

**KOGANEI**

## Air Valve

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**SOLENOID VALVES 430 630 830 SERIES**

**INSTRUCTION MANUAL** Ver.1.0

Handling Instructions and Precautions



Internal circuit

| Voltage specification |                 | Internal circuit |  |
|-----------------------|-----------------|------------------|--|
| DC24V                 | Single solenoid |                  | ① Bridge diode<br>(input nonpolarized element)<br><br>② LED indicator<br><br>③ Surge voltage absorption<br>element |
|                       | Double solenoid |                  |  |
| AC100V<br>AC200V      | Single solenoid |                  | ① Varistor<br>(surge voltage absorption<br>element)<br><br>② LED indicator   |
|                       | Double solenoid |                  |  |

- Cautions:**

1. Do not apply megger between the lead wires.

2. Leakage current inside the circuit could result in failure of the solenoid valve to return, or in other erratic operation. Always use at or below the allowable leakage current listed in the solenoid specifications on p.729 (or p.741, 753).  
When circuit conditions, etc. cause the current leakage to exceed the allowable leakage current, consult us.

3. Since the **DC24V** specification does not have polarity, it can be used with either positive or negative common.

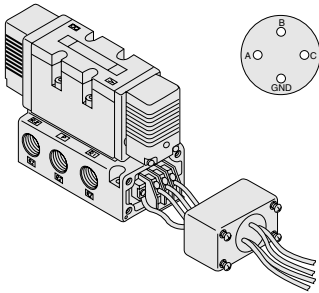
4. For a double solenoid, avoid energizing both solenoids simultaneously. Valve switching will not operate normally.

## Wiring instructions

### When using a sub-base

#### Grommet type

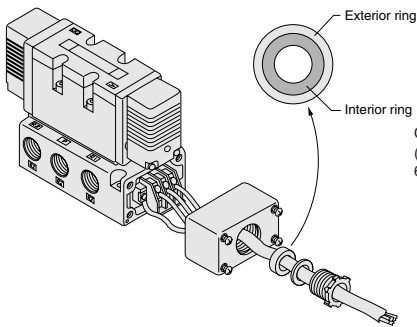
The terminal block is attached to the sub-base, as shown in the illustration below. Remove the wiring cover, and follow the internal circuitry to connect lead wires to each terminal on the terminal block.



**Caution:** For the 4E2 type or GND, pass lead wires through wiring outlet B and the lower hole GND, and then connect them to the terminal block.

#### Conduit type

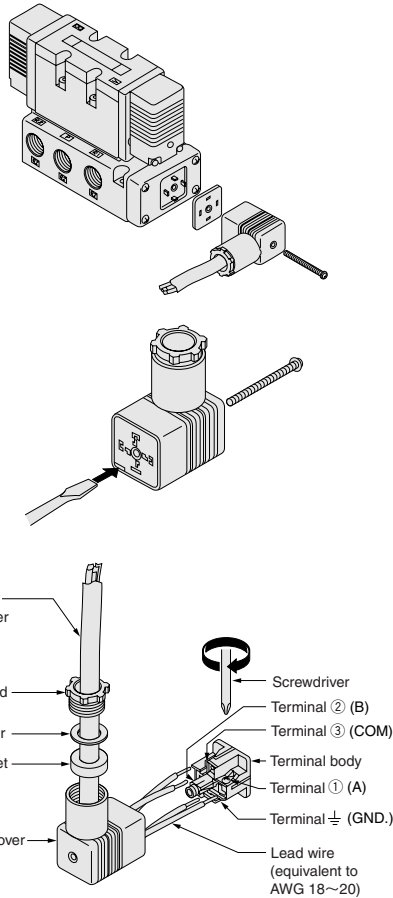
The applicable cable outer diameter is  $\phi 6$  [0.24in.]~ $\phi 12$  [0.47in.]. When using  $\phi 10$  [0.39in.]~ $\phi 12$  [0.47in.] cable, disengage the gland screw and pull out the grommet. The interior ring of the grommet is slitted for easy removal. Remove the interior ring only and leave the exterior ring in place for use.



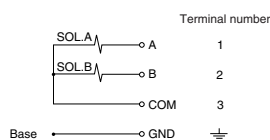
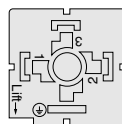
**Caution:** The connection to the terminal is identical to the grommet type.

#### DIN connector

The applicable cable outer diameter is  $\phi 6$  [0.24in.]~ $\phi 10$  [0.39in.]. For wiring, remove the cover mounting screws and lift off the terminal cover from the base body. Insert a screwdriver (blade width of 4~4.5mm [0.16~0.18in.]), into the groove on the boundary between the terminal body and the terminal cover, and remove the terminal body from the terminal cover. Slip a cable gland, washer, and cable gasket over a cable (outer diameter  $\phi 6$  [0.24in.]~ $\phi 10$  [0.39in.]), insert the cable into the wiring outlet of the terminal cover, and connect the wires to each of the terminals on the terminal block.



The terminal locations and terminal numbers are as shown below:



### When using individual wiring manifolds (430, 630 series only)

#### Grommet type

"Wiring instructions" are the same as for the grommet type when using a sub-base.

#### Conduit type

"Wiring instructions" are the same as for the conduit type when using a sub-base.

#### DIN connector

"Wiring instructions" are the same as for the DIN connector when using a sub-base.

### Applicable crimping terminal JIS C 2805 R type 1.25-3 or equivalent

### Recommended tightening torque for each screw

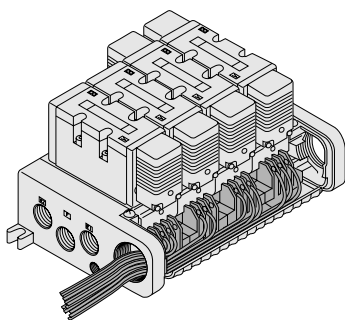
| Screw parts  | N·cm {kgf·cm} [in·lbf] |                   |
|--|------------------------|-------------------|
|  | Recommended            | tightening torque |
| Terminal screw   | 58.8 {6.0} [5.2]       |                   |
| Sub-base wiring cover mounting screw                   | 58.8 {6.0} [5.2]       |                   |
| Collective wiring manifold wiring cover mounting screw | 68.6 {7.0} [6.1]       |                   |
| Individual wiring manifold wiring cover mounting screw | 58.8 {6.0} [5.2]       |                   |

# Handling Instructions and Precautions

## ● When using collective wiring manifolds (430, 630 series only)

### Terminal block

The terminal block is available on the manifold as shown in the illustration below. Remove the wiring cover, and following the internal circuit described above, connect lead wires to each terminal on the terminal block. The wiring cover can be removed by only loosening the wiring cover mounting screws.



### Serial transmission system

(For 430 series only)

For the usage and system configuration methods, see the relevant User's Manual.

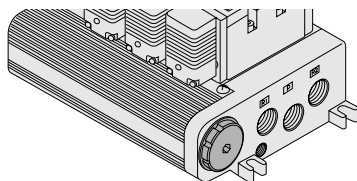
| Optional code | Applicable PC manufacturer                  | User's manual No. <small>Note</small> |
|---------------|---|---------------------------------------|
| OR            | OMRON                                       | Document: HV007                       |
| MB            | Mitsubishi Electric                         | Document: HV006                       |
| FJ            | Fuji Electric<br>FA Components &<br>Systems | Document: HV012                       |
| SP            | SHARP                                       | Document: V107                        |
| MS            | Matsushita Electric<br>Works                | Document: V109                        |
| HT            | Hitachi                                     | Document: V108                        |

Note : When you require a User's Manual, consult us.

Remark : The address number is placed on the solenoid at shipping.

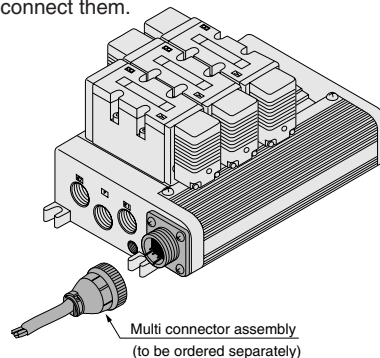
### ● Conduit cap

A conduit cap is attached to a manifold's end block. Attach it to a wiring outlet that is not in use on one side.

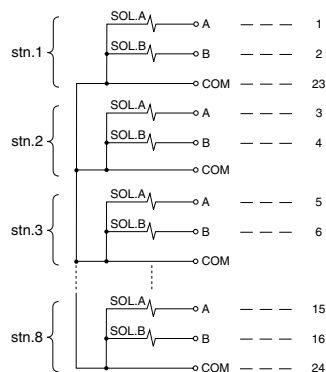
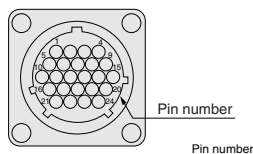


### Multi connector

As shown in the illustration below, align the pin numbers on the multi connector and those on the multi connector assembly to connect them.



The pin locations and pin numbers are as shown below:



**Caution:** Since the DC24V specification does not have polarity, it can be used with either positive or negative common.

Additional parts (to be ordered separately)

Multi connector assembly order code

**430M-AM240-A-** ☐

Cable length  
**150** : 1500mm [59in.]  
**300** : 3000mm [118in.]  
**500** : 5000mm [197in.]

Component parts

Plug: 206837-1 (1 pc.)

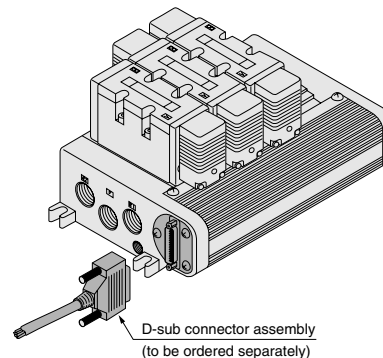
Cable clamp: 206138-1 (1 pc.)

Socket: 66101-2 (18 pcs.)

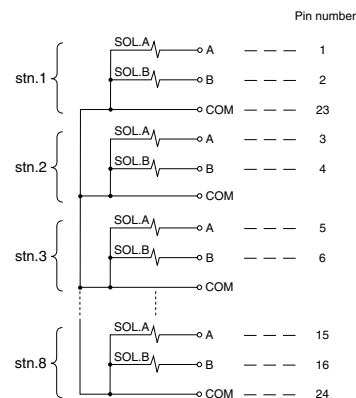
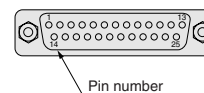
Manufactured by Tyco Electronics AMP K.K.

### D-sub connector

Align the pin numbers on the D-sub connector and those on the D-sub connector assembly to connect them.



The pin locations and pin numbers are as shown below:



**Cautions:** 1. Since the DC24V specification does not have polarity, it can be used with either positive or negative common.

2. Use M3 for the connector mounting screw.

Additional parts (to be ordered separately)

D-sub connector assembly order code

**430M-AD250-A-** ☐

Cable length  
**150** : 1500mm [59in.]  
**300** : 3000mm [118in.]  
**500** : 5000mm [197in.]

Component parts

Plug: D type connector in accordance with MIL

Number of pins: 25

Connector mounting screw (molded type): M3×0.5

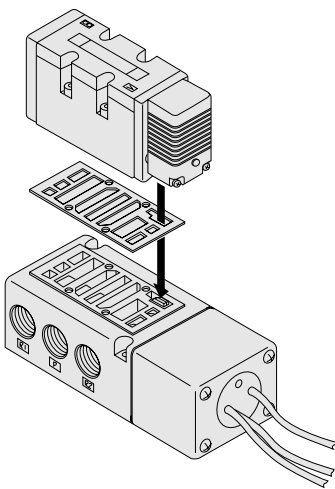


## Plug-in

### Attaching and removing valves

This series is a plug-in type valve that enables valve replacement without removing the air piping and electrical wiring.

To remove the valve body from the sub-base or manifold, loosen the valve mounting screws (4 places), and pull the valve body straight out. To mount the valve body, align the valve body plugs to the socket on the upper surface of the sub-base or manifold, fit it straight in, and then tighten the valve mounting screws. The recommended tightening torques for the valve mounting screws are as shown below.



**Caution:** Do not attempt to remove the pilot valve.

N·cm {kgf·cm} [in·lb]

| Series name | Recommended tightening torque |
|-------------|-------------------------------|
| 430 series  | 105.9 {10.8} [9.37]           |
| 630 series  | 137.3 {14.0} [12.15]          |
| 830 series  | 137.3 {14.0} [12.15]          |



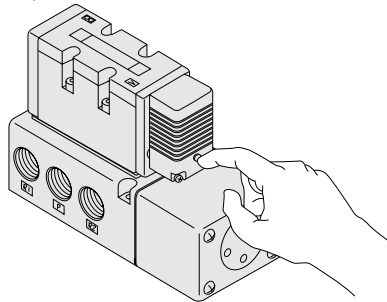
## Manual override

### Manual override

Using a fingertip, press the manual override all the way down to operate.

The manual override's protruding dimension is 0.7mm [0.028in.].

- For the single solenoid, the valve works the same as when in the energized state as long as the manual override is pushed down, and returns to the normal position upon release.

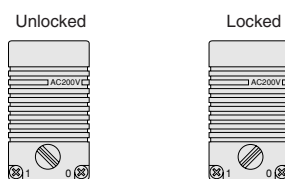


- For the double solenoid, pressing the manual override on the 14(SA) side switches the 14(SA) to enter the energized position, and the unit remains in that state even after the manual override is released. To return it to the normal position, operate the manual override on the 12(SB). This is the same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

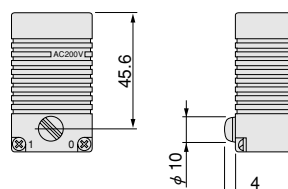
### Locking type manual lever override

(430,630 series only)

- Shown in the illustration below, the locking type manual lever override is normally (when lock is released) set to 0 on the slit in the lever. To lock it, turn the lever slit 90 degrees in the direction of 1.



Dimensions



- Cautions:**
1. The 430, 630 series valves are pilot type solenoid valves. As a result, the manual override cannot switch the main valve without air supplied from the 1(P) port.
  2. Always release the lock of the locking type manual lever override before commencing normal operation.

## Handling Instructions and Precautions



**Manifold** (430, 630 series only)

### Piping

Since the 1(P), 3(R2), 5(R1) ports are on both ends of the manifold, the piping direction can be selected depending on the application.

At shipping, plugs are temporarily plugged on ports at one end, but are not firmly tightened. Regardless of which end the piping is connected to, always remove the plug, apply sealing tape or another sealing agent, and securely tighten the plug into the unused ports.

### Parts ordering

When additional parts are required due to manifold increases or replacements, examine the disassembly diagram below to place orders, using the following order codes:

**<Collective wiring manifold>** (Wiring type is terminal block only)

| No. | Parts  | Order Codes  |  |
|-----|--|--|--|
|     |  | For 430 series   | For 630 series   |
| ①   | Manifold additional unit <small>Note 1</small> | 430M□ <small>Note 2</small> A(B) <small>Note 3</small> S | 630M□ <small>Note 2</small> A(B) <small>Note 3</small> S |
| ②   | Manifold block assembly                        | 430MA(B) <small>Note 3</small> -MB                       | 630MA(B) <small>Note 3</small> -MB                       |
| ③   | Auxiliary parts set                            | 430MA-MHB  | 630MA-MHB  |
| ④   | End block set                                  | 430MA-EB   | 630MA-EB   |
| ⑤   | Wiring cover                                   | 430MA-MC□ <small>Note 4</small>                          | 630MA-MC□ <small>Note 4</small>                          |

Remark: The recommended tightening torque for manifold connecting bolts is 196.1N·cm {20kgf·cm} [17.4in·lbf].

Notes: 1. When ordering an additional manifold unit, first list the order code, and then enter the solenoid valve model required for the number of units. For the method of order entry, see the manifold order codes.

(Example) 430M2AS stn. 1 430-4E1 DC24V  
stn. 2 433-4E2 DC24V 1 set

When ordering additional manifold units, it is necessary to order a new wiring cover (corresponds to the total number of units).

- Enter the number of units 1~n into □. However, the total number of units on the manifold after adding new units should be 10 units or less.
- When ordering bottom piping (made to order), enter **B** instead of **A**.
- Enter the number of units 2~10 into □.

### Block-off plate

To close the unused stations, use the block-off plate available as additional parts (Order code for 430: **430M-BP**, Order code for 630: **630M-BP**).

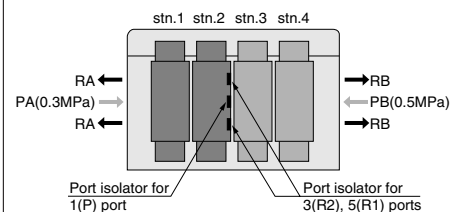
- Cautions:**
- For the 1(P) port piping, use a size that matches the manifold's piping connection port.
  - When installing piping or mufflers to the 3(R2), 5(R1) ports, ensure there will be minimum exhaust resistance.
  - On rare occasions, exhaust can interfere with other valves and actuators. In this case, let exhaust from 3(R2), 5(R1) ports on both ends.
  - When a multiple number of valves are operating simultaneously on a multi-unit manifold, or during high frequency applications, supply air from the 1(P) ports on both ends, and exhaust air from the 3(R2), 5(R1) ports on both ends.

### Port isolator

When entering a port isolator order code (**-MSP**, **-MSR**, **-MSD**) to the manifold order code, the port isolators are installed at shipping in the space between the designated station and the station to its right (with the larger stn. number). Inserting port isolators in the 1(P) and 3(R2), 5(R1) ports between the designated station and the station to its right can isolate the air path by the port isolator position into stations with smaller station numbers and stations with larger station numbers.

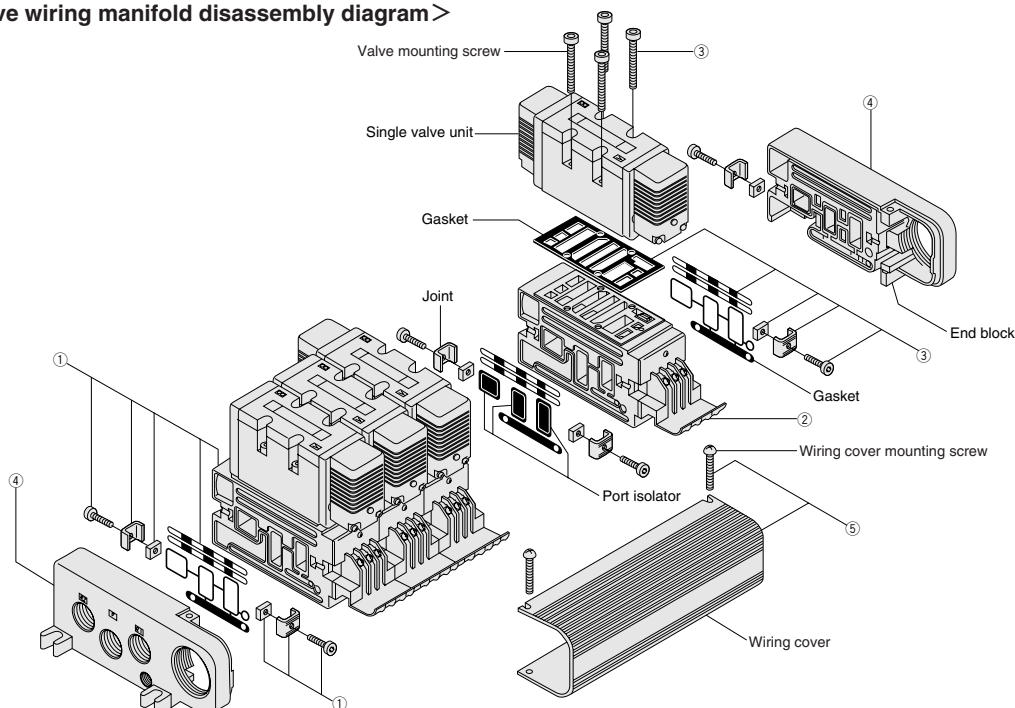
- Port isolator for 1(P) port Can supply 2 different pressure.
- Port isolator for 3(R2), 5(R1) ports Can prevent exhaust air interference.
- Port isolator for 1(P), 3(R2), 5(R1) ports Can supply 2 different pressure, and prevent exhaust air interference.

**Example: When a port isolator order code has been placed for stn.2**



PA air is supplied to stn.1 and stn.2, while PB air is supplied to stn.3 and stn.4. Moreover, RA on stn.1 and stn.2 is exhausted from the left side, and RB on stn.3 and stn.4 is exhausted from the right side.

### <Collective wiring manifold disassembly diagram>



| No. | Parts  | Order Codes   |  |
|-----|--|---|--|
|     |  | For 430 series  | For 630 series   |
| ⑥   | Manifold additional unit <small>Note 1</small> | <b>430M</b> <input type="checkbox"/> <small>Note 2</small> <b>A (B) TS</b> - <input type="checkbox"/> <small>Note 3</small> | <b>630M</b> <input type="checkbox"/> <small>Note 2</small> <b>A(B) TS</b> - <input type="checkbox"/> <small>Note 3</small> |
| ⑦   | Auxiliary parts set                            | <b>430MA-MHB</b>  | <b>630M-MHB</b>  |
| ⑧   | End block set                                  | <b>430MAT-EB</b>  | <b>630MAT-EB</b>   |

Notes: 1. When ordering a manifold additional unit, first list the order code, and then enter the solenoid valve model required for the number of units. For the method of order entry, see the manifold order codes.

