

New Product

Graphical Panel Meter

WPMZ Series



Evolution of Digital Panel Meter
The Highest Usability for Production Site

DC Voltage / Current Meter

WPMZ-1 New Product

Strain Gauge Meter

WPMZ-3 New Product

Rotation / Speed Meter

WPMZ-5

Flow Rate / Flow Totalizer

WPMZ-6

Graphical Panel Meter

WPMZ Series

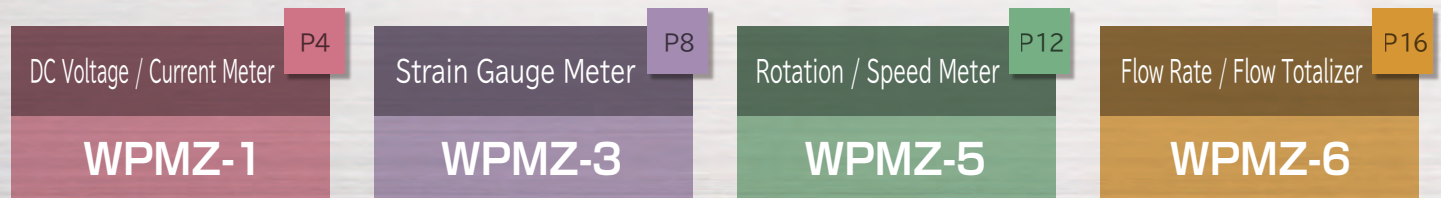
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Evolution of Digital Panel Meter

The Highest Usability for Production Site

Watanabe developed WPMZ series as multi-display digital panel meter matched to the user's needs, and focused on the basic performance such as [1. Easy to read] [2. Easy to use].

WPMZ has below 4 series. It is a product that can cover various requirements, such as process monitoring, quality judgement etc. at the manufacturing site for various applications and environment.



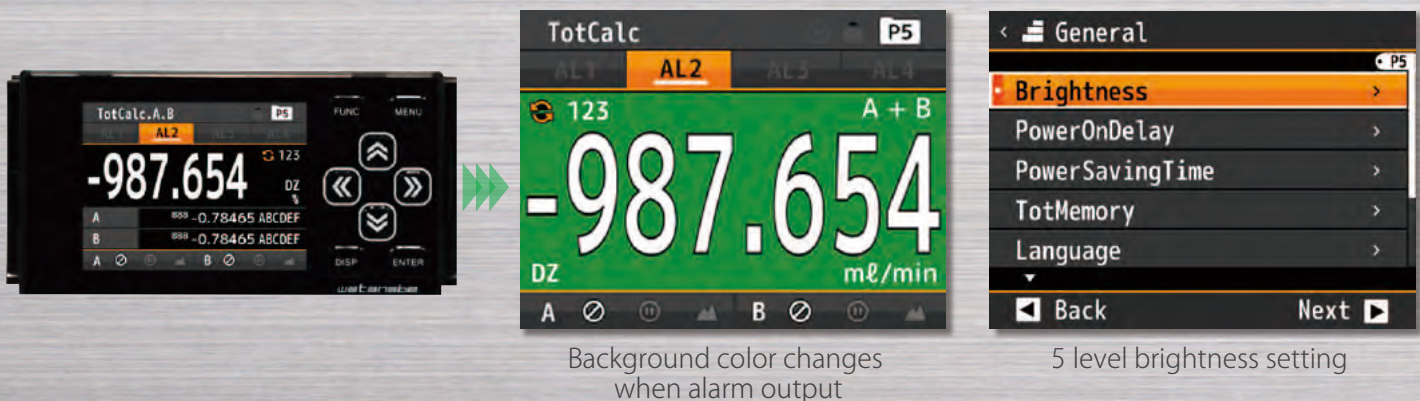
1. Easy to read

High-brightness and sharp display to read small letters

2.4 inch high brightness TFT full-color LCD.

WPMZ has 5 level brightness setting to adjust according to the indoor / outdoor lighting of site.

