Process Pump

RoHS

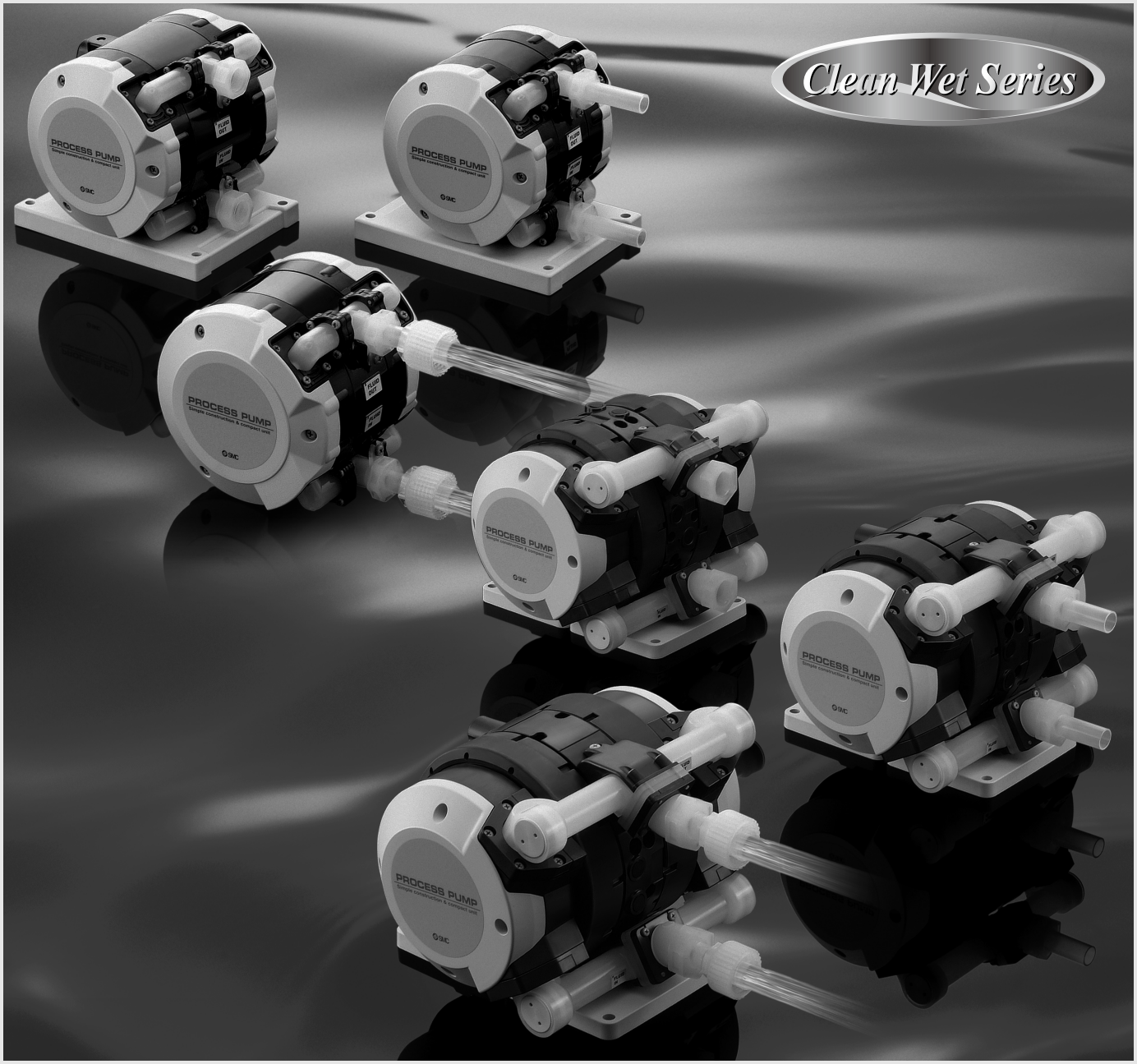
PAF3000 Series/PAF5000 Series

100% **fluoropolymer** pump (wetted part)

The excellent corrosion resistance is achieved due to the **new PFA** wetted material construction.

PPS/PFA dual construction, withstand pressure and heat cycle performance have been improved.

- **PAF3000 Series: Non-metal exterior** (Resin-coated stainless steel is used for some non-wetted parts.)
- **PAF5000 Series: No metallic parts are used.** (Metal-free)



- **Max. flow rate: 45 L/min (Automatically operated) (PAF5000 series)**
- **Fitting type: Female thread/Tube extension/With nut (Insert bushing type, Flare type)**

The excellent corrosion resistance is achieved due

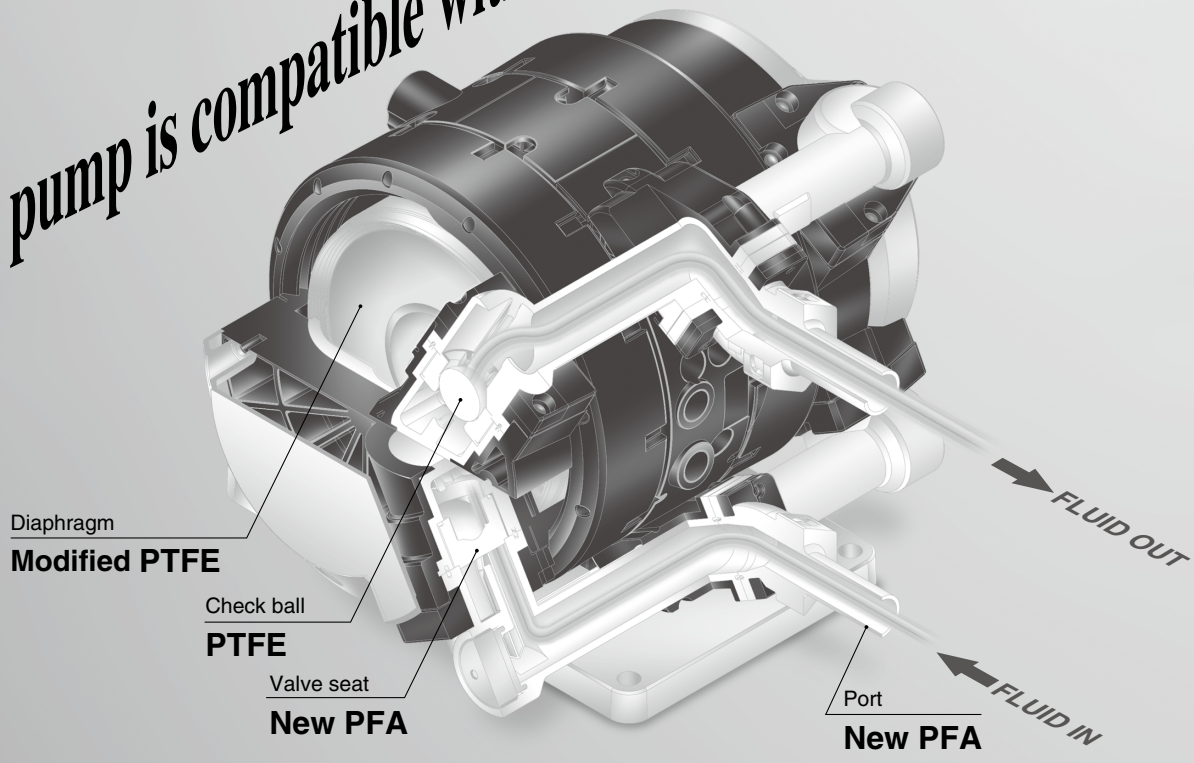
Body material

Diaphragm/Seal material

New PFA PTFE

Excellent corrosion resistance

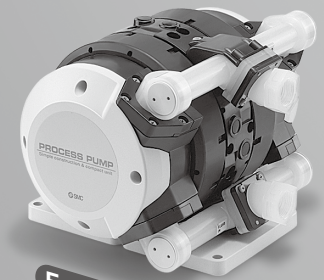
One pump is compatible with various fluids.

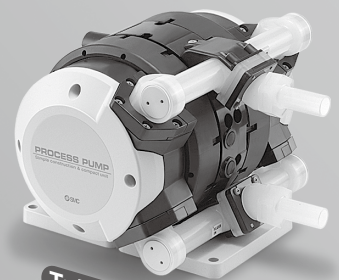


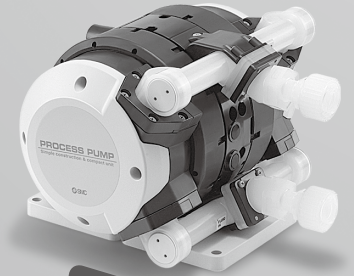
Variation

Model		Body material	Diaphragm material	Discharge flow rate (L/min)	Fitting type	Option
Automatically operated	PAF3410	New PFA	Modified PTFE	1 to 20	Female thread Tube extension With nut	• Foot Note 1) • Silencer Note 2)
	PAF5410			5 to 45		
Air operated	PAF3413			1 to 15		
	PAF5413			5 to 38		

Note 1) Equipped with the PAF5000 series as standard equipment. Note 2) Automatically operated only.







to the new PFA wetted material construction!

Light weight and Compact

Weight: 1.3 kg

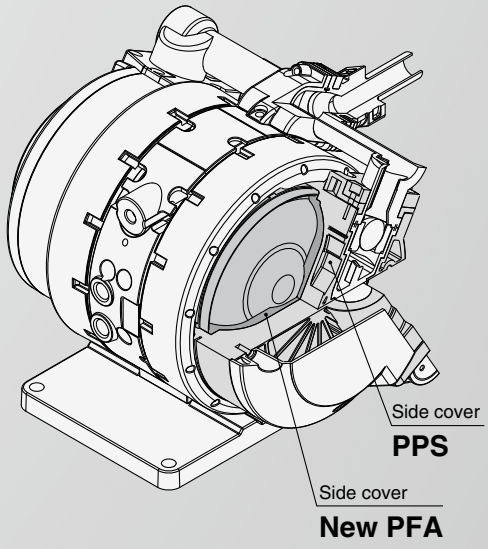
(PAF3000 / air operated, without foot)

Clean

Assembled in a clean room and double-packaged.
By using a molded side cover and port, it effectively reduces the amount of dust generation.

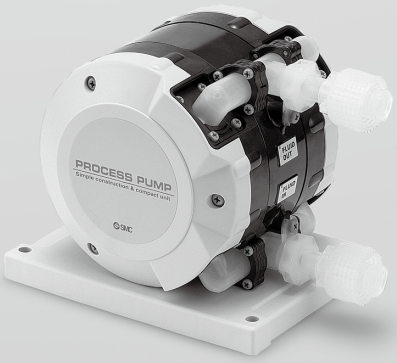
PPS/PFA dual construction

Withstand pressure and heat cycle performance have been improved.

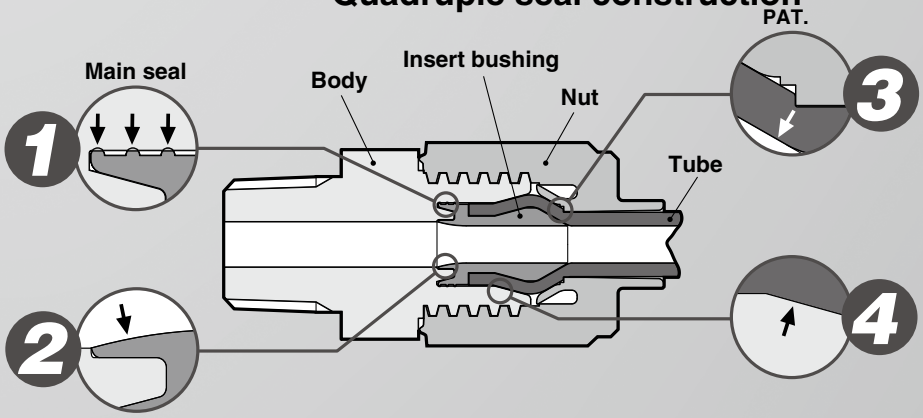


Variation on fittings with nut

Insert bushing type (LQ1 fittings)

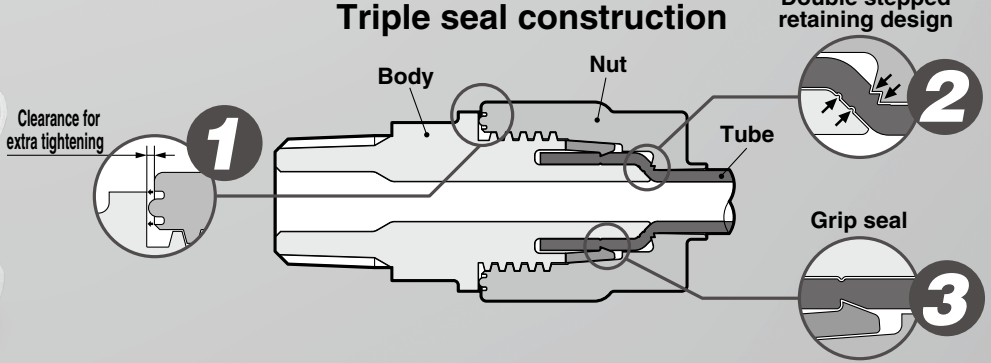


Quadruple seal construction



Flare type (LQ3 fittings)

Triple seal construction



Process Pump:
Automatically Operated Type (Internal Switching Type)
Air Operated Type (External Switching Type)
PAF3000 Series RoHS

How to Order

Female thread

PAF341 0 – □ 03 – □

Actuation Note 1)

Symbol	Actuation
0	Automatically operated
3	Air operated

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G

Port size

Symbol	Port size
03	3/8"

Option

Symbol	Option	Applicable actuation	
		Automatically operated	Air operated
Nil	None	●	●
B	With foot	●	●
N	With silencer **	●	—

∗ When option is more than one, suffix in alphabetical order.
∗∗ For AIR EXH: AN20-□02
(□: Either Nil or N is entered as a thread symbol.)

Tube extension

PAF341 0 –P13 □ – □

Actuation Note 1)

Symbol	Actuation
0	Automatically operated
3	Air operated

Tubing size

Symbol	Main fluid connection size
13	1/2"

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G

Option

Symbol	Option	Applicable actuation	
		Automatically operated	Air operated
Nil	None	●	●
B	With foot	●	●
N	With silencer **	●	—

∗ When option is more than one, suffix in alphabetical order.
∗∗ For AIR EXH: AN20-□02
(□: Either Nil or N is entered as a thread symbol.)

With nut

PAF341 0 S – 1 S 13 □ – □

Actuation Note 1)

Symbol	Actuation
0	Automatically operated
3	Air operated

Fitting type

Symbol	Fitting type
1	LQ1
3	LQ3

Fitting size

Symbol	IN side	OUT side	Fitting type	
			LQ1	LQ3
13	4		●	●
1319	4	5	●	–
1913	5	4	●	–
19	5		●	–

∗ Refer to page 433 for the compatible fittings.

Option

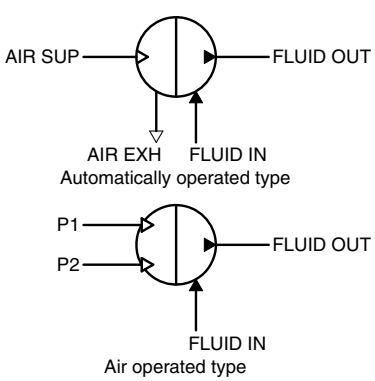
Symbol	Option	Applicable actuation	
		Automatically operated	Air operated
Nil	None	●	●
B	With foot	●	●
N	With silencer **	●	—

∗ When option is more than one, suffix in alphabetical order.
∗∗ For AIR EXH: AN20-□02
(□: Either Nil or N is entered as a thread symbol.)

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G

Symbol



Note 1) The port size of the pilot port is as follows. Automatically operated type is 1/4"; Air operated type is 1/8".
Note 2) The thread type is applied to the pilot port thread and the female thread piping connection.
∗ Refer to page 439 for maintenance parts.
∗ Refer to pages 483 and 484 for related products.

