Rotation and Speed Measurement

WPMZ-5

- ● Rotation and Speed Measurement

- ● Pulse input

- ● Line driver input

[WPMZ-5] is Digital panel meter for measuring Rotation & Speed.
By installing a rotary encoder in a line or device that uses a rotating mechanism such as a roll, the speed of the roll can be measured in real time and the rotation can be controlled.

Application examples

Open collector output

Signal tower

WPMZ-5

RS-232C

BCD output

Large BCD display

Setting / management computer

Rotation detector

Pulse input

*4 point threshold to measurement value

Analog output
Open collector output
RS-485 (Modbus RTU)

Feedback to inspection process

PLC / Controller

Motor (Inspection object)

Main Specifications

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

Input : Ach/Bch
- ・Pulse input
- ・Line driver 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)

Graphical Digital Panel Meter (Rotation and Speed Measurement)

Prohibiting Use of Hazardous Substances

Features

- High precision measurement and various measurement menu with 32 bit microcomputer
- Easy to read by 2.4 inch TFT Full color LCD display
- [Value], [Bar graph] and [Trend graph] Display can be selected according to the measurement
- Display rotation function which can select the mounting direction
- Standard 1ch input type, and also 2ch input type which can use for special measurement

Model

WPMZ－5－①②③－④⑤－⑥⑦

Series	① Power supply	② Input Ach	③ Input Bch	④ Option output	⑤ Comparator output	⑥ Test report	⑦ Suffix code	Description
WPMZ-5								Rotation and Speed Measurement
	1							Power supply voltage: 100 to 240VAC
	3							Power supply voltage: 12VDC
	4							Power supply voltage: 24 to 48VDC
		P						Pulse input
		L						Line driver input
			X					None
			P					Pulse input (Note 1)
			L					Line driver input (Note 1)
				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

*In case of two input type, the combination of pulse input and line driver input cannot be selected together.

Input Specifications

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

■Pulse input   Input code P

Measurement types	Rotation and speed measurement
Input frequency range	10mHz to 500kHz * 250kHz for 2 channel input
Input signal	Open collector (NPN/PNP), voltage pulse, totem pole output, AC pulse, proximity sensor
Input level	Open collector
	Pull up to 12V or 24V
	ON current：Approx.1mA
	Allowable residual voltage：1V or less
	Logic
	L level: 1.0V or less
	H level: 3.9 to 30V (Max. allowable voltage ±50V)
	Zero-crossing
	60mV to 40VAC (Max. Allowable voltage 70V)
Input pulse width	0.9μs or more (Both L level and H level)
	*1.8μs or more in case of 2 channel input
Measurement method	Cyclic calculation method
Accuracy	±(20ppm reading +1digit) at 23±5°C

■ Line driver input   Input code L

Measurement types	Rotation and speed measurement
Input frequency range	10mHz to 500kHz * 250kHz for 2 channel input
Input signal	Differential input, input resistance (Termination resistor)：330Ω
	*Can be connected one-to-one with RS-422 compliant line driver device
Input level	Line driver signal ±1V or more (Differential voltage)
Input pulse width	0.9μs or more (Both L level and H level)
	*1.8μs or more in case of 2 channel input
Accuracy	±(20ppm reading +1digit) at 23±5°C

Common Specifications

Measurement channel	1 channel or 2 channels (Based on model selection)
Display	2.4 inch TFT LCD
	1ch input:
	Measurement results of Ach input
	2 ch 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	0 to 999999
Zero display	Leading zero suppression
Decimal point	Arbitrary setting possible
Over range warning	OVER or -Over when input range and display range are exceeded
Operating temp & humidity range	−5 to 50℃, 35 to 85% RH (No condensation)
Storage temp & humidity range	−10 to 70℃, 60% RH or less
Power supply	100 to 240VAC ±10% 50/60 Hz
	12VDC ±10%
	24 to 48VDC ±10%
Power consumption	10VA max. at 100VAC
	14VA max. at 240VAC
	6W max. at 12VDC
	6W max. at 24VDC
	6.5W max. at 48VDC
Sensor power supply	12VDC ±10% 100mA max; 24VDC ±10% 50mA max
	*When 2 channel input, allowable current of Ach and Bch together will be above current.
	*1.2W max. when the combination of 12VDC and 24VDC (For example: Ach is 12V and Bch is 24V)
	(Line driver input)
	5VDC ±10% 200mA max.
	*When 2 channel input, allowable current of Ach and Bch together will be above current.
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	500VDC 100MΩ 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

