and push "**ARROW (RIGHT)**" key, then the display moves to the **3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"PatternSelect"** and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting values).**<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Patern8"**<br>*Select the pattern number which you need to be configured. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 3 - 2. Select Calculation Expression for 2-Input Instantaneous Value

This setting variable selects a calculation equation for instantaneous values of the A channel input and the B channel input.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Expression for instantaneous values [InsExpression] | None | * | No calculation |
| | AbsRatio (B/A)×100 | | Expression for absolute ratio |
| | ErrRatio (B/A-1)×100 | | Expression for error ratio |
| | Err B-A | | Expression for error |
| | Dens (B/(A+B))×100 | | Expression for density |
| | SUM A+B | | Expression for sum |

## ⚠CAUTION

"A" in the calculation expressions denotes "A Channel Input" and "B" in the calculation expressions denotes "B Channel Input".
Please pay attention to the relationship of A and B in the calculation expressions.

●Setting steps which select expression for instantaneous values to "Dens (B/(A+B))×100" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"2 InputCalc"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsExpression** (Expression for Instantaneous Values)" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**Dens (B/(A+B)) × 100**".<br>*Select a proper expression for your usage. |
| ⑥ | Pushing **"ENTER"** key, selected parameter becomes valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

**Note: If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 3 - 3. Set Decimal Point Position of Calculation Result for Instantaneous Values

This setting variable selects position of decimal point of calculation result for instantaneous values.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value decimal point position [InsDecPoint] | ###### | * | Set decimal point position of calculation result for instantaneous values. |
| | #####. # | | |
| | ####. ## | | |
| | ###. ### | | |
| | ##. #### | | |
| | #. ##### | | |

●Setting steps to display the calculation result of instantaneous values down to 2 decimal points are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2 InputCalc"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"InsDecPoint"** and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting values)**.<br>∗In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"####.##"**<br>* Select the pattern number which you need to be configured.<br>∗Select a proper option for your usage. |
| ⑥ | Pushing **"ENTER"** key, selected parameter becomes valid and a check mark accompanies.<br>∗Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

**Note**: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 3 - 4. Set Variation Width for Instantaneous Calculation Result

This function reduces the fluctuation of the displayed value by correcting the least significant digit (LSD) of it.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value display step [InsDispStep] | None | * | LSD 0 to 9 (No correction) |
| | 5 steps | | LSD 0, 5<br>Correct 0 to 4 to "0", 5 to 9 to "5". |
| | 10 steps | | LSD 0<br>Correct 0 to 9 to "0" *LSD is fixed to "0" |

●Setting steps to set display step to "10 steps" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2 InputCalc"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"InsDispStep"** and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting values)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"10 Steps"**<br>*Select a proper steps for your use. |
| ⑥ | By pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 4 - 3 - 5. Set Units for Calculation Result of Instantaneous Values

For a calculation result of instantaneous values, a unit can be selected.
This product has 62 selectable units. If you cannot find a suitable unit among them, you can compose custom unit up to 6 characters.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous value display unit [InsDispUnit] | None,<br>μA,mA,A,kA,<br>μV,mV,V,kV,VA,<br>W,kW,MW,<br>μm,mm,cm,m,<br>Ω,kΩ,MΩ,<br>g,kg,<br>N,kN,MN,<br>Pa,kPa,MPa,hPa,<br>J,kJ,MJ,<br>Hz,kHz,MHz,<br>$m^3$,<br>mm/s,mm/min,<br>cm/min, m/s,m/min,m/h,$m/s^2$,<br>$m^3/s$,$m^3/min$,$m^3/h$,<br>kg/h,$kg/m^2$,$kg/m^3$,<br>$N/m^2$,<br>ℓ,ℓ/s,ℓ/min,ℓ/h,<br>%,‰,%RH,˚C,<br>pH,ppm,rpm,t,inch,<br>custom unit | None | Set unit for instantaneous value display. |

**⚠ CAUTION**

If you choose the custom unit, define the unit in the 5th layer.
Characters which can be used in custom unit are alphabets “a” to “z”, “A” to “Z” and marks.
（marks：[,],(,),$_1$,$_2$,$_3$,$^1$,$^2$,$^3$,-,μ,Ω,g,・,/,ℓ,%,‰,°,’,”）

## 【Display Unit Setting Example】

### 1) Example 1

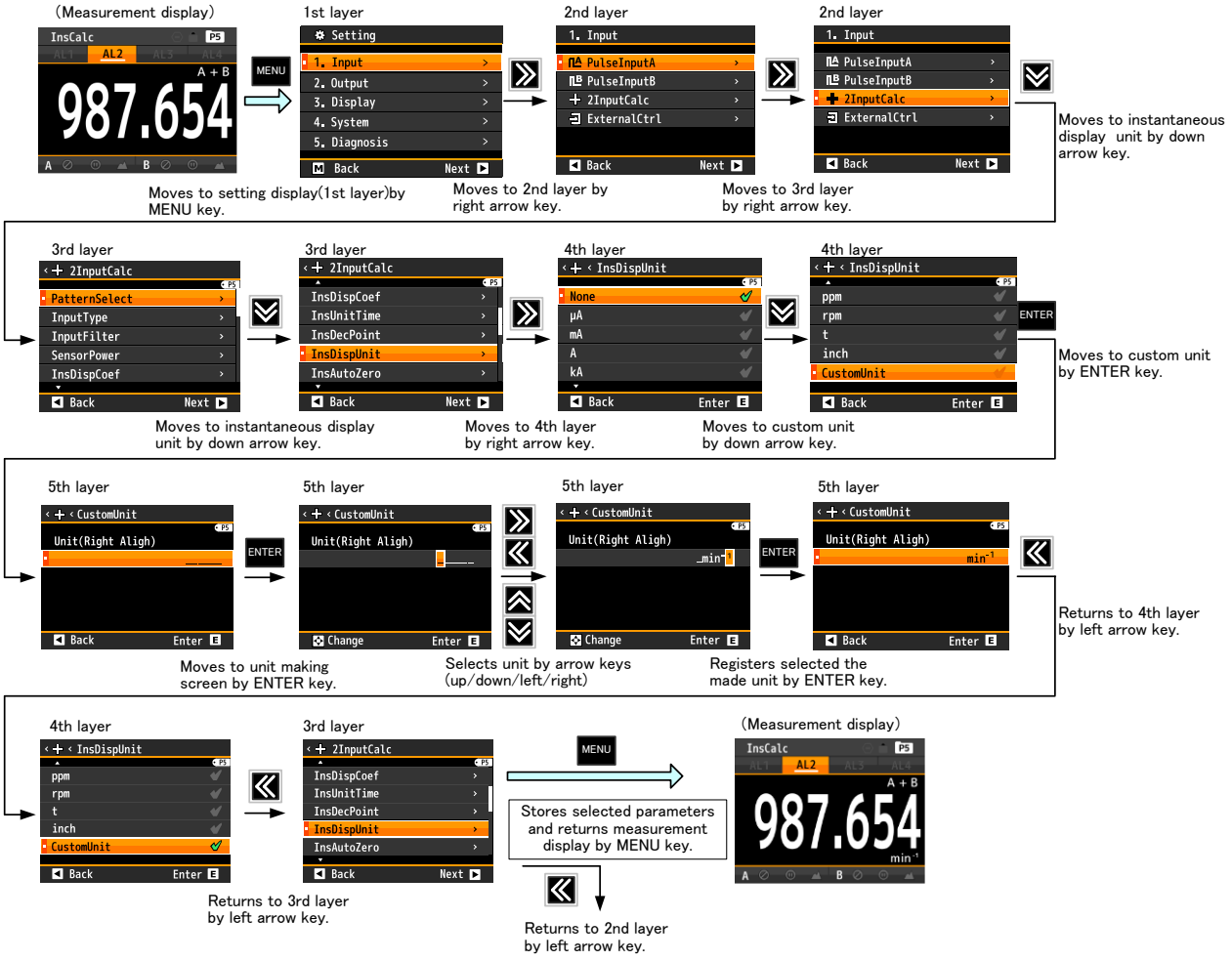
The steps to set the display unit of instantaneous value to "Hz" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| | By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"2InputCalc"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsDispUnit**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**Hz**".<br>*Select a proper unit for your usage in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

Note : **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 2) Example 2

Setting steps to make a custom unit "$min^{-1}$" for a instantaneous value display unit are shown below.
(The same steps could be applied to the analog input B.)



## 9 - 4 - 4. EXTERNAL CONTROL

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select functions assigned to each external control terminal. | Terminal 1 function | page68 |
| | Terminal 2 function | |
| | Terminal 3 function | |
| | Terminal 4 function | |
| | Terminal 5 function | |

### 9 - 4 - 4 - 1. Select Functions Assigned to Terminals 1 to 5

These setting variables select functions from 18 functions of external control for each terminal.
*Functions of terminals 1 to 5 are configured individually.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Terminal 1 function [ExtCtrl1Func]<br>Terminal 2 function [ExtCtrl2Func]<br>Terminal 3 function [ExtCtrl3Func]<br>Terminal 4 function [ExtCtrl4Func]<br>Terminal 5 function [ExtCtrl5Func] | None | * | Assigns no function. |
| | Compare Reset | | Assigns “compare reset” function. |
| | Measure Block A | | Assigns “measurement inhibit” function for chA. |
| | Measure Block B | | Assigns “measurement inhibit” function for chB<br>*Displayed only chB input is available. |
| | Measure Block A&B | | Assigns “measurement inhibit” function of chA and chB.<br>*Displayed only chB input is available. |
| | DispHold A | | Assigns “current value hold” function for chA. |
| | DispHold B | | Assigns “current value hold” function for chB.<br>*Displayed only chB input is available. |
| | DispHold A&B | | Assigns “current value hold” function for chA and chB.<br>*Displayed only chB input is available. |
| | MaxHold A | | Assigns “maximum value hold” function for chA. |
| | MaxHold B | | Assigns “maximum value hold” function for chB.<br>*Displayed only chB input is available. |
| | MaxHold A&B | | Assigns “maximum value hold” function for chA and chB.<br>*Displayed only chB input is available. |
| | MinHold A | | Assigns “minimum value hold” function for chA. |
| | MinHold B | | Assigns “minimum value hold” function for chB.<br>*Displayed only chB input is available. |
| | MinHold A&B | | Assigns “minimum value hold” function for chA and chB.<br>*Displayed only chB input is available. |
| | Pattern Change 1 | | Assigns “pattern select (1st bit)” function. |
| | Pattern Change 2 | | Assigns “pattern select (2nd bit)” function. |
| | Pattern Change 3 | | Assigns “pattern select (3rd bit)” function. |
| | Monitor Change | | Assigns “monitor change” function. |
| | Trend Hold | | Assigns “trend hold” function. |

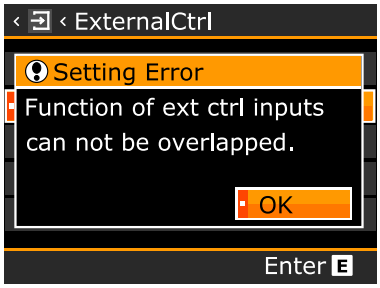
●The setting steps to assign "MeasureBlockA" to terminal 2 are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"ExternalCtrl"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**ExtCtrl2 Func**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**MeasureBlockA**".<br>*Select a proper option for your usage. |
| ⑥ | Pushing **"ENTER"** key, selected parameter becomes valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display. |

**Note**:**If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

## ⚠CAUTION

If functions which assigned to terminal 1 to 5 overlap (except "NONE"), the following message is deployed.
In this case, push "ENTER" key to return to setting display and configure again to prevent the overlap.



## 9－5．DETAIL OF OUTPUTSETTING GROUP

The output setting group is classified to the following small 5 categories and can be configured respectively.

| 2nd layer (Small categories) | Descriptions | Remarks |
|---|---|---|
| Comparative output AL1 | Settings related to comparative outputs. | |
| Comparative output AL2 | | |
| Comparative output AL3 | | |
| Comparative output AL4 | | |
| Analog output | Settings related to the analog output. | Displayed only with an analog output option. |
| BCD output | Settings related to the BCD output. | Displayed only with a BCD output option. |
| RS-232C communication | Settings related to the RS-232C communication. | Displayed only with a RS-232C communication option. |
| Modbus communication | Settings related to the Modbus communication. | Displayed only with Modbus communication option. |

### 9 - 5 - 1．COMPARATIVE OUTPUT AL1 - 4

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select [PatternSelect] | page71 |
| Select displayable source item for comparative output | Output Display Value [OutputDispValue] | page 72 |
| Select compare mode of comparative output | Compare mode [CompareMode] | page 73 |
| Set condition that comparative outputs turn on | Condition of ON [OnConditions] | page 74 |
| Set comparison judgement value | Comparison judgement value [Threshold] | page 75 |
| Set delay time of comparative output | Comparison ON delay [OnDelay] | page 77 |
| | Comparison OFF delay [OffDelay] | page 78 |
| Set output mode of comparative output | Output Mode [OutputMode] | page 79 |
| Set output logic of comparative output | Output Logic [OutputLogic] | page 80 |
| Set background color at comparative output ON state | Background Color at ON [OnBgColors] | page 81 |

### 9 - 5 - 1 - 1. Select a Pattern Number to Configure Settings

This product can memorize 8 patterns (8 kinds) of parameters including input settings (pulse input A/B, analog input A/B, 2 input calculations), output settings and display settings.
In measurement mode, the product calculates using one of 8 patterns which are configured.
This setting selects the pattern number which a configuration is performed.

**⚠ CAUTION**

The pattern number is common to input settings, output settings and display settings.
Design contents related to"Comparative Output"are registered in the pattern number selected.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Pattern select [PatternSelect] | Pattern1 | Pattern number which is selected in measurement mode. | Performs a configuration to pattern No.1 |
| | Pattern2 | | Performs a configuration to pattern No.2 |
| | Pattern3 | | Performs a configuration to pattern No.3 |
| | Pattern4 | | Performs a configuration to pattern No.4 |
| | Pattern5 | | Performs a configuration to pattern No.5 |
| | Pattern6 | | Performs a configuration to pattern No.6 |
| | Pattern7 | | Performs a configuration to pattern No.7 |
| | Pattern8 | | Performs a configuration to pattern No.8 |

●Setting steps to set the "Pattern select" to "Pattern8" are shown below.
(Same steps could be applied to AL2-AL4.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CompareAL1"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"PatternSelect"** and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting values)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Pattern8"**<br>* Select the pattern number which you need to be configured. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:<u>If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.</u>**

### 9 - 5 - 1 - 2. Select Displayable Source Item for Comparative Output

Comparative outputs AL1-AL4 can be configured independently and are needed to be selected which displayable source items (source output display values) are applied to.
For example, the instantaneous measured value of chA is assigned to AL1, the instantaneous measured value of chB is assigned to AL2, the instantaneous calculated value is assigned to AL3 and AL4, etc. To each displayable source item, comparative outputs can be assigned arbitrarily.
Because multiple items are selectable for comparative outputs, item to use for compare should be selected by this setting variable.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Source output display value [OutputDispValue] | None | * | No comparative output |
| | InsA | | Compare to instantaneous measured value of chA. |
| | InsB | | Compare to instantaneous measured value of chB.<br>*Displayed in the option with chB input only. |
| | InsCalc | | Compare to instantaneous calculated value of chA & chB<br>*Displayed in the option with chB input only. |

●Setting steps to set displayable source item of comparative output AL1 to "InsA" (instantaneous value of chA).
Same steps could be applied to comparative outputs AL2 - AL4.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CompareAL1"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"OutputDispValue"** and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting values)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"InsA".**<br>*Select a desired source item in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 1 - 3. Select Compare Mode of Comparative Output

Modes of comparison in comparative output function have 2 modes of "Level judge mode" and "Zone judge mode".

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Compare mode [CompareMode] | Level judge [LevelJudge] | * | Compare to 1 judgement value in magnitude (high/low) relation. |
| | Zone judge [ZoneJudge] | | Compare to 2 judgement values in inclusion (in/out) relation. |

●Setting steps to compare mode of comparative output AL1 to "Zone judge" are shown below.
(Same steps could be applied to comparative out AL2 - AL4.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CompareAL1"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CompareMode"** and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting values)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"ZoneJudge".**<br>*Select a compare mode for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:<u>If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.</u>**

### 9 - 5 - 1 - 4. Set Condition That Comparative Outputs Turn On

This setting variable selects the condition that makes comparative output turn ON in comparison with comparison judgement values.

.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Condition of ON (OnConditions) | Compare mode in "Level judgement" | | *Displayed only when compare mode is level judgement |
| | Excess | * | Comparative output is ON when displayed value excess judgement value. |
| | LessThan | | Comparative output is ON when displayed value is less than judgement value. |
| | Compare mode in "Zone judgement" | | *Displayed only when compare mode is zone judgement |
| | InTheZone | * | Comparative output is ON when displayed value is between 2 judgement values. |
| | OutsideTheZone | | Comparative output is ON when displayed value is outside of 2 judgement values. |

●The setting steps to set "OnConditions" of comparative output AL1 to "LessThan" are shown below.
(The same steps could be applied to comparative output AL2-AL4.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CompareAL1"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"OnCondetions"** and push "**ARROW (RIGHT)**" key, then the display moves to the 4th layer (setting values).<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑧ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Less Than".**<br>*Select a desired condition for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 1 - 5. Set Comparison Judgement Value

This setting variable determines comparison judgement values (thresholds) and hysteresis widths.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial values | Meanings of setting values |
|---|---|---|---|
| Comparison Judgement Value [Threshold] | Compare mode in "Level judgement" | | *Displayed only when compare mode is level judgement |
| | Threshold | 10000 | |
| | hysteresis | 0 | |
| | Compare mode in "Zone judgement" | | *Displayed only when compare mode is zone judgement |
| | Zone lower limit | 0 | |
| | Zone upper limit | 10000 | |
| | hysteresis | 0 | |

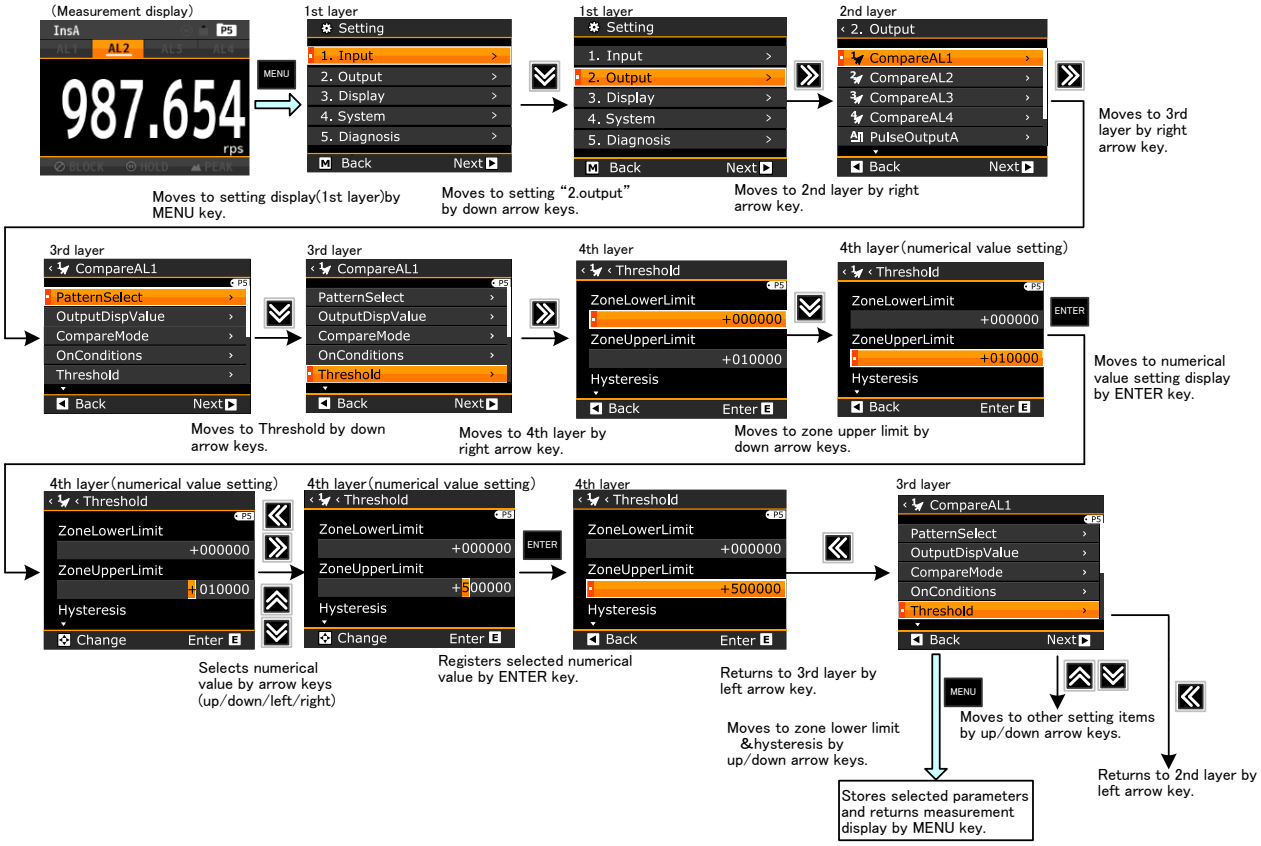
●Setting method of compare judgement value in level judgement of compare mode

The setting steps to set threshold of comparative output AL1 to "50000" are shown below. For the hysteresis, the same steps could be applied.

(The same steps could be applied to comparative output AL2 -AL4.)

●Setting method of compare judgement value (zone judgement value) in zone judgement of compare mode

The setting steps to set zone upper limit to “50000” are shown below.
The same steps could be applied to zone lower limit and hysteresis.
(The same steps could be applied to comparative output AL2 - AL4.)



