### Features
- 13 kinds of various operation modes:
  - Revolution, Speed, Frequency, Absolute ratio, Passing time,
  - Error ratio, Cycle, Density, Passing speed, Error,
  - Time width, Length measurement, Time difference, Interval,
  - Multiplication (MP5M Series have 11 operation modes)
- Various output function:
  - Relay output, NPN/PNP open collector output,
  - Low speed serial output, BCD output,
  - PV transmission, RS485 communication output
- Various functions:
  - Prescale function, Data monitoring function, Hysteresis
  - function, Peak value monitoring function, Monitoring
  - delay function, Auto zero time setting function,
  - Lock setting function, Display period delay function
- Max. display range: \(-19999 \sim 99999\) (MP5M-0\sim99999)
- Various display units: rpm, rps, Hz, kHz, sec, min, m, mm, mm/s, m/s,
  - m/min, m/h, \(\ell/s\), \(\ell/min\), \(\ell/h\), %, counts, etc.
- Selectable voltage input (PNP) or No voltage input (NPN)
- 50kHz High speed response

⚠️ Please read “Caution for your safety” in operation manual before using.

### Ordering information

<table>
<thead>
<tr>
<th>MP</th>
<th>5</th>
<th>S</th>
<th>–</th>
<th>4</th>
<th>N</th>
</tr>
</thead>
</table>

**S Type**
- Main output (Comparative value output)
  - N Indicator
  - Y Type
    - 1 NPN open collector quintuple output
    - 2 PNP open collector quintuple output

**Y Type**
- Sub output (Display value output)
  - 3 Indicator
    - BCD Dynamic
  - 4 Indicator
    - PV transmission output (DC4~20mA)
    - RS485 communication output
  - 5 Indicator
    - N Indicator
      - A Quintuple relay (HH, H, GO, L, LL)
      - BCD Dynamic
    - 3 NPN open collector quintuple output
      - BCD Dynamic
    - 4 NPN open collector quintuple output
      - PV transmission output (DC4~20mA)
    - 5 NPN open collector quintuple output
      - PV transmission output (DC4~20mA)
    - 6 NPN open collector quintuple output
      - Low speed serial output
    - 7 PNP open collector quintuple output
      - Low speed serial output
    - 8 NPN open collector quintuple output
      - RS485 communication output
    - 9 PNP open collector quintuple output
      - RS485 communication output

**W Type**
- Power supply
  - Size
    - S: DIN W48 \times H48mm
    - Y: DIN W72 \times H36mm
    - W: DIN W96 \times H48mm
    - M: DIN W72 \times H72mm

**M Type**
- Digit
  - 5 Sdigit (99999)
  - Series
    - MP Pulse meter

---

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## Specifications (MP5S/MP5Y/MP5W Series)

<table>
<thead>
<tr>
<th></th>
<th>MP5S</th>
<th>MP5Y</th>
<th>MP5W</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Display method</strong></td>
<td>7 Segment LED (Zero blanking type)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Character size</strong></td>
<td>W4 × H8mm</td>
<td>W6.8 × H13.8mm</td>
<td></td>
</tr>
<tr>
<td><strong>Max. indication</strong></td>
<td>-19999 ~ 99999</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>100~240VAC 50/60Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Allowable operation</strong></td>
<td>Allowable operation voltage: 90 ~ 110%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>Approx. 7.5VA (240VAC)</td>
<td>Approx. 3.5VA (240VAC)</td>
<td>Approx. 6VA (240VAC)</td>
</tr>
<tr>
<td><strong>Power for external sensor</strong></td>
<td>12VDC ±10%, 80mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input frequency</strong></td>
<td>50kHz (Pulse width: Each over 10μs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input level</strong></td>
<td>4.5<del>24VDC (High), 0</del>1.0VDC (Low), Impedance: 4.5kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Measuring range</strong></td>
<td>Mode P1, P2, F7, F8, F9, F10: 0.0005Hz ~ 50Hz</td>
<td>Mode F3: 0.02s ~ 3.200s</td>
<td>Mode F11, F12, F13: 0 ~ 4 ~ 10' Count</td>
</tr>
<tr>
<td><strong>Measuring accuracy</strong></td>
<td>±0.05% of rdg 1 digit</td>
<td>Mode F3, P4, F5, F6: ±0.01% of rdg 1 digit</td>
<td></td>
</tr>
<tr>
<td><strong>Display period</strong></td>
<td>0.05 / 0.5 / 1 / 2 / 4 / 8 sec (It is same with period of output update.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operation mode</strong></td>
<td>Number of revolution/Speed/Frequency (F1), Passing speed (F2), Cycle (F3), Time delay (F4), Time difference (F6), Absolute ratio (F7), Error ratio (F8), Density (F9), Error (F10), Length measurement (F11), Interval (F12), Multiplication (F13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prescale function</strong></td>
<td>Direct input method (0.0001 × 10^n to 9.9999 × 10^1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hysteresis</strong></td>
<td>(Note1) 0 ~ 9999</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other functions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lock setting function</td>
<td>• Lock setting function</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Auto-zero time setting function</td>
<td>• Monitoring delay function</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Time unit setting function</td>
<td>• Auto-zero time setting function</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Peak value monitoring function</td>
<td>• Current output range selection (Current output type only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Memory protection function (Mode F13 applied only)</td>
<td>• Comparative output function (H1, H0, L, LL)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Time unit selection function</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Deviation memory function (Output mode applied only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Peak value monitoring function</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Remote/local switching function (Communication output type only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Data Bank switching function (Note2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Memory protection function (Mode F13 applied only)</td>
<td></td>
</tr>
<tr>
<td><strong>Triple relay</strong></td>
<td></td>
<td></td>
<td>250VAC 3A resistive load 3a</td>
</tr>
<tr>
<td><strong>Quintuple relay</strong></td>
<td></td>
<td></td>
<td>250VAC 3A resistive load 5a</td>
</tr>
<tr>
<td><strong>NPN Open collector</strong></td>
<td></td>
<td>12~24VDC 30mA Max.</td>
<td>12~24VDC 20mA Max.</td>
</tr>
<tr>
<td><strong>PNP Open collector</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BCD Dynamic</strong></td>
<td></td>
<td>NPN Open collector</td>
<td>NPN Open collector</td>
</tr>
<tr>
<td><strong>Low speed serial output</strong></td>
<td>12~24VDC 30mA Max.</td>
<td>12~24VDC 20mA Max.</td>
<td></td>
</tr>
<tr>
<td><strong>PV transmission</strong></td>
<td></td>
<td>DC4~20mA Load 600Ω Max.</td>
<td>DC4~20mA Load 600Ω Max.</td>
</tr>
<tr>
<td><strong>RS485 communication</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Memory protection</strong></td>
<td>Non-volatile memory (Input: Min. 100,000 times)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insulation resistance</strong></td>
<td>Min. 100MΩ (at 500VDC mega) Between charge part and non-charge part</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dielectric strength</strong></td>
<td>2000VAC 60Hz 1minute (Between terminals of AC power and case, Between terminals of AC power and measuring input terminals)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Impulse noise strength</strong></td>
<td>±2000VAC the square wave noise (pulse width: 1μs) by the noise simulator, Repeat frequency 60Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vibration</strong></td>
<td>Mechanical: 0.75mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shock</strong></td>
<td>Mechanical: 0.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 10 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Relay life cycle</strong></td>
<td>Mechanical: 300m/s² (3G) in X, Y, Z directions for 3 times</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mechanical: 100m/s² (1G) in X, Y, Z directions for 3 times</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>Min. 10,000,000 times</td>
<td>Min. 100,000 times (250VAC 3A Load current)</td>
<td></td>
</tr>
<tr>
<td><strong>Storage temperature</strong></td>
<td>-10 ~ +50°C (at non-freezing status)</td>
<td>-20 ~ +60°C (at non-freezing status)</td>
<td></td>
</tr>
<tr>
<td><strong>Ambient humidity</strong></td>
<td>35 ~ 85%RH</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unit weight</strong></td>
<td>Approx. 130g</td>
<td>Approx. 155g</td>
<td>Approx. 230g</td>
</tr>
</tbody>
</table>

