Graphical Digital Panel Meter

DC / Process Input

Instruction manual

WPMZ－1－□□□－□□－□□□

watanabe

Watanabe Electric Industry Co., Ltd.

IM-0882-02

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://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 covers WPMZ-1-***-**-*** of version V1.00 or later.
・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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If you read this manual on a pc, you can jump to linked destination by clicking characters in blue.

1. PRECAUTIONS FOR USE

1-1. ENVIRONMENTS AND CONDITIONS OF USE

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

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

RESTRICTION FOR USE

● Do not use this product as a part of equipment which aimed at life maintenance of human bodies.

● Please avoid usages of this product which bring physical accident or property damage when it breaks down.

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

1-2. INSTALLATION AND CONNECTION

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

Reinforced Insulation　Basic Insulation　Operational Insulation

AC power	Comparative outputs, External control inputs, Analog output, BCD output, RS-232C	RS-485 Modbus RTU
	Input Ach	Input Bch
	GO output	GO output

DC power	Comparative outputs, External control inputs, Analog output, BCD output,RS-232C	RS-485 Modbus RTU
	Input Ach	Input Bch
	GO output	GO output

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

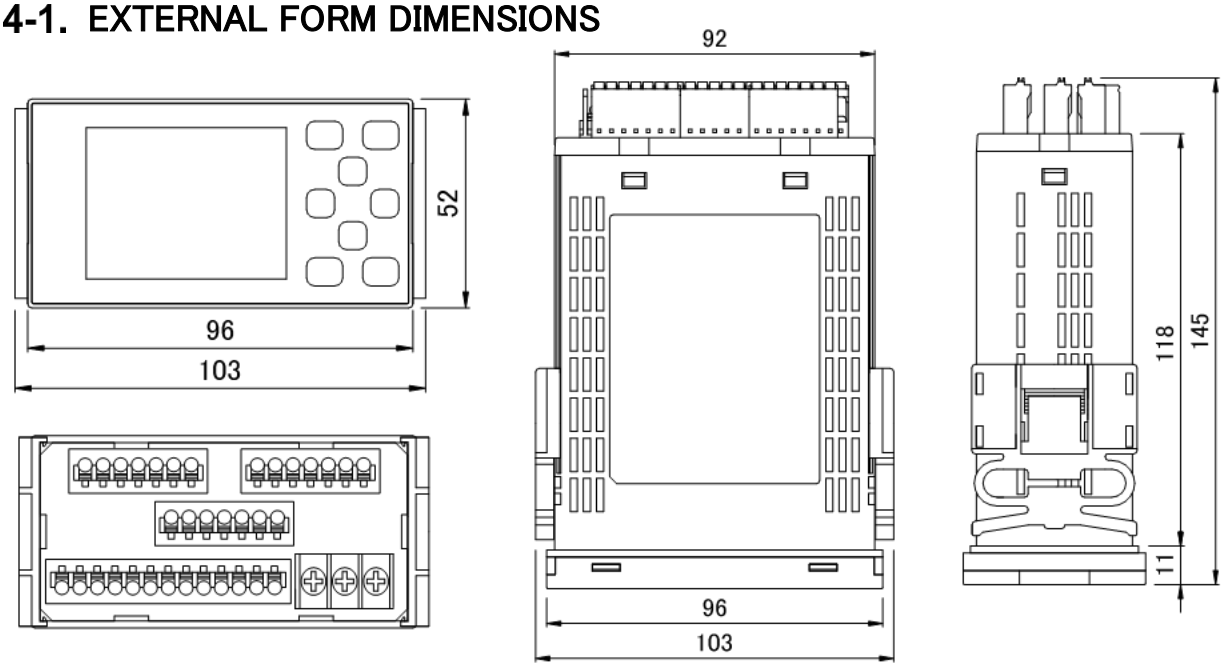
The model code of this product is shown as below. Check the product which has been delivered has a same model code you ordered.

WPMZ－1－□□□－□□－□□□

Series name	Supply power	Input A	Input B	Output	Comparative output	Test report	Additional code	Description
WPMZ-1								DC Voltage / DC Current measurement
	1							Voltage power: AC100 to 240V
	3							Voltage power: DC12V
	4							Voltage power: DC24～48V
		1						DC ±99.999mV
		2						DC ±999.99mV
		3						DC ±9.9999V
		5						DC ±99.999uA
		6						DC ±999.99uA
		7						DC ±9.9999mA
		B						Process input
			X					No Bch input
			1					DC ±99.999mV
			2					DC ±999.99mV
			3					DC ±9.9999V
			5					DC ±99.999uA
			6					DC ±999.99uA
			7					DC ±9.9999mA
			B					Process input
				X				Display only (No output)
				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

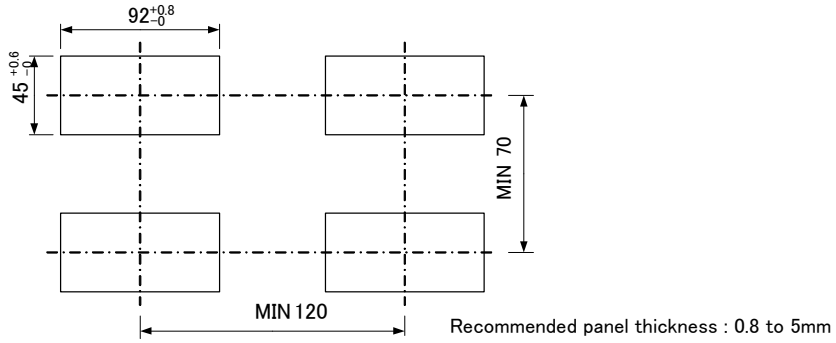
4. MOUNTING METHOD

4-1. EXTERNAL FORM DIMENSIONS

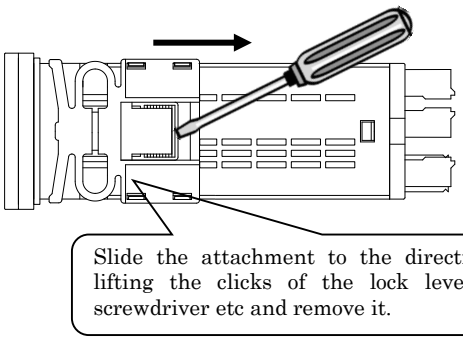


4-2. PANEL MOUNTING METHOD

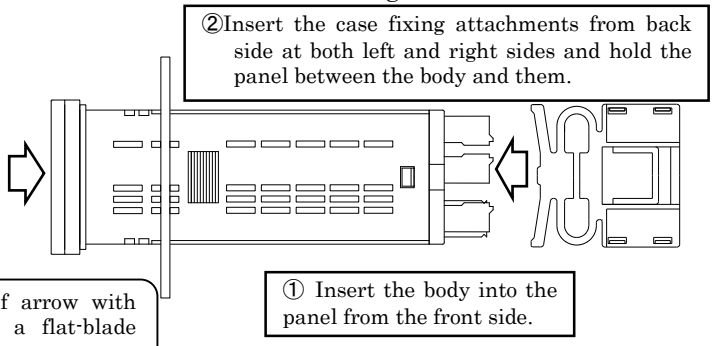
Panel cut dimensions are as shown by the figure below.



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" (page6)
○ In the case of installation or replacing of this product, please pay attention to the damage and accident by dropping.
○ In the case of some wires are connected, do not install or replacing this product. It may cause shock, damage fire etc.

5. CONNECTING TERMINALS

5-1. WIRING TO TERMINALS

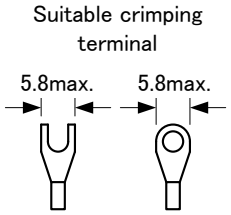
The connections to this product are done by connecting wires to the screw terminal block (power supply) and screwless terminal blocks on the back side of the body. Show below for the method and precautions.

■ 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.

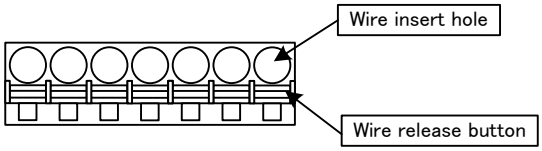
②Insert lugs under the washers of loosened screws and fasten the screws.
(Recommended torque:0.6 [N･m])



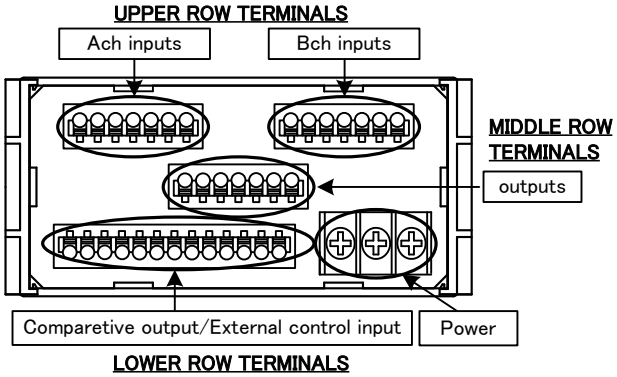
■ WIRING TO SCREWLESS TERMINALS

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)



■ THE LOCATION OF EACH TERMINAL STAND

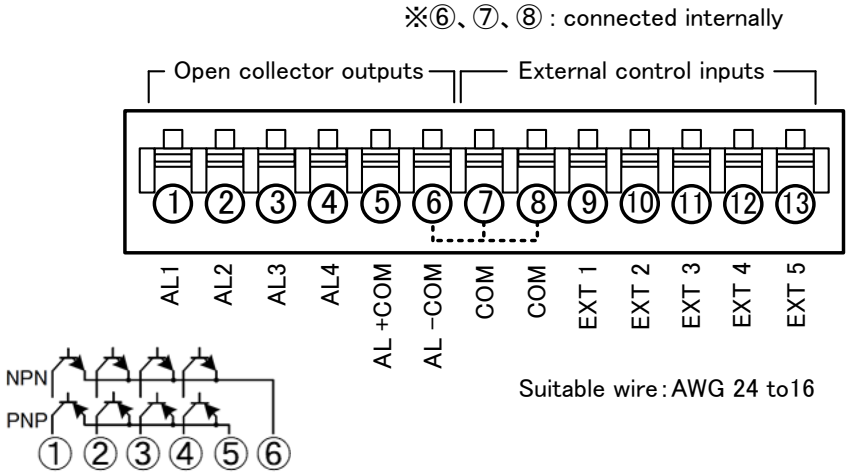


Note: In this manual, “channel A”, “channel B” may be abbreviated to “chA”,”chB” (or “Ach”,”Bch”).

5-2. CONNECTION FOR LOWER ROW TERMINALS

■ COMPARATIVE OUTPUT(O.C.)/EXTERNAL CONTROL INPUT

Screwless terminals

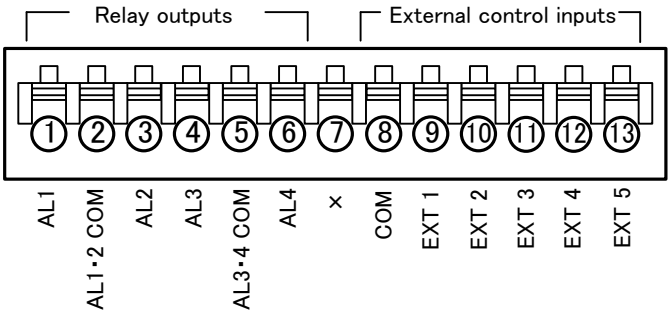


No.	Name	Description
1	AL1 c	AL1 open-collector output (collector)
2	AL2 c	AL2 open-collector output (collector)
3	AL3 c	AL3 open-collector output (collector)
4	AL4 c	AL4 open-collector output (collector)
5	AL+COM e	Common terminal for PNP output (emitter) (NPN output : no connection)
6	AL-COM e	Common terminal for NPN output (emitter) (PNP output : GND for PNP)
7,8	COM	Common terminal for external control inputs
9	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 “AL-COM e terminal” and “COM terminal” is connected internally and same voltage level.

■ COMPARATIVE OUTPUT(relay)/EXTERNAL CONTROL INPUT

Screwless terminals



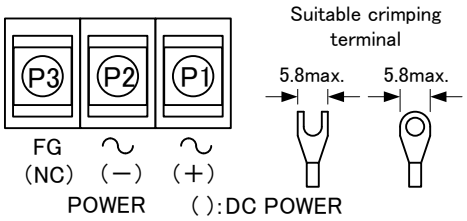
Suitable wire : AWG 24 to 16

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.

■ 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))

(Recommended torque:0.6 [N・m])

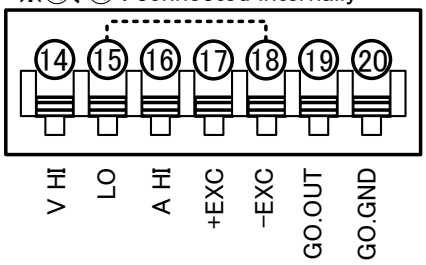
5-3. CONNECTION FOR UPPER ROW TERMINALS

■ VOLTAGE / CURRENT INPUTS

Screwless terminals

Ach Process input

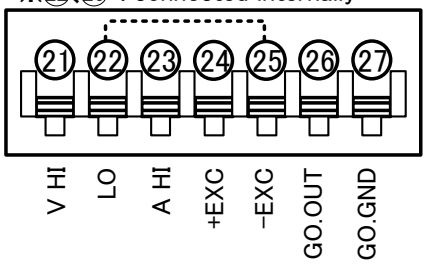
※⑮、⑱ : connected internally



Suitable wire : AWG 24 to 16

Bch Process input

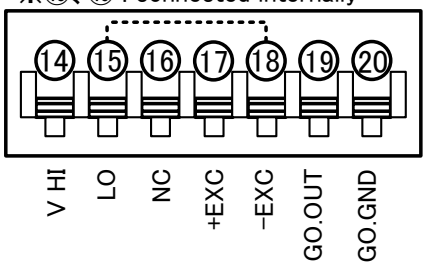
※㉒、㉕ : connected internally



Suitable wire : AWG 24 to 16

Ach Voltage input

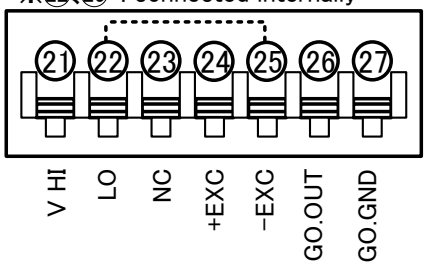
※⑮、⑱ : connected internally



Suitable wire : AWG 24 to 16

Bch Voltage input

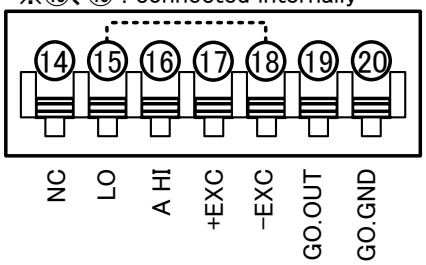
※㉒、㉕ : connected internally



Suitable wire : AWG 24 to 16

Ach Current input

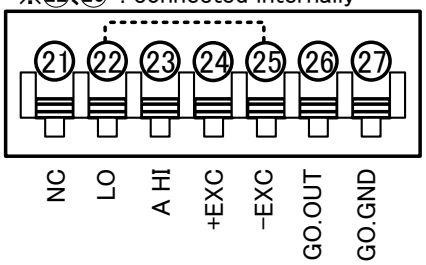
※⑮、⑱ : connected internally



Suitable wire : AWG 24 to 16

Bch Current input

※㉒、㉕ : connected internally



Suitable wire : AWG 24 to 16

●Ach Process input／GO output

No.	Name	Description
14	V HI	Ach voltage input terminal (+) (NC in current input)
15	LO	Ach common input terminal(-)
16	A HI	Ach current input terminal (+) (NC in voltage input)
17	+EXC	Ach sensor power output terminal(+)
18	-EXC	Ach sensor power output terminal(-)
19	GO.OUT	Ach GO output terminal(collector)
20	GO.GND	Ach GO output terminal(emitter)

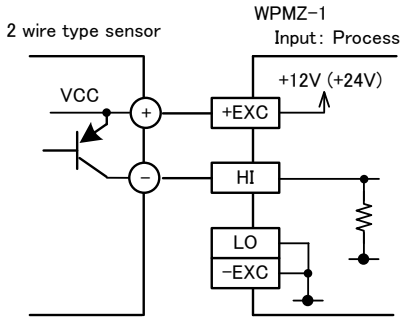
*1 “LO terminal” and “-EXC terminal” is connected internally and same voltage level.

●Bch　Process input／GO output

No.	Name	Description
21	V HI	Bch voltage input terminal (+) (NC in current input)
22	LO	Bch common input terminal(-)
23	A HI	Bch current input terminal (+) (NC in voltage input)
24	+EXC	Bch sensor power output terminal(+)
25	-EXC	Bch sensor power output terminal(-)
26	GO.OUT	Bch GO output terminal(collector)
27	GO.GND	Bch GO output terminal(emitter)

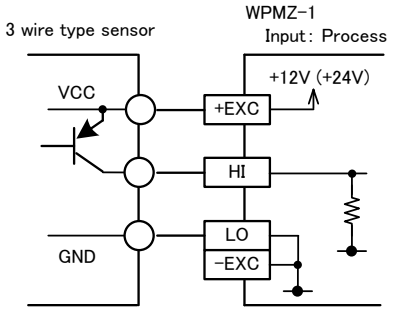
*1 “LO terminal” and “-EXC terminal” is connected internally and same voltage level.

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



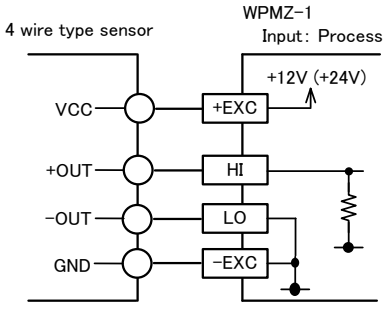
＊Use [V HI] terminal as HI terminal if the sensor is voltage output type, use [A HI] terminal if the sensor is current output type.

●Example of connecting to sensor(3 wire type sensor)



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

●Example of connecting to sensor(4 wire type sensor)

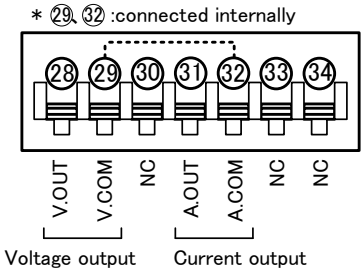


＊Use [V HI] terminal as HI terminal if the sensor is voltage output type, use [A HI] terminal if the sensor is current output type.

5-4. CONNECTION FOR MIDDLE ROW TERMINALS

■ ANALOG OUTPUT

Screwless terminals



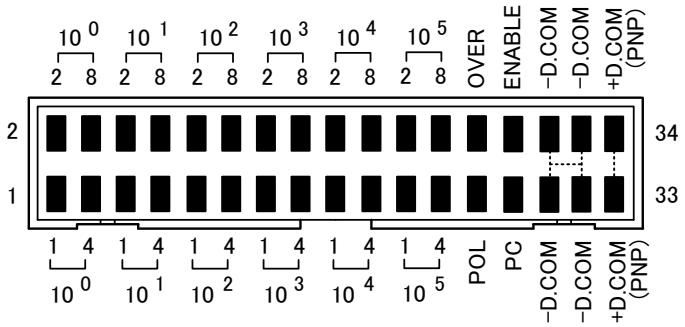
Suitable wire : AWG24 to 16

No.	Name	Description
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.

■ BCD OUTPUT

Crimp connector

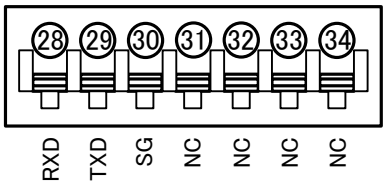


Suitable wire : AWG#28 flat cable(7/0.127mm)

No.	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

■ RS-232C

Screwless terminals

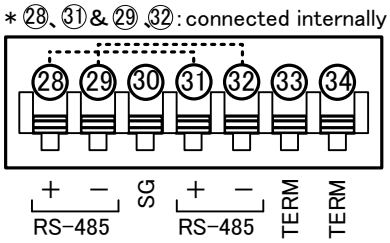


Suitable wire : AWG24 to 16

No.	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

■ RS-485 MODBUS RTU

Screwless terminals



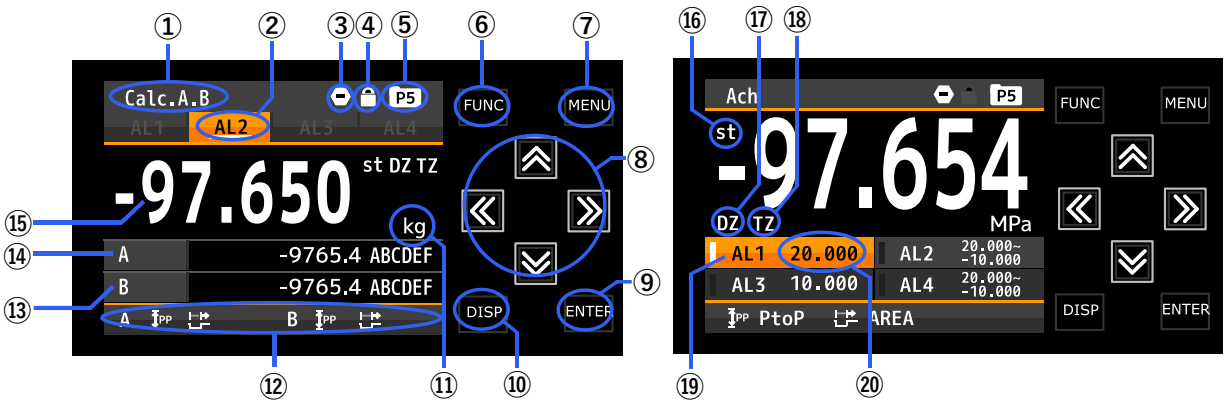
Suitable wire : AWG24 to 16

No.	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.

* "28 terminal" and "31 terminal" is connected internally and same voltage level.
* "29 terminal" and "32 terminal" is connected internally and same voltage level.

