Fluororesin Type

Process Pump

RoHS

PA(P)3000 Series

The PAP3000 series process pump with an LQ2 nut and the integrated fitting type are to be discontinued as of September 30, 2025.
Order the PAP3000 series process pump with an LQ1 nut instead.

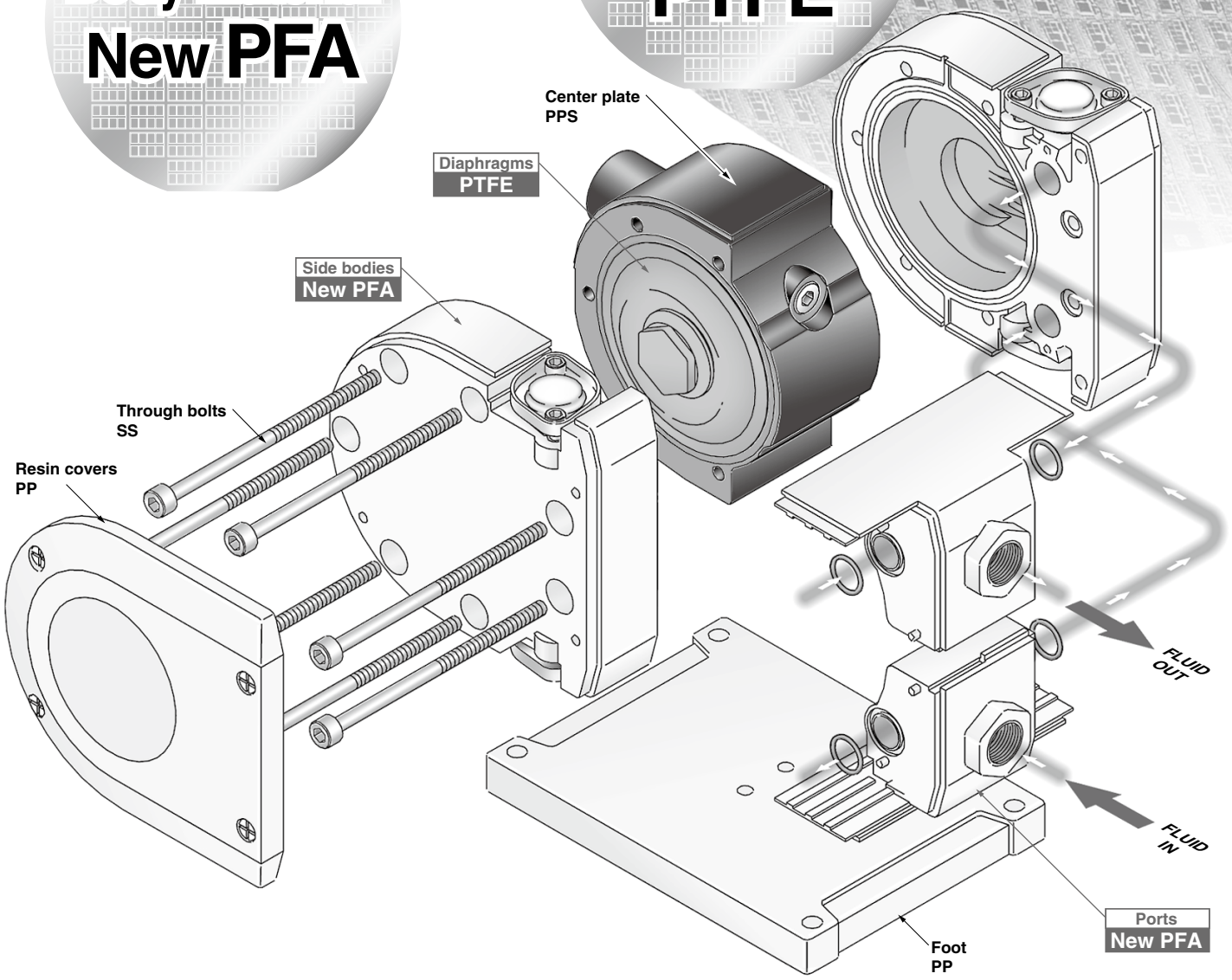
Body material made from New PFA for superior corrosion resistance.*

* Refer to the “Material and Fluid Compatibility Check List for Process Pumps” on page 485. It is your responsibility to check the suitability for your workpiece and equipment.