- (Example) **430M2ATS-37** strn. 1 **430-4E1** **DC24V**  
strn. 2 **433-4E2** **DC24V** 1 set
2. Enter the number of units 1~n into . However, the total number of units on the manifold after adding new units should be 10 units or less.
3. Enter wiring type: **Blank** (Grommet type), **-37** (Conduit type), **-39** (DIN connector) into .

< Individual wiring manifold disassembly diagram >

This diagram illustrates the disassembly of the individual wiring manifold. It shows three main components being removed from the central assembly:

- Component 6:** A terminal block with three circular terminals, shown being detached from the bottom left of the main assembly.
- Component 7:** A rectangular manifold with three vertical screws on top, shown being detached from the top right of the main assembly.
- Component 8:** A rectangular manifold with internal wiring, shown being detached from the top right of the main assembly.

The diagram uses numbered callouts (6, 7, 8) to identify the components and lines to show their removal paths from the main assembly.



# SOLENOID VALVES

## 430 SERIES

### Basic Models and Valve Functions

| Basic model         | 430-4E1     | 430-4E2 | 433-4E2   |
|---------------------|-------------|---------|---|
| Item                |             |         |   |
| Number of positions | 2 positions |         | 3 positions   |
| Number of ports     | 5 ports     |         |   |
| Valve function      | —           | —       | Closed center (standard)<br>Exhaust center (optional)<br>Pressure center (optional) |

Remark: For optional specifications and order codes, see p.731~733.

### Specifications

| Basic model  |                             |       | 430-4E1                    | 430-4E2                    | 433-4E2                    |
|--|-----------------------------|-------|----------------------------|----------------------------|----------------------------|
| Item   |                             |       |                            |                            |                            |
| Media  |                             |       | Air                        |                            |                            |
| Operation type   |                             |       | Pilot type                 |                            |                            |
| Effective area <sup>Note 1</sup><br>[Cv]                   | Port size <sup>Note 2</sup> | Rc3/8 | 40 [2.2]                   |                            | 35 [1.9]                   |
|  |                             | Rc1/4 | 35 [1.9]                   |                            | 30 [1.7]                   |
| Lubrication  |                             |       | Not required               |                            |                            |
| Operating pressure range MPa {kgf/cm <sup>2</sup> } [psi.] |                             |       | 0.2~0.9 [2.0~9.2] [29~131] | 0.1~0.9 [1.0~9.2] [15~131] | 0.2~0.9 [2.0~9.2] [29~131] |
| Proof pressure MPa {kgf/cm <sup>2</sup> } [psi.]           |                             |       | 1.35 [13.8] [196]          |                            |                            |
| Response time <sup>Note 3</sup><br>ms                      | DC24V                       |       | 25/25 or below             | 20/20 or below             | 25/35 or below             |
| ON/OFF   | AC100V, AC200V              |       | 20/30 or below             | 15/15 or below             | 20/35 or below             |
| Maximum operating frequency Hz                             |                             |       | 5                          |                            |                            |
| Minimum time to energize for self holding ms               |                             |       | —                          | 50                         | —                          |
| Operating temperature range (atmosphere and media) °C [°F] |                             |       | 5~50 [41~122]              |                            |                            |
| Shock resistance m/s <sup>2</sup> {G}                      |                             |       | 294 {30}                   |                            |                            |
| Mounting direction   |                             |       | Any                        |                            |                            |

Notes: 1. For details, see the effective area on p.730.

2. For details, see the port size on p.730.

3. Values when the air pressure is 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]. The values for **430-4E2** are when switching from the opposite position, and for **433-4E2** are those of closed center, when switching from the neutral valve position.

### Solenoid Specifications

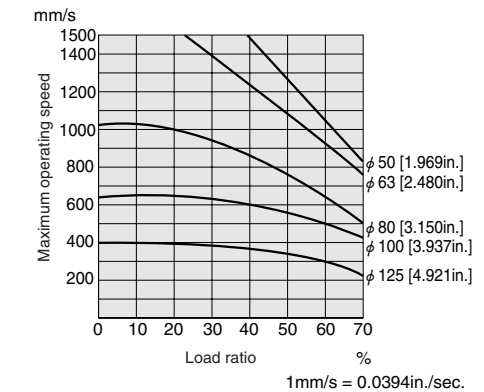
| Rated voltage   |            | DC24V | AC100V                      |                     | AC200V |                      |    |
|---|------------|-------|-----------------------------|---------------------|--------|----------------------|----|
| Item  |            |       |                             |                     |        |                      |    |
| Operating voltage range                               |            | V     | 21.6~26.4<br>(24±10%)       | 90~110<br>(100±10%) |        | 180~220<br>(200±10%) |    |
| Rated frequency                                       |            | Hz    | —                           | 50                  | 60     | 50                   | 60 |
| Current (when rated voltage is applied)<br>mA (r.m.s) | Starting   | —     | 68                          | 58                  | 34     | 27                   |    |
|   | Energizing | 72    | 42                          | 32                  | 21     | 16                   |    |
| Power consumption                                     |            | W     | 1.7                         | —                   |        | —                    |    |
| Allowable leakage current                             |            | mA    | 4                           | 6                   |        | 3                    |    |
| Insulation resistance <sup>Note</sup>                 |            | MΩ    | Over 100                    |                     |        |                      |    |
| Color of LED indicator                                |            |       | Red                         | Yellow              |        | Green                |    |
| Surge suppression (as standard)                       |            |       | Surge absorption transistor | Varistor            |        |                      |    |

Note: Value at DC500V megger.

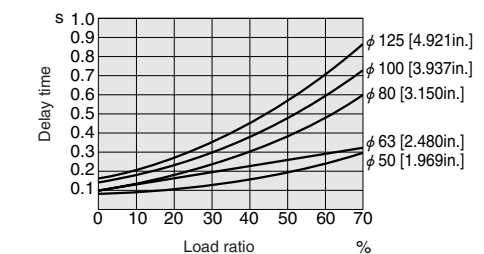
### Cylinder Operating Speed

#### 430-4E1-263

#### Maximum operating speed

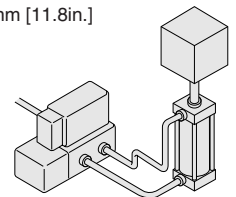


#### Delay time

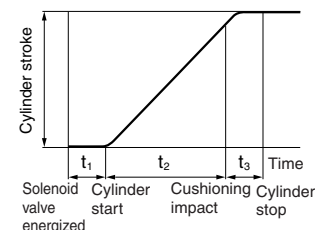


#### Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length: φ7.5×1000mm [39in.]
- Fitting: Quick fitting (Model: TS10-03)
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}}$  (%)
- Cylinder stroke: 300mm [11.8in.]



#### How to obtain cylinder speed



t = Time required for the cylinder to complete 1 stroke

t<sub>1</sub> = Cylinder delay time

t<sub>2</sub> = Time moving at maximum speed

t<sub>3</sub> = Time required for cushioning (about 0.2s)

● Without cushion

t = t<sub>1</sub> + t<sub>2</sub>

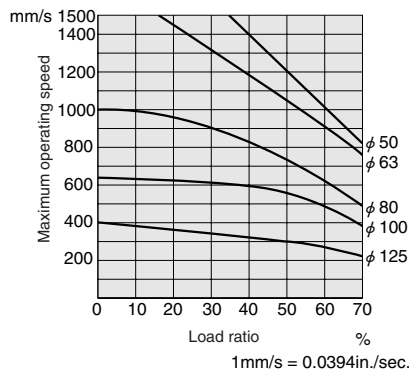
● With cushion

t = t<sub>1</sub> + t<sub>2</sub> + t<sub>3</sub>

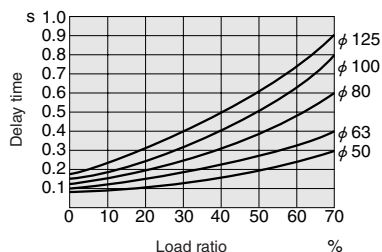


## 433-4E2-263

### Maximum operating speed

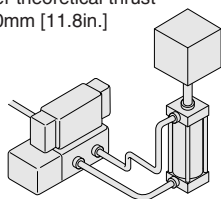


### Delay time



### Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length: φ7.5×1000mm [39in.]
- Fitting: Quick fitting (Model: TS10-03)
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}} (\%)$
- Cylinder stroke: 300mm [11.8in.]



## Effective Area [Cv]

| Model              | Port size | Standard mm <sup>2</sup> Note 1 | Effective area mm <sup>2</sup> Note 2 | Fitting size |
|--------------------|-----------|---------------------------------|---------------------------------------|--------------|
| 430-4E1<br>430-4E2 | Rc3/8     | 40<br>[2.22]                    | 34 [1.9]                              | TS 12-03     |
|                    |           |                                 | 30 [1.7]                              | TS 10-03     |
|                    |           |                                 | 22 [1.2]                              | TS 8-03      |
|                    | Rc1/4     | 35<br>[1.94]                    | 30 [1.7]                              | TS 12-02     |
|                    |           |                                 | 29 [1.6]                              | TS 10-02     |
|                    |           |                                 | 22 [1.2]                              | TS 8-02      |
| 433-4E2            | Rc3/8     | 35<br>[1.94]                    | 29 [1.6]                              | TS 12-03     |
|                    |           |                                 | 25 [1.4]                              | TS 10-03     |
|                    |           |                                 | 19 [1.1]                              | TS 8-03      |
|                    | Rc1/4     | 30<br>[1.66]                    | 26 [1.4]                              | TS 12-02     |
|                    |           |                                 | 25 [1.4]                              | TS 10-02     |
|                    |           |                                 | 19 [1.1]                              | TS 8-02      |

Notes: 1. Values for single valve unit.

2. Values when fittings are attached on 1(P), 4(A), and 2(B) ports. Fitting size is as shown in the table above.

## Solenoid Valve Port Size

| Model                      | Port specification | Sub-base port size |
|----------------------------|--------------------|--------------------|
| 430-4E□-263<br>433-4E2-263 | 1 (P)              | Rc 3/8             |
|                            | 4 (A), 2 (B)       |                    |
|                            | 3 (R2), 5 (R1)     |                    |
|                            | PR                 |                    |
| 430-4E□-262<br>433-4E2-262 | 1 (P)              | Rc 1/8             |
|                            | 4 (A), 2 (B)       |                    |
|                            | 3 (R2), 5 (R1)     |                    |
|                            | PR                 |                    |

## Manifold Connection Port Size

| Manifold model | Port           | Piping size |
|----------------|----------------|-------------|
| 430M□A         | 1 (P)          | Rc 1/2      |
|                | 4 (A), 2 (B)   | Rc 3/8      |
|                | 3 (R2), 5 (R1) | Rc 1/2      |
|                | PR             | Rc 1/8      |

## Solenoid Valve Mass g [oz.]

| Basic model | Mass                      |
|-------------|---------------------------|
| 430-4E1     | 390 [13.76] (800 [28.22]) |
| 430-4E2     | 490 [17.28] (900 [31.75]) |
| 433-4E2     | 540 [19.05] (950 [33.51]) |

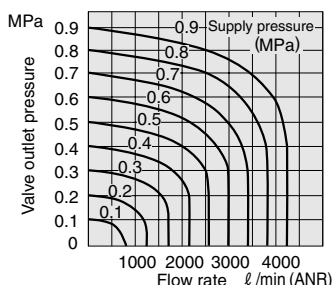
Remark: Figures in parentheses ( ) are the mass with sub-base.

## Manifold Mass g [oz.]

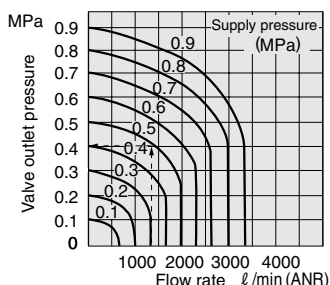
| Manifold model | Mass calculation of each unit<br>(n=Number of units)     | Block-off plate<br>(Model: 430M-BP) |
|----------------|--|-------------------------------------|
| 430M□A         | $(430 \times n) + 830 \quad [(15.17 \times n) + 29.28]$  | 100 [3.53]                          |
| 430M□AT        | $(430 \times n) + 630 \quad [(15.17 \times n) + 22.22]$  |                                     |
| 430M□ASR       | $(430 \times n) + 2000 \quad [(15.17 \times n) + 70.55]$ |                                     |
| 430M□ASL       |  |                                     |

## Flow Rate

430-4E1-263  
430-4E2-263



433-4E2-263



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 1300 l /min [45.9ft<sup>3</sup>/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

## 430 Series Solenoid Valve Order Codes



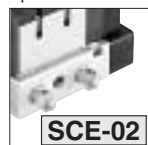
| 3-position valve<br>Valve function                    | Sub-base   | Manual override  | Wiring type  |                           |
|---|--|--|--|---------------------------|
| <div>Closed center</div> <div></div> <div>Blank</div> | <div>Port size Rc1/4,<br/>side piping</div> <div></div> <div>-262</div>  | <div>Non-locking type<br/>Manual override</div> <div></div> <div>Blank</div>     | <div>Grommet type</div> <div></div> <div>Blank</div> |                           |
| <div>Exhaust center</div> <div></div> <div>-13</div>  | <div>Port size Rc3/8,<br/>side piping</div> <div></div> <div>-263</div>  | <div>Locking type<br/>Manual lever<br/>override</div> <div></div> <div>-84</div> | <div>Conduit type</div> <div></div> <div>-37</div>   |                           |
| <div>Pressure center</div> <div></div> <div>-14</div> | <div>Port size Rc1/4,<br/>bottom piping<br/>(made to order)</div> <div></div> <div>-282</div>  |  | <div>DIN connector</div> <div></div> <div>-39</div>  |                           |
|   | <div>Port size Rc3/8,<br/>bottom piping<br/>(made to order)</div> <div></div> <div>-283</div>  |  |  |                           |
|   | <div>●When ordering<br/>single valve units,<br/>omit this code from<br/>the order code. The<br/>single valve unit<br/>includes 4<br/>mounting screws<br/>and 1 gasket.</div> |  |  |                           |
|   |  |  | Voltage  |                           |
|   | -262<br>-263<br>-282<br>-283   | -84<br>-84<br>-84  | -37<br>-39   | DC24V<br>AC100V<br>AC200V |
| 3,-14   |  |  |  |                           |

●When ordering single valve units, omit this code from the order code. The single valve unit includes 4 mounting screws and 1 gasket.

For made to order details, see p.759.

## Additional Parts (To be ordered separately)

Speed controller



●For Rc1/4



●For Rc3/8

Muffler

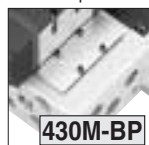


●For Rc1/4



●For Rc3/8

Block-off plate



# 430 Series Collective Wiring Manifold Order Codes



## Wiring type

Terminal block



Multi connector  
On right side



On left side



D-sub connector  
On right side



On left side



Serial transmission module  
On right side



On left side

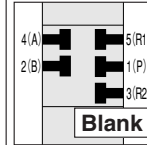


## Serial transmission module

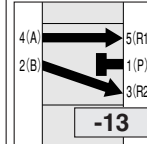
-OR OMRON  
-MB Mitsubishi Electric  
-FJ Fuji Electric  
FA Components  
& Systems  
-SP SHARP  
-MS Matsushita Electric  
Works  
-HT Hitachi

## 3-position valve Valve function

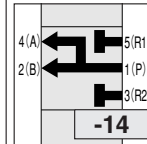
Closed center



Exhaust center

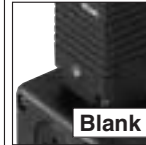


Pressure center

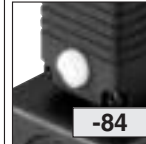


## Manual override

Non-locking type  
manual override



Locking type  
manual lever  
override



## Port isolator

**Blank** : Without  
port isolator  
-MSP : For 1(P) port  
-MSR : For 3(R2),  
5(R1) ports  
-MSD : For 1(P),  
3(R2), 5(R1)  
ports

|   | Manifold model<br>Number of units | Station                          | Basic model   | Voltage  |
|---|-----------------------------------|----------------------------------|---|--|
| Internal pilot<br>manifold                    | 430M<br>2<br>: 10<br>A            | MR<br>ML<br>DR<br>DL<br>SR<br>SL | -OR<br>-MB<br>-FJ<br>-SP<br>-MS<br>-HT<br>stn. <input type="checkbox"/><br>:<br>stn. <input type="checkbox"/> | -430-4E1<br>-430-4E2<br>-433-4E2<br>-432-4E1<br>-432-4E2 |
| External pilot<br>manifold<br>(made to order) | 432M                              | B                                |   | -84<br>-13,-14<br>-84<br>-84                             |
|   |                                   |                                  |   | -MSP<br>-MSR<br>-MSD                                     |
|   |                                   |                                  |   | DC24V<br>AC100V<br>AC200V                                |

For made to order details,  
see p.759.

●Maximum 8 units for  
multi connectors, D-sub  
connectors, and serial  
transmission modules.


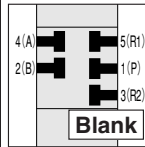


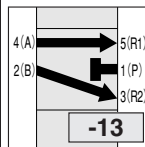


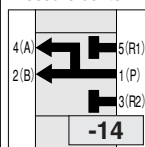
●A : Side piping  
B : Bottom piping (made to order)  
●Valve mounting location from the left, with wiring cover  
on top and the 4(A), 2(B) ports in front (□ : 1~10)

●Specify the valve model for each station.  
●Enter -BP when closing a station with a block-off  
plate without mounting a valve.  
●To increase the units in the manifold, order additional  
manifold units. (For order codes, see p.765.)

●When one of these port isolator order codes is entered to  
the designated station, the port isolator is installed in the  
space between the designated station and the station to  
its right (the side with the larger station number).  
For details, see the port isolators item on p.765.  
Note: The port isolator can be installed to only 1 station  
on each manifold set.

## 430 Series Individual Wiring Manifold Order Codes



| Wiring type   | 3-position valve<br>Valve function  | Manual<br>override  | Port isolator  |
|---|---|---|--|
| Grommet type<br><br><b>Blank</b> | Closed center<br><br><b>Blank</b> | Non-locking type<br>manual override<br><br><b>Blank</b>    | <b>Blank</b> : Without<br>port isolator<br><b>-MSP</b> : For 1(P) port<br><b>-MSR</b> : For 3(R2),<br>5(R1) ports<br><b>-MSD</b> : For 1(P), 3(R2),<br>5(R1) ports |
| Conduit type<br><br><b>-37</b>   | Exhaust center<br><br><b>-13</b>  | Locking type<br>manual lever<br>override<br><br><b>-84</b> |  |
| DIN connector<br><br><b>-39</b>  | Pressure center<br><br><b>-14</b> |   |  |

|   | Manifold model<br>Number of units | Station                             | Basic model   | Voltage  |
|---|-----------------------------------|-------------------------------------|---|--|
| Internal pilot<br>manifold                    | <b>430M</b>                       | <b>2</b><br>⋮<br><b>10</b>          | <b>AT</b>   | <b>-37</b><br><b>-39</b>   |
| External pilot<br>manifold<br>(made to order) | <b>432M</b>                       | <b>BT</b>                           | <b>-37</b><br><b>-39</b>  | <b>-37</b><br><b>-39</b>   |
|   |                                   | <b>stn. □</b><br>⋮<br><b>stn. □</b> | <b>-430-4E1</b><br><b>-430-4E2</b><br><b>-433-4E2</b><br><b>-432-4E1</b><br><b>-432-4E2</b> | <b>-84</b><br><b>-84</b><br><b>-13,-14</b><br><b>-84</b><br><b>-84</b> |
|   |                                   |                                     |   | <b>-MSP</b><br><b>-MSR</b><br><b>-MSD</b>                              |
|   |                                   |                                     |   | <b>DC24V</b><br><b>AC100V</b><br><b>AC200V</b>                         |

For made to order details,  
see p.759.

- **AT** : Side piping
- **BT** : Bottom piping (made to order)

- Valve mounting location from the left, with wiring cover  
on top and the 4(A), 2(B) ports in front (□ : 1~10)

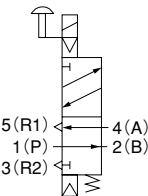
- Specify the valve model for each station.
- Enter **-BP** when closing a station with a block-off plate  
without mounting a valve.
- To increase the units in the manifold, order the  
manifold additional units. (For order codes, see p.766.)

- When one of these port isolator order codes is entered to  
the designated station, the port isolator is installed in the  
space between the designated station and the station to  
its right (the side with the larger station number).  
For details, see the port isolators item on p.765.  
Note: The port isolator can be installed to only 1 station  
on each manifold set.