### 9 - 5 - 1 - 6. Set Delay Time of Comparative Output (Comparison ON Delay)

Comparison ON delay is the delay function which the output does NOT turn on immediately after meeting the compare ON condition, but after keeping on setting time continuously turns ON.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Comparison ON Delay [OnDelay] | None | * | No output ON delay |
| | 20ms | | Output ON delay 20ms |
| | 50ms | | Output ON delay 50ms |
| | 100ms | | Output ON delay 100ms |
| | 200ms | | Output ON delay 200ms |
| | 500ms | | Output ON delay 500ms |
| | 1s | | Output ON delay 1s |
| | 5s | | Output ON delay 5s |
| | 10s | | Output ON delay 10s |
| | 20s | | Output ON delay 20s |

●Setting steps to set output ON delay of comparative output AL1 to "200ms" are shown below.
(Same steps could be applied to Comparative output AL2-AL4.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CompareAL1"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**OnDelay**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"200ms".**<br>*Select a desired delay time for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 1 - 7. Set Delay Time of Comparative Output (Comparison OFF Delay)

Comparison OFF delay is the delay function which the output does NOT turn off immediately after meeting the compare OFF condition, but after keeping on setting time continuously turns OFF.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Comparison OFF Delay [OffDelay] | None | * | No output OFF delay |
| | 20ms | | Output OFF delay 20ms |
| | 50ms | | Output OFF delay 50ms |
| | 100ms | | Output OFF delay 100ms |
| | 200ms | | Output OFF delay 200ms |
| | 500ms | | Output OFF delay 500ms |
| | 1s | | Output OFF delay 1s |
| | 5s | | Output OFF delay 5s |
| | 10s | | Output OFF delay 10s |
| | 20s | | Output OFF delay 20s |

●Setting steps to set output OFF delay of comparative output AL1 to "200ms" are shown below. (Same steps could be applied to Comparative output AL2-AL4.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CompareAL1"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**OffDelay**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"200ms".**<br>*Select a desired delay time for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 1 - 8. Set Output Mode of Comparative Output

This setting variable selects output mode of comparative output.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Output Mode [OutputMode] | Normal | * | While the condition is met, output turns ON. |
| | Latch | | Once the condition is met, output keeps ON.<br>*Turns OFF by comparative output reset. |
| | OneShot 5ms | | When the condition is met, output turns ON for 5ms. |
| | OneShot 10ms | | When the condition is met, output turns ON for 10ms. |
| | OneShot 20ms | | When the condition is met, output turns ON for 20ms. |
| | OneShot 50ms | | When the condition is met, output turns ON for 50ms. |
| | OneShot 0.1s | | When the condition is met, output turns ON for 0.1 s. |
| | OneShot 0.2s | | When the condition is met, output turns ON for 0.2s. |
| | OneShot 0.5s | | When the condition is met, output turns ON for 0.5 s. |
| | OneShot 1s | | When the condition is met, output turns ON for 1 s. |
| | OneShot 2s | | When the condition is met, output turns ON for 2s. |

●Setting steps to set the output mode of **"CompareAL1"** to "OneShot 50ms" are shown below. (Same steps could be applied to AL2-AL4.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CompareAL1"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**OutputMode**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"OneShot 50ms".**<br>*Select a desired mode for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note: If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 1 - 9. Set Output Logic of Comparative Output

This setting variable selects output logic of comparative output.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Output Logic (OutputLogic) | Positive (NC) | | When comparative output is ON, transistor is OFF (1 level) . Relay OFF (relay output product) |
| | Negative (NO) | * | When comparative output is ON, transistor is ON (0 level) . Relay ON (relay output product) |

**⚠CAUTION**

The above explanation is described with reference to NPN Open collector output.
In the case of PNP outputs, the output turns 1 level at transistor ON and turns 0 level at transistor OFF.
In other words, the output logic is reversed on PNP output.

●Setting steps to set output logic of comparative output AL1 to "Positive" are shown below. (Same steps could be applied to AL2-AL4.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CompareAL1"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**OutputLogic**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. *In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Positive Logic".** *Select a desired logic for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies. *Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** <u>If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.</u>

### 9 - 5 - 1 - 10. Set Background Color at Comparative Output ON State

This setting variable selects background color of display when comparative output is ON.

**⚠CAUTION**

This setting is for the color of background, not for color of characters.
The color of characters can be changed and its color is white in measurement display.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Background Color at ON [OnBgColors] | Black | * | Background color is still black when comparative output is ON. |
| | Red | | Background color turns red when comparative output is ON. |
| | Yellow | | Background color turns yellow when comparative output is ON. |
| | Green | | Background color turns green when comparative output is ON. |

●Setting steps to set background color of comparative output AL1 to "Red" are shown below. (Same steps could be applied to AL2-AL4.)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CompareAL1"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**OnBgColors**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Red".**<br>*Select a desired color for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note: If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 2. ANALOG OUTPUT

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select (PatternSelect) | page83 |
| Select output range of analog output | Output range (OutputRange) | page 84 |
| Select displayable source item for analog output | Source Output display value (OutputDispValue) | page 85 |
| Set scaling of analog output | Output scale (OutputScale) | page 86 |

⚠CAUTION

Setting variables about analog output appear on models with analog output (WPMZ-5-***-1*-***).

### 9 - 5 - 2 - 1. Select a Pattern Number to Configure Settings

This product can memorize 8 patterns (8 kinds) of parameters including input settings, output settings and display settings.
In measurement mode, the product calculates using one of 8 patterns which are configured.
This setting selects the pattern number which a configuration is performed.

**⚠ CAUTION**

The pattern number is common to input settings, output settings and display settings.
Design contents related to"Analog Output"are registered in the pattern number selected.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Pattern select [Pattern Select] | Pattern1 | Pattern number which is selected in measurement mode. | Performs a configuration to pattern No.1 |
| | Pattern2 | | Performs a configuration to pattern No.2 |
| | Pattern3 | | Performs a configuration to pattern No.3 |
| | Pattern4 | | Performs a configuration to pattern No.4 |
| | Pattern5 | | Performs a configuration to pattern No.5 |
| | Pattern6 | | Performs a configuration to pattern No.6 |
| | Pattern7 | | Performs a configuration to pattern No.7 |
| | Pattern8 | | Performs a configuration to pattern No.8 |

● Setting steps to set pattern number for analog output to "Pattern8" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"AnalogOutput"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**PatternSelect**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Pattern8"**<br>* Select the pattern number which you need to be configured. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

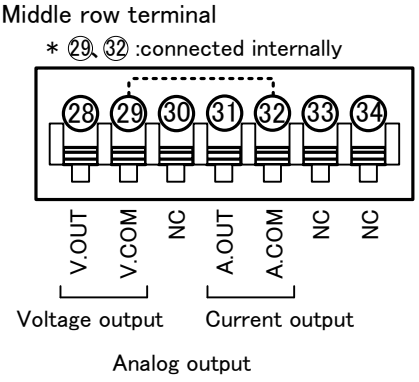
**Note**:<u>**If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**</u>

### 9 - 5 - 2 - 2. Select Output Range of Analog Output

This setting variable selects the output range of the analog output.

**⚠CAUTION**

Depending on the selection of the analog output range, terminals for use varies




| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Output range [OutputRange] | DC0-10V | * | Analog output range: DC0 to 10V<br>Load resistance: more than 2kΩ |
| | DC±10V | | Analog output range: DC-10 to 10V<br>Load resistance: more than 2kΩ |
| | DC1-5V | | Analog output range: DC1 to 5V<br>Load resistance: more than 2kΩ |
| | DC0-20mA | | Analog output range: DC0 to 20mA<br>Load resistance: less than 550Ω |
| | DC4-20mA | | Analog output range: DC4 to 20mA<br>Load resistance: less than 550Ω |

● Setting steps to set output range of analog output to "DC1-5V" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"AnalogOutput"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**OutputRange**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"DC1-5V"**<br>*Select a desired output range for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note: <u>If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.</u>**

### 9 - 5 - 2 - 3. Select Displayable Source Item for Analog Output

Because multiple items are selectable for the analog output, an item to use as the analog output should be selected by this setting variable.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Source output display value (OutputDispValue) | None | * | No analog output. |
| | Instantaneous value A (InsA) | | Analog output outputs for instantaneous value of chA |
| | Instantaneous value B (InsB) | | Analog output outputs for instantaneous value of chB<br>*Displayed in the option with chB input only. |
| | Instantaneous calculated value (InsCalc) | | Analog output outputs for instantaneous calculated value of chA and chB.<br>*Displayed in the option with chB input only. |

● Setting steps to set "Source output display value (OutputDispValue)" of the analog output to "Instantaneous value A (InsA)" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"AnalogOutput"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**OutputDispValue**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"InsA".**<br>*Select a desired source item for analog output in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note**: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 2 - 4. Set Scaling of Analog Output

This setting variable set scaling for analog output.

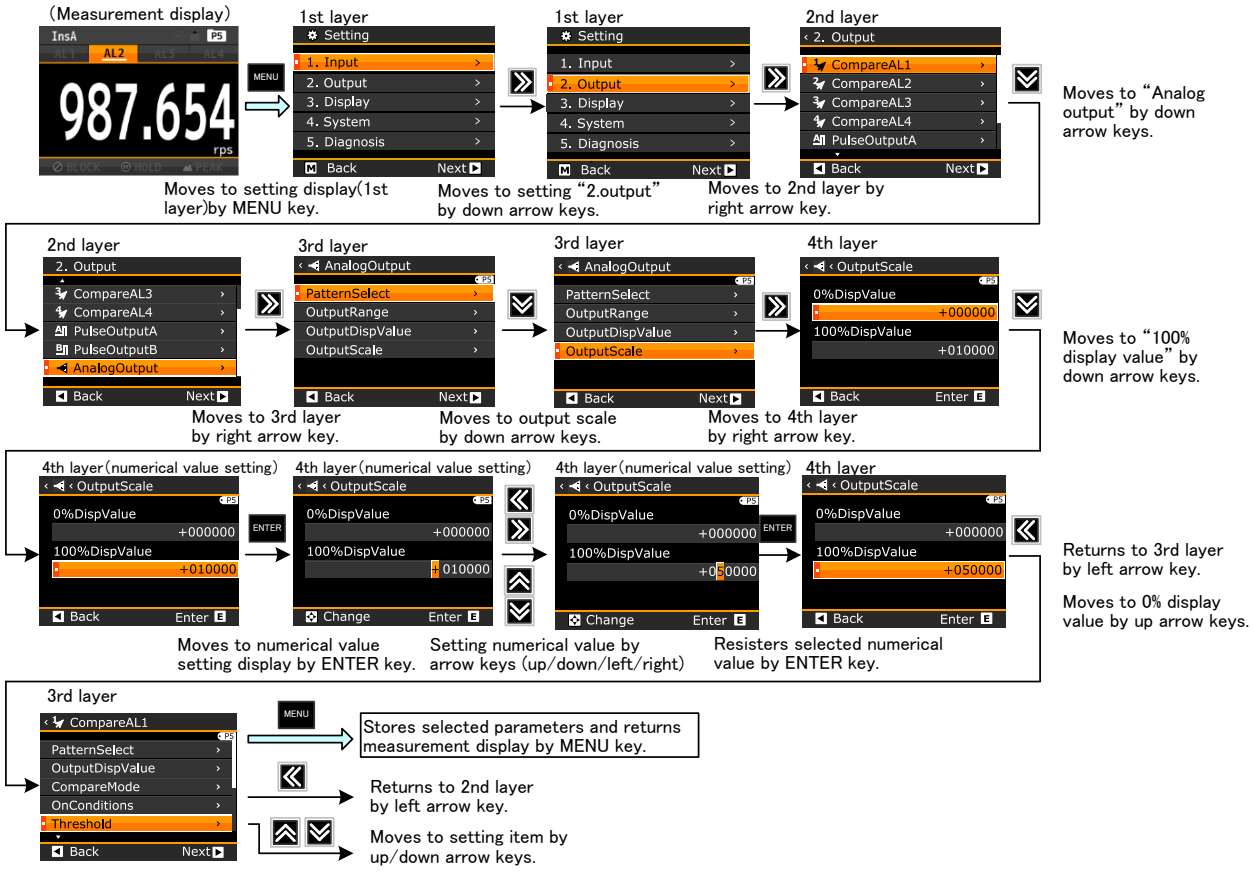
| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Output scale (OutputScale) | 0% display value ±999999 | +000000 | Set display value when analog output outputs 0% of full scale. |
| | 100% display value ±999999 | +010000 | Set display value when analog output outputs 100% of full scale. |

【Setting example of scaling】

For the instantaneous value of chA input of 0 to 50000, outputs 4 to 20mA on the analog outputs.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Descriptions for the setting examples |
|---|---|---|
| Output range (OutputRange) | DC4-20mA | To output by "4-20mA" range, the setting variable "output range" should be selected to "DC4-20mA". |
| Source output display value (OutputDispValue) | Instantaneous value A (InsA) | To output the instantaneous value of chA on the analog output, the setting variable "Source output display value" should be selected to "Instantaneous value A". |
| Output scale (OutputScale) | (0% display value) +000000 | When the instantaneous value is "0", to output 4mA on the analog output, sets "0% display value" to "+000000". |
| | (100% display value) +050000 | When the instantaneous value is "50000", to output 20mA on the analog output, sets "100% display value" to "+050000". |

● A setting method of the "output scale" is shown on the following chart.



### 9 - 5 - 3. BCD OUTPUT

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select (PatternSelect) | page88 |
| Select displayable source item for analog output | OutputDispValue (OutputDispValue) | page 89 |
| Select output logic of data signals. | Data signal logic (DataSignalLogic) | page 90 |
| Select output logic of synchronous signal. | Synchronous signal logic (SyncSignalLogic) | page 91 |

**⚠CAUTION**

The setting variables for BCD OUTPUT are shown on the models with BCD output option (WPMZ-5-***-**2 or 3***-***) only.

### 9 - 5 - 3 - 1. Select a Pattern Number to Configure Settings

This product can memorize 8 patterns (8 kinds) of parameters including input settings (pulse input A/B, analog input A/B, 2 input calculations), output settings and display settings.
In measurement mode, the product calculates using one of 8 patterns which are configured.
This setting selects the pattern number which a configuration is performed.

**⚠ CAUTION**

The pattern number is common to input settings, output settings and display settings.
Design contents related to"BCD Output"are registered in the pattern number selected.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Pattern select | Pattern1 | Pattern number which is selected in measurement mode. | Performs a configuration to pattern No.1 |
| | Pattern2 | | Performs a configuration to pattern No.2 |
| | Pattern3 | | Performs a configuration to pattern No.3 |
| | Pattern4 | | Performs a configuration to pattern No.4 |
| | Pattern5 | | Performs a configuration to pattern No.5 |
| | Pattern6 | | Performs a configuration to pattern No.6 |
| | Pattern7 | | Performs a configuration to pattern No.7 |
| | Pattern8 | | Performs a configuration to pattern No.8 |

● Setting steps to set pattern number for BCD Output to "Pattern8" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"BCD Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**PatternSelect**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Pattern8"**<br>* Select the pattern number which you need to be configured. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 3 - 2. Select Displayable Source Item for BCD Output

Because multiple items are selectable for the BCD output, an item to use as the BCD output should be selected by this setting variable.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Source output display value (OutputDispValue) | None | * | No BCD output |
| | Instantaneous value A (InsA) | | BCD output outputs for instantaneous value of chA |
| | Instantaneous value B (InsB) | | BCD output outputs for instantaneous value of chB<br>*Displayed in the option with chB input only. |
| | Instantaneous calculated value (InsCalc) | | BCD output outputs for instantaneous calculated value of chA and chB.<br>*Displayed in the option with chB input only. |

● Setting steps to set "Source output display value (OutputDispValue)" of the BCD output to "Instantaneous value A (InsA)" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"BCD Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**OutputDispValue**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"InsA".**<br>*Select a desired source item for the BCD output in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 3 - 3. Select Output Logic of BCD Data Signals

This setting variable selects the output logic of the BCD data signals.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Output Logic (OutputLogic) | Positive | | When data output is ON, transistor is OFF （1 level） |
| | Negative | * | When data output is ON, transistor is ON （0 level） |

**⚠ CAUTION**

The above explanation is described with reference to NPN Open collector output.
In the case of PNP outputs, the output turns 1 level at transistor ON and turns 0 level at transistor OFF.
In other words, the output logic is reversed on PNP output.

●Setting steps to set output logic of BCD data to "Positive" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"BCD Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**DataSignalLogic**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Positive".**<br>*Select a desired logic for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note: If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 3 - 4. Select Output Logic of BCD Data Synchronous Signal

This setting variable selects the output logic of the BCD data signals.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Output Logic (OutputLogic) | Positive | | When synchronous output is ON, transistor is OFF (1 level) |
| | Negative | * | When synchronous output is ON, transistor is ON (0 level) |

## ⚠CAUTION

To acquire BCD data, if the synchronous signal (PC) is negative, use the off-state of transistor (i.e. the leading edge or 1 level of PC).
If synchronous signal (PC) is positive, use the on-state of transistor (i.e. the trailing edge or 0 level of PC).
*This explanation is described with reference to NPN Open collector output.
In the case of PNP outputs, the polarity of the output is opposite.

●Setting steps to set output logic of synchronized signal (PC) to "Negative" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"BCD Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**SyncSignalLogic**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. *In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Negative".** *Select a desired logic for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies. *Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 4. RS-232C COMMUNICATION

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select protocol | Protocol | page91 |
| Select baud rate | Baudrate | page93 |
| Select data length | Datalength | page 94 |
| Select parity bit | Parity | page 95 |
| Select stop bit | Stopbit | page 96 |
| Select delimiter | Delimiter | page 97 |

**⚠CAUTION**

The setting variables for RS-232C communication appear only on models with RS-232C option(WPMZ-5-***-4*-***).

### 9 - 5 - 4 - 1. Select Protocol

This setting variable selects the protocol of RS-232C communication.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Protocol | Modbus-RTU | * | - |
| | OriginalCommand | | - |
| | OriginalOutput | | - |

●Setting steps to set the protocol of RS-232C to "OriginalCommand" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"RS-232C Com"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**Protocol**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"OriginalCommand".**<br>*Select a desired baud rate for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 4 - 2. Select Baud Rate

This setting variable selects the baud rate of RS-232C communication.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Baudrate | 9600bps | | Baud rate 9600bps |
| | 19200bps | * | Baud rate 19200bps |
| | 38400bps | | Baud rate 38400bps |

●Setting steps to set the baud rate of RS-232C to "38400bps" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"RS-232C Com"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**Baudrate**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"38400 bps".**<br>*Select a desired baud rate for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note**: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 4 - 3. Select Data Length

This setting variable selects the data length of RS-232C communication.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Datalength | 7bit | * | Data bit length 7 bit |
| | 8bit | | Data bit length 8 bit |

●Setting steps to set the data length of RS-232C to "8bit" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"RS-232C Com"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**DataLength**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"8bit".**<br>*Select a desired bit length for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 4 - 4. Select Parity Bit

This setting variable selects the parity bit of RS-232C communication.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Parity | None | | No parity bit |
| | Even | * | Even parity: count of 1's in the data is even |
| | Odd | | Odd parity: count of 1's in the data is odd |

●Setting steps to set parity of RS-232C to "Odd" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"RS-232C Com"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**Parity**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Odd".**<br>*Select a desired parity for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note**:**If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 4 - 5. Select Stop Bit

This setting variable selects the stop bit of RS-232C communication.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Stop bit | 1bit | * | Stop bit: 1bit |
| | 2bit | | Stop bit: 2bit |

●Setting steps to set stop bit of RS-232C communication to "2bit" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"RS-232C Com"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**Stopbit**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2bit".**<br>*Select a desired stop bit for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)** "key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note: <u>If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.</u>**

### 9 - 5 - 4 - 6. Select Delimiter

This setting variable selects the delimiter of RS-232C communication.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Delimiter | CR | | Delimiter: CR |
| | CR LF | * | Delimiter: CR. LF |

●Setting steps to set delimiter of RS-232C communication to "CR" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"RS-232C Com"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**Delimiter**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"CR".**<br>*Select a desired delimiter type for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note**: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 5. MODBUS COMMUNICATION

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select device address | SlaveAddress | page99 |
| Select baud rate | Baudrate | page 100 |
| Select parity bit | Parity | page 101 |

**⚠CAUTION**

The setting variables for Modbus communication appear only on models with Modbus communication option(WPMZ-5-***-5*-***)

### 9 - 5 - 5 - 1. Select Device Address

This setting variable selects a device address (slave address) of Modbus communication.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Slave Address | 1 | * | Device ID 1 |
| | 2 | | Device ID 2 |
| | 3 | | Device ID 3 |
| | 4 | | Device ID 4 |
| | 5 | | Device ID 5 |
| | 6 | | Device ID 6 |
| | 7 | | Device ID 7 |
| | 8 | | Device ID 8 |
| | 9 | | Device ID 9 |
| | 10 | | Device ID 10 |
| | 11 | | Device ID 11 |
| | 12 | | Device ID 12 |
| | 13 | | Device ID 13 |
| | 14 | | Device ID 14 |
| | 15 | | Device ID 15 |
| | 16 | | Device ID 16 |
| | 17 | | Device ID 17 |
| | 18 | | Device ID 18 |
| | 19 | | Device ID 19 |
| | 20 | | Device ID 20 |
| | 21 | | Device ID 21 |
| | 22 | | Device ID 22 |
| | 23 | | Device ID 23 |
| | 24 | | Device ID 24 |
| | 25 | | Device ID 25 |
| | 26 | | Device ID 26 |
| | 27 | | Device ID 27 |
| | 28 | | Device ID 28 |
| | 29 | | Device ID 29 |
| | 30 | | Device ID 30 |
| | 31 | | Device ID 31 |

●Setting steps to set device ID (Slave address) of Modbus communication "10" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"ModbusCom"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**SlaveAddress**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"10".**<br>*Select a desired device Delimiter type for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 5 - 2. Select Baud Rate

This setting variable selects the baud rate of Modbus communication.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Baudrate | 9600bps | | Baud rate 9600bps |
| | 19200bps | * | Baud rate 19200bps |
| | 38400bps | | Baud rate 38400bps |

●Setting steps to set the baud rate of Modbus to "38400bps" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"ModbusCom"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**Baudrate**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"38400 bps".**<br>*Select a desired baud rate for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note: If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 5 - 5 - 3. Select Parity Bit

This setting variable selects the parity bit of Modbus communication.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Parity | None | | No parity bit |
| | Even | * | Even parity: count of 1's in the data is even |
| | Odd | | Odd parity: count of 1's in the data is odd |

●Setting steps to set parity of Modbus to "Odd" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2. Output"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"ModbusCom"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**Parity**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑨ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Odd".**<br>*Select a desired parity for your use in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note: If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

## 9－6．DETAIL OF DISPLAY SETTING GROUP

The display setting group is classified to the following small 3 categories and can be configured respectively.

| 2nd layer (Small categories) | Descriptions | Remarks |
|---|---|---|
| Display Select | Select the measurement screen to be displayed during measurement. | Display styles：numerical value display, level display and trend display |
| Level Display | Sets scales of level display. | |
| Trend Display | Sets scales of trend display. | |

### 9 - 6 - 1．DISPLAY SELECT

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Selects contents to display on numerical value display from displayable items. | MeasureSelect | page102 |
| Selects contents to display on level display from displayable items. | LevelSelect | page 105 |
| Selects contents to display on trend display from displayable items. | TrendSelact | page106 |

Note: In each display style, multiple selections are available. All selected display patterns are switched by DISP key or “Monitor Change” functions of the external control input.

