

Graphical Digital Panel Meter
WPMZ-5-□□□-□□-□□□
Quick instruction manual

Thank you for purchasing the WPMZ graphical digital panel meter. This manual is a quick instruction manual only for preparation, connection and basic condition settings of the WPMZ. For the all functions of WPMZ, please refer to a detailed instruction manual which can be downloaded from our homepage.

For models with RS communication functions, please refer to "Modbus communication manual" or "RS-232C communication manual" which also can be downloaded from our homepage.

(<http://www.watanabe-electric.co.jp/en/>)

Checks before supplying power, preparations, wiring

1. CHECKING THE PRODUCT

1-1. MODEL CODES

Please check that the product has been delivered matches the model code has been ordered in reference to "17. SPECIFICATIONS".

2. PRECAUTIONS FOR USE

2-1. ENVIRONMENTS AND CONDITIONS OF USE

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

- 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 frontpanel)
- 7) Environment of strong electromagnetic field or much exogenous noises.

2-2. INSTALLATION AND CONNECTION

- 1) Please read this manual before the installation and the connection of wires. And they should be performed by a person having a specialized technique. In addition, the insulation class of the WPMZ is as shown by the figure below. Please confirm that the insulation class satisfies a use condition prior to the installation.

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

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

Note: The inputs "A channel" and "B channel" may be abbreviated to "Ach" and "Bch" in this manual.

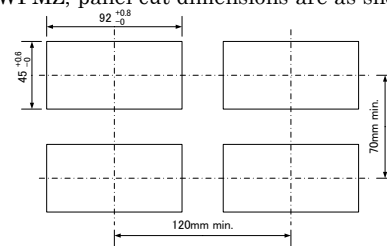
2-3. CHECKING BEFORE USE

Install the WPMZ under the environments and conditions of use which meet requirements.

If you find any damage to the product or any problem, please contact to your dealer or our company directly.

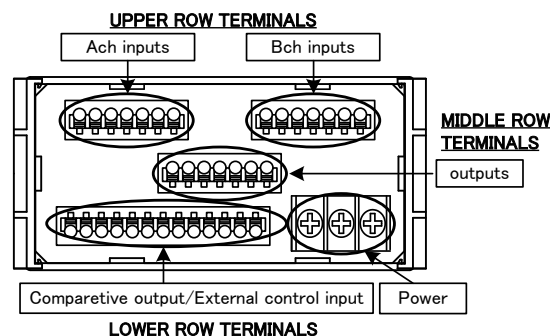
3. HOW TO INSTALL (PANEL CUT DIMENSIONS)

To install the WPMZ, panel cut dimensions are as shown by the figure below.

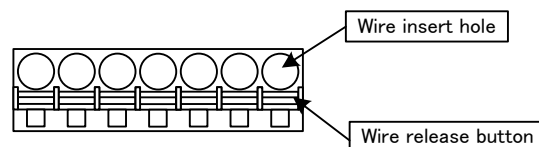


4. CONNECTING TERMINALS

4-1. BACK VIEW



4-2. WIRING TO SCREWLESS TERMINALS



Pushing the wire release button with a flat-blade screwdriver, insert the wire to the wire insert hole deeply and then release the button.

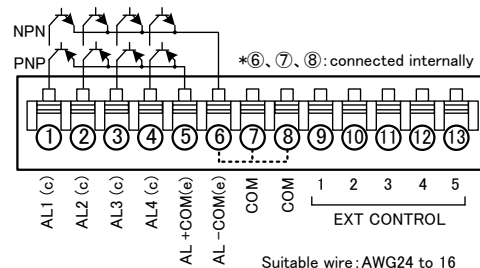
(Suitable tool for pushing buttons : flat-blade screwdriver blade width 2.5mm)

4-3. CONNECTOR FOR LOWER ROW TERMINALS (COMPARATIVE OUTPUT/EXTERNAL CONTROL INPUT, POWER)

4-3-1. Comparative Output/External Control Input

*Screwless connector

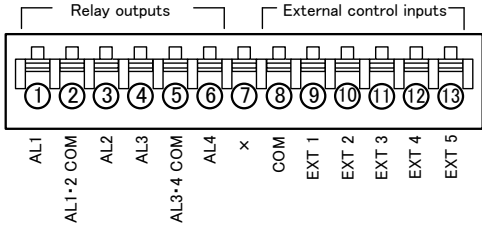
【Open-collector output products】



Suitable wire: AWG24 to 16

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

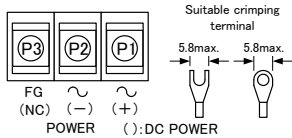
【Relay output products】



Suitable wire: AWG 24 to 16

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

4-3-2. Supply Power

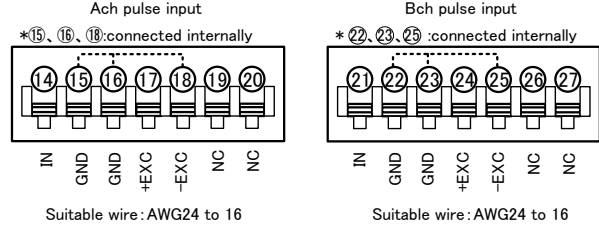


Terminal	Name	Description
P1	POWER (+)	Power source terminal (In case of DC power, +V)
P2	POWER (-)	Power source terminal (In case of DC Power, 0V)
P3	FG (NC)	FG terminal (DC power option: no connection (Non-usable for a relay terminal))

4-4. CONNECTION FOR UPPER ROW TERMINALS

4-4-1. Pulse Inputs (Open collector/Logic/Zero cross/2wire)

*Screwless connector



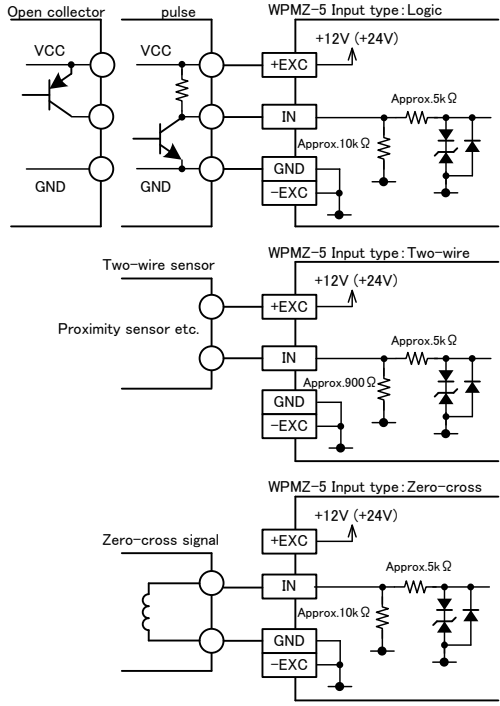
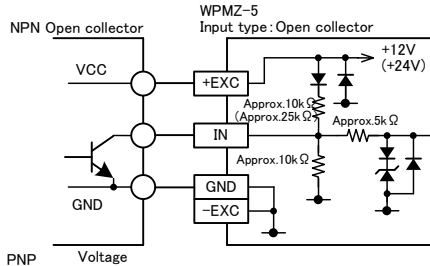
●A channel pulse input