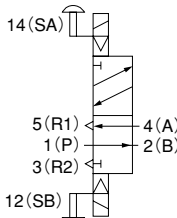
Operating Principles, Major Parts and Materials

5-port, 2-position

Single solenoid



Double solenoid

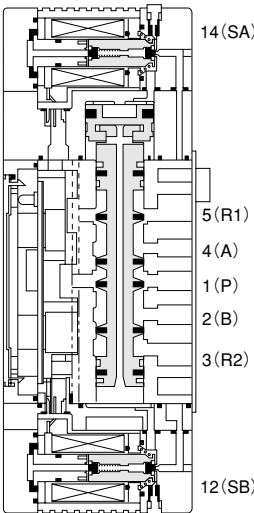
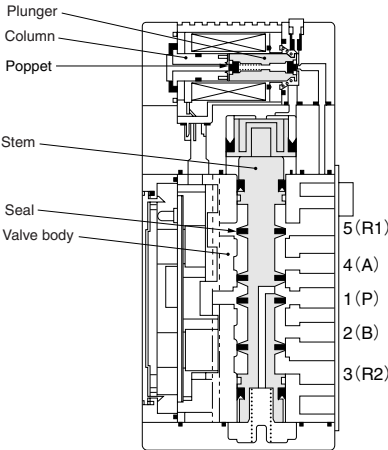


430-4E1

(De-energized)

430-4E2

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

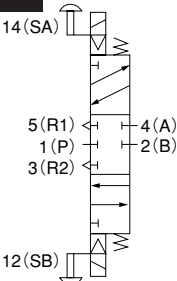


Major Parts and Materials

|          | Parts           | Materials                  |
|----------|-----------------|----------------------------|
| Valve    | Body            | Aluminum alloy (painted)   |
|          | Stem            | Aluminum alloy (anodized)  |
|          | Poppet          | Synthetic rubber           |
|          | Seal            |                            |
|          | Plunger         | Magnetic stainless steel   |
|          | Column          |                            |
| Manifold | Sub-base        | Aluminum alloy (painted)   |
|          | Body            | Aluminum alloy (painted)   |
|          | Block-off plate | Mild steel (nickel plated) |
|          | Seal            | Synthetic rubber           |

5-port, 3-position

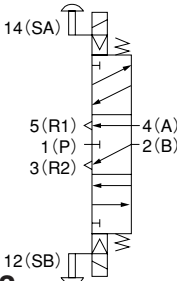
Closed center



433-4E2

(Both solenoids 14(SA) and 12(SB) are de-energized.)

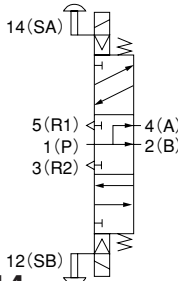
Exhaust center



433-4E2-13

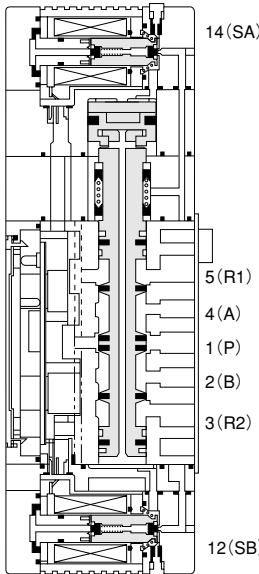
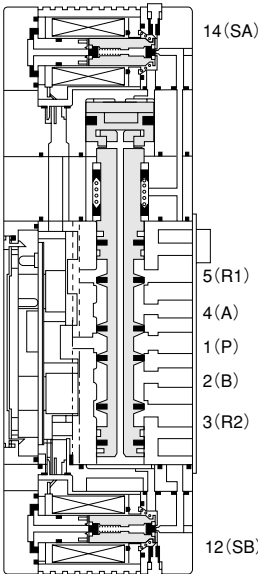
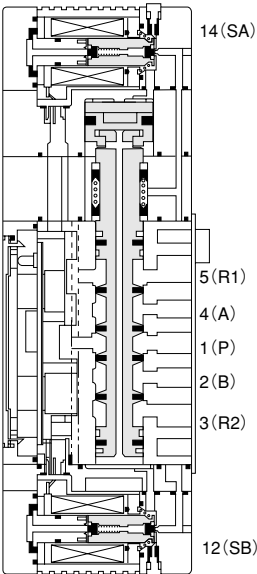
(Both solenoids 14(SA) and 12(SB) are de-energized.)

Pressure center



433-4E2-14

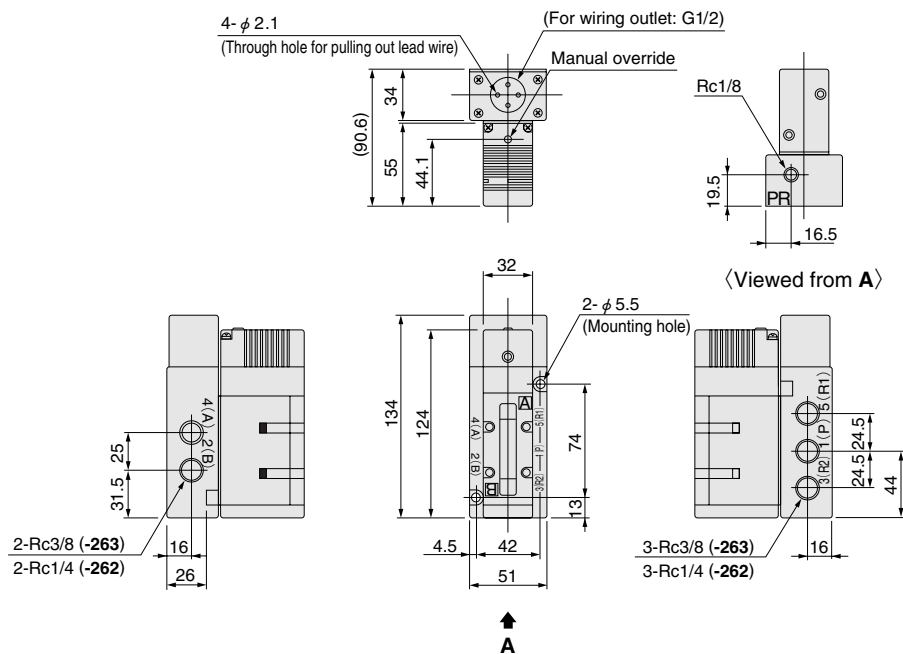
(Both solenoids 14(SA) and 12(SB) are de-energized.)



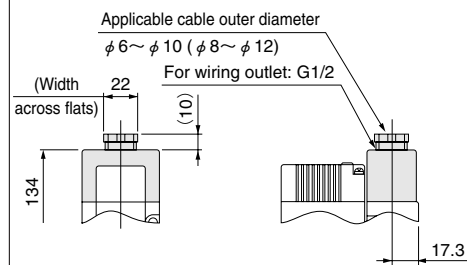
## Dimensions of Solenoid Valve (mm)

### 430-4E1-262 (Grommet type)

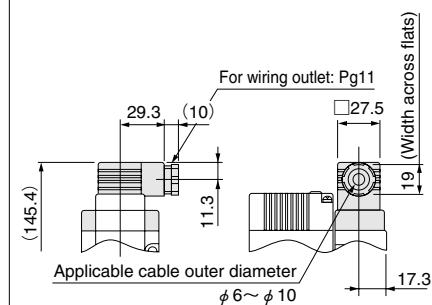
### 430-4E1-263 (Grommet type)



### -37 (Conduit type)

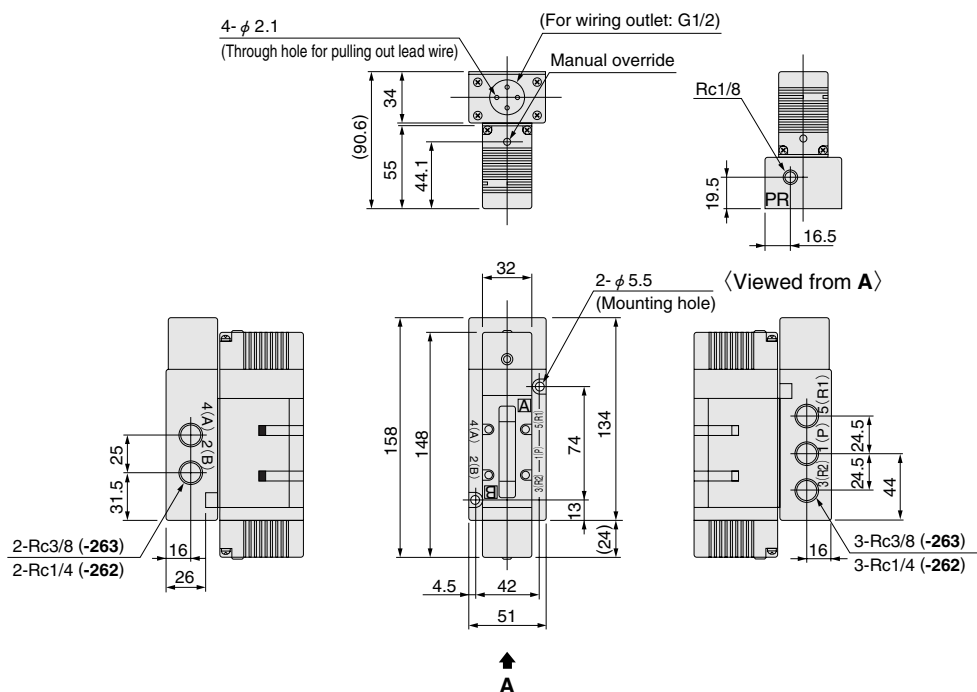


### -39 (DIN connector)

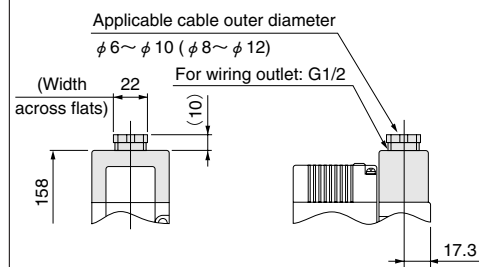


### 430-4E2-262 (Grommet type)

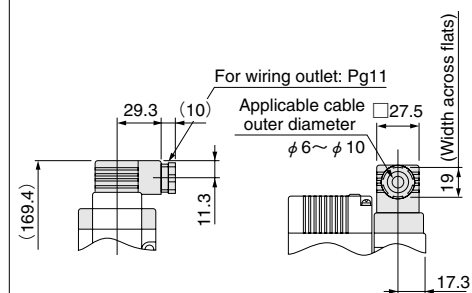
### 430-4E2-263 (Grommet type)



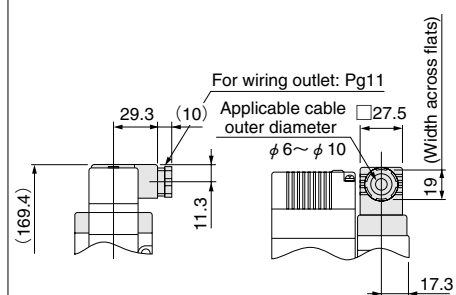
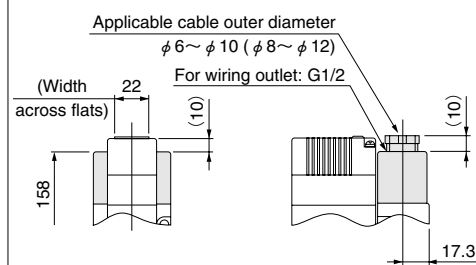
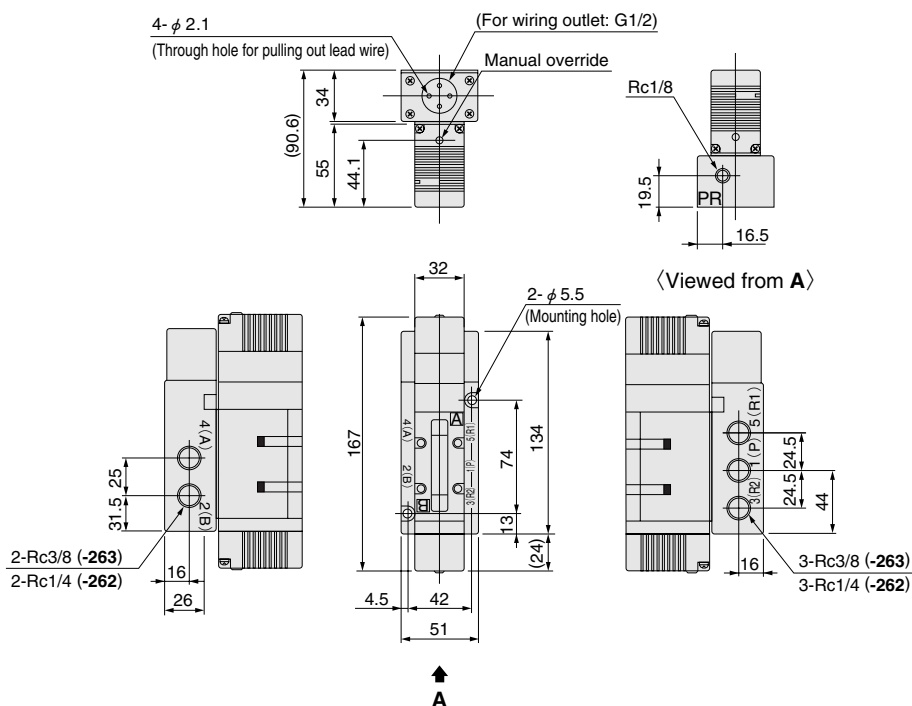
### -37 (Conduit type)



### -39 (DIN connector)



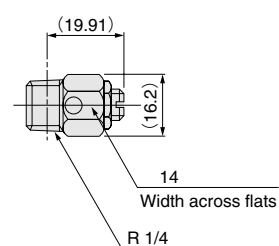
433-4E2-262 (Grommet type)  
433-4E2-263 (Grommet type)



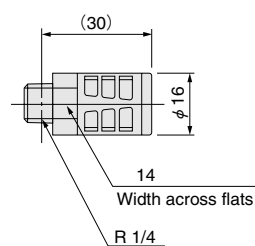
### Dimensions of Additional Parts (To be ordered separately) (mm)



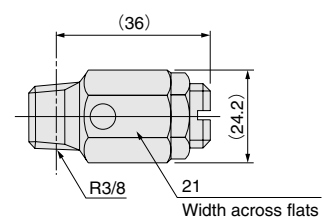
- Speed controller: **SCE-02**



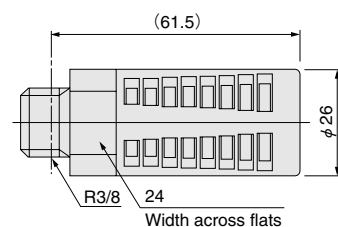
- Muffler: KM-22



- Speed controller: **SCE-03**



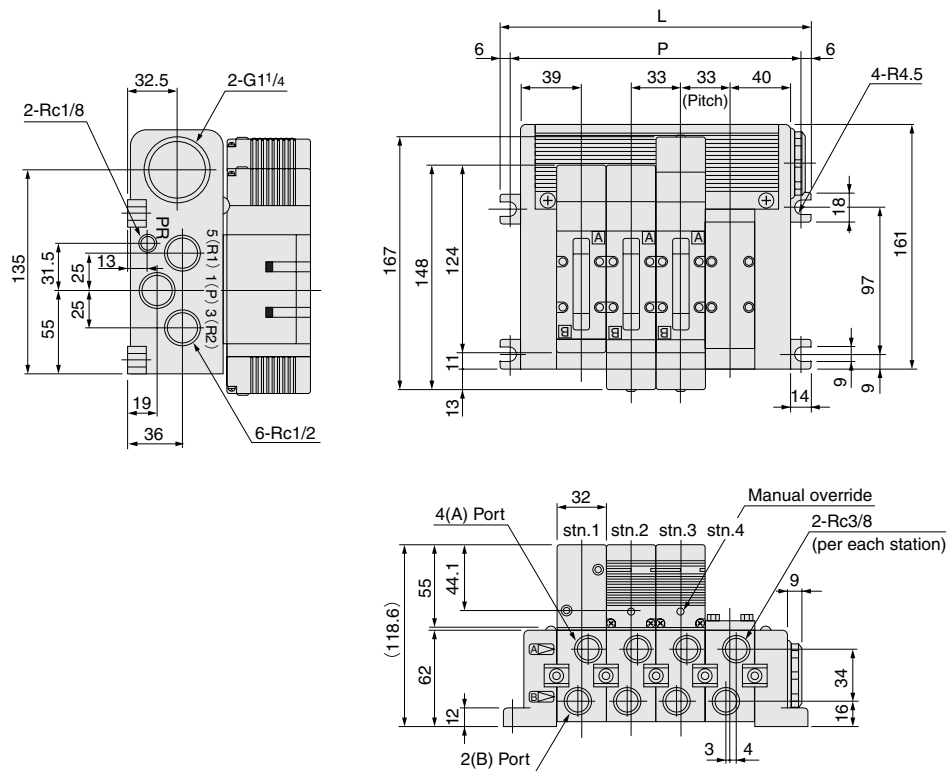
- Muffler: KM-31





Dimensions of Collective Wiring Manifold (mm)

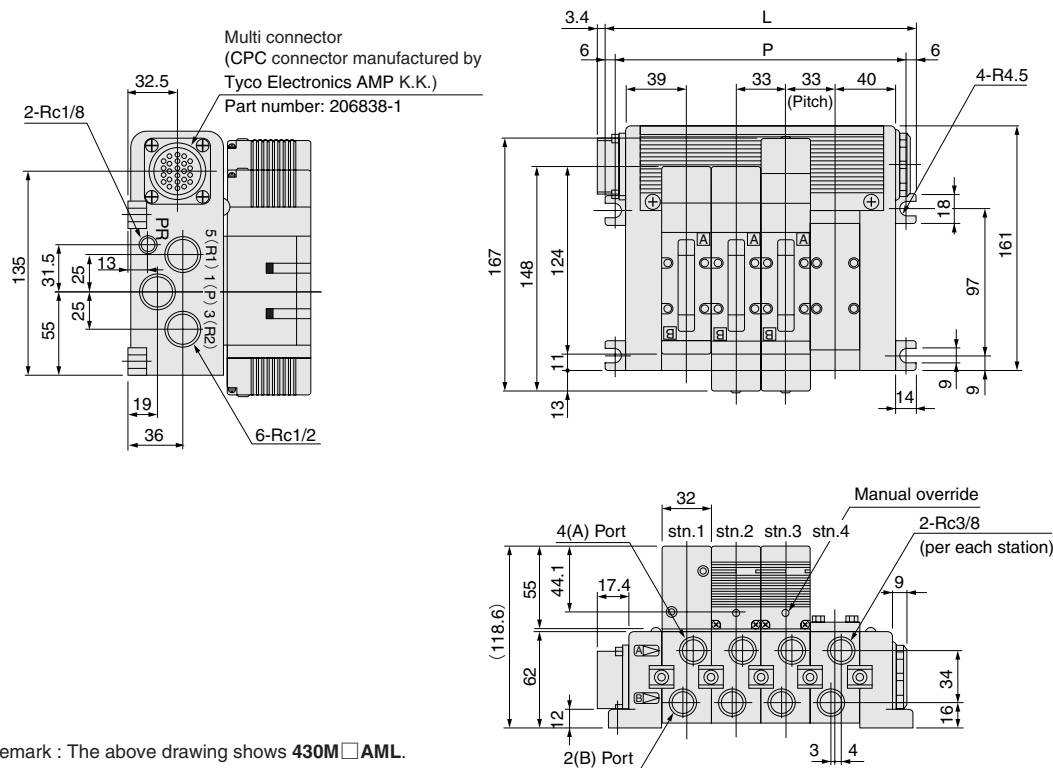
430M□A (Terminal block)



Unit dimensions

| Model   | L   | P   |
|---------|-----|-----|
| 430M2A  | 140 | 128 |
| 430M3A  | 173 | 161 |
| 430M4A  | 206 | 194 |
| 430M5A  | 239 | 227 |
| 430M6A  | 272 | 260 |
| 430M7A  | 305 | 293 |
| 430M8A  | 338 | 326 |
| 430M9A  | 371 | 359 |
| 430M10A | 404 | 392 |

430M□AMR (With multi connector on right side)  
430M□AML (With multi connector on left side)



Unit dimensions

| Model         | L   | P   |
|---------------|-----|-----|
| 430M2AMR (ML) | 140 | 128 |
| 430M3AMR (ML) | 173 | 161 |
| 430M4AMR (ML) | 206 | 194 |
| 430M5AMR (ML) | 239 | 227 |
| 430M6AMR (ML) | 272 | 260 |
| 430M7AMR (ML) | 305 | 293 |
| 430M8AMR (ML) | 338 | 326 |

Remark : The above drawing shows 430M□AML.

