# Indicator for Voltage-Output Type Sensors

# Instruction manual

## WD-100A

Business use only

## INTRODUCTION

Thank you for purchasing our Indicator for voltage-output type sensors WD-100A.
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.

## SUPPLIED ITEMS

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

| item name | Quantity |
|---|---|
| Indicator for voltage-output type sensors WD-100A (body) | 1 |
| Case fixing attachment | 2 |
| Terminal block cover | 1 (For power supply terminal) |
| Attached connectors | 4 (7P×3, 13P×1) |
| GETTING STARTED GUIDE | 1 |
| Product Warranty | 1 |
| INITIAL SETTING FOR ENGLISH | 1 |

## OPTIONAL ACCESSORIES

Optional accessories are shown below.

| Name | Model | Notes |
|---|---|---|
| AC adapter | UNI324-2410-CT | Input:100～240VAC(50/60Hz), output:24VDC |

Notes: When using the AC adapter, use it in the operating temperature range of 0 to 40 ℃.

## 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) Operating temperature of out of -5 to 50°C
2) Operating 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 in such a way that 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.

Basic Insulation : Basic insulation to prevent electric shock.
Operational Insulation : Insulation for the function of the equipment.

<table>
<tr><td rowspan="2">DC<br>power</td><td colspan="2">Comparative outputs, External control inputs,<br>Analog output,</td></tr>
<tr><td>Input Ach<br>(Analog)</td><td>Input Bch (Pulse)<br>Totalizer-synchronous pulse output</td></tr>
</table>

3) Do not wire the power supply line, input signal lines and output signal lines near noise sources or relay driven 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) Please use wire which has appropriate specifications. Inappropriate wire may cause a fire because of heat generation.
5) 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.
6) 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.
7) 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.
8) Attach a terminal block cover to the product. Otherwise it may cause an electric shock.
9) 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.

## 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.

In addition, the limited lifespan parts used in the product and optional accessories are as follows:

| Item | Replacement frequency |
|---|---|
| LCD panel | Once every five years |
| Aluminum electrolytic capacitor | Once every five years |
| AC adapter (optional accessory) | Once every five years |

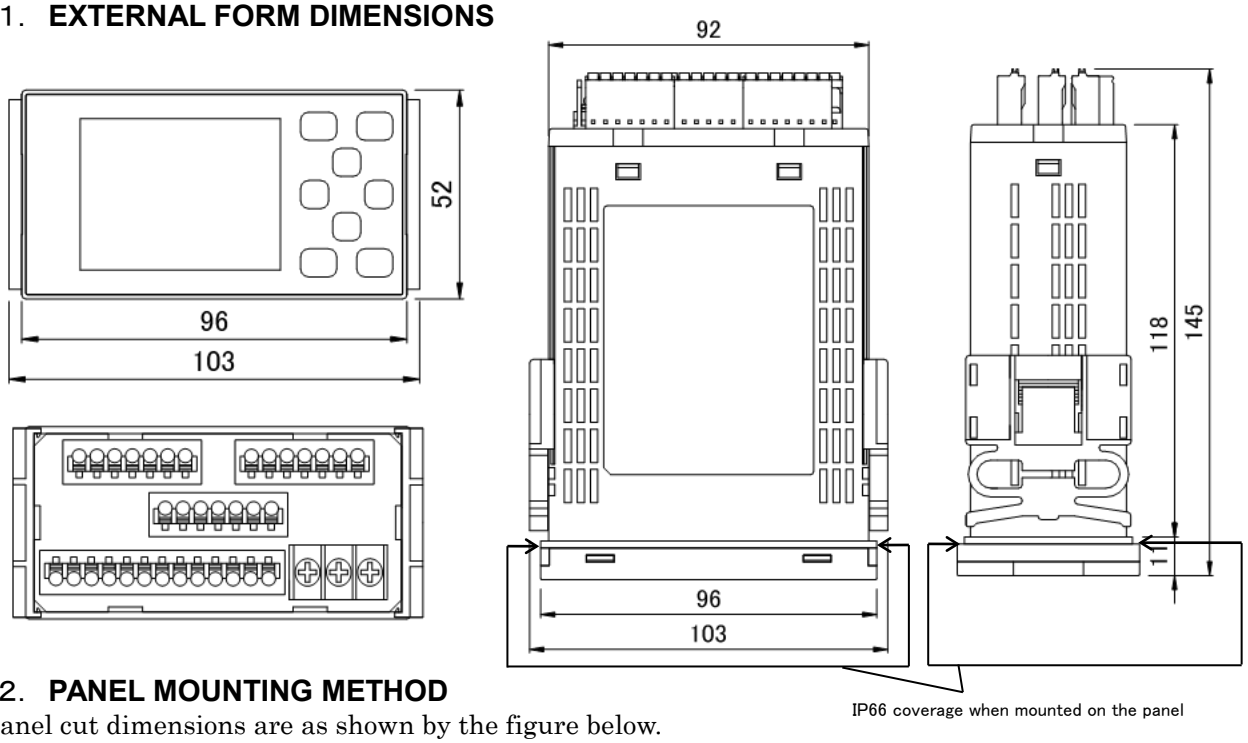
The above estimates assume use for eight hours per day, 365 days per year. Note that the above periods are only intended as estimates and do not guarantee that there will be no malfunctions during the above periods, nor are they a promise of free repairs.
Regular maintenance and the replacement of parts are necessary to use the equipment without worry.
Part replacement is required as soon as possible from the standpoint of safety, etc., especially when the equipment is used continuously for a long time.

## 1－6. DISPOSAL OF THIS PRODUCT

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

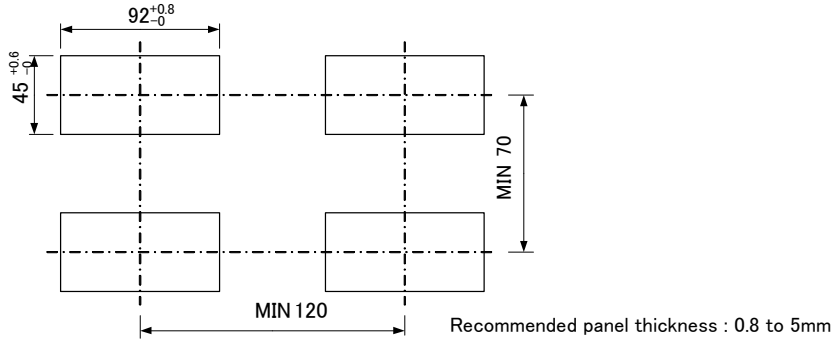
# 2. MOUNTING METHOD

## 2－1. EXTERNAL FORM DIMENSIONS



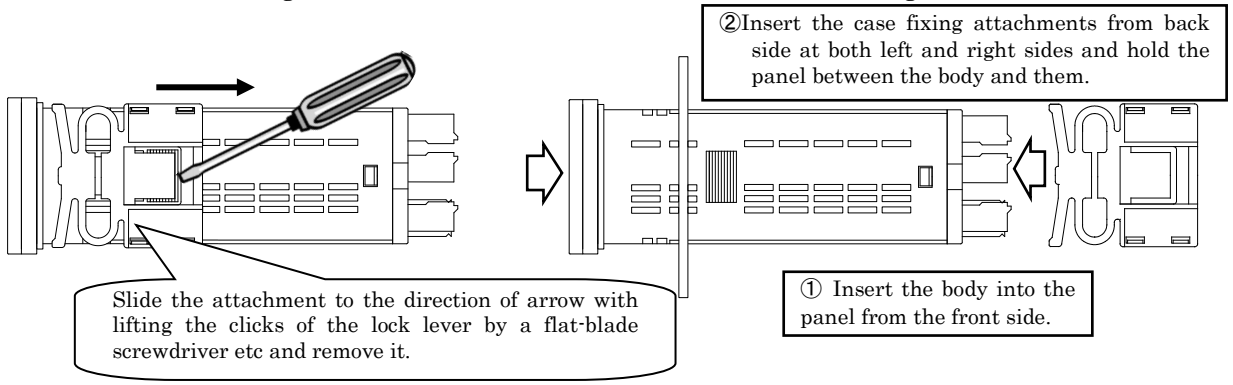

## 2－2. PANEL MOUNTING METHOD

Panel cut dimensions are as shown by the figure below.




1) Removal of case fixing attachments

2) Installment of case fixing attachments




## CAUTION

○ Prior to the installation of this product please read “1-1. ENVIRONMENTS AND CONDITIONS OF USE” (page6)

○ 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.

# 3. CONNECTING TERMINALS

## 3－1. WIRING TO TERMINALS

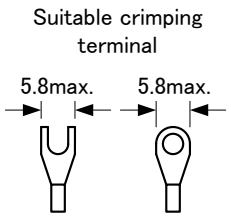
The connections to this product are done by connecting wires to the screw terminal block (power supply) and screwless terminal blocks on the back side of the body. Show below for the method and precautions.

### 3－1－1. 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.

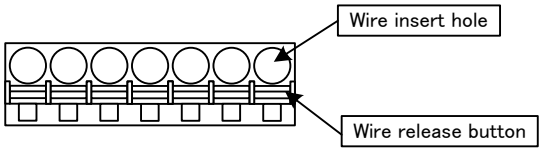
②Insert lugs under the washers of loosened screws and fasten the screws.
(Recommended torque：0.6 [N･m])



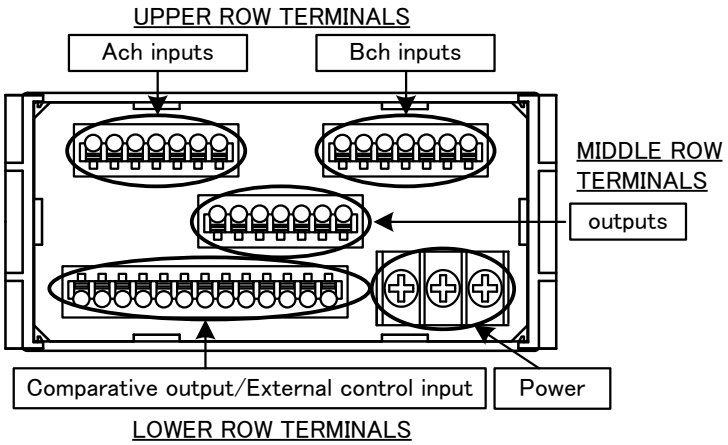

### 3－1－2. WIRING TO SCREWLESS TERMINALS

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)



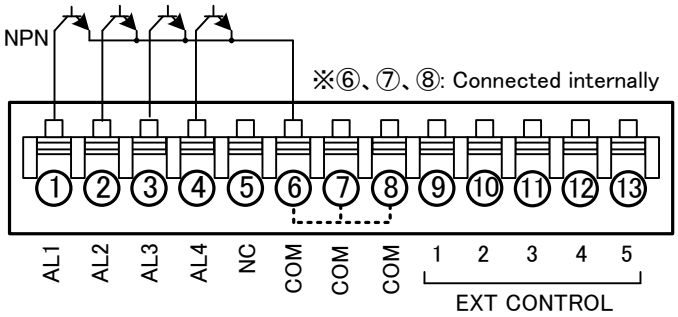

### 3－1－3. THE LOCATION OF EACH TERMINAL STAND



## 3－2. CONNECTION FOR LOWER ROW TERMINALS

### 3－2－1. COMPARATIVE OUTPUT/EXTERNAL CONTROL INPUT

Screwless connector

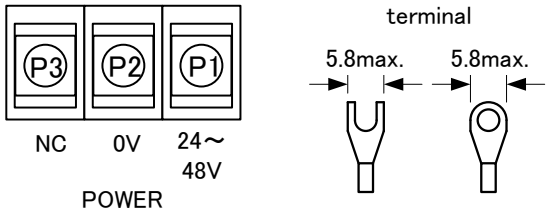



Suitable wire：AWG24 to 16

| No. | Name | Description |
|---|---|---|
| 1 | AL1 | AL1 open-collector output (collector) |
| 2 | AL2 | AL2 open-collector output (collector) |
| 3 | AL3 | AL3 open-collector output (collector) |
| 4 | AL4 | AL4 open-collector output (collector) |
| 5 | NC | No connection.（Non-usable for a relay terminal) |
| 6,7,8 | COM | Common terminal for NPN output (emitter) and 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 |

### 3－2－2. POWER SUPPLY

Screw terminals





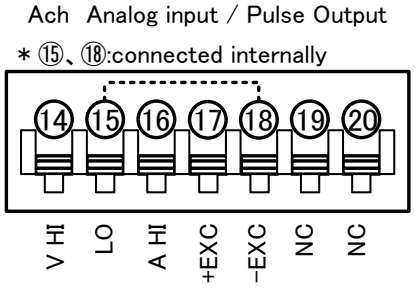


| Terminal | Name | Description |
|---|---|---|
| P1 | POWER (+) | Power source terminal ＋V |
| P2 | POWER (－) | Power source terminal 0V |
| P3 | NC | No connection.（Non-usable for a relay terminal) |

## 3－3. CONNECTION FOR UPPER ROW TERMINALS

### 3－3－1. ANALOG INPUTS

Screwless connector



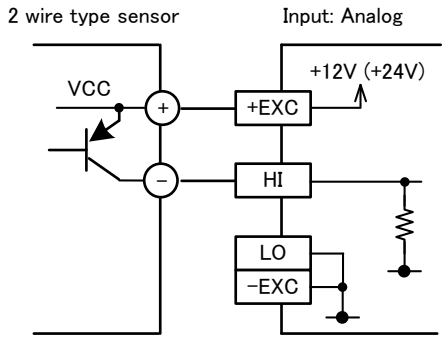

Suitable wire：AWG24 to 16

●A channel analog input

| terminal | name | description |
|---|---|---|
| 14 | V HI | Ach voltage range input terminal (+) |
| 15 | LO | Ach input common terminal (-) |
| 16 | A HI | Ach current range input terminal (+) |
| 17 | +EXC | Ach sensor power supply output terminal (+) |
| 18 | -EXC | Ach sensor power supply output terminal (-) |
| 19 | NC | No connection. (Non-usable for a relay terminal) |
| 20 | NC | No connection. (Non-usable for a relay terminal) |

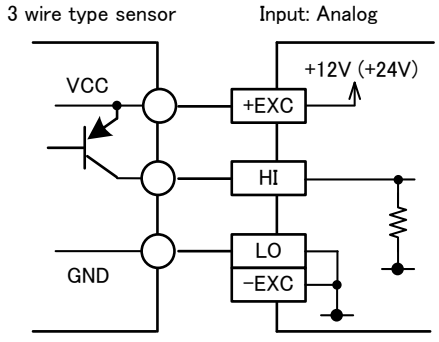
*1 “LO terminal” and “-EXC terminal” is connected internally and same voltage level.

・Example of connecting to sensor (2 wire type sensor)



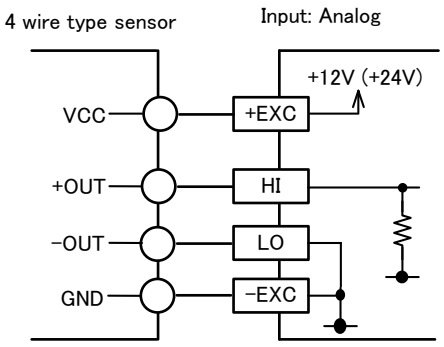

＊Use [V HI] terminal as HI terminal if the sensor is voltage output type, use [A HI] terminal if the sensor is current output type.

・Example ofconnecting to sensor (3 wire type sensor)




＊Use [V HI] terminal as HI terminal if the sensor is voltage output type, use [A HI] terminal if the sensor is current output type.

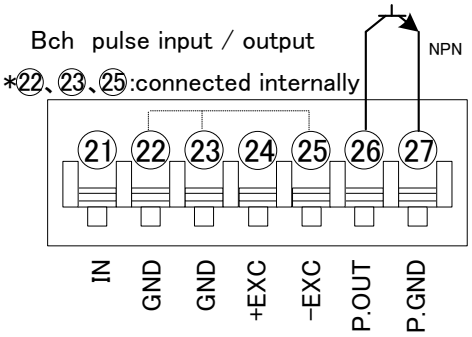
・Example ofconnecting to sensor (4 wire type sensor)




* Use [V HI] terminal as HI terminal if the sensor is voltage output type, use [A HI] terminal if the sensor is current output type.

### 3－3－2. **PULSE INPUTS / OUTPUT**

Screwless connector



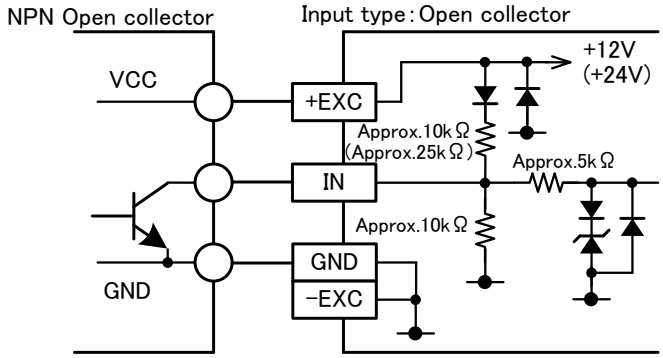

Suitable wire: AWG24 to 16

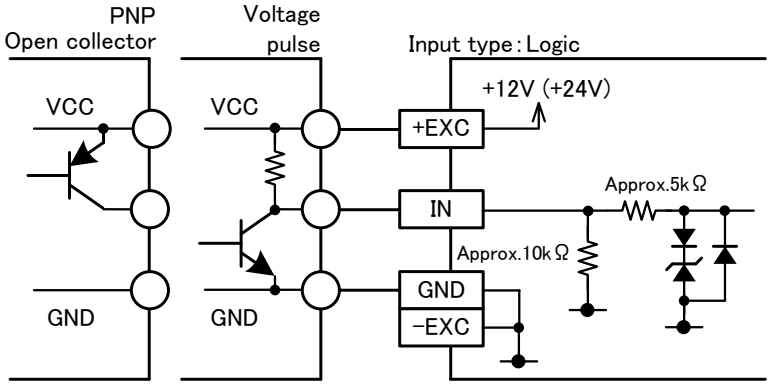
●B channel pulse input

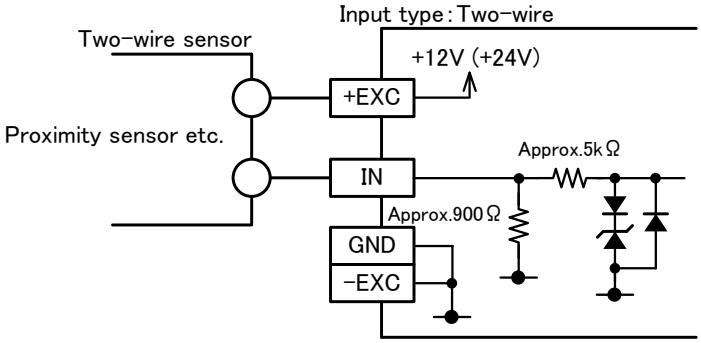
| terminal | name | descriptions |
|---|---|---|
| 21 | IN | Bch pulse input terminal |
| 22,23 | GND | Bch input ground terminal |
| 24 | +EXC | Bch sensor power supply output terminal (+) |
| 25 | -EXC | Bch sensor power supply output terminal (-) |
| 26 | P.OUT | Bch totalizer-synchronous pulse output terminal (+) |
| 27 | P.GND | Bch totalizer-synchronous pulse output terminal (-) |

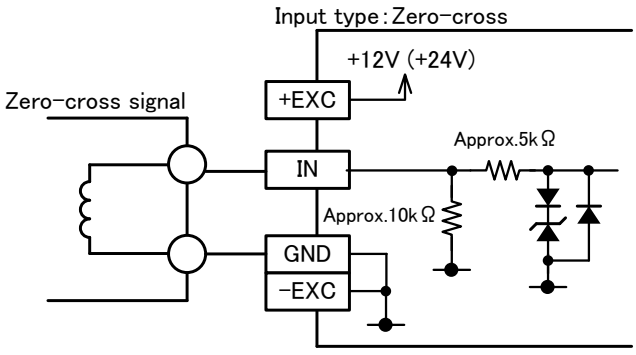
*1 “GND terminal” and “-EXC terminal” is connected internally and same voltage level.

