Push-In Fitting Incorporated Type Solenoid Valve

Solenoid Valve SVA21 Series

- *Lightweight and Large Capacity*
- *Effective Sectional Area 18mm² (Cv 0.97) with valve width 16mm (5/8″)*
- *Various Valve Selections*

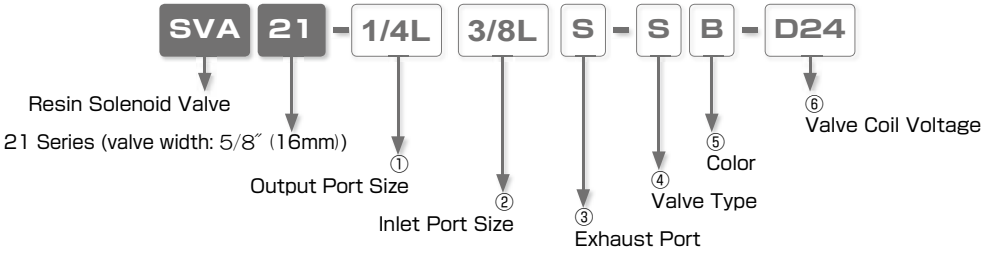
Characteristics

- *2 selections of piping direction: (Top and Side)*
- *2 color selection: Black and Light Gray*
- *Twin 3-Port Solenoid Valve (3-way valve) enables to control 2 actuators separately with one unit.*

Vacuum-operatable 2 / 3-Port Solenoid Valve

- *Vacuum-operatable 2 or 3-way valve which does not require external piping.*
- *Single and Double solenoid types are available*

Model Designation of SVA21 Single Valve type (Example)



① Output Port Size, ② Inlet Port Size (*)

Fitting Type	Push-In Fitting (inch)						Push-In Fitting (mm)					
Code	1/4C	5/16C	3/8C	1/4L	5/16L	3/8L	6C	8C	0C	6L	8L	0L
Size O.D.	ø1/4"	ø5/16"	ø3/8"	ø1/4"	ø5/16"	ø3/8"	ø6	ø8	ø10	ø6	ø8	ø10
Piping Direction	Side			Top (Elbow)			Side			Top (Elbow)		

* When the silencer exhaust is selected, the inlet port piping option is only "Side" (straight fitting).

③ Exhaust Port

Fitting Type	Push-In Fitting (mm)			Push-In Fitting (inch)			Silencer (Open-Air Exhaust)
Code	1/4	5/16	3/8	6	8	0	S
Size O.D.	ø1/4"	ø5/16"	ø3/8"	ø6	ø8	ø10	—

* Piping direction of exhaust ports are the same style as the inlet port. If you choose "Top" direction of inlet port (elbow type), the exhaust ports come with all "Top" directions (elbows).

* Do not plug the exhaust ports even when you choose T or U type of valve (2-way valve) since the pilot valve air exhausts through the ports.

④ Valve Type

Code	Position	Port	Valve Function
S	2	5	Single Solenoid
D	2	5	Double Solenoid
E	2	3	4(A).2(B).Normally Closed (Twin 3-way valve)
F	2	3	4(A).2(B).Normally Open (Twin 3-way valve)
G	2	3	4(A).Normally Closed, 2(B).Normally Open
H	2	3	4(A).Normally Open, 2(B).Normally Closed

Code	Position	Port	Valve Function
A	3	5	Closed Center
R	3	5	Exhaust Center
P	3	5	Pressure Center
T	2	2	Single Solenoid (Vacuum-operatable valve)
U	2	2	Double Solenoid (Vacuum-operatable valve)
V	2	3	Single Solenoid (Vacuum-operatable valve)
W	2	3	Double Solenoid (Vacuum-operatable valve)

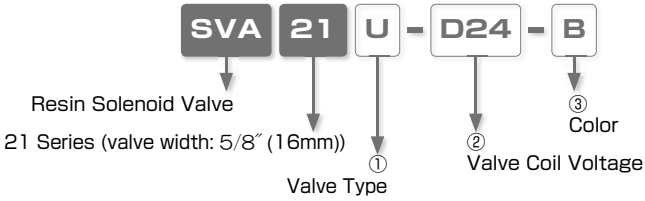
⑤ Color

B : Black
W : Light Gray

⑥ Valve Coil Voltage

D24 : DC24V
100 : AC100V

Model Designation of Mounting Unit (Example)



① Valve Type

Code	Position	Port	Valve Function
S	2	5	Single Solenoid
D	2	5	Double Solenoid
E	2	3	4(A).2(B).Normally Closed (Twin 3-way valve)
F	2	3	4(A).2(B).Normally Open (Twin 3-way valve)
G	2	3	4(A).Normally Closed, 2(B).Normally Open
H	2	3	4(A).Normally Open, 2(B).Normally Closed

Code	Position	Port	Valve Function
A	3	5	Closed Center
R	3	5	Exhaust Center
P	3	5	Pressure Center
T	2	2	Single Solenoid (Vacuum-operatable valve)
U	2	2	Double Solenoid (Vacuum-operatable valve)
V	2	3	Single Solenoid (Vacuum-operatable valve)
W	2	3	Double Solenoid (Vacuum-operatable valve)

