

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.

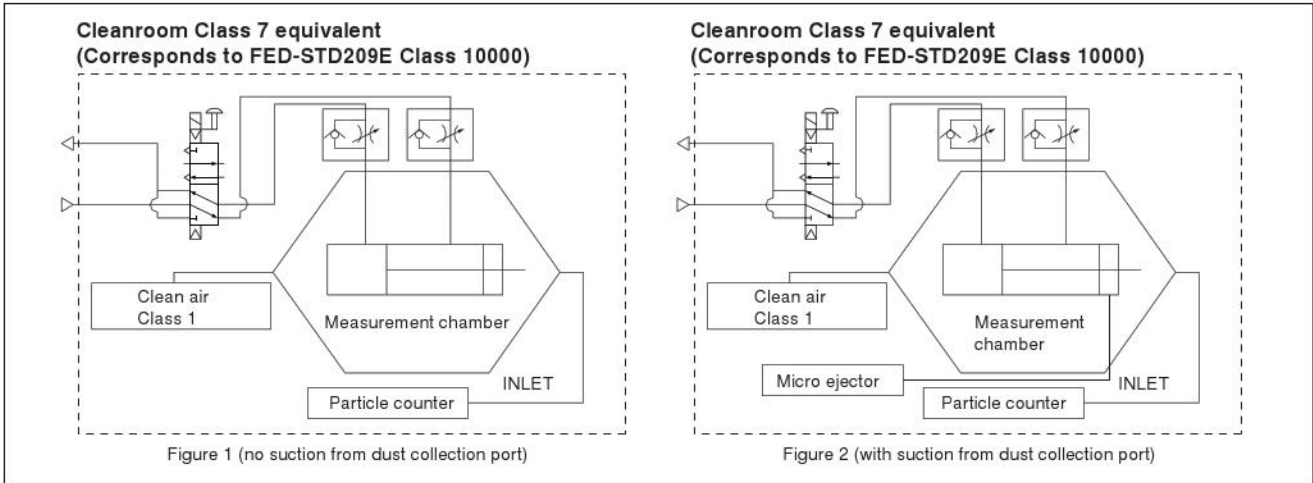
Evaluations of Cleanliness

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

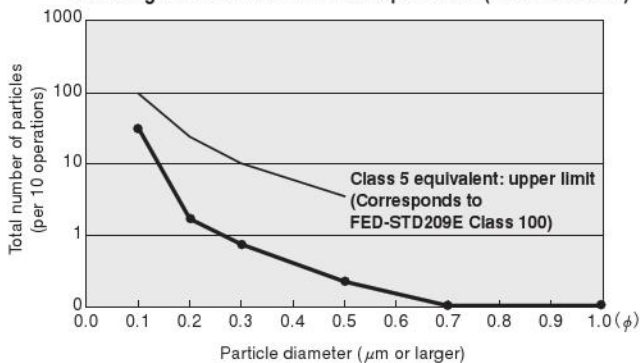
Performed the measurement in 3-1 again, to reconfirm the number of particles in the measurement system.

4. Measurement results

● Cleanroom specification

Jig Cylinder (no suction from dust collection port)

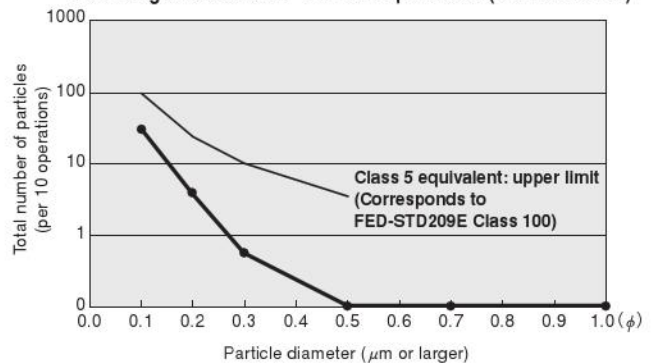
Particle generation over 1 million operations (CS-CDA16 \times 30)



● Cleanroom specification

Slim Cylinder (with suction from dust collection port)

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

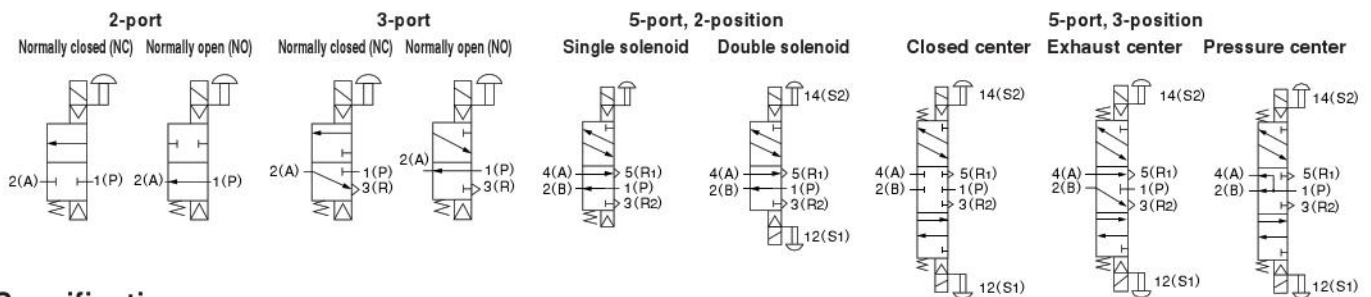


For "safety precautions" listed in the Clean System Product Drawings, see the materials below.