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	Compare reset	Lights when the “CompareReset”function is ON.
④	Key lock	Lights when the key lock is effective.
⑤	Pattern	Indicates pattern No. in use.
⑥	FUNC key	Used for registering external control shortcut function.
⑦	MENU key	Used for moving to setting display and returning measurement display.
⑧	Arrow keys	Used to move the cursor while setting and move other displays. *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 displays.
⑪	Display unit	Unit for 1st item display
⑫	Hold type	Indicate hold type by an icon. * For 1ch input products, the following abbreviations will be added. HOLD: DispHold MAX: MaxHold MIN: MinHold PtoP: AmpHold DIFF: DevHold AVE: AveHold
	Hold mode	Indicate hold mode with icon. * For 1ch input products, the following abbreviations will be added. NORM: NormalHold AREA: AreaHold
⑬	3rd item display	Displays measured value of 3rd item
⑭	2nd item display	Displays measured value of 2nd item
⑮	1st item display	Displays measured value of 1st item
⑯	st icon	Lights up during display value is stable. (Only when the “ActCondition” function is OnStable or OnStableExceptNearZero)
⑰	DZ icon	Lights up during digital zero operation.
⑱	TZ icon	Lights up during tracking zero operation.
⑲	Comparison result	Lights when the result of comparative output is ON.
⑳	Comparison judgement value	Displays comparison judgement value.

6-2. EXPLANATION OF ICONS

■ DISPLAY ICONS ON THE MEASUREMENT DISPLAY

Icon	Meanings
	Indicates comparative output reset function is effective.
	Indicates DispHold function is effective.
MX	Indicates MaxHold function is effective.
MI	Indicates MinHold function is effective.
PP	Indicates AmpHold function is effective.
Diff	Indicates DevHold function is effective.
AVE	Indicates AveHold function is effective.

Icon	Meanings
	HoldMode/DispHoldMode is NormalHold/Normal.
	HoldMode/DispHoldMode is AreaHold/Normal.
	DispHoldMode is OneShot.
DZ	Indicates digital zero operation is effective.
P5	Indicates pattern No. in use.
	Indicates key lock function is effective.

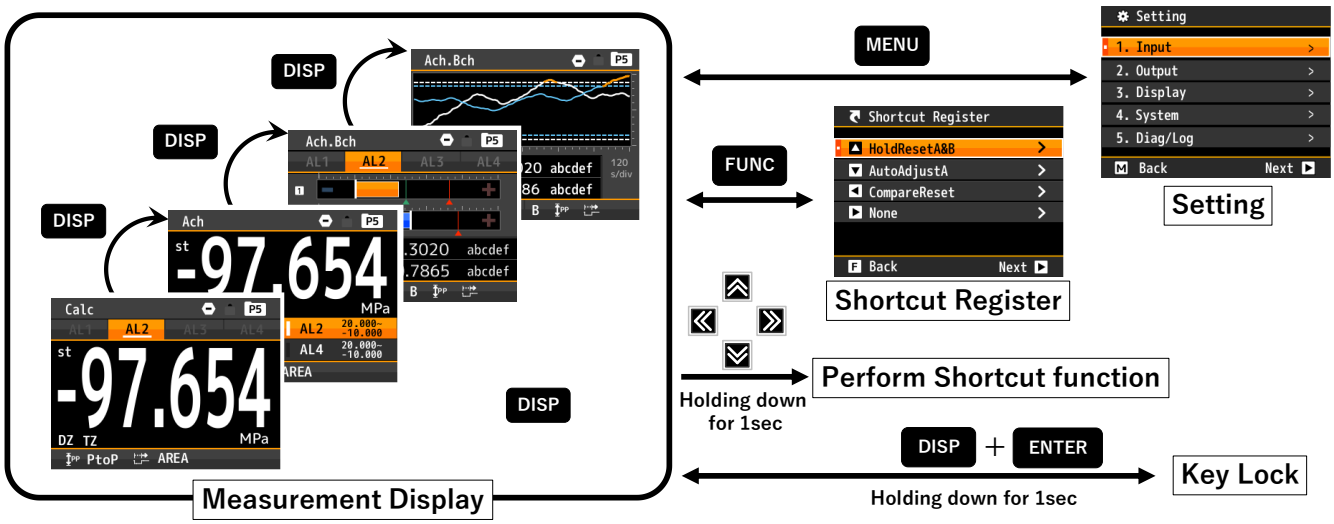
■ KEY OPERATION ICONS ON THE SETTING DISPLAY

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. OPERATION ON MEASUREMENT DISPLAY

The system starts up after power on, and works as shown below.



【Measurement Display】

By pressing the DISP key, each measurement display including level display, and trend display is displayed in order.

The measurement displays to be displayed can be selected by "screen setting".

【Setting】

You can make various settings.

Press the "MENU" key to open the setting screen and press the "MENU" key again to return to the measurement display.

【Shortcut Register】

Register the shortcut function.

Press the "FUNC" key to open the Shortcut Register screen and press the "FUNC" key again to return to the measurement display.

You can register up to 4 from external control functions, “ManuAdjust”, and “AutoAdjust”.

【Perform Shortcut Register】

By holding down any of the four-way controller keys for 1sec, the shortcut function will be done.

* Shortcuts will not work if the same function is done via communication control or external control.

【Key Lock】

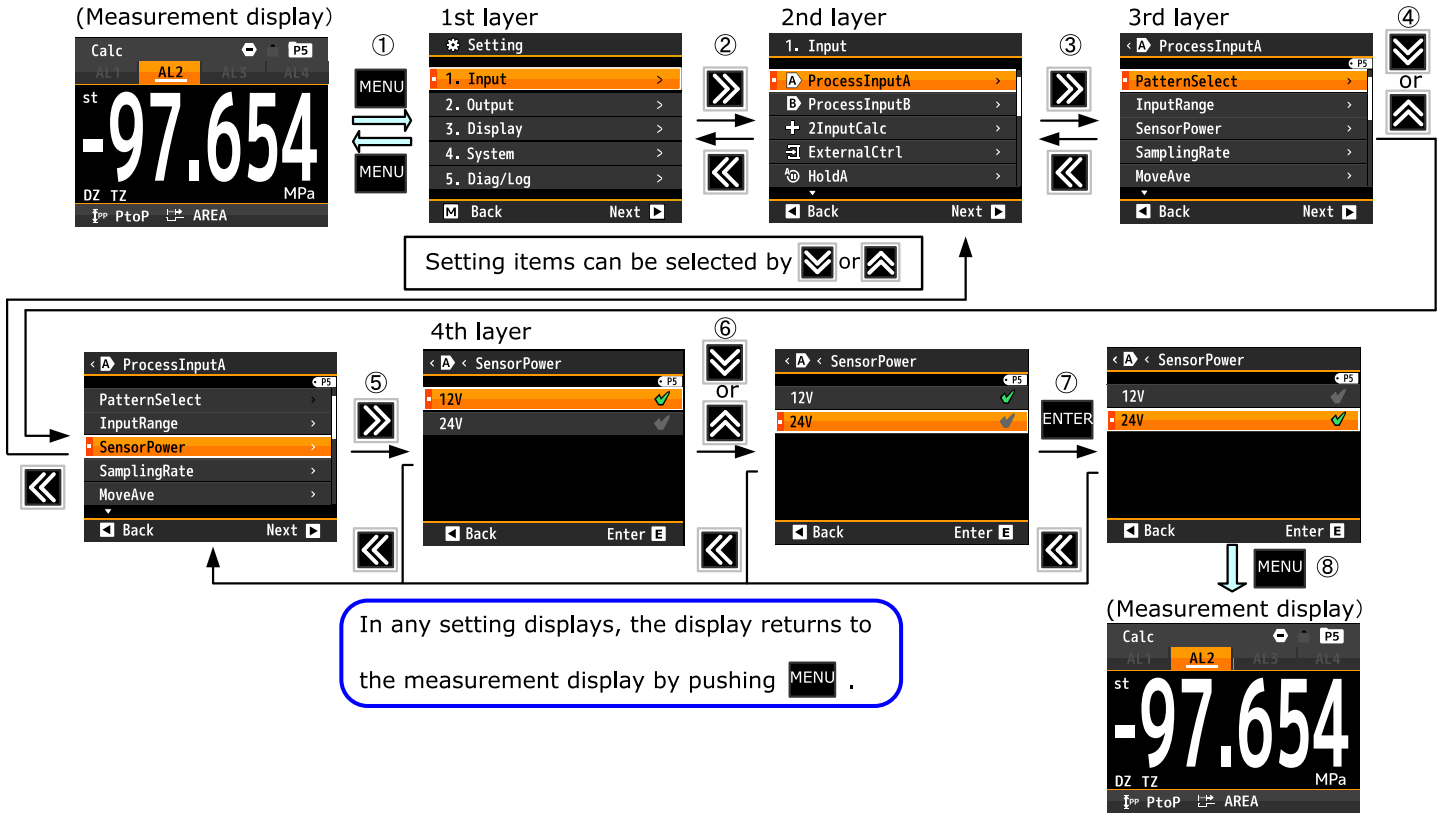
By holding down both “DISP” and “ENTER” keys for 1sec, the key lock function will be done.

If the key lock function is doing, the system will not accept any key operations except key lock.

* Since the measurement screen will change if the "DISP" key is pressed first, you should first press the "ENTER" key and then press the "DISP" key.

7-2. OPERATION ON SETTING

The setting procedure is shown below.



*Some setting value change numerical value or other value.

⚠ CAUTION

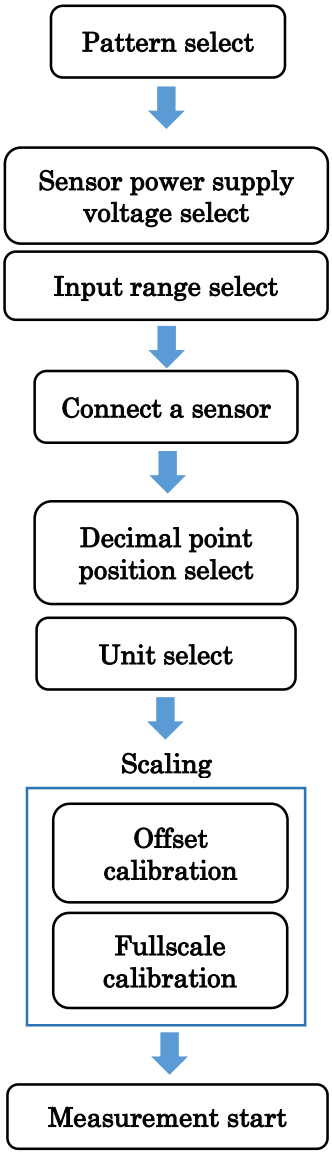
The timing at which the change of the set value is saved is the point when returning to the measurement screen from the setting screen.

Please keep in mind that setting change will not be saved if you leave the setting screen and turn off the power.

8. BASIC SETTINGS

8-1. CALIBRATION OF DC / PROCESS INPUT

Calibration of DC / process input is proceeded as follow.
Each setting items are set up at [Setting]⇒[Input]⇒[DC InputA/B] or [ProcessInputA/B].



*If you changed the sensor power supply or input range, please close the menu once for reflecting the setting.

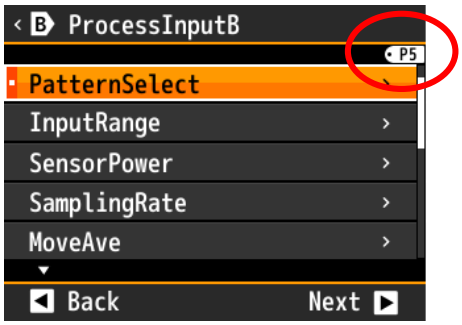
*For wiring, please confirm "5. CONNECTING TERMINALS".

When registering calibration values of multiple sensors, change the pattern and continue setting and calibration.
Descriptions of each setting item are described on the following pages after this section.
Moreover, please check "input detailed setting" for the setting not described in the above flow.

*1 Each setting and calibration value are saved and reflected at the timing when the menu is closed and returned to the measurement screen.
Note that the contents will not be saved if the power is turned off before closing the menu.

■ PatternSelect

You can store and set up 8 patterns (8 kinds) of various settings such as input and output with this unit, you can select the pattern to save the setting in "PatternSelect".
The pattern number being set is displayed as "P5" on the upper right of the setting screen as shown below.



Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[PatternSelect]
Setting value:Pattern1,Pattern 2,・・・・・Pattern 8

* At the time of opening the menu, the setting pattern is the value selected as operating on the measurement screen.
* Since the setting pattern is common in each setting, "PatternSelect" such as output setting is also changed when "PatternSelect" is changed by "DC Input A/B" or "ProcessInput A/B".

■ SensorPower

Select sensor power supply voltage.
If you change "SensorPower", please close the menu once for reflecting the setting before connect a sensor.

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[SensorPower]
Setting value:12V (Default),24V

* In 1ch products, the maximum supply current is 100mA@12V, 50mA@24V
* In 2ch products, the maximum supply current (sum of Ach and Bch) is 100mA@12V, 50mA@24V
* When using both DC24V and DV12V in 2ch products, the maximum (sum of Ach and Bch) is 1.2Wmax

■ InputRange

Select input range of a sensor.
(In the case of DC input, only the input range corresponding to the product model is displayed,
There is no range change function.)
If you change "InputRange", please close the menu once for reflecting the setting before connect a sensor.
*Be careful to connect input terminals. There are 2 terminals that one of it is for voltage input, and another is for current input. (For wiring, please confirm "5. CONNECTING TERMINALS".)

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[InputRange]
Setting value: DC Input: Input range corresponding to the product model.
Process input: 0-5V, 1-5V, ±5V, 0-10V(Default), ±10V, 0-20mA, 4-20mA, ±20mA

■ DecPoint

Select decimal point position of display value.

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[DecPoint]
Setting value: ##### ,####.#,###.##,##.###,#.####
(Default value is corresponding to the product model when DC input, and [#####] when process input.)

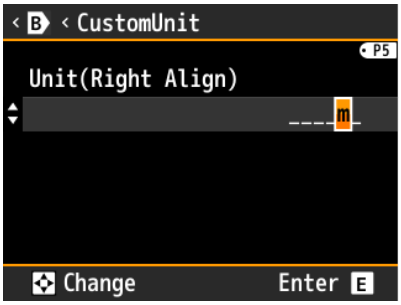
■ DispUnit

Select a unit for display value.

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[DispUnit]
Setting value:

Items	Setting value
Electrical	µA, mA, A, kA, µV, mV, V, kV, VA, W, kW, MW
Length	µm, mm, cm, m, inch
Resistance	Ω, kΩ, MΩ
Weight	g, kg, t
Power	N, kN, MN
Heat quantity	J, kJ, MJ
Work	mN･m, N･m, kN･m
Rotation	Hz, kHz, MHz,　ppm, rpm
Speed	mm/s, mm/min, cm/min, m/s, m/min, m/h, m/s2
Stress	Pa, kPa, MPa, hPa, kg/m2, N/m2
Flow rate	m3/s, m3/min, m3/h, kg/h, ℓ, ℓ /s, ℓ /min, ℓ /h, m3
Other	kg/m3, %, %0, %RH, ℃, pH, CustomUnit

(Default value is corresponding to the product model when DC input, and [None] when process input.)



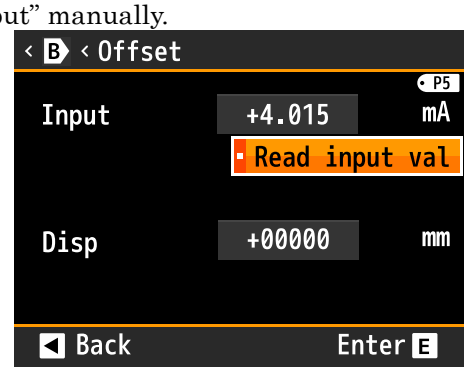
*If you select “CustomUnit”, you can create an original unit within 6 letters. You can use following letters to create a unit.
([a]～[z], [A]～[Z], [,],(,),$_{1}$,$_{2}$,$_{3}$,^{1},^{2},^{3},$^{-}$,µ,Ω,g,･,/,ℓ,%,‰,°,’,”)

■ Offset

Calibrate offset of input signal. Please calibrate both “Offset” and “Fullscale”.
●Operation for calibration **(ex: InputRange 4-20mA, set display value to be 0-10000)**

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

*You can also set “Input” manually.



Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[Offset]
Setting value:-99999～99999 (DispValue)

*Setting values of “DecPoint” and “DispUnit” are reflected.
(Default value is Disp:0 both DC input and process input.)

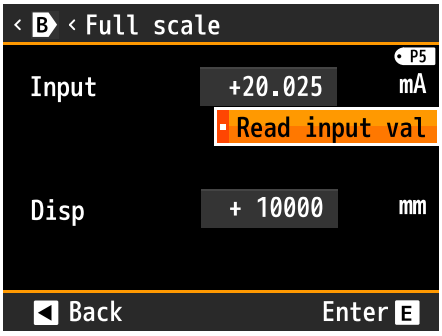
■ Fullscale

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

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

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

*You can also set “Input” manually.

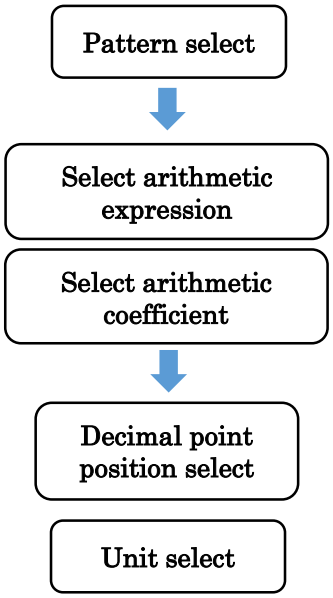


Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[FullScale]
Setting value:-99999～99999 (DispValue)

*Setting values of “DecPoint” and “DispUnit” are reflected.
(Default value is Disp:99999 when DC input, and Disp:10000 when process input.)

8-2. 2 INPUT CALCULATION

*In 1ch products, this setting item is invisible.
Setting of 2 input calculation is proceed as follow.
Each setting items are set up at [Setting]⇒[Input]⇒[2InputCalc]

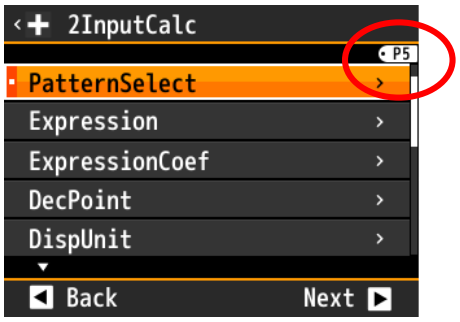


Descriptions of each setting item are described on the following pages after this section.
Moreover, please check "input detailed setting" for the setting not described in the above flow.

*1 Each setting and calibration value are saved and reflected at the timing when the menu is closed and returned to
the measurement screen.
Note that the contents will not be saved if the power is turned off before closing the menu.

■ PatternSelect

You can store and set up 8 patterns (8 kinds) of various settings such as input and output with this unit, you can select the pattern to save the setting in "PatternSelect".
The pattern number being set is displayed as "P5" on the upper right of the setting screen as shown below.



Operation:[MENU]⇒[Input]⇒[2InputCalc]⇒[PatternSelect]
Setting value:Pattern1,Pattern 2,・・・・・Pattern 8

* At the time of opening the menu, the setting pattern is the value selected as operating on the measurement screen.
* Since the setting pattern is common in each setting, "PatternSelect" such as output setting is also changed when "PatternSelect" is changed by "2InputCalc".

■ Expression

Select arithmetic expression for 2 input signals.
*[A] means value of Ach, and [B] means value of Bch. The most detailed value is used for calculation.
(If display value is 123.45, calculation is done with 123.456789 that is the most detail internal data.)
*[C] and [K] means any number. (Set in "ExpressionCoef")
* Please note the relation between A and B in the calculation formula in Sub, Div, ErrRaito and Dens.
* Please note that adding, subtracting, multiplying, and dividing have two different types of calculation formula (the relationship between coefficients C and K is different).

Operation:[MENU]⇒[Input]⇒[2InputCalc]⇒[Expression]

Functions	Arithmetic expression
None(Default)	---
Add	{ (A + B) + C } * K
Sub	{ (B – A) + C } * K
Mul	{ (A * B) + C } * K
Div	{ (B / A) + C } * K
Ave	{ [(A + B) / 2] + C } * K
HiSelect	[(Larger of A and B) + C] * K
LoSelect	[(Smaller of A and B) + C] * K
DifAbs	[(Abs of (B - A)) + C] * K
ErrRaito	[(A / B) - 1] * K
Dens	[B / (A + B)] * K
Add	(A + B) * K + C
Sub	(B – A) * K + C
Mul	(A * B) * K + C
Div	(B / A) * K + C

■ ExpressionCoef

Select [C] and [K] used for calculation.

Operation:[MENU]⇒[Input]⇒[2InputCalc]⇒[ExpressionCoef]
Setting value: C: ±9.9999 *10$^{\pm5}$ (Default is 0)
K: ±9.9999 (Default is 1)

■ DecPoint

Select decimal point position of display value.

Operation:[MENU]⇒[Input]⇒[2InputCalc]⇒[DecPoint]
Setting value:##### (Default),####.#,###.##,##.###,#.####

■ DispUnit

Select a unit for display value.

