Rotation and Speed Measurement

**WPMZ-5**

- Rotation and Speed Measurement
- Pulse input
- Line driver input

[WPMZ-5] is a 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
- Large BCD display
- Rotation detector
- Pulse input
- Setting / management computer
- Feedback to inspection process
- PLC / Controller

### 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)
### 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**

<table>
<thead>
<tr>
<th>Series</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rotation and Speed Measurement</td>
</tr>
<tr>
<td>2</td>
<td>Power supply voltage: 10V to 28VAC</td>
</tr>
<tr>
<td>3</td>
<td>Power supply voltage: 12VDC</td>
</tr>
<tr>
<td>4</td>
<td>Power supply voltage: 24 to 48VDC</td>
</tr>
<tr>
<td>P</td>
<td>Pulse input</td>
</tr>
<tr>
<td>L</td>
<td>Line driver input</td>
</tr>
<tr>
<td>X</td>
<td>Pulse input (Note 1)</td>
</tr>
<tr>
<td>P</td>
<td>Line driver input (Note 1)</td>
</tr>
<tr>
<td>X</td>
<td>Display only (External control)</td>
</tr>
<tr>
<td>1</td>
<td>Analog output</td>
</tr>
<tr>
<td>2</td>
<td>BCD output (Open collector NPN)</td>
</tr>
<tr>
<td>3</td>
<td>BCD output (Open collector PNP)</td>
</tr>
<tr>
<td>4</td>
<td>RS-232C Output</td>
</tr>
<tr>
<td>5</td>
<td>RS-485 Output (Modbus RTU)</td>
</tr>
<tr>
<td>E</td>
<td>Open collector output (NPN)/AL–ALN</td>
</tr>
<tr>
<td>F</td>
<td>Open collector output (PNP)/AL–ALN</td>
</tr>
<tr>
<td>R</td>
<td>Relay output (Normally open)/AL–ALN</td>
</tr>
<tr>
<td>X</td>
<td>Without test report</td>
</tr>
<tr>
<td>T</td>
<td>With test report</td>
</tr>
<tr>
<td>00</td>
<td>Japanese default setting</td>
</tr>
<tr>
<td>000</td>
<td>English default setting</td>
</tr>
</tbody>
</table>

(Note 1) 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**
- **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, pulse, logic level, AC pulse, proximity sensor
- **Input level**: Open collector, I/O level
- **Logic level**: L level: 1.0V or less, H level: 3.9V 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)
- **Measurement category**: *Cyclic calculation method*
- **Accuracy**: ±20ppm reading +1 digit at 23 ±5°C

**Line driver input**
- **Measurement types**: Rotation and speed measurement
- **Input frequency range**: 10mHz to 500kHz * 250kHz for 2 channel input
- **Input signal**: Differential input, input resistance (Terminal resistance): 50Ω
- **Line driver signal**: ±1V or more (Differential voltage)
- **Input pulse width**: 0.9μs or more (Both L level and H level)
- **Accuracy**: ±20ppm reading +1 digit at 23 ±5°C

### Common Specifications

**Measurement channel**
- 1 channel or 2 channels (Based on model selection)
- 1 channel: measurement results of Ach input
- 2 channel: measurement results of Ach input, measurement results of Bch input, or calculation results
- Measurement results of Ach or Bch input

**Display range**
- 0 to 999999

**Zero display**
- Leading zero suppression

**Decimal point**
- Arbitrary setting possible

**Over range warning**
- 0V or over when input range and display range are exceeded

**Operating temp. & humidity range**
- –5 to 50°C, 30 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 48VDC ±10%

**Power consumption**
- 10VA max at 100VAC
- 14VA max at 240VAC
- 6W max at 12VDC
- 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% 20mA 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

---

https://www.watanabe-electric.co.jp/en/
Protection: IP66 (Front bezel)
Rated altitude: 2000m or less
Measurement category: II
Contamination level: 2
Applicable EN standard: EN61326-1 (EMS: Industrial installations; EM: Class A)
  "Applies to wiring length of 30m or less" - EN61010-1
  EN50081

