Graphical Digital Panel Meter
WPMZ－1－□□□－□□－□□□
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 the 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.

（https://www.watanabe-electric.co.jp/en/）

Checks before suppling power, preparations, wiring

1. CHECKING THE PRODUCT
1－1. MODEL CODES
Please check that the product has been delivered matches the model code ordered in reference to "**18. 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) Excessive dust or metal particles
    (Storing in a dust-proof chassis and a countermeasure against heat dissipation are required.)
4) Environment of corrosive gas, salty air or oily smoke
5) Environment of much vibration or impact
6) Environment of rain or water drops (except the front panel)
7) Environment of strong 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
	Go output	Go output

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

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.
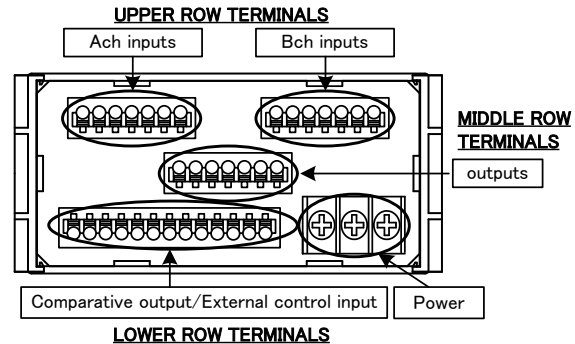
3. HOW TO INSTALL (PANEL CUT DIMENTIONS)
To install the WPMZ, panel cut dimensions are as shown by the figure below.
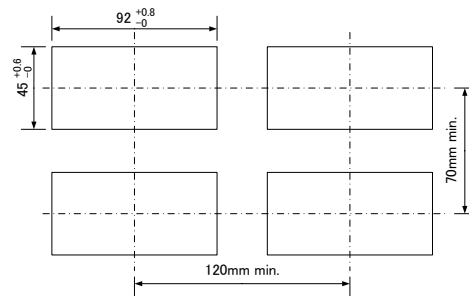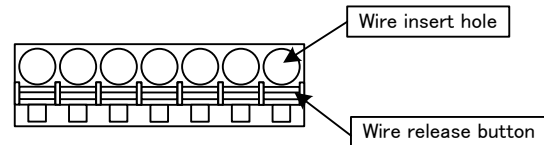

4. CONNECTING TERMINALS
4－1. BACK VIEW

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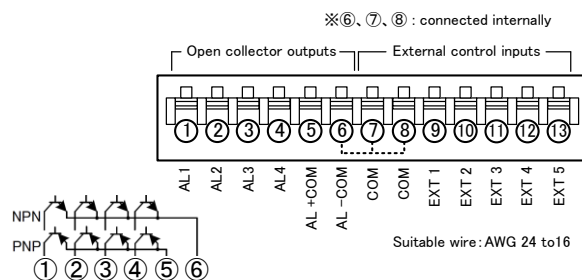(Suitable tool for pushing buttons : flat-blade screwdriver blade width 2.5mm)

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

4－3－1. Comparative Output / External Control Input
*Screwless connector
【Open-collector output products】

No.	Name	Description
1	AL1	AL1 open-collector output (collector)
2	AL2	AL2 open-collector output (collector)
3	AL3	AL3 open-collector output (collector)
4	AL4	AL4 open-collector output (collector)
5	AL+COM	Common terminal for PNP output (emitter) (NPN output : no connection)
6	AL-COM	Common terminal for NPN output (emitter) (PNP output : GND for PNP)
7,8	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

【Relay output products】

Relay outputs | External control inputs

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	×	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

Suitable crimping terminal
5.8max. 5.8max.
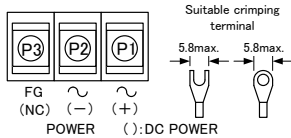
FG (NC) ～ (−) ～ (+)
POWER ( ):DC POWER

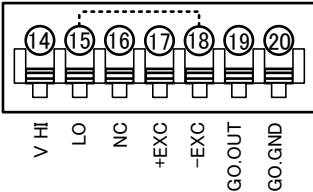| No.	Name	Description
P1	POWER (+)	Power source terminal (In case of DC power, ＋V)
P2	POWER (−)	Power source terminal (In case of DC Power, 0V)
P3	FG (NC)	FG terminal (DC power option: no connection (Non-usable for a relay terminal))

4－4. CONNECTION FOR UPPER ROW TERMINALS

4－4－1. Voltage Input / GO Output / Sensor Power Supply
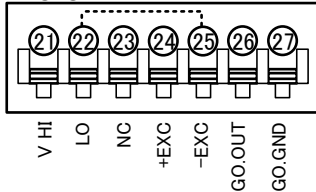*Screwless connector

Ach Voltage input
※⑮、⑱ : connected internally

Bch Voltage input
※㉒、㉕ : connected internally

V HI   LO   NC   +EXC   -EXC   GO.OUT   GO.GND
Suitable wire：AWG 24 to 16

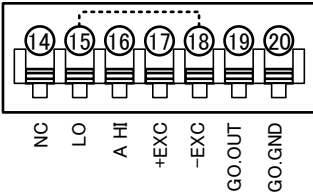V HI   LO   NC   +EXC   -EXC   GO.OUT   GO.GND
Suitable wire：AWG 24 to 16

4－4－2. Current Input / GO Output / Sensor Power Supply
*Screwless connector

Ach Current input
※⑮、⑱ : connected internally
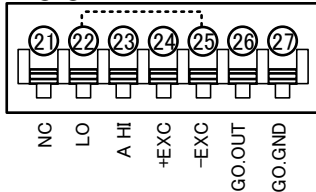
Bch Current input
※㉒、㉕ : connected internally

NC   LO   A HI   +EXC   -EXC   GO.OUT   GO.GND
Suitable wire：AWG 24 to 16

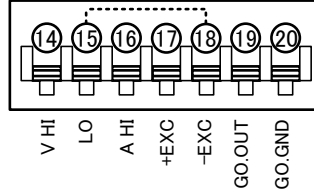NC   LO   A HI   +EXC   -EXC   GO.OUT   GO.GND
Suitable wire：AWG 24 to 16

4－4－3. Process Input / GO Output / Sensor Power Supply
*Screwless connector

Ach Process input
※⑮、⑱ : connected internally
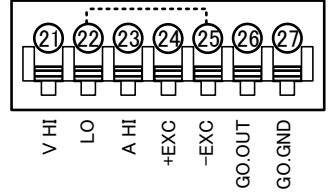
Bch Process input
※㉒、㉕ : connected internally