Process Pump:
Automatically Operated Type (Internal Switching Type)
Air Operated Type (External Switching Type)
PAF5000 Series RoHS

How to Order

Female thread

PAF541[0]-[ ][06]-[ ]

Actuation Note 1)

Symbol	Actuation
0	Automatically operated
3	Air operated

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G

Port size

Symbol	Port size
06	3/4"

Option

Symbol	Option	Applicable actuation	
		Automatically operated	Air operated
Nil	None	●	●
N	With silencer *	●	—

* For AIR EXH: AN20-□02
(□: Either Nil or N is entered as a thread symbol.)

Tube extension

PAF541[0]-P19[ ][ ]-[ ]

Actuation Note 1)

Symbol	Actuation
0	Automatically operated
3	Air operated

Tubing size

Symbol	Main fluid connection size
19	3/4"

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G

Option

Symbol	Option	Applicable actuation	
		Automatically operated	Air operated
Nil	None	●	●
N	With silencer *	●	—

* For AIR EXH: AN20-□02
(□: Either Nil or N is entered as a thread symbol.)

With nut

PAF541[0]S-[1]S[19][ ]-[ ]

Actuation Note 1)

Symbol	Actuation
0	Automatically operated
3	Air operated

Fitting type

Symbol	Fitting type
1	LQ1
3	LQ3

Fitting size

Symbol	IN side	OUT side	Fitting type	
			LQ1	LQ3
19	5		●	●
1925	5	6	●	–
2519	6	5	●	–
25	6		●	–

* Refer to page 433 for the compatible fittings.

Thread type Note 2)

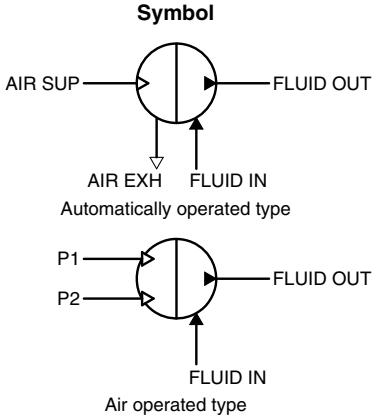
Symbol	Type
Nil	Rc
N	NPT
F	G

Option

Symbol	Option	Applicable actuation	
		Automatically operated	Air operated
Nil	None	●	●
N	With silencer *	●	—

* For AIR EXH: AN20-□02
(□: Either Nil or N is entered as a thread symbol.)

Symbol



Note 1) The port size of the pilot port is 1/4".
Note 2) The thread type is applied to the pilot port thread and the female thread piping connection.
* Refer to page 439 or maintenance parts.
* Refer to pages 483 and 484 for related products.

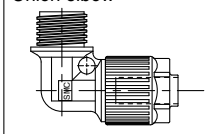
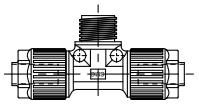
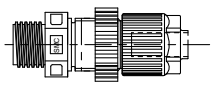
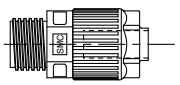
How to Order Fittings for Products with Nut (PAF341□S, PAF541□S Series)

Fittings compatible for the process pump with nut / **PAF341□S, PAF541□S.**
Product without nut (insert bushing), 1 piece nut removed, which is not necessary in cases when using the products with nut.

LQ1 fittings

LQ1 E 41 – SN

- **Fitting type**
- **Applicable tubing size**
- **Nut (including insert bushing), 1 location removed**

E	T
Union elbow 	Union tee 
P	**U**
Panel mount union 	Union 

Metric size

Class	No.	Applicable tubing size (mm)	Reducing*	Applicable process pump	
				PAF341□S	PAF541□S
4	1	12 x 10	○	■	—
4	2	10 x 8	●	■	—
5	1	19 x 16	○	■	■
5	2	12 x 10	●	■	■
6	1	25 x 22	○	—	■
6	2	19 x 16	●	—	■

∗ ○: Basic size ●: With reducer

Inch size

Class	Symbol	Applicable tubing size (inch)	Reducing*	Applicable process pump	
				PAF341□S	PAF541□S
4	A	1/2" x 3/8"	○	■	—
4	B	3/8" x 1/4"	●	■	—
5	A	3/4" x 5/8"	○	■	■
5	B	1/2" x 3/8"	●	■	■
6	A	1" x 7/8"	○	—	■
6	B	3/4" x 5/8"	●	—	■

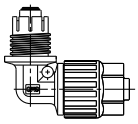
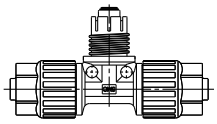
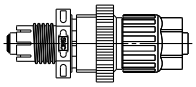
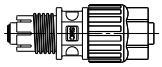
∗ ○: Basic size ●: With reducer

Note) Select the fitting after confirming the IN / OUT side fitting size and fitting type.

LQ3 fittings

LQ3 E 4A – SN

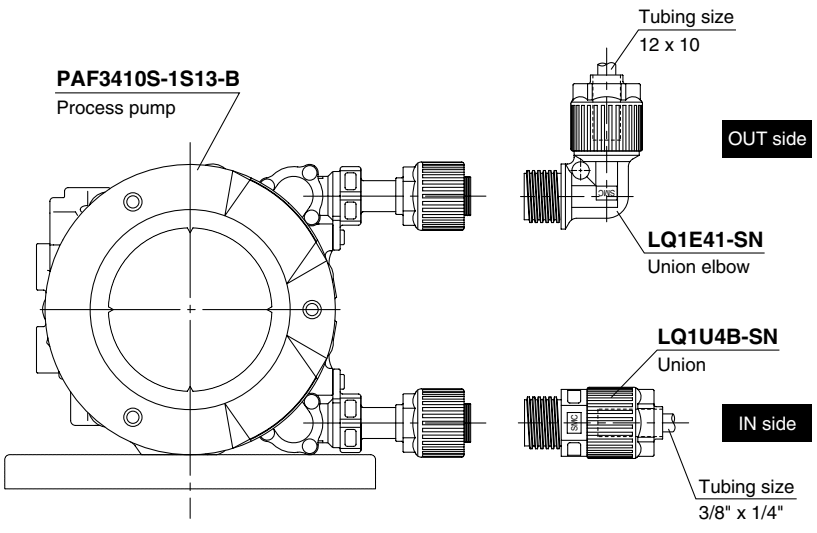
- **Fitting type**
- **Nut, 1 location removed**
- **Applicable tubing size**

E	T
Union elbow 	Union tee 
P	**U**
Panel mount union 	Union 

Class	Symbol	Applicable tubing size (inch)	Applicable process pump	
			PAF341□S	PAF541□S
4	A	1/2" x 3/8"	■	—
5	A	3/4" x 5/8"	—	■

Note) Select the fitting after confirming the IN / OUT side fitting size and fitting type.

Ordering Example



PAF3410S-1S13-B	1
LQ1E41-SN (Union elbow)	1
LQ1U4B-SN (Union)	1

Note) Fittings which are ordered with the process pump at the same time will be shipped in a separate package.

Specifications

PAF3000 Series

Model		PAF3410	PAF3413
Operation method		Automatically operated	Air operated
Port size	**Main fluid: Suction/Discharge port**	Rc, NPT, G 3/8" Female thread, 1/2" Tube extension, With nut (size 4, 5)	
	Pilot air: Supply/Exhaust port	Rc, NPT, G 1/4" Female thread	Rc, NPT, G 1/8" Female thread
Material	**Body wetted parts**	New PFA	
	Diaphragm	PTFE	
	Check valve	PTFE, New PFA	
	Wetted part seal material	PTFE	
Fluid		Refer to the applicable fluids on page 485.	
Discharge flow rate		1 to 20 L/min	1 to 15 L/min
Average discharge pressure		0 to 0.4 MPa	
Pilot air pressure		0.2 to 0.5 MPa (for 0 to 60°C)	
Air consumption		230 L/min (ANR) or less	
Suction lift	**Dry**	Up to 1 m (inside the pump is dry)	
	Wet	Up to 4 m (with fluid inside the pump)	
Noise		80 dB (A) or less (Option: with silencer, AN20)	80 dB (A) or less (excluding the noise from the quick exhaust and solenoid valve)
Withstand pressure		0.75 MPa	
Diaphragm life Note)		50 million cycles (for water)	
Operating fluid temperature		0 to 90°C (No freezing)	
Ambient temperature		0 to 70°C (No freezing)	
Maximum viscosity		1000 mPa·s	
Recommended operation cycle		—	2 to 4 Hz
Weight (without foot bracket)		1.6 kg	1.3 kg
Mounting		Horizontal (mounting on the bottom surface)	
Packaging		Clean double packaging	

∗ Values in the table are measured at room temperature using fresh water.
Note) These are reference values for room temperature and fresh water. These are not guaranteed. For details, refer to page 489. (Notes on the service life of the diaphragm in the "Specific Product Precautions")

PAF5000 Series

Model		PAF5410	PAF5413
Operation method		Automatically operated	Air operated
Port size	**Main fluid: Suction/Discharge port**	Rc, NPT, G 3/4" Female thread, 3/4" Tube extension, With nut (size 5, 6)	
	Pilot air: Supply/Exhaust port	Rc, NPT, G 1/4" Female thread	
Material	**Body wetted parts**	New PFA	
	Diaphragm	PTFE	
	Check valve	PTFE, New PFA	
	Wetted part seal material	PTFE	
Fluid		Refer to the applicable fluids on page 485.	
Discharge flow rate		5 to 45 L/min	5 to 38 L/min
Average discharge pressure		0 to 0.4 MPa	
Pilot air pressure		0.2 to 0.5 MPa (for 0 to 60°C)	
Air consumption		300 L/min (ANR) or less	
Suction lift	**Dry**	Up to 1 m (inside the pump is dry)	
	Wet	Up to 4 m (with fluid inside the pump)	
Noise		80 dB (A) or less (Option: with silencer, AN20)	80 dB (A) or less (excluding the noise from the quick exhaust and solenoid valve)
Withstand pressure		0.75 MPa	
Diaphragm life Note)		50 million cycles (for water)	
Operating fluid temperature		0 to 90°C (No freezing)	
Ambient temperature		0 to 70°C (No freezing)	
Maximum viscosity		1000 mPa·s	
Recommended operation cycle		—	1 to 3 Hz
Weight		6 kg	
Mounting		Horizontal (mounting on the bottom surface)	
Packaging		Clean double packaging	

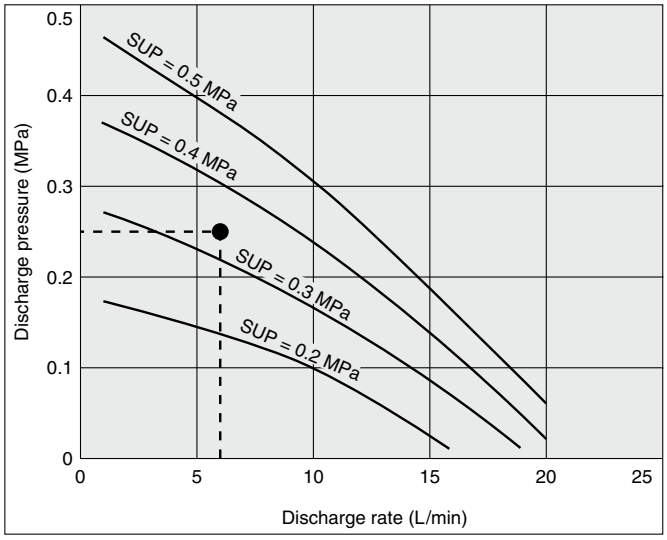
∗ Values in the table are measured at room temperature using fresh water.
Note) These are reference values for room temperature and fresh water. These are not guaranteed. For details, refer to page 489. (Notes on the service life of the diaphragm in the "Specific Product Precautions")

Tube Size Applicable for Nut Size
(Tube size can be altered, using a reducer even within the same nut size.)

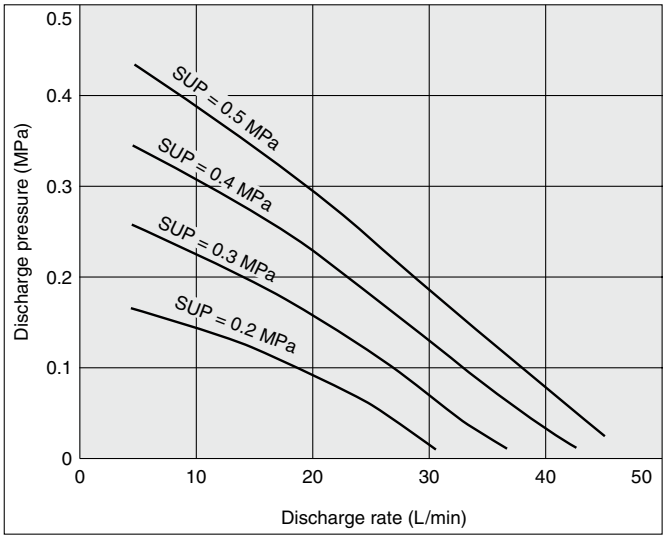
Size	Applicable tubing size
4	10 x 8, 12 x 10, 3/8" x 1/4", 1/2" x 3/8"
5	12 x 10, 19 x 16, 1/2" x 3/8", 3/4" x 5/8"
6	19 x 16, 25 x 22, 3/4" x 5/8", 1" x 7/8"

Performance Curve: Automatically Operated Type

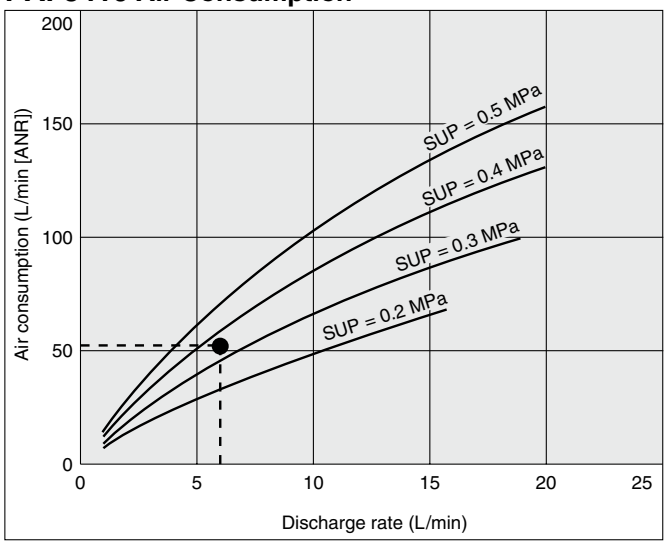
PAF3410 Flow Rate Characteristics



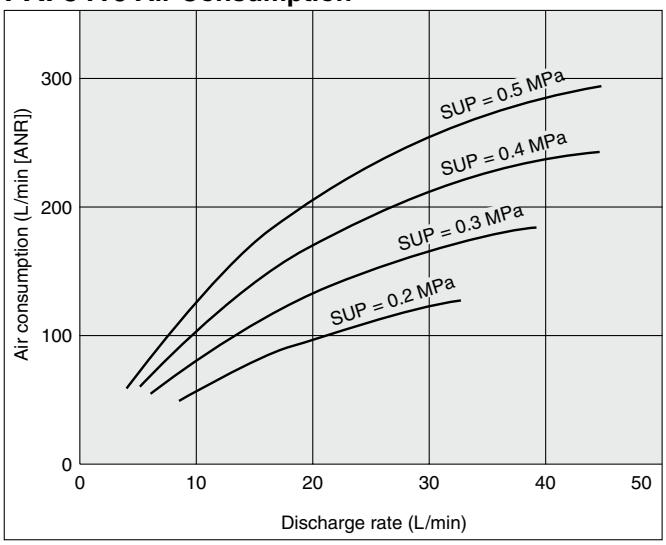
PAF5410 Flow Rate Characteristics



PAF3410 Air Consumption



PAF5410 Air Consumption



Selection from Flow Characteristic Graph (PAF3410)

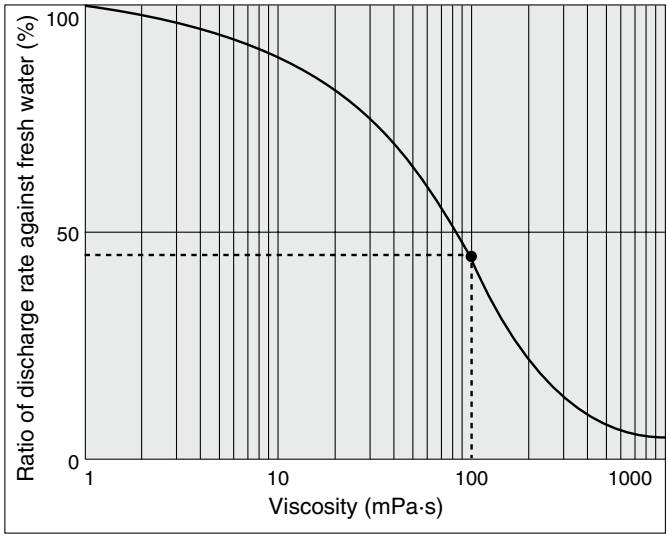
Required specifications example:
Find the pilot air pressure and pilot air consumption for a discharge rate of 6 L/min and discharge pressure of 0.25 MPa. <The transfer fluid is fresh water (viscosity 1 mPa·s, specific gravity 1.0).>
∗ If the total lifting height is required instead of the discharge pressure, discharge pressure of 0.1 MPa corresponds to a total lift of 10 m.