* (Note1) The hysteresis setting range is changed by the setting position of decimal point. (Refer to F-25 for hysteresis function.)
* (Note2) Data Bank switching function is in MP5W series only.
### Specifications (MP5 Series)

<table>
<thead>
<tr>
<th>Model</th>
<th>MP5M-4N</th>
<th>MP5M-41</th>
<th>MP5M-42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display method</td>
<td>7 Segment LED (Zero Blanking), Letter size : W4 X H8mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. indication</td>
<td>0.0001 ~ 99999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>100~240VAC 50/60Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowable operation voltage</td>
<td>Allowable operation voltage: 90 ~ 110%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>Approx. 7.5VAC (240VAC)</td>
<td>Approx. 8VA (240VAC)</td>
<td></td>
</tr>
<tr>
<td>Power for external sensor</td>
<td>12VDC ±10%, 80mA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Input frequency | • Solid-state input : Max. 50kHz (pulse width:over 10µs)  
• Contact input : Max. 45Hz (pulse width:over 11ms) | | |
| Input level | [Voltage input] High: 4.5~24VDC, Low: 0~1.0VDC, Input impedance: 4.5kΩ  
[No-voltage input] Impedance at short-circuit: Max. 300Ω, Residual voltage: Max. 1V  
Impedance at open-circuit: Min. 100kΩ | | |
| Measuring range | • Mode F1, F2, F7, F8: 0.0005Hz ~ 50kHz  
• Mode F4, F5, F6: 0.01s ~ 3.200s  
Mode F3, F9, F10, F11: 0 ~ 4 × 10’s Count | | |
| Measuring accuracy (23 ±5°C) | • Mode F1, F2, F7, F8: F.S. ±0.05% rdg ±1Digit  
• Mode F3, F4, F5, F6: F.S. ±0.01% rdg ±1Digit | | |
| Display period | 0.05 / 0.5 / 1 / 2 / 4 / 8sec. (It is same with period of output update.) | | |
| Operation mode | Number of revolution/Speed/Frequency (F1), Passing speed (F2), Cycle (F3), Passing time (F4),  
Time width (F5), Time difference (F6), Absolute ratio (F7), Density (F8), Length measurement (F9),  
Interval (F10), Multiplication (F11)  
*Refer to F-19~22 for operation mode.* | | |
| Prescale function | Direct input method (0.0001 × 10^n ~ 99999 × 10^n) | | |
| Hysteresis | (Note1: 0 ~ 9999) | | |
| Other function | • Lock setting function  
• Auto-Zero time setting function  
• Time unit selection function  
• Peak value monitoring function  
• Memory protection function (Mode F11 applied only) | | |
| Main output | Relay output | 250VAC 3A resistive load 1c | 250VAC 3A resistive load 1a × 2 |
| NPN Open Collector | 30VDC 100mA Max. | 30VDC 100mA Max. × 2 |
| Memory protection | Non-volatile memory (Input: Min. 100,000 times) | | |

**Appraisal**

- MP5S, MP5Y, MP5W have same function.  
- (Note1: The hysteresis setting range is changed by the setting position of decimal point. (Refer to F-25 Page, hysteresis function.)

### Connections

#### MP5 Series

- **MP5M-4N** (Indicator)
- **MP5M-41** (High-limit setting type)
- **MP5M-42** (High/Low-limit setting type)

![Connection Diagram](image-url)
Connections

MP5S Series

- **MP5S-4N** (Indicator)

![Connection Diagram](image)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

- **Hirose Connector:** HIIF3BD~10PA~2.54DS

MP5Y Series

- **MP5Y-4N** (Indicator)

![Connection Diagram](image)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>9</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Hirose Connector:** HIIF3BD~10PA~2.54DS

**Main output (Connector)**

- **MP5Y-41** (NPN Open Collector output)

Main OUT

(NPN OPEN COLLECTOR: 12~24VDC Max. 30mA)

![Connection Diagram](image)

- **MP5Y-42** (PNP Open Collector output)

Main OUT

(PNP OPEN COLLECTOR: 12~24VDC Max. 30mA)

![Connection Diagram](image)

**Sub output (Connector)**

- **MP5Y-43** (BCD Dynamic output)

BCD OUT

(NPN OPEN COLLECTOR: 12~24VDC Max. 30mA)

![Connection Diagram](image)

- **MP5Y-44** (PV transmission output)

DC4~20mA

Load 600Ω Max.

![Connection Diagram](image)

- **MP5Y-45** (RS485 communication output)

![Connection Diagram](image)

**Main output type & Sub output type: Customizable**
MP5S/MP5Y/MP5W/MP5M Series

MP5W Series

- **MP5W-4N** (Indicator)
  - (1) It is used for the RESET terminal when an operation mode is F13.
  - (2) Refer to F-25 for BANK function.
  - Main output type & Sub output type : option

- **Main output + Sub output (Connector)**

- **MP5W-4/ MP5W-43** (NPN/PNP Open Collector output + BCD output)
  - 24VDC 30mA Max.

- **MP5W-44/ MP5W-45** (NPN/PNP Open Collector output + PV transmission output (DC4-20mA) output)
  - 24VDC 30mA Max.

- **MP5W-46/ MP5W-47** (NPN/PNP Open Collector output + Low speed serial output)
  - 24VDC 30mA Max.

- **MP5W-48/ MP5W-49** (NPN/PNP Open Collector output + RS485 communication output)
  - 24VDC 30mA Max.

