KOGANEI CLEAN SYSTEM

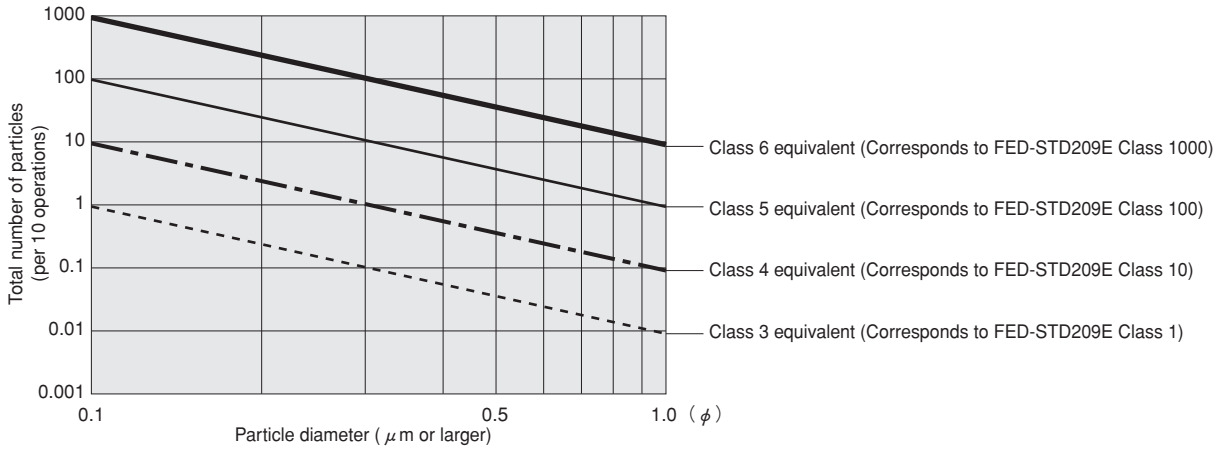
Koganei Clean System products provide complete support for the maintenance of a clean environment inside the cleanroom.

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.

Particle generation classification of Koganei pneumatic equipment



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)

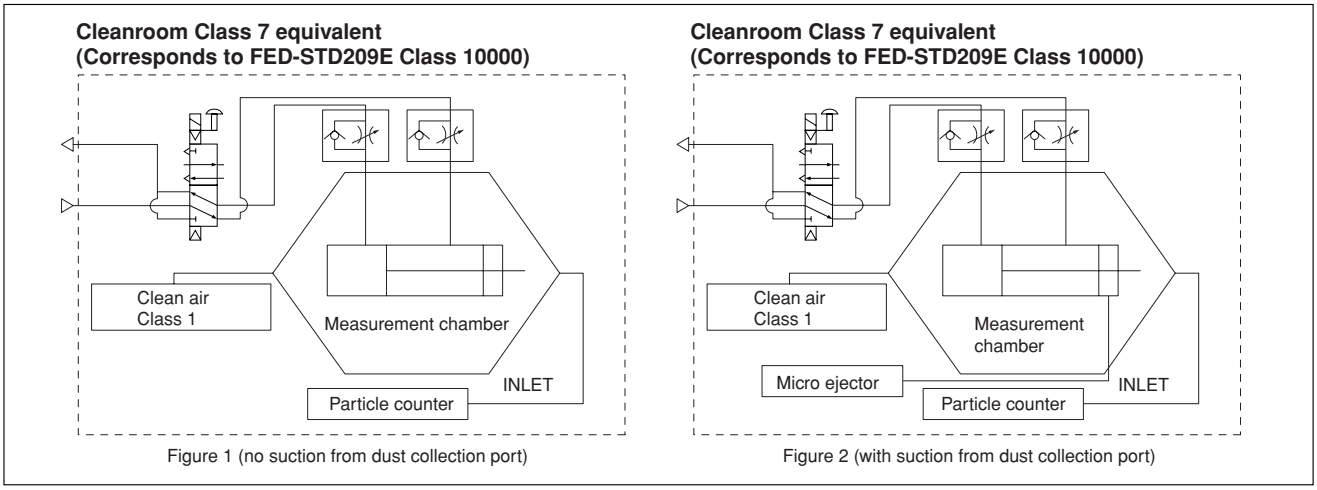


Figure 1 (no suction from dust collection port)

Figure 2 (with suction from dust collection port)

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: ϕ6 [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.

