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KOGANEI

VALVES GENERAL CATALOG

SOLENOID VALVES 110 SERIES INDEX

-ea	atures ————————————————————————————————————
Bas	sic Models and Configuration ————————————————————————————————————
110	Series
	Specifications —
	Cylinder Operating Speed and Flow Rate —————
	Tandem Solenoid Valve Order Codes ————————————————————————————————————
	Solenoid Valve, Air-piloted Valve Order Codes
	Manifold Order Codes —
	Operating Principles and Symbols, Major Parts and Materials
	Dimensions of Solenoid Valve —
	Dimensions of Manifold ————————————————————————————————————
	Made to Order —
	Plug Connector
	DIN Connector
	LED Indicator
	Built-in Interface Unit
	Air-piloted Valves 110 Series
	Handling Instructions and Precautions —————
PC	Board Manifold 110 Series
	Specifications ————————————————————————————————————
	Order Codes —
	Dimensions —
	Handling Instructions and Precautions ——————

Reliability & Versatile Applications

SOLENOID VALVES 110 series

The 110 series Solenoid Valves, which achieve highly reliable, powerful, and low current basic performance in a compact, thin body, offer a simple and flexible standard type, and a full-option type with advanced maintenance features, to become still more user-friendly.

With a varistor for the AC type, and a flywheel diode for the DC type, the solenoid is equipped with excellent surge suppression measures.

Standard type

Its clean lines emphasize basic performance, for

low-cost and versatile applications.

Equipped with an easy-to-handle plug connector for fast wiring installation and removal. Available in a straight type and L type, both are equipped with LED indicators for easy confirmation of operations.

Built-in quick fittings offer one-touch simple tube installation and removal.
 Moreover, an effective area of 4.0mm² (Cv: 0.22) enables even more powerful applications.

Full-option type

Greatly improves piping and wiring work efficiency, for excellent applications in assembly, adjustment, and maintenance.

A manual override (non-locking type) is standard equipment and offers easy adjustment during assembly and maintenance. A fingertip-operable protruding-type manual override (locking type) is also available as an option.

F type manifold

Direct piping type valves can be mounted directly on this manifold. An FE type manifold enabling collected pilot exhaust through its PR port is also available.

• The common terminal pre-wired plug connector type frees technicians from tedious common terminal wiring work. Crossover wires are used to connect the common terminals, so that a single common wire is sufficient even for a manifold with many stations.

For the delivery port quick fittings, select from φ 4 or φ 6 fittings for each station in accordance with actuator size.

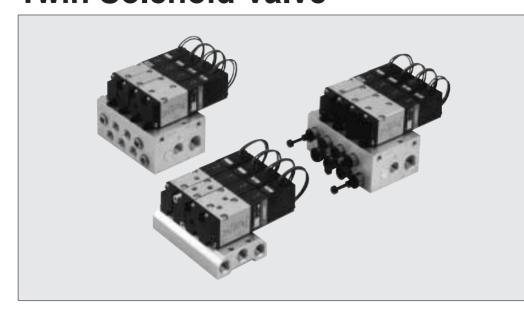
AJ type manifold

Combines all ports into a manifold base. Quick fittings are built into the delivery ports (4(A), 2(B)), allowing easy assembly and maintenance in a confined space.

Piping to the pilot exhaust ports is also possible to keep the control box interior and working environment from becoming contaminated.

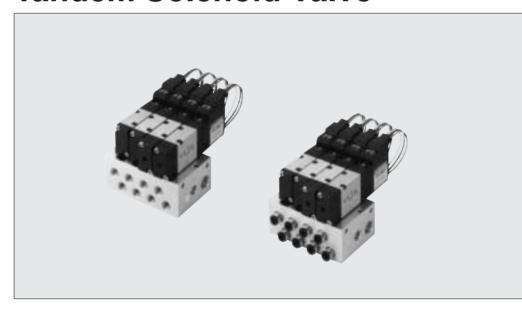
The built-in check mechanism prevents exhaust interference.

Twin Solenoid Valve



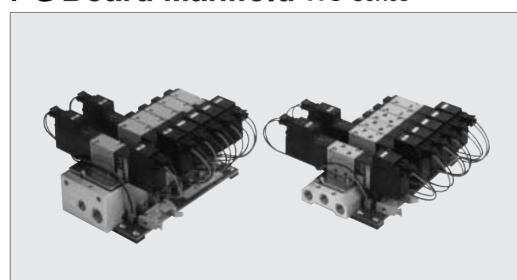
Ensures the functions of the conventional double solenoid type, but in a much shorter length, while simple wiring enables correct connections with a sequencer. Moreover, it is capable of being installed on a conventional manifold to occupy space for two stations.

Tandem Solenoid Valve



Retains the performance specifications of the 110 series while realizing a two-unit combination solenoid in the space of a single station. Achieves a compact outer appearance for the manifold and still more space savings.

PC Board Manifold 110 Series



Secures ease of use by using a printed circuit board with a connector for quick wiring connection to control devices. This simplified wiring method greatly reduces wiring work and the need for tools.

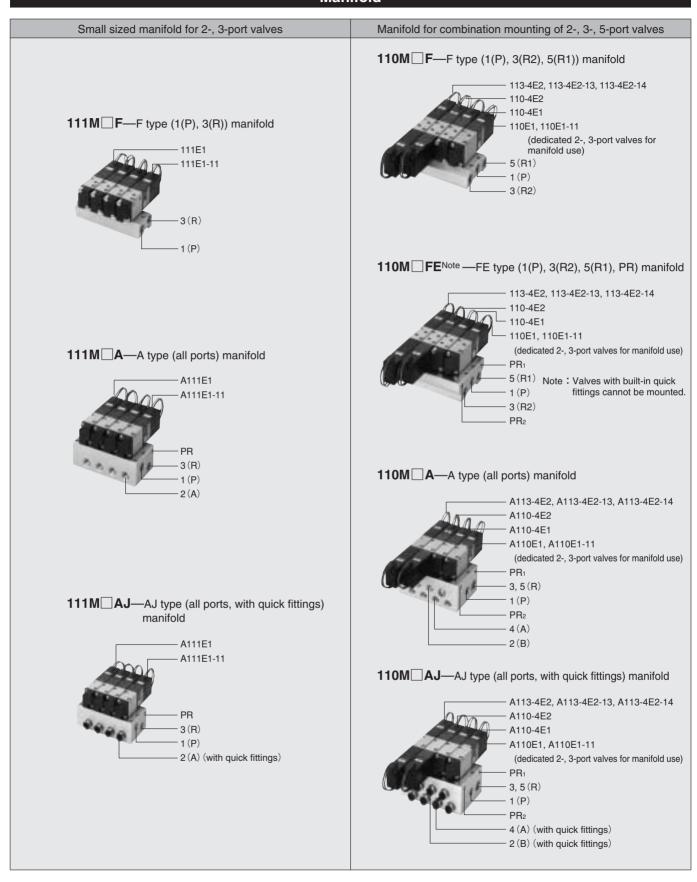
110 Series Basic Models and Configuration

Single unit 2-, 3-port 5-port Normally Normally 2-position 3-position closed (NC) open (NO) Single Double Exhaust Pressure Closed solenoid solenoid center Direct piping 110-4E1 110-4E2 113-4E2 113-4E2-13 113-4E2-14 (110E1) Note 1 (110E1-11) Note (110-4KE2) Note 2 (113-4KE2) Note 2 (113-4KE2-13) Note 2 (113-4KE2-14) Note 2 2-position 3-position Single solenoid Double solenoid Closed center Exhaust center Pressure center Normally Normally closed (NC) open (NO) Sub-base piping A110-4E1-25 A110-4E2-25 A113-4E2-25 A113-4E2-13-25 A113-4E2-14-25 2-position (tandem solenoid) 3-position (tandem solenoid) Double solenoid Closed center Exhaust center Pressure center A111E1-25 A111E1-11-25 A110-4ME2 A113-4ME2 A113-4ME2-13 A113-4ME2-14

Notes: 1. 110E1 and A110E1 are dedicated valves for manifolds with combination mounting of 2-, 3-, 5-port valves. They cannot be used as single units. For single unit applications, use 111E1 or A111E1-25.

^{2.} They are dedicated twin solenoid valves for manifolds with combination mounting of 2-, 3-, 5-port valves. They cannot be used as single units.

Manifold



SOLENOID VALVES 110 SERIES

Basic Models and Valve Functions

Basic model	Direct piping, F, FE type manifolds	111E1 (110E1 ^{Note})	110-4E1 110-4E2 110-4KE2 ^{Note}		113-4E2	113-4KE2		
Sub-base piping, A111E1 A110-4E1 A110-4E2 A110-4ME2 A110-4ME2		A110-4KE2Note	A113-4E2 A113-4ME2	A113-4KE2				
Number of positions			2 positions			3 positions		
Number of por	ts	2, 3 ports	5 ports					
Valve function		Normally closed (NC, standard) or Normally open (NO, optional)	Single solenoid, Double solenoid or Tandem solenoid	Twin solenoid	Closed center (standard), Exhaust center (optional), Pressure center (optional) or Tandem solenoid	Closed center (standard), Exhaust center (optional), Pressure center (optional) or Twin solenoid		

Remark: For optional specifications and order codes, see p.300~302.

Note: The 110E1, A110E1, 110-4KE2, and A110-4KE2 are dedicated valves for manifolds with combination mounting of 2-, 3-, 5-port valves. They cannot be used as single units. When using 2-,3-port valves as single units, use 111E1 or A111E1-25.

Specifications

F,	ect piping, FE type Inifolds	111E1 (110E1)	110-4E1 110-4E2	110-4KE2		113-4E2	113-4KE2			
Itam A,	b-base piping, AJ type ınifolds	A111E1 (A110E1)	A110-4E1 A110-4E2	A110-4KE2	A110-4ME2	A113-4E2	A113-4KE2	A113-4ME2		
Media					Air					
Operation type					Internal pilot type					
Effective area (Cv) Note1 mm ²		4.2(0.23)		4.0 (0.22)	3.8(0.21)	3.6 (0.2)		
Port sizeNote 2		M5×0.8								
Lubrication		Not required								
Operating pressure range	MPa {kgf/cm²} [psi.]	0.15~0.7 {1.5~7.1} [22~102]								
Proof pressure MP	a {kgf/cm²} [psi.]	1.05 {10.7} [152]								
Response time Note 3 ms	DC12V, DC24V	15/25 or below	15/25 (20) or below 15 or below				15/30 or below			
ON/OFF	AC100V, AC200V	15/15 or below	15/15〔15	or below	_	15/20 c	_			
Maximum operating fre	equency Hz	5								
Minimum time to energize for self holding ms		_	50(□110-4E2) 50			_				
Operating temperature range (atmosphere and media) °C [°F]		5~50 [41~122]								
Shock resistance m/s² {G}		137	3.0 {140.0} (Axial o	direction 294.2 {30	.0})		294.2 {30.0}			
Mounting direction	1		Any							

- Notes:1. For details, see the effective area on p.298.
 - 2. For details, see the port size on p.298.
 - 3. Values when air pressure is 0.5MPa (5.1kgf/cm²) [73psi.]. Values in brackets () for 110-4E2, 110-4KE2, and 110-4ME2 are when switching from the opposite position, while the values for 113-4E2, 113-4KE2, and A113-4ME2 are those of the closed center valve, when switching from the neutral position.