Contact OUT: 250VAC 3A 1a RESISTIVE LOAD

Hirose connector pin header model of the unit:
- HIF3BA-20PA-2.54DS
- Contact Hirose Electric to purchase socket and wires of Hirose connector.
  - [Socket : HIF3BA-20D-2.54K]

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**Dimensions**

- **MP5S Series**
  - [Image of MP5S Series]
  - Dimensions: 48 x 60 x 48 mm
  - Panel cut-out: 100 x 100 x 12 mm

- **MP5Y Series**
  - [Image of MP5Y Series]
  - Dimensions: 85 x 72 x 36 mm
  - Panel cut-out: 108 x 88 x 14 mm
  - *Hirose connector: HIF3BD-10PA-2.54DS

- **MP5W Series**
  - Terminal block type:
    - Dimensions: 109 x 96 x 48 mm
    - Panel cut-out: 106 x 89.5 x 10.5 mm
    - Sub Terminal: 6 mm
    - Main Terminal: 45 mm
    - *There is no terminal block in indicator.

  - Connector type:
    - Dimensions: 110.4 mm
    - Hirose connector (There is no connector in indicator): HIF3BA-20PA-2.54DS

- **MP5M Series**
  - [Image of MP5M Series]
  - Dimensions: 86 x 72 x 72 mm
  - Panel cut-out: 126 x 102 x 11 mm
  - *Hirose connector (There is no connector in indicator): HIF3BA-20PA-2.54DS

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**Elcodis.com** electronic components distributor
**Input specifications**

- **Input signal**
  - Solid-state input
  - Input frequency: **50kHz Max.**
    - Standard duty ratio of input signal is 1:1.
    - ON/OFF pulse width should be over 10μs.
  - Input voltage Level: High → 4.5~24VDC, Low → 0~1.0VDC
- **Relay contact input**
  - Input frequency: **45Hz Max.**
  - Relay contact specification: Use a relay contact that can carry the load current (min. 12VDC 2mA).

- **Input type**
  MP5 has NPN input and PNP input and it is able to select in Parameter group 1.
  - When it is NPN input type
    ![NPN input diagram](image)
  - When it is PNP input type
    ![PNP input diagram](image)

  *O・C is Open collector output.

**Output specifications**

- **BCD Dynamic output (Negative logic)**
  - Output: Display value
  - Output signal:
    - BCD Data (A, B, C, D, DOT) → A: Lowest bit
    - Digit Data (D0, D1, D2, D3, D4) → D0: Lowest digit
    - D4: Highest digit
  - There is no DOT data output in MP5Y-43, therefore decimal point should be marked in first display plate.
  - Output type: NPN Open collector
  - Rated load voltage: 12~24VDC
  - Max. load current: 30mA (MP5Y)/20mA (MP5W)

<table>
<thead>
<tr>
<th>10^0 Digit</th>
<th>10^1 Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>H</td>
</tr>
<tr>
<td>B</td>
<td>H</td>
</tr>
<tr>
<td>C</td>
<td>H</td>
</tr>
<tr>
<td>D</td>
<td>H</td>
</tr>
<tr>
<td>DOT</td>
<td>H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>D4 &lt;br&gt; 5ms</td>
</tr>
<tr>
<td>D3 &lt;br&gt; 39ms</td>
</tr>
<tr>
<td>D2 &lt;br&gt; 7.8ms</td>
</tr>
<tr>
<td>D1 &lt;br&gt; 1ms</td>
</tr>
<tr>
<td>D0 &lt;br&gt; 1ms</td>
</tr>
</tbody>
</table>

Ex) When BCD Dynamic output is 125.89
Pulse(Rate) Meter

©Low speed serial output (Negative logic)
- Output : Display value
- Output signal : Clock, Data, Latch
- Clock cycle : 50Hz
- Output CLK bit : 25 bit
- Output Data bit : 25 bit
- Output form : NPN Open Collector
- Rated load voltage : 12–24VDC
- Max. load current : 30mA (MP5Y)/ 20mA (MP5W)
- Serial transmission time diagram

Data output order when it is serial transmission

©PV transmission output (DC4–20mA)
- Application : Transmit the measured value
- Function : This function is to transmit DC4–20mA converted from measured display value between High limit output (FS–H) and Low limit (FS–L).
- Range of High/Low limit output setting
  - High limit setting range (FS–H)
    - From min. to max. within range of measurement
  - Low limit setting range (FS–L)
    - From min. to max. within range of measurement (FS–H ≥ FS–1+1 digit)
- Load resistance : Max. 600Ω
- Resolution : 8000 division

©RS485 communication output
- Address : 0 ~ 99 address
- Transmission speed (Baud rate) : 2400/4800/9600 bps
- Transmission code : ASCII
- Parity Bit : No
- Data Bit : 8 Bit
- Stop Bit : 1 Bit
- Communication items
  MP5W ← PC : Comparative value of each bank data, Presacle value and Peak value, RESET control
  MP5W → PC : Comparative value of each bank data, Presacle value and Peak value, Display value
*Refer to F–26 for communication data.
### Parameter group chart for operation mode

- Parameter display are different according to each operation mode, refer to "Parameter" part.
- "0": When select the operation mode, the parameter will be displayed.
- "X": When select the operation mode, the parameter will not be displayed.
- "X": It is only able to set $P_{n x F}$ or $P_{n y F}$ for $i-n-b$ sensor type in F11, F12, F13 of operation mode.

<table>
<thead>
<tr>
<th>Parameter display</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>F6</th>
<th>F7</th>
<th>F8</th>
<th>F9</th>
<th>F10</th>
<th>F11</th>
<th>F12</th>
<th>F13</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_{5t.hh}$</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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### Parameter group chart for model

- The parameter has different modes according to each model, therefore refer to "Parameter group chart of operation mode" and "Parameter".

- **X**: When selecting the operation mode, the parameter will be displayed.
- **X**: When selecting the operation mode, the parameter will not be displayed.

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* : Data bank (PbrA#) setting is available in only MP5W-4N.

### Monitoring delay operation function chart by each output mode

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<th>out-b</th>
<th>out-l</th>
<th>out-f</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comparative output limit function</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Starting correction timer function</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Autonics**

F-14
Parameter group 0

Run

If [MD] key is pressed in RUN mode, it will advance to Parameter group 0.

Set HH comparative value. Refer to the "Setting range of comparative value by operation mode" for a setting range.
(-development) : Shift the setting digit (△) : Change the setting value)

Set H comparative value.
(-development) : Shift the setting digit (△) : Change the setting value

Set L comparative value.
(-development) : Shift the setting digit (△) : Change the setting value

Display High Peak value among measuring values.
If [A] key is pressed for 2 sec, the High Peak value will be reset and it displays a current measuring value.

Display Low Peak value among measuring values.
If [A] key is pressed for 2 sec, the Low Peak value will be reset and it displays a current measuring value.

