

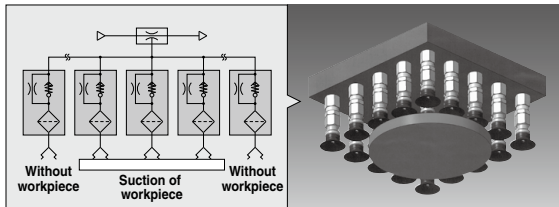
Vacuum Saving Valve

ZP2V Series

● Can restrict the reduction of vacuum pressure even when there is no workpiece.

When multiple vacuum pads are operated by one vacuum generator, and some of them are not holding the workpiece, the reduction of vacuum pressure is restricted and the workpiece can remain held by the rest of pads.

With One-touch fitting type available!



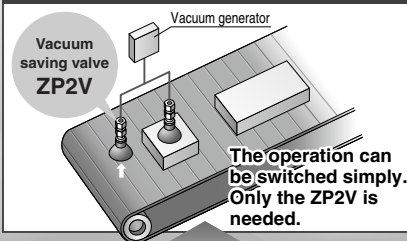
		Pad side		
		Male thread	Female thread	With One-touch fitting
Vacuum generator side	Male thread	★	●	
	Female thread	●	★	
	With One-touch fitting	★	★	★

★ New variations

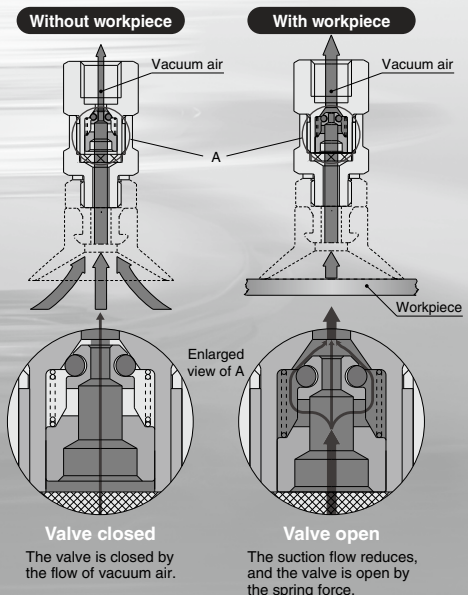
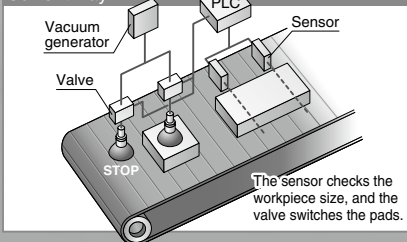
● No need for switching operation when changing workpieces

When the work pieces have different shapes, the control circuit can be simplified.

Use of ZP2V



Current way



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Calculate the number of vacuum saving valves that can be used with one vacuum generator.

Selection Conditions

Workpiece: No leakage and several sizes
Required vacuum pressure: -50 kPa or more of vacuum pressure per vacuum pad
Part number of vacuum saving valve used: ZP2V-A8-05
(Connection thread size for pad side: M8, Fixed orifice size: ø0.5)

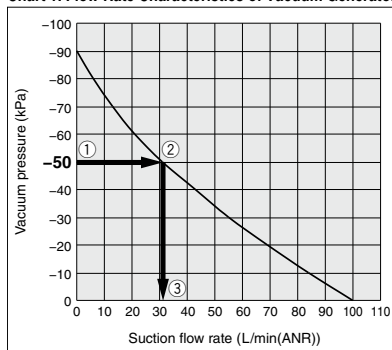
1 Check the flow rate characteristics of the vacuum generator used.

From the flow rate characteristics of the vacuum generator (**Chart 1**), calculate the suction flow rate of the vacuum generator (**Q1**) from the required vacuum pressure.

Vacuum pressure - 50 kPa (① → ② → ③) =

Suction flow rate (**Q1**) = 31 L/min (ANR).