② Valve Coil Voltage

D24 : DC24V
100 : AC100V

③ Color

B : Black
W : Light Gray

Sub-Base Specifications

Fluid Medium		Air	
Operating Pressure Range		30~100psi (0.2～0.7MPa)	
Pressure Resistance		150psi (1.05MPa)	
Operating Temp. Range		40~120°F (5～50°C)	
Installing Direction		No Restriction (*1)	
No. Mountable Main Valve		1 unit	
Tube Dia.	1(P).5(R1).3(R2) Port	Push-In Fitting	Ø1/4", 6mm (*2)
			Ø5/16", 8mm (*2)
			Ø3/8", 10mm (*2)
	4(A).2(B) port	Push-In Fitting：Ø5/32"、Ø1/4"、Ø5/16"、Ø4mm、Ø6mm、Ø8mm	
Wiring Method	Type	Individual Plug-in Connector	
	No. of Pins	3 pins	
Silencer		Standard equipment only with open-air exhaust (5(R1) and 3(R2) Port).	

*1. Refer to "Warning" in "Detailed Safety Instructions".

Solenoid Valve Specifications (DC24V)

Item \ Model		SVA 21S-D24	SVA 21D-D24	SVA 21A-D24 SVA 21R-D24 SVA 21P-D24	SVA 21E-D24 SVA 21F-D24 SVA 21G-D24 SVA 21H-D24	SVA 21T-D24	SVA 21U-D24	SVA 21V-D24	SVA 21W-D24
Pilot Valve	Valve Type	Direct Acting Valve							
	Valve Stracture	Elastic Seal, Poppet Valve							
	Rated Coil Voltage	DC24V							
	Tolerance of Voltage Range	DC21.6 ～ 26.4V							
	Power Consumption	1.2W (with LED)							
	Surge Protection Circuit	Diode							
	Manual Operation	Non-Lock Push Button							
	Operating Pressure Range	30~100psi (0.2～0.7MPa)							
Main Valve	Valve Type	Pneumatic Operation by Pilot Valve							
	Valve Stracture	Elastic Seal ,Spool Valve							
	Number of Positions	2-Position		3-Position	2-Position				
	Number of Ports	5-Port			3-Port X 2 (*1)	2-Port		3-Port	
	Valve Function	Single Solenoid	Double Solenoid		Single Solenoid X 2	Single Solenoid	Double Solenoid	Single Solenoid	Double Solenoid
	# of pilot points	1	2			1	2	1	2
	Response Time (*2)	18msec	12msec	18msec		15msec			
	Max. Operation Cycle	5Hz							
	Min. Excitation Time		50msec				50msec		50msec
	Lubrication	Not Required							
	Operating Pressure Range	30~100psi (0.2～0.7MPa)				-14.5~100psi (-0.1 ～ 0.7MPa)			

*1. This is a valve construction incorporating 2× 3-port valves. 1(P) is common.

*2. Values are at air pressure of 0.5MPa (72psi) and from power off to on. For 3 positions valve, the valueis from neutral position of all port block (closed center) valve.

Solenoid Valve Specifications (AC100V)

Item		Model: SVA 21S-100	SVA 21D-100	SVA 21A-100 / SVA 21R-100 / SVA 21P-100	SVA 21E-100 / SVA 21F-100 / SVA 21G-100 / SVA 21H-100	SVA 21T-100	SVA 21U-100	SVA 21V-100	SVA 21W-100
Pilot Valve	Valve Type	Direct Acting Valve							
	Valve Stracture	Elastic Seal, Poppet Valve							
	Rated Coil Voltage	AC100V							
	Tolerance of Voltage Range	AC90 ~ 110V							
	Power Consumption	1.5VA (with LED)							
	Surge Protection Circuit	Diode							
	Manual Operation	Non-Lock Push Button							
	Operating Pressure Range	30~100psi (0.2~0.7MPa)							
Main Valve	Valve Type	Pneumatic Operation by Pilot Valve							
	Valve Stracture	Elastic Seal, Spool Valve							
	Number of Position	2-Position		3-Position	2-Position				
	Number of Ports	5-Port			3-Port X 2 (*1)	2-Port		3-Port	
	Valve Function	Single Solenoid	Double Solenoid		Single Solenoid X 2	Single Solenoid	Double Solenoid	Single Solenoid	Double Solenoid
	# of pilot points	1	2			1	2	1	2
	Response Time (*2)	18msec	12msec	18msec		15msec			
	Max. Operation Cycle	5Hz							
	Min. Excitation Time		50msec				50msec		50msec
	Lubrication	Not Required							
	Operating Pressure Range	30~100psi (0.2~0.7MPa)				-14.5~100psi (-0.1 ~ 0.7MPa)			

*1. This is a valve construction incorporating 2x3-port valves. 1(P) is common.

*2. Values are at air pressure of 72.5psi (0.5MPa) and from power-off to-on. For 3-positions valve, the value is from neutral position of all port block valve.