Selection procedures:
1. First mark the intersection point for a discharge rate of 6 L/min and discharge pressure of 0.25 MPa.
2. Find the pilot air pressure for the marked point. In this case, the point is between the discharge curves for SUP = 0.3 MPa and SUP = 0.4 MPa, and based on the proportional relationship to these lines, the pilot air pressure for this point is approximately 0.35 MPa.
3. Next find the air consumption rate. Trace the discharge rate, 6 L/min, up to the point between the discharge curves for SUP = 0.3 MPa and 0.4 MPa, then trace to the Y-axis, finding the air consumption to be around 55 L/min (ANR).

⚠ Caution

1. These flow rate characteristics are for fresh water (viscosity 1 mPa·s, specific gravity 1.0).
2. The discharge rate differs greatly depending on properties (viscosity, specific gravity) of the fluid being transferred and operating conditions (lifting range, transfer distance), etc.
3. Use 0.75 kW per 100 L/min of air consumption as a guide for the relationship of the air consumption to the compressor.

Viscosity Characteristics (Flow rate correction for viscous fluids)



Selection from Viscosity Characteristic Graph

Required specifications example:
Find the pilot air pressure and pilot air consumption for a discharge rate of 2.7 L/min, discharge pressure of 0.25 MPa, and a viscosity of 100 mPa·s.

Selection procedures:
1. First find the ratio of the discharge rate for fresh water when viscosity is 100 mPa·s from the graph below. It is determined to be 45%.
2. Next, in the required specification example, the viscosity is 100 mPa·s and the discharge rate is 2.7 L/min. Since this is equivalent to 45% of the discharge rate for fresh water, 2.7 L/min ÷ 0.45 = 6 L/min, indicating that a discharge rate of 6 L/min is required for fresh water.
3. Finally, find the pilot air pressure and pilot air consumption based on selection from the flow characteristic graphs.

⚠ Caution

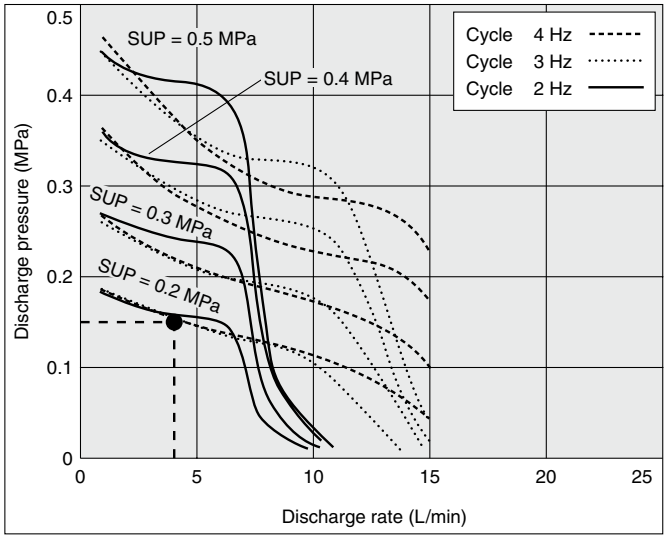
Viscosities up to 1000 mPa·s can be used.
Dynamic viscosity ν= Viscosity μ/Density ρ.

$$\nu = \frac{\mu}{\rho}$$

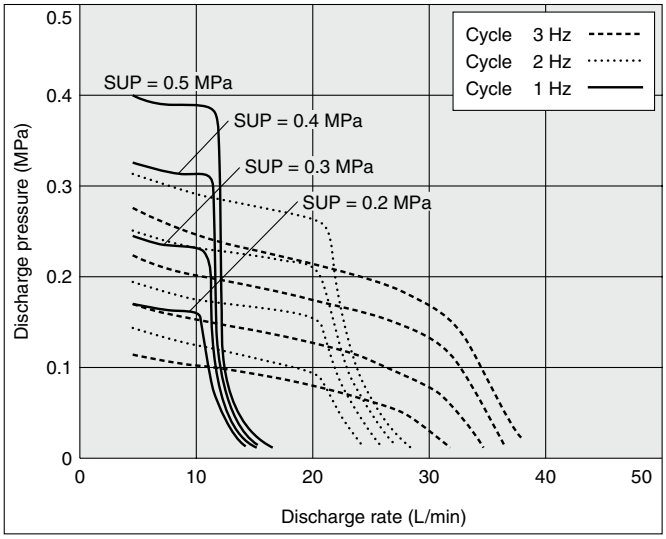
$\nu(10^{-3}\,m^2/s) = \mu(mPa{\cdot}s)/\rho(kg/m^3)$

Performance Curve: Air Operated Type

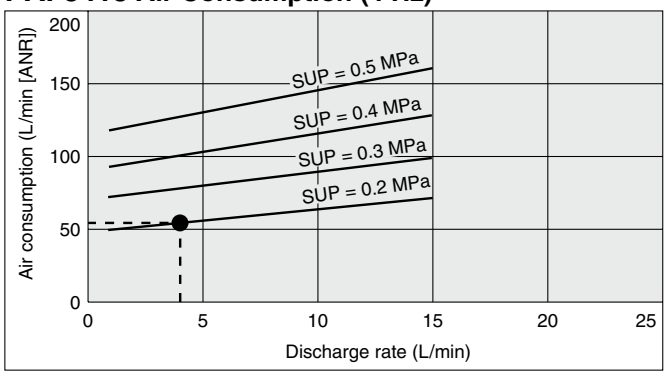
PAF3413 Flow Rate Characteristics



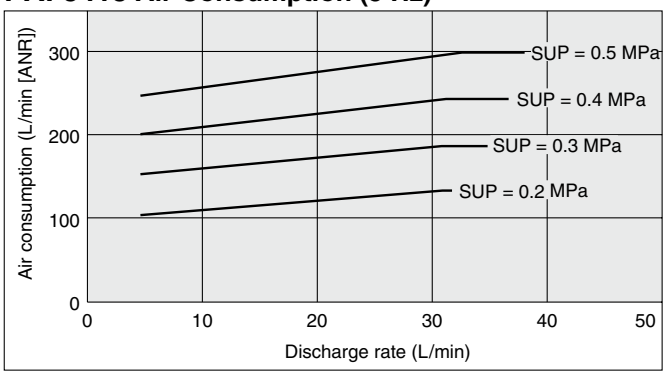
PAF5413 Flow Rate Characteristics



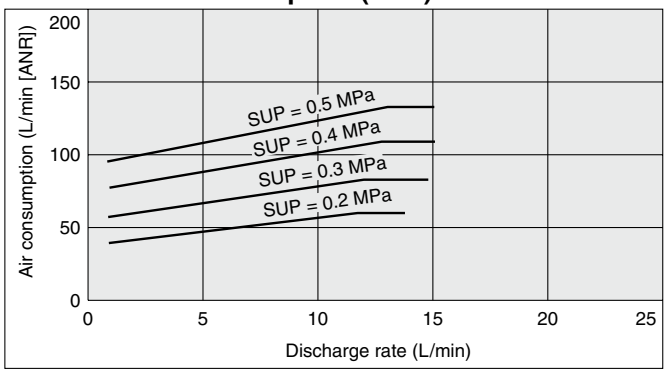
PAF3413 Air Consumption (4 Hz)



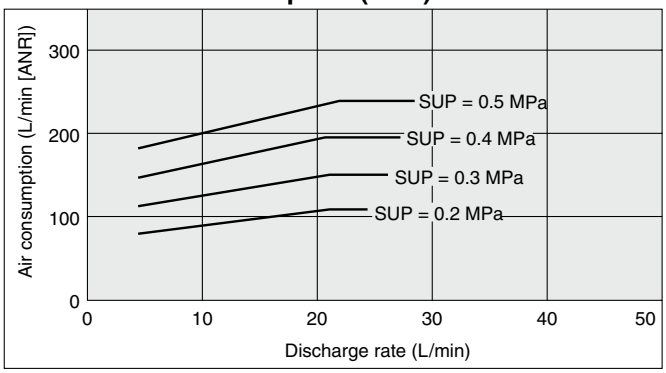
PAF5413 Air Consumption (3 Hz)



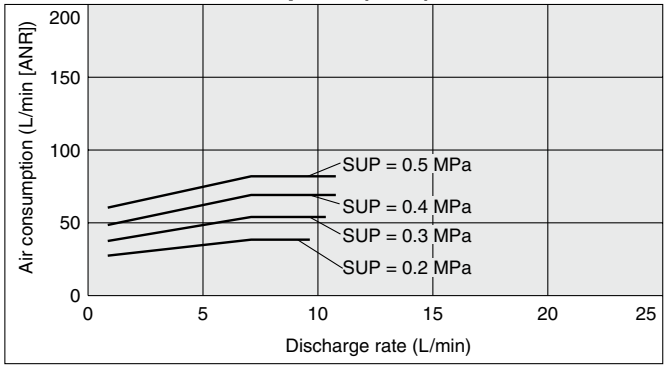
PAF3413 Air Consumption (3 Hz)



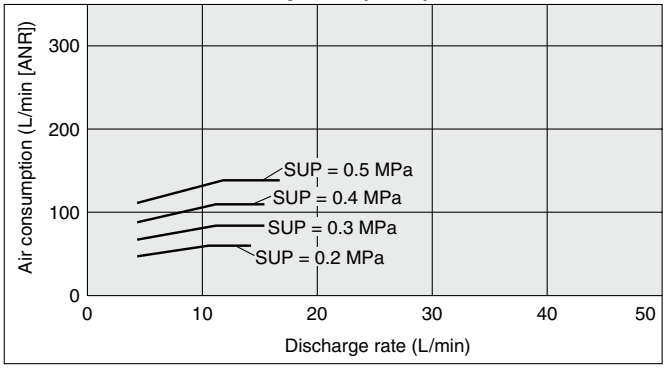
PAF5413 Air Consumption (2 Hz)



PAF3413 Air Consumption (2 Hz)



PAF5413 Air Consumption (1 Hz)



Selection from Flow Rate Characteristic Graph (PAF3413)

Required specification example:
Find the pilot air pressure and pilot air consumption for a discharge rate of 4 L/min and discharge pressure of 0.15 MPa. <The transfer fluid is fresh water (viscosity 1 mPa·s, specific gravity 1.0).>

Note 1) If the total lifting height is required instead of the discharge pressure, discharge pressure of 0.1 MPa corresponds to a total lift of 10 m.

Note 2) Discharge per cycle: Approx. 50 mL

Selection procedures:

1. First mark the intersection point for a discharge rate of 4 L/min and discharge pressure of 0.15 MPa.
2. Find the pilot air pressure for the marked point. In this case, the point is between the discharge curves (solid lines) for SUP = 0.2 MPa, and the pilot air pressure for this point is approx. 0.2 MPa.

Calculating Air Consumption (PAF3413)

Find the air consumption for operation with a discharge rate of 4 L/min, a 4 Hz switching cycle and pilot air pressure of 0.2 MPa from the air consumption graph.

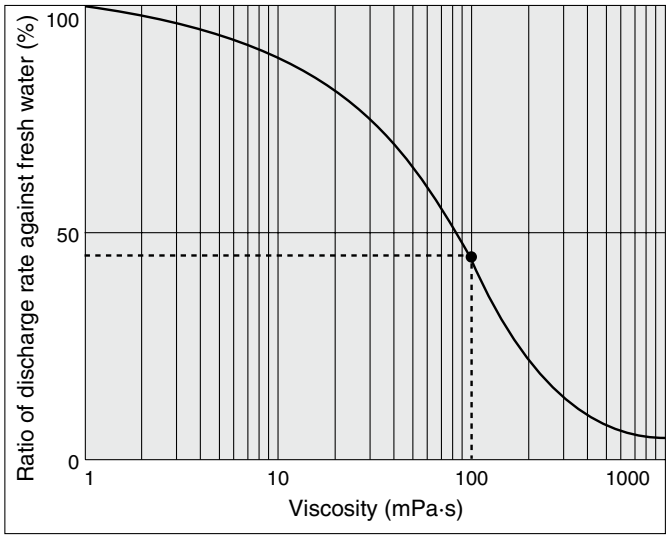
Selection procedures:

1. Look up from the discharge rate of 4 L/min to find the intersection with SUP = 0.2 MPa.
2. From the point just found, draw a line to the Y-axis to find the air consumption. The result is approximately 54 L/min (ANR).

⚠ Caution

1. These flow rate characteristics are for fresh water (viscosity 1 mPa·s, specific gravity 1.0).
2. The discharge rate differs greatly depending on properties (viscosity, specific gravity) of the fluid being transferred and operating conditions (density, lifting range, transfer distance).

Viscosity Characteristics (Flow rate correction for viscous fluids)



Selection from Viscosity Characteristic Graph

Required specification example:
Find the pilot air pressure and pilot air consumption for a discharge rate of 2.7 L/min, discharge pressure of 0.25 MPa, and a viscosity of 100 mPa·s.

Selection procedures:

1. First find the ratio of the discharge rate for fresh water when viscosity is 100 mPa·s from the graph below. It is determined to be 45%.
2. Next, in the required specification example, the viscosity is 100 mPa·s and the discharge rate is 2.7 L/min. Since this is equivalent to 45% of the discharge rate for fresh water, 2.7 L/min ÷ 0.45 = 6 L/min, indicating that a discharge rate of 6 L/min is required for fresh water.
3. Finally, find the pilot air pressure based on selection from the flow characteristic graphs.

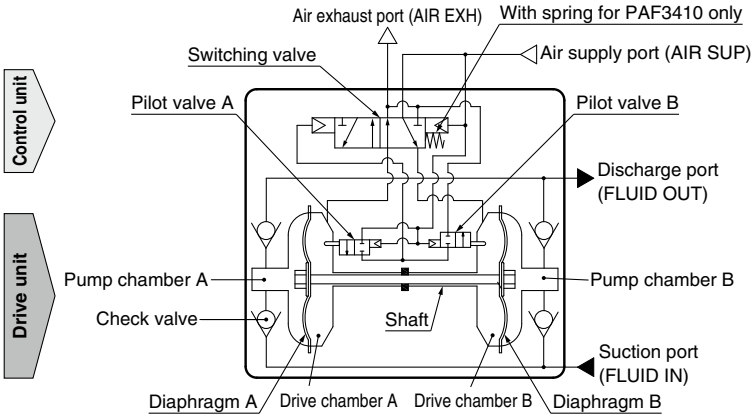
⚠ Caution

Viscosities up to 1000 mPa·s can be used.
Dynamic viscosity ν = Viscosity μ/Density ρ.

$$\nu = \frac{\mu}{\rho}$$

$\nu(10^{-3}\,m^2/s) = \mu(mPa{\cdot}s)/\rho(kg/m^3)$

Working Principle: Automatically Operated Type (PAF3410, 5410)



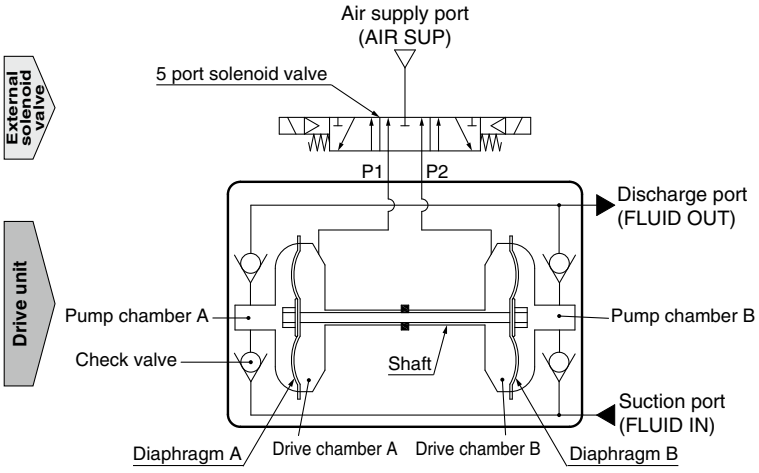
Control unit

1. When air is supplied, it passes through the switching valve and enters drive chamber B.
2. Diaphragm B moves to the right, and at the same time diaphragm A also moves to the right pushing pilot valve A.
3. When pilot valve A is pushed, air acts upon the switching valve, drive chamber A switches to a supply state, and the air which was in drive chamber B is exhausted to the outside.
4. When air enters drive chamber A, diaphragm B moves to the left pushing pilot valve B.
5. When pilot valve B is pushed, the air which was acting upon the switching valve is exhausted, and drive chamber B once again switches to a supply state. A continuous reciprocal motion is generated by this repetition.

