Fluororesin Products

Pure Process Series

CONTENTS

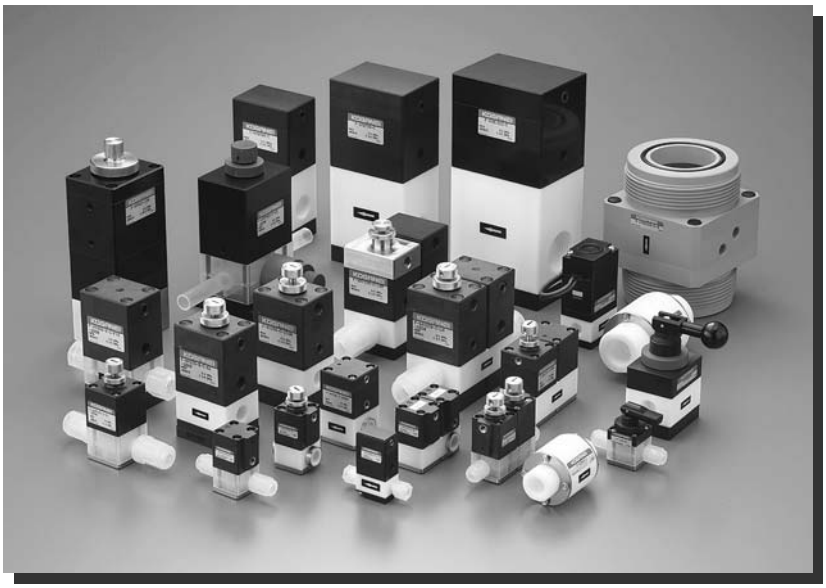
⚠ **Caution** Before use, always read the “Safety Precautions” on p.819 and 866.

Fluororesin Products

Pure Process Series

Among various plastic materials, fluororesin exhibits particularly superior chemical resistance, heat resistance, low friction, electrical insulation, low tackiness, weather resistance, and other features. This superior material is fabricated using micro-machining technology for PTFE products, and Koganei's independently developed injection molding method for PFA products, all under Koganei's rigorous quality control. These products are used in the semiconductor, liquid crystal, and other electronics sectors, as well as in chemicals, food products, medical equipment, chemical plants, and a wide variety of other industrial sectors.

Fluororesin Valve Series

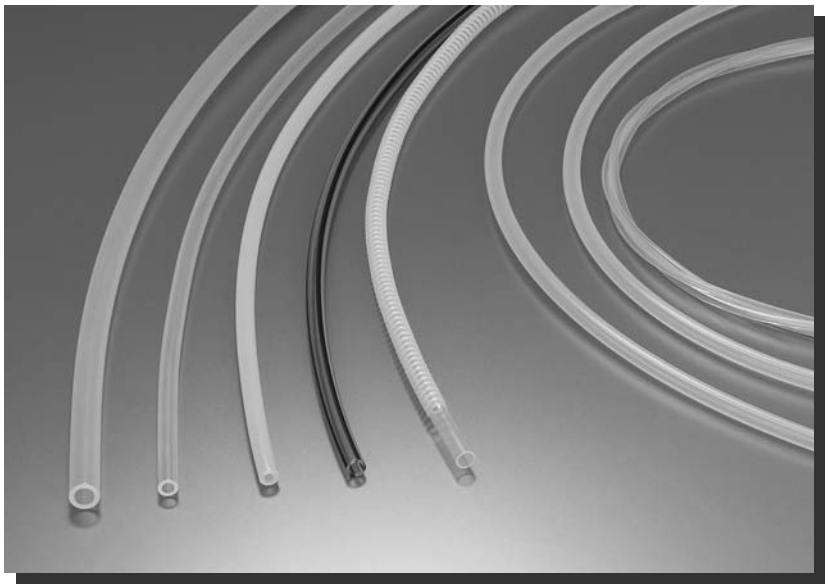


- Compact series line-up suitable for control of small chemical flows now offers even more variety.
- In addition to diverse piping specifications and valve functions, the line-up offers a wide selection of options, such as flow rate adjustment type.

- Air operated valves
- Suck back valves
- Air operated valves with suck back
- Solenoid valve
- Check valve
- Drain valves

Page 823

Fluororesin Tube Series



- Size variations for the field-proven fluororesin tube have expanded.
- The high-grade HG tube and NE tube that demonstrates effectiveness against anti-static charges, have been added to the line-up.

- PFA tubes
- PFA-HG tubes
- PFA-NE tubes
- BT tubes
- RPL tubes

Page 865

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 you, other people, and 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!"

⚠ **DANGER**	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.
⚠ **WARNING**	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.
⚠ **CAUTION**	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.
⚠ **ATTENTION**	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, Owner's Manual and other literature before commencing operation. Making mistakes in handling is dangerous.

■ After reading the Owner's Manual, Catalog, etc., always place them where they can be easily available for reference to users of this product.

■ If transferring or lending the product to another person, always attach the Owner's Manual, Catalog, etc., to the product where they are 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 Owner's Manual carefully, and always keep safety first.

⚠ DANGER

● Do not use for the purposes listed below:
1. 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 solenoid valves in locations with or near dangerous substances such as flammable or ignitable substances. The products are not explosion-proof. They could ignite or burst into flames.

● Do not allow flammable gases or ignitable chemicals to flow the solenoid valves. Moreover, do not use the solenoid valve in atmospheres containing flammable gases. There is a chance of explosion or ignition.

● Persons who use a pacemaker, etc., should keep a distance of at least 1 meter [3.28ft.] away from the solenoid valve. There is a possibility that the pacemaker will malfunction due to the strong magnet built into the solenoid valve.

● Do not use any media other than those shown in the specifications table. Use of non-specified media could lead to early shutdown of function or a sudden drop in performance, and result in a reduced operating life. Media leakage on the outside of the product could pose a risk to human life.

● When using chemicals, always check compatibility with the structural materials of the product before use. Use of incompatible media could lead to early shutdown of function or a sudden drop in performance, and result in a reduced operating life. Fluid leakage on the outside of the product could pose a risk to human life.

● When attaching the product, always ensure that it is securely mounted in place. Dropping or falling the product or improper operation could result in injury.

● 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, disconnection or connection of piping tubes or plugs, or adjustment of mounting positions) while in operation. The chemicals could leak out, possibly resulting in injury.

● 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, fires, etc.

● Never attempt to remodel the product. It could result in abnormal operation leading to injury, electric shock, fires, etc.

● Never attempt inappropriate disassembly, assembly or repair of the product relating to basic inner construction, or to its performance or to functions. It could result in injury, electric shock, fires, etc.

⚠ WARNING

● Do not use the product in excess of its specification range. Such use could result in product breakdowns, function stop, damage, or drastically reduce the operating life.

● Before supplying chemicals, gases, or pilot air to the product, and before beginning operation, check that the piping is connected correctly. Careless supply of chemicals, gases, or pilot air could result in chemicals, etc. flowing to an unintended location or leaking out, and causing injury.

● For repairs, inspections, maintenance, replacement, or any other operations related to the product (particularly when the media used are chemicals), check that the chemicals have been completely drained from inside of the equipment, and that pilot air has been shut off and pressure inside the piping completely released. Neglecting this check could lead to leaks of chemicals, etc., that could cause injury.

● When installing a fluororesin fitting, always perform a leak test before supplying chemicals or gases through it, to check that there are no leaks, and then start passing the media. Neglecting this check could lead to leaks of chemicals, etc., that could cause injury.

● Do not pull on tubes that are connected to the fittings. The tube(s) could pull out, leaking chemicals or gases.

● When using fittings and tubes, always use compatible thread sizes and tube sizes. Use of incompatible sizes could lead to leaks or disconnections.

● Always check the Catalog etc. to ensure that solenoid valve

wiring and piping is installed correctly. Errors in wiring and piping could lead to abnormal operation.

- Do not use the solenoid valves or the wiring to control them, at locations close to power lines where large electrical currents are flowing, or in locations subject to strong magnetic fields or power surges. Such applications could lead to unintended operation.
- Do not install solenoid valves inside control panels. Heat inside the control panels could cause leakage on the piping or other areas.
- When energizing the solenoid valve for long periods, provide heat radiation measures to ensure that ambient temperature of the solenoid valve always remain within the specified temperature range. When energizing the unit for long periods, consult us.
- The solenoid valve could 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.
- Always shut off the power when performing wiring work. Leaving the power on could result in electric shock.
- After completing wiring work, always check to ensure that no wiring connection errors exist before turning on the power.
- Apply the specified voltage to the solenoid. Using the wrong voltage level will prevent the solenoid from performing its function, and could lead to breakage or burning damage of the product itself.
- Avoid scratching the solenoid valve lead wires. Letting the lead wires 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 continuity that lead to fires, electric shock, or abnormal operation.
- Do not touch terminals and miscellaneous switches, etc., while the solenoid valve is powered on. There is a possibility of electric shock and abnormal operation.
- Design devices so as to ensure safety even when equipment shuts down due to emergency stops, power outages, or other system problems, to prevent damage to the devices or personal injury.
- 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 may have stuck together, resulting in equipment operation delays or sudden movements. For these initial operations, always run a test operation before use to confirm that the movement is normal.
- In low frequency use (more than 30 days between uses), there is a possibility that contacting parts may have stuck together, 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.
- 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.
- Do not throw the product into fire. The product could explode and/or release toxic gases.

⚠ CAUTION

- Do not use in locations that are subject to direct sunlight (ultraviolet rays), in locations with high temperatures or high humidity, in locations subject to dust, salt, or iron powder, or when the media or ambient atmosphere include particles that are incompatible with the product structural materials. It could lead to early shutdown of some functions or a sudden degradation of performance, and result in a reduced operating life. For the material, see the Major Parts and Materials.
- When installing 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 installing or transporting heavy products, use a lift, supporting tool, or several people, to provide firm support, and proceed with due caution to ensure personal safety.
- Always post an “operations in progress” sign for installations, adjustments, or other operations, to avoid accidental supply of chemicals, gases, pilot air, or electrical power, etc. Accidental supplying of chemicals, gases, pilot air, or electrical power, etc., could result in injury to operators due to sudden movement of the product, or to electrical shocks.
- Do not bring floppy disks or magnetic media, etc., within 1 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.
- Do not use the solenoid valve in locations subject to large electrical currents or magnetic fields. It could result in erratic operation.
- If leakage current is occurring in the control circuit, there is a possibility of the product performing an unintended operation. Take measures against leakage current 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 intended operation, equipment damage, or personal injury.

⚠ ATTENTION

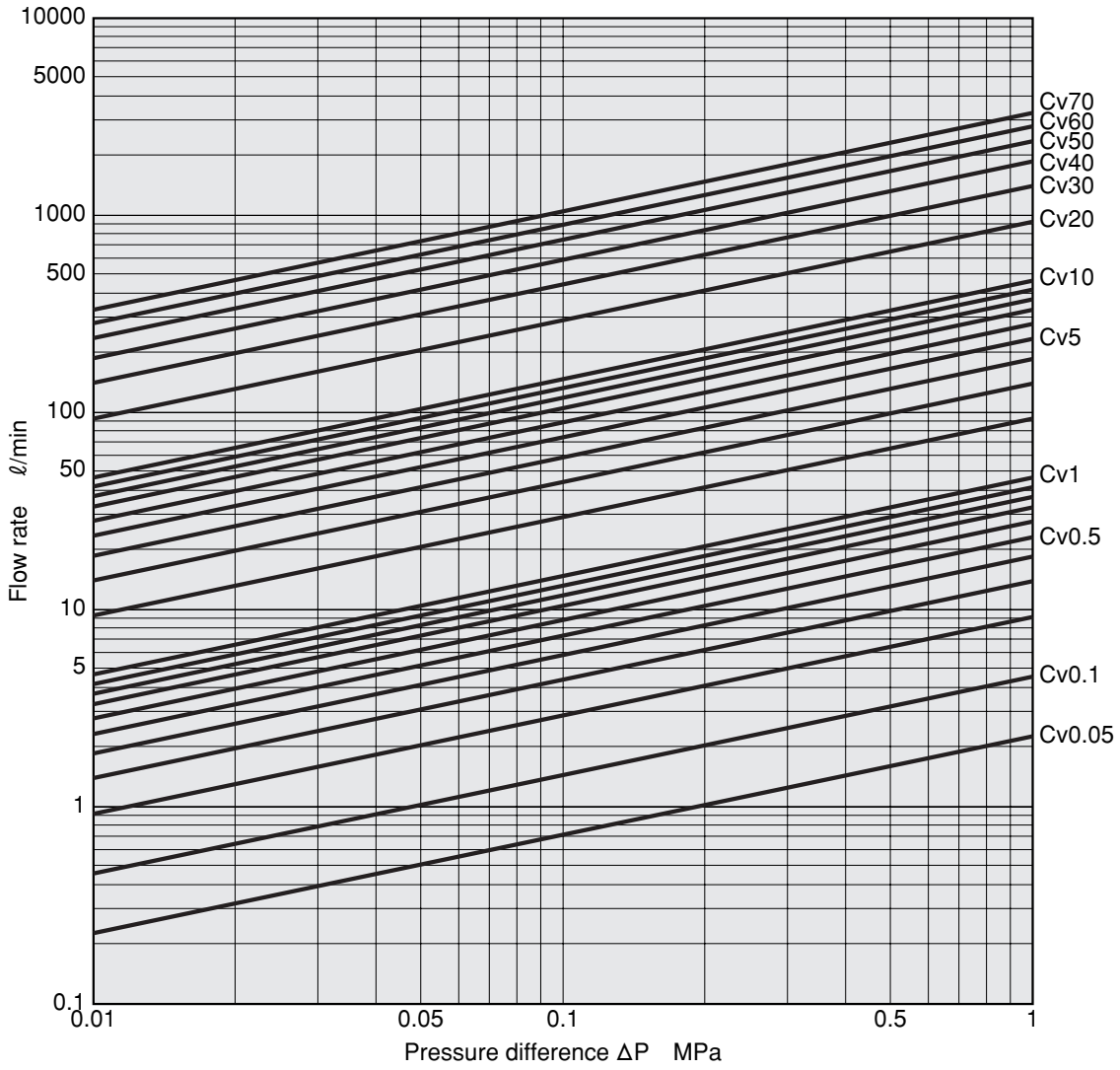
- When considering the possibility of using this product in situations or environments not specifically noted in the Catalog or Owner’s Manual, or in applications where safety is an important requirement, such as in an airplane facility, combustion equipment, leisure equipment, safety equipment and other 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.
- The properties of fluororesin products mean that they may sometimes not be used with certain acid, alkaline or toxic fluids due to penetration or permeation. For use in such applications, consult us.
- Always check the Catalog and other reference materials for product wiring and piping.
- Use protective covers, etc., to ensure that human bodies do not come into direct contact with the operating parts of mechanical devices, etc.
- When handling the product, wear protective gloves, safety glasses, safety shoes, etc., to keep safety.
- When the product can no longer be used, or is no longer necessary, dispose of it appropriately as industrial waste.
- Fluororesin products can show deterioration in performance or function as operating span lengthens. Perform daily inspections of fluororesin products, to check that they satisfy the required functions for the system, and to prevent accidents.
- For inquiries about the product, consult your nearest Koganei sales office or Koganei overseas department. The address and telephone number are shown on the back cover of this catalog.

⚠ OTHERS

- Always observe the following items.
  1. When using this product in fluid system or pneumatic systems for pilot, 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 to its performance or to functions.

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

Water: Flow rate conversion graph



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

Note: The pressure difference ΔP in the graph shows the pressure difference between the primary (upstream) gauge pressure P1 and secondary (downstream) gauge pressure P2.
ΔP=P1−P2 (MPa)

Flow rate equation (in the equation, pressures Ph and Pl show absolute pressure)

$$Q=45.62Cv\frac{\sqrt{Ph-Pl}}{\sqrt{G}}$$

Q: Flow rate ℓ/min
Cv: Flow rate coefficient
Ph: Primary (upstream) absolute pressure (MPa)
Pl: Secondary (downstream) absolute pressure (MPa)
G: Specific gravity (for water, this equals 1)

$$Q'=0.1338Cv\frac{\sqrt{Ph'-Pl'}}{\sqrt{G}}$$

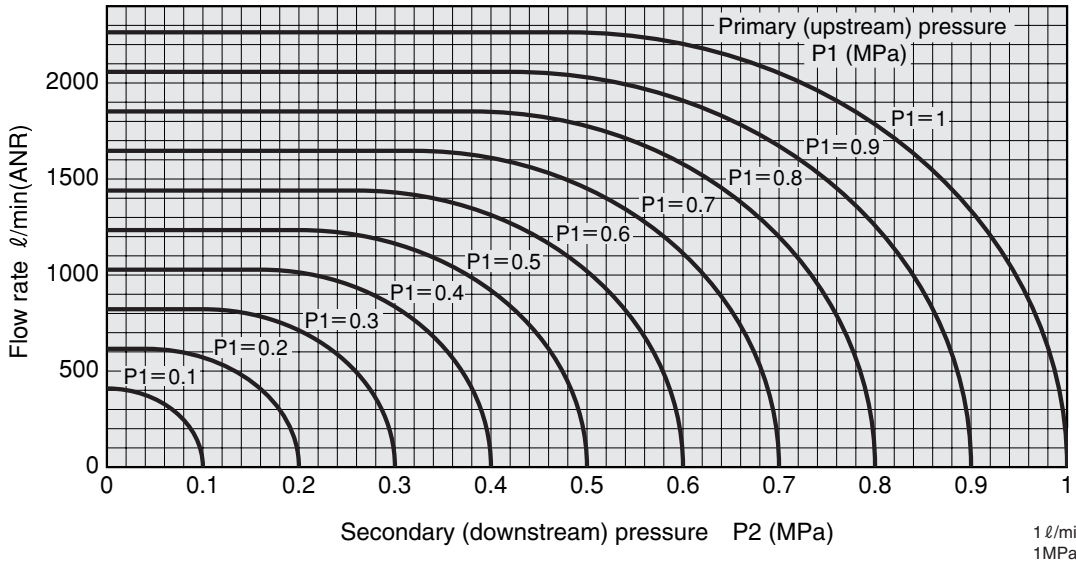
Q': Flow rate ft³/min.
Cv: Flow rate coefficient
Ph': Primary (upstream) absolute pressure (psi.)
Pl': Secondary (downstream) absolute pressure (psi.)
G: Specific gravity (for water, this equals 1)

How to use the graph

When there is no diagram for the valve flow rate coefficient (Cv) in the above graph:
Multiply the Cv of the valve being used to the flow rate at Cv = 1 read out from the graph to calculate the flow.

Example: At Cv = 1, value read out from the graph:
Q=20 ℓ/min [0.706ft³/min.] for the desired pressure difference
When flow rate coefficient for the valve being used is
Cv = 0.31
Seeking flow rate =Q×Cv=20×0.31=
6.2 ℓ/min [0.219ft³/min.]

Air: Flow rate conversion graph Cv=1



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

Note: Pressures P1 and P2 in the graph show the gauge pressure (MPa).

How to use the graph

The above graph shows the flow rate when the flow rate coefficient Cv = 1.
When Cv≠1, multiply the Cv of the valve being used to the flow rate read out from the graph to calculate the flow.

Example: Value read out from the graph:
Q=500 ℓ/min [17.7ft³/min.] (ANR) for the desired P1 and P2
When flow rate coefficient for the valve being used is Cv=0.31
Seeking flow rate =Q×Cv=500×0.31=
155 ℓ/min [5.47ft³/min.] (ANR)

Flow rate equation

(in the equation, pressures Ph and Pl show absolute pressure)

1) When Pl / Ph>0.5283

$$Q=4119Cv\frac{\sqrt{(Ph-Pl)Pl}}{\sqrt{G}}$$

2) When Pl / Ph≦0.5283

$$Q=2056CvPh\frac{1}{\sqrt{G}}$$

Q: Flow rate ℓ/min (ANR)
Cv: Flow rate coefficient
Ph: Primary (upstream) absolute pressure (MPa)
Pl: Secondary (downstream) absolute pressure (MPa)
G: Specific gravity (conversion specific gravity, when air is 1)

1) When Pl′ / Ph′ >0.5283

$$Q'=1.0Cv\frac{\sqrt{(Ph'-Pl')Pl'}}{\sqrt{G}}$$

2) When Pl′ / Ph′ ≦0.5283

$$Q'=0.5CvPh'\frac{1}{\sqrt{G}}$$

Q': Flow rate ft³/min. (ANR)
Cv: Flow rate coefficient
Ph': Primary (upstream) absolute pressure (psi.)
Pl': Secondary (downstream) absolute pressure (psi.)
G: Specific gravity (conversion specific gravity, when air is 1)

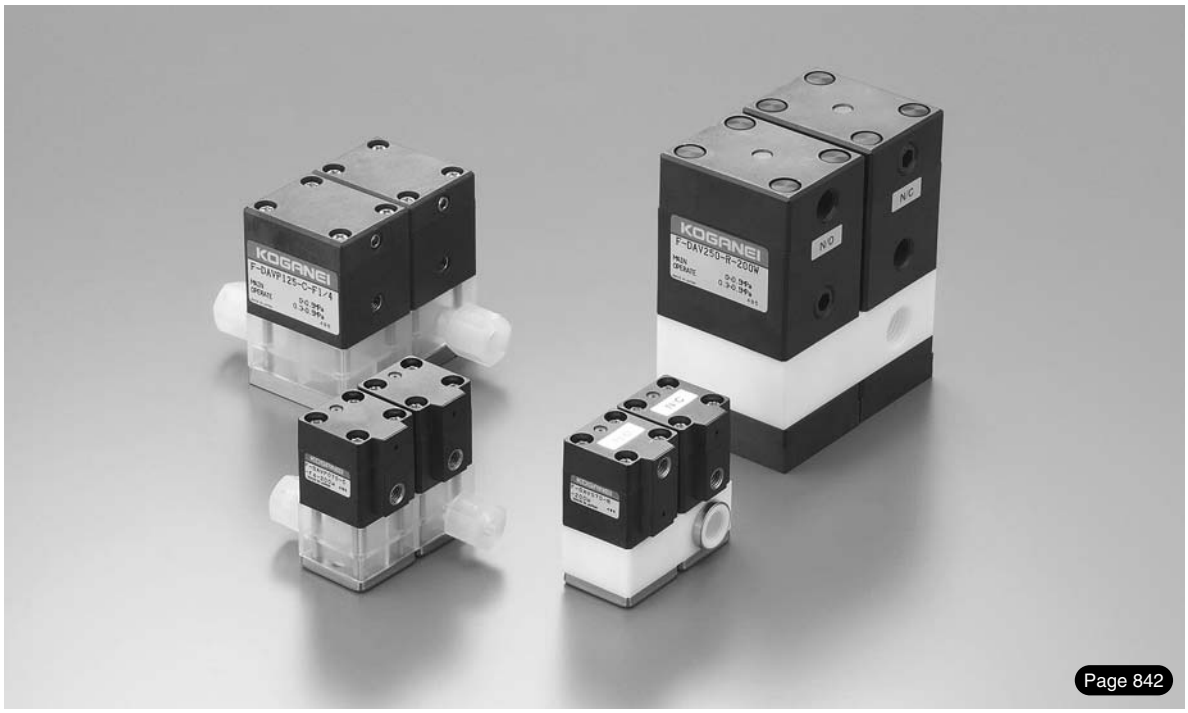
Fluororesin Valve Series

■ Air Operated Diaphragm Type 2-port Valves

Page 832

- Compact series line-up, suitable for control of small flow rate of chemicals, now offers even more variety.
- For the valve body materials, select from among PFA, PTFE, and SUS.
- In addition to the highly reliable Koganei H series fitting, a monoblock Flowell 60 series fitting integrated type has been added to the product range. Now, other manufacturers fittings are available to suit various applications.
- A flow rate adjustment mechanism employing a differential screw method to enable fine flow rate adjustment can be selected as an option.

■ Air Operated Diaphragm Type 3-port Valves



Page 842

- Compact series line-up, suitable for control of small flow rate of chemicals, now offers even more variety.
- For the valve body materials, select from among PFA, PTFE, and SUS.
- In addition to the highly reliable Koganei H series fitting, a monoblock Flowell 60 series fitting integrated type has been added to the product range. Now, other manufacturers fittings are available to suit various applications.
- Can be used as either a divider valve or selector valve by only changing the piping direction.

■ Air Operated Valves with Suck Back


Page 851

- The highly reliable diaphragm-type 2-port valve is combined with a suck back valve to achieve space savings. Ease of use is improved through opposite-position piping ports.
- A low sliding resistance type enabling fine adjustment is also available.
- For the valve body materials, select from among PFA, PTFE, and SUS.
- In addition to the highly reliable Koganei H series fitting, a monoblock Flowell 60 series fitting integrated type has been added to the product range. Now, other manufacturers fittings are available to suit various applications.
- A flow rate adjustment mechanism employing a differential screw method to enable fine flow rate adjustment can be selected as an option.

■ Suck Back Valves


Page 848

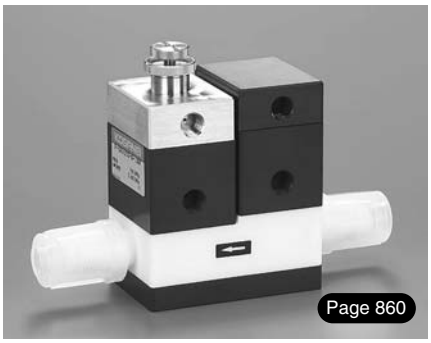
- Use in combination with an air operated valve easily prevents dripping of chemicals.
- Adjustment of the suck back volume is easy using an adjusting screw.

■ Solenoid Valve


Page 858

- The highly reliable compact solenoid used in the pneumatic solenoid valves is combined with fluororesin valve technology. Energizing the solenoid enables easy control of chemicals even in locations without a pilot air supply.
- The square, compact design achieves space savings, and is suitable for control of small flow rate chemicals.

■ High Viscosity Specification Valves


Page 860

- New high viscosity specification valves are now added to our line-up of field-proven air operated valves with suck back.
- Improved valve airtightness boosts reliability during both positive pressure and vacuum, and enables the valves to control discharges of high viscosity chemicals. Employs a special construction that prevents micro-bubbles due to inlet vacuum from growing during suck back operation.

■ Valve with Dual Flow Rate Switching Mechanism


Page 861

- Allows switching between two stages of flow rate in a single valve. Flow rates can be switched easily without making a complex circuit.
- A highly reliable diaphragm valve construction ensures high durability.

■ Check Valve


Page 859

- Compact and lightweight unit prevents fluid leakage.
- A choice of different seal materials is available, depending on the media used.

■ Large Flow Series, Drain Valve Series


Page 862

- Air operated valve (Diaphragm type, bellows type)
- Check valve

■ Other Related Products


Page 864

- PTFE ejector, needle valves, and lever valves
- Speed controller for pilot air control

Valve Selection Guides[Note 1]

Type	Basic model	Page	Orifice mm [in.]	Suck back volume cm³ [in³]	Operating pressure MPa [psi.]	Valve function [Note 2]	Body material	Solvent-resistant specification	Female thread piping			With **H** series fitting[Note 3] **-F**□					
									M6×1	Rc1/8	Rc1/4	φ3	φ4	φ6	φ8	φ10	1/8 (φ3.17)
Air operated diaphragm type 2-port valve	**F-AV030**	832	1 [0.039]	—	0.2 [29]	C	PTFE	●	●			●	●				●
	F-AV050 ★	833	1.6 [0.063]	—	0.2 [29]	C	PTFE	—	●			●	●				●
	F-AV070 ★	834	1.8 [0.071]	—	0.2 [29]	C	PTFE	—		●			●				●
	F-AV070	835	2 [0.079]	—	0.5 [73]	C, O, D	PTFE	●		●							
	F-AV100	836	2.5 [0.098]	—	0.5 [73]	C, O, D	PTFE	●		●				●			
	F-AV125	837	4 [0.157]	—	0.5 [73]	C, O, D	PTFE	●		●				●			
	F-AV250	838	6, 8 [0.236, 0.315]	—	0.5 [73]	C, O, D	PTFE	●			●				●	●	
	F-AVP070	839	2 [0.079]	—	0.5 [73]	C, O, D	PFA	●					●				●
	F-AVP125	840	4 [0.157]	—	0.5 [73]	C, O, D	PFA	●									
	F-AVP250	841	8 [0.315]	—	0.5 [73]	C, O, D	PFA	●							●	●	
Air operated diaphragm type 3-port valve	**F-DAV070**	842	2 [0.079]	—	0.5 [73]	C, R, D	PTFE	●		●							
	F-DAV125	843	4 [0.157]	—	0.5 [73]	C, R, D	PTFE	●		●							
	F-DAV250	844	6 [0.236]	—	0.5 [73]	C, R, D	PTFE	●			●						
	F-DAVP070	845	2 [0.079]	—	0.5 [73]	C, R, D	PFA	●					●				●
	F-DAVP125	846	3.2 [0.126]	—	0.5 [73]	C, R, D	PFA	●						●			
	F-DAVP250	847	8 [0.315]	—	0.5 [73]	C, R, D	PFA	●								●	
Suck back valve	**F-SV070**	848	—	0.045 [0.00275]	0.3 [44]	C, D	PTFE	●		●							
	F-SV125	849	—	0.25 [0.0153]	0.3 [44]	C, D	PTFE	●		●							
	F-SV250	850	—	0.40 [0.0244]	0.3 [44]	C, D	PTFE	●			●						
Air operated valve with suck back diaphragm type	**F-SAV070** ★	851	1.8 [0.071]	0.04 [0.0024]	0.2 [29]	C	PTFE	—		●			●				●
	F-SAV070	852	2 [0.079]	0.045 [0.00275]	0.3 [44]	C	PTFE	●		●			●				●
	F-SAV100	853	2.5 [0.098]	0.25 [0.0153]	0.3 [44]	C, D	PTFE	●		●				●			
	F-SAV125	854	4 [0.157]	0.25 [0.0153]	0.3 [44]	C, D	PTFE	●		●				●			
	F-SAV250	855	6 [0.236]	0.40 [0.0244]	0.3 [44]	C, D	PTFE	●			●				●	●	
	F-SAVP070	856	2 [0.079]	0.045 [0.00275]	0.3 [44]	C	PFA	●									
	F-SAVP125	857	4 [0.157]	0.25 [0.0153]	0.3 [44]	C, D	PFA	●									
Solenoid valve diaphragm type 2-port valve	**F-EV120**	858	3 [0.118]	—	0.15 [22]	C	PTFE	—		●							
Check valve	**F-C250**	859	(14mm²)	—	0.9 [131]	C	PTFE	—			●						

Notes:
1. For specification details, see the page of each product.
2. For valve functions, “C” means normally closed, “O” means normally open, “D” means double acting type, and “R” means one side normally closed and the other side normally open.
3. For the tube sizes applicable to the H series fittings, see p.828.
4. For the Flowell 60 series special fittings, see p.827.
5. For items with flow rate adjustment, the square mark ■ shows the differential screw type, and the circle mark ● shows the conventional screw type. For features of the differential screw type, see p.831.
6. When SUS specification is selected for the valve body material, the fitting specification cannot be selected.
7. The star mark ★ shows the low sliding resistance diaphragm type. A speed controller can be used for fine open/close control.
8. For the triangle mark ▲, which shows the features with bypass flow rate adjustment (made to order), see p.831.
9. For details of asterisk ※ specifications, consult us.

Piping specification																With flow rate adjustment -Q1 Note 5	With special functions (Made to order)			Body materials SUS specification -S Note 6
			With Flowell 60 series standard fitting -L □										Flowell 60 series special size Note 4				With bypass flow rate adjustment Note 8	With Pillar fitting	With reducing H fitting	
	1/4 (φ6.35)	3/8 (φ9.52)	φ3 × φ2	φ4 × φ2	φ4 × φ3	φ6 × φ4	φ8 × φ6	φ10 × φ8	φ3.17 × φ1.59	φ6.35 × φ3.96 φ6.35 × φ4.35	φ9.52 × φ6.35	φ9.52 × φ7.52	For φ4 × φ3 only	For φ3.17 × φ2.17 only	For φ6.35 × φ4.35 only					
			●	●	●				●				●	●		●	—	※	※	●
			●	●	●				●				●	●		●	—	※	※	●
				●	●				●				●	●		●	—	※	※	●
																■	—	※	※	●
	●					●				●						■	▲	※	※	●
	●					●				●						■	▲	※	※	●
		●					●	●			●	●				●	▲	※	※	●
													●	●		■	—	—	—	—
															●	■	—	—	—	—
		●														●	—	—	—	—
				●	●				●				●	●		※	—	※	※	●
						●				●						※	—	※	※	●
							●	●			●	●				※	—	※	※	●
																※	—	—	—	—
	●															※	—	—	—	—
		●														※	—	—	—	—
																—	—	※	※	●
																—	—	※	※	●
																—	—	※	※	●
				●	●				●				●	●		●	—	※	※	●
				●	●				●				●			■	—	※	※	●
	●					●				●						■	—	※	※	●
	●					●				●						■	—	※	※	●
		●					●	●			●	●				●	—	※	※	●
														●		■	—	—	—	—
															●	■	—	—	—	—
																—	—	※	※	※
																—	—	—	—	—

Mounting

Mounting

1. While any mounting direction is acceptable, for the F-SV, F-SAV, F-SAVP series, a vertical mounting that positions the OUT port facing upward is recommended. This will allow easy removal of air bubbles generated inside the valve or introduced from outside.
2. To mount the product, examine the external dimensions and then firmly secure it in place.

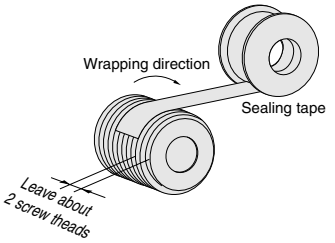
Media

For pilot air, use clean air that has been passed through an air filter with a filtration rating of a minimum 5 μm to eliminate collected liquid and solid particles.

Valve piping

●Piping for thread portion

1. PTFE sealing tape is required, even when fluororesin fittings are used. Always use it to fill in gaps in the threads to prevent leakage.
2. Before piping, perform air blowing (flushing) or cleaning to completely remove solid particles and other foreign objects from the piping interior.
   Introduction of foreign objects into the valve could result in leakage at the valve seat. In the cases in which there is the possibility of foreign objects entering, install a filter on the valve primary side.
3. When screwing fittings, exercise caution to ensure that machining chips of piping threads, etc., do not enter to the valve interior.
4. Wrap PTFE sealing tape around the thread portion so that 1.5 to 2 screw threads remain visible. This will probably require 3 to 4 wrappings, but the number of wrappings can be adjusted to match the thread variation.
5. For the tightening torque, see the tables below. (The tightening torque is required to be raised or lowered depending on the operating pressure and on the machined accuracy of the threads.)



Tightening torque for piping

Port size Rc	PFA, PTFE fitting (N・m) [ft・lbf]
1/8	0.4～0.7 [0.30～0.52]
1/4	0.5～0.8 [0.37～0.59]
3/8	1.0～1.5 [0.74～1.11]
1/2	1.5～2.0 [1.11～1.48]
3/4	2.0～2.5 [1.48～1.84]

Tightening torque for pilot connection port

Port size	N・m [ft・lbf]
M5	0.4～0.6 [0.30～0.44]
Rc1/8	0.4～0.7 [0.44～0.52]

●Metal fittings

1. The use of metal fittings directly onto a PTFE valve body can result in the fitting threads cutting the screw threads on the valve body, resulting in damage to the thread portion and allowing foreign objects to enter into the valve interior. When using metal fittings, always take caution in their selection and installation.
2. When using metal fittings on a PTFE valve body, do not use fittings with threads coated with sealant.

●H series fittings

1. While the applicable tube sizes are based on outer diameters, some tubes cannot be used because of their tube thickness. See the table on p.828, “Applicable tube sizes/tolerances,” when making a selection.
2. See p.829, “Tube installing procedure,” and install it in accordance with those instructions.