Chart 1. Flow Rate Characteristics of Vacuum Generator



2 Calculate the number of vacuum saving valves (N).

Find the minimum operating flow rate (**Q2**) and the suction flow rate of the vacuum generator (**Q1**) in the specifications on page 629, and calculate the number of vacuum saving valves (**N**) that can be used with one vacuum generator.

$$\text{Number of vacuum saving valves (N)} = \frac{\text{Suction flow rate of the vacuum generator (Q1)}}{\text{Minimum operating flow rate (Q2)}}$$

Example) Vacuum saving valve used: ZP2V-A8-05

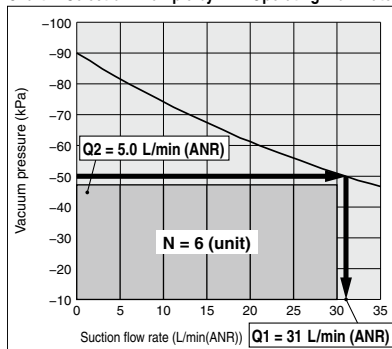
From **Table 1**, **Q2** can be calculated as 5.0 L/min (ANR).

$$N = \frac{31 \{ \text{L/min(ANR)} \}}{5 \{ \text{L/min(ANR)} \}} \approx 6 \text{ (unit)}$$

Table 1. Relationship between Minimum Operating Flow Rate and Fixed Orifice Size

Connection thread size for pad side	M8
Fixed orifice size (mm)	0.5
Minimum operating flow rate (L/min(ANR)) Q2	5.0

Chart 2. Selection Example by Min. Operating Flow Rate



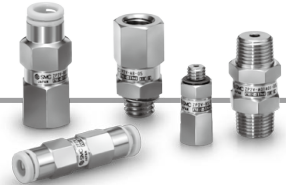
The above selection example is based on a general method under the given selection conditions, and may not always be applicable. For vacuum piping, select equipment and piping so that the "Minimum operating flow rate" in the specifications on page 629 is secured. A final decision on operating conditions should be made based on test results performed at the responsibility of the customer.

Vacuum Saving Valve

ZP2V Series

How to Order

ZP2V - **A5** - **03**



Connection size (Pad side/Vacuum generator side) •

Male thread/Female thread

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side Female thread
	Male thread	Female thread	0.3	0.5	0.7	1.0	
A5	M5 x 0.8		○	○	○	—	
A8	M8 x 1.25		—	○	○	○	
A01	R1/8	Rc1/8	—	○	○	○	
AG1	G1/8		—	○	○	○	
AN1	NPT1/8		—	○	○	○	

• Fixed orifice size

Symbol	Fixed orifice size (mm)
03	0.3
05	0.5
07	0.7
10	1.0

Female thread/Male thread

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side Male thread
	Female thread	Male thread	0.3	0.5	0.7	1.0	
B5	M5 x 0.8		○	○	○	—	
B6	M6 x 1		—	○	○	○	
B01	Rc1/8	R1/8	—	○	○	○	
BG1	G1/8		—	○	○	○	
BN1	NPT1/8		—	○	○	○	

Male thread/One-touch fitting

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side One-touch fitting
	Male thread	One-touch fitting	0.3	0.5	0.7	1.0	
A5W4	M5 x 0.8	ø4	○	○	○	—	
A01W6	R1/8	ø6	—	○	○	○	
AG1W6	G1/8	ø6	—	○	○	○	

Female thread/One-touch fitting

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side One-touch fitting
	Female thread	One-touch fitting	0.3	0.5	0.7	1.0	
B5W4	M5 x 0.8	ø4	○	○	○	—	
B01W6	Rc1/8	ø6	—	○	○	○	
BG1W6	G1/8	ø6	—	○	○	○	

Male thread/Male thread

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side Male thread
	Male thread	Male thread	0.3	0.5	0.7	1.0	
A5A5	M5 x 0.8		○	○	○	—	
A01A01	R1/8		—	○	○	○	
AG1AG1	G1/8		—	○	○	○	

Female thread/Female thread

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side Female thread
	Female thread	Female thread	0.3	0.5	0.7	1.0	
B5B5	M5 x 0.8		○	○	○	—	
B01B01	Rc1/8		—	○	○	○	
BG1BG1	G1/8		—	○	○	○	

One-touch fitting/One-touch fitting

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side One-touch fitting
	One-touch fitting	One-touch fitting	0.3	0.5	0.7	1.0	
W4		ø4	○	○	○	—	
W6		ø6	—	○	○	○	

Specifications

Connection size for pad side		M5, M6, ø4			M8, R1/8, Rc1/8, G1/8, NPT1/8, ø6		
Fixed orifice size (mm)		0.3	0.5	0.7	0.5	0.7	1.0
Effective area	When the valve is operating (mm ²)	0.07	0.19	0.38	0.19	0.38	0.78
	When the valve is not operating (mm ²)	1.64	1.76	1.95	1.76	2.64	3.04
Fluid		Air					
Max. operating pressure range (MPa)		0 to 0.7					
Max. operating vacuum pressure range (kPa)		0 to -100					
Ambient and fluid temperature (°C)		5 to 60 (No freezing)					
Element nominal filtration rating (μm)		40					
Min. operating flow rate (L/min (ANR))		3	5	8	5	8	16