V HI   LO   A HI   +EXC   -EXC   GO.OUT   GO.GND
Suitable wire：AWG 24 to 16

V HI   LO   A HI   +EXC   -EXC   GO.OUT   GO.GND
Suitable wire：AWG 24 to 16

No.	Name	Description
14,21	V HI	Voltage input(＋) (No connection in current input)
15,22	LO	Input(−)
16,23	A HI	Current input(＋) (No connection in voltage input)
17,24	+EXC	Sensor power supply(＋)
18,25	-EXC	Sensor power supply(−)
19,26	GO.OUT	GO output(collector)
20,27	GO.GND	GO output(emitter)

●Example of connecting to sensor(2 wire type sensor)
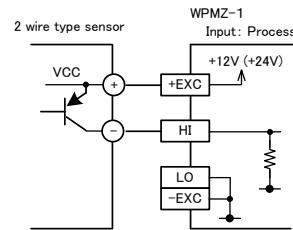
＊ Use [V HI] terminal as HI terminal if the sensor is voltage output type, use [A HI] terminal if the sensor is current output type.

●Example of connecting to sensor(3 wire type sensor)
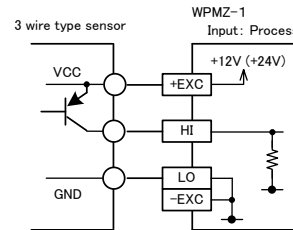
＊ Use [V HI] terminal as HI terminal if the sensor is voltage output type, use [A HI] terminal if the sensor is current output type.

●Example of connecting to sensor(4 wire type sensor)
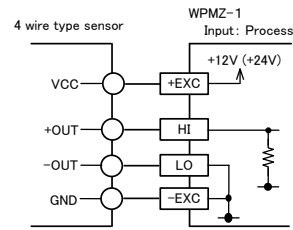
＊ Use [V HI] terminal as HI terminal if the sensor is voltage output type, use [A HI] terminal if the sensor is current output type.

4－5. CONNECTION FOR MIDDLE ROW TERMINALS
4－5－1. Analog Output

＊ ㉙,㉜ :connected internally
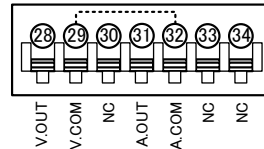
V.OUT   V.COM   NC   A.OUT   A.COM   NC   NC
Suitable wire：AWG24 to 16

●WPMZ-1-□□□-1□-□□□

No.	Name	Description
28	V.OUT	Analog voltage output terminal (+)
29	V.COM	Analog voltage output terminal (−)
30	NC	No connection *Non-usable for a relay terminal
31	A.OUT	Analog current output terminal (+)
32	A.COM	Analog current output terminal (−)
33,34	NC	No connection *Non-usable for a relay terminal

4－5－2．BCD Output
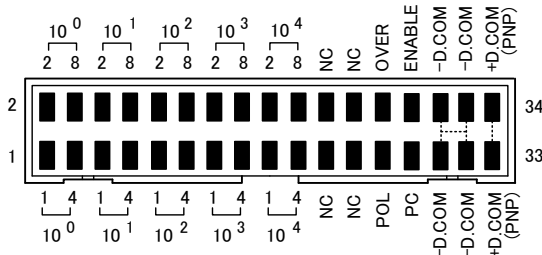
Suitable wire：AWG#28 flat cable(7/0.127mm)

●WPMZ-1-□□□-**2or3**□-□□□

No.	Name	Description
1 to 4	$10^0$1-8	Bit 1-8 of BCD 10^0 digit output terminals
5 to 8	$10^1$1-8	Bit 1-8 of BCD 10^1 digit output terminals
9 to 12	$10^2$1-8	Bit 1-8 of BCD 10^2 digit output terminals
13 to 16	$10^3$1-8	Bit 1-8 of BCD 10^3 digit output terminals
17 to 20	$10^4$1-8	Bit 1-8 of BCD 10^4 digit output terminals
21 to 24	NC	no connection *Non-usable for a relay terminal
25	POL	BCD polarity output terminal
26	OVER	BCD over output terminal
27	PC	BCD synchronous signal output terminal
28	ENABLE	BCD enable terminal By bringing to same voltage level of -D.COM or connecting to –D.COM, transistors of BCD outputs become OFF.
29 to 32	-D.COM	Common terminal for BCD open collector NPN
33,34	+D.COM	External power terminal for BCD open collector PNP

4－5－3．RS-232C

Suitable wire：AWG24 to 16

●WPMZ-1-□□□-**4**□-□□□

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

4－5－4．RS-485 Modbus RTU

* 28,31 & 29,32：connected internally
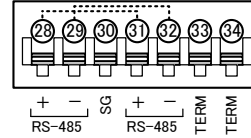
Suitable wire：AWG24 to 16

●WPMZ-1-□□□-**5**□-□□□

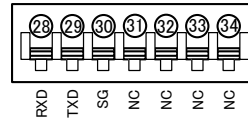| No.	Name	Description
28	+	Non-inverting signal
29	−	Inverting signal
30	SG	Signal ground
31	+	Non-inverting signal
32	−	Inverting signal
33,34	TERM	Terminal resistance （120Ω）terminals * Short 33 and 34 to be enable the resistance.

5. NAMES OF EACH PART

5－1. NAMES OF EACH PART
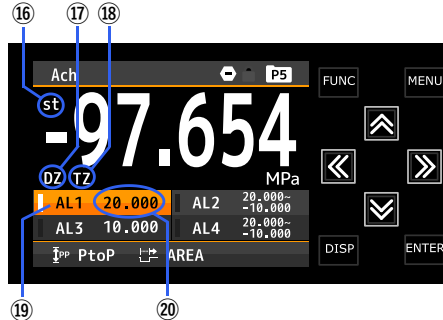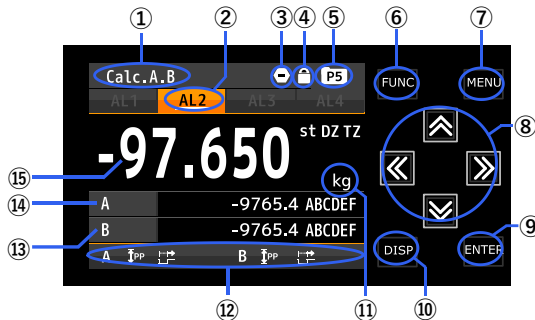
No.	Name	Function
①	Display title	Indicates contents of display
②	Comparison result	Lights when the result of comparative output is ON.
③	Compare reset	Lights when the function of compare reset is ON.
④	Key lock	Lights when the key lock is effective.
⑤	Pattern	Indicates pattern No. in use.
⑥	FUNC key	Used for registering shortcut function.
⑦	MENU key	Used for moving to setting display and returning to measurement display.
⑧	Arrow keys	Used to move the cursor and to move to other displays while setting mode. *Shortcut function is executed by holding down the key over 1 second in measurement display.
⑨	ENTER key	Used to validate setting value.
⑩	DISP key	Used to switch measurement displays.
⑪	Display unit	Unit for displayed item
⑫	Hold type / Hold mode	Indicate hold type with icon. * In addition, 1ch product shows abbreviation below. HOLD ： DispHold MAX ： PeakHold MIN ： BottomHold PtoP ： AmpHold DIFF ： DiffelenceHold AVE ： AveHold