Drive unit

1. When air enters drive chamber B, the fluid in pump chamber B is forced out, and at the same time fluid is sucked into pump chamber A.
2. When the diaphragm moves in the opposite direction, the fluid in pump chamber A is forced out, and fluid is sucked into pump chamber B.
3. Continuous suction and discharge is performed by the reciprocal motion of the diaphragm.

Working Principle: Air Operated Type (PAF3413, 5413)



1. When air is supplied to P1 port, it enters drive chamber A.
2. Diaphragm A moves to the left, and at the same time diaphragm B also moves to the left.
3. The fluid in pump chamber A is forced out to the discharge port, and the fluid is sucked into pump chamber B from the suction port.
4. If air is supplied to the P2 port, the opposite will occur. Continuous suction and discharge of fluid is performed by repeating this process with the control of an external solenoid valve (5 port valve).

Maintenance Parts

⚠ **●While it is not possible to disassemble this product without voiding the warranty, if disassembly is to be carried out anyway due to necessity, be sure to follow the maintenance procedures.**
●When carrying out this work, wear appropriate protective equipment.

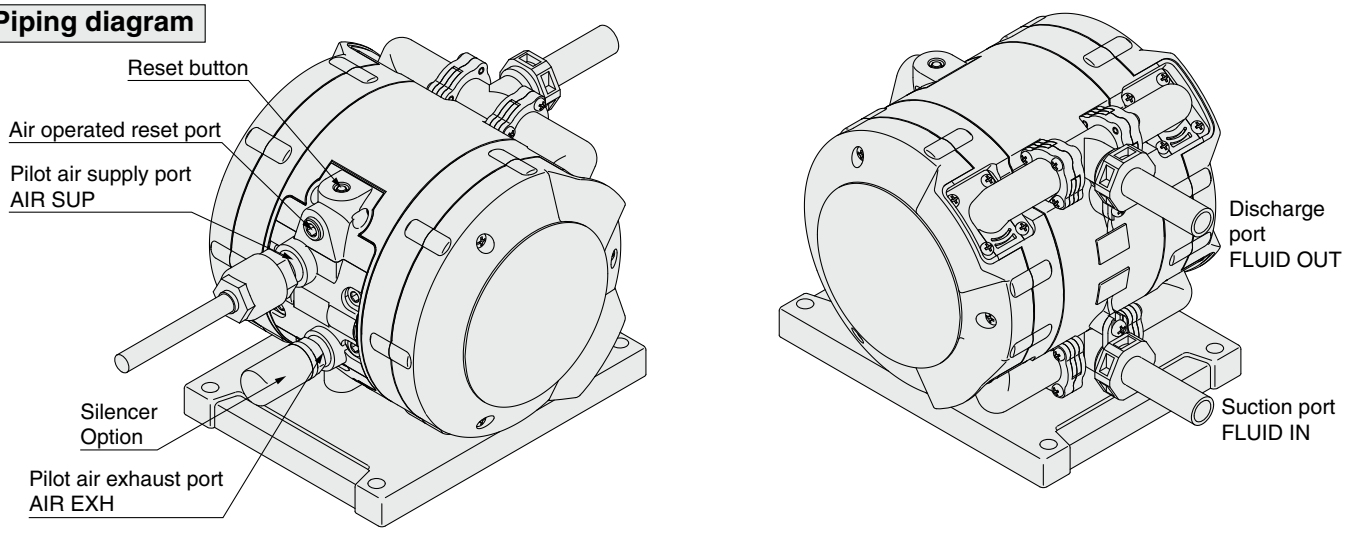
PAF3000/5000 Series

Description	PAF3000 series		PAF5000 series	
	PAF3410	PAF3413	PAF5410	PAF5413
Diaphragm kit	KT-PAF3-31		—	
Check valve kit	KT-PAF3-36		KT-PAF5-36	
Switching valve kit	KT-PAF3-37□ Note)	—	KT-PAF5-37□ Note)	—
Pilot valve kit	KT-PAF3-38	—	—	
Foot kit	KT-PAF3-40		KT-PAF5-40	
Leakage sensor	KT-PAF3-47		KT-PAF5-47	

∗ The maintenance procedure is to be distributed individually. Please contact your SMC sales representative for details.
Note) One of Nil, F or N is entered as thread symbol.

Piping and Operation: Automatically Operated Type (PAF3410, 5410)

Piping diagram



⚠ Caution

Mounting posture of the pump is set with the foot bracket facing downward. Air to be supplied to the air supply port <AIR SUP> should be cleaned and filtered through a filter, or a mist separator etc. Air with foreign matter or drainage etc. will have negative effects on the built-in solenoid valve and will lead to malfunction.
Maintain the proper tightening torque for fittings and mounting bolts, etc. Looseness can cause problems such as fluid and air leaks, while over tightening can cause damage to threads and parts, etc.

Operation

<Starting and Stopping> Refer to circuit example (1)
1. Connect air piping to the air supply port <AIR SUP> and connect piping for the fluid to be transfered to the suction port <FLUID IN> and the discharge port <FLUID OUT>.
2. Using a regulator, set the pilot air pressure within the range of 0.2 to 0.5 MPa. Then, the pump operates when power is applied to the 3 port solenoid valve of the air supply port <AIR SUP>, the sound of exhaust begins from the air exhaust port <AIR EXH> and fluid flows from the suction port <FLUID IN> to the discharge port <FLUID OUT>.
   At this time, the throttle on the discharge side is in an open state. The pump performs suction with its own power even without priming. (Dry state suction lifting range: max. 1 m) To restrict exhaust noise, attach a silencer (AN20-02: option) to the air exhaust port <AIR EXH>.
3. To stop the pump, exhaust the air pressure being supplied to the pump by the 3 port solenoid valve of the air supply port <AIR SUP>. The pump stops even when the throttle on the discharge side is closed. But the pressure supply to the pump should be exhausted quickly.

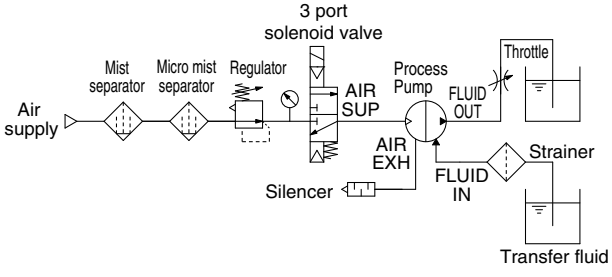
<Discharge Flow Rate Adjustment>
1. To adjust the flow rate from the discharge port <FLUID OUT>, use the throttle connected to the discharge side. Refer to circuit example (1). Note that this product cannot be used as a fixed quantity liquid dispense pump.
2. When operating with a discharge flow rate below the specification range, provide a by-pass circuit from the discharge side to the suction side to ensure the minimum flow rate inside the process pump. With a discharge flow rate below the minimum flow rate, the process pump may stop due to unstable operation. Refer to circuit example (2). (Minimum flow rates: PAF3000 1 L/min, PAF5000 5 L/min)

<Reset Button>
When the pump stops during operation, press the reset button. This makes it possible to restore operation in case the switching valve be-comes clogged due to foreign matter in the supply air.

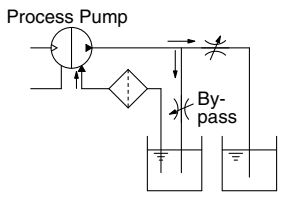
<Air Operated Reset Port>
It is possible to restore operation by supplying air to the air operated reset port without directly pressing the reset button, such as by remote control. Pressure equivalent to or greater than pilot air pressure (but less than 0.5 MPa) is required to reset air. Refer to air operated reset circuit example (1) and (2).

<Counting The Operating Cycle: PAF3000 Only>
The pump's operating cycle can be counted by applying a pressure switch to the air operated reset port. Keep the distance between the pressure switch and the air operated reset port within 50 mm. Refer to air operated reset circuit example (1).

Circuit example (1)

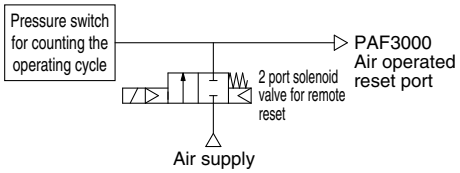


Circuit example (2)

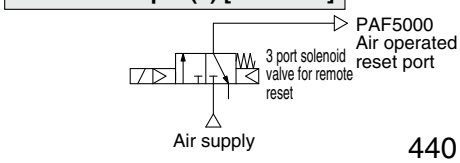


Air operated reset

Circuit example (1) [PAF3000]



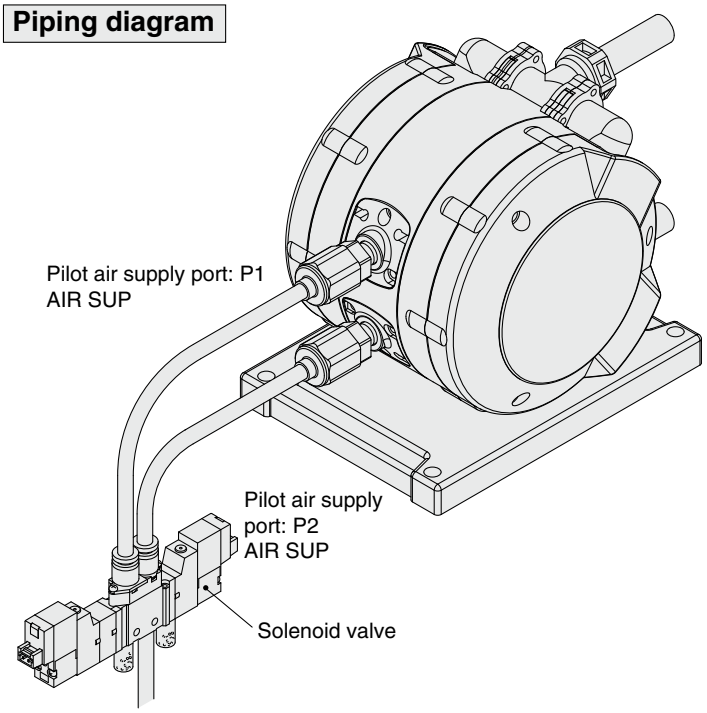
Circuit example (2) [PAF5000]

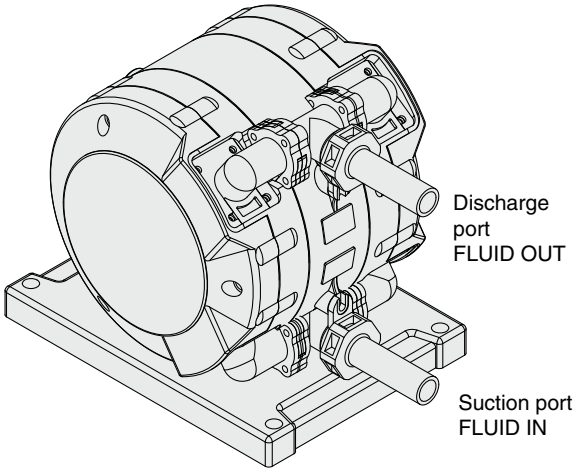


For the related products, refer to pages 483 and 484.

Piping and Operation: Air Operated Type (PAF3413, 5413)

Piping diagram





Recommended Valve

PAF3413	VQZ14□0 (Exhaust center)
PAF5413	VQ44□0 (Exhaust center)

Refer to page 483 for further details.

⚠ Caution

Maintain the proper tightening torque for fittings and mounting bolts, etc. Looseness can cause problems such as fluid and air leaks, while over tightening can cause damage to threads and parts, etc.

Operation

<Starting and Stopping> Refer to circuit example

1. Connect air piping Note 1) to the pilot air supply port <P1>, <P2> and connect piping for the fluid to be transfered to the suction port <FLUID IN> and the discharge port <FLUID OUT>.

2. Using a regulator, set the pilot air pressure within the range of 0.2 to 0.5 MPa. Then, the pump operates when power is applied to the solenoid valve Note 2) of the pilot air supply port and fluid flows from the suction port <FLUID IN> to the discharge port <FLUID OUT>. At this time, the throttle on the discharge side is in an open state. The pump performs suction with its own power even without priming. Note 3) (Dry state suction lifting range: Max. 1 m) To restrict exhaust noise, attach a silencer to the solenoid valve air exhaust port.

3. To stop the pump, exhaust the air pressure being supplied to the pump with the solenoid valve of the air supply port.

Note 1) When used for highly permeable fluids, the solenoid valve may malfunction due to the gas contained in the exhaust. Implement measures to keep the exhaust from going to the solenoid valve side.

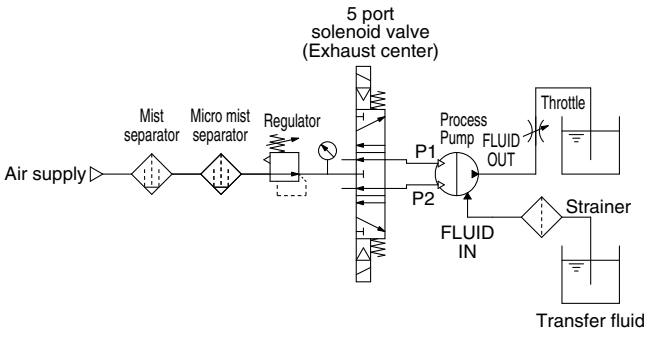
Note 2) For the solenoid valve, use an exhaust center 5 port valve, or a combination of residual exhaust 3 port valve and a pump drive 4 port valve. If air in the drive chamber is not released when the pump is stopped, the diaphragm will be subjected to pressure and its life will be shortened.

Note 3) When the pump is dry, operate the solenoid valve at a switching cycle of 2 to 4 Hz for PAF3000, 1 to 3 Hz for PAF5000. If operated outside of this range, the suction capacity will be reduced.

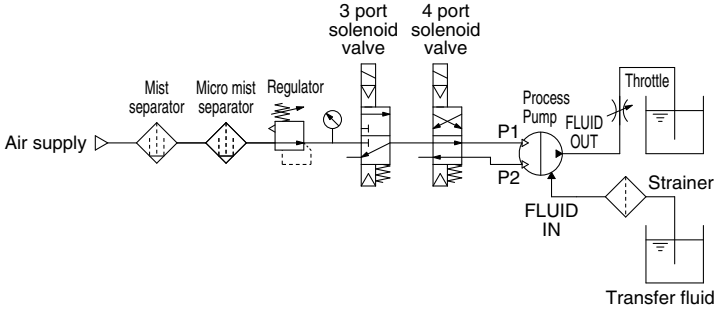
<Discharge Flow Rate Adjustment>

1. The flow rate from the discharge port <FLUID OUT> can be adjusted easily by changing the switching cycle of the solenoid valve on the air supply port.