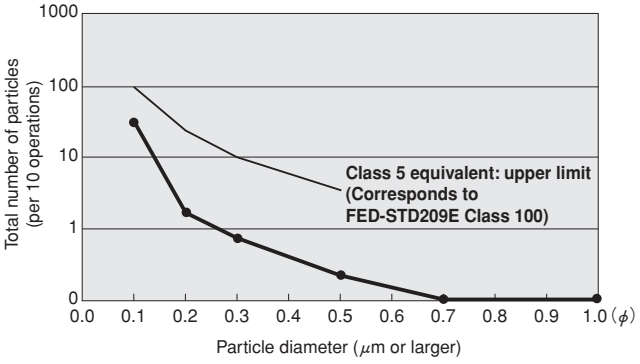
3-2 Measurement under operation
Under the conditions in the above1 and 2, operating the measurement sample for 36 minutes, and measured the total values in the latter half of 18 minutes test.

3-3 Reconfirmation
Performed the measurement in 3-1 again, to reconfirm the number of particles in the measurement system.

4. Measurement results

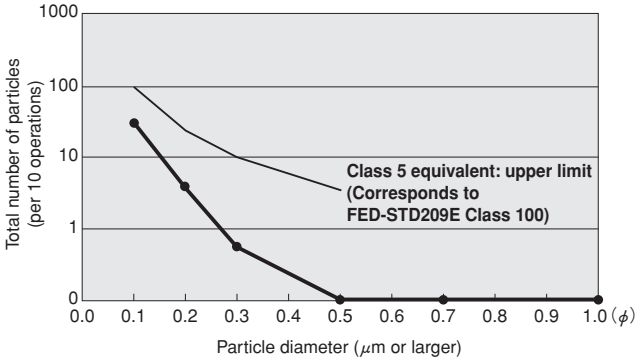
● **Cleanroom specification**
Jig Cylinder (no suction from dust collection port)

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



● **Cleanroom specification**
Slim Cylinder (with suction from dust collection port)

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



Safety Precautions

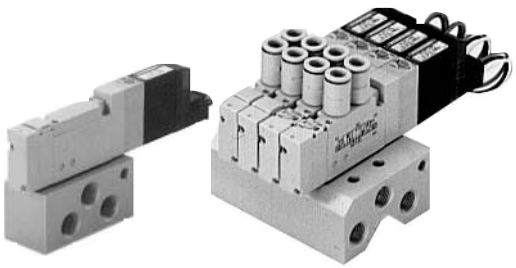
Always read these precautions carefully before use.

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.

KOGANEI CLEAN SYSTEM

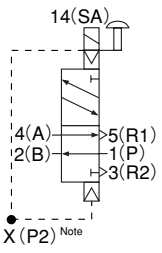
SOLENOID VALVES
F10 SERIES



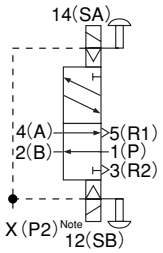
Symbols

5-port, 2-position

When set as a single solenoid



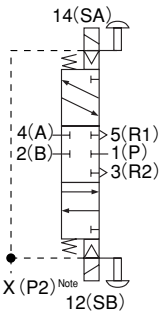
When set as a double solenoid



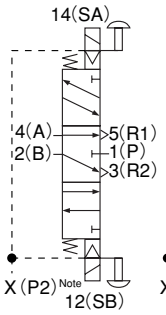
Note: For external pilot type.

