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

WPMZ-5－□□□－□□－□□□

watanabe

Watanabe Electric Industry Co., Ltd.

IM-0836-05

INTRODUCTION

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

SUPPLIED ITEMS

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

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

NOTES

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

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1. PRECAUTIONS FOR USE

1－1. ENVIRONMENTS AND CONDITIONS OF USE

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

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

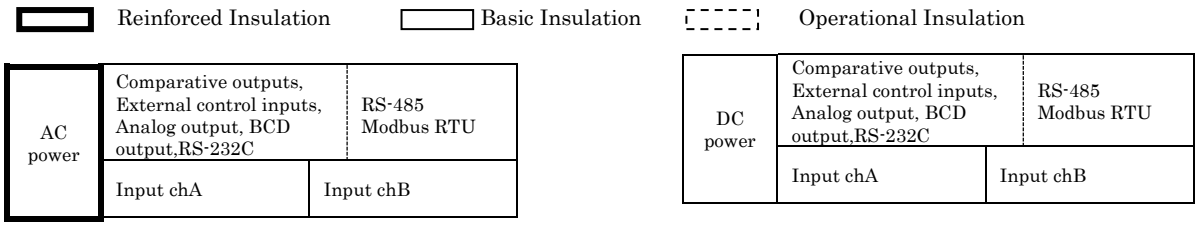
RESTRICTION FOR USE

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

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

1－2. INSTALLATION AND CONNECTION

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



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

⚠CAUTION

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

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

1－3．CHECKING BEFORE USE

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

1－4．CHECKING FOR ABNORMALITIES

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

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

1－5．MAINTENANCE AND INSPECTION

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

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

1－6．DISPOSAL OF THIS PRODUCT

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

2. WARRANTY

2－1. TERM OF WARRANTY

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

2－2. WARRANTY RANGE

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

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

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

2－3. LIMITATION OF LIABILITY

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

3. BEFORE USING THE PRODUCT

3－1. MODEL CODES

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

WPMZ-5－□□□－□□－□□□

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

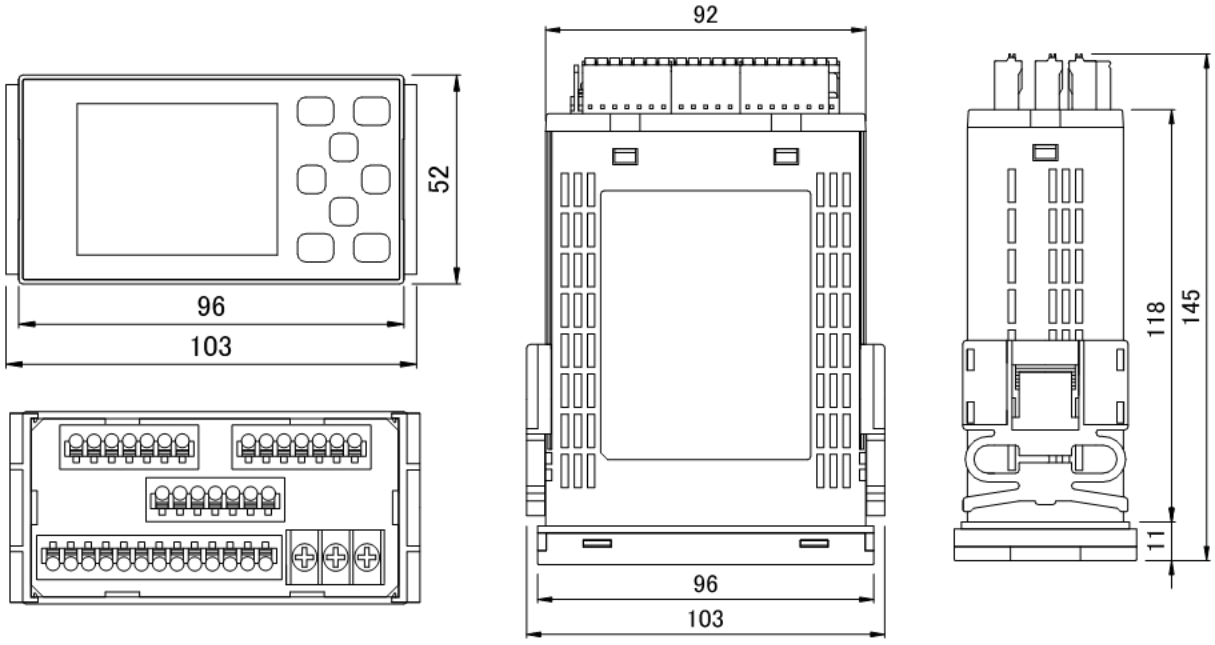
(Note 1) Combination of 2 inputs
The combination of a pulse input and a line driver input is NOT selectable.
(WPMZ-5-*PL and WPMZ-5-*LP are NOT available.)

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

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

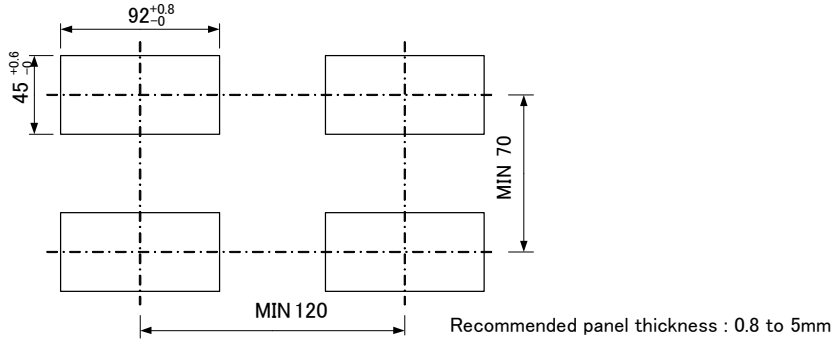
4. MOUNTING METHOD

4－1. EXTERNAL FORM DIMENSIONS

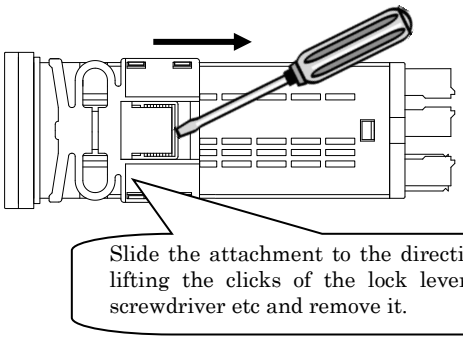


4－2. PANEL MOUNTING METHOD

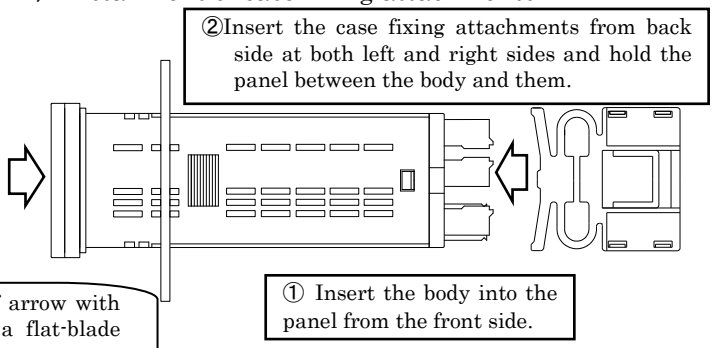
Panel cut dimensions are as shown by the figure below.



1) Removal of case fixing attachments



2) Installment of case fixing attachments



CAUTION

○ Prior to the installation of this product please read "1-1. ENVIRONMENTS AND CONDITIONS OF USE" (page5).

○ In the case of installation or replacing of this product, please pay attention to the damage and accident by dropping.

○ In the case of some wires are connected, do not install or replacing this product. It may cause shock, damage ,fire etc.

5. CONNECTING TERMINALS

5－1. WIRING TO TERMINALS

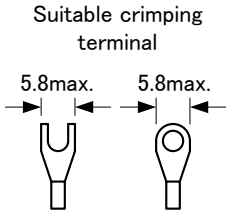
The connections to this product are done by connecting wires to the screw terminal block (power supply) and screwless terminal blocks on the back side of the body. Show below for the method and precautions.

5－1－1. CONNECTING TERMINALS

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

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

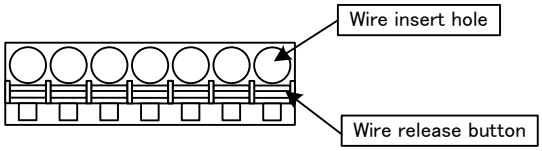
②Insert lugs under the washers of loosened screws and fasten the screws.
(Recommended torque：0.6 [N·m])



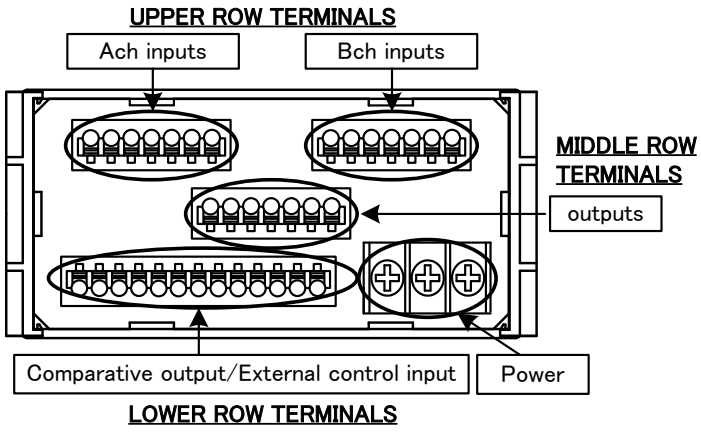
5－1－2. WIRING TO SCREWLESS TERMINALS

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

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



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



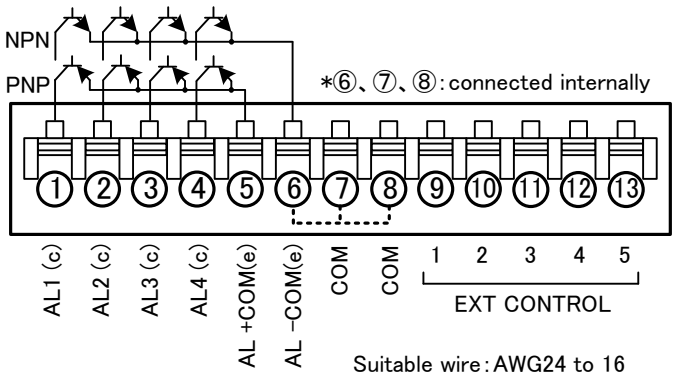
Note: In this manual, “channel A”, “channel B” may be abbreviated to “chA”,”chB” (or “Ach”,”Bch”).

5－2．CONNECTION FOR LOWER ROW TERMINALS

5－2－1．COMPARATIVE OUTPUT/EXTERNAL CONTROL INPUT

[Opencollector output product]

Screwless terminals



Suitable wire：AWG24 to 16

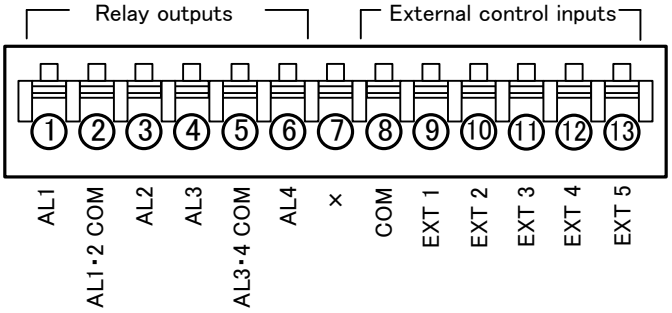
No.	Name	Description
1	AL1 c	AL1 open-collector output (collector)
2	AL2 c	AL2 open-collector output (collector)
3	AL3 c	AL3 open-collector output (collector)
4	AL4 c	AL4 open-collector output (collector)
5	AL+COM e	Common terminal for PNP output (emitter) (NPN output：no connection)
6	AL-COM e	Common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

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

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

[Relay output product]

Screwless terminals



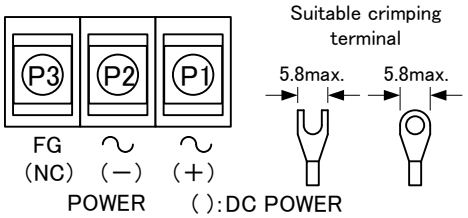
Suitable wire：AWG 24 to 16

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

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

5－2－3．SUPPLY POWER

Screw terminals

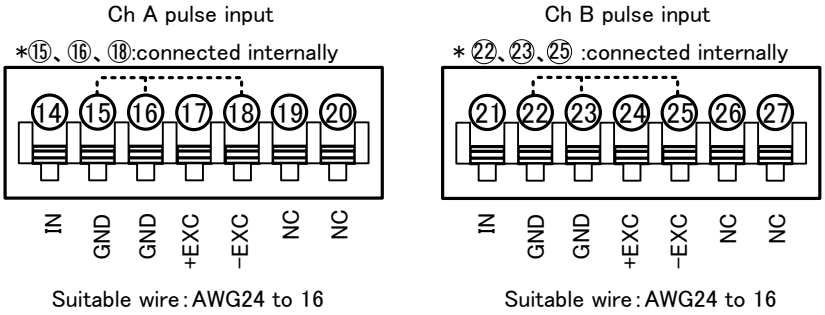


Terminal	Name	Description
P1	POWER (+)	Power source terminal (In case of DC power, ＋V)
P2	POWER (-)	Power source terminal (In case of DC Power, 0V)
P3	FG (NC)	FG terminal (DC power option: no connection (Non-usable for a relay terminal))

5－3．CONNECTION FOR UPPER ROW TERMINALS

5－3－1．PULSE INPUTS

Screwless terminals



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

●Channel A pulse input

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

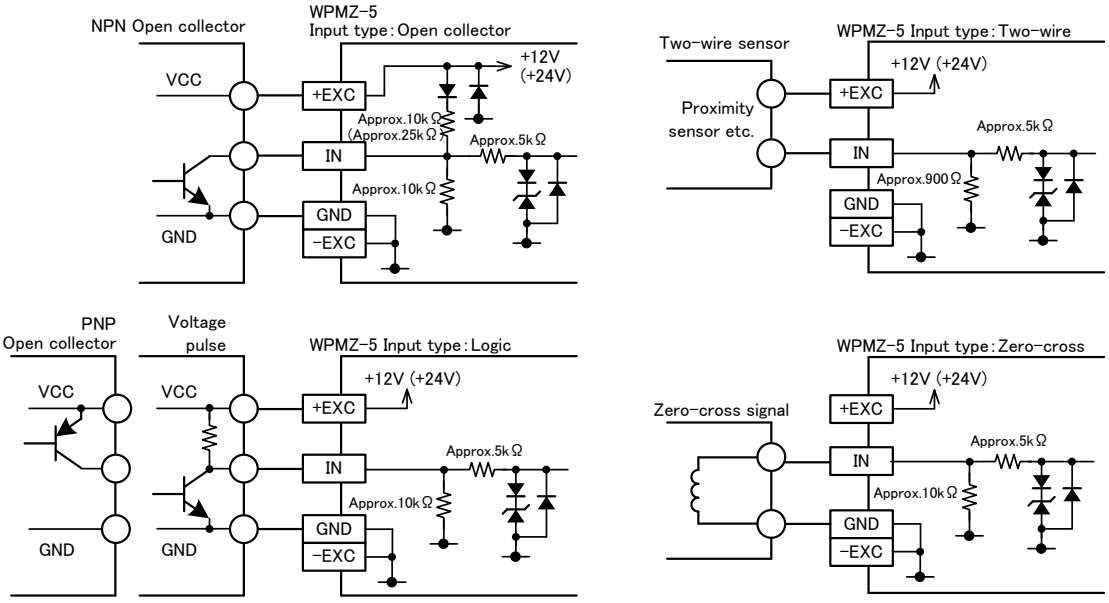
*1 “GND terminal” and “-EXC terminal” is connected internally and same voltage level.

●Channel B pulse input

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

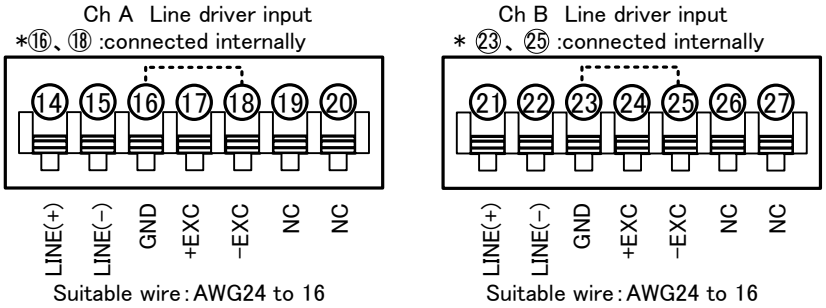
*1 “GND terminal” and “-EXC terminal” is connected internally and same voltage level.

●Examples for Input connections



5－3－2．LINE DRIVER INPUTS

Screwless terminals



●Channel A line driver input

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

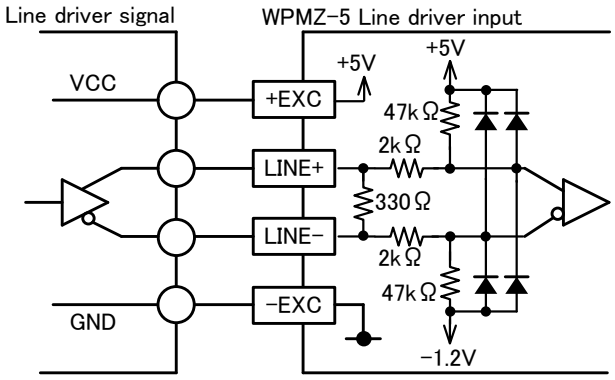
*1 “GND terminal” and “-EXC terminal” is connected internally and same voltage level.

●Channel B line driver input

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

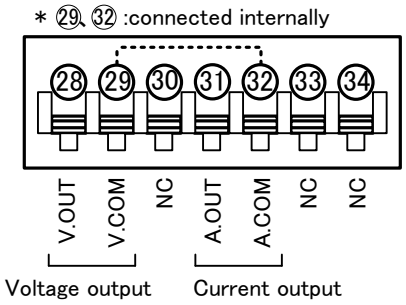
*1 “GND terminal” and “-EXC terminal” is connected internally and same voltage level.

●Examples for Input connections



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

5－4－1．ANALOG OUTPUT



Suitable wire：AWG24 to 16

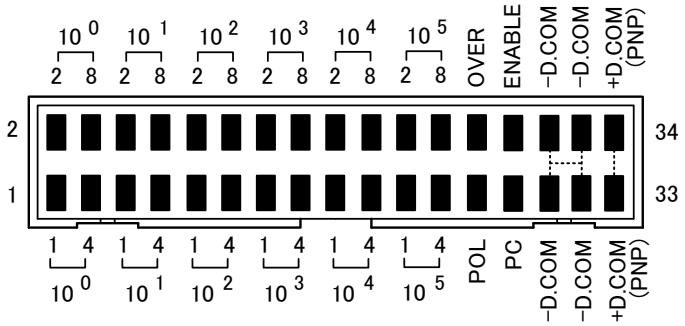
Screwless terminals

terminal	name	descriptions
28	V.OUT	Analog voltage output terminal (+)
29	V.COM	Analog voltage output terminal (-)
30	NC	No connection *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.

