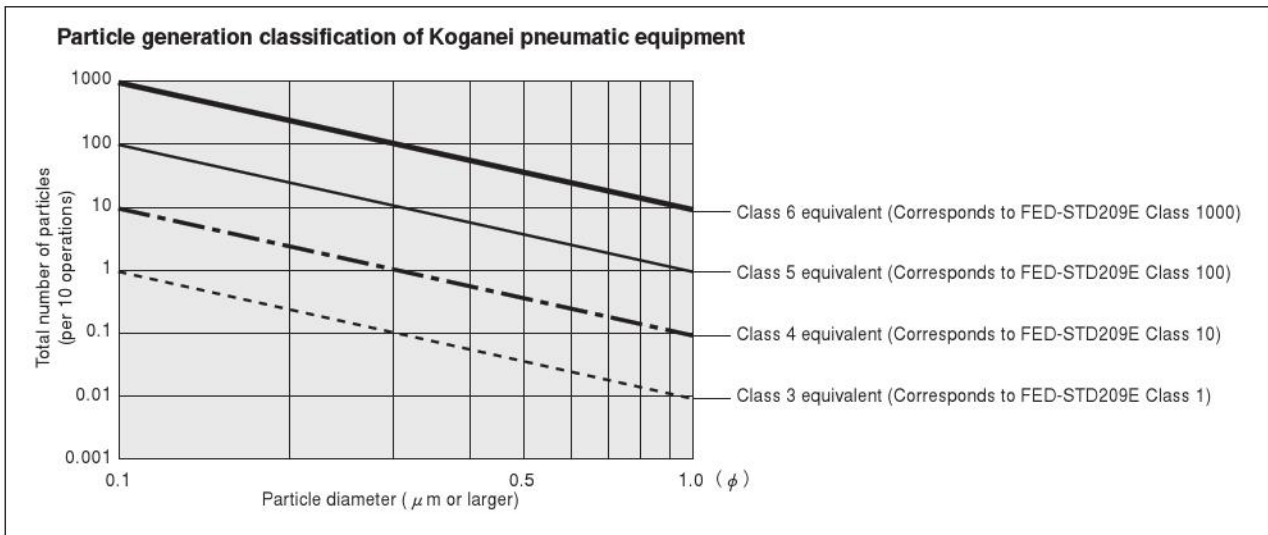


# Koganei Clean System products provide complete support for the maintenance of a clean environment inside the cleanroom.

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.**

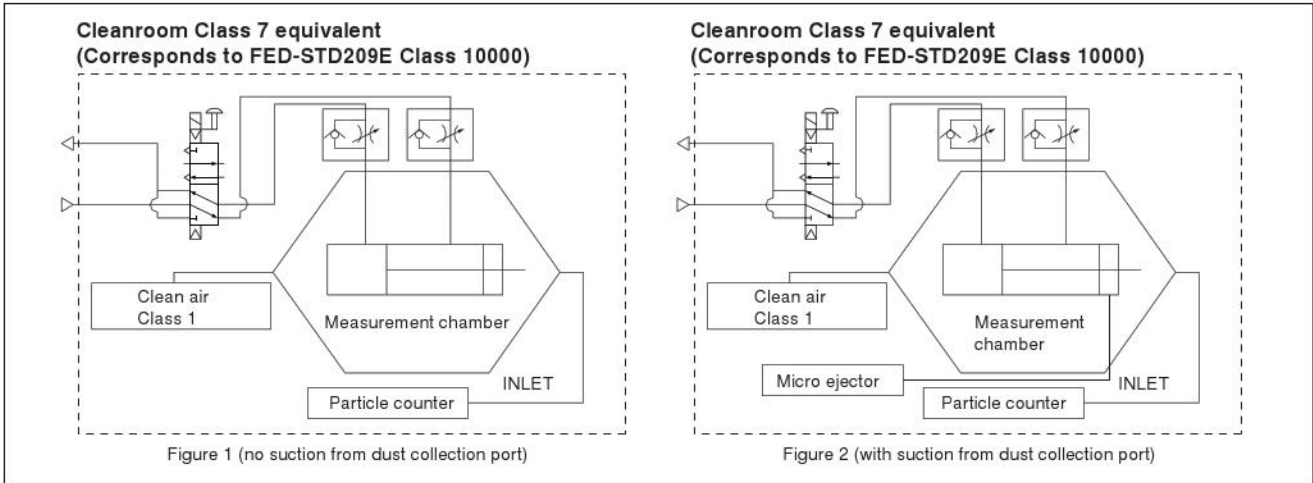
# Evaluations of Cleanliness

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  $\ell$  [0.293ft<sup>3</sup>]

## 2. Particle counter

Manufacturer/model: RION/KM20

Suction flow rate: 28.3  $\ell$  /min [1ft<sup>3</sup>/min.]

