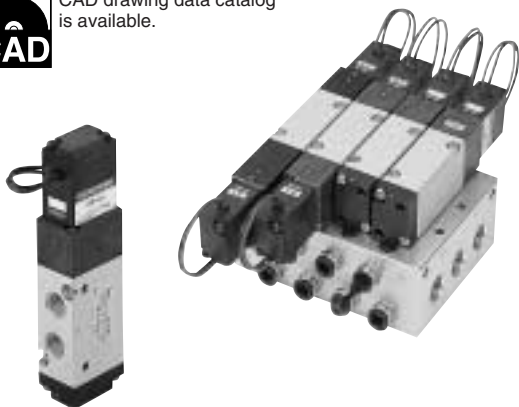




CAD drawing data catalog  
is available.



# KOGANEI

## VALVES GENERAL CATALOG

### SOLENOID VALVES 180 SERIES INDEX

SOLENOID VALVES 180 SERIES

|                                                             |     |
|-------------------------------------------------------------|-----|
| Features                                                    | 331 |
| Basic Models and Configuration                              | 333 |
| Specifications                                              | 335 |
| Cylinder Operating Speed, Flow Rate                         | 337 |
| Tandem Solenoid Valve Order Codes                           | 338 |
| Solenoid Valve, Air-piloted Valve Order Codes               | 339 |
| Manifold Order Codes                                        | 340 |
| Operating Principles and Symbols, Major Parts and Materials | 341 |
| Dimensions of Solenoid Valve                                | 342 |
| Dimensions of Manifold                                      | 347 |
| Made to Order                                               | 353 |
| Plug Connector                                              |     |
| DIN Connector                                               |     |
| LED Indicator                                               |     |
| Built-in Interface Unit                                     |     |
| Sub-base Regulator                                          |     |
| Air-piloted Valves 180 Series                               |     |
| Handling Instructions and Precautions                       | 361 |



#### Caution

Before use, be sure to read the "Safety Precautions" on p. 31.

## Reliability & Versatile Application

# SOLENOID VALVES 180 SERIES

The 180 series Solenoid Valves, which achieve highly reliable, powerful, and low current basic performance in a compact, thin body, offer a simple and flexible standard type, and a full-option type with advanced maintenance features, to become still more user-friendly.

- With a varistor for the AC type, and a flywheel diode for the DC type, the solenoid is equipped with excellent surge suppression measures.

**Standard type**  
Its clean lines emphasize basic performance, for low-cost and versatile applications.

- A manual override (non-locking type) is standard equipment and offers easy adjustment during assembly and maintenance. A fingertip-operable protruding-type manual override (locking type) is also available as an option.

- Equipped with an easy-to-handle plug connector for fast wiring installation and removal. Available in a straight type and L type, both are equipped with LED indicators for easy confirmation of operations.



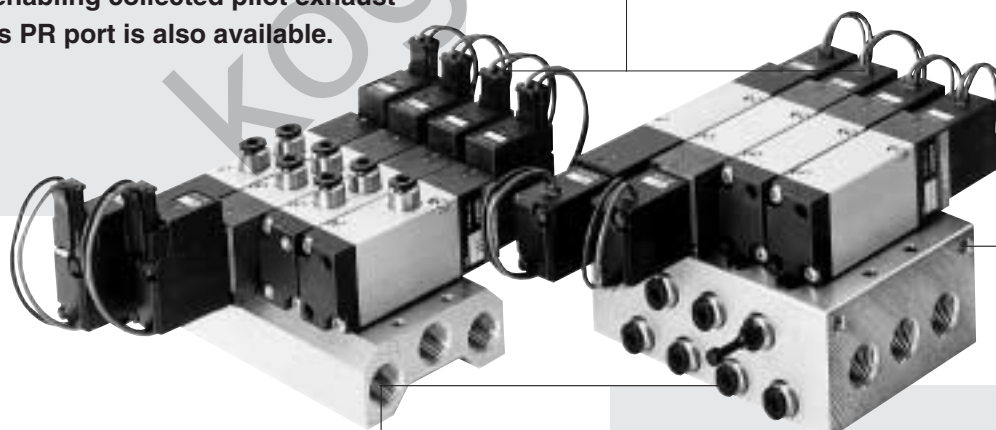
- Built-in quick fittings offer one-touch simple tube installation and removal. Moreover, an effective area of 9.6mm<sup>2</sup> (Cv: 0.53), ensures even more powerful applications.

**Full-option type**  
Greatly improves piping and wiring work efficiency, for excellent applications in assembly, adjustment, and maintenance.

### F type manifold

Direct piping type valves can be mounted directly on this manifold. An FE type manifold enabling collected pilot exhaust through its PR port is also available.

- The common terminal pre-wired plug connector type frees technicians from tedious common terminal wiring work. Crossover wires are used to connect the common terminals, so that a single common wire is sufficient even for a manifold with many stations.



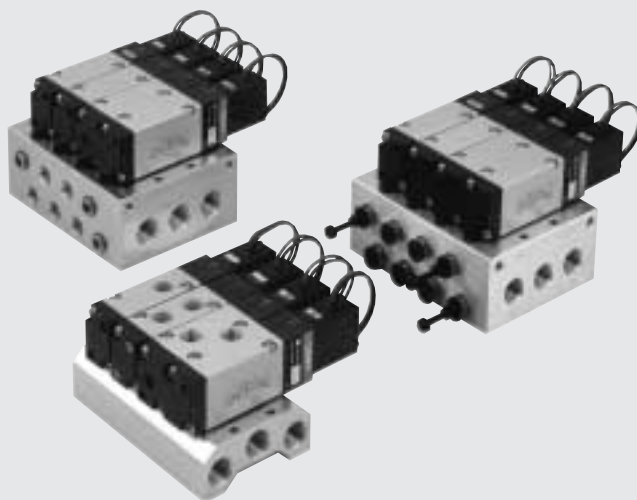
- For the delivery port quick fittings, select from  $\phi 4$  or  $\phi 6$  fittings for each station in accordance with actuator size.

### AJ type manifold

Combines all ports into a manifold base. Quick fittings are built into the delivery ports (4(A), 2(B)), allowing easy assembly and maintenance in a confined space.

- Piping to the pilot exhaust ports is also possible to keep the control box interior and working environment from becoming contaminated. The built-in check mechanism prevents exhaust interference.

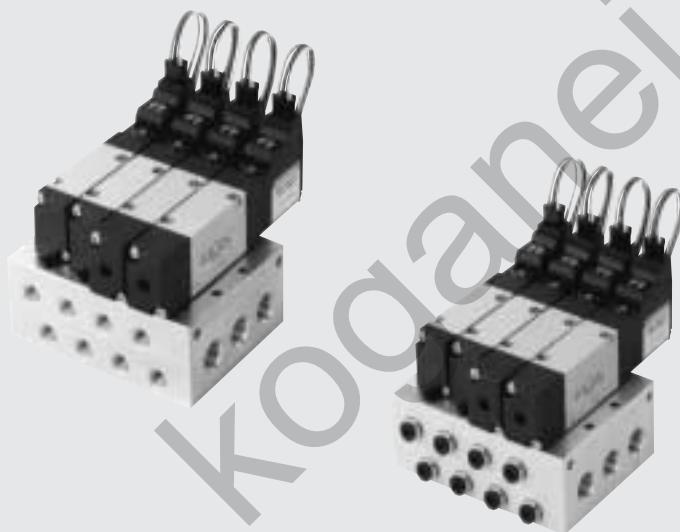
## Twin Solenoid Valve



Ensures the functions of the conventional double solenoid type, but in a much shorter length, while simple wiring enables correct connections with a sequencer. Moreover, it is capable of being installed on a conventional manifold to occupy space for two stations.

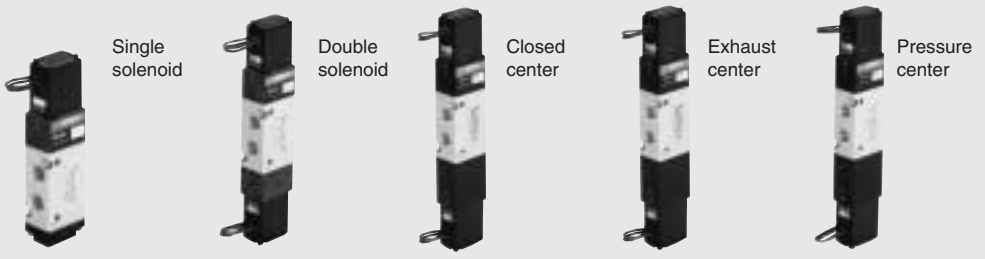
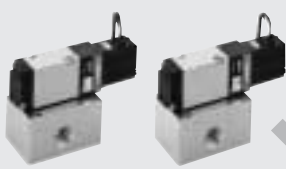
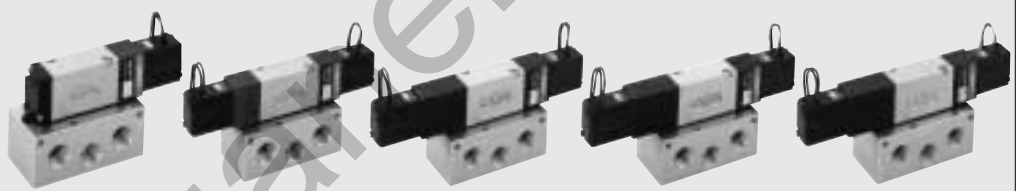
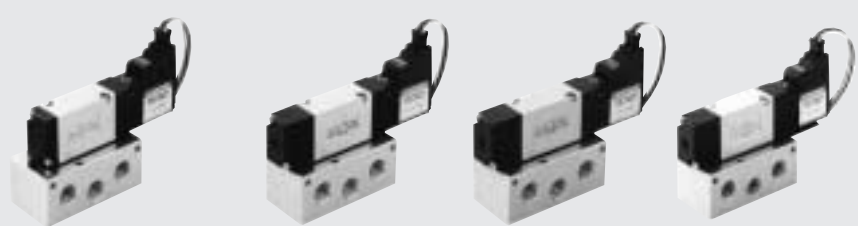
SOLENOID VALVES 180 SERIES

## Tandem Solenoid Valve



Retains the performance specifications of the 180 series while realizing a two-unit combination solenoid in the space of a single station. Achieves a compact outer appearance for the manifold and still more space savings.

## Single unit

|                 | 2-, 3-port                                                                                                                                                                                                                                     | 5-port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Direct piping   | <p>Normally closed (NC)      Normally open (NO)</p>  <p><b>181E1</b>      <b>181E1-11</b><br/>(□180E1)<sup>Note 1</sup>      (□180E1-11)<sup>Note 1</sup></p> | <p>2-position      3-position</p> <p>Single solenoid      Double solenoid      Closed center      Exhaust center      Pressure center</p>  <p><b>180-4E1</b>      <b>180-4E2</b>      <b>183-4E2</b>      <b>183-4E2-13</b>      <b>183-4E2-14</b><br/>(□180-4E2)<sup>Note 2</sup>      (□183-4E2)<sup>Note 2</sup>      (□183-4E2-13)<sup>Note 2</sup>      (□183-4E2-14)<sup>Note 2</sup></p>                                                                                                                                                                                                                            |
| Sub-base piping | <p>Normally closed (NC)      Normally open (NO)</p>  <p><b>A181E1-25</b>      <b>A181E1-11-25</b></p>                                                       | <p>2-position      3-position</p> <p>Single solenoid      Double solenoid      Closed center      Exhaust center      Pressure center</p>  <p><b>A180-4E1-25</b>      <b>A180-4E2-25</b>      <b>A183-4E2-25</b>      <b>A183-4E2-13-25</b>      <b>A183-4E2-14-25</b></p> <p>2-position (tandem solenoid)      3-position (tandem solenoid)</p> <p>Double solenoid      Closed center      Exhaust center      Pressure center</p>  <p><b>A180-4ME2</b>      <b>A183-4ME2</b>      <b>A183-4ME2-13</b>      <b>A183-4ME2-14</b></p> |

Notes: 1. 180E1 and A180E1 are dedicated valves for manifolds with combination mounting of 2-, 3-, 5-port valves. They cannot be used as single units.

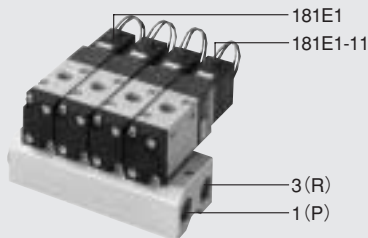
When using 2-, 3-port valves as single units, use 181E1 or A181E1-25.

2. They are dedicated twin solenoid valves for manifolds with combination mounting of 2-, 3-, 5-port valves. They cannot be used as single units.

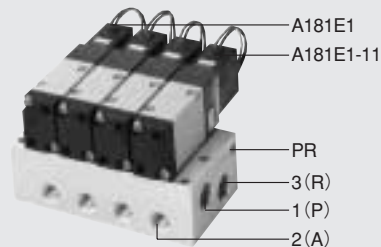
## Manifold

### Small sized manifold for 2-, 3-port valves

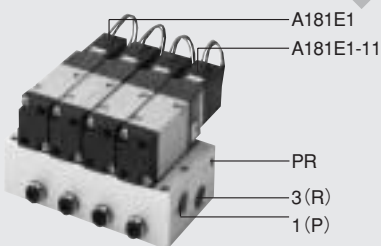
#### 181M□F—F type (1(P), 3(R)) manifold



#### 181M□A—A type (all ports) manifold

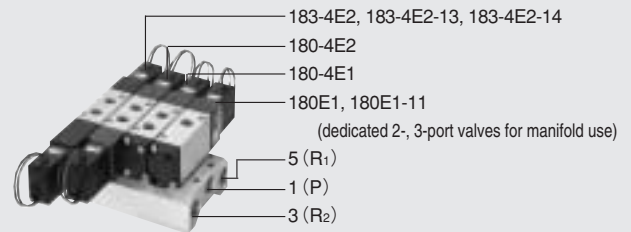


#### 181M□AJ—AJ type (all ports, with quick fittings) manifold

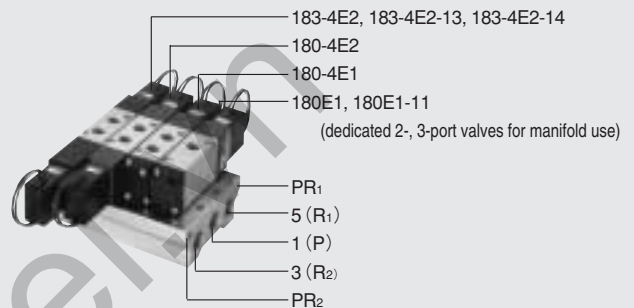


### Manifold for combination mounting of 2-, 3-, 5-port valves

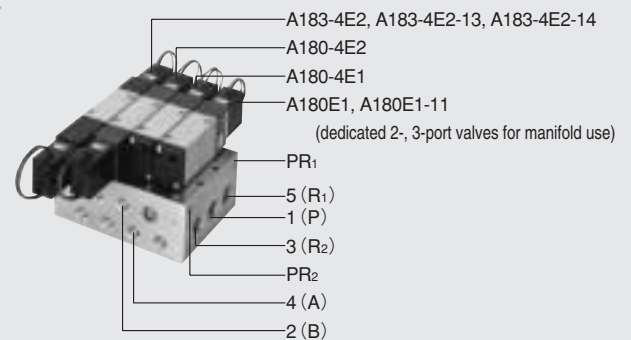
#### 180M□F—F type (1(P), 3(R2), 5(R1)) manifold



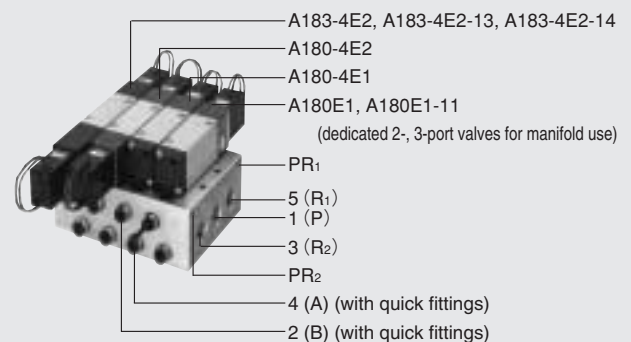
#### 180M□FE—FE type (1(P), 3(R2), 5(R1), PR) manifold



#### 180M□A—A type (all ports) manifold



#### 180M□AJ—AJ type (all ports, with quick fittings) manifold



# SOLENOID VALVES

## 180 SERIES

### Basic Models and Valve Functions

| Item                | Basic model | Direct piping,<br>F, FE type manifolds                               | <b>181E1</b><br><b>(180E1<sup>Note</sup>)</b>                | <b>180-4E1</b><br><b>180-4E2</b>                       | <b>180-4KE2<sup>Note</sup></b>  | <b>183-4E2</b>                                                                                              | <b>183-4KE2</b>                                                                                           |
|---------------------|-------------|----------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|                     |             | Sub-base piping,<br>A, AJ type manifolds                             | <b>A181E1</b><br><b>(A180E1<sup>Note</sup>)</b>              | <b>A180-4E1</b><br><b>A180-4E2</b><br><b>A180-4ME2</b> | <b>A180-4KE2<sup>Note</sup></b> | <b>A183-4E2</b><br><b>A183-4ME2</b>                                                                         | <b>A183-4KE2</b>                                                                                          |
| Number of positions |             | 2 positions                                                          |                                                              |                                                        |                                 | 3 positions                                                                                                 |                                                                                                           |
| Number of ports     |             | 2, 3 ports                                                           | 5 ports                                                      |                                                        |                                 |                                                                                                             |                                                                                                           |
| Valve function      |             | Normally closed (NC, standard)<br>or<br>Normally open (NO, optional) | Single solenoid,<br>Double solenoid<br>or<br>Tandem solenoid | Twin solenoid                                          |                                 | Closed center (standard),<br>Exhaust center (optional),<br>Pressure center (optional)<br>or Tandem solenoid | Closed center (standard),<br>Exhaust center (optional),<br>Pressure center (optional)<br>or Twin solenoid |

Remark: For optional specifications and order codes, see p.338 ~ 340.

Note: 180E1, A180E1, 180-4KE2, and A180-4KE2 are dedicated valves for manifolds with combination mounting of 2-, 3-, 5-port valves. They cannot be used as single units. When using 2-, 3-port valves as single units, use 181E1 or A181E1-25.

### Specifications

| Item                                                       | Basic model | Direct piping,<br>F, FE type manifolds   | 181E1<br>(180E1)                              | 180-4E1<br>180-4E2   | 180-4KE2  | —           | 183-4E2        | 183-4KE2  | —              |
|------------------------------------------------------------|-------------|------------------------------------------|-----------------------------------------------|----------------------|-----------|-------------|----------------|-----------|----------------|
|                                                            |             | Sub-base piping,<br>A, AJ type manifolds | A181E1<br>(A180E1)                            | A180-4E1<br>A180-4E2 | A180-4KE2 | A180-4ME2   | A183-4E2       | A183-4KE2 | A183-4ME2      |
| Media                                                      |             |                                          | Air                                           |                      |           |             |                |           |                |
| Operation type                                             |             |                                          | Internal pilot type                           |                      |           |             |                |           |                |
| Effective area (Cv) <sup>Note 1</sup> mm <sup>2</sup>      |             |                                          | 10.2(0.57)                                    |                      |           | 8.2(0.46)   | 9.0(0.50)      |           | 8.2(0.46)      |
| Port size <sup>Note 2</sup>                                |             |                                          | Rc1/8                                         |                      |           |             |                |           |                |
| Lubrication                                                |             |                                          | Not required                                  |                      |           |             |                |           |                |
| Operating pressure range MPa [kgf/cm <sup>2</sup> ] [psi.] |             |                                          | 0.15~0.7 {1.5~7.1} [22~102]                   |                      |           |             |                |           |                |
| Proof pressure MPa [kgf/cm <sup>2</sup> ] [psi.]           |             |                                          | 1.05 {10.7} [152]                             |                      |           |             |                |           |                |
| Response time <sup>Note 3</sup> ms                         |             | DC12V, DC24V                             | 15/25 or below                                | 15/25 [20] or below  |           | 20 or below | 15/35 or below |           | 15/40 or below |
| ON/OFF                                                     |             | AC100V, AC200V                           | 15/15 or below                                | 15/15 [15] or below  |           | —           | 15/20 or below |           | —              |
| Maximum operating frequency Hz                             |             |                                          | 5                                             |                      |           |             |                |           |                |
| Minimum time to energize for self holding ms               |             |                                          | —                                             | 50 (□180-4E2)        | 50        |             | —              |           |                |
| Operating temperature range (atmosphere and media) °C [°F] |             |                                          | 5~50 [41~122]                                 |                      |           |             |                |           |                |
| Shock resistance m/s <sup>2</sup> {G}                      |             |                                          | 1373.0 {140.0} (Axial direction 294.2 {30.0}) |                      |           |             | 294.2 {30.0}   |           |                |
| Mounting direction                                         |             |                                          | Any                                           |                      |           |             |                |           |                |

Notes: 1. For details, see the effective area on p.336.