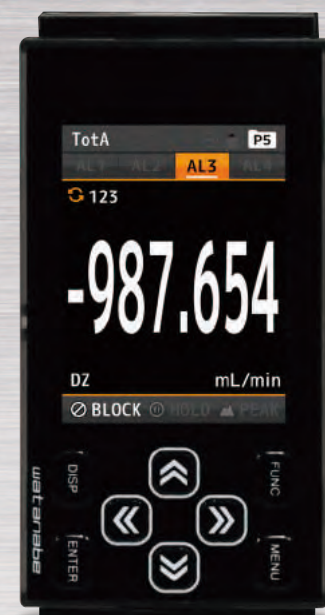
Also 4 high visibility background color can be set in case of alarm output is ON.



90° Display rotation is effective to use narrow places of board

There is a function to rotate display 90°.

Also able to change key assignment of cross keys.



Vertical display

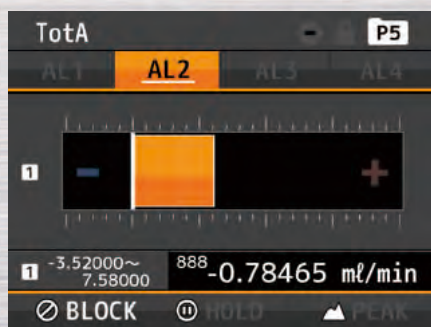


Graphical Digital Panel Meter

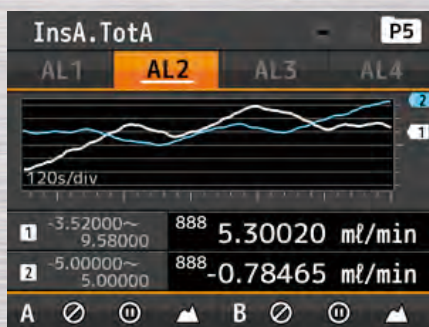
WPMZ
Series

2. Easy to use

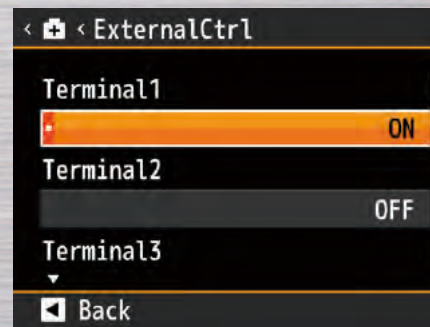
Numerical display and graph display selectable according to the measurement purpose



Shows ratio by Bar graph



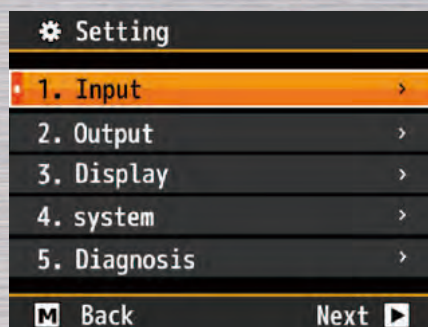
Shows trend by Trend graph



Self-diagnostics function to prevent connection trouble



Simple settings by Cross-key



English Menu

10 Arithmetic expression for 2 input calculation

Measurement value or calculation result can display 1 to 3 elements in one display. (Display below)

You can select 10 kinds of arithmetic expression for Ach & Bch calculation. (List at right)

Arithmetic expression can be easily set by cross-keys. 2ch display saves install space.



1 element display



2 element display



3 element display

Arithmetic expression for 2 input calculation

Function	Arithmetic expression
Addition	$((A + B) + C) \times K$ or $(A + B) \times K + C$
Subtraction	$((B - A) + C) \times K$ or $(B - A) \times K + C$
Multiplication	$((A \times B) + C) \times K$ or $(A \times B) \times K + C$
Division	$((B / A) + C) \times K$ or $(B / A) \times K + C$
Average	$((A + B) / 2) + C \times K$
HighSelect	$((\text{Larger of A and B}) + C) \times K$
LowSelect	$((\text{Smaller of A and B}) + C) \times K$
Difference	$((\text{Abs of } (B - A)) + C) \times K$
RelaticeError	$((A / B) - 1) \times K$
Density	$(B / (A + B)) \times K$

* In case WPMZ-1/3

DC Voltage / Current Measurement

WPMZ-1

- DC Voltage / Current input
- High-speed sampling rate (1ch : 4000 times/sec, 2ch : 2000 times/sec)
- Alarm log function

[WPMZ-1] is for measuring DC voltage / Current, and it is especially suited for High-speed sampling on the production line in factory manufacturing process. We recommend using at parts inspection for shortening the inspection process by NG judgement and clearance judgement etc.