- 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 180 SERIES

Symbols



Specifications

Item	Basic model	For direct piping, FE type manifolds	CS-180E1	CS-180-4E1 CS-180-4E2	CS-183-4E2
		For sub-base piping, A, AJ type manifolds	CS-A180E1	CS-A180-4E1 CS-A180-4E2	CS-A183-4E2
Number of positions	2 positions			3 positions	
Number of ports	2, 3 ports		5 ports		
Valve function	Normally closed (NC, standard) or Normally open (NO, optional)		Single solenoid or Double solenoid	Closed center (standard), Exhaust center (optional), or Pressure center (optional)	
Media	Air				
Operation type	Internal pilot type				
Effective area [Cv]	mm ²	10.2 (0.57) ^{Note2}			9.0 (0.50) ^{Note2}
Port size	Rc1/8				
Lubrication	Not required				
Operating pressure range	MPa [psi.]	0.15~0.7 [22~102]			
Proof pressure	MPa [psi.]	1.05 [152]			
Response time ^{Note1} ms	DC12V, DC24V	15/20 or below	15/25 [20] or below	15/35 or below	15/35 or below
	AC100V, AC200V	15/15 or below	15/15 [15] or below	15/20 or below	15/20 or below
Maximum operating frequency	Hz	5			
Minimum time to energize for self holding	ms	—	50 (CS-□180-4E2)	—	
Operating temperature range (atmosphere and media)	°C [°F]	5~50 [41~122]			
Shock resistance	m/s ² {G}	1373.0 {140.0} (Axial direction 294.2 {30.0})			294.2 {30.0}
Mounting direction	Any				

Notes: 1. Values when air pressure is 0.5MPa [73psi]. Value in brackets () for CS-□180-4E2 is when switching from the opposite position, while the values for CS-□183-4E2 are those of the closed center valve, when switching from the neutral position.

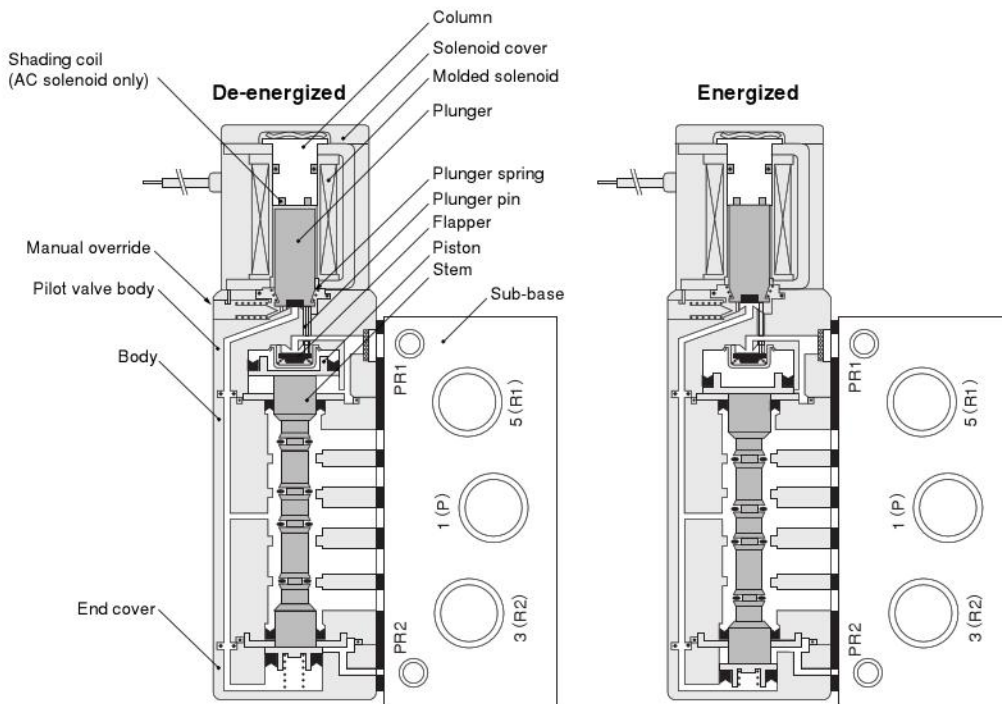
2. For A type, effective area [Cv] is 8.2 [0.46].