Solenoid Specifications

Item Rated voltage		DC12V	DC24V	AC100V		AC200V		DC24V (Tandem solenoid)
Туре		Flywheel diode incorporated for surge suppression			Shadir	Built-in surge absorption transistor		
Operating v	oltage range V	10.8~13.2 (12±10%)	21.6~26.4 (24±10%)	90~132 (100 ⁺³² ₋₁₀ %)				21.6~26.4 (24±10%)
Current	Frequency Hz	_	_	50	60	50	60	_
(when rated	Starting mA (r.m.s)	_	_	36	32	18	16	_
voltage is applied)	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	50 (1.2W)
Allowable le	akage current mA	8	4	4		2		2
Insulation re	esistance MΩ	Over 100						
Wiring type	Standard		Plug connector type: 300mm [11.8in.]					
and lead wire length	Optional			ne: 300mm [11.8in.] order on p.315∼316.				_
Color of lead wire		Brown (+) Black (-)	Red (+) Black (-)	Ye	llow	White		Red (SA), Black (COM) White (SB)
Color of LEI	D indicator	R	ed	Yellow Green		Red		
Surge suppr	ession (as standard)	Flywhe	el diode		Var	istor		Surge absorption transistor

Effective Area (Cv) mm² [Cv]

Basic model	Standard (Single valve)	Built-in quick fittings	Remarks
111E1Note (110E1) 110-4E1 110-4E2 110-4KE2	4.2 (0.23)	-J4□: 3.6 (0.20) -J6□: 4.0 (0.22)	 When attaching TS4-M5 to the 1(P), 4(A), 2(B) ports, the value is 1.8 (0.10). On the F type manifold, attaching TS4-M5 to the 4(A), 2(B) ports gives the value 2.1 (0.12). When large flow rates are required, we recommend the
113-4E2 113-4KE2	3.8 (0.21)	-J4□ : 3.4〔0.19〕 -J6□ : 3.6〔0.20〕	fitting.
A111E1Note (A110E1) A110-4E1 A110-4E2 A110-4KE2 A110-4ME2	4.0 (0.22)	-J4□: 3.6 (0.20) -J6□: 4.0 (0.22)	 When mounting on a sub-base or manifold. Attaching TS4-01 to the 1(P), 4(A), 2(B) ports on the sub-base gives the value 3.2 (0.18).
A113-4E2 A113-4KE2 A113-4ME2	3.6 (0.20)	3.6 (0.20)	

Note: The delivery port is the 2(A) for 111E1, A111E1.

Solenoid Valve Port Size

Basic model	Port spe	ecification	Port size
	Standard	Female thread	M5×0.8
		-J41	Quick fitting for ϕ 4, for 2(A) (4(A)) port only
111E1 ^{Note1} (110E1 ^{Note2})	Ontional	-J42	Quick fitting for ϕ 4, for 1(P), 2(A) ports
(11021)	Optional	-J61	Quick fitting for ϕ 6, for 2(A) (4(A)) port only
		-J62	Quick fitting for ϕ 6, for 1(P), 2(A) ports
	Standard	Female thread	M5×0.8
110-4E1 110-4E2	Optional	-J42	Quick fitting for ϕ 4, for 4(A), 2(B) ports only
110-4KE2		-J43Note 3	Quick fitting for ϕ 4, for 1(P), 4(A), 2(B) ports
113-4E2 113-4KE2		-J62	Quick fitting for ϕ 6, for 4(A), 2(B) ports only
		-J43Note 3	Quick fitting for ϕ 6, for 1(P), 4(A), 2(B) ports
A111E1-25Note1	1 (P)		
A110-4E1-25 A110-4E2-25	4 (A), 2 (B)	Female thread	Rc1/8
A113-4E2-25 A110-4ME2-25	3 (R2), 5 (R1)]	
A113-4ME2-25	PR	Female thread	M5×0.8

Notes: 1. The delivery port is the 2(A) for 111E1, A111E1-25.

- 2. Since 110E1 is for manifold use only, piping to the 1 (P) port with a fitting is not possible.

 3. Not available in 110-4E2, 113-4E2, 110-4KE2, and 113-4KE2.

Manifold Connection Port Size

Manifold model	Port	Location of piping ports	Port size
	1 (P)	Manifold	Rc1/8
111M□F ^{Note1} 110M□F	4 (A), 2 (B)	Valve	M5×0.8 Note2
	3(R), 3(R2), 5(R1)	Manifold	Rc1/8
	1 (P)	Manifold	Rc1/8
110M□FE	4 (A), 2 (B)	Valve	M5×0.8
IIUWILIFE	3 (R2), 5 (R1)	Manifold	Rc1/8
	PR	Ivianiioid	M5×0.8
	1 (P)		Rc1/8
111M ANote1	4 (A), 2 (B)	Manifold	NC1/0
110M□A	3 (R), 3, 5 (R)	Ivianiioid	Rc1/8 (111M□A), Rc1/4 (110M□A)
	PR	M5×0.8	
	1 (P)		Rc1/8
111M AJNote1	4 (A), 2 (B)	Manifold	Quick fitting for ϕ 4 or ϕ 6
110M□AJ	3 (R), 3, 5 (R)	iviarilfold	Rc1/8 (111M□AJ), Rc1/4 (110M□AJ)
	PR		M5×0.8

Notes: 1. The delivery port is the 2(A) for 111M \square F, 111M \square A, 111M \square AJ.

2. When the mounting valve is a female thread specification, the ports are this size. For the built-in quick fitting types, quick fittings for ϕ 4 or ϕ 6 are installed.

Solenoid Valve Mass

Soleliola valve ivia	g [oz.]
Basic model	Mass
111E1	75 [2.65]
(110E1)	80 [2.82]
110-4E1	80 [2.82]
110-4E2	125 [4.41]
110-4KE2	175 [6.17]
113-4E2	145 [5.11]
113-4KE2	165 [5.82]
A111E1	80 [2.82] (180 [6.35])
(A110E1)	85 [3.00]
A110-4E1	85 [3.00] (180 [6.35])
A110-4E2	130 [4.59] (225 [7.94])
A110-4KE2	180 [6.35]
A110-4ME2	110 [3.88] (205 [7.23])
A113-4E2	150 [5.29] (245 [8.64])
A113-4KE2	170 [6.00]
A113-4ME2	120 [4.23] (215 [7.58])

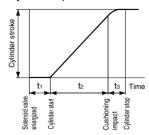
Manifold Mass

g [oz.]

Manifold model	Mass calculation of each unit (n=number of units)	Block-off plate
111M□F	$(15\times n)+30$ $[(0.53\times n)+1.06]$	5 [0.18]
111M□A	$(45 \times n) + 45$ [(1.59 \times n) + 1.59]	
111M□AJ	-J4: (53×n)+45 [(1.87×n)+1.59] -J6: (50×n)+45 [(1.76×n)+1.59]	10 [0.35]
110M□F	$(20 \times n) + 30$ $[(0.71 \times n) + 1.06]$	6 [0.21]
110M□FE	$(40 \times n) + 50$ [(1.41 \times n) + 1.76]	
110M□A	$(60 \times n) + 60$ [(2.12 \times n) + 2.12]	11 [0.39]
110M□AJ	-J4: $(67 \times n)$ +60 [(2.36 \times n)+2.12] -J6: $(64 \times n)$ +60 [(2.26 \times n)+2.12]	11 [0.39]

■Cylinder Operating Speed

How to obtain cylinder speed



Load

To obtain the time required for the cylinder to complete 1 stroke, add cylinder's delay time t_1 (time between energizing of solenoid valve and actual starting of the cylinder), to the cylinder's max. speed operating time t_2 .

When a cushion is used, add the cushioning time t_3 , to the above calculation. The standard cushioning time t_3 is approximately 0.2 seconds.

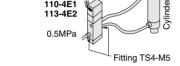
110-4E1 113-4E2

Measurement conditions

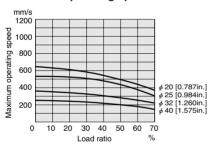
- Air pressure : 0.5MPa {5.1kgf/cm²} [73psi.]
- Piping inner diameter and length : ϕ 2.5 [0.10in.]× 1000mm [39in.]
- Fitting : Quick fitting TS4-M5
- ●Load ratio = Load
 Cylinder theoretical thrust
 (%)

 Cylinder stroke: 150mm [5.91in.]

 Solenoid valve
 110-4E1

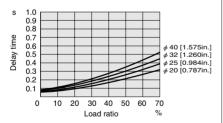


Maximum operating speed



1mm/s = 0.0394in./sec.

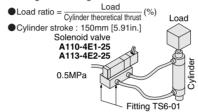
Delay time



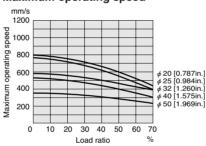
A110-4E1-25 A113-4E2-25

Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm²} [73psi.]
- Piping inner diameter and length : ϕ 4 [0.16in.] \times 1000mm [39in.]
- Fitting : Quick fitting TS6-01

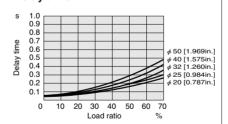


Maximum operating speed



1mm/s = 0.0394in./sec

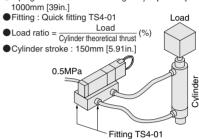
Delay time



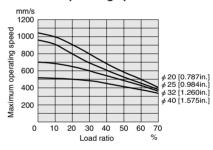
A110-4ME2 A113-4ME2

Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm²} [73psi.]
- Piping inner diameter and length : ϕ 4 [0.16in.]×

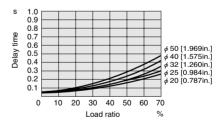


Maximum operating speed

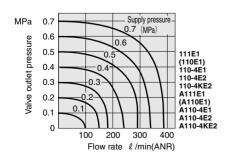


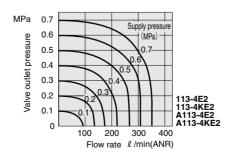
1mm/s = 0.0394in./sec.

Delay time

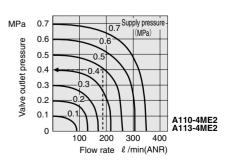


Flow Rate





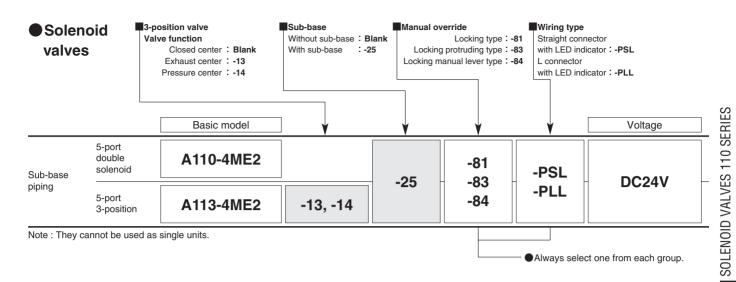
1MPA = 145psi. 1 \(\ell \) /min = 0.0353ft³/min.

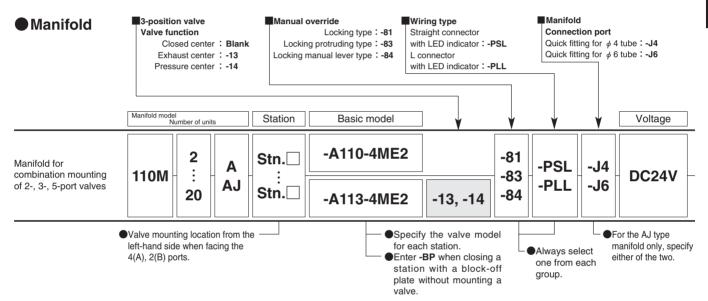


How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 180 ℓ /min [6.35ft³/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

* Single solenoid, double solenoid, twin solenoid, and tandem solenoid valves can be mounted together on the manifold.