Particle diameter: 0.1  $\mu\text{m}$ , 0.2  $\mu\text{m}$ , 0.3  $\mu\text{m}$ , 0.5  $\mu\text{m}$ , 0.7  $\mu\text{m}$ , 1.0  $\mu\text{m}$

## 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

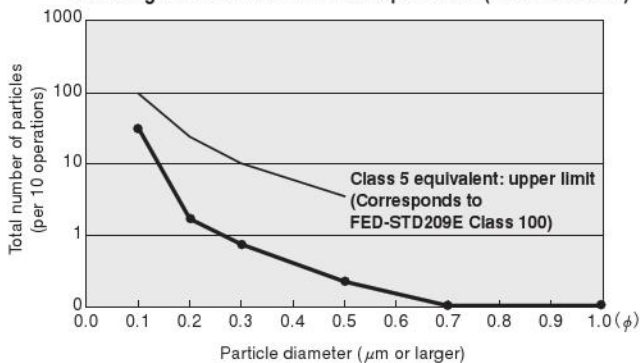
Performed the measurement in 3-1 again, to reconfirm the number of particles in the measurement system.

## 4. Measurement results

### ● Cleanroom specification

Jig Cylinder (no suction from dust collection port)

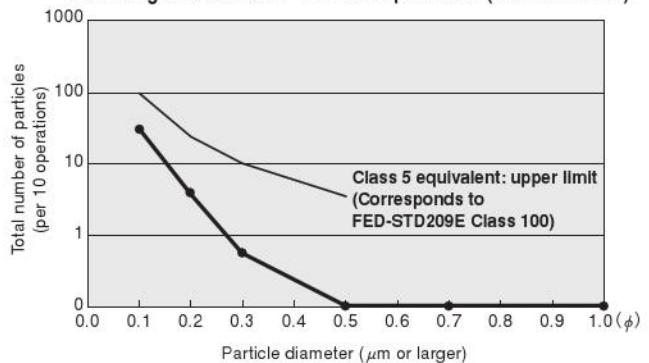
Particle generation over 1 million operations (CS-CDA16 $\times$ 30)



### ● Cleanroom specification

Slim Cylinder (with suction from dust collection port)

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

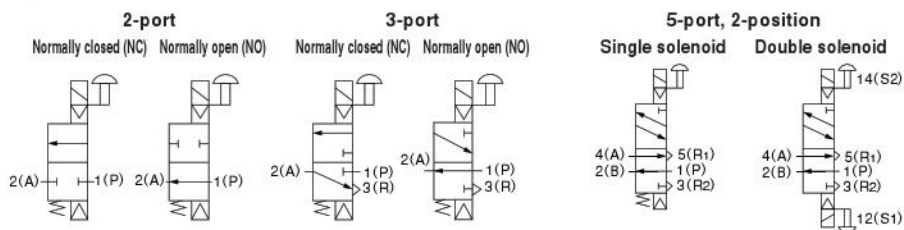


For "safety precautions" listed in the Clean System Product Drawings, see the materials below.

- 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 110 SERIES

## Symbols



## Specifications

Item	Basic model	For direct piping, FE type manifolds	CS-110E1	CS-110-4E1 CS-110-4E2
		For sub-base piping, A, AJ type manifolds	CS-A110E1	CS-A110-4E1 CS-A110-4E2
Number of positions	2 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
Media	Air			
Operation type	Internal pilot type			
Effective area [Cv]	mm <sup>2</sup>	4.2 [0.23]		
Port size	M5×0.8			
Lubrication	Not required			
Operating pressure range	MPa [psi.]	0.15~0.7 [22~102]		
Proof pressure	MPa [psi.]	1.05 [152]		
Response time <sup>Note</sup> ON/OFF	ms	DC12V,DC24V	15/25 or below	15/25 [20] or below
		AC100V,AC200V	15/15 or below	15/15 [15] or below
Maximum operating frequency	Hz	5		
Minimum time to energize for self holding	ms	—	50 (CS-□110-4E2)	
Operating temperature range (atmosphere and media)	°C [°F]	5~50 [41~122]		
Shock resistance	m/s <sup>2</sup> [G]	1373.0 [140.0] (Axial direction 294.2 [30.0])		
Mounting direction	Any			