#### 9 - 6 - 1 - 1．Select Measurement Display Contents Displayed in Measurement Mode

This product can display multiple items from measured values or calculated values (i.e. displayable source items) on each measurement display style (i.e. numerical value display, level display and trend display). Therefore, by using this setting variable, contents to be shown on each display style should be selected. Each display patterns can be switched by “DISP” key or “pattern change” function of the external control input.
Note: Displayable source items are also used for each output (i.e. comparative outputs, pulse outputs, analog output).

**⚠CAUTION**

Initial values of display screens are different from 1. Input (without chB input) and 2 inputs (with chB input).

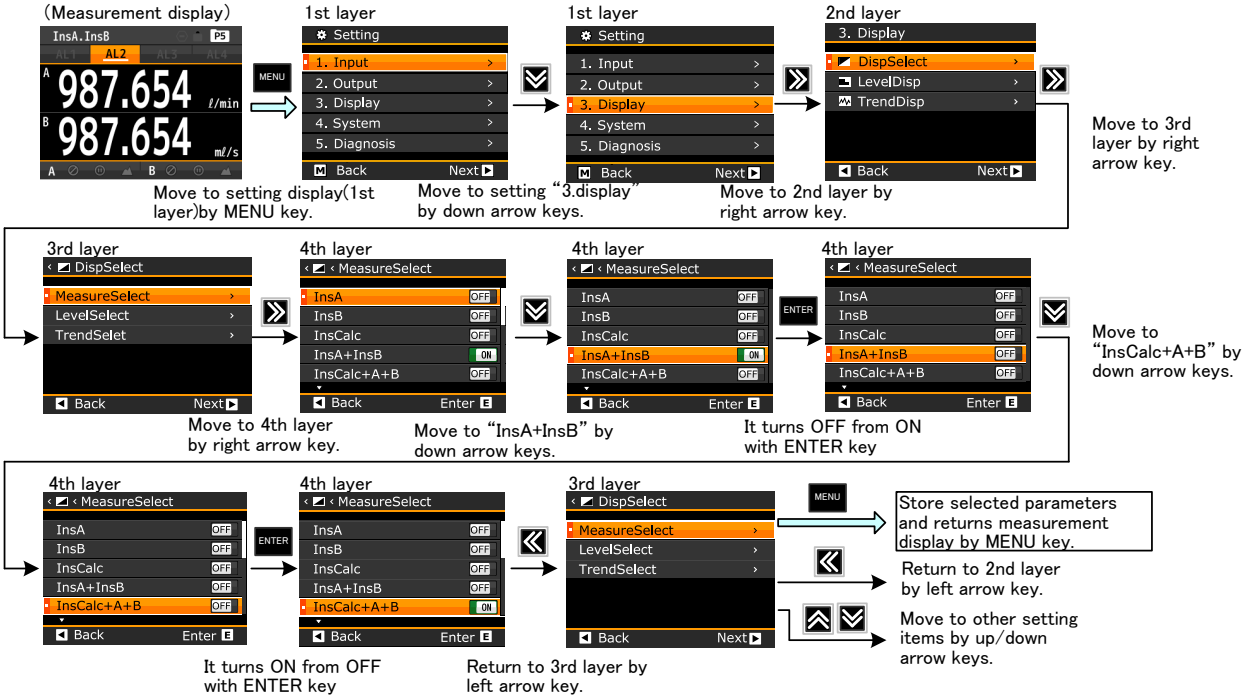
○1. Input (without chB input) models （WPMZ-5-*PX-**-***, WPMZ-5-*LX-**-***）

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Display Select (DisplaySelect) | Instantaneous value A (InsA) | * | Display Instantaneous value of chA input. |
| | InsA + Comp | | Displays instantaneous value of chA input, comparison judgement values and result. |

○2-input (with chB input) models (WPMZ-5-***PP**-**-***, WPMZ-5-***LL**-**-***)

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Display Select (DisplaySelect) | Instantaneous value A (InsA) | | Displays Instantaneous value of chA input. |
| | Instantaneous value B (InsB) | | Displays Instantaneous value of chB input. |
| | Instantaneous value calculation (InsCalc) | | Displays calculation result of chA input instantaneous value and chB input instantaneous value. |
| | Instantaneous value A + Instantaneous value B (InsA+InsB) | * | Displays 2 items of chA input instantaneous value and chB input instantaneous value. |
| | Instantaneous value calculation+ Instantaneous value A + Instantaneous value B (InsCalc+A+B) | | Displays 3 items of instantaneous value calculation result, chA input instantaneous value and chB input instantaneous value. |
| | InsA + Comp | | Displays instantaneous value of chA input, comparison judgement values and result. |
| | InsB + Comp | | Displays instantaneous value of chB input, comparison judgement values and result. |
| | InsCalc + Comp | | Displays calculation result value of instantaneous values, comparison judgement values and result. |

●In the “Display Select” configuration of a two-inputs model, setting steps that select “Instantaneous value calculation+ Instantaneous value A + Instantaneous value B(InsCulc+A+B)” and does not show default setting “Instantaneous value A + Instantaneous value B (InsA+InsB)” are shown below.



### 9 - 6 - 1 - 2. Selects Displayable Items to Display on Level Display

This setting variable selects displayed items on level display from displayable items.
Each display can be switched by "DISP" key or "pattern change" function of the external control input.

**⚠CAUTION**

Initial values of display screens are different in the case of 1. Input (without chB input) and in the case of 2 inputs (with chB input).
In level display, 3-item display is not available even for 2 inputs.

○1. Input (without chB input) models (WPMZ-5-***PX**-**-***, WPMZ-5-***LX**-**-***)

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Level Select | Instantaneous value A [InsA] | * | Display Instantaneous value of chA input. |

○2-input (with chB input) models (WPMZ-5-***PP**-**-***, WPMZ-5-***LL**-**-***)

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Level select | Instantaneous value A [InsA] | | Displays Instantaneous value of chA input. |
| | Instantaneous value B [InsB] | | Displays Instantaneous value of chB input. |
| | Instantaneous value calculation [InsCalc] | | Displays calculation result of chA input instantaneous value and chB input instantaneous value. |
| | Instantaneous value A + Instantaneous value B [InsA+InsB] | * | Displays 2 items of chA input instantaneous value and chB input instantaneous value. |

●The setting method is same as that of "Display Select". Refer to "9-6-1-1. Select measurement display contents displayed in measurement mode"

### 9 - 6 - 1 - 3. Selects Displayable Items to Display on Trend Display

This setting variable selects displayed items on level display from displayable items
Each display can be switched by "DISP" key or "pattern change" function of the external control input.

**⚠ CAUTION**

Initial values of display screens are different in the case of 1. Input (without chB input) and in the case of 2 inputs (with chB input).
In trend display, 3-item display is not available even for 2 inputs.

○1. Input (without chB input) models (WPMZ-5-***PX**-**-***, WPMZ-5-***LX**-**-***)

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Trend select | Instantaneous value A [InsA] | * | Displays Instantaneous value of chA input. |

○2-input (with chB input) models (WPMZ-5-***PP**-**-***, WPMZ-5-***LL**-**-***)

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Trend select | Instantaneous value A [InsA] | | Displays Instantaneous value of chA input. |
| | Instantaneous value B [InsB] | | Displays Instantaneous value of chB input. |
| | Instantaneous value calculation [InsCalc] | | Displays calculation result of chA input instantaneous value and chB input instantaneous value. |
| | Instantaneous value A + Instantaneous value B [InsA+InsB] | * | Displays 2 items of chA input instantaneous value and chB input instantaneous value. |

**⚠CAUTION**

Two phase (90deg phase) pulse inputs are acceptable on pulse 2-input models (WPMZ-5-*PP-**-***). In the case that two-phase is selected as input type and chB or calculated result are selected in Display Select, measurement display shows "------".

●The setting method is same as that of "Display Select". Refer to "9-6-1-1. Select measurement display contents displayed in measurement mode"

### 9 - 6 - 2. LEVEL DISPLAY

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select (PatternSelect) | page108 |
| Set scales of level display for instantaneous value. | Instantaneous value A scale (InsA Scale) | page109 |
| | Instantaneous value B scale (InsB Scale) | |
| | Instantaneous value calculation scale (InsCalc Scale) | |

### 9 - 6 - 2 - 1. Select a Pattern Number to Configure Settings

This product can memorize 8 patterns (8 kinds) of parameters including input settings, output settings and display settings.
In measurement mode, the product calculates using one of 8 patterns which are configured.
This setting selects the pattern number which a configuration is performed.

**⚠CAUTION**

The pattern number is common to input settings, output settings and display settings.
Design contents related to"Level Display"are registered in the pattern number selected.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Pattern select | Pattern1 | Pattern number which is selected in measurement mode. | Performs a configuration to pattern No.1 |
| | Pattern2 | | Performs a configuration to pattern No.2 |
| | Pattern3 | | Performs a configuration to pattern No.3 |
| | Pattern4 | | Performs a configuration to pattern No.4 |
| | Pattern5 | | Performs a configuration to pattern No.5 |
| | Pattern6 | | Performs a configuration to pattern No.6 |
| | Pattern7 | | Performs a configuration to pattern No.7 |
| | Pattern8 | | Performs a configuration to pattern No.8 |

● Setting steps to set pattern number for Level Display to "Pattern8" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"3. Display"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"LevelDisp"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**PatternSelect**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Pattern8"**<br>* Select the pattern number which you need to be configured in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 6 - 2 - 2. Set Scales of Level Display for Instantaneous Value

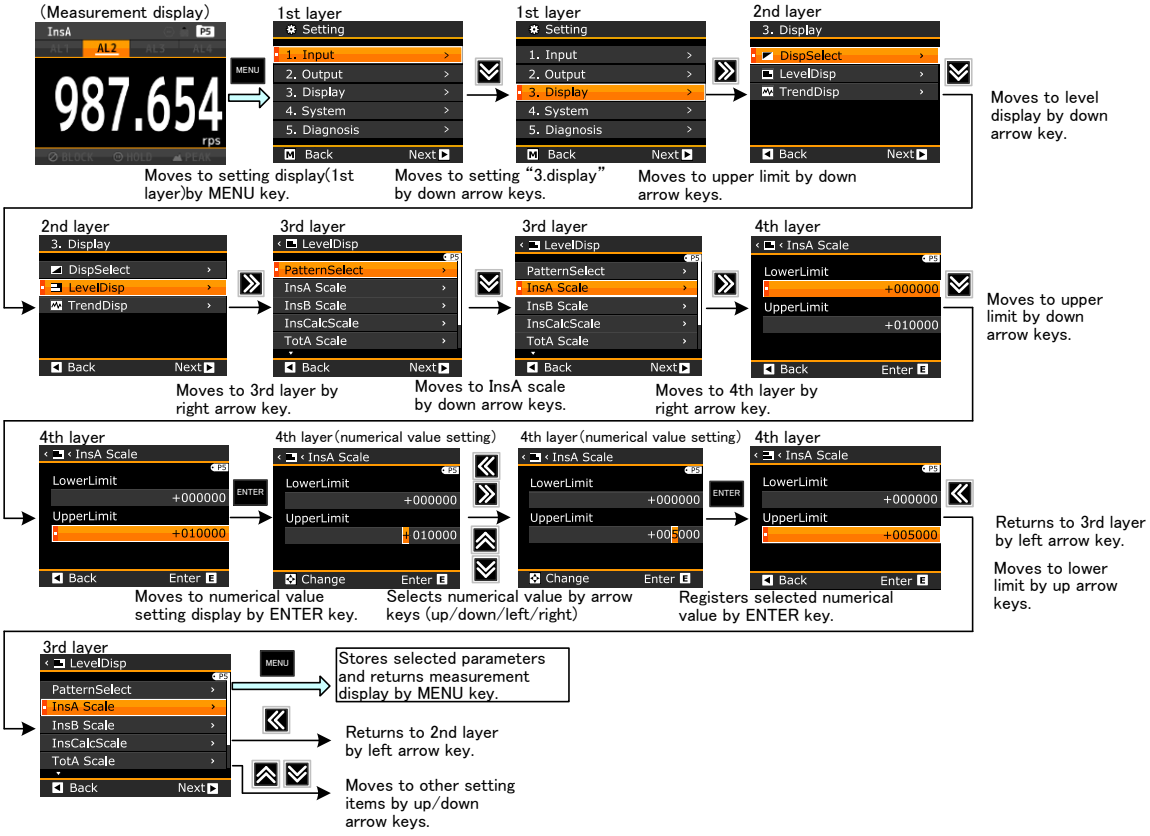
These setting variables set display scales (display range) of level display (bar graph display) for instantaneous value of inputs.
The range between scale lower limit and scale upper limit is displayed on level display as a bar graph.

**⚠CAUTION**

These setting variables set scales (display range) of level display only. Scaling settings for instantaneous values are not performed by these setting variables.
Instantaneous value B scale (InsB Scale) and instantaneous value calculation scale (IncCalc Scale) appears on models with 2-inputs (with chB).

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial values | Meanings of setting values |
|---|---|---|---|
| Instantaneous value A scale | scale lower limit ±999999 | +000000 | Set lower limit value of level display for chA instantaneous values. Left edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of level display for chA instantaneous values. Right edge is upper limit of scale. |
| Instantaneous value B scale | scale lower limit ±999999 | +000000 | Set lower limit value of level display for chB instantaneous values. Left edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of level display for chB instantaneous values. Right edge is upper limit of scale. |
| Instantaneous calculation value scale | scale lower limit ±999999 | +000000 | Set lower limit value of level display for instantaneous calculated values. Left edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of level display for instantaneous calculated values. Right edge is upper limit of scale. |

●In the level display, setting steps to set upper limit value for chA instantaneous values to “5000” are shown below. Same steps can be applied to lower limit value, chB instantaneous value and instantaneous calculation value.



### 9 - 6 - 3. TREND DISPLAY

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select (PatternSelect) | page111 |
| Set scales of trend display for instantaneous value. | Instantaneous value A scale (InsA Scale) | page112 |
| | Instantaneous value B scale (InsB Scale) | |
| | Instantaneous value calculation scale (InsCalc Scale) | |
| Set time axis for trend display | Time axis (TimeAxis) | pgae113 |

### 9 - 6 - 3 - 1. Select a Pattern Number to Configure Settings

This product can memorize 8 patterns (8 kinds) of parameters including input settings, output settings and display settings.
In measurement mode, the product calculates using one of 8 patterns which are configured.
This setting selects the pattern number which a configuration is performed.

**⚠CAUTION**

The pattern number is common to input settings, output settings and display settings.
Design contents related to"Trend Display" are registered in the pattern number selected.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Pattern select | Pattern1 | Pattern number which is selected in measurement mode. | Performs a configuration to pattern No.1 |
| | Pattern2 | | Performs a configuration to pattern No.2 |
| | Pattern3 | | Performs a configuration to pattern No.3 |
| | Pattern4 | | Performs a configuration to pattern No.4 |
| | Pattern5 | | Performs a configuration to pattern No.5 |
| | Pattern6 | | Performs a configuration to pattern No.6 |
| | Pattern7 | | Performs a configuration to pattern No.7 |
| | Pattern8 | | Performs a configuration to pattern No.8 |

● Setting steps to set pattern number for trend display to "Pattern8" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"3. Display"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"TrendDisp"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**PatternSelect**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Pattern8"**<br>* Select the pattern number which you need to be configured in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note: If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 6 - 3 - 2. Set Scales of Trend Display for Instantaneous Value

These setting variables set display scales (display range) of trend display for instantaneous value of inputs.

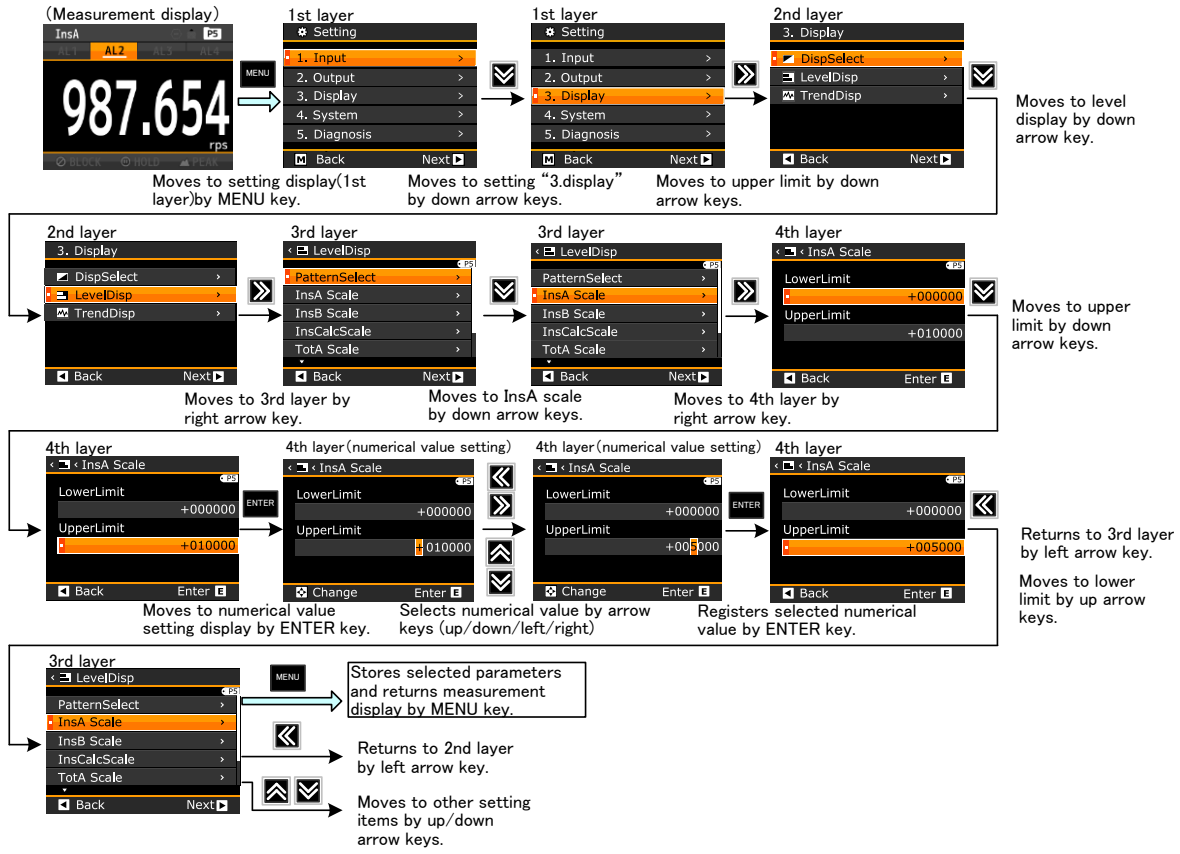
The range between scale lower limit and scale upper limit is displayed on trend display.

**⚠CAUTION**

- ○These setting variables set scales (display range) of trend display only. Scaling settings for instantaneous values are not performed by these setting variables.
- ○When the scale is modified, the trend display is redrawn using current value right after the modification and starting with the right end.
- ○"Instantaneous value B scale (InsB Scale)" and "Instantaneous value calculation scale (InsCalc Scale)" appear on models with 2 inputs (with chB).

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial values | Meanings of setting values |
|---|---|---|---|
| Instantaneous value A scale | scale lower limit ±999999 | +000000 | Set lower limit value of trend display for chA instantaneous values. Lower edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of trend display for chA instantaneous values. Upper edge is upper limit of scale. |
| Instantaneous value B scale | scale lower limit ±999999 | +000000 | Set lower limit value of trend display for chB instantaneous values. Lower edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of trend display for chB instantaneous values. Upper edge is upper limit of scale. |
| Instantaneous calculation value scale | scale lower limit ±999999 | +000000 | Set lower limit value of trend display for instantaneous calculated values. Lower edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of trend display for instantaneous calculated values. Upper edge is upper limit of scale. |

●In the trend display, setting steps to set upper limit value for chA instantaneous values to "5000" are shown below. Same steps can be applied to lower limit value, chB instantaneous value and instantaneous calculation value.



### 9 - 6 - 3 - 3. Set Time Axis for Trend Display

This setting variable sets the time axis of trend display.

> **⚠CAUTION**
>
> When the time axis is modified, the trend display is redrawn using current value right after the modification and starting with the right end.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Time axis (Time Axis) | 1s/div | * | 1 division of time axis is equivalent to 1 second. (Maximum display time) Horizontal display: 0.5min,Vertical display: 0.3min |
| | 2s/div | | 1 division of time axis is equivalent to 2 seconds. (Maximum display time) Horizontal display: 0.9min,Vertical display: 0.7min |
| | 5s/div | | 1 division of time axis is equivalent to 5 seconds. (Maximum display time) Horizontal display: 2.3min,Vertical display: 1.7min |
| | 10s/div | | 1 division of time axis is equivalent to 10 seconds. (Maximum display time) Horizontal display: 4.7min,Vertical display: 3.3min |
| | 30s/div | | 1 division of time axis is equivalent to 30 seconds. (Maximum display time) Horizontal display: 14min,Vertical display: 10min |
| | 60s/div | | 1 division of time axis is equivalent to 60 seconds. (Maximum display time) Horizontal display: 28min,Vertical display: 20min |
| | 120s/div | | 1 division of time axis is equivalent to 120 seconds. (Maximum display time) Horizontal display: 56min,Vertical display: 40min |

●Setting steps to set the time axis of trend display to "30s/div" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"3. Display"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"TrendDisp"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**TimeAxis**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. *In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"30s/div"** * Select the time axis which you need to be configured in actually. |
| ⑥ | By pushing "**ENTER**" key, a message "**Changing the time axis, trend data will be cleared"** appears and the cursor is placed on "**Cancel**" |
| ⑦ | By moving the cursor with "**ARROW (UP/DOWN)**" keys, point the cursor to **"OK".** Push "**ENTER**" key, then the setting becomes valid and the check mark moves to "30s/div". *If the setting is needed to cancel, move the cursor to **"CANCEL** "and push **"ENTER"** key. |
| ⑧ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Note:If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

## 9－7．DETAIL OF SYSTEM SETTING GROUP

The system setting group is classified to the following small 2 categories and can be configured respectively.

| 2nd layer (Small categories) | Descriptions | Remarks |
|---|---|---|
| General | Configure setting of supporting functions, such as brightness of display | |
| Initialize | Configure setting about initialization. | |

### 9 - 7 - 1．GENERAL

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Change brightness of display | Brightness | page 115 |
| Delay start up time | PowerOnDelay | page 116 |
| Set power saving time | PowerSavingTime | page 117 |
| Change displayed language | Language | page 118 |
| Change direction of display | DisplayDirecton | page 119 |
| Protect settings | SettingProtect | page 120 |
| Copy data of a pattern number to other pattern number(s). | PatternCopy | page 121 |

### 9 - 7 - 1 - 1. Change Brightness of Display

By this setting variable, the brightness of display can be controlled by 6 steps.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Brightness | 5 Bright | * | Bright |
| | 4 | | Rather dark |
| | 3 | | Dark |
| | 2 | | Very dark |
| | 1 Dark | | Darkest |
| | 0 Off | | Light off |

**⚠ CAUTION**

If "0 Off (Light off)"is set, whole of display turns light off and goes black.
In this case, display lights up by pushing MENU key and FUNC key.