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

●B channel pulse input

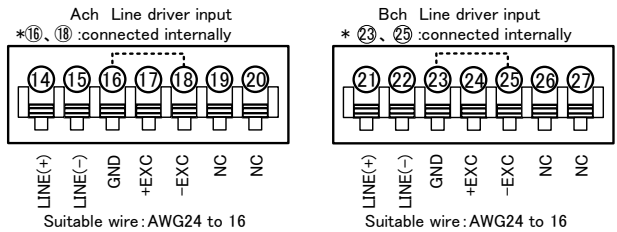
terminal	name	description
21	IN	Bch pulse input terminal
22,23	GND	Bch input GND terminal
24	+EXC	Bch sensor power output terminal (+)
25	-EXC	Bch sensor power output terminal (-)
26,27	NC	No connection *Non-usable for a relay terminal

• Examples for Input connections



4-4-2. Line Driver Inputs

*Screwless connector



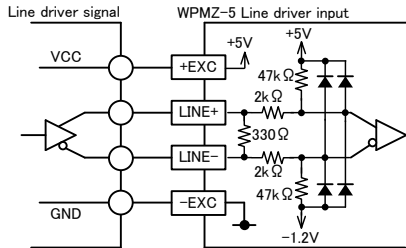
●A channel line driver input

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

●B channel line driver input

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

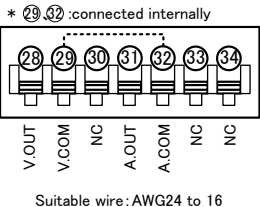
• Examples for Input connections



4-5. CONNECTION FOR MIDDLE ROW TERMINALS

4-5-1. Analog Output

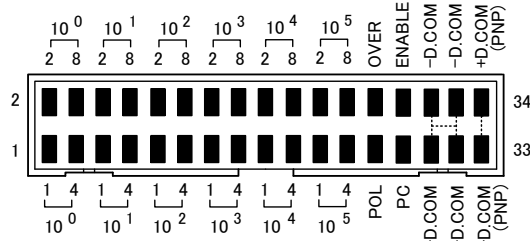
*Screwless connector



●WPMZ-5-□□□-1□-□□□

terminal	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

4-5-2. BCD Output *MIL connector



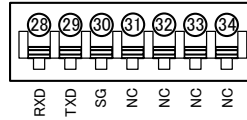
Suitable wire: AWG#28 flat cable(7/0.127mm)

●WPMZ-5-□□□-2or3□-□□□

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

terminal	name	description
33,34	+D.COM	External power terminal for BCD open collector PNP

4-5-3. RS-232C *Screwless connector

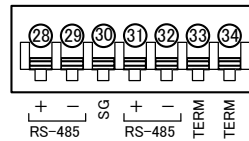


Suitable wire: AWG24 to 16

●WPMZ-5-□□□-4□-□□□

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

4-5-4. RS-485 Modbus RTU *Screwless connector



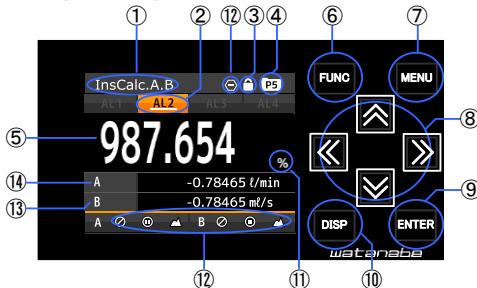
Suitable wire: AWG24 to 16

●WPMZ-5-□□□-5□-□□□

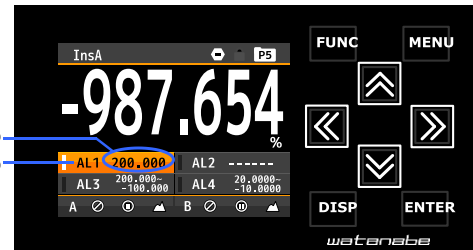
terminal	name	description
28	+	Non-inverting signal
29	–	Inverting signal
30	SG	Signal ground
31	+	Non-inverting signal
32	–	Inverting signal
33,34	TERM	Terminal resistance (120Ω) terminals * Short 33 and 34 to be enable the resistance.

5. NAMES OF EACH PART

5-1. NAMES OF EACH PART



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



5-2. EXPLANATION OF ICONS

5-2-1. Display Icons On The Measurement Display

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

Icon	Meanings
P5	Indicates pattern No. in use.
🔒	Indicates key lock function is effective.
🔄	Indicates comparative output reset function (an external control function) is effective.
🚫	Indicates measurement inhibit function (an external control function) is effective.
⏸	Indicates display hold function (an external control function) is effective.
📈 📉	Indicates maximum value or minimum value hold function (an external control function) is effective.

5-2-2. Key Operation Icons On The Setting Display

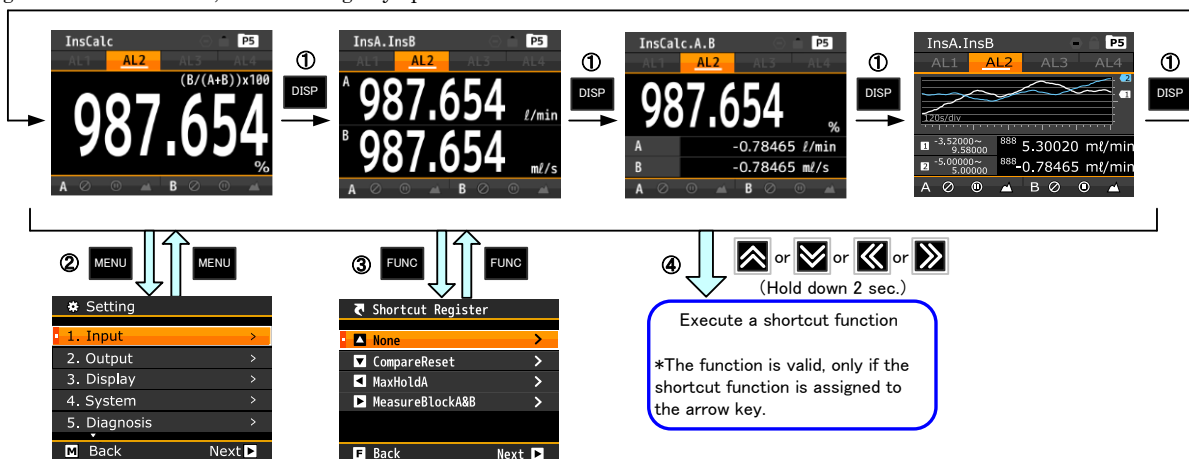
Key operation icons which are displayed on setting displays are shown below.

Icon	Meanings	Icon	Meanings
M	MENU key	←	ARROW key (LEFT)
F	FUNC key	→	ARROW key (RIGHT)
E	ENTER key	↕	ARROW key (UP&DOWN)
D	DISP key	↔	ARROW key (LEFT&RIGHT)
▲	ARROW key (UP)	⬆	ARROW key (ALL)
▼	ARROW key (DOWN)	P1	Pattern No. under setting

BASIC OPERATIONS, SETTINGS

6. BASIC OPERATIONS OF MEASUREMENT DISPLAY

During measurement mode, the following key operations can be done.