With the use of New PFA for body material,

Body material
New PFA

Diaphragm material
PTFE



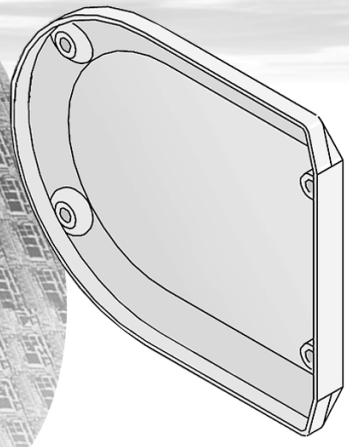
Variations

Model		Body material	Diaphragm material	Assembly environment	Discharge rate (L/min)	Option
Automatically operated type	PA3310	New PFA	PTFE	Standard	1 to 13*	• Foot • Silencer
	PAP3310			Clean room		
Air pilot operated type	PA3313			Standard	0.1 to 9	• Foot
	PAP3313			Clean room		

* With 3/8" inlet/outlet tube: 1 to 12

high corrosion resistance is achieved!*

* Refer to the “Material and Fluid Compatibility Check List for Process Pumps” on page 485. It is your responsibility to check the suitability for your workpiece and equipment.



Clean

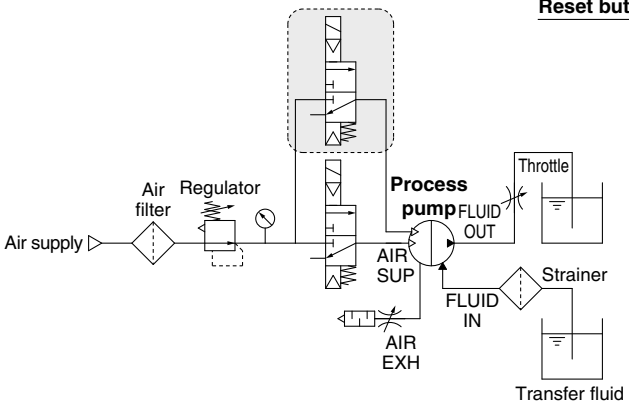
You can order your process pump assembled in a Clean room environment and double-packaged (Order number PAP331□).
Side bodies and ports are molded to achieve a great reduction in dust generation.

Air pilot actuation reset is now a standard feature.

When the pump is used in an environment where manual reset is not possible, designing a circuit as the one shown below allows the use of air pressure for reset purposes.

With the use of an air pilot actuation reset circuit, resetting can be done by releasing the air pressure after supplying it to the reset port.

Air pilot actuation reset circuit



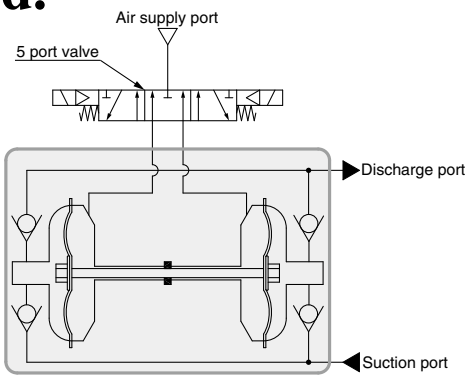
Compact & Lightweight (Without foot)

Weight: 2.1 kg

Air pilot actuation is standard.

External switching valve control makes constant cycling possible.

