Caution: Before use, be sure to read the “Safety Precautions” on p. 31.
Koganei, which has always supplied products compatible with customer needs, has recently developed the 240 series valves in response to worksite requirements. The 240 series valves are suitable for operating mid-sized cylinders of bore sizes 63mm [2.480in.] to 100mm [3.937in.], and offer every required function. In addition to 5-port 2-position types, closed center and exhaust center 3-position valves are included in the product range. Serial transmission modules, which are compatible with connecting directly to various manufacturers’ PCs, are also included in the product variations. The series realizes optimum system design, offering space saving as well as reducing wiring and piping work.

**One-touch connect/disconnect Plug-In Connector for Wiring Connections**
- A plug-in connector is available for wiring connections between the solenoid valve and sub-base, as well as between the solenoid valve and manifold, so that you can remove the solenoid valve without disturbing the wiring portion.

**Easy to increase or decrease the number of manifold units**
- You can increase or decrease the number of manifold units easily due to the individual manifold construction using each solenoid valve mounted unit.
- You can stock manifold bases as single units, thereby offering you a reduction in stocking costs.
You can select port direction and supply pressure according to your requirements. **The Bottom Ports on the Manifold Increase Versatility.**

- You can use the bottom ports on the manifold for piping.
- By using the port isolator between manifold station ports, you can supply multiple pressures on 1 manifold assembly.

Compatible with control by sequencers and PCs **Low Power Consumption and Highly Reliable Solenoid**

- By using a low power consumption solenoid, 1.6W at DC24V and 65mA, improved reliability and low heat generation are achieved.
- A serial transmission system, which offers distributed system control from a PC, is available and offers a cost reduction when considering the complete pneumatic control system.
### 240 Series Basic Models and Configuration

#### Single unit

<table>
<thead>
<tr>
<th>2-position</th>
<th>5-port</th>
<th>3-position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single solenoid</td>
<td>Double solenoid</td>
<td>Closed center</td>
</tr>
<tr>
<td>Direct piping</td>
<td></td>
<td>Exhaust center</td>
</tr>
<tr>
<td>240-4E1</td>
<td>240-4E2</td>
<td>243-4E2</td>
</tr>
<tr>
<td>2-position</td>
<td>3-position</td>
<td></td>
</tr>
<tr>
<td>Single solenoid</td>
<td>Double solenoid</td>
<td>Closed center</td>
</tr>
<tr>
<td>Standard sub-base piping</td>
<td></td>
<td>Exhaust center</td>
</tr>
<tr>
<td>A240-4E1-25</td>
<td>A240-4E2-25</td>
<td>A243-4E2-25</td>
</tr>
<tr>
<td>2-position</td>
<td>3-position</td>
<td></td>
</tr>
<tr>
<td>Single solenoid</td>
<td>Double solenoid</td>
<td>Closed center</td>
</tr>
<tr>
<td>Plug-in sub-base piping</td>
<td></td>
<td>Exhaust center</td>
</tr>
<tr>
<td>W240-4E1-26</td>
<td>W240-4E2-26</td>
<td>W243-4E2</td>
</tr>
<tr>
<td>W240-4E1-28</td>
<td>W240-4E2-28</td>
<td>W243-4E2-13</td>
</tr>
</tbody>
</table>

These are dedicated valves for the manifold.
## Manifold

Manifold for mounting 5-port valves

<table>
<thead>
<tr>
<th>240M □ F</th>
<th>F type 1 (P), 3 (R2), 5 (R1) manifold</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M □ A</td>
<td>A type (all ports) manifold</td>
</tr>
<tr>
<td>240M □ B</td>
<td>B type (bottom ported all ports) manifold</td>
</tr>
<tr>
<td>240M □ AW</td>
<td>AW type (plug-in and all ports) manifold</td>
</tr>
<tr>
<td>240M □ BW</td>
<td>BW type (plug-in and bottom ported all ports) manifold</td>
</tr>
<tr>
<td>240M □ AS</td>
<td>AW type (side piping and compatible with serial transmission module) manifold</td>
</tr>
<tr>
<td>240M □ BS</td>
<td>BW type (bottom piping and compatible with serial transmission module) manifold</td>
</tr>
</tbody>
</table>
### Specifications

#### Manifold Specifications and Port Size

<table>
<thead>
<tr>
<th>Manifold model</th>
<th>Specifications</th>
<th>Port size</th>
<th>Applicable valve model</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M□F</td>
<td>1(P), 3(R2), 5(R1) manifold piping 4(A), 2(B) valve piping</td>
<td>1(P)</td>
<td>240-4E1, 240-4E2, 243-4E2</td>
<td>Piping not allowed on the PR port.</td>
</tr>
<tr>
<td>240M□A</td>
<td>All port manifold piping</td>
<td>1(P)</td>
<td>240-4E1, 240-4E2, 243-4E2</td>
<td></td>
</tr>
<tr>
<td>240M□AW</td>
<td>All port manifold piping plug-in type</td>
<td>1(P)</td>
<td>240-4E1, 240-4E2, 243-4E2</td>
<td></td>
</tr>
<tr>
<td>240M□B</td>
<td>All port manifold piping bottom ported</td>
<td>1(P)</td>
<td>240-4E1, 240-4E2, 243-4E2</td>
<td>By using port isolators, the 1(P), 4(A), 2(B), 3(R2) and 5(R1) ports can be selected on either the end plate, side piping or bottom piping (the PR port is available only on the end plate).</td>
</tr>
<tr>
<td>240M□BW</td>
<td>All port manifold piping bottom ported plug-in type</td>
<td>1(P)</td>
<td>240-4E1, 240-4E2, 243-4E2</td>
<td>By using port isolators, the 1(P), 4(A), 2(B), 3(R2) and 5(R1) ports can be selected on either the end plate, side piping or bottom piping (the PR port is available only on the end plate).</td>
</tr>
</tbody>
</table>