5－4－2．BCD OUTPUT

Crimp connector

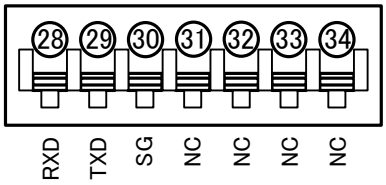


Suitable wire：AWG#28 flat cable(7/0.127mm)

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

5－4－3．RS-232C

Screwless terminals

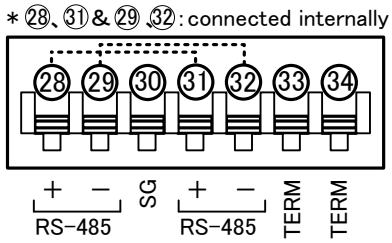


Suitable wire：AWG24 to 16

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

5－4－4．RS-485 MODBUS RTU

Screwless terminals



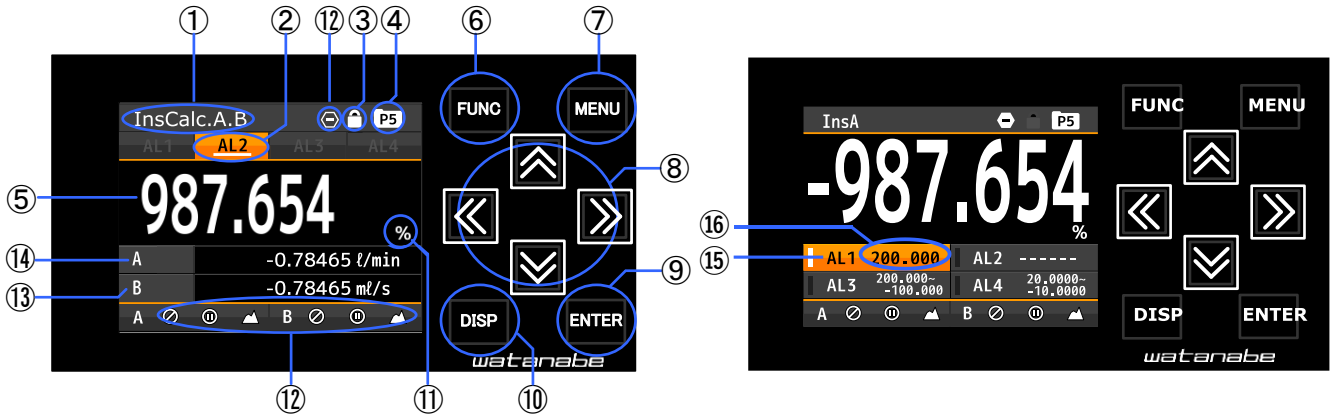
Suitable wire：AWG24 to 16

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

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

6. NAMES OF EACH PART

6－1. NAMES OF EACH PART



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

6－2. EXPLANATION OF ICONS

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

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

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

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

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

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

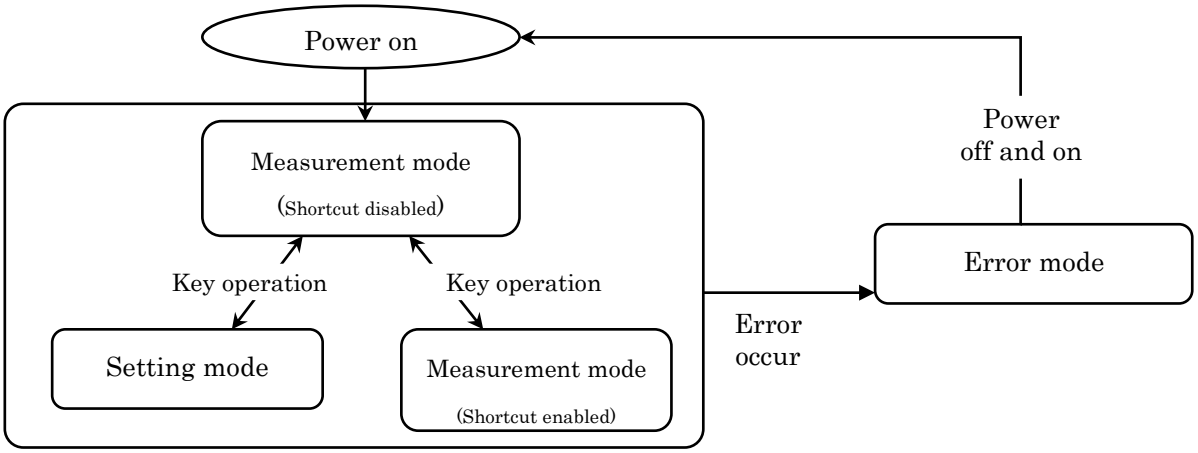
7. MODES OF OPERATION

7－1. WHAT YOU CAN DO USING THIS PRODUCT

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

Mode	Summary	Related Page
Setting Mode	**3. Display Setting** DISPLAY SELECT ・Selection of display in measurement mode such as numerical value, trend display etc. LEVEL DISPLAY ・Setting of scale on level display TREND DISPLAY ・Setting of scale on trend display	page 24
	4. System Setting GENERAL ・Basic setting such as brightness of display, direction of display etc. INITIALIZE ・Setting about initialize such as initialize to user settable values or factory defaults etc.	page 25
	5. Input-Output Diagnosis INPUT DIAGNOSIS ・Makes a diagnosis to inputs. SIMULATED OUTPUT (OUTPUT TEST) ・Outputs simulated signals for each output.	page25
Shortcut enabled mode	Can control external control functions which are assigned to arrow keys by operations of the keys	page140
Error mode	Displays error codes when some error occurs.	page 153

7－2．STATE TRANSITION DIAGRAM



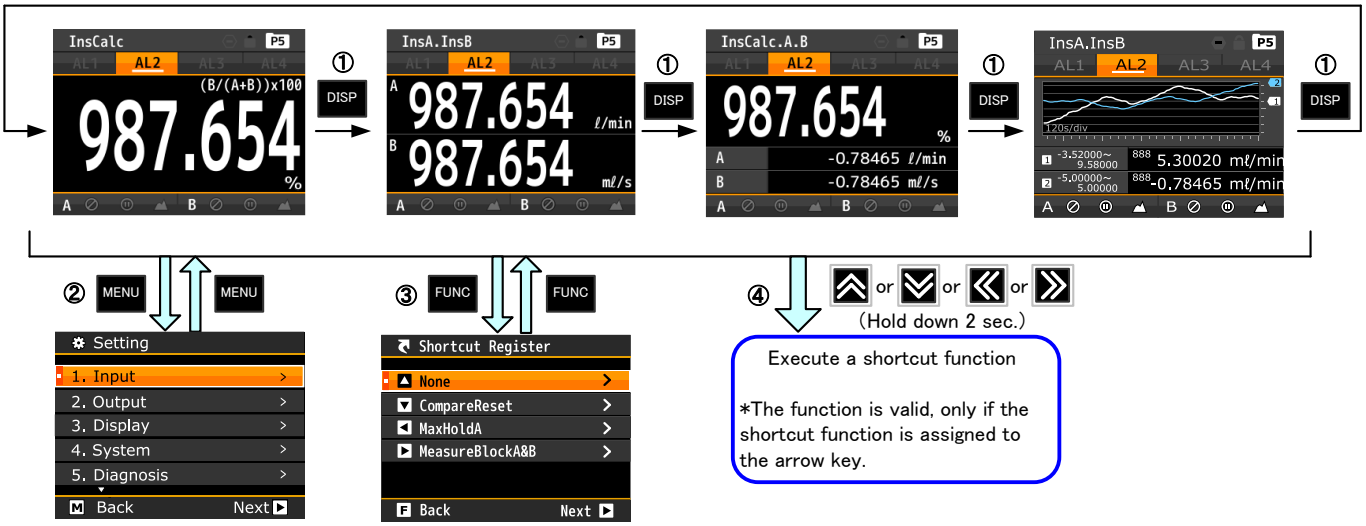
8. MEASUREMENT MODE

8－1. WHAT YOU CAN DO IN MEASUREMENT MODE

WHAT YOU CAN DO	DESCRIPTION	RELATED PAGE
Display of measured value	Displays results of measurement	page 21
Switch of measurement displays	Switches measurement displays which are entries in advance.	page20
Shortcut functions	Executes external control functions which are assigned to arrow keys.	page140

8－2. OPERATIONS IN MEASUREMENT MODE

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



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

⚠CAUTION

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

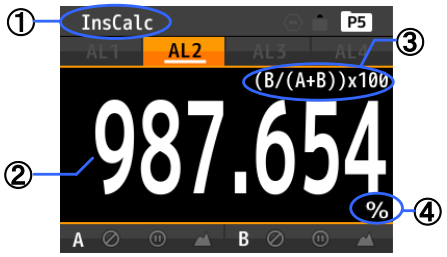
8－3．MEASUREMENT VALUE DISPLAY

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

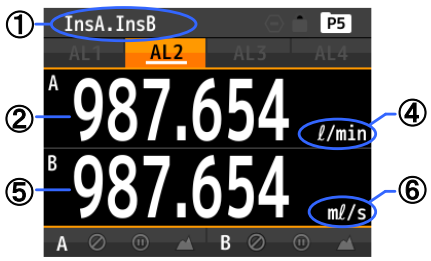
8－3－1．MEASUREMENT (NUMERICAL NUMBER) DISPLAY

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

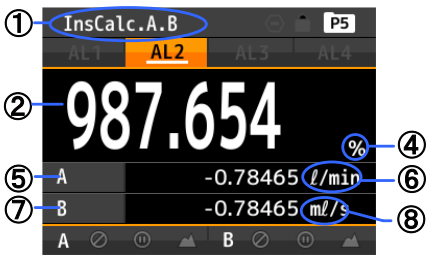
1st item display



2nd item display



3rd item display



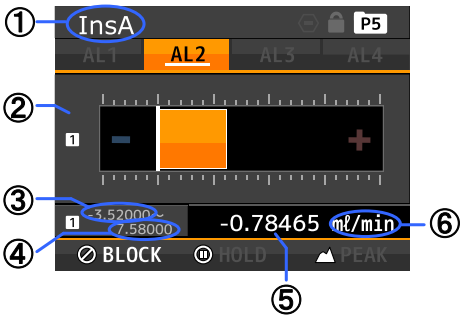
No.	Description
①	Shows the title of display which is currently displayed in measurement display. *In the case of “Ins Calc, A,B”, instantaneous calculation value is treated as the 1st item, Instantaneous value A is treated as the 2nd item and Instantaneous value B is the 3rd item.
②	Shows measurement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

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

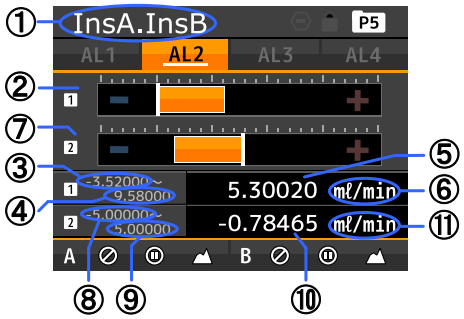
8－3－2．LEVEL DISPLAY (BAR GRAPH)

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

1st item display



2nd item display



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

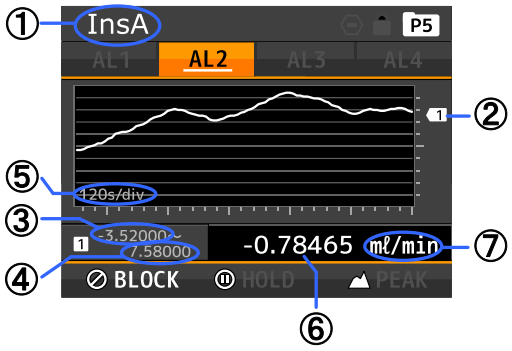
	* 1 denotes 1st item.
③	Shows lower limit value (left edge) of level display (bar graph) scale for 1st item.
④	Shows upper limit value (right edge) of level display (bar graph) scale for 1st item.
⑤	Shows measurement result of 1st item by numerical number.
⑥	When any units are selected in display setting,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

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

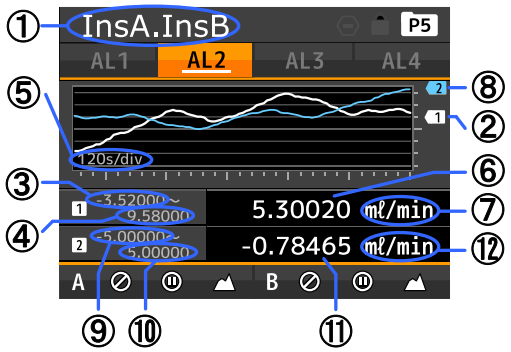
8－3－3．TREND DISPLAY (LINE GRAPH)

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

1st item display



2nd item display



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

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

9. SETTING MODE

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

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

PULSE INPUT (chA / chB) →page36

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

*Available for models with pulse input.

LINE DRIVER INPUT (chA / chB) →page 50

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

*Available for models with line driver input.

2 INPUT CALCULATION SETTING →page61

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

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

EXTERNAL CONTROL →page68

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

9－1－2．WHAT YOU CAN DO IN “THE OUTPUT SETTING GROUP”

COMPARATIVE OUTPUTS (AL1–AL4) SETTING →page71

- 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→page83

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

*Available for models with analog output.

BCD OUTPUT SETTING→page88

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

*Available for models with BCD output.

RS–485 MODBUS COMMUNICATION SETTING →page99

- Set unit ID.
- Set parameters for communication.

*Available for models with RS-485 Modbus.

RS–232C COMMUNICATION SETTING →page93

- Set parameters for communication.

*Available for models with RS-232C.

9－1－3．WHAT YOU CAN DO IN “THE DISPLAY SETTING GROUP”

DISPLAY SELECT SETTING→page103

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

LEVEL DISPLAY SETTING →page108

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

TREND DISPLAY SETTING →page111

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

9－1－4．WHAT YOU CAN DO IN “THE SYSTEM SETTING GROUP”

GENERAL SETTINGS →page115

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

INITIALIZINGS →page124

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

9－1－5．WHAT YOU CAN DO IN “THE DIAGNOSIS GROUP”

INPUT DIAGNOSIS →page126

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

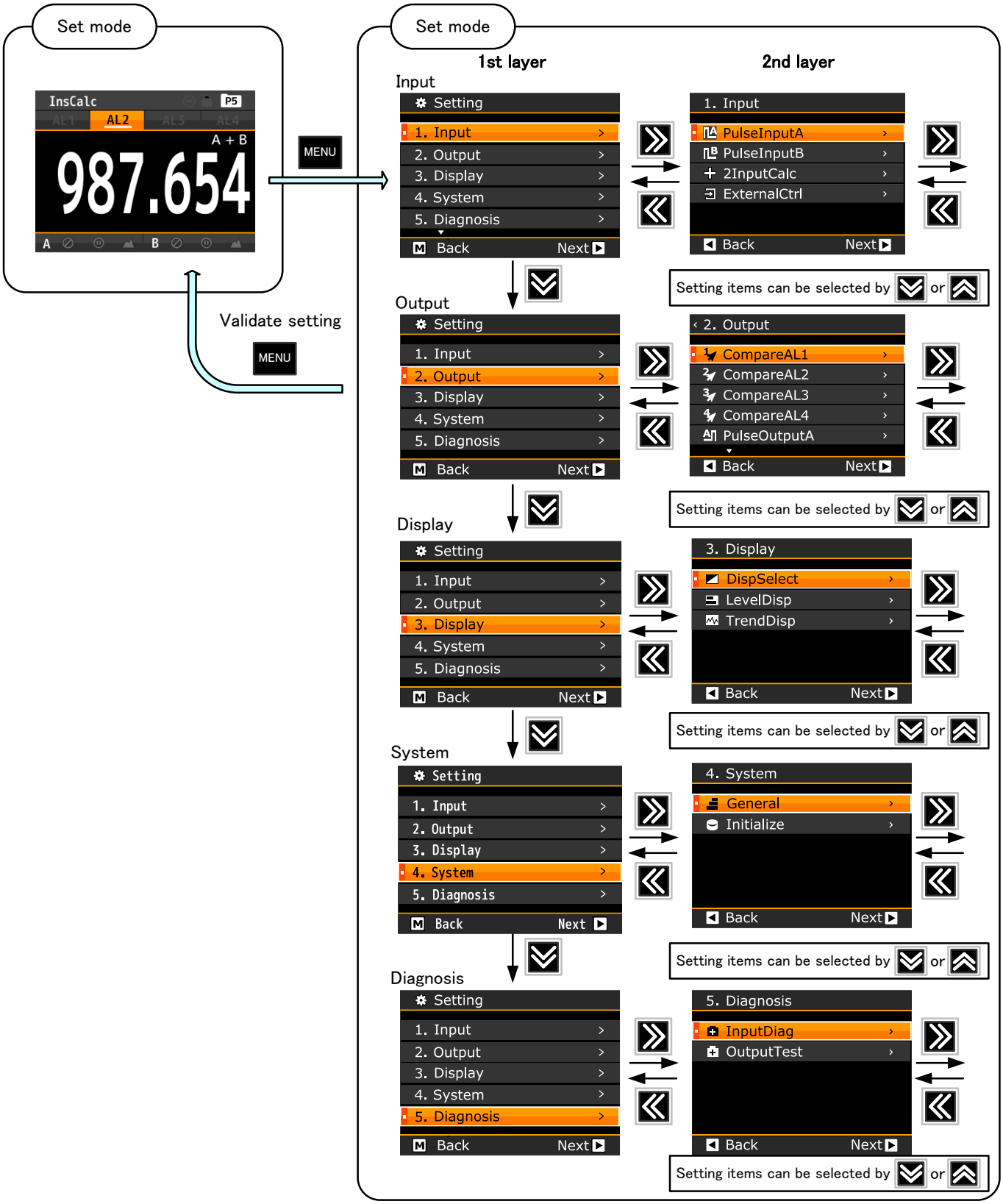
SIMULATED OUTPUT (OUTPUT TEST) →page129

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

9－2．OPERATION IN SETTING MODE

9－2－1．TRANSFER BETWEEN SETTING GROUPS

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



⚠CAUTION

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

9－2－2．OPRERATING PROCEDURE

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the 1st layer (major categories). By moving the cursor with "**ARROW (UP/DOWN)**" key, the selection of major categories to set can be changed.
	* On the 1st layer, by pushing the "**MENU**" key, the display returns to the measurement display.
②	Pointing the cursor to a major category to set and pushing "**ARROW (RIGHT)**" key, the display moves to the 2nd layer (small categories). 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). 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. 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. If the "**ARROW (LEFT)**" key is pushed, the display returns to the 3rd layer.
⑥	By moving the cursor with "**ARROW key (UP/DOWN)**", select content. 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. If the "**ARROW (LEFT)**"key is pushed, the display returns to the 3rd layer.
⑧	By pushing the **"MENU"** key, the selected contents are stored and the display returns the measurement display.

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

9－3．OVERVIEW OF PARAMETERS AND INITIAL VALUES

9－3－1．INPUT SETTING GROUP OVERVIEW

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

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

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

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

9－3－2．OUTPUT SETTING GROUP OVERVIEW

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

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

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

9－3－3．DISPLAY SETTING GROUP OVERVIEW

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

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

9－3－4．SYSTEM SETTING GROUP OVERVIEW

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

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

9－3－5. DISGNOSIS OVERVIEW

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

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

9－4．DETAILS OF INPUT SETTING GROUP

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

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

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

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

⚠CAUTION

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

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

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

⚠CAUTION

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

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

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

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

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

9－4－1－2. Selecting Type of Input

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

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

⚠CAUTION

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

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

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

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

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

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

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

⚠CAUTION

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

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**.
②	By moving the cursor with "**ARROW(UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**.
③	By moving the cursor with "**ARROW(UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**.
④	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InputFilter**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. *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"**. *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. *By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display.

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

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

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

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

⚠CAUTION

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

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

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

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

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

Set scaling parameters of scaling settings required for measurement.

3rd layer (Setting variables)		4th layer (Setting values)	Initial value	Meanings of setting values
Names of variables	Character Strings on Display (Abbreviated Form)			
Instantaneous value display coefficient	InsDispCoef	0.00000 to $9.99999\times10^{-9\sim9}$	1.00000×10^{0}	Scaling setting for instantaneous value display. Multiplying frequency by instantaneous coefficient and unit time.
Instantaneous Unit Time	InsUnitTime	Sec	Sec	
		Min		
		Hour		
Instantaneous value decimal point position	InsDecPoint	######	######	Select decimal point position for instantaneous value display.
		#####. #		
		####. ##		
		###. ###		
		##. ####		
		#. #####		

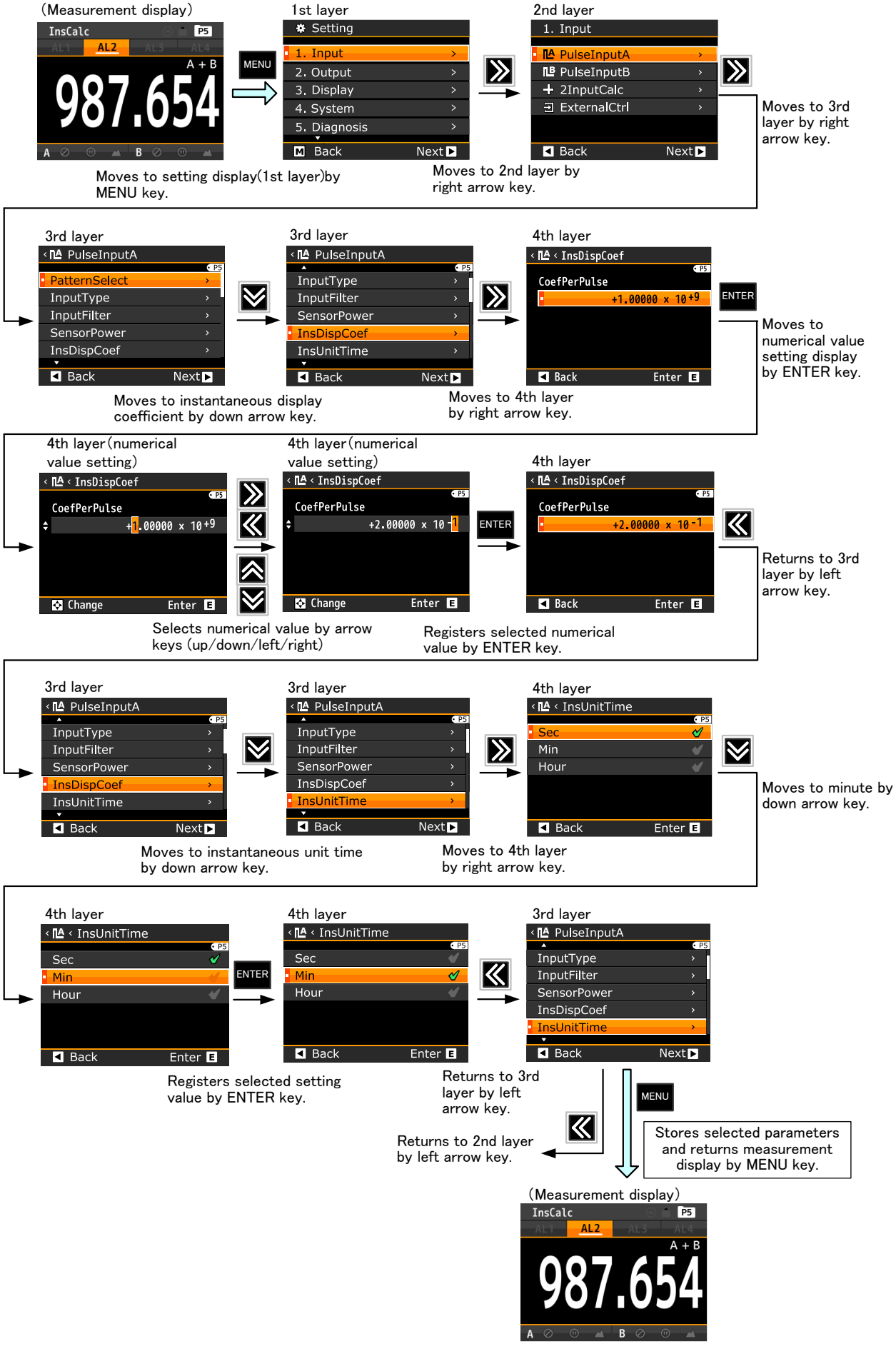
【Scaling setting examples】

1) **Example 1**

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

3rd layer (Setting variables)	4th layer (Setting values)	Descriptions for setting examples
Input type [InputType]	Open collector	The sensor is an NPN open collector type, therefore "open collector" should be selected as the input type.
Instantaneous value display coefficient [InsDispCoef]	2.00000×10^{-1}	(Setting for Instantaneous revolving speed display) For setting of Instantaneous display coefficient, number of rotation per 1 pulse is needed. ・Calculate the number of rotation per 1 pulse. Because of 5 [Pulse] per 1 round, therefore, $1/5=2\times10^{-1}$[round] ・Set " **2.00000×10^{-1}** " as the Instantaneous display coefficient
Instantaneous Unit Time [InsUnitTime]	Min	Unit to display is [rpm], therefore, select "**Min**" for the instantaneous unit time.
instantaneous decimal point position [InsDecPoint]	######	Displays without decimal point, therefore select "######" for Instantaneous value decimal point position

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



2) Example 2

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

3rd layer (Setting variables)	4th layer (Setting values)	Descriptions for setting examples
Input type [InputType]	Open collector	The sensor is an open collector output type, therefore select "open collector" as input type.
Instantaneous value display coefficient [InsDispCoef]	7.50000×10^{-3}	(Setting for instantaneous flow rate display) Set flowrate per 1 pulse as instantaneous display coefficient Although instantaneous flow rate will be displayed in [ℓ/min], the rating of the sensor is 7.5[mℓ/Pulse], it should be converted to7.5×10^{-3}[ℓ/Pulse]. ・Set the "Instantaneous display factor" as "**7.50000×10^{-3}**"
Instantaneous Unit Time [InsUnitTime]	Min	Displayed unit is [ℓ/min], therefore select "**Min**" as the instantaneous unit time.
instantaneous decimal point position [InsDecPoint]	###. ###	To display 3 digits after the decimal point, select "###.###" for "instantaneous decimal point position".