- **Discharge rate is easily controlled.**
  The flow rate can be easily adjusted by the number of ON/OFF cycles of the external solenoid valve.
- **Stable operation is possible in spite of such conditions as a minimal flow rate, low pressure operation, or the entrainment of gasses.**
- **Can be used for operation with repetitive stopping.**



Process Pump Clean Room
Automatically Operated Type (Internal Switching Type)
Air Operated Type (External Switching Type)
PA(P)3000 Series RoHS

How to Order

Female thread PA P 331 0 – □ 03 – □

Actuation Note 1)

Symbol	Actuation
0	Automatically operated
3	Air operated

Assembly environment

Symbol	Assembly environment
Nil	Standard
P	Clean room

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G
T	NPTF

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 PAP331 0 – P 13 □ – □

Actuation Note 1)

Symbol	Actuation
0	Automatically operated
3	Air operated

Assembly environment

Symbol	Assembly environment
P	Clean room

Tubing size

Symbol	Main fluid connection size
11	3/8"
13	1/2"

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G
T	NPTF

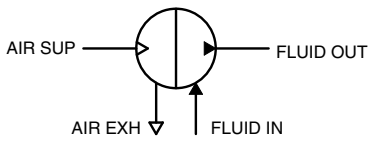
Option

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

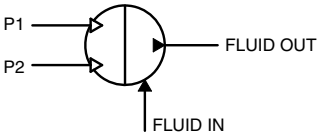
* When option is more than one, suffix in alphabetical order.
** For AIR EXH: AN20-□02
(□: Either Nil or N is entered as a thread symbol.)

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.

Symbol



Automatically operated type



Air operated type

The PAP3000 series process pump with an LQ2 nut and the integrated fitting type are to be discontinued as of September 30, 2025.
Order the PAP3000 series process pump with an LQ1 nut instead.

With nut

PAP331 0 S − 1 S 13 □ − □

Assembly environment

Symbol	Assembly environment
P	Clean room

Actuation Note 1)

Symbol	Actuation
0	Automatically operated
3	Air operated

Fitting type

Symbol	Fitting type
1	LQ1
2	LQ2

Fitting size

Symbol	IN side	OUT side
11	3	3
1113	3	4
1311	4	3
13	4	4
1319	4	5
1913	5	4
19	5	5

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G
T	NPTF

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.)

Integrated fitting type

PAP331 0 − S 13 □ − □

Assembly environment

Symbol	Assembly environment
P	Clean room

Actuation Note 1)

Symbol	Actuation
0	Automatically operated
3	Air operated

Fitting size

Symbol	Fitting size
11	LQ2 3/8"
13	LQ2 1/2"

Thread type Note 2)

Symbol	Type
Nil	Rc
N	NPT
F	G
T	NPTF

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.)

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.
Note 3) Refer to the pamphlet “High-Purity Fluoropolymer Fittings Hyper Fitting/LQ1, 2 series Work Procedure Instructions” (M-E05-1) for connecting tubing with special tools. (Downloadable from our website.)

Specifications

Model		PA3310	PAP3310	PA3313	PAP3313
Actuation		Automatically operated		Air operated	
Port size	Main fluid suction discharge port	Rc, NPT, G, NPTF 3/8" Female thread	Rc, NPT, G, NPTF 3/8" Female thread 3/8", 1/2" Tube extension With nut (size 3, 4, 5) 3/8", 1/2" Integrated fitting type	Rc, NPT, G, NPTF 3/8" Female thread	Rc, NPT, G, NPTF 3/8" Female thread 3/8", 1/2" Tube extension With nut (size 3, 4, 5) 3/8", 1/2" Integrated fitting type
	Pilot air supply/exhaust port	Rc, NPT, G, NPTF 1/4" Female thread			
Material	Body wetted areas	New PFA			
	Diaphragm	PTFE			
	Check valve	PTFE, New PFA			
Fluid		Refer to the applicable fluids on page 485.			
Discharge rate		1 to 13 L/min Note 1)		0.1 to 9 L/min	
Average discharge pressure		0 to 0.4 MPa			
Pilot air pressure		0.2 to 0.5 MPa			
Pilot air consumption		140 L/min (ANR) or less			
Suction lifting range	Dry	Up to 0.5 m (Interior of pump dry)			
	Wet	Up to 4 m (liquid inside pump)			
Noise		80 dB (A) or less (Option: with silencer, AN20)		75 dB (A) or less (excluding the noise from the quick exhaust and solenoid valve)	
Withstand pressure		0.75 MPa			
Diaphragm life Note 2)		50 million times			
Fluid temperature		0 to 100°C (No freezing, heat cycle not applied)			
Ambient temperature		0 to 100°C (No freezing, heat cycle not applied)			
Maximum viscosity		1000 mPa·s			
Recommended operating cycle		—		2 to 4 Hz	
Weight		2.1 kg (without foot)			
Mounting orientation		Horizontal (with mounting foot at bottom)			
Packaging		General environment	Clean double packaging	General environment	Clean double packaging