#### Manifold Mass

<table>
<thead>
<tr>
<th>Manifold model</th>
<th>Mass calculation of each unit (n=number of units)</th>
<th>Mounting valve</th>
<th>Block-off plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M□F</td>
<td>69(3.6)</td>
<td>240-4E1</td>
<td>30 [1.06]</td>
</tr>
<tr>
<td>240M□A</td>
<td>157(9.2)</td>
<td>240-4E1</td>
<td></td>
</tr>
<tr>
<td>240M□AW</td>
<td>159(9.8)</td>
<td>240-4E1</td>
<td></td>
</tr>
<tr>
<td>240M□B</td>
<td>167(10.2)</td>
<td>240-4E1</td>
<td></td>
</tr>
<tr>
<td>240M□BW</td>
<td>199(12.2)</td>
<td>240-4E1</td>
<td></td>
</tr>
</tbody>
</table>

#### Solenoid Specifications

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>AC100V</th>
<th>AC200V</th>
<th>DC24V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Shading type</td>
<td>Flywheel diode incorporated for surge suppression</td>
<td></td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>90 ~ 132 V (100% ±1%)</td>
<td>160 ~ 264 V (100% ±10%)</td>
<td>21.6 ~ 26.4 V (24 ±10%)</td>
</tr>
<tr>
<td>Current (when rated voltage is applied)</td>
<td>34 mA</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Allowable leakage current mA</td>
<td>4</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Insulation resistance MΩ</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Solenoid Specifications

- **Rated voltage**: AC100V, AC200V, DC24V
- **Type**: Shading type, Flywheel diode incorporated for surge suppression
- **Operating voltage range**: 90 ~ 132 V (100% ±1%), 160 ~ 264 V (100% ±10%), 21.6 ~ 26.4 V (24 ±10%)
- **Current (when rated voltage is applied)**: 34 mA, 17, 16
- **Allowable leakage current**: 4 mA
- **Insulation resistance**: 100 MΩ

#### Notes

1. Effective area for A240-4E□, W240-4E□.
2. Port size of sub-base.

### Remarks

- For optional specifications and order codes, see p.637~639.
- For order codes, see p.637~639.
- Calculation example: The mass of 240M10F strn. 1~5-240-4E1
  - 240-4E1, 240-4E2, 243-4E2 strn. 6~10-240-4E2, (69×10) + 69 + (160×5) + (230×5) = 2709 g [95.56 oz].

---

**SOLENOID VALVES**

**240 SERIES**

---

635
How to obtain cylinder speed

To obtain the time required for the cylinder to complete 1 stroke, add cylinder’s delay time $t_1$ (time between energizing of the solenoid valve and actual starting of the cylinder), to the cylinder’s max. speed operating time $t_2$.

When a cushion is used, add the cushioning time $t_3$ to the above calculations. The standard cushioning time $t_3$ is approximately 0.2 seconds.

Measurement conditions
- Air pressure: 0.5MPa (5.1kgf/cm²) [73psi]
- Piping inner diameter and length: $\phi 7.5 \times 1000$mm [39in.]
- Fitting: Quick fitting TS10-02
- Load ratio= Cylinder theoretical thrust (%) 
- Cylinder stroke: 300mm [11.8in.]

Measurement conditions
- Air pressure: 0.5MPa (5.1kgf/cm²) [73psi]
- Piping inner diameter and length: $\phi 7.5 \times 1000$mm [39in.]
- Fitting: Quick fitting TS10-02
- Load ratio= Cylinder theoretical thrust (%) 
- Cylinder stroke: 300mm [11.8in.]

Flow rate

Maximum operating speed

Delay time

How to obtain cylinder speed
## 240 Series Solenoid Valve, Air-piloted Valve Order Codes

<table>
<thead>
<tr>
<th>3-position valve</th>
<th>Mounting base</th>
<th>Sub-base</th>
<th>Speed controller</th>
<th>Manual override</th>
<th>Wiring type (standard type)</th>
<th>Wiring type (plug-in type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve function</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closed center</td>
<td>Without</td>
<td></td>
<td>Without speed</td>
<td>Non-locking</td>
<td>Blank</td>
<td>Blank</td>
</tr>
<tr>
<td></td>
<td>mounting base</td>
<td></td>
<td>controller</td>
<td>type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exhaust center</td>
<td>With</td>
<td></td>
<td>With speed</td>
<td>Locking type</td>
<td>Blank</td>
<td>Blank</td>
</tr>
<tr>
<td></td>
<td>mounting base</td>
<td></td>
<td>controller</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Options

- Mounting base
- Plug-in type sub-base
- Speed controller
- Manual override
- Straight connector
- L connector
- DIN connector

#### Notes
1. Attached to the sub-base.
2. Because the long valve body interferes with the connector, no sub-base is set in the order codes.
3. When ordering the non-ion specification, enter -NCU after the basic model code.
5. -ZR: Varistor for surge suppression is available for AC100V and AC200V only (flywheel diode for surge suppression is standard equipment for DC24V) and a varistor for surge suppression is built into AC100V and AC200V with LED indicator.
6. Color of LED indicator: AC100V: yellow, AC200V: green, DC24V: red