Options





Lead wire length

L connector





Locking protruding type



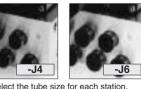
Locking manual lever type



■AJ type manifold



Quick fitting for ϕ 6 tube



Select the tube size for each station

Additional Parts (To be ordered separately)

Speed controller



piping

For sub-base piping

Muffler



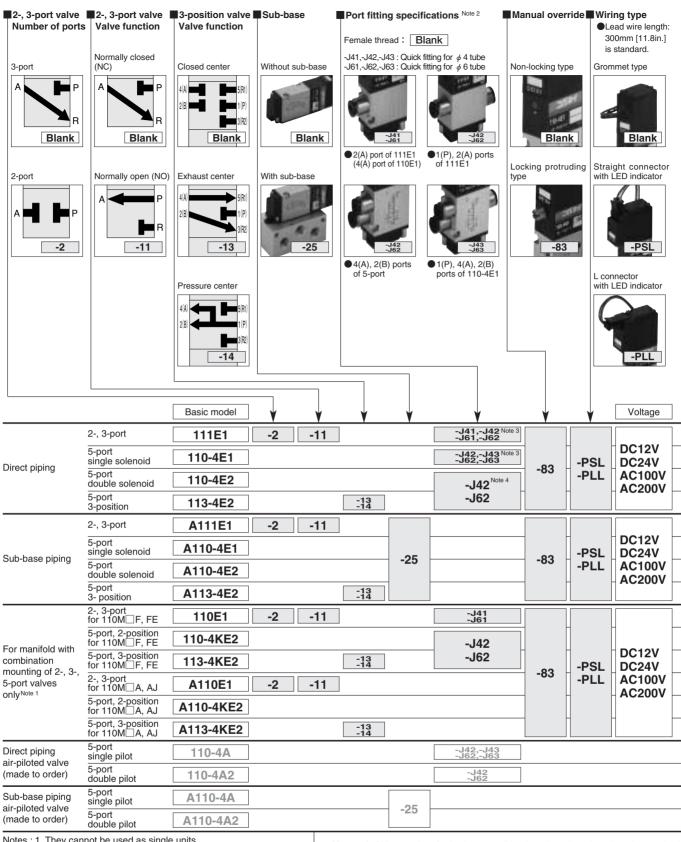
● 110 MA-BP 110-For 110M

Made to Order

Lead wire length -3L

● For plug connector ● Length -1L: 1000 [39in.] (mm) -3L: 3000 [118in.]

110 Series Solenoid Valve, Air-piloted Valve Order Codes



Notes : 1. They cannot be used as single units. 2. The port fittings are for ϕ 4: TSK4-M8M, and for ϕ 6:

- Notes: 3. Side mounting of valve is not possible when -J41, -J42, -J43, -J61, -J62, or -J63 is selected, because in these cases there are no mounting holes on the valve side
 - 4. Mounting on the manifold only is possible when -J42 or -J62 is selected for the 110-4E2 or 113-4E2, because in these cases they do not have mounting holes.

Additional Parts (To be ordered separately)

Speed controlle

● For direct piping ● For sub-base

piping



● For direct piping ● For sub-base piping



Mounting base

For direct piping ●For 2-, 3-port and 5-port single solenoids

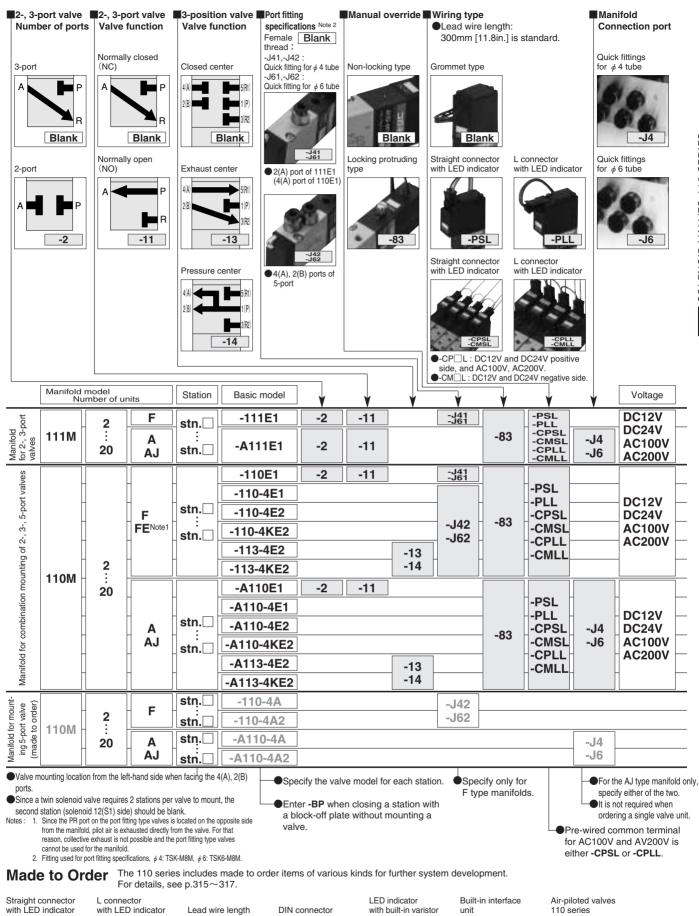


Block-off plate

M 🗌 -BP

For 111M **110** — For 110M -F — For F type manifold FE — For FE type manifold For A type, AJ type manifolds

110 Series Manifold Order Codes





Without lead wire Connector contacts included.





Without lead wire Connector contacts included



● For plug connector ●Length (mm) -1L: 1000 [39in.] -3L: 3000 [118in.]

-39

Cannot be used with -L

■Cannot be used with -39



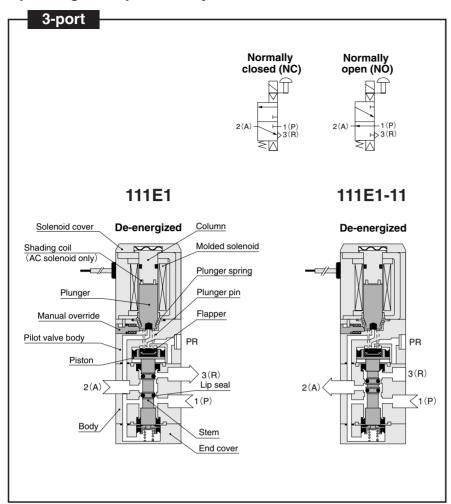
Possible to be directly controlled by output from micro computer or other logic devices.

With LED indicator



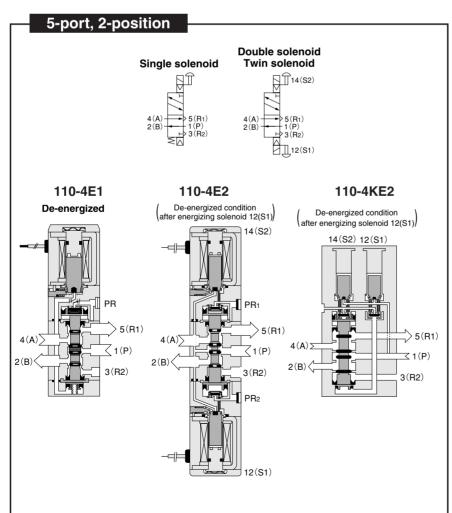
●5-port, 2-position Single pilot Double pilot

Operating Principles and Symbols



Major Parts and Materials

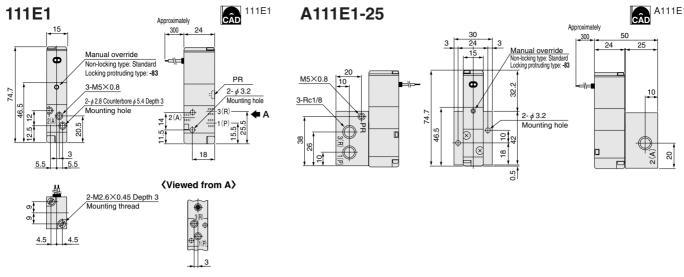
F	Parts	Materials		
	Body	Aluminum alloy		
	Stem	(anodized)		
	Lip seal	Cynthotic rubbor		
Valve	Flapper	Synthetic rubber		
vaive	Mounting base	Mild steel (zinc plated)		
	Sub-base	Aluminum alloy (anodized)		
	Plunger	Magnetic stainless		
	Column	steel		
	Body	Aluminum alloy (anodized)		
Manifold	Block-off plate	Mild steel (nickel plated)		
	Seal	Synthetic rubber		



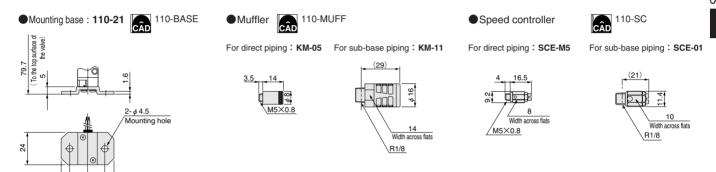
5-port, 3-position Closed center 4(A) 14(S2) 113-4E2 113-4KE2 14(S2) 12(S1)

SOLENOID VALVES 110 SERIES

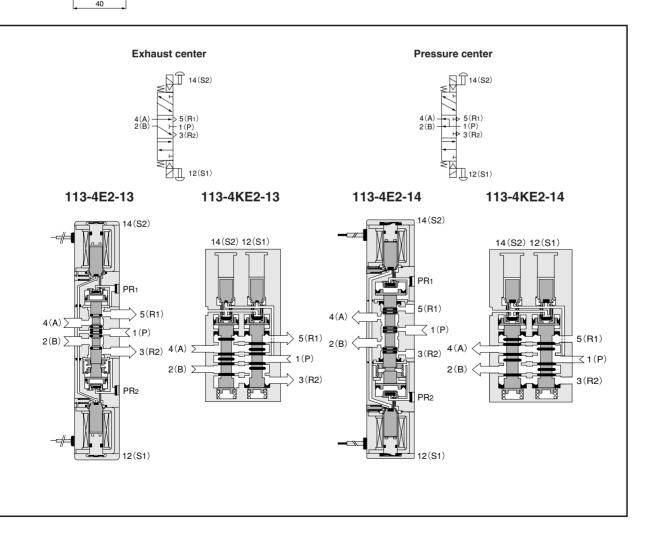
Dimensions of Solenoid Valve, 2-, 3-port (mm)

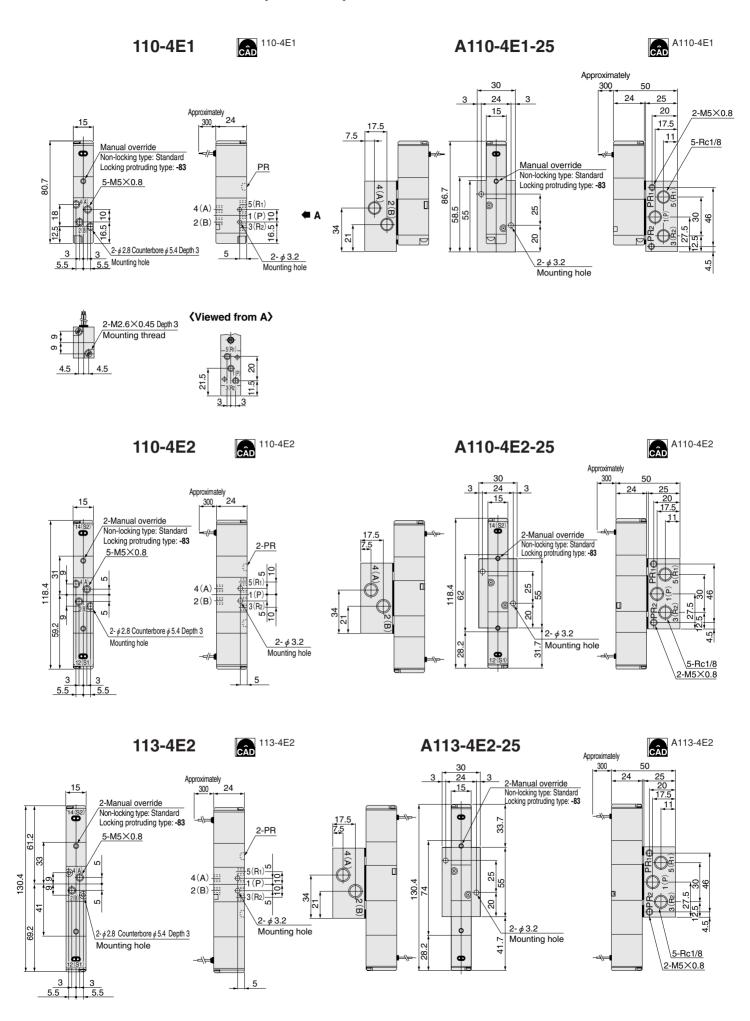


Additional Parts (To be ordered separately)



For options and made to order, see p.306.





