

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.

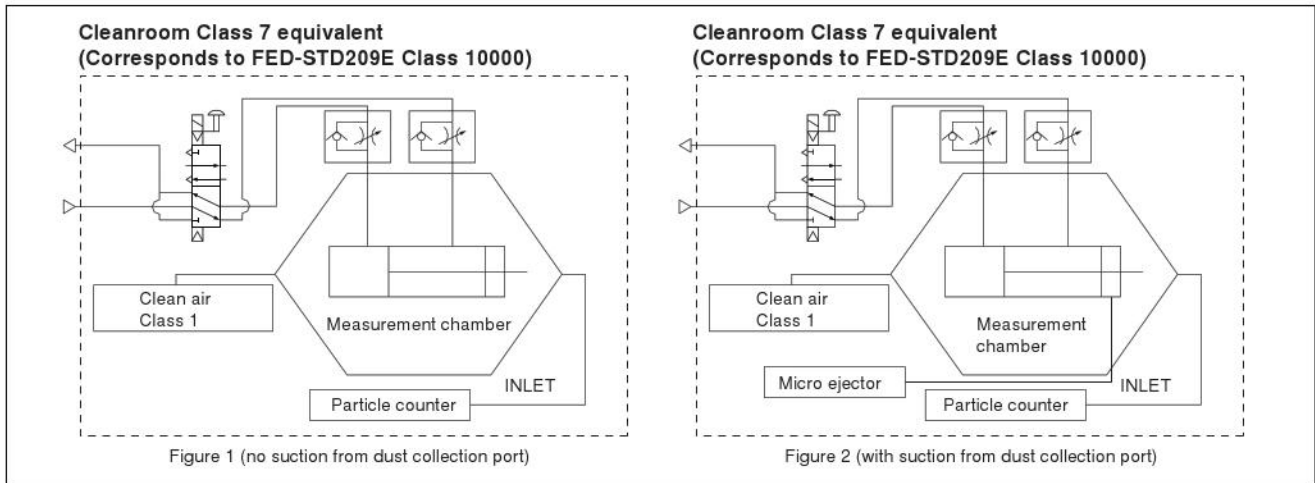
Evaluations of Cleanliness

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 [0.293ft³]

2. Particle counter

Manufacturer/model: RION/KM20

Suction flow rate: 28.3 ℓ /min [1ft³/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

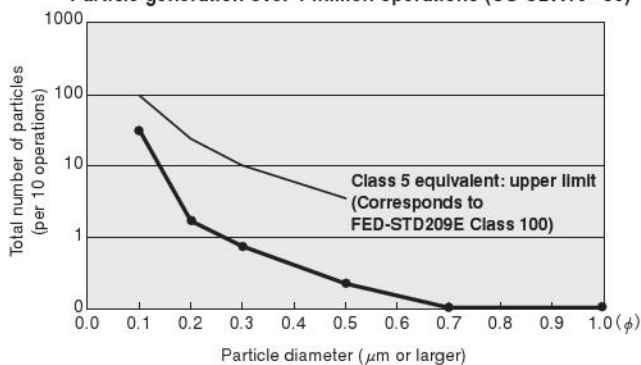
Performed the measurement in 3-1 again, to reconfirm the number of particles in the measurement system.

4. Measurement results

● Cleanroom specification

Jig Cylinder (no suction from dust collection port)

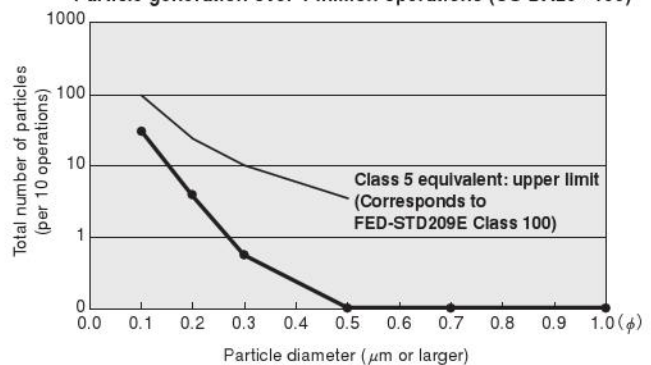
Particle generation over 1 million operations (CS-CDA16 \times 30)