**430M** ☐ **ADL** (With D-sub connector on left side)



## mm

| Model         | L   | P   |
|---------------|-----|-----|
| 430M2ADR (DL) | 140 | 128 |
| 430M3ADR (DL) | 173 | 161 |
| 430M4ADR (DL) | 206 | 194 |
| 430M5ADR (DL) | 239 | 227 |
| 430M6ADR (DL) | 272 | 260 |
| 430M7ADR (DL) | 305 | 293 |
| 430M8ADR (DL) | 338 | 326 |

**430M□ASL** (With serial transmission module on left side)

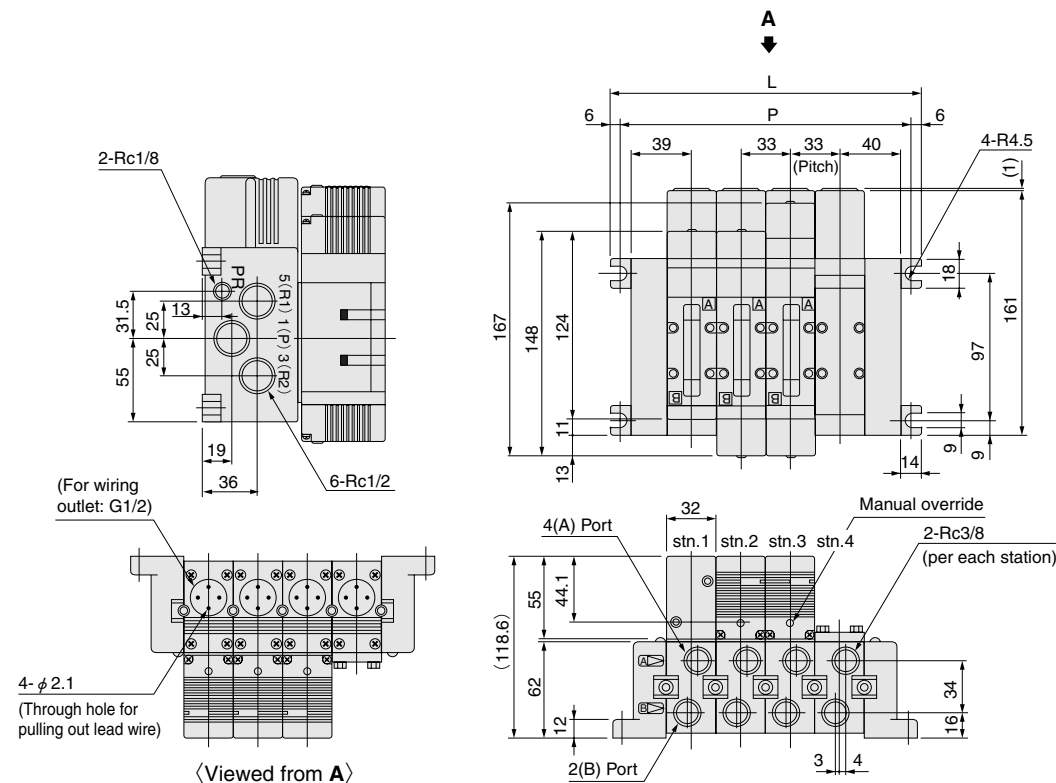


## mm

| Model         | L   | P   |
|---------------|-----|-----|
| 430M2ASR (SL) | 205 | 193 |
| 430M3ASR (SL) | 238 | 226 |
| 430M4ASR (SL) | 271 | 259 |
| 430M5ASR (SL) | 304 | 292 |
| 430M6ASR (SL) | 337 | 325 |
| 430M7ASR (SL) | 370 | 358 |
| 430M8ASR (SL) | 403 | 391 |

Dimensions of Individual Wiring Manifold (mm)

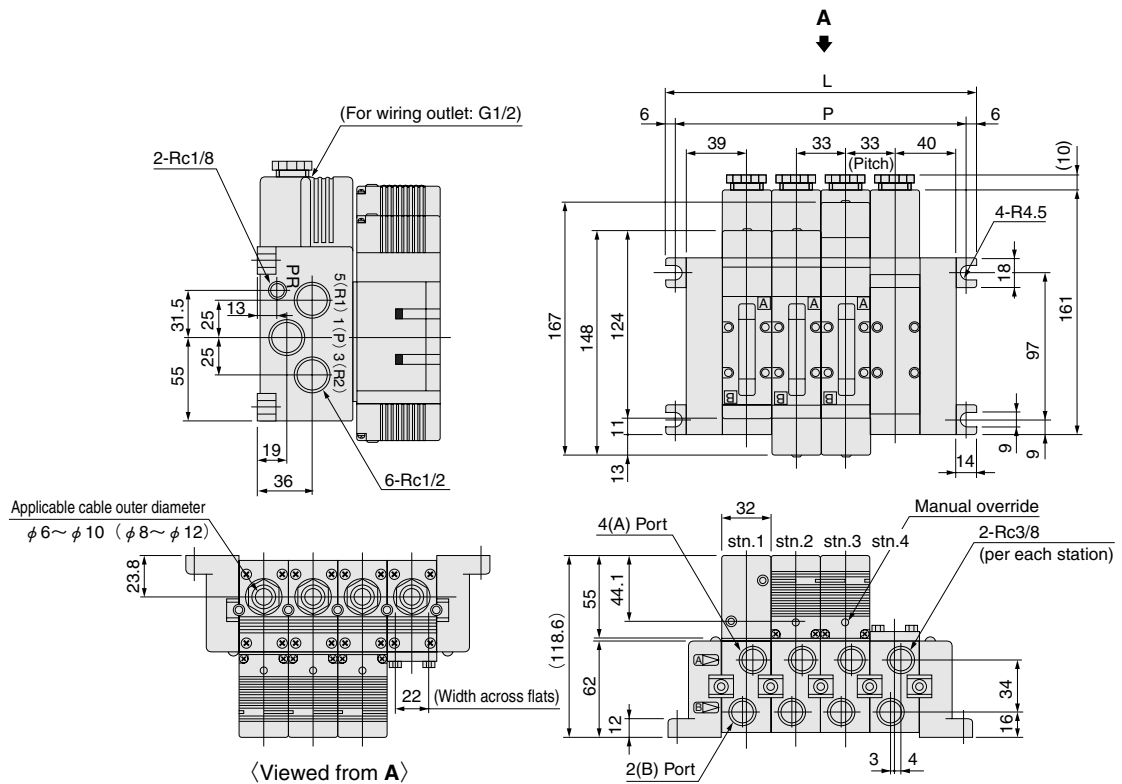
430M□AT (Grommet type)



Unit dimensions  
mm

| Model    | L   | P   |
|----------|-----|-----|
| 430M2AT  | 140 | 128 |
| 430M3AT  | 173 | 161 |
| 430M4AT  | 206 | 194 |
| 430M5AT  | 239 | 227 |
| 430M6AT  | 272 | 260 |
| 430M7AT  | 305 | 293 |
| 430M8AT  | 338 | 326 |
| 430M9AT  | 371 | 359 |
| 430M10AT | 404 | 392 |

430M□AT-37 (Conduit type)



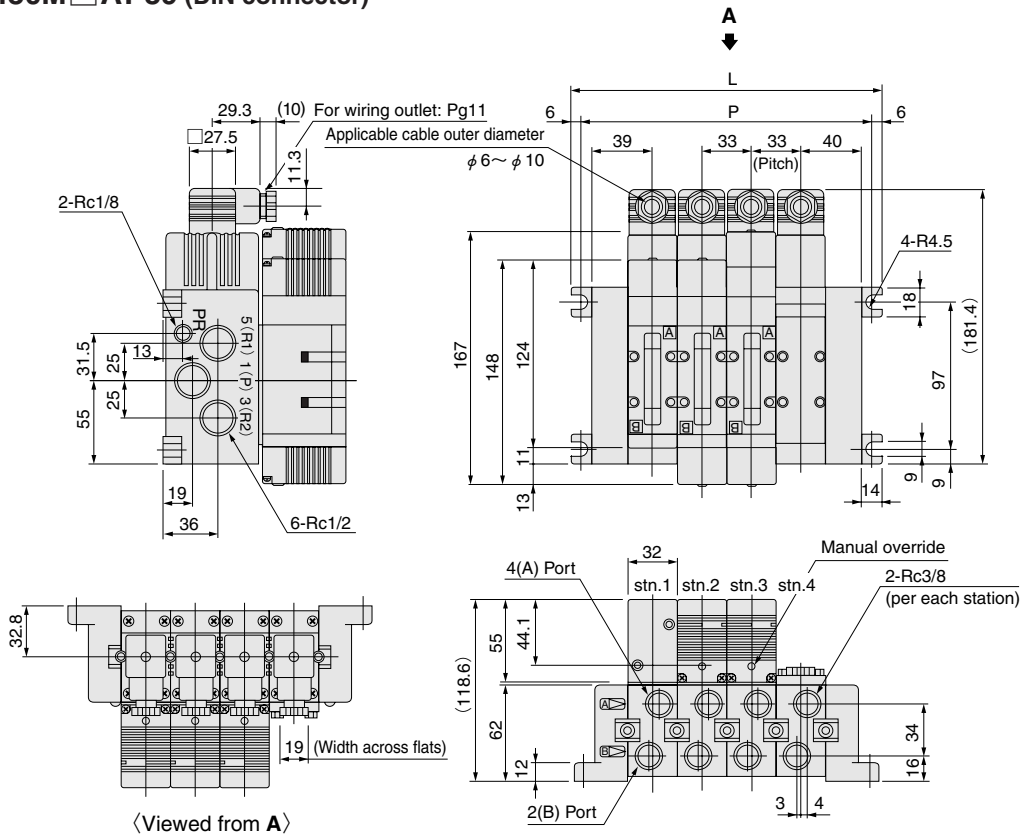
Unit dimensions  
mm

| Model       | L   | P   |
|-------------|-----|-----|
| 430M2AT-37  | 140 | 128 |
| 430M3AT-37  | 173 | 161 |
| 430M4AT-37  | 206 | 194 |
| 430M5AT-37  | 239 | 227 |
| 430M6AT-37  | 272 | 260 |
| 430M7AT-37  | 305 | 293 |
| 430M8AT-37  | 338 | 326 |
| 430M9AT-37  | 371 | 359 |
| 430M10AT-37 | 404 | 392 |

430M□AT-39 (DIN connector)



430-39-3



Unit dimensions  
mm

| Model       | L   | P   |
|-------------|-----|-----|
| 430M2AT-39  | 140 | 128 |
| 430M3AT-39  | 173 | 161 |
| 430M4AT-39  | 206 | 194 |
| 430M5AT-39  | 239 | 227 |
| 430M6AT-39  | 272 | 260 |
| 430M7AT-39  | 305 | 293 |
| 430M8AT-39  | 338 | 326 |
| 430M9AT-39  | 371 | 359 |
| 430M10AT-39 | 404 | 392 |

# SOLENOID VALVES

## 630 SERIES

### Basic Models and Valve Functions

| Basic model         | 630-4E1     | 630-4E2 | 633-4E2   |
|---------------------|-------------|---------|---|
| Item                |             |         |   |
| Number of positions | 2 positions |         | 3 positions   |
| Number of ports     | 5 ports     |         |   |
| Valve function      | —           | —       | Closed center (standard)<br>Exhaust center (optional)<br>Pressure center (optional) |

Remark: For optional specifications and order codes, see p.743~745.

### Specifications

| Basic model  |                             |                      | 630-4E1                    | 630-4E2                    | 633-4E2                    |
|--|-----------------------------|----------------------|----------------------------|----------------------------|----------------------------|
| Item   |                             |                      |                            |                            |                            |
| Media  |                             |                      | Air                        |                            |                            |
| Operation type   |                             |                      | Pilot type                 |                            |                            |
| Effective area <sup>Note 1</sup><br>[Cv]                   | Port size <sup>Note 2</sup> | Rc1/2                | 60 [3.3]                   |                            | 50 [2.8]                   |
|  |                             | Rc3/8                | 55 [3.1]                   |                            | 45 [2.5]                   |
| Lubrication  |                             |                      | Not required               |                            |                            |
| Operating pressure range MPa {kgf/cm <sup>2</sup> } [psi.] |                             |                      | 0.2~0.9 [2.0~9.2] [29~131] | 0.1~0.9 [1.0~9.2] [15~131] | 0.2~0.9 [2.0~9.2] [29~131] |
| Proof pressure MPa {kgf/cm <sup>2</sup> } [psi.]           |                             |                      | 1.35 [13.8] [196]          |                            |                            |
| Response time <sup>Note 3</sup><br>ms                      | DC24V                       | 25/45 or below       | 20/20 or below             | 25/40 or below             |                            |
| ON/OFF   | AC100V, AC200V              | 20/45 or below       | 15/15 or below             | 20/40 or below             |                            |
| Maximum operating frequency                                |                             | Hz                   | 5                          |                            |                            |
| Minimum time to energize for self holding                  |                             | ms                   | —                          | 50                         | —                          |
| Operating temperature range (atmosphere and media) °C [°F] |                             |                      | 5~50 [41~122]              |                            |                            |
| Shock resistance   |                             | m/s <sup>2</sup> {G} | 294 [30]                   |                            |                            |
| Mounting direction   |                             |                      | Any                        |                            |                            |

Notes: 1. For details, see the effective area on p.742.

2. For details, see the port size on p.742.

3. Values when the air pressure is 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]. The values for **630-4E2** are when switching from the opposite position, and for **633-4E2** are those of closed center, when switching from the neutral position.

### Solenoid Specifications

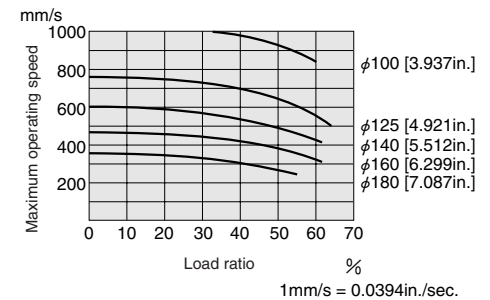
| Rated voltage                           | DC24V                       | AC100V             | AC200V           |
|---|-----------------------------|--------------------|------------------|
| Item                                    |                             |                    |                  |
| Operating voltage range                 | V                           | 21.6~26.4 (24±10%) | 90~110 (100±10%) |
| Rated frequency                         | Hz                          | 50                 | 60               |
| Current (when rated voltage is applied) | Starting                    | 68                 | 58               |
|   | Energizing                  | 42                 | 32               |
| Power consumption                       | W                           | 1.7                | —                |
| Allowable leakage current               | mA                          | 4                  | 6                |
| Insulation resistance <sup>Note</sup>   | MΩ                          | Over 100           |                  |
| Color of LED indicator                  | Red                         | Yellow             | Green            |
| Surge suppression (as standard)         | Surge absorption transistor | Varistor           |                  |

Note: Value at DC500V megger.

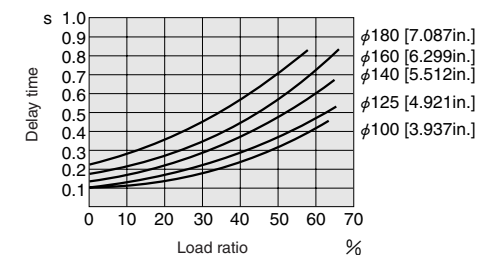
### Cylinder Operating Speed

#### 630-4E1-263

#### Maximum operating speed

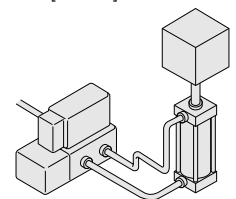


#### Delay time

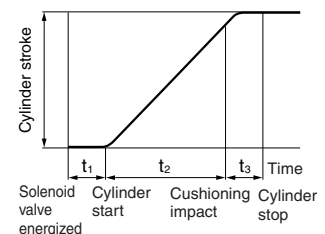


#### Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length: φ7.5×1000mm [39in.]
- Fitting: Quick fitting (Model: TS10-04)
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}}$  (%)
- Cylinder stroke: 300mm [11.8in.]



#### How to obtain cylinder speed



t = Time required for the cylinder to complete 1 stroke

t<sub>1</sub> = Cylinder delay time

t<sub>2</sub> = Time moving at maximum speed

t<sub>3</sub> = Time required for cushioning (about 0.2s)

● Without cushion

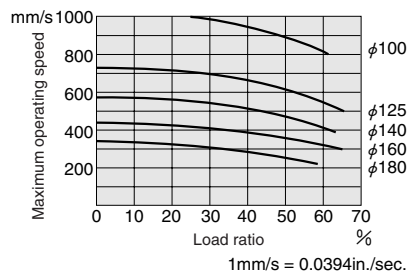
t = t<sub>1</sub> + t<sub>2</sub>

● With cushion

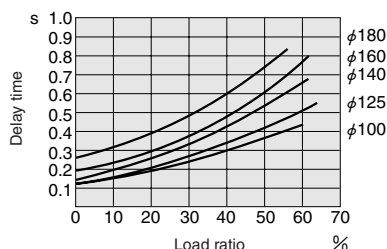
t = t<sub>1</sub> + t<sub>2</sub> + t<sub>3</sub>

## 633-4E2-263

### Maximum operating speed

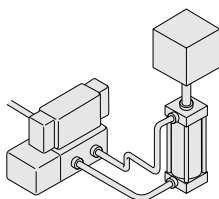


### Delay time



### Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length: φ 7.5×1000mm [39in.]
- Fitting: Quick fitting (Model: TS10-04)
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}}$  (%)
- Cylinder stroke: 300mm [11.8in.]



## Effective Area [Cv]

| Model              | Port size | Standard mm <sup>2</sup> Note 1 | Effective area mm <sup>2</sup> Note 2 | Fitting size |
|--------------------|-----------|---------------------------------|---------------------------------------|--------------|
| 630-4E1<br>630-4E2 | Rc1/2     | 60<br>[3.33]                    | 53 [2.9]                              | TS 12-04     |
|                    |           |                                 | 38 [2.1]                              | TS 10-04     |
|                    | Rc3/8     | 55<br>[3.05]                    | 52 [2.9]                              | TS 12-03     |
|                    |           |                                 | 36 [2.0]                              | TS 10-03     |
| 633-4E2            | Rc1/2     | 50<br>[2.77]                    | 24 [1.3]                              | TS 8-03      |
|                    |           |                                 | 42 [2.3]                              | TS 12-04     |
|                    | Rc3/8     | 45<br>[2.5]                     | 27 [1.5]                              | TS 10-04     |
|                    |           |                                 | 38 [2.1]                              | TS 12-03     |
|                    |           |                                 | 27 [1.5]                              | TS 10-03     |
|                    |           |                                 | 17 [0.9]                              | TS 8-03      |

Notes: 1. Values for a single valve unit.

2. Values when fittings are attached on 1(P), 4(A), and 2(B) ports. Fitting size is as shown in the table above.

## Solenoid Valve Port Size

| Model                      | Port specification | Sub-base port size |
|----------------------------|--------------------|--------------------|
| 630-4E□-264<br>633-4E2-264 | 1 (P)              | Rc 1/2             |
|                            | 4 (A), 2 (B)       |                    |
|                            | 3 (R2), 5 (R1)     |                    |
|                            | PR                 |                    |
| 630-4E□-263<br>633-4E2-263 | 1 (P)              | Rc 3/8             |
|                            | 4 (A), 2 (B)       |                    |
|                            | 3 (R2), 5 (R1)     |                    |
|                            | PR                 |                    |
|                            |                    | Rc 1/8             |

## Manifold Connection Port Size

| Manifold model | Port           | Piping size |
|----------------|----------------|-------------|
| 630M□A         | 1 (P)          | Rc1/2       |
|                | 4 (A), 2 (B)   |             |
|                | 3 (R2), 5 (R1) |             |
|                | PR             |             |
|                |                | Rc1/8       |

## Solenoid Valve Mass

| Basic model | Mass                       |
|-------------|----------------------------|
| 630-4E1     | 490 [17.28] (1070 [37.74]) |
| 630-4E2     | 610 [21.52] (1190 [41.98]) |
| 633-4E2     | 590 [20.81] (1170 [41.27]) |

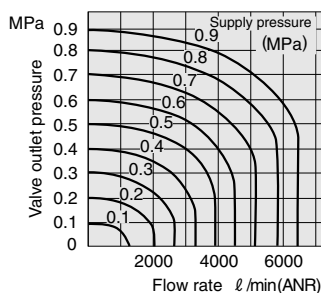
Remark: Figures in parentheses ( ) are the mass with sub-base.

## Manifold Mass

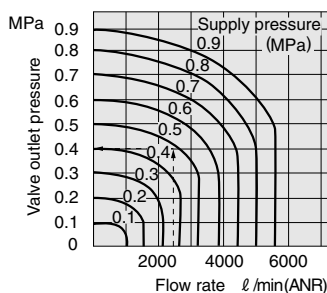
| Manifold model | Mass calculation of each unit (n=Number of units) | Block-off plate (Model: 630M-BP) |
|----------------|---|----------------------------------|
| 630M□A         | $(590 \times n) + 1040$ [(20.81 × n) + 36.68]     | 130 [4.59]                       |
| 630M□AT        | $(650 \times n) + 830$ [(22.93 × n) + 29.28]      |                                  |

## Flow Rate

630-4E1-263  
630-4E2-263



633-4E2-263



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 2420 l / min [85.4ft.<sup>3</sup>/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

## 630 Series Solenoid Valve Order Codes



| 3-position valve<br>Valve function | Sub-base  | Manual override  | Wiring type                                 |
|------------------------------------|---|--|---|
| <p>Closed center</p>               | <p>Port size Rc3/8, side piping</p> <p>-263</p>   | <p>Non-locking type<br/>Manual override</p> <p>Blank</p>     | <p>Grommet type</p> <p>Blank</p>            |
| <p>Exhaust center</p>              | <p>Port size Rc1/2, side piping</p> <p>-264</p>   | <p>Locking type<br/>Manual lever<br/>override</p> <p>-84</p> | <p>Conduit type</p> <p>-37</p>              |
| <p>Pressure center</p>             | <p>Port size Rc3/8, bottom piping (made to order)</p> <p>-283</p>   |  | <p>DIN connector</p> <p>-39</p>             |
|                                    | <p>Port size Rc1/2, bottom piping (made to order)</p> <p>-284</p>   |  |   |
|                                    | <p>●When ordering single valve units, omit this code from the order code. The single valve includes 4 mounting screws and 1 gasket.</p> |  |   |
|                                    |   |  | Voltage                                     |
| 3,-14                              | -263<br>-264<br><br>-283<br>-284  | -84<br><br>-84<br><br>-84                                    | -37<br>-39<br><br>DC24V<br>AC100V<br>AC200V |

For made to order details, see p.759.