Additional Parts (To be ordered separately)

● Mounting base : 110-21



110-BASE



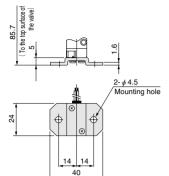
Speed controller



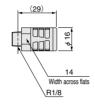
For direct piping: KM-05

For sub-base piping: KM-11 For direct piping: SCE-M5

For sub-base piping: SCE-01



M5×0.8

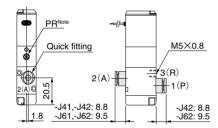






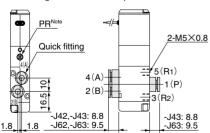
Options

- With quick fittings (2-, 3-port):
- **-J41** (For ϕ 4 tube, 2(A) or 4(A) port with fitting)
- **-J42** (For ϕ 4 tube, 1(P), 2(A) ports with fittings)
- **-J61** (For ϕ 6 tube, 2(A) or 4(A) port with fitting)
- **-J62** (For ϕ 6 tube, 1(P), 2(A) ports with fittings) The drawing shows the -J42 specification.

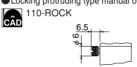


Note: PR is on the side with the A port.

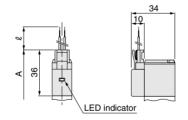
- With quick fittings (5-port):
- **-J42** (For ϕ 4 tube, 4(A), 2(B) ports with fittings)
- **-J43** (For ϕ 4 tube, 1(P), 4(A), 2(B) ports with fittings)
- **-J62** (For ϕ 6 tube, 4(A), 2(B) ports with fittings)
- **-J63** (For ϕ 6 tube, 1(P), 4(A), 2(B) ports with fittings) The drawing shows the -J43 specification.



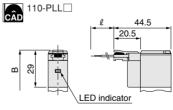
Locking protruding type manual override : -83



Solenoid with straight connector: -PSL 110-PSL



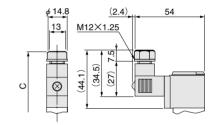
Solenoid with L connector: -PLL



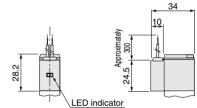
Made to Order



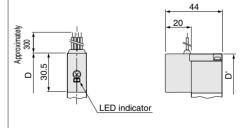
Solenoid with DIN connector: -39



Solenoid with LED indicator: -L



Built-in interface unit : -FA

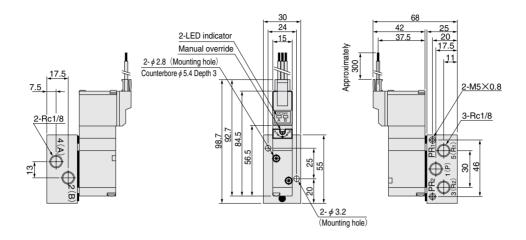


Note: PR is on the side with the A, B ports.

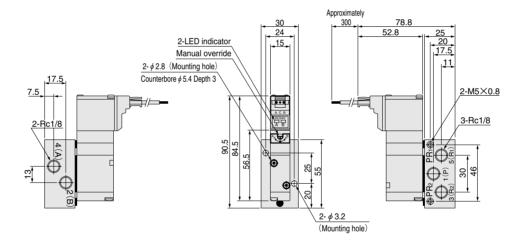
Remark: Valves with quick fittings do not have 2- ϕ 3.2 side mounting holes. Moreover, the quick fittings are the following types: **TSK4-M8M** (for ϕ 4 tube), **TSK6-M8M** (for ϕ 6 tube)

	- (-	7 /					
Model Code	Α	В	С	D	D'	ℓ (lead wire length)	Remarks
111E1, A111E1-25	82.5	75.5	90.6	77	77.2		Overall length to the
110-4E1	88.5	81.5	96.6	83	83.2	-PSL, -PLL : 300	end of the valve or sub-
A110-4E1-25	94.5	87.5	102.6	89	89.2	Made to order	base
110-4E2, A110-4E2-25	134	120	150.2	123	123.4	-1L:1000 -3L:3000	Overall length to the end of
113-4E2, A113-4E2-25	146	132	162.2	135	135.4		the opposite side solenoid

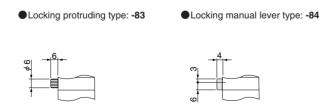
A110-4ME2-25-PSL



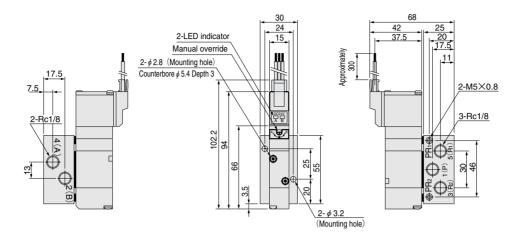
A110-4ME2-25-PLL



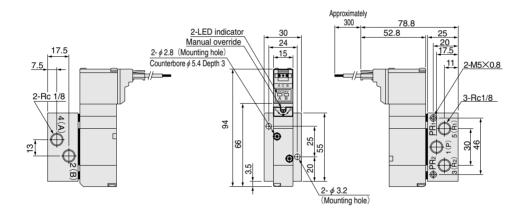
Options



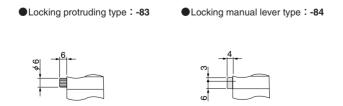
A113-4ME2-25-PSL



A113-4ME2-25-PLL



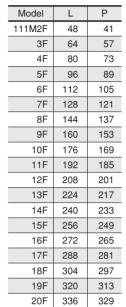
Options



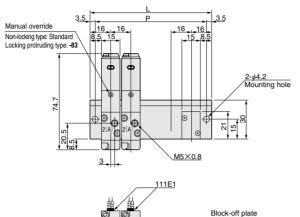
111M□F

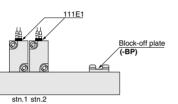


Unit dimensions



4-Rc1/8 (with 2 plugs)



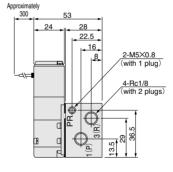


111M□A



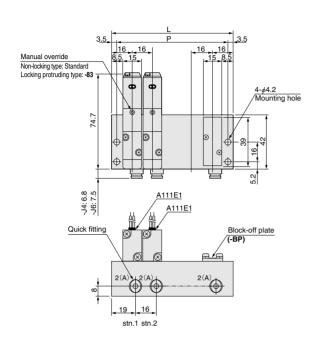
Unit dimensions

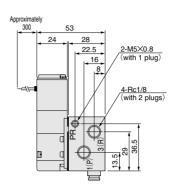
Manual override Non-locking type: Standard Locking protruding type: -83 A-\$\phi4.2 \\ Mounting hole
A111E1
A111E1 Block-off plate (-BP)
2(A) 2(A) 2(A) 2(A) 3(A) 3(A) 3(A) 3(A) 3(A) 3(A) 3(A) 3



onit a	IIII CIII	SIUII
Model	L	Р
111M2A	48	41
ЗА	64	57
4A	80	73
5A	96	89
6A	112	105
7A	128	121
8A	144	137
9A	160	153
10A	176	169
11A	192	185
12A	208	201
13A	224	217
14A	240	233
15A	256	249
16A	272	265
17A	288	281
18A	304	297
19A	320	313
20A	336	329

111M□AJ



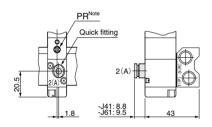


Unit dimensions

Model	L	Р
111M2AJ	48	41
3AJ	64	57
4AJ	80	73
5AJ	96	89
6AJ	112	105
7AJ	128	121
8AJ	144	137
9AJ	160	153
10AJ	176	169
11AJ	192	185
12AJ	208	201
13AJ	224	217
14AJ	240	233
15AJ	256	249
16AJ	272	265
17AJ	288	281
18AJ	304	297
19AJ	320	313
20AJ	336	329

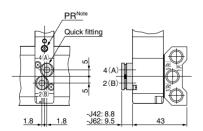
Options

- ●With quick fitting (2-, 3-port):
 - **-J41** (For ϕ 4 tube, 2(A) or 4(A) port with fitting) **-J61** (For ϕ 6 tube, 2(A) or 4(A) port with fitting)



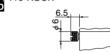
Note: PR is on the A port side.

- 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)

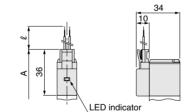


Note: PR is on the side with the 4(A), 2(B) ports.

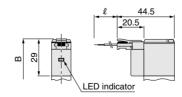
● Locking protruding type manual override: -83



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



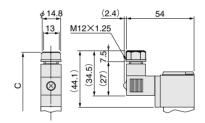
● Solenoid with L connector: **-PLL**110-PLL□



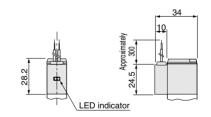
Made to Order



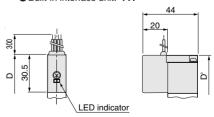
● Solenoid with DIN connector: -39



Solenoid with LED indicator: -L



●Built-in interface unit: -FA



Remark: Valves with quick fittings do not have 2- ϕ 3.2 side mounting holes. Moreover, the quick fittings are the following types:

TSK4-M8M (for ϕ 4 tube), **TSK6-M8M** (for ϕ 6 tube)

	•	•				
Model Code	Α	В	С	D	D'	
111E1, A111E1	82.5	75.5	90.6	77	77.2	Г
110-4E1, 110-4KE2, 113-4KE2, A110-4E1	88.5	81.5	96.6	83	83.2	
110-4E2, A110-4E2	134	120	150.2	123	133.4	
113-4E2, A113-4E2	146	132	162.2	135	135.4	

mm

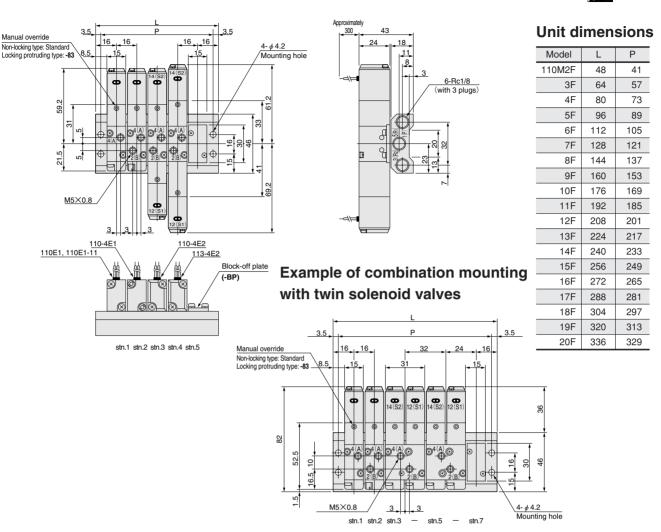
-PSL, -PLL: 300 Made to order -1L: 1000, -3L: 3000

ℓ (lead wire length)

Dimensions of Manifold for Combination Mounting of 2-, 3-, 5-port Valves (mm)

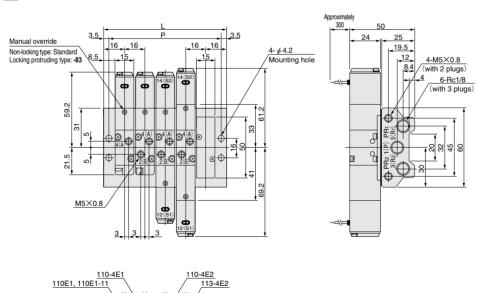
110M ☐ F





110M□FE





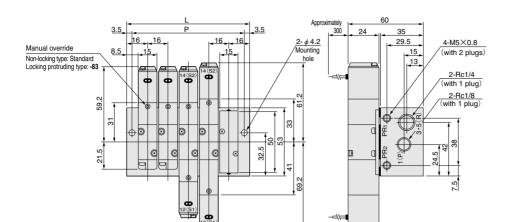
Block-off plate

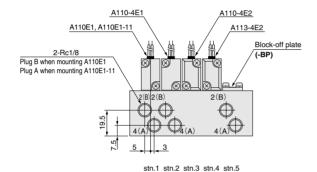
Unit dimensions

Model	L	Р
110M2FE	48	41
3FE	64	57
4FE	80	73
5FE	96	89
6FE	112	105
7FE	128	121
8FE	144	137
9FE	160	153
10FE	176	169
11FE	192	185
12FE	208	201
13FE	224	217
14FE	240	233
15FE	256	249
16FE	272	265
17FE	288	281
18FE	304	297
19FE	320	313
20FE	336	329

For options and made to order, see p.310.

