

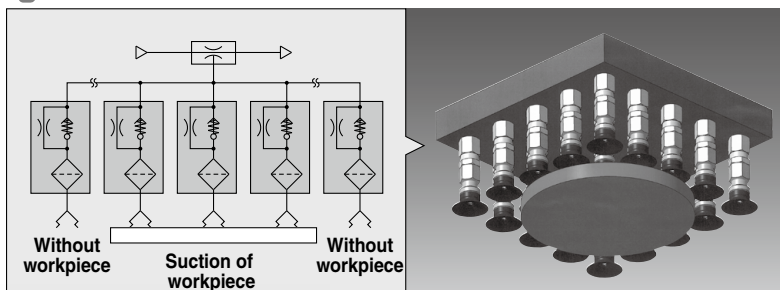
Vacuum Saving Valve **ZP2V Series**

Model
Selection

● 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!



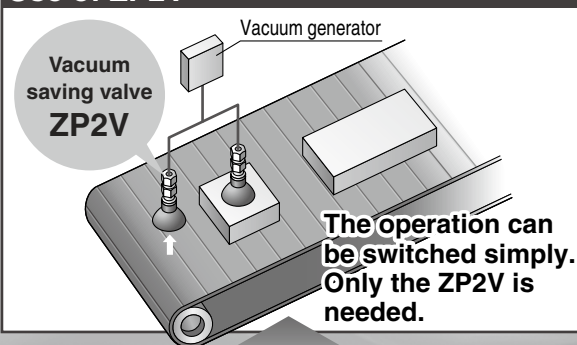
		Pad side		
		Male thread	Female thread	With One-touch fitting
Vacuum generator side	Male thread	★	●	
	Female thread	●	★	
	With One-touch fitting	★	★	★

★ New variations

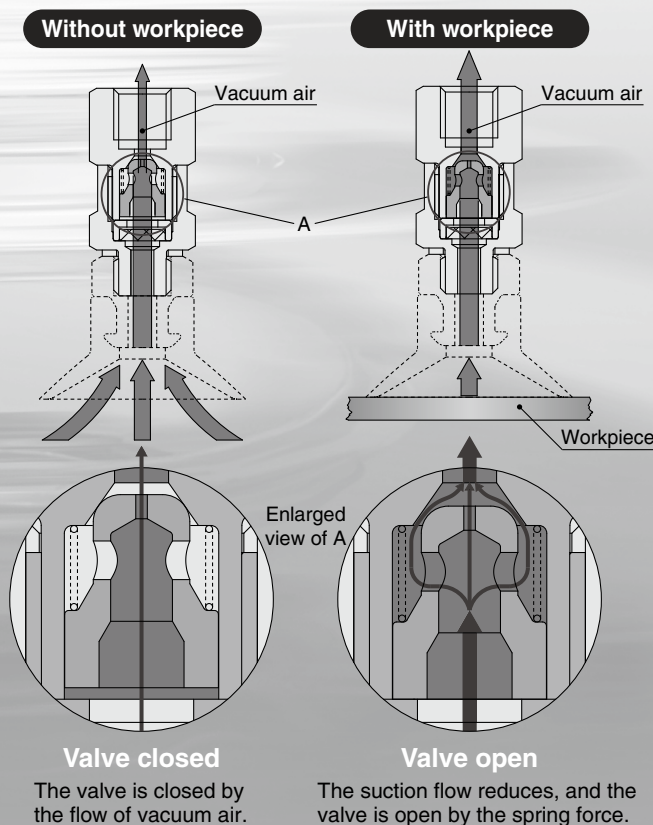
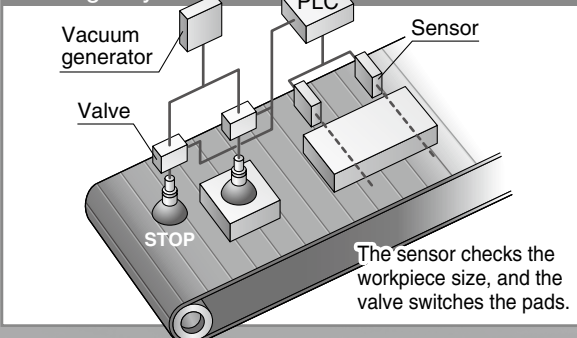
● A switching operation is not required when changing workpieces.