* If [MD] key is pressed in RUN mode, it will advance to Parameter group 0.
* When advance to Parameter group 0, parameter and set data value is flashed as 1 sec. cycle.
* (1) The parameter shown in dotted line is displayed only for comparative value setting type.
  - If F mode is selected among output modes, it is to set H and L deviation only, therefore [PS.L] and [PS.LL] parameter will not appear.
* After setting value in each parameter is changed, data will be saved by press [MD] key for 2 sec and return to RUN mode, but if any keys are untouched for 60sec while changing data, it will return to RUN mode with previous set value.
  - If it is not comparing value setting type, [h.PE] will appear when advance to parameter group 0.
●Parameter group 1

This is parameter group 1. Display PRrA.1 for 2 sec and move to nodE.

Select operation mode.

\[ F2 \rightarrow F3 \rightarrow F3 \rightarrow F3 \]

(Select input: Change the mode)

Set the sensor type of input A.

\[ nPnLF \rightarrow nPnLF \rightarrow nPnLF \rightarrow nPnLF \]

(Select input: Change the sensor type)

Select the output mode.

\[ \text{StAr} \rightarrow \text{out-b} \rightarrow \text{out-l} \rightarrow \text{out-b} \rightarrow \text{out-l} \rightarrow \text{out-f} \]

(Select input: Change the setting value)

Set the hysteresis for the output.

Setting range: 0 – 9999 (The hysteresis range differs by the setting position of decimal point. See F-25 page)

(Select input: Change the setting value)

Starting protection timer function (StAr.b) or comparative output (L, LL) limit function (F.dEFY)

(Select input: Change the setting value)

Set the protection time when it is starting protection timer function (StAr.b).

Setting range: 00 – 9999 sec

(Select input: Move the digit, Change the setting value)

Set the Auto-Zero time of INA input.

Setting range: 0.1 – 9999.9 sec

(Select input: Move the digit, Change the setting value)

Set the Auto-Zero time of INB input.

Setting range: 0.1 – 9999.9 sec

(Select input: Move the digit, Change the setting value)

It sets the memory protection.

\[ \text{off} \rightarrow \text{on} \] (off: Enable of memory protection, on: Disable of memory protection)

(Select input: Change the setting value)

*If [MD] key is pressed for 3 sec. in RUN mode, it will advance to Parameter group 1.
*When advance to Parameter group 1, parameter and set data value flash as 1 sec. cycle.
The parameter shown in dotted line is not displayed by operating mode.
(Refer to F-13, “Parameter group chart for operation mode”)
*(1)* The parameter is displayed in case of comparative value setting type only.
(Except for indicator and MP5M series.)
*(2)* The Selecting function of memory protection is displayed when the mode is F13 (Multiplication mode).
(But, F11 mode for MP5M-42)
*After changing setting value in each Parameter, data will be saved by press [MD] key for 2 sec and return to RUN mode, but if any keys are untouched for 60 sec while changing data, it will return to RUN mode with previous set value.
MP5S/MP5Y/MP5W/MP5M Series

● Parameter group 2

This is Parameter group 2.
Display \textbf{PR-R2} for 2 sec. and move to [ \textbf{dot} ] parameter automatically.
*MP5W series display \textbf{PR-R2} for 2sec. and move to \textbf{Plmr} parameter automatically.

Select Data Bank.

\begin{center}
\begin{tabular}{c}
\textbf{Set the decimal point position of display value.} \\
\textbf{[00000 00000 00000 00000 00000 00000 00000 00000 00000]}
\end{tabular}
\end{center}

It will be displayed in F3, F4, F5, F6 operation mode and set the \textbf{time unit}.

\begin{center}
\begin{tabular}{c}
\textbf{Set the comparative value HH. See "Setting range of comparative value by operating mode" for setting range.} \\
\textbf{[\textbf{4}]: Shift the setting digit \textbf{[\textbf{4}]}, change the setting value)}
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{c}
\textbf{Set the comparative value H. See "Setting range of comparative value by operating mode" for setting range.} \\
\textbf{[\textbf{4}]: Shift the setting digit \textbf{[\textbf{4}]}, change the setting value)}
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{c}
\textbf{Set the comparative value L. See "setting range of comparative value by operating mode" for setting range.} \\
\textbf{[\textbf{4}]: Shift the setting digit \textbf{[\textbf{4}]}, change the setting value)}
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{c}
\textbf{Set the comparative value LL. See "Setting range of comparative value by operating mode" for setting range.} \\
\textbf{[\textbf{4}]: Shift the setting digit \textbf{[\textbf{4}]}, change the setting value)}
\end{tabular}
\end{center}

Set the prescale value of input A mantissa(X).
Setting range : \textbf{0000 1} \textbf{1} \textbf{99999}

Set the prescale value of input B mantissa(X).
Setting range : \textbf{0000 1} \textbf{99999}

Select the display cycle.

\begin{center}
\begin{tabular}{c}
\textbf{If \textbf{MD} key is pressed for 4sec in \textbf{RUN} mode, \textbf{PR-R2} will be displayed after \textbf{PR-R1}. If \textbf{MD} key is released, it is advance to Parameter group 2.} \\
\textbf{When advance to Parameter group 2, parameter and set data value is flashed as 1sec cycle.} \\
\textbf{(1)} If it will be displayed only in F3, F4, F5, F6 modes.
\textbf{(2)} If F mode is selected among output modes, it is set H and L deviation only, therefore \textbf{PS.} and \textbf{PS.L} \textbf{LL} parameter will not appear.
\textbf{(3)} It will be displayed only in F7, F8, F9, F10 modes. But in case of MP5M type, it is displayed only in F7, F8 modes.
\textbf{(4)} After setting value in each parameter is changed, data will be saved by press \textbf{MD} key for 2sec and return to \textbf{RUN} mode, but if any key is untouched for 60sec while changing data, it will return to \textbf{RUN} mode with previous set value.
\end{tabular}
\end{center}
**●Parameter group 3**

This is Parameter group 3. Display [PR-A3] for 2 sec. and move to [FS-h] parameter automatically.

Set the High-limit value of PV transmission output. See "Setting range of comparative value by operating mode" for setting range

(1) Shift the setting digit (2) Change the setting value

Set the Low-limit value of PV transmission output.

(1) Shift the setting digit (2) Change the setting value

Set the communication Address.

setting range: 00 ~ 99

(1) Shift the setting digit (2) Change the setting value

Set the communication Speed.

9600 → 14800 → 2400

(1) Shift the setting digit (2) Change the setting value

Select the Remote and the Local.

(off → on) (off: Local, on: Remote)

(1) Change the setting value

Enable to lock the key for each parameter group

(1) off → Loc 0 → Loc 1

Loc 3 ← Loc 2

(2) Lock cancel

Loc 0: P0 ~ 3 Lock

Loc 1: P1 ~ 3 Lock

Loc 2: P2 ~ 3 Lock

Loc 3: P3 Lock only

*If [MD] key is pressed for 5sec. in Run mode, [PR-A3] will be displayed after [PR-A1] and [PR-A2].

*If [MD] key is released, it is advance to Parameter group 3.

*When it advances into Parameter group 3, parameter and data value is flashed as 1sec. cycle.

* (1) The parameter is displayed in case of PV transmission output type only.