**Voltage**

- DC24V
- AC100V
- AC200V

### 3-position valve

#### Direct piping

**Single solenoid**

- 240-4E1
- 240-4E2
- A240-4E1
- A240-4E2
- W240-4E1
- W240-4E2

#### Standard sub-base piping

**Single solenoid**

- 243-4E2

#### Plug-in sub-base piping

**Single solenoid**

- W243-4E2

### Speed controller

- Single pilot
- Double pilot

### Manual override

- Single pilot
- Double pilot

### Straight connector

- Without lead wire
- Connector, contacts included
- With built-in varistor for surge suppression

### L connector

- Without lead wire
- Connector, contacts included
- With built-in varistor for surge suppression

### Wiring type

- Standard plug-in
- With LED indicator
- With built-in varistor for surge suppression

### Options

- Side piping type
- Side and bottom piping type
- Mated to the sub-base in the case of sub-base type.
- Locking type
- With lead wire and LED indicator: Surge suppression
- With built-in varistor for surge suppression

### Notes

- When ordering the non-ion specification, enter -NCU after the basic model code.
- Lead wire length: mm [in.]

- 300 [11.8]—Standard
- 1000 [39], 3000 [118]—Optional

### Wiring type (plug-in type)

- DC24V
- AC100V
- AC200V

### Voltage

- DC24V
- AC100V
- AC200V
### 240 Series Manifold Order Codes

#### Valve function
- Closed center
- Non-locking type
- Locking type
- Exhaust center

#### Manual override
- Standard
- Blank

#### Wiring type (standard type)
- Grommet type
- Straight connector with LED indicator
- L connector with LED indicator

#### Wiring type (plug-in type)
- Standard plug-in
- With built-in varistor for surge suppression
- With LED indicator

#### Made to order

<table>
<thead>
<tr>
<th>Manifold model</th>
<th>Number of units</th>
<th>Station</th>
<th>Basic model</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M</td>
<td>2</td>
<td>F</td>
<td>-240-4E1</td>
<td>DC24V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>stn.</td>
<td>-240-4E2</td>
<td>AC100V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-243-4E2</td>
<td>AC200V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>-A240-4E1</td>
<td>DC24V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-A240-4E2</td>
<td>AC100V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-A243-4E2</td>
<td>AC200V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AW</td>
<td>-W240-4E1</td>
<td>DC24V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-W240-4E2</td>
<td>AC100V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-W243-4E2</td>
<td>AC200V</td>
</tr>
</tbody>
</table>

#### Valve mounting location from the left-hand side when facing the 4(A), 2(B) ports.

#### Specify the valve model for each station.

#### Enter -BP when closing a station with a block-off plate without mounting a valve.

#### When ordering the non-ion specification, enter -NCU after the basic model code.

### Made to order

Air-piloted valves
240 series

- 5-port, 2-position
- Single pilot
- Double pilot
Manifold for Serial Transmission System Order Codes

**Wiring type**
- Side piping AW type manifold
  - For right side mounting
  - For left side mounting
- Bottom piping BW type manifold
  - For right side mounting
  - For left side mounting
- BSR
- ASR
- ASL
- BSL

**Serial transmission module**
- OR: OMRON
- MB: Mitsubishi Electric
- FJ: Fuji Electric FA Components & Systems
- SP: SHARP
- MS: Matsushita Electric Works
- HT: Hitachi

**3-position valve**
- Valve function
  - Blank: Closed center
  - -13: Exhaust center

**Manual override**
- Blank: Non-locking type manual override
- -81: Locking type manual override

**Wiring type**
- L: Plug-in type

### Basic model
- 240M
- 2: stn.
- 10: stn.

### Station
- ASR
- ASL
- BSR
- BSL

### Station
- -OR
- -MB
- -FJ
- -SP
- -MS
- -HT

### Station
- -W240-4E1
- -W240-4E2
- -W243-4E2

### Voltage
- DC24V

**Note:** Serial transmission systems are only available for solenoid specification DC24V with LED indicator.

- Valve mounting location from the left-hand side when facing the 4(A), 2(B) ports. (1~10)
- The serial transmission module is not counted as a station.
- Specify the valve model for each station.
- Enter -BP when closing a station with a block-off plate without mounting a valve.
- To increase units in the manifold, order the manifold stacking units.

**Depending on the number of control outputs in the product's unit, up to 16 solenoid coils can be installed.**

- **W243-4E2** can be operated with a maximum of 8 units, while **W240-4E1** can be operated with a maximum of 16 units.

1. The address number is stuck on the solenoid at shipping.
2. The 11~16 units are special specifications.
Operating Principles and Major Parts

**240-4E1**

- **De-energized**
  - Body
  - Stem
  - Lip seal
  - End cover

- **Energized**
  - Body
  - Stem
  - Lip seal
  - End cover

**240-4E2**

(De-energized condition after energizing solenoid 12 (S1))

**243-4E2**

(Both solenoid 12 (S1) and 14 (S2) are de-energized.)

**243-4E2-13**

(Both solenoid 12 (S1) and 14 (S2) are de-energized.)