●Flowell 60 series fittings

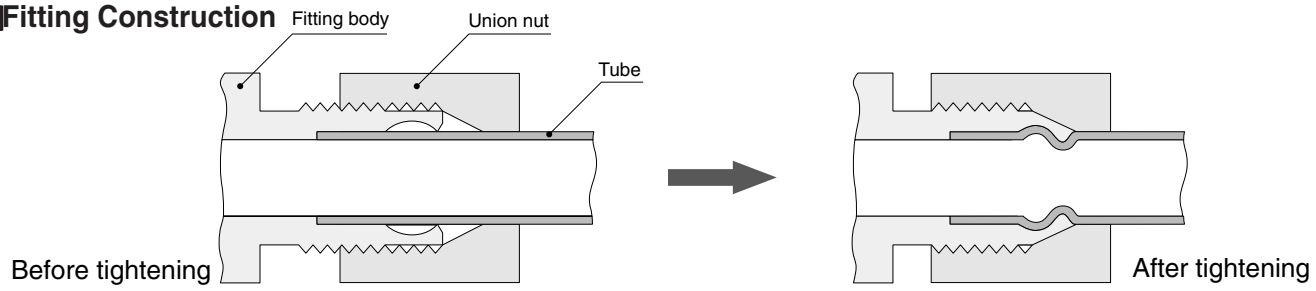
1. These fittings are flare seal type fittings. See the latest Flowell’s catalog and user’s manual to properly perform the installation.
2. Regarding the special fitting sizes, dedicated tools for flare processing of the tubes are required in special sizes. Check and ask Flowell for selection and installation.

Application

1. For nitrogen gas, air, or other gases, there is a possibility of leakage of 1cm^3/min [0.061in.^{3}/min.] (at atmospheric pressure) or less occurring at the valve seat.
2. For the diaphragm type with flow rate adjustment, diaphragm vibrations may occur, depending on the application conditions. In this case, recheck the piping, flow rate, and pressure.
3. The diaphragm type and bellows type may be subjected to water hammering. In the cases in which introduced air bubbles or other problems occur, use a speed controller, etc., to adjust the open/close speed. When the situation does not improve, recheck the piping, flow rate, and pressure.
4. Valve series products are packaged in a clean room. Exercise caution in regard to location, etc., when opening the packages, and handling the products.

Fluororesin H Series Fittings

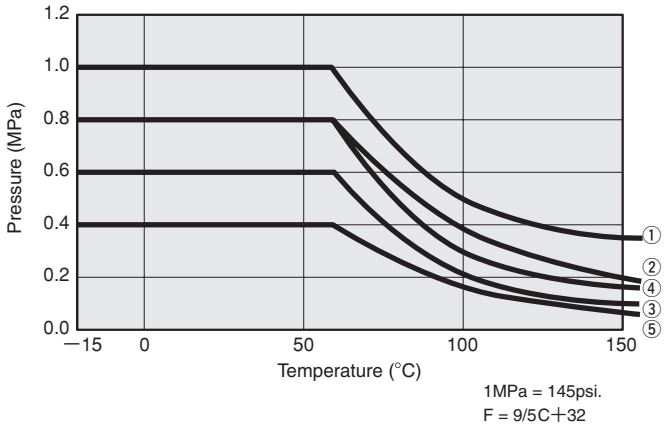
■Fitting Construction



■Specifications

Seal type: Tapered seal type
Continuous operating temperature: −15°～+150°C [5°～302°F]
Materials: Body—PTFE
: Union nut
Fitting size: 12mm [0.472in.] or less — PFA
Fitting size: 16mm [0.630in.] or more — PTFE

Recommended operating temperatures and pressure ranges



1MPa = 145psi.
F = 9/5C+32

	Fitting size	
	mm	Inch
	3	1/8
	4	
①	6	1/4
	8	
	10	3/8
②	12	1/2
③	16	
④	19	3/4
⑤	25	4/4

Caution
The numerical values at left are based on Koganei test results. Note that conditions may vary from practical applications. For this reason, careful evaluation before use is recommended.

■Applicable Tube Materials

PTFE, PFA, FEP, and other fluororesin tubes

■Applicable Tube Sizes/Tolerances

Fitting size		Tube size	Outer diameter mm [in.]		Thickness mm [in.]	
		Outer dia .X Inner dia.	Basic dimension	Tolerance	Basic dimension	Tolerance
mm	3	3×2	3.0 [0.118]	±0.20 [±0.0079]	0.5 [0.020]	±0.10 [±0.0039]
	4	4×2	4.0 [0.157]		1.0 [0.039]	±0.10 [±0.0039]
		4×3	4.0 [0.157]		0.5 [0.020]	±0.10 [±0.0039]
	6	6×3	6.0 [0.236]		1.5 [0.059]	±0.20 [±0.0079]
		6×4	6.0 [0.236]		1.0 [0.039]	±0.10 [±0.0039]
	8	8×5	8.0 [0.315]		1.5 [0.059]	±0.20 [±0.0079]
		8×6	8.0 [0.315]		1.0 [0.039]	±0.10 [±0.0039]
	10	10×7	10.0 [0.394]		1.5 [0.059]	±0.20 [±0.0079]
		10×8	10.0 [0.394]		1.0 [0.039]	±0.10 [±0.0039]
	12	12×9	12.0 [0.472]	±0.30 [±0.0118]	1.5 [0.059]	±0.20 [±0.0079]
		12×10	12.0 [0.472]		1.0 [0.039]	±0.10 [±0.0039]
	16	16×13	16.0 [0.630]		1.5 [0.059]	±0.15 [±0.0059]
		16×14	16.0 [0.630]		1.0 [0.039]	±0.10 [±0.0039]
	19	19×16	19.0 [0.748]	±0.40 [±0.0157]	1.5 [0.059]	±0.15 [±0.0059]
		19×17	19.0 [0.748]		1.0 [0.039]	±0.10 [±0.0039]
	25	25×22	25.0 [0.984]		1.5 [0.059]	±0.15 [±0.0059]
		25×23	25.0 [0.984]		1.0 [0.039]	±0.10 [±0.0039]
Inch	1/8	3.17×1.59	3.17 [0.1248]	±0.20 [±0.0079]	0.79 [0.0311]	±0.15 [±0.0059]
		3.17×2.17	3.17 [0.1248]		0.5 [0.020]	±0.06 [±0.0024]
	1/4	6.35×3.17	6.35 [0.2500]		1.59 [0.0626]	±0.20 [±0.0079]
		6.35×3.96	6.35 [0.2500]		1.2 [0.047]	
		6.35×4.35	6.35 [0.2500]		1.0 [0.039]	
	3/8	9.52×6.35	9.52 [0.3748]		1.59 [0.0626]	
		9.52×7.52	9.52 [0.3748]		1.0 [0.039]	
	1/2	12.7×9.52	12.7 [0.5000]	±0.30 [±0.0118]	1.59 [0.0626]	±0.30 [±0.0118]
		12.7×10.7	12.7 [0.5000]		1.0 [0.039]	
	3/4	19.05×15.88	19.05 [0.7500]	±0.40 [±0.0157]	1.59 [0.0626]	±0.40 [±0.0157]
	4/4	25.40×22.22	25.40 [1.0000]		1.59 [0.0626]	

Tube installing procedure

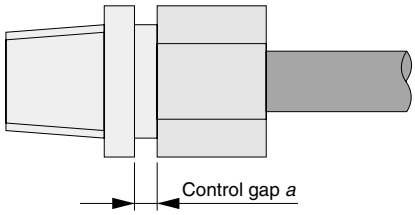
1. Cutting tubes
   Use a tube cutter, and cut at right angles to the tube length direction.
2. Inserting tubes
   - With the union nut set into the fitting body, insert the tube into the nut.
   - Insert the tube until it reaches the shoulder at the back of the fitting body.
3. Tightening the union nut
   - Lightly finger tighten the union nut.
   - Use a wrench or other tool to tighten the union nut, and tighten until the control gap *a* is within the “Control gap *a* dimensions at the time of initial tightening” range.
     ※ See the “Control gap *a* dimensions at the time of initial tightening” table below.
   - When tightening fittings for tube outer diameter sizes of 19 and 25 (3/4, 4/4), manually push the union nut toward the fitting body while tightening.
     ※ Tightening without pushing down on the union nut could result in crushed screw threads on the fitting body.

●Control gap *a* dimensions at the time of initial tightening

mm	
Fitting size	Control gap *a*※ mm [in.]
3	2.0～1.5 [0.079～0.059]
4	2.0～1.5 [0.079～0.059]
6	2.6～2.1 [0.102～0.083]
8	2.6～2.1 [0.102～0.083]
10	2.6～2.1 [0.102～0.083]
12	2.6～2.1 [0.102～0.083]
16	3.0～2.5 [0.118～0.098]
19	3.0～2.5 [0.118～0.098]
25	3.0～2.5 [0.118～0.098]

Inch	
Fitting size	Control gap *a*※ mm [in.]
1/8	2.0～1.5 [0.079～0.059]
1/4	2.6～2.1 [0.102～0.083]
3/8	2.6～2.1 [0.102～0.083]
1/2	2.6～2.1 [0.102～0.083]
3/4	3.0～2.5 [0.118～0.098]
4/4	3.0～2.5 [0.118～0.098]

※ The control gap *a* dimension at the time of initial tightening is roughly determined to be at the point where the main body threads disappear.



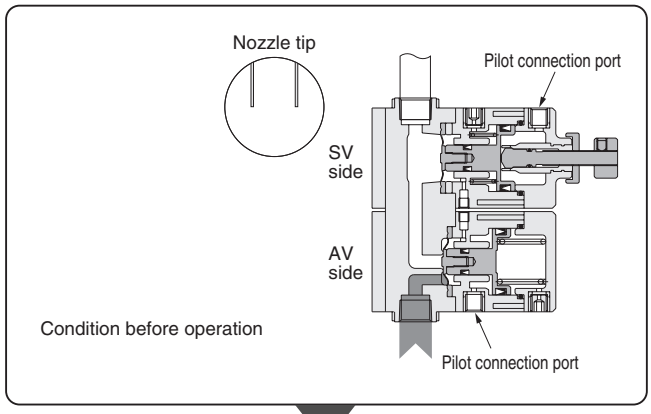
① Further tightening is acceptable only in the cases where the nut becomes loosened and leakage occurs, due to stress relaxation characteristics of the plastic, and to operating conditions.
② Tighten about 1/4 extra turn.
③ The upper limit of further tightening is about from 1/2 to 3/4 extra turns.

●Reuse of product
Since the sealing function of the fitting will be degraded after one use, product reuse cannot obtain the same level of sealing performance as a new product.
Since the sealing performance degradation compared with a new product will vary depending on the application conditions and the amount of time used, perform a careful investigation before reuse.

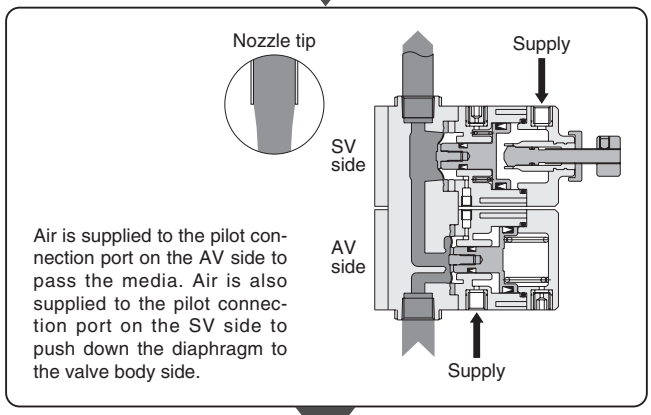
●Piping connections to valves
For details, see p.827, Valve piping.

Operation Principles of Air Operated Valves with Suck Back

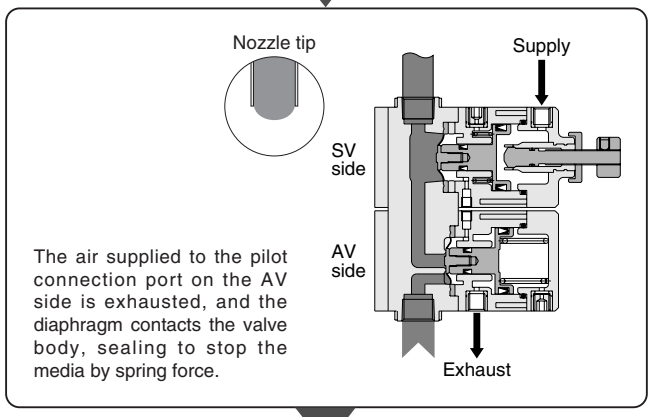
Operation principles of single acting type **-C**



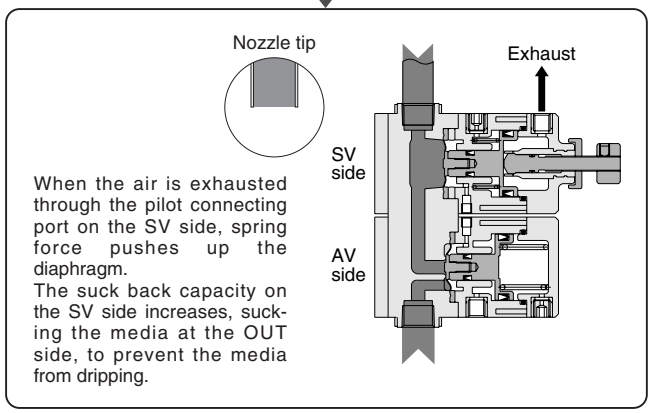
Condition before operation



Air is supplied to the pilot connection port on the AV side to pass the media. Air is also supplied to the pilot connection port on the SV side to push down the diaphragm to the valve body side.



The air supplied to the pilot connection port on the AV side is exhausted, and the diaphragm contacts the valve body, sealing to stop the media by spring force.



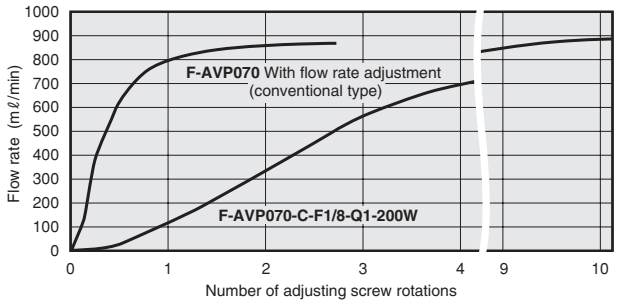
When the air is exhausted through the pilot connecting port on the SV side, spring force pushes up the diaphragm.
The suck back capacity on the SV side increases, sucking the media at the OUT side, to prevent the media from dripping.

Fine flow rate adjustment type (differential screw type)

- Uses a differential screw for the flow rate adjustment mechanism. The adjusting screw slowly changes the flow rate, enabling easy fine adjustment of the flow rate.
- Flow rate stability on fine flow rate setting is improved.
- The flow rate adjustment range is wide, allowing adjustment all the way from fine flow rate to full flow rate using one valve.

Comparison of flow rate characteristics

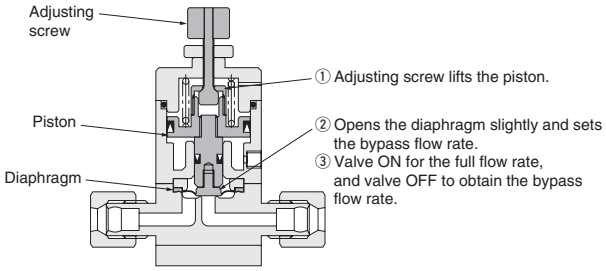
(Media: Water, Differential pressure: 0.1 MPa [15psi.])
F-AVP070 (Orifice: ϕ 2) comparison



1mℓ/min = 0.061in³/min.

With bypass flow rate adjustment (made to order)

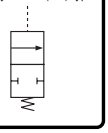
- Restricting the stroke of the diaphragm in closing direction sets the bypass flow rate.
- Compared to conventional bypass flow rate mechanisms, this product provides a more compact valve.
- There is no bypass flow passage, and no residual liquid area.



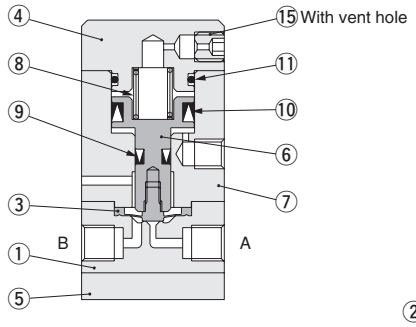
Air Operated Valve
Diaphragm type
2-port valve

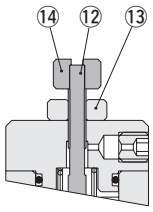
F-AV030-100W

Symbol
Normally closed (NC) type

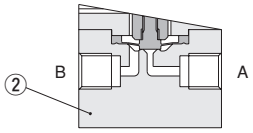


Inner Construction and Materials





With flow rate adjustment: **-Q1**



Body material SUS316 specification: **-S**

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	Aluminum alloy
⑤	Plate	Aluminum alloy
⑥	Piston	SUS304
⑦	Cylinder tube	Aluminum alloy
⑧	Spring	SUS304-WPB

No.	Parts	Materials
⑨	Seal	FKM
⑩	Seal	FKM
⑪	O-ring	FKM
⑫	Adjusting screw	SUS304
⑬	Nut	SUS304
⑭	Nut	SUS304
⑮	Set screw	SUS304

Specifications

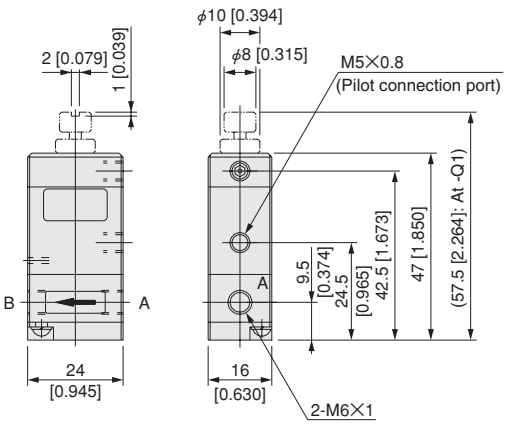
Item		Model F-AV030-100W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.2 [0～29]
	B→A	0～0.1 [0～15]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.1 [0～15]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	1〔0.02〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat	cm^3/min [$in.^3$/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

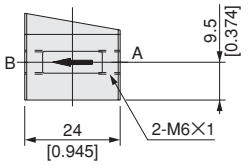
Order Codes

F-AV030 – □ – □ – □ – **100W**

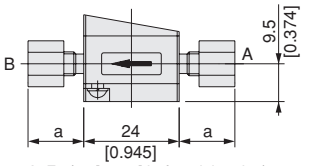
- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Body material**
- **Basic model**

Dimensions mm [in.]



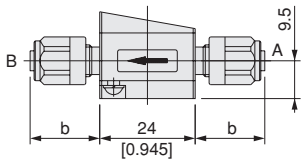


Body material SUS316 specification: **-S**



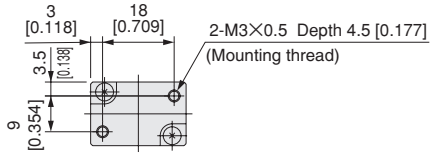
a: At F3 (14 [0.551] before tightening), width across flats of nut: 10 [0.394]
At F1/8 (14 [0.551] before tightening), width across flats of nut: 10 [0.394]
At F4 (16 [0.630] before tightening), width across flats of nut: 10 [0.394]

With H series fitting specification: **-F□**



b: At LA (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LB (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LC (20.5 [0.807]), width across flats of nut: 12 [0.472]
At LX (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LY (20.5 [0.807]), width across flats of nut: 12 [0.472]

With Flowell 60 series fitting specification: **-L□**



Body material Note 1
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: M6 × 1

H series fitting
F3 : Connecting tube outer diameter ϕ3
F1/8 : Connecting tube outer diameter ϕ1/8 (ϕ3.17)
F4 : Connecting tube outer diameter ϕ4

Flowell 60 series fitting Note 2
Standard fitting
LA: Connecting tube diameter ϕ3 × ϕ2
LB: Connecting tube diameter ϕ3.17 × ϕ1.59
LC: Shared connecting tube diameters
ϕ4 × ϕ2 and ϕ4 × ϕ3
Special fitting
LX: Connecting tube diameter
ϕ3.17 × ϕ2.17 only
LY: Connecting tube diameter ϕ4 × ϕ3 only

Flow rate adjustment
Blank: None
Q1: With flow rate adjustment

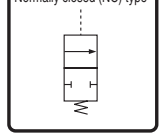
Valve function
Normally closed (NC) is only available.

Notes: 1. When the selected body material is **-S**, with-fitting specification cannot be selected.
2. For the Flowell 60 series special fittings, a mounting tool is also a special type.
Do not use the standard mounting tool.

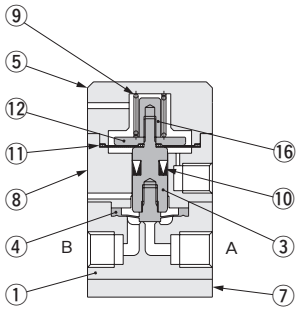
Air Operated Valve
Low sliding resistance diaphragm type
2-port valve

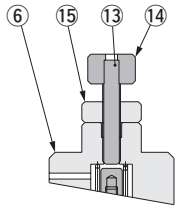
F-AV050-100W

Symbol
Normally closed (NC) type

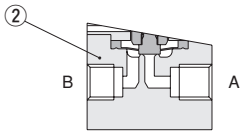


Inner Construction and Materials





With flow rate adjustment: **-Q1**



Body material SUS316 specification: **-S**

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Stem	SUS304
④	Diaphragm	PTFE
⑤	Cover	C-PVC
⑥	Cover	SUS304
⑦	Plate	SUS304
⑧	Cylinder tube	C-PVC

No.	Parts	Materials
⑨	Spring	SUS304-WPB
⑩	Seal	FKM
⑪	Diaphragm	FKM
⑫	Washer	SUS304
⑬	Adjusting screw	SUS304
⑭	Nut	SUS304
⑮	Nut	SUS304
⑯	Nut	SUS304

Specifications

Item		Model F-AV050-100W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.2 [0～29]
	B→A	0～0.1 [0～15]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.1 [0～15]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	1.6〔0.04〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat	cm^3/min [$in.^3$/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-AV050 – □ – □ – □ – 100W

- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Body material**
- **Basic model**

Body material Note 1
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: M6 × 1

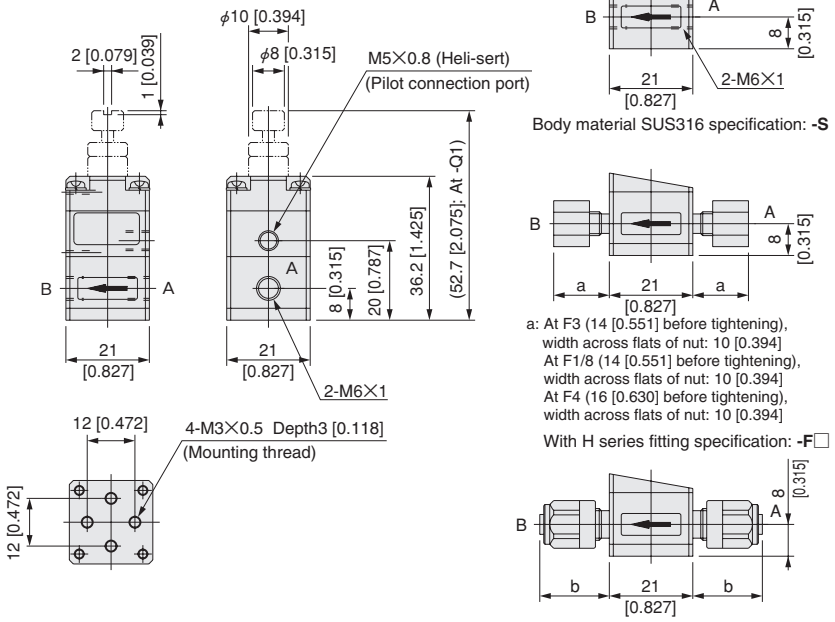
H series fitting
F3 : Connecting tube outer diameter ϕ3
F1/8 : Connecting tube outer diameter ϕ1/8 (ϕ3.17)
F4 : Connecting tube outer diameter ϕ4

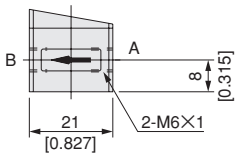
Flowell 60 series fitting Note 2
Standard fitting
LA: Connecting tube diameter ϕ3 × ϕ2
LB: Connecting tube diameter ϕ3.17 × ϕ1.59
LC: Shared connecting tube diameters
ϕ4 × ϕ2 and ϕ4 × ϕ3
Special fitting
LX: Connecting tube diameter
ϕ3.17 × ϕ2.17 only
LY: Connecting tube diameter ϕ4 × ϕ3 only

Flow rate adjustment Note 3
Blank: None
Q1: With flow rate adjustment

Valve function
Normally closed (NC) is only available.

Dimensions mm [in.]





Body material SUS316 specification: **-S**

a: At F3 (14 [0.551] before tightening), width across flats of nut: 10 [0.394]
At F1/8 (14 [0.551] before tightening), width across flats of nut: 10 [0.394]
At F4 (16 [0.630] before tightening), width across flats of nut: 10 [0.394]

With H series fitting specification: **-F□**

b: At LA (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LB (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LC (20.5 [0.807]), width across flats of nut: 12 [0.472]
At LX (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LY (20.5 [0.807]), width across flats of nut: 12 [0.472]

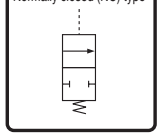
With Flowell 60 series fitting specification: **-L□**

Notes: 1. When the selected body material is **-S**, with-fitting specification cannot be selected.
2. For the Flowell 60 series special fittings, a mounting tool is also a special type.
Do not use the standard mounting tool.
3. Exercise caution, as the flow rate adjusting screw will come off, if rotated more than necessary.

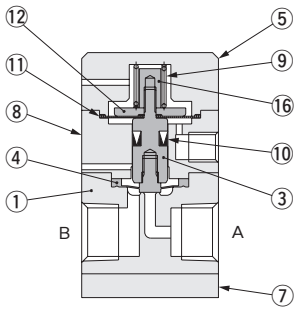
Air Operated Valve
Low sliding resistance diaphragm type
2-port valve

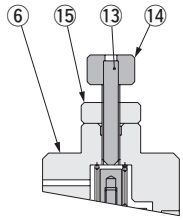
F-AV070-100W

Symbol
Normally closed (NC) type

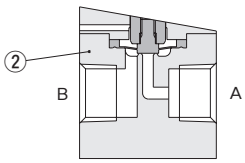


Inner Construction and Materials





With flow rate adjustment: **-Q1**



Body material SUS316 specification: **-S**

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Stem	SUS304
④	Diaphragm	PTFE
⑤	Cover	C-PVC
⑥	Cover	SUS304
⑦	Plate	SUS304
⑧	Cylinder tube	C-PVC

No.	Parts	Materials
⑨	Spring	SUS304-WPB
⑩	Seal	FKM
⑪	Diaphragm	FKM
⑫	Washer	SUS304
⑬	Adjusting screw	SUS304
⑭	Nut	SUS304
⑮	Nut	SUS304
⑯	Nut	SUS304

Specifications

Item		Model F-AV070-100W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.2 [0～29]
	B→A	0～0.1 [0～15]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.1 [0～15]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	1.8〔0.06〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat		0 [0]
cm^3/min [$in.^3$/min.]		(When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-AV070 – □ – □ – □ – 100W

- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Body material**
- **Basic model**

Body material Note 1
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: Rc1/8

H series fitting
F1/8 : Connecting tube outer diameter ϕ1/8 (ϕ3.17)
F4 : Connecting tube outer diameter ϕ4

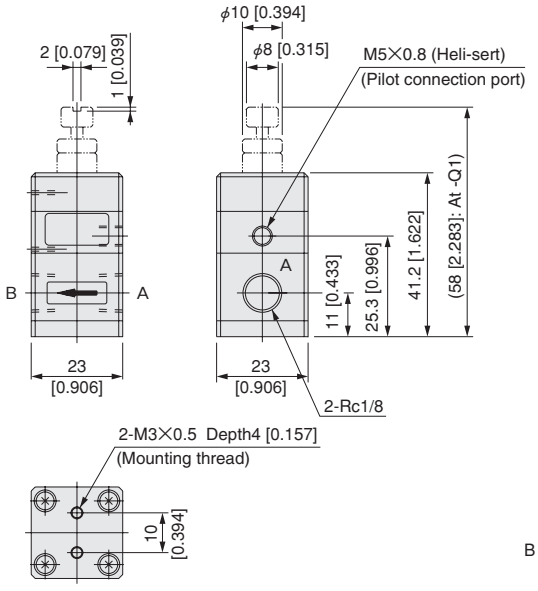
Flowell 60 series fitting Note 2
Standard fitting
LB: Connecting tube diameter ϕ3.17 × ϕ1.59
LC: Shared connecting tube diameters
ϕ4 × ϕ2 and ϕ4 × ϕ3
Special fitting
LX: Connecting tube diameter
ϕ3.17 × ϕ2.17 only
LY: Connecting tube diameter ϕ4 × ϕ3 only

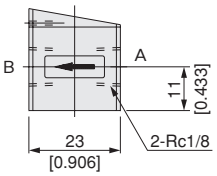
Flow rate adjustment Note 3
Blank: None
Q1: With flow rate adjustment

Valve function
Normally closed (NC) is only available.

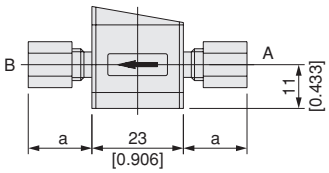
Notes: 1. When the selected body material is **-S**, with-fitting specification cannot be selected.
2. For the Flowell 60 series special fittings, a mounting tool is also a special type. Do not use the standard mounting tool.
3. Exercise caution, as the flow rate adjusting screw will come off, if rotated more than necessary.

Dimensions mm [in.]



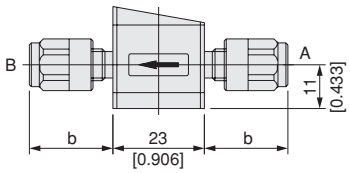


Body material SUS316 specification: **-S**



a: At F1/8 (14 [0.551] before tightening), width across flats of nut: 10 [0.394]
At F4 (16 [0.630] before tightening), width across flats of nut: 10 [0.394]

With H series fitting specification: **-F□**



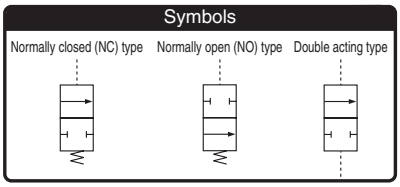
b: At LB (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LC (20.5 [0.807]), width across flats of nut: 12 [0.472]
At LX (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LY (20.5 [0.807]), width across flats of nut: 12 [0.472]

With Flowell 60 series fitting specification: **-L□**

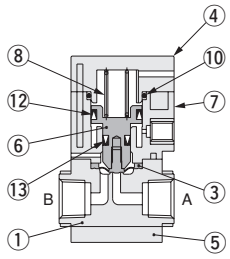
Air Operated Valve
Diaphragm type
2-port valve

F-AV070-200W

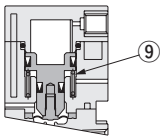
Symbols



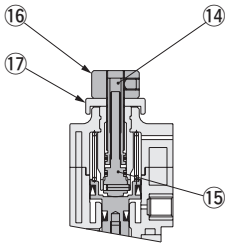
Inner Construction and Materials



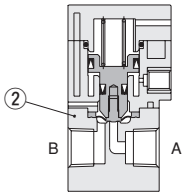
Normally closed (NC) type: **-C**



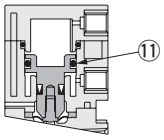
Normally open (NO) type: **-O**



With flow rate adjustment: **-Q1**



Body material SUS316 specification: **-S**

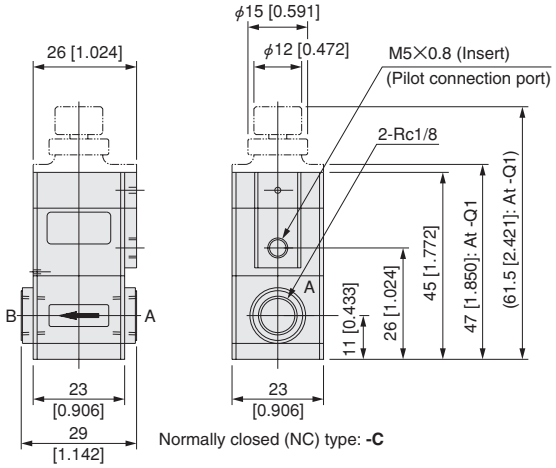


Double acting type: **-D**

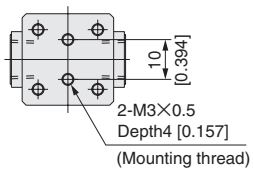
No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB
⑨	Spring	SUS304-WPB

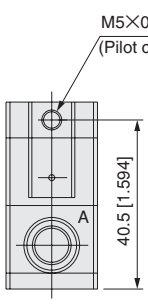
No.	Parts	Materials
⑩	O-ring	FKM
⑪	O-ring	FKM
⑫	Seal	FKM
⑬	Seal	FKM
⑭	Adjusting screw	SUS304
⑮	Adjusting screw	SUS304
⑯	Nut	SUS304
⑰	Nut	SUS304

Dimensions mm [in.]

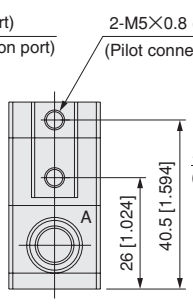


Normally closed (NC) type: **-C**

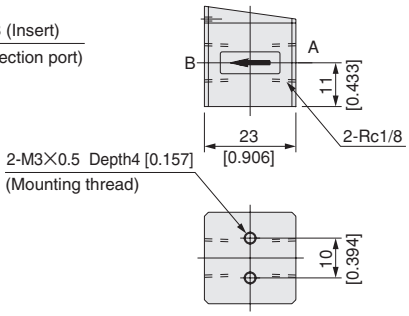




Normally open (NO) type: **-O**



Double acting type: **-D**



Body material SUS316 specification: **-S**

Specifications

Item		Model F-AV070-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	2〔0.1〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat		0 [0] (When the media is water)
	cm^3/min [$in.^3$/min.]	
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-AV070 – □ – □ – □ – **200W**

- **Flow rate adjustment**
- **Body material**
- **Valve function**
- **Basic model**

Valve function
C: Normally closed (NC) type
O: Normally open (NO) type
D: Double acting type

Body material
Blank: PTFE
S: SUS316

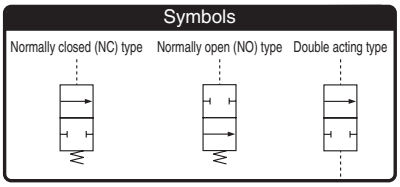
Flow rate adjustment Note
Blank: None
Q1: With flow rate adjustment (Fine flow rate adjustment type)

Note: With-flow-rate-adjustment **-Q1** can be selected only with the valve function normally closed (NC) type **-C**. Enter "C" for the valve function code.
The flow rate adjustment mechanism uses a differential screw method for easier flow rate setting.