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

3) Example 3

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

3rd layer (Setting variables)	4th layer (Setting values)	Descriptions for setting examples
Input type [InputType]	Logic	The sensor is voltage output type, therefore select "Logic" for "input type".
Instantaneous value display coefficient [InsDispCoef]	1.00000×10^{-1}	(Setting for instantaneous flow rate display) Set flowrate per 1 pulse as "instantaneous display coefficient". ・Calculate number of pulses per 1 [ℓ]. The sensor outputs pulses of 15[Hz] at 90[ℓ/min], therefore, (15×60)/90＝10[Pulse/ℓ] . ・Calculate flowrate par 1 pulse. Number of pulses per 1 litter is 10[Pulse/ℓ], therefore, $1/10=1\times10^{-1}$[ℓ/Pulse]. ・Set "**1.00000×10^{-1}**" for the "instantaneous value display coefficient". * Any of "1.00000×10^{-1}", "0.10000×10^{0}" and "0.01000×10^{1}" for the "instantaneous value display coefficient" bring same results.
Instantaneous Unit Time [InsUnitTime]	Sec	Unit to display is [ℓ/sec], therefore, select "Sec" for the "instantaneous unit time".
instantaneous decimal point position [InsDecPoint]	######	Displays without decimal point, therefore select "######" for Instantaneous value decimal point position

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

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

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

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

⚠CAUTION

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

【Display unit setting example】

1) Example 1

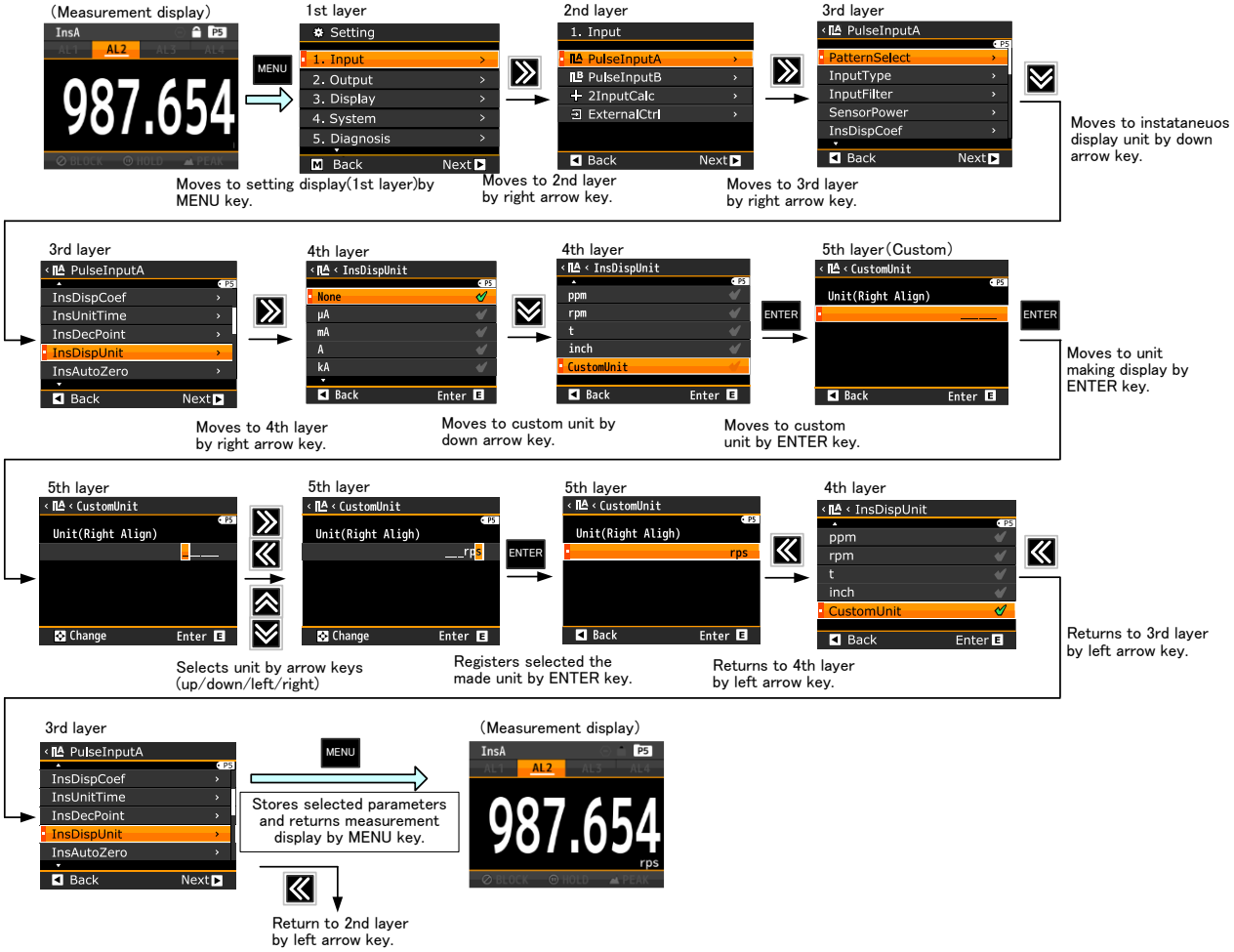
The method for setting the display unit of Instantaneous value to "m/s" is shown below.
(Same operation is also applied to the pulse input B.)

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

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

2) Example 2

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



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

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

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

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

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

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

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

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**.
②	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**.
③	By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**.
④	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsMoveAve**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. *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**". *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. *By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display.

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

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

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

⚠CAUTION

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

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

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**.
②	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**.
③	By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**.
④	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsSimpleAve**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. *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**". *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. *By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display.

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

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

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

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

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**.
②	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**.
③	By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**.
④	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsDispStep**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. ＊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**". ＊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. ＊Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display.

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

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

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

⚠CAUTION

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

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

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

⚠CAUTION

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

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

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

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

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

9－4－2－2．Selecting Type of Input

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

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

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

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

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

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

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

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

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

Set scaling parameters of scaling settings required for measurement.

3rd layer (Setting variables)		4th layer (Setting values)	Initial value	Meanings of setting values
Names of variables	Character Strings on Display (Abbreviated Form)			
Instantaneous value display coefficient	InsDispCoef	0.00000 to $9.99999\times10^{-9\text{ to }9}$	1.00000×10^{0}	Scaling setting for instantaneous value display. Multiplying frequency by instantaneous coefficient and unit time.
Instantaneous Unit Time	InsUnitTime	Sec	Sec	
		Min		
		Hour		
Instantaneous value decimal point position	InsDecPoint	######	######	Select decimal point position for instantaneous value display.
		#####. #		
		####. ##		
		###. ###		
		##. ####		
		#. #####		

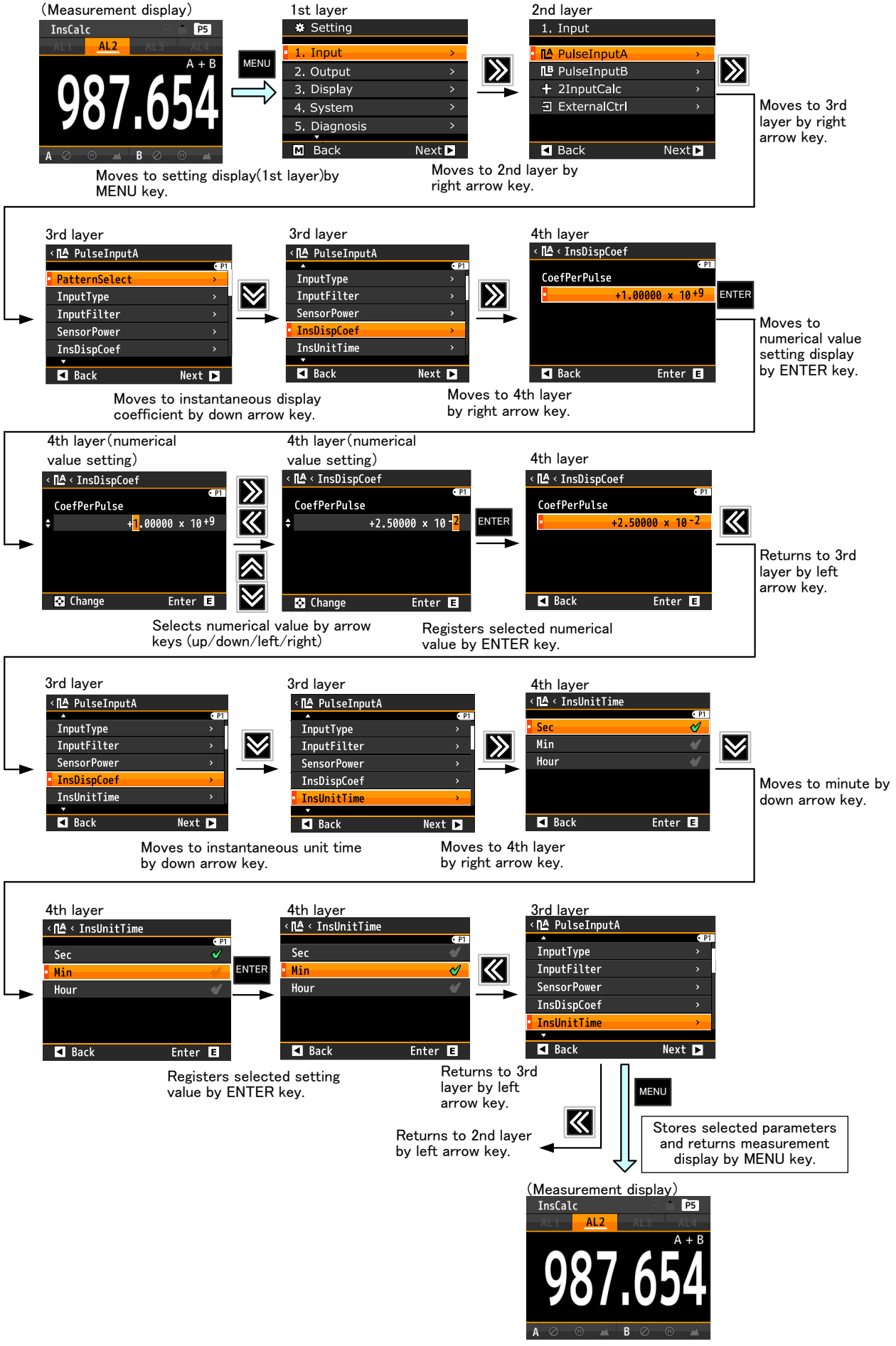
【Scaling setting examples】

1) **Example 1**

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

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

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



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

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

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

⚠CAUTION

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

【Display unit setting example】

1) Example 1

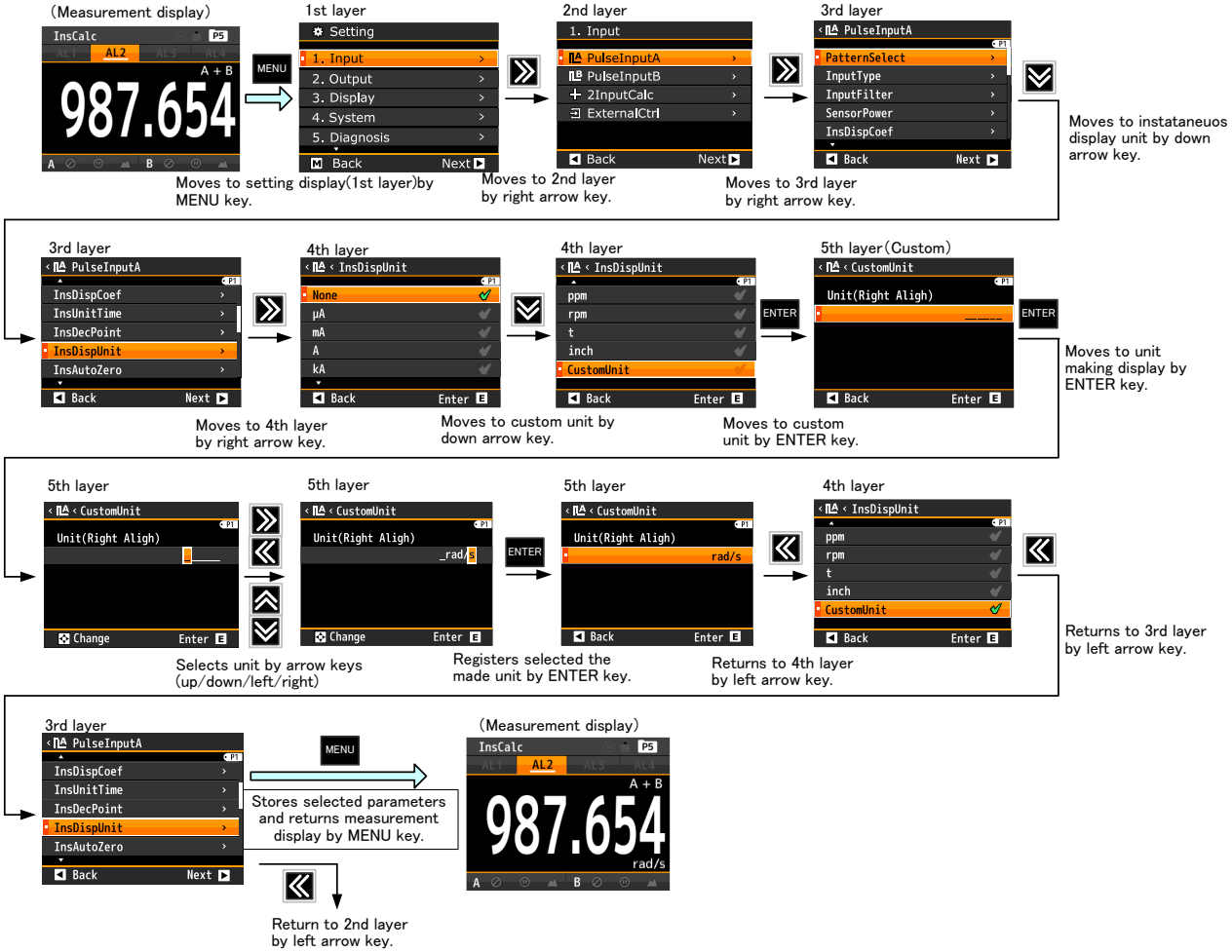
The method for setting the display unit of Instantaneous value to "rpm" is shown below. (Same operation is also applied to the pulse input B.)

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

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

2) Example 2

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

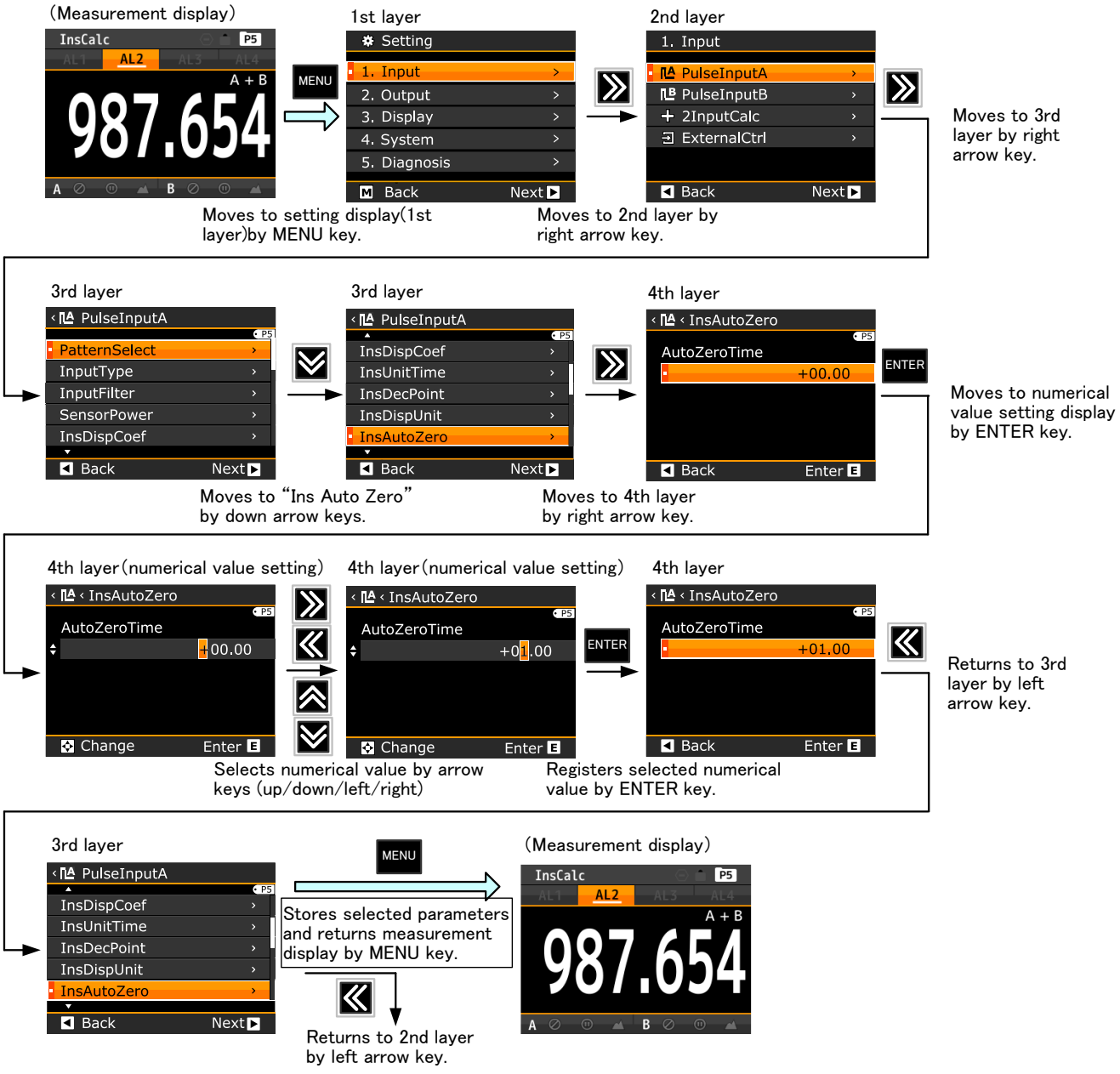


9－4－2－7. Setting Time for Instantaneous Value Set to Zero

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

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

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



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

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

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

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**.
②	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**.
③	By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**.
④	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsMoveAve**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. *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**". *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. *By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display.

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

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

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

⚠CAUTION

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

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

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**.
②	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**.
③	By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**.
④	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsSimpleAve**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. *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**". *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. *By pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display.

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

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

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

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

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**.
②	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**.
③	By moving the cursor with "**ARROW (UP/DOWN)** key", point the cursor to **"PulseInputA"** and push "**ARROW (RIGHT)** key", then the display moves to the **3rd layer (setting variables)**.
④	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**InsDispStep**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. *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**". *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. *Pushing "**ARROW (LEFT)**"key each time, the display content returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected parameters are stored and display returns the measurement display.

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

9－4－3．2-INPUT CALCULATION

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

⚠CAUTION

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

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

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

⚠ CAUTION

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

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

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

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

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

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

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

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

⚠CAUTION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**.
②	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**1. Input**" and push "**ARROW (RIGHT)**" key, then the display moves to the **2nd layer (small categories)**.
③	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"2 InputCalc"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**).
④	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"InsDispStep"** and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting values)**. *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"** *Select a proper steps for your 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: If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.