- ① By pushing the “DISP key” in the measurement mode, the display can be switched to others which are selected in “display select”.
- ② By pushing the “MENU key” in the measurement mode, the display moves to the setting display.
Alternatively, by pushing the “MENU key” in the setting display, the display returns to the measurement display
- ③ By pushing the “FUNC key” in the measurement mode, the display moves to the shortcut entry display.
Alternatively, by pushing the “FUNC key” in the shortcut entry display, the display returns to the measurement display.
- ④ During measurement, by holding down the “arrow key” in 1 second, the shortcut function registered to the key will be executed.
On this occasion, the display has no change.

7. SETTING LAYER OVERVIEW

The setting menus of the WPMZ which are represented by key words and have layers, therefore desired setting menu can be selected accurately. The layers consist of 1st layer to 4th layer (Only custom unit setting has the 5th layer). Please refer to “8. BASIC OPERATION OF SETTING DISPLAY” about how to set up.

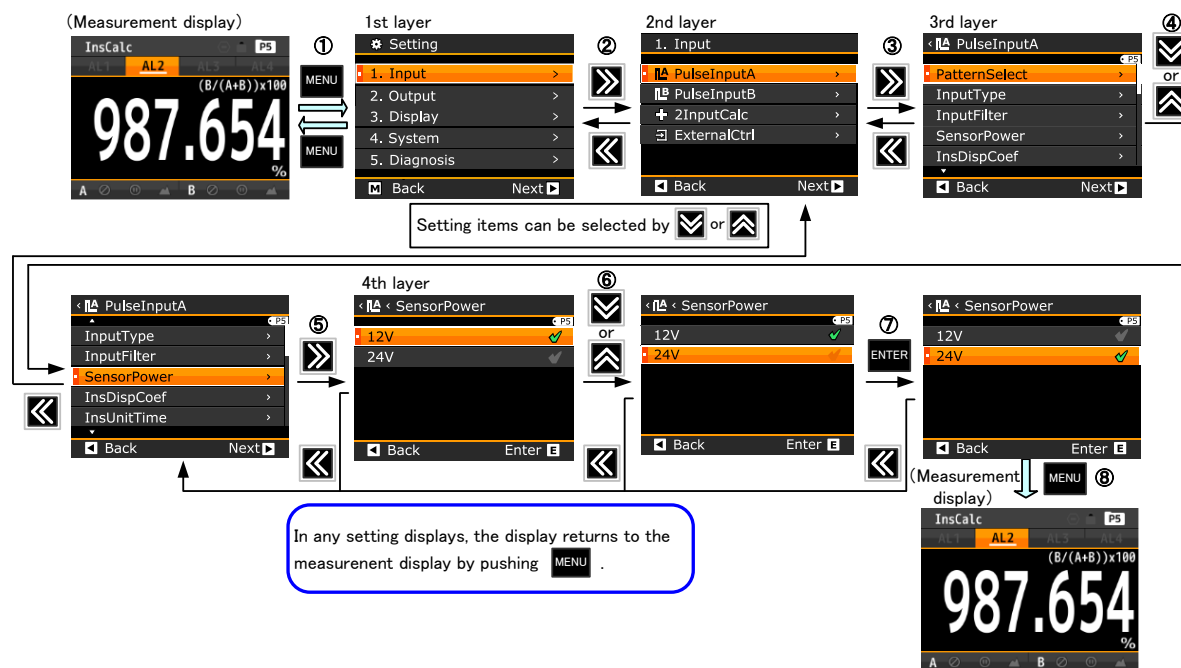
1st layer Large categories	2nd layer Small categories	3rd layer (setting items)		4th layer (setting contents)		Remarks
		name of item	Character strings on display (abbreviated form)	Initial values	Settable variables	
1.Input	(WPMZ-5-□□□)	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Input type	InputType	OpenCollector	OpenCollector/Logic/ZeroCross/2Wire	Select input signal type
		Input filter	InputFilter	None	None/30Hz/1.5kHz/15kHz	Select analog input filters
		Sensor power	SensorPower	12V	12V/24V	Switch Sensor power voltage
		Instantaneous value display coefficient	InsDispCoef	1.00000×10 ⁰	0.00000 to 9.99999×10 ⁻⁹	For scaling setting of instantaneous value display, multiply frequency by instantaneous coefficient and unit time.
		Instantaneous unit time	InsUnitTime	Sec	Sec/Min/Hour	
		Instantaneous value decimal point position	InsDecPoint	##### (No decimal point)	#####/ #####/ ##/ ####/ ###/ #####/ #####	Set number of digits after decimal point
		Instantaneous value display unit	InsDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Instantaneous value auto zero	InsAutoZero	0.00	0.00 to 99.99sec	Displays 0 if no pulse input over more than setting time
		Instantaneous value moving average	InsMoveAve	None	None/2times/3times /4times /5times /6times /7times /8times / 9times	Set number of moving average.
		Instantaneous value simple average	InsSimpleAve	None	None/2 times /4 times /8 times /16 times /32 times /64 times /128 times /256 times	Set number of simple average for internal sampling (10ms)
		Instantaneous value display step	InsDispStep	None	None/5steps/10steps	Setting of steps of display (If set to 5steps, displayed only 0 or 5 on LSB)
	(WPMZ-5-□□□)	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Input Type	InputType	Line driver	Line driver	Only line driver
		Input filter	InputFilter	None	None	None analog filters
		Sensor Power	SensorPower	5V	5V	Sensor power is 5V only
		Instantaneous value display Coefficient	InsDispCoef	1.00000×10 ⁰	0.00000 to 9.99999×10 ⁻⁹	For scaling setting of instantaneous value display, multiply frequency by instantaneous coefficient and unit time.
		Instantaneous value unit time	InsUnitTime	Sec	Sec/Min/Hour	
		Instantaneous value decimal point position	InsDecPoint	##### (No decimal point)	#####/ #####/ #/ #####/ ##/ ####/ ###/ #####/ #####	Set number of digits after decimal point
		Instantaneous value display unit	InsDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Instantaneous value auto zero	InsAutoZero	0.00	0.00 to 99.99 sec	Displays 0 if no pulse input over more than setting time
		Instantaneous value moving average	InsMoveAve	None	None/2times/3times /4times /5times /6times /7times /8times / 9times	Set number of moving average for analog inputs
		Instantaneous value simple average	InsSimpleAve	None	None/2 times /4 times /8 times /16 times /32 times /64 times /128 times /256 times	Set number of simple average
		Instantaneous value display step	InsDispStep	None	None/5steps/10steps	Setting of steps of display (If set to 5steps, displayed only 0 or 5 on LSB)
	2 input calculation	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Expression for instantaneous value	InsExpression	None	None/ (B/A)*100 / (B/A-1)*100 /B-A / (B/(A+B))*100 / A+B	Select expression for calculation of instantaneous value.
		Instantaneous value decimal point position	InsDecPoint	##### (No decimal point)	#####/ #####/ #/ #####/ ##/ ####/ ###/ #####/ #####	Set number of digits after decimal point
		Instantaneous value display unit	InsDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Instantaneous value display step	InsDispStep	None	None/5steps/10steps	Setting of steps of display (If set to 5steps, displayed only 0 or 5 on LSB)

