Maintains vacuum on workpieces in separate circuits even if one workpiece detaches
Drop Prevention Valve

VSECV Series

●Connection Port Size: M3, M4, M5, M6, M10, R1/8

RoHS

■When two or more pads are used, pads that suction normally reduce the vacuum decline even if other pads are not suctioning. Thus, they prevent the normally suctioned workpiece from falling.

Model No. Notation

●Drop Prevention Valve

VSECV - M4

Model No. / ❶ Connection Thread Size

❶ Connection Thread Size

Code	Content
M3	M3x0.5
M4	M4x0.7
M5	M5x0.8
M6	M6x1
M10	M10x1.5
6A	R1/8, Rc1/8

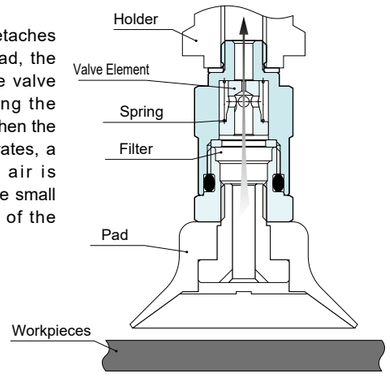
Specifications

Item			VSECV
Operating Fluid			Air
Operating Pressure	Positive Pressure	MPa	0 to 0.7
	Negative Pressure	kPa	-100 to 0
Operating Temperature °C			0 to 60

Drop Prevention Valve Operation Explanation

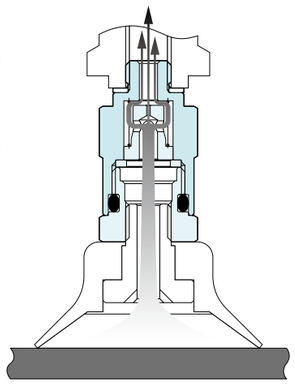
●Position locking valve operational status

If the workpiece detaches from the suction pad, the air flow pushes the valve element up, closing the suction passage. When the valve element operates, a small amount of air is drawn in through the small hole in the center of the valve element.



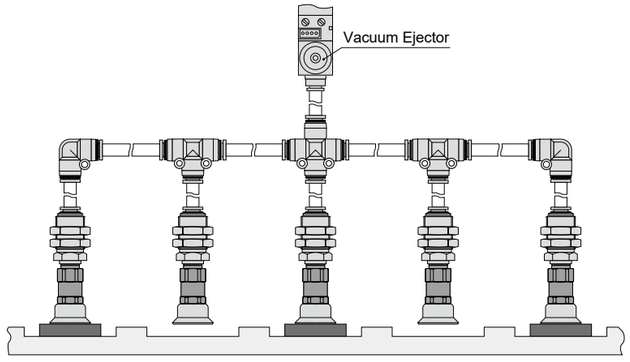
●Workpiece suction status

When the workpiece adheres closely to the suction pad, the vacuum suction flow rate decreases, and the valve element is pushed down by spring force, opening the suction passage between the valve element and the main body.



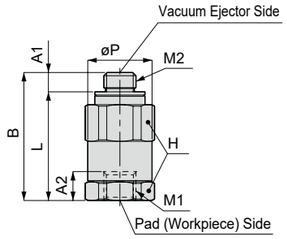
Piping Example

■ When using multiple vacuum pads with one vacuum ejector or vacuum pump, if a workpiece detaches from a pad or a pad is not contacting a workpiece within an acceptable number range, the suction at that location is automatically reduced. This mitigates vacuum reduction in the overall system, preventing issues such as handling operations stopping. When adopting this system, determine the number of pads that can be detached without causing problems during transport. Also, if the number of detached pads hinders transport, ensure the system issues an NG judgment and incorporates safety measures.

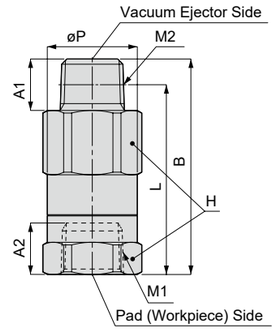


External Dimension Drawings

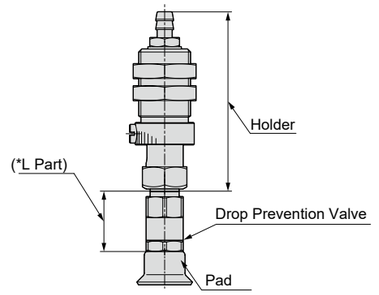
Drop Prevention Valve Mounting Example



For Metric Threads



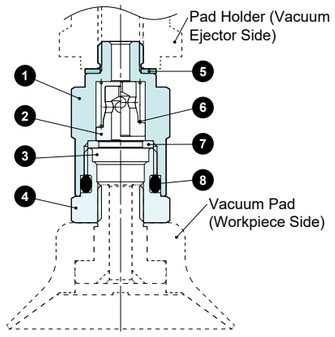
For Tapered Pipe Threads



Note: When selecting the option with a drop prevention valve for the suction pad product model No., the total length of the pad will be the dimension obtained by adding *L from the dimension table below.