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Working Principle

	Initial condition	When a workpiece is sucked		When a workpiece is released
		Without workpiece	With workpiece	
Air flow				
Valve operating condition	<p>Since there is no air flow, the valve remains open by the spring force.</p>	<p>Valve closed</p> <p>When the workpiece is separated from the vacuum pad, the valve is closed by the air flow, and the suction air can only flow through the fixed orifice. At this time, an amount of air corresponding to the fixed orifice size is sucked.</p>	<p>Valve open</p> <p>When the workpiece is sucked by the vacuum pad, the suction flow reduces, and the valve is open by the spring force, which opens the path between the valve and the body for suction.</p>	<p>Valve open</p> <p>When the workpiece is released, the valve is open by the vacuum release air, and the path between the valve and the body will open.</p>

Construction

Pad side

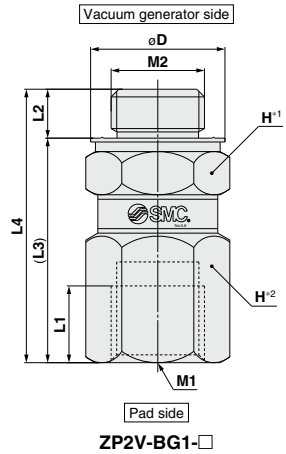
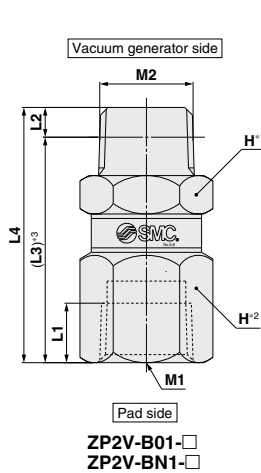
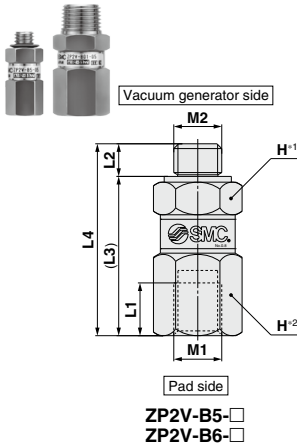
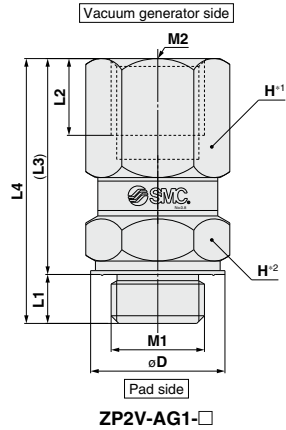
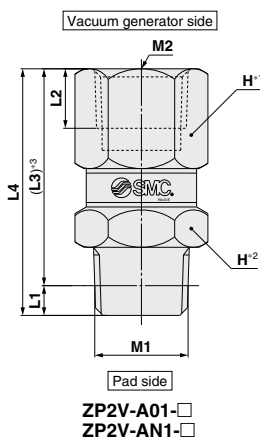
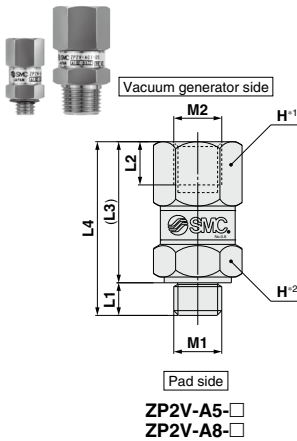
Vacuum generator side

Pad side

* For the mounting direction of the product, refer to page 635.

No.	Description	Material	Surface treatment
1	Body A	Brass	Electroless nickel plating
2	Body B	Brass	Electroless nickel plating
3	Valve	Aluminum	—
4	O-ring	HNBR	—
5	Spring	Stainless steel	—
6	Element	CAC403 equivalent	—
7	Gasket	NBR + Stainless steel	—

Dimensions



- *1 The place at the vacuum generator side where the tool is applied.
*2 The place at the pad side where the tool is applied.
*3 The referential dimension after the R or NPT thread is screwed.