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 & B: Valid for Ach, Measurement prohibited B: Valid for 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 simultaneously

**Max value hold**
- Shorted with COM terminal, holds the max value
  Max value hold A & B: Valid 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 simultaneously

**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

**Rated output**
- NPN: Sine current Max. 50mA
- PNP: Source current Max. 50mA
- Applied voltage Max. 30V
- Output saturation voltage 1.2V or less at 50mA
- Contact rating: 250VAC 2A, 30VAC 2A
- Mechanical life: 20,000,000 times
- Electrical life: 100,000 times

**Relay output**
- Microcomputer operation method
  - 99999 to 99999

**Control method**
- Setting range: 1 to 99999 digit for each setpoints
- Hysteresis: Condition can be set to ALL to AL4 independently

**Over alarm (Upper limit judgement)**

<table>
<thead>
<tr>
<th>Condition condition</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display value &gt; AL1 judgement value</td>
<td>AL1</td>
</tr>
<tr>
<td>Display value &gt; AL2 judgement value</td>
<td>AL2</td>
</tr>
<tr>
<td>Display value &gt; AL3 judgement value</td>
<td>AL3</td>
</tr>
<tr>
<td>Display value &gt; AL4 judgement value</td>
<td>AL4</td>
</tr>
</tbody>
</table>

**Under alarm (Lower limit judgement)**

<table>
<thead>
<tr>
<th>Condition condition</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL1 judgement value &gt; Display value</td>
<td>AL1</td>
</tr>
<tr>
<td>AL2 judgement value &gt; Display value</td>
<td>AL2</td>
</tr>
<tr>
<td>AL3 judgement value &gt; Display value</td>
<td>AL3</td>
</tr>
<tr>
<td>AL4 judgement value &gt; Display value</td>
<td>AL4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Output type</th>
<th>Load resistance</th>
<th>Accuracy (23±5°C 35 to 85%RH)</th>
<th>Ripple</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ~ 10V</td>
<td>2kΩ or more</td>
<td>±0.1%fs</td>
<td>±5mVp-p</td>
</tr>
<tr>
<td>1 ~ 5V</td>
<td></td>
<td></td>
<td>±25mVp-p</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Output type</th>
<th>Open collector output, NPN/PNP type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement data</td>
<td>Negative logic. Transistor ON when logic is &quot;1&quot;</td>
</tr>
<tr>
<td>Polarity signal</td>
<td>Negative logic. Transistor ON when negative display</td>
</tr>
<tr>
<td>Over signal</td>
<td>Negative logic. Transistor ON when over display</td>
</tr>
</tbody>
</table>

**Print command signal**
- Transistor ON for fixed period when data conversion

**Transistor capacity**
- Voltage 30V max, Current 10mA max.
- Output saturation voltage ±12V at 10mA

**Enable**
- Output transistor turns OFF when the enable terminal is short with D.COM

**RS-232C communication**
- Communication: Modbus RTU*, Original command. Original output protocol
- 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: Modbus RTU protocol
- 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
  *6/7/8 are connected inside the product.

- Power supply
  \( \text{DC} (-) (+) \)
  \( 1: \text{DC POWER} \)

Upper terminal (Input)

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

  Ach pulse input

  Bch pulse input

Middle terminal (Option output)

- Analog output
  Compatible wire: AWG24 to 16
  *Select either Ach, Bch or calculation results to be output.

- RS-232C
  Compatible wire: AWG24 to 16

- RS-485
  Compatible wire: AWG24 to 16

- BCD
  Compatible wire: AWG28 flat cable (1.27mm)
  *Select either Ach, Bch or calculation results to be output.

Dimensions

(1/8 DIN size)

Panel cutout

* Recommended panel thickness: 0.8 to 5.0mm