Model No.	M1	M2	A1	A2	B	*L	øP	Width across flats H	Valve Element Minimum Operating Suction Flow Rate (L/min (ANR))	Suction Flow Rate After Valve Element Operation (L/min (ANR))	Effective Area (mm²) Free Flow	Weight (g)
VSECV-M3	M3x0.5	M3x0.5	2.5	4.5	18.4	15.9	8	8	2	1.3	0.7	4.9
VSECV-M4	M4x0.7	M4x0.7	2.9	4.5	19.9	17	10	10	5	1.3	1.6	7.9
VSECV-M5	M5x0.8	M5x0.8	3	4.5	19.9	16.9	10	10	5	1.3	1.6	6.6
VSECV-M6	M6x1	M6x1	4	5	28.1	24.1	12	12	13	1.3	4.0	13
VSECV-M10	M10x1.5	M10x1.5	7.5	10	40	32.5	14	14	13	1.3	4.8	11
VSECV-6A	Rc1/8	R1/8	8	8	33.5	29.5	14	14	13	1.3	4.8	10

Internal Structure Diagram



Part No.	Part Name	Material				
		VSECV-M3	VSECV-M4	VSECV-M5	VSECV-M6	VSECV-M10 VSECV-6A
1	Metal Body A	Stainless Steel		Brass, Electroless nickel plating		Aluminum Alloy, Electroless Nickel Plating
2	Valve Element	Aluminum alloy				
3	Filter	Polyvinyl formal				
4	Metal Body B	Brass, Electroless nickel plating			Aluminum Alloy, Electroless Nickel Plating	
5	Gasket	Stainless Steel + Nitrile Rubber				
6	Spring	Stainless Steel				
7	Stopper	Brass, Electroless nickel plating				
8	O-ring	Nitrile rubber				

Applicable Pad List

Model No.	Pad Shape	Pad Size (mm)	Holder Shape					
			VSP-A	VSP-B	VSP-C	VSP-D	VSP-E	VSP-F
			VSP-MA	VSP-MB	VSP-MC	VSP-MD	VSP-ME	-
			-	-	VSP-LFC	VSP-LFD	-	-
			-	VSP-HE*	VSP-HC	VSP-HD*	-	-
VSECV-M3	Standard Type	ø0.7, ø1, ø1.5, ø2, ø3, ø4	-				○	-
	Bellows Type	ø2, ø4	-				○	-
VSECV-M4	Standard Type	ø10, ø15	○				-	○
	Bellows Type	ø10, ø15	○				-	○
	Multi-stage Bellows Type	ø10	○				-	○
	Soft Type	ø4, ø6, ø8, ø10, ø15	○				-	○
	Soft Bellows Type	ø6, ø8, ø10, ø15	○				-	○
	Anti-slip Type	ø10	○				-	○
	Flat Type	ø10, ø15	○				-	○
	Suction Mark Prevention Type	ø10	○				-	○
	For Metal Detectors Type	ø10, ø15	○				-	○
VSECV-M5	Standard Type	ø6, ø8	-				○	-
	Bellows Type	ø6, ø8	-				○	-
	For Thin Objects Type	ø8, ø10, ø15, ø20	-				○	-
VSECV-M6	Standard Type	ø20, ø25, ø30, ø40, ø50	○				-	○
	Sponge-type	ø10, ø15, ø20, ø25, ø30, ø35, ø50	○				-	○
	Bellows Type	ø20, ø25, ø30, ø40, ø50	○				-	○
	Multi-stage Bellows Type	ø20, ø30, ø40, ø50	○				-	○
	Oval-type	2x4 to 8x30	○				-	○
	Soft Type	ø20, ø30, ø40	○				-	○
	Soft Bellows Type	ø20	○				-	○
	Anti-slip Type	ø20, ø30, ø40, ø50	○				-	○
	Flat Type	ø20, ø25, ø30	○				-	○
	Suction Mark Prevention Type	ø20, ø30	○				-	○
	For Metal Detectors Type	ø20	○				-	○
VSECV-M10	Standard Type	ø60, ø80, ø100	○				-	-
	Sponge-type	ø70, ø100	○				-	-
	Bellows Type	ø60, ø80, ø100	○				-	-

MEMO

Selection Method

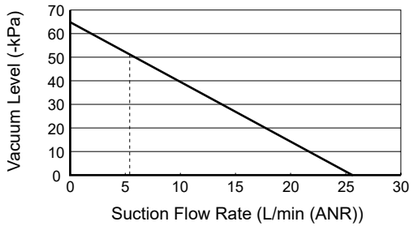
Determine the maximum number of drop prevention valves that can be mounted on one vacuum generator based on the valve element minimum operating suction flow rate in the table below and the example graph.