2. For details, see the port size on p.336.

3. Values when air pressure is 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]. Values in brackets [ ] for 180-4E2, 183-4KE2, and for A180-4ME2 are when switching from the opposite position, while the values for 183-4E2, 183-4KE2, and A183-4ME2 are those of the closed center valve, when switching from the neutral position.

### Solenoid Specifications

| Item                                             |            | Rated voltage                                                                 | DC12V                                                | DC24V                                                                                                   | AC100V                                                                                                |    | AC200V                                 |    | DC24V (Tandem solenoid)                 |           |
|--------------------------------------------------|------------|-------------------------------------------------------------------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----|----------------------------------------|----|-----------------------------------------|-----------|
| Type                                             |            |                                                                               | Flywheel diode incorporated<br>for surge suppression |                                                                                                         | Shading type                                                                                          |    |                                        |    | Built-in surge<br>absorption transistor |           |
| Operating voltage range                          |            | V                                                                             | 10.8~13.2<br>(12±10%)                                | 21.6~26.4<br>(24±10%)                                                                                   | 90~132<br>(100 $\pm\frac{32}{10}\%$ )                                                                 |    | 180~264<br>(200 $\pm\frac{32}{10}\%$ ) |    | 21.6~26.4<br>(24±10%)                   |           |
| Current<br>(when rated<br>voltage<br>is applied) | Frequency  | Hz                                                                            | —                                                    | —                                                                                                       | 50                                                                                                    | 60 | 50                                     | 60 | —                                       |           |
|                                                  | Starting   | mA (r.m.s)                                                                    |                                                      | —                                                                                                       | —                                                                                                     | 36 | 32                                     | 18 | 16                                      | —         |
|                                                  | Energizing | mA (r.m.s)                                                                    |                                                      | $\left\{ \begin{array}{l} 130\ (1.6W) \\ 140\ (1.7W) \\ \text{with LED indicator} \end{array} \right\}$ | $\left\{ \begin{array}{l} 65\ (1.6W) \\ 75\ (1.8W) \\ \text{with LED indicator} \end{array} \right\}$ | 24 | 20                                     | 12 | 10                                      | 50 (1.2W) |
| Allowable leakage current                        |            | mA                                                                            |                                                      | 8                                                                                                       | 4                                                                                                     | 4  | 2                                      | 2  | 2                                       |           |
| Insulation resistance                            |            | MΩ                                                                            |                                                      | Over 100                                                                                                |                                                                                                       |    |                                        |    |                                         |           |
| Wiring type<br>and lead<br>wire length           | Standard   | Grommet type: 300mm [11.8in.]                                                 |                                                      |                                                                                                         |                                                                                                       |    |                                        |    | Plug connector type: 300mm [11.8in.]    |           |
|                                                  | Optional   | Plug connector type: 300mm [11.8in.]<br>Note: See made to order on p.353~354. |                                                      |                                                                                                         |                                                                                                       |    |                                        |    | —                                       |           |
| Color of lead wire                               |            | Brown (+)<br>Black (—)                                                        |                                                      | Red (+)<br>Black (—)                                                                                    | Yellow                                                                                                |    | White                                  |    | Red (SA), Black (COM)<br>White (SB)     |           |
| Color of LED indicator                           |            | Red                                                                           |                                                      |                                                                                                         | Yellow                                                                                                |    | Green                                  |    | Red                                     |           |
| Surge suppression (as standard)                  |            | Flywheel diode                                                                |                                                      |                                                                                                         | Varistor                                                                                              |    |                                        |    | Surge absorption transistor             |           |

## Effective Area [Cv]

mm<sup>2</sup> [Cv]

| Basic model                                                                                                                | Standard (Single valve) | Built-in quick fittings              | Remarks                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 181E1 <sup>Note</sup><br>(180E1)<br>180-4E1<br>180-4E2<br>180-4KE2                                                         | 10.2<br>[0.57]          | -J4□: 4.4 [0.24]<br>-J6□: 9.6 [0.53] | <ul style="list-style-type: none"> <li>● When attaching TS6-01 to the 1(P), 4(A), 2(B) ports, the value is 9.2 [0.51].</li> <li>● On the F type manifold, attaching TS4-01 to the 4(A), 2(B) ports gives the value 4.1 [0.23], and attaching TS6-01 gives the value 9.2 [0.51].</li> <li>● When large flow rates are required, we recommend the <math>\phi</math> 6 built-in quick fitting type.</li> </ul> |
| 183-4E2<br>183-4KE2                                                                                                        | 9.0<br>[0.50]           | -J4□: 4.4 [0.24]<br>-J6□: 8.5 [0.47] |                                                                                                                                                                                                                                                                                                                                                                                                             |
| A181E1 <sup>Note</sup><br>(A180E1)<br>A180-4E1<br>A180-4E2<br>A180-4KE2<br>A183-4E2<br>A183-4KE2<br>A180-4ME2<br>A183-4ME2 | 8.2<br>[0.46]           | -J4□: 4.4 [0.24]<br>-J6□: 7.9 [0.44] | <ul style="list-style-type: none"> <li>● When mounting on a sub-base or manifold.</li> <li>● Attaching TS6-02 to the 1(P), 4(A), 2(B) ports on the sub-base gives the value 7.5 [0.42].</li> </ul>                                                                                                                                                                                                          |

Note: The delivery port is the 2(A) for 180E1, A181E1.

## Solenoid Valve Port Size

| Basic model                                                                                             | Port specification |               | Port size                                              |
|---------------------------------------------------------------------------------------------------------|--------------------|---------------|--------------------------------------------------------|
| 181E1 <sup>Note1</sup><br>(180E1 <sup>Note2</sup> )                                                     | Standard           | Female thread | Rc1/8                                                  |
|                                                                                                         | Optional           | -J41          | Quick fitting for $\phi$ 4, for 2(A) (4(A)) port only  |
|                                                                                                         |                    | -J42          | Quick fitting for $\phi$ 4, for 1(P), 2(A) ports       |
|                                                                                                         |                    | -J61          | Quick fitting for $\phi$ 6, for 2(A) (4(A)) port only  |
|                                                                                                         |                    | -J62          | Quick fitting for $\phi$ 6, for 1(P), 2(A) ports       |
| 180-4E1<br>180-4E2<br>180-4KE2<br>183-4E2<br>183-4KE2                                                   | Standard           | Female thread | Rc1/8                                                  |
|                                                                                                         | Optional           | -J42          | Quick fitting for $\phi$ 4, for 4(A), 2(B) ports only  |
|                                                                                                         |                    | -J43          | Quick fitting for $\phi$ 4, for 1(P), 4(A), 2(B) ports |
|                                                                                                         |                    | -J62          | Quick fitting for $\phi$ 6, for 4(A), 2(B) ports only  |
|                                                                                                         |                    | -J63          | Quick fitting for $\phi$ 6, for 1(P), 4(A), 2(B) ports |
| A181E1-25 <sup>Note1</sup><br>A180-4E1-25<br>A180-4E2-25<br>A183-4E2-25<br>A180-4ME2-25<br>A183-4ME2-25 | 1(P)               | Female thread | Rc1/4                                                  |
|                                                                                                         | 4(A), 2(B)         |               |                                                        |
|                                                                                                         | 3(R2), 5(R1)       |               |                                                        |
|                                                                                                         | PR                 | Female thread | M5×0.8                                                 |

Notes: 1. The delivery port is the 2(A) for 180E1, A181E1-25.

2. Since 180E1 is for manifold use only, piping to the 1(P) port with a fitting is not possible.

## Manifold Connection Port Size

| Manifold model                                              | Port         | Location of piping ports | Port size                              |
|-------------------------------------------------------------|--------------|--------------------------|----------------------------------------|
| 181M□ <sup>Note1</sup><br>180M□ <sup>F</sup>                | 1(P)         | Manifold                 | Rc1/4                                  |
|                                                             | 4(A), 2(B)   | Valve                    | Rc1/8 <sup>Note2</sup>                 |
|                                                             | 3(R2), 5(R1) | Manifold                 | Rc1/4                                  |
| 180M□ <sup>FE</sup>                                         | 1(P)         | Manifold                 | Rc1/4                                  |
|                                                             | 4(A), 2(B)   | Valve                    | Rc1/8                                  |
|                                                             | 3(R2), 5(R1) | Manifold                 | Rc1/4                                  |
|                                                             | PR           |                          | M5×0.8                                 |
| 181M□ <sup>A</sup> <sup>Note1</sup><br>180M□ <sup>A</sup>   | 1(P)         | Manifold                 | Rc1/4                                  |
|                                                             | 4(A), 2(B)   |                          | Rc1/8                                  |
|                                                             | 3(R2), 5(R1) |                          | Rc1/4                                  |
|                                                             | PR           |                          | M5×0.8                                 |
| 181M□ <sup>AJ</sup> <sup>Note1</sup><br>180M□ <sup>AJ</sup> | 1(P)         | Manifold                 | Rc1/4                                  |
|                                                             | 4(A), 2(B)   |                          | Quick fitting for $\phi$ 4 or $\phi$ 6 |
|                                                             | 3(R2), 5(R1) |                          | Rc1/4                                  |
|                                                             | PR           |                          | M5×0.8                                 |

Notes: 1. The delivery port is the 2(A) for 181M□<sup>F</sup>, 181M□<sup>A</sup>, 181M□<sup>AJ</sup>.2. When the mounting valve is a female thread specification, the ports are this size. For the built-in quick fitting types, quick fittings for  $\phi$  4 or  $\phi$  6 are installed.

## Solenoid Valve Mass

g [oz.]

| Basic model | Mass                     |
|-------------|--------------------------|
| 181E1       | 95 [3.35]                |
| (180E1)     | 105 [3.70]               |
| 180-4E1     | 105 [3.70]               |
| 180-4E2     | 155 [5.47]               |
| 180-4KE2    | 255 [8.99]               |
| 183-4E2     | 190 [6.70]               |
| 183-4KE2    | 240 [8.47]               |
| A181E1      | 105 [3.70] (250 [8.82])  |
| (180E1)     | 115 [4.06]               |
| A180-4E1    | 115 [4.06] (275 [9.70])  |
| A180-4E2    | 165 [5.82] (325 [11.46]) |
| A180-4KE2   | 260 [9.17]               |
| A180-4ME2   | 135 [4.76] (295 [10.41]) |
| A183-4E2    | 200 [7.05] (360 [12.70]) |
| A183-4KE2   | 245 [8.64]               |
| A183-4ME2   | 150 [5.29] (310 [10.93]) |

Remark: Figures in parentheses ( ) are the mass with sub-base:-25.

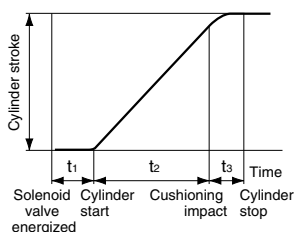
## Manifold Mass

g [oz.]

| Manifold model      | Mass calculation of each unit<br>(n=number of units)                   | Block-off plate |
|---------------------|------------------------------------------------------------------------|-----------------|
| 181M□ <sup>F</sup>  | (32×n)+30 [(1.13×n)+1.06]                                              | 14 [0.49]       |
| 181M□ <sup>A</sup>  | (72×n)+72 [(2.54×n)+2.54]                                              | 22 [0.78]       |
| 181M□ <sup>AJ</sup> | -J4 : (80×n)+72 [(2.82×n)+2.54]<br>-J6 : (78×n)+72 [(2.75×n)+2.54]     |                 |
| 180M□ <sup>F</sup>  | (42×n)+40 [(1.48×n)+1.41]                                              | 19 [0.67]       |
| 180M□ <sup>FE</sup> | (60×n)+70 [(2.12×n)+2.47]                                              | 30 [1.06]       |
| 180M□ <sup>A</sup>  | (120×n)+120 [(4.23×n)+4.23]                                            |                 |
| 180M□ <sup>AJ</sup> | -J4 : (135×n)+120 [(4.76×n)+4.23]<br>-J6 : (138×n)+120 [(4.87×n)+4.23] |                 |

## Cylinder operating speed

How to obtain cylinder speed

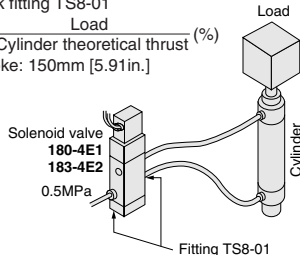


To obtain the time required for the cylinder to complete 1 stroke, add cylinder's delay time  $t_1$  (time between energizing of the solenoid valve and actual starting of the cylinder), to the cylinder's max. speed operating time  $t_2$ . When a cushion is is used, add the cushioning time  $t_3$  to the above calculation. The standard cushioning time  $t_3$  is approximately 0.2 seconds.

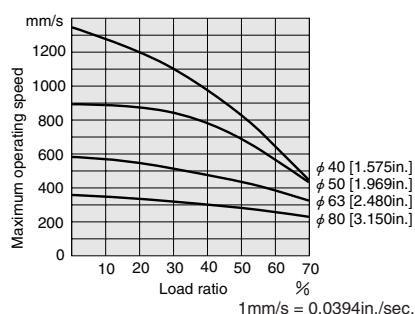
### 180-4E1 183-4E2

#### ● Measurement conditions

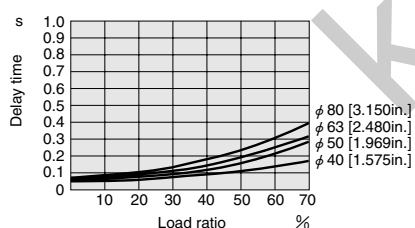
- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length:  $\phi 6 \times 1000$ mm [39in.]
- Fitting: Quick fitting TS8-01
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}} (\%)$
- Cylinder stroke: 150mm [5.91in.]



#### Maximum operating speed



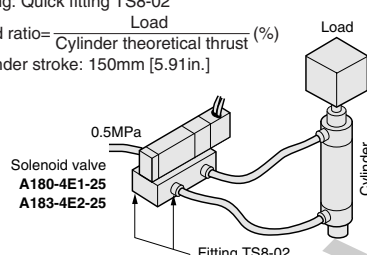
#### Delay time



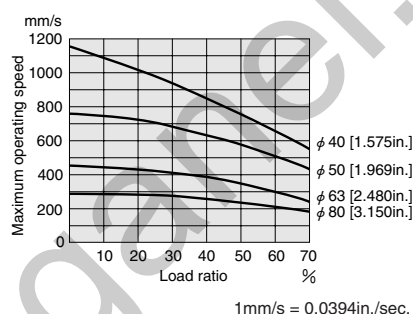
### A180-4E1-25 A183-4E2-25

#### ● Measurement conditions

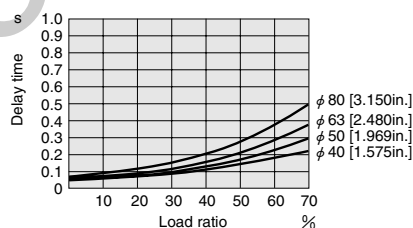
- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length:  $\phi 6 \times 1000$ mm [39in.]
- Fitting: Quick fitting TS8-02
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}} (\%)$
- Cylinder stroke: 150mm [5.91in.]



#### Maximum operating speed



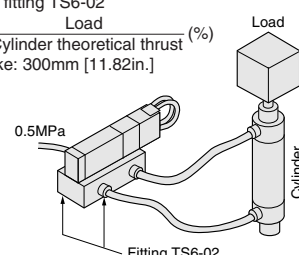
#### Delay time



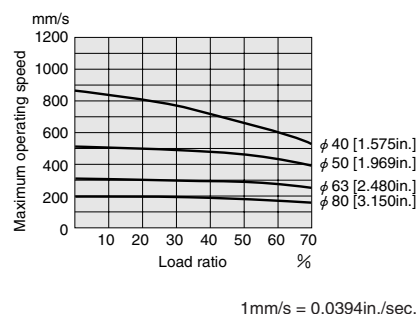
### A180-4ME2 A183-4ME2

#### ● Measurement conditions

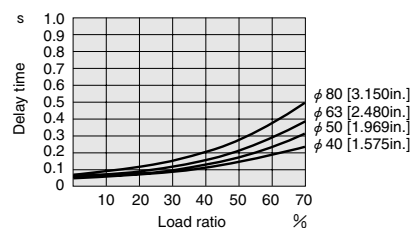
- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length:  $\phi 6 \times 1000$ mm [39in.]
- Fitting: Quick fitting TS6-02
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}} (\%)$
- Cylinder stroke: 300mm [11.82in.]



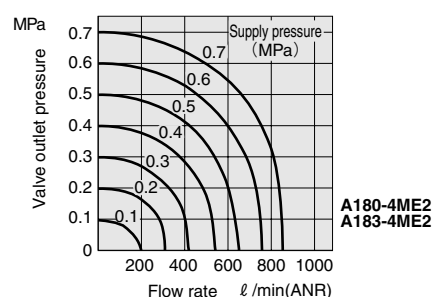
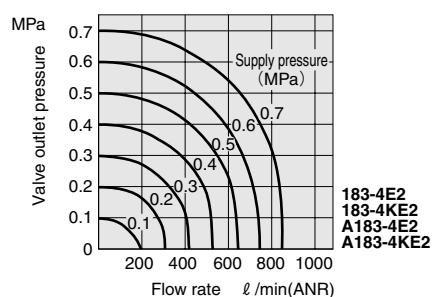
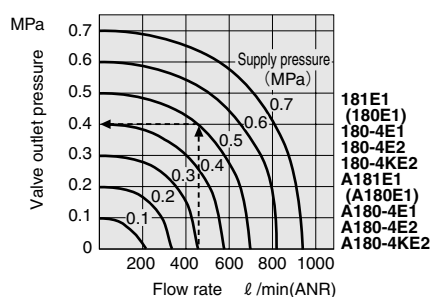
#### Maximum operating speed



#### Delay time



## Flow Rate



#### How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 460 l/min [16.2ft<sup>3</sup>/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

# 180 Series Tandem Solenoid Valve Order Codes

※Single solenoid, double solenoid, twin solenoid, and tandem solenoid valves can be mounted together on the manifold.

## ● Solenoid valves

■ 3-position valve  
Valve function  
Closed center: **Blank**  
Exhaust center: **-13**  
Pressure center: **-14**

■ Sub-base  
Without sub-base: **Blank**  
With sub-base: **-25**

■ Manual override  
Locking type: **-81**  
Locking protruding type: **-83**  
Locking manual lever type: **-84**

■ Wiring type  
Straight connector  
with LED indicator: **-PSL**  
L connector  
with LED indicator: **-PLL**

|                 |                        | Basic model |          |     |                   |              |  | Voltage |  |  |
|-----------------|------------------------|-------------|----------|-----|-------------------|--------------|--|---------|--|--|
| Sub-base piping | 5-port double solenoid | A180-4ME2   |          | -25 | -81<br>-83<br>-84 | -PSL<br>-PLL |  | DC24V   |  |  |
|                 | 5-port 3-position      | A183-4ME2   | -13, -14 |     |                   |              |  |         |  |  |

Note: They cannot be used as single units.