110M □ A

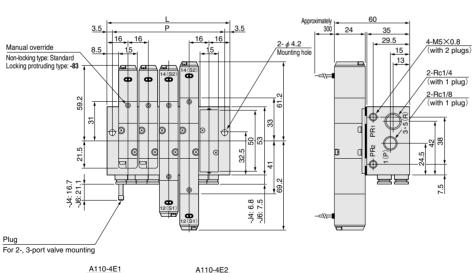


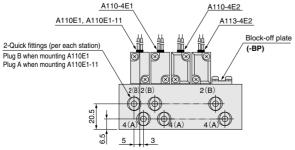


Unit dimensions

Model	L	Р
110M2A	48	41
3A	64	57
4A	80	73
5A	96	89
6A	112	105
7A	128	121
8A	144	137
9A	160	153
10A	176	169
11A	192	185
12A	208	201
13A	224	217
14A	240	233
15A	256	249
16A	272	265
17A	288	281
18A	304	297
19A	320	313
20A	336	329

110M□AJ





stn.1 stn.2 stn.3 stn.4 stn.5

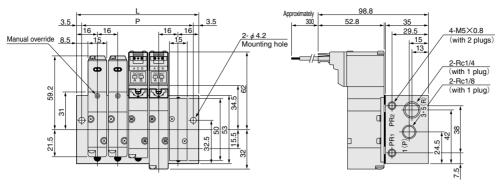


Unit dimensions

Model	L	Р
110M2AJ	48	41
3AJ	64	57
4AJ	80	73
5AJ	96	89
6AJ	112	105
7AJ	128	121
8AJ	144	137
9AJ	160	153
10AJ	176	169
11AJ	192	185
12AJ	208	201
13AJ	224	217
14AJ	240	233
15AJ	256	249
16AJ	272	265
17AJ	288	281
18AJ	304	297
19AJ	320	313
20AJ	336	329

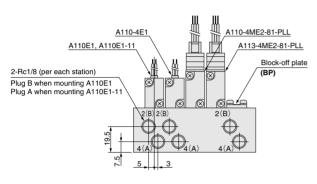
Dimensions of Manifold for Combination Mounting of Tandem Solenoid and 2-, 3-, 5-port Valves (mm)

110M □ A



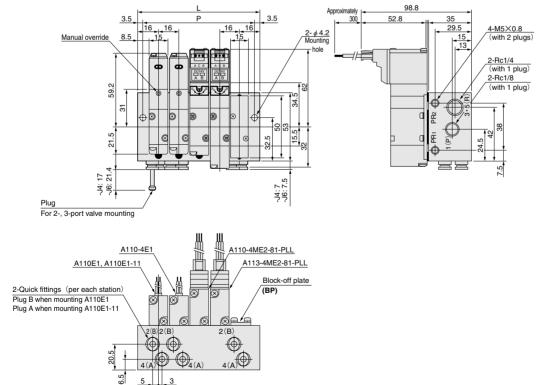
Unit dimensions

Model	L	Р
110M2A	48	41
3A	64	57
4A	80	73
5A	96	89
6A	112	105
7A	128	121
8A	144	137
9A	160	153
10A	176	169
11A	192	185
12A	208	201
13A	224	217
14A	240	233
15A	256	249
16A	272	265
17A	288	281
18A	304	297
19A	320	313
20A	336	329



stn.1 stn.2 stn.3 stn.4 stn.5

110M□AJ



stn.1 stn.2 stn.3 stn.4 stn.5

Unit dimensions

III CII	310113
L	Р
48	41
64	57
80	73
96	89
112	105
128	121
144	137
160	153
176	169
192	185
208	201
224	217
240	233
256	249
272	265
288	281
304	297
320	313
336	329
	L 48 64 80 96 112 128 144 160 176 192 208 224 240 256 272 288 304 320

Made to Order

The 110 series Solenoid Valves include a variety of made to order solenoids for application in a wider range of control and wiring types.

Plug connector

Straight connector with LED indicator



- Without lead wireConnector and contacts included
- L connector with LED indicator
- -PLLN
- Without lead wire
 Connector and contacts included
- •When ordering, enter -PSLN or -PSLL in place of the normal option code for the wiring type.

Lead wire length



- For plug connector ● Length mm [in.] -1L: 1000 [39] -3L: 3000 [118]
- For lead wire length, -1L is 1000mm [39in.] and -3L is 3000mm [118in.].

When ordering, enter ${ extstyle -1L}$ or ${ extstyle -3L}$ following the wiring type option code.

DIN connector



A compact connector that is highly resistant to dust and water splashes.

Employs a self-stripping method that eliminates the need for de-sheathing the lead wire.

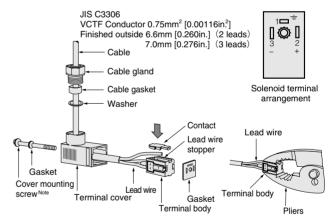
- •When ordering, enter -39 in place of the normal option code for the wiring type.
- A varistor for surge suppression is also equipped.
 (For the AC100V and AC200V only. For DC12V and DC24V, a flywheel diode for surge suppression is installed as standard equipment.)
- ●LED indicator is not available.

Wiring instructions

Solenoid with DIN connector

When de-sheathing (only the outer sheath of the cabtyre), pay attention to the lead wire direction. The cover will be easily mounted when the lead wire on the outer side of the terminal cover is set about 8mm [0.31in.] longer than the inner side.

Without stripping off the sheath, insert the lead until it contacts the lead wire stopper on the terminal body, and then place the contact from the upper side. Then use pliers to press the lead wire further to ensure that the contact is firmly touching the core wire.



Note: The appropriate tightening torque for the cover mounting screw is 29.4N-cm {3kgf-cm} [2.6in-lbf].

LED indicator



The LED indicator for confirmation of operation is also available without a plug connector. This creates a clean monoblock look with a compact cover.

- •When ordering, enter -L in place of the normal option code for the wiring type.
- A varistor for surge suppression is also equipped.
 (For the AC100V and AC200V only. For the DC12V and DC24V, a flywheel diode for surge suppression is installed as standard equipment.)

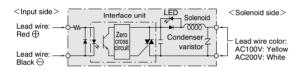
Built-in interface unit



Includes an interface unit with a photo transistor. Can be directly controlled by a microcomputer and logic chip, and is equipped with full electric noise countermeasures and LED indicators.

- ■When ordering, enter -FA in place of the normal option code for the wiring type.
- Cannot be ordered in combination with any other solenoid option
- Rated voltages for the solenoid are AC100V and AC200V only.

Block diagram



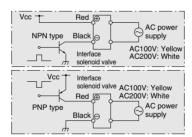
The interface unit is a triac with a photo coupler. Applying DC5V to the input terminals when AC power is applied on the solenoid side causes the LED inside the unit to light up, turns on the triac, and energizes the solenoid. At this time, an LED indicator turns on.

When the input side voltage reaches 0V, the LED inside the unit shuts off, the triac is turned off, and the solenoid is de-energized. At this time, the LED indicator is turned off.

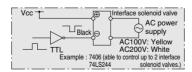
With a built-in zero-cross circuit, the zero-cross voltage is used to turn the power on, and the zero-cross current to turn it off.

Example of control circuits

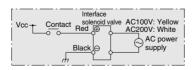
1. Control by transistor



2. Control by TTL, IC



3. Control by relay contact



Red J⊕

Interface

AC powe supply

AC100V: Yellow AC200V: White

4. When input is not a DC5V power supply

R.

Install resistance externally to drop the input voltage to $4\sim$ 6V.

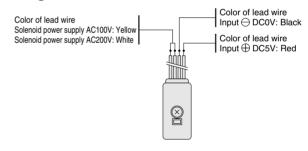
Example	Vp(V)	R1
$1 = \frac{\text{Vp-5-VcE}}{18 \times 10^{-3}} (\Omega)$	12	390 Ω ½W
10 × 10 °	24	1.0K Ω 1W

In the case of VcE=0(V)

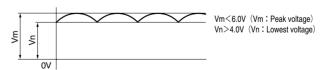
Solenoid Specifications for Valve with Built-in Interface Unit

Item				Specifi	cations	
Rated voltage DC V		5				
Voltage range DC				4~6		
	Current (when	5V DC is applied) mA	18			
Input side	Operating	voltage DC V		4 or b	pelow	
	Return vol	tage DC V		0.8 0	rover	
	Color of le	ad wire		Red (十),	Black (-)	
	Rated volt	age AC V	10	00	20	00
	Туре			Shadir	ng type	
Operating v		oltage range AC V	90~ (100-	125 -25 %)		~250 +25 %)
	Current	Frequency Hz	50	60	50	60
Solenoid	when rated voltage is	Starting mA(r.m.s.)	36	32	18	16
side	applied	Energizing mA(r.m.s.)	24	20	12	10
	Leakage	Frequency Hz	50	60	50	60
	current	Current mA(r.m.s.)	0.3	0.4	0.6	0.8
	Surge suppre	ession (as standard)	Built-in varistor on solenoid side		id side	
	Color of le	ad wire	Yel	low	White	
	Color of LED	indicator (as standard)	Yellow Green		een	
Voltage resistance		Min. AC1500V at input side and solenoid side			enoid side	
Insulation resistance $M\Omega$		Between input side and solenoid side, and between Over 100 whole terminals and body		Over 100		
Zero-cross	s function		Available			
Wiring typ	e and lead	wire length	Grommet type: 300mm [11.8in.]			

Wiring instructions



- Separate the input side and solenoid side lead wires by color. Never apply AC power/6VDC or more to the input side.
- Ensure that voltage ripple on the input side remains within the range shown below.



- **3.** Even when a wrong polarity is applied to the input side, a built-in diode for protection against reverse polarity eliminates any worry about short circuiting. The valve will not operate, however.
- **4.** A varistor and condensor are built-in in the solenoid power supply side, for protection circuit against external surge voltages. As a result, there is a 0.3mA leakage current in AC100V, and a 0.6mA leakage current in AC200V.
- **5.** The operation and return times of the interface unit are 10ms or less with a 50Hz AC power supply, and 8ms or less with a 60Hz AC power supply.

Made to Order

Air-piloted valves 110 series

The ideal air valve for master valves or pilot valves for total pneumatic control.