● Cleanroom specification

Slim Cylinder (with suction from dust collection port)

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

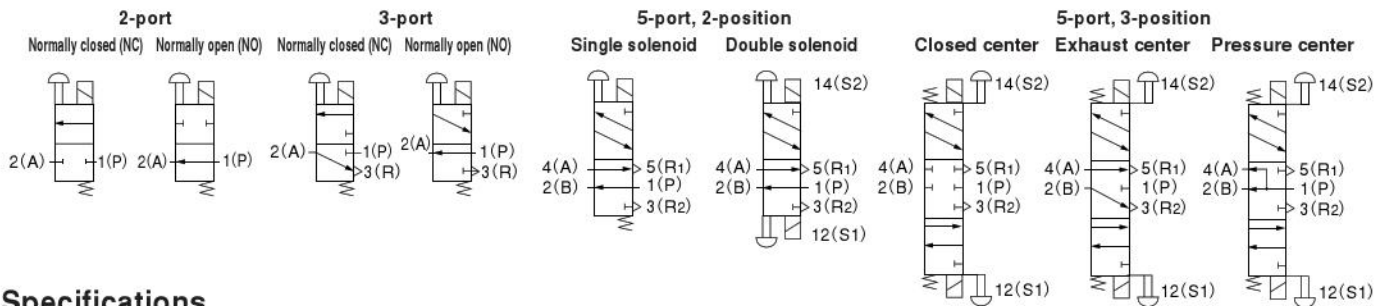


For "safety precautions" listed in the Clean System Product Drawings, see the materials below.

- 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.

KOGANEI CLEAN SYSTEM SOLENOID VALVES 200 SERIES

Symbols



Specifications

Item	Basic model	For direct piping, F, T type manifolds	CS-200E1	CS-200-4E1	CS-200-4E2	CS-203-4E2
	Item	Single unit for mounting sub-base, A type manifold	CS-A200E1	CS-A200-4E1	CS-A200-4E2	CS-A203-4E2
Number of positions			2 positions			3 positions
Number of ports	2, 3 ports		5 ports			
Valve function	Normally closed (NC) or Normally open (NO)		Single solenoid	Double solenoid	Closed center (standard), exhaust center or pressure center (optional)	
Media	Air					
Operation type	Direct acting type					
Effective area [Cv]	mm ²	8.5 [0.47]	7.5 [0.42]		6.5 [0.36]	
Port size	Rc1/4					
Lubrication	Not required					
Operating pressure range	MPa [psi.]	0~0.9 [0~131]		0.15~0.7 [22~102]		0~0.7 [0~102]
Proof pressure	MPa [psi.]	1.35 [196]		1.05 [152]		
Response time ^{Note} ms	DC24V	20/20 or below		20 or below		20/20 or below
ON/OFF	AC100V, AC200V	20/20 or below		20 or below		20/20 or below
Maximum operating frequency	Hz	5				
Minimum time to energize for self holding	ms	—		50		—
Operating temperature range (atmosphere and media)	°C [°F]	0~50 [32~122]				
Shock resistance m/s ² [G]	Lateral direction	980.7 [100.0]				
	Axial direction	588.4 [60.0]	392.3 [40.0]	294.2 [30.0]		588.4 [60.0]
Mounting direction	Any					

Note: Values when air pressure is 0.5MPa [73psi.]. Values for CS-□200-4E2 are switching time from the opposite-side position, and for CS-□203-4E2 are switching time from the neutral valve position.

