

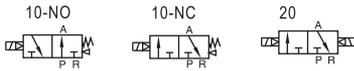
Solenoid valve(3/2 way)

3V100 Series

3V100



Symbol

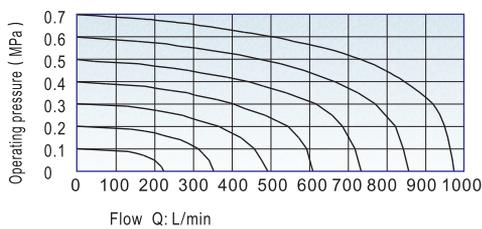


Product feature

1. Pilot-oriented mode: Internal pilot or external pilot.
2. Structure in sliding column mode: good tightness and sensitive reaction.
3. Double control solenoid valves have memory function.
4. Internal hole adopts special processing technology which has little attrition friction, low start pressure and long service life.
5. No need to add oil for lubrication.
6. Affiliated manual devices are equipped to facilitate installation and debugging.
7. Several standard voltage grades are optional.
8. Integrate with the manifold to save installation space.

Flow chart

Model: 3V110-06-NO



Specification

Model	3V110-M5	3V120-M5	3V110-06	3V120-06
Fluid	Air (to be filtered by 40 μm filter element)			
Acting	Internal pilot or external pilot			
Port size ①	M5		1/8"	
Orifice size	5.5mm ² (Cv=0.31)		12.0mm ² (Cv=0.67)	
Valve type	3 port 2 position			
Lubrication ②	Not required			
Operating pressure	0.15~0.8MPa(21~114psi)			
Proof pressure	1.5MPa(215psi)			
Temperature °C	-20~70			
Material of body	Aluminum alloy			

① PT thread, G thread and NPT thread are available.

② Once lubricated air is used, continue with same medium to optimise valve life span. Lubricants like ISO VG32 or equivalent are recommended.

Coil specification

Item	Specification
Standard voltage	AC220V, AC110V, AC24V, DC24V, DC12V
Scope of voltage	AC: ± 15% DC: ± 10%
Power consumption	AC: 2.5VA DC: 2.5W
Protection	IP65(DIN40050)
Temperature classification	B Class
Electrical entry	Terminal, Grommet
Activating time	0.05 sec and below
Max. frequency ①	5 cycle/sec

① The maximum actuation frequency is in the no-load state.

Ordering code

3V 1 10 06 NO A □ □ -W

- Model**
3V: Solenoid valve(3/2 way)
- Code**
1: 100 Series
- Valve type**
10: Single solenoid
20: Double solenoid
- Port size**
M5: M5
06: 1/8"
- Acting type**

Valve type	Acting type
10	NC: Normally closed NO: Normally opened
20	Not code
- Pilot type**
 - Blank: Internal pilot
 - W: External pilot
- Thread type**

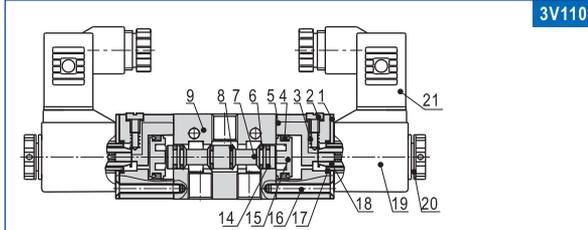
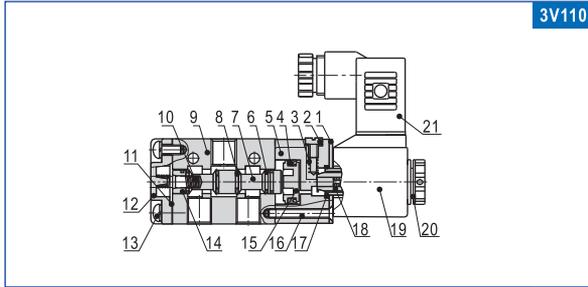
Port size	Thread type
1/8"	Blank: PT
	G: G
	T: NPT
M5	Not this code
- Voltage**
 - A: AC220V
 - B: DC24V
 - C: AC110V
 - E: AC24V
 - F: DC12V
- Electrical entry**
 - Blank: Terminal
 - I: Grommet

Please refer to 38 for manifold specification and the order way.

Solenoid valve(3/2 way)

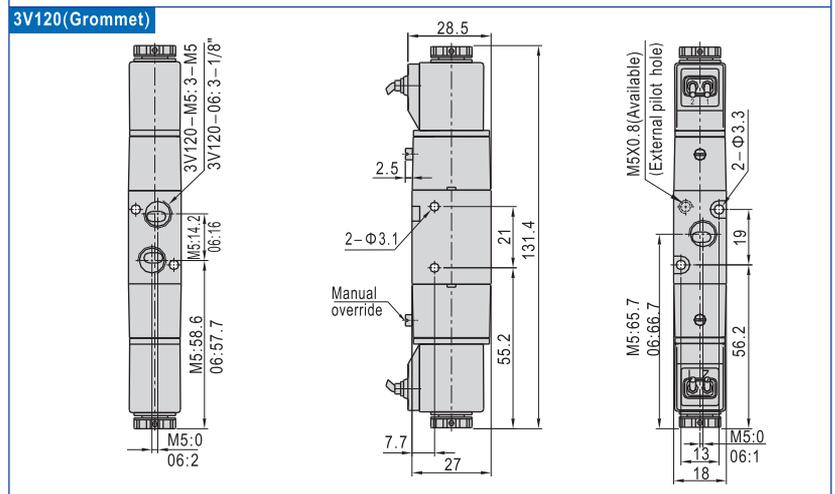
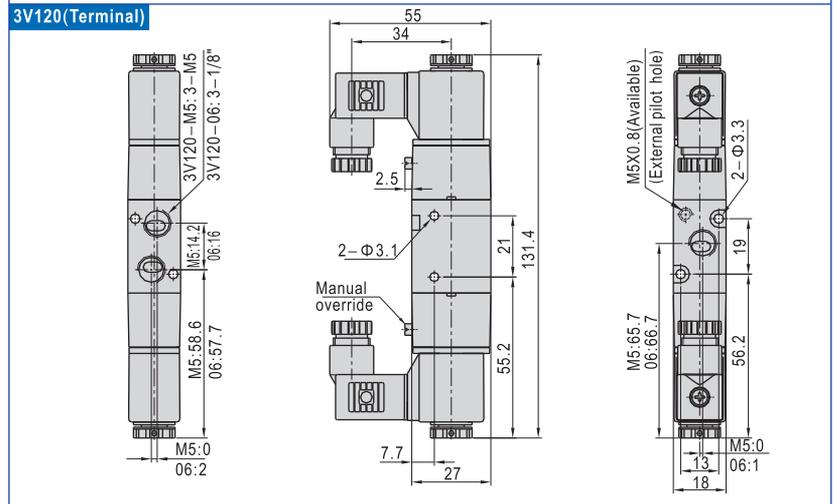
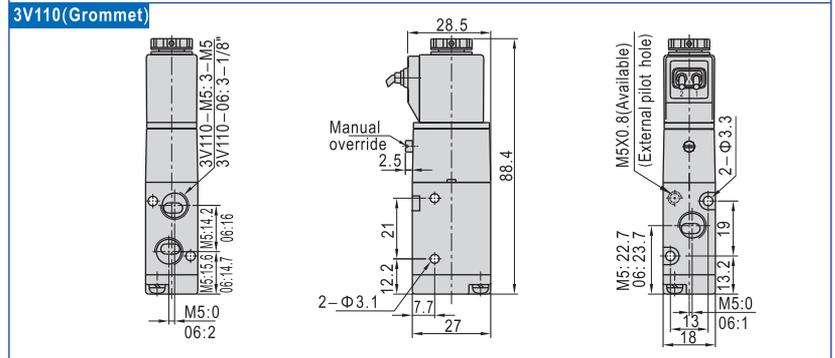
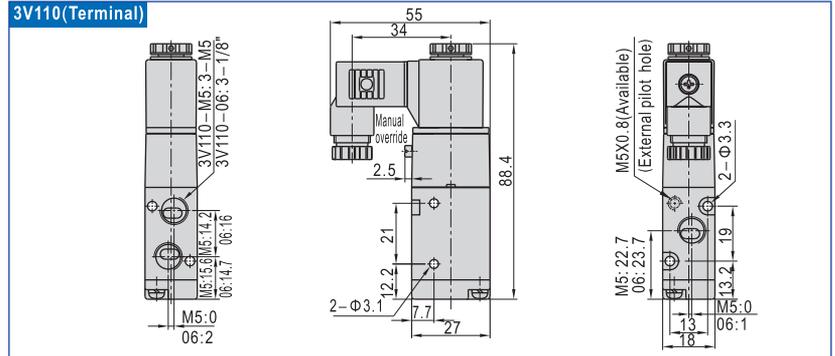
3V100 Series

Inner structure



No.	Item	No.	Item	N0.	Item
1	Fixed plate	8	O-ring	15	Piston
2	Manual override	9	Body	16	Pilot screw
3	Override spring	10	Spool spring	17	O-ring
4	Piston O-ring	11	Bottom cover gasket	18	Armature
5	Pilot body	12	Bottom cover	19	Coil
6	Spool packing	13	Screw	20	Coil net
7	Spool	14	Wear ring	21	Connector