∗ Each value of above represents at normal temperatures with fresh water.
∗ For related products, refer to pages 483 and 484.
Note 1) The discharge rates for PAP3310-P11, PAP3310S-□S11, PAP3310S-□S1113, PAP3310S-□S1311, PAP3310-S11 are between 1 to 12 L/min.
Note 2) 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")

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.

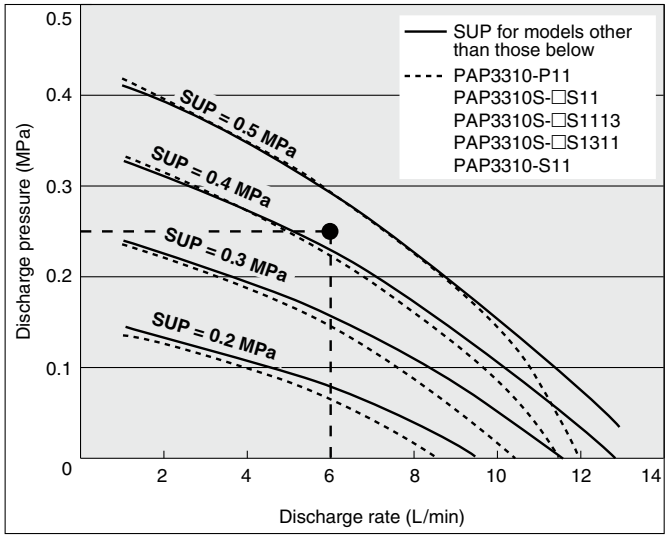
PA(P)3000 Series

Description	PA(P)3000 series			
	PA3310	PA3313	PAP3310	PAP3313
Diaphragm kit	KT-PA3-531		KT-PAP3-531	
Check valve kit	KT-PA3-536#1		KT-PAP3-536#1	
Pilot valve kit	KT-PA3-538	—	KT-PA3-538	—
Manual cap assembly kit	KT-PA3-545□ Note)	—	KT-PA3-545□ Note)	—
Foot kit	KT-PA3-40		KT-PAP3-40	
Switching valve parts kit	KT-PA3-537□ Note)	—	KT-PA3-537□ Note)	—

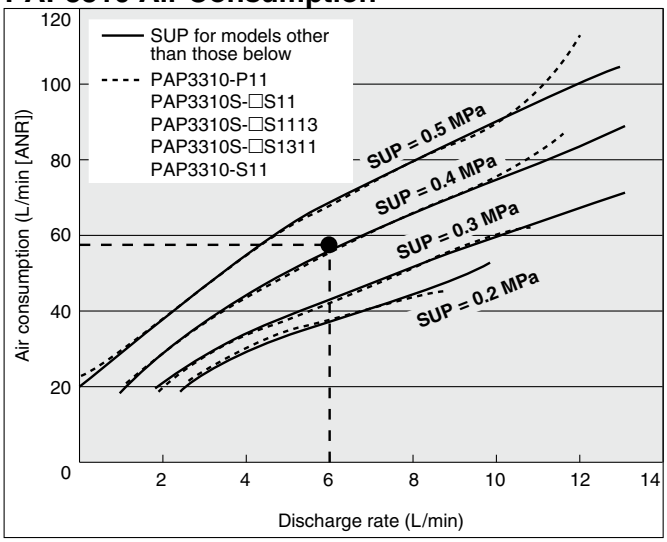
∗ The maintenance procedure is to be distributed individually. Please contact your SMC sales representative for details.
Note) One of Nil, N, F or T is entered as a thread symbol.