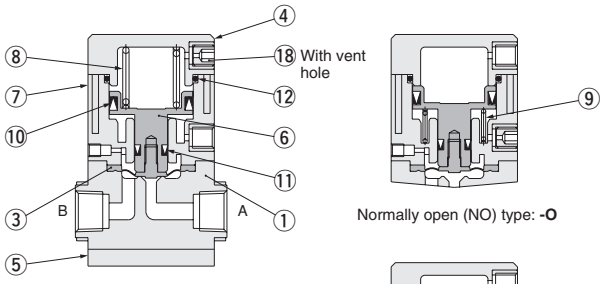
Air Operated Valve
Diaphragm type
2-port valve

F-AV100-200W

Symbols

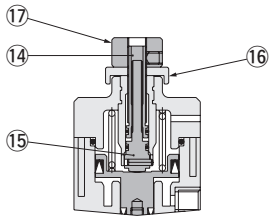


Inner Construction and Materials

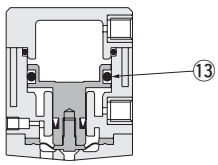


Normally closed (NC) type: **-C**

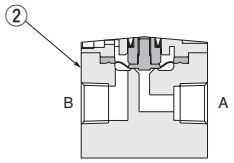
Normally open (NO) type: **-O**



With flow rate adjustment: **-Q1**



Double acting type: **-D**



Body material SUS316 specification: **-S**

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB
⑨	Spring	SUS304-WPB
⑩	Seal	FKM

No.	Parts	Materials
⑪	Seal	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	Adjusting screw	SUS304
⑮	Adjusting screw	SUS304
⑯	Nut	SUS304
⑰	Nut	SUS304
⑱	Set screw	SUS304

Specifications

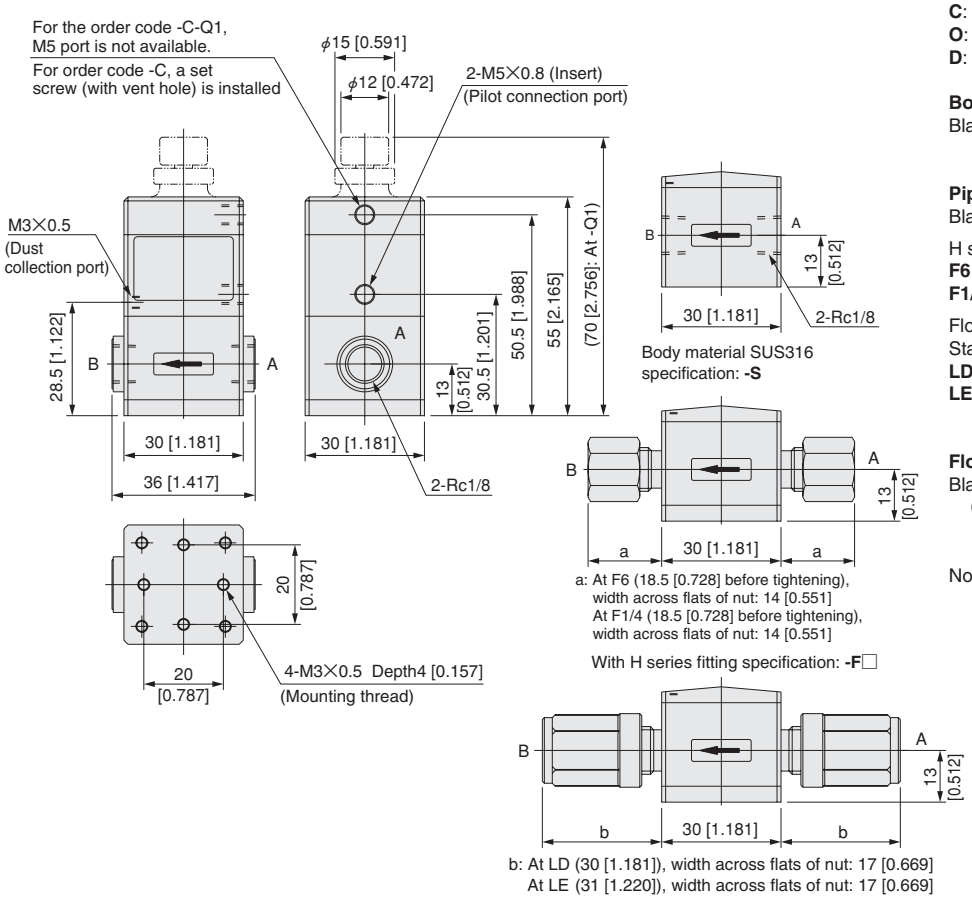
Item		Model F-AV100-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	2.5〔0.15〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat	cm^3/min [in^3/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-AV100 – □ – □ – □ – □ – **200W**

- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Body material**
- **Valve function**
- **Basic model**

Dimensions mm [in.]



a: At F6 (18.5 [0.728] before tightening), width across flats of nut: 14 [0.551]
At F1/4 (18.5 [0.728] before tightening), width across flats of nut: 14 [0.551]

b: At LD (30 [1.181]), width across flats of nut: 17 [0.669]
At LE (31 [1.220]), width across flats of nut: 17 [0.669]

Valve function
C: Normally closed (NC) type
O: Normally open (NO) type
D: Double acting type

Body material
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: Rc1/8

H series fitting
F6 : Connecting tube outer diameter ϕ6
F1/4 : Connecting tube outer diameter ϕ1/4 (ϕ6.35)

Flowell 60 series fitting
Standard fitting
LD: Connecting tube diameter ϕ6 × ϕ4
LE: Shared connecting tube diameters
ϕ6.35× ϕ3.96 and ϕ6.35× ϕ4.35

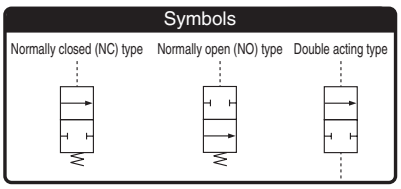
Flow rate adjustment Note 2
Blank: None
Q1: With flow rate adjustment (Fine flow rate adjustment type)

Notes: 1. When the selected body material is **-S**, with-fitting specification cannot be selected.
2. The flow rate adjustment mechanism uses a differential screw method for easier flow rate setting.

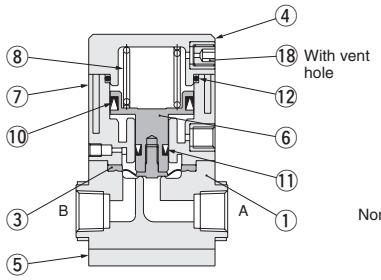
Air Operated Valve
Diaphragm type
2-port valve

F-AV125-200W

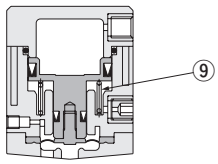
Symbols



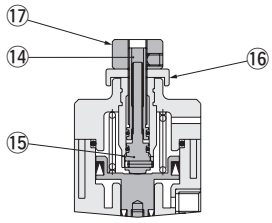
Inner Construction and Materials



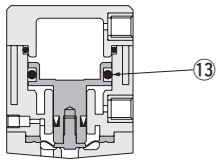
Normally closed (NC) type: **-C**



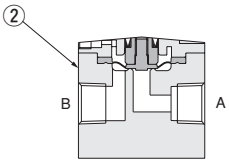
Normally open (NO) type: **-O**



With flow rate adjustment: **-Q1**



Double acting type: **-D**



Body material SUS316 specification: **-S**

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB
⑨	Spring	SUS304-WPB
⑩	Seal	FKM

No.	Parts	Materials
⑪	Seal	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	Adjusting screw	SUS304
⑮	Adjusting screw	SUS304
⑯	Nut	SUS304
⑰	Nut	SUS304
⑱	Set screw	SUS304

Specifications

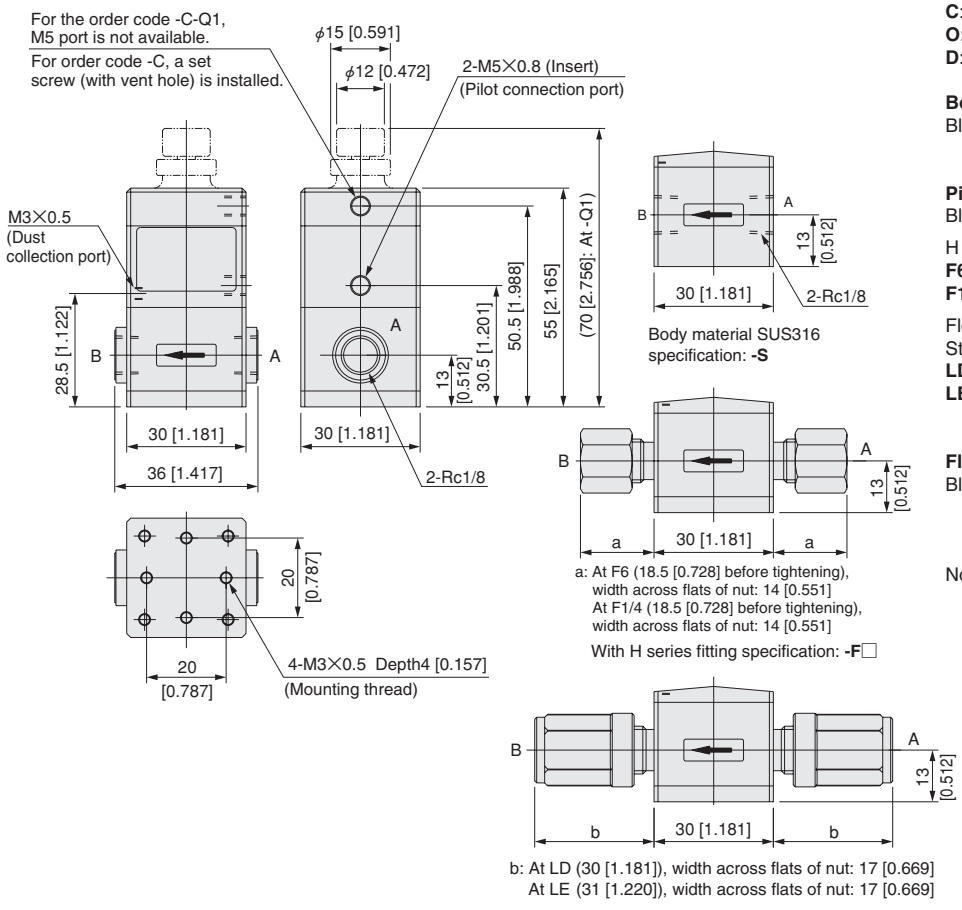
Item		Model F-AV125-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	4〔0.31〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat	cm³/min [in³/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-AV125 – □ – □ – □ – □ – **200W**

- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Body material**
- **Valve function**
- **Basic model**

Dimensions mm [in.]



a: At F6 (18.5 [0.728] before tightening), width across flats of nut: 14 [0.551]
At F1/4 (18.5 [0.728] before tightening), width across flats of nut: 14 [0.551]

b: At LD (30 [1.181]), width across flats of nut: 17 [0.669]
At LE (31 [1.220]), width across flats of nut: 17 [0.669]

Valve function
C: Normally closed (NC) type
O: Normally open (NO) type
D: Double acting type

Body material
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: Rc1/8

H series fitting
F6 : Connecting tube outer diameter ϕ6
F1/4 : Connecting tube outer diameter ϕ1/4 (ϕ6.35)

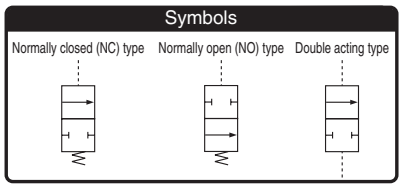
Flowell 60 series fitting
Standard fitting
LD: Connecting tube diameter ϕ6 × ϕ4
LE: Shared connecting tube diameters
ϕ6.35× ϕ3.96 and ϕ6.35× ϕ4.35

Flow rate adjustment Note 2
Blank: None
Q1: With flow rate adjustment (Fine flow rate adjustment type)

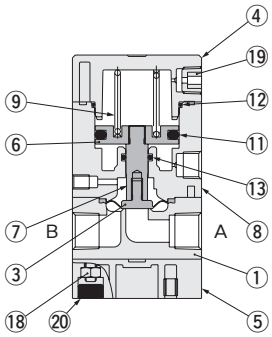
Notes: 1. When the selected body material is **-S**, with-fitting specification cannot be selected.
2. The flow rate adjustment mechanism uses a differential screw method for easier flow rate setting.

Air Operated Valve
Diaphragm type
2-port valve

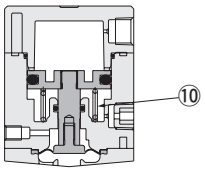
F-AV250-200W



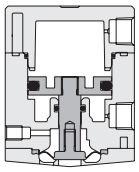
Inner Construction and Materials



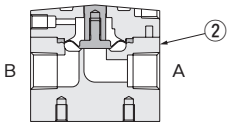
Normally closed (NC) type: **-C**
Orifice ϕ8 specification: **-8**



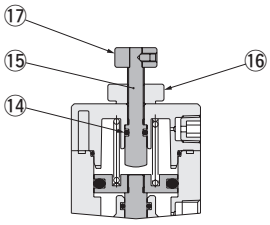
Normally open (NO) type: **-O**



Double acting type: **-D**



Body material SUS316 specification: **-S**



With flow rate adjustment: **-Q1**

No.	Parts	Materials
①	Body	PTFE/PFA[Note 2]
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	PPS
⑥	Piston	SUS304
⑦	Piston rod	SUS304
⑧	Cylinder tube	PPS
⑨	Spring	SUS304-WPB
⑩	Spring	SUS304-WPB

No.	Parts	Materials
⑪	Seal	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	O-ring	FKM
⑮	Adjusting screw	SUS304
⑯	Nut	SUS304
⑰	Nut	SUS304
⑱	Nut	SUS304
⑲	Plug	VECTRA
⑳	Cap	FKM

Specifications

Item		Model F-AV250-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	6〔0.6〕or 8〔1.2〕
Pilot connection port size		Rc1/8
Leakage at valve seat	cm^3/min [in^3/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-AV250-□-□-□-□-□-□-□-**200W**

- **Mounting base**
- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Orifice**
- **Body material**
- **Valve function**
- **Basic model**

Valve function
C: Normally closed (NC) type
O: Normally open (NO) type
D: Double acting type

Body material [Note 1]
Blank: PTFE/PFA[Note 2]
S: SUS316

Orifice [Note 2]
Blank: 6mm [0.236in.]
8: 8mm [0.315in.]

Piping port size and applicable tube size
Blank: Rc1/4

H series fitting
F8 : Connecting tube outer diameter ϕ8
F3/8: Connecting tube outer diameter ϕ3/8 (ϕ9.52)
F10 : Connecting tube outer diameter ϕ10

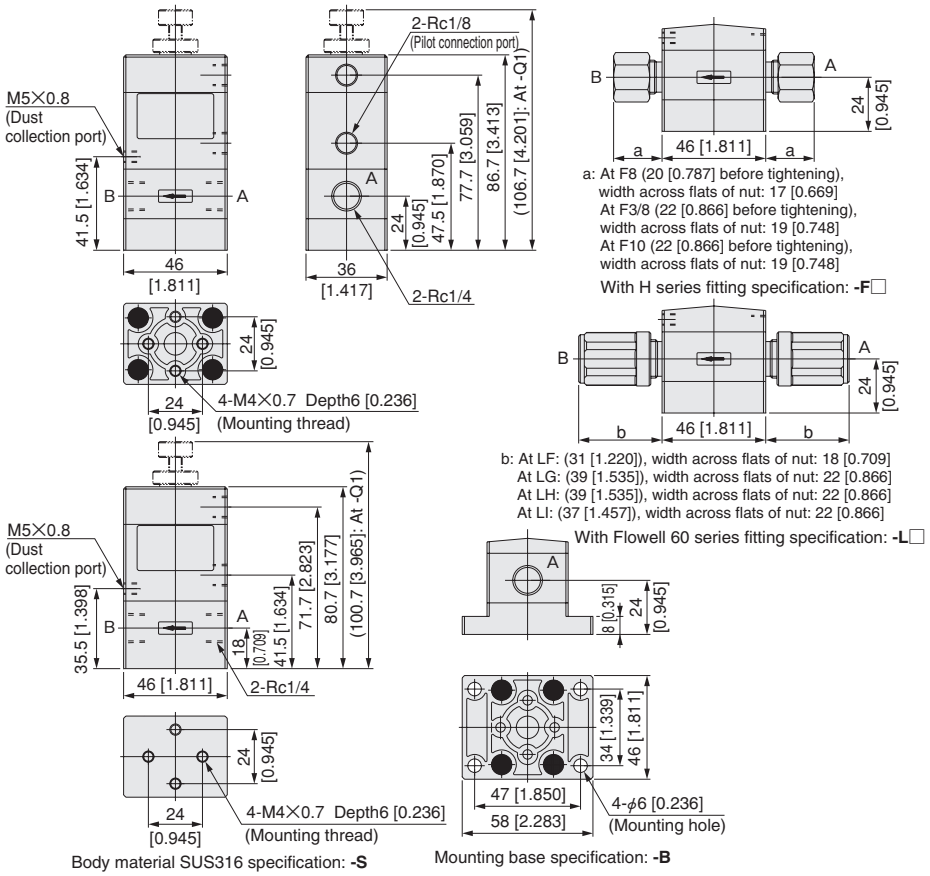
Flowell 60 series fitting
Standard fitting
LF: Connecting tube diameter ϕ8 × ϕ6
LG: Connecting tube diameter ϕ9.52 × ϕ6.35
LH: Connecting tube diameter ϕ9.52 × ϕ7.52
LI : Connecting tube diameter ϕ10 × ϕ8

Flow rate adjustment
Blank: None
Q1: With flow rate adjustment

Mounting base
Blank: Bottom mounting type
B: With mounting base

Notes: 1. When the selected body material is **-S**, with-fitting specification and with-mounting-base cannot be selected.
2. When the H series fitting is selected with an orifice of ϕ8 [0.315in.], the body material is PFA.

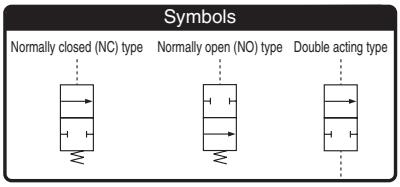
Dimensions mm [in.]



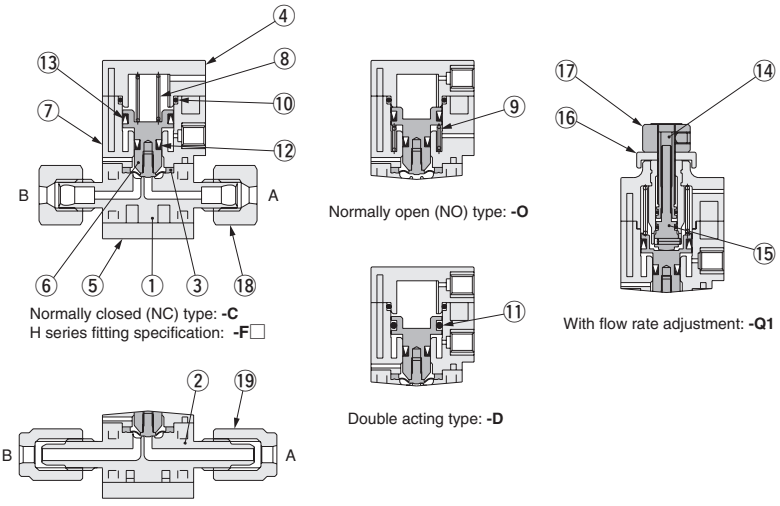
Air Operated Valve
Diaphragm type
2-port valve

F-AVP070-200W

Symbols



Inner Construction and Materials



Normally closed (NC) type: **-C**
H series fitting specification: **-F□**

Normally open (NO) type: **-O**

With flow rate adjustment: **-Q1**

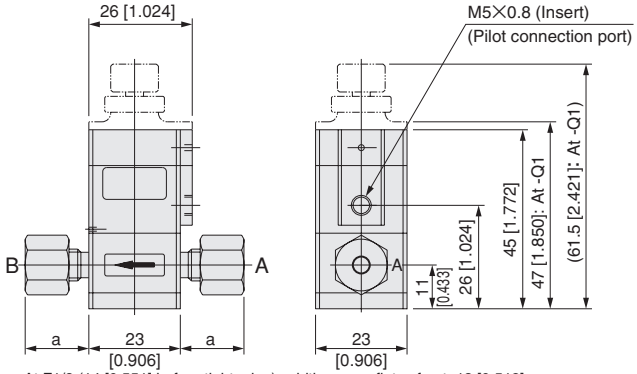
Double acting type: **-D**

Flowell 60 series fitting specification: **-L□**

No.	Parts	Materials
①	Body	PFA
②	Body	PFA
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB
⑨	Spring	SUS304-WPB
⑩	O-ring	FKM

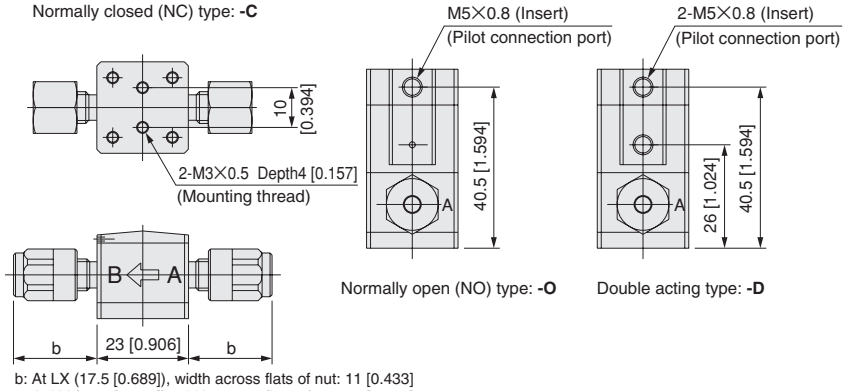
No.	Parts	Materials
⑪	O-ring	FKM
⑫	Seal	FKM
⑬	Seal	FKM
⑭	Adjusting screw	SUS304
⑮	Adjusting screw	SUS304
⑯	Nut	SUS304
⑰	Nut	SUS304
⑱	Nut	PFA
⑲	Nut	PFA

Dimensions mm [in.]



a: At F1/8 (14 [0.551] before tightening), width across flats of nut: 13 [0.512]
At F4 (16 [0.630] before tightening), width across flats of nut: 13 [0.512]

With H series fitting specification: **-F□**
Normally closed (NC) type: **-C**



Normally open (NO) type: **-O**

Double acting type: **-D**

b: At LX (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LY (20.5 [0.807]), width across flats of nut: 12 [0.472]

With Flowell 60 series fitting specification: **-L□**

Specifications

Item		Model F-AVP070-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～80 [41～176]
	Atmosphere	0～60 [32～140]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	2〔0.1〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat	cm³/min [in.³/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-AVP070 – □ – □ – □ – **200W**

- **Flow rate adjustment**
- **Applicable tube size**
- **Valve function**
- **Basic model**

Valve function
C: Normally closed (NC) type
O: Normally open (NO) type
D: Double acting type

Applicable tube size
H series fitting
F1/8: Connecting tube outer diameter ϕ 1/8 (ϕ 3.17)
F4 : Connecting tube outer diameter ϕ 4

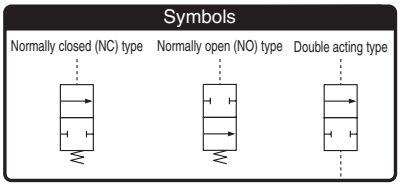
Flowell 60 series fitting Note 1
Special fitting
LX: Connecting tube diameter
ϕ 3.17 × ϕ 2.17 only
LY: Connecting tube diameter ϕ 4 × ϕ 3 only

Flow rate adjustment Note 2
Blank: None
Q1: With flow rate adjustment (Fine flow rate adjustment type)

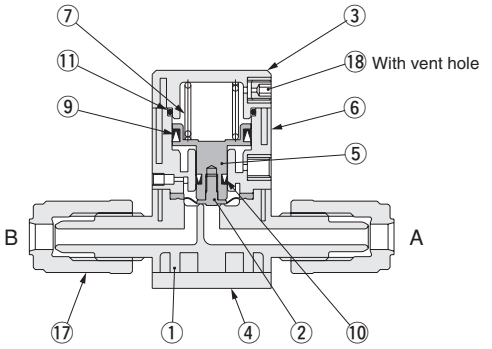
Notes: 1. For the Flowell 60 series special fittings, a mounting tool is also a special type. Do not use the standard mounting tool.
2. With-flow-rate-adjustment **-Q1** can be selected only with the valve function normally closed (NC) type **-C**. Enter "C" for the valve function code. The flow rate adjustment mechanism uses a differential screw method for easier flow rate setting.

Air Operated Valve
Diaphragm type
2-port valve

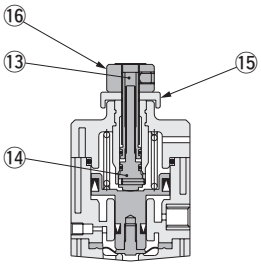
F-AVP125-200W



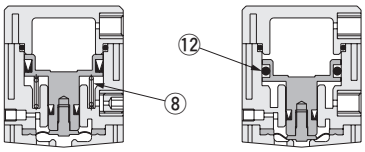
Inner Construction and Materials



Normally closed (NC) type: **-C**



Normally closed (NC) type
with flow rate adjustment: **-C-Q1**

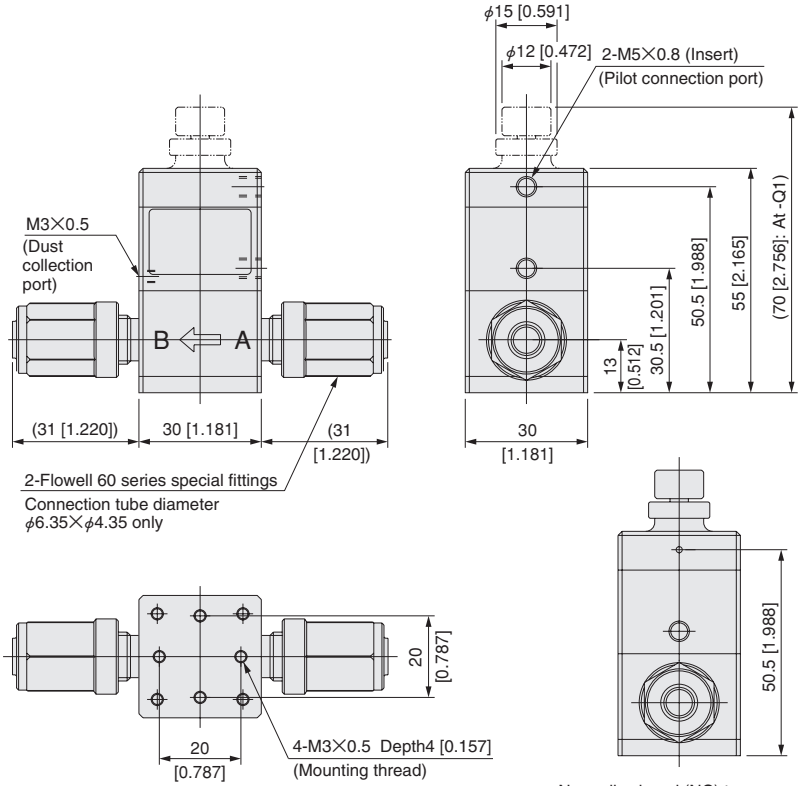


Normally open (NO) type: **-O** Double acting type: **-D**

No.	Parts	Materials
①	Body	PFA
②	Diaphragm	PTFE
③	Cover	PPS
④	Plate	SUS304
⑤	Piston	SUS304
⑥	Cylinder tube	PPS
⑦	Spring	SUS304-WPB
⑧	Spring	SUS304-WPB
⑨	Seal	FKM
⑩	Seal	FKM

No.	Parts	Materials
⑪	O-ring	FKM
⑫	O-ring	FKM
⑬	Adjusting screw	SUS304
⑭	Adjusting screw	SUS304
⑮	Nut	SUS304
⑯	Nut	SUS304
⑰	Nut	PFA
⑱	Set screw	SUS304

Dimensions mm [in.]



Normally closed (NC) type
with flow rate adjustment: **-C-Q1**

Specifications

Item \ Model		F-AVP125-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～80 [41～176]
	Atmosphere	0～60 [32～140]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	4〔0.31〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat	cm^3/min [in^3/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-AVP125 – □ – **LZ** – □ – **200W**

- **Flow rate adjustment**
- **Applicable tube size**
- **Valve function**
- **Basic model**

Valve function Note 1
C: Normally closed (NC) type
O: Normally open (NO) type
D: Double acting type

Applicable tube size
Flowell 60 series fitting Note 2
Special fitting
LZ: Fitting tube diameter ϕ6.35× ϕ4.35 only

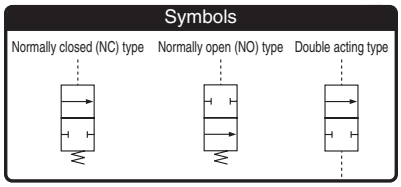
Flow rate adjustment Note 3
Blank: None
Q1: With flow rate adjustment (Fine flow rate adjustment type)

Notes: 1. For the normally closed (NC) valve, a set screw with vent hole is installed at the operating port on the normally open (NO) side, and for the normally open (NO) valve, the set screw with vent hole is installed at the operating port on the normally closed (NC) side.
2. This product comes with Flowell 60 series fittings. The fittings are special sizes. The mounting tool is also a special type. Do not use the standard mounting tool.
3. The flow rate adjustment mechanism uses a differential screw method for easier flow rate setting.
In the case of normally closed (NC) valves with flow rate adjustment, there is no pilot connection port on the normally open (NO) side.

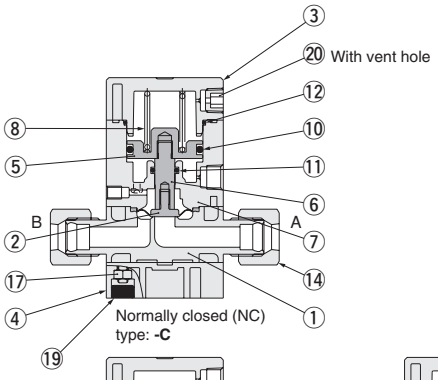
Air Operated Valve
Diaphragm type
2-port valve

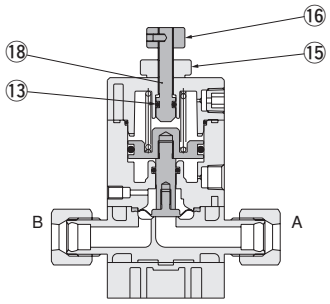
F-AVP250-200W

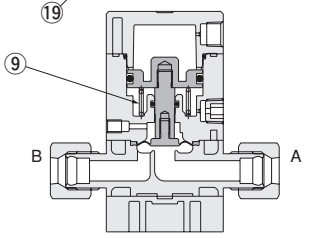
Symbols

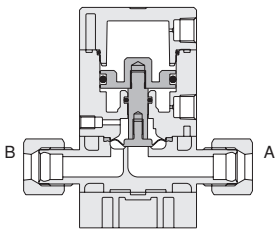


Inner Construction and Materials







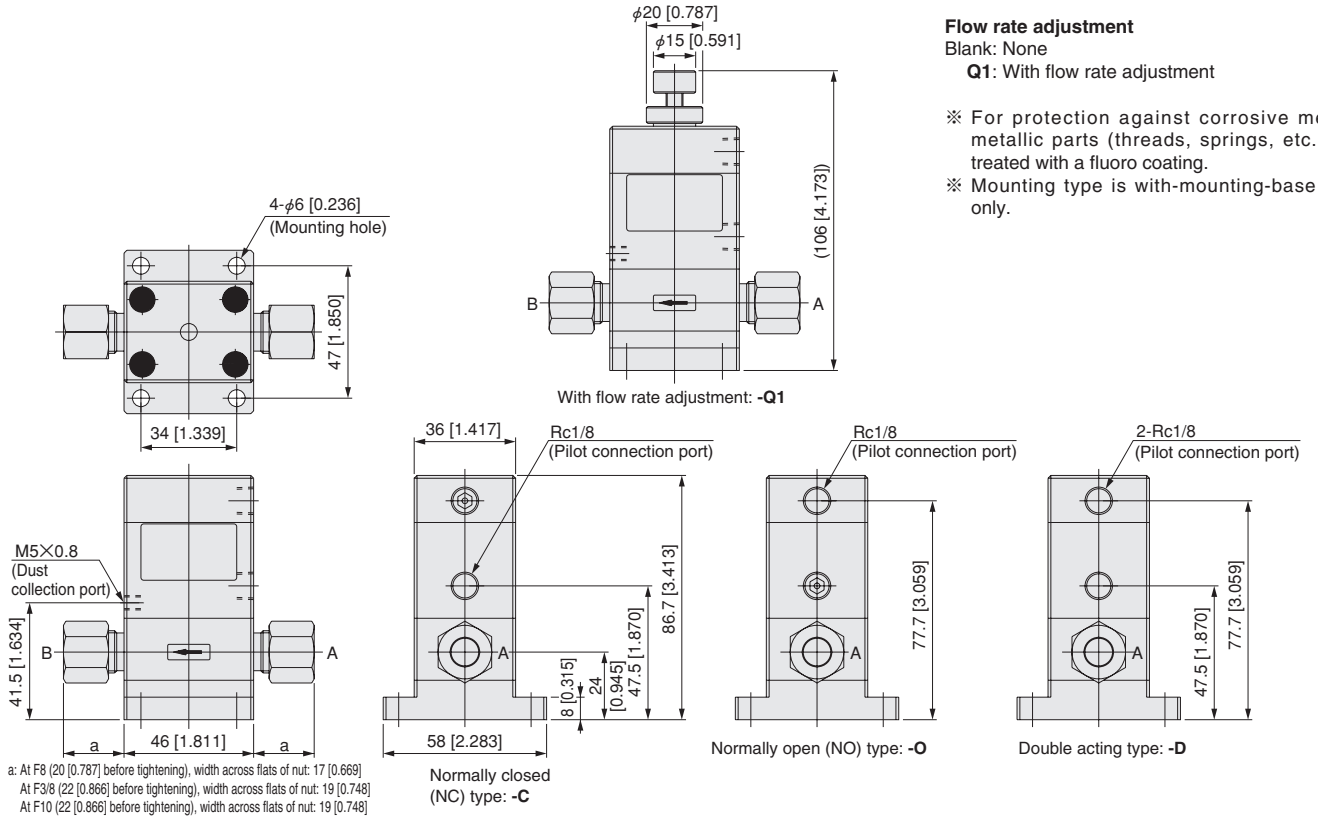


No.	Parts	Materials
①	Body	PFA
②	Diaphragm	PTFE
③	Cover	PPS
④	Plate	PPS
⑤	Piston	—
⑥	Piston rod	—
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB[Note]
⑨	Spring	SUS304-WPB[Note]
⑩	O-ring	FKM

No.	Parts	Materials
⑪	O-ring	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	Nut	PFA
⑮	Nut	PP
⑯	Nut	PP
⑰	Nut	SUS304[Note]
⑱	Adjusting screw	—
⑲	Cap	FKM
⑳	Plug	VECTRA

Note: Fluoro coated

Dimensions mm [in.]



a: At F8 (20 [0.787] before tightening), width across flats of nut: 17 [0.669]
At F3/8 (22 [0.866] before tightening), width across flats of nut: 19 [0.748]
At F10 (22 [0.866] before tightening), width across flats of nut: 19 [0.748]

With H series fitting specification

Specifications

Item		Model F-AVP250-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	8〔1.2〕
Pilot connection port size		Rc1/8
Leakage at valve seat	cm³/min [in³/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-AVP250 – □ – □ – □ – **200W**

- **Flow rate adjustment**
- **Applicable tube size**
- **Valve function**
- **Basic model**

Valve function
C: Normally closed (NC) type
O: Normally open (NO) type
D: Double acting type

Applicable tube size
H series fitting
F8 : Connecting tube outer diameter ϕ8
F3/8: Connecting tube outer diameter ϕ3/8 (ϕ9.52)
F10 : Connecting tube outer diameter ϕ10

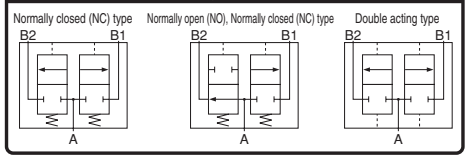
Flow rate adjustment
Blank: None
Q1: With flow rate adjustment

※ For protection against corrosive media, metallic parts (threads, springs, etc.) are treated with a fluoro coating.
※ Mounting type is with-mounting-base type only.

