KOGANEI VALVES GENERAL CATALOG



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Air-piloted Valves Features

PILOT

Pilot cap

Body

Stem

Diaphragn

(Lower side with holes

Return spring

Body car

Base

Þ

Diaphragm type basic construction (125A type)

Diaphragm (Upper side)

- Since the unit requires air piping only, with no need for electrical wiring, it can be handled by a person without fear of electrical shocks or current leakage.
- Using no electricity means that expensive equipment to protect against explosions, special precautions, or measures against electric noise are not to be required.
- Unlike electrical equipment, the construction is simple. The associated limit valve is also durable and can be used for long periods.
- Because harmless compressed air is used, there is no need for major construction work on the main or pilot air line unlike that of hydraulic piping, and piping work is simple enough for anyone trained to perform.
- The power source is always compressed air, so that the system can be easily used where no power supply exists. In addition, it retains memory for about several dozen minutes, and can therefore continue operations even during power outages.

Koganei Air-piloted Valves Features

Sharp, switching characterized by poppet and diaphragm construction. The valve seat is also reliable. (Quick switching of main pressure helps to keep valve seat seal performance.)

Few breakdowns occur in this construction

The construction is extremely simple. A poppet-type prevents galling or other problems, even if small foreign objects have entered inside. And no sticking occurs even if the unit is left unused for long periods of time. It can be used without lubrication.

With virtually no sliding parts, there is no need for lubrication other than for a few specific models. This means no breakdown due to insufficient lubrication.

Tolerates frequent operations for long operating life The small mass and stroke of the moving parts means a small inertial force which, along with construction with

the large-capacity synthetic rubber for absorbing impacts, ensures continuous high-frequency operations and a long operating life.

Any mounting direction acceptable

No matter what direction is used for mounting, the construction causes no trouble to the operation. Compact and lightweight

A unique, compact design, with a body of light aluminum alloy.



Piston poppet-type basic construction (501A type)

Switching of air pressure signal

Application Examples of Air-piloted Valves





To obtain signals A" and B", turn ON hand operated valves a and b, and open the air-piloted valves A and B. Then, turning off the manual valve for start (which is normally left ON) turns off all of the air-piloted valves, (NO valves) A', B', C', and D', and opens them up, and signals A" and B" appear.

Charts for Selection of Air-piloted Valves

2-, 3-port valve (air flow rate of each model)

Model of air- piloted valve	Air flow rate &/min [ft.3/min.] (Supply pressure 0.5MPa [73psi.] (ANR) when outlet port vents to the air) 200 300400 1000 2000 3000 10000 20000	
3P+34A (TAC valve)	120 [4.2]	_
31P+341A (TAC ² valve)	370 [13.1]	
125A	370 [13.1]	
250A 2503A	1000 [35.3]	
500A	3700 [131]	
375A 501A	4700 [166]	
750A	9300 [328]	
1000A 1250A	186	600 57]

Cylinder bore size mm [in.] Model of air 50 63 80 100 125 140 φ20 <u>4</u>0 180 piloted valve 9691 [2.480] [3.150] [3.937 4P+34A (TAC valv This area presents high cylinde 41P+341A (TAC² valve 250-4A speed is not required. Normal operating range Cylinder speed 2503-4A /max. 200~300mm/s [7.9~11.8in./sec.], Cylinder speed 254-4A (300~500mm/s [11.8~19.7in./sec.] min. 50mm/s [2.0in./sec. 375-4A 501-4A This area presents high cylinder speed is required 750-4A 1000-4A 1250-4A (Cylinder speed: min. 500~600mm/s [19.7~23.6in./sec.])

4-, 5-port valve (applicable cylinder bore size of each model)

Notes : 1. While the speeds shown in this graph assume an air supply pressure of 0.5MPa [73psi.] and a load ratio of 0, the speeds will be virtually the same in the range of 0.4~0.7MPa [58~102psi.], and up to a load ratio of about 30 %

2. In general, select a valve with a margin of about 50 % for the required cylinder speed, and then use a

speed controller to reduce the speed in operation. 3. In considering the time required for the cylinder to make one stroke, the "cylinder delay time" and "cushioning time" need to be considered alongside the "cylinder speed."

Differences between A Type and AA Type Air-piloted Valves

A type valves (Continuous pilot pressure is needed to maintain the operating condition.)





AA type Valves

The difference from the A type valve is the existence of a bypass hole (small hole) on the stem. This helps the pilot valve to maintain its operating condition during a momentary operation. It is able to maintain the operating condition even if a certain amount of air leaks from the pilot line.



Note : These shematic diagrams show the diaphragm type, 3-port valves. The bypass for the 4, 5-port valve is on the A side stem. See the Operating Principles for the 250-4 AA type on p.946.

Safety Precautions (Air-piloted valves)



1. All types other than the A2 (double pilot) type are designed to use air as the media. For other media, consult us. 2. Always check the Catalog, etc., when performing piping to products to ensure that the connections are correctly done Wrong piping could result in abnormal operation of the actuator, etc.

Caution

🛝 Others

- For locations subject to water or to large amounts of dust, use a cover, etc., to protect the valve. In addition, install a muffler, etc., to the R port to prevent entering of dust. Intrusion of water or dust could result in short-term functional breakdowns, or in sudden drops in performance or reduced operating life.
- 1. Use main air pressure higher than the minimum operating pressure listed in the Catalog.
- 2. Set the pilot pressure to a level suitable to the main pressure. An unnecessarily high pressure can shorten the operating life
- 3. If excessively throttling the R port for operation, set the pilot pressure at the main pressure or higher (A type). For details, see the specifications of each series.
- 4. The AA type (internal pilot holding type) cannot be used as a 2-port valve. For a large air flow rate, provide sufficient air supply. In addition, the R port cannot be used in a choked condition. Install speed controllers between the valve and cvlinder.
- 5. As with the normal A type, use a pilot valve size that offers enough margin when the AA type is operated as a single pilot valve. In this case, set the main and pilot valves to the same pressure.