Dimensions



3V100

Solenoid valve(5/2 way, 5/3 way)

4V100 Series

4V100



Specification

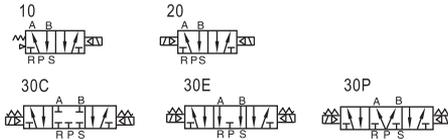
Model	4V110-M5 4V120-M5	4V130C-M5 4V130E-M5 4V130P-M5	4V110-06 4V120-06	4V130C-06 4V130E-06 4V130P-06
Fluid	Air(to be filtered by 40 μ m filter element)			
Acting	Internal pilot or external pilot			
Port size ①	In=Out=M5		In=Out=1/8"	
Orifice size	5.5mm ² (Cv=0.31)	5.0mm ² (Cv=0.28)	12.0mm ² (Cv=0.67)	9.0mm ² (Cv=0.50)
Valve type	5 port 2 position	5 port 3 position	5 port 2 position	5 port 3 position
Operating pressure	0.15~0.8MPa(21~114psi)			
Proof pressure	1.5MPa(215psi)			
Temperature °C	-20~70			
Material of body	Aluminum alloy			
Lubrication ②	Not required			
Max. frequency ③	5 cycle/sec	3 cycle/sec	5 cycle/sec	3 cycle/sec
Weight	4V110-M5:120g 4V120-M5:175g	200g	4V110-06:120g 4V120-06:175g	200g

① PT thread, G thread and NPT thread are available.

② Once lubricated air is used, continue with same medium to optimise valve life span. Lubricants like ISO VG32 or equivalent are recommended.

③ The maximum actuation frequency is in the no-load state.

Symbol



Product feature

- Pilot-oriented mode: Internal pilot or external pilot.
- Structure in sliding column mode: good tightness and sensitive reaction.
- Three position solenoid valves have three kinds of central function for your choice.
- Double control solenoid valves have memory function.
- Internal hole adopts special processing technology which has little attrition friction, low start pressure and long service life.
- No need to add oil for lubrication.
- It is available to form integrated valve group with the base to save installation space.
- Affiliated manual devices are equipped to facilitate installation and debugging.
- Several standard voltage grades are optional.

Coil specification

Item	Specification
Standard voltage	AC220V, AC110V, AC24V, DC24V, DC12V
Scope of voltage	AC: ± 15% DC: ± 10%
Power consumption	AC:2.5VA DC:2.5W
Protection	IP65(DIN40050)
Temperature classification	B Class
Electrical entry	Terminal, Grommet
Activating time	0.05 sec and below

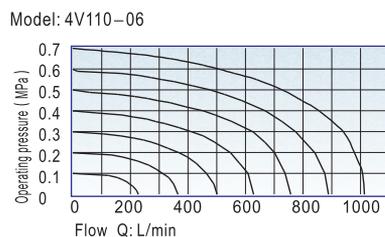
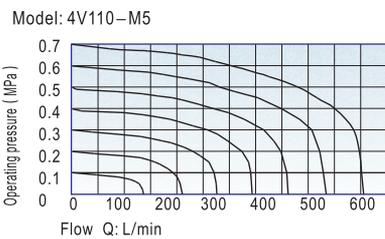
Ordering code

4V 1 10 06 A □ □ -W

- Model**: 4V: Solenoid valve(5/2, 5/3 way)
- Code**: 1: 100 Series
- Valve type**:
 - 10: Single solenoid 5/2 way
 - 20: Double solenoid 5/2 way
 - 30C: Double solenoid 5/3 way closed center
 - 30E: Double solenoid 5/3 way exhaust center
 - 30P: Double solenoid 5/3 way pressure center
- Port size**:
 - M5: M5
 - 06: 1/8"
- Voltage**:
 - A: AC220V
 - B: DC24V
 - C: AC110V
 - E: AC24V
 - F: DC12V
- Pilot type**:
 - Blank: Internal pilot
 - Without M5 thread hole
 - W: External pilot
 - With M5 thread hole
- Thread type**:

Port size	Thread type
1/8"	Blank: PT
	G: G
	T: NPT
M5	Not this code
- Electrical entry**:
 - Blank: Terminal
 - I: Grommet

Flow chart



Please refer to 39 for manifold specification and the order way.

SOLENOID VALVES

030 SERIES

Basic Models and Valve Functions

Item	Basic model Direct piping, T, F, F01 type manifolds	030E1	030-4E1
Number of positions	2 positions		
Number of ports	2, 3 ports		5 ports
Valve function	Normally closed (NC)		Single solenoid

Remark: For optional specifications and order codes, see p.91 ~ 92.

Specifications

Item	Basic model Direct piping, T, F, F01 type manifolds	030E1	030-4E1
Media	Air		
Operation type	Direct acting type		Internal pilot type
Effective area (Cv)	mm ²	1(P)→2(A) 0.6{0.03} 2(A)→3(R) 0.8{0.04}	1(P)→4(A), 2(B) 0.6{0.03} 4(A)→5(R1), 2(B)→3(R2) 0.8{0.04}
Port size <small>Note</small>	M5×0.8		
Lubrication	Not required		
Operating pressure range	MPa{kgf/cm ² } [psi.]	0~0.7 {0~7.1} [0~102]	0.15~0.7 {1.5~7.1} [22~102]
Proof pressure	MPa{kgf/cm ² } [psi.]	1.05 {10.7} [152]	
Response time	ms	DC12V, DC24V	
ON/OFF		AC100V, AC200V	
Maximum operating frequency	Hz	5	
Operating temperature range (atmosphere and media)	°C [°F]	5~50 [41~122]	
Shock resistance	m/s ² {G}	117.7 {12.0}	
Mounting direction	Any		

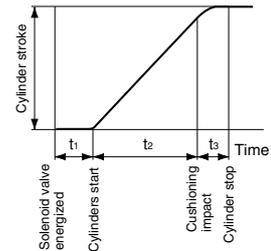
Note: For details, see the port size on p.90.

Solenoid Specifications

Item	Rated voltage				
	DC12V	DC24V	AC100V	AC200V	
Type	Flywheel diode incorporated for surge suppression		Shading type		
Operating voltage range	V	10.8~13.2 (12±10%)	21.6~26.4 (24±10%)	90~132 (100 ⁺³² / ₋₁₀ %)	180~264 (200 ⁺³² / ₋₁₀ %)
Current (when rated voltage is applied)	Frequency	Hz	—	50	60
	Starting	mA (r.m.s.)	—	36	32
	Energizing	mA (r.m.s.)	130 (1.6W) [140 (1.7W) with LED indicator]	65 (1.6W) [75 (1.8W) with LED indicator]	24
Maximum 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.] Note: See made to order on p.97~98.			
Color of lead wire	Brown (+) Black (-)	Red (+) Black (-)	Yellow	White	
Color of LED indicator	Red		Yellow	Green	
Surge suppression (as standard)	Flywheel diode		Varistor		

Cylinder Operating Speed

How to obtain cylinder speed

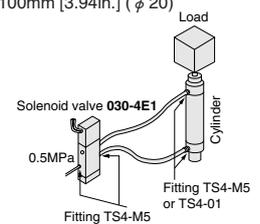


To obtain the time required for the cylinder to complete 1 stroke, add the cylinder's delay time t_1 (time between energizing of the solenoid valve and actual starting of the cylinder), to the cylinder's max. speed operating time t_2 . When a cushion is used, add the cushioning time t_3 , to the above calculations. The standard cushioning time t_3 is approximately 0.2 seconds.

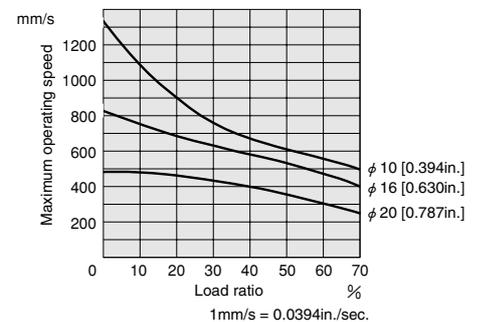
Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm²} [73psi.]
- Piping inner diameter and length:
 ϕ 2.5 [0.1in.]×1000mm [39in.]
 Quick fitting
- Fitting:
 Valve side: TS4-M5
 Cylinder side: TS4-M5 (ϕ 10, ϕ 16)
 TS4-01 (ϕ 20)

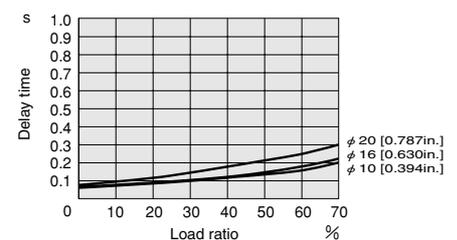
- Load ratio = $\frac{\text{Load}}{\text{Cylinder theoretical thrust}}$ (%)
- Cylinder stroke: 60mm [2.36in.] (ϕ 10, ϕ 16)
 100mm [3.94in.] (ϕ 20)



Maximum operating speed

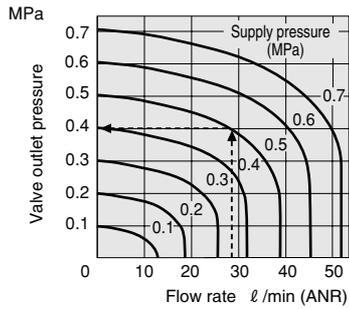


Delay time



Note: Delay time changes depending on the valve construction, the volume of the cylinder and piping.

