

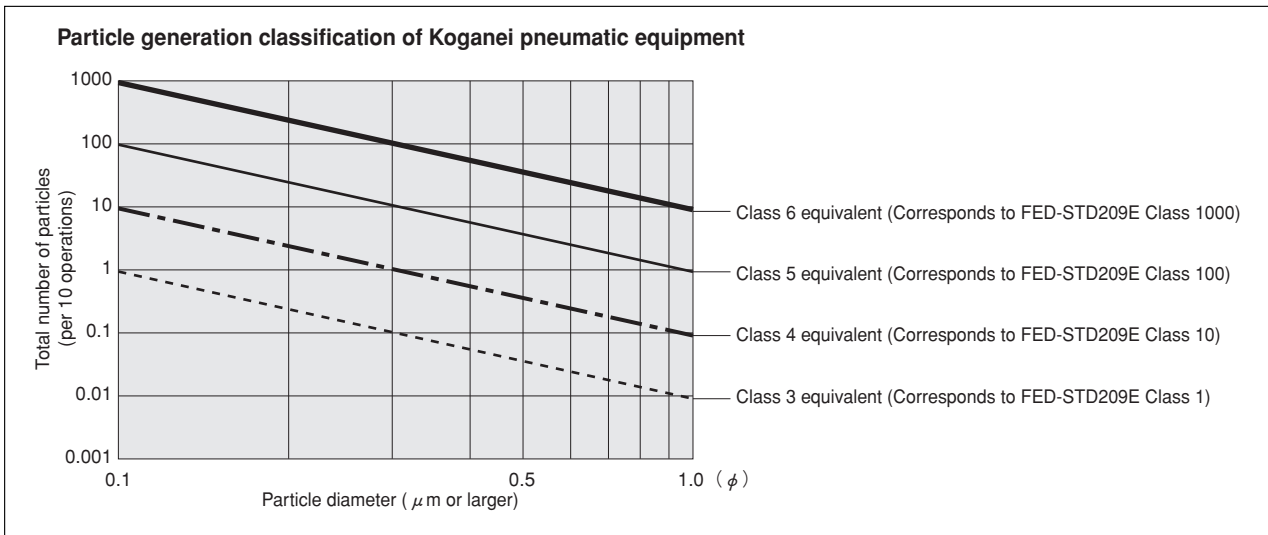


Koganei Clean System products provide complete support for the maintenance of a clean environment inside the cleanroom.

Koganei Clean System products meet the needs of the ultra-clean production environment. In everything from actuators and valves to air preparation and auxiliary equipment, anti-corrosion materials processing and other Koganei-developed design concepts serve to prevent particle contamination within the cleanroom. These perfectly designed mechanisms, which resolve even the slightest leaks to the outside during operations, have already won a high level of reliability.

Koganei Cleanliness

There is currently no standard in JIS or elsewhere for methods of evaluating cleanliness for pneumatic equipment in the cleanroom specifications. Therefore, to measure the effects of cleanroom contamination by pneumatic equipment, Koganei has decided to use “number of particles generated per 10 operations,” rather than particle density. Koganei has also developed classifications for application classes in cleanroom, based on JIS and other upper limit density tables, and on the company’s own experience.



- Remarks:
1. In the above table, product performance in terms of the number of particles generated per 10 operations is expressed as the upper limit of particles corresponding to the equivalent JIS or ISO class.
 2. In the above table, values in the JIS, ISO, and FED-STD upper limit density tables are calculated as upper density per liter.
 3. The classes shown are clean levels as classified in JIS and ISO.

From the above definitions, the Koganei clean level classes can be viewed as the level of average contamination per liter of surrounding air over a period of 10 operations in cleanroom. Air ventilation in cleanrooms is usually faster than 1 cycle per minute, and clean volumetric capacity is usually larger than 1 liter, which should provide a sufficient safety margin in practice.

Caution: The above conclusions are based on an ideal situation in which air ventilation is being implemented. For specific cases where air ventilation is not ensured, caution is needed since the clean classes cannot be maintained.

The clean system diagrams shown here are for Class 5 equivalent products. For Class 4 or Class 3 equivalent products, consult us.

