# Vacuum Saving Valve

New

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!



Male th

generator

Without workpiece



Pad side

Female threa

With workpiece

Male threa



Mew 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 Vacuum Equipment Vacuum air Vacuum air Vacuum generator Vacuum saving valve ZP2V ZK2 The operation can 7P2 be switched simply. Only the ZP2V is ZP2V needed. Workpiece XT661 Existing way Enlarged iew of A Sensor Vacuum generator Valve Valve closed Valve open The sensor checks the workpiece size, and the The valve is closed by The suction flow reduces, valve switches the pads the flow of vacuum air. and the valve is open by the spring force.

# Series **ZP2V**



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## Series ZP2V 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  $(1 \rightarrow 2 \rightarrow 3)$  = Suction flow rate (Q1) ~ 31 L/min (ANR).





#### 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 1540, and calculate the number of vacuum saving valves (N) that can be used with one vacuum generator.

#### Number of vacuum saving valves (N) = <u> Suction flow rate of the vacuum generator (Q1)</u> <u> Minimum operating flow rate (Q2)</u>

 $\begin{array}{l} \mbox{Example} ) \mbox{Vacuum saving valve used: $ZP2V-A8-05$} \\ \mbox{From Table 1, Q2 can be calculated as 5.0 L/min (ANR).} \\ \mbox{N} = \frac{31\{L/min(ANR)\}}{5\{L/min(ANR)\}} \approx 6 \mbox{ (unit)} \end{array}$ 

#### 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



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 1540 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 Series ZP2V

How to Order



# ZP2V-A5-03

Connection size (Pad side/Vacuum generator side) -Male thread/Female thread

Cumhal	Pad side	Pad side Vacuum generator side			ed orific	ce size	
Symbol	Male thread Female thread		0.3	0.5	0.7	1.0	Female thread
A5	M5	0	0	0	—		
A8	M8	—	0	0	0		
A01	R1/8 Rc1/8		—	0	0	0	
AG1	G1/8		—	0	0	0	Male thread
AN1	NF	—	0	0	0	Fau Side	

#### Female thread/Male thread

Cumhal	Pad side	Pad side Vacuum generator side			ed orific	ce size	Vacuum generator side
Symbol	Female thread	Male thread	0.3	0.5	0.7	1.0	Male thread
B5	M5	0	0	0	—	L A	
B6	M	0	0	0	—		
B01	Rc1/8 R1/8		—	0	0	0	
BG1	G	—	0	0	0	Female thread	
BN1	NP	'T1/8	—	0	0	0	Pad side

#### Male thread/Male thread

Symbol	Pad side Vacuum generator side		Applic	able fix	ed orific	ce size	Vacuum generator side Male thread
	Male thread	Male thread	0.3	0.5	0.7	1.0	
A5A5	M5	0	0	0	—		
A01A01	R1/8		—	0	0	0	Male thread
AG1AG1	G1/8			0	0	0	Fau side

#### Female thread/Female thread

Symbol	Pad side Vacuum generator side		Applic	able fix	ed orific	ce size	Vacuum generator side Female thread
	Female thread	Female thread	0.3	0.5	0.7	1.0	
B5B5	M5	0	0	0	—		
B01B01	R	—	0	0	0	Female thread	
BG1BG1	G	_	0	0	0	r au siue	

#### Fixed orifice size

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

#### Male thread/One-touch fitting

Symbol	Pad side Vacuum generator side		Applic	able fix	ed orific	ce 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	0	0	0	—	
A01W6	R1/8	ø6	-	0	0	0	Male thread
AG1W6	G1/8	ø6	_	0	0	0	Pad side

#### Female thread/One-touch fitting

Symbol	Pad side	Vacuum generator side	Applic	able fix	ed orific	ce size	Vacuum generator side One-touch fitting	ے تے
Symbol	Female thread	One-touch fitting	0.3	0.5	0.7	1.0		acuun
B5W4	M5 x 0.8	ø4	0	0	0	_		ੇ ਦੋ
B01W6	Rc1/8	ø6	—	0	0	0	Female thread	_
BG1W6	G1/8	ø6	—	0	0	0	Pad side	
<b>.</b>								ZK2

#### One-touch fitting/One-touch fitting

	_		_					
	Pad side	Vacuum generator side	Applic	able fix	ed orific	ce size	Vacuum generator side One-touch fitting	ZP2
Symbol	One-touch	One-touch	0.3	0.5	0.7	1.0		ZP2V
W4	ø4		0	0	0	-	Ē	XT661
W6	ø6		-	0	0	0	One-touch fitting Pad side	

#### Specifications

Connectio	on size for pad side		M5, M6, ø4		M8, R1/8, Rc1/8, G1/8, NPT1/8, ø6				
Fixed orifi	ice size (mm)	0.3	0.5	0.7	0.5	0.7	1.0		
Effective	When the valve is operating (mm <sup>2</sup> )	0.07	0.19	0.38	0.19	0.38	0.78		
area	When the valve is not operating (mm <sup>2</sup> )	1.64	1.76	1.95	1.76	2.64	3.04		
Fluid		Air							
Max. operati	ng pressure range (MPa)			0 to	0.7				
Max. operati	ng vacuum pressure range (kPa)			0 to -	-100				
Ambient a	and fluid temperature (°C)			5 to 60 (N	o freezing)				
Element no	ominal filtration rating (μm)	40							
Min. opera	ting flow rate (L/min (ANR))	3 5 8 5 8 16							

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## Series **ZP2V**

#### **Working Principle**



#### Construction





**SMC** 

#### Vacuum generator side



Pad side

\* For the mounting direction of the product, refer to page 1546.

#### **Component Parts**

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



Model	M1	M2	L1	L2	L3	L4	H (Width across flat)	øD	<b>W</b> (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-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	3.4	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-BN1-	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. INDEX

### Series ZP2V

#### 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 thread is screwed.

				(mm)	
Model	Connection	thread size	w	Tightening torque	
Widder	Pad side	Vacuum generator side	(g)	(N-m) Note)	
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.

**SMC** 

#### 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 thread is screwed.

				(mm)
Model	Connection	thread size	W	Tightening torque
	Pad side	Vacuum generator side	(g)	(N-m) Note)
ZP2V-A5W4-	M5 x 0.8	ø4	6	1.0 to 1.5
ZP2V-A01W6-	R1/8	ø6	18	7.0 to 9.0
ZP2V-AG1W6-	G1/8	ø6	20	5.5 to 6.0
ZP2V-B5W4-	M5 x 0.8	ø4	7	1.0 to 1.5
ZP2V-B01W6-	Rc1/8	ø6	17	7.0 to 9.0
ZP2V-BG1W6-	G1/8	ø6	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.

## Series ZP2V

#### Dimensions

![](_page_7_Picture_2.jpeg)

![](_page_7_Figure_3.jpeg)

				(mm)
Model	Connection	thread size	W	Tightening torque
	Pad side	Vacuum generator side	(g)	(N-m) Note)
ZP2V-W4-	ø4	ø4	7	_
ZP2V-W6-	ø6	ø6	19	—

![](_page_8_Picture_0.jpeg)

### Series ZP2V Specific Product Precautions

Be sure to read this before handling. Refer to page 1574 for Safety Instructions. For Vacuum Equipment Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com

- 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	М	15	—	M8	R1/8	Rc1/8	G	/8	NP	T1/8	_
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.)

![](_page_8_Figure_9.jpeg)

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 1542 to 1544 to apply tools. Also, when mounting the product, tighten to the specified torque shown in pages 1542 to 1544. 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.
- 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 1540 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.

![](_page_8_Figure_22.jpeg)

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