---

**Major Parts and Materials**

<table>
<thead>
<tr>
<th>Parts</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>Aluminum alloy (treated with chromic acid)</td>
</tr>
<tr>
<td>Stem</td>
<td>Aluminum alloy (anodized)</td>
</tr>
<tr>
<td>Lip seal</td>
<td>Synthetic rubber</td>
</tr>
<tr>
<td>Flapper</td>
<td></td>
</tr>
<tr>
<td>Mounting base</td>
<td>Mild steel (zinc plated)</td>
</tr>
<tr>
<td>Sub-base</td>
<td>Aluminum alloy (anodized)</td>
</tr>
<tr>
<td>Plunger</td>
<td>Magnetic stainless steel</td>
</tr>
<tr>
<td>Column</td>
<td></td>
</tr>
</tbody>
</table>

Remark: Materials that generate copper ions are not used for the non-ion specification.
Dimensions of Solenoid Valve (mm)

●240-4E1

Approximately

2-PR
2-Rc1/8
5(Rt) Port
1(P) Port

2-M3 X 0.5 Depth 4 Mounting thread
2-(B) Port
9
9

2-(B) Port
9
9

2-M3 X 0.5 Depth 4 Mounting thread
2-(B) Port
9
9

2-Manual override
Non-locking type

2-PR
2-Rc1/8
5(Rt) Port
1(P) Port

2-Manual override
Non-locking type

●240-4E2

2-M3 X 0.5 Depth 4 Mounting thread
2-(B) Port
9
9

2-M3 X 0.5 Depth 4 Mounting thread
2-(B) Port
9
9

2-Manual override
Non-locking type

2-Manual override
Non-locking type

Approximately

200
35

200
35

PR1
2-Rc1/8
5(Rt) Port
1(P) Port

PR1
2-Rc1/8
5(Rt) Port
1(P) Port

Approximately

200
35

200
35

PR1
2-Rc1/8
5(Rt) Port
1(P) Port

PR1
2-Rc1/8
5(Rt) Port
1(P) Port
**Options**

- **Mounting base:** -21
  - Non-locking type: Standard
  - Locking type: -81

- **Straight connector with LED indicator:** -PS(N)-L

- **With built-in varistor for surge suppression:** -ZR
  - Dimensions are the same as the standard product.

- **Speed controller:** -70
  - Width across flats: R1/8

- **L connector with LED indicator:** -PL(N)-L

- **DIN connector:** -39
Options

- Speed controller: 240SC
- Straight connector with LED indicator: 240SOL
- L connector with LED indicator: 240SOL
- DIN connector: 240SOL

Dimensions for the built-in varistor for surge suppression are the same as for the standard product.

Approximately 300 Manual overrides
Non-locking type: Standard Locking type: 

Mounting hole

Rated current

Overall length of the valve

LED indicator

To view from A

-PS(N)-L
-PL(N)-L

To the bottom of the sub-base

Mounting hole

Overall length of the valve

LED indicator

To the bottom of the sub-base

Mounting hole

Overall length of the valve

LED indicator

To the bottom of the sub-base
### Dimensions of Solenoid Valve (mm)

**W240-4E1-26**

**W240-4E1-28**

**W240-4E2-26**

**W240-4E2-28**

**Options**

- **Speed controller:** -70
  - 240SC

- **With LED indicator:** -L

- **Plug-in type with built-in varistor for surge suppression:** -ZR
  - Dimensions are the same as the standard product.

---

**Dimensions**

- **Width across flats:** 14
  - R1/4

- **LED indicator:**
  - To the bottom of the sub-base: 85
  - 41

- **Mounting hole:**
  - 2-Mounting hole

- **Manual override:**
  - Non-locking type: Standard
  - Locking type: -81

- **Plug-in type with built-in varistor for surge suppression:** -ZR
### Dimensions of Manifold (mm)

#### Options

- **Straight connector with LED indicator:** -PS(N)-L
- **L connector with LED indicator:** -PL(N)-L
- **Built-in varistor for surge suppression:** -ZR
- **Manual override**
  - Non-locking type: Standard
  - Locking type: -81

#### Unit dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>L</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M2F</td>
<td>72</td>
<td>62</td>
</tr>
<tr>
<td>240M3F</td>
<td>96</td>
<td>86</td>
</tr>
<tr>
<td>240M4F</td>
<td>120</td>
<td>110</td>
</tr>
<tr>
<td>240M5F</td>
<td>144</td>
<td>134</td>
</tr>
<tr>
<td>240M6F</td>
<td>168</td>
<td>158</td>
</tr>
<tr>
<td>240M7F</td>
<td>192</td>
<td>182</td>
</tr>
<tr>
<td>240M8F</td>
<td>216</td>
<td>206</td>
</tr>
<tr>
<td>240M9F</td>
<td>240</td>
<td>230</td>
</tr>
<tr>
<td>240M10F</td>
<td>264</td>
<td>254</td>
</tr>
</tbody>
</table>

---

**Approximately 300**

- 6-Rc1/4 (with 3 plugs)

---

**Approximately 243**

Rc1/4
**Dimensions of Manifold (mm)**

![Diagram of manifold]

**Options**
- Straight connector with LED indicator: -PS(N)-L
  - 240SOL

- L connector with LED indicator: -PL(N)-L
  - 240SOL

- With built-in varistor for surge suppression: -ZR
  - Dimensions are the same as the standard product.

- DIN connector: -39
  - 240SOL

---

**Unit dimensions**

<table>
<thead>
<tr>
<th>Model</th>
<th>L</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M2A, 240M2B</td>
<td>117</td>
<td>107</td>
</tr>
<tr>
<td>240M3A, 240M3B</td>
<td>145</td>
<td>135</td>
</tr>
<tr>
<td>240M4A, 240M4B</td>
<td>173</td>
<td>163</td>
</tr>
<tr>
<td>240M5A, 240M5B</td>
<td>201</td>
<td>191</td>
</tr>
<tr>
<td>240M6A, 240M6B</td>
<td>229</td>
<td>219</td>
</tr>
<tr>
<td>240M7A, 240M7B</td>
<td>257</td>
<td>247</td>
</tr>
<tr>
<td>240M8A, 240M8B</td>
<td>285</td>
<td>275</td>
</tr>
<tr>
<td>240M9A, 240M9B</td>
<td>313</td>
<td>303</td>
</tr>
<tr>
<td>240M10A, 240M10B</td>
<td>341</td>
<td>331</td>
</tr>
</tbody>
</table>
**Dimensions of Manifold (mm)**