Flow Characteristics

Piping Spec. \ Model		SVA 21S-□	SVA 21D-□	SVA 21A-□ SVA 21R-□ SVA 21P-□	SVA 21E-□ SVA 21F-□ SVA 21G-□ SVA 21H-□	SVA 21T-□ SVA 21U-□	SVA 21V-□ SVA 21W-□
1(P)→4(A).2(B) (φ3/8", 10mm)(*2)	C (*3)	3.4	3.4	2.4	3	3.4	3.4
	S (*4)	17(0.92)	17(0.92)	12(0.65)	15(0.81)	17(0.92)	17(0.92)
1(P)→4(A).2(B) (φ5/16", 8mm) (*2)	C (*3)	3.2	3.2	2.4	2.9	2.6	2.6
	S (*4)	16(0.86)	16(0.86)	12(0.65)	14.5(0.78)	13(0.7)	13(0.7)
1(P)→4(A).2(B) (φ1/4", 6mm) (*2)	C (*3)	2.1	2.1	1.9	2.1	1.7	1.7
	S (*4)	10.5(0.56)	10.5(0.56)	9.5(0.51)	10.5(0.56)	8.5(0.46)	8.5(0.46)
4(A).2(B) (φ3/8", 10mm)→ 5(R1).3(R2)without Check Valve (*1)	C (*3)	3.6	3.6	2.8	2.8		3.5
	S (*4)	18(0.97)	18(0.97)	14(0.75)	14(0.75)		17.5(0.95)
4(A).2(B) (φ5/16", 8mm)→ 5(R1).3(R2)with Check Valve (*1)	C (*3)						
	S (*4)						
4(A).2(B) (φ5/16", 8mm)→ 5(R1).3(R2)without Check Valve (*1)	C (*3)	3.4	3.4	2.7	2.7		2.8
	S (*4)	17(0.92)	17(0.92)	13.5(0.73)	13.5(0.73)		14(0.76)
4(A).2(B) (φ1/4", 6mm)→ 5(R1).3(R2)with Check Valve (*1)	C (*3)						
	S (*4)						
4(A).2(B) (φ1/4", 6mm)→ 5(R1).3(R2)without Check Valve (*1)	C (*3)	2.1	2.1	2	2		1.9
	S (*4)	10.5(0.56)	10.5(0.56)	10(0.54)	10(0.54)		9.5(0.51)

*1. The value of .5(R1) and 3(R2) port are those of Open-air Exhaust.

*2. 2(B) to 4(A) piping is applied to valve type T / U / V / W.

*3. C: Sonic Conductance C(dm³/(s-bar)

*4. S: Effective Sectional Area S(mm²(CV))

Cylinder Speed Table

Cylinder Speed (m/s)	Cylinder Tube bore (mm)									
	φ20	φ25	φ32	φ40	φ50	φ63	φ80	φ100	φ125	φ140
100	■	■	■	■	■	■	■	■	■	■
200	■	■	■	■	■	■	■	■	■	
300	■	■	■	■	■	■	■	■		
400	■	■	■	■	■	■	■			
500	■	■	■	■	■	■				
600	■	■	■	■	■	■				
700	■	■	■	■	■					
800	■	■	■	■						

Note) ● The average speed of the cylinder represents a reference value where the pressure is 0.5MPa (72psi), the load factor is 30% and the piping tube length is 1m.

● Cylinder speed can vary depending on the piping and joint configurations.

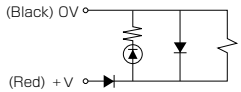
● The table represents the case that ø8mm Push-In Fitting is used on 4(A) and 2(B) ports of SVA21S-D24.

Construction

Refer to SVA20 Series.

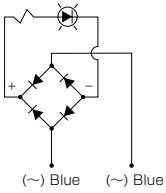
Electric Circuit

●Individual Plug-in Connector for DC24V



Note) The color in the parenthesis is lead wire color.

●Individual Plug-in Connector for AC100V



Weight List

Valve Type	Weight (g)
SVA 21S	85.5
SVA 21D	129
SVA 21E	131
SVA 21F	131
SVA 21G	131
SVA 21H	131
SVA 21A	131.5

Valve Type	Weight (g)
SVA 21P	131
SVA 21R	131
SVA 21T	81.5
SVA 21U	125
SVA 21V	81.5
SVA 21W	125

	Weight (g)
Sub Base	52.5

Silencer Unit	Weight (g)
Port ϕ 6mm	28
Port ϕ 8mm	22.5
Port ϕ 10mm	27

Cartridge Fitting	Weight (g)
CJC 18-06	20.5
CJC 18-08	20
CJC 18-10	19
CJL 18-06	23
CJL 18-08	25
CJL 18-10	31.5

■ Use the following formula to calculate the weight of SVA21.

Sub-Base + (Cartridge Fitting x Qty) + Silencer Unit + Valve Type

Example **SVA** **21** ① **-** **0C0C** ② **S** ③ **-** **S** ④ **B - D24**

52.5 + 38 + 27 + 129 = 246.5g

① Sub-Base : 52.5g
② Cartridge Fitting (CJC 18-10) : 19g×2
③ Silencer Unit (ø10mm) : 27g
④ Valve Type (SVA 21D) : 129g

⚠ Detailed Safety Instructions

Before using PISCO products, be sure to read “Safety Instructions” and “Safety Instruction Manual” and “Common Safety Instructions for Solenoid Valve Series”.

Warning

1. When a solenoid valve is operated under a vibration of 49m/s^2 or less, install a spool valve at a right angle to the vibrating direction.
   * Refer to “4. Installation” in “Precautions for Use”.

Caution

1. Do not use a 3-position valve for middle-position stop of the cylinder that requires accuracy. Compressiveness of air does not achieve accuracy in stop position. Also, the valve permits leakage, so that retention of stop position for long term may not be possible.
2. Do not give excessive tension or bending to the individual plug-in connector (cable). Disconnection or damage to the connector may be caused.
3. The cartridge joint can be disconnected by removing the lock pin. During use, however, make certain that the lock pin is properly in place.
4. Read the manual carefully for proper installation and removal of valves.
   Also, keep the manual at hand.
5. Thoroughly read the method for replacing and piping Cartridge Fittings in this catalog.