Solenoid Specifications

Item	Rated voltage	DC12V	DC24V	AC100V	AC200V
	Type	Flywheel diode incorporated for surge suppression			Shading type
Operating voltage range	V	10.8~13.2 (12±10%)	21.6~26.4 (24±10%)	90~132 (100 ^{+32%} _{-10%})	180~264 (200 ^{+32%} _{-10%})
Current (when rated voltage is applied)	Frequency Hz	—	—	50	60
	Starting mA (r.m.s)	—	—	36	32
	Energizing mA (r.m.s)	130 (1.6W) (140 (1.7W) with LED indicator)	65 (1.6W) (75 (1.8W) with LED indicator)	24	20
Allowable leakage current	mA	8	4	4	2
Insulation resistance	MΩ	Over 100			
Wiring type and lead wire length	Standard	Grommet type: 300mm [11.8in.]			
	Optional	Plug connector type: 300mm [11.8in.]			
Color of lead wire		Brown (+) Black (-)	Red (+) Black (-)	Yellow	White
Color of LED indicator		Red		Yellow	Green
Surge suppression (as standard)		Flywheel diode		Varistor	

Inner Construction and Major Parts

CS-A180-4E1-25



Major Parts and Materials

Parts	Materials
Body, end cover	Aluminum alloy (anodized)
Stem	(anodized)
Lip seal	Synthetic rubber (NBR)
Flapper	
Mounting base	Mild steel (nickel plated)
Sub-base	Aluminum alloy (anodized)
Plunger	Magnetic stainless steel
Column	
Mounting screw	Mild steel (nickel plated)

Manifold Materials

Parts	Materials
Manifold body	Aluminum alloy (anodized)
Block-off plate	Mild steel (nickel plated)
Seal	Synthetic rubber (NBR)
Mounting screw	Mild steel (nickel plated)

Order Codes

Clean system 180 series valve basic model		Number of ports		2-, 3-port valve function		3-position valve function			Sub-base	
		3-port	2-port	Normally closed (NC)	Normally open (NO)	Closed center	Exhaust center	Pressure center	Without sub-base	With sub-base
<ul style="list-style-type: none"> ● For sub-base-mounted units (cannot be used for units without sub-base) ● For A type manifold ● For AJ type manifold 	CS - A180E1	3-port	Blank	- 2	Blank	- 11	—			Blank Cannot be used as single unit - 25
	CS - A180 - 4E1	5-port	—		—		—			
	CS - A180 - 4E2	5-port	—		—		—			
	CS - A183 - 4E2	5-port	—		—		Blank	- 13	- 14	
<ul style="list-style-type: none"> ● For FE type manifold (can be used only for manifold mounting) 	CS - 180E1	3-port	Blank	- 2	Blank	- 11	—			— Dedicated for manifold mounting
	CS - 180 - 4E1	5-port	—		—		—			
	CS - 180 - 4E2	5-port	—		—		—			
	CS - 183 - 4E2	5-port	—		—		Blank	- 13	- 14	

Note: Used only with common terminal pre-wired manifolds. Order code -CP□L is for DC12V and DC24V positive side, and for AC100V and AC200V. -CM□L is for DC12V and DC24V negative side.

Manifold Order Codes

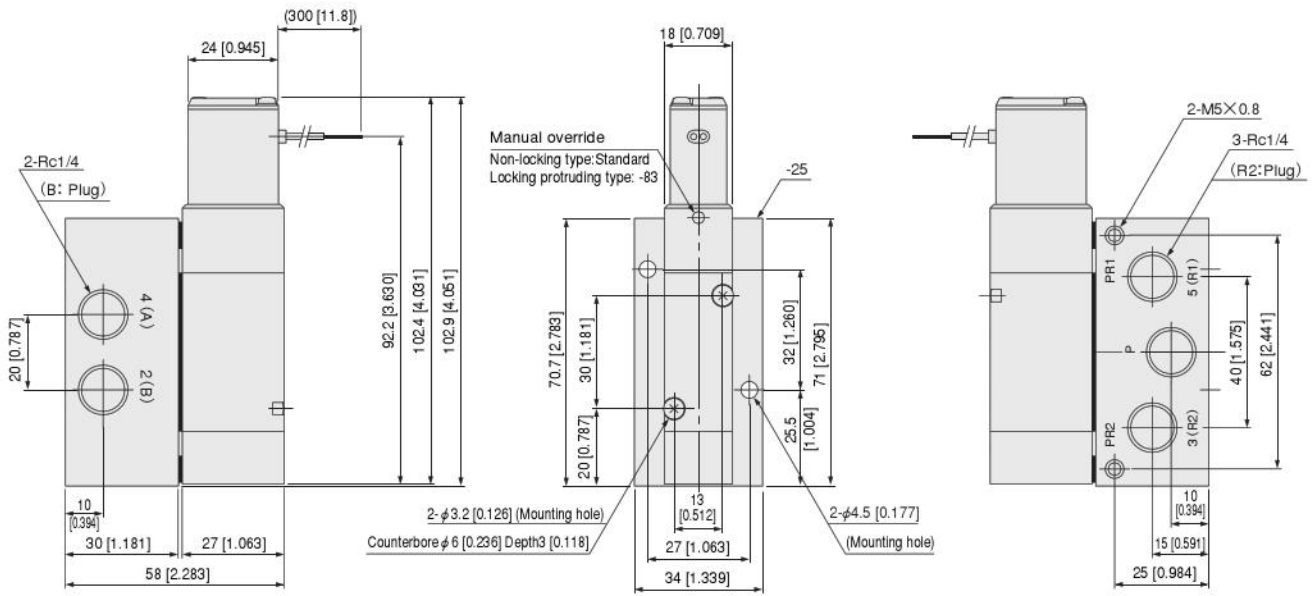
Clean system 180 series manifold basic model		Number of units	Manifold model	Station	Clean system mounting valve type
CS-180M	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">2</div> <div style="border: 1px solid black; padding: 2px;">3</div> <div style="border: 1px solid black; padding: 2px;">⋮</div> <div style="border: 1px solid black; padding: 2px;">20</div> </div> : 2 units : 3 units : 20 units	[FE]: FE type ● P, R and PR collective manifold ● Valve with A and B ports for piping [A]: A type ● All ports manifold ● Manifold with Rc1/8 A and B ports [AJ]: AJ type ● All ports manifold with quick fittings ● A, B ports with quick fittings	● Valve mounting position from left, as viewed from the front [Stn.1] : First [Stn.2] : Second [Stn.3] : Third ⋮ [Stn.20] : 20th	● 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.	