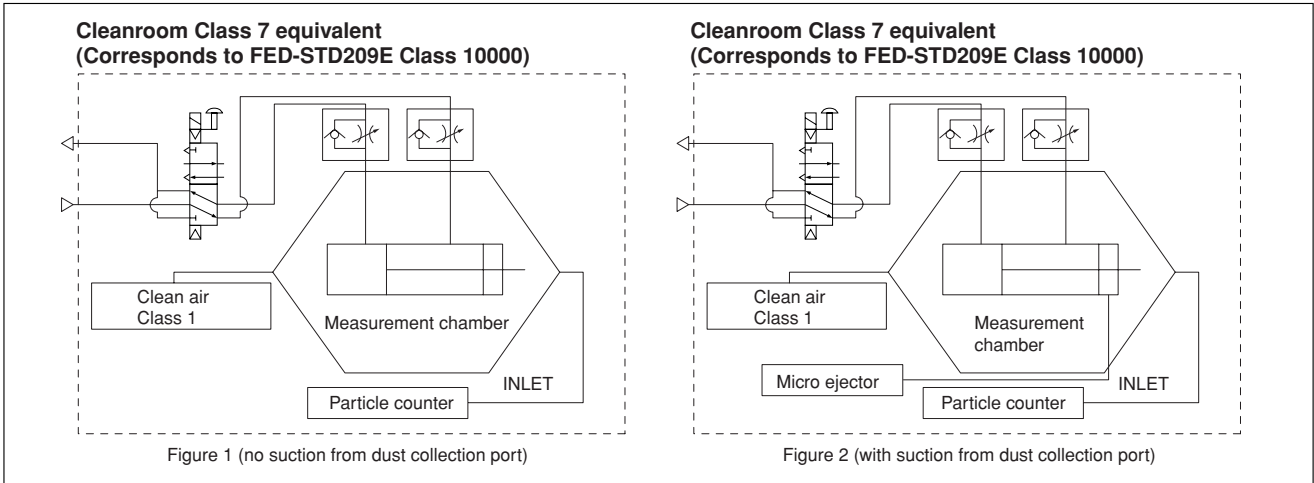
Evaluations of Cleanliness

Koganei has therefore specified its in-house measurement methods, to conduct evaluations on the cleanroom rating.

The number of particles of the Air Cylinder Cleanroom Specification is measured as shown in the method below.

1. Measurement conditions

1-1 Test circuit: Figure 1 (no suction), Figure 2 (with suction)



1-2 Operating conditions of tested cylinder

- Operating frequency: 1Hz
- Average speed: 500mm/s [20in./sec.]
- Applied pressure: 0.5MPa [73psi.]
- Suction condition: Microejector ME05, Primary side: 0.5MPa [73psi.] applied, Tube: $\phi 6$ [0.236in.]
- Mounting direction: Vertical
- Chamber volume: 8.3 ℓ [0.293ft.³]

2. Particle counter

- Manufacturer/model: RION/KM20
- Suction flow rate: 28.3 ℓ /min [1ft.³/min.]
- Particle diameter: 0.1 μm , 0.2 μm , 0.3 μm , 0.5 μm , 0.7 μm , 1.0 μm

3. Measurement method

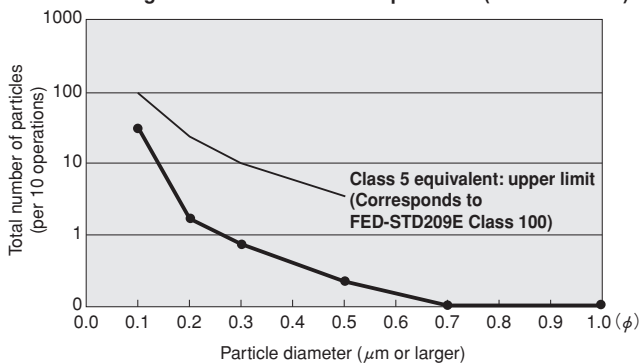
- 3-1 Confirmation of number of particles in the measurement system
Under the conditions in the above 1 and 2, using a particle counter to measure the sample for 9 minutes without operating the measurement sample, and confirmed the measured number of particle is 1 piece or less.
- 3-2 Measurement under operation
Under the conditions in the above 1 and 2, operating the measurement sample for 36 minutes, and measured the total values in the latter half of 18 minutes test.
- 3-3 Reconfirmation
Performed the measurement in 3-1 again, to reconfirm the number of particles in the measurement system.