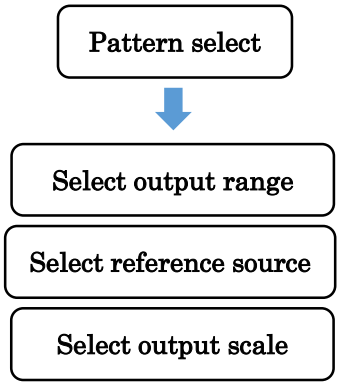
Operation:[MENU]⇒[Input]⇒[2InputCalc]⇒[DispUnit]
Setting value:

Items	Setting value
Electrical	µA, mA, A, kA, µV, mV, V, kV, VA, W, kW, MW
Length	µm, mm, cm, m, inch
Resistance	Ω, kΩ, MΩ
Weight	g, kg, t
Power	N, kN, MN
Heat quantity	J, kJ, MJ
Work	mN・m, N・m, kN・m
Rotation	Hz, kHz, MHz, ppm, rpm
Speed	mm/s, mm/min, cm/min, m/s, m/min, m/h, m/s2
Stress	Pa, kPa, MPa, hPa, kg/m2, N/m2
Flow rate	m3/s, m3/min, m3/h, kg/h, ℓ, ℓ /s, ℓ /min, ℓ /h, m3
Other	kg/m3, %, %0, %RH, °C, pH, CustomUnit

*If you select “CustomUnit”, you can create an original unit within 6 letters. You can use following letters to create a unit. ([a]～[z], [A]～[Z], [,],(,),$_1$,$_2$,$_3$,^{1},^{2},^{3},$^-$,µ,Ω,g,・,/,ℓ,%,‰,°,’,”)

8-3. ANALOG OUTPUT

*In products that have no analog output option, this setting item is invisible.
Setting of analog output is proceed as follow.
Each setting items are set up at [Setting]⇒[Input]⇒[AnalogOutput]

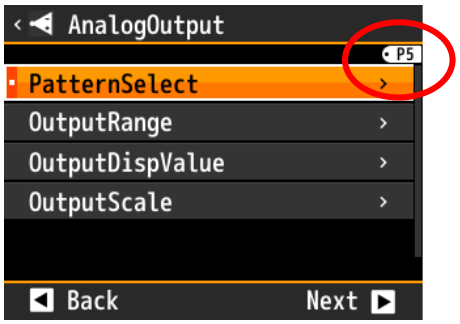


Descriptions of each setting item are described on the following pages after this section.
Moreover, please check "output detailed setting" for the setting not described in the above flow.

* Each setting and calibration value are saved and reflected at the timing when the menu is closed and returned to
the measurement screen.
Note that the contents will not be saved if the power is turned off before closing the menu.

■ PatternSelect

You can store and set up 8 patterns (8 kinds) of various settings such as input and output with this unit, you can select the pattern to save the setting in "PatternSelect".
The pattern number being set is displayed as "P5" on the upper right of the setting screen as shown below.



Operation:[MENU]⇒[Output]⇒[AnalogOutput]⇒[PatternSelect]
Setting value:Pattern1, Pattern 2, ・・・・・Pattern 8

* At the time of opening the menu, the setting pattern is the value selected as operating on the measurement screen.
* Since the setting pattern is common in each setting, "PatternSelect" such as input setting is also changed when "PatternSelect" is changed by "AnalogOutput".

■ OutputRange

Select output range of analog output.
*Be careful to connect output terminals. There are 2 terminals that one of it is for voltage output, and another is for current output. (For wiring, please confirm "CONNECTING TERMINALS".)

Operation:[MENU]⇒[Output]⇒[AnalogOutput]⇒[OutputRange]
Setting value: 0-10V (Default) (Load resistance of 2 kΩ or more)
±10V (Load resistance of 2 kΩ or more)
1-5V (Load resistance of 2 kΩ or more)
0-20mA (Load resistance of 550 Ω or less)
4-20mA (Load resistance of 550 Ω or less)

■ OutputDispValue

Select reference source of analog output.
*In 1ch products, [Bch] and [Calc] are invisible.

Operation:[MENU]⇒[Output]⇒[AnalogOutput]⇒[OutputDispValue]
Setting value: None(Default), Ach, Bch, Calc

■ OutputScale

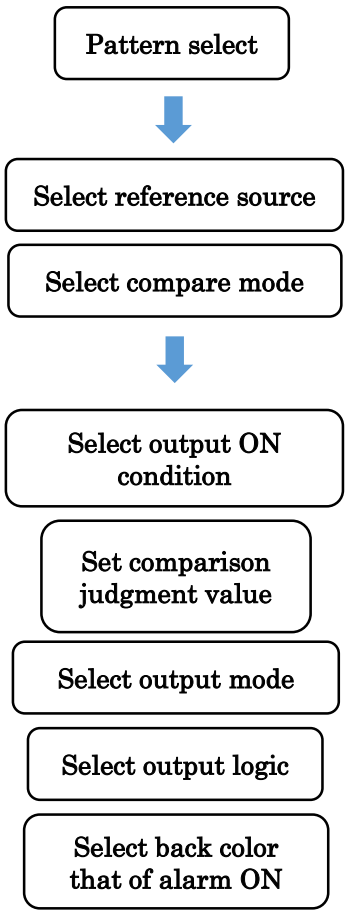
Select the display value that corresponding to output scale 0% and 100%.
Analog output is referred display value.
(ex: ["OutputRange" is 4-20mA and "0%DispValue" is 2000 and "100%DispValue" is 8000]
4mA is outputted when display value is 2000, and 20mA is outputted when display value is 8000)

Operation:[MENU]⇒[Output]⇒[AnalogOutput]⇒[OutputScale]
Setting value: 0% DispValue: ±99999 (Default is 0)
100% DispValue: ±99999 (Default is 10000)

8-4. COMPARISON OUTPUT FUNCTION

The comparison output function compares the display value with a preset comparison judgment value, displays the judgment result on the comparison result monitor, and outputs according to the judgment result.
There are three types of output method, two types of open collector output (NPN type / PNP type) and relay output, and it can be selected depending on the model at the time of shipment. Each function and setting method does not change with any output type.

Setting of comparison output function is proceed as follow.
Each setting items are set up at [Setting] ⇒ [Input] ⇒ [CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4]



Select reference source (Ach or Bch or Calc) and select method to compare.

Descriptions of each setting item are described on the following pages after this section.

*1 Each setting and calibration value are saved and reflected at the timing when the menu is closed and returned to
the measurement screen.
Note that the contents will not be saved if the power is turned off before closing the menu.

● GO Output

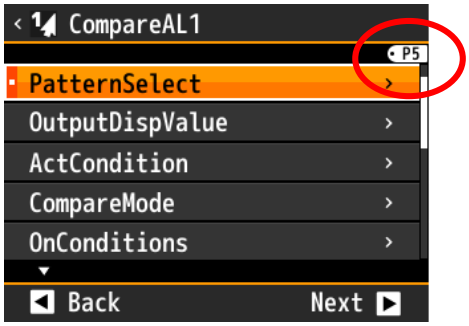
GO output is auxiliary output of comparison output. There is no setting item for it. GO output always operates as follows and corresponds to AL1～AL4.

GO output A: Turns ON when all of alarms that refer Ach or Calc are OFF. Otherwise, GO output turns OFF.
GO output B: Turns ON when all of alarms that refer Bch or Calc are OFF. Otherwise, GO output turns OFF.

*No indication on display about GOoutput ON / OFF.
*Only NPN open collector output exists.

■ PatternSelect

You can store and set up 8 patterns (8 kinds) of various settings such as input and output with this unit, you can select the pattern to save the setting in "PatternSelect".
The pattern number being set is displayed as "P5" on the upper right of the setting screen as shown below.



Operation:[MENU]⇒[Output]⇒[CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4]⇒[PatternSelect]
Setting value:Pattern1, Pattern 2, ・・・・・Pattern 8

* At the time of opening the menu, the setting pattern is the value selected as operating on the measurement screen.
* Since the setting pattern is common in each setting, "PatternSelect" such as input setting is also changed when "PatternSelect" is changed by "CompareAL1～4".

■ OutputDispValue

Select reference source of comparison output. You can set AL1~AL4 arbitrarily to Ach, Bch or Calc.
* Even if the comparison output is allocated to a display element that is not displayed on the measurement screen, it will monitor and output when the comparison result turns ON.

*In 1ch products, [Bch] and [Calc] are invisible.

Operation:[MENU] ⇒ [Output] ⇒ [CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4] ⇒ [OutputDispValue]
Setting value: None(Default),Ach,Bch,Calc

■ CompareMode

Select compare mode: Leveljudge or Zonejudge or Diffjudge.

Compare mode	Function
Leveljudge	[Threshold] is set, and it is judged whether the displayed value is less than (or exceeded) the judgment value.
Zonejudge	[ZoneLowerLimit] and [ZoneUpperLimit] are set, and it is judged whether or not the displayed value is within (or out of) the zone area.
Diffjudge	The maximum value and the minimum value are monitored in [DetectionInterval], and when the change amount (maximum value - minimum value) becomes excess [ChangeAmount], the comparison output is output ON.

Operation: [MENU]⇒[Output]⇒[CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4] ⇒[CompareMode]
Setting value: Leveljudge(Default), Zonejudge, Diffjudge

■ OnConditions

Select output ON condition.
Setting value of [OnConditions] changes by setting value of [CompareMode].
*If setting value of [CompareMode] is “Diffjudge”, [OnConditions] is invisible.

Operation: [MENU]⇒[Output]⇒[CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4] ⇒[OnConditions]

[CompareMode] is “Leveljudge”
Setting value: Excess(Default), LessThan

[CompareMode] is “Zonejudge”
Setting value: InTheZone(Default), OutsideTheZone

■ Threshold

Set threshold for comparison output.
Setting value of [Threshold] changes by setting value of [CompareMode].

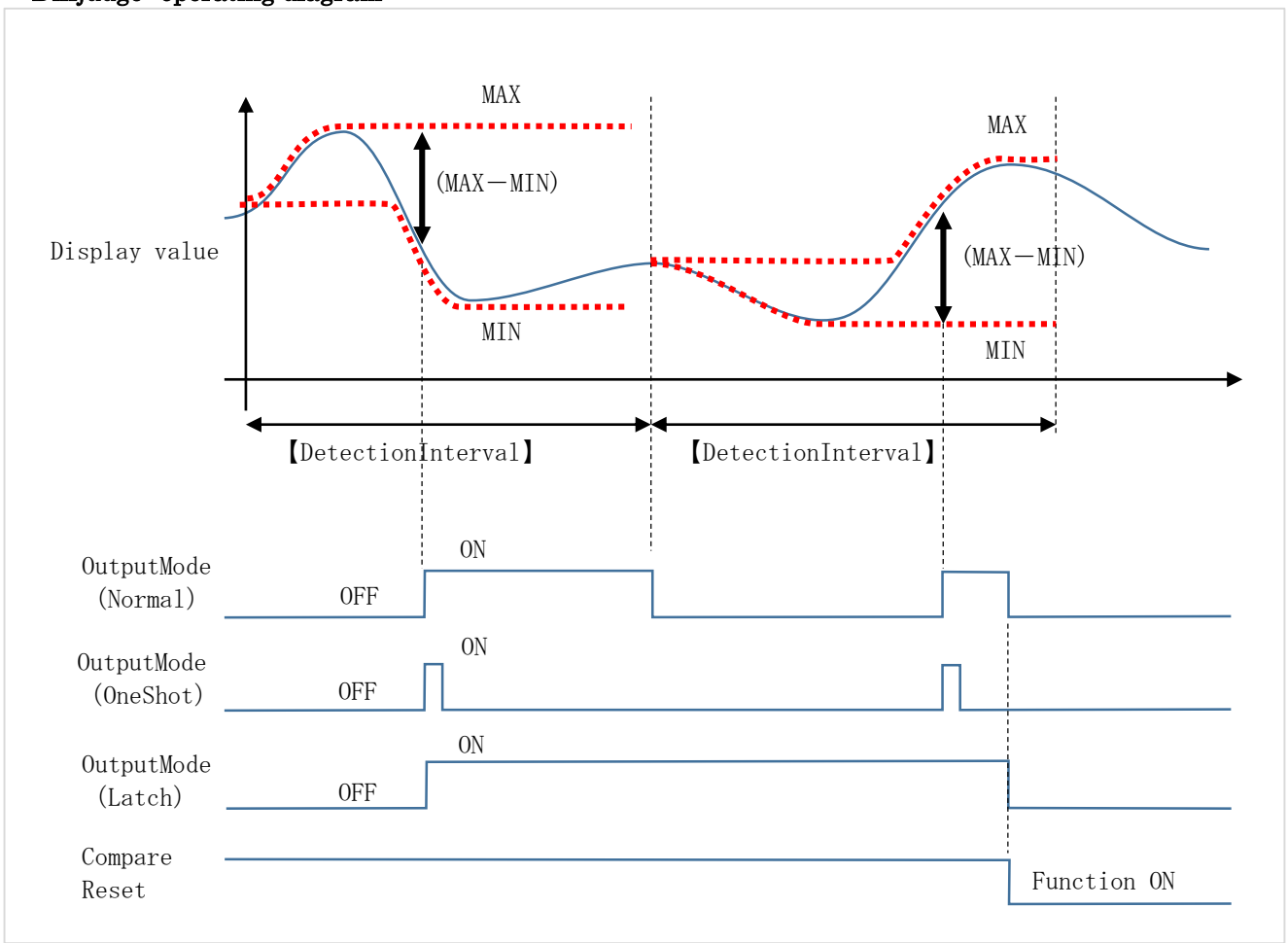
Operation:[MENU]⇒[Output]⇒[CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4]⇒[Threshold]

[CompareMode] is "Leveljudge"
Setting value: Threshold ±99999 (Default is10000)
Hysteresis 0～99999(Default is 0)

[CompareMode] is "Zonejudge"
Setting value: ZoneLowerLimit ±99999 (Default is 0)
ZoneUpperLimit ±99999 (Default is 10000)
Hysteresis 0～99999(Default is 0)
***Same hysteresis is applied in ZoneLowerLimit and ZoneUpperLimit.**

[CompareMode] is "Diffjudge"
Comparison output turns ON when (MAX - MIN) > ChangeAmount (See below)
Setting value: ChangeAmount 0～99999 (Default is 10000)
DetectionInterval 0.00～99.99[sec] (Default is 1.00)
***If "DetectionInterval" is 0.00, "Diffjudge" is disabled.**

"Diffjudge" operating diagram



***If setting value of [OutputMode] is "Normal", comparison output continues until end of "DetectionInterval".**
***When Compare Reset is ON, comparison output is always set to OFF.**

■ OutputMode

Select comparison output mode.
Please check operation diagram on the previous page about operation of each output mode.

Output mode	Function
Normal	Outputs ON while the condition is satisfied.
Latch	Outputs ON until receive reset signal from the condition is satisfied. Reset signal is controlled by [CompareReset] function of external control function.
OneShot ## ms	Outputs ON for ## ms from the condition is satisfied.

Operation:[MENU]⇒[Output]⇒[CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4]⇒[OutputMode]
Setting value: Normal(Default), Latch, OneShot5ms, 10ms, 20ms, 50ms, 0.1s, 0.2s, 0.5s, 1s, 2s

■ OutputLogic

Select output logic of comparison output.
Note that the operation of each output (NPN open collector/PNP open collector/Relay) are different.

Operation:[MENU]⇒[Output]⇒[CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4]⇒[OutputLogic]
Setting value: Negative(Default), Positive

・NPN open collector
Negative: A transistor turns ON when comparison output ON (Signal level: 0)
Positive: A transistor turns OFF when comparison output ON (Signal level: 1)

・PNP open collector
Negative: A transistor turns OFF when comparison output ON (Signal level: 0)
Positive: A transistor turns ON when comparison output ON (Signal level: 1)

・Relay(NO, Non-inverted)
Negative: A Relay turns ON when comparison output ON
Positive: A Relay turns OFF when comparison output ON

■ OnBgColors

Select back color that of comparison output ON。
*You can select only the back color, not the text color.

Operation:[MENU]⇒[Output]⇒[CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4]⇒[OnBgColors]

Setting value: Black(Default), Red, Yellow, Green
***When the setting value is black, the back color does not change compered to normal operation.**
***If some comparison outputs are ON at the same time, priority of back color is given in following order.**
AL1 > AL2 > AL3 > AL4

9. INPUT ADVANCED SETTING

Here, the items of input setting which are not explained in the "BASIC SETTING" are explained.

9-1. DC InputA/B, ProcessInputA/B

■ SamplingRate

Select a sampling rate. Max rate of 1ch input products is 4000 sampling per sec(sps), and of 2ch input products is 2000 sps.
Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[SamplingRate]
Setting value:4000sps, 2000sps, 1000sps, 500sps, 200sps, 100sps, 50sps(Default), 20sps, 10sps, 5sps, 2sps, 1sps

■ MoveAve

Select the number of moving average.

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[MoveAve]
Setting value: None(Default), 2times, 4times, 8times, 16times, 32times, 64times

■ InputCorrect

Select linearize ON or OFF.
Linearize is a function to correct by maximum 16 points of polygonal line approximation when the sensor characteristics are nonlinear.

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[InputCorrect]
Setting value: None(Default), Linearize
*** Calculation processing of linearize is performed after calculation processing of "DispLoCut".**
("DispLoCut" is to be described later)

■ LinearizePoint

*This setting item can be set only when "InputCorrect" is "Linearize".
Set the correction value for 16 points of the linearize function.
After the second point, if both the pre-correction and post-correction set values are set to 0, it is judged to be a termination, and the subsequent correction points are invalidated.

ex) In the case of a sensor whose output is dull when the load is large.
(Display value is 0 to 8000 corresponding to 0 to 10 V input)
1stInput : 0
1stOutput: 0

2ndInput : 5000
2ndOutput: 5000

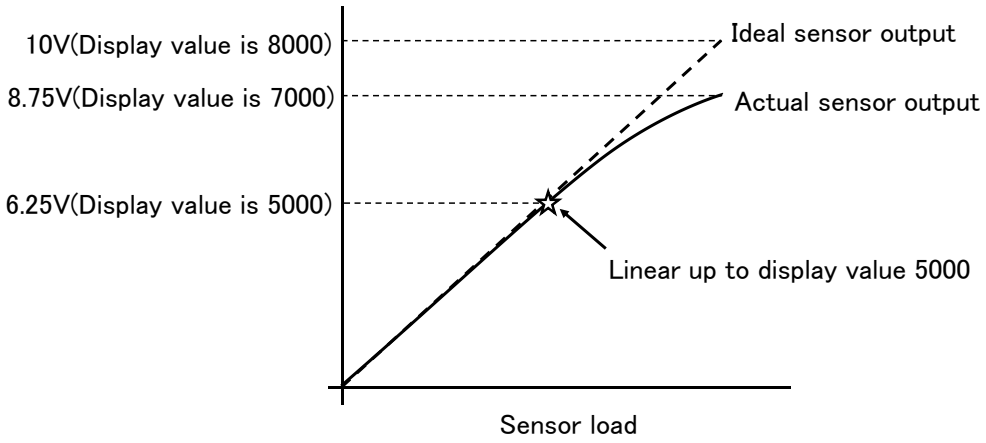
3rdInput : 5800
3rdOutput: 6000

4thInput : 6500
4thOutput: 7000

5thInput : 7000
5thOutput: 8000

6thInput : 0 (Disabled)
6thOutput: 0 (Disabled)
(7 to 16 points are disabled)

Output graph of sensor which output becomes nonlinear at high load



Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[LinearizePoint]

Setting value: 1stInput : ±99999 (Default is 0)
1stOutput: ±99999 (Default is 0)
2ndInput: ±99999 (Default is 1000)
2ndOutput: ±99999 (Default is 1000)
.
.
.
15thInput: ±99999 (Default is 14000)
15thOutput: ±99999 (Default is 14000)
16thInput: ±99999 (Default is 15000)
16thOutput: ±99999 (Default is 15000)

■ DispShift

Set offset of display value.

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[DispShift]
Setting value: ±99999(Default is 0)

■ TrackingZero

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

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[TrackingZero]
Setting value: Interval 0 to 9999[msec](Default is 0)
ActiveArea ±99999(Default is 0)
*** If either of "Interval" or "ActiveArea" is 0, the tracking zero function is invalid.**
*** As the power is turned off, the offset value corrected by tracking zero becomes 0.**

■ DispLimit

Sets the upper and lower limit of the display value. It is effective when you want to suppress output to 10 V even if input is over (ex: 22mA) when input is 4 to 20 mA and output is 0 to 10 V.
ex) When the display value 0 to 10000 is set for the input 4-20 mA and the analog output is 0 to 10 V, the analog output becomes maximum 10 V by setting the "UpperLimit" 10000. (The output is limited to 10 V even when an excessive input of 22 mA is entered)

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[DispLimit]
Setting value: LowerLimit ±99999 (Default is -99999)
UpperLimit ±99999(Default is +99999)

■ DispLoCut

It is a function to cut floating input near zero. If the absolute value of the display value is less than the set value, set the display value to zero.
Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[DispLoCut]
Setting value: 0～99999 (Default is 0)
*** Calculation processing of "DispLoCut" is performed after calculation processing of digital zero function.**

■ InsDispStep

When the minimum digit of display value fluctuates, truncate the minimum digit and stabilize the display.

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[InsDispStep]
Setting value: None (Default): 0 to 9
5steps : 0 to 4 → 0, 5 to 9 → 5
10steps : 0 to 9 → 0

■ ZeroArea

Zero detection is a function to judge whether the display value is around zero and disable comparison output function when it is near zero.
It is effective when measuring the weight of an object, such as suppressing comparison output function when not holding anything on the tare.
In this item, set the range of the display value considered to be near zero.
* To enable this function, it is necessary to set the "ActCondition" of the comparison output function.
(The setting method of the "ActCondition" is [MENU]⇒[Output]⇒[CompareAL1～4]⇒[ActCondition]

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[ZeroArea]
Setting value: 0～99999 (Default is 0)

■ StableArea

It judges whether the display value is stable or not and invalidates the comparison output function when it is not stable. If the variation of the display value at each specified time is within the set value, it is judged stable and the "st" mark will light.
It is effective when measuring the weight of the object caught with a crane when you want to make a comparison output function after the shake falls.
In this item, set the fluctuation range of the display value considered stable.
* Please set it together with "StableTime". This function is invalid if either set value is 0.
* To enable this function, it is necessary to set the "ActCondition" of the comparison output function.
(The setting method of the "ActCondition" is [MENU]⇒[Output]⇒[CompareAL1～4]⇒[ActCondition]

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[StableArea]
Setting value: 0～99999 (Default is 0)

■ StableTime

Same function as "StableArea" and this item is a time parameter for detecting stability of display value.
* Please set it together with "StableArea". This function is invalid if either set value is 0.

Operation:[MENU]⇒[Input]⇒[DC InputA/B][ProcessInputA/B]⇒[StableTime]
Setting value: 0～9999 * 10msec (Default is 0)
***You can set by 10ms steps.**

9-2. 2InputCalc

■ InsDispStep

When the minimum digit of display value fluctuates, truncate the minimum digit and stabilize the display.