Diaphragm Type Air-piloted Valves Rc1/8~1/2

125, 250, 2503, 500 Series

Symbols

	Spring return internal pilot holding type (AA type)			
2-р	ort	З-р	ort	3-port
NC (normally closed)	NO (normally open)	NC (normally closed)	NO (normally open)	NC (normally closed)
		R P	H R P	
125A-2 250A-2 2503A-2 500A-2	125A-2-11 250A-2-11 2503A-2-11 500A-2-11	125A 250A 2503A 500A (common	125A-11 250A-11 2503A-11 for NC and NO)	125AA 250AA 2503AA

Specifications

			A type (normal type)			AA type (internal pilot holding type)			
Item	Basic model	125A	250A	2503A	500A	125AA	250AA	2503AA*	
Port sizo Po	Main	1/8	1/4	3/8	1/2	1/8	1/4	3/8	
	Pilot		1.	/8		1/8			
Effective area (Cv)	mm ²	5.5 (0.27)	15 (0.76]	55 [2.7]	5.5 (0.27)	5.5 (0.27) 15 (0.76)		
Media					Air	•			
Operating pressure range MPa {kgf/cm ² } [psi]	Main	Normally closed Normally closed with Normally open	ormally closed 0~0.9 {0~9.2} [0~131] Normally closed 0~0.9 {0~9.2} [0~131] ormally closed with booster 0.07~0.9 {0.7~9.2} [10~131] Normally closed 0~0.9 {0~9.2} [0~131] ormally closed with booster 0.07~0.9 {0.7~9.2} [10~131] Normally open 0~0.5 {0~5.1} [0~73]		0.2~0.9 {2.0~9.2} [29~131]				
	Pilot	S	ee the table "Minir	num Pilot Pressure	e "	0.2~0.9 {2.0~9.2} [29~131] (Use at the same pressure as main pressure)			
Proof pressure MPa	{kgf/cm2} [psi.]	Normally closed 1.35 {13.8} [196] 1.35 {13.8} [196] Normally open 0.75 [7.65] [109]			1.35 {13.8} [196]				
Operating temp. range (atmosphere)	re and media) °C [°F]	5~60 [41~140]							
Maximum operating	frequency Hz	10							
Lubrication		Not required							
Mass	kg [lb.]	0.05 [0.11]	0.19 [0.42]	0.22 [0.49]	0.45 [0.99]	0.05 [0.11] 0.19 [0.42] 0.22		0.22 [0.49]	

Notes :1. The AA type offers the 3-port NC (normally closed) only. 2. The ※ mark shows semi-standard products.

3. When excessively throttling the R port in operation, set the pilot pressure at the main pressure or higher.

Operating Principles, Major Parts and Materials

A type normally closed

Normal condition



Note: The AA type (internal pilot holding type) is identical, except for the bypass hole (small hole) in the stem.

Parts	Materials
Body	Aluminum alloy (anodized)
Stem	Brass
Diaphragm	Synthetic rubber (Upper diaphragm of 500A: Urethane rubber)

Order Codes

θA	type	(normal	type)
<u> </u>			-
Basic model_	Jumber of ports-	Valve function-	Option –

Basic model

Nur

(

2

Code	Main port size
125A	Rc1/8
250A	Rc1/4
2503A	Rc3/8
500A	Rc1/2

umber of	ports	(
Code	Number of ports	
Blank	3 ports	

2 ports

Valve function			
Code	Value function		

Coue	valve function
Blank	NC (normally closed)
11	NO (normally open) (500A type common for NC and NO)

Option Code specifications 22 (125A type only) 65

• AA ty	ype (internal pilot holdin	ig type) Option	
Code	Main port size Rc	Code	Specifications
125AA	1/8		With lock nuts for panel mount
250AA	1/4	22	(125AA type only)
2503AA*	3/8		

Notes

Flow Rate



Dimensions (mm)



Note: For normally open type, the exhaust port (R) is on the opposite side (A type)

●250A ●250AA ●2503A ●2503AA



Notes: 1. () shows 2503A, 2503AA

2. For the normally open type, the exhaust port (R) is on the opposite side (A type).



Note: For the normally open type, the exhaust port (R) becomes the inlet port (P), and P becomes R.

Minimum Pilot Pressure

					MP	a [p	si.]
$\overline{}$		Mai	in p	ress	sure		
Mode	0 [0]	0.1 [15]	0.3 [44]	0.5 [73]	0.7 [105]	0.9 [131]	
	NC	0.16 [23]	0.18 [26]	0.26 [38]	0.39 [57]	0.54 [78]	0.67 [97]
125A	With booster NC	_	0.13 [19]	0.2 [29]	0.26 [38]	0.35 [51]	0.44 [64]
	NO	_	0.18 [26]	0.26 [38]	0.39 [57]	0.54 [78]	0.67 [97]
250A 2503A	NC	0.1 [15]	0.18 [26]	0.27 [39]	0.42 [61]	0.62 [90]	0.82 [119]
	With booster NC	_	0.12 [17]	0.18 [26]	0.24 [35]	0.29 [42]	0.36 [52]
	NO	-	0.15 [22]	0.24 [35]	0.34 [49]	0.45 [65]	0.57 [83]
500A	NC	0.1 [15]	0.15 [22]	0.29 [42]	0.46 [67]	0.64 [93]	0.83 [120]
	NO	0.12 [17]	0.18 [26]	0.35 [51]	0.55 [80]	_	_

Note: Set the AA type pilot pressure to the same as the main pressure.

Time Required for Switching by Pilot Line Length

(Both main and pilot 0.5MPa [73psi.]) Pilot line inner diameter 4mm [0.16in.]						
$\overline{\ }$		Pilo	t line	lengt	hLm	ı [ft.]
Mode	Model		6 [19.7]	10 [32.8]	50 [164]	100 [328]
1054	ON	0.05	0.1	0.2	1.0	2.6
IZJA	OFF	0.1	0.2	0.4	1.7	4.8
250A	ON	0.05	0.1	0.2	1.1	2.9
2503A	OFF	0.1	0.2	0.3	1.3	4.0
5004	ON	0.05	0.1	0.15	1.1	3.2
DUUA	OFF	0.1	0.1	0.2	1.2	3.0

How to read the table

For example, when using a 10m [32.8ft.] pilot line to send a signal to the 125A type, it takes 0.2 second for the switching operation to turn it on and 0.4 second to turn it off.



R-PILOTED VALVES SERIES

 $\overline{\triangleleft}$

Air-piloted valve



mod	el		Option			
de	Main port size Rc		Code	Specifications		
٩A	1/8	22		With lock nuts for panel mounting		
٩A	1/4			(125AA type only)		
\A ∦	3/8					
: 1. T 2. 2	The ※ mark shows semi-s P-port valve and normally c	tanc open	lard pro type n	ducts. ot available.		