●Setting steps to set brightness of display to "1 Dark "are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"4. System"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"General"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**Brightness**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"1 Dark".**<br>*Select a desired brightness in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 7 - 1 - 2. Provide Wait Time after Power on

This setting variable provides waiting time after power on to start measurement.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| PowerOn Delay | None | * | No waiting time |
| | 2sec | | Waiting time 2sec |
| | 5 sec | | Waiting time 5sec |
| | 10 sec | | Waiting time 10sec |
| | 20 sec | | Waiting time 20sec |
| | 30 sec | | Waiting time 30sec |
| | 60 sec | | Waiting time 60sec |

⚠CAUTION

○In the power on delay period, the display indicates "------".
○While "------"is displayed, all outputs keep OFF state.

●Setting steps to set "Power on delay" to "10sec"are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"4. System"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"General"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**PowerOnDelay**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"10sec".**<br>*Select a desired time in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 7 - 1 - 3. Set Power Saving Time

This setting variable sets time of power saving mode.
After no key operation over the time, the display turns power saving mode automatically.
During power saving display, if any key is pushed, the power saving mode is released.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Power saving time [PowerSavingTime] | None | * | No power saving display. |
| | 1min | | After 1minute of no key operation, display turns power saving display. |
| | 2min | | After 2minutes of no key operation, display turns power saving display. |
| | 5min | | After 5minutes of no key operation, display turns power saving display. |
| | 10min | | After 10minutes of no key operation, display turns power saving display. |
| | 30min | | After 30minutes of no key operation, display turns power saving display. |
| | 60min | | After 60minutes of no key operation, display turns power saving display. |

**⚠CAUTION**

In "Power saving display" mode, the brightness of the display is "1 dark".

●Setting steps to set "PowerSavingTime" to "5min"are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"4. System"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"General"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**PowerSavingTime**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"5min".**<br>*Select a desired time for power saving in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 7 - 1 - 4. Select Displayed Language

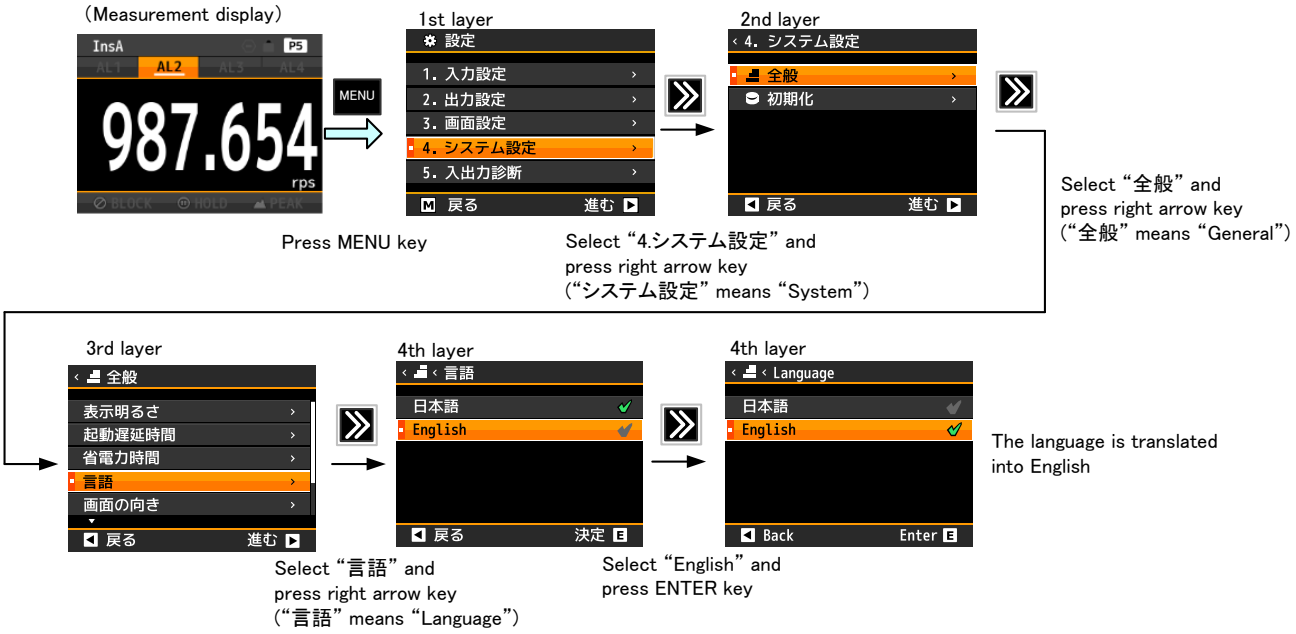
This setting variable selects language displayed in measurement mode and setting mode.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Language | 日本語 | * | Displayed in Japanese. |
| | English | | Displayed in English. |

●Setting steps to set language from "日本語" to "English" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"4. システム設定"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"全般"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**言語**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"English".**<br>*Select a desired language in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**



### 9 - 7 - 1 - 5. Change Direction of Display

This setting variable selects direction of display in measurement mode and setting mode.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Direction of display (DisplayDirection) | Horizontal | * | Horizontal display. |
| | Vertical | | Vertical display. |

**⚠CAUTION**

If you change direction of display, measurement values are cleared and measurement restarts.
Functions of Arrow keys (UP/DOWN/LEFT/RIGHT) are adapted to the direction of display.

●Setting steps to set direction of display to "Vertical" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"4. System"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"General"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**DisplayDirection**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Vertical".**<br>*Select a desired direction in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 7 - 1 - 6. Protect Settings

By this setting variable, settings which have been configured can be protected to prevent further change in setting mode.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Setting protect (SettingProtect) | Disable | * | Protection of settings is disabled. |
| | Enable | | Protection of settings is enabled. |

**⚠CAUTION**

When setting protection is enabled, you can see setting values which are configured, but you cannot change them. If you need to change them, let setting protect to disable in advance.

●Setting steps to set "Setting protect" to "Enable" are shown below.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"4. System"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"General"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**SettingProtect**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**.<br>*In the 4th layer, the currently selected parameter accompanies a check mark. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Enable".**<br>*Select a desired setting in actually. |
| ⑥ | Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies.<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 9 - 7 - 1 - 7. Copy Configured Pattern Data to Other Patterns

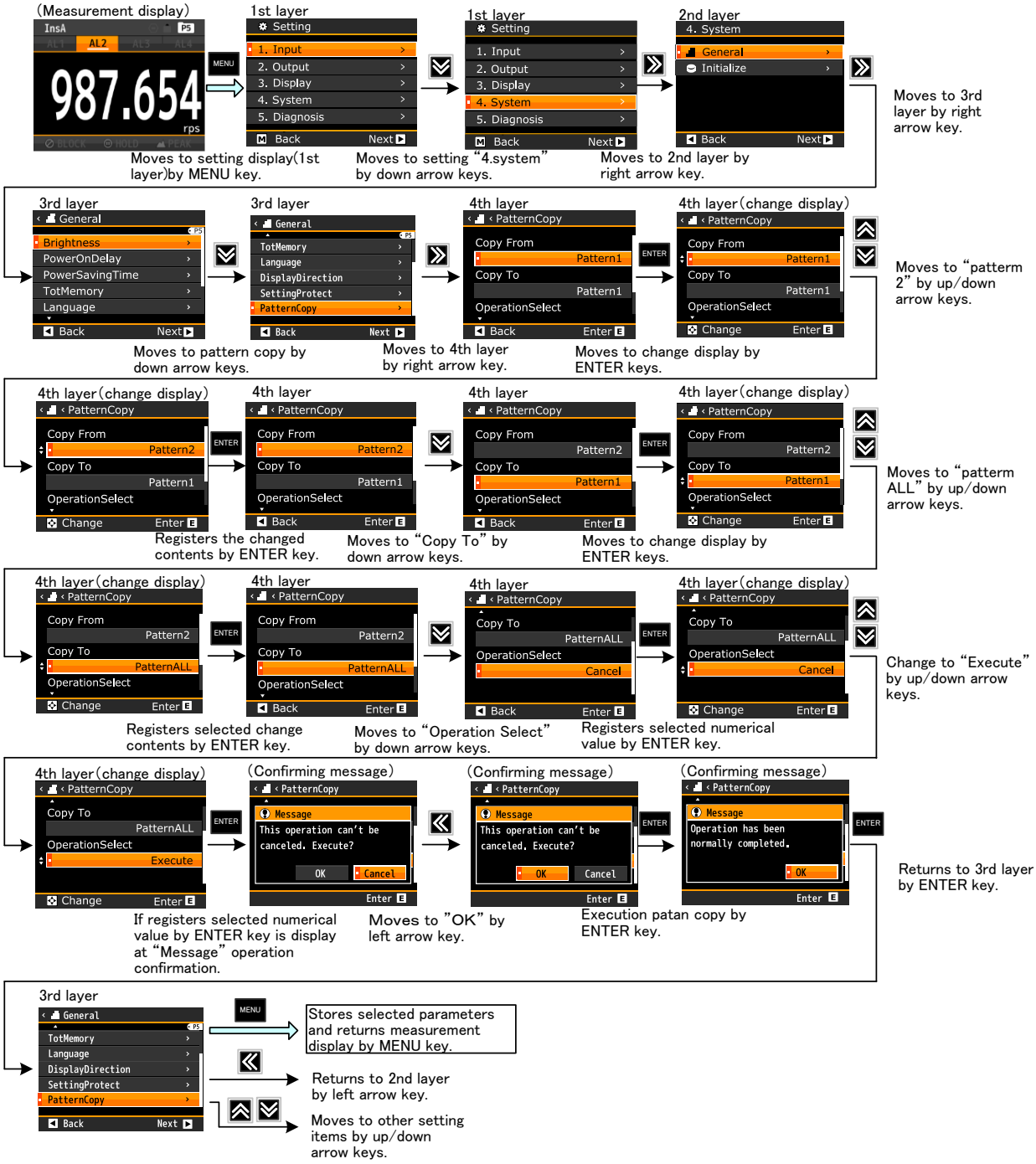
Using this setting variable, you can copy a configured pattern data on some pattern number to other pattern number(s).

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Pattern copy | (Copy from) [Source pattern number] | | |
| | Pattern1 | * | Copy data of Pattern 1 to destination pattern No. |
| | Pattern2 | | Copy data of Pattern 2 to destination pattern No. |
| | Pattern3 | | Copy data of Pattern 3 to destination pattern No. |
| | Pattern4 | | Copy data of Pattern 4 to destination pattern No. |
| | Pattern5 | | Copy data of Pattern 5 to destination pattern No. |
| | Pattern6 | | Copy data of Pattern 6 to destination pattern No. |
| | Pattern7 | | Copy data of Pattern 7 to destination pattern No. |
| | Pattern8 | | Copy data of Pattern 8 to destination pattern No. |
| | (Copy to) [Destination pattern number] | | |
| | Pattern1 | | Copy data of source pattern No to Pattern 1. |
| | Pattern2 | | Copy data of source pattern No to Pattern 2. |
| | Pattern3 | | Copy data of source pattern No to Pattern 3. |
| | Pattern4 | | Copy data of source pattern No to Pattern 4. |
| | Pattern5 | | Copy data of source pattern No to Pattern 5. |
| | Pattern6 | | Copy data of source pattern No to Pattern 6. |
| | Pattern7 | | Copy data of source pattern No to Pattern 7. |
| | Pattern8 | | Copy data of source pattern No to Pattern 8. |
| | All patterns | * | Copy data of source pattern No to All pattern No. |
| | (Operation Selects) | | |
| | Cancel | * | Cancel pattern copy |
| | Execute | | Execute pattern copy |

**⚠CAUTION**

When setting protects is enabled, you can see setting values which are configured, but you cannot change them. If you need to change them, let setting protect to disable in advance.

●Setting steps to copy configured data of pattern 2 to all pattern numbers are shown below.



### 9 - 7 - 2. INITIALIZATION

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Restore setting values to user default value. | Save user defaults (UserDefaultSave) | page123 |
| | Initialize to user defaults (UserDefaultLoad) | page123 |
| Restore setting values to factory default value | Initialize to factory defaults (FactoryDefaultLoad) | page124 |

#### 9 - 7 - 2 - 1. Restore Setting Values to User Default Value (Save User Defaults)

Using this setting variable, you can save setting values you have configured as user default values and can initialize to these saved values. First, registering user default values are needed.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Save user defaults (UserDefaultSave) | Save current settings as user initial values? | | |
| | Yes | | Execute saving to register. |
| | No | * | Cancel saving to register. |

**⚠CAUTION**

To save user default values, setting values must be configured to values which are used as initial values.

●The operation for registering user default values is same as the case of "initialize to factory defaults". Refer to "9-7-2-3. Restore setting values to factory default value".

#### 9 - 7 - 2 - 2. Restore Setting Values to User Default Value (Initialize to User Defaults)

Using this setting variable, setting values can be restored to user default values.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Initialize to user defaults (UserDefaultLoad) | Initialize setting values to user initial values? | | |
| | Yes | | Execute initialization. |
| | No | * | Cancel initialization. |

●The operation for registering user default values is same as the case of "initialize to factory defaults". Refer to "9-7-2-3. Restore setting values to factory default value".

### 9 - 7 - 2 - 3. Restore Setting Values to Factory Default Value

Using this setting variable, setting values can be restored to factory default values.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Initialize to factory defaults (FactoryDefaultLoad) | Initialize setting values to factory defaults? | | |
| | Yes | | Execute initialization. |
| | No | * | Cancel initialization. |

●To initialize setting values to factory default values perform the following operation.


Note: The setting method of the language is referred to p118

## 9－8．DETAIL OF INPUT-OUTPUT DIAGNOSIS GROUP

The input-output diagnosis group is classified to the following small 2 categories and can be configured respectively.

| 2nd layer (Small categories) | Descriptions | Remarks |
|---|---|---|
| Input diagnosis | Performs diagnosis for inputs. | |
| Output test | Outputs “simulated outputs” | |

### 9 - 8 - 1．INPUT DIAGNOSIS

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Pulse input diagnosis | PulseInputA | page126 |
| | PulseInputB | |
| External control input diagnosis | ExtenalCtrl | page127 |

### 9 - 8 - 1 - 1. Pulse Input Diagnosis

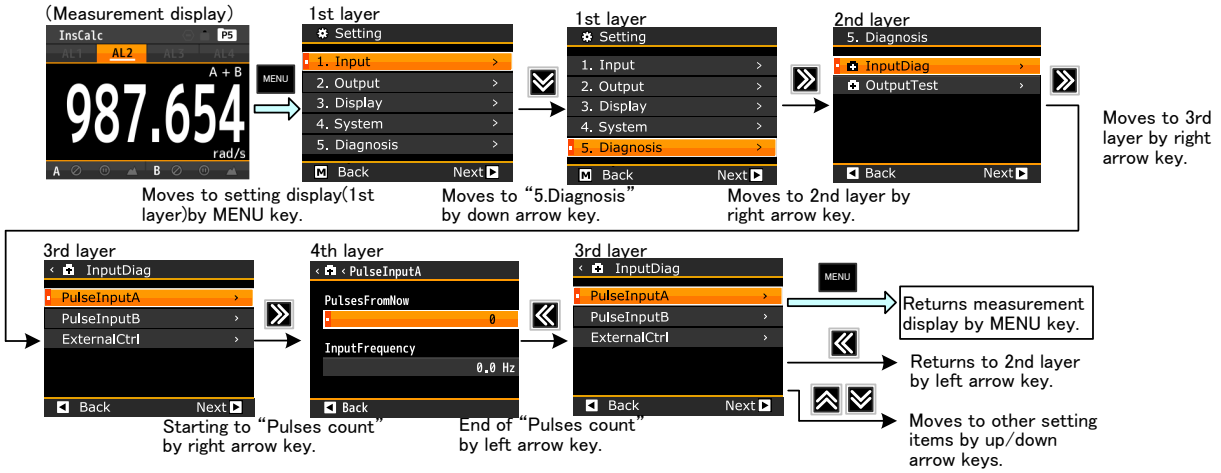
Pulse input diagnosis is useful for checking the pulse inputs when display value is not correct or when existence of sensor outputs is uncertain.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| PulseInputA | – | – | No setting value, no initial value |
| | Number of pulse after entering 4th layer | | Entering 4th layer, starts counting pulse immediately. |
| | InputFrequency | | Display current frequency measurement value |
| PulseInputB | – | – | No setting value, no initial value |
| | Number of pulse after entering 4th layer | | Entering 4th layer, starts counting pulse immediately. |
| | InputFrequency | | Display current frequency measurement value |

**⚠CAUTION**

Only WPMZ-5-*PP-**-*** and WPMZ-5-*LL-**-*** is “PulseInputB” appears.
In this case, **“PulseInputA”** is for chA input, “PulseInputB” is for chB input.

●To perform the pulse input diagnosis, the following operation is needed.
(Same operation can be also applied to the pulse input B.)

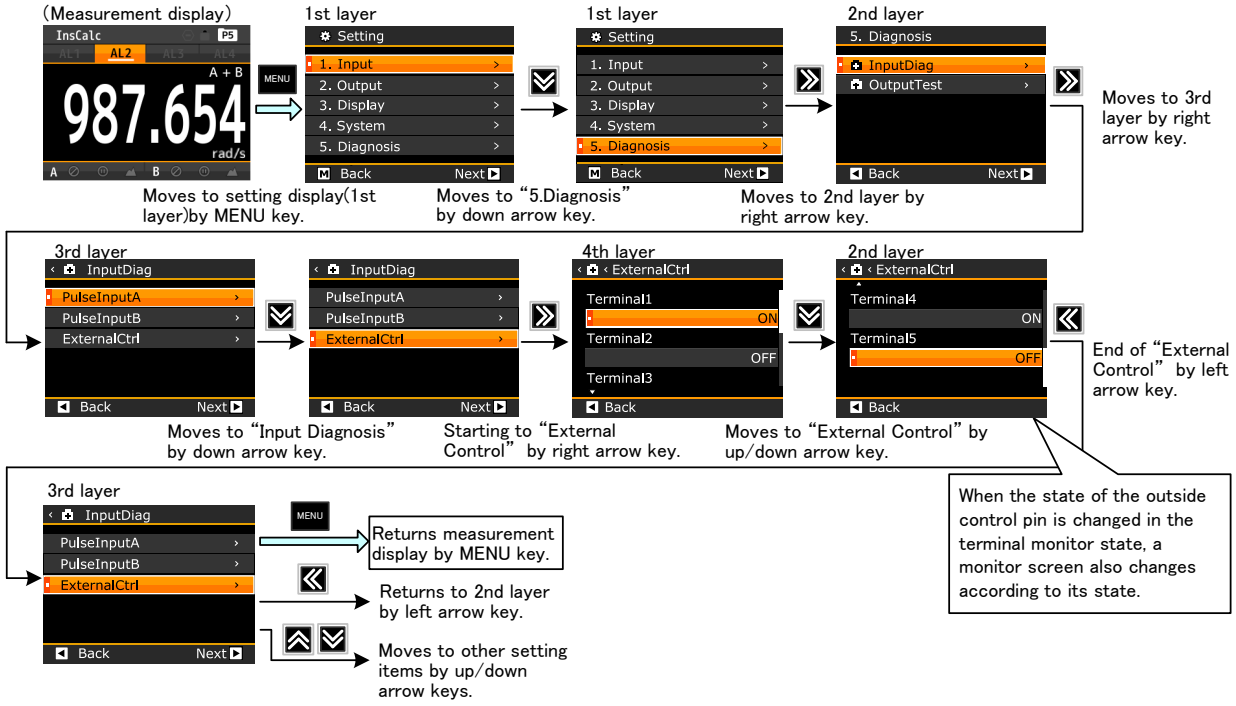


### 9 - 8 - 1 - 2. External Control Input Diagnosis

By External Control Input Diagnosis, the status of external control terminal can be monitored.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| External Control Inputs (ExternalCtrl) | (terminal 1) | | |
| | Current status | OFF | Displays current status in “OFF” or “ON”. |
| | (terminal 2) | | |
| | Current status | OFF | Displays current status in “OFF” or “ON”. |
| | (terminal 3) | | |
| | Current status | OFF | Displays current status in “OFF” or “ON”. |
| | (terminal 4) | | |
| | Current status | OFF | Displays current status in “OFF” or “ON”. |
| | (terminal 5) | | |
| | Current status | OFF | Displays current status in “OFF” or “ON”. |

●To perform the external control input diagnosis, the following operation is needed.