**240M AW**

**240M BW**

Manual override
Non-locking type: Standard
Locking type: -ZR

**Unit dimensions**

<table>
<thead>
<tr>
<th>Model</th>
<th>L</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M 2 AW, 240M 2 BW</td>
<td>117</td>
<td>107</td>
</tr>
<tr>
<td>240M 3 AW, 240M 3 BW</td>
<td>145</td>
<td>135</td>
</tr>
<tr>
<td>240M 4 AW, 240M 4 BW</td>
<td>173</td>
<td>163</td>
</tr>
<tr>
<td>240M 5 AW, 240M 5 BW</td>
<td>201</td>
<td>191</td>
</tr>
<tr>
<td>240M 6 AW, 240M 6 BW</td>
<td>229</td>
<td>219</td>
</tr>
<tr>
<td>240M 7 AW, 240M 7 BW</td>
<td>257</td>
<td>247</td>
</tr>
<tr>
<td>240M 8 AW, 240M 8 BW</td>
<td>285</td>
<td>275</td>
</tr>
<tr>
<td>240M 9 AW, 240M 9 BW</td>
<td>313</td>
<td>303</td>
</tr>
<tr>
<td>240M10AW, 240M10BW</td>
<td>341</td>
<td>331</td>
</tr>
</tbody>
</table>

**Options**

- With LED indicator: -L

- Plug-in type with built-in varistor for surge suppression: -ZR

Dimensions are the same as the standard product.
Dimensions of Serial Transmission System (mm)

240MASL

Unit dimensions

<table>
<thead>
<tr>
<th>Number of units</th>
<th>P</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>163</td>
<td>173</td>
</tr>
<tr>
<td>3</td>
<td>191</td>
<td>201</td>
</tr>
<tr>
<td>4</td>
<td>219</td>
<td>229</td>
</tr>
<tr>
<td>5</td>
<td>247</td>
<td>257</td>
</tr>
<tr>
<td>6</td>
<td>275</td>
<td>285</td>
</tr>
<tr>
<td>7</td>
<td>303</td>
<td>313</td>
</tr>
<tr>
<td>8</td>
<td>331</td>
<td>341</td>
</tr>
<tr>
<td>9</td>
<td>359</td>
<td>369</td>
</tr>
<tr>
<td>10</td>
<td>387</td>
<td>397</td>
</tr>
</tbody>
</table>

Bottom port (Viewed from A)

Applicable cable outer diameter $\phi$ 8.5 – $\phi$ 12.5
Dimensions of Serial Transmission System (mm)

● 240M □ ASR, 240M □ BSR

Unit dimensions

<table>
<thead>
<tr>
<th>Number of units</th>
<th>P</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>163</td>
<td>173</td>
</tr>
<tr>
<td>3</td>
<td>191</td>
<td>201</td>
</tr>
<tr>
<td>4</td>
<td>219</td>
<td>229</td>
</tr>
<tr>
<td>5</td>
<td>247</td>
<td>257</td>
</tr>
<tr>
<td>6</td>
<td>275</td>
<td>285</td>
</tr>
<tr>
<td>7</td>
<td>303</td>
<td>313</td>
</tr>
<tr>
<td>8</td>
<td>331</td>
<td>341</td>
</tr>
<tr>
<td>9</td>
<td>359</td>
<td>369</td>
</tr>
<tr>
<td>10</td>
<td>387</td>
<td>397</td>
</tr>
</tbody>
</table>

Bottom port (Viewed from A)
# Made to Order

**Air-piloted valves 240 series**

-The optimum air valve for master valves or pilot valves for all-pneumatic control.

---

## Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>For direct piping</th>
<th>For sub-base</th>
</tr>
</thead>
<tbody>
<tr>
<td>F type manifold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single pilot</td>
<td>240-4A</td>
<td>A240-4A</td>
</tr>
<tr>
<td>Double pilot</td>
<td>240-4A2</td>
<td>A240-4A2</td>
</tr>
<tr>
<td>Basic model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media</td>
<td>Air</td>
<td>Air</td>
</tr>
<tr>
<td>Operation type</td>
<td>Air piloted type</td>
<td></td>
</tr>
<tr>
<td>Number of positions, ports</td>
<td>2 positions, 5 ports</td>
<td></td>
</tr>
<tr>
<td>Effective area [Cv] mm²</td>
<td>16 (0.88)</td>
<td>11.3 (0.627)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port size</th>
<th>Pilot</th>
<th>Pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
<td>1(P), 4(A), 2(B)</td>
<td>1(P), 4(A), 2(B), 3(R2), 5(R1)</td>
</tr>
<tr>
<td>Pilot</td>
<td>Rc1/4</td>
<td>Rc1/4</td>
</tr>
</tbody>
</table>

| Lubrication                 | Not required      |              |

<table>
<thead>
<tr>
<th>Operating pressure range</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
<td>0.17<del>0.7 (1.7</del>7.1) [25~102]</td>
<td></td>
</tr>
<tr>
<td>Pilot</td>
<td>See the table “Minimum Pilot Pressure”</td>
<td></td>
</tr>
</tbody>
</table>

| Proof pressure MPa (kgf/cm²) [psig] | 1.05 (10.7) [152] |

| Operating temperature range °C [°F] | 5~60 [41~140] |

<table>
<thead>
<tr>
<th>Shock resistance</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Axial direction</td>
<td>912.0 (93.0)</td>
<td>264.8 (27.0)</td>
</tr>
<tr>
<td>Lateral direction</td>
<td>1373.0 (140.0)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting direction</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Maximum operating frequency Hz | 5                |

|----------------|------------|------------|------------|-------------|--------|------------|------------|--------|

Notes: 1. Port size of sub-base and manifold.
2. Figures in parentheses ( ) are the mass with sub-base.
3. For optional specifications and order codes, see p.637~638.