Flow Rate



1MPa = 145psi., 1 l/min = 0.0353ft.³/min.

How to read the graph

When the supply pressure is 0.5MPa [73psi.] and flow rate is 29 l/min [1.02ft.³/min.] (ANR), the valve outlet pressure becomes 0.4 MPa [58psi.].

Solenoid Valve Port Size

Basic model	Port	Port specification	Port size
030E1	1(P)	Female thread	M5×0.8
	2(A)		
	3(R)	—	φ 1.8
030-4E1	1(P)	Female thread	M5×0.8
	4(A), 2(B)		
	3(R2), 5(R1)	—	φ 1.8

Manifold Port Size

Manifold model	Port	Location of piping ports	Port size
YM□T	1(P)	Manifold	M5×0.8
	2(A)	Valve	
	3(R)	Manifold	M6×1
YM□F	1(P)	Manifold	M5×0.8
	4(A), 2(B)	Valve	
	3, 5(R)	Manifold	M6×1
YM□F01	1(P)	Manifold	Rc1/8
	4(A), 2(B)	Valve	M5×0.8
	3, 5(R)	Manifold	Rc1/8

Solenoid Valve Mass g [oz.]

Basic model	Mass
030E1	57 [2.01]
030-4E1	71 [2.50]

Manifold Mass g [oz.]

Manifold model	Mass calculation of each unit (n=number of units)	Block-off plate
YM□T	(11×n)−1 [(0.39×n)−0.04]	3 [0.11]
YM□F	(20.5×n)−1 [(0.72×n)−0.04]	
YM□F01	(20×n)+23 [(0.71×n)+0.81]	

EA SERIES SPECIFICATIONS

Specifications

Basic Models and Functions

Basic model	For direct piping, F type manifold	EA10□F1 ^{Note} EA10□F2 ^{Note} EA10□F3 ^{Note} EA10□F4 ^{Note}	EA10□F5	EA10□F6
	For base piping, A, AJ type manifolds	EA10□A1 ^{Note} EA10□A2 ^{Note} EA10□A3 ^{Note} EA10□A4 ^{Note}	EA10□A5	EA10□A6
Item				
Number of positions		2 positions		
Number of ports		2, 3 ports	5 ports	
Valve function		Single solenoid NC, NO	Single solenoid	Double solenoid

Remark: For the optional specifications and order codes, see p.113

Note: Valves with valve specifications F1, F2, F3, F4, A1, A2, A3, and A4 are for mounting on manifolds only, and cannot be used as single valve units.

Specifications

Basic model	For direct piping, F type manifold	EA10□F1 EA10□F2 EA10□F3 EA10□F4	EA10□F5	EA10□F6
	For base piping, A, AJ type manifolds	EA10□A1 EA10□A2 EA10□A3 EA10□A4	EA10□A5	EA10□A6
Item				
Media		Air		
Operation type		Internal pilot type		
Flow rate characteristics ^{Note 1}	Sonic conductance C [dm ³ /(s·bar)]	Base piping (A, AJ type): 0.26		
	Effective area S [Cv] mm ²	Direct piping (F type): 1.3 [0.07]		
Port size ^{Note 2}		M3×0.5		
Lubrication		Not required		
Operating pressure range MPa [kgf/cm ²] [psi.]		0.2~0.7 [2~7.1] [29~102]		
Proof pressure MPa[kgf/cm ²] [psi.]		1.05 [10.7] [152]		
Response time ^{Note 3} ON/OFF ms	Standard type	10/20 or below	12 or below	
	Low current type (L)	10/50 or below	12 or below	
	Quick response type (S)	6/7 or below	6 or below	
Maximum operating frequency Hz	Standard type	5		
	Low current type (L)	2		
	Quick response type (S)	10		
Minimum time to energize for self holding ^{Note 4} ms		—	50	
Operating temperature range (atmosphere and media) °C [°F]		5~50 [41~122]		
Shock resistance m/s ² [G]		1373.0 {140} (Axial direction 294.2 {30})	1373.0 {140} (Axial direction 147.1 {15})	
Mounting direction		Any		

Notes: 1. For details, see the flow rate characteristics on p.110.

2. For details, see the port size on p.110.

3. Values when air pressure is 0.5MPa [73psi.].

4. For double solenoid valves.

Solenoid Specifications

Item	Rated voltage	DC12V	DC24V	DC24V	DC24V	
		(Standard type)	(Standard type)	(Low current type)	(Quick response type)	
Operating voltage range	V	10.8~13.2 (12±10%)	21.6~26.4 (24±10%)	21.6~26.4 (24±10%)	21.6~26.4 (24±10%)	
Standard type	Current (when rated voltage is applied) mA (r.m.s)	46	23	—	—	
	Power consumption W	0.55	0.55	—	—	
Low current type Quick response type	Current (when rated voltage is applied)	Starting mA	—	23	125	
		Holding mA	—	6.3	46	
	Power consumption	Starting W	—	—	0.55	3
		Holding W	—	—	0.15	1.1
Start-up time (standard time) ms	—	—	200 or below	30 or below		
Allowable leakage current	mA	2	1	0.5	4	
Insulation resistance	MΩ	Over 100 (value at DC500V megger)				
Color of LED indicator		Red				
Surge suppression (as standard)		Flywheel diode				

Port Size

Specification	Port	2(B), 4(A)	1(P)	3, 5(R)	PR
Single unit	Direct piping	M3×0.5	M3×0.5	M3×0.5	—
	Base piping (with sub-base)	M5×0.8	M5×0.8	M5×0.8	M5×0.8
Manifold	F type	M3×0.5	M5×0.8	Rc1/8	Collected at 3, 5 (R) port
	A type	M5×0.8	Rc1/8	Rc1/8	
	AJ type	Quick fitting for $\phi 4$	Rc1/8	Rc1/8	

Flow Rate Characteristics

The test method for flow rate characteristics conforms to JIS B 8390:2000 (test method for pneumatic equipment — equipment for compressible fluids — flow rate characteristics).

● When used as a single unit

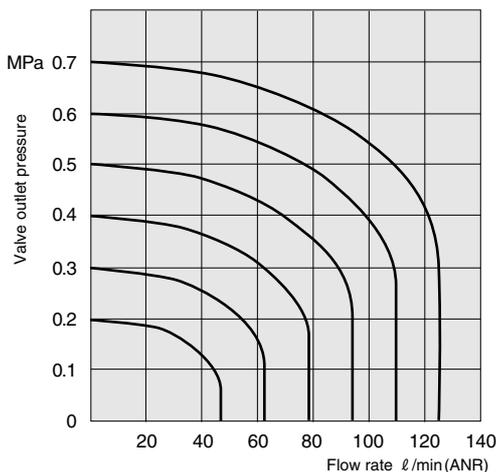
Basic model		Flow path	Sonic conductance C dm ³ /(s·bar)	Critical pressure ratio b	Effective area S [Cv] mm ²	
Direct piping	EA10□F5 EA10□F6	1 (P) → 4 (A)	—	—	1.30 [0.072]	0.75 [0.042] ^{Note1} (with fittings)
		1 (P) → 2 (B)	—	—		
		4 (A) → 5 (R1)	—	—		
		2 (B) → 3 (R2)	—	—		
Base piping (with sub-base)	EA10□A5 EA10□A6	1 (P) → 4 (A)	0.26	0.17	1.30 [0.072] ^{Note3}	
		1 (P) → 2 (B)	0.22	0.00	1.10 [0.061] ^{Note3}	
		4 (A) → 5 (R1)	0.26	0.17	1.30 [0.072] ^{Note3}	
		2 (B) → 3 (R2)	0.26	0.12	1.30 [0.072] ^{Note3}	

● When mounted on a manifold

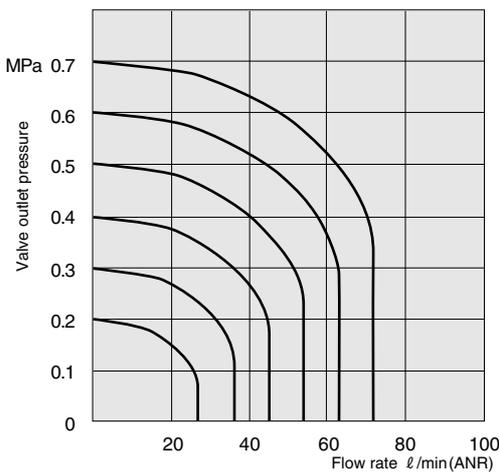
Basic model		Flow path	Sonic conductance C dm ³ /(s·bar)	Critical pressure ratio b	Effective area S [Cv] mm ²	
F type manifold (direct piping type)	EA10□F1 EA10□F2 EA10□F3 EA10□F4 EA10□F5 EA10□F6	1 (P) → 4 (A)	—	—	1.30 [0.072]	0.80 [0.044] ^{Note2} (with fittings)
		1 (P) → 2 (B)	—	—		
		4 (A) → 5 (R1)	—	—		
		2 (B) → 3 (R2)	—	—		
		1 (P) → 4 (A)	0.26	0.12		
A, AJ type manifolds (base piping type)	EA10□A1 EA10□A2 EA10□A3 EA10□A4 EA10□A5 EA10□A6	1 (P) → 2 (B)	0.26	0.18	1.30 [0.072] ^{Note3}	
		4 (A) → 5 (R1)	0.25	0.26	1.25 [0.069] ^{Note3}	
		2 (B) → 3 (R2)	0.26	0.20	1.30 [0.072] ^{Note3}	

- Notes: 1. Quick fitting TS3-M3Ms have been mounted on connection ports 1(P), 2(B), and 4(A).
 2. Quick fitting TS3-M3Ms have been mounted on connection ports 2(B), and 4(A).
 3. Figures in effective area S are calculated based on sonic conductance C ($S=5.0 \times C$).