	Name	Function
	Hold type / Hold mode	Indicate hold mode with icon. * In addition, 1ch product shows abbreviation below. NORM ： NormalHold AREA ： AreaHold
⑬	3rd item	Displays measured value of 3rd item
⑭	2nd item	Displays measured value of 2nd item
⑮	1st item	Displays measured value of 1st item
⑯	"st" icon	Indicates the measured value is stable
⑰	"DZ" icon	Indicates the operation status of the " Digital zero" function
⑱	"TZ" icon	Indicates the operation status of the " Tracking zero" function
⑲	Comparison result	Lights when the result of comparative output is ON.
⑳	Judgement value	Shows value or area of comparison judgement

5－2． EXPLANATION OF ICONS
5－2－1． ICONS FOR EXTERNAL CONTROL
These are icons when external control is ON.

Icon	Meaning
P5	Indicates pattern No. in use.
🔒	Indicates key lock function is effective.
⊖	Light when CompareReset function is ON.
⏸	Light when DispHold function is ON.
MX	Light when PeakHold function is ON.
MI	Light when BottomHold function is ON.
PP	Light when AmpHold function is ON.
Diff	Light when DifferenceHold function is ON.
AVE	Light when AveHold function is ON.
	Lights when HoldMode is NormalHold.
	Lights when HoldMode is AreaHold.
	Lights when DispHoldMode is OneShot.

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

Icon	Meaning	Icon	Meaning
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.
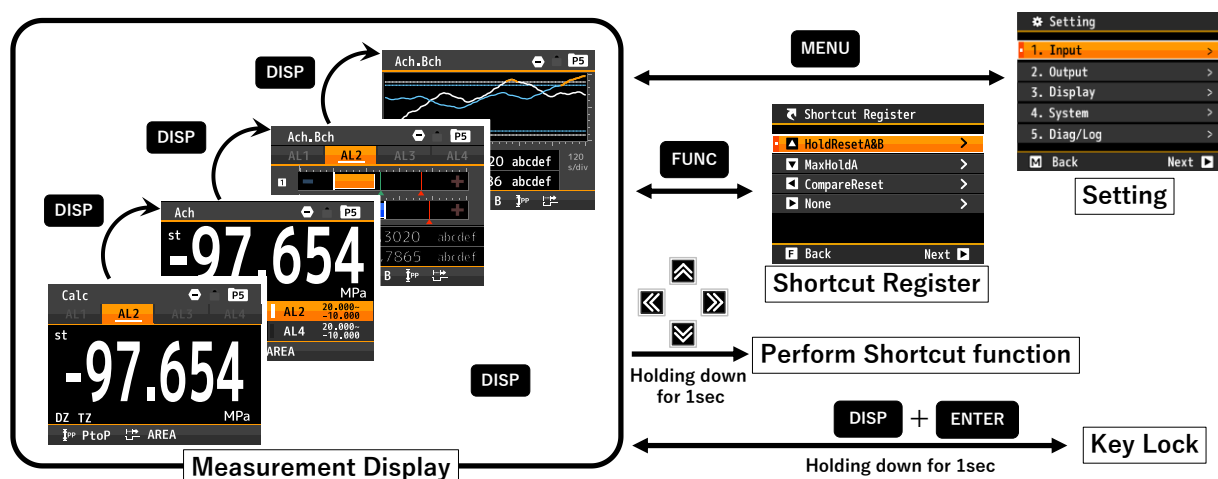
7. SETTING LAYER OVERVIEW

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.)

・Settings of default measurement mode are below.

1st Layer	2nd Layer	3rd Layer (setting items)	4th Layer (setting values) Initial values	Settable values	Remarks
1. Input	DC InputA DC InputB Process InputA Process InputB	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		InputRange (DC)	Depend on model	Fixed by default value.	
		InputRange (Process)	0～10V	0～5V/1～5V/±5V/0～10V /±10V/0～20mA /4～20mA/±20mA	Select an input range. *Offset and Fullscale settings are initialized by changing this item.
		SensorPower	12V	12V/24V	Switch sensor power supply
		SamplingRate	50times/sec (1 input product) 50times/sec (2 input product)	4000 times/sec, 2000, 1000, 500, 200, 100, 20,10, 5, 2, 1	Select sampling rate (4000times/sec is enabled only 1 input product)
		MoveAve	None	None/2/4/8/16/32/64times	Set moneing average of input.
		Offset	DC: 0 Process: 0	Go to screen of setting offset.	
		Fullscale	DC: 99999 Process: 10000	Go to screen of setting fullscale.	
		DecPoint	DC:*Depend on model Process: #####	#####/ #.####/ ##.###/ ###.##/ ####.#	*It is set to specific position depends on each input ranges.
		DispUnit	DC:*Depend on model Process: None	None/mV, mA, Pa, kg, N etc./CustomUnit	All units are mentioned in [10.UNIT SETTINGS]. *Unit that depends on input range is set.
		InputCorrect	None	None/Linearize	