1st layer Large categories	2nd layer Small categories	3rd layer (setting items)		4th layer (setting contents)		Remarks
		name of item	Character strings on display (abbreviated form)	Initial values	Settable variables	
1.Input	External Control	Function of external control terminal 1 to 5	ExtCtrl1Func ExtCtrl2Func ExtCtrl3Func ExtCtrl4Func ExtCtrl5Func	None	None/ CompareReset/ MeasureBlockA/ MeasureBlockB/ MeasureBlockA&B/ DispHoldA&B/ DispHoldA/ DispHoldB/ MaxHoldA/ MaxHoldB/ MaxHoldA&B/ MinHoldA/ MinHoldB/ MinHoldA&B/PatternChange1/ PatternChange2/ PatternChange3/ MonitorChange/ TrendHold	Select functions assigned to external control terminals.
2.Output	Comparative Output AL1	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern 1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Source output display value	OutputDispValue	None	None/InsA/InsB/InsCalc	Select source output display value to compare.
		Compare mode	CompareMode	LevelJudge	LevelJudge/ ZoneJudge	Select compare mode
		Condition of ON	OnConditions	Excess	Excess/LessThan	In level judge mode
				InTheZone	InTheZone/OutsideTheZone	In Zone judge mode
	Comparative Output AL2	Comparison judgement value	Threshold	10000	Threshold:±999999	In level judge mode
				0	Hysteresis:0 to 999999	
	Comparative Output AL3	Comparison ON delay	OnDelay	0	Zone lower limit:±999999	In Zone judge mode
				10000	Zone upper limit :±999999	
	Comparative Output AL4	Comparison OFF delay	OffDelay	None	Hysteresis:0 to 999999	Comparative output turns ON, if ON condition continues over set delay time.
				None	None/20ms/50ms/100ms/200ms/500ms 1s/5s/10s/20s	
	Analog Output	Output mode	OutputMode	Normal	Normal/Latch/OneShot5ms/ OneShot 10ms/ OneShot 20ms/OneShot 50ms/ OneShot 0.1s/ OneShot 0.2s/ OneShot 0.5s/ OneShot 1s/ OneShot 2s	Select output mode of comparison
		Output logic	OutputLogic	Negative(NO)	Positive(NC)/Negative(NO)	NC/NO are for relay output product.
		Background Color at ON	OnBgColors	Black	Black/Red/Yellow/Green	Background color priority AL1>AL2>AL3>AL4
		Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern 1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
	BCD Output	Output range	OutputRange	0-10V	0-10V/±10V/1-5V/0-20mA/4-20mA	Select output range (type).
		Source output display value	OutputDispValue	None	None/InsA/InsB/InsCalc	Select a displayable item for analog output
		Output scale	OutputScale	0 10000	0% display value :±999999 100% display value :±999999	Set scaling for analog output. Set expected display values at 0% and 100% output.
		Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern 1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
	RS-485 Modbus communication	Source output display value	OutputDispValue	None	None/InsA/InsB/InsCalc	Select a displayable item for BCD output
		Data signal logic	DataSignalLogic	Negative	Positive /Negative	Select logic of data signal output.
		Synchronous signal logic	SyncSignalLogic	Negative	Positive /Negative	Select logic of synchronous signal (PC) output.
		SlaveAddress	SlaveAddress	1	1/2/3/4/ /30/31	Set ID number.
	RS-232C communication	Baudrate	Baudrate	19200bps	9600bps/19200bps/38400bps	Set baud rate.
		Parity	Parity	Even	None/Even/Odd	Set parity bit.
		Protocol	Protocol	Modbus-RTU	Modbus-RTU/OriginalCommand/OriginalOutput	Set protocol
		Baud rate	Baudrate	19200bps	9600bps/19200bps/38400bps	Set baudrate.
		Data length	DataLength	8bit	7bit/8bit	Set data character length
		Parity	Parity	None	None/Even/Odd	Set parity bit.
		Stop bit	Stopbit	1bit	1bit/2bit	Set stop bit length.
		Delimiter	Delimiter	CR	CR/CR LF	Set delimiter type.
3.Display	Display Select	Measure select	MeasureSelect	1input: InsA 2inputs: InsA+ InsB	InsA/InsB/InsCalc/ InsA+InsB / InsCalc+A+B/ InsA+Comp/InsB+Comp/InsCalc+Comp	Select displayable items can be switched by DISP key or external control (multiple selects are available)
		Level select	LevelSelect			Select an item displayed on level display
		Trend select	TrendSelect		InsA/InsB/InsCalc/ InsA+InsB	Select an item displayed on trend display.
	Level Display	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern 1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Instantaneous value A scale	InsA Scale	0 10000	Lower limit:±999999 Upper limit:±999999	Set display scale of level display. Left edge of display is lower limit and right edge of display is higher limit
		Instantaneous value B scale	InsB Scale			
		Instantaneous calculation scale	InsCalcScale			
	Trend Display	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern 1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Instantaneous value A scale	InsA Scale	0 10000	Lower limit :±999999 Upper limit :±999999	Set display scale of trend display. Bottom edge of display is lower limit and top edge of display is higher limit.
		Instantaneous value B scale	InsB Scale			
		Instantaneous calculation scale	InsCalcScale			
		Time axis	TimeAxis	1s/div	1s/div,2s/div,5s/div,10s/div,30s/div,60s/div 120s/div	Select time for 1 division of time axis.
4.System	General	Brightness	Brightness	5 Bright	5 Bright/4/3/2/1 Dark/0 Off	Select brightness of display *0 Off is set, whole display is black out
		Power on delay	PowerOnDelay	None	None/2Sec/5Sec/10Sec/20Sec/30Sec/60Sec	Select time from power on to starting measurement
		Power saving time	PowerSavingTime	None	None/1min/2 min/5 min/10 min/30 min/60 min	In power saving state, brightness becomes "1 Dark" level.
		Language	Language	日本語	日本語 /English	Select language
		Direction of display	DisplayDirection	Horizontal	Horizontal/Vertical	Select direction of display
		Setting protect	SettingProtect	Disable	Disable/Enable	If Enable, changing settings are disabled.
		Pattern Copy	PatternCopy	Pattern5(source) PatternAll(destination) Excuse	Pattern 1/2/3/4/5/6/7/8 PatternAll Operationsselect Excuse	Function of copying settings for each pattern.
	Initialize	Save user defaults	UserDefaultSave	Message "Save current settings as user initial values?"		
		Initialize to user defaults	UserDefaultLoad	Message "Initialize setting values to user initial values?"		
		Initialize to factory default	FactoryDefaultLoad	Message "Initialize setting values to factory default?"		
5.Diagnosis	Input Diagnosis	Pulse input A Pulse input B	PulseInputA PulseInputB	—	—	Check for input signal existence. (Displays pulse counts)
		Analog input A Analog input B	AnalogInputA AnalogInputB	—	—	Check for input signal existence. (Displays level in percentage of rating.)
		External control inputs	ExternalCtrl	—	—	Check for ON/OFF state of terminals
	Output Test	Comparative output AL1 to AL4	CompareAL1 CompareAL2 CompareAL3 CompareAL4	—	—	Outputs ON level or OFF level
		Analog output	AnalogOutput	—	—	Outputs level of 10% steps of rating.
		BCD Output(Data) BCD Output(PC)	BCD Output(Data) BCD Output(PC)	—	—	Outputs ON level or OFF level for each bit
		Modbus Communication RS-485	ModbusCom	—	—	Displays receive data and transmit data
		RS-232C	RS-232C Com	—	—	Displays receive data and transmit data