* (2) The parameter is displayed in case of RS485 transmission output type only. When Remote [RNoB] is selected, it is not able to operate front keys.

*After setting value in each parameter is changed, data will be saved by pressing [MD] key for 2sec and return to Run mode, but if any key is untouched for 60sec while changing data, it will return to Run move with previous set value.

### Factory defaults

#### Parameter 1 group

<table>
<thead>
<tr>
<th>Mode</th>
<th>Setting value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nade</td>
<td>F 1</td>
</tr>
<tr>
<td>N-R</td>
<td>nPnhF</td>
</tr>
<tr>
<td>OUT-T</td>
<td>StArD</td>
</tr>
<tr>
<td>HYS</td>
<td>000 1</td>
</tr>
<tr>
<td>GUAR</td>
<td>FdEFy</td>
</tr>
<tr>
<td>AutoR</td>
<td>99999</td>
</tr>
<tr>
<td>NEna</td>
<td>off</td>
</tr>
</tbody>
</table>

#### Parameter 2 group

<table>
<thead>
<tr>
<th>Mode</th>
<th>Setting value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PbRAl</td>
<td>1</td>
</tr>
<tr>
<td>dot</td>
<td>00000</td>
</tr>
<tr>
<td>PSthh</td>
<td>99999</td>
</tr>
<tr>
<td>PSt.h</td>
<td>99999</td>
</tr>
<tr>
<td>PSt.L</td>
<td>00000</td>
</tr>
<tr>
<td>PStLL</td>
<td>00000</td>
</tr>
<tr>
<td>PSRCH</td>
<td>6.000</td>
</tr>
<tr>
<td>PSCRY</td>
<td>10 0 1</td>
</tr>
<tr>
<td>dtSPt</td>
<td>00 5</td>
</tr>
</tbody>
</table>

#### Parameter 3 group

<table>
<thead>
<tr>
<th>Mode</th>
<th>Setting value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS-h</td>
<td>99999</td>
</tr>
<tr>
<td>FS-L</td>
<td>00000</td>
</tr>
<tr>
<td>Addr</td>
<td>0 1</td>
</tr>
<tr>
<td>bPS</td>
<td>9b00</td>
</tr>
<tr>
<td>rEna</td>
<td>off</td>
</tr>
<tr>
<td>Loc</td>
<td>off</td>
</tr>
</tbody>
</table>

*Setting specification may not be displayed because of operation mode or output specification.*
**Operation mode**

- Select operation mode from mode (mode) of Parameter group 1.
- There are 13 kinds of operation mode in MP5S, MP5Y, MP5W. There are 11 kinds of operation mode in MP5M series.

**Mode F1 (Frequency/Number of revolution/Speed)**

This mode is to display calculated frequency or number of revolution or speed by measuring frequency of Input A.

1) Frequency (Hz) = \( f \times a \) \[ a = 1 \text{ (sec) } \]

2) Number of revolution (rpm)
   \[ f \times a \] \[ a = 60 \text{ (sec) } \]
   Several targets \( a = 60 \times \frac{1}{N} \)

3) Speed (m/min) = \( f \times a \) \[ a = 60 \times L (m) \]
   Several targets \( a = 60 \times \frac{1}{N} \)

\*L = The length of conveyor moved for 1 pulse cycle [m]
N : Number of sensing target
(Number of pulse per revolution)
\( a \) : Prescale value

**Mode F2 (Passing speed)**

Display the passing speed between ON of input A and ON of input B.

Passing speed (V) = \( f \times a \) \[ a = L (m) \]

\*f : This is reciprocal number of the time between ON of input A and ON of input B.
L : The distance between input A and input B [m]
\( a \) : Prescale value

**Mode F3 (Cycle)**

Display the time from when input A is ON to the next ON.

Cycle (T) = \( t \)

\*t : Measurement time [sec]

**Display value and display unit**

<table>
<thead>
<tr>
<th>Display value</th>
<th>Display unit</th>
<th>( a ) (Prescale value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Hz</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>kHz</td>
<td>0.001</td>
</tr>
<tr>
<td>Number of revolution</td>
<td>rpm</td>
<td>60</td>
</tr>
<tr>
<td>Speed</td>
<td>mm/sec</td>
<td>1,000L</td>
</tr>
<tr>
<td></td>
<td>cm/sec</td>
<td>100L</td>
</tr>
<tr>
<td></td>
<td>m/sec</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>m/min</td>
<td>60L</td>
</tr>
<tr>
<td></td>
<td>km/hour</td>
<td>3.6L</td>
</tr>
</tbody>
</table>

**Display unit of default : rpm**

**Time chart**

- Hold input display
  \( (1/1) \times a \) \( (1/13) \times a \) \( (1/16) \times a \)

**Display value and display unit**

<table>
<thead>
<tr>
<th>Display value</th>
<th>Display unit</th>
<th>( a ) (Prescale value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passing speed</td>
<td>mm/sec</td>
<td>1,000L</td>
</tr>
<tr>
<td></td>
<td>cm/sec</td>
<td>100L</td>
</tr>
<tr>
<td></td>
<td>m/sec</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>m/min</td>
<td>60L</td>
</tr>
<tr>
<td></td>
<td>km/hour</td>
<td>3.6L</td>
</tr>
</tbody>
</table>

**Display unit of factory default : m/sec**

**Time chart**

- Hold input
  \( 1/1 \times a \) \( 1/12 \times a \) \( 1/14 \times a \) \( 1/17 \times a \)

\( ta \) : It requires min. 20ms for return time

**Display value and display unit**

<table>
<thead>
<tr>
<th>Display value</th>
<th>Display unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle</td>
<td>SEC</td>
</tr>
<tr>
<td></td>
<td>MIN</td>
</tr>
<tr>
<td>999.99sec.</td>
<td>999.99min.</td>
</tr>
<tr>
<td>9999.9sec.</td>
<td>9999.9min.</td>
</tr>
<tr>
<td>99min. 59.9sec.</td>
<td>9999.9min.</td>
</tr>
<tr>
<td>99min. 59.9sec.</td>
<td>9999.9min.</td>
</tr>
<tr>
<td>99hour 59min. 59sec.</td>
<td>9999.9min.</td>
</tr>
<tr>
<td>999999sec.</td>
<td>999999min.</td>
</tr>
</tbody>
</table>

**Set the display unit at the Time unit of Parameter 2.**

**Display unit of factory default : 999.99sec.**

**Time chart**

- Hold input display
  \( 11 \) \( 12 \) \( 13 \) \( 14 \) \( 15 \) \( 16 \)

\( *11 \text{ to } 16 \) should be over min. 20ms for measuring.
**Mode F4 (Passing time)**

It displays the pass time of certain distance to measure the time between ON and the next ON of Input A.

\[
\text{Passing time (sec)} = t \times a
\]

\[
a = \frac{L (\text{m})}{\text{Moving distance within 1 pulse cycle [m]}}
\]

* \(t\) : Measurement time [sec]