Piston Poppet Type Air-piloted Valves Rc1/4~1 1/4

375, 501, 750, 1000, 1250 Series

Symbols

Spring return normal type (A type)				
2-p	oort	3-port		
NC (normally closed)	NO (normally open)	NC/NO (common for NC and NO)		
375 501 750 100(1250	375A 501A 750A 1000A 1250A			

Specifications

		A type (normal type)					
Item	Basic model	375A	501A	750A	1000A	1250A	
Port oizo Po	Main	3/8	1/2	3/4	1	1 1/4	
FUIL SIZE NC	Pilot	1,	/8		1/4		
Effective area (Cv)	mm ²	70 (3.5)		140〔7〕	280	[14]	
Media		Air					
Operating pressure range	Main	0~0.9 {0~9.2} [0~131]					
MPa {kgf/cm ² } [psi.]	Pilot	See the table "Minimum Pilot Pressure"					
Proof pressure MPa	{kgf/cm2} [psi.]	1.35 {13.8} [196]					
Operating temp. range (atmosphere	e and media) °C [°F]	0~60 [32~140]					
Maximum operating f	10 3 4						
Lubrication	Required (Turbine Oil Class 1 (ISO VG32) or equivalent)						
Mass kg [lb.]		0.6	[1.3]	1.8 [4.0]	2.7	[6.0]	

Note: When excessively throttling the R port in operation, set the pilot pressure at the main pressure or higher.

Operating Principles, Major Parts and Materials

Normal condition



Operating condition Plug here for normally closed 2-port valve



Parts	Materials
Body	Aluminum alloy (anodized)
Stem	Brass
Poppet seal	Synthetic rubber

Order Codes

A type (normal type)	Basic model		
	Code	Ν	
	375A		
del_ rts -	501A		
od j	750A		
er of	1000A		
Ba mbe	1250A		
N			

sic model					
Code	Main port size Rc				
375A	3/8				
501A	1/2				
750A	3/4				
1000A	1				
1250A	1 1/4				

Number of ports				
Code	Number of ports			
Blank	3 ports			
2	2 ports			

Dimensions (mm)

750A



Note: For the normally closed type, the exhaust port (R) is on the NO side. For the normally open type, the exhaust port (R) is on the NC side. (A type only).



Note: For the normally closed type, the exhaust port (R) is on the NO side. For the normally open type, the exhaust port (R) is on the NC side. (A type only).



Note: For the normally closed type, the exhaust port (R) is on the NO side. For the normally open type, the exhaust port (R) is on the NC side. (A type only).

Flow Rate





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

How to read the graph (1000, 1250 series)

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 13900 ℓ /min [491ft.³/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

Minimum Pilot Pressure

Flow rate *ℓ*/min (ANR)

						I	MPa [psi.]
				Main p	ressure		
Model	\searrow	0 [0]	0.1 [15]	0.3 [44]	0.5 [73]	0.7 [102]	0.9 [131]
375A	NC	0.1 [15]	0.1 [15]	0.22 [32]	0.33 [48]	0.45 [65]	0.57 [83]
501A	NO	0.1 [15]	0.1 [15]	0.19 [28]	0.27 [39]	0.36 [52]	0.45 [65]
750.0	NC	0.1 [15]	0.1 [15]	0.23 [33]	0.34 [49]	0.47 [68]	0.59 [86]
7504	NO	0.1 [15]	0.1 [15]	0.15 [22]	0.2 [29]	0.25 [36]	0.29 [42]
1000A	NC	0.1 [15]	0.1 [15]	0.2 [29]	0.29 [42]	0.39 [57]	0.49 [71]
1250A	NO	0.1 [15]	0.1 [15]	0.15 [22]	0.2 [29]	0.25 [36]	0.32 [46]

Time Required for Switching by Pilot Line Length

Both main and pilot Pilot line inner diameter		0.5MPa [73 4mm [0.16i	n.]		s	
			Pilot I	ine length L	m [ft.]	
Model		2 [6.6]	6 [19.7]	10 [32.8]	50 [164]	100 [328]
375A	ON	0.05	0.1	0.15	1.0	2.9
501A	OFF	0.1	0.2	0.3	1.5	4.0
750.0	ON	0.05	0.15	0.2	1.2	3.0
7504	OFF	0.1	0.3	0.5	2.5	6.0
1000A	ON	0.09	0.15	0.2	1.3	3.7
1250A	OFF	0.2	0.4	0.6	3.3	7.5

How to read the table

For example, when using a 10m [32.8ft.] pilot line to send a signal to the 375A type, it takes 0.15 second for the switching operation to turn it on and 0.3 second to turn it off.

Pilo	t line length L
0.5MPa 요	(Pipe inner diameter $\phi 4)$
Valve 125P	0.5MPa
for pilot	₽≕⊨⇒A
	Air-piloted valve

Diaphragm Type Air-piloted Valves Rc1/4~3/8

250-4, 2503-4 Series

Symbols

Spring return normal type (A type)	Spring return Internal pilot holding type (AA type)
5-r	port
R1 R2 B	R1 R2 B2 B
250-4A 2503-4A	250-4AA 2503-4AA

Specifications

		A type (normal type)		AA type (internal pilot holding type)			
Item	Basic model	250-4A	2503-4A	250-4AA	2503-4AA		
Port oizo Po	Main	1/4	3/8	1/4	3/8		
FUIL SIZE NC	Pilot		1/8				
Effective area (Cv)	mm ²		15 (0.76]			
Media			A	ir			
Operating pressure range	Main	0.07~0.9 {0.7~9.2} [10~131]		0.2~0.9 {2.0~9.2} [29~131]			
MPa {kgf/cm ² } [psi.]	Pilot	See the table "Minim	um Pilot Pressure"	0.2~0.9 {2.0~9.2} [29~131] (Use at th	ne same pressure as the main pressure)		
Proof pressure MP	a {kgf/cm²} [psi.]		1.35 {13	.8} [196]			
Operating temp. range (atmosphe	re and media) °C [°F]		5~60 [41~140]				
Maximum operating	frequency Hz	10					
Lubrication		Not required					
Mass	kg [lb.]	0.6 [1.3]					

Note: Install speed controllers between the valve and cylinder.

Do not attempt to throttle the R port, and do not install a muffler with a large exhaust resistance.

Order Codes

	Basic model		
	Code	Specifications	
	250-4A	Spring return	Rc1/4
asic model-	2503-4A	(normal type)	Rc3/8
	250-4AA	Spring return	Rc1/4
	2503-4AA	(internal pilot holding type)	Rc3/8

Flow Rate



How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 740 ℓ /min [26.1ft3/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

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

Operating Principles, Major Parts and Materials

A type (normal type)

Normal condition



Operating condition



B Pilot air ~ Σ 2(B) 5(R1) 3(R2) 4(A

Internal pilot holding type (AA type)



	Parts	Materials	
) -	Body	Aluminum alloy (anodized)	
	Stem	Brass	
2)	Diaphragm	Curthetic rubber	
	Seal	Synthetic rubber	

Note: For operation instructions, see p.940.