⚠ Safety Instructions for Vacuum-Operateble 2 / 3-Port Solenoid Valve

- Connect 2(B) Port with air supply port and 4(A) Port with an actuator port. The reverse connection causes troubles.
- Place a filter to prevent foreign particles from entering inside.

Standard Size List

Type	Port	Fitting Type	Tube O.D.
SVA Double Solenoid Valve Tube Exhaust	Output port 4(A) 2(B)	Push-In Fitting (Straight Type / Elbow Type)	ø1/4 ø5/16 ø3/8 ø6mm ø8mm ø10mm
	Inlet port 1(P) Exhaust port 5(R1) 3(R2)	Push-In Fitting (Straight Type / Elbow Type)	ø1/4 ø5/16 ø3/8 ø6mm ø8mm ø10mm

Type	Port	Fitting Type	Tube O.D.
SVA Single Solenoid Valve Tube Exhaust	Output port 4(A) 2(B)	Push-In Fitting (Straight Type / Elbow Type)	ø1/4 ø5/16 ø3/8 ø6mm ø8mm ø10mm
	Inlet port 1(P) Exhaust port 5(R1) 3(R2)	Push-In Fitting (Straight Type / Elbow Type)	ø1/4 ø5/16 ø3/8 ø6mm ø8mm ø10mm

Type	Port	Fitting Type	Tube O.D.
SVA Double Solenoid Valve Open-air Exhaust	Output port 4(A) 2(B)	Push-In Fitting (Straight Type / Elbow Type)	ø1/4 ø5/16 ø3/8 ø6mm ø8mm ø10mm
	Inlet port 1(P)	Push-In Fitting (Straight Type / Elbow Type)	ø1/4 ø5/16 ø3/8 ø6mm ø8mm ø10mm

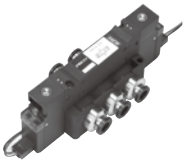
Type	Port	Fitting Type	Tube O.D.
SVA Single Solenoid Valve Open-air Exhaust	Output port 4(A) 2(B)	Push-In Fitting (Straight Type / Elbow Type)	ø1/4 ø5/16 ø3/8 ø6mm ø8mm ø10mm
	Inlet port 1(P)	Push-In Fitting (Straight Type / Elbow Type)	ø1/4 ø5/16 ø3/8 ø6mm ø8mm ø10mm

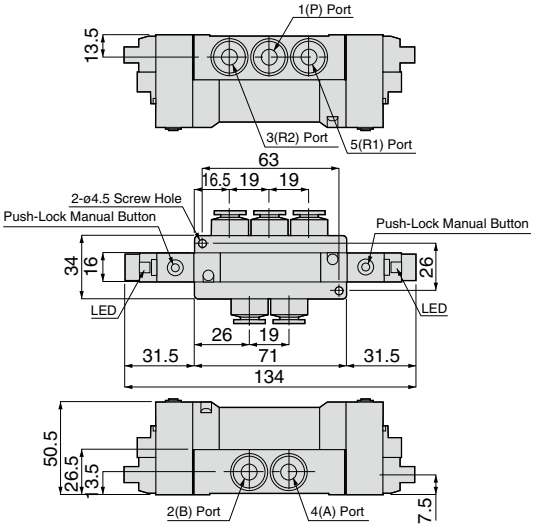
Tube Exhaust

SVA 21 Double Solenoid Valve Tube Exhaust

Unit：mm

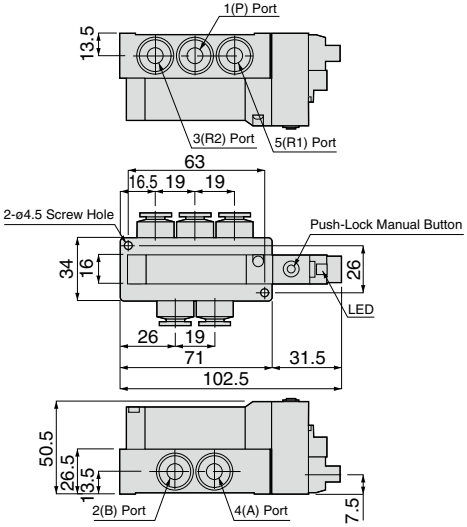
Model Code	CAD file name
SVA21-□□□-D□-□	SVA-043
SVA21-□□□-E□-□	
SVA21-□□□-F□-□	
SVA21-□□□-G□-□	
SVA21-□□□-H□-□	
SVA21-□□□-A□-□	
SVA21-□□□-R□-□	
SVA21-□□□-P□-□	
SVA21-□□□-U□-□	
SVA21-□□□-W□-□	