Circuit example (1)



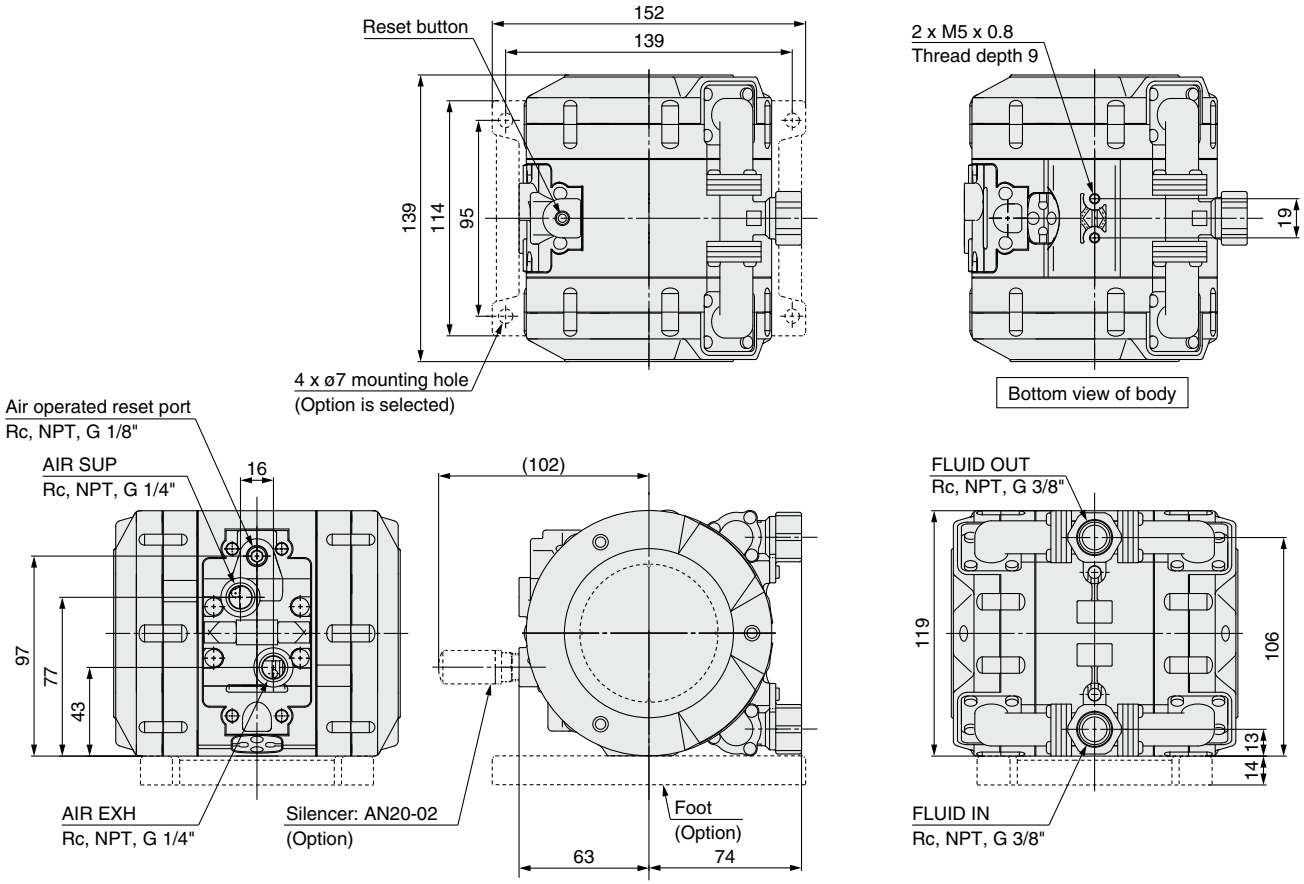
Circuit example (2)



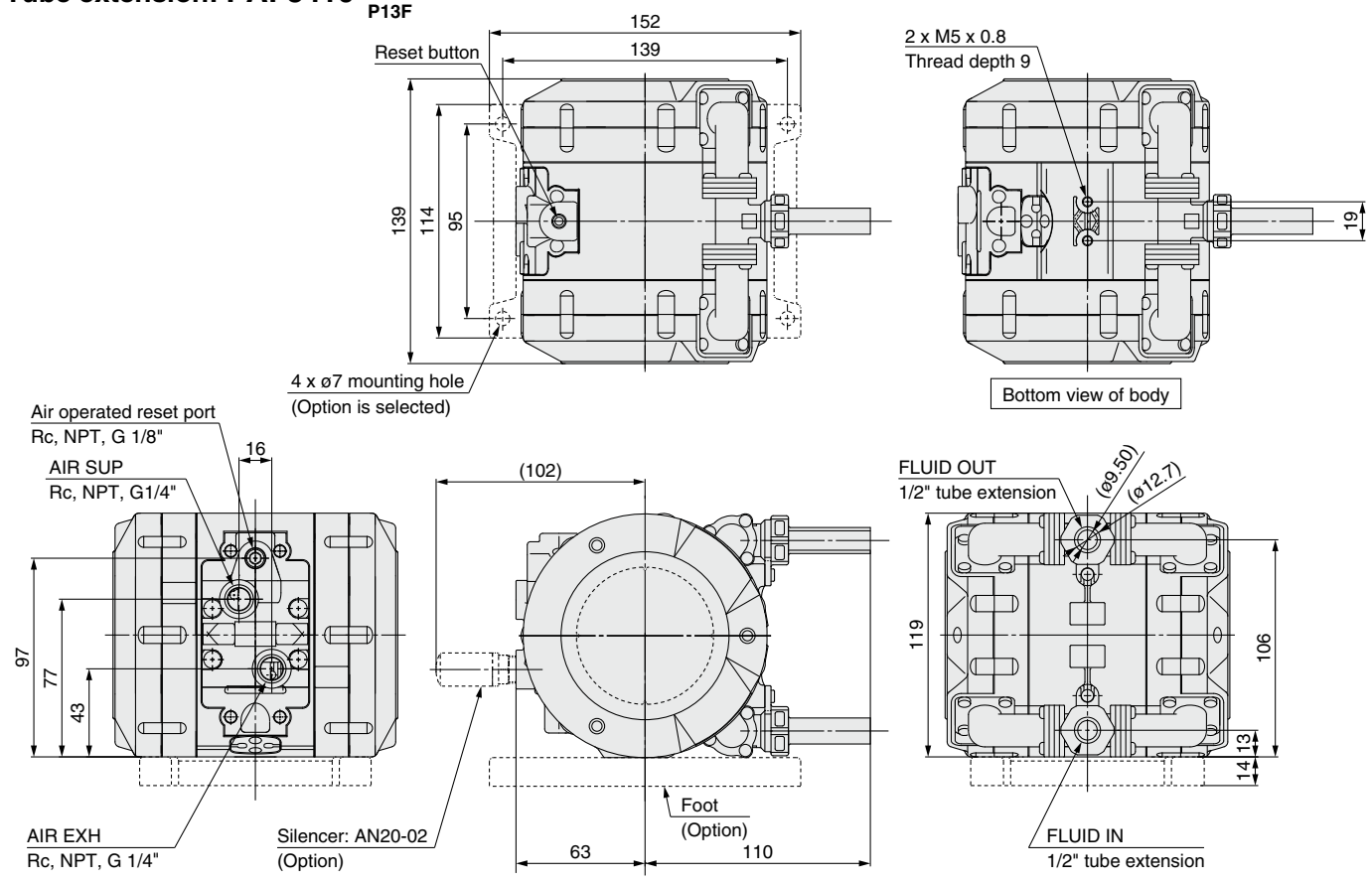
For the related products, refer to pages 483 and 484.

Dimensions: Automatically Operated Type (PAF3000 Series)

Female thread: PAF3410-$^{03}_{N03}$ $^{}_{F03}$

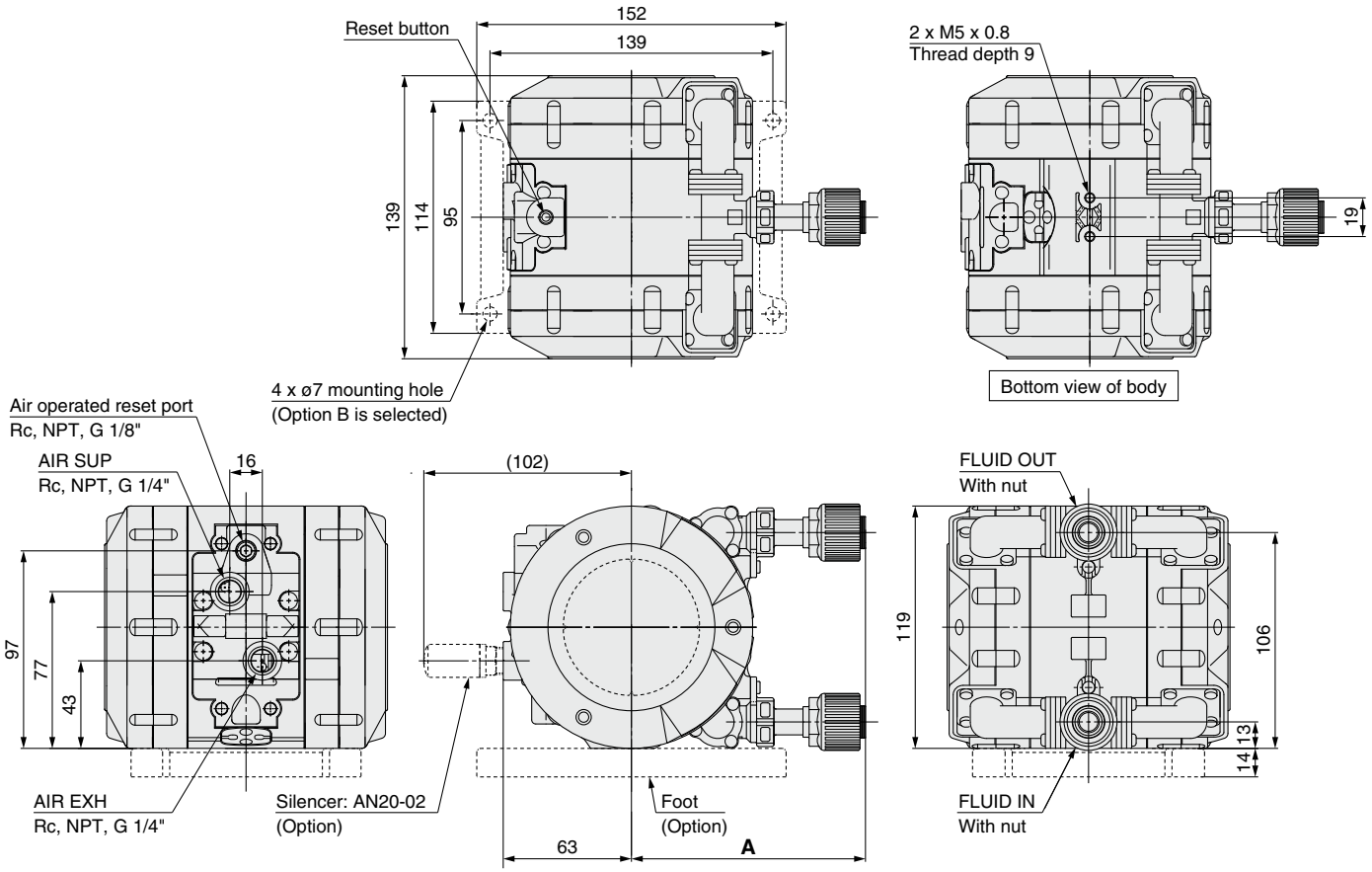


Tube extension: PAF3410-$^{P13}_{P13N}$ $^{}_{P13F}$



Dimensions: Automatically Operated Type (PAF3000 Series)

With nut (with LQ1 fittings): PAF3410S-$^{1S13\square}_{1S19\square}$



(mm)

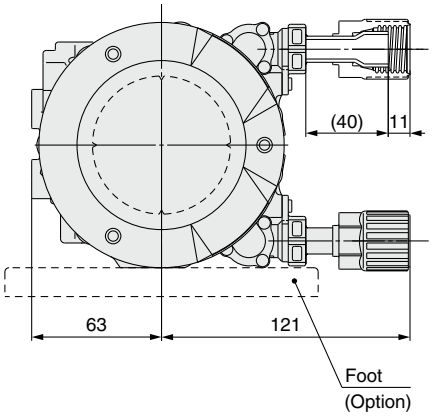
Model	A
PAF3410S-1S13□	115
PAF3410S-1S19□	118

Tube Size Applicable for Nut Size

(Tube size can be altered, using a reducer even within the same nut size.)

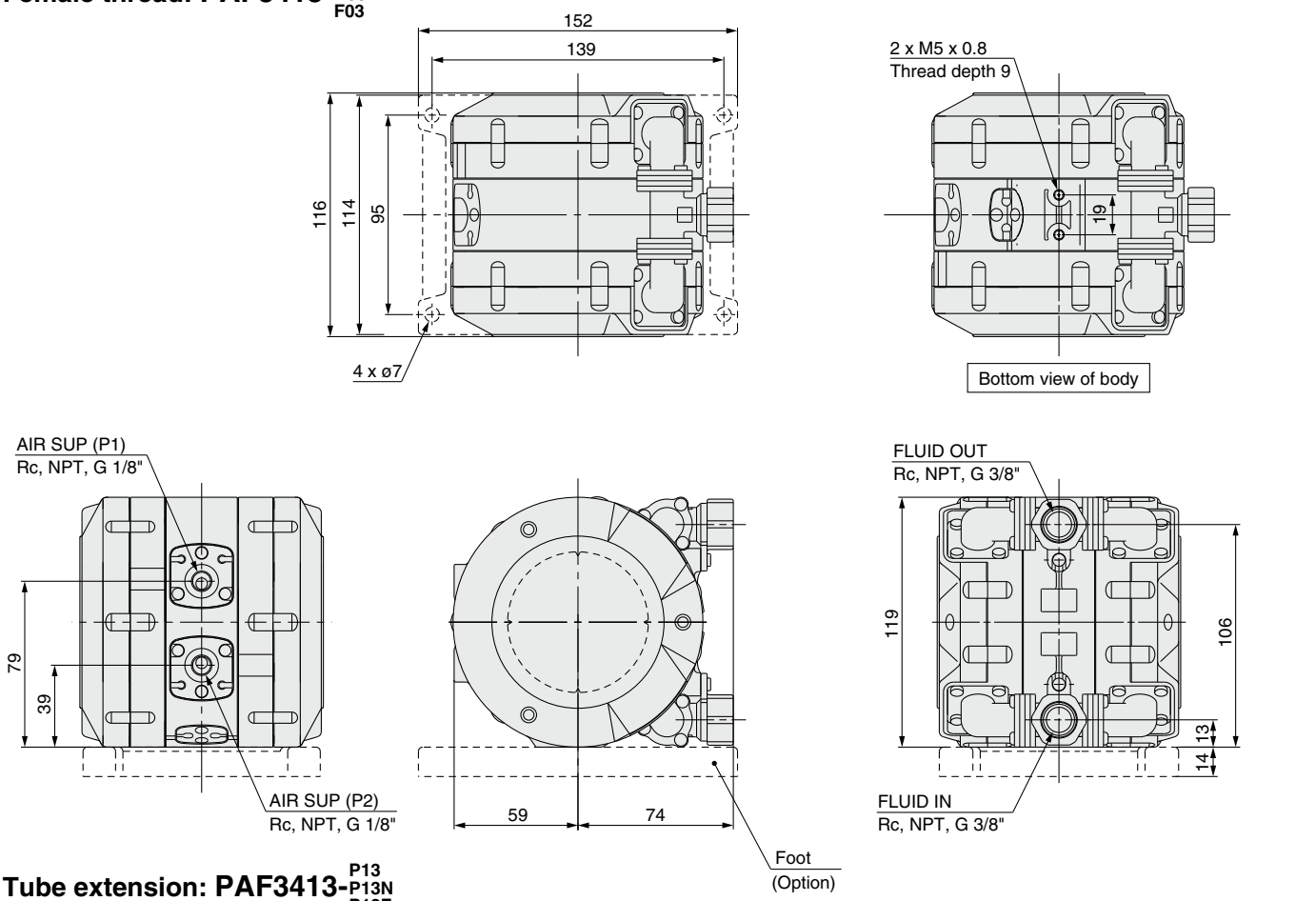
Size	Applicable tubing size
4	10 x 8, 12 x 10, 3/8" x 1/4", 1/2" x 3/8"
5	12 x 10, 19 x 16, 1/2" x 3/8", 3/4" x 5/8"