AC100V

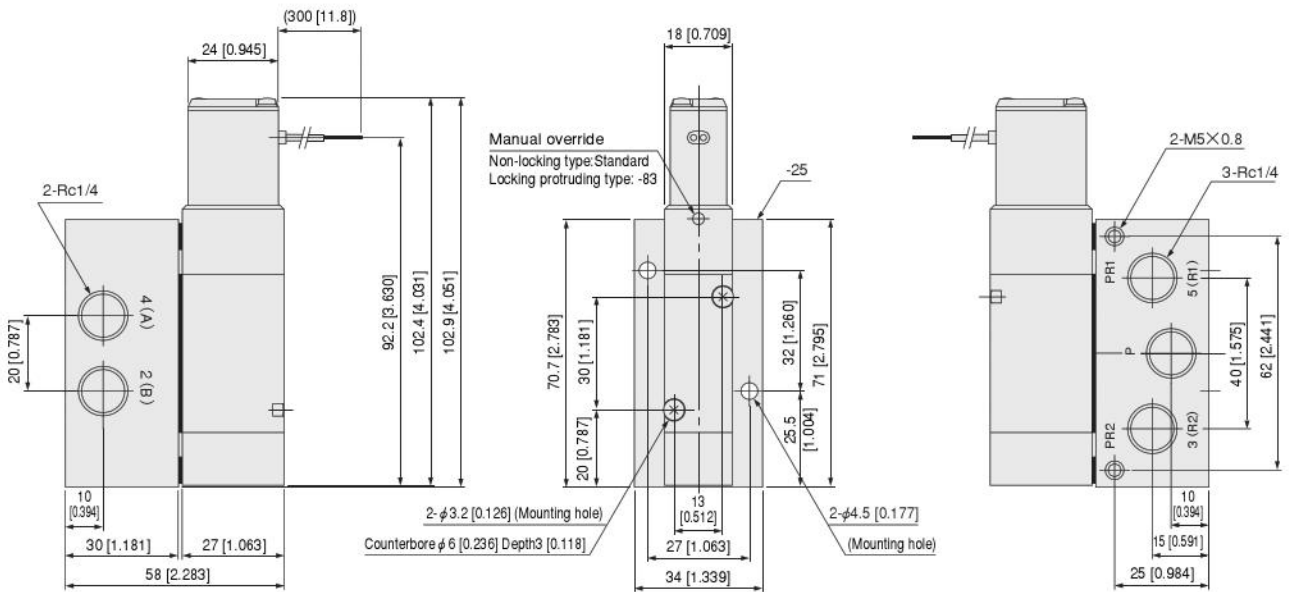
Port fitting specification			Manual override		Solenoid option			Manifold connection port (For AJ type manifold only)		Voltage
Without quick fitting	Quick fitting for ϕ 4 tube	Quick fitting for ϕ 6 tube	Non-locking type (standard)	Locking protruding type	Grommet (standard)	Straight connector With LED indicator	L connector With LED indicator	Quick fitting for ϕ 4 tube	Quick fitting for ϕ 6 tube	
—			Blank	- 83	Blank	- PSL - CPSL ^{Note} - CMSL ^{Note}	- PLL - CPLL ^{Note} - CMLL ^{Note}	- J4	- J6	DC12V DC24V AC100V AC200V
Blank	- J41	- J61						—		
	- J42	- J62								

Dimensions of Solenoid Valve mm [in.]

