

# Air-piloted Valves Features

- 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

### Assured operation

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 valve 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

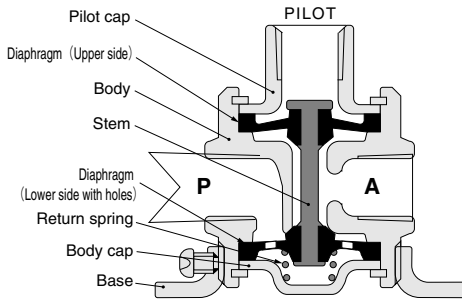
The small mass and stroke of the moving parts means a small inertial force which, along with construction with the large-capacity synthetic rubber for absorbing impacts, ensures continuous high-frequency operations and a long operating life.

### Any mounting direction acceptable

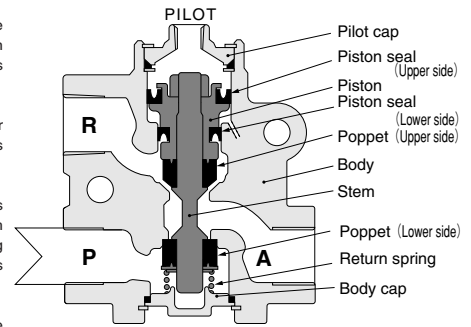
No matter what direction is used for mounting, the construction causes no trouble to the operation.

### Compact and lightweight

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



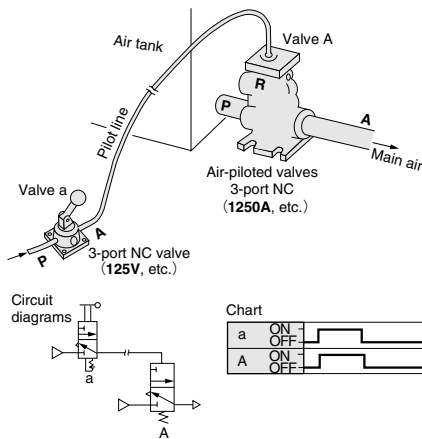
Diaphragm type basic construction (125A type)



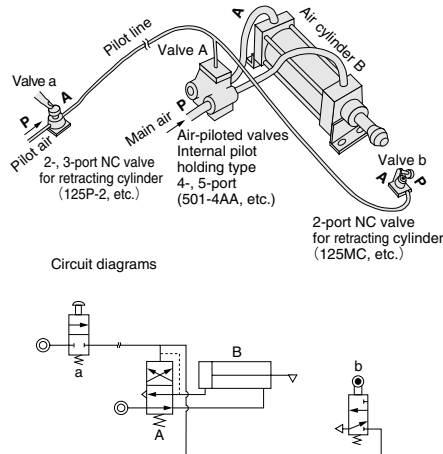
Piston poppet-type basic construction (501A type)

# Application Examples of Air-piloted Valves

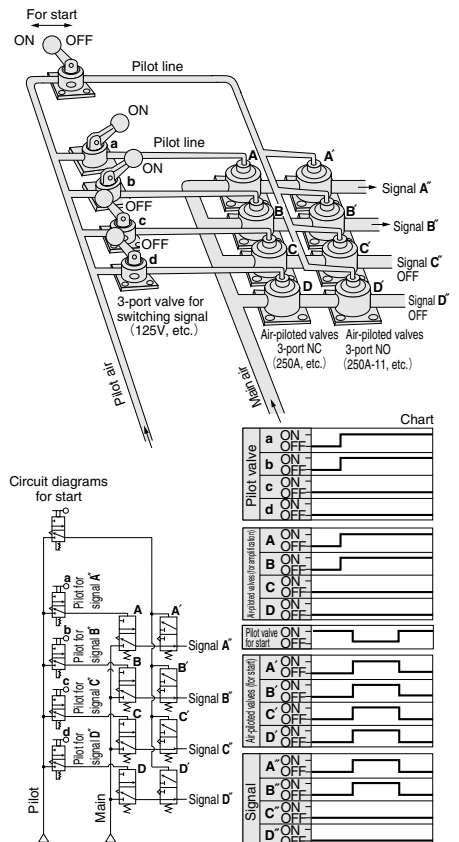
## Using as a large-sized stop valve



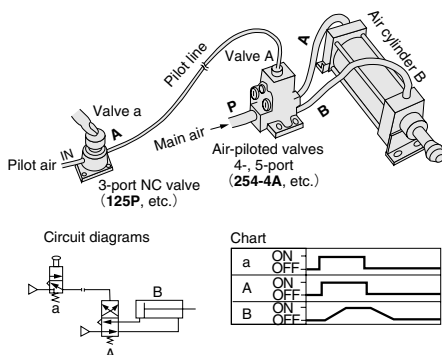
## Air cylinder operation



## Switching of air pressure signal



## Air cylinder operation



The air cylinder rod extends only as long as pilot valve a is pressed down.