●Examples for Input connections



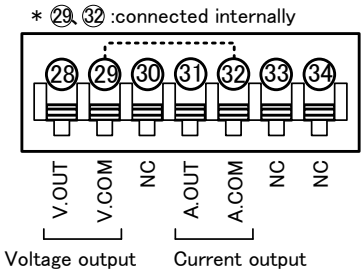



## 3－4. CONNECTION FOR MIDDLE ROW TERMINALS

### 3－4－1. ANALOG OUTPUT

Screwless connector

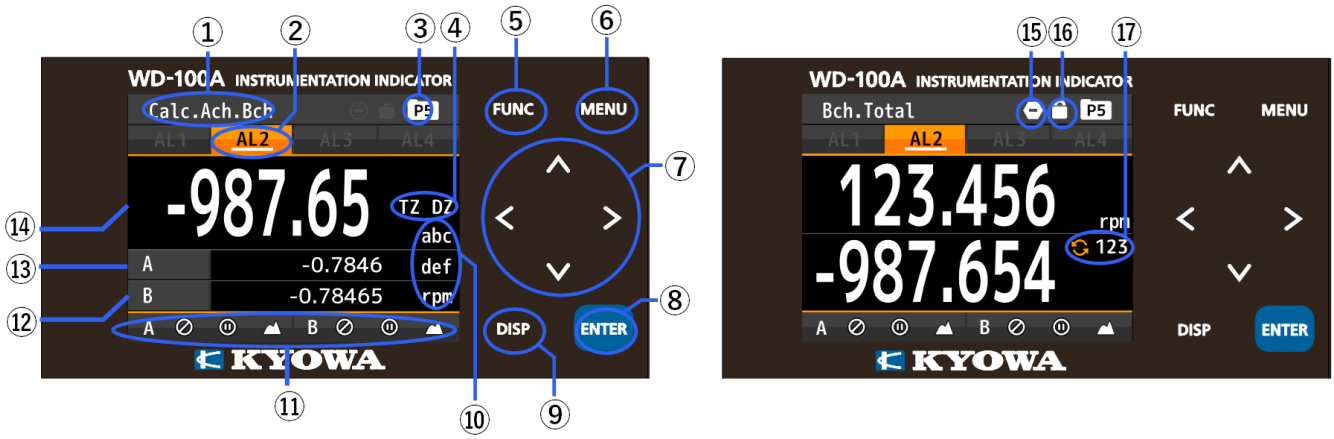



Suitable wire : AWG24 to 16

| terminal | name | descriptions |
|---|---|---|
| 28 | V.OUT | Analog voltage output terminal (+) |
| 29 | V.COM | Analog voltage output terminal (-) |
| 30 | NC | No connection (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 (Non-usable for a relay terminal) |

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

# 4. 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 | Pattern | Indicates pattern No. in use. |
| ④ | DZ/TZ icon | DZ: Indicates the operation status of the “Digital zero” function.<br>TZ: Indicates the operation status of the “Tracking zero” function. |
| ⑤ | FUNC key | Used for registering external control shortcut function. |
| ⑥ | MENU key | Used for moving to setting display and returning to measurement display. |
| ⑦ | Arrow keys | Used to move the cursor and to move to other displays while setting mode.<br>*When the shortcut function is registered, the assigned function will be valid by holding down the key over 1 second. |
| ⑧ | ENTER key | Used to validate setting value. |
| ⑨ | DISP key | Used to switch measurement displays. |
| ⑩ | Display unit | Unit for 1st item display |
| ⑪ | External control | Lights when any of external control functions are valid |
| ⑫ | 3rd item display | Displays measured value of 3rd item |
| ⑬ | 2nd item display | Displays measured value of 2nd item |
| ⑭ | 1st item display | Displays measured value of 1st item |
| ⑮ | Comparison result | Lights when the result of comparative output is ON. |
| ⑯ | Key lock | Lights when the key lock is effective. |
| ⑰ | Overflow counter | In case that 1st display item is totalized value, indicates overrun count.<br>* If the setting for the overflow count is NONE, this item is not shown. |

## 4－1. EXPLANATION OF ICONS

### 4－1－1. DISPLAY ICONS ON THE MEASUREMENT DISPLAY

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

| icon | meanings |
|---|---|
| P5 | Indicates pattern No. in use. |
| | Indicates key lock function is effective. |
| | Indicates comparative output reset function is effective. |
| | Indicates measurement block function is effective. |
| | Indicates display hold function is effective. |
| | Indicates maximum value or minimum value hold function is effective. |

### 4－1－2. KEY OPERATION ICONS ON THE SETTING DISPLAY

Key operation icons which are displayed on setting displays 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 |

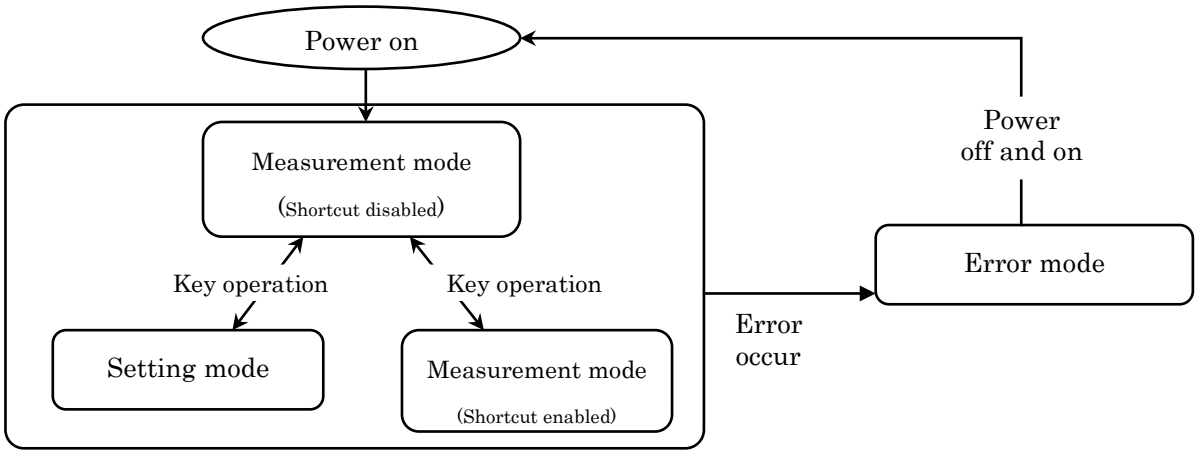
# 5. MODES OF OPERATION

## 5－1. 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. | page18 |
| Setting mode | **1.Input Setting**<br>Ach(Analog) / Bch (Pulse)<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. | page22 |
| | **2.Output Setting**<br>Comparative Output AL1 to AL4<br>・Settings of comparative output such as comparative judgment value, output mode etc.<br>Pulse Output<br>・Setting of totalizer-synchronous pulse.<br>Analog Output<br>・Setting of analog output such as output range, scaling. | page 233 |

| 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 23 |
| | **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 24 |
| | **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. | page24 |
| Shortcut enabled mode | Can control external control functions which are assigned to arrow keys by operations of the keys | page127 |
| Error mode | Displays error codes when some error occurs. | page 140 |

## 5－2. STATE TRANSITION DIAGRAM



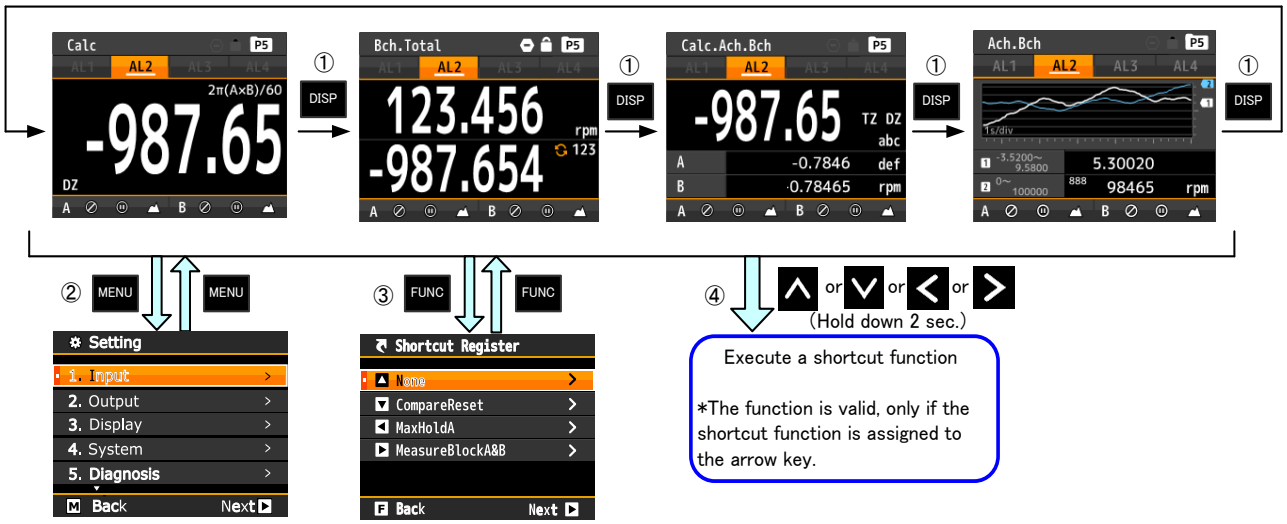
# 6. MEASUREMENT MODE

## 6－1. WHAT YOU CAN DO IN MEASUREMENT MODE

| WHAT YOU CAN DO | DESCRIPTION | RELATED PAGE |
|---|---|---|
| Display of measured value | Displays results of measurement | page 19 |
| Switch of measurement displays | Switches measurement displays which are entries in advance. | page 18 |
| Shortcut functions | Executes external control functions which are assigned to arrow keys. | page 127 |

## 6－2. 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 | ∧<br>∨<br><<br>> | 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**

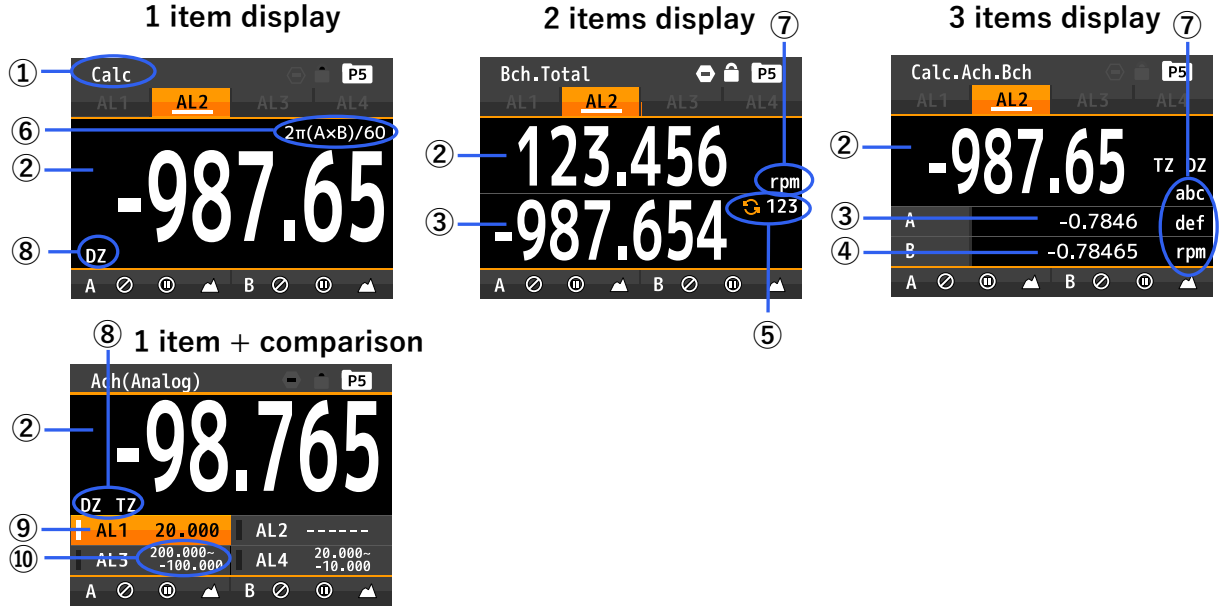
When the key lock is enabled, key operations are not acceptable. Operate the keys after canceling key lock function.

## 6－3. 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).

### 6－3－1. 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 display.

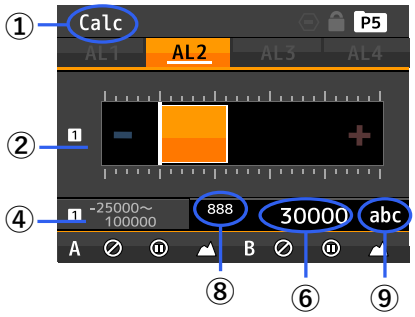



| No. | Description |
|---|---|
| ① | Shows the title of display which is currently displayed in measurement display.<br>*In the case of “Calc, ABchch”, calculation value is treated as the 1st item, value A is treated as the 2nd item and value B is the 3rd item. |
| ② | Shows measurement result of the 1st item. |
| ③ | Shows measurement result of the 2st item. |
| ④ | Shows measurement result of the 3st item. |
| ⑤ | In the case of totalized value display, shows number of overflows. |
| ⑥ | In the case of calculation value display, shows expression. (Only 1 item display) |
| ⑦ | Shows units selected in settings. |
| ⑧ | DZ icon lights up during Digital Zero operation.<br>TZ icon lights up during Tracking Zero operation. |
| ⑨ | Light up when comparison output is active. |
| ⑩ | Display comparison judgement values. |

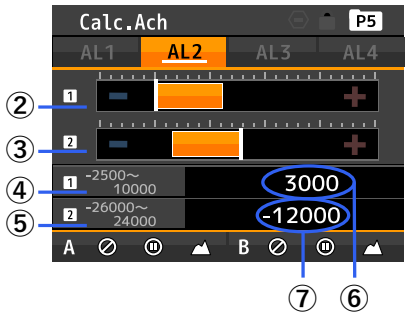
## 6－3－2. LEVEL DISPLAY (BAR GRAPH)

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 display.

1 item display



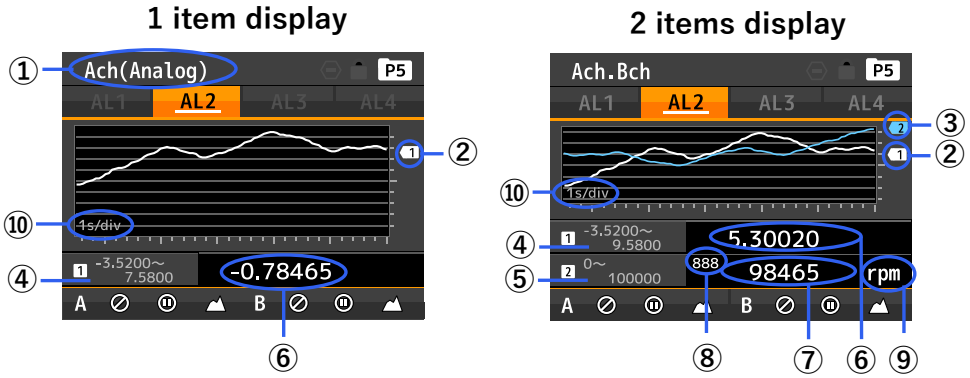

2 items display




| Item | Description |
|---|---|
| ① | Shows the title of display which is currently displayed in measurement display.<br>*In the case of “Calc, Ach”, calculation value is treated as 1st item and value A is treated as 2nd item. |
| ② | Shows measurement result (1st item) by level display (bar graph).<br>* 1 denotes 1st item. |
| ③ | Shows measurement result of 2nd item by level display (bar graph).<br>* 2 denotes 2nd item. |
| ④ | Shows upper and lower limit value of level display (bar graph) scale for 1st item. |
| ⑤ | Shows upper and lower limit value of level display (bar graph) scale for 2nd item. |
| ⑥ | Shows measurement result of 1st item by numerical number. |
| ⑦ | Shows measurement result of 2nd item by numerical number. |
| ⑧ | In the case of totalized value display, shows number of overflows. |
| ⑨ | Shows units selected in settings. |

## 6－3－3. 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 display.




| Item | Description |
|---|---|
| ① | Shows the title of display which is currently displayed in measurement display.<br>*In the case of “ABchch”, value A is treated as 1st item and value B is treated as 2nd item. |
| ② | Shows measurement result (1st item) by trend display (trend graph).<br>* 1 denotes 1st item. |
| ③ | Shows measurement result of 2nd item by trend display (trend graph).<br>* 2 denotes 2nd item. |
| ④ | Shows upper and lower limit value of level display (trend graph) scale for 1st item. |
| ⑤ | Shows upper and lower limit value of level display (trend graph) scale for 2nd item. |
| ⑥ | Shows measurement result of 1st item by numerical number. |
| ⑦ | Shows measurement result of 2nd item by numerical number. |
| ⑧ | In the case of totalized value display, shows number of overflows. |
| ⑨ | Shows units selected in settings. |
| ⑩ | Shows time scale of the graph. (The scale is common in 1st and 2nd items.) |

# 7. SETTING MODE

## 7－1. WHAT YOU CAN DO IN “THE SETTING MODE”

### 7－1－1. WHAT YOU CAN DO IN “THE INPUT SETTING GROUP”

ANALOG INPUT (Ach) →page27

- Select a pattern number to configure settings.
- Selects the input range.
- Selects voltage of power supply for sensor.
- Sets simple average function.
- Sets moving average function.
- Sets linearize function.
- Sets scaling for display value.
- Selects position of decimal point for display value.
- Selects a unit for display value.
- Makes settings for stabilizing display value.

PULSE INPUT (Bch) →page42

- Select a pattern number to configure settings.
- Selects the type of the input.
- Selects the analog filter of input.
- Selects voltage of power supply 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.
- Sets scaling for totalized value display.
- Sets initial value of totalized value display.
- Selects direction of add-subtract for totalized value.
- Selects position of decimal point for totalized value display.
- Selects a unit for totalized value display.
- Selects overflow count method of totalized value.

2 INPUT CALCULATION SETTING →page58

- 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.
- Sets calculating formula for totalized value display.
- Sets decimal point for totalized value display.
- Sets unit for totalized value display.
- Selects overflow count method of totalized value.

EXTERNAL CONTROL →page65

- 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.

WHAT YOU CAN DO IN “THE OUTPUT SETTING GROUP”

COMPARE LIST →page68

- Display comparative output settings.
- Edit comparative output judgement value.

PULSE OUTPUT SETTING→ page79

- Select a pattern number to configure settings.
- Select pulse width of pulse.
- Select output logic of pulse.

COMPARATIVE OUTPUTS(AL1-AL4) SETTING →page68

- 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→page84

- 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.