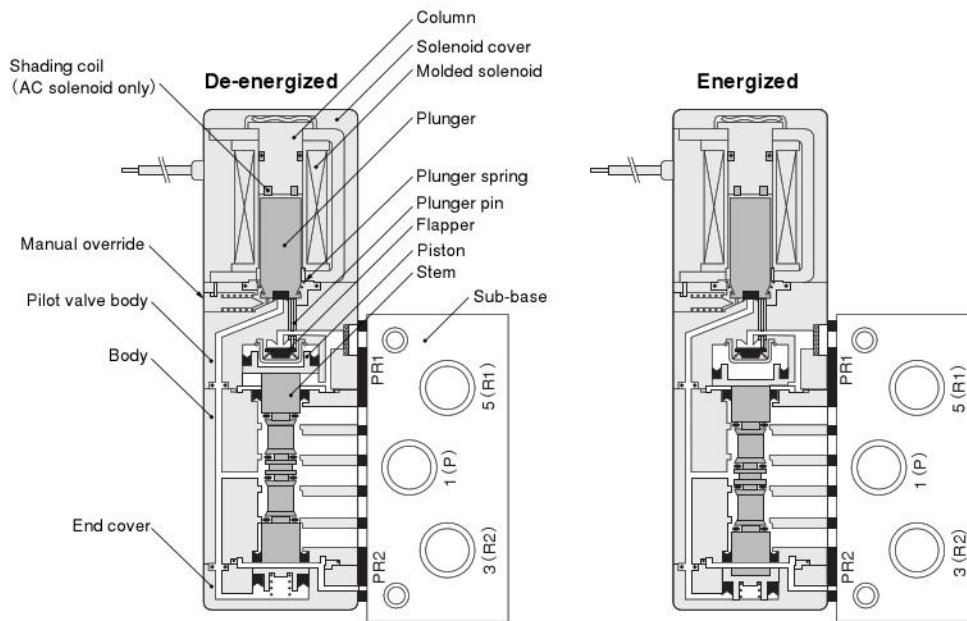
Note: Values when air pressure is 0.5MPa [73psi.]. Value in brackets [ ] for CS-□110-4E2 is when switching from the opposite position.

## 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 <sup>+320</sup> / <sub>-10</sub> %)		180~264 (200 <sup>+320</sup> / <sub>-10</sub> %)	
Current (when rated voltage is applied)	Frequency Hz	—	—	50	60	50	60
	Starting mA (r.m.s)	—	—	36	32	18	16
	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	12	10
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-A110-4E1-25



### Major Parts and Materials

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

<b>CS - 110E1</b>		-	-	-	-	-	-	<b>AC100V</b>		
<b>Clean system 110 series valve basic model</b>				<b>Number of ports</b>		<b>2-, 3-port valve function</b>		<b>Sub-base</b>		<b>Manual override</b>
				3-port	2-port	Normally closed (NC)	Normally open (NO)	Without sub-base	With sub-base	Non-locking type (standard)
<ul style="list-style-type: none"> <li>● For sub-base-mounted units (cannot be used for units without sub-base)</li> <li>● For A type manifold</li> <li>● For AJ type manifold</li> </ul>	<b>CS - A110E1</b>	3-port	<b>Blank</b>	<b>- 2</b>	<b>Blank</b>	<b>- 11</b>	<b>Blank</b> Cannot be used as single unit	<b>- 25</b>	<b>Blank</b>	
	<b>CS - A110 - 4E1</b>	5-port	---		---					
	<b>CS - A110 - 4E2</b>	5-port	---		---					
<ul style="list-style-type: none"> <li>● For FE type manifold (can be used only for manifold mounting)</li> </ul>	<b>CS - 110E1</b>	3-port	<b>Blank</b>	<b>- 2</b>	<b>Blank</b>	<b>- 11</b>	---	Dedicated for manifold mounting	<b>Blank</b>	
	<b>CS - 110 - 4E1</b>	5-port	---		---					
	<b>CS - 110 - 4E2</b>	5-port	---		---					

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.