Application examples

Calculation function + Alarm log function

Can be used for Capacitor lead length detection!

Input signals (Ach, Bch) from the sensor to WPMZ-1.
Able to detect capacitor lead length by using calculation function (B-A).
Also, WPMZ-1 has alarm log function to keep trend data before and after alarm of comparison judgement.



High-speed sampling

Small change of value can be measured!

High-speed sampling of max. 4000 times/sec with 1ch input, and max. 2000 times/sec with 2ch input, by $\Delta\Sigma$ modulation.
Capture changes in instantaneous values such as press management and torque management.



Main Specifications

Power supply

- 100~240VAC $\pm 10\%$
- 12VDC $\pm 10\%$
- 24~48VDC $\pm 10\%$

Input : Ach/Bch

- DC Voltage / Current input (Process input)

Option output

- Analog output
- BCD output (Open collector NPN / PNP)
- RS-232C
- RS-485 (Modbus RTU)

Comparator output (AL1~AL4)

- Open collector output (NPN / PNP)
- Relay output (Normally open)



Prohibiting
Use of
Hazardous
Substances

Features

- Easy to read by 2.4 inch TFT Full color LCD display
- High-speed sampling rate
(1ch : Max. 4000 times/sec, 2ch : Max. 2000 times/sec)
- Alarm log function up to 8 alarm trend data
- [Value], [Bar graph] and [Trend graph] Display can be selected according to the measurement
- Standard 1ch input type, and also 2ch input type which can use for special measurement

Model

WPMZ-1 — ① ② ③ — ④ ⑤ — ⑥ ⑦

Series	① Power supply	② Input Ach	③ Input Bch	④ Option output	⑤ Comparator output	⑥ Test report	⑦ Suffix code	Description
WPMZ-1								DC Voltage / Current measurement
	1							Power supply : 100 to 240VAC ±10%
	3							Power supply : 12VDC ±10%
	4							Power supply : 24 to 48VDC ±10%
		1						±99.999mVDC
		2						±999.99mVDC
		3						±9.9999VDC
		5						±99.999μADC
		6						±999.99μADC
		7						±9.9999mADC
		B						Process input (DC Voltage / Current)
			X					None
			1					±99.999mVDC
			2					±999.99mVDC
			3					±9.9999VDC
			5					±99.999μADC
			6					±999.99μADC
			7					±9.9999mADC
			B					Process input (DC Voltage / Current)
				X				Display only (External control)
				1				Analog output
				2				BCD output (Open collector NPN)
				3				BCD output (Open collector PNP)
				4				RS-232C output
				5				RS-485 output (Modbus RTU)
					E			Open collector output (NPN) (AL1~AL4)
					F			Open collector output (PNP) (AL1~AL4)
					R			Relay output (Normally open) (AL1~AL4)
						X		Without Test report
						T		With Test report
							00	Japanese default setting
							E0	English default setting

Input Specifications

Ach input (1ch) / Bch input (2ch)

DC Voltage input

Code	Measurement range	Input resistance	Max. allowable input	Accuracy
1	±99.999mV	Approx. 1MΩ	±10V	±(0.05% of FS + 1digit)
2	±999.99mV		±100V	
3	±9.9999V		±100V	

DC Current input

Code	Measurement range	Input resistance	Max. allowable input	Accuracy
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 (DC Voltage / Current)

Code	Measurement range	Input resistance	Max. allowable input	Accuracy
B	±5V	Approx. 1MΩ	±100V	±(0.05% of FS + 1digit)
	0~5V			
	1~5V			
	±10V			
	0~10V	Approx. 10Ω	±50mA	
	±20mA			
0~20mA				
	4~20mA			