SVA 21 Single Solenoid Valve Tube Exhaust

Model Code	CAD file name
SVA21-□□□-S□-□	SVA-044
SVA21-□□□-T□-□	
SVA21-□□□-V□-□	

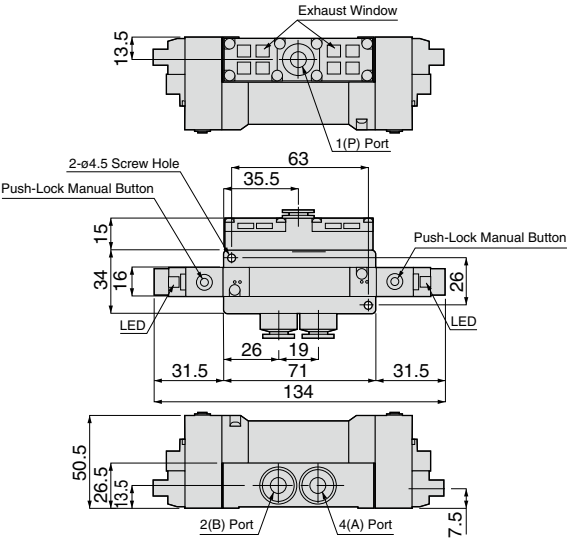


Open-air Exhaust

Double Solenoid Valve
Open-air Exhaust (Silencer Exhaust)

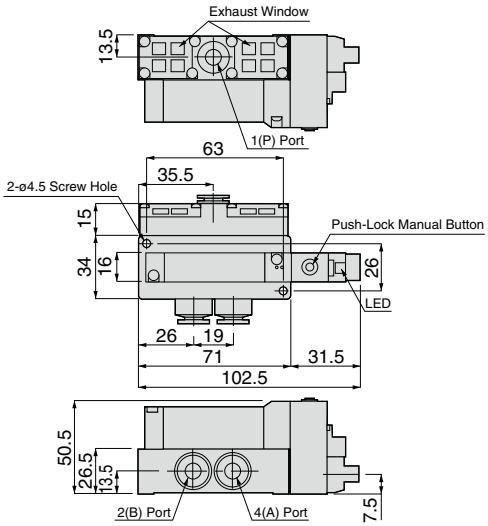
Unit : mm

Model Code	CAD file name
SVA21-□□S-D□-□	SVA-045
SVA21-□□S-E□-□	
SVA21-□□S-F□-□	
SVA21-□□S-G□-□	
SVA21-□□S-H□-□	
SVA21-□□S-A□-□	
SVA21-□□S-R□-□	
SVA21-□□S-P□-□	
SVA21-□□S-U□-□	
SVA21-□□S-W□-□	



Single Solenoid Valve
Open-air Exhaust (Silencer Exhaust)

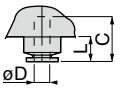
Model Code	CAD file name
SVA21-□□S-S□-□	SVA-046
SVA21-□□S-T□-□	
SVA21-□□S-V□-□	



Dimension of Fitting Part

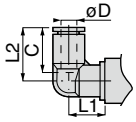
Unit：mm

Piping Direction: Side
Outlet ports - 4(A) · 2(B) Port,
Inlet/Exhaust ports - 1(P) · 5(R1) · 3(R2) Port (Tube Exhaust)



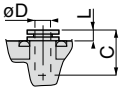
Tube O.D. øD	L	C
6(1/4)	11	17
8(5/16)	12.5	18.5
10(3/8)	15	21

Piping Direction: Top
Outlet ports - 4(A) · 2(B) Port,
Inlet/Exhaust ports - 1(P) · 5(R1) · 3(R2) Port (Tube Exhaust)



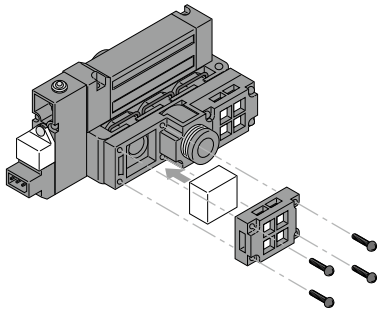
Tube O.D. øD	L1	L2	C
6(1/4)	14	20	17
8(5/16)	17	23	18.5
10(3/8)	21	26.5	20.5

Inlet port - 1(P) Port and
Silencer (Open-air Exhaust)



