Strain Gauge Measurement

WPMZ-3

- Strain Gauge input
- Wave compare, Multi hold function
- High-speed sampling rate (1ch : 4000 times/sec, 2ch : 2000 times/sec)

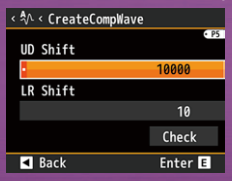
[WPMZ-3] is for measuring strain gauge, and it has wave compare and multi hold function.
It is suitable for Process control, Quality control and traceability etc. at the manufacturing site where mass production is carried out with constant cycle.

Application examples

Wave compare mode
Alarm output and waveform log function by comparing measurement waveform and comparison waveform

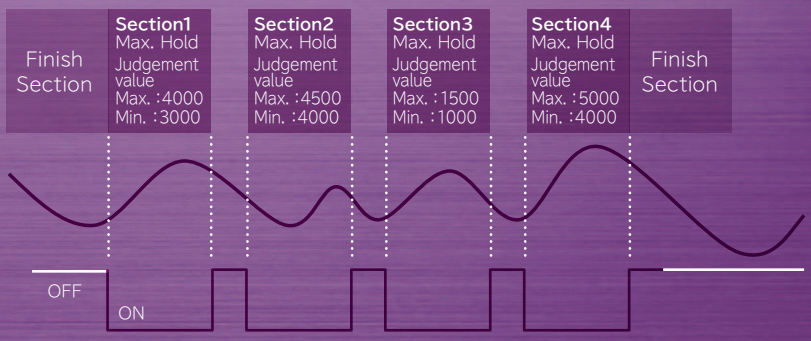
Multi hold mode
Outputs each compare result for each hold value of each section and the comparison judgement setting value.

Judgement waveform creation
Function to create judgement waveform necessary for comparison



NG judgement

Alarm output
Output alarm as 'NG' judgement if there is more than 1 measured point which is out of judgement waveform



Display Example
Displays the hold value in each section with the current measurement value. Icons will appear according to the hold detail section switching method.

Multi hold measurement display

Multi hold graph display

Main Specifications

Power supply
- 100~240VAC ±10%
- 12VDC ±10%
- 24~48VDC ±10%

Input : Ach/Bch
- Strain gauge input
- 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)

Graphical Digital Panel Meter (Strain Gauge) WPMZ-3

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
- Wave compare function in 48 x 96mm size
  (1/8 DIN size)
- 8 types of hold method and 4 section Multi hold function
- [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−3−①②③−④⑤−⑥⑦

Series	① Power supply	② Input Ach	③ Input Bch	④ Option output	⑤ Comparator output	⑥ Test report	⑦ Suffix code	Description
WPMZ-3								Strain gauge measurement
	1							Power supply : 100 to 240VAC ±10%
	3							Power supply : 12VDC ±10%
	4							Power supply : 24 to 48VDC ±10%
		S						Strain gauge input
		B						DC Voltage / Current input (Process input)
			X					None
			S					Strain gauge input
			B					DC Voltage / Current input (Process input)
				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)

■Strain gauge input Input code S

Bridge power supply	Adjustment range of gain	Measurement range	Calibration accuracy (at 23±5°C 35~85%RH)	Nonlinearity (at 23±5°C 35~85%RH)
5V	1mV/V~ 3.5mV/V	−3.5mV/V~ 3.5mV/V	±(0.1% of FS + 1digit)	±(0.02% of FS + 1digit)
10V				
2.5V				

A/D conversion: ΔΣ conversion
Bridge voltage: DC5V ± 10% 60mA
*Up to four 350Ω load cells can be connected
DC10V ± 10% 30mA
DC2.5V ± 10% 30mA
*1.2W max. in the case of combination with DC voltage / current input (Process input)
Temperature characteristic: 100ppm/°C
Applicable sensor: 350Ω Strain gage type sensors
Sampling rate: 1ch input model : Max. 4000 times/sec
2ch input model : Max. 2000 times/sec