5-port, 3-position (Both SA and SB are de-energized)

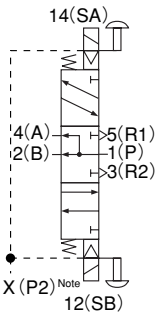
Closed center



Exhaust center



Pressure center



Specifications

Item \ Basic model		CS-F10T1	CS-F10T3 CS-F10T4 CS-F10T5	CS-F10T1G	CS-F10T3G CS-F10T4G CS-F10T5G	CS-F10T1V	CS-F10T3V CS-F10T4V CS-F10T5V
Media		Air					
Operation type		Internal pilot type		External pilot type (for positive pressure)		External pilot type (for vacuum)	
Effective area〔CV〕	mm²	5〔0.28〕	4.5〔0.25〕	5〔0.28〕	4.5〔0.25〕	5〔0.28〕	4.5〔0.25〕
Port size		M5× 0.8, fittings for ϕ4 and ϕ6, Rc1/8					
Lubrication		Not required					
Operating pressure range	Main valve	0.2～0.7MPa [29～102psi.]		0～0.7MPa [0～102psi.]Note1		–100kPa～0.15MPa [–29.53in.Hg～22psi.]	
	External pilot	——		0.2～0.7MPa [29～102psi.]Note1		0.2～0.7MPa [29～102psi.]	
Proof pressure	MPa [psi.]	1.05 [152]					
Response time Note2 ON/OFF time	ms DC12V, DC24V	15/20 or below	15/25 or below	15/20 or below	15/25 or below	15/20 or below	15/25 or below
	ms AC100V	15/20 or below	15/25 or below	15/20 or below	15/25 or below	15/20 or below	15/25 or below
Maximum operating frequency	Hz	5					
Minimum time to energize for self holding Note3	ms	50	——	50	——	50	——
Operating temperature range (atmosphere and media)	°C [°F]	5～50 [41～122]					
Shock resistance	m/s² {G}	1373 {140.0} (Axial direction 294.2 {30.0})	294.2 {30.0}	1373 {140.0} (Axial direction 294.2 {30.0})	294.2 {30.0}	1373 {140.0} (Axial direction 294.2 {30.0})	294.2 {30.0}
Mounting direction		Any					

Notes: 1. When the main valve pressure is 0.2～0.7MPa [29～102psi.], set the external pilot pressure to the main valve pressure or higher, and 0.7MPa [102psi.] or less.
2. Values when air pressure is 0.5MPa [73psi.]. The values for 2-position valves are when used as a single solenoid, and the values for 3-position valves are those when switching from the neutral position of closed center.
3. When used as a double solenoid valve.