### 7－1－2. **WHAT YOU CAN DO IN “THE DISPLAY SETTING GROUP”**

DISPLAY SELECT SETTING→page89

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

LEVEL DISPLAY SETTING →page93

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

TREND DISPLAY SETTING →page96

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

### 7－1－3. **WHAT YOU CAN DO IN "THE SYSTEM SETTING GROUP"**

GENERAL SETTINGS →page100

- Change brightness of display.
- Provide wait time after power on.
- Darken the display after a specified period of time.
- Select whether the totalized value to save or not.
- Selects whether or not to retent the execution state and value of digital zero.
- Select languages of display.
- Set the direction of the display.
- Disable changing the settings.
- Copy pattern data.

INITIALIZINGS →page111

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

### 7－1－4. **WHAT YOU CAN DO IN "THE DIAGNOSIS GROUP"**

INPUT DIAGNOSIS →page113

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

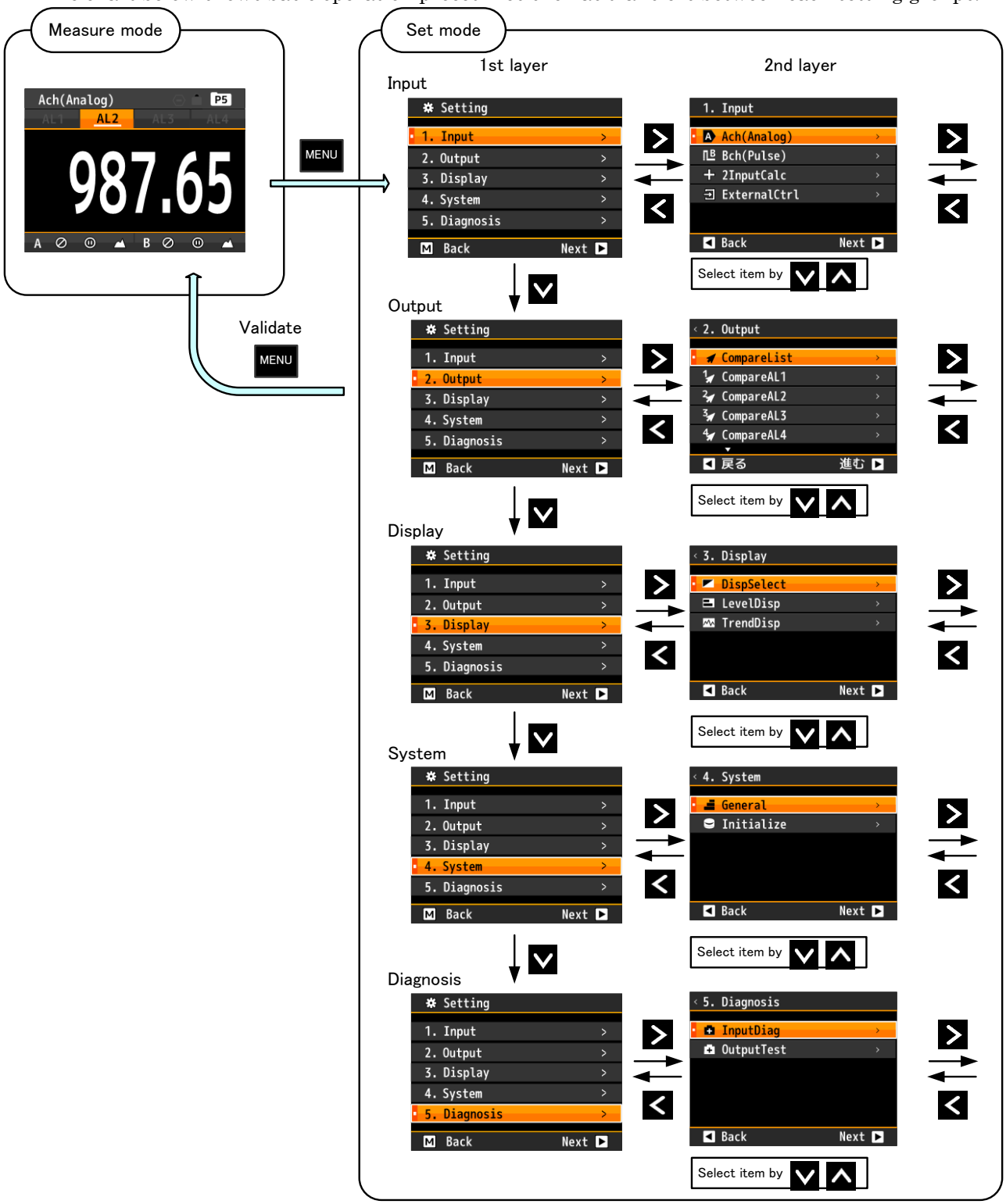
SIMULATED OUTPUT (OUTPUT TEST) →page117

- Output simulated output to comparative output.
- Output simulated output to totalizer-synchronous pulse.
- Output simulated output of specified value to analog output.

## 7－2. OPERATION IN SETTING MODE

### 7－2－1. TRANSFER BETWEEN SETTING GROUPS

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

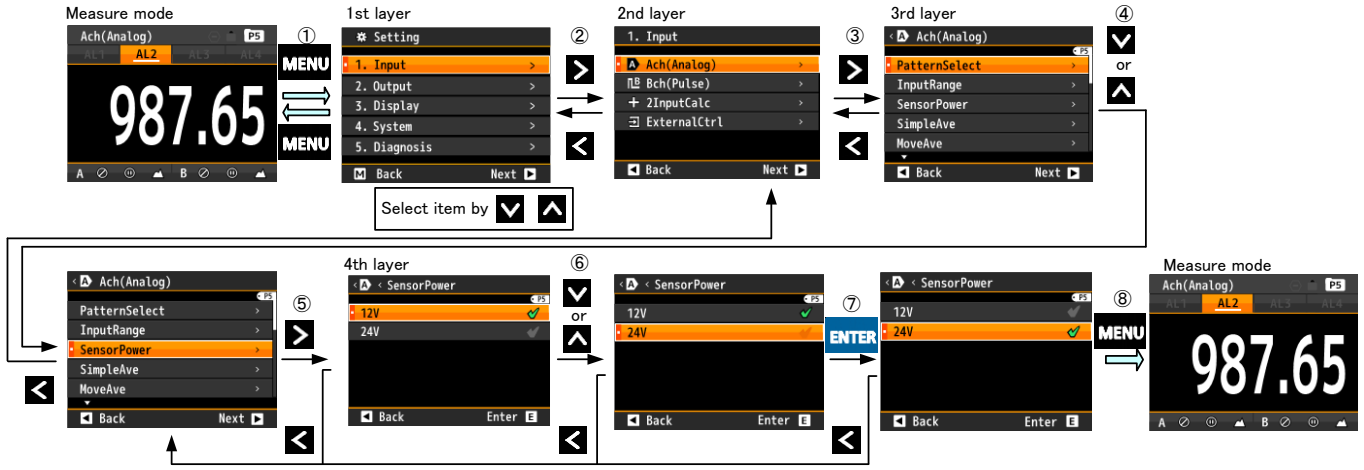



**⚠CAUTION**

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.

## 7－2－2. OPRERATING PROCEDURE

An operating procedure for a concrete setting is shown below. The chart below is an explanation for changing of the sensor power supply 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 (UP/DOWN)**" key, 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.

## 7－3. 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 |
|---|---|
| Ach(Analog) | - Settings for the sensor.<br>- Settings for scaling. |
| Bch(Pulse) | |
| 2 input calculation | Setting for the calculation. |
| External control inputs | Setting about assignments of external control terminals. |

### 7－3－1. Ach(Analog)

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select | page28 |
| Select input range | Input range | page 29 |
| Select voltage of power for the sensor. | Sensor power | page 30 |
| Set input low cut function. | Input low cut | page 31 |
| Set input correction function. | Input correct | page 32 |
| | Linearize point | |
| Scaling setting. | Offset | page 35 |
| | FullScale | |
| | Decimal point position | |
| | Display unit | |
| Set function which stabilize the value. | Simple average | page 38 |
| | Moving average | |
| | Display step | |
| | Tracking zero | |

### 7－3－1－1. 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.
> Please pay attention to the target pattern number which the following "Analog 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 |

●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 **"Ach(Analog)"** 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 **"Pattern select"** 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: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 7－3－1－2. **Select Input Range**

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 Range [InputRange] | 0 ~ 5V | | Measurement range: 0 to 5V |
| | 1 ~ 5V | | Measurement range: 1 to 5V |
| | ±5V | * | Measurement range: -5 to 5V |
| | 0 ~ 10V | | Measurement range: 0 to 10V |
| | ±10V | | Measurement range: -10 to 10V |
| | 4 ~ 20mA | | Measurement range: 4 to 20mA |
| | 0 ~ 20mA | | Measurement range: 0 to 20mA |
| | ±20mA | | Measurement range: -20 to 20mA |

● Setting steps to set the input range to "1 ~ 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 **"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 **"Ach(Analog)"** 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 **"Input Range"** 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 **"1 ~ 5V"**<br>*Select a suitable input range for the sensor which you connect to WD-100A actually. |
| 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.**

### 7－3－1－3. Select Voltage of Power for the Sensor

This setting variable selects voltage of the power source 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 12VDC（100mA max.） to the sensor. *Arrowable current for both Ach and Bch is 100mA max. |
| | 24V | | Supplies 24VDC（50mA max.） to the sensor. *Arrowable current for both Ach and Bch is 50mA max. |

**⚠CAUTION**

○When the setting of the sensor power supply is changed, measurement function is inhibit for approx. 1 second after returning measurement mode.
○In the case of combination of 12VDC and 24VDC, maximum arrowable power is 1.2W

●A method to select “24VDC” as sensor power supply is 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 **“Ach(Analog)”** 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 **“Sensor Power”** and push “**ARROW (RIGHT)**” key, then the display moves to the **4th layer (setting values)**. *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”** *Select suitable voltage for the sensor in use. |
| ⑥ | By pushing **“ENTER”** key, selected parameters become valid and a check mark accompanies. *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：<u>If the power is shut down before being pushed the “MENU” key, the selected contents are not stored.</u>**

### 7－3－1－4. Set Input Low Cut Function

This function eliminates floating input near zero level and let display value to zero for input under setting value in %.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Input low cut [InputLowCut] | 00000 to ±99999 | 00000 | Sets display value to shut down. |

**⚠CAUTION**

○For analog input products, processing of the input low cut function is performed after the calculation process of the digital zero function (see page 125).

A method for shutdown input value to "±5"is displayed 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 **"Ach(Analog)"** 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 **"InputLowCut"** 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 | Pushing **"ENTER"** key, move to numerical value setting display. |
| ⑥ | Using the "**ARROW (UP/DOWN/LEFT/RIGHT)**" keys, set setting value to "**±00005**".<br>* Set desired value of input % in actually. |
| ⑦ | 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. |
| 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.**

### 7－3－1－5. Set Input Correction Function（Linear Correction Function）

As input correction function, this product has linearize correction and square route correction.
* Please refer to page 33 for the characteristic setting of linearize.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Input Correction Function [InputCorrect] | Non | * | No Input correction |
| | Linearize | | Select linearize correction |

**⚠CAUTION**

Calculation processing of the input correction function is performed after calculation processing of the input low cut function.

● A method to select the linearize correction is 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 "**Ach(Analog)**" 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 "**InputCorrect**" 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 "**linearize**". |
| 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.**

### 7－3－1－6. **Set Linearize（Linearize Point）**

21 points of linearize settings are available.
Each setting needs 2 settings of display value before correction and display value after correction.

> **⚠CAUTION**
>
> After 2nd point, “00000” is set on both of input value and output value, it is recognized as end, and the following points are invalid.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial values | Meanings of setting values |
|---|---|---|---|
| Linearize Points [LinearizePoint] | ±99999 | 0 | 1st point input value (Input value of 1st point before correction) |
| | ±99999 | 0 | 1st point output value (Input value of 1st point after correction) |
| | ±99999 | 1000 | 2nd point input value (Input value of 2nd point before correction) |
| | ±99999 | 1000 | 2nd point output value (Input value of 2nd point after correction) |
| | ±99999 | 2000 | 3rd point input value (Input value of 3rd point before correction) |
| | ±99999 | 2000 | 3rd point output value (Input value of 3rd point after correction) |
| | ±99999 | 3000 | 4th point input value (Input value of 4th point before correction) |
| | ±99999 | 3000 | 4th point output value (Input value of 4th point after correction) |
| | ±99999 | 4000 | 5th point input value (Input value of 5th point before correction) |
| | ±99999 | 4000 | 5th point output value (Input value of 5th point after correction) |
| | ±99999 | 5000 | 6th point input value (Input value of 6th point before correction) |
| | ±99999 | 5000 | 6th point output value (Input value of 6th point after correction) |
| | ±99999 | 6000 | 7th point input value (Input value of 7th point before correction) |
| | ±99999 | 6000 | 7th point output value (Input value of 7th point after correction) |
| | ±99999 | 7000 | 8th point input value (Input value of 8th point before correction) |
| | ±99999 | 7000 | 8th point output value (Input value of 8th point after correction) |
| | ±99999 | 8000 | 9th point input value (Input value of 9th point before correction) |
| | ±99999 | 8000 | 9th point output value (Input value of 9th point after correction) |
| | ±99999 | 9000 | 10th point input value (Input value of 10th point before correction) |
| | ±99999 | 9000 | 10th point output value (Input value of 10th point after correction) |
| | ±99999 | 10000 | 11th point input value (Input value of 11th point before correction) |
| | ±99999 | 10000 | 11th point output value (Input value of 11th point after correction) |
| | ±99999 | 11000 | 12th point input value (Input value of 12th point before correction) |
| | ±99999 | 11000 | 12th point output value (Input value of 12th point after correction) |
| | ±99999 | 12000 | 13th point input value (Input value of 13th point before correction) |
| | ±99999 | 12000 | 13th point output value (Input value of 13th point after correction) |
| | ±99999 | 13000 | 14th point input value (Input value of 14th point before correction) |
| | ±99999 | 13000 | 14th point output value (Input value of 14th point after correction) |
| | ±99999 | 14000 | 15th point input value (Input value of 15th point before correction) |
| | ±99999 | 14000 | 15th point output value (Input value of 15th point after correction) |
| | ±99999 | 15000 | 16th point input value (Input value of 16th point before correction) |
| | ±99999 | 15000 | 16th point output value (Input value of 16th point after correction) |
| | ±99999 | 16000 | 17th point input value (Input value of 17th point before correction) |
| | ±99999 | 16000 | 17th point output value (Input value of 17th point after correction) |
| | ±99999 | 17000 | 18th point input value (Input value of 18th point before correction) |
| | ±99999 | 17000 | 18th point output value (Input value of 18th point after correction) |
| | ±99999 | 18000 | 19th point input value (Input value of 19th point before correction) |
| | ±99999 | 18000 | 19th point output value (Input value of 19th point after correction) |
| | ±99999 | 19000 | 20th point input value (Input value of 20th point before correction) |
| | ±99999 | 19000 | 20th point output value (Input value of 20th point after correction) |
| | ±99999 | 20000 | 21st point input value (Input value of 21st point before correction) |
| | ±99999 | 20000 | 21st point output value (Input value of 21st point after correction) |

●A method to set the 2nd point input value to “315” and the 2nd point output value to “405” is 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)**” keys, 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)** keys”, point the cursor to “**Ach(Analog)**” and push “**ARROW (RIGHT)** key”, then the display moves to the **3rd layer (setting variables)**. |
| ④ | By moving the cursor with “**ARROW (UP/DOWN)**” keys, point the cursor to “**Linearize Points**” 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)**” keys, point the cursor to setting value of “**1st point input value”** and push **“ENTER”** key to move to numerical value setting display. |
| ⑥ | Using “**ARROW (UP/DOWN/LEFT/RIGHT)**”keys, set the setting value to **“00315”.**<br>*Set it to a desired value in input in actually. |
| ⑦ | By pushing **“ENTER”** key, the set value is fixed.<br>By moving the cursor with “**ARROW (UP/DOWN)**” keys, point the cursor to setting value of “**2nd point output value”** and push **“ENTER”** key to move to numerical value setting display. |
| ⑧ | Using “**ARROW (UP/DOWN/LEFT/RIGHT)**” keys, set the setting value to **“00405”.**<br>*Set it to a desired value in output in actually. |
| ⑨ | By pushing **“ENTER”** key, the set value is fixed.<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. |
| ⑩ | 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.**

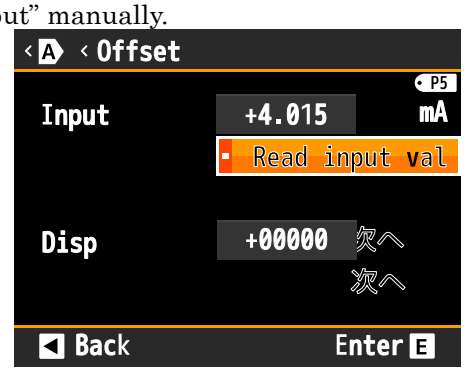
### 7－3－1－7. **Set Offset / Full Scale setting**

Calibrate offset of input signal. Please calibrate both “Offset” and “Fullscale”.

●Operation for offset calibration **(ex: InputRange 4-20mA, set display value to be 0-10000)**

1. Select "Offset" and press "ENTER" key. (Go to offset setting screen)
2. Input 4mA to WD-100A and select "Read input val" and press "ENTER" key. Then, input current is displayed in “Input”.
3. Set “Disp” to be “0”.
4. Back to forward screen by press “Left” key.

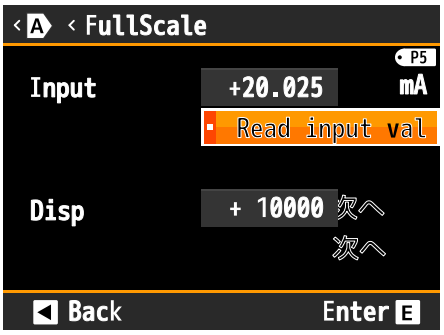
*You can also set “Input” manually.




●Operation for full scale calibration **(ex: InputRange 4-20mA, set display value to be 0-10000)**

1. Select "Fullscale" and press "ENTER" key. (Go to fullscale setting screen)
2. Input 20mA to WD-100A and select "Read input val" and press "ENTER" key. Then, input current is displayed in “Input”.
3. Set “Disp” to be “10000”.
4. Back to forward screen by press “Left” key.

*You can also set “Input” manually.



### 7－3－1－8. **Set Units for Display Value**

Selectable units for the display value are below.
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 |
|---|---|---|---|
| Display unit [DispUnit] | None, Hz, rpm, mN, N, kN, MN, mgf, gf, kgf, tf, mg, g, kg, t, ton, Pa, hPa, kPa, MPa, $gf/mm^2$, $tf/mm^2$, $gf/cm^2$, $tf/cm^2$, atm, mmHg, $mmH_2O$, mmAq, mbar, psi, mN・m, N・m, kN・m, MN・m, gf・cm, kgf・cm, gf・m, kgf・m, tf・m, µm, mm, cm, m, km, inch, km/h, rad/s, µV, mV, V, kV, µA, mA, A, kA, mΩ, Ω, kΩ, W, kW, VA, µε, µm/m, µV/V, mV/V, ℃, K, $m/s^2$, G, Gal, No., $m^3$, ml, l, kl, %, ‰, ppm, /s, /min, /h, Custom | None | Set unit for display value. |

**⚠ 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】**

The steps to set the display unit of instantaneous calculation result to "Hz" are 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 Input Calc"** 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 "**DispUnit**" 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.**

### 7－3－1－9. **Set Position of Decimal Point for Display Value**

This setting variable sets position of decimal point.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Decimal Point [DecPoint] | ##### | * | Set position of decimal point. |
| | ####.# | | |
| | ###.## | | |
| | ##.### | | |
| | #.#### | | |

● How to set the position of decimal point to "####. #" are 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 "**Ach(Analog)**" 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 "**DecPoint**" 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 "**####.#**".<br>*Select a proper number of times 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.**

### 7－3－1－10. **Set Functions Which Stabilize Display Value (Simple Average)**

This setting variable sets a number of times of simple average to the input signal.
The sampling speed is controlled as simple average of inner sampling (100times/sec).