Tube O.D. øD	L	C
6(1/4)	7	17
8(5/16)	5	18.5
10(3/8)	5.5	20.5

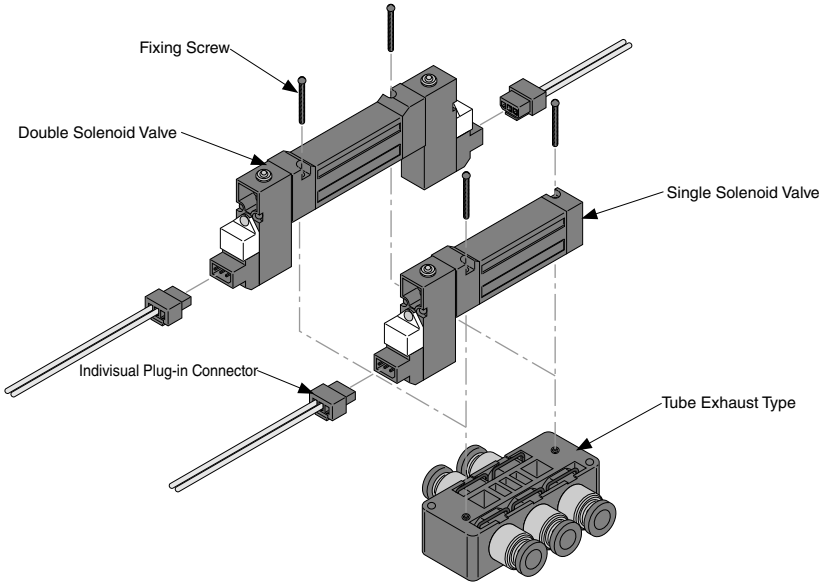
Replacement of Silencer Element



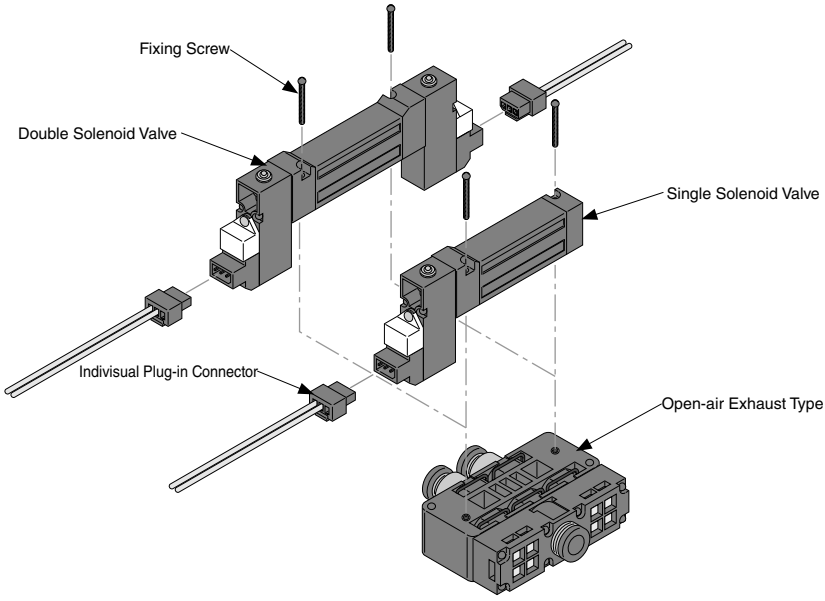
To replace silencer element for 21 series with open-air exhaust, loose the installing screws of the element cover with a proper Phillips head screwdriver, and take out the cover for the replacement.

Model Designation	Adapted Model	Quantity
SVA21EX-E	SVA21 (Open-air exhaust)	2pcs / set

Construction of SVA 21 Series (Stand-alone Unit) Tube Exhaust Type



Construction of SVA 21 Series (Stand-alone Unit) Open-air Exhaust Type



⚠ SAFETY Instructions

This safety instructions aim to prevent personal injury and damage to properties by requiring proper use of PISCO products.

Be certain to follow ISO 4414 and JIS B 8370

ISO 4414 : Pneumatic fluid power…Recomendations for the application of equipment to transmission and control systems.

JIS B 8370 : General rules and safety requirements for systems and their components.

This safety instructions is classified into “Danger”, “Warning” and “Caution” depending on the degree of danger or damages caused by improper use of PISCO products.

⚠ Danger	Hazardous conditions. It can cause death or serious personal injury.
⚠ Warning	Hazardous conditions depending on usages. Improper use of PISCO products can cause death or serious personal injury.
⚠ Caution	Hazardous conditions depending on usages. Improper use of PISCO products can cause personal injury or damages to properties.

⚠ Warning

1. Selection of pneumatic products
   ① A user who is a pneumatic system designer or has sufficient experience and technical expertise should select PISCO products.
   ② Due to wide variety of operating conditions and applications for PISCO products, carry out the analysis and evaluation on PISCO products. The pneumatic system designer is solely responsible for assuring that the user's requirements are met and that the application presents no health or safety hazards. All designers are required to fully understand the specifications of PISCO products and constitute all systems based on the latest catalog or information, considering any malfunctions.

2. Handle the pneumatic equipment with enough knowledge and experience
   ① Improper use of compressed air is dangerous. Assembly, operation and maintenance of machines using pneumatic equipment should be conducted by a person with enough knowledge and experience.

3. Do not operate machine / equipment or remove pneumatic equipment until safety is confirmed.
   ① Make sure that preventive measures against falling work-pieces or sudden movements of machine are completed before inspection or maintenance of these machine.
   ② Make sure the above preventive measures are completed. A compressed air supply and the power supply to the machine must be off, and also the compressed air in the systems must be exhausted.
   ③ Restart the machines with care after ensuring to take all preventive measures against sudden movements.

Disclaimer

1. PISCO does not take any responsibility for any incidental or indirect loss, such as production line stop, interruption of business, loss of benefits, personal injury, etc., caused by any failure on use or application of PISCO products.

2. PISCO does not take any responsibility for any loss caused by natural disasters, fires not related to PISCO products, acts by third parties, and intentional or accidental damages of PISCO products due to incorrect usage.

3. PISCO does not take any responsibility for any loss caused by improper usage of PISCO products such as exceeding the specification limit or not following the usage the published instructions and catalog allow.

4. PISCO does not take any responsibility for any loss caused by remodeling of PISCO products, or by combinational use with non-PISCO products and other software systems.

5. The damages caused by the defect of Pisco products shall be covered but limited to the full amount of the PISCO products paid by the customer.

⚠ SAFETY INSTRUCTION MANUAL

PISCO products are designed and manufactured for use in general industrial machines. Be sure to read and follow the instructions below.

⚠ Danger

1. Do not use PISCO products for the following applications.
   ① Equipment used for maintaining / handling human life and body.
   ② Equipment used for moving / transporting human.
   ③ Equipment specifically used for safety purposes.