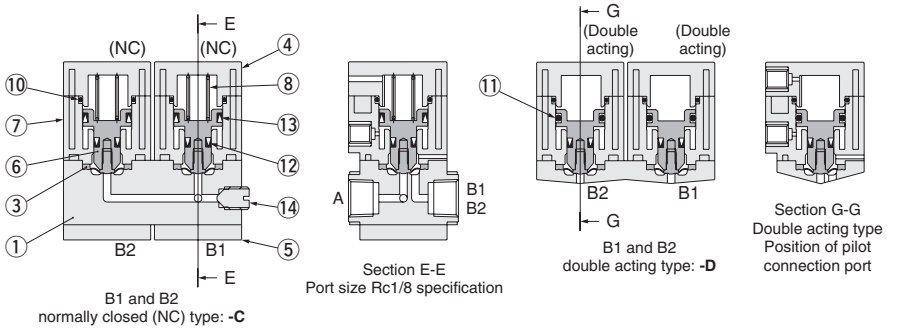
Air Operated Valve
Diaphragm type
3-port valve

F-DAV070-200W

Symbols



Inner Construction and Materials



No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS

No.	Parts	Materials
⑧	Spring	SUS304-WPB
⑨	Spring	SUS304-WPB
⑩	O-ring	FKM
⑪	O-ring	FKM
⑫	Seal	FKM
⑬	Seal	FKM
⑭	Plug	CTFE

Specifications

Item		Model F-DAV070-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	2〔0.1〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat	cm^3/min [in^3/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-DAV070 – □ – □ – □ – **200W**

- **Piping port size and applicable tube size**
- **Body material**
- **Valve function**
- **Basic model**

Valve function Note 1
C: B1 and B2 normally closed (NC) type
R: B1 normally closed (NC), B2 normally open (NO) type
D: B1 and B2 double acting type

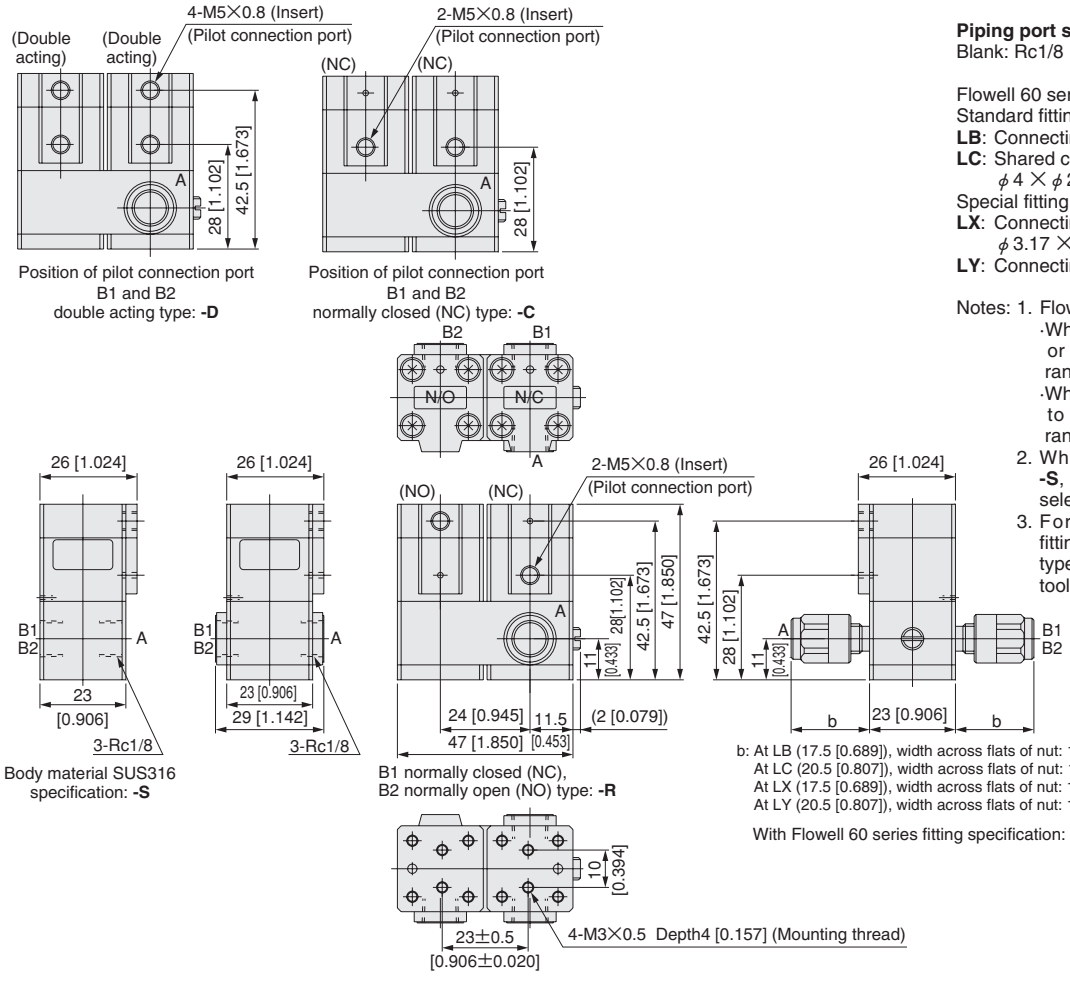
Body material Note 2
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: Rc1/8

Flowell 60 series fitting Note 3
Standard fitting
LB: Connecting tube diameter ϕ3.17 × ϕ1.59
LC: Shared connecting tube diameters
ϕ4 × ϕ2 and ϕ4 × ϕ3
Special fitting
LX: Connecting tube diameter
ϕ3.17 × ϕ2.17 only
LY: Connecting tube diameter ϕ4 × ϕ3 only

Notes: 1. Flow directions for media
·When media flow direction is A to B1 or B2, use at an operating pressure range of 0 ～ 0.5MPa [0 ～ 73psi.].
·When media flow direction is B1 or B2 to A, use at an operating pressure range of 0 ～ 0.3MPa [0 ～ 44psi.].
2. When the selected body material is **-S**, with-fitting specification cannot be selected.
3. For the Flowell 60 series special fittings, a mounting tool is also a special type. Do not use the standard mounting tool.

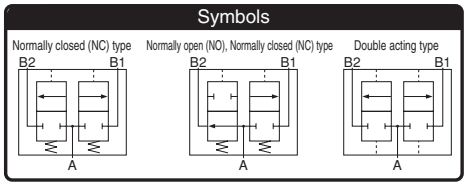
Dimensions mm [in.]



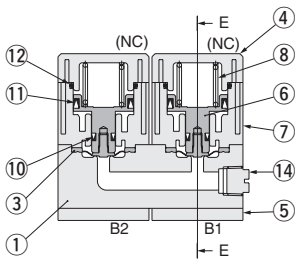
Air Operated Valve
Diaphragm type
3-port valve

F-DAV125-200W

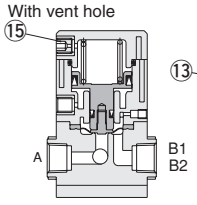
Symbols



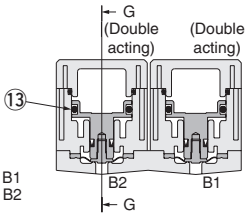
Inner Construction and Materials



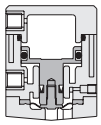
B1 and B2
normally closed (NC) type: **-C**



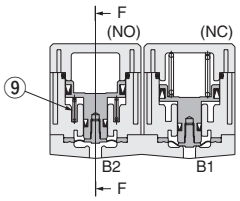
Section E-E
Port size Rc1/8 specification



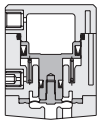
B1 and B2
double acting type: **-D**



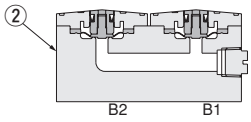
Section G-G
Double acting type
Position of pilot connection port



B1 normally closed (NC),
B2 normally open (NO) type: **-R**



Section F-F
Normally open (NO) type
Position of pilot connection port

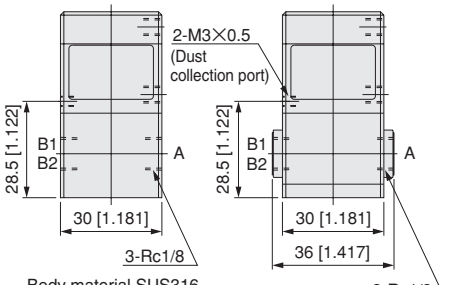


Body material SUS316 specification: **-S**

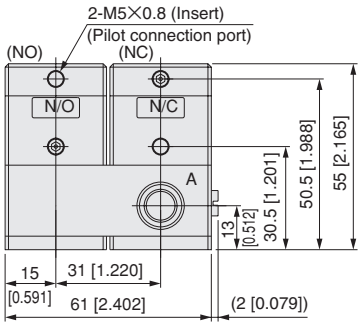
No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB

No.	Parts	Materials
⑨	Spring	SUS304-WPB
⑩	Seal	FKM
⑪	Seal	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	Plug	CTFE
⑮	Set screw	SUS304

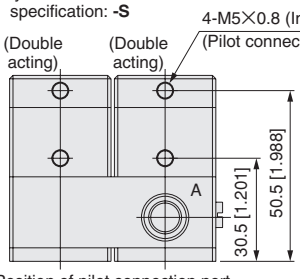
Dimensions mm [in.]



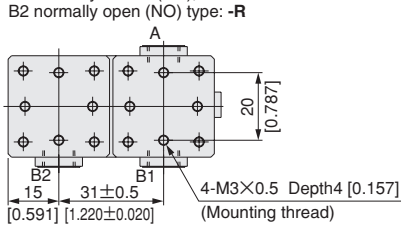
Body material SUS316
specification: **-S**

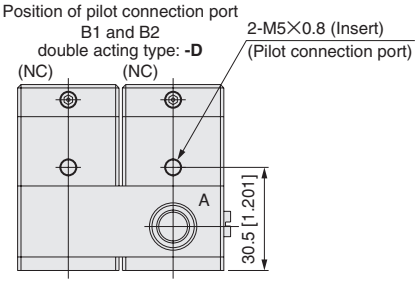


B1 normally closed (NC),
B2 normally open (NO) type: **-R**

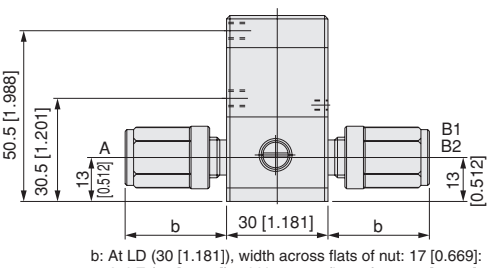


Position of pilot connection port
B1 and B2
double acting type: **-D**





Position of pilot connection port
B1 and B2
normally closed (NC) type: **-C**



b: At LD (30 [1.181]), width across flats of nut: 17 [0.669]:
At LE (31 [1.220]), width across flats of nut: 17 [0.669]:

With Flowell 60 series fitting specification: **-L□**

Specifications

Item		Model F-DAV125-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	4〔0.31〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat	cm³/min [in.³/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-DAV125 – □ – □ – □ – **200W**

- **Piping port size and applicable tube size**
- **Body material**
- **Valve function**
- **Basic model**

Valve function Note 1
C: B1 and B2 normally closed (NC) type
R: B1 normally closed (NC), B2 normally open (NO) type
D: B1 and B2 double acting type

Body material Note 2
Blank: PTFE
S: SUS316

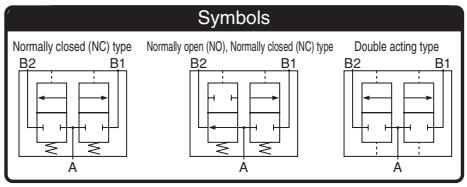
Piping port size and applicable tube size
Blank: Rc1/8

Flowell 60 series fitting
Standard fitting
LD: Connecting tube diameter $\phi 6 \times \phi 4$
LE: Shared connecting tube diameters
$\phi 6.35 \times \phi 3.96$ and $\phi 6.35 \times \phi 4.35$

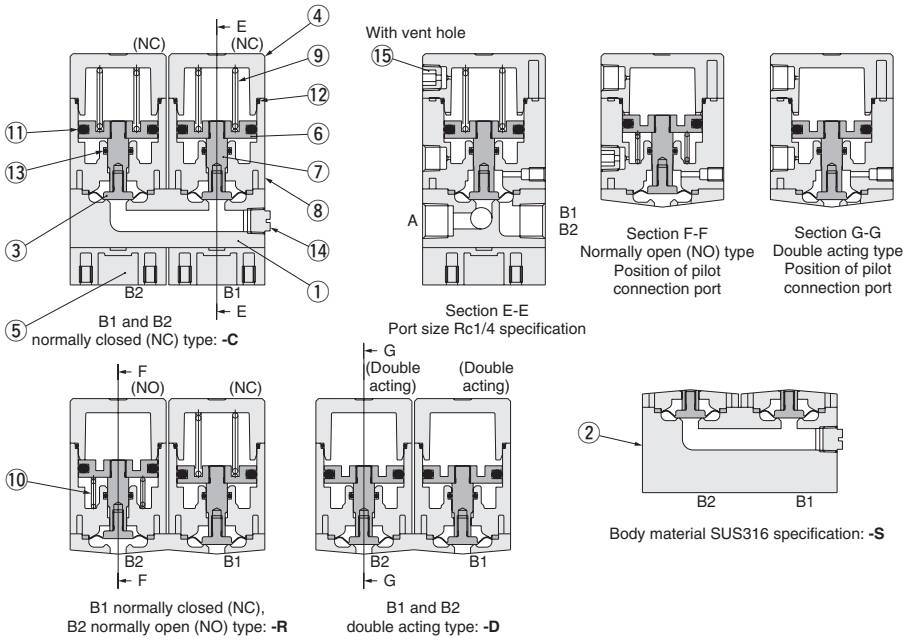
Notes: 1. Flow directions for media
·When media flow direction is A to B1 or B2, use at an operating pressure range of 0 ～ 0.5MPa [0 ～ 73psi.].
·When media flow direction is B1 or B2 to A, use at an operating pressure range of 0 ～ 0.3MPa [0 ～ 44psi.].
2. When the selected body material is **-S**, with-fitting specification cannot be selected.

Air Operated Valve
Diaphragm type
3-port valve

F-DAV250-200W



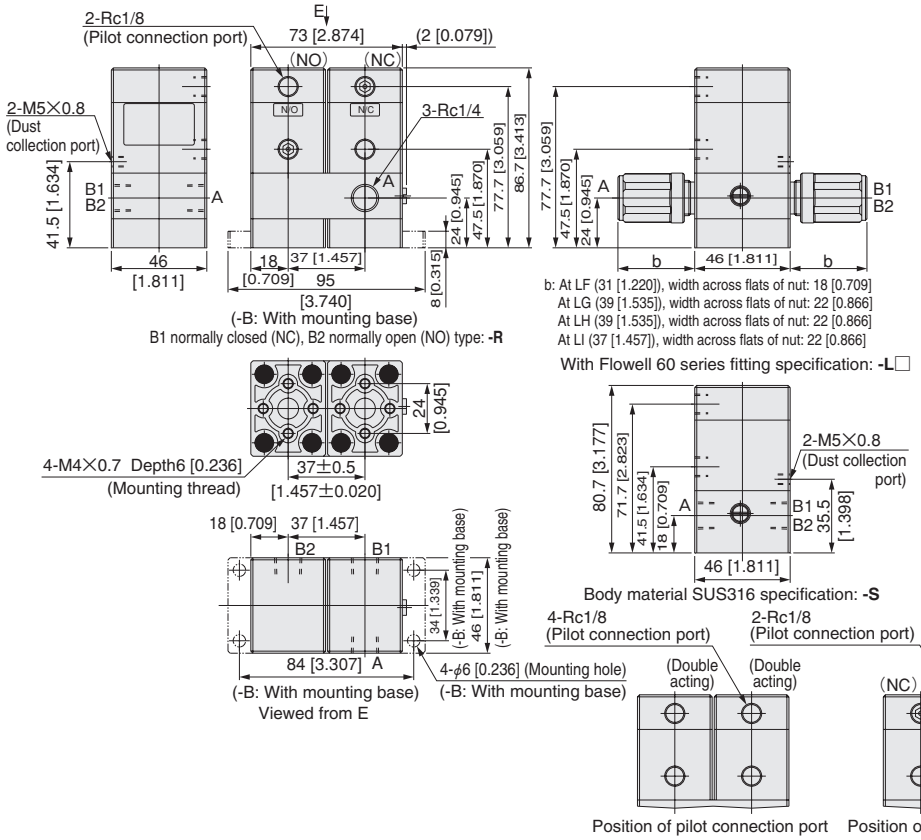
Inner Construction and Materials



No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	PPS
⑥	Piston	SUS304
⑦	Piston rod	SUS304
⑧	Cylinder tube	PPS

No.	Parts	Materials
⑨	Spring	SUS304-WPB
⑩	Spring	SUS304-WPB
⑪	Seal	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	Plug	CTFE
⑮	Plug	VECTRA

Dimensions mm [in.]



Specifications

Item		Model F-DAV250-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	6〔0.6〕
Pilot connection port size		Rc1/8
Leakage at valve seat	cm^3/min [$in.^3$/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-DAV250 – □ – □ – □ – □ – □ – **200W**

- **Mounting base**
- **Piping port size and applicable tube size**
- **Body material**
- **Valve function**
- **Basic model**

Valve function Note 1
C: B1 and B2 normally closed (NC) type
R: B1 normally closed (NC), B2 normally open (NO) type
D: B1 and B2 double acting type

Body material Note 2
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: Rc1/4

Flowell 60 series fitting
Standard fitting
LF: Connecting tube diameter φ8 × φ6
LG: Connecting tube diameter φ9.52 × φ6.35
LH: Connecting tube diameter φ9.52 × φ7.52
LI: Connecting tube diameter φ10 × φ8

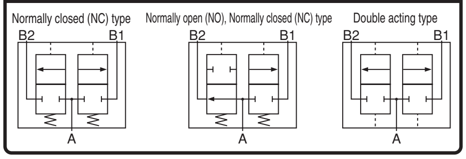
Mounting base
Blank: Bottom mounting type
B: With mounting base

Notes: 1. Flow directions for media
·When media flow direction is A to B1 or B2, use at an operating pressure range of 0 ～ 0.5MPa [0 ～ 73psi.].
·When media flow direction is B1 or B2 to A, use at an operating pressure range of 0 ～ 0.3MPa [0 ～ 44psi.].
2. When the selected body material is **-S**, with-fitting specification cannot be selected.

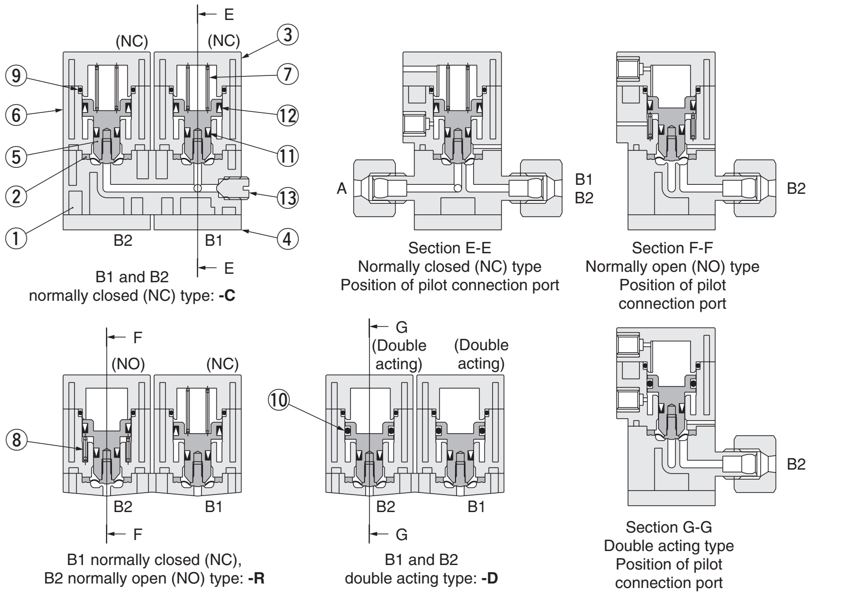
Air Operated Valve
Diaphragm type
3-port valve

F-DAVP070-200W

Symbols

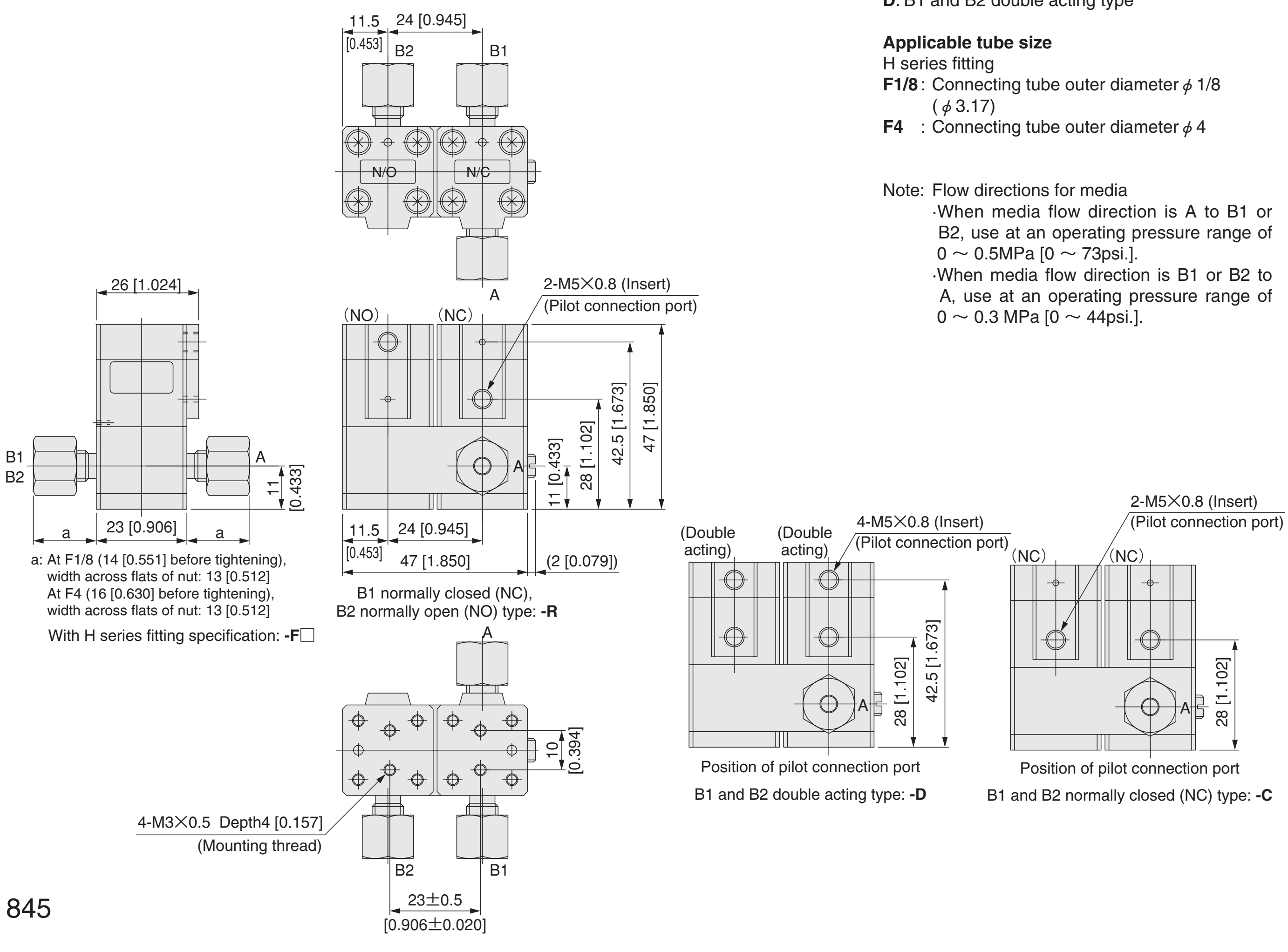


Inner Construction and Materials



No.	Parts	Materials
①	Body	PFA
②	Diaphragm	PTFE
③	Cover	PPS
④	Plate	SUS304
⑤	Piston	SUS304
⑥	Cylinder tube	PPS
⑦	Spring	SUS304-WPB
⑧	Spring	SUS304-WPB
⑨	O-ring	FKM
⑩	O-ring	FKM
⑪	Seal	FKM
⑫	Seal	FKM
⑬	Plug	CTFE

Dimensions mm [in.]



Specifications

Item		Model: F-DAVP070-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～80 [41～176]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	2〔0.1〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat	cm³/min [in³/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-DAVP070 – □ – □ – **200W**

- **Applicable tube size**
- **Valve function**
- **Basic model**

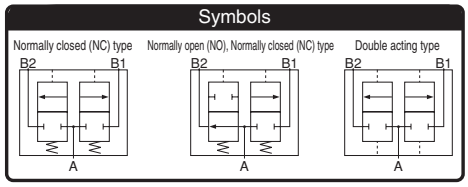
Valve function Note
C: B1 and B2 normally closed (NC) type
R: B1 normally closed (NC), B2 normally open (NO) type
D: B1 and B2 double acting type

Applicable tube size
H series fitting
F1/8: Connecting tube outer diameter φ 1/8 (φ 3.17)
F4 : Connecting tube outer diameter φ 4

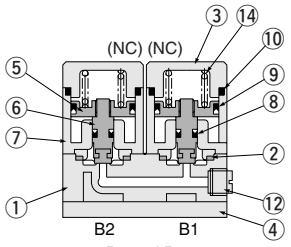
Note: Flow directions for media
·When media flow direction is A to B1 or B2, use at an operating pressure range of 0 ～ 0.5MPa [0 ～ 73psi.].
·When media flow direction is B1 or B2 to A, use at an operating pressure range of 0 ～ 0.3 MPa [0 ～ 44psi.].

Air Operated Valve
Diaphragm type
3-port type

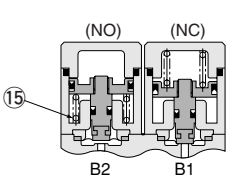
F-DAVP125



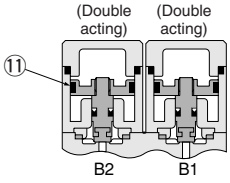
Inner Construction and Materials



B1 and B2
normally closed (NC) type: **-C**



B1 normally closed (NC),
B2 normally open (NO) type: **-R**

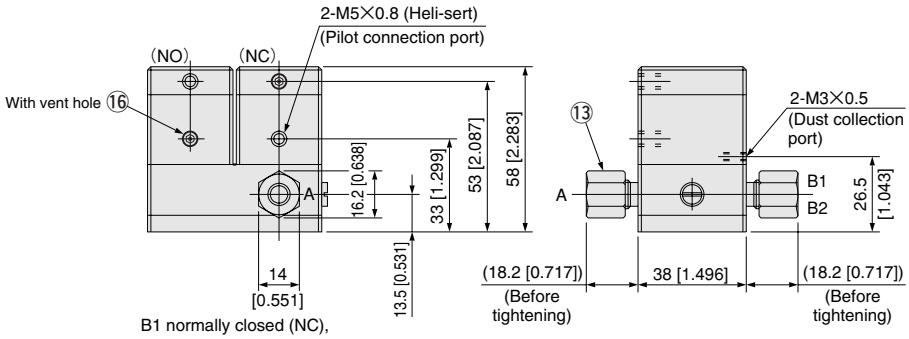


B1 and B2
double acting type: **-D**

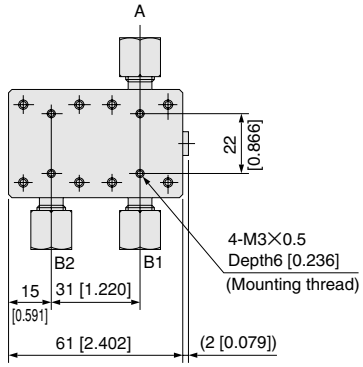
No.	Parts	Materials
①	Body	PFA
②	Diaphragm	PTFE
③	Cover	VECTRA
④	Plate	SUS304
⑤	Piston	SUS304
⑥	Piston rod	SUS304
⑦	Cylinder tube	VECTRA
⑧	Seal	FKM

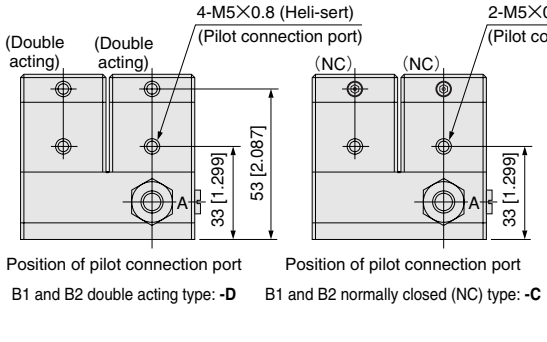
No.	Parts	Materials
⑨	Seal	FKM
⑩	O-ring	FKM
⑪	O-ring	FKM
⑫	Plug	CTFE
⑬	Nut	PFA
⑭	Spring	SUS304-WPB
⑮	Spring	SUS304-WPB
⑯	Set screw	SUS304

Dimensions mm [in.]



B1 normally closed (NC),
B2 normally open (NO) type: **-R**





Specifications

Item \ Model		F-DAVP125
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	3.2〔0.25〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat	cm^3/min [$in.^3$/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-DAVP125 – □ – □

- **Applicable tube size**
- **Valve function**
- **Basic model**

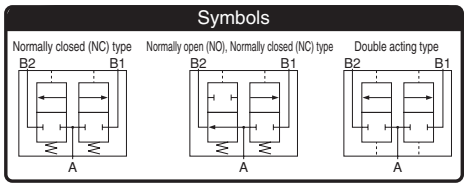
Valve function
C: B1 and B2 normally closed (NC) type
R: B1 normally closed (NC), B2 normally open (NO) type
D: B1 and B2 double acting type

Applicable tube size
H series fitting
F6 : Connecting tube outer diameter ϕ 6
F1/4 : Connecting tube outer diameter ϕ 1/4 (ϕ 6.35)

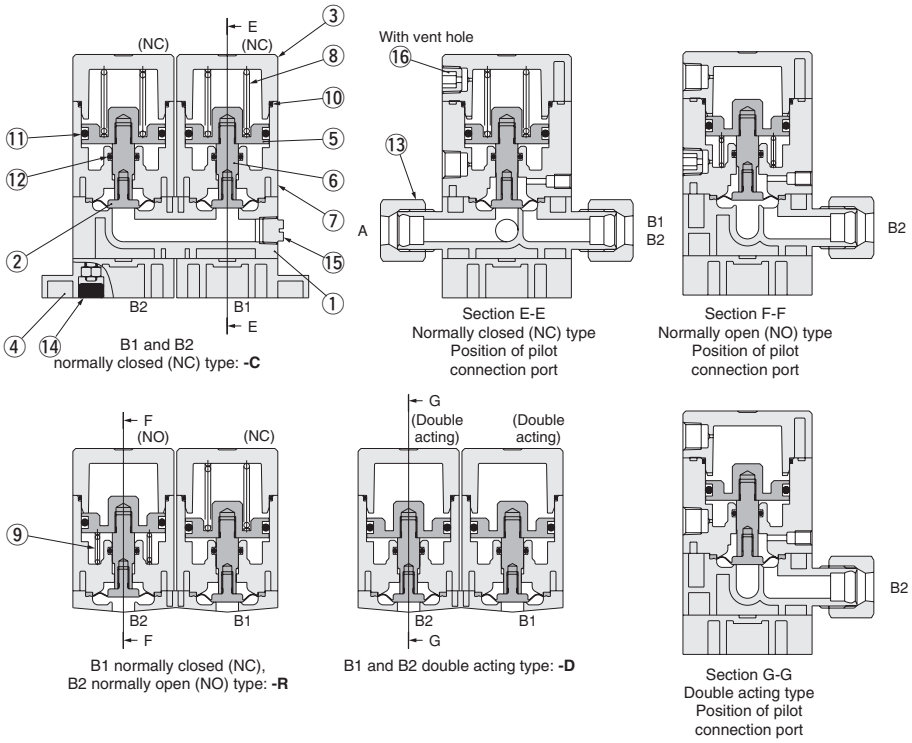
Note: Flow directions for media
·When media flow direction is A to B1 or B2, use at an operating pressure range of 0 ～ 0.5MPa [0 ～ 73psi.].
·When media flow direction is B1 or B2 to A, use at an operating pressure range of 0 ～ 0.3 MPa [0 ～ 44psi.].

Air Operated Valve
Diaphragm type
3-port type

F-DAVP250-200W



Inner Construction and Materials

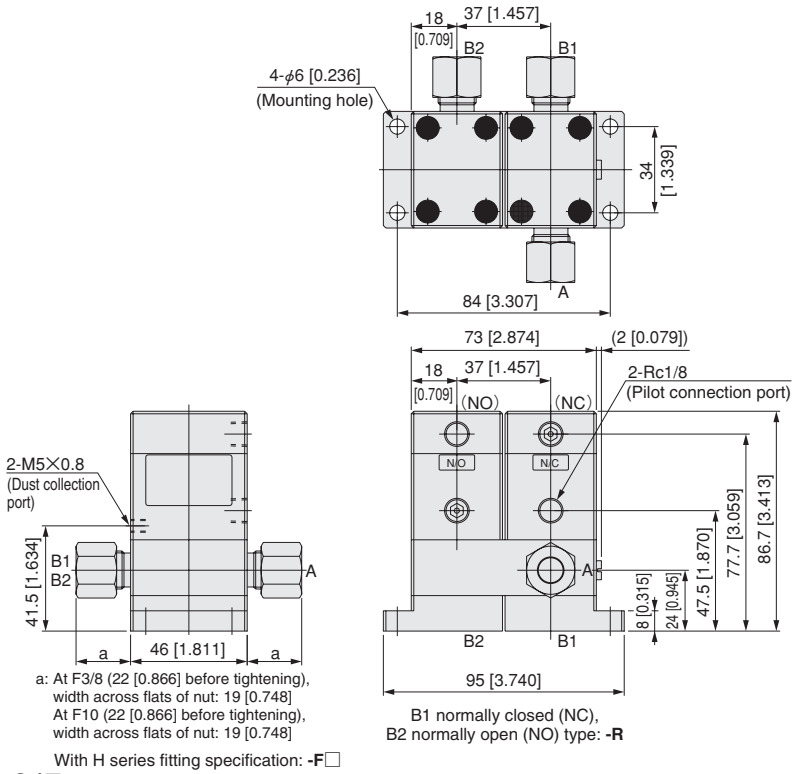


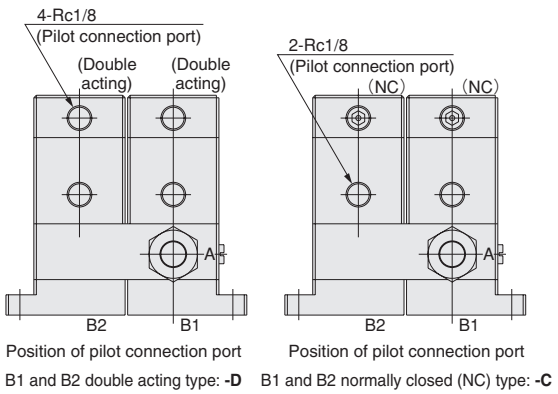
No.	Parts	Materials
①	Body	PFA
②	Diaphragm	PTFE
③	Cover	PPS
④	Plate	PPS
⑤	Piston	PEEK
⑥	Piston rod	PEEK
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB[Note]

No.	Parts	Materials
⑨	Spring	SUS304-WPB[Note]
⑩	O-ring	FKM
⑪	O-ring	FKM
⑫	O-ring	FKM
⑬	Nut	PFA
⑭	Cap	FKM
⑮	Plug	CTFE
⑯	Plug	VECTRA

Note: Fluoro coated

Dimensions mm [in.]





Specifications

Item		Model F-DAVP250-200W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	8〔1.2〕
Pilot connection port size		Rc1/8
Leakage at valve seat	cm^3/min [in^3/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Codes

F-DAVP250 – □ – □ – **200W**

- **Applicable tube size**
- **Valve function**
- **Basic model**

Valve function [Note]
C: B1 and B2 normally closed (NC) type
R: B1 normally closed (NC), B2 normally open (NO) type
D: B1 and B2 double acting type

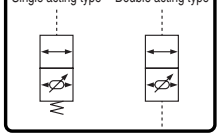
Applicable tube size
H series fitting
F3/8: Connecting tube outer diameter φ3/8 (φ9.52)
F10: Connecting tube outer diameter φ10

Note: Flow directions for media
·When media flow direction is A to B1 or B2, use at an operating pressure range of 0 ～ 0.5MPa [0 ～ 73psi.].
·When media flow direction is B1 or B2 to A, use at an operating pressure range of 0 ～ 0.3 MPa [0 ～ 44psi.].

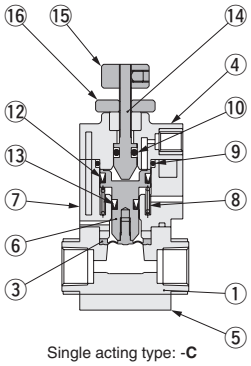
※ As protection against corrosive media, metallic parts (threads, springs, etc.) are treated with a fluoro coating.