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

Use of ZP2V



Existing way



Made to Order

ZP2V

XT661

MHM

Precautions

ZP2V Series Model Selection

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)

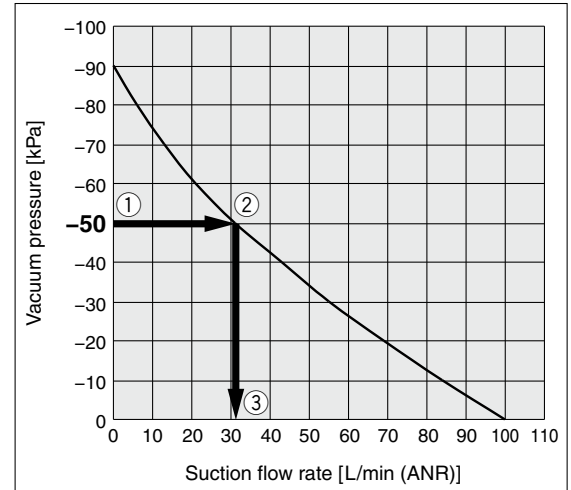
1 Check the flow rate characteristics of the vacuum generator used.

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 346, 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**

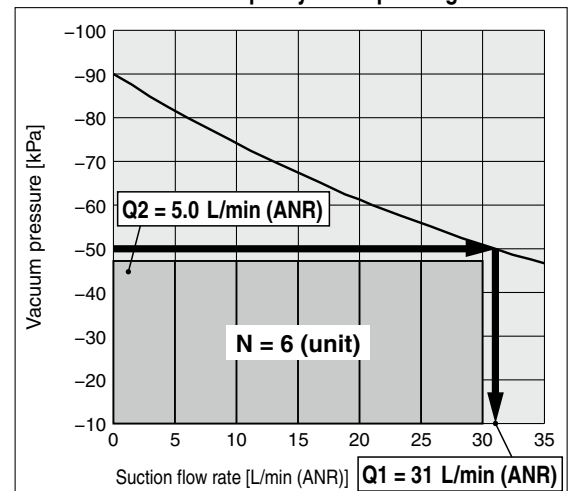
From **Table 1**, **Q2** can be calculated as **5.0 L/min (ANR)**.

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

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 346 is satisfied. A final decision on operating conditions should be made based on test results performed at the responsibility of the customer.

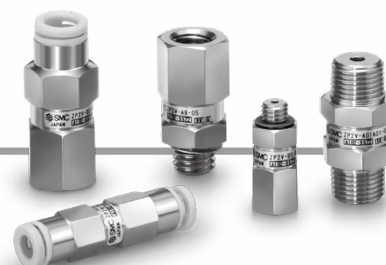
Vacuum Saving Valve

ZP2V Series

Model
Selection

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		○	○	○	—	 Male thread Pad side
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		○	○	○	—	 Female thread Pad side
B6	M6 x 1		○	○	○	—	
B01	Rc1/8	R1/8	—	○	○	○	
BG1	G1/8		—	○	○	○	
BN1	NPT1/8		—	○	○	○	

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		○	○	○	—	 Male thread Pad side
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		○	○	○	—	 Female thread Pad side
B01B01	Rc1/8		—	○	○	○	
BG1BG1	G1/8		—	○	○	○	

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	○	○	○	—	 Male thread Pad side
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	○	○	○	—	 Female thread Pad side
B01W6	Rc1/8	ø6	—	○	○	○	
BG1W6	G1/8	ø6	—	○	○	○	

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		○	○	○	—	 One-touch fitting Pad side
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 temperatures [°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