## Additional Parts (To be ordered separately)

Speed controller



● For Rc3/8

● For Rc1/2

Muffler



● For Rc3/8

● For Rc1/2

Block-off plate





## 630 Series Collective Wiring Manifold Order Codes



### Wiring type

Terminal block

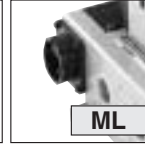


Multi connector

On right side



On left side

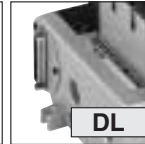


D-sub connector

On right side

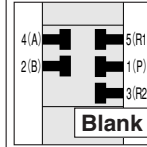


On left side

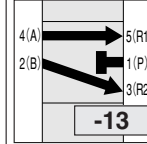


### 3-position valve Valve function

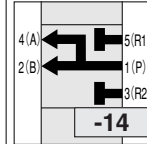
Closed center



Exhaust center



Pressure center

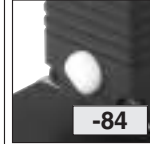


### Manual override

Non-locking type  
manual override



Locking type  
manual lever  
override



### Port isolator

**Blank** : Without  
port isolator  
**-MSP** : For 1(P) port  
**-MSR** : For 3(R2),  
5(R1) ports  
**-MSD** : For 1(P),  
3(R2), 5(R1)  
ports

|   | Manifold model<br>Number of units | Station               | Basic model  | Voltage                      |
|---|-----------------------------------|-----------------------|--|------------------------------|
| Internal pilot<br>manifold                    | 630M                              | 2<br>⋮<br>10          | A  | MR<br>ML<br>DR<br>DL         |
| External pilot<br>manifold<br>(made to order) | 632M                              | B                     | DL   |                              |
|   |                                   | stn. □<br>⋮<br>stn. □ | -630-4E1<br>-630-4E2<br>-633-4E2<br>-632-4E1<br>-632-4E2 | -84<br>-13,-14<br>-84<br>-84 |
|   |                                   |                       |  | -MSP<br>-MSR<br>-MSD         |
|   |                                   |                       |  | DC24V<br>AC100V<br>AC200V    |

For made to order details,  
see p.759.

●Maximum 8 units for multi  
connectors and D-sub  
connectors.

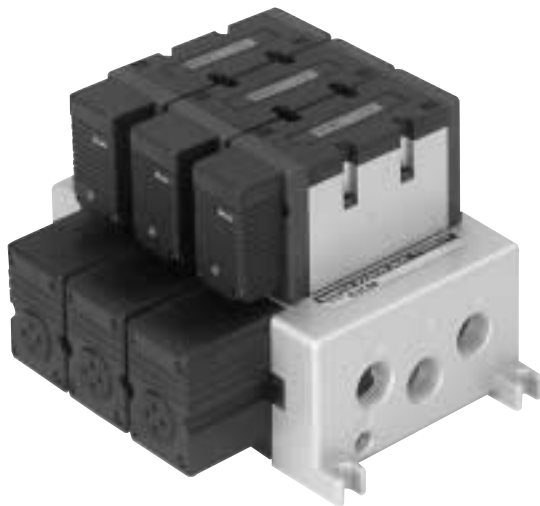
●A : Side piping  
B : Bottom piping  
(made to order)


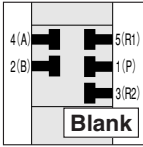

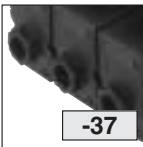
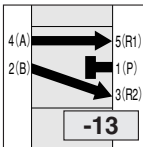


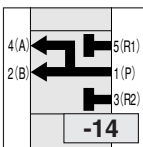
●Valve mounting location from the left, with wiring cover  
on top and the 4(A), 2(B) ports in front (□ : 1~10)

- Specify the valve model for each station.
- Enter **-BP** when closing a station with a block-off  
plate without mounting a valve.
- To increase the units in the manifold, order additional  
manifold units. (For order codes, see p.765.)

●When one of these port isolator order codes is entered to  
the designated station, the port isolator is installed in the  
space between the designated station and the station to  
its right (the side with the larger station number).  
For details, see the port isolators item on p.765.  
Note: The port isolator can be installed to only 1 station  
on each manifold set.

## 630 Series Individual Wiring Manifold Order Codes



| Wiring type   | 3-position valve<br>Valve function  | Manual<br>override  | Port isolator   |
|---|---|---|---|
| Grommet type<br><br><b>Blank</b> | Closed center<br><br><b>Blank</b> | Non-locking type<br>manual override<br><br><b>Blank</b>    | <b>Blank</b> : Without<br>port isolator<br><b>-MSP</b> : For 1(P) port<br><b>-MSR</b> : For 3(R2),<br>5(R1) ports<br><b>-MSD</b> : For 1(P),<br>3(R2), 5(R1)<br>ports |
| Conduit type<br><br><b>-37</b>   | Exhaust center<br><br><b>-13</b>  | Locking type<br>manual lever<br>override<br><br><b>-84</b> |   |
| DIN connector<br><br><b>-39</b>  | Pressure center<br><br><b>-14</b> |   |   |

|  | Manifold model<br>Number of units |              | Station | Basic model |   |  |                                  | Voltage              |                           |
|--|-----------------------------------|--------------|---------|-------------|---|--|----------------------------------|----------------------|---------------------------|
| Internal pilot manifold                    | 630M                              | 2<br>⋮<br>10 | AT      | -37<br>-39  | stn. <input type="checkbox"/><br>⋮<br>stn. <input type="checkbox"/> | -630-4E1<br>-630-4E2<br>-633-4E2<br>-632-4E1<br>-632-4E2 | -84<br><br>-13,-14<br>-84<br>-84 | -MSP<br>-MSR<br>-MSD | DC24V<br>AC100V<br>AC200V |
| External pilot manifold<br>(made to order) | 632M                              |              | BT      |             |   |  |                                  |                      |                           |

For made to order details,  
see p.759.

- **AT** : Side piping
- **BT** : Bottom piping (made to order)

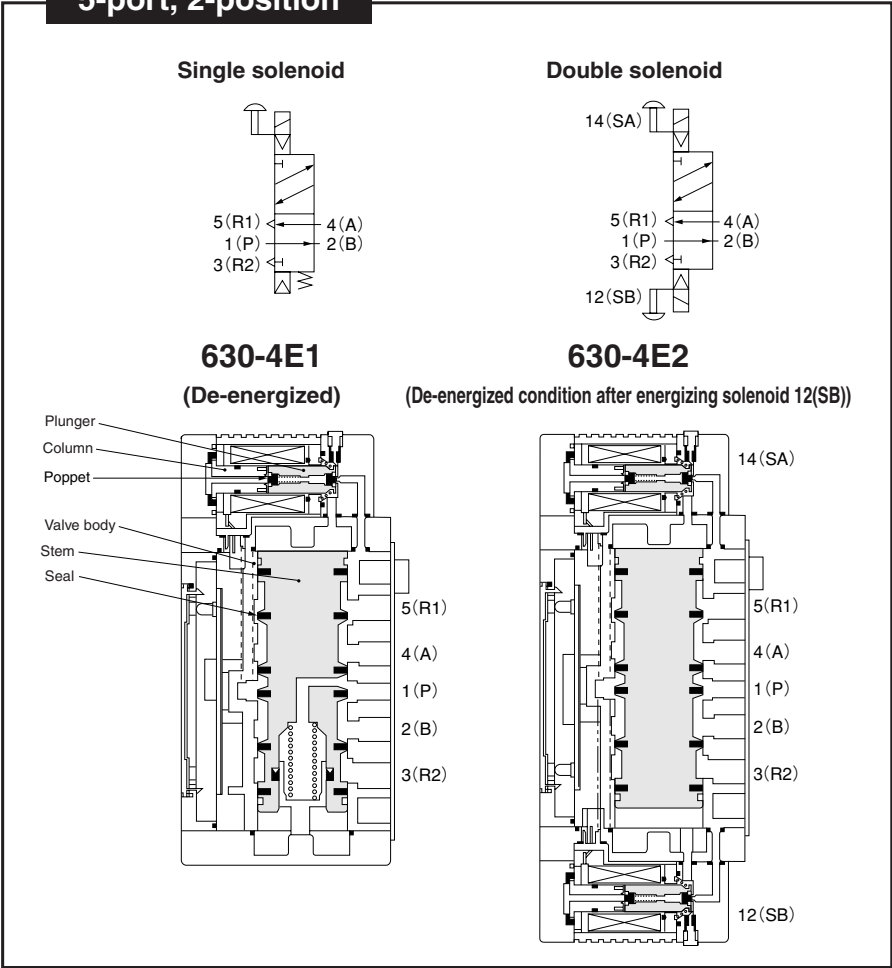
- Valve mounting location from the left, with wiring cover  
on top and the 4(A), 2(B) ports in front (□ : 1~10)

- Specify the valve model for each station.
- Enter **-BP** when closing a station with a block-off  
plate without mounting a valve.
- To increase the units in the manifold, order additional  
manifold units. (For order codes, see p.766.)

- When one of these port isolator order codes is entered to  
the designated station, the port isolator is installed in the  
space between the designated station and the station to  
its right (the side with the larger station number).  
For details, see the port isolators item on p.765.  
Note: The port isolator can be installed to only 1 station  
on each manifold set.

Operating Principles, Major Parts and Materials

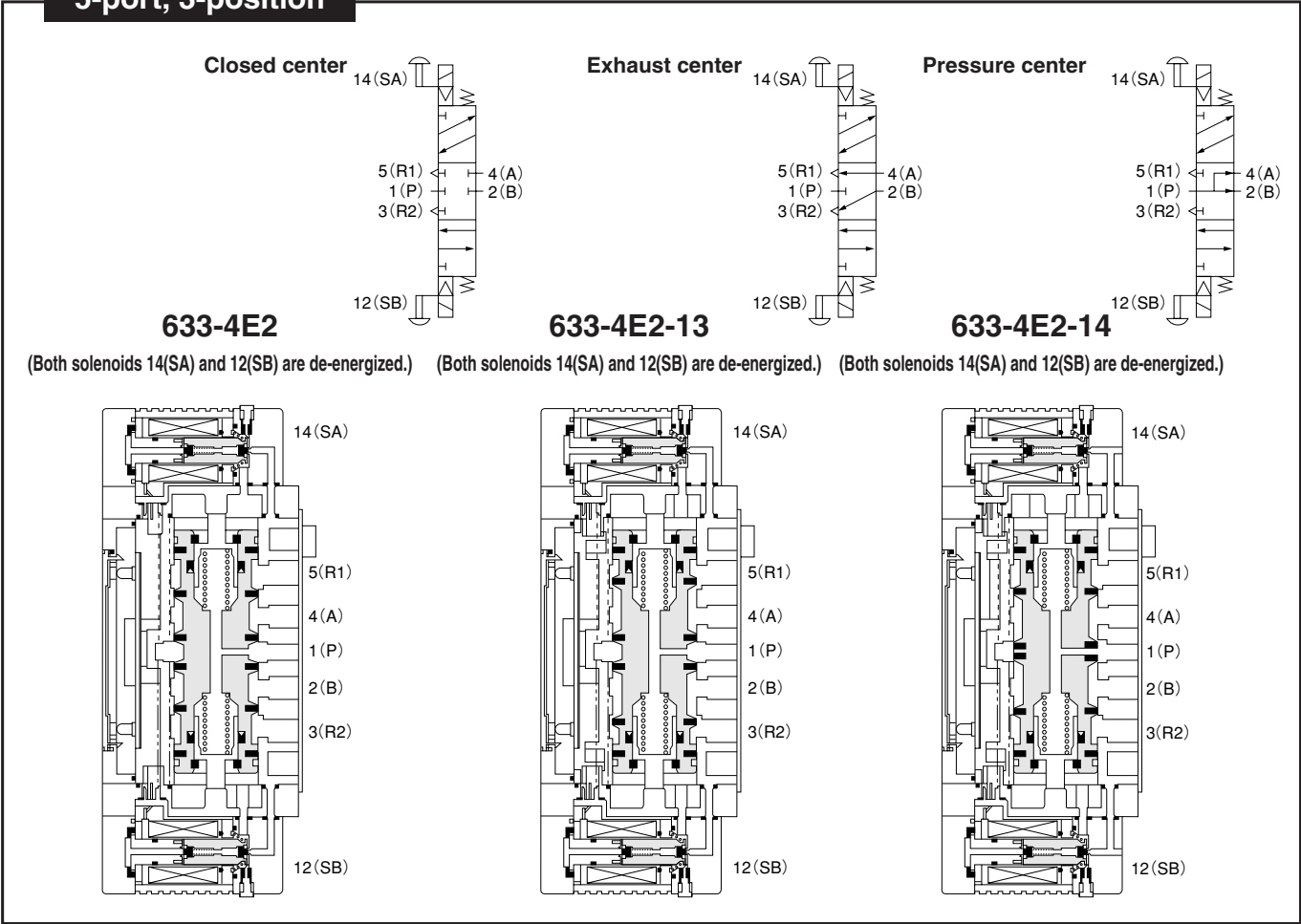
5-port, 2-position



Major Parts and Materials

| Parts    |                 | Materials                  |
|----------|-----------------|----------------------------|
| Valve    | Body            | Aluminum alloy (painted)   |
|          | Stem            | Aluminum alloy (anodized)  |
|          | Poppet          | Synthetic rubber           |
|          | Seal            |                            |
|          | Plunger         | Magnetic stainless steel   |
|          | Column          | steel                      |
| Manifold | Sub-base        | Aluminum alloy (painted)   |
|          | Body            | Aluminum alloy (painted)   |
|          | Block-off plate | Mild steel (nickel plated) |
|          | Seal            | Synthetic rubber           |

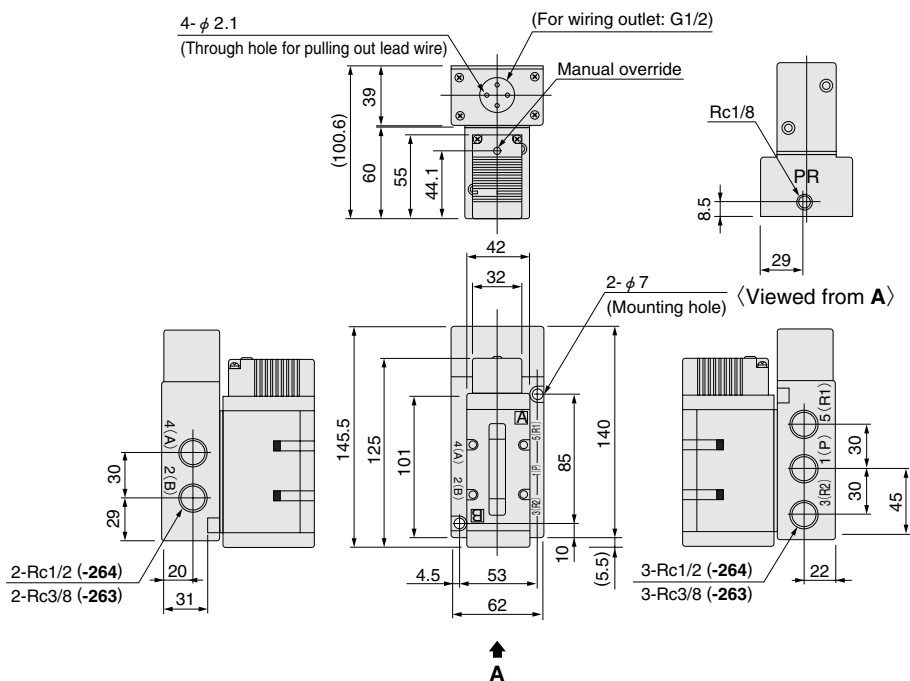
5-port, 3-position



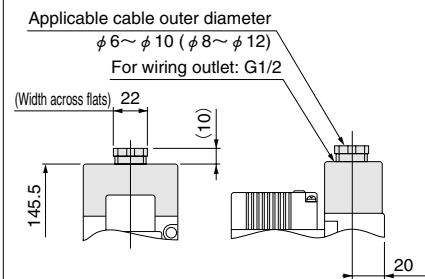
## Dimensions of Solenoid Valve (mm)

### 630-4E1-263 (Grommet type)

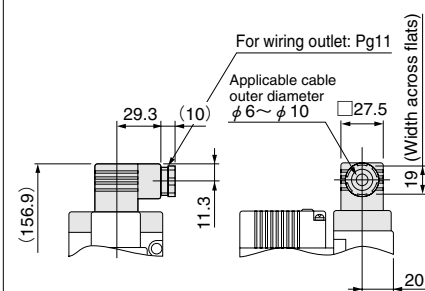
### 630-4E1-264 (Grommet type)



### -37 (Conduit type)

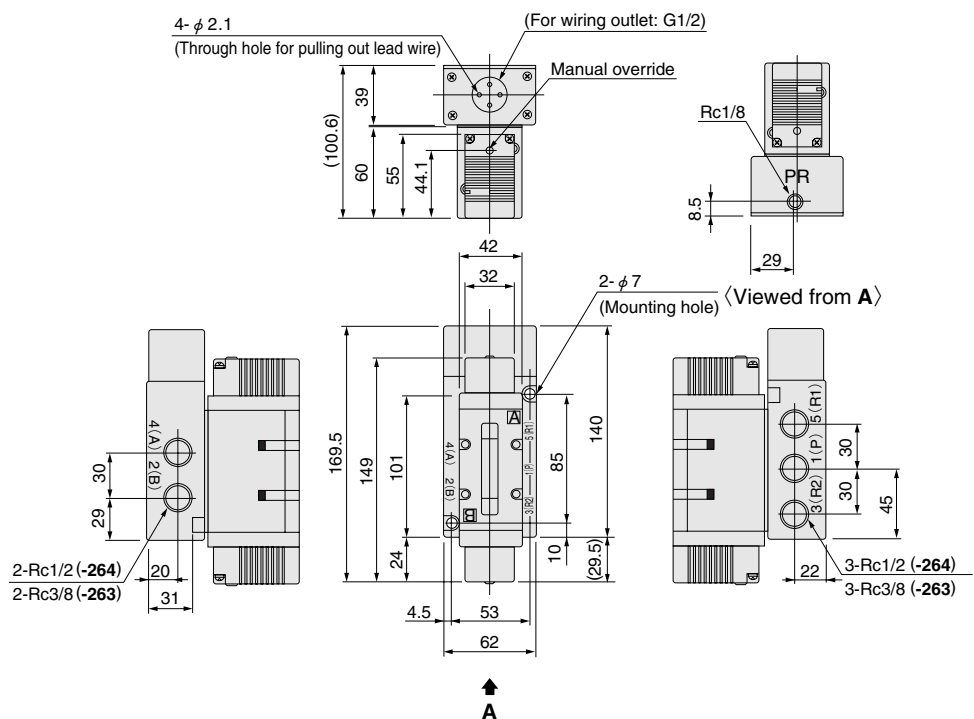


### -39 (DIN connector)

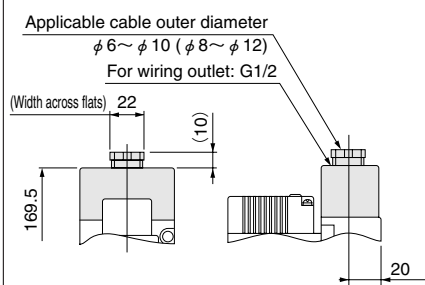
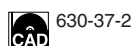


### 630-4E2-263 (Grommet type)

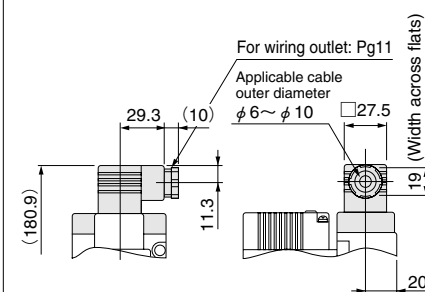
### 630-4E2-264 (Grommet type)