* \(L\) : Certain distance [m]

* \(a\) : Presale value

\[\text{is not displayed in MP5M-4N, MP5M-41, MP5M-42.}\]

**Mode F5 (Time width)**

It displays the ON time of input A.

\[
\text{Time width (T)} = t
\]

* \(t\) : ON measurement time of input A [sec]

\[\text{is not displayed in MP5M-4N, MP5M-41, MP5M-42.}\]

**Mode F6 (Time difference)**

It displays the time from input A is ON to input B is ON.

\[
\text{Time difference (T)} = t (T_a - T_b)
\]

* \(T_a - T_b\) : The measured time from input A is ON to input B is ON [sec]

\[\text{is not displayed in MP5M-4N, MP5M-41, MP5M-42.}\]

---

**Display value and display unit**

<table>
<thead>
<tr>
<th>Display value</th>
<th>Display unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEC</td>
<td>MIN</td>
</tr>
<tr>
<td>999.99sec.</td>
<td>999.99min.</td>
</tr>
<tr>
<td>999.99sec.</td>
<td>999.99min.</td>
</tr>
<tr>
<td>99min. 59 sec</td>
<td>99hour 59 min</td>
</tr>
<tr>
<td>99hour 59 min</td>
<td>99hour 59 min</td>
</tr>
<tr>
<td>99hour 59 min</td>
<td>99hour 59 min</td>
</tr>
</tbody>
</table>

* Set the display unit at the \(\text{cnt}\) (Time unit) of Parameter 2.

* Display unit of factory default: 999.9sec.

**Time chart**

<table>
<thead>
<tr>
<th>Input A</th>
<th>Hold input</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(t_1)</td>
<td>(t_a)</td>
</tr>
<tr>
<td></td>
<td>(t_2)</td>
<td>(t_a)</td>
</tr>
<tr>
<td></td>
<td>(t_3)</td>
<td></td>
</tr>
</tbody>
</table>

\(t_a\) : It requires min. 20ms for return time
**Mode F7 (Absolute ratio)**

It displays how fast or late Input B comparing to Input A as well as speed or amount of Input, as a percentage.

Absolute ratio = \( \frac{\text{Input B} - \text{Input A}}{\text{Input A}} \times 100\% \)

\( A \alpha : \) Prescale for input A  
\( B \alpha : \) Prescale for input A

**Display value and display unit**

<table>
<thead>
<tr>
<th>Display value</th>
<th>Display unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute ratio</td>
<td>%</td>
</tr>
</tbody>
</table>

**Time chart**

\[ \text{Input A} \]
\[ \text{Input B} \]

\[ \text{Display} = \frac{\text{Frequency of input B}[\text{Hz}] \times B \alpha}{\text{Frequency of input A}[\text{Hz}] \times A \alpha} \times 100\% \]

\(*A \alpha : \) Prescale for input A  
\( B \alpha : \) Prescale for input B

**Hold :** Hold signal is ON, the display value will be held until Hold signal is OFF.

---

**Mode F8 (Error ratio)**

It displays how fast or late as a percentage(%) for input B against input A.

Error ratio = \( \frac{\text{Input B} - \text{Input A}}{\text{Input A}} \times 100\% \)

\( (\text{Frequency of input B}[\text{Hz}] \times B \alpha) - (\text{Frequency of input A}[\text{Hz}] \times A \alpha) \times 100\% \)

Error ratio

\(*A \alpha : \) Prescale for input A  
\( B \alpha : \) Prescale for input B

**Display value and display unit**

<table>
<thead>
<tr>
<th>Display value</th>
<th>Display unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error ratio</td>
<td>%</td>
</tr>
</tbody>
</table>

**Time chart**

\[ \text{Input A} \]
\[ \text{Input B} \]

\(*A \alpha : \) Prescale for input A  
\( B \alpha : \) Prescale for input B

**Hold :** Hold signal is ON, the display value will be held until Hold signal is OFF.

---

**Mode F9 (Density)**

It displays the density ratio of input B against total sum of input A and input B.

Density = \( \frac{\text{Input B}}{\text{Input A} + \text{Input B}} \times 100\% \)

Density = \( \frac{\text{Frequency of input B}[\text{Hz}] \times B \alpha}{(\text{Frequency of input A}[\text{Hz}] \times A \alpha) + (\text{Frequency of input B}[\text{Hz}] \times B \alpha)} \times 100\% \)

\(*A \alpha : \) Prescale value of input A  
\( B \alpha : \) Prescale value of input B

**Display value and display unit**

<table>
<thead>
<tr>
<th>Display value</th>
<th>Display unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>%</td>
</tr>
</tbody>
</table>

**Time chart**

\[ \text{Input A} \]
\[ \text{Input B} \]

\(*A \alpha : \) Prescale value of input A  
\( B \alpha : \) Prescale value of input B

**Hold :** Hold signal is ON, the display value will be held until Hold signal is OFF.

---

*F8 mode is applied to MP5M-4N, MP5M-41, MP5M-42 models.*
**Mode F10** (Error)
It displays the error between standard input A and comparing input B.

\[
\text{Error} = \text{Input B} - \text{Input A} \\
\text{Error} = (\text{Frequency of input B}[\text{Hz}] \times B_a) - (\text{Frequency of input A}[\text{Hz}] \times A_a)
\]

*There is no error mode in MP5M-4N, MP5M-41, MP5M-42 models.*

**Mode F11** (Length measurement)
It displays the number of input A pulse while input B is ON.

\[
\text{Length measurement} = P \times a \\
P: \text{Number of input A pulse,} \\
a: \text{Prescale value}
\]

*F9 mode is applied to MP5M-4N, MP5M-41, MP5M-42 models.*

**Mode F12** (Interval)
It displays the number of input A pulse from input B is ON to the time input B is ON next.

\[
\text{Interval} = P \times a \\
P: \text{Number of input A pulse,} \\
a: \text{Prescale value}
\]

*F10 mode is applied to MP5M-4N, MP5M-41, MP5M-42 models.*

**Mode F13** (Multiplication)
It displays the counting value against pulses of input A.

\[
\text{Multiplication} = P \times a \\
P: \text{Pulse number of input A,} \\
a: \text{Prescale value}
\]

*Max. counting speed: 50kcps (same with max. response frequency)
*F11 mode is applied to MP5M-4N, MP5M-41, MP5M-42 models.*
**Output mode**

- Select output mode in \texttt{out\_t}(output type) of Parameter group 1.
- MP5 series are 6 kinds of output mode. There is no output mode in indicator type, MP5Y–43/44/45. MP5M–41 models.
- S(Standard) output mode, H(High) output mode, L(Low) output mode, B(Block) output mode, I(One shot) output mode, F(Deviation) output mode.
- In order to set comparative value, B output mode should be LL\(<\text{L}\text{<H}\text{<HH}, other S, H, L. I output modes operate individually, regardless of value size of comparative setting value. (There is no GO, HI, LL, OUTPUT in MP5M–42)

**\texttt{S(Standard)} output mode**

- **Comparative value**
  - HH
  - H
  - L
  - LL
- **Output**
  - HH
  - H
  - L
  - LL
- **Display value \geq \text{Comparative value HH} \Rightarrow \text{HH output ON}
  - Display value \geq \text{Comparative value H} \Rightarrow \text{H output ON}
  - Display value \leq \text{Comparative value L} \Rightarrow \text{L output ON}
  - Display value \leq \text{Comparative value LL} \Rightarrow \text{LL output ON}
- GO output : When there are no HH, H, L, LL output, it will be ON.