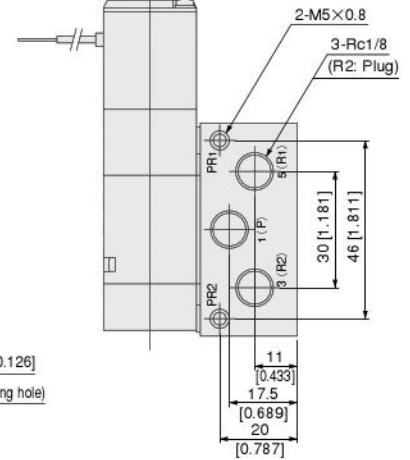
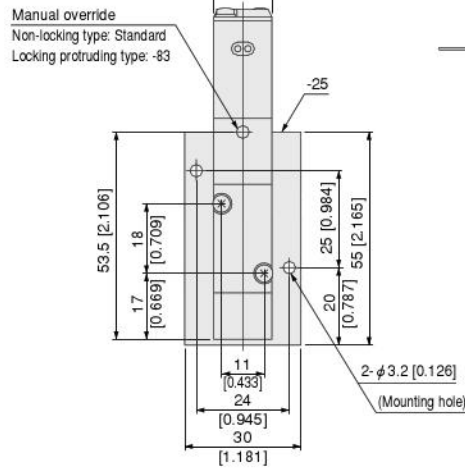
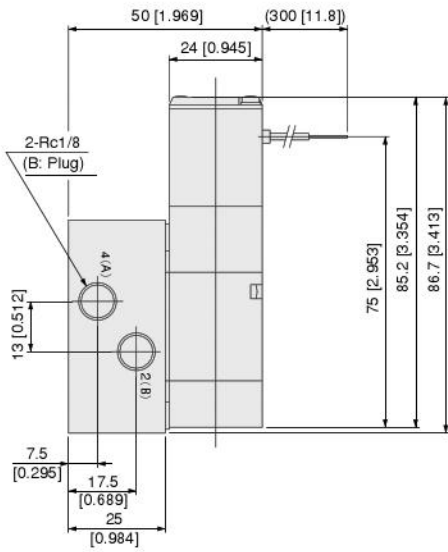
## Manifold Order Codes

<b>CS - 110M</b>		-	-	-	-	-	-	-
<b>Clean system 110 series manifold basic model</b>		<b>Number of units</b>	<b>Manifold model</b>		<b>Station</b>		<b>Clean system mounting valve type</b>	
		<b>2</b> : 2 units <b>3</b> : 3 units ⋮ <b>20</b> : 20 units	<b>[FE]</b> : FE type ● P, R and PR collective manifold ● Valve with A and B ports for piping <b>[A]</b> : A type ● All ports manifold ● Manifold with Rc1/8 A and B ports <b>[AJ]</b> : AJ type ● All ports manifold with quick fittings ● A, B ports with quick fittings		● Valve mounting position from left, as viewed from the front <b>Stn.1</b> : First <b>Stn.2</b> : Second <b>Stn.3</b> : Third ⋮ <b>Stn.20</b> : 20th		● For details of valve models, see the order codes listed above. ● Enter <b>CS-BP</b> when closing a station with a block-off plate without mounting a valve.	
<b>CS-110M</b>								