Solenoid Specifications

Item	Rated voltage	DC24V	AC100V	AC200V
	Type	DC type	Flywheel diode type	
Operating voltage range	V	21.6~26.4 (24±10%)	90~110 (100±10%)	180~220 (200±10%)
Current ^{Note 1} (when rated voltage is applied)	Frequency	—	50	60
	Energizing ^{Note 2} mA (r.m.s)	420 (10.1W) [432 (10.4W)]	160 [170]	150 [160]
Maximum allowable leakage current	mA	30	15	
Insulation resistance	MΩ	10		
Wiring type and lead wire length	Standard	Grommet type: 300mm [11.8in.]		
	Optional	With DIN connector		
Color of lead wire		Red [Red (+), Blue (-)] ^{Note 1} Red (+), Black (-) ^{Note 3}	Yellow, Black	White, Black
Color of LED indicator (optional)		Red	Yellow	Green
Surge suppression	Standard	Flywheel diode		
	Optional	Flywheel diode	—	

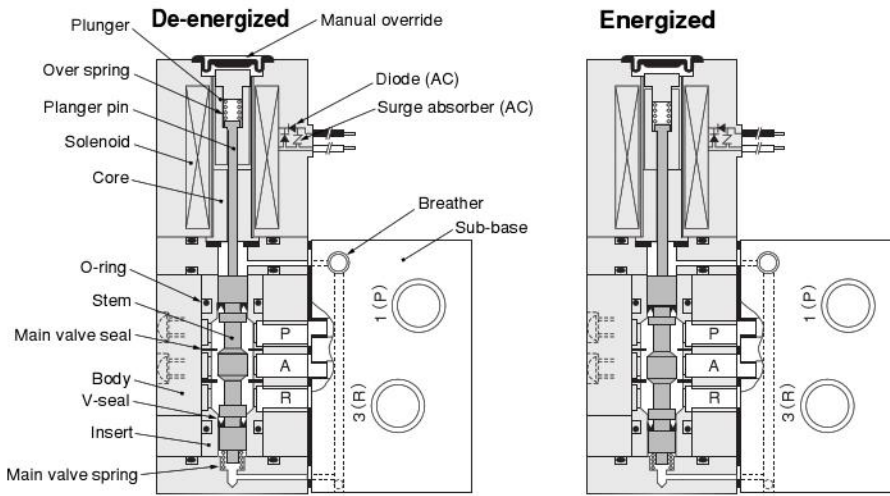
Notes: 1. Figures in brackets [] are for solenoids with LED indicators.

2. Since the AC types have built-in flywheel diodes, the starting current value and energizing current value are virtually the same.

3. For solenoids with surge suppression, and solenoids with surge suppression and LED indicators.

Inner Construction and Major Parts

CS-A200E1-25



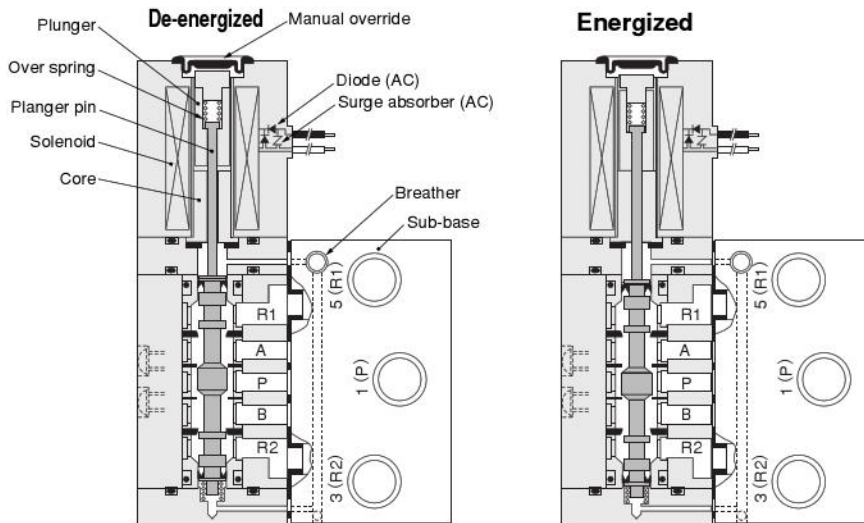
Major Parts and Materials

Parts	Materials
Body, sub-base	Aluminum alloy (anodized)
Stem	Aluminum alloy (anodized)
Plunger	Stainless steel
Plunger pin	
Stem spring	
Main valve seal	Synthetic rubber (NBR)
V-seal	
O-ring	Aluminum alloy and brass
Insert	
Mounting screw	Mild steel (nickel plated)