8. BASIC OPERATIONS FOR SETTING DISPLAYS

Basic operations for setting displays are shown as below.

The following is an example for changing the voltage of sensor power supply.



- ① By pushing the “**MENU**” key in the measurement mode, the display moves to the setting display and displays the **1st layer (major categories)**.
By moving the cursor with “**arrow key (UP/DOWN)**”, the selection of major categories to set can be changed.
* On the 1st layer, by pushing the “**MENU**” key, the display returns to the measurement display.
- ② Pointing the cursor to a major category to set and pushing “**arrow key (RIGHT)**”, the display moves to the **2nd layer (small categories)**.
By moving the cursor with “**arrow key (UP/DOWN)**”, the selection of small categories of the setting can be changed.
If the “**arrow key (LEFT)**” is pushed, the display returns to the 1st layer.
* On the 2nd layer, by pushing the “**MENU**” key, the display returns to the measurement display.
- ③ Pointing the cursor to a small category to set and pushing “**arrow key (RIGHT)**”, the display moves to the **3rd layer (setting items)**.
If the “**arrow key (LEFT)**” is pushed, the display returns to the 2nd layer.
* On the 3rd layer, by pushing the “**MENU**” key, the display returns to the measurement display.
- ④ By moving the cursor with “**arrow key (UP/DOWN)**”, select a setting item.
If the “**arrow key (LEFT)**” is pushed, the display returns to the 2nd layer.
- ⑤ At the selected setting item, by pushing “**arrow key (RIGHT)**”, the display moves to the 4th layer (setting contents) and a current selected content has a check mark. If the “**arrow key (LEFT)**” is pushed, the display returns to the 3rd layer.
- ⑥ By moving the cursor with “**arrow key (UP/DOWN)**”, select a content.
If the “**arrow key (LEFT)**” is pushed, the display returns to the 3rd layer.
- ⑦ By pushing the “**ENTER**” key, the selected content is confirmed and a check mark accompanies.
If the “**arrow key (LEFT)**” is pushed, the display returns to the 3rd layer.
- ⑧ By pushing the “**MENU**” key, the selected content is stored and returns the measurement display.
*** If the power is shut down before being pushed the “MENU” key, the selected content is not stored.**

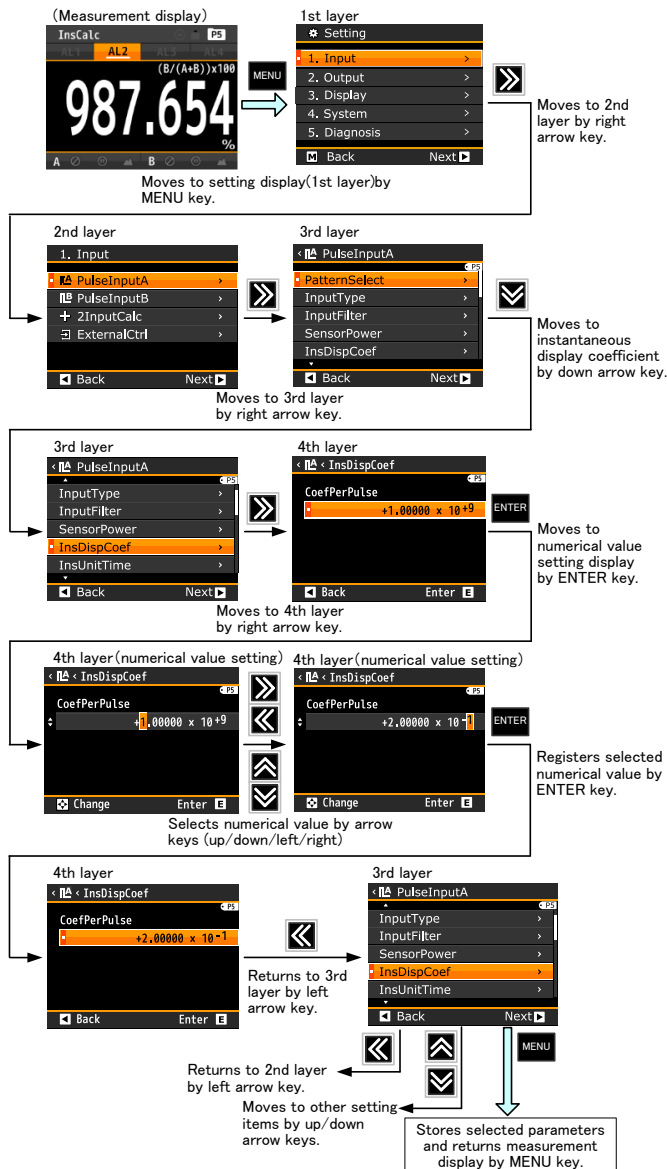
9. SETTING EXAMPLES

The instantaneous followings are some examples for some necessary setting point and operation methods to perform flow measurements.

9-1. SETTING EXAMPLE 1

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

- ① Input type setting
The sensor is an open collector type, therefore “open collector” should be selected as the input type.
- ② Setting for revolving speed display
For setting of Instantaneous display coefficient, Number of rotation per 1 pulse is needed.
• Calculate the number of rotation per 1 pulse.
Because of 5 [Pulse] per 1 round, therefore,
 $1/5 = 2 \times 10^{-1}$ [round]
• Set “ 2.00000×10^{-1} ” as the Instantaneous display coefficient
• Unit to display is [rpm], therefore, select “Min” for the instantaneous unit time.
• By “instantaneous decimal point position”, set the number of digits after the decimal point.
- ③ Setup steps
Although setup steps are basically same as “8.BASIC OPERATION OF SETTING DISPLAY”, setting of instantaneous display factor is needed, an example is shown below.