Effective Area

Effective Area mm ² (c				
		For direct piping, F type manifold	For sub-base, A, AJ type manifolds	
Specifications	Basic model	110-4A, 110-4A2	A110-4A, A110-4A2	
Single valve		4.2(0.23)	4.0(0.22)	
Built-in quick fit-	-J42 4(A), 2(B) ports with fittings	3.6(0.20)	3.6 (0.20) (When mounted on the AJ type manifold with -J4 specification)	
ting for ϕ 4 tube	-J43 ^{1(P), 4(A), 2(B)} ports with fittings	3.6 (0.20)	_	
Built-in quick fitJ62 4(A), 2(B) ports with fittings		_	4.0 (0.22) (When mounted on the AJ type manifold with -J4 specification)	
ting for	-J63 ^{1(P), 4(A), 2(B)} ports with fittings	_	_	
Remarks		Attaching TS4-M5 to the 1(P), 4(A), 2(B) ports gives the value 1.8 (0.1). On the F type manifold, attaching TS4-M5 to the 4(A), 2(B) ports gives the value 2.1 (0.12). When large flow rates are required, we recommend the built-in quick fittings.	 Attaching TS4-01 to the 1(P), 4(A), 2(B) ports on the sub-base (-25) gives the value 3.2(0.18). 	

Specifications

-					
		For direct piping	For direct piping, F type manifold For sub-base, A, AJ type manifold		
		Single pilot	Double pilot	Single pilot	Double pilot
Item Basic	model	110-4A	110-4A2	A110-4A	A110-4A2
Media	dia Air				
Operation typ	е		Air-pilot	ted type	
Number of positions	and ports		2 position	ıs, 5 ports	
Effective area (Cv) mm²		4.2(0.2	23) Note 1	
Port size	Main	M5×0	.8 Note 2	N	lote 2
Port size	Pilot		M5×0.8		
Lubrication	•		Not re	quired	
Operating pressure range	Main	0.15~0.7 {1.5~7.1} [22~102]	0~0.7 {0~7.1} [0~102]	0.15~0.7 {1.5~7.1} [22~102]	0~0.7 {0~7.1} [0~102]
MPa {kgf/cm ² } [psi.]	Pilot	See t	he table "Minir	num Pilot Pres	sure"
Proof pressure MPa (kgf	/cm ² } [psi.]		1.05 {10	.7 } [152]	
Operating temperature range (atmosphere and media) $^{\circ}$ C [$^{\circ}$ F] 5 $^{\sim}$ 60 [41 $^{\sim}$ 140]					
Shock resistance	m/s ² {G}	1373.0 {140.0} (Axial direction 294.2 {30.0})			
Mounting direction Any					
Maximum operating frequ	ency Hz	5			
Mass				50 [1.76] (145 [5.11]) Note 3	

Notes: 1. For details, see the effective area.

- 2. For details, see the port size.
- 3. Figures in parentheses () are the mass with sub-plate: -25.
- % For optional specifications and order codes, see p.301 $\sim\!302.$

Port Size

Basic model For direct piping F type manifold	For sub-base.
	A, AJ type manifolds
Specifications Port 110-4A 110-4A2	A110-4A Remarks A110-4A2
_ 1(P)	
Female thread $4(A),2(B)$ M5 \times 0.8	— Standard
3(R2),5(R1)	
1(P) M5×0.8	
-J42 4(A), 2(B) Built-in quick fitt	
Built-in 3(R2),5(R1) M5×0.8	For ϕ 4 tube
quick fitting 1(P) Built-in quic	── ── ── ●For both nylon tubes and
-J43 4(A), 2(B) fitting	urethane tubes
3(R2),5(R1) M5×0.8	
1(P)	
Sub-base 4(A),2(B) —	Rc1/8 All ports sub-base piping
3(R2),5(R1)	piping
_ 1(P) Rc1/8	●1(P), 3(R2), 5(R1)
F type manifold 4(A),2(B) M5×0.8 or quick file	
3(R2),5(R1) Rc1/8	4(A), 2(B) valve piping
1(P)	Bc1/8 All ports manifold
A type 4(A),2(B) —	Rc1/8 All ports manifold piping
3, 5(R)	Rc1/4
1(P)	Rc1/4 • All ports manifold piping
AJ type 4(A),2(B) -J4	Built-in quick fitting 4(A), 2(B) ports
manifold 4(A),2(b) -J6	Built-in quick fitting -J4 : For ∮ 4 tube
3, 5(R)	-J6 : For φ 6 tube

Manifold Specifications and Port Size

Manifold model	Specifications	Port		Port size
	D. D. manifold minima	1(P)	Rc1/8
F type	P, R manifold piping A, B valve piping	4(A),	2(B)	M5×0.8 or quick fitting (Valve order code: -J42)
	7, B valve piping	3(R2), 5(R1)		Rc1/8
	1 (P)		Rc1/8	
A type	All ports manifold piping	4(A), 2(B)		Rc1/8
		3, 5(R)		Rc1/4
			P)	Rc1/8
A I turno	A, B ports built-in quick fittings	4(A), 2(B)	-J4	Quick fitting for ϕ 4 tube
AJ type	All ports manifold piping	4(A), 2(b)	-J6	Quick fitting for ϕ 6 tube
		3, 5(R)		Rc1/4

^{*} For optional specifications and order codes, see p.302.

Manifold Mass

g [oz.]

Manifold model		Mass calculation of each unit	Mounting valve					
		(n=number of units)	110-4A	110-4A2	A110-4A	A110-4A2		
F type		(20×n)+30 [(0.71×n)+1.06]	40 [1.41]	45 [1.59]	_	_		
A type		(60×n)+60 [(2.12×n)+2.12]						
AJ	-J4	(67×n)+60 [(2.36×n)+2.12]	_	_	45 [1.59]	50 [1.76]		
type	-J6	(64×n)+60 [(2.26×n)+2.12]						

Calculation example: The mass of 110M 10F stn.1 \sim 5 110-4A, stn.6 \sim 10 110-4A2 becomes (20 \times 10)+30+(40 \times 5)+(45 \times 5)=655g [23.10 oz.]

Minimum Pilot Pressure

MPa {kgf/cm²} [psi.]

Main pressure Model	0.15 {1.5} [22]	0.3 {3.0} [44]	0.5 {5.1} [73]	0.7 {7.1} [102]
110-4A	0.15 {1.5} [22]	0.25 {2.5} [36]	0.34 {3.5} [49]	0.45 {4.5} [65]
110-4A2	0.08 {0.8} [12]	0.10 {1.0} [15]	0.12 {1.2} [17]	0.14 {1.4} [20]

Required Time for Switching

S

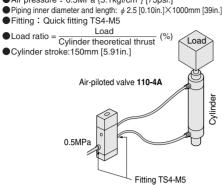
Model	Operation	Pilot line length L m [ft.]						Measurement circuit	Measurement conditions		
Model	Operation	2 [6.6]	6 [19.7]	10 [32.8]	20 [65.6]	50 [163.9]	100 [327.8]	weasurement circuit	ivieasurement conditions		
110.44	ON	0.06	0.14	0.26	0.63	2.30	6.54	Pilot valve (B port plug)	●Pilot valve=050-4E1 (effective area1.2mm²		
110-4A	OFF	0.12	0.33	0.67	1.65	6.30	19.50		(Cv: 0.067))		
A110 4A0	ON	0.07	0.10	0.00	0.70	0.00	7.40	Pilot valve	● Tube inner diameter = 4mm [0.16in.] ■ Air pressure (both main and pilot)=0.5MPa		
A110-4A2	OFF	0.07	0.16	0.29	0.70	2.66	7.40		[73psi.]		

Cylinder Operating Speed and Flow Rate

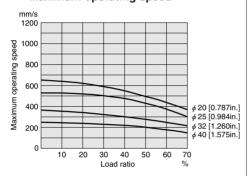
110-4A

Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm²} [73psi.]



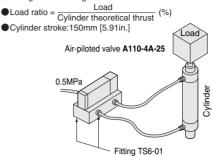
Maximum operating speed



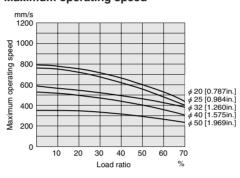
A110-4A-25

Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm²} [73psi.]
- lacktriangle Piping inner diameter and length $\ddot{\cdot}$ ϕ 4 [0.16in.]imes1000mm [39in.]
- Fitting: Quick fitting TS6-01

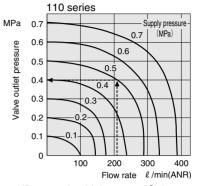


Maximum operating speed



1mm/s = 0.0394in./sec

Flow rate

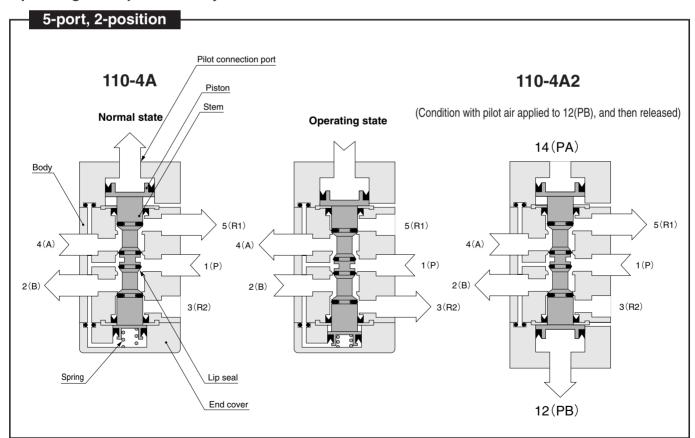


 $1MPa = 145psi., 1 \ell /min = 0.0353 ft^3/min.$

How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 210 ℓ /min [7.41ft3/min.] (ANR), the valve outlet pressure becomes 0.4 MPa [58psi.].

Operating Principles and Major Parts



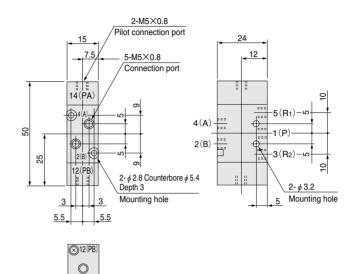
Major Parts and Materials

Parts	Materials
Body	Aluminum alloy
Stem	(anodized)
Lip seal	Synthetic rubber
Mounting base	Mild steel (zinc plated)
Sub-base	Aluminum alloy (anodized)

110-4A

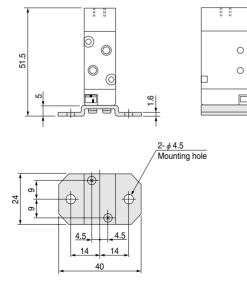
M5×0.8 Pilot connection port 5-M5×0.8 Connection port 12 -5(R₁) 46.5 4(A)-1(P) 2(B) 21.5 -3(R₂) 2- φ 2.8 Counterbore φ 5.4 2- ϕ 3.2 Depth 3 Mounting hole Mounting hole 5 5.5 2-M2.6 Depth 2.5 Mounting thread

110-4A2



Options

● Mounting base : -21

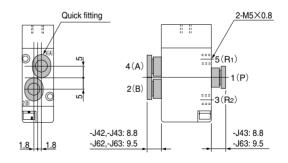


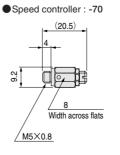
• With quick fittings: **-J42** (For ϕ 4 tube, 4(A), 2(B) ports with fittings)

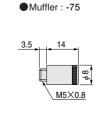
(S)

- **-J43** (For ϕ 4 tube, 1(P), 4(A), 2(B) ports with fittings)
- **-J62** (For ϕ 6 tube, 4(A), 2(B) ports with fittings)
- **-J63** (For ϕ 6 tube, 1(P), 4(A), 2(B) ports with fittings)

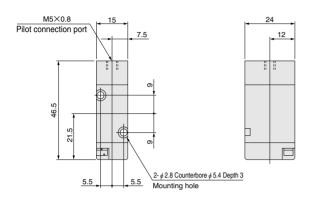
The drawing shows the -J43 specification.