### 9 - 8 - 2. OUTPUT TEST

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Simulated output on comparative output | Comparative output AL1 (Compare AL1) | page129 |
| | Comparative output AL2 (Compare AL2) | |
| | Comparative output AL3 (Compare AL3) | |
| | Comparative output AL4 (Compare AL4) | |
| Simulated output on analog output | AnalogOutput | page 131 |
| Simulated output on BCD output | BCD Output(DATA) | page 133 |
| | BCD Output(PC) | |
| Diagnosis of RS-232C communication | RS-232C Com | page135 |
| Diagnosis of Modbus communication | ModbusCom | page136 |

### 9 - 8 - 2 - 1. Simulated Output of Comparative Output

By using simulated output of comparative output, the status of comparative output can be set to "ON" or "OFF" arbitrary. You can test devices connected to comparative outputs in advance.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Comparative output AL1 (Compare AL1) | TestOutput | | |
| | Disable | * | Simulated output is disabled. |
| | Enable | | Simulated output is enabled. |
| | TerminalOutput | | |
| | ON output | * | Terminal state is ON when enabled. |
| | OFF output | | Terminal state is OFF when enabled. |
| Comparative output AL2 (Compare AL2) | TestOutput | | |
| | Disable | * | Simulated output is disabled. |
| | Enable | | Simulated output is enabled. |
| | TerminalOutput | | |
| | ON output | * | Terminal state is ON when enabled. |
| | OFF output | | Terminal state is OFF when enabled. |
| Comparative output AL3 (Compare AL3) | TestOutput | | |
| | Disable | * | Simulated output is disabled. |
| | Enable | | Simulated output is enabled. |
| | TerminalOutput | | |
| | ON output | * | Terminal state is ON when enabled. |
| | OFF output | | Terminal state is OFF when enabled. |
| Comparative output AL4 (Compare AL4) | TestOutput | | |
| | Disable | * | Simulated output is disabled. |
| | Enable | | Simulated output is enabled. |
| | TerminalOutput | | |
| | ON output | * | Terminal state is ON when enabled. |
| | OFF output | | Terminal state is OFF when enabled. |

⚠ CAUTION

If simulated output is enabled, output continues until the setting is set to disable or power off.

●To perform the test output of comparative output, the following operation is needed.
(Same operation can be also applied to comparative outputs AL2-AL4.)


*To stop simulated output, set "simulated output setting" to "Disable" or turn the power once.

### 9 - 8 - 2 - 2. Simulated Output of Analog Output

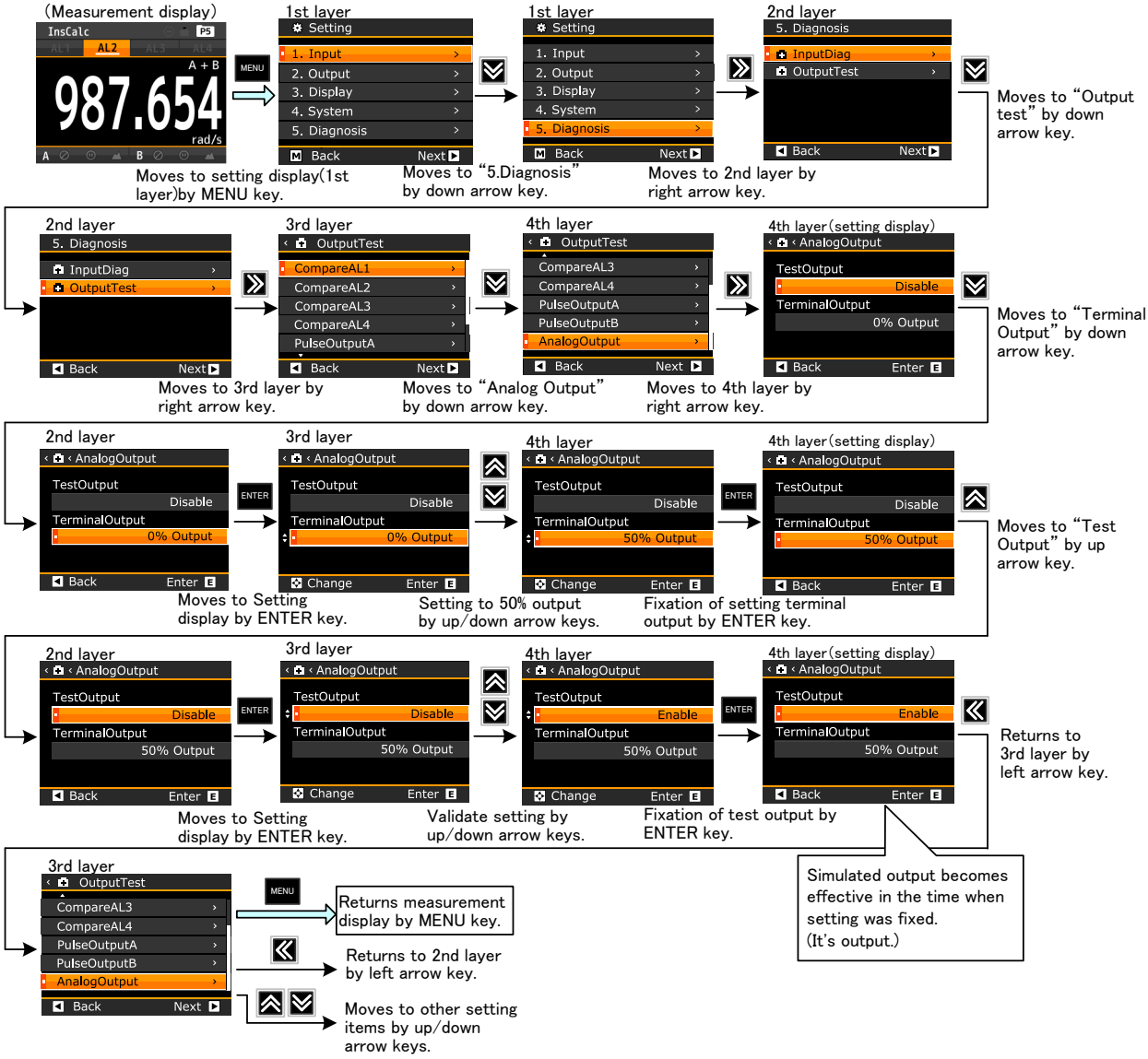
Simulated output of analog output can output 0-100% (10% steps) value of selected output range. You can test devices connected to analog outputs in advance.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Analog output (AnalogOutput) | TestOutput | | |
| | Disable | * | Simulated output is disabled. |
| | Enable | | Simulated output is enabled. |
| | TerminalOutput | | |
| | 0% | * | Outputs 0 % value of output range. |
| | 10% | | Outputs 10 % value of output range. |
| | 20% | | Outputs 20 % value of output range. |
| | 30% | | Outputs 30 % value of output range. |
| | 40% | | Outputs 40 % value of output range. |
| | 50% | | Outputs 50 % value of output range. |
| | 60% | | Outputs 60 % value of output range. |
| | 70% | | Outputs 70 % value of output range. |
| | 80% | | Outputs 80 % value of output range. |
| | 90% | | Outputs 90 % value of output range. |
| | 100% | | Outputs 100 % value of output range. |

⚠CAUTION

* Once simulated output is enabled, output continues until the setting is set to disable or turning off power of the product.
* This setting variable appears only on models with analog output (WPMZ-5-***-1*-***).

●To perform the test output of analog Output, the following operation is needed. The operation is an example to output 50% value of rating.




*** To stop simulated output, set setting to "Disable" or turn off the power of the product.**

### 9 - 8 - 2 - 3. Simulated Output of BCD Output

Simulated output of BCD output can set each bit of BCD to “ON” level or “OFF” level arbitrarily. You can test devices connected to BCD outputs in advance.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| BCD output (DATA) | TestOutput | | |
| | Disable | * | Simulated output is disabled. |
| | Enable | | Simulated output is enabled. |
| | POL Output | | Output to POL terminal |
| | OFF output | * | Terminal state is OFF when enabled. |
| | ON output | | Terminal state is ON when enabled. |
| | OVER Output | | Output to OVER terminal |
| | OFF output | * | Terminal state is OFF when enabled. |
| | ON output | | Terminal state is ON when enabled. |
| | $10^5$-1/$10^5$-2/$10^5$-4/$10^5$-8 Output | | Output to $10^5$ digit 1/2/4/8bit terminal |
| | OFF output | * | Terminal state is OFF when enabled. |
| | ON output | | Terminal state is ON when enabled. |
| | $10^4$-1/$10^4$-2/$10^4$-4/$10^4$-8 Output | | Output to $10^4$ digit 1/2/4/8bit terminal |
| | OFF output | * | Terminal state is OFF when enabled. |
| | ON output | | Terminal state is ON when enabled. |
| | $10^3$-1/$10^3$-2/$10^3$-4/$10^3$-8 Output | | Output to $10^3$ digit 1/2/4/8bit terminal |
| | OFF output | * | Terminal state is OFF when enabled. |
| | ON output | | Terminal state is ON when enabled. |
| | $10^2$-1/$10^2$-2/$10^2$-4/$10^2$-8 Output | | Output to $10^2$ digit 1/2/4/8bit terminal |
| | OFF output | * | Terminal state is OFF when enabled. |
| | ON output | | Terminal state is ON when enabled. |
| | $10^1$-1/$10^1$-2/$10^1$-4/$10^1$-8 Output | | Output to $10^1$ digit 1/2/4/8bit terminal |
| | OFF output | * | Terminal state is OFF when enabled. |
| | ON output | | Terminal state is ON when enabled. |
| | $10^0$-1/$10^0$-2/$10^0$-4/$10^0$-8 Output | | Output to $10^0$ digit 1/2/4/8bit terminal |
| | OFF output | * | Terminal state is OFF when enabled. |
| | ON output | | Terminal state is ON when enabled. |
| BCD output (PC) | TestOutput | | |
| | Disable | * | Simulated output is disabled. |
| | Enable | | Simulated output is enabled. |
| | PC Output | | Output to PC terminal. |
| | OFF output | * | Terminal state is OFF when enabled. |
| | ON output | | Terminal state is ON when enabled. |

## ⚠CAUTION

- Once simulated output is enabled, output continues until the setting is set to disable or turning off power of the product.
- This setting variable appears only on models with BCD output (WPMZ-5-***-2 or 3*-***)

To perform the test output of BCD Output, the following operation is needed. The operation is an example to output POL.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"5. Diagnosis"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"OutputTest"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**BCD Output (DATA)**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer**. |
| ⑤ | By moving the cursor with "**ARROW (DOWN)**" key, point the cursor to "**POL Output** " and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer**. |
| ⑥ | By moving the cursor with "**ARROW (DOWN)**" key, point the cursor to "**POL Output**" and by pushing "**ENTER**" key, setting becomes acceptable. And, icon of "**ARROW (UP/DOWN)"** key appears on left side of the cursor.<br>Using "**ARROW (UP/DOWN)**" keys, test output is set to "**ON output**".<br>*Set all bits for outputs desired to be tested to "ON output" or "OFF output" in actually. |
| ⑦ | By pushing "**ENTER**" key, the setting is fixed, the icon of "**ARROW (UP/DOWN)"** key on left side of the cursor disappears. |
| ⑧ | By moving the cursor with "**ARROW (UP)**" key, point the cursor to "**TestOutput"** and push "ENTER" key, then setting is acceptable. And, icon of "**ARROW (UP/DOWN)"** key appears on left side of the cursor.<br>Using "**ARROW (UP/DOWN)**" keys, test output is set to "**Enable**". |
| ⑨ | By pushing "**ENTER**" key, setting values are fixed and **Simulated output start to output.**<br>*Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑩ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

**Caution: To stop simulated output, set setting to "Disable" or turn off the power of the product.**

### 9 - 8 - 2 - 4. Diagnosis of RS-232C Communication

Diagnosis of RS-232C communication provides monitoring of communication condition. Command sent from host and response to the command is displayed.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| RS-232C Communication | ReceiveData | | Displays data sent from host (command) |
| | — | — | No setting value (No initial value) |
| | TransmitData | | Displays response data |
| | — | — | No setting value (No initial value) |

**⚠CAUTOION**

This setting variable appears only on models with RS-232C communication (WPMZ-5-***-4*-***).

●To perform diagnosis of RS-232C communication, the following operation is needed.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"5. Diagnosis"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"OutputTest"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**). |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**RC-232C Com**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer** and diagnosis (communication check) can be done. |
| ⑤ | If Data (command) is sent from host correctly, it is **displayed as Receive Data** and **Response data is displayed** as transmit data. |
| ⑥ | Pushing "**ARROW (LEFT)**"key, the display returns to the 3rd layer and diagnosis of RS-232C is terminated.<br>Pushing "**ARROW (LEFT)**"key moreover, the display returns to the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

### 9 - 8 - 2 - 5. Diagnosis of Modbus Communication

Diagnosis of RS-485 (Modbus) communication, which although belongs to "Output Test" category, allows to monitoring the condition of communication.
Both of received data which is transmitted by the host as command and transmitted data which is transmitted by this product as the response to the command can be displayed.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Modbus Communication [ModbusCom] | Received data | | Displays data transmitted from the host as command. |
| | – | – | No setting value (No initial value) |
| | Transmitted data | | Displays data transmitted from this product as response. |
| | – | – | No setting value (No initial value) |

**⚠ CAUTION**

This setting variable appears only on models with Modbus communication function (WPMZ-5-***-5*-***).

●For diagnosis of Modbus communication, perform the following operation.

| No. | Descriptions |
|---|---|
| ① | By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"5. Diagnosis"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"Output test"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables)**. |
| ④ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"ModbusCom"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 4th layer** and diagnosis (communication check) can be done. |
| ⑤ | If Data (command) is sent from host correctly, it is **displayed as Receive Data** and **Response data is displayed** as transmit data. |
| ⑥ | Pushing "**ARROW (LEFT)**"key, the display returns to the 3rd layer and diagnosis of Modbus is terminated.<br>Pushing "**ARROW (LEFT)**"key moreover, the display returns to the 2nd layer and 1st layer. If you need other settings, operate required steps continuously. |
| ⑦ | By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display. |

# 10. CONTROL FUNCTIONS

## 10－1. EXTERNALCONTROL FUNCTIONS

As external control functions, this product have compare reset function, measurement inhibit function, display hold function, maximum value hold function, minimum value hold function, pattern select function etc., each function can be performed by assigning to external control terminals 1-5.

### 10-1-1. EXTERNAL CONTROL FUNCTION ICONS

When an EXTERNAL CONTROL FUNCTION is enabled, an ICON for each function lights up.

| Icon | Description |
|---|---|
| P5 | Indicates pattern No. in use. |
| | Indicates the KEY LOCK function is effective. |
| | Indicates the COMPARATIVE OUTPUT RESET function is effective. |
| | Indicates the MEASUREMENT INHIBIT function is effective. |
| | Indicates the DISPLAY HOLD function is effective. |
| | Indicates the MAXIMUM VALUE HOLD function is effective. |
| | Indicates the MINIMUM VALUE HOLD function is effective. |

### 10-1-2. TERMINAL CONTROL

The control of assigned functions is performed by shorting each terminal to the com terminal or bringing to the “0” level

“0” level: 0 to 1.5V

“1” level: 3.5 to 5V

Input current: -1.2mA

* The control terminals 1 to 5 are isolated from Power and input as DC signals.

### 10-1-3. COMPARATIVE OUTPUT RESET FUNCTION

Comparative output reset function makes all of comparative judgement results and their outputs OFF.

The function becomes valid while the terminal which is assigned the function is shortened to the COM terminal or brought to 0 level.

### 10-1-4. MEASUREMENT INHIBIT FUNCTION

The measurement inhibit function inhibits the input and the display value accompanies this.

This function can be selected from the following 3 kinds.

The function becomes valid while the terminal which is assigned the function is shortened to the COM terminal or brought to 0 level.

Measurement inhibit A: inhibits the input of chA

Measurement inhibit B: inhibits the input of chB

Measurement inhibit A&B: inhibits the inputs of both chA and chB

### 10-1-5. DISPLAY HOLD FUNCTION

Display hold function holds current display value and can be selected from the following 3 kinds.

The function becomes valid while the terminal which is assigned the function is shortened to the COM terminal or brought to 0 level.

While this function is valid, measurement action is performed internally and the latest measurement value is displayed when the function become invalid.

Display hold A: holds the display of chA

Display hold B: holds the display of chB

Display hold A&B: holds the display of chA and chB

### 10-1-6. MAXIMUM VALUE HOLD FUNCTION

Maximum value hold function is the function which holds the maximum display value and can be selected from the following 3 kinds.
The function becomes valid while the terminal which is assigned the function is shortened to the COM terminal or brought to 0 level.

Maximum hold A: holds the maximum display value of chA
Maximum hold B: holds the maximum display value of chB
Maximum hold A&B: holds the maximum display value of chA and chB

*If the displayed value becomes over while the maximum hold function is valid, over display never disappears until the function is canceled.

Note: This function is valid for the instantaneous value only.

### 10-1-7. MINIMUM VALUE HOLD FUNCTION

Minimum value hold function is the function which holds the minimum display value and can be selected from the following 3 kinds.
The function becomes valid while the terminal which is assigned the function is shortened to the COM terminal or brought to 0 level.
*When both of the maximum value hold and the minimum value hold are ON simultaneously, only the maximum value hold becomes valid.

Minimum hold A: holds the minimum display value of chA
Minimum hold B: holds the minimum display value of chB
Minimum hold A&B: holds the minimum display value of chA and chB

Note: This function is valid for the instantaneous value only and invalid for the totalized value.

### 10-1-8. PATTERN SELECT FUNCTION

This product can memorize 8 patterns (8 kinds) of parameters including input settings (pulse input A/B, analog input A/B, 2 input calculations), output settings and display settings.
By using pattern select 1-3, Up to 8 patterns can be switched.

| Function Name | Selected pattern No. (pattern No. in use) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Pattern select1 | Open | Short | Open | Short | Open | Short | Open | Short |
| Pattern select2 | Open | Open | Short | Short | Open | Open | Short | Short |
| Pattern select3 | Open | Open | Open | Open | Short | Short | Short | Short |

Open: pattern select terminal is open or connected to "1" level.
Short: pattern select terminal is shorted to COM terminal or connected to "0" level.

**⚠ CAUTION**

If the used pattern is switched, measured data is cleared and the measurement restarts from the switched time point.

### 10-1-9. MONITOR CHANGE FUNCTION

The monitor change function is the function which switches display.
The display is switched by shortening the terminal, which the function is assigned to, to COM terminal or bringing it to "0" level for over 20ms.
It performs same action of DISP key at front panel.

### 10-1-10. TREND HOLD FUNCTION

The trend hold function is a function which holds the trend display.
The function becomes valid while the terminal which is assigned the function is shortened to the COM terminal or brought to 0 level.

**⚠CAUTION**

When the function is disabled, the WPMZ starts plotting the trend display with the current measurement value.

## １０－２．SHORTCUT FUNCTION

Shortcut function is external control functions are registered to arrow keys and are performed not by the terminal control but by the operation of the keys.

### １０－２－１．SHORTCUT REGISTER KEYS

Keys which can be registered shortcut functions are shown below.

| Keys can be registered shortcut Functions in | | |
|---|---|---|
|  | Up arrow key | Used in the shortcut function on measurement display. |
|  | Down arrow key | |
|  | Left arrow key | |
|  | Right arrow key | |

### １０－２－２．FUNCTIONS CAN BE REGISTERED TO SHORTCUT

Functions which can be registered to shortcut functions are shown below

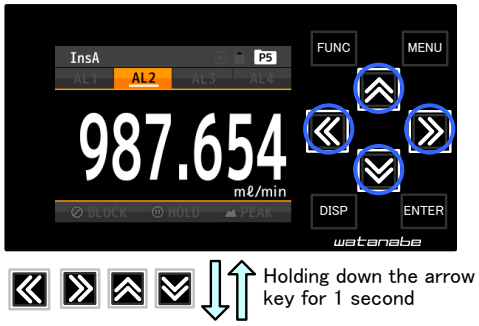
| Function | Action |
|---|---|
| None | No function. |
| Comparative output reset | Comparative output reset function makes all of comparative judgement results and their outputs OFF. |
| Measurement block A | The measurement inhibit chA is function inhibits the input and the display value accompanies this. |
| Measurement block B | The measurement inhibit chB is function inhibits the input and the display value accompanies this. |
| Measurement block A&B | The measurement inhibit chA and chB is function inhibits the input and the display value accompanies this. |
| Display hold A | Display hold chA function holds display value. |
| Display hold B | Display hold chB function holds display value. |
| Display hold A&B | Display hold chA and chB function holds display value. |
| Maximum value hold A | Maximum value hold chA function is the function which holds the maximum display value. |
| Maximum value hold B | Maximum value hold chB function is the function which holds the maximum display value. |
| Maximum value hold A&B | Maximum value hold chA and chB function is the function which holds the maximum display value. |
| Minimum value hold A | Minimum value hold chA function is the function which holds the minimum display value. |
| Minimum value hold B | Minimum value hold chB function is the function which holds the minimum display value. |
| Minimum value hold A&B | Minimum value hold chA and chB function is the function which holds the minimum display value. |
| Pattern select | Pattern select function assigned to 1st bit |
| Trend hold | The trend hold function is a function which holds the trend display. |

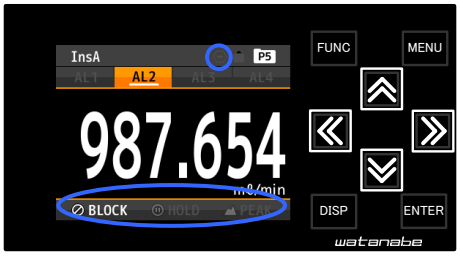
## 10-2-3. REGISTERING SHORTCUT FUNCTIONS

Registering shortcuts how to set up is shown below


## 10-2-4. PERFORMING SHORTCUT FUNCTIONS

A shortcut function is performed by holding down the arrow key which an external control function is registered for 1 second.
An active function becomes inactive by holding down the arrow key which the function is registered for 1 second again.




The icon for active external control lights up

### ⚠ CAUTION

If the external control assigned to the shortcut is registered in the terminal, it can not be controlled with shortcut function.

※Priority of external control is
"RS control"> "control with external control terminal"> "control with arrow keys (shortcut function)".

# 11. COMPARATIVE OUTPUT FUNCTION

## 11－1. COMPARATIVE OUTPUT FUNCTION

Comparative output function compares displayed value (including other displayable values) and judgement value which is configured in advance and shows the result on "comparison result" on the display and also outputs the result on comparative output terminals.