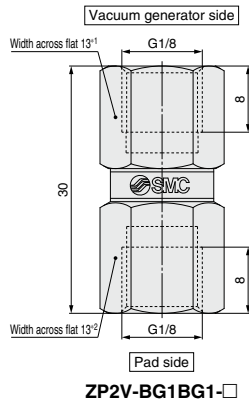
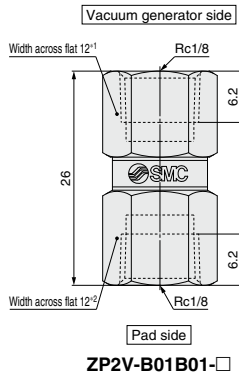
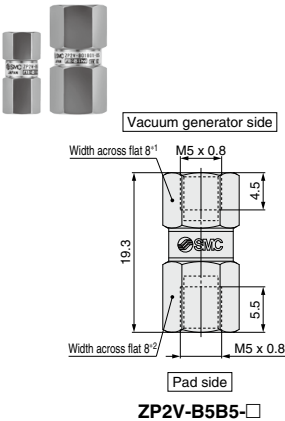
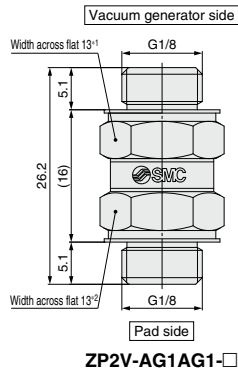
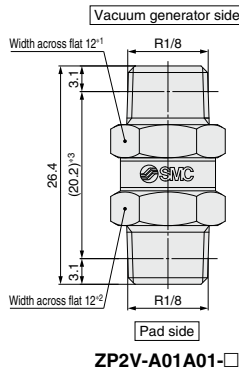
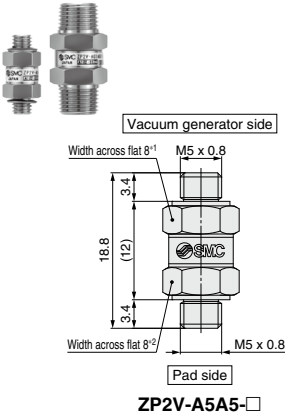
Model	M1	M2	L1	L2	L3	L4	H (Width across flat)	øD	W (g)	Tightening torque (N·m) ^(Note)
ZP2V-A5-□	M5 x 0.8	M5 x 0.8	3.4	4.5	14.7	18.1	8	—	6	1.0 to 1.5
ZP2V-A8-□	M8 x 1.25	M8 x 1.25	5.9	8	20.1	26	12	—	18	5.5 to 6.0
ZP2V-A01-□	R1/8	Rc1/8	3.1	6.2	22.6	25.7	12	—	18	7.0 to 9.0
ZP2V-AG1-□	G1/8	G1/8	5.1	8	22.5	27.6	13	14	23	5.5 to 6.0
ZP2V-A01-□	NPT1/8	NPT1/8	3.2	6.9	23.3	26.5	12	—	19	7.0 to 9.0
ZP2V-B5-□	M5 x 0.8	M5 x 0.8	5.5	3.4	16.6	20	8	—	7	1.0 to 1.5
ZP2V-B6-□	M6 x 1	M6 x 1	5	4.5	16.2	20.7	8	—	7	2.0 to 2.5
ZP2V-B01-□	Rc1/8	R1/8	6.2	3.1	23.5	26.6	12	—	19	7.0 to 9.0
ZP2V-BG1-□	G1/8	G1/8	8	5.1	23.4	28.5	13	14	24	5.5 to 6.0
ZP2V-B01-□	NPT1/8	NPT1/8	6.9	3.2	24.2	27.4	12	—	19	7.0 to 9.0

Note) When mounting and/or removing the product, apply a wrench or torque wrench to the place shown in Figure.
When mounting the product, tighten to the torque specified in the table.