Made to Order

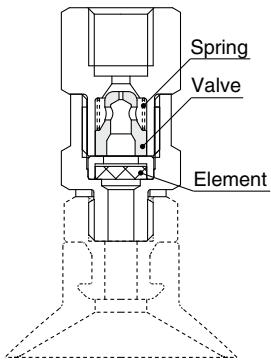
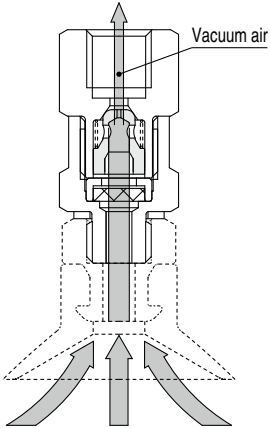
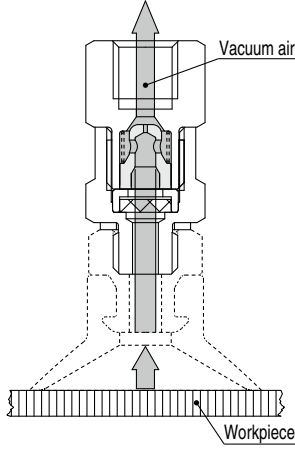
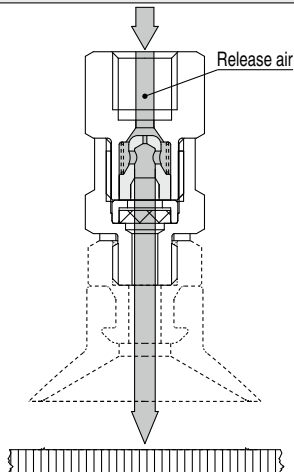
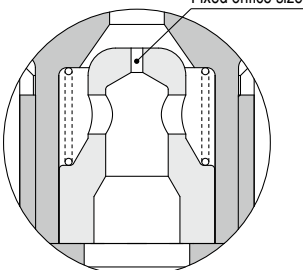
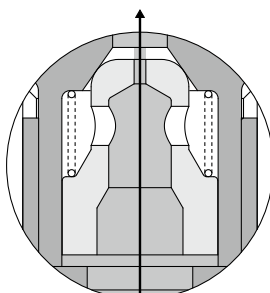
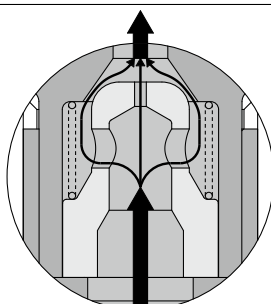
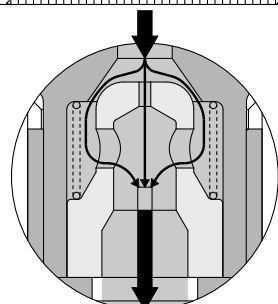
ZP2V

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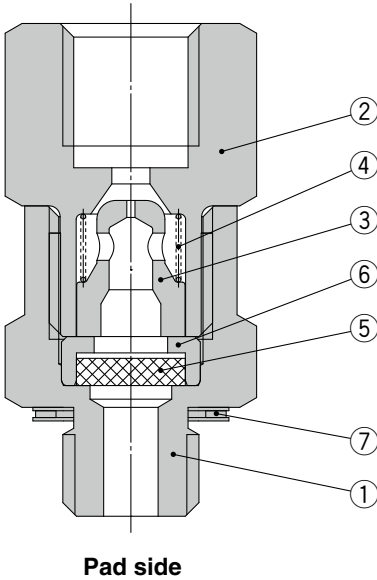
Precautions

Working Principle

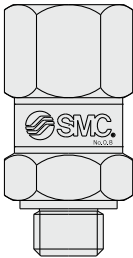
	Initial condition	When a workpiece is adsorbed		When a workpiece is released
		Without workpiece	With workpiece	
Air flow				
Valve operating condition	 <p>Since there is no air flow, the valve remains open by the spring force.</p>	 <p>Valve closed When the workpiece is separated from the vacuum pad, 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 When the workpiece is adsorbed 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 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