Dimensions (mm)



Minimum Pilot Pressure

					I	MPa [psi.]
			Main p	ressure		
Model	0.07 [10]	0.1 [15]	0.3 [44]	0.5 [73]	0.7 [102]	0.9 [131]
250-4A	0.15	0.18	0.27	0.4	0.53	0.7
2503-4A	[22]	[26]	[39]	[44]	[77]	[102]

Note: Set the AA type pilot pressure to the same as the main pressure.

Time Required for Switching by Pilot Line Length

Both main and pilot Pilot line inner diameter		0.5MPa [73 4mm [0.16i	psi.]) n.]		s	
			Pilot I	ine length L	m [ft.]	
Model		2 [6.6]	6 [19.7]	10 [32.8]	50 [164]	100 [328]
250-44	ON	0.05	0.1	0.15	0.9	2.7

0.15

0.1

0.05

250-4A

2503-4A OFF

How to read the table For example, when using a 10m [32.8ft.] pilot line to send a signal, it takes 0.15 second for the switching operation to turn it on and 0.15 second to turn it off.



1.5

4.0



Piston Poppet Type Air-Piloted Valves Rc1/4~3/8

254 Series

Symbols

Spring return	Spring return
4-p	port
R A B	R A B
254-4A 254-4A-03	254-4AA 254-4AA-03

Specifications

		A type (normal type)		AA type (internal pilot holding type)		
Item	Basic model	254-4A	254-4A-03	254-4AA	254-4AA-03	
Port oizo Po	Main	1/4	3/8	1/4	3/8	
FUIL SIZE NC	Pilot		1,	/8		
Effective area (Cv)	mm ²		15 (0.76〕		
Media			Air			
Operating pressure range	Main	0~0.9 {0~9.2} [0~131]		0.1~0.9 {1.0~9.2} [15~131]		
MPa {kgf/cm ² } [psi.]	Pilot	See the table "Minim	um Pilot Pressure"	0.1~0.9 {1.0~9.2} [15~131] (Use at th	ne same pressure as the main pressure)	
Proof pressure MP	a {kgf/cm²} [psi.]		1.35 {13	.8} [196]		
Operating temp. range (atmosphe	re and media) °C [°F]	0~60 [32~140]				
Maximum operating	frequency Hz	6				
Lubrication		Not required				
Mass	kg [lb.]	0.8 [1.8]				

Order Codes





Port size	
Code	Port size Rc
Blank	1/4
03	3/8

Option

Code	Specification
70	With speed controller

• AA type (internal pilot holding type)



Port size

Code	Port size Rc		
Blank	1/4		
03	3/8		
A built-in type speed controller			

cannot be installed into the 254-4AA type.

Install a separate speed controller (KSC21, KSC31, etc.) between the valve and cylinder.

Flow Rate



How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 740 ℓ /min [26.1ft3/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

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

Operating Principles, Major Parts and Materials



Note: The AA type (internal pilot holding type) is identical, except for the bypass hole (small hole) on the A side stem. For the operating principles and methods of use, see p.940.

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

Dimensions (mm)



- Notes: 1. To change the speed controller installed position to the A port side, just rotate the valve body by 180 degrees. In this case, B becomes NC, while A becomes NO.
 - 2. A built-in speed controller cannot be installed into the 254-4AA type.

Minimum Pilot Pressure

					I	MPa [psi.]
	Main pressure					
Model	0 [0]	0.1 [15]	0.3 [44]	0.5 [73]	0.7 [102]	0.9 [131]
254-4A	0.1	0.15	0.22	0.3	0.4	0.5
254-4A-03	[15]	[22]	[32]	[44]	[58]	[73]

Note: Set the AA type pilot pressure to the same as the main pressure.

Time Required for Switching by Pilot Line Length

Both main and pilot Pilot line inner diamete	0.5MPa [73psi.]) r 4mm [0.16in.]	s

		Pilot line length L m [ft.]					
Model		2 [6.6]	6 [19.7]	10 [32.8]	50 [164]	100 [328]	
254-4A	ON	0.15	0.2	0.3	1.6	3.0	
	OFF	0.2	0.35	0.5	2.8	7.1	

How to read the table

For example, when using a 10m [32.8ft.] pilot line to send a signal, it takes 0.3 second for the switching operation to turn it on and 0.5 second to turn it off. 0.5MPa Valve 125P for pilot Valve 125P for pilot Air-piloted valve

Piston Poppet Type Rc1/4~3/8 Manifold Air-piloted Valves

M254 Series

Order Codes



Note: 1. The prefix M of each valve model signifies a "solenoid valve for manifolds." Enter M in every order code. The order code for the valpack cylinder is M254-4E1-70 or M254-4A-70.

2. The "block-off plate" is used to close unused stations.

Dimensions (mm)



Note: Shows the 254-4E2 and 254-4E1-T dimensions.

Manifold Mass (with valves)

				kg [lb.]
Mounting valve		Solenoid valve		Air-piloted valve
model	Single solenoid	Double solenoid	Keep solenoid	M254-4A
Manifold model	M254-4E1	M254-4E2	M254-4SE2	M254-4AA
M2	2.8 [6.2]	3.3 [7.3]	3.1 [6.8]	2.2 [4.9]
М3	4.2 [9.3]	4.9 [10.8]	4.6 [10.1]	3.3 [7.3]
M4	5.6 [12.3]	6.5 [14.3]	6.1 [13.5]	4.4 [9.7]
M5	7.0 [15.4]	8.1 [17.9]	7.6 [16.8]	5.5 [12.1]
M6	8.4 [18.5]	9.7 [21.4]	9.1 [20.1]	6.6 [14.6]
Single valve unit	0.9 [2.0]	1.2 [2.6]	1.1 [2.4]	0.6 [1.3]

Major Parts and Materials

Parts	Materials
Base	Aluminum alloy (anodized)
Block-off plate	Aluminum alloy (anodized)

Piston Poppet Type Air-piloted Valves Rc3/8~1 1/4

375-4, 501-4, 750-4, 1000-4, 1250-4 Series

Symbols

Spring return Normal type (A type)	Spring return Internal pilot holding type (AA type)
4-p	port
	R P Z Z B
375-4A 501-4A 750-4A 1000-4A 1250-4A	375-4AA 501-4AA

Specifications

			A type (normal type)					pilot holding type)
Item	Basic model	375-4A	501-4A	750-4A	1000-4A	1250-4A	375-4AA	501-4AA
Porteizo Po	Main	3/8	1/2	3/4	1	1 1/4	3/8	1/2
FUILSIZE NC	Pilot	1/	/8		1/4		1/	/8
Effective area [Cv]	mm ²	50	[2.5]	100 (5)	100 (5) 240 (12)			[2.5]
Media			Air					
On any time and the second	Main	0~0.9 {0~9.2} [0~131] 0.1~0.9 {1.0~9.2} [15~13						·9.2} [15~131]
Operating pressure range MPa {kgf/cm ² } [psi.] Pilot			See the ta	0.1~0.9 {1.0~ (Use at the sar the main	~9.2} [15~131] me pressure as pressure)			
Proof pressure MPa	a {kgf/cm²} [psi.]				1.35 {13.8} [196]			
Operating temp. range (atmosphere	re and media) °C [°F]				0~60 [32~140]			
Maximum operating	frequency Hz 6 3 4			1	6	3		
Lubrication			Required (Turbine Oil Class 1 (ISO VG32) or equivalent)				it)	
Mass	kg [lb.]	0.9 [[2.0]	3.4 [7.5]	4.7 [10.4]	0.9 [2.0]	

Note: When excessively throttling the R port for use, set the pilot pressure at the main pressure or higher.