● Always select one from each group.

## ● Manifold

■ 3-position valve  
Valve function  
Closed center: **Blank**  
Exhaust center: **-13**  
Pressure center: **-14**

■ Manual override  
Locking type: **-81**  
Locking protruding type: **-83**  
Locking manual lever type: **-84**

■ Wiring type  
Straight connector  
with LED indicator: **-PSL**  
L connector  
with LED indicator: **-PLL**

■ Manifold  
Connection port  
Quick fitting for  $\phi$  4 tube: **-J4**  
Quick fitting for  $\phi$  6 tube: **-J6**

| Manifold model/Number of units                             |      |              | Station | Basic model |            |          |                   |              |            |       |  | Voltage |
|------------------------------------------------------------|------|--------------|---------|-------------|------------|----------|-------------------|--------------|------------|-------|--|---------|
| Manifold for combination mounting of 2-, 3-, 5-port valves | 180M | 2<br>⋮<br>20 | A<br>AJ | stn.□       | -A180-4ME2 | -13, -14 | -81<br>-83<br>-84 | -PSL<br>-PLL | -J4<br>-J6 | DC24V |  |         |
|                                                            |      |              |         | ⋮<br>stn.□  | -A183-4ME2 |          |                   |              |            |       |  |         |

● 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.

● Always select one from each group.

● For the AJ type manifold only, specify either of the two.

## Options

### ■ Wiring type

Straight connector with LED indicator



**-PSL**

L connector with LED indicator

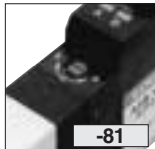


**-PLL**

● Lead wire length 300mm

### ■ Manual override

Locking type



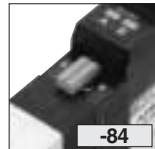
**-81**

Locking protruding type



**-83**

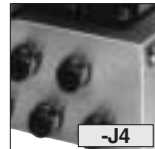
Locking manual lever type



**-84**

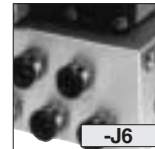
### ■ AJ type manifold

Quick fitting for  $\phi$  4 tube



**-J4**

Quick fitting for  $\phi$  6 tube



**-J6**

● Specify the tube size for each station.

## Additional Parts (To be ordered separately)

Speed controller



**SCE-02**

● For sub-base piping

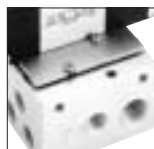
Muffler



**KM-22**

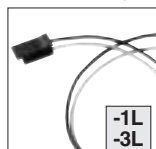
● For sub-base piping

Block-off plate



● **180 MA-BP**  
180 — For 180M

Lead wire length



**-1L**  
**-3L**

● For plug connector  
● Length **-1L**: 1000 [39in.] (mm)  
**-3L**: 3000 [118in.]

## Made to Order

\_\_\_\_\_

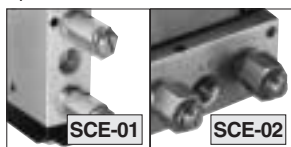
[illegible]

Notes: 1. They cannot be used as single units.

2. The port fittings are for  $\phi 4$ : TSK4-M8M, and for  $\phi 6$ : TSK6-M8M.

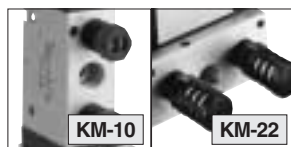
### Additional Parts (To be ordered separately)

## Speed controller



● For direct piping      ● For sub-base piping

## Muffler



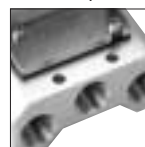
● For direct piping      ● For sub-base piping

### Mounting base



- For direct piping
- For 2-, 3-port and 5-port single solenoids

## Block-off plate



181—For 181M  
180—For 180M

- **F** —For F type manifold
- FE**—For FE type manifold
- A** —For A type, AJ type manifolds

# 180 Series Manifold Order Codes

**2-, 3-port valve**  
Number of ports

3-port

Blank

2-port

-2

**2-, 3-port valve**  
Valve function

Normally closed (NC)

Blank

Normally open (NO)

-11

**3-position valve**  
Valve function

Closed center

Blank

Exhaust center

-13

Pressure center

-14

**Port fitting specifications** Note 1

Female thread: **Blank**

~J41, ~J42: Quick fitting for  $\phi$  4 tube  
~J61, ~J62: Quick fitting for  $\phi$  6 tube

~J41  
~J61

~J42  
~J62

● 2(A) port of 181E1  
4(A) port of 180E1

● 4(A), 2(B) ports of 5-port

**Manual override**

Non-locking type

Blank

Locking protruding type

-83

**Wiring type**

● Lead wire length: 300mm [11.8in.] is standard.

Grommet type

Blank

Straight connector with LED indicator

-PSL

L connector with LED indicator

-PLL

Straight connector with LED indicator

-CPSL  
-CMSL

L connector with LED indicator

-CPLL  
-CMLL

● -CP□□L: DC12V and DC24V positive side, and AC100V, AC200V.  
● -CM□□L: DC12V and DC24V negative side.

**Manifold Connection port**

Quick fittings for  $\phi$  4 tube

-J4

Quick fittings for  $\phi$  6 tube

-J6

| Manifold model<br>Number of units                             |      | Station      | Basic model |                     |            |    |            |              |                                                  | Voltage                                          |                                    |                                    |
|---------------------------------------------------------------|------|--------------|-------------|---------------------|------------|----|------------|--------------|--------------------------------------------------|--------------------------------------------------|------------------------------------|------------------------------------|
| Manifold for<br>2-, 3-port valves                             | 181M | 2<br>⋮<br>20 | F           | stn.□               | -181E1     | -2 | -11        | -J41<br>-J61 | -83                                              | -PSL<br>-PLL<br>-CPSL<br>-CMSL<br>-CPLL<br>-CMLL | -J4<br>-J6                         | DC12V<br>DC24V<br>AC100V<br>AC200V |
|                                                               |      |              | A<br>AJ     | stn.□               | -A181E1    | -2 | -11        |              |                                                  |                                                  |                                    |                                    |
| Manifold for combination mounting<br>of 2-, 3-, 5-port valves | 180M | 2<br>⋮<br>20 | F<br>FE     | stn.□<br>⋮<br>stn.□ | -180E1     | -2 | -11        | -J41<br>-J61 | -83                                              | -PSL<br>-PLL<br>-CPSL<br>-CMSL<br>-CPLL<br>-CMLL |                                    | DC12V<br>DC24V<br>AC100V<br>AC200V |
|                                                               |      |              |             |                     | -180-4E1   |    |            | -J42<br>-J62 |                                                  |                                                  |                                    |                                    |
|                                                               |      |              |             |                     | -180-4E2   |    |            |              |                                                  |                                                  |                                    |                                    |
|                                                               |      |              |             |                     | -180-4KE2  |    |            |              |                                                  |                                                  |                                    |                                    |
|                                                               |      |              |             |                     | -183-4E2   |    | -13<br>-14 |              |                                                  |                                                  |                                    |                                    |
|                                                               |      |              |             |                     | -183-4KE2  |    |            |              |                                                  |                                                  |                                    |                                    |
|                                                               |      |              | A<br>AJ     | stn.□<br>⋮<br>stn.□ | -A180E1    | -2 | -11        | -83          | -PSL<br>-PLL<br>-CPSL<br>-CMSL<br>-CPLL<br>-CMLL | -J4<br>-J6                                       | DC12V<br>DC24V<br>AC100V<br>AC200V |                                    |
|                                                               |      |              |             |                     | -A180-4E1  |    |            |              |                                                  |                                                  |                                    |                                    |
|                                                               |      |              |             |                     | -A180-4E2  |    |            |              |                                                  |                                                  |                                    |                                    |
|                                                               |      |              |             |                     | -A180-4KE2 |    |            |              |                                                  |                                                  |                                    |                                    |
|                                                               |      |              |             |                     | -A183-4E2  |    | -13<br>-14 |              |                                                  |                                                  |                                    |                                    |
|                                                               |      |              |             |                     | -A183-4KE2 |    |            |              |                                                  |                                                  |                                    |                                    |
| Manifold for mounting<br>5-port (made to order)               | 180M | 2<br>⋮<br>20 | F           | stn.□<br>⋮<br>stn.□ | -180-4A    |    |            | -J42<br>-J62 |                                                  |                                                  |                                    |                                    |
|                                                               |      |              |             |                     | -180-4A2   |    |            |              |                                                  |                                                  |                                    |                                    |
|                                                               |      |              | A<br>AJ     | stn.□<br>⋮<br>stn.□ | -A180-4A   |    |            |              |                                                  | -J4<br>-J6                                       |                                    |                                    |
|                                                               |      |              |             |                     | -A180-4A2  |    |            |              |                                                  |                                                  |                                    |                                    |

Note: The port fittings are for  $\phi$  4: TSK4-M8M, and for  $\phi$  6: TSK6-M8M.

- Specify the valve model for each station.
- Enter -BP when closing a station with a block-off plate without mounting a valve.
- Valve mounting location from the left-hand side when facing the 4(A), 2(B) ports.
- Since a twin solenoid valve requires 2 stations per valve to mount, the second station (solenoid 12(S1) side) should be blank.

- For the AJ type manifold only.
- It is not required when ordering as a single valve unit.
- Pre-wired common terminal for AC100V and AC200V is either -CPSL or -CPLL.

## Made to Order

The 180 series includes made to order items of various kinds for further system development. For details, see p.353~360.

**Straight connector with LED indicator**

-PSLN

● Without lead wire  
● Connector, contacts included

**L connector with LED indicator**

-PLLN

● Without lead wire  
● Connector, contacts included

**Lead wire length**

-1L  
-3L

● For plug connector  
● Length -1L: 1000 [39in.] (mm)  
-3L: 3000 [118in.]

**DIN connector**

-39

● Cannot be used with -L.

**LED indicator with built-in varistor**

-L

● Cannot be used with -39.

**Built-in interface unit**

-FA

● Possible to be directly controlled by output from micro computer or other logic devices.  
● With LED indicator

**Sub-base regulator**

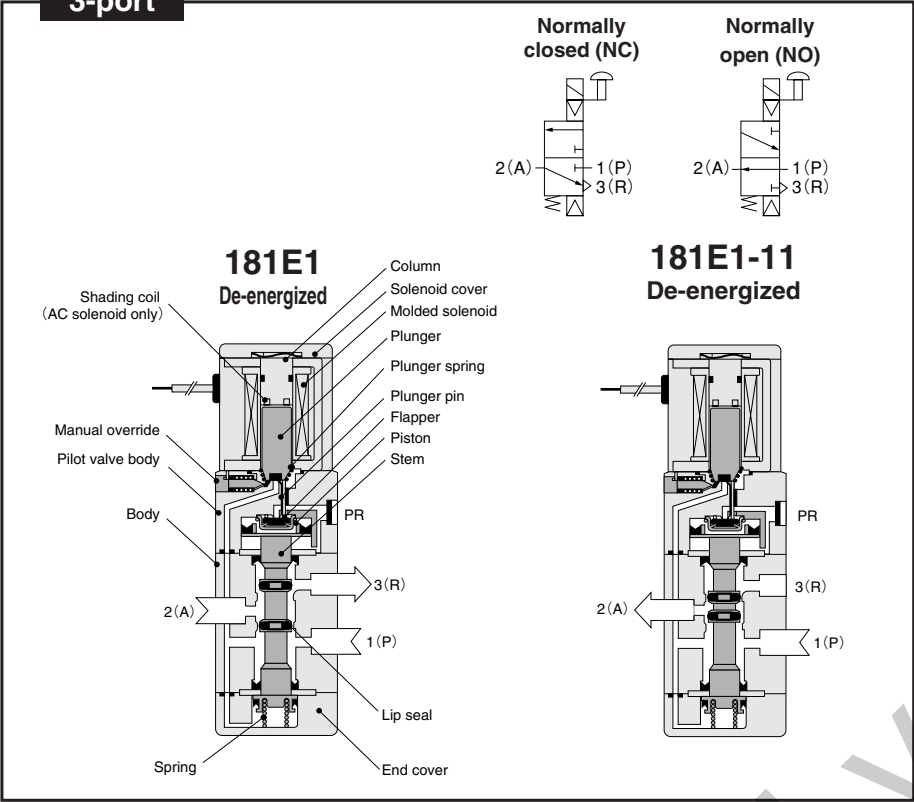
-52  
-54

● Regulate the pressure at each station on the manifold.  
● -52: P port pressure regulating type  
-54: B port pressure regulating type

**Air-piloted valves 180 series**

● 5-port, 2-position  
● Single pilot  
● Double pilot

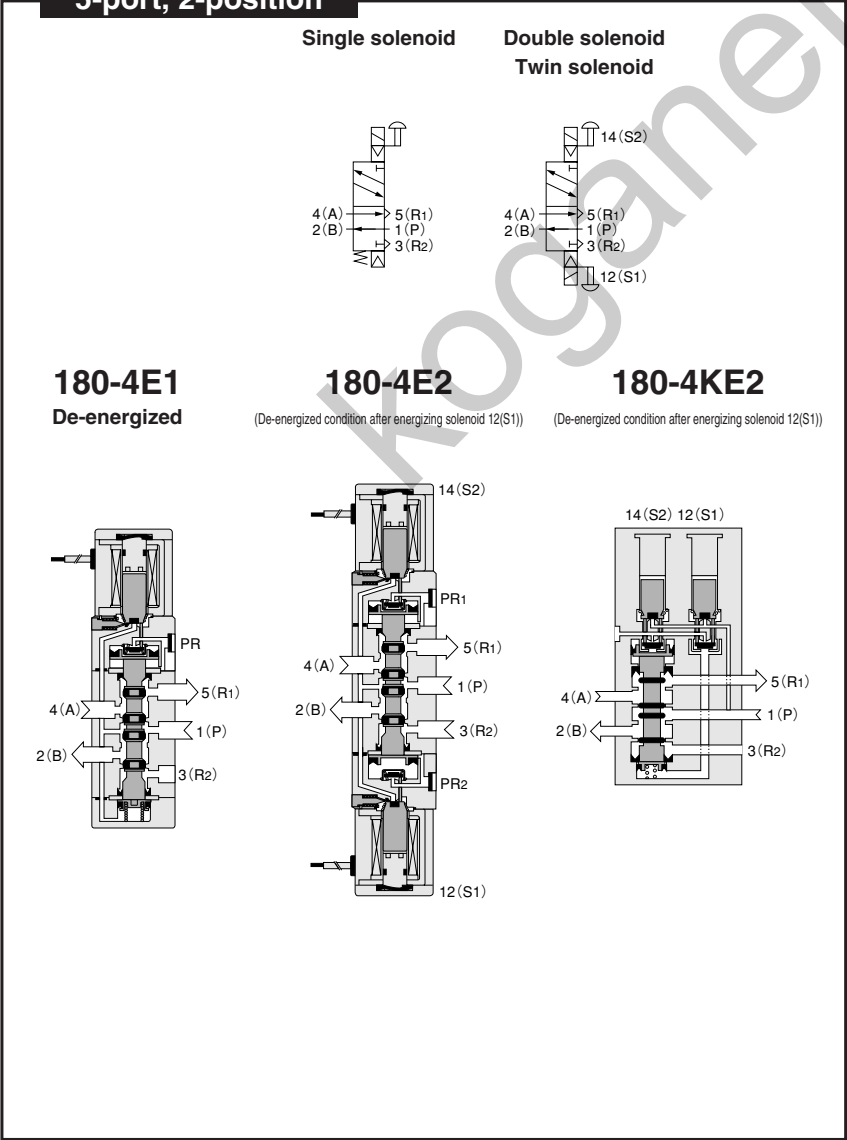
3-port



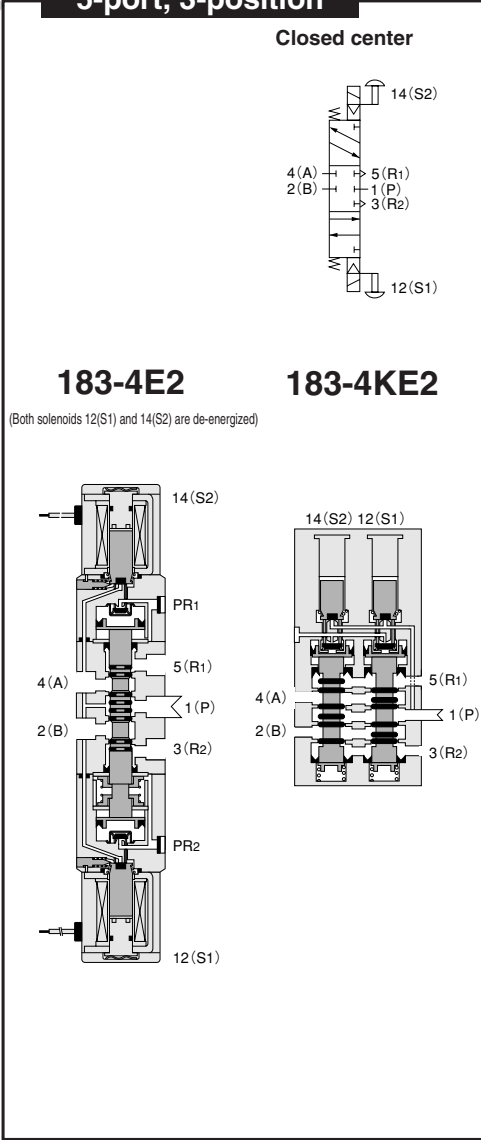
Major Parts and Materials

| Parts    |                 | Materials                  |
|----------|-----------------|----------------------------|
| Valve    | Body            | Aluminum alloy (anodized)  |
|          | Stem            | Aluminum alloy (anodized)  |
|          | Lip seal        | Synthetic rubber           |
|          | Flapper         | Synthetic rubber           |
|          | Mounting base   | Mild steel (zinc plated)   |
|          | Sub-base        | Aluminum alloy (anodized)  |
|          | Plunger         | Magnetic stainless steel   |
| Manifold | Body            | Aluminum alloy (anodized)  |
|          | Block-off plate | Mild steel (nickel plated) |
|          | Seal            | Synthetic rubber           |

5-port, 2-position



5-port, 3-position



### Dimensions of Solenoid Valve, 2-, 3-port (mm)

**181E1**

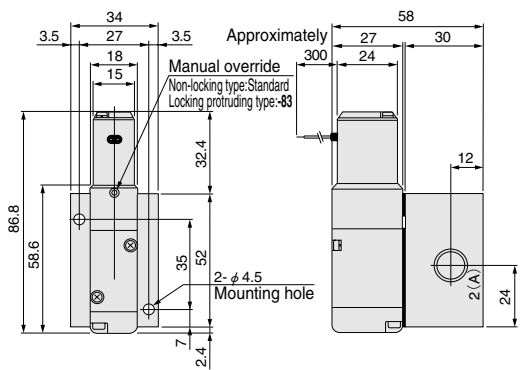
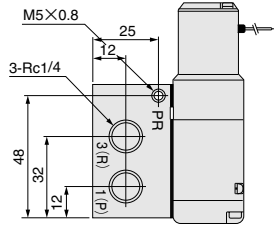
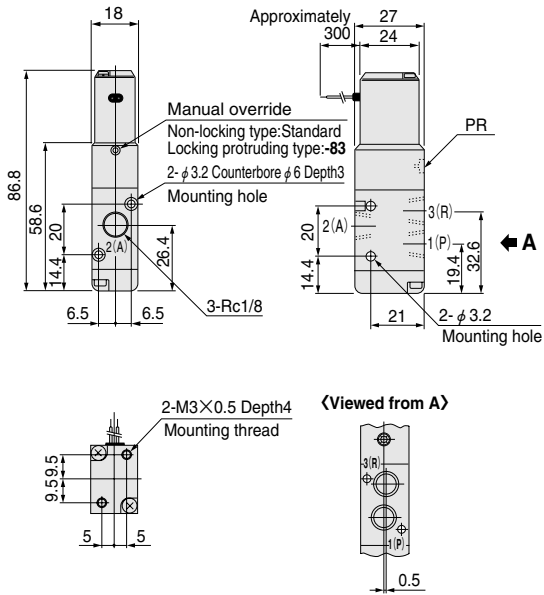