Operation:[MENU]⇒[Input]⇒[2InputCalc]⇒[InsDispStep]
Setting value: None (Default): 0 to 9
5steps : 0 to 4 → 0, 5 to 9 → 5
10steps : 0 to 9 → 0

■ DispLimit

Sets the upper and lower limit of the display value. It is effective when you want to suppress output to 10 V even if input is over (ex: 22mA) when input is 4 to 20 mA and output is 0 to 10 V.
ex) When the display value 0 to 10000 is set for the input 4-20 mA and the analog output is 0 to 10 V, the analog output becomes maximum 10 V by setting the "UpperLimit" 10000. (The output is limited to 10 V even when an excessive input of 22 mA is entered)

Operation:[MENU]⇒[Input]⇒[2InputCalc]⇒[DispLimit]
Setting value: LowerLimit ±99999 (Default is -99999)
UpperLimit ±99999(Default is +99999)

10. OUTPUT ADVANCED SETTING

Here, the items of output setting which are not explained in the “BASIC SETTING” are explained.
Since the output options differ depending on the model, the items that can be set change depending on the model.
The correspondence between model number and output option is as follows.
・WPMZ-1-□□□-X□-□□□: No output
・WPMZ-1-□□□-1□-□□□: Analog output
・WPMZ-1-□□□-2□-□□□: BCD output(open collector NPN)
・WPMZ-1-□□□-3□-□□□: BCD output(open collector PNP)
・WPMZ-1-□□□-4□-□□□: RS-232C
・WPMZ-1-□□□-5□-□□□: RS-485(Modbus RTU)

10-1. CompareAL1～4

■ ActCondition

Select the condition of comparison output function.

Operation:[MENU]⇒[Output]⇒[CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4]⇒[ActCondition]
Setting value: Always(Default)
ExceptNearZero *
OnStable *
OnStableExceptNearZero*
OnHold
***Please also set “ZeroArea”, “StableArea”, “StableTime” of input setting.**

■ OnDelay

This is a delay function that comparison output turns ON when the comparison condition is kept continuously for the set time or more.

Operation:[MENU]⇒[Output]⇒[CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4]⇒[OnDelay]
Setting value: None(Default),20ms,50ms,100ms,200ms,500ms,1s,5s,10s,20s,

■ OffDelay

This is a delay function that comparison output turns OFF when the comparison condition is kept continuously for the set time or more.

Operation:[MENU]⇒[Output]⇒[CompareAL1], [CompareAL2], [CompareAL3], [CompareAL4]⇒[OffDelay]
Setting value: None(Default),20ms,50ms,100ms,200ms,500ms,1s,5s,10s,20s,

10-2. BCD output

*In products that have no BCD output option, this setting item is invisible.

■ PatternSelect

You can store and set up 8 patterns (8 kinds) of various settings such as input and output with this unit, you can select the pattern to save the setting in "PatternSelect".

Operation:[MENU]⇒[Output]⇒[BCDOutput]⇒[PatternSelect]
Setting value:Pattern1, Pattern 2, ・・・・・Pattern 8

* At the time of opening the menu, the setting pattern is the value selected as operating on the measurement screen.
* Since the setting pattern is common in each setting, "PatternSelect" such as input setting is also changed when "PatternSelect" is changed by "BCD output”.

■ OutputDispValue

Select reference source of analog output.
*In 1ch products, [Bch] and [Calc] are invisible.

Operation:[MENU]⇒[Output]⇒[BCDOutput]⇒[OutputDispValue]
Setting value: None(Default), Ach, Bch, Calc

■ DataSignalLogic

Select output logic of BCD output data.

Operation:[MENU]⇒[Output]⇒[BCDOutput]⇒[DataSignalLogic]
Setting value: Negative(Default), Positive

■ SynSignalLogic

Select output logic of BCD output synchronized signal.

Operation:[MENU]⇒[Output]⇒[BCDOutput]⇒[SynSignalLogic]
Setting value: Negative(Default), Positive
***When acquiring data of BCD, when the synchronous signal (PC signal) is negative logic, please do it when the transistor is OFF (rising edge or 1 level of the synchronous signal). In the case of positive logic, please do it when the transistor is ON (falling edge of synchronous signal is 0 level).**
*** Since it is described based on the NPN open collector output, the output level is reversed in case of PNP output.**

10-3. Modbus Communication

This item is valid only for products with output option RS - 485 (Modbus RTU).
When using Modbus communication output, in addition to this setting item, please refer to "WPMZ Series Modbus communication instruction manual supported module type WPMZ - 1/3" from our website.
*In products that have no Modbus communication option, this setting item is invisible.

■ SlaveAddress

Select slave address of Modbus communication.

Operation:[MENU]⇒[Output]⇒[ModbusCom]⇒[SlaveAddress]
Setting value: 1～31(Default is 1)

■ Baudrate

Select baudrate of Modbus communication.

Operation:[MENU]⇒[Output]⇒[ModbusCom]⇒[Baudrate]
Setting value: 9600bps, 19200bps(Default), 38400bps

■ Parity

Select parity of Modbus communication.

Operation:[MENU]⇒[Output]⇒[ModbusCom]⇒[Parity]
Setting value: None, Even(Default), Odd

10-4. RS-232C Communication

This item is valid only for products with output option RS-232C communication.
When using RS-232C communication output, in addition to this setting item, please refer to "RS-232C Originalcommand/Originaloutput communication manual supported module type WPMZ - 1/3" from our website.
*In products that have no RS-232C communication option, this setting item is invisible.

■ Protocol

Select protocol of RS-232C communication.

・Modbus-RTU: Modbus communication
・OriginalCommand: The master (PC etc) sends the command, and the slave (this product) sends the response message.
・OriginalOutput: The slave (this product) sends a message to the master (PC etc.) at regular intervals. The slave (this product) will reject messages from the master.
* For details, refer to " RS-232C Originalcommand/Originaloutput communication manual supported module type WPMZ-1/3".

Operation:[MENU]⇒[Output]⇒[RS-232C Com]⇒[Protocol]
Setting value: Modbus-RTU (Default), OriginalCommand, OriginalOutput

■ Baudrate

Select baudrate of RS-232C communication.

Operation:[MENU]⇒[Output]⇒[RS-232C Com]⇒[Baudrate]
Setting value: 9600bps, 19200bps(Default), 38400bps

■ DataLength

*Valid only when the protocol is " OriginalCommand " or " OriginalOutput ".
Select data length of RS-232C communication.

Operation:[MENU]⇒[Output]⇒[RS-232C Com]⇒[DataLength]
Setting value: 7bit(Default),8bit

■ Parity

Select parity of RS-232C communication.

Operation:[MENU]⇒[Output]⇒[RS-232C Com]⇒[Parity]
Setting value: None, Even(Default), Odd

■ Stopbit

*Valid only when the protocol is " OriginalCommand " or " OriginalOutput ".
Select length of stopbit of RS-232C communication.

Operation:[MENU]⇒[Output]⇒[RS-232C Com]⇒[Stopbit]
Setting value: 1bit(Default),2bit

■ Delimiter

*Valid only when the protocol is " OriginalCommand " or " OriginalOutput ".
Select delimiter of RS-232C communication.

Operation:[MENU]⇒[Output]⇒[RS-232C Com]⇒[Delimiter]
Setting: CR LF(Default),CR

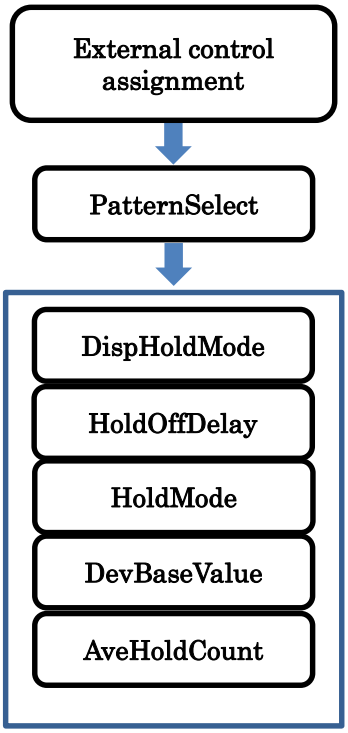
11. EXTERNAL CONTROL FUNCTION

11-1. OVERVIEW

As the external control function, the functions of "comparison reset", "hold (various types of hold)", "hold reset", "digital zero", "pattern select", "switching measurement display", "trend log", etc. These functions can be executed by assigning functions to external control terminals 1 to 5.

*In addition to terminal control, each external control can be assigned (registered) to 4 cross keys using the shortcut function, and the assigned shortcut function can be executed by pressing and holding the key for 1 second on the measurement screen.

Setting of external control function is proceed as follow.
Each setting items about external control assignment are set up at [Setting]⇒[Input]⇒[ExternalCtrl]⇒[ExtCtrl1Func], [ExtCtrl2Func], [ExtCtrl3Func], [ExtCtrl4Func], [ExtCtrl5Func], and about hold function are set up at [Setting]⇒[Input]⇒[HoldA], [HoldB]



*Since external control assignment also includes pattern control, patterns can not be registered.

*Pattern registration is possible about hold function.

【Setting fot hold function】

*Set the items for hold function. If you do not use related holding function, you do not need to set it.

DisoMode: Used with "DispHoldA, B, A&B" function
HoldOffDelay: Used with " DispHoldA, B, A&B " function
HoldMode: Used in each holding function
DevBaseValue: Used for "DevHoldA, B, A&B" function
AveHoldCount: Used with "AveHoldA, B, A&B" function

* Each setting is saved and reflected at the timing of closing the menu and returning to the measurement screen. Please note that the contents will not be saved if the power is turned off before closing the menu.

■ External control function list

The list of functions that can be assigned to external control is as follows.
Details of each function and setting will be described on the following pages after this section.

Function	Operation
None	None
CompareReset	Function to turn off all comparison output function
DispHoldA/B/A&B	Function to hold display value
MaxHoldA/B/A&B	Function to hold max value (Peak hold)
MinHoldA/B/A&B	Function to hold min value (Bottom hold)
AmpHoldA/B/A&B	Function to hold difference between max and min(Peak to peak hold)
DevHoldA/B/A&B	Function to hold display value the most distant from reference value
AveHoldA/B/A&B	Function to stabilize the display value by performing moving average for the specified number of times

HoldResetA/B/A&B	Function to reset holding state
DigitalZeroA/B/A&B	Function to zero display value as offset
MonitorChange	Function to switch measurement display (Same as Disp key)
TrendLog	Function to instruct starting trend log (This is disable if it started already)
PatternChange1/2/3	Function to switch operating pattern (Use 3 terminals max)

*A/B/A&B of function column indicate Ach operation, Bch operation, both Ach and Bch operation.
*If same function is assigned to some external control terminals, the function will operate regardless of which pin is used.
*"DispHold" is independent of other holding functions.
*When the function execution timings are simultaneous, it operates with the following priority order.
MaxHold > MinHold > AmpHold > DevHold > AveHold

■ 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.

11-2. Details of functions

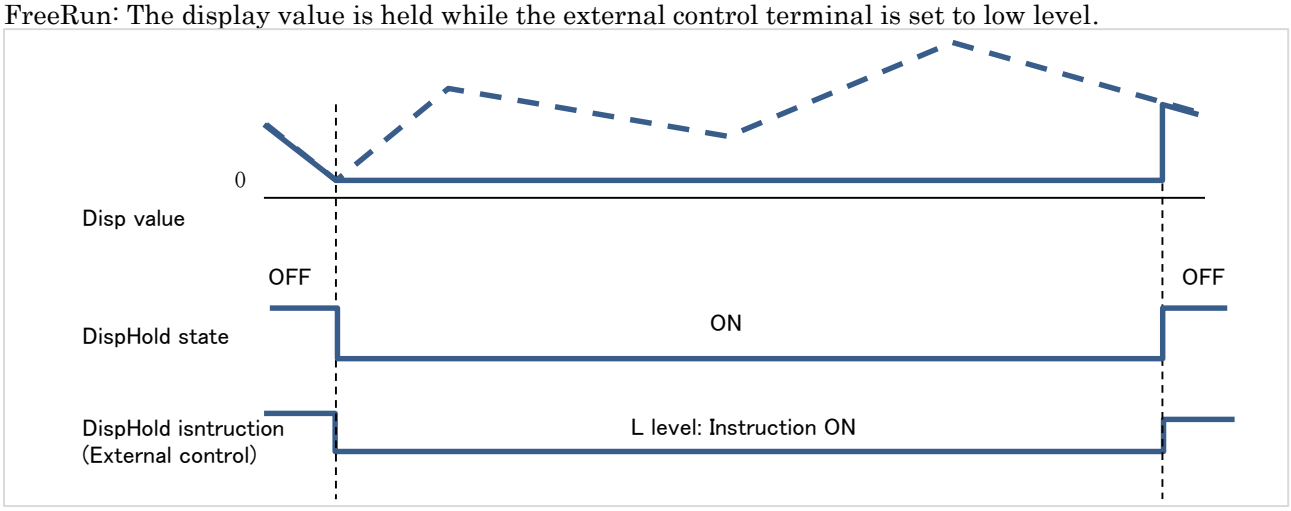
■ CompareReset

This 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.

■ DispHold

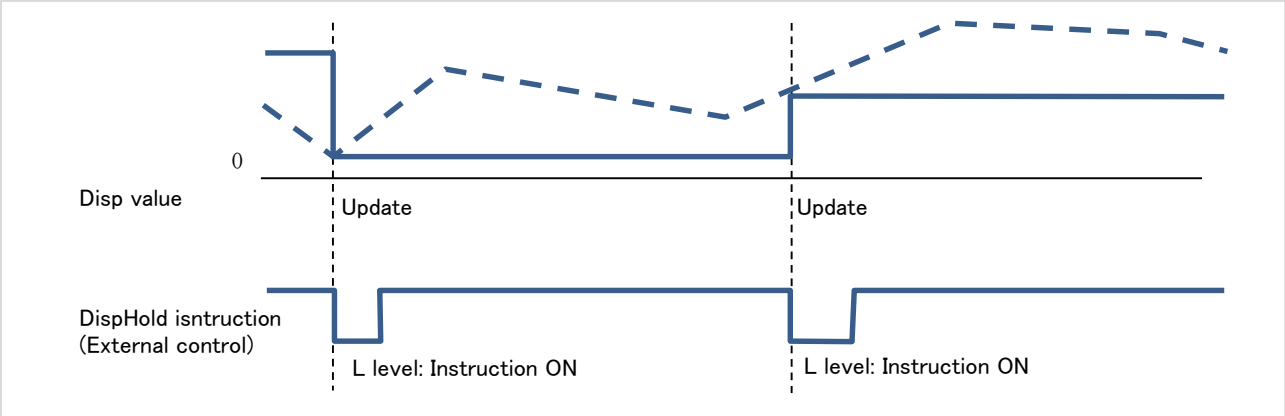
This function stops the display value update independently of other holding functions.
Measurement is continued internally during holding, and the latest display value including other holding operation such as maximum value holding is displayed at the time of release.
The function has two modes, "FreeRun" and "OneShot", and you can change the mode with the "DispHoldMode".

FreeRun: The display value is held while the external control terminal is set to low level.



*If "HoldOffDelay" is set, holding is canceled after the set time passed after the instruction is turned off.

OneShot: The display value is kept constant all the time, and it is updated every time the external control terminal falls.



*If "HoldOffDelay" is set, holding is canceled after the set time passed after the instruction is turned off.

■ MaxHold

This function holds the maximum value of display value. There are two modes of “NormalHold” and “AreaHold”, and the mode can be changed by the “HoldMode”.

NormalHold: As long as the external control terminal is set to the L level, the display continues to be updated with the maximum value. By setting the pin to H level, holding is canceled and the latest display value is displayed.

AreaHold: As long as the external control terminal is set to the L level, the display continues to be updated with the maximum value. When the terminal is set to H level, it keeps holding at the maximum value at that point.

* When the display value becomes OVER during control of the maximum value holding function, the OVER display will not disappear unless control is canceled once.

■ MinHold

This function holds the minimum value of display value. There are two modes of “NormalHold” and “AreaHold”, and the mode can be changed by the “HoldMode”.

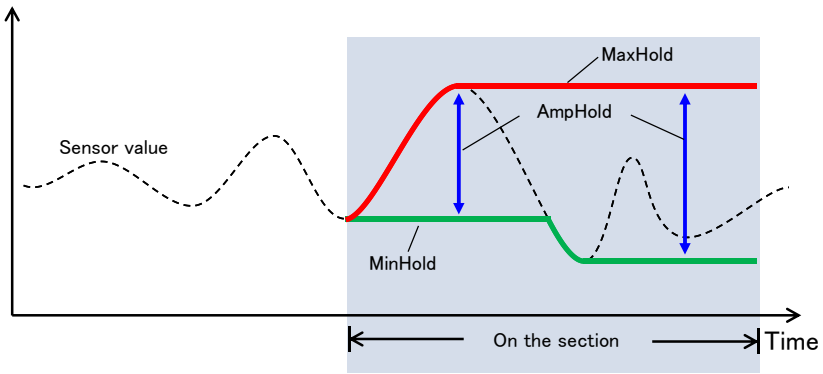
NormalHold: As long as the external control terminal is set to the L level, the display continues to be updated with the minimum value. By setting the pin to H level, holding is canceled and the latest display value is displayed.

AreaHold: As long as the external control terminal is set to the L level, the display continues to be updated with the minimum value. When the terminal is set to H level, it keeps holding at the minimum value at that point.

* When the display value becomes -OVER during control of the minimum value holding function, the -OVER display will not disappear unless control is canceled once.

■ AmpHold (Peak to peak)

This function holds the difference between maximum and minimum value.



There are two modes of “NormalHold” and “AreaHold”, and the mode can be changed by the “HoldMode”.

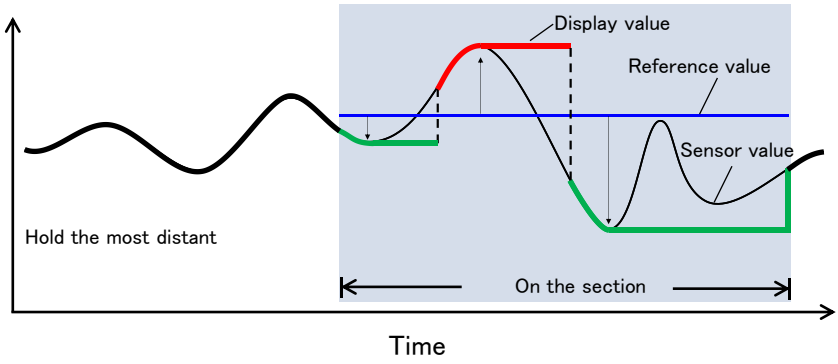
NormalHold: As long as the external control terminal is set to the L level, the display continues to be updated with the peak to peak value. By setting the pin to H level, holding is canceled and the latest display value is displayed.

AreaHold: As long as the external control terminal is set to the L level, the display continues to be updated with the peak to peak value. When the terminal is set to H level, it keeps holding at the peak to peak value at that point.

* When the display value becomes OVER during control of the peak to peak value holding function, the OVER display will not disappear unless control is canceled once.

■ DevHold

This function holds value that is the most distant from reference value. The reference value is set with "DevBaseValue".
It is used to indicate the position of the error with respect to the target control value.
*Note that this function holds not difference value but display value.



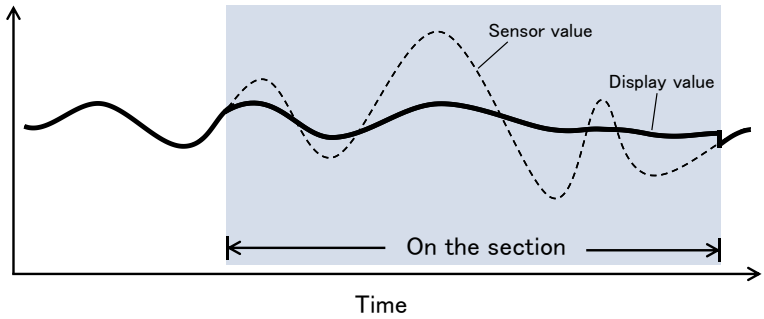
There are two modes of "NormalHold" and "AreaHold", and the mode can be changed by the "HoldMode".

NormalHold: As long as the external control terminal is set to the L level, the display continues to be updated with the most distant value. By setting the pin to H level, holding is canceled and the latest display value is displayed.

AreaHold: As long as the external control terminal is set to the L level, the display continues to be updated with the most distant value. When the terminal is set to H level, it keeps holding at the most distant value at that point.

■ AveHold

This function performs additional moving average while running.
The average number of times is set by the "AveHoldCount" of the setting item.
It is effective in temporarily canceling vibration influences etc. by the external environment.



There are two modes of "NormalHold" and "AreaHold", and the mode can be changed by the "HoldMode".

NormalHold: As long as the external control terminal is set to the L level, the display continues to be updated with the moving average value. By setting the pin to H level, holding is canceled and the latest display value is displayed.

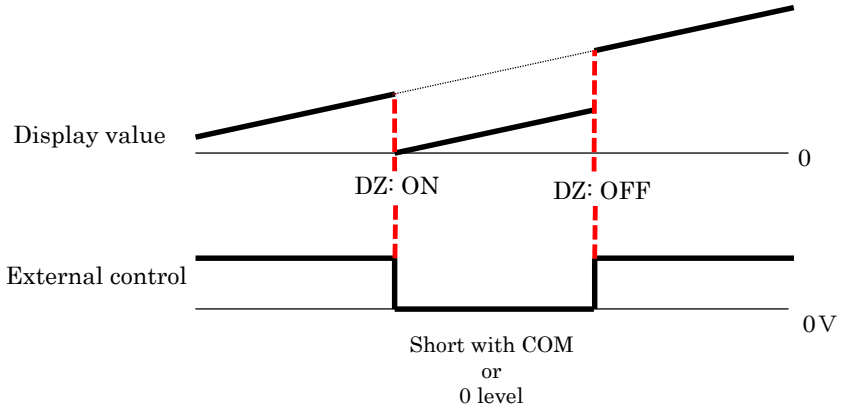
AreaHold: As long as the external control terminal is set to the L level, the display continues to be updated with the moving average value. When the terminal is set to H level, it keeps holding at the moving average value at that point.