Suck Back Valve **F-SV070-200W**

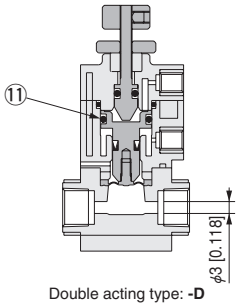
Symbols



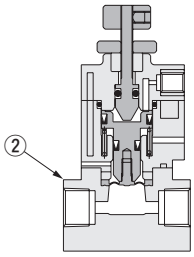
Inner Construction and Materials



Single acting type: **-C**



Double acting type: **-D**



Body material SUS316 specification: **-S**

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB

No.	Parts	Materials
⑨	O-ring	FKM
⑩	O-ring	FKM
⑪	O-ring	FKM
⑫	Seal	FKM
⑬	Seal	FKM
⑭	Adjusting screw	SUS304
⑮	Nut	SUS304
⑯	Nut	SUS304

Specifications

Item		Model F-SV070-200W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]		0～0.3 [0～44]
Pilot pressure MPa [psi.]		0.3～0.5 [44～73]
Proof pressure MPa [psi.]		1 [145]
Maximum suck back volume cm³ [in.³]		0.045 [0.00275]
Connection port size	Pilot	M5 × 0.8
	Main	Rc1/8
Recommended mounting direction		Vertical mounting with port facing upward

Order Codes

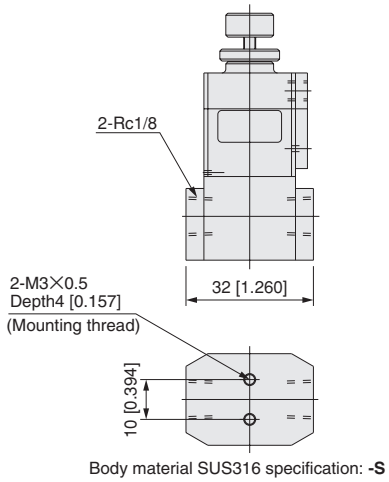
F-SV070 – □ – □ – **200W**

- **Basic model**
- **Valve function**
- **Body material**

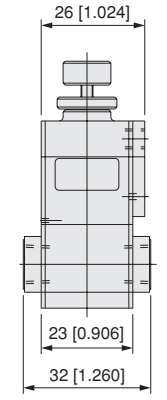
Valve function
C: Single acting type
D: Double acting type

Body material
Blank: PTFE
S: SUS316

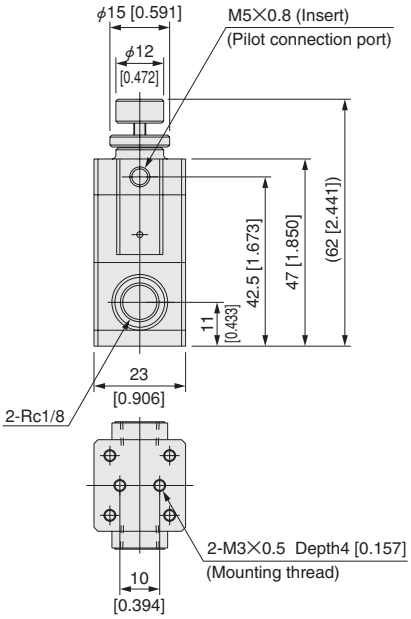
Dimensions mm [in.]

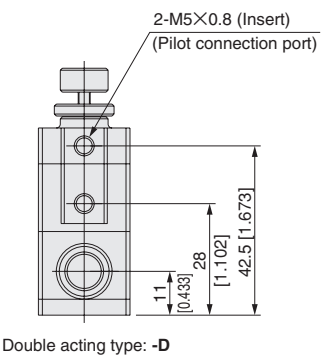


Body material SUS316 specification: **-S**



Single acting type: **-C**

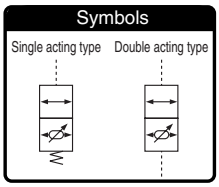




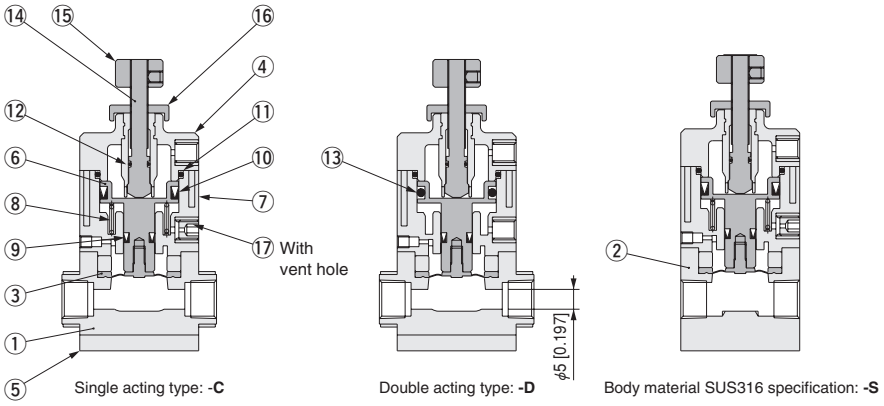
Double acting type: **-D**

Suck Back Valve **F-SV125-200W**

Symbols



Inner Construction and Materials



No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB
⑨	Seal	FKM

No.	Parts	Materials
⑩	Seal	FKM
⑪	O-ring	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	Adjusting screw	SUS304
⑮	Nut	SUS304
⑯	Nut	SUS304
⑰	Set screw	SUS304

Specifications

Item \ Model		F-SV125-200W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]		0～0.3 [0～44]
Pilot pressure MPa [psi.]		0.3～0.5 [44～73]
Proof pressure MPa [psi.]		1 [145]
Maximum suck back volume cm^3 [$in.^3$]		0.25 [0.0153]
Connection port size	Pilot	M5 × 0.8
	Main	Rc1/8
Recommended mounting direction		Vertical mounting with port facing upward

Order Codes

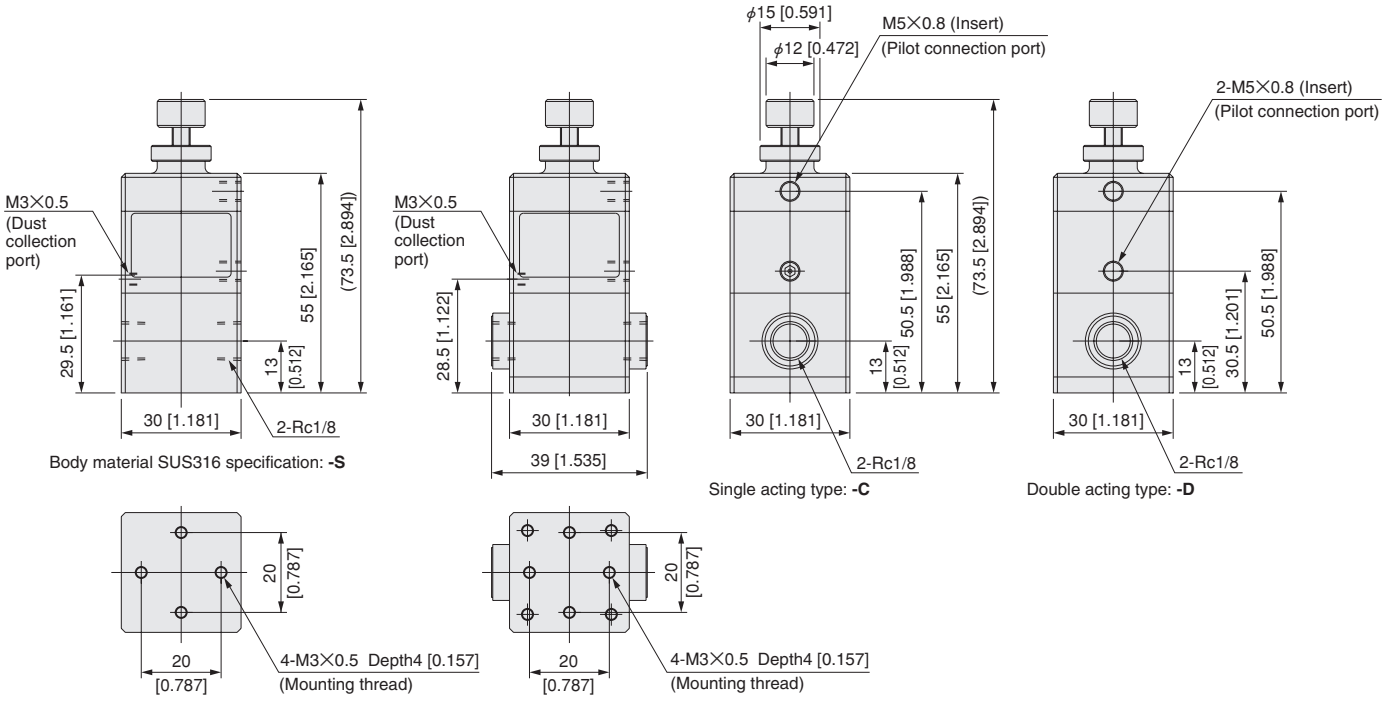
F-SV125 – □ – □ – **200W**

- **Basic model**
- **Valve function**
- **Body material**

Valve function
C: Single acting type
D: Double acting type

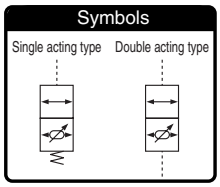
Body material
Blank: PTFE
S: SUS316

Dimensions mm [in.]

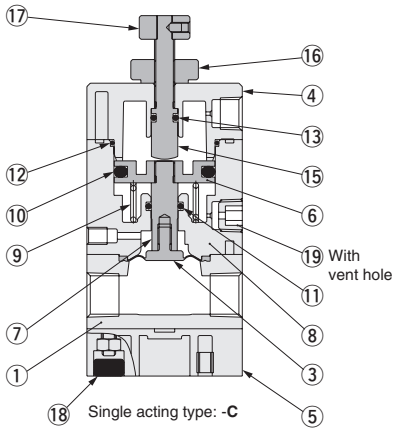


Suck Back Valve F-SV250-200W

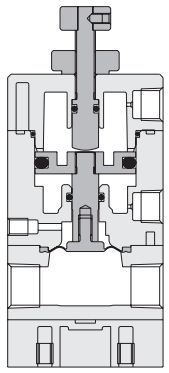
Symbols



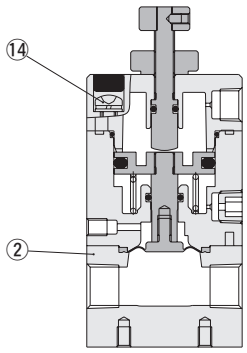
Inner Construction and Materials



Single acting type: **-C**



Double acting type: **-D**



Body material SUS316 specification: **-S**

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	PPS
⑥	Piston	SUS304
⑦	Piston rod	SUS304
⑧	Cylinder tube	PPS
⑨	Spring	SUS304-WPB
⑩	Seal	FKM

No.	Parts	Materials
⑪	O-ring	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	Screw	SUS304
⑮	Adjusting screw	SUS304
⑯	Nut	SUS304
⑰	Nut	SUS304
⑱	Cap	FKM
⑲	Plug	VECTRA

Specifications

Item \ Model		F-SV250-200W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]		0～0.3 [0～44]
Pilot pressure MPa [psi.]		0.3～0.5 [44～73]
Proof pressure MPa [psi.]		1 [145]
Maximum suck back volume cm³ [in.³]		0.40 [0.0244]
Connection port size	Pilot	Rc1/8
	Main	Rc1/4
Recommended mounting direction		Vertical mounting with port facing upward

Order Codes

F-SV250 – □ – □ – □ – 200W

- Mounting base
- Body material
- Valve function
- Basic model

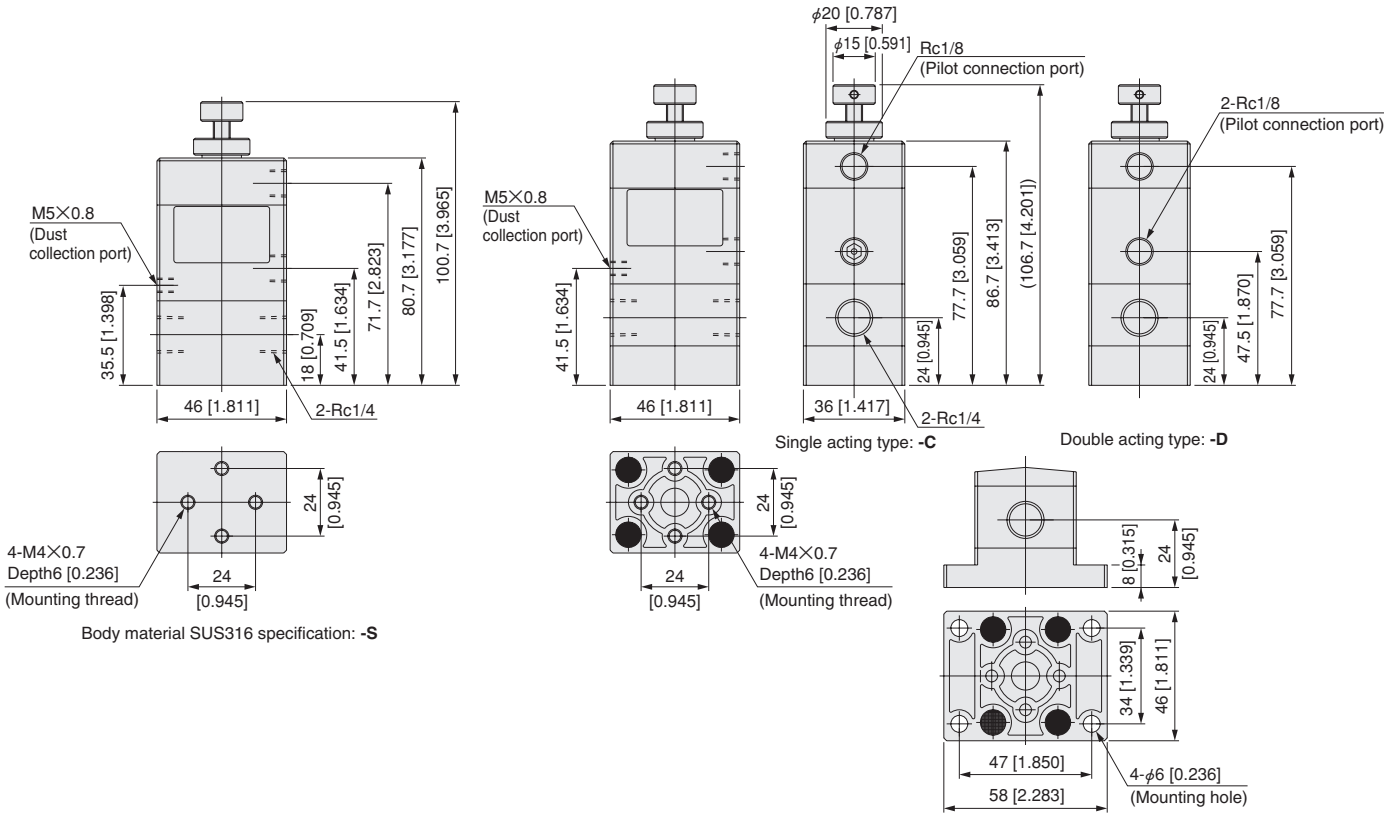
Valve function
C: Single acting type
D: Double acting type

Body material Note
Blank: PTFE
S: SUS316

Mounting base
Blank: Bottom mounting type
B: With mounting base

Note: When the selected body material is **-S**, with-mounting-base specification cannot be selected.

Dimensions mm [in.]

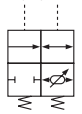


Air Operated Valve with Suck Back
Low sliding resistance
diaphragm type

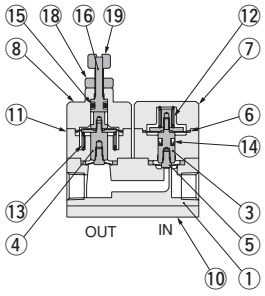
F-SAV070-100W

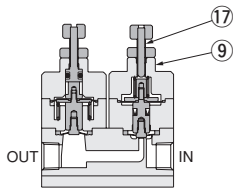
Symbol

AV side normally closed (NC), SV side single acting type

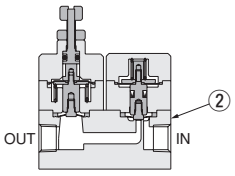


Inner Construction and Materials

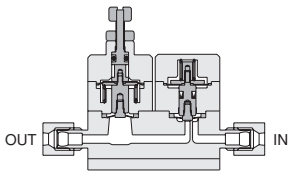




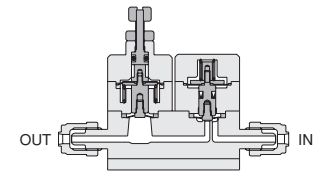
With flow rate adjustment: **-Q1**



Body material SUS316 specification: **-S**



With H series fitting specification: **-F**□



With Flowell 60 series fitting specification: **-L**□

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Stem	SUS304
④	Stem	SUS304
⑤	Diaphragm	PTFE
⑥	Diaphragm	FKM
⑦	Cover	C-PVC
⑧	Cover	SUS304
⑨	Cover	SUS304
⑩	Plate	SUS304

No.	Parts	Materials
⑪	Tube	C-PVC
⑫	Spring	SUS304-WPB
⑬	Spring	SUS304-WPB
⑭	Seal	FKM
⑮	O-ring	FKM
⑯	Adjusting screw	SUS304
⑰	Adjusting screw	SUS304
⑱	Nut	SUS304
⑲	Knob	SUS304

Specifications

Item		Model F-SAV070-100W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]		0～0.2 [0～29]
Pilot pressure MPa [psi.]		0.3～0.5 [44～73]
Back pressure MPa [psi.]		0～0.2 [0～29]
Proof pressure MPa [psi.]		1 [145]
Orifice〔Cv〕 mm		1.8〔0.06〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat cm^3/min [$in.^3$/min.]		0 [0] (When the media is water)
Maximum suck back volume cm^3 [$in.^3$]		0.04 [0.0024]
Recommended mounting direction		Vertical mounting with port facing upward Note

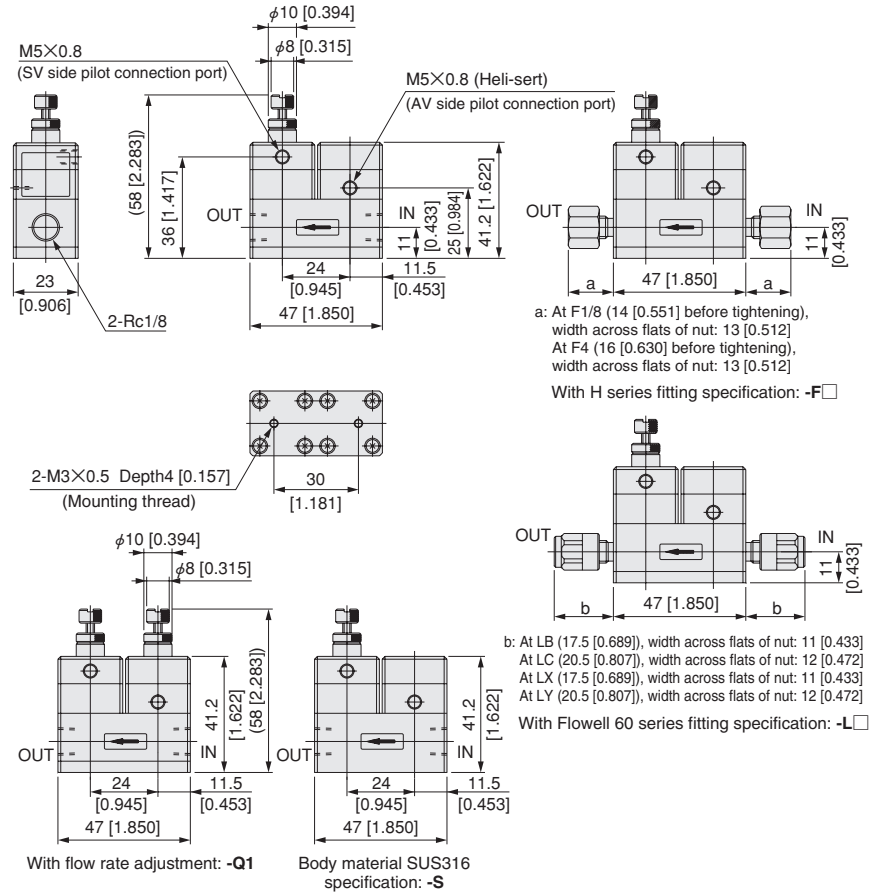
Note: Mount the valve with the arrow mark on the label on the side of the valve body pointing upward.

Order Codes

F-SAV070 – □ – □ – □ – **100W**

- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Body material**
- **Basic model**

Dimensions mm [in.]



a: At F1/8 (14 [0.551] before tightening), width across flats of nut: 13 [0.512]
At F4 (16 [0.630] before tightening), width across flats of nut: 13 [0.512]

With H series fitting specification: **-F**□

b: At LB (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LC (20.5 [0.807]), width across flats of nut: 12 [0.472]
At LX (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LY (20.5 [0.807]), width across flats of nut: 12 [0.472]

With Flowell 60 series fitting specification: **-L**□

With flow rate adjustment: **-Q1**

Body material SUS316 specification: **-S**

Body material Note 1
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: Rc1/8

H series fitting
F1/8: Connecting tube outer diameter ϕ1/8 (ϕ3.17)
F4 : Connecting tube outer diameter ϕ4

Flowell 60 series fitting Note 2
Standard fitting
LB: Connecting tube diameter ϕ3.17 × ϕ1.59
LC: Shared connecting tube diameters
ϕ4 × ϕ2 and ϕ4 × ϕ3
Special fitting
LX: Connecting tube diameter
ϕ3.17 × ϕ2.17 only
LY: Connecting tube diameter ϕ4 × ϕ3 only

Flow rate adjustment Note 3
Blank: None
Q1: With flow rate adjustment

Valve function
Only AV side normally closed (NC), SV side single acting type is available.

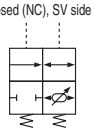
Notes: 1. When the selected body material is **-S**, with-fitting specification cannot be selected.
2. For the Flowell 60 series special fittings, a mounting tool is also a special type.
Do not use the standard mounting tool.
3. Exercise caution as the flow rate adjusting screw will come off, if rotated more than necessary.

Air Operated Valve with Suck Back
Diaphragm type

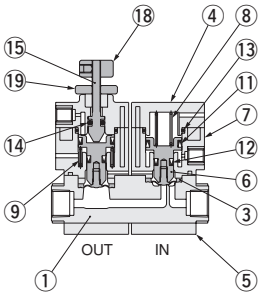
F-SAV070-200W

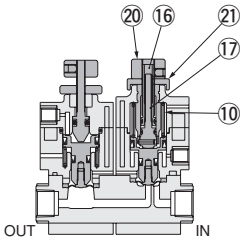
Symbol

AV side normally closed (NC), SV side single acting type

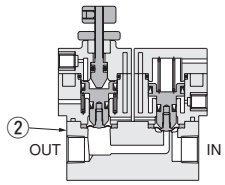


Inner Construction and Materials





With flow rate adjustment: **-Q1**



Body material SUS316 specification: **-S**

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB
⑨	Spring	SUS304-WPB
⑩	Spring	SUS304-WPB
⑪	Seal	FKM

No.	Parts	Materials
⑫	Seal	FKM
⑬	O-ring	FKM
⑭	O-ring	FKM
⑮	Adjusting screw	SUS304
⑯	Adjusting screw	SUS304
⑰	Adjusting screw	SUS304
⑱	Nut	SUS304
⑲	Nut	SUS304
⑳	Nut	SUS304
㉑	Nut	SUS304

Specifications

Item		Model F-SAV070-200W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]		0～0.3 [0～44]
Pilot pressure MPa [psi.]		0.3～0.5 [44～73]
Back pressure MPa [psi.]		0～0.3 [0～44]
Proof pressure MPa [psi.]		1 [145]
Orifice〔Cv〕 mm		2〔0.1〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat cm^3/min [$in.^3$/min.]		0 [0] (When the media is water)
Maximum suck back volume cm^3 [$in.^3$]		0.045 [0.00275]
Recommended mounting direction		Vertical mounting with port facing upward Note

Note: Mount the valve with the arrow mark on the label on the side of the valve body pointing upward.

Order Codes

F-SAV070 – □ – □ – □ – **200W**

- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Body material**
- **Basic model**

Body material Note 1
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: Rc1/8

H series fitting
F1/8 : Connecting tube outer diameter ϕ1/8 (ϕ3.17)
F4 : Connecting tube outer diameter ϕ4

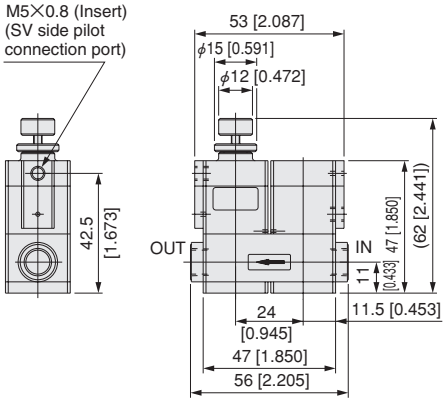
Flowell 60 series fitting Note 2
Standard fitting
LB: Connecting tube diameter ϕ3.17 × ϕ1.59
LC: Shared connecting tube diameters ϕ4 × ϕ2 and ϕ4 × ϕ3
Special fitting
LY: Connecting tube diameter ϕ4 × ϕ3 only

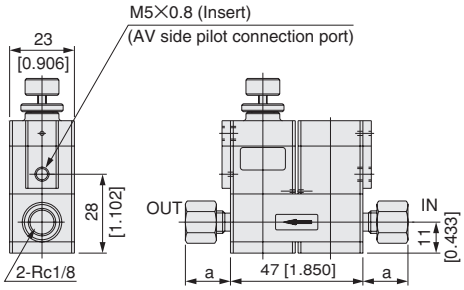
Flow rate adjustment Note 3
Blank: None
Q1: With flow rate adjustment (Fine flow rate adjustment type)

Valve function
Only AV side normally closed (NC), SV side single acting type is available.

Notes: 1. When the selected body material is **-S**, with-fitting specification cannot be selected.
2. For the Flowell 60 series special fittings, a mounting tool is also a special type.
Do not use the standard mounting tool.
3. The flow rate adjustment mechanism uses a differential screw method for easier flow rate setting.

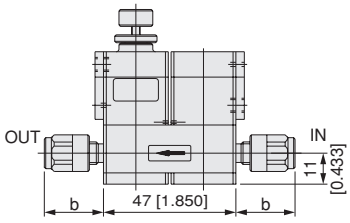
Dimensions mm [in.]





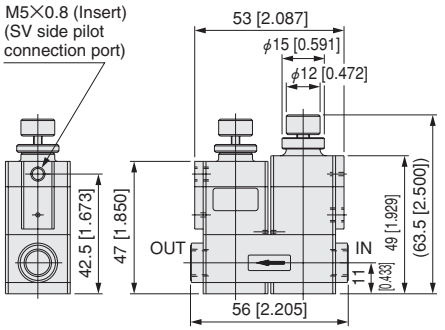
a: At F1/8 (14 [0.551] before tightening), width across flats of nut: 13 [0.512]
At F4 (16 [0.630] before tightening), width across flats of nut: 13 [0.512]

With H series fitting specification: **-F**□

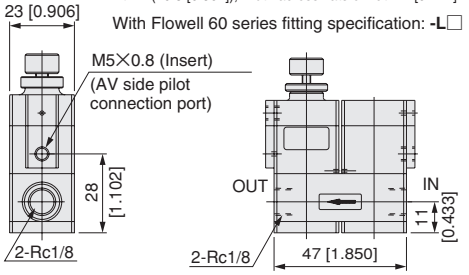


b: At LB (17.5 [0.689]), width across flats of nut: 11 [0.433]
At LC (20.5 [0.807]), width across flats of nut: 12 [0.472]
At LY (20.5 [0.807]), width across flats of nut: 12 [0.472]

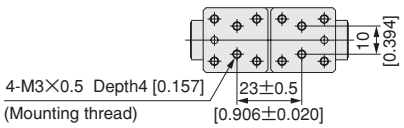
With Flowell 60 series fitting specification: **-L**□



With flow rate adjustment: **-Q1**



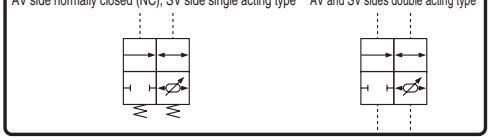
Body material SUS316 specification: **-S**



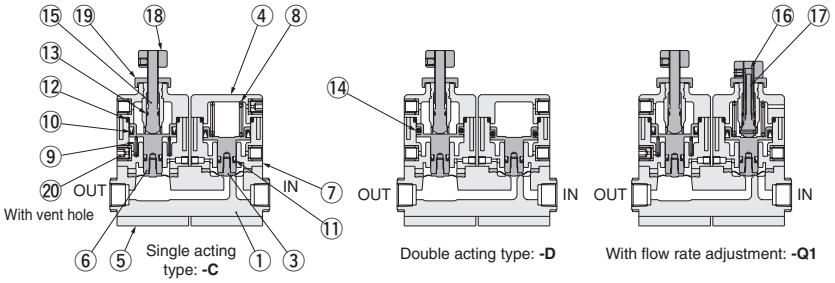
Air Operated Valve with Suck Back
Diaphragm type

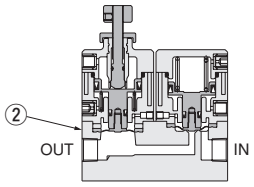
F-SAV100-200W

Symbols



Inner Construction and Materials





Body material SUS316 specification: **-S**

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB
⑨	Spring	SUS304-WPB
⑩	Seal	FKM

No.	Parts	Materials
⑪	Seal	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	O-ring	FKM
⑮	Adjusting screw	SUS304
⑯	Adjusting screw	SUS304
⑰	Adjusting screw	SUS304
⑱	Nut	SUS304
⑲	Nut	SUS304
⑳	Set screw	SUS304

Specifications

Item		Model F-SAV100-200W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]		0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.3～0.5 [44～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	2.5〔0.15〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat cm³/min [in.³/min.]		0 [0] (When the media is water)
Maximum suck back volume cm³ [in.³]		0.25 [0.0153]
Recommended mounting direction		Vertical mounting with port facing upward Note

Note: Mount the valve with the arrow mark on the label on the side of the valve body pointing upward.

Order Codes

F-SAV100 – □ – □ – □ – □ – **200W**

- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Body material**
- **Valve function**
- **Basic model**

Valve function
C: Single acting type (AV side normally closed (NC), SV side single acting type)
D: Double acting type

Body material Note 1
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: Rc1/8

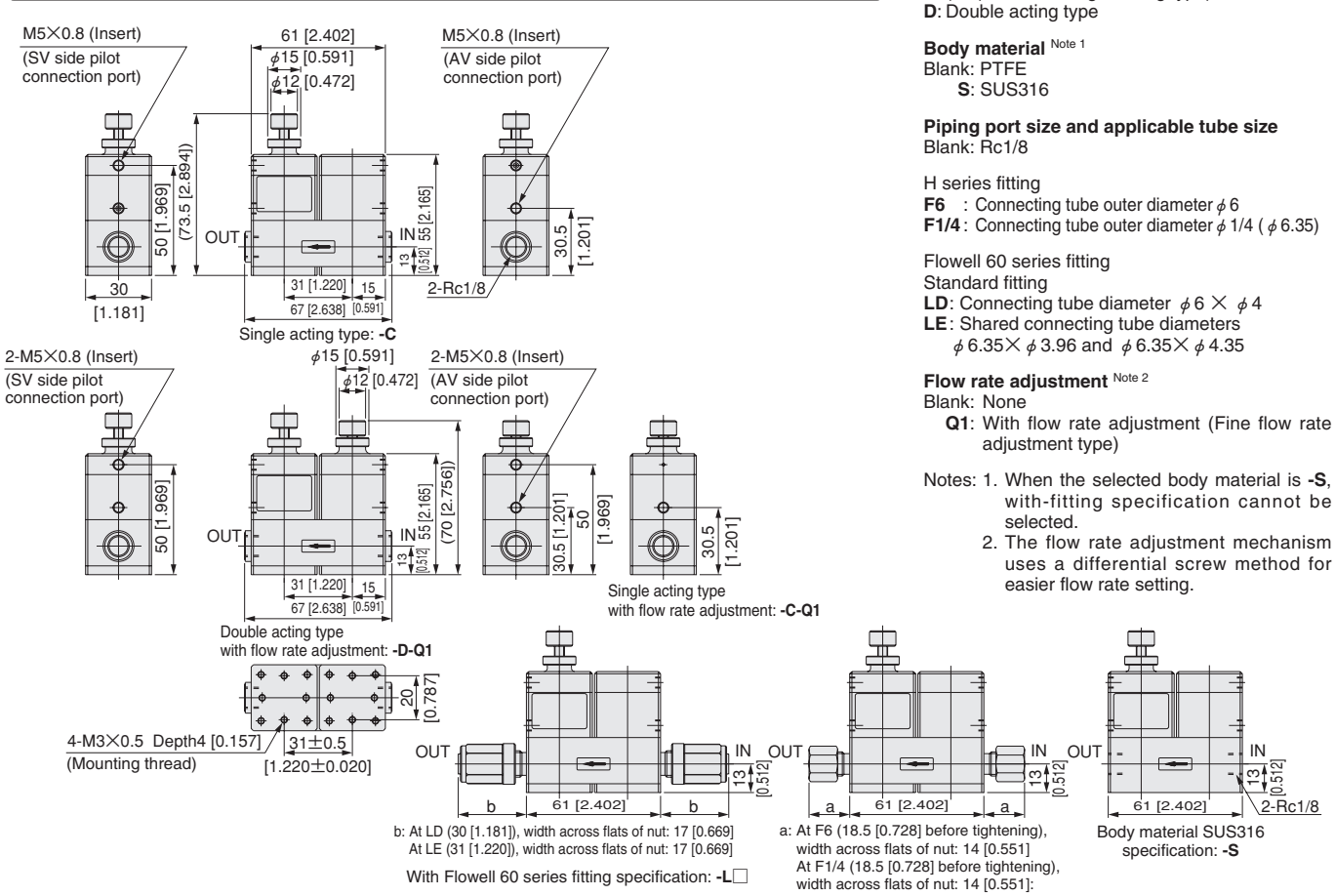
H series fitting
F6 : Connecting tube outer diameter ϕ6
F1/4: Connecting tube outer diameter ϕ1/4 (ϕ6.35)

Flowell 60 series fitting
Standard fitting
LD: Connecting tube diameter ϕ6 × ϕ4
LE: Shared connecting tube diameters
ϕ6.35× ϕ3.96 and ϕ6.35× ϕ4.35

Flow rate adjustment Note 2
Blank: None
Q1: With flow rate adjustment (Fine flow rate adjustment type)

Notes: 1. When the selected body material is **-S**, with-fitting specification cannot be selected.
2. The flow rate adjustment mechanism uses a differential screw method for easier flow rate setting.

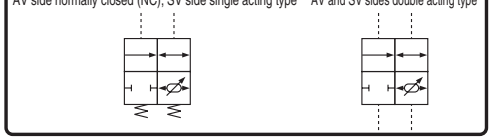
Dimensions mm [in.]



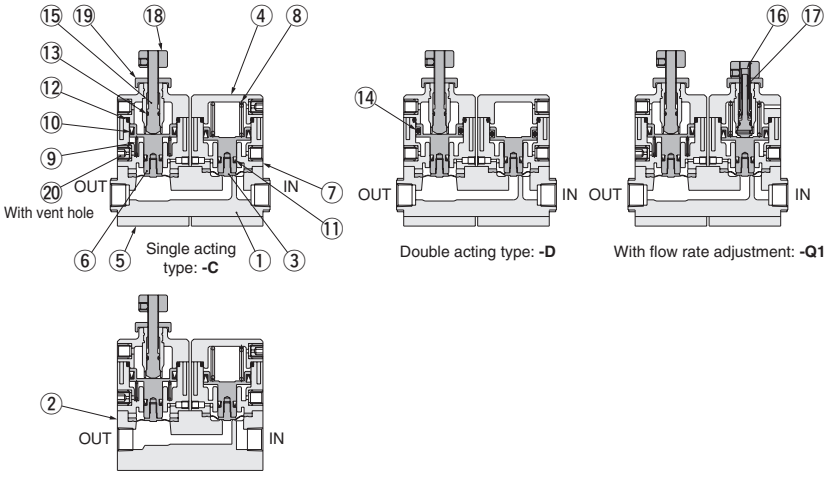
Air Operated Valve with Suck Back
Diaphragm type

F-SAV125-200W

Symbols



Inner Construction and Materials



Body material SUS316 specification: **-S**

No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB
⑨	Spring	SUS304-WPB
⑩	Seal	FKM

No.	Parts	Materials
⑪	Seal	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	O-ring	FKM
⑮	Adjusting screw	SUS304
⑯	Adjusting screw	SUS304
⑰	Adjusting screw	SUS304
⑱	Nut	SUS304
⑲	Nut	SUS304
⑳	Set screw	SUS304

Specifications

Item		Model F-SAV125-200W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]		0～0.3 [0～44]
Pilot pressure MPa [psi.]		0.3～0.5 [44～73]
Back pressure MPa [psi.]		0～0.3 [0～44]
Proof pressure MPa [psi.]		1 [145]
Orifice〔Cv〕 mm		4〔0.31〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat cm³/min [in.³/min.]		0 [0] (When the media is water)
Maximum suck back volume cm³ [in.³]		0.25 [0.0153]
Recommended mounting direction		Vertical mounting with port facing upward Note

Note: Mount the valve with the arrow mark on the label on the side of the valve body pointing upward.