● CS-A180E1-25

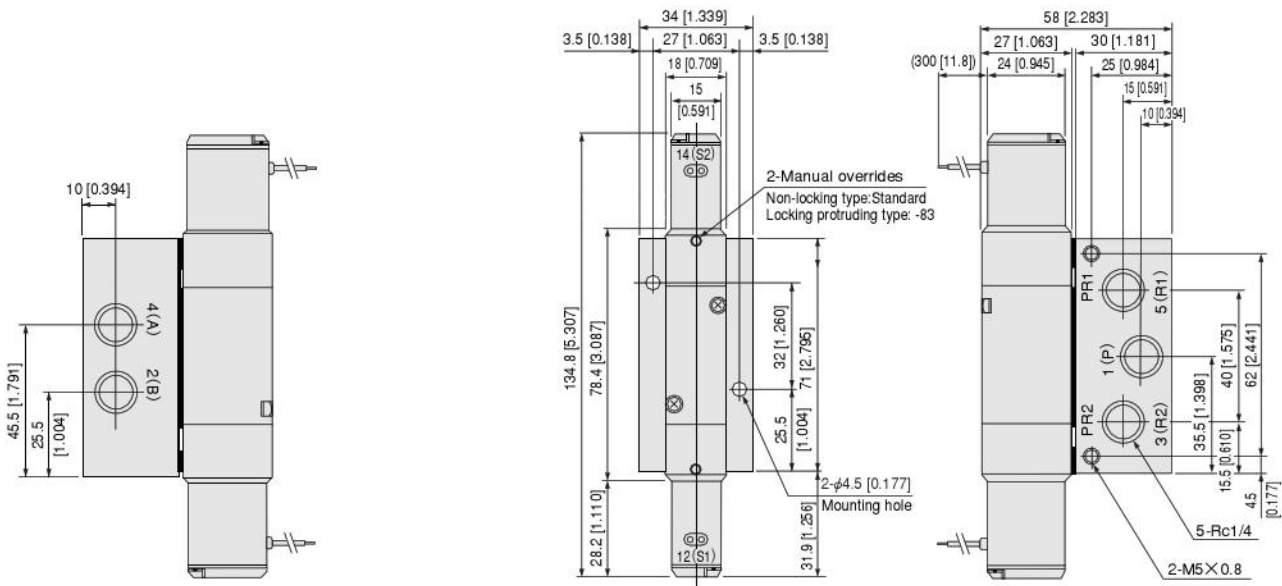


● CS-A180-4E1-25

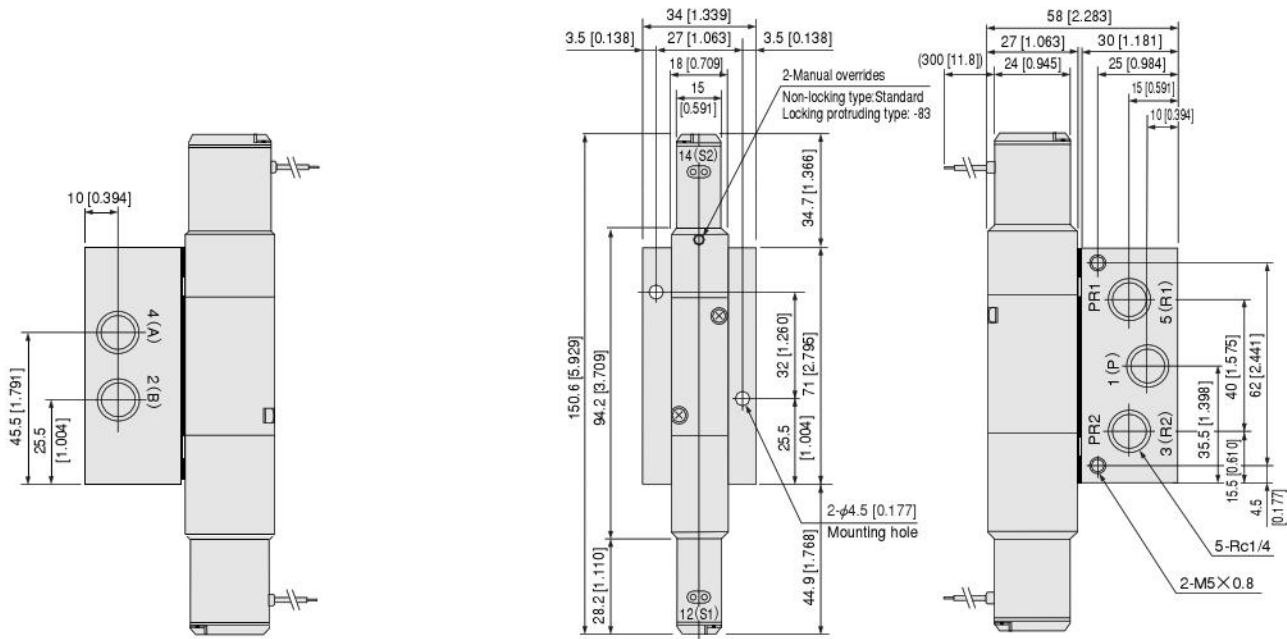


Dimensions of Solenoid Valve mm [in.]