ZP2V Series

Dimensions

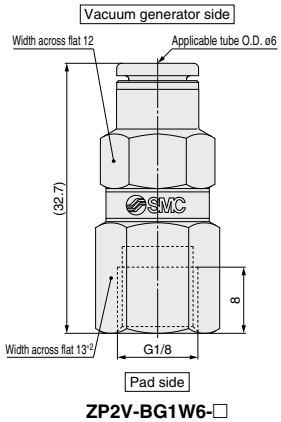
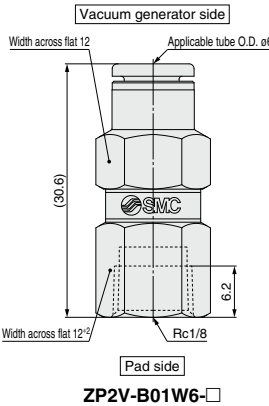
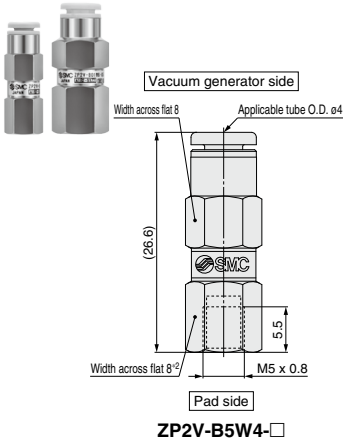
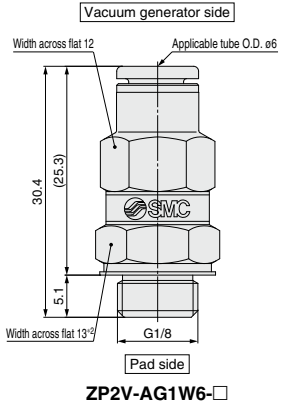
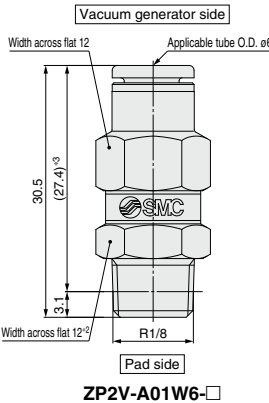
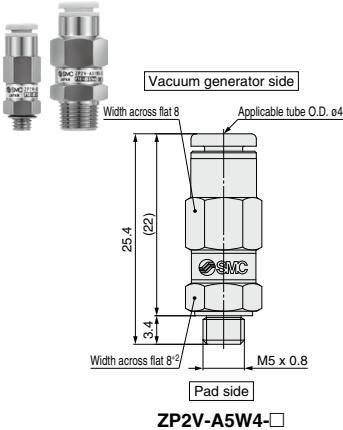


Model	Connection thread size		W (g)	Tightening torque (N·m) ^(Note)
	Pad side	Vacuum generator side		
ZP2V-A5A5-□	M5 x 0.8	M5 x 0.8	6	1.0 to 1.5
ZP2V-A01A01-□	R1/8	R1/8	19	7.0 to 9.0
ZP2V-AG1AG1-□	G1/8	G1/8	22	5.5 to 6.0
ZP2V-B5B5-□	M5 x 0.8	M5 x 0.8	7	1.0 to 1.5
ZP2V-B01B01-□	Rc1/8	Rc1/8	17	7.0 to 9.0
ZP2V-BG1BG1-□	G1/8	G1/8	24	5.5 to 6.0

Note) When mounting and/or removing the product, apply a wrench or torque wrench to the place shown in Figure.
When mounting the product, tighten to the torque specified in the table.

- *1 The place at the vacuum generator side where the tool is applied.
- *2 The place at the pad side where the tool is applied.
- *3 The referential dimension after the R thread is screwed.

Dimensions



Model	Connection thread size		W (g)	Tightening torque (N·m) ^(*)
	Pad side	Vacuum generator side		
ZP2V-A5W4-□	M5 x 0.8	$\phi 4$	6	1.0 to 1.5
ZP2V-A01W6-□	R1/8	$\phi 6$	18	7.0 to 9.0
ZP2V-AG1W6-□	G1/8	$\phi 6$	20	5.5 to 6.0
ZP2V-B5W4-□	M5 x 0.8	$\phi 4$	7	1.0 to 1.5
ZP2V-B01W6-□	Rc1/8	$\phi 6$	17	7.0 to 9.0
ZP2V-BG1W6-□	G1/8	$\phi 6$	21	5.5 to 6.0

Note) When mounting and/or removing the product, apply a wrench or torque wrench to the place shown in Figure.
When mounting the product, tighten to the torque specified in the table.

