1/8 DIN Digital Panel Meter for DC Voltage (Multi Display)

WPM-1-□2-1□□-□□□

Instruction Manual

CE

IP66 rating (Front Bezel)

Contents

Setup

1. Precautions

1－1. Operating environment and conditions

Please do not install the device in the following locations. It may damage the device or shorten the life.

1） Locations out of operating temperature range -5 to 50°C.
2） Locations out of operating humidity range 35 to 85%, or locations where freezes / condenses.
3） Locations with high concentrations of dusts, metal powders etc.
(Required measures against heat radiation and storage to the dust-proof case.)
4） Locations with corrosive gas, salinity or soot.
5） Locations which has a influence of vibration or impact.
6） Locations where the unit may come in contact with rain or water drop. (except the front bezel)
7） Locations with a strong electromagnetic fields or exogenous noise.

1－2. Mounting and connecting

1） Please read this manual before installation and connection. Also, please install and connect by the person who has professional skills.
The insulation class of this unit is as below. Please check the insulation class satisfies the requirement before installation.

——— Basic insulation

Power supply	Comparative output
	Input
	External control, Analog output

2） Do not connect power connect line, input signal line and output signal line near the noise source or the relay driving line.
3） Connecting with the noise superimposed line or storing in the same duct may cause operation failures.
4） This unit is available as soon as the power supplied, but needs 30 minutes electrification to show the best performance.

1－3. Check before using

Installation location must meet the requirement of operating conditions and operating environments.
Please inspect the product for any signs of shipping damage and contact your dealer or Watanabe Electric Industry Co., Ltd if anything comes to your attention.

2. Ordering information

2－1. Ordering code

The ordering code of the WPM-1 is shown below. Please check that the product received matches the product ordered.

WPM - 1 - □□ - □□□ - □00

Code	Power supply
1	100 to 240Vac

Code	Display
1	Single
2	Multi

Code	Input range
1	DC voltage (11 to 14 range)
2	DC high voltage (15 range)
3	DC current (21 to 24 range)
4	DC large current (25 range)
B	Process signal

Code	Output
0	Display only
1	Analog output

Code	Comparative output
0	None
1	2 setpoints Relay output
2	4 setpoints Relay output
3	2 setpoints Photo coupler output
4	4 setpoints Photo coupler output

Code	Test report
0	None
1	With Test report

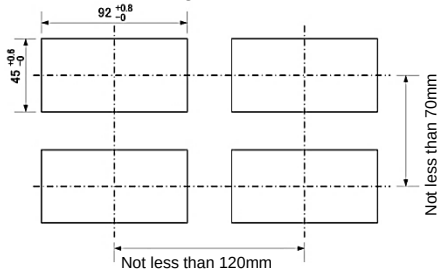
2－2. Accessories

Please check if you have all the accessories below.
Protective cover for terminal block
'Display only' / 'with Analog output' : 2pcs, with Comparative output : 3pcs

3. Installation

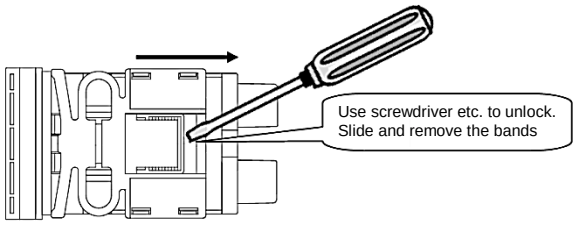
3－1. Panel cutout dimensions

Panel cutout is as the diagram shown below.

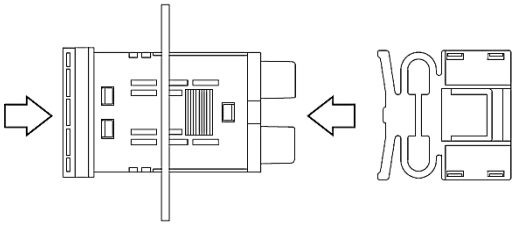


3－2. Mounting

1) Remove the mounting bands from the main unit,

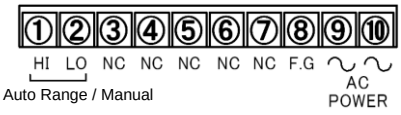


2) Insert the unit from the front side of the panel.
Then, fix the unit in place from the rear of the panel using the mounting bands to the left and right sides.



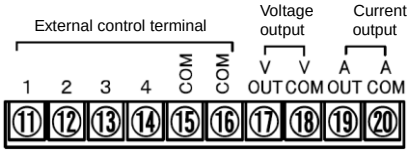
4. Terminal connections

4－1. Lower terminal connections (Input / power supply)



Terminal	Name	Description
1	HI	Input + terminal
2	LO	Input – terminal
3-7	NC	No connection (Intermediate terminal cannot be used)
8	F.G	
9,10	AC POWER	AC Power supply terminal

4－2. Upper terminal connections (External control / analog output)



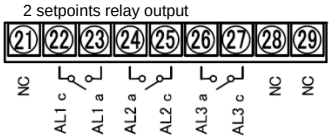
Terminal	Name	Description
11	1	External control terminal 1
12	2	External control terminal 2
13	3	External control terminal 3
14	4	External control terminal 4
15,16	COM	External control common terminal
17	V OUT	Analog voltage output + terminal
18	V COM	Analog voltage output – terminal *1
19	A OUT	Analog current output + terminal
20	A COM	Analog current output – terminal *1

*1 Please do not short-circuit between voltage output – terminal and current output – terminal.

4−3. Intermediate terminal connections (2 setpoints comparative output)

WPM-1-□□-□□1-□□□

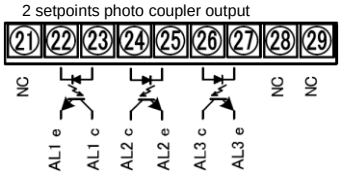
2 setpoints relay output



Terminal	Name	Description	Relay output
21	NC	No connection (Intermediate terminal cannot be used)	-
22	AL1 c	AL1 comparative output common terminal	COM
23	AL1 a	AL1 comparative output terminal	Normal open (a contact)
24	AL2 a	AL2 comparative output terminal	Normal open (a contact)
25	AL2 c	AL2 comparative output common terminal	COM
26	AL3 a	AL3 comparative output terminal	Normal open (a contact)
27	AL3 c	AL3 comparative output common terminal	COM
28,29	NC	No connection (Intermediate terminal cannot be used)	-