**\texttt{H(High)} output mode**

- **Comparative value**
  - HH
  - H
  - L
  - LL
- **Output**
  - HH
  - H
  - L
  - LL
- **Display value \geq \text{Comparative value HH} \Rightarrow \text{HH output ON}
  - Display value \geq \text{Comparative value H} \Rightarrow \text{H output ON}
  - Display value \leq \text{Comparative value L} \Rightarrow \text{L output ON}
  - Display value \leq \text{Comparative value LL} \Rightarrow \text{LL output ON}
- GO output : When there are no HH, H, L, LL output, it will be ON.

**\texttt{L(Low)} output mode**

- **Comparative value**
  - HH
  - H
  - L
  - LL
- **Output**
  - HH
  - H
  - L
  - LL
- **Display value \leq \text{Comparative value HH} \Rightarrow \text{HH output ON}
  - Display value \geq \text{Comparative value L} \Rightarrow \text{L output ON}
  - Display value \leq \text{Comparative value LL} \Rightarrow \text{LL output ON}
  - Display value \leq \text{Comparative value LL} \Rightarrow \text{LL output ON}
- GO output : When there are no HH, H, L, LL output, it will be ON.

**\texttt{B(Block)} output mode**

- **Comparative value**
  - HH
  - H
  - L
  - LL
- **Output**
  - HH
  - H
  - L
  - LL
- **Display value \geq \text{Comparative value HH} \Rightarrow \text{HH output ON}
  - Display value \geq \text{Comparative value H} \Rightarrow \text{H output ON}
  - Display value \leq \text{Comparative value L} \Rightarrow \text{L output ON}
  - Display value \leq \text{Comparative value LL} \Rightarrow \text{LL output ON}
- GO output : When there are no HH, H, L, LL output, it will be ON.

**\texttt{I(One Shot)} output mode**

- **Comparative value**
  - HH
  - H
  - L
  - LL
- **Output**
  - HH
  - H
  - L
  - LL
- **Display value \geq \text{Comparative value HH} \Rightarrow \text{HH output ON}
  - Display value \geq \text{Comparative value H} \Rightarrow \text{H output ON}
  - Display value \leq \text{Comparative value L} \Rightarrow \text{L output ON}
  - Display value \leq \text{Comparative value LL} \Rightarrow \text{LL output ON}
- \text{GO output} : When there are no GO, HI, LL output in output mode L.
- One Shot (\texttt{I}) output time has been fixed 0.3sec.
- There is no Hysteresis in I(One shot) comparative output mode.

**\texttt{F(Deviation)} output mode**

- This function is to memorize the setting value and it outputs when exceed the deviation of H, L.
- Memorize the setting value : Memorize the current display value as the setting value with pressing \texttt{(M + A)} key is front.
- Display the setting value : Check the memorized setting value by \texttt{(A)} key. (Display the memorized setting value for pressing \texttt{A} key continuously.)
- Deviation setting : Set \texttt{HI} [\texttt{PS} \texttt{DI}], \texttt{LI} [\texttt{PS} \texttt{LI}] deviation by setting value. (The set deviation will be memorized until the next deviation again when power off.)
- Deviation setting range : 0.0001 to 99999(The setting range will be changed by decimal point setting parameter. If setting decimal point as 0000.0, the setting range will be 0.1 to 9999.9.)
- Operation : Display value \texttt{\textless} L. Comparative value \texttt{\textless} L. Comparative output ON, Display value \texttt{\textgreater} H. Comparative value \texttt{\textgreater} H. Comparative output ON
- Press \texttt{(M + A)} Key for memorizing the setting value at the same time

Press \texttt{(M + A)} Key for memorizing the setting value at the same time.
Function

Selection of display interval

It measures and displays reciprocal number of measuring time to detect target. Measuring accuracy may be dropped because the measuring time of interval is short, if the target is revolving with high speed.

It is able to change the display cycle in range of 0.05/0.5/1/2/4/8/sec. and displays the average value of measuring value then able to maintain measuring accuracy when revolving with high speed. In case of preset output type, the response can be delayed when the measuring time is long. Therefore, please adjust the measuring time properly.

Select display sampling period in parameter 2.

Prescale function

This prescale function allows to multiply the number of pulse or pulse length by a variable (X × 10^2) then display specification of measurement.

It will display frequency or RPM from prescale value by measuring the input frequency. For example, what is prescale value α when rpm is displayed?

\[
RPM = f \times \alpha = (f \times 60 \times \frac{1}{N}) = f \times 60 \times \frac{1}{4} = f \times 60 \times 0.25 = f \times 15
\]

* f: Input pulse (Frequency) per sec.
* α: Prescale value
* N: Pulse number per 1 revolution

Prescale value (α=15) setting

Set Prescale value (α) as (X) and (y) separately in PSCRH, PSCRY, PSCBH, PSCBY of Parameter group 2.

Set Prescale (α=15) as (X)=1.5000, (y)=10^2

It is also able to get the same display value even though set as X=0.1500, y=10^2

X setting range : 0.0001 to 9,9999

Y setting range : 10^-3 to 10^8

Peak value monitoring function

It saves High Peak value HPEV or Low Peak value LPEV against display value.

It can check in parameter group 0, the High Peak (HPEV) value or the Low Peak (LPEV) value will be continuously saved during checking.

Refer to Parameter group 0 for Reset.

Monitoring delay function

It controls stably to limit L, LL output until certain output is displayed or all output until the equipment will be in a stable status against various change of input such as the starting current when the motor is running after power on.

Starting correction timer function

(StRe-t mode of Parameter group 1)

This function is to inhibit the output come for the setting time. (Time setting range 0.0 to 99.9sec.) Applicable output mode : S, H, L, B, I, F mode

Comparative output limit function

(FdeFY mode of Parameter group 2)

This function is to limit the LL, L output before H or HH output.

Applicable output mode : S, B, F mode

The output mode is S output mode

(Initial operation after supplying power)

The output mode is B output mode

(Initial operation after supplying power)
The output mode is F output mode (Initial operation after supplying power)

- Initial L comparative output does not operate after supplying power.
- The comparative output limit function will be released at the setting value (Standard setting).

Hysteresis function

Set the Hysteresis value (A) for comparative setting value in order to prevent unstable operation due to output is ON/OFF frequently.