Order Codes

F-SAV125 – □ – □ – □ – □ – **200W**

- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Body material**
- **Valve function**
- **Basic model**

Valve function
C: Single acting type (AV side normally closed (NC), SV side single acting type)
D: Double acting type

Body material Note 1
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: Rc1/8

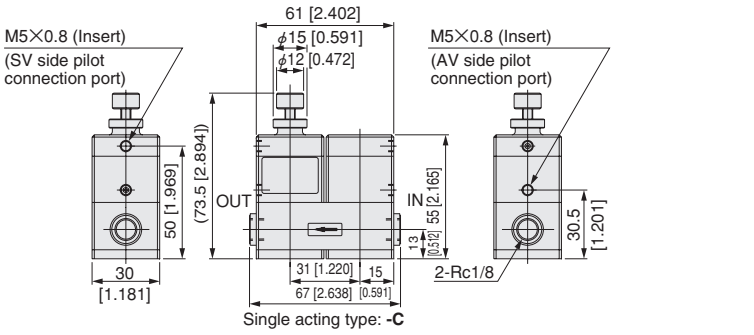
H series fitting
F6 : Connecting tube outer diameter ϕ6
F1/4: Connecting tube outer diameter ϕ1/4 (ϕ6.35)

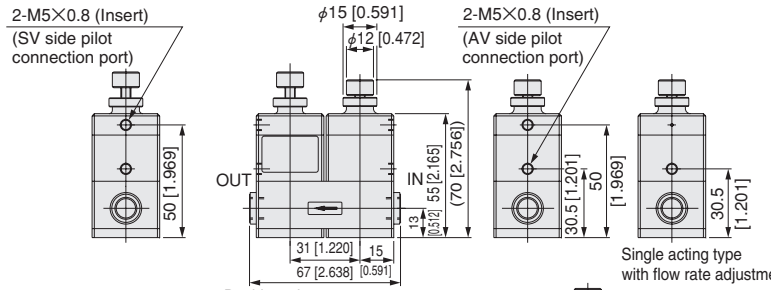
Flowell 60 series fitting
Standard fitting
LD: Connecting tube diameter ϕ6 × ϕ4
LE: Shared connecting tube diameters ϕ6.35 × ϕ3.96 and ϕ6.35 × ϕ4.35

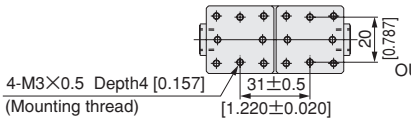
Flow rate adjustment Note 2
Blank: None
Q1: With flow rate adjustment (Fine flow rate adjustment type)

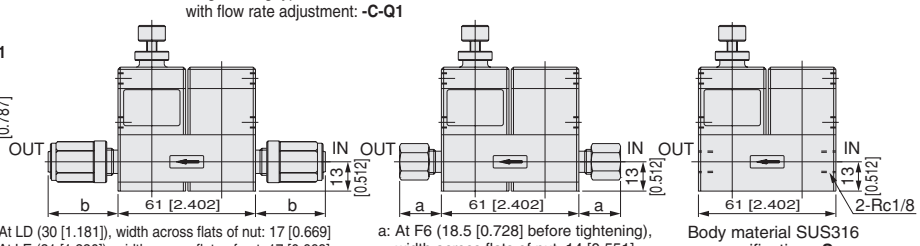
Notes: 1. When the selected body material is **-S**, with-fitting specification cannot be selected.
2. The flow rate adjustment mechanism uses a differential screw method for easier flow rate setting.

Dimensions mm [in.]





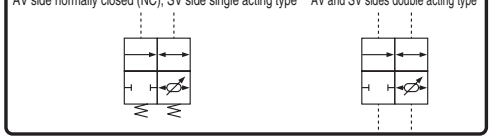




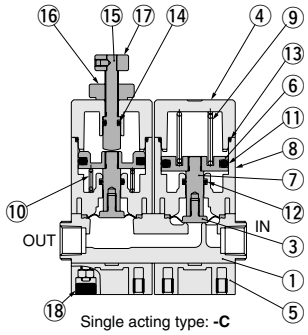
Air Operated Valve with Suck Back
Diaphragm type

F-SAV250-200W

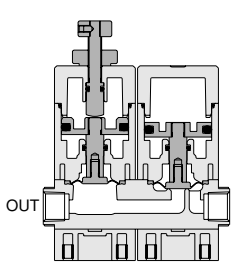
Symbols



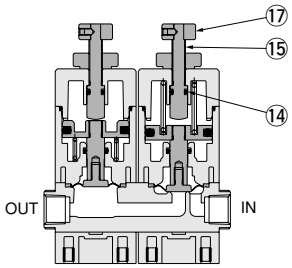
Inner Construction and Materials



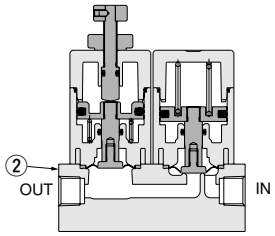
Single acting type: **-C**



Double acting type: **-D**



With flow rate adjustment: **-Q1**

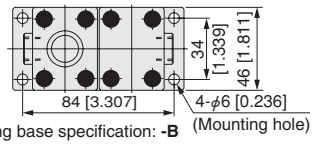


Body material SUS316 specification: **-S**

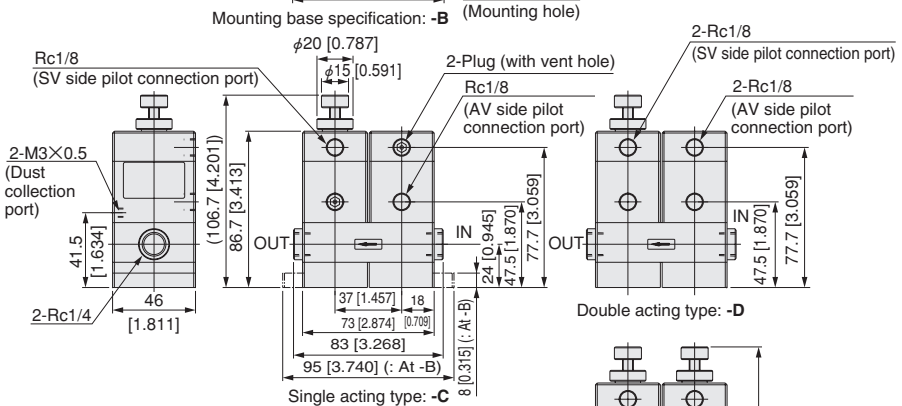
No.	Parts	Materials
①	Body	PTFE
②	Body	SUS316
③	Diaphragm	PTFE
④	Cover	PPS
⑤	Plate	PPS
⑥	Piston	SUS304
⑦	Piston rod	SUS304
⑧	Cylinder tube	PPS
⑨	Spring	SUS304-WPB

No.	Parts	Materials
⑩	Spring	SUS304-WPB
⑪	Seal	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	O-ring	FKM
⑮	Adjusting screw	SUS304
⑯	Nut	SUS304
⑰	Nut	SUS304
⑱	Cap	FKM

Dimensions mm [in.]

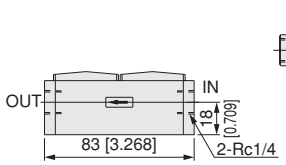


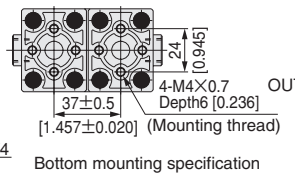
Mounting base specification: **-B**



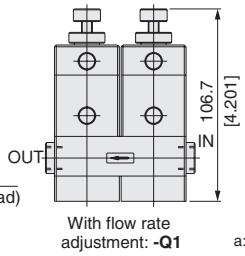
Single acting type: **-C**

Double acting type: **-D**

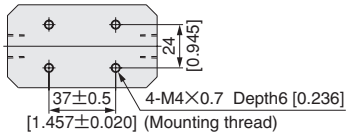




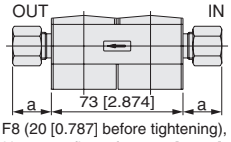
Bottom mounting specification



With flow rate adjustment: **-Q1**

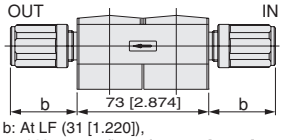


Body material SUS316 specification: **-S**



a: At F8 (20 [0.787] before tightening), width across flats of nut: 17 [0.669]
At F3/8 (22 [0.866] before tightening), width across flats of nut: 19 [0.748]
At F10 (22 [0.866] before tightening), width across flats of nut: 19 [0.748]

With H series fitting specification: **-F□**



b: At LF (31 [1.220]), width across flats of nut: 18 [0.709]
At LG (39 [1.535]), width across flats of nut: 22 [0.866]
At LH (39 [1.535]), width across flats of nut: 22 [0.866]
At LI (37 [1.457]), width across flats of nut: 22 [0.866]

With Flowell 60 series fitting specification: **-L□**

Specifications

Item		Model F-SAV250-200W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]		0～0.3 [0～44]
Pilot pressure MPa [psi.]		0.3～0.5 [44～73]
Back pressure MPa [psi.]		0～0.3 [0～44]
Proof pressure MPa [psi.]		1 [145]
Orifice〔Cv〕 mm		6〔0.6〕
Pilot connection port size		Rc1/8
Leakage at valve seat cm³/min [in.³/min.]		0 [0] (When the media is water)
Maximum suck back volume cm³ [in.³]		0.40 [0.024]
Recommended mounting direction		Vertical mounting with port facing upward Note

Note: Mount the valve with the arrow mark on the label on the side of the valve body pointing upward.

Order Codes

F-SAV250 − □ − □ − □ − □ − □ − **200W**

- **Mounting base**
- **Flow rate adjustment**
- **Piping port size and applicable tube size**
- **Body material**
- **Valve function**
- **Basic model**

Valve function
C: Single acting type (AV side normally closed (NC), SV side single acting type)
D: Double acting type

Body material Note
Blank: PTFE
S: SUS316

Piping port size and applicable tube size
Blank: Rc1/4

H series fitting
F8 : Connecting tube outer diameter φ8
F3/8: Connecting tube outer diameter φ3/8 (φ9.52)
F10 : Connecting tube outer diameter φ10

Flowell 60 series fitting
Standard fitting
LF: Connecting tube diameter φ8 × φ6
LG: Connecting tube diameter φ9.52× φ6.35
LH: Connecting tube diameter φ9.52 × φ7.52
LI : Connecting tube diameter φ10 × φ8

Flow rate adjustment
Blank: None
Q1: With flow rate adjustment

Mounting base
Blank: Bottom mounting type
B: With mounting base

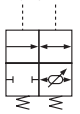
Note: When the selected body material is **-S**, with-fitting specification cannot be selected.

Air Operated Valve with Suck Back
Diaphragm type

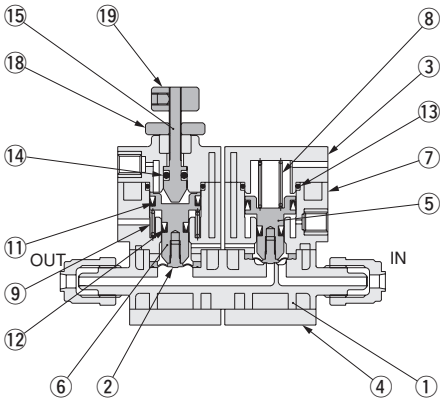
F-SAVP070-200W

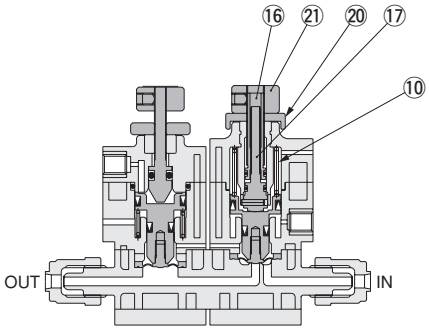
Symbol

AV side normally closed (NC), SV side single acting type



Inner Construction and Materials





With flow rate adjustment: **-Q1**

No.	Parts	Materials
①	Body	PFA
②	Diaphragm	PTFE
③	Cover	PPS
④	Plate	SUS304
⑤	Piston	SUS304
⑥	Piston	SUS304
⑦	Cylinder tube	PPS
⑧	Spring	SUS304-WPB
⑨	Spring	SUS304-WPB
⑩	Spring	SUS304-WPB
⑪	Seal	FKM

No.	Parts	Materials
⑫	Seal	FKM
⑬	O-ring	FKM
⑭	O-ring	FKM
⑮	Adjusting screw	SUS304
⑯	Adjusting screw	SUS304
⑰	Adjusting screw	SUS304
⑱	Nut	SUS304
⑲	Nut	SUS304
⑳	Nut	SUS304
㉑	Nut	SUS304

Specifications

Item		Model F-SAVP070-200W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～80 [41～176]
	Atmosphere	0～60 [32～140]
Operating pressure range MPa [psi.]		0～0.3 [0～44]
Pilot pressure MPa [psi.]		0.3～0.5 [44～73]
Back pressure MPa [psi.]		0～0.3 [0～44]
Proof pressure MPa [psi.]		1 [145]
Orifice〔Cv〕 mm		2〔0.1〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat cm^3/min [$in.^3$/min.]		0 [0] (When the media is water)
Maximum suck back volume cm^3 [$in.^3$]		0.045 [0.00275]
Recommended mounting direction		Vertical mounting with port facing upward Note

Note: Mount the valve with the arrow mark on the label on the side of the valve body pointing upward.

Order Codes

F-SAVP070 – C – LX – □ – 200W

- **Flow rate adjustment**
- **Applicable tube size**
- **Valve function**
- **Basic model**

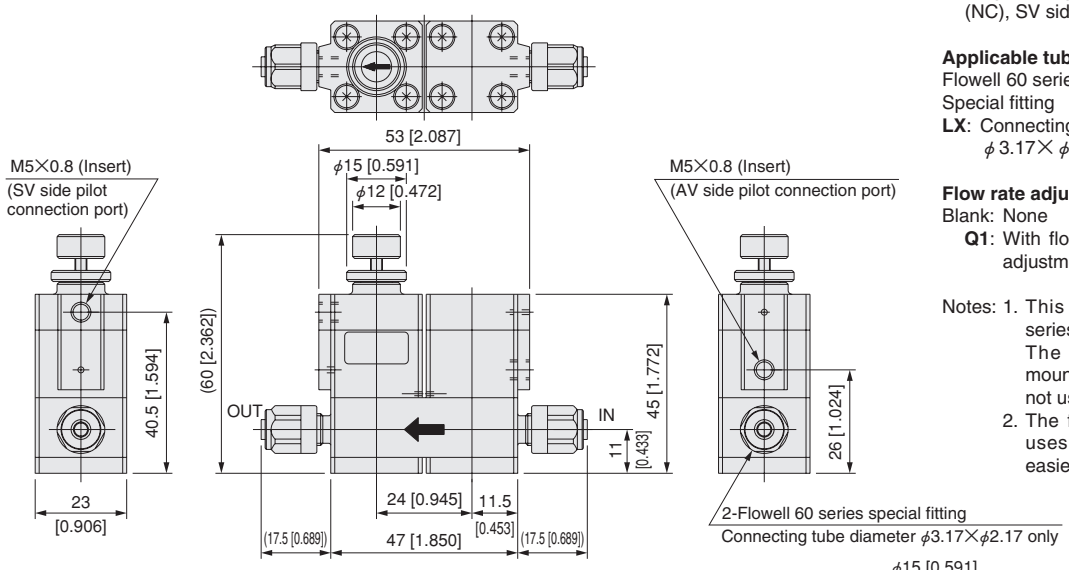
Valve function
C: Single acting type (AV side normally closed (NC), SV side single acting type)

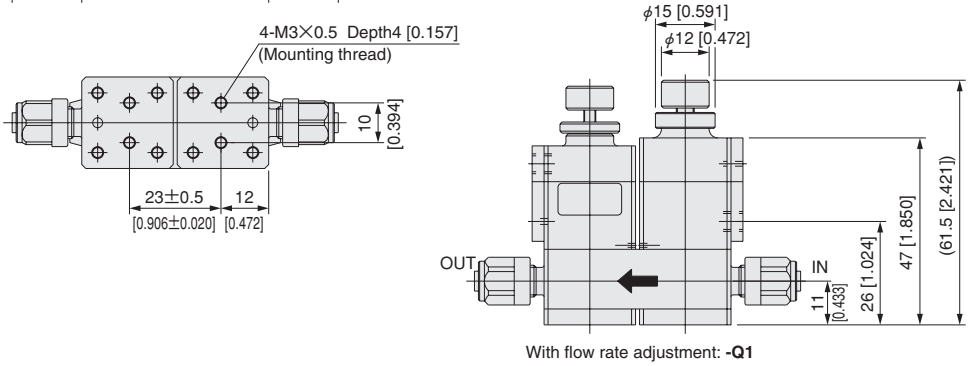
Applicable tube size
Flowell 60 series fitting Note 1
Special fitting
LX: Connecting tube diameter
ϕ3.17× ϕ2.17 only

Flow rate adjustment Note 2
Blank: None
Q1: With flow rate adjustment (Fine flow rate adjustment type)

Notes: 1. This product comes with Flowell 60 series fittings.
The fittings are special sizes. The mounting tool is also a special type. Do not use the standard mounting tool.
2. The flow rate adjustment mechanism uses a differential screw method for easier flow rate setting.

Dimensions mm [in.]



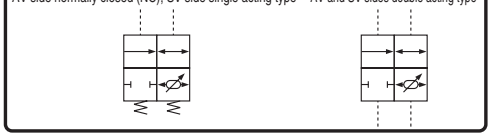


With flow rate adjustment: **-Q1**

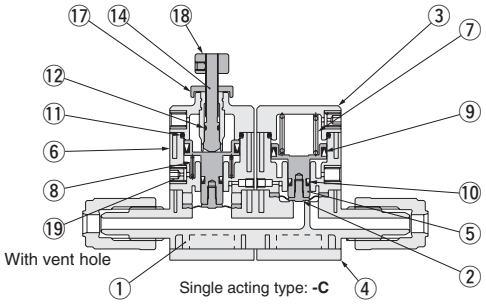
Air Operated Valve with Suck Back
Diaphragm type

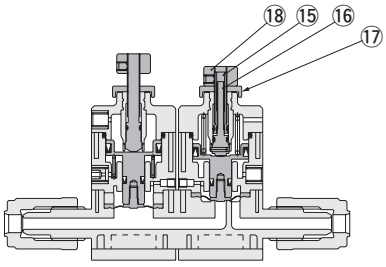
F-SAVP125-200W

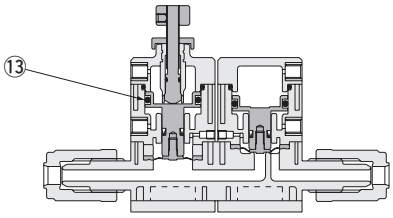
Symbols



Inner Construction and Materials




With flow rate adjustment: **-Q1**


Double acting type: **-D**

No.	Parts	Materials
①	Body	PFA
②	Diaphragm	PTFE
③	Cover	PPS
④	Plate	SUS304
⑤	Piston	SUS304
⑥	Cylinder tube	PPS
⑦	Spring	SUS304-WPB
⑧	Spring	SUS304-WPB
⑨	Seal	FKM
⑩	Seal	FKM

No.	Parts	Materials
⑪	O-ring	FKM
⑫	O-ring	FKM
⑬	O-ring	FKM
⑭	Adjusting screw	SUS304
⑮	Adjusting screw	SUS304
⑯	Adjusting screw	SUS304
⑰	Nut	SUS304
⑱	Nut	SUS304
⑲	Set screw	SUS304

Specifications

Item		Model: F-SAVP125-200W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～80 [41～176]
	Atmosphere	0～60 [32～140]
Operating pressure range MPa [psi.]		0～0.3 [0～44]
Pilot pressure MPa [psi.]		0.3～0.5 [44～73]
Back pressure MPa [psi.]		0～0.3 [0～44]
Proof pressure MPa [psi.]		1 [145]
Orifice〔Cv〕 mm		4〔0.31〕
Pilot connection port size		M5 × 0.8
Leakage at valve seat cm³/min [in.³/min.]		0 [0] (When the media is water)
Maximum suck back volume cm³ [in.³]		0.25 [0.0153]
Recommended mounting direction		Vertical mounting with port facing upward Note

Note: Mount the valve with the arrow mark on the label on the side of the valve body pointing upward.

Order Codes

F-SAVP125 – □ – **LZ** – □ – **200W**

- **Flow rate adjustment**
- **Applicable tube size**
- **Valve function**
- **Basic model**

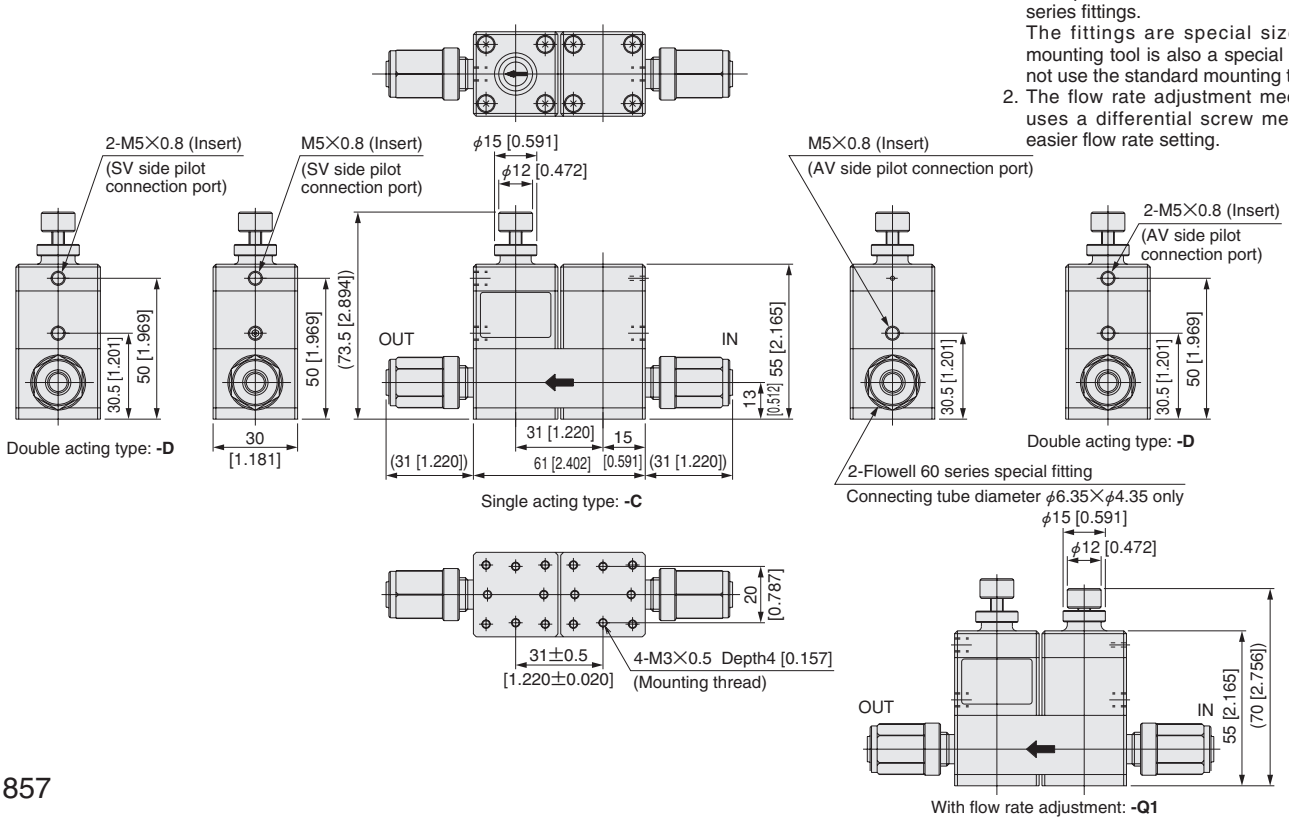
Valve function
C: Single acting type (AV side normally closed (NC), SV side single acting type)
D: Double acting type

Applicable tube size
Flowell 60 series fitting Note 1
Special fitting
LZ: Connecting tube diameter of ϕ6.35× ϕ4.35 only

Flow rate adjustment Note 2
Blank: None
Q1: With flow rate adjustment (Fine flow rate adjustment type)

Notes: 1. This product comes with Flowell 60 series fittings.
The fittings are special sizes. The mounting tool is also a special type. Do not use the standard mounting tool.
2. The flow rate adjustment mechanism uses a differential screw method for easier flow rate setting.

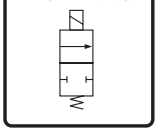
Dimensions mm [in.]



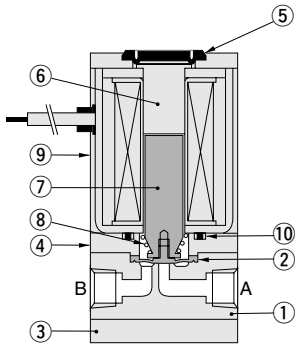
Solenoid Valve
Diaphragm type
2-port valve

F-EV120

Symbol
Normally closed (NC) type



Inner Construction and Materials



No.	Parts	Materials
①	Body	PTFE
②	Diaphragm	PTFE
③	Plate	Aluminum alloy (black anodized)
④	Adapter	Aluminum alloy (black anodized)
⑤	Cap Note	
⑥	Column	
⑦	Plunger	
⑧	Spring	
⑨	Solenoid	
⑩	O-ring	

Note: The No.5 cap is not a manual override.
Pushing this cap will not switch the functions.

Specifications

Item		Model F-EV120
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.15 [0～21.8]
	B→A	0～0.03 [0～4.4]
Back pressure	MPa [psi.]	0～0.03 [0～4.4]
Proof pressure	MPa [psi.]	1 [145]
Orifice〔Cv〕	mm	3〔0.21〕
Connection port size		Rc1/8
Leakage at valve seat	cm^3/min [$in.^3$/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any
Mass	kg [lb.]	0.25 [0.55]

Order Codes

F-EV120 – □

Basic model

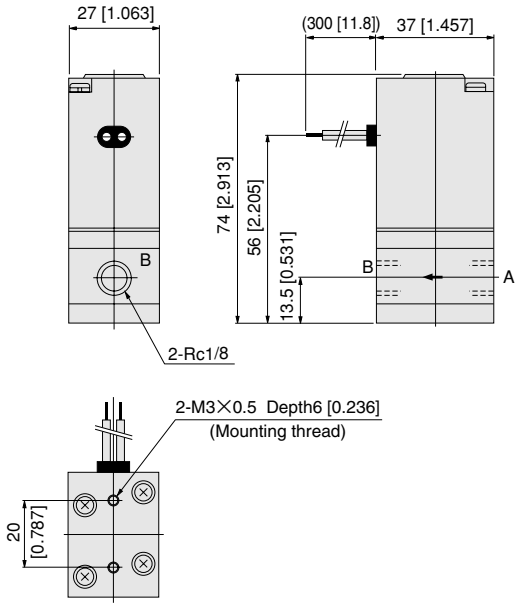
Voltage
DC24V
AC100V
AC200V

Note: The grommet type is the only available wiring type for the solenoid.

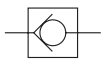
Solenoid Specifications

Item \ Model / Solenoid rating		F-EV120 DC24V	F-EV120 AC100V		F-EV120 AC200V	
Type		Flywheel diode incorporated for surge suppression	Flywheel			
Operating voltage range	V	21.6～26.4 (24±10%)	90～110 (100±10%)		180～220 (200±10%)	
Current (When rated voltage is applied)	Frequency Hz	—	50	60	50	60
	Energizing mA	420	160	150	70	65
Allowable leakage current	mA	30	15		7	
Insulation resistance	MΩ	10				
Lead wire length	mm [in.]	300 [11.8]				
Color of lead wire		Red (+), Black (−)	Yellow, Black		White, Black	
Surge suppression		Flywheel diode				

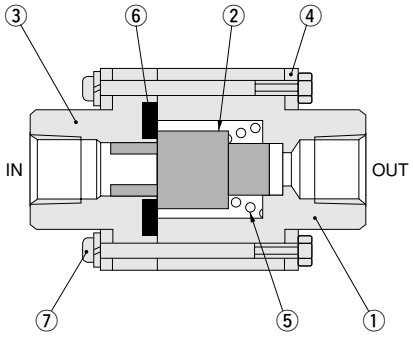
Dimensions mm [in.]



Symbol



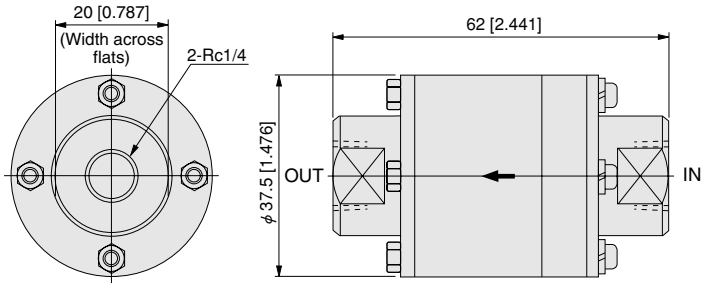
Inner Construction and Materials



No.	Parts	Materials
①	Body	PTFE
②	Stem	PTFE
③	Cover with port	PTFE
④	Retainer	SUS304
⑤	Spring	SUS304-WPB Note
⑥	Seal	（NBR, FKM, Si, EP）
⑦	Screw	SUS304

Note: Fluoro coated

Dimensions mm [in.]



Specifications

Item \ Model		F-C250
Media Note		Pure water, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]		0.07～0.9 [10.2～131]
Proof pressure MPa [psi.]		1 [145]
Effective area〔Cv〕 mm²		14〔0.72〕
Connection port size Rc		1/4
Mounting direction		Any
Mass kg [lb.]		0.12 [0.26]

Note: Can be used with media of viscosity 40cp or less. When planning to use the product with corrosive media, consult us.

Order Codes

F-C250 – □

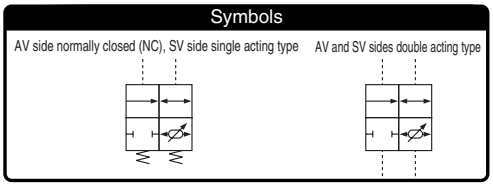
Basic model

Seal material
1 : NBR (Nitril rubber)
2 : FKM (Viton)
3 : Si (Silicone rubber)
4 : EP (Ethylene propylene rubber)

Air Operated Valves with Suck Back
High Viscosity Specification

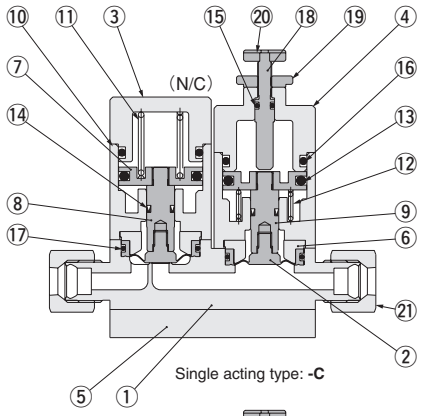
F-SAV250-10W
F-SAV250-18W

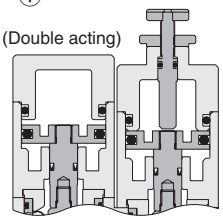
Symbols



Inner Construction and Materials

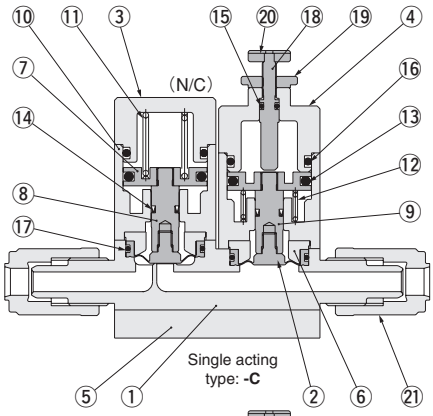
●F-SAV250-10W

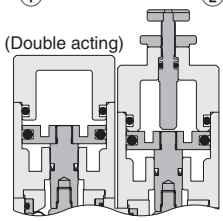




Double acting type: **-D**

●F-SAV250-18W





Double acting type: **-D**

No.	Parts	Materials
①	Body	PTFE
②	Diaphragm	PTFE
③	Cover	C-PVC
④	Cover	SUS304
⑤	Plate	C-PVC
⑥	Guide washer	SUS304
⑦	Piston	SUS304
⑧	Piston rod	SUS304
⑨	Piston rod	SUS304
⑩	Cylinder tube	C-PVC
⑪	Spring	SUS304-WPB

No.	Parts	Materials
⑫	Spring	SUS304-WPB
⑬	Seal	FKM
⑭	Seal	FKM
⑮	O-ring	FKM
⑯	O-ring	FKM
⑰	O-ring	FKM
⑱	Adjusting screw	SUS304
⑲	Lock nut	SUS304
⑳	Nut	SUS304
㉑	Nut	PFA
㉒	Plug	VECTRA

Specifications

Item		Model: F-SAV250-10W F-SAV250-18W
Media		Pure water, chemicals
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]		0～0.2 [0～29]
Pilot pressure MPa [psi.]		0.3～0.5 [44～73]
Back pressure MPa [psi.]		0～0.3 [0～44]
Proof pressure MPa [psi.]		1 [145]
Orifice〔Cv〕 mm		6〔0.6〕
Pilot connection port size		Rc1/8
Leakage at valve seat cm³/min [in.³/min.]		0 [0] (When the media is water)
Maximum suck back volume cm³ [in.³]		0.5 [0.031]
Recommended mounting direction		Vertical mounting with port facing upward Note

Note: Mount the valve with the arrow mark on the label on the side of the valve body pointing upward.

Order Codes

●With H series fitting

F-SAV250 – □ – **10W**

Valve function

Basic model

Valve function
C: Single acting type (AV side normally closed (NC), SV side single acting type)
D: Double acting type

●With Flowell 60 series fitting

F-SAV250 – □ – **18W**

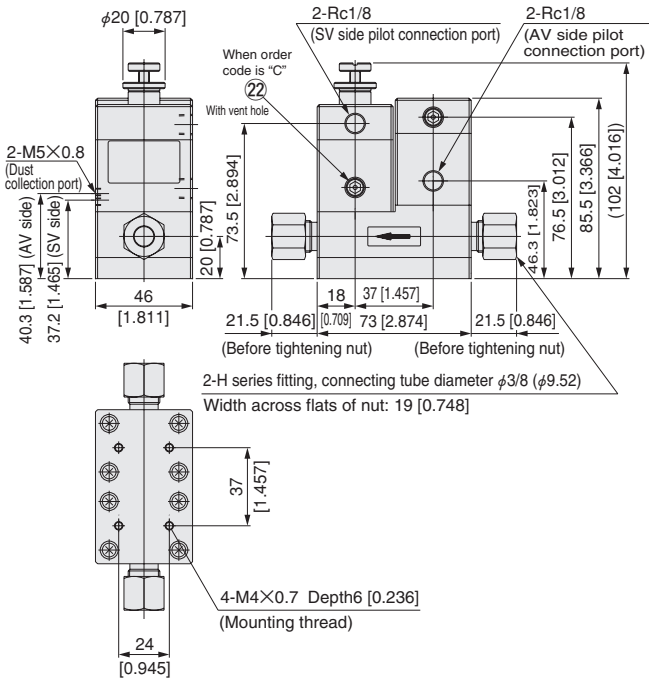
Valve function

Basic model

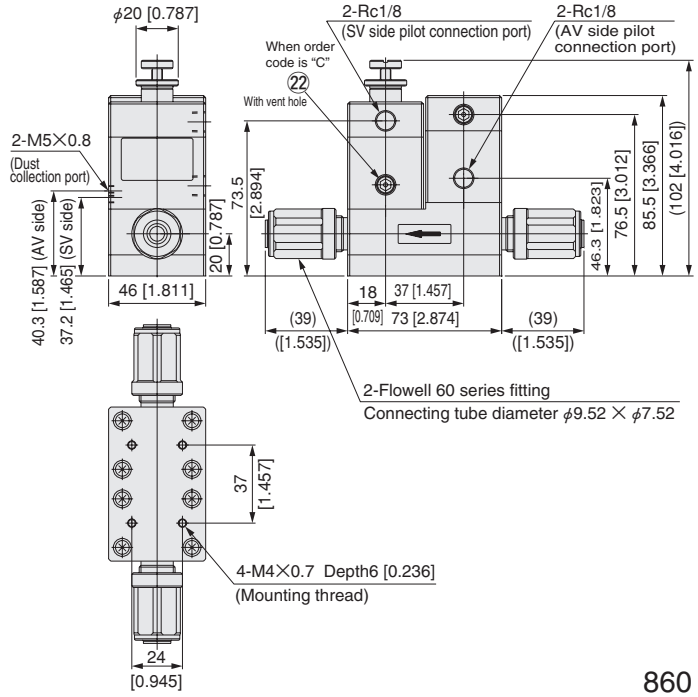
Valve function
C: Single acting type (AV side normally closed (NC), SV side single acting type)
D: Double acting type

Dimensions mm [in.]