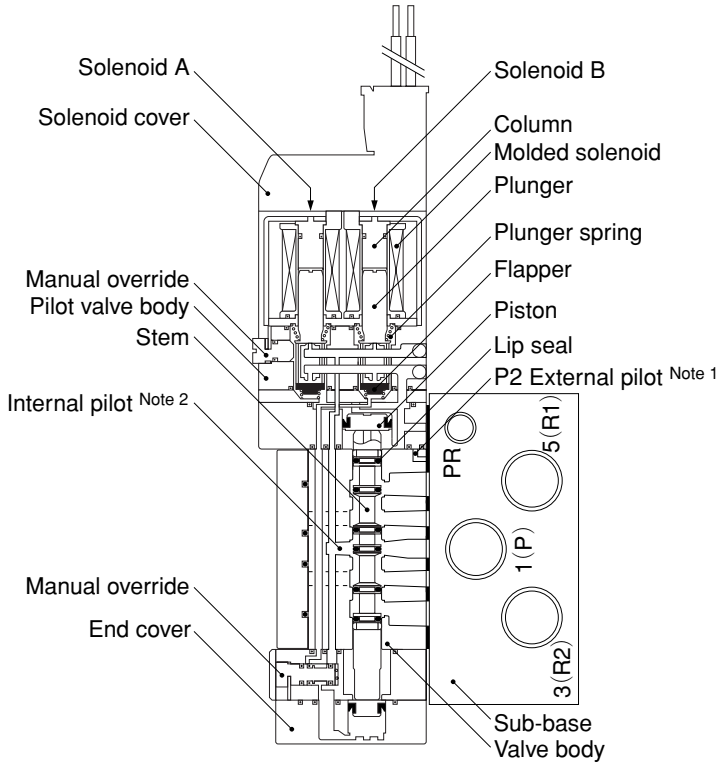
Solenoid Specifications

Item \ Rated voltage		DC12V	DC24V	AC100V	
Voltage range	V	10.8～13.2 (12±10%)	21.6～26.4 (24±10%)	90～110 (100±10%)	
Rated frequency	Hz	——	——	50	60
Current (when rated voltage is applied)	mA (r.m.s) Starting	——	——	10Note1	10Note1
	Energizing	76	38	10Note1	10Note1
Power consumption	W	0.9	0.9	1.0VA	
Allowable leakage current	mA	4.0	2.0	2.0	
Insulation resistance Note 2	MΩ	Over 100			
Color of LED indicator		14(SA)：Red, 12(SB)：Green	14(SA)：Red, 12(SB)：Green	14(SA)：Red, 12(SB)：Green	
Surge suppression (as standard)		Flywheel diode		Bridge diode	

Notes: 1. Since the AC types have built-in bridge diodes, the starting current and energizing current value are virtually the same.
2. Value at DC500V megger.

Inner Construction and Major Parts

●CS-F10T1-A1



Notes: 1. For external pilot type
2. Not available with external pilot type

Major Parts and Materials

Parts			Materials
Valve	Body		Aluminum die-casting
	Stem		Aluminum alloy
	Lip seal		Synthetic rubber
	Flapper		
	Sub-base		Aluminum alloy (anodized)
	Plunger		Magnetic stainless steel
	Column		
	End cover		Plastic
Manifold	Body	Monoblock	Aluminum alloy (anodized)
	Block-off plate		Mild steel (nickel plated)
	Seal		Synthetic rubber

Order Codes

CS-F10 - □ - □ - □ - □ - □

Clean system F10 series valve basic model		Pilot specification			Manual override		Valve outlet type Note 3				
		Internal pilot	External pilot (positive pressure)	External pilot (vacuum)	Manual override button	Manual override lever (made to order) Note 1	Without inlet/outlet block	With A type outlet plate	With A type sub-base	With outlet port fitting block	With outlet port female thread block
●For sub-base-mounted units (cannot be used for units without sub-base) ●For A type manifold ●For F type manifold	**CS-F10T1** 2-position (Both single and double solenoid use)	**Blank**	**G**	**V**	**Blank**	**-R** Note 1	**Blank** Note 2	**-A1** Note 2	**-A2**	**-FJ** Note 2	**-FM** Note 2
	CS-F10T3 3-position (Closed center)										
	CS-F10T4 3-position (Exhaust center)										
	CS-F10T5 3-position (Pressure center)										

Notes: 1. The manual override lever is made to order. Consult us for delivery. When the valve specification is T1, the manual override lever is available for the A side only.
2. Two manifold mounting screws are included.
3. For the outlet port size, see the table at right.