Performance Curve: Automatically Operated Type

PAP3310 Flow Rate Characteristics



PAP3310 Air Consumption



Selection from Flow Rate Characteristic Graph (PAP3310)

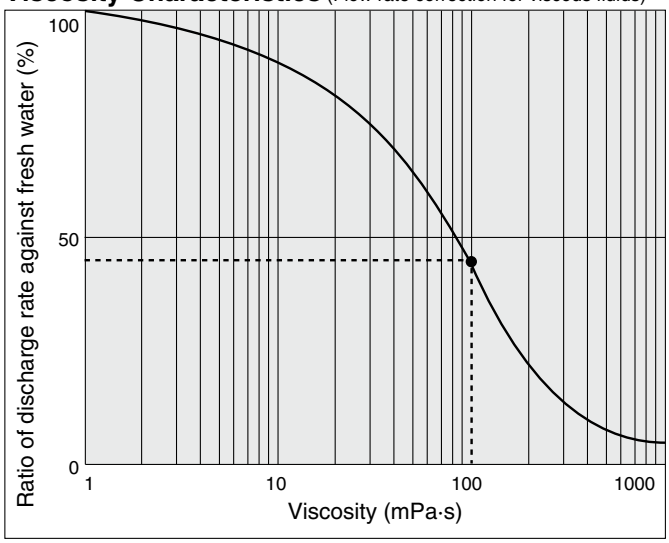
Required specifications example:
Find the pilot air pressure and pilot air consumption for a discharge rate of 6 L/min and a discharge pressure of 0.25 MPa. <The transfer fluid is fresh water (viscosity 1 mPa·s, specific gravity 1.0).
∗ If the total lifting height is required instead of the discharge pressure, a 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 a 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 (solid lines) for SUP = 0.4 MPa and SUP = 0.5 MPa, and based on the proportional relationship to these lines, the pilot air pressure for this point is approximately 0.43 MPa.
3. Next find the air consumption rate. Find the intersection point for a discharge rate of 6 L/min and a discharge curve (solid line) for SUP = 0.43 MP a. Draw a line from this point to the Y axis to determine the air consumption rate. The result should be approx. 58 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, 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

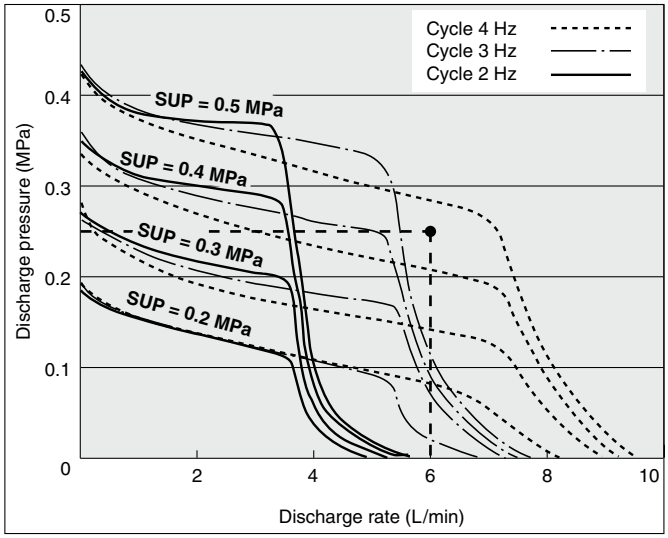
Viscosities up to 1000 mPa·s can be used.
Dynamic viscosity ν = Viscosity μ/Density ρ.