4. Measurement results

● Cleanroom specification

Jig Cylinder (no suction from dust collection port)

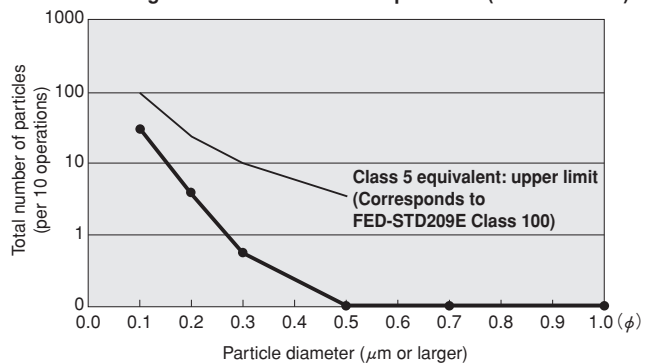
Particle generation over 1 million operations (CS-CDA16 \times 30)



● Cleanroom specification

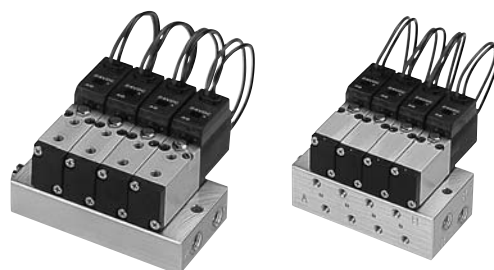
Slim Cylinder (with suction from dust collection port)

Particle generation over 1 million operations (CS-DA20 \times 100)



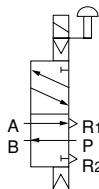
For “safety precautions” listed in the Clean System Product Drawings, see the materials below.

- For actuators, see “Safety Precautions” on p. 45 of the Actuators General Catalog .
- For valves, see “Safety Precautions” on p. 31 of the Valves General Catalog.
- For air treatment and auxiliary equipment, see “Safety Precautions” on p.31 of the General Catalog of Air Treatment, Auxiliary, Vacuum.



Symbol

5-port, 2-position
Single solenoid



Specifications

| Item | Basic model | For direct piping, F type manifold | CS-010-4E1 |
|--|----------------------|---------------------------------------|---|
| | | For A type manifold | CS-A010-4E1 ^{Note2} |
| Number of positions | | | 2 positions |
| Number of ports | | | 5 ports |
| Valve function | | | Single solenoid |
| Media | | | Air |
| Operation type | | | Internal pilot type |
| Effective area [Cv] | mm ² | | P→A 0.2 [0.01] A→R1, B→R2 0.3 [0.02] |
| Port size | | | M3×0.5 |
| Lubrication | | | Not required |
| Operating pressure range | MPa [psi.] | | 0.15~0.7 [22~102] |
| Proof pressure | MPa [psi.] | | 1.05 [152] |
| Response time ^{Note 1} ON/OFF | ms | DC5V, DC12V DC6V, DC24V | 4/8 or below 4/8 or below |
| Maximum operating frequency | Hz | | 5 |
| Minimum time to energize for self holding | ms | | — |
| Operating temperature range (atmosphere and media) | °C [°F] | | 5~50 [41~122] |
| Shock resistance | m/s ² {G} | | 1373.0 {140} (Axial direction 392.3 {40}) |
| Mounting direction | | | Any |

Notes: 1. Values when air pressure is 0.5MPa [73psi].

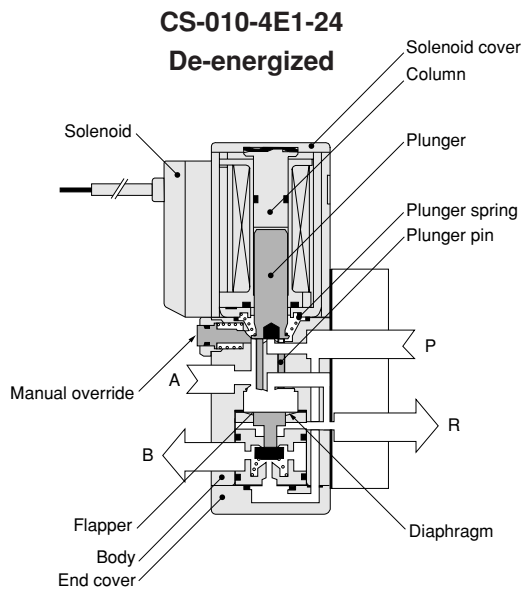
2. CS-A010-4E1 is for A type manifolds only. It cannot be used as a single unit.