Monoblock Manifold A type (Base Piping Type) Order Codes

CS-F10M □ □ ⋮ □ □ ⋮

Clean system F10 series manifold basic model	Number of units		Manifold outlet specification		Pilot specification		Station Note 1	Valve size	Valve specification	Pilot specification
			With fitting block: ϕ4, ϕ6	With female thread block: M5×0.8	Internal pilot	External pilot				
CS-F10M	**2** : 2 units **3** : 3 units ⋮ **20** : 20 units	**A**	**J**	**M**	**Blank**	**G**	**stn.1** : First **stn.2** : Second **stn.3** : Third ⋮ **stn.20** : 20th	**CS-F10**	**T1:** 2-position, single solenoid specification **T2:** 2-position, double solenoid specification Note 2 **T3:** 3-position, closed center **T4:** 3-position, exhaust center **T5:** 3-position, pressure center	**Blank** **G** **V**

Notes: 1. Valve mounting location is from the left, with the solenoid on top and the valve in front.
2. This is a special model when ordering manifolds. If ordering valves only for repairs, etc., order CS-F□T1, and switch to the double solenoid specification for use.
3. The manual override lever is made to order. Consult us for delivery. When the valve specification is T1 or T2, the manual override lever is available for the A side only.
4. Always enter -A1.

Monoblock Manifold F type (Direct Piping Type) Order Codes

CS-F10M □ □ ⋮ □ □ ⋮

Clean system F10 series manifold basic model	Number of units		Station Note 1	Valve size	Valve specification	Manual override	Valve outlet type	
							With outlet port fitting block	With outlet port female thread block
CS-F10M	**2** : 2 units **3** : 3 units ⋮ **20** : 20 units	**F**	**stn.1** : First **stn.2** : Second **stn.3** : Third ⋮ **stn.20** : 20th	**CS-F10**	**T1:** 2-position, single solenoid specification **T2:** 2-position, double solenoid specification Note 2 **T3:** 3-position, closed center **T4:** 3-position, exhaust center **T5:** 3-position, pressure center	**Blank** **-R** Note 3	**-FJ**	**-FM**

Notes: 1. Valve mounting location is from the left, with the solenoid on top and the valve in front.
2. This is a special model when ordering manifolds. If ordering valves only for repairs, etc., order CS-F□T1, and switch to the double solenoid specification for use.
3. The manual override lever is made to order. Consult us for delivery. When the valve specification is T1 or T2, the manual override lever is available for the A side only.

	Wiring specification						Voltage
	L type plug connector			S type plug connector			
	Without connector	Lead wire		Without connector	Lead wire		
		300mm [11.8in.]	3000mm [118in.]		300mm [11.8in.]	3000mm [118in.]	
	Blank	**-PL**	**-PL3**	**-PN**	**-PS**	**-PS3**	**DC24V** **DC12V** **AC100V**

Valve outlet type (code)	Outlet port size
-A2	Rc1/8
-FJ	ϕ4, ϕ6
-FM	M5×0.8

	Manual override	Valve outlet type	Wiring specification										Voltage
			L type connector					S type connector					
			Without connector	Lead wire		Pre-wired positive common terminal		Without connector	Lead wire		Pre-wired positive common terminal		
				300mm [11.8in.]	3000mm [118in.]	Lead wire 300mm [11.8in.]	Lead wire 3000mm [118in.]		300mm [11.8in.]	3000mm [118in.]	Lead wire 300mm [11.8in.]	Lead wire 3000mm [118in.]	
	Blank **-R**Note 3	**-A1**Note 4	**Blank**	**-PL**	**-PL3**	**-CPL**	**-CPL3**	**-PN**	**-PS**	**-PS3**	**-CPS**	**-CPS3**	**DC24V** **DC12V** **AC100V**
	CS-F Valve size **BP** (for block-off plate)												