Order Codes

	Basic model		
	Code	Specifications	
del	375-4A		Rc3/8
Basic mo	501-4A		Rc1/2
	750-4A	Spring return	Rc3/4
	1000-4A	(normal type)	Rc1
	1250-4A		Rc1 1/4
	375-4AA	Spring return	Rc3/8
	501-4AA	(internal pilot holding type)	Rc1/2

Operating Principles, Major Parts and Materials

Normal condition

Operating condition



Note: The AA type (internal pilot holding type) is identical, except for the bypass hole (small hole) on the A side stem. For the operating principles and usage, see p.940.

Parts	Materials	
Body	Aluminum alloy (anodized)	
Stem	Brass	
Poppet	Questa stie rubber	
Seal	Synthetic rubber	

Dimensions (mm)

375-4A 375-4AA 501-4A

●501-4AA

Rc1¹/₈ Pilot connection port 375-4A, 375-4AA 4-RC3³/₆ 501-4A, 501-4AA 4-RC1¹/₂





●750-4A





1000-4A1250-4A



Rc1/4 Pilot connection port



Flow Rate



750-4A series



1000-4A series



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

How to read the graph

(1000-4, 1250-4 series) When the supply pressure is 0.5MPa [73psi.] and the flow rate is 12000 ℓ / min [424ft3/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

Minimum Pilot Pressure

					I	MPa [psi.]	
		Main pressure					
Model	0 [0] 0.1 [15] 0.3 [44] 0.5 [73] 0.7 [102] 0.9 [131]					0.9 [131]	
375-4A	0.1 [15]	[15] 0.1 [15]	0.22 [32]	0.36 [52]	0.50 [73]	0.62 [90]	
501-4A							
750-4A	0.1 [15]	0.1 [15]	0.23 [33]	0.34 [49]	0.47 [68]	0.59 [86]	
1000-4A	0.1 [15]	0.4.1451 0.4.1451	0.01.001	0.04 [45]	0.40.0041	0 50 5771	
1250-4A		0.1[15]	0.21 [30]	0.31 [43]	0.42 [01]	0.55 [77]	

Note: Set the AA type pilot pressure to the same as the main pressure.

Time Required for Switching by Pilot Line Length

Both ma	ain and 9 inner	pilot diameter	0.5MPa [73 4mm [0.16i	8psi.]) n.]		s	
$\overline{}$			Pilot I	ine length L	m [ft.]		
Model	\searrow	2 [6.6]	2 [6.6] 6 [19.7] 10 [32.8] 50 [164]				
375-4A	ON	0.05	0.1	0.15	1.1	2.7	
501-4A	OFF	0.1	0.15	0.2	1.7	5.0	
750-44	ON	0.05	0.15	0.2	1.2	3.0	
750-4A	OFF	0.1	0.3	0.5	2.5	6.0	
1000-4A	ON	0.09	0.15	0.2	1.3	3.7	
1250-4A	OFF	0.2	0.4	0.6	3.3	7.5	

How to read the table

For example, when using a 10 m [32.8ft.] pilot line to send a signal to the 501-4A, it takes 0.15 second for the switching operation to turn it on and 0.2 second to turn it off.



Double Pilot Type Air-piloted Valves Rc1/8~3/8

125A2, 250A2, 2503A2 Series

Symbols

2-port	3-port
NC/NO (commo	n for NC and NO)
125A2-2 250A2-2 2503A2-2	125A2 250A2 2503A2

Specifications

Item	Bas	ic model	125A2	2503A2			
Nain Da		lin	1/8	1/4	3/8		
FOIT SIZE NC	Pil	ot		1/8			
Effective area (Cv)		mm ²	5.5 (0.27)	15 (0	0.76]		
Media			Air, Gas, Liquid, Vacuum				
- · · · · · · · · · · ·		Gas	0~0.9 {0~9.2} [0~131] Vacuum 0~−100kPa [0~−29.53in.Hg]				
MPa /kgf/cm ² [nsi]	IVIAIII	Liquid	0~0.2 {0~2.0} [0~29]				
Pilot		ot	See the table "Minimum Pilot Pressure"				
Proof pressure MPa	{kgf/cm ²	} [psi.]		1.35 {13.8} [196]			
Operating temp. range (atmosphere and media) °C [°F]			5~60 [41~140]				
Maximum operating f	requenc	y Hz	z 10				
Lubrication			Not required				
Mass	k	g [lb.]	0.05 [0.11] 0.21 [0.46] 0.24 [0.53]				

Note: The even larger size Rc1/2, 3/4, 1, and 1 1/4 units are available as special orders.

Operating Principles, Major Parts and Materials

Normal condition



Order Codes



Basic mod	el	Opti
Code	Main port size Rc	С
125A2	1/8	
250A2	1/4	:
2503A2	3/8	
Number of	ports	
Code	Number of ports	

3 ports

2 ports

Blank

2

Option	
Code	Specifications
22	With lock nuts for mounting panel (125A2 only)

Handling Precautions

Cannot be used with media that can damage rubber or other body materials.

For use of special media, consult us. The standard material for the diaphragm is NBR, while that for the body is aluminum, and for the stem is brass. However, Viton can also be ordered for the diaphragm, and stainless steel for the main body and stem.

The valve cannot hold either the actuated or unactuated condition on its own.

Maintain a continuous supply of pilot air.

The pilot pressure might be slightly higher for liquid media.

Dimensions (mm)

•125A2



45

●250A2 ●2503A2





Note: The figures in parentheses () are for the 2503A2.