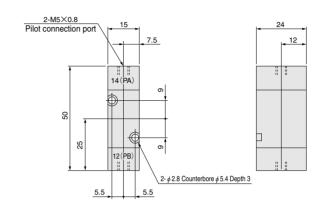




A110-4A



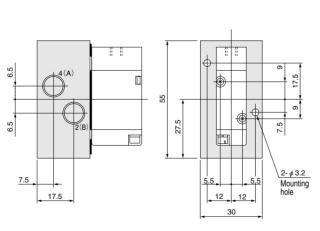
A110-4A2

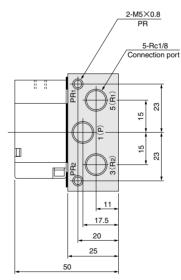




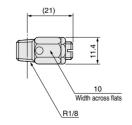
Options

●Sub-base : -25





● Speed controller : -70



Handling Instructions and Precautions

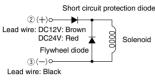


Solenoid

Internal circuit

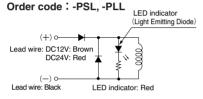
DC12V, DC24V

Standard solenoid (Surge suppression)



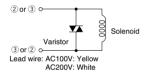
2 and 3 are for with DIN connector (Order code: -39).

Solenoid with LED indicator (Surge suppression)



●AC100V. AC200V

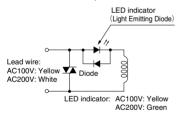
Standard solenoid (Surge suppression)



 $\ensuremath{\textcircled{2}}$ and $\ensuremath{\textcircled{3}}$ are for with DIN connector (Order code : -39).

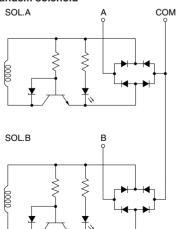
Solenoid with LED indicator (Surge suppression)

Order code: -PSL, -PLL



●DC24V

Tandem solenoid



Cautions: 1. Do not apply megger between the lead wires

- The DC solenoid will not short circuit even if the wrong polarity is applied, but the valve will not operate.
- 3. Leakage current inside the circuit could result in failure of the solenoid valve to return, or in other erratic operation. Always use it within the range of the allowable leakage current. If circuit conditions, etc. cause the leakage current to exceed the allowable leakage current, consult us.
- For double solenoid and twin solenoid, avoid energizing both solenoids simultaneously. The valve could fall into a neutral position.

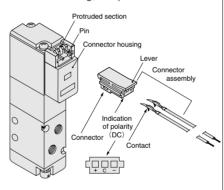


Plug connector

Attaching and removing plug connector

Use fingers to insert the connector into the pin, push it in until the lever claw latches onto the protruded section of the connector housing, and complete the connection.

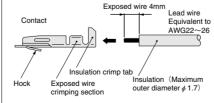
To remove the connector, squeeze the lever along with the connector, lift the lever claw up from the protruded section of the connector housing, and pull it out.



 \divideontimes Illustration shows the 110 series.

Crimping of connecting lead wire and contact

To crimp lead wires into contacts, strip off 4mm [0.16in.] of the insulation from the end of the lead wire, insert it into the contact, and crimp it. Be sure to avoid catching the insulation on the exposed wire crimping section.



Cautions: 1. Do not pull hard on the lead wire.

Always use a dedicated tool for crimping of connecting lead wire and contact.

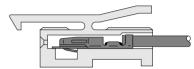
Contact: Model 702062-2M Manufactured by Sumiko Tech, Inc.

Crimping tool: Model F1-702062 Manufactured by Sumiko Tech, Inc.

Attaching and removing contact and connector

Insert the contact with a lead wire into a plug connector \square hole until the contact hook latches on the connector and is secured to the plug connector. Confirm that the lead wire cannot be easily pulled out.

To remove it, insert a tool with a fine tip (such as a small screwdriver) into the rectangular hole on the side of the plug connector to push up on the hook, and then pull out the lead wire.



Cautions: 1. Do not pull hard on the lead wire.It could result in defective contacts, breaking wires, etc.

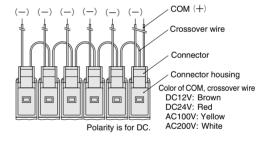
If the pin is bent, use a small screwdriver, etc. to gently straighten out the pin, and then complete the connection to the plug connector.



Common terminal pre-wired plug connector

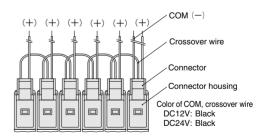
Pre-wired common terminal at DC positive side or AC.

Order code With straight connector: -CPSL With L connector: -CPLL



2. Pre-wired common terminal at DC negative side

Order code With straight connector: -CMSL With L connector: -CMLL



Cautions: 1.The diagrams show the straight connector configuration.

While the connector's orientation is different in the case of the L connector, in every case the first COM lead wire comes from the last station's mounted valve.

2. Since the COM terminal is connected to a crossover terminal inside the connector housing, the connector cannot be switched between a positive common and a negative common by changing the connectors.

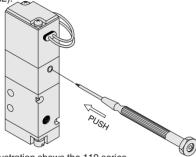


Manual override

Non-locking type

To operate the manual override, press it all the way down. The single solenoid valve works the same as when in the energized state as long as the manual override is pushed down, and returns to the normal position upon release.

For the double solenoid and twin solenoid valves, pressing the manual override on the 12(S1) side switches the 12(S1) to enter the energized position, and the unit remains in that state even after the manual override is released. To return it to the normal position, operate the manual override on the 14(S2) side. This is the same for the solenoid 14(S2).

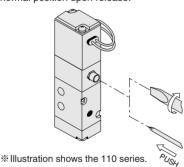


* Illustration shows the 110 series.

Locking protruding type

Use a small screwdriver to turn the adjusting knob several times in the clockwise direction, and lock the manual override in place. When locked, turning the adjusting knob several times in the counterclockwise direction releases a spring on the manual override, returns it to the normal position, and releases the lock.

For the locking protruding type, when the adjusting knob is not turned, this type acts just like the non-locking type, like the valve is the energized position as long as the manual override is pushed down, and it returns to the normal position upon release.



Cautions: 1. The 110 series valves are internal pilot type solenoid valves. As a result, the manual override cannot switch the main valve without air supplied from the 1(P)

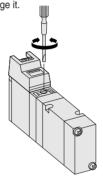
- Always release the lock of the locking type and locking protruding type manual override before commencing normal operation.
- Do not attempt to operate the manual override with a pin or other object having an extremely fine tip. It could damage the manual override button.
- Do not turn the adjusting knob more than needed. It could result in defective operation.



Manual override (Tandem solenoid)

Locking type

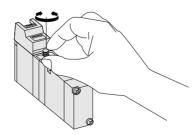
To lock the locking type manual override, use a small screwdriver to push down the manual override in all the way, then set the 0 position as the reference point and turn it in the clockwise direction as far as position A. This achieves the same conditions as when the 14(SA) side is energized, and the manual override is locked in place. For the 12(SB) side, turn it in the counterclockwise direction as far as position B. To release the lock, return the manual override to the 0 position. A spring mechanism returns the manual override to its normal position, and the lock is released. Care should be taken to avoid excessive turning of the manual override, which could damage it.



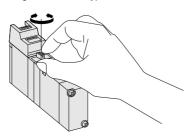
Locking protruding type, locking manual lever type

To lock the locking protruding type manual override or locking manual lever type, use either a small screwdriver or your fingertips to push the manual override button (manual lever) all the way down, then set the 0 position as the reference point and turn it in the clockwise direction as far as position A. This achieves the same conditions as when the 14(SA) side is energized, and the manual override button (manual lever) is locked in place. For the 12(SB) side, turn it in the counterclockwise direction as far as position B. To release the lock, return the manual override button (manual lever) to the 0 position. A spring mechanism returns the manual override button (manual lever) to its normal position, and the lock is released. Care should be taken to avoid excessive turning of the manual override button (manual lever), which could damage it.

Locking protruding type manual override



Locking manual lever type



Cautions: 1. The 110 series valves are internal pilot type solenoid valves. As a result, the manual override cannot switch the main valve without air supplied from the 1(P) port.

- Always release the lock of the locking protruding type manual override before commencing normal operation.
- Do not attempt to operate the manual override with a pin or other object having an extremely fine tip. It could damage the manual override button.
- 4. Do not turn the adjusting knob more than needed. It could result in defective operation.

Mounting base 110-21

When installing a mounting base to the valve, always use the provided screws. The recommended tightening torque for the screws is 49N·cm {5kgf·cm} [4.3in·lbf].

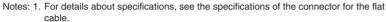
Mounting valves on manifold

When mounting valves on manifold, apply the recommended tightening torque of $39.2N \cdot cm \{4kgf \cdot cm\} [3.5in \cdot lbf]$ for the valve mounting screws.

PC Board Manifold 110 Series Specifications

Manifold Basic Models and Specifications

Basic model	Manifold	function	1(P), 3(R2), 5(R1) manifolds	All port manifold	All port manifold with guick fittings	
	Number	8 stations	110M8FP	110M8AP	110M8AJP	
Item	of units	16 stations	110M16FP	110M16AP	110M16AJP	
	2-, 3-port		110E1	A110	E1	
	5-port, singl	e solenoid	110-4E1	A110	-4E1	
Type of	5-port,		110-4E2	A110	-4E2	
mounting valve	double solenoid		110-4KE2	A110-4KE2		
	5-port, 3-position		113-4E2	A113-4E2		
			113-4KE2	A113-4KE2		
Wiring type			Connector for flat cable ('	hort clip (standard) ong clip (optional) ^{Note2}	
Common wiring			Positive common (standard) Negative common (optional: -CM)Note 2			
Operating temperature range (atmosphere and media) °C [°F]			5~50 [41~122]			
Shock resistance m/s² {G}			294.2 {30.0}			
Mounting direction	on		Any			



^{2.} For order codes, see p.324.

Solenoid Valve Specifications

Basic model	FP type manifo	old	110E1	110-4E1	110-4E2	110-4KE2	113-4E2	113-4KE2
Item	AP, AJP type manif	olds	A110E1	A110-4E1	A110-4E2	A110-4KE2	A113-4E2	A113-4KE2
Media				Air				
Operation t	ype		Internal pilot type					
Effective ar	ea (Cv) r	nm²		4.2(0.23)		3.8(0).21)
Lubrication					Not re	quired		
Operating pressure	e range MPa{kgf/cm²]	[psi.]		0.15	~0.7 {1.5~	~7.1} [22~	-102]	
Proof press	sure MPa{kgf/cm²]	[psi.]			1.05 {10	.7} [152]		
Response tir	me ^{Note} ON/OFF	ms	15/20 or below 20 or below 15/30 or below				r below	
Maximum ope	rating frequency	Hz	5					
Minimum time to e	energize for self holding	ms	_	_	5	0	_	_

Note: Values when air pressure is 0.5MPa {5.1kgf/cm²} [73psi.]. The values for ☐110-4E2 are when switching from the opposite position, while the valves for ☐113-4E2 are those of the closed center valve, when switching from the neutral position.