● CS-A180-4E2-25



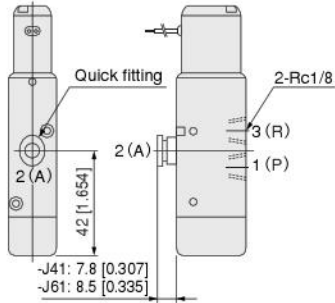
● CS-A183-4E2-25



Options

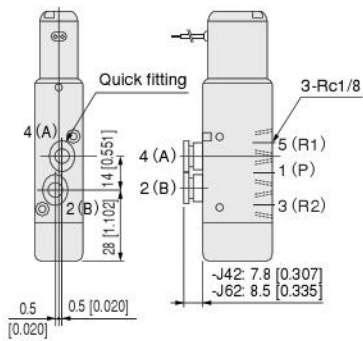
With quick fittings (2-, 3-port):

- J41 (For ϕ 4 tube, 2(A) port with fitting)
 - J61 (For ϕ 6 tube, 2(A) port with fitting)
- The drawing shows the -J61 specification.

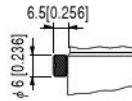


With quick fittings (5-port):

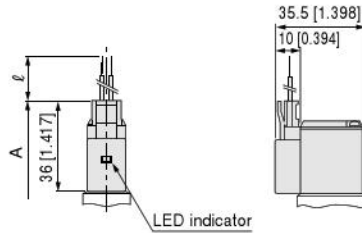
- J42 (For ϕ 4 tube, 4(A), 2(B) ports with fittings)
 - J62 (For ϕ 6 tube, 4(A), 2(B) ports with fittings)
- The drawing shows the -J62 specification.



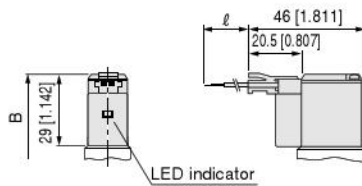
Locking protruding type manual override: -83