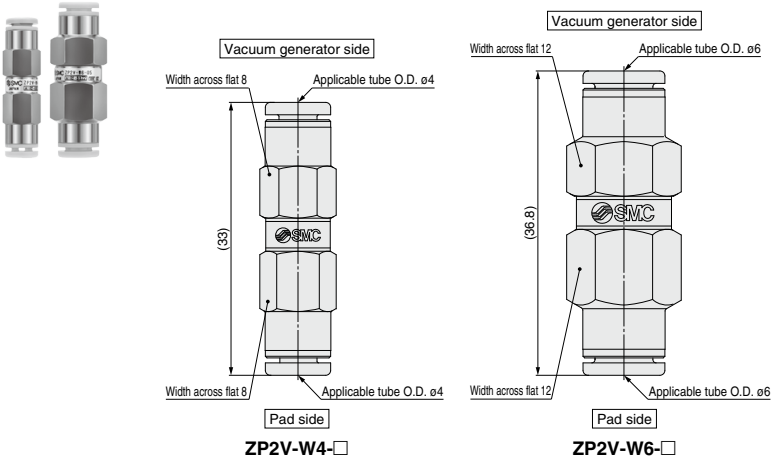
- *1 The place at the vacuum generator side where the tool is applied.
- *2 The place at the pad side where the tool is applied.
- *3 The referential dimension after the R thread is screwed.

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Dimensions



Model	Connection thread size		W (g)	Tightening torque (N·m) ^{Note)}
	Pad side	Vacuum generator side		
ZP2V-W4-□	ø4	ø4	7	—
ZP2V-W6-□	ø6	ø6	19	—



ZP2V Series

Specific Product Precautions

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 49 to 51 for Vacuum Equipment Precautions.

1. The product is not equipped with a vacuum holding function, and cannot be used for the purpose of holding vacuum.
2. Determine the number of products to be used by selection, and keep the recommended pad diameter per product shown in Table 1. Also, check the operation with the customer's machine sufficiently beforehand.

Table 1. Recommended Pad Diameter per Product

Connection thread symbol for pad side	A5	B5	W4	A8	A01	B01	AG1	BG1	AN1	BN1	W6
Thread size	M5		—	M8	R1/8	Rc1/8	G1/8		NPT1/8		—
Recommended pad diameter (mm)	25 or less			32 to 50							

3. Do not disassemble the product. Once the product is disassembled and reassembled, it will not be able to satisfy the original performance.
4. When piping, do not get the pad side and vacuum generator side of the product the wrong way round. (Refer to Fig. 1.)

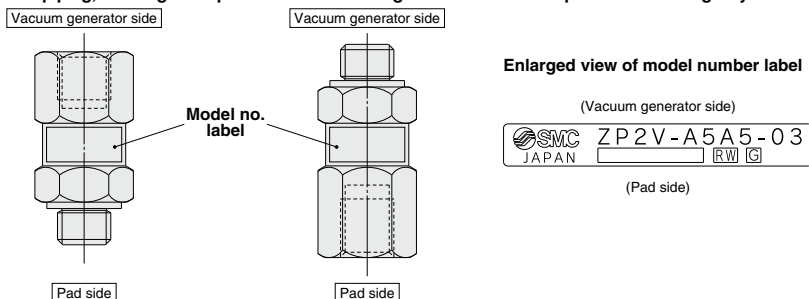


Fig. 1. Mounting direction

5. For mounting and/or removing the product, strictly follow the instructions below.

When mounting and/or removing the product, use the specified places shown in pages 631 to 633 to apply tools. Also, when mounting the product, tighten to the specified torque shown in pages 631 to 633. Excessive torque or applying a tool to places other than the specified place can cause damage or loss of original performance.

6. The reduction of vacuum pressure while the workpiece is sucked and released depends on the flow rate characteristics of the vacuum generator. Check the flow rate characteristics of the vacuum generator before checking the operation with the customer's machine.
7. When the built-in element of the product gets clogged, replace the whole product.
8. When verifying the suction using such as a pressure sensor, check the operation with the customer's machine sufficiently beforehand.
9. If there is leakage between the pad and a workpiece, for example if the workpiece is permeable, the number of products that can be used with one vacuum generator is reduced.
Take the leakage between the pad and workpiece into account and check the operation with the customer's machine sufficiently beforehand.
10. Any mounting direction is available with this product. (Upward or lateral mounting is also available.)
11. For vacuum piping, select equipment and piping so that the "Minimum operating flow rate" in the specifications on page 629 is secured.

Make sure that there are no unnecessary restrictions or leaks, etc., along the course of the piping.

If the minimum operating flow rate listed in the specifications is not secured, operation will be unstable, which may lead to suction failure or cause damage to internal parts.

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