Vacuum generator side



Vacuum generator side



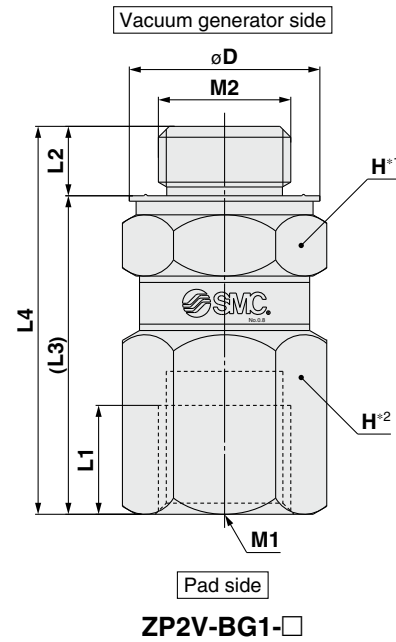
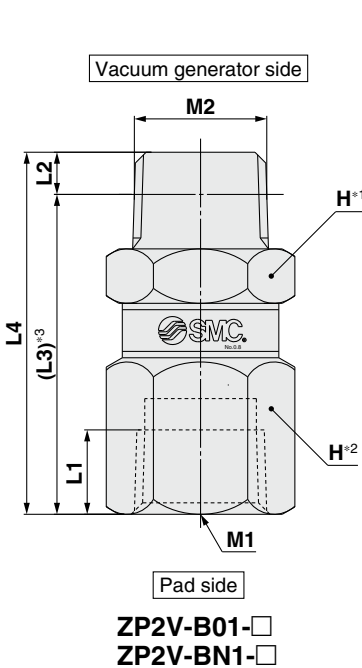
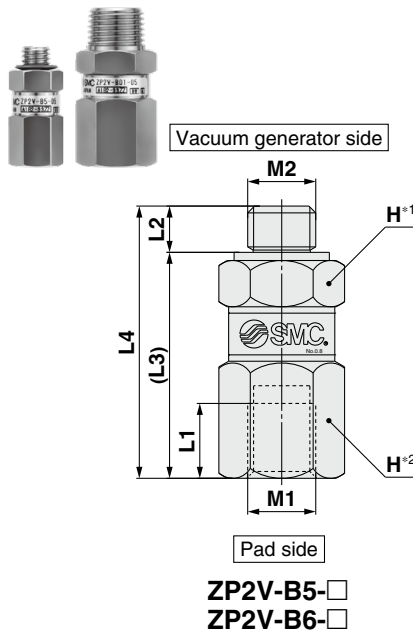
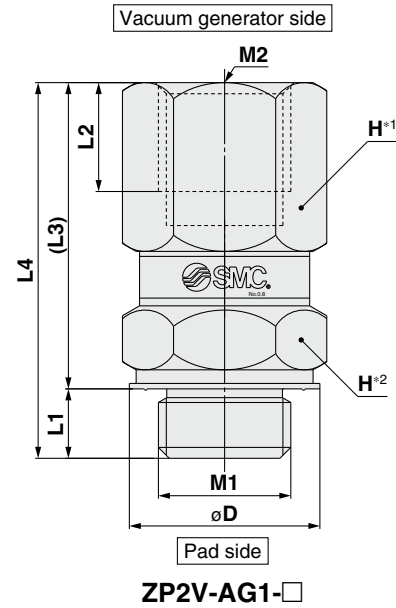
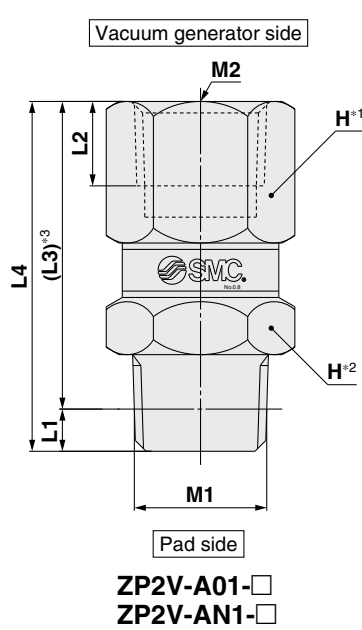
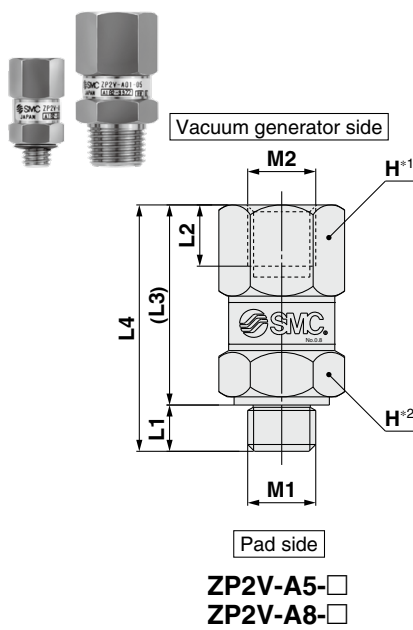
Pad side

* For the mounting direction of the product, refer to page 352.