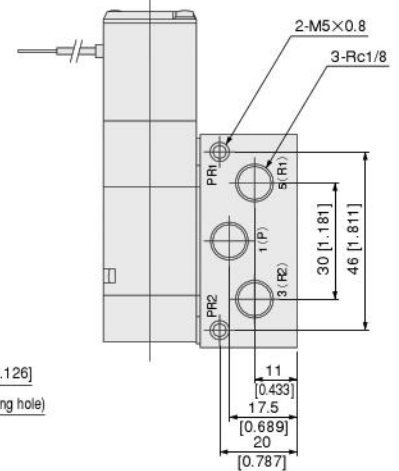
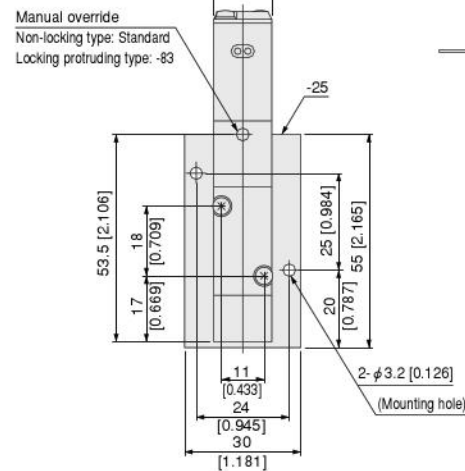
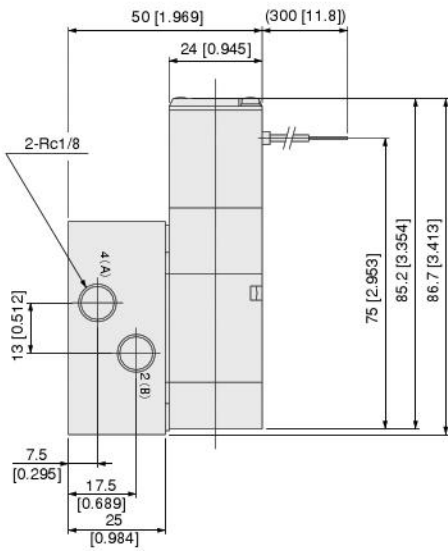
		Solenoid option			Manifold connection port (For AJ type manifold only)		Voltage
Locking protruding type	Grommet (standard)	Straight connector With LED indicator	L connector With LED indicator	Quick fitting for $\phi$ 4 tube	Quick fitting for $\phi$ 6 tube		
- 83	Blank	- PSL - CPSL <sup>Note</sup> - CMSL <sup>Note</sup>	- PLL - CPLL <sup>Note</sup> - CMLL <sup>Note</sup>	- J4	- J6	DC12V DC24V AC100V AC200V	
				—			

# Dimensions of Solenoid Valve mm [in.]

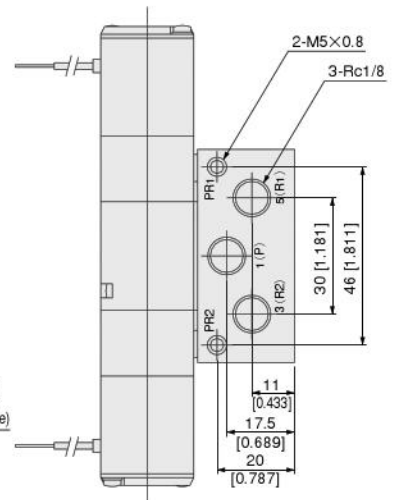
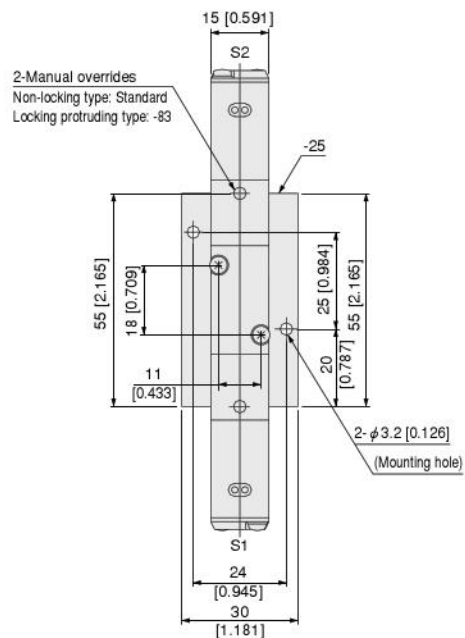
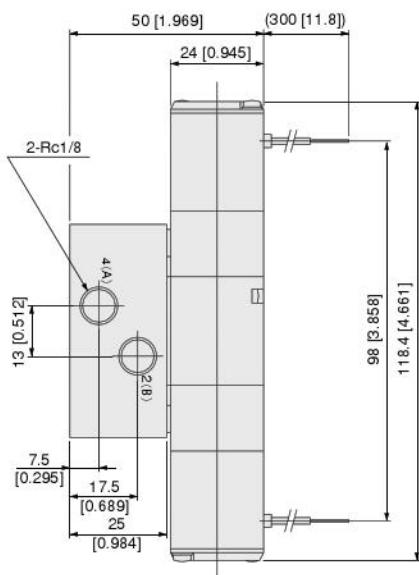
## ● CS-A110E1-25