■ HoldReset

This is a function to cancel all holding state and display the latest display value during function ON.
The function becomes valid while the terminal is "0" level or shorted with the COM terminal.

■ DigitalZero

The digital zero function (DZ) is a function to set the display value to zero when the DZ instruction is made. The display is offset during the DZ instruction, and the fluctuation width from the start of instruction is treated as the display value.
"DZ" icon is displayed on the measurement screen during operation.



In addition, when restarting after turning off the power, it is also possible to set the offset by the DZ function at last power off.
For details, refer to the contents of “D-ZeroRetention” in the system setting.

⚠Caution

1) If the DZ instruction is issued during execution of various holding functions, the digital zero function is executed immediately after the end of these holding.
2) If the DZ indication is issued during the display value is OVER or -OVER, the digital zero is executed immediately after OVER or -OVER is lost.

■ MonitorChange

This is a function to switch the measurement display. The kind of displays are selected by [MENU]⇒[Display]⇒[DispSelect]
The screen is switched by shorting the terminal for 20 ms or longer with the COM terminal or setting it to "0" level (falling edge detection), releasing the terminal once and shorting again will cause the screen to switch again.
It is the same as the “DISP key” on the front panel.

■ TrendLog

This is a function to start acquiring trend data automatically apart from alarm log function. This function operates even without alarm. Data storage starts with shorting the terminal for 20 ms or more or setting it to "0" level (falling edge detection).
Please check the section about log for the contents of the log and how to view it.
* Log data cannot be saved even if trend log signal is input while trend data is being saved.

■ PatternChange

You can store and set up 8 patterns (8 kinds) of various settings such as input and output with this unit.
You can select a pattern by setting the terminals 1, 2, 3 to high or low.
Even if you only use one terminal, you can select pattern 1 or 2.

Even if you only use terminals 1 and 2, you can select pattern 1 or 2 or 3 or 4.
*Functions not assigned to external control terminals are treated as “open”.

Function	Selected Pattern							
	1	2	3	4	5	6	7	8
PatternChange1	Open	Short	Open	Short	Open	Short	Open	Short
PatternChange 2	Open	Open	Short	Short	Open	Open	Short	Short
PatternChange 3	Open	Open	Open	Open	Short	Short	Short	Short

Open: Open the terminal or set to “1” level.
Short: Short the terminal with “COM” terminal or set to “0” level.

⚠CAUTION

When the pattern is switched, the measurement data before switching is cleared and measurement starts from the switching point.

11-3. Setting Items

■ DispHoldMode

You can switch the operating mode of DispHold either “FreeRun” or “OneShot”.
FreeRun: The display value is held while the external control terminal is set to low level.
OneShot: The display value is kept constant all the time, and it is updated every time the external control terminal falls.

For details, please refer the content about “DispHold”.

Operation: [MENU]⇒[Input]⇒[HoldA] [HoldB]⇒[DispHoldMode]
Setting value: Normal (Default), OneShot

■ HoldOffDelay

You can set the delay about when the DispHold function is canceled.
There are differences in the delay operation for each “FreeRun” and “OneShot” shown below.
“FreeRun”: You can set the time from release of device to release of hold.
“OneShot”: You can set the time from release of device to update of display value.
This function is disable when the setting value is 0.

Operation: [MENU]⇒[Input]⇒[HoldA] [HoldB]⇒[HoldOffDelay]
Setting value:0～99.99[sec] (Default is 0)

⚠CAUTION

Setting of retention cancellation delay is effective only for "DispHold".
No delay occurs when releasing other holding functions.

■ HoldMode

You can switch the operation mode of each holding function except "DispHold" function to "NormalHold" or "AreaHold".
The basic operation of each mode is as follows.
"NormalHold": The hold function is executed while the terminal is short-circuited and released when the terminal is released
"AreaHold": The hold function is executed while the terminal is short-circuited, and the display value is fixed with the final holding value when the terminal is released
For details of operation of each holding function, please confirm the holding function explanation.

Operation: [MENU]⇒[Input]⇒[HoldA] [HoldB]⇒[HoldMode]
Setting value: NormalHold(Default), AreaHold

> ⚠CAUTION
>
> Because it is a common setting, you can not specify the mode for each holding function.
> It is possible to change the setting for each input channel.

■ DevBaseValue

You can set a reference value for “DevHold”. Please confirm the page of "DevHold" function.

Operation: [MENU]⇒[Input]⇒[HoldA] [HoldB]⇒[DevBaseValue]
Setting value:±99999 (Default is 0)

■ AveHoldCount

You can set the additional moving average number during “AveHold” operation. Please confirm the "AveHold" function.

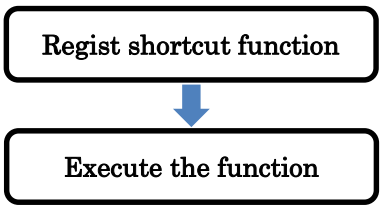
Operation: [MENU]⇒[Input]⇒[HoldA] [HoldB]⇒[AveHoldCount]
Setting value:None(Default), 2times, 4times, 8times, 16time, 32times, 64times

12. SHORTCUT

12-1. OVERVIEW

The shortcut function allows you to control the external control function by key operation. You can regist external control functions, "ManuAdjust" function and "AutoAdjust" function in the each upper, lower, left, and right keys.
Please set it when calibration work is used frequently.

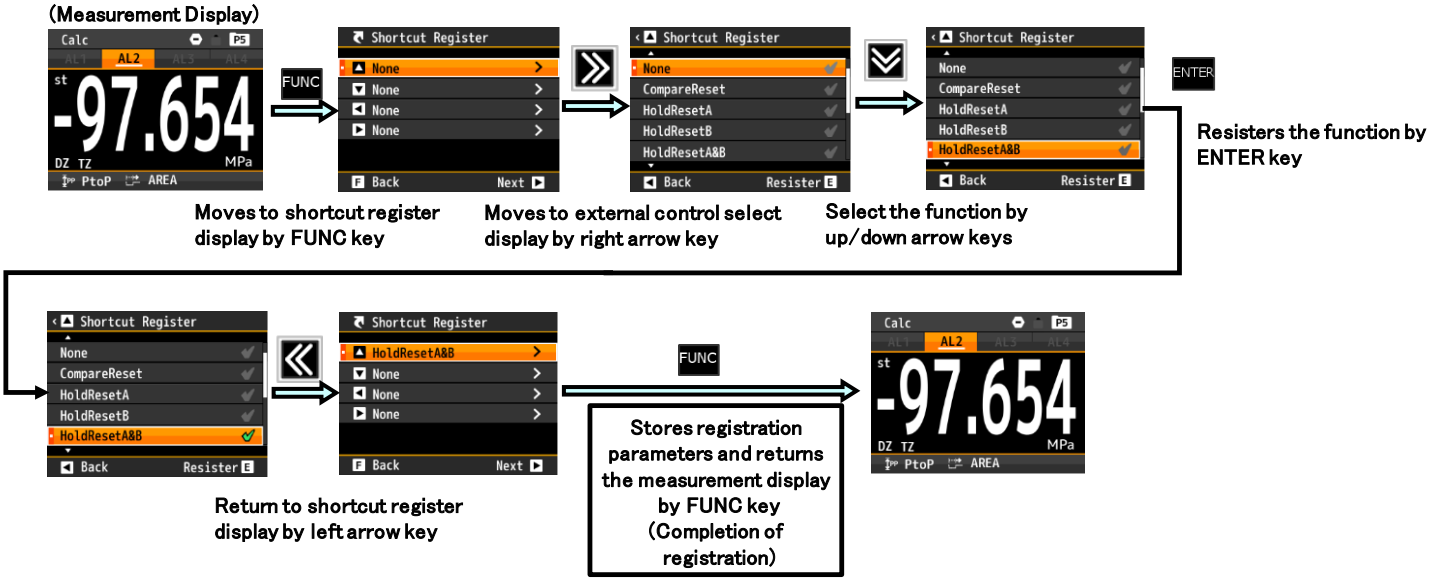
Register the function on the shortcut registration screen and execute the function by pressing and holding the corresponding cross key for 1 second on the measurement screen.



*Shortcut Register display will open when push FUNC key at measurement screen.

12-2. How to regist

Register the shortcut function by the following procedure.



12-3. How to execute

The relationship between function execution operation and terminal control is as shown in the table below.

	Terminal control	Shortcut
ON/OFF operation	ON: Short with COM terminal (or input “Low”) OFF: Open the terminal (or input “High”)	ON: Press and hold the key for 1sec OFF: Press and hold again the key for 1sec
Trigger Operation(*)	The function is executed at each falling edge when shorting with the COM terminal. (or input “Low”)	The function is executed at each pressing and holding the key for 1sec.

*The function to perform trigger operation is "DispHold (When DispHoldMode is “OneShot”)", "MonitorChange", "TrendLog".
*“PatternChange” operates continuously switching when continuing long press.

There are three operation methods of external control function, terminal control, shortcut, and communication function, but there are the relationships shown in the table below as the operation at the time of simultaneous execution.

ON operation	If one of the control methods is ON, the function will be ON.
OFF operation	The function is canceled when both control states (terminal control and communication) are OFF. The function ON state by shortcut is automatically canceled by OFF operation either of terminal control or communication.
Trigger operation	It is possible to operate simultaneously by any control method. However, if each function is not ready for operation again, it cannot operate.

12-4. Control function list

Shows the list of functions that can be registered as a shortcut function.
Please check each function description for each operation details.
Other control functions ⇒ describe details in "11. EXTERNAL CONTROL FUNCTION".

Function	Operation
None	None
CompareReset	Function to turn off all comparison result and its output.
DispHold A/B/A&B	Function to hold display value of current value.
MaxHold A/B/A&B	Function to hold the maximum value of display.
MinHold A/B/A&B	Function to hold the minimum value of display.
AmpHold A/B/A&B	Function to hold difference between maximum and minimum.
DevHold A/B/A&B	Function to hold a display value most distant from an arbitrary reference value.
AveHold A/B/A&B	Function to stabilize the display by performing additional moving average for the specified number of times.
HoldResetA/B/A&B	Function to reset holding state.
DigitalZero A/B/A&B	Function to zero display value.
TrendLog	Function to start trend logging, invalid if logging is already in progress.
PatternChange 1/2/3	Function to change active pattern (up to 3 terminals used).

* A/B/A&B in the function column indicate Ach operation, Bch operation, Ach / Bch simultaneous operation, respectively.

*Only pattern change function, pattern is switched in order shown below. Pattern changing is carried out every seconds when you press and hold the button.
Pattern 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 1 → (continue)

13. DISPLAY SETTINGS

This section explains the items of the display setting.
The screen displayed on the measurement screen is as follows.

・Measure Disp: Displayed values of Ach, Bch, calculation are displayed with numbers. It is a display method which is displayed with large letters and real values are easy to see.
・Level Disp: The display values of Ach, Bch and calculation are displayed in level notation. It is a display method which can understand the ratio to the setting upper limit value and the lower limit value at a glance.
・Trend Disp: Displays the display values of Ach, Bch and calculation in a trend graph. It is a display method that makes it easy to understand the change with time of the display value.

If you press Disp key, the display is switched to next display. The order of displays is shown below.
Measurement display ⇒ Level display ⇒ Trend display ⇒ Measurement display (repeat).

13-1. Display select

■ Measurement display select

Select the screen to be displayed as measurement screen.

Operation:[MENU]⇒[Display]⇒[Display select]⇒[MeasureSelect]

Setting value (Multiple selection is possible.)

MeasureSelect	Operation	Display type	Initial display
Ach	Screen shows only display value of Ach.	1 parameter	○ (when 1 input)
Bch	Screen shows only display value of Bch.	1 parameter	
Calc	Screen shows only calculated value.	1 parameter	
Ach + Comp	Screen show display value of Ach and threshold for comparison judgment.	1 parameter + comparison	
Bch + Comp	Screen show display value of Bch and threshold for comparison judgment.	1 parameter + comparison	
Calc + Comp	Screen show calculated value and threshold for comparison judgment.	1 parameter + comparison	
Ach + Bch	Screen show display values of Ach and Bch.	2 parameters	○ (when 2 inputs)
Calc + Ach + Bch	Screen show calculated value and display values of Ach and Bch.	3 parameters	

*In 1ch products, some setting items are invisible.

■ Level display select

Select the screen to be displayed as level screen.

Operation:[MENU]⇒[Display]⇒[Display select]⇒[LevelSelect]

Setting value (Multiple selection is possible.)

MeasureSelect	Operation	Display type	Initial display
Ach	Screen shows only level value of Ach.	1 parameter	○ (when 1 input)
Bch	Screen shows only level value of Bch.	1 parameter	
Calc	Screen shows only calculated value as level value.	1 parameter	
Ach + Bch	Screen show level values of Ach and Bch.	2 parameters	○ (when 2 inputs)

*In 1ch products, some setting items are invisible.
*3 parameter display is not available in level display select.

■ Trend display select

Select the screen to be displayed as trend screen.

Operation:[MENU]⇒[Display]⇒[Display select]⇒[TrendSelect]

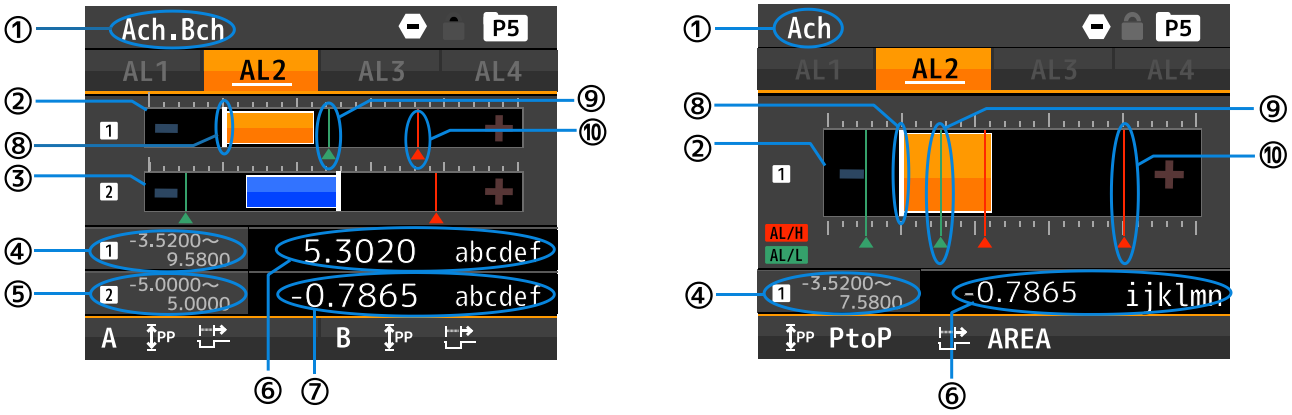
Setting value (Multiple selection is possible.)

MeasureSelect	Operation	Display type	Initial display
Ach	Screen shows only display value of Ach as trend graph.	1 parameter	○ (when 1 input)
Bch	Screen shows only display value of Bch as trend graph.	1 parameter	
Calc	Screen shows only calculated value of Ach as trend graph.	1 parameter	
Ach + Bch	Screen show display values of Ach and Bch as trend graph.	2 parameters	○ (when 2 inputs)

*In 1ch products, some setting items are invisible.
*3 parameter display is not available in trend display select.

13-2. Level display

Level display show display values and level values.
You can set each upper limit and lower limit freely and they are also shown.
1 parameter or 2 parameters are shown in the display.



Number	Explain
①	Display title of the screen. *First element is Ach, Second element is Bch.
②	Display level value of first element(Ach) as bar graph. When the value is a positive number, the color of the bar graph is orange, and when the value is a negative number it is displayed in blue.
③	Display level value of second element(Bch) as bar graph. When the value is a positive number, the color of the bar graph is orange, and when the value is a negative number it is displayed in blue.
④	Upper and lower limit of first element(Ach).
⑤	Upper and lower limit of second element(Bch).
⑥	Display value and unit of first element(Ach).
⑦	Display value and unit of second element(Bch).
⑧	While line in bar graph means zero value.
⑨	**Green line means lower threshold** of comparison judgement. You can select thresholds that should be displayed in [MENU]⇒[Display]⇒[Display select]⇒[LevelSelect] ⇒[ALSelect] *Threshold for other input channel is not displayed.
⑩	**Green line means upper threshold** of comparison judgement. You can select thresholds that should be displayed in [MENU]⇒[Display]⇒[Display select]⇒[LevelSelect] ⇒[ALSelect] *Threshold for other input channel is not displayed.

Caution:Others except ① to ⑩ are listed in [6-1. NAMES OF EACH PART].

⚠Caution

Thresholds are displayed only when the setting “Comparison mode” is “Level operation”.

■ PatternSelect

You can store and set up 8 patterns (8 kinds) of various settings such as input and output with this unit, you can select the pattern to save the setting in "PatternSelect".
* Actual pattern switching is done by "Pattern switching of external control function" or "Assign pattern switching of external control function to shortcut key".

Operation:[MENU]⇒[Display]⇒[LevelDisp]⇒[PatternSelect]
Setting value:Pattern1, Pattern 2, ・・・・・Pattern 8

* At the time of opening the menu, the setting pattern is the value selected as operating on the measurement screen.
* Since the setting pattern is common in each setting, "PatternSelect" such as input setting is also changed when "PatternSelect" is changed by "LevelDisp”.

■ Ach Scale

Set upper limit and lower limit in Level Display of Ach.
*This is not scaling for display value of Ach, but only set limits of values in level display.

Operation:[MENU]⇒[Display]⇒[LevelDisp]⇒[Ach Scale]
Setting value: Lower limit: ±99999 (Initial value is 0)
Upper limit: ±99999 (Initial value is 10000)

■ Bch Scale

Set upper limit and lower limit in Level Display of Bch.
*This is not scaling for display value of Bch, but only set limits of values in level display.

Operation:[MENU]⇒[Display]⇒[LevelDisp]⇒[Bch Scale]
Setting value: Lower limit: ±99999 (Initial value is 0)
Upper limit: ±99999 (Initial value is 10000)

■ CalcScale

Set upper limit and lower limit in Level Display of calc value.
*This is not scaling for display value of calc value, but only set limits of values in level display.

Operation:[MENU]⇒[Display]⇒[LevelDisp]⇒[CalcScale]
Setting value: Lower limit: ±99999 (Initial value is 0)
Upper limit: ±99999 (Initial value is 10000)

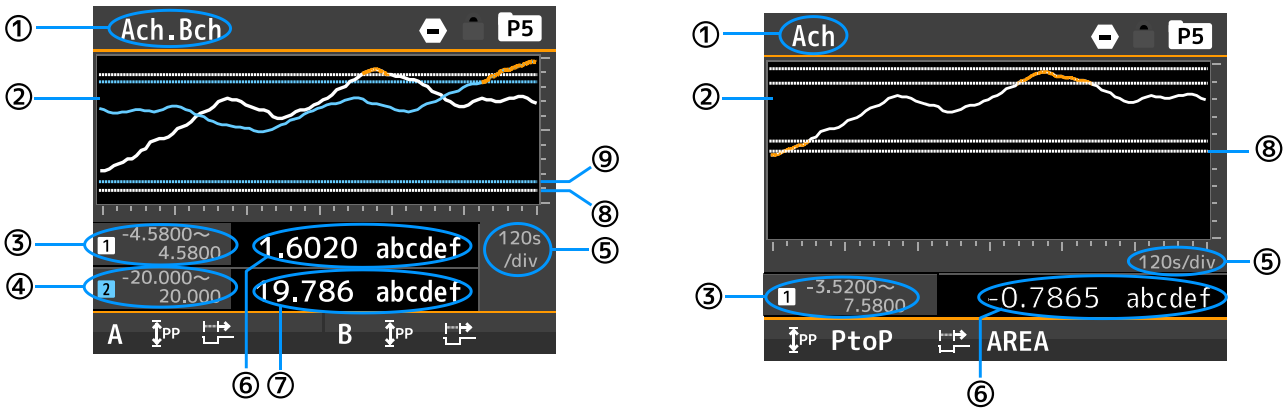
■ ALSelect

Set alarms(AL1～4) that should be display in level display.

Operation:[MENU]⇒[Display]⇒[LevelDisp]⇒[ALSelect]
Setting value: AL1 ON/OFF (Initial state is ON)
AL2 ON/OFF (Initial state is ON)
AL3 ON/OFF (Initial state is ON)
AL4 ON/OFF (Initial state is ON)

13-3. TrendDisp

Trend display shows trend graph of selected CH.
As the right side is new value, and left side is old value.
Setting items are upper and lower limit and time axis.
Less than 2 parameters are displayed.



項目	内容
①	Display title of the screen. *First element is Ach, Second element is Bch.
②	Display trend graph. White line is first trend graph(Ach). Blue line is second graph(Bch). Orange line means overring the limit(Color is common in both A and B graph.)
③	Display upper and lower limits of first element(Ach).
④	Display upper and lower limits of socond element(Bch).
⑤	Display time scale of the graph. *Time scale is common in both Ach and Bch.
⑥	Display first element(Ach) value and unit.
⑦	Display first element(Ach) value and unit.
⑧	**White dash line** means threshold of first element.
⑨	**Blue dash line** means threshold of first element

Caution:Others except ① to ⑨ are listed in [6-1. NAMES OF EACH PART].

> ⚠Caution
> Thresholds are displayed only when the setting “Comparison mode” is “Level operation”.

■ PatternSelect

You can store and set up 8 patterns (8 kinds) of various settings such as input and output with this unit, you can select the pattern to save the setting in "PatternSelect".
* Actual pattern switching is done by "Pattern switching of external control function" or "Assign pattern switching of external control function to shortcut key".

Operation:[MENU]⇒[Display]⇒[TrendDisp]⇒[PatternSelect]
Setting value:Pattern1, Pattern 2, ・・・・・Pattern 8

* At the time of opening the menu, the setting pattern is the value selected as operating on the measurement screen.
* Since the setting pattern is common in each setting, "PatternSelect" such as input setting is also changed when "PatternSelect" is changed by "TrendlDisp”.

■ Ach Scale

Set upper limit and lower limit in Trend Display of Ach.
*This is not scaling for display value of Ach, but only set limits of values in level display.