Component Parts

No.	Description	Material
1	Body A	Brass (Electroless nickel plating)
2	Body B	Brass (Electroless nickel plating)
3	Valve	Synthetic resin
4	Spring	Stainless steel
5	Element	CAC403 equivalent
6	Ring	Aluminum alloy
7	Gasket	Stainless steel/NBR

Dimensions



*1 The place at the vacuum generator side where the tool is used

*2 The place at the pad side where the tool is used

*3 The reference dimension after the R or NPT thread is screwed

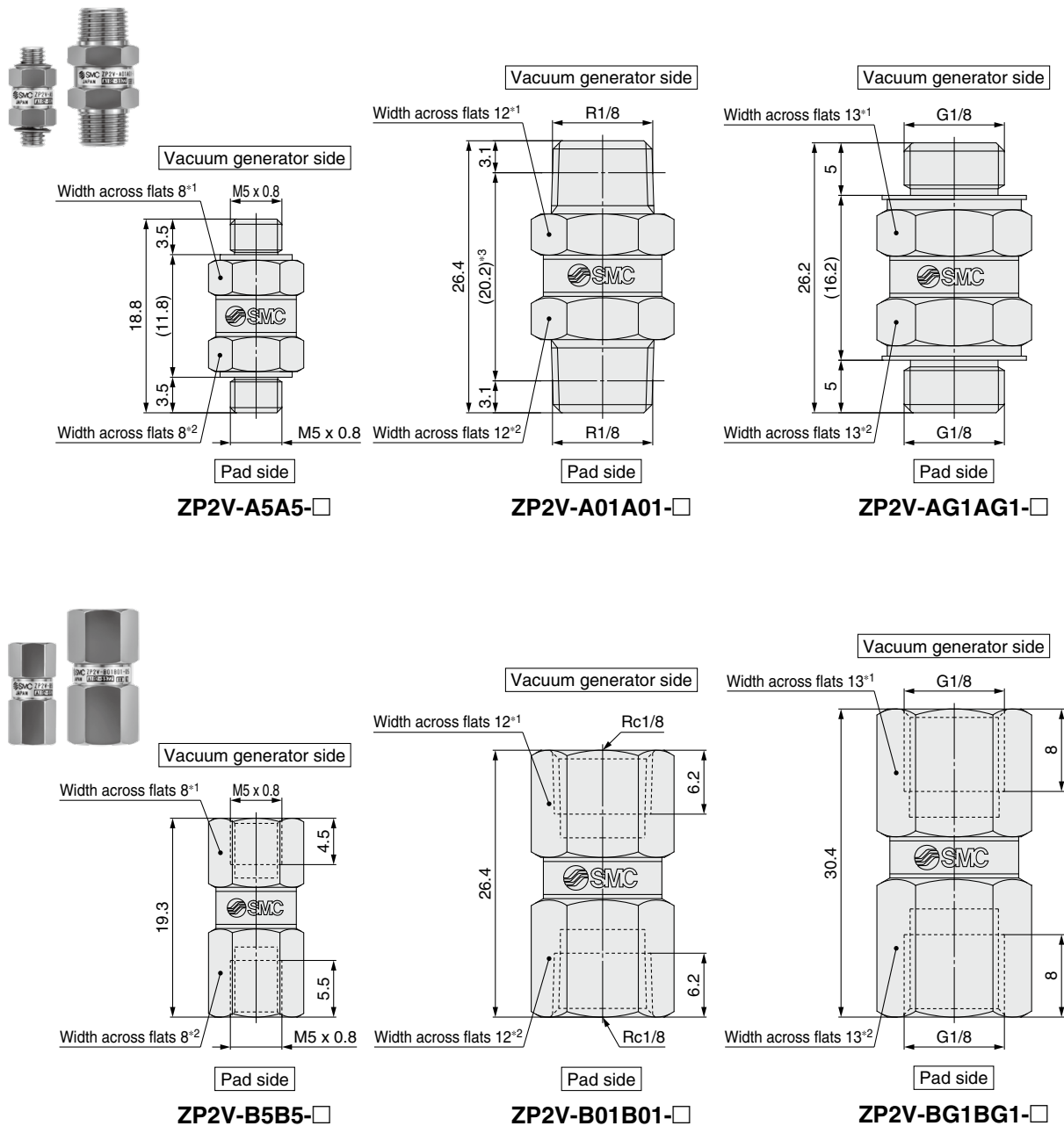
Model	M1	M2	L1	L2	L3	L4	H (Width across flats)	øD	W [g]	Tightening torque [N·m]*1
ZP2V-A5- □	M5 x 0.8	M5 x 0.8	3.5	4.5	14.6	18.1	8	—	6	1.0 to 1.5
ZP2V-A8- □	M8 x 1.25	M8 x 1.25	5.9	8	20.1	26	12	—	18	5.5 to 6.0
ZP2V-A01- □	R1/8	Rc1/8	3.1	6.2	22.6	25.7	12	—	18	7.0 to 9.0
ZP2V-AG1- □	G1/8	G1/8	5	8	22.6	27.6	13	14	23	5.5 to 6.0
ZP2V-AN1- □	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	3.5	16.5	20	8	—	7	1.0 to 1.5
ZP2V-B6- □	M6 x 1	M6 x 1	5	4.5	17	21.5	8	—	7	2.0 to 2.5
ZP2V-B01- □	Rc1/8	R1/8	6.2	3.1	24	27.1	12	—	19	7.0 to 9.0
ZP2V-BG1- □	G1/8	G1/8	8	5	24	29.0	13	14	24	5.5 to 6.0
ZP2V-BN1- □	NPT1/8	NPT1/8	6.9	3.2	24.7	27.9	12	—	19	7.0 to 9.0