> **⚠CAUTION**
>
> In the cases that the measured signal varies slowly or this product is used under a circumstance which is influenced by noise strongly, small number of times of simple average (i.e. fast sampling speed) may cause fluctuations of display.
>
> Comparative outputs, analog output and BCD output are output at this sampling speed.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Instantaneous Simple Average [SimpleAve] | None | * | No simple average（sampling 100 times /sec） |
| | 2times | | Simple average 2 times（sampling 50 times /sec） |
| | 4 times | | Simple average 4 times（sampling 25 times /sec） |
| | 8 times | | Simple average 8 times（sampling 12.5 times /sec） |
| | 16 times | | Simple average 16 times（sampling 6.25 times /sec） |
| | 32 times | | Simple average 32 times（sampling 3.13 times /sec） |
| | 64 times | | Simple average 64 times（sampling 1.56 times /sec） |
| | 128 times | | Simple average 128times（sampling 0.78times /sec） |
| | 256 times | | Simple average 256times（sampling 0.39times /sec） |

●Setting steps which set the simple average to “32 times” are shown below.
(The same steps could be also applied to the Ach(Analog).)

| 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 “**Ach(Analog)**” 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 “**SimpleAve**” 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 “**32 times**”.<br>* Select a proper number of times 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.**

### 7－3－1－11. **Set Functions Which Stabilize Display Value (Moving Average)**

This setting variable sets a number of times of moving average which is performed to sampling values after simple average.
The moving average is a function which brings filter effect without decreasing of sampling rate.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Moving Average [MoveAve] | None | * | No moving average（No delay） |
| | 2times | | Moving average 2 times （With delay of 1 sampling period） |
| | 3 times | | Moving average 3 times （With delay of 2 sampling periods） |
| | 4 times | | Moving average 4 times （With delay of 3 sampling periods） |
| | 5 times | | Moving average 5 times （With delay of 4 sampling periods） |
| | 6 times | | Moving average 6 times （With delay of 5 sampling periods） |
| | 7 times | | Moving average 7 times （With delay of 6 sampling periods） |
| | 8 times | | Moving average 8 times （With delay of 7 sampling periods） |
| | 9 times | | Moving average 9 times （With delay of 8 sampling periods） |

● Setting steps which set the moving average to “5 times” 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 “**Ach(Analog)**” 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 “**MovingAve**” 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 proper number of times 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.**

### 7－3－1－12. Set Functions Which Stabilize Display Value(Display Step)

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 |
|---|---|---|---|
| Display step [DispStep] | 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.
(The same steps could be applied to the Ach(Analog).)

| 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 **"Ach(Analog)"** 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 **"DispStep"** 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.**

### 7－3－1－13. Set Functions Which Stabilize Display Value(Tracking Zero)

Tracking zero is a function that automatically corrects minute offset of display value over time.
The judgment is made at each setting time, and if the display value is within 0 ± "ActiveArea", offset correction is performed and the display value becomes 0.
While the tracking zero function is in operation, the "TZ" mark will light.
* Tracking zero function operates only when the digital zero function operates, and it works automatically when the function is enabled and when the function of the digital zero function starts.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Tracking Zero [TrackingZero] | Interval | 0.00sec | Interval of tracking zero judgement.<br>The function is disable when this parameter is 0.00sec. |
| | ActiveArea | ±00000 | The function carry out and diplay value set to 00000 when display value is in range of this value. |

### 7－3－2. **Bch(Pulse)**

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select | page43 |
| Select input signal type | Input type | page 44 |
| Select input analog filter | Input filter | page 45 |
| Select voltage of power for the sensor. | Sensor power | page 46 |
| Set scaling functions for instantaneous value and totalized value | Instantaneous value display coefficient | page 47 |
| | Instantaneous unit time | |
| | Instantaneous value decimal point position | |
| | Totalized value display coefficient | |
| | Totalized value decimal point position | |
| Set units for instantaneous value display and totalized value display | Instantaneous value display unit | page 49 |
| | Totalized value display unit | |
| Set time after that passes the instantaneous value display becomes zero | Instantaneous value auto zero | page 51 |
| Set functions which stabilize the instantaneous value display. | Instantaneous value moving average | page 52 |
| | Instantaneous value simple average | |
| | Instantaneous value display step | |
| Set initial value of totalized value display. | Totalized value default value | page 55 |
| Select totalizing direction (addition or subtraction) for totalized value. | Total calculation direction | page 56 |
| Select count method of overflow of totalized value. | Totalized value overflow count | page 57 |

### 7－3－2－1. 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.
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.

| 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 **"Bch(Pulse)"** 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 **"Pattern select"** 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.**

### 7－3－2－2. 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.

| 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 "**Bch(Pulse)**" 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 "**Input type**" 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 "**Zero cross**"<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.**

### 7－3－2－3. **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.

| 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 “**Bch(Pulse)**” 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 “**Input type**” 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.

### 7－3－2－4. **Selecting Voltage of Power Supply for the Sensor.**

This setting variable selects power supply 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 12VDC power to the sensor (100mA max.).<br>* For Ach and Bch is 100mA or less. |
| | 24V | | Supplies 24VDC power to the sensor (50mA max.)<br>*For Ach and Bch is 50mA or less. |

**⚠CAUTION**

- When the sensor power supply 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 12VDC and 24VDC, the total power is 1.2 W max.

●How to set the sensor power supply to “24VDC” is 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 “**Bch(Pulse)**” 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 “**Sensor Power**” 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.**

### 7－3－2－5. **Setting Scaling for Instantaneous Value Display and Totalized Value Display.**

Set scaling parameters of scaling settings required for flow rate 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. |
| | | #####. # | | |
| | | ####. ## | | |
| | | ###. ### | | |
| | | ##. #### | | |
| | | #. ##### | | |
| Totalized value display coefficient | TotDispCoef | 0.00000 to $9.99999\times10^{-9\sim9}$ | $1.00000\times10^{0}$ | Scaling setting for totalized value display. |
| Totalized value decimal point position | TotDecPoint | ###### | ###### | Select decimal point position for totalized value display. |
| | | #####. # | | |
| | | ####. ## | | |
| | | ###. ### | | |
| | | ##. #### | | |
| | | #. ##### | | |

【Scaling setting examples】

Detecting pulses from a gear wheel which generates 4 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] | $2.50000\times10^{-1}$ | 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>$1/4=2.5\times10^{-1}$[round]<br>・Set "**$2.50000\times10^{-1}$**" as the Instantaneous display coefficient |
| Instantaneous Unit Time [InsUnitTime] | MINUTE | Unit to display is [rpm], therefore, select "MINUTE" for the instantaneous unit time. |
| instantaneous decimal point position [InsDecPoint] | ###### | Displays without decimal point, therefore select "######" for Instantaneous value decimal point position |
| totalized value display coefficient | $1.00000\times10^{5}$ | (Setting for totalized flow rate display)<br>The totalize function is not used, therefore, the setting in not needed. |
| Totalizes value decimal point position | ###### | The totalize function is not used, therefore, the setting in not needed. |

.

●The method for setting the instantaneous value display coefficient is shown below.
Other setting items can be set by the same 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 "**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 "**Bch(Pulse)**" 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 "**Instantaneous value display coefficient**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. |
| ⑤ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**2.50000×10-1**". |
| 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.**

### 7－3－2－6. **Set Units for Instantaneous Value Display and Totalized Value Display**

Units for the instantaneous value display and the totalized value display can be set separately. 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, Hz, rpm, mN, N, kN, MN, mgf, gf, kgf, tf, mg, g, kg, t, ton, Pa, hPa, kPa, MPa, $gf/mm^2$, $tf/mm^2$, $gf/cm^2$, $tf/cm^2$, atm, mmHg, $mmH_2O$, mmAq, mbar, psi, mN･m, N･m, kN･m, MN･m, gf･cm, kgf･cm, gf･m, kgf･m, tf･m, μm, mm, cm, m, km, inch, km/h, rad/s, μV, mV, V, kV, μA, mA, A, kA, mΩ, Ω, kΩ, W, kW, VA, με, μm/m, μV/V, mV/V, ℃, K, $m/s^2$, G, Gal, No., $m^3$, ml, l, kl, %, ‰, ppm, /s, /min, /h, Custom | None | Set unit for instantaneous value display. |
| Totalized value display unit [TotDispUnit] | None, Hz, rpm, mN, N, kN, MN, mgf, gf, kgf, tf, mg, g, kg, t, ton, Pa, hPa, kPa, MPa, $gf/mm^2$, $tf/mm^2$, $gf/cm^2$, $tf/cm^2$, atm, mmHg, $mmH_2O$, mmAq, mbar, psi, mN･m, N･m, kN･m, MN･m, gf･cm, kgf･cm, gf･m, kgf･m, tf･m, μm, mm, cm, m, km, inch, km/h, rad/s, μV, mV, V, kV, μA, mA, A, kA, mΩ, Ω, kΩ, W, kW, VA, με, μm/m, μV/V, mV/V, ℃, K, $m/s^2$, G, Gal, No., $m^3$, ml, l, kl, %, ‰, ppm, /s, /min, /h, Custom | None | Set unit for totalized 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】

The method for setting the display unit of Instantaneous value to "Hz" is 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 "**Bch(Pulse)**" 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 "**Instantaneous display unit**" 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 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.**

### 7－3－2－7. 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 instantaneous auto zero to “1sec” is 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 “**Bch(Pulse)**” 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 “**InsAutoZero**” 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 | Pushing **“ENTER”** key, move to numerical value setting display.<br>Set the value to “**1.00**”. |
| 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.**

### 7－3－2－8. **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.

| 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 "**Bch(Pulse)**" 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 "**Instantaneous value moving average**" 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.**

### 7－3－2－9. **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 10 ms.
Each of the period, comparative outputs, analog output are output.

| 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.

| 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 "**Bch(Pulse)**" 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 "**Instantaneous value simple average**" 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.**

### 7－3－2－10. **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 Bch(Pulse).)

| 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 "**Bch(Pulse)**" 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 "**Instantaneous display step**" 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.**

### 7－3－2－11. Setting Initial Value of Totalized Value Display

This setting variable sets the initial value of totalized value display.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Totalized value defaults [TotDefaults] | $\pm 9.99999\times10^{-9\sim9}$ | $0.00000\times10^{0}$ | Sets Initial value for totalized value display.<br>Setting of "$0.00000\times10^{+0}$" makes "0" display.<br>Setting of "$1.00000\times10^{+2}$" makes "100" display. |

●A method to set the initial value for totalized value to "10" is 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 "**Bch(Pulse)**" 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 "**Totalized value Default value**" 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 | Pushing **"ENTER"** key, move to numerical value setting display. |
| ⑥ | Using the "**ARROW (UP/DOWN/LEFT/RIGHT)**" keys, set setting value to "**+1.00000×10+1**".<br>* Set desired initial value for your use in actually. |
| ⑦ | 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. |
| ⑧ | 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.**

### 7－3－2－12. **Setting Addition or Subtraction for the Totalized Value**

This setting variable determines whether addition to initial value or subtraction from initial value.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Total calculation direction [TotDirection] | Add to default [AddToDefault] | * | Totalized value calculation is performed by adding to default value. |
| | Subtract from default [SubFromDefault] | | Totalized value calculation is performed by subtracting from default value. |

**⚠CAUTION**

When the total calculation direction is changed, be sure to reset the totalized value before starting measurement.
If the totalized value is not reset, it will not be able to measure correctly.
This product cannot be used as a reversible counter.

●A method of setting the total calculation direction to subtraction is 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 "**Bch(Pulse)**" 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 "**Total calculation direction**" 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 "**Subtract from default**".<br>*Select a direction 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.**

### 7－3－2－13. **Select Count Method of Totalized Value Overrun**

This setting variable determines the method of counting to the overrun (i.e. overflow) of the totalized value.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Totalized value overrun count [TotOverCount] | None | * | When the totalized count value excesses 999999, the display indicates OVER. |
| | 999times | | When the totalized count value exceeds 999999, the number of times of overruns is increased by one by resetting the totalized count value to zero.<br>When the totalized count value excesses 999999 999times, the display indicates OVER. The number of times of overruns is indicated at the upper left of totalized value in small size characters. |
| | Endless | | When the totalized count value excesses 999999 999times, the number of times of overruns is cleared and the totalized count restarts from initial value. |

● Setting steps to set the totalized value overrun count to "999 times" be shown below. (The same steps could be applied to the Bch(Pulse).)

| 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 "**Bch(Pulse)**" 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 "**Totalized value overrun count**" 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 "**999 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 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.**

### 7－3－3. **2-INPUT CALCULATION**

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select [PatternSelect] | page59 |
| Select calculation expression. | Expression for calculation [Expression] | page 60 |
| Set decimal point position of calculation result. | Instantaneous value decimal point position [DecPoint] | page 61 |
| Set variation width for instantaneous calculation result | Display step [InsDispStep] | page 62 |
| Set units for calculation result | Display unit [DispUnit] | page 63 |

### 7－3－3－1. 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.
Please pay attention to the target pattern number which the following "2-input Calculation" 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 |

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

### 7－3－3－2. Select Calculation Expression

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 [Expression] | None | | No calculation |
| | EP 2π(A×B)/ 60 | * | Expression for electric power |

**⚠CAUTION**

"A" in the calculation expressions denotes "Ach(Analog)" and "B" in the calculation expressions denotes "Bch(Pulse)".

●Setting expression to "EP 2π(A×B)/ 60" 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 "**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 "**Expression** (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 "**EP 2π(A×B)/ 60**".<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.**

### 7－3－3－3. Set Decimal Point Position of Calculation Result for Display 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 |
|---|---|---|---|
| Decimal point position [DecPoint] | ##### | * | Set decimal point position of calculation result for instantaneous values. |
| | ####. # | | |
| | ###. ## | | |
| | ##. ### | | |
| | #. #### | | |

●How to set the position of decimal point to "####. #" are 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 **"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 **"DecPoint"** 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.**

### 7－3－3－4. **Set Variation Width for 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 |
|---|---|---|---|
| Display step [DispStep] | 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 **“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 **“DispStep”** 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.**

### 7－3－3－5. Set Units for Calculation Result

Units for the instantaneous value display and the totalized value display can be set separately.
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 |
|---|---|---|---|
| Display unit [DispUnit] | None, Hz, rpm, mN, N, kN, MN, mgf, gf, kgf, tf, mg, g, kg, t, ton, Pa, hPa, kPa, MPa, $gf/mm^2$, $tf/mm^2$, $gf/cm^2$, $tf/cm^2$, atm, mmHg, $mmH_2O$, mmAq, mbar, psi, mN･m, N･m, kN･m, MN･m, gf･cm, kgf･cm, gf･m, kgf･m, tf･m, μm, mm, cm, m, km, inch, km/h, rad/s, μV, mV, V, kV, μA, mA, A, kA, mΩ, Ω, kΩ, W, kW, VA, με, μm/m, μV/V, mV/V, ℃, K, $m/s^2$, G, Gal, No., $m^3$, ml, l, kl, %, ‰, ppm, /s, /min, /h, Custom | None | Set unit for display value. |

**⚠ 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】**

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)**. |
| ③ | 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 "**DispUnit**" 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.**

### 7－3－4. EXTERNAL CONTROL

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select functions assigned to each external control terminal. | Terminal 1 function | page66 |
| | Terminal 2 function | |
| | Terminal 3 function | |
| | Terminal 4 function | |
| | Terminal 5 function | |

### 7－3－4－1. Select Functions Assigned to Terminals 1 to 5

These setting variables select functions from 10 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 |
|---|---|---|---|
| Function of External Control Terminal 1 [ExtCtrl1Func]<br>Function of External Control Terminal 2 [ExtCtrl2Func]<br>Function of External Control Terminal 3 [ExtCtrl3Func]<br>Function of External Control Terminal 4 [ExtCtrl4Func]<br>Function of External Control Terminal 5 [ExtCtrl5Func] | None | * | Assigns no function. |
| | Compare Reset | | Assigns “compare reset” function. |
| | Total Reset | | Assigns “total value reset” function |
| | Measure Block A | | Assigns “measurement block” function for Ach. |
| | Measure Block B | | Assigns “measurement block” function for Bch |
| | Measure Block A&B | | Assigns “measurement block” function of Ach and Bch. |
| | DispHold A | | Assigns “current value hold” function for Ach. |
| | DispHold B | | Assigns “current value hold” function for Bch. |
| | DispHold A&B | | Assigns “current value hold” function for Ach and Bch. |
| | MaxHold A | | Assigns “maximum value hold” function for Ach. |
| | MaxHold B | | Assigns “maximum value hold” function for Bch. |
| | MaxHold A&B | | Assigns “maximum value hold” function for Ach and Bch. |
| | MinHold A | | Assigns “minimum value hold” function for Ach. |
| | MinHold B | | Assigns “minimum value hold” function for Bch. |
| | MinHold A&B | | Assigns “minimum value hold” function for Ach and Bch. |
| | Digital Zero | | Assigns “Digital Zero” function. |
| | 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. |

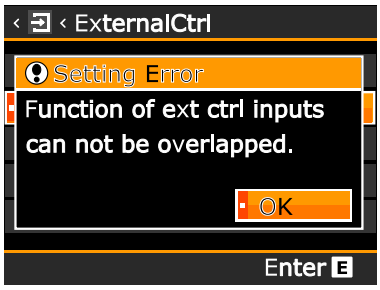
●The setting steps to assign “measurement block A” to terminal 2 are shown below.

| 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 “measurement block A”.<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.



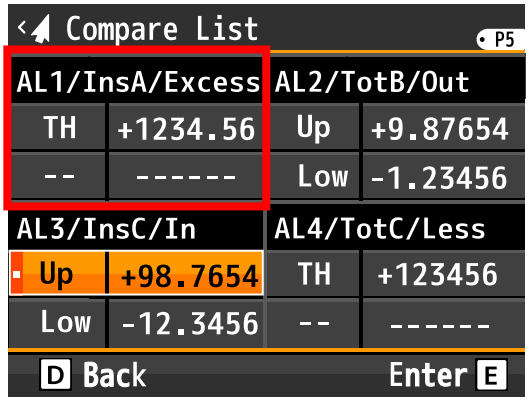
## 7－4. DETAIL OF OUTPUTSETTING GROUP

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

| 2nd layer (Small categories) | Descriptions | Remarks |
|---|---|---|
| CompareList | See comparative output settings / change thresholds | |
| Comparative output AL1 | Settings related to comparative outputs. | |
| Comparative output AL2 | | |
| Comparative output AL3 | | |
| Comparative output AL4 | | |
| Pulse output | Settings related to the totalizer-synchronous pulse output | |
| Analog output | Settings related to the analog output. | |

### 7－4－1. COMPARE LIST

When you move on to “Compare List” screen, comparison output setting parameters are displayed in a list.
In the example of the red frame in the upper left of the figure below (AL1 setting), [AL1 / OutputDispValue: InsA / OnConditions: Excess] and [Threshold: +1234.56].
*By registering this screen with a shortcut key, you can move on to this screen directly from measurement display.