A/D conversion ΔΣ conversion

Input Configuration Single ended

Sampling rate 1ch input model : Max. 4000 times/sec

2ch input model : Max. 2000 times/sec

Common Specifications

Measurement channel	1ch or 2channels
Display	2.4 inch TFT LCD 1ch input : Measurement results of Ach input 2ch input : Either measurement results of Ach input, measurement results of Bch input, or calculation results of Ach and Bch input Measurement results and calculation results of Ach or Bch input -99999 to 99999
Display range	Leading zero suppression
Zero display	Arbitrary setting possible
Decimal point	OVER or -OVER when input range or display range is exceeded
Over range warning	-5 to 50 °C, 35 to 85% RH (No condensation)
Operating temp & humidity range	-10 to 70 °C, 60% RH or less
Storage temp & humidity range	
Power supply	100 to 240VAC ±10% 50/60 Hz 12VDC ±10% 24 to 48 VDC ±10%
Power consumption	10VA (100VAC), 14VA (240VAC), 6W (12VDC), 6W (24VDC), 6.5W (48VDC)
Sensor power supply	12VDC ±10% 100mA max. / 24VDC ±10% 50mA max. *When 2channel input, allowable current of Ach and Bch together will be above current. *1.2W max. when the combination of 12VDC and 24VDC
Dimensions	96mm(W) x 48mm(H) x 145mm(D), 1/8 DIN size
Weight	Approx. 350g
Withstand voltage	AC power supply : 3000VAC for 1 minute: Between the power supply terminal - input / external control / comparator output / option output DC power supply : 1500VAC for 1 minute: Between the power supply terminal - input / external control / comparator output / option output AC/DC power supply : 1500VAC for 1 minute: Between the input terminal - external control / comparator output / option output
Insulation resistance	Between Case - each terminals : 3000VAC for 1 minute Between Input ch : 1500VAC for 1 minute
Protection	100MΩ (500VDC) or more between the above terminals
Rated altitude	IP66 (Front bezel)
Measurement category	2000m or less
Contamination level	II
Applicable EN standard	EN61326-1 (EMS : Industrial installations; EMI : Class A) *Applies to wire length of 30m or less EN61010-1 EN50581
Case material / color	Polycarbonate, Black UL94V-0

External control

*Execute by COM terminal short circuit

Compare reset	Turns OFF comparator output monitor and comparator output
Display hold	Holds the display value
Peak hold	Holds the max. value
Bottom hold	Holds the min. value
Amplitude Hold	Holds the difference between max. and min. value
Deviation hold	Holds the display value that has the max. absolute value of difference from reference value
Average hold	Stabilize display by additional moving average for the set number of times
Hold reset	Reset hold state of display value
Digital zero	Set the display value to zero value
Display change	Changes the measurement display
Trend log	Acquire alarm log
Pattern select	Changes the setting patterns (Max. 8 pattern)

*Each function can be assigned to control terminal 1 to 5.

Option Specifications

Comparator output

Output method	Open collector output or Relay output
●Open collector output	Rated output NPN : Sinc current Max. 50mA PNP : Source current Max. 50mA Applied voltage Max. 30V Output saturation voltage 1.2V or less at 50mA
●Relay output	Contact rating : 250VAC 2A, 30VDC 2A Mechanical life : 20,000,000 times Electrical life : 100,000 times
Control method	Microcomputer operation method
Setting range	-99999 to 99999
Hysteresis	1 to 99999 digit for each setpoints
Comparison condition	Condition can be set to AL1 to AL4 independently
●Level judgement mode	The alarm is ON when display value exceeds setpoint (Over alarm) The alarm is ON when display value is under setpoint (Under alarm)

Over alarm (Upper limit judgement)

Comparison condition	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)

Comparison condition	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 between upper and lower judgement values (Inside zone) The alarm is ON when out of upper and lower judgement values (Outside zone)
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Inside zone alarm

Comparison condition	Result
AL1 zone HI \geq Display value \geq AL1 zone LO	AL1
AL1 zone HI \geq Display value \geq AL2 zone LO	AL2
AL1 zone HI \geq Display value \geq AL3 zone LO	AL3
AL1 zone HI \geq Display value \geq AL4 zone LO	AL4

Outside zone alarm

Comparison condition	Result
Display value > AL1 zone HI or AL1 zone LO > Display value	AL1
Display value > AL2 zone HI or AL2 zone LO > Display value	AL2
Display value > AL3 zone HI or AL3 zone LO > Display value	AL3
Display value > AL4 zone HI or AL4 zone LO > Display value	AL4

●Difference judgement mode

*Alarm is ON when the (Max.-Min.) during the fixed time exceeds the change judgement value.