1st Layer	2nd Layer	3rd Layer (setting items)	4th Layer (setting values) Initial values	4th Layer (setting values) Settable values	Remarks
1. Input	DC InputA DC InputB Process InputA Process InputB	LinearizePoint	1stIn : 0 1stOut : 0 2ndIn : 1000 2ndOut : 1000 …… 16thIn : 15000 16thOut : 15000	Each: ±99999	Enable only if [InputCorrect] is [Linearize].
		DispShift	0	±99999	Take over setting of [DecPoint].
		TrackingZero	Interval : 0 ActiveArea : 0	Interval : 0～99.99[sec] ActiveArea : 0～99999	Disable if setting value is 0[sec]. Take over setting of [DecPoint].
		DispLimit	Lower : -99999 Upper : +99999	±99999 ±99999	Take over setting of [DecPoint].
		DispLoCut	0	0～99999	Cut both positive and negative.
		InsDispStep	None	None/5steps/10steps	
		ZeroArea	0	0～99999[digit]	Disable if the value is 0[digit].
		StableArea	0	0～99999[digit]	Disable if the value is 0[digit].
		StableTime	0	0～99.99[sec]	Disable if the value is 0[sec].
	2InputCalc	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		Expression	None	None/Add((A+B)+C)*K /Sub((B-A)+C)*K /Mul((A*B)+C)*K /Div((B/A)+C)*K /Ave (((A+B)/2)+C)*K /HiSelect((Larger of A and B)+C)*K /LoSelect((Smaller of A and B)+C)*K /DifAbs(Abs of (B-A)+C)*K /ErrRaito((A/B)-1)*K /Dens(B/(A+B))*K /Add(A+B)*K+C /Sub(B-A)*K+C /Mul(A*B)*K+C /Div(B/A)*K+C	Select an expression.
		Const-C	C : 0	C : ±9.9999 x 10^(±5)	
		Coef-K	K : 1	K : ±9.9999	
		DecPoint	#####	#####/ #.####/ ##.###/ ###.##/ ####.#	
		DispUnit	None	None/mV, mA, Pa, kg, N, etc./CustomUnit	All units are mentioned in [10.UNIT SETTINGS].
		InsDispStep	None	None/5steps/10steps	
		DispLimit	Lower : -99999 Upper : +99999	±99999 ±99999	Take over setting of [DecPoint].
	ExternalCtrl	ExtCtrl 1～5 Func	None	None/CompareReset/HoldResetA,B,A&B /DispHoldA,B,A&B/PeakHoldA,B,A&B /BottomHoldA,B,A&B/AmpHoldA,B,A&B /DevHoldA,B,A&B/AveHoldA,B,A&B /DigitalZeroA,B,A&B/PatternChange1,2,3 /MonitorChange/TrendLog	Select a function which is attached to each external control terminals.
	Hold A/B	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		DispHoldMode	Normal	Normal/OneShot	
		HoldOffDelay	0.00	0.00～99.99[sec]	
		HoldMode	NormalHold	NormalHold/AreaHold	Select a mode of DispHold.
		DevBaseValue	0	±99999	Take over setting of [DecPoint].
		AveHoldCount	None	None/2/4/8/16/32/64times	
2.Output	CompareList	---	---	Go to screen of CompareList	
	CompareAL1 CompareAL2 CompareAL3 CompareAL4	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		OutputDispValue	None	None/Ach/Bch/Calc	
		ActCondition	Always	Always/ExceptNearZero/OnStable / OnStableExceptNearZero/OnHold	Select a condition of comparison.
		CompareMode	LevelJudge	LevelJudge/ZoneJudge/DiffJudge	
		OnConditions	Excess	Excess/LessThan	Only LevelJudge.
			InTheZone	InTheZone/OutsideTheZone	Only ZoneJudge.
		Threshold	10000 0	Threshold : ±99999 Hysteresis : 0～99999	Only LevelJudge.
			0 10000 0	ZoneLowerLimit : ±99999 ZoneUpperLimit : ±99999 Hysteresis : 0～99999	Only ZoneJudge.
			10000 1.00	ChangeAmount : 0～99999 DetectionInterval : 0.00～99.99[sec]	Only DiffJudge
		OnDelay	None	None/20ms/50ms/100ms/200ms/500ms 1s/5s/10s/20s	Compare ON/OFF after ActCondition is kept certain time set here.
		OffDelay	None		
		OutputMode	Normal	Normal/Latch/OneShot5ms/10ms/20ms /50ms/0.1s/0.2s/0.5s/1s/2s	Select an output mode.
		OutputLogic	Negative(NO)	Positive(NC)/Negative(NO)	Select an output logic.
		OnBgColors	Black	Black/Red/Yellow/Green	Priority: AL1 > AL2 > AL3 > AL4
	Analog Output	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		OutputRange	0-10V	0-10V/±10V/1-5V/0-20mA/4-20mA	Select a type of output range.
		OutputDispValue	None	None/Ach/Bch/Calc	Select a ch referenced for analog output.
		OutputScale	0 10000	0% : ±99999 100% : ±99999	Scaling of analog output. Set 0% and 100% value.
	BCD Output	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		OutputDispValue	None	None/Ach/Bch/Calc	Select a ch referenced for BCD output.
		DataSignalLogic	Negative	Positive/Negative	Select an output mode.
		SyncSignalLogic	Negative	Positive/Negative	Select an output mode.
	ModbusCom	SlaveAddress	1	1～31	Set ID of the product.
		Baudrate	19200bps	9600bps/19200bps/38400bps	Select a baudrate.
		Parity	Even	None/Even/Odd	Select a type of parity bit.