181E1

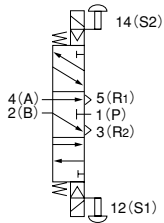
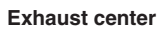
**A181E1-25**



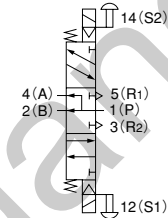
A181E1



# SOLENOID VALVES 180 SERIES



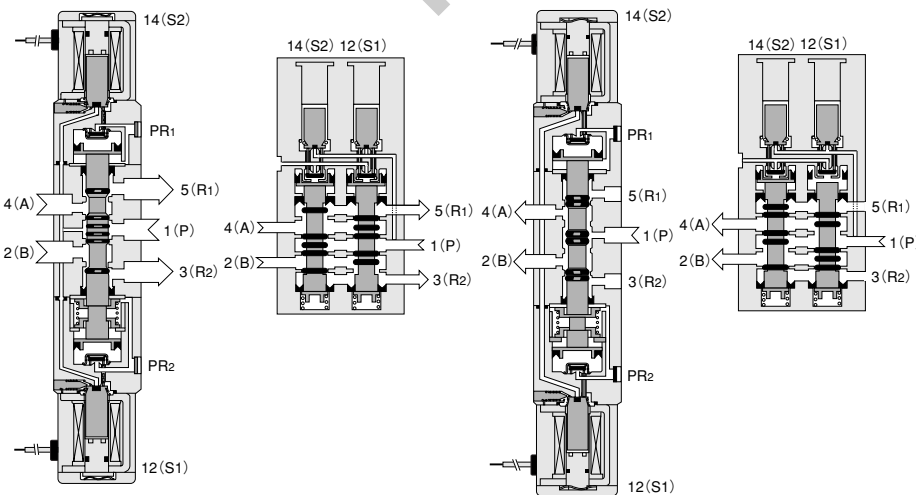
### Pressure center



183-4E2-13    183-4KE2-13    183-4E2-14    183-4KE2-14

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

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

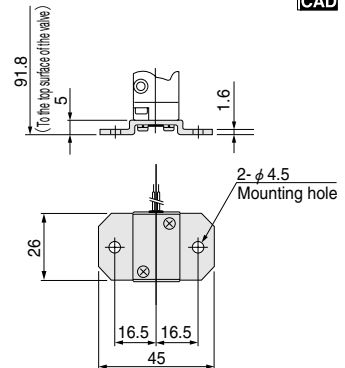


### Additional Parts (To be ordered separately)

● Mounting base: 180-21



180-BASE



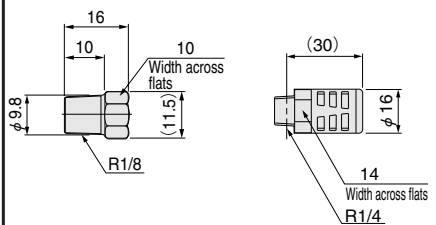
● Muffler



180-MUFF

For direct piping: **KM-10**

For sub-base piping: **KM-22**



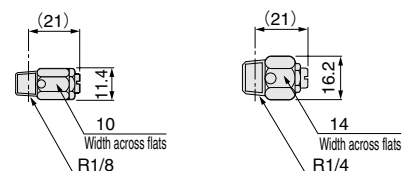
- Speed controller



180-SC

For direct piping: **SCE-01**

For sub-base mounting: **SCE-02**



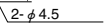
\_\_\_\_\_



180-4E1



A180-4E1



180-4E2



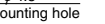
A180-4E2



183-4E2



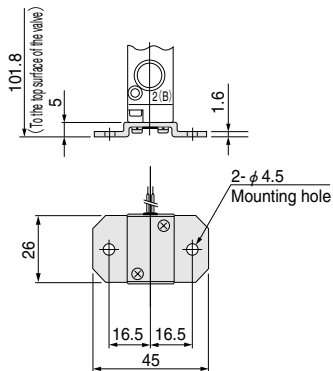
A183-4E2



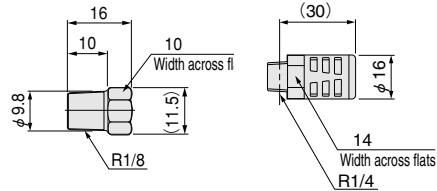
## Additional Parts (To be ordered separately)

● Mounting base: **180-21**  180-BASE ● Muffler  180-MUFF

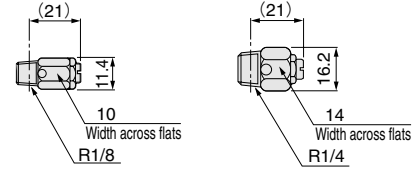
● Speed controller  180-SC



For direct piping: **KM-10** For sub-base piping: **KM-22**



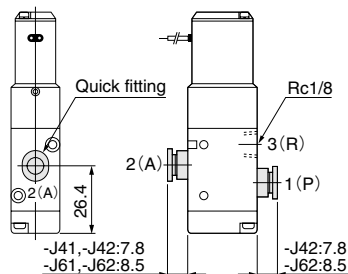
For direct piping: **SCE-01** For sub-base mounting: **SCE-02**



## Options

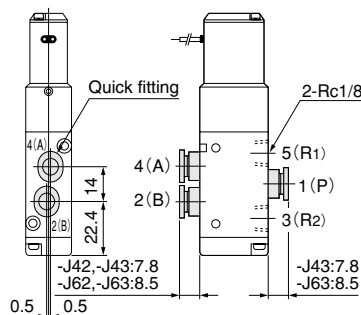
● With quick fittings (2-, 3-port):

- J41 (For φ 4 tube, 2(A) or 4(A) port with fitting)
  - J42 (For φ 4 tube, 1(P), 2(A) ports with fittings)
  - J61 (For φ 6 tube, 2(A) or 4(A) port with fitting)
  - J62 (For φ 6 tube, 1(P), 2(A) ports with fittings)
- The drawing shows the -J62 specification.

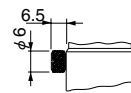


● With quick fittings (5-port):

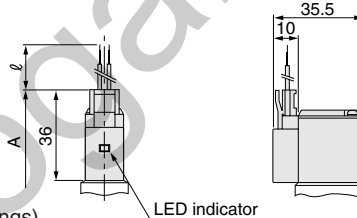
- J42 (For φ 4 tube, 4(A), 2(B) ports with fittings)
  - J43 (For φ 4 tube, 1(P), 4(A), 2(B) ports with fittings)
  - J62 (For φ 6 tube, 4(A), 2(B) ports with fittings)
  - J63 (For φ 6 tube, 1(P), 4(A), 2(B) ports with fittings)
- The drawing shows the -J63 specification.



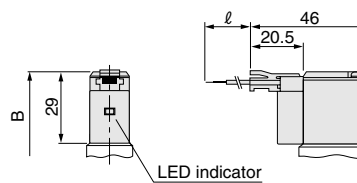
● Locking protruding type manual override: **-83**  
 180-ROCK



● Solenoid with straight connector: **-PSL**  
 180-PSL



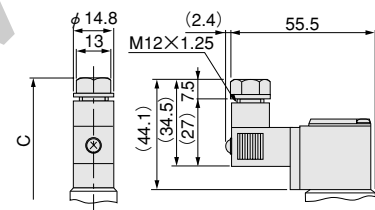
● Solenoid with L connector: **-PLL**  
 180-PLL



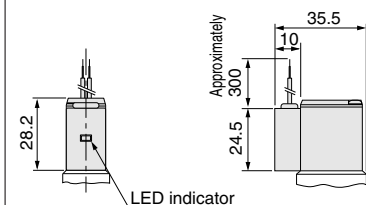
## Made to Order

 180-PSL

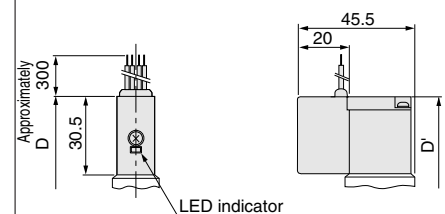
● Solenoid with DIN connector: **-39**



● Solenoid with LED indicator: **-L**



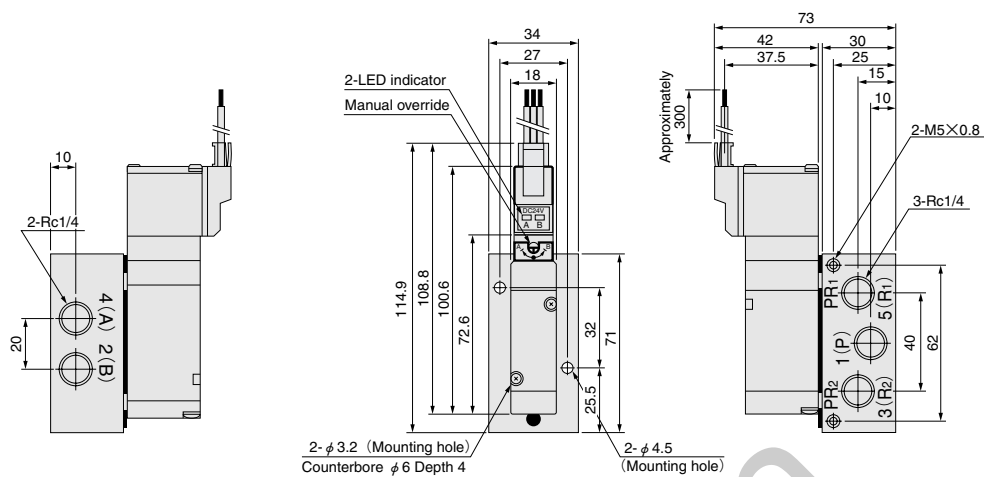
● Built-in interface unit: **-FA**



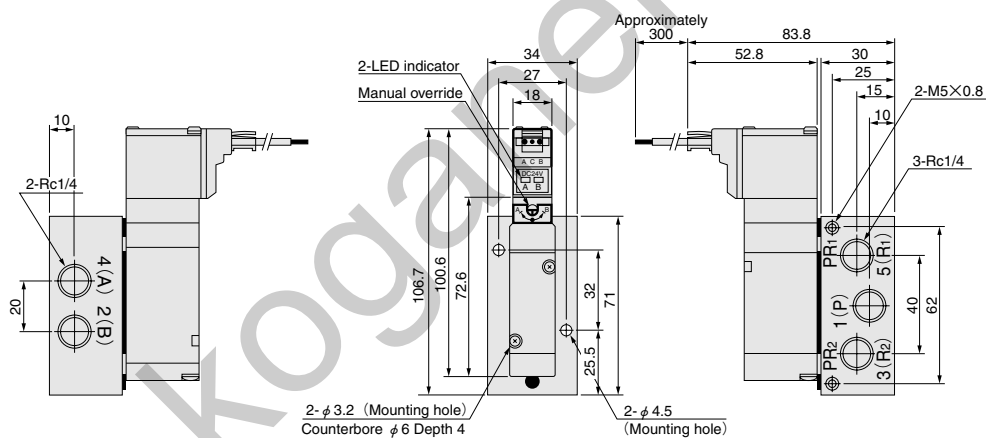
Remark: Quick fittings are the following types:  
**TSK4-M8M** (for φ 4 tube), **TSK6-M8M** (for φ 6 tube)

| Model                        | Code | A     | B     | C     | D     | D'    | ℓ (lead wire length)                                   | Remarks                                                 |
|------------------------------|------|-------|-------|-------|-------|-------|--------------------------------------------------------|---------------------------------------------------------|
| 181E1, 181E1-25              |      | 94.6  | 87.6  | 102.7 | 89.1  | 89.3  | -PSL, -PLL: 300<br>Made to order: -1L: 1000, -3L: 3000 | Overall length to the end of the valve or sub-base      |
| 180-4E1, 180-4KE2, A183-4KE2 |      | 104.6 | 97.6  | 112.7 | 99.1  | 99.3  |                                                        |                                                         |
| A180-4E1-25                  |      | 110.7 | 103.7 | 118.8 | 105.2 | 105.4 |                                                        |                                                         |
| 180-4E2, A180-4E2-25         |      | 150.4 | 136.4 | 166.6 | 139.4 | 139.8 |                                                        | Overall length to the end of the opposite side solenoid |
| 183-4E2, A183-4E2-25         |      | 166.2 | 152.2 | 182.4 | 155.2 | 155.6 |                                                        |                                                         |

## A180-4ME2-25-PSL

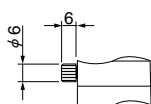


## A180-4ME2-25-PLL

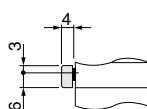


## Options

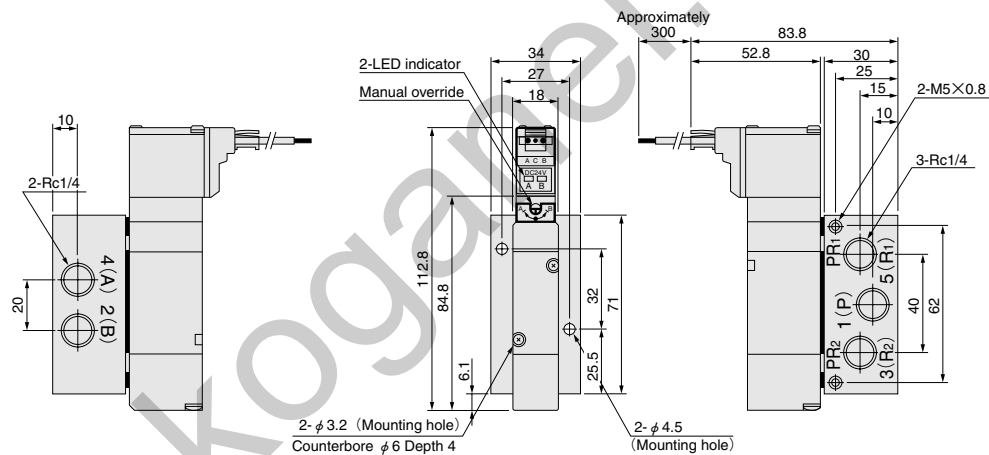
● Locking protruding type: -83



● Locking manual lever type: -84



**A183-4ME2-25-PLL**



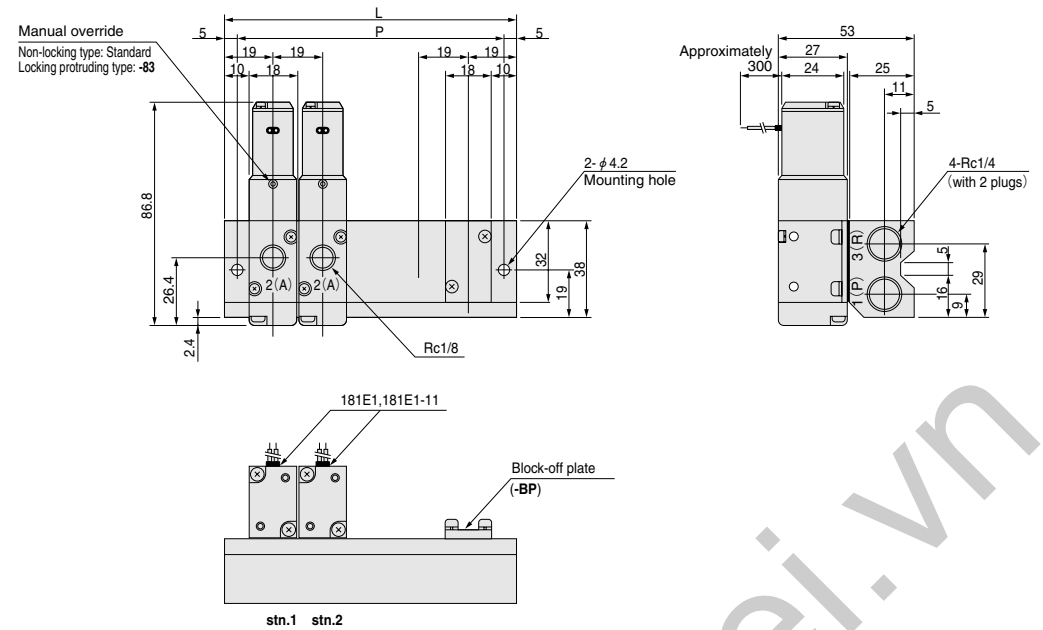
Dimensions of Manifold for 2-, 3-port Valves (mm)

181M□F



Unit dimensions

| Model  | L   | P   |
|--------|-----|-----|
| 181M2F | 57  | 47  |
| 3F     | 76  | 66  |
| 4F     | 95  | 85  |
| 5F     | 114 | 104 |
| 6F     | 133 | 123 |
| 7F     | 152 | 142 |
| 8F     | 171 | 161 |
| 9F     | 190 | 180 |
| 10F    | 209 | 199 |
| 11F    | 228 | 218 |
| 12F    | 247 | 237 |
| 13F    | 266 | 256 |
| 14F    | 285 | 275 |
| 15F    | 304 | 294 |
| 16F    | 323 | 313 |
| 17F    | 342 | 332 |
| 18F    | 361 | 351 |
| 19F    | 380 | 370 |
| 20F    | 399 | 389 |