Solenoid Specifications

| Item | Rated voltage | DC5V | DC6V | DC12V | DC24V |
|---|---------------|--|---|--|--|
| | Type | | With built-in flywheel diodes for surge suppression | | |
| Operating voltage range | DC V | 4.5~5.5 (5±10%) | 5.4~6.6 (6±10%) | 10.8~13.2 (12±10%) | 21.6~26.4 (24±10%) |
| Current (Power consumption when rated voltage is applied) | mA (W) | 325 (1.6) (335 (1.7) with LED indicator) | 270 (1.6) (280 (1.7) with LED indicator) | 130 (1.6) (140 (1.7) with LED indicator) | 70 (1.7) (80 (1.9) with LED indicator) |
| Maximum allowable leakage current | mA | 30 | 25 | 15 | 5 |
| Insulation resistance | MΩ | Over 100 | | | |
| Wiring type | Standard | Grommet type | | | |
| | Optional | Plug connector type | | | |
| Lead wire length | | 300mm [11.8in.] | | | |
| Color of lead wire | | Green (+) Black (-) | Blue (+) Black (-) | Brown (+) Black (-) | Red (+) Black (-) |
| Color of LED indicator | | Red | | | |
| Surge suppression (as standard) | | Flywheel diode | | | |

Inner Construction and Major Parts

●5-port



Major Parts and Materials

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

Order Codes

| | | | | | | | | | | |
|---|---------------------------|------------------------|-----------------------|---------------------------------|--|---------------|--------------------|--------------------|-------------|--|
| CS - 010E1 | | — | — | — | — | DC24V | | | | |
| Clean system 010 series valve basic model | | Number of ports | Mounting base | | Sub-base | | Wiring type | | | Voltage |
| | | 3-port | Without mounting base | With mounting base | Without sub-base | With sub-base | Grommet | Straight connector | L connector | |
| <ul style="list-style-type: none"> ● For sub-base-mounted units (cannot be used for units without sub-base) ● For A type manifold | CS-A010-4E1 5-port | — | — | | Blank | - 25 | Blank | - PSL | PLL | DC5V DC6V DC12V DC24V |
| <ul style="list-style-type: none"> ● For direct piping ● For F type manifold only | CS-010-4E1 5-port | — | Blank | - 21 <small>Note</small> | Blank * Cannot be used as a single unit. | - 24 | | | | |

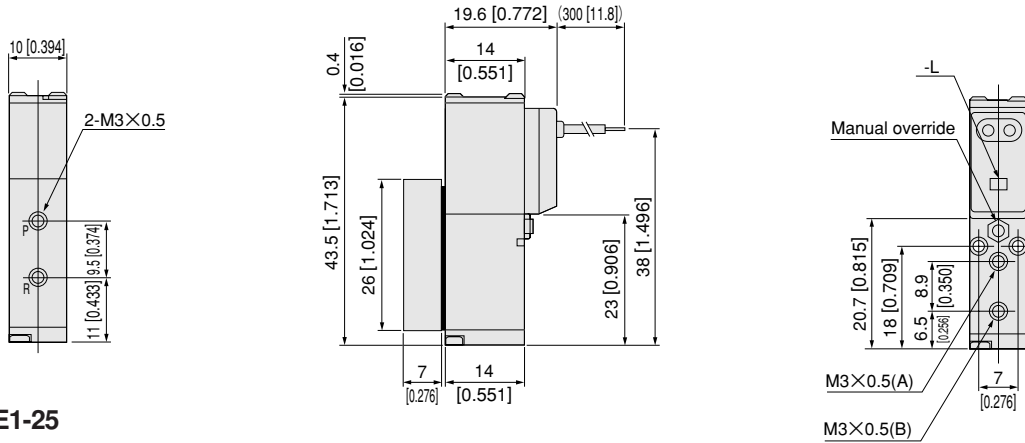
Note: With-mounting base (-21) specification can be used only with-sub-base specification (-24).