Flow Rate



When the supply pressure is 0.5MPa [73psi.] and the flow rate is 740ℓ /min [26.1ft.³/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

General Application Circuit



Circuit diagram



Minimum Pilot Pressure

						MPa [psi.]	
$\overline{}$		Main (gas) pressure					
Model	0 [0]	0.1 [15]	0.3 [44]	0.5 [73]	0.7 [102]	0.9 [131]	
125A2	0.16 [23]	0.18 [26]	0.33 [48]	0.51 [74]	0.67 [97]	0.82 [119]	
250A2	0 1 [15]	0 20 [20]	0 20 [57]	0 57 [00]	0 74 [107]	0.04 [100]	
2503A2	0.1[15]	0.20 [29]	0.39[37]	0.57 [65]	0.74[107]	0.04 [122]	
Nata: The alt	late. The shows table assumes a second of favora through the main line. For linuid						

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

Note: The above table assumes a gas media flowing through the main line. For liquid media, the pilot pressure will be slightly higher.

Low Pressure Air-piloted Valves (Interface Valves)

125LA

Symbols

2-port	3-port
NC (norma	ally closed)
	R P
125LA-2	125LA

Specifications

Item	Basic model	125LA	
	Main	Rc1/8	
Port size		M5×0.8 or	
	Pilot	Barbed fitting $\begin{pmatrix} barbed fitting for \\ nylon tube \phi 6~4 \end{pmatrix}$	
Effective area (Cv)	mm ²	5.5 [0.27]	
Media		Air	
0	Main	0.2~0.9 {2.0~9.2} [29~131]	
Operating pressure range	Dilat	0.001~0.003 {0.01~0.03} [0.15~0.44], Max.0.1 {1.0} [15]	
ινιι α (και/οιτι) [μοι.]	Pliot	See the table "Minimum Pilot Pressure"	
Proof pressure	Main	1.35 {13.8} [196]	
MPa {kgf/cm ² } [psi.]	Pilot	0.1 {1.0} [15]	
Bleed volume ℓ /min	[ft.3/min.] (ANR)	Max. 1.5 [0.053] (0.5MPa [73psi.])	
Operating temp. range (atmosphere and media) °C [°F]		5~60 [41~140]	
Maximum operating frequency Hz		5	
Lubrication		Not required	
Mass	kg [lb.]	0.1 [0.22]	

Operating Principles, **Major Parts and Materials**



Dimensions (mm)



Flow Rate



How to read the graph When the supply pressure is 0.5MPa [73psi.] and th flow rate is 275 ℓ /min [9.7ft³/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

Handling Precautions

Do not apply higher pressure than the specified pilot pressure.

Use an oil-removing air filter, etc., to prevent impure compressor oil, etc., from entering. To prevent clogging, supply the main line air through the filter to prevent solid objects from mixing into the flow. Supply a sufficient amount of air and

pressure on the P port.

Control of liquid level

When the liquid level rises, the low-pressure pilot line's internal pressure will rise, 125LA will switch ON, and the liquid control valve will activate.



• Air timer (Off delay timer

momentarily return during limited operation time)

operation inme) Pressing the 2-port valve (pressing and releasing) switches the 125LA to ON, and switches it to OFF after a set period. Since the 125LA has a snap-action operation, the neutral position can be kept at the minimum level.



Order Codes

A type (normal type)

125LA-	-
Basic model	Number of ports

Number of ports			
Code	Number of ports		
Blank	3 ports		
2	2 ports		

Minimum Pilot Pressure

MPa [psi.]					
	Main pressure				
Model	0.2~0.35	0.35~0.56	0.56~0.9		
	[29~51]	[51~81]	[81~131]		
125LA	0.002	0.0022	0.0029		
	[0.29]	[0.32]	[0.42]		

Application Examples

Confirmation of objects When a workpiece is blocking the small hole, the pressure in the low pressure pilot line will rise, and 125LA will switch ON.



When a workpiece passes through, the when a workpiece passes through, the sensor pilot on the left side activates, and 125LA will switch ON. If there is no work-piece, the sensor air jet on the right side blows off the left side's pilot air, and 125LA switches OFF.



When a workpiece passes through the jet sensor and blocks the air jet, 125LA will switch OFF.



When a workpiece presses against and bends a rubber tube, the low-pressure pilot line's internal pressure will rise, and 125LA will switch ON.

Use of a coil spring (dense pitch coils, with the end capped) in place of the rubber tube will cause an opposite action to the rubber tube, and switch OFF.



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Before selecting and using products, please read all the Safety Precautions carefully to ensure proper product use. The Safety Precautions shown below are to help you use the product safely and correctly, and to prevent injury or damage to assets beforehand.

Follow the Safety Precautions for: ISO4414 (Pneumatic fluid power—Recommendations for the application of equipment to transmission and control systems), JIS B 8370 (Pneumatic system regulations)

The directions are ranked according to degree of potential danger or damage: "DANGER!" "WARNING!" "CAUTION!" and "ATTENTION!"

Expresses situations that can be clearly predicted as dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in light or semi-serious injury. It could also result in damage or destruction of assets.
While there is little chance of injury, this content refers to points that should be observed for appropriate use of the product.

This product was designed and manufactured as parts for use in General Industrial Machinery.

- In the selection and handling of equipment, the system designer or other person with fully adequate knowledge and experience should always read the Safety Precautions, Catalog, User's Manual and other literature before commencing operation. Making mistakes in handling is dangerous.
- After reading the Instruction Manual, Catalog, etc., always place it where it can be easily available for reference to users of this product.
- If transferring or lending the product to another person, always attach the Instruction Manual, Catalog, etc., to the product where it is easily visible, to ensure that the new user can use the product safely and properly.
- The danger, warning, and caution items listed under these "Safety Precautions" do not cover all possible cases. Read the catalog and user's manual carefully, and always keep safety first.

- Do not use for the purposes listed below:
 - Medical equipment related to maintenance or management of human lives or bodies.
 - 2. Mechanical devices or equipment designed for the purpose of moving or transporting people.
 - 3. Critical safety components in mechanical devices.

This product has not been planned or designed for purposes that require advanced stages of safety. It could cause injury to human life.

- Do not use in locations with or near dangerous substances such as flammable or ignitable substances. This product is not explosion-proof. It could ignite or burst into flames.
- When attaching the product and workpiece, always ensure that it is securely mounted in place. Dropping or falling the product or improper operation could result in injury.
- Persons who use a pacemaker, etc., should keep a distance of at least one meter [3.28ft.] away from the product. There is a possibility that the pacemaker will malfunction due to the strong magnet built into the product.
- Never attempt to remodel the product. It could result in abnormal operation leading to injury, electric shock, fire, etc.
- Never attempt inappropriate disassembly, assembly or repair of the product's basic construction, or of its performance or functions. It could result in injury, electric shock, fire, etc.
- Do not splash water on the product. Spraying it with water, washing it, or using it underwater could result in malfunction of the product leading to injury, electric shock, fire, etc.
- While the product is in operation, avoid touching it with your hands or otherwise approaching too close. In addition, do not make any adjustments to the interior or to the attached mechanisms (manual override, connecting and disconnecting of wiring connectors, adjustment of pressure switches, or release or connection of piping tubes or plugs) while in operation. The actuator can move suddenly, possibly resulting in injury.