## ● CS-A110-4E1-25



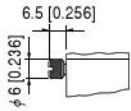
## ● CS-A110-4E2-25



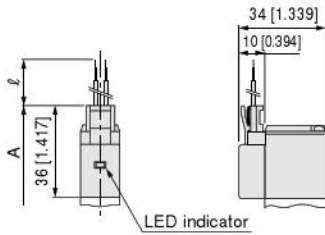
# Dimensions of Solenoid Valve mm [in.]

## Options

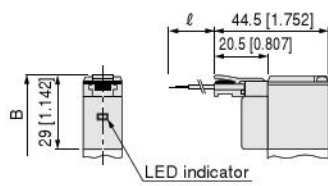
- Locking protruding type manual override : **-83**



- Solenoid with straight connector : **-PSL**

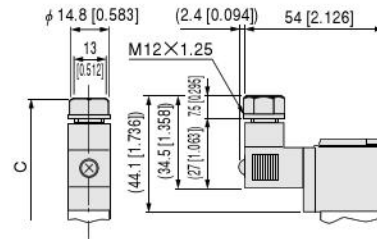


- Solenoid with L connector : **-PLL**

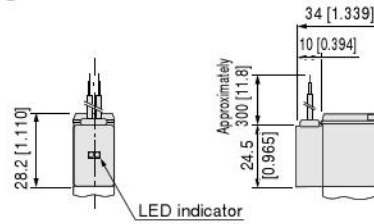


## Made to Order

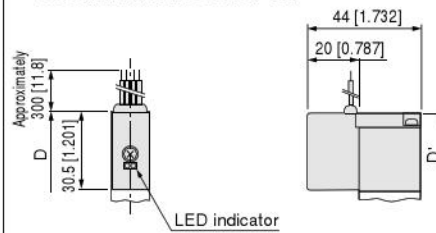
- Solenoid with DIN connector : **-39**



- Solenoid with LED indicator : **-L**



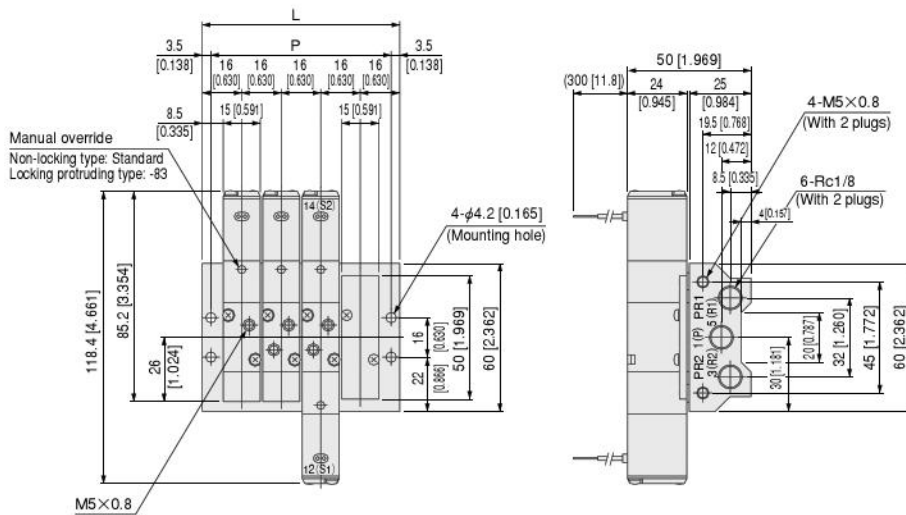
- Built-in interface unit : **-FA**



Model	Code	A	B	C	D	D'	ℓ (lead wire length)	Remarks
CS-A110E1		93 [3.661]	86 [3.386]	101.1 [3.980]	87.5 [3.445]	87.7 [3.453]	-PSL, -PLL : 300 [11.8]	Overall length to the end of the valve or sub-base
CS-A110-4E1-25		94.5 [3.720]	87.5 [3.445]	102.6 [4.039]	89 [3.504]	89.2 [3.512]	Made to order :	
CS-110-4E2, CS-A110-4E2-25		134 [5.276]	120 [4.724]	150.2 [5.913]	123 [4.843]	123.4 [4.858]	-1L ; 1000 [39] -3L ; 3000 [118]	Overall length to the end of the opposite side solenoid