Item	VSECV-M3	VSECV-M4	VSECV-M5	VSECV-M6	VSECV-M10	VSECV-6A
Valve Element Minimum Operating Suction Flow Rate L/min (ANR)	2.0	5.0	5.0	13.0	13.0	13.0
Vacuum Reduction Amount during Non-Suction kPa	2.0	2.0	2.0	2.0	2.0	2.0

Example 1.
VSJ-L07...(Catalog Data)

Ultimate Vacuum Level (-kPa)	Suction Flow Rate (L/min (ANR))
66.5	26

Referring to the completed diagram on the right based on catalog data, the-type and maximum usable quantity of drop prevention valves can be determined from the valve element minimum operating suction flow rate table above.



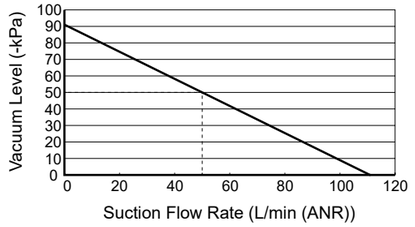
■When using at vacuum degree of -50 kPa

Since the intake flow rate is about 6 L/min (ANR), operable position locking valve model No.: VSECV-M3, VSECV-M4, and VSECV-M5 are required.
No. of valves used and non-suctioned locations for VSECV-M3: 3 units,
No. of valves used and non-suctioned locations for VSECV-M4, VSECV-M5: It is required to allow up to 1 unit.

Example 2. VSQ-H2O
(Catalog Data)

Ultimate Vacuum Level (-kPa)	Suction Flow Rate (L/min (ANR))
93	110

Referring to the completed diagram on the right based on catalog data, the-type and maximum usable quantity of drop prevention valves can be determined from the valve element minimum operating suction flow rate table above.



■When using at vacuum degree of -50 kPa

Since the intake flow rate is about 52 L/min (ANR), operable position locking valve model No.: VSECV-M3, VSECV-M4, VSECV-M5 VSECV-M6, VSECV-M10, and VSECV-6A are required.
No. of valves used and non-suctioned locations for VSECV-M3: No. of valves used and non-suctioned locations for 21 units (*1), VSECV-M4, and VSECV-M5: No. of valves used and non-suctioned locations for 10 units, VSECV-M6, VSECV-M10, and VSECV-6A: Up to 4 units must be allowed.

*1: VSECV-M3 is calculated by suction flow rate alone, theoretical: 2 kPa Up to 25 units can be supported. However, considering that all 25 units are not suctioned, the degree of vacuum is: -93 +(2 x 25) = -43 kPa. Therefore, when using -50 kPa: -93 +(2xx) ≤ -50 x≤21.5 ∴ Max. non-suctioned area: That's 21 units.

Pneumatic Components

To Use This Product Safely

Be sure to read this before use.
For general pneumatic components precautions, Intro 15 for details.

Individual Precautions: Drop Prevention Valve VSECV Series

Selection / Design Notes

Warning

■Since it is not a Check Valves, vacuum is not held unless there is a hold function on the vacuum source side. Do not use for the purpose of vacuum holding.

■The design allows multiple suction pads to be mounted on a single ejector, but before using the product, confirm the performance with an actual device.

■When using a sponge pad, if the valving element is operated under conditions where leakage exceeding the valving element operating intake flow rate occurs, the workpiece may fall.

Caution

■Precautions for body mounting and removal
①Use appropriate tools for mounting and removing the product.
②During mounting, tighten by referring to the recommended tightening torque for each thread size (table below).

Recommended Tightening Torque

Thread Size	Tightening Torque
M3x0.5	0.5 N·m
M4x0.7	1.0 to 1.2 N·m
M5x0.8	1.0 to 1.5 N·m
M6x1	1.5 to 2.0 N·m
M10x1	5.0 to 7.0 N·m
R1/8, Rc1/8	4.5 to 6.5 N·m

■Precautions for body screw tightening position
①When mounting the male thread side of the drop prevention valve to equipment or a holder, use the hexagonal width across flats on the male thread side for tightening and confirm there is no looseness. Also, tighten by referring to the recommended tightening torque in the table above.
②When mounting equipment or a pad to the female thread side of the drop prevention valve, use the hexagonal width across flats on the female thread side for tightening and confirm there is no looseness. Also, tighten by referring to the recommended tightening torque in the table above.
③Regarding body part screw tightening during element replacement, also tighten by referring to the recommended tightening torque in the table above.

■Since the pressure drop of this product is very small even when the workpiece is not being suctioned, when checking suction in a pressure sensor, etc., be sure to thoroughly confirm with actual devices before use. Also, clogging of the filter element further minimizes the pressure drop during workpiece non-suction, so exercise sufficient caution when configuring pressure sensors, etc.