## Minimum Pilot Pressure

<table>
<thead>
<tr>
<th>Model</th>
<th>Minimum Pilot Pressure MPa (kgf/cm²) [psig]</th>
<th>MPA 0.15 (1.5) [22]</th>
</tr>
</thead>
<tbody>
<tr>
<td>240-4A</td>
<td>0.15 (1.5) [22]</td>
<td>0.3 (3.1) [44]</td>
</tr>
<tr>
<td>240-4A2</td>
<td>0.06 (0.6) [8]</td>
<td>0.07 (0.7) [15]</td>
</tr>
</tbody>
</table>

Note: Reference value.

## Time Required for Switching

<table>
<thead>
<tr>
<th>Model</th>
<th>Operation</th>
<th>Pilot line length L m [ft.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>240-4A</td>
<td>ON</td>
<td>2 [6.6]</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>0.15 [0.5]</td>
</tr>
<tr>
<td>240-4A2</td>
<td>ON</td>
<td>0.09 [0.33]</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>0.23 [0.88]</td>
</tr>
</tbody>
</table>

## Measurement Conditions

- Pilot valve = 0.50E1 (effective area 1.2mm² Cv: 0.07)
- Tube inner diameter = 4mm [0.16in.]
- Air pressure (both main and pilot) = 0.25MPa [73psi.]

## Manifold Specifications and Port Size

<table>
<thead>
<tr>
<th>Manifold model</th>
<th>Specifications</th>
<th>Port size</th>
<th>Applicable valve model</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M[F]</td>
<td>1(P), 3(R2), 5(R1) ports manifold piping 4(A), 2(B) ports valve piping</td>
<td>1(P)</td>
<td>240-4A</td>
<td>240-4A2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manifold model</th>
<th>Specifications</th>
<th>Port size</th>
<th>Applicable valve model</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M[A]</td>
<td>All port manifold piping</td>
<td>1(P)</td>
<td>240-4A</td>
<td>240-4A2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manifold model</th>
<th>Specifications</th>
<th>Port size</th>
<th>Applicable valve model</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M[B]</td>
<td>All port manifold piping Bottom ported End plate and side port</td>
<td>1(P)</td>
<td>240-4A</td>
<td>240-4A2</td>
</tr>
</tbody>
</table>

For order codes, see p.638.

## Manifold Mass g [oz.]

<table>
<thead>
<tr>
<th>Manifold model</th>
<th>Mass of calculation for each unit [number of units]</th>
<th>Mounting valve</th>
<th>Block-off plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>240M[F]</td>
<td>(68Xn)+69 + (240Xn)+243</td>
<td>110 [3.88]</td>
<td>135 [4.76]</td>
</tr>
<tr>
<td>240M[A]</td>
<td>(167Xn)+217 + (5.89Xn)+17.65</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Calculation example: The mass of 240M10F str.1~5 240-4A str.6~10 240-4A2, (68x10)+69+(110x5)+(135x5)=1974g [69.63oz].
Cylinder Operating Speed and Flow Rate

### 240-4A

**Measurement conditions**
- Air pressure: 0.5 MPa (5.1 kgf/cm²) [73 psi]
- Piping inner diameter and length: 7.5 × 1000 mm [39 in.]
- Fitting: Quick fitting TS10-02
- Load ratio = Cylinder theoretical thrust (%)
- Cylinder stroke: 300 mm [11.8 in.]

**Maximum operating speed**

<table>
<thead>
<tr>
<th>Load (mm/s)</th>
<th>0</th>
<th>20</th>
<th>40</th>
<th>60</th>
<th>80</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPa</td>
<td>0.1</td>
<td>0.15</td>
<td>0.2</td>
<td>0.25</td>
<td>0.3</td>
<td>0.35</td>
</tr>
</tbody>
</table>

**Flow rate**

<table>
<thead>
<tr>
<th>Valve outlet pressure (MPa)</th>
<th>0.1</th>
<th>0.2</th>
<th>0.3</th>
<th>0.4</th>
<th>0.5</th>
<th>0.6</th>
<th>0.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate (l/min)</td>
<td>500</td>
<td>1000</td>
<td>1500</td>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 MPa = 145 psi.

### A240-4A-25

**Measurement conditions**
- Air pressure: 0.5 MPa (5.1 kgf/cm²) [73 psi]
- Piping inner diameter and length: 7.5 × 1000 mm [39 in.]
- Fitting: Quick fitting TS10-02
- Load ratio = Cylinder theoretical thrust (%)
- Cylinder stroke: 300 mm [11.8 in.]

**Maximum operating speed**

<table>
<thead>
<tr>
<th>Load (mm/s)</th>
<th>0</th>
<th>20</th>
<th>40</th>
<th>60</th>
<th>80</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPa</td>
<td>0.1</td>
<td>0.15</td>
<td>0.2</td>
<td>0.25</td>
<td>0.3</td>
<td>0.35</td>
</tr>
</tbody>
</table>

**Flow rate**

<table>
<thead>
<tr>
<th>Valve outlet pressure (MPa)</th>
<th>0.1</th>
<th>0.2</th>
<th>0.3</th>
<th>0.4</th>
<th>0.5</th>
<th>0.6</th>
<th>0.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate (l/min)</td>
<td>500</td>
<td>1000</td>
<td>1500</td>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 MPa = 145 psi.