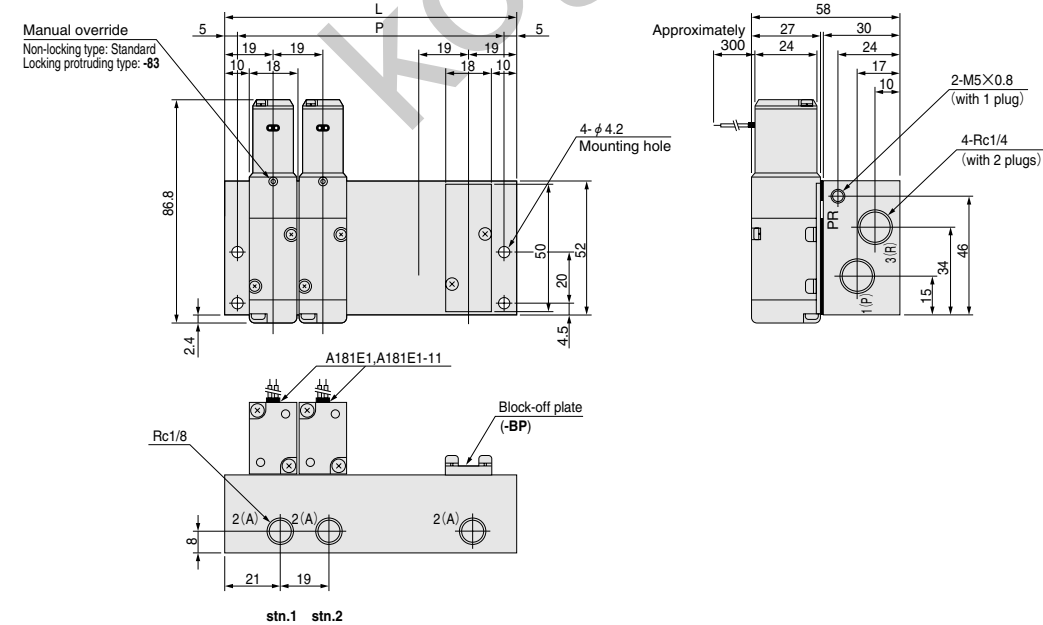


181M□A



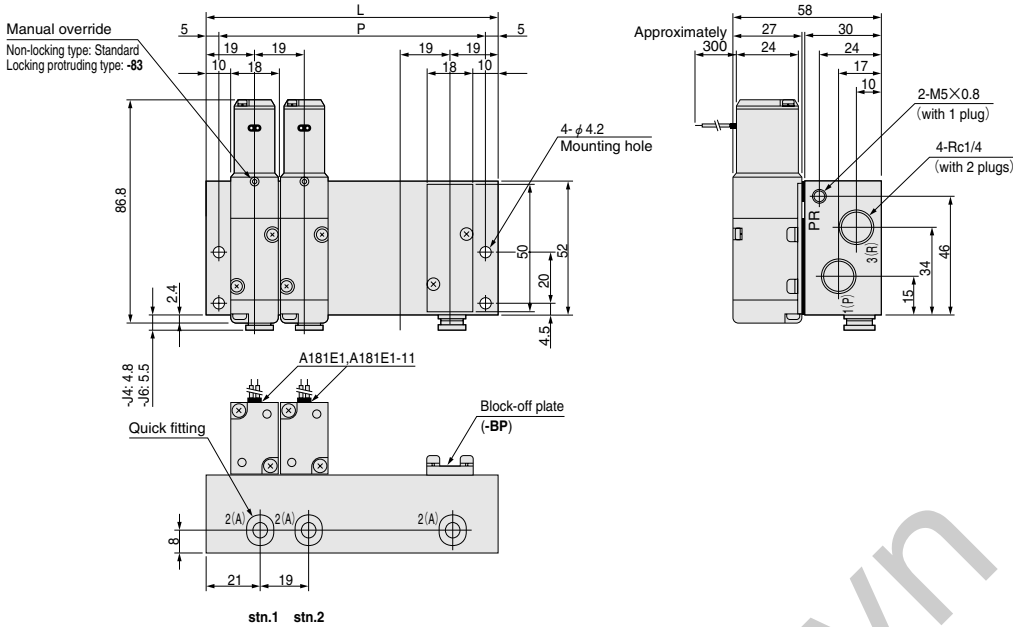
Unit dimensions

| Model  | L   | P   |
|--------|-----|-----|
| 181M2A | 57  | 47  |
| 3A     | 76  | 66  |
| 4A     | 95  | 85  |
| 5A     | 114 | 104 |
| 6A     | 133 | 123 |
| 7A     | 152 | 142 |
| 8A     | 171 | 161 |
| 9A     | 190 | 180 |
| 10A    | 209 | 199 |
| 11A    | 228 | 218 |
| 12A    | 247 | 237 |
| 13A    | 266 | 256 |
| 14A    | 285 | 275 |
| 15A    | 304 | 294 |
| 16A    | 323 | 313 |
| 17A    | 342 | 332 |
| 18A    | 361 | 351 |
| 19A    | 380 | 370 |
| 20A    | 399 | 389 |



# 181M□AJ

CAD 181M-A



## Unit dimensions

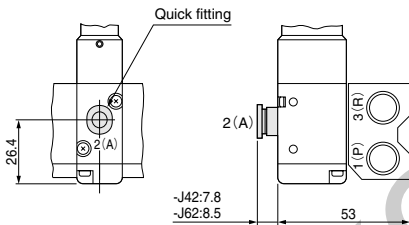
| Model   | L   | P   |
|---------|-----|-----|
| 181M2AJ | 57  | 47  |
| 3AJ     | 76  | 66  |
| 4AJ     | 95  | 85  |
| 5AJ     | 114 | 104 |
| 6AJ     | 133 | 123 |
| 7AJ     | 152 | 142 |
| 8AJ     | 171 | 161 |
| 9AJ     | 190 | 180 |
| 10AJ    | 209 | 199 |
| 11AJ    | 228 | 218 |
| 12AJ    | 247 | 237 |
| 13AJ    | 266 | 256 |
| 14AJ    | 285 | 275 |
| 15AJ    | 304 | 294 |
| 16AJ    | 323 | 313 |
| 17AJ    | 342 | 332 |
| 18AJ    | 361 | 351 |
| 19AJ    | 380 | 370 |
| 20AJ    | 399 | 389 |

## Options

### ●With quick fitting (2-, 3-port):

-J41 (For φ 4 tube, 2(A) or 4(A) port with fitting)

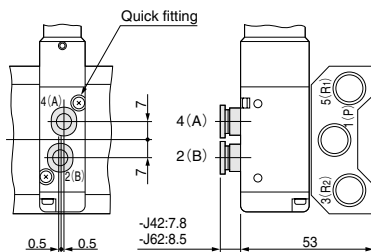
-J61 (For φ 6 tube, 2(A) or 4(A) port with fitting)



### ●With quick fittings (5-port):

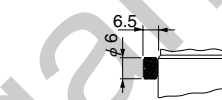
-J42 (For φ 4 tube, 4(A), 2(B) ports with fittings)

-J62 (For φ 6 tube, 4(A), 2(B) ports with fittings)



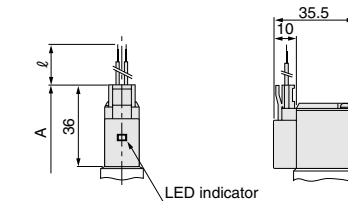
### ●Locking protruding type manual override: -83

CAD 180-ROCK



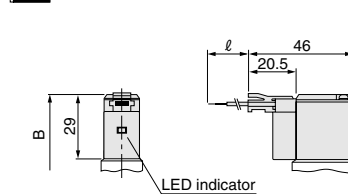
### ●Solenoid with straight connector: -PSL

CAD 180-PSL□



### ●Solenoid with L connector: -PLL

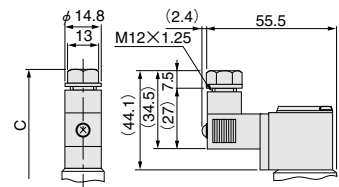
CAD 180-PLL□



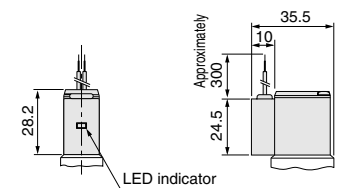
## Made to Order

CAD 180-PSL□

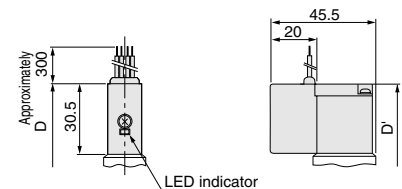
### ●Solenoid with DIN connector: -39



### ●Solenoid with LED indicator: -L



### ●Built-in interface unit: -FA



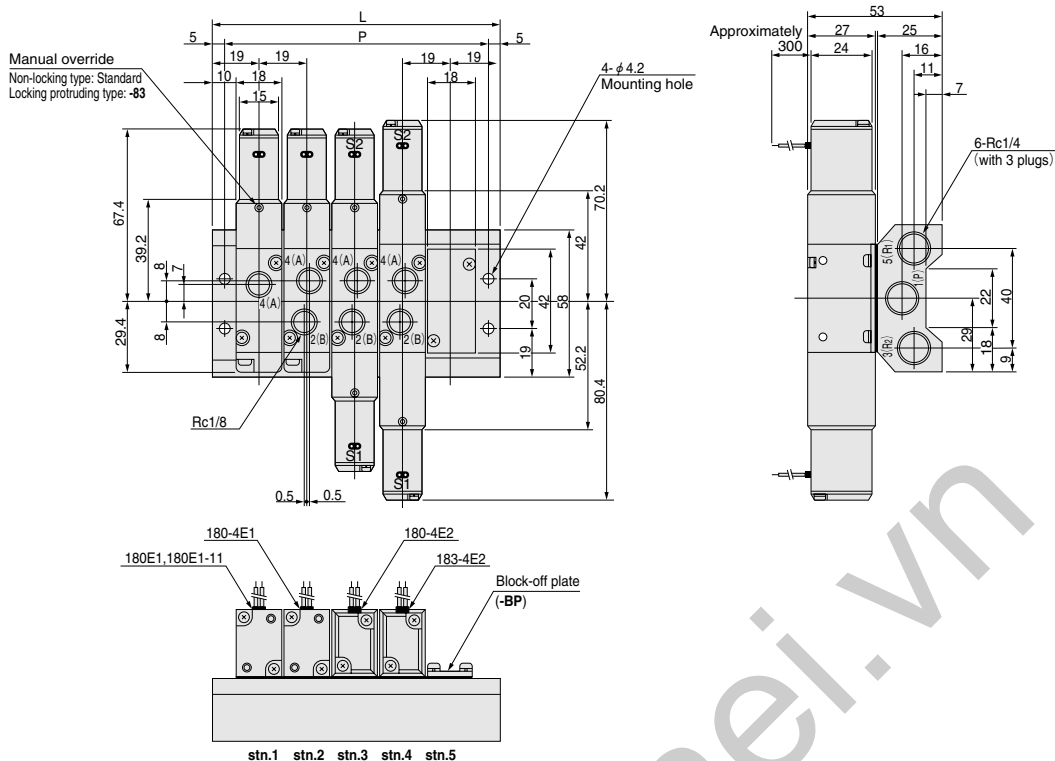
Remark: Quick fittings are the following types:  
TSK4-M8M (for φ 4 tube), TSK6-M8M (for φ 6 tube)

| Model                                        | Code | A     | B     | C     | D     | D'    | ℓ (lead wire length) |
|----------------------------------------------|------|-------|-------|-------|-------|-------|----------------------|
| 181E1, A181E1                                |      | 94.6  | 87.6  | 102.7 | 89.1  | 89.3  |                      |
| 180E1, 180-4E1, 180-4KE2, 183-4KE2, A180-4E1 |      | 104.6 | 97.6  | 112.7 | 99.1  | 99.3  |                      |
| 180-4E2, A180-4E2                            |      | 150.4 | 136.4 | 166.6 | 139.4 | 139.8 |                      |
| 183-4E2, A183-4E2                            |      | 166.2 | 152.2 | 182.4 | 155.2 | 155.6 |                      |

-PSL, -PLL: 300  
Made to order: -1L: 1000, -3L: 3000

# Dimensions of Manifold for Combination Mounting of 2-, 3-, 5-port Valves (mm)

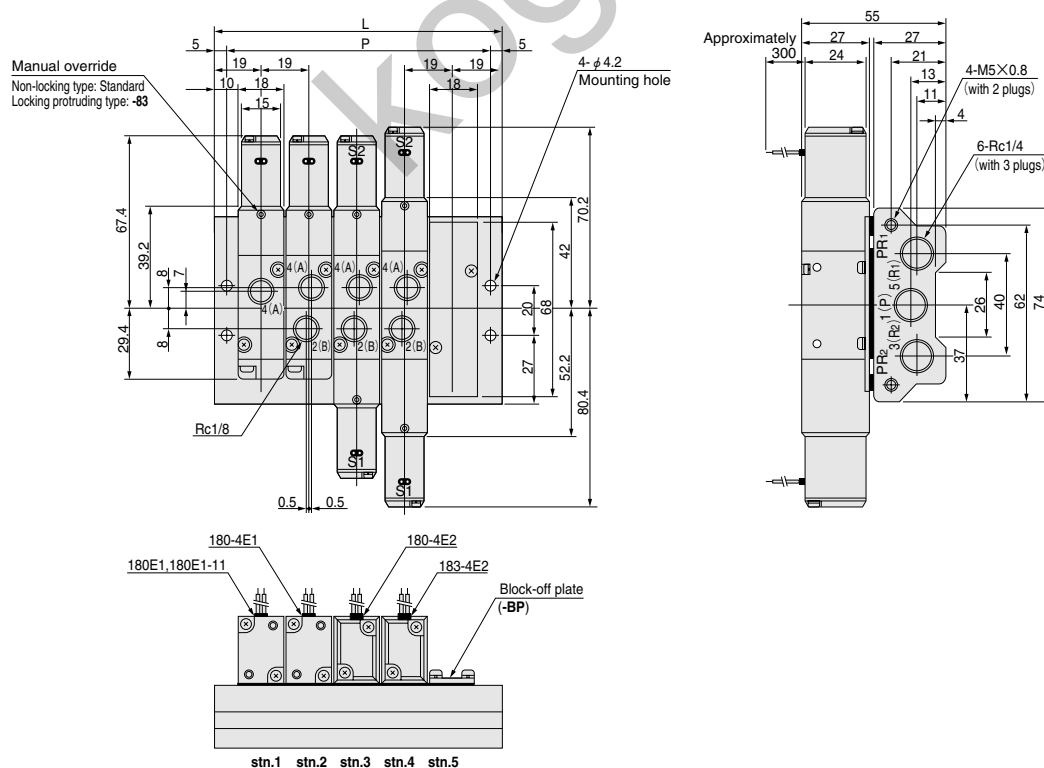
## 180M□F



### Unit dimensions

| Model  | L   | P   |
|--------|-----|-----|
| 180M2F | 57  | 47  |
| 3F     | 76  | 66  |
| 4F     | 95  | 85  |
| 5F     | 114 | 104 |
| 6F     | 133 | 123 |
| 7F     | 152 | 142 |
| 8F     | 171 | 161 |
| 9F     | 190 | 180 |
| 10F    | 209 | 199 |
| 11F    | 228 | 218 |
| 12F    | 247 | 237 |
| 13F    | 266 | 256 |
| 14F    | 285 | 275 |
| 15F    | 304 | 294 |
| 16F    | 323 | 313 |
| 17F    | 342 | 332 |
| 18F    | 361 | 351 |
| 19F    | 380 | 370 |
| 20F    | 399 | 389 |

## 180M□FE



### Unit dimensions

| Model   | L   | P   |
|---------|-----|-----|
| 180M2FE | 57  | 47  |
| 3FE     | 76  | 66  |
| 4FE     | 95  | 85  |
| 5FE     | 114 | 104 |
| 6FE     | 133 | 123 |
| 7FE     | 152 | 142 |
| 8FE     | 171 | 161 |
| 9FE     | 190 | 180 |
| 10FE    | 209 | 199 |
| 11FE    | 228 | 218 |
| 12FE    | 247 | 237 |
| 13FE    | 266 | 256 |
| 14FE    | 285 | 275 |
| 15FE    | 304 | 294 |
| 16FE    | 323 | 313 |
| 17FE    | 342 | 332 |
| 18FE    | 361 | 351 |
| 19FE    | 380 | 370 |
| 20FE    | 399 | 389 |

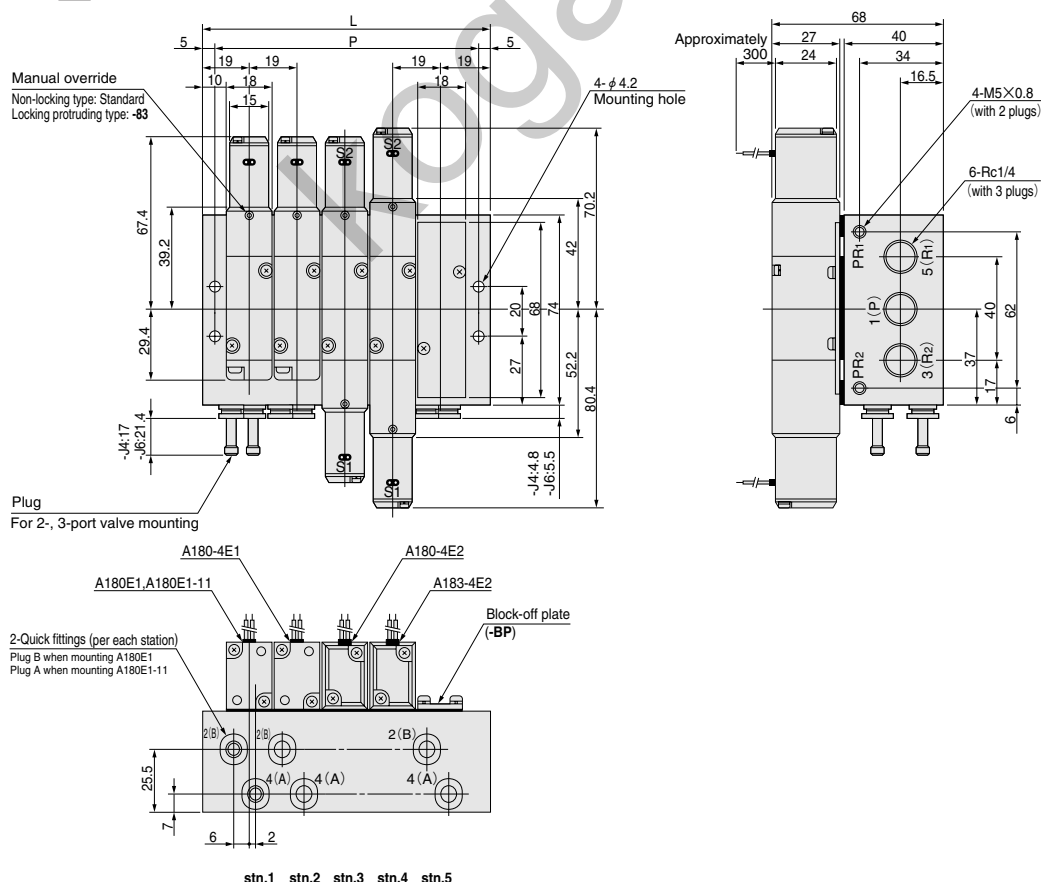
For options and made to order, see p.348.

 180M-A

| Model         | L   | P   |
|---------------|-----|-----|
| <b>180M2A</b> | 57  | 47  |
| <b>3A</b>     | 76  | 66  |
| <b>4A</b>     | 95  | 85  |
| <b>5A</b>     | 114 | 104 |
| <b>6A</b>     | 133 | 123 |
| <b>7A</b>     | 152 | 142 |
| <b>8A</b>     | 171 | 161 |
| <b>9A</b>     | 190 | 180 |
| <b>10A</b>    | 209 | 199 |
| <b>11A</b>    | 228 | 218 |
| <b>12A</b>    | 247 | 237 |
| <b>13A</b>    | 266 | 256 |
| <b>14A</b>    | 285 | 275 |
| <b>15A</b>    | 304 | 294 |
| <b>16A</b>    | 323 | 313 |
| <b>17A</b>    | 342 | 332 |
| <b>18A</b>    | 361 | 351 |
| <b>19A</b>    | 380 | 370 |
| <b>20A</b>    | 399 | 389 |

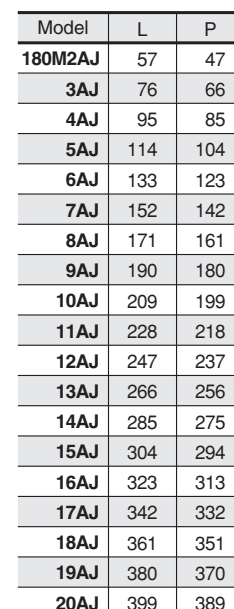
## SOLENOID VALVES 180 SERIES

## Unit dimensions



| Model          | L   | P   |
|----------------|-----|-----|
| <b>180M2AJ</b> | 57  | 47  |
| <b>3AJ</b>     | 76  | 66  |
| <b>4AJ</b>     | 95  | 85  |
| <b>5AJ</b>     | 114 | 104 |
| <b>6AJ</b>     | 133 | 123 |
| <b>7AJ</b>     | 152 | 142 |
| <b>8AJ</b>     | 171 | 161 |
| <b>9AJ</b>     | 190 | 180 |
| <b>10AJ</b>    | 209 | 199 |
| <b>11AJ</b>    | 228 | 218 |
| <b>12AJ</b>    | 247 | 237 |
| <b>13AJ</b>    | 266 | 256 |
| <b>14AJ</b>    | 285 | 275 |
| <b>15AJ</b>    | 304 | 294 |
| <b>16AJ</b>    | 323 | 313 |
| <b>17AJ</b>    | 342 | 332 |
| <b>18AJ</b>    | 361 | 351 |
| <b>19AJ</b>    | 380 | 370 |
| <b>20AJ</b>    | 399 | 389 |

For options and made to order, see p.348.