1st Layer	2nd Layer	3rd Layer (setting items)	4th Layer (setting values)		Remarks
			Initial values	Settable values	
2.Output	RS-232C Com	Protocol	Modbus-RTU	ModbusRTU/OriginalCommand/OriginalOutput	Select a protocol.
		Baudrate	19200bps	9600bps/19200bps/38400bps	Select a baudrate.
		Parity	Even	None/Even/Odd	Select a type of parity bit.
		DataLength	7bit	7bit/8bit	Enable when Protocol is OriginalCommand or OriginalOutput.
		Stopbit	1bit	1bit/2bit	Enable when Protocol is OriginalCommand or OriginalOutput.
		Delimiter	CR LF	CR / CR LF	Enable when Protocol is OriginalCommand or OriginalOutput.
3.Display	DispSelect	MeasureSelect	1ch product Ach, Ach + Comp Level, Trend 2ch product Ach + Bch, Level, Trend	Ach/Bch/Calc/Ach+Comp/Bch+Comp/Calc+Comp/Ach+Bch/Calc+A+B	*Bch and Calc is enable in 2ch product.
		LevelSelect		Ach/Bch/Calc/Ach+Bch	*Bch and Calc is enable in 2ch product.
		TrendSelect			
	LevelDisp	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		Ach Scale	0 10000	LowerLimit : ±99999 UpperLimit : ±99999	Set scale of level screen.
		Bch Scale			
		CalcScale			
		AL Select	AL1～AL4 : ON	AL1/AL2/AL3/AL4	
	TrendDisp	PatternSelect	Pattern in use	Pattern 1/2/3/4/5/6/7/8	Select pattern No. to set.
		Ach Scale	0 10000	LowerLimit : ±99999 UpperLimit : ±99999	Set scale of trend screen.
		Bch Scale			
		CalcScale			
		AL Select	AL1～AL4 : ON	AL1/AL2/AL3/AL4	
		TimeAxis	1s/div	100ms/div,1s/div,2s/div,5s/div,10s/div, 30s/div,60s/div120s/div	Set time scale of division time.
4.System	General	Brightness	5 Bright	5Bright/4/3/2/1Dark/0 Off	Off means that whole of screen is turned off.
		PowerOnDelay	None	None/2sec/5sec/10sec/20sec/30sec/60sec	Set time that until measure after power on.
		PowerSavingTime	None	None/1/2/5/10/30/60min	Display is dark while power saving.
		D-ZeroRetention	Disable	Disable/Enable	Whether remember D-Zero value or not.
		Language	English	日本語/English	Language.
		DisplayDirection	Horizontal	Horizontal/Vertical	Select a direction of screen.
		SettingProtect	Disable	Disable/Enable	
		AdjustProtect	Disable	Disable/Enable	
		Display UpdateCycle	10 sps	1 sps/ 10 sps	
		PatternCopy	---	Go to screen of pattern copy.	Copy settings of pattern to other pattern.
	AlarmLog	SyncedAlarm	AL1 : ON AL2 : ON AL3 : ON AL4 : ON	AL1/AL2/AL3/AL4	
		RecordPos	BeforeAndAfter	BeforeAlarm/BeforeAndAfter/AfterAlarm	
		Overwrite	Enable	Disable/Enable	
	Initialize	UserDefaultSave	Save current settings as use initial values.		
		UserDefaultLoad	Initialize setting values to user initial values.		
		Factory DefautLoad	Initialize setting values to factory default.		
5.Diag/Log	InputDiag	DC InputA/B ProcessInputA/B	—	InputRatingPercent InputActualValue	Check input confirm existence. Display percent value or actual value.
		ExternalCtrl	—	—	Check ON/OFF of terminal.
	OutputTest	Compare AL1～AL4	—	—	Check ON/OFF Level of compare output.
		PulseOutputA/B	—	—	Check ON/OFF Level of pulse output.
		AnalogOutput	—	—	Output any value output. （Step by 10%）
		BCD Output(Data)	—	—	Output ON/OFF data of each bits.
		BCD Output(PC)	—	—	Output ON/OFF by photo coupler of each bits.
		ModbusCom	—	—	Display received and transmitted data.
		RS-232C Com	—	—	Display received and transmitted data.
	Alarm LogView	No. 1～8		Go to screen of log data confirmation.	
	Alarm LogClear	---		Erase all alarm log.	

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.

Caution : Settings are saved by pressing MENU key , so settings are not saved if power off in setting mode.
Caution : Measuring continues with old settings in setting mode.
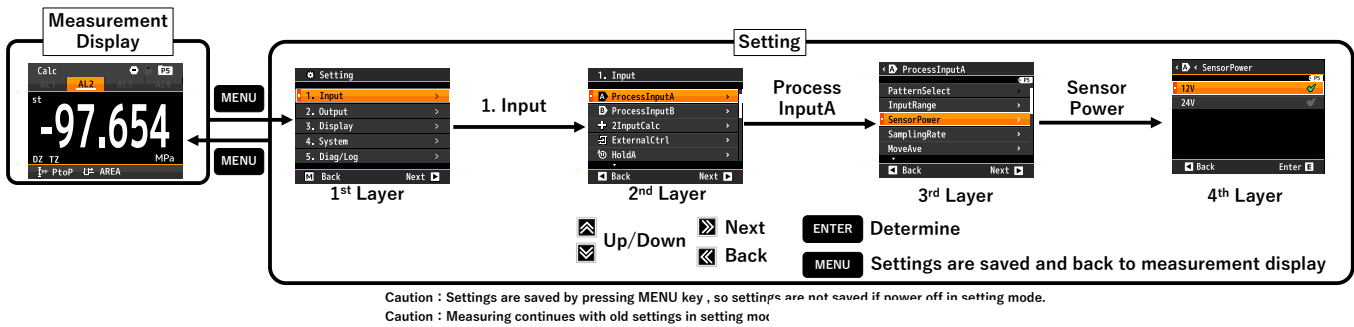
9. SETTING EXAMPLES

9－1. Example of Calibrating of Process Input

① Go to [Offset] display.
(Setting)→1. Input→DC Input/ProcessInputA/B→Offset
② How to operate in [Offset] display (Near 0% cariblarion)
・Get input value by execute [Read input val]. (You can enter the value manually too.)
・Enter [Disp] manually that you want to display.
・Back to one before by press left arrow key/
③ Go to [Fullscale] display.
(Near 100% calibration)
・Operation is same as ②.

*Settings are saved by pressing MENU key and back to measurement display. Don't power off until back to measurement display.

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 are 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 SETTINS

1st Layer	2nd Layer	3rd Layer
1.Input	DC InputA DC InputB ProcessInputA ProcessInputB	DispUnit
	Calc	DispUnit

### 10－2. AVAILABLE UNITS

You can set these 65 units below.

Units
μA,mA,A,kA,μV,mV,V,kV,VA,W,kW,MW, μm,mm,cm,m,Ω,kΩ,MΩ,g,kg,N,kN,MN, Pa,kPa,MPa,hPa,J,kJ,MJ,Hz,kHz,MHz,m3, mm/s,mm/min,cm/min, m/s,m/min,m/h,m/s2, m3/s,m3/min,m3/h,kg/h,kg/m2,kg/m3,N/m2, ℓ,ℓ/s,ℓ/min,ℓ/h,%,%0,%RH, °C, pH,ppm,rpm,t,inch,mN・m,N・m,kN・m

11. DispSelect

Select the screen to be displayed as measurement screen. When some screens are set, they are displayed in turn each time the DISP key is pressed.