Comparative outputs are open-collector outputs which can be selected from NPN type or PNP type by model codes.
As modes of the comparison, 2 modes shown below are available.

| Comparison mode | Action |
|---|---|
| Level judgement | Compares a displayable value to 1 judgement value in magnitude relation. |
| Zone judgement | Compares a displayable value to 2 judgement values in inclusion relation. |

### 11-1-1. SOURCE DISPLAYABLE VALUE FOR COMPARISON

As comparative outputs, this product has 4 outputs AL1-AL4 which can be configured independently.
To each displayable value, comparative outputs AL1-AL4 can be assigned arbitrarily.
For example, you can assign each displayable value to all of AL1-AL4, or else, you can assign the instantaneous value of chA input to AL1, AL2, instantaneous value of chB to AL3, AL4.

**⚠ CAUTION**

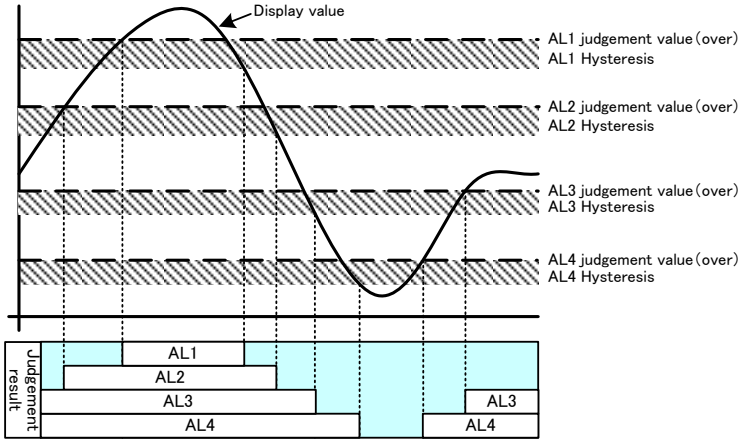
Comparative output can be assigned to a displayable item including items which are not displayed on the display. If the condition of comparison is met, "comparison result" is displayed and comparative output is output.

### 11-1-2. LEVEL JUDGEMENT

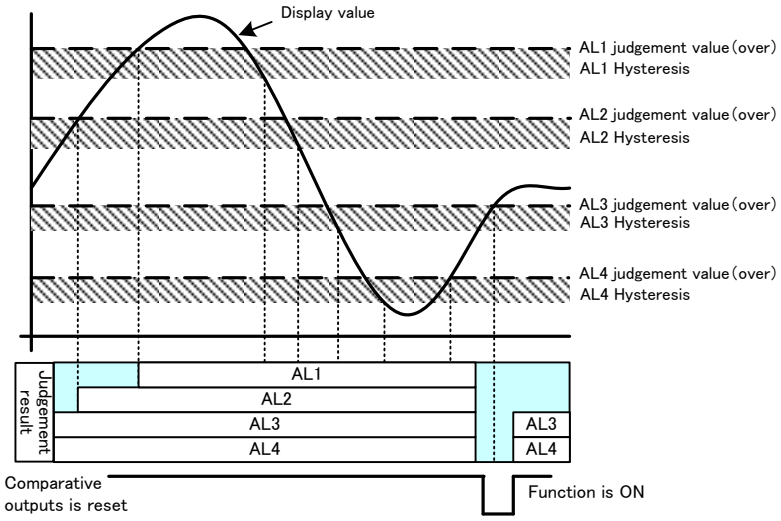
In the case that the "level judgement" is selected in compare mode, this product judges magnitude relation to comparison judgement value.
To output comparison result, by configurations for "Condition of ON (OnConditions)", "output mode (OutputMode)" etc. , compare action should be determined.
The followings show judgement actions on each output mode in the case that comparative outputs AL1-AL4 are assigned to one displayable item (i.e. source value).
1) Upper judgement of 4 steps
For using in the upper judgement, the setting variable "Condition of ON (OnCondition)" should be configured to "excess".

| Comparative output | Condition of ON | Condition of comparison | Judgement result |
|---|---|---|---|
| AL1 | ON at "Excess" | Display value >AL1 judgement value | AL1 |
| AL2 | ON at "Excess" | Display value >AL2 judgement value | AL2 |
| AL3 | ON at "Excess" | Display value >AL3 judgement value | AL3 |
| AL4 | ON at "Excess" | Display value >AL4 judgement value | AL4 |

●Judgement action in the case that output mode is "Normal".
Output mode "Normal": comparative output is valid while judgement is ON.



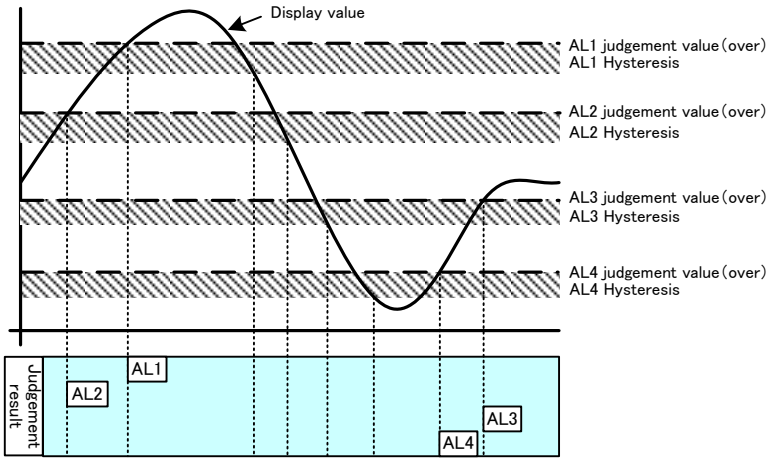
●Judgement action in the case that output mode is “Latch”.
Output mode “Latch”: Comparative output keeps valid once judgement becomes ON.




## ⚠CAUTION

In Latch mode, reset of comparative output is performed by comparative output reset of external control.

●Judgement action in the case that output mode is “One Shot”.
Output mode “One Shot”: Comparative output is valid while setup time period after judgement is ON.



2) Upper judgement of 2 steps and lower judgement of 2 steps (HH/HI/LO/LL)

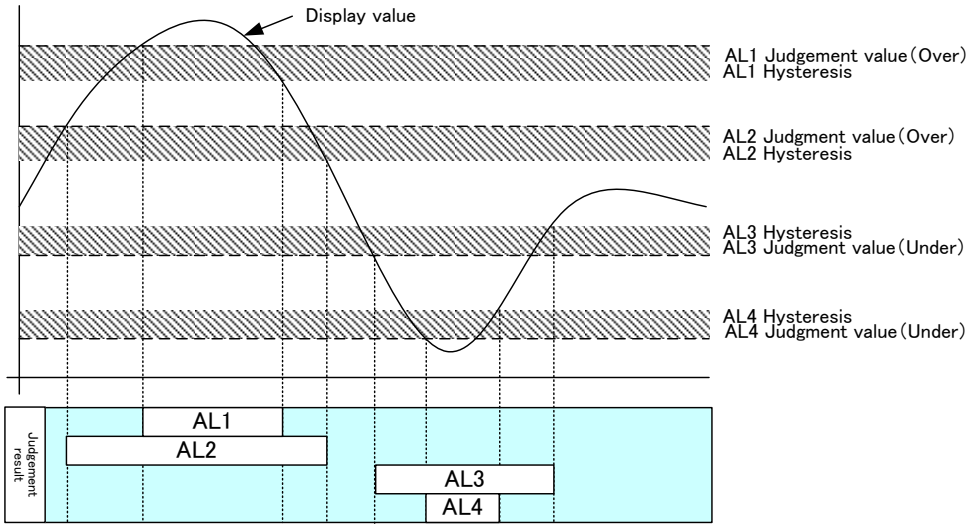
For AL1 and AL2 used in the upper judgement, the setting variable "Condition of ON (OnCondition)" should be configured to "Excess".

For AL3 and AL4 used in the lower judgement, the setting variable "Condition of ON (OnCondition)" should be configured to "Less Than".

| Comparative output | Condition of ON | Condition of comparison | Judgement result |
|---|---|---|---|
| AL1 | ON at "Excess" | Display value >AL1 judgement value | AL1 |
| AL2 | ON at "Excess" | Display value >AL2 judgement value | AL2 |
| AL3 | ON at "Less Than" | Display value <AL3 judgement value | AL3 |
| AL4 | ON at "Less Than" | Display value <AL4 judgement value | AL4 |

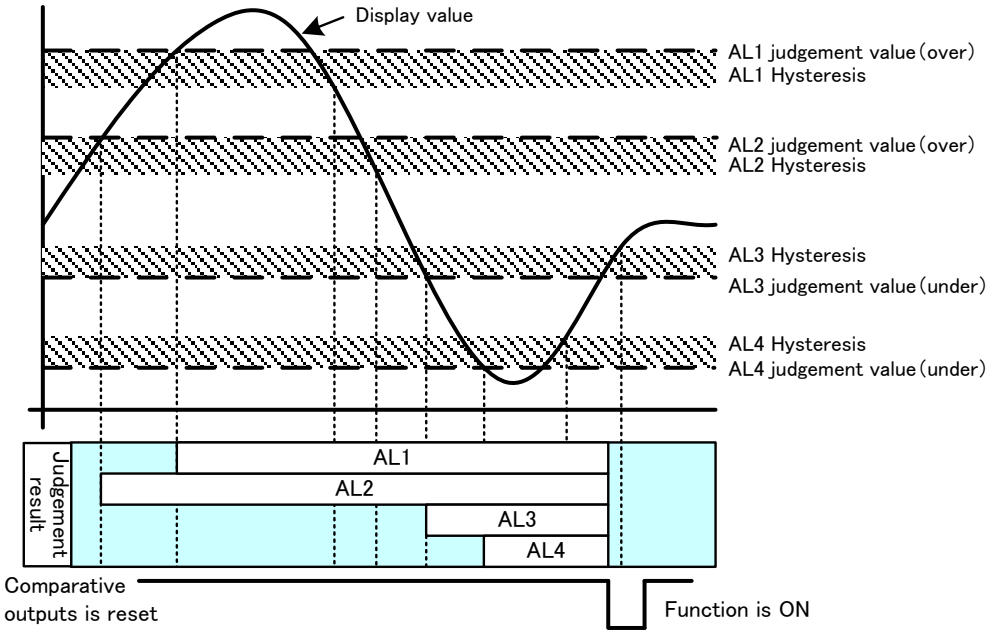
●Judgement action in the case that output mode is "Normal".

Output mode "Normal": comparative output is valid while judgement is ON.




●Judgement action in the case that output mode is "Latch".

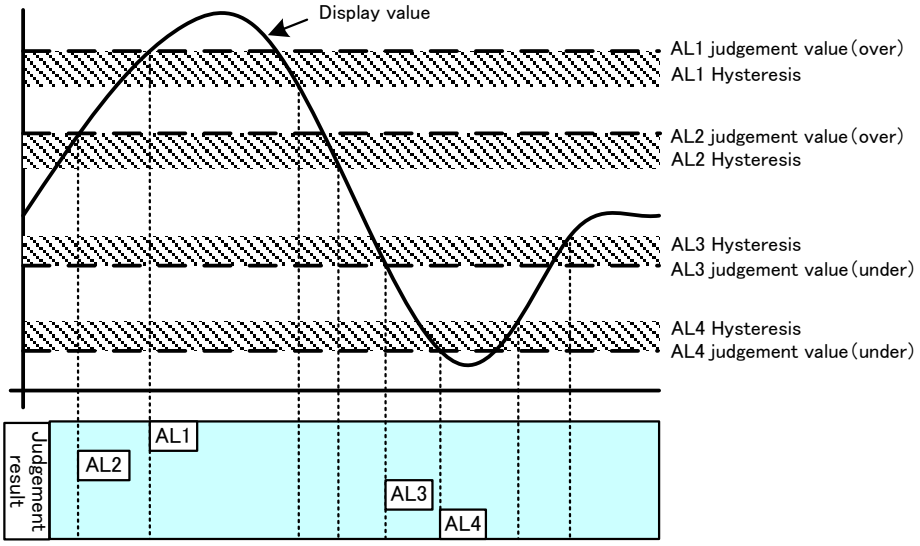
Output mode "Latch": comparative output keeps valid once judgement becomes ON.




## ⚠CAUTION

In Latch mode, reset of comparative output is performed by comparative output reset of external control.

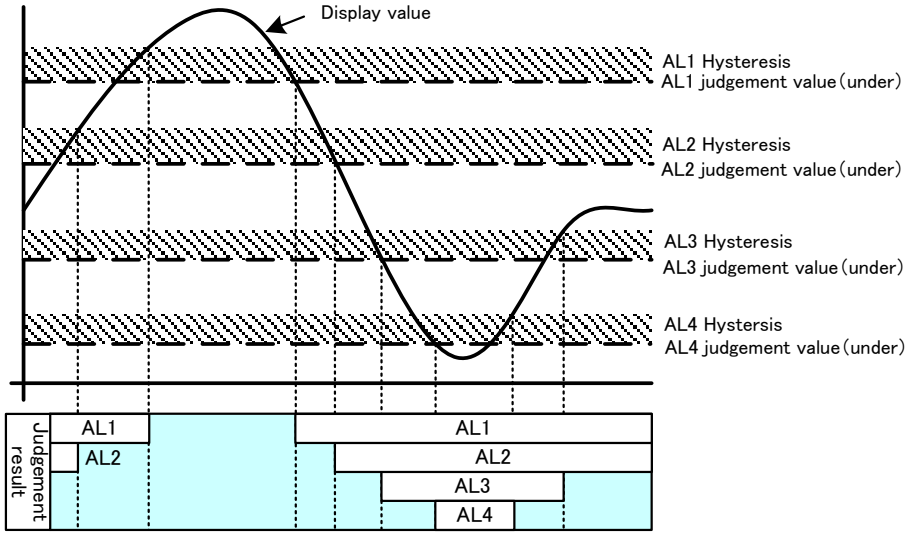
●Judgement action in the case that output mode is “One Shot”.
Output mode “One Shot”: comparative output is valid while setup time period after judgement is ON.



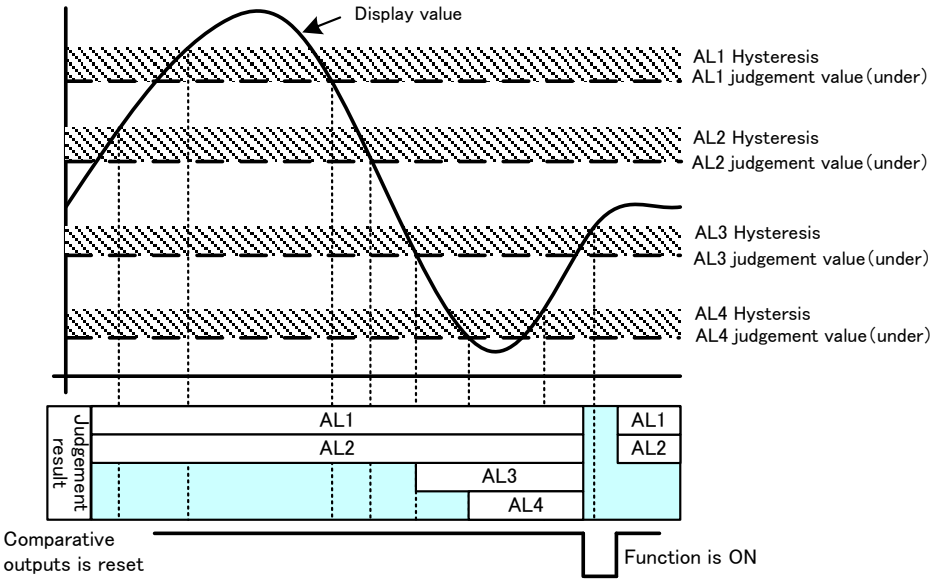

3) Lower judgement of 4 steps
For using in the lower judgement, the setting variable “Condition of ON (OnCondition)” should be configured to “Less Than”.

| Comparative output | Condition of ON | Condition of comparison | Judgement result |
|---|---|---|---|
| AL1 | “Less Than” | Display value <AL1 judgement value | AL1 |
| AL2 | “Less Than” | Display value <AL2 judgement value | AL2 |
| AL3 | “Less Than” | Display value <AL3 judgement value | AL3 |
| AL4 | “Less Than” | Display value <AL4 judgement value | AL4 |

●Judgement action in the case that output mode is “Normal”.
Output mode “Normal”: comparative output is valid while judgement is ON.



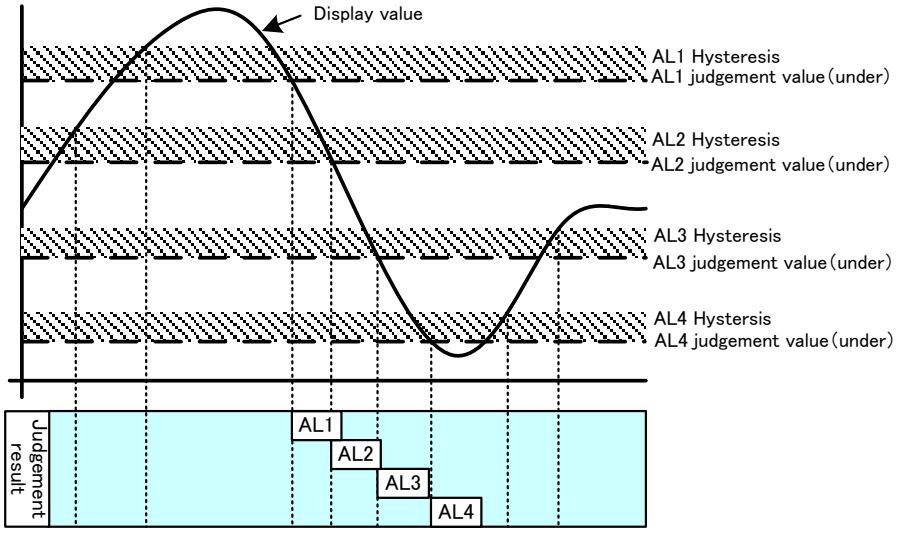
●Judgement action in the case that output mode is “Latch”.
Output mode “Latch”: Comparative output keeps valid once judgement becomes ON.




## ⚠CAUTION

In Latch mode, reset of comparative output is performed by comparative output reset of external control.

●Judgement action in the case that output mode is “One Shot”.
Output mode “One Shot”: comparative output is valid while setup time period after judgement is ON.



### 11-1-3. ZONE JUDGEMENT

In the case that the "Zone judgement" is selected in compare mode, this product judges inclusion relation to 2 comparison judgement values.
To output comparison result, by configurations for "Condition of ON (OnConditions)","output mode (OutputMode)" etc. , compare action should be determined.
The followings show judgement actions on each output mode.

**⚠CAUTION**

Comparative outputs AL1-AL4 can be configured independently and can be assigned to displayable items arbitrary. Therefore, for each comparative output, 2 setting values of the upper limit and the lower limit are required to perform zone judgement.

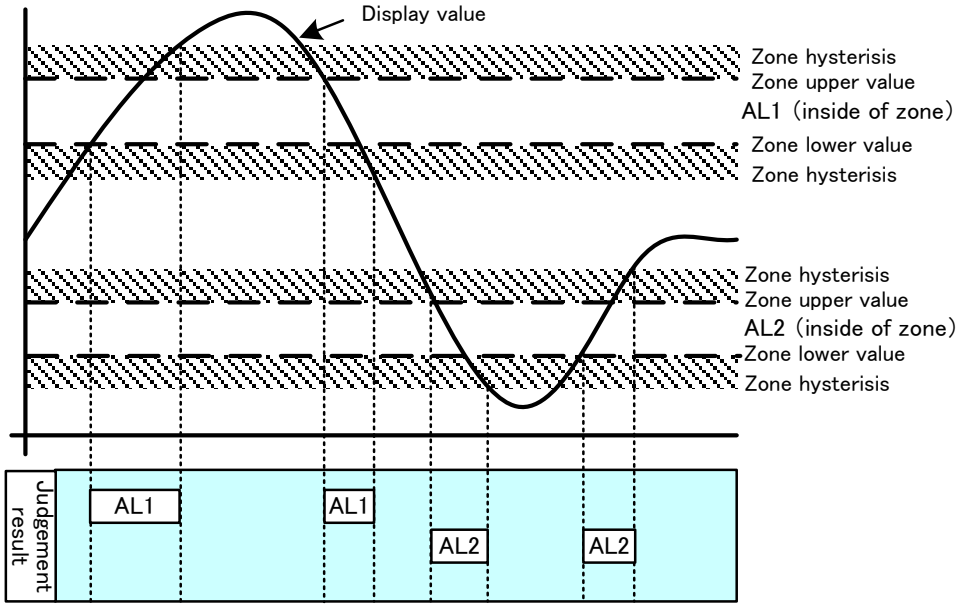
1) "Condition of ON (OnCondition)" is "In the zone"
When the value of the source item (displayable value) for comparison is between "Zone upper limit" and "Zone lower limit", comparative output result turns ON.

| Comparative output | Condition of ON | Condition of comparison | Judgement result |
|---|---|---|---|
| AL1 | "In the zone" | AL1 Zone upper limit ≥ Display value ≥AL1 Zone lower limit | AL1 |
| AL2 | | AL2 Zone upper limit ≥ Display value ≥AL2 Zone lower limit | AL2 |
| AL3 | | AL3 Zone upper limit ≥ Display value ≥AL3 Zone lower limit | AL3 |
| AL4 | | AL4 Zone upper limit ≥ Display value ≥AL4 Zone lower limit | AL4 |

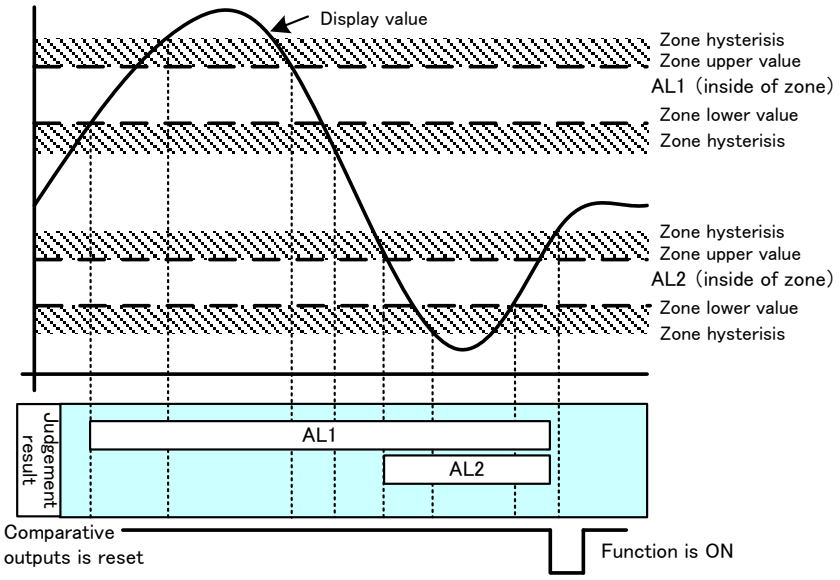
**⚠CAUTION**

Hystereses lie on outside (upper side) of the zone upper limit and outside (lower side) of the zone lower limit. The widths of the hystereses are same on both zone upper limit and zone lower limit.