WPM-1-□□-□□3-□□□

2 setpoints photo coupler output

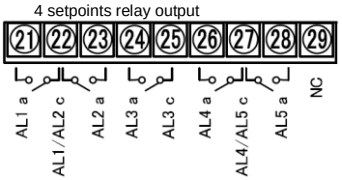


Terminal	Name	Description	Photo coupler output
21	NC	No connection (Intermediate terminal cannot be used)	-
22	AL1 e	AL1 comparative output common terminal	Emitter
23	AL1 c	AL1 comparative output terminal	Collector
24	AL2 c	AL2 comparative output terminal	Collector
25	AL2 e	AL2 comparative output common terminal	Emitter
26	AL3 c	AL3 comparative output terminal	Collector
27	AL3 e	AL3 comparative output common terminal	Emitter
28,29	NC	No connection (Intermediate terminal cannot be used)	-

4−4. Intermediate terminal connections (4 setpoints comparative output)

WPM-1-□□-□□2-□□□

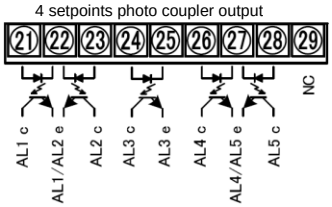
4 setpoints relay output



Terminal	Name	Description	Relay output
21	AL1 a	AL1 comparative output terminal	Normal open (a contact)
22	AL1, 2 c	AL1/AL2 comparative output common terminal	COM
23	AL2 a	AL2 comparative output terminal	Normal open (a contact)
24	AL3 a	AL3 comparative output terminal	Normal open (a contact)
25	AL3 c	AL3 comparative output common terminal	COM
26	AL4 a	AL4 comparative output terminal	Normal open (a contact)
27	AL4, 5 c	AL4/AL5 comparative output common terminal	COM
28	AL5 a	AL5 comparative output terminal	Normal open (a contact)
29	NC	No connection (Intermediate terminal cannot be used)	-

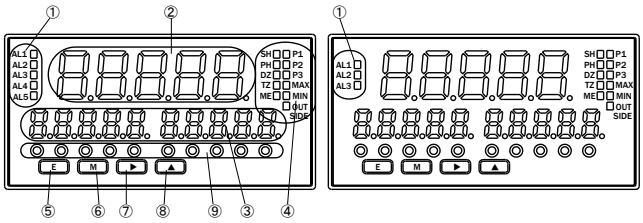
WPM-1-□□-□□4-□□□

4 setpoints photo coupler output



Terminal	Name	Description	Photo coupler output
21	AL1c	AL1 comparative output terminal	Collector
22	AL1, 2 e	AL1/AL2 comparative output common terminal	Emitter
23	AL2 c	AL2 comparative output terminal	Collector
24	AL3 c	AL3 comparative output terminal	Collector
25	AL3 e	AL3 comparative output common terminal	Emitter
26	AL4 c	AL4 comparative output terminal	Collector
27	AL4, 5 e	AL4/AL5 comparative output common terminal	Emitter
28	AL5 c	AL5 comparative output terminal	Collector
29	NC	No connection (Intermediate terminal cannot be used)	-

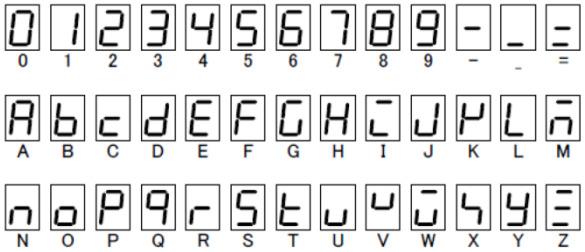
5. Component names and functions



No.	Name	Main Functions	
1	Comparative output display	Displays judgment result of comparative alarm function	
2	Main display	Displays measured value, parameters and set values when settings.	
3	Sub display	Displays set values of comparative value settings and set values when settings..	
4	Function indicators	SH	Lights up when sampling hold is activated.
		PH	Lights up when peak hold, bottom hold or peak-to-peak is activated.
		DZ	Lights up when digital zero is activated.
		TZ	Lights up when tracking zero is activated.
		ME	Lights up when digital zero backup is activated.
		P1-P3	Lights up according to the selected pattern.
		MAX	Flashes when max. display value
		MIN	Flashes when min. display value
		OUT SIDE	Flashes when comparative judgment value displayed on sub monitor is max. or min.
5	ENTER key	Switches display and sets selected set value. Switches to the Setting mode when holding the key down for 3 seconds. (Cancels settings by pressing [ENTER] key and [MODE] key for 3 seconds at the same time.)	
6	MODE key	Switches display. Switches measured value and % value display. Switches to the Memory mode when holding the key down for 3 seconds. (Memory mode displays Max. and Min. measurement value, difference between Max. and Min. measurement value and input value before scaling.)	
7	SHIFT key	Switches display and clears comparative alarm latch. Digital zero when holding the key down for 3 seconds.	
8	UP key	Switches display and selects setting parameters. Switches display of comparative set values. Switches pattern select when holding the key down for 3 seconds.	
9	COMPARATIVE VALUE SETTING key	Direct setting of comparative set values.	