180M ☐ A

## Made to Order

The 180 series Solenoid Valves include a variety of made to order solenoids for application in a wider range of control and wiring types.

### Plug connector

Straight connector  
with LED indicator



- Without lead wire
- Connector and contacts included

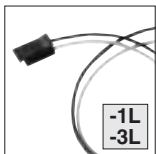
L connector  
with LED indicator



- Without lead wire
- Connector and contacts included

- When ordering, enter **-PSLN** or **-PLLN** in place of the normal option code for the wiring type.

Lead wire length



- For plug connector
- Length **-1L**: 1000 [39]  
mm [in.] **-3L**: 3000 [118]

- For lead wire length, **-1L** is 1000mm [39in.] and **-3L** is 3000mm [118in.].  
When ordering, enter **-1L** or **-3L** following the wiring type option code.

### DIN connector



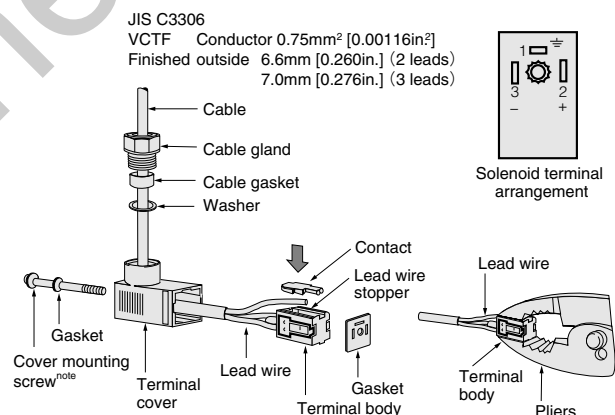
A compact connector that is highly resistant to dust and water splashes.  
Employs a self-stripping method that eliminates the need for de-sheathing the lead wire.

- When ordering, enter **-39** in place of the normal option code for the wiring type.
- A varistor for surge suppression is also equipped as standard. (For the AC100V and AC200V only. For DC12V and DC24V, a flywheel diode for surge suppression is installed as standard equipment.)
- LED indicator is not available.

### Wiring instructions

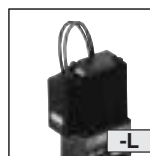
#### ● Solenoid with DIN connector

When de-sheathing (only the outer sheath of the cable), pay attention to the lead wire direction. The cover will be easily mounted when the lead wire on the outer side of the terminal cover is set 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 contact is firmly touching the core wire.



Note: The appropriate tightening torque for the cover mounting screw is 29.4N · cm {3kgf · cm} [2.6in · lbf].

### LED indicator



The LED indicator for confirmation of operation is also available without a plug connector. This creates a clean monoblock look with a compact cover.

- When ordering, enter **-L** in place of the normal option code for the wiring type.
- A varistor for surge suppression is also equipped. (For the AC100V and AC200V only. For DC12V and DC24V, a flywheel diode for surge suppression is installed as standard equipment.)

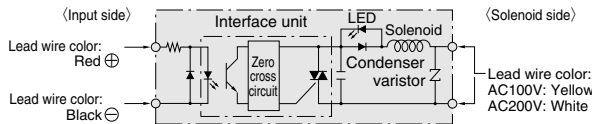
## Built-in interface unit



Includes an interface unit with a photo transistor. Can be directly controlled by a microcomputer and logic chip, and is equipped with full electric noise countermeasures and LED indicators.

- When ordering, enter **-FA** in place of the normal option code for the wiring type.
- Cannot be ordered in combination with any other solenoid option.
- Rated voltages for the solenoid are AC100V and AC200V only.

## Block diagram



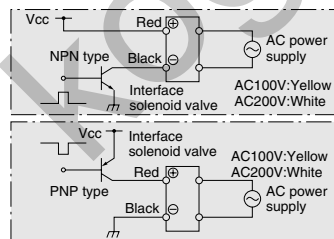
The interface unit is a triac with a photo coupler. Applying DC5V to the input terminals when AC power is applied on the solenoid side causes the LED inside the unit to light up, turns on the triac, and energizes the solenoid. At this time, an LED indicator turns on.

When the input side voltage reaches 0V, the LED inside the unit shuts off, the triac is turned off, and the solenoid is de-energized. At this time, the LED indicator is turned off.

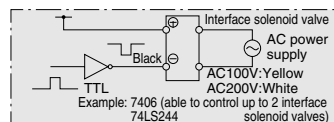
With a built-in zero-cross circuit, the zero-cross voltage is used to turn the power on, and the zero-cross current to turn it off.

## Example of control circuits

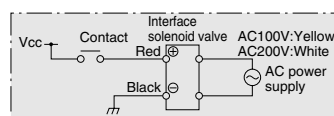
### 1. Control by transistor



### 2. Control by TTL, IC

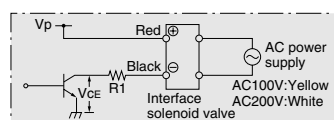


### 3. Control by relay contact



### 4. When input is not a DC5V power supply

Install resistance externally to drop the input voltage to 4~6V.



Example

$$R1 = \frac{Vp - 5 - V_{CE}}{18 \times 10^{-3}} [\Omega]$$

| Vp [V] | R1                |
|--------|-------------------|
| 12     | 390 $\Omega$ 1/4W |
| 24     | 1.0k $\Omega$ 1W  |

In the case of  $V_{CE}=0$  [V]

## Solenoid Specifications for Valve with Built-in Interface Unit

| Item                                 |                                            |                        | Specifications                                                             |       |                                                  |          |
|--------------------------------------|--------------------------------------------|------------------------|----------------------------------------------------------------------------|-------|--------------------------------------------------|----------|
| Input side                           | Rated voltage                              | DC V                   | 5                                                                          |       |                                                  |          |
|                                      | Voltage range                              | DC V                   | 4~6                                                                        |       |                                                  |          |
|                                      | Current (When 5V DC is applied)            | mA                     | 18                                                                         |       |                                                  |          |
|                                      | Operating voltage                          | DC V                   | 4 or below                                                                 |       |                                                  |          |
|                                      | Return voltage                             | DC V                   | 0.8 or over                                                                |       |                                                  |          |
|                                      | Color of lead wire                         |                        | Red (+), Black (-)                                                         |       |                                                  |          |
| Solenoid side                        | Rated voltage                              | AC V                   | 100                                                                        |       | 200                                              |          |
|                                      | Type                                       |                        | Shading type                                                               |       |                                                  |          |
|                                      | Operating voltage range                    | AC V                   | 90~125<br>(100 <sup>+25</sup> <sub>-10</sub> %)                            |       | 180~250<br>(200 <sup>+25</sup> <sub>-10</sub> %) |          |
|                                      | Current<br>(when rated voltage is applied) | Frequency Hz           | 50                                                                         | 60    | 50                                               | 60       |
|                                      |                                            | Starting mA (r.m.s.)   | 36                                                                         | 32    | 18                                               | 16       |
|                                      |                                            | Energizing mA (r.m.s.) | 24                                                                         | 20    | 12                                               | 10       |
|                                      | Leakage current                            | Frequency Hz           | 50                                                                         | 60    | 50                                               | 60       |
|                                      |                                            | Current mA (r.m.s.)    | 0.3                                                                        | 0.4   | 0.6                                              | 0.8      |
|                                      | Surge suppression (as standard)            |                        | Built-in varistor at solenoid side                                         |       |                                                  |          |
|                                      | Color of lead wire                         |                        | Yellow                                                                     |       | White                                            |          |
| Color of LED indicator (as standard) |                                            | Yellow                 |                                                                            | Green |                                                  |          |
| Voltage resistance                   |                                            |                        | Min. AC1500V at input side and solenoid side                               |       |                                                  |          |
| Insulation resistance                |                                            | MΩ                     | Between input side and solenoid side, and between whole terminals and body |       |                                                  | Over 100 |
| Zero-cross function                  |                                            |                        | Available                                                                  |       |                                                  |          |
| Wiring type and lead wire length     |                                            |                        | Grommet type: 300mm [118in.]                                               |       |                                                  |          |

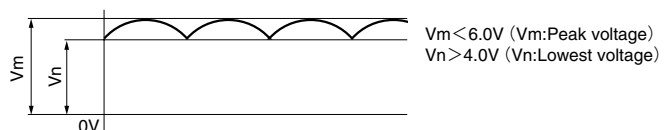
## Wiring instructions

Color of lead wire  
Solenoid power supply AC100V: Yellow  
Solenoid power supply AC200V: White

Color of lead wire  
Input  $\ominus$  DC0V: Black  
Input  $\oplus$  DC5V: Red

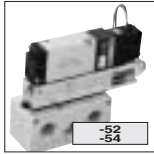


1. Separate the input side and solenoid side lead wires by color. Never apply AC power/6VDC or more to the input side.
2. Ensure that voltage ripple on the input side remains within the range shown below.



3. Even when a wrong polarity is applied to the input side, a built-in diode for protection against reverse polarity eliminates any worry about short circuiting. The valve will not operate, however.
4. A varistor and condenser are built-in to the solenoid power supply side, for protection circuit against external surge voltages. As a result, there is a 0.3mA leakage current in AC100V, and a 0.6mA leakage current in AC200V.
5. The operation and return times of the interface unit are 10ms or less with a 50Hz AC power supply, and 8ms or less with a 60Hz AC power supply.

## Sub-base regulator

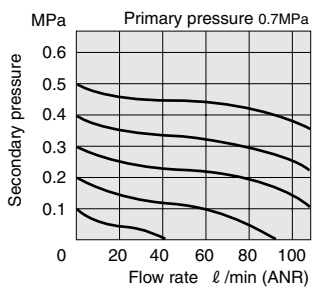


### Specifications

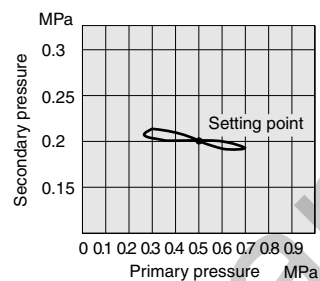
| Item                        | Order code                        | -52 (180MA-52) <small>Note</small> | -54 (180MA-54) <small>Note</small> |
|-----------------------------|-----------------------------------|------------------------------------|------------------------------------|
| Function                    |                                   | 1(P) port pressure regulating type | 2(B) port pressure regulating type |
| Media                       |                                   | Air                                |                                    |
| Operating pressure range    | MPa {kgf/cm <sup>2</sup> } [psi.] | 0.15~0.5 {1.5~5.1} [22~73]         |                                    |
| Maximum operating pressure  | MPa {kgf/cm <sup>2</sup> } [psi.] | 0.7 {7.1} [102]                    |                                    |
| Proof pressure              | MPa {kgf/cm <sup>2</sup> } [psi.] | 1.05 {10.7} [152]                  |                                    |
| Operating temperature range | °C [°F]                           | 5~50 [41~122]                      |                                    |
| Mass                        | g [oz.]                           | 80 [2.82]                          |                                    |

Note: The order code in parentheses ( ) is for the sub-base regulator only.

### Flow rate characteristics



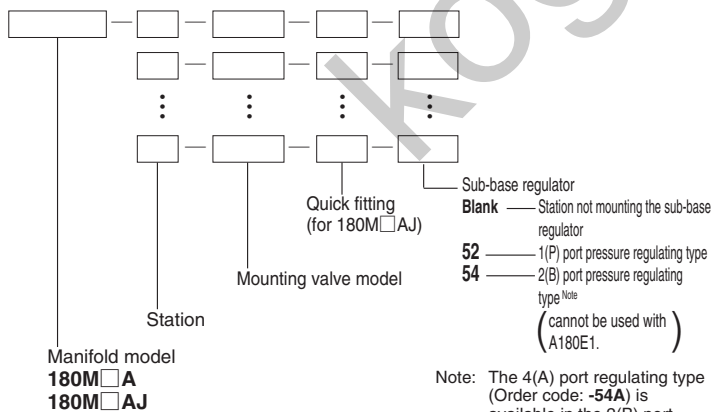
### Pressure characteristics



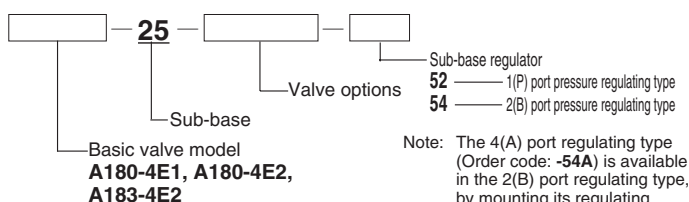
1MPa = 145psi., 1 l / min = 0.0353ft<sup>3</sup>/min.

### Order code

#### ● When mounting on a manifold



#### ● When mounting on a sub-base

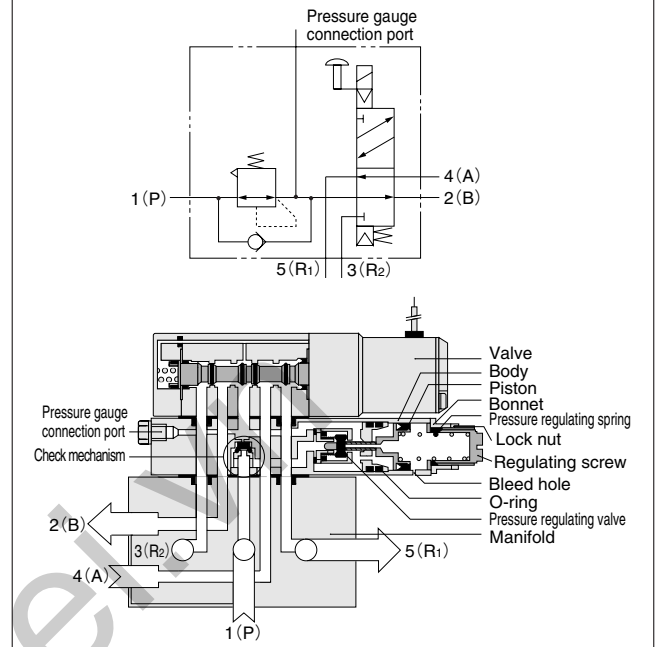


#### ● For sub-base regulators to be ordered separately

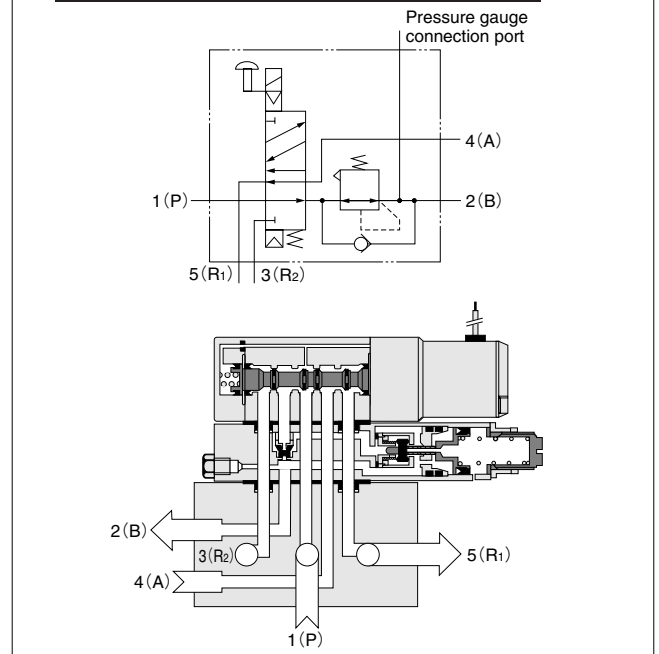
180MA-52 — 1(P) port pressure regulating type (with a gasket and mounting screws)  
180MA-54 — 2(B) port pressure regulating type (with a gasket and mounting screws)

## Operating Principles and Symbols

### P port pressure regulating type



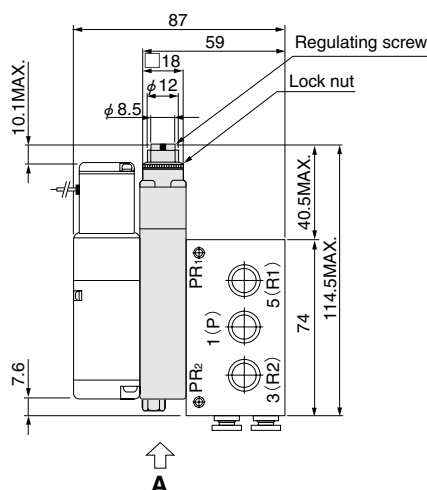
### B port pressure regulating type



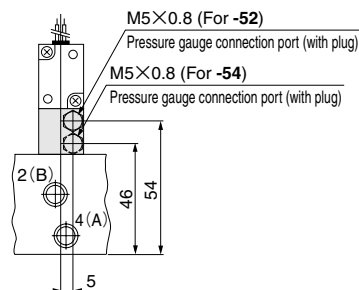
## Major Parts and Materials

| Parts                      | Materials                 |
|----------------------------|---------------------------|
| Body                       | Aluminum alloy (anodized) |
| Adjusting screw            | Brass                     |
| Piston                     | Aluminum alloy (anodized) |
| Pressure regulating spring | Stainless steel           |
| Seal                       | Synthetic rubber          |

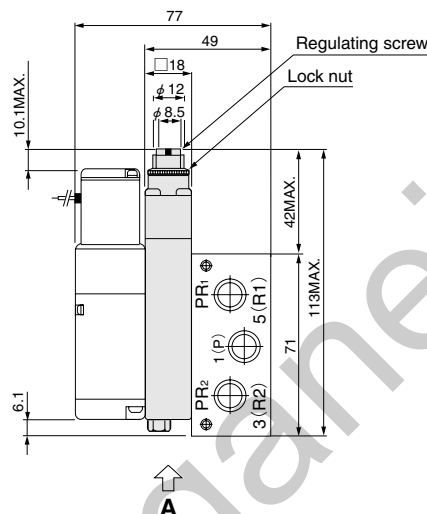
180M ☐ A  
180M ☐ AJ



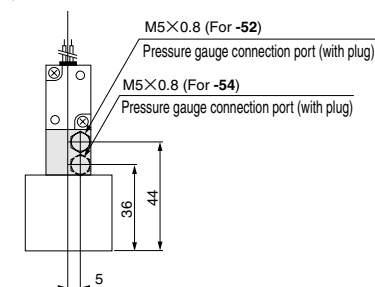
<Viewed from A>



A180E1-25  
A180-4E ☐ -25  
A183-4E2-25



<Viewed from A>

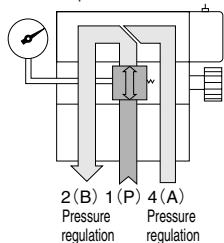


## Handling Instructions and Precautions

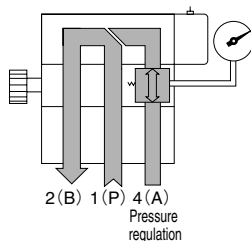


### Application example

- 1(P) port pressure regulating type: -52  
Regulates the 4(A) and 2(B) port pressure to the same pressure

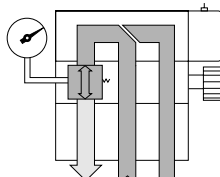


- 2(B) port pressure regulating type: -54  
Regulates the 4(A) port pressure



When the 2(B) port pressure regulating type (order code: -54) is used to regulate the 4(A) port pressure, mount it so that the regulating screw is on the 3(R2) side of the manifold base.