With nut (with LQ3 fittings): PAF3410S-3S13□

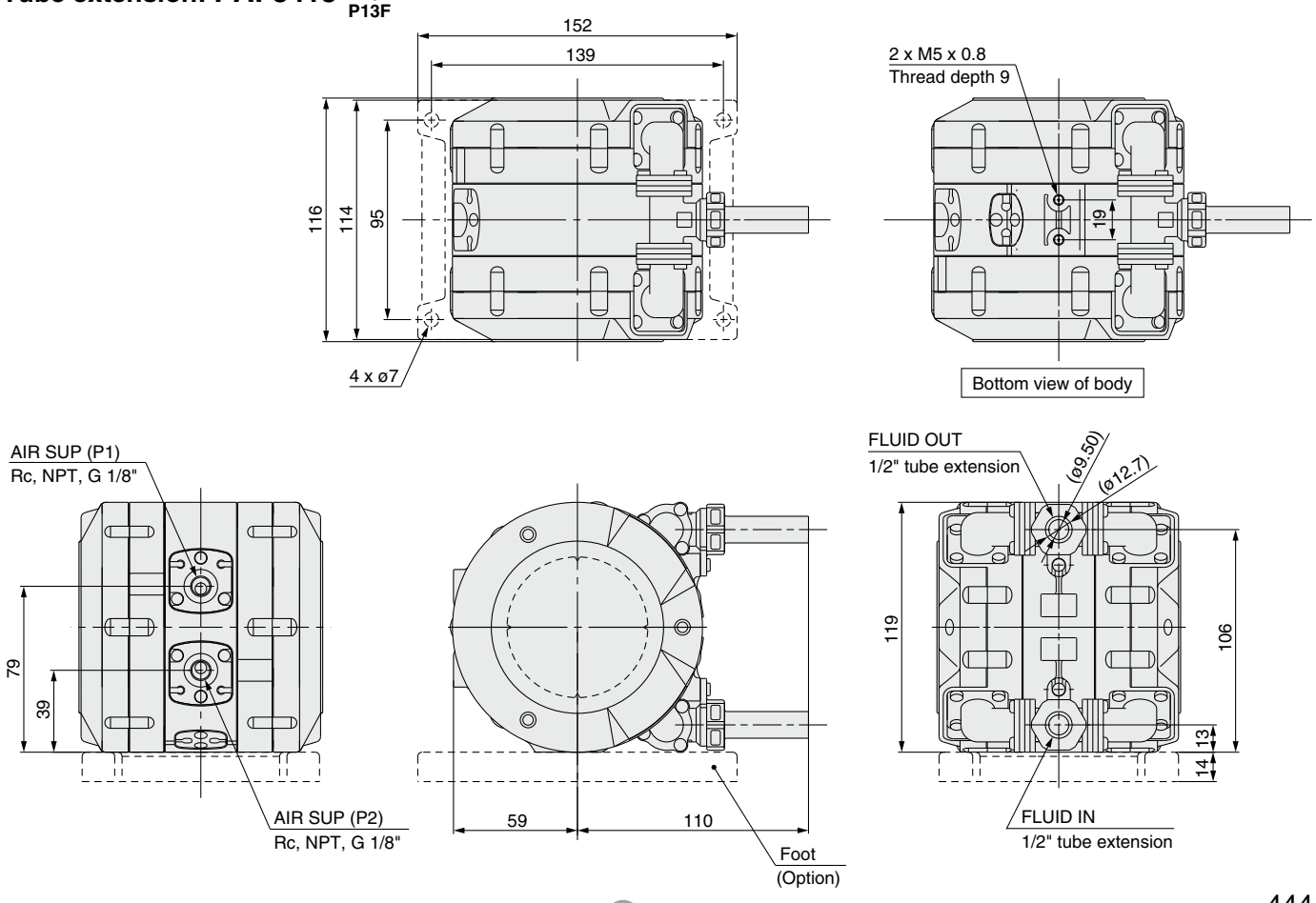


Dimensions: Air Operated Type (PAF3000 Series)

Female thread: PAF3413-$^{03}_{N03}$ $^{}_{F03}$

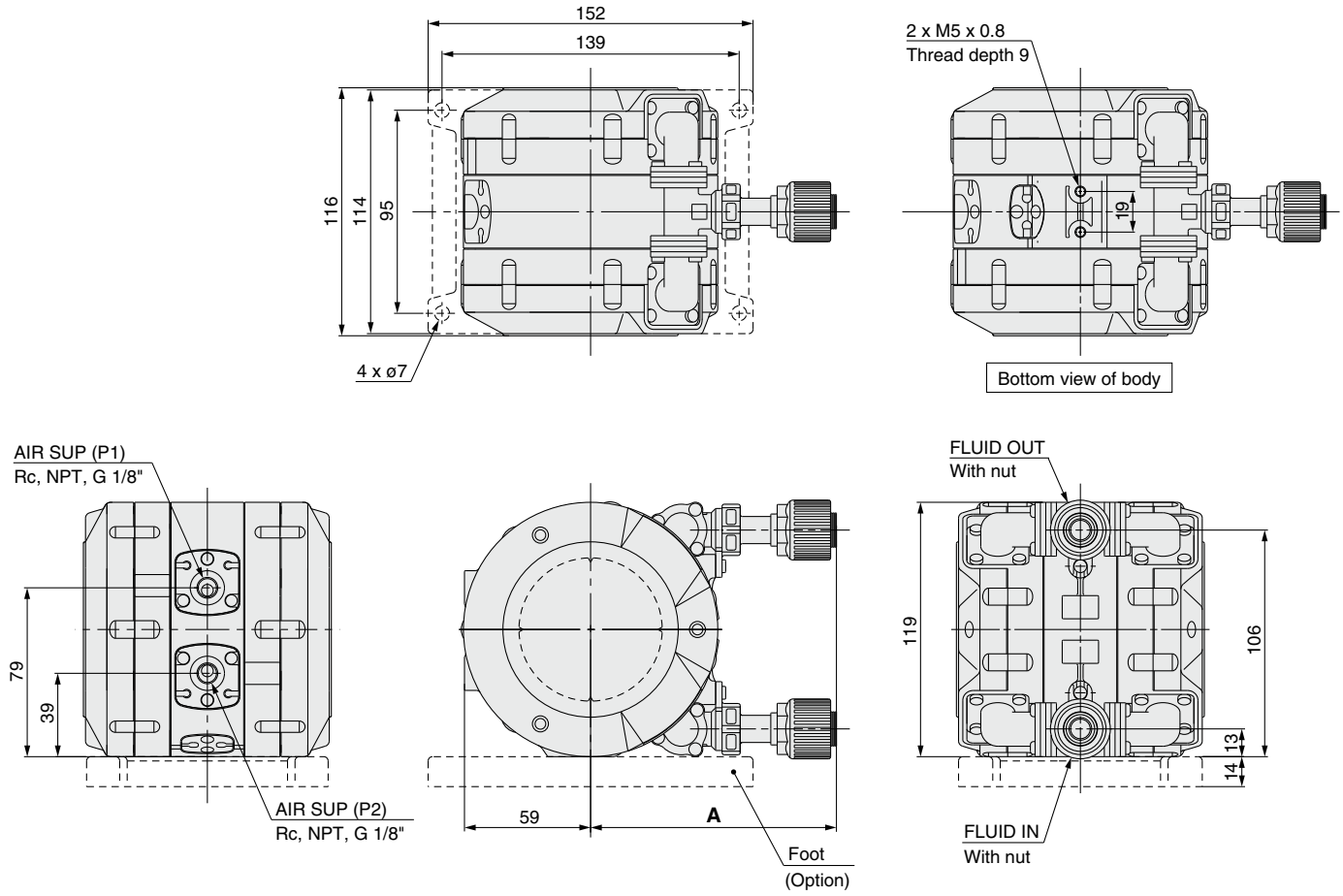


Tube extension: PAF3413-$^{P13}_{P13N}$ $^{}_{P13F}$



Dimensions: Air Operated Type (PAF3000 Series)

With nut (with LQ1 fittings): PAF3413S-$^{1S13\square}_{1S19\square}$



(mm)

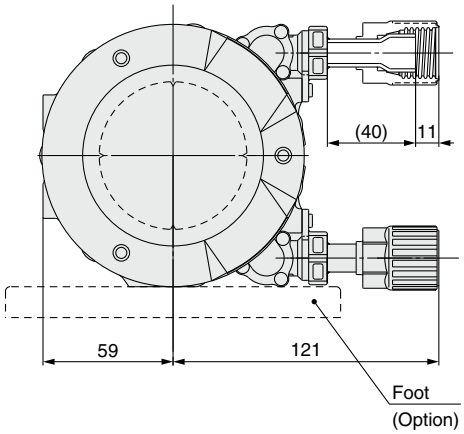
Model	A
PAF3413S-1S13□	115
PAF3413S-1S19□	118

Tube Size Applicable for Nut Size

(Tube size can be altered, using a reducer even within the same nut size.)

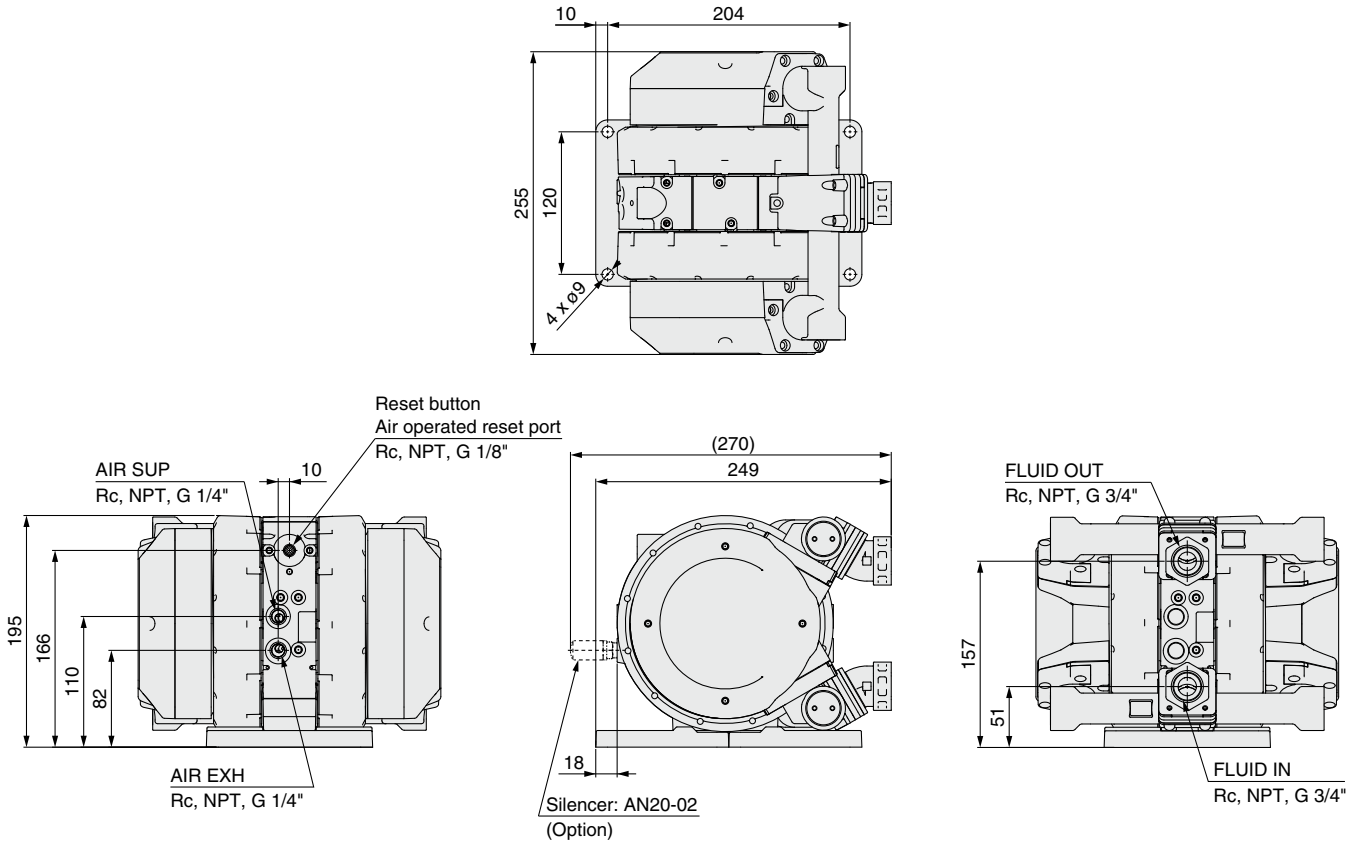
Size	Applicable tubing size
4	10 x 8, 12 x 10, 3/8" x 1/4", 1/2" x 3/8"
5	12 x 10, 19 x 16, 1/2" x 3/8", 3/4" x 5/8"

With nut (with LQ3 fittings): PAF3413S-3S13□

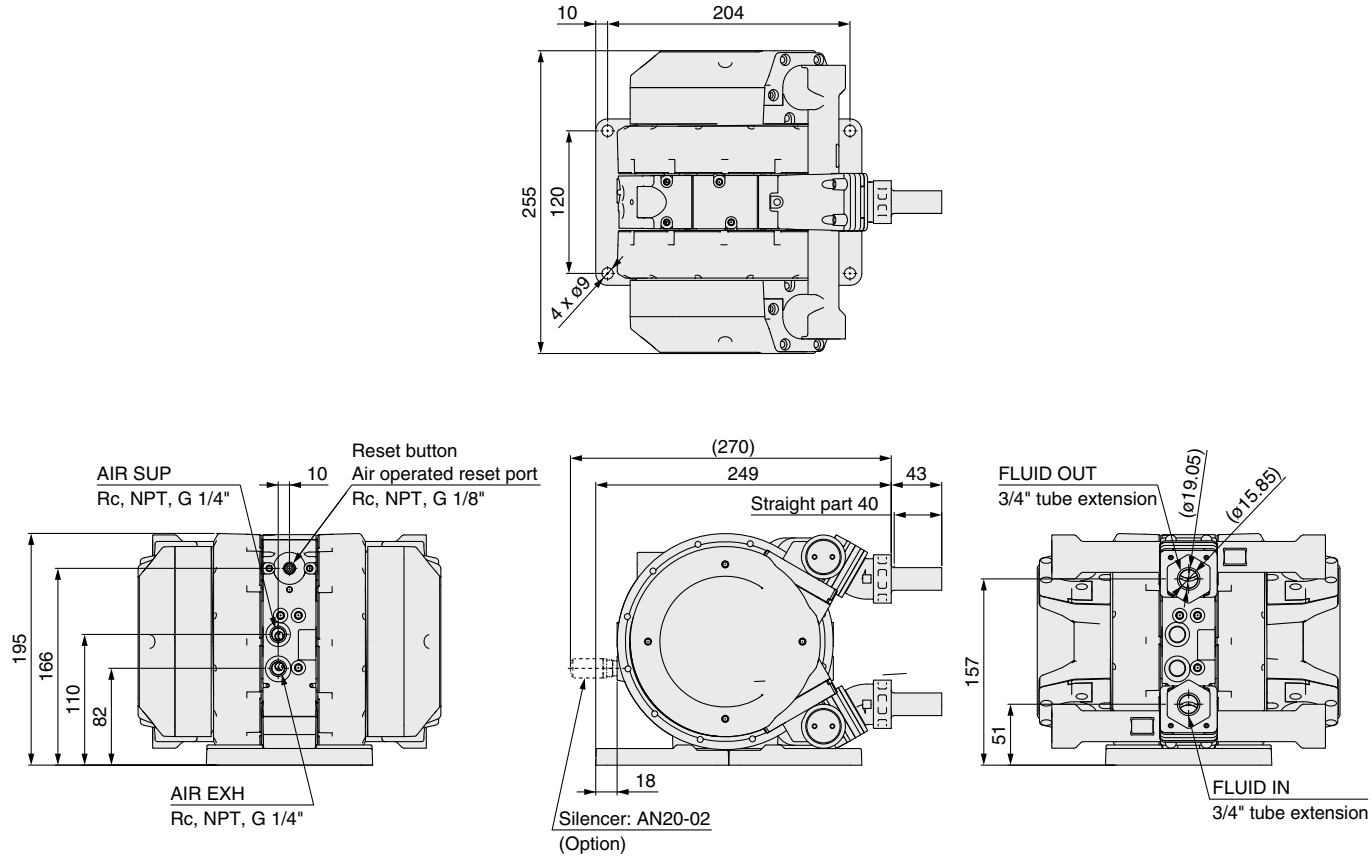


Dimensions: Automatically Operated Type (PAF5000 Series)