●F-SAV250-10W

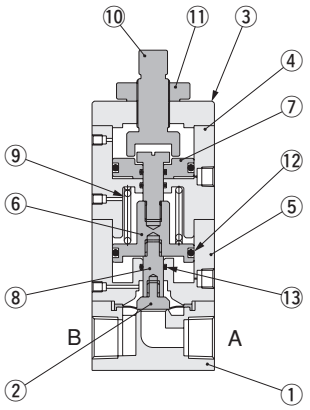


●F-SAV250-18W



F-AV500-12W

Inner Construction and Materials



No.	Parts	Materials
①	Body	SUS316
②	Diaphragm	PTFE
③	Cover	Aluminum alloy
④	Cylinder tube	Aluminum alloy
⑤	Cylinder tube	Aluminum alloy
⑥	Piston	SUS304
⑦	Piston	SUS304

No.	Parts	Materials
⑧	Piston rod	SUS304
⑨	Spring	SUS304-WPB
⑩	Adjusting screw	SUS304
⑪	Lock nut	SUS304
⑫	O-ring	FKM
⑬	O-ring	FKM

Note: SUS304, PTFE, or PFE is available as the valve body material.
For details of order codes and specifications, consult us.

Specifications

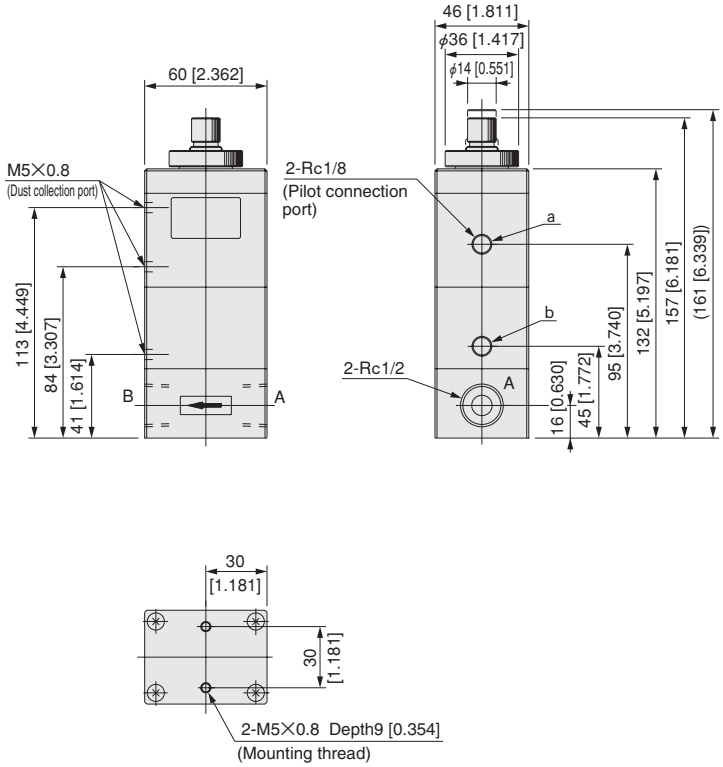
Item		Model F-AV500-12W
Media		Pure water, chemicals, air, N_2
Operating temp. range °C [°F]	Media	5～60 [41～140]
	Atmosphere	0～50 [32～122]
Operating pressure range MPa [psi.]	A→B	0～0.5 [0～73]
	B→A	0～0.3 [0～44]
Pilot pressure	MPa [psi.]	0.35～0.5 [50.8～73]
Back pressure	MPa [psi.]	0～0.3 [0～44]
Proof pressure	MPa [psi.]	1.5 [218]
Orifice〔Cv〕	mm	12〔2.3〕
Pilot connection port size		Rc1/8
Leakage at valve seat	cm^3/min [in^3/min.]	0 [0] (When the media is water)
Operating frequency	c.p.m	30 or less
Mounting direction		Any

Order Code

F-AV500 – 12W

Basic model

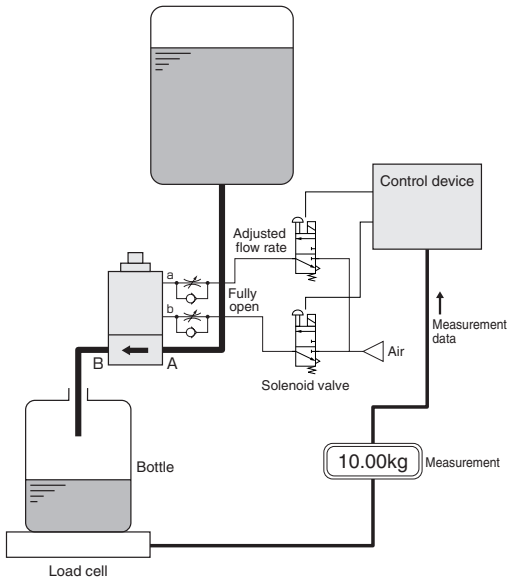
Dimensions mm [in.]



■Features

A single valve switches between two flow rates. It is easy to operate and does not require complex circuitry. Switching is possible between the maximum flow rate and an adjusted flow rate, and this function is best demonstrated when accurate filling is needed for bottle filling processes, etc.

Application example (bottle filling process)



- When air is supplied to port **a**, the adjusted flow rate is obtained (the flow rate is set by the adjusting screw).
- When air is supplied to port **b**, the maximum flow rate is obtained.
- When air is not supplied to either port **a** or **b**, the B port is closed (NC).

Large Flow Series

● For details of order codes and specifications, consult us.

Air Operated Valve
F-AVB400～1000

Bellows type 2-port valve

Model	Operating temperature range °C [°F]		Operating pressure range MPa [psi.]		Orifice mm〔Cv〕	Port size	
	Media	Atmosphere	A→B	B→A		Main	Operating port
F-AVB400	5～60 [41～140]	0～50 [32～122]	0～0.44 [0～63.8]	0～0.03 [0～4.4]	10〔1.8〕	Rc3/8	Rc1/8
F-AVB500					12〔2.5〕	Rc1/2	
F-AVB600			0～0.2 [0～29]		16〔6.5〕	Rc3/4	
F-AVB750					20〔7.0〕		
F-AVB1000				0～0.02 [0～2.9]	25〔11.0〕	Rc1	

● For details of order codes and specifications, consult us.

Air Operated Valve
F-AVP500, 750

Diaphragm type 2-port valve

Model	Operating temperature range °C [°F]		Operating pressure range MPa [psi.]		Orifice mm〔Cv〕	Port size	
	Media	Atmosphere	A→B	B→A		Main	Operating port
F-AVP500	5～60 [41～140] (5～100 [41～212] Note 1)	0～50 [32～122]	0～0.5 [0～73]	0～0.3 [0～44]	12 Note 2 〔2.5〕	Outer dia. 1/2" tube	Rc1/8
F-AVP750					20 Note 2 〔7.0〕	Outer dia. 3/4" tube	

● For details of order codes and specifications, consult us.
Notes: 1. For medium temperature specifications
2. Valve seat orifice

Check Valve
F-C375, 500

Model	Operating temperature range °C [°F]		Operating pressure range MPa [psi.]	Effective area mm² 〔Cv〕	Port size
	Media	Atmosphere			
F-C375	5～60 [41～140]	0～50 [32～122]	0.07～0.9 [10.2～131]	74〔3.7〕	Rc3/8
F-C500					Rc1/2

● For details of order codes and specifications, consult us.

Drain Valve Series

●For details of order codes and specifications, consult us.

Drain Valve Union Type (2-port, 3-port)
F-AVE1000～4000

Model	Operating temperature range °C [°F]		Operating pressure range MPa [psi.]	Orifice mm	Port size	
	Media	Atmosphere			Main	Operating port
F-AVE1000	5～40 [41～104]	5～40 [41～104]	0～0.02 [0～2.9]	25	25A	Rc1/8
F-AVE1500				30	32A	
				40	40A	
F-AVE2000				50	50A	
F-AVE2500				65	65A	
F-AVE3000				78	75A	
F-AVE4000				100	100A	

Body material: PVC, PP
O-ring material: FKM, EPDM, perfluorinated rubber. Other types of O-ring materials are also available upon request.
●For details of order codes and specifications, consult us.

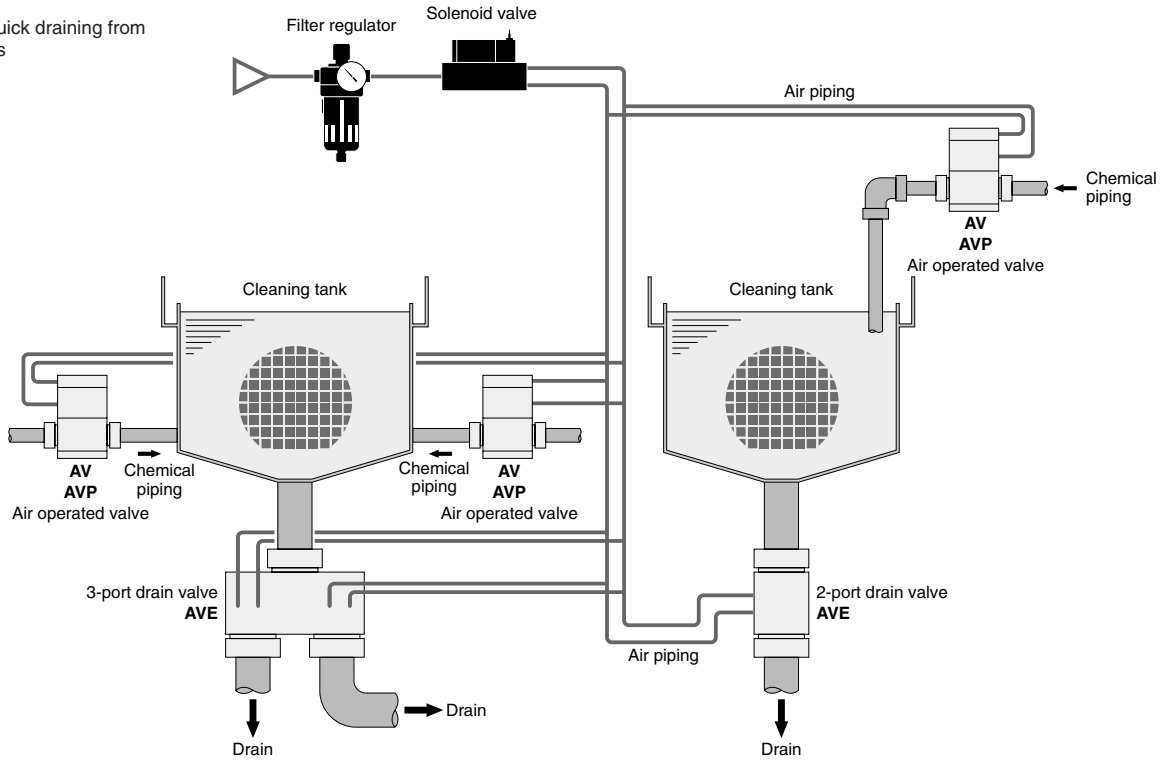
Drain Valve Flange Type (2-port)
F-AVE4000, 5000, 6000

Model	Operating temperature range °C [°F]		Operating pressure range MPa [psi.]	Orifice mm	Port size	
	Media	Atmosphere			Main	Operating port
F-AVE4000	5～40 [41～104]	5～40 [41～104]	0～0.02 [0～2.9]	100	100A	Rc1/8
F-AVE5000				125	125A	
F-AVE6000				150	150A	

Body material: PVC, PP
O-ring material: FKM, EPDM, perfluorinated rubber. Other types of O-ring materials are also available upon request.
●For details of order codes and specifications, consult us.

■Drain valve (2-port, 3-port) application example

Suitable for quick draining from cleaning tanks



Other Related Products

■PTFE Ejector

Suitable for suction of corrosive gases

■PTFE Needle Valve

Suitable for adjustment of flow rate from shut down to micro flow

■PTFE, PFA Lever Valves

Manual lever ensures easy opening and closing.

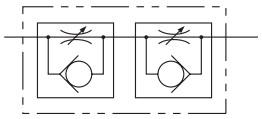
Speed Controller for Pilot Air Control

TSC-60W

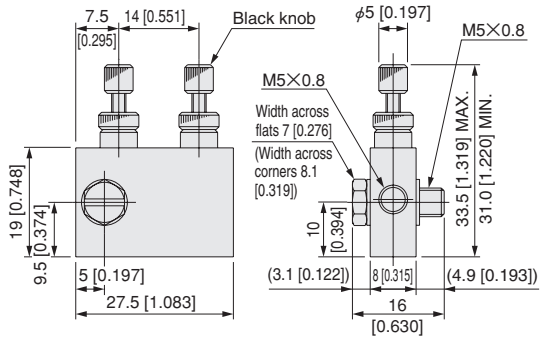
■Specifications

Item / Model		TSC-60W
Media		Air
Operating pressure range	MPa [psi.]	0～0.9 [0～131]
Operating temperature range	°C [°F]	5～60 [41～140]
Cracking pressure	MPa [psi.]	0.05 [7.3]
Description		Both directions adjustment speed controller
		Low flow rate type
		Special piping direction
		Black knob on one side

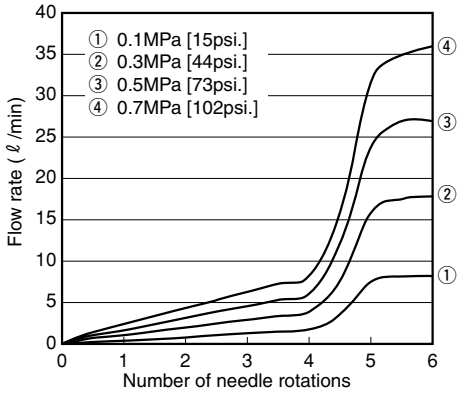
■Symbol



■Dimensions mm [in.]

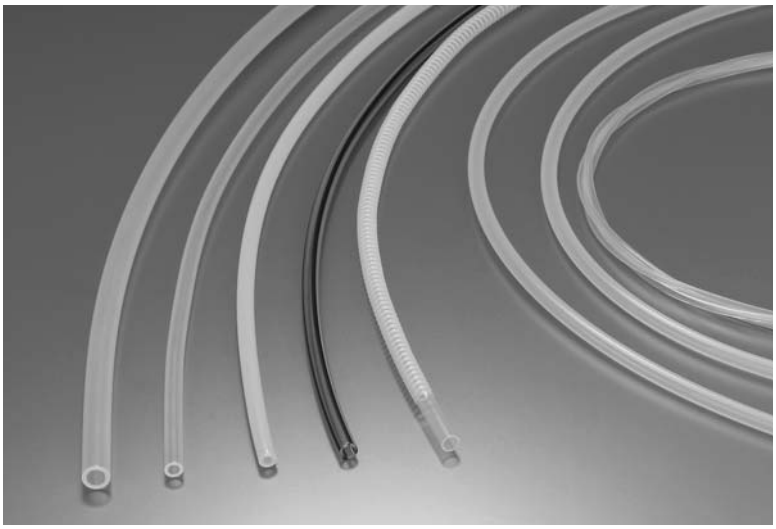


■Flow rate characteristics



1 ℓ /min = 0.0353ft.³/min.

Fluororesin Tube Series



Koganei uses our own independently developed advanced molding technology, in a clean environment, to manufacture all kinds of high-quality fluororesin tubes. These can be used in semiconductors, liquid crystals, and other areas in the electronics sector, in biotechnology, in the medical and food-products sector, in fine chemicals, and in other advanced sectors, as well as in petrochemicals, and in a wide range of general industrial applications.

※ Because it is impossible to cover all possible uses or operation environment conditions, features, applications, specifications, data, etc., are common standards which serve as a "Reference" in the catalog. Read and understand the tube series safety precautions on p.866 before use.

Caution: The fluororesin tube series cannot be used with quick fittings.

Fluororesin Tube Features and Application Examples (Reference)

Chemical resistance

Features

Withstands virtually all corrosive fluids available on the market, including strong acids, alkalis, and solvents.
(Exceptions include fused alkaline metals, high-temperature fluorine gas, etc.)

Applications

- Highly corrosive waste fluid line
- Protective sheathing for wiring

Operating temperature range

Features

Usable over a broad temperature range, from −40°～260°C [−40°～500°F] (PFA, PTFE).

Applications

- Acid and alkali cleaning lines in plating plants
- Steam transfer line
- Fuel transfer lines in aircraft, automobiles, etc.

※ For applications under −40°C [−40°F], consult us.

Non-tackiness (low friction)

Features

High level of non-tackiness means even highly viscous fluids flow virtually without sticking.

Applications

- Urethane foam chemical liquid transfer line
- Paint transfer line
- Transfer of sticky powders
- Transfer of adhesives or sticky substances
- Sheathing for pipes, rollers, etc.

Purity

Features

Contains no plasticizers or additives. In addition, it elutes extremely small amounts of impurities into the media.

Applications

- Transfer line for high-purity chemicals used in semiconductors
- Transfer of ultra-pure water
- Juice manufacturing processes
- Medical product and food-product manufacturing processes
- Transfer line for clean air
- Tubes for liquid and gas analyzers

Electrical insulation

Features

Exhibits excellent insulation properties, and is stable over a wide range of temperatures and frequencies.

Applications

- Tubes for electrical sheathing
- Cooling tubes for electrical equipment, power units, etc.
- Insulation for lead wires and heaters
- Insulation sheathing for wiring

Weather resistance

Features

Exhibits superior weather resistance, and does not degrade (deteriorate) over time.

Applications

- Applications in which tube replacement should be avoided
- Applications near coastlines subject to severe salt damage or ultraviolet radiation

⚠ Warning

This product is a fluororesin product. To maintain its performance and ensure safe use, strictly observe the following precautions:

1. Do not use for any purposes other than those listed in the catalog, etc.
2. Never use in contact with human tissue or body fluids, etc.
3. Never ingest (accidental swallowing, etc.) products into the human body.
4. Do not use at temperatures in excess of the maximum operating temperature specified in the catalog.
5. Processing at temperatures above the maximum operating temperature can generate cracked fluorine gases. For this reason, always provide sufficient ventilation, and take measures to avoid inhaling the cracked gas.
6. When discarding, use the processes detailed in the waste management and public cleaning law.
   Do not incinerate the discarded product. If, however, incineration must be performed, always do it at an incineration facility equipped with neutralizing agents and other suitable disposal equipment.

Precautions for Product Handling

To avoid deteriorating the performance of this product, read and understand the precautions listed below before use:

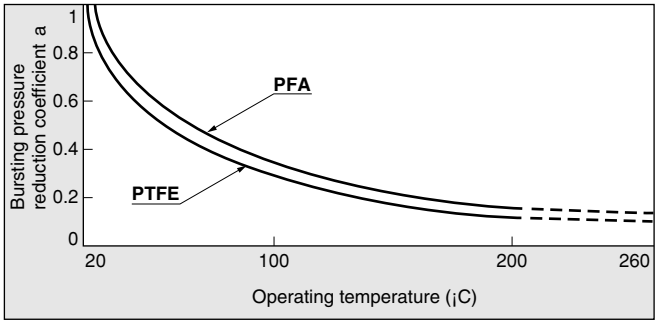
1. All technical data in this catalog (items expressing product capabilities) are values obtained in actual testing, or are reference values, and are not intended to be guaranteed values.
   Careful investigation of the planned usage is recommended before use.
2. Careful investigation is particularly necessary for fluids that are strongly acidic, alkaline, or toxic. For such uses, consult us.
3. Due to properties of the material, there is a risk of repeated loads, excessive concentrated loads, or bending loads, having an effect on durability. For such uses, perform careful investigation before use.
4. While self-lubrication is a property of fluororesins, abrasive action is also progressive.
   For application in locations where repeated wear occurs, periodic replacement of the product is recommended.
5. Due to fluororesin characteristics, the fluid can penetrate or permeate the material, depending on the operating environment.
   In addition, because of the risk of product hardening or changes in dimensions, perform careful investigation before use.
6. Some products can be manufactured at specifications not listed in this catalog. In these cases, the products are available within a certain reasonable range of cost and delivery deadlines.
7. If some detail is not clear in the above items or elsewhere, consult us.

Maximum Tube Operating Pressure (Reference)

■Use at or less than the $P_{U.T}$ pressure obtained in the below equation:

$$P_{U.T} = S \times a \times P_{R.T}$$

- $P_{U.T}$: ●Maximum operating pressure at operating temperature
- S: ●Safety factor (1/3 to 1/5)
  ※ Use a safety factor of 1/3 to 1/5, depending on the type of media (gas or liquid), degree of risk, and presence of impact pressure.
- a: ●Bursting pressure reduction coefficient
  ※ In the diagram at right, read the bursting pressure reduction coefficient for the operating temperature of the tube material.
- $P_{R.T}$: ●Tube bursting pressure at room temperature



F = 9/5C+32

Tube Size and Flow Rate (Reference)

■The relationship between the flow rate, flow velocity, and inner diameter of the tube is found as in the below equation:

$$\pi\left(\frac{\text{Tube inner diameter}}{2}\right)^2 [\text{cm}^2] = \frac{\text{Flow rate } [\text{cm}^3/\text{s}]}{\text{Flow velocity } [\text{cm/s}]}$$

$$\pi\left(\frac{\text{Tube inner diameter}}{2}\right)^2 [\text{in.}^2] = \frac{\text{Flow rate } [\text{in.}^3/\text{sec.}]}{\text{Flow velocity } [\text{in./sec.}]}$$

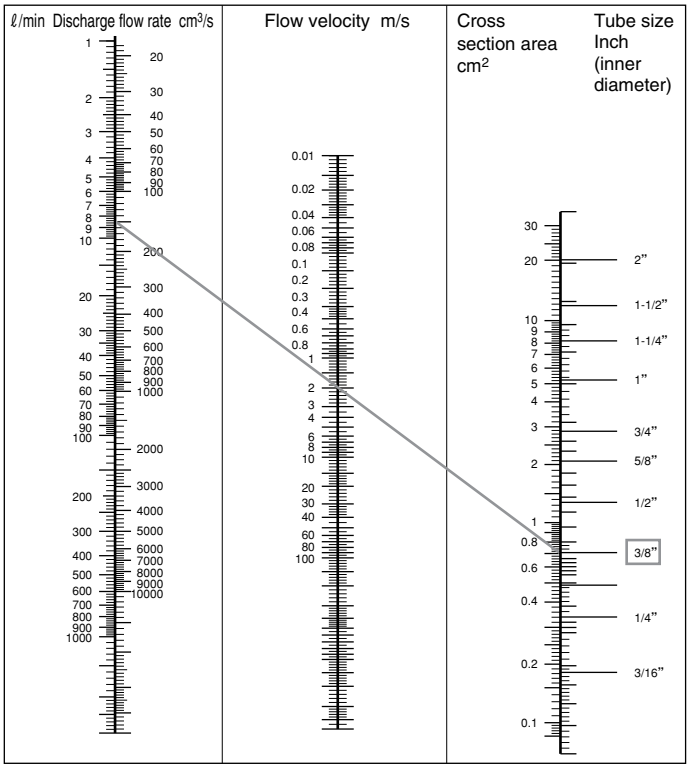
For a graphic expression of this relationship, a nomograph can be used to determine the relationship between the tube size and flow rate.

●How to determine the required tube size for pure water flowing at 150 cm^3/s, and a flow velocity of 2 m/s

On the left side of the graph, use a discharge flow rate point of 150 cm^3/s, and in the center, use the 2 m/s flow velocity point. Draw a straight line through those two points, and then beyond to the right side of the graph, to intersect with the point showing the tube size, or in this case, a tube inner diameter of 3/8".

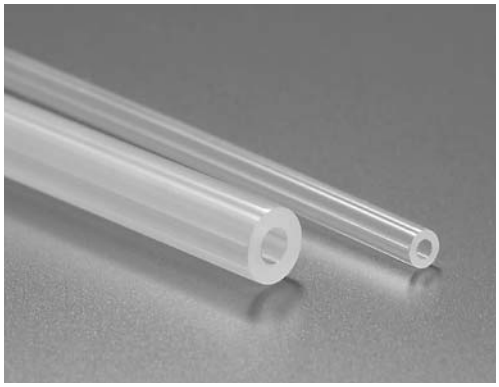
1ℓ/min = 0.0353ft^3/min.
1cm^3/s = 0.061$in.^3$/sec.
1m/s = 3.28ft./sec. = 39.37in./sec.
1cm^2 = 0.155$in.^2$

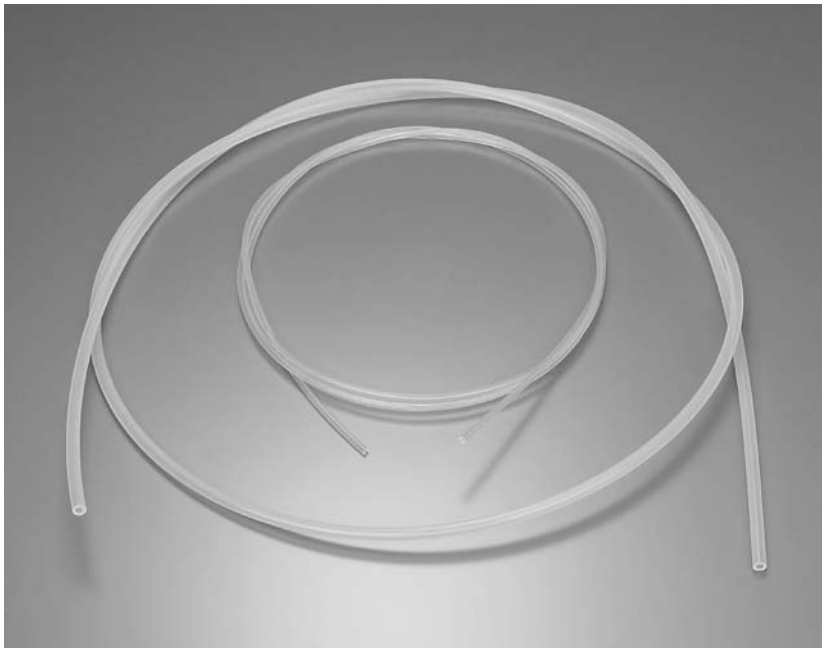
Nomograph



F-9003-PFA

The F-9003-PFA tubes employ PFA, the most superior material among the fluororesins, and are molded by melting resin extrusion molding.
With its superior chemical resistance, heat resistance, weather resistance, and electrical characteristics, it is the most suitable piping for all kinds of chemicals.





Features

- Chemically inert, it can withstand virtually any chemical products.
- With little fluid permeability, it is suitable for hoses for chlorine gas and other halogen gases.
- A combination of strength and flexibility ensures strong resistance to bending fatigue.
- Offers superior low wear and non-tackiness characteristics.
- Electrical characteristics are extremely stable.
- Superior weather resistance ensures long-term durability in outdoor applications.
- Excellent transparency allows monitoring of fluids inside.

Specifications (Reference)

- Maximum operating temperature: 260°C [500°F]
- Maximum operating pressure: See p.866, “Maximum Tube Operating Pressure.”

Applications

- Piping, etc., inside equipment capable of handling all kinds of chemicals, pure water, or ultra-pure water.

※ Manufacturing available in straight type (1m, 2m, and 3m lengths). Consult us.
※ Manufacturing also available in fluororesin PTFE. Consult us.

Order Codes

F - 9003 - PFA - 6×4 - 20

- **F** — **Series**
- **9003** — **Tube code**
- **PFA** — **Tube material** **PFA**: PFA
- **6×4** — **Tube size** (outer dia.×inner dia.)
- **20** — **Length** (See p.868, basic dimension.)

Caution: The fluororesin tube series cannot be used with quick fittings.

PFA Tubes Standard Dimensions/Bursting Pressure at Room Temperature and Minimum Bending Radius

mm size

Size [Note 1]		Outer diameter mm [in.]		Thickness mm [in.]		Length (m)		Bursting pressure at room temperature [Note 2] MPa [psi.]	Minimum bending radius [Note 2] mm [in.]
	Outer dia.×Inner dia.	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance		
	3× 2	3.0 [0.118]	±0.10 [±0.0039]	0.5 [0.020]	±0.06 [±0.0024]	10, 20, 50, 100, 200	+1% 0	5.7 [827]	15 [0.6]
	4× 2	4.0 [0.157]		1.0 [0.039]	±0.10 [±0.0039]			8.8 [1276]	15 [0.6]
	4× 3	4.0 [0.157]		0.5 [0.020]	±0.06 [±0.0024]			4.1 [595]	20 [0.8]
△	5× 3	5.0 [0.197]		1.0 [0.039]	±0.10 [±0.0039]			6.9 [1001]	20 [0.8]
△	5× 4	5.0 [0.197]		0.5 [0.020]	±0.06 [±0.0024]			3.2 [464]	25 [1.0]
	6× 4	6.0 [0.236]		1.0 [0.039]	±0.10 [±0.0039]			5.7 [827]	25 [1.0]
△	6× 5	6.0 [0.236]		0.5 [0.020]	±0.06 [±0.0024]			2.7 [392]	35 [1.4]
△	7× 5	7.0 [0.276]		1.0 [0.039]	±0.10 [±0.0039]	10, 20, 50, 100		4.8 [696]	40 [1.6]
△	7× 6	7.0 [0.276]		0.5 [0.020]	±0.06 [±0.0024]			2.2 [319]	50 [2.0]
	8× 6	8.0 [0.315]		1.0 [0.039]	±0.10 [±0.0039]			4.1 [595]	50 [2.0]
△	8× 7	8.0 [0.315]		0.5 [0.020]	±0.06 [±0.0024]			2.0 [290]	65 [2.6]
△	9× 7	9.0 [0.354]		1.0 [0.039]	±0.10 [±0.0039]			3.6 [522]	60 [2.4]
△	9× 8	9.0 [0.354]		0.5 [0.020]	±0.06 [±0.0024]			1.7 [247]	80 [3.1]
	10× 8	10.0 [0.394]		1.0 [0.039]	±0.10 [±0.0039]			3.2 [464]	80 [3.1]
△	10× 9	10.0 [0.394]		0.5 [0.020]	±0.06 [±0.0024]			1.5 [218]	105 [4.1]
△	11× 9	11.0 [0.433]		1.0 [0.039]	±0.10 [±0.0039]			2.9 [421]	100 [3.9]
	12×10	12.0 [0.472]		1.0 [0.039]	±0.10 [±0.0039]			2.7 [392]	130 [5.1]
△	12×11	12.0 [0.472]	±0.12 [±0.0047]	0.5 [0.020]	±0.06 [±0.0024]			1.4 [203]	170 [6.7]
△	13×10	13.0 [0.512]		1.5 [0.059]	±0.15 [±0.0059]			3.8 [551]	75 [3.0]
△	13×11	13.0 [0.512]		1.0 [0.039]	±0.10 [±0.0039]	10, 20, 50		2.4 [348]	155 [6.1]
△	14×12	14.0 [0.551]		1.0 [0.039]	±0.10 [±0.0039]			2.2 [319]	190 [7.5]
△	15×12	15.0 [0.591]		1.5 [0.059]	±0.15 [±0.0059]			3.2 [464]	105 [4.1]
△	15×13	15.0 [0.591]		1.0 [0.039]	±0.10 [±0.0039]			2.1 [305]	210 [8.3]
	16×13	16.0 [0.630]		1.5 [0.059]	±0.15 [±0.0059]			3.0 [435]	125 [4.9]
	16×14	16.0 [0.630]		1.0 [0.039]	±0.10 [±0.0039]			2.0 [290]	145 [5.7]
△	17×15	17.0 [0.669]		1.0 [0.039]	±0.10 [±0.0039]			1.8 [261]	290 [11.4]
△	18×15	18.0 [0.709]		1.5 [0.059]	±0.15 [±0.0059]			2.7 [392]	170 [6.7]
△	18×16	18.0 [0.709]		1.0 [0.039]	±0.10 [±0.0039]			1.7 [247]	340 [13.4]
	19×16	19.0 [0.748]		1.5 [0.059]	±0.15 [±0.0059]			2.5 [363]	200 [7.9]
	19×17	19.0 [0.748]		1.0 [0.039]	±0.10 [±0.0039]			1.6 [232]	400 [15.7]
△	21×18	21.0 [0.827]	±0.15 [±0.0059]	1.5 [0.059]	±0.15 [±0.0059]			2.2 [319]	250 [9.8]
△	22×19	22.0 [0.866]		1.5 [0.059]	±0.15 [±0.0059]			2.1 [305]	280 [11.0]
△	22×20	22.0 [0.866]		1.0 [0.039]	±0.10 [±0.0039]			1.4 [203]	560 [22.0]
	25×22	25.0 [0.984]		1.5 [0.059]	±0.15 [±0.0059]			1.9 [276]	370 [14.6]
	25×23	25.0 [0.984]		1.0 [0.039]	±0.10 [±0.0039]			1.3 [189]	740 [29.1]

Notes: 1. Sizes shown by the triangle mark △ cannot be used with **H** series fittings.
2. The above figures are reference values, not specified values.

10m = 32.8ft.

Inch size

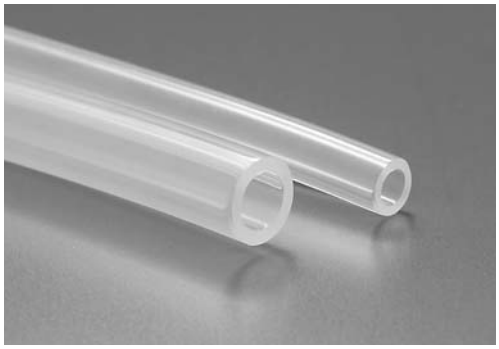
Size		Outer diameter mm [in.]		Thickness mm [in.]		Length (m)		Bursting pressure at room temperature [Note] MPa [psi.]	Minimum bending radius [Note] mm [in.]
	Outer dia.×Inner dia.	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance		
	3.17× 1.59	3.17 [0.1248]	±0.10 [±0.0039]	0.79 [0.0311]	±0.10 [±0.0039]	10, 20, 50, 100, 200	+1% 0	8.8 [1276]	15 [0.6]
	6.35× 3.17	6.35 [0.2500]		1.59 [0.0626]	±0.15 [±0.0059]			8.8 [1276]	20 [0.8]
	6.35× 3.96	6.35 [0.2500]		1.20 [0.0472]	±0.12 [±0.0047]			6.5 [943]	20 [0.8]
	6.35× 4.35	6.35 [0.2500]		1.00 [0.0394]	±0.10 [±0.0039]			5.3 [769]	30 [1.2]
	9.52× 6.35	9.52 [0.3748]	±0.12 [±0.0047]	1.59 [0.0626]	±0.15 [±0.0059]	10, 20, 50, 100		5.7 [827]	40 [1.6]
	9.52× 7.52	9.52 [0.3748]		1.00 [0.0394]	±0.10 [±0.0039]			3.4 [493]	70 [2.8]
	12.70× 9.52	12.70 [0.5000]		1.59 [0.0626]	±0.15 [±0.0059]			4.1 [595]	75 [3.0]
	12.70×10.70	12.70 [0.5000]		1.00 [0.0394]	±0.10 [±0.0039]			2.5 [363]	150 [5.9]
	19.05×15.88	19.05 [0.7500]		1.59 [0.0626]	±0.15 [±0.0059]	10, 20, 50		2.6 [377]	200 [7.9]
	25.40×22.22	25.40 [1.0000]	±0.15 [±0.0059]	1.59 [0.0626]	±0.15 [±0.0059]			2.0 [290]	370 [14.6]

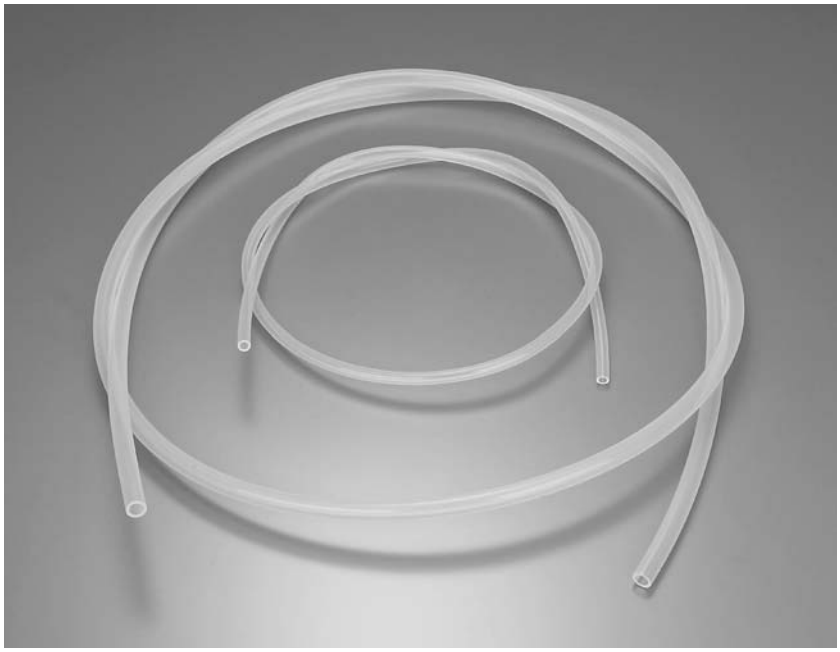
Note: The above figures are reference values, not specified values.