Manifold Order Codes

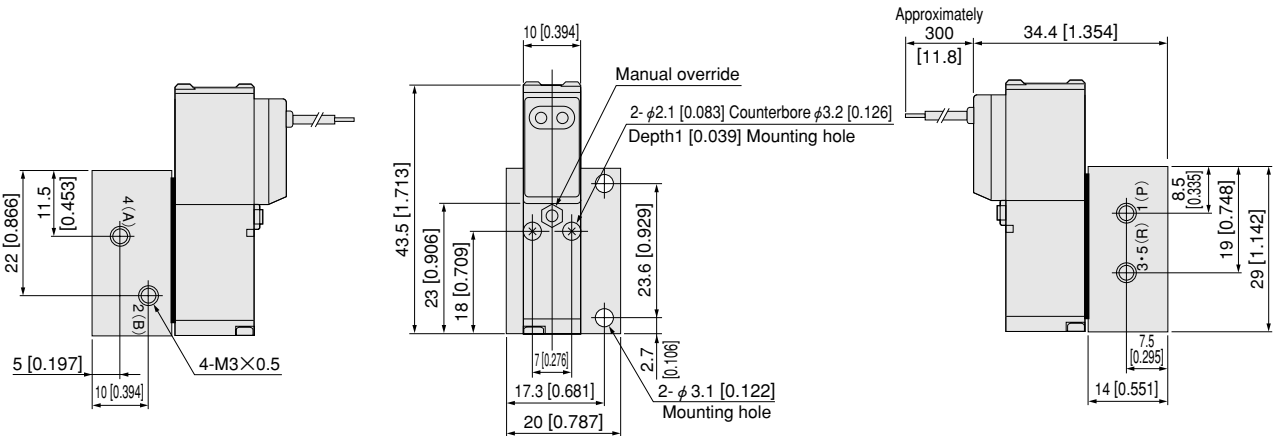
| | | | | | | |
|---|--|---|---|---|--|--|
| CS - 010M | | | | | | |
| Clean system 010 series manifold basic model | | Number of units | Manifold model | | Station | Clean system mounting valve model |
| | | <ul style="list-style-type: none"> 2 : 2 units 3 : 3 units ⋮ 20 : 20 units | <ul style="list-style-type: none"> F: F type <ul style="list-style-type: none"> ● For 2-, 3-port, F type manifold (PR common)—Dedicated for CS-010M ● For 5-port, F type manifold (PR common)—Dedicated for CS-010MB A: A type <ul style="list-style-type: none"> ● For 2-, 3-port, A type manifold (PR common, side A)—Dedicated for CS-010M ● For 5-port, A type manifold (PR common, sides A, B)—Dedicated for CS010MB | <ul style="list-style-type: none"> ● Valve mounting position from left, as viewed from the front Stn.1 : First Stn.2 : Second Stn.3 : Third ⋮ Stn.20 : 20th | <ul style="list-style-type: none"> ● For details of valve models, see the order codes listed above. ● Enter CS-BP when closing a station with a block-off plate without mounting a valve. | |
| CS-010M CS-010MB | | | | | | |

Dimensions of Solenoid Valve mm [in.]