Locations of parameter for DispSelect

1st Layer	2nd Layer	3rd Layer
3.Display	DispSelect	MeasureSelect
		LevelSelect
		TrendSelect

Measurement Display
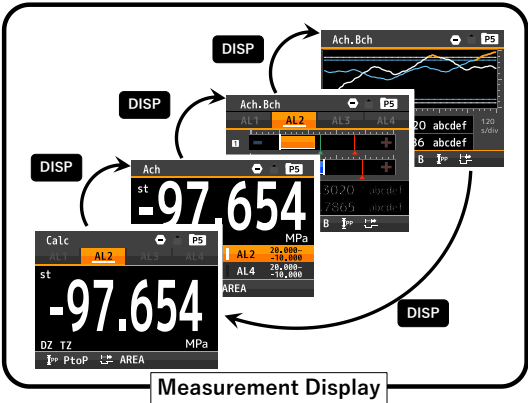
*Example: Measurement display (calculation), measurement display (Ach + comparison), level display (Ach + Bch), trend display (Ach + Bch)

12. 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.

12－1. Locations of parameter for comparative output

1st Layer	2nd Layer	3rd Layer
4.Output	CompareAL1 CompareAL2 CompareAL3 CompareAL4	PatternSelect
		OutputDispValue
		ActCondition
		ComparedMode
		OnConditions
		ThresholdOnDelay
		OffDelay
		OutputMode
		OutputLogic
		OnBgColors

*Refer to "7. SETTING LAYER OVERVIEW"

12－2. OutputDispValue

Comparative outputs AL1-AL4 are settable independently and they have no magnitude relationship.
For example, measured value of Ach is assigned to AL1, measured value of Bch is assigned to AL2 and calculate value is assigned to AL3, AL4 and so on. Every display item can be freely assigned to comparative outputs.
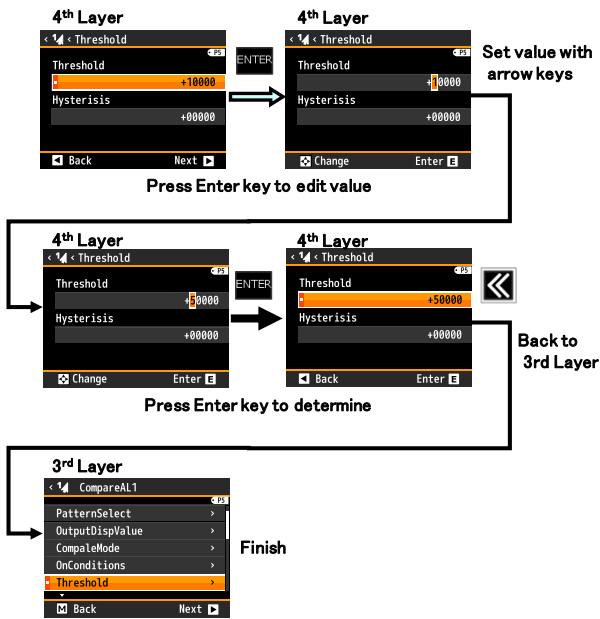
12－3. COMPARISON JUDGEMENT VALUE

The comparison judgement value is a threshold value to judge. How to set the value is shown below.
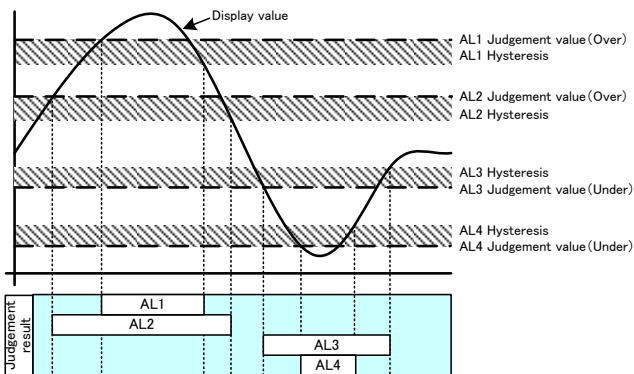*The following is an explanation for the compare mode of "Level judgement".
(Setting)→2.Output→CompareAL1→Threshold

4th Layer — Threshold / Threshold +10000 / Hysterisis +00000 / Back — Next

ENTER → Press Enter key to edit value

4th Layer — Threshold / Threshold 0000 / Hysterisis +00000 / Change — Enter E

Set value with arrow keys

4th Layer — Threshold / Threshold 0000 / Hysterisis +00000 / Change — Enter E

ENTER → Press Enter key to determine

4th Layer — Threshold / Threshold +50000 / Hysterisis +00000 / Back — Enter E

Back to 3rd Layer

3rd Layer — CompareAL1 / PatternSelect / OutputDispValue / CompaleMode / OnConditions / Threshold / Back — Next

Finish

● 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 **"18. SPECIFICATIONS –output specifications [comparative output]"**

Display value
AL1 Judgement value（Over）
AL1 Hysteresis
AL2 Judgement value（Over）
AL2 Hysteresis
AL3 Hysteresis
AL3 Judgement value（Under）
AL4 Hysteresis
AL4 Judgement value（Under）
Judgement result / AL1 / AL2 / AL3 / AL4

13. EXTERNAL CONTROL FUNCTION

As external control functions, the WPMZ has some functions below. 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.

13－1. COMPARE RESET FUNCTION

This is a function that makes all of comparative judgement results and their outputs OFF.

13－2. HOLD RESET FUNCTION

This is a function that reset hold state.
HoldResetA   : Reset hold state of Ach
HoldResetB   : Reset hold state of Bch
HoldResetA&B : Reset hold state of both Ach and Bch

13－3. 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.
DispHold A :   Holds the display value of Ach
DispHold B :   Holds the display value of Bch
DispHold A&B :   Holds the display values of Ach and Bch

13－4. PEAK HOLD FUNCTION

This is a function which holds the maximum value.
PeakHold A :   Holds the maximum value of Ach
PeakHold B :   Holds the maximum value of Bch
PeakHold A&B :   Holds the maximum values of Ach and Bch

13－5. BOTTOM HOLD FUNCTION

This is a function which holds the minimum value.
Minimum hold A :   Holds the minimum value of Ach
Minimum hold B :   Holds the minimum value of Bch
Minimum hold A&B :   Holds the minimum values of Ach and Bch

13－6. AMP HOLD FUNCTION

This is a function which holds the difference between maximum and minimum.
AmpHold A :   Holds that of Ach
AmpHold B :   Holds that of Bch
AmpHold A&B :   Holds that of Ach and Bch

13－7. DEVIATION HOLD FUNCTION

This is a function which holds display value that has the maximum absolute value of difference from reference value.
DevHold A :   Holds that of Ach
DevHold B :   Holds that of Bch
DevHold A&B :   Holds that of Ach and Bch

13－8. AVERAGE HOLD FUNCTION

This is a function which holds average value of display value.
AveHold A :   Holds that of Ach
AveHold B :   Holds that of Bch
AveHold A&B :   Holds that of Ach and Bch

13－9. DIGITAL ZERO FUNCTION

This is a function which makes display value "0" as offset.
DigitalZeroA   : Execute to Ach.
DigitalZeroB   : Execute to Bch.
DigitalZeroA&B   : Execute to both Ach and Bch.