Manifold Materials

Parts	Materials
Manifold body	Aluminum alloy (anodized)
Block-off plate	Mild steel
Plug, mounting screw	(nickel plated)

CS-A200-4E1-25



Order Codes

CS - A200 E1		[]	[]	[]	[]	[]	[]	[]	
Clean system 200 series valve basic model		Valve function			Number of ports		Valve function		
		Closed center	Exhaust center	Pressure center	3-port	2-port	Normally closed (NC)	Normally open (NO)	
● For sub-base-mounted units (cannot be used for units without sub-base)	CS - A200E1	2-, 3-port	—			Blank	- 2 (Plug)	Blank	- 11
	CS - A200 - 4E1	5-port	—			—		—	
	CS - A200 - 4E2	5-port	—			—		—	
	CS - A203 - 4E2	5-port	Blank	- 13	- 14	—		—	
● For manifold-mounted units	CS - 200E1	2-, 3-port	—			Blank	- 2 (Steel ball press fitted)	Blank	- 11
	CS-200-4E1, CS-A200-4E1	5-port	—			—		—	
	CS-200-4E2, CS-A200-4E2	5-port	—			—		—	
	CS - 203-4E2, CS-A203-4E2	5-port	Blank	- 13	- 14	—		—	

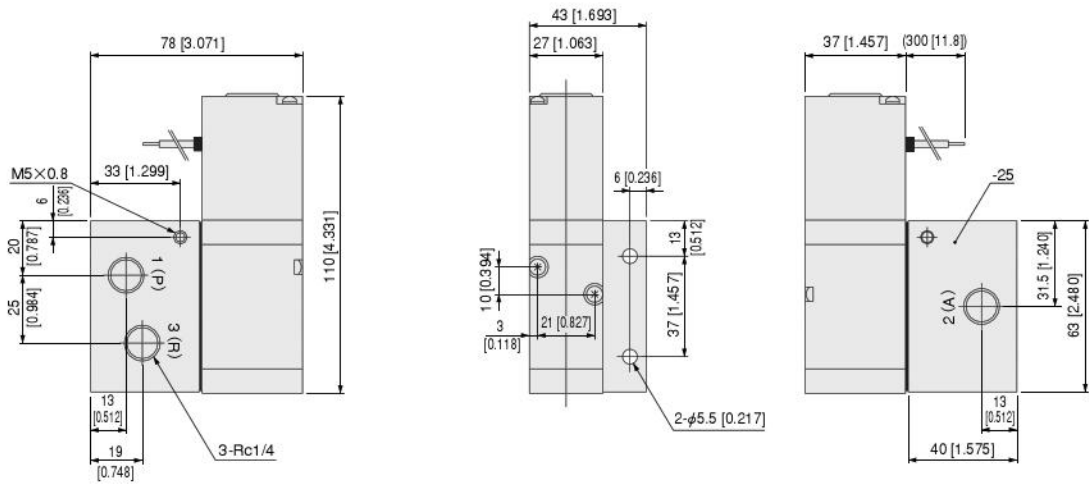
Manifold Order Codes

CS - BM		[]	[]	[]	[]	[]	[]
Clean system 200 series manifold basic model		Number of units	Manifold model		Station		Clean system mounting valve type
		2 : 2 units 3 : 3 units ⋮ 10 : 10 units	T : T type ● For mounting 2 -, 3-port valve ● P, R port manifold Rc1/4 F : F type ● For mounting 5-port valve ● P, R port manifold Rc1/4 ● Valve with A and B ports for piping A : A type ● For mounting 5-port valve ● All ports manifold		● Valve mounting position from left, as viewed from the front Strn.1 : First Strn.2 : Second ⋮ Strn.10 : 10th		● 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-BM							