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

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

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

⚠ CAUTION

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

【Display Unit Setting Example】

1) Example 1

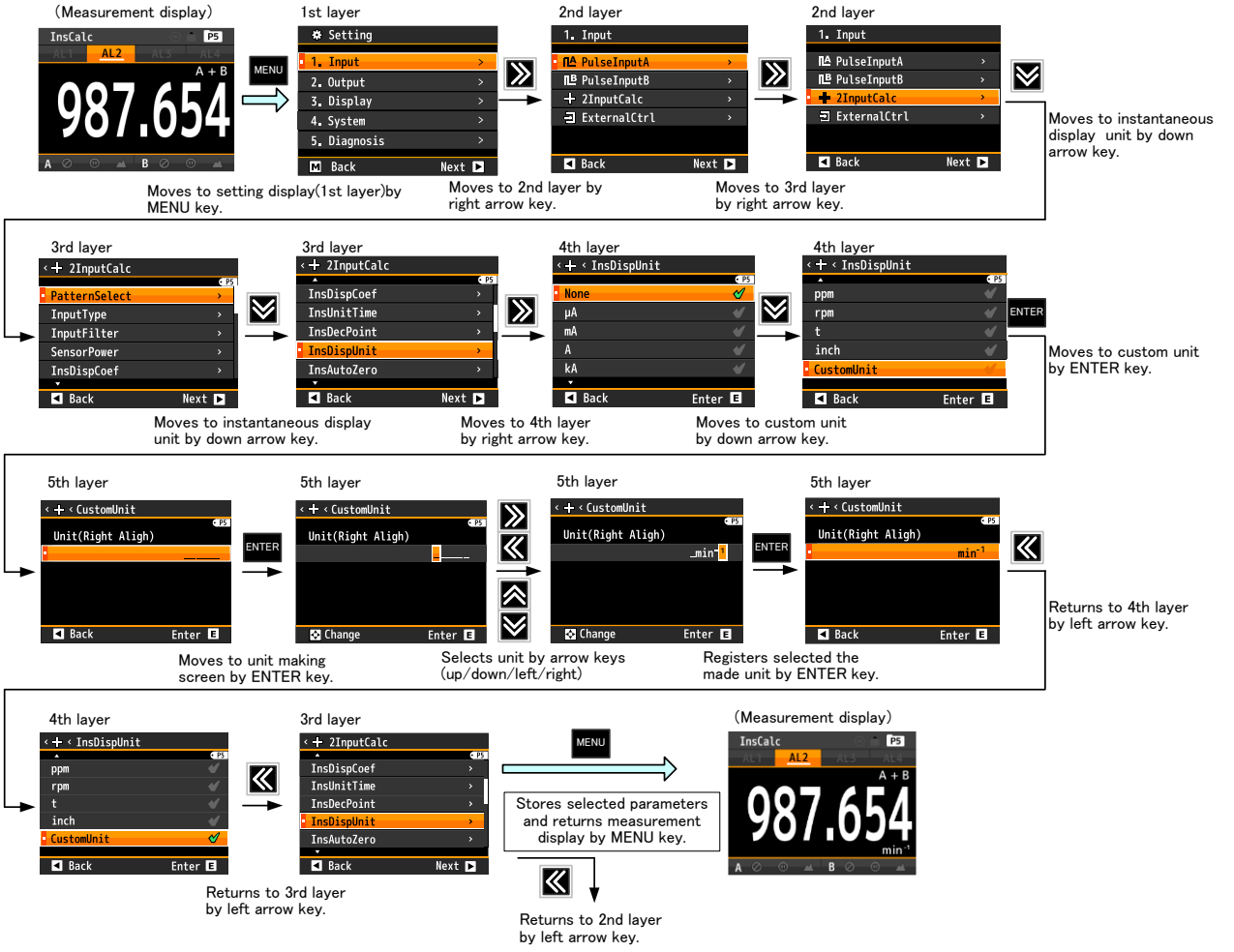
The steps to set the display unit of instantaneous value to "Hz" are shown below.

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

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

2) Example 2

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



9－4－4．EXTERNAL CONTROL

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

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

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

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

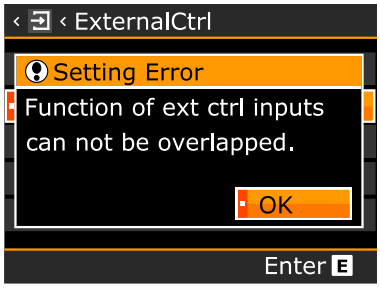
●The setting steps to assign "MeasureBlockA" to terminal 2 are shown below.

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

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

⚠CAUTION

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



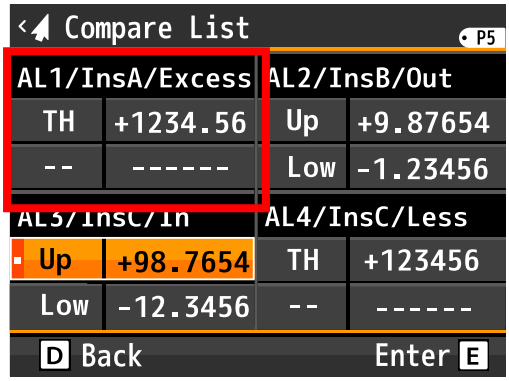
9－5．DETAIL OF OUTPUTSETTING GROUP

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

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

9－5－1．COMPARE LIST

When you move on to “Compare List” screen, the 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.



9－5－2．COMPARATIVE OUTPUT AL1 - 4

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Select a pattern number to configure settings	Pattern select [PatternSelect]	page72
Select displayable source item for comparative output	Output Display Value [OutputDispValue]	page 73
Select compare mode of comparative output	Compare mode [CompareMode]	page 74
Set condition that comparative outputs turn on	Condition of ON [OnConditions]	page 75
Set comparison judgement value	Comparison judgement value [Threshold]	page 76
Set delay time of comparative output	Comparison ON delay [OnDelay]	page 78
	Comparison OFF delay [OffDelay]	page 79
Set output mode of comparative output	Output Mode [OutputMode]	page 80
Set output logic of comparative output	Output Logic [OutputLogic]	page 81
Set background color at comparative output ON state	Background Color at ON [OnBgColors]	page 82

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

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

⚠ CAUTION

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

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

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

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

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

9－5－2－2．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 chA is assigned to AL1, the instantaneous measured value of chB is assigned to AL2, the instantaneous calculated value is assigned to AL3 and AL4, etc. To each displayable source item, comparative outputs can be assigned arbitrarily.
Because multiple items are selectable for comparative outputs, item to use for compare should be selected by this setting variable.

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

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

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

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

9－5－2－3．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)**. *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”.** *Select a compare mode for your use in actually.
⑥	Pushing **“ENTER”** key, selected parameters become valid and a check mark accompanies. *Pushing “**ARROW (LEFT)**”key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **“MENU”** key, the selected contents are stored and display returns the measurement display.

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

9－5－2－4．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.

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

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

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

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

9－5－2－5．Set Comparison Judgement Value

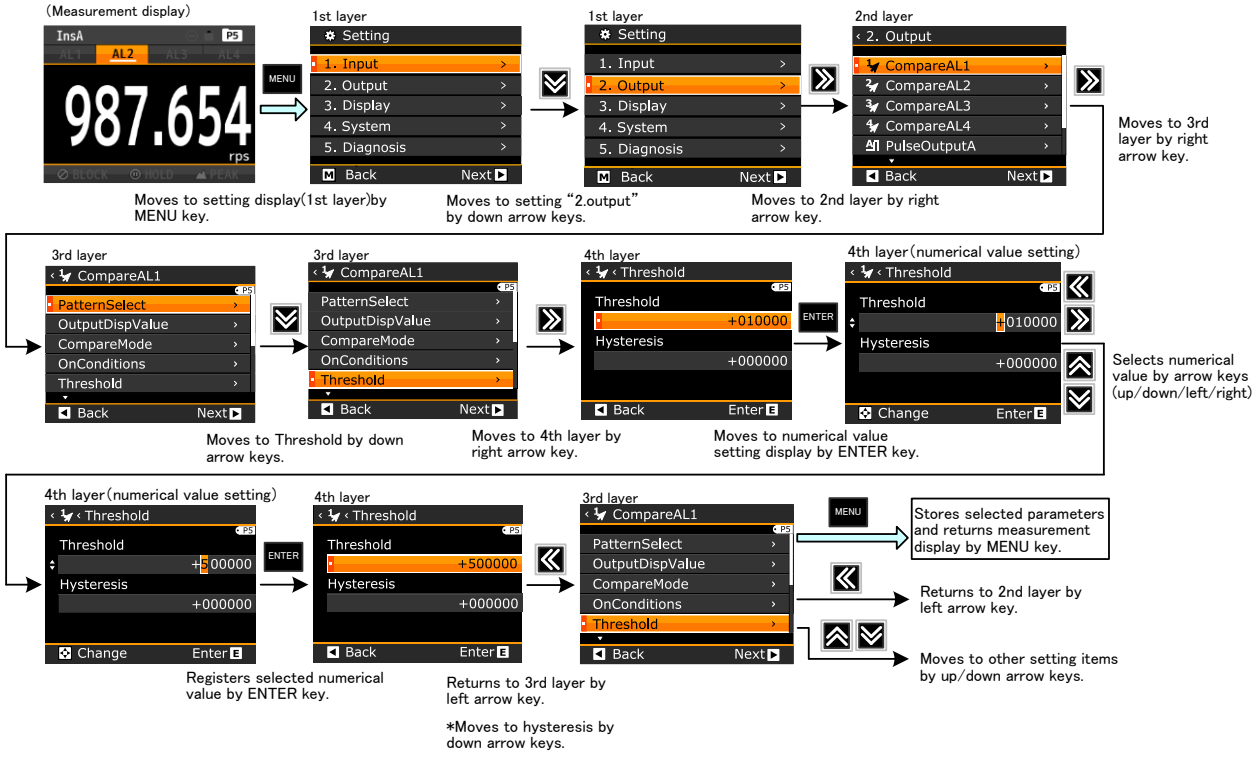
This setting variable determines comparison judgement values (thresholds) and hysteresis widths.

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

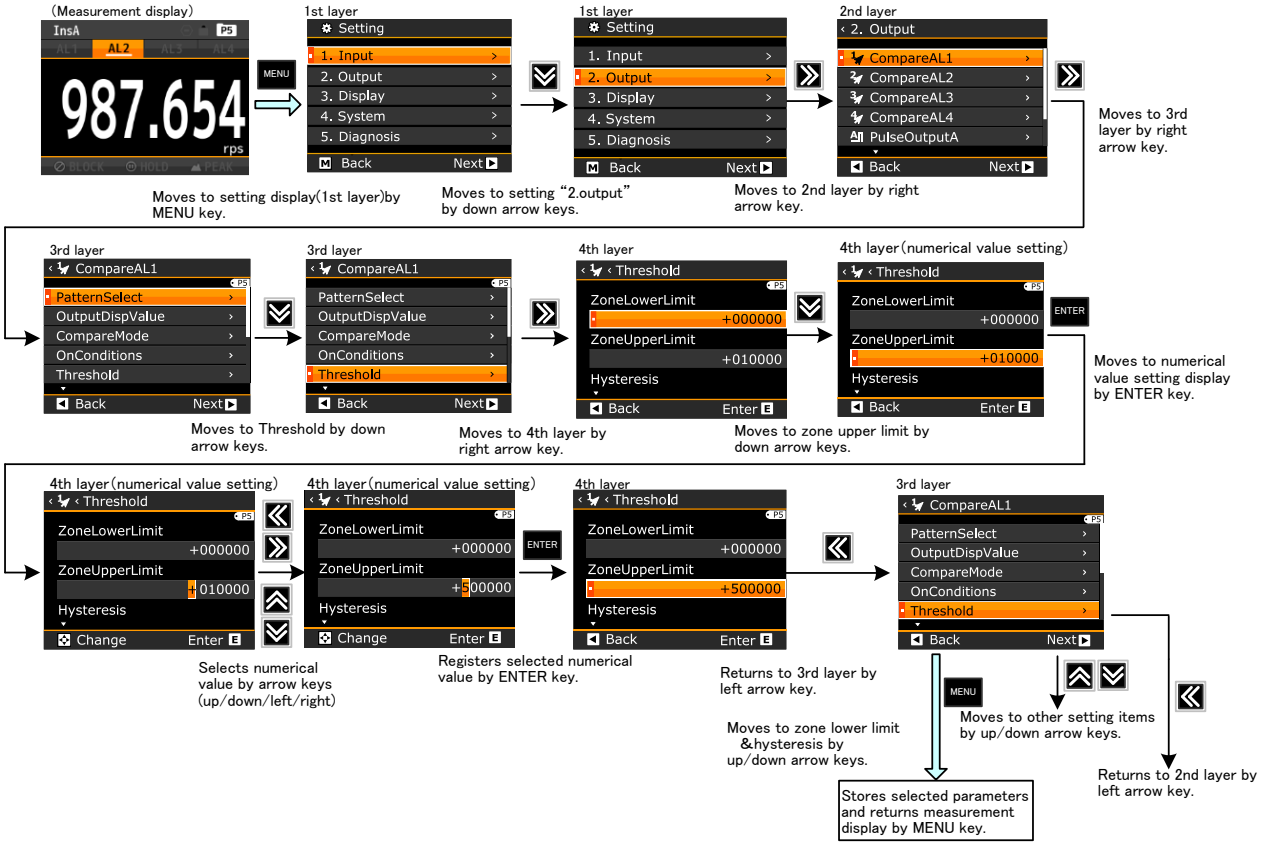
The setting steps to set threshold of comparative output AL1 to “50000” are shown below. For the hysteresis, the same steps could be applied.

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



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

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



9－5－2－6. 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)**. *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".** *Select a desired delay time for your use in actually.
⑥	Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies. *Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display.

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

9－5－2－7. 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)**. *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".** *Select a desired delay time for your use in actually.
⑥	Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies. *Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display.

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

9－5－2－8. 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. *Turns OFF by comparative output reset.
	OneShot 5ms		When the condition is met, output turns ON for 5ms.
	OneShot 10ms		When the condition is met, output turns ON for 10ms.
	OneShot 20ms		When the condition is met, output turns ON for 20ms.
	OneShot 50ms		When the condition is met, output turns ON for 50ms.
	OneShot 0.1s		When the condition is met, output turns ON for 0.1 s.
	OneShot 0.2s		When the condition is met, output turns ON for 0.2s.
	OneShot 0.5s		When the condition is met, output turns ON for 0.5 s.
	OneShot 1s		When the condition is met, output turns ON for 1 s.
	OneShot 2s		When the condition is met, output turns ON for 2s.

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

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

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

9－5－2－9. 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)

⚠CAUTION

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

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

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

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

9－5－2－10. 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.

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)**. *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".** *Select a desired color for your use in actually.
⑥	Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies. *Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display.

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

9－5－3．ANALOG OUTPUT

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Select a pattern number to configure settings	Pattern select (PatternSelect)	page84
Select output range of analog output	Output range (Output Range)	page 85
Select displayable source item for analog output	Source Output display value (OutputDispValue)	page 86
Set scaling of analog output	Output scale (OutputScale)	page 87

⚠CAUTION

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

9－5－3－1. 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"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)**. ∗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"** ∗ Select the pattern number which you need to be configured.
⑥	Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies. ∗Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display.

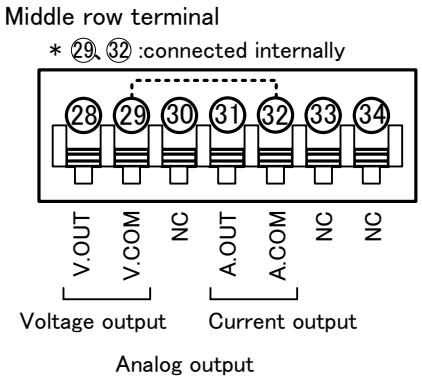
Note: **If the power is shut down before being pushed the "MENU" key, the selected contents are not stored.**

9－5－3－2．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 [Output Range]	DC0-10V	*	Analog output range: DC0 to 10V Load resistance: more than 2kΩ
	DC±10V		Analog output range: DC-10 to 10V Load resistance: more than 2kΩ
	DC1-5V		Analog output range: DC1 to 5V Load resistance: more than 2kΩ
	DC0-20mA		Analog output range: DC0 to 20mA Load resistance: less than 550Ω
	DC4-20mA		Analog output range: DC4 to 20mA 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 "**Output Range**" 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 **"DC1-5V"** *Select a desired output range for your use in actually.
⑥	Pushing **"ENTER"** key, selected parameters become valid and a check mark accompanies. ＊Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display.

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

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

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

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

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

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

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

9－5－3－4．Set Scaling of Analog Output

This setting variable set scaling for analog output.

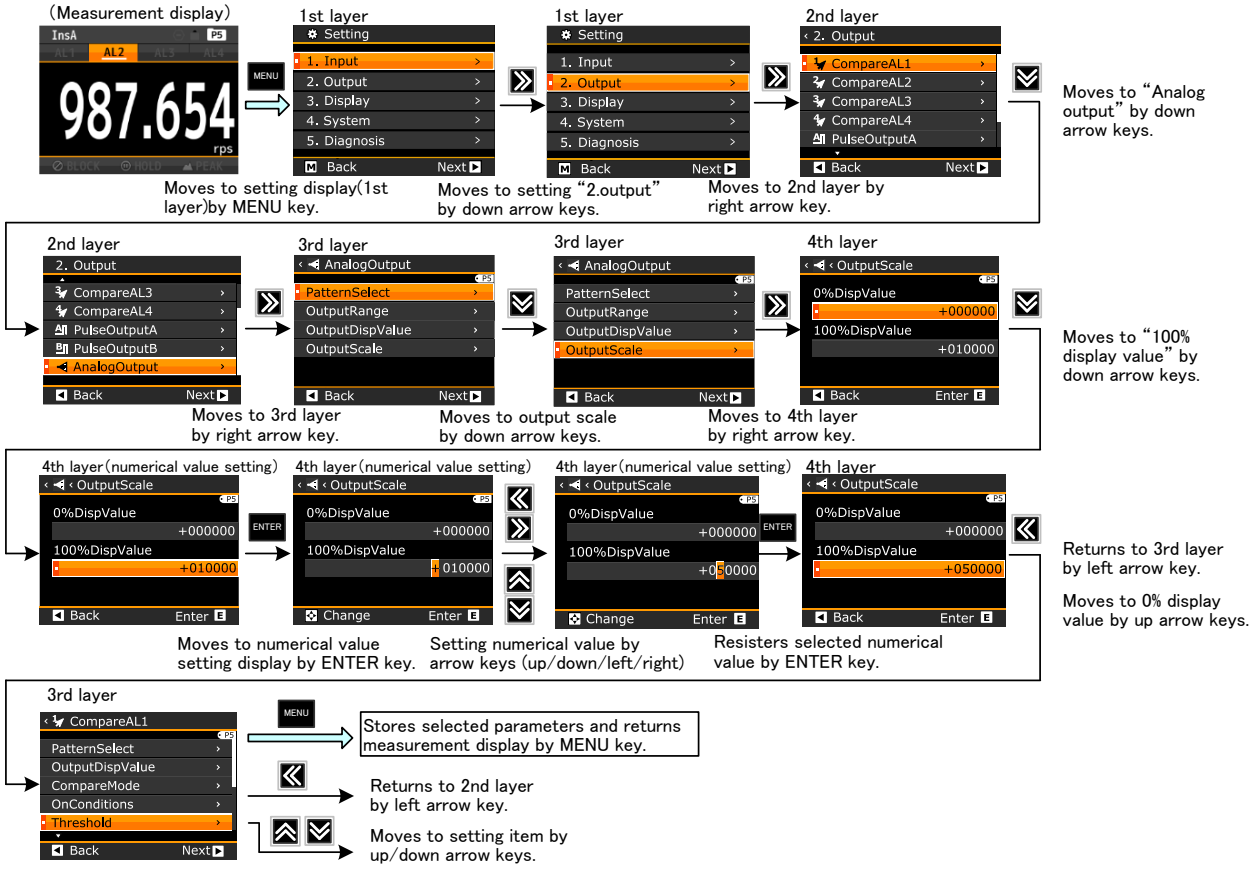
3rd layer (Setting variables)	4th layer (Setting values)	Initial value	Meanings of setting values
Output scale (OutputScale)	0% display value ±999999	+000000	Set display value when analog output outputs 0% of full scale.
	100% display value ±999999	+010000	Set display value when analog output outputs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

【Setting example of scaling】

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

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

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



9－5－4．BCD OUTPUT

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Select a pattern number to configure settings	Pattern select (PatternSelect)	page89
Select displayable source item for analog output	OutputDispValue (OutputDispValue)	page 90
Select output logic of data signals.	Data signal logic (DataSignalLogic)	page 91
Select output logic of synchronous signal.	Synchronous signal logic (SyncSignalLogic)	page 92

⚠CAUTION

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

9－5－4－1. Select a Pattern Number to Configure Settings

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

⚠ CAUTION

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

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

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

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

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

9－5－4－2. Select Displayable Source Item for BCD Output

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

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

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

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

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

9－5－4－3. Select Output Logic of BCD Data Signals

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

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

⚠ CAUTION

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

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

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

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

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

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

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

⚠CAUTION

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

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

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

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

9－5－5．RS-232C COMMUNICATION

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Select protocol	Protocol	page91
Select baud rate	Baudrate	page94
Select data length	Datalength	page 95
Select parity bit	Parity	page 96
Select stop bit	Stopbit	page 97
Select delimiter	Delimiter	page 98

⚠CAUTION

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

9－5－5－1．Select Protocol

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

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

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

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

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

9－5－5－2. Select Baud Rate

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

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

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

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

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

9－5－5－3．Select Data Length

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

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

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

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

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

9－5－5－4．Select Parity Bit

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

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

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

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

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

9－5－5－5. Select Stop Bit

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

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

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

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

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

9－5－5－6. Select Delimiter

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

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

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

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

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

9－5－6．MODBUS COMMUNICATION

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Select device address	SlaveAddress	page100
Select baud rate	Baudrate	page 101
Select parity bit	Parity	page 102

⚠CAUTION

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

9－5－6－1. Select Device Address

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

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

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

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

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

9－5－6－2. Select Baud Rate

This setting variable selects the baud rate of Modbus communication.