13－10. 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.

13－11. MONITOR CHANGE FUNCTION

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

13－12. TREND LOG FUNCTION

Trend log function is a function to execute acquisition of alarm log at an arbitrary timing by external control. While data is being acquired, the clock mark icon will light on the trend screen.

14. SHORTCUT FUNCTION

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

14－1. REGISTERING SHORTCUTS

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

・1ch product

Key	Default function
▲	DigitalZeroA
▼	DispHold A
◀	Pattern select
▶	PeakHold A

・2ch product

Key	Default function
▲	DigitalZeroA
▼	DigitalZeroB
◀	Pattern select
▶	None

14－2. 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.

15. INITIALIZE

Setting values can be initialized to factory default settings or user saved settings.

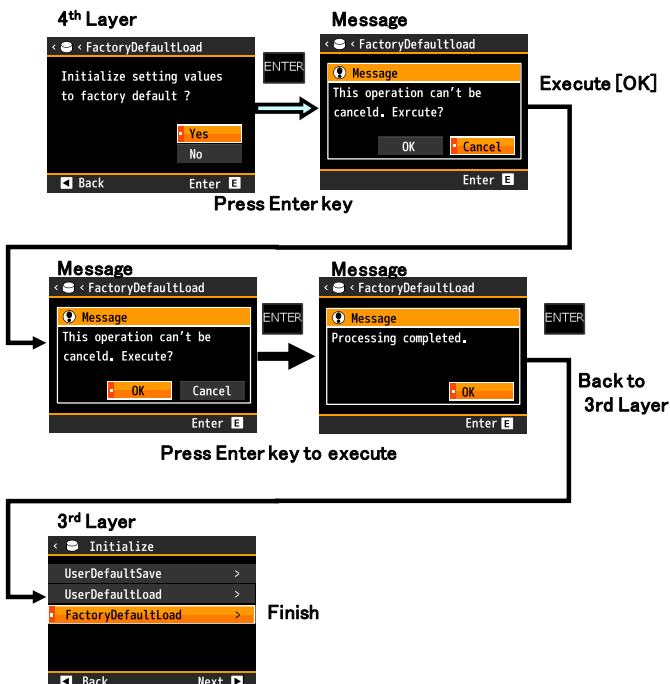### 15－1. LOCATIONS OF PARAMETERS FOR INITIALIZE

1st Layer	2nd Layer	3rd Layer
4.System	Initialize	UserDefaultSave
		UserDefaultLoad
		FactoryDefaultLoad

*Refer to "7. SETTING LAYER OVERVIEW".

15－2. INITIALIZE TO THE FACTORY DEFAULTS

By performing the following steps, setting values can be initialized to the factory defaults.

(Setting)→4.System→Initialize→FactoryDefaultLoad

4th Layer

< 🖴 ‹ FactoryDefaultLoad

Initialize setting values to factory default ?

▸ Yes
No

◀ Back   Enter Ｅ

Message

< 🖴 ‹ FactoryDefaultload
🔔 Message
This operation can't be canceld. Exrcute?

OK   ▸ Cancel

Enter Ｅ

Execute [OK]

Press Enter key

Message

< 🖴 ‹ FactoryDefaultLoad
🔔 Message
This operation can't be canceld. Execute?

▸ OK   Cancel

Enter Ｅ

Message

< 🖴 ‹ FactoryDefaultLoad
🔔 Message
Processing completed.

▸ OK

Enter Ｅ

Back to 3rd Layer

Press Enter key to execute

3rd Layer

< 🖴 Initialize

UserDefaultSave   >
UserDefaultLoad   >
FactoryDefaultLoad   >

◀ Back   Next ▶

Finish

15－3. INITIALIZE TO USER DEFAULTS

Beside of initializing to factory defaults, current setting values can be saved as user default data and setting values will be initialized to the data.

１５－３－１. Saving User Defaults

For initializing to user default values, entering setting values used as default values are required.
(Setting)→4.System→Initialize→UserDefaultSave
1) Setting each values
    Set all setting values which are needed as user default values.
2) Saving user initial values
    By executing to save user default values, current setting values are saved as user default values.
    Steps for the save operation are same as **"16-2. Initializing to the factory defaults"**. Operate the WPMZ according to the setting displays.

１５－３－２. Initializing To User Defaults

(Setting)→4.System→Initialize→UserDefaultLoad
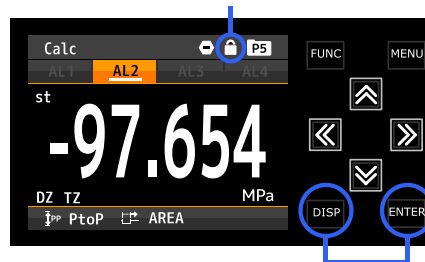By executing to initialize to user defaults, current setting values are replaced by user defaults.
Steps for the initialize operation are same as **"16-2. Initializing to the factory defaults"**. Operate the WPMZ according to the setting displays.

16. KEY LOCK FUNCTION

To prevent unconsidered key operations, the WPMZ has the key lock function.
*If you can't lock well, press enter key first.

Light when key lock is active

Calc   🔒 P5
AL1 AL2 AL3 AL4   FUNC   MENU

st
-97.654   ≫
                        ≪
DZ TZ   MPa
↕PP PtoP ⊔ AREA   DISP   ENTER

KEY LOCK on:
Enabled by pushing DISP key and ENTER key simultaneously
* 🔒 lights up.

KEY LOCK off:
Disabled by pushing DISP key and ENTER key simultaneously
* 🔒 lights down.

17. ERROR CODES

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

An error has ocurred

Error Code : E200

Please see the
Operations Manual.