Solenoid with straight connector: -PSL

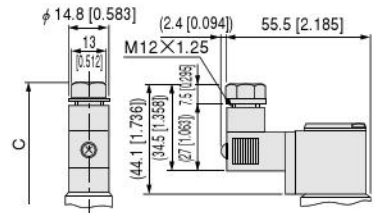


Solenoid with L connector: -PLL

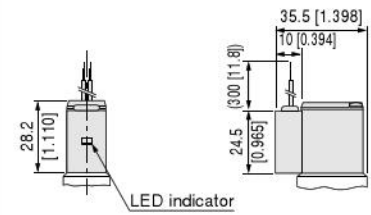


Made to Order

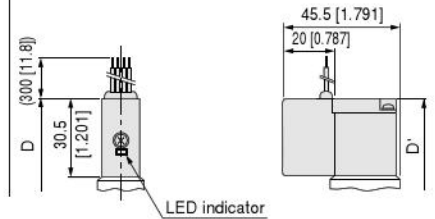
Solenoid with DIN connector: -39



Solenoid with LED indicator: -L



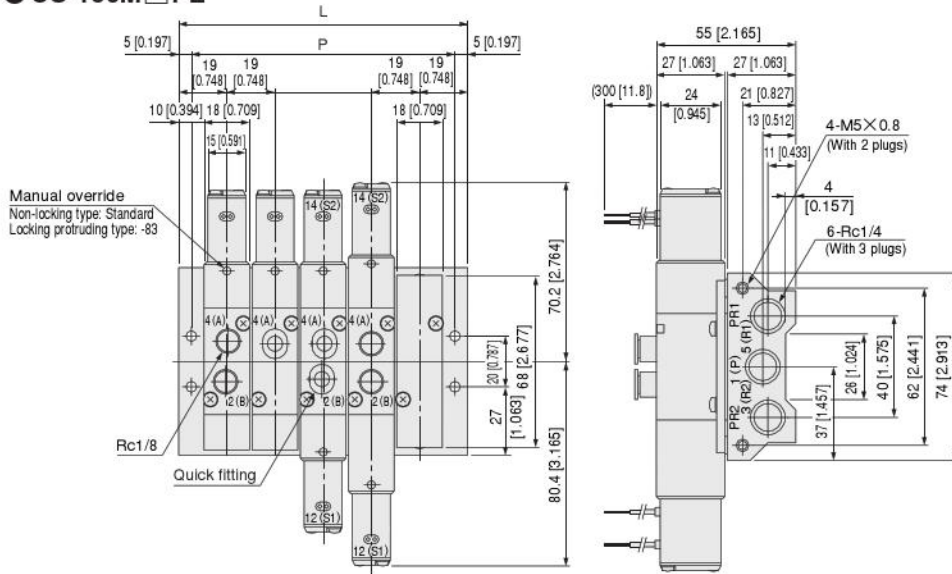
Built-in interface unit: -FA



Model	Code	A	B	C	D	D'	ℓ (lead wire length)	Remarks
CS-A180E1		110.2 [4.339]	103.2 [4.063]	118.3 [4.657]	104.7 [4.122]	104.9 [4.130]	-PSL, -PLL: 300 [11.8]	Overall length to the end of the valve or sub-base
CS-A180-4E1-25		110.7 [4.358]	103.7 [4.083]	118.8 [4.677]	104.7 [4.122]	105.4 [4.150]	Made to order:	
CS-180-4E2, CS-A180-4E2-25		150.4 [5.921]	136.4 [5.370]	166.6 [6.559]	139.4 [5.488]	139.8 [5.504]	-1L: 1000 [39], -3L: 3000 [118]	Overall length to the end of the opposite side solenoid
CS-183-4E2, CS-A183-4E2-25		166.2 [6.543]	152.2 [5.992]	182.4 [7.181]	155.2 [6.110]	155.6 [6.126]		

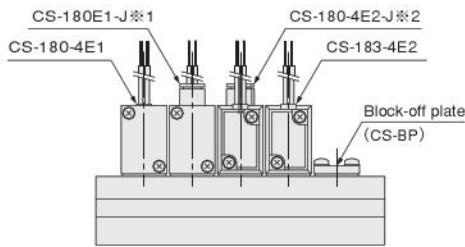
Dimensions of Manifold for Combination Mounting of 2-, 3-, 5-port Valves mm [in.]

● CS-180M □ FE

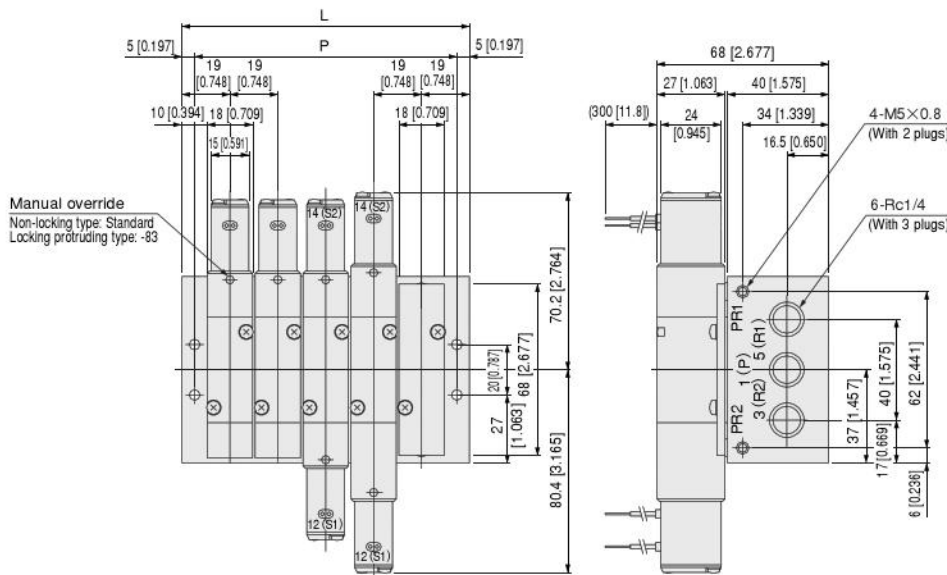


Unit dimensions

Model	P	L
CS-180M2FE	47 [1.850]	57 [2.244]
CS-180M3FE	66 [2.598]	76 [2.992]
CS-180M4FE	85 [3.346]	95 [3.740]
CS-180M5FE	104 [4.094]	114 [4.488]
CS-180M6FE	123 [4.843]	133 [5.236]
CS-180M7FE	142 [5.591]	152 [5.984]
CS-180M8FE	161 [6.339]	171 [6.732]
CS-180M9FE	180 [7.087]	190 [7.480]
CS-180M10FE	199 [7.835]	209 [8.228]
CS-180M11FE	218 [8.583]	228 [8.976]
CS-180M12FE	237 [9.331]	247 [9.724]
CS-180M13FE	256 [10.079]	266 [10.472]
CS-180M14FE	275 [10.827]	285 [11.220]
CS-180M15FE	294 [11.575]	304 [11.969]
CS-180M16FE	313 [12.323]	323 [12.717]
CS-180M17FE	332 [13.071]	342 [13.465]
CS-180M18FE	351 [13.819]	361 [14.213]
CS-180M19FE	370 [14.567]	380 [14.961]
CS-110M20FE	389 [15.315]	399 [15.709]