- Do not use the product in excess of its specification range. Such use could result in product breakdowns, function stop or damage or drastically reduce the operating life.
- Before supplying air or electricity to the device and before starting operation, always conduct a safety check of the area of machine operation. Unintentional supply of air or electricity could possibly result in electric shocks, or in injury caused by contact with moving portion.
- Do not touch the terminal and the miscellaneous switches, etc., while the device is power on. There is a possibility of electric shock and abnormal operation.
- Do not allow the product to be thrown into fire. The product could explode and/or release toxic gases.
- Do not sit on the product, place your foot on it, or place other objects on it. Accidents such as falling and tripping over could result in injury. Dropping the product may result in injury, or also damage or break the product resulting in abnormal or erratic operation, or runaway etc.
- When conducting any kind of operation for the product, such as maintenance, inspection, repair, or connect/disconnect or replacement of piping, always turn off the air supply completely and confirm that residual pressure inside the product or in piping connected to the product is zero before proceeding. In particular, be aware that residual air will still be in the air compressor or air storage tank. The actuator could abruptly move if residual air pressure remains inside the piping, causing injury.
- Before commencing normal operation, always release the lock on the locking type manual override, and confirm that the manual override is in the normal position and that the main valve is in the proper switching position, and only then commence the operation. Failure to do so could lead to erroneous operation.
- Always shut off power when performing wiring operations. Leaving the power on could result in electric shocks.
- Apply the specified voltage for the solenoid. Using the wrong voltage level will prevent the solenoid from performing its function, and could lead to breakage or burn damage of the product itself.
- Avoid scratching the cords for the sensor switch lead wires, etc. Letting the cords be subject to scratching, excessive

bending, pulling, rolling up, or being placed under heavy objects or squeezed between two objects, may result in current leaks or defective transmission that lead to fires, electric shocks, or abnormal operation.

- Do not pull out the connectors while the power is ON. Also, do not put unnecessary stress on the connector. It could result in erroneous equipment operation that could lead to personal injury, equipment breakdown, or electrical shocks, etc.
- Always check the Catalog to ensure that the product wiring and piping is done correctly. Errors in wiring and piping could lead to abnormal operation of the actuators, etc.
- In the first operation after the equipment has been idle for 48 hours or more, or has been in storage, there is a possibility that contacting parts have been sticked, resulting in equipment operation delays or sudden movements. For these first operations, always run a test operation before use to check that operating performance is normal.
- In low frequency use (more than 30 days between uses), there is a possibility that contact parts will stick, resulting in equipment operation delays or sudden movements that could lead to personal injury. Run a test operation at least once every 30 days to confirm that movement is normal.
- For double solenoid type (excluding the Tandem 3-port valve), do not apply current through both solenoids simultaneously. It is impossible in such a situation to maintain the correct valve position, and the equipment may operate in an unintended direction, leading to the possibility of equipment breakdown or personal injury.
- Do not use the solenoid valves or the wiring that controls them, near power lines where large electrical currents are flowing, or in locations subject to powerful magnetic fields or power surges. Such application could lead to unintended operation.
- The solenoid valve can generate surge voltage and electromagnetic waves when the switch is turned off, affecting the operations of surrounding equipment. Use solenoids with surge suppression, or take countermeasures in the electrical circuits for surges or electromagnetic waves.
- Do not use where ozone may be generated, such as near ocean beaches or other places subject to direct sunlight or mercury lamps. Ozone can cause rubber parts to deteriorate, which can lead to degraded performance and functions, or to equipment stoppages and functional shutdown. (Excludes items where measures against ozone have been taken.)
- Do not use any media other than shown on the specifications. Use of non-specified media could lead to functional shutdown after a short period, to sudden performance drops, or to shorter operating life.
- If mounting the solenoid valve inside a control panel, or if energizing it for long periods, provide heat radiation measures to ensure that temperatures surrounding the solenoid valve always remain within the specified temperature range. If energizing the unit for long periods, consult us.
- After finishing wiring operations, always check to ensure that no wiring connection errors exist before turning on the power.
- Do not collect the exhaust lines for air cylinders, etc. with pilot exhaust lines for solenoid valves into the same piping, etc. Interference in the exhaust could result in erratic operation.

- When mounting the product, leave room for adequate working space around it. Failure to ensure adequate working space will make it more difficult to conduct daily inspections or maintenance, which could eventually lead to system shutdown or damage to the product.
- For mounting or transport of heavy products, use a lift, supporting tool, or several people, to provide firm support, and proceed with due caution to ensure personal safety.
- Do not bring floppy disks or magnetic media, etc., within one meter [3.28ft.] of the product. There is the possibility that the data on the floppy disks will be destroyed due to the magnetism of the magnet.
- If leakage current is occurring in the control circuit, there is a possibility of the product performing an unintended operation. Take measures against current leaking in the control circuit, to ensure that the leakage current value does not exceed the allowed range in the product specifications.

- Do not block the product's breathing holes. Pressure changes occur due to changes in volume during operation. Blocking the breathing holes destroys the pressure balance, and could cause failure of the intentioned operation, equipment damage, or personal injury.
- Do not use the solenoid valve in locations subject to large electrical currents or magnetic fields. It could result in erratic operation.
- Oily materials from the compressor (excluding the oil-free compressor) can cause drastic deterioration in product performance, and even a functional shutdown. Always install a mist filter before pneumatic equipment to remove the oily component.
- The properties of the lubrication oil can change when used in dry air where dew point temperatures is lower than -20 degrees Celsius [-4°F]. It could result in degraded performance or in functional shutdown.
- Do not use the product in locations of direct sunlight (ultraviolet), in locations subject to dust, salt, or iron powder, in locations with humidity and high temperature, or in the media and/or the ambient atmospheres that include organic solvents, phosphoric ester type hydraulic oil, sulfur dioxide, chlorine gas, or acids, etc. These conditions could lead to functional shutdowns, sudden degraded performance, or shortened operating life in a brief period of time. For materials used, see Major Parts and Materials.