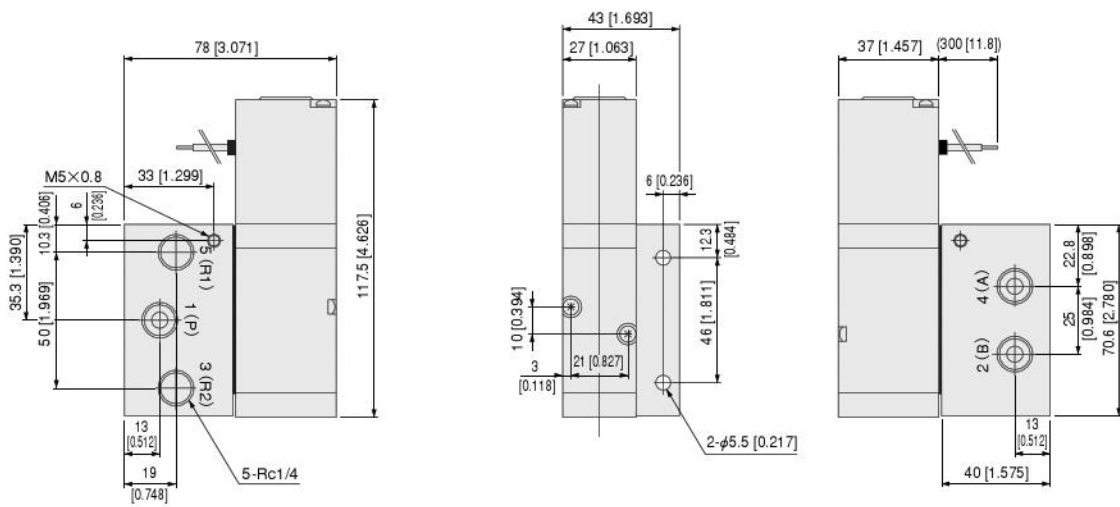
Sub-base		Wiring type		Indicator		Flywheel diode		Voltage
Without sub-base	With sub-base	Grommet type	DIN connector	Without indicator	With indicator	With flywheel diode	Without flywheel diode	
Blank	- 25	Blank	- 39	Blank	- L ●Not available with DIN connector	Blank	- SR ●For DC24V only. For AC100V and AC200V, equipped as standard.	DC24V AC100V AC200V
Dedicated for manifold mounting								

Dimensions of Solenoid Valve mm [in.]