Solenoid Specifications

Rated voltage	DC12V	DC24V		
Туре	Flywheel diode incorpora	ted for surge suppression		
Operating voltage range DC V	10.8~13.2 (12±10%)	21.6~26.4 (24±10%)		
Current (when rated voltage is applied) mA	140 (1.7W)	75 (1.8W)		
Allowable leakage current mA	8	4		
Insulation resistance $M\Omega$	Over	100		
Wiring type	Plug connector type Straight connector -PSL: With dedicated lead wire for PC board connection, with connector			
Color of lead wire	Red (+), Black (-)			
Color of LED indicator	Re	ed		

Specifications of Connector for Flat Cable

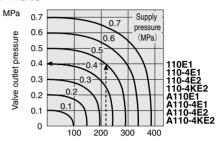
Order code	Header	Socket Note	Strain relief Note	Standard
Blank	Box type, with short clip (Part number: 3662-5002SCSC)	Open end type, with nose	_	MIL-C-83503 conformity (made by
-LC	Box type, with long clip (Part number: 3662-5002LCSC)	(Part number: 7910-6500SC)	Included (Part number: 3448-7910J)	Sumitomo 3M Ltd.)

Remark: Regarding the units with center slots (grooves), note that there is no key groove for the prevention of erroneous insertion.

Note: Included at shipping.



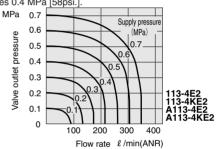
Flow Rate



Flow rate ℓ /min(ANR) 1MPa = 145psi., 1 ℓ /min = 0.0353ft³/min.

How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 210 ℓ /min [7.41ft³/min.] (ANR), the valve outlet pressure becomes 0.4 MPa [58psi.].



 $1MPa = 145psi., 1 \ell /min = 0.0353ft.^3/min.$

Manifold Connection Port Size

Manifold model	Port	Location of piping ports	Port size	
	1(P)	Manifold	Rc1/8	
110M□FP	4(A), 2(B)	Valve	M5×0.8Note	
	3(R2),5(R1)	Manifold	Rc1/8	
	1(P)		Rc1/8	
110M□AP	4(A), 2(B)	Manifold	nc1/8	
I I UWI L.AP	3, 5(R)	Manilold	Rc1/4	
	PR		M5×0.8	
	1(P)		Rc1/8	
110M□AJP	4(A), 2(B)	Manifold	Quick fitting for ϕ 4 or ϕ 6	
	3, 5(R)	,	Rc1/4	
	PR		M5×0.8	

Note: When the mounting valve is a female thread specification, the ports are this size. For the built-in quick fitting type, quick fittings for ϕ 4 are installed.

Mass g [oz.]

						9 []
Manifold	Manifold	Мо	Block- off			
model	mass	□110E1	□110-4E1	□110-4E2	□113-4E2	plate
110M8FP	240 [8.47]	80	80	125	145	6
110M16FP	450 [15.87]	[2.82]	2] [2.82]	[4.41]	[5.11]	[0.21]
110M8AP	590 [20.81]	85	85	130	150	11
110M16AP	1120 [39.51]	[3.00]	[3.00]	[4.59]	[5.29]	[0.39]
110M8AJP	590+(7Xn ₁)+(4Xn ₂) [20.81+(0.25Xn ₁)+ (0.14Xn ₂)]	85 [3.00]	85	130	150	11
110M16AJP	1120+(7×n ₁)+(4×n ₂) [39.51+(0.25×n ₁)+ (0.14×n ₂)]		[3.00]	[4.59]	[5.29]	[0.39]

Remark: n₁ is the total number of stations with -J4, while n₂ is the total number with -J6.

Additional Parts (To be ordered separately)

Block-off plate



●110 M F-BP F ——For FP type manifold
A ——For AP, AJP type manifolds

Made to Order

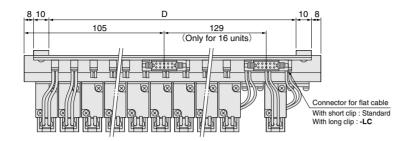
AJP type manifold



SOLENOID VALVES 110 SERIES

Dimensions (mm)

110M8FP 110M16FP

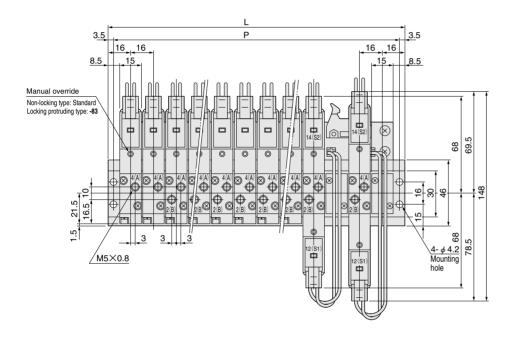


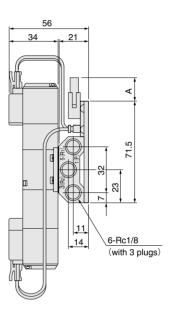
Unit dimensions

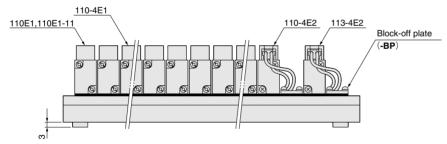
Model	L	Р	D
110M8FP	144	137	108
110M16FP	272	265	236

Option dimensions

Model	Α
Short clip	12.5
Long clip	15.5





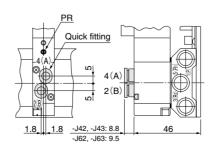


Options

● Locking protruding type manual override: -83

●With quick fittings: -J41 (A port with fitting)
-J42 (A, B ports with fittings)
The drawing shows the -J42 specification.



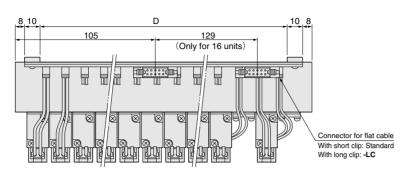


Note: PR is on the side with the 4(A), 2(B) ports.

Dimensions (mm)

110M8AP

110M16AP

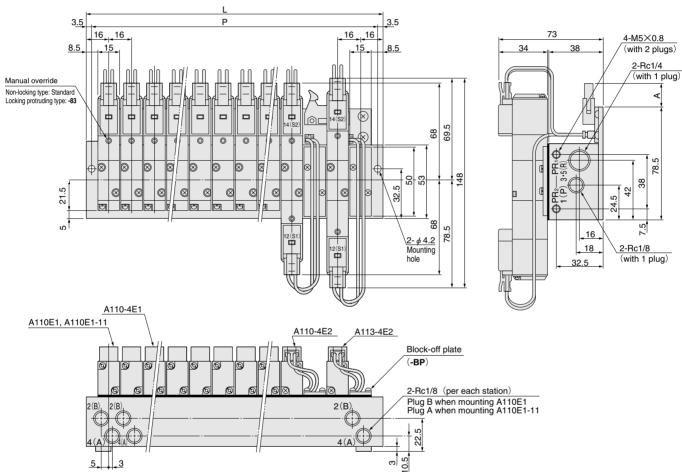


Unit dimensions

Model	L	Р	D
110M8AP	144	137	108
110M16AP	272	265	236

Option dimensions

Model	Α
Short clip	12.5
Long clip	15.5



Option

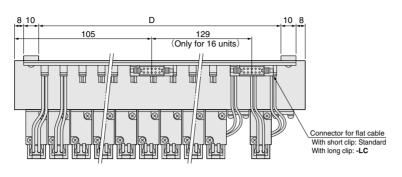
● Locking protruding type manual override: -83



Dimensions (mm)

110M8AJP

110M16AJP

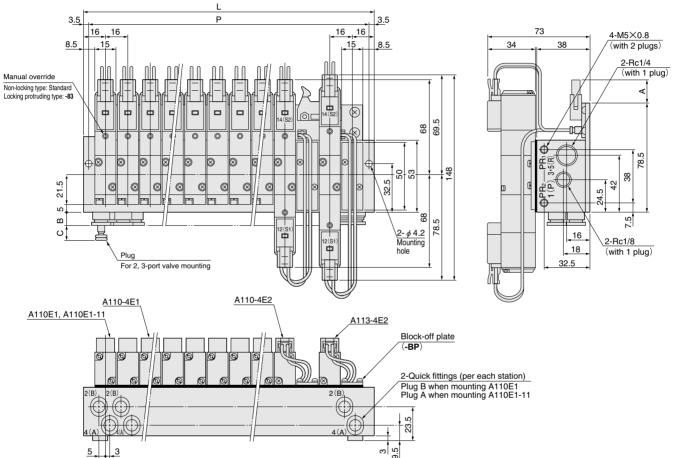


Unit dimensions

Model	L	Р	D
110M8AJP	144	137	108
110M16AJP	272	265	236

Option dimensions

Model	Α	В	С
Short clip	12.5	_	
Long clip	15.5	_	
Quick fitting for φ 4 tube	_	6.8	16.7
Quick fitting for ϕ 6 tube	_	7.5	21.1



Option

● Locking protruding type manual override: -83



Handling Instructions and Precautions (PC Board Manifold)

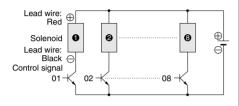


Solenoid

Circuit configurations

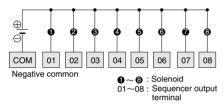
For positive common type (standard)

Operation example



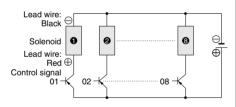
Correspondence to sequencer

Output module is negative common type.



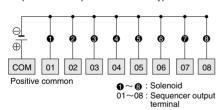
● For negative common type (optional: -CM)

Operation example



Correspondence to sequencer

Output module is positive common type.



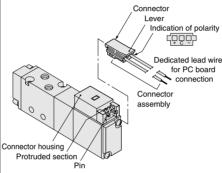


Plug connector

Attaching and removing plug connector

Use fingers to insert the connector into the pin, push it in until the lever claw latches onto the protruded section of the connector housing, and complete the connection.

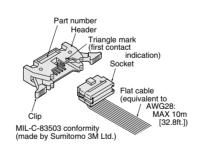
To remove the connector, squeeze the lever along with the connector, lift the lever claw up from the protruded section of the connector housing, and pull it out.



Cautions: 1. Do not pull hard on the lead wire.lt could result in defective contacts, breaking wires, etc.

If the pin is bent, use a small screwdriver, etc. to gently straighten out the pin, and then complete the connection to the plug connector.

Connector for flat cable





Manifold

Print circuit board

Avoid using in the locations listed below, as it may result in deterioration of the print circuit board or a short circuit in the wiring. If use in such conditions is unavoidable, always provide a cover or other adequate protective measures.

- Locations subject to high levels of dust or oil mists
- **2.** Locations subject to salt, corrosive gases, or conductive particles
- Locations directly subject to condensation, direct sunlight, or other weather effects

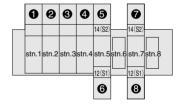
Combination mounting for different type of valves

In the 110 series manifold for combination mounting of 2-, 3-, 5-port, and the PC board manifold for combination mounting of 2-, 3-, 5-port, single solenoids can be mounted together with double solenoids, or with twin solenoids, and a total number of up to 8 or 16 solenoids can be mounted.

In this case, observe the following precautions:

- Always use a block-off plate (-BP) to close the next right station (the side with the higher numbered station) of the double solenoid valve mounting station.
- When using block-off plates (-BP) for some reason other than item 1, place them together on the higher numbered stations side.
- 3. Connector pin numbers are allocated to stations in order from the left end of the manifold. For a double solenoid mounting, the upper pins are allocated to 14(S2) and the lower ones to 12(S1), with the upper 14(S2) numbers being the smaller pin numbers. And for a twin solenoid mounting, the left side is allocated to 14(S2) and the right side allocated to 12(S1), with the left side 14(S2) numbers being the smaller pin numbers.

Example of 4 single solenoid valves and 2 double solenoid valves installation on an 8 unit manifold:



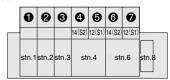
Connector pin location of 8 units:



Remark: The standard is positive common wiring.

Negative common wiring is optional (-CM).

Example of 3 single solenoid valves and 2 double solenoid valves installation on an 8 unit manifold:



Connector pin location of 8 units:



Remark: The standard is positive common wiring.

Negative common wiring is optional (-CM).