Comparison condition	Result
(Max.-Min.) during the fixed time \geq AL1 judgement value	AL1
(Max.-Min.) during the fixed time \geq AL2 judgement value	AL2
(Max.-Min.) during the fixed time \geq AL3 judgement value	AL3
(Max.-Min.) during the fixed time \geq AL4 judgement value	AL4

Analog output

*Select either Ach, Bch or calculation results to be output.

Conversion method	D/A conversion method
Resolution capability	Equivalent of 13bit
Scaling	Digital scaling
Response speed	Up to 300 μ s (0 \rightarrow 90% response)
Specifications for each output	Refer to the following chart.

Output type	Load resistance	Accuracy (23 \pm 5 $^{\circ}$ C 35 \sim 85%RH)	Ripple
0 \sim 10V	$\geq 2k\Omega$	$\pm 0.1\%$ FS	$\pm 50mV_{p-p}$
-10 \sim 10V			
1 \sim 5V			
0 \sim 20mA	$\leq 500\Omega$		$\pm 25mV_{p-p}$
4 \sim 20mA			

*Ripple for current output is at load resistance 250 Ω (20mA output)

BCD Output

*Select either Ach, Bch or calculation results to be output.

Output type	Open collector output, NPN/PNP type
Measurement data	Negative logic. Transistor ON when logic is "1"
Polarity signal	Negative logic. Transistor ON when negative display
Over signal	Negative logic. Transistor ON when over display
Print command signal	Transistor ON for fixed period when data conversion
Transistor capacity	Voltage 30V max., Current 10mA max. Output saturation voltage $\leq 1.2V$ at 10mA
Enable	Output transistor turns OFF when the enable terminal is short with D.COM

RS-232C communication

Communication protocol	Modbus RTU*, Original command, Original output
Synchronous system	Asynchronous mode
Communication method	Full duplex
Communication speed	9600bps, 19200bps, 38400bps
Data length	7bit, 8bit
Stop bit	1bit, 2bit
Parity bit	None, Odd, Even
Delimiter	CR, CR+LF
Character code	ASCII
Transmission control procedure	Non-procedure
Signal name	TXD, RXD, SGI
No. of connectable units	1 unit
Line length	15m

*No data length / stop bit / delimiter settings when Modbus RTU protocol

RS-485 communication

Communication protocol	Modbus RTU
Synchronous system	Asynchronous mode
Communication method	2-wire half duplex
Communication speed	9600bps, 19200bps, 38400bps
Data length	8bit
Stop bit	1bit, 2bit
Parity bit	N/A, odd number, even number
Signal name	Non-inverting (+), inverting (-)
No. of connectable units	31 units
Line length	1.2km max (Total)

Terminal Connections

Lower terminal

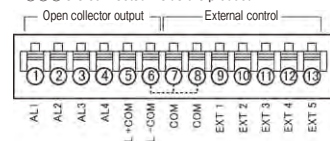
(External control / comparator output / power supply)

- Comparator output / External control

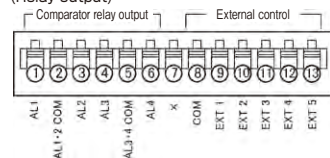
Compatible wire : AWG24 to 16

(Open collector output)

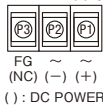
*⑥⑦⑧ are connected inside the product.