● CS-010-4E1-24

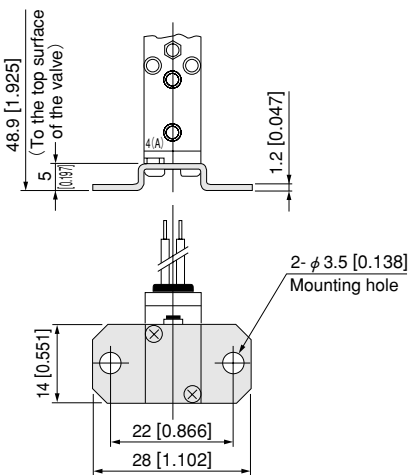


● CS-A010-4E1-25

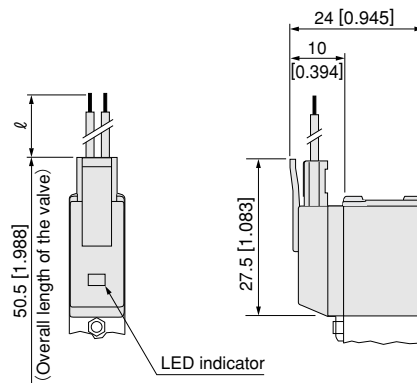


● Options

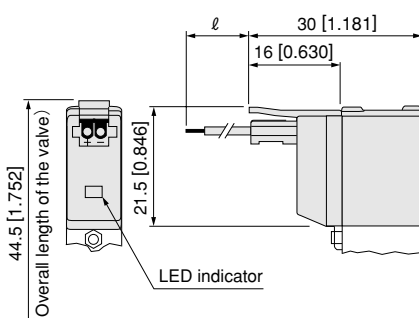
● Mounting base: -21



● Solenoid with straight connector: -PSL

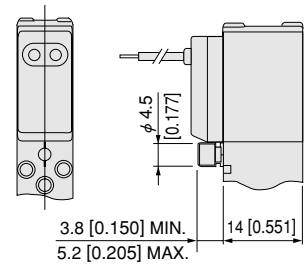


● Solenoid with L connector: -PLL

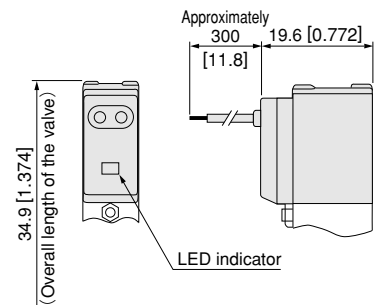


● Made to Order

● Locking protruding type manual override: -83



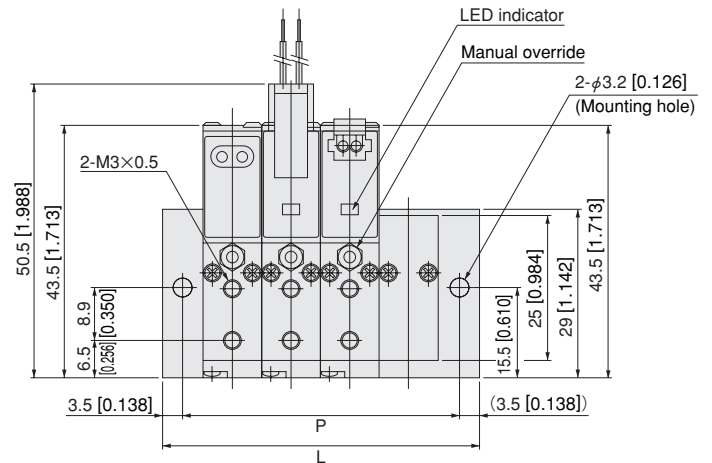
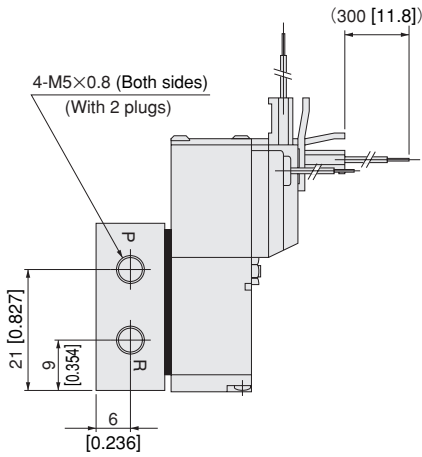
● Grommet type with LED indicator: -L



| Model | Code | ℓ (Lead wire length) |
|----------------------------------|------|----------------------|
| -PSL, -PLL, -L (standard length) | | 300 [11.8] |
| Made to order | -1L | 1000 [39] |
| | -3L | 3000 [118] |

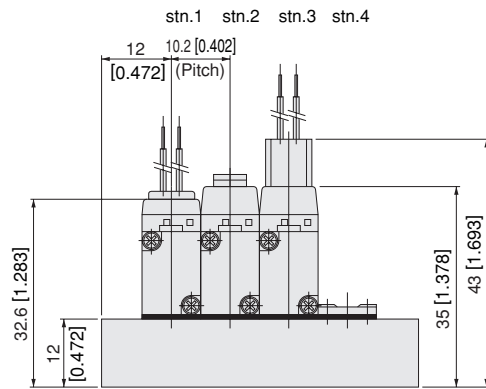
Dimensions of Manifold for Combination Mounting of 2-, 3-, 5-port Valves mm [in.]