*1 When mounting and/or removing the product, use a wrench or torque wrench in the place shown in the figures.

When mounting the product, tighten to the torque specified in the table.

Vacuum Saving Valve **ZP2V Series**

Dimensions

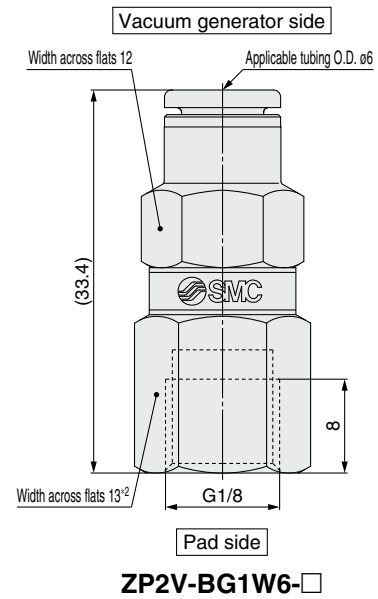
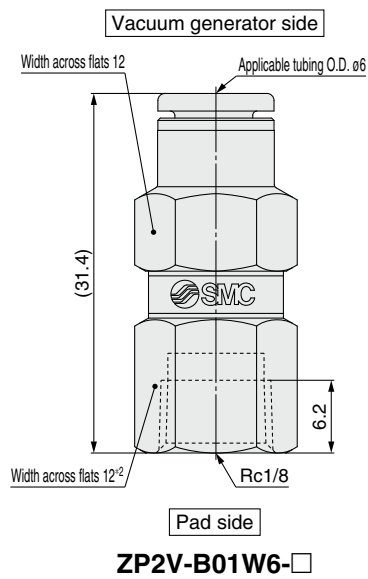
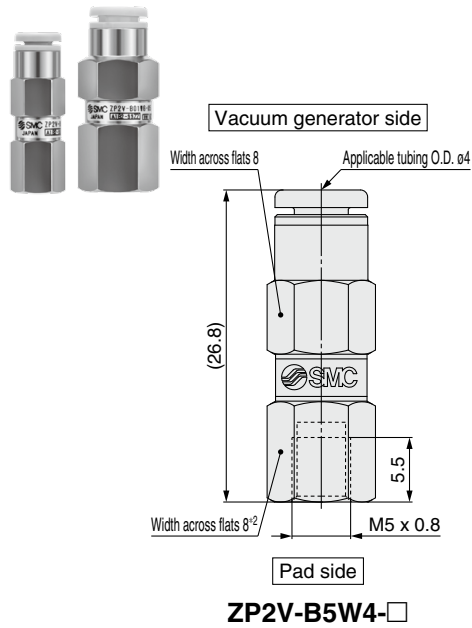
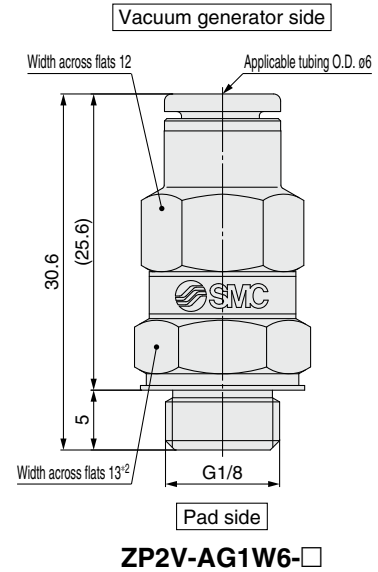
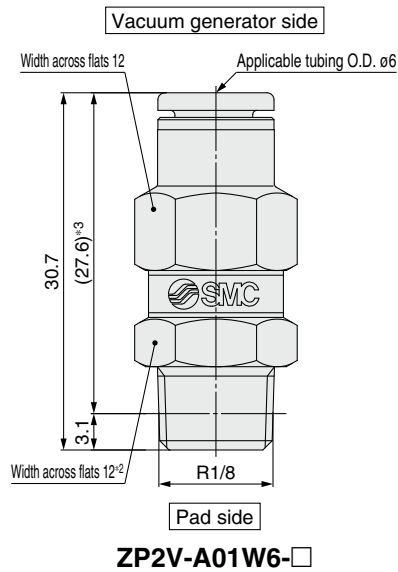
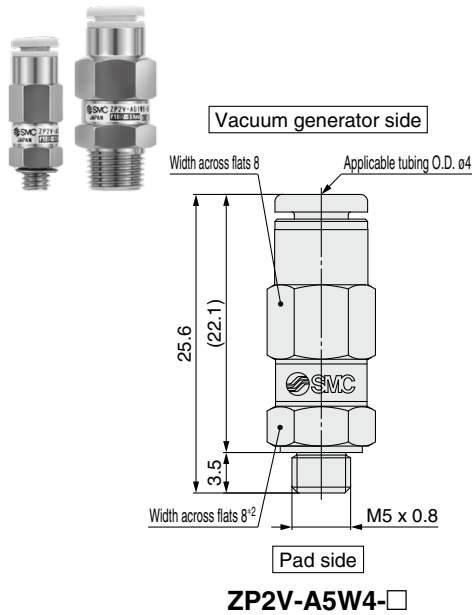


- *1 The place at the vacuum generator side where the tool is used
 *2 The place at the pad side where the tool is used
 *3 The reference dimension after the R thread is screwed

Model	Connection thread size		W [g]	Tightening torque [N·m] *1
	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

*1 When mounting and/or removing the product, use a wrench or torque wrench in the place shown in the figures.
 When mounting the product, tighten to the torque specified in the table.