(Relay output)



- Power supply



Applicable crimp terminal



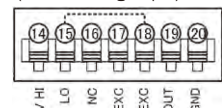
Upper terminal

(Input / GO output / sensor power supply)

- DC voltage input / GO output

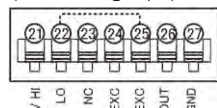
Compatible wire : AWG24 to 16

(Ach DC voltage input)



*⑮⑯ are connected internally

(Bch DC voltage input)

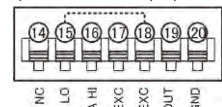


*⑳㉑ are connected internally

- DC current input / GO output

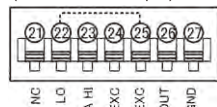
Compatible wire : AWG24 to 16

(Ach DC current input)



*⑮⑯ are connected internally

(Bch DC current input)

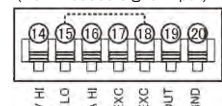


*⑳㉑ are connected internally

- Process signal input / GO output

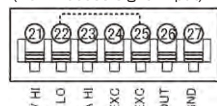
Compatible wire : AWG24 to 16

(Ach Process signal input)



*⑮⑯ are connected internally

(Bch Process signal input)

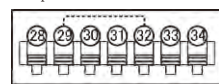


*⑳㉑ are connected internally

Middle terminal (Option output)

- Analog output

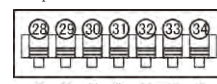
Compatible wire : AWG24 to 16



*⑳㉑ are connected internally

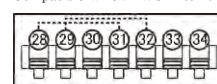
- RS-232C

Compatible wire : AWG24 to 16



- RS-485

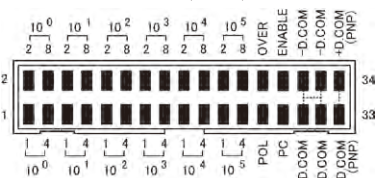
Compatible wire : AWG24 to 16



*⑳㉑ are connected internally

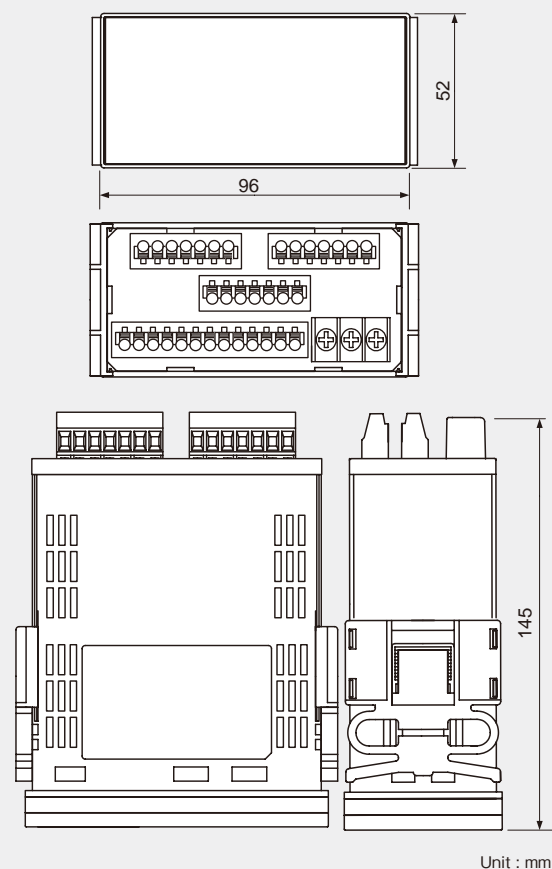
- BCD

Compatible wire: AWG28 flat cable (1.27mm)



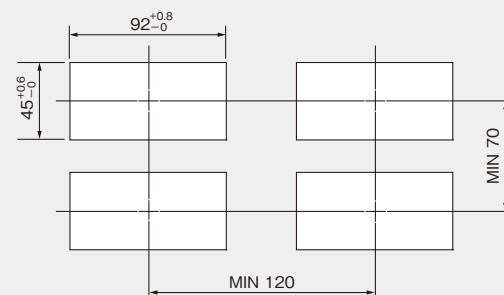
Dimensions

(1/8 DIN size)



Unit : mm

Panel cutout



* Recommended panel thickness : 0.8 to 5.0mm



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2st edition, Jun 2019

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