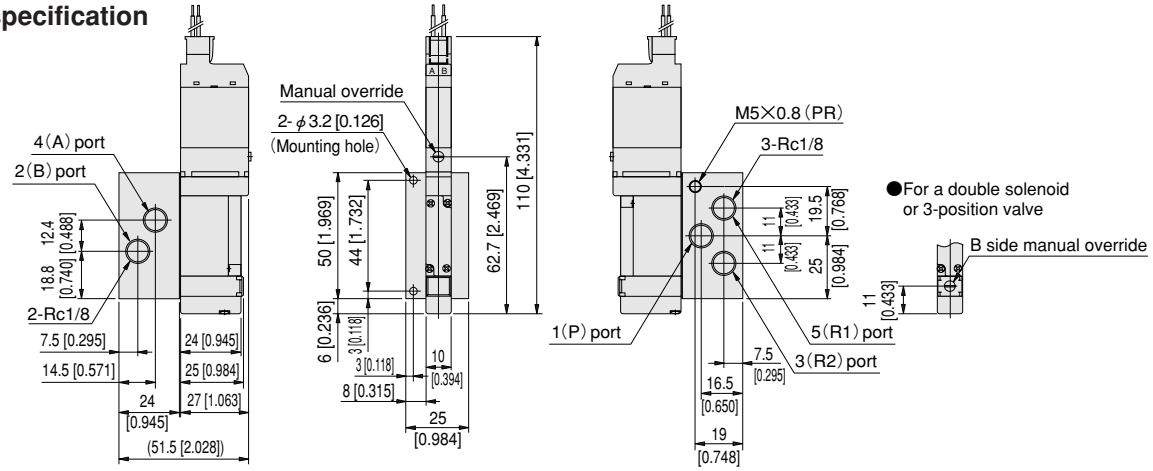
	Wiring specification										Voltage
	L type connector					S type connector					
	Without connector	Lead wire		Pre-wired positive common terminal		Without connector	Lead wire		Pre-wired positive common terminal		
		300mm [11.8in.]	3000mm [118in.]	Lead wire 300mm [11.8in.]	Lead wire 3000mm [118in.]		300mm [11.8in.]	3000mm [118in.]	Lead wire 300mm [11.8in.]	Lead wire 3000mm [118in.]	
	Blank	**-PL**	**-PL3**	**-CPL**	**-CPL3**	**-PN**	**-PS**	**-PS3**	**-CPS**	**-CPS3**	**DC24V** **DC12V** **AC100V**
	CS-F Valve size **BP** (for block-off plate)										

Dimensions of Single Valve Unit mm [in.]

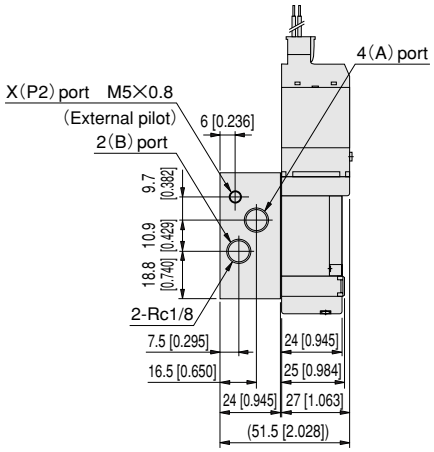
CS-F10T | **Valve specification** | **Operation type** | **-A2-PS**