● CS-A200E1-25

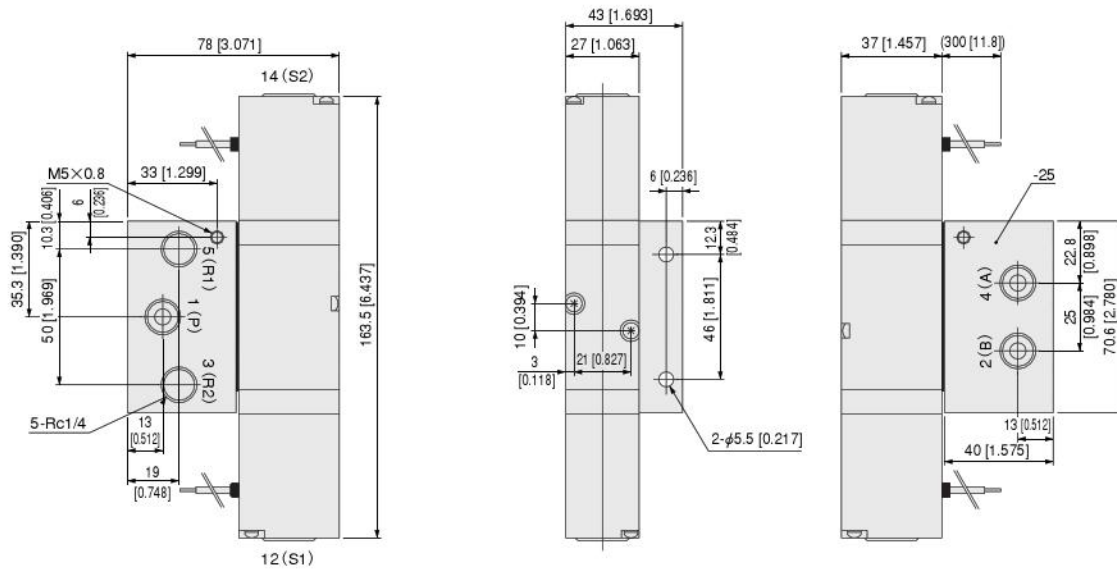


● CS-A200-4E1-25



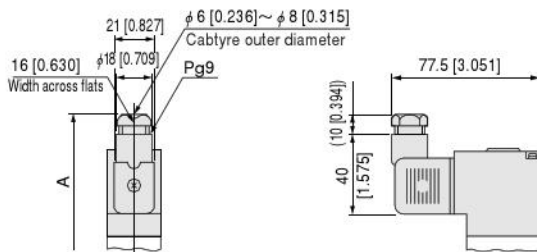
Dimensions of Solenoid Valve mm [in.]

- CS-A200-4E2-25
- CS-A203-4E2-25

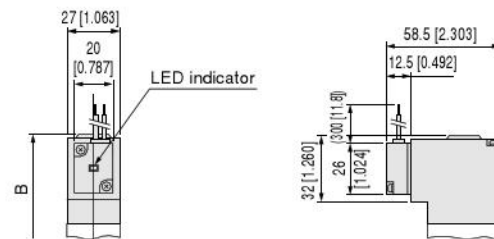


Options

- Solenoid with DIN connector: -39



- Solenoid with LED indicator: -L

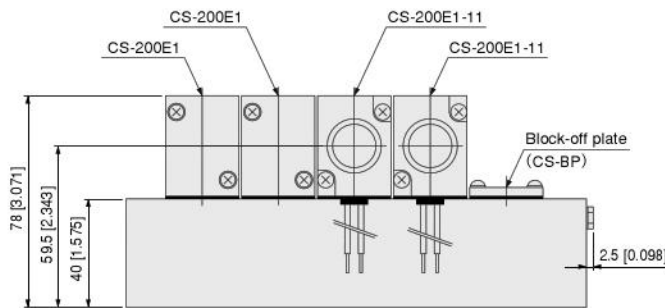
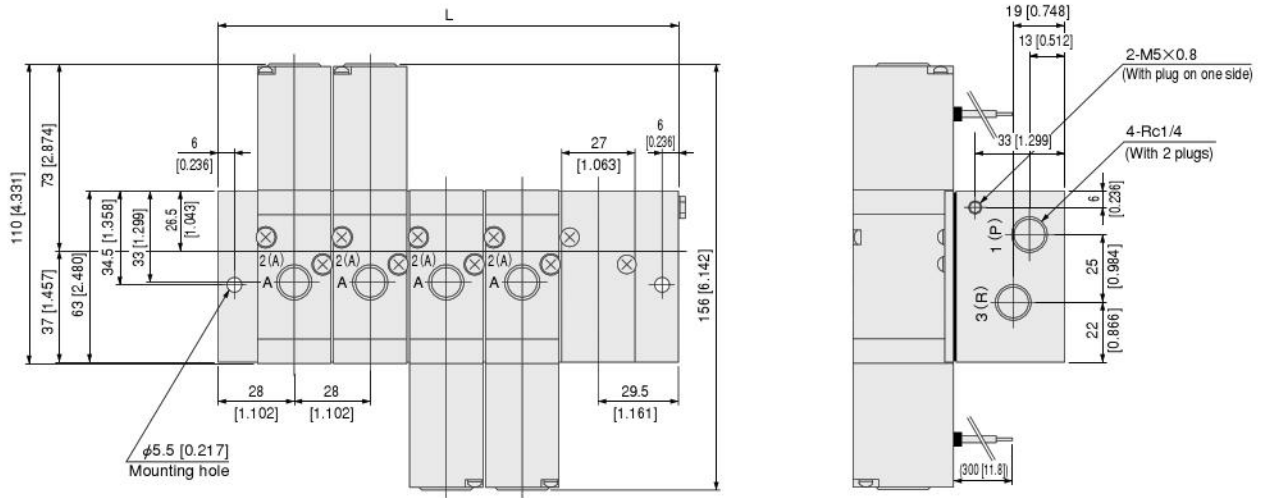