●Judgement action in the case that output mode is "Normal".
Output mode "Normal": comparative output is valid while judgement is ON.



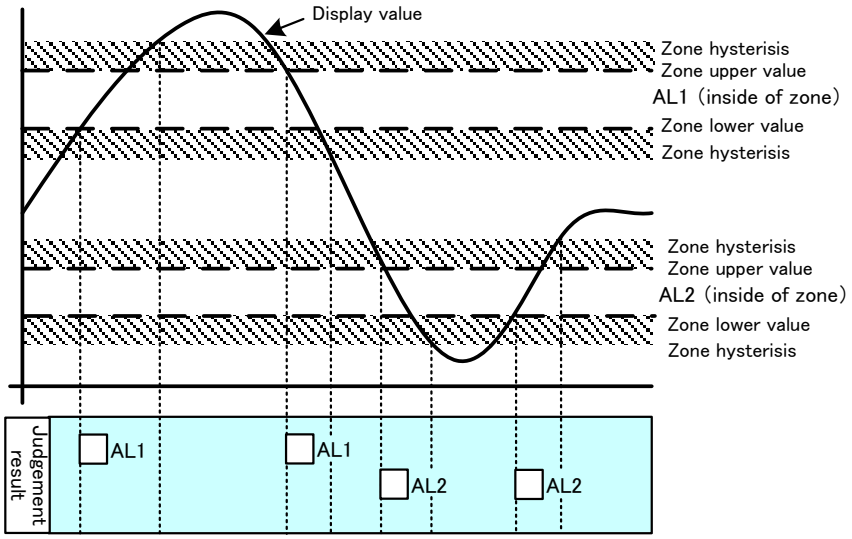
●Judgement action in the case that output mode is “Latch”.
Output mode “Latch”: Comparative output keeps valid once judgement becomes ON.




## ⚠CAUTION

In Latch mode, reset of comparative output is performed by comparative output reset of external control.

●Judgement action in the case that output mode is “One Shot”.
Output mode “One Shot”: Comparative output is valid while setup time period after judgement is ON.



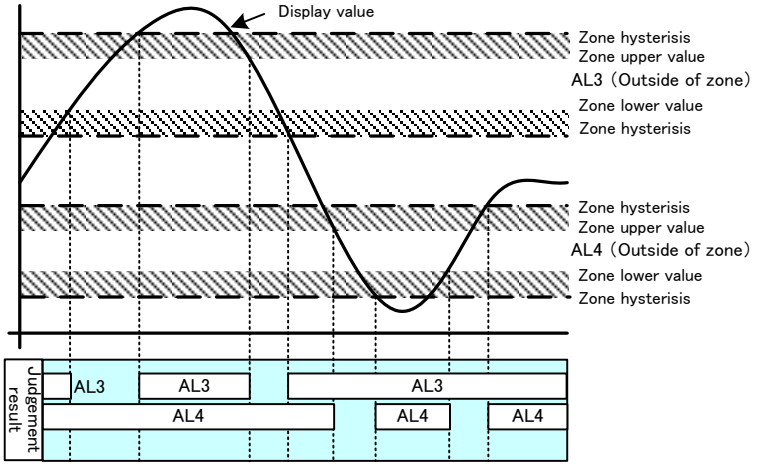
2)"Condition of ON (OnCondition)" is "Outside of the zone"
When the value of the source item (displayable value) for comparison is over "Zone upper limit" or under "Zone lower limit", comparative output result turns ON.

| Comparative output | Condition of ON | Condition of comparison | Judgement result |
|---|---|---|---|
| AL1 | "Outside of the zone" | Display value > AL1 Zone upper limit<br>or AL1 Zone lower limit > Display value | AL1 |
| AL2 | | Display value > AL2 Zone upper limit<br>or AL2 Zone lower limit > Display value | AL2 |
| AL3 | | Display value > AL3 Zone upper limit<br>or AL3 Zone lower limit > Display value | AL3 |
| AL4 | | Display value > AL4 Zone upper limit<br>or AL4 Zone lower limit > Display value | AL4 |

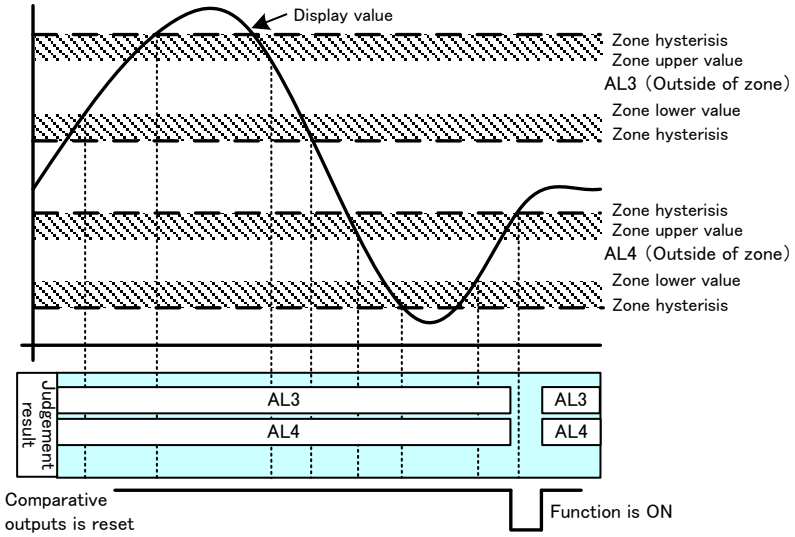
## ⚠ CAUTION

Hystereses lie on outside (upper side) of the zone upper limit and outside (lower side) of the zone lower limit. The widths of the hystereses are same on both zone upper limit and zone lower limit.

●Judgement action in the case that output mode is "Normal".
Output mode "Normal": comparative output is valid while judgement is ON.



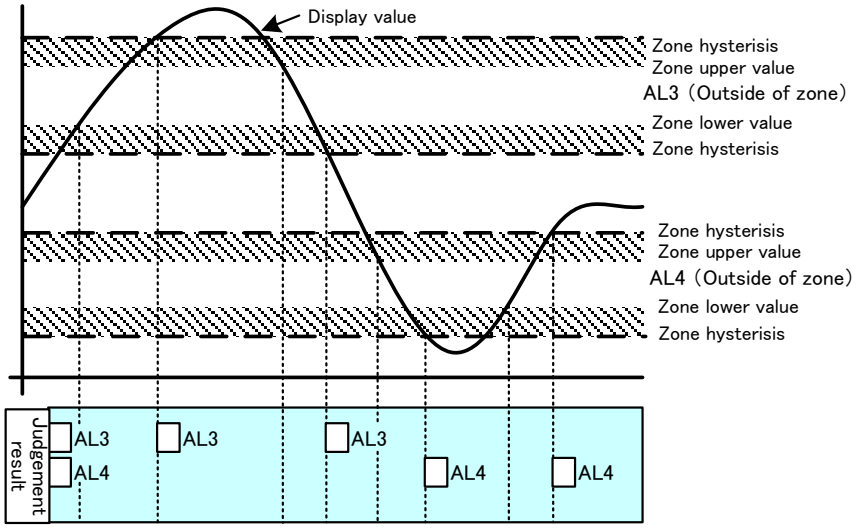

●Judgement action in the case that output mode is "Latch".
Output mode "Latch": Comparative output keeps valid once judgement becomes ON.




## ⚠ CAUTION

In Latch mode, reset of comparative output is performed by comparative output reset of external control.

●Judgement action in the case that output mode is “One Shot”.
Output mode “One Shot”: comparative output is valid while setup time period after judgement is ON.



# 12. OUTPUT FUNCTIONS

## 12－1. ANALOG OUTPUT FUNCTION

The models with an analog output option can output an analog output for a displayable value.
As output ranges, 5 types of 0-10V, ±10 V, 1-5V, 0-20mA and 4-20mA are equipped and they can be switched by a setting variable in “Analog Output” in “Output”.

### 12 - 1 - 1. SOURCE DISPLAYABLE VALUE FOR OUTPUT

Analog output has one channel and an output source should be selected from various displayable items.
Even if the selected item is not displayed, the output is valid.

### 12 - 1 - 2. ANALOG OUTPUT SCALING

Analog output can be scaled arbitrary. For the scaling, settings of display value for 0% output and display value for 100% for each output range are required.

| Output range | 0%output value | 100%output value |
|---|---|---|
| DC0-10V | 0V | 10V |
| DC±10V | -10V | 10V |
| DC1-5V | 1V | 5V |
| DC0-20mA | 0mA | 20mA |
| DC4-20mA | 4mA | 20mA |

### 12 - 1 - 3. OUTPUT RANGE OF ANALOG OUTPUT

Analog output can output in the range of ±10 % of full scale for each output range.
For the scaling, settings of display value for 0% output and display value for 100% for each output range are required.

| Output range | Output lower limit | Output upper limit |
|---|---|---|
| DC0-10V | -1V | 11V |
| DC±10V | -11V | 11V |
| DC1-5V | 0.6V | 5.4V |
| DC0-20mA | 0mA | 22mA |
| DC4-20mA | 2.4mA | 21.6mA |

⚠CAUTION

In DC0-20mA output range, output lower limit is 0mA.

## １２－２．BCD OUTPUT FUNCTION

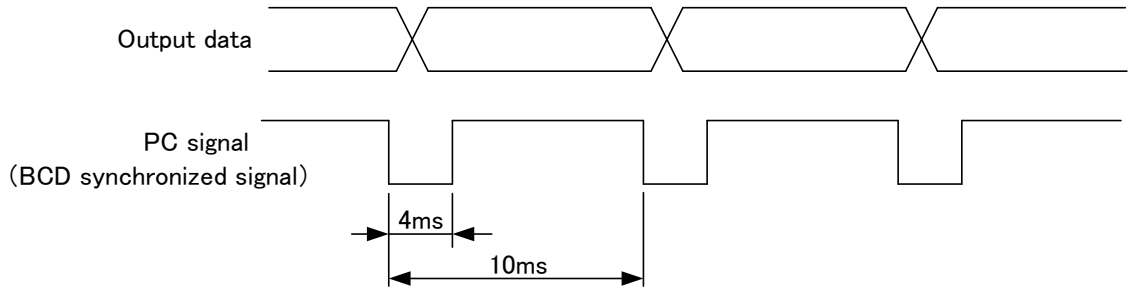
The models with a BCD output option can output a BCD output for a displayable value.
BCD outputs are open-collector outputs which can be selected from NPN type or PNP type by model codes.

### １２-２-１．SOURCE DISPLAYABLE VALUE FOR OUTPUT

BCD output has one channel and an output source should be selected from various displayable items.
Even if the selected item is not displayed, the output is valid.

### １２-２-２．DATA OUTPUT

Data of selected source displayable value is output at the rate of sampling rate (10ms).
The acquisition of the data should be done when the PC signal (BCD synchronized signal) is OFF.
*By configuration, the output logic of BCD data signal and PC signal can be inverted.




**⚠CAUTION**

In the case that Instantaneous simple average is set to other than NONE in Input setting, calculation period expands as long as the average times, but the period of PC signals is 10ms.

### １２-２-３．ENABLE

By shorting the enable terminal to -D.COM or bringing to same voltage level, the BCD data and PC signal (BCD synchronous signal) output transistors become OFF.

## １２－３．RS-232C COMMUNICATION FUNCTION

The models with a RS-232C communication option can be acquired display data and set various configuration.

## １２－４．RS-485 (MODBUS RTU) COMMUNICATION FUNCTION

The models with a RS-485 communication option can be acquired display data and set various configuration.

# 13. ERROR MODE

## 13－1. DISPLAY ON OCCURRENCE OF AN ERROR

When some malfunctions occur, error codes are displayed according to the factor of the error.


## 13－2. LIST OF ERROR CODES AND RECOVERY PROCEDURES

When some malfunction occurs, an error code is displayed according to the factor of the error.

| ERROR CODE | ERROR MESSAGE | RECOVERY PROCEDURE |
|---|---|---|
| E000 | Program sum error | During the error mode, hold down the ENTER key for 1 second (long-press) to reset or power down and on.<br><br>*If the WPMZ does not recover by this procedure, please contact your dealer or our company. |
| E006 | RAM error | |
| E100 to 102 | Errors associated with serial flash memory | |
| E103 to 105<br>E210 to 211 | Errors associated with FRAM | |
| E110 to 111 | Error associated with sensor power short | |
| E202 to 203 | Errors associated with calibration values | |
| E204 to 205 | Errors associated with setting values | |
| E206 to 209 | Errors associated with initial values | |
| Other than above codes | Other errors | |

・If start-up delay is enabled, the WPMZ displays "------" according to the delay time.
・If display value becomes out of displayable range, "OVER" is displayed in the display.

**⚠CAUTION**

If error display is not recovered by system reset or power re-activation, please let us know the error code and situation.
During error mode, outputs are disabled.

# 14. SPECIFICATIONS

## 14－1. BASIC SPECIFICATIONS

| | | |
|---|---|---|
| Number of measurement channel | : | 1 or 2 （ according to model codes） |
| Display | : | 2.4 inch TFT liquid crystal display<br>Used in 1ch input ： chA measurement result<br>Used in 2ch inputs ： chA measurement result, chB measurement result, calculation result, chA and chB measurement results, chA or chB measurement result and calculation result |
| Over warning | : | By exceeding the range of display, displays OVER or -OVER |
| External controls | : | 5 functions of the followings can be assigned to control terminals (user-configurable).<br>①Comparative output reset function<br>②Measurement inhibit function：Measurement inhibit A/B/A&B<br>③Current value hold function：Current value hold A/B/A&B<br>④Maximum value hold function：Maximum value hold A/B/A&B<br>⑤Minimum value hold function：Minimum value hold A/B/A&B<br>⑥Pattern select function：Pattern select 1/2/3<br>⑦Window select function<br>⑧Trend Hold function |
| Ambient temperature range | : | -5 to 50° C, 35 to 85%RH（Non condensing） |
| Storage temperature range | : | -10 to 70° C up to 60%RH |
| Supply power | : | AC power（WPMZ-5-1**-**-***）<br>AC100 to 240V±10%　50/60Hz<br>DC power（WPMZ-5-3**-**-***）<br>DC12V±10%<br>DC power（WPMZ-5-4**-**-***）<br>DC24 to 48V±10% |
| Power consumption | : | AC power（WPMZ-5-1**-**-***）<br>At AC100V：10VA max　At AC240V：14VA max<br>DC power（WPMZ-5-3**-**-***）<br>At DC12V：6W max,<br>DC power（WPMZ-5-4**-**-***）<br>At DC24V：6W max,　At DC48V：6.5W max |
| Sensor power | : | Pulse input<br>DC12V ±10% 100mA max, DC24V ±10% 50mA max.<br>* For 2ch inputs of DC12*2 or DC24*2, allowable total current of both chA and chB is same as above.<br>In the case of 2ch with combination of DC12V and DC24, allowable total power is 1.2W.<br><br>Line driver input<br>DC5V ±10% 200mA max<br>* For 2ch inputs, allowable total current of both chA and chB is same as above. |
| External dimension's | : | 96mm（W）×52mm（H）×145mm（D） |
| Weight | : | Approx. 350g |
| Withstand voltage | : | AC power （WPMZ-5-1**-**-***）<br>Between Power terminals and inputs/external controls/comparative outputs/other outputs AC3000V for 1 minute |

DC power（WPMZ-5-3or4**-**-***）
Between Power terminals and inputs/external controls/comparative outputs/other outputs AC1500V for 1 minute
AC power and DC power
Between input terminals and external controls/comparative outputs/other outputs AC1500V for 1 minute
Between enclosures and each terminals AC3000V for 1 minute

| | | |
|---|---|---|
| Insulation resistance | : | Between terminals mentioned above, at DC500V 100MΩ or higher |
| Vibration tolerance | : | 10 to 55Hz half amplitude 0.15mm in X,Y,Z directions for 30 minutes |
| Protective structure | : | IP66(front) |
| Installation environment | : | indoor use |
| Rated altitude | : | up to 2000m |
| Transient overvoltage | : | II |
| Measurement category | : | II |
| Pollution degree | : | 2 |
| Conformed EN standard | : | EN61326-1(EMS:industrial electromagnetic environment/EMI:Class A)<br>(Applicable to line length only under 30m)<br>EN61010-1<br>EN50581 |
| Material of enclosure | : | polycarbonate(PC) black UL94V-0 |

## 14－2．INPUT SPECIFICATIONS

### 14-2-1．PULSE INPUT

－Input specifications(common to chA,chB)

| | | |
|---|---|---|
| Frequency range | : | 0.01Hz to 500kHz (*2ch input:250kHz) |
| Input signal | : | Open collector (NPN/PNP), voltage pulse, totem pole output (complementary output), AC pulse, proximity sensor |
| Input method | : | Single phase pulse |
| Input level | : | Open collector<br>Pullup to 12V or 24V<br>Logic<br>L level: ≤1.0V<br>H level:3.9 to 30V (max. allowable voltage ±50V)<br>Zero Cross<br>AC60mV to 40V (max. allowable voltage 70V)<br>*AC signal which gets across 0V. |
| Input resistance | : | Open collector<br>Pulled up to 12 V through approx. 10kΩ(in the case of sensor power 12V)<br>Pulled up to 24 V through approx. 25kΩ(in the case of sensor power 24V)<br>Pulled down to GND through approx. 10kΩ.<br>Logic/Zero Cross<br>Pulled down to GND through approx. 10kΩ<br>2 wire<br>Pulled down to GND through approx. 900Ω |
| Input pulse width | : | ≥ 0.9μs (both of L level and H level)<br>(2 channel inputs: ≥1.8 μs) |
| Measurement method | : | Cyclic calculation method |
| Display unit time | : | Can be selected one of second, minute, hour |
| Accuracy | : | ±(20ppm rdg +1digit) @23±5˚C |

### 14-2-2. LINE DRIVER INPUT

- Input specifications (common to chA,chB)

| | | |
|---|---|---|
| Frequency range | : | 0.01Hz to 500kHz (*2ch input:250kHz) |
| Input signal | : | Differential input (line driver signal)<br>* Can be connected to a device which has RS-422 compatible line driver output on one-on-one level. |
| Input method | : | Single phase pulse |
| Input sensitivity | : | ± 1V or more (differential voltage) |
| Input resistance | : | 330Ω (terminate resistance) |
| Maximum allowable voltage | : | ±10V(differential voltage) |
| Input pulse width | : | ≥ 0.9μs (both of L level and H level)<br>(2 channel inputs: ≥1.8 μs) |
| Measurement method | : | Cyclic calculation method |
| Display unit time | : | Can be selected one of second, minute, hour |
| Accuracy | : | ±(20ppm rdg +1digit) @23±5℃ |

## １４－３．OUTPUT SPECIFICATIONS

【Comparative outputs】

Open collector output : Output rating
NPN： sink current 50mA MAX.
PNP： source current 50mA MAX.
Applied voltage 30V MAX.
Output saturation voltage ≤1.2V at 50mA
Number of outputs 4 transistor outputs

Relay output : Contact rating:AC250V 2A,DC30V 2A
Mechanical life:20 million times
Electrical life:100 thousand times or more
4 A contacts, AL1 and AL2, AL3 and AL4 share common

Control method : Microcomputer calculating method

Judgement value settable range : -999999 to 999999

Hysteresis : Settable within the range of 1-999999 digits for each judgement value independently.

Comparison action : According to sampling rate (circulate period).

Setting condition : Condition of comparison can be set to AL1 to AL4 independently.

●Level judgement mode
The alarm is ON when display value exceeds judgement value (over alarm)
The alarm is ON when display value underruns judgement value (under alarm)

Over alarm(upper limit judgement)

| Condition of comparison | Judgement result |
|---|---|
| display value>AL1 judgement value | AL1 |
| display value>AL2 judgement value | AL2 |
| display value>AL3 judgement value | AL3 |
| display value>AL4 judgement value | AL4 |

Under alarm（under limit judgement)

| Condition of comparison | Judgement result |
|---|---|
| AL1 judgement value>display value | AL1 |
| AL2 judgement value>display value | AL2 |
| AL3 judgement value>display value | AL3 |
| AL4 judgement value>display value | AL4 |

●Zone judgement mode
The alarm is ON when display value between upper and lower judgement values （inside of zone alarm）
The alarm is ON when display value out of upper and lower judgement values(outside of zone alarm)

Inside of zone alarm

| Condition of comparison | Judgement result |
|---|---|
| AL1 zone upper limit≥display value≥AL1 zone lower limit | AL1 |
| AL2 zone upper limit≥display value≥AL2 zone lower limit | AL2 |
| AL3 zone upper limit≥display value≥AL3 zone lower limit | AL3 |
| AL4 zone upper limit≥display value≥AL4 zone lower limit | AL4 |

Outside of zone alarm

| Condition of comparison | Judgement result |
|---|---|
| display value>AL1 zone upper limit<br>or AL1 zone lower limit>display value | AL1 |
| display value>AL2 zone upper limit<br>or AL2 zone lower limit>display value | AL2 |
| display value>AL3 zone upper limit<br>or AL3 zone lower limit>display value | AL3 |
| display value>AL4 zone upper limit<br>or AL4 zone lower limit>display value | AL4 |

Comparison formula memory : 8 pattern memory

【Analog output】

Conversion method : D/A conversion method

Resolution capability : Equivalent of 13bit

Scaling : Digital scaling

Output objective : An item can be selected from source displayable values

Response speed : Up to 25ms (0→90% response)

Specifications for each output :

| Output type | Load resistance | Accuracy (23±5° C 35 to 85%RH) | Ripple |
|---|---|---|---|
| 0 to 10V | ≥2kΩ | ±(0.1% of FS) | ±50mVp-p |
| -10 to 10V | | | |
| 1 to 5V | | | |
| 0 to 20mA | ≤550Ω | | ±25mVp-p<br>*Ripple for 4 to 20mA is at load resistance 250Ω, 20mA output. |
| 4 to 20mA | | | |

【BCD output】

Output type : Open collector output NPN/PNP type

Measurement data : Negative logic transistor is ON at logical "1"

Polarity signal : Negative logic transistor is ON at minus display

Over signal : Negative logic transistor is ON at over display

Synchronized signal (PC) : Transistor is ON for a fixed period every time data becomes valid.