Female thread: PAF5410-$^{06}_{N06}$ $^{}_{F06}$

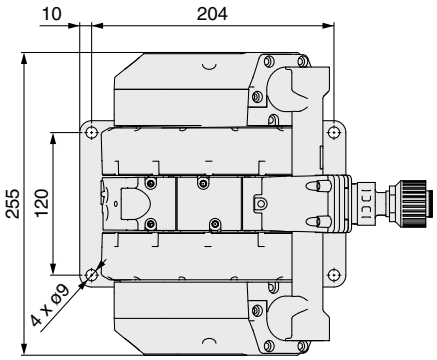


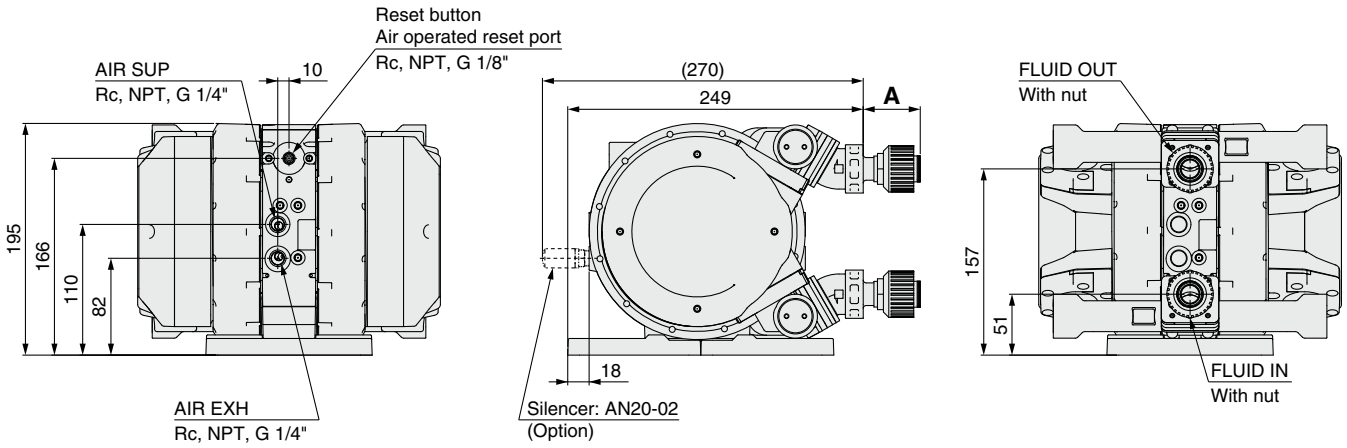
Tube extension: PAF5410-$^{P19}_{P19N}$ $^{}_{P19F}$



Dimensions: Automatically Operated Type (PAF5000 Series)

With nut (with LQ1 fittings): PAF5410S-$^{1S19\square}_{1S25\square}$





(mm)

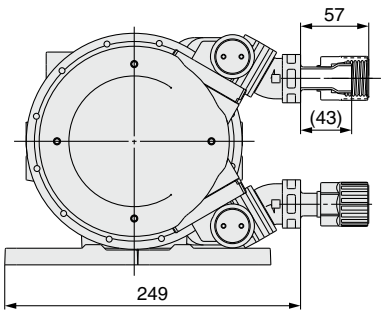
Model	A
PAF5410S-1S19□	48
PAF5410S-1S25□	55

Tube Size Applicable for Nut Size

(Tube size can be altered, using a reducer even within the same nut size.)

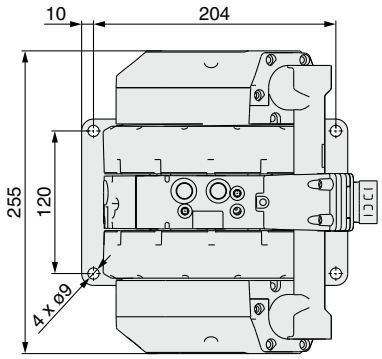
Size	Applicable tubing size
5	12 x 10, 19 x 16, 1/2" x 3/8", 3/4" x 5/8"
6	19 x 16, 25 x 22, 3/4" x 5/8", 1" x 7/8"

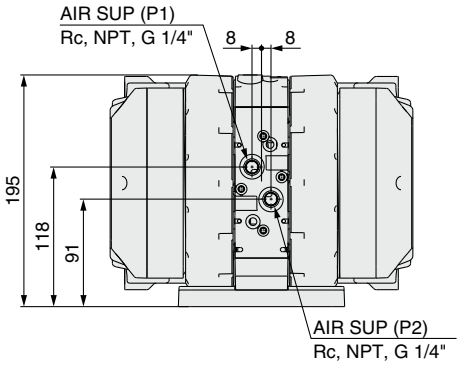
With nut (with LQ3 fittings): PAF5410S-3S19□

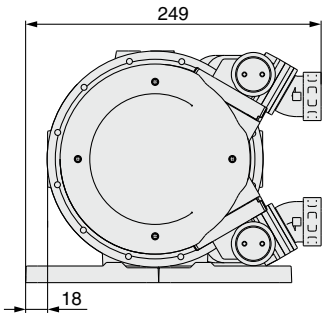


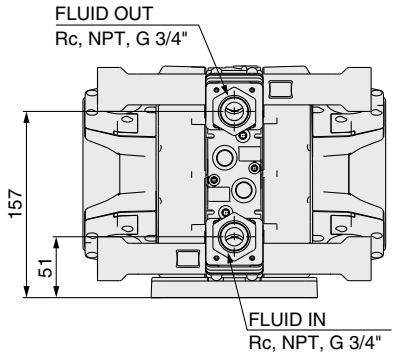
Dimensions: Air Operated Type (PAF5000 Series)

Female thread: PAF5413-$^{06}_{N06}_{F06}$

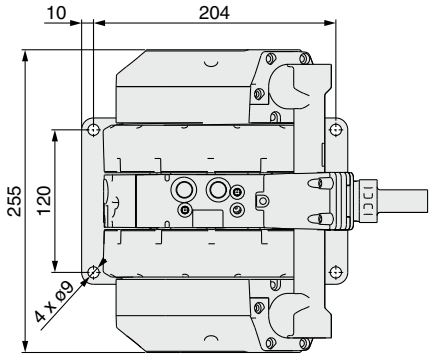


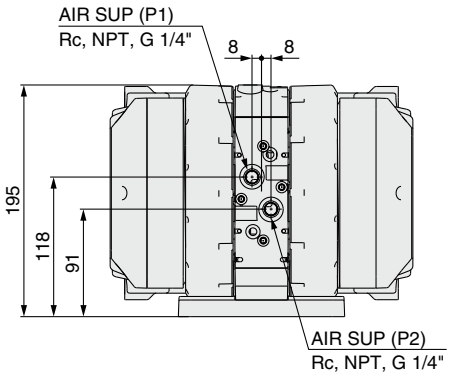


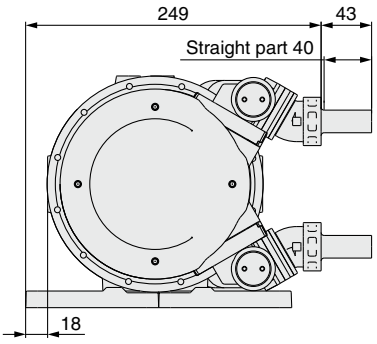


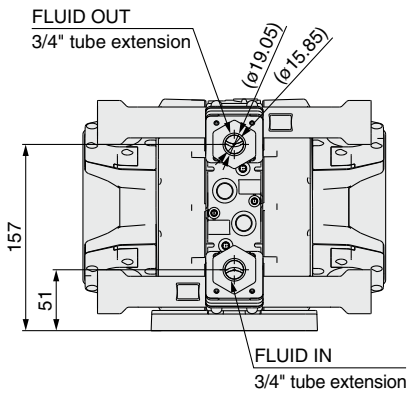


Tube extension: PAF5413-$^{P19}_{P19N}_{P19F}$



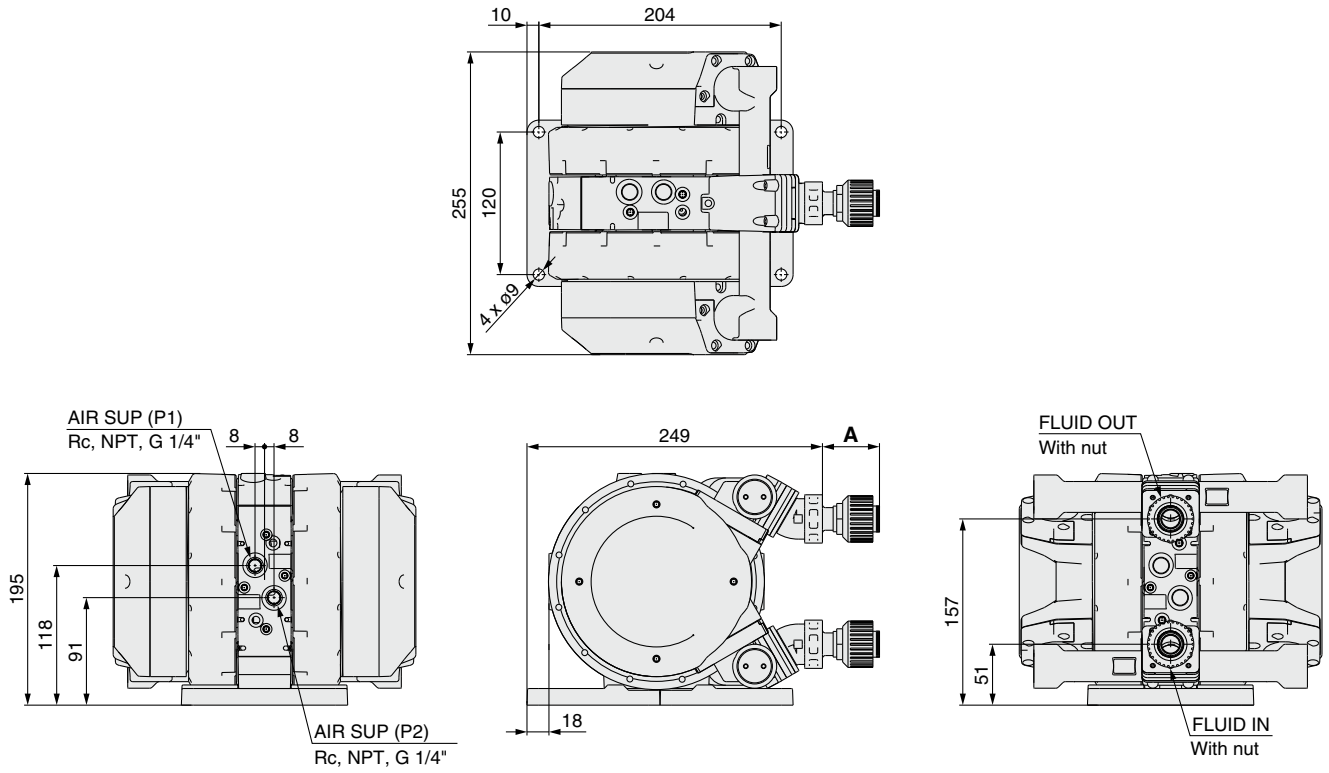






Dimensions: Air Operated Type (PAF5000 Series)

With nut (with LQ1 fittings): PAF5413S-$^{1S19\square}_{1S25\square}$



(mm)

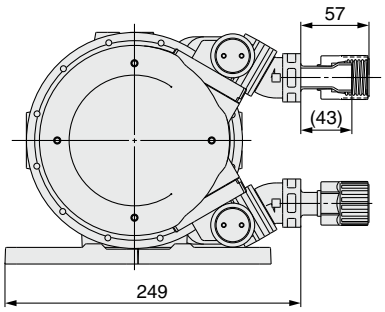
Model	A
PAF5413S-1S19□	48
PAF5413S-1S25□	55

Tube Size Applicable for Nut Size

(Tube size can be altered, using a reducer even within the same nut size.)

Size	Applicable tubing size
5	12 x 10, 19 x 16, 1/2" x 3/8", 3/4" x 5/8"
6	19 x 16, 25 x 22, 3/4" x 5/8", 1" x 7/8"

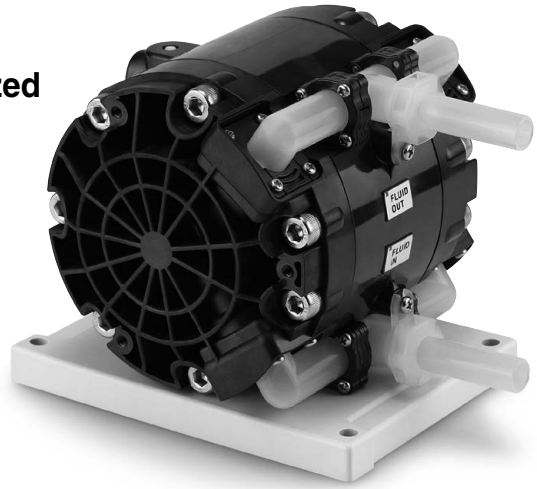
With nut (with LQ3 fittings) : PAF5413S-3S19□



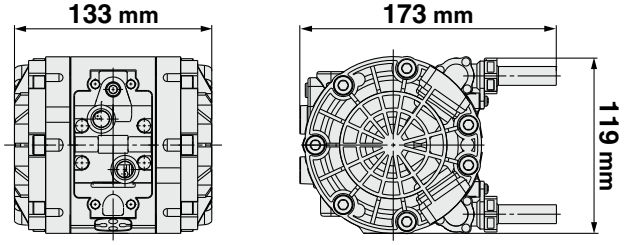
Process Pump Made to Order

PAF3000-X68

Body material	Diaphragm seal material
New PFA	PTFE



- **Compatible with various liquids (DI water (Deionized water), solvent)***
  - ∗ Tightening bolt, Air switching valve: Stainless steel
    Use the PAF series standard products when metal-free pump is necessary for hydrofluoric acid, etc.
- **Lightweight/Compact (PAF3000-X68 without foot)**
  Weight: 1.8 kg



- **PPS/PFA dual construction**
  Withstand pressure and heat cycle performance have been improved.
- **Connection type: Female thread/Tube extension/With nut (Insert bushing type, Flare type)**

Specifications

Model		PAF3410-X68
Operation method		Automatically operated
Port size	Main fluid: Suction/Discharge port	Rc, NPT, G 3/8" Female thread, 1/2" Tube extension, With nut (Size 4, 5)
	Pilot air: Supply/Exhaust port	Rc, NPT, G 1/4" Female thread
Material	Body wetted parts	New PFA
	Diaphragm	PTFE
	Check valve	PTFE, New PFA
	Wetted part seal material	PTFE
Fluid		Refer to the applicable fluids on page 485.
Discharge flow rate		1 to 20 L/min
Average discharge pressure		0 to 0.4 MPa
Pilot air pressure		0.2 to 0.5 MPa (for 0 to 60°C)
Air consumption		230 L/min (ANR) or less
Suction lift	Dry	Up to 1 m (Dry interior of the pump)
	Wet	Up to 4 m (Liquid inside the pump)
Noise		80 dB (A) or less (Option: with silencer, AN20)
Withstand pressure		0.75 MPa
Diaphragm life Note)		50 million cycles (for water)
Fluid temperature		0 to 90°C (No freezing)
Ambient temperature		0 to 70°C (No freezing)
Maximum viscosity		1000 mPa·s
Weight (without foot)		1.8 kg
Mounting orientation		Horizontal (mounting on the bottom surface)
Packaging		General environment

∗ Values in the table are measured at room temperature using fresh water.