Base piping type
(Effective area S = 1.3mm² [Cv: 0.072])



Direct piping type with fittings
(Effective area S = 0.75mm² [Cv: 0.042])



- Graphs use flow rate calculations based on the discharge method.
- Use the flow rate as a guide.

1MPa = 145psi., 1 l/min = 0.0353ft.³/min.

SOLENOID VALVES

050 SERIES

Basic Models and Functions

Item	Basic model	Standard type			Low current type	
		050E1	050-4E1	050-4E2	050LE1	050-4LE1
Number of positions		2 positions			2 positions	
Number of ports		2, 3 ports	5 ports		2, 3 ports	5 ports
Valve function	Normally closed (NC, standard) or Normally open (NO, optional)		Single solenoid	Double solenoid	Normally closed (NC, standard) or Normally open (NO, optional)	Single solenoid

Remark: For optional specifications and order codes, see p.137 ~ 138.

Specifications

Item	Basic model	Standard type			Low current type	
		050E1	050-4E1	050-4E2	050LE1	050-4LE1
Media		Air			Air	
Operation type		Direct acting type			Direct acting type	
Effective area [Cv]	mm ²	1.5 [0.08]	1.2 [0.07]		1.5 [0.08]	1.2 [0.07]
Port size ^{Note 1}		M5×0.8			M5×0.8	
Lubrication		Not required			Not required	
Operating pressure range	MPa {kgf/cm ² } [psi.]	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]	
Proof pressure	MPa {kgf/cm ² } [psi.]	1.05 {10.7} [152]			1.05 {10.7} [152]	
Response time ^{Note 2}	DC24V	20/20 or below		20 or below	30/30 or below	
ON/OFF	ms	AC100V, AC200V		25/25 or below	20 or below	
Maximum operating frequency	Hz	5			5	
Minimum time to energize for self holding	ms	—		50	—	
Operating temperature range (atmosphere and media)	°C [°F]	0~50 [32~122]			0~50 [32~122]	
Shock resistance m/s ² {G}	Lateral direction	1373.0 {140.0}			1373.0 {140.0}	
	Axial direction	294.2 {30.0}		147.1 {15.0}	294.2 {30.0}	
Mounting direction		Any			Any	

Notes: 1. For details, see the port size on p.136.

2. Values when air pressure is 0.5MPa {5.1 kgf/cm²} [73 psi.]. Values of the double solenoid valve are switching time from the opposite position.

Solenoid Specifications

Item	Rated voltage	Standard type				Low current type	
		DC24V	AC100V		AC200V		DC24V
Type		DC type	Flywheel type			DC type	
Operating voltage range	V	21.6~26.4 (24 ± 10%)	90~110 (100 ± 10%)		180~220 (200 ± 10%)		21.6~26.4 (24 ± 10%)
Current ^{Note 1} (when rated voltage is applied)	Frequency	Hz	—	50	60	50	60
	Energizing ^{Note 2}	mA(r.m.s)	240 (5.8W) [252 (6.0W)]	74 [83]	71 [79]	48 [50]	46 [48]
Maximum allowable leakage current	mA	20	10		5		10
Insulation resistance	MΩ	10					10
Wiring type and lead wire length	Standard	Grommet type: 300mm [11.8in.]				Grommet type: 300mm [11.8in.]	
	Optional	With DIN connector				With DIN connector	
Color of lead wire		Red [Red(+), Blue(-)] ^{Note 1} Red(+), Black(-) ^{Note 3}	Yellow, Black		White, Black		Red [Red(+), Blue(-)] ^{Note 1} Red(+), Black(-) ^{Note 3}
Color of LED indicator (optional)		Red	Yellow		Green		Red
Surge suppression	Standard	—					—
	Optional	Flywheel diode		—		Flywheel diode	

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

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

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

Solenoid Valve Port Size

Basic model	Port specification	Port size
050E1 ^{Note} , 050-4E1 050-4E2 050LE1 ^{Note} , 050-4LE1	Standard	Female thread M5×0.8
	Optional	Female thread 1(P), 4(A), 2(B) port: Rc1/8 3(R2), 5(R1) port: M5×0.8

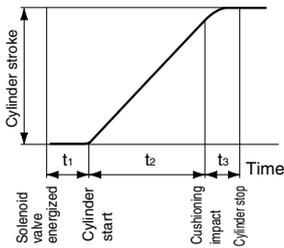
Note: The output ports of 050E1 and 050LE1 are the (2A) port.

Manifold Port Size

Manifold model	Port	Location of piping port	Port size
SM□	1(P)	Manifold	Rc 1/8
	4(A), 2(B)	Valve	M5×0.8 ^{Note}
	3, 5(R)	Manifold	Rc 1/8

Note: For standard specification valves. In the case of optional ports -01: Rc1/8.

Cylinder Operating Speed

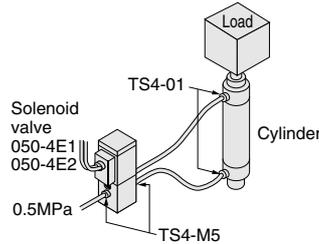


To obtain the time required for the cylinder to complete 1 stroke, add the cylinder's delay time t_1 (time between energizing of the solenoid valve and actual starting of the cylinder), to the cylinder's max. speed operating time t_2 . When a cushion is used, add the cushioning time t_3 , to the above calculations. The standard cushioning time t_3 is approximately 0.2 seconds.

050-4E1, 050-4E2

Measurement conditions

- Air pressure: 0.5MPa {5.1kgf/cm²} [73 psi.]
- Piping inner diameter and length: $\phi 2.5 \times 1000$ mm
- Fitting: Quick fitting TS4-M5, TS4-01
- Load ratio = $\frac{\text{Load}}{\text{Cylinder theoretical thrust}}$ (%)
- Cylinder stroke: 100mm [3.9 in.]



Solenoid Valve Mass

g [oz.]

Basic model	Mass
050E1	190 [6.70] (185 [6.53])
050-4E1	190 [6.70] (185 [6.53])
050-4E2	400 [14.11]
050LE1	295 [10.41] (290 [10.23])
050-4LE1	295 [10.41] (290 [10.23])

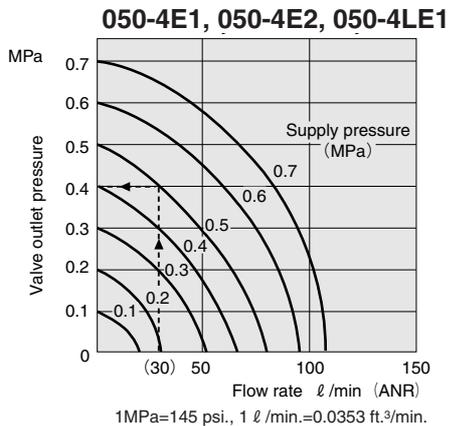
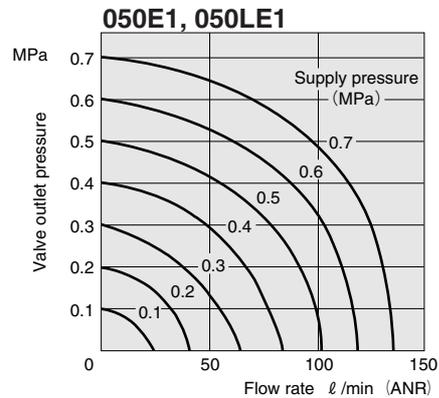
Remark: Figures in parentheses () are for port size Rc1/8: -01.

Manifold Mass

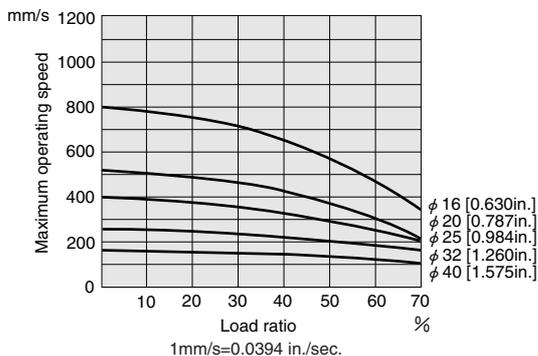
g [oz.]