⚠ Warning

1. Do not use PISCO products under the following conditions.
   ① Beyond the specifications or conditions stated in the catalog, or the instructions.
   ② Under the direct sunlight or outdoors.
   ③ Excessive vibrations and impacts.
   ④ Exposure / adhere to corrosive gas, inflammable gas, chemicals, seawater, water and vapor. *
   * Some products can be used under the condition above(④), refer to the details of specification and condition of each product.
2. Do not disassemble or modify PISCO products, which affect the performance, function, and basic structure of the product.
3. Turn off the power supply, stop the air supply to PISCO products, and make sure there is no residual air pressure in the pipes before maintenance and inspection.
4. Do not touch the release-ring of push-in fitting when there is a working pressure. The lock may be released by the physical contact, and tube may fly out or slip out.
5. Frequent switchover of compressed air may generate heat, and there is a risk of causing burn injury.
6. Avoid any load on PISCO products, such as a tensile strength, twisting and bending. Otherwise, there is a risk of causing damage to the products.
7. As for applications where threads or tubes swing / rotate, use Rotary Joints, High Rotary Joints or Multi-Circuit Rotary Block only. The other PISCO products can be damaged in these applications.
8. Use only Die Temperature Control Fitting Series, Tube Fitting Stainless SUS316 Series, Tube Fitting Stainless SUS316 Compression Fitting Series or Tube Fitting Brass Series under the condition of over 60℃ (140° F) water or thermal oil. Other PISCO products can be damaged by heat and hydrolysis under the condition above.
9. As for the condition required to dissipate static electricity or provide an antistatic performance, use EG series fitting and antistatic products only, and do not use other PISCO products. There is a risk that static electricity can cause system defects or failures.
10. Use only Fittings with a characteristic of spatter-proof such as Anti-spatter or Brass series in a place where flame and weld spatter is produced. There is a risk of causing fire by sparks.
11. Turn off the power supply to PISCO products, and make sure there is no residual air pressure in the pipes and equipment before maintenance. Follow the instructions below in order to ensure safety.
    ① Make sure the safety of all systems related to PISCO products before maintenance.
    ② Restart of operation after maintenance shall be proceeded with care after ensuring safety of the system by preventive measures against unexpected movements of machines and devices where pneumatic equipment is used.
    ③ Keep enough space for maintenance when designing a circuit.
12. Take safety measures such as providing a protection cover if there is a risk of causing damages or fires on machine / facilities by a fluid leakage.

⚠ Caution

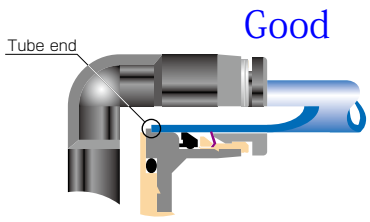
1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without using an Insert Ring.
3. The product incorporating NBR as seal rubber material has a risk of malfunction caused by ozone crack. Ozone exists in high concentrations in static elimination air, clean-room, and near the high-voltage motors, etc. As a countermeasure, material change from NBR to HNBR or FKM is necessary. Consult with PISCO for more information.
4. Special option "Oil-free" products may cause a very small amount of a fluid leakage. When a fluid medium is liquid or the products are required to be used in harsh environments, contact us for further information.
5. In case of using non-PISCO brand tubes, make sure the tolerance of the outer tube diameter is within the limits of Table 1.

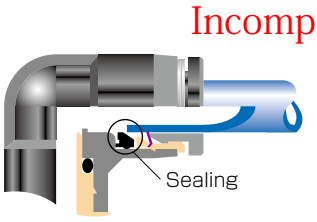
● Table 1. Tube O.D. Tolerance

mm size	Nylon tube	Polyurethane tube
ø1.8mm	—	±0.05mm
ø3mm	—	±0.15mm
ø4mm	±0.1mm	±0.15mm
ø6mm	±0.1mm	±0.15mm
ø8mm	±0.1mm	±0.15mm
ø10mm	±0.1mm	±0.15mm
ø12mm	±0.1mm	±0.15mm
ø16mm	±0.1mm	±0.15mm

inch size	Nylon tube	Polyurethane tube
ø1/8	±0.1mm	±0.15mm
ø5/32	±0.1mm	±0.15mm
ø3/16	±0.1mm	±0.15mm
ø1/4	±0.1mm	±0.15mm
ø5/16	±0.1mm	±0.15mm
ø3/8	±0.1mm	±0.15mm
ø1/2	±0.1mm	±0.15mm
ø5/8	±0.1mm	±0.15mm

6. Instructions for Tube Insertion
   ① Make sure that the cut end surface of the tube is at right angle without a scratch on the surface and deformations.
   ② When inserting a tube, the tube needs to be inserted fully into the push-in fitting until the tubing edge touches the tube end of the fitting as shown in the figure below. Otherwise, there is a risk of leakage.





Tube is not fully inserted up to tube end.

   ③ After inserting the tube, make sure it is inserted properly and not to be disconnected by pulling it moderately.
   ※. When inserting tubes, Lock-claws may be hardly visible in the hole, observed from the front face of the release-ring. But it does not mean the tube will surely escape. Major causes of the tube escape are the followings;
   ①Shear drop of the lock-claws edge
   ②The problem of tube diameter (usually small)
   Therefore, follow the above instructions from ① to ③, even lock-claws is hardly visible.