- 2(B) port pressure regulating type: -54  
Regulates the 2(B) port pressure



### Mounting

1. Always thoroughly blow off (use compressed air) the tubing before piping. Entering metal chips, sealing tape, rust, etc., generated during piping work could result in air leaks or other defective operation.
2. Mount the sub-base regulator between the manifold base and the valve. In the standard configuration, the sub-base regulator's pressure regulating screw is to be mounted on the manifold base's 5(R1) port side. In the 2(B) port pressure regulating type, however, the pressure regulating screw can be mounted on the manifold base's 3(R2) port side to regulate the 4(A) port pressure, as well. For mounting direction and function, see the application examples.

**Caution:** When the sub-base regulator is being newly mounted, or when the pressure regulating port is being changed, caution should be exercised to the sub-base regulator direction and front and rear facing. In the 1(P) port pressure regulating type: -52, the pressure regulating screw is on the 5(R1) side, and the pressure gauge connection port is on the valve side. In the 2(B) port pressure regulating type: -54, the pressure regulating screw for 2(B) port pressure regulation is on the 5(R1) side, and for 4(A) port pressure regulation, it is on the 3(R2) side. In both cases, the pressure gauge connection port is on the manifold side.



### Pressure regulation

1. Check the pressure setting by connecting a pressure gauge.  
The pressure display sight glass will show the scale for the setting pressure as a guide.
2. Once the pressure is set, tighten the lock nut to lock in place.

## Made to Order

### Air-piloted valves 180 series

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



### Specifications

| Item                                      | Basic model | For direct piping, F type manifold            |                | For sub-base, A type, AJ type manifolds |                                          |
|-------------------------------------------|-------------|-----------------------------------------------|----------------|-----------------------------------------|------------------------------------------|
|                                           |             | Single pilot                                  | Double pilot   | Single pilot                            | Double pilot                             |
|                                           |             | <b>180-4A</b>                                 | <b>180-4A2</b> | <b>A180-4A</b>                          | <b>A180-4A2</b>                          |
| Media                                     |             | Air                                           |                |                                         |                                          |
| Operation type                            |             | Air piloted type                              |                |                                         |                                          |
| Number of positions and ports             |             | 2 positions, 5 ports                          |                |                                         |                                          |
| Effective area (Cv) mm <sup>2</sup>       |             | 10.2 [0.567] <sup>Note 1</sup>                |                |                                         |                                          |
| Port size                                 | Main        | Rc1/8 <sup>Note 2</sup>                       |                |                                         |                                          |
|                                           | Pilot       | Rc1/8                                         |                |                                         |                                          |
| Lubrication                               |             | Not required                                  |                |                                         |                                          |
| Operating pressure range                  | Main        | 0.15~0.7 {1.5~7.1}                            | 0~0.7 {0~7.1}  | 0.15~0.7 {1.5~7.1}                      | 0~0.7 {0~7.1}                            |
| MPa {kgf/cm <sup>2</sup> }                |             | [22~102]                                      | [0~102]        | [22~102]                                | [0~102]                                  |
| [psi.]                                    | Pilot       | See the table "Minimum Pilot Pressure"        |                |                                         |                                          |
| Proof pressure MPa {kgf/cm <sup>2</sup> } |             | 1.05 {10.7} [152]                             |                |                                         |                                          |
| Operating temperature range               |             | 5~50 {41~122}                                 |                |                                         |                                          |
| (atmosphere and media)                    |             |                                               |                |                                         |                                          |
| Shock resistance                          |             | 1373.0 {140.0} (Axial direction 294.2 {30.0}) |                |                                         |                                          |
| Mounting direction                        |             | Any                                           |                |                                         |                                          |
| Maximum operating frequency               |             | 5                                             |                |                                         |                                          |
| Mass                                      |             | g [oz.]                                       | 70 [2.47]      | 80 [2.82]                               | 80 [2.82] {240 [8.47]} <sup>Note 3</sup> |

Notes: 1. For details, see the effective area.

2. For details, see the port size.

3. Values in parentheses ( ) are the mass with sub-plate: -25.

※ For optional specifications and order codes, see p.339~340.

### Effective Area

| Specifications                           | Basic model | For direct piping, F type manifold                                                                                                                                                                                              |         | For sub-base, A type, AJ type manifolds                                                            |          |
|------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------------------------------------------------------------------------------------|----------|
|                                          |             | 180-4A                                                                                                                                                                                                                          | 180-4A2 | A180-4A                                                                                            | A180-4A2 |
| Single valve                             |             | 10.2 [0.57]                                                                                                                                                                                                                     |         | 8.2 [0.46]                                                                                         |          |
| Built-in quick fitting for $\phi$ 4 tube | -J42        | 4(A), 2(B) ports with fittings                                                                                                                                                                                                  |         | 4.4 [0.24]                                                                                         |          |
|                                          | -J43        | 1(P), 4(A), 2(B) ports with fittings                                                                                                                                                                                            |         | —                                                                                                  |          |
| Built-in quick fitting for $\phi$ 6 tube | -J62        | 4(A), 2(B) ports with fittings                                                                                                                                                                                                  |         | 9.6 [0.53]                                                                                         |          |
|                                          | -J63        | 1(P), 4(A), 2(B) ports with fittings                                                                                                                                                                                            |         | 7.9 [0.44]                                                                                         |          |
| Remarks                                  |             | ● Attaching TS6-01 to the 1(P), 4(A), 2(B) ports gives the value 9.2 [0.51].<br>● On the F type manifold, attaching TS4-01 to the 4(A), 2(B) ports gives the value 4.1 [0.23], and attaching TS6-01 gives the value 9.2 [0.51]. |         | ● Attaching TS6-02 to the 1(P), 4(A), 2(B) ports on the sub-base (-25) gives the value 7.5 [0.42]. |          |

### Port Size

| Specifications         | Port                               | For direct piping, F type manifold |                                 | For sub-base, A type, AJ type manifolds |          | Remarks                                                                             |
|------------------------|------------------------------------|------------------------------------|---------------------------------|-----------------------------------------|----------|-------------------------------------------------------------------------------------|
|                        |                                    | 180-4A                             | 180-4A2                         | A180-4A                                 | A180-4A2 |                                                                                     |
| Female thread          | 1(P)<br>4(A), 2(B)<br>3(R2), 5(R1) | Rc1/8                              | —                               | —                                       | —        | Standard                                                                            |
| Built-in quick fitting | -J42                               | 1(P)<br>4(A), 2(B)<br>3(R2), 5(R1) | Rc1/8<br>Built-in quick fitting | —                                       | —        | ● Straight type<br>● For $\phi$ 4 tube<br>● For both nylon tubes and urethane tubes |
|                        | -J43                               | 1(P)<br>4(A), 2(B)<br>3(R2), 5(R1) | Rc1/8<br>Built-in quick fitting | —                                       | —        |                                                                                     |
|                        | -J62                               | 1(P)<br>4(A), 2(B)<br>3(R2), 5(R1) | Rc1/8<br>Built-in quick fitting | —                                       | —        |                                                                                     |
|                        | -J63                               | 1(P)<br>4(A), 2(B)<br>3(R2), 5(R1) | Rc1/8<br>Built-in quick fitting | —                                       | —        |                                                                                     |
|                        | -J42                               | 1(P)<br>4(A), 2(B)<br>3(R2), 5(R1) | Rc1/8<br>Built-in quick fitting | —                                       | —        | ● Straight type<br>● For $\phi$ 6 tube<br>● For both nylon tubes and urethane tubes |
|                        | -J43                               | 1(P)<br>4(A), 2(B)<br>3(R2), 5(R1) | Rc1/8<br>Built-in quick fitting | —                                       | —        |                                                                                     |
|                        | -J62                               | 1(P)<br>4(A), 2(B)<br>3(R2), 5(R1) | Rc1/8<br>Built-in quick fitting | —                                       | —        |                                                                                     |
|                        | -J63                               | 1(P)<br>4(A), 2(B)<br>3(R2), 5(R1) | Rc1/8<br>Built-in quick fitting | —                                       | —        |                                                                                     |

### Manifold Specifications and Port Size

| Manifold model | Specifications                          | Port         | Port size                                                                         |
|----------------|-----------------------------------------|--------------|-----------------------------------------------------------------------------------|
| F type         | 1(P), 3(R2), 5(R1) manifold piping      | 1(P)         | Rc1/4                                                                             |
|                | 4(A), 2(B) valve piping                 | 4(A), 2(B)   | Rc1/8 or quick fitting (valve order code for $\phi$ 4: -J 42, for $\phi$ 6: -J62) |
|                |                                         | 3(R2), 5(R1) | Rc1/4                                                                             |
| A type         | All ports manifold piping               | 1(P)         | Rc1/4                                                                             |
|                |                                         | 4(A), 2(B)   | Rc1/8                                                                             |
|                |                                         | 3(R2), 5(R1) | Rc1/4                                                                             |
| AJ type        | 4(A), 2(B) ports built-in quick fitting | 1(P)         | Rc1/4                                                                             |
|                | All ports manifold piping               | 4(A), -J4    | Quick fitting for $\phi$ 4 tube                                                   |
|                |                                         | 2(B) -J6     | Quick fitting for $\phi$ 6 tube                                                   |
|                |                                         | 3(R2), 5(R1) | Rc1/4                                                                             |

※ For optional specifications and order codes, see p.340.

### Manifold Mass

| Manifold model | Mass calculation of each unit (n=number of units) | Mounting valve |           |            |            |
|----------------|---------------------------------------------------|----------------|-----------|------------|------------|
|                |                                                   | 180-4A         | 180-4A2   | A180-4A    | A180-4A2   |
| F type         | $(42 \times n) + 40 [(1.48 \times n) + 1.41]$     | 70 [2.47]      | 80 [2.82] | —          | —          |
| A type         | $(120 \times n) + 120 [(4.23 \times n) + 4.23]$   | —              | —         | 120 [4.23] | 170 [6.00] |
| AJ type        | -J4                                               | —              | —         | 120 [4.23] | 170 [6.00] |
|                | -J6                                               | —              | —         | 120 [4.23] | 170 [6.00] |

Calculation example: The mass of 180M 10F stn.1~5 180-4A, stn.6~10

180-4A2 becomes  $(42 \times 10) + 40 + (110 \times 5) + (90 \times 5) = 1310$  g [46.21oz.]

### Minimum Pilot Pressure

| Model   | Main pressure | 0.15 {1.5} [22] | 0.3 {3.0} [44]  | 0.5 {5.1} [73]  | 0.7 {7.1} [102] |
|---------|---------------|-----------------|-----------------|-----------------|-----------------|
| 180-4A  |               | 0.15 {1.5} [22] | 0.25 {2.5} [36] | 0.34 {3.5} [49] | 0.45 {4.5} [65] |
| 180-4A2 |               | 0.08 {0.8} [12] | 0.10 {1.0} [15] | 0.12 {1.2} [17] | 0.14 {1.4} [20] |

### Time Required for Switching

| Model   | Operation | Pilot line length L m [ft.] |          |           |           |            |             |
|---------|-----------|-----------------------------|----------|-----------|-----------|------------|-------------|
|         |           | 2 [6.6]                     | 6 [19.7] | 10 [32.8] | 20 [65.6] | 50 [163.9] | 100 [327.9] |
| 180-4A  | ON        | 0.07                        | 0.18     | 0.32      | 0.65      | 2.10       | 5.80        |
|         | OFF       | 0.15                        | 0.42     | 0.72      | 1.50      | 4.32       | 12.20       |
| 180-4A2 | ON        | 0.09                        | 0.23     | 0.40      | 0.83      | 2.73       | 7.00        |
|         | OFF       | 0.09                        | 0.23     | 0.40      | 0.83      | 2.73       | 7.00        |

| Model   | Measurement circuit | Measurement conditions                                                                                                                                               |
|---------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 180-4A  |                     | ● Pilot valve=050-4E1 (effective area 1.2mm <sup>2</sup> {Cv: 0.067})<br>● Tube inner diameter=4mm [0.16in.]<br>● Air pressure (both main and pilot)=0.5MPa [73psi.] |
| 180-4A2 |                     |                                                                                                                                                                      |

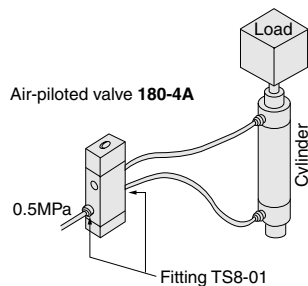
| Specifications   | Port                               | For direct piping, F type manifold |         | For sub-base, A type, AJ type manifolds |          | Remarks                                                |
|------------------|------------------------------------|------------------------------------|---------|-----------------------------------------|----------|--------------------------------------------------------|
|                  |                                    | 180-4A                             | 180-4A2 | A180-4A                                 | A180-4A2 |                                                        |
| Sub-base -25     | 1(P)<br>4(A), 2(B)<br>3(R2), 5(R1) | —                                  | —       | Rc1/4                                   | —        | ● All ports sub-base piping                            |
| F type manifold  | 1(P)                               | Rc1/4                              | —       | —                                       | —        | ● 1(P), 3(R2), 5(R1) manifold, 4(A), 2(B) valve piping |
|                  | 4(A), 2(B)<br>3(R2), 5(R1)         | Rc1/8 or quick fitting             | Rc1/4   | —                                       | —        |                                                        |
| A type manifold  | 1(P)                               | —                                  | —       | Rc1/4                                   | —        | ● All ports manifold piping                            |
|                  | 4(A), 2(B)<br>3(R2), 5(R1)         | —                                  | —       | Rc1/8                                   | —        |                                                        |
|                  |                                    | —                                  | —       | Rc1/4                                   | —        |                                                        |
| AJ type manifold | 1(P)                               | —                                  | —       | Rc1/4                                   | —        | ● All ports manifold piping                            |
|                  | 4(A), -J4                          | —                                  | —       | Built-in quick fitting                  | —        |                                                        |
|                  | 2(B) -J6<br>3(R2), 5(R1)           | —                                  | —       | Built-in quick fitting                  | —        |                                                        |

## Cylinder Operating Speed and Flow Rate

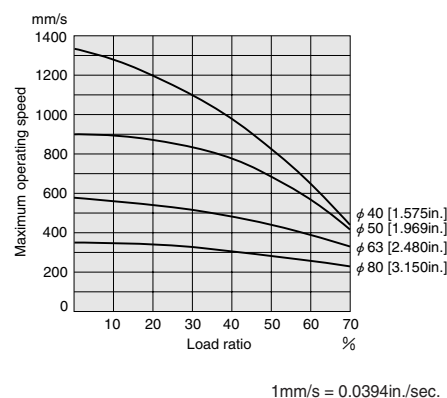
### 180-4A

#### ● Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length:  $\phi$  6 [0.24in.] × 1000mm [39in.]
- Fitting: Quick fitting TS8-01
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}}$  (%)
- Cylinder stroke: 150mm [5.91in.]



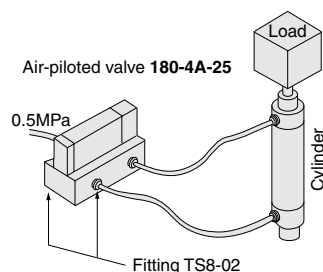
#### Maximum operating speed



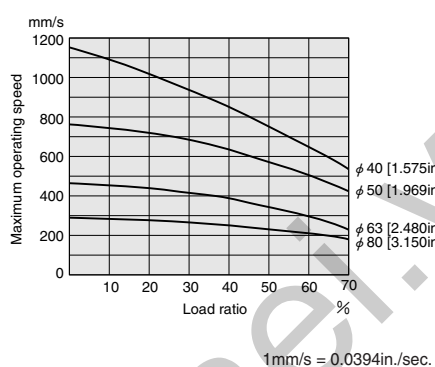
### A180-4A-25

#### ● Measurement conditions

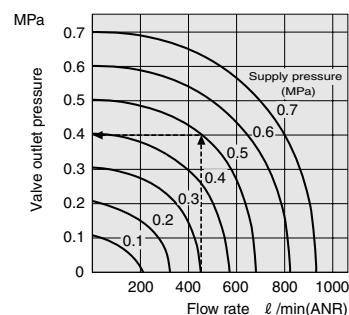
- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length:  $\phi$  6 [0.24in.] × 1000mm [39in.]
- Fitting: Quick fitting TS8-02
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}}$  (%)
- Cylinder stroke: 150mm [5.91in.]



#### Maximum operating speed



#### Flow rate 180 series



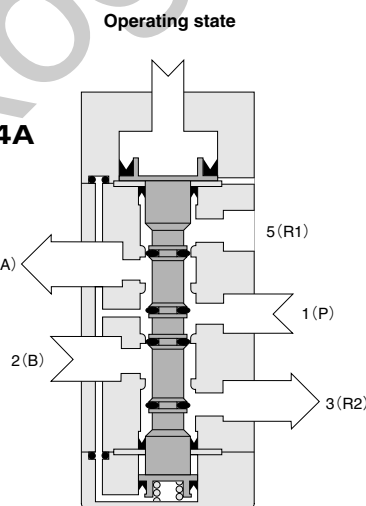
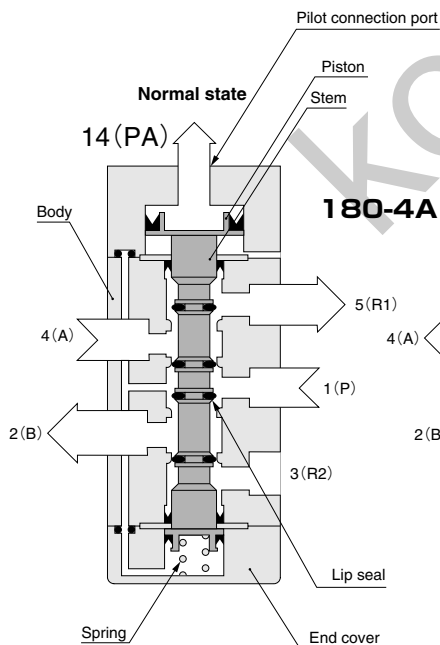
1MPa = 145psi., 1 l/min = 0.0353ft<sup>3</sup>/min.