1 l/min = 0.0353 ft³/min.
Operating Principles and Symbols

### 5-port, 2-position

#### Single pilot

**240-4A**

- Normal condition
- Actuated condition

#### Double pilot

**240-4A2**

- Normal condition
- Actuated condition

(Condition with pilot air applied to 12(PB), and then released)

### Major Parts and Materials

<table>
<thead>
<tr>
<th>Parts</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Valve</strong></td>
<td></td>
</tr>
<tr>
<td>Body</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>Stem</td>
<td>(anodized)</td>
</tr>
<tr>
<td>Lip seal</td>
<td>Synthetic rubber</td>
</tr>
<tr>
<td>Mounting base</td>
<td>Mild steel (zinc plated)</td>
</tr>
<tr>
<td>Sub-base</td>
<td>Aluminum alloy (anodized)</td>
</tr>
<tr>
<td><strong>Manifold</strong></td>
<td></td>
</tr>
<tr>
<td>Body</td>
<td>Aluminum alloy (anodized)</td>
</tr>
<tr>
<td>Block-off plate</td>
<td>Mild steel (zinc plated)</td>
</tr>
<tr>
<td>Seal</td>
<td>Synthetic rubber</td>
</tr>
</tbody>
</table>
Dimensions of Air-piloted Valves (mm)

● 240-4A

Options

● Mounting base: -21

● Speed controller: -70
Dimensions of Air-piloted Valves (mm)

● A240-4A-25
● A240-4A-27

Options

● Speed controller: -70

(Viewed from A)

-27: Bottom port
Handling Instructions and Precautions

Solenoid

**Internal circuit**

- **AC100V, AC200V**

  **Standard solenoid**
  - Solenoid (Surge suppression)
  - Order code: -ZR
  - Lead wire: AC100V: Yellow
  - AC200V: White

  **Solenoid with LED indicator**
  - (Surge suppression)
  - Order code: -PS-L -PL-L
  - Color of LED indicator: AC100V: Yellow
  - AC200V: Green

- **DC24V**

  **Standard solenoid (Surge suppression)**
  - (+) Short circuit protection diode
  - Flywheel diode
  - Lead wire: Black

  **Solenoid with LED indicator**
  - (Surge suppression)
  - Order code: -PS-L -PL-L
  - LED indicator (Light Emitting Diode)

  **Plug connector**

  **Attaching and removing plug connector**
  - Use fingers to insert the connector into the pin, push it in until the lever claw latches onto the protruded section of the connector housing, and complete the connection.
  - To remove the connector, squeeze the lever along with the connector, lift the lever claw up from the protruded section of the connector housing, and pull it out.

  **Crimping of connecting lead wire and contact**
  - To crimp lead wires into contacts, strip off 4mm [0.16in.] of the insulation from the tip of the lead wire, insert it into the contact, and crimp it. Be sure to avoid catching the insulation on the exposed wire crimping section.

  **Contact**
  - Lead wire: Red
  - Insulation crimp tab
  - Insulation (Maximum outer diameter ≤ 1.7)
  - Exposed wire crimping section: Equivalent to AWG22-26

  **LED indicator**
  - Red
  - Equipped with a diode

  **Cautions:**
  1. Do not pull hard on the lead wire.
  2. Always use a dedicated tool for crimping of connecting lead wire and contact.

  **Contact: Model 702062-2M**
  - Manufactured by Sumiko Tech, Inc.
  - Crimping tool: Model F1-702062
  - Manufactured by Sumiko Tech, Inc.

**Manual override**

**Non-locking type**

To operate the manual override, press it all the way down. For single solenoid, the valve works the same as when in the energized state as long as the manual override is pushed down, and returns to the normal position upon release.

For the double solenoid, pressing the manual override on the 12(S1) side switches the 12(S1) to enter the energized position, and the unit remains in this state even after the manual override is released. To return it to the normal position, operate the manual override on the 14(S2) side. This is the same for the solenoids 14(S2).

**Locking type**

To lock the manual override, use a small screwdriver to push down on the manual override all the way down and turn it 45 degrees. Either turning direction at this time is acceptable.

When locked, turning the manual override from the locking position releases a spring on the manual override, returns it to its normal position, and releases the lock.

When the manual override is not turned, this type acts just like the non-locking type.

**Attaching and removing contact and connector**

- Insert the contact with lead wire into a plug connector hole until the contact hook latches on the connector and is secured to the plug connector. Confirm that the lead wire cannot be easily pulled out.
- To remove it, insert a tool with a fine tip (such as a small screwdriver) into the rectangular hole on the side of the plug connector to push up on the hook, and then pull out the lead wire.

**Cautions:**
  1. Do not pull hard on the lead wire. It could result in defective contacts, breaking wires, etc.
  2. If the pin is bent, use a small screwdriver, etc. to gently straighten out the pin, and then complete the connection to the plug connector.

**Cautions:**
  1. The 240 series valves are pilot type solenoid valves. As a result, the manual override cannot switch the main valve without air supplied from the 1(P) port.
  2. Always release the lock of the locking type manual overrides before commencing normal operation.
  3. Do not attempt to operate the manual override with a pin or other object having an extremely fine tip. It could damage the manual override button.
  4. Do not turn the adjusting knob more than needed. It could result in defective operation.
Handling Instructions and Precautions

**Manifold**

End plate B

Port isolator

Illustration shows 240M AW.

**Stacking unit order**

If stacking part is required due to the addition or replacement of manifold units, use the following order codes to place orders.