Manifold model	Mass calculation of each unit (n= number of units)	Block-off plate
SM□	$(47 \times n) + 30$ [(1.66 × n) + 1.06]	20 [0.71]

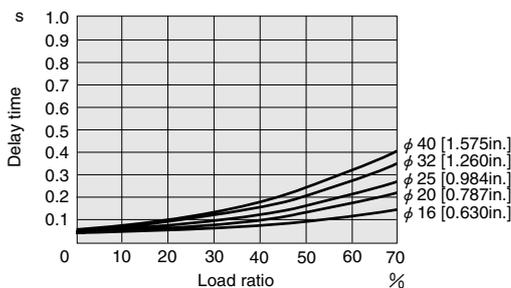
Flow Rate



Maximum operating speed



Delay time



How to read the graph

When the supply pressure is 0.5MPa [73 psi.] and flow rate is 30 l/min [1.06ft³/min.] (ANR), the valve outlet pressure becomes 0.4 MPa [58 psi.].

JC SERIES SPECIFICATIONS

Specifications

Basic Models and Functions

Basic model	For direct piping, F type manifolds	JC10□F1 ^{Note} JC10□F2 ^{Note} JC10□F3 ^{Note} JC10□F4 ^{Note}	JC10□F5	JC10□F6	JC10□F7 JC10□F8 JC10□F9
	For base piping, A type manifolds	JC10□A1 ^{Note} JC10□A2 ^{Note} JC10□A3 ^{Note} JC10□A4 ^{Note}	JC10□A5	JC10□A6	JC10□A7 JC10□A8 JC10□A9
Item					
Number of positions	2 positions			3 positions	
Number of ports	2, 3 ports		5 ports		
Valve function	Single solenoid NC, NO	Single solenoid	Double solenoid	Closed center, Exhaust center, Pressure center	

Remark: For the optional specifications and order codes, see p.239.

Note: Valves with valve specifications F1, F2, F3, F4, A1, A2, A3, and A4 are for mounting on manifolds only, and cannot be used as single valve units.

Specifications

Basic model	For direct piping, F type manifolds	JC10□F1 JC10□F2 JC10□F3 JC10□F4	JC10□F5	JC10□F6	JC10□F7 JC10□F8 JC10□F9
	For base piping, A type manifolds	JC10□A1 JC10□A2 JC10□A3 JC10□A4	JC10□A5	JC10□A6	JC10□A7 JC10□A8 JC10□A9
Item					
Media	Air				
Operation type	Internal pilot type				
Flow rate characteristics ^{Note 1} Sonic conductance C dm ³ /(s·bar)	0.6				
Port size ^{Note 2}	M5×0.8				
Lubrication	Not required				
Operating pressure range MPa {kgf/cm ² }[psi.]	0.2~0.7 {2~7.1} [29~102]			0.25~0.7 {2.5~7.1} [36~102]	
Proof pressure MPa {kgf/cm ² }[psi.]	1.05 {10.7} [152]				
Response time ^{Note 3} ON/OFF	ms	Standard type	10/20 or below	12 or below	10/30 or below
		Low current type (L)	10/50 or below	12 or below	10/60 or below
		Quick response type (S)	6/7 or below	6 or below	6/12 or below
Maximum operating frequency	Hz	Standard type	5		
		Low current type (L)	2		
		Quick response type (S)	10		
Minimum time to energize for self holding ^{Note 4}	ms	—	50	—	
Operating temperature range (atmosphere and media)	°C [°F]	5~50 [41~122]			
Shock resistance	m/s ² {G}	1373.0 {140} (Axial direction 294.2 {30})	1373.0 {140} (Axial direction 147.1 {15})	1373.0 {140} (Axial direction 195.0 {20})	
Mounting direction	Any				

Notes: 1. For details, see the flow rate characteristics on p.236.

2. For details, see the port size on p.237.

3. Values when air pressure is 0.5MPa [73psi.]. The values for the 3-position valves are switching time from the neutral position.

4. For double solenoid valve.

Solenoid Specifications

Item	Rated voltage	DC12V	DC24V	DC24V	DC24V	
		(Standard type)	(Standard type)	(Low current type)	(Quick response type)	
Operating voltage range	V	10.8~13.2 (12±10%)	21.6~26.4 (24±10%)	21.6~26.4 (24±10%)	21.6~26.4 (24±10%)	
Standard type	Current (when rated voltage is applied) mA (r.m.s)	46	23	—	—	
	Power consumption W	0.55	0.55	—	—	
Low current type Quick response type	Current (when rated voltage is applied)	Starting mA	—	23	125	
		Holding mA	—	—	6.3	46
	Power consumption	Starting W	—	—	0.55	3
		Holding W	—	—	0.15	1.1
	Start-up time (standard time) ms	—	—	200 or below	30 or below	
Allowable leakage current	mA	2	1	0.5	4	
Insulation resistance	MΩ	Over 100 (value at DC500V megger)				
Color of LED indicator	Red					
Surge suppression (as standard)	Flywheel diode					

Flow Rate Characteristics

The test method for flow rate characteristics conforms to JIS B 8390:2000 (test method for pneumatic equipment — equipment for compressible fluids — flow rate characteristics).

● When used as a single unit (with fittings)

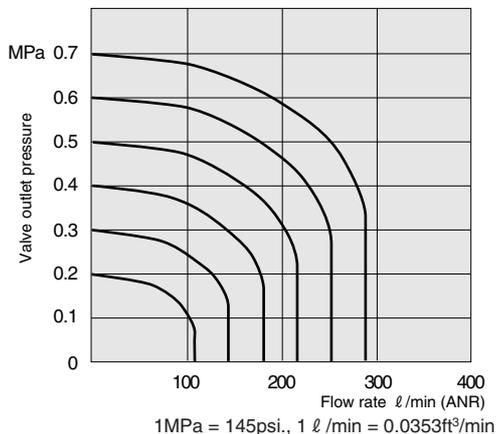
Basic model		Flow path	Sonic conductance C dm ³ /(s·bar)	Critical pressure ratio b	Effective area S mm ² [Cv]
Direct piping ^{Note 1}	JC10□F5 JC10□F6	1 (P) → 4 (A)	—	—	2.80 [0.156]
		1 (P) → 2 (B)	—	—	
		4 (A) → 5 (R1)	—	—	
		2 (B) → 3 (R2)	—	—	
	JC10□F7 JC10□F8 JC10□F9	1 (P) → 4 (A)	—	—	2.50 [0.139]
		1 (P) → 2 (B)	—	—	
		4 (A) → 5 (R1)	—	—	
		2 (B) → 3 (R2)	—	—	
Base piping ^{Note 1} (with sub-base)	JC10□A5 JC10□A6	1 (P) → 4 (A)	0.58	0.40	2.90 [0.161] ^{Note 3}
		1 (P) → 2 (B)	0.57	0.37	2.85 [0.158] ^{Note 3}
		4 (A) → 5 (R1)	0.51	0.29	2.55 [0.142] ^{Note 3}
		2 (B) → 3 (R2)	0.61	0.26	3.05 [0.169] ^{Note 3}
	JC10□A7 JC10□A8 JC10□A9	1 (P) → 4 (A)	0.52	0.36	2.60 [0.144] ^{Note 3}
		1 (P) → 2 (B)	0.53	0.33	2.65 [0.147] ^{Note 3}
		4 (A) → 5 (R1)	0.49	0.27	2.45 [0.136] ^{Note 3}
		2 (B) → 3 (R2)	0.55	0.27	2.75 [0.153] ^{Note 3}

● When mounted on a manifold (with fittings)

Basic model		Flow path	Sonic conductance C dm ³ /(s·bar)	Critical pressure ratio b	Effective area S ^{Note 3} mm ² [Cv]		
F type manifold ^{Note 2} (direct piping type)	JC10□F1 JC10□F2 JC10□F3 JC10□F4 JC10□F5 JC10□F6	1 (P) → 4 (A)	0.66	0.54	3.30 [0.183]		
		1 (P) → 2 (B)	0.62	0.46	3.10 [0.172]		
		4 (A) → 5 (R1)	0.58	0.33	2.90 [0.161]		
		2 (B) → 3 (R2)	0.55	0.14	2.75 [0.153]		
		1 (P) → 4 (A)	0.56	0.41	2.80 [0.156]		
		1 (P) → 2 (B)	0.56	0.42	2.80 [0.156]		
	JC10□F7 JC10□F8 JC10□F9	4 (A) → 5 (R1)	0.53	0.32	2.65 [0.147]		
		2 (B) → 3 (R2)	0.50	0.13	2.50 [0.139]		
		A type manifold ^{Note 2} (base piping type)	JC10□A1 JC10□A2 JC10□A3 JC10□A4 JC10□A5 JC10□A6	1 (P) → 4 (A)	0.61	0.33	3.05 [0.169]
				1 (P) → 2 (B)	0.60	0.31	3.00 [0.167]
4 (A) → 5 (R1)	0.61			0.08	3.05 [0.169]		
2 (B) → 3 (R2)	0.60			0.08	3.00 [0.167]		
JC10□A7 JC10□A8 JC10□A9	1 (P) → 4 (A)		0.54	0.29	2.70 [0.150]		
	1 (P) → 2 (B)		0.54	0.30	2.70 [0.150]		
	4 (A) → 5 (R1)	0.57	0.08	2.85 [0.158]			
	2 (B) → 3 (R2)	0.54	0.09	2.70 [0.150]			

- Notes: 1. Quick fitting TSH6-M5Ms are mounted on connection ports 1(P), 2(B), and 4(A).
 2. Quick fitting TSH6-M5Ms are mounted on connection ports 2(B) and 4(A).
 3. Figures in effective area S are calculated based on sonic conductance C (S=5.0×C).