### -37 (Conduit type)

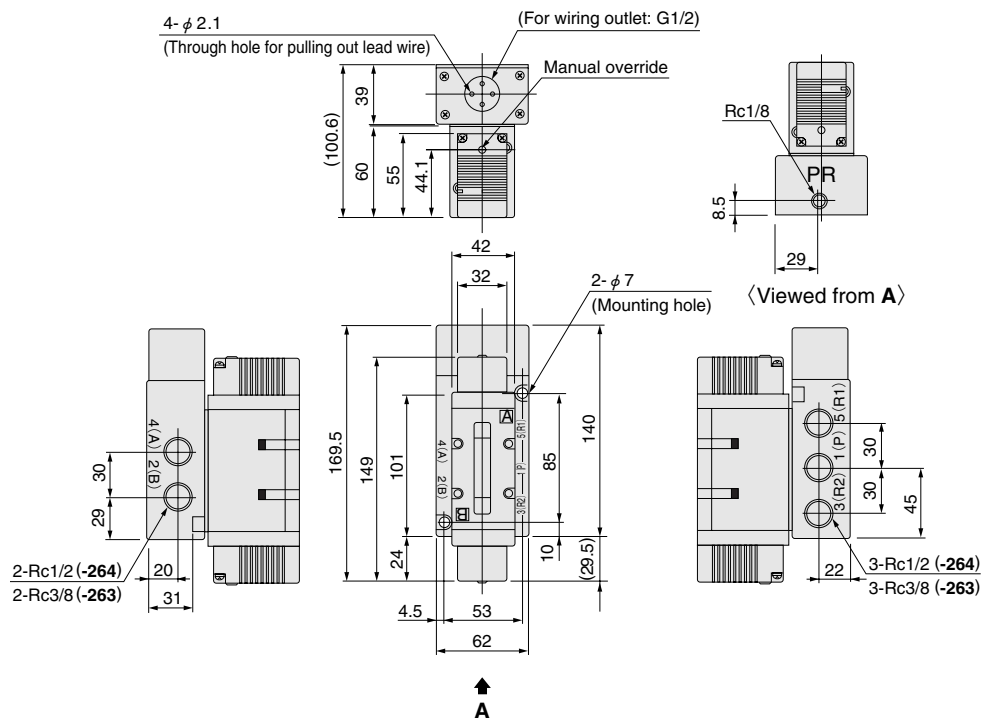


### -39 (DIN connector)



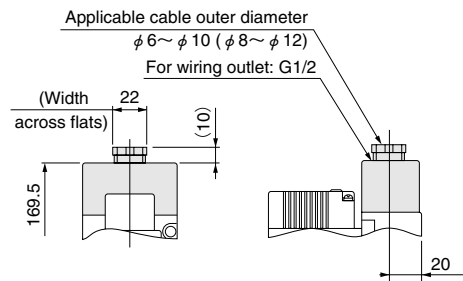
**633-4E2-263 (Grommet type)**  
**633-4E2-264 (Grommet type)**

CAD 630-4E2



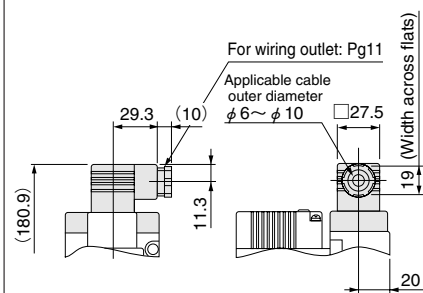
**-37 (Conduit type)**

CAD 630-37-2



**-39 (DIN connector)**

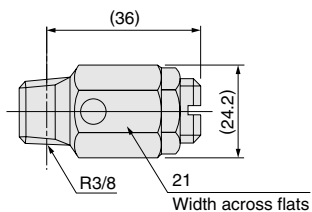
CAD 630-39-2



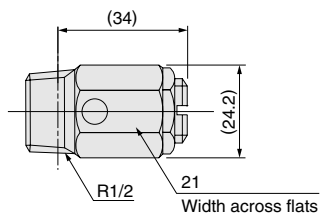
**Dimensions of Additional Parts (To be ordered separately) (mm)**

CAD 630-AD

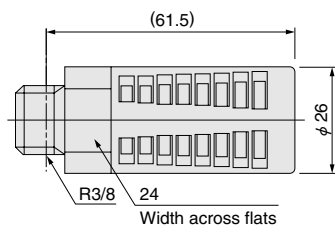
● Speed controller: **SCE-03**



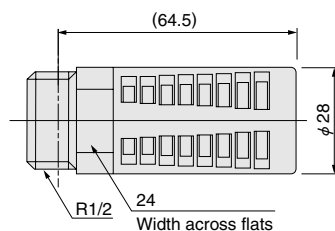
● Speed controller: **SCE-04**



● Muffler: **KM-31**

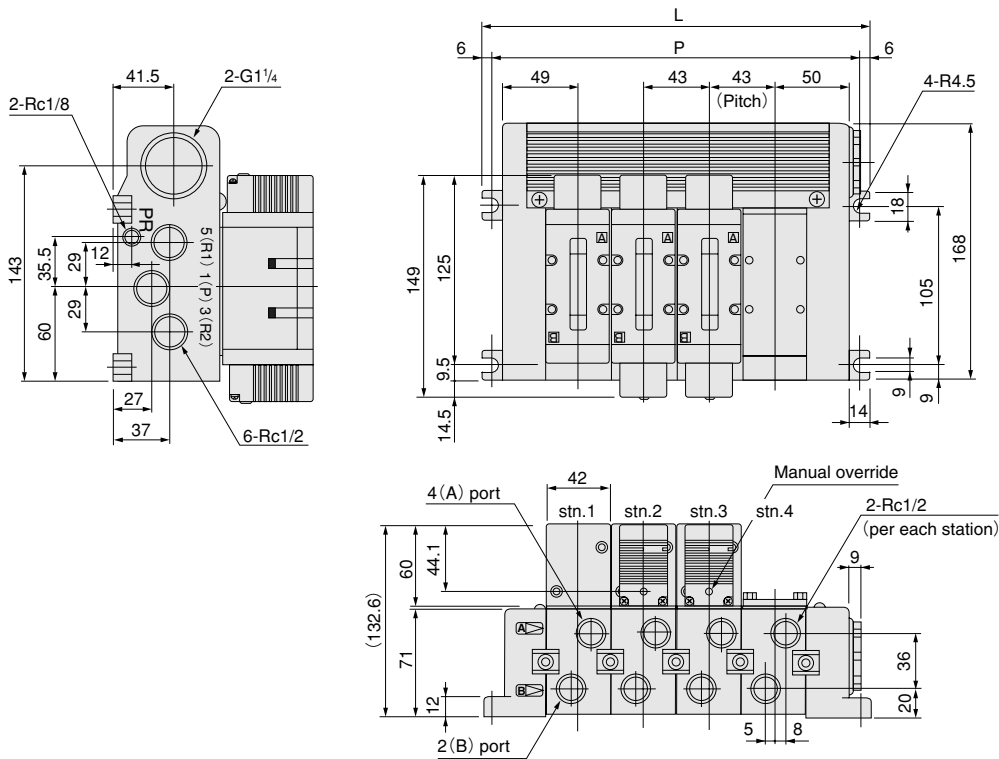


● Muffler: **KM-41**



Dimensions of Collective Wiring Manifold (mm)

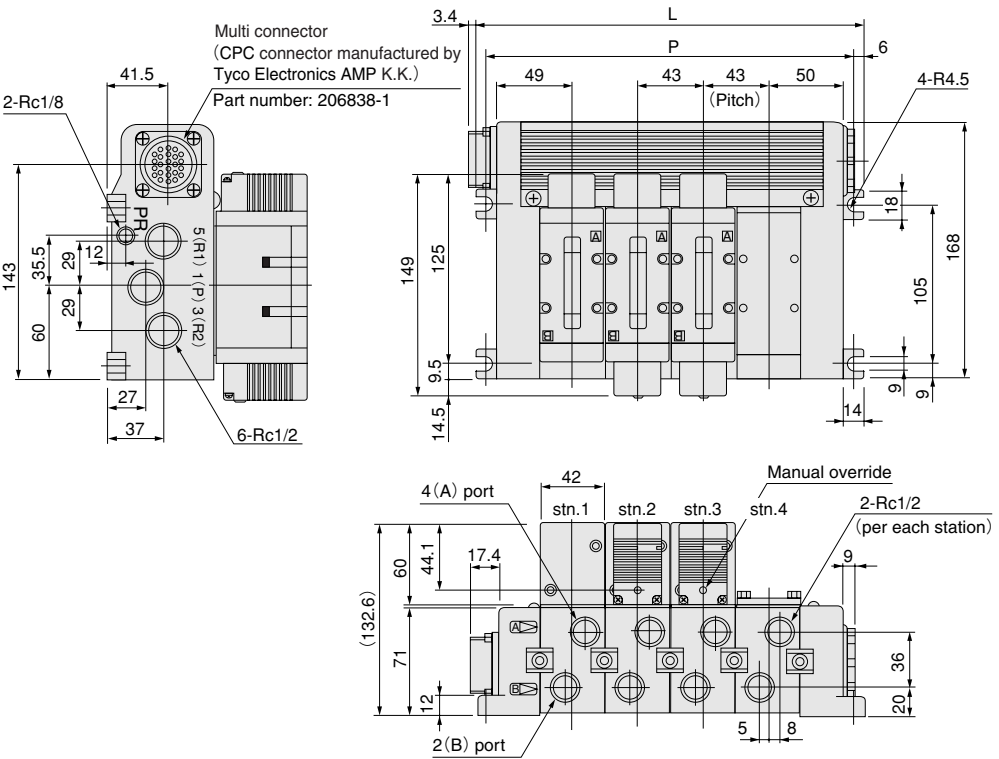
630M□A (Terminal block)



Unit dimensions

| Model   | mm  |     |
|---------|-----|-----|
|         | L   | P   |
| 630M2A  | 170 | 158 |
| 630M3A  | 213 | 201 |
| 630M4A  | 256 | 244 |
| 630M5A  | 299 | 287 |
| 630M6A  | 342 | 330 |
| 630M7A  | 385 | 373 |
| 630M8A  | 428 | 416 |
| 630M9A  | 471 | 459 |
| 630M10A | 514 | 502 |

630M□AMR (With multi connector on right side)  
630M□AML (With multi connector on left side)



Unit dimensions

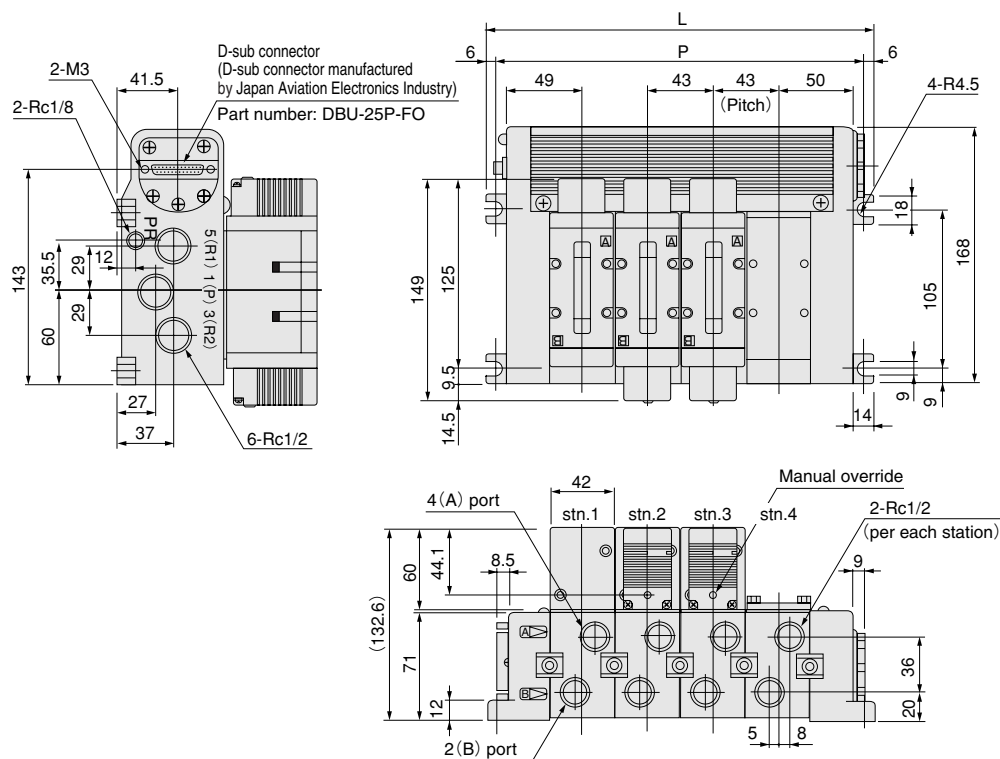
| Model        | mm  |     |
|--------------|-----|-----|
|              | L   | P   |
| 630M2AMR(ML) | 170 | 158 |
| 630M3AMR(ML) | 213 | 201 |
| 630M4AMR(ML) | 256 | 244 |
| 630M5AMR(ML) | 299 | 287 |
| 630M6AMR(ML) | 342 | 330 |
| 630M7AMR(ML) | 385 | 373 |
| 630M8AMR(ML) | 428 | 416 |

Remark: The above drawing shows 630M□AML.

630M□ADR (With D-sub connector on right side)

630M□ADL (With D-sub connector on left side)

 630M-AD



## Unit dimensions

| Model        | mm  |     |
|--------------|-----|-----|
|              | L   | P   |
| 630M2ADR(DL) | 170 | 158 |
| 630M3ADR(DL) | 213 | 201 |
| 630M4ADR(DL) | 256 | 244 |
| 630M5ADR(DL) | 299 | 287 |
| 630M6ADR(DL) | 342 | 330 |
| 630M7ADR(DL) | 385 | 373 |
| 630M8ADR(DL) | 428 | 416 |

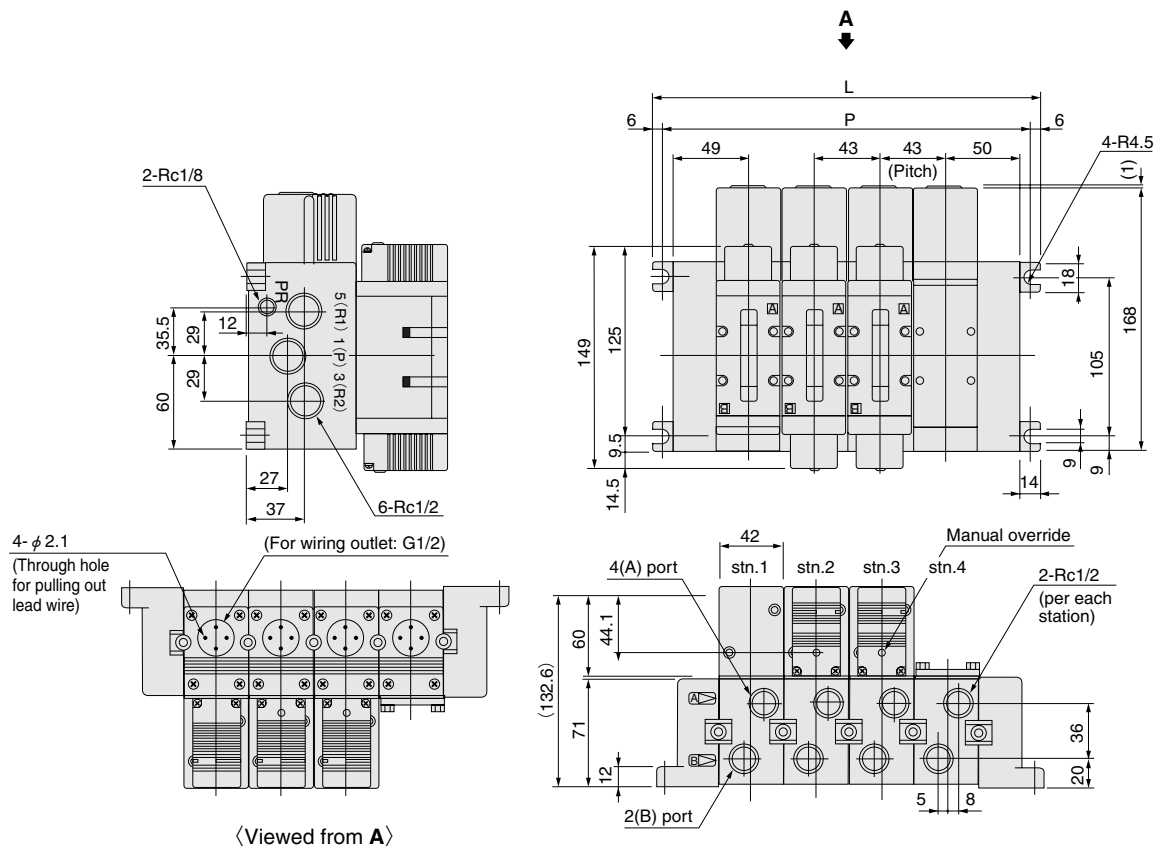
Remark: The above drawing shows 630M□ADL.



## Dimensions of Individual Wiring Manifold (mm)

### 630M□AT (Grommet type)

CAD 630M-AT



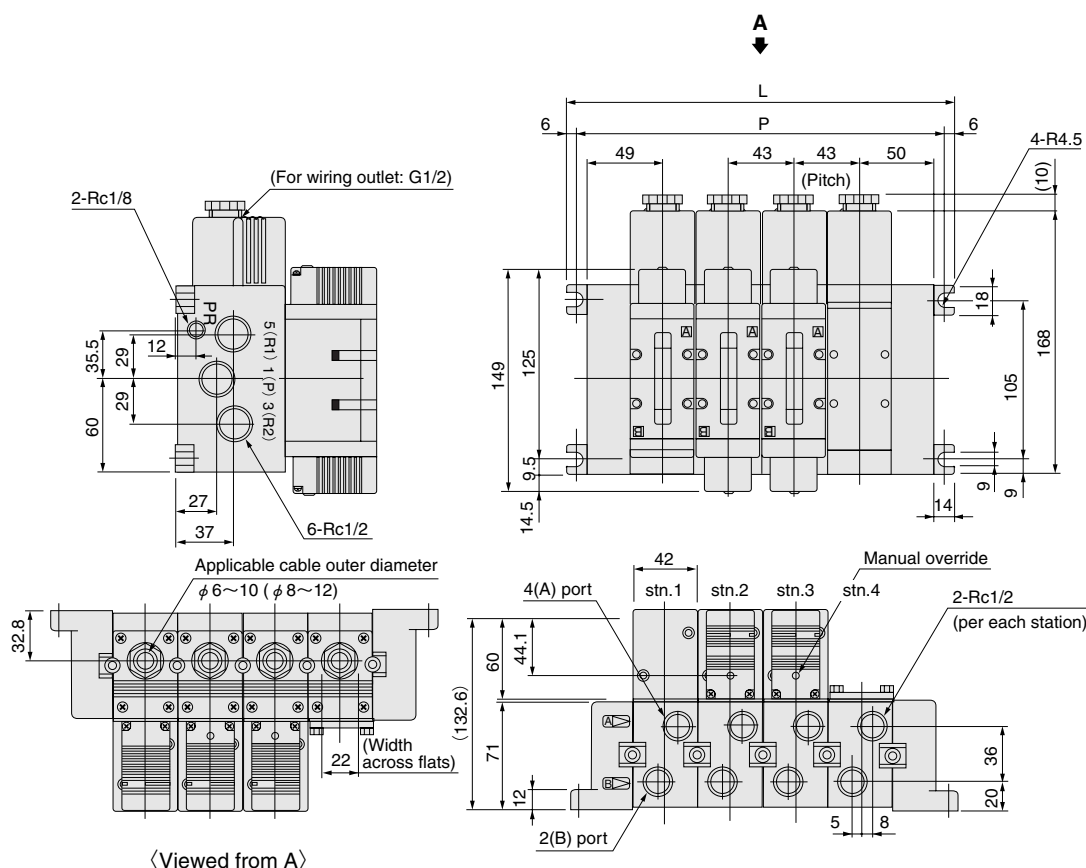
### Unit dimensions

mm

| Model    | L   | P   |
|----------|-----|-----|
| 630M2AT  | 170 | 158 |
| 630M3AT  | 213 | 201 |
| 630M4AT  | 256 | 244 |
| 630M5AT  | 299 | 287 |
| 630M6AT  | 342 | 330 |
| 630M7AT  | 385 | 373 |
| 630M8AT  | 428 | 416 |
| 630M9AT  | 471 | 459 |
| 630M10AT | 514 | 502 |