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

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

Performance Curve: Air Operated Type

PAP3313 Flow Rate Characteristics



Selection from Flow Rate Characteristic Graph (PAP3313)

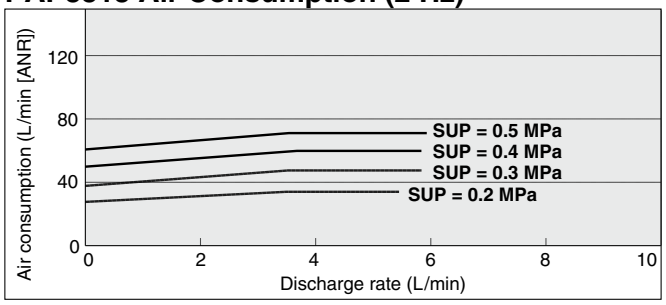
Required specification example: Find the pilot air pressure for a discharge rate of 6 L/min, a discharge pressure of 0.25 MPa, and a cycle of 4 Hz. <The transfer fluid is fresh water (viscosity 1 mPa·s, specific gravity 1.0).>

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

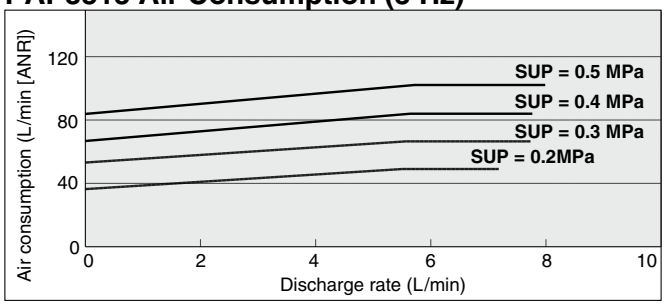
Selection procedures:

1. First mark the intersection point for a discharge rate of 6 L/min and a 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 (solid lines) for SUP = 0.4 MPa and SUP = 0.5 MPa, and based on the proportional relationship to these lines, the pilot air pressure for this point is approximately 0.45 MPa.

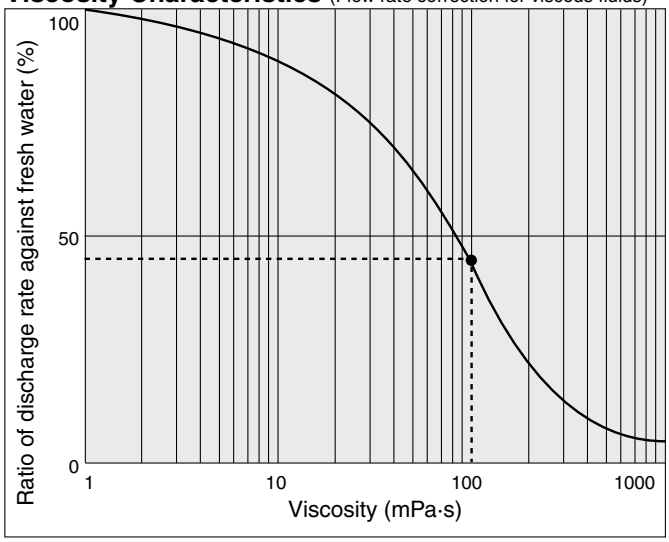
PAP3313 Air Consumption (2 Hz)



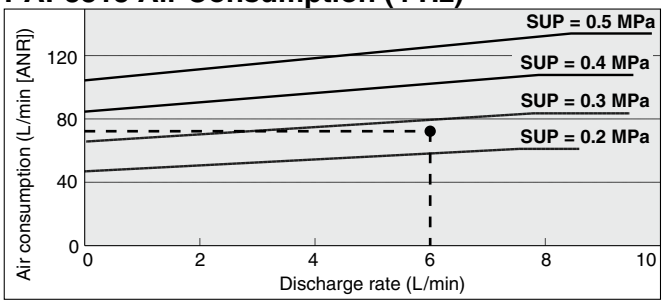
PAP3313 Air Consumption (3 Hz)



Viscosity Characteristics (Flow rate correction for viscous fluids)



PAP3313 Air Consumption (4 Hz)



Calculating Air Consumption (PAP3313)

Required specifications example:

Find the pilot air consumption for a discharge rate of 6 L/min, a cycle of 4 Hz and a pilot air pressure of 0.25 MPa.