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

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

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

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

9－5－6－3．Select Parity Bit

This setting variable selects the parity bit of Modbus communication.

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

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

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

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

9－6．DETAIL OF DISPLAY SETTING GROUP

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

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

9－6－1．DISPLAY SELECT

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Selects contents to display on numerical value display from displayable items.	MeasureSelect	page103
Selects contents to display on level display from displayable items.	LevelSelect	page 106
Selects contents to display on trend display from displayable items.	TrendSelect	page107

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

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

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

Note: Displayable source items are also used for each output (i.e. comparative outputs, pulse outputs, analog output).

⚠CAUTION

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

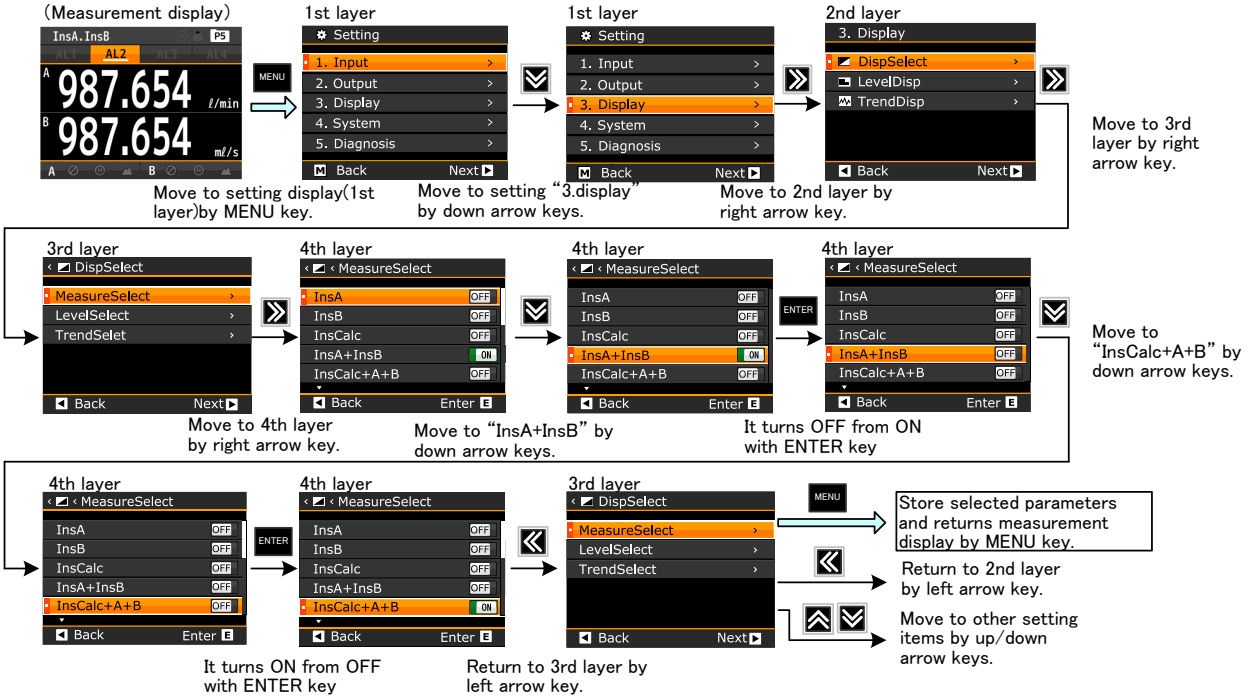
○1. Input (without chB input) models （WPMZ-5-***PX**-**-***, WPMZ-5-***LX**-**-***）

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

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

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

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



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

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

⚠CAUTION

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

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

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

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

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

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

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

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

⚠ CAUTION

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

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

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

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

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

⚠CAUTION

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

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

9－6－2．LEVEL DISPLAY

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Select a pattern number to configure settings	Pattern select (PatternSelect)	page109
Set scales of level display for instantaneous value.	Instantaneous value A scale (InsA Scale)	page110
	Instantaneous value B scale (InsB Scale)	
	Instantaneous value calculation scale (InsCalc Scale)	

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

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

⚠CAUTION

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

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

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**.
②	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"3. Display"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**.
③	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"LevelDisp"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**).
④	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**PatternSelect**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. ∗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"** ∗ 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. ∗Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display.

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

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

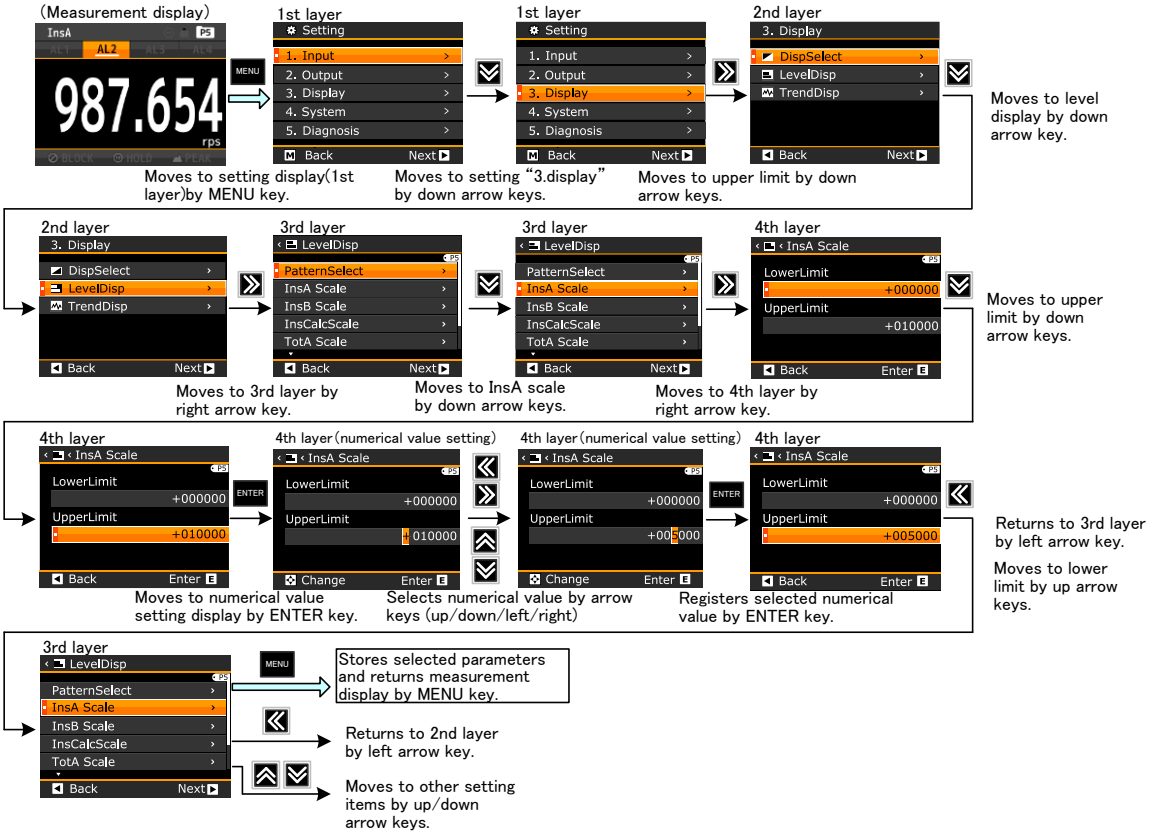
These setting variables set display scales (display range) of level display (bar graph display) for instantaneous value of inputs.
The range between scale lower limit and scale upper limit is displayed on level display as a bar graph.

⚠CAUTION

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

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

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



9－6－3．TREND DISPLAY

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Select a pattern number to configure settings	Pattern select (PatternSelect)	page112
Set scales of trend display for instantaneous value.	Instantaneous value A scale (InsA Scale)	page113
	Instantaneous value B scale (InsB Scale)	
	Instantaneous value calculation scale (InsCalc Scale)	
Set time axis for trend display	Time axis (TimeAxis)	pgae114

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

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

⚠CAUTION

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

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

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

No.	Descriptions
①	By pushing the "**MENU**" key in the measurement mode, the display moves to the setting display and shows the **1st layer (major categories)**.
②	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"3. Display"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 2nd layer (small categories)**.
③	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to **"TrendDisp"** and push "**ARROW (RIGHT)**" key, then the display moves to **the 3rd layer (setting variables**).
④	By moving the cursor with "**ARROW (UP/DOWN)**" key, point the cursor to "**PatternSelect**" and push "**ARROW (RIGHT)**" key, then the display moves to the **4th layer (setting contents)**. *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"** * 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. *Pushing "**ARROW (LEFT)**"key each time, the display returns to the 3rd layer, the 2nd layer and 1st layer. If you need other settings, operate required steps continuously.
⑦	By pushing the **"MENU"** key, the selected contents are stored and display returns the measurement display.

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

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

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

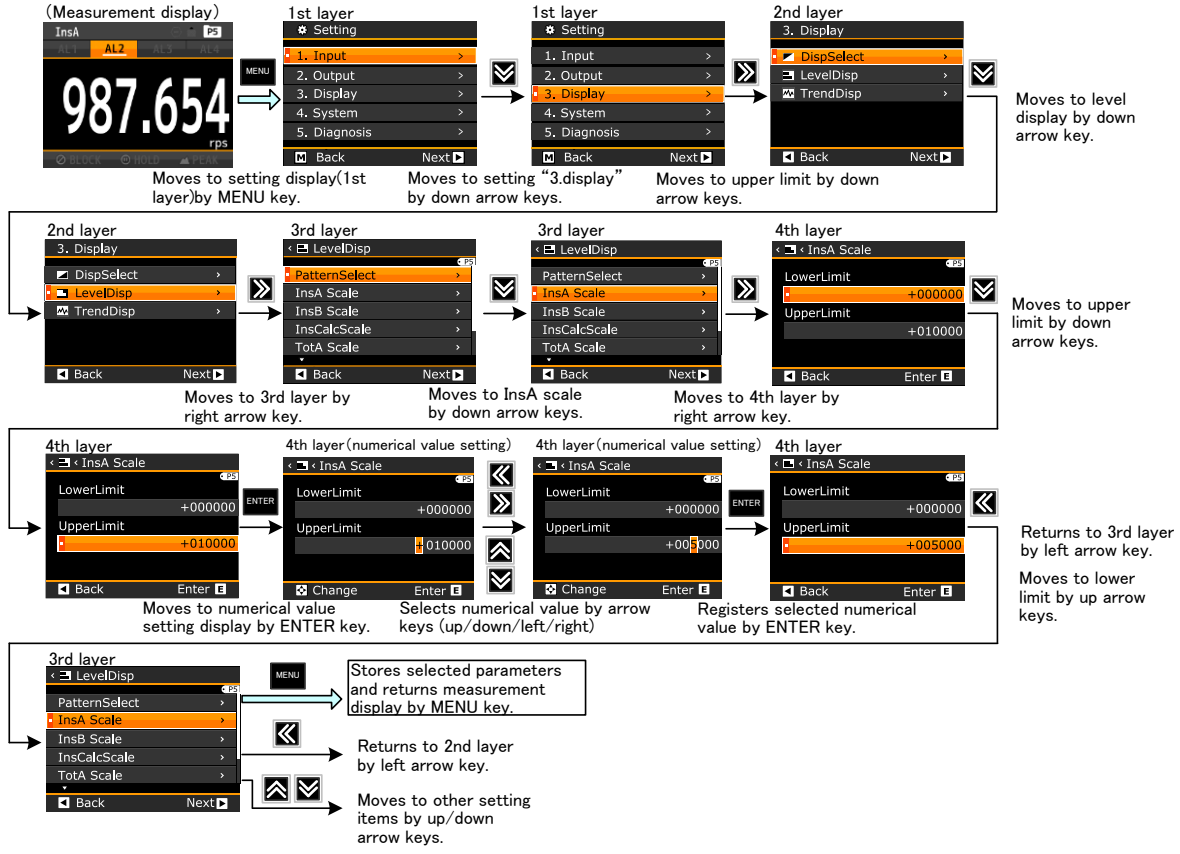
The range between scale lower limit and scale upper limit is displayed on trend display.

⚠CAUTION

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

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

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



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

This setting variable sets the time axis of trend display.

⚠CAUTION

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

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

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

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

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

9－7．DETAIL OF SYSTEM SETTING GROUP

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

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

9－7－1．GENERAL

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Change brightness of display	Brightness	page 116
Delay start up time	PowerOnDelay	page 117
Set power saving time	PowerSavingTime	page 118
Change displayed language	Language	page 119
Change direction of display	DisplayDirecton	page 120
Protect settings	SettingProtect	page 121
Copy data of a pattern number to other pattern number(s).	PatternCopy	page 122

9－7－1－1. Change Brightness of Display

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

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

⚠ CAUTION

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

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

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

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

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

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

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

⚠CAUTION

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

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

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

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

9－7－1－3. Set Power Saving Time

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

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

⚠CAUTION

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

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

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

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

9－7－1－4．Select Displayed Language

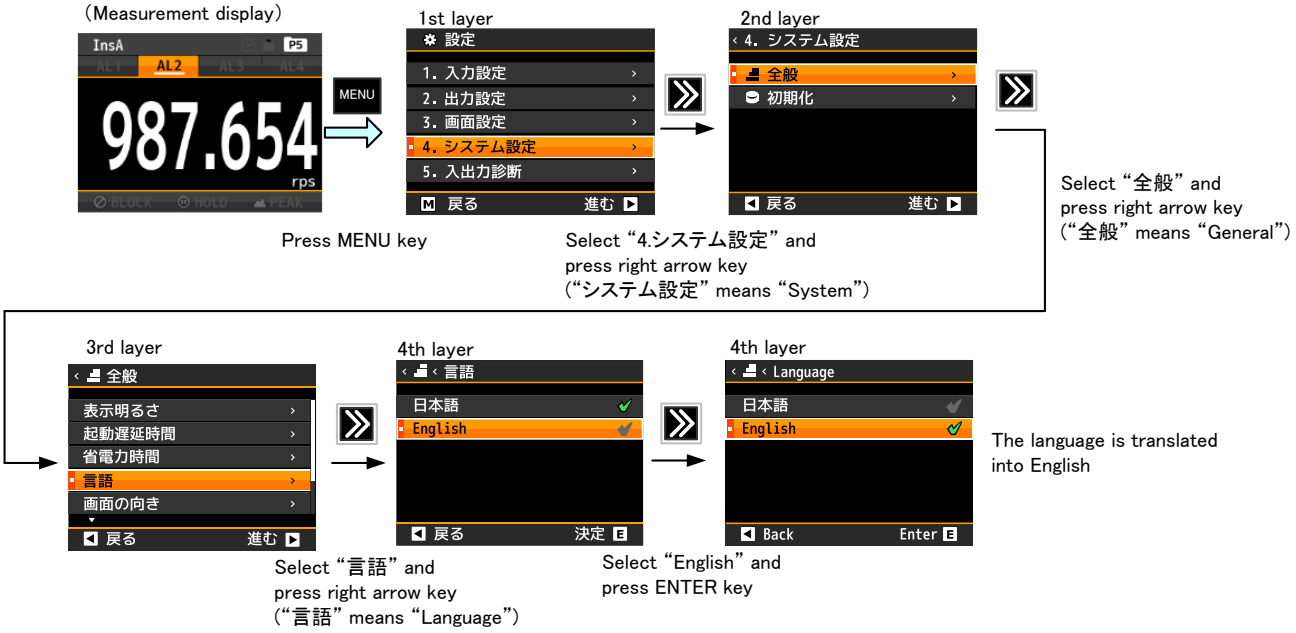
This setting variable selects language displayed in measurement mode and setting mode.

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

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

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

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



9－7－1－5. Change Direction of Display

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

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

⚠CAUTION

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

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

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

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

9－7－1－6. Protect Settings

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

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

⚠CAUTION

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

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

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

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

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

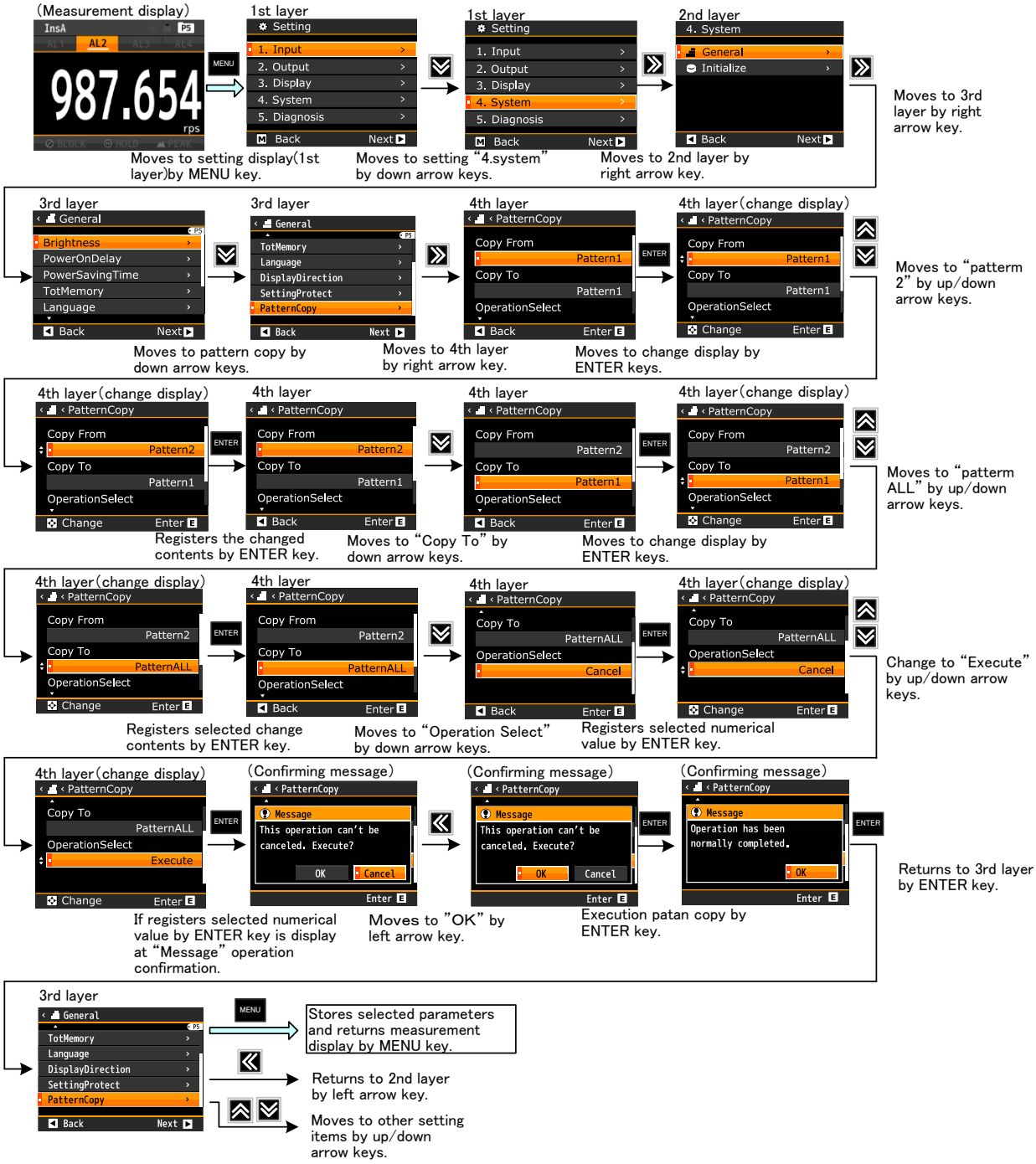
Using this setting variable, you can copy a configured pattern data on some pattern number to other pattern number(s).

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

⚠CAUTION

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

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



9－7－2．INITIALIZATION

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Restore setting values to user default value.	Save user defaults (UserDefaultSave)	page124
	Initialize to user defaults (UserDefaultLoad)	page124
Restore setting values to factory default value	Initialize to factory defaults (FactoryDefaultLoad)	page125

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

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

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

⚠CAUTION

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

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

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

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

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

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

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

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

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

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

Note: The setting method of the language is referred to p119

9－8．DETAIL OF INPUT-OUTPUT DIAGNOSIS GROUP

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

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

9－8－1．INPUT DIAGNOSIS

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Pulse input diagnosis	PulseInputA	page127
	PulseInputB	
External control input diagnosis	ExtenalCtrl	page128

9－8－1－1．Pulse Input Diagnosis

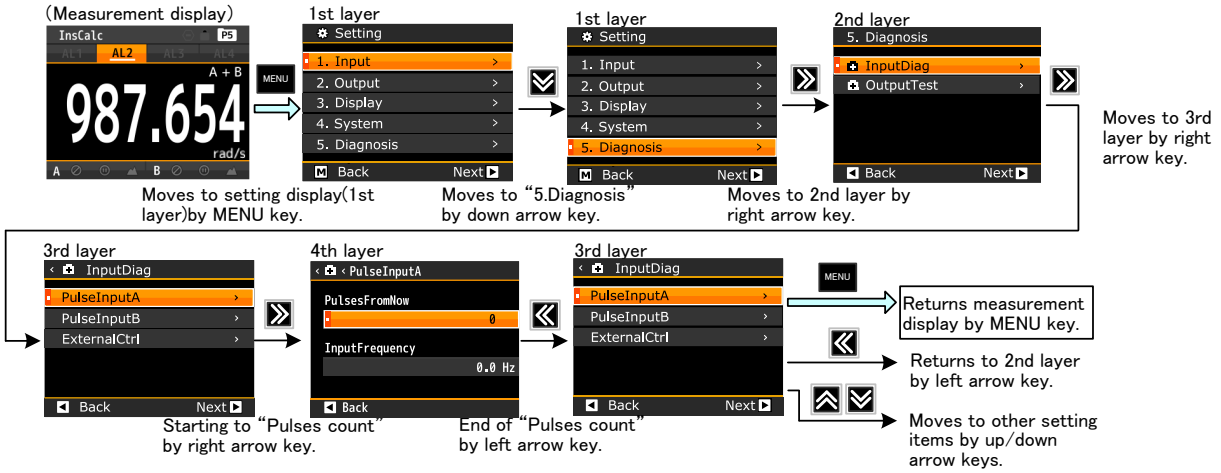
Pulse input diagnosis is useful for checking the pulse inputs when display value is not correct or when existence of sensor outputs is uncertain.