### 630M□AT-37 (Conduit type)

CAD 630-37-3

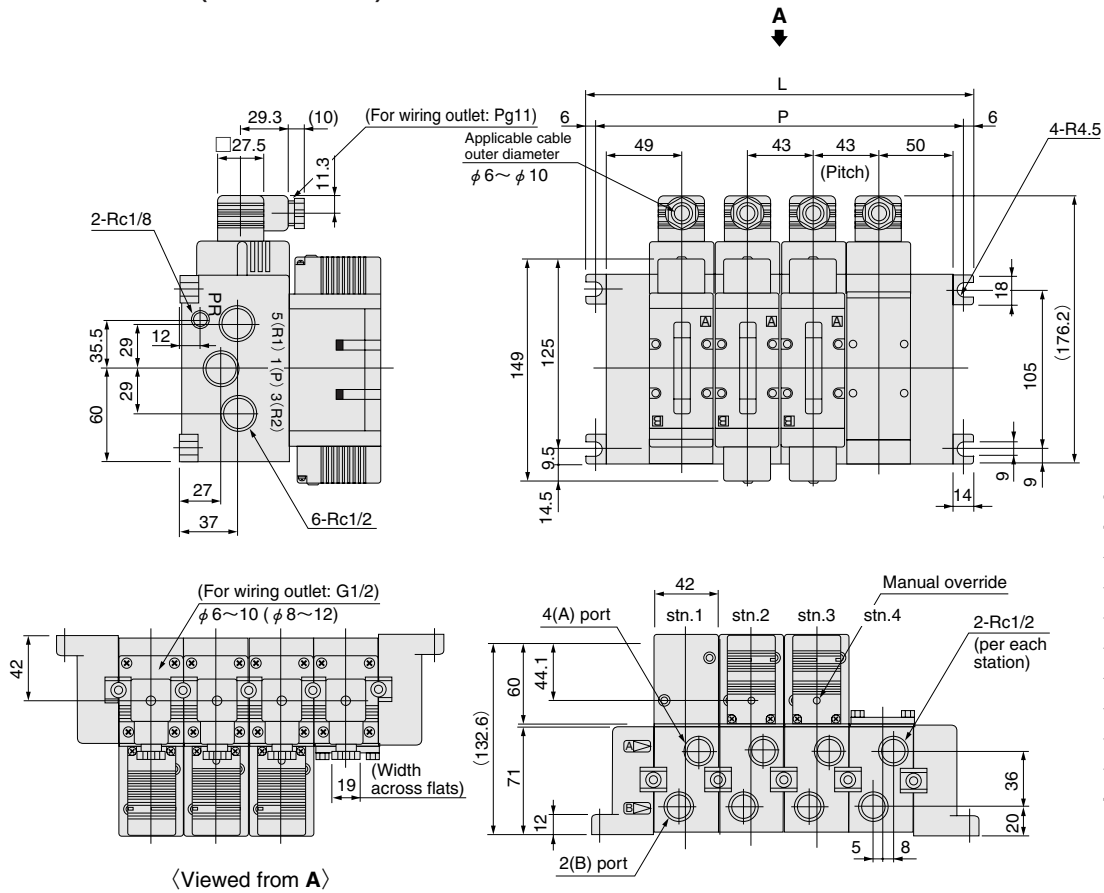


### Unit dimensions

mm

| Model       | L   | P   |
|-------------|-----|-----|
| 630M2AT-37  | 170 | 158 |
| 630M3AT-37  | 213 | 201 |
| 630M4AT-37  | 256 | 244 |
| 630M5AT-37  | 299 | 287 |
| 630M6AT-37  | 342 | 330 |
| 630M7AT-37  | 385 | 373 |
| 630M8AT-37  | 428 | 416 |
| 630M9AT-37  | 471 | 459 |
| 630M10AT-37 | 514 | 502 |

630M□AT-39 (DIN connector)



Unit dimensions

mm

| Model       | L   | P   |
|-------------|-----|-----|
| 630M2AT-39  | 170 | 158 |
| 630M3AT-39  | 213 | 201 |
| 630M4AT-39  | 256 | 244 |
| 630M5AT-39  | 299 | 287 |
| 630M6AT-39  | 342 | 330 |
| 630M7AT-39  | 385 | 373 |
| 630M8AT-39  | 428 | 416 |
| 630M9AT-39  | 471 | 459 |
| 630M10AT-39 | 514 | 502 |

# SOLENOID VALVES

## 830 SERIES

### Basic Models and Valve Functions

| Basic model         | 830-4E1     | 830-4E2 | 833-4E2   |
|---------------------|-------------|---------|---|
| Item                |             |         |   |
| Number of positions | 2 positions |         | 3 positions   |
| Number of ports     | 5 ports     |         |   |
| Valve function      | —           | —       | Closed center (standard)<br>Exhaust center (optional)<br>Pressure center (optional) |

Remark: For optional specifications and order codes, see p.755.

### Specifications

| Basic model  |                             |       | 830-4E1                    | 830-4E2                    | 833-4E2                    |
|--|-----------------------------|-------|----------------------------|----------------------------|----------------------------|
| Item   |                             |       |                            |                            |                            |
| Media  |                             |       | Air                        |                            |                            |
| Operation type   |                             |       | Pilot type                 |                            |                            |
| Effective area <sup>Note 1</sup><br>[Cv]                   | Port size <sup>Note 2</sup> | Rc3/4 | 120 [6.7]                  |                            |                            |
|  |                             | Rc1/2 | 100 [5.6]                  |                            |                            |
| Lubrication  |                             |       | Not required               |                            |                            |
| Operating pressure range MPa {kgf/cm <sup>2</sup> } [psi.] |                             |       | 0.2~0.9 [2.0~9.2] [29~131] | 0.1~0.9 [1.0~9.2] [15~131] | 0.2~0.9 [2.0~9.2] [29~131] |
| Proof pressure MPa {kgf/cm <sup>2</sup> } [psi.]           |                             |       | 1.35 [13.8] [196]          |                            |                            |
| Response time <sup>Note 3</sup><br>ms                      | DC24V                       |       | 30/60 or below             | 20/20 or below             | 25/70 or below             |
| ON/OFF   | AC100V, AC200V              |       | 25/75 or below             | 20/20 or below             | 25/80 or below             |
| Maximum operating frequency Hz                             |                             |       | 5                          |                            |                            |
| Minimum time to energize for self holding ms               |                             |       | —                          | 50                         | —                          |
| Operating temperature range (atmosphere and media) °C [°F] |                             |       | 5~50 [41~122]              |                            |                            |
| Shock resistance m/s <sup>2</sup> {G}                      |                             |       | 294 {30}                   |                            |                            |
| Mounting direction   |                             |       | Any                        |                            |                            |

Notes: 1. For details, see the effective area on p.754.

2. For details, see the port size on p. 754.

3. Values when the air pressure is 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]. The values for **830-4E2** are when switching from the opposite position, and for **833-4E2** are those of closed center, when switching from the neutral position.

### Solenoid Specifications

| Rated voltage                           | DC24V                       | AC100V             | AC200V           |
|---|-----------------------------|--------------------|------------------|
| Item                                    |                             |                    |                  |
| Operating voltage range                 | V                           | 21.6~26.4 (24±10%) | 90~110 (100±10%) |
| Rated frequency                         | Hz                          | 50                 | 60               |
| Current (When rated voltage is applied) | Starting                    | 68                 | 58               |
|   | Energizing                  | 42                 | 32               |
| Power consumption                       | W                           | 1.7                | 3                |
| Allowable leakage current               | mA                          | 4                  | 6                |
| Insulation resistance <sup>Note</sup>   | MΩ                          | Over 100           |                  |
| Color of LED indicator                  | Red                         | Yellow             | Green            |
| Surge suppression (as standard)         | Surge absorption transistor | Varistor           |                  |

Note: Value at DC500V megger.

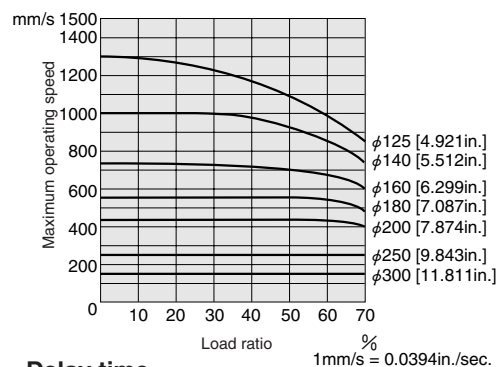
### Cylinder Operating Speed

#### ●For tube piping

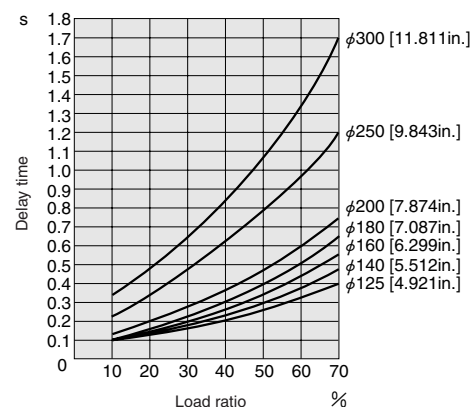
**830-4E□-264**

**833-4E2-264**

#### Maximum operating speed

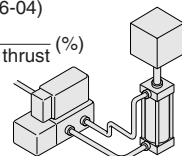


#### Delay time

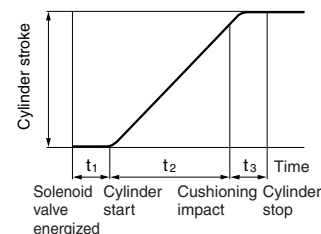


#### Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length: φ 13X1000mm [39in.]
- Fitting: Quick fitting (Model: TS16-04)
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}} (\%)$
- Cylinder stroke: 300mm [11.8in.]



#### How to obtain cylinder speed



t = Time required for the cylinder to complete 1 stroke

t<sub>1</sub> = Cylinder delay time

t<sub>2</sub> = Time moving at maximum speed

t<sub>3</sub> = Time required for cushioning (about 0.2s)

● Without cushion

t = t<sub>1</sub> + t<sub>2</sub>

● With cushion

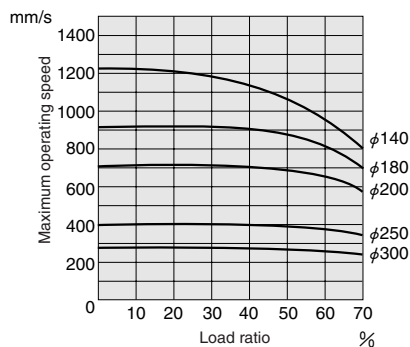
t = t<sub>1</sub> + t<sub>2</sub> + t<sub>3</sub>

## ● For steel piping

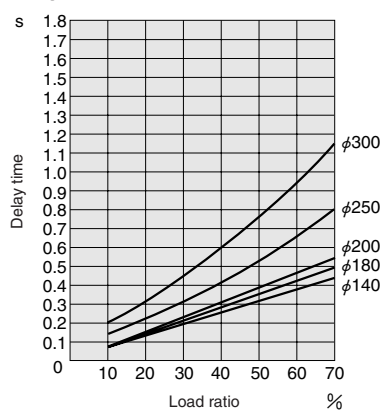
830-4E□-266

833-4E2-266

### Maximum operating speed

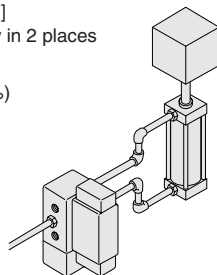


### Delay time



### Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping length: 20A steel piping 2m, elbow in 2 places
- Fitting: R3/4 steel piping fitting
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}}$  (%)
- Cylinder stroke: 300mm [11.8in.]



## Effective Area [Cv]

| Model                         | Port size | Effective area mm <sup>2</sup> |   |   |                         |                         |
|-------------------------------|-----------|--------------------------------|---|---|-------------------------|-------------------------|
|                               |           | Standard<br>(without fitting)  | Tube piping                             |   | Steel piping            |                         |
|                               |           |                                | Inner diameter φ13×1m<br>TS16-04 2 pcs. | Inner diameter φ13×2m<br>TS16-04 2 pcs. | R3/4×2m<br>Elbow 2 pcs. | R1/2×2m<br>Elbow 2 pcs. |
| 830-4E1<br>830-4E2<br>833-4E2 | Rc3/4     | 120<br>[6.7]                   | 72<br>[4.0]                             | 68<br>[3.8]                             | 105<br>[5.8]            | 77<br>[4.3]             |
|                               | Rc1/2     | 100<br>[5.6]                   | 68<br>[3.8]                             | 64<br>[3.6]                             | —                       | 75<br>[4.2]             |

## Solenoid Valve Port Size

| Model                      | Port specification | Sub-base port size      |
|----------------------------|--------------------|-------------------------|
| 830-4E□-266<br>833-4E2-266 | 1 (P)              | Female thread<br>Rc 3/4 |
|                            | 4 (A), 2 (B)       |                         |
|                            | 3 (R2), 5 (R1)     |                         |
|                            | PR                 |                         |
| 830-4E□-264<br>833-4E2-264 | 1 (P)              | Female thread<br>Rc 1/2 |
|                            | 4 (A), 2 (B)       |                         |
|                            | 3 (R2), 5 (R1)     |                         |
|                            | PR                 |                         |

## Solenoid Valve Mass g [oz.]

| Basic model | Mass                       |
|-------------|----------------------------|
| 830-4E1     | 760 [26.81] (1640 [57.85]) |
| 830-4E2     | 870 [30.69] (1760 [62.08]) |
| 833-4E2     | 850 [29.98] (1740 [61.38]) |

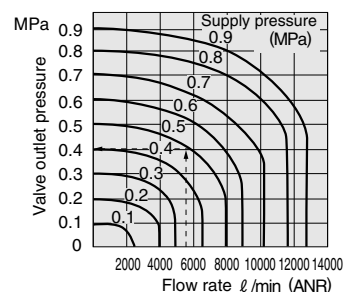
Remark: Figures in parentheses ( ) are the mass with sub-base.

## Flow Rate

830-4E1-266

830-4E2-266

833-4E2-266



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 5800 l /min [205ft.<sup>3</sup>/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

830 Series Solenoid Valve Order Codes



| 3-position valve<br>Valve function  | Sub-base  | Manual override  | Wiring type                        |
|---|---|--|------------------------------------|
| <p>Closed center</p> <p>Blank</p>   | <p>Port size Rc1/2,<br/>side piping</p> <p>-264</p>                       | <p>Non-locking type<br/>manual override</p> <p>Blank</p> | <p>Grommet type</p> <p>Blank</p>   |
| <p>Exhaust center</p> <p>-13</p>  | <p>Port size Rc3/4,<br/>side piping</p> <p>-266</p>                       |  | <p>Conduit type</p> <p>-37</p>     |
| <p>Pressure center</p> <p>-14</p>   | <p>Port size Rc1/2,<br/>bottom piping<br/>(made to order)</p> <p>-284</p> |  | <p>DIN connector</p> <p>-39</p>    |
|   | <p>Port size Rc3/4,<br/>bottom piping<br/>(made to order)</p> <p>-286</p> |  |                                    |
| <p>●When ordering<br/>single valve units,<br/>omit this code from<br/>the order code. The<br/>single valve includes<br/>4 mounting screws<br/>and 1 gasket.</p> |   |  |                                    |
| <p>Voltage</p>  |   |  |                                    |
| <p>-264<br/>-266<br/>-284<br/>-286</p>  |   | <p>-37<br/>-39</p>                                       | <p>DC24V<br/>AC100V<br/>AC200V</p> |

For made to order details, see p.759.

Additional Parts (To be ordered separately)

Speed controller



●For Rc1/2

●For Rc3/4

Muffler

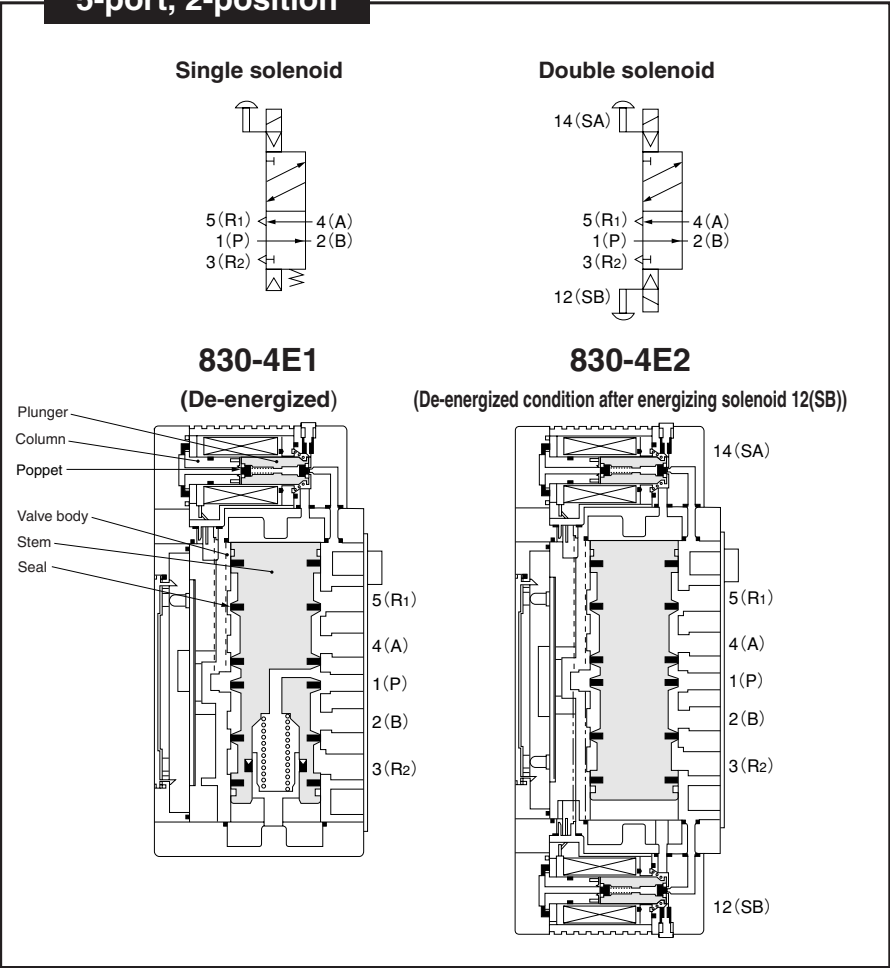


●For Rc1/2

●For Rc3/4

Operating Principles, Major Parts and Materials

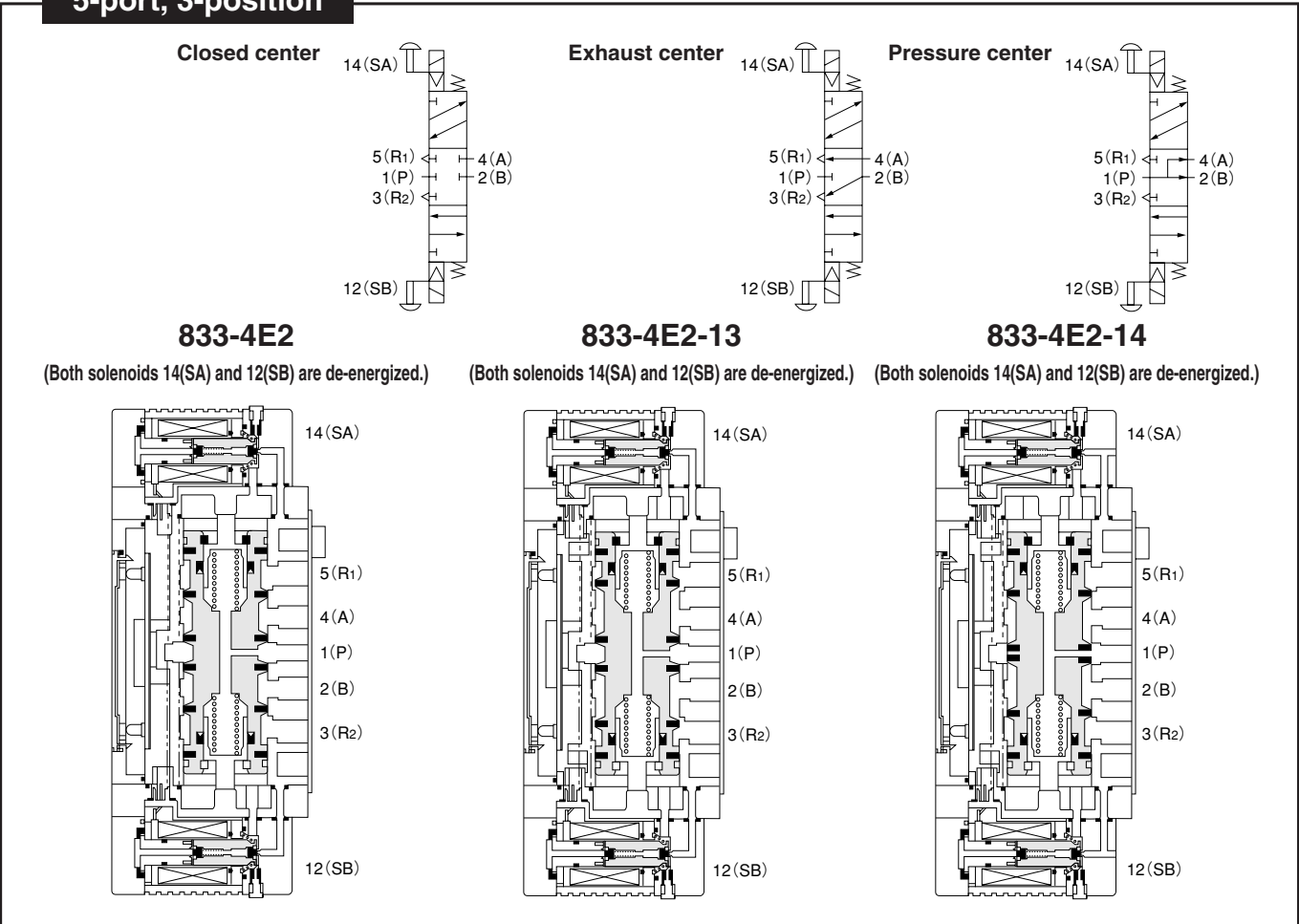
5-port, 2-position



Major Parts and Materials

| Parts |          | Materials                 |
|-------|----------|---------------------------|
| Valve | Body     | Aluminum alloy (painted)  |
|       | Stem     | Aluminum alloy (anodized) |
|       | Poppet   | Synthetic rubber          |
|       | Seal     | Urethane rubber           |
|       | Plunger  | Magnetic stainless steel  |
|       | Column   |                           |
|       | Sub-base | Aluminum alloy (painted)  |