Selection procedures:

1. In the graph for air consumption (4 Hz), start at a discharge rate of 6 L/min.
2. Mark where this point intersects with the air consumption rate. Based on the proportional relationship between these lines, the intersection point will be between the discharge curves SUP = 0.2 MPa and SUP = 0.3 MPa.
3. From the point just found, draw a line to the Y-axis to find the air consumption. The result is approximately 70 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).

Selection from Viscosity Characteristic Graph

Required specification example: Find the pilot air pressure 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 100m Pa·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.

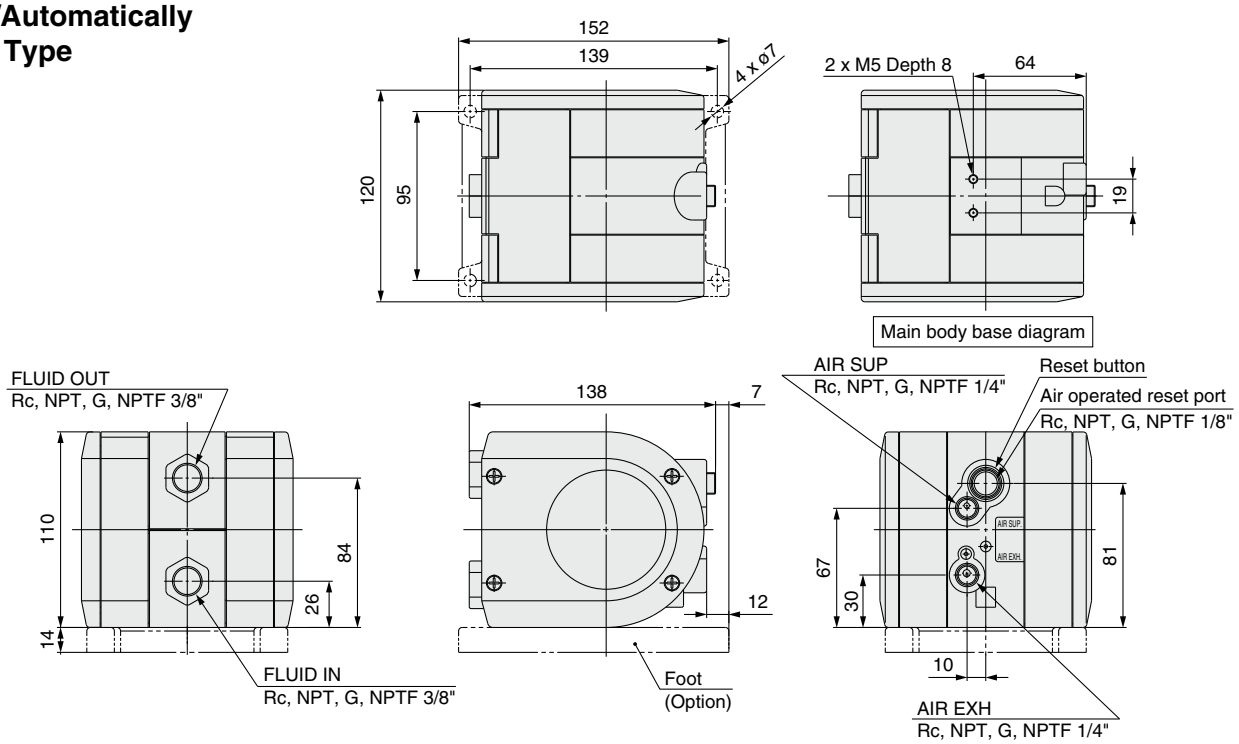
Dynamic viscosity ν = Viscosity μ/Density ρ.