Model	Code	A	B	Remark
CS-A200E1		128 [5.039]	110 [4.331]	Overall length of the valve
CS-A200-4E1		135.5 [5.335]	117.5 [4.626]	
CS-A200-4E2		199.5 [7.854]	163.5 [6.437]	
CS-A203-4E2				

Dimensions of Manifold mm [in.]

For mounting of 2-, 3-port valves

● CS-BM□T

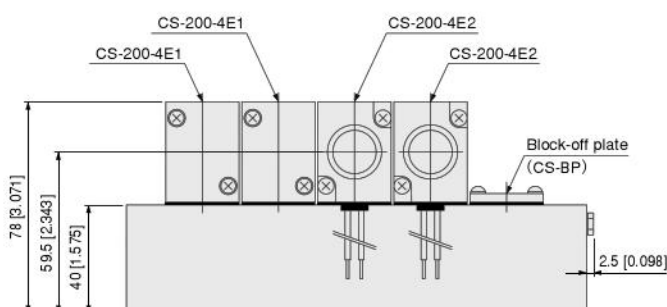
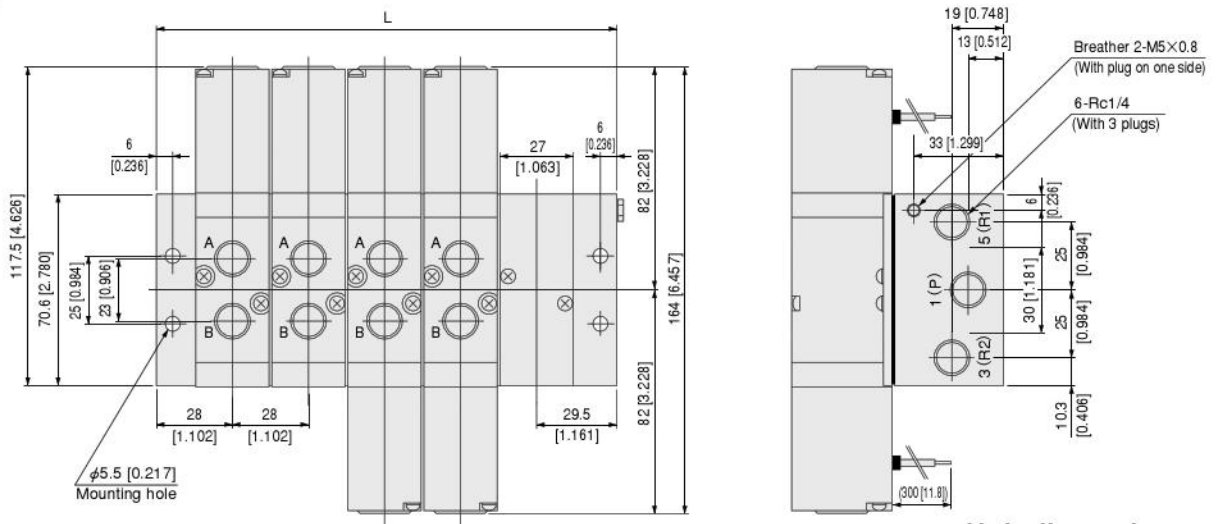


Unit dimensions

Model	L
CS-BM2T	85.5 [3.366]
CS-BM3T	113.5 [4.469]
CS-BM4T	141.5 [5.571]
CS-BM5T	169.5 [6.673]
CS-BM6T	197.5 [7.776]
CS-BM7T	225.5 [8.878]
CS-BM8T	253.5 [9.980]
CS-BM9T	281.5 [11.083]
CS-BM10T	309.5 [12.185]