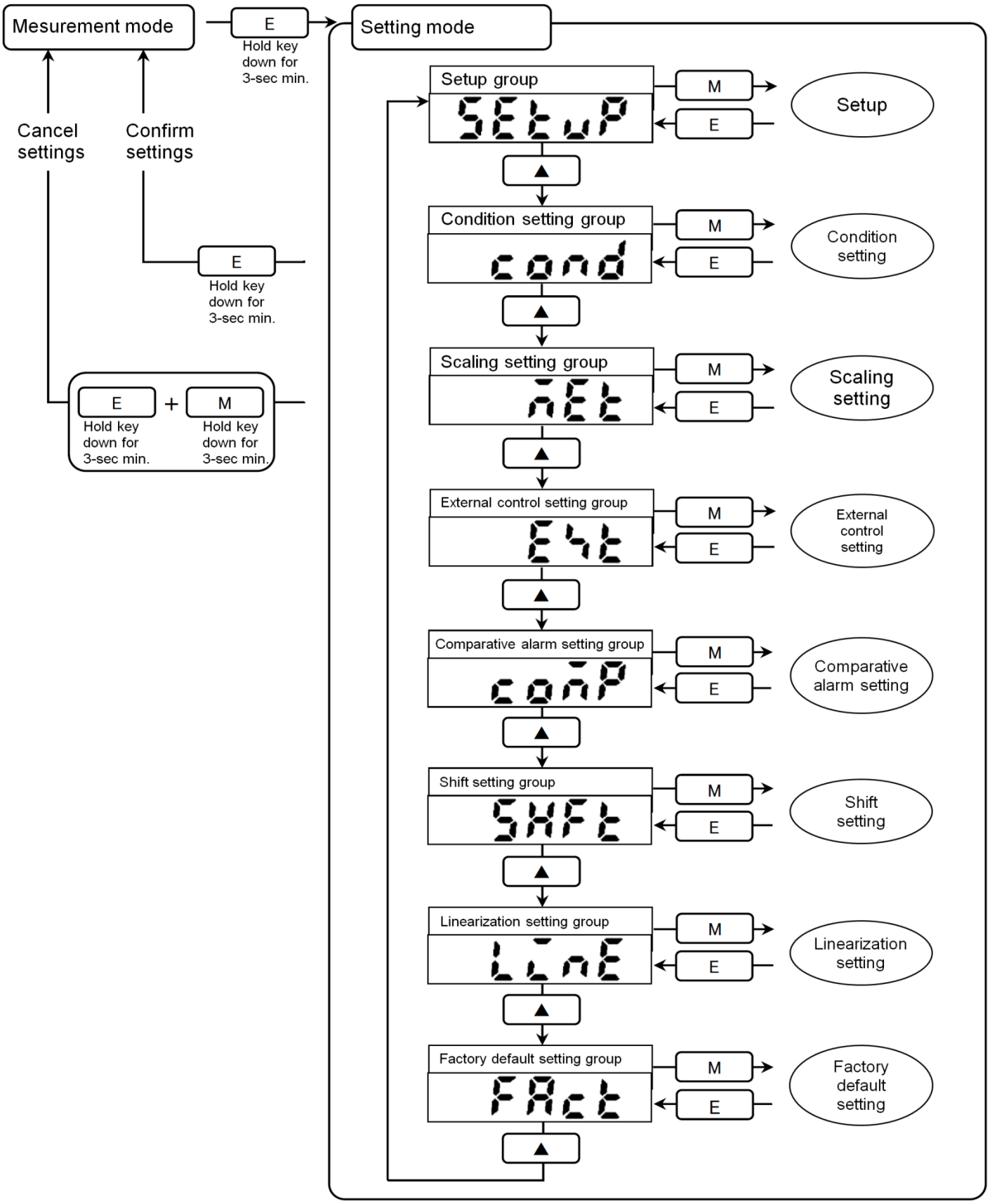
6. Character representation

The characters on the seven segment display are displayed as below.



Operation

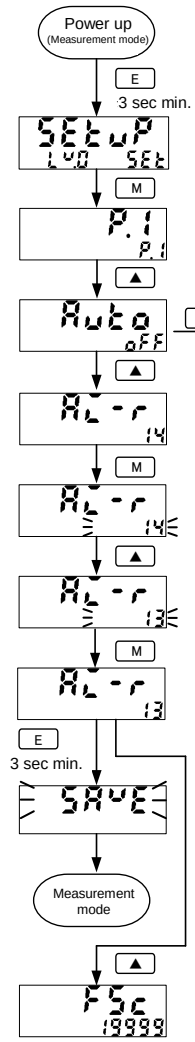
7. Operation procedure diagram



8. Measurement range settings

The default setting for measurement range is '14 (±199.99V)' when you purchase.
Please change the setting to the measurement range you want to use.

Set value	Measurement range
11	±199.99mV
12	±1.9999V
13	±19.999V
14 (Default value)	±199.99V



1) Hold the [E] [ENTER] key down for 3 seconds when Measurement mode.

2) Displays pattern name by pressing the [M] [MODE] key.

3) Displays Auto range settings by pressing the [▲] [UP] key.
Press [M] [MODE] key to change Auto range setting.

4) Displays range settings by pressing the [▲] [UP] key.

5) Switches to the Edit mode by pressing the [M] [MODE] key.

6) Select the range by pressing the [▲] [UP] key for several times.

7) Temporary settings by pressing the [M] [MODE] key.

8) Displays 'SAVE' and sets selected set value by holding the [E] [ENTER] key down for 3 seconds, and then it will return to the Measurement mode.

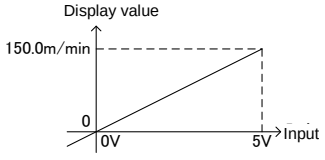
9) Press the [▲] [UP] key to move on to the next parameter.
Full scale display value setting parameter will be displayed.

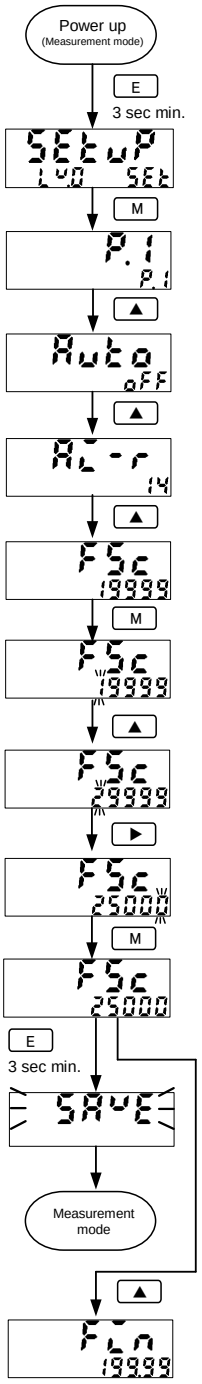
9. Scaling settings

Scaling setting is the function to display the values of the analog output signals from displacement sensors or signal converters, which is converted linear to the primary chemical quantity / physical quantity.

Sets distance display (0.0 to 150.0m / min) by linear output signal (0 to 5V) of distance sensors.

Display	Parameter	Value	Description
AL-r	Input range	13	±19.999V measurement
FSc	Full scale display value	1500	Maximum detection value of distance sensors : 150.0m/min
FLn	Full scale input value	5000	Sensor output value when maximum value above : 5.000V
oFS	Offset display value	0	Measurement standard value of distance sensors : 0.0m/min
oLn	Offset input value	0	Sensor output value when standard value above : 0.0V
dP	Decimal point position	0.0	Decimal point position setting





1) Hold the [E] [ENTER] key down for 3 seconds when Measurement mode.

2) Displays pattern name by pressing the [M] [MODE] key.

3) Displays Auto range settings by pressing the [▲] [UP] key.

4) Displays range settings by pressing the [▲] [UP] key.

5) Displays full-scale display value by pressing the [▲] [UP] key.

6) Switches to the Edit mode by pressing the [M] [MODE] key.

7) Select the value by pressing the [▲] [UP] key for several times.

8) Select the digit you want to set by pressing [▶] [SHIFT] key. Select the value by pressing the [▲] [UP] key for several times.

9) Temporary settings by pressing the [M] [MODE] key.

10) Displays 'SAVE' and sets selected set value by holding the [E] [ENTER] key down for 3 seconds, and then it will return to the Measurement mode.

11) Press the [▲] [UP] key to move on to the next parameter. Full-scale display value setting parameter will be displayed.