(Effective area S=3.0mm² [Cv: 0.17])



- The graph uses flow rate calculations based on the discharge method.
- Use the flow rate as a guide.

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.



- 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.

- 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.



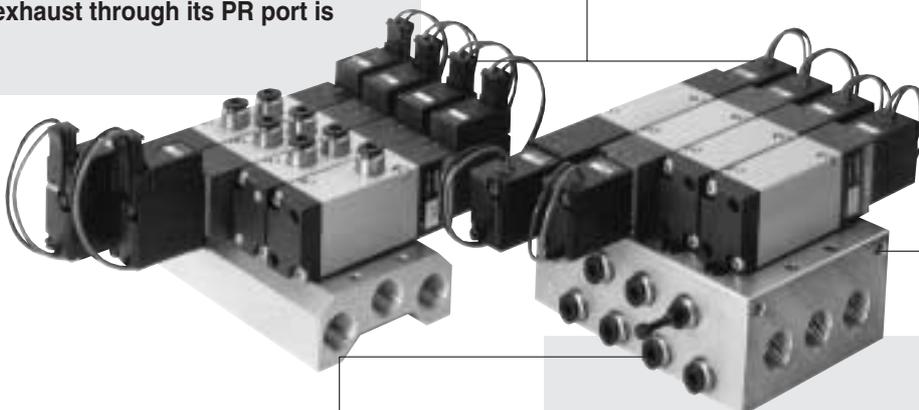
- Built-in quick fittings offer one-touch simple tube installation and removal. Moreover, an effective area of 4.0mm² [Cv: 0.22] enables even more powerful applications.

Full-option type

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

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.

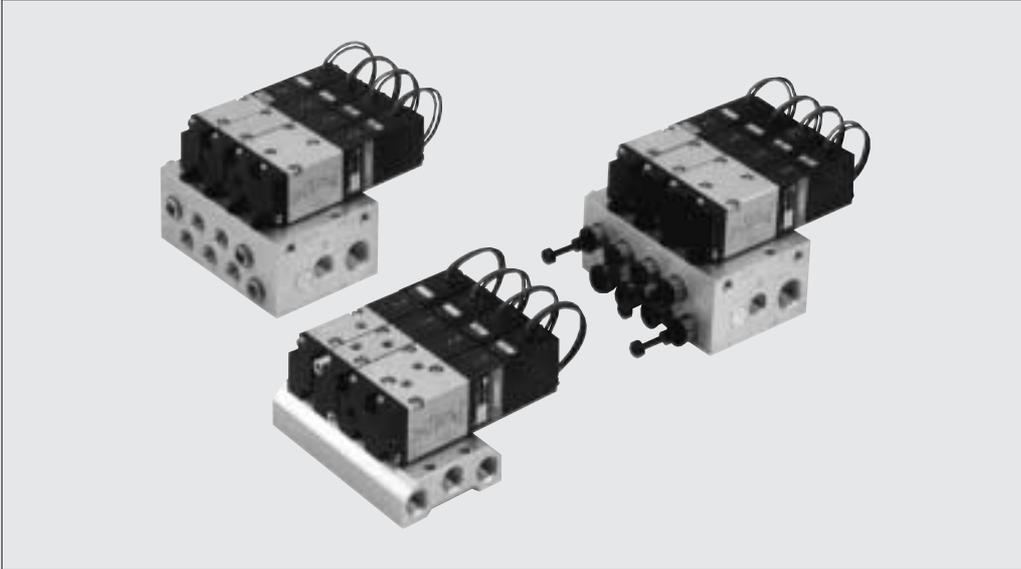
- For the delivery port quick fittings, select from $\phi 4$ or $\phi 6$ fittings for each station in accordance with actuator size.

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.

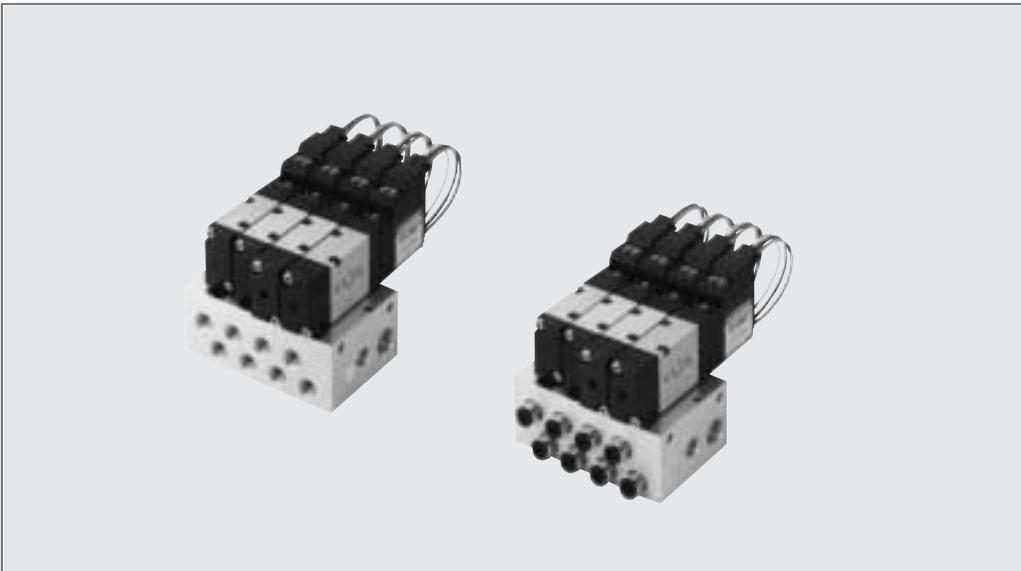
Twin Solenoid Valve



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.

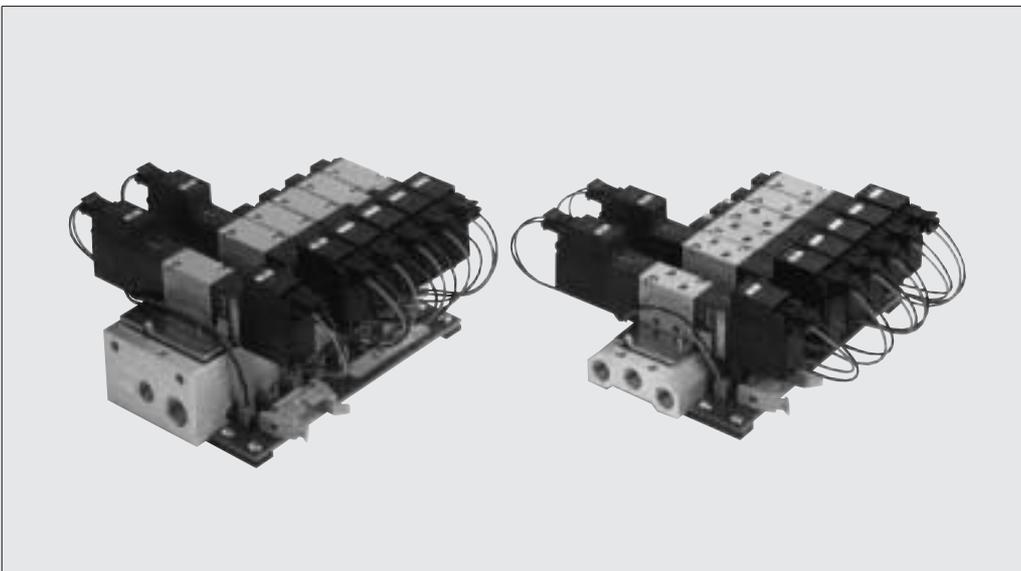
SOLENOID VALVES 110 SERIES

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.