- It is able to set "0" but when set "0", the actual operation will be as "1".
- The initial setting value is 0001.
- It is able to set in "h95" mode of Parameter group 1.

Auto Zero time setting function

If there is no pulse input within setting time (Auto zero time), it regards as the input signal is cut off then make the value as "00000" forcibly. Note that the Auto zero time setting should be longer than the widest interval of input pulse. Otherwise it may be difficult to make the display value as "00000".

- Auto zero time setting range: 0.1 ~ 9999.9sec (Factory default setting: 9999.9sec)
- When the display value is "00000", each output will respond to how it was programmed for "0".
- Set the time in "AutoA" and "AutoB" mode of parameter group 1.

Lock setting function

This function is to set the enable or disable of each Parameter.

- oFF: Disable to lock keys
- oC 0: Lock P0 ~ P3 (Lock Parameter 0 ~ 3)
- oC 1: Lock P1 ~ P3 (Lock Parameter 1 ~ 3)
- oC 2: Lock P2 ~ P3 (Lock Parameter 2 ~ 3)
- oC 3: Lock P3 (Lock Parameter 3 only)
- Set lock function in parameter group 3.

Inner hardware Lock setting function

This function is to lock LoC in Parameter group 3 by Inner hardware lock function in order to prevent wrong setting.

- h0 (Hardware Lock0)
  It is able to check and change LoC mode in Parameter group 3.
- h1 (Hardware Lock1)
  It is able to check LoC mode in Parameter group 3 but, unable to change.
- h2 (Hardware Lock2)
  It is unable to check and change LoC mode in Parameter group 3
- Hardware Lock setting is decided when power is on.

MP5S, MP5Y, MP5W Series

- h0 mode (Factory default setting)
- Inner hardware Lock setting pin is on inner PCB.

MP5M Series

- h1 mode
- h2 mode (Factory default setting)
- The position of inner hardware Lock setting switch.

Data bank switching function

This is a function to save comparative setting value and prescale value in each data bank (Data Bank 1, Data Bank 2) in order to make easy to use necessary data saved in each data bank.

- When terminal No.3 and 5 are open, comparative value and prescale value in Data Bank 1 will be activated.
- When terminal No.3 and 5 are shorted, comparative value and prescale value in Data Bank 2 will be activated.
- How to save comparative value and prescale value in each Data Bank: Enter into parameter 2 group PbAnE and select the Data Bank where you save the data. Then, save each comparative setting value and prescale value.
**Time unit selection function**
Enable to display PV value in various time ranges.
- Time unit selection function can be set in parameter 2 group.
- Applicable mode : Mode F3 to F6

<table>
<thead>
<tr>
<th>High order</th>
<th>S A C T E C X R O T X C</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP5 series</td>
<td>A</td>
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<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
</tbody>
</table>

※A → Min. 4sec, B → Max. 300msec, C → Min. 20msec

**Case detachment (DIP switch)**
Please detach the case after turning off the power.
- MP5W Series/MP5Y Series/MP5S-4N

*Please press a pull of terminal ① and pull it toward ② direction.

**Communication output**

**System structure**

- Terminating Resistance (100~120Ω)

**Communication control ordering**

1. The communication control ordering of MP5 series is private protocol (Not compatible with other system).
2. After 4sec. being supplied the power into upper system, then it starts to communicate.
3. Initial communication will be started by upper system. When Command signal comes out from upper system then MP5 series will response.
   If there is no response after 3times of the command signal from upper system, error will be occurred.

---

**Communication Command and Block**

**Format of Command and Response**

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<tr>
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<td>10'</td>
<td>R/W</td>
<td>X/D</td>
<td>ETX</td>
</tr>
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</table>

*Calculation range of CRC Check Sum*

1. **Start Code**
   It shows the first of BLOCK
   STX → [02H], in case of Response, ACK/NAK will be added.

2. **Address Code**
   This code is high order system can discern MP5 series and able to set within range of 00 to 99.
   (BCD ASCII)

3. **Header Code**
   It shows Command as 2 alphabets as below.
   RX (Read request) → R[52H], X[58H]
   RD (Read response) → R[52H], D[44H]
   WX (Write request) → W[57H], X[58H]
   WD (Write response) → W[57H], D[44H]

4. **Text**
   It indicates the detail contents of Command /Response. (Refer to command item)

5. **END Code**
   It indicates the end of BLOCK. ETX → [03H]

6. **CRC**
   CRC is Cyclic Redundancy Check and called polynomial code. CRC is for more reliable transmit/receive to check the error between transmitter and receiver.
   There are CRC-8, CRC-16 and CRC-32, CRC-8 has been adopted in MP5 series according to CCITT-8 Polynomial regulation.
   (Refer to CRC8 table) Result value is HEX 1 Byte.

**CRC8 Table**

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Autonics

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**F-26**
## Communication Command

- The Characteristic(Number) at ‘ ’ is ASCII.

| STX | ACK | STX | Addr | Command | Bank | Code | +/− | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F | CRC |
|-----|-----|-----|------|---------|------|------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0x0 | 0x0 | 0x0 | 0x0 | 0x0    | 0x0  | 0x0  | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 |

- Read[RX] of measurement:
  - Address 01, Command RX
  1. Command (Upper)
    1) Command
    2) Application: Address(01), Header code(RX),
       Current value (P0) of Bank(0),
       CRC Check sum(B5H)

| STX | 0 | 1 | R | X | 0 | P | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | STX | CRC |
| 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 |

- 2. Response
  1) Normal receive: Adding ACK[06H] to current value of Data transmission Bank(0) is +1.234.

| STX | 0 | 1 | R | D | 0 | P | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | STX | CRC |
| 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 |

2. Response (MP5 series)
When completing the operation after normal receive.

- Write[WX] of measurement / setting value:
  - Address 01, Command WX
  1. COMMAND (Upper)
    1) Command
    2) Application: Address(01), Head Code(WX),
       The setting value into SV−HH (CO) of BANK(0) is +1.234.

| STX | 0 | 1 | W | X | 0 | P | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | STX | CRC |
| 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 | 0x0 |

- Precaution for communicating with MP5 series

1. It is not possible to modify Parameter(Baud rate, Address etc) related to communication of MP5 series on line with high order systems such as PC, PLC etc. (Error will be occurred)
2. Firstly make communication Parameter of MP5 series and high order system at one.
3. It is not allow to set overlapping communication number at the same communication line. (Error will be occurred)
4. Please use Twist pair wire for RS485 communication.
5. Communication cable can be extended up to 800m, and maximum 31 equipments can be connected.
6. When connect communication cable between MP5 series and high order system, the vertical resistance (100~200Ω) must be installed at between both communication lines.
7. Please check Parameter related to communication
   1) Start bit : 1bit(Fix)
   2) Stop bit : 1bit(Fix)
   3) Parity bit : Non(Fix)
   4) Data bit : 8bit(Fix)
   5) Baud rate : 2400, 4800, 9600(Settable)
   6) Address : 00 ~ 99(Settable)