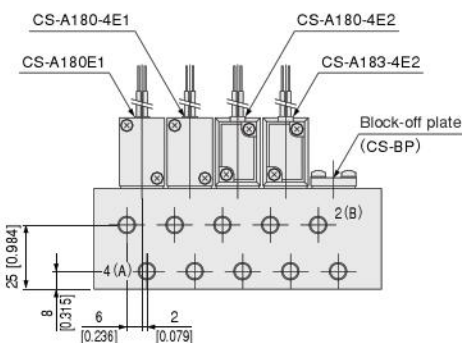


● CS-180M □ A



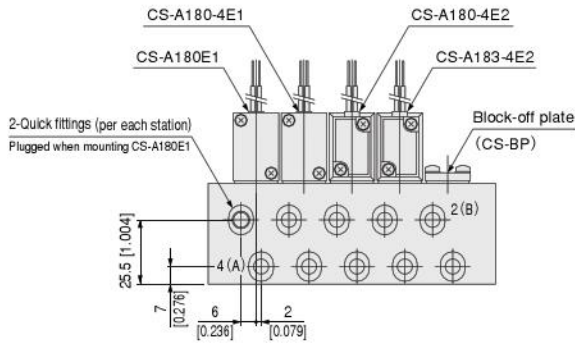
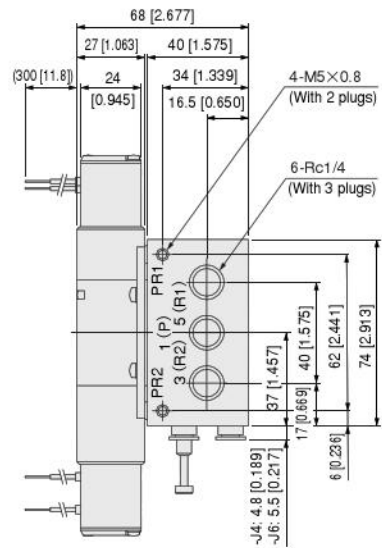
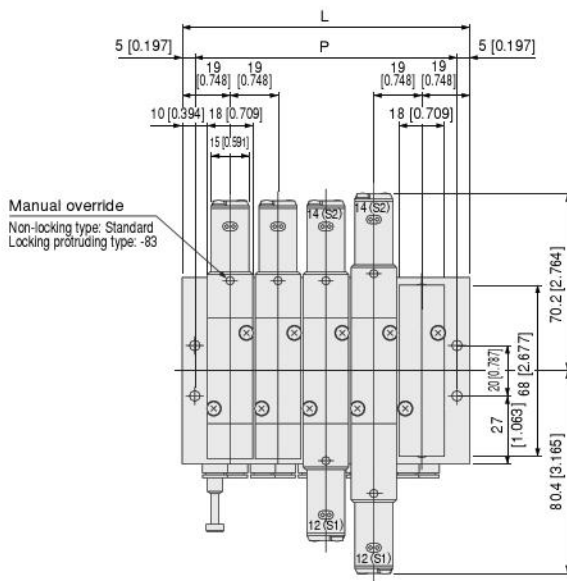
Unit dimensions

Model	P	L
CS-180M2A	47 [1.850]	57 [2.244]
CS-180M3A	66 [2.598]	76 [2.992]
CS-180M4A	85 [3.346]	95 [3.740]
CS-180M5A	104 [4.094]	114 [4.488]
CS-180M6A	123 [4.843]	133 [5.236]
CS-180M7A	142 [5.591]	152 [5.984]
CS-180M8A	161 [6.339]	171 [6.732]
CS-180M9A	180 [7.087]	190 [7.480]
CS-180M10A	199 [7.835]	209 [8.228]
CS-180M11A	218 [8.583]	228 [8.976]
CS-180M12A	237 [9.331]	247 [9.724]
CS-180M13A	256 [10.079]	266 [10.472]
CS-180M14A	275 [10.827]	285 [11.220]
CS-180M15A	294 [11.575]	304 [11.969]
CS-180M16A	313 [12.323]	323 [12.717]
CS-180M17A	332 [13.071]	342 [13.465]
CS-180M18A	351 [13.819]	361 [14.213]
CS-180M19A	370 [14.567]	380 [14.961]
CS-110M20A	389 [15.315]	399 [15.709]



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

● CS-180M □ AJ



Unit dimensions

Model	P	L
CS-180M2AJ	47 [1.850]	57 [2.244]
CS-180M3AJ	66 [2.598]	76 [2.992]
CS-180M4AJ	85 [3.346]	95 [3.740]
CS-180M5AJ	104 [4.094]	114 [4.488]
CS-180M6AJ	123 [4.843]	133 [5.236]
CS-180M7AJ	142 [5.591]	152 [5.984]
CS-180M8AJ	161 [6.339]	171 [6.732]
CS-180M9AJ	180 [7.087]	190 [7.480]
CS-180M10AJ	199 [7.835]	209 [8.228]
CS-180M11AJ	218 [8.583]	228 [8.976]
CS-180M12AJ	237 [9.331]	247 [9.724]
CS-180M13AJ	256 [10.079]	266 [10.472]
CS-180M14AJ	275 [10.827]	285 [11.220]
CS-180M15AJ	294 [11.575]	304 [11.969]
CS-180M16AJ	313 [12.323]	323 [12.717]
CS-180M17AJ	332 [13.071]	342 [13.465]
CS-180M18AJ	351 [13.819]	361 [14.213]
CS-180M19AJ	370 [14.567]	380 [14.961]
CS-110M20AJ	389 [15.315]	399 [15.709]