Transistor output capability : Voltage 30V max. Current 10mA max.
Output saturation voltage up to 1.2V at 10mA

Enable : By shorting the enable terminal to -D.COM or bringing to same voltage level, the BCD output transistors become OFF.

【RS-232C】

Communication protocol : Modbus-RTU,OriginalCommand,OriginalOutput

Synchronization method : Asynchronous

Communication method : Full duplex

Baud rate : 9600bps,19200bps,38400bps

Data length : 7bit,8bit

Start bit : 1bit

Parity bit : None, Odd, Even

Stop bit : 1bit,2bit

Delimiter : CR LF,CR

Character code : Code ASCII

Transmission control procedure : No control sequence

Used signal names : TXD,RXD,SG

Number of connectable units : 1

Cable length : Max. 15m

【RS-485 Modbus】

| | | |
|---|---|---|
| Communication protocol | : | Modbus RTU |
| Synchronization method | : | Asynchronous |
| Communication method | : | 2-wire half- duplex |
| Baud rate | : | 9600bps,19200bps,38400bps |
| Data length | : | 8bit |
| Start bit | : | 1bit |
| Parity bit | : | None, Odd, Even |
| Stop bit | : | 1bit |
| Used signal names | : | Non-inverting (+), Inverting (-) |
| Number of connectable units | : | 31 |
| Cable length | : | Max.1.2km （total）*Conforming CE mark, less than 30m |

# 15. TROUBLESHOOTING

| No. | Condition | Checkpoint | Action |
|---|---|---|---|
| 1 | The display does not light up. | Check the power is supplied correctly. | ・Check the supplied power meets requirement of supply power specifications.<br>・Using a circuit-tester, check voltage and wiring. Tighten up the screws of the terminals. |
| | | Check the setting of "brightness" is set to "OFF". | - By pushing MENU and FUNC keys, if the display lights up, "BRIGHTNESS" is set to "OFF". Change "BRIGHTNESS" setting.<br>*Refer to page 115. |
| | | | If the above procedure does not make an improvement, contact your dealer or our company. |
| 2 | Display keeps indicating"0" or"------". | Check the input signal is applied adequately. | ・Check the supplied input signal meets requirement of input specifications.<br>・Check input wiring and its continuity.<br>・Check with input diagnostic function of the product.<br>・Check status of external control function.<br>- Measurement inhibit<br>- Current value hold (see page 137)<br>・Check settings.<br>- Input filter setting（see page39）<br>- Instantaneous value auto zero setting（see page 46）<br>- Start delay time setting（see page 116）<br>・Initialize the WPMZ.<br>Caution：All settings are reset to default values by the initialization.<br>*Initialization（see page 123） |
| | | Check the selected display is appropriate for the input channel or displayed item in use. | ・Using DISP key, try to switch display.<br>・Check setting of "Display Select".<br>* "Display Select" setting<br>（See page102） |
| | | | If phenomenon is not improved by above methods, please contact your dealer or our company. |
| 3 | OVER alarm display<br>Error code display | Check setting of scaling. | ・Review setting values.<br>（see page 41, 53） |
| | | Influence of noise | ・Using shield cable, improving wiring.<br>・Input filter setting（see page39） |

| No. | Condition | Checkpoint | Action |
|---|---|---|---|
| 4 | The display disappear, display value becomes over twice times. | Influence of spark noise from nearby electromagnetic stich, solenoid, electromagnetic valve, relay etc. | ・Using shield cable, improving wiring.<br>・Input filter setting(see page39) |
| 5 | Two wire transmitters do not operate. | Two wire input of WPMZ is not applicable to 4-10mA current pulse. | |
| 6 | Comparative output does not turn OFF. | Check setting of "comparison judgement value" and "hysteresis". | ・Setting of "comparison judgement value" (see page75)<br>・Check whether output mode of comparative output is set to "Latch".<br>*Output mode(see page47) |
| 7 | Spend much time for display value changing to zero after input pulse stopping. | Consideration of "Instantaneous value auto zero". | ・Setting of "Instantaneous value auto zero"(see page46) |
| 8 | Fluctuations of displayed value are wide. | (Sometimes, displayed value becomes small.) | ・Check the level of input signal is under nominal value.<br>・Input filter setting(see page39) |
| | | (Sometimes, displayed value becomes large.) | ・Input filter setting(see page39) |
| | | (Input signal varies in actually.) | ・Consideration of "Average" functions.<br>*Instantaneous Value Moving Average(see page48)<br>*3 Instantaneous Value Simple Average(see page48) |
| 9 | Analog output abnormal | Check by "test output" | ・Check using "test output" function. |
| | | Check connected load is suitable. | ・Disconnect the load and check the output value. |
| | | Check wiring. | ・Check whether the load is connected to suitable terminal (current output or voltage output). |
| | | Check settings. | ・Check scaling setting for analog output.<br>・Check selected displayable value for analog output.<br>・Check output range of analog output. |
| | | | If phenomenon is not improved by above methods, please contact your dealer or our company. |
| 10 | BCD output abnormal | Check connected device is suitable. (NPN/PNP, external pullup etc.)<br>Check output logic setting is correct. | ・Check using "test output" function. |

| No. | Condition | Checkpoint | Action |
|---|---|---|---|
| 11 | RS-232C communication abnormal | Check wiring, wire length are correct.<br>Check setting such as baud rate is correct.<br>Check communication command is correct. | ・Check using “test output” function. |
| 12 | RS-485 communication abnormal | Check wiring, wire length, termination, number of connected devices are correct.<br>Check setting such as baud rate is correct. | ・Check using “test output” function. |

# 16. APPENDIX

## １６－１．KEY OPERATION REFERENCE CHART

The functions of keys are shown in the chart below.

Operation in “measurement mode”

| FUNC | MENU | DISP | ENTER | ≪ | ≫ | ≪ | ≫ | Action |
|---|---|---|---|---|---|---|---|---|
| ○ | | | | | | | | Moves to entering short-cut function of external control. |
| | ○ | | | | | | | Moves to setting mode. |
| | | ○ | | | | | | Switches measurement display contents. |
| | | | ◎ | | | | | Resets the system by 1sec. long-pressing in error mode. condition |
| | | | | ◎ | | | | When assigned short-cut functions, makes the function ON/OFF by long-pressing. |
| | | | | | ◎ | | | |
| | | | | | | ◎ | | |
| | | | | | | | ◎ | |
| | | ◎ | ◎ | | | | | Makes the key lock function ON/OFF by long-pressing simultaneously. |

Operation in “setting mode”

| FUNC | MENU | DISP | ENTER | ≪ | ≫ | ≪ | ≫ | Action |
|---|---|---|---|---|---|---|---|---|
| ○ | | | | | | | | Moves from shortcut function entry display to measurement mode |
| | ○ | | | | | | | Stores settings and moves to measurement mode. |
| | | ○ | | | | | | No action |
| | | | ○ | | | | | Fixes setting parameters. |
| | | | | ○ | | | | Moves to other setting displays / Moves cursors in setting displays / Modifying setting values. |
| | | | | | ○ | | | |
| | | | | | | ○ | | |
| | | | | | | | ○ | |

*Note: ○ short-pressing ◎ long–pressing (holding down more than 1sec.)

## １６－２．SETTING VARIABLES

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting Variables) | | 4th Layer ( Setting Values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Name of Variables | Character Strings on Display (Abbreviated Form) | Initial values | Settable Variables | |
| 1. Input | Pulse input A, Pulse input B [PulseInputA, PulseInputB] [WPMZ-5-*P*] (Generic pulse input) | Pattern select | PatternSelect | Pattern1(or pattern No. in use) | Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern8 | Select pattern No. to set. |
| | | Input Type | InputType | OpenCollector | OpenCollector/ Logic/ ZeroCross/ 2Wire | Select input signal type |
| | | Input Filter | InputFilter | None | None/ 30Hz/ 1.5kHz/ 15kHz | Select input analog filters |
| | | Sensor Power | SensorPower | 12V | 12V/24V | Switch Sensor power voltage |
| | | Instantaneous Value Display Coefficient | InsDispCoef | $1.00000\times10^{0}$ | $0.00000$ to $9.99999\times10^{-9\sim9}$ | For scaling setting of instantaneous value display, multiply frequency by instantaneous coefficient and unit time. |
| | | Instantaneous Unit Time | InsUnitTime | Sec | Sec/ Min/ Hour | |
| | | Instantaneous Value Decimal Point Position | InsDecPoint | ###### (No decimal point) | ###### / #####.# / ####.## / ###.### / ##.#### / #.##### | Set number of digits after decimal point |
| | | Instantaneous Value Display Unit | InsDispUnit | None | None/ select from 62 units (See 6-2)/custom unit | Refer to detailed instruction manual about custom unit |
| | | Instantaneous Value Auto Zero | InsAutoZero | 0.00 | 0.00 to 99.99sec | Displays 0 if no pulse input over more than setting time |
| | | Instantaneous Value Moving Average | InsMoveAve | None | None/ 2times/ 3times / 4times/ 5times/ 6times/ 7times/ 8times/ 9times | Set number of moving average. |
| | | Instantaneous Value Simple Average | InsSimpleAve | None | None/ 2 times/ 4 times/ 8times/ 16times/ 32times/ 64times/ 128times/ 256 times | Set number of simple average for internal sampling (10ms) |
| | | Instantaneous Value Display Step | InsDispStep | None | None/ 5steps/ 10steps | Setting of steps of display（If set to 5steps, displayed only 0 or 5 on LSB) |
| | Pulse input A, Pulse input B [PulseInputA, PulseInputB] [WPMZ-5-*L*] (Line driver input) | Pattern Select | PatternSelect | Pattern1 (or pattern No. in use) | Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8 | Select pattern No. to set. |
| | | Input Type | InputType | LineDriver | LineDriver | Line Driver only |
| | | Input Filter | InputFilter | None | None | No input analog filter |
| | | Sensor Power | SensorPower | 5V | 5V | 5V only |
| | | Instantaneous Value Display Coefficient | InsDispCoef | $1.00000\times10^{0}$ | $0.00000$ to $9.99999\times10^{-9\sim9}$ | For scaling setting of instantaneous value display, multiply frequency by instantaneous coefficient and unit time. |
| | | Instantaneous Unit Time | InsUnitTime | Sec | Sec/Min/Hour | |
| | | Instantaneous Value Decimal Point Position | InsDecPoint | ###### (No decimal point) | ######/#####.#/####.##/###.###/##.####/#.##### | Set number of digits after decimal point |
| | | Instantaneous Value Display Unit | InsDispUnit | None | None/select from 62 units (See 6-2)/custom unit | Refer to detailed instruction manual about custom unit |
| | | Instantaneous Value Auto Zero | InsAutoZero | 0.00 | 0.00 to 99.99sec | Displays 0 if no pulse input over more than setting time |
| | | Instantaneous Value Moving Average | InsMoveAve | None | None/ 2times/ 3times / 4times/ 5times/ 6times/ 7times/ 8times/ 9times | Set number of moving average. |
| | | Instantaneous Value Simple Average | InsSimpleAve | None | None/ 2 times/ 4 times/ 8times/ 16times/ 32times/ 64times/ 128times/ 256 times | Set number of simple average for internal sampling (10ms) |
| | | Instantaneous Value Display Step | InsDispStep | None | None/ 5steps/ 10steps | Setting of steps of display（If set to 5steps, displayed only 0 or 5 on LSB) |

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting Variables) | | 4th Layer ( Setting Values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Name of Variables | Character Strings on Display (Abbreviated Form) | Initial values | Settable Variables | |
| 1. Input | 2 Input Calculation [2InputCalc] | Pattern Select | PatternSelect | Pattern1 (or pattern No. in use) | Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8 | Select pattern No. to set. |
| | | Expression for instantaneous value | InsExpression | None | None/ (B/A)*100 / (B/A-1)*100 /B-A / (B/(A+B))*100 / A+B | Select expression for calculation of instantaneous value. |
| | | Instantaneous value decimal point position | InsDecPoint | ###### (No decimal point) | ###### / #####.# / ####.## / ###.### / ##.#### / #.##### | Set number of digits after decimal point |
| | | Instantaneous value display unit | InsDispUnit | None | None/select from 62 units (See 6-2)/custom unit | Refer to detailed instruction manual about custom unit |
| | | Instantaneous value display step | InsDispStep | None | None/5steps/10steps | Setting of steps of display (If set to 5steps, displayed only 0 or 5 on LSB) |
| | External Control [ExternalCtrl] | Function of external control terminal 1 to 5 | ExtCtrl1Func<br>ExtCtrl2Func<br>ExtCtrl3Func<br>ExtCtrl4Func<br>ExtCtrl5Func | None | None/ CompareReset/ MeasureBlockA/ MeasureBlockB/ MeasureBlockA&B/ DispHoldA/ DispHoldB/ DispHoldA&B/ MaxHoldA/ MaxHoldB/ MaxHoldA&B/ MinHoldA/ MinHoldB/ MinHoldA&B/ PatternChange1/ PatternChange2/ PatternChange3/ MonitorChange/ TrendHold | Select functions assigned to external control terminals. |
| 2.Output | Comparative Output AL1/ Comparative Output AL2/ Comparative Output AL3/ Comparative Output AL4 [CompareAL1/ CompareAL2/ CompareAL3/ CompareAL4] | Pattern Select | PatternSelect | Pattern1 (or pattern No. in use) | Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8 | Select pattern No. to set. |
| | | Source output display value | OutputDispValue | None | None/InsA/InsB/InsCalc | Select source output display value to compare. |
| | | Compare mode | CompareMode | LevelJudge | LevelJudge/ ZoneJudge | Select compare mode |
| | | Condition of ON | OnConditions | Excess | Excess/LessThan | In level judge mode |
| | | | | InTheZone | InTheZone/OutsideTheZone | In zone judge mode |
| | | Comparison judgement value | Threshold | 10000<br>0 | Threshold:±999999<br>Hysteresis:0 to 999999 | In level judge mode |
| | | | | 0<br>10000<br>0 | Zone lower limit:±999999<br>Zone upper limit :±999999<br>Hysteresis:0 to 999999 | In zone judge mode |
| | | Comparison ON delay | OnDelay | None | None/20ms/50ms/100ms/ 200ms/500ms/1s/5s/10s/20s | Comparative output turns ON, if ON condition continues over set delay time. |
| | | Comparison OFF delay | OffDelay | None | | Comparative output turns OFF, if OFF condition continues over set delay time. |
| | | Output mode | OutputMode | Normal | Normal/Latch/OneShot5ms/ OneShot 10ms/ OneShot 20ms/ OneShot 50ms/ OneShot 0.1s/ OneShot 0.2s/ OneShot 0.5s/ OneShot 1s/ OneShot 2s | Select output mode of comparison |
| | | Output logic | OutputLogic | Negative (NO) | Positive(NC)/Negative(NO) | NC/NO are for relay output product. |
| | | Background Color at ON | OnBgColors | Black | Black/Red/Yellow/Green | Background color priority AL1>AL2>AL3>AL4 |

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting Variables) | | 4th Layer ( Setting Values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Name of Variables | Character Strings on Display (Abbreviated Form) | Initial values | Settable Variables | |
| 2.Output | Analog Output [AnalogOutput] | Pattern Select | PatternSelect | Pattern1 (or pattern No. in use) | Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8 | Select pattern No. to set. |
| | | Output range | OutputRange | 0-10V | 0-10V/±10V/1-5V/0-20mA/ 4-20mA | Select output range (type). |
| | | Source output display value | OutputDispValue | None | None/InsA/InsB/InsCalc | Select a displayable item for analog output |
| | | Output scale | OutputScale | 0<br>10000 | 0% display value :±999999 (±99999)<br>100% display value : ±999999(±99999) | Set scaling for analog output.<br>Set expected display values at 0% and 100% output. |
| | BCD Output [BCD Output] | Pattern Select | PatternSelect | Pattern1 (or pattern No. in use) | Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8 | Select pattern No. to set. |
| | | Source output display value | OutputDispValue | None | None/InsA/InsB/InsCalc | Select a displayable item for BCD output |
| | | Data signal logic | DataSignalLogic | Negative | Positive /Negative | Select logic of data signal output. |
| | | Synchronous signal logic | SyncSignalLogic | Negative | Positive /Negative | Select logic of synchronous signal (PC) output. |
| | RS-485 Modbus communication [ModbusCom] | Slave Address | SlaveAddress | 1 | 1/2/3/4/ ····· /30/31 | Set ID number. |
| | | Baud rate | Baudrate | 19200bps | 9600bps/19200bps/38400bps | Set baud rate. |
| | | Parity | Parity | Even | None/Even/Odd | Set parity bit. |
| | RS-232C communication [RS-232C COM] | Protocol | Protocol | Modbus-RTU | Modbus-RTU/OriginalComm and/OriginalOutput | Set protocol |
| | | Baud rate | Baudrate | 19200bps | 9600bps/19200bps/38400bps | Set baud rate. |
| | | Data length | DataLength | 7bit | 7bit/8bit | Set data character length |
| | | Parity | Parity | Even | None/Even/Odd | Set parity bit. |
| | | Stop bit | Stopbit | 1bit | 1bit/2bit | Set stop bit length. |
| | | Delimiter | Delimiter | CR LF | CR/CR LF | Set delimiter type. |
| 3. Display | Display Select [DispSelect] | Measure select | MeasureSelect | 1. Input: InsA<br>2inputs: InsA+InsB | InsA/InsB/InsCalc/ InsA+InsB / InsCalc+A+B/ InsA+Comp/InsB+Comp/InsCalc+Comp | Select displayable items can be switched by DISP key or external control for numerical value display.<br>(multiple selects are available) |
| | | Level select | LevelSelect | 1. Input: InsA<br>2inputs: InsA+InsB | InsA/InsB/InsCalc/ InsA+InsB | Select displayable items can be switched by DISP key or external control for level display.<br>(multiple selects are available) |
| | | Trend select | TrendSelect | 1. Input: InsA<br>2inputs: InsA+InsB | | Select displayable items can be switched by DISP key or external control for trend display.<br>(multiple selects are available) |
| | Level Display [LevelDisp] | Pattern Select | PatternSelect | Pattern1 (or pattern No. in use) | Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8 | Select pattern No. to set. |
| | | Instantaneous value A scale | InsA Scale | 0<br>10000 | Lower limit:±999999<br>Upper limit:±999999 | Set display scale of level display.<br>Left edge of display is lower limit and right edge of display is higher limit |
| | | Instantaneous value B scale | InsB Scale | | | |
| | | Instantaneous calculation scale | InsCalcScale | | | |

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting Variables) | | 4th Layer ( Setting Values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Name of Variables | Character Strings on Display (Abbreviated Form) | Initial values | Settable Variables | |
| 3. Display | Trend Display [TrendDisp] | Pattern Select | PatternSelect | Pattern1 (or pattern No. in use) | Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8 | Select pattern No. to set. |
| | | Instantaneous value A scale | InsA Scale | 0<br>10000 | Lower limit :±999999 (±99999)<br>Upper limit :±999999 (±99999) | Set display scale of trend display.<br>Bottom edge of display is lower limit and top edge of display is higher limit. |
| | | Instantaneous value B scale | InsB Scale | | | |
| | | Instantaneous calculation scale | InsCalcScale | | | |
| | | Time axis | TimeAxis | 1s/div | 1s/div,2s/div,5s/div,10s/div,30 s/div,60s/div,120s/div | Select time for 1 division of time axis. |
| 4.System | General [Gerenal] | Brightness | Brightness | 5 Bright | 5 Bright/4/3/2/1 Dark/0 Off | Select brightness of display.<br>*"0 Off" is set, whole display is black out |
| | | Power on delay | PowerOnDelay | None | None/2sec/5sec/10sec/20sec /30sec/60sec | Select time from power on to starting measurement |
| | | Power saving time | PowerSavingTime | None | None/1min/2 min/5 min/10 min/30 min/60 min | In power saving state, brightness becomes "1 Dark" level. |
| | | Language | Language | Japanese | Japanese /English | Select language |
| | | Direction of display | DisplayDirection | Horizontal | Horizontal/Vertical | Select direction of display |
| | | Setting protect | SettingProtect | Disable | Disable/Enable | If ON, changing settings are disabled. |
| | | Pattern Copy | PatternCopy | Pattern1 (Copy From)<br>PatternAll (Copy To)<br>Execute (OperationSelect) | Pattern1/2/3/4/5/6/7/8<br>Pattern1/2/3/4/5/6/7/8/PatternAll | Function of copying settings for each pattern. |
| | Initialize [Initialize] | Save user defaults | UserDefaultSave | Message "Save current settings as user initial values?" | | |
| | | Initialize to user defaults | UserDefaultLoad | Message "Initialize setting values to user initial values?" | | |
| | | Initialize to factory default | FactoryDefaultLoad | Message "Initialize setting values to factory default?" | | |

| 1st Layer (Large Categories) | 2nd Layer (Small Categories) | 3rd Layer (Setting Variables) | | 4th Layer ( Setting Values) | | Remarks |
|---|---|---|---|---|---|---|
| | | Name of Variables | Character Strings on Display (Abbreviated Form) | Initial values | Settable Variables | |
| 5.Diagnosis | Input Diagnosis [InputDiag] | Pulse input A<br>Pulse input B | PulseInputA<br>PulseInputB | – | – | Check for input signal existence.<br>(Displays pulse counts) |
| | | External control inputs | ExternalCtrl | – | – | Check for ON/OFF state of terminals |
| | Output Test (Simulated output) [OutputTest] | Comparative output AL1 to AL4 | CompareAL1<br>CompareAL2<br>CompareAL3<br>CompareAL4 | – | – | Outputs ON level or OFF level |
| | | Analog output | AnalogOutput | – | – | Outputs level of 10% steps of rating. |
| | | BCD Output(Data)<br>BCD Output(PC) | BCD Output(Data)<br>BCD Output(PC) | – | – | Outputs ON level or OFF level for each bit |
| | | Modbus Communication RS-485 | ModbusCom | – | – | Displays receive data and transmit data |
| | | RS-232C | RS-232C Com | – | – | Displays receive data and transmit data |

The contents of this instruction manual are subject to change without prior notice.

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