SOLENOID VALVES 062 SERIES

Direct acting 2-, 3-, 4-port

Symbols

Single solenoid (E1) type					Double solenoid (E2) type			Keep solenoid (SE2) type		
2-port		3-port		4-port	2-port	3-port	4-port	2-port	3-port	4-port
NC	NO	NC	NO	NC/NO	NC/NO	NC/NO	—	NC/NO	NC/NO	—
062E1-2	062E1-2-11	062E1	062E1-11	062-4E1	062E2-2	062E2	062-4E2	062SE2-2	062SE2	062-4SE2

Basic Models and Valve Functions

Item	Model	062E1-2	062E1-2-11	062E1	062E1-11	062-4E1	062E2-2	062E2	062-4E2	062SE2-2	062SE2	062-4SE2
Number of positions		2										
Number of ports		2		3		4	2	3	4	2	3	4
Valve function		Single solenoid					Double solenoid			Keep solenoid		
		Normally closed (NC, standard)	Normally open (NO, optional)	Normally closed (NC, standard)	Normally open (NO, optional)	—	Normally closed (NC) or Normally open (NO)		—	Normally closed (NC) or Normally open (NO)		

Specifications

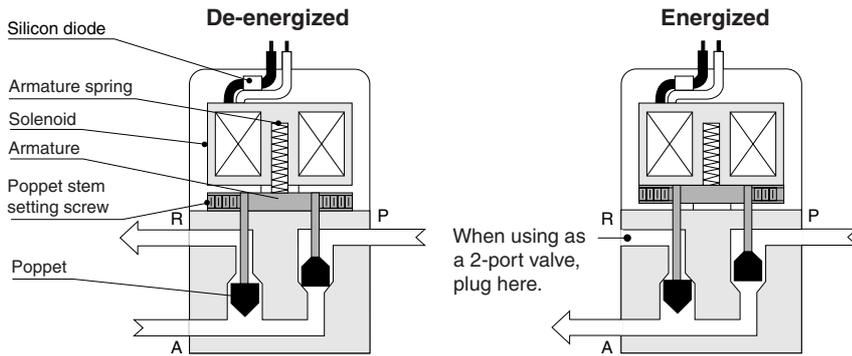
Item	Model	062E1-2	062E1-2-11	062E1	062E1-11	062-4E1	062E2-2	062E2	062-4E2	062SE2-2	062SE2	062-4SE2	
Media		Air											
Operation type		Direct acting											
Effective area [Cv]	mm ²	2.5 [0.12]				1.8 [0.08]	2.5 [0.12]		1.8 [0.08]	2.5 [0.12]		1.8 [0.08]	
Port size	Rc	1/4											
Lubrication		Not required											
Operating pressure range	MPa(kgf/cm ²) [psi.]	0~0.9 [0~9.2] [0~131]											
Proof pressure	MPa(kgf/cm ²) [psi.]	1.35 [13.8] [196]											
Response time	ms	ON				30							
		OFF				30							
Maximum operating frequency	Hz	5											
Minimum time to energize for self holding	ms	—									50		
Operating temperature range (atmosphere and media)	°C [°F]	0~60 [32~140]											
Mounting direction		Any											
Mass	kg [lb.]			0.3 [0.66]				0.5 [1.1]				0.4 [0.88]	

Solenoid Specifications

Item	Solenoid type	Single solenoid (E1)	Double solenoid (E2)	Keep solenoid (SE2)
Voltage type	V	See the Voltage Types and Current.		
Voltage range	%	Rated voltage ±10%		Rated voltage +10%, -5%
Current	mA	See the Voltage Types and Current.		
Energizing type		Continuously energizing type		Common type for momentarily and continuously energizing
Insulation type		B type		
Wiring type		Grommet type		
Lead wire length	mm [in.]	Approximately 300 [11.8]		

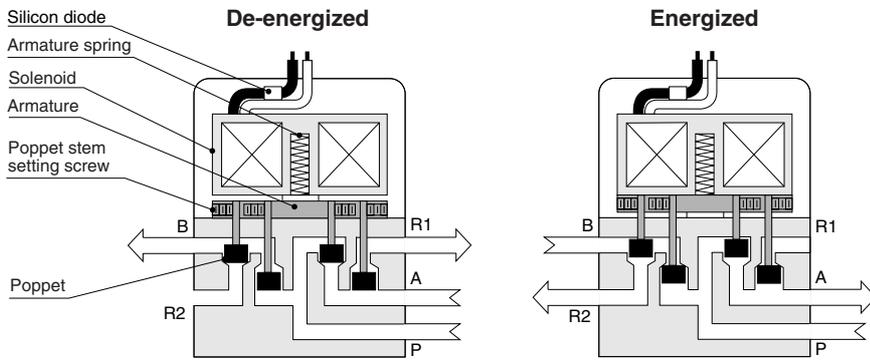
Inner Construction, Major Parts and Materials

● 2-, 3-port



● For the keep solenoid (SE2) type and double solenoid (E2) type, see p.881.

● 4-port

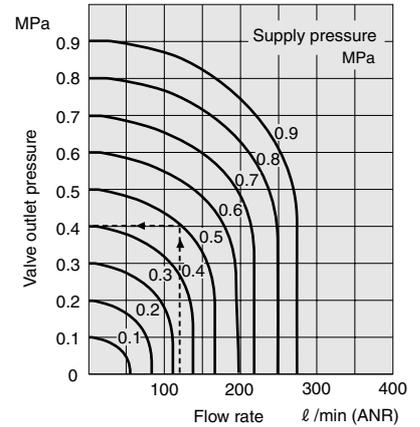


- Although the Inner construction schematic diagram shows R1 and R2 separately, these are in fact combined inside the body, with just the Rc1/4 female thread leading to the outside.
- For the keep solenoid (SE2) type and double solenoid (E2) type, see p.881.

Parts	Materials
Body	Aluminum alloy (anodized)
Poppet stem	Brass
Poppet	Synthetic rubber
Seal	

Flow Rate

● 2-, 3-port

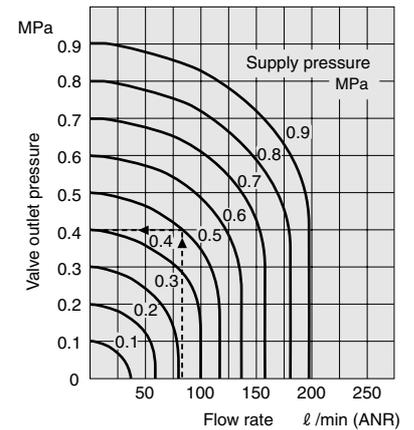


How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 120 l/min [4.24ft³/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

1MPa = 145psi., 1 l/min = 0.0353ft³/min.

● 4-port



How to read the graph

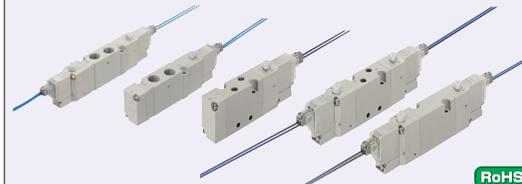
When the supply pressure is 0.5MPa [73psi.] and the flow rate is 85 l/min [3.0ft³/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

1MPa = 145psi., 1 l/min = 0.0353ft³/min.

Solenoid Valves

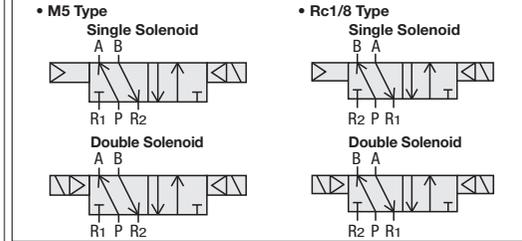
5-Port

5-Port Direct Connection / Base Plumbing Solenoid Valves



RoHS

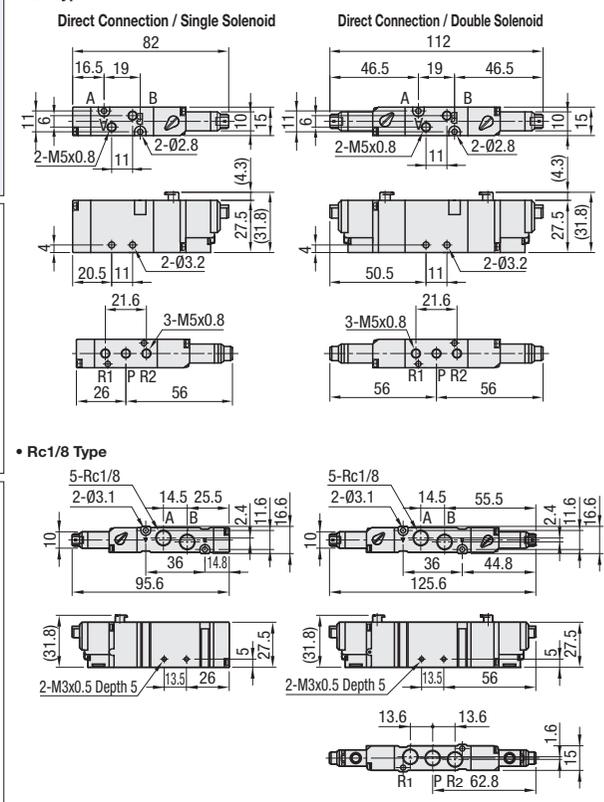
JIS Symbol



Features

- Direct Connection Type can be directly connected to the pipes.
- Base Plumbing Type must be attached on the base unit (P1504) for connection. Can not be directly connected to the solenoid valve. For using this type, please purchase base unit separately.
- External dimensions of this type are the same as those of Direct Connection Type.
- **Direct Connection Type**
- **Base Plumbing Type**
- **Precautions for Use**
 - Operating Environment
 - Use the solenoid valves at temperatures between 5 and 50 °C. Avoid any use and storage in a corrosive atmosphere.
 - Do not use the solenoid valves in such locations as where water or oil splash and dusty area.
 - Fluid Quality
 - When compressed air is used as a fluid, remove drainage and dust through an air filter.
 - Can be used without lubrication maintenance. Use turbine oil "ISO VG32" if any lubricant is to be added.
 - Continuous Current
 - If a valve is continuously energized for long periods, heat generation of the coil may result in reduced performance and shorter service life. Please set the valve to make the nonenergized period longer.
 - Installation
 - The valve must be installed by mounting the body and must not be supported by the plumbing.
 - Maintenance
 - Before the maintenance, be sure that you have turned off the power, stopped the compressed air supply, and no residual pressure left.
 - Do not disassemble the solenoid valves.