9-2. Setting Example 2

Using a gearbox of 805[rpm] with an open collector output, displaying the circumferential speed of the roll diameter 350[mm] in [m/min]

(conditions)

- rotation speed 805[rpm] (output pulse 60[P/R] built-in)
- reduction ratio 1/90
- roll diameter 350[mm]

- ① Input type setting
The sensor is an open collector type, therefore “open collector” should be selected as the input type.
- ② Setting for circumferential speed display
For setting of Instantaneous display coefficient, travel distance of rotation per 1 pulse is needed.
• calculation of circumferential speed
 $805[\text{rpm}] \times 1/90 \times (0.35[\text{m}] \times 3.14) = 9.82994[\text{m/min}]$
• Cumulate travel distance per 1 pulse
 $1/60[\text{P/R}] \times 1/90 \times (0.35[\text{m}] \times 3.14) = 2.03518 \times 10^{-4}[\text{m/Pulse}]$
• Set “ 2.03518×10^{-4} ” as the Instantaneous display coefficient
• Display is in [min], therefore, “Min” is selected for the instantaneous unit time.
• By “instantaneous decimal point position”, set the number of digits after the decimal point.

9-3. SETTING EXAMPLE 3

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

- ① Input type setting
The sensor is an open collector output type, therefore select “open collector” as input type.
- ② Setting for instantaneous flow rate display
Set flowrate per 1 pulse as instantaneous display coefficient
Although instantaneous flow rate will be displayed in [l/min], the rating of the sensor is 7.5[ml/Pulse], it should be converted to 7.5×10^{-3} [l/Pulse].
• Set the “Instantaneous display factor” as “ 7.50000×10^{-3} ”
• Displayed unit is [l/min], therefore select “Minute” as the instantaneous unit time.
By “instantaneous decimal point position”, set the number of digits after the decimal point

9-4. SETTING EXAMPLE 4

Using a sensor (Voltage output type) which outputs 15 [Hz] for 90[l/min], instantaneous flow rate will be displayed in [l/sec].

- ① Input type setting
The sensor is Voltage output type, therefore select “LOGIC” for “input type”.
- ② Setting for instantaneous flow rate display
Set flowrate per 1 pulse as “instantaneous display coefficient”.
• Calculate number of pulses per 1 [l].
The sensor outputs pulses of 15[Hz] at 90[l/min], therefore,
 $(15 \times 60) / 90 = 10[\text{Pulse/l}]$.
• Calculate flowrate per 1 pulse.
Number of pulses per 1 liter is 10[Pulse/l], therefore,
 $1/10 = 1 \times 10^{-1}[\text{l/Pulse}]$.
• Set “ 1.00000×10^{-1} ” for the “instantaneous value display coefficient”.
• Any settings of “ 1.00000×10^{-1} ”, “ 0.10000×10^0 ” and “ 0.01000×10^1 ” for the “instantaneous value display coefficient” bring same results.
• Unit to display is [l/sec], therefore, select “Sec” for the “instantaneous unit time”.
• By “instantaneous decimal point position”, set the number of digits after the decimal point.

10. SETTING OF UNITS

Units are selectable and can be displayed optionally.

If units should be used is not available, custom units up to 6 characters can be made.

*For custom units, please refer to the detailed manual which can be downloaded from our home page.

10-1. LOCATIONS OF PARAMETERS FOR UNIT SETTING

1st layer	2nd layer	3rd layer
1.input setting	pulse input A (pulse input B)	Instantaneous display unit
	2 input calculation	Instantaneous display unit

10-2. AVAILABLE UNITS

The WPMZ has selectable 62 units.

Unit
$\mu A, mA, A, kA, \mu V, mV, V, kV, VA, W, kW, MW,$ $\mu m, mm, cm, m, \Omega, k\Omega, M\Omega, g, kg, N, kN, MN,$ $Pa, kPa, MPa, hPa, J, kJ, MJ, Hz, kHz, MHz, m^3,$ $mm/s, mm/min, cm/min, m/s, m/min, m/h, m/s^2,$ $m^3/s, m^3/min, m^3/h, kg/h, kg/m^2, kg/m^3, N/m^2,$ $l, l/s, l/min, l/h, \%, \%, \%RH, ^\circ C,$ $pH, ppm, rpm, t, inch$

10-3. SETTING OPERATION

Setting procedure is same as “8. BASIC OPERATIONS FOR SETTING DISPLAY”. Operate in the track of SETTING DIPLAY.

11. COMPARATIVE OUTPUT FUNCTION

Settings of comparative output functions needs 10 parameters to set for each output.

The following describe only main setting parameters and refer to detailed manual which can be downloaded from our homepage for other parameters.

11-1. LOCATIONS OF PARAMETERS FOR COMPARATIVE OUTPUT FUNCTION SETTING

1st layer	2nd layer	3rd layer
4. Output settings	Comparative output AL1 (Comparative output AL2) (Comparative output AL3) (Comparative output AL4)	pattern select
		output source display value
		camparison mode
		compare ON condition
		compare judgement value
		campare ON delay
		campare OFF delay
		output mode
		output logic
		compare ON background color

*Refer to “7. SETTING LAYER OVERVIEW”

11-2. SETTING OF OUTPUT SOURCE DISPLAY VALUE

Comparative outputs AL1-AL4 are settable independently and they have no magnitude relationship.
 For example, instantaneous measured value of Ach is assigned to AL1, instantaneous measured value of Bch is assigned to AL2 and instantaneous calculate value is assigned to AL3,4 and so on.
 Every display item can be freely assigned to comparative outputs.

Setting procedure is same as “8. BASIC OPERATIONS FOR SETTING DISPLAYS”. Operate in the track of the procedure of SETTING DISPLAYS.

Caution: COM (emitter) terminal is common for AL1-AL4 in open-collector output products. Each AL1&2, AL3&4 have common terminal in relay ouput products.