Operation:[MENU]⇒[Display]⇒[TrendDisp]⇒[Ach Scale]
Setting value: Lower limit: ±99999 (Initial value is 0)
Upper limit: ±99999 (Initial value is 10000)

■ Bch Scale

Set upper limit and lower limit in Trend Display of Bch.
*This is not scaling for display value of Bch, but only set limits of values in level display.

Operation:[MENU]⇒[Display]⇒[TrendDisp]⇒[Bch Scale]
Setting value: Lower limit: ±99999 (Initial value is 0)
Upper limit: ±99999 (Initial value is 10000)

■ CalcScale

Set upper limit and lower limit in Trend Display of calc value.
*This is not scaling for display value of calc value, but only set limits of values in level display.

Operation:[MENU]⇒[Display]⇒[TrendlDisp]⇒[CalcScale]
Setting value: Lower limit: ±99999 (Initial value is 0)
Upper limit: ±99999 (Initial value is 10000)

■ ALSelect

Set alarms(AL1～4) that should be display in Trend display.

Operation:[MENU]⇒[Display]⇒[TrendDisp]⇒[ALSelect]
Setting value: AL1 ON/OFF (Initial state is ON)
AL2 ON/OFF (Initial state is ON)
AL3 ON/OFF (Initial state is ON)
AL4 ON/OFF (Initial state is ON)

■ TimeAxis

Set time axis of trend display.

Operation:[MENU]⇒[Display]⇒[TrendDisp]⇒[TimeAxis]
Setting value: 100ms/div,1s/div (Initial state),2s/div,5s/div,10s/div,30s/div,60s/div,120s/div
***When you change time scale, past graph is erased.**

14. SYSTEM SETTINGS

This section explains the items of the system setting.

14-1. General

■ Brightness

Set screen brightness.

Operation:[MENU]⇒[System]⇒[General]⇒[Brightness]
Setting value: 5 Bright(Initial state), 4, 3, 2, 1 (Dark), 0 (Off)
***When the setting is 0(Off), screen lighting up only when you push MENU key or FUNC key.**

■ PowerOnDelay

Set time until to start measuring after power on.
*While waiting for measurement start, screen shows [-----] and each output turn OFF.

Operation:[MENU]⇒[System]⇒[General]⇒[PowerOnDelay]
Setting value: None (Initial state), 2Sec, 5Sec, 10Sec, 20Sec, 30Sec, 60Sec

■ PowerSavingTime

Set the time to turn off the screen when there is no operation for a certain period of time.
*Screen turns ON when some key is operated.

Operation:[MENU]⇒[System]⇒[General]⇒[PowerSavingTime]
Setting value: None (Initial state), 1min, 2min, 5min, 10min, 30min, 60min

■ D-ZeroRetention

This function continuous D-Zero function even when re-power on.
(D-Zero function is reset at re-power on as default.)

Operation:[MENU]⇒[System]⇒[General]⇒[D-ZeroRetention]
Setting: Disable (Initial state), Enable

■ Language

Select menu language.

Operation:[MENU]⇒[System]⇒[General]⇒[Language]
Setting: English (Initial state), 日本語(Japanese)

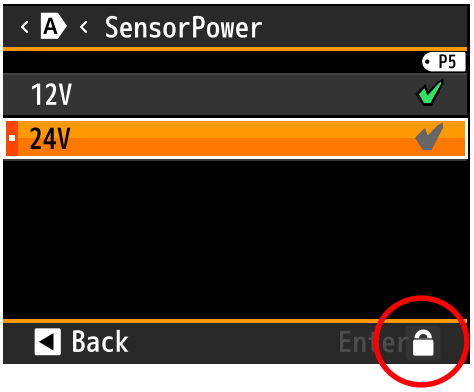
■ DisplayDirection

Select direction of display.
*When the direction is changed, the cross key is also changed and measured values are initialized.

Operation:[MENU]⇒[System]⇒[General]⇒[DisplayDirection]
Setting: Horizontal (Initial state), Vertical

■ SettingProtect

This function forbids changing other settings. You need to disable this function to change other settings.
(You can check settings but can't change settings.)
*When this function is enabled, protecting icon is displayed as follows.



Operation:[MENU]⇒[System]⇒[General]⇒[SettingProtect]
Setting: Disable (Initial state), Enable

■ DisplayUpdateCycle

Select a cycle of updating display.

Operation:[MENU]⇒[System]⇒[General]⇒[DisplayUpdateCycle]
Setting: 10 sps (Initial state), 1 sps

■ PatternCopy

Copy pattern to other pattern.

Operation:[MENU]⇒[System]⇒[General]⇒[PatternCopy]
Setting: CopyFrom Pattern1, 2, 3, 4, 5, 6, 7, 8
Copy To Pattern1, 2, 3, 4, 5, 6, 7, 8

14-2. Initialize

■ UserDefaultSave

Save all settings as a user setting.

Operation:[MENU]⇒[System]⇒[Initialize]⇒[UserDefaultSave]
Setting: - - -

■ UserDefaultLoad

Initialize all settings to the saved setting above.

Operation:[MENU]⇒[System]⇒[Initialize]⇒[UserDefaultLoad]
Setting: - - -

■ FactoryDefaultLoad

Initialize all settings to the factory setting.

Operation:[MENU]⇒[System]⇒[Initialize]⇒[FactoryDefaultLoad]
Setting: - - -

15. DIAGNOSIS

This section explains the items relate to diag setting of diag/log setting.
(The items related to log setting are in other section.)

・InputDiag: You can check whether the output of the sensor is performing normally or check ON / OFF of the external controls.

・OutputTest: You can try comparisonjudgemant outputs, pulse outputs and other option outputs for operation confirmation.

15-1. InputDiag

■ DC InputA/B, ProcessInputA/B

Display process input level in percentage and actual value.

Operation:[MENU]⇒[Diag/Log]⇒[InputDiag]⇒[DC InputA/B] [ProcessInputA/B]
Display: InputRatingPercent: (Input level in percentage.)
InputActualValue: (Input level in actual value.)

■ ExternalCtrl

Display statuses of each external controls.

Operation:[MENU]⇒[Diag/Log]⇒[InputDiag]⇒[ExternalCtrl]
Setting: Terminal 1 ON / OFF
Terminal 2 ON / OFF
Terminal 3 ON / OFF
Terminal 4 ON / OFF
Terminal 5 ON / OFF
*Statuses are reflected in real time.

15-2. OutputTest

■ CompareAL1～AL4

You can arbitrarily turn on / off the comparison judgment outputs in order to check connected device.

Operation:[MENU]⇒[Diag/Log]⇒[OutputTest]⇒[CompareAL1～AL4]
Setting: CompareAL1 TestOutput: Disable (Initial state) / Enable
TerminalOutput: ON Output/ OFF Output (Initial state)
CompareAL2～4 Same as above.

*The output enables as soon as TestOutput turn on.
TestOutput is enabled until it is disabled or power off.
TestOutput automatically turn off when re-power on.

■ GoOutputA/B

You can arbitrarily turn on / off the GO outputs in order to check connected device.

Operation:[MENU]⇒[Diag/Log]⇒[OutputTest]⇒[GoOutputA/B]
Setting: GoOutputA TestOutput: Disable (Initial state) / Enable
TerminalOutput: ON / OFF (Initial state)
GoOutputB Same as above.

*The output enables as soon as TestOutput turn on.
TestOutput is enabled until it is disabled or power off.
TestOutput automatically turn off when re-power on.

■ AnalogOutput

You can arbitrarily set analog output by 10% steps in order to check connected device.
*This function is for only products that have analog output option.

Operation:[MENU]⇒[Diag/Log]⇒[OutputTest]⇒[AnalogOutput]
Setting: TestOutput: Disable (Initial state) / Enable
TeminalOutput: 0%(Initial state), 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%

*The output enables as soon as TestOutput turn on.
TestOutput is enabled until it is disabled or power off.
TestOutput automatically turn off when re-power on.

■ BCD Output(DATA)

You can arbitrarily turn on / off each bits of BCD output (DATA) in order to check connected device.
*This function is for only products that have BCD output option.

Operation:[MENU]⇒[Diag/Log]⇒[OutputTest]⇒[BCD Output(DATA)]
Setting: TestOutput: Disable (Initial state) / Enable
POL Output ON / OFF(Initial state)
OVER Output ON / OFF(Initial state)
10^4-1 / 10^4-2 / 10^4-4 / 10^4-8 Output ON / OFF(Initial state)
10^3-1 / 10^3-2 / 10^3-4 / 10^3-8 Output ON / OFF(Initial state)
10^2-1 / 10^2-2 / 10^2-4 / 10^2-8 Output ON / OFF(Initial state)
10^1-1 / 10^1-2 / 10^1-4 / 10^1-8 Output ON / OFF(Initial state)
10^0-1 / 10^0-2 / 10^0-4 / 10^0-8 Output ON / OFF(Initial state)

*The output enables as soon as TestOutput turn on.
TestOutput is enabled until it is disabled or power off.
TestOutput automatically turn off when re-power on.

■ BCD Output (PC)

You can arbitrarily turn on / off each bits of BCD output (PC) in order to check connected device.
*This function is for only products that have BCD output option.

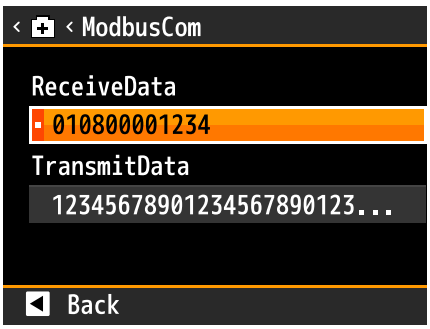
Operation:[MENU]⇒[Diag/Log]⇒[OutputTest]⇒[BCD Output(DATA)]
Setting: TestOutput: Disable (Initial state) / Enable
PC Output ON / OFF(Initial state)

*The output enables as soon as TestOutput turn on.
TestOutput is enabled until it is disabled or power off.
TestOutput automatically turn off when re-power on.

■ ModbusCom

Display received data and transmitted data of Modbus communication.
*This function is for only products that have RS485 output option.

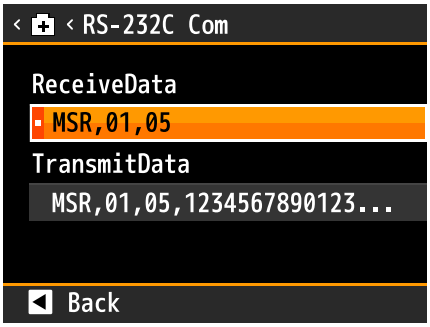
Operation:[MENU]⇒[Diag/Log]⇒[OutputTest]⇒[ModbusCom]
Setting: RecieveData: (Data sent form host.)
TransmitData: (Data replied to host)



■ RS-232C Com

Display received data and transmitted data of RS-232C communication.
*This function is for only products that have RS485 output option.

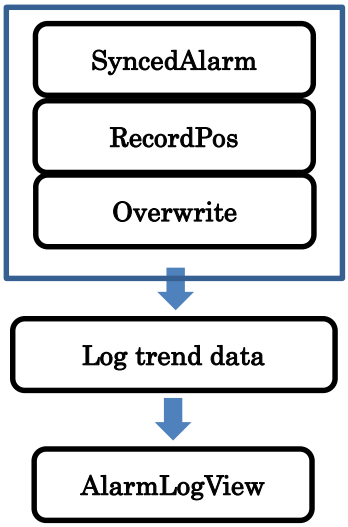
Operation:[MENU]⇒[Diag/Log]⇒[OutputTest]⇒[RS-232C Com]
Setting: RecieveData: (Data sent form host.)
TransmitData: (Data replied to host)



16. AlarmLog

16-1. Orverview

This function log trend data before and after occurring comparison judgement alarm.
The trend data remain only during power on and “MeasureMode” is “Default”.
The trend data is discarded when power off or “MeasureMode” is not “Default”.
This function log max 8 data.
If overwrite function is enabled, 9th or later data are overwritten to the oldest data.
If overwrite function is disabled, 9th or later data are not saved.
You can also log trend data anytime by using external controls, shortcut key Modbus or RS-232C communication.
The flow of function usage is as follows.



【Settings for alarm log】

*Set about auto logging in conjunction with alarm.
Each settings are in [System] ⇒[AlarmLog]
SyncedAlarm: Select alarm as a logging trigger.
RecordPos: Select logging area.
(BeforeAlarm/BeforeAndAfter/AfterAlarm)
Overwrite: Select overwrite enable/disable.

*There are 2 ways to log trend data as follows.
・Log automatically in conjunction with alarm.
・Log anytime by TrendLog signal
by externa control, shortcut, and communication.

*Operate [Diag/Log] ⇒[AlarmLogView] to check log data.

⚠Caution

Log data is discarded when power off.
If you operate changing time scale, range, etc. that affects trend data during logging, logging is stopped and save previous data.

16-2. Specification of logged data

Specification of logging data is as follow.

Item	Content
Number of data point	300 points per screen. *228 points when display direction is vertical.
Logging time	Depends on time scale. (Mentioned as follow table.)
Logging data(CH)	1 input product:Ach 2 input product:Ach, Bch, Calculation
Storage capacity	1 input product:1 element * 8 screen 2 input product:3 elements * 8 screen
Time stamp	Display elapsed time from alarm.

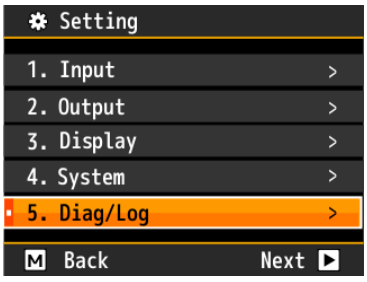
・Logging time

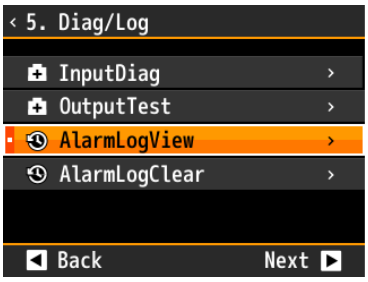
Setting		Logging time (Full scale of time of screen)
TimeAxis	100ms/div	Horisontal:3sec Vertical:2.22sec
	1s/div	Horisontal:0.5min Vertical:0.37min
	2s/div	Horisontal:1min Vertical:0.7min
	5s/div	Horisontal:2.5min Vertical:1.8min
	10s/div	Horisontal:5min Vertical::3.7min
	30s/div	Horisontal:15min Vertical:11min
	60s/div	Horisontal:30min Vertical:22min
	120s/div	Horisontal:60min Vertical:44min

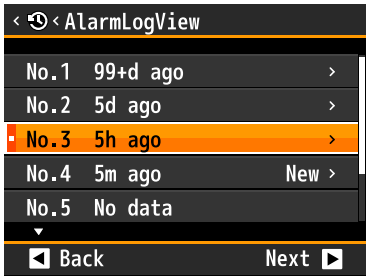
If the product has RS-485 or RS-232C option, you can export the logging data by each communication.
For details, please see the “WPMZ-1-3_Modbus Communication Guide”.

16-3. AlarmLogView/Clear

You can check logged data in [Diag/Log]⇒[AlarmLogView].
It is displayed in order from old data. Time stamp of data means as follows.
[1 to 99s ago]⇒[[1 to 99m ago]⇒[1 to 99h ago]⇒[4 to 99d ago]⇒[99+d ago]
[No data] is displayed if no data exist.

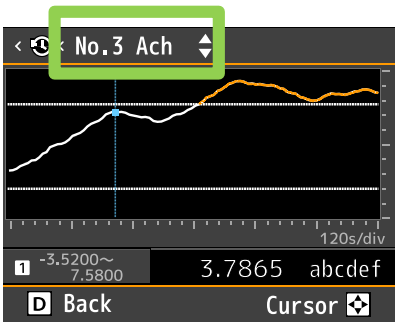


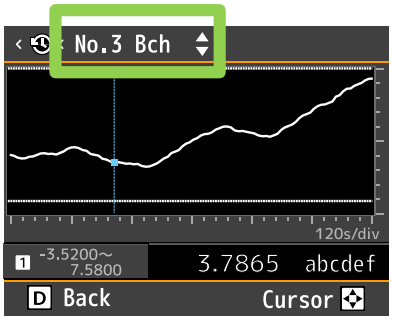


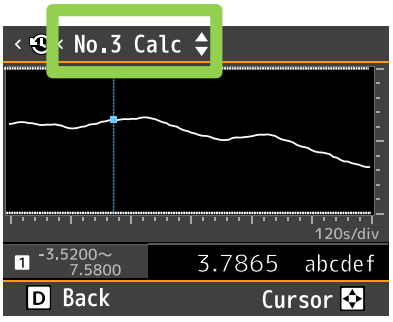


Confirmation screens are shown below. You can select Ach/Bch/Calc screen by operating up/down key. You can move cursor to confirm point of data by operating right/left key.

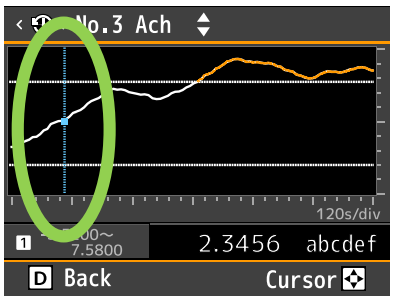
・Up/Down key: Select screen. (Ach⇔Bch⇔Calc.)

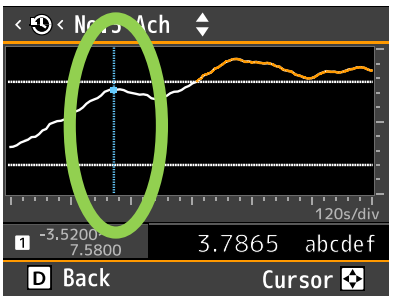


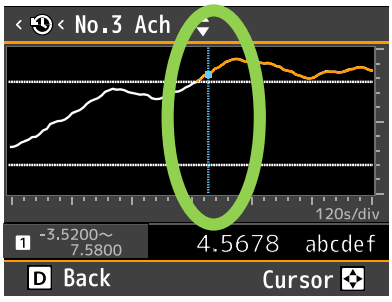




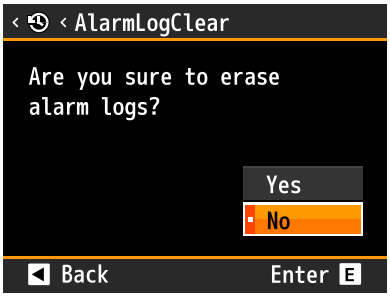
・Right/Left key: Moving cursor.







You can erase logged data by [Diag/Log]⇒[AlarmLogClear].
This screen is displayed and you can clear all of data by operating [Yes].



16-4. Setting Items

Settings related alarm log are shown below.

■ SyncedAlarm

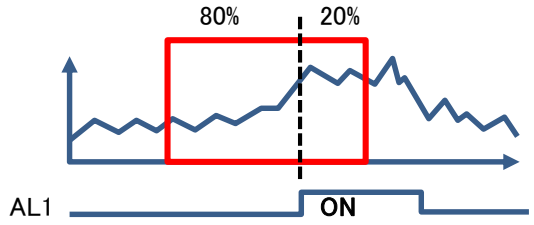
Select automatically save with ON of each alarms 1～4.

Operation:[MENU]⇒[System]⇒[AlarmLog]⇒[SyncedAlarm]
Setting: AL1 ON / OFF (Initial state is ON)
AL2 ON / OFF (Initial state is ON)
AL3 ON / OFF (Initial state is ON)
AL4 ON / OFF (Initial state is ON)

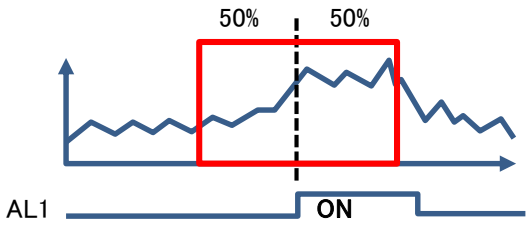
■ RecordPos

Select a timing of saving data after alarm occurs.

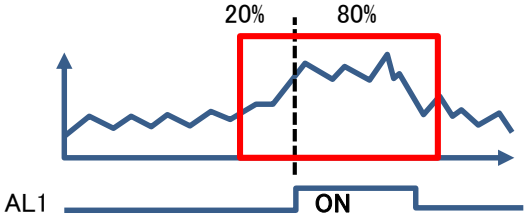
・BeforeAlarm: Save log when the data before alarm occurs occupies **80%** in screen. (Save data of red frame below.)



・BeforeAndAfter: Save log when the data before alarm occurs occupies **50%** in screen. (Save data of red frame below.)



・AfterAlarm: Save log when the data before alarm occurs occupies **20%** in screen. (Save data of red frame below.)



Operation:[MENU]⇒[System]⇒[AlarmLog]⇒[RecordPos]
Setting: BeforeAlarm (Initial state), BeforeAndAfter, AfterAlarm
*** Because data is saved after constant time after alarm occurs, long time is needed if the time scale is large.**

■ Overwrite

Select overwrite setting enable/disable. You can save data up to 8 data and 9th data is overwritten to oldest data or canceled.