- When considering the possibility of using this product in situations or environments not specifically noted in the Catalog or User's Manual, or in applications where safety is an important requirement, such as in an airplane facility, combustion equipment, leisure equipment, safety equipment and other places where human life or assets may be greatly affected, take adequate safety precautions such as application with enough margins for ratings and performance or fail-safe measures. Be sure to consult us with such applications.
- Always check the catalog and other reference materials for product wiring and piping.
- Install a muffler, etc. on the exhaust port. It is effective in reducing exhaust noise.
- When handling the product, wear protective gloves, safety glasses, safety boots, etc. to keep safety.
- When the product can no longer be used, or is no longer necessary, dispose of it appropriately as industrial waste.
- Pneumatic equipment can exhibit degraded performance and function over its operating life. Always conduct daily inspections of the pneumatic equipment, and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
- Air leaks from the valve are not zero. For application of requiring holding pressure (including vacuum) inside the pressure vessel, consider adequate margin of capacity and holding time in design of the system.
- For inquiries about the product, consult your nearest Koganei sales office or Koganei overseas department. The address and telephone number is shown on the back cover of this catalog.



- Always observe the following items.
 - When using this product in pneumatic systems, always use genuine KOGANEI parts or compatible parts (recommended parts).
 - When conducting maintenance and repairs, always use genuine KOGANEI parts or compatible parts (recommended parts). Always observe the required methods and procedure.
 - **2.** Do not attempt inappropriate disassembly or assembly of the product relating to basic construction, or its performance or functions.

Koganei cannot be responsible if these items are not properly observed.

Mounting

- 1. While any mounting direction is allowed, be sure to avoid strong shocks or vibrations applied directly to the body. Also, avoid strong shocks in the lateral direction when using a mounting base for installation. For the order code, see the Additional Parts item under each series.
- 2. Avoid using in the locations and environment listed below, as it could result in malfunction of the valve. If use in such conditions is unavoidable, always provide a cover or other adequate protective measures.
- Location directly exposed to water drops or oil drops
- Environment where a valve body is subject to dew condensation
- Location directly exposed to machining chips, dust, etc
- Install a muffler, etc. in the exhaust port to prevent dust from entering into the piping.
- 4.In piping connection with valves, flush the tube completely (by blowing compressed air) before piping. Intrusion of machining chips or sealing tape, rust, etc., generated during plumbing could result in air leaks and other defective operations.
- 5. When mounting a valve unit inside the control panels or when the operation requires long energizing periods, consider providing heat radiation measure such as ventilation.
- **6.** Never use the valve with the 4(A) and 2(B) ports vent to atmosphere.

Media

- 1. Use air for the media. For the use of any other media, consult us.
- 2. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of 40 μm or less) near the valve to remove collected liquid or dust. In addition, drain the air filter periodically.
- When supply pressure is low, use piping for the 1(P) port with sufficient tube size.

Lubrication

Can be used without lubrication. When the actuator requires lubrication, use Turbine Oil Class 1 (ISO VG32) or the equivalent. Avoid using spindle oil or machine oil.

Atmosphere

The product cannot be used when the media or ambient atmosphere contains any of the substances listed below. Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.

How to find the flow rate

Subsonic speed flow when P_1 +0.1013<1.89 (P_2 +0.1013)

 $Q = 226S \sqrt{\Delta P (P_2 + 0.1013)}$

Sonic speed flow when $P_1+0.1013 \ge 1.89 (P_2+0.1013)$

Q=113S (P1+0.1013)

- Q: Air flow rate [ℓ /min (ANR)] S: Effective area [mm²]
- Δ P: Pressure drop P₁-P₂ (MPa) P₁: Upstream pressure (MPa)
- P2: Downstream pressure (MPa)

Corrections for variances in air temperature Multiply the flow rate calculated in the formula above by the coefficients in the table below.

Air temperature	-20	-10	0	10	30	40	50	60
°C [°F]	[-4]	[14]	[32]	[50]	[86]	[104]	[122]	[140]
Correction coefficient	1.08	1.06	1.04	1.02	0.98	0.97	0.95	0.94

Piping

Since the 1(P) and exhaust ports are on both ends of the manifold, piping direction can be selected depending on the application (excluding some models).

At shipping, plugs are temporarily screwed in ports at one end, but are not firmly tightened. Regardless of which end piping is connected, always remove the plugs, use sealing tape or apply other sealing agent, and securely tighten the plugs into the unused ports.

1. Sealing tape wrapping method

- Before piping, use air blowing (flushing) or cleaning to eliminate any machining chips, cutting oil, or dust, etc., remaining inside the pipes.
- ②When screwing in piping or fittings, caution should be taken to avoid letting machining chips or sealing materials from entering into the valves. When using sealing tape, wrap it so that 1.5~ 2 screw threads remain.



2. Tightening torque for piping

Connection thread	Suitable tightening torque N∙cm (kgf∙cm) [in∙lbf]
М3	59 (6) [5.2]
M5×0.8	157 (16) [13.9]
Rc (PT)1/8	686~883 (70~90) [60.8~78.1]
Rc (PT)1/4	1177~1373 (120~140) [104~122]
Rc (PT) 3/8	2157~2354 (220~240) [191~208]
Rc (PT) 1/2	2746~2942 (280~300) [243~260]
Rc (PT) 3/4	2746~2942 (280~300) [243~260]
Rc (PT) 1	3530~3727 (360~380) [313~330]
Rc (PT) 1 1/4	3923~4119 (400~420) [347~365]
Rc (PT) 1 1/2	4707~4903 (480~500) [417~434]

Block-off plate

To close the unused stations, use a block-off plate.

For the order code, see the Additional Parts item under each series.

- **Cautions:** 1. For the 1(P) port piping, use a size that matches the manifold's piping connection port.
 - When installing piping or mufflers to the exhaust port, ensure there will be minimum exhaust resistance.
 - On rare occasions, exhaust can interfere with other valves and actuators. In this case, let exhaust from the R ports on both ends.
 - 4. When a multiple number of valves are operating simultaneously on a multi-unit manifold, or during high frequency applications, supply air from the 1(P) ports on both ends, and let exhaust from the R ports on both ends.
 - 5. Since the twin solenoid valve uses 2 stations, it cannot be mounted on the final station.
 - 6. In the 025 series, the seal between the valve and manifold is used reversed top-to-bottom, in accordance with the valve function (NC or NO). Install the seal as the mark (NC or NO) is located on the valve side and matches the valve function.

Tube installation and removal

Insert the tube to connect as far as the tube stopper contacts the tubes. Pull the tube to confirm the connection.

For tube removal, push the release ring forward parallel to the ring, and pull the tube out.

Tubes

Either nylon or urethane tubes can be used. Use tubes that are not scratched on their outer surface.

The tube's outer diameter tolerance should be within ± 0.1 mm [± 0.004 in.] of the nominal dimension, and within 0.2mm [0.008in.] for the ellipticity (difference between long and short diameter).

Caution: Do not excessively bend the tube near fittings.