■DC Voltage/Current input(Process input) Input code B

Measurement range	Input resistance	Max. allowable input	Accuracy (at 23±5°C 35~85%RH)
±5V	Approx. 1MΩ	±100V	±(0.05% of FS + 1digit)
0~5V			
1~5V			
±10V			
0~10V			
±20mA	Approx. 10Ω	±50mA	
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
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
*1.2W max. when the combination of Strain gauge input

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
Measurement results of Ach and Bch input
Measurement results and calculation results of Ach or Bch input
Display range: −99999 to 99999
Zero display: Leading zero suppression
Decimal point: Arbitrary setting possible
Over range warning: OVER or −OVER when input range or display range is exceeded
Operating temp & humidity range: −5 to 50 °C, 35 to 85% RH (No condensation)
Storage temp & humidity range: −10 to 70 °C, 60% RH or less
Power supply: 100 to 240VAC ±10% 50/60 Hz
12VDC ±10%
24 to 48 VDC ±10%
Power consumption: 11VA max. (100VAC), 15VA max. (240VAC), 6.5W (12VDC), 6.5W (24VDC), 7W (48VDC)
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
Between Case - each terminals : 3000VAC for 1 minute
Insulation resistance: 100MΩ (500VDC) or more between the above terminals
Protection: IP66 (Front bezel)
Rated altitude: 2000m or less
Contamination level: 2
Applicable EN standard: EN61326-1 (EMS : Industrial installations; EMI : Class A)
*Applies to wire length of 30m or less
EN61010-1
EN IEC 63000
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 : Sink 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)

Inside zone alarm

Comparison condition	Result
AL1 zone HI ≥ Display value ≥ AL1 zone LO	AL1
AL1 zone HI ≥ Display value ≥ AL2 zone LO	AL2
AL1 zone HI ≥ Display value ≥ AL3 zone LO	AL3
AL1 zone HI ≥ Display value ≥ 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 ≥ AL1 judgement value	AL1
(Max.-Min.) during the fixed time ≥ AL2 judgement value	AL2
(Max.-Min.) during the fixed time ≥ AL3 judgement value	AL3
(Max.-Min.) during the fixed time ≥ 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 300μs (0→90% response)
Specifications for each output	Refer to the following chart.

Output type	Load resistance	Accuracy	Ripple
0～10V	≥2kΩ	±0.1% FS	±50mVp-p
−10～10V			
1～5V			
0～20mA	≤500Ω		±25mVp-p
4～20mA			

*Ripple for current output is at load resistance 250Ω (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 ≤1.2V at 10mA
Enable	Output transistor turns OFF when the enable terminal is short with D.COM

RS-232C communication

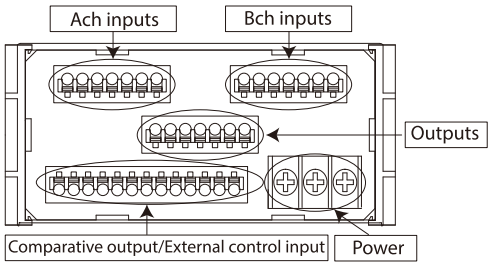
Communication protocol	Modbus RTU*, Original command, Original output
Synchronous system	Asynchronous mode
Communication method	Full duplex
Communication speed	9600bps, 19200bps, 38400bps
Data length	7bit, 8bit
Stop bit	1bit, 2bit
Parity bit	None, Odd, Even
Delimiter	CR, CR+LF
Character code	ASCII
Transmission control procedure	Non-procedure
Signal name	TXD, RXD, SG
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



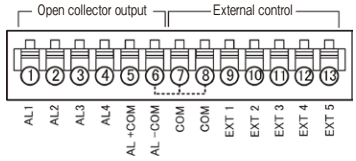
Lower terminal
(External control / comparator output / power supply)

- Comparator output / External control

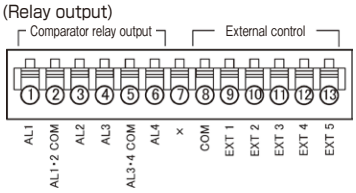
Compatible wire : AWG24 to 16

(Open collector output)

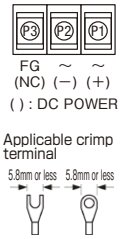
*⑥⑦⑧ are connected inside the product.