M5 Type

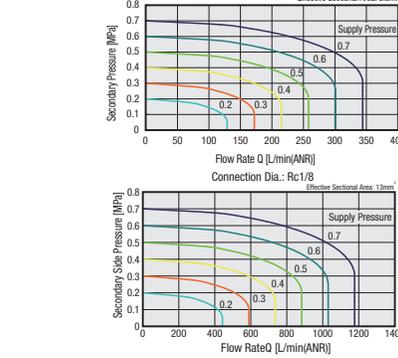


Accessory: Base Plumbing Type only: Gaskets (NBR) / Mounting Screws (SS400 Nickel Plating) / Lead Wire: 500mm

Basic Specifications of Solenoid Valves

Connection Dia.	M5	Rc1/8
Effective Sectional Area	3.8mm ²	13mm ²
Valve Type	Pilot-Operated, 5-Port	
Number of Ports	5	
Number of Positions	2	
Applicable Fluid	Air	
Operating Pressure	0.15~0.7MPa	
Pressure Resistance	1.0MPa	
Response Time	30ms	19ms
Operating Temp. Range	5 ~ 50°C	
Rated Voltage	24VDC, 100VAC, 200VAC	
Power Consumption	2.1/1.8VA(50/60Hz AC), 1.6W(DC) 1.6/2.5VA(50/60Hz AC), 1.2W(DC)	
Allowable Voltage Range	±10%	
Insulation Class	B Type	F Type

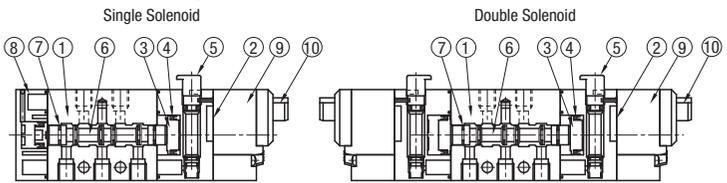
Flow Rate Characteristics



Check for the following when operating condition is poor.
 - Whether the operating pressure is 0.15 ~ 0.7MPa. (Not operational at less than 0.15MPa.)
 - If operated within the range of rated voltage.

Cross Section Structure Diagram

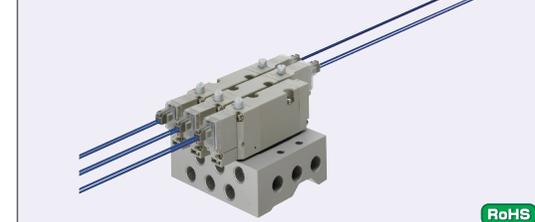
* The figures below are for Direct Connection Type, but the components are in common with the Base Plumbing Type.



Component List

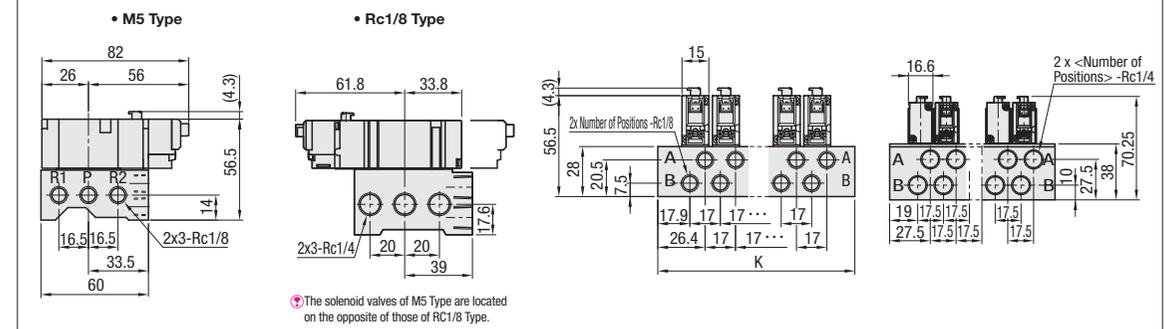
Part Number	Name	Material	Part Number	Name	Material
①	Main Body	A6061	⑥	Spool Valve	A6061
②	Pilot Body	PBT	⑦	Spool Valve Gasket	NBR
③	Piston	POM	⑧	End Cover	PBT
④	Piston Gasket	NBR	⑨	Coil	
⑤	Push Button	POM	⑩	Connector Cord	

5-Port Base Plumbing Solenoid Valve



RoHS

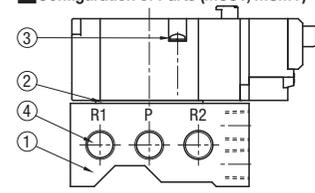
MSSY (Base for M5 Type + Solenoid Valve) / MSSYB (Base for M5 Type)
 MSMY (Base for Rc1/8 Type + Solenoid Valve) / MSMYB (Base for Rc1/8 Type)



Part Number	Specify only for Base + Solenoid Valve Type		M5 Type			Rc1/8 Type			Solenoid Valve Mass (g)	M5 Type		Rc1/8 Type		
	1 ~ 12 Position	Solenoid Valve Voltage (V)	L	K	Base Mass (g)	L	K	Base Mass (g)		Base Unit Price	Additional Price for Solenoid Valve	Base Unit Price	Additional Price for Solenoid Valve	
Type	Number of Positions									S (Single)	D (Double)	S (Single)	D (Double)	
(Base + Solenoid Valve Type)	1	A (24VDC)	30	42	140	32	42	217	(M5) Single 68 Double 80					
	2	B (100VAC)	47	59	203	49.5	59.5	303						
	3	C (200VAC)	64	76	266	67	77	387						
MSSY (M5)	4		81	93	329	84.5	94.5	474						
MSMY (Rc1/8)	5		98	110	392	102	112	558						
	6		115	127	455	119.5	129.5	640						
	7		132	144	518									
(Base only)	8		149	161	581				(Rc1/8) Single 68 Double 87					
MSSYB (M5)	9		166	178	644									
MSMYB (Rc1/8)	10		183	195	707									
	11		200	212	770									
	12		217	229	833									

Ordering Example: Part Number - 1 Position - 2 Positions - 3 Positions - 4 Positions - ... - 12 Positions
 MSSY12 - SA - DA - DC - SB - ... - DB
 MSMY3 - SA - DA - DC - SB - ... - DB
 MSSYB6

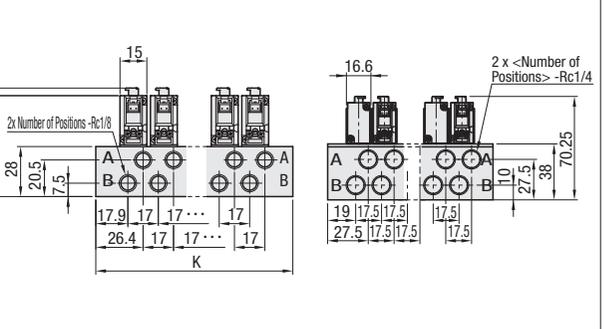
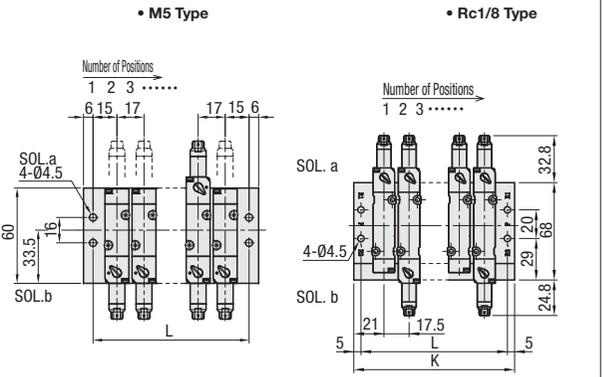
Configuration of Parts (MSSY, MSMY)



Parts Material Table

Part Number	Name	Material
①	Base	A6061
②	Gasket	NBR
③	Set Screw	SS400
④	Plug	Nickel Plating

Arrangement and Selecting Order of Solenoid Valve Installation



- For MSSY and MSMY, the base and the solenoid valve will be assembled before shipping.
- MSSYB and MSMYB are the base only, which are designed to be combined with the Base Plumbing Type of the solenoid valve on the left-hand page. (Assembly is required by the customer.)
- For the Basic Specifications, the Flow Rate Characteristics and the Cross Section Structure Diagram, see the left-hand page.