Comparator reset	Shorted with COM terminal, turns OFF comparator output monitor and comparator output
Measurement prohibited	Shorted with COM terminal, prohibits measurement and integration Measurement prohibited A: Valid for Ach; Measurement prohibited B: Valid for Bch Measurement prohibited A & B: Valid for Ach and Bch simultaneously
Current value hold	Shorted with COM terminal, holds the display value Current value hold A: Valid for Ach; Current value hold B: Valid for Bch Current value hold A & B: Valid for Ach and Bch simultaneously
Max value hold	Shorted with COM terminal, holds the max value Max value hold A: Valid for Ach; Max value hold B: Valid for Bch Max value hold A & B: Effective for Ach and Bch simultaneously
Min value hold	Shorted with COM terminal, holds the min value Min value hold A: Valid for Ach; Min value hold B: Valid for Bch Min value hold A & B: Effective for Ach and Bch simultane-ously
Display change	Shorted with COM terminal, changes the measurement display
Pattern change 1 to 3	Shorted with COM terminal, changes the pattern used for measurement
Trend hold	Shorted with COM terminal, holds the trend display
Integrated value reset	Shorted with COM terminal, reset the integrated value

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,30VAC 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

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

Analog output

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

Conversion method	D/A conversion method
Resolution	13bit equivalent
Scaling	Digital scaling
Response speed	25ms or less (0 → 90% response)
Specifications by types	See below

Output type	Load resistance	Accuracy (23±5℃ 35 to 85%RH)	Ripple
0～10V	2kΩ or more	±0.1%fs	±50mVp-p
±10V			
1～5V			
0～20mA	550Ω or less		±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

Ach inputs | Bch inputs

Outputs
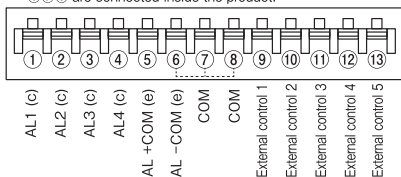
Comparative output/External control input | Power
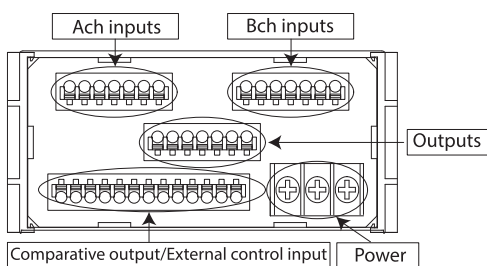
Lower terminal
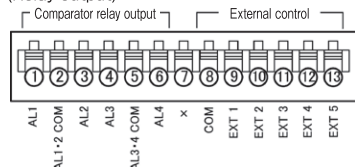(External control / comparator output / power supply)

● Comparator output / External control
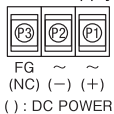Compatible wire : AWG24 to 16

(Open collector output)

*⑥⑦⑧ are connected inside the product.

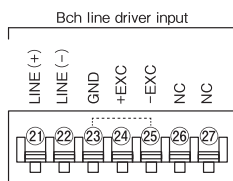| ①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬

AL1 (c) / AL2 (c) / AL3 (c) / AL4 (c) / AL +COM (e) / AL −COM (e) / COM / COM / External control 1 / External control 2 / External control 3 / External control 4 / External control 5

● Power supply

P3 | P2 | P1

FG ～ ～
(NC) (−) (+)
( ) : DC POWER

Applicable crimp terminal
5.8mm or less 5.8mm or less

(Relay output)

Comparator relay output | External control

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬

AL1 / AL1·2 COM / AL2 / AL3 / AL3·4 COM / AL4 / × / COM / EXT 1 / EXT 2 / EXT 3 / EXT 4 / EXT 5

Upper terminal (Input)