Note) These are reference values for room temperature and fresh water. These are not guaranteed. For details, refer to page 489. (Notes on the service life of the diaphragm in the “Specific Product Precautions”)

Process Pump/Wetted Part: Fluoropolymer
Automatically Operated Type (Internal Switching Type)
PAF3000-X68

How to Order

Female thread

PAF3410-□03-□-X68

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G

Port size

Symbol	Port size
03	3/8"

Option

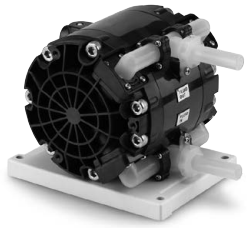
Symbol	Option
Nil	None
B	With foot
N	With silencer **

Products using stainless steel parts (Body tightening bolts, switching valves, etc.)

* When multiple options are required, indicate them in alphabetical order.
** For AIR EXH: AN20-□02 (□: Either Nil or N is entered as a thread symbol.)

Tube extension

PAF3410-P13□-□-X68



Tubing size

Symbol	Main fluid connection size
13	1/2"

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G

Option

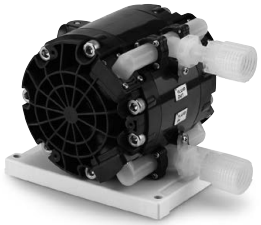
Symbol	Option
Nil	None
B	With foot
N	With silencer **

Products using stainless steel parts (Body tightening bolts, switching valves, etc.)

* When multiple options are required, indicate them in alphabetical order.
** For AIR EXH: AN20-□02 (□: Either Nil or N is entered as a thread symbol.)

With nut

PAF3410S-1S13□-□-X68



Fitting type

Symbol	Fitting type
1	LQ1
3	LQ3

Fitting size

Symbol	IN side	OUT side	Fitting type LQ1	Fitting type LQ3
13	4		●	●
1319	4	5	●	—
1913	5	4	●	—
19	5		●	—

* Refer to page 433 for applicable fittings.

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G

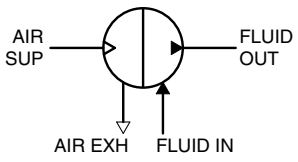
Option

Symbol	Option
Nil	None
B	With foot
N	With silencer **

Products using stainless steel parts (Body tightening bolts, switching valves, etc.)

* When multiple options are required, indicate them in alphabetical order.
** For AIR EXH: AN20-□02 (□: Either Nil or N is entered as a thread symbol.)

Symbol



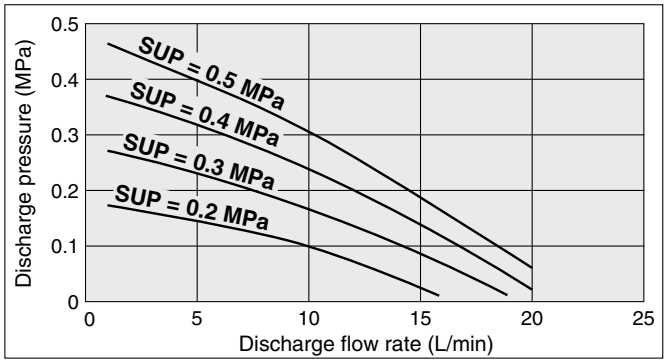
Automatically operated type

Note 1) The port size of the pilot port is 1/4".
Note 2) The thread type is applied to the pilot port thread and the female thread piping connection.
* Refer to pages 483 and 484 for related products.

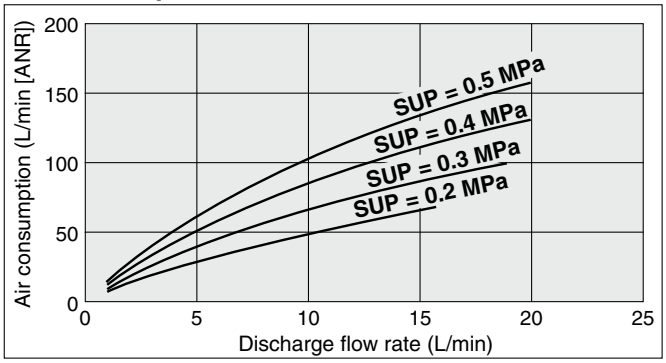
Performance Curve

* SUP: Pilot air pressure

Flow Rate Characteristics



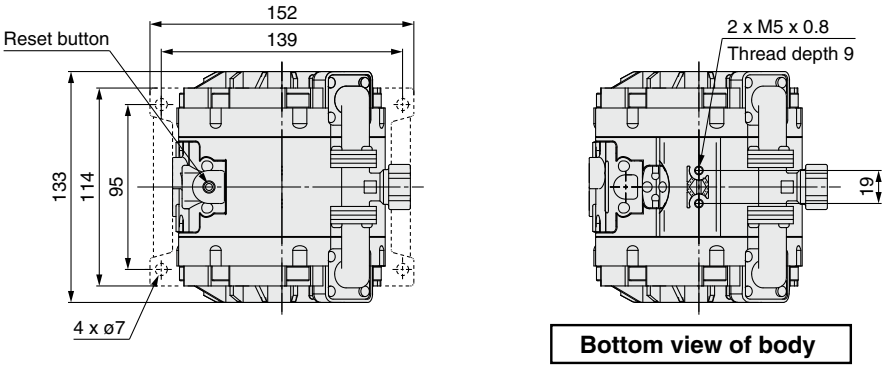
Air Consumption

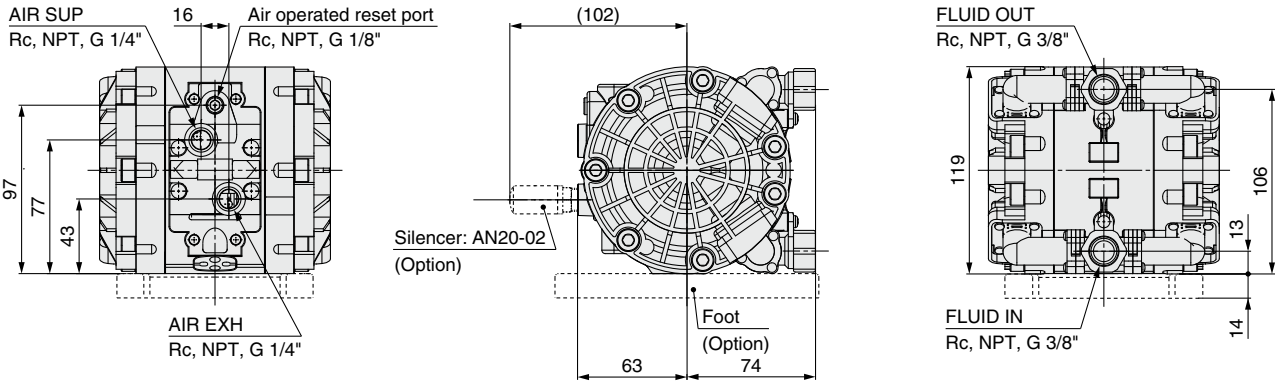


SMC

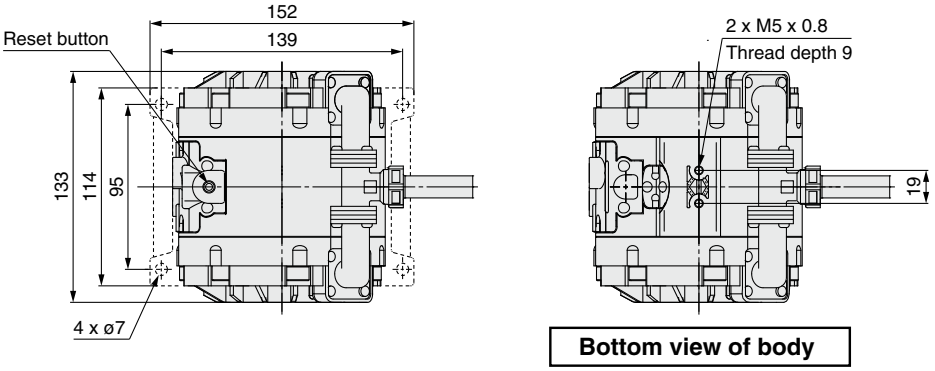
Dimensions: Automatically Operated Type (PAF3000 Series)

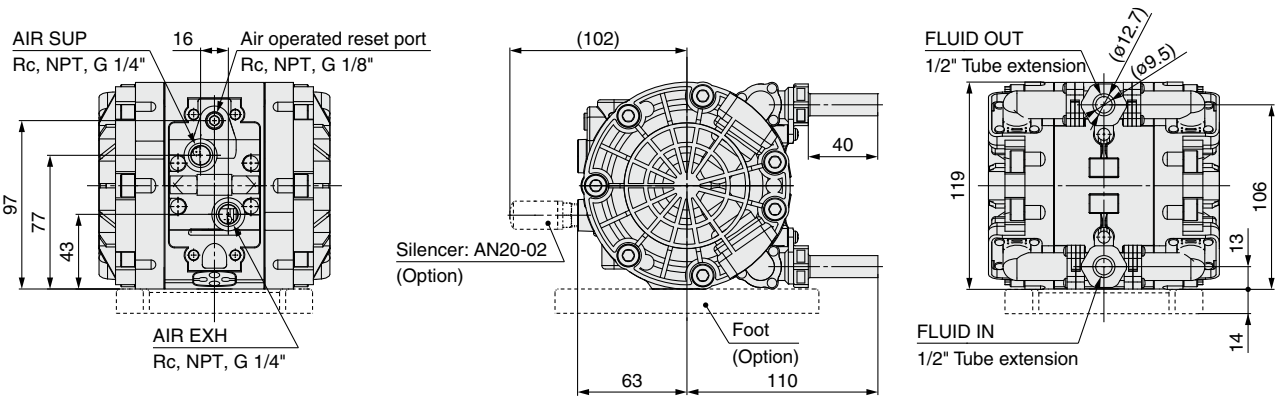
Female thread: PAF3410-$^{03}_{N03}_{F03}$-□-X68





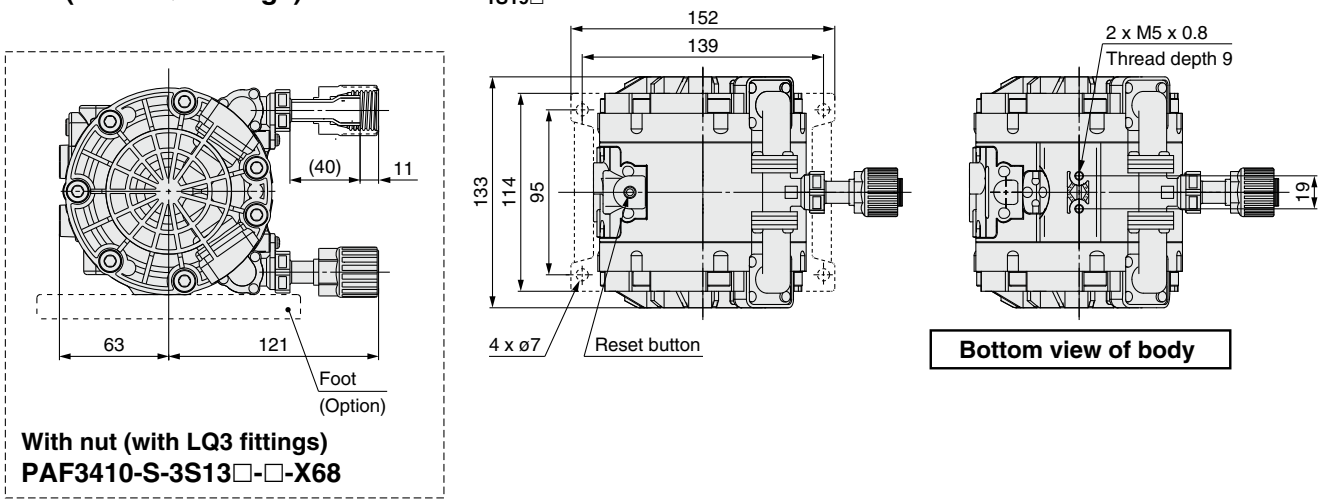
Tube extension: PAF3410-$^{P13}_{P13N}_{P13F}$-□-X68

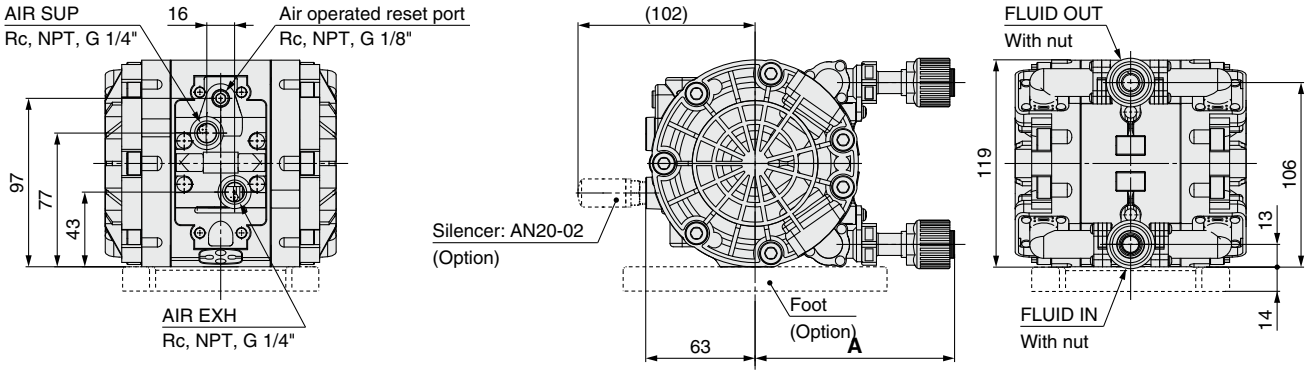




Dimensions: Automatically Operated Type (PAF3000 Series)

With nut (with LQ1 fittings): PAF3410S-$^{1S13\square}_{1S19\square}$-X68





(mm)

Model	A
PAF3410S-1S13□	115
PAF3410S-1S19□	118

Tube Size Applicable for Nut Size

(Tube size can be altered, using a reducer even within the same nut size.)

Size	Applicable tubing size
4	10 x 8, 12 x 10, 3/8" x 1/4", 1/2" x 3/8"
5	12 x 10, 19 x 16, 1/2" x 3/8", 3/4" x 5/8"

Applicable Fluids

Material and Fluid Compatibility Check List for Process Pumps

- The data below is prepared based on data provided by the material manufacturers.
- SMC assumes no responsibility for the accuracy of the data or for any damages arising from the data.
- The material and fluid compatibility check list provides reference values as a guide only; therefore SMC does not guarantee the application to our product.

Table symbols ○: Can be used. ×: Cannot be used.

Model		PAF3410-X68
Body material		New PFA
Diaphragm material		PTFE
Chemical	Acetone	○ Note 1, 2)
	Ammonium hydroxide	○ Note 2)
	Isobutyl alcohol	○ Note 1, 2)
	Isopropyl alcohol	○ Note 1, 2)
	Hydrochloric acid	×
	Ozone water	○
	Hydrogen peroxide Concentration 5% or less, 50°C or less	○
	Ethyl acetate	×
	Butyl acetate	×
	Nitric acid (except fuming nitric acid) Concentration 10% or less	×
	Pure water	○
	Sodium hydroxide Concentration 50% or less	×
	Super pure water	○
	Toluene	○ Note 1, 2)
	Hydrofluoric acid	×
	Sulfuric acid (except fuming sulfuric acid)	×
	Phosphoric acid Concentration 80% or less	×

⚠ Caution

1. Select the wetted parts material in accordance with the transfer liquid for determining the model.
   - Do not use fluid which corrode the wetted parts material.
2. Do not use the products for medical or food applications.
3. The applicability may vary depending on additives. Take note also of additives.
4. The applicability may vary depending on impurities. Take note also of impurities.
5. Examples of transfer liquids are shown in the table on the left. Since the applicability may vary depending on your operating conditions, be sure to check it by means of experimentation.
6. The compatibility shown in the table is when the fluid temperature is within the product specification (90°C or less).

Note 1) Static electricity may be generated. Take measures to prevent static electricity.

Note 2) Fluid may permeate through and affect parts made of other materials.