10. Analog output

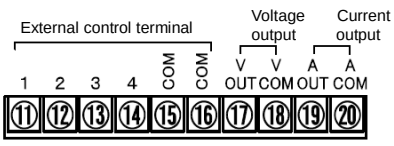
10−1. Analog output range settings

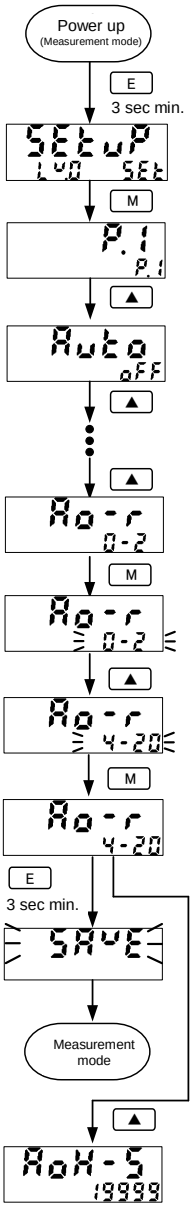
The default setting for measurement range is '0 to 2V' when you purchase. Please change the setting to the output range you want to use.

Note : Only the model with analog output option can set the output range. (WPM-1-□□-□1□-□00).

Set value	Analog output range	Remarks
0-2 (Default value)	0 to 2V	Load resistance : more than 10kΩ
0-10	0 to 10V	
-10-10	-10V to 10V	
1-5	1 to 5V	
0-20	0 to 20mA	Load resistance : 550kΩ or less
4-20	4 to 20mA	

Caution : Differs depending on the connection terminal on voltage output and current output.





1) Hold the [E] [ENTER] key down for 3 seconds when Measurement mode.

2) Displays pattern name by pressing the [M] [MODE] key.

3) Displays Auto range settings by pressing the [▲] [UP] key.

4) Move on to analog output range settings by pressing the [▲] [UP] key for several times.

5) Switches to the Edit mode by pressing the [M] [MODE] key.

6) Select the range by pressing the [▲] [UP] key for several times.

7) Temporary settings by pressing the [M] [MODE] key.

8) Displays 'SAVE' and sets selected set value by holding the [E] [ENTER] key down for 3 seconds, and then it will return to the Measurement mode.

9) Press the [▲] [UP] key to move on to the next parameter. Analog output HI display setting parameter will be displayed.

Note : When Auto range is valid, Analog output HI range setting will be displayed.

10−2. Analog output scaling settings

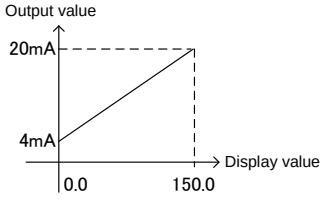
Sets the specific analog output setting according to the optional starting point and end point of display value.

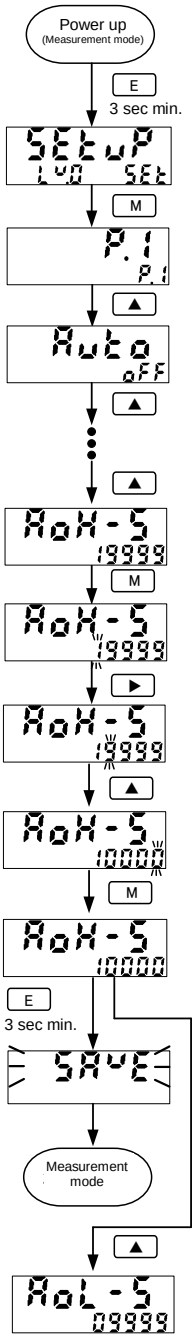
Note : Only the model with analog output option can set the output range. (WPM-1-□□-□1□-□00).

Set value	Upper limit	Lower limit
0-2	2V	0V
0-10	10V	0V
-10-10	10V	-10V
1-5	5V	1V
0-20	20mA	0mA
4-20	20mA	4mA

Sets distance display (0.0 to 150.0m / min) by linear output signal (0 to 5V) of distance sensors.
Then outputs 4mA when 0.0m/min, 20mA when 150.0m/min is displayed.

Display	Parameter	Value	Description
Ao-r	Output range	4-20	4 to 20mA output
AoH-S	Analog output HI display value	1500	Display value to output 20mA : 150.0m/min
AoL-S	Analog output LO display value	0	Display value to output 4mA : 0.0m/min





1) Hold the [E] [ENTER] key down for 3 seconds when Measurement mode.

2) Displays pattern name by pressing the [M] [MODE] key.

3) Displays Auto range settings by pressing the [▲] [UP] key.

4) Move on to analog output HI display value settings by pressing the [▲] [UP] key for several times.

5) Switches to the Edit mode by pressing the [M] [MODE] key.

6) Select the digit you want to set by pressing [▶] [SHIFT] key.

7) Select the value by pressing the [▲] [UP] key for several times.
(Repeat 'Process 6 & 7')

8) Temporary settings by pressing the [M] [MODE] key.

9) Displays 'SAVE' and sets selected set value by holding the [E] [ENTER] key down for 3 seconds, and then it will return to the Measurement mode.

10) Press the [▲] [UP] key to move on to the next parameter.
Analog output LO display setting parameter will be displayed.

Note : When Auto range is valid, Analog output LO range setting will be displayed.

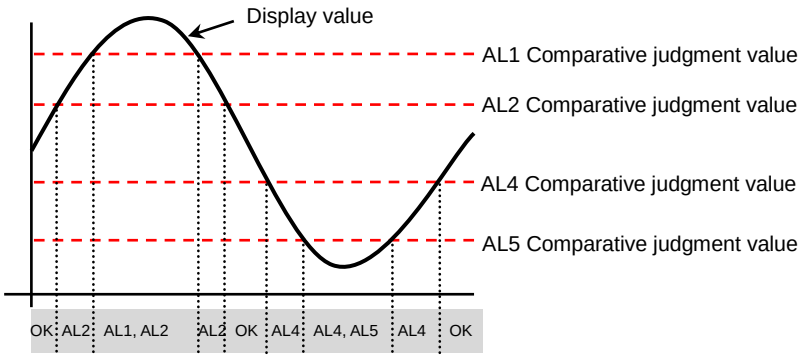
11. Comparative alarm function

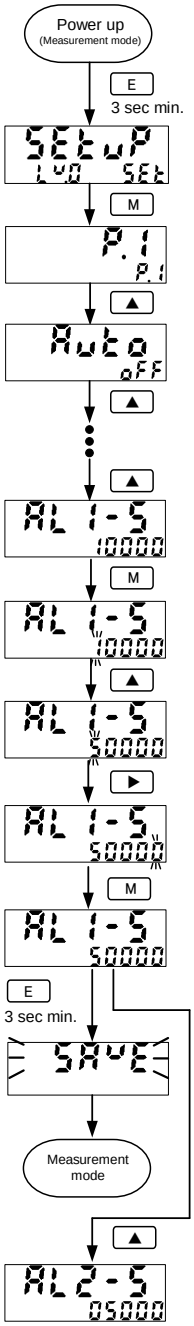
Normal operation

There are 3 operation types for comparative alarm function in WPM.(Normal judgment, Zone judgment, Tolerance judgment)
Explains about Normal operation in this column which is default setting.