<table>
<thead>
<tr>
<th>No.</th>
<th>Parts</th>
<th>Order codes</th>
<th>Parts lists (quantities)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stacking unit for 240M A</td>
<td>CR016</td>
<td>A type stacking unit (1): ① joints (2), ② joint mounting bolts (2), ③ valve mounting screws (3), ④ gasket (1), ⑤ gasket (1), ⑥ O-rings (3)</td>
</tr>
<tr>
<td></td>
<td>Stacking unit for 240M B</td>
<td>CR017</td>
<td>B type stacking unit (1): ① joints (2), ② joint mounting bolts (2), ③ valve mounting screws (3), ④ gasket (1), ⑤ gasket (1), ⑥ O-rings (3), ⑦ O-ring (1), Rc1/8 plugs (5), Rc1/4 plugs (2)</td>
</tr>
<tr>
<td></td>
<td>Stacking unit for 240M AW</td>
<td>CR018</td>
<td>AW type stacking unit (1): ① joints (2), ② joint mounting bolts (2), ③ valve mounting screws (3), ④ gasket (1), ⑤ gasket (1), ⑥ O-rings (3), ⑦ terminal block (1), ⑧ terminal cover (1), ⑨ connection cover (1)</td>
</tr>
<tr>
<td></td>
<td>Stacking unit for 240M BW</td>
<td>CR019</td>
<td>BW type stacking unit (1): ① joints (2), ② joint mounting bolts (2), ③ valve mounting screws (3), ④ gasket (1), ⑤ gasket (1), ⑥ O-rings (3), ⑦ O-ring (1), ⑧ terminal block (1), ⑨ terminal cover (1), ⑩ connection cover (1), Rc1/8 plugs (5), Rc1/4 plugs (2)</td>
</tr>
<tr>
<td></td>
<td>Terminal block</td>
<td>CR020</td>
<td></td>
</tr>
</tbody>
</table>

**Piping**

The 1(P) port, 3(R2) port, 5(R1) port and PR port are on both ends of the manifold, and piping direction can be selected depending on the mounting location. At shipping, the ports on one side are plugged. Remove the plugs and then use sealing tape or another sealing agent to tighten in place.

**Cautions:**

1. For the 1(P) port piping, use a size that matches the manifold’s piping connection port. Insufficient flow rate or pressure could result in defective valve operation or in insufficient actuator output.
2. When installing piping or mufflers to the 3(R2) and 5(R1) ports, ensure there will be minimum exhaust resistance. On rare occasions, exhaust from valves can interfere with other valves and actuators.
3. When a multiple number of valves operate simultaneously on a multi-unit manifold, or when the manifold with valves is used at high frequency, supply air from the 1(P) ports on both ends, and exhaust air from the 3(R2), 5(R1) ports on both ends.
4. In bottom ported manifolds (B type and BW type), use of the bottom 1(P), 3(R2) and 5(R1) ports can prevent flow rate or pressure shortages, or exhaust interference.
Mounting and removing valves

With the plug-in type, valves can be replaced while leaving the air piping or electrical wiring in place.
Loosen the 3 valve mounting screws, and pull the valve straight out. To mount the valve, align the valve plug over the socket of the sub-base or manifold, and fit it straight in. Then tighten the valve mounting screws to secure it in place.

Stacking

The A Type, B Type, AW Type and BW Type manifolds are the stacking type, for flexible addition or reduction of units.

Assembly instructions

240M A and 240M B
Loosening the joint mounting bolts (hexagon socket head bolts) 2 on both ends and removing the joint 1 lets the stations be separated.
To add units, position the O-rings 6 and 7 and gasket 5 in the stacking unit stations, install the joint, and tighten the joint mounting bolts.

240M AW and 240M BW
Loosen the set screw on the terminal cover, remove the terminal cover 9 and connection cover 8, and pull out the terminal block 10.
Loosening the joint mounting bolts on both sides and removing the joint lets the stations be separated. To add units, first position O-rings and gaskets in the stations to be added, install the joint, and tighten the joint mounting bolts. Then, fit the terminal block, secure the terminal cover in place with mounting screws, and fit the connection cover.

Bottom port

Since the B Type and BW Type manifolds have piping ports on the bottom of the manifold, both the bottom and side ports can be used as required.

Piping port location

With the 1(P) port on both ends and the bottom surface, the 4(A) and 2(B) ports on the side and bottom surfaces, and the 3(R2) and 5(R1) ports on both ends and the bottom surface, piping is allowed in any location. Use the plugs provided with the manifold, with sealing tape or another sealing agent, to block off the unused ports.

Port isolator

Port isolators on the 1(P), 3(R2) and 5(R1) ports can be used to separate them from adjacent stations, to allow supply of different pressures, or to prevent exhaust interference.
Port isolators can be fitted and assembled between stations in place of the O-rings 6 to separate the 1(P), 3(R2) and 5(R1) ports from adjacent stations. For stations split by port isolators, plumb the 1(P), 3(R2) and 5(R1) ports on the bottom.

Block-off plate

To close up the unused stations, use a block-off plate (order code: -BP).

Wiring instructions

Solenoid with DIN connector

When de-sheathing (outer sheath of the cabtyre only), pay attention to the outlet direction of the lead wire. The cover will be easy to mount when the lead wire on the outer side of the terminal cover interior is set to about 8mm [0.31in.] longer than the inner side. Without stripping off the sheath, insert the lead wire until it contacts the lead wire stopper on the terminal body, and then place the contact from the upper side. Then use pliers to press the lead wire further to ensure that the contacts are firmly holding the core wire.

SOLENOID VALVES 240 SERIES