11-3. COMPARISON JUDGEMENT VALUE

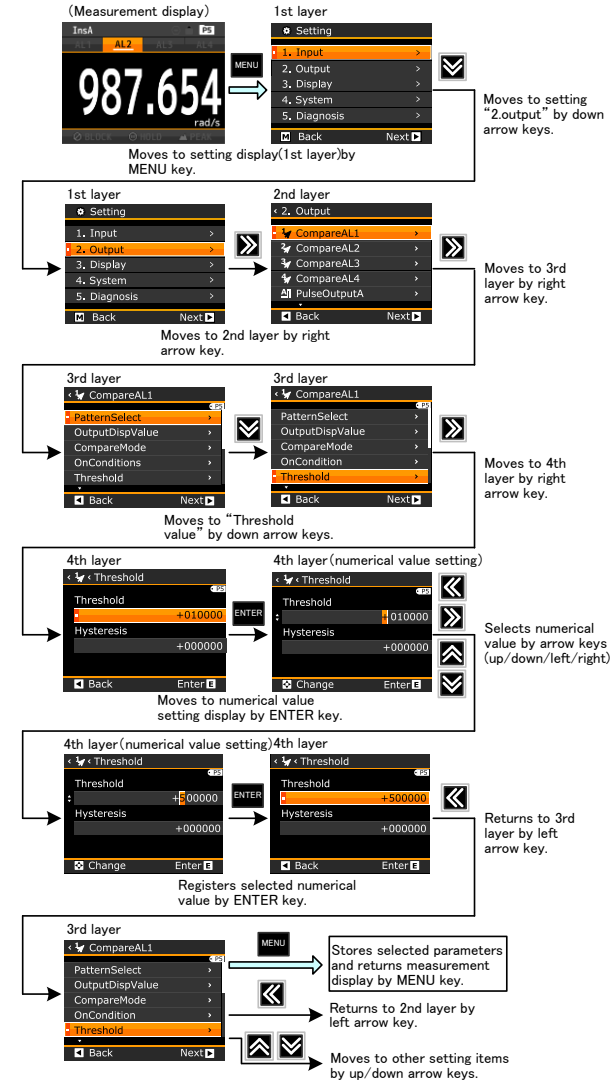
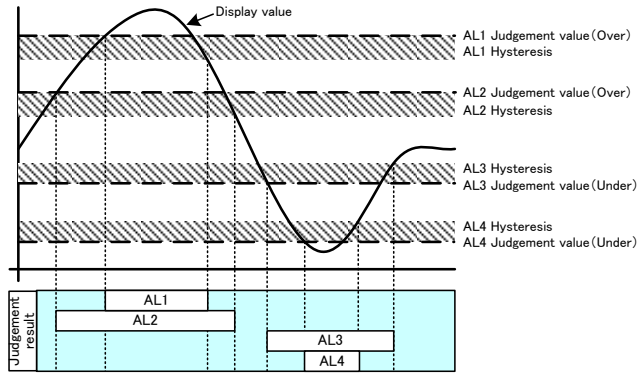
The comparison judgement value is a threshold value to judge. Although, the setting procedure is same as “8. BASIC OPERATIONS FOR SETTING DISPLAY”, comparison judgement values need the settings of numerical values. Therefore, its procedure is shown below.

*The following is an explanation for the compare mode of “Level judgement”.

●Level judgement action

Comparative Output	Comparison type	Comparison formula	judgement result
AL1	alarm when over	display value > AL1 judgement value	AL1 ON
AL2	alarm when over	display value > AL2 judgement value	AL2 ON
AL3	alarm when under	display value < AL3 judgement value	AL3 ON
AL4	alarm when under	display value < AL4 judgement value	AL4 ON

*Refer to “17. SPECIFICATIONS –output specifications [comparative output]”



12. EXTERNAL CONTROL FUNCTION

As external control functions, the WPMZ has comparative output reset function, measurement inhibit function, display hold function, maximum value hold function, minimum value hold function and pattern select function, each function can be executed by assigning to external control terminal 1 to 5.

*External control functions are also assigned (entered) to 4 arrow keys as shortcut functions.

12-1. 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.

12-2. COMPARATIVE OUTPUT RESET FUNCTION

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

12-3. MEASUREMENT INHIBIT FUNCTION

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

Measurement inhibit A: inhibits the input of Ach

Measurement inhibit B: inhibits the input of Bch

Measurement inhibit A&B: inhibits the inputs of both Ach and Bch

12-4. DISPLAY HOLD FUNCTION

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

Display hold A: holds the display of Ach

Display hold B: holds the display of Bch

Display hold A&B: holds the display of Ach and Bch

12-5. MAXIMUM VALUE HOLD FUNCTION

Maximum value hold function is the function which holds the maximum display value.

Maximum hold A: holds the maximum display value of Ach

Maximum hold B: holds the maximum display value of Bch

Maximum hold A&B: holds the maximum display value of Ach and Bch

12-6. MINIMUM VALUE HOLD FUNCTION

Minimum value hold function is the function which holds the minimum display value.

*When both of the maximum value hold and the minimum value hold are ON simultaneously, only the maximum value hold becomes valid.

Minimum hold A: holds the minimum display value of Ach

Minimum hold B: holds the minimum display value of Bch

Minimum hold A&B: holds the minimum display value of Ach and Bch

12-7. PATTERN SELECT FUNCTION

The pattern select function is the function which switches the pattern number to use for measurement. By using pattern select 1-3, Up to 8 patterns can be switched.

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

Open: pattern select terminal is open or connected to "1" level.

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

12-8. MONITOR CHANGE FUNCTION

The monitor change function is the function which switches display and performs same action of DISP key.

12-9. TREND HOLD FUNCTION

The trend hold function is a function which holds the trend display.

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

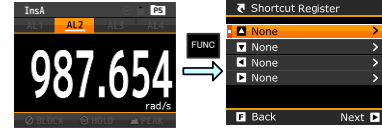
13. SHORTCUT FUNCTION

External control functions are registered to arrow keys and are performed not by the terminal control but by the operation of the keys.

13-1. REGISTERING SHORTCUTS

External control functions which would be performed by shortcuts are assigned to arrow keys by the following steps.

(Measurement display)

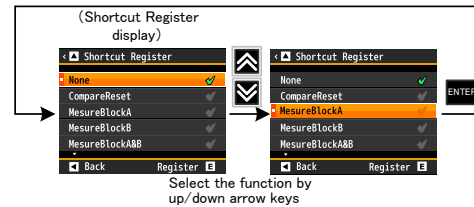


Move to shortcut register display by FUNC key

1) Select 1 of 4 arrow keys to set a shortcut function by up/down arrow keys.

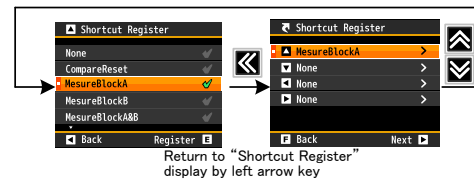
*This example sets a shortcut function to the up arrow key.

2) Move to "Shortcut Register" display by right arrow key.



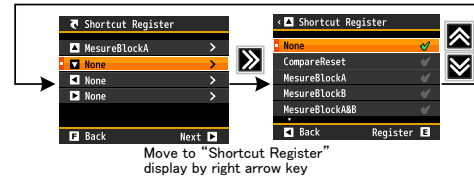
Select the function by up/down arrow keys

Register the function by ENTER key



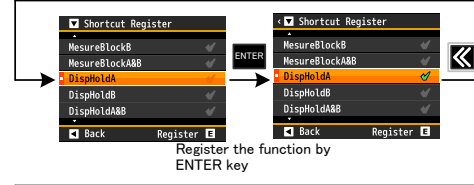
Return to "Shortcut Register" display by left arrow key

Move to the arrow key to set by up/down arrow key



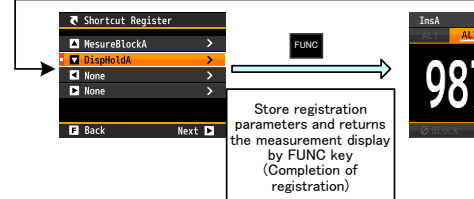
Move to "Shortcut Register" display by right arrow key

Select the function by up/down arrow keys



Register the function by ENTER key

Return to "Shortcut Register" display by left arrow key



Store registration parameters and returns the measurement display by FUNC key (Completion of registration)

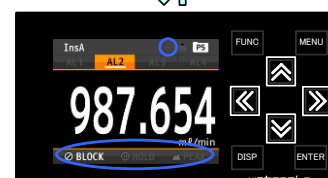
13-2. PERFORMING SHORTCUTS

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

An active function becomes inactive by holding down the arrow key which the function is registered for 1 second.