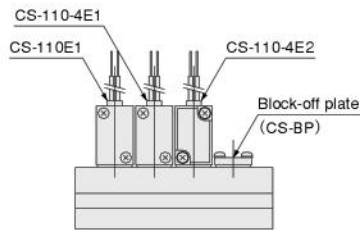
# Dimensions of Manifold for Combination Mounting of 2-, 3-, 5-port Valves mm [in.]

## ● CS-110M □ FE

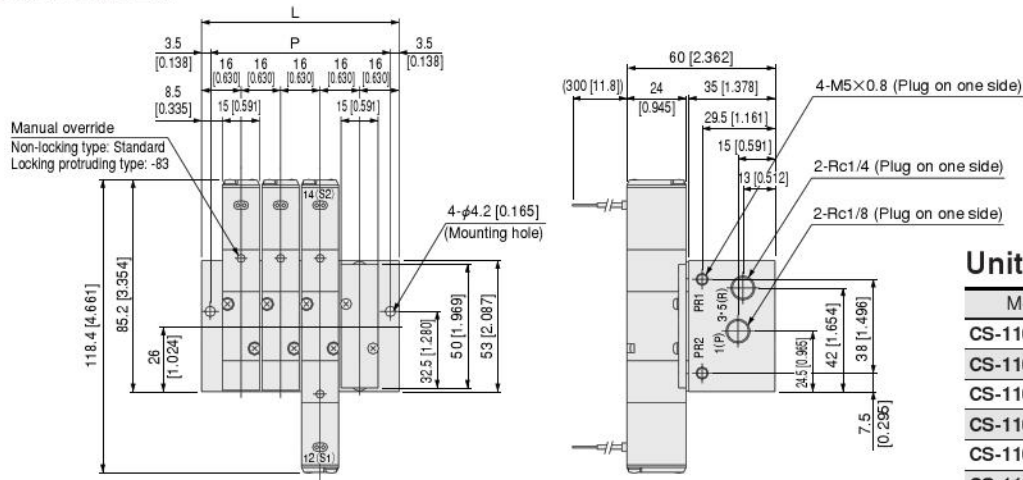


### Unit dimensions

Model	P	L
CS-110M2FE	41 [1.614]	48 [1.890]
CS-110M3FE	57 [2.244]	64 [2.520]
CS-110M4FE	73 [2.874]	80 [3.150]
CS-110M5FE	89 [3.504]	96 [3.780]
CS-110M6FE	105 [4.134]	112 [4.409]
CS-110M7FE	121 [4.764]	128 [5.039]
CS-110M8FE	137 [5.394]	144 [5.669]
CS-110M9FE	153 [6.024]	160 [6.299]
CS-110M10FE	169 [6.654]	176 [6.929]
CS-110M11FE	185 [7.283]	192 [7.559]
CS-110M12FE	201 [7.913]	208 [8.189]
CS-110M13FE	217 [8.543]	224 [8.819]
CS-110M14FE	233 [9.173]	240 [9.449]
CS-110M15FE	249 [9.803]	256 [10.079]
CS-110M16FE	265 [10.433]	272 [10.709]
CS-110M17FE	281 [11.063]	288 [11.339]
CS-110M18FE	297 [11.693]	304 [11.969]
CS-110M19FE	313 [12.323]	320 [12.598]
CS-110M20FE	329 [12.953]	336 [13.228]