Dimensions

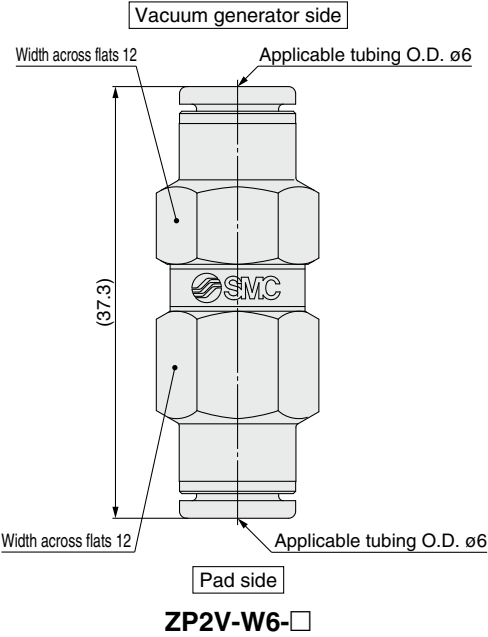
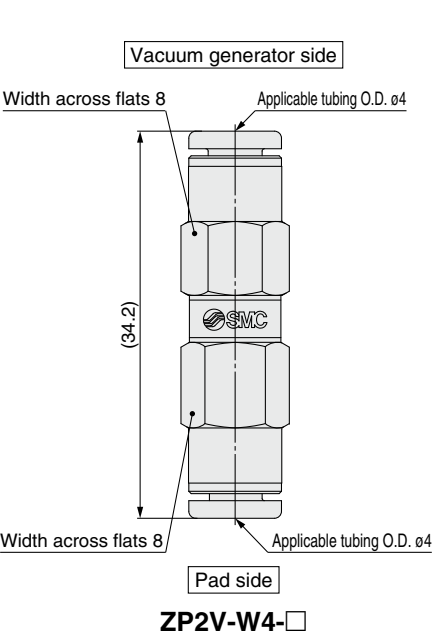


- *1 The place at the vacuum generator side where the tool is used
- *2 The place at the pad side where the tool is used
- *3 The reference dimension after the R thread is screwed

Model	Connection thread size		W [g]	Tightening torque [N·m] *1
	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

*1 When mounting and/or removing the product, use a wrench or torque wrench in the place shown in the figures.
When mounting the product, tighten to the torque specified in the table.

Dimensions



Model	Connection thread size		[mm]
	Pad side	Vacuum generator side	W [g]
ZP2V-W4-□	ø4	ø4	7
ZP2V-W6-□	ø6	ø6	19



ZP2V Series

Specific Product Precautions

Be sure to read this before handling the products.

For safety instructions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

Model
Selection

Made to Order

ZP2V

XT661

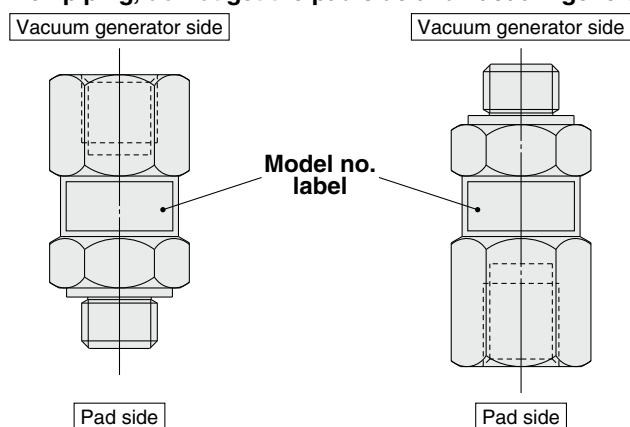
MHM

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, and keep the recommended pad diameter per product as shown in Table 1. Also, sufficiently check the operation with the actual equipment 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 has been disassembled and reassembled, it will no longer be able to satisfy the original specifications.
4. When piping, do not get the pad side and vacuum generator side of the product mixed up. (Refer to Fig. 1.)



Enlarged view of model number label



Flow indication symbol on body

Flow Indication Symbol on Body

Indication symbol	Symbol

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 tool in the specified places shown on pages 348 to 350. Also, when mounting the product, tighten to the specified torque shown on pages 348 to 350. Applying excessive torque or using a tool in places other than those specified can cause damage or decreased performance.

6. The reduction of vacuum pressure while the workpiece is adsorbed 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 actual equipment.

7. When the built-in element of the product gets clogged, replace the whole product.

8. When verifying the suction using a pressure sensor, etc., sufficiently check the operation with the actual equipment beforehand.

9. If there is leakage between the pad and a workpiece, for example, if the workpiece is permeable, fewer products can be used with one vacuum generator.

Take the leakage between the pad and workpiece into account and sufficiently check the operation with the actual equipment beforehand.

10. Any mounting direction is available for this product. (Vertical 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 346 is satisfied.

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

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

Precautions