● Input (Ach, Bch)
Compatible wire: AWG24 to 16

Ach pulse input

IN / GND / GND / +EXC / −EXC / NC / NC
| ⑭ | ⑮ | ⑯ | ⑰ | ⑱ | ⑲ | ⑳ |

Ach line driver input

LINE (+) / LINE (−) / GND / +EXC / −EXC / NC / NC
| ⑭ | ⑮ | ⑯ | ⑰ | ⑱ | ⑲ | ⑳ |

Bch pulse input

IN / GND / GND / +EXC / −EXC / NC / NC
| ㉑ | ㉒ | ㉓ | ㉔ | ㉕ | ㉖ | ㉗ |

Bch line driver input

LINE (+) / LINE (−) / GND / +EXC / −EXC / NC / NC
| ㉑ | ㉒ | ㉓ | ㉔ | ㉕ | ㉖ | ㉗ |
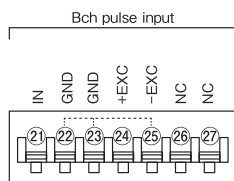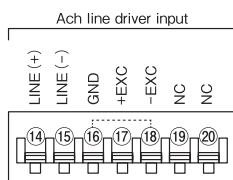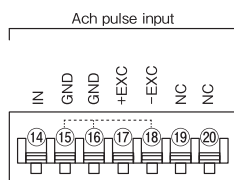
Middle terminal (Option output)

● Analog output
Compatible wire : AWG24 to 16

V.OUT / V.COM / NC / A.OUT / A.COM / NC / NC
| 28 | 29 | 30 | 31 | 32 | 33 | 34 |
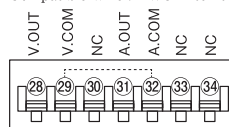
*Select either Ach, Bch or calculation results to be output.

● RS-232C
Compatible wire : AWG24 to 16

RXD / TXD / SG / NC / NC / NC / NC
| 28 | 29 | 30 | 31 | 32 | 33 | 34 |

● RS-485
Compatible wire : AWG24 to 16

RS-485 + / RS-485 − / SG / RS-485 + / RS-485 − / Termination resistor / Termination resistor
| 28 | 29 | 30 | 31 | 32 | 33 | 34 |

● BCD

10^0 10^1 10^2 10^3 10^4 10^5 OVER ENABLE −D.COM −D.COM +D.COM (PNP)
2 8 | 2 8 | 2 8 | 2 8 | 2 8 | 2 8 | | | | |

Row 2 ... 34
Row 1 ... 33

1 4 | 1 4 | 1 4 | 1 4 | 1 4 | 1 4 | POL PC −D.COM −D.COM +D.COM (PNP)
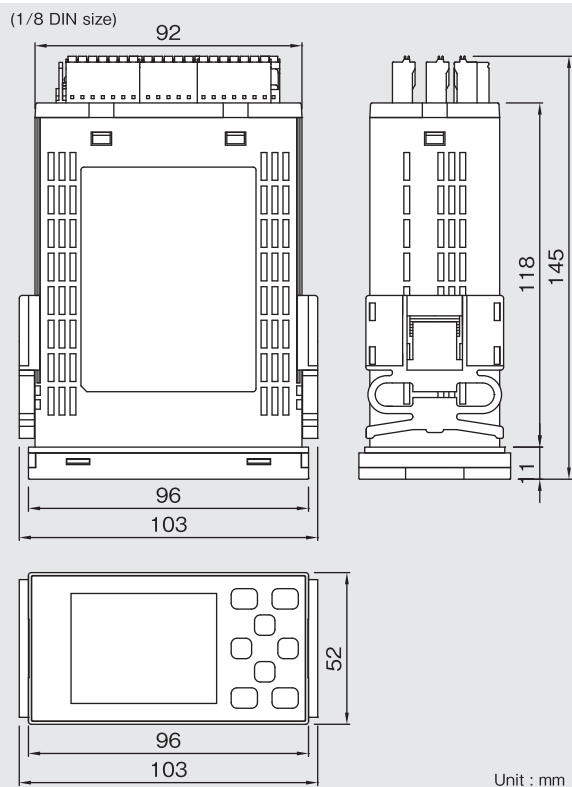10^0 10^1 10^2 10^3 10^4 10^5
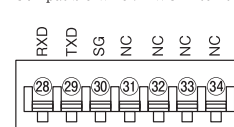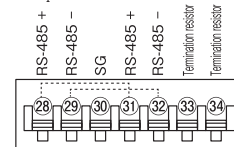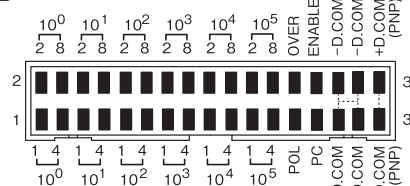
Compatible wire: AWG28 flat cable (1.27mm)
*Select either Ach, Bch or calculation results to be output.

Dimensions

(1/8 DIN size)

92
96
103
118
145
11

96
103
52

Unit : mm

Panel cutout

$92^{+0.8}_{-0}$
$45^{+0.6}_{-0}$
MIN 70
MIN 120

* Recommended panel thickness : 0.8 to 5.0mm