### 7－4－2. COMPARATIVE OUTPUT AL1 - 4

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select [PatternSelect] | page69 |
| Select displayable source item for comparative output | Output Display Value [OutputDispValue] | page 70 |
| Select compare mode of comparative output | Compare mode [CompareMode] | page 71 |
| Set condition that comparative outputs turn on | Condition of ON [OnCondition] | page 72 |
| Set comparison judgement value | Comparison judgement value [Threshold] | page 73 |
| Set delay time of comparative output | Comparison ON delay [OnDelay] | page 74 |
| | Comparison OFF delay [OffDelay] | page 75 |
| Set output mode of comparative output | Output Mode [OutputMode] | page 76 |
| Set output logic of comparative output | Output Logic [OutputLogic] | page 77 |
| Set background color at comparative output ON state | Background Color at ON [OnBgColor] | page 78 |

### 7－4－2－1. 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.
> Please pay attention to the target pattern number which the following "comparative output" configuration is performed to.

| 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 "Pattern 8" 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 **"Pattern select"** 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**:**If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 7－4－2－2. 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 Ach is assigned to AL1, the instantaneous measured value of Bch 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 |
| | Ach(Analog) | | Compare to value of Ach. |
| | Bch(Pulse) | | Compare to value of Bch. |
| | Calc | | Compare to calculated value. |
| | Total | | Compare to totalized value. |

●Setting steps to set displayable source item of comparative output AL1 to "Total".
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 **"Total".**<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.**

### 7－4－2－3. **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**:**If the power is shut down before being pushed the “MENU” key, the selected contents are not stored.**

### 7－4－2－4. 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 (OnCondition) | 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 "Condition of ON" of comparative output AL1 to "Less Than" 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 **"OnCondition"** 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 **"LessThan".**<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.**

### 7－4－2－5. 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.)

| 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 **"Threshold"** 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 | Start editing the number by pushing **"ENTER"** key, and set to **"50000".** |
| 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.**

### 7－4－2－6. 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.**

### 7－4－2－7. **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.**

### 7－4－2－8. **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 "comparative output AL1" 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.**

### 7－4－2－9. **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) |

●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>

### 7－4－2－10. **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.
*There is a priority order for the background color at ON, and the AL1 background color at ON has the highest priority.
AL1＞AL2＞AL3＞AL4

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

### 7－4－3. PULSE OUTPUT

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select (PatternSelect) | page80 |
| Select displayable source item for totalizer-synchronous pulse output | Pulse Output Enable (PulseOutput) | page 81 |
| Select pulse width of totalizer-synchronous pulse | Output Pulse Width (OutputPulseWidth) | page 82 |
| select output logic of totalizer-synchronous pulse | Output Logic (OutputLogic) | page 83 |

**⚠ CAUTION**

This pulse output is not a function that outputs the input pulse as it is.
The pulse output is totalizer-synchronous pulse.
The totalizer-synchronous pulse outputs the same number of pulses as the input pulse.

### 7－4－3－1. 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.
> Please pay attention to the target pattern number which the following "Pulse Output" configuration is performed to.

| 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 pulse output to "Pattern8" are shown below.
(Same steps could be applied for pulse output 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 "**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 **"PulseOutput"** 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 **"Pattern select"** 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: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 7－4－3－2. Select Displayable Source Item for Totalizer-Synchronous Pulse Output

This setting variable selects a displayable source item which is output as totalizer-synchronous pulse.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Pulse Output Enable [PulseOutput] | OFF | | Pulse output disable. |
| | ON | * | Pulse output enable. |

●Setting steps to set "PulseOutput" to "OFF" 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 **"PulseOutput"** 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 "**PulseOutput**" 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 **"OFF".**<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.**

### 7－4－3－3. **Select Pulse Width**

This setting variable selects the pulse width of the totalizer-synchronous pulse.

**⚠CAUTION**

○Minimum pulse output period is 10ms. Therefore, the totalizer-synchronous pulse of the frequency over 100Hz is not available.
○If the set pulse width is wider than the interval of pulses, the totalizer-synchronous pulse keeps ON state.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Output Pulse Width (OutputPulseWidth) | 1ms | * | ON duration of the output pulse is 1ms. (400Hz Max.) |
| | 5ms | | ON duration of the output pulse is 5ms. (100Hz Max.) |
| | 10ms | | ON duration of the output pulse is 10ms. (50Hz Max.) |
| | 20ms | | ON duration of the output pulse is 20ms. (33.33Hz Max.) |
| | 50ms | | ON duration of the output pulse is 50ms. (16.66Hz Max.) |
| | 100ms | | ON duration of the output pulse is 100ms. (9.09Hz Max.) |
| | 200ms | | ON duration of the output pulse is 200ms. (4.76Hz Max.) |
| | 500ms | | ON duration of the output pulse is 500ms. (1.96Hz Max.) |
| | 1s | | ON duration of the output pulse is 1s. (0.99Hz Max.) |
| | 2s | | ON duration of the output pulse is 2s. (0.49Hz Max.) |

● Setting steps to set "OutputPulseWidth" of the pulse output to "50ms" 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 **"PulseOutput"** 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 "**OutputPulseWidth**" 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 **"50ms".**<br>*Select a desired pulse width 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.**

### 7－4－3－4. Select Output Logic of Totalizer-Synchronous Pulse

This setting variable selects the output logic of the totalizer-synchronous pulse.

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

●Setting steps to set output logic of pulse output 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 **"PulseOutput"** 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)**.<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 **"Negative".**<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.**

### 7－4－4. **ANALOG OUTPUT**

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select (PatternSelect) | page85 |
| Select output range of analog output | Output range (OutputRange) | page 86 |
| Select displayable source item for analog output | Source Output display value (OutputDispValue) | page 87 |
| Set scaling of analog output | Output scale (OutputScale) | page 88 |

### 7－4－4－1. **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 displaysettings.
> 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. |

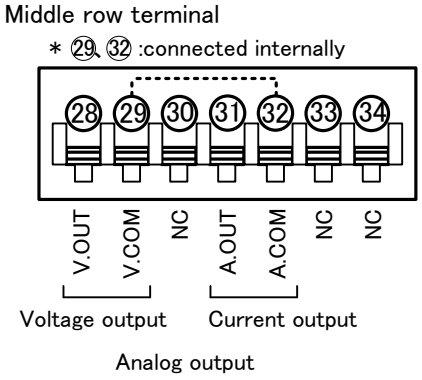
**Note**:**If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 7－4－4－2. **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: 0 to 10VDC<br>Load resistance: more than 2kΩ |
| | DC±10V | | Analog output range: -10 to 10VDC<br>Load resistance: more than 2kΩ |
| | DC1-5V | | Analog output range: 1 to 5VDC<br>Load resistance: more than 2kΩ |
| | DC0-20mA | | Analog output range: 4 to 20mADC<br>Load resistance: less than 550Ω |
| | DC4-20mA | | Analog output range: 0 to 20mADC<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:** **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

### 7－4－4－3. 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. |
| | Ach (Analog) | | Analog output refer to value of Ach. |
| | Bch (Pulse) | | Analog output refer to value of Bch. |
| | Calc | | Analog output refer to value of calculation. |
| | Total | | Analog output refer to value of total. |

● Setting steps to set "Source output display value (OutputDispValue)" of the analog output to "Totalized value A (TotA)" 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 **"Total".**<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.**

### 7－4－4－4. 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 Ach 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) | Ach (Analog) | To output the value of Ach on the analog output, the setting variable "Source output display value" should be selected to "Ach (Analog)". |
| 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". |

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

| 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 **"OutputScale"** 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 | Start editing the number by pushing **"ENTER"** key, and set **"0%DispValue"** to **"000000",** and **"100%DispValue"** to **"050000".** |
| 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>

## 7－5. 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. | |

### 7－5－1. DISPLAY SELECT

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Selects contents to display on numerical value display from displayable items. | MeasureSelect | page90 |
| Selects contents to display on level display from displayable items. | LevelSelect | page 91 |
| Selects contents to display on trend display from displayable items. | TrendSelect | page92 |

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.

### 7－5－1－1. 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).

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Display Select (DisplaySelect) | Ach (Analog) | * | Displays value of Ach input. |
| | Bch (Pulse) | * | Displays value of Bch input. |
| | Calc | | Displays value of calculation. |
| | Ach + Bch | | Displays value of Ach & Bch input. |
| | Calc + Ach | | Displays value of calculation & Ach input. |
| | Calc + Ach + Bch | * | Displays value of calculation & Ach & Bch input. |
| | Total | | Displays totalized value of Bch. |
| | Bch + Total | | Displays Bch input & totalized value of Bch. |
| | Ach＋Comp | | Displays value of Ach input & compasrison output judgement value. |
| | Bch + Comp | | Displays value of Bch input & compasrison output judgement value. |
| | Calc + Comp | | Displays value of calculation & compasrison output judgement value. |
| | Total + Comp | | Displays value of totalized value of Bch & compasrison output judgement value. |

### 7－5－1－2. 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.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Level select | Ach (Analog) | | Displays value of Ach input. |
| | Bch (Pulse) | | Displays value of Bch input. |
| | Calc | | Displays value of calculation. |
| | Ach + Bch | | Displays value of Ach & Bch input. |
| | Calc + Ach | | Displays value of calculation & Ach input. |
| | Total | | Displays totalized value of Bch. |
| | Bch + Total | | Displays Bch input & totalized value of Bch. |

### 7－5－1－3. 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.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Trend select | Ach (Analog) | | Displays value of Ach input. |
| | Bch (Pulse) | | Displays value of Bch input. |
| | Calc | | Displays value of calculation. |
| | Ach + Bch | | Displays value of Ach & Bch input. |
| | Calc + Ach | | Displays value of calculation & Ach input. |
| | Total | | Displays totalized value of Bch. |
| | Bch + Total | | Displays Bch input & totalized value of Bch. |

### 7－5－2. LEVEL DISPLAY

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select (PatternSelect) | page94 |
| Set scales of level display. | Ach scale (Ach Scale) | page95 |
| | Bch scale (Bch Scale) | |
| | Calc scale (Calc Scale) | |
| | Total scale (Total Scale) | |

### 7－5－2－1. 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"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.**

### 7－5－2－2. **Sets 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.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial values | Meanings of setting values |
|---|---|---|---|
| Ach Scale | scale lower limit ±99999 | +00000 | Set lower limit value of level display for Ach value. Left edge is lower limit of scale. |
| | scale upper limit ±99999 | +10000 | Set upper limit value of level display for Ach value. Left edge is lower limit of scale. |
| Bch Scale | scale lower limit ±999999 | +000000 | Set lower limit value of level display for Bch value. Left edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of level display for Bch value. Left edge is lower limit of scale. |
| Calc Scale | scale lower limit ±999999 | +000000 | Set lower limit value of level display for Calc value. Left edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of level display for Calc value. Left edge is lower limit of scale. |
| Total Scale | scale lower limit ±999999 | +000000 | Set lower limit value of level display for Total value. Left edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of level display for Total value. Left edge is lower limit of scale. |

●In the level display, setting steps to set upper limit value for Ach to "5000" 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 **"Ach Scale"** 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 | Start editing the number by pushing **"ENTER"** key, and set **"LowerLimit"** to **"00000",** and **"UpperLimit"** to **"05000".** |
| 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>**

### 7－5－3. **TREND DISPLAY**

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Select a pattern number to configure settings | Pattern select (PatternSelect) | page97 |
| Set scales of trend display. | Ach scale (Ach Scale) | page98 |
| | Bch scale (Bch Scale) | |
| | Calc scale (Calc Scale) | |
| | Total scale (Total Scale) | |
| Set time axis for trend display | Time axis (TimeAxis) | pgae99 |

### 7－5－3－1. 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.**

### 7－5－3－2. **Set Scales of Trend Display for Totalized 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.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial values | Meanings of setting values |
|---|---|---|---|
| Ach Scale | scale lower limit ±99999 | +00000 | Set lower limit value of trend display for Ach value. Left edge is lower limit of scale. |
| | scale upper limit ±99999 | +10000 | Set upper limit value of trend display for Ach value. Left edge is lower limit of scale. |
| Bch Scale | scale lower limit ±999999 | +000000 | Set lower limit value of trend display for Bch value. Left edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of trend display for Bch value. Left edge is lower limit of scale. |
| Calc Scale | scale lower limit ±999999 | +000000 | Set lower limit value of trend display for Calc value. Left edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of trend display for Calc value. Left edge is lower limit of scale. |
| Total Scale | scale lower limit ±999999 | +000000 | Set lower limit value of trend display for Total value. Left edge is lower limit of scale. |
| | scale upper limit ±999999 | +010000 | Set upper limit value of trend display for Total value. Left edge is lower limit of scale. |

●In the trend display, setting steps to set upper limit value for Ach to "5000" 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 **"Ach Scale"** 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 | Start editing the number by pushing **"ENTER"** key, and set **"LowerLimit"** to **"00000",** and **"UpperLimit"** to **"05000".** |
| 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.**

### 7－5－3－3. **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.**

## 7－6. 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. | |

### 7－6－1. GENERAL

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Change brightness of display | Brightness | page 101 |
| Delay start up time | PowerOnDelay | page 102 |
| Set power saving time | PowerSaving Time | page 103 |
| Select whether to retent totalized value at power shutdoun | TotMemory | page 104 |
| Select whether to maintain the digital zero execution state and offset value at the time of power shutdown at restart | D-ZeroRetention | page 105 |
| Change displayed language | Language | page 106 |
| Change direction of display | DisplayDirecton | page 107 |
| Protect settings | SettingProtect | page 108 |
| Copy data of a pattern number to other pattern number(s). | PatternCopy | page 109 |

### 7－6－1－1. Change Brightness of Display

By this setting variable, the brightness oh 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.**

### 7－6－1－2. **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 |
|---|---|---|---|
| PowerOnDelay | 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.**

### 7－6－1－3. **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".
If any key is pressed in "Power saving display" mode, the power saving display will be canceled.

●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.**

### 7－6－1－4. **Memorize Totalized Value**

This setting variable decides whether backup of totalized value is enabled or not.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Totalized value memory (TotMemory) | Disable | | Totalized value is NOT backed up. |
| | Enable | * | Totalized value is backed up. |

**⚠CAUTION**

If this item is set to “Disable”, the totalized value is cleared by power-off.

●Setting steps to set “Totalized PowerSavingTime” value memory” to “Disable” 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 “**TotMemory**” 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 **“Disable”.**<br>*Caution: If this item is set to “Disable”, the totalized value is cleared |
| 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.**

### 7－6－1－5. **Digital Zero Retention**

This setting is whether or not to save the operating state and offset value of the digital zero function when the power is turned off
By setting "Enable", the following operation is performed.

● DZ indication from the external control terminal
When turning off the power while keeping the DZ indication and restarting with the external control terminal shorted or 0 level, keep the offset value at the last power off and start up.

● DZ instruction by shortcut key
When turning the power off and restarting in the DZ indication state, restart will be done in the DZ indicated state by the offset value at the last power off.

| 3rd layer (Setting variable) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| Digital Zero Retention (D-ZeroRetention) | Disable | * | DZ state and value is NOT backed up. |
| | Enable | | DZ state and value is backed up. |

●Setting steps to set “Digital zero retention” 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 “**D-ZeoroRetention**” 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”.** |
| 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.**

### 7－6－1－6. **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 "English" to "日本語" 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 "**Language**" 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 **"日本語".**<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.**

### 7－6－1－7. **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.**

### 7－6－1－8. **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 protect 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.**

### 7－6－1－9. **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. |
| | PatternAll | * | 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.

| 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 "**PatternCopy**" 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 | Set any pattern to "**Copy From"** and "**Copy To**", then point the cursor to **"Execute".**<br>*Select a desired setting in actually. |
| ⑥ | Pushing **"ENTER"** key, message dialog open and select "**OK**" to execute pattern copy function.<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.**

### 7－6－2. INITIALIZATION

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Restore setting values to user default value. | Save user defaults (UserDefaultSave) | page111 |
| | Initialize to user defaults (UserDefaultLoad) | page111 |
| Restore setting values to factory default value | Initialize to factory defaults (FactoryDefaultLoad) | page112 |

**⚠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.

#### 7－6－2－1. Restore Setting Values to User Default Vale (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**

The totalized value cannot be reset (cleared) by initialize to user defaults or initialize to factory defaults.
To reset the totalizer value, use the total reset function of external control. (See pages 65, 123, 127.)

*The operation for registering user default values is same as the case of “initialize to factory defaults ”. Refer to “7-6-2-3. Restore setting values to factory default value”.

#### 7－6－2－2. Restore Setting Values to User Default Vale (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 “7-6-2-3. Restore setting values to factory default value”.

### 7－6－2－3. **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.

| 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 **"Initialize"** 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 "**FactoryDefaultLoad**" 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 | Dialog opens and select "**Yes"** to initialize settings. |
| ⑥ | Pushing **"ENTER"** key, message dialog open and select "**OK**" to execute pattern copy function.<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.**

## 7－7. 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” | |

### 7－7－1. INPUT DIAGNOSIS

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Analog input diagnosis | Ach(Analog) | page115 |
| Pulse input diagnosis | Bch(Pulse) | page114 |
| External control input diagnosis | ExtenalCtrl | page116 |

### 7－7－1－1. **Analog Input Diagnosis**

Analog input diagnosis is useful for checking whether the inputs are supplied from sensors correctly.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meaning of setting value |
|---|---|---|---|
| Ach(Analog) | － | － | No setting values, No initial value |
| | displays input value in % of input rating | | Entering 4th layer, displays applied input in % of input rating immediately. |
| | InputActualValue | | Display current analog signal value |

●To perform the analog input diagnosis, 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 **"InputDiag"** 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 "**Ach(Analog)**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. |
| ⑤ | Rating percent of input and actual value of input are shown. |
| ⑥ | 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.**

### 7－7－1－2. **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 |
|---|---|---|---|
| Bch(Pulse) | － | － | No setting value, no initial value |
| | Number of pulses after entering 4th layer | | Entering 4th layer, starts counting pulse immediately. |
| | InputFrequency | | Display current frequency measurement value |

●To perform the pulse input diagnosis, 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 **"InputDiag"** 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 "**Bch(Pulse)**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. |
| ⑤ | Number of pluse after entering the layer and input frequency are shown. |
| ⑥ | 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.**

### 7－7－1－3. 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 | － | Displays current status in “OFF” or “ON”. |
| | (terminal 2) | | |
| | Current status | － | Displays current status in “OFF” or “ON”. |
| | (terminal 3) | | |
| | Current status | － | Displays current status in “OFF” or “ON”. |
| | (terminal 4) | | |
| | Current status | － | Displays current status in “OFF” or “ON”. |
| | (terminal 5) | | |
| | Current status | － | Displays current status in “OFF” or “ON”. |

●To perform the external control input diagnosis, 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 **“InputDiag”** 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 “**ExternalCtrl**” and push “**ARROW (RIGHT)**” key, then the display moves to the **4th layer (setting contents)**. |
| ⑤ | Status of terminals are shown. |
| ⑥ | 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.**

### 7－7－2. OUTPUT TEST

| WHAT YOU CAN DO | 3rd layer (Setting variables) | Reference page |
|---|---|---|
| Simulated output on comparative output | Comparative output AL1 (Compare AL1) | page118 |
| | Comparative output AL2 (Compare AL2) | |
| | Comparative output AL3 (Compare AL3) | |
| | Comparative output AL4 (Compare AL4) | |
| Simulated output on totalizer-synchronous pulse | PulseOutput | page 120 |
| Simulated output on analog output | AnalogOutput | page 121 |

### 7－7－2－1. 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.)

| 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 "**CompareAL1**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. |
| ⑤ | Switch "**TestOutput**" to "**Enable**" and "**TerminalOutput"** to "**ON Output**", then test output enable. |
| ⑥ | 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.**

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

,,

### 7－7－2－2. Simulated Output of Totalizer-Synchronous Pulse Output

By Simulated Output of totalizer-synchronous pulse Output, the status of totalizer-synchronous pulse Output can be set to "ON" level or "OFF" level arbitrary. You can test devices connected to totalizer-synchronous pulse outputs in advance.

| 3rd layer (Setting variables) | 4th layer (Setting values) | Initial value | Meanings of setting values |
|---|---|---|---|
| PulseOutputA | 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.
○The simulated output is not pulse output but level output.