5-port, 3-position

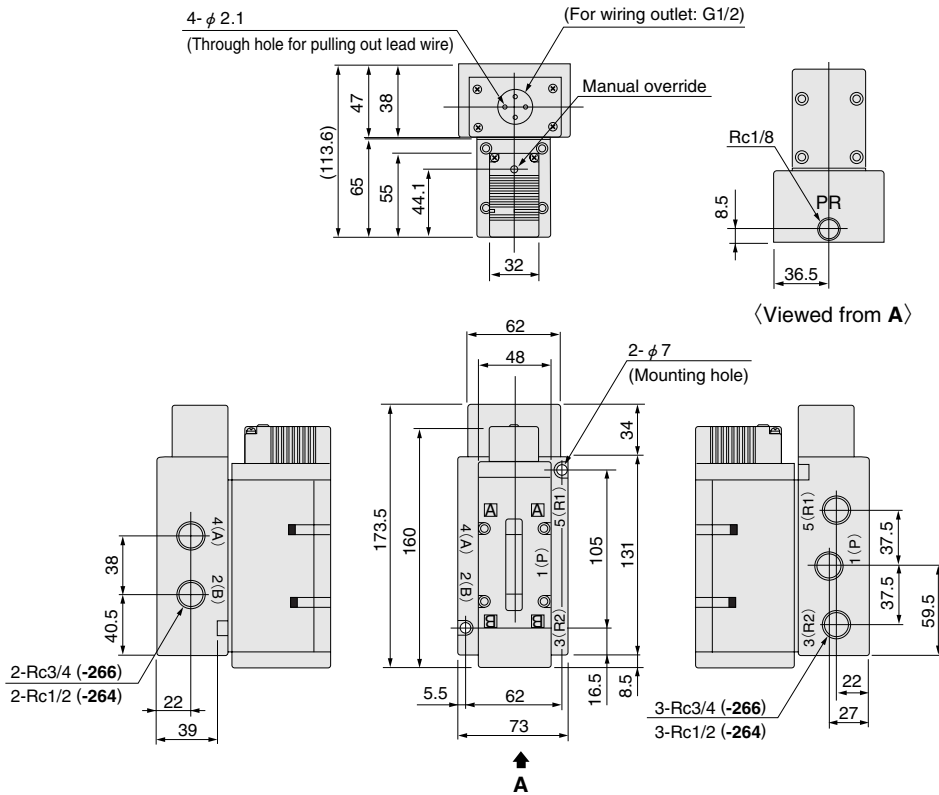


## Dimensions of Solenoid Valve (mm)

### 830-4E1-264 (Grommet type)

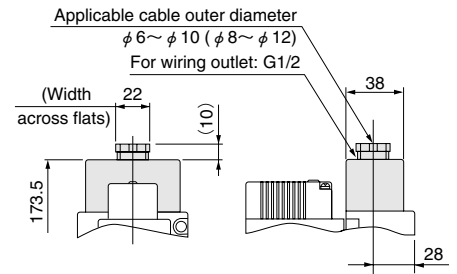
### 830-4E1-266 (Grommet type)

CAD 830-4E1



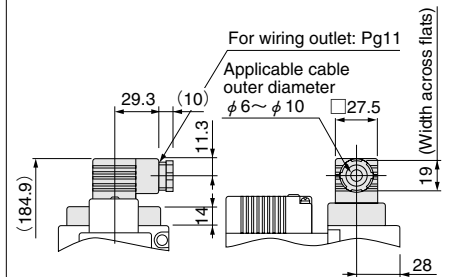
### -37 (Conduit type)

CAD 830-37-1



### -39 (DIN connector)

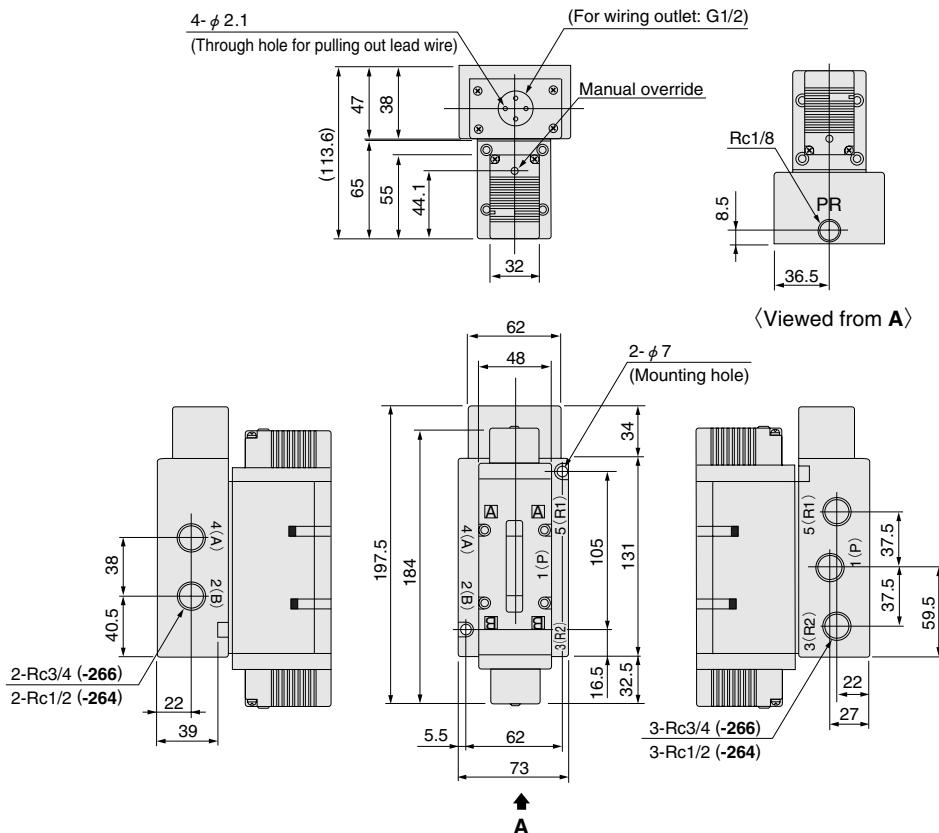
CAD 830-39-1



### 830-4E2-264 (Grommet type)

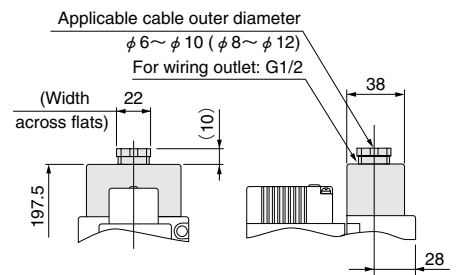
### 830-4E2-266 (Grommet type)

CAD 830-4E2



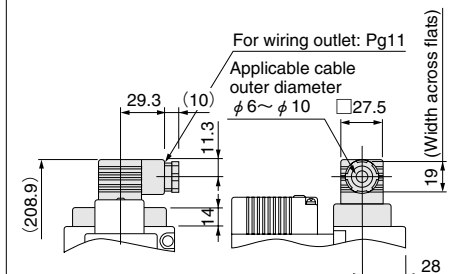
### -37 (Conduit type)

CAD 830-37-2



### -39 (DIN connector)

CAD 830-39-2




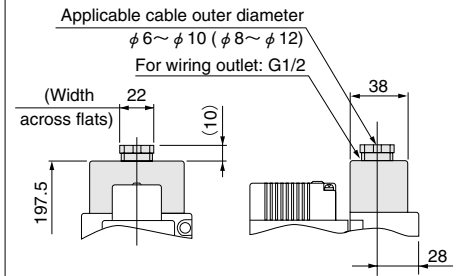
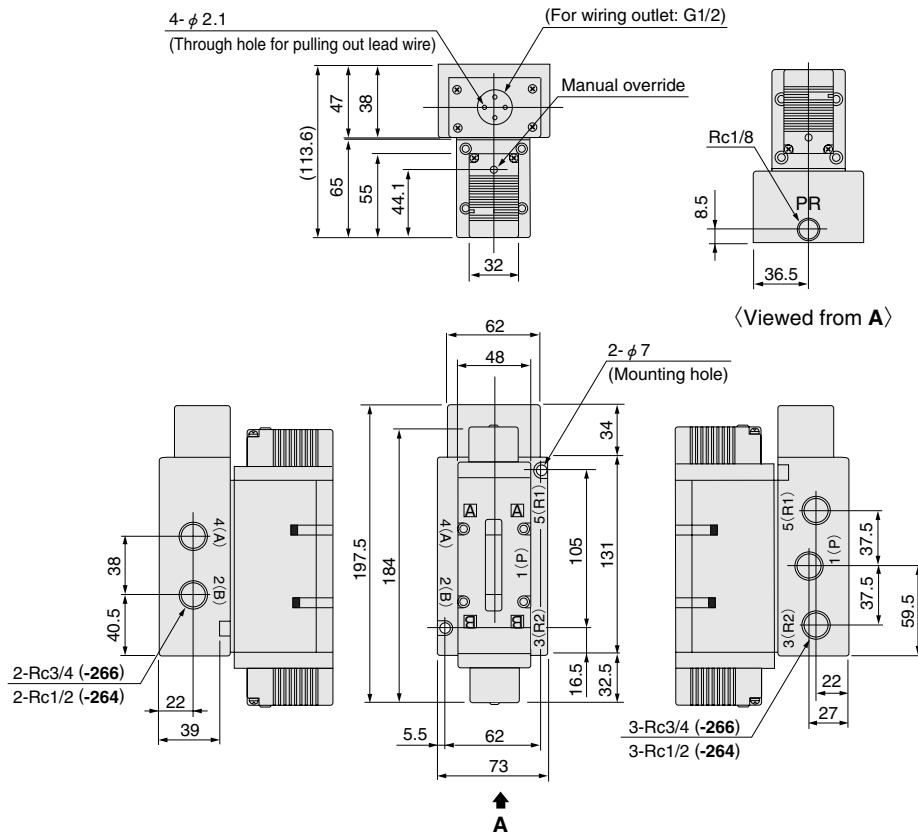


**833-4E2-264 (Grommet type)**  
**833-4E2-266 (Grommet type)**


 830-4E2

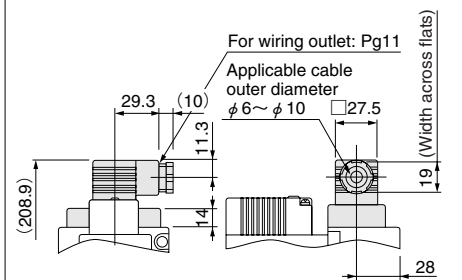
**-37 (Conduit type)**

 830-37-2



**-39 (DIN connector)**

 830-39-2

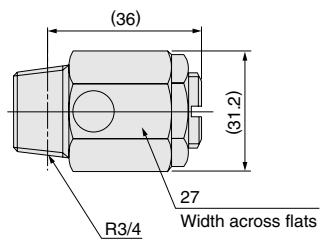
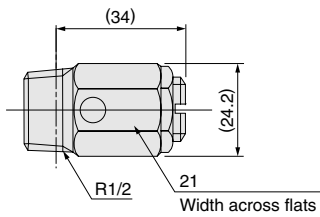


**Dimensions of Additional Parts (To be ordered separately) (mm)**

 830-AD

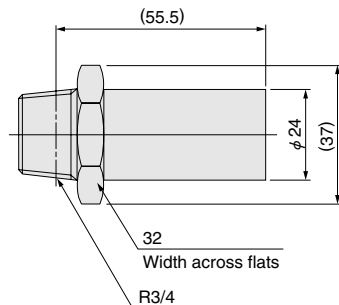
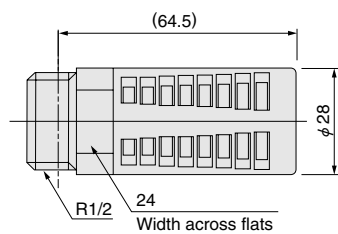
● Speed controller: **SCE-04**

● Speed controller: **SCE-06**



● Muffler: **KM-41**

● Muffler: **KM-6**



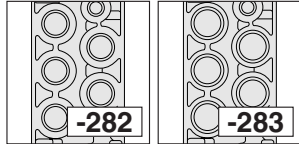
## Bottom piping sub-base

(Internal pilot solenoid valve)

The standard sub-base employs side piping, but the use of this sub-base enables the bottom piping. Use it when there is not enough piping space in the sub-base side-surface application. Two types of port sizes are provided for the bottom piping sub-base in each series (the PR port size, however, is Rc1/8).

### 430 series

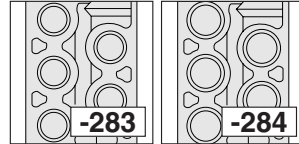
Bottom piping sub-base



● Rc 1/4 specification ● Rc 3/8 specification

### 630 series

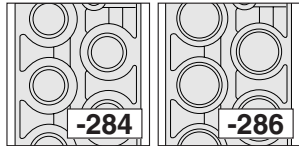
Bottom piping sub-base



● Rc 3/8 specification ● Rc 1/2 specification

### 830 series

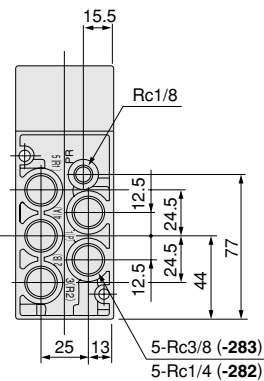
Bottom piping sub-base



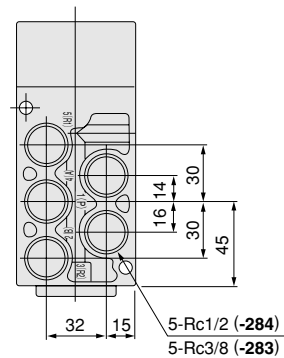
● Rc 1/2 specification ● Rc 3/4 specification

## <Bottom dimensions> (mm)

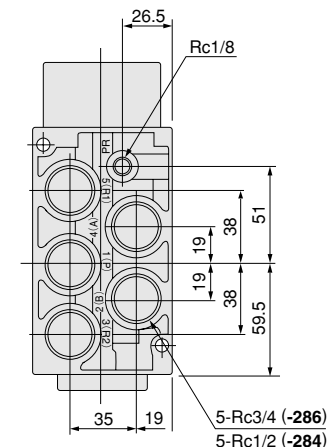
### ●430 series



### ●630 series



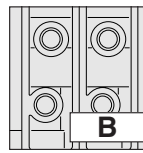
### ●830 series



Remarks: The sub-base mass is the same as the standard one.  
For the **430** series, see "Solenoid Valve Mass" on p.730, for the **630** series, see p.742, and for the **830** series, see p.754.

## Bottom piping manifold

(Internal pilot solenoid valve)



The standard manifold employs side piping, but the use of this manifold enables the bottom piping. Use it when there is not enough piping space in the manifold side-surface application.

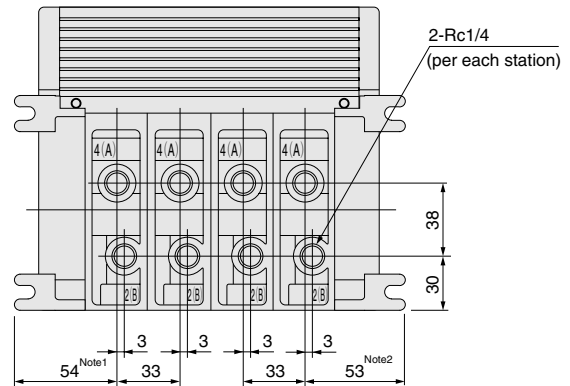
| Manifold model | Port           | Piping size |
|----------------|----------------|-------------|
| 430M□B         | 1 (P)          | Rc 1/2      |
|                | 4 (A), 2 (B)   | Rc 1/4      |
|                | 3 (R2), 5 (R1) | Rc 1/2      |
|                | PR             | Rc 1/8      |

| Manifold model | Port           | Piping size |
|----------------|----------------|-------------|
| 630M□B         | 1 (P)          | Rc 1/2      |
|                | 4 (A), 2 (B)   | Rc 3/8      |
|                | 3 (R2), 5 (R1) | Rc 1/2      |
|                | PR             | Rc 1/8      |

## <Bottom dimensions> (mm)

### ●430 series

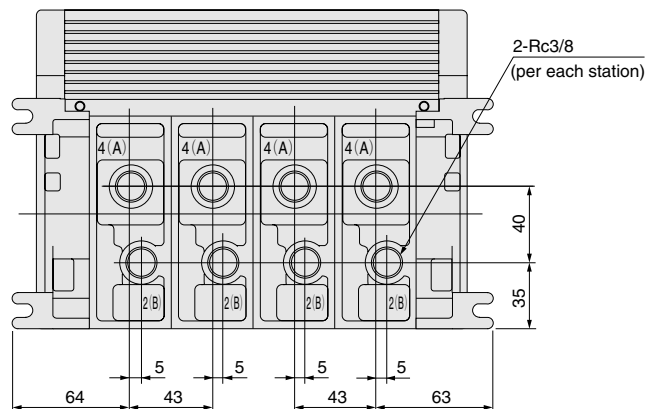
Order code: 430M□B



Notes: 1. With serial transmission module :-BSR, the length is 119.  
2. With serial transmission module :-BSL, the length is 118.

### ●630 series

Order code: 630M□B



## Manifold Mass

g [oz.]

| Manifold model | Mass calculation of each unit<br>(n=number of units) | Block-off plate<br>(Model for 430 : 430-BP<br>Model for 630 : 630-BP) |
|----------------|--|---|
| 430M□B□        | $(430 \times n) + 830$ [(15.17 × n) + 29.28]         | 100 [3.53]  |
| 630M□B□        | $(590 \times n) + 1040$ [(20.81 × n) + 36.68]        | 130 [4.59]  |

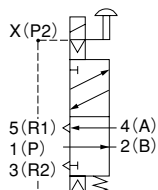
## External pilot solenoid valve

The standard solenoid valve and sub-base is an internal pilot type. Use of this solenoid valve enables stable switching from low pressure to high pressure range (0~0.9MPa {0~9.2kgf/cm<sup>2</sup>} [0~131psi.]).

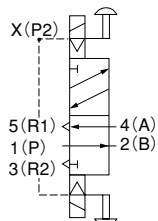
Cautions: For the external pilot solenoid valve, use the dedicated sub-base.

Use the external pilot pressures of 0.2MPa {2kgf/cm<sup>2</sup>} [29psi.] or more.

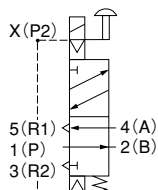
### 〈Symbols〉 432-4E1



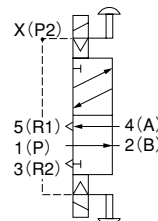
### 432-4E2



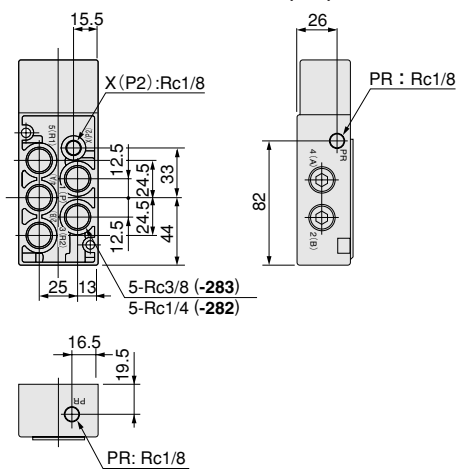
### 632-4E1



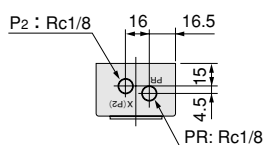
### 632-4E2



### 〈432 sub-base dimensions〉 (mm)

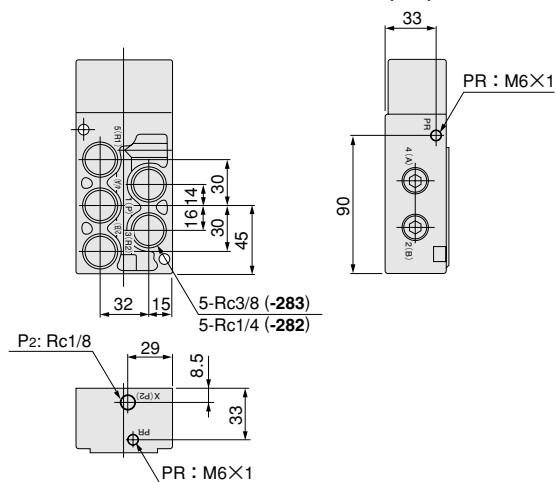


For bottom piping

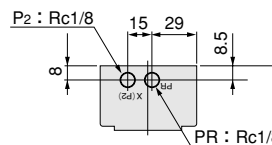


For side piping

### 〈632 sub-base dimensions〉 (mm)



For bottom piping



For side piping

Caution: X(P2) is a piping port for the external pilot.

The mounting dimensions for ports other than the PR and X(P2) ports are the same as the 430 and 630 series.

### 〈Dimensions of manifold side〉

432M□A  
432M□B

432M□AT  
432M□BT

632M□A  
632M□B

632M□AT  
632M□BT