Judgment results		Operating conditions
AL1 AL2	2nd upper limit alarm	Display value > AL1 comparative judgment value
AL2	1st upper limit alarm	AL1 comparative judgment value ≥ Display value > AL2 comparative judgment value
AL3	OK	AL2 comparative judgment value ≥ Display value ≥ AL4 comparative judgment value
AL4	1st lower limit alarm	AL4 comparative judgment value > Display value ≥ AL5 comparative judgment value
AL4 AL5	2nd lower limit alarm	AL5 comparative judgment value > Display value

Note 1 : Setting condition of Comparative judgment value
AL1 judgment value > AL2 judgment value > AL4 judgment value > AL5 judgment value
Note 2 : When the hysteresis is set to the comparative judgment value, hysteresis will affects judgment operation.





1) Hold the [E] [ENTER] key down for 3 seconds when Measurement mode.

2) Displays pattern name by pressing the [M] [MODE] key.

3) Displays Auto Range settings by pressing the [▲] [UP] key.

4) Move on to AL1 judgment value settings by pressing the [▲] [UP] key for several times.

5) Switches to the Edit mode by pressing the [M] [MODE] key.

6) Select the value you want to set by pressing [▶] [SHIFT] key for several times.

7) Shift the digits by pressing [▶] [SHIFT] key for several times, and set the value you want.

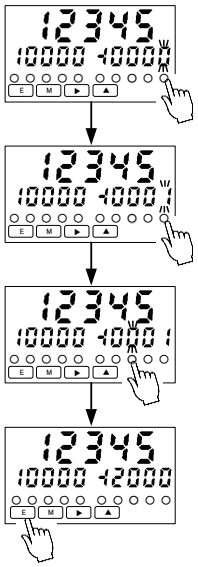
8) Temporary settings by pressing the [M] [MODE] key.

9) Displays ‘SAVE’ and sets selected set value by holding the [E] [ENTER] key down for 3 seconds, and then it will return to the Measurement mode.

10) Press the [▲] [UP] key to move on to the next parameter. AL2 judgment value setting parameter will be displayed.

●Easy direct settings

[COMPARATIVE VALUE SETTING] key below sub monitor can be used to change the comparative judgment value directly.

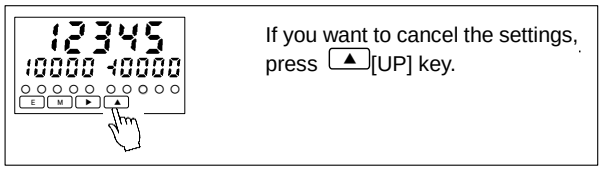


1) Pressed digit flashes.

2) Can be changed directly by pressing [COMPARATIVE VALUE SETTING] key of flashing digit.

3) If you want to change the other digits, press the [COMPARATIVE VALUE SETTING] key which you want to change.

4) When you finished changing, press [E] [ENTER] key to confirm the settings.
If there is an error, "ERROR" will be displayed.
Note : AL1 > AL2 > AL3 > AL4 > AL5



If you want to cancel the settings, press [▲] [UP] key.

●Switching sub monitor display of 4 point comparative alarm settings

Sub monitor displays 2 comparative judgment value.
[OUTSIDE] light will turn on/off when pressing [▲] [UP] key to switch the display to other comparative set values.

	OUTSIDE light	Alarm set value	
		Left	Right
Upper limit 4 points alarm	On	AL1	AL4
	Off	AL2	AL3
Upper limit 3 points alarm Lower limit 1 point alarm	On	AL1	AL5
	Off	AL2	AL3
Upper limit 2 point alarm Lower limit 2 point alarm	On	AL1	AL5
	Off	AL2	AL4
Upper limit 1 point alarm Lower limit 3 point alarm	On	AL1	AL5
	Off	AL3	AL4
Lower limit 4 point alarm	On	AL2	AL5
	Off	AL3	AL4

12. External control function

Can use each function by assigning external control terminal 1 to 4.
It will operate during each terminal and COM terminal is short circuit or L level.
(L level : 0 to 1.5V, H level : 3.5 to 5V, Input current : -2mA or less)

	Terminal number	Default value	Description
Default condition	External control terminal 1	DZ	Digital zero
	External control terminal 2	SH	Sampling hold
	External control terminal 3	PH	Peak hold
	External control terminal 4	R.RST	Relay reset

12−1. Digital zero function

Digital zero function is to display zero instead of the optional display value. After that, it will display the variation value from that point.
Only if the external control terminal settings are not set, digital zero can be operated by holding the [►] [SHIFT] key.

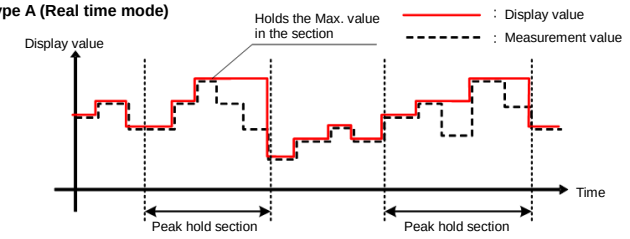
12−2. Sampling hold function

Sampling hold function is to hold the display value and output value.
Sampling hold function has Type A (Free running mode) and Type B (One shot mode).

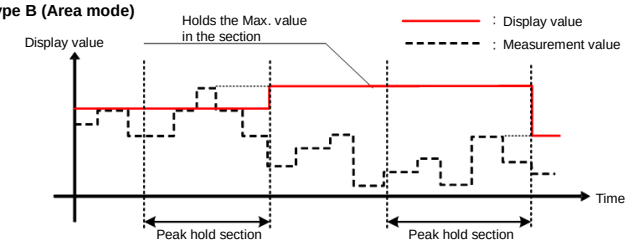
12−3. Peak hold function

Peak hold function is to always hold the larger measurement value.
Peak hold function has Type A (real time mode) and Type B (Area mode).
Also, there are 3 types of peak hold, Max. value (peak hold), Min. value (bottom hold), difference between Max. value and Min. value (peak-to-peak hold).

Type A (Real time mode)



Type B (Area mode)



12－4. Relay reset function

Relay reset function is to turn off all the judgment result and output of comparative alarm function during relay reset function is ON.

12－5. Pattern select functon

Pattern select function is to switch the patterns of parameters for scaling setting and comparative alarm setting.
WPM-1 can store 8 patterns in the internal memory.

It is able to switch pattern settings by following 2 ways.