●To perform the test output totalizer-synchronous pulse Output, 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 **"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 "**PulseOutput**" and push "**ARROW (RIGHT)**" key, then the display moves to **the 4th layer**. |
| ⑤ | Switch "**TestOutput**" to "**Enable**" and "**TerminalOutput"** to "**ON Output**", then test output enable. |
| ⑥ | 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. |

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

### 7－7－2－3. **Simulated Output of Analog Output**

Simulated output of analog output can output 0 to 100% (10% step) 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.

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

| 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 "**PulseOutput**" and push "**ARROW (RIGHT)**" key, then the display moves to **the 4th layer**. |
| ⑤ | Switch "**TestOutput**" to "**Enable**" and "**TerminalOutput"** to "**50% Output**", then test output enable. |
| ⑥ | 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. |

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

# 8. CONTROL FUNCTIONS

## 8－1. EXTERNALCONTROL FUNCTIONS

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

### 8－1－1. EXTRLNAL CONTROL FUNCTION ICONS

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

| Icon | Description |
|---|---|
|  | Indicates pattern No. in use. |
|  | Indicates the KEY LOCK function is effective. |
|  | Indicates the COMPARATIVE OUTPUT RESET function is effective. |
|  | Indicates the MEASUREMENT BLOCK 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. |
|  | Indicates the DIGITAL ZERO function is effective. |

### 8－1－2. 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.

### 8－1－3. 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.

### 8－1－4. TOTAL RESET FUNCTION

The total reset function makes the totalized value clear and reset to the initial totalized value and can be selected from the following 3 kinds.

The target totalized value is reset at the timing when the terminal to which the function is assigned is shorted to the COM terminal or set to 0 level.

Total reset A: Resets totalized value of Ach

Total reset B: Resets totalized value of Bch

Total reset A&B: Resets totalized values of Ach and Bch

**⚠ CAUTION**

1) Total reset function by external control terminal input operates at the timing when the function-allocated terminal is shorted to with the COM terminal or "0" level.
   Even if the short with the COM terminal or "0" level is maintained as it is, the totalized value is counted without stopping.
2) When turning on the power with the terminal to which the function is assigned shorted with the COM terminal or at "0" level, until the terminal is released or the "1" level is detected, the totalized value reset will not be done.
   * If you want to reset the totalized value at startup, refer to "Digital zero retention" (page 104).

### 8－1－5. MEASUREMENT BLOCK FUNCTION

The measurement block 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 block A: Inhibits the input of Ach
Measurement block B: Inhibits the input of Bch
Measurement block A&B: Inhibits the inputs of both Ach and Bch

### 8－1－6. 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 Ach
Display hold B: Holds the display of Bch
Display hold A&B: Holds the display of Ach and Bch

### 8－1－7. 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 Ach
Maximum hold B: Holds the maximum display value of Bch
Maximum hold A&B: Holds the maximum display value of Ach and Bch
*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 and invalid for the totalized value.

### 8－1－8. 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 Ach
Minimum hold B: holds the minimum display value of Bch
Minimum hold A&B: holds the minimum display value of Ach and Bch

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

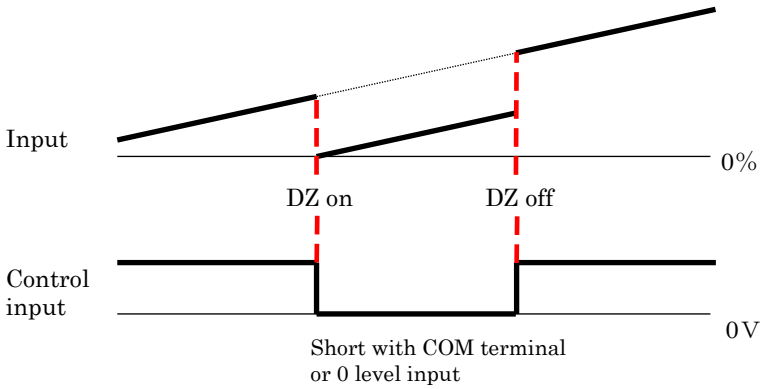
Note: This function is valid for the instantaneous value only and invalid for the totalized value.

## 8－1－9. DIGITAL ZERO FUNCTION

The digital zero function (hereinafter referred to as DZ) is a function to set the input value to zero when the DZ instruction is made. During the DZ instruction, the fluctuation width from the start of instruction is treated as input value.
The function is valid while the terminal to which the function is assigned is shorted with the COM terminal or "0" level.

Digital zero: Executes DZ for Ach

*DZ is a function for instantaneous values.
The totalize operation during DZ instruction is for the result of DZ function operation.




It is also possible to maintain the shift value by the DZ function at the last power OFF at restart after turning off the power.
For details, refer to the contents of "Digital Zero Retention" (page 105).

### ⚠ CAUTION

1) The digital zero function is installed only in analog input products.
2) "Set the input value to zero" means 0% in the set input range.
For example, setting the input range to 4 ~ 20 mA and make DZ instruction, the input at DZ instruction will be treated as 4 mA.
3) If the DZ instruction is issued during measurement block function and various hold functions are executed, the digital zero function is executed at the sampling immediately after these are canceled.
4) When instantaneous display value is OVER or -OVER, when DZ indication is made, digital zero is executed at the sampling immediately after display value OVER, -OVER disappears.

### 8－1－10. PATTERN SELECT FUNCTION

This product can memorize 8 patterns (8 kinds) of parameters including input settings, 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.

### 8－1－11. 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.
Performs same action of DISP key at front panel.

### 8－1－12. 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, starts plotting the trend display with the current measurement value.

## 8－2. SHORTCUT FUNCTION

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

*External control functions which would be performed by shortcuts to arrow keys.

### 8－2－1. SHORTCUT REGISTER KEYS

Keys which can be registered shortcuts function in 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 | |

### 8－2－2. 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. |
| Total reset | The total reset is function makes the totalized value clear and reset to the initial totalized value. |
| Measurement block A | The measurement block Ach is function inhibits the input and the display value accompanies this. |
| Measurement block B | The measurement block Bch is function inhibits the input and the display value accompanies this. |
| Measurement block A&B | The measurement block Ach and Bch is function inhibits the input and the display value accompanies this. |
| Display hold A | Display hold Ach function holds display value. |
| Display hold B | Display hold Bch function holds display value. |
| Display hold A&B | Display hold Ach and Bch function holds display value. |
| Maximum value hold A | Maximum value hold Ach function is the function which holds the maximum display value. |
| Maximum value hold B | Maximum value hold Bch function is the function which holds the maximum display value. |
| Maximum value hold A&B | Maximum value hold Ach and Bch function is the function which holds the maximum display value. |
| Minimum value hold A | Minimum value hold Ach function is the function which holds the minimum display value. |
| Minimum value hold B | Minimum value hold Bch function is the function which holds the minimum display value. |
| Minimum value hold A&B | Minimum value hold Ach and Bch function is the function which holds the minimum display value. |
| Digital zero | Digital zero is the function that handles the input value of the instructed timing as zero for Ach(Analog). |
| Pattern change | Pattern select function assigned to 1st bit |
| Trend hold | The trend hold function is a function which holds the trend display. |
| Compare List | Function to go to the setting list of comparison judgement and change or reference the judgment value. |

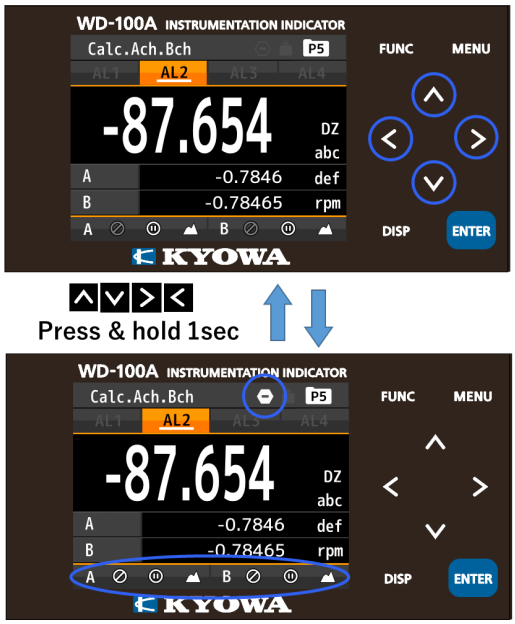
### 8－2－3. REGISTERING SHORTCUT FUNCTIONS

Registering shortcuts how to set up is shown below. (ex: Measurement block A)

| No. | Descriptions |
|---|---|
| ① | By pushing the "**FUNC**" key in the measurement mode, the display moves to the shortcut setting display. |
| ② | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to any arrow icon and push "**ARROW (RIGHT)**" key, then the display moves to **next layer**. |
| ③ | By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"MeasureBlockA"** and push "**ENTER**" key. |
| ④ | Pushing "**ARROW (LEFT)**"key, the display returns to the previous layer. |
| ⑤ | By pushing the **"FUNC"** key, the selected contents are stored and display returns the measurement display. |

## 8－2－4. EXECUTION AND RELEASE 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.




### ⚠ 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
"control with external control terminal"> "control with arrow keys (shortcut function)".

# 9. COMPARATIVE OUTPUT FUNCTION

## 9－1. 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 NPN output.
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. |

### 9－1－1. 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 Ach input to AL1, the totalized value of Ach input to AL2, instantaneous value of Bch to AL3 and totalized value of Bch to AL4

**⚠ CAUTION**

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

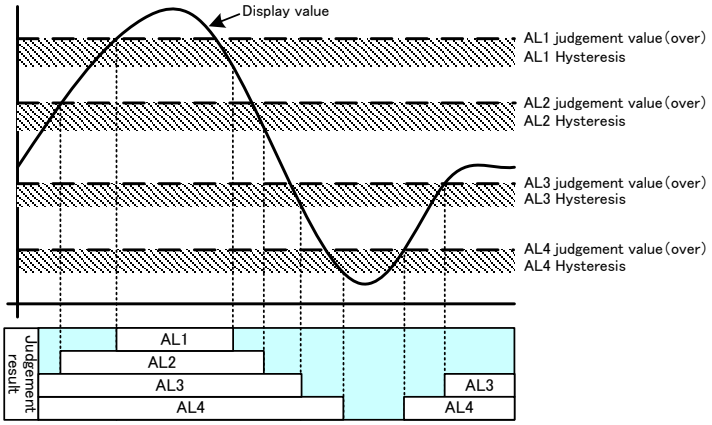
### 9－1－2. LEVEL JUDGEMENT

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).

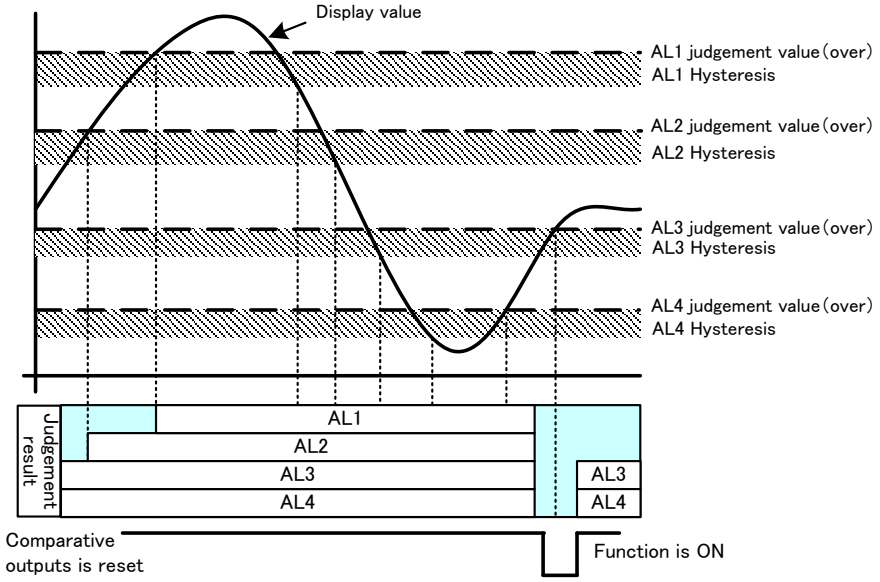
1) Upper judgement of 4 steps
For using in the upper judgement, the setting variable “Condition of ON (OnCondition)” should be configured to “excess”.

| Comparative output | Condition of ON | Comparison condition | 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.



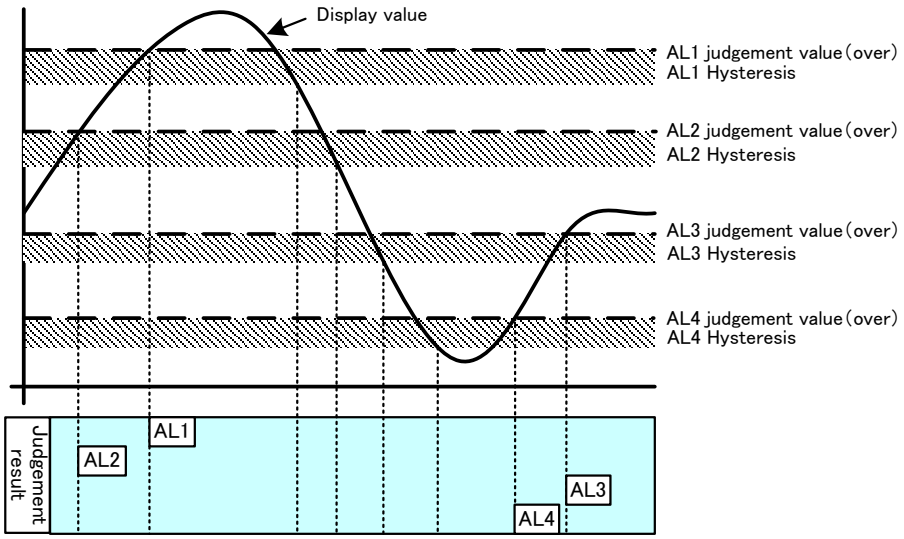
●Judgement action in the case that output mode is “Latch”.
Output mode “Latch”: Comparative output keeps valid once judgement becomes ON.




## ⚠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)

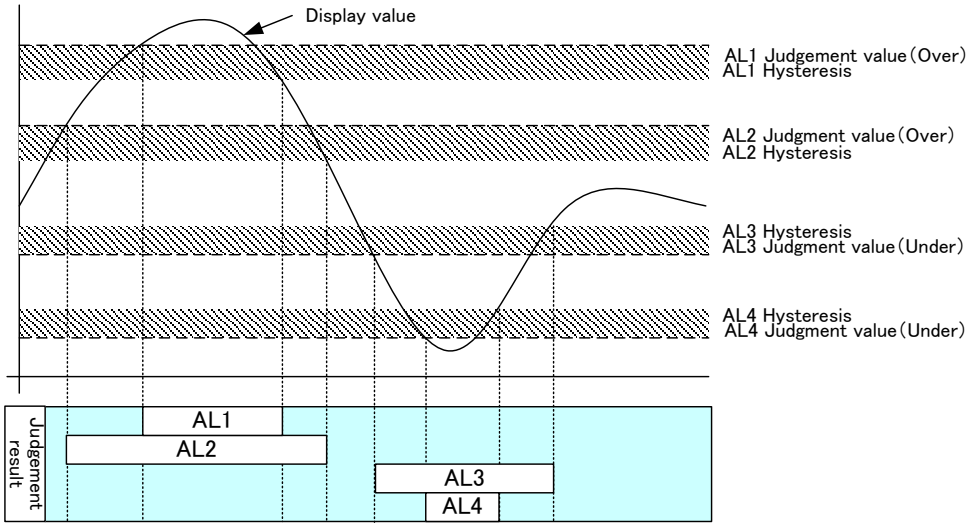
For AL1 and AL2 used in the upper judgement, the setting variable"Condition of ON (OnCondition)" should be configured to "Excess".

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 | Comparison condition | 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 |

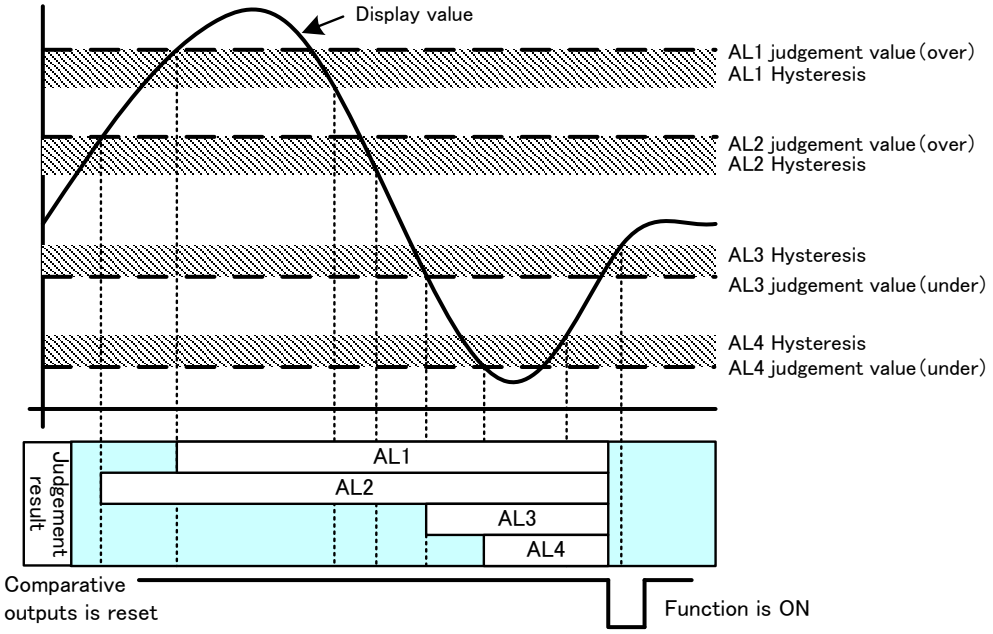
●Judgement action in the case that output mode is "Normal".