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

⚠CAUTION

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

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

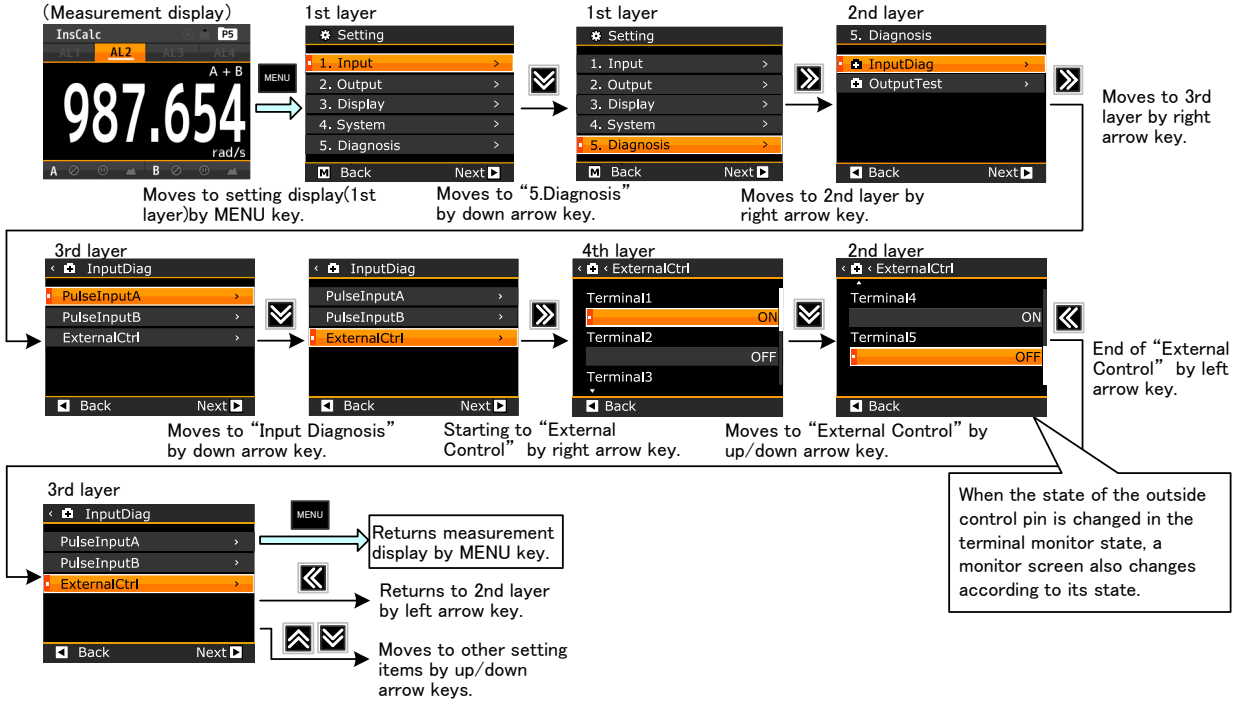


9－8－1－2．External Control Input Diagnosis

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

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

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



9－8－2．OUTPUT TEST

WHAT YOU CAN DO	3rd layer (Setting variables)	Reference page
Simulated output on comparative output	Comparative output AL1 (Compare AL1)	page130
	Comparative output AL2 (Compare AL2)	
	Comparative output AL3 (Compare AL3)	
	Comparative output AL4 (Compare AL4)	
Simulated output on analog output	AnalogOutput	page 132
Simulated output on BCD output	BCD Output(DATA)	page 134
	BCD Output(PC)	
Diagnosis of RS-232C communication	RS-232C Com	page136
Diagnosis of Modbus communication	ModbusCom	page137

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

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

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

⚠ CAUTION

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

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

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

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

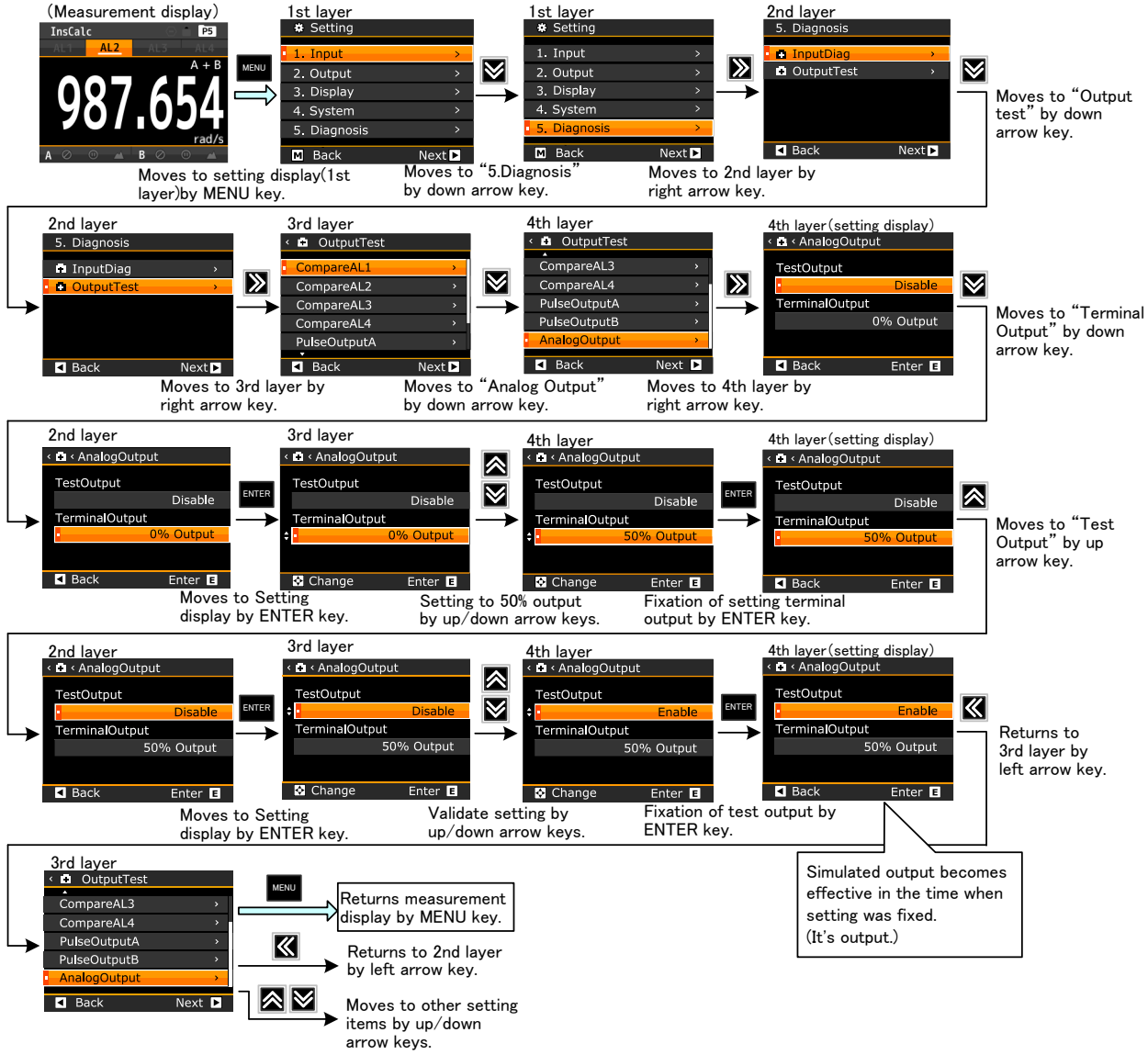
Simulated output of analog output can output 0-100% (10% steps) value of selected output range. You can test devices connected to analog outputs in advance.

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

⚠CAUTION

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

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



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

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

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

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

⚠CAUTION

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

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

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

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

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

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

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

⚠CAUTOION

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

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

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

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

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

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

⚠ CAUTION

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

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

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

10. CONTROL FUNCTIONS

１０－１. EXTERNALCONTROL FUNCTIONS

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

１０－１－１. EXTERNAL CONTROL FUNCTION ICONS

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

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

１０－１－２. TERMINAL CONTROL

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

“0” level: 0 to 1.5V

“1” level: 3.5 to 5V

Input current: -1.2mA

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

１０－１－３. COMPARATIVE OUTPUT RESET FUNCTION

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

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

１０－１－４. MEASUREMENT INHIBIT FUNCTION

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

This function can be selected from the following 3 kinds.

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

Measurement inhibit A: inhibits the input of chA

Measurement inhibit B: inhibits the input of chB

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

１０－１－５. DISPLAY HOLD FUNCTION

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

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

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

Display hold A: holds the display of chA

Display hold B: holds the display of chB

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

１０－１－６．MAXIMUM VALUE HOLD FUNCTION

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

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

*If the displayed value becomes over while the maximum hold function is valid, over display never disappears until the function is canceled.
Note: This function is valid for the instantaneous value only.

１０－１－７．MINIMUM VALUE HOLD FUNCTION

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

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

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

１０－１－８．PATTERN SELECT FUNCTION

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

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

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

⚠ CAUTION

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

１０－１－９．MONITOR CHANGE FUNCTION

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

１０－１－１０．TREND HOLD FUNCTION

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

⚠CAUTION

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

１０－２．SHORTCUT FUNCTION

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

１０－２－１．SHORTCUT REGISTER KEYS

Keys which can be registered shortcut functions are shown below.

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

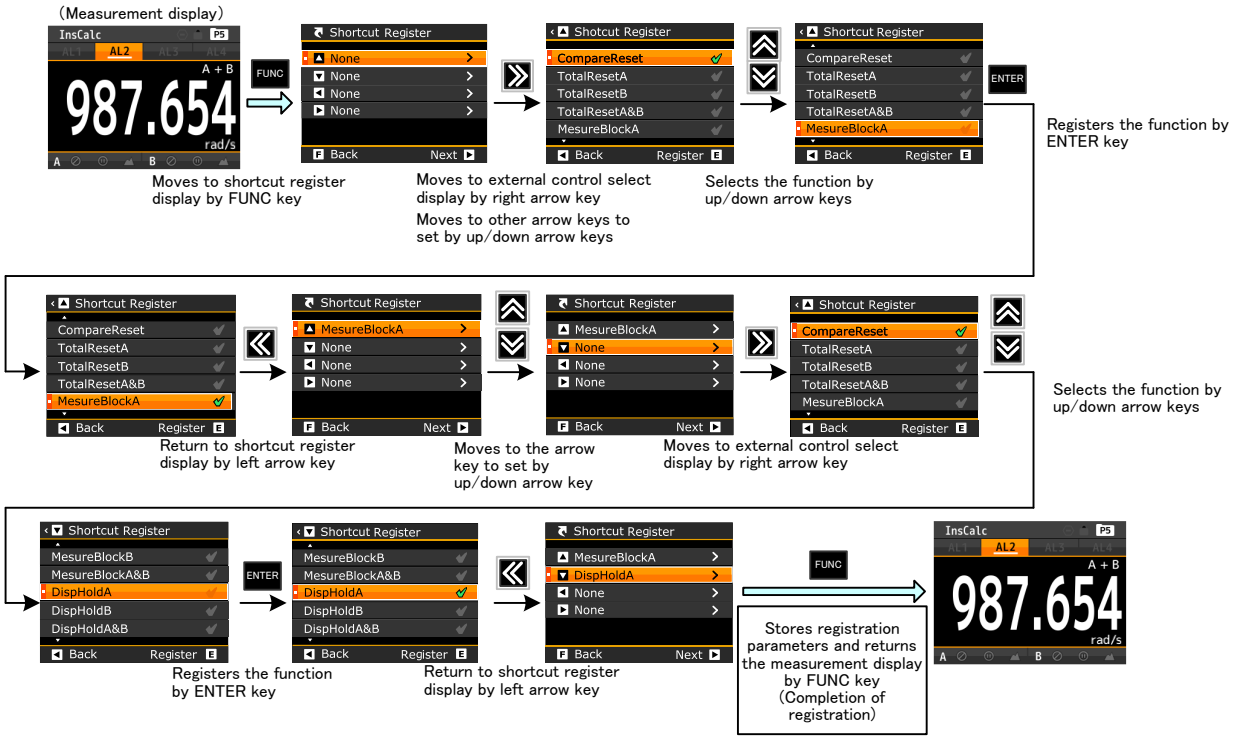
１０－２－２．FUNCTIONS CAN BE REGISTERED TO SHORTCUT

Functions which can be registered to shortcut functions are shown below

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

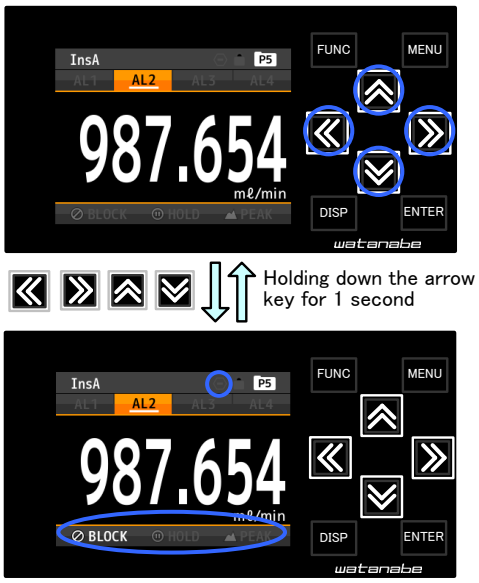
10－2－3. REGISTERING SHORTCUT FUNCTIONS

Registering shortcuts how to set up is shown below



10－2－4. PERFORMING SHORTCUT FUNCTIONS

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



The icon for active external control lights up

⚠ CAUTION

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

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

11. COMPARATIVE OUTPUT FUNCTION

11－1. COMPARATIVE OUTPUT FUNCTION

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

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

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

11－1－1. SOURCE DISPLAYABLE VALUE FOR COMPARISON

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

⚠ CAUTION

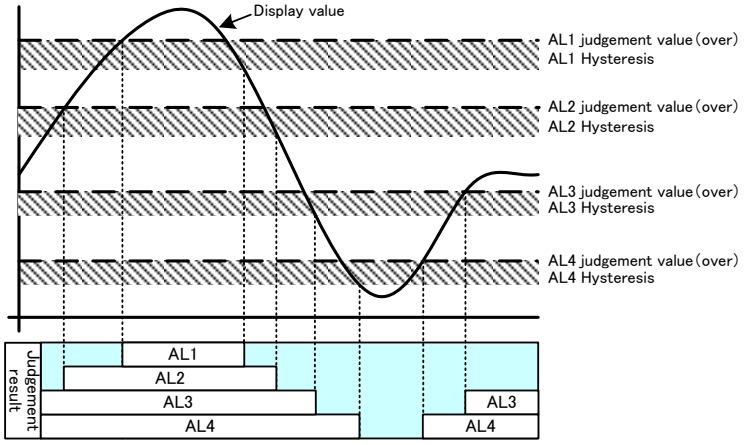
Comparative output can be assigned to a displayable item including items which are not displayed on the display. If the condition of comparison is met, "comparison result" is displayed and comparative output is output.

11－1－2. LEVEL JUDGEMENT

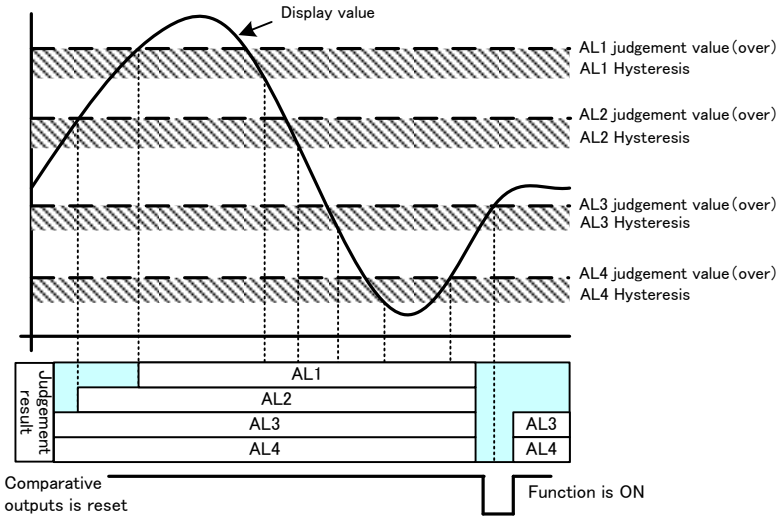
In the case that the "level judgement" is selected in compare mode, this product judges magnitude relation to comparison judgement value.
To output comparison result, by configurations for "Condition of ON (OnConditions)", "output mode (OutputMode)" etc. , compare action should be determined.
The followings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

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

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



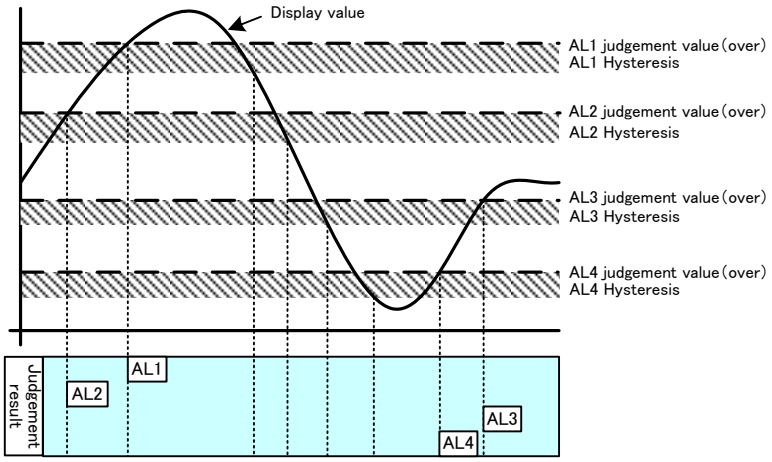
●Judgement action in the case that output mode is “Latch”.
Output mode “Latch”: Comparative output keeps valid once judgement becomes ON.



⚠CAUTION

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

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



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

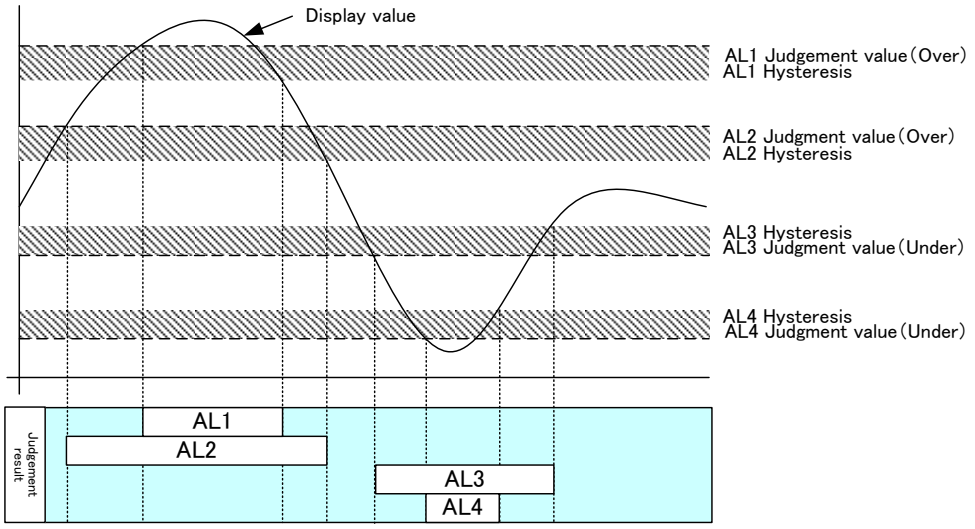
For AL1 and AL2 used in the upper judgement, the setting variable "Condition of ON (OnCondition)" should be configured to "Excess".

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

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

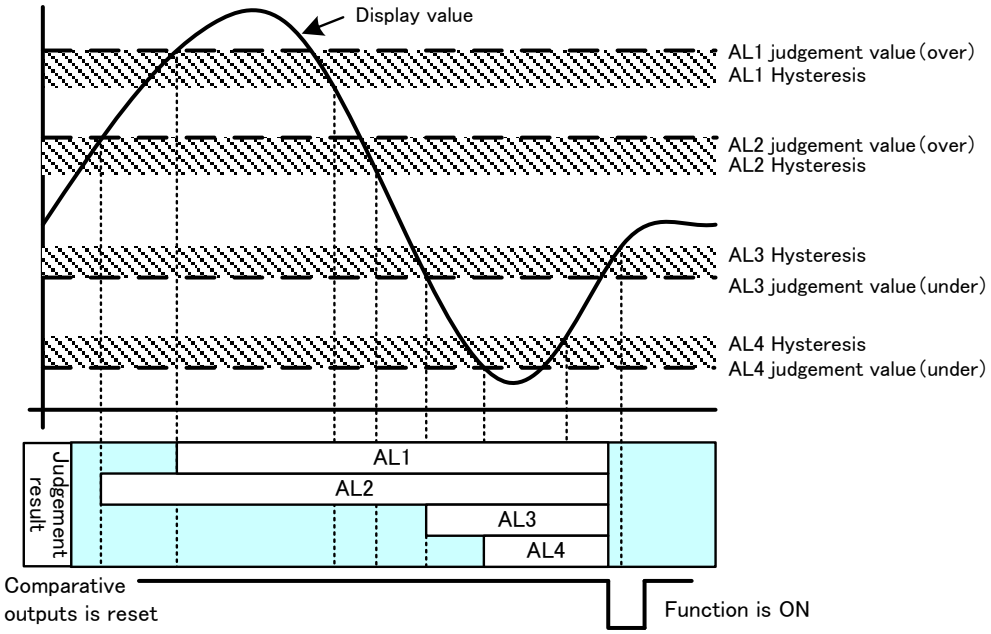
●Judgement action in the case that output mode is "Normal".