With an A type sub-base
S type plug connector

●Internal pilot specification

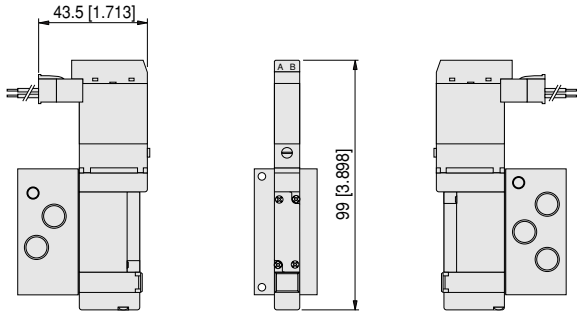


●External pilot specification



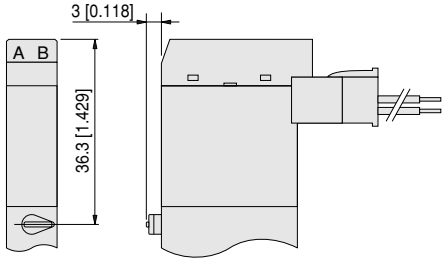
●Option

●L type plug connector : **-PL**



●Made to Order

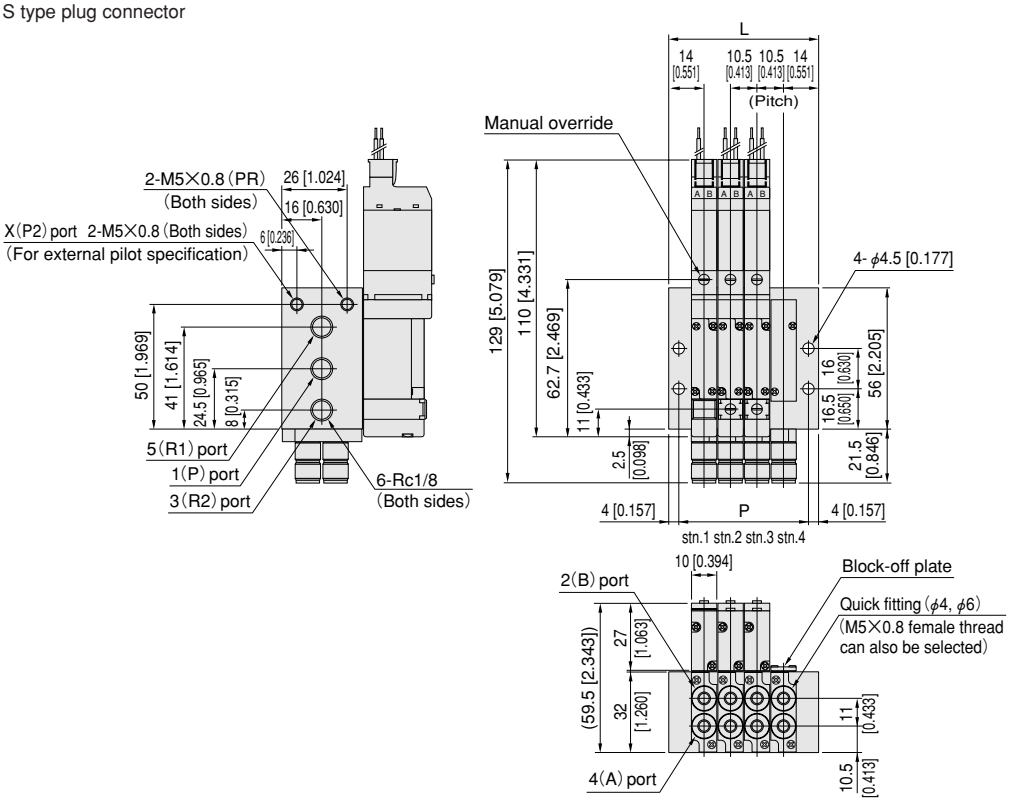
● Manual override lever



Dimensions of Monoblock Manifold A Type, F Type mm [in.]

CS-F10M Number of units A J/M Pilot specification (base piping type)

Monoblock manifold A type
Manifold with outlet port different size fitting blocks
S type plug connector