(Relay output)



- Power supply

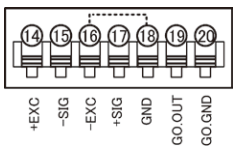


Upper terminal
(Input / GO output / sensor power supply)

- Strain gauge input

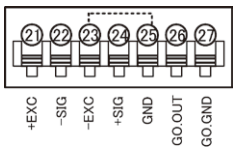
Compatible wire : AWG24 to 16

(Ach Strain gauge input)



*⑮⑱ are connected internally

(Bch Strain gauge input)

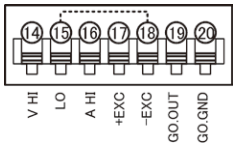


*㉒㉕ are connected internally

- DC voltage / current input (Process input)

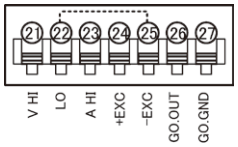
Compatible wire : AWG24 to 16

(Ach DC voltage / current input)



*⑮⑱ are connected internally

(Bch DC voltage / current input)

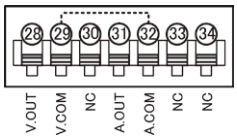


*㉒㉕ are connected internally

Middle terminal (Option output)

- Analog output

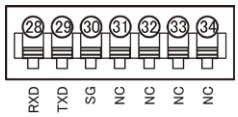
Compatible wire : AWG24 to 16



*㉙㉜ are connected internally

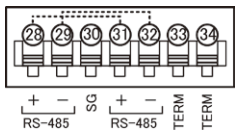
- RS-232C

Compatible wire : AWG24 to 16



- RS-485

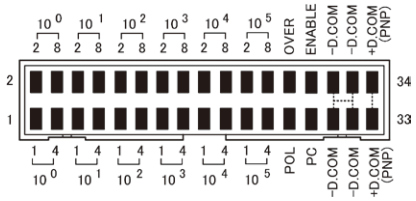
Compatible wire : AWG24 to 16



*㉘㉛ are connected internally

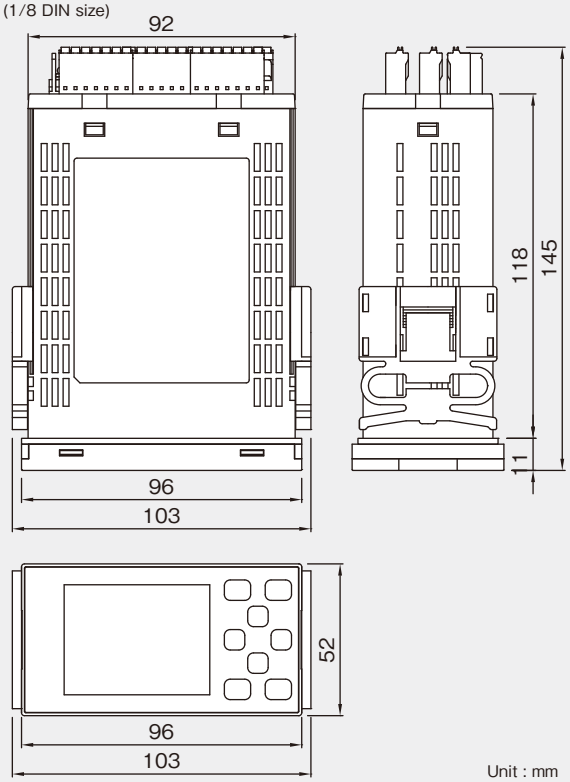
- BCD

Compatible wire: AWG28 flat cable (1.27mm)



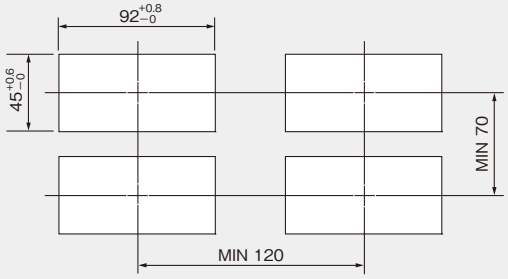
Dimensions

(1/8 DIN size)



Unit : mm

Panel cutout



* Recommended panel thickness : 0.8 to 5.0mm