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



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

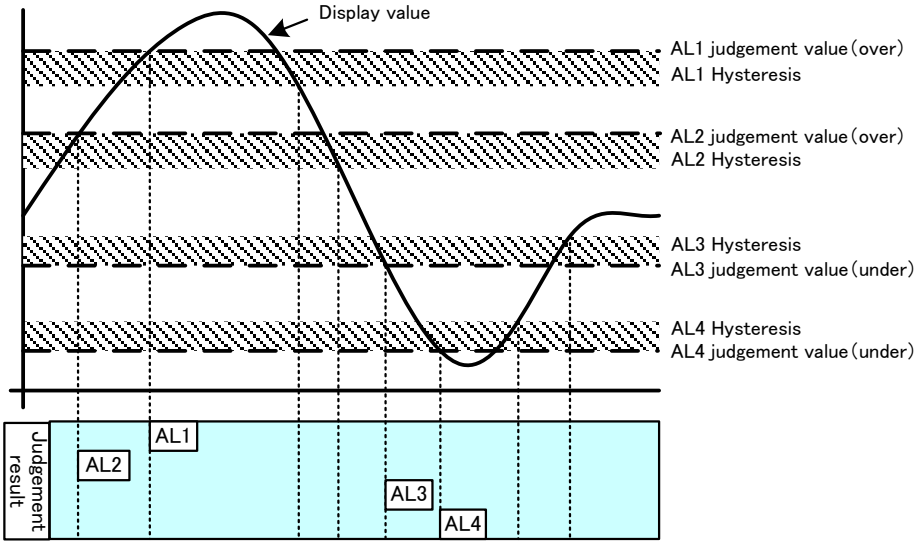
Output mode "Latch": comparative output keeps valid once judgement becomes ON.



⚠CAUTION

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

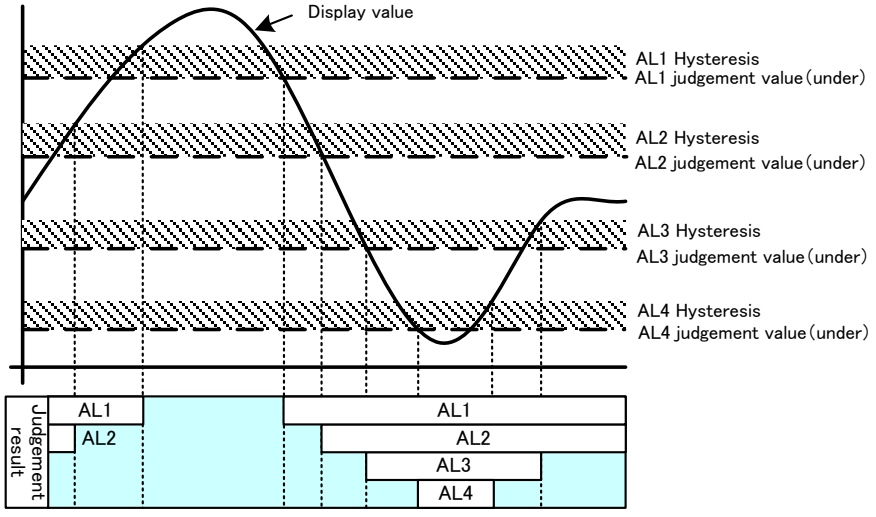
●Judgement action in the case that output mode is “One Shot”.
Output mode “One Shot”: comparative output is valid while setup time period after judgement is ON.



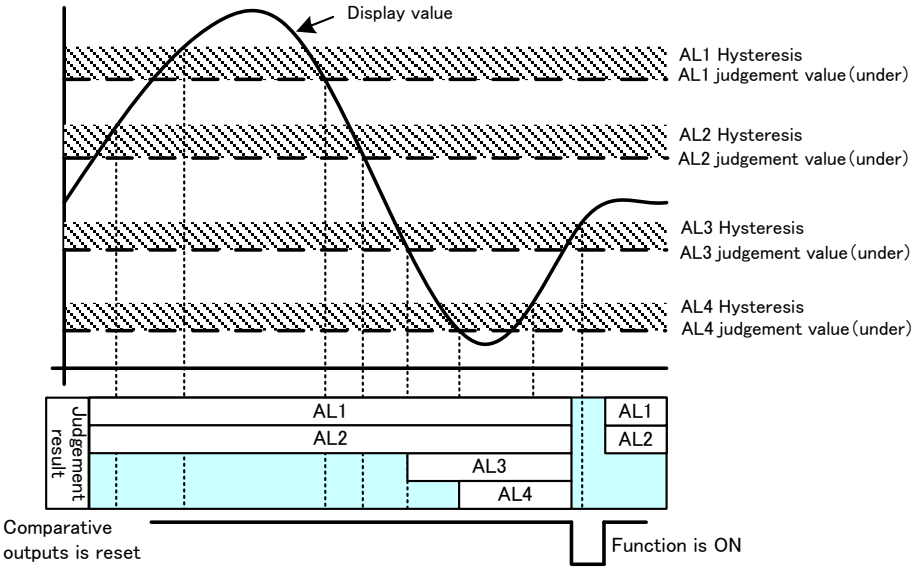
3) Lower judgement of 4 steps
For using in the lower judgement, the setting variable “Condition of ON (OnCondition)” should be configured to “Less Than”.

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

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



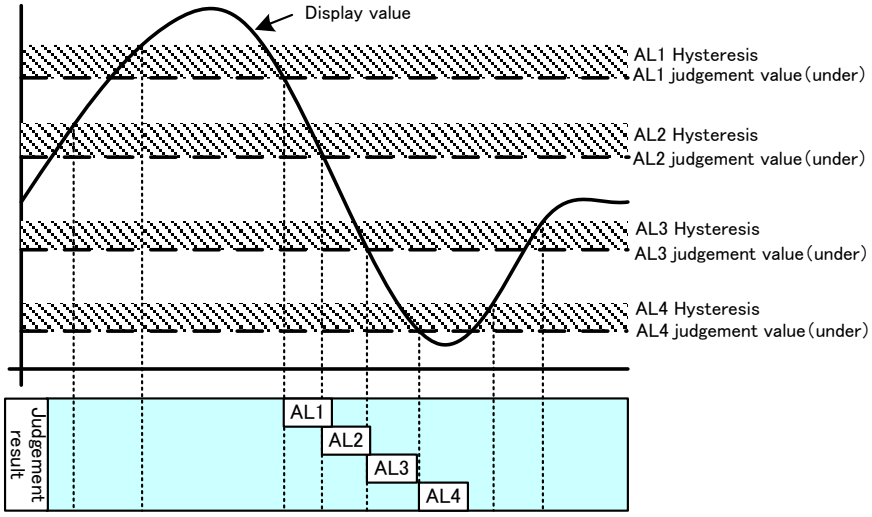
●Judgement action in the case that output mode is “Latch”.
Output mode “Latch”: Comparative output keeps valid once judgement becomes ON.



⚠CAUTION

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

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



１１－１－３．ZONE JUDGEMENT

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

⚠CAUTION

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

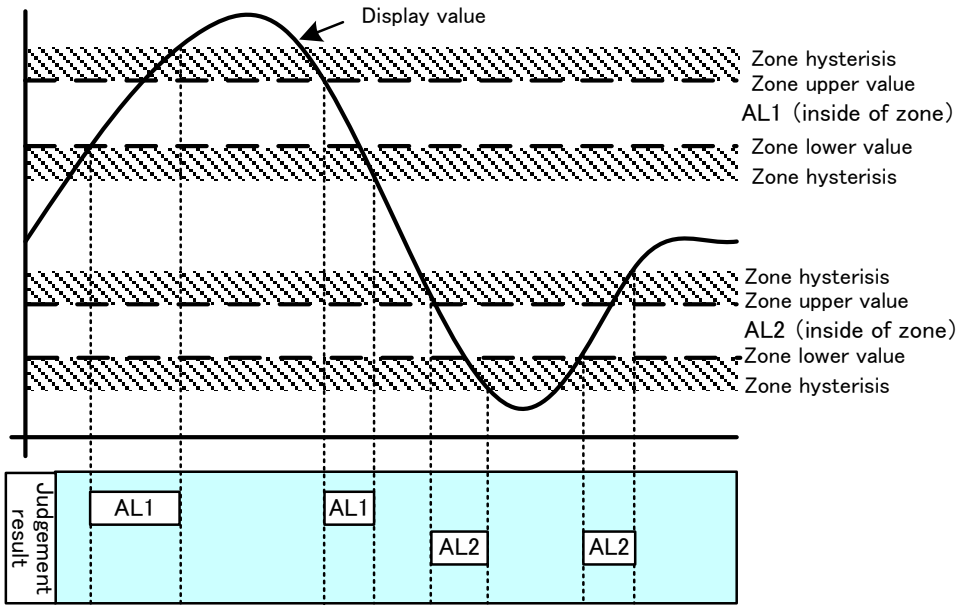
1) “Condition of ON (OnCondition)” is “In the zone”
When the value of the source item (displayable value) for comparison is between “Zone upper limit” and “Zone lower limit”, comparative output result turns ON.

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

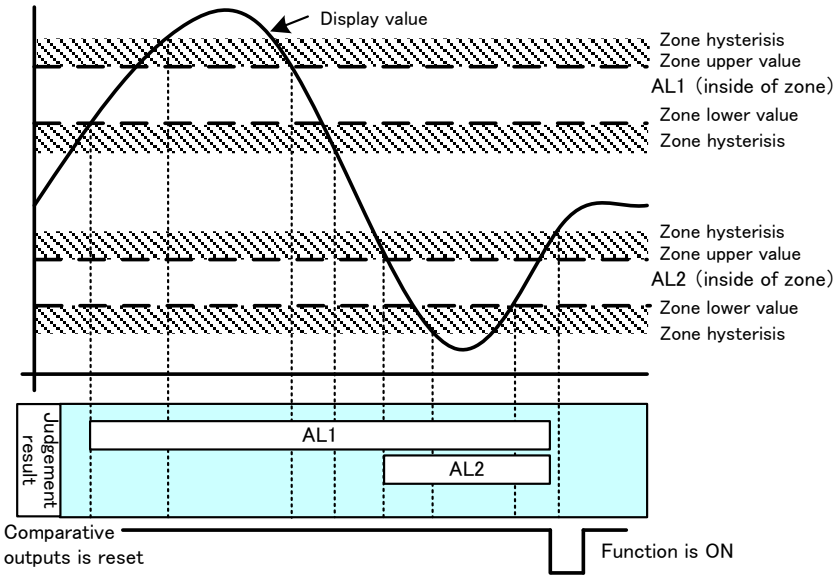
⚠CAUTION

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.



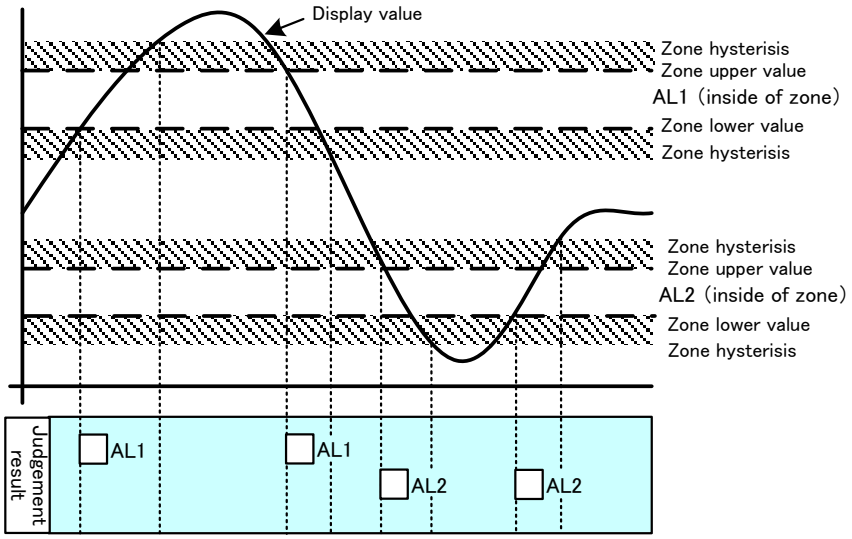
●Judgement action in the case that output mode is “Latch”.
Output mode “Latch”: Comparative output keeps valid once judgement becomes ON.



⚠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.



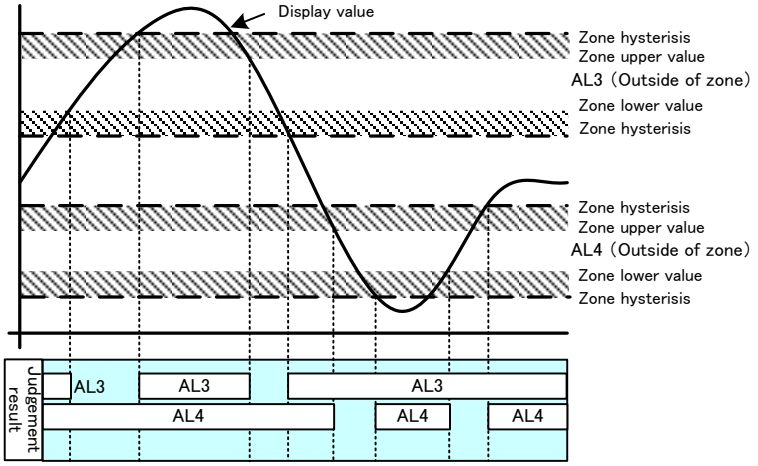
2)"Condition of ON (OnCondition)" is "Outside of the zone"
When the value of the source item (displayable value) for comparison is over "Zone upper limit" or under "Zone lower limit", comparative output result turns ON.

Comparative output	Condition of ON	Condition of comparison	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

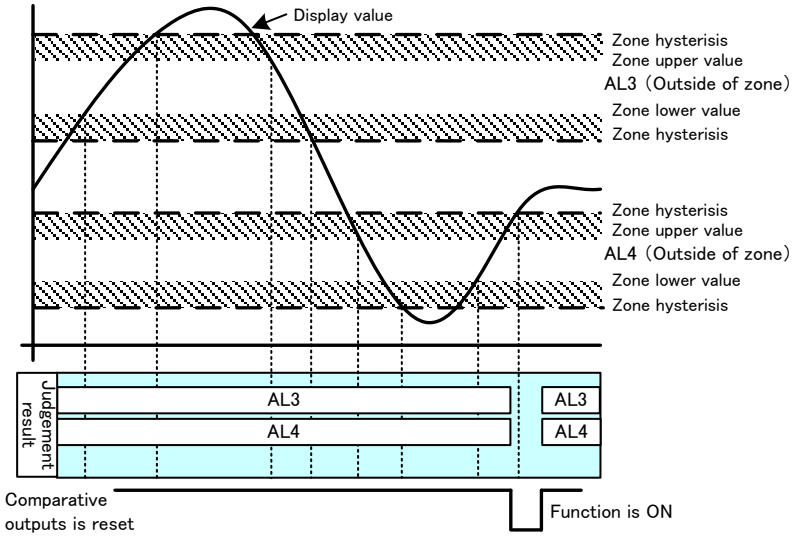
⚠ CAUTION

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.



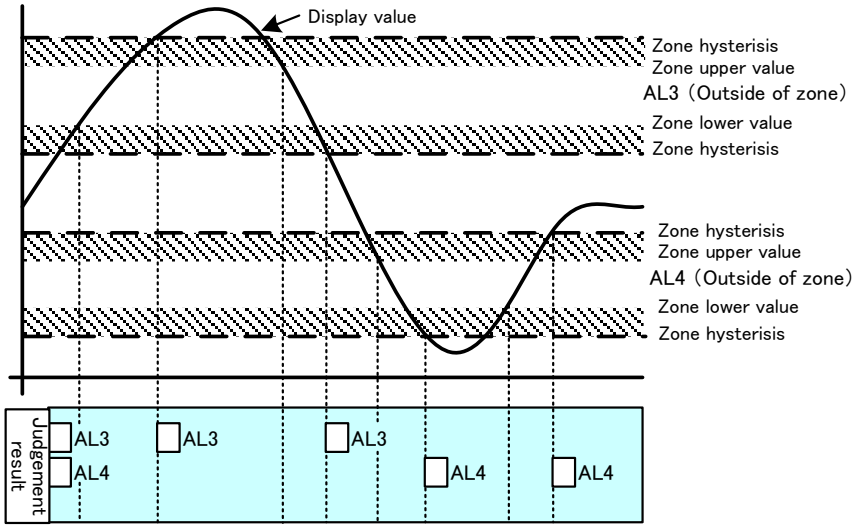
●Judgement action in the case that output mode is "Latch".
Output mode "Latch": Comparative output keeps valid once judgement becomes ON.



⚠ 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.



12. OUTPUT FUNCTIONS

12－1. ANALOG OUTPUT FUNCTION

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

12－1－1. SOURCE DISPLAYABLE VALUE FOR OUTPUT

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

12－1－2. ANALOG OUTPUT SCALING

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

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

12－1－3. OUTPUT RANGE OF ANALOG OUTPUT

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

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

⚠CAUTION

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

１２－２．BCD OUTPUT FUNCTION

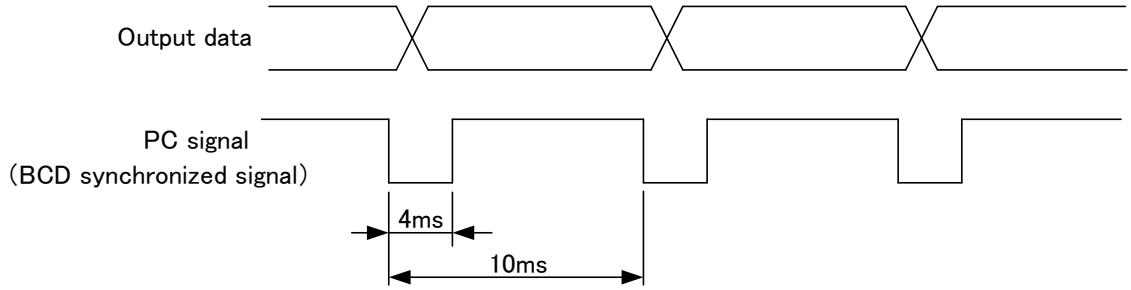
The models with a BCD output option can output a BCD output for a displayable value.
BCD outputs are open-collector outputs which can be selected from NPN type or PNP type by model codes.

１２－２－１．SOURCE DISPLAYABLE VALUE FOR OUTPUT

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

１２－２－２．DATA OUTPUT

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



⚠CAUTION

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

１２－２－３．ENABLE

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

１２－３．RS-232C COMMUNICATION FUNCTION

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

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

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

13. ERROR MODE

13－1. DISPLAY ON OCCURRENCE OF AN ERROR

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

13－2. LIST OF ERROR CODES AND RECOVERY PROCEDURES

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

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

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

⚠CAUTION

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

14. SPECIFICATIONS

14－1. BASIC SPECIFICATIONS

Number of measurement channel	:	1 or 2 （ according to model codes）
Display	:	2.4 inch TFT liquid crystal display Used in 1ch input ： chA measurement result Used in 2ch inputs ： chA measurement result, chB measurement result, calculation result, chA and chB measurement results, chA or chB measurement result and calculation result
Over warning	:	By exceeding the range of display, displays OVER or -OVER
External controls	:	5 functions of the followings can be assigned to control terminals (user-configurable). ①Comparative output reset function ②Measurement inhibit function：Measurement inhibit A/B/A&B ③Current value hold function：Current value hold A/B/A&B ④Maximum value hold function：Maximum value hold A/B/A&B ⑤Minimum value hold function：Minimum value hold A/B/A&B ⑥Pattern select function：Pattern select 1/2/3 ⑦Window select function ⑧Trend Hold function As follows, only shortcut setting ⑨CompareList function
Ambient temperature range	:	-5 to 50° C, 35 to 85%RH（Non condensing）
Storage temperature range	:	-10 to 70° C up to 60%RH
Supply power	:	AC power（WPMZ-5-1**-**-***） AC100 to 240V±10%　50/60Hz DC power（WPMZ-5-3**-**-***） DC12V±10% DC power（WPMZ-5-4**-**-***） DC24 to 48V±10%
Power consumption	:	AC power（WPMZ-5-1**-**-***） At AC100V：10VA max　At AC240V：14VA max DC power（WPMZ-5-3**-**-***） At DC12V：6W max, DC power（WPMZ-5-4**-**-***） At DC24V：6W max,　At DC48V：6.5W max
Sensor power	:	Pulse input DC12V ±10% 100mA max, DC24V ±10% 50mA max. * For 2ch inputs of DC12*2 or DC24*2, allowable total current of both chA and chB is same as above. In the case of 2ch with combination of DC12V and DC24, allowable total power is 1.2W. Line driver input DC5V ±10% 200mA max * For 2ch inputs, allowable total current of both chA and chB is same as above.
External dimension's	:	96mm（W）×52mm（H）×145mm（D）
Weight	:	Approx. 350g
Withstand voltage	:	AC power （WPMZ-5-1**-**-***） Between Power terminals and inputs/external controls/comparative outputs/other outputs AC3000V for 1 minute

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

Insulation resistance	:	Between terminals mentioned above, at DC500V 100MΩ or higher
Vibration tolerance	:	10 to 55Hz half amplitude 0.15mm in X,Y,Z directions for 30 minutes
Protective structure	:	IP66(front)
Installation environment	:	indoor use
Rated altitude	:	up to 2000m
Transient overvoltage	:	II
Pollution degree	:	2
Conformed EN standard	:	EN61326-1(EMS:industrial electromagnetic environment/EMI:Class A) (Applicable to line length only under 30m) EN61010-1 EN IEC 63000
Material of enclosure	:	polycarbonate(PC) black UL94V-0

１４－２．INPUT SPECIFICATIONS

１４－２－１．PULSE INPUT

－Input specifications(common to chA,chB)

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

１４－２－２．LINE DRIVER INPUT

－Input specifications（common to chA,chB）

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

１４－３．OUTPUT SPECIFICATIONS

【Comparative outputs】

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

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

Control method : Microcomputer calculating method

Judgement value settable range : -999999 to 999999

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

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

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

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

Over alarm(upper limit judgement)

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

Under alarm（under limit judgement)

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

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

Inside of zone alarm

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

Outside of zone alarm

Condition of comparison	Judgement result
display value>AL1 zone upper limit 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

【Analog output】

Conversion method : D/A conversion method

Resolution capability : Equivalent of 13bit

Scaling : Digital scaling

Output objective : An item can be selected from source displayable values

Response speed : Up to 25ms (0→90% response)

Specifications for each output :

Output type	Load resistance	Accuracy (23±5° C 35 to 85%RH)	Ripple
0 to 10V	≥2kΩ	±(0.1% of FS)	±50mVp-p
-10 to 10V			
1 to 5V			
0 to 20mA	≤550Ω		±25mVp-p *Ripple for 4 to 20mA is at load resistance 250Ω, 20mA output.
4 to 20mA			

【BCD output】

Output type : Open collector output NPN/PNP type

Measurement data : Negative logic transistor is ON at logical "1"

Polarity signal : Negative logic transistor is ON at minus display

Over signal : Negative logic transistor is ON at over display

Synchronized signal (PC) : Transistor is ON for a fixed period every time data becomes valid.