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




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

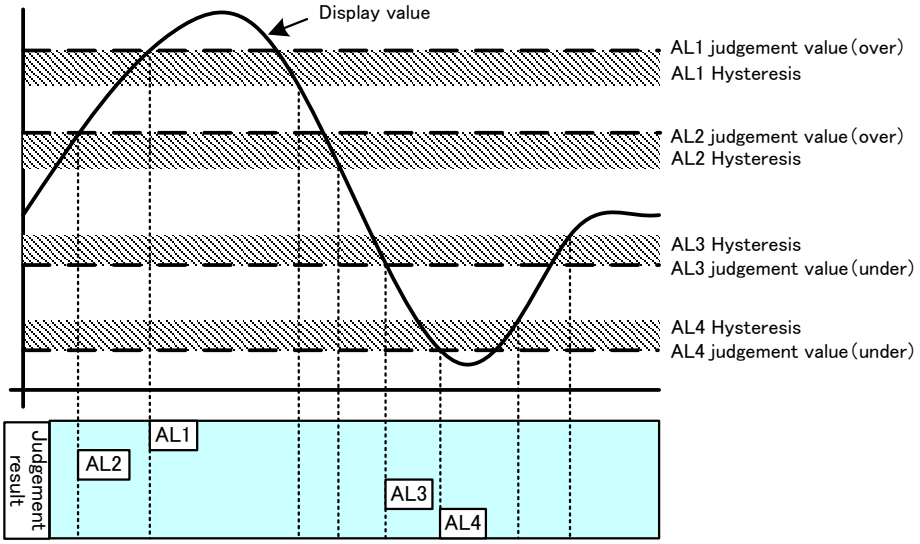
Output mode "Latch": comparative output keeps valid once judgement becomes ON.




**⚠CAUTION**

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

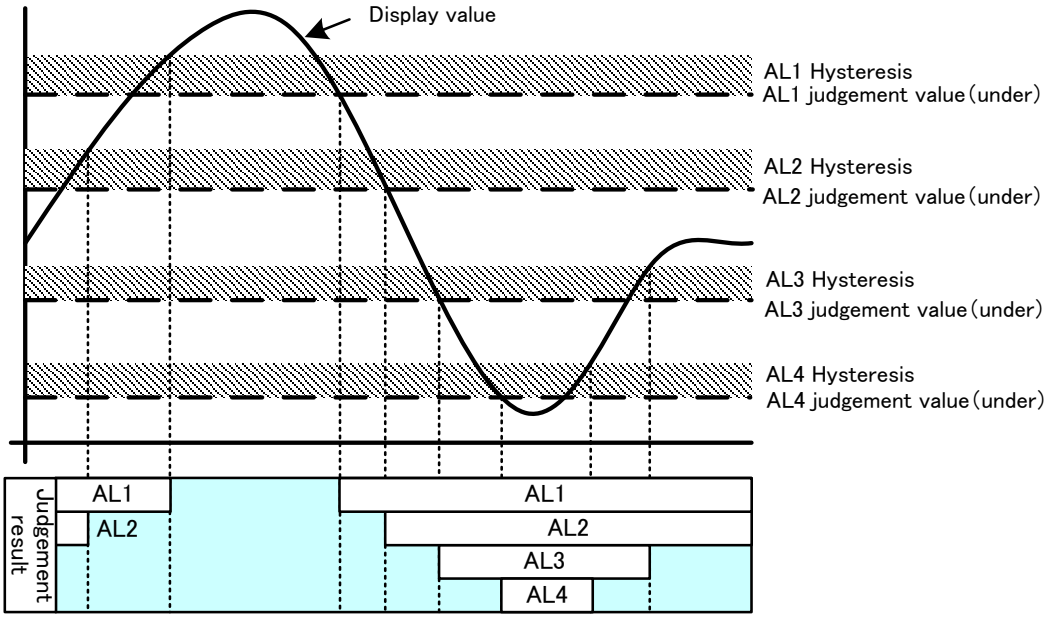
●Judgement action in the case that output mode is “One Shot”.
Output mode “One Shot”: comparative output is valid while setup time period after judgement is ON.



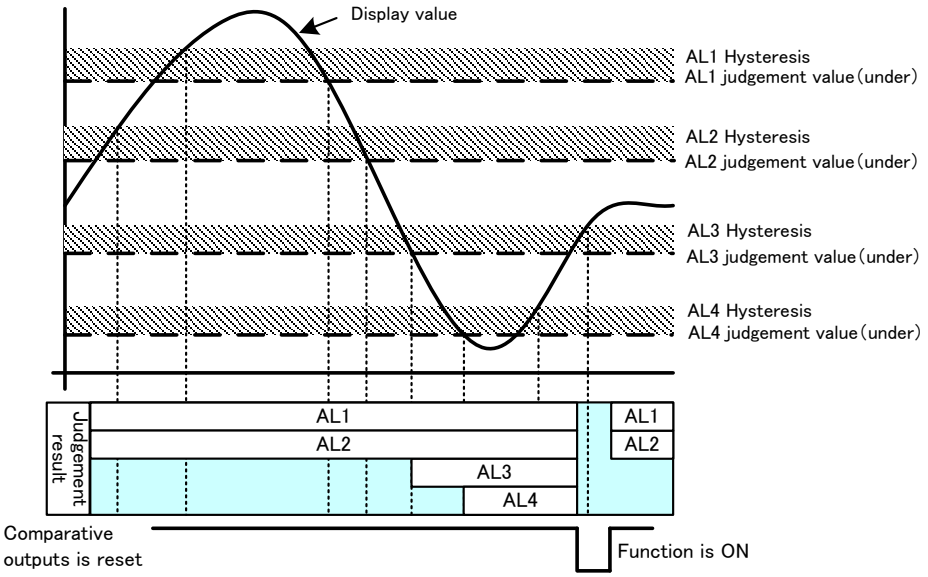

3) Lower judgement of 4 steps
For using in the lower judgement, the setting variable“Condition of ON (OnCondition)” should be configured to “Less Than”.

| Comparative output | Condition of ON | Comparison condition | 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.



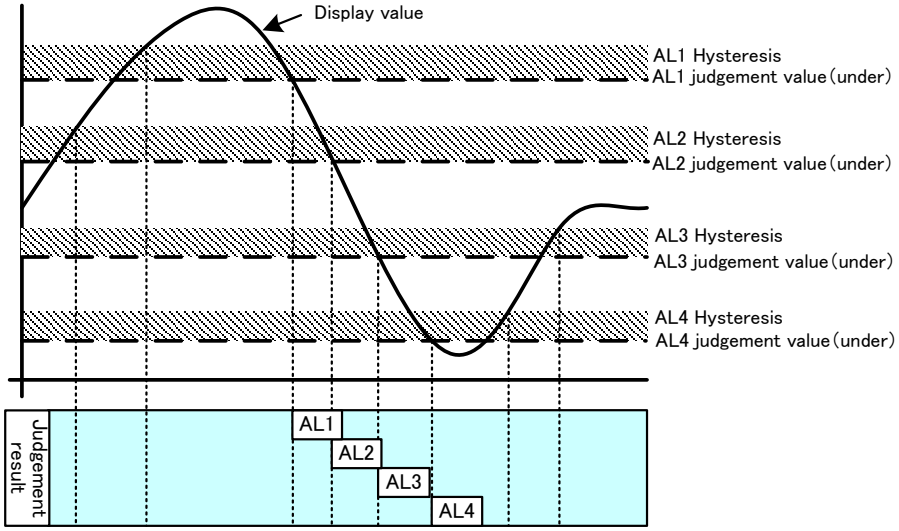
●Judgement action in the case that output mode is “Latch”.
Output mode “Latch”: Comparative output keeps valid once judgement becomes ON.




## ⚠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.



### 9－1－3. **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.

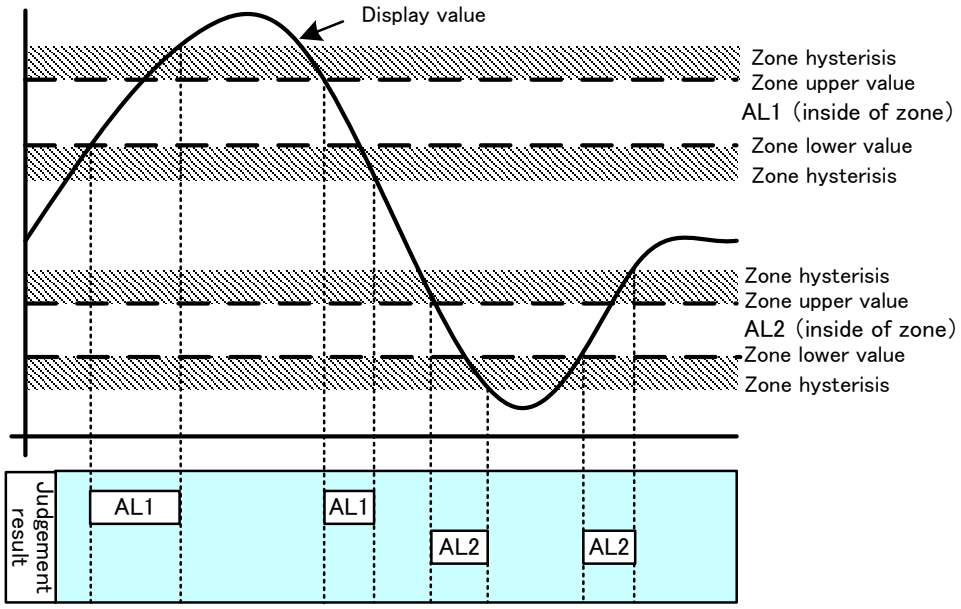
1) “Condition of ON (OnCondition)” is “In the zone”
When the value of the source item (displayable value) for comparison is between”Zone upper limit” and “Zone lower limit”, comparative output result turns ON.

| Comparative output | Condition of ON | Comparison condition | 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 |

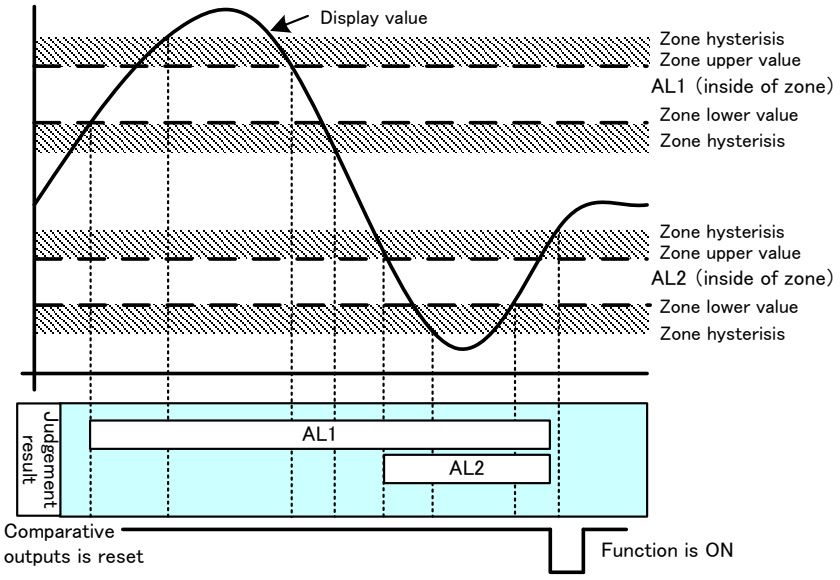
**⚠CAUTION**

Hysteresis lie on outside (upper side) of the zone upper limit and outside (lower side) of the zone lower limit. The widths of the hysteresis 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.



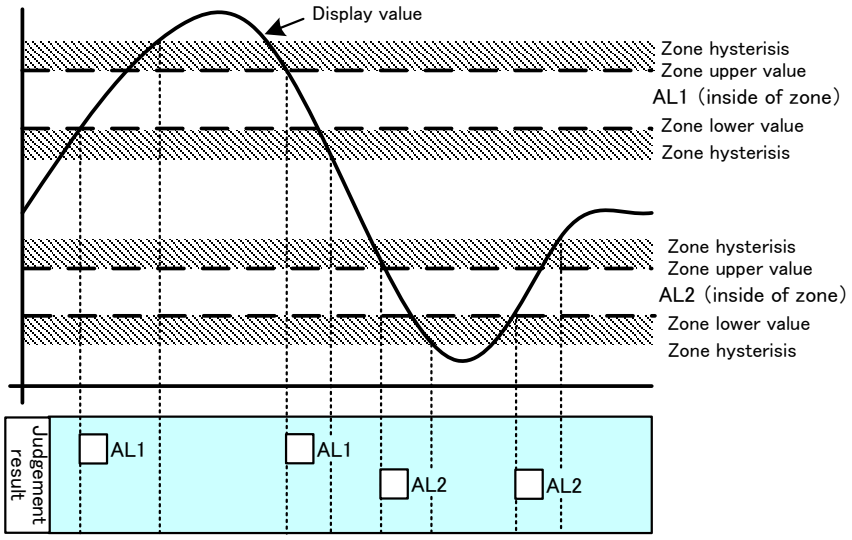
●Judgement action in the case that output mode is “Latch”.
Output mode “Latch”: Comparative output keeps valid once judgement becomes ON.




## ⚠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.



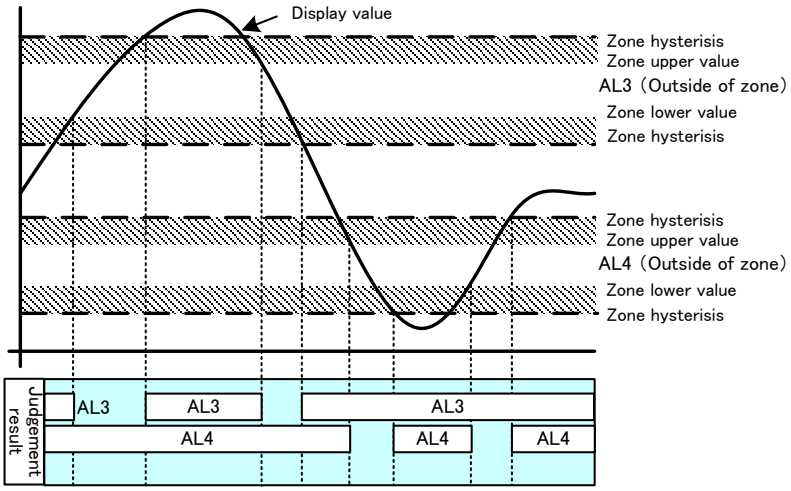
2) "Condition of ON (OnCondition)" is "Outside of the zone"
When the value of the source item (displayable value) for comparison is over"Zone upper limit" or under "Zone lower limit", comparative output result turns ON.

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

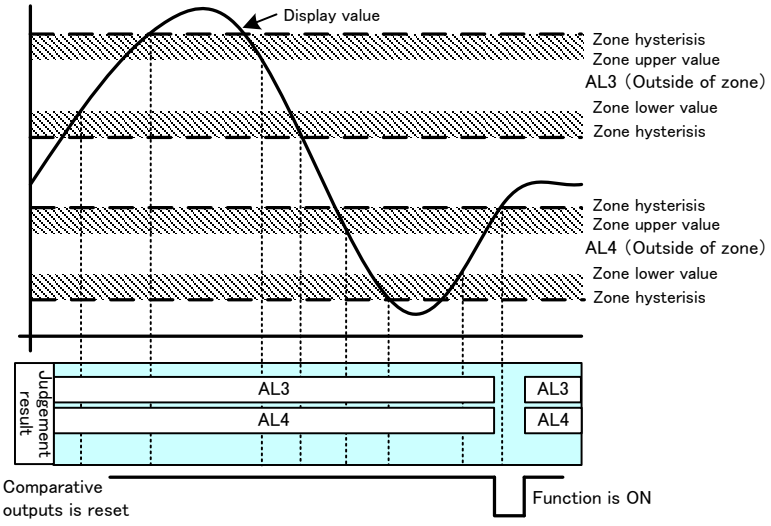
**⚠ CAUTION**

Hysteresis lie on outside (upper side) of the zone upper limit and outside (lower side) of the zone lower limit. The widths of the hysteresis 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.



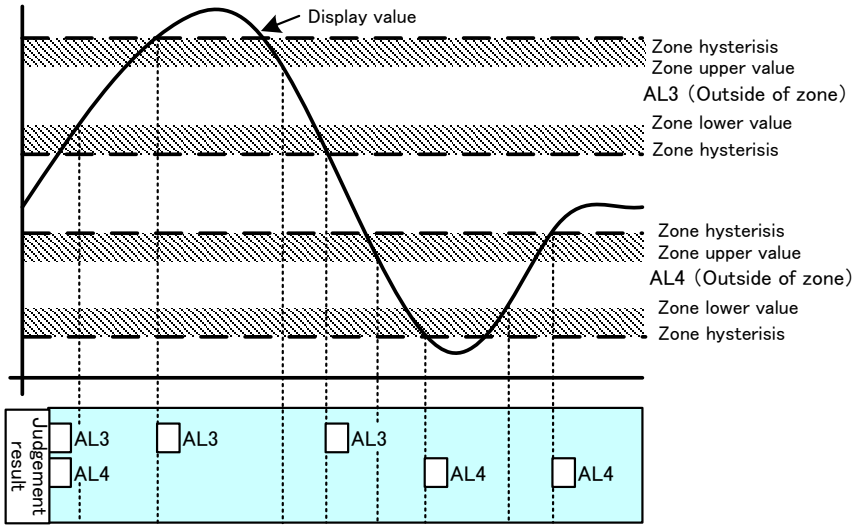

●Judgement action in the case that output mode is "Latch".
Output mode "Latch": Comparative output keeps valid once judgement becomes ON.




**⚠ 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.



# 10. OUTPUT FUNCTIONS

## 10－1. PULSE OUTPUTFUNCTION

This product can output pulse which are synchronized with the totalizer value.
The type of the output is NPN open-collector (30VDC, 20mA max).

**⚠CAUTION**

○ The pulse width selected in settings affects maximum frequence of output.

## 10－2. 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 0V, 1-5V, 0-20mA, 4-20mA are equipped and they can be switched by a setting variable in “Analog Output” in “Output”.

### 10－2－1. 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.

### 10－2－2. 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 |

### 10－2－3. OUTPUT RANGE OF ANALOG OUTPUT

Analog output can output in the range of ±10 % of full scale for each output range.

| 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 |

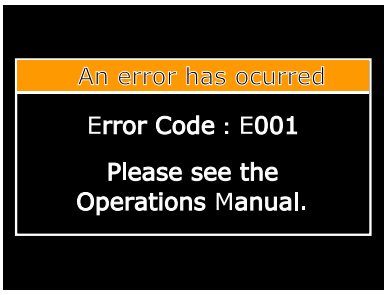
**⚠CAUTION**

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

# 11. ERROR MODE

## 11－1. DISPLAY ON OCCURRENCE OF AN ERROR

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




## 11－2. 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 WD-100A 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 | |
| E202 to 203 | Errors associated with calibration values | |
| E110 to 111 | Error associated with sensor power short | |
| 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 WD-100A 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.