Holding down the arrow key for 1 second



The icon for active external control lights up

18. SPECIFICATIONS

MODEL CODES

WPMZ-5-□□□-□□-□□□

Series name	Power	Input Ach	Input Bch	Output	Comparative output	Test report	Additional code	Description
WPMZ-5								Tachometer/Speed Meter
	1							Voltage power: AC100 to 240V
	3							Voltage power: DC12V
	4							Voltage power: DC24 to 48V
		P						Pulse input
		L						Line driver input
			X					No Bch input
			P					Pulse input (*1)
			L					Line driver input (*1)
				X				Display only (No output)
				1				Analog output
				2				BCD output (Opencollector NPN)
				3				BCD output (Opencollector PNP)
				4				RS-232C
				5				RS-485 (Modbus RTU)
					E			Opencollector output (NPN)
					F			Opencollector output (PNP)
					R			Relay output (Normally open)
						X		Test report: No test report
						T		Test report: With test report
							00	Standard (Initial language : Japanese)
							EO	Initial language setting : English

(*1) Combination of 2 inputs

The combination of a pulse input and an line driver input is NOT selectable.
(WPMZ-5-□PL and WPMZ-5-□LP are NOT available.)

Basic specifications

Number of measurement channel	:	1 or 2 (according to model codes)
Display	:	2.4 inch TFT liquid crystal display Used in 1ch input : 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
Display range	:	0 to 999999
Zero display	:	Reading zero suppress
Decimal point	:	Settable freely
Over warning	:	By exceeding the range of display, displays OVER or -OVER
Sampling rate	:	10ms (calculation period)
Display updating period	:	100ms
External controls	:	5 functions of the followings can be assigned to control terminals (user-configurable). ① Comparative output reset function ② Measurement inhibit function : Measurement inhibit A/B/A&B ③ Current value hold function : Current value hold A/B/A&B ④ Maximum value hold function : Maximum value hold A/B/A&B ⑤ Minimum value hold function : Minimum value hold A/B/A&B ⑥ Pattern select function : Pattern select 1/2/3 ⑦ Display select function ⑧ Trend Hold function
Ambient temperature range	:	-5 to 50°C 35 to 85%RH (Non condensing)
Storage temperature range	:	-10 to 70°C up to 60%RH
Supply power	:	AC power (WPMZ-5-1□□-□□-□□□) AC100 to 240V±10% 50/60Hz DC power (WPMZ-5-3□□-□□-□□□) DC12V±10% DC power (WPMZ-5-4□□-□□-□□□) DC24 to 48V±10%
Power consumption	:	AC power (WPMZ-5-1□□-□□-□□□) At AC100V: 10VA max At AC240V: 14VA max DC power (WPMZ-5-3□□-□□-□□□) At DC12V: 6W max, DC power (WPMZ-5-4□□-□□-□□□) At DC24V: 6W max, At DC48V: 6.5W max
Sensor power	:	Pulse input DC 12V ±10% 100mA max. DC24V±10% 50mA max. *For 2ch inputs, allowable current of both Ach and

External dimensions	:	96mm (W)×52mm (H)×145mm (D)
Weight	:	Approx. 350g
Withstand voltage	:	AC power (WPMZ-5-1□□-□□-□□□) Between Power terminals and inputs/external controls/comparative outputs/other outputs AC3000V for 1 minute DC power (WPMZ-5-3or4□□-□□-□□□) Between Power terminals and inputs/external controls/comparative outputs/other outputs AC1500V for 1 minute AC power and DC power Between input terminals and external controls/comparative outputs/other outputs AC1500V for 1 minute Between enclosure 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

Input Specifications

【Pulse input instantaneous measurement】

●Input specifications (common to Ach, Bch)

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

【Line driver input measurement】

●Input specifications (Common to Ach, Bch)

Conversion method	:	0.01Hz to 500kHz (*2ch input: 250kHz)
Input signal	:	Differential input (Line driver signal)
Input level	:	≥ ±1V (Differential voltage)
Input resistance	:	330Ω
Maximum allowable voltage	:	±10V (Differential voltage)
Input pulse width	:	≥ 0.9μs (both of L level and H level) (2 channel inputs: ≥ 1.8 μs)
Measurement method	:	Cyclic calculation method
Display unit	:	Can be selected one of second, minute, hour

time
Accuracy : $\pm(20\text{ppm rdg} + 1\text{digit}) @ 23 \pm 5^\circ\text{C}$

OUTPUT SPECIFICATIONS

【Comparative outputs】

Open collector output : Output rating
NPN : sink current 50mA MAX.
PNP : source current 50mA MAX.
Applied voltage 30V MAX.
Output saturation voltage $\leq 1.2\text{V}$ at 50mA
Number of outputs 4 transistor outputs

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

Control method : Microcomputer calculating method

Judgement value settable range : -999999 to 999999

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

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

Setting condition : Condition of comparison can be set to AL1 to AL4 independently.
●Level judgement mode
The alarm is ON when display value exceeds judgement value (over alarm)
The alarm is ON when display value underruns judgement value (under alarm)
Over alarm (upper limit judgement)

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

Under alarm (Under limit judgement)

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

●Zone judgement mode

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

Inside of zone alarm

Condition of comparison	Judgement result
AL1 zone upper limit $\geq$ display value $\geq$ AL1 zone lower limit	AL1
AL2 zone upper limit $\geq$ display value $\geq$ AL2 zone lower limit	AL2
AL3 zone upper limit $\geq$ display value $\geq$ AL3 zone lower limit	AL3
AL4 zone upper limit $\geq$ display value $\geq$ 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

【Analog output】

Conversion method : D/A conversion method

Resolution capability : Equivalent of 13bit

Scaling : Digital scaling

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

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

Specification for each output : Refer to the following chart.

Output type	Load resistance	Accuracy	Ripple
0 to 10V	$\geq 2\text{k}\Omega$	$\pm(0.1\%$ of FS)	$\pm 50\text{mVp-p}$
$\pm 10\text{V}$			
1 to 5V			
0 to 20mA	$\leq 550\Omega$		$\pm 25\text{mVp-p}$
4 to 20mA			

*Ripple for 4 to 20mA is at load resistance 250 Ω , 20mA output.

【BCD output】

Output type : Open collector output NPN/PNP type

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

Polarity signal : Negative logic transistor is ON at minus display

Over signal : Negative logic transistor is ON at over display

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

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

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

【RS-232C】

Communication protocol : Modbus-RTU/OriginalCommand/OriginalOutput

Synchronization method : Asynchronous

Communication method : Full duplex

Baud rate : 9600bps, 19200bps, 38400bps

Data length : 7bit, 8bit

Start bit : 1bit

Parity bit : None, Odd, Even

Stop bit : 1bit, 2bit

Delimiter : CR LF, CR

Character code : ASCII

Transmission control procedure : No control sequence

Used signal names : TXD, RXD, SG

Number of connectable units : 1

Cable length : Max. 15m

【RS-485】

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

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

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