●CS-010MB□F



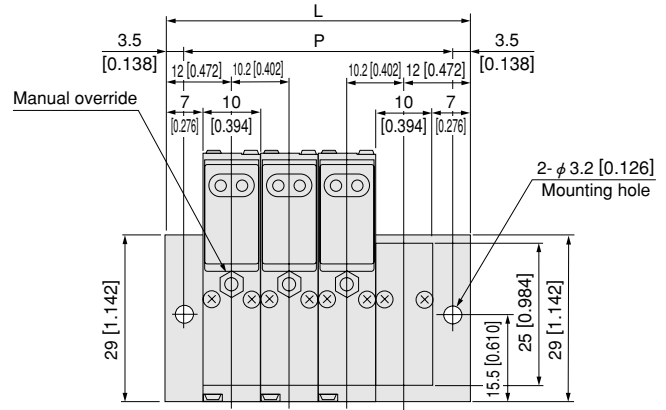
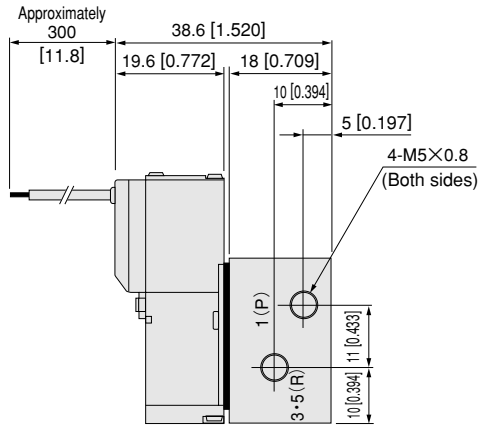
Unit dimensions

| Model | P | L |
|-------------|---------------|---------------|
| CS-010MB2F | 27.2 [1.071] | 34.2 [1.346] |
| CS-010MB3F | 37.4 [1.472] | 44.4 [1.748] |
| CS-010MB4F | 47.6 [1.874] | 54.6 [2.150] |
| CS-010MB5F | 57.8 [2.276] | 64.8 [2.551] |
| CS-010MB6F | 68 [2.677] | 75 [2.953] |
| CS-010MB7F | 78.2 [3.079] | 85.2 [3.354] |
| CS-010MB8F | 88.4 [3.480] | 95.4 [3.756] |
| CS-010MB9F | 98.6 [3.882] | 105.6 [4.157] |
| CS-010MB10F | 108.8 [4.283] | 115.8 [4.559] |
| CS-010MB11F | 119 [4.685] | 126 [4.961] |
| CS-010MB12F | 129.2 [5.087] | 136.2 [5.362] |
| CS-010MB13F | 139.4 [5.488] | 146.4 [5.764] |
| CS-010MB14F | 149.6 [5.890] | 156.6 [6.165] |
| CS-010MB15F | 159.8 [6.291] | 166.8 [6.567] |
| CS-010MB16F | 170 [6.693] | 177 [6.969] |
| CS-010MB17F | 180.2 [7.094] | 187.2 [7.370] |
| CS-010MB18F | 190.4 [7.496] | 197.4 [7.772] |
| CS-010MB19F | 200.6 [7.898] | 207.6 [8.173] |
| CS-010MB20F | 210.8 [8.299] | 217.8 [8.575] |



Dimensions of Manifold for Combination Mounting of 2-, 3-, 5-port Valves mm [in.]

● CS-010MB□A



Unit dimensions

| Model | P | L |
|-------------|---------------|---------------|
| CS-010MB2A | 27.2 [1.071] | 34.2 [1.346] |
| CS-010MB3A | 37.4 [1.472] | 44.4 [1.748] |
| CS-010MB4A | 47.6 [1.874] | 54.6 [2.150] |
| CS-010MB5A | 57.8 [2.276] | 64.8 [2.551] |
| CS-010MB6A | 68 [2.677] | 75 [2.953] |
| CS-010MB7A | 78.2 [3.079] | 85.2 [3.354] |
| CS-010MB8A | 88.4 [3.480] | 95.4 [3.756] |
| CS-010MB9A | 98.6 [3.882] | 105.6 [4.157] |
| CS-010MB10A | 108.8 [4.283] | 115.8 [4.559] |
| CS-010MB11A | 119 [4.685] | 126 [4.961] |
| CS-010MB12A | 129.2 [5.087] | 136.2 [5.362] |
| CS-010MB13A | 139.4 [5.488] | 146.4 [5.764] |
| CS-010MB14A | 149.6 [5.890] | 156.6 [6.165] |
| CS-010MB15A | 159.8 [6.291] | 166.8 [6.567] |
| CS-010MB16A | 170 [6.693] | 177 [6.969] |
| CS-010MB17A | 180.2 [7.094] | 187.2 [7.370] |
| CS-010MB18A | 190.4 [7.496] | 197.4 [7.772] |
| CS-010MB19A | 200.6 [7.898] | 207.6 [8.173] |
| CS-010MB20A | 210.8 [8.299] | 217.8 [8.575] |