Operation:[MENU]⇒[System]⇒[AlarmLog]⇒[Overwritten]
Setting: Enable (Initial state), Disable

17. SPECIFICATIONS

17-1. BASIC SPECIFICATIONS

Number of input channel	:	1 or 2 (According to model codes)
Display	:	2.4 inch TFT liquid crystal display Used in 1ch input: Ach measurement result Used in 2ch inputs: Ach measurement result, Bch measurement result, calculation result, Ach and Bch measurement results, Ach or Bch 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 ②Hold reset function A/B/A&B ③Display value holding function A/B/A&B ④Maximum value holding function A/B/A&B ⑤Minimum value holding function A/B/A&B ⑥Amplitude value holding function A/B/A&B ⑦Deviation value holding function A/B/A&B ⑧Average value holding function A/B/A&B ⑨Digital zero function A/B/A&B ⑩Monitor change function ⑪Trend rog function ⑫Pattern select function 1/2/3
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-1-1**-**-***) AC100 to 240V±10% 50/60Hz DC power(WPMZ-1-3**-**-***) DC12V±10% DC power(WPMZ-1-4**-**-***) DC24 to 48V±10%
Power consumption	:	AC power(WPMZ-1-1**-**-***) At AC100V:10VA max At AC240V:14VA max DC power(WPMZ-1-3**-**-***) At DC12V:6W max, DC power(WPMZ-1-4**-**-***) At DC24V:6W max, At DC48V:6.5W max
External dimension's	:	96mm(W)×52mm(H)×145mm(D)
Weight	:	Approx. 350g
Withstand voltage	:	AC power (WPMZ-1-1**-**-***) Between Power terminals and inputs/external controls/comparative outputs/other outputs AC3000V for 1 minute DC power (WPMZ-1-3or4**-**-***) Between Power terminals and inputs/external controls/comparative outputs/other outputs AC1500V for 1 minute AC power and DC power Between input terminals and external controls/comparative outputs/other outputs AC1500V for 1 minute Between enclosures and each terminals AC3000V for 1 minute
Insulation resistance	:	Between terminals mentioned above, at DC500V 100MΩ or higher
Vibration tolerance	:	10 to 55Hz half amplitude 0.15mm in X, Y, Z directions for 30 minutes

Protective structure	:	IP66(front)
Installation environment	:	indoor use
Rated altitude	:	up to 2000m
Transient overvoltage	:	Ⅱ
Measurement category	:	Ⅱ
Pollution degree	:	2
Conformed EN standard	:	EN61326-1(EMS:industrial electromagnetic environment／EMI:Class A) (Applicable to line length only under 30m) EN61010-1 EN50581
Material of enclosure	:	polycarbonate(PC) black UL94V-0

17-2. INPUT SPECIFICATIONS

●Voltage input

Code	Measurement range	Input resistance	Maximum arrowable input	Accuracy (at 23±5℃ 35～85%RH)
1	±99.999mV	Approx. 1MΩ	±10V	±(0.05% of FS + 1digit)
2	±999.99mV		±100V	
3	±9.9999V		±100V	

●Current input

Code	Measurement range	Input resistance	Maximum arrowable input	Accuracy (at 23±5℃ 35～85%RH)
5	±99.999uA	Approx. 1kΩ	±1mA	±(0.1% of FS + 1digit)
6	±999.99uA	Approx. 100Ω	±10mA	
7	±9.9999mA	Approx. 10Ω	±50mA	

●Process input

Code	Measurement range	Input resistance	Maximum arrowable input	Accuracy (at 23±5℃ 35～85%RH)
B	±5V	Approx. 1MΩ	±100V	±(0.05% of FS + 1digit)
	0～5V			
	1～5V			
	±10V			
	0～10V			
	±20mA	Approx. 10Ω	±50mA	
	0～20mA			
	4～20mA			

*It is possible to measure up to ± 10% FS range on each range. (Limited with ± 10% FS by internal processing.)
In the bipolar input setting, the full scale is set to be ± separately, and for ± 10 V input, for example, limit processing is performed up to ± 11 V. (20 V is not treated as FS.)
Also, in the accuracy of ± 10 V input, it is prescribed as one side FS handling and accuracy is calculated as 5 mV (0.05%) ± 1 digit.

Conversion method	:	⊿∑conversion method
Input signal	:	Single ended
Sampling rate	:	Max. 4000times/sec (1ch product) Max. 2000times/sec (2ch product)
Display updating period	:	10sps, 1sps
Display resolution	:	1/99999
Zero display	:	Reading zero suppress
Decimal point	:	Settable freely
Display range	:	-99999～99999
Sensor power supply	:	DC12V±10% 100mA max. DC24V±10% 50mA max. *Allowable current of 2 ch input is the above current together with Ach and Bch. *When used with a combination of DC12V and DC24V, power consumption is 1.2W max.

17-3. OUTPUT SPECIFICATIONS

【Comparison output】

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 : -99999～99999

Hysteresis : Settable within the range of 1-99999 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 (lower 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

●Difference judgement mode
When the (maximum - minimum) during the fixed time exceeds the judgement value, alarm ON.

Condition of comparison	Result
(maximum - minimum) during the fixed time) ≥AL1 Judgement value	AL1
(maximum - minimum) during the fixed time) ≥AL2 Judgement value	AL2
(maximum - minimum) during the fixed time) ≥AL3 Judgement value	AL3
(maximum - minimum) during the fixed time) ≥AL4 Judgement 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

Circuit response : Up to 300μs(0→90% response)

Specifications for each output :

Output type	Load resistance	Accuracy (23±5℃ 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 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

Communication protocol : 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

18. TROUBLESHOOTING

18-1. ERROR MODE

■ Display on occurrence of an error

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

■ 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	
E202 to 203	Errors associated with calibration values	
E110 to 111	Error associated with sensor power short	
E204 to 205	Errors associated with setting values	
E206 to 209	Errors associated with initial values	
Other than above codes	Other errors	

・If start-up delay is enabled, the 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.

18-2. Phenomena and measures

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.
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 diag function of the product. ・Check status of external control function. ・Check these settings. -Linearize -DispLoCut -PowerOnDelay ・Initialize the WPMZ. Caution: All settings are reset to default values by the initialization.
		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”.
3	OVER alarm display (-OVER alarm display)	Confirm over input (Warning display with input of ± 110% or more of the input range)	・Check the supplied input signal meets requirement of input specifications. ・Check by using input diag function.
		Confirmation of scaling setting (The display of 99999 or more is OVER)	Check the settings.
		Effect of noise	· Application of shielded wire and wiring improvement · Perform input filter setting · Change the average number of times and add moving average

No.	Condition	Checkpoint	Action
4	Comparative output does not turn OFF.	Check setting of “comparison judgement value” and “hysteresis”.	・Setting of ”comparison judgement value” ・Check whether output mode of comparative output is set to “Latch”.
5	Can’t change settings.	Check “Setting Protect” function.	Check whether the function is ON.
6	Can’t execute calibration.	Check “Adjust Protect” function.	Check whether the function is ON.
7	Can’t operate by keys.	Check “Key Lock” function.	Check whether the function is ON.
8	Fluctuations of displayed value are wide.	Check wring and measurement target.	· Check for wobble factors such as vibration. · Make sure that the wiring is not close to a power line etc. with high noises.
		If input signal drifts.	・Consider to use moving average. ・Consider to change sampling rate.
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.
10	BCD output abnormal	・Check connected device is suitable.（NPN/PNP,external pullup etc.） ・Check output logic setting is correct.	・Check by using “test output” function.

No.	Condition	Checkpoint	Action
11	RS-232C communication abnormal	Check wiring, wire length is correct. Check setting such as baud rate is correct. Check communication command is correct.	・Check by 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 by using “test output” function.
13	In a DC/process input product, instantaneous value has large offset error	Check whether the digital zero function is working	・Check digital zero function. ・Check D-ZeroRetention function.

19. Appendix

19-1. 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 shortcut function of external control.
	○							Moves to setting mode.
		○						Switches measurement display contents.
			◎					Reset the system by press and hold for 1 second in error mode.
				◎				When assigned shortcut functions, makes the function ON/OFF by press and hold for 1 second.
					◎			
						◎		
							◎	
		◎	◎					Makes the key lock function ON/OFF by press and hold for 1 second.
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.
		○						Return to the higher layer.
			○					Fixes setting parameters.
				○				Moves to other setting display / Moves cursors in setting displays / Modifying setting values.
					○			
						○		
							○	

*Note: ○ short-pressing ◎ press and hold 1sec

19-2. SETTING VARIABLES

1st Layer	2nd Layer	3rd Layer (setting items)	4th Layer (setting values)		Remarks
			Initial values	Settable values	
1. Input	DC InputA DC InputB Process InputA Process InputB	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		InputRange (DC)	Depend on model	Fixed by default value.	
		InputRange (Process)	0～10V	0～5V/1～5V/±5V/0～10V /±10V/0～20mA /4～20mA/±20mA	Select an input range. *Offset and Fullscale setting are initialized by changing this item.
		SensorPower	12V	12V/24V	Switch sensor power supply
		SamplingRate	50times/sec (1 input product) 50times/sec (2 input product)	4000 times/sec, 2000, 1000, 500, 200, 100, 20,10, 5, 2, 1,	Select sampling rate (4000times/sec is enabled only 1 input product)
		MoveAve	None	None/2/4/8/16/32/64times	Set moving average of input.
		Offset	DC:*Depend on model Process: #####	Go to screen of setting offset.	*It is set to specific position depends on each input ranges.
		Fullscale	DC:*Depend on model Process: None	Go to screen of setting fullscale.	*Unit that depends on input range is set.
		DecPoint	#####	#####/ #.####/ ##.###/ ###.##/ ####.#	
		DispUnit	None	None/mV, mA, Pa, kg, N, etc./CustomUnit	
		InputCorrect	None	None/Linearize	
		LinearizePoint	1stIn : 0 1stOut : 0 2ndIn : 1000 2ndOut : 1000 …… 16thIn : 15000 16thOut : 15000	Each: ±99999	Enable only if [InputCorrect] is [Linearize].
		DispShift	0	±99999	Take over setting of [DecPoint].
		TrackingZero	Interval : 0 ActiveArea : 0	Interval : 0～99.99[sec] ActiveArea : 0～99999	Disable if setting value is 0[sec]. Take over setting of [DecPoint].
		DispLimit	Lower : -99999 Upper : +99999	±99999 ±99999	Take over setting of [DecPoint].
		DispLoCut	0	0～99999	Cut both positive and negative.
		InsDispStep	None	None/5steps/10steps	
		ZeroArea	0	0～99999[digit]	Disable if the value is 0[digit].
		StableArea	0	0～99999[digit]	Disable if the value is 0[digit].
		StableTime	0	0～99.99[sec]	Disable if the value is 0[sec].
	2InputCalc	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		Expression	None	None/Add((A+B)+C)*K /Sub((B-A)+C)*K /Mul((A*B)+C)*K /Div((B/A)+C)*K /Ave (((A+B)/2)+C)*K /HiSelect((Larger of A and B)+C)*K /LoSelect((Smaller of A and B)+C)*K /DifAbs(Abs of (B-A))+C)*K /ErrRaito((A/B)-1)*K /Dens(B/(A+B))*K /Add(A+B)*K+C /Sub(B-A)*K+C /Mul(A*B)*K+C /Div(B/A)*K+C	Select an expression.
		Const-C	C : 0	C : ±9.9999 x 10^(±5)	
		Coef-K	K : 1	K : ±9.9999	
		DecPoint	#####	#####/ #.####/ ##.###/ ###.##/ ####.#	
		DispUnit	None	None/mV, mA, Pa, kg, N, etc./CustomUnit	
		InsDispStep	None	None/5steps/10steps	
		DispLimit	Lower : -99999 Upper : +99999	±99999 ±99999	Take over setting of [DecPoint].
	ExternalCtrl	ExtCtrl 1～5 Func	None	None/CompareReset/HoldResetA,B,A&B /DispHoldA,B,A&B/PeakHoldA,B,A&B /BottomHoldA,B,A&B/AmpHoldA,B,A&B /DevHoldA,B,A&B/AveHoldA,B,A&B /DigitalZeroA,B,A&B/PatternChange1,2,3 /MonitorChange/TrendLog	Select a function which is attached to each external control terminals.
	Hold A/B	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		DispHoldMode	Normal	Normal/OneShot	
		HoldOffDelay	0.00	0.00～99.99[sec]	
		HoldMode	NormalHold	NormalHold/AreaHold	Select a mode of DispHold.
		DevBaseValue	0	±99999	Take over setting of [DecPoint].
		AveHoldCount	None	None/2/4/8/16/32/64times	

1st Layer	2nd Layer	3rd Layer (setting items)	4th Layer (setting values)		Remarks
			Initial values	Settable values	
2.Output	CompareAL1 CompareAL2 CompareAL3 CompareAL4	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		OutputDispValue	None	None/Ach/Bch/Calc	
		ActCondition	Always	Always/ExceptNearZero/OnStable / OnStableExceptNearZero/OnHold	Select a condition of comparison.
		CompareMode	LevelJudge	LevelJudge/ZoneJudge/DiffJudge	
		OnConditions	Excess	Excess/LessThan	Only LevelJudge.
			InTheZone	InTheZone/OutsideTheZone	Only ZoneJudge.
		Threshold	10000 0	Threshold : ±99999 Hysteresis : 0～99999	Only LevelJudge.
			0 10000 0	ZoneLowerLimit : ±99999 ZoneUpperLimit : ±99999 Hysteresis : 0～99999	Only ZoneJudge.
			10000 1.00	ChangeAmount : ±99999 DetectionInterval : 0.00～99.99[sec]	Only DiffJudge
		OnDelay	None	None/20ms/50ms/100ms/200ms/500ms 1s/5s/10s/20s	Compare ON/OFF after ActCondition is kept certain time set here.
		OffDelay	None		
		OutputMode	Normal	Normal/Latch/OneShot5ms/10ms/20ms /50ms/0.1s/0.2s/0.5s/1s/2s	Select an output mode.
		OutputLogic	Negative	Positive/Negative	Select an output logic.
		OnBgColors	Black	Black/Red/Yellow/Green	Priority: AL1 > AL2 > AL3 > AL4
	Analog Output	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		OutputRange	0-10V	0-10V/±10V/1-5V/0-20mA/4-20mA	Select a type of output range.
		OutputDispValue	None	None/Ach/Bch/Calc	Select a ch referenced for analog output.
		OutputScale	0 10000	0% : ±99999 100% : ±99999	Scaling of analog output. Set 0% and 100% value.
	BCD Output	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		OutputDispValue	None	None/Ach/Bch/Calc	Select a ch referenced for BCD output.
		DataSignalLogic	Negative	Positive/Negative	Select an output mode.
		SyncSignalLogic	Negative	Positive/Negative	Select an output mode.
	ModbusCom	SlaveAddress	1	1～31	Set ID of the product.
		Baudrate	19200bps	9600bps/19200bps/38400bps	Select a baudrate.
		Parity	Even	None/Even/Odd	Select a type of parity bit.
	RS-232C Com	Protocol	Modbus-RTU	ModbusRTU/OriginalCommand/OriginalOutput	Select a protocol.
		Baudrate	19200bps	9600bps/19200bps/38400bps	Select a baudrate.
		Parity	Even	None/Even/Odd	Select a type of parity bit.
		DataLength	7bit	7bit/8bit	Enable when Protocol is OriginalCommand or OriginalOutput.
		Stopbit	1bit	1bit/2bit	Enable when Protocol is OriginalCommand or OriginalOutput.
		Delimiter	CR LF	CR / CR LF	Enable when Protocol is OriginalCommand or OriginalOutput.
3.Display	DispSelect	MeasureSelect	1ch product Ach, Ach + Comp Level, Trend 2ch product Ach + Bch, Level, Trend	Ach/Bch/Calc/Ach+Comp/Bch+Comp /Calc+Comp/Ach+Bch/Calc+A+B	*Bch and Calc is enable in 2ch product.
		LevelSelect		Ach/Bch/Calc/Ach+Bch	*Bch and Calc is enable in 2ch product.
		TrendSelect			
	LevelDisp	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		Ach Scale	0 10000	LowerLimit : ±99999 UpperLimit : ±99999	Set scale of level screen.
		Bch Scale			
		CalcScale			
		AL Select	AL1～AL4 : ON	AL1/AL2/AL3/AL4	
	TrendDisp	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		Ach Scale	0 10000	LowerLimit : ±99999 UpperLimit : ±99999	Set scale of trend screen.
		Bch Scale			
		CalcScale			
		AL Select	AL1～AL4 : ON	AL1/AL2/AL3/AL4	
		TimeAxis	1s/div	100ms/div,1s/div,2s/div,5s/div,10s/div, 30s/div,60s/div120s/div	Set time scale of division time.

1st Layer	2nd Layer	3rd Layer (setting items)	4th Layer (setting values)		Remarks
			Initial values	Settable values	
4.System	General	Brightness	5 Bright	5Bright/4/3/2/1Dark/0 Off	Off means that whole of screen is turned off.
		PowerOnDelay	None	None/2sec/5sec/10sec/20sec/30sec/60sec	Set time that until measure after power on.
		PowerSavingTime	None	None/1/2/5/10/30/60min	Display is dark while power saving.
		D-ZeroRetention	Disable	Disable/Enable	Whether remember D-Zero value or not.
		Language	English	日本語/English	Language.
		DisplayDirection	Horizontal	Horizontal/Vertical	Select a direction of screen.
		SettingProtect	Disable	Disable/Enable	
		AdjustProtect	Disable	Disable/Enable	
		Display UpdateCycle	10 times/sec	1 times/sec,10 times/sec	
		PatternCopy	---	Go to screen of pattern copy.	Copy settings of pattern to other pattern.
	AlarmLog	SyncedAlarm	AL1 : ON AL2 : ON AL3 : ON AL4 : ON	AL1/AL2/AL3/AL4	
		RecordPos	BeforeAndAfter	BeforeAlarm/BeforeAndAfter/AfterAlarm	
		Overwrite	Enable	Disable/Enable	
	Initialize	UserDefaultSave	Save current settings as use initial values.		
		UserDefaultLoad	Initialize setting values to user initial values.		
		Factory DefautLoad	Initialize setting values to factory default.		
5.Diag/Log	InputDiag	DC InputA/B ProcessInputA/B	—	InputRatingPercent InputActualValue	Check input confirm existence. Display percent value or actual value.
		ExternalCtrl	—	—	Check ON/OFF of terminal.
	OutputTest	Compare AL1～AL4	—	—	Check ON/OFF Level of compare output.
		PulseOutputA/B	—	—	Check ON/OFF Level of pulse output.
		AnalogOutput	—	—	Output any value output. (Step by 10%)
		BCD Output(Data)	—	—	Output ON/OFF data of each bits.
		BCD Output(PC)	—	—	Output ON/OFF by photo coupler of each bits.
		ModbusCom	—	—	Display received and transmitted data.
		RS-232C Com	—	—	Display received and transmitted data.
	Alarm LogView	No. 1～8		Go to screen of log data confirmation.	
	Alarm LogClear	---		Erase alarm logs.	

19-3. BEHAVIOR OF COMPARISON JUDGEMENT

Behavior of each comparison modes (LevelJudge/ZoneJudge/DiffJudge) and output modes (Normal/Latch/OneShot) are mentioned below with some figures.

■ LevelJudge

Determine the magnitude relationship between the display value and the comparison judgment value.
Below, the comparison output operation is shown for each output mode.

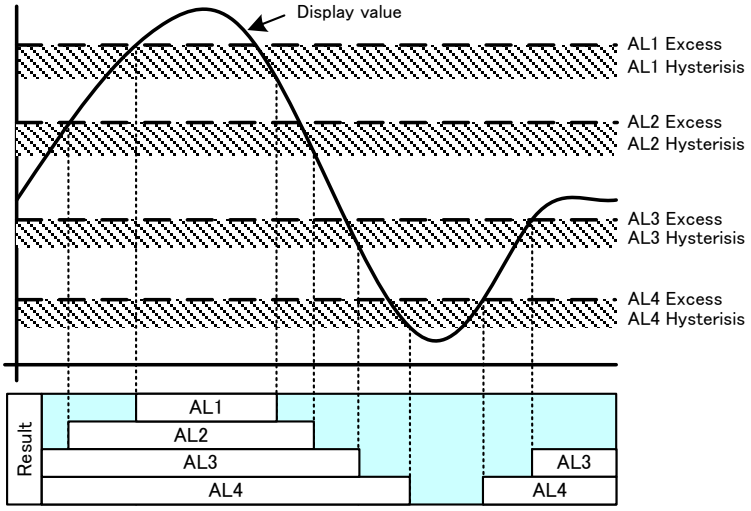
1) In case of upper limit determination 4 stages

To use in the upper limit judgment, set the "OnCondition" to "Excess".

Output	OnCondition	Comparison condition	Result
AL1	Excess	Display value＞Judgement value of AL1	AL1
AL2	Excess	Display value＞Judgement value of AL2	AL2
AL3	Excess	Display value＞Judgement value of AL3	AL3
AL4	Excess	Display value＞Judgement value of AL4	AL4

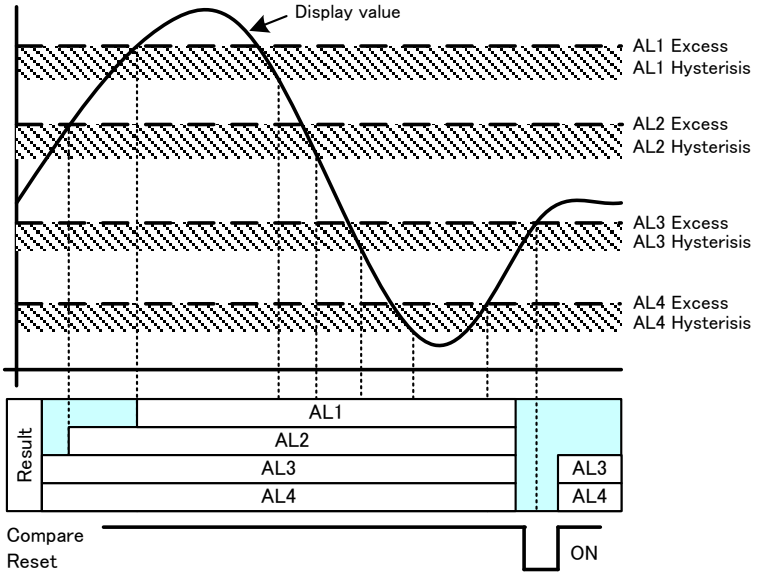
●Behavior of judgement when output mode is "Normal".

"OutputMode" is "Normal": Outputs while result is ON.

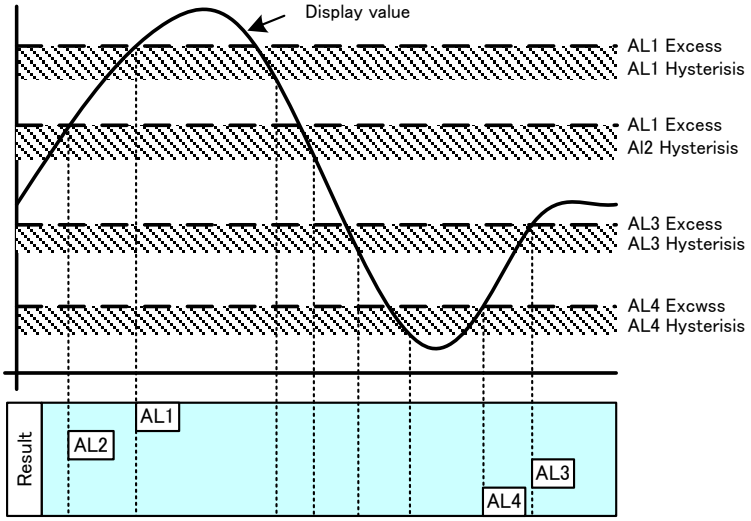


●Behavior of judgement when output mode is "Latch".