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

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

18. SPECIFICATIONS

MODEL CODES

WPMZ-1- □□ - □□ - □□

Series name	Power	Input Ach	Input Bch	Output	Comparative output	Test report	Additional code	Description
WPMZ-1								DC Voltage / DC Current measurement
	1							Voltage power：AC100 to 240V
	3							Voltage power：DC12V
	4							Voltage powerDC24 to 48V
		1						DC ±99.999mV
		2						DC ±999.99mV
		3						DC ±9.9999V
		5						DC ±99.999uA
		6						DC ±999.99uA
		7						DC ±9.9999mA
		B						Process input
			X					No Bch input
			1					DC ±99.99mV
			2					DC ±999.99mV
			3					DC ±9.9999V
			5					DC ±99.999uA
			6					DC ±999.99uA
			7					DC ±9.9999mA
			B					Process input
				X				Display only (No output)
				1				Analog output
				2				BCD output (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
							OO	Stardard (Initial languae: Japanese)
							EO	Initial language setting: English

BASIC SPECIFICATIONS

Number of input channel	:	1 or 2　(According to model codes)
Display	:	2.4 inch TFT liquid crystal display Used in 1ch input ： Ach measurement result Used in 2ch inputs ： Ach measurement result, Bch measurement result, calculation result, Ach and Bch measurement results, Ach or Bch measurement result and calculation result
Over warning	:	By exceeding the range of display, displays OVER or −OVER
External controls	:	5 functions of the followings can be assigned to control terminals (user-configurable). ① Comparative output reset function ②Hold reset function A/B/A&B ③Display value holding function A/B/A&B ④Maximum value holding function A/B/A&B ⑤Minimum value holding function A/B/A&B ⑥Amplitude value holding function A/B/A&B ⑦Deviation value holding function A/B/A&B ⑧Average value holding function A/B/A&B ⑨Digital zero function A/B/A&B ⑩Monitor change function ⑪Trend log function ⑫Pattern select function 1/2/3 As follows, only short cut setting ⑬CompareList 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-1-1**-**-***) 　AC100 to 240V±10%　50/60Hz DC power （WPMZ-1-3**-**-***) 　DC12V±10% DC power （WPMZ-1-4**-**-***) 　DC24 to 48V±10%

Power consumption	:	AC power （WPMZ-1-1**-**-***) 　At AC100V : 10VA max　At AC240V : 14VA max DC power （WPMZ-1-3**-**-***) 　At DC12V : 6W max, DC power （WPMZ-1-4**-**-***) 　At DC24V : 6W max,　At DC48V : 6.5W max
External dimension's	:	96mm （W）×52mm （H）×145mm （D）
Weight	:	Approx. 350g
Withstand voltage	:	AC power （WPMZ-1-1**-**-***) 　Between Power terminals and inputs/external controls/comparative outputs/other outputs AC3000V for 1 minute DC power （WPMZ-1-3or4**-**-***) 　Between Power terminals and inputs/external controls/comparative outputs/other outputs AC1500V for 1 minute AC power and DC power 　Between input terminals and external controls/comparative outputs/other outputs AC1500V for 1 minute 　Between enclosures and each terminals AC3000V for 1 minute
Insulation resistance	:	Between terminals mentioned above, at DC500V 100MΩ or higher
Vibration tolerance	:	10 to 55Hz half amplitude 0.15mm in X, Y, Z directions for 30 minutes
Protective structure	:	IP66 （front）
Installation environment	:	indoor use
Rated altitude	:	up to 2000m
Transient overvoltage	:	Ⅱ
Pollution degree	:	2
Conformed EN standard	:	EN61326-1 （EMS : industrial electromagnetic environment／EMI : Class A) (Applicable to line length only under 30m) EN61010-1 EN IEC 63000
Material of enclosure	:	polycarbonate （PC)　black UL94V-0

INPUT SPECIFICATIONS

【Voltage input】
●Input specification　　(Common to Ach, Bch)

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

【Current input】
●Input specification　　(Common to Ach, Bch)

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

【Process input】
●Input specification　　(Common to Ach, Bch)

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

*It is possible to measure up to ± 10% FS range on each range. (Limited with ± 10% FS by internal processing.)

In the bipolar input setting, the full scale is set to be ± separately, and for ± 10 V input, for example, limit processing is performed up to ± 11 V. (20 V is not treated as FS.)

Also, in the accuracy of ± 10 V input, it is prescribed as one side FS handling and accuracy is calculated as 5 mV (0.05%) ± 1 digit.

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

OUTPUT SPECIFICATIONS

【Comparison output】

Open collector output	:	Output rating
		  NPN : Sink current 50mA MAX.
		  PNP : Source current 50mA MAX.
		Applied voltage 30V MAX.
		Output saturation voltage $\leqq$1.2V at 50mA
		Number of outputs 4 transistor outputs

Relay output	:	Contact rating : AC250V 2A,DC30V 2A Mechanical life : 20 million times Electrical life : 100 thousand times or more 4 A contacts, AL1 and AL2, AL3 and AL4 share common
Control method	:	Microcomputer calculating method
Judgement value settable range	:	-99999～99999
Hysteresis	:	Settable within the range of 0-99999 digits for each judgement value independently.
Comparison action	:	According to sampling rate (circulate period).
Setting condition	:	Condition of comparison can be set to AL1 to AL4 independently.

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

Over alarm (upper limit judgement)

Condition of comparison	Result
display value>AL1 judgement value	AL1
display value>AL2 judgement value	AL2
display value>AL3 judgement value	AL3
display value>AL4 judgement value	AL4

Under alarm (lower limit judgement)

Condition of comparison	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	Result
AL1 upper limit ≥ display value ≥ AL1 lower limit	AL1
AL2 upper limit ≥ display value ≥ AL2 lower limit	AL2
AL3 upper limit ≥ display value ≥ AL3 lower limit	AL3
AL4 upper limit ≥ display value ≥ AL4 lower limit	AL4

Outside of zone alarm

Condition of comparison	Result
Display value > AL1 upper limit or lower limit > value	AL1
Display value > AL2 upper limit or lower limit > value	AL2
Display value > AL3 upper limit or lower limit > value	AL3
Display value > AL4 upper limit or lower limit > value	AL4

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

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

Comparison formula memory	:	8 pattern memory

【Analog output 】

Conversion method	:	D/A conversion method
Resolution capability	:	Equivalent of 13bit
Scaling	:	Digital scaling
Output objective	:	An item can be selected from source displayable values
Response speed	:	Up to 300 us (0→90% response)
Specifications for each output	:	Refer to the following chart.

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

*Current output ripple is at load resistance 250Ω,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.