7. Instructions for Tube Disconnection
   ① Make sure there is no air pressure inside of the tube, before disconnecting it.
   ② Push the release-ring of the push-in fitting evenly and deeply enough to pull out the tube toward oneself. By insufficient pushing of the release-ring, the tube may not be pulled out or damaged by scratch, and tube shavings may remain inside of the fitting, which may cause the leakage later.
8. Instructions for Installing a fitting
   ① When installing a fitting, use proper tools to tighten a hexagonal-column or an inner hexagonal socket. When inserting a hex key into the inner hexagonal socket of the fitting, be careful so that the tool does not touch lock-claws. The deformation of lock-claws may result in a poor performance of systems or an escape of the tube.
   ② Refer to Table 2 which shows the recommended tightening torque. Do not exceed these limits to tighten a thread. Excessive tightening may break the thread part or deform the gasket and cause a fluid leakage. Tightening thread with tightening torque lower than these limits may cause a loosened thread or a fluid leakage.
   ③ Adjust the tube direction while tightening thread within these limits, since some PISCO products are not rotatable after the installation.

● Table 2: Recommended tightening torque / Sealock color / Gasket materials

Thread type	Thread size	Tightening torque	Sealock color	Gasket materials
Metric thread	M3 × 0.5	0.7N·m	—	SUS304 NBR
	M5 × 0.8	1.0 ~ 1.5N·m		
	M6 × 1	2 ~ 2.7N·m		
	M3 × 0.5	0.5 ~ 0.6N·m		POM
	M5 × 0.8	1 ~ 1.5N·m		
	M6 × 0.75	0.8 ~ 1N·m		
	M8 × 0.75	1 ~ 2N·m		
Taper pipe thread	R1/8	7 ~ 9N·m	White	—
	R1/4	12 ~ 14N·m		
	R3/8	22 ~ 24N·m		
	R1/2	28 ~ 30N·m		
Unified thread	No.10-32UNF	1.0 ~ 1.5N·m	—	SUS304、NBR
National pipe thread taper	1/16-27NPT	7 ~ 9N·m	White	—
	1/8-27NPT	7 ~ 9N·m		
	1/4-18NPT	12 ~ 14N·m		
	3/8-18NPT	22 ~ 24N·m		
	1/2-14NPT	28 ~ 30N·m		

※ These values may differ for some products. Refer to each specification as well.

9. Instructions for removing a fitting
   ① When removing a fitting, use proper tools to loosen a hexagonal-column or an inner hex bolt.
   ② Remove the sealant stuck on the mating equipment. The remained sealant may get into the peripheral equipment and cause malfunctions.
10. Arrange piping avoiding any load on fittings and tubes such as twist, tensile, moment load, shaking and physical impact. These may cause damages to fittings, tube deformations, bursting and the escape of tubes.

⚠ Common Safety Instructions for Solenoid Valve Series

Before selecting or using PISCO products, read the following instructions. Read the detailed instructions for individual series.

⚠ Warning

1. When piping, pipe flushing is required for pipes at both air supply and actuator sides. A filter (filtering accuracy should be 5μm or less) should be located close to a solenoid valve on the upstream side. Drain or dust can cause malfunctions.

2. Do not supply compressed air or dry air more than necessary. Deterioration of seal rubber or oil can cause malfunctions.

3. Do not use a solenoid valve in the location where it is exposed to water, oil and dust falling. Using in such circumstance may cause malfunctions or damages, since the valve is neither drip- nor dust- proof. (Protection Structure: IP30)

4. Solennoid valve is not explosive-proof. Do not use a solenoid valve in the location it is exposed to inflammable and explosive gasses or liquid. Using in such circumstance can cause a fire or explosion.

5. Do not use a solenoid valve in the location where it is exposed to corrosive gas. Using in such circumstance can cause trouble.

6. Do not use a solenoid valve in the location where it is exposed excessive vibrating or shock. Using in such circumstance can cause malfunctions or trouble.

7. Make sure a leakage current is 1mA or less before starting the valve. A leakage current more than 1mA can cause malfunctions.

8. The coil in a valve generates heat by the following (1) to (3) conditions. Heating can impair the product life or cause problems in operation. Heating can also cause getting burnt or damaging peripheral machines.
   Contact us when energization is necessary under the following conditions:
   (1) The power is continuously on for more than 2 hours.
   (2) High-cycle operation
   (3) The total operation time per day is longer than non-operation time even the generator is operated intermittently.

⚠ Caution

1. A solenoid valve allows air leakage. Do not use the valve for applications which requires air tightness.

2. Do not use a solenoid valve for a large air-blow. A drop of inner pressure can cause the internally pilotted-valve structure malfunctions.

3. When a solenoid valve is switched over by a manual operation, connected actuators start operation. Confirm the safety before the system is operated.

4. Make sure to turn off the power supply and wire colors before wiring.

5. Solenoid valves work without lubrication. When lubrication is necessary, use Turbine Oil Class 1 (ISO VG 32). If lubrication is stopped in the middle of the operation, it can cause malfunctions due to the loss of initial lubricant on valves. Keep providing lubricant.

6. Make sure each port by a marking on a solenoid valve body when piping.

7. Turn off the power and air supply and make sure the residual pressure becomes zero before maintenance. It should be noted that the residual pressure exists between a solenoid valve and an actuator in Three-Position Closed Center type.

8. Clogged element of a manifold with silencer increases the exhaust resistance. It can also cause impairing the performance in a whole pneumatic system. Carry out the maintenance periodically.

9. Thoroughly read and understand instructions and precautions in this catalog before replacing a silencer element.