For combination mounting of 2-, 3-, 5-port valves

● CS-BM□F



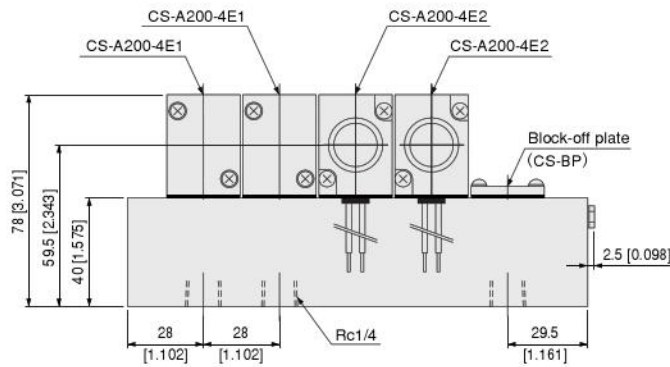
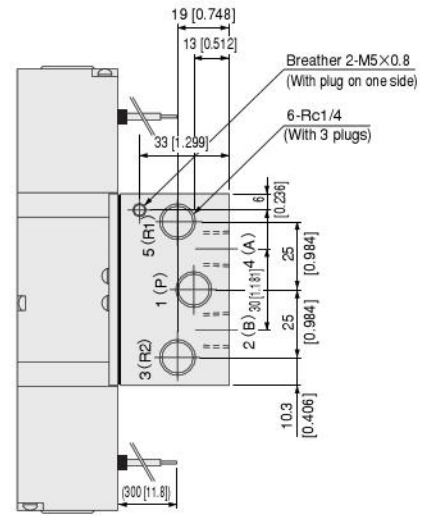
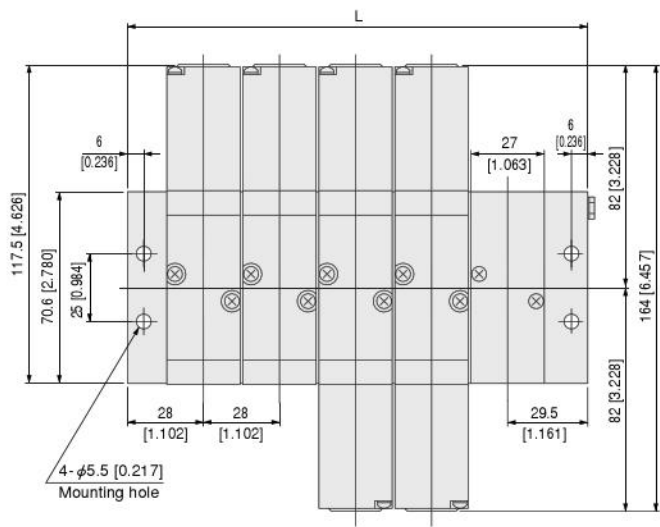
Unit dimensions

Model	L
CS-BM2F	85.5 [3.366]
CS-BM3F	113.5 [4.469]
CS-BM4F	141.5 [5.571]
CS-BM5F	169.5 [6.673]
CS-BM6F	197.5 [7.776]
CS-BM7F	225.5 [8.878]
CS-BM8F	253.5 [9.980]
CS-BM9F	281.5 [11.083]
CS-BM10F	309.5 [12.185]

Dimensions of Manifold mm [in.]

For mounting of 5-port valves

● CS-BM□A



Unit dimensions

Model	L
CS-BM2A	85.5 [3.366]
CS-BM3A	113.5 [4.469]
CS-BM4A	141.5 [5.571]
CS-BM5A	169.5 [6.673]
CS-BM6A	197.5 [7.776]
CS-BM7A	225.5 [8.878]
CS-BM8A	253.5 [9.980]
CS-BM9A	281.5 [11.083]
CS-BM10A	309.5 [12.185]