Transistor output capability : Voltage 30V max. Current 10mA max.
Output saturation voltage up to 1.2V at 10mA

Enable : By shorting the enable terminal to -D.COM or bringing to same voltage level, the BCD output transistors become OFF.

【RS-232C】

Communication protocol : Modbus-RTU,OriginalCommand,OriginalOutput

Synchronization method : Asynchronous

Communication method : Full duplex

Baud rate : 9600bps,19200bps,38400bps

Data length : 7bit,8bit

Start bit : 1bit

Parity bit : None, Odd, Even

Stop bit : 1bit,2bit

Delimiter : CR LF,CR

Character code : Code ASCII

Transmission control procedure : No control sequence

Used signal names : TXD,RXD,SG

Number of connectable units : 1

Cable length : Max. 15m

【RS-485 Modbus】

Communication protocol	:	Modbus RTU
Synchronization method	:	Asynchronous
Communication method	:	2-wire half- duplex
Baud rate	:	9600bps,19200bps,38400bps
Data length	:	8bit
Start bit	:	1bit
Parity bit	:	None, Odd, Even
Stop bit	:	1bit
Used signal names	:	Non-inverting (+), Inverting (-)
Number of connectable units	:	31
Cable length	:	Max.1.2km （total）*Conforming CE mark, less than 30m

15. TROUBLESHOOTING

No.	Condition	Checkpoint	Action
1	The display does not light up.	Check the power is supplied correctly.	・Check the supplied power meets requirement of supply power specifications. ・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. *Refer to page 116.
			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. ・Check input wiring and its continuity. ・Check with input diagnostic function of the product. ・Check status of external control function. - Measurement inhibit - Current value hold (see page 138) ・Check settings. - Input filter setting（see page39） - Instantaneous value auto zero setting（see page 46） - Start delay time setting（see page 117） ・Initialize the WPMZ. Caution：All settings are reset to default values by the initialization. *Initialization（see page 124）
		Check the selected display is appropriate for the input channel or displayed item in use.	・Using DISP key, try to switch display. ・Check setting of "Display Select". * "Display Select" setting （See page103）
			If phenomenon is not improved by above methods, please contact your dealer or our company.
3	OVER alarm display Error code display	Check setting of scaling.	・Review setting values. （see page 41, 53）
		Influence of noise	・Using shield cable, improving wiring. ・Input filter setting（see page39）

No.	Condition	Checkpoint	Action
4	The display disappear, display value becomes over twice times.	Influence of spark noise from nearby electromagnetic stich, solenoid, electromagnetic valve, relay etc.	・Using shield cable, improving wiring. ・Input filter setting(see page39)
5	Two wire transmitters do not operate.	Two wire input of WPMZ is not applicable to 4-10mA current pulse.	
6	Comparative output does not turn OFF.	Check setting of "comparison judgement value" and "hysteresis".	・Setting of "comparison judgement value" (see page76) ・Check whether output mode of comparative output is set to "Latch". *Output mode(see page47)
7	Spend much time for display value changing to zero after input pulse stopping.	Consideration of "Instantaneous value auto zero".	・Setting of "Instantaneous value auto zero"(see page46)
8	Fluctuations of displayed value are wide.	(Sometimes, displayed value becomes small.)	・Check the level of input signal is under nominal value. ・Input filter setting(see page39)
		(Sometimes, displayed value becomes large.)	・Input filter setting(see page39)
		(Input signal varies in actually.)	・Consideration of "Average" functions. *Instantaneous Value Moving Average(see page48) *3 Instantaneous Value Simple Average(see page48)
9	Analog output abnormal	Check by "test output"	・Check using "test output" function.
		Check connected load is suitable.	・Disconnect the load and check the output value.
		Check wiring.	・Check whether the load is connected to suitable terminal (current output or voltage output).
		Check settings.	・Check scaling setting for analog output. ・Check selected displayable value for analog output. ・Check output range of analog output.
			If phenomenon is not improved by above methods, please contact your dealer or our company.
10	BCD output abnormal	Check connected device is suitable. (NPN/PNP, external pullup etc.) Check output logic setting is correct.	・Check using "test output" function.

No.	Condition	Checkpoint	Action
11	RS-232C communication abnormal	Check wiring, wire length are correct. Check setting such as baud rate is correct. Check communication command is correct.	・Check using “test output” function.
12	RS-485 communication abnormal	Check wiring, wire length, termination, number of connected devices are correct. Check setting such as baud rate is correct.	・Check using “test output” function.

16. APPENDIX

１６－１．KEY OPERATION REFERENCE CHART

The functions of keys are shown in the chart below.

Operation in “measurement mode”

FUNC	MENU	DISP	ENTER	≪	≫	≪	≫	Action
○								Moves to entering short-cut function of external control.
	○							Moves to setting mode.
		○						Switches measurement display contents.
			◎					Resets the system by 1sec. long-pressing in error mode. condition
				◎				When assigned short-cut functions, makes the function ON/OFF by long-pressing.
					◎			
						◎		
							◎	
		◎	◎					Makes the key lock function ON/OFF by long-pressing simultaneously.

Operation in “setting mode”

FUNC	MENU	DISP	ENTER	≪	≫	≪	≫	Action
○								Moves from shortcut function entry display to measurement mode
	○							Stores settings and moves to measurement mode.
		○						No action
			○					Fixes setting parameters.
				○				Moves to other setting displays / Moves cursors in setting displays / Modifying setting values.
					○			
						○		
							○	

*Note: ○ short-pressing ◎ long–pressing (holding down more than 1sec.)

１６－２．SETTING VARIABLES

1st Layer (Large Categories)	2nd Layer (Small Categories)	3rd Layer (Setting Variables)		4th Layer (Setting Values)		Remarks
		Name of Variables	Character Strings on Display (Abbreviated Form)	Initial values	Settable Variables	
1. Input	Pulse input A, Pulse input B [PulseInputA, PulseInputB] [WPMZ-5-*P*] (Generic pulse input)	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern8	Select pattern No. to set.
		Input Type	InputType	OpenCollector	OpenCollector/ Logic/ ZeroCross/ 2Wire	Select input signal type
		Input Filter	InputFilter	None	None/ 30Hz/ 1.5kHz/ 15kHz	Select input analog filters
		Sensor Power	SensorPower	12V	12V/24V	Switch Sensor power voltage
		Instantaneous Value Display Coefficient	InsDispCoef	1.00000×10^{0}	0.00000 to $9.99999\times10^{-9\sim9}$	For scaling setting of instantaneous value display, multiply frequency by instantaneous coefficient and unit time.
		Instantaneous Unit Time	InsUnitTime	Sec	Sec/ Min/ Hour	
		Instantaneous Value Decimal Point Position	InsDecPoint	###### (No decimal point)	###### / #####.# / ####.## / ###.### / ##.#### / #.#####	Set number of digits after decimal point
		Instantaneous Value Display Unit	InsDispUnit	None	None/ select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Instantaneous Value Auto Zero	InsAutoZero	0.00	0.00 to 99.99sec	Displays 0 if no pulse input over more than setting time
		Instantaneous Value Moving Average	InsMoveAve	None	None/ 2times/ 3times / 4times/ 5times/ 6times/ 7times/ 8times/ 9times	Set number of moving average.
		Instantaneous Value Simple Average	InsSimpleAve	None	None/ 2 times/ 4 times/ 8times/ 16times/ 32times/ 64times/ 128times/ 256 times	Set number of simple average for internal sampling (10ms)
		Instantaneous Value Display Step	InsDispStep	None	None/ 5steps/ 10steps	Setting of steps of display（If set to 5steps, displayed only 0 or 5 on LSB)
	Pulse input A, Pulse input B [PulseInputA, PulseInputB] [WPMZ-5-*L*] (Line driver input)	Pattern Select	PatternSelect	Pattern1 (or pattern No. in use)	Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8	Select pattern No. to set.
		Input Type	InputType	LineDriver	LineDriver	Line Driver only
		Input Filter	InputFilter	None	None	No input analog filter
		Sensor Power	SensorPower	5V	5V	5V only
		Instantaneous Value Display Coefficient	InsDispCoef	1.00000×10^{0}	0.00000 to $9.99999\times10^{-9\sim9}$	For scaling setting of instantaneous value display, multiply frequency by instantaneous coefficient and unit time.
		Instantaneous Unit Time	InsUnitTime	Sec	Sec/Min/Hour	
		Instantaneous Value Decimal Point Position	InsDecPoint	###### (No decimal point)	######/#####.#/####.##/###.###/##.####/#.#####	Set number of digits after decimal point
		Instantaneous Value Display Unit	InsDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Instantaneous Value Auto Zero	InsAutoZero	0.00	0.00 to 99.99sec	Displays 0 if no pulse input over more than setting time
		Instantaneous Value Moving Average	InsMoveAve	None	None/ 2times/ 3times / 4times/ 5times/ 6times/ 7times/ 8times/ 9times	Set number of moving average.
		Instantaneous Value Simple Average	InsSimpleAve	None	None/ 2 times/ 4 times/ 8times/ 16times/ 32times/ 64times/ 128times/ 256 times	Set number of simple average for internal sampling (10ms)
		Instantaneous Value Display Step	InsDispStep	None	None/ 5steps/ 10steps	Setting of steps of display（If set to 5steps, displayed only 0 or 5 on LSB)

1st Layer (Large Categories)	2nd Layer (Small Categories)	3rd Layer (Setting Variables)		4th Layer (Setting Values)		Remarks
		Name of Variables	Character Strings on Display (Abbreviated Form)	Initial values	Settable Variables	
1. Input	2 Input Calculation [2InputCalc]	Pattern Select	PatternSelect	Pattern1 (or pattern No. in use)	Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8	Select pattern No. to set.
		Expression for instantaneous value	InsExpression	None	None/ (B/A)*100 / (B/A-1)*100 /B-A / (B/(A+B))*100 / A+B	Select expression for calculation of instantaneous value.
		Instantaneous value decimal point position	InsDecPoint	###### (No decimal point)	###### / #####.# / ####.## / ###.### / ##.#### / #.#####	Set number of digits after decimal point
		Instantaneous value display unit	InsDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Instantaneous value display step	InsDispStep	None	None/5steps/10steps	Setting of steps of display (If set to 5steps, displayed only 0 or 5 on LSB)
	External Control [ExternalCtrl]	Function of external control terminal 1 to 5	ExtCtrl1Func ExtCtrl2Func ExtCtrl3Func ExtCtrl4Func ExtCtrl5Func	None	None/ CompareReset/ MeasureBlockA/ MeasureBlockB/ MeasureBlockA&B/ DispHoldA/ DispHoldB/ DispHoldA&B/ MaxHoldA/ MaxHoldB/ MaxHoldA&B/ MinHoldA/ MinHoldB/ MinHoldA&B/ PatternChange1/ PatternChange2/ PatternChange3/ MonitorChange/ TrendHold	Select functions assigned to external control terminals.
2.Output	Compare List	---	---	---	Go to screen of CompareList	
	Comparative Output AL1/ Comparative Output AL2/ Comparative Output AL3/ Comparative Output AL4 [CompareAL1/ CompareAL2/ CompareAL3/ CompareAL4]	Pattern Select	PatternSelect	Pattern1 (or pattern No. in use)	Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8	Select pattern No. to set.
		Source output display value	OutputDispValue	None	None/InsA/InsB/InsCalc	Select source output display value to compare.
		Compare mode	CompareMode	LevelJudge	LevelJudge/ ZoneJudge	Select compare mode
		Condition of ON	OnConditions	Excess	Excess/LessThan	In level judge mode
				InTheZone	InTheZone/OutsideTheZone	In zone judge mode
		Comparison judgement value	Threshold	10000 0	Threshold:±999999 Hysteresis:0 to 999999	In level judge mode
				0 10000 0	Zone lower limit:±999999 Zone upper limit :±999999 Hysteresis:0 to 999999	In zone judge mode
		Comparison ON delay	OnDelay	None	None/20ms/50ms/100ms/ 200ms/500ms/1s/5s/10s/20s	Comparative output turns ON, if ON condition continues over set delay time.
		Comparison OFF delay	OffDelay	None		Comparative output turns OFF, if OFF condition continues over set delay time.
		Output mode	OutputMode	Normal	Normal/Latch/OneShot5ms/ OneShot 10ms/ OneShot 20ms/ OneShot 50ms/ OneShot 0.1s/ OneShot 0.2s/ OneShot 0.5s/ OneShot 1s/ OneShot 2s	Select output mode of comparison
		Output logic	OutputLogic	Negative (NO)	Positive(NC)/Negative(NO)	NC/NO are for relay output product.
		Background Color at ON	OnBgColors	Black	Black/Red/Yellow/Green	Background color priority AL1>AL2>AL3>AL4

1st Layer (Large Categories)	2nd Layer (Small Categories)	3rd Layer (Setting Variables)		4th Layer (Setting Values)		Remarks
		Name of Variables	Character Strings on Display (Abbreviated Form)	Initial values	Settable Variables	
2.Output	Analog Output [AnalogOutput]	Pattern Select	PatternSelect	Pattern1 (or pattern No. in use)	Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8	Select pattern No. to set.
		Output range	Output Range	0-10V	0-10V/±10V/1-5V/0-20mA/ 4-20mA	Select output range (type).
		Source output display value	OutputDispValue	None	None/InsA/InsB/InsCalc	Select a displayable item for analog output
		Output scale	OutputScale	0 10000	0% display value :±999999 (±99999) 100% display value : ±999999(±99999)	Set scaling for analog output. Set expected display values at 0% and 100% output.
	BCD Output [BCD Output]	Pattern Select	PatternSelect	Pattern1 (or pattern No. in use)	Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8	Select pattern No. to set.
		Source output display value	OutputDispValue	None	None/InsA/InsB/InsCalc	Select a displayable item for BCD output
		Data signal logic	DataSignalLogic	Negative	Positive /Negative	Select logic of data signal output.
		Synchronous signal logic	SyncSignalLogic	Negative	Positive /Negative	Select logic of synchronous signal (PC) output.
	RS-485 Modbus communication [ModbusCom]	Slave Address	SlaveAddress	1	1/2/3/4/ ····· /30/31	Set ID number.
		Baud rate	Baudrate	19200bps	9600bps/19200bps/38400bps	Set baud rate.
		Parity	Parity	Even	None/Even/Odd	Set parity bit.
	RS-232C communication [RS-232C COM]	Protocol	Protocol	Modbus-RTU	Modbus-RTU/OriginalComm and/OriginalOutput	Set protocol
		Baud rate	Baudrate	19200bps	9600bps/19200bps/38400bps	Set baud rate.
		Data length	DataLength	7bit	7bit/8bit	Set data character length
		Parity	Parity	Even	None/Even/Odd	Set parity bit.
		Stop bit	Stopbit	1bit	1bit/2bit	Set stop bit length.
		Delimiter	Delimiter	CR LF	CR/CR LF	Set delimiter type.
3. Display	Display Select [DispSelect]	Measure select	MeasureSelect	1. Input: InsA 2inputs: InsA+InsB	InsA/InsB/InsCalc/ InsA+InsB / InsCalc+A+B/ InsA+Comp/InsB+Comp/InsCalc+Comp	Select displayable items can be switched by DISP key or external control for numerical value display. (multiple selects are available)
		Level select	LevelSelect	1. Input: InsA 2inputs: InsA+InsB	InsA/InsB/InsCalc/ InsA+InsB	Select displayable items can be switched by DISP key or external control for level display. (multiple selects are available)
		Trend select	TrendSelect	1. Input: InsA 2inputs: InsA+InsB		Select displayable items can be switched by DISP key or external control for trend display. (multiple selects are available)
	Level Display [LevelDisp]	Pattern Select	PatternSelect	Pattern1 (or pattern No. in use)	Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8	Select pattern No. to set.
		Instantaneous value A scale	InsA Scale	0 10000	Lower limit:±999999 Upper limit:±999999	Set display scale of level display. Left edge of display is lower limit and right edge of display is higher limit
		Instantaneous value B scale	InsB Scale			
		Instantaneous calculation scale	InsCalcScale			

1st Layer (Large Categories)	2nd Layer (Small Categories)	3rd Layer (Setting Variables)		4th Layer (Setting Values)		Remarks
		Name of Variables	Character Strings on Display (Abbreviated Form)	Initial values	Settable Variables	
3. Display	Trend Display [TrendDisp]	Pattern Select	PatternSelect	Pattern1 (or pattern No. in use)	Pattern1/ Pattern2/ Pattern3/ Pattern4/ Pattern5/ Pattern6/ Pattern7/ Pattern 8	Select pattern No. to set.
		Instantaneous value A scale	InsA Scale	0 10000	Lower limit :±999999 (±99999) Upper limit :±999999 (±99999)	Set display scale of trend display. Bottom edge of display is lower limit and top edge of display is higher limit.
		Instantaneous value B scale	InsB Scale			
		Instantaneous calculation scale	InsCalcScale			
		Time axis	TimeAxis	1s/div	1s/div,2s/div,5s/div,10s/div,30 s/div,60s/div,120s/div	Select time for 1 division of time axis.
4.System	General [Gerenal]	Brightness	Brightness	5 Bright	5 Bright/4/3/2/1 Dark/0 Off	Select brightness of display. *"0 Off" is set, whole display is black out
		Power on delay	PowerOnDelay	None	None/2sec/5sec/10sec/20sec /30sec/60sec	Select time from power on to starting measurement
		Power saving time	PowerSavingTime	None	None/1min/2 min/5 min/10 min/30 min/60 min	In power saving state, brightness becomes "1 Dark" level.
		Language	Language	Japanese	Japanese /English	Select language
		Direction of display	DisplayDirection	Horizontal	Horizontal/Vertical	Select direction of display
		Setting protect	SettingProtect	Disable	Disable/Enable	If ON, changing settings are disabled.
		Pattern Copy	PatternCopy	Pattern1 (Copy From) PatternAll (Copy To) Execute (OperationSelect)	Pattern1/2/3/4/5/6/7/8 Pattern1/2/3/4/5/6/7/8/PatternAll	Function of copying settings for each pattern.
	Initialize [Initialize]	Save user defaults	UserDefaultSave	Message "Save current settings as user initial values?"		
		Initialize to user defaults	UserDefaultLoad	Message "Initialize setting values to user initial values?"		
		Initialize to factory default	FactoryDefaultLoad	Message "Initialize setting values to factory default?"		

1st Layer (Large Categories)	2nd Layer (Small Categories)	3rd Layer (Setting Variables)		4th Layer (Setting Values)		Remarks
		Name of Variables	Character Strings on Display (Abbreviated Form)	Initial values	Settable Variables	
5.Diagnosis	Input Diagnosis [InputDiag]	Pulse input A Pulse input B	PulseInputA PulseInputB	–	–	Check for input signal existence. (Displays pulse counts)
		External control inputs	ExternalCtrl	–	–	Check for ON/OFF state of terminals
	Output Test (Simulated output) [OutputTest]	Comparative output AL1 to AL4	CompareAL1 CompareAL2 CompareAL3 CompareAL4	–	–	Outputs ON level or OFF level
		Analog output	AnalogOutput	–	–	Outputs level of 10% steps of rating.
		BCD Output(Data) BCD Output(PC)	BCD Output(Data) BCD Output(PC)	–	–	Outputs ON level or OFF level for each bit
		Modbus Communication RS-485	ModbusCom	–	–	Displays receive data and transmit data
		RS-232C	RS-232C Com	–	–	Displays receive data and transmit data

The contents of this instruction manual are subject to change without prior notice.

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