#### How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 460 l/min [16.2ft<sup>3</sup>/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

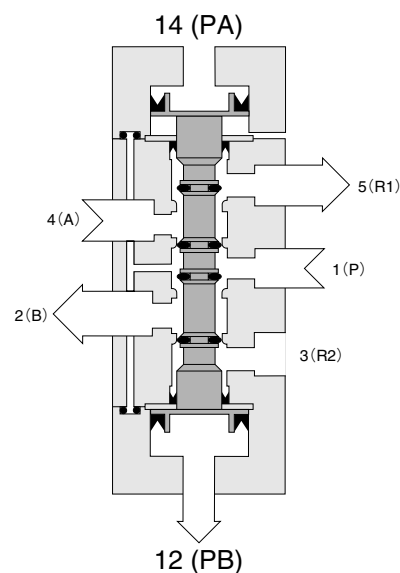
## Operating Principles, and Major Parts and Materials

### 5-port, 2-position



### 180-4A2

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

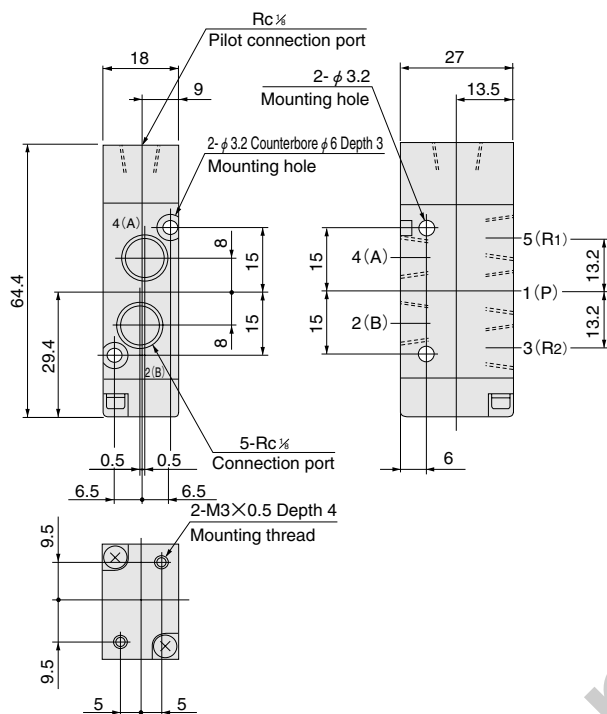


### Major Parts and Materials

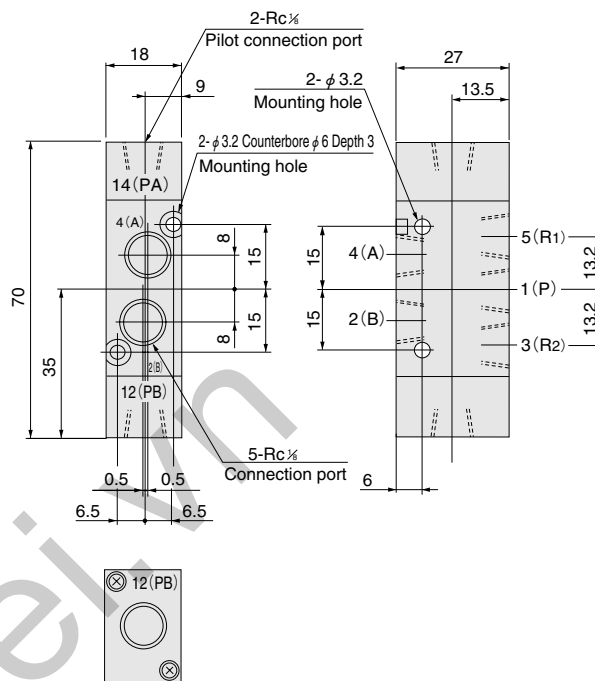
| Parts         | Materials                 |
|---------------|---------------------------|
| Body          | Aluminum alloy (anodized) |
| Stem          | Aluminum alloy (anodized) |
| Lip seal      | Synthetic rubber          |
| Mounting base | Mild steel (zinc plated)  |
| Sub-base      | Aluminum alloy (anodized) |

# Dimensions of Air-piloted 5-port, 2-position Valve (mm)

## 180-4A

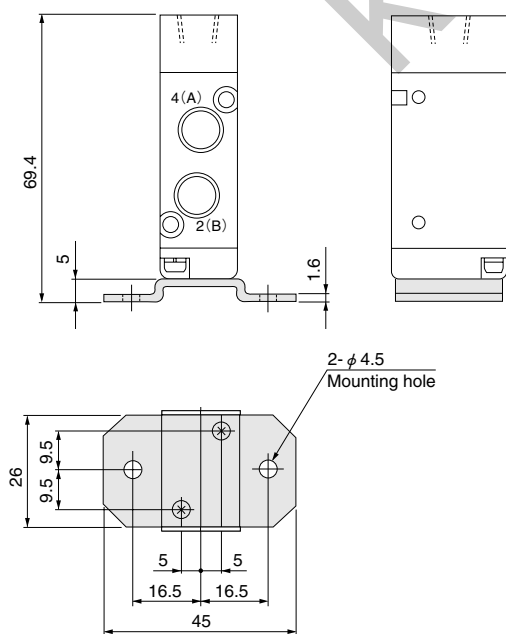


## 180-4A2

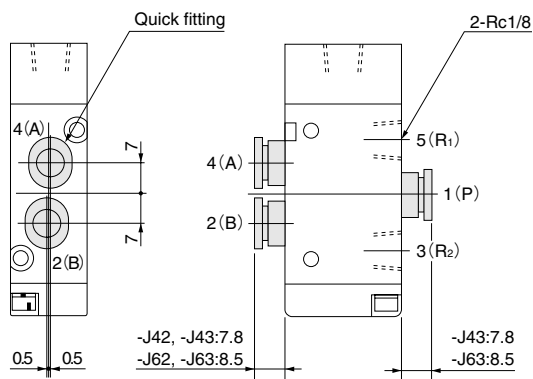


## Options

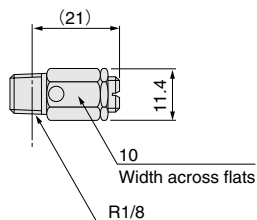
### ● Mounting base: -21



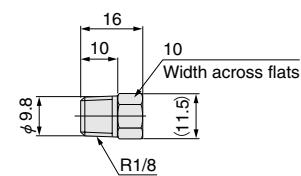
- With quick fittings: -J42 (For φ 4 tube, 4(A), 2(B) ports with fittings)
- J43 (For φ 4 tube, 1(P), 4(A), 2(B) ports with fittings)
- J62 (For φ 6 tube, 4(A), 2(B) ports with fittings)
- J63 (For φ 6 tube, 1(P), 4(A), 2(B) ports with fittings)



### ● Speed controller: -70

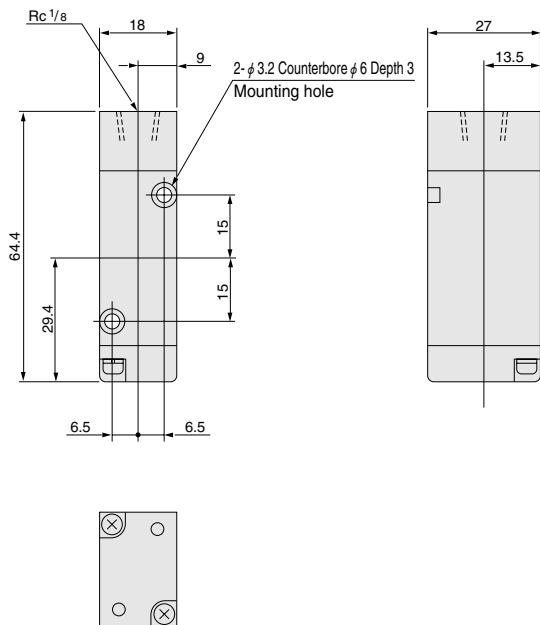


### ● Muffler: -75

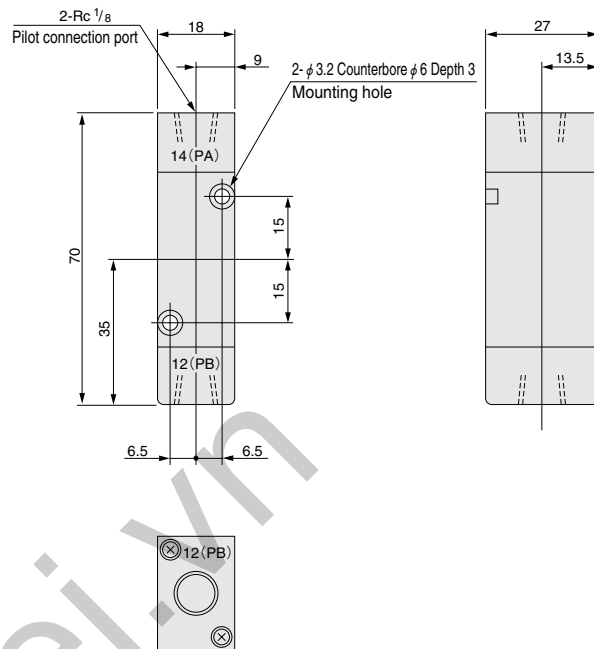


## Dimensions of Air-piloted 5-port, 2-position Valve (mm)

### A180-4A

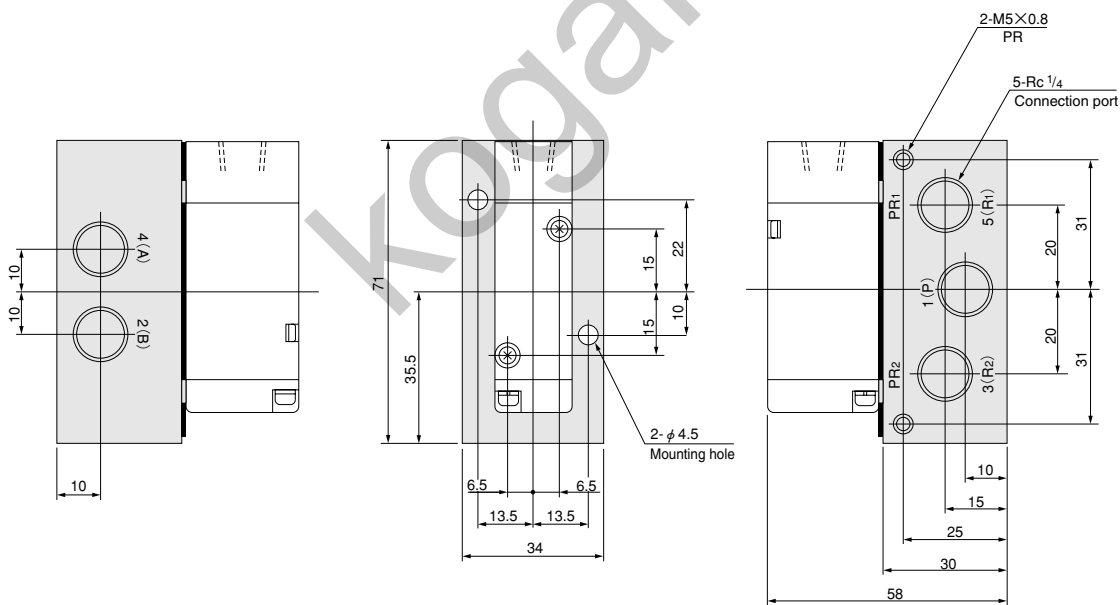


### A180-4A2

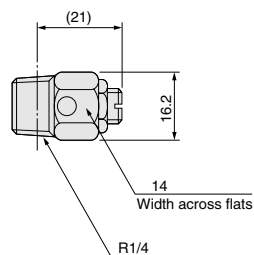


## Options

● Sub-base: -25



● Speed controller: -70  
(for sub-base only)



# Handling Instructions and Precautions

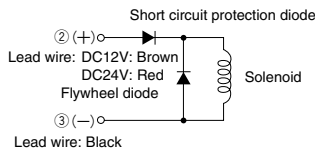


## Solenoid

### Internal circuit

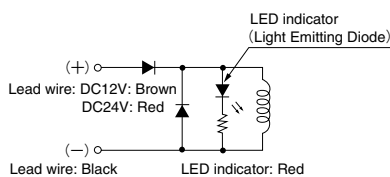
#### ●DC12V, DC24V

#### Standard solenoid (Surge suppression)



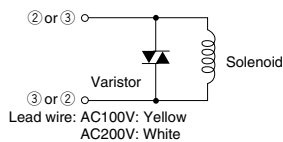
② and ③ are for with DIN connector (Order code: -39).

#### Solenoid with LED indicator (Surge suppression) Order code: -PSL, -PLL



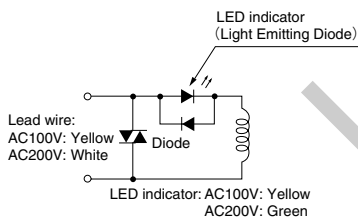
#### ●AC100V, AC200V

#### Standard solenoid (Surge suppression)



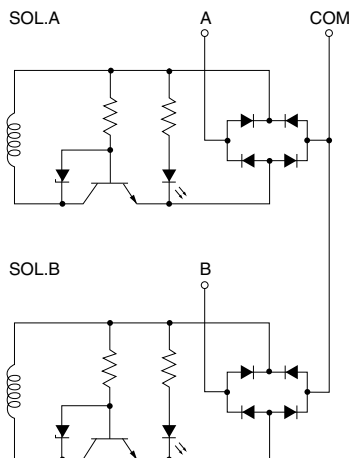
② and ③ are for with DIN connector (Order code: -39).

#### Solenoid with LED indicator (Surge suppression) Order code: -PSL, -PLL



#### ●DC24V

#### Tandem solenoid



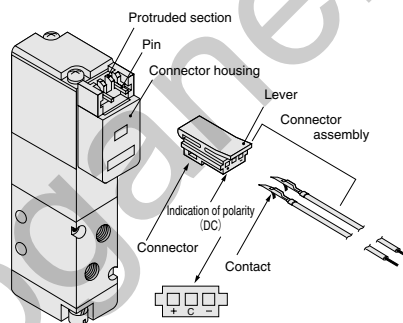
- Cautions:**
1. Do not apply megger between the lead wires.
  2. The DC solenoid will not short circuit even if the wrong polarity is applied, but the valve will not operate.
  3. Leakage current inside the circuit could result in failure of the solenoid valve to return, or in other erratic operation. Always use it within the range of the allowable leakage current. If circuit conditions, etc. cause the leakage current to exceed the allowable leakage current, consult us.
  4. For double solenoid and twin solenoid, avoid energizing both solenoids simultaneously. The valve could fall into the neutral position.



## Plug connector

### Attaching and removing plug connector

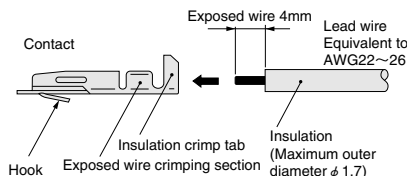
Use fingers to insert the connector into the pin, push it in until the lever claw latches onto the protruded section of the connector housing, and complete the connection. To remove the connector, squeeze the lever along with the connector, lift the lever claw up from the protruded section of the connector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



※ Illustration shows the 110 series.

### Crimping of connecting lead wire and contact

To crimp lead wires into contacts, strip off 4mm [0.16in.] of the insulation from the end 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.

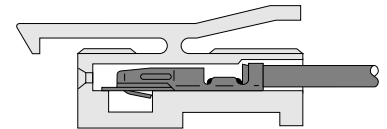


- Cautions:**
1. Do not pull hard on the lead wire.
  2. Always use a dedicated tool for crimping of connecting lead wire and contact.

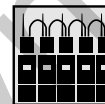
Contact: Model 702062-2M  
Manufactured by Sumiko Tech, Inc.  
Crimping tool: Model F1-702062  
Manufactured by Sumiko Tech, Inc.

### 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.



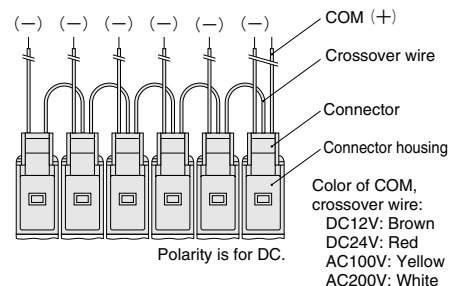
## Common terminal pre-wired plug connector

### 1. Pre-wired common terminal at DC positive side or AC

Order code With straight connector:

-CPSL

With L connector: -CPLL

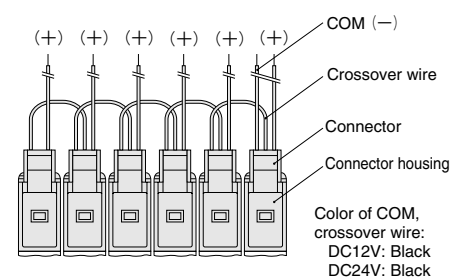


### 2. Pre-wired common terminal at DC negative side

Order code With straight connector:

-CMSL

With L connector: -CMLL



- Cautions:**
1. The diagrams show the straight connector configuration. While the connector's orientation is different in the case of the L connector, in every case the first COM lead wire comes from the last station's mounted valve.
  2. Since the COM terminal is connected to a crossover terminal inside the connector housing, the connector cannot be switched between a positive common and a negative common by changing the connectors.

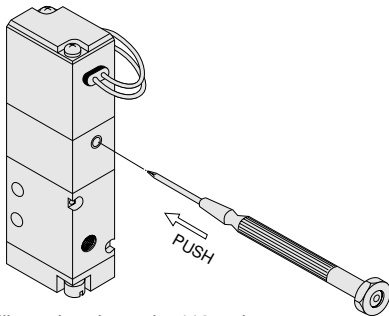


## Manual override

### Non-locking type

To operate the manual override, press it all the way down. The single solenoid 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 and twin solenoid valves, pressing the manual override on the 12(S1) side switches the 12(S1) to enter the energized position, and the unit remains in that 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 solenoid 14(S2).

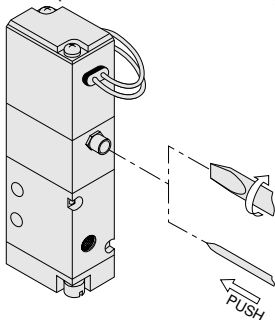


※ Illustration shows the 110 series.

### Locking protruding type

Use a small screwdriver to turn the adjusting knob several times in the clockwise direction, and lock the manual override in place. When locked, turning the adjusting knob several times in the counterclockwise direction releases a spring on the manual override, returns it to the normal position, and releases the lock.

For the locking protruding type, when the adjusting knob is not turned, this type acts just like the non-locking type; the valve enters the energized position as long as the manual override is pushed down, and it returns to the normal position upon release.



※ Illustration shows the 110 series.

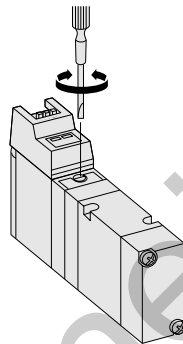
- Cautions:**
1. The 180 series valves are internal pilot type solenoid valves. As a result, the manual override cannot switch the main valve without air supplied from the 1(P) port.
  2. Always release the lock of the locking type and locking protruding type manual override before commencing normal 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.



## Manual override (Tandem solenoid)

### Locking type

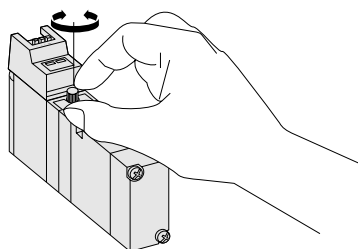
To lock the locking type manual override, use a small screwdriver to push down the manual override all the way, then set the 0 position as the reference point and turn it in the clockwise direction as far as position A. This achieves the same conditions as when the 14(SA) side is energized, and the manual override is locked in place. For the 12(SB) side, turn it in the counterclockwise direction as far as position B. To release the lock, return the manual override to the 0 position. A spring mechanism returns the manual override to its normal position, and the lock is released. Care should be taken to avoid excessive turning of the manual override, which could damage it.



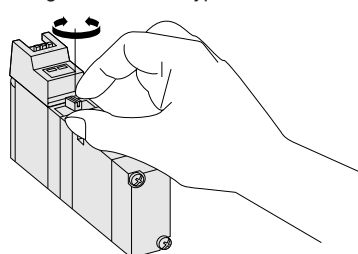
### Locking protruding type, locking manual lever type

To lock the locking protruding type manual override or locking manual lever type, use either a small screwdriver or your fingertips to push the manual override button (manual lever) all the way down, then set the 0 position as the reference point and turn it in the clockwise direction as far as position A. This achieves the same conditions as when the 14(SA) side is energized, and the manual override button (manual lever) is locked in place. For the 12(SB) side, turn it in the counterclockwise direction as far as position B. To release the lock, return the manual override button (manual lever) to the 0 position. A spring mechanism returns the manual override button (manual lever) to its normal position, and the lock is released. Care should be taken to avoid excessive turning of the manual override button (manual lever), which could damage it.

#### Locking protruding type manual override



#### Locking manual lever type



- Cautions:**
1. The 180 series valves are internal 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 protruding type manual override 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.

### Mounting base 180-21

When installing a mounting base to the valve, always use the provided screws. The recommended tightening torque for the screws is 49N·cm {5kgf·cm} [4.3in·lbf]. If you must use screws other than the provided ones, use screws with a screw length of 6mm [0.24in.] or less. Avoid applying excessive force or shocks.

### Mounting valves on manifold

When mounting valves on manifold, apply the recommended tightening torque of 49N·cm {5kgf·cm} [4.3in·lbf] for the valve mounting screws.