# 12. SPECIFICATIONS

## 12－1. BASIC SPECIFICATIONS

| | | |
|---|---|---|
| Measurement channel | : | 2 |
| Display | : | 2.4 inch TFT LCD<br>Ach measurement result, Bch measurement result, calculation result,<br>Ach and Bch measurement results,<br>Ach or Bch measurement result and calculation result |
| Over warning | : | OVER or -OVER when display range are exceeded |
| External controls | : | Following 5 functions can be assigned to control terminals (user-configurable).<br>①Comparator reset function<br>②Totalized value reset function<br>③Measurement prohibited function：Measurement prohibited A/B/A&B<br>④Current value hold function：Current value hold A/B/A&B<br>⑤Max value hold function：Max value hold A/B/A&B<br>⑥Min value hold function：Min value hold A/B/A&B<br>⑦Digital zero function<br>⑧Pattern change function：Pattern change 1 to 3<br>⑨Display change function<br>⑩Trend hold function<br>As follows, only shortcut setting<br>⑪Compare list function |
| Operating temp & humidity range | : | −5 to 50℃, 35 to 85% RH (No condensation) |
| Storage temp & humidity range | : | −10 to 70℃, 60% RH or less |
| Power supply | : | 24 to 48VDC ±10% |
| Power consumption | : | 6W max. at 24VDC, 6.5W max. at 48VDC |
| Sensor power supply | : | 12VDC ±10% 100mA max.; 24VDC ±10% 50mA max.<br>*When 2 channel input, allowable current of Ach and Bch together will be above current.<br>*1.2W max. when the combination of 12VDC and 24VDC. |
| Dimensions | : | 96mm（W）×52mm（H）×145mm（D） |
| Weight | : | Approx. 350g |
| Withstand voltage | : | 1500VAC for 1 minute: Between the power supply terminal - input / external control / comparator output / option output<br>1500VAC for 1 minute: Between the input terminal - external control / comparator output / option output<br>3000VAC for 1 minute: Between enclosures - each terminals |
| Insulation resistance | : | 500VDC 100MΩ or more between the above terminals |
| Vibration tolerance | : | 10 to 55Hz half amplitude 0.15mm in X,Y,Z directions for 30 minutes |
| Protection | : | IP66<br>(When mounted on the panel. See “2－1. EXTERNAL FORM DIMENSIONS” for coverage.) |
| Installation environment | : | indoor use |
| Applicable EN standard | : | EN61326-1 (EMS: Industrial installations; EMI: Class A)<br>"Applies to wire length of 30m or less"<br>EN IEC 63000 |
| Case material | : | Polycarbonate（PC）, Black UL94V-0 |

## 12－2. INPUT SPECIFICATIONS

### 12－2－1. ANALOG INPUT MEASUREMENT for Ach

Measurement range

| Measurement range | Input impedance | Maximum allowable input | Accuracy |
|---|---|---|---|
| ±5V | About 1MΩ | ±100V | ±(0.05% of FS +1digit) |
| 0~5V | | | |
| 1~5V | | | |
| ±10V | | | |
| 0~10V | | | |
| 4~20mA | About 10Ω | ±50mA | |
| 0~20mA | | | |
| ±20mA | | | |

*Each range can measure up to ± 10% FS range. (Internal limit processing with ± 10% FS.)
The full scale in the bipolar input setting considers plus and minus separately. For example, in the case of ± 10V input, limit processing is performed up to ± 11V. (20V is not treated as FS.)
Similarly, the accuracy with ± 10V input is also specified as one-sided FS treatment, and the accuracy is calculated as 5mV (0.05%) ± 1 digit.

| | | |
|---|---|---|
| Conversion method | : | ⊿∑ conversion method |
| Input signal | : | Single-ended |
| Sampling rate | : | 100 times/second max. |
| Display updating period | : | 100ms |
| Zero display | : | Leading zero suppression |
| Decimal point | : | Arbitrary setting possible |
| Display range | : | -99999 to 99999 |

### 12－2－2. PULSE INPUT MEASUREMENT for Bch

- Input specifications

| | | |
|---|---|---|
| Frequency range | : | 0.01Hz to 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>Pull up to 12V or 24V<br>Logic<br>L level:1.0V or less<br>H level:3.9 to 30V(Max. allowable voltage ±50V)<br>Zero-crossing<br>60mV to 40VAC(Max. allowable voltage 70V)<br>*AC signal which gets across 0V. |
| Input impedance | : | Open collector<br>Pull up to 12 V through approx. 10kΩ (sensor power supply 12V)<br>Pull up to 24 V through approx. 25kΩ (sensor power supply 24V)<br>Pull down to GND through approx. 10kΩ.<br>Logic/Zero-crossing<br>Pull down to GND through approx. 10kΩ<br>2 wire<br>Pull down to GND through approx. 900Ω |
| Input pulse width | : | 1.8μs or more(Both L level and H level) |
| Measurement method | : | Cyclic calculation method |
| Sampling rate | : | 10ms(calculation period) |
| Display updating period | : | 100ms |

(Display)

| | | |
|---|---|---|
| Display range | : | 0 to 999999 |
| Zero display | : | Leading zero suppression |
| Decimal point | : | Arbitrary setting possible |
| Display unit time | : | Second, minute or hour selectable |
| Accuracy | : | ±(20ppm reading +1digit)at 23±5°C |

(Totalized display)

| | | |
|---|---|---|
| Display range | : | -999999 to 999999 |
| Zero display | : | Leading zero suppression |
| Decimal point | : | Arbitrary setting possible |
| Totalized value reset | : | Totalized value can be reset to total initial value by external control |
| Accuracy | : | ±0(When scaling is “1”) |

## 12－3. **OUTPUT SPECIFICATIONS**

【Comparator output】

Open collector output : Rated output
sink current Max. 50mA
Applied voltage Max. 30V
Output saturation voltage 1.2V or less at 50mA
Number of outputs 4 transistor outputs

Control method : Microcomputer operation method

Setting range : Pulse input : -999999 to 999999
Analog input : -99999 to 99999

Hysteresis : 1 to 99999 digit for each setpoints

Comparison operation : According to sampling rate(circulate period)

Setting condition : Condition 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)

| Comparison condition | 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(Lower limit judgement)

| Comparison condition | 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

| Comparison condition | 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

| Comparison condition | Judgement result |
|---|---|
| Display value>AL1 zone upper limit or AL1 zone lower limit> Display value | AL1 |
| Display value>AL2 zone upper limit or AL2 zone lower limit> Display value | AL2 |
| Display value>AL3 zone upper limit or AL3 zone lower limit> Display value | AL3 |
| Display value>AL4 zone upper limit or AL4 zone lower limit> Display value | AL4 |

Comparison formula memory : 8 pattern memory

【Pulse output】

Bch (pulse input) totalizer-synchronous output function, one pulse output per input pulse.

| | | |
|---|---|---|
| Output type | : | Open collector output NPN type |
| Rated output | : | 30VDC 20mA max. |
| Output range | : | 400Hz max.<br>(Pulse width is selectable, 1ms is the minimum width.) |

【Analog output】

| | | |
|---|---|---|
| Conversion method | : | D/A conversion method |
| Resolution | : | 13bit equivalent |
| Scaling | : | Digital scaling |
| Output objective | : | An item can be selected from source displayable values |
| Response speed | : | 25ms or less（0→90% response） |
| Specifications by types | : | |

<table>
<tr><th>Output type</th><th>Load resistance</th><th>Accuracy<br>（23±5℃ 35 to 85%RH）</th><th>Ripple</th></tr>
<tr><td>0~10V</td><td rowspan="3">2kΩ or more</td><td rowspan="5">±（0.1% of FS）</td><td rowspan="3">±50mVp-p</td></tr>
<tr><td>±10V</td></tr>
<tr><td>1~5V</td></tr>
<tr><td>0~20mA</td><td rowspan="2">550Ω or less</td><td rowspan="2">±25mVp-p<br>*Load resistance 250Ω<br>(20mA output)</td></tr>
<tr><td>4 to 20mA</td></tr>
</table>

# 13. 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 power supply 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. |
| | | | 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 block<br>- Current value hold<br>・Check settings.<br>- Input filter setting<br>- Instantaneous value auto zero setting<br>- Start delay time setting<br>・Initialize the WD-100A.<br>Caution：All settings are reset to default values by the initialization.<br>*Initialization |
| | | 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 |
| | | | 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. |
| | | Influence of noise | ・Using shield cable, improving wiring.<br>・Input filter setting |
| 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 |

| No. | Condition | Checkpoint | Action |
|---|---|---|---|
| 5 | Two wire transmitters do not operate. | Two wire input of WD-100A 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”<br>・Check whether output mode of comparative output is set to “Latch”.<br>*Output mode |
| 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” |
| 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 |
| | | (Sometimes, displayed value becomes large.) | ・Input filter setting |
| | | (Input signal varies in actually.) | ・Consideration of “Average” functions. |
| 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 | Totalized value is fixed to”OVER”. | Check whether noise on input signal makes unexpected input. | ・Input filter setting |
| | | Check setting of “Overrun count” | ・Check “Totalized value overrun count (TotOverCount)” setting. |
| 11 | Totalized value is larger for number of input pulse. | Chattering of relay, ringing by inductive factor of wiring. | ・Input filter setting |
| 12 | Totalized value has deceased. | Check “Overrun count” | ・Check number of “Overrun count<br>Check whether the “Total calculation direction(TotDirection)” is set to “Subtract from default (SubFromDefault)”<br>* Total calculation direction |
| 13 | Totalized value is lost by power off. | Check the setting variable “Totalized value memory” | Check “Totalized value memory” is set to enable. |
| 14 | In an analog input product, display value has large offset error | Check whether the digital zero function is working | ・Digital zero function<br>・Digital zero retention |

# 14. APPENDIX

## 14－1. 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 2sec.)

## 14－2. **SETTING VARIABLES**

| 1st Layer Large Categories | 2nd Layer Small Categories | 3rd Layer (setting items) | 4th Layer (setting values) | | Remarks |
|---|---|---|---|---|---|
| | | | Initial Values | Settable Values | |
| 1.Input | Ach (Analog) | 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. |
| | | InputRange | ±5V | 0～5V / 1～5V / ±5V / 0～10V / ±10V / 0～20mA / 4～20mA / ±20mA | Select an input range. *Offset and Fullscale setting are initialized by changing this item. |
| | | SensorPower | 12V | 12V/24V | Switch sensor power supply |
| | | SimpleAve | None | None/2/4/8/16/32/64/128/2556times | Set simple average of input. |
| | | MoveAve | None | None/2/4/8/16/32/64times | Set moneing average of input. |
| | | InputLowCut | 0 | 0～99999 | Cut both positive and negative. |
| | | Offset | -10000 | Go to screen of setting offset. | |
| | | Fullscale | 10000 | Go to screen of setting fullscale. | |
| | | InputCorrect | None | None/Linearize | |
| | | LinearizePoint | 1stIn： 0<br>1stOut： 0<br>2ndIn：1000<br>2ndOut：1000<br>……<br>21thIn：20000<br>21thOut:20000 | Each: ±99999 | Enable only if [InputCorrect] is [Linearize].<br>Take over setting of [DecPoint]. |
| | | DecPoint | ##### | #####/ #.####/ ##.###/ ###.##/ ####.# | |
| | | DispUnit | None | None/Select(*)/CustomUnit | |
| | | InsDispStep | None | None/5steps/10steps | |
| | | TrackingZero | Interval： 0<br>ActiveArea： 0 | Interval： 0～99.99[sec]<br>ActiveArea： 0～99999 | Disable if setting value is 0[sec].<br>Take over setting of [DecPoint]. |
| | Bch (Pulse) | 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. |
| | | InputType | OpenCollector | OpenCollector/Logic/ZeroCross/2Wire | Select input signal type |
| | | InputFilter | None | None/30Hz/1.5kHz/15kHz | Select analog input filters |
| | | SensorPower | 12V | 12V/24V | Switch Sensor power supply |
| | | 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. |
| | | InsUnitTime | Sec | Sec/Min/Hour | |
| | | InsDecPoint | ######<br>(No decimal point) | ######/#####.#/####.##/###.###/##.#### /#.##### | Set number of digits after decimal point |
| | | InsDispUnit | None | None/select from 62 units (See 6-2)/custom unit | Refer to detailed instruction manual about custom unit |
| | | InsAutoZero | 0.00 | 0.00 to 99.99sec | Displays 0 if no pulse input over more than setting time |
| | | InsMoveAve | None | None/2times/3times /4times /5times /6times /7times /8times / 9times | Set number of moving 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) |
| | | InsDispStep | None | None/5steps/10steps | Setting of steps of display（If set to 5steps, displayed only 0 or 5 on LSB) |
| | | TotDispCoef | $1.00000\times10^{0}$ | 0.00000 to $9.99999\times10^{-9\sim9}$ | Scaling setting for totalized value display. |
| | | TotDefaults | $0.00000\times10^{0}$ | $\pm9.99999\times10^{-9\sim9}$ | Setting of Initial value of totalized value |
| | | TotDirection | AddToDefault | AddToDefault/SubFromDefault | Set addition or subtraction for totalized value |
| | | TotDecPoint | ######<br>(No decimal point) | ######/#####. #/####. ##/###. ###/##. ####<br>/#. ##### | Set number of digits after decimal point |
| | | TotDispUnit | None | None/select from 62 units (See 6-2)/custom unit | Refer to detailed instruction manual about custom unit |
| | | TotOverCount | None | None/999times/Endless | Setting for overrun count |
| | 2InputCalc | 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 | 2π(A×B)/60 | None/ 2π(A×B)/60 | Select expression for calculation. |
| | | DecPoint | ######<br>(No decimal point) | ######/#####.#/####.##/###.###/##.#### /#.##### | Set number of digits after decimal point |
| | | DispUnit | None | None/select from 62 units (See 6-2)/custom unit | Refer to detailed instruction manual about custom unit |
| | | DispStep | None | None/5steps/10steps | Setting of steps of display（If set to 5steps, displayed only 0 or 5 on LSB) |
| | ExternalCtrl | ExtCtrl1Func<br>ExtCtrl2Func<br>ExtCtrl3Func<br>ExtCtrl4Func<br>ExtCtrl5Func | None | None/ CompareReset/ TotalReset/ MeasureBlockA/ MeasureBlockB/ MeasureBlockA&B/ DispHoldA/ DispHoldB/ DispHoldA&B/ MaxHoldA/ MaxHoldB/ MaxHoldA&B/ MinHoldA/ MinHoldB/ MinHoldA&B/DigitalZero/PatternChange1/ PatternChange2/ PatternChange3/ MonitorChange/ TrendHold | Select functions assigned to external control terminals. |

| 1st Layer Large Categories | 2nd Layer Small Categories | 3rd Layer (setting items) | 4th Layer (setting values) | | Remarks |
|---|---|---|---|---|---|
| | | | Initial Values | Settable Values | |
| 2.Output | CompareList | --- | --- | Go to screen of CompareList | |
| | CompareAL1<br>CompareAL2<br>CompareAL3<br>CompareAL4 | 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. |
| | | OutputDispValue | None | None/InsA/InsB/InsCalc/TotA/TotB/TotCalc | Select source output display value to compare. |
| | | CompareMode | LevelJudge | LevelJudge/ ZoneJudge | Select compare mode |
| | | OnConditions | Excess | Excess/LessThan | In level judge mode |
| | | | InTheZone | InTheZone/OutsideTheZone | In Zone judge mode |
| | | 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 |
| | | 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. |
| | | OffDelay | None | | Comparative output turns OFF, if OFF condition continues over set delay time. |
| | | OutputMode | Normal | Normal/Latch/OneShot5ms/ OneShot 10ms/<br>OneShot 20ms/<br>OneShot 50ms/ OneShot 0.1s/ OneShot 0.2s/<br>OneShot 0.5s/ OneShot 1s/ OneShot 2s | Select output mode of comparison |
| | | OutputLogic | Negative(NO) | Positive/Negative | |
| | | OnBgColors | Black | Black/Red/Yellow/Green | Background color priority<br>AL1>AL2>AL3>AL4 |
| | PulseOutput | 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. |
| | | PulseOutput | ON | OFF/ON | |
| | | OutputPulseWidth | 1ms | 1ms/5ms/10ms/20ms/50ms/100ms/200ms/500ms<br>/1s/2s | Select width of totalizer-synchronous pulse. |
| | | OutputLogic | Negative | Positive/Negative | Select logic of totalizer-synchronous pulse. |
| | AnalogOutput | 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. |
| | | OutputRange | 0-10V | 0-10V/±10V/1-5V/0-20mA/4-20mA | Select output range (type). |
| | | OutputDispValue | None | None/Ach(Analog)/Bch(Pulse)/Calc/Total | Select a displayable item for analog output |
| | | 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. |
| 3.Display | DispSelect | MeasureSelect | Ach(Analog)<br>Bch(Pulse)<br>Calc + Ach + Bch | Ach(Analog) / Bch(Pulse) / Calc / Ach+Bch / Calc+Ach / Calc+Ach+Bch / Total / Bch+Total / Ach+Comp / Bch+Comp / Calc+Comp / Total+Comp | Select displayable items can be switched by DISP key or external control (multiple selects are available) |
| | | LevelSelect | Disable all | Ach(Analog) / Bch(Pulse) / Calc / Ach+Bch / Calc+Ach / Total / Bch+Total | Select an item displayed on level display |
| | | TrendSelect | Disable all | | Select an item displayed on trend display. |
| | LevelDisp | 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. |
| | | Ach Scale<br>Bch Scale<br>Calc Scale<br>Total 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 |
| | TrendDisp | 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. |
| | | Ach Scale<br>Bch Scale<br>Calc Scale<br>Total 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. |
| | | TimeAxis | 1s/div | 1s/div,2s/div,5s/div,10s/div,30s/div,60s/div<br>120s/div | Select time for 1 division of time axis. |
| 4.System | General | 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 |
| | | PowerOnDelay | None | None/2Sec/5Sec/10Sec/20Sec/30Sec/60Sec | Select time from power on to starting measurement |
| | | PowerSavingTime | None | None/1min/2 min/5 min/10 min/30 min/60 min | In power saving state, brightness becomes "1 Dark" level. |
| | | TotMemory | Enable | Enable/Disable | Select saving totalized value or not. |
| | | D-ZeroRetention | Disable | Enable/Disable | Select retent digital zero execution state and value or not. |
| | | Language | English | 日本語 / English | Select language |
| | | DisplayDirection | Horizontal | Horizontal/Vertical | Select direction of display |
| | | SettingProtect | Disable | Disable/Enable | If Enable, changing settings are disabled. |
| | | PatternCopy | Go to pattern copy screen. | | Function of copying settings for each pattern. |
| | Initialize | UserDefaultSave | Message "Save current settings as user initial values?" | | |
| | | UserDefaultLoad | Message "Initialize setting values to user initial values?" | | |
| | | FactoryDefaultLoad | Message "Initialize setting values to factory default?" | | |
| 5.Diagnosis | InputDiag | Ach(Analog) | — | — | |
| | | Bch(Pulse) | — | — | |
| | | ExternalCtrl | — | — | Check for ON/OFF state of terminals |
| | OutputTest | CompareAL1<br>CompareAL2<br>CompareAL3<br>CompareAL4 | — | — | Outputs ON level or OFF level |
| | | PulseOutput | — | — | Outputs ON level or OFF level |
| | | AnalogOutput | — | — | Outputs level of 10% steps of rating. |

(*)Selectable units are below.

None, Hz, rpm, mN, N, kN, MN, mgf, gf, kgf, tf, mg, g, kg, t, ton, Pa, hPa, kPa, MPa, gf/mm$^2$, tf/mm$^2$, gf/cm$^2$, tf/cm$^2$, atm, mmHg, mm$H_2O$, mmAq, mbar, psi, mN・m, N・m, kN・m, MN・m, gf・cm, kgf・cm, gf・m, kgf・m, tf・m, µm, mm, cm, m, km, inch, km/h, rad/s, µV, mV, V, kV, µA, mA, A, kA, mΩ, Ω, kΩ, W, kW, VA, µε, µm/m, µV/V, mV/V, ℃, K, m/s$^2$, G, Gal, No., m$^3$, ml, l, kl, %, ‰, ppm, /s, /min, /h, Custom

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