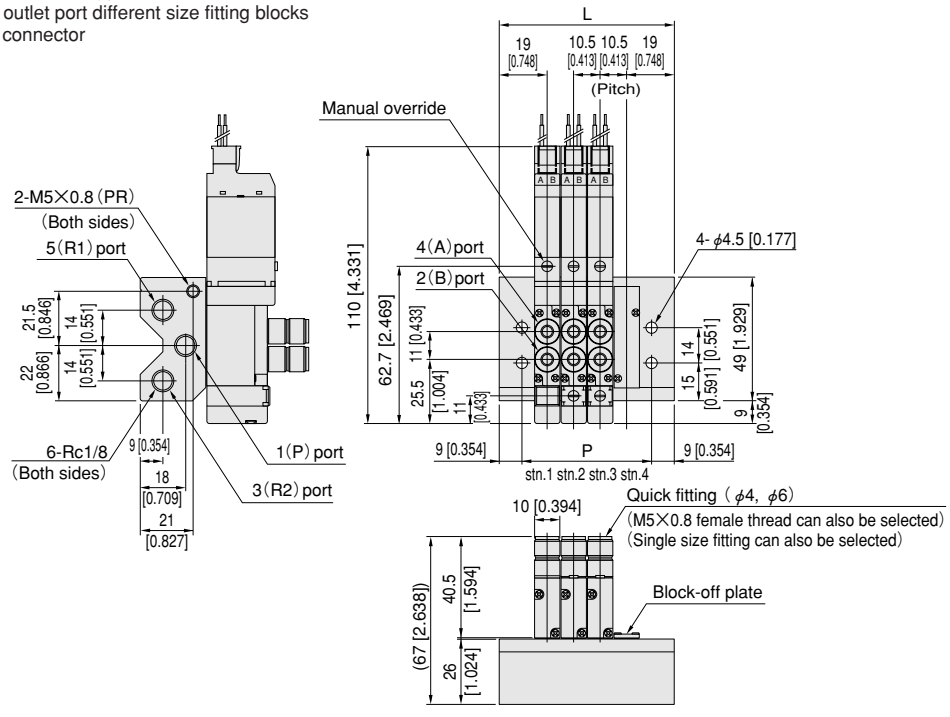


Unit dimensions

No. of units	L	P
2	38.5 [1.516]	30.5 [1.201]
3	49.0 [1.929]	41.0 [1.614]
4	59.5 [2.343]	51.5 [2.028]
5	70.0 [2.756]	62.0 [2.441]
6	80.5 [3.169]	72.5 [2.854]
7	91.0 [3.583]	83.0 [3.268]
8	101.5 [3.996]	93.5 [3.681]
9	112.0 [4.409]	104.0 [4.094]
10	122.5 [4.823]	114.5 [4.508]
11	133.0 [5.236]	125.0 [4.921]
12	143.5 [5.650]	135.5 [5.335]
13	154.0 [6.063]	146.0 [5.748]
14	164.5 [6.476]	156.5 [6.161]
15	175.0 [6.890]	167.0 [6.575]
16	185.5 [7.303]	177.5 [6.988]
17	196.0 [7.717]	188.0 [7.402]
18	206.5 [8.130]	198.5 [7.815]
19	217.0 [8.543]	209.0 [8.228]
20	227.5 [8.957]	219.5 [8.642]

CS-F10M Number of units F (direct piping type)

Monoblock manifold F type
Valves with outlet port different size fitting blocks
S type plug connector



Unit dimensions

No. of units	L	P
2	48.5 [1.909]	30.5 [1.201]
3	59.0 [2.323]	41.0 [1.614]
4	69.5 [2.736]	51.5 [2.028]
5	80.0 [3.150]	62.0 [2.441]
6	90.5 [3.563]	72.5 [2.854]
7	101.0 [3.976]	83.0 [3.268]
8	111.5 [4.390]	93.5 [3.681]
9	122.0 [4.803]	104.0 [4.094]
10	132.5 [5.217]	114.5 [4.508]
11	143.0 [5.630]	125.0 [4.921]
12	153.5 [6.043]	135.5 [5.335]
13	164.0 [6.457]	146.0 [5.748]
14	174.5 [6.870]	156.5 [6.161]
15	185.0 [7.283]	167.0 [6.575]
16	195.5 [7.697]	177.5 [6.988]
17	206.0 [8.110]	188.0 [7.402]
18	216.5 [8.524]	198.5 [7.815]
19	227.0 [8.937]	209.0 [8.228]
20	237.5 [9.350]	219.5 [8.642]