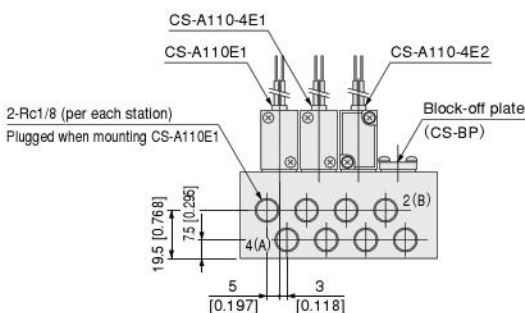


## ● CS-110M □ A



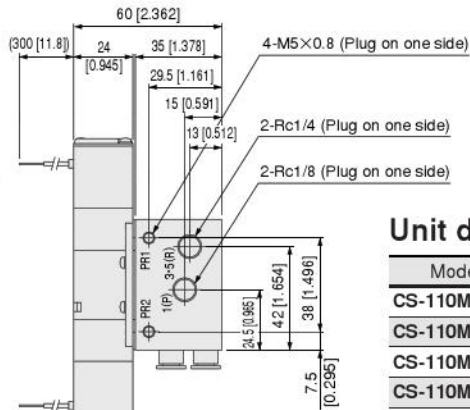
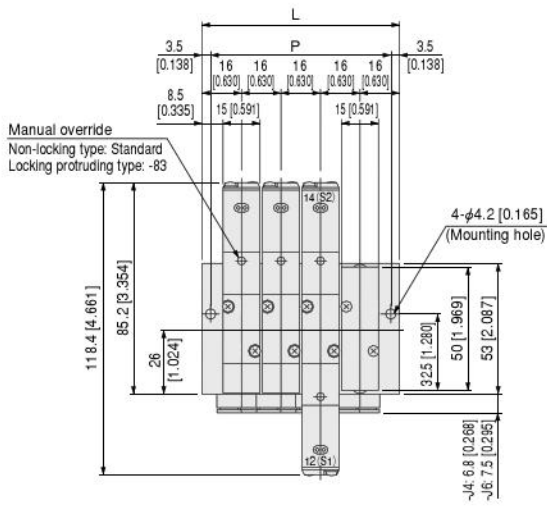
### Unit dimensions

Model	P	L
CS-110M2A	41 [1.614]	48 [1.890]
CS-110M3A	57 [2.244]	64 [2.520]
CS-110M4A	73 [2.874]	80 [3.150]
CS-110M5A	89 [3.504]	96 [3.780]
CS-110M6A	105 [4.134]	112 [4.409]
CS-110M7A	121 [4.764]	128 [5.039]
CS-110M8A	137 [5.394]	144 [5.669]
CS-110M9A	153 [6.024]	160 [6.299]
CS-110M10A	169 [6.654]	176 [6.929]
CS-110M11A	185 [7.283]	192 [7.559]
CS-110M12A	201 [7.913]	208 [8.189]
CS-110M13A	217 [8.543]	224 [8.819]
CS-110M14A	233 [9.173]	240 [9.449]
CS-110M15A	249 [9.803]	256 [10.079]
CS-110M16A	265 [10.433]	272 [10.709]
CS-110M17A	281 [11.063]	288 [11.339]
CS-110M18A	297 [11.693]	304 [11.969]
CS-110M19A	313 [12.323]	320 [12.598]
CS-110M20A	329 [12.953]	336 [13.228]



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

## ● CS-110M □ AJ



### Unit dimensions

Model	P	L
CS-110M2AJ	41 [1.614]	48 [1.890]
CS-110M3AJ	57 [2.244]	64 [2.520]
CS-110M4AJ	73 [2.874]	80 [3.150]
CS-110M5AJ	89 [3.504]	96 [3.780]
CS-110M6AJ	105 [4.134]	112 [4.409]
CS-110M7AJ	121 [4.764]	128 [5.039]
CS-110M8AJ	137 [5.394]	144 [5.669]
CS-110M9AJ	153 [6.024]	160 [6.299]
CS-110M10AJ	169 [6.654]	176 [6.929]
CS-110M11AJ	185 [7.283]	192 [7.559]
CS-110M12AJ	201 [7.913]	208 [8.189]
CS-110M13AJ	217 [8.543]	224 [8.819]
CS-110M14AJ	233 [9.173]	240 [9.449]
CS-110M15AJ	249 [9.803]	256 [10.079]
CS-110M16AJ	265 [10.433]	272 [10.709]
CS-110M17AJ	281 [11.063]	288 [11.339]
CS-110M18AJ	297 [11.693]	304 [11.969]
CS-110M19AJ	313 [12.323]	320 [12.598]
CS-110M20AJ	329 [12.953]	336 [13.228]