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 ℓ /min [ft. <sup>3</sup> /min.] (ANR)							
	200	300	400	1000	2000	3000	10000	20000
3P+34A (TAC valve)	120 [4.2]							
31P+341A (TAC <sup>2</sup> 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	18600 [657]							

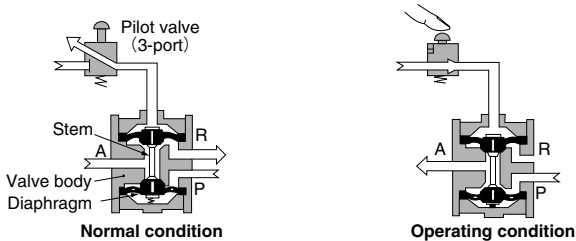
## ● 4-, 5-port valve (applicable cylinder bore size of each model)

Model of air-piloted valve	Cylinder bore size mm [in.]									
	φ20 [0.787]	25.32 [0.984] 1.260	40 [1.575]	50 [1.969]	63 [2.480]	80 [3.150]	100 [3.937]	125 [4.921]	140 [5.512]	180 [7.087]
4P+34A (TAC valve)	This area presents high cylinder speed is not required.									
41P+341A (TAC <sup>2</sup> valve)	Normal operating range (Cylinder speed 300~500mm/s [11.8~19.7in./sec.] Cylinder speed (max. 200~300mm/s [7.9~11.8in./sec.] min. 50mm/s [2.0in./sec.]									
250-4A 2503-4A	This area presents high cylinder speed is required.									
254-4A										
375-4A 501-4A										
750-4A										
1000-4A 1250-4A	(Cylinder speed: min. 500~600mm/s [19.7~23.6in./sec.]									

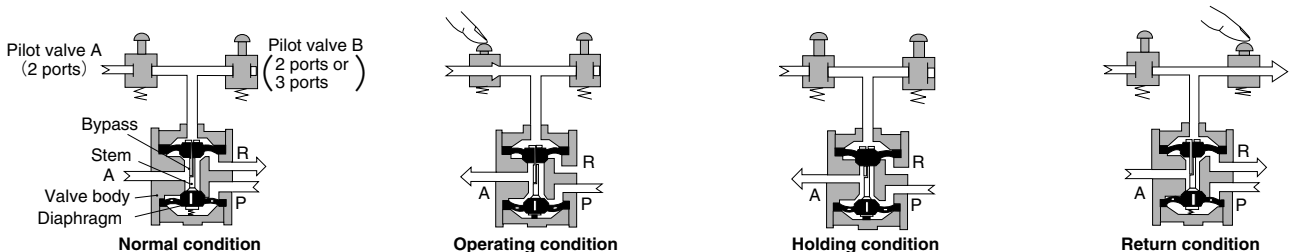
- Notes :
1. While the speeds shown in this graph assume an air supply pressure of 0.5MPa [73psi.] and a load ratio of 0, the speeds will be virtually the same in the range of 0.4~0.7MPa [58~102psi.], and up to a load ratio of about 30 %.
  2. In general, select a valve with a margin of about 50 % for 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 schematic 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)



### Warning

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

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.



### Others

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 cylinder.
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.

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

125A2, 250A2, 2503A2 Series

## Symbols

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

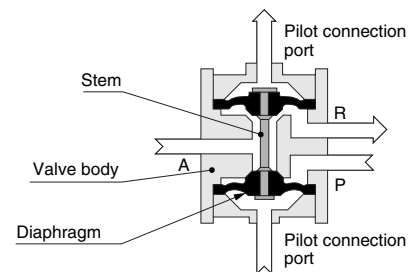
## Specifications

Item		Basic model	125A2	250A2	2503A2
Port size	Rc	Main	1/8	1/4	3/8
		Pilot	1/8		
Effective area [Cv]	mm <sup>2</sup>		5.5 [0.27]	15 [0.76]	
Media			Air, Gas, Liquid, Vacuum		
Operating pressure range MPa [kgf/cm <sup>2</sup> ] [psi.]	Main	Gas	0~0.9 {0~9.2} [0~131] Vacuum 0~-100kPa [0~-29.53in.Hg]		
		Liquid	0~0.2 {0~2.0} [0~29]		
	Pilot		See the table "Minimum Pilot Pressure"		
Proof pressure	MPa [kgf/cm <sup>2</sup> ] [psi.]		1.35 {13.8} [196]		
Operating temp. range (atmosphere and media)	°C [°F]		5~60 [41~140]		
Maximum operating frequency	Hz		10		
Lubrication			Not required		
Mass	kg [lb.]		0.05 [0.11]	0.21 [0.46]	0.24 [0.53]

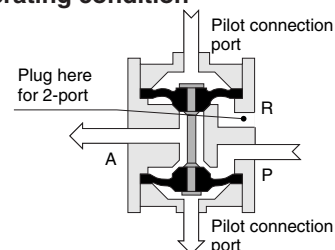
Note: The even larger size Rc1/2, 3/4, 1, and 1 1/4 units are available as special orders.