1) Select functions of External control terminal function to P.SEL 1 to 3.
It will operate during each terminal and COM terminal is short circuit or L level.
(L level : 0 to 1.5V, H level : 3.5 to 5V, Input current : -2mA or less)

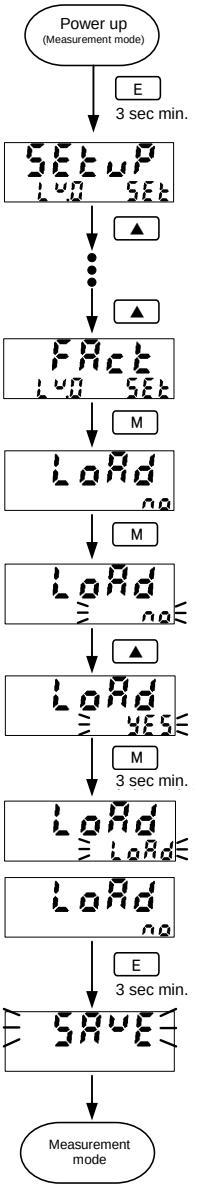
Pattern	P.SEL1	P.SEL2	P.SEL3
1	HIGH (Open)	HIGH (Open)	HIGH (Open)
2	HIGH (Open)	HIGH (Open)	LOW (Short)
3	HIGH (Open)	LOW (Short)	HIGH (Open)
4	HIGH (Open)	LOW (Short)	LOW (Short)
5	LOW (Short)	HIGH (Open)	HIGH (Open)
6	LOW (Short)	HIGH (Open)	LOW (Short)
7	LOW (Short)	LOW (Short)	HIGH (Open)
8	LOW (Short)	LOW (Short)	LOW (Short)

2) Press the [▲] [UP] key for 3 seconds from the front panel to switch the pattern setting.
You can check the pattern selected by indicators P1/P2/P3 at the front panel.

Pattern	1	2	3	4	5	6	7	8
Function indicators	□P1 □P2 □P3	■P1 □P2 □P3	□P1 ■P2 □P3	■P1 ■P2 □P3	□P1 □P2 ■P3	■P1 □P2 ■P3	□P1 ■P2 ■P3	■P1 ■P2 ■P3

13. Initialize set values

Initialize the product to the factory default settings.



1) Hold the E [ENTER] key down for 3 seconds when Measurement mode.

2) Select factory default settings by pressing the ▲ [UP] key for several times.

3) Move on to factory default settings by pressing the M [MODE] key.

4) Switches to the Edit mode by pressing the M [MODE] key.

5) Select YES by pressing ▲ [UP] key.

6) Factory default setting loading will run by holding the M [MODE] key down for 3 seconds.
Display and flashes 'LOAD' on right sub monitor until it finishes.

7) Goes back to the parameter selection after loading finished.

8) Displays 'SAVE' and sets selected set value by holding the E [ENTER] key down for 3 seconds, and then it will return to the Measurement mode.

14. Troubleshooting (Error codes)

When error occurs, error code will be displayed on the main monitor according to the case of the operation

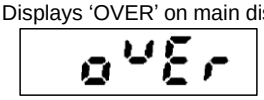
Please reference the list below to solve the problem.

Error code	Description	Solution
E000 E001	FLASH error etc.	Re-start the system. Note : Please contact us if it doesn't restore.
E003	Watchdog error etc.	Hold the M [MODE] key down for 3 seconds.
E060 - E069	Condition data error etc.	Hold the M [MODE] key down for 3 seconds. Note : Restores with initialized settings.
E070 - E079	Scaling data error etc.	
E080 - E089	Comparator data error etc.	
E090 - E099	Log area error etc.	

⚠Caution

Displays 'WAIT' on main display when waiting the input signal or during the ON timing delay.
Note : External control input, analog output and comparative alarm function will be invalid during the ON timing delay.

Displays 'OVER' on main display when measured value overflowed measurement range or display range.



15. Specifications

Common specifications

Input configuration	:	Single ended
A/D conversion	:	ΔΣ conversion
Sampling rate	:	Max. 250 times per second
Display	:	Main display: red or green 7 segment LED (height 14.9mm) Sub display: white 7 segment LED(height 9mm)
Polarity	:	'-' is displayed automatically at negative polarity
Zero display	:	Leading zero suppression
External control	:	Select 4 external control and set parameter 1) Pattern select 2) Sampling hold 3) Peak hold 4) Digital zero 5) Relay reset
Memory protection	:	EEPROM (non-volatile memory) Number of rewrites : 1,000,000 times
Operating temperature / relative humidity	:	-5 to 50°C 35 to 85% (non-condensing)
Storage temperature / humidity	:	-10 to 70° C less 60%RH or less
Power supply	:	100 to 240Vac ±10% 50/60Hz
Power consumption	:	12VA max. at 100Vac 15VA max. at 240Vac
Dimensions	:	96mm(W) x 48mm(H) x 85.9mm(D) DIN size (with comparative function : 99.7mm(D))
Weight	:	approx. 250g
Dielectric strength	:	2000VAC per 1 min. : Power supply terminal - input / external control / analog output terminals 1500VAC per 1 min. : Power supply terminal - comparative output terminal
	:	1500VAC per 1 min. : Input terminal - External control / analog output / comparative output terminals 2000VAC per 1 min. : Case – Terminals
Insulation resistance	:	500VDC more than 100MΩ on the above terminals
Vibration strength	:	10 to 55Hz 0.15mm X,Y,Z 30 min.
Front protection	:	IP66 rating (Front bezel)
Installation location	:	Indoors only
Rated altitude	:	2000m or less
Overvoltage category	:	II
Measurement category	:	II
Pollution level	:	2
Compatible EN standards	:	EN61326-1 (EMS : Industrial use / EMI : Class A) EN61010-1 (Use cables shorter than 30m)
Case material	:	Polycarbonate, black, UL94V-0

Input specifications

Range	Measurement range	Auto range	Display Range (Scaling)	Resolution	Impedance	Max. allowable input	Accuracy (23±5°C 35 to 85%RH)
11	±199.99mV	Not available	Offset: : -19999 to 99999 Full scale : -19999 to 99999 Resolution : ±19999	10μV	Approx. 10M Ω	±250V	±(0.1% of FS +1 digit)
12	±1.9999V	Available		100μV			
13	±19.999V			1mV			
14	±199.99V			10mV			

Note : 'Accuracy' is when the sampling rate is 60 times per sec or less.