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

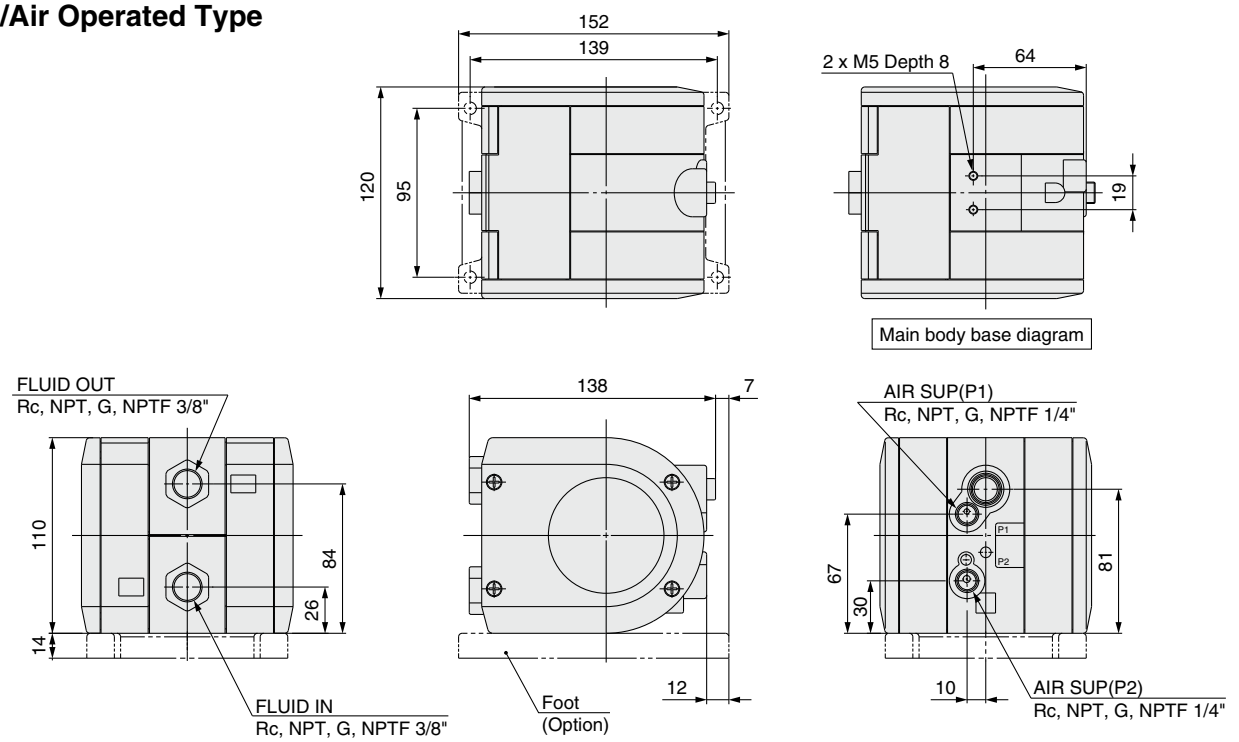
$\nu(10^{-3}\ m^2/s) = \mu(mPa{\cdot}s)/\rho(kg/m^3)$

Dimensions

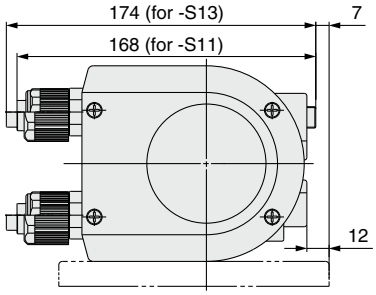
PAP3310/Automatically Operated Type



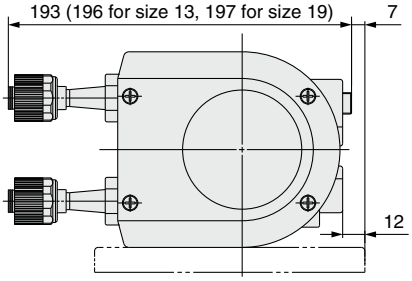
PAP3313/Air Operated Type



Integrated fitting type



With nut



Tube extension