"OutputMode" is "Latch": Outputs after result turns on even if result turns off after that.



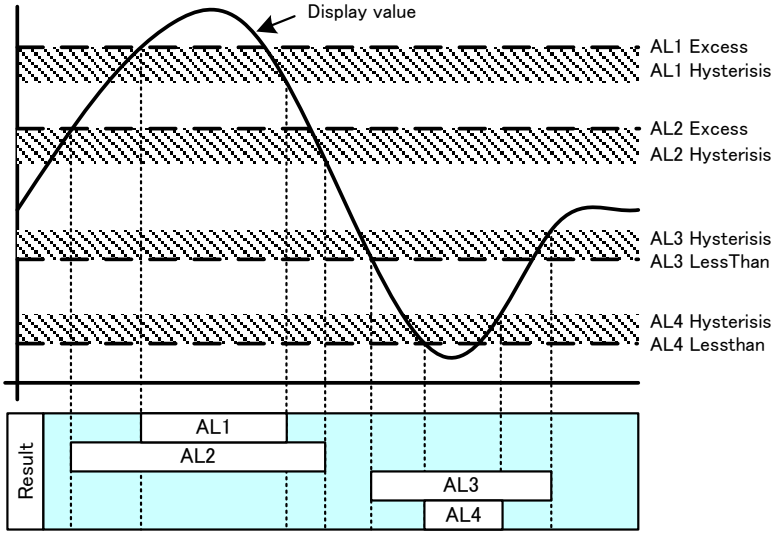
●Behavior of judgement when output mode is “OneShot”.
“OutputMode” is “OneShot”: Outputs certain time after result turns on.



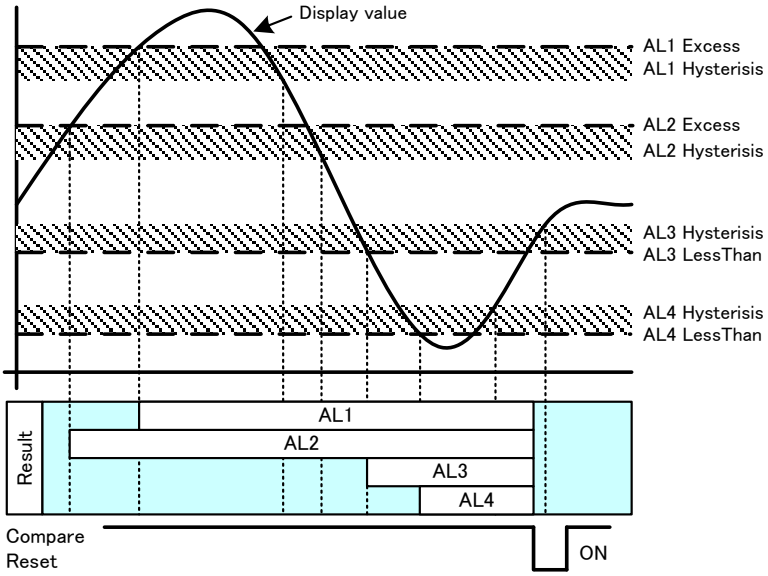
2) In case of upper limit 2 stages and the lower limit 2 stages （HH/HI/LO/LL）
Set the “OnCondition” to “Excess” for AL1, AL2, “LessThan” for AL3, AL4

Output	OnCondition	Comparison condition	Result
AL1	Excess	Display value＞Judgement value of AL1	AL1
AL2	Excess	Display value＞Judgement value of AL2	AL2
AL3	LessThan	Display value＜Judgement value of AL3	AL3
AL4	LessThan	Display value＜Judgement value of AL3	AL4

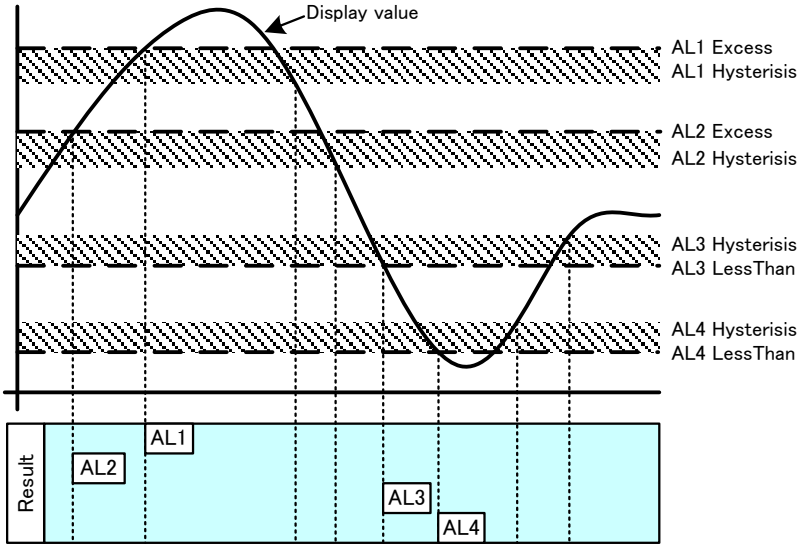
●Behavior of judgement when output mode is “Normal”.
“OutputMode” is “Normal”: Outputs while result is ON.



●Behavior of judgement when output mode is “Latch”.
“OutputMode” is “Latch”: Outputs after result turns on even if result turns off after that.



●Behavior of judgement when output mode is “OneShot”.
“OutputMode” is “OneShot”: Outputs certain time after result turns on.



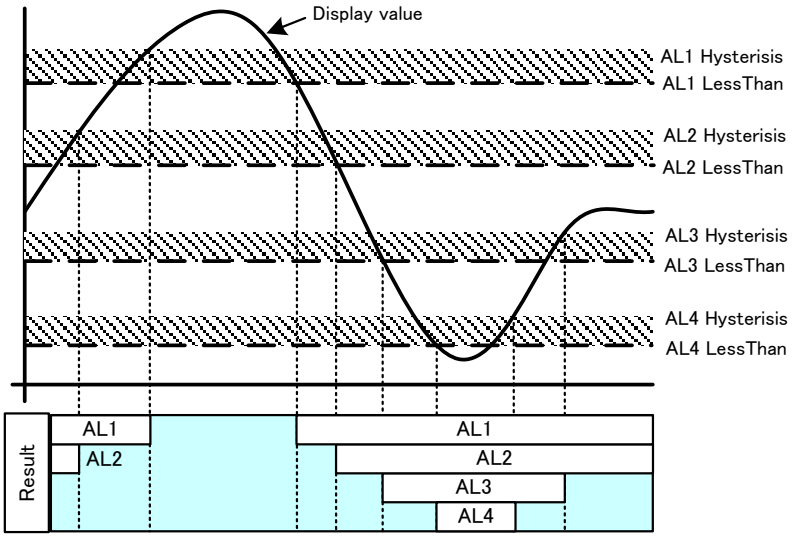
3) In case of lower limit 4 stages.

Set the "OnCondition" to "LessThan" for AL1, AL2, AL3, AL4.

Output	OnCondition	Comparison condition	Result
AL1	LessThan	Display value＜Judgement value of AL1	AL1
AL2	LessThan	Display value＜Judgement value of AL2	AL2
AL3	LessThan	Display value＜Judgement value of AL3	AL3
AL4	LessThan	Display value＜Judgement value of AL3	AL4

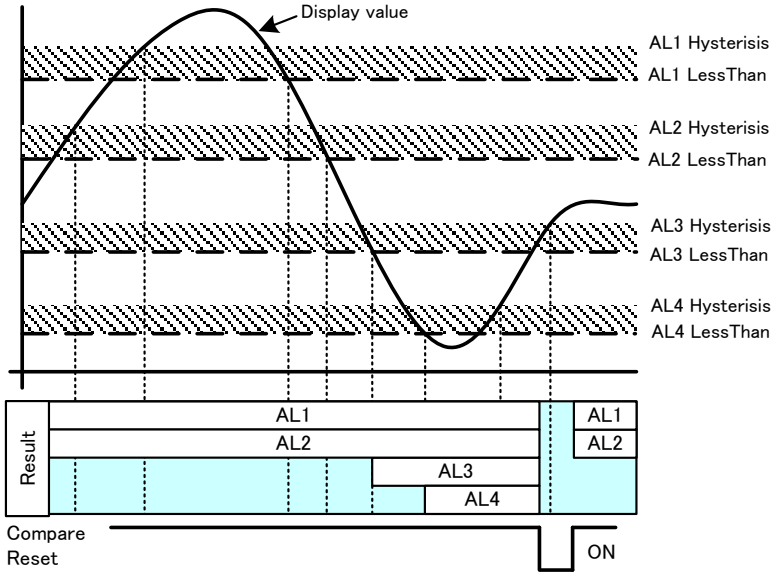
●Behavior of judgement when output mode is "Normal".

"OutputMode" is "Normal": Outputs while result is ON.

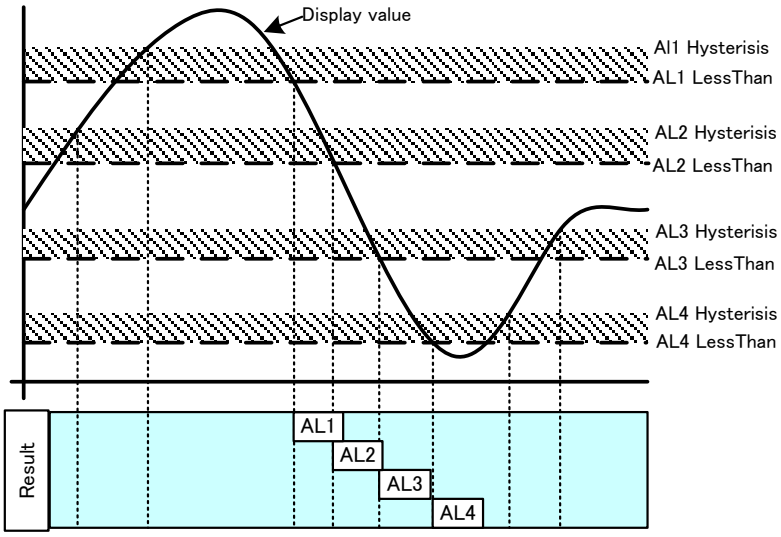


●Behavior of judgement when output mode is "Latch".

"OutputMode" is "Latch": Outputs after result turns on even if result turns off after that.



●Behavior of judgement when output mode is “OneShot”.
“OutputMode” is “OneShot”: Outputs certain time after result turns on.



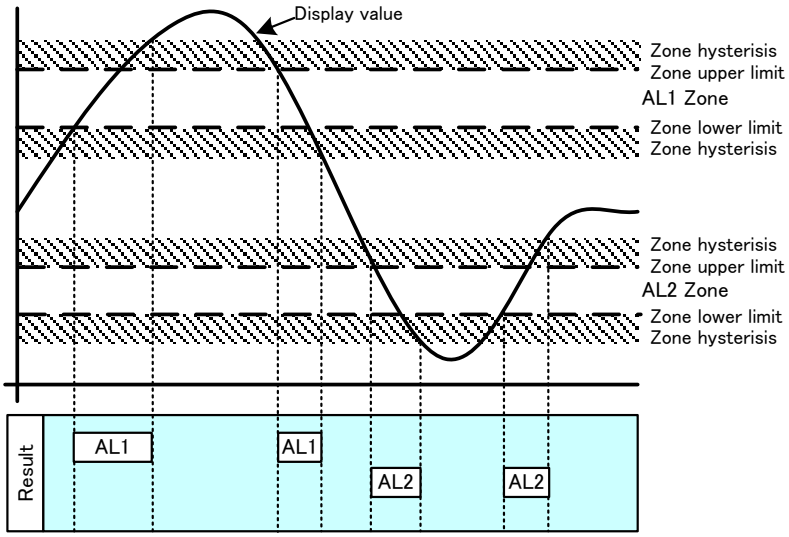
■ ZoneJudge

Determine the inclusion relation with the two comparison judgment values.
Below, the comparison output operation is shown for each output mode.

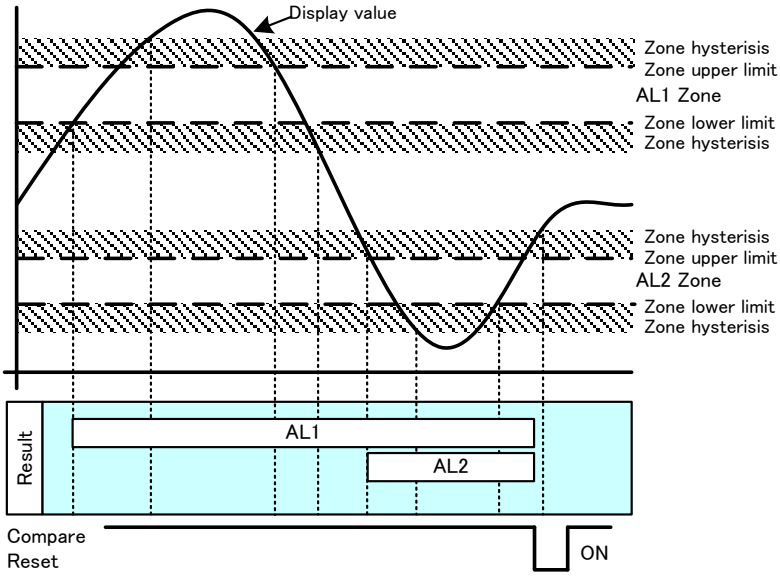
1) In case of OnCondition is InTheZone.
Comparison output turns on when display value is inside of the zone.

Output	OnCondition	Comparison condition	Result
AL1	InTheZone	Upper limit of AL1≧Display value≧ Lower limit of AL1	AL1
AL2		Upper limit of AL2≧Display value≧ Lower limit of AL2	AL2
AL3		Upper limit of AL3≧Display value≧ Lower limit of AL3	AL3
AL4		Upper limit of AL4≧Display value≧ Lower limit of AL4	AL4

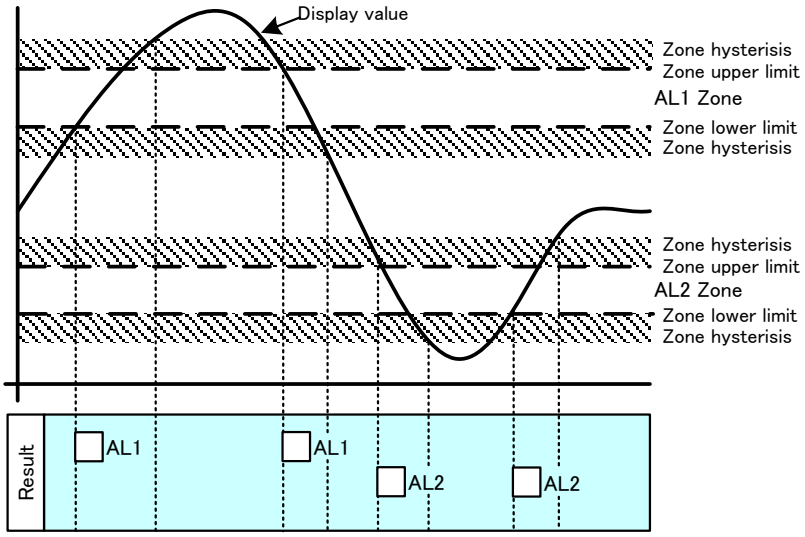
●Behavior of judgement when output mode is “Normal”.
“OutputMode” is “Normal”: Outputs while result is ON.



●Behavior of judgement when output mode is “Latch”.
“OutputMode” is “Latch”: Outputs after result turns on even if result turns off after that.



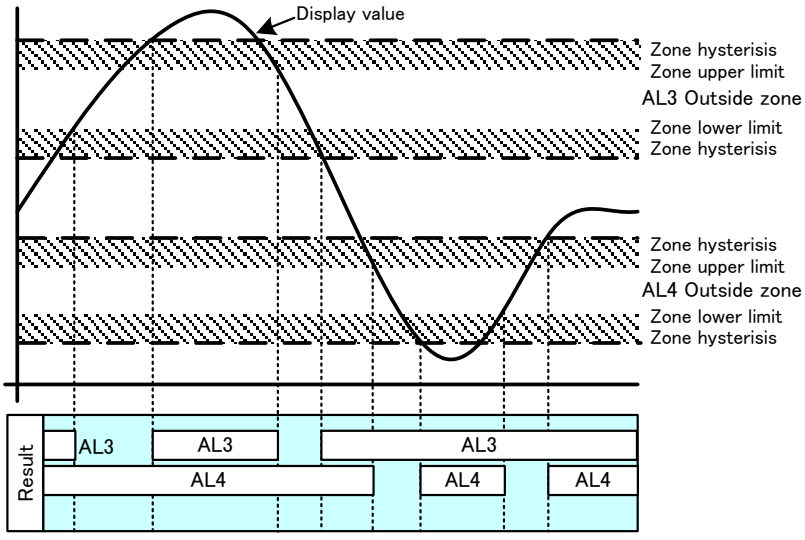
●Behavior of judgement when output mode is “OneShot”.
“OutputMode” is “OneShot”: Outputs certain time after result turns on.



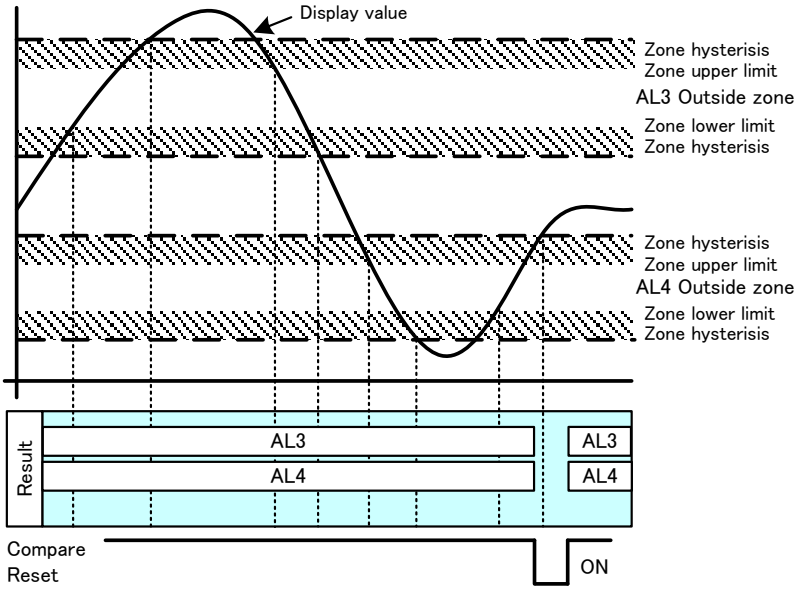
2) In case of OnCondition is OutsideTheZone.
Comparison output turns on when display value is outside of the zone.

Output	OnCondition	Comparison condition	Result
AL1	OutsideTheZone	Display value＞Upper limit of AL1 or Lower limit of AL1＞Display value	AL1
AL2		Display value＞Upper limit of AL2 or Lower limit of AL2＞Display value	AL2
AL3		Display value＞Upper limit of AL3 or Lower limit of AL3＞Display value	AL3
AL4		Display value＞Upper limit of AL4 or Lower limit of AL4＞Display value	AL4

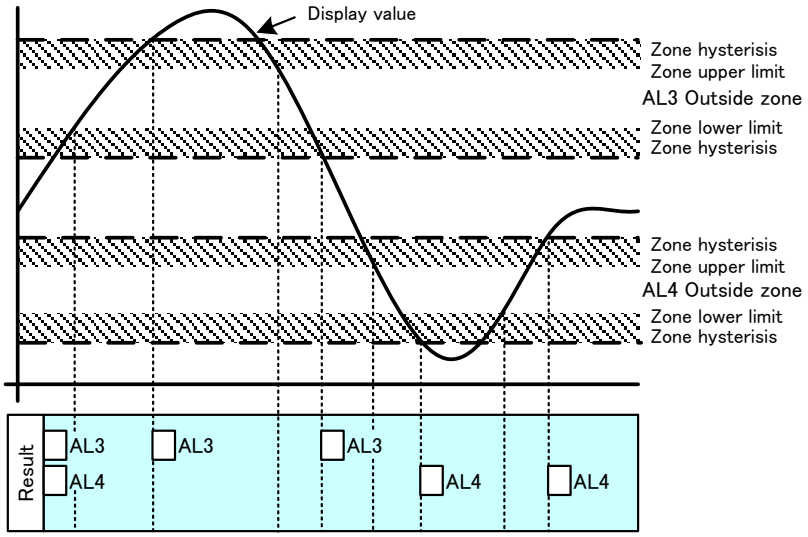
●Behavior of judgement when output mode is “Normal”.
“OutputMode” is “Normal”: Outputs while result is ON.



●Behavior of judgement when output mode is “Latch”.
“OutputMode” is “Latch”: Outputs after result turns on even if result turns off after that.



●Behavior of judgement when output mode is “OneShot”.
“OutputMode” is “OneShot”: Outputs certain time after result turns on.



■ DiffJudge

It judges successively whether or not the change amount of the display value at the set time interval exceeds the judgment value.
Output mode of DiffJudge is only Latch, and OnCondition is only Excess.

1) OnCondition is fixed as Excess.
Outputs turns on after difference value of display value in certain time is excessed ChangeAmount, and continue until receive HoldReset signal.

Output	OnCondition	Comparison condition	Result
AL1	Excess(Fixed)	Difference value in certain time＞ChangeAmount of AL1	AL1
AL2		Difference value in certain time＞ChangeAmount of AL2	AL2
AL3		Difference value in certain time＞ChangeAmount of AL3	AL3
AL4		Difference value in certain time＞ChangeAmount of AL4	AL4

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

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