10m = 32.8ft.

F-9003-PFA-HG

The F-9003-PFA-HG tubes are PFA tubes that use a NEW PFA-type material with a low level of elution of fluorine ions, having a smooth tube internal surface obtained by controlling the high degree of polymerization (microcrystalline of spherulite) of PFA. Suitable for applications in the semiconductor and liquid crystal industrial sectors with demand for ultra-clean conditions.





Features

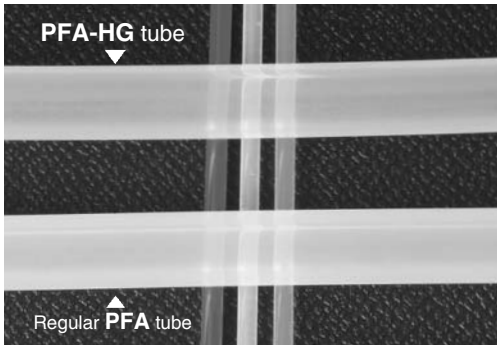
The following features are achieved in addition to the performance of conventional PFA tubes:

The tube interior surface is smooth (Rt = 0.2 μm).

- Reduced residual particulates and chemicals
- Reduced cleaning time
- Reduced chemical solution penetration volume, due to reduced tube internal surface area
- Improved transparency
- Improved dielectric strength

Uses **NEW PFA** type material.

- Reduced elution of fluorine ions
- Improved stress crack resistance in stressed environments (i.e., sulfuric acid hydrogen peroxide, fuming sulfuric acid, etc.)



※Photo shows transparency comparison between regular **PFA** tubes and **PFA-HG** tubes (comparison by Koganei).

Specifications (Reference)

- Maximum operating temperature: 260°C [500°F]
- Maximum operating pressure: Same as **PFA** tubes. See p.866, "Maximum Tube Operating Pressure."

Characteristics

Metal ion elution results

Item	Elution weight μg [n oz.]
K	＜0.02 [0.71]
Na	＜0.01 [0.35]
Ca	＜0.01 [0.35]
Al	＜0.02 [0.71]
Cr	＜0.01 [0.35]
Ni	＜0.01 [0.35]
FE	＜0.02 [0.71]
Cu	＜0.01 [0.35]

※ Analysis method:

1. Cut a sample **PFA-HG** tube (outer diameter ϕ 12 × inner diameter ϕ 10) 1m [3.28ft.] in length, clean the cut surface, and then wash with pure water.
2. Fill the sample tube with about 70mℓ [4.27in.^{3}] (tube length: 900mm [35.4in.]) of hydrofluoric acid, and perform an elution test at room temperature for six days.
3. After completion of the elution test, evaporate the elution solution, add nitric acid to the effluent, then reduce it with pure water, and make a determination of the elements included in the elution solution by frameless atomic absorption spectrophotometry.

※ The above figures are measurement values, not specified values.

Comparison of PFA tube internal surface roughness

	Unit	**PFA-HG** tube	Company A product	Company B product	**PFA** tube
Surface roughness (Rt)	(μm)	0.2	0.8	0.8	0.8

Note: ※ The above figures are measurement values, not specified values.
※ Rt=Rmax
※ The Company A and Company B products are conventional **PFA** tubes.

Fluorine ion elution results

	Unit	**PFA-HG** tube	Regular **PFA** tube
Elution concentration	(ppm)	1.6	4.2

※ Analysis method:

1. Cut up a tube (outer diameter ϕ 25.4 × inner diameter ϕ 22.2) into pellets.
2. Soak the tube test sample in 20mℓ [1.22in.^{3}] extract. Leave at room temperature for 24 hours, and then use fluororine ion measurement equipment (Expandable Ion Analyzer EA940, made by Orion Research) to measure the fluorine ion concentration (contents ratio of the extract: water, methanol, TISAB (II) = 1:1:2).

PFA-HG Tubes Standard Dimensions/Bursting Pressure at Room Temperature and Minimum Bending Radius

mm size

Size	Outer diameter mm [in.]		Thickness mm [in.]		Length (m)		Bursting pressure at room temperature[Note] MPa [psi.]	Minimum bending radius[Note] mm [in.]
Outer dia.×Inner dia.	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance		
3× 2	3.0 [0.118]	±0.10 [±0.0039]	0.5 [0.020]	±0.06 [±0.0024]	10, 20, 50, 100, 200	+1% 0	5.7 [827]	15 [0.6]
4× 2	4.0 [0.157]		1.0 [0.039]	±0.10 [±0.0039]			8.8 [1276]	15 [0.6]
4× 3	4.0 [0.157]		0.5 [0.020]	±0.06 [±0.0024]			4.1 [595]	20 [0.8]
6× 4	6.0 [0.236]		1.0 [0.039]	±0.10 [±0.0039]			5.7 [827]	25 [1.0]
8× 6	8.0 [0.315]		1.0 [0.039]	±0.10 [±0.0039]	10, 20, 50, 100		4.1 [595]	50 [2.0]
10× 8	10.0 [0.394]		1.0 [0.039]	±0.10 [±0.0039]			3.2 [464]	80 [3.1]
12×10	12.0 [0.472]		1.0 [0.039]	±0.10 [±0.0039]			2.7 [392]	130 [5.1]
19×16	19.0 [0.748]	±0.12 [±0.0047]	1.5 [0.059]	±0.15 [±0.0059]	10, 20, 50		2.5 [363]	200 [7.9]
25×22	25.0 [0.984]	±0.15 [±0.0059]	1.5 [0.059]	±0.15 [±0.0059]			1.9 [276]	370 [14.6]

Note: The above figures are reference values, not specified values. 10m = 32.8ft.

Inch size

Size	Outer diameter mm [in.]		Thickness mm [in.]		Length (m)		Bursting pressure at room temperature[Note] MPa [psi.]	Minimum bending radius[Note] mm [in.]
Outer dia.×Inner dia.	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance		
3.17× 2.17	3.17 [0.1248]	±0.10 [±0.0039]	0.50 [0.0197]	±0.06 [±0.0024]	10, 20, 50, 100, 200	+1% 0	5.3 [769]	15 [0.6]
6.35× 3.96	6.35 [0.2500]		1.20 [0.0472]	±0.12 [±0.0047]			6.5 [943]	20 [0.8]
6.35× 4.35	6.35 [0.2500]		1.00 [0.0394]	±0.10 [±0.0039]			5.3 [769]	30 [1.2]
9.52× 6.35	9.52 [0.3748]	±0.12 [±0.0047]	1.59 [0.0626]	±0.15 [±0.0059]			5.7 [827]	40 [1.6]
9.52× 7.52	9.52 [0.3748]		1.00 [0.0394]	±0.10 [±0.0039]	10, 20, 50, 100		3.4 [493]	70 [2.8]
12.70× 9.52	12.70 [0.5000]		1.59 [0.0626]	±0.15 [±0.0059]			4.1 [595]	75 [3.0]
19.05×15.88	19.05 [0.7500]		1.59 [0.0626]	±0.15 [±0.0059]	10, 20, 50		2.6 [377]	200 [7.9]
25.40×22.22	25.40 [1.0000]	±0.15 [±0.0059]	1.59 [0.0626]	±0.15 [±0.0059]			2.0 [290]	370 [14.6]

Note: The above figures are reference values, not specified values. 10m = 32.8ft.

Order Codes

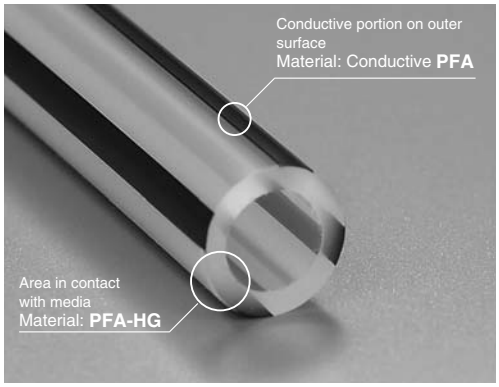
F - **9003** - **PFA** - **HG** - **6×4** - **20**

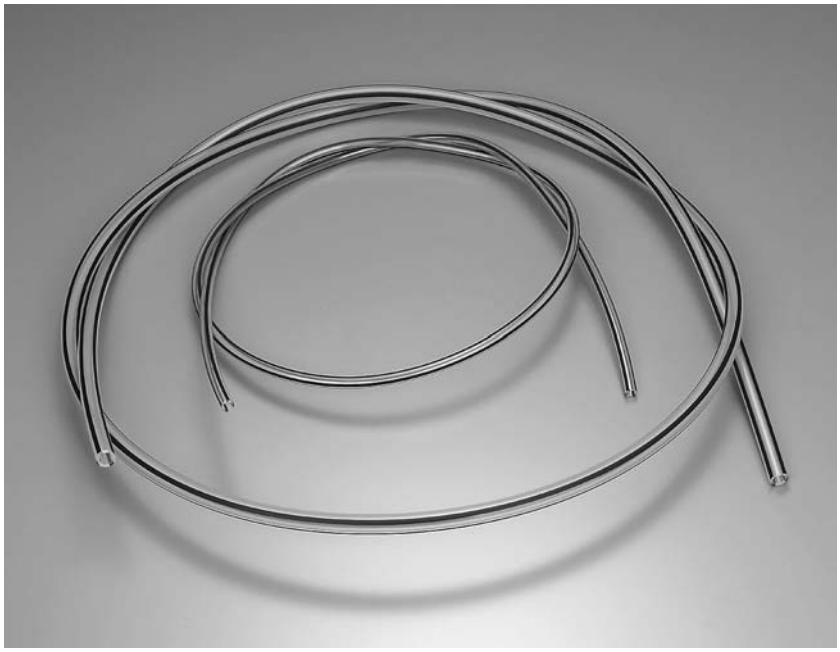
- **F**: **Series**
- **9003**: **Tube code**
- **PFA**: **Tube material**
- **HG**: **Tube type**
- **6×4**: **Tube size** (outer dia.×inner dia.)
- **20**: **Length** (See the above basic dimension.)

Caution: The fluororesin tube series cannot be used with quick fittings.

F-9003-PFA-NE

The F-9003-NE tubes incorporate striped conductive PFA areas onto the outer surface of Koganei's PFA-HG tubes.
The shielding effect of the conductive PFA is suitable for the prevention of accidental fires that could occur when flammable gas atmospheres spark fire onto the outer surface of the tubes.





Features

- Prevents sparks that could lead to fire risk.
- Prevents breakage of tube insulation due to electrical discharges from insulated atmosphere.
- No concerns about corrosion compared to metallic wires or meshes, etc.

Specifications (Reference)

- Maximum operating temperature: 200°C [392°F]
- Maximum operating pressure: Same as **PFA** tubes. See p.866, "Maximum Tube Operating Pressure."

Characteristics

Volume resistivity

Materials	Volume resistivity (Ω—cm [Ω—in.]
Conductive **PFA**	5.3×10^{2} [2.09×10^{2}]
PFA-HG	$>10^{18}$ [3.94×10^{17}]

- Sample: ϕ6.35×ϕ4.35
- Measurement method: Conforms to JIS K 7194.

Static charges removal characteristics Unit: KV

Tube type	1m [3.3ft.] length tube: center	15m [49.2ft.] length tube: center	15m [49.2ft.] length tube: end
PFA-NE tube	0.5～0.7	0.5～0.7	0.5～0.7
PFA-HG tube	>2.0 (Measurement limit)	—	—

- Sample: ϕ6.35×ϕ4.35, Lengths: 1m [3.3ft.], 15m [49.2ft.]
- Measurement method: Ground one end, and rub across 20cm [7.9in.] in the center or opposite end of the sample with non-fiber paper 50 times, and then measure the surface potential of that section.
- According to the "Static Electricity Safety Guidelines" (issued by the Technology Institution of Industrial Safety), as a control index for static charges in non-conductors for prevention of explosions and fires, the static potential is regulated at 5KV or less when the minimum ignition energy of a flammable substance is at 0.1 to 1.0mJ range (equivalent to toluene or other solvents).

Order Codes

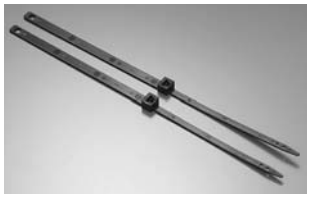
F - **9003** - **PFA** - **NE** - **6×4** - **10**

- **F**: Series
- **9003**: Tube code
- **PFA**: Tube material
- **NE**: Tube type
- **6×4**: Tube size (outer dia.×inner dia.)
- **10**: Length (See p.872, basic dimension.)

Caution: The fluororesin tube series cannot be used with quick fittings.

Precautions for Use

- **The F-9003-NE is a tube that requires grounding. Always ensure tubes are grounded when in use. For grounding, Koganei's dedicated conductive Ground Strap is available.**



Ground Strap
Order code: **F-9021**
Sales unit: one bag (100 pcs.)

PFA-NE Tubes Standard Dimensions/Bursting Pressure at Room Temperature and Minimum Bending Radius

mm size

Size	Outer diameter mm [in.]		Thickness mm [in.]		Conductive portion thickness mm [in.]		Conductive portion width mm [in.]		Number of stripes	Length (m)		Bursting pressure at room temperature[Note] MPa [psi.]	Minimum bending radius[Note] mm [in.]
Outer dia.× Inner dia.	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance		Basic dimension	Tolerance		
3× 2	3.0 [0.118]	+0.15 −0.10 [+0.0059 −0.0039]	0.50 [0.0197]	±0.07 [±0.0028]	0.03 [0.0012]	+0.04 −0.01 [+0.0016 −0.0004]	0.6 [0.024]	±0.3 [±0.012]	4	10 50 100	+1% 0	5.7 [827]	15 [0.6]
4× 2	4.0 [0.157]		1.00 [0.0394]	±0.07 [±0.0028]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	0.8 [0.031]	±0.3 [±0.012]				8.8 [1276]	15 [0.6]
4× 3	4.0 [0.157]		0.50 [0.0197]	±0.07 [±0.0028]	0.03 [0.0012]	+0.04 −0.01 [+0.0016 −0.0004]	0.8 [0.031]	±0.3 [±0.012]				4.1 [595]	20 [0.8]
6× 4	6.0 [0.236]		1.00 [0.0394]	±0.07 [±0.0028]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	1.4 [0.055]	±0.4 [±0.016]				5.7 [827]	25 [1.0]
8× 6	8.0 [0.315]		1.00 [0.0394]	±0.07 [±0.0028]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	1.8 [0.071]	±0.4 [±0.016]				4.1 [595]	50 [2.0]
10× 8	10.0 [0.394]		1.00 [0.0394]	±0.07 [±0.0028]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	2.3 [0.091]	±0.4 [±0.016]				3.2 [464]	80 [3.1]
12×10	12.0 [0.472]	+0.25 −0.10 [+0.0098 −0.0039]	1.00 [0.0394]	±0.07 [±0.0028]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	2.6 [0.102]	±0.6 [±0.024]	8	10 50		2.7 [392]	130 [5.1]
19×16	19.0 [0.748]		1.50 [0.0591]	±0.12 [±0.0047]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	3.8 [0.150]	±0.8 [±0.031]				2.5 [363]	200 [7.9]
25×22	25.0 [0.984]		1.50 [0.0591]	±0.12 [±0.0047]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	4.9 [0.193]	±0.8 [±0.031]				1.9 [276]	370 [14.6]

Note: The above figures are reference values, not specified values.

10m = 32.8ft.

Inch size

Size	Outer diameter mm [in.]		Thickness mm [in.]		Conductive portion thickness mm [in.]		Conductive portion width mm [in.]		Number of stripes	Length (m)		Bursting pressure at room temperature[Note] MPa [psi.]	Minimum bending radius[Note] mm [in.]
Outer dia.× Inner dia.	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance		Basic dimension	Tolerance		
3.17× 2.17	3.17 [0.1248]	+0.15 −0.10 [+0.0059 −0.0039]	0.50 [0.0197]	±0.07 [±0.0028]	0.03 [0.0012]	+0.04 −0.01 [+0.0016 −0.0004]	0.8 [0.031]	±0.3 [±0.012]	4	10 50 100	+1% 0	5.3 [769]	15 [0.6]
6.35× 4.35	6.35 [0.2500]		1.00 [0.0394]	±0.07 [±0.0028]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	1.5 [0.059]	±0.4 [±0.016]				5.3 [769]	30 [1.2]
9.52× 6.35	9.52 [0.3748]		1.59 [0.0626]	±0.12 [±0.0047]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	2.4 [0.094]	±0.4 [±0.016]				5.7 [827]	40 [1.6]
9.52× 7.52	9.52 [0.3748]		1.00 [0.0394]	±0.07 [±0.0028]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	2.2 [0.087]	±0.4 [±0.016]				3.4 [493]	70 [2.8]
12.70× 9.52	12.70 [0.5000]	+0.25 −0.10 [+0.0098 −0.0039]	1.59 [0.0626]	±0.12 [±0.0047]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	2.6 [0.102]	±0.6 [±0.024]	8	10 50		4.1 [595]	75 [3.0]
19.05×15.88	19.05 [0.7500]		1.59 [0.0626]	±0.12 [±0.0047]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	3.8 [0.150]	±0.8 [±0.031]				2.6 [377]	200 [7.9]
25.40×22.22	25.40 [1.0000]		1.59 [0.0626]	±0.12 [±0.0047]	0.06 [0.0024]	+0.06 −0.03 [+0.0024 −0.0012]	4.9 [0.193]	±0.8 [±0.031]				2.0 [290]	370 [14.6]

Note: The above figures are reference values, not specified values.

10m = 32.8ft.

F-9021 Ground Strap Handling Instructions

1. Product

- The Ground Strap is a tie strap for **PFA-NE** tubing, providing heat and chemical resistance due to employment of polypropylene, and also providing the anti-static charge function.
- Can be used to bundle **PFA-NE** tubes up to an outer diameter of ϕ19.05(3/4B size). It enables removal of static charges on the outer surfaces of the tubes by grounding.

2. Specifications

- Size: 6W × 195L (Bundling portion length: 88L, Hole for M3 grounding screw: ϕ3.5 × 1 place)
- Material: Polypropylene with carbon
- Operating temperature range: −40°~85°C [−40°~185°F]
- Chemical resistance: Acid: good, Alkaline: excellent, Organic solvent: good
- Volume resistivity (material): $10^3\Omega \cdot cm$
- Surface resistivity (material): $10^{4\sim5}\Omega \cdot cm$
- Applicable tube sizes: Up to ϕ19.05 (3/4B size)

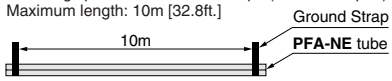
3. Product inspections and checks

When the product is delivered, check the following items:

- Quantity and outward appearance (Molding failure: mottles, sink, burning, deformation)
- Can tubes be smoothly inserted and secured while tying tubes? If you find a smaller quantity and/or damage to the product, immediately contact us.

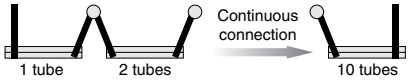
4. Mounting span of the Ground Straps

- Mounting span of the Ground Straps (maximum span) Maximum length: 10m [32.8ft.]



- Number of Ground Straps that can be overlaid for grounding: Maximum of 10 pcs.

- Number of tubes that can be bundled together when connecting several tubes tied by Ground Straps for grounding: Maximum of 10 pcs.

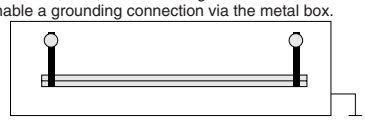


Note: The mounting span of the Ground Straps, which is based on the Static Electricity Safety Guidelines (Ministry of Labour, Research Institute of Industrial Safety), uses a leakage resistance of 100MΩ or less as the basis for restricting the surface electrical potential of major flammable materials to the minimum ignition energy or less.

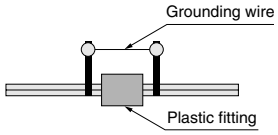
5. Mounting method

Use a ϕ3.5 [0.138in.] hole for M3 screws to install as shown below:

- Use a M3 screw to directly secure the Ground Strap to a metal box, etc., or attach a ground lead to the box to enable a grounding connection via the metal box.



- When using insulation type plastic fittings, use Ground Straps with ϕ3.5 [0.138in.] holes to connect two Ground Straps placed on both sides of the fitting with a grounding wire. When using metallic fittings, a Ground Strap is not required, since grounding can be performed directly from the metal fitting.

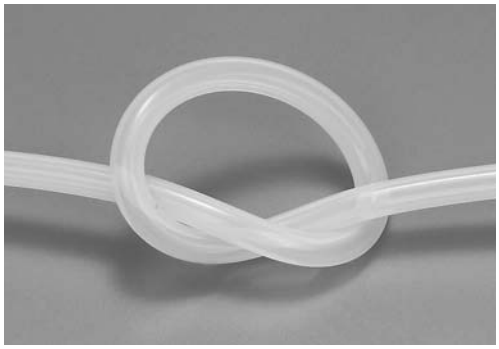


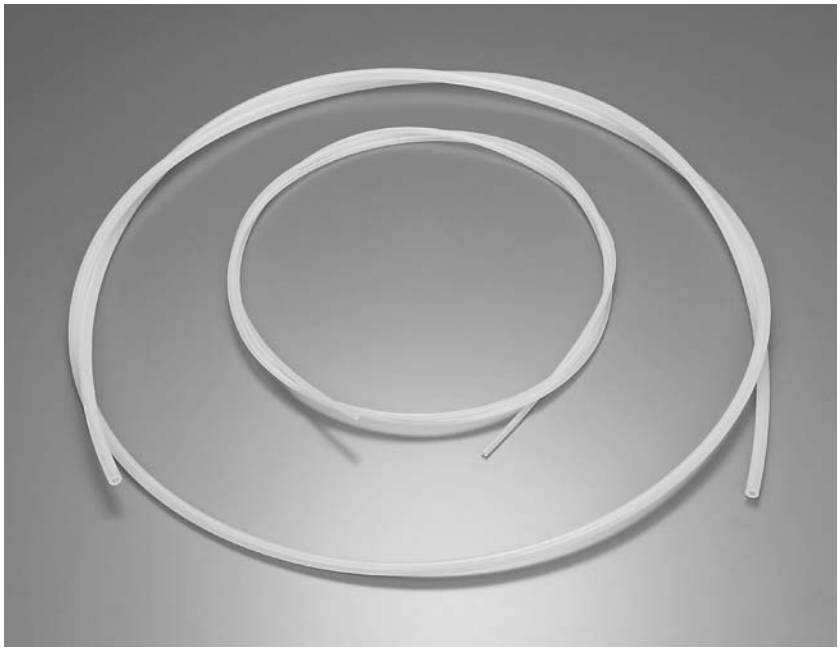
6. Precautions for safety use

- After attaching the Ground Strap, check that there is no looseness.
- After the Ground Strap has been grounded, use a volt-ohm-milliammeter, etc., to check for proper grounding with leakage resistance of 100MΩ or less.
- If the leakage resistance is not adequate even after the Ground Strap has been grounded, wrap the **PFA-NE** tube with conductive tape (aluminum tape, etc.), and then tie the tubes with the Ground Strap.
- In the cases in which Ground Strap chemical resistance is suspected because of spattering chemicals, soaking in chemicals, etc., it is recommended that a detailed investigation into the planned application be performed beforehand.

F-9003-BT

The F-9003-BT fluororesin BT tubes are a thick type of fluororesin PTFE tube with superior flexibility and transparency. With a small bending radius that prevents buckling or crushing, this tube is convenient for piping in tight spaces, while its thickness and transparency ensure safety and check monitoring on interior flows.





Features

- A small bending radius prevents buckling or crushing even if sharply bent.
- Allows checks on interior media flows.
- Resists virtually all chemical products.
- Superior non-tackiness makes cleaning easy.

Specifications (Reference)

- Maximum operating temperature: 260°C [500°F]
- Maximum operating pressure: See p.866, “Maximum Tube Operating Pressure.”

F-9003-BT Tubes Standard Dimensions/Bursting Pressure at Room Temperature and Minimum Bending Radius

mm size

Size	Outer diameter mm	Inner diameter mm	Outer diameter mm [in.]		Thickness mm [in.]		Length (m)		Bursting pressure at room temperature[Note] MPa [psi.]	Minimum bending radius[Note] mm [in.]
			Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance		
4A	4	2	4 [0.157]	±0.10 [±0.0039]	1.0 [0.039]	±0.10 [±0.0039]	10 20 30	+2% 0	11.8 [1711]	10 [0.4]
6A	6	3	6 [0.236]		1.5 [0.059]	±0.15 [±0.0059]			11.8 [1711]	10 [0.4]
8A	8	5	8 [0.315]		1.5 [0.059]				7.4 [1073]	25 [1.0]
10A	10	7	10 [0.394]		1.5 [0.059]				5.0 [725]	40 [1.6]
12A	12	9	12 [0.412]	±0.15 [±0.0059]	1.5 [0.059]				3.9 [566]	55 [2.2]

Note: The above figures are reference values, not specified values. 10m = 32.8ft.

Inch size

Size	Outer diameter mm	Inner diameter mm	Outer diameter mm [in.]		Thickness mm [in.]		Length (m)		Bursting pressure at room temperature[Note] MPa [psi.]	Minimum bending radius[Note] mm [in.]
			Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance		
1/8B	3.17	1.59	3.17 [0.1248]	±0.10 [±0.0039]	0.79 [0.0311]	±0.10 [±0.0039]	10 20 30	+2% 0	11.7 [1697]	5 [0.2]
1/4B	6.35	3.17	6.35 [0.2500]		1.59 [0.0626]	±0.15 [±0.0059]			9.8 [1421]	10 [0.4]
3/8B	9.52	6.35	9.52 [0.3748]		1.59 [0.0626]				3.0 [435]	30 [1.2]
1/2B	12.70	9.52	12.70 [0.5000]	±0.15 [±0.0059]	1.59 [0.0626]				4.0 [580]	55 [2.2]

Note: The above figures are reference values, not specified values. 10m = 32.8ft.

Order Codes

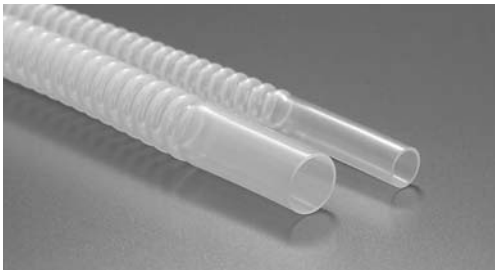
F - **9003** - **BT** - **6A** - **10**

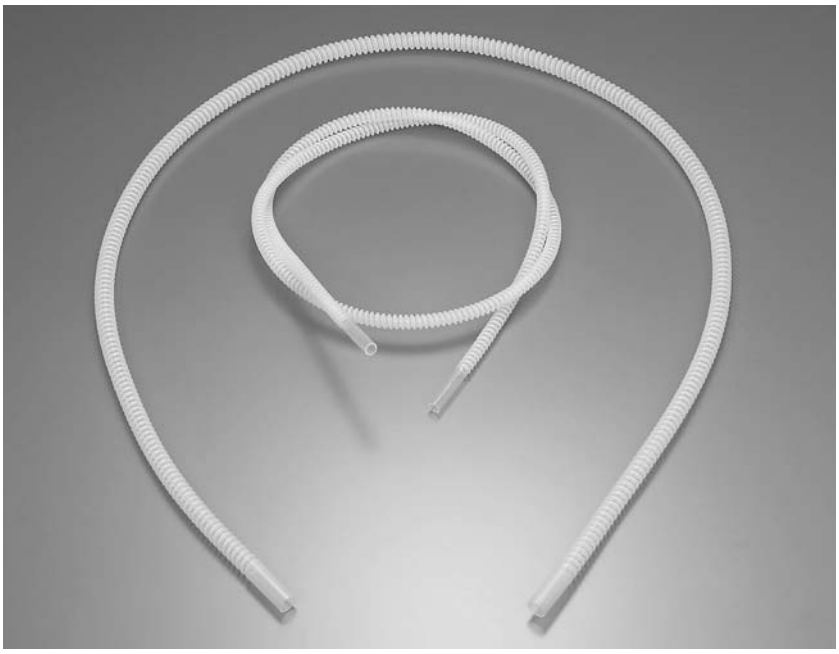
- **F** — Series
- **9003** — Tube code
- **BT** — Tube type
- **6A** — Tube size
- **10** — **Length** (See above basic dimension.)

Caution: The fluororesin tube series cannot be used with quick fittings.

F-9003-RPL

The F-9003-RPL tubes are PTFE tubes equipped with a helical groove. Endowed with extreme flexibility, they offer a small bending radius, as well as excellent low friction and non-tackiness. The result is a tube with low fluid pressure loss, and a low chance for fluid adherence to the inner surface of the tube.
In addition, the tube's resistance to bending fatigue has been improved greatly over the properties of the F-9003-PL conventional pliable tube.





Features

●Resistance to bending fatigue

Specifications (Reference)

● Material: PTFE
● Maximum operating temperature: See the table at the bottom of this page.
● Maximum operating pressure: See the table at the bottom of this page.

F-9003-RPL Tubes Standard Dimensions/Bursting Pressure at Room Temperature and Minimum Bending Radius

Inner diameter basis tube (I)

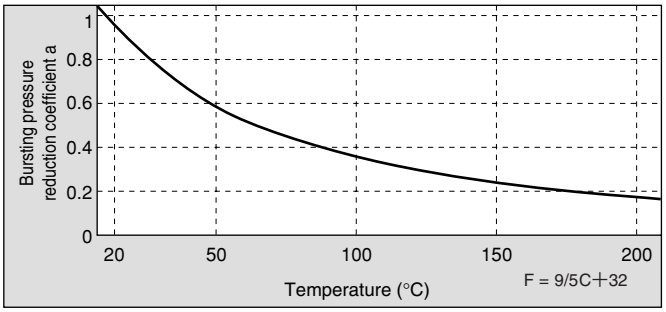
Size	Inner diameter at end mm [in.]	Helical outer dia. mm [in.]	Bursting pressure at room temperature MPa [psi.]	Minimum bending radius mm [in.]	Available length m [ft.]
6A	6 [0.236]	8.5 [0.335]	1.8 [261]	6.0 [0.24]	3.0 [9.8]
8A	8 [0.315]	10.5 [0.413]	1.4 [203]	7.0 [0.28]	3.0 [9.8]
10A	10 [0.394]	13.0 [0.512]	1.0 [145]	10.0 [0.39]	3.0 [9.8]
12A	12 [0.472]	16.0 [0.630]	0.9 [131]	15.0 [0.59]	3.0 [9.8]
1/4B	6.4 [0.252]	8.5 [0.335]	1.8 [261]	6.0 [0.24]	3.0 [9.8]
3/8B	9.5 [0.374]	13.0 [0.512]	1.0 [145]	10.0 [0.39]	3.0 [9.8]
1/2B	12.7 [0.500]	16.0 [0.630]	0.9 [131]	15.0 [0.59]	3.0 [9.8]

Outer diameter basis tube (O)

Size	Inner diameter at end mm [in.]	Helical outer dia. mm [in.]	Bursting pressure at room temperature MPa [psi.]	Minimum bending radius mm [in.]	Available length m [ft.]
6A	6 [0.236]	8.5 [0.335]	1.8 [261]	6.0 [0.24]	3.0 [9.8]
8A	8 [0.315]	9.5 [0.374]	1.6 [232]	7.0 [0.28]	3.0 [9.8]
10A	10 [0.394]	12.0 [0.472]	1.3 [189]	9.0 [0.35]	3.0 [9.8]
12A	12 [0.472]	14.5 [0.571]	1.0 [145]	10.0 [0.39]	3.0 [9.8]
1/4B	6.4 [0.252]	8.5 [0.335]	1.8 [261]	6.0 [0.24]	3.0 [9.8]
3/8B	9.5 [0.374]	12.0 [0.472]	1.3 [189]	9.0 [0.35]	3.0 [9.8]
1/2B	12.7 [0.500]	14.5 [0.571]	1.0 [145]	10.0 [0.39]	3.0 [9.8]

※ The dimensions shown above are standard values. For items with lengths of 3m [9.8ft.] or more, consult us separately.
※ The above figures are measurement values, not specified values.

Maximum Tube Operating Pressure (Reference)



Use the product at pressures at or below the $P_{U.T}$ determined in the below equation:

$$P_{U.T} = S \times a \times P_{R.T}$$

● **S** : Safety factor (take safety factor of 1/3 to 1/5 or more.)
● **a** : Bursting pressure reduction coefficient for the operating temperature, read from the graph at left
● $P_{R.T}$: Tube bursting pressure at room temperature

Caution: Set the operating temperature upper limit at 200°C [392°F].
This is a design data based on actual test values, and is not intended to be guaranteed values.
Use this data as reference data when selecting a product. For determination of actual use, careful evaluation is recommended before use.

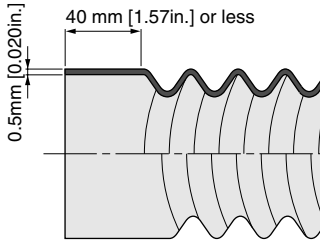
Tube Types

Depending on an application, there are two types of end dimensions available, the inner diameter basis (I) and the outer diameter basis (O).

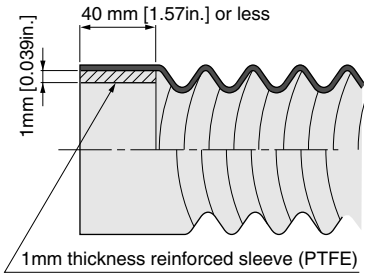
Inner diameter basis tube (I)
Use this type when inserting pipes, etc., inside the tube to form joints. Glass, metal, or plastic pipes can be used as joints.

Outer diameter basis tube (O)
Use this type when using tube fittings, etc. The shape of the end is available in three different types, depending on applications. When using the fluororesin tube fitting, use types B or C.

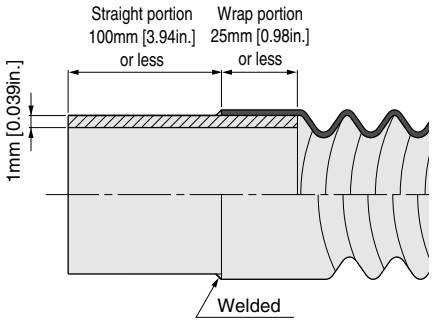
●Type A straight on both ends



●Type B with reinforced sleeves on both ends



●Type C with welded straight portions on both ends



Order Codes

F - 9003 - RPL - O - 1/4B - 3000 - C - 25 - S100

Series

Tube code

Tube type
RPL: pliable tube

Inner/outer diameter basis for straight portion
O: Outer diameter basis
I: Inner diameter basis
(selection for Type A only)

Tube size

Size	Dia. at end mm [in.]
6A	6 [0.236]
8A	18 [0.315]
10A	10 [0.394]
12A	12 [0.472]
1/4B	6.4 [0.252]
3/8B	9.5 [0.374]
1/2B	12.7 [0.500]

Overall length
100: 100mm [3.94in.]
⟆ ⟆
3000: 3000mm [118.1in.]
(Units in 10mm increments up to 500mm, and in 100mm increments above 500mm)

Straight portion type
A: Type A (straight on both ends)
B: Type B (with reinforced sleeves on both ends)
C: Type C (with welded straight portions on both ends)

Straight portion length (Types A and B)
10: 10mm [0.39in.]
⟆ ⟆
40: 40mm [1.57in.]
(Unit: 5mm)

Wrap portion length (Type C)
10: 10mm [0.39in.]
⟆ ⟆
25: 25mm [0.98in.]
(Unit: 5mm)

Type C straight portion length
S10: 10mm [0.39in.]
⟆ ⟆
S100: 100mm [3.94in.]
(5mm units, selection for Type C only.
Enter the code "S" before the length.)

Caution: The fluororesin tube series cannot be used with quick fittings.