Range swich	:	Manual range (11 to 14 range) Auto range (12 to 14 range, Up level 19999, Down level 1800) Note : Selectable by scaling settings When setting is manual range, also swiches input range by scaling setteing
Over range display	:	When input exceeds the maximum display, 'ovEr' or '-ovEr'. Also, 'ovEr' or '-ovEr' displays when exceeded the measurement ±10%. Note : When Auto range is valid, 'ovEr' displays when exceeded the measurement 219.99V (110%) '-ovEr' displays when -199.99V or less
Decimal point	:	Manual range : Able to set to any digit Auto range : Depends on range

Output specifications

[Comparative output]

Comparative relay : Contact rating : 125Vac 0.3A (resistance load) 30Vdc 1A (resistance load)
Number of contacts : 5 relay contacts
Minimum applicable load : 10μA 10mVdc
Mechanical life : More than 50,000,000 times
Electrical life : More than 100,000 times (resistance load)

Photo coupler open collector output (NPN) : Rated output : Sink current 50mA Max.
Applied voltage : 30V Max
Output saturation voltage : 1.2V or less when 50mA
Number of outputs : Photo coupler output (NPN) x 5

Operation method : Microcomputer computing type

Setting range : -19999 to 99999

Hysteresis : 1 to 9999 digit for each setpoints

Comparative operation : According to sampling rate

Setting condition : H.H.H.H.G. AL1 > AL2 > AL3 > AL4 > AL5 judgment value (GO)

Comparative condition	Result
Display value > AL1 judgment value	AL1,AL2,AL3,AL,4
AL1 ≥ Display value > AL2 judgment value	AL2,AL3,AL4
AL2 ≥ Display value > AL3 judgment value	AL3,AL4
AL3 ≥ Display value > AL4 judgment value	AL4
AL4 judgment value ≥ Display value	AL5

H.H.H.G.L. AL1 > AL2 > AL3 > AL4 (GO) > AL5 judgment value

Comparative condition	Result
Display value > AL1 judgment value	AL1,AL2,AL3
AL1 ≥ Display value > AL2 judgment value	AL2,AL3
AL2 ≥ Display value > AL3 judgment value	AL3
AL3 ≥ Display value ≥ AL5 judgment value	AL4
AL5 judgment value > Display value	AL5

H.H.G.L.L. AL1 > AL2 > AL3 (GO) > AL4 > AL5 judgment value

Comparative condition	Result
Display value > AL1 judgment value	AL1,AL2
AL1 ≥ Display value > AL2 judgment value	AL2
AL2 ≥ Display value ≥ AL4 judgment value	AL3
AL4 > Display value ≥ AL5 judgment value	AL4
AL5 judgment value > Display value	AL4,AL5

H.G.L.L.L. AL1 > AL2 (GO) > AL3 > AL4 > AL5 judgment value

Comparative condition	Result
Display value > AL1 judgment value	AL1
AL1 ≥ Display value ≥ AL3 judgment value	AL2
AL3 > Display value ≥ AL4 judgment value	AL3
AL4 > Display value ≥ AL5 judgment value	AL3,AL4
AL5 judgment value > Display value	AL3,AL4,AL5

G.L.L.L.L. AL1 (GO) > AL2 > AL3 > AL4 > AL5 judgment value

Comparative condition	Result
Display value ≥ AL1 judgment value	AL1
AL1 > Display value ≥ AL3 judgment value	AL2
AL3 > Display value ≥ AL4 judgment value	AL2,AL3
AL4 > Display value ≥ AL5 judgment value	AL2,AL3,AL4
AL5 judgment value > Display value	AL2,AL3,AL4,AL5

Comparative alarm function types : Normal judgment output, Zone judgment output, Tolerance output

Comparative condition memory : 8 patterns stored in the internal memory

[Analog output]

Conversion : D/A

Resolution : 15bit

Scaling : Digital scaling

Response time : 10ms or less (0 to 90%) (When sampling rate 250 times per sec)
Note : 2ms+2(1/Sampling rate)ms or less

Specifications by type :

Output type	Load resistance	Accuracy	Ripple
0-2V	More than 10kΩ	±(0.1% of FS)	±50mVp-p
0-10V			
-10-10V			
1-5V			
0-20mA	550Ω or less		±25mVp-p
4-20mA			

Note : 'Ripple' is when load resistance is 250Ω and current output is 20mA.

16. Parameter list

[Setup group list]

Parameter	Display	Protection level	Default value	Set value
Setting pattern select	P.1	2	P1	P1 to P8
Auto range function	Auto	1	OFF	OFF/ON
Input range	AI-r	1	14	11 (±199.99mV)/ 12 (±1.999V)/ 13 (±19.999V)/ 14 (±199.99V)
Full scale display value	FSc	2	19999	-19999 to 99999
Full scale input value	FIn	2	19999	-19999 to 99999
Offset display value	oFS	2	0	-19999 to 99999
Offset input value	oIn	2	0	-19999 to 99999
Decimal point	dP	2	0	0/0.0000/0.000/ 0.00/0.0/0.
Analog output range	Ao-r	0	0-2	0-2/0-10/-10-10/1-5/ 0-20/4-20
Analog output HI range	AoH-r	1	___.__	_.____ / __.___ / ___.__
Analog output HI display value	AoH-S	1	19999	-19999 to 99999
Analog output LO range	AoL-r	1	___.__	_.____ / __.___ / ___.__
Analog output LO display value	AoL-S	1	0	-19999 to 99999
Comparative alarm function type	cont	1	O/U	OFF/ O/U (Normal judgment)/ ZONE (Zone judgment)/ ER (Tolerance judgment)
Comparative alarm judgment condition	JudGE	1	H.H.G.L.L (H.G.L.).	H.H.H.H.G./H.H.H.G.L./ H.H.G.L.L./H.G.L.L.L./ G.L.L.L.L. (H.H.G./H.G.L./G.L.L.)
AL1 judgment value range	AL 1-r	2	___.__	_.____ / __.___ / ___.__
AL1 judgment value	AL 1-S	2	10000 （5000）	-19999 to 99999
AL2 judgment value range	AL2-r	2	___.__	_.____ / __.___ / ___.__
AL2 judgment value	AL2-S	2	5000 (Hide when 2 point comparative outputs)	-19999 to 99999
AL3 judgment value range	AL3-r	2	___.__	_.____ / __.___ / ___.__
AL3 judgment value	AL3-S	2	(Hide when 2 point comparative outputs) (-5000)	-19999 to 99999
AL4 judgment value range	AL4-r	2	___.__	_.____ / __.___ / ___.__
AL4 judgment value	AL4-S	2	-5000 (Hide when 2 point comparative outputs)	-19999 to 99999
AL5 judgment value range	AL5-r	2	___.__	_.____ / __.___ / ___.__
AL5 judgment value	AL5-S	2	-10000 (Hide when 2 point comparative outputs)	-19999 to 99999
Tolerance judgment reference value range	Er-r	2	___.__	_.____ / __.___ / ___.__
Tolerance judgment reference value	Er-S	2	10000	-19999 to 99999
Tolerance value 1	Er 1-S	2	5.000	00.000 to 99.999
Tolerance value 2	Er2-S	2	10.000	00.000 to 99.999

[Condition setting group list]