## Operating Principles, Major Parts and Materials

### ● Normal condition

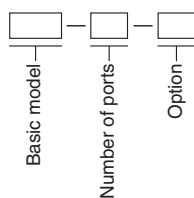


### ● Operating condition



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

## Order Codes



### Basic model

Code	Main port size Rc
125A2	1/8
250A2	1/4
2503A2	3/8

### Number of ports

Code	Number of ports
Blank	3 ports
2	2 ports

### 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.

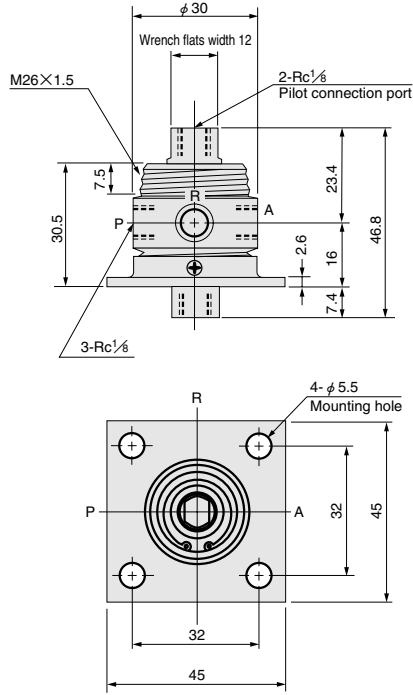
The valve cannot hold either the actuated or unactuated condition on its own.

Maintain a continuous supply of pilot air.

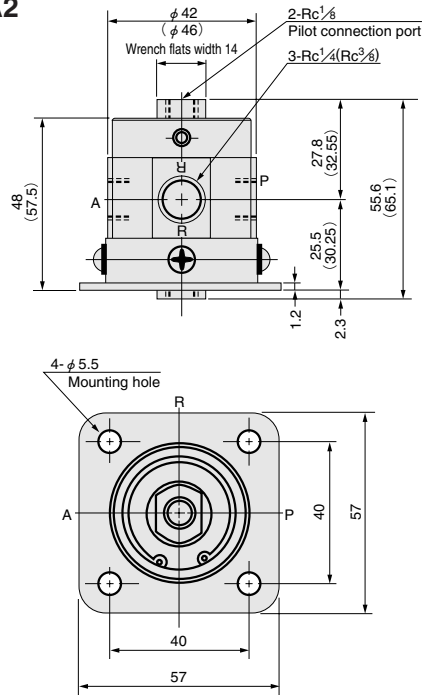
The pilot pressure might be slightly higher for liquid media.

## Dimensions (mm)

### 125A2



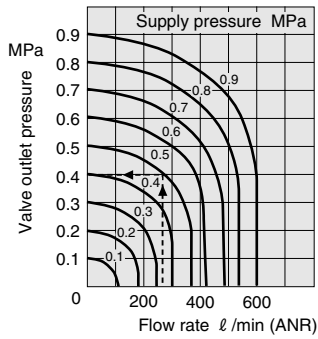
### 250A2 2503A2



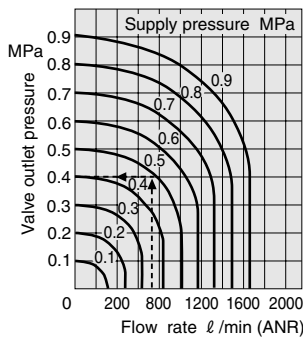
Note: The figures in parentheses ( ) are for the 2503A2.

## Flow Rate

### 125A2



### 250A2 2503A2

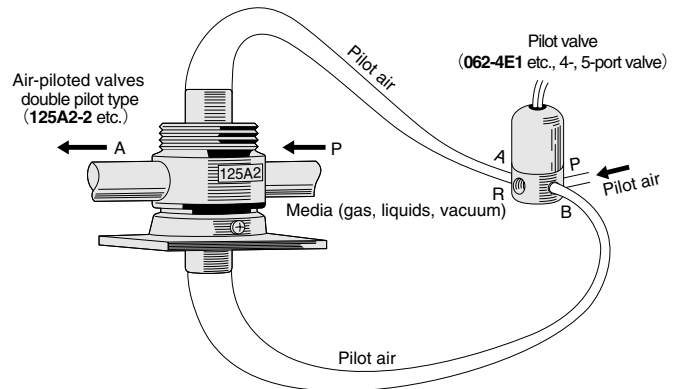


1MPa = 145psi.,  
1  $\ell/\text{min}$  = 0.0353ft<sup>3</sup>/min.

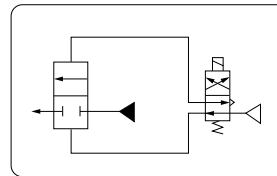
### How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 740  $\ell/\text{min}$  [26.1ft<sup>3</sup>/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

## General Application Circuit



### Circuit diagram



## Minimum Pilot Pressure

Model	Main (gas) pressure					
	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 [29]	0.39 [57]	0.57 [83]	0.74 [107]	0.84 [122]
2503A2						

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