Parameter	Display	Protection level	Default value	Set value
Setting protection level	Pro.n	3	LV.0	LV0/LV1/LV2/LV3 Note : Unable to set the value below set protection level
Key protection level	Pro.P	3	NONE	NONE/ M.KEY(Invalidate [E] [ENTER] key, [M] [MODE] key, [▶] [SHIFT] key, [▲] [UP] key) C.KEY (Invalidate [COMPARATIVE VALUE SETTING] key)/ ALL
ON timing delay	Po.dLY	0	0	0 to 99
Number of simple average	AVG	0	4	1/2/4/8/16/32/64/ 128/256/512/1024
Number of moving average	nAV	0	1	1/2/4/8/16/32
Digital zero backup function	dZ.bu	0	OFF	OFF/ON
Tracking zero interval	tZ.cYc	0	0	0 to 999
Tracking zero correction range	tZ-S	0	1	1 to 999
Display variation width	S.uidE	0	1	1/2/5/10
Display refresh interval	d.cYc	0	0.25	0.05/0.25/0.50/ 1.00/2.00/4.00
Changing method of main monitor color	cLt	1	AUTO	AUTO/MANU
GO color of main monitor	cL	1	GREEN	GREEN/RED
AL1 color	AL 1cL	1	RED	GREEN/RED
AL2 color	AL2cL	1	RED	GREEN/RED
AL3 color	AL3cL	1	GREEN	GREEN/RED
AL4 color	AL4cL	1	RED	GREEN/RED
AL5 color	AL5cL	1	RED	GREEN/RED
Comparative judgment value monitor light off	AL5cL	0	OFF	OFF/ON
Display brightness	bLAnP	0	OFF	OFF/LV1/LV2/ON

[Scaling setting group list]

Parameter	Display	Protection level	Default value	Set value
Setting pattern select	P.1	2	P1	P1 to P8
Auto range function	Auto	1	OFF	OFF/ON
Input range	AI-r	1	14	11 (±199.99mV)/ 12 (±1.999V)/ 13 (±19.999V)/ 14 (±199.99V)
Full scale display value	FSc	2	19999	-19999 to 99999
Full scale input value	FIn	2	19999	-19999 to 99999
Offset display value	oFS	2	0	-19999 to 99999
Offset input value	oIn	2	0	-19999 to 99999
Decimal point	dP	2	0	0/0.0000/0.000/ 0.00/0.0/0.
Upper limit of display range (Digital limiter HI)	dLH-r	0	___.__	_.____ / __.___ / ___.__
Upper limit of display value (Digital limiter HI)	dLH-S	0	99999	-19999 to 99999
Lower limit of display range (Digital limiter LO)	dLL-r	0	___.__	_.____ / __.___ / ___.__
Lower limit of display value (Digital limiter LO)	dLL-S	0	-19999	-19999 to 99999
Low level cut range	In-r	0	___.__	_.____ / __.___ / ___.__
Low level cut	In-S	0	0000	0000 to 9999
Analog output range	Ao-r	0	0-2	0-2 (0 to 2V)/ 0-10 (0 to 10V)/ -10-10 (±10V)/ 1-5 (1 to 5V)/ 0-20 (0 to 20mA)/ 4-20 (4 to 20mA)
Analog output HI range	AoH-r	1	___.__	_.____ / __.___ / ___.__
Analog output HI display value	AoH-S	1	19999	-19999 to 99999
Analog output LO range	AoL-r	1	___.__	_.____ / __.___ / ___.__
Analog output LO display value	AoL-S	1	0	-19999 to 99999

[External control setting group list]

Parameter	Display	Protection level	Default value	Set value
External control terminal 1 function	Ext 1	0	DZ	OFF/ DZ (Digital zero)/ SH (Sampling hold)/ PH (Peak hold)/ R.RST (Relay reset)/ P.SEL1 (Pattern select 1st bit)/ P.SEL2 (Pattern select 2nd bit)/ P.SEL3 (Pattern select 3rd bit)
External control terminal 2 function	Ext2	0	SH	
External control terminal 3 function	Ext3	0	PH	
External control terminal 4 function	Ext4	0	R.RST	
Sampling hold type	SH.t	0	SH.A	SH.A (Free run mode)/ SH.B (One shot mode)
Sampling hold delay	SH.dLY	0	0000	0000 to 9999
Peak hold type	PH.t	0	PH.A	PH.A (Real time mode)/ PH.B (Area mode)
Peak hold select	PHSEL	0	PH	PH (Max. value)/ BH (Min. value)/ PPH (difference between Max. value and Min. value)

[Comparative alarm setting group list]

Parameter	Display	Protection level	Default value	Set value
Setting pattern select	P.1	2	P1	P1 to P8
Comparative alarm function type	comt	1	O/U	OFF/ O/U (Normal judgment)/ ZONE (Zone judgment)/ ER (Tolerance judgment)
Comparative alarm judgment condition	JudGE	1	H.H.G.L.L. （H.G.L.）	H.H.H.H.G./H.H.H.G.L./ H.H.G.L.L./H.G.L.L.L./ G.L.L.L.L. （H.H.G./H.G.L./G.L.L.）
AL1 judgment value	AL 1-S	2	10000 (5000)	-19999 to 99999
AL2 judgment value	AL2-S	2	5000 (non-display)	-19999 to 99999
AL3 judgment value	AL3-S	2	Non-display （-5000）	-19999 to 99999
AL4 judgment value	AL4-S	2	-5000 (non-display)	-19999 to 99999
AL5 judgment value	AL5-S	2	-10000 (non-display)	-19999 to 99999
AL1 hysteresis	AL 1-H	1	0	0000 to 9999
AL2 hysteresis	AL2-H	1	0	
AL3 hysteresis	AL3-H	1	0	
AL4 hysteresis	AL4-H	1	0	
AL5 hysteresis	AL5-H	1	0	
Tolerance judgment reference value	Er-S	2	10000	-19999 to 99999
Tolerance value 1	Er 1-S	2	5.000	00.000 to 99.999
Tolerance value 2	Er2-S	2	10.000	00.000 to 99.999
Tolerance hysteresis 1	Er 1-H	1	0	0000 to 9999
Tolerance hysteresis 2	Er2-H	1	0	0000 to 9999
Comparative alarm delay type	dLYt	0	NONE	NONE/ ON.DLY (ON timing delay type)/ OF.DLY (OFF timing delay type)
Comparative alarm delay	dLY	0	0	0000 to 9999
Comparative alarm latch function	LAtcH	0	OFF	OFF/ON
Al1 logic	AL 1-L	0	N.O	N.O (Normal open)/ N.C (Normal close)
Al2 logic	AL2-L	0	N.O	
Al3 logic	AL3-L	0	N.O	
Al4 logic	AL4-L	0	N.O	
Al5 logic	AL5-L	0	N.O	

Note : Inside '()' is when 2 point comparative output.

Note : All contents in this manual are subject to change without notice

watanabe

Watanabe Electric Industry Co., Ltd.

http://www.watanabe-electric.co.jp/en/

6-16-19 Jinguumae Shibuya-ku Tokyo, 150-0001 Japan

Tel: +(81)3-3400-6140 | Fax: +(81)3-3409-3156